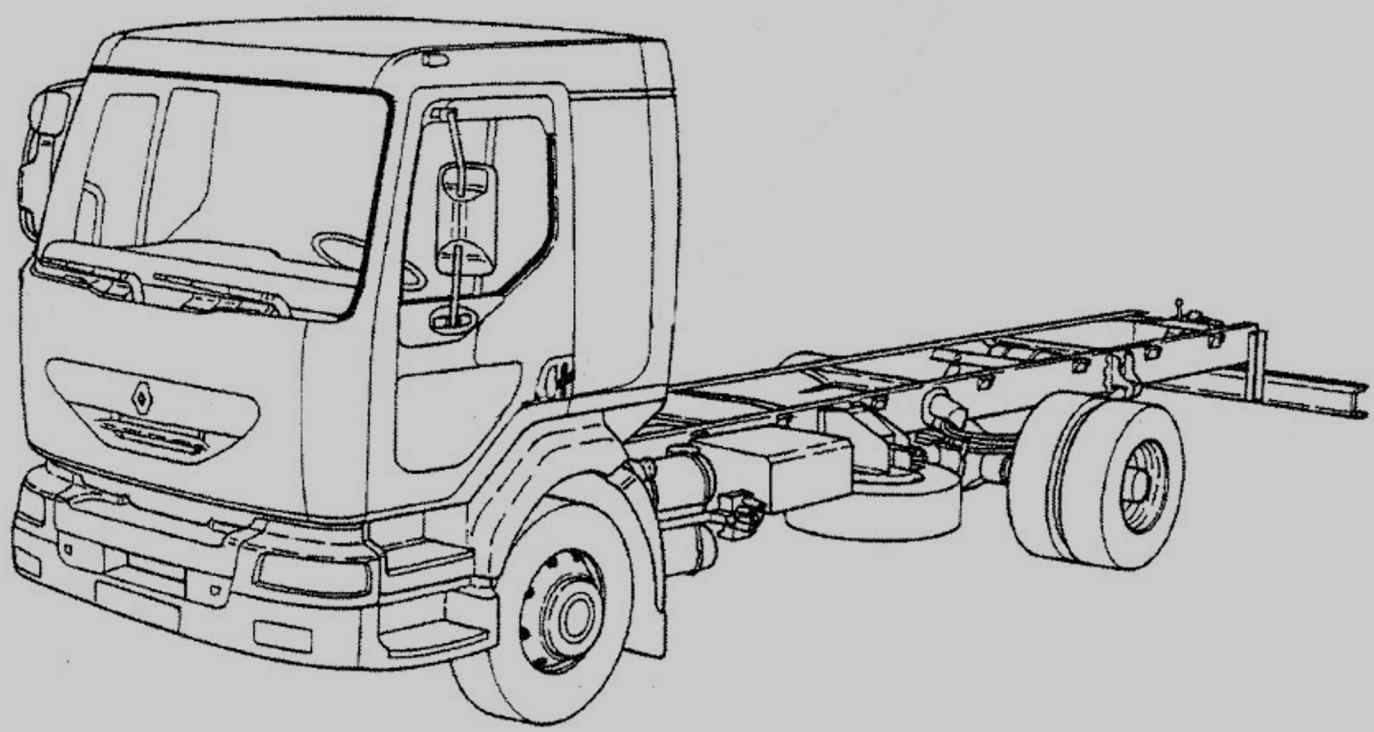
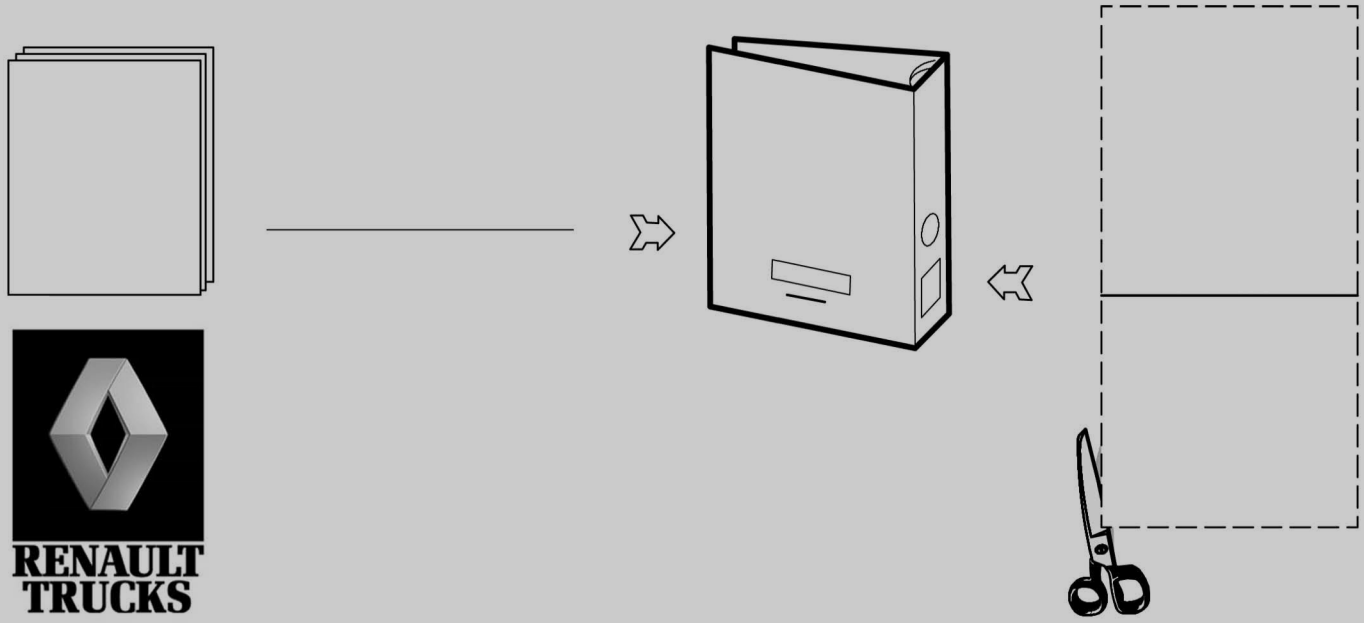
MIDLUM Series





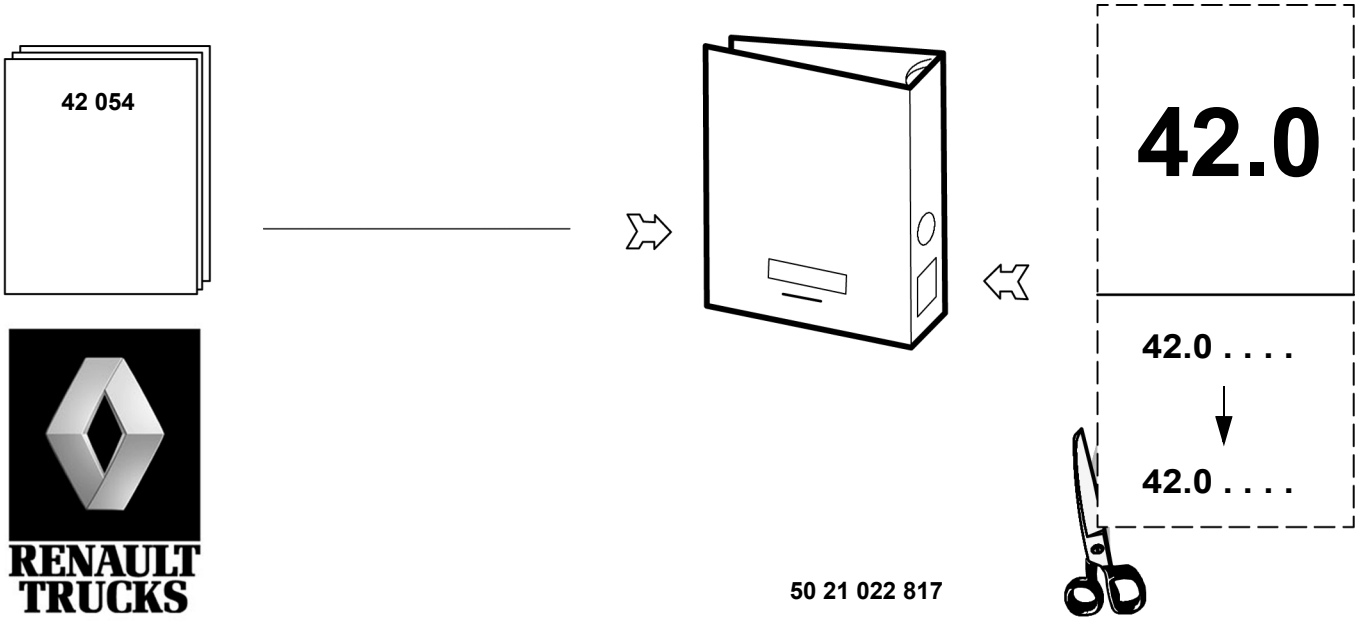
RENAULT TRUCKS

42 054 - GB - 01/2005

ADJUSTMENTS TO AXLES / DRIVE AXLES

RANGE	FAMILY	VARIANT
RENAULT KERAX	-	13102/03
RENAULT MAGNUM		12919/23
RENAULT MAGNUM DXi 12 440 - 480	17RD	-
	17SD	
	17TD	
RENAULT MASCOTT dCi	-	12911/13/15
RENAULT MIDLUM 12 -16 t Euro 2		13102/03
RENAULT MIDLUM 12-16 t Euro 3		
RENAULT MIDLUM 16-18 t		
RENAULT MIDLUM 4x4	47XA	
	47XC	
RENAULT MIDLUM 7-12 t	-	
RENAULT PREMIUM		

The above information may change in the course of time. Only the "Consult" section of the workshop manuals repertory in standard N° 10320 serves as reference.



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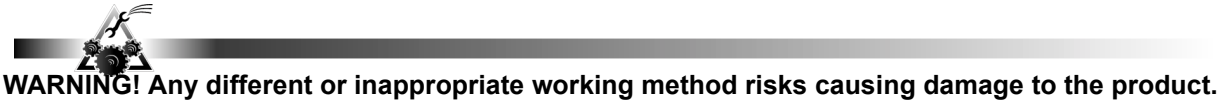
GENERALITIES

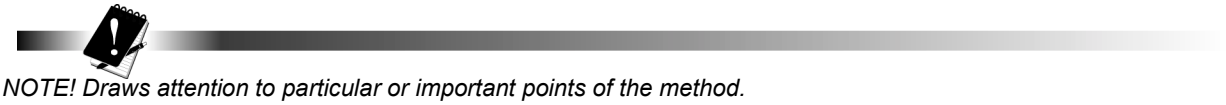
Warnings

In this document, safety instructions are symbolized as follows:

DANGER! NON-OBSERVANCE OF THE PROCEDURE DESCRIBED OR LACK OF CARE OR ATTENTION, RISK CAUSING SERIOUS INJURY OR EVEN DEATH.



WARNING! Any different or inappropriate working method risks causing damage to the product.



NOTE! Draws attention to particular or important points of the method.

Comply without fail with the regulations in force relative to the recovery and treatment of used parts and waste.

Identification

MASCOTT		
Family	**Variant**	**Unit**
52 A / 54 A / 54 B		E 22 AB

MIDLUM		
Family	**Variant**	**Unit**
44 C1	168BW	E 42 BC
44 V	168CL	E 42 BD
42 B1 / B2 / B3 / B4	168BV	E 46 AB
43 C2	168CG	E 62 AD
44 C2 / 44 T / 44 V	168CG	E 62 AD
43 E1 / 43 E2 / 45 D2 / 45 E2	168BY	E 63 BC
45 D3	168CH	E 72 AB
47 XA	168CI	PA 610
47 XC	168CJ	PA 611

PREMIUM		
Family	**Variant**	**Unit**
22 C / AA / AB	168BM	E 81 NO
22 AA / AB / QQ	168BE	E 81 EO
22 C / CC	168BL	E 81 NQ
22 C / CC / AA / AB / JJ / RR	168BF	E 82 CN
22 AA / AB / EE / HA / HB / QQ	168BG	E 82 JN
22 AA / AB		E 86 LR
22 EE	168BS	E 81 NS
22 HA / HB	168CC	E 81 B
22 QQ	16906	AUSTERAS

KERAX		
Family	**Variant**	**Unit**
33 G / H / K / L / P / Q / GG / HH / II / PP / QQ	168CF	E 83 OL
33 G / H / P / GG / HH / II / KK / LL / PP / QQ	168AL	E 83 KL
33 A / AA / BB / CC / DD	168CS	E 83 OP
33 A / AA / BB / CC / DD	168BO	E 83 ML
33 A / AA / BB / CC / DD	168CT	E 83 PM
33 A / AA / BB / CC / DD	168BZ	E 83 OM
33 M / N / R / MM / NN / RR / SS	168BH	PA 941
33 M / N / R / MM / NN / RR / SS	168AN	PA 945

MAGNUM		
Family	**Variant**	**Unit**
11 E	16839	E 81 AC
11 F / H	16845	E 81 EC
11 F	168AX	E 81 EP
11 F	16906	AUSTERAS

MAGNUM DXI		
Family	**Variant**	**Unit**
17 TD		FA 71 A
17 TD		FA 81 A
17 RD / SD		FA 71 B
17 RD / SD		FA 81 B
17 TD		E 81 PNG

Generalities

Preliminary checks
Before carrying out any work, proceed with the following checks:
- Condition and pressure of tyres.
- Condition and height of suspension.
- Efficiency of shock absorbers.
- Play of front axle wheel hub bearings, swivel pins and joints.

With the front wheels in the "straight ahead" position, check the wheel alignment.
Check that the steering is in the "mid-point" position. For power-assisted steering systems, make sure there is no hydraulic pressure when the steering is in the "mid-point" position.
Carry out a road test after making adjustments found to be necessary during the above checks. If necessary, check the front axle geometry angles.

Inspection conditions:
- Vehicle unladen and in running order.
- Cab in "road" position (for vehicles with tilt cab).
- Vehicle on flat ground, steering axle wheels on pivoting plates.
- Vehicle equipped with lift-up axle: the axle must be lowered.
- Front axle geometry checking apparatus.

Adjusting the mechanical steering lock stops
With the wheel alignment adjusted, screw the steering lock stops fully home.
Turn the steering wheel carefully to the right until the required steering lock angle is obtained, without exceeding the angle so as not to maladjust the hydraulic lockover limitation stops on the steering box.
Unscrew the mechanical steering lock stop in question until contact is made with the axle stop shoulder. Tighten the locknut (depending on the assembly).
Turn the steering wheel to the left and adjust the other steering lock stop in the same way.
Check that the tyres do not enter into contact with the chassis mechanical elements.

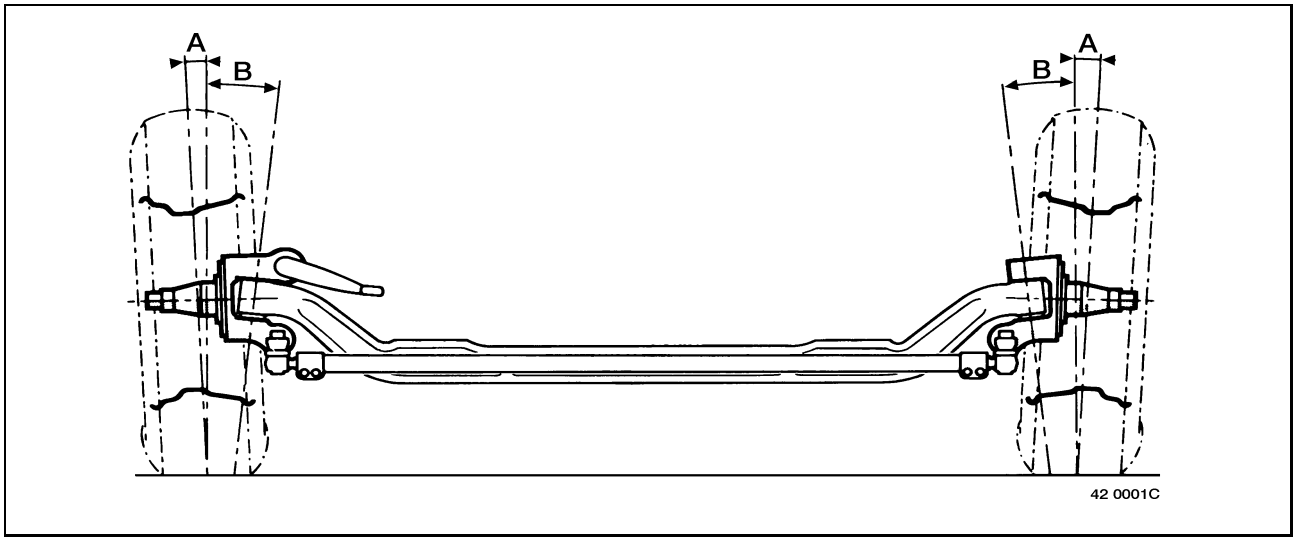
Steering box with automatic adjustment hydraulic stops: Do not manoeuvre the steering box when its mechanical deflection is not limited (risk of maladjustment of hydraulic stops).

E1 - First axle
E2 - Second axle (in front of drive axle)
E3 - Third axle (behind drive axle)

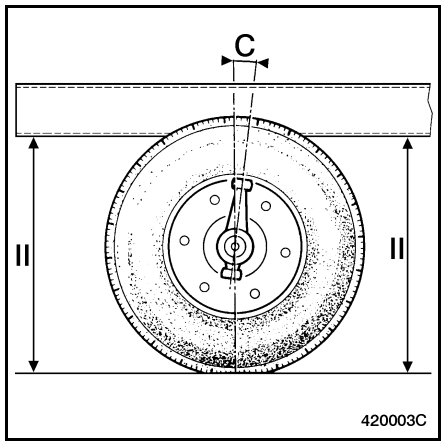
Inspection

The angles are given in degrees (°) and minutes (') with a tolerance of ± 30'.
The load is given in kilograms (kg). The zero (0) corresponds to the vehicle unladen and in running order.

A - Camber angle
B - Kingpin angle

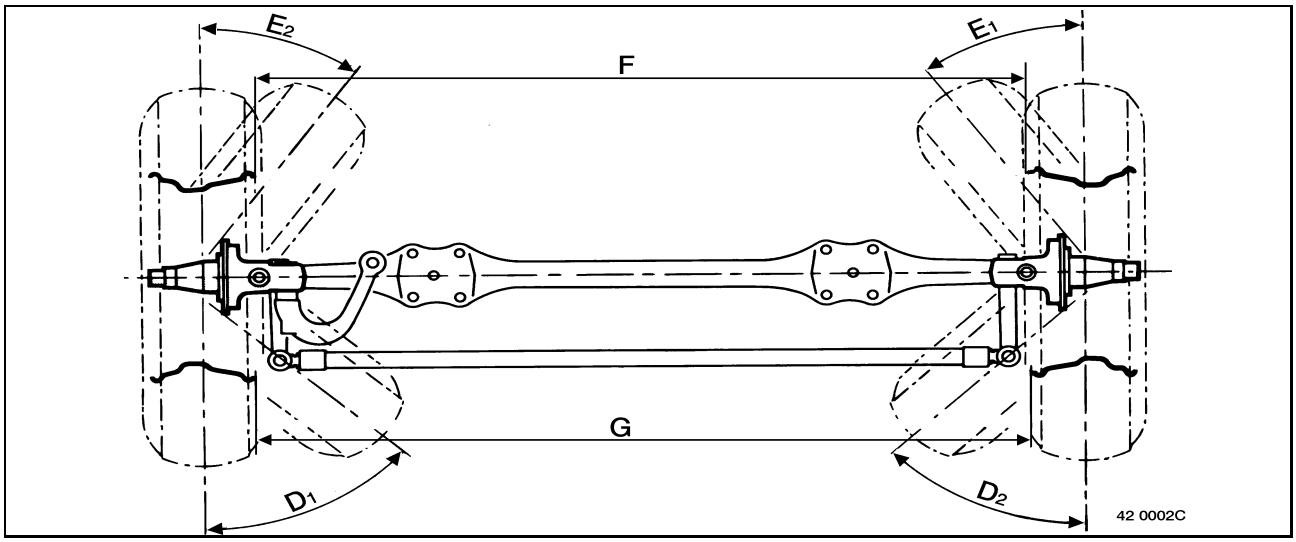


C - Caster angle



Inspection

D / E - Turning angle
Inner wheel
D^1 - Turning angle (to the left)
D^2 - Turning angle (to the right)
Outer wheel
E^1 - Turning angle (to the left)
E^2 - Turning angle (to the right)



Wheel alignment (toe-in) **(F → G) mm/m ± 0.44 mm/m**
Wheel alignment (toe-in) **+ (F < G)**
Wheel alignment (toe-out) **- (F > G)**

INSPECTION

MASCOTT

AXLE		WHEEL BASE	TYRE	ANGLE						
				A	B	C	D^1	D^2	E^1	E^2
-	E 22 AB	≤ 4700	-	1°	6° 45'	6° 20'	52°	52°	40°	40°

AXLE	WHEEL ALIGNMENT IN RELATION TO LOAD					
	1540	2200	-	-	-	-
E 22 AB	- 2.2	- 2.9	-	-	-	-

MIDLUM

4x2

AXLE		WHEEL BASE	TYRE	ANGLE						
				A	B	C	D^1	D^2	E^1	E^2
-	E 42 BC	≤ 4700	-	1°	6° 45'	4° 30'	50°	50°	35° 20'	35° 20'
-	E 42 BD	≤ 4700	-	1°	6° 45'	4° 30'	50°	50°	35° 20'	35° 20'
-	E 46 AB	≤ 4700	-	1°	6° 45'	4° 30'	50°	50°	35° 20'	35° 20'
-	E 62 AD	≤ 4700	-	1°	6° 45'	4° 30'	50°	50°	35° 20'	35° 20'
-	E 63 BC	≤ 4700	-	1°	6° 45'	4° 30'	50°	50°	35° 20'	35° 20'
-	E 72 AB	≤ 4700	-	1°	6° 45'	4° 30'	44°	44°	36°	36°
-	E 72 AB	> 4700	-	1°	6° 45'	4° 30'	50°	50°	36°	36°

AXLE	WHEEL ALIGNMENT IN RELATION TO LOAD					
	3000	3170	4200	4500	6000	7100
E 46 AB	0.5	-	- 0.8	-	-	-
E 42 BC	0.5	-	-	- 1.2	-	-
E 42 BD	0.5	-	-	- 1.2	-	-
E 62 AD*	- 3.1	-	-	-	- 0.7	-
E 62 AD**	0.3	-	-	-	- 1.8	-
E 63 BC	- 0.9	-	-	-	- 2	-
E 72 AB	-	1.2	-	-	-	- 1.5

MIDLUM

4x4

AXLE		WHEEL BASE	TYRE	ANGLE						
				A	B	C	D^1	D^2	E^1	E^2
-	PA 610	≤ 4700	-	1°	8°	4° 30'	38°	38°	30°	30°
-	PA 611	≤ 4700	-	1°	8°	4° 30'	38°	38°	30°	30°

AXLE	WHEEL ALIGNMENT IN RELATION TO LOAD					
	3000	5300	-	-	-	-
PA 610	- 5.9	- 2.5	-	-	-	-
PA 611	- 5.9	- 2.5	-	-	-	-

PREMIUM

4x2

AXLE		WHEEL BASE	TYRE	ANGLE						
				A	B	C	D^1	D^2	E^1	E^2
-	E 81 EO	> 4700	-	1°	6° 45'	3° 40'	50°	50°	36°	36°
-	E 81 NO	≤ 4700	315/ 60R22,5	1°	6° 45'	3° 40'	46°	46°	38° 30'	38° 30'
-	E 81 NO	≤ 4700	315/ 70R22,5	1°	6° 45'	3° 40'	43° 30'	43° 30'	36° 40'	36° 40'
-	E 81 NO	≤ 4700	315/ 80R22,5	1°	6° 45'	3° 40'	46°	46°	38° 30'	38° 30'
-	E 81 NO	≥ 4700	315/ 70R22,5	1°	6° 45'	3° 40'	44°	44°	37° 10'	37° 10'
-	E 81 NO	≥ 4700	315/ 80R22,5	1°	6° 45'	3° 40'	45°	45°	37° 40'	37° 40'
-	E 81 EQ	> 4700	13R22,5	1°	6° 45'	3° 40'	50°	50°	36°	36°
-	E 81 NQ	≤ 4700	315/ 60R22,5	1°	6° 45'	3° 40'	46°	46°	38° 30'	38° 30'
-	E 81 NQ	≥ 4700	315/ 70R22,5	1°	6° 45'	3° 40'	43° 30'	43° 30'	36° 40'	36° 40'
-	E 81 NQ	≤ 4700	315/ 80R22,5	1°	6° 45'	3° 40'	46°	46°	38° 30'	38° 30'
-	E 82 CN	≥ 4700	315/ 60R22,5	1°	6° 45'	3° 40'	46°	46°	38° 30'	38° 30'
-	E 82 CN	≥ 4700	315/ 70R22,5	1°	6° 45'	3° 40'	43° 30'	43° 30'	36° 40'	36° 40'
-	E 82 CN	≥ 4700	315/ 80R22,5	1°	6° 45'	3° 40'	46°	46°	38° 30'	38° 30'
-	E 82 CN	≥ 4700	13R22,5	1°	6° 45'	3° 40'	44°	44°	37°	37°
-	E 82 JN	> 4700	315/ 60R22,5	1°	6° 45'	3° 40'	50°	50°	36°	36°
-	E 82 JN	> 4700	315/80 R22,5	1°	6° 45'	3° 40'	50°	50°	36°	36°
-	E 86 LR	≥ 4700	315/ 60R22,5	1°	6° 45'	3° 40'	46°	46°	38° 30'	38° 30'
-	E 86 LR	≥ 4700	315/ 70R22,5	1°	6° 45'	3° 40'	43° 30'	43° 30'	36° 40'	36° 40'
-	E 86 LR	≥ 4700	315/ 80R22,5	1°	6° 45'	3° 40'	46°	46°	38° 30'	38° 30'

6x2

AXLE		WHEEL BASE	TYRE	ANGLE						
				A	B	C	D^1	D^2	E^1	E^2
E1	E 82 JN	> 4700	315/ 60R22,5	1°	6° 45'	3° 30'	46°	46°	38° 30'	38° 30'
E1	E 82 JN	> 4700	315/70 R22,5	1°	6° 45'	3° 30'	43° 30'	43° 30'	36° 50'	36° 50'
E1	E 82 JN	> 4700	315/ 80R22,5	1°	6° 45'	3° 30'	46°	46°	38° 30'	38° 30'
E3	AUSTE	-	-	-	-		13°	13°	-	-
E1	E 81 EO	> 4700	315/ 60R22,5	1°	6° 45'	3° 40'	46°	46°	38° 30'	38° 30'
E1	E 82 EO	> 4700	315/ 70R22,5	1°	6° 45'	3° 30'	43° 30'	43° 30'	36° 50'	36° 50'
E1	E 81 EO	> 4700	315/ 80R22,5	1°	6° 45'	3° 40'	46°	46°	38° 30'	38° 30'
E3	AUSTE	-	-	-	-		13°	13°	-	-

AXLE	WHEEL ALIGNMENT IN RELATION TO LOAD					
	4500	8000	3000	7700	-	-
E 81 EO	- 2.5	- 0.2	-	-	-	-
E 81 NO	- 2.5	- 0.2	-	-	-	-
E 81 NQ	- 2.5	- 0.2	-	-	-	-
E 82 CN	- 2.5	- 0.2	-	-	-	-
E 82 JN	- 2.5	- 0.2	-	-	-	-
E 86 LR	0.2	- 1.7	-	-	-	-
AUSTERAS	-	-	2.5	± 1	-	-

PREMIUM

6x2/4

AXLE		WHEEL BASE	TYRE	ANGLE						
				A	B	C	D^1	D^2	E^1	E^2
E1	E 82 JN	> 4700	-	1°	6° 45'	3° 30'	46°	46°	38° 30'	38° 30'
E2	E 81 NS	> 4700	-	1°	6° 45'		10° 30'	10° 30'	10° 30'	10° 30'

6x2/4H

AXLE		WHEEL BASE	TYRE	ANGLE						
				A	B	C	D^1	D^2	E^1	E^2
E1	E 82 JN	≤ 4700	-	1°	6° 45'	4°	46°	46°	38° 30'	38° 30'
E3	E 81 B	≤ 4700	-	1°	6° 45'	3° 30'	19° 50'	19° 50'	16° 20'	16° 20'

AXLE	WHEEL ALIGNMENT IN RELATION TO LOAD					
	4500	8000	4100	7100		
E 82 JN	1.2	-1.7	-	-	-	-
E 81 NS	- 2.5	- 0.2	-	-	-	-
E 81 B	-	-	0.2	- 1.3	-	-

KERAX

4x2 / 6x4

AXLE		WHEEL BASE	TYRE	ANGLE						
				A	B	C	D^1	D^2	E^1	E^2
-	E 83 KL	> 4700	-	1°	6° 45'	3° 20'	41°	41°	35° 20'	35° 20'
-	E 83 KL	> 4700	1200 R24	1°	6° 45'	3° 20'	36° 50'	36° 50'	32° 20'	32° 20'
-	E 83 ML	> 4700	-	1°	6° 45'	3° 20'	41°	41°	35° 20'	35° 20'
-	E 83 ML	> 4700	1200 R24	1°	6° 45'	3° 20'	36° 50'	36° 50'	32° 20'	32° 20'
-	E 83 OL	≤ 4700	-	1°	6° 45'	3° 20'	46° 30'	46° 30'	35° 30'	35° 30'
-	E 83 OL	≤ 4700	1200 R24	1°	6° 45'	3° 20'	37° 30'	37° 30'	30° 30'	30° 30'
-	E 83 OP	≤ 4700	-	1°	6° 45'	3° 20'	46° 30'	46° 30'	35° 30'	35° 30'
-	E 83 OP	≤ 4700	1200 R24	1°	6° 45'	3° 20'	37° 30'	37° 30'	30° 30'	30° 30'

8x4

AXLE		WHEEL BASE	TYRE	ANGLE						
				A	B	C	D^1	D^2	E^1	E^2
E1	E 83 OP	≤ 4700	-	1°	6° 45'	3° 20'	41°	41°	35° 20'	35° 20'
E2	E 83 PM	≤ 4700	-	1°	6° 45'	3° 30'	31°	31°	28°	28°
E1	E 83 ML	> 4700	-	1°	6° 45'	3° 20'	43° 30'	43° 30'	33° 30'	33° 30'
E2	E 83 OM	> 4700	-	1°	6° 45'	3° 30'	28°	28°	25°	25°

AXLE	WHEEL ALIGNMENT IN RELATION TO LOAD					
	4500	7500	-	-	-	-
E 83 KL	- 2.7	- 3.5	-	-	-	-
E 83 ML	- 2.7	- 3.5	-	-	-	-
E 83 OL	- 2.7	- 3.5	-	-	-	-
E 83 OM	- 2.7	- 3.5	-	-	-	-
E 83 OP	- 2.7	- 3.5	-	-	-	-
E 83 PM	- 2.7	- 3.5	-	-	-	-

KERAX

4x4 / 6x6

AXLE		WHEEL BASE	TYRE	ANGLE						
				A	B	C	D^1	D^2	E^1	E^2
-	PA 941	-	-	2°	8°	3°	42°	42°	32° 50'	32° 50'
-	PA 941	-	1200 R24	2°	8°	3°	32° 10'	32° 10'	27°	27°
-	PA 941	-	395/85 R20	2°	8°	3°	32° 10'	32° 10'	27°	27°
-	PA 945	-	-	2°	8°	3°	42°	42°	32° 50'	32° 50'
-	PA 945	-	1200 R24	2°	8°	3°	32° 10'	32° 10'	27°	27°
-	PA 945	-	395/85 R20	2°	8°	3°	32° 10'	32° 10'	27°	27°

AXLE	WHEEL ALIGNMENT IN RELATION TO LOAD					
	4500	8000	-	-		
PA 941	7.6	6.5				
PA 945	7.6	6.5				

MAGNUM

AXLE		WHEEL BASE	TYRE	ANGLE						
				A	B	C	D^1	D^2	E^1	E^2
E1	E 81 AC	-	-	1°	6° 45'	3°	50°	50°	32°	32°
E1	E 81 EC	-	-	1°	6° 45'	3°	47°	47°	38°	38°
E1	E 81 EP	-	-	1°	6° 45'	3°	47°	47°	38°	38°
E3	AUST	-	-	-	-	-	13°	13°	-	-

AXLE	WHEEL ALIGNMENT IN RELATION TO LOAD					
	5000	8000	3000	7700	-	-
E 81 AC	0	- 1.3	-	-	-	-
E 81 EC	- 1.5	- 0.3	-	-	-	-
E 81 EP	- 2.6	- 0.5	-	-	-	-
AUSTERAS	-	-	2.5	± 1	-	-

MAGNUM DXI

AXLE	ANGLES								
	A		B		C	D^1	D^2	E^1	E^2
	(1)	(2)	(1)	(2)					
FA 71/81 A E 81 PNG	1°	0.25°	5.5°	6.25°	5.2°	48°	48°	34°	34°
FA 71/81 B	1°	0.25°	5.5°	6.25°	5.2°	46°	46°	36.4°	36.4°

(1): steering side
(2): side opposite steering

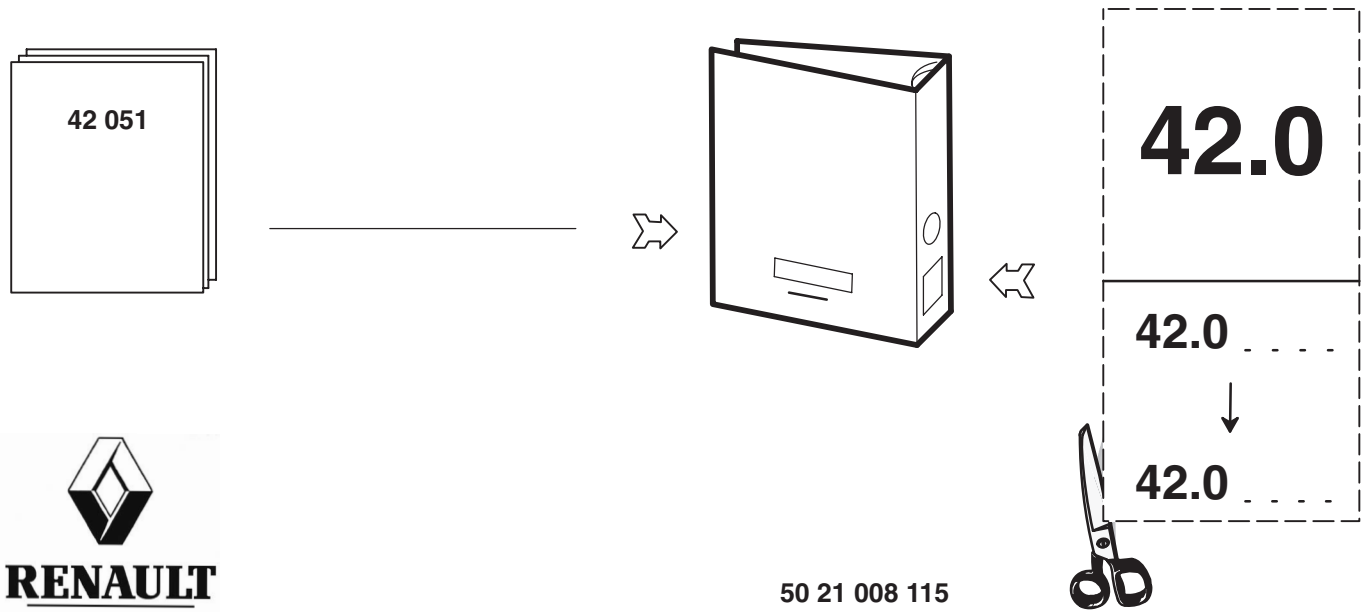
AXLE	WHEEL ALIGNMENT IN RELATION TO LOAD					
	5000	7000	8000	-	-	-
FA 71/81 A/B E 81 PNG	0	-0.5	-0.75	-	-	-

42 051 – AN – 11.2001

AXLE E 60

AXLE	VEHICLE
E 60 C.LISA	MIDLUM
E 60 PAN 19	

NOTE
The above information may change in the course of time.
Only the “Consult” section of the workshop manuals repertory in standard N° 10320 serves as reference.



RENAULT

AXLE E 60

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A	Specifications	A1 → A4
B	Hubs	B1 → B4
C	Stub axle	C1 → C2
D	Tools	D1 → D2

CONVENTIONAL SYMBOLS

Tighten to torque (Nm) (right–hand thread)

Rotational load

Grease or oil (see “Consumables” table)

Depending on versions or options

Place in contact

Dimension to be assured (mm)

Directional movement

Machining tolerance

Part to be replaced

Wear limit

Direction of disassembly (the arrow shows the direction)

Direction of assembly (the arrow shows the direction)

SPECIFICATIONS

Symbol code

Example

E	Axle
6	Load per axle in metric tons
2	Axle beam offset and center line distance between springs
A	Track rod connection arm
B	Steering arm

Consumables

Grease

Symbol	Huiles Renault Diesel	Standards
	..... Superol EP2	NLGI 2 lithium soap grease calcium lead–free EP additive

Preparation prior to assembly
Carefully clean and inspect all the parts.
Wash the bearings in clean solvent.
Let them drip dry naturally.
Immediately prior to assembly, lubricate them lightly with thin oil.
Do not unpack a new bearing until you are ready to install it.
Do not clean the the protective grease off new bearings.
Seals and lock–plates must always be discarded and new ones fitted.
Never force–fit parts with copper or brass punches or drifts.
Use a specially adapted plunger each time so as to prevent metallic particles getting into the casings and bearings.
Always oil parts prior to force fitting.
The inside of the lips of seal rings must be smeared with grease.
Shrink fitted parts must be heated with a hot air blower or in an oven, etc... Flame heating is strictly forbidden.

NOTE
When using a torque multiplier, calibrate the torque wrench–torque multiplier assembly to the desired torque.

Locking, fastening, sealing and gluing products
Prior to assembly, carefully clean the surface of the parts to which the product is to be applied. Get rid of any old product residue. Threaded portions are to be brushed, tapped and cleaned if necessary using a suitable cleaner.
Using the product
Always adapt the recommended product by following the directions for use appearing on the pack
– surface finish,
– operating temperature,
– reaction, drying times, etc...,
– shelf–life.
Comply with the method of assembly so as to guarantee the quality of the repair.

For angle checking, see CMR **42 038**.

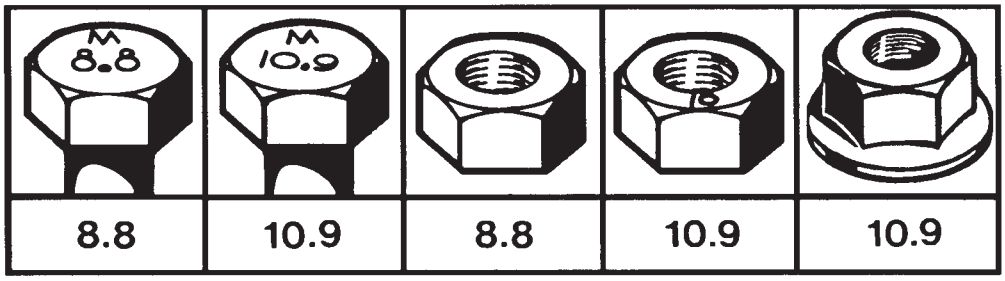
Tightening torques
There are several types of tightening
– Tightening to torque (in **Nm.**)
– Tightening to angle (in °)
– Tightening to torque–angle (in **Nm. +** °)

Torques given in **Nm** are nominal torques (average value calculated on the basis of the minimum torque and the maximum torque).
The tightening accuracy class defines the tolerance of this torque in percent as a function of the nominal torque applied.

Tightening accuracy classes
– **Class I** : Special threaded hardware (tolerances variable depending on assembly)
– **Class II** : Reserved for precise tightening (tolerance ± 10% of the nominal torque)
– **Class III** : Reserved for normal standard tightening (tolerance ± 20% of the nominal torque)

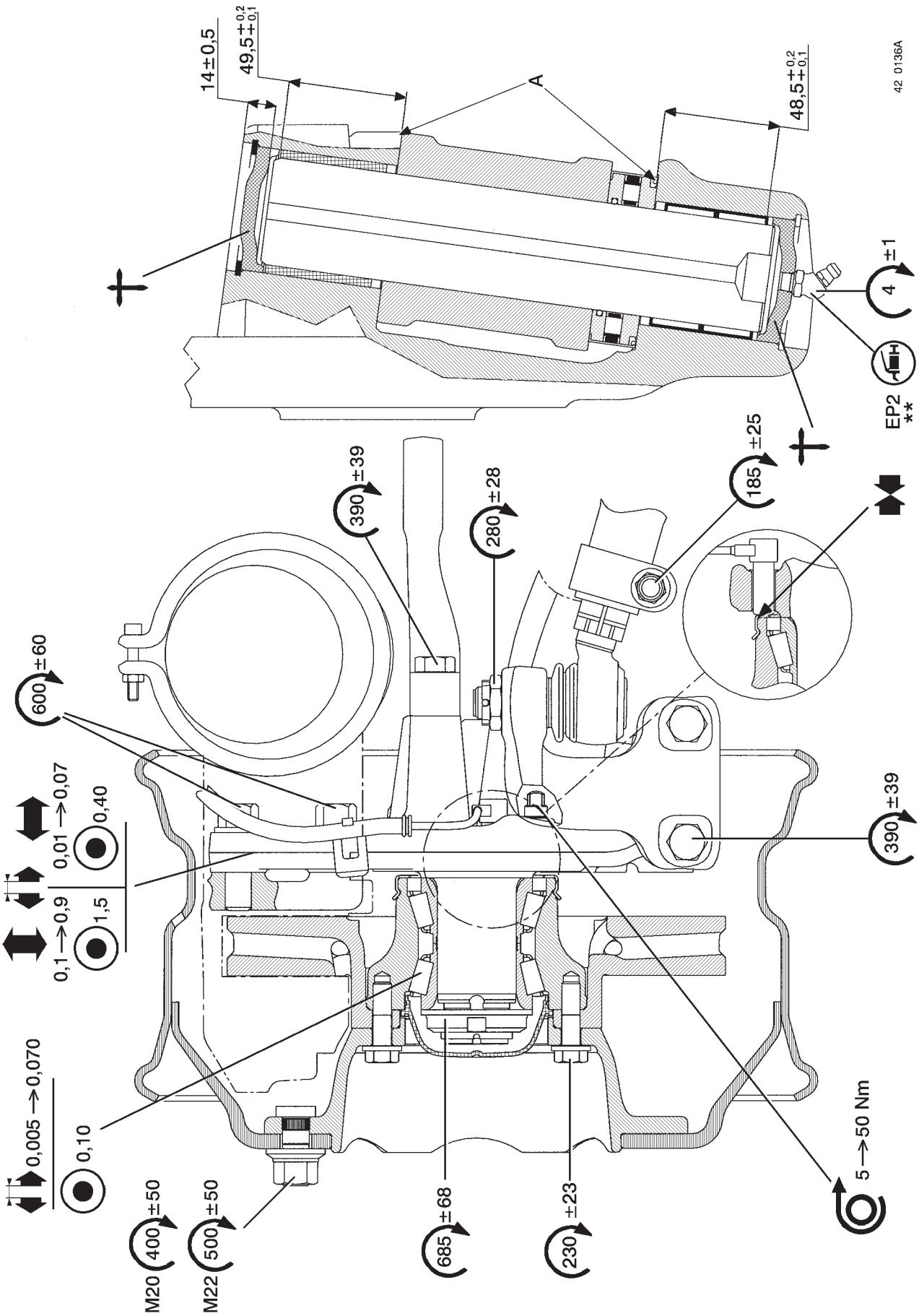
For standard threaded hardware indicated in the table below, use tightening class **III**.

For other torques, see pages **A3** → **A4**.



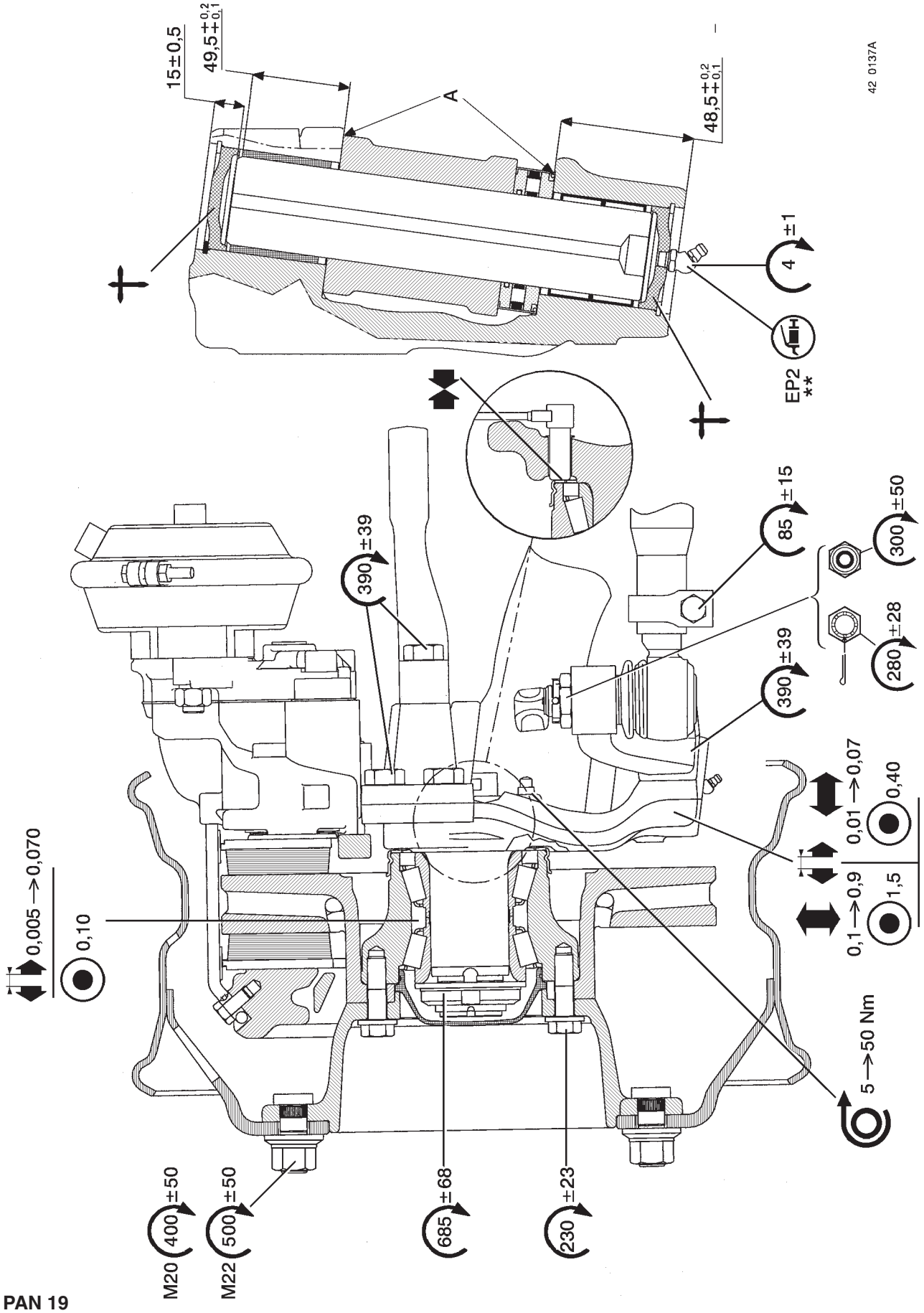
21 0122

Tightening torques for conventional nut and bolt hardware to "METRIC system" standard 01.50.4002		
Dia. and pitch of nuts and bolts (in mm)	**Quality class 8.8**	**Quality class 10.9**
	Tightening class III (± 20 %)	**Tightening class III (± 20 %)**
6 x 1.00	7.4	10.8
7 x 1.00	12.1	17.8
8 x 1.00	19.2	28.2
8 x 1.25	17.9	26.3
10 x 1.00	39.4	58
10 x 1.25	37.4	55
10 x 1.50	35.4	52
12 x 1.25	67	98
12 x 1.50	64	94
12 x 1.75	61	90
14 x 1.50	105	155
14 x 2.00	98	143
16 x 1.50	161	237
16 x 2.00	151	222
18 x 1.50	235	346
18 x 2.50	210	308
20 x 1.50	328	481
20 x 2.50	296	435
22 x 1.50	444	652
22 x 2.50	406	596



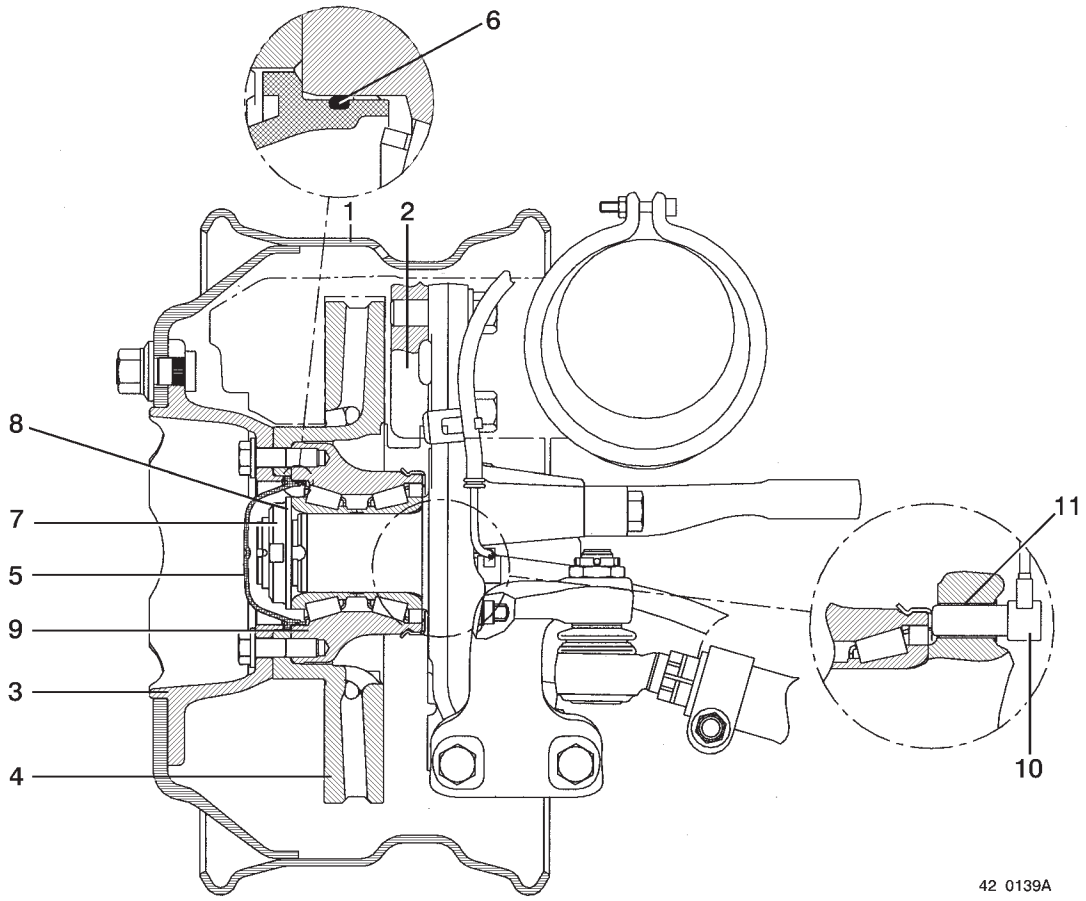
C.LISA

** King pins are to be greased with the axle roadwheels resting on the ground. Grease must emerge from points **A**.



PAN 19

** King pins are to be greased with the axle roadwheels resting on the ground. Grease must emerge from points **A**.



Hubs

Disassembly

The item numbers indicated in the drawing on page **B1** correspond to the **sequence of disassembly**.

The table indicates the designation and the reference number of tools necessary for assembly / disassembly of the itemized parts.

Item	Tool designation	Reference N°	Assembly	Disassembly
7	Castellated box wrench	2449	X	X

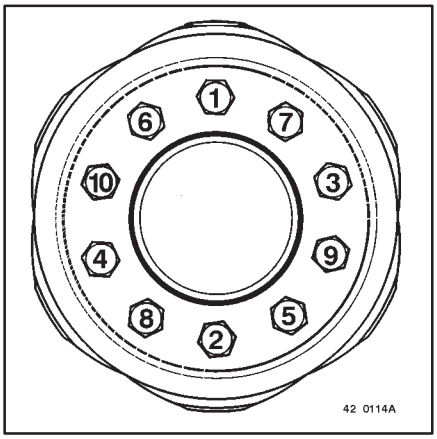
Remove the hub (**9**).
If necessary
Use tool(s) **0843**.

IMPORTANT
Do not degrease the interior of the hub.
Do not separate the bearings.

Assembly

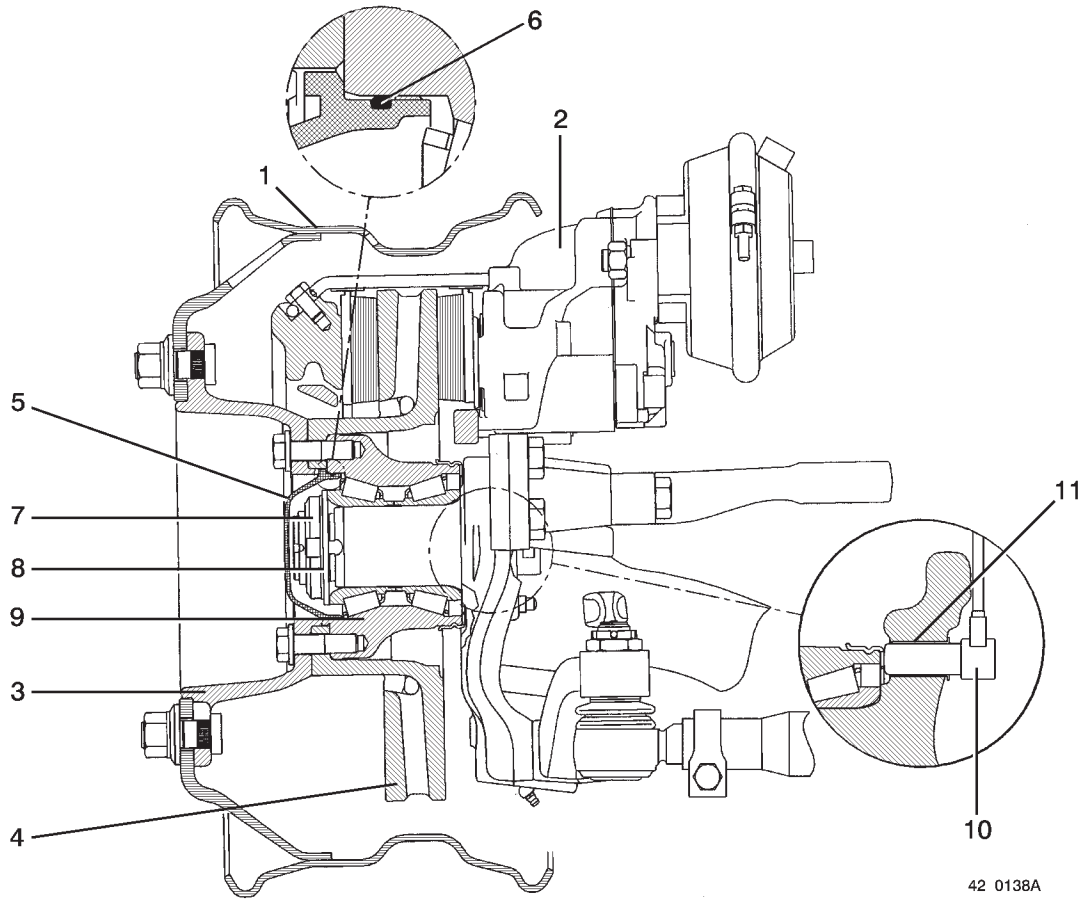
The numbers shown in the text refer to figure on page **B1**.

Setting of wheel flange (**3**).
Tighten initially at the recommended torque in the order shown ; then tighten again at the recommended torque.



Anti–lock braking system (ABS)

Adjust the sensor (**10**) to make contact with the inner toothed crown wheel.



Hubs

Disassembly

The item numbers indicated in the drawing on page **B3** correspond to the **sequence of disassembly**.

The table indicates the designation and the reference number of tools necessary for assembly / disassembly of the itemized parts.

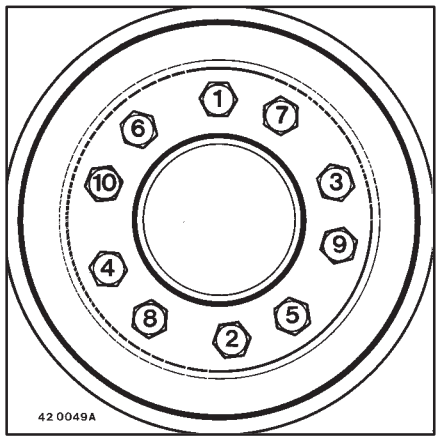
Item	Tool designation	Reference N°	Assembly	Disassembly
7	Castellated box wrench	2449	X	X

Remove the hub (**9**).
If necessary
Use tool(s) **0843**.

IMPORTANT
Do not degrease the interior of the hub.
Do not separate the bearings.

Assembly

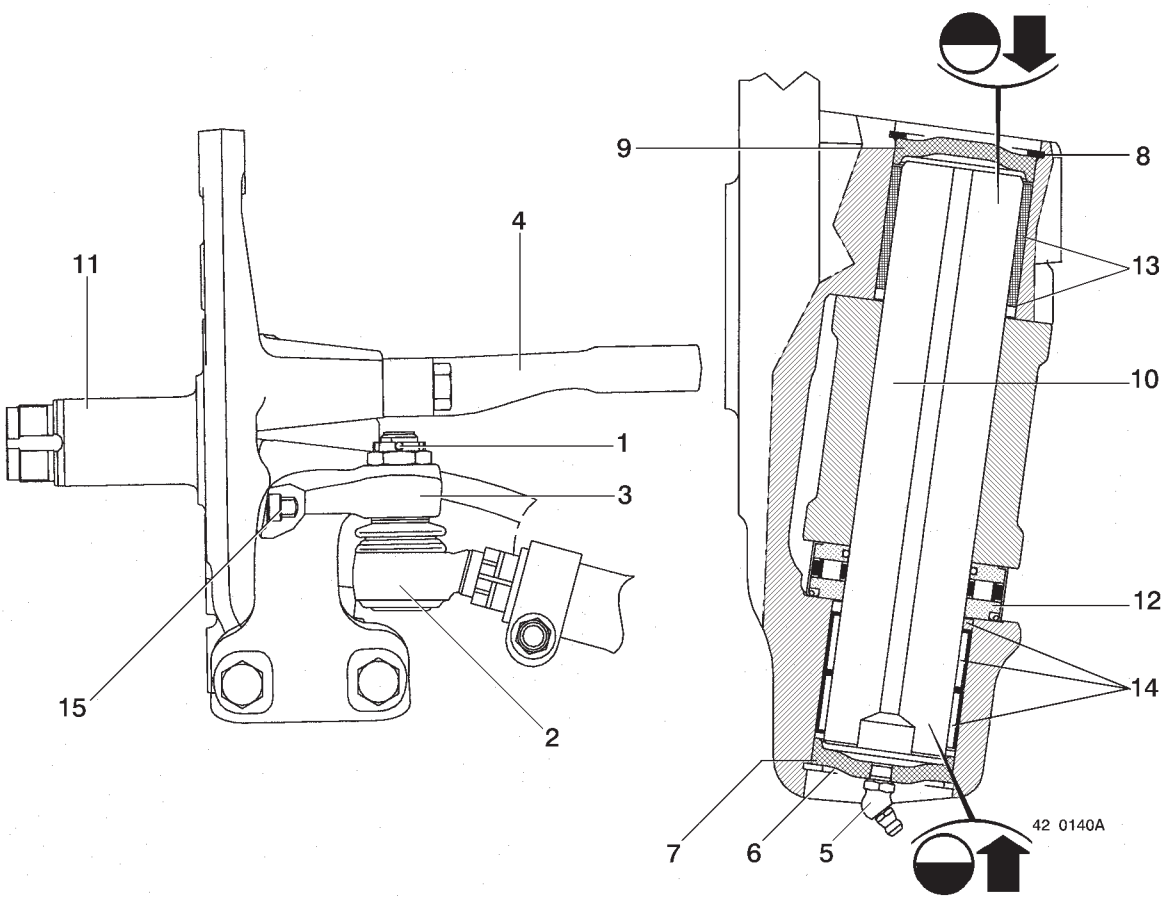
The item numbers indicated in the text correspond to the figure on page **B3**.



Setting of wheel flange (**3**).
Tighten initially at the recommended torque in the order shown ; then tighten again at the recommended torque.

Anti–lock braking system (ABS)

Adjust the sensor (**10**) to make contact with the inner toothed crown wheel.



Stub axle

On vehicle or on support.
Remove the hub.
(See chapter : **B**).

Disassembly

The item numbers indicated in the drawing on page **C1** correspond to the **sequence of disassembly**.

The table indicates the designation and reference number of the tools required for assembly / disassembly of the itemized parts.

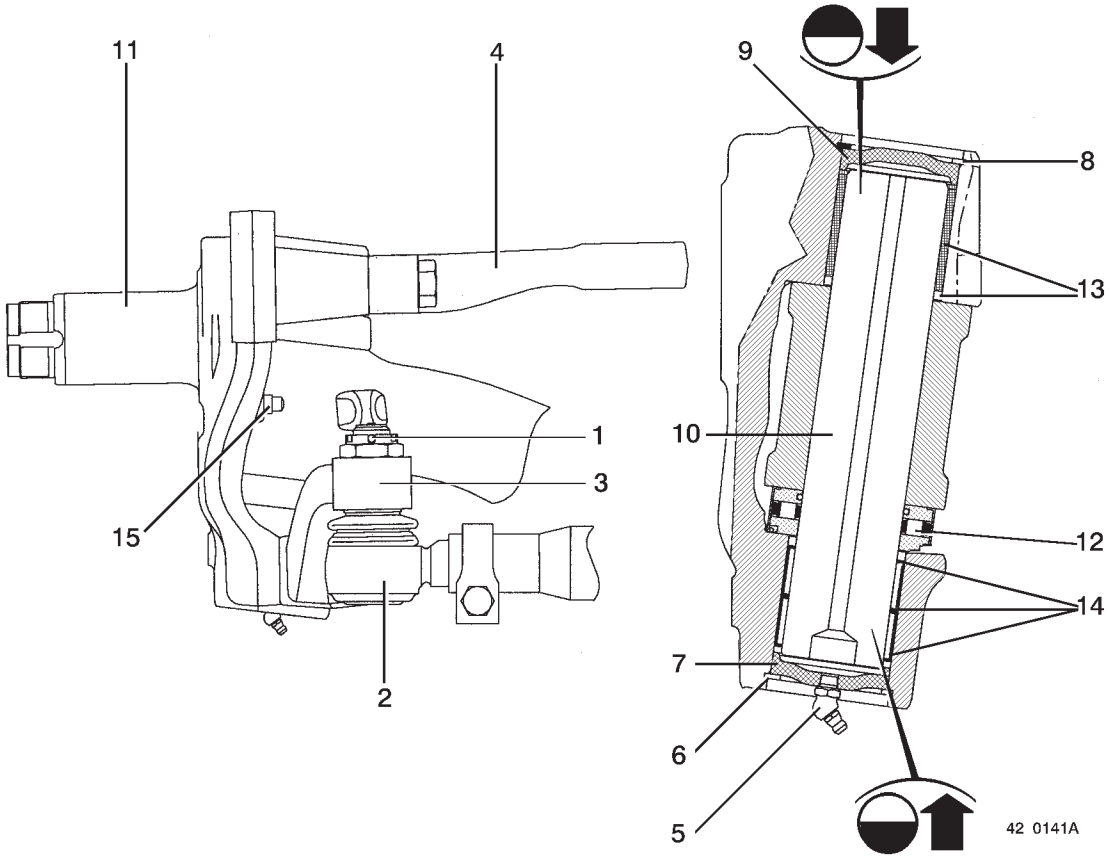
Item	Tool Designation	Reference N°	Assembly	Disassembly
2	Puller	1744		X

Remove king pin (**10**).
Use tool(s) **9423**.

Assembly

Proceed in the reverse sequence to disassembly.

Grease.



Stub axle

On vehicle or on support.
Remove the hub.
(See chapter : **B**).

Disassembly

The item numbers indicated in the drawing on page **C2** correspond to the **sequence of disassembly**.

The table indicates the designation and reference number of the tools required for assembly / disassembly of the itemized parts.

Item	Tool Designation	Reference N°	Assembly	Disassembly
2	Puller	1744		X

Remove king pin (**10**).
Use tool(s) **9423**.

Assembly

Proceed in the reverse sequence to disassembly.

Grease.

TOOL

RENAULT V.I. divide tools into 3 categories

– **General–purpose tools :** Commercially available tools.
  . **50 00 26 .... reference number** (possibility of purchasing through the Renault V.I. Spare Parts department).
  . **4–figure reference number** (tools with Renault V.I. reference number, but available from the supplier).

– **Special tools :** Specially created tools, distributed by the RENAULT V.I. spare parts division.

– **Locally manufactured tools :** these tools are classified differently according to their degree of sophistication

  . **4–figure reference number** (represented by a drawing) : tools that are simple to make without need for special qualification.

  . **50 00 26 .... reference number** (possibility of purchasing through the Renault V.I. Spare Parts department) : a certain skill is needed to make these tools.

Three levels (or echelons) determine their assignment

– **LEVEL1 :** Tools for servicing and minor tasks.

– **LEVEL 2 :** Tools for major repairs.

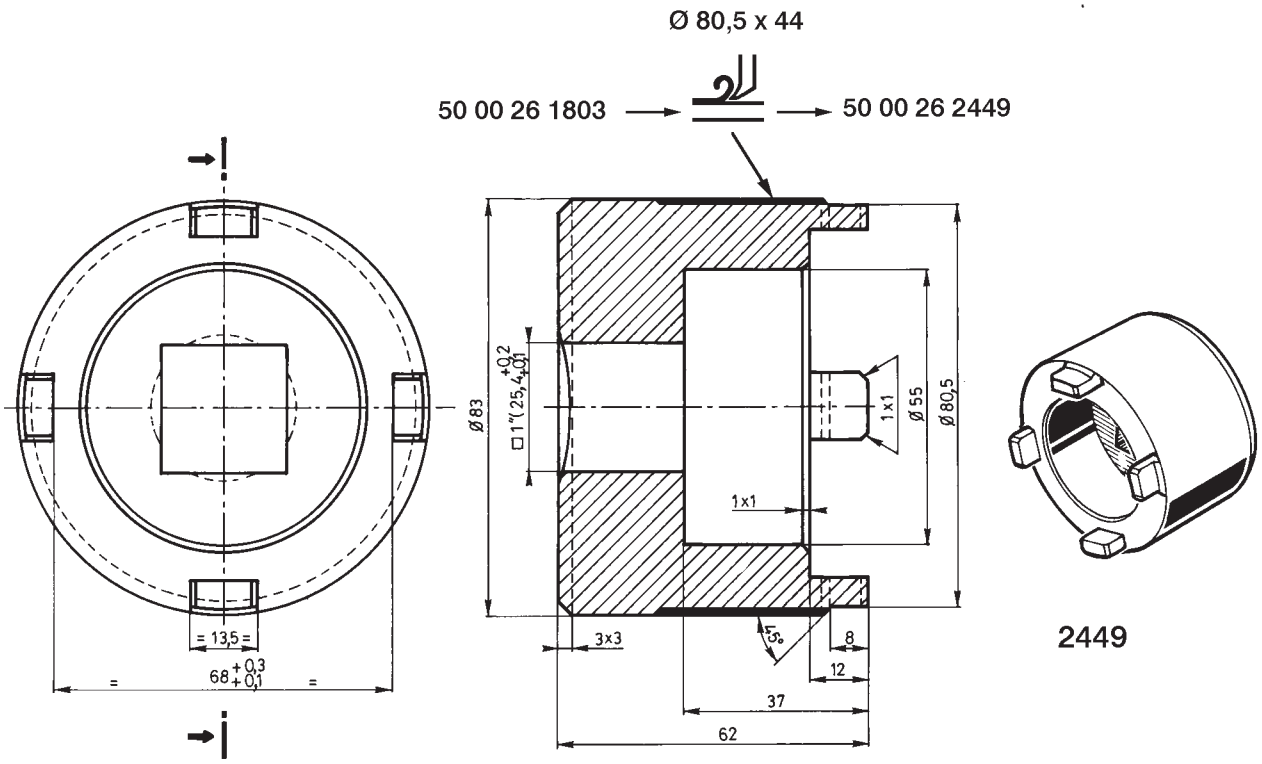
– **LEVEL 3 :** Tools for refurbishment.

NOTE
Standard tools mentioned in this manual do not appear in the tools list.
These tools are identified in the standard tools manual (MO) by a 4–figure number.

General–purpose tools				
Ref. Renault V.I.	**Description**	**Level**	**Quantity**	**Page**
50 00 26 **0843**	Puller	2	1	B1
50 00 26 **1744**	Ball–joint puller	1	1	C1

Special tools				
Ref. Renault V.I.	**Description**	**Level**	**Quantity**	**Page**
50 00 26 **2449****	Castellated box wrench	2	1	B1

(**) Tool to be modified (see page **D2**).


Ø 80,5 x 44
50 00 26 1803
50 00 26 2449
= 13,5 =
68 +0,3 +0,1
Ø 83
□ 1" (25,4 +0,2 +0,1)
1x1
Ø 55
Ø 80,5
1x1
3x3
45°
8
12
37
62
2449

42 038 – ML – 11 . 2001

CONTRÔLE DES ESSIEUX, TRAINS ET PONTS AVANT

INSPECTION OF FRONT AXLES, FONT DRIVE AXLES AND FRONT AXLE UNITS

CONTROL DE LOS EJES, TRENES Y PUENTES DELANTEROS

KONTROLLE DER ACHSEN, FAHRWERKE UND VORDERANTRIEBSACHSEN

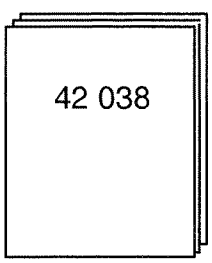
CONTROLO ASSALI, AVANTRENI E PONTI ANTERIORI

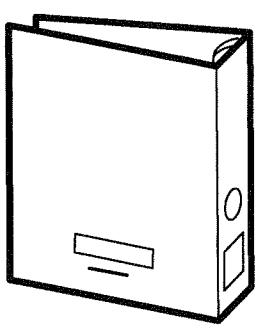
CONTROLO DOS EIXOS, TRENS E DIFERENCIAIS DIANTEIROS

CONTROLE VAN VOORASSEN, DUBBLE VOORASSEN EN AANGEDREVEN VOORASSEN

KONTROL AF AKSLER, FORTØJ OG FORBRO

ПРОВЕРКА ПЕРЕДНИХ ОСЕЙ, ПЕРЕДАТОЧНЫХ МЕХАНИЗМОВ И МОСТОВ





42.0

4

RENAULT

50 21 002 963

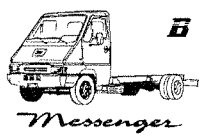
ESSIEUX PONTS AVANT	VÉHICULES
FRONT AXLES FRONT DRIVE AXLES	VEHICLES
EJES PUENTES DELANTEROS	VEHICULOS
ACHSEN VORDERANTRIEBSACHSEN	FAHRZEUGE
ASSALI PONTI ANTERIORI	VEICOLI
EIXOS DIFERENCIAIS DIANTEROS	VEÍCULOS
VOORASSEN AANGEDREVEN VOORASSEN	WAGENS
AKSLER FORBRO	KØRETØJ
ОСИ ПЕРЕДНИЕ МОСТЫ	АВТОМОБИЛИ

CONTRÔLE DES ESSIEUX, TRAINS ET PONTS AVANT	TOUTES GAMMES (1993 ▶ ...)
INSPECTION OF FRONT AXLES, FONT DRIVE AXLES AND FRONT AXLE UNITS	ALL RANGES (1993 ▶ ...)
CONTROL DE LOS EJES, TRENES Y PUENTES DELANTEROS	TODAS LAS GAMAS (1993 ▶ ...)
KONTROLLE DER ACHSEN, FAHRWERKE UND VORDERANTRIEBSACHSEN	ALLE BAUREIHEN (1993 ▶ ...)
CONTROLO ASSALI, AVANTRENI E PONTI ANTERIORI	TUTTE LE GAMME (1993 ▶ ...)
CONTROLO DOS EIXOS, TRENS E DIFERENCIAIS DIANTEIROS	TODAS AS GAMAS (1993 ▶ ...)
CONTROLE VAN VOORASSEN, DUBBLE VOORASSEN EN AANGEDREVEN VOORASSEN	ALLE STERIES (1993 ▶ ...)
KONTROL AF AKSLER, FORTØJ OG FORBRO	ALLE SERIER (1993 ▶ ...)
ПРОВЕРКА ПЕРЕДНИХ ОСЕЙ, ПЕРЕДАТОЧНЫХ МЕХАНИЗМОВ И МОСТОВ	ВСЕХ СЕРИЙ (1993 ▶ ...)

CONTRÔLE – INSPECTION – CONTROL – KONTROLLE
CONTROLO – CONTROLE – KONTROL – ПРОВЕРКА

A2 / A19

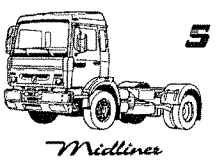
VALEURS – VALUES – VALORES – WERTE – VALORI
VALOR – WAARDEN – VÆRDIER – ЗНАЧЕНИЯ



B1

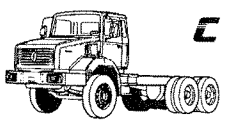
B2

B3



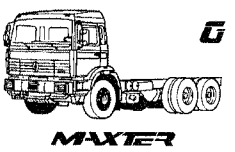
B4

B6



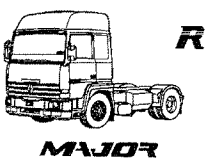
B8

B10

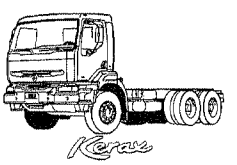


B12

B14



B20



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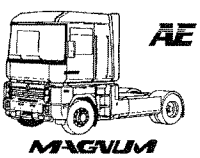


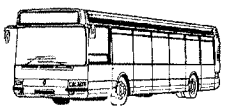
B26

CONTRÔLE – INSPECTION – CONTROL – KONTROLLE
CONTROLO – CONTROLE – KONTROL – ПРОВЕРКА

A2 / A19

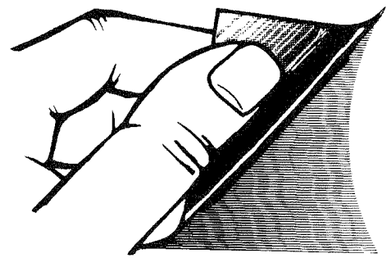
VALEURS – VALUES – VALORES – WERTE – VALORI
VALOR – WAARDEN – VÆRDIER – ЗНАЧЕНИЯ

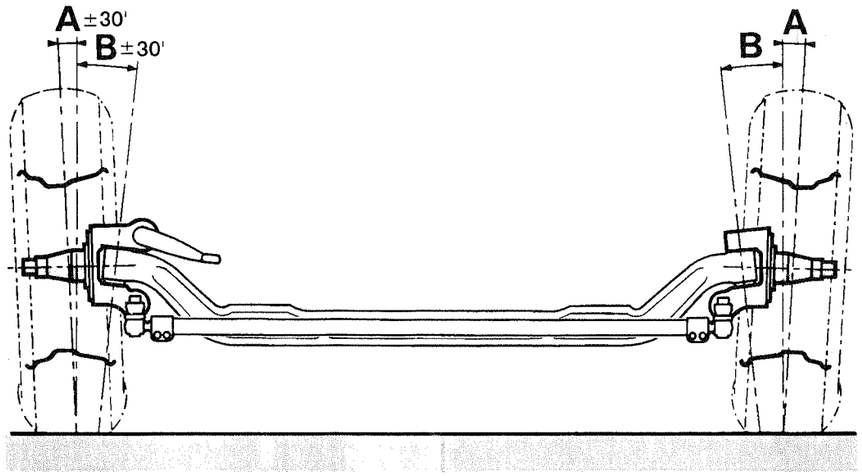
B30



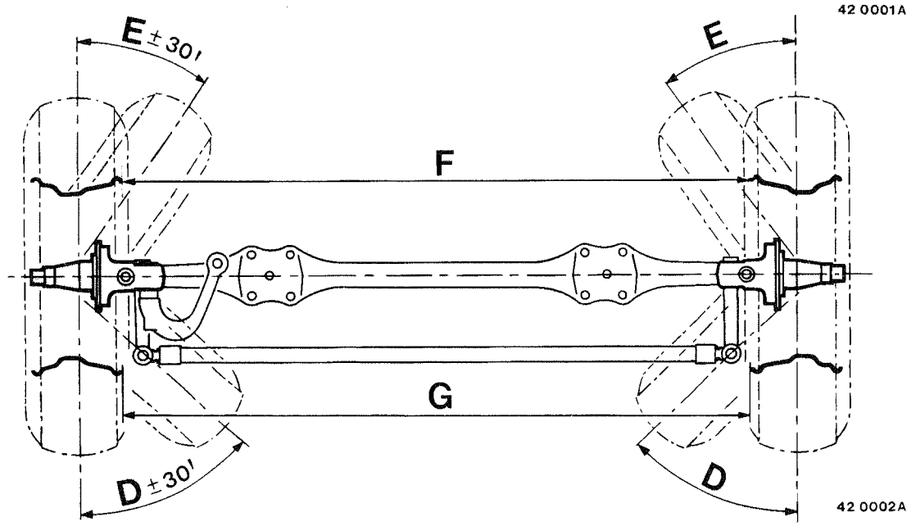
B30

CONTRÔLE – INSPECTION – CONTROL – KONTROLLE
CONTROLO – CONTROLE – KONTROL – ПРОВЕРКА

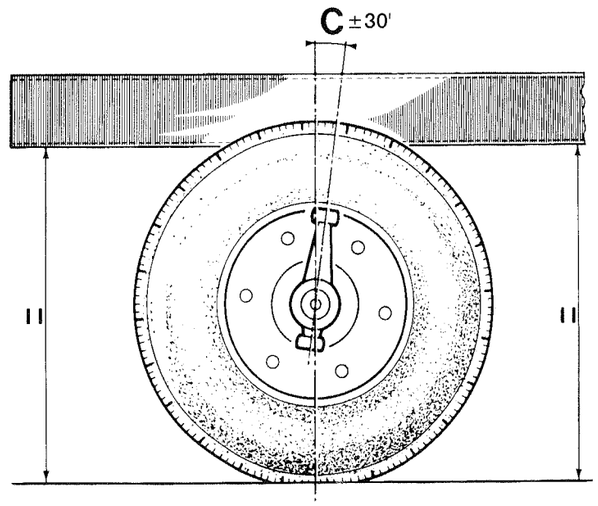




42 0001A



42 0002A



42 0003A

Fig. 1

A = Angle de carrossage
B = Angle d'inclinaison de pivots
C = Angle de chasse
E / D = Angle de braquage

Parallélisme (valeur exprimée en mm/m (Tolérances ± 0,9 mm/m)) :

Pincement = **+** = **G > F**

Ouverture = **—** = **G < F**

Vérifications préliminaires

Avant toute intervention, procéder à certaines vérifications :
- Etat et pression des pneumatiques.
- Etat et hauteur de la suspension.
- Efficacité des amortisseurs.
- Jeux des roulements des moyeux, des pivots et des articulations du train avant.

Roues avant alignées, contrôler le parallélisme.
Vérifier que la direction est au point milieu. Pour les directions assistées s'assurer, au point milieu, de l'absence de pression hydraulique.
Effectuer un essai du véhicule si ces dernières vérifications ont éxigé un réglage. Si nécessaire procéder au contrôle des angles de l'essieu.

Conditions de contrôle :
- **Véhicule à vide et en ordre de marche.**
- Cabine en position route (pour les véhicules à cabine basculante).
- Véhicule sur une aire plane, roues de l'essieu directeur sur plateaux pivotants.
- Véhicule équipé d'un essieu relevable, l'essieu doit être abaissé.
- Appareil à projection lumineuse.

Réglage des butées mécaniques de braquage

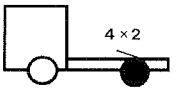
Parallélisme réglé, visser à fond les butées de braquage.
Tourner la direction à droite jusqu'à obtenir l'angle de braquage désiré.
Dévisser les butées concernées jusqu'au contact. Serrer les contre–écrous (selon montage).
Tourner la direction à gauche et régler de la même façon les autres butées.
Vérifier que les pneumatiques ne viennent pas en contact avec des éléments mécaniques du châssis.

IMPORTANT
Boîtier de direction avec butées hydrauliques à réglage automatique : ne pas manœuvrer le boîtier de direction lorsque celui–ci n'est pas limité en débattement mécaniquement (risque de déréglage des butées hydrauliques).

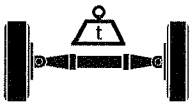
Réglage des butées de limitation hydraulique de braquage (à effectuer après le réglage des butées mécaniques de braquage), (voir MR 41 623).

IMPORTANT
Tourner lentement la direction lorsque les roues de l'essieu sont sur plateaux pivotants ou levées.

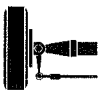
SIGNES CONVENTIONNELS



Silhouette (s)

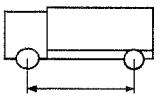


Charge en tonne sur l'avant du véhicule pour effectuer la mesure

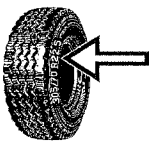


Type d'essieux (position de la plaque d'identification)

Type de pont avant (position de la plaque d'identification)



Empattement du véhicule



Type de pneumatique

< ... Inférieur à ...

> ... Supérieur à ...

≤ ... Inférieur ou égal à ...

Fig. 1

A = Camber angle
B = Swivel pin inclination angle
C = Castor angle
E / D = Steering angle

Wheel alignment (value expressed in mm/m (Tolerances ± 0.9 mm/m)::
Toe–in = **+ = G > F**
Toe–out = **– = G < F**

Preliminary checks
Before carrying out any work, proceed with the following checks :
- Condition and pressure of tyres.
- Condition and height of suspension.
- Efficiency of shock absorbers.
- Play of front axle wheel hub bearings, swivel pins and joints.

With the front wheels aligned, check the wheel alignment.
Check that the steering is in the "mid–point" position. For power–assisted steering systems, make sure there is no hydraulic pressure when the steering is in the "mid–point" position.
Carry out a road test after making adjustments found to be necessary during the above checks. If necessary, check the axle geometry angles.

Checking conditions :
- **Vehicle unladen and in running order.**
- Cab in "road" position (for vehicles with tilt cab).
- Vehicle on flat ground, steering axle wheels on pivoting plates.
- Vehicle equipped with lift–up axle: the axle must be lowered.
- Luminous projector.

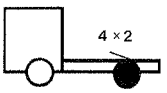
To adjust mechanical steering lock stops
With the front wheels aligned, screw the steering lock stops fully home.
Turn the steering wheel to the right until the required steering lock angle is obtained.
Unscrew the steering lock stops until contact is made with the axle stop shoulder. Tighten the locknuts (depending on the assembly).
Turn the steering wheel to the left and adjust the other lock stops in the same way.
Check that the tyres do not enter into contact with chassis mechanical elements.

IMPORTANT
Steering box with automatic adjustment hydraulic stops: Do not manoeuvre the steering box when its mechanical deflection is not limited (risk of maladjustment of hydraulic stops).

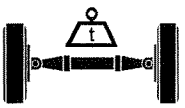
Adjusting the hydraulic lockover limitation stops (To be carried out after adjusting the mechanical lock stops).

IMPORTANT
Turn the steering wheel slowly when the axle wheels are on pivoting plates or are lifted.

CONVENTIONAL SYMBOLS



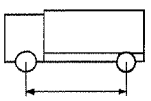
Axle spread



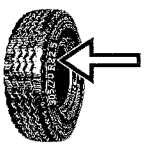
Load in tonne on front of vehicle for making the measurement

Type of axle

Type of drive axle



Vehicle wheelbase



Tyre size in inches

< ... Smaller than ...

> ... Greater than ...

≤ ... Less than or equal to ...

Fig. 1

A = Angulo de inclinación de la rueda
B = Angulo de inclinación de los pivotes
C = Angulo de avance del pivote
E / D = Angulo de giro

Paralelismo (valor expresado en mm/m (Tolerancia: ± 0,9 mm/m)) :
Convergencia = **+ = G > F**
Abertura = **– = G < F**

Verificaciones preliminares
Antes de proceder a cualquier operación, se deben efectuar varias verificaciones :
- Estado y presión de los neumáticos.
- Estado y altura de la suspensión.
- Eficacia de los amortiguadores.
- Juego de los rodamientos de los cubos, pivotes y articulaciones del tren delantero.

Con las ruedas delanteras alineadas, controlar el paralelismo.
Verificar que la dirección se encuentre en el punto medio. Si el vehículo posee una dirección asistida, verificar, en el punto medio, que no haya presión hidráulica.
Hacer una prueba del vehículo si se ha efectuado algún ajuste tras estas últimas verificaciones. Si es necesario, controlar los ángulos del eje.

Condiciones de control :
- **Condiciones de control :**
- Vehículo vacío y en condiciones de funcionamiento.
- Cabina en posición carretera (en vehículos con cabina volcable).
- Vehículo sobre una superficie plana, con las ruedas del eje director sobre plataformas giratorias.
- Si el vehículo está provisto de un eje elevable, el eje debe estar en posición baja.
- Proyector luminoso.

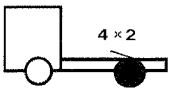
Ajuste de los topes de giro mecánicos
Paralelismo ajustado, atornillar a fondo los topes de giro.
Hacer girar la dirección a la derecha hasta lograr el ángulo de giro deseado.
Desenroscar los topes correspondientes hasta que haya contacto. Apretar las contratuercas (según el montaje).
Hacer girar la dirección a la izquierda y regular del mismo modo los otros topes.
Verificar que los neumáticos no entren en contacto con elementos mecánicos del chasis.

IMPORTANTE
Caja de dirección con topes hidráulicos de ajuste automático: no se debe maniobrar la caja de dirección si no tiene un límite de oscilación mecánica (se corre el riesgo de desajustar los topes hidráulicos)

Ajuste de los topes de limitación hidráulica de giro (a efectuar después del ajuste de los topes mecánicos de giro).

IMPORTANTE
Hacer girar lentamente la dirección si las ruedas del eje están elevadas o colocadas sobre plataformas giratorias.

SIGNOS CONVENCIONALES

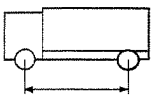


Configuraciones

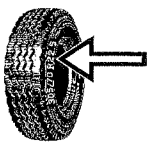
Carga en toneladas en la parte delantera del vehículo para efectuar la medición

Tipo de ejes

Tipo de puente delantero



Distancia entre ejes del vehículo



Dimensión del neumático en pulgadas

< ... Inferior a ...

> ... Superior a ...

≤ ... Inferior o igual a ...

Abb. 1

A = Radsturzwinkel
B = Spreizungswinkel
C = Nachlaufwinkel
E / D = Einschlagwinkel

Radeinstellung (Wertangaben in mm Toleranz ± 0,9 mm) :
Vorspur= **+** = **G > F**
Nachspur = **–** = **G < F**

Voruntersuchung
Vor jedem Eingriff folgende Prüfungen durchführen :
- Zustand der Bereifung sowie Reifendruck.
- Zustand und Höhe der Federung.
- Leistungsfähigkeit der Schwingungsdämpfer.
- Spiel der Radnabenlager, der Achsschenkel und der Anlenkungsteile der Vorderachse.

Bei gerade stehenden Rädern die Radstellung prüfen.
Die Lenkung mub genau in der Mitte stehen. Bei den Hydrolenkungen darf in der Mittelstellung kein Öldruck zu verspüren sein.
Einen Fahrversuch durchführen, wenn diese Prüfungen eine Einstellung erforderten. Erforderlichenfalls die Einstellung der Winkel an der Achse prüfen.

Kontrollbedingungen :
- **Leeres und fahrbereites Fahrzeug.**
- Fahrerhaus in Fahrtstellung (bei Fahrzeugen mit Kippfahrerhaus).
- Fahrzeug auf eine ebene Fläche stellen, die Räder der Lenkachse müssen dabei auf Drehscheiben stehen.
- Bei Fahrzeugen mit Liftachse, mub letztere herabgesenkt sein.
- Lichtprojektor.

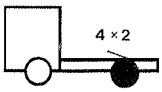
Einstellung der mechanischen Lenkanschläge
Nach Einstellung der Radspur, die Lenkanschläge fest anziehen.
Das Lenkrad nach rechts drehen, um den gewünschten Einschlagwinkel zu erhalten.
Die entsprechenden Lenkanschläge bis zur Berührung herausschrauben. Die Gegenmuttern festziehen (je nach Ausstattung).
Das Lenkrad nach links drehen und in der gleichen Weise die anderen Anschläge einstellen.
Darauf achten, daß die Reifen nicht mit mechanischen Teilen des Fahrgestells in Berührung kommen.

WICHTIG
Lenkgetriebe mit automatisch einstellbaren hydraulischen Lenkanschlägen : das Lenkgetriebe nicht betätigen, wenn dieses nicht mechanisch einschlagbegrenzt ist (Verstellungsgefahr der hydraulischen Lenkanschläge).

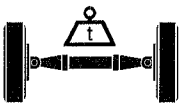
Einstellung der hydraulischen Einschlagbegrenzungen (nach Einstellung der mechanischen Einschlagbegrenzungen durchzuführen).

WICHTIG
Das Lenkrad langsam drehen, dabei die Räder der Lenkachse anheben oder auf die Drehscheibe stellen.

STANDARDSYMBOLE



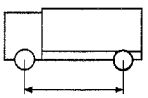
Silhouette (n)



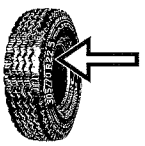
Vorderachslast in Tonnen für die Einstellung durchzuführen

Achstypen

Angetriebener Vorderachstyp



Fahrzeugradstand



Reifenmasse in Inch (Zoll)

< ... kleiner als ...

> ... größer als ...

≤ ... kleiner als oder gleich ...

Fig. 1

A = Angolo di carrozzatura
B = Angolo di inclinazione dei perni
C = Angolo di incidenza
E / D = Angolo di sterzata
Parallelismo (valore espresso in mm/m (Tolleranze ± 0,9 mm/m)):
Convergenza = **G > F**
apertura = **G < F**

Controlli preliminari
Prima di qualsiasi intervento, bisogna eseguire alcuni controlli :
- Condizioni e pressione dei pneumatici.
- Condizioni e altezza della sospensione.
- Efficienza degli ammortizzatori.
- Gioco dei cuscinetti dei mozzi, dei perni e delle articolazioni dell'avantreno.

Controllare il parallelismo con ruote anteriori allineate.
Controllare che lo sterzo di trovi in posizione mediana. Per i servosterzi, controllare l'assenza di pressione idraulica nel punto mediano.
Se è stato necessario procedere a delle regolazioni durante questi ultimi controlli, eseguire una prova del veicolo.
Se occorre, eseguire il controllo degli angoli dell'assale.

Sistema di controllo :
- **Veicolo vuoto e in ordine di marcia.**
- Cabina in posizione strada (per i veicoli con cabina ribaltabile).
- Veicolo su superficie piana e ruote dell'assale sterzante su dischi girevoli.
- Veicolo dotato di assale rialzabile: l'assale deve essere abbassato.
- Apparecchio con fascio luminoso.

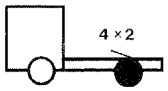
Regolazione delle battute di sterzata meccaniche
Con parallelismo regolato, avvitare a fondo le battite di sterzata.
Girare lo sterzo a destra fino ad ottenere l'angolo di sterzata richiesto.
Svitare le battute interessate fino al contatto. Serrare i controdadi (secondo il montaggio).
Girare lo sterzo a sinistra e regolare allo stesso modo le altre battute.
Controllare che i pneumatici non tocchino i componenti meccanici del telaio.

IMPORTANTE
Scatola dello sterzo con battute idrauliche a regolazione automatica: non azionare la scatola dello sterzo se la corsa non è limitata meccanicamente (rischio di sregolare le battute idrauliche).

Regolazione delle battute di limitazione idraulica di sterzata (da eseguire dopo la regolazione delle battute meccaniche di sterzata).

IMPORTANTE
Ruotare lentamente lo sterzo con ruote dell'assale su dischi girevoli o sollevate.

SIMBOLOGIA

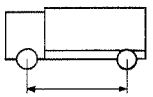


Sagoma/e

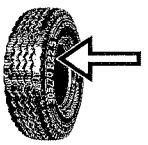
Carico in tonnellate sulla parte anteriore del veicolo per eseguire la misura

Tipo di assale

Tipo di ponte anteriore



Passo del veicolo



Dimensioni del pneumatico in pollici

< ... Minore di ...

> ... Maggiore di ...

≤ ... Inferiore o uguale a ...

Fig. 1

A = Ângulo de sopé
B = Ângulo de inclinação dos cavilhões
C = Ângulo de avanço
E / D = Ângulo de viragem

Paralelismo (valor expresso em mm/m (Tolerâncias: ± 0,9 mm/m)):
Convergência = **G > F**
Divergência = **G < F**

Verificações preliminares
Antes de qualquer intervenção, efectuar certas verificações:
- Estado e pressão dos pneus.
- Estado e altura da suspensão.
- Eficiência dos amortecedores.
- Folgas dos rolamentos dos cubos, dos cavilhões e das articulações do eixo dianteiro.

Com as rodas a direito, controlar o paralelismo.
Verificar se a direcção está no ponto médio. Para as direcções assistidas certificar–se, no ponto médio, da ausência de pressão hidráulica.
Efectuar um ensaio do veículo se estas verificações exigiram uma afinação. Se necessário, efectuar um controlo dos ângulos do eixo.

Condições de controlo:
- **Veículo vazio e em ordem de marcha.**
- Cabina na posição estrada (para os veículos com cabina basculante).
- Veículo numa área plana, rodas do eixo director sobre pratos giratórios.
- Veículo equipado com eixo levantável, o eixo deve ser baixado.
- Aparelho de projecção luminosa.

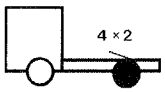
Regulação dos batentes de limitação mecânicos de viragem
com o paralelismo regulado, enroscar a fundo os batentes de viragem.
Girar a direcção para a direita até obter o ângulo de viragem pretendido.
Desenroscar os batentes concernidos até ao contacto. Apertar as contra–porcas (consoante a montagem).
Girar a direcçao para a esquerda e regular da mesma forma os outros batentes.
Verificar se os pneus não ficam em contacto com os elementos mecânicos do chassis.

IMPORTANTE
Caixa de direcção com batentes hidráulicos de regulação automática: não manobrar a caixa de direcção quando esta não estiver limitada mecanicamente em oscilação (risco de desregulação dos batentes hidráulicos.

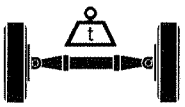
Regulação dos batentes de limitação hidráulica de viragem das rodas (deve ser efectuada depois da regulação dos batentes mecânicos de viragem das rodas).

IMPORTANTE
Girar lentamente a direcção quando as rodas do eixo estiverem sobre pratos giratórios ou levantadas.

SINAIS CONVENCIONAIS



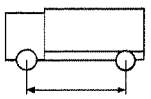
Silhueta (s)



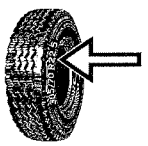
Carga em toneladas à frente do veículo para efectuar a medição

Tipo de eixos

Tipo de ponte dianteira



Distância entre eixos do veículo



Dimensão do pneu em polegadas

< ... Inferior a ...

> ... Superior a ...

≤ ... Inferior ou igual a ...

Fig. 1

A = Camber
B = K.P.I.
C = Caster
E / D = Wieluitslag

Wieluitlijning (waarde in mm/m (Toleranties ±0,9 mm/m)) :
Toespoor = **G > F**
Uitspoor = **G < F**

Voorafgaande controles
Voordat aan de onderdelen wordt gewerkt, moeten de onderstaande controles worden uitgevoerd:
- Staat van de banden en hun spanning.
- Staat en hoogte van de vering.
- Werking van de schokdempers.
- Speling in de lagers van de wielnaven, de fusees en de draaipunten van de voorwielophanging.

Zet de wielen in de rechtuitrijstand en controleer de uitlijning.
Controleer of het stuurhuis in de middenstand staat. Bij stuurbekrachtiging moet worden gecontroleerd of er in de middenstand geen bekrachtiging aanwezig is.
Voer een test uit bij de wagens als deze laatste controles een afstelling vereisten. Voer zonodig een controle uit van de wielen fuseepenhoeken.

Voorwaarden voor de controle:
- **Lege, rijklare wagen.**
- Cabine in de rijstand (bij wagens met kantelcabine).
- Zet de wagen op een recht en horizontaal vlak met de sturende wielen op draaiplateaus.
- Wagens met een sleepas: de as moet op de grond staan.
- Gebruik optische uitlijnapparatuur.

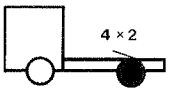
Afstelling van de mechanische aanslagen voor de wieluitslag :
Stel eerst zonodig de wieluitlijning af en draai vervolgens de aanslagbouten volledig in.
Verdraai het stuurwiel naar rechts om de gewenste wieluitslag te verkrijgen.
Verdraai de bouten tot deze tegen de aanslagen aankomen. Draai de borgmoeren vast (indien aanwezig).
Verdraai de wielen naar links en voer dezelfde werkzaamheden uit.
Controleer of de banden niet tegen mechanische delen van de carrosserie aankomen.

BELANGRIJK
Het stuurhuis heeft hydraulische aanslagen met automatische afstelling: verdraai het stuurhuis niet als de mechanische aanslagen voor de suuruitslag niet zijn aangebracht (de hydraulische afstellingen kunnen hierdoor worden verstoord).

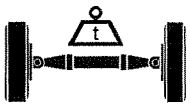
Afstelling van de hydraulische aanslag voor de wieluitslag (moet worden uitgevoerd nadat de mechanische aanslagen zijn afgesteld).

BELANGRIJK
Verdraai de stuurinrichting langzaam als de wielen van de as op draaiplateaus staan of van de grond zijn.

ALGEMENE SYMBOLEN



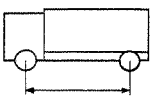
Model(len)



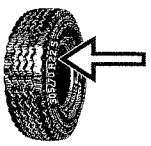
Belading in ton op de voorzijde van de wagen om te kunnen meten

Type as

Type aangedreven vooras



Wielbasis van de wagen



Bandmaat in inches

< ... kleiner dan ...

> ... groter dan ...

≤ ... minder dan of gelijk aan ...

Fig. 1

A = Cambervinkel
B = Styreboltenes hældningsvinkel
C = Castervinkel
E / D = Drejningsvinkel

Sporing (værdi i mm/m (Tolerancer: ±0,9 mm/m)) :
Spidsning = **G > F**
spredning = **G < F**

Forudgående kontrol
Inden ethvert indgreb kontrolleres følgende :
- Dækkenes tilstand og dæktryk.
- Affjedringens tilstand og højde.
- Støddæmpernes effektivitet.
- Slør i navlejer, forhjulsspindler og drejelige led i fortøjet.

Med forhjulene i lige line kontrolleres sporingen.
Det ses efter, at styretøjet er i midpunktet. For styretøjer med servo kontrolleres, at der i midtpunkt ikke er noget hydrauliktryk.
Der foretages afprøvning af køretøjet, hvis sidstnævnte kontrolarbejder har medført justering. Om nødvendigt kontrolleres akslens vikler.

Kontrolbetingelser :
- **Vognen skal være tom og køreklar.**
- Førerhuset skal være i kørestilling (ved vogne med tipbare førehuse).
- Vognen skal være parkeret på en plan flade med styreakslens hjul på drejeskiver
- Ved vogne med løftbar aksel skal denne være sænket.
- Der anvendes lysprojektionsapparat.

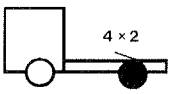
Justering af mekaniske udvingsstop :
Efter indstilling af sporingen skrues udsvingsstoppene helt i bund.
Styretøjet drejes til højre til den ønskede drejningsvinkel.
De pågældende udvingsstop løsnes, til de er i kontakt. Kontramøtrikkerne spændes til (afhængig af montering).
Styretøjet drejes til venstre, og de øvrige stop indstilles tilsvarende.
Det kontrolleres, at dækkene ikke kommer i berøring med chassis'ets mekaniske dele.

VIGTIGT
Ved styrehuse med automatisk regulerede hydrauliske udsvingsstop må styrehuset ikke manøvreres, når det ikke har mekanisk styringsbegrænsning (risiko for at ændre de hydrauliske udsvingsstops justering).

Indstilling af stop for hydraulisk begrænsning af drejning (Foretages efter justering af de mekaniske styringsstop).

VIGTIGT
Styretøjet skal drejes langsomt, når akslens hjul er på drejeskiver eller hævet.

SYMBOLER

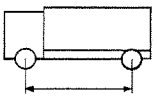


Profil

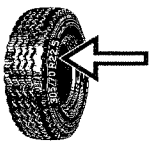
Belastning i tons på køretøjets forende ved målingens udførelse

Akseltype

Drivakseltype



Køretøjets akselafstand



Dækdimension i tommer

< ... Mindre end ...

> ... Større end ...

≤ ... Mindre end eller lig med ...

Пис 1

A = Угол развала колёс
B = Угол наклона шкворней
C = Угол продольного наклона шкворня
E / D = Угол поворота колёс

Параллельность (значение, указанное в мм/м (Допуск (0,9 мм/м)) :
Схождение = **G > F**
Открытие = **G < F**

Предварительный контроль
До начала работ провести следующие проверки :
- Состояние шин и давление в них.
- Состояние подвески и её высоту.
- Состояние амортизаторов.
- Подшипники ступиц, шкворней и шарнирных соединений передней оси.

Выравнять передние колёса, проверить параллельность.
Убедиться, что руль находится в среднем положении. Для рулевого управления с гидроусилителем убедиться в отсутствии гидравлического давления при среднем положении руля.
Если результаты проверки потребовали выполнения регулировок, необходимо провести испытания автомобиля.

Условия проведения проверки :
- **Автомобиль без груза и в положении запуска.**
- Кабина в положении езды (для автомобилей с опрокидывающейся кабиной).
- Автомобиль паркирован на ровной плоскости так, чтобы колеса ведущей оси стояли на поворотных технических платформах.
- На автомобилях с подъёмной осью кабина должна быть опущена.
- Использование осветительного прожектора.

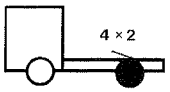
Регулировка механических ограничителей поворота колёс :
После регулировки параллельности, закрепить до отказа ограничители поворота колёс.
Повернуть руль вправо до получения желаемого угла поворота колёс.
Отвинтить ограничители до контакта. Затянуть контрящие гайки (соответственно сборке).
Повернуть руль влево и отрегулировать по аналогии остальные ограничители.
Убедиться, что шины не соприкасаются с механичеслими элементами шасси.

ЭТО ВАЖНО !
Картер рулевого механизма оборудован саморегулируемыми гидравлическими ограничителями : не маневрировать рычаг рулевого управления если не установлено механическое ограничение по углу отклонения (во избежание расстройки гидравлических ограничителей).

Регулировка саморегулируемых гидравлических ограничителей поворота (Выполняется вслед за регулировкой механических ограничителей поворота).

ЭТО ВАЖНО !
Когда колеса оси стоят на поворотных технических платформах или если они подняты, рулевой механизм поворачивать медленно.

УСЛОВНЫЕ ОБОЗНАЧЕНИЯ

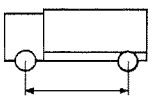


Силуэт (силуэты)

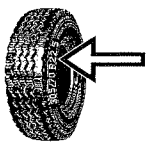
Нагрузка (в тоннах) передней стороны автомобиля, для выполнения замеров

Тип осей

Тип переднего моста



Расстояние между осями колес

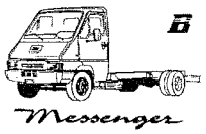


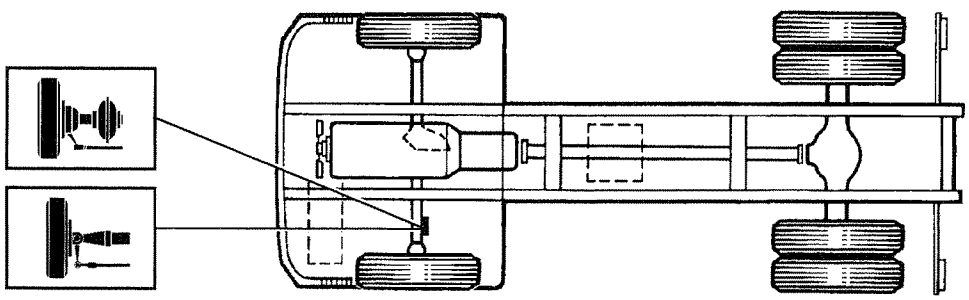
Размер пневматической шины (в дюймах)

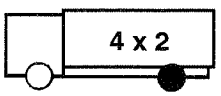
< ... Меньше ...

> ... Больше ...

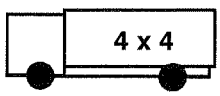
≤ ... Меньше или равно ...



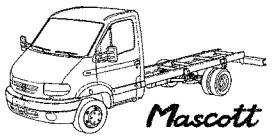


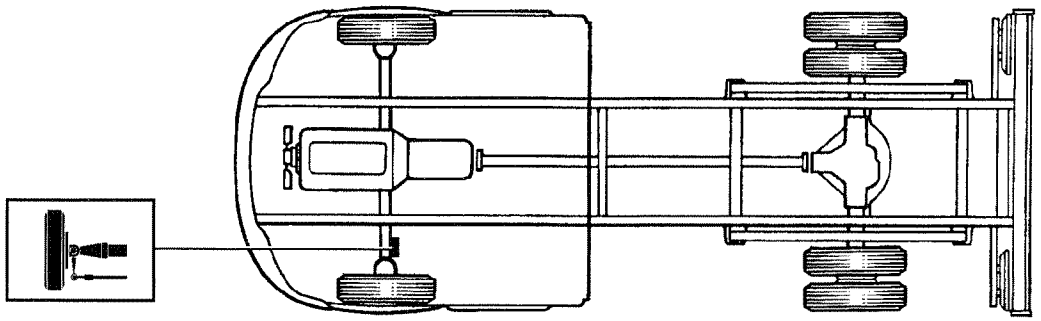


B Messenger			A	B	C		D	E	G > F
					Gemmer 65	TRW TAS 30 Bendix C 111 3..			
B 80 B 110 B 120	369.05	2 700	1° 30'	7°	2° 45'	6° 10'	38° 30'	30°	2,5
	369.02	3 200 3 840 4 400					43°	32°	

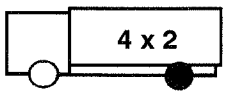


B Messenger		A	B	C	D	G < F
B 110	Hurt 202 569.10	1°	8°	5°	40°	0

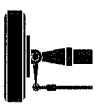
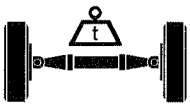


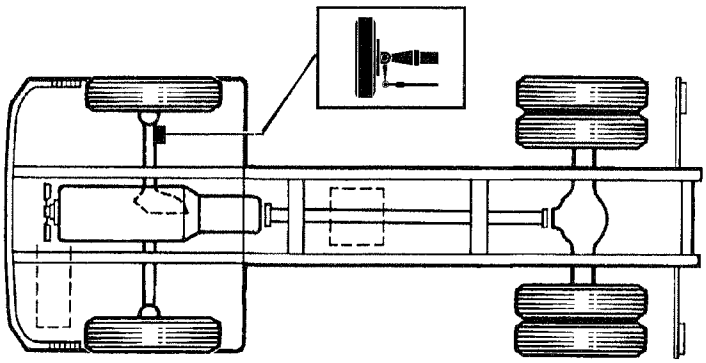


42 0118A

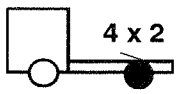


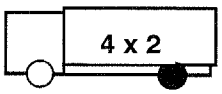
	A	B	C	D	E
E 22 AB	1°	6° 20'	6° 45'	52°	40°

		
E 22 AB	– 2,2	– 2,7

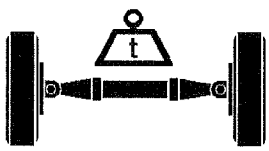


97 0049F



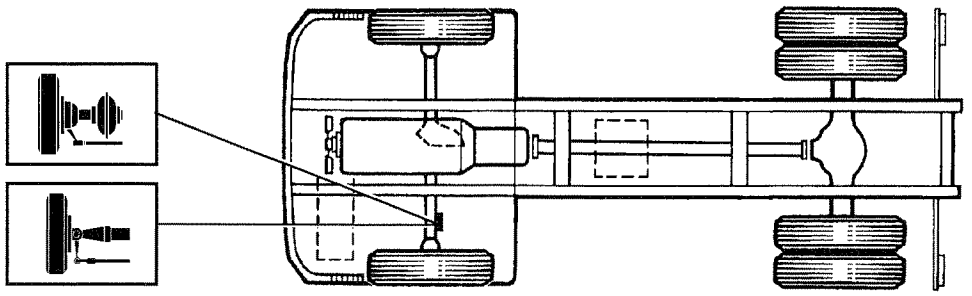


	A	B	C	D	E
E 42 BC	1°	6° 45'	4 ° 30'	50°	35°
E 46 AB					
E 62 AD					



	1,5	2	2,5	3	3,5	4	4,5	5	6	6,5
E 42 BC	+ 1,2	+ 0,6	0	– 0,5	– 1,1	– 1,7	– 2,3	– 2,8		
E 46 AB	+ 2,5	+ 1,8	+ 0,5	– 1,2	– 0,20	– 0,9	– 1,6	– 2,3		
E 62 AD	– 4,3	– 3,9	– 3,5	– 3,1	– 2,7	– 2,3	– 1,9	– 1,5	– 0,7	– 0,3

S
Midliner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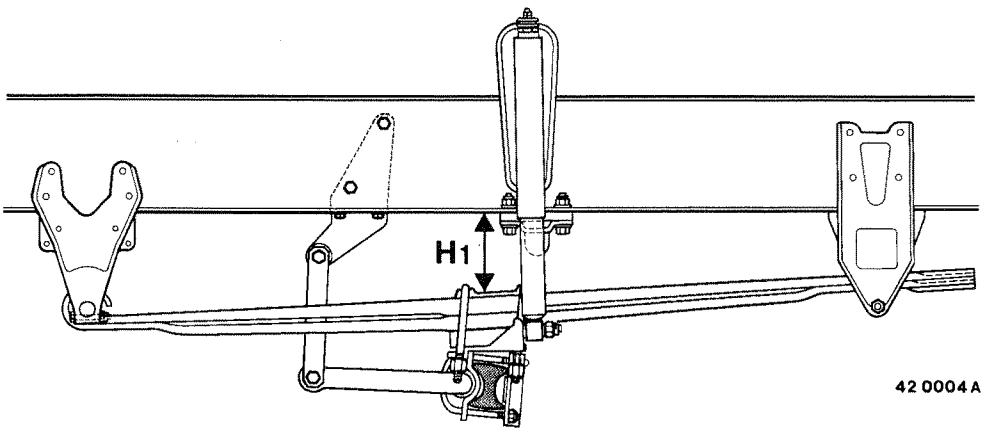
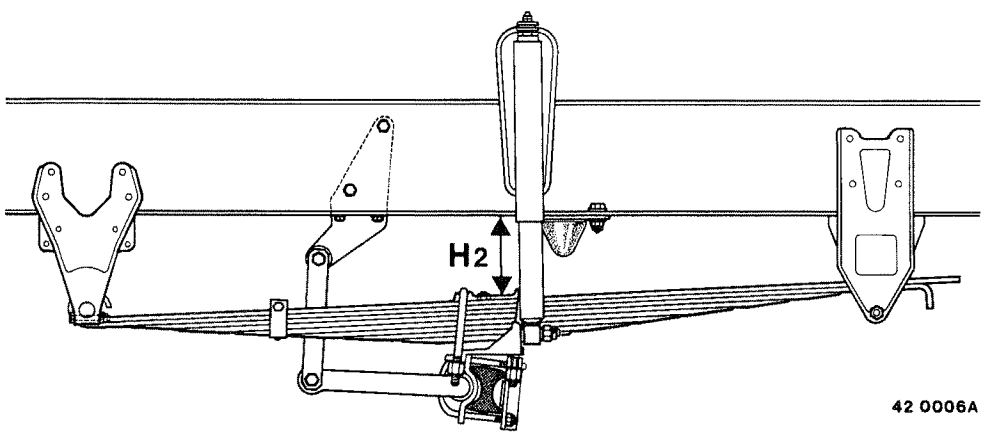
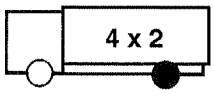
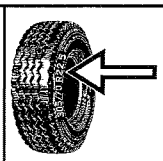
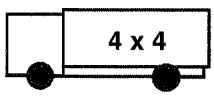
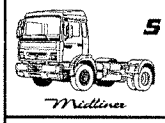
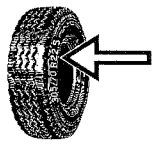

H1
42 0004 A

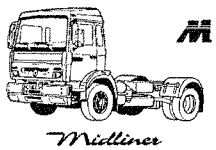

H2
42 0006A

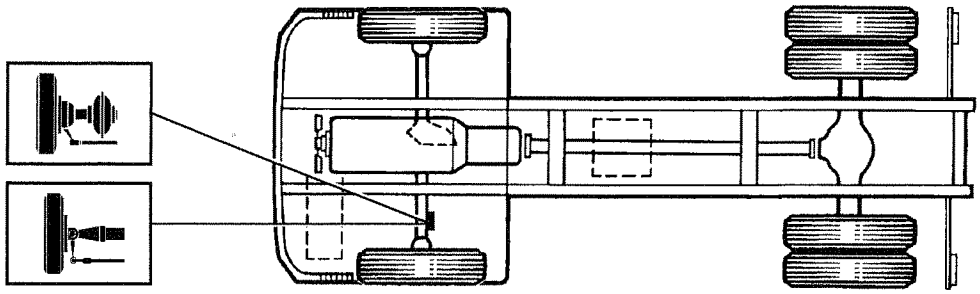


		H1	H2	A	B	C	D	E		G > F
S 120 S 135 S 140 S 150 S 160 S 180 S 200 S 210	E 402	148		0° 45'	6° 45'	2° 30	48°	33° 30'	R.16	1,2 → 3,7
									R.17,5	1,1 → 3,4
	E 401	165	182	1° 30'	6°	3°	44°	33° 20'	R.19,5	1 → 3



		H2	A	B	C	D	E		G < F
S 170	3 MRDIF	164	2°	7°	2° 40'	29°	23°	R.20	0 → 3,9
								R.22,5	0 → 3,5


Midliner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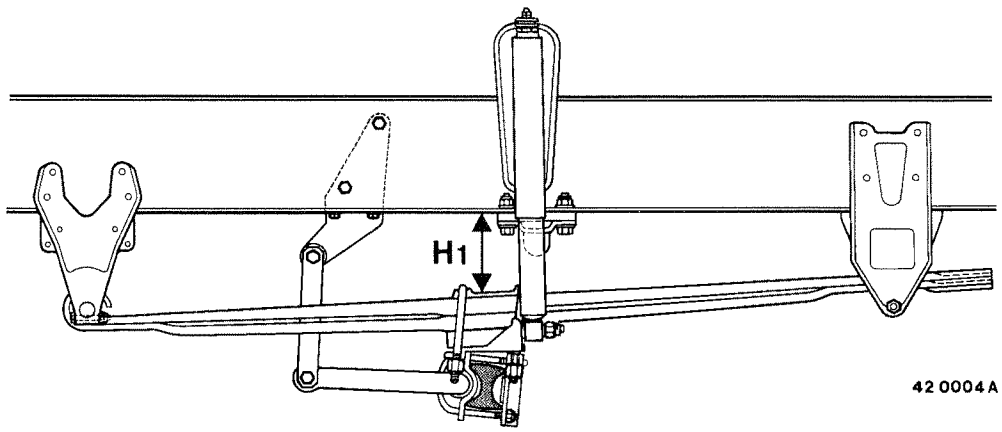
H1
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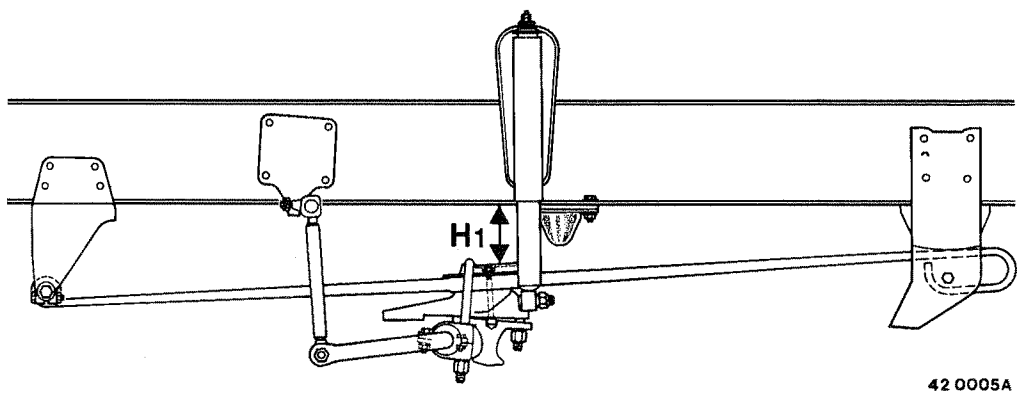
H1
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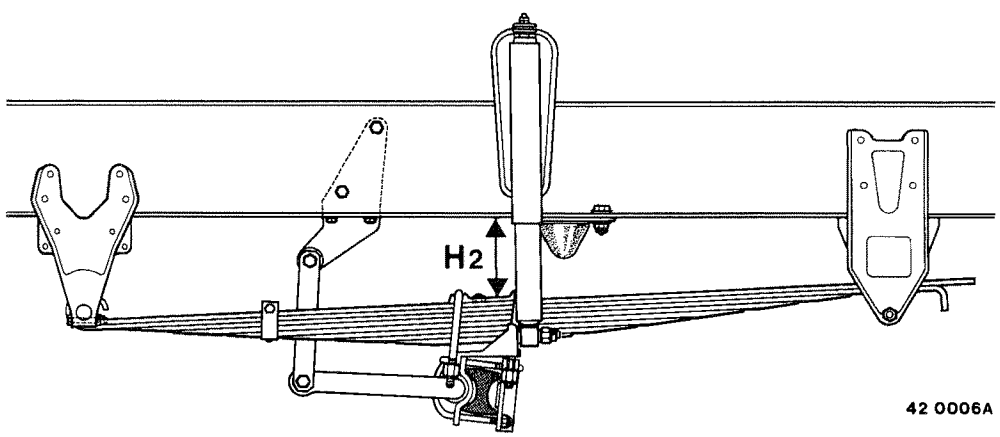
H2
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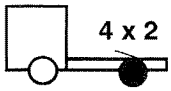
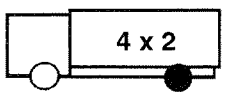
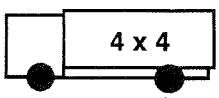
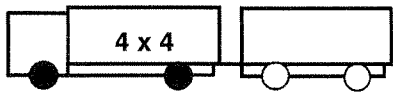


		H1	H2	A	B	C	D	E		G > F
M 160 M 200 M 230	E 400 AA E 400 AB	151		0° 45'	6° 45'	2° 30'	50°	35°	R.19,5 R.20	1 → 3
									R.22,5	0,9 → 2,6

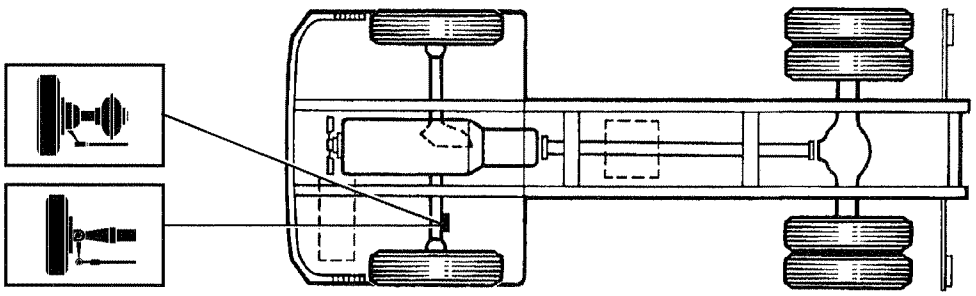


		H1	H2	A	B	C	D	E		G > F
M 120 M 140 M 150 M 160 M 180 M 200 M 210 M 230	E 400 AA E 400 AB E 400 AC	151		0° 45'	6° 45'	4° 30'	50°	35°	R.19,5 R.20	1 → 3
M 160 M 180 M 200 M 210 M 230 M 250	E5 A 221	165	182	1°			42°	34°		
M 120	E 401 AB	151		1° 30'		3°	44°	33° 20'	R.22,5	0,9 → 2,6
M 180 M 200	E 408			0°			50°	32°		





		H1	H2	A	B	C	D	E		G < F
M 150 9.5/11.5 M 180 9.5/11.5	3 MRDIF	170	164	2°	7°	2° 45'	29°	25°	R.20	0 → 5,9
M 180 13/15								23°		
M 210 10	33411 SFW	191				5° 05'		25°	R.22,5	0 → 5,2
M 210 112/14/16	3414 SFW						30°	23°		



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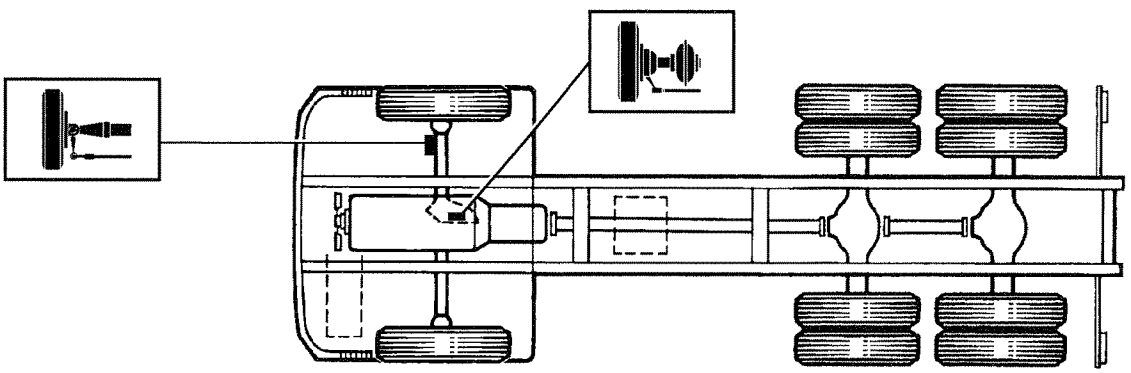
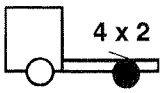
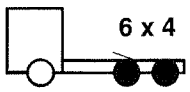


97 0050C

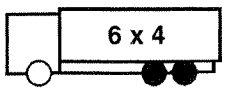


		A	B	C	D	E	G > F
C 340 ti	E 6 A 4 C	1° 45'	6° 45'	3° 30'	45°	35°	0,9 → 2,6
CLM 320 CLM 340 CLM 385	E 6 A 511 E 6 A 811	1°			41°	33°	

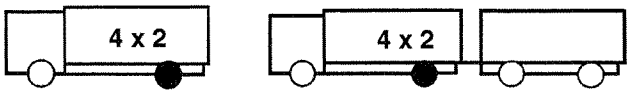


		A	B	C	D	E	G > F
CLM 320 CLM 340 CLM 385	E 6 A 511 E 6 B 811	1°	6° 45'	3° 30'	41°	33°	0,9 → 2,6

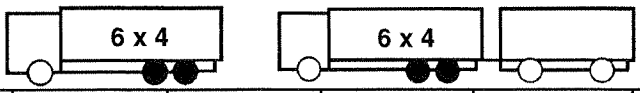
		A	B	C	D	E	G < F
CLM 320 CBH 320 CBH 385	PA 721	2°	7°	1° 30'	39°	31° 40'	0 → 5,2



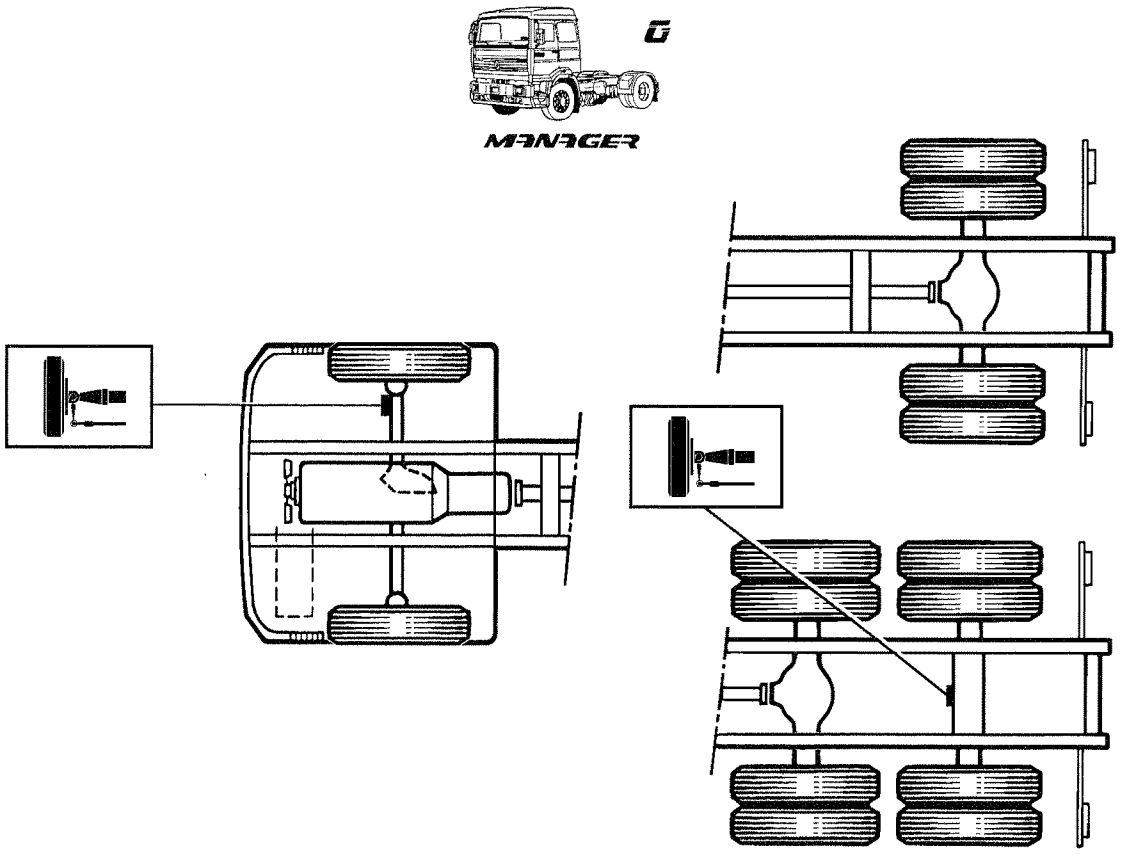
		A	B	C	D	E	G > F
CBH 320	E 6 A 811	1°	6° 45'	3° 30'	41°	33°	0,9 → 2,6
CBH 385	E 6 B 811						



		A	B	C	D	E	G > F
CLR 230	E 6711	1°	6° 45'	3°	45°	37°	0,9 → 2,6
CLM 320 CLM 340 CLM 385	E 6 A 4 C E 6 A 711					33°	



		A	B	C	D	E	G > F
C 300	E 6 A 4 C	1°	6° 45'	3° 30'	45°	37°	0,9 → 2,6
	E 6 A 711					33°	



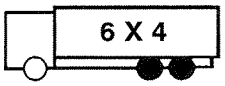
42 0121A

4 x 2

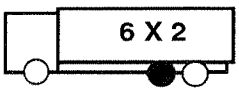
G MANAGER		A	B	C	D	E	G > F
G 270 G 280 G 300 G 330 G 340 ti	E 5 A 4 C E 5 B 4 C	1°	6° 45'	3°	40°	34°	0,9 → 2,6

4 x 2

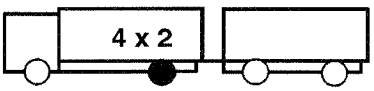
G MANAGER		A	B	C	D	E	G > F
G 210	E 5 B 4 C	1°	6° 45'	3°	40°	34°	0,9 → 2,6
G 230 ti	E 5 B 4 D				45°	35°	
G 220 BOM	E 5 A 821				40°	34°	
	E 5 B 4 C				40°	34°	
G 260 BOM	E 6 B 4 D				45°	35°	
G 230 SP	E 5 A 4 C				40°		



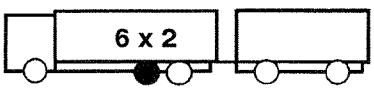
		A	B	C	D	E	G > F
G 300	E 5 A 821	1°	6° 45'	3°	40°	34°	0,9 → 2,6
	E 6 B 7 B				45°	37°	
	E 6 B 4 D					35°	



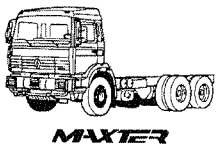
		A	B	C	D	E	G > F
G 300 G 330	E 6 B 4 D	1°	6° 45'	3°	45°	35°	0,9 → 2,6

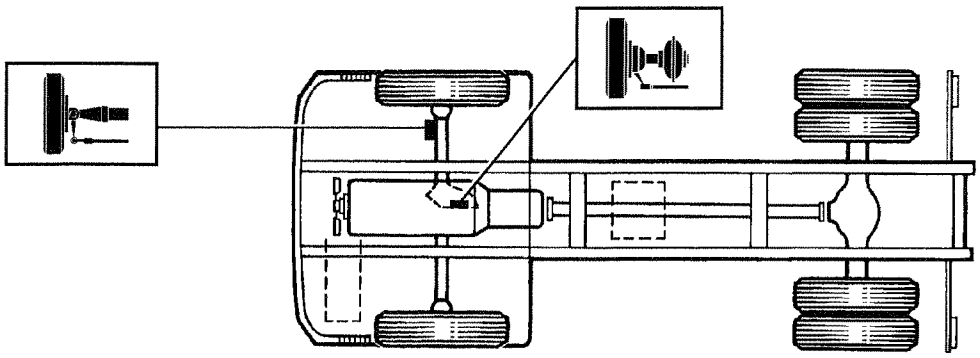


		A	B	C	D	E	G > F
G 230 ti	E 6 B 4 D	1°	6° 45'	3°	45°	35°	0,9 → 2,6
G 270 G 280 G 300 G 330	E 6 B 4 C E 6 B 4 D				40°	34°	
G 340 ti	E 5 A 821				36°	37°	

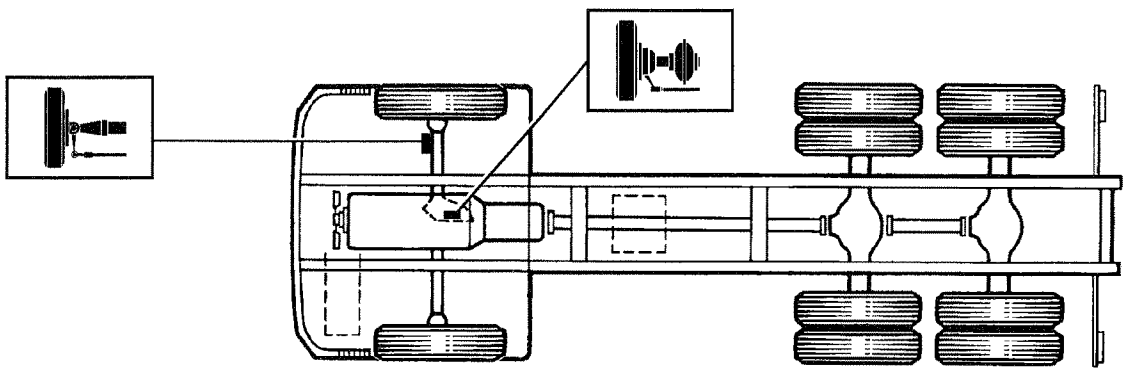


		A	B	C	D	E	G > F
G 270 G 280 G 300 G 330 G 340 ti	E 6 B 4 D	1°	6° 45'	3°	45°	35°	0,9 → 2,6

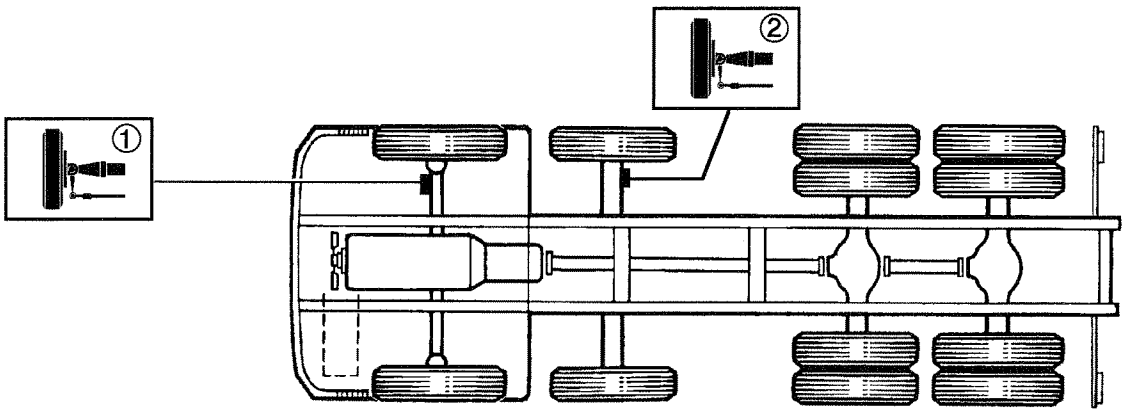




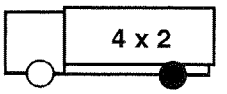
97 0049E

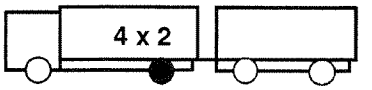


97 0050C

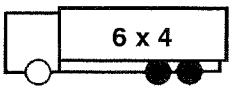


97 0051B

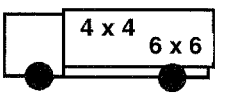


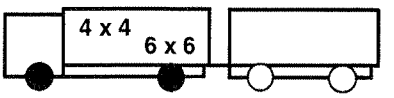


		A	B	C	D	E	G > F
G 230 ti	E 6 B 4 D	1°	6° 45'	3°	45°	37°	0,9 → 2,6
G 270	E 5 A 821				36°	30°	
G 300	E 6 B 4 D				45°	37°	

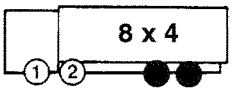


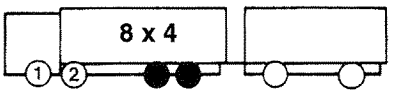
		A	B	C	D	E	G > F
G 270 G 300 G 340 ti	E 83 KL	1°	6° 45'	3°	45°	38°	0,9 → 2,6



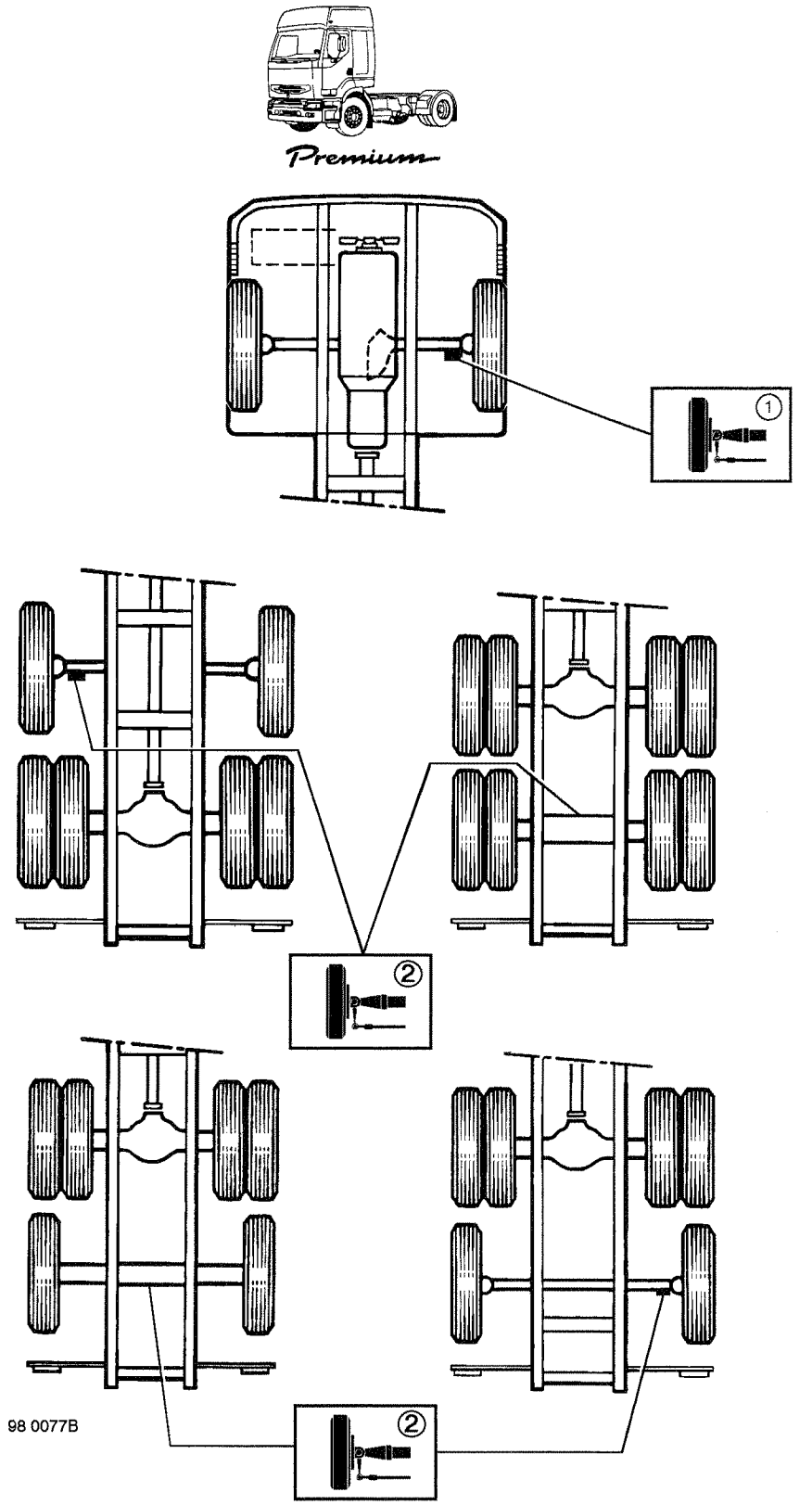


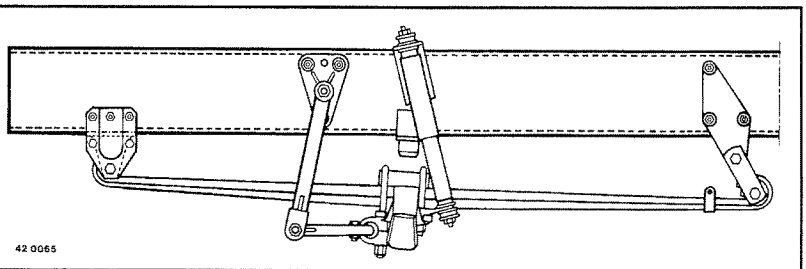
		A	B	C	D	E	G < F
G 300	PA 721	2°	8°	2° 11'	42°	32° 35'	0 ± 1
G 340 ti	PA 945						



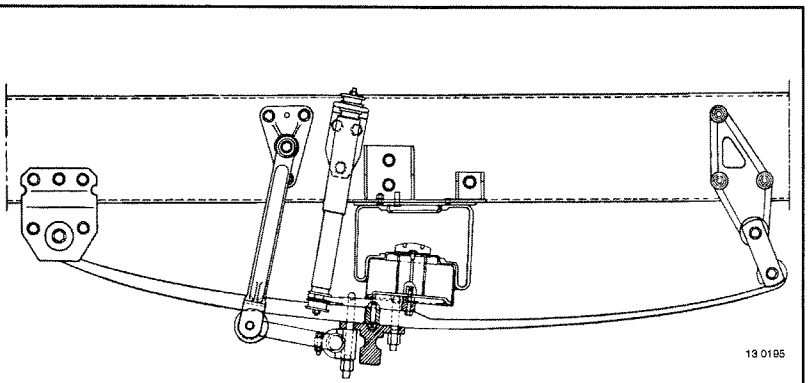


		A	B	C		D		E		G > F
				①	②	①	②	①	②	
G 300 G 340 ti	E 83 KL	0° 15'	7° 45'	3° 11'	2° 29'	44° 4'	37°	29° 33'	33° 21'	0,9 → 2,6

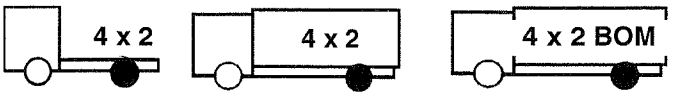

Premium
1
2
2
98 0077B

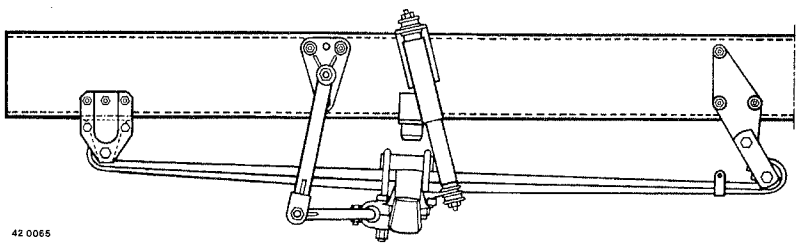


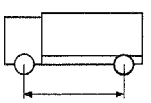
	A	B	C	D	E
E 82 CN E 86 LR	1°	6° 45'	3° 42'	50°	36° 48'
E 82 JN					40° 47'



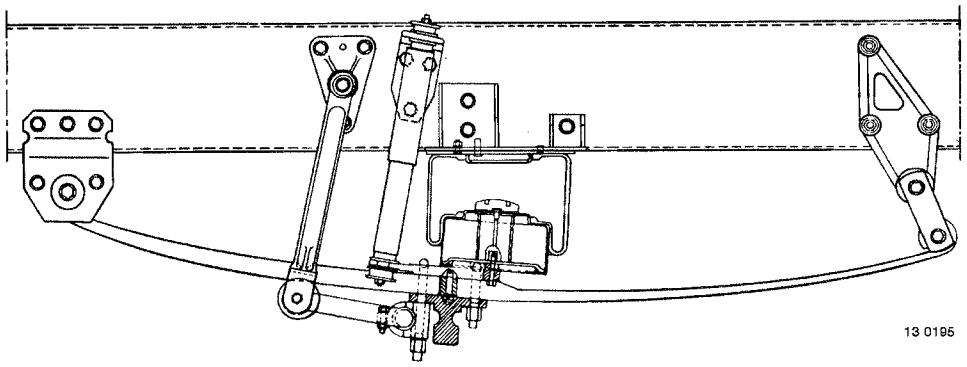
	A	B	C	D	E
E 81 NO E 81 NS	1°	6° 45'	4°	50°	36°48'
E 81 EO					40°47'
E 81 B				18°	15°

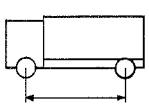




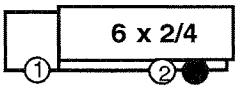


		4	4,5	5	5,5	6	6,5	7
≤ 4700 mm	E 82 CN	+ 0,5	+ 0,2	0	− 0,3	− 0,6	− 0,9	
> 4700 mm	E 82 JN	+ 1,6	+ 1,2	+ 0,8	+ 0,4	0	− 0,5	− 0,9
	E 86 LR	+ 0,4	+ 0,2	0	− 0,2	− 0,5	− 0,7	

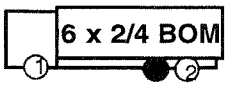




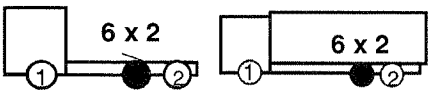
		4	4,5	5	5,5	6	6,5	7
≤ 4700 mm	E 81 NO E 81 NQ	− 2,8	− 2,5	− 2,1	− 1,8	− 1,5	− 1,2	− 0,9
> 4700 mm	E 81 EO			− 2,2				

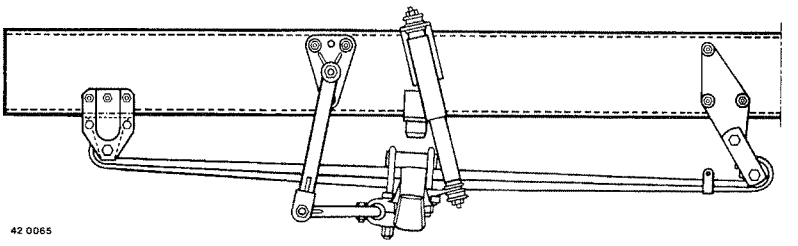


		t 4	4,5	5	5,5	6	6,5	7
①	E 82 JN	+ 1,6	+ 1,2	+ 0,8	+ 0,4	0	− 0,5	− 0,9
②	E 81 NS	− 2,8	− 2,5	− 2,1	− 1,8	− 1,5	− 1,2	

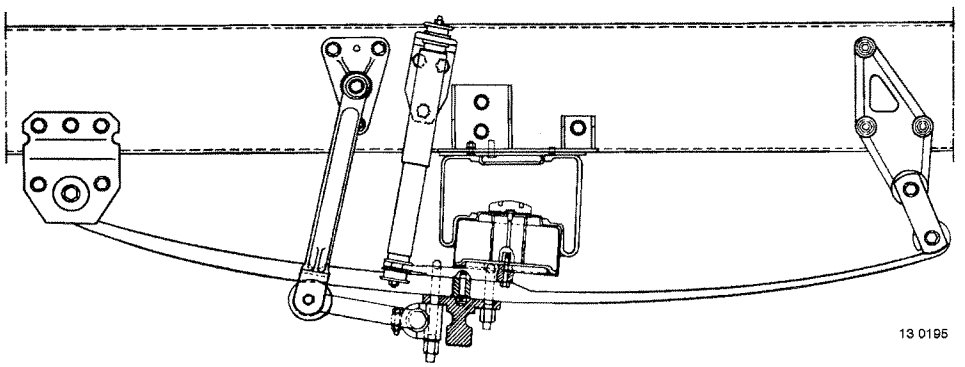


		t 1,6	4	4,5	5	5,5	6	6,5	7
①	E 82 JN		+ 1,6	+ 1,2	+ 0,8	+ 0,4	0	− 0,5	− 0,9
②	E 81 B	− 5	− 2,5	− 2	− 1 ,5	− 1	0	+ 0,2	



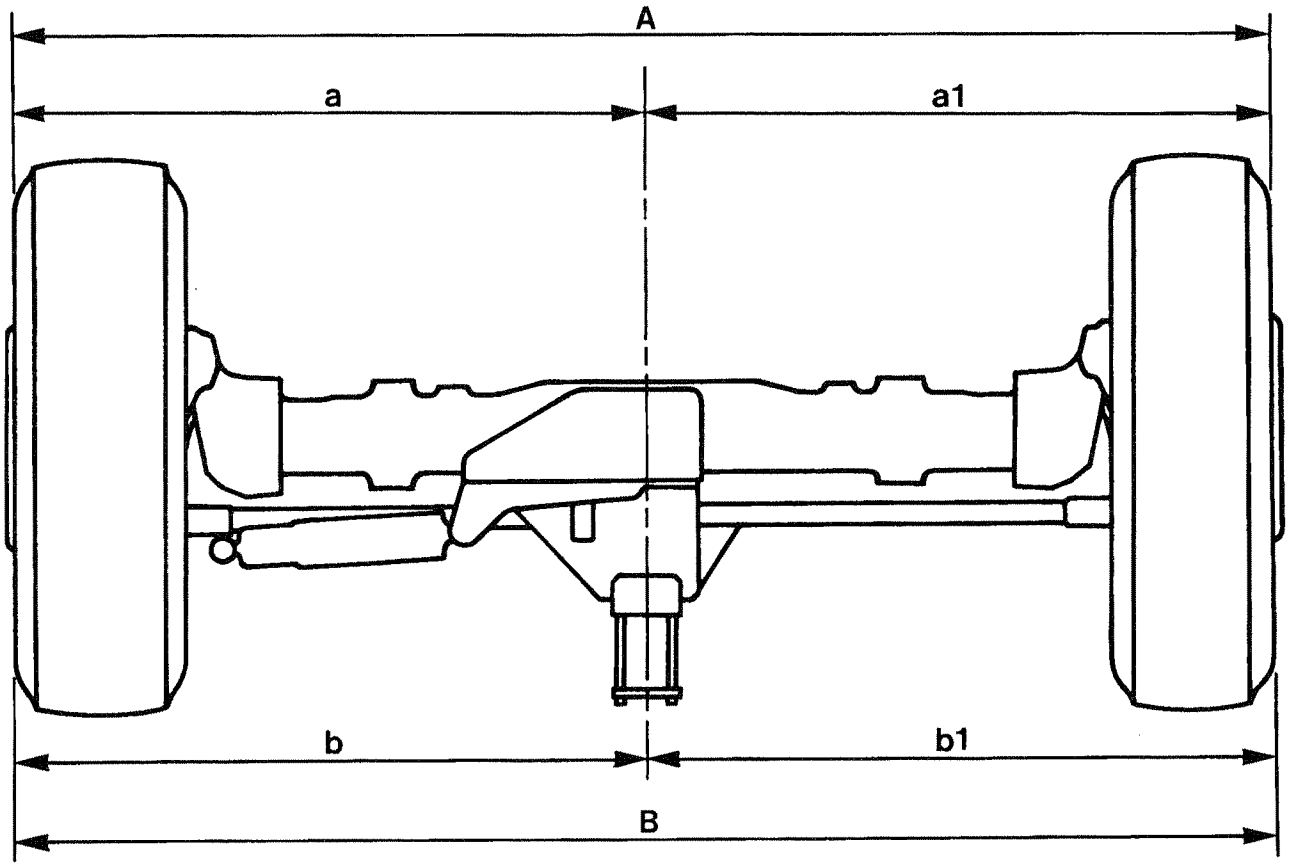


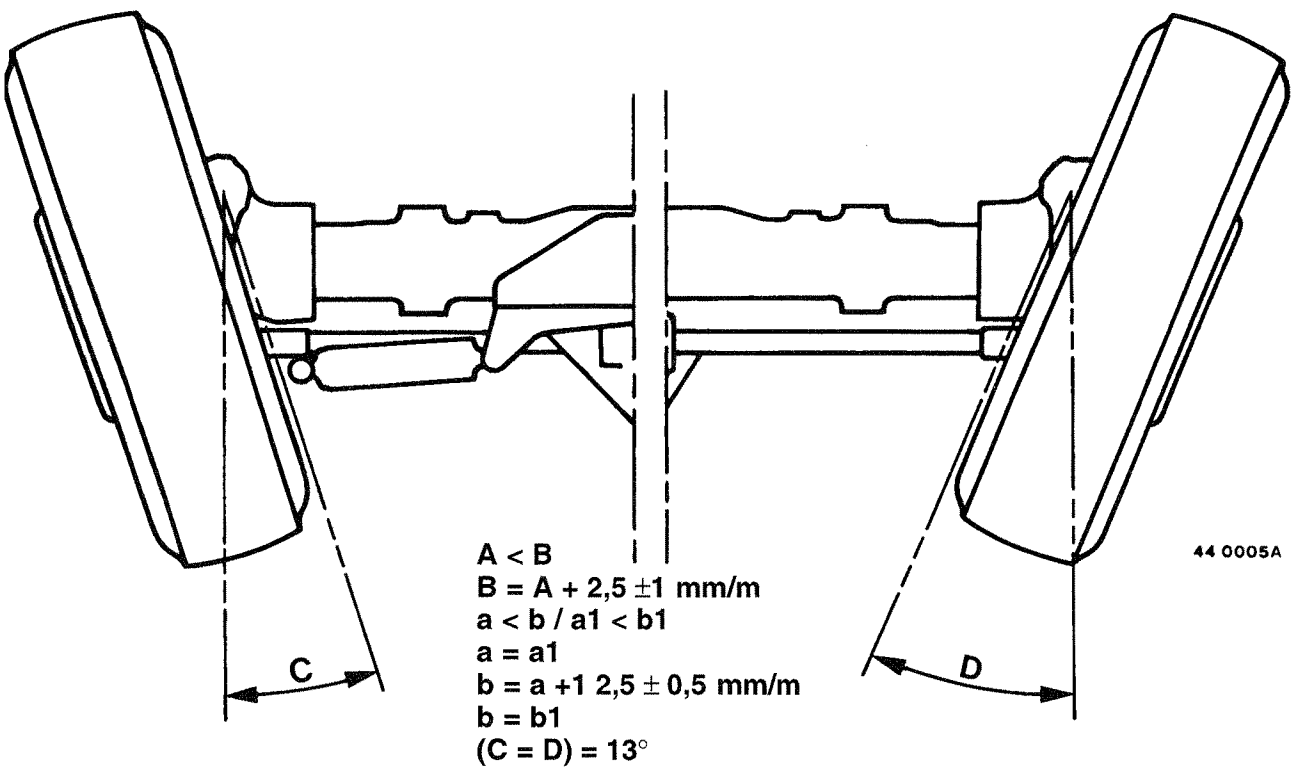
		t							
		4	4,5	5	5,5	6	6,5	7	7,5
①	E 82 JN	+ 1,6	+ 1,2	+ 0,8	+ 0,4	0	− 0,5	− 0,9	
②	AUSTERAS	+ 1,2	+ 1,05	+ 0,85	+ 0,7	+ 0,5	+ 0,35	+ 0,2	0



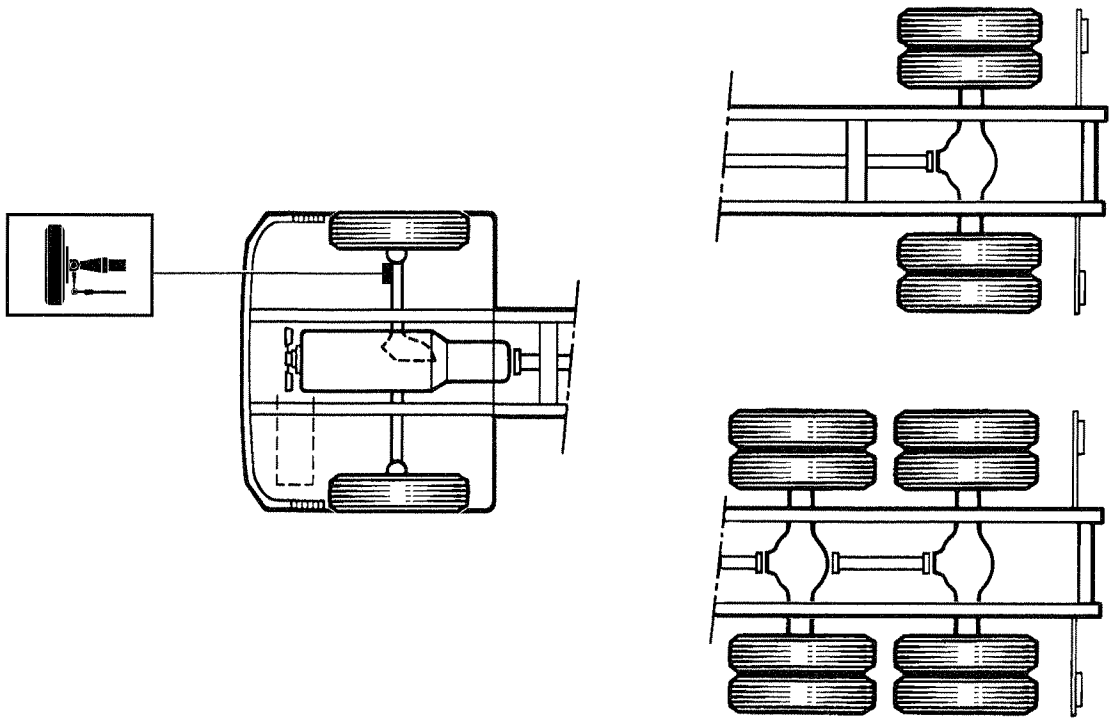
		t						
		4	4,5	5	5,5	6	6,5	7
①	E 81 NO E 81 EO	− 2,8	− 2,5	− 2,1	− 1,8	− 1,5	− 1,2	− 0,9

AUSTERAS

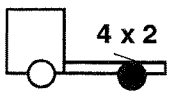




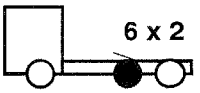
A < B
B = A + 2,5 ±1 mm/m
a < b / a1 < b1
a = a1
b = a +1 2,5 ± 0,5 mm/m
b = b1
(C = D) = 13°



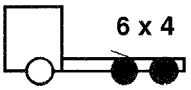
42 0119A



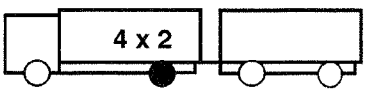
R MAJOR		A	B	C	D	E	G > F
R 340 R 385 R 420	E 84 AG E 84 GG	1°	7° 45'	4°	47° 40'	32° 15'	0,9 → 2,6
	E 85 CM				39°	36° 30'	
	E 6 A 211 E 6 A 311 E 6 A 32 E 6 A 33		6°		39°	29°	

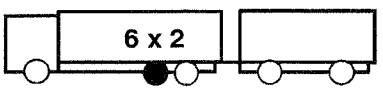


R MAJOR		A	B	C	D	E	G > F
R 385	E 6 A 311 E 6 A 32	1°	6° 45'	4°	39°	29°	0,9 → 2,6

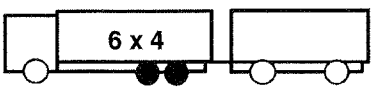


R MAJOR		A	B	C	D	E	
R 340 ti	E 85 CM	1°	7° 45'	4°	39°	36° 30'	0,9 → 2,6
R 340 ti/td	E 6 A 211		6° 45'			29°	

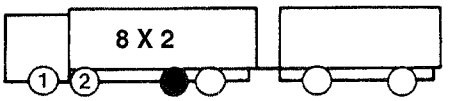




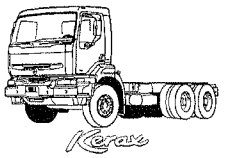
R MAJOR		A	B	C	D	E	G > F
R 340 R 385	E 84 EG E 85 AG E 85 CM E 85 JM	1°	7° 45'	4°	39°	36° 30'	0,9 → 2,6

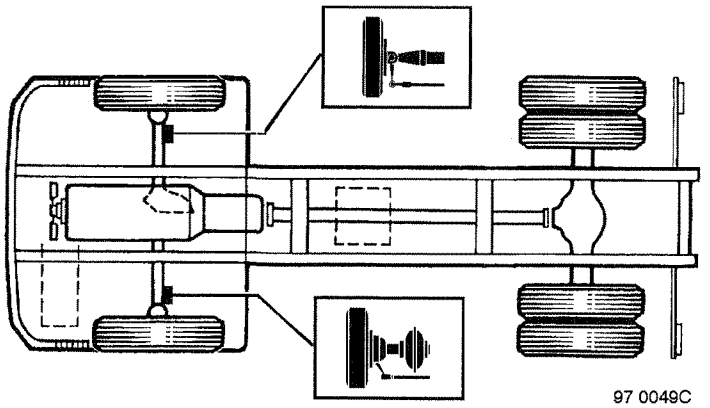


R MAJOR		A	B	C	D	E	G > F
R 385	E 85 CM E 85 JM	1°	7° 45'	4°	47° 30'	32° 15'	0,9 → 2,6
	E 6 A 211		6° 45'		39°	29°	



R MAJOR		A	B	C	D	E	G > F
R 385 ti	① E 85 JH	0° 15'	7° 30'	3° 15'	38° 27'	33° 15'	0,9 → 2,6
	② E 85 JH				29° 5'	26° 15'	

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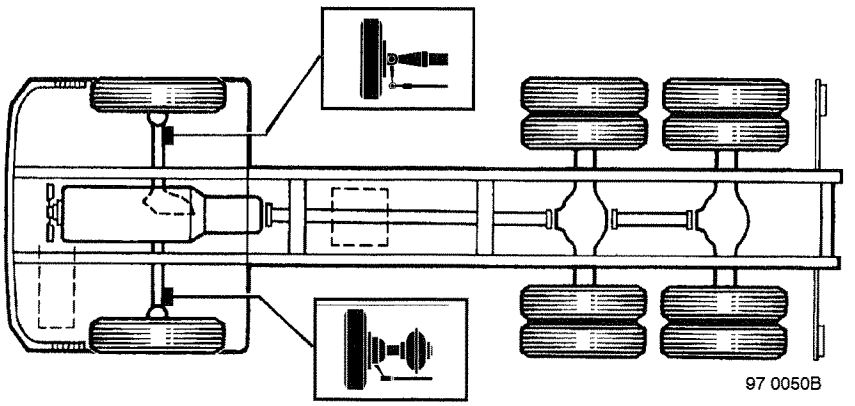
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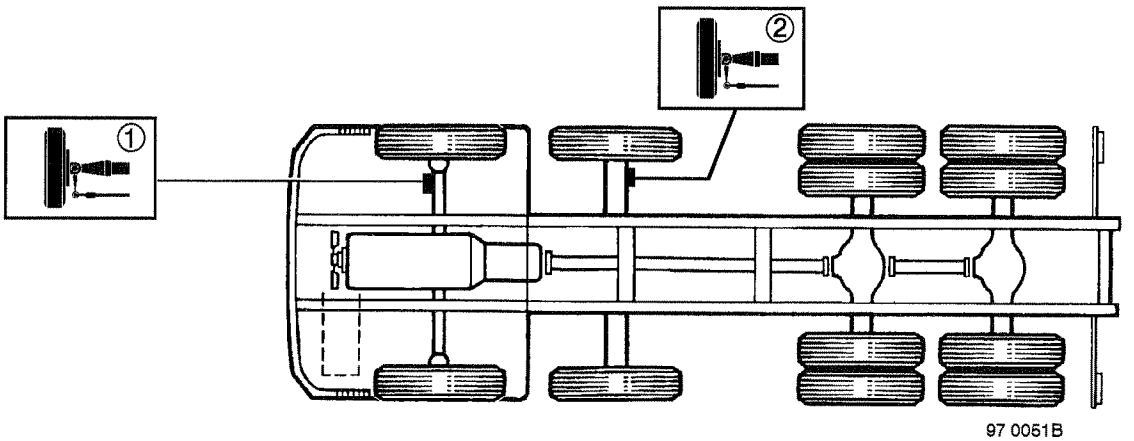
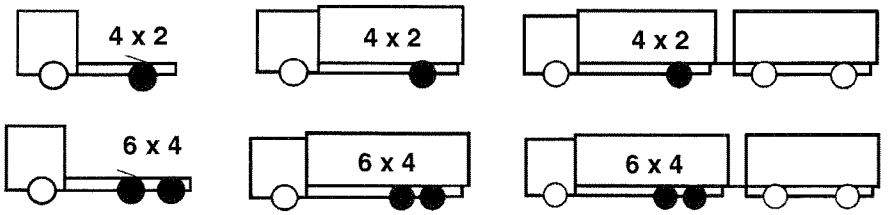
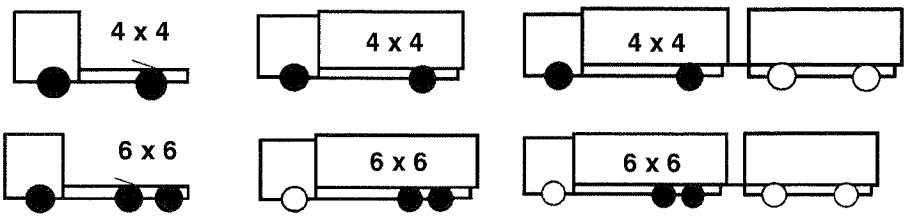
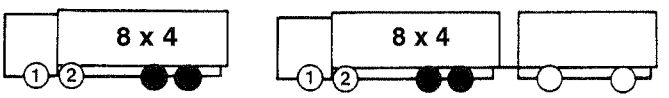

①
②
97 0051B



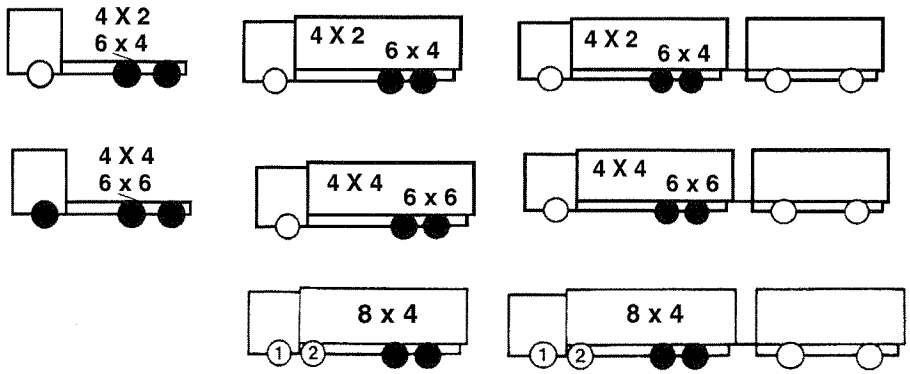
	A	B	C	D	E
E 83 KL	1°	6° 45'	3° 20'	41°	37° 3'



	A	B	C	E
PA 941 PA 945	2°	8°	3°	42°

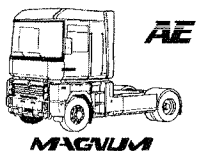


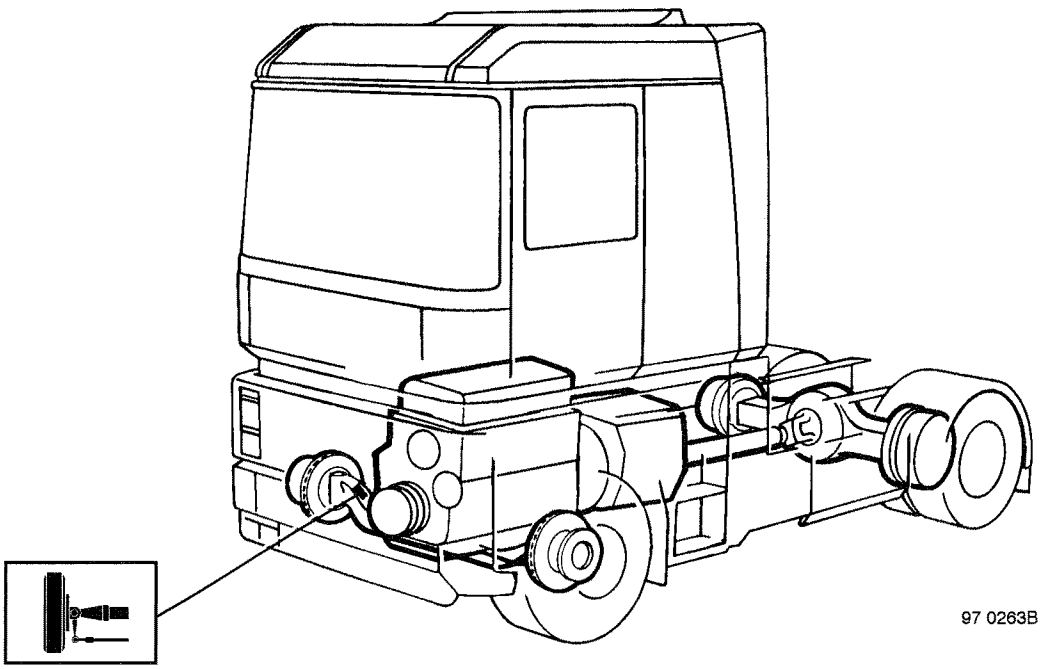
	A	B	C	D	E
① E 83 KL	1°	6° 45'	3° 30'	41°	35°
② E 83 ML ② E 83 OM			3°	31°	28°



	t								
	4	4,5	5	5,5	6,5	6	7	7,5	8
E 83 ML E 83 KL E 83 OM	+ 0,1	– 2,35	– 2,5	– 2,6	– 2,9	– 3,2	– 3,5	– 3,8	– 4

	t	
	8	
PA 941 PA 945	0	


AE
MAGNUM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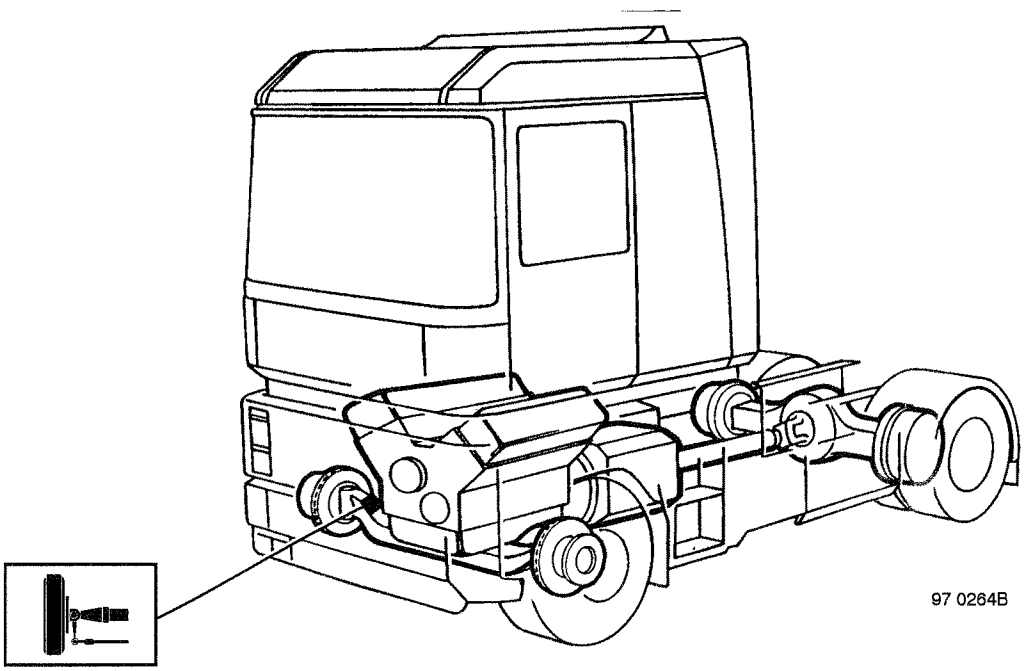
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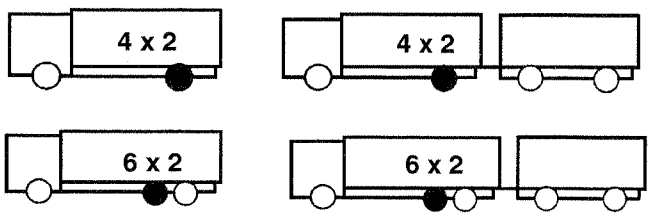
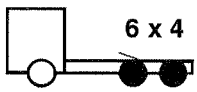
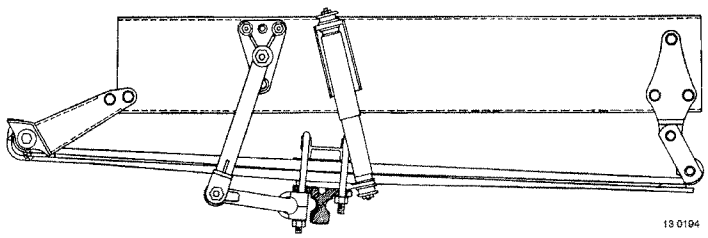
	A	B	C	D	E
E 81 AC E 81 AP	1°	6° 45'	3°	50°	31° 41'



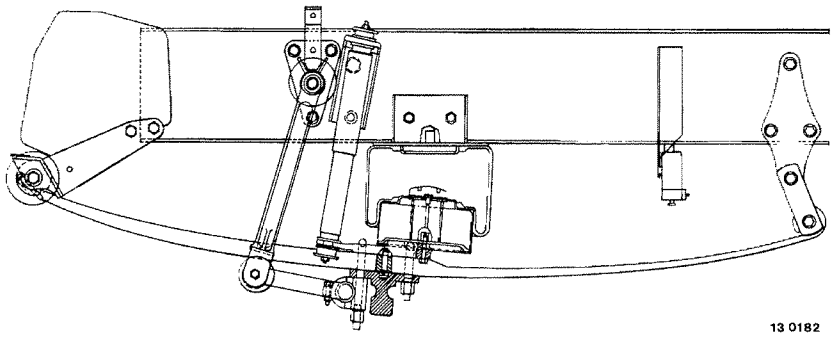
	A	B	C	D	E
E 81 EC E 81 EP	1°	6° 45'	3°	50°	40° 47'



	A	B	C	D	E
E 81 AC	1°	6° 45'	3°	50°	40° 47'
E 81 EC					31° 41'

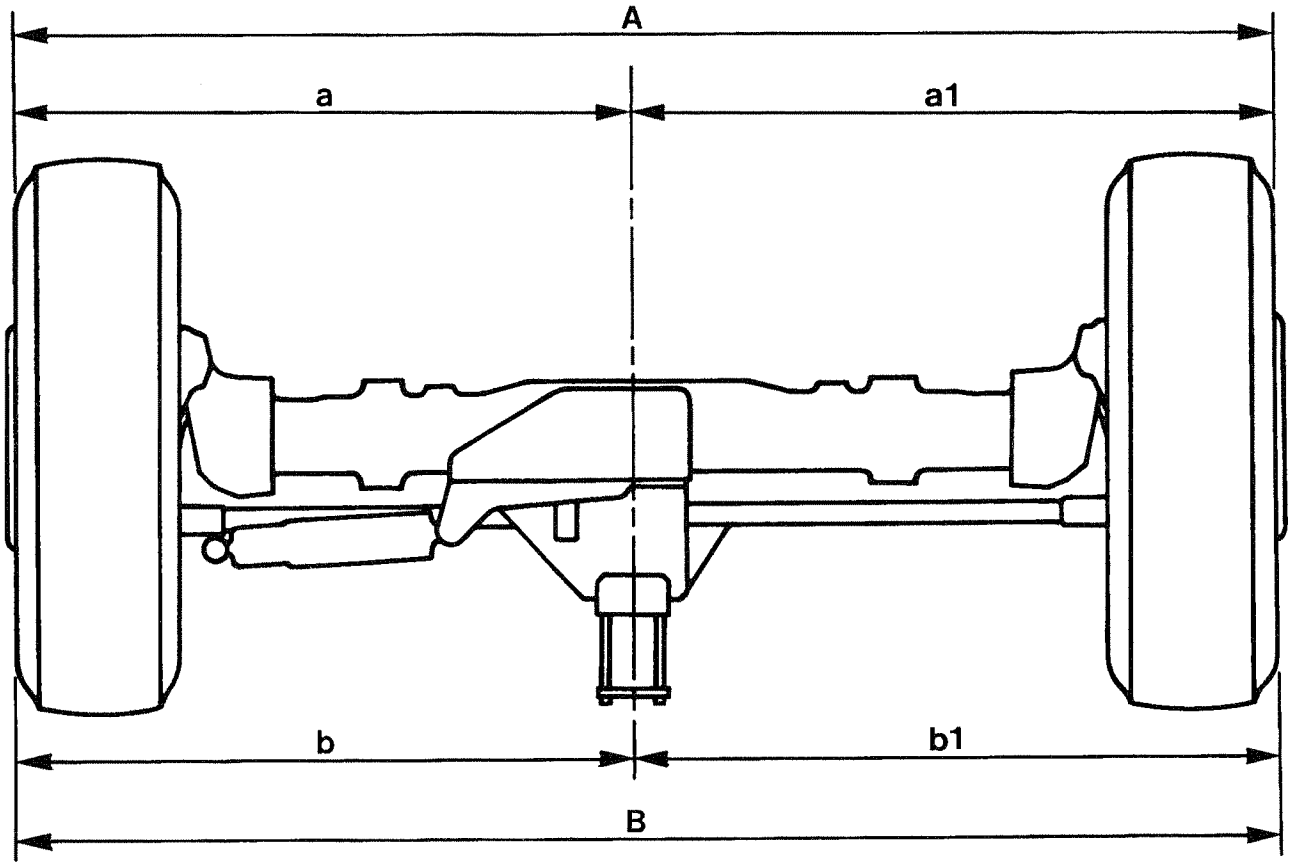


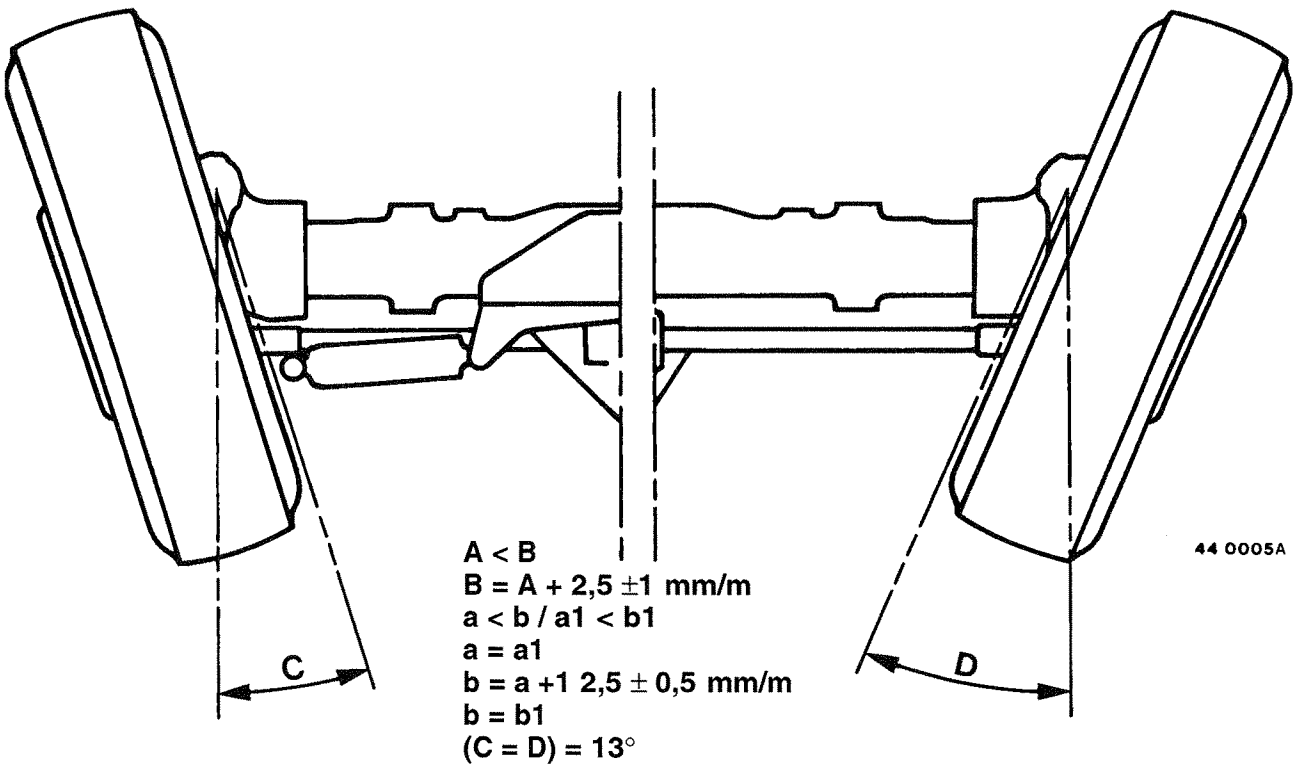
		t						
		4,5	5	5,5	6	6,5	7	7,5
①	E 81 AC	+ 0,2	0	– 0,2	– 0,4	– 0,66	– 0,9	
	E 81 EC	– 2,9	– 2,5	– 2,2	– 1,9	– 1,5	– 1,2	– 0,9



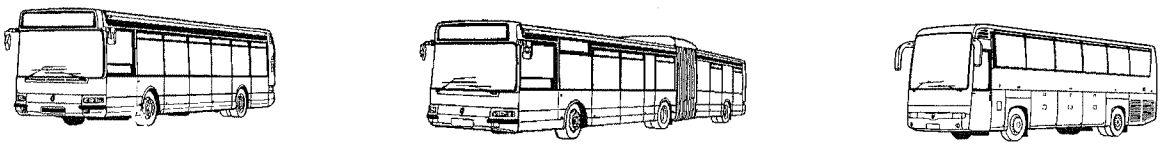
		t						
		4,5	5	5,5	6	6,5	7	7,5
①	E 81 AP	+ 0,2	0	– 0,2	– 0.4	– 0.66	– 0,9	
	E 81 EP	– 2,9	– 2,5	– 2,2	– 1,9	– 1,5	– 1,2	– 0,9
②	AUSTERAS	+ 1	+ 0,9	+ 0,7	+ 0,5	+ 0,35	+ 0,15	0

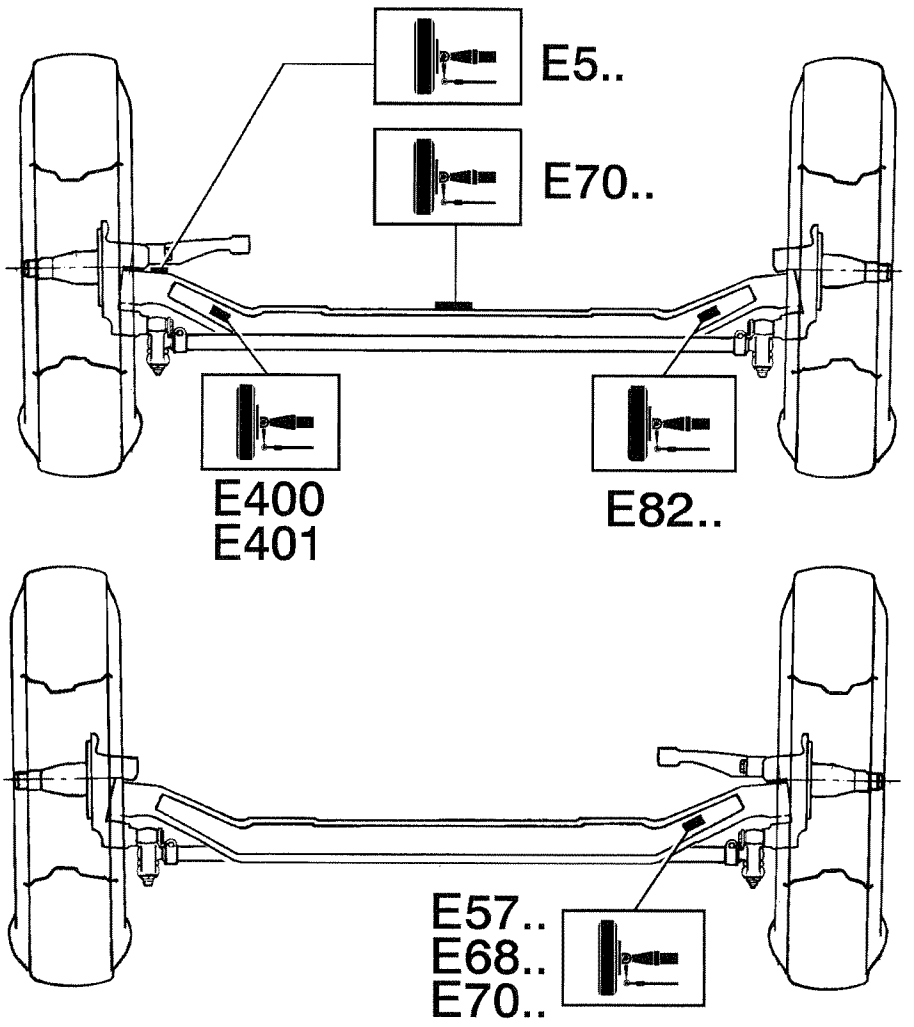
AUSTERAS

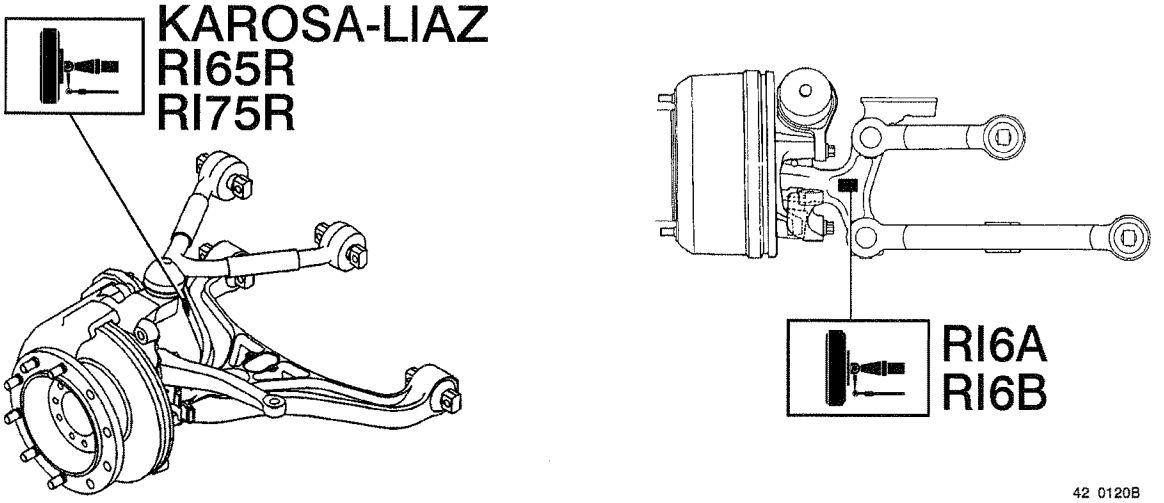




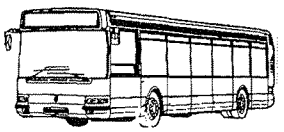
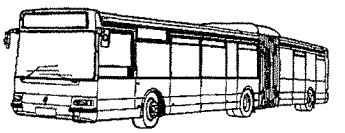
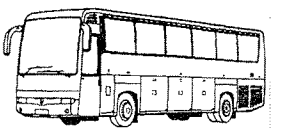
A < B
B = A + 2,5 ±1 mm/m
a < b / a1 < b1
a = a1
b = a +1 2,5 ± 0,5 mm/m
b = b1
(C = D) = 13°



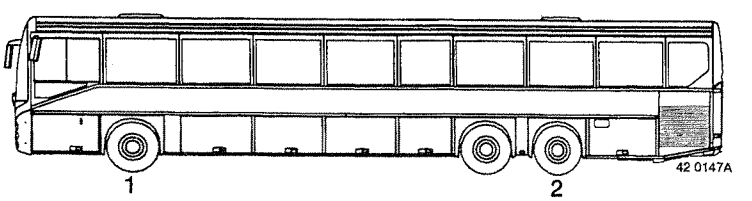

E5..
E70..
E400
E401
E82..
E57..
E68..
E70..


KAROSA-LIAZ
RI65R
RI75R
RI6A
RI6B

42 0120B

		A	B	C	D	E	F = G
PS 150	E 401	1° 30'	6°	3°	44°	33° 30'	0 ± 1 mm
PP 180	E 400	0° 45'	6° 45'	6°	46°	31°	
FR1 ILIADE ARES 12m	RI 65 R	0° 45'	7° 45'	1° 30'	50°	41°	
	RI 75 R	1°	7° 50'	1° 30'	54°	43°	
TRACER	E 70 XD	1°	6° 45'	1° 30'		43°	
S 45 RX S 53 R/RX S 105 R/RX S 105 RA	E 57	1° 15'	8° 45'	4°	46°	38°	
PR 10 S	E 5 AX 21		6°	0°	50°	37°	
R 312	E 68 AX	0° 45'	9°	4°	50°	42°	
PR 100 PR 100.2	RI 6 A		7°	3°	50°	38° 30'	
PR 180	RI 6 B	0° 45'	7°	3°	41°	33° 30'	
PR 100.3	RI 6 B	0° 45'	7°	3°	45° 30'	35° 30'	
PR 112	RI 6 B	0° 45'	7°	3°	45° 30'		
PR 118	RI 6 B	0° 45'	7°	3°	43° 30'		
AGORA 12m AGORA LINE CIVIS CRISTALIS	E 70 XH	1°	6° 45'	2° 30'	53° 30'	42°	0 ± 1,5 mm
AGORA 18m	E 70 XH	1°	6° 45'	2° 30'	39°	33°	
MRC	E 5 A 221	1°	6° 45'	6°	42°	34°	0 ± 1
	E 82 CN						**F > G** 1,8 ± 0,5 mm
AXER RECREO	KAROSA LIAZ	0° 33'	8° 27'	2° 15'	48°	40°	0 ± 1 mm



		A	B	C	D		E		F = G
ARES 15m	RI 75R	1°	7° 50'	1° 30'	1	2	1	2	0 ± 1mm
					54°	16°	43°	13°	

DT 3/366 AN
english edition

Guide for the Fitting of Bodywork for the MIDLUM Series

04/2001 →

50 21 001 967 - 03/01
édition anglaise

IMPORTANT

Reading the "Guide for the Fitting of Bodywork for the MIDLUM series"

The "Guide for the Fitting of Bodywork for the MIDLUM series" ushers in a new type of presentation for bodywork fitting guides.

This new presentation sets out in one single document all those details which are necessary for the bodybuilder and equipment manufacturer to have available.

The data given in the "Guide for the Fitting of Bodywork" ref. (DT 6/354) has been included in the present document under the "General Features" section at the beginning.

You therefore no longer have to refer separately to the "Guide for the Fitting of Bodywork" ref. (DT 6/354) in order to use and understand this document.

The present document consists of three sections:

A - "General features": This describes the relevant general principles and basic rules applicable for the conversion and fitting of equipment to vehicles in most cases for the majority of applications.

B - "MIDLUM special bodybuilding features": This deals in greater detail with presentation of the vehicle, attachment of the body, electrical pre-arrangements, trade vehicles and trade packs.

C - "Supplementary information on the MIDLUM Euro 3 vehicle": This deals in greater detail with power take-offs, air-operated and specific equipment, assembly of equipment to chassis and cab.

If a topic is dealt with in the three sections, the relative information may be:

- ***complementary:*** *in this case the "Special features" section provides details or values relating to the topic dealt with in "General features".*
- ***partially or fully contradictory:*** *when the MIDLUM vehicle is endowed with a special feature whose characteristics go against general principles. In such case, the elements regarding this specificity in the "Special features" section supersede those dealing with the same topic in the "General features" section.*

You may need, when looking for information on a specific point, to consult the three "General features", "Specific Features" and "Supplementary information on the MIDLUM vehicle" sections, so as to ensure that you have obtained all the relevant details.

RENAULT V.I. S.A. au capital de 327 978 500 F.
Siège social : 99, route de Lyon - 69802 Saint-Priest

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CHAPTER -A-
GENERAL FEATURES

1. GENERAL FEATURES

1.1 Scope of liability

RENAULT V.I. vehicles are merchandized at the end of corroborated technical designwork and endurance testing, taking the various laws, regulations, standards... involved into consideration.
Modifications to a RENAULT V.I. vehicle for the fitting of bodywork and equipment should be carried out in accordance with the rules and recommendations set out in this bodywork fitting guide and require an "Agreement in Principle", issued by the Product Applications Department.

Guarantee and responsibility

Any intervening party is responsible for his services in terms of guarantee and responsibility, including any damage caused by his work and/or the equipment installed on-vehicle or the basic product.

In the event of RENAULT V.I. (or its network) being prime contractor for its own equipment (in relation to the end customer), the guarantee is considered as being at least that of the warranty offered by RENAULT V.I. to its customer.

Unless clearly specified otherwise in the order, the equipment warranty shall be negotiated directly between the end customer and the equipment manufacturer.

The meeting of recommendations contained in the present document can in no way be considered as relieving the equipment manufacturer's responsibility, but simply as complying with the basic rules for professional trade practice.

Any breach of these recommendations must be considered as shortcoming in respect of the rules and shall relieve RENAULT V.I. of its liability in the event of damage connected directly or indirectly to such non-compliance.

All the equipment is considered to comply with these recommendations and shall not require any acceptance testing upon delivery to check the conformity.

RENAULT V.I. guarantees non-modified original parts and components.

Interventions, conversions, adaptations of fittings carried out by the intervening party involves his responsibility, even if they are authorized administratively (Conversion appendix II).

Such conversions must not under any circumstance lead to any impairment of the quality or of the primary functions of the component elements of the vehicle (whether these elements are affected directly or not by the intervention).

Any modification, changing of position of constituent vehicle parts or elements must be covered by an "Agreement in Principle", issued by the RENAULT V.I. Product Applications Department.

For further information or assembly agreement, contact:

TO OBTAIN ANY INFORMATION OR APPROVAL OF MOUNTING, PLEASE CONTACT:

For France:
SERVICE TECHNICO-COMMERCIAL
RENAULT V.I.
API. COM 00A 238
69806 ST PRIEST CEDEX
Tel.: 04 72 96 68 14
Telex: 300 265 UDCF +
Fax: 04 72 96 81 93

For the United Kingdom:
Product Applications Department
RENAULT V.I. UNITED KINGDOM LIMITED
Boscombe Road,
Dunstable
Bedfordshire LU5 4LX
Tel. (Switchboard): (+44) (0)1582 471 122
Fax (Marketing) (+44) (0)1582 479 146

1.2 Regulations

The bodybuilder must meet:
- the different European and/or destination country laws, regulations and standards governing driving and vehicle building,
- the stipulations of the highway code and its various amendments and appendices,
- the different laws, regulations and standards governing road traffic in force in the country of destination.

The scope of this compliance must cover:
- Lighting and signalling,
- Weight and dimensions,
- The field of vision and rear view,
- The regulation protection devices (e.g. side beams, anti-spray, run-under guard),
- The hitch coupling and towing systems, (compliance with standards and regulations),
- Specific clauses concerning the transport of dangerous goods (ADR, COSHH etc.),
- Sun-roofs,
- Pollution control standards,
- Electromagnetic compatibility standards for electronic equipment.

1.3 Safety

All components having an influence on:
- The control of the driver of the trajectory and the ability to stop the vehicle and its trailer,
- The load distribution on the front or the rear, the left or the right,
- The risk of fire,
- and any other risk for the vehicle and its surrounding environment.

Among the components, we would mention, among others:
- The cab tilt mechanism,
- The wheels (tightening of the bolts),
- Seats and seat belts (anchorage points),
- The attachment of bodywork or equipment to be in conformity with the technical instruction document in force, (i.e. the Guide for the Fitting of Bodywork),
- The hitch coupling and towing systems, (i.e. anchorages),
- Electrical systems (protection of circuitry, the electrical rating, attachment, conformity of the connections with the technical instruction document, (i.e. the Guide for the Fitting of Bodywork),
- Warning systems and driver information systems, (i.e. no interference with the information given by the instrument panel on the dashboard),
- Information for use affixed by the manufacturer to the vehicle (i.e. decals for tilting of the cab, drilling points, welding points, batteries, etc.)
- Extension and reduction of the length of the wheelbase and the rear overhang.
- Re-location or replacement of the crossmembers.
- Circuits for ancillary equipment.

In order to guarantee the safety and the satisfactory operation of the vehicle, modification of the following components is strictly forbidden:
- Brakes: circuits, controls and anchorages,
- Steering: circuits, controls, anchorages and geometry,
- Axle and axle housing assemblies,
- The air-bag system and pretensioning systems on the seat belts,
- The electronics.

1.4 Quality assurance

Our permanent objective is to give satisfaction to our customers and we must achieve this in full on the final product consisting of a chassis, bodywork and/or an item of equipment.

In order to achieve this objective, RENAULT V.I. expects from all those co-operating with it in the field of mounting bodywork and equipment supply to implement a Quality Assurance System.

RENAULT V.I. can demand proof for the execution of all bodywork, the fitting of equipment or modification of a basic truck, in accordance with Standard ISO 9000, of:

- The conformity with all legislation, EC Directives and national regulations,
- The compliance with the manufacturers' directions,
- The control of quality of the execution of the work.

This is done with the knowledge that, on the face of it, the vehicle is considered as complying with the whole of the regulations.

1.5 Documentation

In all cases involving equipment, the installer is obliged to supply a manual covering the use, service, maintenance and safety of his installation.

1.6 General instructions

When building and fitting a body (including such equipment as rear run-under guards), a certain number of requirements and a certain number of vital requirements specific to each type of vehicle must be taken into consideration. These various points relate to maintenance, accessibility and the circulation of fluids.

Examples:

- Ease of access to the various maintenance and lubrication points, to the fuel tank and fuel gauge, to the batteries and the various electrical terminal boxes.

- The ability to easily dismantle the various component parts of the transmission and the suspension.

- Access to the circuits for air-intake, exhaust, and fuel supply.

- Taking into account the wheel movement detailed on the bodywork drawing (i.e. take care to allow for snow chains; extra clearance must be provided).

- Ventilation of the brake drums and discs and the battery compartment.

- The radiator inlet and outlet areas, which must not be modified.

- Complete compliance with the dimensions and weights specified in our technical documents. Under all circumstances, the bodybuilder must ensure free movement and safe operation of all the moving component parts of the chassis (i.e. springs, prop shaft, etc.)

- The addition of a body must not affect the vehicle running and driving safety. Take care to ensure that a balanced distribution of the loads on the right and the left hand sides of the vehicle is obtained.

- For any bodywork installation, a calculation of load distribution must be made for each axle, in order to check that the weight imbalance between the right and the left hand side is below 4%.

- The flow of the coolant must be maintained at all times. It is, therefore, not allowed to blank off, even partially, the air intakes provided (on the radiator grille or the front end). Orange ADR or similar “Hazardous Substances” plates should be affixed to solid surfaces (i.e. without vent holes).

On the arrival of a vehicle in your workshop for body fitting, we recommend that you should check one hour after the arrival of the vehicle, the state of charge of the batteries.

Voltage at the battery terminals		Specific gravity of the electrolyte	State of charge
6 Volt battery	**12 Volt battery**		
6.3 Volts	12.7 Volts	1.27	100 %
6.2 Volts	12.5 Volts	1.24	80 %

During the period for the fitting of the bodywork, you should particularly check that:

- The vehicle is not run without a battery.

- Do not move the vehicle on the starter motor.

- Do not use a booster starter.

- Ensure that the tyre pressure is checked and tyres inflated to the correct value where necessary.

- Protect body components or items of trim against all damage.

- Refit the original batteries, where these have been taken off.

IMPORTANT

- Whatever work you are doing on the vehicle, you must switch off the electrical circuit at the master switch or by disconnecting the batteries in order to avoid any risk of electric shock during work.

- When a vehicle is laid up (i.e. at a standstill for longer than 10 days), disconnect the electrical circuit by removing the fuse or by the circuit-breaker so as to avoid discharge of the batteries through the tachograph.

The information contained in this manual is only applicable to bodywork in steel. For aluminium bodies, refer to the Product Applications Department of RENAULT V.I.

It is forbidden to weld, grind, cut up, drill or heat the sidemembers or crossmembers unless the contrary is clearly stated. These operations may only be carried out in conformity with the recommendations laid down in the present document.
Any special case, any bodywork fasteners and fittings not described in this manual must be submitted for our approval prior to use.

Before commencing the fitting of any bodywork, you must consult:
- The Vehicle Technical Data Sheet,
- The bodybuilders drawing and the relevant calculation sheets which relate to the body to be fitted,
- The vehicle driving and maintenance handbook.

If you do not have these items available, you should obtain them from RENAULT V.I. Dealers or the Product Applications Department.

In the technical manual and on the bodywork drawing is stated the permitted maximum and minimum length of body; we would strongly advise you to stay within these limits.

Furthermore, it should be noted that the changing of position of a component such as spare wheel, tank, etc., the modification of a chassis without uniform weight distribution or the fitting of an over-cab extension, causes a modification of the load distribution of a fully equipped chassis in every single case.

Modification to load distribution must be compensated for by an alteration in the permitted length for bodywork. It then becomes necessary to calculate the new position of the centre of gravity of the bodywork.

The weights specified in our technical data sheets refer to standard vehicles, ready for the road, without optional extras.
Furthermore, the weight of chassis cab is given with a tolerance of plus or minus 4%.

Optional equipment such as reinforced springs, power take-offs, different tyre fitments, will cause an increase in weight for the basic chassis.

For these reasons, when weighing the chassis cab, bodybuilders should weigh:
- The front axle(s),
- The rear axle(s),
- The complete vehicle,

without driver, without passenger, but with full fuel tanks and with vehicle on-board tool kit.

For the preparation and attachment of the various types of bodywork, it is preferable not to take off the wheels, unless absolutely necessary.

Nevertheless, you must take the precautions set out below:
- It is forbidden to paint the bearing surfaces of the wheel rim hubs and the seating for wheel nuts.
- During fitting, make certain that the parts are perfectly clean prior to fitting.
- Tighten the wheel nuts to the torque recommended (cf. vehicle driving and maintenance handbook)

Installation fitted with keys: the section of such keys must be very different to that used for the vehicle keys. Indeed, these keys should not be able to be put into the vehicle locks by mistake, thus avoiding any risk of damage to the barrels of the locks.

1.7 Safety on tilt cabs

After the conversion of standard cabs by the bodybuilders, (i.e. extension, bunk adaptation, over-cab extension, etc.) because the weight distribution has changed, the tilt system may no longer meet the requirements of the safety standards.
Under these circumstances, and without prior agreement from the manufacturer, the full and entire responsibility rests with the bodybuilder.

1.8 Chassis markings

The identification number of the vehicle is on the sidemember (refer to the vehicle driving handbook).

The identity markings of the vehicle must remain visible and accessible without having to remove any part of the body.

1.9 Adjustments to the vehicle settings

Under no circumstance may bodybuilder or converters make any alteration to the original settings of RENAULT V.I. vehicles.

1.10 Cleaning

1.10.1 Bodywork

So as not to cause any damage to the condition of the paintwork and the seals:
- Avoid using a high temperature jet of steam.
- Restrict the use of brushes. They must be in good condition and well maintained.
- We advise against the use of brushes, during the first month of vehicle use.
- If you are using a high pressure jet wash unit, limit the pressure to 80 bars maximum.
- Keep the lance well away from the bodywork; do not spray fluidtight joints.
- Use neutral soap based products.
- In order to remove grease spots, use cleaning fluid (not petrol).
- Parts in aluminium must be cleaned with water to which a non-alkaline washing product has been added, and rinsed with clean water.
- Spread a coat of Vaseline or talcum powder over the seals.

1.10.2 Chassis/Underbodies

Use a high pressure unit. Limit the pressure of the jet to 80 bars maximum and the time of use to the strict minimum necessary.
In order to prevent any risk of a problem, do not spray:
- electronic or electrical boxes,
- the seals of link rods,
- hinge pins,
- air inlets for the heater, the engine air intake and air filter,
- pneumatic and electrical apparatus,
- absorbent materials and soundproofing screens,
- the fuel gauge.

1.10.3 Cleaning of the cab

Spray lightly or use a cloth dipped in a cleaning agent (i.e. soapy water, methylated spirits, etc.). Products with a petroleum and trichlorethylene base are not to be used.
Spread talcum powder lightly onto the door seals and the windows, as well as any link rods.

1.10.4 Cleaning of the instrument panel

Only use soapy water. Any other product is not allowed.

1.11 Safety and protection of components

Before any operation of grinding, drilling, or welding, ensure that the following are effectively protected or taken off:
- Plastic pipework and tubes,
- Electrical wiring harnesses,
- Suspension springs (particularly for the protection against corrosion),
- The bags for the air suspension,
- The soundproofing screens,
- Any other component sensitive to heat, to the discharge of incandescent matter, to ultraviolet rays (i.e. electronic control units, electronic components, items in plastic material, flexible anti-vibration mountings, painted items, etc.)
- For welding work, comply with the other recommendations described in the chapter entitled “Protection of electrical and mechanical components”.

1.12 Summary of definitions

Maximum body length (Dimension W on technical data sheets and bodywork drawings).
This is the bracket of lengths for bodies (not including fittings and accessories) worked out in relation to the extreme positions of a given centre of gravity for a load which is taken to be evenly distributed and taking into account the space which must be left to the aft of the cab, laid down by the manufacturer, and the maximum permitted loads per axle on a chassis cab without options.

Body entrance (Dimension B on technical data sheets)
Minimum distance between the front axle centre-line and the front end plane of the body.

Load distribution calculations
Comply with the regulatory constraints for each country and the load limits given per axle for each model by RENAULT V.I.
We remind you that these values are given for uniformly distributed loads.
The lateral imbalance of the loads should not exceed a maximum of 4% between the LH and RH roadwheel of each axle.

Chassis rear overhang (Dimension N on technical data sheets)
Horizontal distance between the centre-line of the rear roadwheels and the rear extremity of the body (excluding fittings and accessories).
In the case of vehicles with 3 or 4 axles: distance between the centre-line of the rearmost axle and the extremity of the chassis.

Body rear overhang (Dimension X on technical data sheets)
Horizontal distance between the centre-line of the rear roadwheels and the rear extremity of the body (excluding fittings and accessories).
In the case of vehicles with 3 or 4 axles: distance between the technical centre-line of the tandem and the rear extremity of the body.

Wheelbase (Dimension F or F' on technical data sheets).
Distance between the centre-lines of the front and rear roadwheels (vehicle laden).
In the case of vehicles with 3 or 4 axles: distance between the centre-line of the front roadwheels and the centre-line of the foremost rear axle - for calculations take dimension F' (technical wheelbase).

Tandem
Solely in the case of vehicles with 3 or 4 axles: the 2 rear axles taken together, regardless of whether they are driving axles or trailing axles.

Maximum axle weight
Carrying weights are stipulated on each axle for each type of vehicle. These values are indicated on the technical data sheets and on the VIN plate and must be complied with on all vehicles fitted with bodies when laden and when empty.

Driver and cab passengers weight
The weight of the driver and passenger (passengers) in the cab is applied to the front axle in the case of a forward control cab.
For cabs of the semi-forward control type, 2/3 of the weight should be applied to the front axle and 1/3 to the rear axle.
Weight of driver or each passenger: 75 kg (calculated on the basis of the cab seating capacity), unless stipulated otherwise: i.e. Export, Army, Fire Brigade, etc.
For cabs with a seating capacity of more than 3 persons, calculate the weight distribution of the persons on the basis of the seats layout.
For equipment intended for the Army or for Civil Administrations, take the specific specifications into account.

1.13 Certificate of approval of the conversion of a vehicle

1.13.1 Application for approval

1 If the body or the equipment fitted do not modify the weight and dimensional characteristics of the chassis entered in the descriptive sheet, the vehicle can be submitted to the Type Approval Department without any action by RENAULT V.I. being necessary (within the permitted limits in force).

2 The maximum rear overhang is equal to 60% of the wheelbase. However, for special cases, we can grant higher percentages - for this, consult us.

3 If the layout requires modification to the wheelbase, it is essential to consult the Product Applications Department. Each case has to be covered by a specific design.

4 The certificate will be issued in accordance to the legislation in force regarding modifications made by and under the responsibility of the bodybuilder, within the limits stipulated by the Manufacturer and relative to:
- the wheelbase
- the distribution of loads
- the cab characteristics.

5 For more accuracy in your calculations, we recommend you to introduce into the data the weighed weight of the chassis cab to be equipped (capable of varying according to manufacturing tolerances and the various options available). The same applies to equipment for which the manufacturers can accurately define the weight and the position of the centre of gravity.

1.13.2 Body fitting certificate

This defines the installation of the equipment on the chassis cab and the unladen weight imposed on the axles and then the weight when fully laden.
It must be attached to all applications relating to the equipment which do not comply with any of the dimensions set out in the descriptive sheet.

1.13.3 Responsibility for installation

The building and fitting of a body on a vehicle is the sole responsibility of the bodybuilder, who must comply with the recommendations in the present document.

He must ensure that the installation of the body does not affect the functions or the reliability of the components or the road behaviour of the vehicle.

1.14 Painting

1.14.1 Precautions

- Protect the RENAULT V.I. equipment (i.e. by using screens, self-adhesive tape, cab cover etc.)
- Never put vehicles into drying ovens at a temperature of more than 80° C.
- The chassis of the vehicle must be electrically earthed to allow static electricity to run away to earth (protection of electronic boxes).
- The vehicle must be protected against corrosion by paints compatible with those used by our Company and conforming to RENAULT V.I. Specification No 4702 441 (protection of bodywork and equipment adapted to RENAULT V.I. vehicles) available from the Product Applications Department.
- Thinner solvents must never be used on cables and electrical sheaths.
- Protect the identification marking of electrical wires and compressed air pipes.

Never paint bearing surfaces of brake drums and disc wheels, or with twin tyre fitment, the assembly surfaces between the disc wheels. As a general rule, do not repaint the support surfaces of original fitment nut and bolt hardware and comply with the specification.

NOTE
Our Product Applications Department holds the reference numbers for paint colour shades for chassis and cabs at your disposal. These paint colours can be procured as “spare parts” and can be ordered from our dealers.
The cab colour shade is indicated on the front end of the cab.
Since 1994, chassis and accessories are no longer sprayed with the customer’s shade of paint at the time of original fitment.
To preserve the aspect and original quality, it is essential to observe the following methods after fitting equipment, body, sub-frames and various adaptations to major units or chassis frame:

1.14.2 Major units (gearboxes, drive axles, engines, axles, etc.)

Works paint: GLYCEROPHTHALIC
Retouch (after fitting PTO, charge indicator, etc.)

Retouch method
- Clean with a universal cleaner or using a high-pressure cleaner.
- Wipe down, then apply a primer.
- Let the product cure until mat (about 15 minutes at 20° C), then apply the corresponding polyurethane lacquer.

1.14.3 **Chassis frame and accessories** (sidemembers, crossmembers, fittings, lockers, etc.)

Works paint: POLYURETHANE or POLYESTER powder.

Retouch method:

Superficial scratches (the metal is not affected).

- Clean with a universal cleaning product.
- Wipe down, then apply the corresponding undiluted but catalyzed polyurethane lacquer, using a small brush.

Deep and fine scratches (down to the bare metal).

- Clean with a universal cleaning product.
- Wipe down, then apply the primer, using a small brush.
- Let the product cure (about 15 minutes at 20° C), then apply the corresponding undiluted but catalyzed polyurethane lacquer.

Deep and wide scratches (down to the bare metal, drilling of sidemembers for attaching tail lifts and accessories) due to drilling.

- Rub down.
- Clean with a universal cleaning product.
- Let the product cure until mat (about 15 minutes at 20° C), then apply the corresponding polyurethane lacquer.

Making good after conversion (after converting wheelbase and overhang).

- Grind, rub down; prepare the area in question (burnt paint, welding scale, etc.).
- Clean with a universal cleaning product or using a high-pressure cleaner.
- Mask with tape (electrical wiring harnesses, air and fuel pipes, labels, etc.)
- Wipe down, then apply the primer.
- Let the product cure until mat (about 15 minutes at 20° C), then apply the corresponding polyurethane lacquer.
- After drying, put back the electrical wiring harnesses, air and fuel pipes and accessories.

Spraying chassis and accessories (with customers colour shade).

- The bodybuilder undertakes to preserve the aspect and quality of the original fitment vehicle (except for nut and bolt hardware).
- Clean with a universal cleaning product or using a high-pressure cleaner.
- Mask with tape (electrical wiring harnesses, air and fuel pipes, labels, etc.)
- Wipe down, then apply the primer.
- Let the product cure until mat (about 15 minutes at 20° C), then apply the corresponding polyurethane lacquer.
- After drying, put back the electrical wiring harnesses, air and fuel pipes and accessories.

NOTE

All spray gun operations are to be carried out in a painting booth.

Since August 1999, the chassis are painted grey as replacement for Enduro red. For paint retouches on grey chassis, use a grey paint aerosol ref. N° 50 01 848 147.

1.14.4 Recommended products

Manual cleaning

Universal cleaning product or equivalent solvent

Products approved by RENAULT V.I.

Supplier	Commercial name	RENAULT V.I. Ref.	Supplier Ref.
BASF	PK 900	50 01 821 758	SV 20023F
ICI AUTOCOLOR	Slow Spirit Wipe	50 01 854 983	P850–1402
STANDOX	ENTFERNER Agent	50 01 825 985	FA 931 2002

High-pressure cleaning

Degreaser, phosphater degreaser

Filing and sealing

Products approved by RENAULT V.I.

Supplier	Commercial name	RENAULT V.I. Ref.	Supplier Ref.
STANDOX	“EPOXY” filler-sealer “EPOXY” hardener “EPOXY” thinner “EPOXY” slow thinner thinner 2KS	50 01 826 019 50 01 825 990 50 01 826 005 50 01 829 256 50 01 825 992	FA 931 5203 FA 931 5204 FA 931 5205 FA 931 5213 FA 020 7810
ICI AUTOCOLOR	“EPOXY” filler-sealer “EPOXY” hardener thinner	50 01 829 477 50 01 829 480 50 01 829 481	P580–2100 P210—833 P850–3091

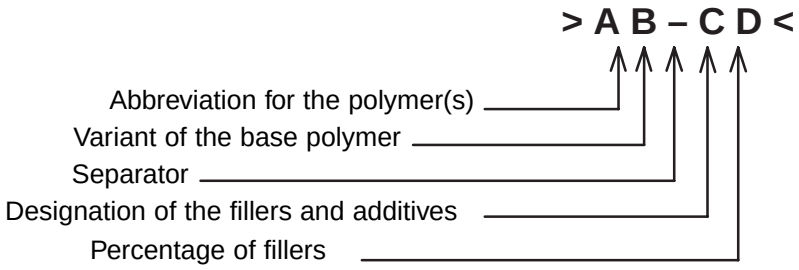
Finish paint

Two-component polyurethane paint and corresponding thinner.

1.14.5 Marking of polymer components (recycling of plastics)

Plastic parts are marked so as to simplify their sorting during recycling at the time when the vehicle is scrapped at the end of its life.

Marking of the plastic parts is done by placing abbreviated terms for the polymer components between the symbols “>“ and “<“. The parts are marked on a face which the customers cannot see and when it is possible the marking is indelible. Marking is done in the following manner:



Marking of single component products
The abbreviated term for the material is enclosed in symbols “>“ and “<“.
For example: “>PP<“ or “PP” indicates polypropylene.

Marking of copolymers
The abbreviated terms for the polymers are separated by a “/”.
For example: “>P/E<” indicates the copolymer propylene ethylene.

Marking of mixtures or blends of polymers
The abbreviated terms are separated by a “+” (heterogeneous structure).
For example: “>PP + EPDM<“ stands for a blend of polypropylene and EPDM.

Marking of polymers with fillers (additives)
The abbreviated term for the polymer is separated from that for the filler by a dash “-”.
The number following the abbreviated term for the filler relates to its percentage in the mixture.
For example: “>PA66 - (GF25 + MD15)<“ indicates polyamide 66 with 25% filler and 15% reinforcement with mineral fillers (in decreasing order of percentage).

Marking of multi-component products
The abbreviated terms for the components are separated by commas, in order of appearance (firstly the surface material).
For example: “>PVC, PUR, ABS<“ indicates skin surface PVC on PUR foam with an ABS insert.

Marking of special features
Abbreviated terms for the polymers can be added up to 4 symbols, in order to indicate a modification.
The symbols are put in after the abbreviated terms.
For example: “>PE - C<“ indicates chlorinated polyethylene, “>PE - LLD” stands for linear low density polyethylene.

Table of the principal polymers

Abbreviated term	Variant	Materials
A.B.S		Acrylonitrile/butadiene/styrene
A.S.A		Acrylonitrile/styrene/acrylate
E/P		Ethylene/propylene
E.P.D.M		Copolymer ethylene/propylene/diene
P.A		Polyamide
P.A	6	Polyamide 6
P.A	66	Polyamide 66
P.C		Polycarbonate
P/E		Propylene/ethylene
P.E		Polyethylene
P.E	– HD	High density polyethylene
P.E	– LD	Low density polyethylene
P.E	– LLD	Linear low density polyethylene
P.E	– X	Cross-linked polyethylene
P.M.M.A		Poly(methacrylate of methyl)
P.O.M		Polyoxomethylene
P.P		Polypropylene
P.P.E		Poly(phenylene ether)
P.P.O.X		Poly(oxide of propylene)
P.S		Polystyrene
P.S	– HI	Impact polystyrene
P.T.F.E		Poly(tetrafluoroethylene)
P.U.R		Polyurethane
P.V.C		Polyvinyl chloride
P.V.C	– C	Chlorinated polyvinyl chloride
P.V.C	– P	Plasticized polyvinyl chloride

1.15 Electrical equipment

1.15.1 General

- Any mounting of a specific item of equipment on a commercial vehicle must be in conformity with the recommendations of RENAULT V.I. and the legislation in force. Its execution remains the entire responsibility of the bodybuilder, both with regard to the suitability for the vehicle being equipped and any possible electromagnetic interference.
- For reference to wiring diagrams, consult the electrical equipment workshop manual for the vehicle (available from the Spare Parts Department of RENAULT V.I.).
- Check that the electrical consumption of this equipment is appropriate for the capacity of the batteries and also the charging current rate of the alternator (if not, refer to the recommendations of the manufacturer CIC 1081). For the fitting of any particular equipment, consult the Product Applications Department of RENAULT V.I.
- A schematic diagram should be submitted for the approval of RENAULT V.I., when raising any specific question.
- A wiring diagram for the bodybuilder's or equipment manufacturer's installation must be incorporated into the vehicle driving and maintenance handbook. The electrical connection points for the equipment being supplied should be clearly and precisely indicated on this wiring diagram (even after the agreement of RENAULT V.I. has been obtained).
- Follow the electrical protection recommendations of RENAULT V.I.; it is forbidden to change the rating of fuses.
- In order to harmonize vehicle equipment, you should use in preference such items as are identical to those fitted in the basic vehicle (i.e. indicator lamps, controls, relays, etc.).
- Assembly of a protective shield on the electric retarder is compulsory for ADR (Transport of Hazardous Substances) vehicles (refer to regulations in force).
- It is compulsory for the supply voltage for the equipment installed to be equal to the rated voltage of the vehicle. The installation of equipment with a 12 volt power rating on our vehicles (24 volt rated voltage) is not permitted unless a voltage dropper is added.
- Under the circumstances that additional lamps are fitted, the installation must not damage the fluidtight sealing of the junction boxes.

- Operating without a battery is forbidden.

1.15.2 Wiring harnesses

- Use to the full the wiring runs already set up by the manufacturer (i.e. conduits, tubes, sleeves, etc.) and comply with the limit of their capacity.
- Any wiring harness added by the bodybuilder must be protected by a sealed sheath (smooth and thick or ringed) and can be routed along with the original wiring runs for the vehicle provided that it does not adversely affect the mechanical mountings for the original harnesses. For vehicles for the transport of hazardous goods, use the protective equipment authorized by the regulations covering the transport of hazardous goods.
- If you are obliged to route wires close to a source of heat (i.e. engine, exhaust system, etc.), the minimum clearance to be complied with is 200 mm.
- Never route a wiring harness over projecting angles.
- Never attach a wiring harness to moving parts (even slight movement).
- The section of the cables being used must be suitable for the use in question. Their cross-section should be selected in accordance with the maximum current on-line (5 amperes per mm2).
- The length of the wiring harnesses should be long enough to allow the electrical appliance which is connected to be taken off (i.e. principal display unit, tachograph, etc.).
- The numbering of the wires must be in accordance with the manufacturer's standard.
- The link between the sheath and the connector must be fluidtight.

1.15.3 Electrical connections

- Any additional connection requires protection that is suitable for the use for which it is intended (even if the power supply provided for the customer by RENAULT V.I. is already protected by a fuse).
- Any electrical connection must be properly wired on the power lines supplied by the manufacturer to the bodybuilder's equipment (refer to the servicing and maintenance handbook for the vehicle in question).
- Tapping into the various wiring harnesses supplied by RENAULT V.I. is completely FORBIDDEN (for example vehicle rear lamps, external marker lamps, contactors, pressure switches, relays, electronic box inputs and outputs, etc.)

  Reminder: a 12 V tapping at the middle point between the two batteries is strictly FORBIDDEN.
- The electrical connections of the various wiring harnesses of the bodybuilder must be made using a fluid-tight junction box or otherwise using sealed connectors. If connections have to be made on circuits hooked up to electronic equipment:
- Ensure that you comply with the polarity recommended.
- No inductance current must pass through the circuits which have been added.
- All the earths must be connected up to the available "EARTH" points provided and not to the bodywork of the vehicle.
- After work on junction boxes, the seal must always be as integrally effective as the original seal.
- Any power supply requiring a direct connection to the batteries must be capable of being isolated by a battery cut-out (for example: tail lifts) and protected by a fuse sited as near as possible to the batteries. Suitable connection terminals should be used.
- The + power supply is taken from the master switch, or failing this, from the battery terminal for vehicles without a master switch, but in no case from the alternator or starter motor terminal.
- Power supplies to auxiliary equipment: i.e. telephone, fax, etc. The quality of the installation is the responsibility of the installer (i.e. reception, static, interference, etc.)
- Preferably, you should use connectors approved and distributed by RENAULT V.I. (i.e. type, sealing properties, rating, number of channels, etc.)
- Connectors for equipment should be positioned near the bottom, whilst avoiding areas subject to splashing (i.e. wheelarches, etc.).

1.15.4 Available power supplies

All our vehicles are equipped with the available power supply protected by fuses and these are at the disposal of bodybuilders and equipment manufacturers.

These power supplies are described in the vehicle driving and maintenance handbook (supplied with every vehicle), in the Workshop Repair Electrical Manual, and in this document (all these documents are available from the RENAULT V.I. dealer network).

1.15.5 Flasher units

Should the flasher unit become inoperative due to failure to comply with the instructions contained in this document, the coverage granted by the warranty will be lost.

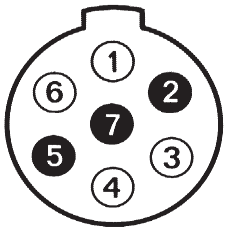
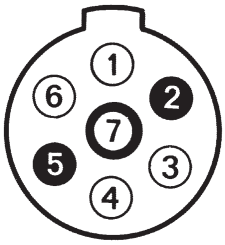
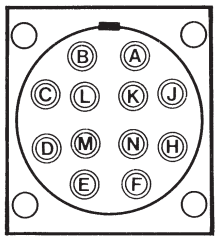
The flasher units are designed for a maximum rating which is marked on the unit.

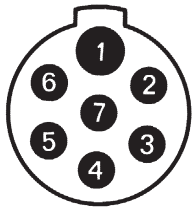
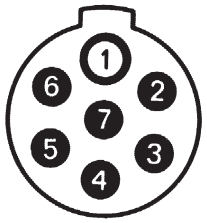
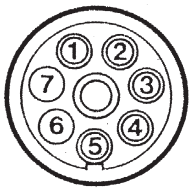
Do not exceed this power rating.

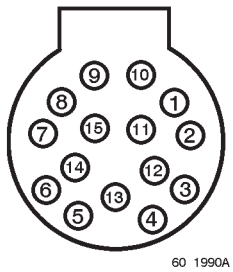
Connection

In order to make the connections correctly, consult either the identification marks which are located close to the terminals, or the wiring diagram on the label which is affixed to the flasher unit cover.

1.15.6 List of standard power sockets

SUPPLY VOLTAGE	DESCRIPTION AND STANDARDS	SOCKET DIAGRAM (front view)
12 Volts	12 N type socket (Standard: - BNA.R.43.407 dated April 1982 - ISO 1724). 1 - LH direction indicator lamp. 2 - Rear fog lamp. 3 - Earth. 4 - RH direction indicator lamp. 5 - RH rear side and marker lamp and number plate illumination lamp. 6 - Stop lamp. 7 - LH rear side and marker lamp and number plate illumination lamp.	 600037
12 Volts	12 S type socket (Standard: - BNA.R.43.410 dated August 1982 - ISO 3732). This is a supplementary socket which is assembled in addition to the 12 N socket. 1 - Reversing lamp. 2 - Not allocated. 3 - Earth. 4 - Supplementary + power supply. 5 - Earthing monitor. 6 - Positive (+) power supply. 7 - Not allocated.	 600038
24 Volts	12-pin socket (Standard: - BNA.R.43.405 dated March 1961 - DEFA 1457 b - DCEA 5.556 - NATO). A - LH black-out side lamp. B - LH direction indicator lamps. C - RH black-out side lamp. D - Earth E - Rear side and marker lamps and number plate illumination lamp. F - Black-out stop lamp. H - Not allocated. J - RH direction indicator lamps. K - Battery + power supply. L - Earth. M - Stop lamps. N - Not allocated	

SUPPLY VOLTAGE	DESCRIPTION AND STANDARDS	SOCKET DIAGRAM (front view)
24 Volts	24 N type socket (Standard: - BNA.R43.406 dated January 1976 - ISO 1185). 1 - Earth. 2 - LH rear side and marker lamp and number plate illumination lamp. 3 - LH direction indicator lamps. 4 - Stop lamps. 5 - RH direction indicator lamps. 6 - rear side and marker lamps and number plate illumination lamp. 7 - Trailer braking lamp. Terminal 7 is scheduled in certain countries for supplying power to regulation trailer brakes. Under no circumstances must it be used as an earth terminal.	 600040
24 Volts	24 S type socket (Standard: - BNA.R43.409 dated April 1982 - ISO 3731). This is a supplementary socket which is assembled in addition to the 24 N socket. 1 - Earth. 2 - Not allocated. 3 - Reversing lamp. 4 - Power supply. 5 - Earthing monitor. 6 - Supplementary power supply. 7 - Rear fog lamp.	 600041
24 Volts	24 P (oil tanker) type socket (Standard: - BNA.R.10.120 dated June 1977) This is the socket for ADR (Transport of Hazardous Substances) vehicles which is assembled in addition to the 24 N socket. 1 - Earth. 2 - Valve lighting. 3 - Reversing lamp. 4 - Positive (+) power supply. 5 - Insulated earth. 6 - Not allocated. 7 - Rear fog lamp.	 600042
24 Volts	ABS specific type socket (Standard: - ISO 7638) 1 - Power (30A). 2 - Control power supply (2A). 3 - Control earth (2A). 4 - Power earth (30A). 5 - Information (2A). 6 - Free. 7 - Free.	 600563

SUPPLY VOLTAGE	DESCRIPTION AND STANDARDS	SOCKET DIAGRAM (front view)
24 Volts	15-pin trailer socket (Standard: - ADR 1999 IP54 and anti-unhooking - ISO 12098). 1 - LH direction indicator lamps 2 - RH direction indicator lamps 3 - Rear fog lamp 4 - Earth 5 - RH rear side/parking and marker and registration plate lamps 6 - LH rear side/parking and marker and registration plate lamps 7 - Stop lamps 8 - Reversing lamps 9 - 24V positive (+) power supply Since July 1999, the 15-way socket replaces 24N and 24P sockets. Channels 10, 11, 12, 13, 14, 15 are unaffected.	 60 1990A

The 15-way socket can be mounted on vehicles equipped with 24N and 24P sockets with the use of a 15-way 24N/24P adapter ref. N° 50 01 851 060 available from the RENAULT V.I. Spare Parts department.

1.15.7 Additional direction indicator lamps

- On tractors and rigids

Should the lamps provided not meet all the requirements of the legislation in force, the bodybuilder may add extra lamps supplied with power by the same circuit as the front lamp or by a special circuit should one be available from the flasher unit. In all cases, comply with the power rating.
We strongly advise you to refrain from fitting any other lamp not required by the regulations.

- On trailers and semi-trailers

The standards in force concerning trailers require only two circuits for the flasher units: one circuit for the RH side and the other for the LH side. No additional lamps must be fitted on the trailer or semi-trailer which run from the monitored trailer lamps.

The addition of extra lamps entails the fitting of new wire runs which have to be drawn from the non-monitored lamp terminals in the flasher unit.

Overloading

Under no circumstances must extra lamps be fitted that exceed the power rating on the flasher unit. The main consequences of such overloading are as follows:

- The service life of the flasher unit is shortened, even when it would appear to be operating normally in spite of the overload.
- Operation is adversely affected by intermittent or permanent sticking of the contacts (the lamps remain lit without flashing)
- The appliance may be **off-circuit for the duration of the overload.**

Protection of the flasher unit (depending on the vehicle equipment)

In the event of excess current, the flasher unit will cease to operate. To return it to service:

- Move the flashing lights control switch to the 0 “off” position.
- Find the cause of the overcurrent (lines or lamps) and remedy it.

You will then be able to use the flashing lights again normally.

1.16 Air-operated equipment

Should it be necessary to add auxiliary equipment not provided by the manufacturer, it must compulsorily be connected to the circuit specifically provided for auxiliary equipment on the vehicle.
The compressed air consumption of such auxiliary equipment should under no circumstances compromise the filling times of the brake circuits laid down by the legislation in force.
The RENAULT V.I. Product Applications Department is at your disposal for any further information you may require.

1.16.1 Regulations

It is forbidden to modify officially approved braking circuits which conform with the standards set out by the Highway Code.
Any modification, without prior agreement from RENAULT V.I., is done under the sole responsibility of the author of such a modification.

1.16.2 Polyamide pipes

Identification marking

Before removing any equipment or disconnecting polyamide pipes, mark the pipe in relation to the connection port on the equipment.

Coding system used on polyamide pipes (RENAULT V.I. standard):

Polyamide pipes are identified with a colour code marked with adhesive tape or by elastic rings.

Brakes code:

Main functions	Sub-functions		
	Constant pressure	Delivered pressure	Signalling pressure
Front service brake	Orange	Orange - White	Orange - Yellow
Rear service brake	Blue	Blue - White	Blue - Yellow
Parking brake	Green	Green - White	Green - Yellow
Trailer brake	Red	Red - White	Red - Yellow
Extra brake	Yellow	Yellow - White	Yellow - Yellow

Coding used on pneumatic appliances (DIN standard)

0 - Air intake	5 - Free		
1 - Pressurized supply	6 - Free		
2 - Delivered pressure	7 - Antifreeze		
3 - Air vent	8 - LubricatIon.	81 - Inlet.	82 - Outlet
4 - Signalling pressure	9 - Water cooling.	91 - Inlet.	92 - Outlet

When the figure is followed by a second figure, the latter figure indicates the sequence number.

Example: 41, 42, 43: The figure 4 indicates the signalling function, the figures 1, 2, 3 indicate a sequence number in that function.

Replacement of a brake line

The entire length of a damaged polyamide pipe should be replaced by a pipe with identical characteristics (length and diameter), and corresponding with the standard in force. (See technical memo 8655 group 53000, part N° 50 20 034 156 available with spare parts). It must also be provided with coloured rings which are identical to those of the tube replaced.

Use an original manufacturer's pipe available from the RENAULT V.I. Spare Parts warehouse.

The routing of a polyamide pipe must be carefully executed. Ensure there is no interference with sharp-edged metal parts and there is no routing close to high temperature units. The pipes must be held at regular intervals by plasticized clamps or run in existing ducting. Non-plasticized attachment clamps are absolutely forbidden. Take care to ensure the minimum radius of curvature of polyamide pipes is observed.

Dimension	4 x 6	6 x 8	9 x 12	12 x 16
Radius of curvature	30 mm	50 mm	70 mm	130 mm

Modification to the length of the chassis

Modification to brake pipe lengths requires braking response times to be checked out, in accordance with the legislation in force, and with agreement from the Type Approvals Department.

Connections for ratchet type pneumatic brake pipes type "RILAX 2000"

For the fitting of this type of connector, refer to and comply absolutely with the technical instruction sheet NT 8852 (method and tooling) available from the RENAULT V.I. Spare Parts Department.

2. GENERAL RULES TO BE OBSERVED WHEN FITTING BODYWORK

Before carrying out any work, protect the cab with a cover.

Our vehicles are equipped with plates, U-bolts or brackets. Preparation work may involve extra drilling or welding.

The principles described below must be adhered to.

2.1 General principles of welding

2.1.1 Precautions

Protection of the batteries

A battery at the end of its charge produces a mixture of oxygen and hydrogen gas. The ignition of this gas presents dangers of battery explosion in the case of the presence of a source of heat nearby. As a result, during a welding operation near the batteries (i.e. engine compartment, front end of the vehicle), take out the batteries and store them in a well-aired location away from the place where welding is being done. This recommendation applies equally for grinding operations.

Soundproofing screens

In the case of welding or use of a disk sander, either provide effective protection or remove the soundproofing screens, if necessary.

Protection of electrical and mechanical components

The vehicle is equipped with numerous electronic circuits: alternator, regulator, flasher units, speed limiter, ABS, etc.

Before any operation involving electric arc welding, make an earth connection by disconnecting the two negative (-) and positive (+) cables from the battery (starting with the earth cable) and connecting them to the frame earth. If the vehicle is equipped with a master switch, this should kept engaged (circuit closed). Place the earthing clamp as near as possible to the point of welding, but never on rotating parts (prop shaft, fan hub, etc.) or on a subassembly having moving parts (i.e. air compressor, turbocharger, etc.)

Nearby plastic pipes and electrical cables, springs and air-suspension bags are to be protected or removed. This also applies when grinding or drilling.

When reconnecting the battery, observe the polarities, commencing with the positive (+) terminal. Reversal of polarity may cause irreparable damage to electronic components.

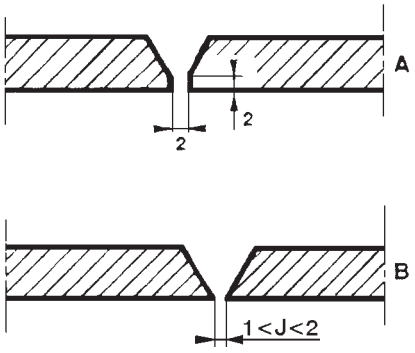
2.1.2 Preparation of parts for welding

Clean the parts, primarily at the location of the weld and at the connection of the earthing wire. This allows:

- free and regular electrical current flow (regularity of weld bead),
- avoidance of inclusion of impurities in the molten metal (weld quality),
- avoidance of spatter and emission of smoke (safety for the welder).

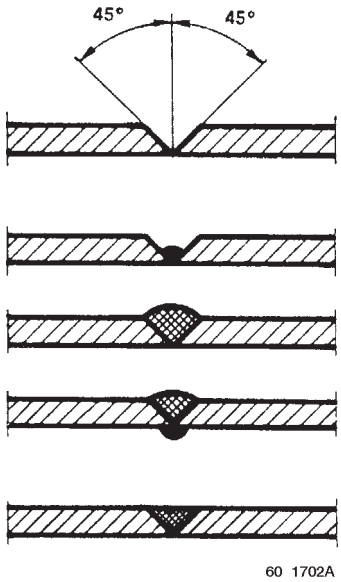
For conversions (extensions, reductions and reinforcement gussets), we recommend arc welding with electrode type B. When semi-automatic welding is use, the bodybuilder must be able to guarantee weld quality.

Preparation of specific edges on chassis frames
A - With electric arc welding
B - With weld under gas shield (MAG or MIG)



Method of welding to be specifically used on chassis frames

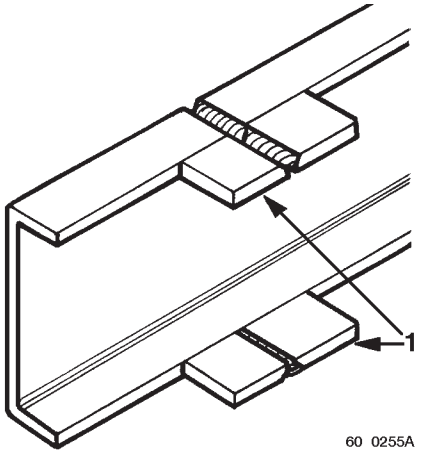
– Preparation of the edges at 45°
– Tack
– Position slave butts
– Weld on one single side
– Weld on second side
– Welds ground flush on both sides



Slave butts

The object of slave butts is to avoid the starting of cracks at the outside edges of the weld joint. Before final welding align butts with plates of the same thickness as the plates to be joined, holding them in position using quick action clamping devices.

They must not under any circumstances be held in position by weld tacks on the plates to be joined.



2.1.3 Welding process

Static or rotary arc welding set

- dc welding set recommended
- coated welding rods

Welding rod usage table

Electrode diameter (in mm)	2.5	3.15 (*)	4 (*)	5
Average current (in amperes)	75 to 90	95 to 110	120 to 140	150 to 175

(*) Most frequently used diameters

Coated welding rods recommended: standard NF EN 499 (January 1995)

EN 499 E 38 2 1 NI B for class: A - B - C
EN 499 E 46 2 1 NI B for class: D - E
EN 499 E 50 2 1 NI B for class: F
E 515/5 B 26 BH for steels class F

If steels are mixed, take the best performing steel electrode category.

Standard **NF EN 499** replaces standard NF A 81-309.

Relevant standards

AFNOR A 81.309 (12.1975)	ISO 2560	ASME (SFA 5.1) AWS (AS.1.69)	DIN 1913	BS 639
E 435/4 B 26 BH	E 435 B 26 (H)	E 7016	E 453/4 B 10	E 435 B 26 (H)
E 515/5 B 26 BH	E 515 B 26 (H)	E 7018	E 515/5 B 10	E 515/6 B 26 (H)

MIG or MAG semi-automatic welding set

MIG: - Metal Inert Gas
- for welding with electrode wire under inert gas shield (Argon, Helium...)

MAG: - Metal Active Gas
- for welding with electrode wire under active gas shield (CO_2, Argon + CO_2, Argon + CO_2 + O_2).
- used for welding mild steels.

Wire diameter (in mm)	Thickness to be welded (in mm)
0.8	up to 2 mm
1.0	from to 8 mm

2.1.4 Equivalent steel grades

The four classes relate to hot rolled steel plate with a high yield strength for cold forming, as currently set out in the French and European Standard NF EN 10149-2, which has replaced French Standard NF A 36.231. High yield strength sheet steel (dispersed carbon)

	RENAULT V.I. Specification 31.09-402			
	Class C	**Class D**	**Class E**	**Class F**
UTS in N/mm2 min.	450	500	540	610
YP at 0.2% in N/mm2 min.	355	445	490	560
E % min.	23	20	18	15
KCV at - 20o C J/cm2 min., longitudinal	35	35	35	37,5
Bending, transversal	1 e	1 e	1.5 e	1.5 e
Grain size	n° 5	–	–	–
= European equivalent French standards	S 355 MC NF EN 10149.2	S 420 MC NF EN 10149.2	S 500 MC NF EN 10149.2	S 550 MC NF EN 10149.2
= German standards equivalent DIN	QStE 380TM SEW 092	QStE 420TM SEW 092	QStE 500TM SEW 092	QStE 550TM SEW 092
= British standards equivalent BS	43 F 35 BS 1449	46 F 40 BS 1449		
= American standards equivalent ASTM	Gr. 50 050 YKL ASTM 607–50	Gr. 60 060 YKL ASTM 607–55	Gr. 70	Gr. 80
= EURONORM standards equivalent 149-80	FeE355 TM	FeE420 TM	FeE490 TM	Fe E560 TM

2.2 Reinforcement, extension, reduction of sidemembers

2.2.1 Bans

It is absolutely forbidden to weld onto sidemembers, except for reinforcement, extension, reduction, and the following instructions must be observed:

- Do not weld on the edges of flanges.
- Do not weld in sidemember bending radii.
- In the case of flat irons: no directly opposing welds on the two faces of the same web - only “alternate” or “plug” welds are authorized.
- No welds which are less than 15 mm from the edge of a hole.

Insofar as possible, we advise you to have modifications of the lengths of sidemembers carried out by specialists.

- The general rules for welding in the paragraph entitled “General Principles of Welding” must be strictly followed.

Only conversions (extensions or reductions) rendering the modified vehicle completely in conformity with a type approved chassis are permitted without additional testing, with certification from the vehicle manufacturer.

2.2.2 Reinforcement of sidemembers

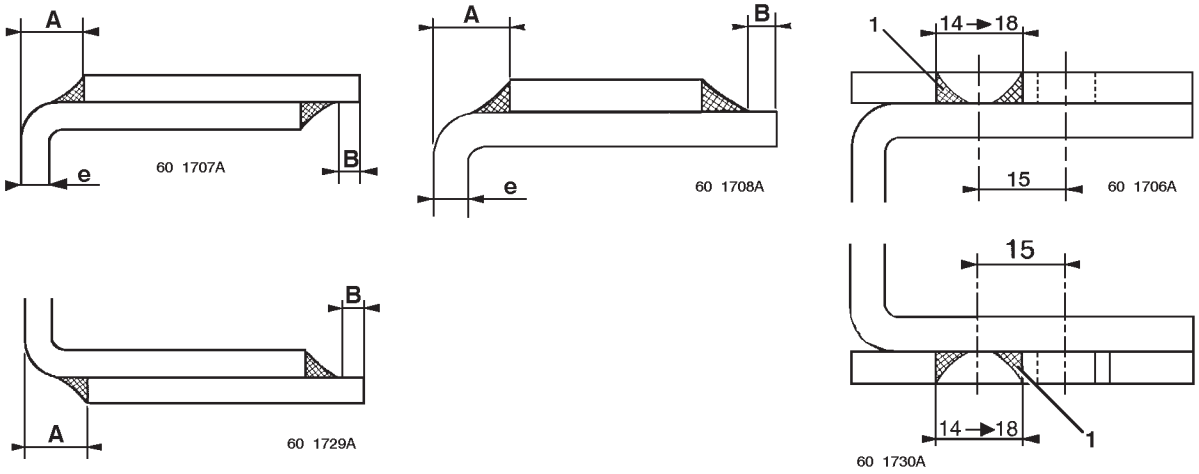
- For inner reinforcements and chassis flange stiffeners, the thickness should be the same as the thickness of the sidemember.

NOTE

The steel grade must be identical to that used for the sidemember.

Examples of reinforcements

Sidemember upper and lower stiffeners



A: Offset of the stiffener in relation to the external face of the sidemember
B: Offset of the stiffener in relation to the edge of the sidemember
e: Thickness of the sidemember
1: Welds through round or slotted holes, staggered

Thickness of the sidemember	A	B
e < 6 mm	10 mm	15 mm
e ≥ 6 mm	15 mm	15 mm

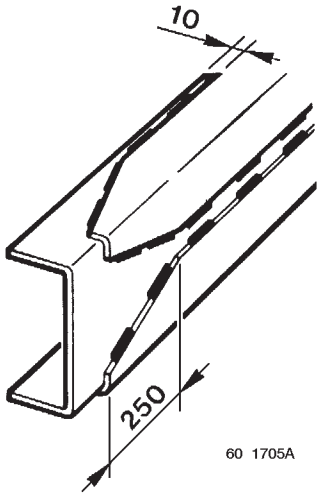
Upper and lower stiffeners using angle-irons :

60 1053

Method of joining

In the case of stiffeners made from flats (on the upper flange or under the lower flange of sidemembers), we recommend attachment by:

Intermittent beads by electric welding: as guidance, 80 mm beads spaced 120 mm apart and staggered.



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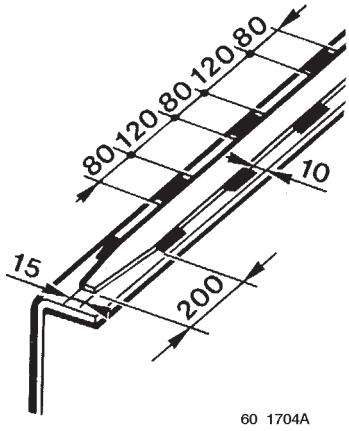

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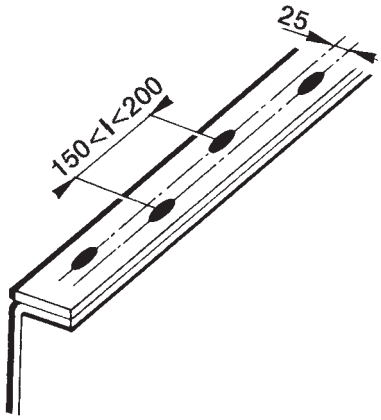

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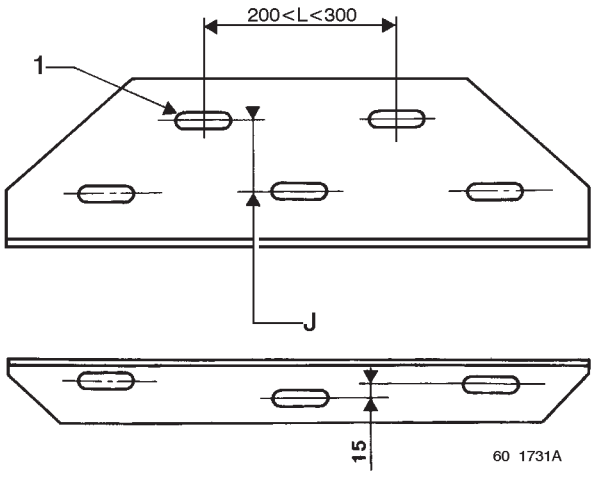
"PLUG" welds: as guidance, round holes diameter 14 to 18 mm or slotted (1) holes diameter 14 x 50 mm to 18 x 50 mm at a "pitch" of 200 mm min. to 300 mm. max., staggered, with good quality weld.

WARNING
No vertical welds on sidemember webs. No transversal welds on sidemember flanges.



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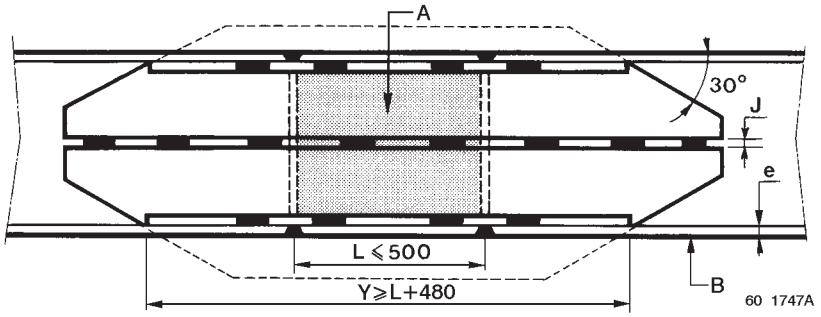
Extension, shortening of sidemembers in the wheelbase

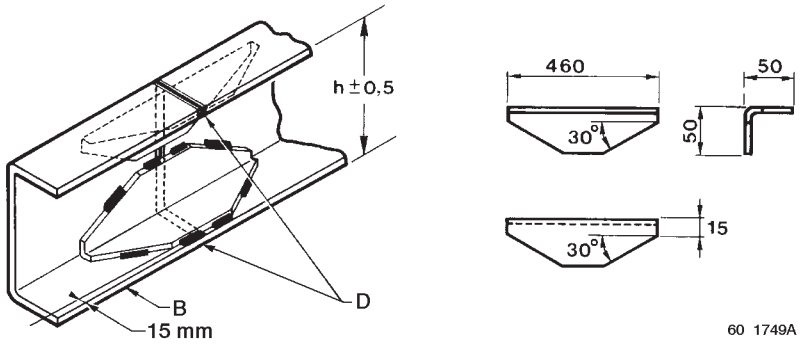
Extension of the sidemembers in the wheelbase

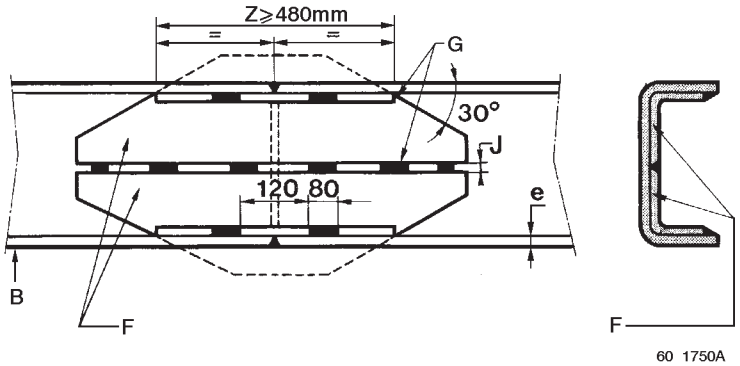
Key

A – piece of sidemember added,
B – sidemember,
C – reconstituted stiffener,
D – welds projecting beyond flanged edge with butt-ends then longitudinal grinding (elimination of sharp edges),
e – thickness of the sidemember,
F – angle-iron of thickness (E) max.: E ≤ (e - 1 mm),
h – height of the sidemember,
J – weld penetration clearance (about 2 mm),
L – max. length of extension,
X – max. length of projection of the stiffener measured on the edge of the flange (extension),
Y – min. length of support of the stiffener measured on the edge of the flange of the sidemember (extension),
Z – min. length of support of the stiffener measured on the edge of the flange (stiffener without extension).

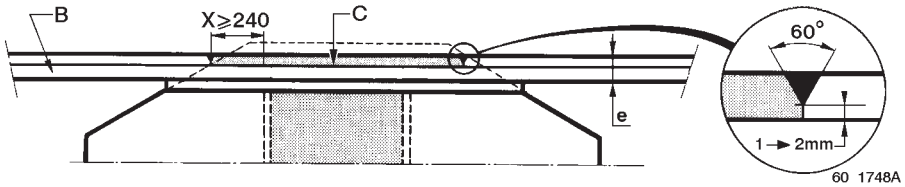
Sidemember without stiffener flat on the flange







Sidemember with stiffener flat on the flange



2.2.3 Modification of the rear overhang

If the bodywork or the equipment fitted do not alter the weight and dimensional characteristics of the chassis entered on the description sheet, the vehicle can be submitted to the Type Approval Department without any action being necessary on the part of RENAULT V.I. (within the permitted limits in force).

- Welding stiffeners are required for drawbar rigids or if the extension is longer than 400 mm for a solo vehicle.

Examples: Drawbar rigid; tail lift; crane at the rear of the chassis; tipper; etc.

- Extension of the rear overhang will also be required when the rear extremities of the bodywork project beyond the maximum authorized value which is indicated on the bodybuilder's drawing and calculation sheets relating to the vehicle.

Attachment of crossmembers

Crossmembers should be attached with nut and bolt hardware of the 10.9 SSS protected class as per standard 01714002 and distributed by RENAULT V.I.

Towing crossmembers

Please refer to the chapter on "Drawbar crossmembers" in the section entitled "SPECIFIC FEATURES OF THE MIDLUM VEHICLE".

Intermediate crossmembers

In the case of extension of the wheelbase or the rear overhang, it is essential to add crossmembers, so as not to weaken the rigidity of the frame.

Observe the following instructions:

- Between two crossmembers, the spacing must be no greater than the original spacing.

- If the extension to the overhang is longer than 500 mm, the rear crossmember must be moved and an intermediate crossmember fitted which is identical to the others.

2.3 Attachment of bodywork

The bodywork must be correctly attached so that both the static and dynamic stresses are freely transmitted without causing excessive local strain, which could prejudice the reliability of the chassis frame or affect the road behaviour of the vehicle.

The following rules apply to the fastening of various standard bodies fitted to our chassis cabs, such as platforms, vans, tippers, and tankers. For special cases, contact the Product Applications Department.

For body design (i.e. length, load distribution, location of accessories on sidemembers, etc.) refer to the CD-ROM “Information for Bodybuilders” or the 1:20 scale bodywork drawing which we supply upon simple request.

Fastenings should always be tightened progressively and alternately.

The shape of sub-frames or underbodies should always be tapered towards the front (i.e. at the back of the cab), so as to avoid sudden variations in inertia (refer to chapter entitled “Finishing of sub-frame behind the cab”.

2.3.1 Bans

- The use, drilling or welding of spring hangers.
- Any modification of: the chassis, the driveline, or the suspension.
- Fastening of sub-frames to our sidemembers by welding.
- The drilling of stiffener gussets.
- The notching of sidemembers, gussets or crossmembers.
- With the exception of special cases described in this document, the use or modification of our nut and bolt hardware and our riveting for the attachment of a body or sub-frame.
- The attachment of sub-frames by hooks (use U-bolts).

All bodies attached by clamps and brackets must mandatorily have 1 inertia stop to the aft of each sidemember to stop the body from moving in the event of fierce braking, as well as 4 body guides 2 at the front, 2 at the rear).

For bolted fastenings, comply with the following instructions:

- By preference use brackets attached to the chassis.
- Use the fixing bolt holes 11, 13 or 15 mm diameter depending on the particular vehicle, spread out along the length of the sidemembers of the chassis frame.
- Take good note of the attachment principles, set out in the chapter on the “Attachment of sub-frames”.

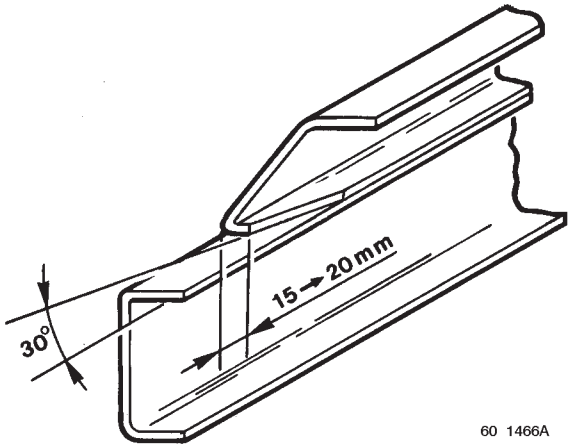
2.3.2 Protection against exhaust heat radiation

Depending on the features of your bodywork or equipment, the fitting of a heat shield on the original protection is recommended.

2.4 Sub-frame

In order to attach bodywork to the frame of the chassis, you should allow for the fitting of a sub-frame whose module of inertia (I/V) is determined in accordance with the vehicle series in question (refer to the section entitled “MIDLUM special bodybuilding features”.
In order to ensure better distribution of the stresses along the sidemembers, you must allow for a cut-out as far forward as possible under the cab.

2.4.1 Finishing of sub-frames behind the cab



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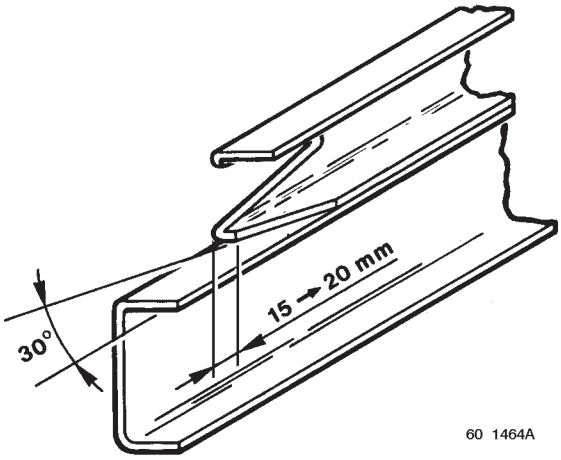

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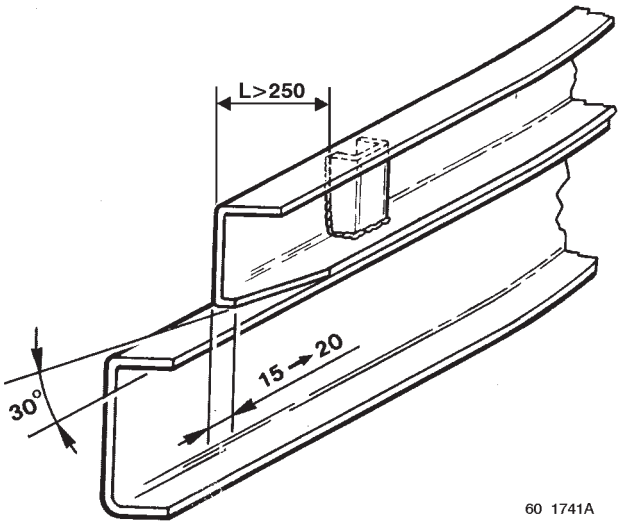

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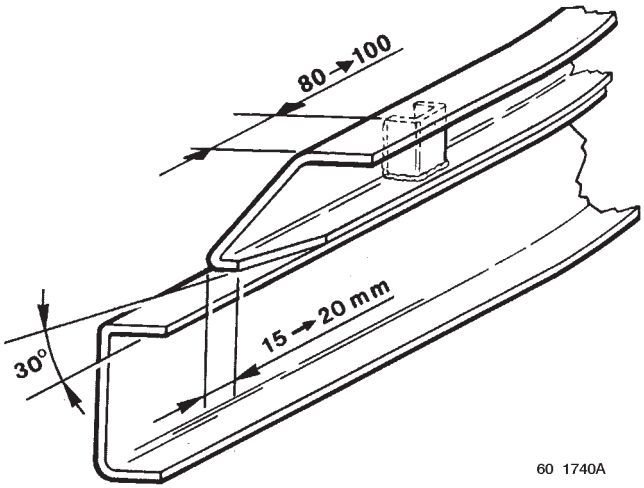

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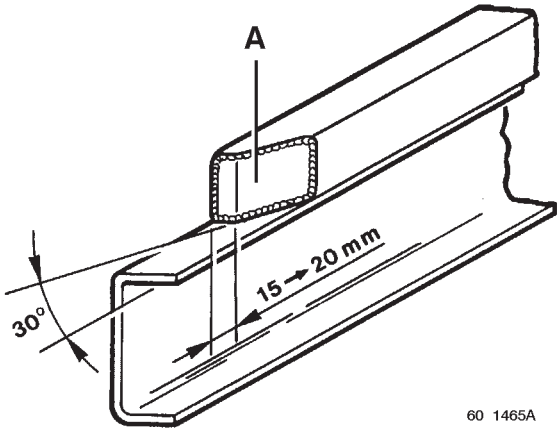
When the sub-frame is constructed of square or rectangular tube section, we also suggest the cut-out shown below.

A: Blank off with 1.5 mm thick sheet metal



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2.5 Nuts and bolts, tightening torques for parts in steel and cast iron

The torques indicated in the table are the nominal torques (i.e. average value calculated on the basis of the minimum and maximum torque).

Class III is the class covering precision tightening (± 20 % of nominal torque) in accordance with Standard 01504002 (coefficient of friction 0.15 ± 003).

The tightening torques are given for nut and bolt hardware that is dry and coated with Dacromet.

Description	Characteristics	Class of Steel	Part Nos.	Tightening torque
Screw	H 10 x 125 L 30	10.9	50 03 101 460	60 N.m
	H 10 x 125 L 50	10.9	50 03 101 148	60 N.m
	H 12 x 125 L 40	10.9	50 03 101 151	110 N.m
	H 12 x 125 L 45	10.9	50 03 101 749	110 N.m
	H 12 x 125 L 50	10.9	77 03 101 679	110 N.m
	H 12 x 125 L 60	10.9	50 03 101 153	110 N.m
	H 14 x 150 x 40	10.9	50 03 101 161	170 N.m
	H 14 x 150 x 50	10.9	50 03 101 162	170 N.m
	H 14 x 150 x 60	10.9	50 03 101 163	170 N.m
	H 14 x 150 x 90	10.9	50 03 101 169	170 N.m
	H 14 x 150 x 100	10.9	50 03 101 660	170 N.m
	H 14 x 150 x 110	10.9	50 03 101 171	170 N.m
	H14 x 150 x 120	10.9	50 03 101 172	170 N.m
	H14 x 150 x 130	10.9	50 03 101 887	170 N.m
	H14 x 150 x 140	10.9	50 03 101 173	170 N.m
	H 16 x 150 x 50	10.9	50 03 101 103	220 N.m
Collar screw	H 10 x 125 L 30	10.9	50 03 002 048	60 N.m
	H 12 x 125 L 40	10.9	50 03 002 049	110 N.m

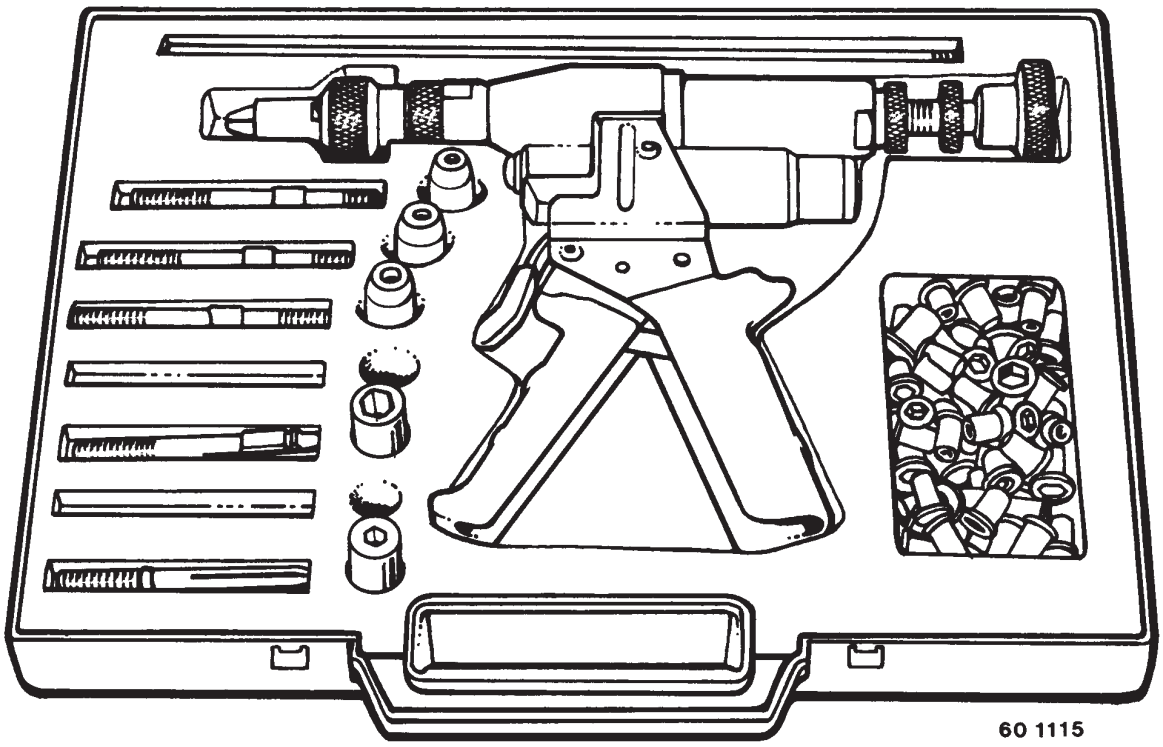
Description	Characteristics	Part Nos.
Cone washer	10 x 20 x 2.2	50 03 058 081
	10 x 24 x 2.8	50 03 058 071
	10 x 27 x 2.8	50 03 058 076
	12 x 30 x 3.2	50 03 058 075
	14 x 28 x 3	50 03 058 069
	16 x 32 x 3.4	50 03 058 034
	16 x 39 x 3.6	50 03 058 070
Flat washer	10 x 22 x 3	50 03 053 453
	10 x 27 x 3	50 03 053 455
	10 x 24 x 2.5	50 03 053 026
	12 x 28 x 5	50 10 054 526
	12 x 32 x 2.5	50 03 053 441
	14 x 30 x 5	50 03 053 014
Cone washer “Belleville” type	14.5 x 35 x 1.8	00 21 721 040

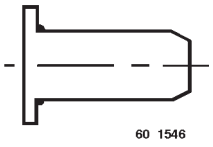
Description	Characteristics	Class of Steel	Part Nos.	Tightening torque
Nut	10 x 125	10	50 03 032 156	60 N.m
	12 x 125	10	50 03 032 157	110 N.m
	14 x 150	10	50 03 032 159	170 N.m
	16 x 150	10	50 03 032 236	220 N.m
Locknut DRH (flanged)	10 x 125	10	50 03 034 246	60 N.m
	12 x 125	10	50 03 034 248	110 N.m
	14 x 150	10	50 03 034 250	170 N.m

2.6 Addition of equipment to the bodywork

The attachment of equipment to the bodywork must be done with fluidtight crimping nuts.

Tooling and crimping nuts



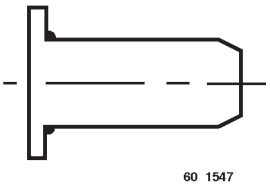


M6 crimp nut - hexagonal barrel

Part N°: 50 03 043 050

Method:
- Drill a 9.2 mm diameter hole (refer to chapter entitled “Drilling of bodywork members for the fitting of accessories”).
- Use the OPEX tooling from OTALU S.A.
- Punch out the hexagonal.
- Insert the nut for crimping.

Information:
- Tightening torque max. 10 Nm.
- Length of barrel projecting under bracket after crimping: 17 mm.



M8 crimp nut - hexagonal barrel

Part N°: 50 03 043 052

Method:
- Drill a 11.2 mm diameter hole (refer to chapter entitled “Drilling of bodywork members for the fitting of accessories”).
- Use the OPEX tooling from OTALU S.A.
- Punch out the hexagonal.
- Insert the nut for crimping.

Information:
- Tightening torque max. 24 Nm.
- Length of barrel projecting under bracket after crimping: 21 mm.

2.7 Rear run-under guard

RENAULT V.I. obtains approval for its equipment to cover the requirements of its range. Their attachment being by means of bolts, this allows them to be moved down along the sidemembers to suit such modifications that the chassis may undergo. This must be observed, along with the maintenance of the attachment method detailed on the 1:20 scale bodywork drawing and compliance with the dimensional requirements under the regulations.
A vehicle which is not equipped at the time of delivery can be fitted afterwards, following a conversion making the fitting compulsory, using items which can be supplied from the Parts Stores of our dealers.

Changing of position of items of equipment

Modifications of a RENAULT V.I. vehicle for the fitting of bodywork and equipment requires technical approval to be obtained from the Product Applications Department of RENAULT V.I.

3. SPECIFIC EQUIPMENT FEATURES

3.1 Running the engine when vehicle stationary

Under the conditions of running an engine for a long period under load, it is vital to fit an additional cooler unit in order to keep the temperature of the engine at a normal level (water temperature approx. 80° C).
The prolonged use of the engine under these conditions can cause malfunctions which could adversely affect the life of the engine.

3.2 Mounting of power take-offs and flanged pumps

RENAULT V.I. power take-offs (PTOs) and their adapter kits should be ordered from the RENAULT V.I. Spare Parts Department. In order to carry out the fitting, refer to the specific information circulars that are available from the Product Applications Department.
Bearing in mind the weight and the large overhang required for certain PTOs having flanged pumps, the rear of these units should be supported by a suitable bracket attached to the rear of the gearbox.

Comply with the standard NF ISO 7653

IMPORTANT
It is compulsory at the time of fitting a power take-off to ensure that there is a certain amount of play in the setting adjustment, so as to allow an ideal backlash of 0.15 to 0.25 mm then to fit a gasket or apply paste in order to achieve a good seal and also to top-up the oil level. (Refer to the vehicle maintenance handbook).
Refer to our Product Information Sheet and 1:20 scale bodywork drawing on “power take-offs”, which can be requested from our Product Applications Department.

3.3 Front power take-offs (crankshaft nose)

RENAULT V.I. pre-arrangement

For belt drive units, pulleys with extra grooves fitted to the engine may be available.

Consult the Product Applications Department to obtain the relevant information and technical approval for the assembly.

3.4 Front and rear power take-offs

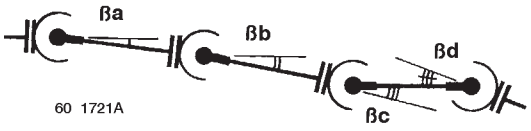
3.4.1 Propeller shaft alignment

In order to achieve satisfactory propeller shaft alignment, several minimum basic criteria have to be observed.

Angularity criteria (or: equivalent angle of inclination β_E permissible for all articulations).
This angle β_E must comply with the following condition:

$$\beta_E = \sqrt{|\beta_a^2 \pm \beta_b^2 \pm \beta_c^2 \pm ...|}$$

$$\beta_E \leq 3°$$

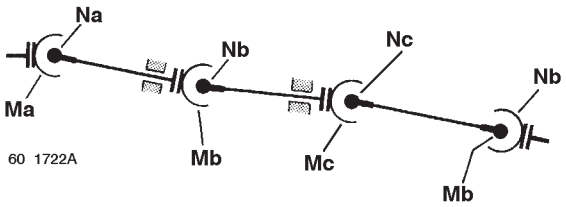


Rule for sign β:
Yoke N° 1 is to be considered as the reference yoke.

β > 0 when the leading yokes are parallel to the first leading yoke (Ma).

Example 1:

$$\beta_E = \sqrt{|\beta_a^2 + \beta_b^2 + \beta_c^2 - \beta_d^2|}$$

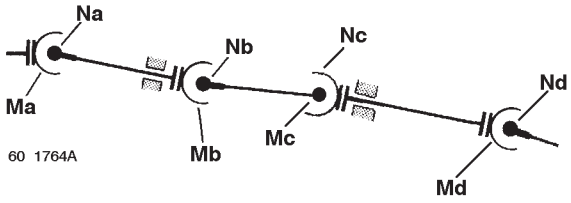


M - Leading yokes
N - Trailing yokes

β < 0 when the leading yokes are perpendicular to the first leading yoke (Ma).

Example 2:

$$\beta_E = \sqrt{|\beta_a^2 + \beta_b^2 - \beta_c^2 + \beta_d^2|}$$



Angular acceleration criteria θ1
Calculated criterion for a theoretical maximum speed of rotation (N).

$$\theta_1 = \left(\beta_E \times \frac{\pi}{180}\right)^2 \times \left(\frac{\pi \times N}{30}\right)^2$$

$$\theta_1 \leq 270$$

θ1: criterion of acceleration in rd/s²
N: max. speed of rotation in rpm

NOTE
This value is calculated without dynamic amplification of the prop shaft tubes and bearings.

Measured criteria θ2:
The angular acceleration or torsional vibrations criteria value θ2 must not exceed 1500 rd/s² at the PTO output or at any point whatsoever of the driveline for a downstream inertia of I such that I ≤ 0.2 kg/m².

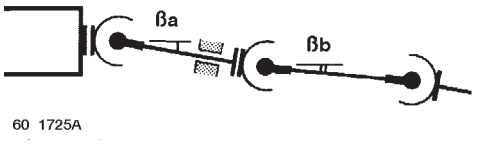
$$\theta_2 \leq 1500 \ \frac{rd}{s^2}$$

NOTE
This limit value θ2 takes into account possible dynamic amplification of the driveline.

Transversal stress criteria for prop shaft tubes and bearings.

Example β1 and β2 maximum not to be exceeded.

- **βa < 2°** for a prop shaft with bearing.
- **βb < 7°** for a prop shaft with sliding yoke.



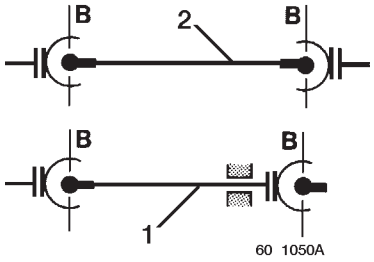
60 1725A

NOTE
If this 7° value has to be exceeded for space or clearance reasons, the vehicle manufacturer must be consulted.

3.4.2 Propeller shaft balancing

Permissible imbalance value (B):

$$B \leq 3 \frac{g \times cm}{kg} \text{ per balancing plane}$$

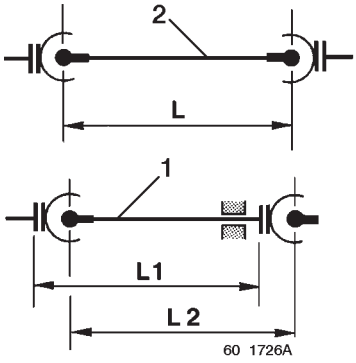


1 - 1/2 prop shaft
2 - prop shaft

NOTE
g = m = 10 m/s²

3.4.3 Maximum permissible length of a prop shaft as a function of the rotating speed (L, L1 or L2)

L: Distance between centres of articulation of a prop shaft.
L2: Distance between centres of articulation welds of a half prop shaft.
L1: Distance between centres of articulations of a half prop shaft.
L1 = L2



$$L = \sqrt{\frac{K}{Nt \times 1,2}} \quad \text{with} \quad K = 0,75 \times 1.22 \times 10^5 \times \sqrt{D^2 + d^2}$$

Nt = prop shaft maximum operating speed
1.2 = safety coefficient
D = prop shaft large diameter
d = prop shaft small diameter

3.5 Vehicle driveline (powertrain)

Any modification to the driveline is forbidden. For special cases, agreement must be obtained from the RENAULT V.I. Product Applications Department.

Any propeller shaft modifications must only be carried out in conformity with the requirements of paragraphs 3.4.2 and 3.4.3.

3.6 Mounting of handling cranes

The installer of the crane is responsible with regard to compliance with the regulations, and also for the stability of the vehicle. The recommendations of RENAULT V.I. are only concerned with the attachment of the equipment.

3.6.1 Mounting on the sub-frame

The mounting of a crane on the chassis behind the cab or in the rear overhang requires the fitting of a specific sub-frame.

The sub-frame module is defined in the graph of inertia in accordance with the lifting torque only for a crane mounted behind the cab and on rigid or drawbar rigid vehicles (refer to the next page).

For all mountings of cranes in the rear overhang, off-limits and on tractors, consult the RENAULT V.I. Product Applications Department.

The sub-frame must be in one single piece, starting from the rear of the cab, and extending as far back as the rear tip of the overhang. The front end must be finished in a single or double bevel (refer to the chapter 2.4.1 entitled “Finishing of the sub-frame behind the cab”).

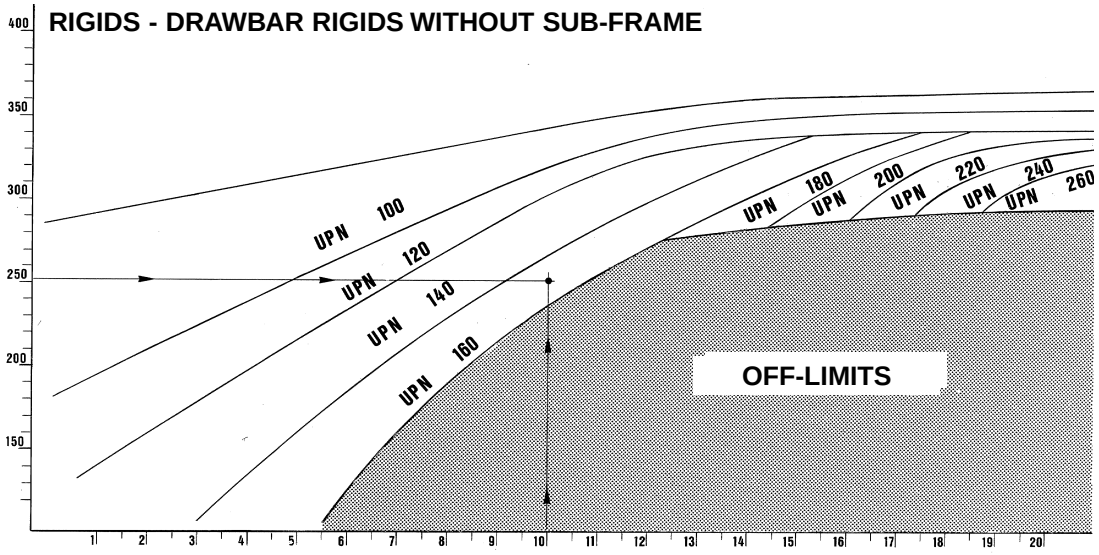
Should the crane be mounted in conjunction with another item of mobile equipment, one single sub-frame shall be designed in accordance with that item of equipment which places the most strain on the sidemembers.

3.6.2 Graph of the moment of inertia of the sub-frame as a function of the lifting torque

Example:

A chassis with sidemembers 252 mm long, fitted with a crane having a lifting capacity of 10 tonnes per metre.
The chassis requires a sub-frame built of size 160 U-section beams (—- direction of reading).
The U-section can be replaced by any other steel section offering equivalent total inertia.

Height of sidemember



Crane LIFTING TORQUE in tonnes/metre

The U-section beams (UPN) can be replaced by any other steel section offering equivalent total inertia (I/V).

UPN 100 : I/V = 41200 mm^3	UPN 160 : I/V = 116000 mm^3	UPN 220 : I/V = 245000 mm^3
UPN 120 : I/V = 60700 mm^3	UPN 180 : I/V = 150000 mm^3	UPN 240 : I/V = 300000 mm^3
UPN 140 : I/V = 86400 mm^3	UPN 200 : I/V = 191000 mm^3	UPN 260 : I/V = 371000 mm^3

WARNING

Before undertaking the mounting of a crane on a vehicle, it is essential to make calculations to check the load distribution, and to determine the new maximum body length of the vehicle, whilst complying with:

- The plated gross vehicle weight (GVW).
- The maximum plated axle loads.
- The maximum rear overhang indicated in the Type Approval Department's descriptive sheet and the body-work diagram.

Should such limits be exceeded and in all cases where the work does not comply with the type approval department descriptive sheet, special authorization must be requested from the RENAULT V.I. Product Applications Department.

In addition to this, the bodybuilder will be responsible for commissioning the equipment.

3.6.3 Crane in the rear overhang

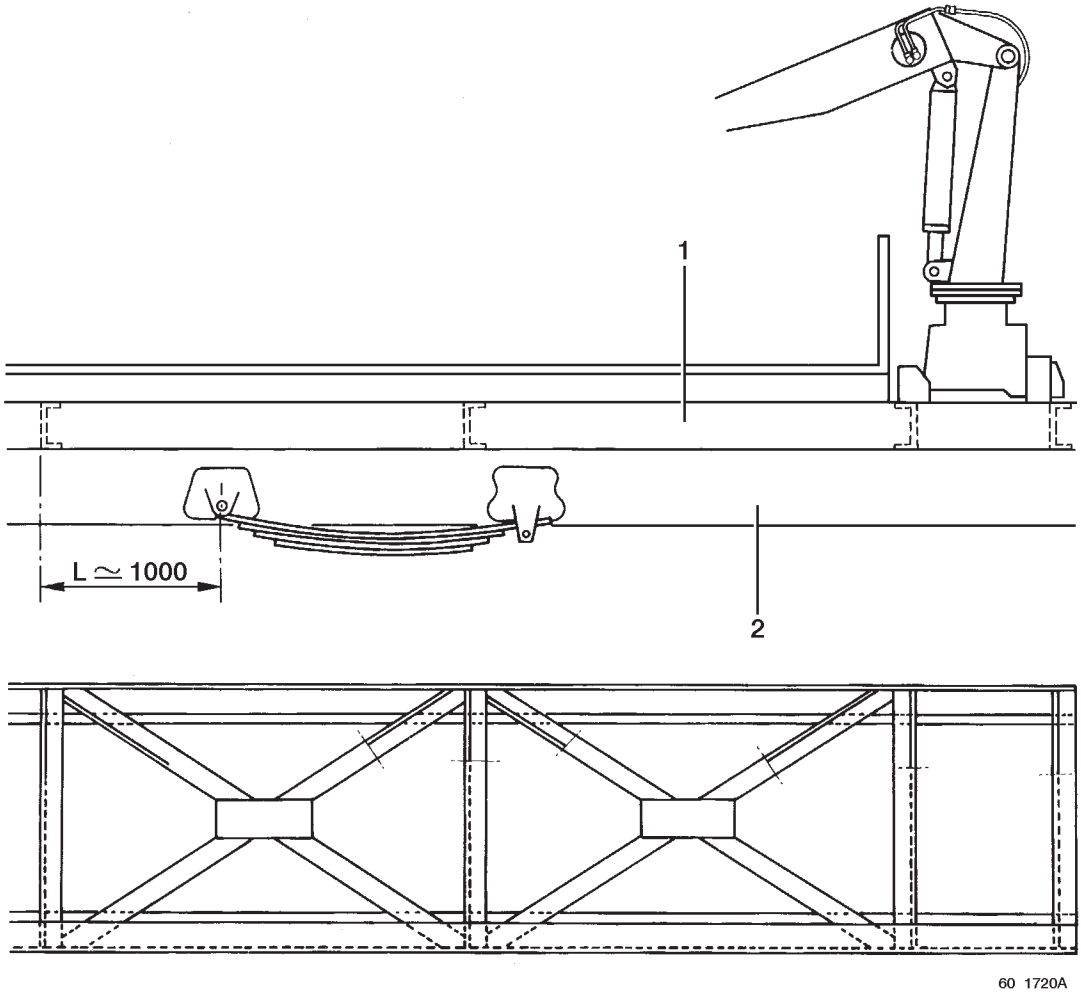
The installer of the crane is responsible with regard to compliance with the regulations, and also for the stability of the vehicle. The recommendations of RENAULT V.I. are only concerned with the attachment of the equipment.

The sub-frame required for such assemblies must be diagonally braced in accordance with the diagram below, using U-section beams with a module that is immediately lower than that recommended for the sub-frames.

Example: A sub-frame made of size 140 U-section beams shall be diagonally braced with size 120 U-section beams.

For a crane mounted in the rear overhang, in addition to the recommendations contained in the “WARNING” paragraph above, the following must also be observed:

- The minimum front axle load, for a vehicle fitted with a body and equipped with crane.
- The maximum plated front axle load shedding: 5% of the value of the weight of the chassis cab on the front axle.



1 - Sub-frame
2 - Vehicle chassis

3.7 Tail lifts

3.7.1 Sub-frames

In the majority of cases, the mounting of a tail lift involves the fitting of a sub-frame to the vehicle. Such a sub-frame must reinforce the entire length of the chassis, with the bevelled front end being located as far forward as possible under the cab.

The module to be used for the sub-frame must be determined for tail lifts:

- without landing legs, for a capacity of 400 to 2,000 kg
- with landing legs, for a capacity of 1,000 to 2,000 kg
- by referring to the graph of inertia of the sub-frame depending on the load to be lifted, plus the information contained in the paragraph entitled “Special Recommendations”, which also deals with tail lifts with a capacity of 1,500 kg without landing legs and tail lifts with a capacity of 2,000 kg with or without landing legs.

3.7.2 Attachment

The tail lift is to be fastened in position with bolted plates. In all cases, the design of the attachment should involve that of the body sub-frame as well. Nut and bolt hardware is to be of class 10.9 fine pitch with a diameter of 12 mm. The plates are to be fastened in position with at least 6 nuts and bolts on each side of the chassis and by 3 bolts and nuts or only by welding to the sub-frame.
If necessary, it may be necessary to wedge the tail lift beam or plate on the lower flange chassis sidemember, so as to avoid flexing of the sidemember.

NOTE
Do not weld the bolted plate to the chassis.

WARNING
In all cases of conversions for tail lifts, it is absolutely essential to calculate the new length of body, to ensure compliance with:

- The maximum plated gross vehicle weight (GVW).
- The maximum load on the front axle, with the vehicle fitted with its body and equipped with tail lift.
- The maximum plated loads on the front and rear axles.
- The maximum rear overhang indicated in the Type Approval Department’s descriptive sheet and the bodywork diagram.

If any loads are exceeded, you should consult the Product Applications Department.

3.7.3 Electrical connections for a tail lift

Electrical connections should comply with the recommendations set out in the chapters entitled “Fitting of specific equipment” and “Electrical equipment”.

3.7.4 Special recommendations for tail lifts from 1500 to 2000 kg without landing legs

1,500 kg tail lift

- This is only possible using our chassis with a GVW equal to or greater than 16 tonnes.

2,000 kg tail lift

- This is only possible using our chassis with a GVW equal to or greater than 19 tonnes.
- For off-limits and for vehicles with a lower capability, consult the Product Applications Department.

Should the run-under guard have to be modified, care should be taken to ensure compliance with regulations in force.

3.7.5 Graph of the moment of inertia of the sub-frame as a function of the lifting torque

How to use the graph

- Draw a straight line joining the type of tail lift in question (lower part of the graph) to the mark corresponding with the height of the sidemember in mm.
- Draw a straight line from the value of the sidemember height.
- Read the value for the sub-frame at the intersection of these two lines.

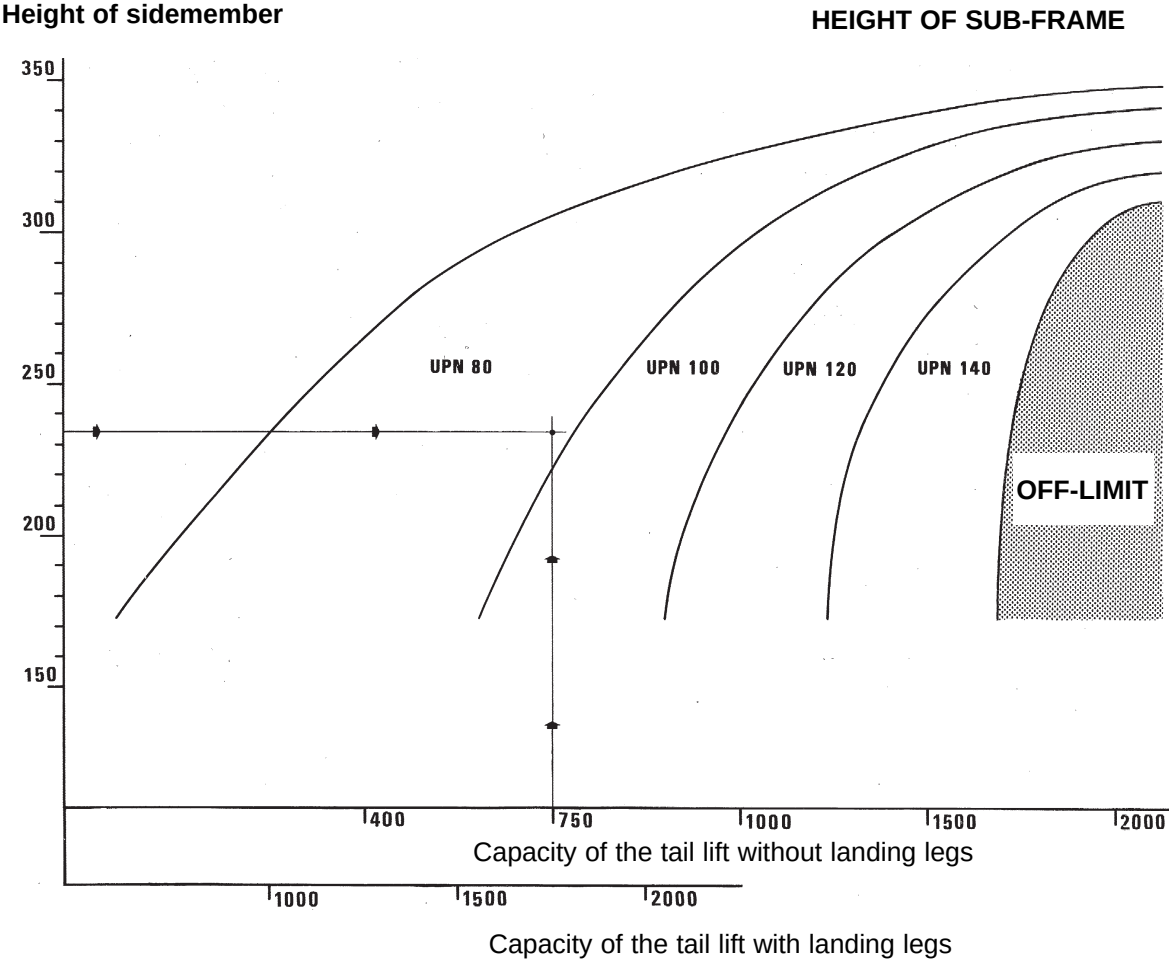
NOTE

For the mounting of tail lifts on 6x2 vehicles, it is essential to consult the RENAULT V.I. Product Applications Department.

Example:

Take a chassis with 234 mm high sidemembers, equipped with a 750 kg tail lift.

It requires a sub-frame made of size 80 U-section beams.



NOTE

The size 80 U-section beams can be replaced by any other section which gives an equivalent inertia (I/V).

UPN 80: I/V = 26500 mm^3

UPN 100: I/V = 41200 mm^3

UPN 120: I/V = 60700 mm^3

UPN 140: I/V = 86400 mm^3

3.8 Sub-frame box sections

The recommended box sections should:

- be constructed in sheet metal which is as thick or thicker than that used for the sub-frame.
- stretch over the entire rear of the sub-frame, starting gradually at least one metre in front of the foremost spring hanger of the rear spring.

WARNING

If the sub-frame is to be constructed in a material other than commercially available U-section beams, we approve all other sections on condition that the modulus of inertia of the “truck sidemember + sub-frame” section, measured at the centre-line of the rear axle, be at least equal to the modulus which we recommend (refer to the previous page).

It is forbidden to make any butt welds on the sub-frame in the area defined as follows:

- from the centre-line of the rear axle up to 500 mm to the aft of the rearmost spring hanger of the rear spring, in the case of 4x2 and 4x4 vehicles.
- from the centre-line of the middle axle up to 500 mm to the aft of the centre-line of the rear axle, in the case of all other vehicles.

3.9 Fitting of specific equipment (for example: refrigerator unit, tail lift)

3.9.1 Electrical connections

Refer to the recommendations for use (chapter on “Electrical equipment” in the General Section).

The power supply cable should be in one single piece, with a cross-section calculated for a max. rating of 5 Amps per mm^2. The power supply must be protected by a fuse and controlled by a specific master switch during fitting. It is compulsory for the cables to be connected to the battery terminals. The fuse and the master switch must be located as close to the battery connection as possible (in order to keep to a minimum the length of unprotected line).

The electric power and auxiliary wiring must compulsorily be independent from that of the vehicle network.

For this, you should contact the Product Applications Department in order to obtain its permission.

In the case of conversion of an independent self-contained unit on the front end of the body, an access ladder and platform for maintenance purposes should be provided.

3.9.2 Installation of receivers or generators with a voltage of more than 24 V

Comply with the standards in force and with the safety regulations covering installations and safety of the person (decree dated 14/11/1988). The protective earth is to be made on the equipment, and never on the vehicle structure.

3.10 Tapping on the diesel fuel tank

It is forbidden to drill the tank for the installation of a tapping point.

3.11 Hitch coupling for rigid drawbar trailers

3.11.1 Fitting of an additional crossmember

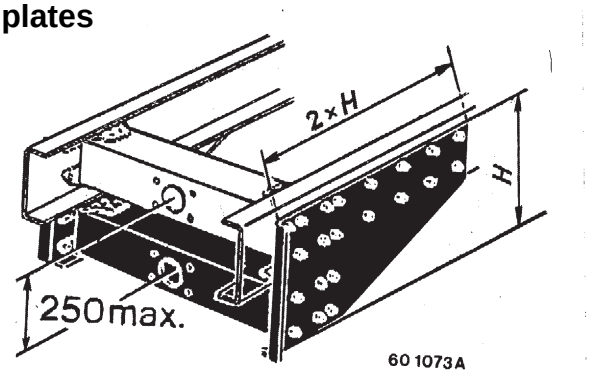
If the rear crossmember fitted is too high, there is the possibility of fitting a second crossmember underneath the other.

The fitting of this must be carried-out using reinforcement plates on the side raves of the sidemembers of the chassis. The attachment bolts of the upper crossmember are used for location of the reinforcing plates. In addition, two rows of eight bolts are to be fitted to each side which are attached to the sidemembers.

The crossmember is mounted on the reinforcement plates and has the same alignment as the crossmember used on the standard vehicle. Use all the holes in the crossmember for the attachment of this. Put in a spacer on each side to take up the space between the new crossmember and the reinforcement plate.

3.11.2 Minimum thickness of reinforcing plates

Thickness = 1.2 x thickness of the sidemember.



3.12 Fifth wheels (baseplates and couplings)

Tractor chassis are normally supplied as original equipment with bolted angle irons. In this case they allow for the longitudinal positioning of the baseplate for the fifth wheel on the chassis, in order to ensure good load distribution on the tractor axles.

The fifth wheel is located on these angle-irons by the use of a crossmember and/or a baseplate (in certain cases the baseplate is sufficient).

The fitting of the fifth wheel must allow for the manoeuvring of a swan-necked semi-trailer in accordance with the ISO Standard in force.

The bedplate and the baseplate must be independently mounted, with a minimum strength equal to that of the attachment for the fifth wheel.

Baseplates for each type of vehicle are available in several heights from the Spare Parts Department.

Refer to the Product Applications Department.

3.12.1 Mounting standards

Comply with the standard in force.

Kingpin 50 mm (2") dia.

The attachment of the fifth wheel to the chassis must be done using 12 bolts size M16, quality class 10.9.

Kingpin 90 mm (3.5") dia.

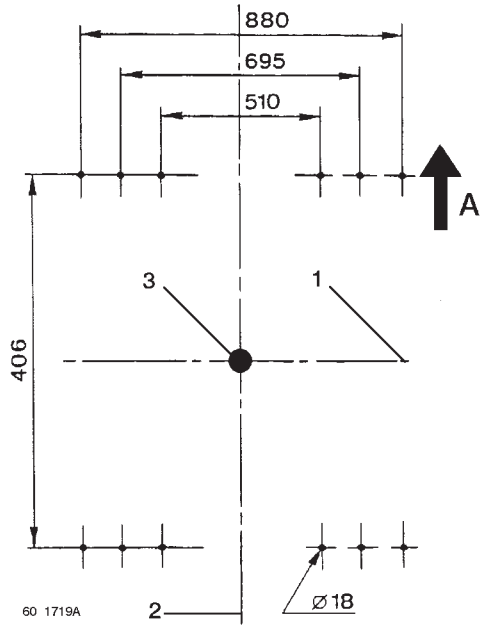
For details of the attachment of the fifth wheel, refer to the Product Applications Department or comply with the recommendations of the supplier.

These values apply equally for the attachment of the baseplate.

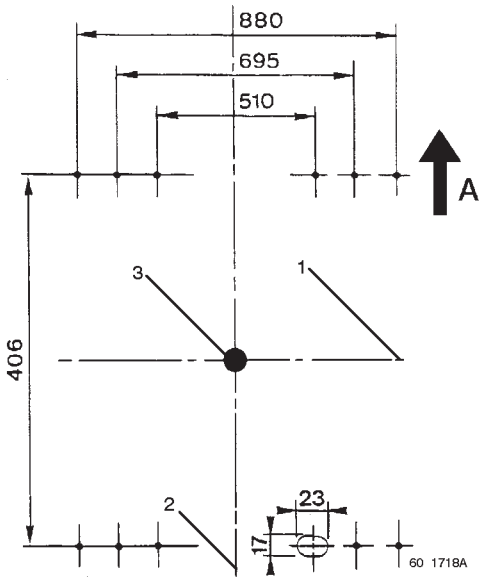
As far as swan-necked semi-trailers are concerned, which are not constructed in accordance with the ISO Standard in force, the attachment of the fifth wheel must take into account the instructions given above, whilst conforming with the capability of the tractor to manoeuvre, i.e. it must not come into contact with parts of the chassis, such as mudguards, rear lamps, registration plates, the back end of the chassis, the tyres, etc.

If the changing of position of the fifth wheel towards the front causes any interference of the mounts of the baseplate with those of a crossmember, you are obliged to refer to the Product Applications Department.

Drawing for drilling the baseplate for the attachment of the fifth wheel using 12 bolts Ø 16 mm (DIN Standard 74081)



Drawing for drilling the baseplate for the attachment of the fifth wheel by 12 bolts Ø 16 mm with slotted holes (Standard NF R 41-171 dated October 1986)



A - Direction of movement of vehicle
1 - Lateral axis
2 - Longitudinal axis of the tractor engine
3 - Kingpin axis

CHAPTER -B-
“MIDLUM” SPECIAL BODYBUILDING FEATURES

1. PRESENTING THE “MIDLUM” SERIES

This MIDLUM range, the new RENAULT V.I. offer for 7.5 to 18 tonne vehicles specifically designed for distribution, replaces and completes the old range.

This modern series hinges around three types of chassis, with greatly optimized models in the major European market segments:

- 7.5 tonnes with a wide choice of power ratings,
- 12 tonnes with a multiple offer allowing maximum adaptation to different trades,
- 18 tonnes.

Two new engines cover the power units for the range:

- 4-cylinder 4200 cc (dCi 4) developing 150 or 180 hp,
- 6-cylinder 6200 cc (dCi 6) developing 220 or 270 hp.

1.1 Make-up of the range

MIDLUM B 7.5 to 10 tonnes:
- 3 power levels (150, 180, 220 hp)
- 6 wheelbases (2700*, 2950, 3250, 3850, 4450, 5050 mm)

MIDLUM B 12 tonnes:
- 2 power levels (150, 180 hp)
- 6 wheelbases (2700*, 2950, 3250, 3850, 4450, 5050 mm)

The MIDLUM B 12 tonnes is the “typical” vehicle for urban and suburban distribution.
The main features of MIDLUM B are:
- 200 x 70 mm sidemembers module,
- 17.5” tyre fitment,
- one single access step to the cab.

* for dCi 4 only.

MIDLUM C’ 12 tonnes:
- 2 power levels (180, 220 hp)
- 8 wheelbases (3070, 3350, 3650, 3950, 4550, 5150, 5750, 6480 mm)

The main features of MIDLUM C’ are:
- 220 x 70 mm sidemembers module,
- 17.5” tyre fitment,
- two access steps to the cab.

The MIDLUM C’ consists of a MIDLUM C chassis and cab with MIDLUM B powertrain and rolling gear.

MIDLUM C 12, 14 and 16 tonnes
- 3 power levels (180, 220, 270 hp)
- 8 wheelbases (3070, 3350, 3650, 3950, 4550, 5150, 5750, 6480 mm)

The main features of MIDLUM C are:
- 220 x 70 mm sidemembers module,
- 19.5” tyre fitment,
- two access steps to the cab.

MIDLUM HD and Construction 12, 14 and 16 tonnes
- 2 power levels (220, 270 hp)
- 5 wheelbases (3070, 3350, 3950, 4550 mm)

The main features of MIDLUM HD and Construction are:
- 220 x 70 mm sidemembers module,
- 20” or 22.5” tyre fitment,
- two access steps to the cab,
- sheet metal bumper.

The MIDLUM HD is proposed for export and the MIDLUM Construction is officially approved for EEC.
These vehicles consist of a MIDLUM C chassis and cab with sheet metal bumper and 22.5” tyres for better ground clearance.

MIDLUM 18 tonnes:
- 2 power levels (220, 270 hp)
- 11 wheelbases (3650, 3950, 4250, 4550, 4850, 5150, 5450, 5750, 6050, 6480, 6780 mm)

The main features of MIDLUM D are:
- 244 x 70 mm sidemembers module,
- 22.5” tyre fitment,
- two access steps to the cab,
- sheet metal bumper for Buildings & Public Works version (wheelbases 3650 to 4550 mm).

MIDLUM 4x4 TA (all-wheel grip) and TC (unkept tracks):
- 11, 13, 15 tonnes for export, in TC version only,
- 12, 13, 14, 15, 16 tonnes for EEC,
- 1 power level (220 hp),
- 4 wheelbases (3070, 3350, 3650, 3950 mm).

The main features of MIDLUM 4x4 are:
- 220 x 70 mm sidemembers module,
- 19.5” tyre fitment (twin fitment for TA only), 20” or 22.5” (single tyre fitment at rear possible for TC),,
- two access steps to the cab,
- sheet metal bumper.

The MIDLUM range, the perfect adaptation to all trades:
- a comprehensive offer for all collection and distribution activities,
- an optimized offer for express delivery and building trades with specific models,
- a specific offer for long-distance haulage,
- a vehicles offer dedicated to bodybuilders (tankers, refuse collectors, road sweepers...).

This search for perfect adequation between the activity and the vehicle is expressed through the attributes of the new MIDLUM range:
- Compactness connected with overall cab width and overhang, and reduced front overhang.
- Loading capacity with tare weight among the best on the market (MIDLUM B 12 tonnes “payload champion” with a tare weight below 3300 kg).
- Accessibility to loading with an unladen height among the best on the market.
- Safety by the adoption of “all-disc” brakes.
- Adaptation to all trades through the “Trade” vehicles offer and development of pre-arrangements for the fitting of bodies.
- The determination to fully respond to the different trades of the intermediate series is fully expressed in the range of cab appointments that constitute an innovation in the world of distribution, both as regards the diversity and the equipment comfort level.
- The result of the work conducted in common with bodybuilders and the pre-arrangements for the fitting of bodies ensure bodybuilders and users time savings and product quality.

These pre-arrangements concern the assembly of tail lifts, behind-cab cranes and other equipment items. They are completed by an “Electrical pre-arrangements” pack intended to facilitate the fitting of electrical features (for a full description, see “Trade packs and vehicles” chapter).

1.2 Changes to “MIDLUM”

- engines equipped with common rail fuel-injection and electronic management offering new power ratings:
  . dCi 4 & dCi 6 available on MIDLUM B, C’, C
  . dCi 6 available on MIDLUM HD & Construction.
- new oil sumps,
- fuel filters in LH front wing,
- fuel prefilter (option),
- new gearbox crossmember,
- new closing crossmember fastened to sidemembers web,
- battery compartment and air tanks superimposed on the entire series, (configuration identical to MIDLUM B),
- air-operated auxiliary equipment identical on all the vehicles,
- new gearboxes,
- discontinuation of soundproofing screens behind cab and on gearbox,
- front run-under guard (option),
- 4-spring cab suspension on MIDLUM D 18 tonnes,
- new instrument panel and new display (with new functions).

1.3 Electronic management of “MIDLUM” vehicles

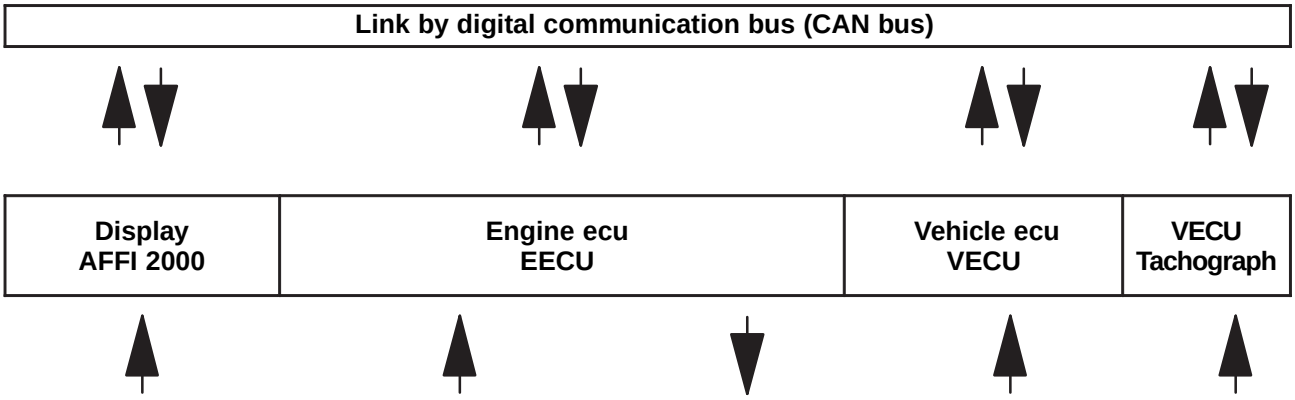
1.3.1 Operating principle

Engine electronic management is used to improve engine performance while optimizing fuel consumption and pollutant emissions (in order to meet Euro 3 standard).

The electronic system consists of two principal electronic control units:
- the **EECU** (Engine Electronic Control Unit):
This is located in the battery compartment and manages, among other things, the fuel pump solenoid valves, the FOWA exhaust brake... on the basis of information it receives from the different engine, speed, air temperature, fuel pressure... sensors.
- the **VECU** (Vehicle Electronic Control Unit):
This is located at the side of the dashboard electrical distribution panel and manages operation of the different vehicle equipment items (windscreen wash/wipe...), controls (accelerator, parking brake, electric retarder...), together with “bodybuilder” functions (PTO, related engine speeds...).

An instrument panel display (AFFI 2000) makes the interface between vehicle and driver. Not only classic information such as distance travelled, average or instant fuel consumption... is displayed, but also information on the state of the vehicle or its body (tailgate incorrectly closed, van lighting in service...) coupled in case of danger with the STOP warning light or a buzzer.

All these modules are interlinked by a digital communication bus (CAN bus) that allows them to exchange the necessary orders and information.



Warning lights: - battery charge - air suspension	**Sensors** - oil level / pressure - coolant temperature - air pressure / temperature - flywheel speed - injection pressure	Electric injectors	**Vehicle information** - accelerator pedal - cruise control and exhaust brake control - PTO engaged, brake and clutch pedals, parking brake... sensor - windscreen wash/wipe...control	control Gearbox sensor
Direction change lights and indicators	Chassis-mounted stop control	HP pump solenoid valves		
Defects / wear: - ABS, transponder, air suspension, brake pad wear...		EGR solenoid valve		
		Exhaust brake solenoid valve		

It is forbidden to cut the engine ECU wiring harness located in the battery compartment (for extension or shortening purposes).
Any changing in position must be done in an area permitted by range of movement of the wiring harness - take care to protect the ECU against splash and spray.

1.3.2 Bodybuilders' electrical pre-arrangements

For a detailed description of the electrical pre-arrangements, wee the Trade Packs chapters. The vehicle electrics is managed by the Vehicle ECU and there are two electrical pre-arrangements levels:
- electrical pre-arrangement N° 1 dedicated to vans with tail lifts for control of lighting, switching on machines, wiring of side lights...
- electrical pre-arrangement N° 2 dedicated to trades for management of PTOs and related engine speeds...

1.4 Warning

Any work on the fuel system is forbidden.
On engines equipped with common rail fuel-injection operating at very high pressure, the presence of air may lead to damage to the pump.
Observe the rules governing common rail system cleanliness and bleeding, that is to be performed whenever any work is carried out on the system
For further information, consult the RENAULT V.I. Product Applications Department.

On the low pressure circuit, changing of position of a fuel tank, adding unions or components, risks creating extra head losses:
- The specification risks not being met both at supply pump inlet and at pump return.
- The pressure regulation device risks malfunctioning (the system is sensitive to head losses).
- Check the air take-offs, make sure the fuel level is correct even when the vehicle is on an incline and during the brake application phases (difficulty in starting or stalling of the engine).
- The fuel filters must still be the last part before the HP pump inlet.
- The position of the prefilter must still be the same on the hydraulic circuit (between the injector return and the feed pump inlet).

On account of the use of electronic boxes, the installation of equipment may cause electromagnetic disturbance and oblige bodybuilders to proceed with new approval of the vehicle in respect of Electromagnetic Compatibility.

The management of engine speeds in PTO mode is managed by the electronics.
Any vehicle not equipped with electrical pre-arrangement N° 2 cannot be equipped with a PTO.
For trade vehicles, the subsequent installation of electrical pre-arrangements requires significant and complex intervention work (installation of cab and chassis wiring harnesses, re-definition of vehicle and engine ECUs...).

It is forbidden to walk on or place heavy articles on the engine for risk of damaging the HP injector pipes and the plastic rocker covers.

Guarantee access to the air intake, exhaust and fuel supply circuits.
The radiator inlet and outlet surfaces must not be modified.
The cooling flows must be conserved.

1.5 Trade vehicle models

In order to optimize the facility of adaptation and bodybuilding and to best meet customers' expectations, MIDLUM vehicles can cascade down into models or be equipped as standard with a "Trade pre-arrangement" based on the "Normal use" model. These pre-arrangements are a combination of options allowing, when installing the equipment, to have a basic vehicle on hand adapted to the constraints of its use, equipped with various pre-arrangements thus reducing conversion work and making for easier installation work.

"Normal use"

Basic vehicle with "general use" vocation, specialized by the fitting as standard of a "Trade pre-arrangement".

"Tanker vehicle"

Tanker special features

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- RH sidemember cleared for the installation of specific accessories,
- punchings on chassis for fastening accessories and wing brackets,
- gearbox-mounted PTO with flange output,
- fast idling set at 1200 rpm with regulated fast idling control, (2 programmed engine speeds available, plus chassis-mounted variable speed control),
- pneumatic coupling for engagement of PTO,
- remote controlled clutch release operating ram,
- 80 litre and 130 litre main fuel tank on the left,
- reinforced front and rear parabolic leaf spring suspensions,
- tanker lateral signalling installation kit,
- ABS,
- exhaust on left side.

ADR equipment

- rear run-under guard for tanker overall width 2350 mm,
- chassis-mounted "palm switch" stop control,
- 2 kg fire extinguisher in cab,
- portable orange wander lamps in cab,
- wheel chock,
- tachograph with current limiter,
- exhaust silencer shield,
- behind-cab shield,
- pre-arrangement for fixing ADR plate,
- battery isolation switch with pneumatic control,
- ADR chassis wiring harnesses.

Options

- loose spare wheel,
- gearbox-mounted PTO with splined shaft output,
- without "ADR" ("transport of dangerous materials") equipment,
- engine hourmeter in cab,
- towing crossmember capacity > 3.5 tonnes.

For all the vehicles (other than tankers), it is possible to choose the ADR variant.

“Refuse collector vehicle”

- refuse collector bodybuilder electrical pre-arrangement (see chapter B-8),
- automatic transmission,
- gearbox-mounted continuous high-power PTO with regulated fast idling control, (2 programmed engine speeds available, plus chassis-mounted variable speed control),
- reinforced front parabolic leaf spring suspension,
- reinforced dissymmetrical rear suspension,
- vertical exhaust,
- 80 litre fuel tank,
- without rear run-under guard,
- RH door with peep window,
- reversing buzzer,
- ripper presence 30 km/h speed limiter,
- without spare wheel,
- mileometer without tachograph,
- frontview mirror,
- passenger bench seat,
- fuel tank to right,
- adapted grab handles,
- central passenger holding bar.

Options
- roof level engine air intake,
- single rear tyre fitment,
- fixed passenger seat,
- engine hourmeter in cab.

“Road sweeper vehicle”

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- dissymmetrical rear suspension,
- right-hand drive,
- LH door with peep window,
- lateral exhaust,
- plastic 80 litre main fuel tank,
- with run-under guard,
- mileometer without tachograph,
- with battery isolation switch,
- reversing buzzer,
- roof level engine air intake,
- without spare wheel,
- frontview mirror.

“Light fire tender vehicle”

- fire brigade bodybuilder electrical pre-arrangements,
- EATON 4106 OD gearbox + power take-off 2903P,
- 4-door cab (6/7 places),
- reinforced front parabolic leaf spring suspension,
- reinforced rear parabolic leaf spring suspension,
- lateral exhaust with internal outlet,
- plastic 130 litre main fuel tank,
- adjustable fast idling,
- lamps mounted on lighting bar,
- pneumatic battery isolation switch,
- loose spare wheel,
- 9.5 R 17.5 XYZ tyres,
- white bumper,
- cab pre-arrangements (working spotlamp with remote control, radio antenna, earth braid on doors, foot-operated horn control, special steering column trim, self-adhesive reflectors on doors...).

Options
- blue revolving beacons.

“Buildings and public works vehicle”

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- glazed cab rear wall,
- gearbox-mounted PTO, engine speed limitation 1400 rpm, PTO engaged,
- rear drive axle differential lock,
- without run-under guard (depending on country),
- towing crossmember and hook capacity 3.5 tonnes,
- front and rear parabolic leaf spring suspensions,
- 2-place bench seat,
- changing of position of air braking appliances for installation of cab tilting ram.

Options
- vertical exhaust,
- roof level engine air intake,
- engine hourmeter in cab,
- pre-arrangement for installation of a crane.

1.6 Make-up of “Trade packs”

“Crane” installation pre-arrangement

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- reinforced front and rear suspensions,
- crane fastening plates,
- gearbox-mounted PTO with regulated fast idling control, (2 programmed engine speeds available, plus chassis-mounted variable speed control).

Options
- vertical exhaust,
- pre-arrangement for engine hourmeter in cab,
- with rear run-under guard for platform body.

For a tipper vehicle, provide only additional crane support plates.

“Tail lift” installation pre-arrangement

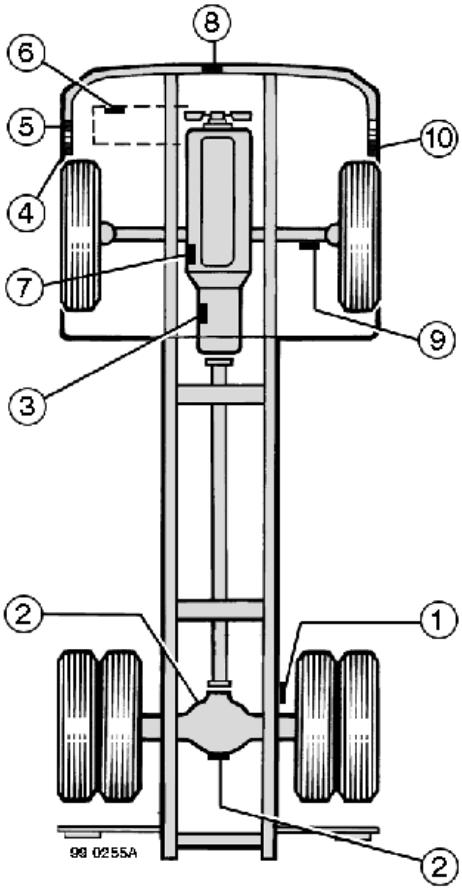
- level 1 bodybuilder electrical pre-arrangement for installation of a tail lift (see chapter B-4),
- reinforced rear suspension,
- without rear run-under guard (option for column type tail lifts),
- 80 Amp alternator,
- 170 Amp-hour batteries,
- 200 Amp fuse-holder located in battery compartment,
- tail lift earth available in the rear overhang,
- earth screw in rear overhang.

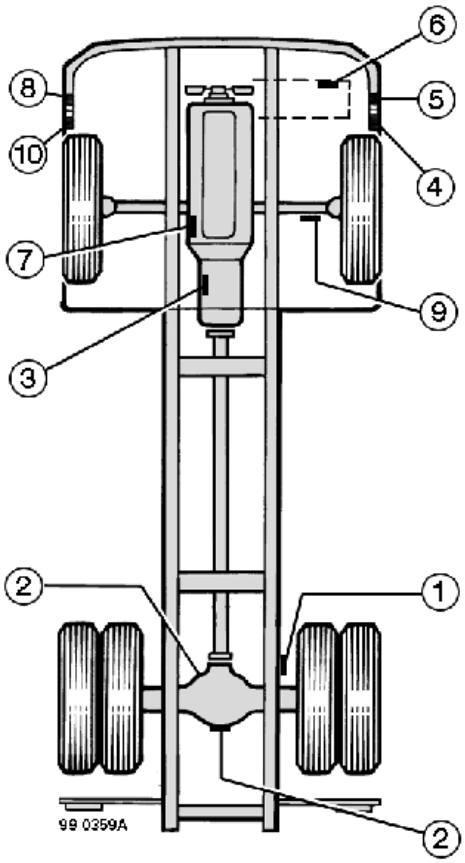
Options
- level 2 bodybuilder electrical pre-arrangement (see chapter B-5).

2. GENERAL REMARKS ON “MIDLUM Euro 3” SERIES

2.1 Identification of the vehicle

LH drive vehicles **RH drive vehicles**





View from above

Position of on-vehicle identification plates

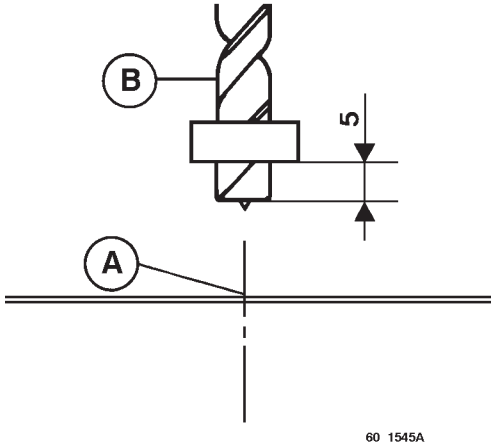
1 - chassis
2 - rear drive axle
3 - gearbox
4 - manufacturer’s plate
4 - pollution index
5 - manufacturing plate
6 - tachograph plate (if fitted)
7 - engine
8 - CAM reference
8 - paint reference
9 - front axle
10 - load sensing valve plate

IMPORTANT
The identification markings must remain visible and accessible without need for removing any bodywork component.

2.2 General drilling principles

2.2.1 Drilling cab panels for fitting accessories

Drilling the cab allows the fastening of sealed crimping nuts for the assembly of accessories.
The recommendations below will help avoid damage to the roof headlining at the time of drilling.



A - Bodywork panel
B - Centring drill with stop:
Ø 9.2 for crimping nut Ø 6 mm.
Ø 11.2 for crimping nut Ø 8 mm.

Details on crimping nuts and tools: see chapter “Addition of equipment to bodywork”.

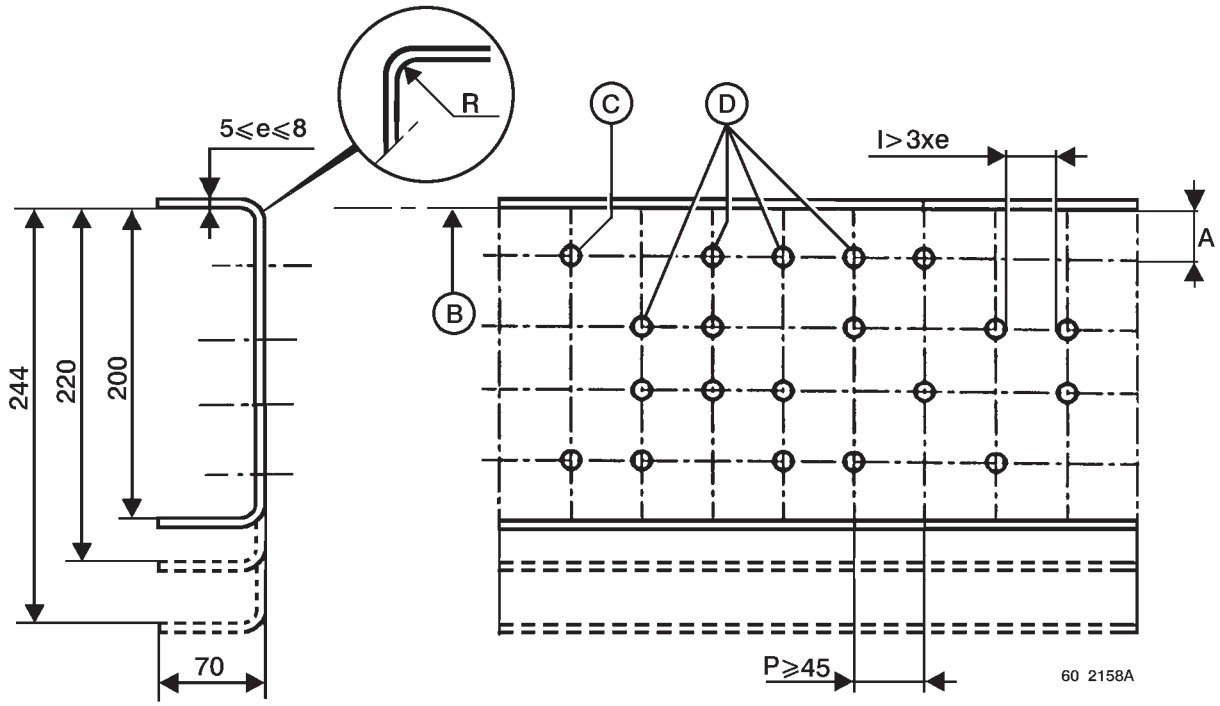
Method
Use a centring drill with stop positioned on the bit to drill the roof.
Drilling depth: 5 mm max. for fastening crimping nut.

Anti-corrosion protection:
Deburr the holes after drilling.
Protect the metal with a zinc aerosol spray available from the Spare Parts department, ref. N° 77.01.406.425.

2.2.2 Drilling in sidemembers

BAN

- No drilling in the flanges of sidemembers.
- No drilling more than 3 holes on the same vertical.



B - Chassis zero plane (RENAULT V.I. reference centre-line)
e - Thickness of sidemember
P - Between-centres distance between two drillings

All the drillings must be at a minimum distance from the sidemember flanges: A > R+3 mm + F
R - sidemember internal radius of curvature
F - diameter of washer or diameter of rivet head divided by two

For maximum safety, take for dimension A a minimum value of 28 mm.

C - Recommended drilling diameter:
13 mm for assembling elements (tool box...)
17 mm for assembling built-on units (tail lifts...)

D - Alignment of 3 holes maximum on the same vertical axis

l - Minimum width corresponding to 3 times the thickness of the sidemember must be observed between 2 drillings

Anti-corrosion protection and paint retouches to the chassis

Protect the metal with a zinc aerosol spray, ref. N° 77.01.406.425.
Retouch paintwork with a grey chassis aerosol paint spray, ref. N° 50.01.848.147.
These consumables are available from the RENAULT V.I. Spare Parts department.

2.3 Precautions

2.3.1 Protection of wiring harnesses

When welding near to the vehicle, if you use a disk sander, take care to protect electrical wiring harnesses and air pipe bundles against any spatter that might damage them.

2.3.2 Protection of electrical installation prior to welding

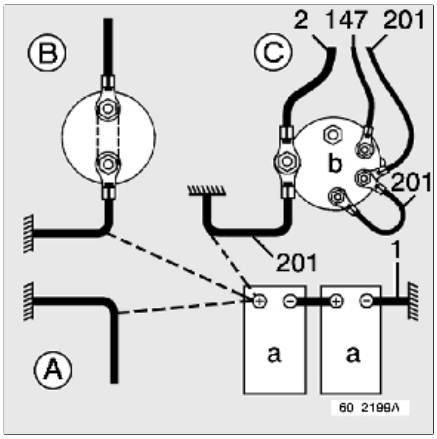
Important operations to be carried out without fail, prior to welding.

The vehicle is equipped with numerous electrical circuits. Before any operation involving electric arc welding, disconnect the positive (+) cable from the battery and connect it to earth.
Place the earthing clamp as near as possible to the point of welding, but never on rotating parts (prop shaft, fan hub, etc.) nor on a sub-assembly having moving parts (i.e. air compressor, turbocharger, etc.)
Nearby plastic pipes and electrical cables, springs and air-suspension bags are to be protected or removed.
This also applies when grinding or drilling.

Diagram A: vehicle without master switch

Diagram B: vehicle with mechanical master switch
The master switch must be closed.

Diagram C: vehicle with electrical master switch
Disconnect the 2 cables and join them together.



a - batteries
b - electromagnetic master switch

Marking of cables:
1 - battery earth
2 - after master switch positive (+) power supply
147 - to engine immobilizer (master switch control)
201 - before master switch positive (+) power supply

After welding, reconnect all the cables finishing with the earth cable (1).
Other precautions before welding: refer to chapter “Precautions before welding” in the “General Features” section.

When welding in the MIDLUM cab, place the earthing clamp as close as possible to the point of welding.

Welding must be an exceptional operation on our vehicles (cab extension, welding of crane frames...).

When installing the wiring harnesses, pay attention to hot areas (exhaust, turbocharger, electric retarder).

Bodybuilder wiring harnesses can be routed parallel to the vehicle harnesses with independent fastenings (do not make use of the vehicle wiring harnesses to connect them to bodybuilder harnesses).

Pay attention to cab movements at articulation level for wiring harnesses that connect the chassis and the cab.

2.4 Minimum load on front axle

In order to guarantee suitable vehicle ride behaviour, stability and handling under maximum safety conditions, the minimum recommended load on the front axle must be applied whatever the vehicle load and equipment conditions.
For special cases, consult the RENAULT V.I. V.I. Product Applications Department.

Vehicle equipment	Minimum load on front axle
Vehicle alone	25% of the vehicle gross weight
Vehicle equipped with tail lift, or loading crane to rear of vehicle	30% of the vehicle gross weight

IMPORTANT
- Never exceed the maximum permissible load on the front axle.
- Application of the load in the rear overhang of the vehicle is detrimental to vehicle ride behaviour, stability and handling. Great prudence is recommended when driving under such conditions.
- Watch that the centre of gravity of the load is positioned laterally as close as possible to the centre of the vehicle.

2.5 Soundproofing screens and heat shields

2.5.1 Instructions for soundproofing screens

Soundproofing screens should neither be removed, modified nor displaced so as not to downgrade the vehicle sound level, which is covered by official homologation.

If it is unavoidable for them to have to be removed, they must without fail be put back into place when the work is completed.

After removal, only perfectly clean screens should be refitted.

The screens are to be cleaned using a cloth. If necessary, use soapy water (all other products are to be forbidden).

Any damage to the internal protective film of the screen requires the screen to be replaced.

In the event of on-vehicle welding or the use of a sand disker, provide efficient protection to the screens.

If the screens have been removed, provide efficient protection to the wiring harnesses.

Pay particular attention that there are no inflammable products present on the screen protective films.

Overtightening of screen attaching nuts and bolts may lead to damage.

Observe the recommended tightening torques without fail.

- screen bracket / chassis fastenings: 20 Nm
- screen / chassis bracket fastenings: 8 Nm

2.5.2 Instructions for heat shields

It is forbidden to remove or modify these shields. They play a part in the safety of your vehicle.

During chassis painting operations, take care to efficiently protect the hot face of heat shields against splashing paint and especially the shields surrounding the electric retarder. In effect, these shields are only effective if the surfaces are free from any foreign matter.

2.6 Side impact beams

Side impact beams must comply with the laws in force and should not impede access to chassis components (spare wheel, air and fuel tanks, air dryer...).

3. INSTALLATION OF BODYWORK

3.1 Use of 1/20th scale drawings and calculation sheets

Technical data sheets are tools used by sales engineers to present the range or series. They cannot be representative of particular vehicles.
To obtain precise information, refer to the 1/20th scale drawings, calculation sheets or type approval department reports to be found in the MIDLUM CD-ROM.
Only these documents will give you accurate and reliable information on vehicles according to tonnage, air intake, cab type, weights...

3.2 Example of a search (according to Euro 2 scenario)

1 - Click on the chosen language.

2 - Click on **“1/20th scale bodybuilder’s drawings”.**

3 - Click on **“Chassis cab drawings”.**

4 - Choose the vehicle use (click on **“Normal”**).

Rigid

Normal	Tipper	Tanker	RCV	Road sweeper

or

Tractor

5 - Choose the vehicle model according to cab, GVW and wheel rims (click on **“Midlum B”**).

	Normal rigid LH drive		Normal rigid RH drive	
GVW Rims	Day & Sleeper cab	4-door cab	Day & Sleeper cab	4-door cab
7.5 to 12 T-17.5”	**Midlum B**	Midlum B	Midlum B	Midlum B
12T-17.5”	Midlum C’	Midlum C’	Midlum C’	Midlum C’
12T à 16T-19.5”	Midlum C	Midlum C	Midlum C	Midlum C

6 - Choose the drawing N° according to wheelbase and engine power rating (click on “**5010496019**”).

Midlum B Rigid (day & sleeper cab)		
Wheelbase	135 - 150 hp	180 - 210 hp
2700	5010496017	5010463960
3250	5010496018	5010463961
3850	**5010496019**	5010463962
4450	5010496020	5010463963
5050	5010496021	5010463964

7 - Click on **“Visualize PDF format”.**

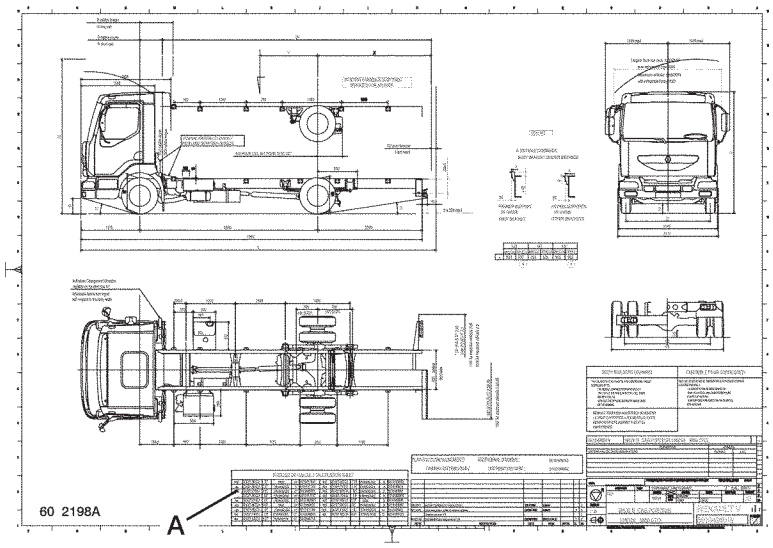
Drawing N° 5010196019

Visualization of PDF format

Recording of DXF format

Access to grids

8 - Visualize the drawing and print out.
On the calculation sheet table (**A**), choose the grid N° to consult according to engine power rating, suspension and GVW (e.g. 5010417757).



9 - Go back to the last screen.

10 - Click on **“Access to grids”.**

Drawing N° 5010196019

Visualization of PDF format

Recording of DXF format

Access to grids

11 - Write down the grid N° “**5010417767**”, click on “**Find**”.

Grid N° 5010417767

Find

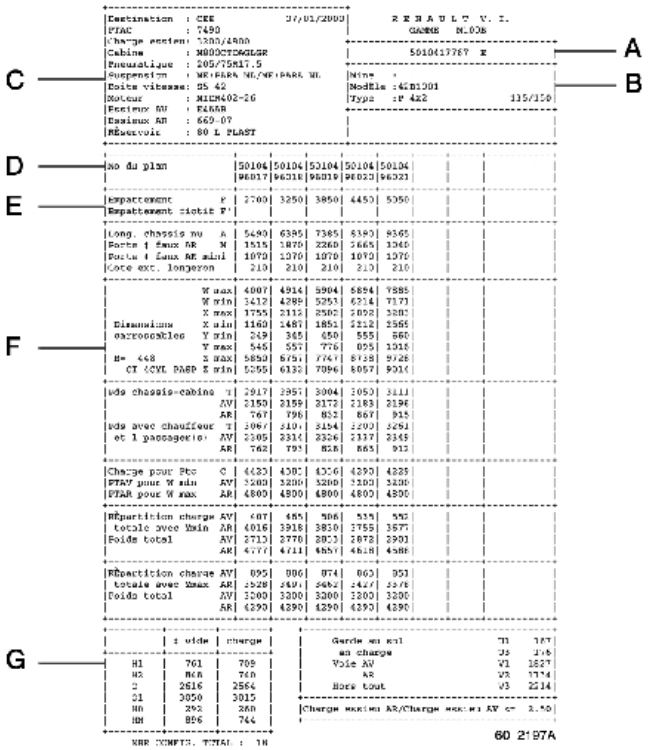
12 - Click on **“Visualization of PDF format).**

Grid N° 5010417767

Visualization of PDF format

13 - Visualize the grid and print out.

A - calculation grid Number
B - vehicle identification
C - vehicle make-up
D - 1/20th scale drawings number
E - wheelbase
F - body entrance dimension
G - height



See without fail;
- cab accompanying drawings (overall dimensions, tilting radius...)
- chassis accompanying drawings (position of appliances...).

3.3 Body entrance dimension

3.3.1 Day cab (1.6 m)

Vehicle		Minimum body entrance dimension			
Type	**Driving position side**	**B1**	**B2**	**B3**	**B4**
MIDLUM B 4 cylinders	left	448	540	600	448
	right				
MIDLUM B 6 cylinders	left	423			423
	right				492
MIDLUM C'/C 4 cylinders	left	398	490	490	398
	right				
MIDLUM C'/C 6 cylinders	left	373	490	490	373
	right				442
MIDLUM HD/construction 6 cylinders	left	401	503	505	401
	right		490		442
MIDLUM D 6 cylinders	left	373	490	490	373
	right		490		442
MIDLUM 4x4 TA 6 cylinders	left	401	503	505	401
	right		490		442
MIDLUM 4x4 TC 6 cylinders	left	401	503	505	401
	right		490		442
MIDLUM RCV	left			490	
Road sweeper	right		490		

B1 - minimum body entrance dimension for version with under-floor engine air intake
B2 - minimum body entrance dimension for version with roof level engine air intake
B3 - minimum body entrance dimension for version with vertical exhaust
B4 - minimum body entrance dimension for version with air intake to aft of cab

NOTE
The values **(B1 - B2 - B3 - B4)** are calculated for a body positioned at a height more than 130 mm from the upper face of the sidemembers.
To move the position of the side direction indicator lights (see chapter B-3.10).

3.3.2 Behind-cab surrounds

To prevent the components forming the rear surrounds of the cab from entering into contact with the body-work, a minimum body entrance dimension, depending on the height of the sub-frame employed, is to be observed.

The components forming the rear surrounds of the cab are:

- direction change indicator lamps,
- cab rear fireproof screen for ADR vehicles,
- front wings and brackets.

Key to diagram on next page

A - front axle centre-line

C - between-centres distance between front axle and rear extremity of direction indicator lamps (see chapter B-3.10).

B - body entrance dimension

F - height of front wing bracket in relation to the chassis

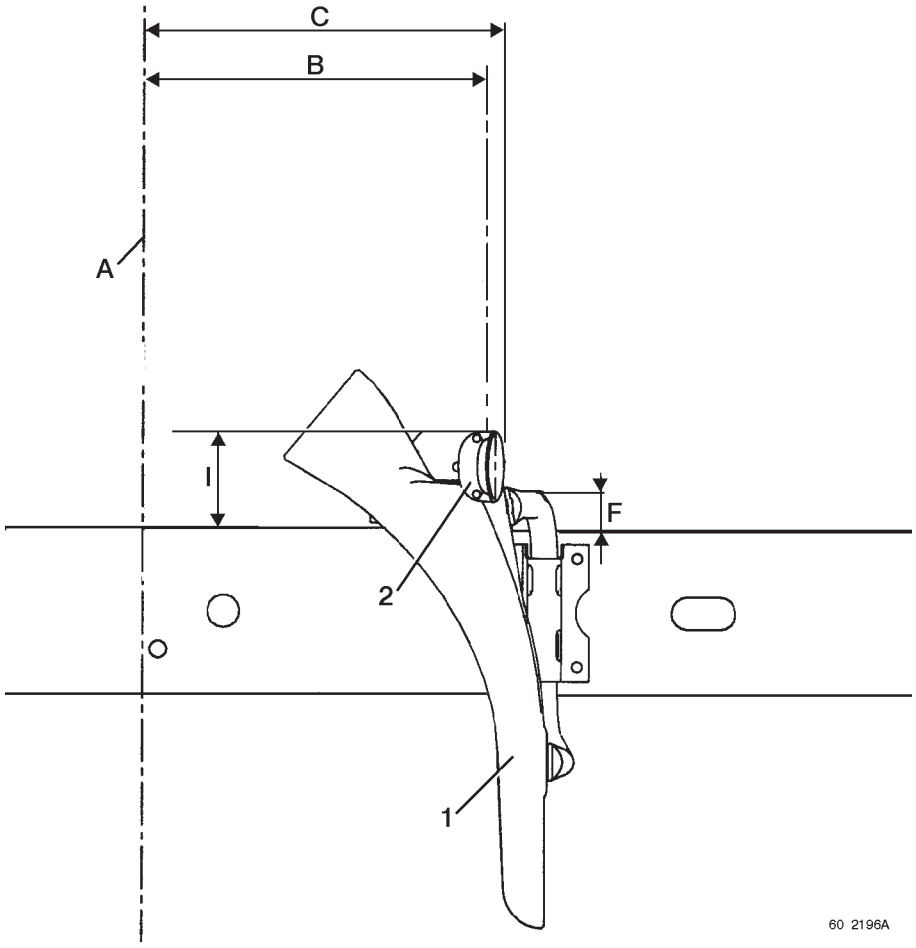
I - protrusion of side direction indicator lamps in relation to top of sidemembers

1 - front wing

3 - side direction change indicator lamp

Table of overall dimensions of components to the rear of the cab

	MIDLUM B	MIDLUM C'/C	MIDLUM HD/ Construction	MIDLUM D
C	470	420	400	
F	50	63	50	
I	130		260	



3.3.3 Sleeper cab (2 m)

Vehicle		Minimum body entrance dimension			
Type	**Driving position side**	**B1**	**B2**	**B3**	**B4**
MIDLUM B 4 cylinders	left	770	876	950	770
	right				
MIDLUM C'/C 4 & 6 cylinders	left	720	826	870	720
	right				
MIDLUM HD/Construction	left	720	826	910	
	right				
MIDLUM D 6 cylinders	left	720	826	870	720
	right				

B1 - minimum body entrance dimension for version with under-floor engine air intake
B2 - minimum body entrance dimension for version with roof level engine air intake
B3 - minimum body entrance dimension for version with vertical exhaust
B4 - minimum body entrance dimension for version with air intake to aft of cab

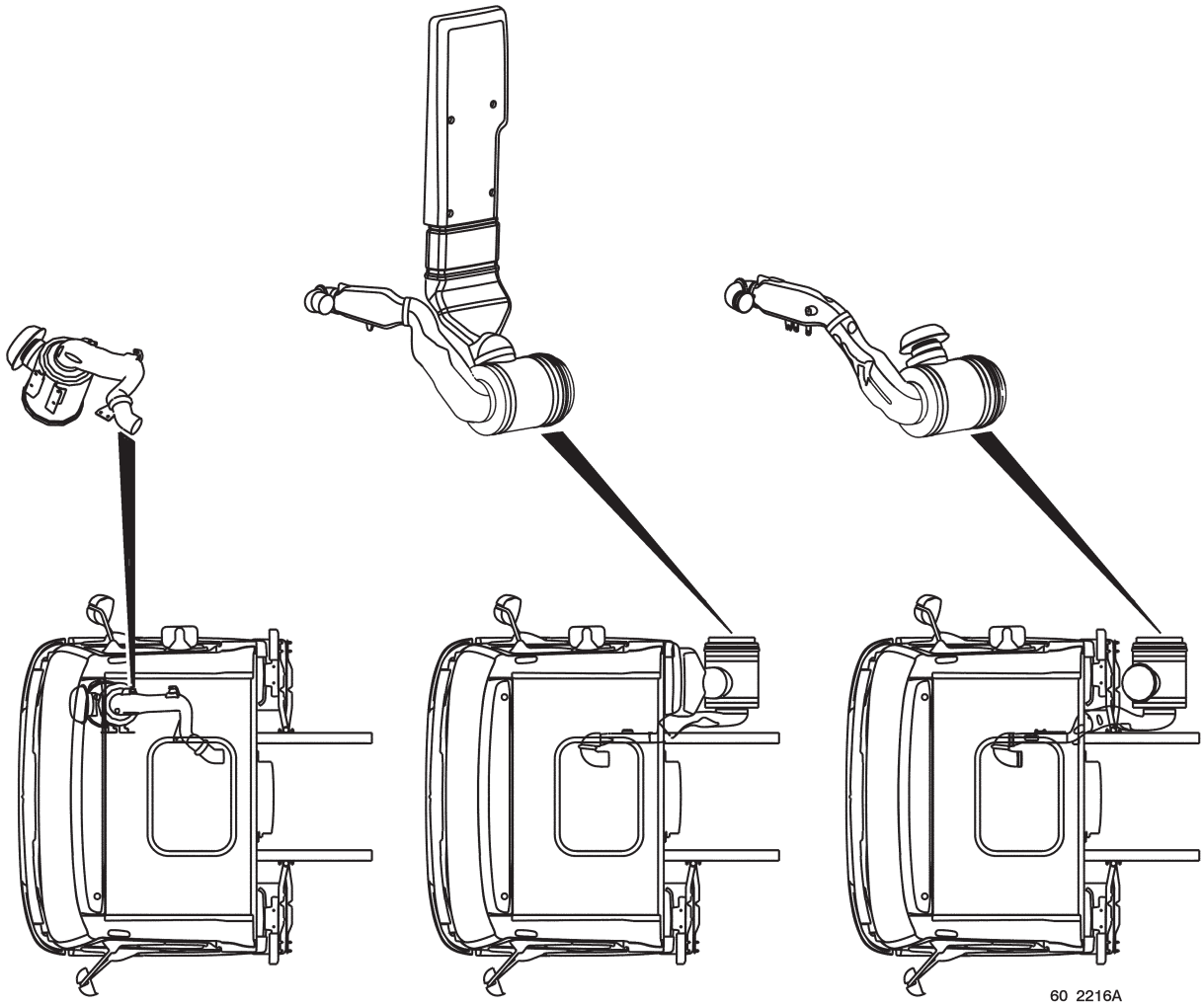
3.3.4 4-door cab

Vehicle	Minimum body entrance dimension
MIDLUM B 4 cylinders	1752
MIDLUM C'/C 4 cylinders	1702
MIDLUM HD/Construction 6 cylinders	
MIDLUM 4x4 TA 6 cylinders	
MIDLUM 4x4 TC 6 cylinders	

3.3.5 Presentation of the different air intakes

When changing the position of equipment or for trade applications (refuse collectors, road sweepers...), take care to not take up the place of the original filtration system or change its position. In fact, its size and position are defined to get optimum yield from the engine by avoiding the ingress of foreign matter (water, gravel, dust...).

When fitting the vehicle body, take care to maintain access to the air filter box so as to be able to replace the filter.



1 - under-floor engine air intake
2 - roof level engine air intake
3 - air intake to aft of cab

Capability of adjusting the behind-cab air intake nozzle according to bodybuilder requirements.

3.4 Sub-frame sections

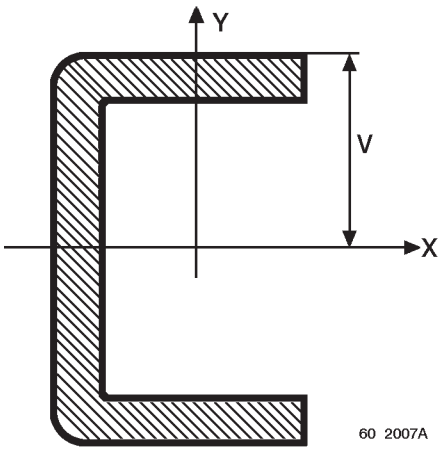
3.4.1 Minimum height according to range of suspension movement

A minimum sub-frame height is imposed by the range of movement of the rear suspension. The use of a subframe with insufficient height would result in possible damage to the underbody or equipment due to friction by the rear wheel tyres.

Minimum sub-frame height according to suspension type		
Vehicles	**Suspension type**	
	Mechanical	**Air**
MIDLUM B 4 cylinders 7.5 tonnes	90 mm	55 mm
MIDLUM B 6 cylinders 7.5 tonnes	100 mm	60 mm
MIDLUM B 4 & 6 cylinders 10 tonnes		55 mm
MIDLUM B 4 cylinders 12 tonnes	110 mm	
MIDLUM C' 12 tonnes	80 mm	55 mm
MIDLUM C 180 & 220 12 tonnes	110 mm	60 mm
MIDLUM C 270 12 tonnes		75 mm
MIDLUM C 180 & 220 14 tonnes	120 mm	
MIDLUM C 270 14 tonnes		90 mm
MIDLUM C 180 & 220 16 tonnes		
MIDLUM C 270 16 tonnes		105 mm
MIDLUM HD 14 tonnes	145 mm	
MIDLUM construction 14 tonnes	125 mm	
MIDLUM HD 16 tonnes	160 mm	
MIDLUM construction 16 tonnes	135 mm	
MIDLUM D 18 tonnes	170 mm	150 mm
MIDLUM 4x4 TA 14 & 16 tonnes	10 mm	
MIDLUM 4x4 TC 11 tonnes	30 mm	
MIDLUM 4x4 TC 12 tonnes monte simple	100 mm	
MIDLUM 4x4 TC 13 & 14 tonnes	65 mm	
MIDLUM 4x4 TC 15 & 16 tonnes	85 mm	

3.4.2 Sub-frame minimum inertia

Vehicle	Sub-frame minimum inertia (mm4)	
	Along axis (X)	Along axis (Y)
MIDLUM B	700 000	1 250 000
MIDLUM C'		
MIDLUM C	850 000	3 500 000
MIDLUM HD Construction		
MIDLUM D 18 tonnes	1 000 000	5 505 500



Reminder of formula for calculating maximum normal surface stress

$$\sigma = \frac{Mf}{\left(\frac{I}{v}\right)}$$

σ: maximum stress at surface edge (N/mm2)
Mf: bending moment (Nm)
I: surface quadratic moment (mm4)
v: distance between section extremity and neutral fibre (mm)

3.5 Finishing of sub-frame entrance dimensions

Depending on:
- cab length (day cab, sleeper cab, 6/7 place crew cab),
- position of engine air intake (roof level air intake or under-floor air intake),
- width of section making up the sub-frame,

the finishing of the sub-frame must be:
- symmetrical or asymmetrical (LH side entrance dimension different from that of the RH side),
- provided or not with horizontal cut-outs (reduction in width), allowing passage of the cab rear soundproofing screen and the roof level air intake.

Key to drawings, following pages.
A - Front axle centre-line,
e - Width of sub-frame section,
L - Distance from centre-line of the first bracket in relation to the centre-line of the front axle,
F - Sub-frame entrance dimension (symmetrical sub-frame),
Fg - Sub-frame LH entrance dimension (asymmetrical sub-frame),
Fd - Sub-frame RH entrance dimension (asymmetrical sub-frame),
Xg - Distance between LH end of sub-frame and first bracket centre-line (asymmetrical sub-frame),
Xd - Distance between RH end of sub-frame and first bracket centre-line (asymmetrical sub-frame),
1 - Air intake pipe,
2 - Cab rear soundproofing screen,
3 - Sub-frame,
4 - First bracket,
5 - Chassis sidemember,
6 - Cab rear attachment.

IMPORTANT
ADR vehicles (transport of dangerous materials) are equipped with a screen behind the cab and a screen on the gearbox. To limit cut-outs at the extremities of the sub-frame, the recommended width of the sections is 50 mm. If this width is greater, provide horizontal cut-outs (reduction in width) allowing passage of the rear screen.

MIDLUM day cab and under-floor air intake

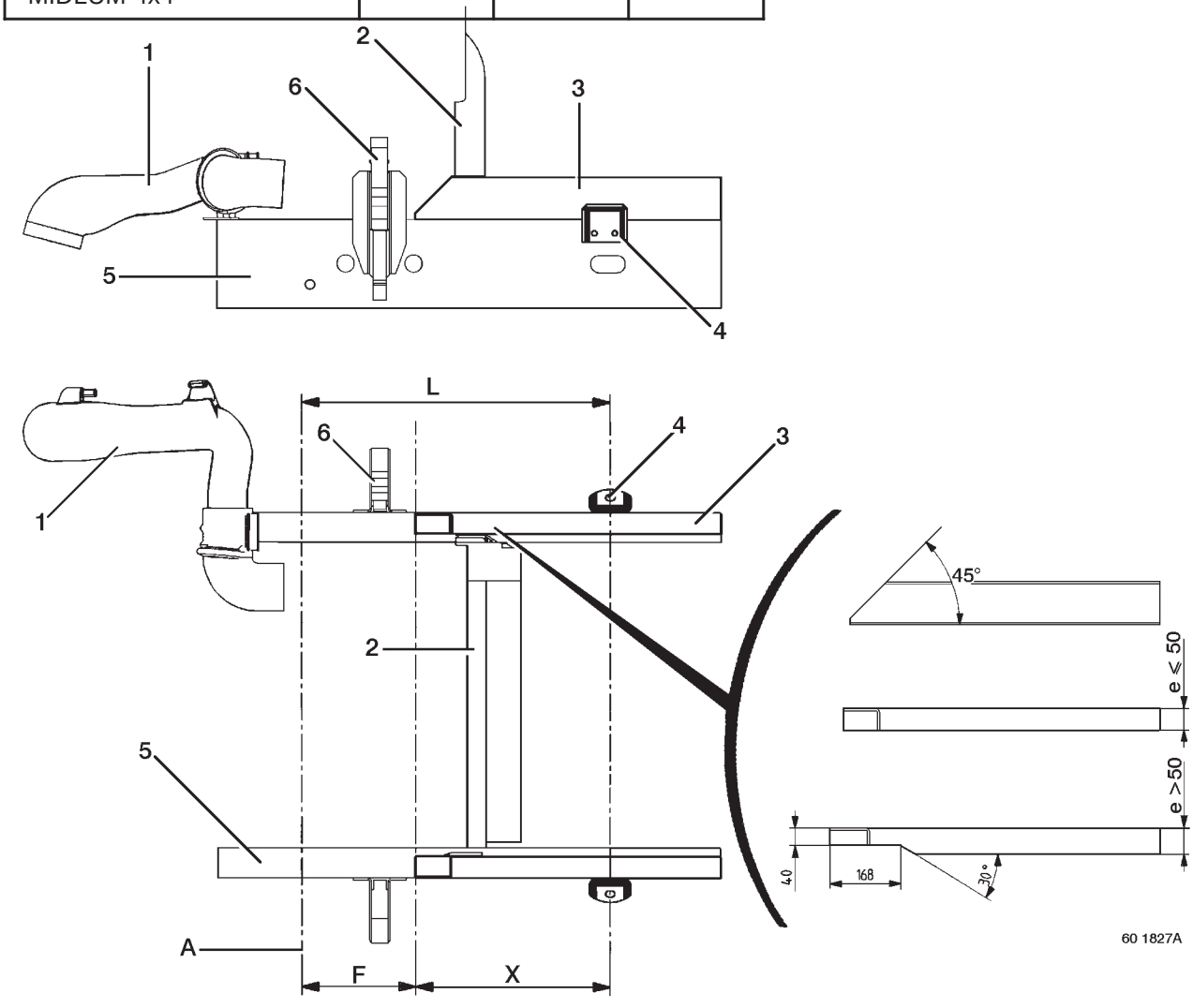
Symmetrical sub-frame finishing

Vehicle	F	L	X
MIDLUM B	273	735.5	462.5
MIDLUM C'/C	223	835.5	612.5
MIDLUM HD/ Construction			
MIDLUM D			
MIDLUM 4x4			

MIDLUM sleeper cab whatever the air intake

Symmetrical sub-frame finishing

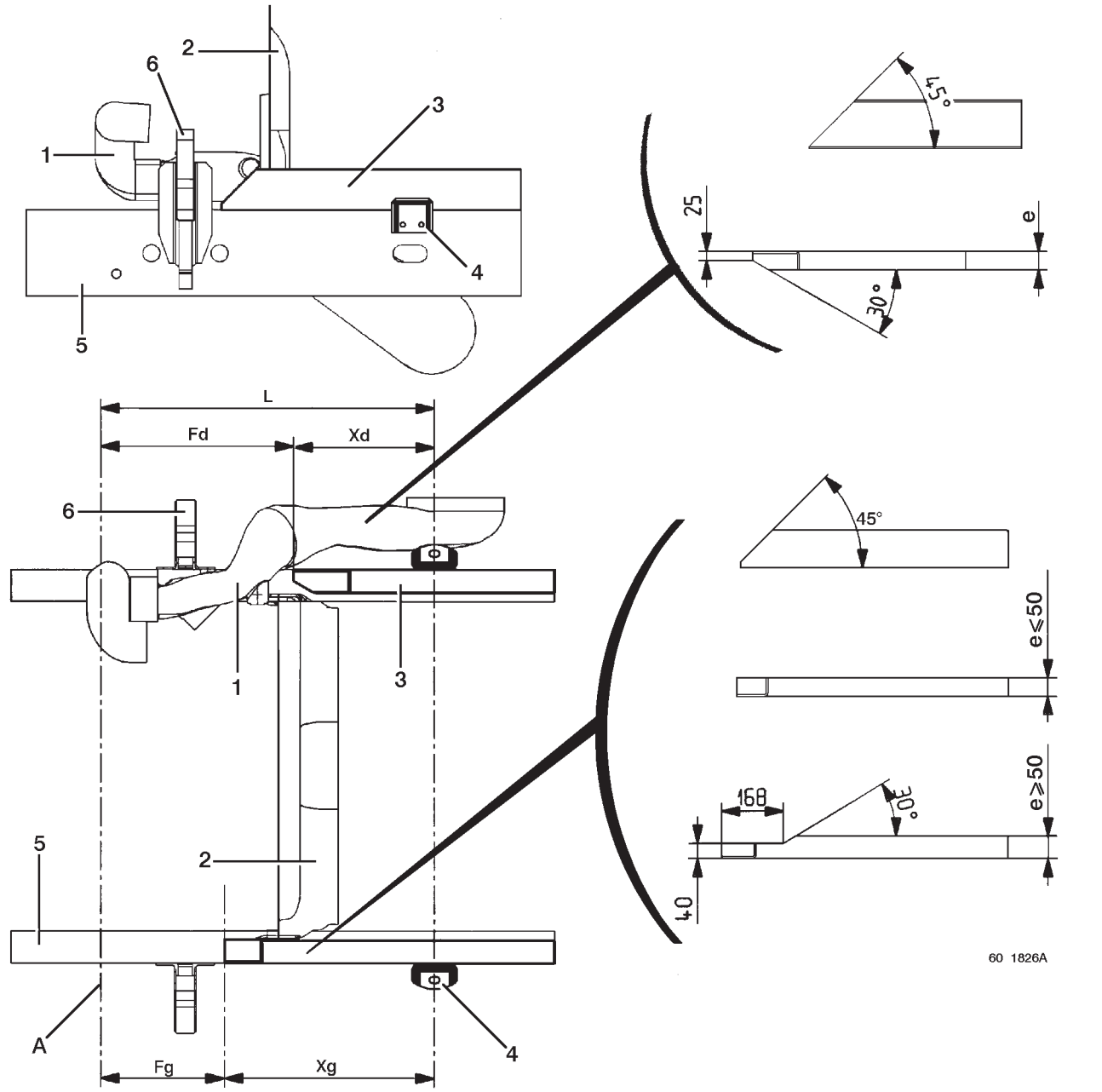
Vehicle	F	L	X
MIDLUM B	620	735.5	115.5
MIDLUM C'/C	570	835.5	265.5
MIDLUM HD/ Construction			
MIDLUM D			
MIDLUM 4x4			



MIDLUM day cab and roof level air intake

Symmetrical sub-frame finishing:
- asymmetrical sub-frame,
- cut-out on the RH side whatever the width (e) of the section.
- cut-out on the LH side if the width (e) of the section is greater than 50 mm.

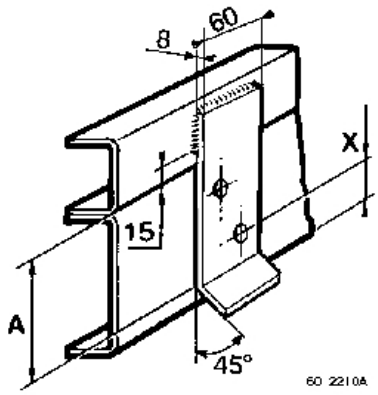
Vehicle	Fg	Fd	L	Xg	Xd
MIDLUM B	273	425	735.5	462.5	310.5
MIDLUM C'/C	223	375	835.5	612.5	460.5
MIDLUM HD/Construction					
MIDLUM D					
MIDLUM 4x4					



3.6 Lateral guiding

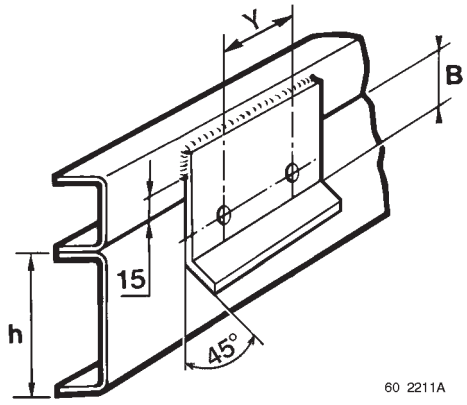
All bodies must be fitted with lateral guides to the fore and aft of the sub-frame.

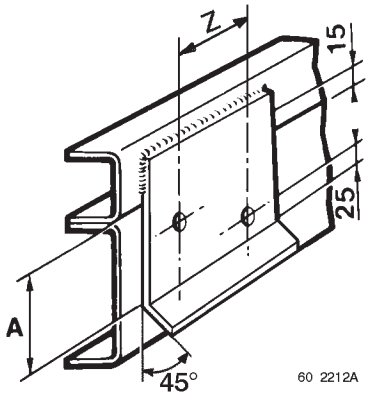
At the front:
For vehicles fitted with flush first brackets, lateral guiding must be assured by two guide plates that are:
- welded to the sub-frame,
- bolted to the sub-frame or the chassis, but never both at the same time.



IMPORTANT
For vehicles fitted with raised first brackets, the latter play the part of front guides.
The fitting of guide plates is therefore unnecessary.

At the rear:
Lateral guiding must be assured by two guide plates. These are drilled and screwed to the sidemembers if they also fulfil the function of inertia stop.





For positioning the drillings to the guides, observe the sidemember drilling recommendations described in the chapter “Drilling of sidemembers”.

A: minimum support height, 3/4 of height (**h**) of the sidemember
B: minimum support height, 1/4 of height (**h)** of the sidemember

X (mm)	Y (mm)	Z (mm)
30	50	45

Inertia stop

All bodies or equipment must be fitted with an inertia stop to the aft of each sidemember to retain the body against motion.

3.7 Attachment of bodywork

It is essential to comply with the stipulations hereafter for attaching bodywork of equipment to our vehicles.

For special cases, contact the RENAULT V.I. Product Application Department.

The bodywork must be correctly attached so that both the static and dynamic stresses are freely transmitted without causing excessive local strain, which could prejudice the reliability of the chassis frame or affect the road behaviour of the vehicle.

The use of brackets mounted in production to the chassis is compulsory.

The fastening of body sub-frames or undercarriages must be carried out according to the recommendations defined in this document (consult the “Bodywork fastening type” chapter).

Sub-frames or undercarriages must be continuous and fit perfectly over the entire length of the chassis. They may however be intermittent for a few specific applications (e.g. tankers). In such case, their attachment remains entirely under the bodybuilder’s responsibility.

Sub-frames or undercarriages should always be tapered towards the front (i.e. under the cab), so as to avoid sudden variations in inertia.

Behind-cab overall dimensions are given in the “Cab footprint” and “Behind-cab surrounds” chapters.

Protection against exhaust heat radiation: the closeness of the bodywork to the exhaust pipe and the fitting of certain accessories (electric retarder, etc...) may require the installation of a suitable eat shield by the body-builder.

BANS

WE FORBID:
- Attachment of sub-frames by U-bolts, clamps or equivalent systems (hooks).
- Use, drilling or welding of spring hangers.
- Any modification to: chassis, driveline, suspension (except if contained in the Guide for Fitting Bodywork).
- Attachment of sub-frames by welding to sidemembers.
- Drilling of stiffener gussets.
- Welding, notching of sidemembers, gussets or crossmembers.
- Use or modification of our nut and bolt hardware for the attachment of a body or a sub-frame (except for special cases specified in this document).
- Dismantling of brackets attached to the chassis (unless specified otherwise in this document).
- Insertion of wooden blocks between sub-frames and the chassis.

3.8 Attachment of sub-frames to brackets

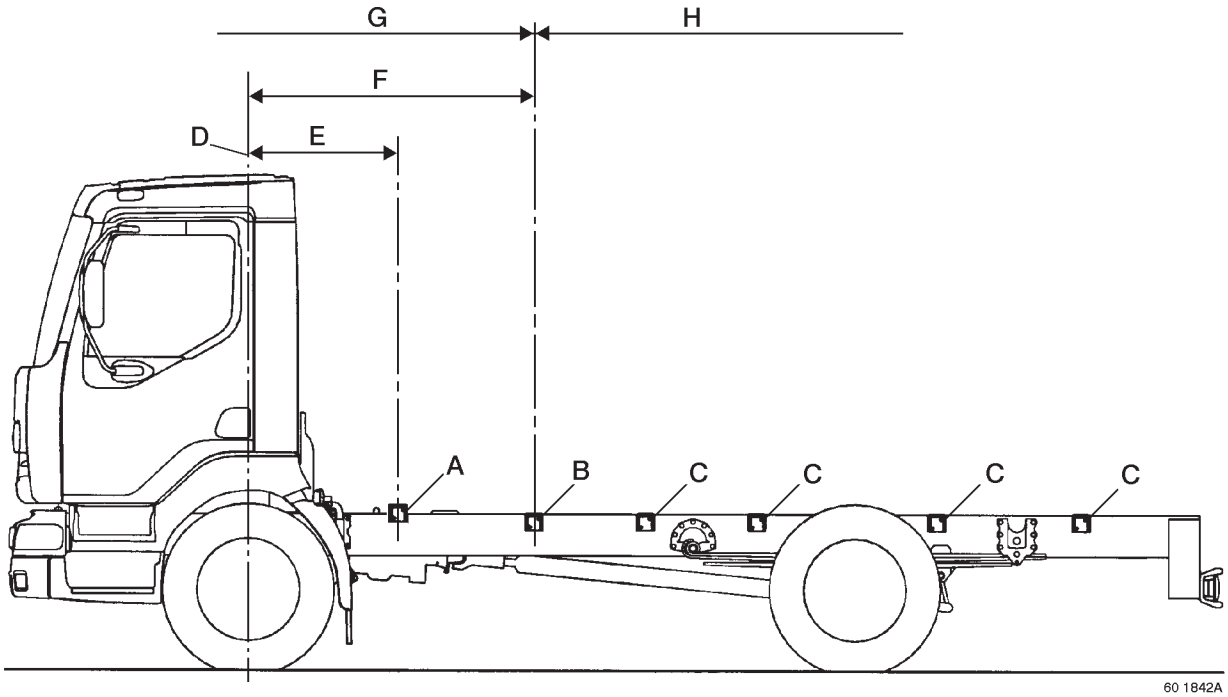
3.8.1 Fastening types

A - Flexible attachment (first bracket)
B - Semi-flexible attachment (second bracket)
C - Rigid attachment (all other brackets)

Guiding and fastening zone

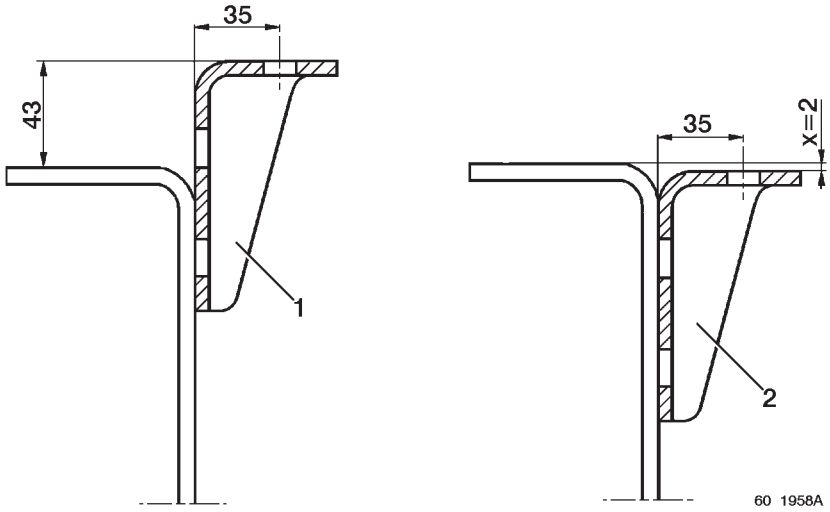
Vehicles	E	F
MIDLUM B	735,5	1302,5
MIDLUM C'/C	835,5	1585,5
MIDLUM HD/construction		
MIDLUM D		
MIDLUM 4x4		

D - Front axle centre-line
E - Flexible fastening position (**A**) (first bracket) in relation to front axle centre-line
F - Semi-flexible fastening position (**B**) (second bracket) in relation to front axle centre-line
G - Lateral guiding and elastic fastening zone
H - Guiding and rigid fastening zone
(See following pages).



Assembly conditions

Raised bracket (first bracket)
Flush brackets (other brackets)

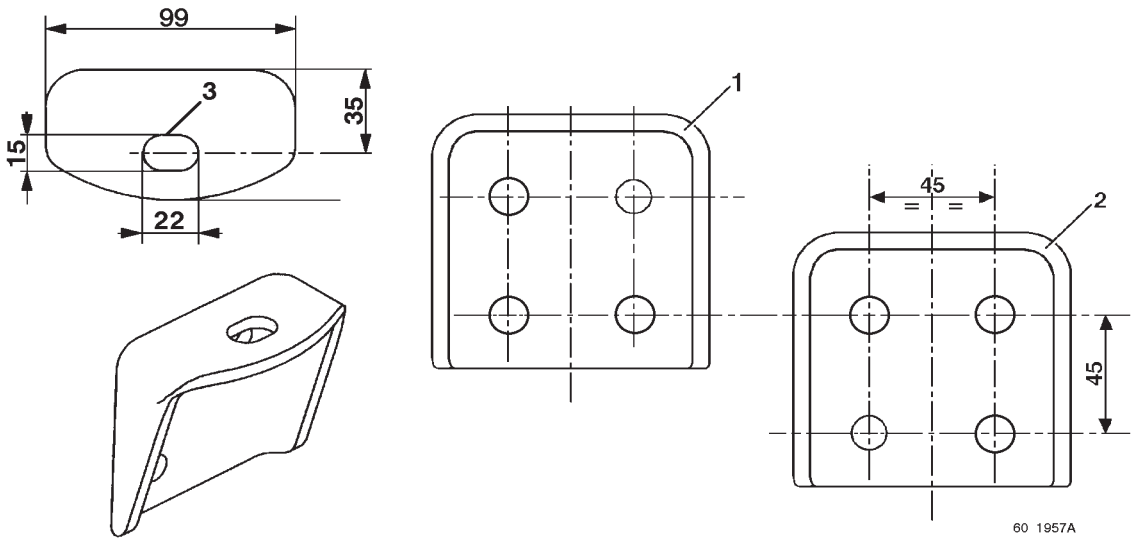


3.8.2 Vertical positioning of brackets

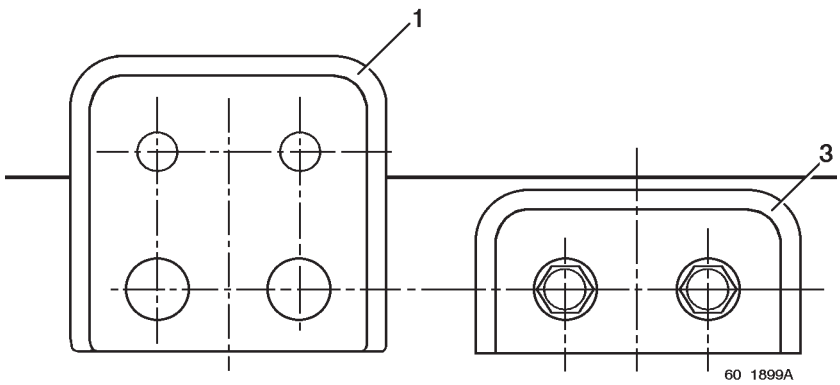
Two bracket assemblies are made on the MIDLUM chassis:

- The first bracket (**1**) is raised in relation to the other brackets.
- All the other brackets (**2**) are flush with the top face of the sidemembers.

The size and position of the slotted hole (**3**) is the same for all the brackets.



If need be, the first bracket (**1**) can be assembled in a flush position (**3**). In this case, the installation of a front lateral guide is necessary. Reduce the height of the bracket by sawing off, if necessary (see chapter B-3.6).

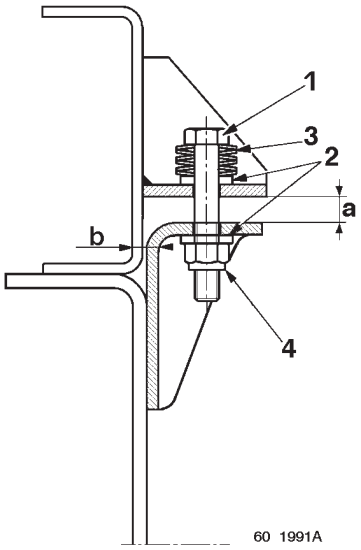


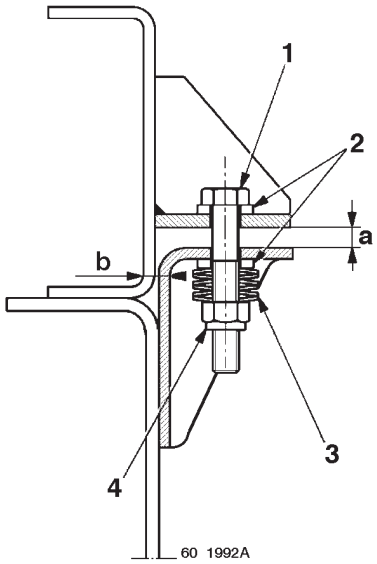
A - Flexible attachment
1 - Hexagon bolt M 14 x 150, class 10.9
2 - 2 plain washers 14 x 30 x 4
3 - 6 cone washers: (“Belleville” type)
i/d 14.5 mm
o/d 35 mm
thickness 1.8 mm
unit preload 400 kg
4 - Nut DAH M 14 class 10.9, or other locknut except nut with nylon ring (e.g. Nyloc)
a - Clearance: 10 to 15 mm max.
b - Bracket / sub-frame clearance: 2 mm minimum (for raised bracket only)

Tightening at 50% of the deflection:

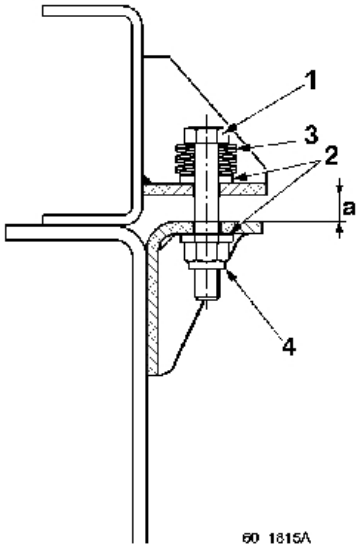
$$\frac{6 \times 1.2 \text{ (deflection)}}{2} = 3.6 \text{ mm}$$

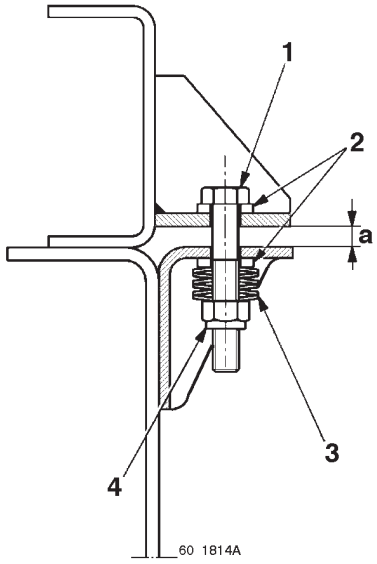
First raised bracket (works assembly)





First flush bracket (assembly reworked by bodybuilder)

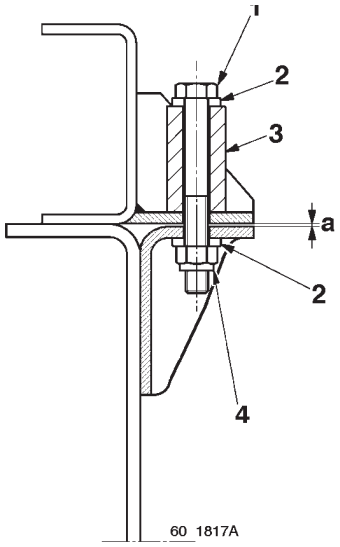


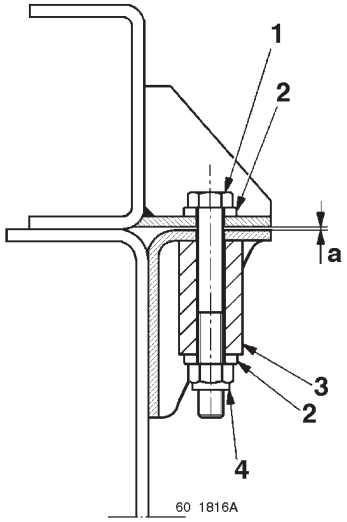


Bodywork attachment kit
The bodywork attachment kit is supplied with level 1 and level 2 electrical pre-arrangements (see chapters B-4 and B-5).

Note
An equivalent fastening technique solution is permitted (e.g. rubber sandwich mounting), if it keeps the same preload.

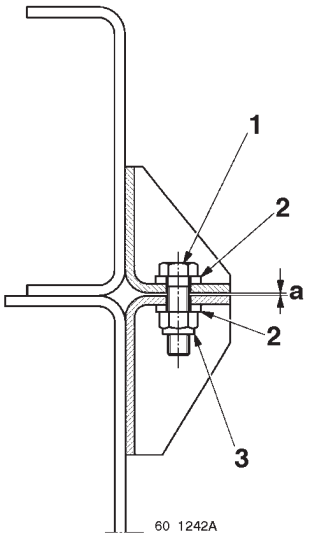
B - Semi-flexible attachment
1 - Hexagon bolt M 14 x 150, class 10.9
2 - 2 plain washers 14 x 30 x 5
3 - Steel spacer 15x38-65 (min.) (after cutting, true both faces)
4 - Flanged nut DRH M 14 class 10 or other locknut except nut with nylon ring (e.g. Nyloc)
a - Clearance: 1 to 2 mm before tightening
Tightening torque: 170 Nm





Bodywork attachment kit
The bodywork attachment kit is supplied with level 1 and level 2 electrical pre-arrangements (see chapters B-4 and B-5).

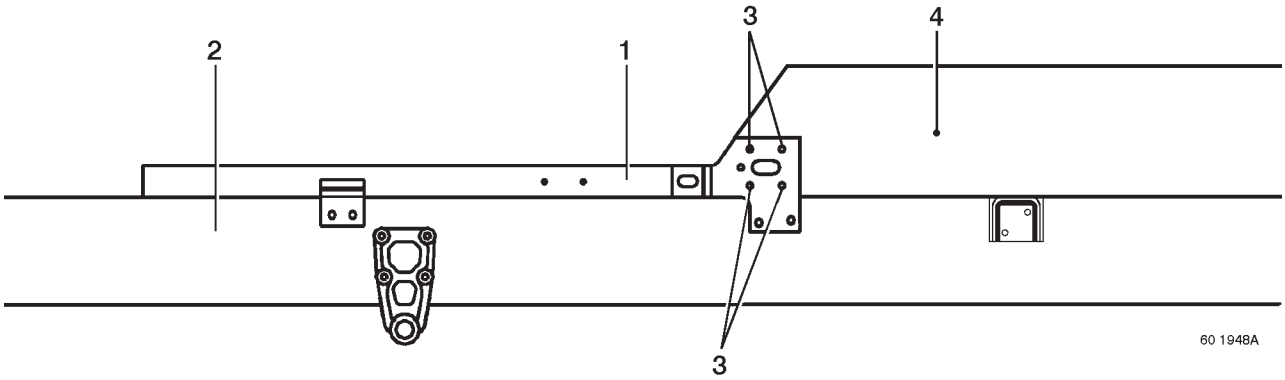
C - Rigid attachment
1 - Hexagon bolt M 14 x 600, class 10.9
2 - 2 plain washers 14 x 30 x 5
3 - Nut DRH M 14 class 10 or other locknut except nut with nylon ring (e.g. Nyloc)
a - Clearance: 1 to 2 mm before tightening
Tightening torque: 170 Nm

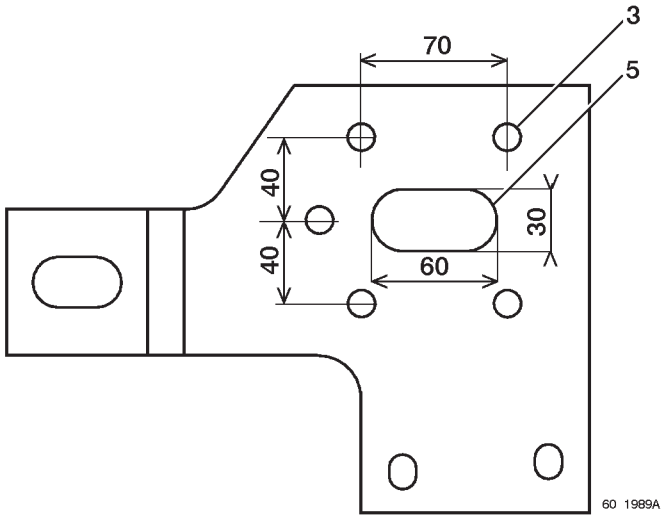


Bodywork attachment kit
The bodywork attachment kit is supplied with level 1 and level 2 electrical pre-arrangements (see chapters B-4 and B-5).

3.8.3 Special features of vehicles with 4-door cab

Vehicles equipped with the 4-door cab are fitted with a reinforcement (1) bolted to the chassis (2) under the cab. This reinforcement must be screwed to the front end of the sub-frame (4) using drillings (3) or plug welded using slotted hole (**5**).





Use M12 class 10.9 bolts with locknuts.

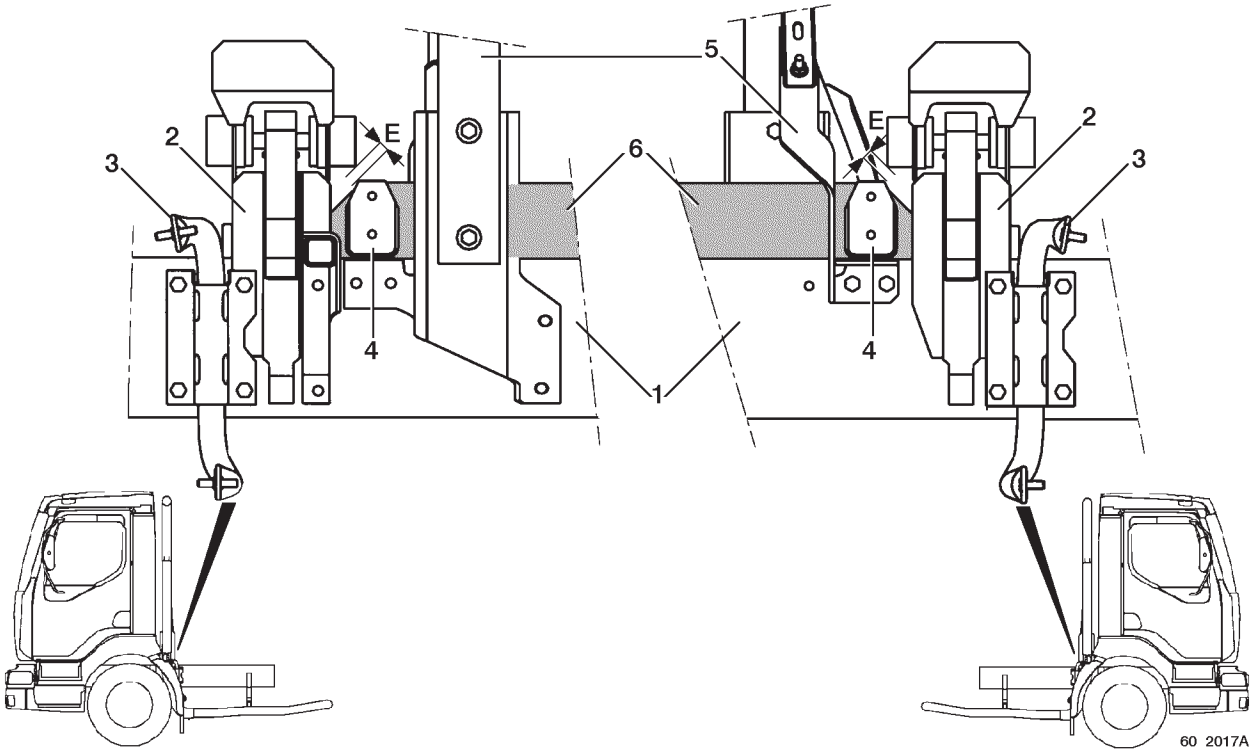
IMPORTANT
Reinforcements (1) can in no way substitute for sub-frame lateral guide stops. The assembly of guides is still vital for vehicles with 4-door cabs.

3.8.4 Special features of vehicles with sleeper cab and vertical exhaust

The vertical exhaust support brackets prevent passage of the sub-frame if the sub-frame brackets are welded on top. It is therefore important to:
- fasten the first bracket to the sub-frame by bolting.
- ban any welding on the sub-frame subsequent to its assembly on-vehicle.

Watch out to leave sufficient clearance (**E**) between the cab suspension and the first sub-frame bracket.
If necessary, notch it.
The width of this bracket should not exceed 90 mm.

1 - chassis
2 - cab rear support bracket
3 - wheelarch support
4 - first sub-frame bracket
5 - vertical exhaust support bracket
6 - sub-frame

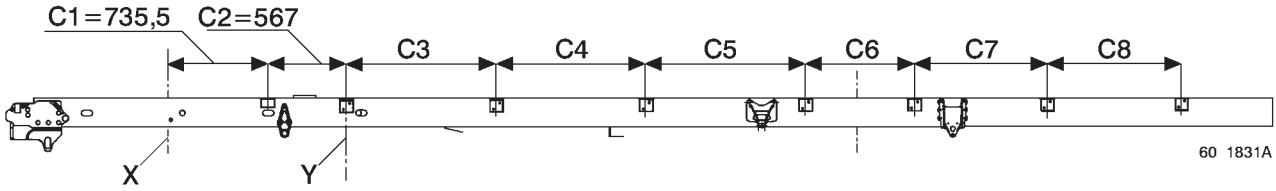


IMPORTANT
To prevent exhaust gases from dirtying the cab, the vertical exhaust pipe nozzle is adjustable over a height of 250 mm.

3.9 Longitudinal positioning of brackets on chassis

3.9.1 MIDLUM B 2-door day & sleeper cabs

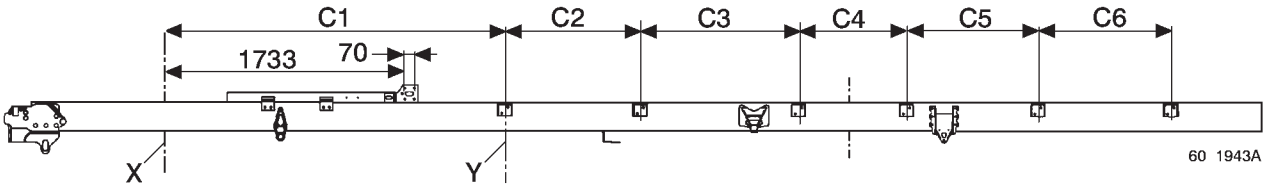
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C3	C4	C5	C6	C7	C8
Mechanical suspension	2700	1020	800	640			
	2950	1270		725			
	3250	930	640	800	850		
	3850	1000	1170		1100		
	4450	800	900	1070	800	805	840
	5050	1100		1170		970	980
Air suspension	3850	1000	780	1280	1010		
	4450	800	900	680	1280	715	840
	5050	1100		780		880	980

3.9.2 MIDLUM B 4-door cab

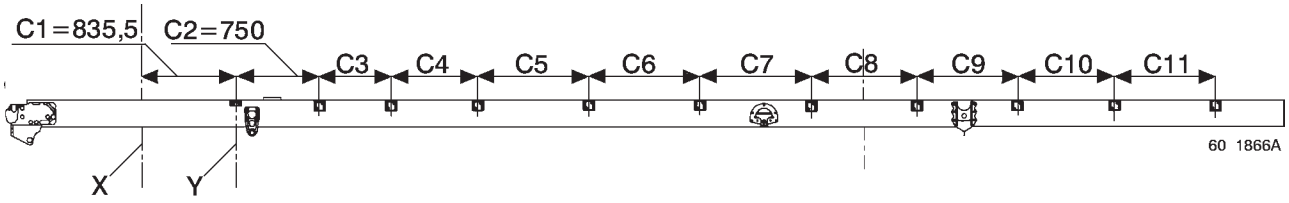
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C1	C2	C3	C4	C5	C6
Mechanical suspension	3250	2157	715	800	850		
	3850	2402	1070		1100		
	4450	2152	850	1070	800	805	840
	5050	2502	1000	1170		970	980

3.9.3 MIDLUM C'/C 2-door day & sleeper cabs

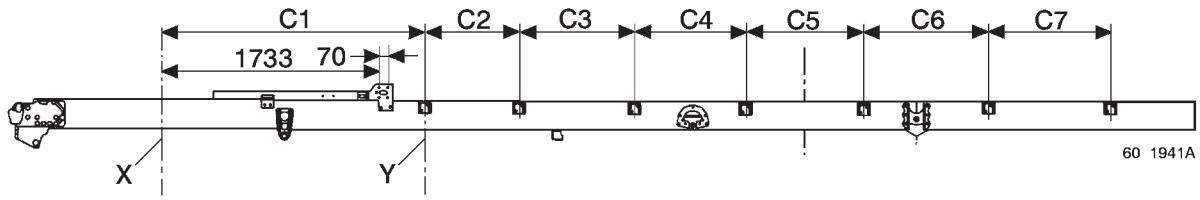
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C3	C4	C5	C6	C7	C8	C9	C10	C11
Mechanical suspension	3070	1012	950	692						
	3350	640	650	950	917					
	3650		950		962					
	3950	910	980							
	4550	640	830	1020	950	782	810			
	5150		630	830	990	950	1000	997		
	5750		900	1100	1050		1100	1100		
	6480		780	1000			950	900	872	900
Air suspension	3650	640	670	1250	942					
	3950	910	700							
	4550	640	830	740	1250	762	810			
	5150		630	830	710	1250	980	997		
	5750		900	1100	770		1080	1077		
	6480		780	1000		720	1250	880	872	900

3.9.4 MIDLUM C'/C 4-door cab

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

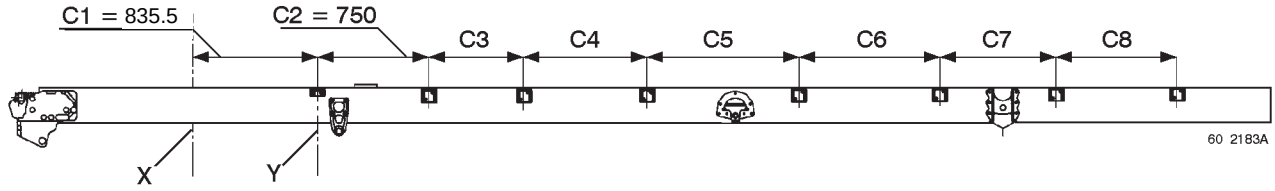


Vehicle C'	E	C1	C2	C3	C4	C5	C6	C7
Mechanical suspension	3350	2151	724	950				
	3650	2322	853					
	3950	2362	419	694	950	977		
	4550	2702	709	664		797	810	
	5150	2360	495	945	875	950	1000	997

Vehicle C	E	C1	C2	C3	C4	C5	C6	C7
Mechanical suspension	3350	2107	768	950				
	3650	2309	866		778			
	3950		546	620	950	957		
	4550	2107	948	1020		782	802	
	5150		748	930	890	950	1000	977

3.9.5 MIDLUM HD / Construction 2-door day & sleeper cabs

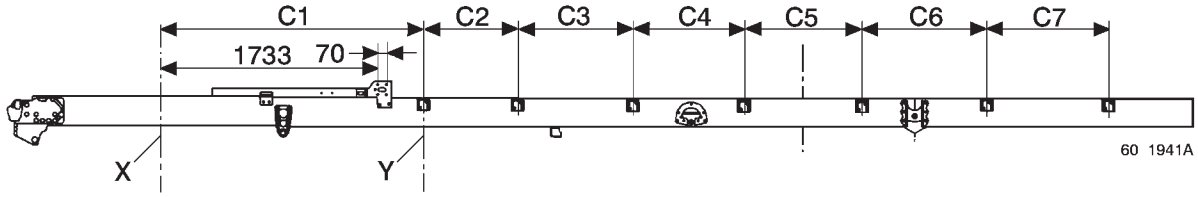
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C3	C4	C5	C6	C7	C8
Mechanical suspension	3070	1012	950	692			
	3350	640	650	950	917		
	3650		950		962		
	3950	910	980				
	4550	640	830	1020	950	782	810

3.9.6 MIDLUM HD / Construction 4-door cab

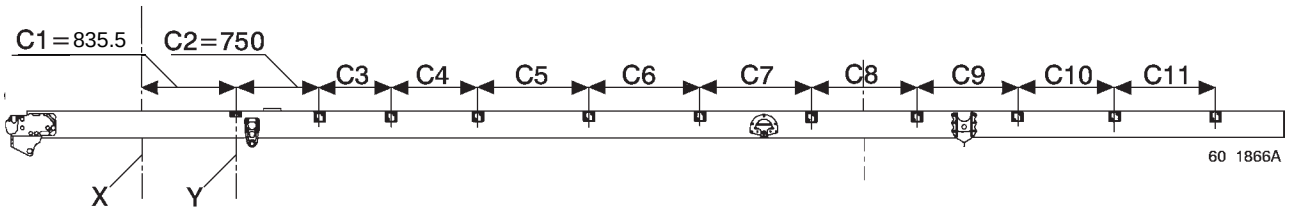
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C1	C2	C3	C4	C5	C6	C7
Mechanical suspension	3350	2107	768	950				
	3650	2309	866		778			
Air suspension	3950		546	620	950	957		
	4550	2107	948	1020		782	802	

3.9.7 MIDLUM D 2-door day & sleeper cabs

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

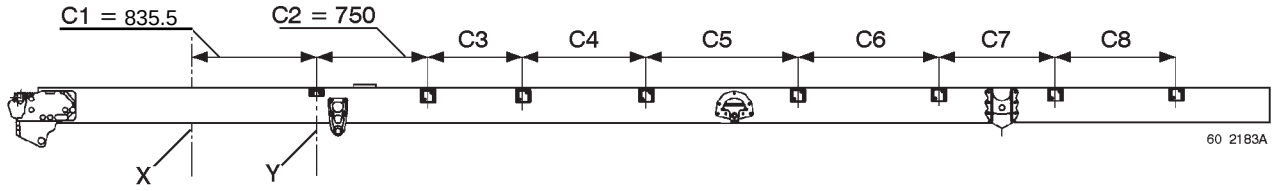


Vehicle	E	C3	C4	C5	C6	C7	C8	C9	C10	C11
Mechanical suspension	3650	640	950	950						
	3950	910	980							
	4250	640	950	600	950	800				
	4550		730	1120		782				
	4850		750		650	950	800			
	5150		630	830	990		1000			
	5750			990	1130		950			
	6050		900	1100	1050		1100			
	6480				700	650	950	1100		
	6780		780	1000				900	872	
Air suspension	3650	960	1050	700						
	3950	1200	1110							
	4250	900	660	1050	700	635				
	4550	640	1170	1100						
	4850		750	770	1050	700	635			
	5150		640	1180			820			
	5750			740	740	1050	700	815		
	6050		900	1030	600	940		952		
	6480			1100	720	1050		940		
	6780		780	1160		1100		770	900	

3.9.8 MIDLUM 4x4 2-door cab

MIDLUM 4x4 TA (all-wheel grip) vehicles are equipped with body brackets.
MIDLUM 4x4 TC (unkept tracks) vehicles are without body brackets (fixing holes available)

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

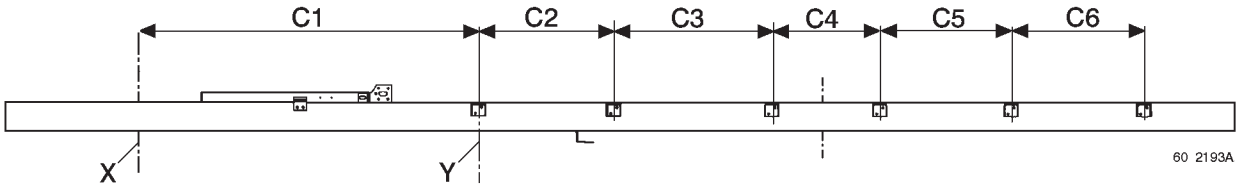


Vehicle	E	C3	C4	C5	C6	C7	C8
Mechanical suspension	3070	1012	950	692			
	3350	640	650	950	917		
	3650	730	860		962		
	3950	910	980				
	4550	727	830	933	950	782	810

3.9.9 MIDLUM 4x4 4-door cab

MIDLUM 4x4 TA (all-wheel grip) vehicles are equipped with body brackets.
MIDLUM 4x4 TC (unkept tracks) vehicles are without body brackets (fixing holes available)

E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C1	C2	C3	C4	C5	C6
Mechanical suspension	3350	2062,5	813	950			
	3650	2252,5	923		778		
	3950		603	620	950	957	
	4550	2312,5	875	888		782	802

3.10 Changing the position of lateral flashing direction indicators

When installing a body on a vehicle equipped with a day cab with under-floor air intake and a body situated at a height lower than 140 mm in relation to the sidemembers, the position of flashing direction indicator lamps must be moved to prevent them from entering into contact with the body.

They can be fastened on the front end or on the sidewalls of the body.

Assembly on body front end

The lamps must be positioned according to the overall width of the bodywork in accordance with the regulations in force.

Install sealed crimping nuts compatible with the body material on the front end of the bodywork.

Make spacers allowing flat support of the lamp brackets and a sufficient spacing (e) between the body and the side lamp rim.

For bodies fitted with side doors, check that the door does not enter into contact with the lamps while it is being opened.

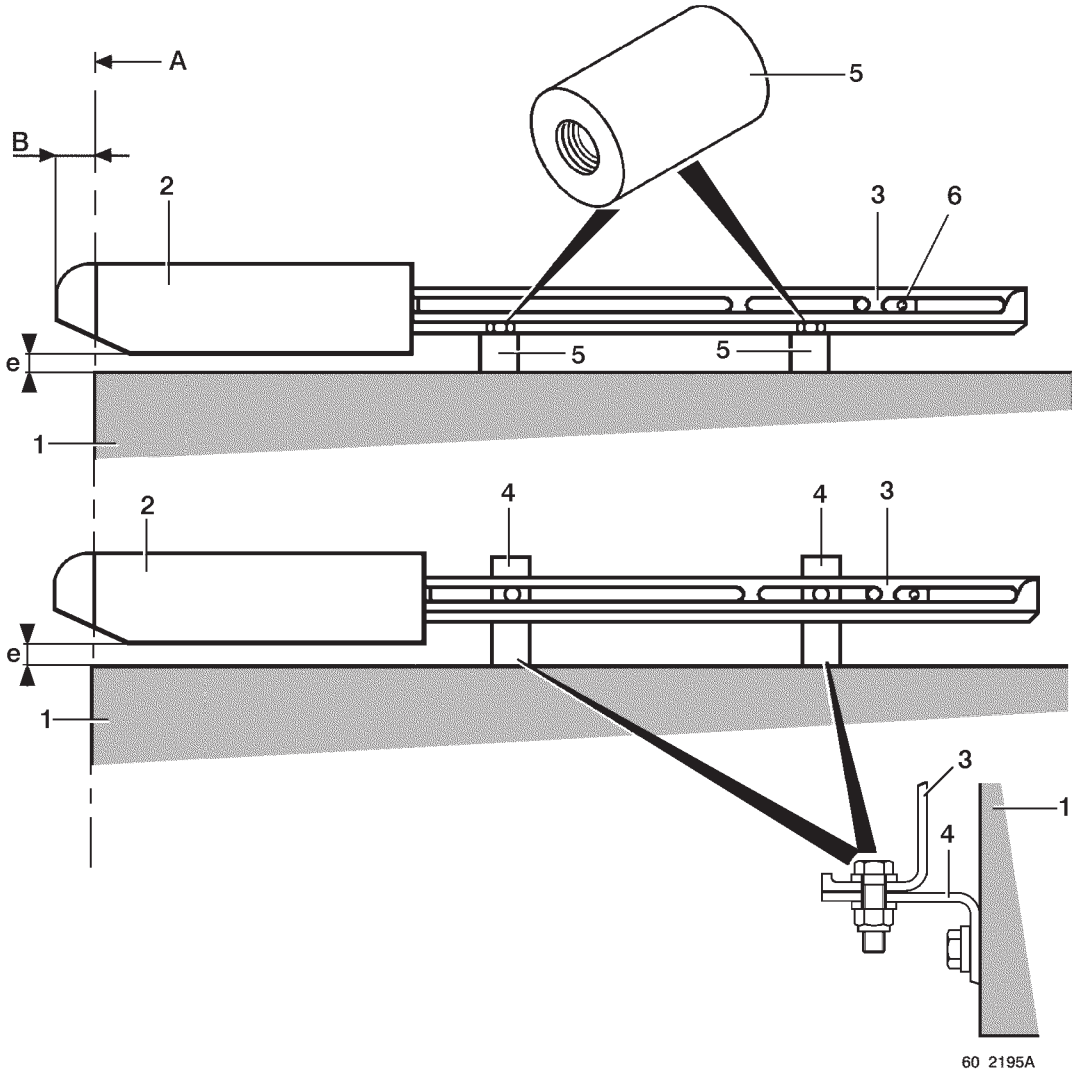
The lateral lamp brackets can also be carried by angle-brackets. This assembly makes it possible to adjust the lateral position of the lamps.

So that the position of lateral flashing direction indicators complies with EEC regulations, their height must not exceed 1500 mm and they must not be arranged at a distance of more than 1800 mm away from the front of the vehicle.

Depending on the overall width of the equipment, it may be necessary to change the position of the lateral direction indicator lamps (2). Comply with the regulations in force. Oblong holes made in the lamp brackets (3) serve for this modification.

The overall position (B) of the lateral direction indicator lamp in relation to the lateral dimensions (A) of the body (1) must be complied with.

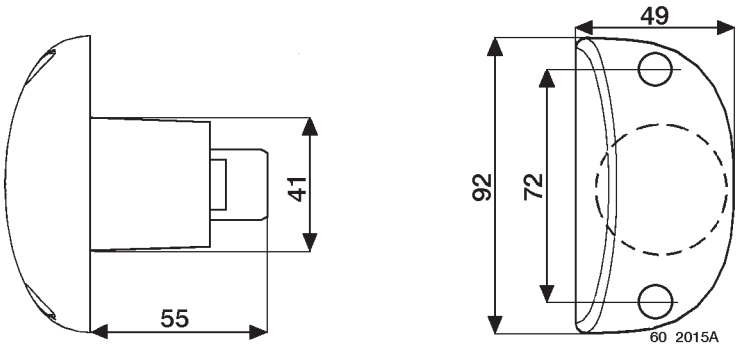
e > 10 mm

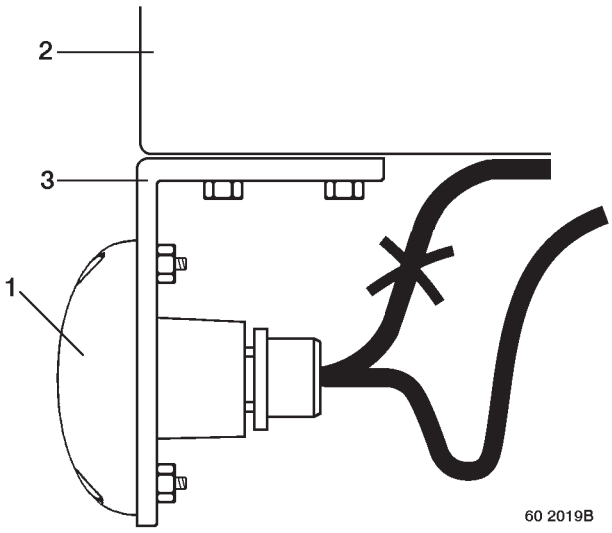


Assembly on body sidewalls

The lateral lamps (1) can be either carried on angle-brackets (3) or fastened directly to the edge of the body (2). The latter assembly nevertheless requires a housing to be contrived to allow passage of the connector through the partition.

So that the position of lateral flashing direction indicators complies with EEC regulations, their height must not exceed 1500 mm and they must not be arranged at a distance of more than 1800 mm away from the front of the vehicle.





ELECTRICAL PRE-ARRANGEMENTS
LEVEL 1

COMMERCIAL VARIANT 15502
Supplied with the “Tail lift” installation pre-arrangement

Available as option on vehicles

4. LEVEL 1 ELECTRICAL PRE-ARRANGEMENTS

4.1 Available power supplies

The basic vehicle is available without electrical pre-arrangement, but as option it can be equipped with level 1 or level 2 electrical pre-arrangements.
Trade vehicles (tankers, buildings and public works) are equipped with level 2 electrical pre-arrangement as standard.
The bodybuilder pre-arrangements as option include the level 1 or level 2 electrical pre-arrangement.
Refuse collector vehicles and light fire tenders are equipped with special electrical pre-arrangements.

The electrical pre-arrangements are necessary to obtain certain functions (e.g. chassis-mounted fast idling control) and contribute towards improvement assembly quality for optimized cost price.

These optional assemblies cannot be installed as aftermarket and must be ordered when purchasing the new vehicle.

4.2 Level 1 electrical pre-arrangements

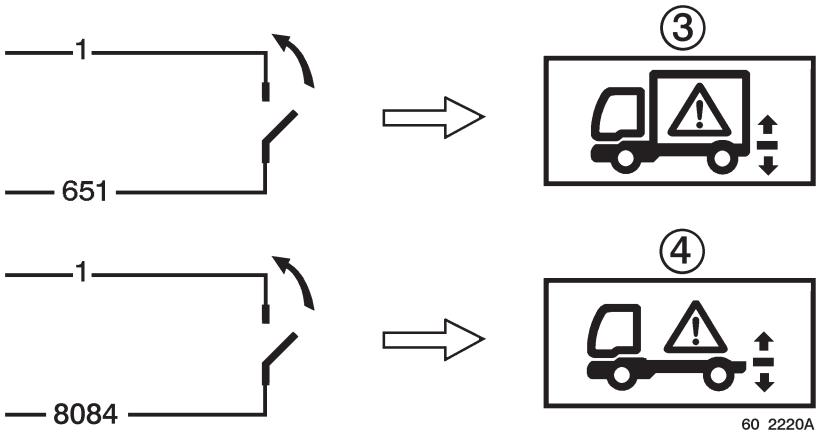
This option serves for the following, without modification to the vehicle wiring harnesses:
- power supply, control and monitoring of equipment (van, tail lift lighting),
- monitoring of equipment (tail lift),
- easy fitting of body lateral signalling.

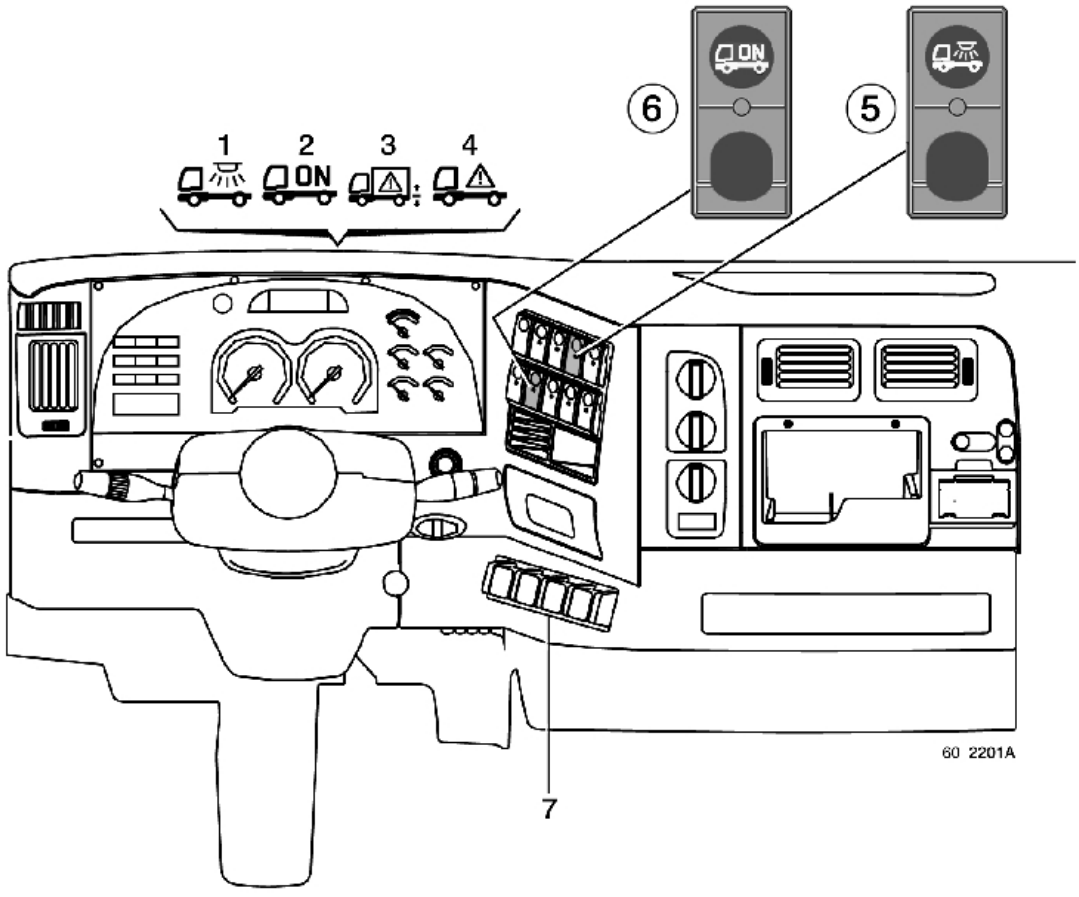
A specific wiring harness routes the power supplies and information from the warning lights and switches located in the cab as far as the battery compartment.
A lateral signalling installation kit is supplied in the cab, not assembled with the new vehicle.
A bodywork fastening kit, comprising all the threaded hardware necessary for fitting the body is supplied in a box in the cab.

Make-up:

In the cab on the display

- Four pictograms integrated in the instrument panel are dedicated to the bodybuilder function:
  - pictogram (**1**): van interior lighting,
  - pictogram (**2**): equipment power supply, machine unlocking,
  - pictogram (**3**): tail lift in working position (coupled to stop light and triggering of buzzer if the road speed is above 5 km/h),
  - pictogram (**4**): chassis equipment alert (available to bodybuilder, coupled with stop light).
- Display of pictograms:
  - pictograms (**1**) & (**2**) are displayed when the corresponding switches (**5**) & (**6**) are actuated.
  - pictograms (**3**) & (**4**) are displayed when the corresponding wires are connected to earth:
  - pictogram (**3**): wire 651 on stand-by in battery compartment,
  - pictogram (**4**): wire 8084 on stand-by in battery compartment.


1
651
③
1
8084
④
60 2220A

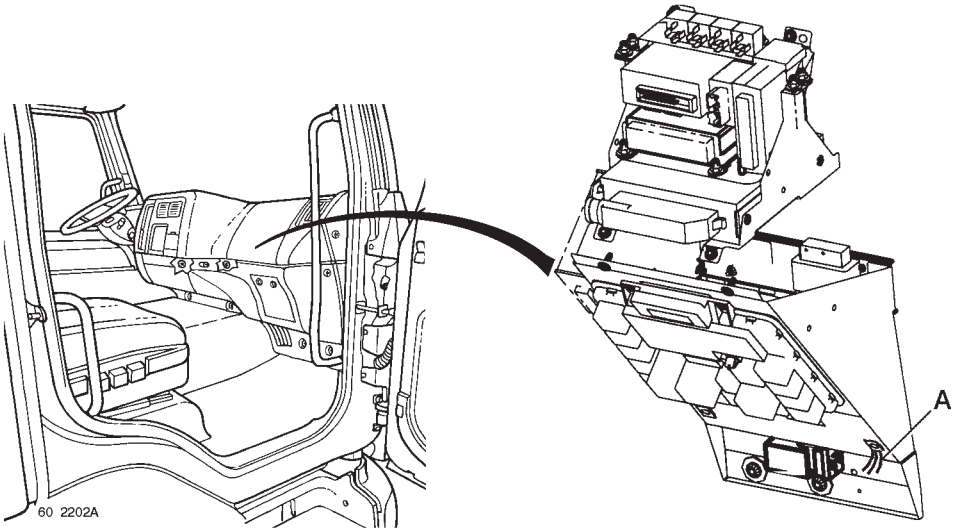

6
5
1
2
ON
3
4
7
60 2201A

Available power supplies in the cab under the connection unit

Three wires (**A**) on stand-by, equipped with 6.35 spade terminals deliver cab available power supplies:
- wire 208: after master switch “+” power supply
- wire 632: lighting, side lights “+” power supply
- wire 275: after ignition “+” power supply.

To make the earth, connect up to an earthing point on the inside of the cab (see chapter C-3.1).

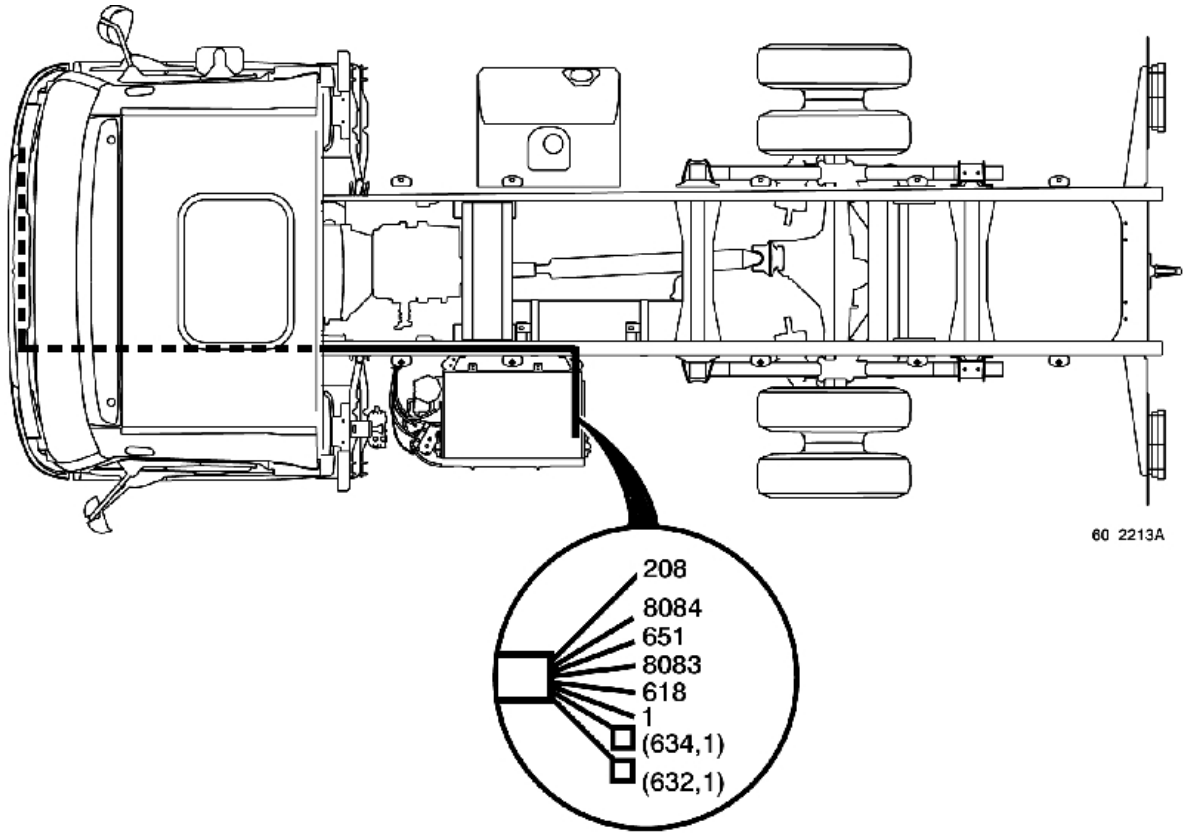
IMPORTANT
Wires N° 208 and 632, each supplied through one single fuse, deliver the available power supplies in parallel into the cab and to the front end. Consequently, the amperage crossing the supply fuse is equal to the sum of the amperages delivered by the two ends of each line. This amperage should not exceed 15 Amps.



In the battery compartment

- Power supplies available at the ends of the wiring harness on stand-by in the battery compartment:
  Two 2-way connectors: lateral lights power supply (earth: wire N° 1, “+” lighting: wire N° 632 on RH side and 634 on LH side).
  wire N° 208: after master switch “+” power supply
  wire N° 618: chassis lighting (10A) “+” power supply, controlled by chassis lighting switch
  wire N° 8083: equipment “+” power supply, controlled by machine unlocking switch
  wire N° 651 & 8084: display of pictograms (see preceding pages).

- High power “+” power supply available before master switch on 200 Amp fuse-holder for vehicles equipped with a “Tail lift” trade pack only.
  Spotface and stainless steel threaded hardware available in rear overhang for fastening the earth.



4.3 Assembly of lateral signalling installation kit

This optional kit is supplied in the cab, not assembled upon delivery of the new vehicle.
It serves for installing the lateral signalling feature of the equipment without having to convert the vehicle's electrical system.
Comply with the regulations in force for positioning the lateral lamps. The wiring harnesses for the lateral lamps must be fastened and protected against heat radiation (electric retarder and exhaust in particular).

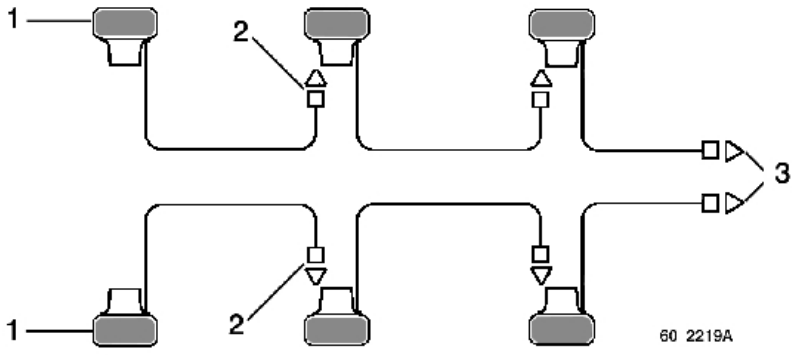
Make-up

6 to 8 lateral signalling lamps, comprising:
- one wiring harness 5 metres long complete with male connector,
- one female connector for interconnecting the lamps.

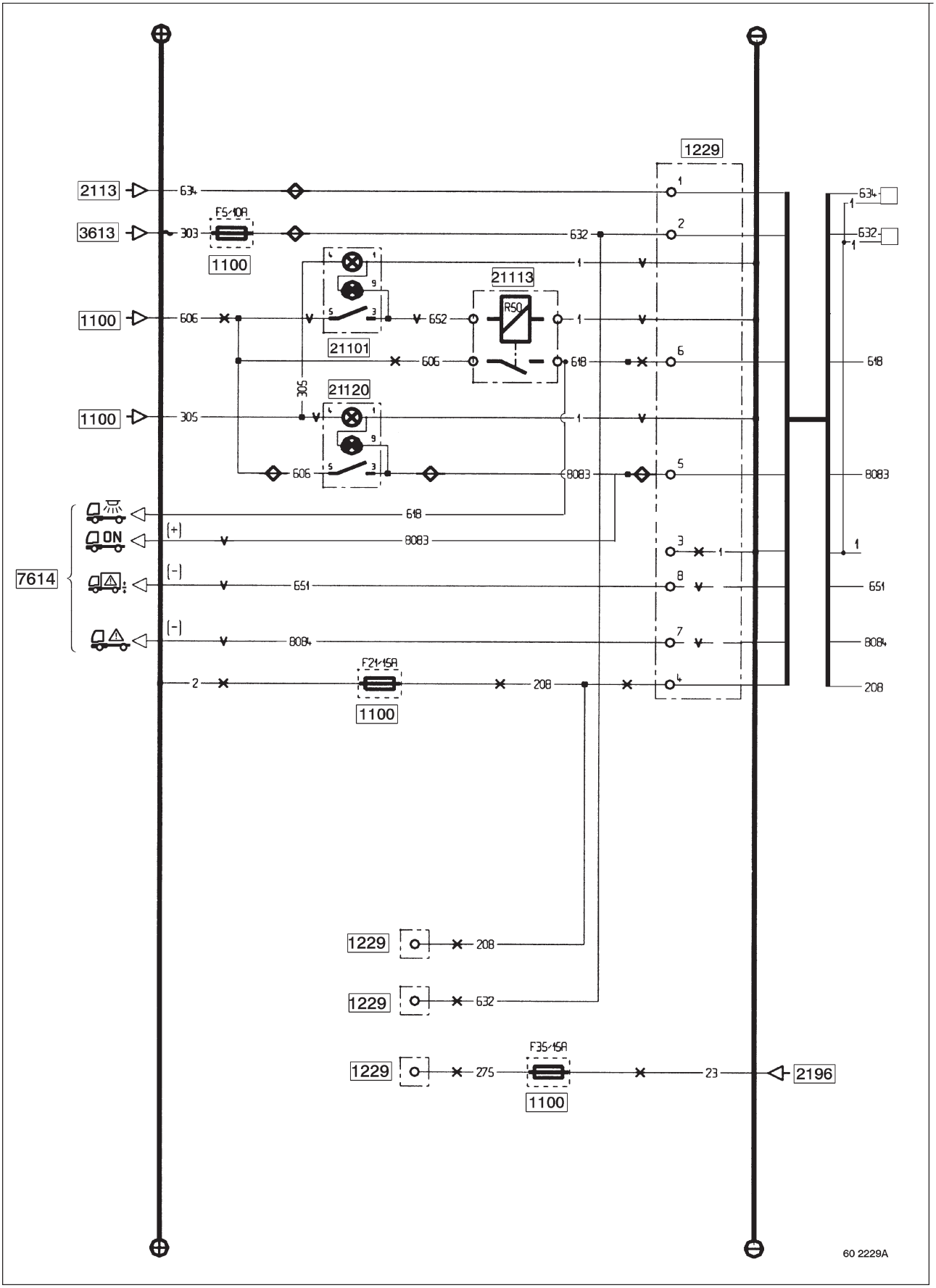
On-vehicle hook-up

The lamps are connected in series to one another, the first in the chain being connected to the vehicle.
The connection point on-vehicle is:
- 2-way connectors JPT of the available power supplies wiring harness in the battery compartment if the vehicle is thus equipped,
- rear lamps for vehicles equipped with rear lighting bar (by tapping),
- registration plate lamp on vehicles equipped with rear run-under guard (by by-pass).

1 - lateral signalling lamps
2 - connector to be plugged into the connector of the next lamp
3 - connector to be plugged into the vehicle (battery compartment, rear lamps or registration plate lamp).

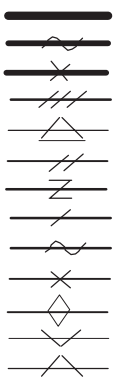


4.4 Electrical diagram for level 1 available power supplies



Key
1100 - Fuses
1229 - Chassis-cab connection unit
1335 - Bodybuilder available power supplies connector
2113 - Trailer socket, 7-pin type 24 N
2196 - After ignition “+” power supply (**R1**)
3613 - RH front side/parking lamp
7614 - Principal display
21101 - Bodybuilder equipment control
21113 - Bodybuilder equipment available power supply relay (**R50**)
21120 - Bodybuilder equipment control N° 2

Cable cross-section and colour



75 mm^2
60 mm^2
50 mm^2
25 mm^2
16 mm^2
10 mm^2 – Ivory
7 mm^2 – Pink
5 mm^2 – Ivory
3 mm^2 – Pink
2 mm^2 – Grey
1 mm^2 – Green
0,6 mm^2 – Grey
0,35 mm^2 – Orange

Assignment of fuses concerning electrical pre-arrangements

Fuse	Amperage	Wire N°	Function
F4	10	634	LH lateral lights power supply
F5	10	632	RH lateral lights power supply
F21	15	208	After master switch “+” power supply
F43	10	618	Power lighting power supply
		8083	Equipment power supply - Machine unlocking power supply
F35	105	202	After ignition “+” power supply

Do not exceed the max. currents of the switches; if you do, relay the power supply.

4.5 Bodywork fastening kit (located in cab and supplied with this pre-arrangement)

20 setbolts HM 14x150x60, class 10.9
2 setbolts HM 14x150x69, class 10.9
2 setbolts HM 14x150x110, class 10.9
48 plain washers 14x30x5
12 cone washers “Belleville” type
24 flanged locknuts DRH M14 class 10

ELECTRICAL PRE-ARRANGEMENTS
LEVEL 2

COMMERCIAL VARIANT 15503
Standard with
“Tanker” - “Buildings and Public Works” - “Road sweeper” vehicles

Supplied with the “Crane” installation pre-arrangement

Available as option on vehicles

5. LEVEL 2 ELECTRICAL PRE-ARRANGEMENTS

5.1 Available power supplies

The basic vehicle is available without electrical pre-arrangement, but as option it can be equipped with level 1 or level 2 electrical pre-arrangements.
Trade vehicles (tankers, buildings and public works) are equipped with level 2 electrical pre-arrangement as standard.
The bodybuilder pre-arrangements as option include the level 1 or level 2 electrical pre-arrangement.
Refuse collector vehicles and light fire tenders are equipped with special electrical pre-arrangements.

The electrical pre-arrangements are necessary to obtain certain functions (e.g. chassis-mounted fast idling control) and contribute towards improvement assembly quality for optimized cost price.

These optional assemblies cannot be installed as aftermarket and must be ordered when purchasing the new vehicle

5.2 Level 2 electrical pre-arrangements

This option serves for the following, without modification to the vehicle wiring harnesses:
- power supply, control and monitoring of equipment (chassis lighting),
- monitoring of equipment (tipper, crane, sideboards...),
- easy fitting of body lateral signalling.

Specific wiring harnesses route the power supplies and information from the warning lights and switches located in the cab as far as the battery compartment.

A lateral signalling installation kit is supplied in the cab, not assembled with the new vehicle.

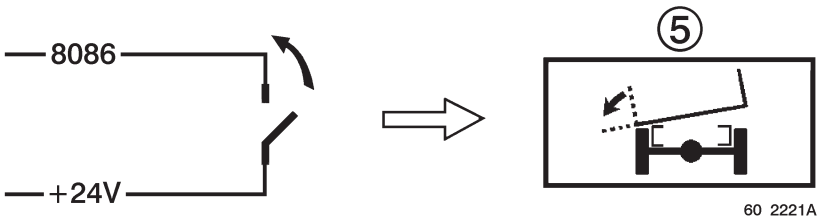
A bodywork fastening kit, comprising all the threaded hardware necessary for fitting the body is supplied in a box in the cab.

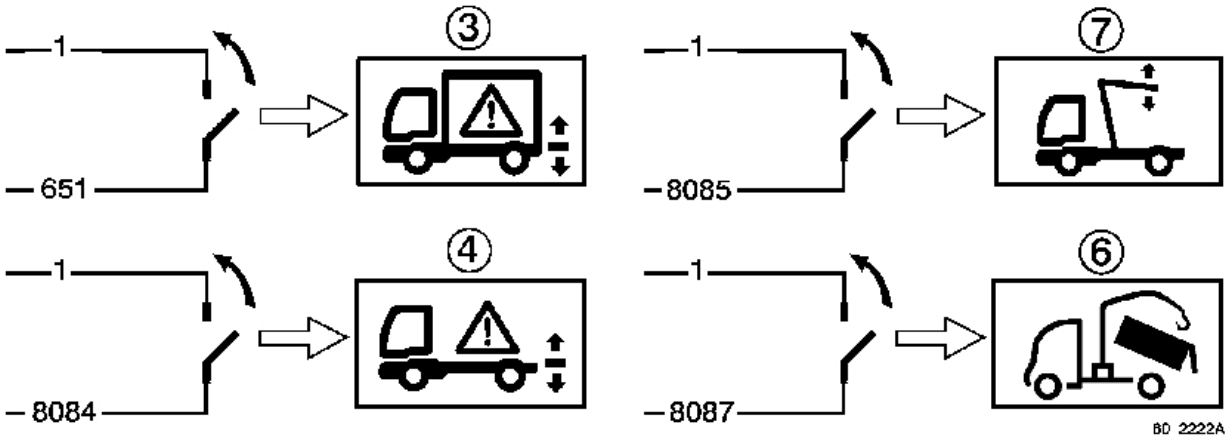
Make-up:

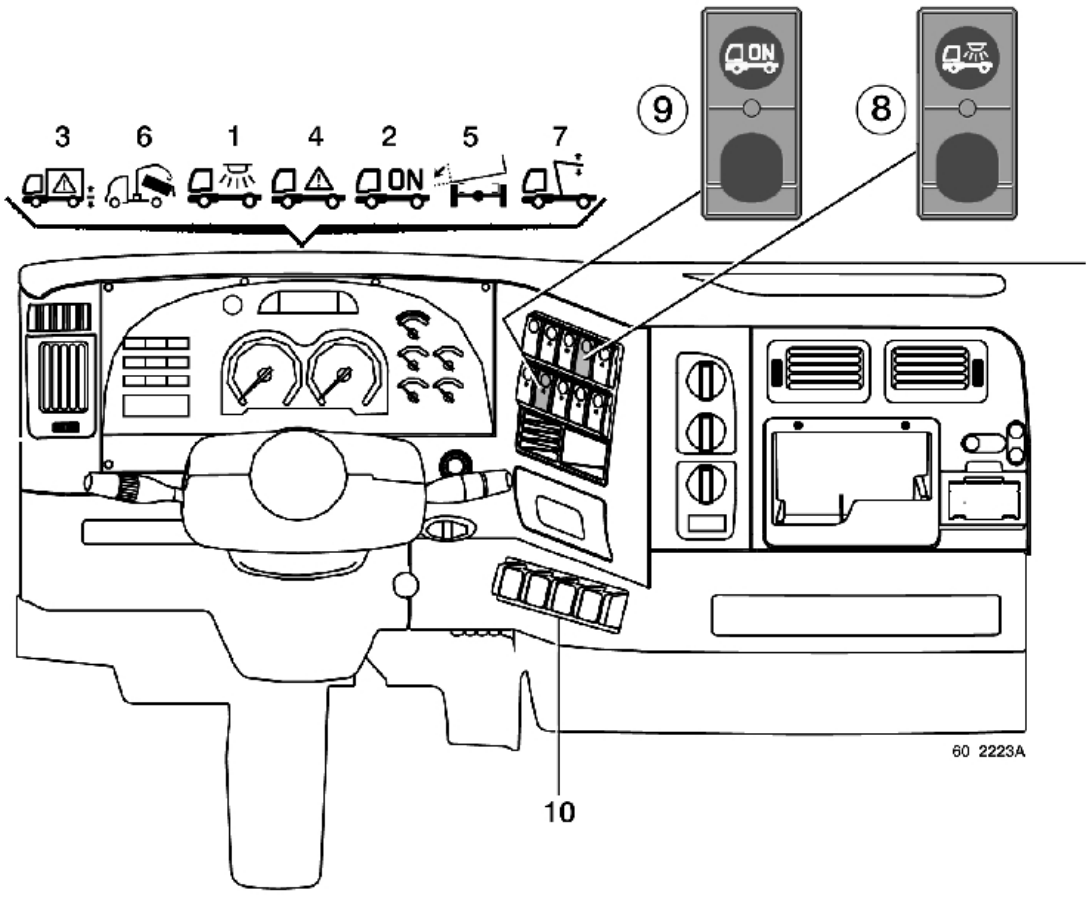
In the cab on the display

- Seven pictograms integrated in the instrument panel are dedicated to the bodybuilder function:
  - pictogram (**1**): van interior lighting,
  - pictogram (**2**): equipment power supply, machine unlocking,
  - pictogram (**3**): tail lift in working position (coupled to stop light and triggering of buzzer if the road speed is above 5 km/h),
  - pictogram (**4**): chassis equipment alert (available to bodybuilder, coupled with stop light),
  - pictogram (**5**): sideboard open(coupled to stop light and triggering of buzzer if the road speed is above 5 km/h),
  - pictogram (**6**): tipper raised (coupled to stop light and triggering of buzzer if the road speed is above 5 km/h),
  - pictogram (**7**): crane or cradle (coupled to stop light and triggering of buzzer if the road speed is above 5 km/h),

- Display of pictograms:
  - pictograms (**1**) & (**2**) are displayed when the corresponding switches (**8**) & (**9**) are actuated.
  - pictograms (**3**), (**4**), (**6**) & (**7**) are displayed when the corresponding wires are connected to earth:
  - pictogram (**3**): wire 651 on stand-by in battery compartment,
  - pictogram (**4**): wire 8084 on stand-by in battery compartment,
  - pictogram (**5**): is displayed when wire 8086 is connected to “+” 24V,
  - pictogram (**6**): wire 8087 on stand-by in RH sidemember,
  - pictogram (**7**): wire 8085 on stand-by in RH sidemember.


8086
+24V
⑤
60 2221A


1
651
③
1
8085
⑦
1
8084
④
1
8087
⑥
BD 2222A

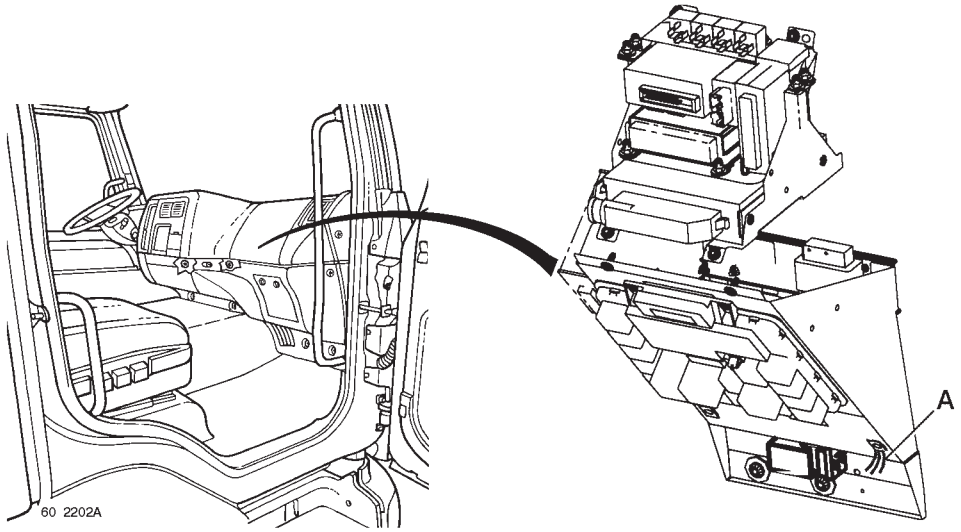

3 6 1 4 2 5 7
ON
⑨
⑧
10
60 2223A

Available power supplies in the cab under the connection unit

Three wires (**A**) on stand-by, equipped with 6.35 spade terminals deliver cab available power supplies:
- wire 208: after master switch “+” power supply
- wire 632: lighting, side lights “+” power supply
- wire 275: after ignition “+” power supply.

To make the earth, connect up to an earthing point on the inside of the cab (see chapter C-3.1).

IMPORTANT
Wires N° 208 and 632, each supplied through one single fuse, deliver the available power supplies in parallel into the cab and to the front end. Consequently, the amperage crossing the supply fuse is equal to the sum of the amperages delivered by the two ends of each line. This amperage should not exceed 15 Amps.



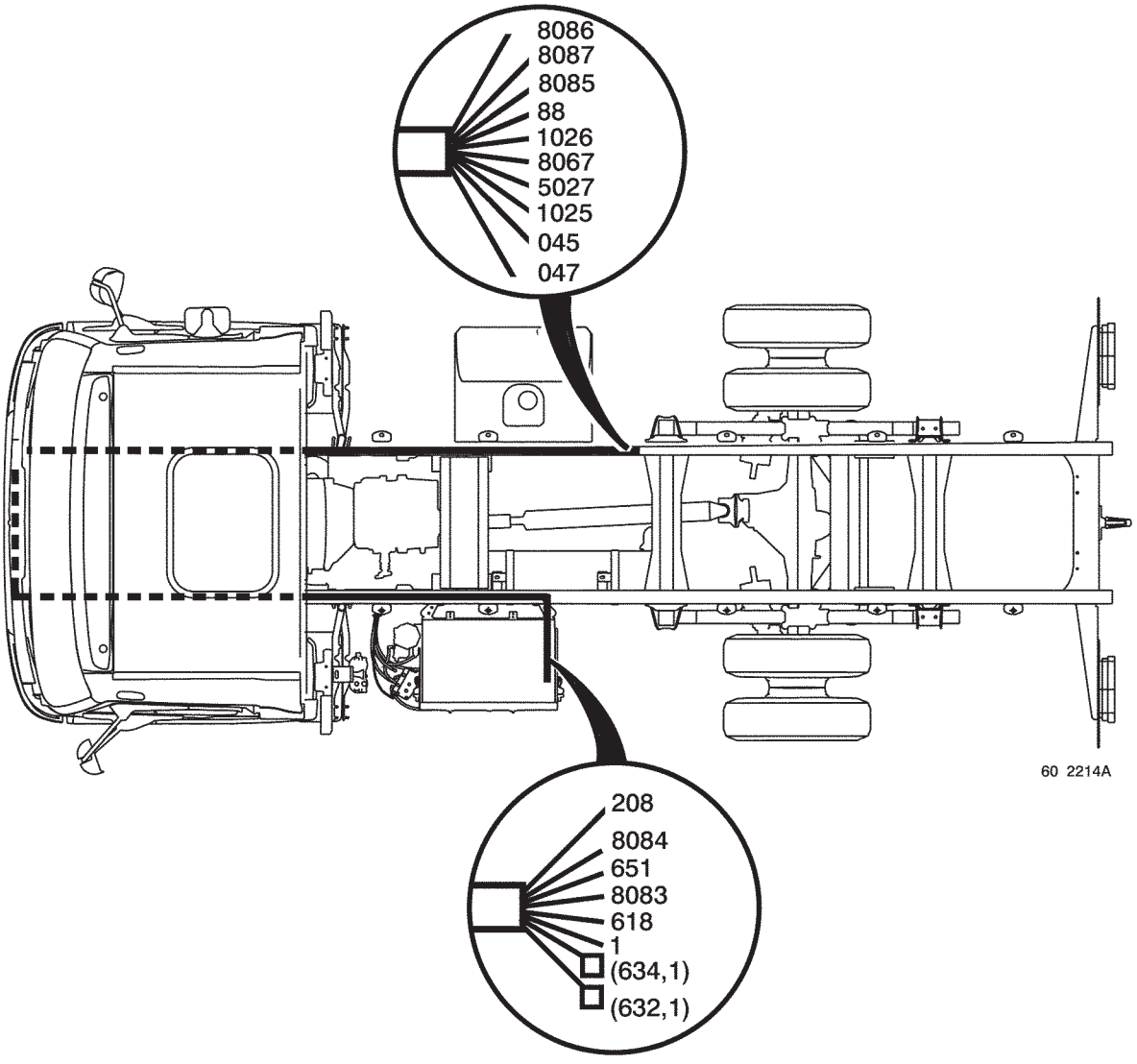
In the battery compartment

- power supplies available at the ends of the wiring harness on stand-by in the battery compartment:
  Two 2-way connectors: lateral lights power supply (earth: wire N° 1, “+” lighting: wire N° 632 on RH side and 634 on LH side).
  wire N° 208: after master switch “+” power supply
  wire N° 618: chassis lighting (10A) “+” power supply, controlled by chassis lighting switch
  wire N° 8083: equipment “+” power supply, controlled by machine unlocking switch
  wire N° 651 & 8084: display of pictograms (see preceding pages).

- high power “+” power supply available before master switch on 200 Amp fuse-holder for vehicles equipped with a “Tail lift” trade pack only.
  Spotface and stainless steel threaded hardware available in rear overhang for fastening the earth.

In the RH sidemember

Wire N° 8085: display of pictogram (**7**),
Wire N° 8086: display of pictogram (**5**),
Wire N° 8087: display of pictogram (**6**),
Wire N° 1025, 045, 047: chassis-mounted variable speed control,
Wire N° 88, 1026: PTO speed control,
Wire N° 5027: 30 km/h speed limitation control,
Wire N° 8067: fast idling speed control.

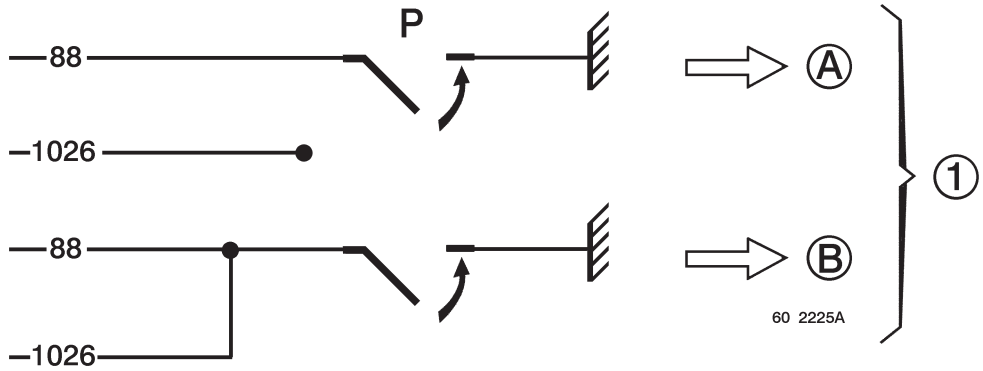


5.3 Management of engine speed

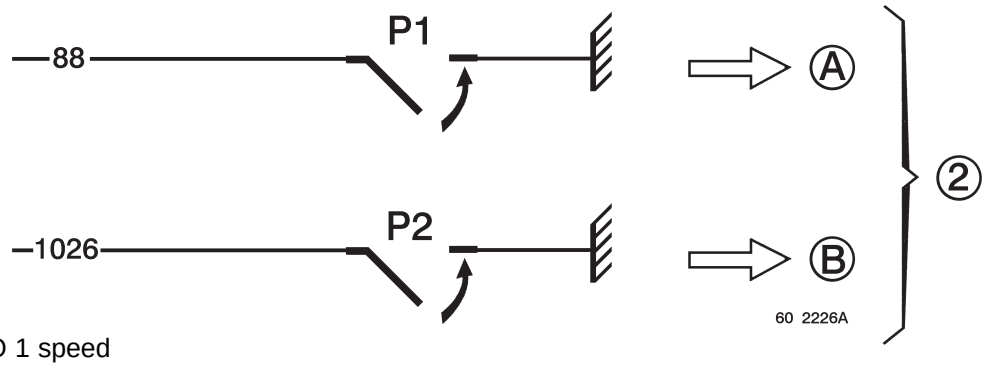
There are 3 ways of accessing the fast idling mode:
- by the steering wheel control,
- by earthing wire 8067 in the RH sidemember,
- by the variable speed control in the RH sidemember.

5.3.1 Choice of engine speed by default

When the vehicle is equipped with a power take-off, the procedure for engaging it is unchanged (see Driving handbook).
It is possible to choose between two pre-programmed speeds according to the vehicle use (see following table).
If wires 88 and 1026 are not connected, PTO speed 1 is activated.
If wires 88 and 1026 are connected, PTO speed 2 is activated.



If a second PTO is mounted, its engagement must connect wire 1026 to earth to access the corresponding idling speed (PTO 2).



A - PTO 1 speed
B - PTO 2 speed
P - PTO
P1 - PTO 1
P2 - PTO 2

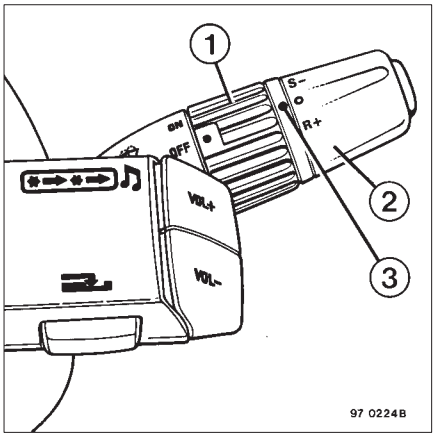
	PTO 1 rated speed (rpm)	PTO 2 rated speed (rpm)	PTO 1/PTO 2 speed limitation	PTO 1/PTO 2 speed limitation
Tanker	1100	950	1400	100%
Tipper				
Platform tower				
Crane				
Refuse collector			engine max.	
Road sweeper	1100	950	1400	

5.3.2 Use of the steering wheel fast idling control

Move the ring (**1**) to the “ON” position and turn the ring (**2**) to bring “R+” or “S-” opposite the mark (**3**), then release it.
Depress the accelerator pedal to bring the engine to the required engine speed and in this position, turn the ring (**2**) to bring to bring “S-” opposite the mark (**3**) so as to memorize the speed, then release the accelerator pedal.
To fine tune the engine speed:

- Turn ring (**2**) to bring “R+” opposite the mark (**3**) to increase the speed.
- Turn ring (**2**) to bring “S-” opposite the mark (**3**) to reduce the speed.

Any action on the brake pedal or any gearshifting or moving the ring (1) to the “OFF” position overrides the feature.



5.3.3 Vehicle fitted with a power take-off

When the PTO is in operation, the first action on the ring (**2**) (“S-” or “R+”) calls up the works set engine rotating speed (1100 or 950 rpm).

Rotating speed
In the event of hydraulic pump drive, do not exceed the rotating speed indicated by the equipment manufacturer.
The engine speed is limited to 1400 rpm by the works setting.
Depending on the equipment fitted by the equipment manufacturer, this engine speed can be modified by means of the RENAULT V.I. test tool.

IMPORTANT
Avoid actuating the accelerator pedal during the use of the fast idling feature.

5.3.4 Use of the chassis-mounted fast idling control

Earthing of wire 8067 permits access to the fast idling speed from the chassis.

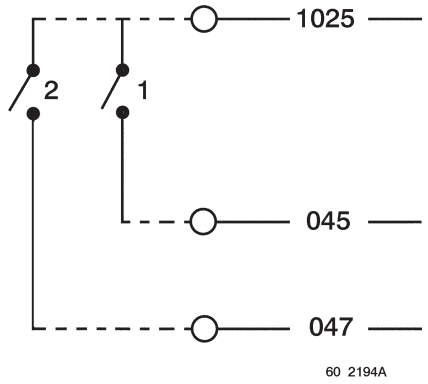
5.3.5 Use of the chassis-mounted fast idling variable speed control

Variable chassis-mounted speed control (example of connection)

- Install a monostable switch (1) between wires 1025 and 045.
- Install a monostable switch (2) between wires 1025 and 047.

When switch (**1**) is closed, the engine speed increases.

When switch (**2**) is closed, the engine speed decreases.



It is possible to install a 3-position monostable switch to avoid the two acceleration and deceleration controls at the same time.

Upon the first pulse on one of the two controls, the engine passes to the pre-programmed speed, then the engine speed is adjusted by means of the controls.

IMPORTANT

All the chassis-mounted controls are doubled up on the steering wheel controls.

5.4 Speed limitation

Earthing of wire 5027 limits the vehicle speed to 30 km/h. The parameter for this value can be defined in the dealership for special needs.
This function is accessible if the vehicle is travelling at a speed below 25 km/h. It is de-activated when the road speed is below 5 km/h.

IMPORTANT
Access to the regulated speeds (see chapters 5.3.2 to 5.3.5) is subject to the following conditions:
- engine running,
- PTO engaged,
- road speed below 15 k/h,
- parking brake applied,
- gear selector in neutral.
Any action or modification to the above-mentioned conditions will lead to exit from the regulated mode.

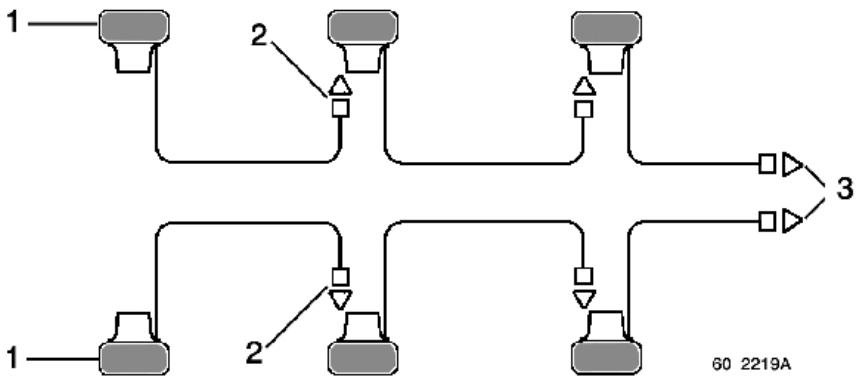
5.5 Assembly of lateral signalling installation kit

This optional kit is supplied in the cab, not assembled upon delivery of the new vehicle.
It serves for installing the lateral signalling feature of the equipment without having to convert the vehicle's electrical system.
Comply with the regulations in force for positioning the lateral lamps. The wiring harnesses for the lateral lamps must be fastened and protected against heat radiation (electric retarder and exhaust in particular).

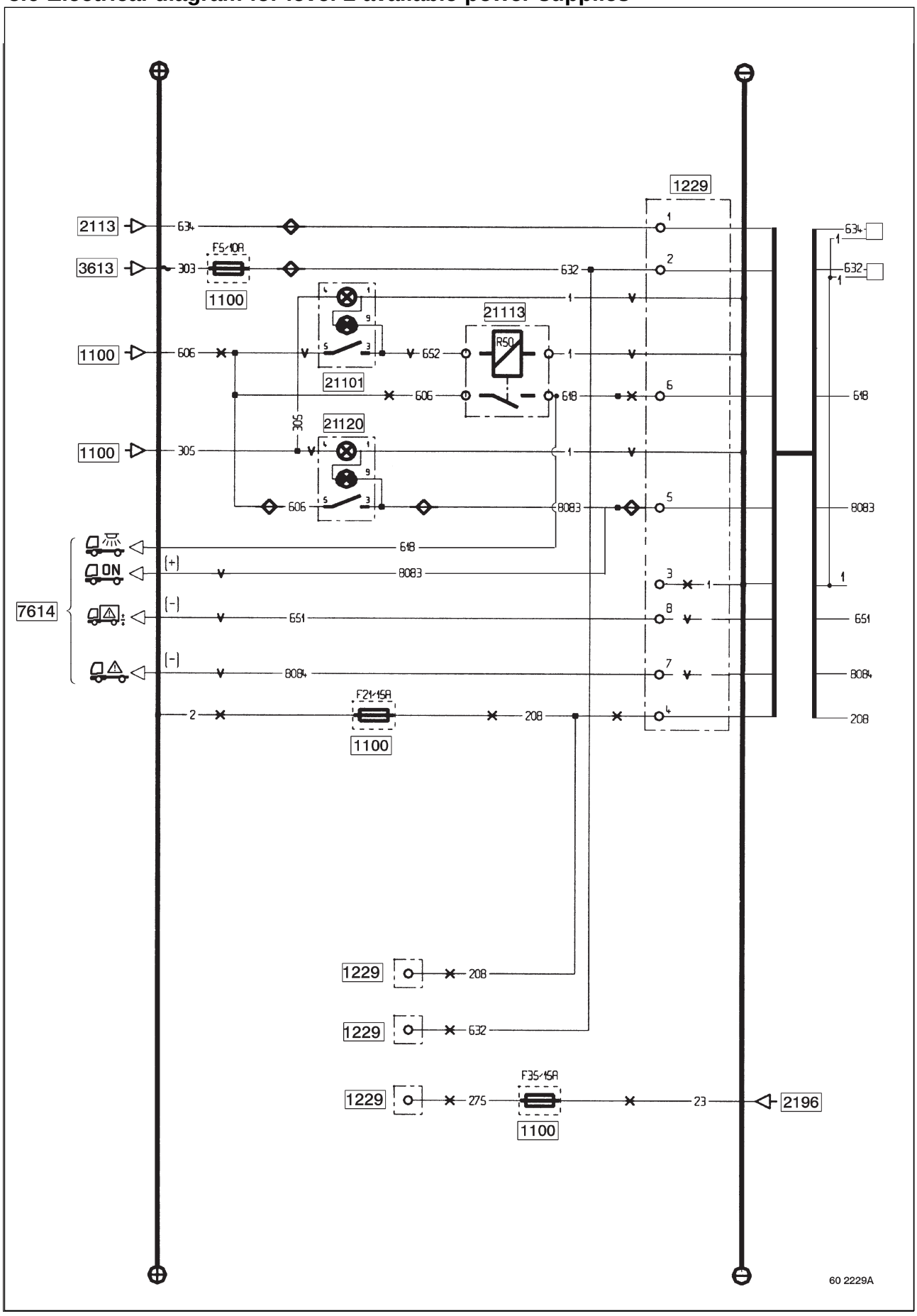
Make-up
6 to 8 lateral signalling lamps, comprising:
- one wiring harness 5 metres long complete with male connector,
- one female connector for interconnecting the lamps.

On-vehicle hook-up
The lamps are connected in series to one another, the first in the chain being connected to the vehicle.
The connection point on-vehicle is:
- 2-way connectors JPT of the available power supplies wiring harness in the battery compartment if the vehicle is thus equipped,
- rear lamps for vehicles equipped with rear lighting bar (by tapping),
- registration plate lamp on vehicles equipped with rear run-under guard (by by-pass).

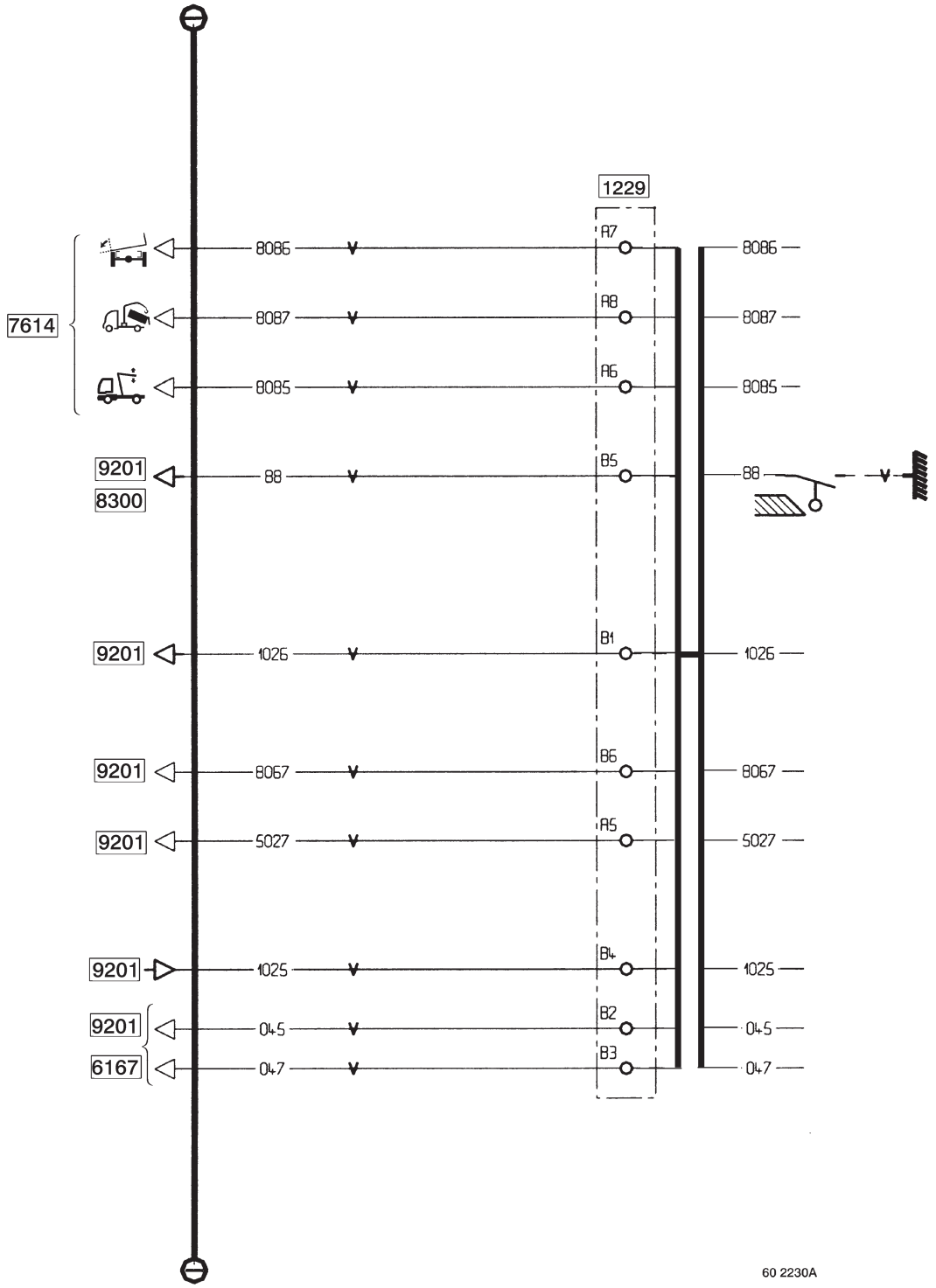
1 - lateral signalling lamps
2 - connector to be plugged into the connector of the next lamp
3 - connector to be plugged into the vehicle (battery compartment, rear lamps or registration plate lamp).



5.6 Electrical diagram for level 2 available power supplies

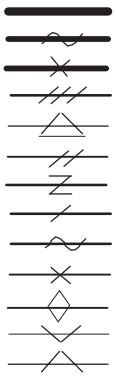


Electrical diagram for level 2 available power supplies



Key
1100 - Fuses
1229 - Chassis-cab connection unit
1335 - Bodybuilder available power supplies connector
2113 - Trailer socket, 7-pin type 24 N
2196 - After ignition “+” power supply (**R1**)
3613 - RH front side/parking lamp
7614 - Principal display
8300 - Power take-off
9201 - Vehicle electronic control unit (VECU)
21101 - Bodybuilder equipment control
21113 - Bodybuilder equipment available power supply relay (**R50**)
21120 - Bodybuilder equipment control N° 2

Cable cross-section and colour



75 mm^2
60 mm^2
50 mm^2
25 mm^2
16 mm^2
10 mm^2 – Ivory
7 mm^2 – Pink
5 mm^2 – Ivory
3 mm^2 – Pink
2 mm^2 – Grey
1 mm^2 – Green
0,6 mm^2 – Grey
0,35 mm^2 – Orange

Assignment of fuses concerning electrical pre-arrangements

Fuse	Amperage	Wire N°	Function
F4	10	634	LH lateral lights power supply
F5	10	632	RH lateral lights power supply
F21	15	208	After master switch “+” power supply
F43	10	618	Power lighting power supply
		8083	Equipment power supply - Machine unlocking power supply
F35	105	275	After ignition “+” power supply

Do not exceed the max. currents of the switches; if you do, relay the power supply.

5.7 Bodywork fastening kit (located in cab and supplied with this pre-arrangement)

20 setbolts HM 14x150x60, class 10.9
2 setbolts HM 14x150x69, class 10.9
2 setbolts HM 14x150x110, class 10.9
48 plain washers 14x30x5
12 cone washers “Belleville” type
24 flanged locknuts DRH M14 class 10

TAIL LIFT INSTALLATION PRE-ARRANGEMENT
COMMERCIAL VARIANT 20295

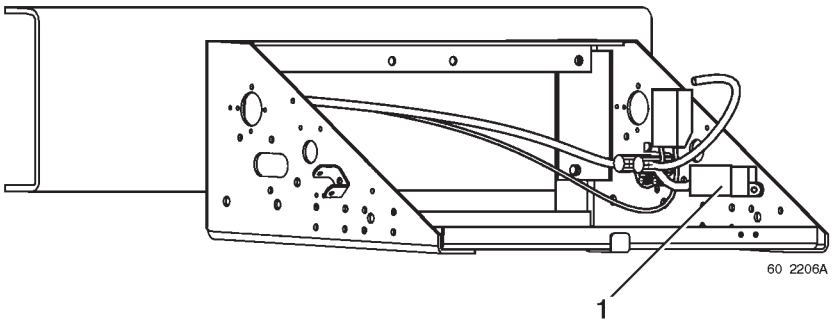
Available as option on all vehicles

6. VEHICLE EQUIPPED WITH A TAIL LIFT

“Tail lift” installation pre-arrangement
- level 1 bodybuilder electrical pre-arrangement for installation of a tail lift (see chapter B-4),
- reinforced rear suspension,
- without rear run-under guard (option for column type tail lifts),
- 80 Amp alternator,
- 170 Amp-hour batteries,
- 200 Amp fuse-holder located in battery compartment,
- tail lift earth available in the rear overhang,
- earth screw in rear overhang.

Options
- level 2 bodybuilder electrical pre-arrangement (see chapter B-5).

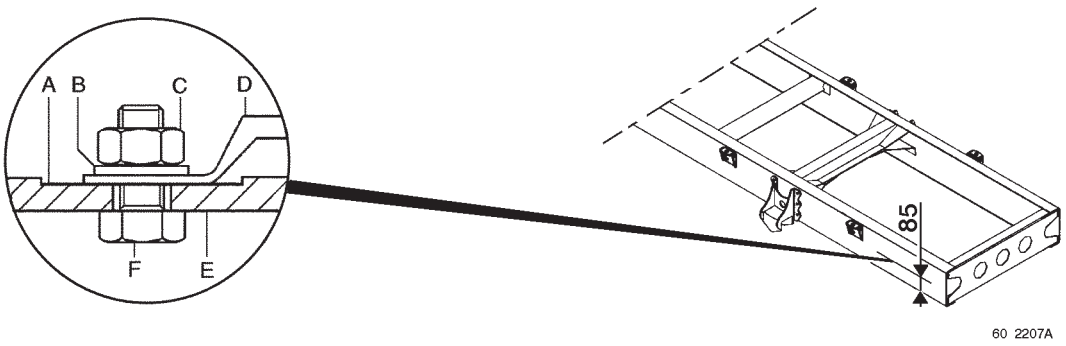
6.1 Fuse-holder 200 A



A high-power fuse-holder (**1**) is on stand-by in the battery compartment for supplying power to the tail lift.

6.2 Tail lift earth in rear overhang

A - Spotface diameter 30 mm
B - Plain washer diameter 10 mm, stainless steel
C - Nut H 10x150, stainless steel
D - Earth lug or braid
E - Sidemember
F - Bolt M10x150, stainless steel



“TANKER” VEHICLE

7. TANKER VEHICLE

- 16 tonnes GVW available in three wheelbases 3350, 3650, 3950 on MIDLUM C base,
- 15.7 tonnes GVW (single tyre fitment at rear) available in three wheelbases 3350, 3650, 3950 on MIDLUM C base,
- 18 tonnes GVW available in four wheelbases 3650, 3950, 4250, 4450 on MIDLUM D base.

Day cab only.

Tanker special features

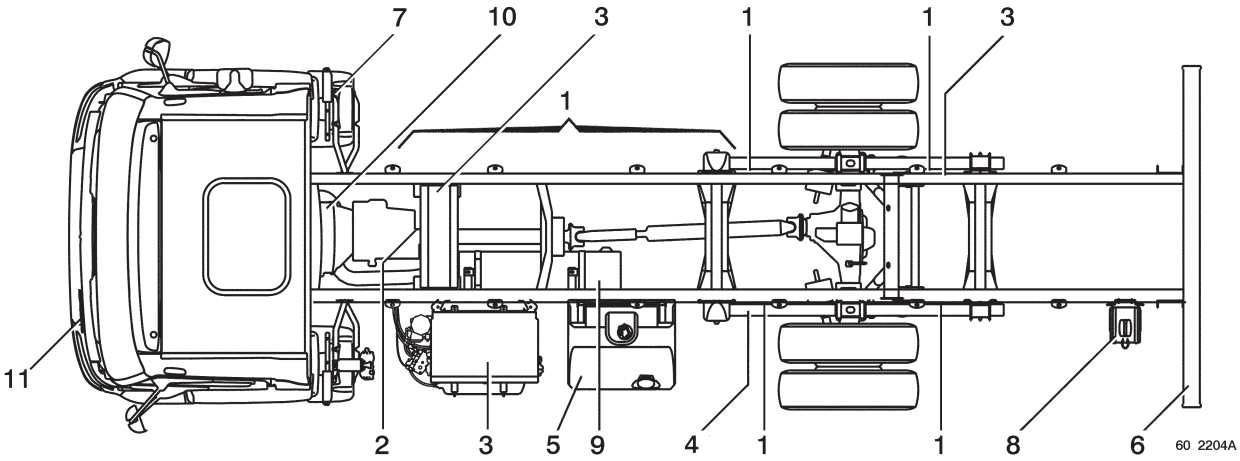
- RH sidemember (**1**) cleared, without lateral accessories for the installation of specific accessories,
- punchings on chassis for fastening accessories and wing brackets (**1**),
- gearbox-mounted PTO (**2**) type 2264 B with flange output, speed 950 or 100 rpm,
- adjustable fast idling,
- remote controlled clutch release operating ram,
- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- reinforced front and rear parabolic leaf spring suspensions (**4**),
- tachograph,
- tanker lateral signalling installation kit,
- fuel tank on left side (**5**).

ADR equipment

- rear run-under guard for tanker overall width 2350 mm, (**6**)
- chassis-mounted “palm switch” stop control (**7**),
- 2 kg fire extinguisher in cab,
- portable orange wander lamps in cab,
- wheel chock (**8**),
- exhaust silencer shield (**9**),
- behind-cab shield (**10**),
- ABS,
- pre-arrangement for fixing ADR plate (**11**),
- battery isolation switch with pneumatic control.

Options

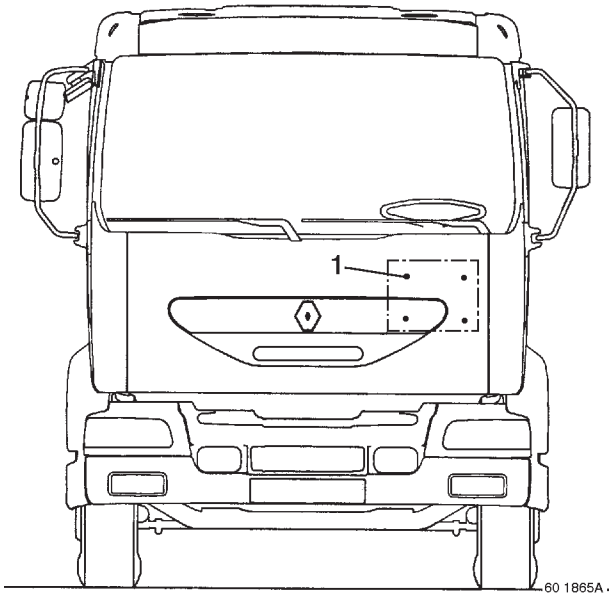
- spare wheel,
- gearbox-mounted PTO with splined shaft output,
- without “ADR” (“transport of dangerous materials”) equipment,
- towing crossmember capacity > 3.5 tonnes,
- engine hourmeter in cab.



7.1 ADR plate

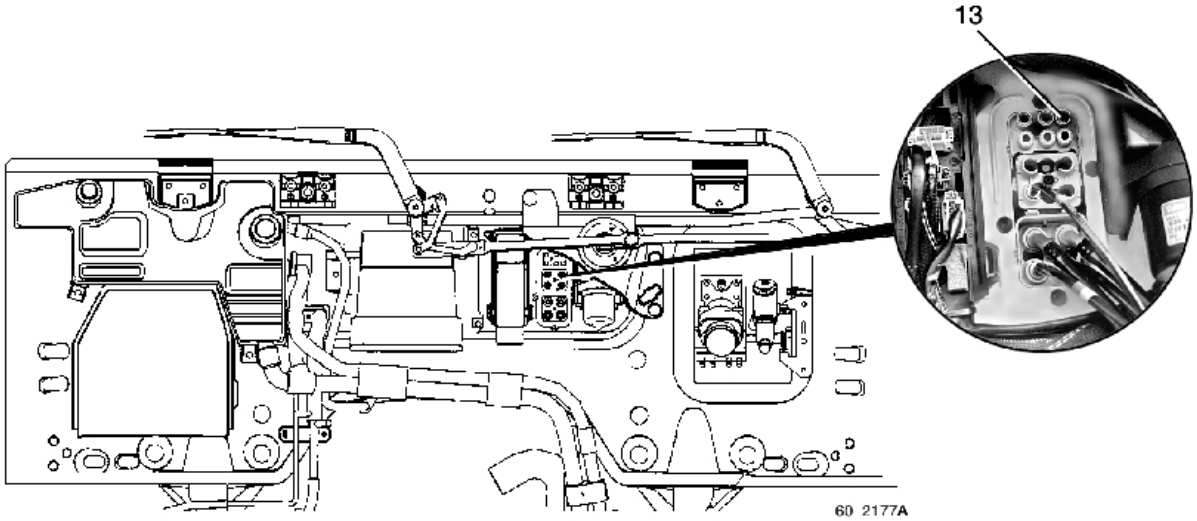
Punchings (**1**) made on the inner face of the front grille mark the position of the drilling points for fixing the ADR plate.

The plate bracket must be provided with a retaining system to keep the plate in its housing when the front grille is opened.



7.2 Remote controlled clutch release operating ram

A remote controlled single-acting clutch release operating ram is installed as option on the clutch pedal. It is pre-wired on the front end through port (**13**). Connect the compressed air supply to this port to actuate the ram.

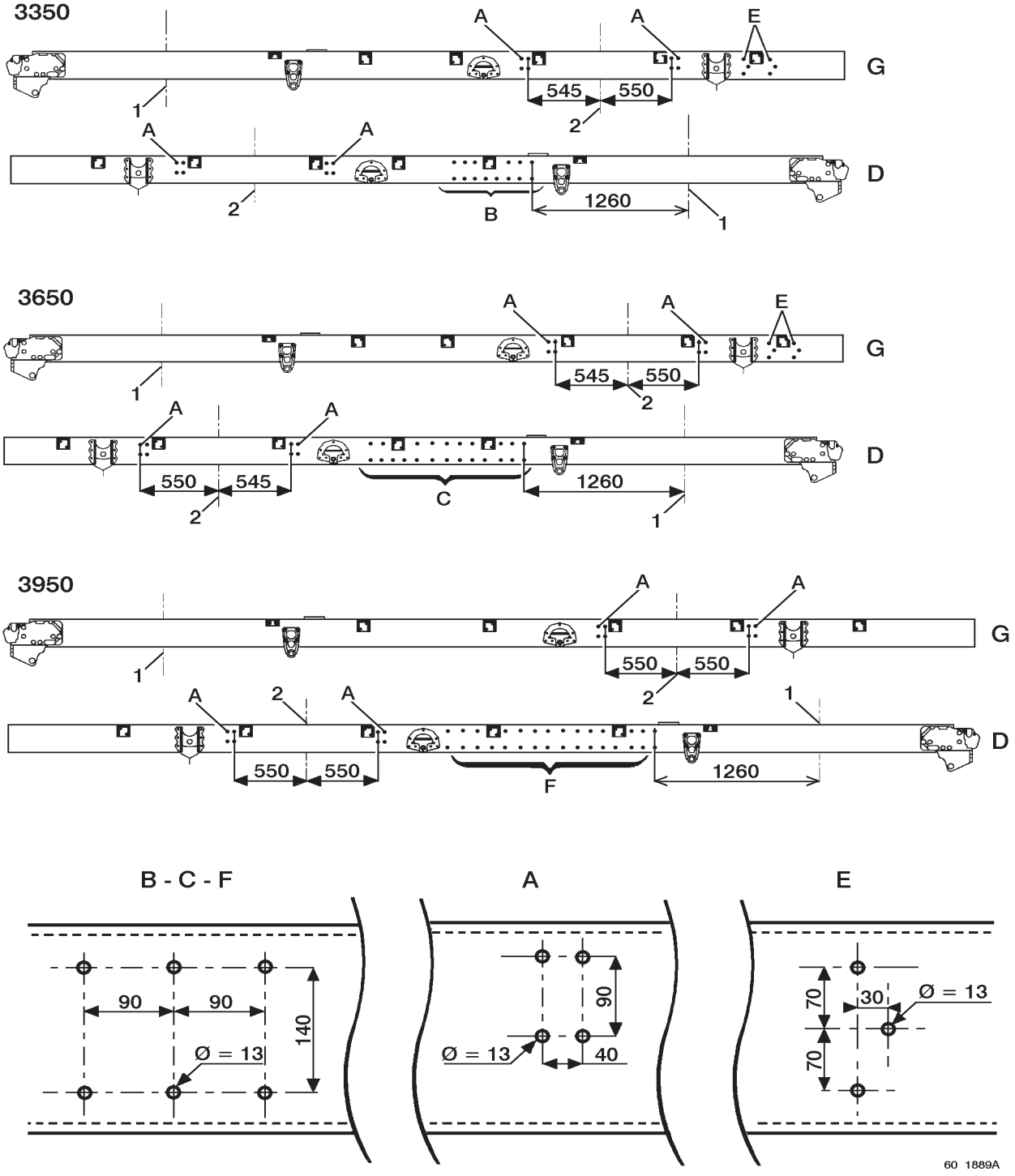


7.3 Assembly of chassis accessories

Drillings in the sidemembers serve for attaching equipment such as:
- wing brackets (stakes),
- fuel tank in the wheelbase or rear overhang, LH side,
- various equipment items (e.g. off-loading pump) in the wheelbase, RH side.

Punchings in the rear overhang serving for adjusting the position of the rear run-under guard are identical to those of the MIDLUM C having the same wheelbase (consult the “Changing the position of equipment” chapter).

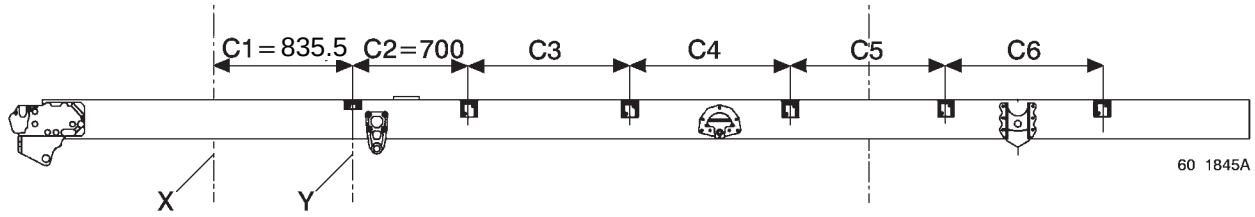
Key to diagram
1 - front axle centre-line
2 - rear drive axle centre-line
A - drillings for assembly of wing brackets
B - drillings for assembly of equipment: 23 drillings distributed over a length of 990 mm
C - drillings for assembly of equipment: 27 drillings distributed over a length of 1260 mm
D - RH sidemember
B - drillings for assembly of fuel tank in rear overhang
B - drillings for assembly of equipment: 34 drillings distributed over a length of 1620 mm
G - LH sidemember



7.4 Longitudinal positioning of brackets on chassis

7.4.1 MIDLUM C tanker

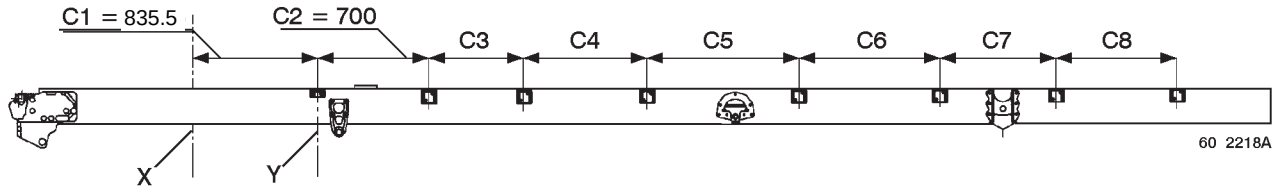
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



E	C3	C4	C5	C6
3350	700	640	940	740
3650		940		
3950	970	970		970

7.4.2 MIDLUM D 18 tonnes tanker

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

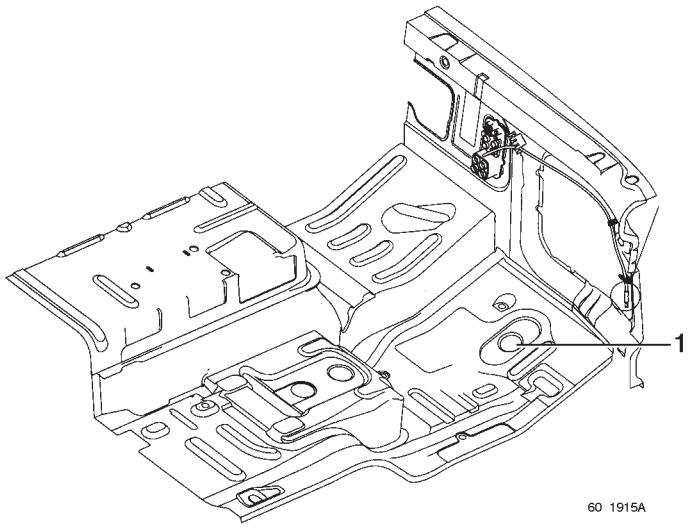


Vehicle	E	C3	C4	C5	C6	C7	C8
Mechanical suspension	3650	700	940	940			
	3950	970					
	4250	700	630	910	940	727	
	4550		925	915		860	
Air suspension	3650	970	1165	875			
	3950	790	660	735	875		
	4250		960			547	
	4550	700	673	677	735	875	680

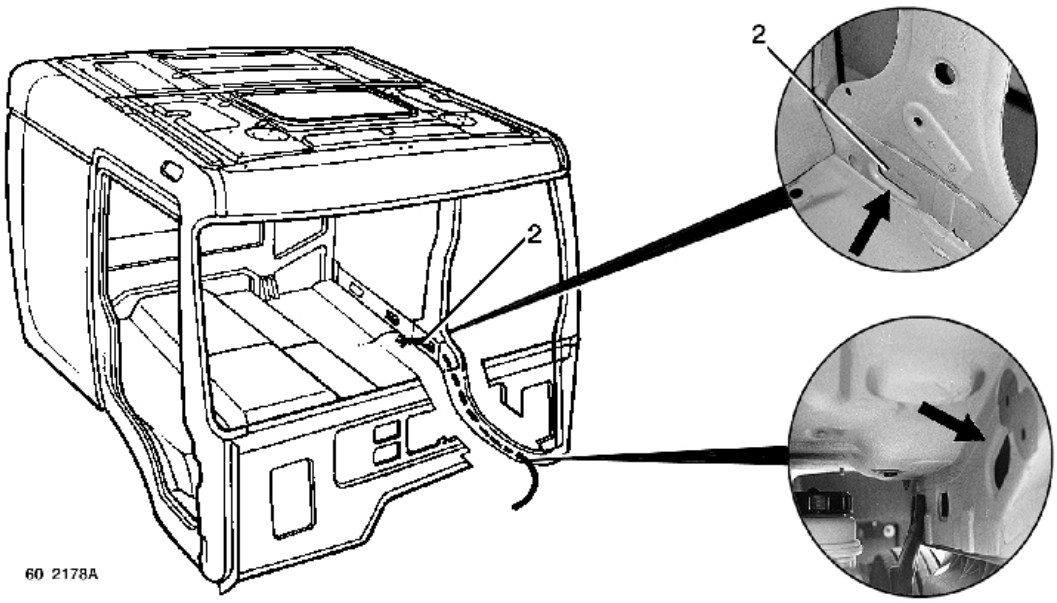
7.5 Passage of wiring harnesses and compressed air pipes through cab

Three passages are possible for routing the wiring harnesses from the inside to the outside of the cab:

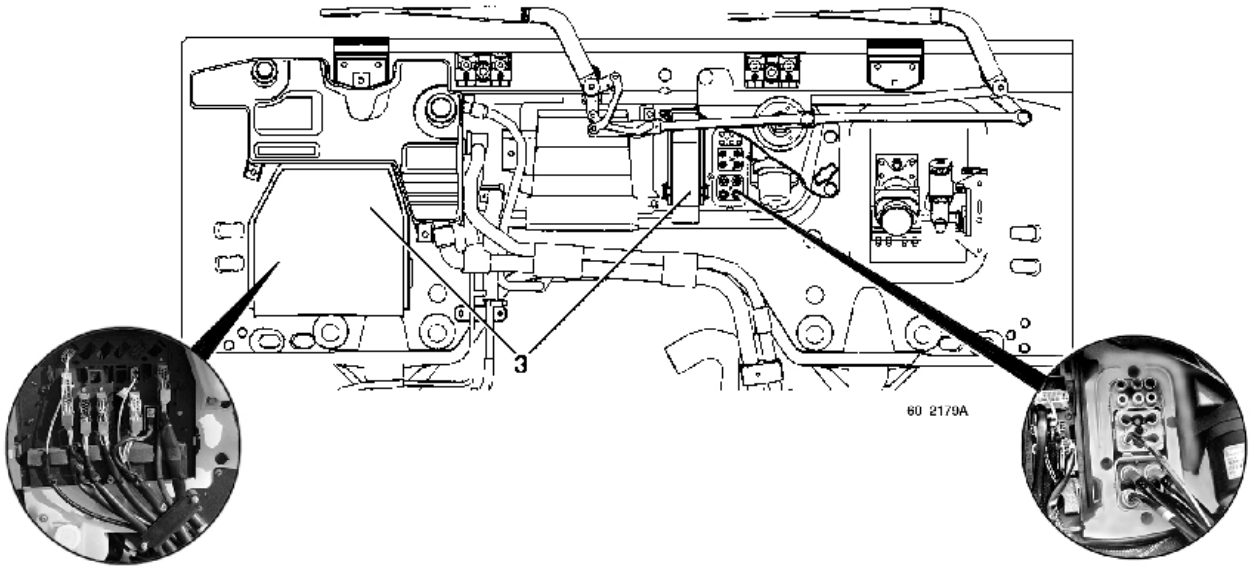
1 - Hole with maximum diameter 45 mm to be drilled in the circular impression on the passenger side floor. Watch out for the screen wash reservoir located under the floor near this impression.



2 - Passage through the RH or LH side rail of the cab. Cut the interior lining.



3 - Passage of wiring harnesses through unused locations in front end connecting zones.



“REFUSE COLLECTOR” VEHICLE

8. “REFUSE COLLECTOR” VEHICLE

- 16 tonnes GVW twin tyre fitment at rear available in three wheelbases 3070, 3350, 3650 on MIDLUM C base,
- 15.7 tonnes GVW (single tyre fitment at rear) available in three wheelbases 3070, 3350, 3650 on MIDLUM C base,

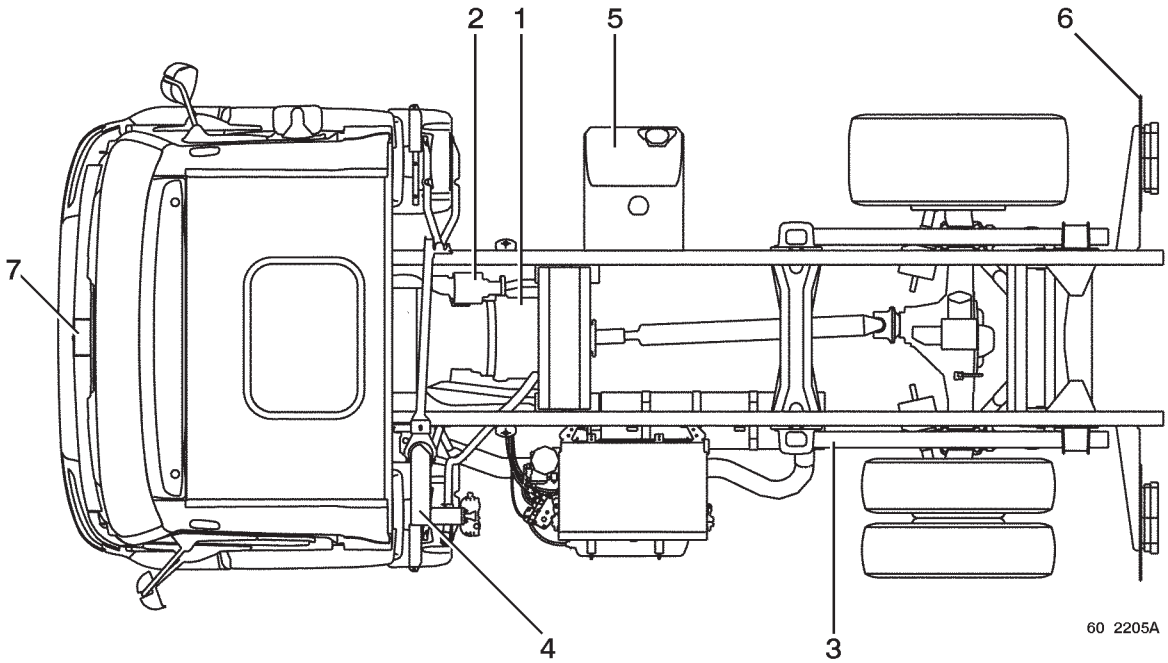
Day cab only.

Refuse collector vehicle special features

- refuse collector bodybuilder electrical pre-arrangement,
- automatic transmission (**1**),
- gearbox-mounted continuous high-power PTO with regulated fast idling control, (2 programmed engine speeds available, plus chassis-mounted variable speed control),
- reinforced front parabolic leaf spring suspension,
- reinforced dissymmetrical rear suspension (**3**),
- vertical exhaust (**4**),
- 80 litre fuel tank (**5**),
- without rear run-under guard (**6**),
- RH door with peep window,
- reversing buzzer,
- ripper presence 30 km/h speed limiter,
- without spare wheel,
- mileometer without tachograph,
- frontview mirror (**7**),
- passenger bench seat,
- adapted grab handles,
- central passenger holding bar.

Options

- roof level engine air intake,
- single rear tyre fitment,
- fixed passenger seat,
- engine hourmeter in cab.

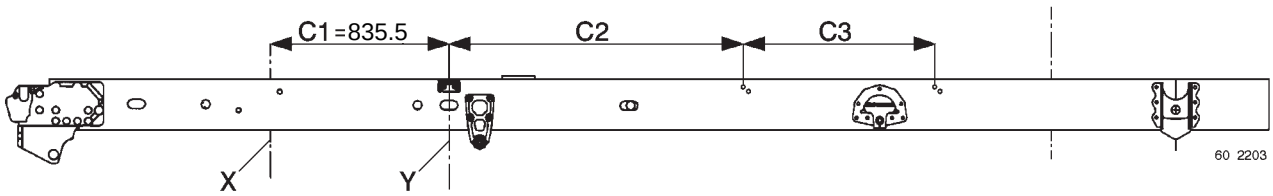


8.1 Longitudinal positioning of brackets on chassis

The first bracket is installed on the vehicle - the other brackets are not supplied. The dimensions indicate the position of the drilling only.

8.1.1 MIDLUM C refuse collector

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

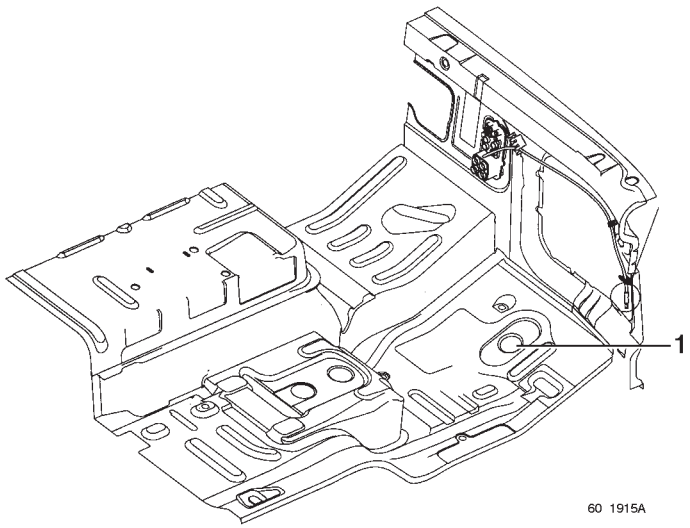


E	C2	C3
3070	1739.5	
3350	1367.5	650
3650		950

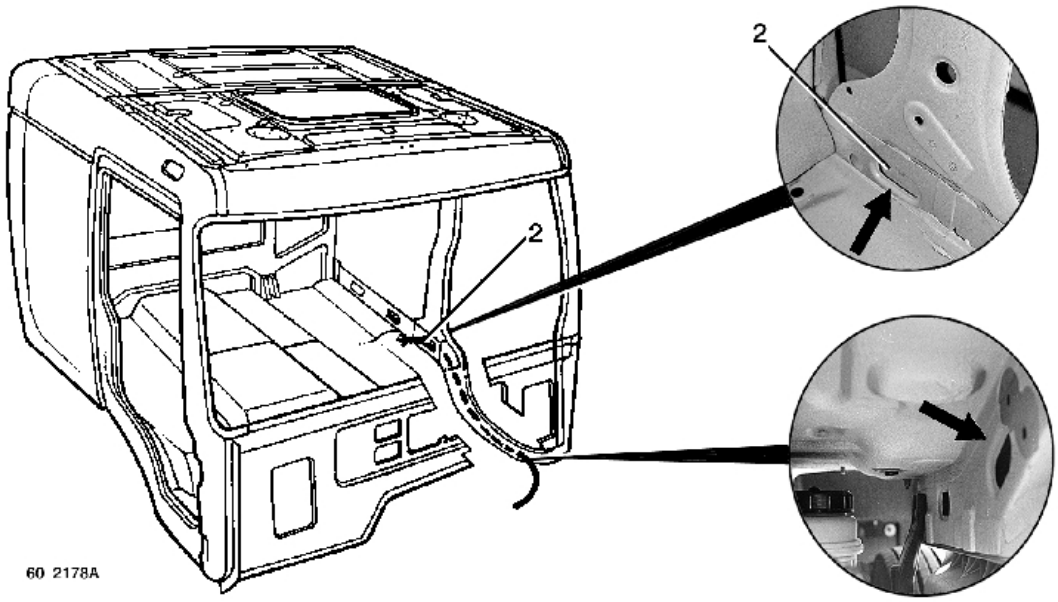
8.2 Passage of wiring harnesses and compressed air pipes through cab

Three passages are possible for routing the wiring harnesses from the inside to the outside of the cab:

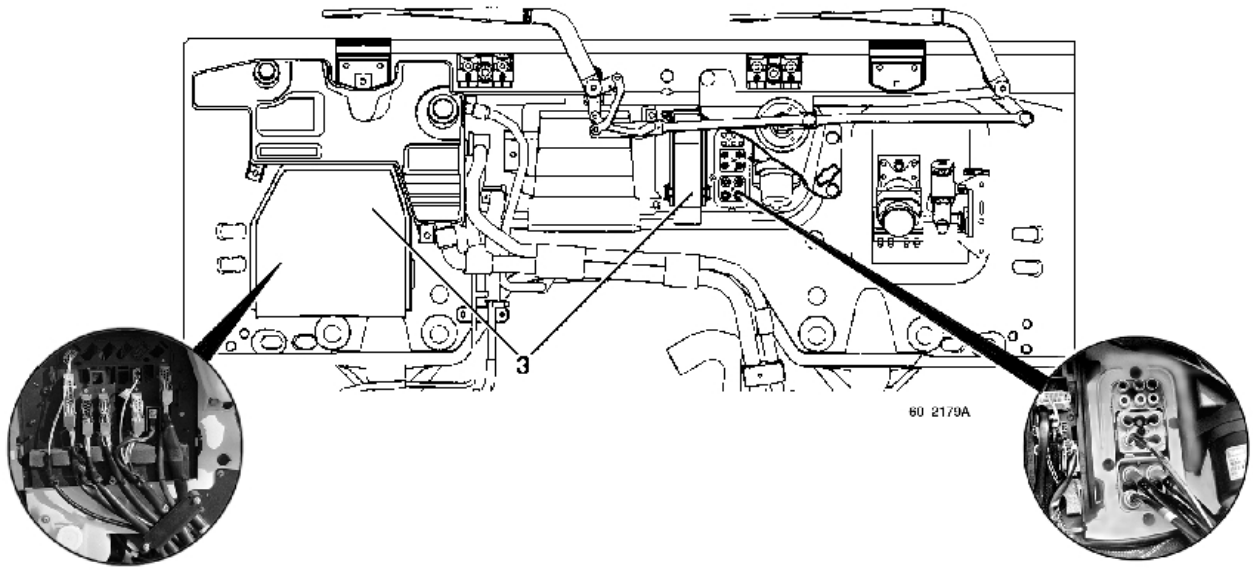
1 - Hole with maximum diameter 45 mm to be drilled in the circular impression on the passenger side floor. Watch out for the screen wash reservoir located under the floor near this impression.



2 - Passage through the RH or LH side rail of the cab. Cut the interior lining.



3 - Passage of wiring harnesses through unused locations in front end connecting zones.



8.3 Electrical pre-arrangements for refuse collectors

Available power supplies in cab under the connection unit

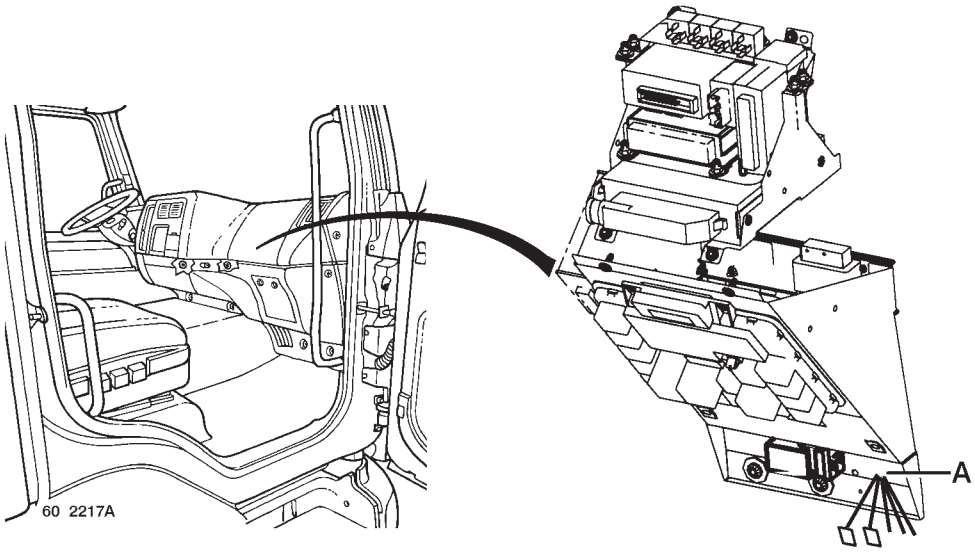
4-way yellow connector FCI (**A**):
- terminal 1: ALLISON automatic transmission PTO engagement (wire N° 818)
- terminal 2: 30 km/h speed limitation (wire N° 5027)
- terminal 3: compacting demand (wire N° 8067)
- terminal 4: reversing forbidden (wire N° 5026).

8-way red connector FCI (**A**):
- terminal 1: PTO 1 fast idling (wire N° 88)
- terminal 2: revolving beacons information (wire N° 323)
- terminal 3: fast idling variable speed deceleration (wire N° 045)
- terminal 4: fast idling variable speed acceleration (wire N° 047).
- terminal 5: zero speed information (wire N° 1025).
- terminal 6: PTO 2 fast idling (wire N° 1026).
- terminal 7: reversing lights information (wire N° 608).
- terminal 8: chassis alert warning light (wire N° 8084).

Four wires (**A**) on stand-by, equipped with 6.35 spade terminals deliver cab available power supplies:
- wire 208: after master switch “+” power supply
- wire 632: lighting, side lights “+” power supply
- wire 275: after ignition “+” power supply
- wire 202: batteries “+” power supply

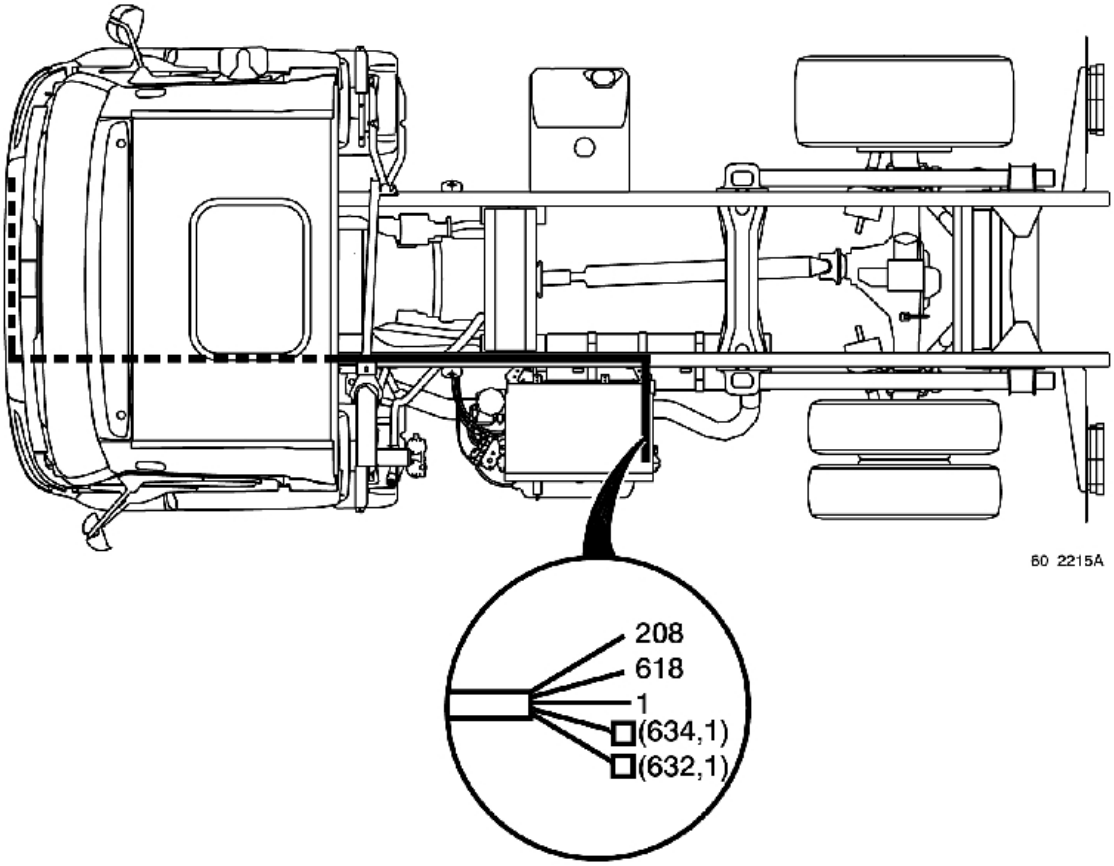
To make the earth, connect up to an earthing point on the inside of the cab (see chapter C-3.1).

IMPORTANT
Wires N° 208 and 632, each supplied through one single fuse, deliver the available power supplies in parallel into the cab and to the front end. Consequently, the amperage crossing the supply fuse is equal to the sum of the amperages delivered by the two ends of each line. This amperage should not exceed 15 Amps.



In the battery compartment

- Power supplies available at the ends of the wiring harness on stand-by in the battery compartment:
  Two 2-way connectors: lateral lights power supply (earth: wire N° 1, “+” lighting: wire N° 632 on RH side and 634 on LH side).
  wire N° 208: after master switch “+” power supply
  wire N° 618: chassis lighting (10A) “+” power supply, controlled by chassis lighting switch



8.4 Assembly of lateral signalling installation kit

This optional kit is supplied in the cab, not assembled upon delivery of the new vehicle.

It serves for installing the lateral signalling feature of the equipment without having to convert the vehicle's electrical system.

Comply with the regulations in force for positioning the lateral lamps. The wiring harnesses for the lateral lamps must be fastened and protected against heat radiation (electric retarder and exhaust in particular).

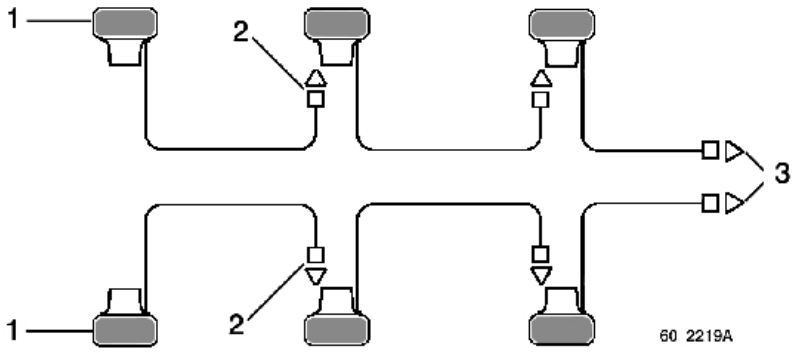
Make-up

6 to 8 lateral signalling lamps, comprising:
- one wiring harness 5 metres long complete with male connector,
- one female connector for interconnecting the lamps.

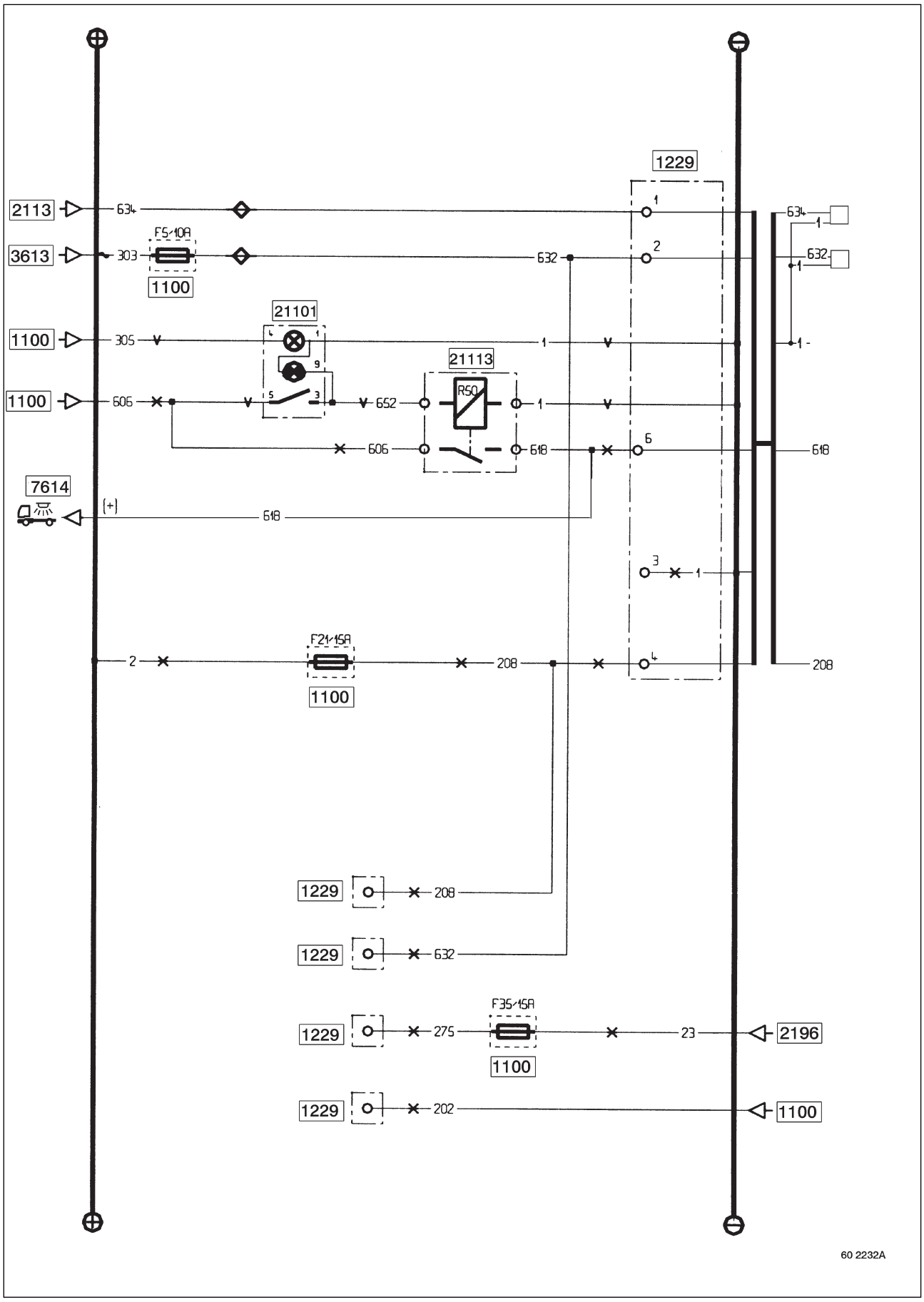
On-vehicle hook-up

The lamps are connected in series to one another, the first in the chain being connected to the vehicle.
The connection point on-vehicle is:
- 2-way connectors JPT of the available power supplies wiring harness in the battery compartment if the vehicle is thus equipped,
- rear lamps for vehicles equipped with rear lighting bar (by tapping),
- registration plate lamp on vehicles equipped with rear run-under guard (by by-pass).

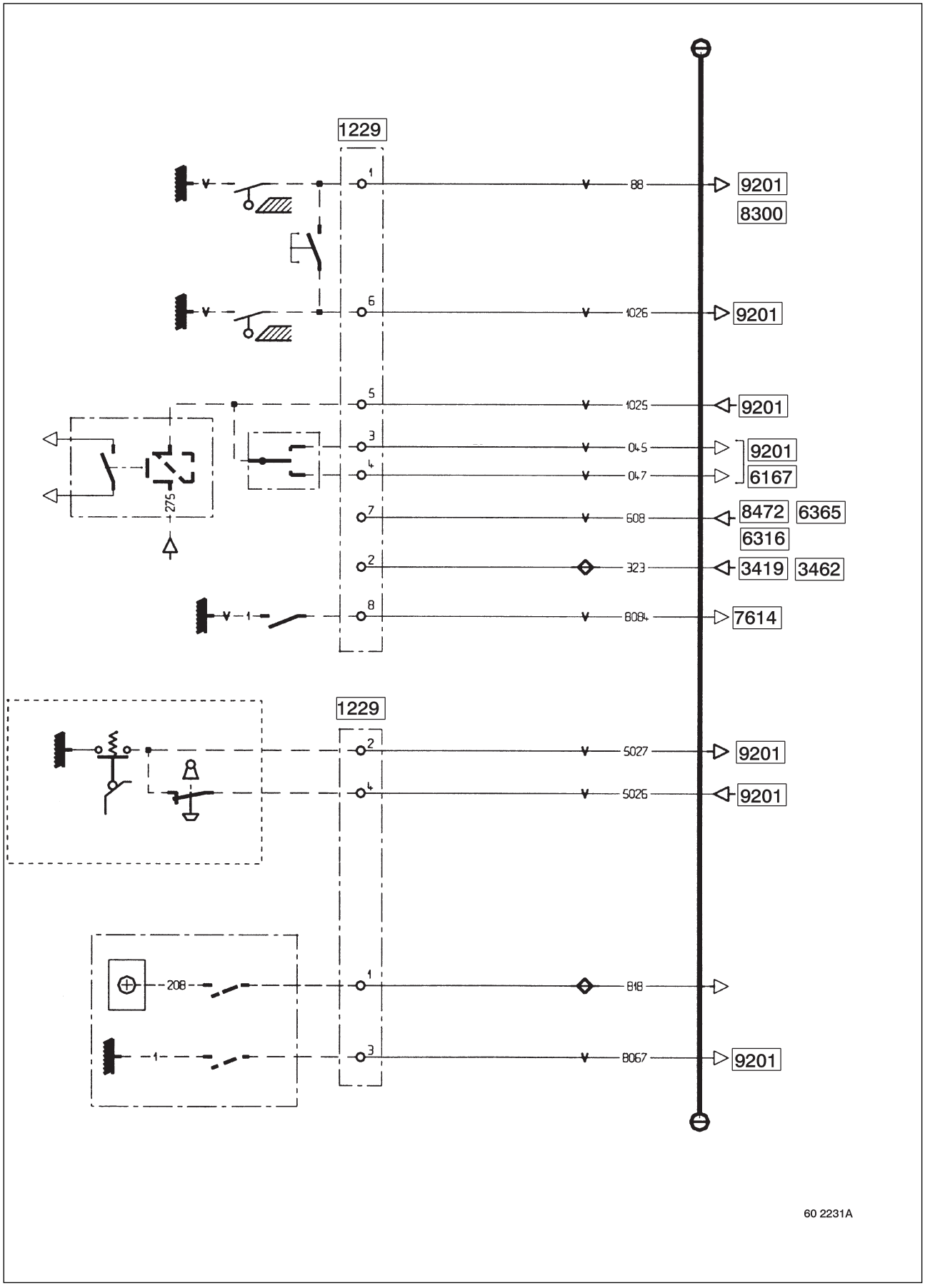
1 - lateral signalling lamps
2 - connector to be plugged into the connector of the next lamp
3 - connector to be plugged into the vehicle (battery compartment, rear lamps or registration plate lamp).



8.5 Electrical diagram for “refuse collector vehicles” optional available power supplies



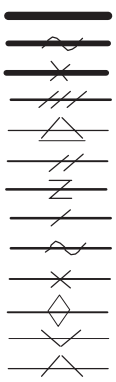
Electrical diagram for “refuse collector vehicles” optional available power supplies



Key

1100 - Fuses
1229 - Chassis-cab connection unit
1335 - Bodybuilder available power supplies connector
2113 - Trailer socket, 7-pin type 24 N
2196 - After ignition “+” power supply (**R1**)
3419 - Revolving beacon(s) relay
3462 - Revolving beacon(s) control
3613 - RH front side/parking lamp
6167 - Steering column fingertip controls (lights, signalling, windscreen wiper, transponder, cruise control)
6316 - reversing lights relay
6365 - reversing buzzer control
7614 - Principal display
8300 - Power take-off
8472 - Reverse gear switch
9201 - Vehicle electronic control unit (VECU)
21101 - Bodybuilder equipment control
21113 - Bodybuilder equipment available power supply relay (**R50**)
21120 - Bodybuilder equipment control N° 2

Cable cross-section and colour



75 mm^2
60 mm^2
50 mm^2
25 mm^2
16 mm^2
10 mm^2 – Ivory
7 mm^2 – Pink
5 mm^2 – Ivory
3 mm^2 – Pink
2 mm^2 – Grey
1 mm^2 – Green
0,6 mm^2 – Grey
0,35 mm^2 – Orange

Assignment of fuses concerning electrical pre-arrangements

Fuse	Amperage	Wire N°	Function
F4	10	634	LH lateral lights power supply
F5	10	632	RH lateral lights power supply
F21	15	208	After master switch “+” power supply
F43	10	618	Power lighting power supply
		8083	Equipment power supply - Machine unlocking power supply
F35	105	275	After ignition “+” power supply

Do not exceed the max. currents of the switches; if you do, relay the power supply.

8.6 Bodywork fastening kit (located in cab and supplied with this pre-arrangement)

20 setbolts HM 14x150x60, class 10.9
2 setbolts HM 14x150x69, class 10.9
2 setbolts HM 14x150x110, class 10.9
48 plain washers 14x30x5
12 cone washers “Belleville” type
24 flanged locknuts DRH M14 class 10

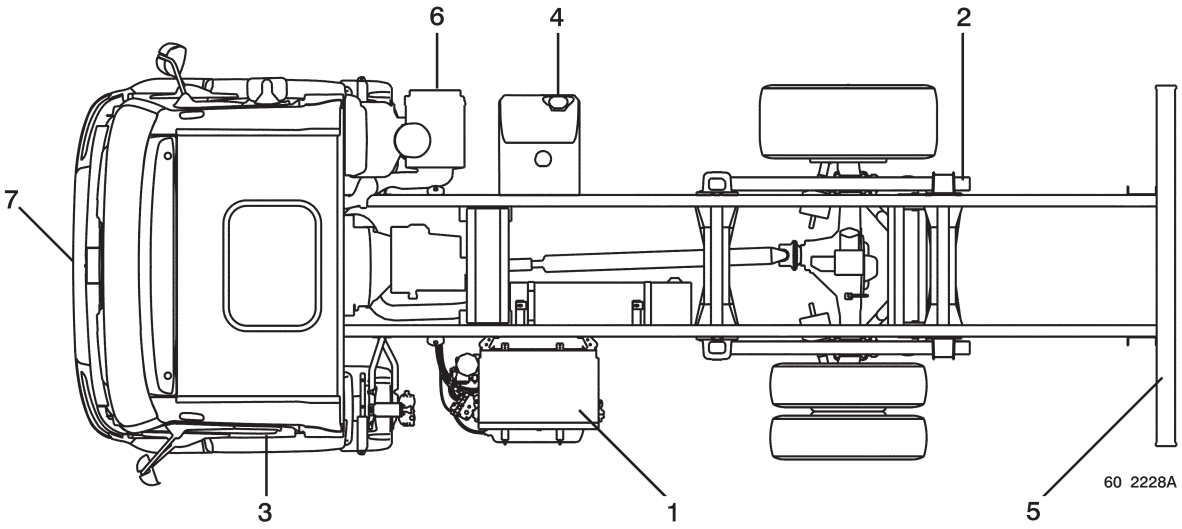
“ROAD SWEEPER” VEHICLE

9. ROAD SWEEPER VEHICLE

- 10 & 12 tonnes GVW available in two wheelbases 3070, 3350 on MIDLUM C' base,
- 15 tonnes GVW available in three wheelbases 3350, 3650, 3950 on MIDLUM C base.
  Single tyre fitment solution non-standard.

Road sweeper special features

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- dissymmetrical rear suspension (**2**),
- right-hand drive,
- LH door with peep window,
- lateral exhaust,
- plastic 80 litre main fuel tank (**4**),
- with run-under guard (**5**),
- mileometer,
- with battery isolation switch,
- reversing buzzer,
- roof level engine air intake (**6**),
- without spare wheel,
- frontview mirror (**7**).

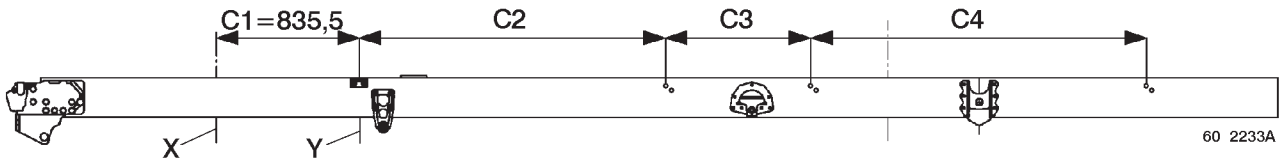


9.1 Longitudinal positioning of brackets on chassis

The first bracket is installed on the vehicle - the other brackets are not supplied. The dimensions indicate the position of the drilling only.

9.1.1 MIDLUM C'/C road sweeper

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

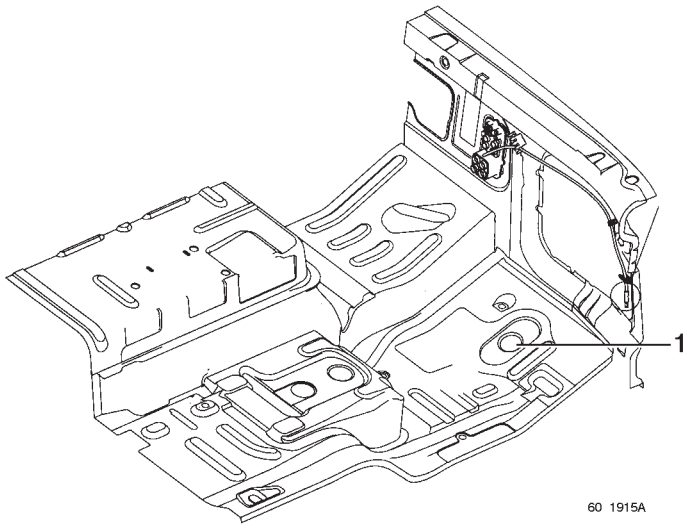


E	C2	C3	C4
3070	1740	1642	
3350	1368	650	1867
3650		950	1912
3950	1638	980	

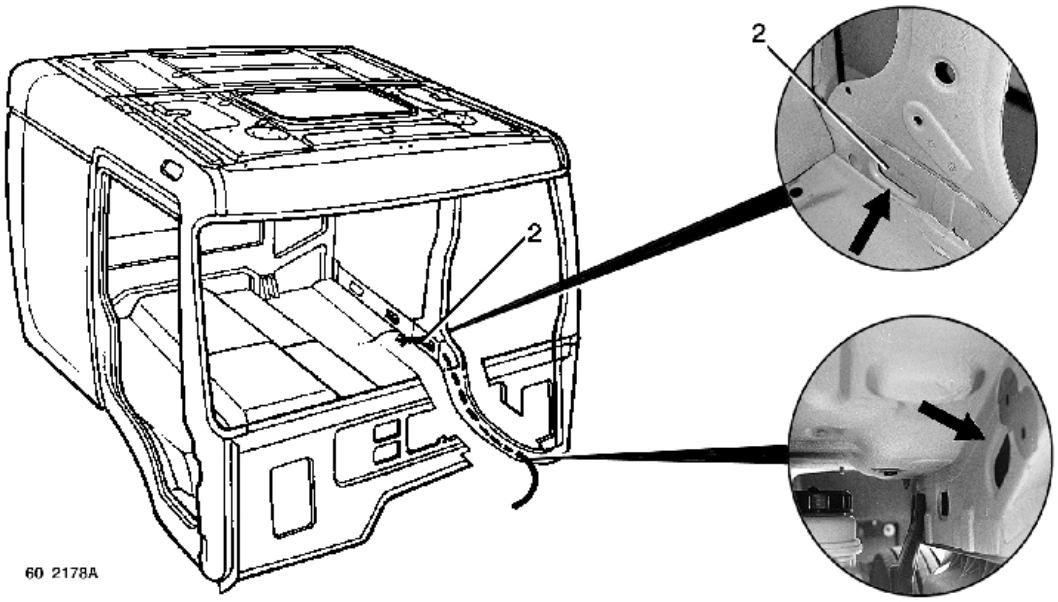
9.2 Passage of wiring harnesses and compressed air pipes through cab

Three passages are possible for routing the wiring harnesses from the inside to the outside of the cab:

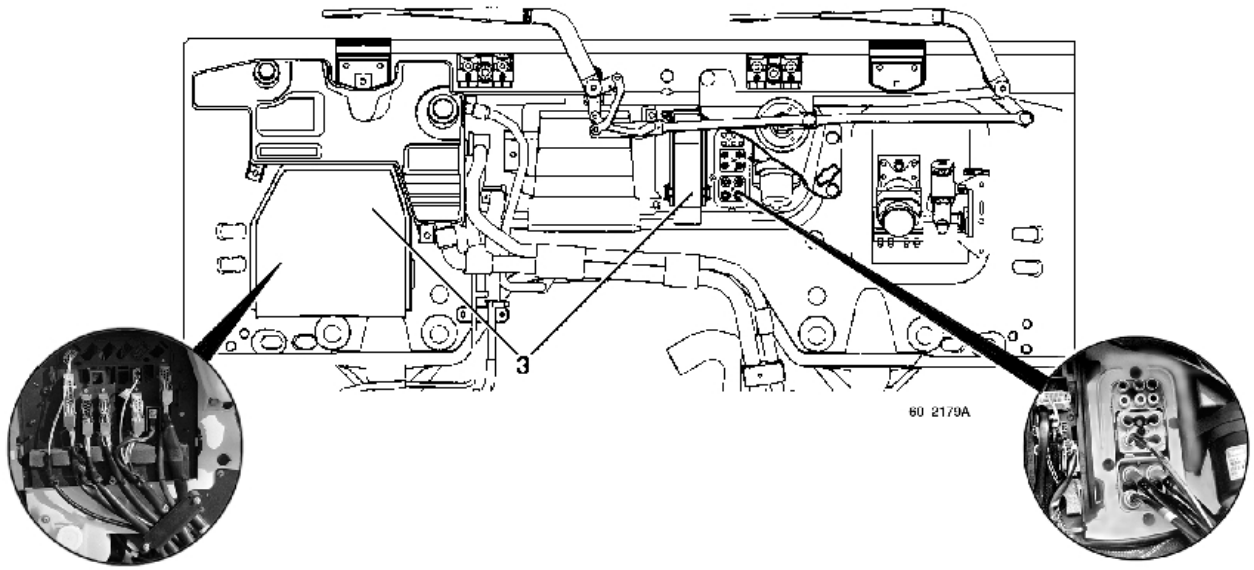
1 - Hole with maximum diameter 45 mm to be drilled in the circular impression on the passenger side floor. Watch out for the screen wash reservoir located under the floor near this impression.



2 - Passage through the RH or LH side rail of the cab. Cut the interior lining.



3 - Passage of wiring harnesses through unused locations in front end connecting zones.



“LIGHT FIRE TENDER” VEHICLE

10. LIGHT FIRE TENDER VEHICLE

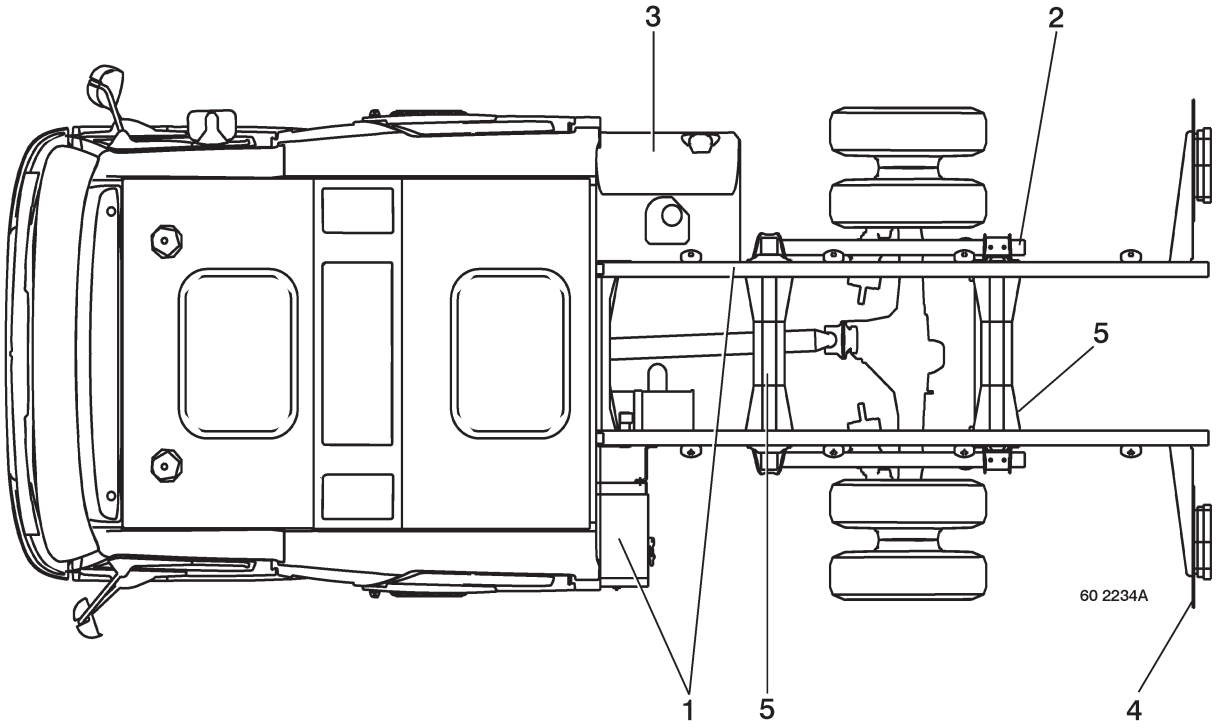
- 10 tonnes GVW available in one wheelbase 3250 on MIDLUM B base,

Light fire tender special features

- fire brigade bodybuilder electrical pre-arrangements (**1**),
- EATON 4106 OD gearbox + power take-off 2903P,
- 4-door cab (6/7 places),
- reinforced front parabolic leaf spring suspension,
- reinforced rear parabolic leaf spring suspension (**2**),
- lateral exhaust with internal outlet,
- plastic 130 litre main fuel tank (**3**),
- adjustable fast idling,
- lamps mounted on lighting bar (**4**),
- pneumatic battery isolation switch,
- loose spare wheel,
- 9.5 R 17.5 XYZ tyres,
- turned over rear spring hanger crossmembers (**5**),
- white bumper,
- cab pre-arrangements (working spotlamp with remote control, radio antenna, earth braid on doors, foot-operated horn control, special steering column trim, self-adhesive reflectors on doors...).

Options

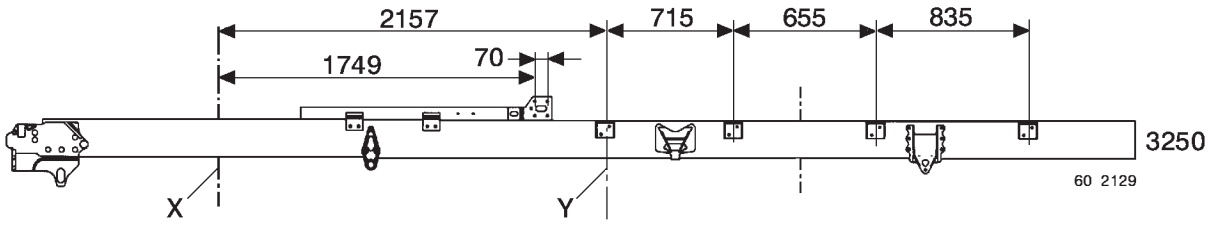
- blue revolving beacons.



10.1 Longitudinal positioning of brackets on chassis

10.1.1 MIDLUM B 10 tonnes 4-door light fire tender

E - wheelbases
X - axle centre-line
Y - first bracket centre-line



10.2 Light fire tender electrical pre-arrangements

The light fire tender is equipped with specific electrical pre-arrangements.
For MIDLUM Euro 3, contact the technical sales engineer.

“BUILDINGS & PUBLIC WORKS” VEHICLE

11. BUILDINGS & PUBLIC WORKS VEHICLE

- 7.5 - 8.5 - 10 tonnes GVW available in four wheelbases 2700, 2950, 3250, 3850 on MIDLUM B base,
- 12 tonnes GVW available in four wheelbases 3070, 3350, 3650, 3950 on MIDLUM C' base,
- 13 - 14 - 15 - 16 tonnes GVW available in four wheelbases 3070, 3350, 3650, 3950 on MIDLUM C/HD/Construction base,
- 18 tonnes GVW available in four wheelbases 3650, 3950, 4250, 4450 on MIDLUM D base,
- 11.99 - 14 - 16 tonnes GVW available in four wheelbases 3070, 3350, 3650, 3950 on MIDLUM 4x4 base.

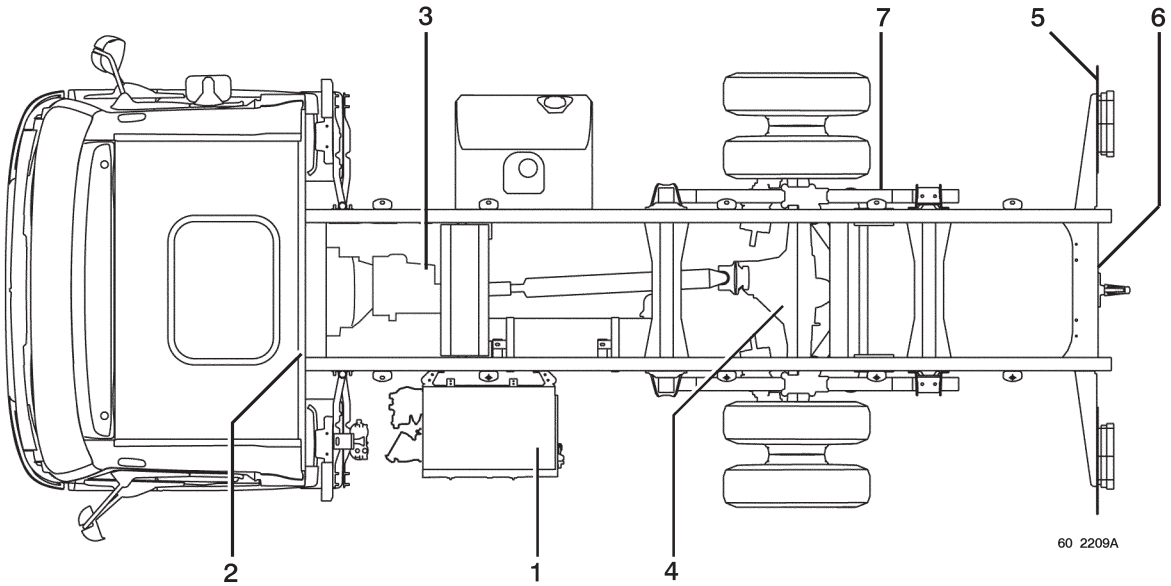
For 4-door cabs, larger wheelbases are available.

Buildings and public works vehicle special features

- level 2 bodybuilder electrical pre-arrangement (**1**) (see chapter B-5),
- glazed cab rear wall,
- gearbox-mounted PTO (**3**), power supply for engine speed limitation 1400 rpm, PTO engaged,
- rear drive axle differential lock (**4**),
- without run-under guard (**5**) (depending on country),
- towing crossmember and hook (**6**) capacity 3.5 tonnes,
- front and rear parabolic leaf spring suspensions (**7**),
- 2-place bench seat,
- changing of position of air braking appliances for installation of tipper tilting ram.

Options

- vertical exhaust,
- roof level engine air intake,
- engine hourmeter in cab,
- pre-arrangement for installation of a crane.

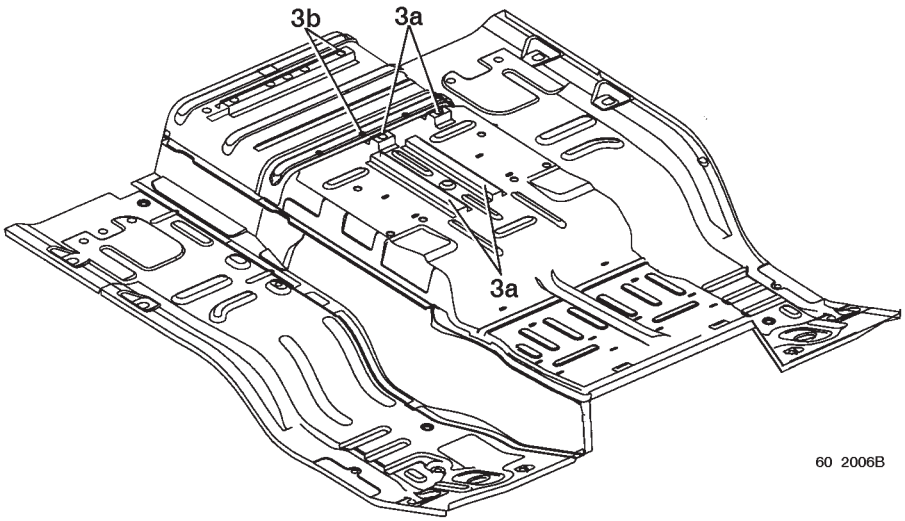


11.1 Fastening of tipper control in cab

We propose 3 ways of fastening the control in the cab.

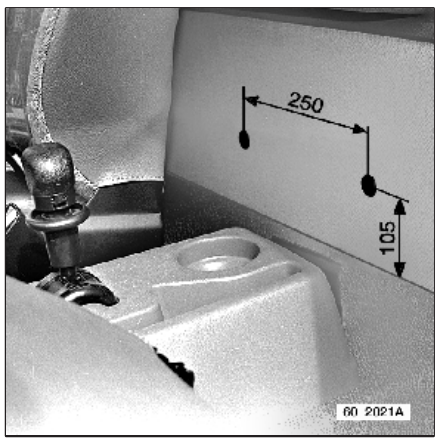
11.1.1 Location on engine tunnel

In case of absence of storage chest and bench seat on the engine tunnel, the fittings (3) can be used:
3a - day & sleeper cab
3b - sleeper cab only.



11.1.2 Location on rear wall

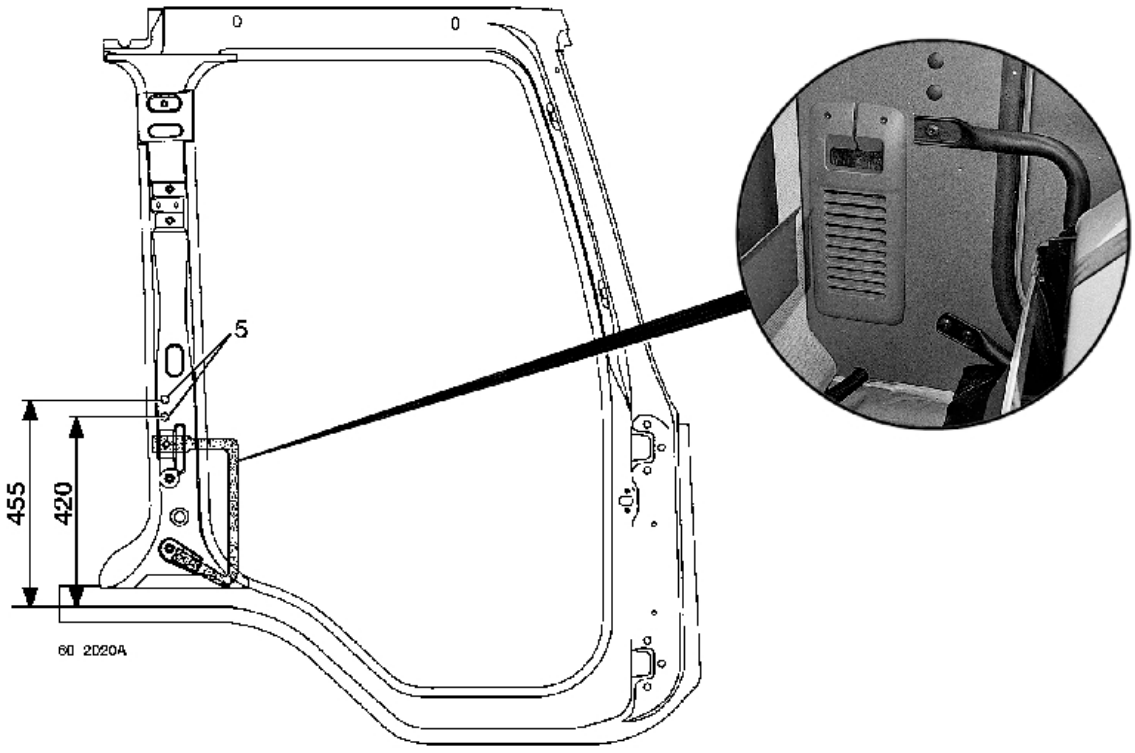
The rear wall comprises two M6 crimping nuts. Remove the two blanking plugs (**4**) to gain access to the nuts (or by taking out the setscrews securing the fire extinguisher in the day cab).



11.1.3 Location on side pillar

The side pillar comprises two M6 crimping nuts. To gain access to the crimping nuts:
- for plastic trim, remove the two blanking plugs (**5**).
- for textile trim, take off the pre-cut-out parts of the trim (**5**).

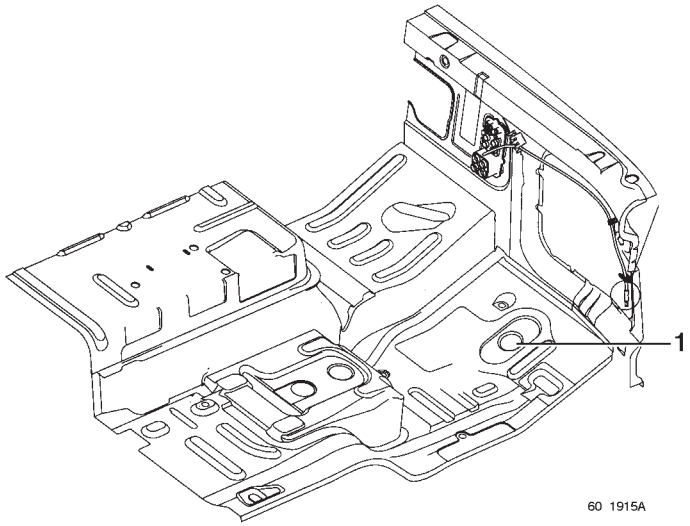
On account of its good accessibility, this location is recommended for fastening an equipment control (e.g. tipper).



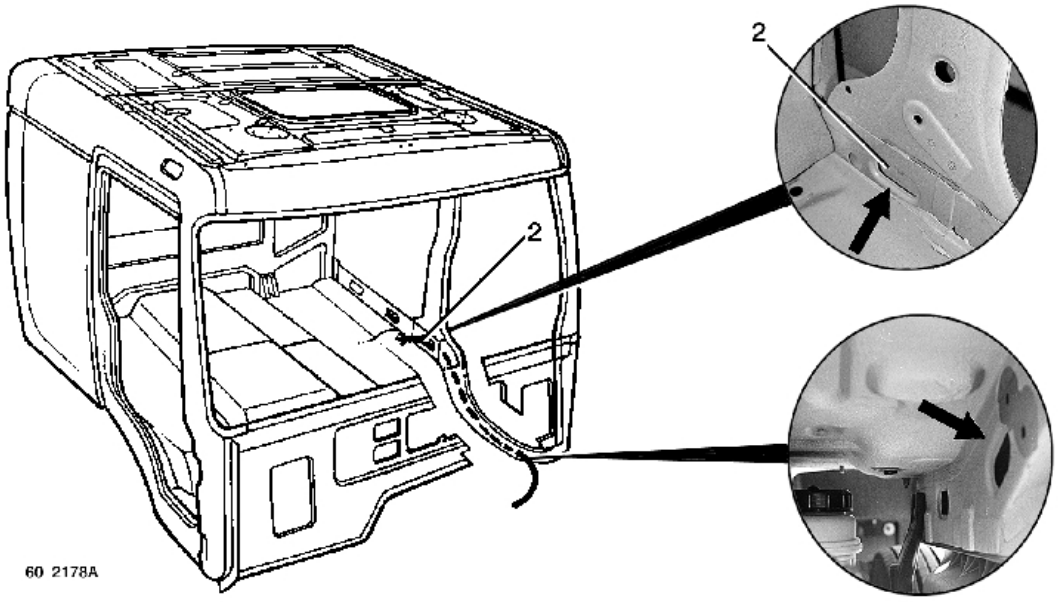
11.2 Passage of wiring harnesses and compressed air pipes through cab

Three passages are possible for routing the wiring harnesses from the inside to the outside of the cab:

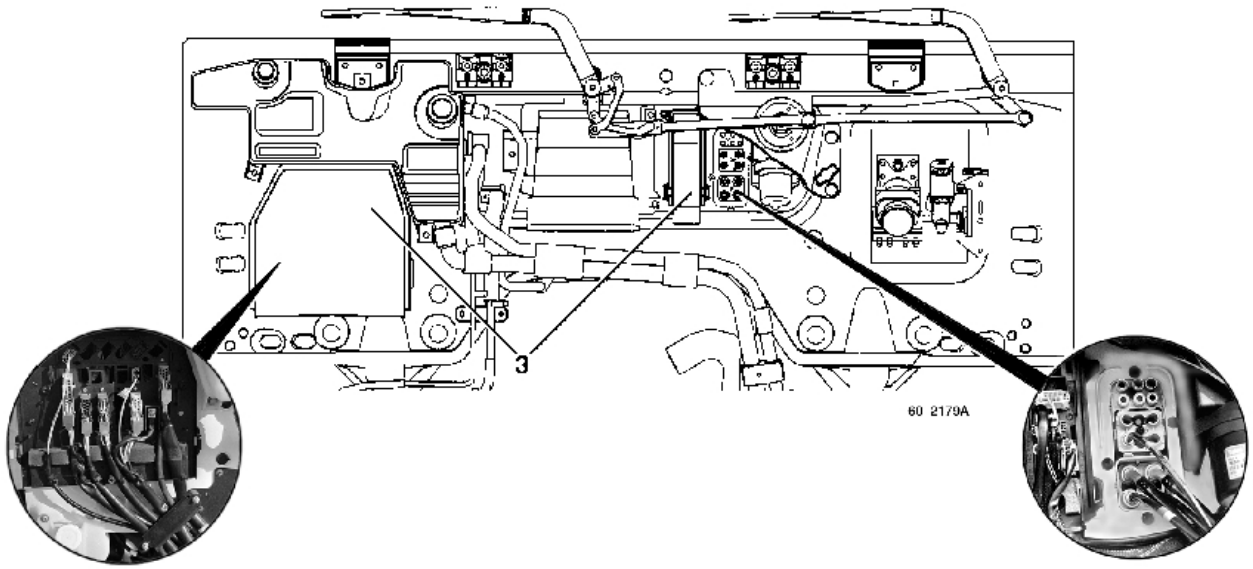
1 - Hole with maximum diameter 45 mm to be drilled in the circular impression on the passenger side floor. Watch out for the screen wash reservoir located under the floor near this impression.



2 - Passage through the RH or LH side rail of the cab. Cut the interior lining.



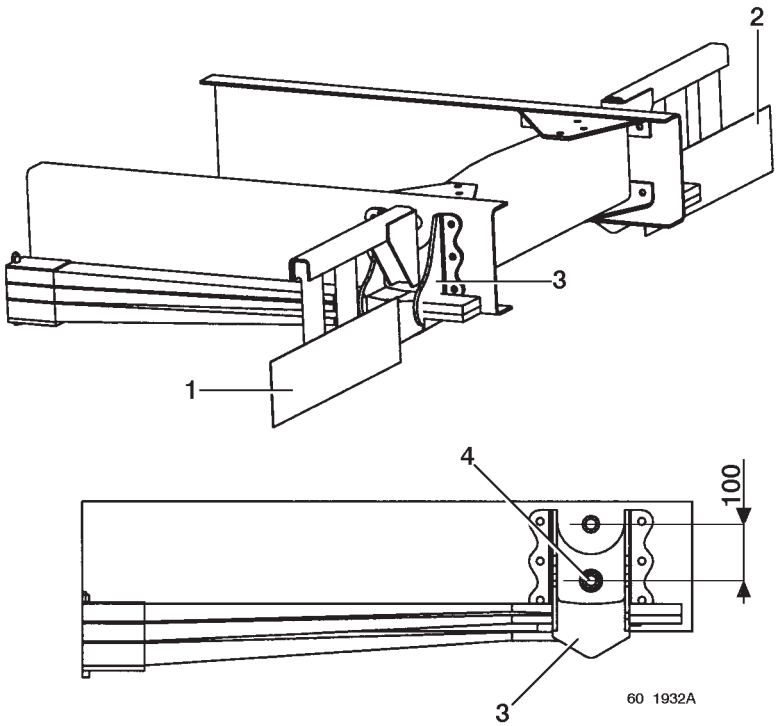
3 - Passage of wiring harnesses through unused locations in front end connecting zones.



11.3 Assembly of rear lamps to lighting bar - tractor version (on MIDLUM C/C'/D/HD/Construction only)

In the event of reduction of the rear overhang, the rear lamps can be assembled on a rear lighting bar in accordance with the assembly of MIDLUM tractors. It is then necessary to replace the lamp brackets.
Drill a 13 mm diameter hole at point (**4**).
Fit the nuts and bolts and tighten to torque.

Procurement:
- LH bracket ref. N° 50 10 478 943
- RH bracket ref. N° 50 10 478 944
- 4 collar screws M12x125x80 class 10.9 ref. N° 50 03 002 067
- 4 flanged nuts DRH M12 class 10.9 ref. N° 50 03 033 012



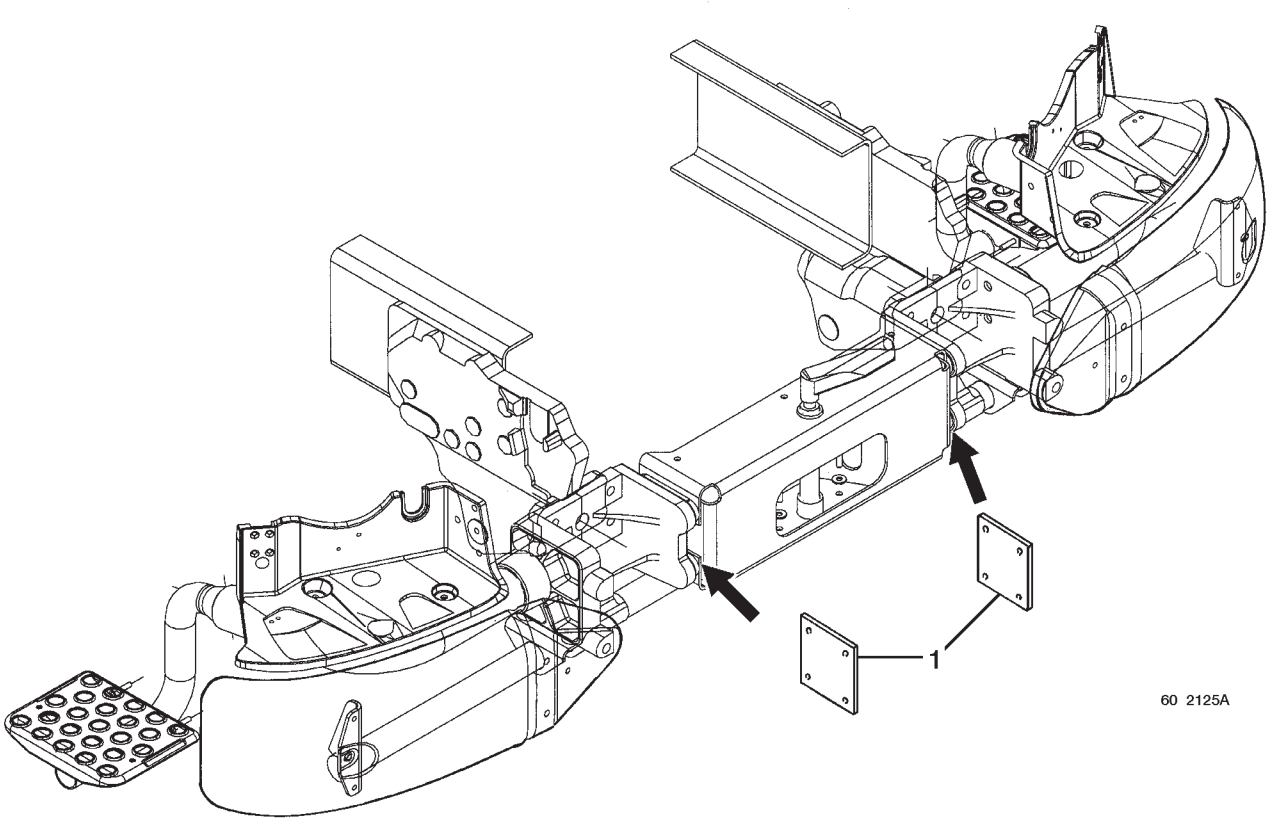
1 - LH lamp bracket
2 - RH lamp bracket
3 - spring rear hanger
4 - hole dia. 13 mm to be drilled

11.4 Fitting a tool-holder to the front of a vehicle with sheet metal bumper

MIDLUM HD/Construction/4x4/18 tonnes Construction vehicles are fitted with a sheet metal bumper from the KERAX series.

Use the shims (**1**) supplied only with the tool-holder pre-arrangement for installing the plates.

Order variant 67406, which allows the vehicle to accommodate 10 mm thick shims - take them out and replace them with the tool-holder brackets.



PRE-ARRANGEMENTS FOR INSTALLATION OF A CRANE COMMERCIAL VARIANT 20294

Available as option on all vehicles

12. BEHIND-CAB HANDLING CRANES

Assembly of the crane requires checking the conformity to regulations of the location of side/parking lights and side impact beams.
Before assembling the crane, make sure it does not exceed maximum permissible values peculiar to the vehicle (lifting moment, distribution of loads, height of centre of gravity).
Assembly of the crane to the bracket remains under the full responsibility of the equipment manufacturer.

12.1 Maximum lifting moment

GVW (tonnes)	Maximum moment (tonne.metres)
7.5	$M \leq 5$
10	$M \leq 7$
12	$M \leq 8$
14	$M \leq 9$
16	$M \leq \times 10$

12.2 Attachment

On vehicles with day or sleeper cabs, the crane must be fastened using support plates defined by RENAULT V.I. (variants 20288, 20289 for tippers with or without crane - 20296, 20297 for platforms with or without crane - 20295 for tail lifts) and are available from the RENAULT V.I. Spare Parts department.

The plates are specific to the vehicle (MIDLUM B, C', C, D, HD/Construction)) and its cab (day, sleeper).

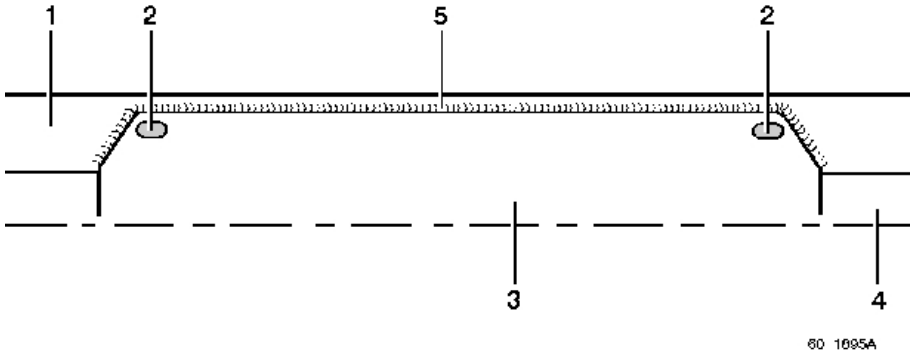
Assembly of a one-piece sub-frame from the rear of the cab to the extremity of the chassis, with bevelled cut-out at the front is compulsory.

Before carrying out any work, remove the first body fixing bracket and any rivets impeding the positioning of the plates to the sidemembers.

IMPORTANT at the time of subsequent assembly
The plates assembly operation may require work on such components as;
- electrical cables,
- compressed air pipe bundles,
- cab tilting hydraulic assistance pipes,
- air tanks, fuel tanks, wings, battery brackets,
- cab rear brackets,
- gearbox crossmember,
- engine brackets.
To limit on-vehicle modifications as much as possible, it is permitted to practise recesses in the brackets to enable them to be installed without having to touch flexible pipes, wiring harnesses and compressed air pipes.
Assembly of the plates should not impair the fastening of components affected by the work.
Such elements must be re-assembled in the original configuration of the vehicle while observing general safety rules (consult the section "General features").
On account of manipulations on the cab tilting hydraulic system, the plates must be fitted when the cab is fully tilted and properly wedged.
Upon re-assembly, bleed the cab tilting hydraulic system without fail, while observing the recommendations described in the vehicle driving and servicing handbook.
All removed rivets must be replaced by nuts and bolts.

12.2.1 Attachment of crane brackets to the sub-frame

Crane brackets (**3**) must be welded without fail to the sub-frame (**1**). These welds must consist of a continuous weld bead (**5**) and pluggings in slotted holes (**2**). It is on the other hand strictly forbidden to weld brackets (**3**) to the chassis (**4**).



12.2.2 Attachment of crane brackets to the chassis

Use collar bolts diameter M12x125, class 10.9 with locknuts. The use of nuts with nylon ring (e.g. Nyloc) are forbidden. Tighten to torque.

Crane support plates assignment table

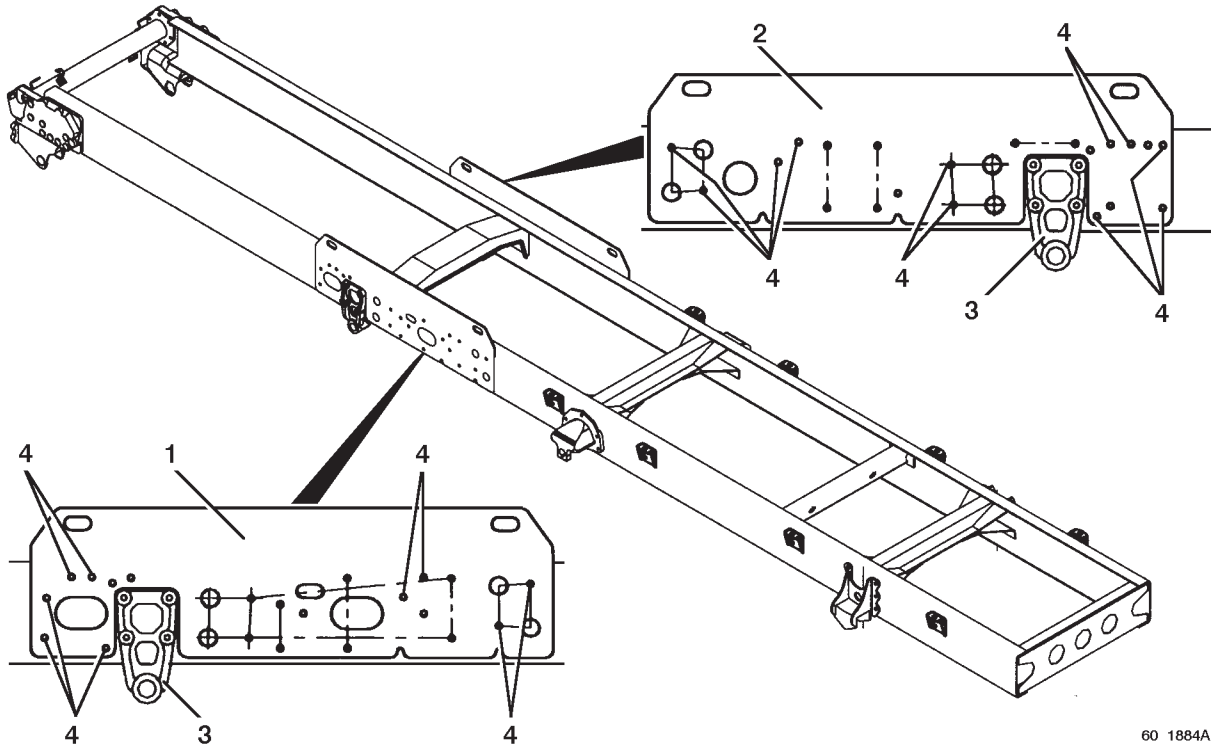
Vehicle	Cab type	Brackets reference N°	
		LH bracket	RH bracket
MIDLUM B	day	50 10 496 653	5010 496654
	sleeper	50 10 496 655	50 10 496 656
MIDLUM C'/C Construction *	day	50 10 496 659	50 10 496 660
	sleeper	50 10 496 661	50 10 496 662
MIDLUM D	day	50 10 528 429	50 10 528 430
	sleeper	50 10 528 431	50 10 528 432

(*) Crane support plates are only available for EEC vehicles.

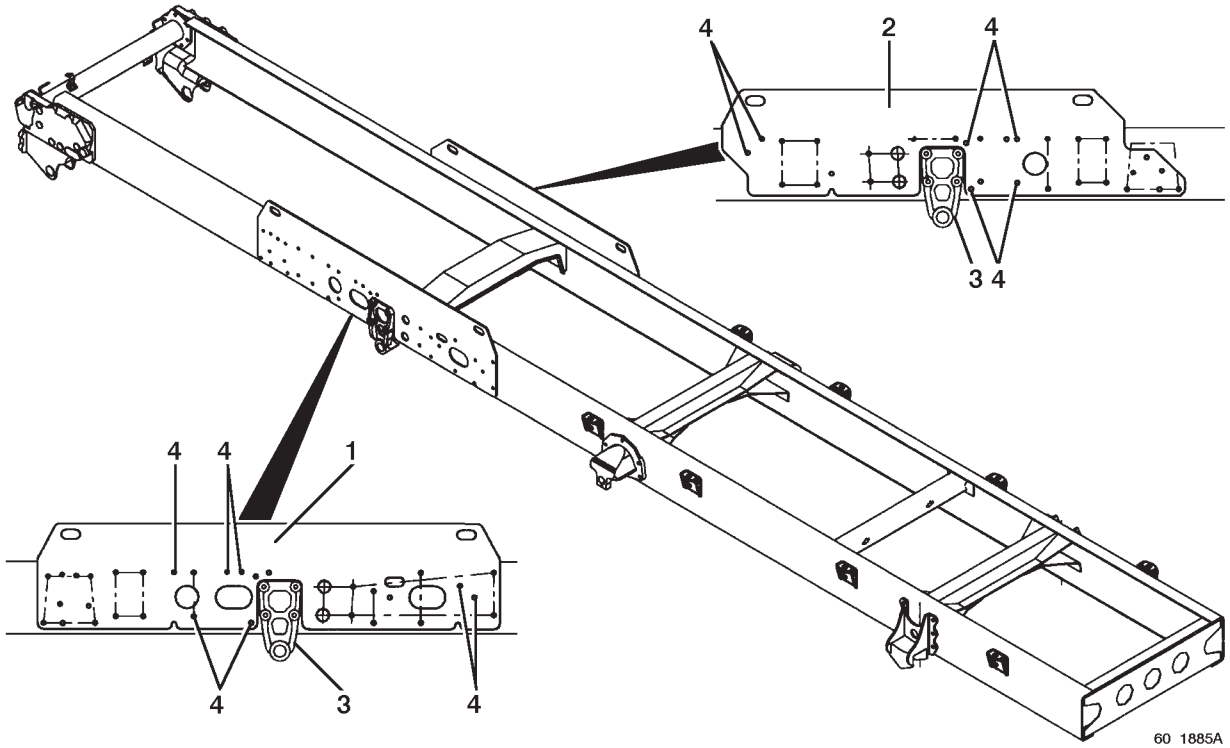
Key to diagrams on following pages:
1 - LH bracket
2 - RH bracket
3 - Front spring rear hanger
4 - Collar bolt M12x125 class 10.9 with locknut

Note
The diagrams indicate only the nuts and bolts (**4**) that must compulsorily be used on the chassis to ensure correct fastening of plates (**1-2**). These nuts and bolts may be present on-vehicle prior to assembly of the brackets (fastening the brackets). If this is not the case, use the specified nuts and bolts and tighten to torque.

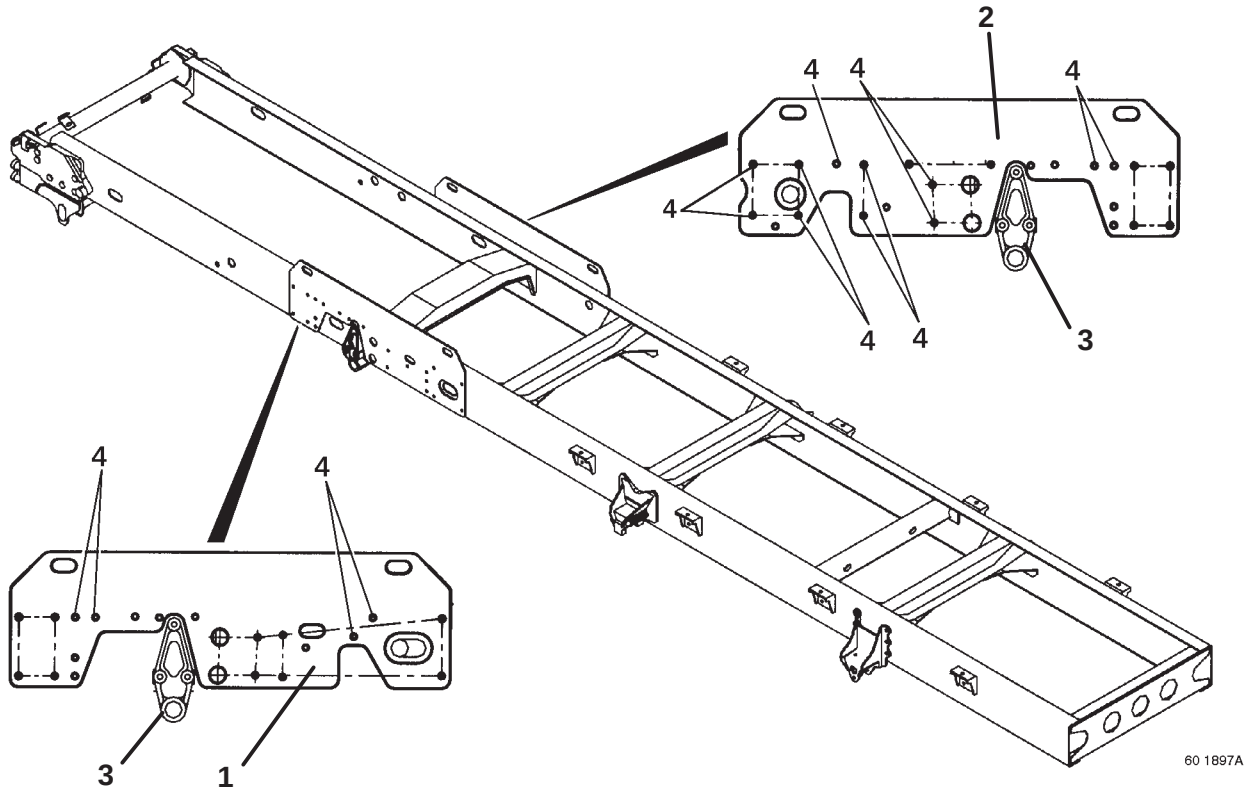
MIDLUM C'/C/D/HD Construction day cab



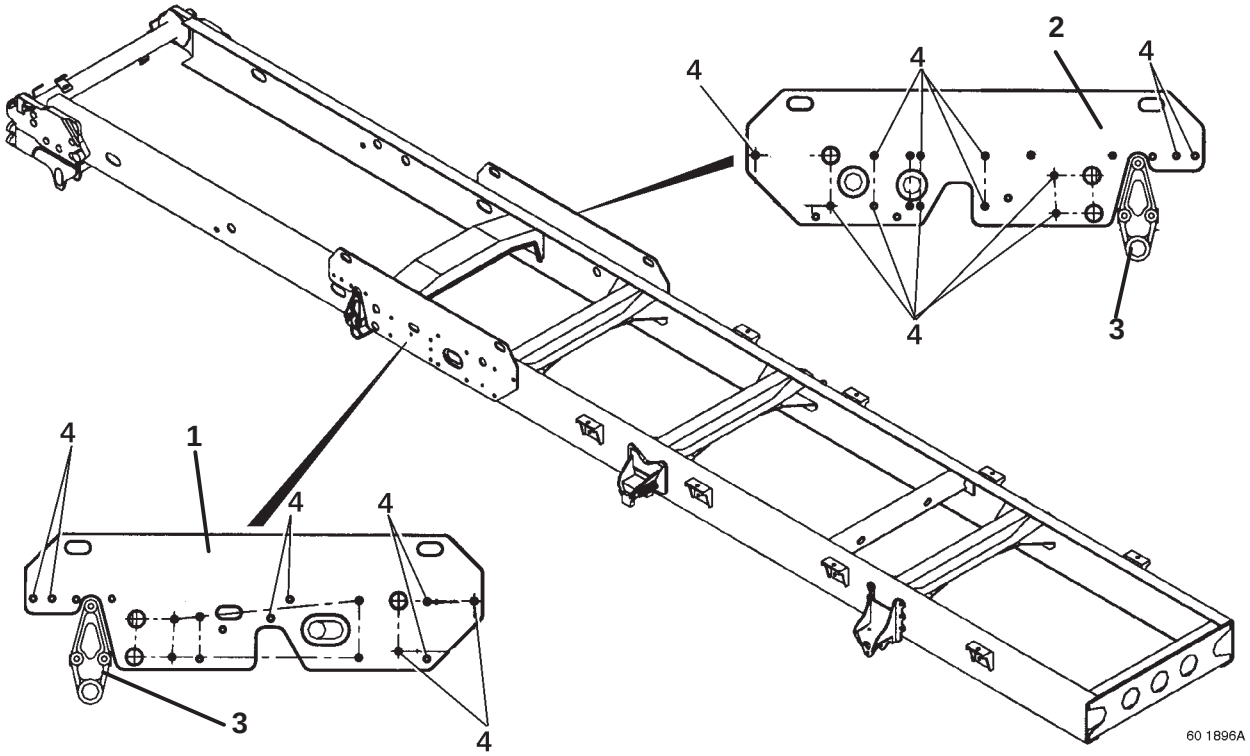
MIDLUM C'/C/D/HD Construction sleeper cab



MIDLUM B day cab



MIDLUM B sleeper cab



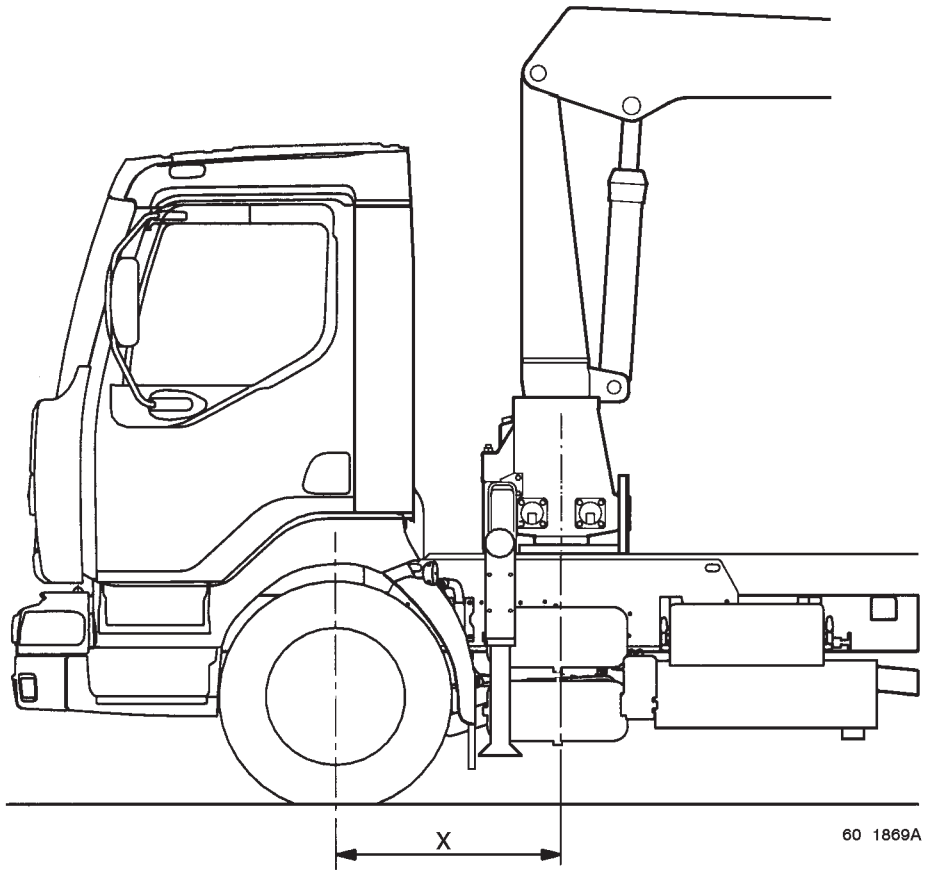
12.3 Position of vertical centre-line of crane

12.3.1 Day cab

Vehicle	Crane centre-line / front axle centre line distance (X)	
	Under-floor air intake	Vertical exhaust
MIDLUM B	900	1020
MIDLUM C'	923	1100
MIDLUM C		
MIDLUM Construction*		
MIDLUM D		

(*) Crane support plates are only available for EEC vehicles.

Positioning of the crane: the vertical axis of rotation of the crane must be situated approximately in the middle of the plates.

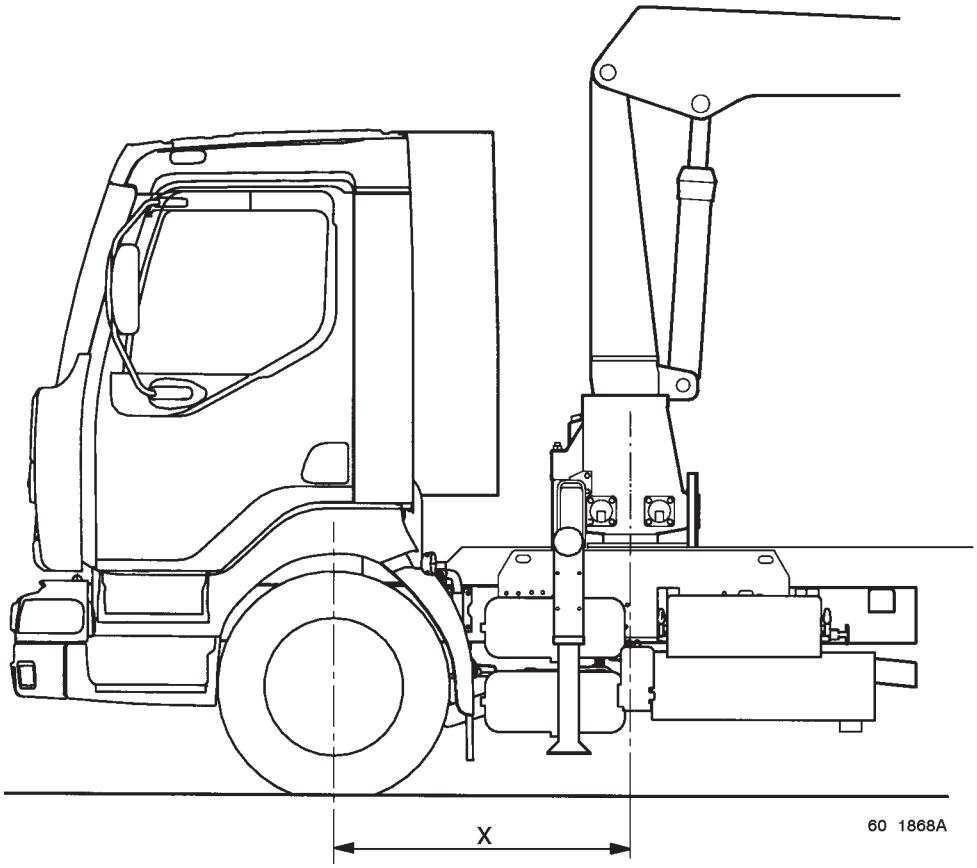


12.3.2 Sleeper cab

Vehicle	Crane centre-line / front axle centre line distance (X)	
	Under-floor air intake	Vertical exhaust
MIDLUM B	1220	1350
MIDLUM C'		
MIDLUM C		
MIDLUM Construction*		
MIDLUM D		

(*) Crane support plates are only available for EEC vehicles.

Positioning of the crane: the vertical axis of rotation of the crane must be situated approximately in the middle of the plates.



MANUFACTURER'S TECHNICAL RECOMMENDATIONS FOR REFRIGERATED VEHICLES

13. INDEPENDENT REFRIGERATOR UNIT LOCATED ABOVE THE CAB

Maximum permissible load on front axle

The installation of a refrigerator unit requires the maximum permissible load on the front axle being greater than or equal to the load necessary for installing a refrigerator unit. In the event of the maximum permissible load on the front axle being insufficient, the weight of the refrigerator unit shall be limited.

Vehicle	Maximum load on front axle (kg)		Maximum weight of refrigerator unit (kg)
	Standard	Option	
MIDLUM B 7.5 tonnes	3400	3700 (*)	450
MIDLUM B 10 tonnes	3700	4000 (*)	
MIDLUM B 12 tonnes	4000	4200(*)	
MIDLUM C' 12 tonnes	4480	–	550
MIDLUM C 12 tonnes		5000 (*)	
MIDLUM C 14 tonnes	5000	5800	
MIDLUM C 16 tonnes	5800	–	
MIDLUM D 16.9 tonnes	6300	–	–
MIDLUM D 17.9 tonnes	7100	–	–
MIDLUM HD/Construction 13 tonnes	5000	–	550
MIDLUM HD/Construction 14 tonnes	5600	–	
MIDLUM HD/Construction ` 15 tonnes	6000	–	
MIDLUM HD/Construction 16 tonnes	6300	–	

(*) essential option for the assembly of a refrigerator unit

13.1 Mechanical receiver on crankshaft pulley

A mechanical receiver (refrigerator compressor, hydraulic pump, electricity generator...), driven by the crankshaft pulley can be installed on the engine.
Transmission is via a type “AV13” vee belt.
Maximum torque transmitted by crankshaft pulley: 47 Nm.

Depending on the vehicle’s equipment, the crankshaft drive pulley for the mechanical receiver differs (two or three grooves). The extra pulley can be assembled as first fitment or as aftermarket, but it can only be installed on 3-groove crankshaft pulleys.

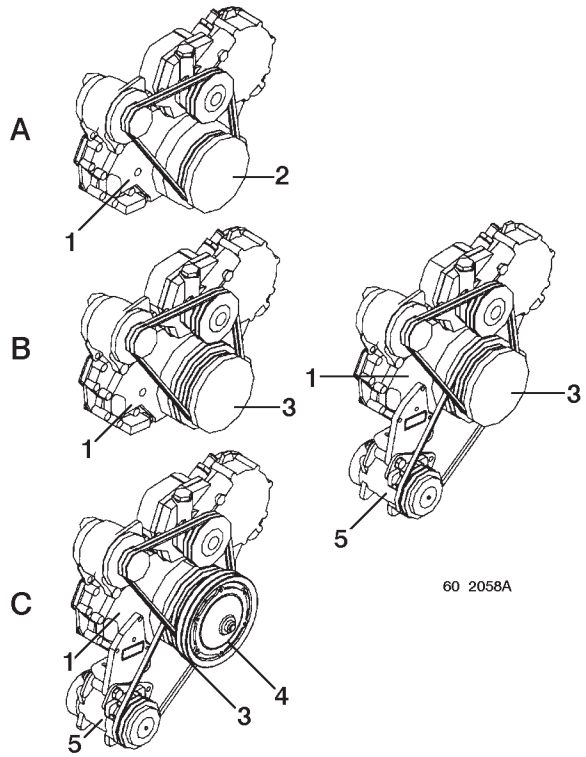
There may be four cases corresponding to three possible pulley assemblies:

IMPORTANT
To obtain the 3-groove pulley together with the accessories drive pulley, order the vehicle with variant 73410 (accessories drive pre-arrangement).

A: 2-groove crankshaft pulley
- vehicle without air conditioning and without drive pre-arrangement

B: 3-groove crankshaft pulley
- vehicle without air conditioning and with drive pre-arrangement
- vehicle with air conditioning and without drive pre-arrangement

C: 3-groove crankshaft pulley
- vehicle with air conditioning and with drive pre-arrangement



1 - engine front end
2 - two-groove crankshaft pulley
3 - three-groove crankshaft pulley
4 - extra pulley
5 - air conditioning compressor

Position of receiver on the engine
- vehicle without air conditioning:

The receiver is installed in the location provided for the air conditioning compressor. This installation requires the assembly of a 3-groove pulley.

In case (**A**), installation of the mechanical receiver requires expensive conversion of the vehicle as aftermarket and is to be proscribed.

- vehicle with air conditioning:

The receiver is installed to the LH side of the engine. This installation requires the assembly of an extra pulley.

For installation of the receiver to the engine, use an assembly kit marketed by the firms FRIDGE KING, THERMO KING and CARRIER, in strict compliance with the assembly instructions included in the kit.

Only two assemblies are officially approved by RENAULT V.I. and do not require technical agreement insofar as the installation complies with the directives of the assembly handbook.

13.2 Additional fuel tapping on fuel tank

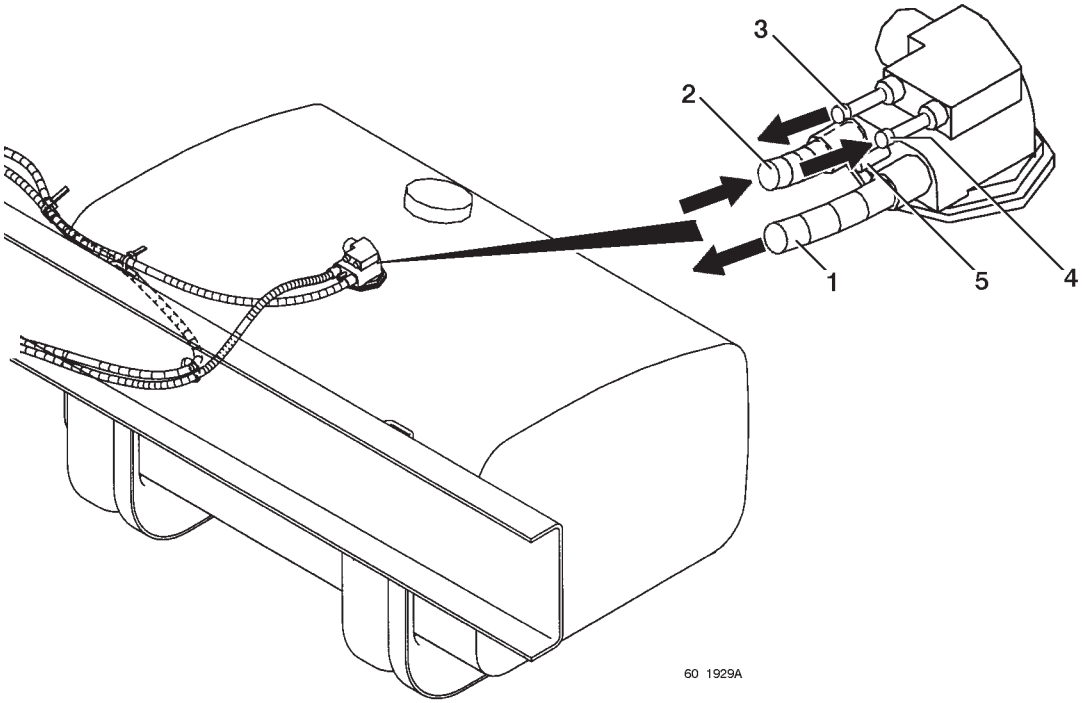
The fuel gauge includes two pipes blanked off by a breakstem blanking plug. These pipes can be used to feed an additional consumer on the vehicle (add-on heater, refrigerator unit, heat engine...).

The pipes are provided with two hexagonal sections to allow the blanking plug to be broken using two spanners. After removing the blanking plugs, deburr the pipe ends.

Installation must be performed according to standard workshop practice while observing constraints connected with heat radiation and remains under the full responsibility of the installer.

It is strictly forbidden:

- to modify the vehicle's standard fuel supply system,
- to drill the fuel tank to install an extra pick-off.



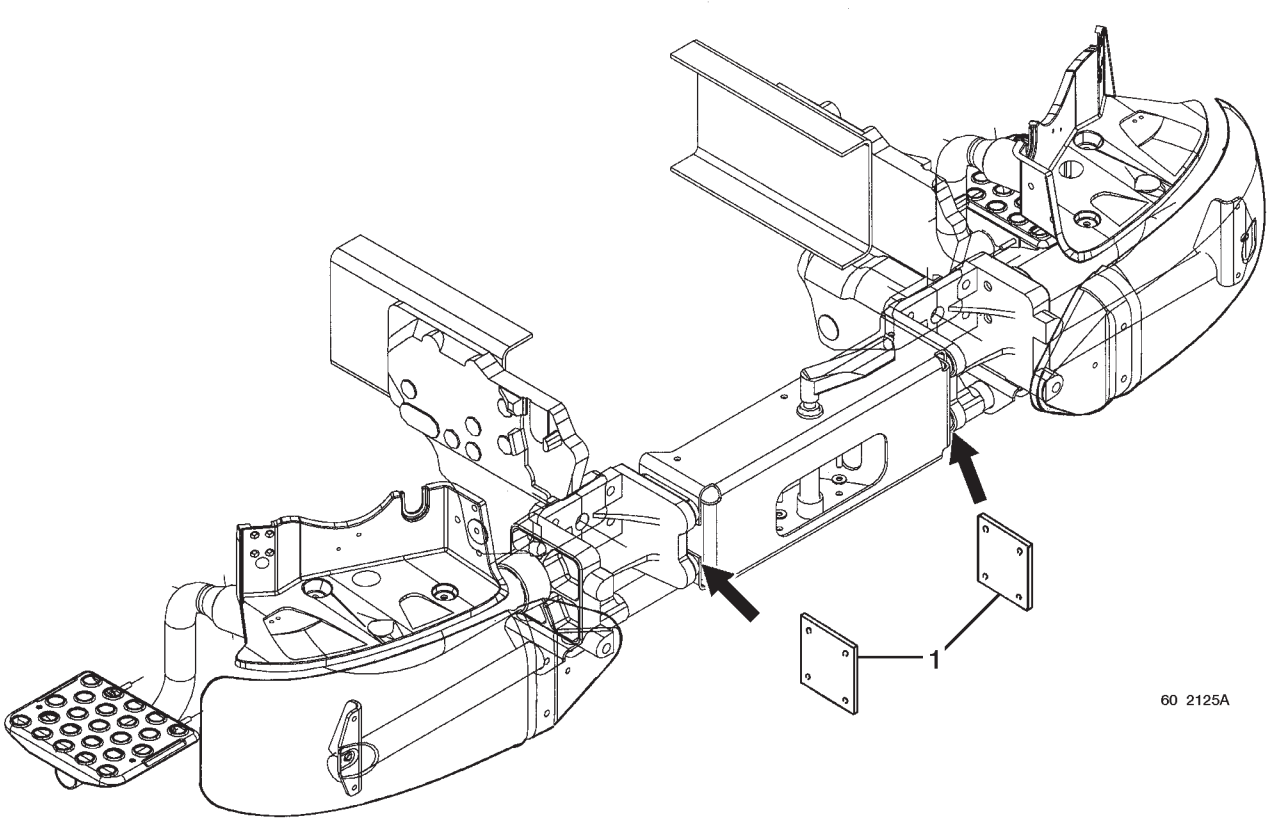
1 - engine suction
2 - engine return
3 - extra consumer suction
4 - extra consumer return
5 - fuel tank air vent

MANUFACTURER'S TECHNICAL RECOMMENDATIONS FOR SNOW CLEARING VEHICLES

14. SNOW CLEARING VEHICLE

14.1 Sheet metal bumper

To facilitate installation of the tool-holder plate, some MIDLUM versions (HD/Construction/4x4/18 tonnes Construction) are fitted with a sheet metal bumper. See that you order the tool-holder plate pre-arrangement option.
Use the shims (**1**) supplied only with the tool-holder pre-arrangement for installing the plates.



14.2 Signalling

To facilitate installation of the roof signalling system on the cab roof, you can order the roof gantry pre-arrangement (variant 46802: roof gantry and electrical power supply).

IMPORTANT
The gantry is a component that requires the presence of a stiffener welded as standard to the cab for its installation. This stiffener, located in an inaccessible zone, cannot be assembled as aftermarket fitment.

14.3 Hydraulic pump drive

To obtain the 3-groove pulley together with the accessories drive pulley, order the vehicle with variant 73410.

CHAPTER -C-
SUPPLEMENTARY INFORMATION ON THE “MIDLUM Euro 3” VEHICLE

1. MOUNTING OF POWER TAKE-OFFS

1.1 Mechanical receiver

To install a mechanical receiver, three layouts are possible:
- on gearbox-mounted PTO,
- on flywheel-mounted PTO,
- on crankshaft pulley.

1.1.1 Gearbox-mounted PTO

Table of possible gearbox-mounted PTO assemblies

Power take-off	Gearbox						
	ZF S5 – 42	EATON 4106 A/B	EATON 4106 OD	EATON 5206 A	EATON 6406 A	EATON 8209 A 8309 A	ALLISON MD 3060
ZF NS 42/2	X						
HYDROCAR 2264		X		X	X		
HYDROCAR 2903			X				
HYDROCAR 2904			X				
HYDROCAR 2903 + 2250 *			X				
HYDROCAR 2904 + 2250 *			X				
HYDROCAR 2266						X	
CHELSEA 276**							X

(*) PTO 2250 is installed on PTO 2903 or 2904 output N° 1.

(**) For continuous use.

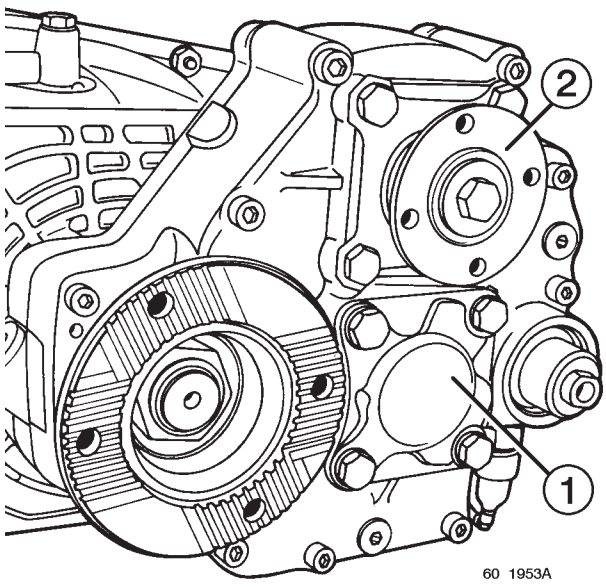
NOTE

The letter "**B**" or "**C**" added after the PTO type indicates the type of coupling mounted on the PTO output:
B - flange
C - splined shaft.

HYDROCAR 2903 & 2904 PTOs with two independent outputs

1 - Output N° 1: direct and full-time drive which can possibly be used. To control engagement, it is necessary to install an extra PTO (HYDROCAR 2250, 2264, 2266). The maximum torque transmissible by the unit is thus the lowest of the two PTOs.

2 - Output N° 2: stepped down drive with engagement control integrated in the PTO.



PTO characteristics

Type	Maximum output torque (Nm)	Maximum weight torque (Nm)	Direction of rotation	Drive ratio	Weight (kg)
NS 42/2	300		clockwise	0,87	11,5
2264		20	anticlockwise	0,84 (4106 A) 1 (4106 B) 1,48 (8209 A)	12
2903			clockwise	EATON 4106 A : Output n°2:1,9	16
2903	Output n°1 : 600 Output n°2 : 300		Output n°1: clockwise Output n°2: anticlockwise	EATON 4106 A : Output n°1:0,434 Output n°2:1,28	12
2903+2250				EATON 4106 B : Output n°1:0,517 Output n°2:1,52	15
2904	Output n°1 : 600 Output n°2 : 245			EATON 4106 A : Output n°1:0,434 Output n°2:1,49	12
2904+2250				EATON 4106 B : Output n°1:0,517 Output n°2:1,78	15
2266	400		anticlockwise	4106 A : 0,6 4106 B : 0,72 8209 A : 1,07	12
CHELSEA	285 (*) 400	90		1,03	

Maximum torques are given for a rotating speed at the PTO input of 1000 rpm and in temporary use.
(*) full-time use.

Flywheel-mounted PTO

Make: ZF
Type: NMV 130
- maximum output torque: maximum engine torque
- drive ratio: 1.03
- flange output only
- engagement by multi-plate clutch

Maximum torque transmissible by the PTO

$$P = \frac{C \times n \times \eta}{9550}$$

P: power (kW)
C: drive torque (Nm)
n: engine rotating speed (rpm)
η: PTO drive ratio

Frequency of use of PTOs

- Permanent use: Do not exceed half the maximum torque. In case of use at full power, it is essential to fit the PTO with a lubrication kit.
- Temporary use: The maximum operating time is 30 minutes, followed by a minimum stop time of 30 minutes (for cooling down).

ZF NMV 130 and CHELSEA 276 PTOs can be used continuously.
ZF NS 42/2 and HYDROCAR 2250, 2264, 2266, 2903, 2904 PTOs can be used temporarily.

PTO control: consult the vehicle driving and servicing handbook.
The maximum rotating speed of the PTO output shaft is 3000 rpm.

For any PTO modification (output shaft, lubrication kit), contact the manufacturer's commercial network.

1.2 Instructions for the assembly of auxiliary hydraulic pumps to ZF type “C” PTOs

Connection of the hydraulic pump must correspond to standard ISO 7653, type D.

1.2.1 Supplementary instructions

Fluidtight seal between pump and PTO

The seal between the pump and the PTO must be made by two gaskets (**J1 & J2**) and an air drain between the gaskets (**E**).

IMPORTANT
The air drain (E) must guarantee that the gearbox oil is not aspirated and the hydraulic oil does not penetrate inside the gearbox.

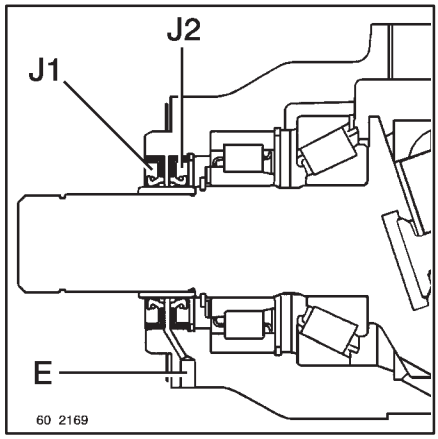
The gaskets must be capable of withstanding temperatures reaching as high as 120°C.

The gasket (**J1**), fitted on the PTO side, must guarantee fluidtightness of the gearbox filled with oil specified by the manufacturer.

The gasket (**J2**), fitted on the pump side, must guarantee fluidtightness of the pump containing hydraulic oil.

Correct operation of the air drain must be guaranteed at all times (do not paint it, blank it off or let it become fouled).

IMPORTANT
In the event of oil leakage through (E), the entire system must be immediately checked out.



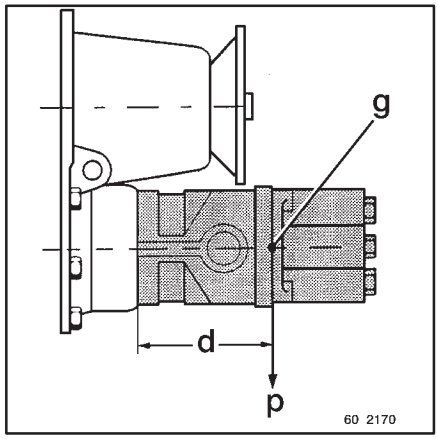
Calculation of the weight torque

In the event of direct assembly of a hydraulic pump or another receiver (**2**) on the PTO (**1**) (see chapter C-1.1.1), the weight torque should not exceed the value given in the PTOs characteristics table. Overstepping this value may lead to fast damage to the PTO or the gearbox.

Calculation method

$$Cp = P \times d$$

Cp : weight torque (Nm)
P : pump weight (N)
d : distance separating PTO contact face from the vertical passing through the centre of gravity (g) of the pump



2. AIR-OPERATED EQUIPMENT

2.1 Connection of extra auxiliary equipment

The addition of extra auxiliary equipment not planned by the manufacturer must without fail be connected to the specific auxiliary equipment circuit.

The compressed air consumption of this auxiliary equipment should in no way compromise the braking circuit filling times laid down by the legislation in force.

The extra piping must be routed on the LH inner side of the chassis. Ensure fastening using nylon clamps.

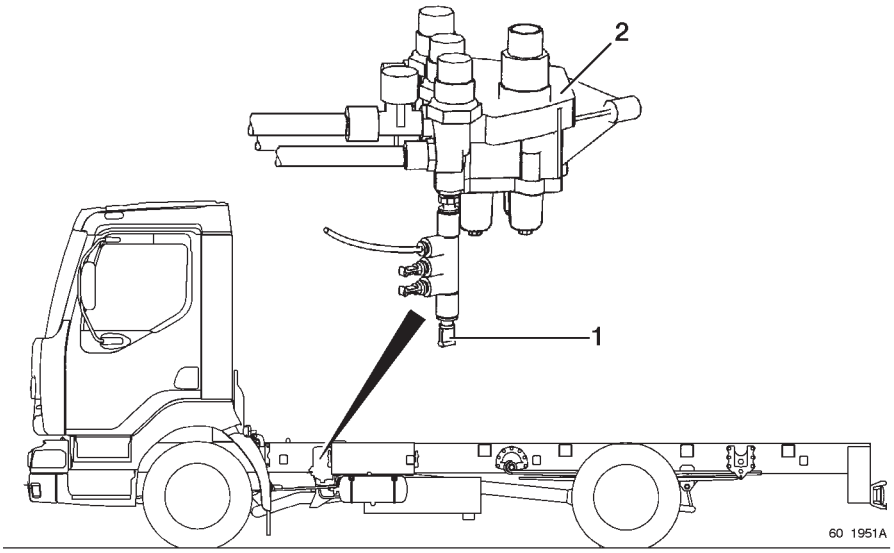
If the vehicle is equipped with an electric retarder, route the piping in a heat shield.

For any further information, consult the RENAULT V.I. Commercial Sales department.

2.1.1 Coupling for extra auxiliary equipment to chassis

There is a coupling for the connection of extra auxiliary equipment to the chassis provided on vehicles with a "Trade pack" or a power take-off:
- road sweeper,
- refuse collector,
- "Trade pack" (crane, tipper, tail lift...) pre-arrangement.

A "multiple T" snap-on coupling, diameter 6 mm, closed by a blanking plug (1) is arranged on the manometric block (2) in the vicinity of the air dryer.



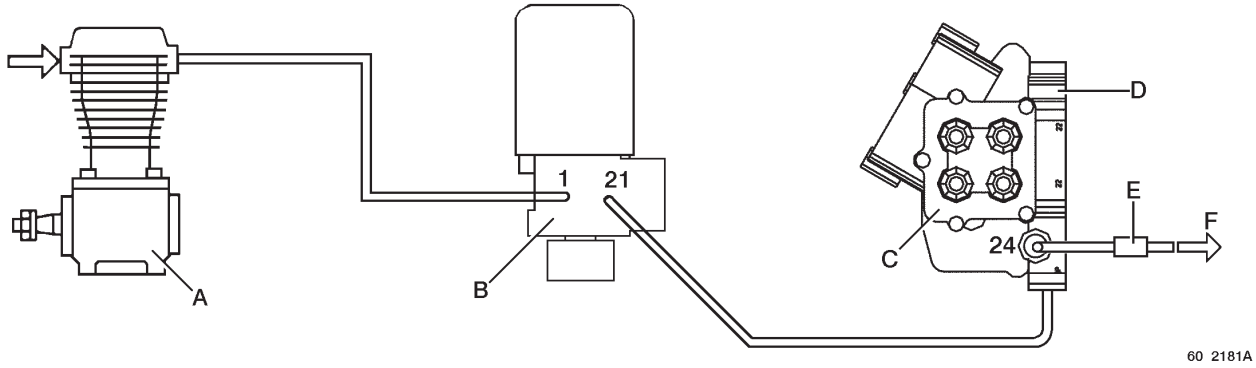
For pneumatic connection on-vehicle not provided with coupling, hook up to the auxiliary equipment circuit (brown coloured mark) close to the air dryer.

Use snap-on couplings for connection:
- "**Y**" coupling diameter 6 mm ref. N° 50.05.330.278
- "**T**" coupling diameter 6 mm ref. N° 50.05.330.159.

The additional circuit should not cause any mechanical stress to the bracket.

Connection diagram

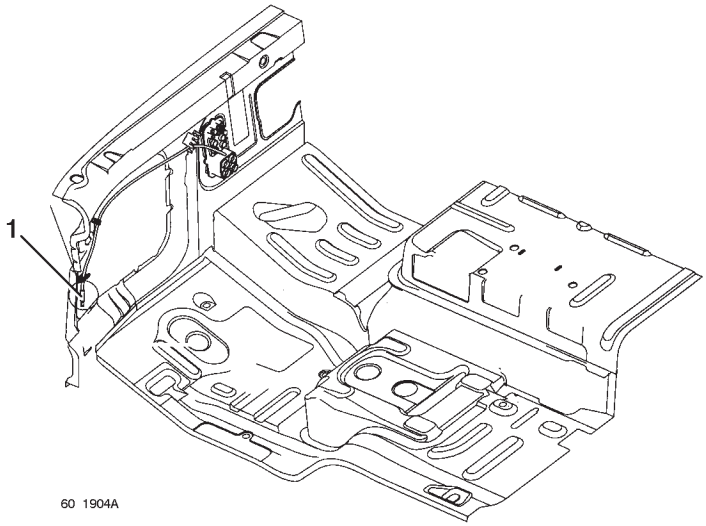
A - Compressor
B - Air dryer
C - Four-way protection valve
D - Manometric block
D - Brown coloured ring
F - To auxiliary equipment (presence of a “multiple T” for vehicles with “Trade pack” or PTO)



2.1.2 Coupling for extra auxiliary equipment in cab

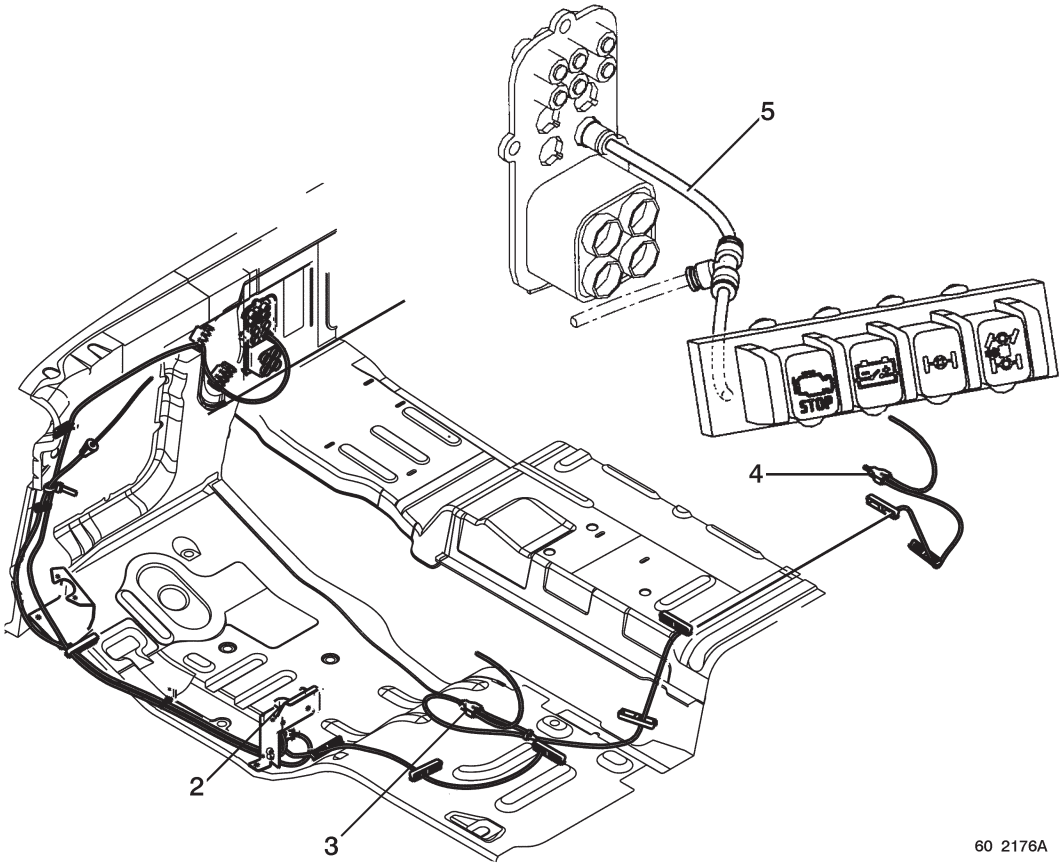
Cab not equipped with air-operated appliances

An available pneumatic feed fitted with a 6 mm snap-on coupling at its end stopped up by a blanking plug (1) is located on the LH inner face of the dash cowl.



Cab equipped with air-operated appliances

Install on the cab auxiliary equipment feed circuit a snap-on “T” or “Y” coupling diameter 6 mm.
Routing of auxiliary equipment circuit in cab:
- Steering column lock (**2**),
- Air suspension seat(s) (**3-4**),
- Chassis pneumatic controls (**5**) (PTO, differential dog clutch),
- “Y” snap-on coupling diameter 6 mm, ref. N° 50.05.330.278,
- “T” snap-on coupling diameter 6 mm, ref. N° 50.05.330.159.



2.2 Table of compressors

According to vehicle equipment

Compressor displacement	Duty pressure	Compressor output at duty pressure according to rotating speed		
		1000 rpm	1500 rpm	2000 rpm
single cylinder 150 cc	9,5 bar	87 l/min	132 l/min	176 l/min
twin cylinder 250 cc		130 l/min	212 l/min	285 l/min

Compressor drive ratio: 1.03

3. ELECTRICS

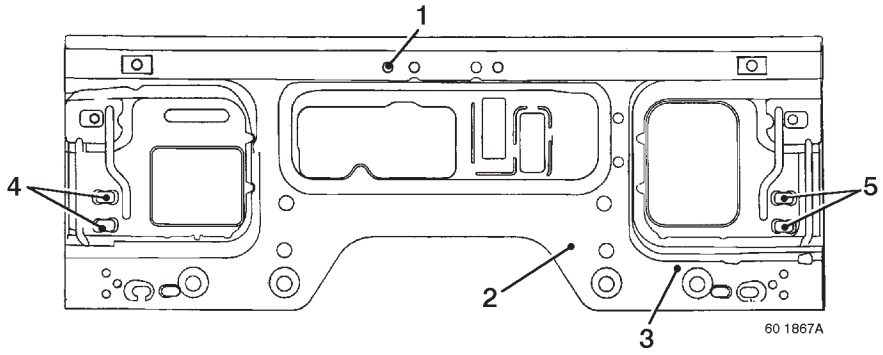
3.1 Earths

3.1.1 Cab earths

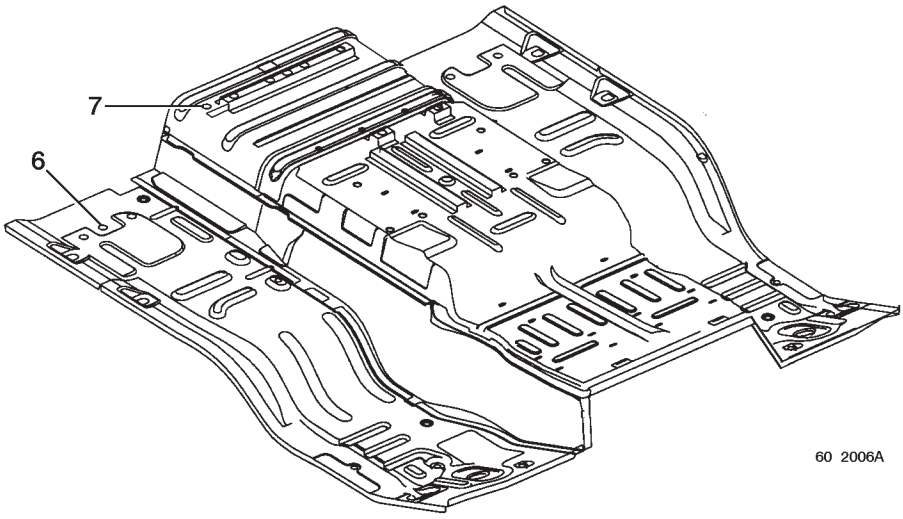
Cab fastenings are by means of M6 stainless steel studs welded to the cab.

Door earths
On light fire tender only:
- earth braids meeting the fire brigade standard are installed on all the doors.

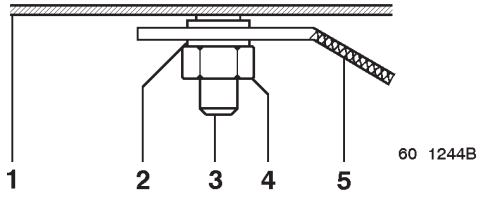
Front end earths
Cab exterior:
1 - heated windscreen earth stud
2 - chassis earth braid stud (RH drive vehicles)
3 - chassis earth braid stud (LH drive vehicles)
Cab interior:
4 - cab earth (LH drive vehicles)
5 - cab earth (LH drive vehicles)



Cab floor earths
6 - independent heating earth on sleeper cab (on RH rear floor)7 - earth (on engine tunnel)



Fastening of earth lug or braid to cab
1 - Front end panel
2 - Stainless steel washer diameter 6 mm
3 - Front end M6 stainless steel stud
4 - M6 stainless steel nut
5 - Earth lug or braid
Nut (**4**) tightening torque: 9 ± 1 Nm



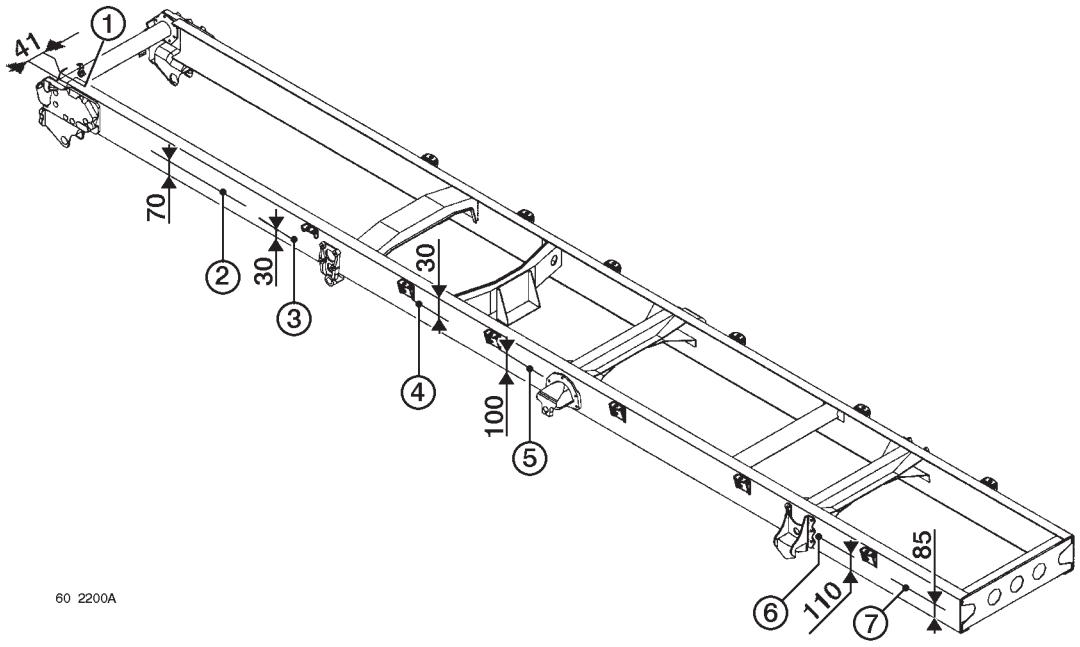
3.1.2 Chassis earths

All chassis earths are on the LH sidemember via 11 mm diameter holes.
1 - cab earth
2 - starter earth
3 - fuel preheater earth
4 - batteries earth
- automatic transmission earth (ALLISON MD 3060)
- trailer socket earth

5 - rear wiring harness earth
- electric retarder earth

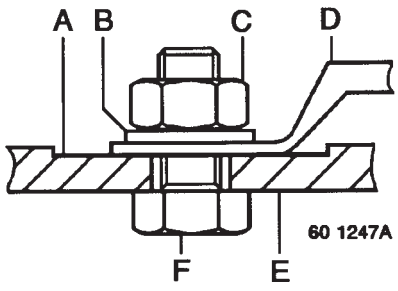
6 - tail lift installation earth (standard fitment stainless steel threaded hardware)
7 - trailer socket earth (drawbar rigid vehicles)

Apart from the battery and cab earths located to the outside of the chassis, all the earths are fastened to the inside of the sidemember.



Assembly to electrical earth points diameter 11 mm

A - spotface diameter 30 mm
B - plain stainless steel washer diameter 10 mm
C - stainless steel nut Hx150
D - earth lug or braid
E - sidemember
F - stainless steel screw M10x150.
Tightening torque: 45 ± 9 Nm.



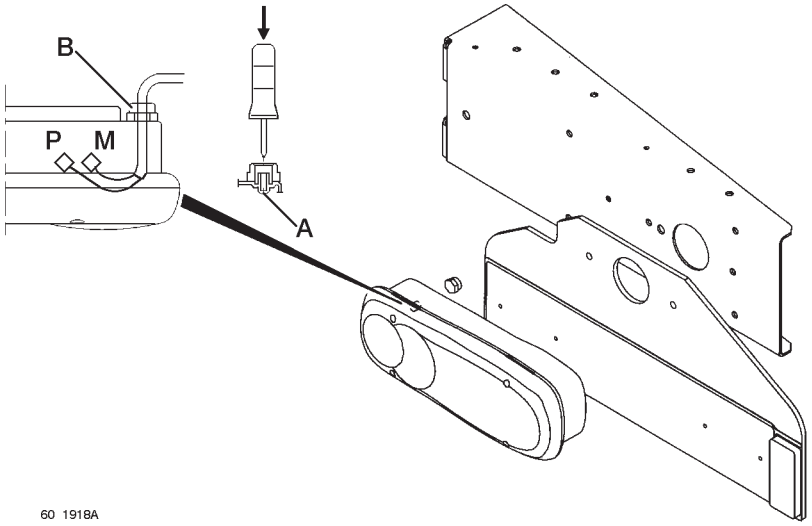
Some equipment items need connection of the earth to a point other than the originally planned earths. In such case, use any free drilling (13 mm diameter). Make a spotface to give anti-corrosion protection by means of tin-coating or a zinc aerosol spray prior to assembly. Use 12 mm stainless steel threaded hardware.

Zinc aerosol paint spray ref. N° 77.01.406.425 available from the RENAULT V.I. Spare Parts department.

3.2 Hook-up of lateral lamps to the rear lamp (vehicle with rear lighting bar, without variant 155 02 & 155 03)

Make a small opening at point (**A**) on the rear lamp.
Cut the 2-way connector of the lateral signalling lamp.
Engage the wiring harness in the rear lamp and connect the wires to the available terminals in the rear lamp:
- brown wire to earth (terminal "**M**"),
- blue wire to side/parking lamps power supply (terminal "**P**").

At point (**A**), fit the stuffing box and tightening nut (**B**) supplied in the installation kit on the wiring harness to the rear lamp.
Make an undercut in the rear lamp bracket to allow passage of the additional wiring harness.



For safety reasons, it is recommended to cross over the wiring harnesses connecting the lateral lamps:
- RH signalling connected to the LH rear lamp
- LH signalling connected to the RH rear lamp

3.3 Hook-up in front end connection zone (vehicles without "bodybuilder pack" and refuse collectors)

Cut the 2-way JPT connector on the wiring harness of a lateral lamp and crimp each wire with a JPT clip ref. N° 50 10 214 346.
In the front end connection zone:
Clip the two wires in the 8-way connector if present on the vehicle - if not, clip the wires to a connector ref. N° 50 10 214 495 and hook up the assembly in the connection zone.
Position the wires on the 8-way connector:
- terminal 2: lighting power supply
- terminal 1: earth.

Connect the other signalling lamps in festoon fashion.

The lateral lamps wiring harness must follow the routing of the other wiring harnesses and allow tilting of the cab without causing any damage.

Procurement:
- 8-way connector (hook-up on front end) ref. N° 50 10 214 495
- electrical clips ref. N° 50 10 214 345

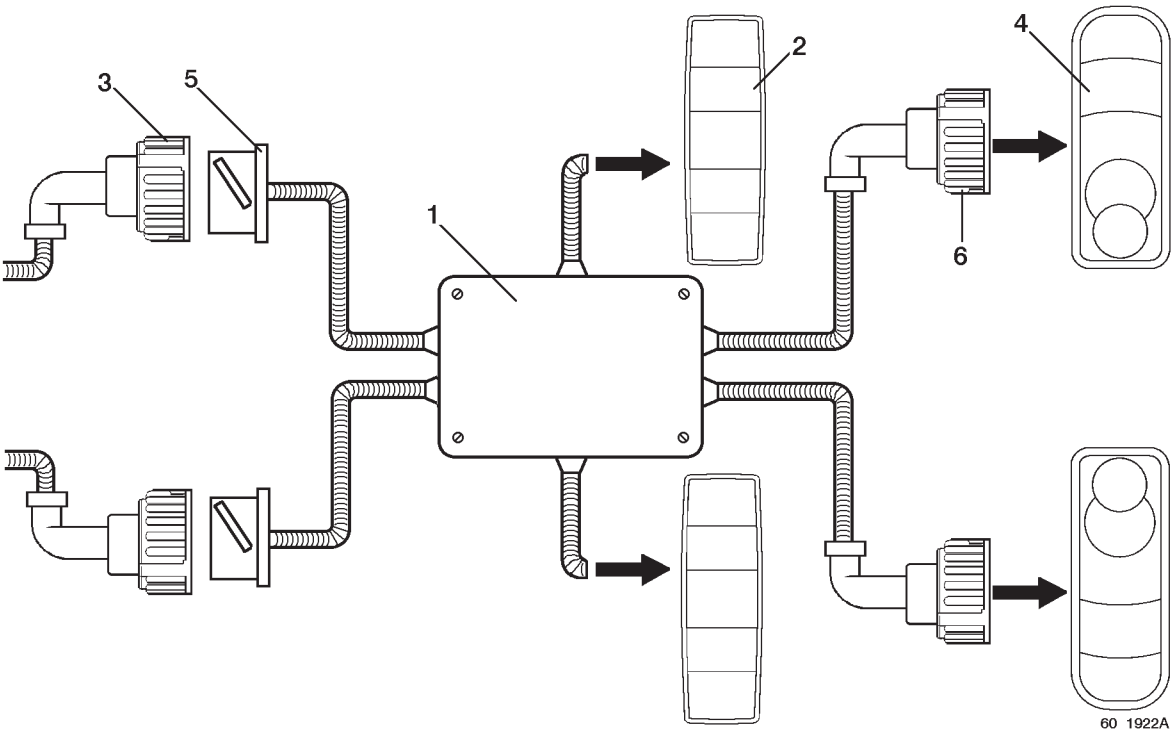
3.4 Changing the position of vehicle rear lamps

Rear lamps mounted in series on lighting bar and on run-under guard are officially approved in the horizontal or vertical position.
If the lamp is mounted in the vertical position, the lens gasket must be repositioned so that the slot (junction between the two ends of the seal) is facing downwards.

3.5 Doubling up the rear lamps

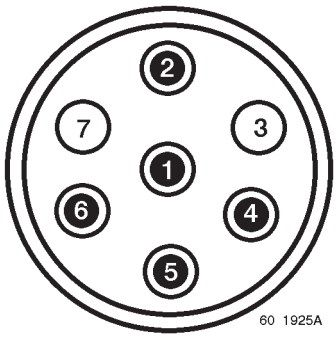
It is possible to install two additional rear lamps by inserting a junction box between the existing rear lamps and their wiring harness. Each additional rear lamp must be connected in parallel with a vehicle lamp.

Key
1 - Junction box
2 - Additional lamps
3 - Vehicle wiring harness
4 - Vehicle rear lamps
5 - Junction box connectors to vehicle wiring harness
6 - Junction box connectors to rear lamps



Assignment of connector terminals

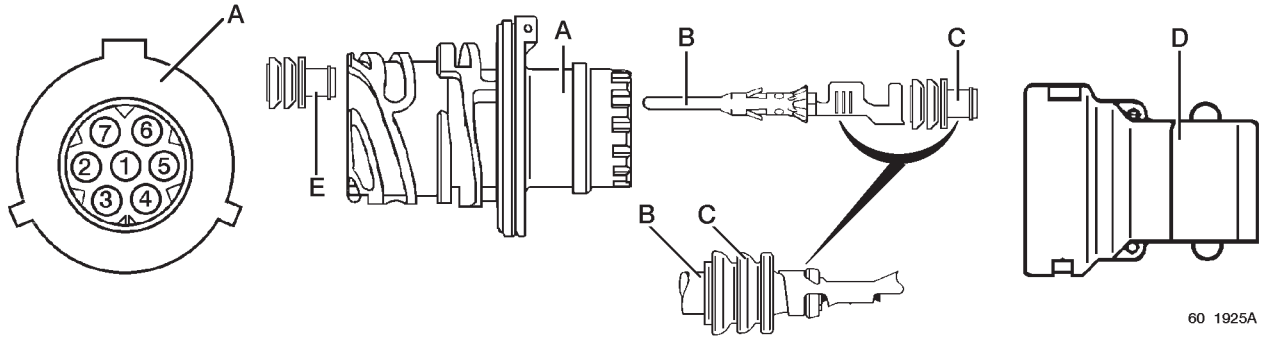
Terminal	Function	
	LH connector	RH connector
1	earth	earth
2	LH side/parking lamp	LH side/parking lamp
3	not assigned	reversing lamp
4	LH flashing lamp	RH flashing lamp
5	LH stop lamp	RH stop lamp
6	fog lamp	braking information
7	not assigned	not assigned

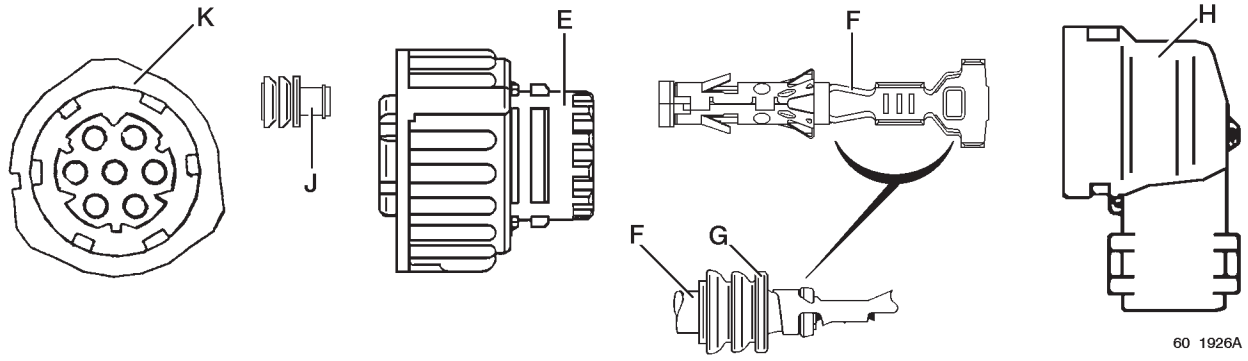


Procurement
Connector (**5**):
A - 7-way pin-holder box ref. N° 50 10 306 943
B - 1 mm2 pin ref. N° 50 10 306 944
C - 1 mm2 wire grommet seal ref. N° 50 10 214 624
D - straight adapter ref. N° 50 10 306 096
E - blanking plug ref. N° 50 10 241 931

Connector (**6**):
K - 7-way socket-holder box ref. N° 50 10 306 490
F - 1 mm2 socket ref. N° 50 10 306 491
G - 1 mm2 wire grommet seal ref. N° 50 10 214 624
H - elbow adapter ref. N° 50 10 306 097
J - blanking plug ref. N° 50 10 214 931

Blanking plugs (**E-J**) are to be installed without fail in the ways of pin-holder (**A**) and of socket-holder (**K**) that are not provided with wires (terminal 7). They give a fluidtight seal to the connector.
Use the 10 mm diameter ringed sheath and position it in the immobilization grooves of the adapters (**D-H**) before crimping them.





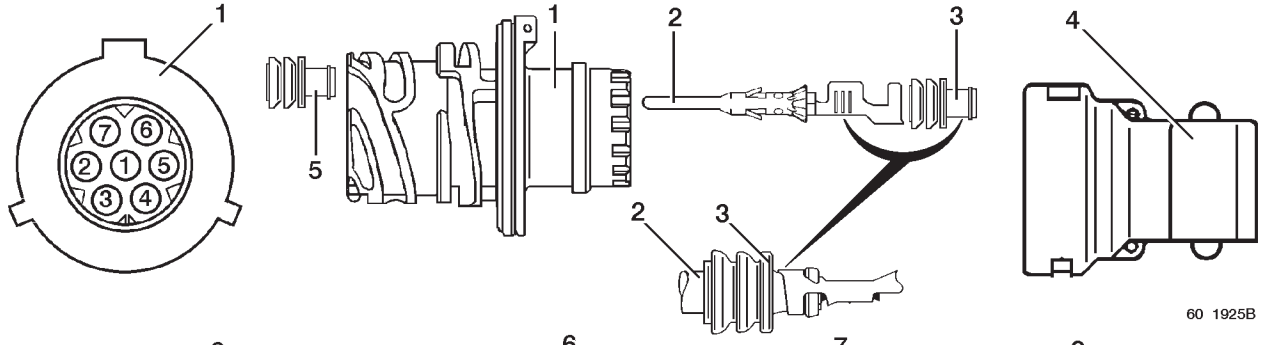
3.6 Extension of the wiring harness

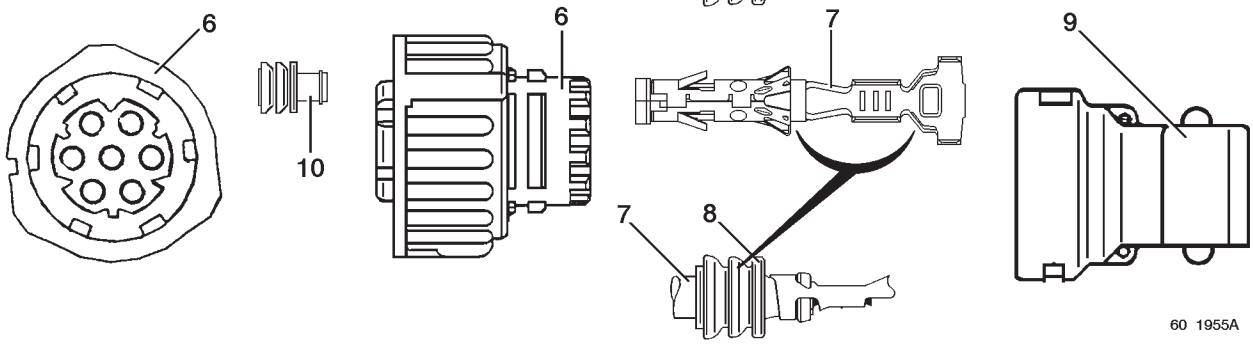
If the chassis is elongated, it may be necessary to extend the vehicle wiring harness.
For this operation, section the harness and insert an electrical extension.
The cables of this extension must without fail be of a cross-section identical to that of the corresponding cable on the vehicle. The maximum amperage passing through each cable should be no greater than 5 Amps/mm2.
Use one or several connectors recommended hereafter. The pins or sockets should be adapted to the cable cross-sections on which they are mounted.

Procurement:

1 - 7-way pin-holder box ref. N° 50 10 306 943
2 - 1 mm^2 pin ref. N° 50 10 306 944
2 - 2.5 mm^2 pin ref. N° 50 10 306 945
3 - 1 mm^2 wire grommet seal ref. N° 50 10 214 624
4 - straight adapter ref. N° 50 10 306 096
5 - blanking plug ref. N° 50 10 241 931
6 - 7-way socket-holder box ref. N° 50 10 306 490
7 - 1 mm^2 socket ref. N° 50 10 306 491
7 - 2.5 mm^2 socket ref. N° 50 10 306 494
8 - 1 mm^2 wire grommet seal ref. N° 50 10 214 624
9 - elbow adapter ref. N° 50 10 306 097
10 - blanking plug ref. N° 50 10 214 931

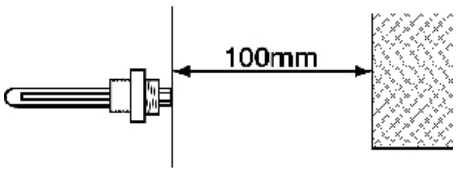
Blanking plugs (**5-10**) are to be installed without fail in the ways of pin-holder (**1**) and of socket-holder (**6**) that are not provided with wires. They give a watertight seal to the connector.
Use the 10 mm diameter ringed sheath and position it in the immobilization grooves of the adapters (**4-9**) before crimping them.





3.7 Assembly of the immersion heater

If the height of the sub-frame is less than 150 mm, provide a free space of at least 100 mm behind the immersion heater for removal purposes.
Do not knock the electrical connection during bodybuilding.



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4. CHASSIS

4.1 Steel classes for sidemembers

Sidemembers are cascade down into two classes of steel (chapter A-2.1.4):
- class F for a minority of cases (identified by an asterisk (*) in the table below).
- class D for all other cases.

4.2 Sections of sidemembers

MIDLUM B

<table>
<tr><th rowspan="2">GVW (tonnes)</th><th rowspan="2">Wheelbase (mm)</th><th colspan="3">Sidemember section</th></tr>
<tr><th>2-door cab mechanical suspension</th><th>2-door cab air suspension</th><th>4-door cab</th></tr>
<tr><td rowspan="6">7.5</td><td>2700</td><td rowspan="6">200 x 70 x 5</td><td rowspan="2"></td><td></td></tr>
<tr><td>2950</td><td rowspan="4">200 x 70 x 7</td></tr>
<tr><td>3250</td></tr>
<tr><td>3850</td><td>200 x 70 x 5</td></tr>
<tr><td>4450</td><td rowspan="2">200 x 70 x 6</td></tr>
<tr><td>5050</td><td></td></tr>
<tr><td rowspan="6">10</td><td>2700</td><td rowspan="3">200 x 70 x 5</td><td rowspan="3"></td><td></td></tr>
<tr><td>2950</td></tr>
<tr><td>3250</td><td rowspan="4">200 x 70 x 7</td></tr>
<tr><td>3850</td><td rowspan="3">200 x 70 x 6</td><td>200 x 70 x 6</td></tr>
<tr><td>4450</td><td rowspan="2">200 x 70 x 7</td></tr>
<tr><td>5050</td><td></td></tr>
<tr><td rowspan="5">12</td><td>2950</td><td rowspan="2">200 x 70 x 5</td><td rowspan="2"></td><td rowspan="5"></td></tr>
<tr><td>3250</td></tr>
<tr><td>3850</td><td rowspan="3">200 x 70 x 6</td><td rowspan="3">200 x 70 x 7 (*)</td></tr>
<tr><td>4450</td></tr>
<tr><td>5050</td></tr>
</table>

MIDLUM C'

<table>
<tr><th rowspan="2">GVW (tonnes)</th><th rowspan="2">Wheelbase (mm)</th><th colspan="3">Sidemember section</th></tr>
<tr><th>2-door cab mechanical suspension</th><th>2-door cab air suspension</th><th>4-door cab</th></tr>
<tr><td rowspan="8">12</td><td>3070</td><td rowspan="6">220 x 70 x 5</td><td rowspan="2"></td><td></td></tr>
<tr><td>3350</td><td rowspan="5">220 x 70 x 7</td></tr>
<tr><td>3650</td><td rowspan="2">220 x 70 x 6</td></tr>
<tr><td>3950</td></tr>
<tr><td>4550</td><td rowspan="2">220 x 70 x 7</td></tr>
<tr><td>5150</td><td>220 x 70 x 6</td></tr>
<tr><td>5750</td><td rowspan="2">220 x 70 x 7</td><td rowspan="2">220 x 70 x 8 (*)</td><td rowspan="2"></td></tr>
<tr><td>6480</td></tr>
</table>

MIDLUM C

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
11–12	3070	220 x 70 x 5		
	3350			220 x 70 x 7
	3650		220 x 70 x 6	
	3950			
	4550		220 x 70 x 7	
	5150	220 x 70 x 6		
	5750	220 x 70 x 7	220 x 70 x 8 (*)	
	6480			
13–14	3070	220 x 70 x 6		
	3350			220 x 70 x 8 (*)
	3650		220 x 70 x 7	
	3950			
	4550	220 x 70 x 7		
	5150		220 x 70 x 8 (*)	
	5750	220 x 70 x 8 (*)		
	6480			
15–16	3070	220 x 70 x 7		
	3350			
	3650		220 x 70 x 7	220 x 70 x 8 (*)
	3950			
	4550			
	5150	220 x 70 x 8 (*)	220 x 70 x 8 (*)	
	5750			
	6480			

MIDLUM D & D Construction**

GVW (tonnes)	Wheelbase (mm)	Sidemember section	
		2-door cab mechanical suspension	2-door cab air suspension
18	3650 **	244 x 70 x 7(*)	244 x 70 x 7(*)
	3950 **		
	4250 **		
	4550 **		
	4850		
	5150		
	5450	244 x 70 x 8(*)	244 x 70 x 8(*)
	5750		
	6050		
	6480		
	6780		

MIDLUM HD/Construction

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
12–13–14	3070	220 x 70 x 7		220 x 70 x 7
	3350			
	3650			
	3950			
	4550			
15–16	3070	220 x 70 x 8 (*)		220 x 70 x 8 (*)
	3350			
	3650			
	3950			
	4550			

MIDLUM 4x4

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
TA 12–13–14	3070	220 x 70 x 7		220 x 70 x 7
	3350			
	3650			
	3950			
TC 15–16	3070	220 x 70 x 8 (*)		220 x 70 x 8 (*)
	3350			
	3650			
	3950			

Trade vehicles

Vehicle	GVW (tonnes)	Wheelbase (mm)	Sidemember section
Tanker	16	3350	220 x 70 x 7
		3650	
		3950	
Tanker	18	3650	244 x 70 x 7 (*)
		3950	
		4250	
		4550	
Refuse collector	16	3070	220 x 70 x 7
		3350	
		3650	
Tractor	16	3650	
Road sweeper	10/12	3070	220 x 70 x 5
		3350	
	15	3350	220 x 70 x 7
		3650	
		3950	

4.3 Reinforcement, extension, shortening of sidemembers

If the bodywork or fitted equipment do not modify the chassis weight and dimensions entered in the descriptive notice, the vehicle can be presented to the Type Approval department without intervention from RENAULT V.I. (within the permitted limits in force).
In the event of chassis extension, take care to use a section with size and steel grade identical to those of the sidemembers (consult the chapter “Section and class of sidemember steels”). Contact the RENAULT V.I. Product Applications Department for any further information or to get a list of sales outlets marketing such sections.

4.3.1 Modification to the rear overhang

In the event of extension of the rear overhang, take into consideration the regulations in force and in particular the overhang / wheelbase ratio and recommendations of the bodybuilders guide.

4.3.2 Modification to the wheelbase

For a given vehicle, the section and class of steel for sidemembers depend on:
- GVW,
- suspension type (air or mechanical),
- cab,
- wheelbase.

The maximum extended wheelbase length is that of the largest wheelbase on the same vehicle (same GVW, cab, suspension) fitted with sidemembers of identical section. It is strictly forbidden to overstep this limit.
Vehicles having the maximum permitted length for a given sidemember section cannot therefore have their wheelbase extended.

MIDLUM B

<table>
<tr><th rowspan="2">GVW (tonnes)</th><th rowspan="2">Wheelbase (mm)</th><th colspan="3">Sidemember section</th></tr>
<tr><th>2-door cab mechanical suspension</th><th>2-door cab air suspension</th><th>4-door cab</th></tr>
<tr><td rowspan="7">7.5</td><td>2700</td><td rowspan="5">5050</td><td rowspan="2"></td><td></td></tr>
<tr><td>2950</td><td rowspan="2">4550</td></tr>
<tr><td>3250</td><td rowspan="2"></td></tr>
<tr><td>3850</td><td>extension forbidden</td></tr>
<tr><td>4450</td><td>5050</td><td>extension forbidden</td></tr>
<tr><td>5050</td><td>extension forbidden</td><td>extension forbidden</td><td></td></tr>
<tr><td rowspan="6">10</td><td>2700</td><td rowspan="2">3250</td><td rowspan="3"></td><td></td></tr>
<tr><td>2950</td><td rowspan="4">4550</td></tr>
<tr><td>3250</td><td>extension forbidden</td></tr>
<tr><td>3850</td><td rowspan="2">5050</td><td>extension forbidden</td></tr>
<tr><td>4450</td><td>5050</td></tr>
<tr><td>5050</td><td>extension forbidden</td><td>extension forbidden</td><td>extension forbidden</td></tr>
<tr><td rowspan="5">12</td><td>2950</td><td>3250</td><td rowspan="2"></td><td rowspan="5"></td></tr>
<tr><td>3250</td><td>extension forbidden</td></tr>
<tr><td>3850</td><td rowspan="2">5050</td><td rowspan="2">5050</td></tr>
<tr><td>4450</td></tr>
<tr><td>5050</td><td>extension forbidden</td><td>extension forbidden</td></tr>
</table>

MIDLUM C'

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
12	3070	4550		
	3350			5150
	3650		3950	
	3950		extension forbidden	
	4550	extension forbidden	5150	
	5150		extension forbidden	extension forbidden
	5750	6480	6480	
	6480	extension forbidden	extension forbidden	

MIDLUM C

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
11–12	3070	4550		
	3350			5150
	3650		3950	
	3950		extension forbidden	
	4550	extension forbidden	5150	
	5150		extension forbidden	extension forbidden
	5750	6480	6480	
	6480	extension forbidden	extension forbidden	
13–14	3070	3950		
	3350			5150
	3650		4550	
	3950	extension forbidden		
	4550	5150	extension forbidden	
	5150	extension forbidden	6480	extension forbidden
	5750	6480		
	6480	extension forbidden	extension forbidden	
15–16	3070	4550		
	3350			
	3650		4550	5150
	3950			
	4550	extension forbidden	extension forbidden	
	5150	6480	6480	extension forbidden
	5750			
	6480	extension forbidden	extension forbidden	

MIDLUM D

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
18	3650	5150	5150	
	3950			
	4250			
	4550			
	4850			
	5150	extension forbidden	extension forbidden	
	5450	6780	6780	
	5750			
	6050			
	6480			
	6780	extension forbidden	extension forbidden	

MIDLUM D construction

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
18	3650	4550	4550	
	3950			
	4250			
	4550	extension forbidden	extension forbidden	

MIDLUM HD/construction

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
12–13 14–15 16	3070	4550		4550
	3350			
	3650			
	3950			
	4550	extension forbidden		extension forbidden

Trade vehicles

Vehicle	GVW (tonnes)	Wheelbase (mm)	Sidemember section
Tanker	16	3350	3950
		3650	
		3950	extension forbidden
Tanker	18	3650	4550
		3950	
		4250	
		4550	extension forbidden
Refuse collector	16	3070	3650
		3350	
		3650	extension forbidden
Tractor	16	3350	extension forbidden
Road sweeper	10/12	3070	3350
		3350	extension forbidden
	15	3350	3950
		3650	
		3950	extension forbidden

4.4 Intermediate crossmember

After extension to the rear overhang or the wheelbase:
The fitting of an intermediate crossmember or relay crossmember is vital if the number of crossmembers in the extended vehicle is less than those for the corresponding standard vehicle.
It is therefore essential to consult the 1/20th scale bodybuilder's drawing for the vehicle with lesser or equal wheelbase so as to find out which crossmembers are to be added.

Note
The crossmember that may have to be added will be different depending on the place where the sidemember is sectioned for the purpose of extension. It is therefore strongly advised, before proceeding with cutting, to determine:
- if there is any need to add a crossmember,
- the point where the fitting of the crossmember will be the easiest (e.g. fitting of a simple crossmember rather than a relay crossmember). Consult the RENAULT V.I. Product Applications Department.

Procurement
On account of the diversity of assemblies, consult the RENAULT V.I. Product Applications Department to find out the reference number and position of the crossmember to be added.
Threaded hardware to be used for fastening crossmembers to chassis:
- collar bolt HM12x125x40 class 10.9
- flanged locknut DRH M12.
Tighten to torque.

5. CHANGING THE POSITION OF EQUIPMENT ON CHASSIS

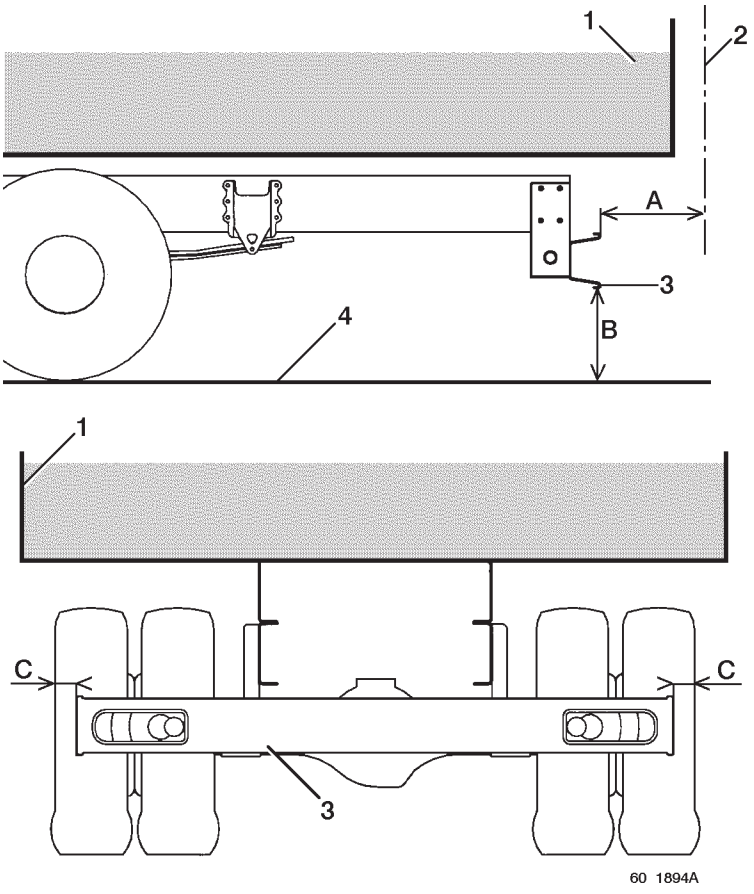
Depending on the vehicle's equipment, drillings existing in the web of sidemembers make it possible to change the position of: rear run-under guard, rear lighting bar, towing crossmember.
Apart from cutting the sidemember, this modification is made without converting the chassis.

5.1 Rear run-under guard

Whatever the position of the rear run-under guard in relation to the chassis, distances (A) and (B) are to be observed without fail.
1 - Body
2 - Body rear overall (including mountings, hinges...)
3 - Run-under guard
4 - Ground
The thickness of mountings and hinges should not exceed 120 mm (distance between centre-line (2) and the rear face of the body).

Vehicle	GVW	A (mm)	B (mm)	C (mm)
MIDLUM B	7.5	250	550	C < 100
	10	375		
	12	250		
MIDLUM C/C'	12	230		
	14			
	16			
MIDLUM HD/Construction	14	219		
	16			
MIDLUM D	18			

A - maximum distance separating the run-under guard to the body rear overall
B - maximum height of run-under guard in relation to ground, vehicle unladen



5.2 Changing the position of the rear run-under guard

The rear run-under guard can be displaced horizontally owing to the presence of drillings in the sidemembers and vertically owing to drillings in its brackets (see drawings on following pages).

Table of possible vertical positionings

Vehicle	Number of position	Maximum movement (mm)	Pitch (mm)
MIDLUM B	2	25	25
MIDLUM C'/C	3	50	
MIDLUM D			
MIDLUM Construction			

The rear run-under guard must be fastened with threaded hardware with dimensions and quality identical to the original. Tighten to torque.

5.3 Changing the position of rear lighting bar lamps

The position of rear lighting bar lamps can be moved horizontally owing to the presence of drillings in the side-members.
The rear lighting bar lamps must be fastened with threaded hardware with dimensions and quality identical to the original. Tighten to torque.

Note:
For vehicles MIDLUM C'/C/D/HD/Construction vehicles, the rear lighting bar lamps can be fastened to the rear spring hangers (tractor version assembly). This assembly requires the use of appropriate parts (see chapter B-5.5).

5.4 Changing the position of the towing crossmember

The position of the towing crossmember can be moved horizontally owing to the presence of drillings in the sidemembers.
The towing crossmember must be fastened with threaded hardware with dimensions and quality identical to the original.
Tighten to torque.

Table of possible horizontal positionings

Vehicle	E	A	D	Z
MIDLUM B 2-door cab	2700	35	630	1515
	2950	35	770	1675
	3250	35	980	1870
	3850	35	1330	2260
	4450	35	1680	2665
	5050	35	1820	3040
MIDLUM B 4-door cab	3250	35	840	1870
	3850	35	1190	2260
	4450	35	1610	2665
	5050	35	1750	3040
MIDLUM Fire Tender 10 tonnes 4-door cab	3250	35	840	1870

Key to diagrams on following pages:
a - High position
b - Low position
W - Maximum vertical displacement
X - Rear axle centre-line
Z - Maximum overhang
1 - Run-under guard
2 - Lighting bar lamps
3 - Towing crossmember

MIDLUM B

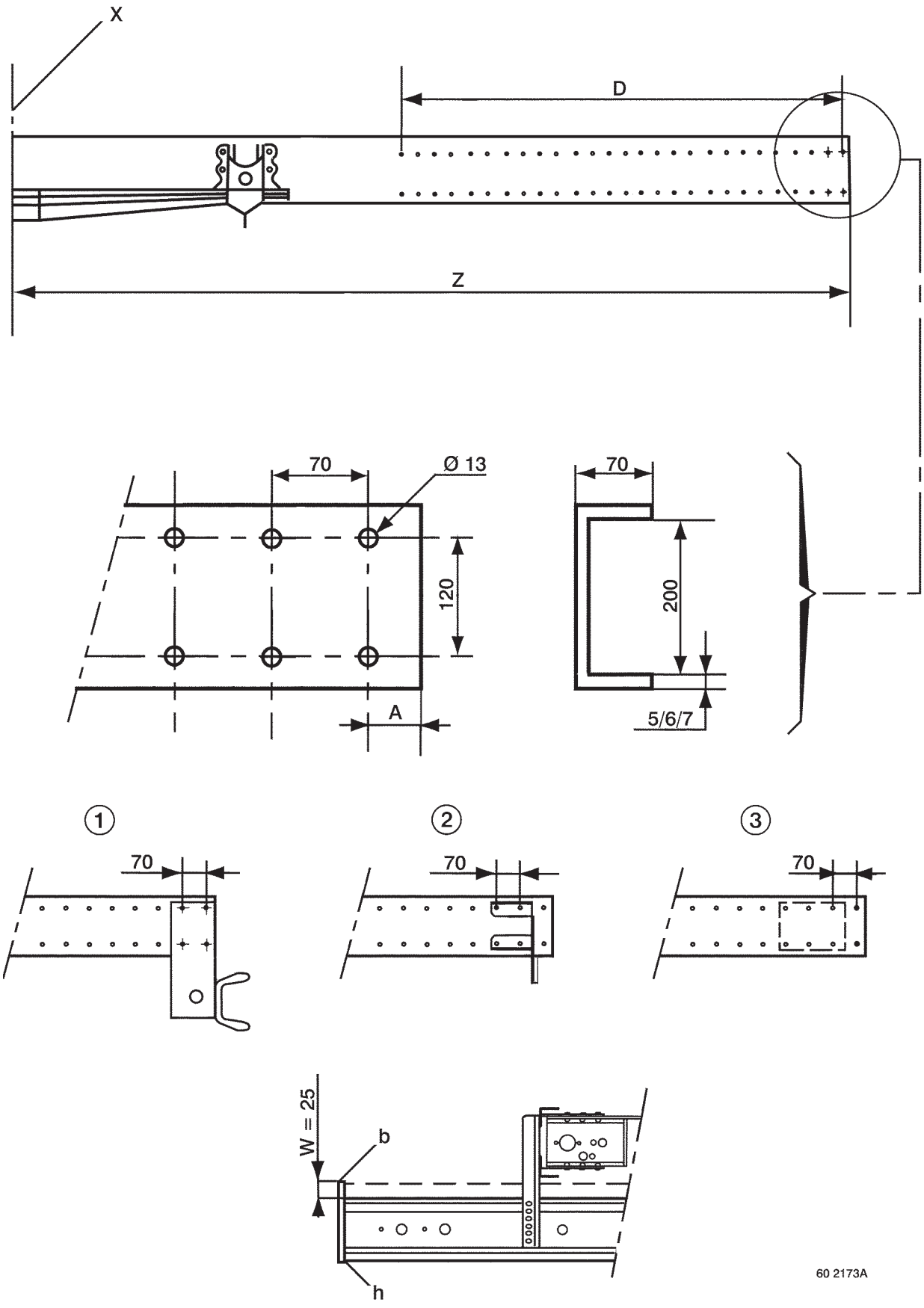
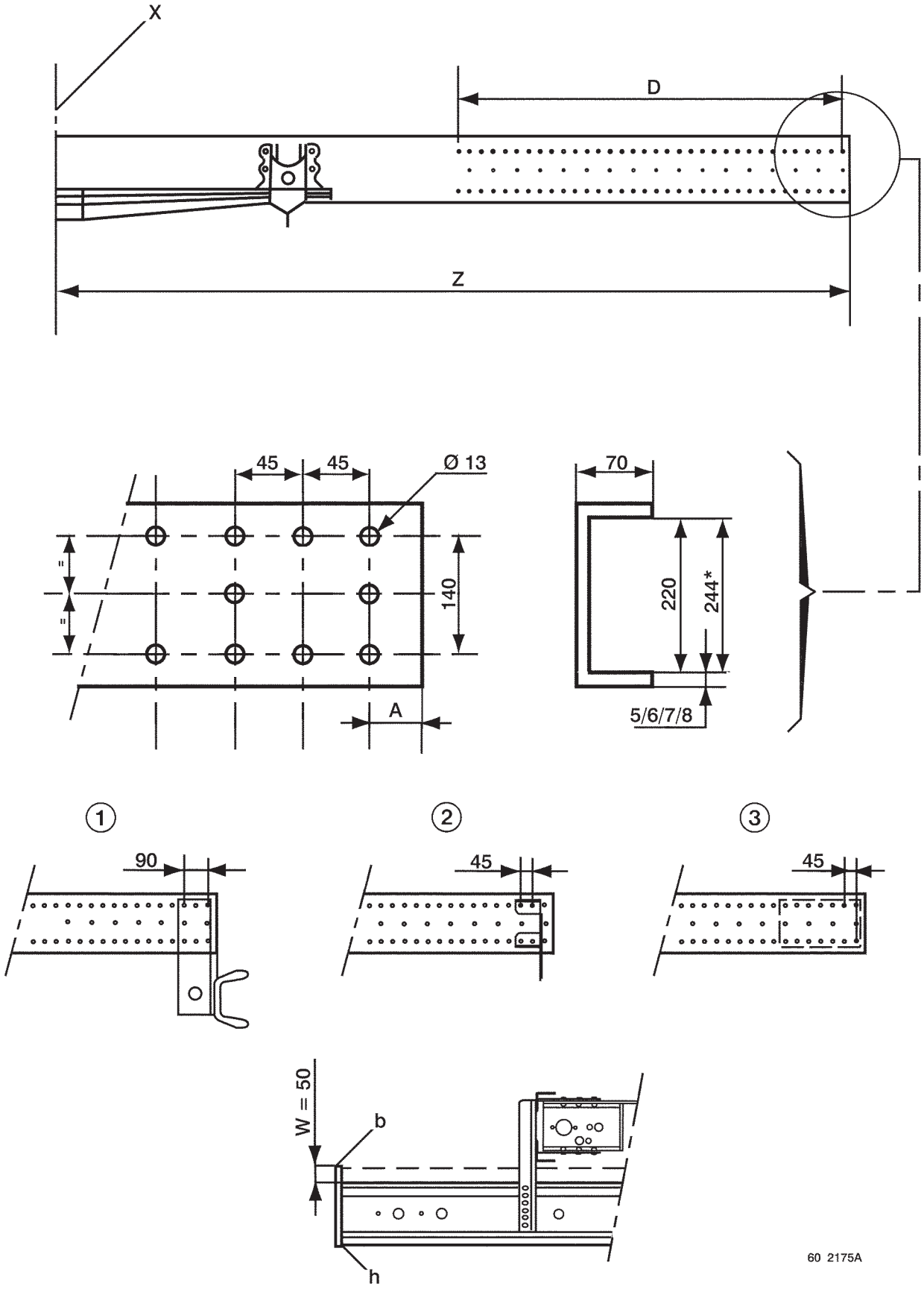


Table of possible horizontal positionings

Vehicle	E	A	D	Z
MIDLUM C/C' 2-door cab	3070	37	585	1700
	3350	37	765	1882
	3650	37	990	2107
	3950	37	1170	2287
	4550	37	1440	2692
	5150	37	1485	3097
	5750	37	1710	3457
	6480	37	1485	3817
MIDLUM D 2-door cab	3650	32	270	1362
	3950	32	360	1452
	4250	32	540	1632
	4550	32	675	1767
	4850	32	800	1902
	5150	32	990	2082
	5450	32	1125	2217
	5750	32	990	2397
	6050	32	990	2522
	6480	32	1305	2757
	6780	32	1305	2907
MIDLUM HD/Construction 2-door cab	3070	37	585	1700
	3350	37	765	1882
	3650	37	990	2107
	3950	37	1170	2287
	4550	37	1440	2692
MIDLUM C' 4-door cab	3350	37	270	1367
	3650	37	405	1507
	3950	37	675	1807
	4550	37	1170	2437
	5150	37	1485	3097
MIDLUM C 4-door cab	3350	37	360	1467
	3650	37	540	1652
	3950	37	855	1967
	4550	37	1350	2597
	5150	37	1530	3122
MIDLUM HD/Construction 4-door cab	3350	37	360	1467
	3650	37	540	1652
	3950	37	855	1967
	4550	37	1350	2597

Key to diagrams on following pages:
a - High position
b - Low position
W - Maximum vertical displacement
X - Rear axle centre-line
Z - Maximum overhang
1 - Run-under guard
2 - Lighting bar lamps
3 - Towing crossmember

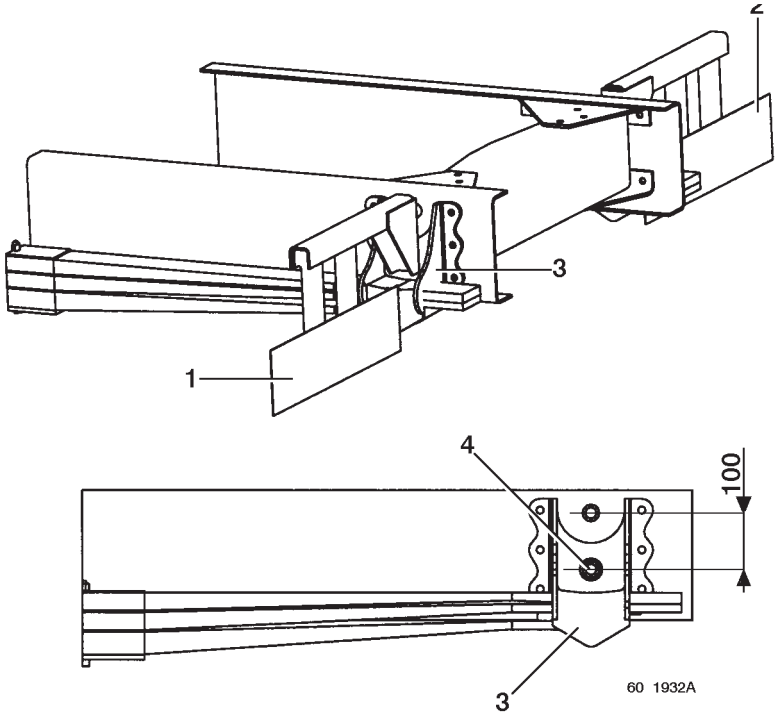
MIDLUM C'/C/D*/HD/Construction



5.5 Assembly of rear lamps to lighting bar - tractor version (on MIDLUM C/C'/HD/Construction only)

In the event of reduction of the rear overhang, the rear lamps can be assembled on a rear lighting bar in accordance with fittings to MIDLUM tractors. It is then necessary to replace the lamp brackets.
Drill a 13 mm diameter hole at point (**4**).
Fit the nuts and bolts and tighten to torque.

Procurement:
- LH bracket ref. N° 50 00 452 773
- RH bracket ref. N° 50 00 452 775
- 4 collar screws M12x125x80 class 10.9 ref. N° 50 03 002 067
- 4 flanged nuts DRH M12 class 10.9 ref. N° 50 03 033 012



1 - LH lamp bracket
2 - RH lamp bracket
3 - spring rear hanger
4 - hole dia. 13 mm to be drilled

5.6 Changing the position of the cab tilting manual pump

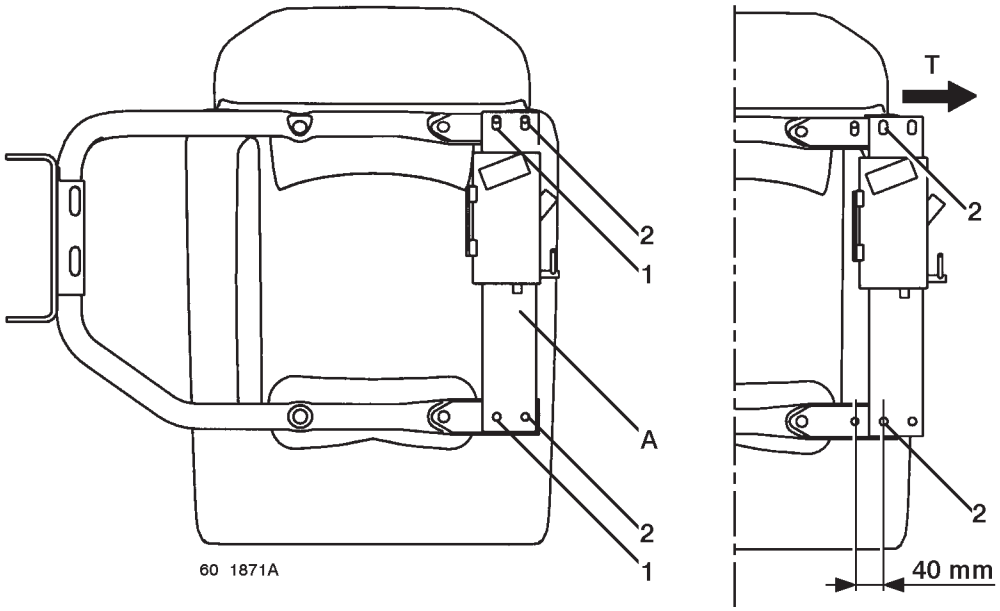
When fitting a body with overall width greater than or equal to 2550 mm, check that the cab tilting pump lever runs its full travel and that it does not abut with the lower RH corner of the bodywork.

If necessary, change the position of the cab tilting manual pump.
Depending on the vehicle, there are two possible positions for the change.

Any other method of changing position is authorized only if:
- it does not involve work on the tilting hydraulic system,
- it does not generate any mechanical, thermal or wear stress to high-pressure piping.

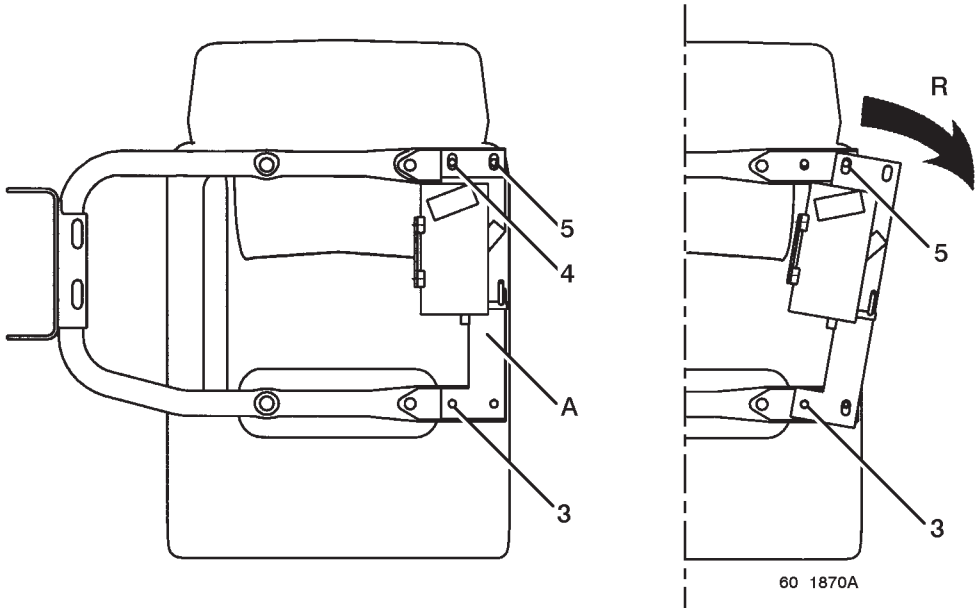
MIDLUM C/C'/HD/Construction

The position of the pump is changed by pushing the bracket in direction (**T**) towards the exterior.
The internal oblong holes in bracket (**A**) are to be moved from (**1**) to (**2**).



MIDLUM B

The position of the pump is changed by rotating the bracket in direction (**R**) in relation to the stud (**3**).
The internal oblong hole in bracket (**A**) is to be moved from (**4**) to (**5**).

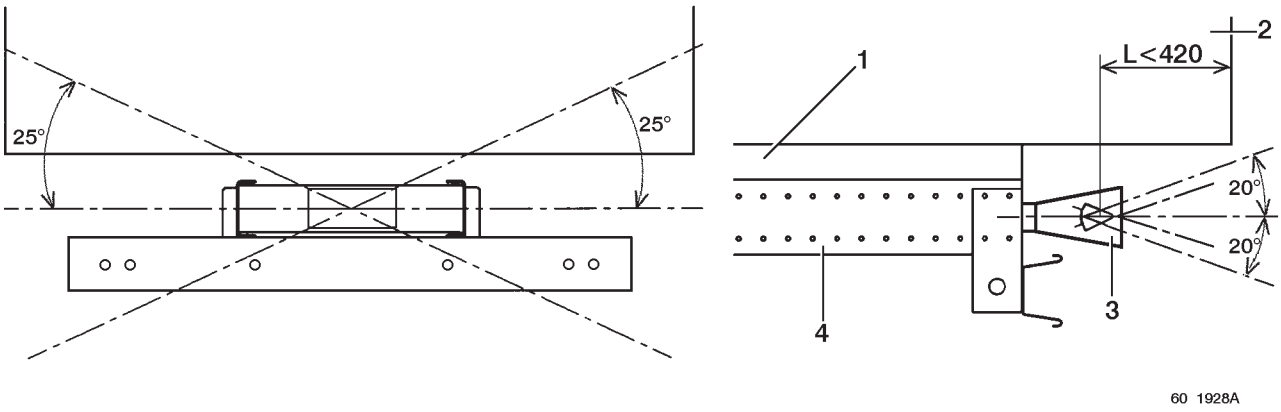


5.7 Trailer hitch coupling

5.7.1 Maximum permissible range of movement

The maximum permissible range of movement is given for guidance for a sub-frame with height 100 mm, a towbar diameter of 65 mm and a body protrusion distance (L) less than 420 mm.

1 - Sub-frame
2 - Body
3 - Towing hook
4 - Chassis



5.7.2 Towing crossmember

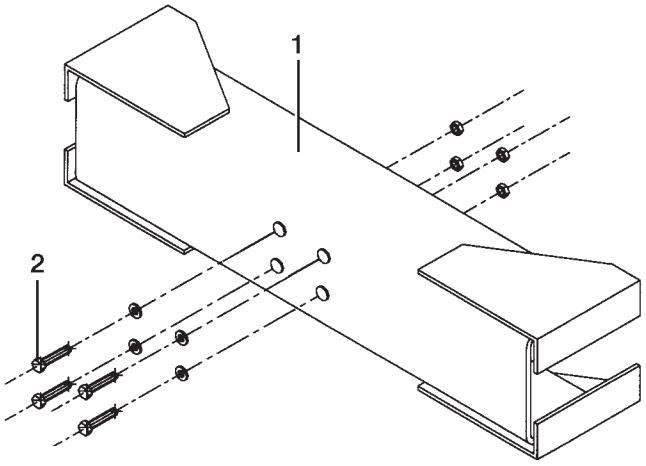
Table of towing crossmembers in relation to towed load

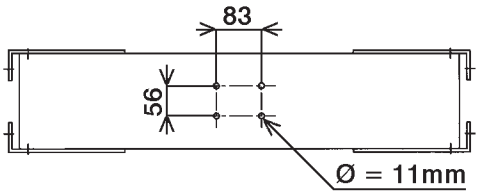
Vehicle	Maximum towable load (C)	
	C ≤ 3500 kg	**C > 3500 kg**
MIDLUM B	50 10 238 113	50 10 228 647
MIDLUM C'/C	50 10 228 650	50 10 228 649
MIDLUM D		
MIDLUM HD/ construction		

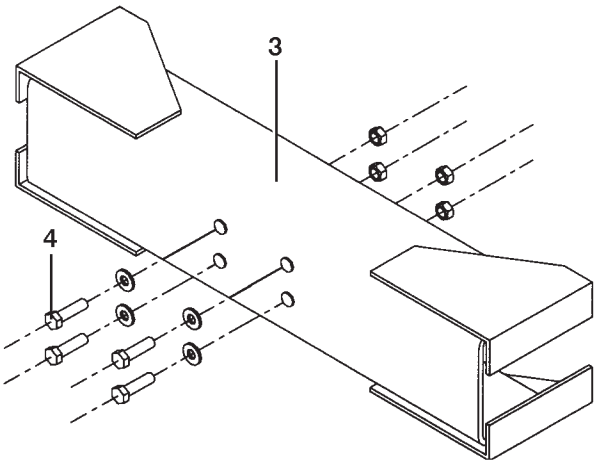
The towing crossmember is to be attached to the chassis by means of bolt hardware 12x125 with locknuts, class 10.9 with S2S protection. The use of nuts with nylon ring (e.g. Nyloc) are forbidden. Tighten to torque. The towing hook is to be attached to the crossmember by means of nut and bolt hardware, class 10.9 with S2S protection. The use of nuts with nylon ring (e.g. Nyloc) are forbidden. Tighten to torque.

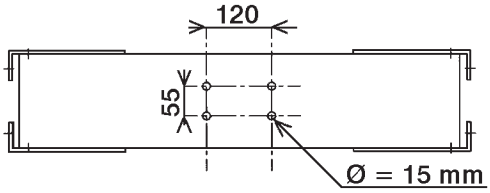
Key to diagram

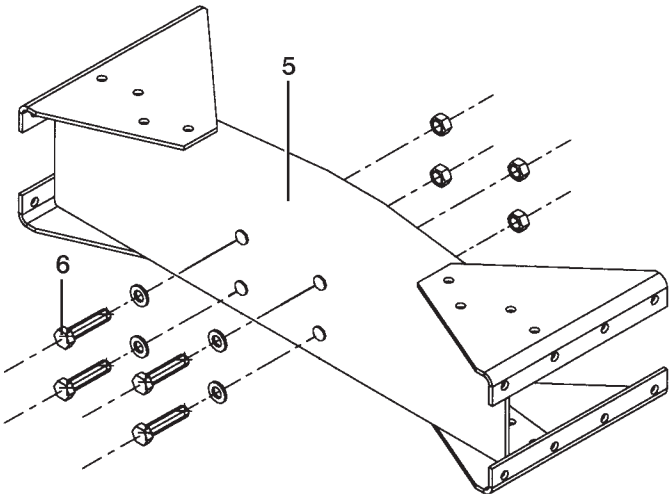
1 - Crossmember 50.10.328.113 & 50.10.228.650
2 - Bolt HM10x125x50, washer 10x20x2.5, nut DRH M10
3 - Crossmember 50.10.228.647
4 - Bolt HM14x150x80, washer 14x30x3.2, nut DRH M14
5 - Crossmember 50.10.228.649
6 - Bolt HM16x150x70, washer 16x30x3, nut DRH M16

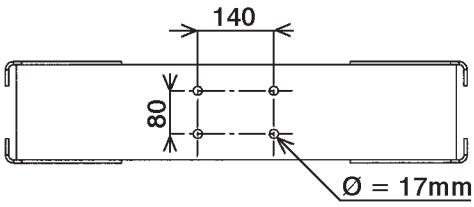












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6. CAB FOOTPRINT

When fitting equipment behind and above the cab (e.g. reefer unit), consideration must be taken of cab overall dimensions due to:
- cab vertical and horizontal range of movement (suspended cab),
- cab tilting.

The clearance zone for cab tilting takes into consideration:
- range of movement of cab suspension,
- safety clearance to be kept between cab and equipment.

No built-on element is be located in this zone.

The minimum clearance (**J**) should be no less than the minimum clearance recommended in the tables so as to avoid contact between the bodywork and the rear end of the cab.

The values (**H - J - K**) are to be observed for vehicles fitted with under-floor engine air intakes and lateral exhausts.

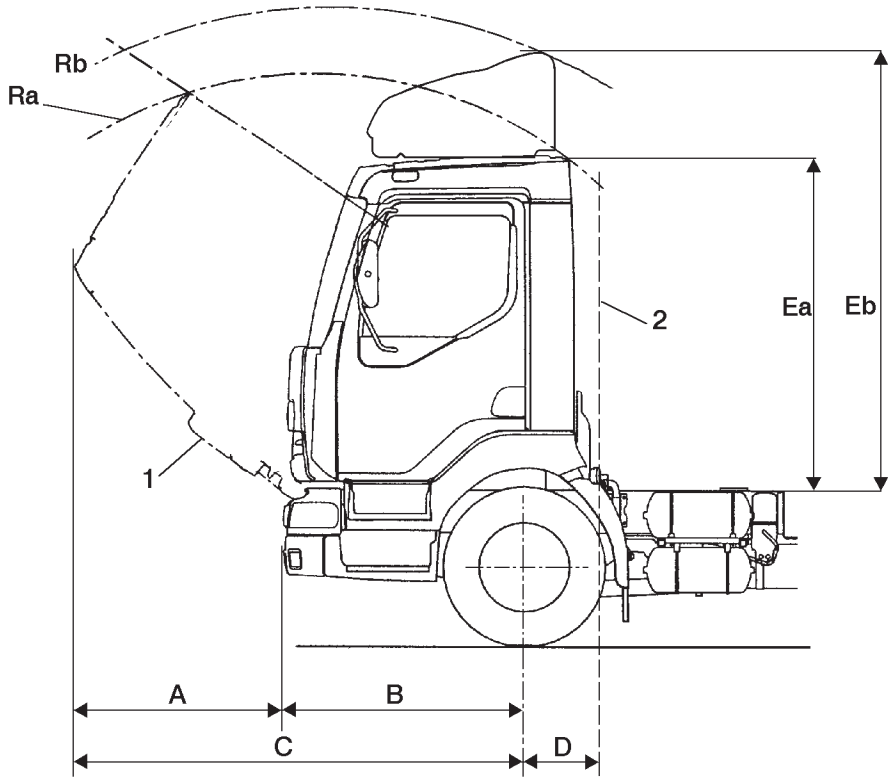
6.1 Day cab

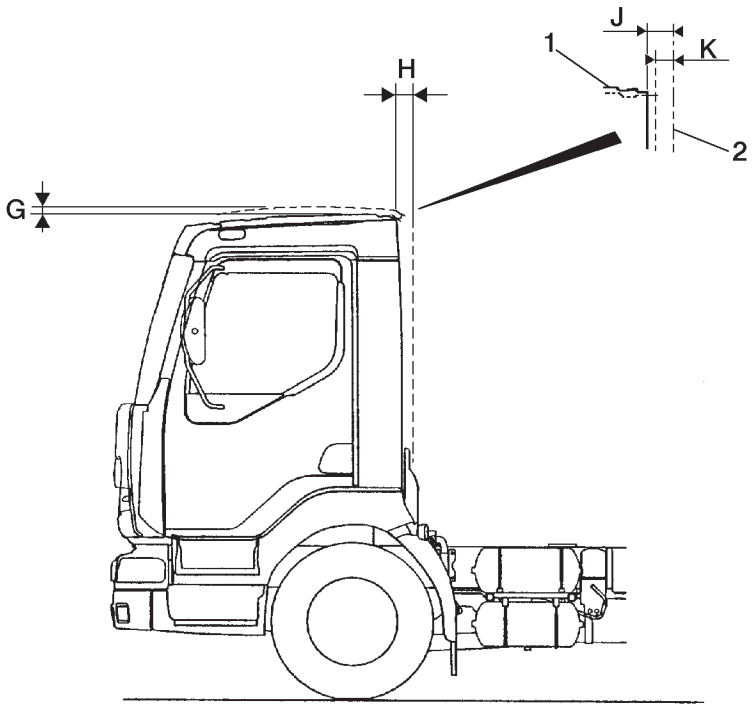
Vehicle	**MIDLUM B**	**MIDLUM C' / C**		**MIDLUM HD construction/4x4**		**MIDLUM D**	
Cab suspension	**Rubber mountings**	**Rubber mountings**	**Mixed**	**Rubber mountings**	**Mixed**	**Mixed**	**Springs**
A	1138			1073		1138	
B	1275	1325		1390		1325	
C	2413	2463					
Ea	1877						
Eb	2479						
G	25		35	25	35		
H	30		50	30	50		
J	100						128
K	95	70	50	70	50		70
Ra	2320						2342
Rb	2774						2796

Key
1 - Cab
2 - Bodywork maximum advance
A - Front protrusion of tilted cab in relation to shield
B - Front overhang
C - Front protrusion of tilted cab in relation to front axle centre-line
Ea - Height of cab in relation to sidemember (without RENAULT V.I. roof-mounted deflector)
Eb - Height of cab in relation to sidemember (with RENAULT V.I. roof-mounted deflector)
G - Cab maximum vertical movement
H - Cab maximum horizontal movement
J - Minimum clearance between cab and body at standstill
K - Minimum clearance between cab and body upon start-up
Ra - Radius of clearance necessary for tilting the cab (without RENAULT V.I. roof-mounted deflector)
Rb - Radius of clearance necessary for tilting the cab (with RENAULT V.I. roof-mounted deflector)

- Mixed cab suspension: cab suspended on 2 flexible mountings to the front and 2 spring/shock absorber combinations to the rear.
- Cab suspension with flexible mountings: cab suspended on 4 flexible mountings.

- Integral spring suspension: cab suspended by 4 spring/shock absorber combinations.





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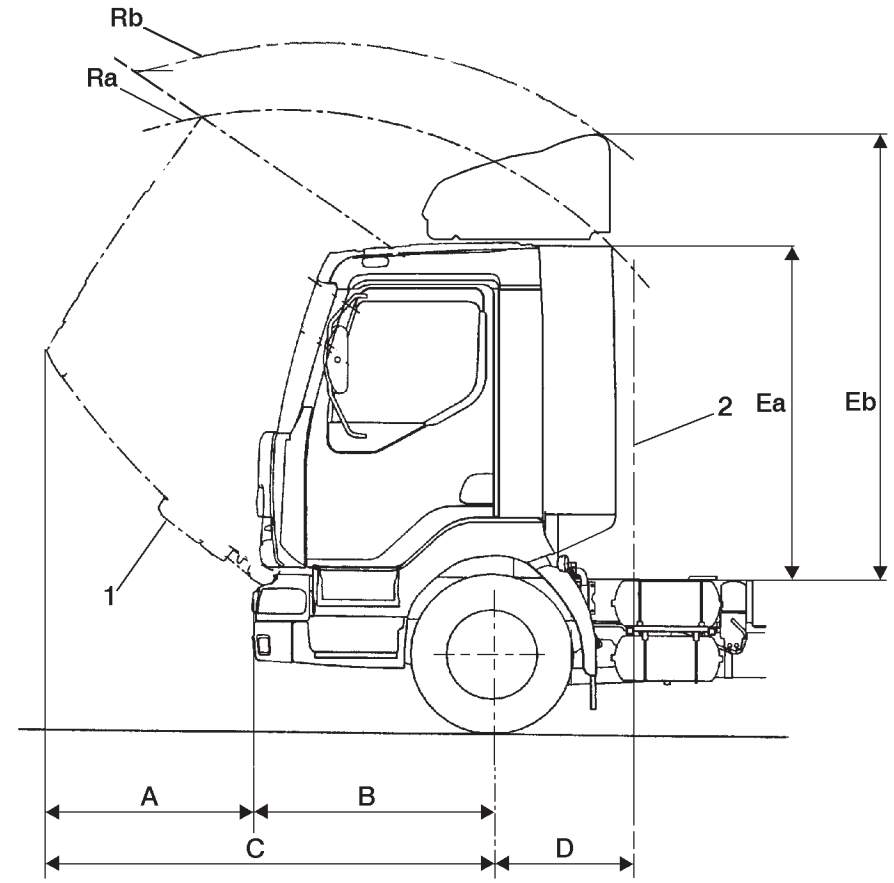
6.2 Sleeper cab

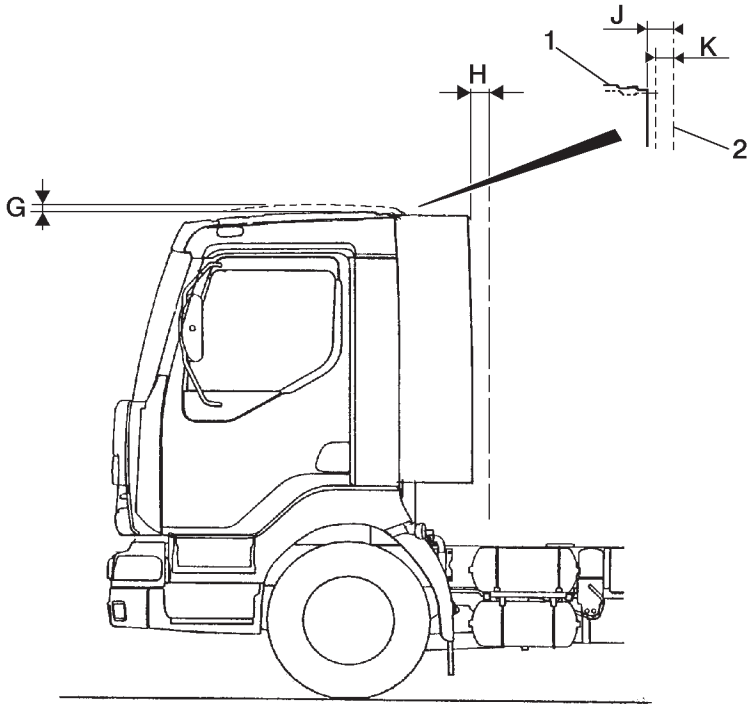
Vehicle	MIDLUM B	MIDLUM C' / C		MIDLUM HD construction		MIDLUM D	
Cab suspension	**Rubber mountings**	**Rubber mountings**	**Mixed**	**Rubber mountings**	**Mixed**	**Mixed**	**Springs**
A	1138			1073		1138	
B	1275	1325		1390		1325	
C	2413	2463					
Ea	1877						
Eb	2487						
G	25		28	25	28		30
H	30						35
J	45						
K	15						10
Ra	2585						2608
Rb	2944						2967

Key
1 - Cab
2 - Bodywork maximum advance
A - Front protrusion of tilted cab in relation to shield
B - Front overhang
C - Front protrusion of tilted cab in relation to front axle centre-line
Ea - Height of cab in relation to sidemember (without RENAULT V.I. roof-mounted deflector)
Eb - Height of cab in relation to sidemember (with RENAULT V.I. roof-mounted deflector)
G - Cab maximum vertical movement
H - Cab maximum horizontal movement
J - Minimum clearance between cab and body at standstill
K - Minimum clearance between cab and body upon start-up
Ra - Radius of clearance necessary for tilting the cab (without RENAULT V.I. roof-mounted deflector)
Rb - Radius of clearance necessary for tilting the cab (with RENAULT V.I. roof-mounted deflector)

- Mixed cab suspension: cab suspended on 2 flexible mountings to the front and 2 spring/shock absorber combinations to the rear.
- Cab suspension with flexible mountings: cab suspended on 4 flexible mountings.

- Integral spring suspension: cab suspended by 4 spring/shock absorber combinations.





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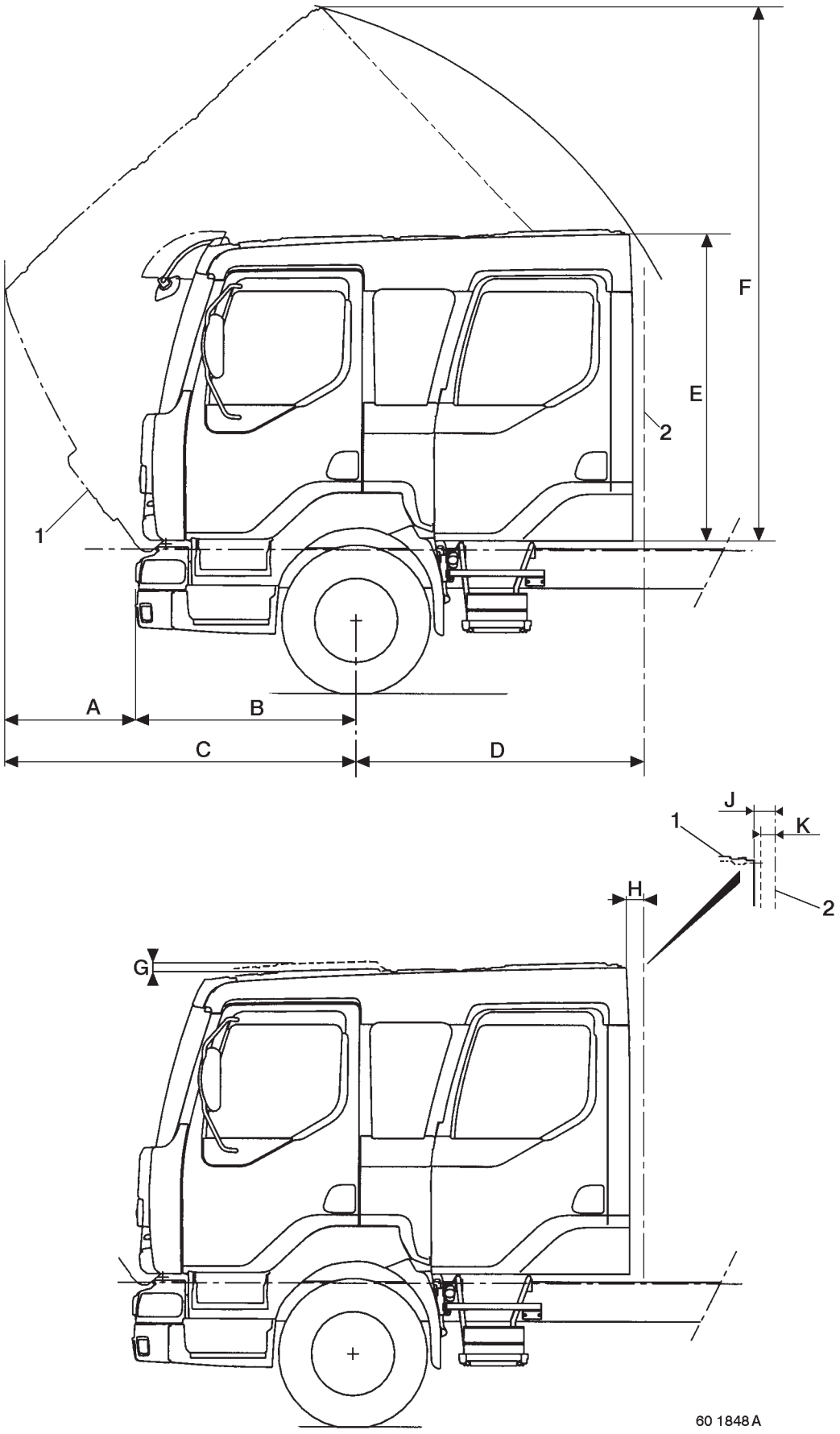
6.3 6/7 place cab

	MIDLUM B	MIDLUM C / C'	MIDLUM HD construction / 4x4
A	777		712
B	1275	1325	1390
C	2052	2102	
E	1882		
F	3230		
G	28		
H	30		
J	50		
K	20		
R	3344		

Key
1 - cab
2 - bodywork maximum advance
A - front protrusion of tilted cab in relation to shield
B - front overhang
C - front protrusion of tilted cab in relation to front axle centre-line
E - height of cab (in relation to sidemember)
F - maximum height of tilted cab (in relation to sidemember)
G - cab maximum vertical movement
H - cab maximum horizontal movement
J - minimum clearance between cab and body at standstill
K - minimum clearance between cab and body upon start-up
R - radius of clearance zone necessary for tilting the cab

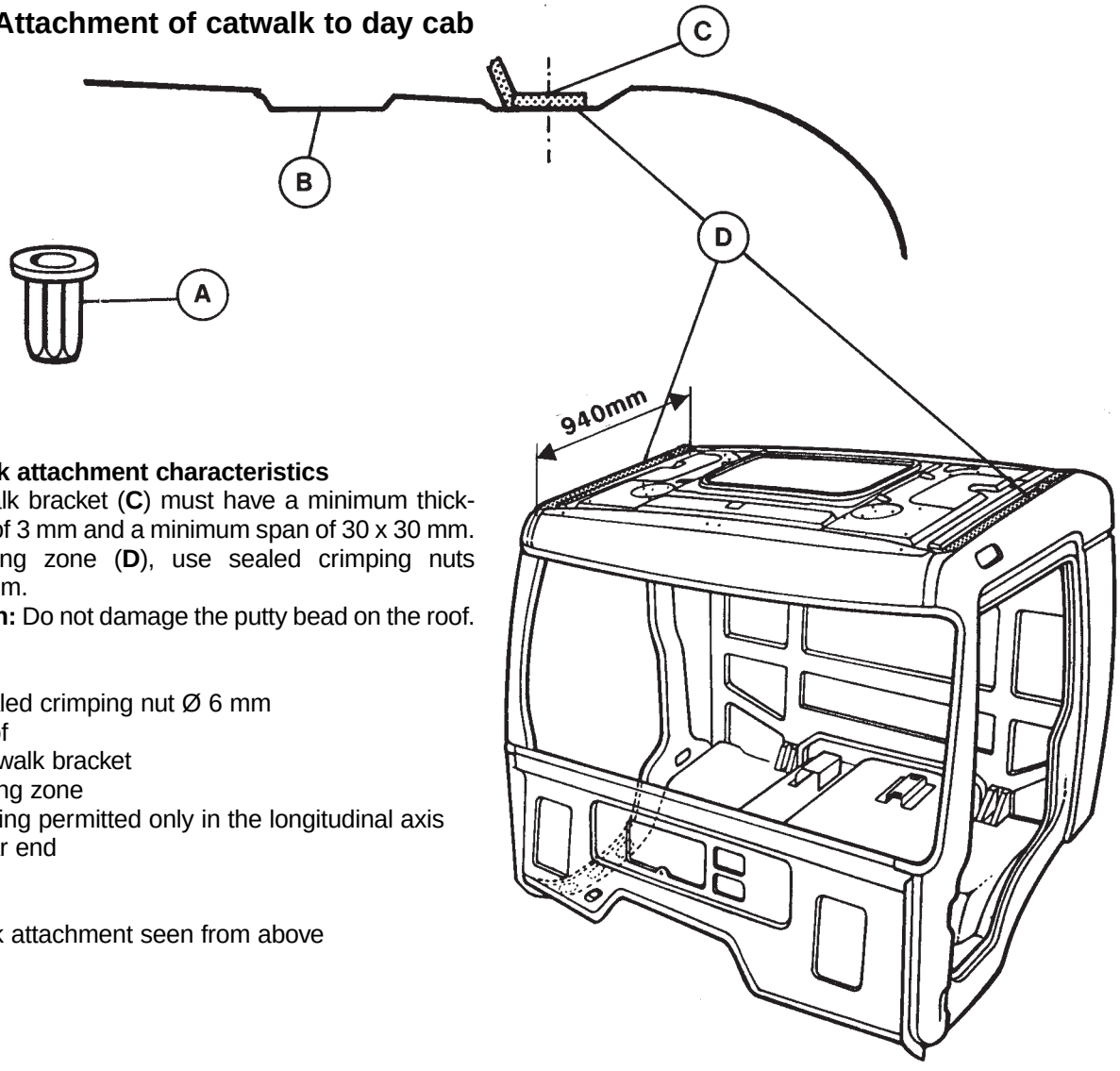

F
E
2
1
A
B
C
D
J
K
1
H
2
G
60 1848 A

7. ASSEMBLY OF EQUIPMENT TO CAB

7.1 Roof catwalk

The cab roofs are designed to accommodate the attachment of a catwalk.

7.1.1 Attachment of catwalk to day cab



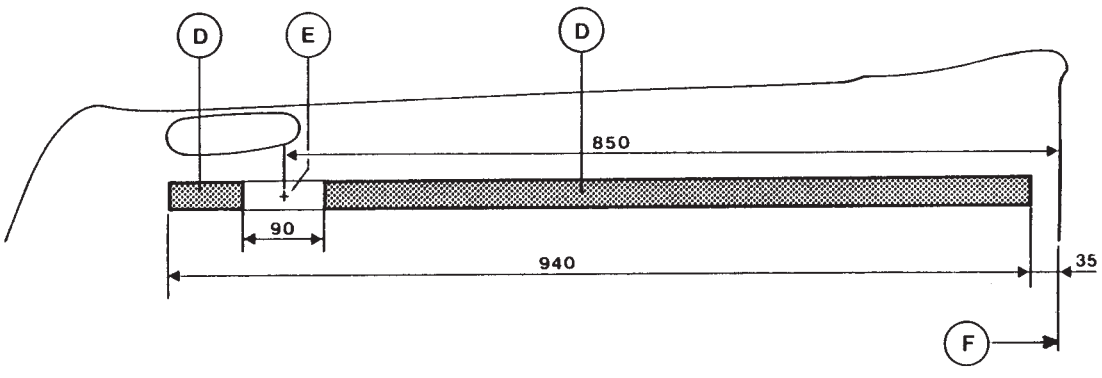
Catwalk attachment characteristics

- Catwalk bracket (**C**) must have a minimum thickness of 3 mm and a minimum span of 30 x 30 mm.
- In fixing zone (**D**), use sealed crimping nuts Ø 6 mm.

Caution: Do not damage the putty bead on the roof.

A - Sealed crimping nut Ø 6 mm
B - Roof
C - Catwalk bracket
D - Fixing zone
E - Drilling permitted only in the longitudinal axis
F - Rear end

Catwalk attachment seen from above



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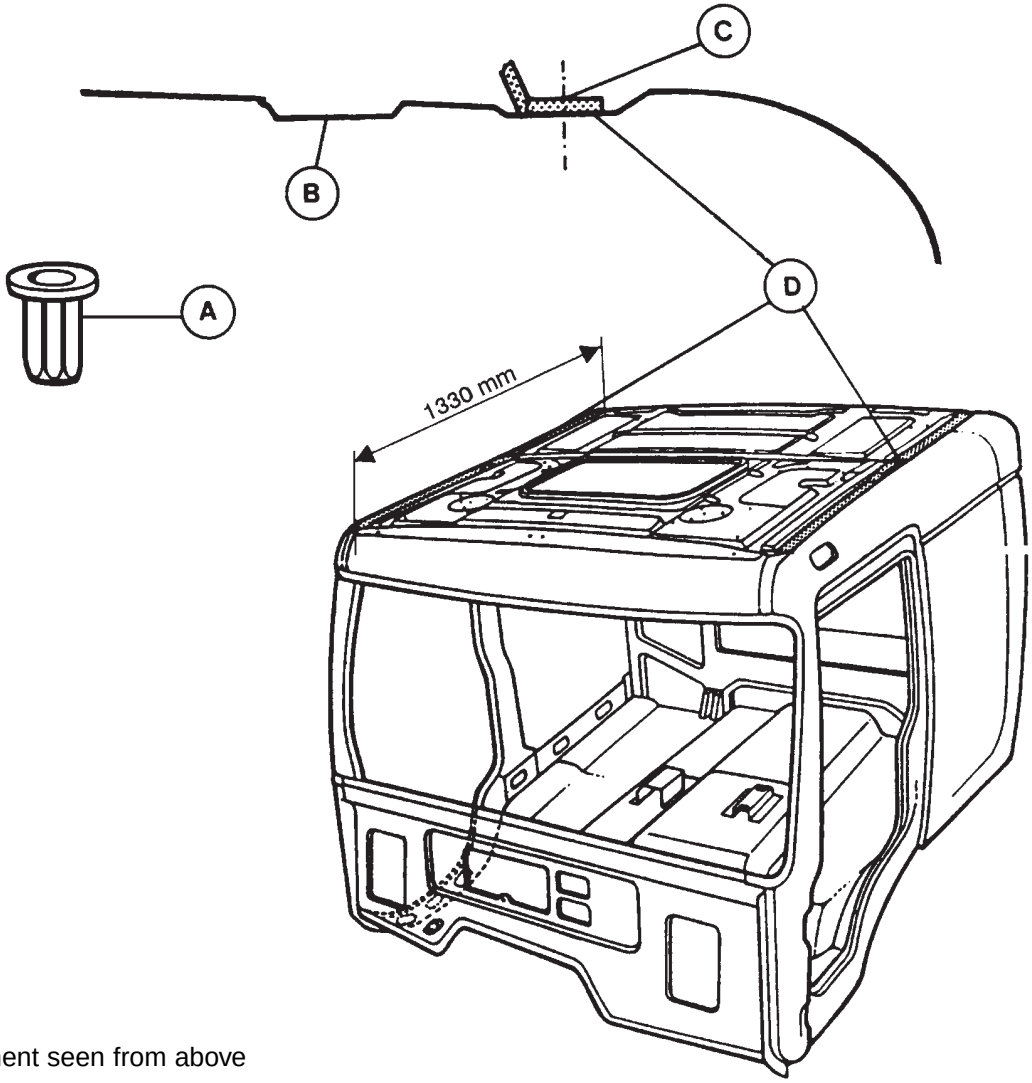
7.1.2 Attachment of catwalk to sleeper cab

Catwalk attachment characteristics

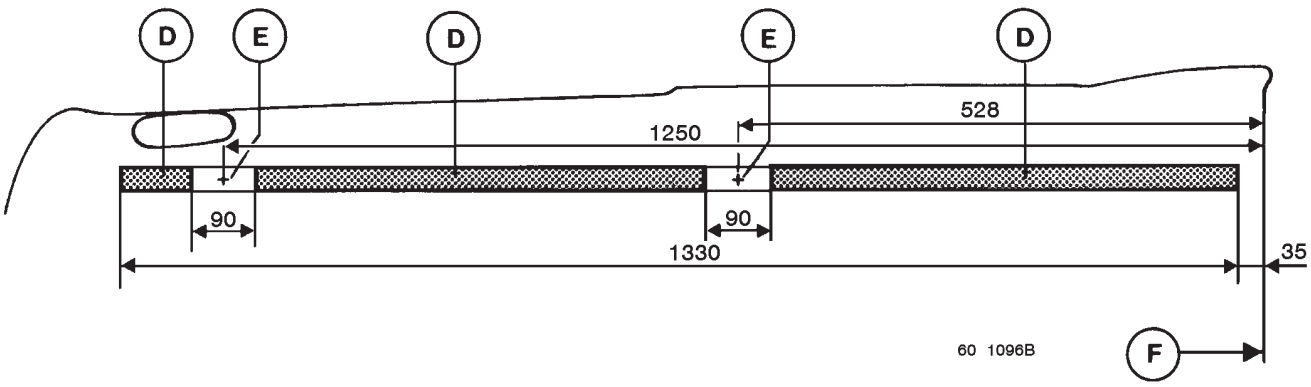
- Catwalk bracket (**C**) must have a minimum thickness of 3 mm and a minimum span of 30 x 30 mm.
- In fixing zone (**D**), use sealed crimping nuts Ø 6 mm.

Caution: Do not damage the putty bead on the roof.

A - Sealed crimping nut Ø 6 mm
B - Roof
C - Catwalk bracket
D - Fixing zone
E - Drilling permitted only in the longitudinal axis
F - Rear end



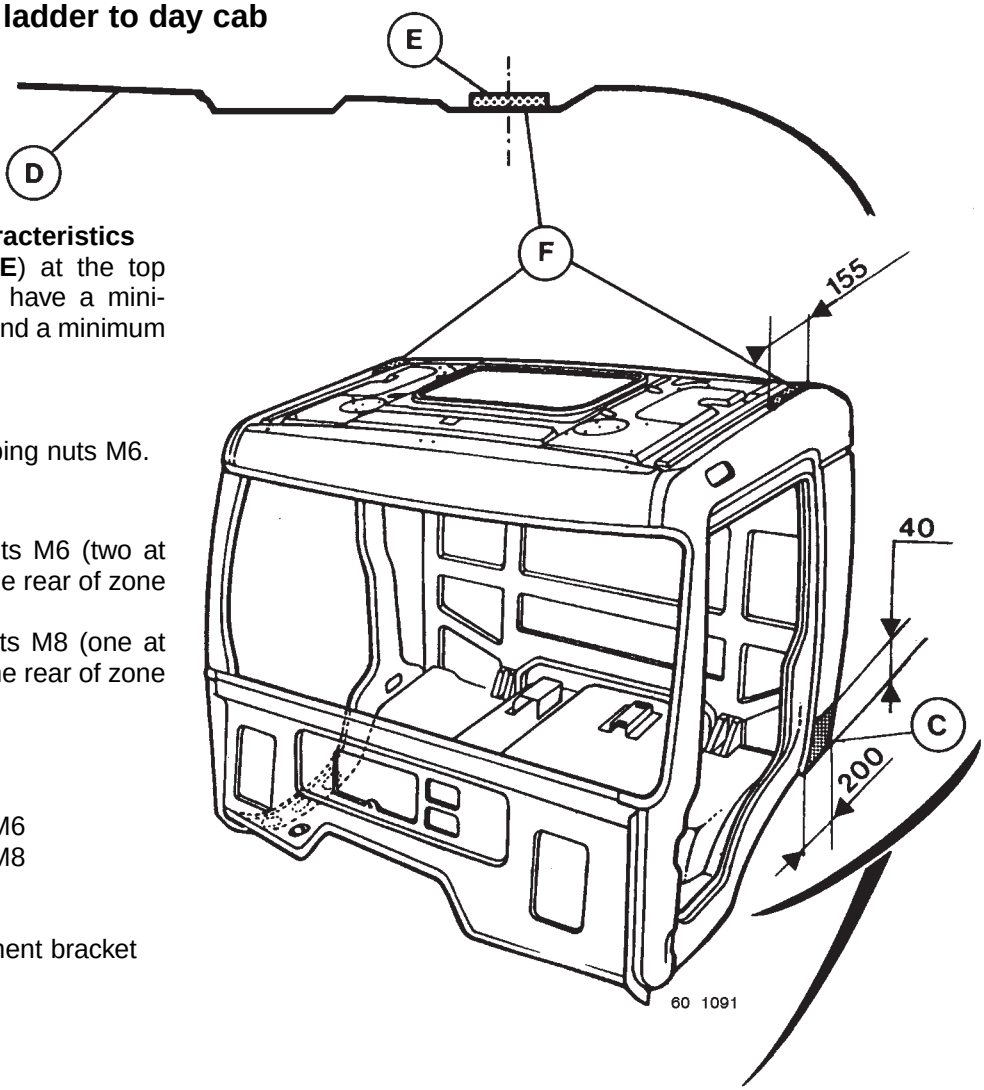
Catwalk attachment seen from above



7.2 Ladder

The design of the roof and the lower parts of the cab sides allow a ladder to be attached on the LH side or on the RH side, except for the RH side of day cabs.

7.2.1 Attachment of ladder to day cab



Ladder attachment characteristics

The ladder brackets (**C-E**) at the top and at the bottom must have a minimum thickness of 3 mm and a minimum span of 30 x 30 mm.

Top part (zone F):

- one or two sealed crimping nuts M6.

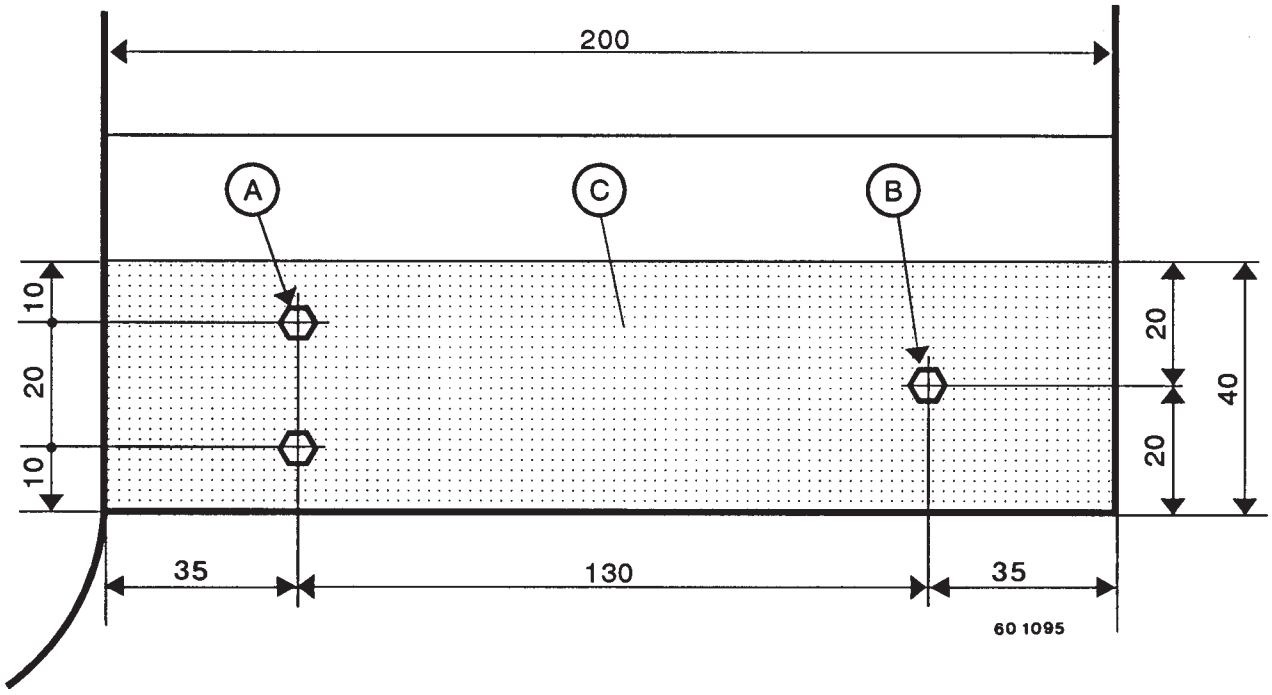
Bottom part (zone C):

Two possibilities:

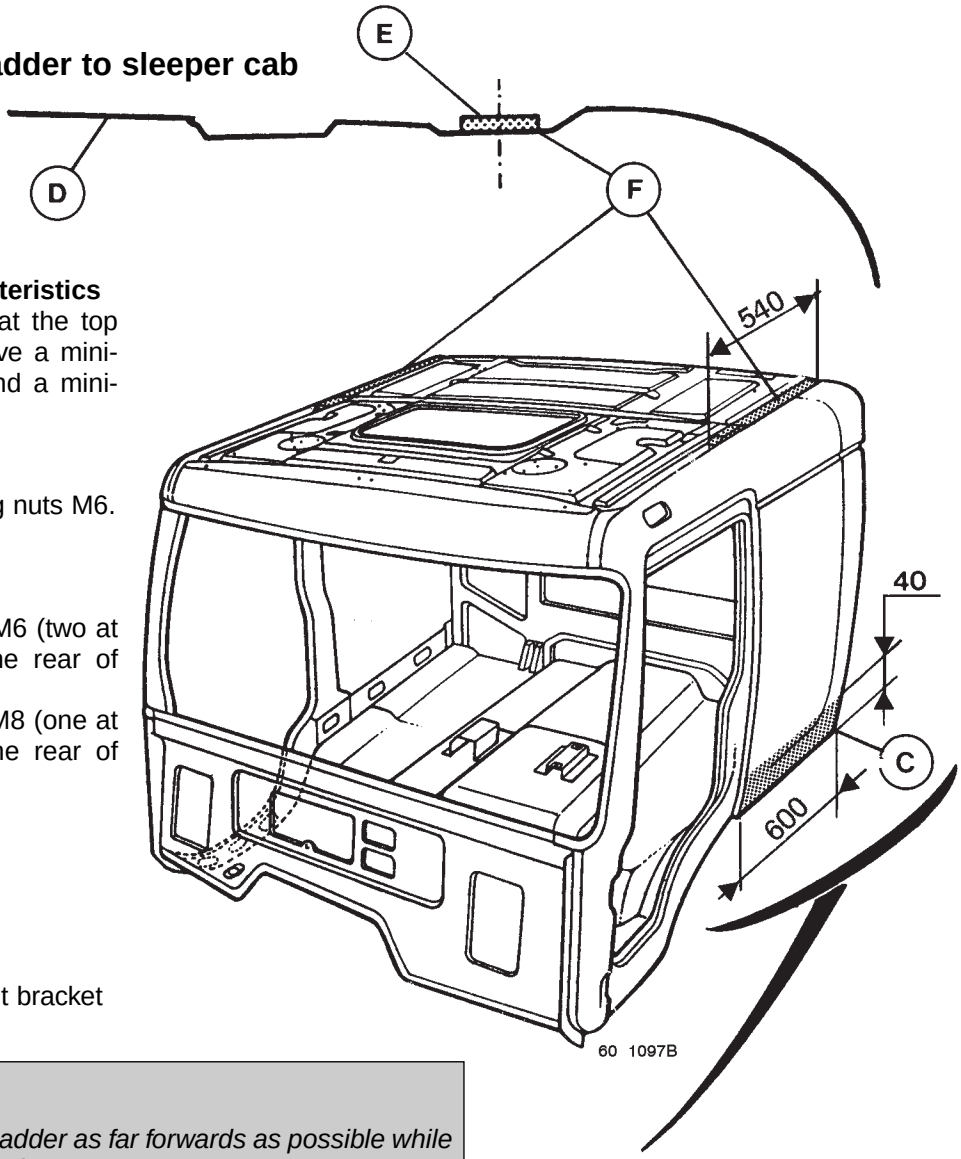
A - 4 sealed crimping nuts M6 (two at the front and two at the rear of zone (**C**).

B - 2 sealed crimping nuts M8 (one at the front and one at the rear of zone (**C**).

A - Sealed crimping nut M6
A - Sealed crimping nut M8
C - Lower fixing zone
D - Roof
E - Ladder upper attachment bracket
F - Upper fixing zone



7.2.2 Attachment of ladder to sleeper cab



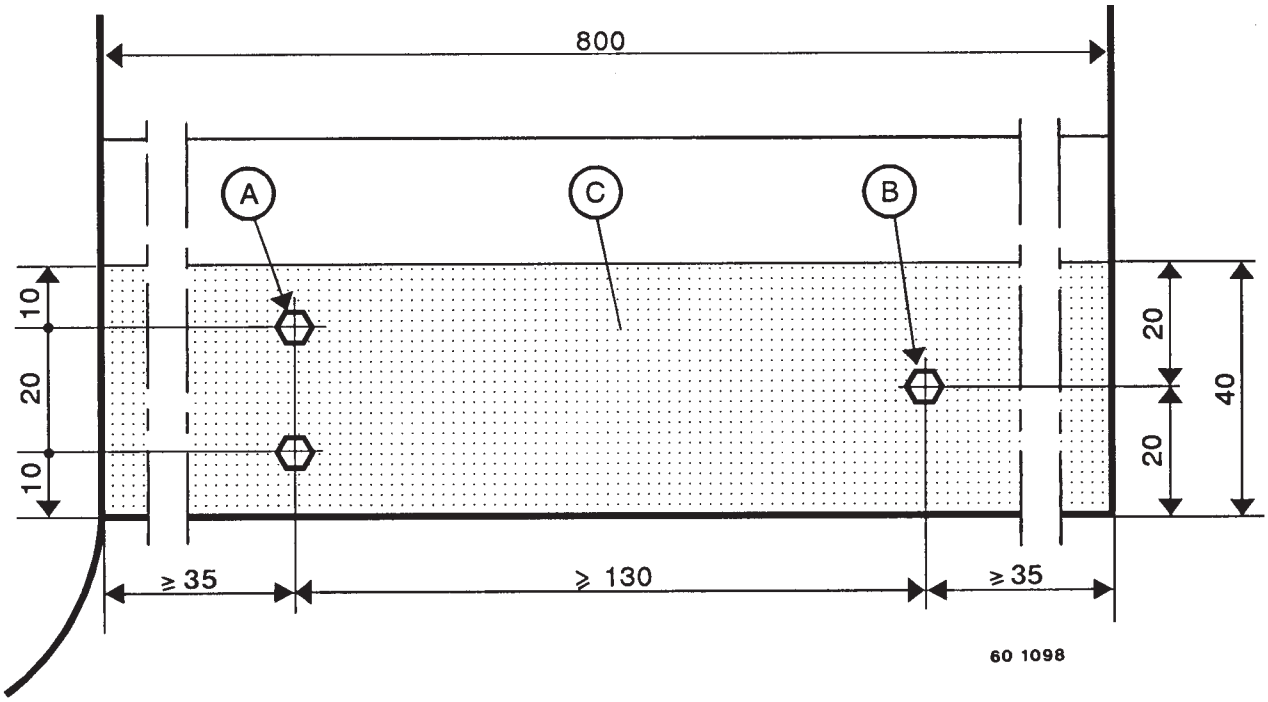
Ladder attachment characteristics
The ladder brackets (**C-E**) at the top and at the bottom must have a minimum thickness of 3 mm and a minimum span of 30 x 30 mm.

Top part (zone F):
- one or two sealed crimping nuts M6.

Bottom part (zone C):
Two possibilities:
A - 4 sealed crimping nuts M6 (two at the front and two at the rear of zone (**C**).
B - 2 sealed crimping nuts M8 (one at the front and one at the rear of zone (**C**).

A - Sealed crimping nut M6
A - Sealed crimping nut M8
C - Lower fixing zone
D - Roof
E - Ladder upper attachment bracket
F - Upper fixing zone

IMPORTANT
It is advised to position the ladder as far forwards as possible while observing the dimensions below, so as to:
- facilitate access to the ladder,
- avoid any interference between the ladder and external lugs on chassis or cab.



7.3 Assembly of accessories on roof

IMPORTANT
The roof is different according to the cab original fitment equipment:
- Welded fixing nuts (1) for the deflector are used only with roof stiffeners on cabs equipped with deflector as standard.
- Sunshade, frontview mirror and gantry are components requiring the presence of a stiffener (2) welded as standard to the cab for their installation. This stiffener, located in an inaccessible zone, cannot be assembled as aftermarket fitment. On account of this, installation of sunshade, gantry and frontview mirror can only be carried out if certain conditions are met. Installation possibilities are detailed in chapter C-7.3.5, 7.3.6, 7.3.7.

1 - Weld nuts
2 - Canopy reinforcement
3 - Canopy
4 - Roof
5 - Roof extension (sleeper cab)
6 - Stiffener extension (sleeper cab)
7 - Stiffener

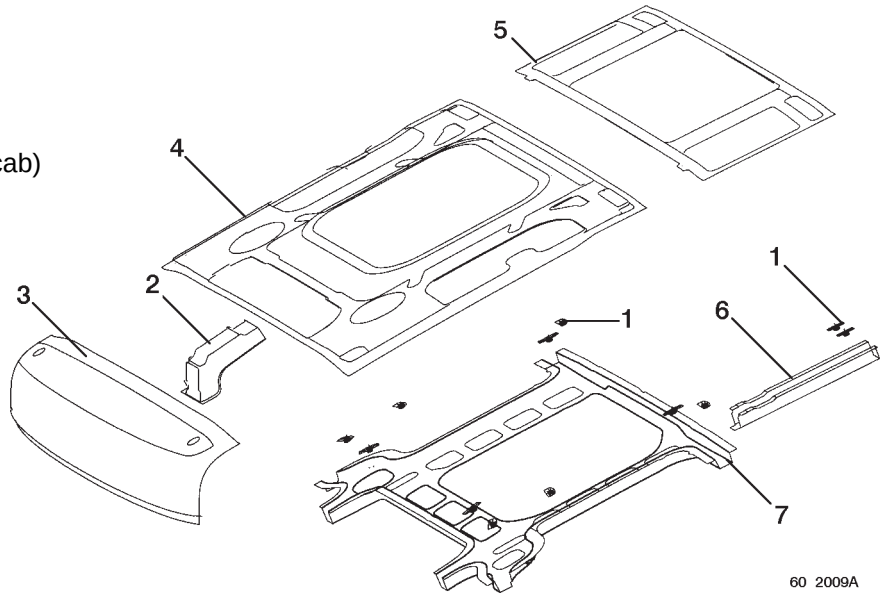


Table of roof assembly possibilities

The following table indicates:
- the exhaustive list of possible assemblies and combinations,
- the minimum configuration necessary for assembly.

Any combination other than that quoted in the table is forbidden (especially deflector / gantry incompatibility).

Assembly possibility according to roof	Roof configuration	
	Nuts (1)	Stiffener (2)
Gantry	X	X
Gantry and sunshade	X	X
Gantry and frontview mirror	X	X
Gantry, sunshade and frontview mirror	X	X
Deflector and sunshade	X	X
Deflector and frontview mirror	X	X
Deflector, sunshade and frontview mirror	X	X
Sunshade		X
Frontview mirror		X
Sunshade and frontview mirror		X
Deflector	X (*)	

(*) Weld nuts are used in the case of replacement of a deflector by a gantry.
If not, it is essential to use the clamping segments supplied with the deflector assembly kit.

Equipment capable of being assembled, whatever the roof:
- Revolving beacons
- CB antenna
- Telephone antenna
- Air horns.

On the roof, impressions locate the position of accessory fastenings

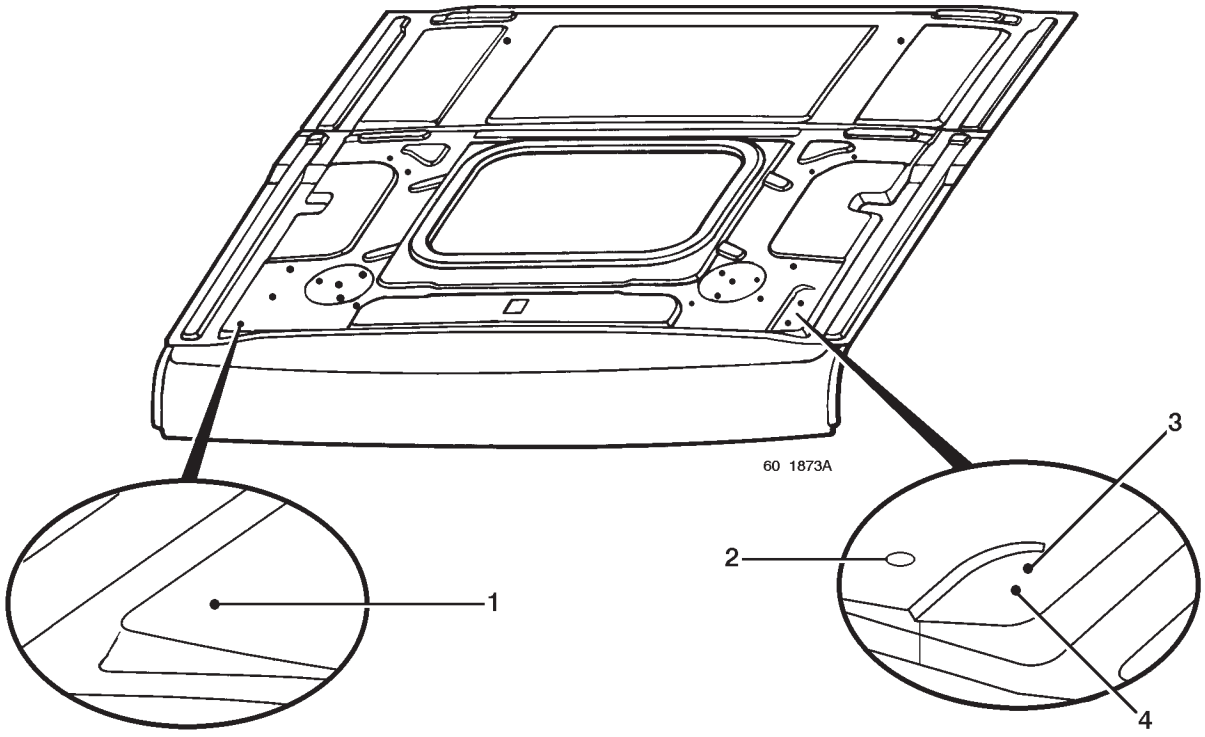
7.3.1 Installation of antennae

CB antenna:
- Wiring harness passage: at point (**3**), drill a hole diameter 4.5 mm.
- Antenna fastening: at point (**4**), drill a hole diameter 8.5 mm.

Telephone antenna
- At point (**1**), drill a hole diameter 14.5 mm.

Fire antenna
- Locate drilling point (**2**) using the template supplied in the installation kit
- Drill a hole diameter 24.5 mm

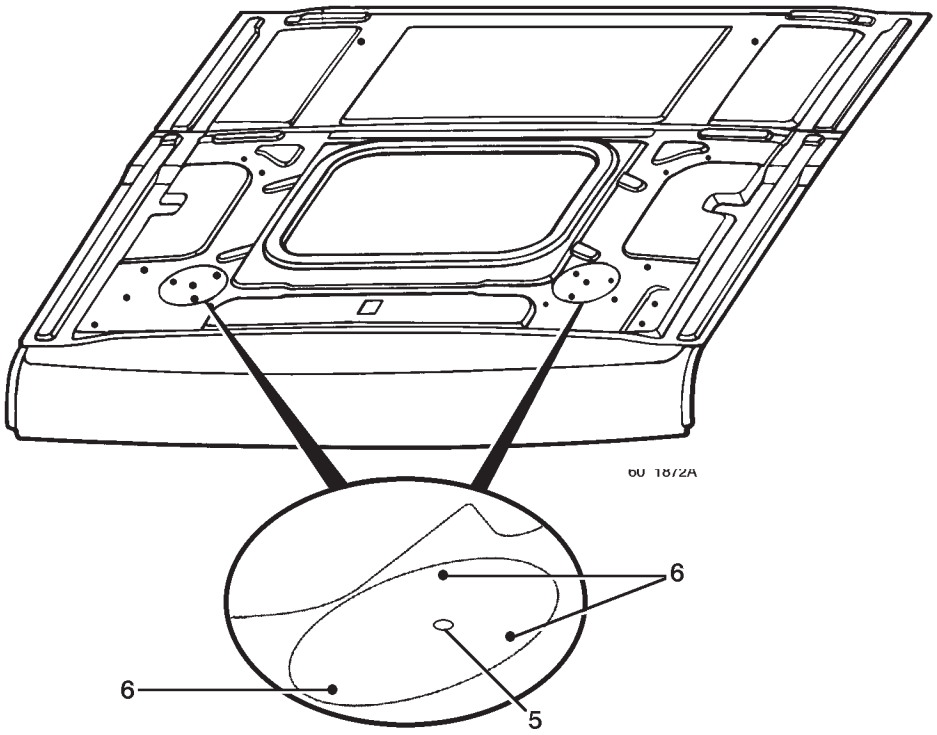
The wiring harness passages must be hermetically sealed. Use a wire grommet and sealing compound, if necessary



7.3.2 Installation of revolving beacons

- Wiring harness passage: at point (**5**), drill a hole diameter 35 mm.
- Revolving beacon fastening: at points (**6**), drill a hole diameter 7 mm.

The wiring harness passages must be hermetically sealed. Use a wire grommet and sealing compound, if necessary.

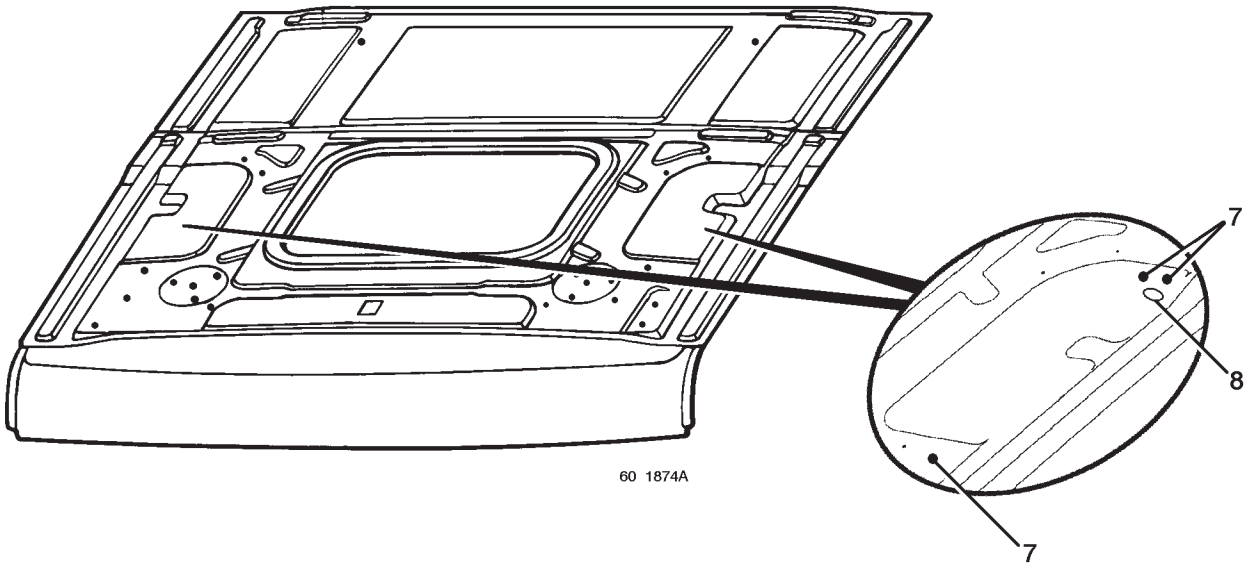


7.3.3 Installation of air horns

- Horns fastening: at points (**7**), drill a hole diameter 7 mm.
- Compressed air pipes passage: at point (8), drill a hole diameter 16.5 mm.

For positioning the drilling points (**7-8**), use the template provided for that purpose in the horns assembly kit.

The compressed air pipes passage must be hermetically sealed. Use a wire grommet and sealing compound, if necessary.



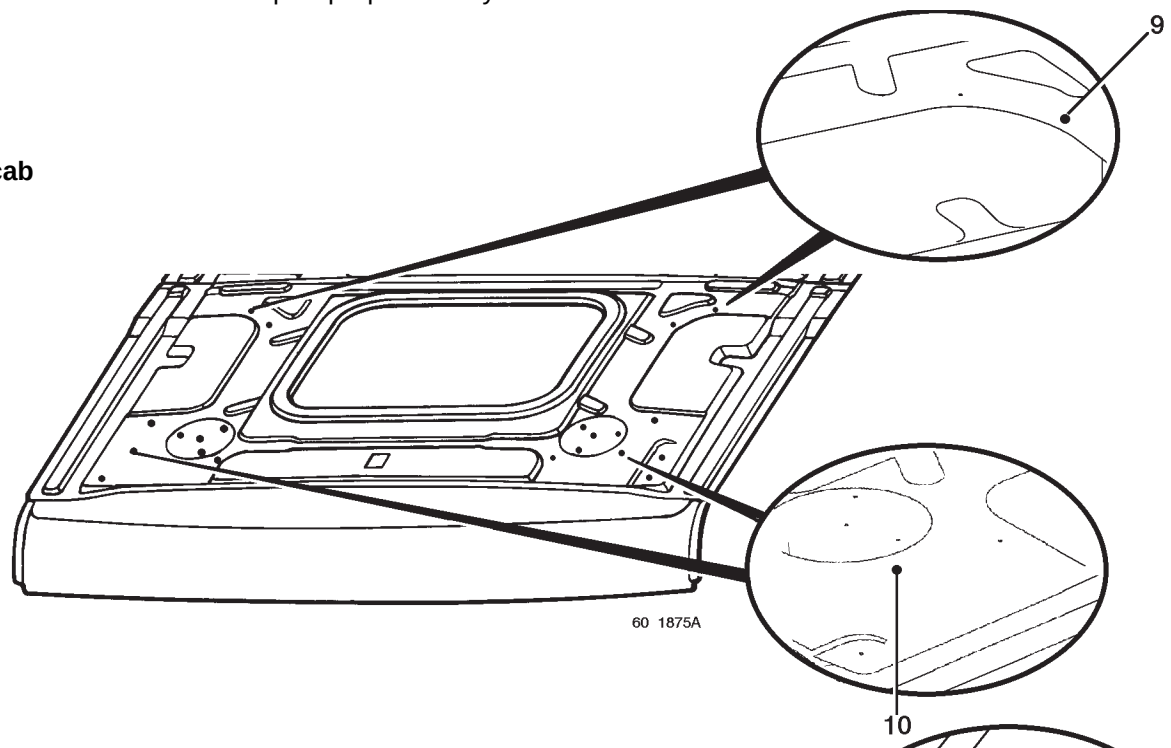
7.3.4 Installation of roof deflector

Impressions (**9-10-11-12**) locate the deflector fastenings. Nuts are welded to the roof stiffener if the vehicle is provided with a gantry as standard. If it is not, it is essential to use the clamping segments supplied with the deflector assembly kit. Drill holes diameter 12.5 mm at points (**9-10**) or (**11-12**).

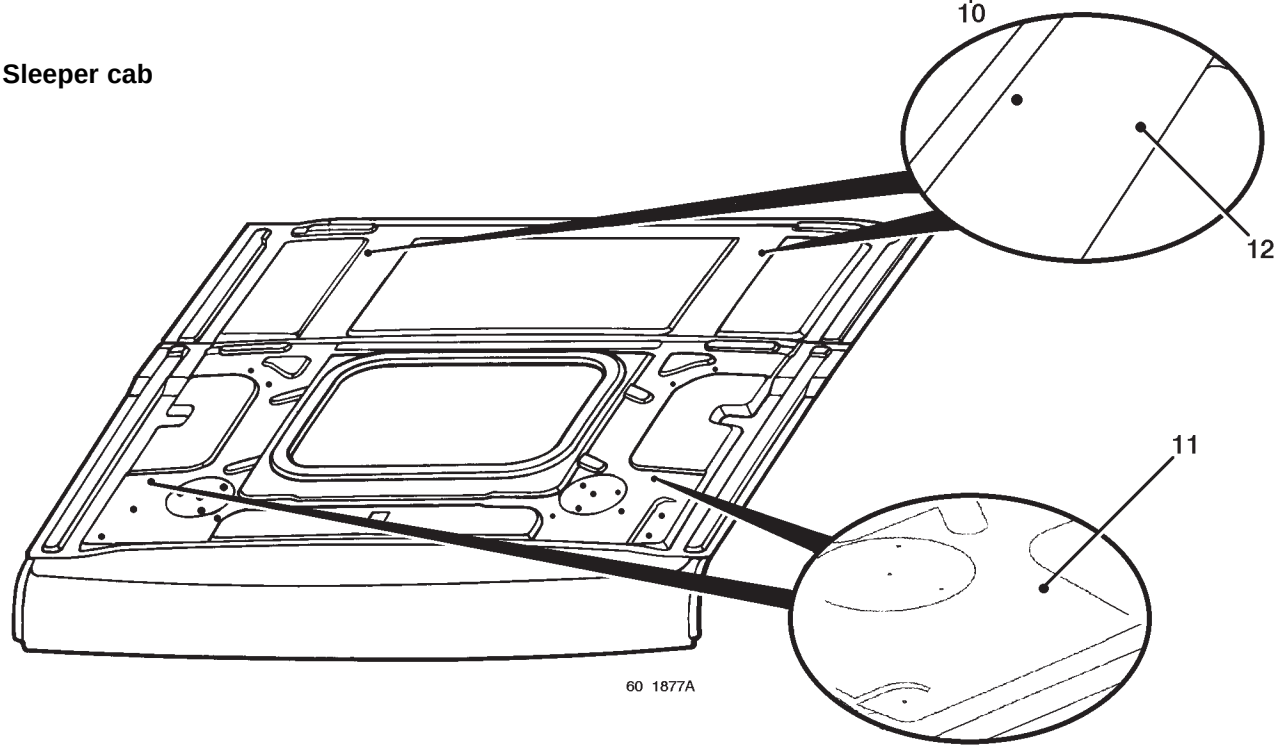
Note
Assembly of the roof deflector is incompatible with the presence of a gantry.

Upon reception of vehicles fitted with a deflector as standard, do not forget to remove the wooden board to be found inside the deflector.
This is used for transport purposes only.

Day cab



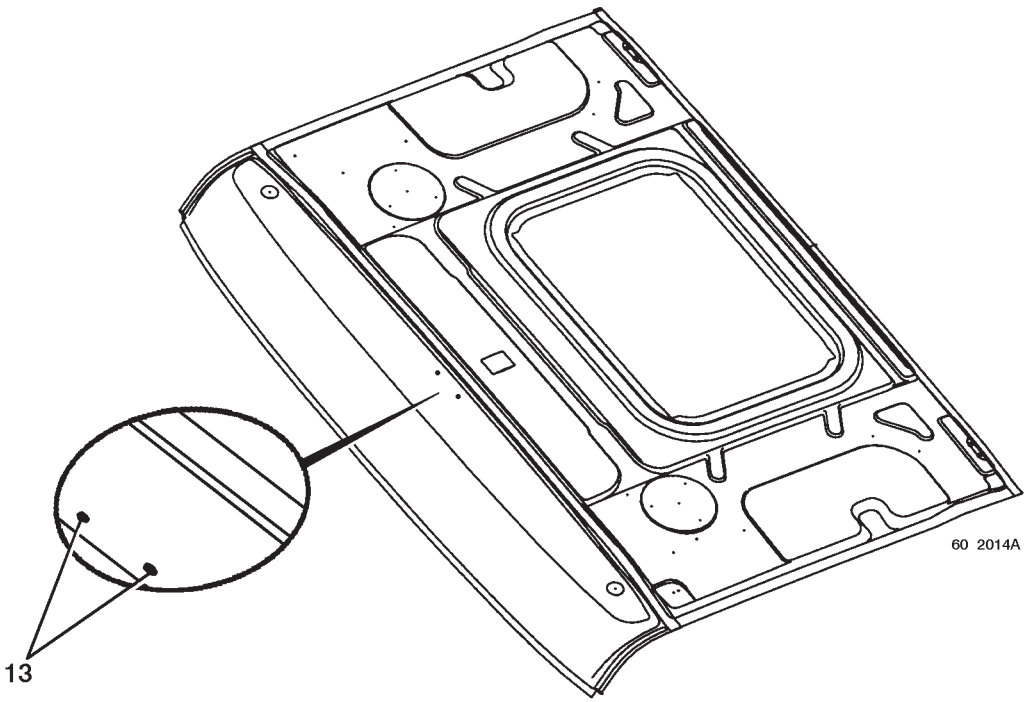
Sleeper cab



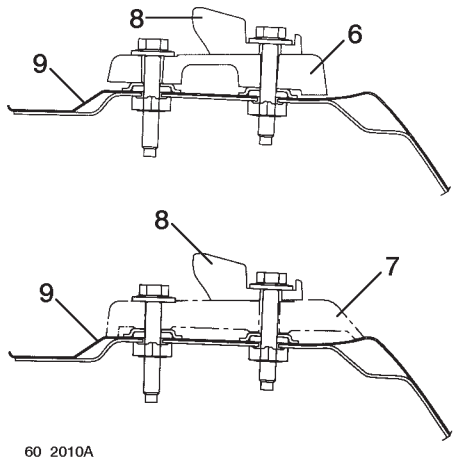
7.3.5 Installation of frontview mirror

Assembly of a frontview mirror is possible if the standard vehicle is equipped with gantry and/or sunshade.
If the vehicle is equipped with gantry and/or sunshade, there are fastening drillings on the existing canopy.
The frontview mirror base-plate takes the place of the gantry fastening spacer.

If the vehicle is not equipped with gantry, drillings (13) must be made in the canopy.
Drilling diameter: 12.5 mm.

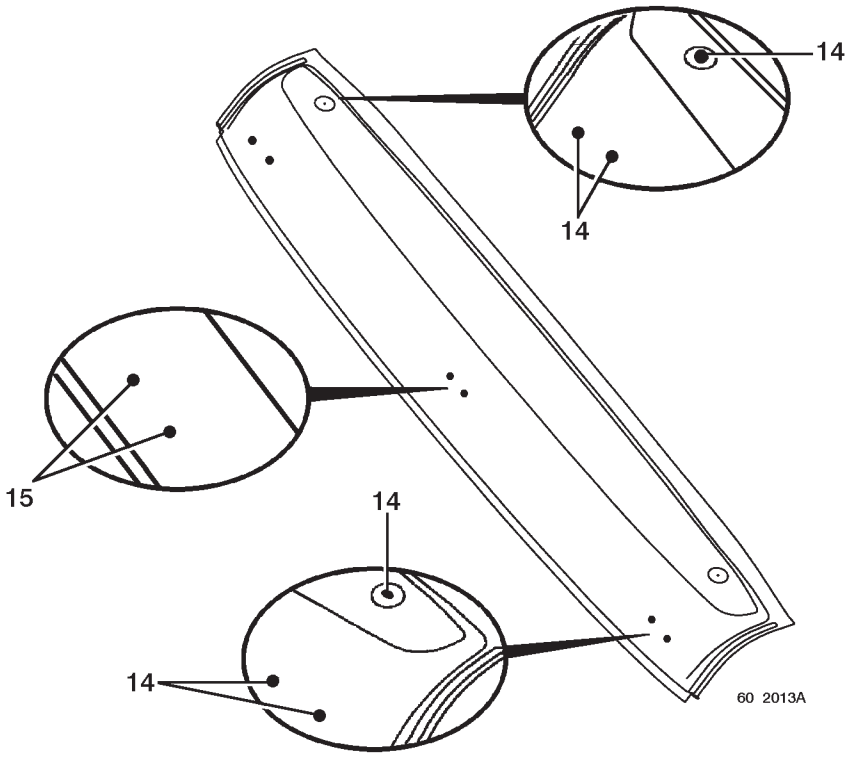


Assembly of a frontview mirror on vehicle equipped with a gantry:
The spacer (**6**) located on the central front fixing point (**8**) of the gantry is to be removed before installing the frontview mirror on the roof (**9**). The frontview mirror base-plate (**7**) plays the part of spacer.



7.3.6 Installation of sunshade

Assembly of the sunshade is possible if the standard vehicle is equipped with gantry and/or frontview mirror.
Drillings to be made on the canopy:
14 - 2 drillings Ø 12.5 mm.
15 - 6 drillings for fitting sealed crimping nuts M8.



7.3.7 Installation of gantry

The gantry can only be assembled as replacement for the deflector on the following assemblies:
- deflector and sunshade,
- deflector and frontview mirror,
- deflector, sunshade and frontview mirror.

The gantry allows a maximum loading weight of 30 kg to be supported.

Fastening the gantry:
- At points (16-17), make drillings diameter 12.5 mm.

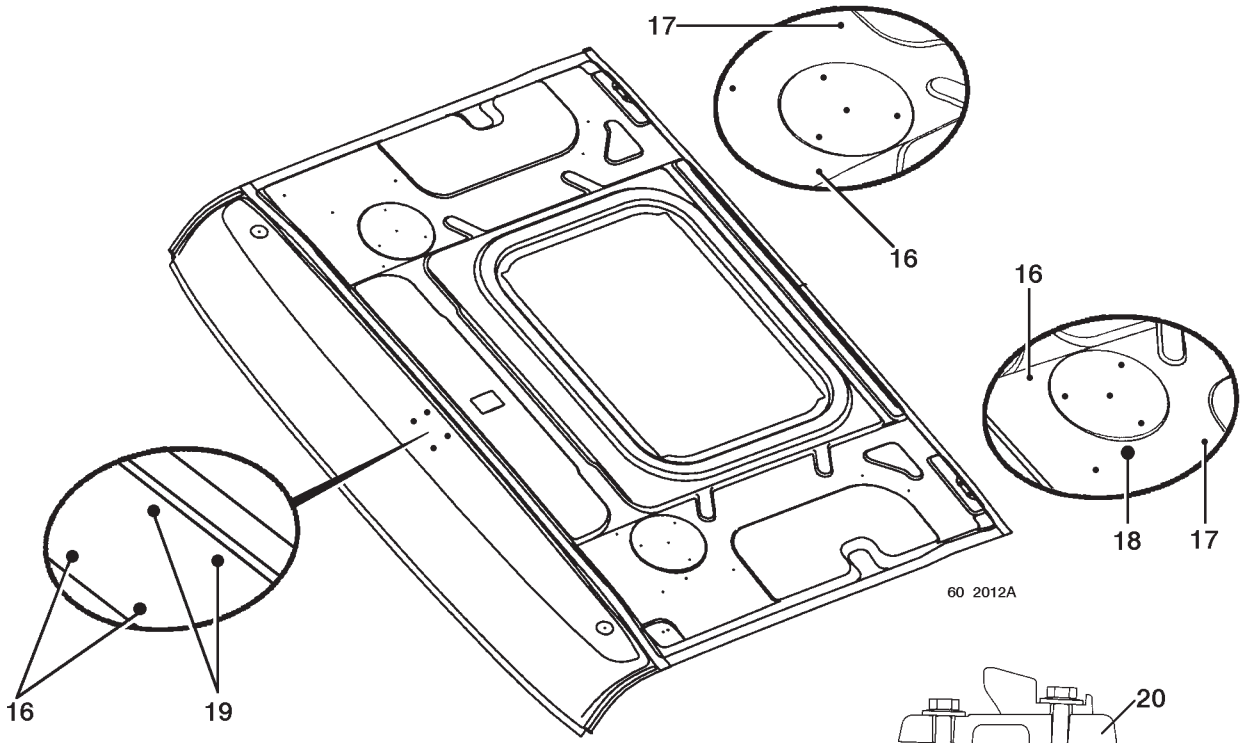
Wiring harness passage aperture:
- At point (**18**), make a drilling diameter 27 mm to allow passage of the wiring harness.

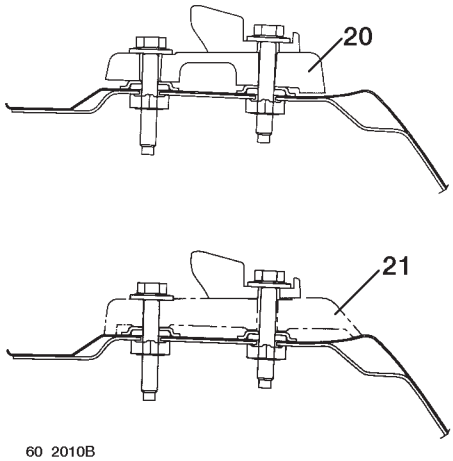
Passage (**18**) of the wiring harness must be hermetically sealed. Use a wire grommet and sealing compound, if necessary.

Note
Holes (**19**) already exist.
Holes (**17**) exist on sleeper cabs in the case of replacement of a deflector by a gantry.

IMPORTANT
All the unused deflector fixing holes must be blanked off with M8 screws and sealed washers.

Assembly of a gantry equipped with a frontview mirror:
Do not assemble spacer (**20**) as the frontview mirror base-plate (**21**) does the same job.



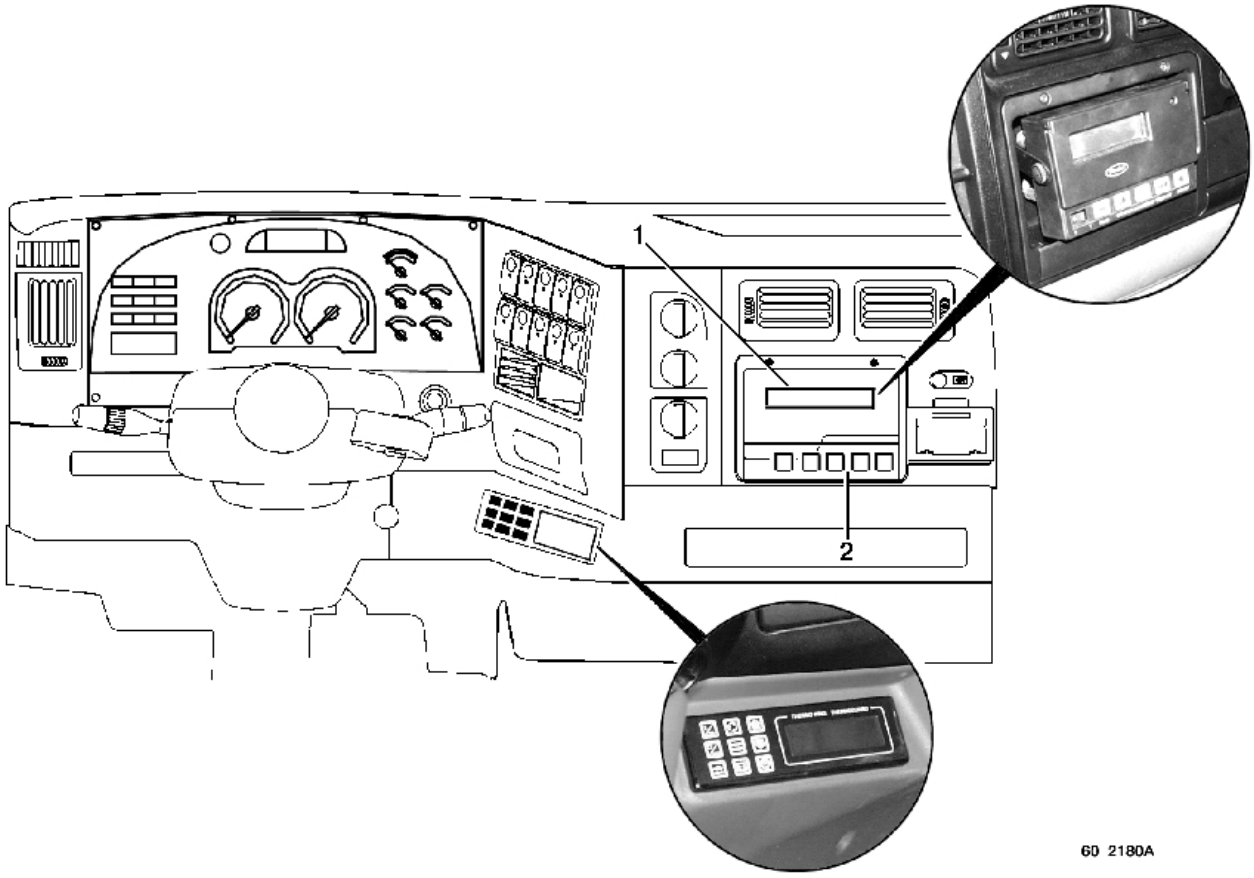


7.4 Assembly of accessories in cab

The cab is provided with several fixing points for the installation of cab equipment and various storage and stowage spaces.

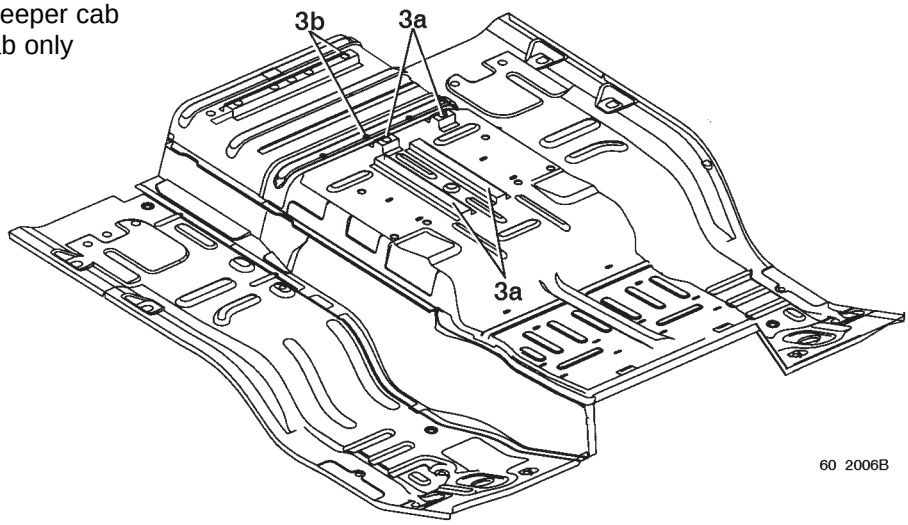
7.4.1 Location in dashboard

Housing (**1**) allows stowage of rectangular equipment items.
Remove the partition (**2**), if necessary.
In the event of absence of pneumatic switches (**3**), this location is available for stowing equipment (control box).



7.4.2 Location on engine tunnel

In the case of absence of a storage locker and front bench seat on the engine tunnel, mountings (3) can be used.
3a - day and sleeper cab
3b - sleeper cab only



8. AIRBAG

Depending on your vehicle's equipment

IMPORTANT
Any work on the airbag system must be carried out by qualified personnel who have undergone suitable training.

8.1 Identification of a vehicle equipped with an airbag system

A vehicle equipped with a driver's airbag can be identified by:
- the inscription "airbag" in the middle of the steering wheel.
- a sticker placed in the bottom corner of the windscreen, on the driver's side. (If the windscreen has to be replaced, affix a new sticker in the bottom corner of the new windscreen, on the driver's side).

8.2 Work on the vehicle (excluding the airbag) requiring precautions to be taken to avoid inadvertent deployment of the airbag

During repair or adaptation work, the vehicle is not to undergo significant knocks (hammer blows...) nor is welding work to be undertaken without previously disconnecting the battery and waiting for a period of 5 minutes.
No electrical accessories should be installed, as aftermarket fitment, within the close surrounds of an airbag (loudspeaker or any other appliance generating a magnetic field might cause the airbag to release).
Before removing the steering wheel, it is essential to unplug the airbag module connector so as to avoid any damage.
In the event of any work requiring uncoupling of the steering box universal joint, the roadwheels must be in the straight ahead position and the steering wheel must be immobilized, in order to keep to the mid-point of the rotary switch.

IMPORTANT
- *If an airbag system is fitted, the seat belt must be worn.*
- *If the driver's seat designed for the airbag system has to be changed, it must be replaced by a seat identical to the one originally fitted.*
- *Adjust the seat cushion and squab correctly so that the airbag offers optimum protection. The driver, with his back against the squab, should hold the steering wheel with his arms slightly bent.*
- *The protective cover (1) must be free from any article (ledge, clock, adhesive, various accessories...).*
- *There should be no objects within the airbag deployment area (Ø 80 cm).*
- *To avoid any inadvertent deployment of the airbag capable of causing bodily injury, it is forbidden to remove the steering wheel or work on the airbag system. Only the RENAULT V.I. network is qualified to work on the airbag system.*
- *Get the airbag system checked out in the case of accident or if there has been attempted theft of or from the vehicle.*
- *For safety reasons, replace the airbag and the pretensioner every 15 years.*
- *If water is splashed onto or gets into the electronic box located under the driver's seat, replace the box.*
- *Any significant modification to the front end of the vehicle or any overloading of the vehicle may lead to inadvertent release of the airbag system.*
- *When lending or reselling the vehicle, inform the borrower or purchaser of all these conditions. Get him to read the driving and servicing handbook.*

DT 4/366 AN
english edition

GUIDE FOR THE FITTING OF BODYWORK FOR THE

RENAULT MIDLUM Series

50 21 008 236 - 04/02
édition anglaise

IMPORTANT

Reading the "Guide for the Fitting of Bodywork for the MIDLUM series"

The "Guide for the Fitting of Bodywork for the RENAULT MIDLUM series" ushers in a new type of presentation for bodywork fitting guides.

This new presentation sets out in one single document all those details which are necessary for the bodybuilder and equipment manufacturer to have available.

The present document consists of three sections:

A - "General features": This describes the relevant general principles and basic rules applicable for the conversion and fitting of equipment to vehicles in most cases for the majority of applications.

B - "RENAULT MIDLUM special bodybuilding features": This deals in greater detail with presentation of the vehicle, attachment of the body, electrical pre-arrangements, trade vehicles and trade packs.

C - "Supplementary information on the RENAULT MIDLUM Euro 3 vehicle": This deals in greater detail with power take-offs, air-operated and specific equipment, assembly of equipment to chassis and cab.

If a topic is dealt with in the three sections, the relative information may be:

- ***complementary:*** *in this case the "Special bodybuilding features" section provides details or values relating to the topic dealt with in "General features".*
- ***partially or fully contradictory:*** *when the RENAULT MIDLUM vehicle is endowed with a special feature whose characteristics go against general principles. In such case, the elements regarding this specificity in the "Special bodybuilding features" section supersede those dealing with the same topic in the "General features" section.*

You may need, when looking for information on a specific point, to consult the three "General features", "Special bodybuilding features" and "Supplementary information on the RENAULT MIDLUM vehicle" sections, so as to ensure that you have obtained all the relevant details.

The information given by the Manufacturer in this document is compiled in relation to the technical specifications in force on the date of drafting of the document.
It is subject to modification in the event of changes made by the OEM during the manufacture of the different units and accessories for vehicles of its make.

RENAULT V.I. S.A. au capital de 50 000 000 €.
Siège social : 99, route de Lyon - 69802 Saint-Priest

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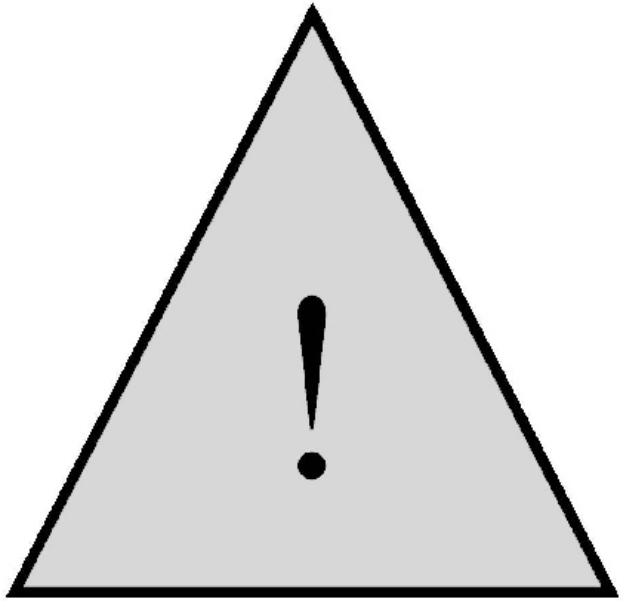
Carrossiers & Equipementiers
ATTENTION
véhicule électronisé EURO3
Respecter IMPERATIVEMENT
les consignes de carrossage
ou
Contacter le constructeur



Karosseriebauer & Ausstatter
ACHTUNG
Fahrzeug mit Elektronik EURO 3
UNBEDINGT die Hinweise
für die Aufbauten beachten oder
sich an den Hersteller wenden.

Carroceros y proveedores de equipos
ATENCION
Vehículo electronizado EURO 3
Respetar OBLIGATORIAMENTE
las instrucciones de carrozado
o
contactar con RENAULT V.I

Bodybuilders & Equipment Manufacturers
WARNING
EURO 3 electronically managed vehicle
It is ESSENTIAL to comply with
bodybuilding instructions
or
Contact the vehicle manufacturer

Carrozzieri e Allestitori
ATTENZIONE
Veicolo con elettronica EURO 3
Rispettare TASSATIVAMENTE
le istruzioni per la carrozzatura
o
Contattare il costruttore

RENAULT

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CHAPTER -A-
GENERAL FEATURES

IMPORTANT

General principles and basic rules applicable for the conversion and fitting of equipment to vehicles in most cases for the majority of applications are detailed in this "General features" chapter.

1. GENERAL FEATURES

1.1 Scope of liability

RENAULT TRUCKS vehicles are merchandized at the end of corroborated technical designwork and endurance testing, taking the various laws, regulations, standards... involved into consideration.
Modifications to a RENAULT TRUCKS vehicle for the fitting of bodywork and equipment should be carried out in accordance with the rules and recommendations set out in this bodywork fitting guide and require an "Agreement in Principle", issued by the Product Applications Department.

Guarantee and responsibility

Any intervening party is responsible for his services in terms of guarantee and responsibility, including any damage caused by his work and/or the equipment installed on-vehicle or the basic product.

In the event of RENAULT TRUCKS (or its network) being prime contractor for its own equipment (in relation to the end customer), the guarantee is considered as being at least that of the warranty offered by RENAULT TRUCKS to its customer.

Unless clearly specified otherwise in the order, the equipment warranty shall be negotiated directly between the end customer and the equipment manufacturer.

The meeting of recommendations contained in the present document can in no way be considered as relieving the equipment manufacturer's responsibility, but simply as complying with the basic rules for professional trade practice.

Any breach of these recommendations must be considered as shortcoming in respect of the rules and shall relieve RENAULT TRUCKS of its liability in the event of damage connected directly or indirectly to such non-compliance.

All the equipment is considered to comply with these recommendations and shall not require any acceptance testing upon delivery to check the conformity.

RENAULT TRUCKS guarantees non-modified original parts and components.

Interventions, conversions, adaptations of fittings carried out by the intervening party involves his responsibility, even if they are authorized administratively (Conversion appendix II).

Such conversions must not under any circumstance lead to any impairment of the quality or of the primary functions of the component elements of the vehicle (whether these elements are affected directly or not by the intervention).

Any modification, changing of position of constituent vehicle parts or elements must be covered by an "Agreement in Principle", issued by the RENAULT TRUCKS Product Applications Department.

For further information or assembly agreement, contact:

TO OBTAIN ANY INFORMATION OR APPROVAL OF MOUNTING, PLEASE CONTACT:

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1.2 Regulations

The bodybuilder must meet:
- the different European and/or destination country laws, regulations and standards governing driving and vehicle building,
- the stipulations of the Highway Code and its various amendments and appendices,
- the different laws, regulations and standards governing road traffic in force in the country of destination.

The scope of this compliance must cover:
- Lighting and signalling,
- Weight and dimensions,
- The field of vision and rear view,
- The regulation protection devices (e.g. side guards, anti-spray, run-under guard),
- The hitch coupling and towing systems, (compliance with standards and regulations),
- Specific clauses concerning the transport of dangerous goods (ADR, COSHH etc.),
- Sun-roofs,
- Pollution control standards,
- Electromagnetic compatibility standards for electronic equipment.

1.3 Safety

All components having an influence on:
- The control of the driver of the trajectory and the ability to stop the vehicle and its trailer,
- The load distribution on the front or the rear, the left or the right,
- The risk of fire,
- and any other risk for the vehicle and its surrounding environment.

Among the components, we would mention, among others:
- The cab tilt mechanism,
- The wheels (tightening of the nuts),
- Seats and seat belts (anchorage points),
- The attachment of bodywork or equipment to be in conformity with the technical instruction document in force, (i.e. the Guide for the Fitting of Bodywork),
- The hitch coupling and towing systems, (i.e. anchorages),
- Electrical systems (protection of circuitry, the electrical rating, attachment, conformity of the connections with the technical instruction document, (i.e. the Guide for the Fitting of Bodywork),
- Warning systems and driver information systems, (i.e. no interference with the information given by the instrument panel on the dashboard),
- Information for use affixed by the manufacturer to the vehicle (i.e. decals for tilting of the cab, drilling points, welding points, batteries, etc.)
- Extension and reduction of the length of the wheelbase and the rear overhang.
- Re-location or replacement of the cross-members.
- Circuits for ancillary equipment.

In order to guarantee the safety and the satisfactory operation of the vehicle, modification of the following components is strictly forbidden:
- Brakes: circuits, controls and anchorages,
- Steering: circuits, controls, anchorages and geometry,
- Axle and axle housing assemblies,
- The air-bag system and pretensioning systems on the seat belts,
- The electronics.

1.4 Quality assurance

Our permanent objective is to give satisfaction to our customers and we must achieve this in full on the final product consisting of a chassis, bodywork and/or an item of equipment.

In order to achieve this objective, RENAULT TRUCKS expects from all those co-operating with it in the field of mounting bodywork and equipment supply to implement a Quality Assurance System.

RENAULT TRUCKS can demand proof for the execution of all bodywork, the fitting of equipment or modification of a basic truck, in accordance with Standard ISO 9000, of:

- The conformity with all legislation, EC Directives and national regulations,
- The compliance with the manufacturers' directions,
- The control of quality of the execution of the work.

This is done with the knowledge that, on the face of it, the vehicle is considered as complying with the whole of the regulations.

1.5 Documentation

In all cases involving equipment, the installer is obliged to supply a manual covering the use, service, maintenance and safety of his installation.

1.6 General instructions

When building and fitting a body (including such equipment as rear run-under guards), a certain number of requirements and a certain number of vital requirements specific to each type of vehicle must be taken into consideration. These various points relate to maintenance, accessibility and the circulation of fluids.

Examples:

- Ease of access to the various maintenance and lubrication points, to the fuel tank and fuel gauge, to the batteries and the various electrical terminal boxes.

- The ability to easily dismantle the various component parts of the transmission and the suspension.

- Access to the circuits for air-intake, exhaust, and fuel supply.

- Taking into account the wheel movement detailed on the bodywork drawing (i.e. take care to allow for snow chains; extra clearance must be provided).

- Ventilation of the brake drums and discs and the battery compartment.

- The radiator inlet and outlet areas, which must not be modified.

- Full compliance with the dimensions and weights specified in our technical documents. Under all circumstances, the bodybuilder must ensure free movement and safe operation of all the moving component parts of the chassis (i.e. springs, prop shaft, etc.)

- The addition of a body must not affect the vehicle running and driving safety. Take care to ensure that a balanced distribution of the loads on the right and the left hand sides of the vehicle is obtained.

- For any bodywork installation, a calculation of load distribution must be made for each axle, in order to check that the weight imbalance between the right and the left hand side is below 4%.

- The flow of the coolant must be maintained at all times. It is, therefore, not allowed to blank off, even partially, the air intakes provided (on the radiator grille or the front end). Orange ADR or similar “Hazardous Substances” plates should be affixed to solid surfaces (i.e. without vent holes).

On the arrival of a vehicle in your workshop for body fitting, we recommend that you should check one hour after the arrival of the vehicle, the state of charge of the batteries.

Voltage at the battery terminals		Specific gravity of the electrolyte	State of charge
6 Volt battery	**12 Volt battery**		
6.3 Volts	12.7 Volts	1.27	100 %
6.2 Volts	12.5 Volts	1.24	80 %

During the period for the fitting of the bodywork, you should particularly check that:

- The vehicle is not run without a battery.

- Do not move the vehicle on the starter motor.

- Do not use a booster starter.

- Ensure that the tyre pressure is checked and tyres inflated to the correct value where necessary.

- Protect body components or items of trim against all damage.

- Refit the original batteries, where these have been taken off.

IMPORTANT

- Whatever work you are doing on the vehicle, you must switch off the electrical circuit at the master switch or by disconnecting the batteries in order to avoid any risk of electric shock during work.

- When a vehicle is laid up (i.e. at a standstill for longer than 10 days), disconnect the electrical circuit by removing the fuse or by the circuit-breaker so as to avoid discharge of the batteries through the tachograph.

The information contained in this manual is only applicable to bodywork in steel. For aluminium bodies, refer to the Product Applications Department of RENAULT TRUCKS.

It is forbidden to weld, grind, cut up, drill or heat the sidemembers or cross-members unless the contrary is clearly stated. These operations may only be carried out in conformity with the recommendations laid down in the present document.
Any special case, any bodywork fasteners and fittings not described in this manual must be submitted for our approval prior to use.

Before commencing the fitting of any bodywork, you must consult:
- The Vehicle Technical Data Sheet,
- The bodybuilders drawing and the relevant calculation sheets which relate to the body to be fitted,
- The vehicle driving and maintenance handbook.

If you do not have these items available, you should obtain them from RENAULT TRUCKS Dealers or the Product Applications Department.

In the technical manual and on the bodywork drawing is stated the permitted maximum and minimum length of body; we would strongly advise you to stay within these limits.

Furthermore, it should be noted that the changing of position of a component such as spare wheel, tank, etc., the modification of a chassis without uniform weight distribution or the fitting of an over-cab extension, causes a modification of the load distribution of a fully equipped chassis in every single case.

Modification to load distribution must be compensated for by an alteration in the permitted length for bodywork. It then becomes necessary to calculate the new position of the centre of gravity of the bodywork.

The weights specified in our technical data sheets refer to standard vehicles, ready for the road, without optional extras.
Furthermore, the weight of chassis cab is given with a tolerance of plus or minus 4%.

Optional equipment such as reinforced springs, power take-offs, different tyre fitments, will cause an increase in weight for the basic chassis.

For these reasons, when weighing the chassis cab, bodybuilders should weigh:
- The front axle(s),
- The rear axle(s),
- The complete vehicle,

without driver, without passenger, but with full fuel tanks and with vehicle on-board tool kit.

For the preparation and attachment of the various types of bodywork, it is preferable not to take off the wheels, unless absolutely necessary.

Nevertheless, you must take the precautions set out below:
- It is forbidden to paint the bearing surfaces of the wheel rim hubs and the seating for wheel nuts.
- During fitting, make certain that the parts are perfectly clean prior to fitting.
- Tighten the wheel nuts to the torque recommended (cf. vehicle driving and maintenance handbook)

Installation fitted with key-operated locks: the section of such keys must be very different to that used for the vehicle keys. Indeed, these keys should not be able to be put into the vehicle locks by mistake, thus avoiding any risk of damage to the barrels of the locks.

1.7 Safety on tilt cabs

After the conversion of standard cabs by the bodybuilders, (i.e. extension, bunk adaptation, over-cab extension, etc.) because the weight distribution has changed, the tilt system may no longer meet the requirements of the safety standards.
Under these circumstances, and without prior agreement from the manufacturer, the full and entire responsibility rests with the bodybuilder.

1.8 Chassis markings

The identification number of the vehicle is on the sidemember (refer to the vehicle driving handbook).

The identity markings of the vehicle must remain visible and accessible without having to remove any part of the body.

1.9 Adjustments to the vehicle settings

Under no circumstance may bodybuilder or converters make any alteration to the original settings of RENAULT TRUCKS vehicles.

1.10 Cleaning

1.10.1 Bodywork

So as not to cause any damage to the condition of the paintwork and the seals:
- Avoid using a high temperature jet of steam.
- Restrict the use of brushes. They must be in good condition and well maintained.
- We advise against the use of brushes, during the first month of vehicle use.
- If you are using a high pressure jet wash unit, limit the pressure to 80 bars maximum.
- Keep the lance well away from the bodywork; do not spray fluidtight joints.
- Use neutral soap based products.
- In order to remove grease spots, use cleaning fluid (not petrol).
- Parts in aluminium must be cleaned with water to which a non-alkaline washing product has been added, and rinsed with clean water.
- Spread a coat of Vaseline or talcum powder over the seals.

1.10.2 Chassis/Underbodies

Use a high pressure unit. Limit the pressure of the jet to 80 bars maximum and the time of use to the strict minimum necessary.
In order to prevent any risk of a problem, do not spray:
- electronic or electrical boxes,
- the seals of link rods,
- hinge pins,
- air inlets for the heater, the engine air intake and air filter,
- pneumatic and electrical apparatus,
- absorbent materials and soundproofing screens,
- the fuel gauge.

1.10.3 Cleaning of the cab

Spray lightly or use a cloth dipped in a cleaning agent (i.e. soapy water, methylated spirits, etc.). Products with a petroleum and trichlorethylene base are not to be used.
Spread talcum powder lightly onto the door seals and the windows, as well as any link rods.

1.10.4 Cleaning of the instrument panel

Only use soapy water. Any other product is not allowed.

1.11 Safety and protection of components

Before any operation of grinding, drilling, or welding, ensure that the following are effectively protected or taken off:
- Plastic pipework and tubes,
- Electrical wiring harnesses,
- Suspension springs (particularly for the protection against corrosion),
- The bags for the air suspension,
- The soundproofing screens,
- Any other component sensitive to heat, to the discharge of incandescent matter, to ultraviolet rays (i.e. electronic control units, electronic components, items in plastic material, flexible anti-vibration mountings, painted items, etc.)
- For welding work, comply with the other recommendations described in the chapter entitled “Protection of electrical and mechanical components”.

1.12 Summary of definitions

Maximum body length (Dimension W on technical data sheets and bodywork drawings).
This is the bracket of lengths for bodies (not including fittings and accessories) worked out in relation to the extreme positions of a given centre of gravity for a load which is taken to be evenly distributed and taking into account the space which must be left to the rear of the cab, laid down by the manufacturer, and the maximum permitted loads per axle on a chassis cab without options.

Body start (Dimension B on technical data sheets)
Minimum distance between the front axle centre-line and the front end plane of the body.

Load distribution calculations
Comply with the regulatory constraints for each country and the load limits given per axle for each model by RENAULT TRUCKS.
We remind you that these values are given for uniformly distributed loads.
The lateral imbalance of the loads should not exceed a maximum of 4% between the LH and RH roadwheel of each axle.

Chassis rear overhang (Dimension N on technical data sheets)
Horizontal distance between the centre-line of the rear roadwheels and the rear extremity of the body (excluding fittings and accessories).
In the case of vehicles with 3 or 4 axles: distance between the centre-line of the rearmost axle and the extremity of the chassis.

Body rear overhang (Dimension X on technical data sheets)
Horizontal distance between the centre-line of the rear roadwheels and the rear extremity of the body (excluding fittings and accessories).
In the case of vehicles with 3 or 4 axles: distance between the technical centre-line of the tandem and the rear extremity of the body.

Wheelbase (Dimension F or F' on technical data sheets).
Distance between the centre-lines of the front and rear roadwheels (vehicle laden).
In the case of vehicles with 3 or 4 axles: distance between the centre-line of the front roadwheels and the centre-line of the foremost rear axle - for calculations take dimension F' (technical wheelbase).

Tandem
Solely in the case of vehicles with 3 or 4 axles: the 2 rear axles taken together, regardless of whether they are driving axles or trailing axles.

Maximum axle weight
Carrying weights are stipulated on each axle for each type of vehicle. These values are indicated on the technical data sheets and on the VIN plate and must be complied with on all vehicles fitted with bodies when laden and when empty.

Driver and cab passengers weight
The weight of the driver and passenger (passengers) in the cab is applied to the front axle in the case of a forward control cab.
For cabs of the semi-forward control type, 2/3 of the weight should be applied to the front axle and 1/3 to the rear axle.
Weight of driver or each passenger: 75 kg (calculated on the basis of the cab seating capacity), unless stipulated otherwise: i.e. Export, Army, Fire Brigade, etc.
For cabs with a seating capacity of more than 3 persons, calculate the weight distribution of the persons on the basis of the seats layout.
For equipment intended for the Army or for Civil Administrations, take the specific specifications into account.

1.13 Certificate of approval of the conversion of a vehicle

1.13.1 Application for approval

1 If the body or the equipment fitted do not modify the weight and dimensional characteristics of the chassis entered in the descriptive sheet, the vehicle can be submitted to the Type Approval Department without any action by RENAULT TRUCKS being necessary (within the permitted limits in force).

2 The maximum rear overhang is equal to 60% of the wheelbase. However, for special cases, we can grant higher percentages - for this, consult us.

3 If the layout requires modification to the wheelbase, it is essential to consult the Product Applications Department. Each case has to be covered by a specific design.

4 The certificate will be issued in accordance to the legislation in force regarding modifications made by and under the responsibility of the bodybuilder, within the limits stipulated by the Manufacturer and relative to:
- the wheelbase
- the distribution of loads
- the cab characteristics.

5 For more accuracy in your calculations, we recommend you to introduce into the data the weighed weight of the chassis cab to be equipped (capable of varying according to manufacturing tolerances and the various options available). The same applies to equipment for which the manufacturers can accurately define the weight and the position of the centre of gravity.

1.13.2 Body fitting certificate

This defines the installation of the equipment on the chassis cab and the unladen weight imposed on the axles and then the weight when fully laden.
It must be attached to all applications relating to the equipment which do not comply with any of the dimensions set out in the descriptive sheet.

1.13.3 Responsibility for installation

The building and fitting of a body on a vehicle is the sole responsibility of the bodybuilder, who must comply with the recommendations in the present document.

He must ensure that the installation of the body does not affect the functions or the reliability of the components or the road behaviour of the vehicle.

1.14 Painting

1.14.1 Precautions

- Protect the RENAULT TRUCKS equipment (i.e. by using screens, self-adhesive tape, cab cover etc.)
- Never put vehicles into drying ovens at a temperature of more than 80° C.
- The chassis of the vehicle must be electrically earthed to allow static electricity to run away to earth (protection of electronic boxes).
- The vehicle must be protected against corrosion by paints compatible with those used by our Company and conforming to RENAULT TRUCKS Specification No 4702 441 (protection of bodywork and equipment adapted to RENAULT TRUCKS vehicles) available from the Product Applications Department.
- Thinner solvents must never be used on cables and electrical sheaths.
- Protect the identification marking of electrical wires and compressed air pipes.

Never paint bearing surfaces of brake drums and disc wheels, or with twin tyre fitment, the assembly surfaces between the disc wheels. As a general rule, do not repaint the support surfaces of original fitment nut and bolt hardware and comply with the specification.

NOTE
Our Product Applications Department holds the reference numbers for paint colour shades for chassis and cabs at your disposal. These paint colours can be procured as “spare parts” and can be ordered from our dealers.
The cab colour shade is indicated on the front end of the cab.
Since 1994, chassis and accessories are no longer sprayed with the customer’s shade of paint at the time of original fitment.
To preserve the aspect and original quality, it is essential to observe the following methods after fitting equipment, body, sub-frames and various adaptations to major units or chassis frame:

1.14.2 **Major units** (gearboxes, drive axles, engines, axles, etc.)

Works paint: GLYCEROPHTHALIC
Retouch (after fitting PTO, charge indicator, etc.)

Retouch method
- Clean with a universal cleaner or using a high-pressure cleaner.
- Wipe down, then apply a primer.
- Let the product cure until mat (about 15 minutes at 20° C), then apply the corresponding polyurethane lacquer.

1.14.3 **Chassis frame and accessories** (sidemembers, cross-members, fittings, lockers, etc.)

Works paint: POLYURETHANE or POLYESTER powder.

Retouch method:

Superficial scratches (the metal is not affected).

- Clean with a universal cleaning product.
- Wipe down, then apply the corresponding undiluted but catalyzed polyurethane lacquer, using a small brush.

Deep and fine scratches (down to the bare metal).

- Clean with a universal cleaning product.
- Wipe down, then apply the primer, using a small brush.
- Let the product cure (about 15 minutes at 20° C), then apply the corresponding undiluted but catalyzed polyurethane lacquer.

Deep and wide scratches (down to the bare metal, drilling of sidemembers for attaching tail lifts and accessories) due to drilling.

- Rub down.
- Clean with a universal cleaning product.
- Let the product cure until mat (about 15 minutes at 20° C), then apply the corresponding polyurethane lacquer.

Making good after conversion (after converting wheelbase and overhang).

- Grind, rub down; prepare the area in question (burnt paint, welding scale, etc.).
- Clean with a universal cleaning product or using a high-pressure cleaner.
- Mask with tape (electrical wiring harnesses, air and fuel pipes, labels, etc.)
- Wipe down, then apply the primer.
- Let the product cure until mat (about 15 minutes at 20° C), then apply the corresponding polyurethane lacquer.
- After drying, put back the electrical wiring harnesses, air and fuel pipes and accessories.

Spraying chassis and accessories (with customers colour shade).

- The bodybuilder undertakes to preserve the aspect and quality of the original fitment vehicle (except for nut and bolt hardware).
- Clean with a universal cleaning product or using a high-pressure cleaner.
- Mask with tape (electrical wiring harnesses, air and fuel pipes, labels, etc.)
- Wipe down, then apply the primer.
- Let the product cure until mat (about 15 minutes at 20° C), then apply the corresponding polyurethane lacquer.
- After drying, put back the electrical wiring harnesses, air and fuel pipes and accessories.

NOTE

All spray gun operations are to be carried out in a painting booth.

Since August 1999, the chassis are painted grey as replacement for Enduro red. For paint retouches on grey chassis, use a grey paint aerosol ref. N° 50 01 848 147.

1.14.4 Recommended products

Manual cleaning

Universal cleaning product or equivalent solvent

Products approved by RENAULT TRUCKS

Supplier	Commercial name	RENAULT TRUCKS Ref.	Supplier Ref.
BASF	PK 900	50 01 821 758	SV 20023F
ICI AUTOCOLOR	Slow Spirit Wipe	50 01 854 983	P850–1402
STANDOX	ENTFERNER Agent	50 01 825 985	FA 931 2002

High-pressure cleaning

Degreaser, phosphater degreaser

Filing and sealing

Products approved by RENAULT TRUCKS

Supplier	Commercial name	RENAULT TRUCKS Ref.	Supplier Ref.
STANDOX	“EPOXY” filler-sealer “EPOXY” hardener “EPOXY” thinner “EPOXY” slow thinner thinner 2KS	50 01 826 019 50 01 825 990 50 01 826 005 50 01 829 256 50 01 825 992	FA 931 5203 FA 931 5204 FA 931 5205 FA 931 5213 FA 020 7810
ICI AUTOCOLOR	“EPOXY” filler-sealer “EPOXY” hardener thinner	50 01 829 477 50 01 829 480 50 01 829 481	P580–2100 P210—833 P850–3091

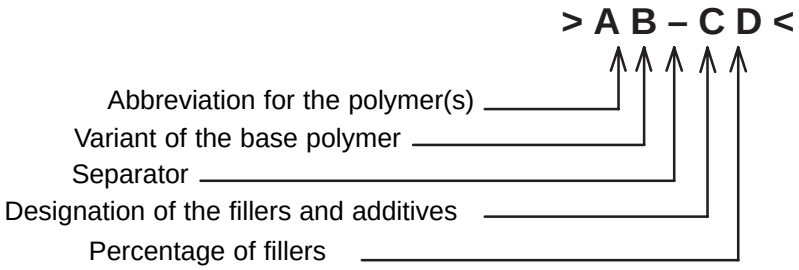
§Finish paint

Two-component polyurethane paint and corresponding thinner.

1.14.5 Marking of polymer components (recycling of plastics)

Plastic parts are marked so as to simplify their sorting during recycling at the time when the vehicle is scrapped at the end of its life.

Marking of the plastic parts is done by placing abbreviated terms for the polymer components between the symbols “>“ and “<“. The parts are marked on a face which the customers cannot see and when it is possible the marking is indelible. Marking is done in the following manner:



Marking of single component products
The abbreviated term for the material is enclosed in symbols “>“ and “<“.
For example: “>PP<“ or “PP” indicates polypropylene.

Marking of copolymers
The abbreviated terms for the polymers are separated by a “/”.
For example: “>P/E<” indicates the copolymer propylene ethylene.

Marking of mixtures or blends of polymers
The abbreviated terms are separated by a “+” (heterogeneous structure).
For example: “>PP + EPDM<“ stands for a blend of polypropylene and EPDM.

Marking of polymers with fillers (additives)
The abbreviated term for the polymer is separated from that for the filler by a dash “-”.
The number following the abbreviated term for the filler relates to its percentage in the mixture.
For example: “>PA66 - (GF25 + MD15)<“ indicates polyamide 66 with 25% filler and 15% reinforcement with mineral fillers (in decreasing order of percentage).

Marking of multi-component products
The abbreviated terms for the components are separated by commas, in order of appearance (firstly the surface material).
For example: “>PVC, PUR, ABS<“ indicates skin surface PVC on PUR foam with an ABS insert.

Marking of special features
Abbreviated terms for the polymers can be added up to 4 symbols, in order to indicate a modification.
The symbols are put in after the abbreviated terms.
For example: “>PE - C<“ indicates chlorinated polyethylene, “>PE - LLD” stands for linear low density polyethylene.

Table of the principal polymers

Abbreviated term	Variant	Materials
A.B.S		Acrylonitrile/butadiene/styrene
A.S.A		Acrylonitrile/styrene/acrylate
E/P		Ethylene/propylene
E.P.D.M		Copolymer ethylene/propylene/diene
P.A		Polyamide
P.A	6	Polyamide 6
P.A	66	Polyamide 66
P.C		Polycarbonate
P/E		Propylene/ethylene
P.E		Polyethylene
P.E	– HD	High density polyethylene
P.E	– LD	Low density polyethylene
P.E	– LLD	Linear low density polyethylene
P.E	– X	Cross-linked polyethylene
P.M.M.A		Poly(methacrylate of methyl)
P.O.M		Polyoxomethylene
P.P		Polypropylene
P.P.E		Poly(phenylene ether)
P.P.O.X		Poly(oxide of propylene)
P.S		Polystyrene
P.S	– HI	Impact polystyrene
P.T.F.E		Poly(tetrafluoroethylene)
P.U.R		Polyurethane
P.V.C		Polyvinyl chloride
P.V.C	– C	Chlorinated polyvinyl chloride
P.V.C	– P	Plasticized polyvinyl chloride

1.15 Electrical equipment

1.15.1 General

- Any mounting of a specific item of equipment on a commercial vehicle must be in conformity with the recommendations of RENAULT TRUCKS and the legislation in force. Its execution remains the entire responsibility of the bodybuilder, both with regard to the suitability for the vehicle being equipped and any possible electromagnetic interference.
- For reference to wiring diagrams, consult the electrical equipment workshop manual for the vehicle (available from the Spare Parts Department of RENAULT TRUCKS).
- Check that the electrical consumption of this equipment is appropriate for the capacity of the batteries and also the charging current rate of the alternator (if not, refer to the recommendations of the manufacturer CIC 1081). For the fitting of any particular equipment, consult the Product Applications Department of RENAULT TRUCKS
- A schematic diagram should be submitted for the approval of RENAULT TRUCKS, when raising any specific question.
- A wiring diagram for the bodybuilder's or equipment manufacturer's installation must be incorporated into the vehicle driving and maintenance handbook. The electrical connection points for the equipment being supplied should be clearly and precisely indicated on this wiring diagram (even after the agreement of RENAULT TRUCKS has been obtained).
- Follow the electrical protection recommendations of RENAULT TRUCKS; it is forbidden to change the rating of fuses.
- In order to harmonize vehicle equipment, you should use in preference such items as are identical to those fitted in the basic vehicle (i.e. indicator lamps, controls, relays, etc.).
- Assembly of a protective shield on the electric retarder is compulsory for ADR (Transport of Hazardous Substances) vehicles (refer to regulations in force).
- It is compulsory for the supply voltage for the equipment installed to be equal to the rated voltage of the vehicle. The installation of equipment with a 12 volt power rating on our vehicles (24 volt rated voltage) is not permitted unless a voltage dropper is added.
- Under the circumstances that additional lamps are fitted, the installation must not damage the fluidtight sealing of the junction boxes.

- Operating without a battery is forbidden.

1.15.2 Wiring harnesses

- Use to the full the wiring runs already set up by the manufacturer (i.e. conduits, tubes, sleeves, etc.) and comply with the limit of their capacity.
- Any wiring harness added by the bodybuilder must be protected by a sealed sheath (smooth and thick or ringed) and can be routed along with the original wiring runs for the vehicle provided that it does not adversely affect the mechanical mountings for the original harnesses. For vehicles for the transport of hazardous goods, use the protective equipment authorized by the regulations covering the transport of hazardous goods.
- If you are obliged to route wires close to a source of heat (i.e. engine, exhaust system, etc.), the minimum clearance to be complied with is 200 mm.
- Never route a wiring harness over projecting angles.
- Never attach a wiring harness to moving parts (even slight movement).
- The section of the cables being used must be suitable for the use in question. Their cross-section should be selected in accordance with the maximum current on-line (5 amperes per mm^2).
- The length of the wiring harnesses should be long enough to allow the electrical appliance which is connected to be taken off (i.e. principal display unit, tachograph, etc.).
- The numbering of the wires must be in accordance with the manufacturer's standard.
- The link between the sheath and the connector must be fluidtight.

1.15.3 Electrical connections

- Any additional connection requires protection that is suitable for the use for which it is intended (even if the power supply provided for the customer by RENAULT TRUCKS is already protected by a fuse).
- Any electrical connection must be properly wired on the power lines supplied by the manufacturer to the bodybuilder's equipment (refer to the servicing and maintenance handbook for the vehicle in question).
- Tapping into the various wiring harnesses supplied by RENAULT TRUCKS is completely FORBIDDEN (for example vehicle rear lamps, external marker lamps, contactors, pressure switches, relays, electronic box inputs and outputs, etc.)

  Reminder: a 12 V tapping at the middle point between the two batteries is strictly FORBIDDEN.
- The electrical connections of the various wiring harnesses of the bodybuilder must be made using a fluid-tight junction box or otherwise using sealed connectors. If connections have to be made on circuits hooked up to electronic equipment:
- Ensure that you comply with the polarity recommended.
- No inductance current must pass through the circuits which have been added.
- All the earths must be connected up to the available "EARTH" points provided and not to the bodywork of the vehicle.
- After work on junction boxes, the seal must always be as integrally effective as the original seal.
- Any power supply requiring a direct connection to the batteries must be capable of being isolated by a battery cut-out (for example: tail lifts) and protected by a fuse sited as near as possible to the batteries. Suitable connection terminals should be used.
- The + power supply is taken from the master switch, or failing this, from the battery terminal for vehicles without a master switch, but in no case from the alternator or starter motor terminal.
- Power supplies to auxiliary equipment: i.e. telephone, fax, etc. The quality of the installation is the responsibility of the installer (i.e. reception, static, interference, etc.)
- Preferably, you should use connectors approved and distributed by RENAULT TRUCKS (i.e. type, sealing properties, rating, number of channels, etc.)
- Connectors for equipment should be positioned near the bottom, whilst avoiding areas subject to splashing (i.e. wheelarches, etc.).

1.15.4 Available power supplies

All our vehicles are equipped with the available power supply protected by fuses and these are at the disposal of bodybuilders and equipment manufacturers.

These power supplies are described in the vehicle driving and maintenance handbook (supplied with every vehicle), in the Workshop Repair Electrical Manual, and in this document (all these documents are available from the RENAULT TRUCKS dealer network).

1.15.5 Flasher units

Should the flasher unit become inoperative due to failure to comply with the instructions contained in this document, the coverage granted by the warranty will be lost.

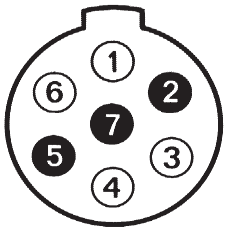
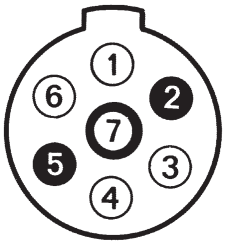
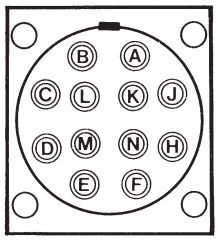
The flasher units are designed for a maximum rating which is marked on the unit.

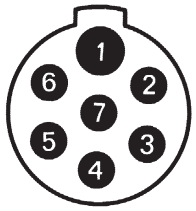
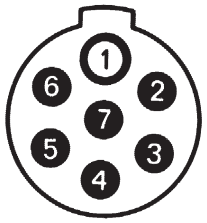
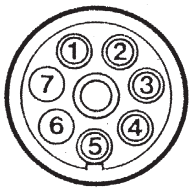
Do not exceed this power rating.

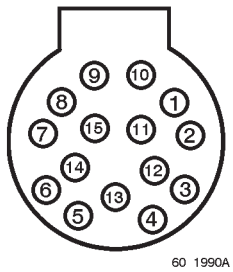
Connection

In order to make the connections correctly, consult either the identification marks which are located close to the terminals, or the wiring diagram on the label which is affixed to the flasher unit cover.

1.15.6 List of standard power sockets

SUPPLY VOLTAGE	DESCRIPTION AND STANDARDS	SOCKET DIAGRAM (front view)
12 Volts	12 N type socket (Standard: - BNA.R.43.407 dated April 1982 - ISO 1724). 1 - LH direction indicator lamp. 2 - Rear fog lamp. 3 - Earth. 4 - RH direction indicator lamp. 5 - RH rear side and marker lamp and number plate illumination lamp. 6 - Stop lamp. 7 - LH rear side and marker lamp and number plate illumination lamp.	 600037
12 Volts	12 S type socket (Standard: - BNA.R.43.410 dated August 1982 - ISO 3732). This is a supplementary socket which is assembled in addition to the 12 N socket. 1 - Reversing lamp. 2 - Not allocated. 3 - Earth. 4 - Supplementary + power supply. 5 - Earthing monitor. 6 - Positive (+) power supply. 7 - Not allocated.	 600038
24 Volts	12-pin socket (Standard: - BNA.R.43.405 dated March 1961 - DEFA 1457 b - DCEA 5.556 - NATO). A - LH black-out side lamp. B - LH direction indicator lamps. C - RH black-out side lamp. D - Earth E - Rear side and marker lamps and number plate illumination lamp. F - Black-out stop lamp. H - Not allocated. J - RH direction indicator lamps. K - Battery + power supply. L - Earth. M - Stop lamps. N - Not allocated	

SUPPLY VOLTAGE	DESCRIPTION AND STANDARDS	SOCKET DIAGRAM (front view)
24 Volts	24 N type socket (Standard: - BNA.R43.406 dated January 1976 - ISO 1185). 1 - Earth. 2 - LH rear side and marker lamp and number plate illumination lamp. 3 - LH direction indicator lamps. 4 - Stop lamps. 5 - RH direction indicator lamps. 6 - rear side and marker lamps and number plate illumination lamp. 7 - Trailer braking lamp. Terminal 7 is scheduled in certain countries for supplying power to regulation trailer brakes. Under no circumstances must it be used as an earth terminal.	 600040
24 Volts	24 S type socket (Standard: - BNA.R43.409 dated April 1982 - ISO 3731). This is a supplementary socket which is assembled in addition to the 24 N socket. 1 - Earth. 2 - Not allocated. 3 - Reversing lamp. 4 - Power supply. 5 - Earthing monitor. 6 - Supplementary power supply. 7 - Rear fog lamp.	 600041
24 Volts	24 P (oil tanker) type socket (Standard: - BNA.R.10.120 dated June 1977) This is the socket for ADR (Transport of Hazardous Substances) vehicles which is assembled in addition to the 24 N socket. 1 - Earth. 2 - Valve lighting. 3 - Reversing lamp. 4 - Positive (+) power supply. 5 - Insulated earth. 6 - Not allocated. 7 - Rear fog lamp.	 600042
24 Volts	ABS specific type socket (Standard: - ISO 7638) 1 - Power (30A). 2 - Control power supply (2A). 3 - Control earth (2A). 4 - Power earth (30A). 5 - Information (2A). 6 - Free. 7 - Free.	 600563

SUPPLY VOLTAGE	DESCRIPTION AND STANDARDS	SOCKET DIAGRAM (front view)
24 Volts	15-pin trailer socket (Standard: - ADR 1999 IP54 and anti-unhooking - ISO 12098). 1 - LH direction indicator lamps 2 - RH direction indicator lamps 3 - Rear fog lamp 4 - Earth 5 - RH rear side/parking and marker and registration plate lamps 6 - LH rear side/parking and marker and registration plate lamps 7 - Stop lamps 8 - Reversing lamps 9 - 24V positive (+) power supply Since July 1999, the 15-way socket replaces 24N and 24P sockets. Channels 10, 11, 12, 13, 14, 15 are unaffected.	 60 1990A

The 15-way socket can be mounted on vehicles equipped with 24N and 24P sockets with the use of a 15-way 24N/24P adapter ref. N° 50 01 851 060 available from the RENAULT TRUCKS Spare Parts department.

1.15.7 Additional direction indicator lamps

- On tractors and rigids

Should the lamps provided not meet all the requirements of the legislation in force, the bodybuilder may add extra lamps supplied with power by the same circuit as the front lamp or by a special circuit should one be available from the flasher unit. In all cases, comply with the power rating.
We strongly advise you to refrain from fitting any other lamp not required by the regulations.

- On trailers and semi-trailers

The standards in force concerning trailers require only two circuits for the flasher units: one circuit for the RH side and the other for the LH side. No additional lamps must be fitted on the trailer or semi-trailer which run from the monitored trailer lamps.

The addition of extra lamps entails the fitting of new wire runs which have to be drawn from the non-monitored lamp terminals in the flasher unit.

Overloading

Under no circumstances must extra lamps be fitted that exceed the power rating on the flasher unit. The main consequences of such overloading are as follows:

- The service life of the flasher unit is shortened, even when it would appear to be operating normally in spite of the overload.
- Operation is adversely affected by intermittent or permanent sticking of the contacts (the lamps remain lit without flashing)
- The appliance may be **off-circuit for the duration of the overload.**

Protection of the flasher unit (depending on the vehicle equipment)

In the event of excess current, the flasher unit will cease to operate. To return it to service:

- Move the flashing lights control switch to the 0 “off” position.
- Find the cause of the overcurrent (lines or lamps) and remedy it.

You will then be able to use the flashing lights again normally.

1.16 Air-operated equipment

Should it be necessary to add auxiliary equipment not provided by the manufacturer, it must compulsorily be connected to the circuit specifically provided for auxiliary equipment on the vehicle.
The compressed air consumption of such auxiliary equipment should under no circumstances compromise the filling times of the brake circuits laid down by the legislation in force.
The RENAULT TRUCKS Product Applications Department is at your disposal for any further information you may require.

1.16.1 Regulations

It is forbidden to modify officially approved braking circuits which conform with the standards set out by the Highway Code.
Any modification, without prior agreement from RENAULT TRUCKS, is done under the sole responsibility of the author of such a modification.

1.16.2 Polyamide pipes

Identification marking

Before removing any equipment or disconnecting polyamide pipes, mark the pipe in relation to the connection port on the equipment.

Coding system used on polyamide pipes (RENAULT TRUCKS standard):

Polyamide pipes are identified with a colour code marked with adhesive tape or by elastic rings.

Brakes code:

Main functions	Sub-functions		
	Constant pressure	Delivered pressure	Signalling pressure
Front service brake	Orange	Orange - White	Orange - Yellow
Rear service brake	Blue	Blue - White	Blue - Yellow
Parking brake	Green	Green - White	Green - Yellow
Trailer brake	Red	Red - White	Red - Yellow
Extra brake	Yellow	Yellow - White	Yellow - Yellow

Coding used on pneumatic appliances (DIN standard)

0 - Air intake	5 - Free		
1 - Pressurized supply	6 - Free		
2 - Delivered pressure	7 - Antifreeze		
3 - Air vent	8 - LubricatIon.	81 - Inlet.	82 - Outlet
4 - Signalling pressure	9 - Water cooling.	91 - Inlet.	92 - Outlet

When the figure is followed by a second figure, the latter figure indicates the sequence number.

Example: 41, 42, 43: The figure 4 indicates the signalling function, the figures 1, 2, 3 indicate a sequence number in that function.

Replacement of a brake line

The entire length of a damaged polyamide pipe should be replaced by a pipe with identical characteristics (length and diameter), and corresponding with the standard in force. (See technical memo 8655 group 53000, part N° 50 20 034 156 available with spare parts). It must also be provided with coloured rings which are identical to those of the tube replaced.

Use an original manufacturer's pipe available from the RENAULT TRUCKS Spare Parts warehouse.

The routing of a polyamide pipe must be carefully executed. Ensure there is no interference with sharp-edged metal parts and there is no routing close to high temperature units. The pipes must be held at regular intervals by plasticized clamps or run in existing ducting. Non-plasticized attachment clamps are absolutely forbidden. Take care to ensure the minimum radius of curvature of polyamide pipes is observed.

Dimension	4 x 6	6 x 8	9 x 12	12 x 16
Radius of curvature	30 mm	50 mm	70 mm	130 mm

Modification to the length of the chassis

Modification to brake pipe lengths requires braking response times to be checked out, in accordance with the legislation in force, and with agreement from the Type Approvals Department.

Connections for firtree type pneumatic brake pipes type "RILAX 2000"

For the fitting of this type of connector, refer to and comply absolutely with the technical instruction sheet NT 8852 (method and tooling) available from the RENAULT TRUCKS Spare Parts Department.

2. GENERAL RULES TO BE OBSERVED WHEN FITTING BODYWORK

Before carrying out any work, protect the cab with a cover.

Our vehicles are equipped with plates, pedestals or brackets. Preparation work may involve extra drilling or welding.

The principles described below must be adhered to.

2.1 General welding principles

2.1.1 Precautions

Protection of the batteries

A battery at the end of its charge produces a mixture of oxygen and hydrogen gas. The ignition of this gas presents dangers of battery explosion in the case of the presence of a source of heat nearby. As a result, during a welding operation near the batteries (i.e. engine compartment, front end of the vehicle), take out the batteries and store them in a well-aired location away from the place where welding is being done. This recommendation applies equally for grinding operations.

Soundproofing screens

In the case of welding or use of a sanding disk, either provide effective protection or remove the soundproofing screens, if necessary.

Protection of electrical and mechanical components

The vehicle is equipped with numerous electronic circuits: alternator, regulator, flasher units, speed limiter, ABS, etc.

Before any operation involving electric arc welding, make an earth connection by disconnecting the two negative (-) and positive (+) cables from the battery (starting with the earth cable) and connecting them to the frame earth. If the vehicle is equipped with a master switch, this should kept engaged (circuit closed). Place the earthing clamp as near as possible to the point of welding, but never on rotating parts (prop shaft, fan hub, etc.) or on a subassembly having moving parts (i.e. air compressor, turbocharger, etc.)

Nearby plastic pipes and electrical cables, springs and air-suspension bags are to be protected or removed. This also applies when grinding or drilling.

When reconnecting the battery, observe the polarities, commencing with the positive (+) terminal. Reversal of polarity may cause irreparable damage to electronic components.

2.1.2 Preparation of parts for welding

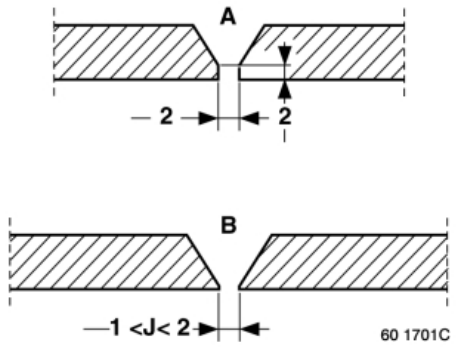
Clean the parts, primarily at the location of the weld and at the connection of the earthing wire. This allows:

- free and regular electrical current flow (regularity of weld bead),
- avoidance of inclusion of impurities in the molten metal (weld quality),
- avoidance of spatter and emission of smoke (safety for the welder).

For conversions (extensions, reductions and reinforcement gussets), we recommend arc welding with electrode type B. When semi-automatic welding is use, the bodybuilder must be able to guarantee weld quality.

Preparation of specific edges on chassis frames

A - With electric arc welding
B - With weld under gas shield (MAG or MIG)
J - 1 min., 2 max.



Method of welding to be specifically used on chassis frames

– Preparation of the edges at 45°

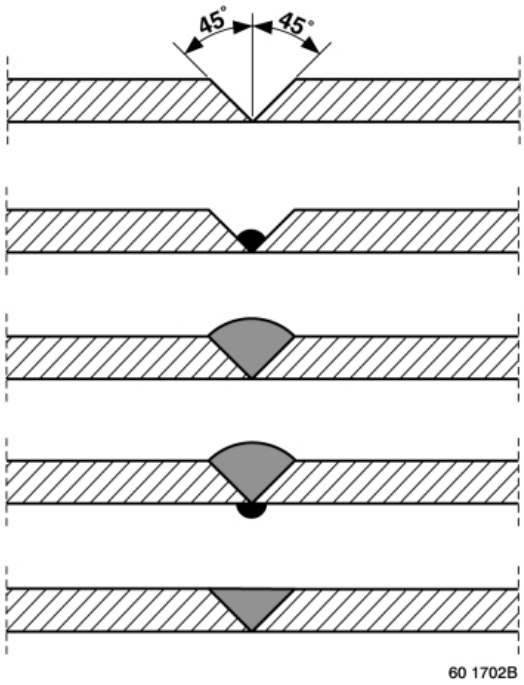
– Tack

– Position slave butts

– Weld on one single side

– Weld on second side

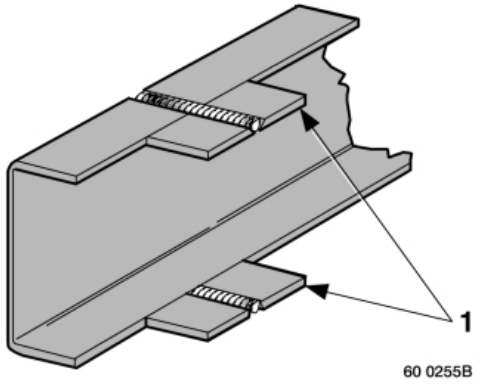
– Welds ground flush on both sides



Slave butts

The object of slave butts is to avoid the starting of cracks at the outside edges of the weld joint. Before final welding align butts with plates of the same thickness as the plates to be joined, holding them in position using quick action clamping devices.

They must not under any circumstances be held in position by weld tacks on the plates to be joined.



2.1.3 Welding process

Static or rotary arc welding set

- dc welding set recommended
- coated welding rods

Welding rod usage table

Electrode diameter (in mm)	2.5	3.15 (*)	4 (*)	5
Average current (in amperes)	75 to 90	95 to 110	120 to 140	150 to 175

(*) Most frequently used diameters
Coated welding rods recommended: standard NF EN 499 (January 1995)
EN 499 E 38 2 1 NI B for class: A - B - C
EN 499 E 46 2 1 NI B for class: D - E
EN 499 E 50 2 1 NI B for class: F
E 515/5 B 26 BH for steels class F

If steels are mixed, take the best performing steel electrode category.
Standard **NF EN 499** replaces standard NF A 81-309.

MIG or MAG semi-automatic welding set

MIG : - Metal Inert Gas
- for welding with electrode wire under inert gas shield (Argon, Helium...)

MAG : - Metal Active Gas
- for welding with electrode wire under active gas shield (CO_2 Argon + CO_2 Argon + CO_2 + O_2).
- used for welding mild steels.

Wire diameter (in mm)	Thickness to be welded (in mm)
0.8	up to 2 mm
1.0	from to 8 mm

2.1.4 Equivalent steel grades

The four classes relate to hot rolled steel plate with a high yield strength for cold forming, as currently set out in the French and European Standard NF EN 10149-2, which has replaced French Standard NF A 36.231.
High yield strength sheet steel (dispersed carbon)

	RENAULT TRUCKS Specification 31.09-402			
	Class C	**Class D**	**Class E**	**Class F**
UTS in N/mm² min.	450	500	540	610
YP at 0.2% in N/mm2 min.	355	445	490	560
E % min.	23	20	18	15
KCV at - 20 °C J/cm² min., longitudinal	35	35	35	37,5
Bending, transversal	1 e	1 e	1.5 e	1.5 e
Grain size	n° 5	–	–	–
= European equivalent French standards	S 355 MC NF EN 10149.2	S 420 MC NF EN 10149.2	S 500 MC NF EN 10149.2	S 550 MC NF EN 10149.2
= German standards equivalent DIN	QStE 380TM SEW 092	QStE 420TM SEW 092	QStE 500TM SEW 092	QStE 550TM SEW 092
= British standards equivalent BS	43 F 35 BS 1449	46 F 40 BS 1449		
= American standards equivalent ASTM	Gr. 50 050 YKL ASTM 607–50	Gr. 60 060 YKL ASTM 607–55	Gr. 70	Gr. 80
= EURONORM standards equivalent 149-80	FeE355 TM	FeE420 TM	FeE490 TM	E560 TM

2.2 Reinforcement, extension, reduction of sidemembers

2.2.1 Bans

It is absolutely forbidden to weld onto sidemembers, except for reinforcement, extension, reduction, and the following instructions must be observed:

- Do not weld on the edges of flanges.
- Do not weld in sidemember bending radii.
- In the case of flat irons: no directly opposing welds on the two faces of the same web - only “alternate” or “plug” welds are authorized.
- No welds which are less than 15 mm from the edge of a hole.

Insofar as possible, we advise you to have modifications of the lengths of sidemembers carried out by specialists.

- The general rules for welding in the paragraph entitled “General Principles of Welding” must be strictly followed.

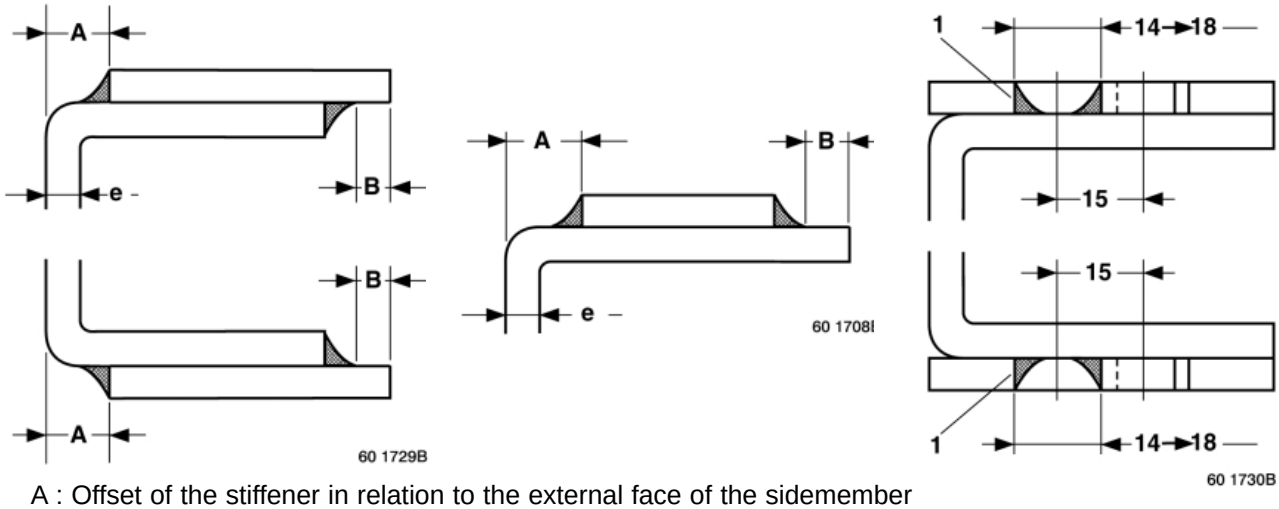
Only conversions (extensions or reductions) rendering the modified vehicle completely in conformity with a type approved chassis are permitted without additional testing, with certification from the vehicle manufacturer.

2.2.2 Reinforcement of sidemembers

- For inner reinforcements and chassis flange stiffeners, the thickness should be the same as the thickness of the sidemember.

NOTE
The steel grade must be identical to that used for the sidemember.

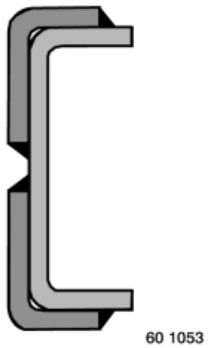
Examples of reinforcements
Sidemember upper and lower stiffeners



A : Offset of the stiffener in relation to the external face of the sidemember
B : Offset of the stiffener in relation to the edge of the sidemember
e : Thickness of the sidemember
1 : Welds through round or slotted holes, staggered

Thickness of the sidemember	A	B
e < 6 mm	10 mm	15 mm
e ≥ 6 mm	15 mm	15 mm

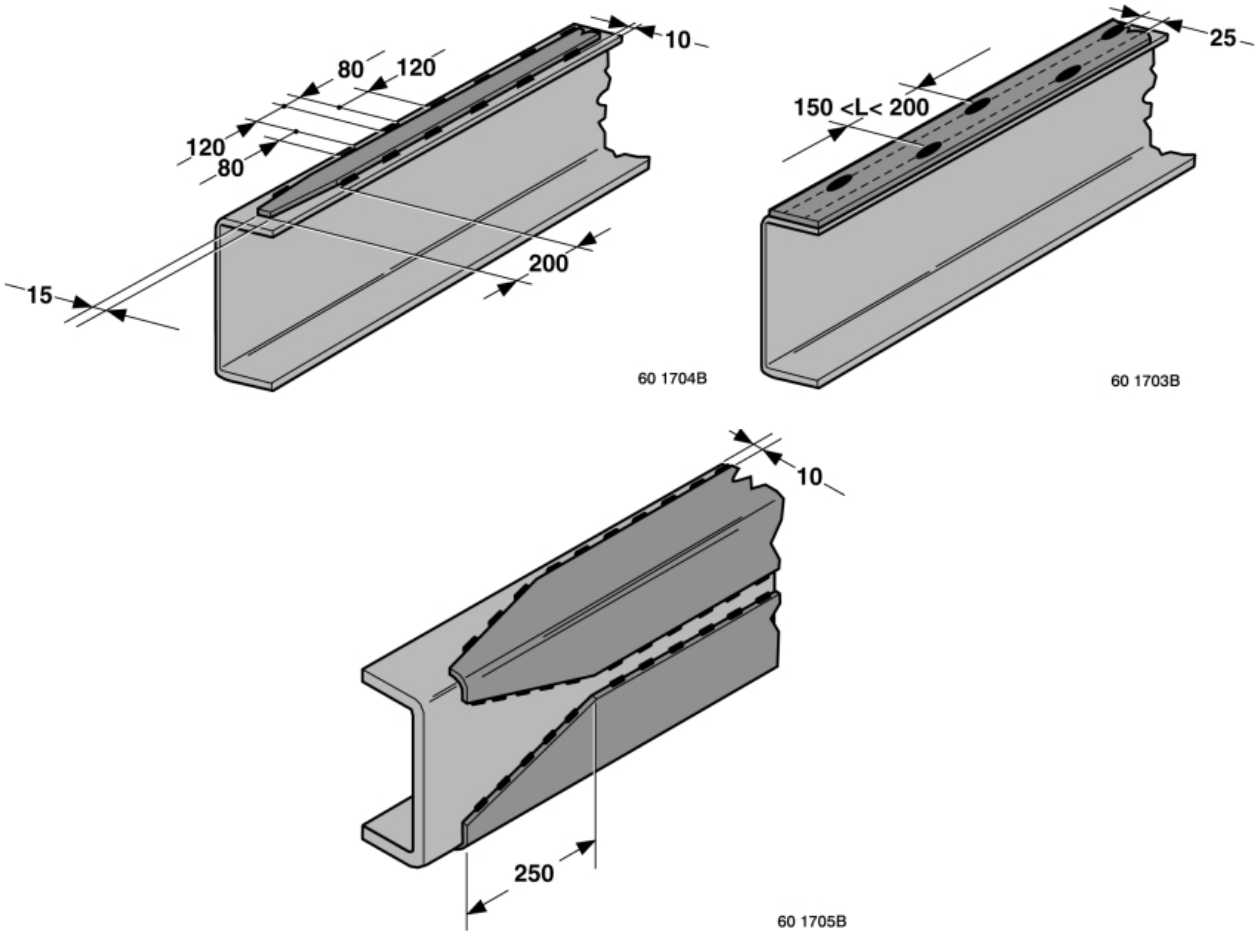
Upper and lower stiffeners using angle-irons



Methods of joining

In the case of stiffeners made from flats (on the upper flange or under the lower flange of sidemembers), we recommend attachment by:

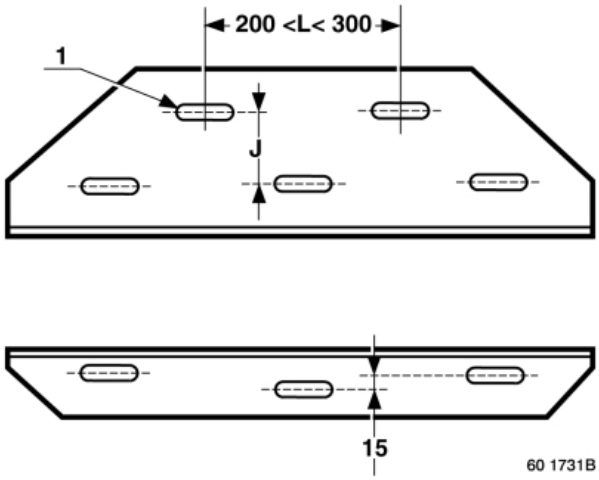
Intermittent beads by electric welding: as guidance, 80 mm beads spaced 120 mm apart and staggered.



"PLUG" welds: as guidance, round holes dia. 14 to 18 mm or slotted (1) holes dia. 14 x 50 mm to 18 x 50 mm at a "pitch" of 200 mm min. to 300 mm. max., staggered, with good quality weld.

WARNING

No vertical welds on sidemember webs. No transversal welds on sidemember flanges.



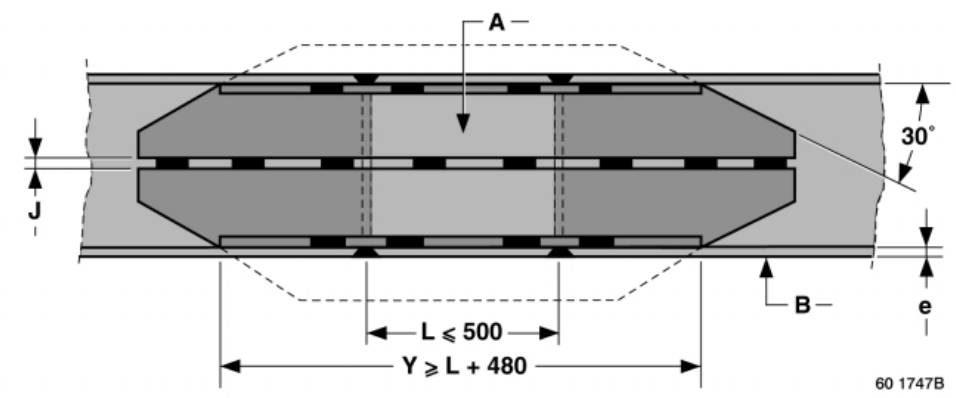
Extension, shortening of sidemembers in the wheelbase

Key

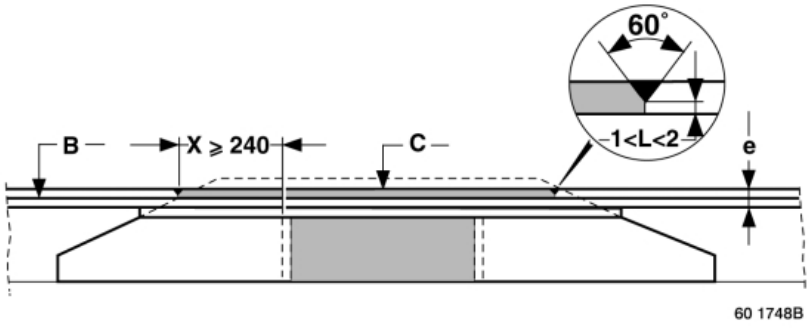
A – piece of sidemember added,
B – sidemember,
C – reconstituted stiffener,
D – welds projecting beyond flanged edge with butt-ends then longitudinal grinding (elimination of sharp edges),
e – thickness of the sidemember,
F – angle-iron of thickness (E) max. : E ≤ (e - 1 mm),
h – height of the sidemember,
J – weld penetration clearance (about 2 mm),
L – max. length of extension,
X – max. length of projection of the stiffener measured on the edge of the flange (extension),
Y – min. length of support of the stiffener measured on the edge of the flange of the sidemember (extension).
Z – min. length of support of the stiffener measured on the edge of the flange (stiffener without extension).

Extension of the sidemembers in the wheelbase

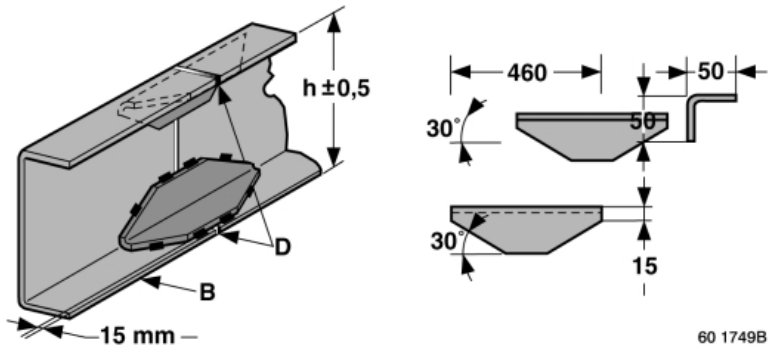
Sidemember without stiffener flat on the flange

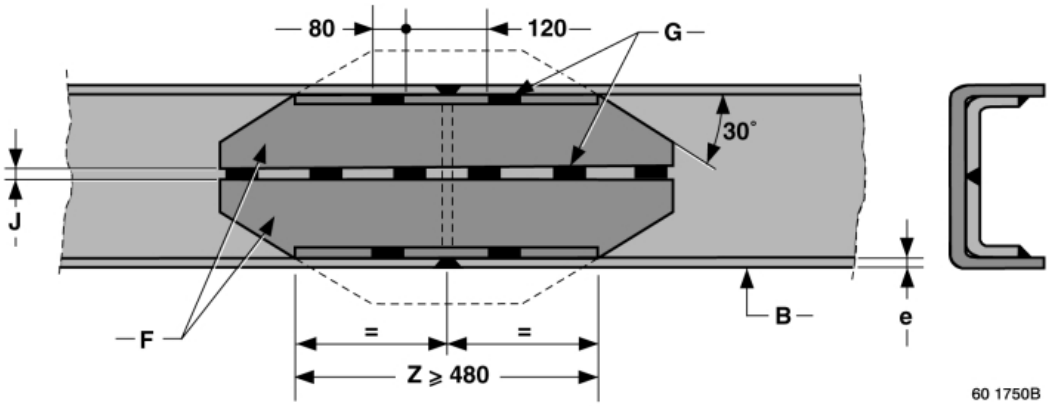


Sidemember with stiffener flat on the flange



Sidemember with stiffener flat on the flange





2.2.3 Modification of the rear overhang

If the bodywork or the equipment fitted do not alter the weight and dimensional characteristics of the chassis entered on the description sheet, the vehicle can be submitted to the Type Approval Department without any action being necessary on the part of RENAULT TRUCKS (within the permitted limits in force).

- Welding stiffeners are required for drawbar rigids or if the extension is longer than 400 mm for a solo vehicle.

Examples : Drawbar rigid; tail lift; crane at the rear of the chassis; tipper; etc.

- Extension of the rear overhang will also be required when the rear extremities of the bodywork project beyond the maximum authorized value which is indicated on the bodybuilder's drawing and calculation sheets relating to the vehicle.

Attachment of cross-members

Cross-members should be attached with nut and bolt hardware of the 10.9 SSS protected class as per standard 01714002 and distributed by RENAULT TRUCKS.

Towing cross-members

Please refer to the chapter on "Drawbar cross-members" in the section entitled "SPECIFIC FEATURES OF THE MIDLUM VEHICLE".

Intermediate cross-members

In the case of extension of the wheelbase or the rear overhang, it is essential to add cross-members, so as not to weaken the rigidity of the frame.

Observe the following instructions:

- Between two cross-members, the spacing must be no greater than the original spacing.

- If the extension to the overhang is longer than 500 mm, the rear cross-member must be moved and an intermediate cross-member fitted which is identical to the others.

2.3 Attachment of bodywork

The bodywork must be correctly attached so that both the static and dynamic stresses are freely transmitted without causing excessive local strain, which could prejudice the reliability of the chassis frame or affect the road behaviour of the vehicle.

The following rules apply to the fastening of various standard bodies fitted to our chassis cabs, such as platforms, vans, tippers, and tankers. For special cases, contact the RENAULT TRUCKS Applications Department.

For body design (i.e. length, load distribution, location of accessories on sidemembers, etc.) refer to the CD-ROM “Information for Bodybuilders” or the 1:20 scale bodywork drawing which we supply upon simple request.

Fastenings should always be tightened progressively and alternately.

The shape of sub-frames or underbodies should always be tapered towards the front (i.e. at the back of the cab), so as to avoid sudden variations in inertia (refer to chapter entitled “Finishing of sub-frame behind the cab”.

2.3.1 Bans

- The use, drilling or welding of spring hangers.
- Any modification of: the chassis, the driveline, or the suspension.
- Fastening of sub-frames to our sidemembers by welding.
- The drilling of stiffener gussets.
- The notching of sidemembers, gussets or cross-members.
- With the exception of special cases described in this document, the use or modification of our nut and bolt hardware and our riveting for the attachment of a body or sub-frame.
- The attachment of sub-frames by U-bolts.

All bodies attached by clamps and brackets must mandatorily have 1 inertia stop to the aft of each sidemember to stop the body from moving in the event of fierce braking, as well as 4 body guides 2 at the front, 2 at the rear).

For bolted fastenings, comply with the following instructions:

- By preference use brackets attached to the chassis.
- Use the fixing bolt holes dia. 11, 13 or 15 mm depending on the particular vehicle, spread out along the length of the sidemembers of the chassis frame.
- Take good note of the attachment principles, set out in the chapter on the “Attachment of sub-frames”.

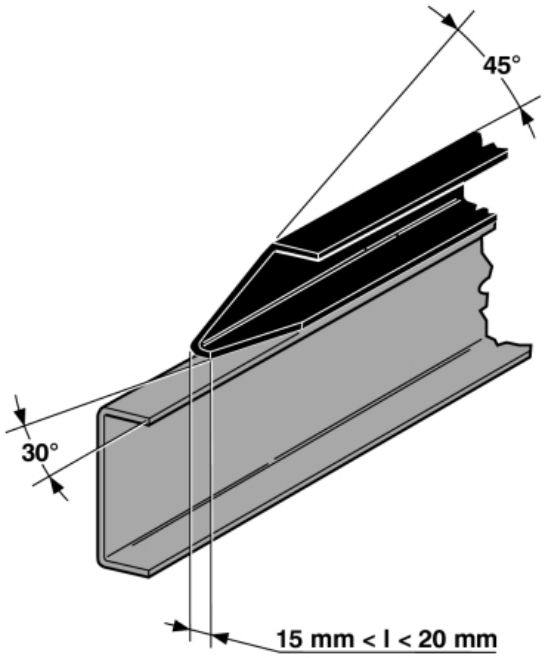
2.3.2 Protection against exhaust heat radiation

Depending on the features of your bodywork or equipment, the fitting of a heat shield on the original protection is recommended.

2.4 Sub-frame

In order to attach bodywork to the frame of the chassis, you should allow for the fitting of a sub-frame whose module of inertia (I/V) is determined in accordance with the vehicle series in question (refer to the section entitled “RENAULT MIDLUM special bodybuilding features”.
In order to ensure better distribution of the stresses along the sidemembers, you must allow for a cut-out as far forward as possible under the cab.

2.4.1 Finishing of sub-frames behind the cab



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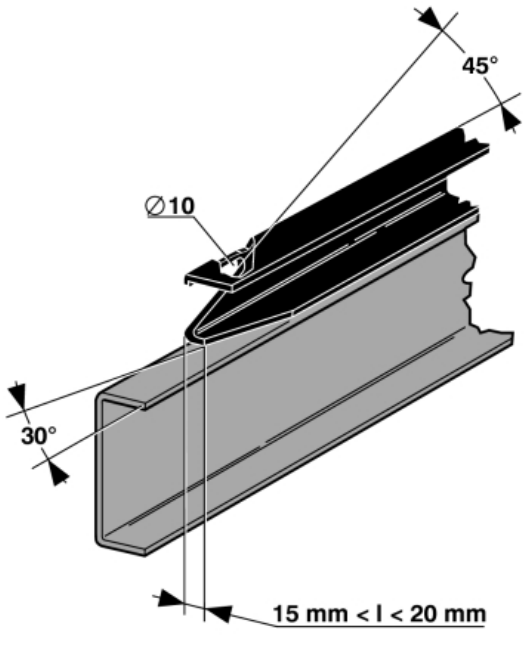

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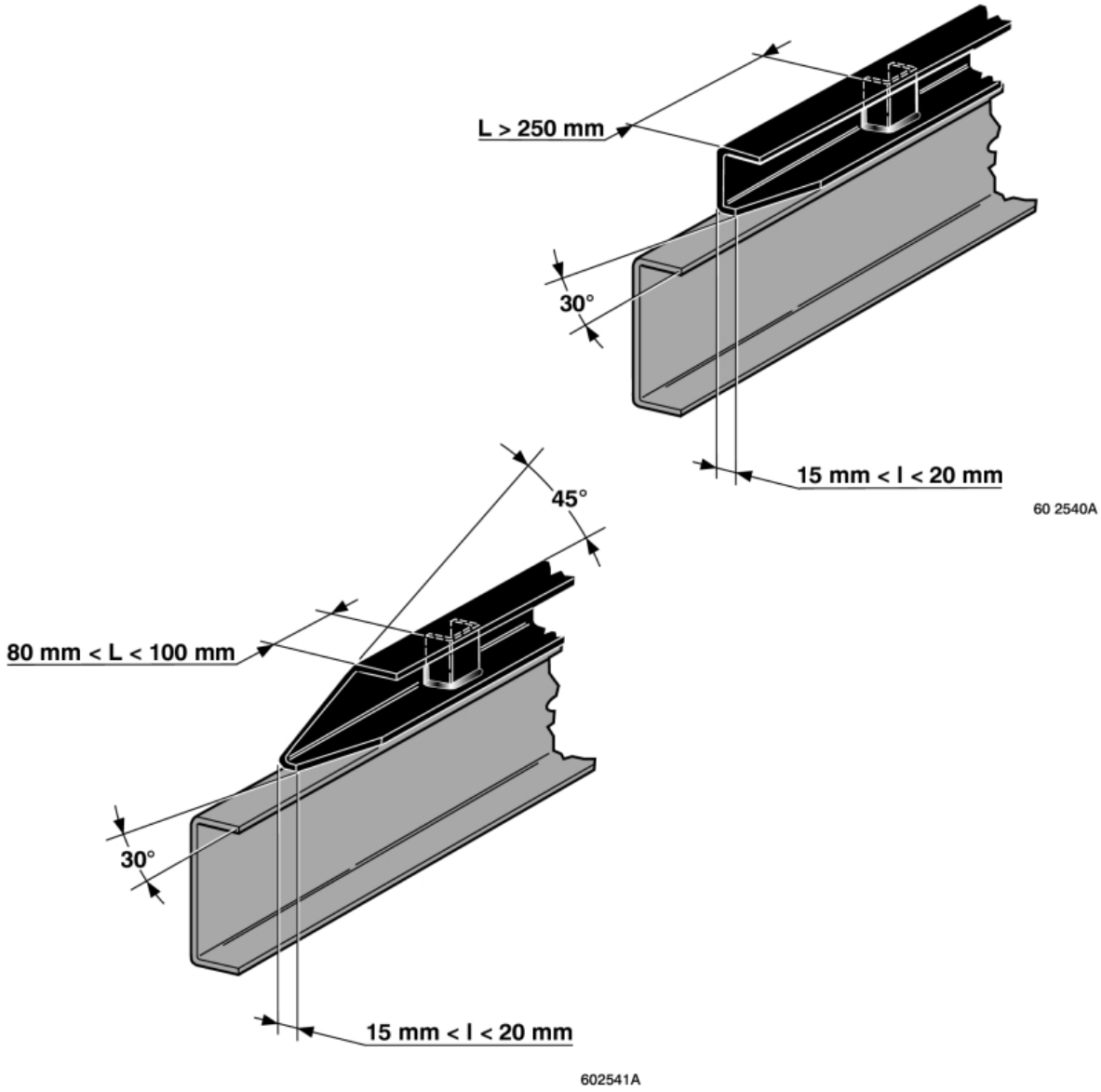
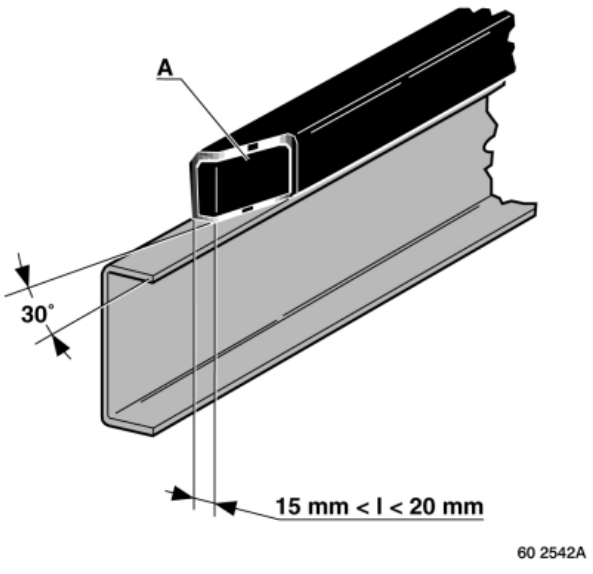


When the sub-frame is constructed of square or rectangular tube section, we also suggest the cut-out shown below.

A: Blank off with 1.5 mm thick sheet metal



2.5 Nuts and bolts, tightening torques for parts in steel and cast iron

The torques indicated in the table are the nominal torques (i.e. average value calculated on the basis of the minimum and maximum torque).

Class III is the class covering precision tightening (± 20 % of nominal torque) in accordance with Standard 01504002 (coefficient of friction 0.15 ± 003).

The tightening torques are given for nut and bolt hardware that is dry and coated with Dacromet.

Description	Characteristics	Class of Steel	Part Nos.	Tightening torque
Screw	H 10 x 125 L 30	10.9	50 03 101 460	60 N.m
	H 10 x 125 L 50	10.9	50 03 101 148	60 N.m
	H 12 x 125 L 40	10.9	50 03 101 151	110 N.m
	H 12 x 125 L 45	10.9	50 03 101 749	110 N.m
	H 12 x 125 L 50	10.9	77 03 101 679	110 N.m
	H 12 x 125 L 60	10.9	50 03 101 153	110 N.m
	H 14 x 150 x 40	10.9	50 03 101 161	170 N.m
	H 14 x 150 x 50	10.9	50 03 101 162	170 N.m
	H 14 x 150 x 60	10.9	50 03 101 163	170 N.m
	H 14 x 150 x 90	10.9	50 03 101 169	170 N.m
	H 14 x 150 x 100	10.9	50 03 101 660	170 N.m
	H 14 x 150 x 110	10.9	50 03 101 171	170 N.m
	H14 x 150 x 120	10.9	50 03 101 172	170 N.m
	H14 x 150 x 130	10.9	50 03 101 887	170 N.m
	H14 x 150 x 140	10.9	50 03 101 173	170 N.m
	H 16 x 150 x 50	10.9	50 03 101 103	220 N.m
Collar screw	H 10 x 125 L 30	10.9	50 03 002 048	60 N.m
	H 12 x 125 L 40	10.9	50 03 002 049	110 N.m

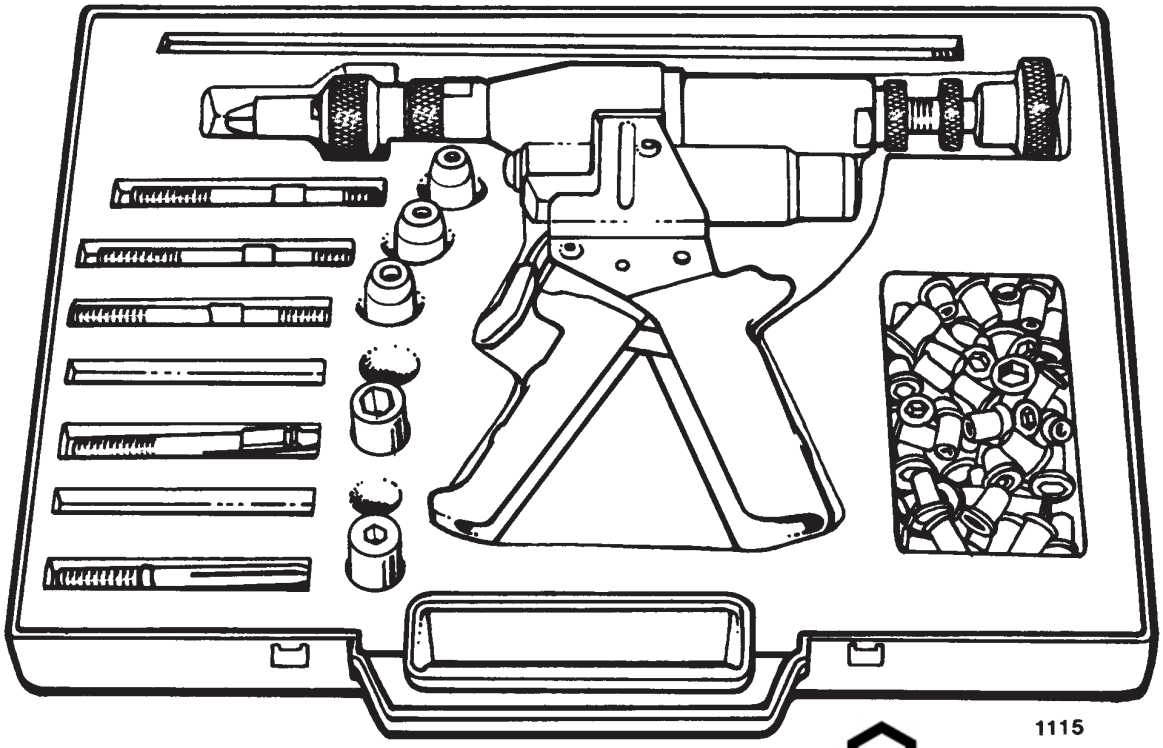
Description	Characteristics	Part Nos.
Cone washer	10 x 20 x 2.2	50 03 058 081
	10 x 24 x 2.8	50 03 058 071
	10 x 27 x 2.8	50 03 058 076
	12 x 30 x 3.2	50 03 058 075
	14 x 28 x 3	50 03 058 069
	16 x 32 x 3.4	50 03 058 034
	16 x 39 x 3.6	50 03 058 070
Flat washer	10 x 22 x 3	50 03 053 453
	10 x 27 x 3	50 03 053 455
	10 x 24 x 2.5	50 03 053 026
	12 x 28 x 5	50 10 054 526
	12 x 32 x 2.5	50 03 053 441
	14 x 30 x 5	50 03 053 511
Cone washer “Belleville” type	14.5 x 35 x 1.8	50 10 377 934

Description	Characteristics	Class of Steel	Part Nos.	Tightening torque
Nut	10 x 125	10	50 03 032 156	60 N.m
	12 x 125	10	50 03 032 157	110 N.m
	14 x 150	10	50 03 032 159	170 N.m
	16 x 150	10	50 03 032 236	220 N.m
Locknut DRH (flanged)	10 x 125	10	50 03 034 246	60 N.m
	12 x 125	10	50 03 034 248	110 N.m
	14 x 150	10	50 03 034 250	170 N.m

2.6 Addition of equipment to the bodywork

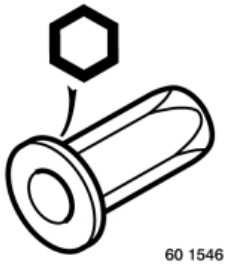
The attachment of equipment to the bodywork must be done with fluidtight crimping nuts.

Tooling and crimping nuts



M6 crimp nut - hexagonal barrel

Part N°: 50 03 043 050



Method:

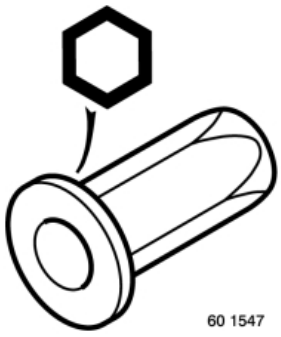
- Drill a dia. 9.2 mm hole (refer to chapter entitled “Drilling of bodywork members for the fitting of accessories”).
- Use the OPEX tooling from OTALU S.A. (RENAULT TRUCKS approval N° 8162).
- Punch out the hexagonal.
- Insert the nut for crimping.

Information:

- Tightening torque max. 10 Nm.
- Length of barrel projecting under bracket after crimping: 17 mm.

M8 crimp nut - hexagonal barrel

Part N°: 50 03 043 052



Method:

- Drill a dia. 11.2 mm hole (refer to chapter entitled “Drilling of bodywork members for the fitting of accessories”).
- Use the OPEX tooling from OTALU S.A.
- Punch out the hexagonal.
- Insert the nut for crimping.

Information:

- Tightening torque max. 24 Nm.
- Length of barrel projecting under bracket after crimping: 21 mm.

2.7 Rear run-under guard

RENAULT TRUCKS obtains approval for its equipment to cover the requirements of its range. Their attachment being by means of bolts, this allows them to be moved down along the sidemembers to suit such modifications that the chassis may undergo. This must be observed, along with the maintenance of the attachment method detailed on the 1:20 scale bodywork drawing and compliance with the dimensional requirements under the regulations.
A vehicle which is not equipped at the time of delivery can be fitted afterwards, following a conversion making the fitting compulsory, using items which can be supplied from the Parts Stores of our dealers.

Changing of position of items of equipment

Modifications of a RENAULT TRUCKS vehicle for the fitting of bodywork and equipment requires technical approval to be obtained from the Product Applications Department of RENAULT TRUCKS.

3. SPECIFIC EQUIPMENT FEATURES

3.1 Running the engine when vehicle stationary

Under the conditions of running an engine for a long period under load, it is vital to fit an additional cooler unit in order to keep the temperature of the engine at a normal level (water temperature approx. 80° C).
The prolonged use of the engine under these conditions can cause malfunctions which could adversely affect the life of the engine.

3.2 Mounting of power take-offs and flanged pumps

RENAULT TRUCKS power take-offs (PTOs) and their adapter kits should be ordered from the RENAULT TRUCKS Spare Parts Department. In order to carry out the fitting, refer to the specific information circulars that are available from the Product Applications Department.
Bearing in mind the weight and the large overhang required for certain PTOs having flanged pumps, the rear of these units should be supported by a suitable bracket attached to the rear of the gearbox.

Comply with the standard NF ISO 7653

IMPORTANT
It is compulsory at the time of fitting a power take-off to ensure that there is a certain amount of play in the setting adjustment, so as to allow an ideal backlash of 0.15 to 0.25 mm then to fit a gasket or apply paste in order to achieve a good seal and also to top-up the oil level. (Refer to the vehicle maintenance handbook).
Refer to our Product Information Sheet and 1:20 scale bodywork drawing on “power take-offs”, which can be requested from our Product Applications Department.

3.3 Front power take-offs (crankshaft nose)

RENAULT TRUCKS pre-arrangement

For belt drive units, pulleys with extra grooves fitted to the engine may be available.

Consult the Product Applications Department to obtain the relevant information and technical approval for the assembly.

3.4 Front and rear power take-offs

3.4.1 Propeller shaft alignment

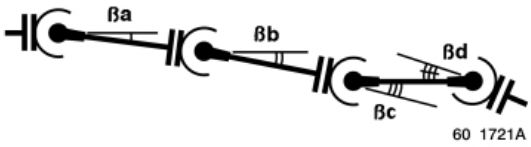
In order to achieve satisfactory propeller shaft alignment, several minimum basic **criteria** have to be observed.

Angularity criteria (or: equivalent angle of inclination β_E permissible for all articulations).

This angle β_E must comply with the following condition:

$$\beta_E = \sqrt{|\beta_a^2 \pm \beta_b^2 \pm \beta_c^2 \pm ...|}$$

$$\beta_E \leq 3°$$



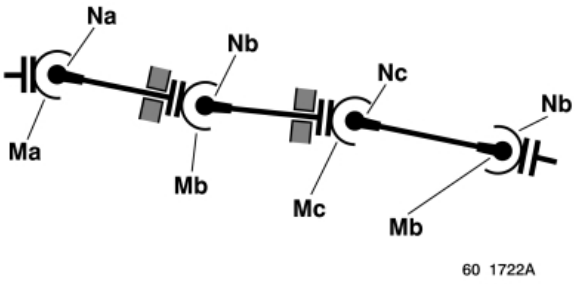
Rule for sign β:

Yoke N° 1 is to be considered as the reference yoke.

β > 0 when the leading yokes are parallel to the first leading yoke (Ma).

Example 1:

$$\beta_E = \sqrt{|\beta_a^2 + \beta_b^2 + \beta_c^2 - \beta_d^2|}$$



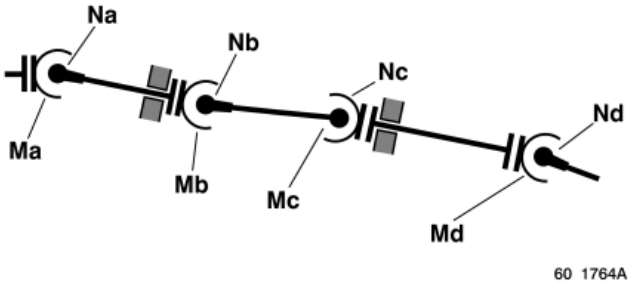
M - Leading yokes

N - Trailing yokes

β < 0 when the leading yokes are perpendicular to the first leading yoke (Ma).

Example 2:

$$\beta_E = \sqrt{|\beta_a^2 + \beta_b^2 - \beta_c^2 + \beta_d^2|}$$



Angular acceleration criteria θ1
Calculated criterion for a theoretical maximum speed of rotation (N).

$$\theta_1 = \left(\beta_E \times \frac{\pi}{180}\right)^2 \times \left(\frac{\pi \times N}{30}\right)^2$$

$$\theta_1 \leq 270$$

θ1 : criterion of acceleration in rd/s²
N : max. speed of rotation in rpm

NOTE
This value is calculated without dynamic amplification of the prop shaft tubes and bearings.

Measured criteria θ2:
The angular acceleration or torsional vibrations criteria value θ2 must not exceed 1500 rd/s² at the PTO output or at any point whatsoever of the driveline for a downstream inertia of I such that I ≤ 0.2 kg/m².

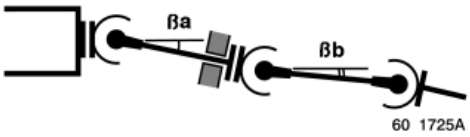
$$\theta_2 \leq 1500 \ \frac{rd}{s^2}$$

NOTE
This limit value θ2 takes into account possible dynamic amplification of the driveline.

Transversal stress criteria for prop shaft tubes and bearings.

Example β1 and β2 maximum not to be exceeded.

- **βa < 2°** for a prop shaft with bearing.
- **βb < 7°** for a prop shaft with sliding yoke.

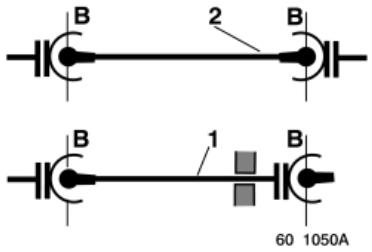


NOTE
If this 7° value has to be exceeded for space or clearance reasons, the vehicle manufacturer must be consulted.

3.4.2 Propeller shaft balancing

Permissible imbalance value (B):

$$B \leq 3 \frac{g \times cm}{kg} \text{ per balancing plane}$$

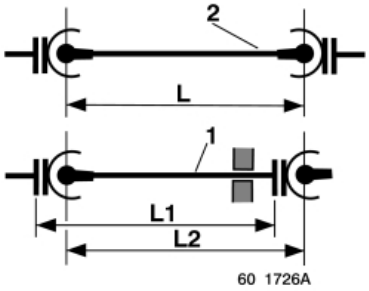


1 - 1/2 prop shaft
2 - prop shaft

NOTE
$g = m = 10\ m/s^2$

3.4.3 Maximum permissible length of a prop shaft as a function of the rotating speed (L, L1 or L2)

L : Distance between centres of articulation of a prop shaft.
L2 : Distance between centres of articulation welds of a half prop shaft.
L1 : Distance between centres of articulations of a half prop shaft.
L1 = L2



$$L = \sqrt{\frac{K}{Nt \times 1,2}} \quad \text{with} \quad K = 0,75 \times 1,22 \times 10^5 \times \sqrt{D^2 + d^2}$$

Nt = prop shaft maximum operating speed
1.2 = safety coefficient
D = prop shaft large diameter
d = prop shaft small diameter

3.5 Vehicle driveline (powertrain)

Any modification to the driveline is forbidden. For special cases, agreement must be obtained from the RENAULT TRUCKS Product Applications Department.

Any propeller shaft modifications must only be carried out in conformity with the requirements of paragraphs 3.4.2 and 3.4.3.

3.6 Mounting of handling cranes

The installer of the crane is responsible with regard to compliance with the regulations, and also for the stability of the vehicle. The recommendations of RENAULT TRUCKS are only concerned with the attachment of the equipment.

3.6.1 Mounting on the sub-frame

The mounting of a crane on the chassis behind the cab or in the rear overhang requires the fitting of a specific sub-frame.

The sub-frame module is defined in the graph of inertia in accordance with the lifting torque only for a crane mounted behind the cab and on rigid or drawbar rigid vehicles (refer to the next page).

For all mountings of cranes in the rear overhang, off-limits and on tractors, consult the RENAULT TRUCKS Product Applications Department.

The sub-frame must be in one single piece, starting from the rear of the cab, and extending as far back as the rear tip of the overhang. The front end must be finished in a single or double bevel (refer to the chapter 2.4.1 entitled “Finishing of the sub-frame behind the cab”).

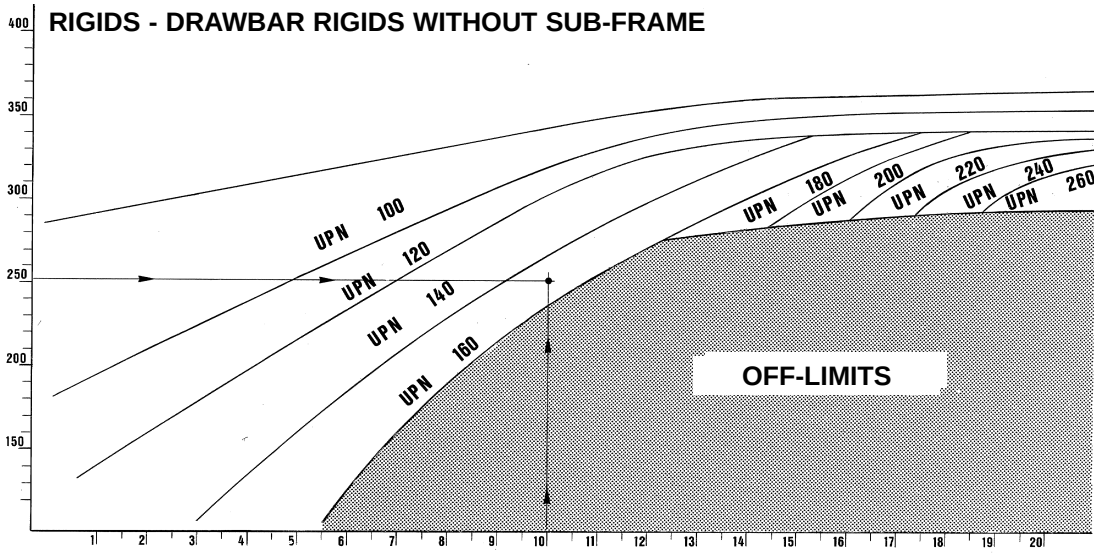
Should the crane be mounted in conjunction with another item of mobile equipment, one single sub-frame shall be designed in accordance with the item of equipment that places the most strain on the sidemembers.

3.6.2 Graph of the moment of inertia of the sub-frame as a function of the lifting torque

Example:

A chassis with sidemembers 252 mm long, fitted with a crane having a lifting capacity of 10 tonnes per metre.
The chassis requires a sub-frame built of size 160 U-section beams (—- direction of reading).
The U-section can be replaced by any other steel section offering equivalent total inertia.

Height of sidemember



Crane LIFTING TORQUE in tonnes/metre

The U-section beams (UPN) can be replaced by any other steel section offering equivalent total inertia (I/V).

UPN 100 : I/V = 41200 mm^3	UPN 160 : I/V = 116000 mm^3	UPN 220 : I/V = 245000 mm^3
UPN 120 : I/V = 60700 mm^3	UPN 180 : I/V = 150000 mm^3	UPN 240 : I/V = 300000 mm^3
UPN 140 : I/V = 86400 mm^3	UPN 200 : I/V = 191000 mm^3	UPN 260 : I/V = 371000 mm^3

WARNING

Before undertaking the mounting of a crane on a vehicle, it is essential to make calculations to check the load distribution, and to determine the new maximum body length of the vehicle, whilst complying with:

- The plated gross vehicle weight (GVW).
- The maximum plated axle loads.
- The maximum rear overhang indicated in the Type Approval Department's descriptive sheet and the body-work diagram.

Should such limits be exceeded and in all cases where the work does not comply with the type approval department descriptive sheet, special authorization must be requested from the RENAULT TRUCKS Product Applications Department.

In addition to this, the bodybuilder will be responsible for commissioning the equipment.

3.6.3 Crane in the rear overhang

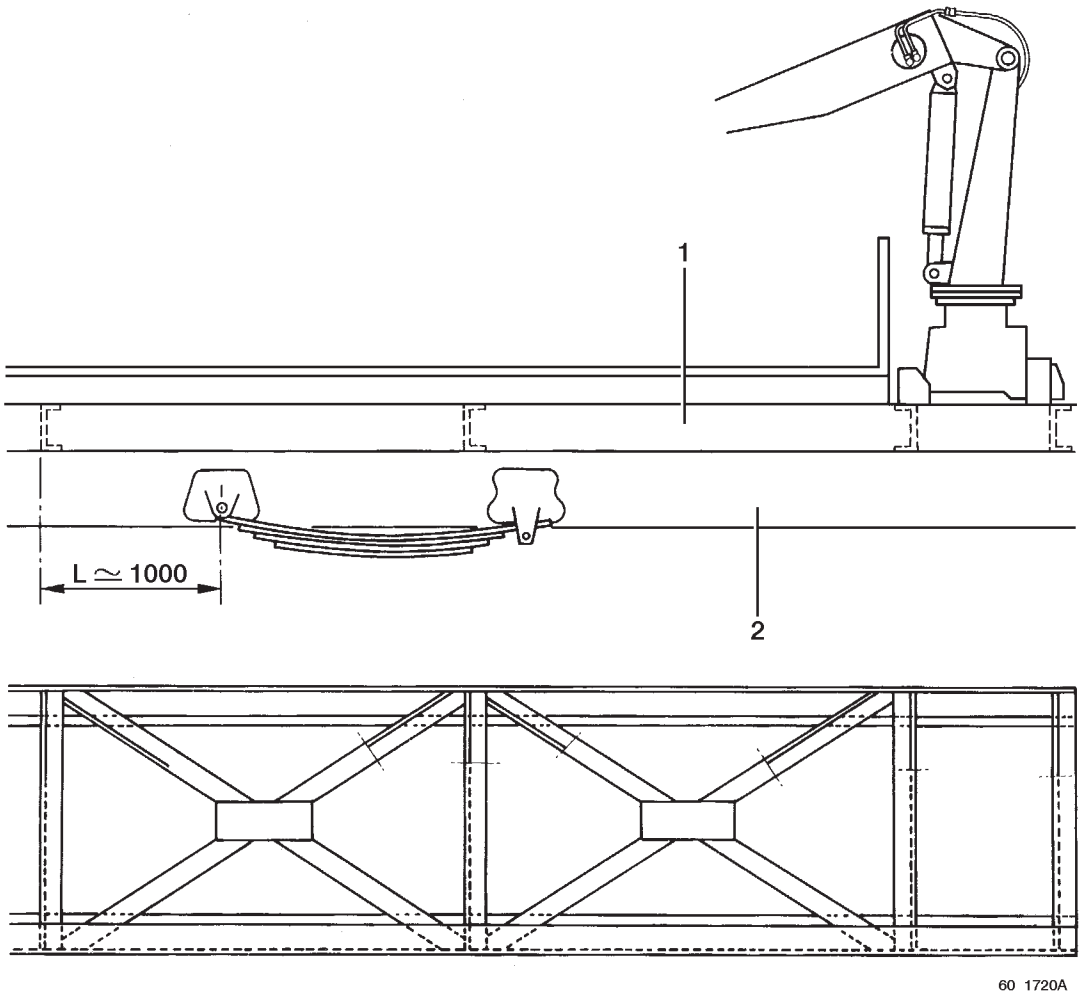
The installer of the crane is responsible with regard to compliance with the regulations, and also for the stability of the vehicle. The recommendations of RENAULT TRUCKS are only concerned with the attachment of the equipment.

The sub-frame required for such assemblies must be diagonally braced in accordance with the diagram below, using U-section beams with a module that is immediately lower than that recommended for the sub-frames.

Example: A sub-frame made of size 140 U-section beams shall be diagonally braced with size 120 U-section beams.

For a crane mounted in the rear overhang, in addition to the recommendations contained in the “WARNING” paragraph above, the following must also be observed:

- The minimum front axle load, for a vehicle fitted with a body and equipped with crane.
- The maximum plated front axle load shedding: 5% of the value of the weight of the chassis cab on the front axle.



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1 - Sub-frame
2 - Vehicle chassis

3.7 Tail lifts

3.7.1 Sub-frames

In the majority of cases, the mounting of a tail lift involves the fitting of a sub-frame to the vehicle. Such a sub-frame must reinforce the entire length of the chassis, with the bevelled front end being located as far forward as possible under the cab.

The module to be used for the sub-frame must be determined for tail lifts:

- without landing legs, for a capacity of 400 to 2,000 kg
- with landing legs, for a capacity of 1,000 to 2,000 kg
- by referring to the graph of inertia of the sub-frame depending on the load to be lifted, plus the information contained in the paragraph entitled “Special Recommendations”, which also deals with tail lifts with a capacity of 1,500 kg without landing legs and tail lifts with a capacity of 2,000 kg with or without landing legs.

3.7.2 Attachment

The tail lift is to be fastened in position with bolted plates. In all cases, the design of the attachment should involve that of the body sub-frame as well. Nut and bolt hardware is to be of class 10.9 fine pitch with a diameter of 12 mm. The plates are to be fastened in position with at least 6 nuts and bolts on each side of the chassis and by 3 bolts and nuts or only by welding to the sub-frame.
If necessary, it may be necessary to wedge the tail lift beam or plate on the lower flange chassis sidemember, so as to avoid flexing of the sidemember.

NOTE
Do not weld the bolted plate to the chassis.

WARNING
In all cases of conversions for tail lifts, it is absolutely essential to calculate the new length of body, to ensure compliance with:

- The maximum plated gross vehicle weight (GVW).
- The maximum load on the front axle, with the vehicle fitted with its body and equipped with tail lift.
- The maximum plated loads on the front and rear axles.
- The maximum rear overhang indicated in the Type Approval Department’s descriptive sheet and the bodywork diagram.

If any loads are exceeded, you should consult the Product Applications Department.

3.7.3 Electrical connections for a tail lift

Electrical connections should comply with the recommendations set out in the chapters entitled “Fitting of specific equipment” and “Electrical equipment”.

3.7.4 Special recommendations for tail lifts from 1500 to 2000 kg without landing legs

1,500 kg tail lift

- This is only possible using our chassis with a GVW equal to or greater than 16 tonnes.

2,000 kg tail lift

- This is only possible using our chassis with a GVW equal to or greater than 19 tonnes.
- For off-limits and for vehicles with a lower capability, consult the Product Applications Department.

Should the run-under guard have to be modified, care should be taken to ensure compliance with regulations in force.

3.7.5 Graph of the moment of inertia of the sub-frame as a function of the lifting torque

How to use the graph

- Draw a straight line joining the type of tail lift in question (lower part of the graph) to the mark corresponding with the height of the sidemember in mm.
- Draw a straight line from the value of the sidemember height.
- Read the value for the sub-frame at the intersection of these two lines.

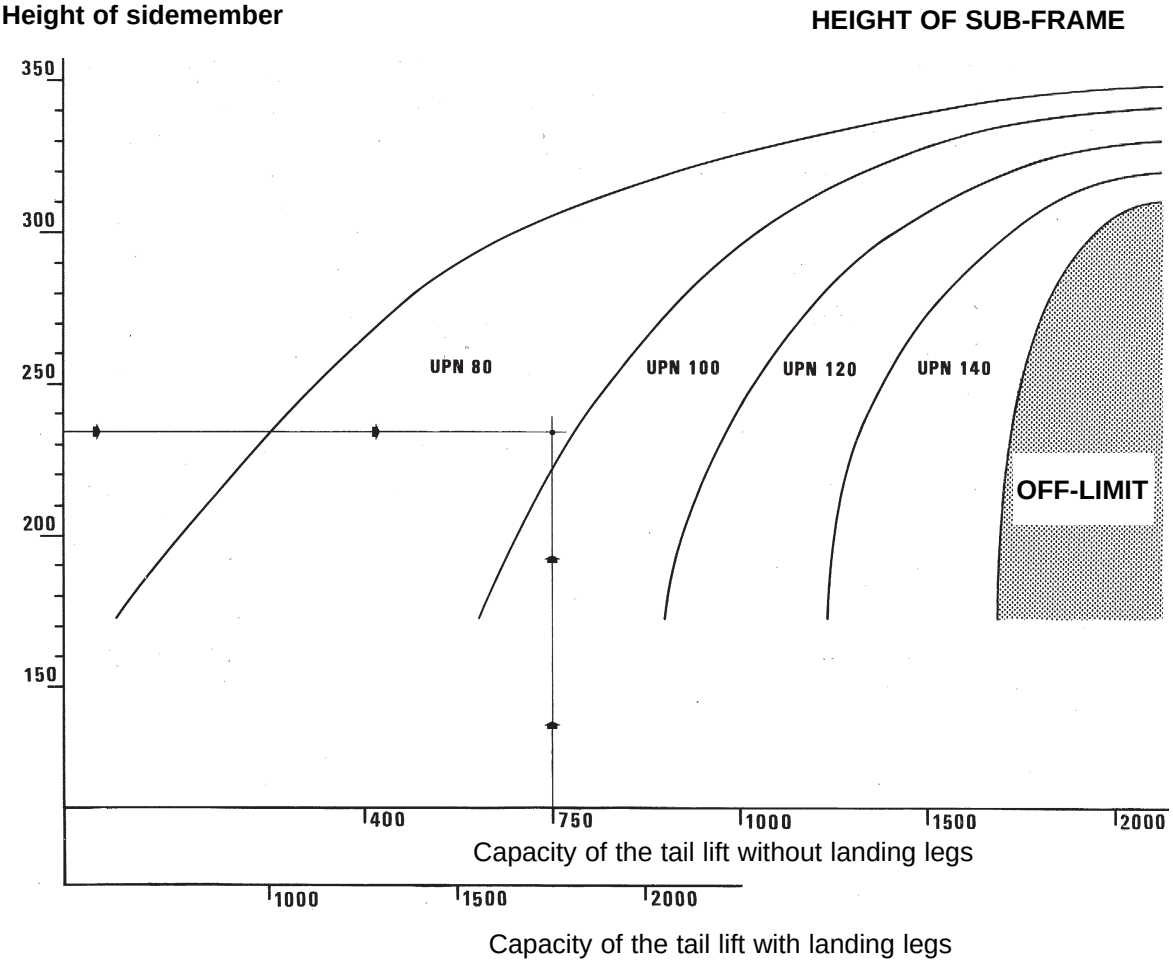
NOTE

For the mounting of tail lifts on 6x2 vehicles, it is essential to consult the RENAULT TRUCKS Product Applications Department.

Example:

Take a chassis with 234 mm high sidemembers, equipped with a 750 kg tail lift.

It requires a sub-frame made of size 80 U-section beams.



NOTE

The size 80 U-section beams can be replaced by any other section which gives an equivalent inertia (I/V).

PN 80: I/V = 26500 mm^3

PN 100: I/V = 41200 mm^3

UPN 120: I/V = 60700 mm^3

UPN 140: I/V = 86400 mm^3

3.8 Sub-frame box sections

The recommended box sections should:

- be constructed in sheet metal which is as thick or thicker than that used for the sub-frame.
- stretch over the entire rear of the sub-frame, starting gradually at least one metre in front of the foremost spring hanger of the rear spring.

WARNING

If the sub-frame is to be constructed in a material other than commercially available U-section beams, we approve all other sections on condition that the modulus of inertia of the “truck sidemember + sub-frame” section, measured at the centre-line of the rear axle, be at least equal to the modulus which we recommend (refer to the previous page).

It is forbidden to make any butt welds on the sub-frame in the area defined as follows:

- from the centre-line of the rear axle up to 500 mm to the aft of the rearmost spring hanger of the rear spring, in the case of 4x2 and 4x4 vehicles.
- from the centre-line of the middle axle up to 500 mm to the aft of the centre-line of the rear axle, in the case of all other vehicles.

3.9 Fitting of specific equipment (for example: refrigerator unit, tail lift)

3.9.1 Electrical connections

Refer to the recommendations for use (chapter on “Electrical equipment” in the General Section).

The power supply cable should be in one single piece, with a cross-section calculated for a max. rating of 5 Amps per mm^2. The power supply must be protected by a fuse and controlled by a specific master switch during fitting. It is compulsory for the cables to be connected to the battery terminals. The fuse and the master switch must be located as close to the battery connection as possible (in order to keep to a minimum the length of unprotected line).

The electric power and auxiliary wiring must compulsorily be independent from that of the vehicle network.

For this, you should contact the Product Applications Department in order to obtain its permission.

In the case of conversion of an independent self-contained unit on the front end of the body, an access ladder and platform for maintenance purposes should be provided.

3.9.2 Installation of receivers or generators with a voltage of more than 24 V

Comply with the standards in force and with the safety regulations covering installations and safety of the person (decree dated 14/11/1988). The protective earth is to be made on the equipment, and never on the vehicle structure.

3.10 Tapping on the diesel fuel tank

It is forbidden to drill the tank for the installation of a tapping point.

3.11 Fifth wheels (baseplates and couplings)

Tractor chassis are normally supplied as original equipment with bolted angle-irons. In this case they allow for the longitudinal positioning of the baseplate for the fifth wheel on the chassis, in order to ensure good load distribution on the tractor axles.

The fifth wheel is located on these angle-irons by the use of a cross-member and/or a baseplate (in certain cases the baseplate is sufficient).

The fitting of the fifth wheel must allow for the manoeuvring of a swan-necked semi-trailer in accordance with the ISO Standard in force : ISO 015/1726: Road vehicles – mechanical links between tractors and semi-trailers - interchangeability.

The bedplate and the baseplate must be independently mounted, with a minimum strength equal to that of the attachment for the fifth wheel.

Baseplates for each type of vehicle are available in several heights from the Spare Parts Department.

Refer to the Product Applications Department.

3.11.1 Mounting standards

Comply with the standard in force.

Kingpin 50 mm (2”) dia.

The attachment of the fifth wheel to the chassis must be done using 12 nuts and bolts size M16, quality class 10.9.

Kingpin 90 mm (3.5”) dia.

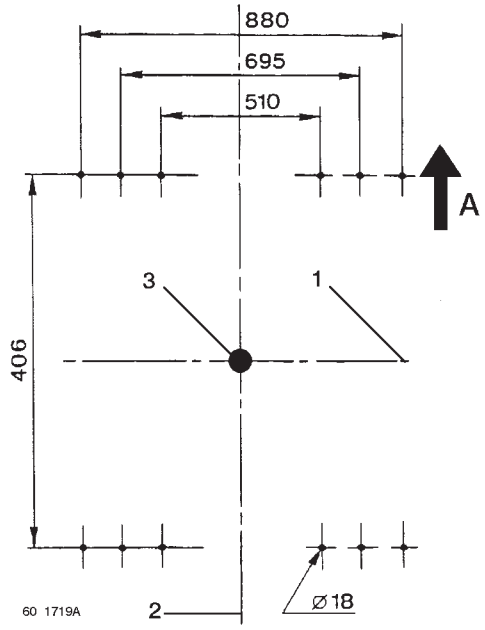
For details of the attachment of the fifth wheel, refer to the Product Applications Department or comply with the recommendations of the supplier.

These values apply equally for the attachment of the baseplate.

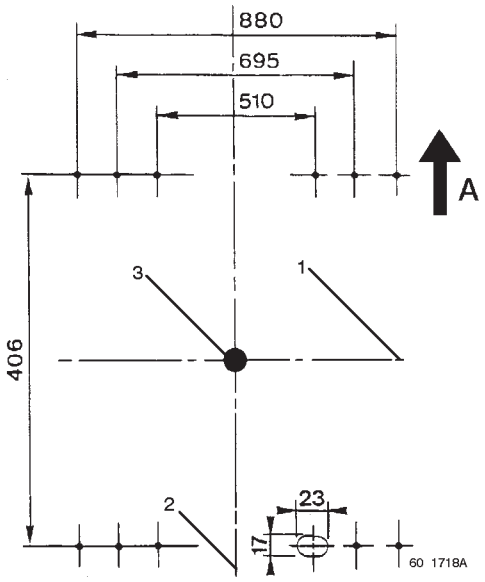
As far as swan-necked semi-trailers are concerned, which are not constructed in accordance with the ISO Standard in force, the attachment of the fifth wheel must take into account the instructions given above, whilst conforming with the capability of the tractor to manoeuvre, i.e. it must not come into contact with parts of the chassis, such as mudguards, rear lamps, registration plates, the back end of the chassis, the tyres, etc.

If the changing of position of the fifth wheel towards the front causes any interference of the mounts of the baseplate with those of a cross-member, you are obliged to refer to the Product Applications Department.

Drawing for drilling the baseplate for the attachment of the fifth wheel using 12 nuts and bolts dia. 16 mm (DIN Standard 74081)



Drawing for drilling the baseplate for the attachment of the fifth wheel by 12 nuts and bolts, dia. 16 mm with slotted holes (Standard NF R 41-171 dated October 1986)



A - Direction of movement of vehicle
1 - Lateral axis
2 - Longitudinal axis of the tractor engine
3 - Kingpin axis

CHAPTER -B-
“RENAULT MIDLUM” SPECIAL BODYBUILDING FEATURES

1. PRESENTING THE “RENAULT MIDLUM” SERIES

This RENAULT MIDLUM range, the new RENAULT TRUCKS offer for 7.5 to 18 tonne vehicles specifically designed for distribution, replaces and completes the old range.

This modern series hinges around three types of chassis, with greatly optimized models in the major European market segments:

- 7.5 tonnes with a wide choice of power ratings,
- 12 tonnes with a multiple offer allowing maximum adaptation to different trades,
- 18 tonnes.

Two new engines cover the power units for the range:

- 4-cylinder 4200 cc (dCi 4) developing 150 or 180 hp,
- 6-cylinder 6200 cc (dCi 6) developing 220 or 270 hp.

1.1 Make-up of the range

RENAULT MIDLUM B 7.5 to 10 tonnes:
- 3 power levels (150, 180, 220 hp)
- 6 wheelbases (2700*, 2950, 3250, 3850, 4450, 5050 mm)

RENAULT MIDLUM B 12 tonnes:
- 2 power levels (150, 180 hp)
- 6 wheelbases (2700*, 2950, 3250, 3850, 4450, 5050 mm)

The RENAULT MIDLUM B 12 tonnes is the “typical” vehicle for urban and suburban distribution.
The main features of RENAULT MIDLUM B are:
- 200 x 70 mm sidemembers module,
- 17.5” tyre fitment,
- one single access step to the cab.

* for dCi 4 only.

RENAULT MIDLUM C’ 12 tonnes:
- 2 power levels (180, 220 hp)
- 8 wheelbases (3070, 3350, 3650, 3950, 4550, 5150, 5750, 6480 mm)

The main features of RENAULT MIDLUM C’ are:
- 220 x 70 mm sidemembers module,
- 17.5” tyre fitment,
- two access steps to the cab.

The RENAULT MIDLUM C’ consists of a RENAULT MIDLUM C chassis and cab with RENAULT MIDLUM B powertrain and rolling gear.

RENAULT MIDLUM C 12, 14 and 16 tonnes
- 3 power levels (180, 220, 270 hp)
- 8 wheelbases (3070, 3350, 3650, 3950, 4550, 5150, 5750, 6480 mm)

The main features of RENAULT MIDLUM C are:
- 220 x 70 mm sidemembers module,
- 19.5” tyre fitment,
- two access steps to the cab.

RENAULT MIDLUM HD and Construction 12, 14 and 16 tonnes
- 2 power levels (220, 270 hp)
- 5 wheelbases (3070, 3350, 3950, 4550 mm)

The main features of RENAULT MIDLUM HD and Construction are:
- 220 x 70 mm sidemembers module,
- 20” or 22.5” tyre fitment,
- two access steps to the cab,
- sheet metal bumper.

The RENAULT MIDLUM HD is proposed for export and the RENAULT MIDLUM Construction is officially approved for EEC.
These vehicles consist of a RENAULT MIDLUM C chassis and cab with sheet metal bumper and 22.5” tyres for better ground clearance.

RENAULT MIDLUM 18 tonnes:
- 2 power levels (220, 270 hp)
- 11 wheelbases (3650, 3950, 4250, 4550, 4850, 5150, 5450, 5750, 6050, 6480, 6780 mm)

The main features of RENAULT MIDLUM D are:
- 244 x 70 mm sidemembers module,
- 22.5” tyre fitment,
- two access steps to the cab,
- sheet metal bumper for Buildings & Public Works version (wheelbases 3650 to 4550 mm).

RENAULT MIDLUM 4x4 TA (all-wheel grip) and TC (unkept tracks):
- 11, 13, 15 tonnes for export, in TC version only,
- 12, 13, 14, 15, 16 tonnes for EEC,
- 1 power level (220 hp),
- 4 wheelbases (3070, 3350, 3650, 3950 mm).

The main features of RENAULT MIDLUM 4x4 are:
- 220 x 70 mm sidemembers module,
- 19.5” tyre fitment (twin fitment for TA only), 20” or 22.5” (single tyre fitment at rear possible for TC),,
- two access steps to the cab,
- sheet metal bumper.

The RENAULT MIDLUM range, the perfect adaptation to all trades:
- a comprehensive offer for all collection and distribution activities,
- an optimized offer for express delivery and building trades with specific models,
- a specific offer for long-distance haulage,
- a vehicles offer dedicated to bodybuilders (tankers, refuse collectors, road sweepers...).

This search for perfect adequation between the activity and the vehicle is expressed through the attributes of the new RENAULT MIDLUM range:
- Compactness connected with overall cab width and overhang, and reduced front overhang.
- Loading capacity with tare weight among the best on the market (RENAULT MIDLUM B 12 tonnes “payload champion” with a tare weight below 3300 kg).
- Accessibility to loading with an unladen height among the best on the market.
- Safety by the adoption of “all-disc” brakes.
- Adaptation to all trades through the “Trade” vehicles offer and development of pre-arrangements for the fitting of bodies.
- The determination to fully respond to the different trades of the intermediate series is fully expressed in the range of cab appointments that constitute an innovation in the world of distribution, both as regards the diversity and the equipment comfort level.
- The result of the work conducted in common with bodybuilders and the pre-arrangements for the fitting of bodies ensure bodybuilders and users time savings and product quality.

These pre-arrangements concern the assembly of tail lifts, behind-cab cranes and other equipment items. They are completed by an “Electrical pre-arrangements” pack intended to facilitate the fitting of electrical features (for a full description, see “Trade packs and vehicles” chapter).

1.2 Changes to “RENAULT MIDLUM”

- engines equipped with common rail fuel-injection and electronic management offering new power ratings:
  . dCi 4 & dCi 6 available on RENAULT MIDLUM B, C’, C
  . dCi 6 available on RENAULT MIDLUM HD & Construction.
- new oil sumps,
- fuel filters in LH front wing,
- fuel prefilter (option),
- new gearbox cross-member,
- new closing cross-member fastened to sidemembers web,
- battery compartment and air tanks superimposed on the entire series, (configuration identical to RENAULT MIDLUM B),
- air-operated auxiliary equipment identical on all the vehicles,
- new gearboxes,
- discontinuation of soundproofing screens behind cab and on gearbox,
- front run-under guard (option),
- 4-spring cab suspension on RENAULT MIDLUM D 18 tonnes,
- new instrument panel and new display (with new functions).

1.3 Electronic management of “RENAULT MIDLUM” vehicles

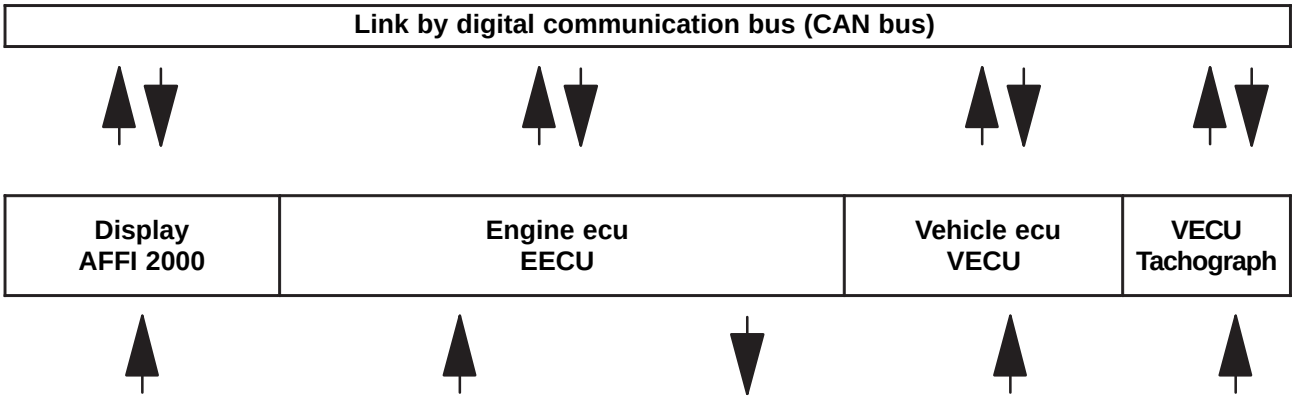
1.3.1 Operating principle

Engine electronic management is used to improve engine performance while optimizing fuel consumption and pollutant emissions (in order to meet Euro 3 standard).

The electronic system consists of two principal electronic control units:
- the **EECU** (Engine Electronic Control Unit):
This is located in the battery compartment and manages, among other things, the fuel pump solenoid valves, the exhaust brake... on the basis of information it receives from the different engine, speed, air temperature, fuel pressure... sensors.
- the **VECU** (Vehicle Electronic Control Unit):
This is located at the side of the dashboard electrical distribution panel and manages operation of the different vehicle equipment items (windscreen wash/wipe...), controls (accelerator, parking brake, electric retarder...), together with “bodybuilder” functions (PTO, related engine speeds...).

An instrument panel display (AFFI 2000) makes the interface between vehicle and driver. Not only classic information such as distance travelled, average or instant fuel consumption... is displayed, but also information on the state of the vehicle or its body (tailgate incorrectly closed, interior lighting in service...) coupled in case of danger with the STOP warning light or a buzzer.

All these modules are interlinked by a digital communication bus (CAN bus) that allows them to exchange the necessary orders and information.



Warning lights: - battery charge - air suspension	**Sensors** - oil level / pressure - coolant temperature - air pressure / temperature - flywheel speed - injection pressure	Electric injectors	**Vehicle information** - accelerator pedal - cruise control and exhaust brake control - PTO engaged, brake and clutch pedals, parking brake... sensor - windscreen wash/wipe...control	control Gearbox sensor
Direction change lights and indicators	Chassis-mounted stop control	HP pump solenoid valves		
Defects / wear: - ABS, transponder, air suspension, brake pad wear...		EGR solenoid valve		
		Exhaust brake solenoid valve		

It is forbidden to cut the engine ECU wiring harness located in the battery compartment (for extension or shortening purposes).
Any changing in position must be done in an area permitted by range of movement of the wiring harness - take care to protect the ECU against splash and spray.

1.3.2 Bodybuilders' electrical pre-arrangements

For a detailed description of the electrical pre-arrangements, wee the Trade Packs chapters. The vehicle electrics is managed by the Vehicle ECU and there are two electrical pre-arrangements levels:
- electrical pre-arrangement N° 1 dedicated to vans with tail lifts for control of lighting, switching on machines, wiring of side lights...
- electrical pre-arrangement N° 2 dedicated to trades for management of PTOs and related engine speeds...

1.4 Warning

Any work on the fuel system is forbidden.
On engines equipped with common rail fuel-injection operating at very high pressure, the presence of air may lead to damage to the pump.
Observe the rules governing common rail system cleanliness and bleeding, that is to be performed whenever any work is carried out on the system
For further information, consult the RENAULT TRUCKS Product Applications Department.

On the low pressure circuit, changing of position of a fuel tank, adding unions or components, risks creating extra head losses:
- The specification risks not being met both at supply pump inlet and at pump return.
- The pressure regulation device risks malfunctioning (the system is sensitive to head losses).
- Check the air take-offs, make sure the fuel level is correct even when the vehicle is on an incline and during the brake application phases (difficulty in starting or stalling of the engine).
- The fuel filters must still be the last part before the HP pump inlet.
- The position of the prefilter must still be the same on the hydraulic circuit (between the injector return and the feed pump inlet).

On account of the use of electronic boxes, the installation of equipment may cause electromagnetic disturbance and oblige bodybuilders to proceed with new approval of the vehicle in respect of Electromagnetic Compatibility.

The management of engine speeds in PTO mode is managed by the electronics.
Any vehicle not equipped with electrical pre-arrangement N° 2 cannot be equipped with a PTO.
For trade vehicles, the subsequent installation of electrical pre-arrangements requires significant and complex intervention work (installation of cab and chassis wiring harnesses, re-definition of vehicle and engine ECUs...).

It is forbidden to walk on or place heavy articles on the engine for risk of damaging the HP injector pipes and the plastic rocker covers.

Guarantee access to the air intake, exhaust and fuel supply circuits.
The radiator inlet and outlet surfaces must not be modified.
The cooling flow must be conserved.

1.5 Trade vehicle models

In order to optimize the facility of adaptation and bodybuilding and to best meet customers' expectations, RENAULT MIDLUM vehicles can cascade down into models or be equipped as standard with a "Trade pre-arrangement" based on the "Normal use" model. These pre-arrangements are a combination of options allowing, when installing the equipment, to have a basic vehicle on hand adapted to the constraints of its use, equipped with various pre-arrangements thus reducing conversion work and making for easier installation work.

"Normal use"

Basic vehicle with "general use" vocation, specialized by the fitting as standard of a "Trade pre-arrangement".

"Tanker vehicle"

Tanker special features

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- RH sidemember cleared for the installation of specific accessories,
- punchings on chassis for fastening accessories and wing brackets,
- gearbox-mounted PTO with flange output,
- fast idling set at 1200 rpm with regulated fast idling control, (2 programmed engine speeds available, plus chassis-mounted variable speed control),
- pneumatic coupling for engagement of PTO,
- remote controlled clutch release operating ram,
- 80 litre and 130 litre main fuel tank on the left,
- reinforced front and rear parabolic leaf spring suspensions,
- tanker lateral signalling installation kit,
- ABS,
- exhaust on left side.

ADR equipment

- rear run-under guard for tanker overall width 2350 mm,
- chassis-mounted "palm switch" stop control,
- 2 kg fire extinguisher in cab,
- portable orange wander lamps in cab,
- wheel chock,
- tachograph with current limiter,
- exhaust silencer shield,
- behind-cab shield,
- pre-arrangement for fixing ADR plate,
- battery isolation switch with pneumatic control,
- ADR chassis wiring harnesses.

Options

- loose spare wheel,
- gearbox-mounted PTO with splined shaft output,
- without "ADR" ("transport of dangerous materials") equipment,
- engine hourmeter in cab,
- towing cross-member capacity > 3.5 tonnes.

For all the vehicles (other than tankers), it is possible to choose the ADR variant.

“Refuse collector vehicle”

- refuse collector bodybuilder electrical pre-arrangement (see chapter B-8),
- automatic transmission,
- gearbox-mounted continuous high-power PTO with regulated fast idling control, (2 programmed engine speeds available, plus chassis-mounted variable speed control),
- reinforced front parabolic leaf spring suspension,
- reinforced dissymmetrical rear suspension,
- vertical exhaust,
- 80 litre fuel tank,
- without rear run-under guard,
- RH door with peep window,
- reversing buzzer,
- ripper presence 30 km/h speed limiter,
- without spare wheel,
- mileometer without tachograph,
- frontview mirror,
- passenger bench seat,
- fuel tank to right,
- adapted grab handles,
- central passenger holding bar.

Options
- roof level engine air intake,
- single rear tyre fitment,
- fixed passenger seat,
- engine hourmeter in cab.

“Road sweeper vehicle”

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- dissymmetrical rear suspension,
- right-hand drive,
- LH door with peep window,
- lateral exhaust,
- plastic 80 litre main fuel tank,
- with run-under guard,
- mileometer without tachograph,
- with battery isolation switch,
- reversing buzzer,
- roof level engine air intake,
- without spare wheel,
- frontview mirror.

“Light fire tender vehicle”

- fire brigade bodybuilder electrical pre-arrangements,
- EATON 4106 OD gearbox + power take-off 2903P,
- 4-door cab (6/7 places),
- reinforced front parabolic leaf spring suspension,
- reinforced rear parabolic leaf spring suspension,
- lateral exhaust with internal outlet,
- plastic 130 litre main fuel tank,
- adjustable fast idling,
- lamps mounted on lighting bar,
- pneumatic battery isolation switch,
- loose spare wheel,
- 9.5 R 17.5 XYZ tyres,
- white bumper,
- cab pre-arrangements (working spotlamp with remote control, radio antenna, earth braid on doors, foot-operated horn control, special steering column trim, self-adhesive reflectors on doors...).

Options
- blue revolving beacons.

“Buildings and public works vehicle”

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- glazed cab rear wall,
- gearbox-mounted PTO, engine speed limitation 1400 rpm, PTO engaged,
- rear drive axle differential lock,
- without run-under guard (depending on country),
- towing cross-member and hook capacity 3.5 tonnes,
- front and rear parabolic leaf spring suspensions,
- 2-place bench seat,
- changing of position of air braking appliances for installation of cab tilting ram.

Options
- vertical exhaust,
- roof level engine air intake,
- engine hourmeter in cab,
- pre-arrangement for installation of a crane.

1.6 Make-up of “Trade packs”

“Crane” installation pre-arrangement

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- reinforced front and rear suspensions,
- crane fastening plates,
- gearbox-mounted PTO with regulated fast idling control, (2 programmed engine speeds available, plus chassis-mounted variable speed control).

Options
- vertical exhaust,
- pre-arrangement for engine hourmeter in cab,
- with rear run-under guard for platform body.

For a tipper vehicle, provide only additional crane support plates.

“Tail lift” installation pre-arrangement

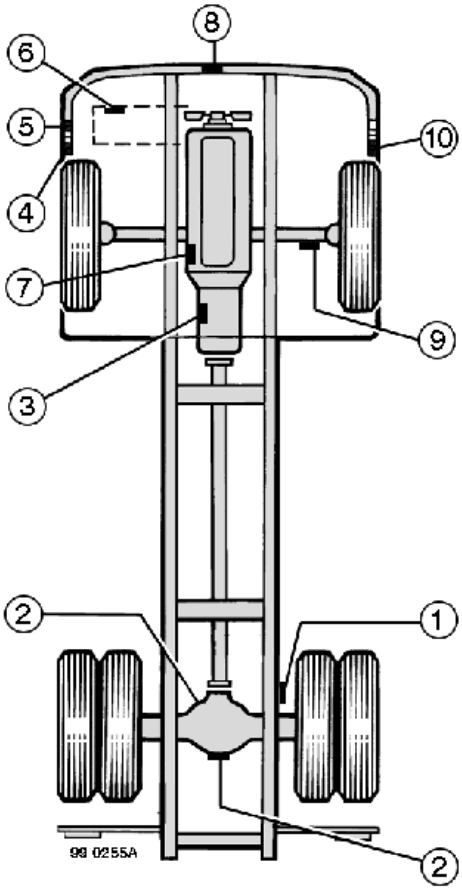
- level 1 bodybuilder electrical pre-arrangement for installation of a tail lift (see chapter B-4),
- reinforced rear suspension,
- without rear run-under guard (option for column type tail lifts),
- 80 Amp alternator,
- 170 Amp-hour batteries,
- 200 Amp fuse-holder located in battery compartment,
- tail lift earth available in the rear overhang,
- earth screw in rear overhang.

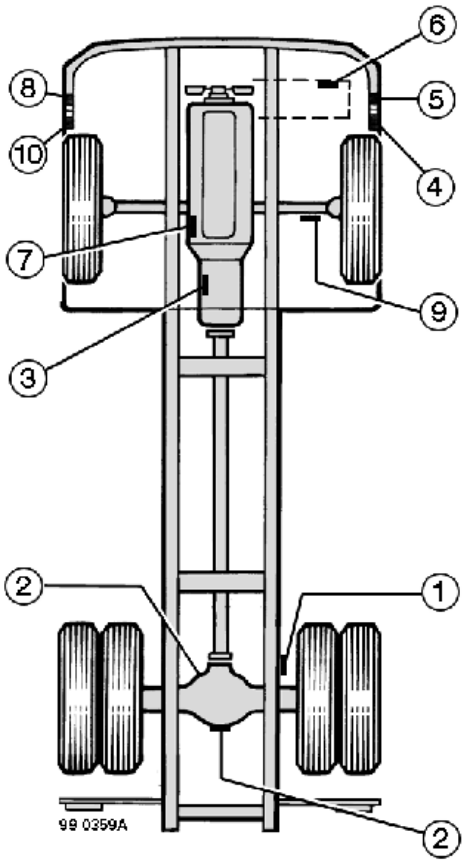
Options
- level 2 bodybuilder electrical pre-arrangement (see chapter B-5).

2. GENERAL REMARKS ON “RENAULT MIDLUM” SERIES

2.1 Identification of the vehicle

LH drive vehicles **RH drive vehicles**





View from above

Position of on-vehicle identification plates

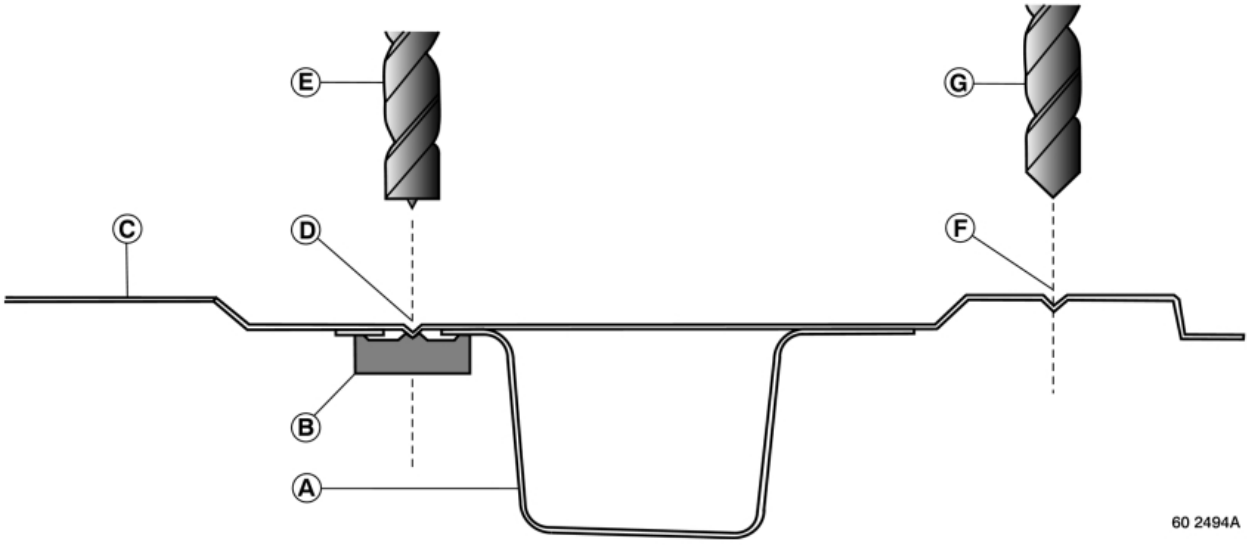
1 - chassis
2 - rear drive axle
3 - gearbox
4 - manufacturer’s plate
4 - pollution index
5 - manufacturing plate
6 - tachograph plate (if fitted)
7 - CAM reference
7 - paint reference
8 - engine
9 - front axle
10 - load sensing valve plate

IMPORTANT
The identification markings must remain visible and accessible without need for removing any bodywork component.

2.2 General drilling principles

2.2.1 Drilling cab panels for fitting accessories

Drilling the cab allows the fastening of sealed crimping nuts for the assembly of accessories.
The recommendations below will help avoid damage to the roof headlining at the time of drilling.



A - Roof stiffener
B - Weld nut on stiffener
C - Bodywork panel
D - Positions of impressions for drilling and access to weld nut
E - Centring drill with stop:
- dia. 11 mm for crimping nut dia. 8 mm
F - Positions of impressions for drilling and access to crimping nut
G - Centring drill with stop:
- dia. 9 mm for crimping nut dia. 6 mm

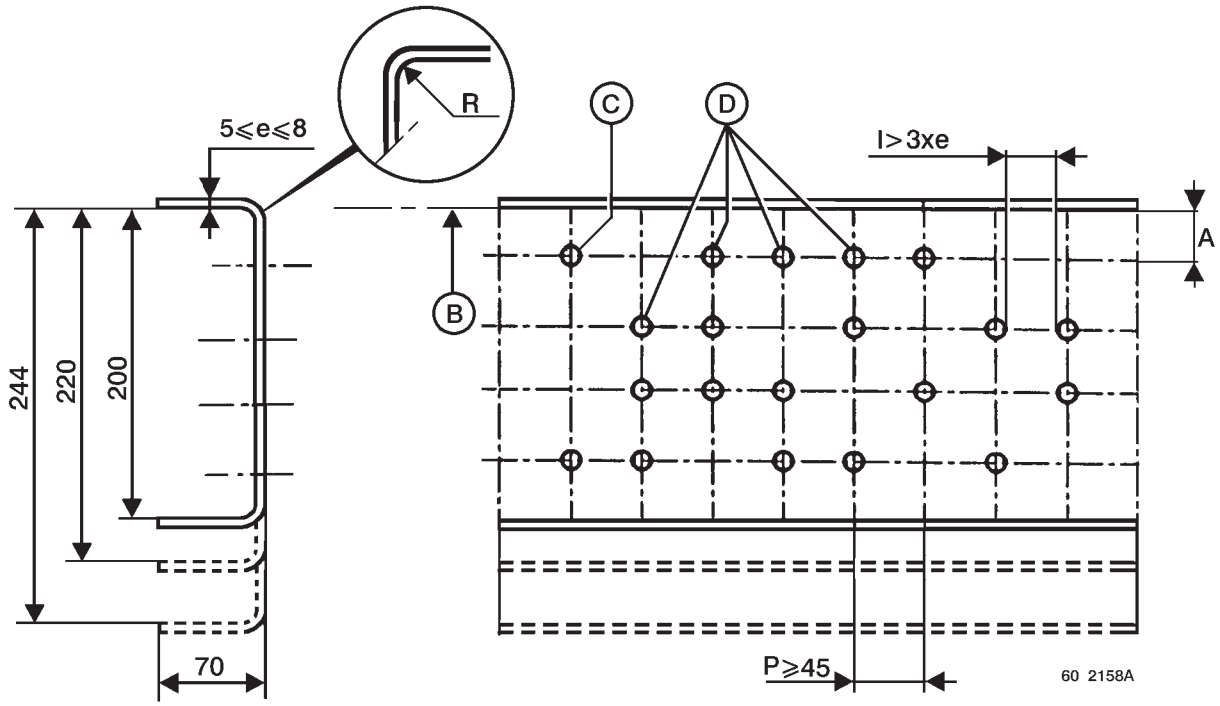
Method
Use a centring drill with stop positioned on the bit to drill the roof.
Drilling depth: 5 mm max. for fastening crimping nut.

Anti-corrosion protection:
Deburr the holes after drilling.
Protect the metal with a zinc aerosol spray available from the Spare Parts department, ref. N° 77.01.406.425.

2.2.2 Drilling in sidemembers

BAN

- No drilling in the flanges of sidemembers.
- No drilling more than 3 holes on the same vertical.



B - Chassis zero plane (RENAULT TRUCKS reference centre-line)
e - Thickness of sidemember
P - Between-centres distance between two drillings

All the drillings must be at a minimum distance from the sidemember flanges: A > R+3 mm + F
R - sidemember internal radius of curvature
F - diameter of washer or diameter of rivet head divided by two

For maximum safety, take for dimension A a minimum value of 28 mm.

C - Recommended drilling diameter:
13 mm for assembling elements (tool box...)
17 mm for assembling built-on units (tail lifts...)

D - Alignment of 3 holes maximum on the same vertical axis

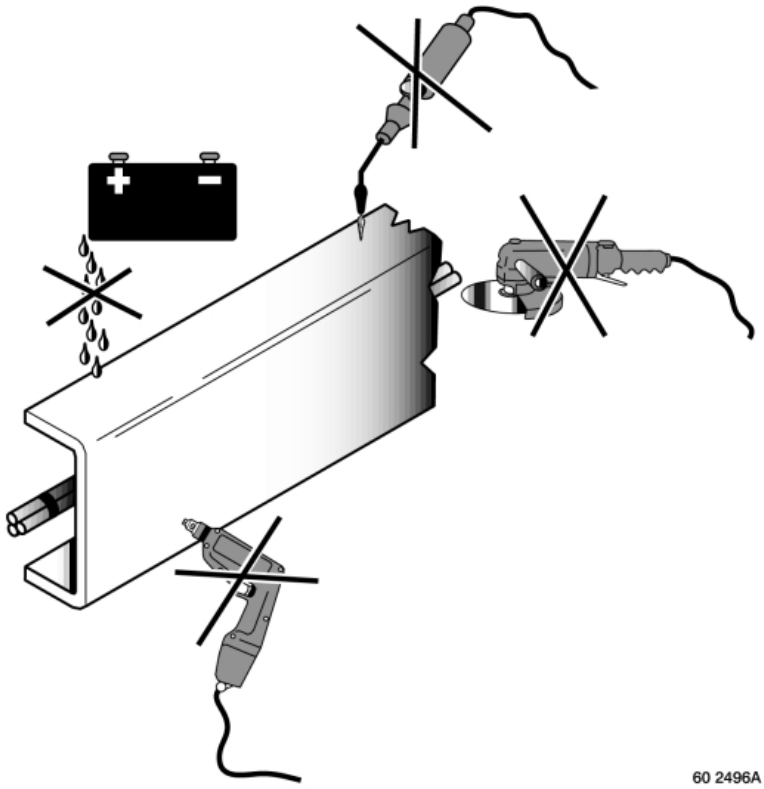
l - Minimum width corresponding to 3 times the thickness of the sidemember must be observed between 2 drillings

Anti-corrosion protection and paint retouches to the chassis
Protect the metal with a zinc aerosol spray, ref. N° 77.01.406.425.
Retouch paintwork with a grey chassis aerosol paint spray, ref. N° 50.01.848.147.
These consumables are available from the RENAULT TRUCKS Spare Parts department.

2.3 Precautions

2.3.1 Protection of wiring harnesses

When welding or using a sanding disk, take care to protect electrical wiring harnesses and air pipe bundles against any spatter that might damage them.



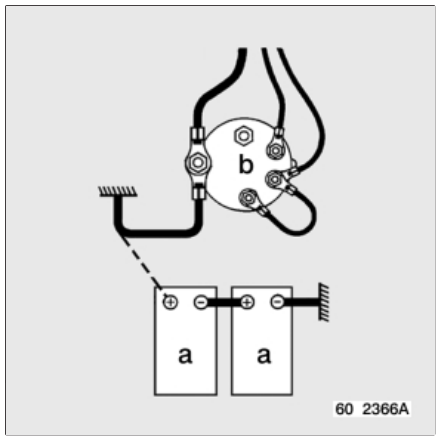
2.3.2 Protection of electrical installation prior to welding

Important operations to be carried out without fail, prior to welding.

The vehicle is equipped with numerous electrical circuits. Before any operation involving electric arc welding, disconnect the positive (+) cable from the battery and connect it to earth.
Place the earthing clamp as near as possible to the point of welding, but never on rotating parts (prop shaft, fan hub, fan, etc.) nor on a sub-assembly having moving parts (i.e. air compressor, turbocharger, etc.).
Nearby plastic pipes and electrical cables, springs and air-suspension bags are to be protected or removed. This also applies when grinding or drilling.
The master switch must be closed.

Diagram : Vehicle with electrical, mechanical or pneumatic master switch
Disconnect the 2 cables and join them together.

a - batteries
b - electromagnetic master switch



After welding, reconnect all the cables finishing with the earth cable.
Other precautions before welding: refer to chapter “Precautions before welding” in the “General Features” section.

When welding in the RENAULT MIDLUM cab, place the earthing clamp as close as possible to the point of welding.

Bodybuilder wiring harnesses can be routed parallel to the vehicle harnesses with independent fastenings (do not make use of the vehicle wiring harnesses to connect them to bodybuilder harnesses).

When installing the wiring harnesses, pay attention to hot areas (exhaust, turbocharger, electric retarder).

Welding must be an exceptional operation on our vehicles (cab extension, welding of crane frames...).

Pay attention to cab movements at articulation level for wiring harnesses that connect the chassis and the cab.

IMPORTANT
Preservation of the batteries during bodybuilding :
- On vehicles with a master switch, open the circuit with the battery isolation switch.
- If the lay-up time is > 2 days, disconnect the battery negative (-) terminal.
- Reconnect the (-) terminal after finishing body fitting.
Tighten the terminal screw to a torque of 4.5 Nm.

Reminder :
- When welding to the chassis or to bodywork fitted to the chassis, it is essential to connect the circuit positive (+) terminal (master switch closed) to the negative (-) terminal (earth) connected to the chassis via a well-tightened nut and bolt.
- If the truck is fitted with an alarm, refer to the "alarm" procedure before touching the batteries (see vehicle operating handbook).

2.4 Minimum load on front axle

In order to guarantee suitable vehicle ride behaviour, stability and handling under maximum safety conditions, the minimum recommended load on the front axle must be applied whatever the vehicle load and equipment conditions.
For special cases, consult the RENAULT TRUCKS Product Applications Department.

Vehicle equipment	Minimum load on front axle
Vehicle alone	25% of the vehicle gross weight
Vehicle equipped with tail lift, or loading crane to rear of vehicle	30% of the vehicle gross weight

IMPORTANT
- Never exceed the maximum permissible load on the front axle.
- Application of the load in the rear overhang of the vehicle is detrimental to vehicle ride behaviour, stability and handling. Great prudence is recommended when driving under such conditions.
- Watch that the centre of gravity of the load is positioned laterally as close as possible to the centre of the vehicle.

2.5 Soundproofing screens and heat shields

2.5.1 Instructions for soundproofing screens

Soundproofing screens should neither be removed, modified nor displaced so as not to downgrade the vehicle sound level, which is covered by official homologation.

If it is unavoidable for them to have to be removed, they must without fail be put back into place when the work is completed.

After removal, only perfectly clean screens should be refitted.

The screens are to be cleaned using a cloth. If necessary, use soapy water (all other products are to be forbidden).

No solvents or paints are to be applied at all on either the inner or the outer faces of soundproofing screens.

Any damage to the internal protective film of the screen requires the screen to be replaced.

In the event of on-vehicle welding or the use of a sanding disk, provide efficient protection to the screens.

If the screens have been removed, provide efficient protection to the wiring harnesses.

Pay particular attention that there are no inflammable products present on the screen protective films.

Overtightening of screen attaching nuts and bolts may lead to damage.

Observe the recommended tightening torques without fail.

- screen bracket / chassis fastenings: 20 Nm
- screen / chassis bracket fastenings: 8 Nm

2.5.2 Instructions for heat shields

It is forbidden to remove or modify these shields. They play a part in the safety of your vehicle.

During chassis painting operations, take care to efficiently protect the hot face of heat shields against splashing paint and especially the shields surrounding the electric retarder. In effect, these shields are only effective if the surfaces are free from any foreign matter.

2.6 Side impact guards

Side impact beams must comply with the laws in force and should not impede access to chassis components (spare wheel, air and fuel tanks, air dryer...).

3. INSTALLATION OF BODYWORK

3.1 Use of 1/20th scale drawings and calculation sheets

Technical data sheets are tools used by sales engineers to present the range or series. They cannot be representative of particular vehicles.
To obtain precise information, refer to the 1/20th scale drawings, calculation sheets or type approval department reports to be found in the RENAULT MIDLUM CD-ROM.
Only these documents will give you accurate and reliable information on vehicles according to tonnage, air intake, cab type, weights...

3.2 Example of a search (according to Euro 2 scenario)

1 - Click on the chosen language.

2 - Click on **“1/20th scale bodybuilder’s drawings”.**

3 - Click on **“Chassis cab drawings”.**

4 - Choose the vehicle use (click on **“Normal”**).

Rigid

Normal	Tipper	Tanker	RCV	Road sweeper	Fire tender	Construction

or

Tractor

5 - Choose the vehicle model according to cab, GVW and wheel rims (click on **“RENAULT MIDLUM B”**).

	Normal rigid LH drive	
GVW Rims	Day & Sleeper cab	4-door cab
7.5 to 12 T-17.5”	**Midlum B**	Midlum B
12T-17.5”	Midlum C’	Midlum C’
12T to 16T-19.5”	Midlum C	Midlum C
11.9 to 18T-22.5”	Midlum D	

6 - Choose the drawing N° according to wheelbase and engine power rating (click on “**5010528253**”).

RENAULT MIDLUM B Rigid (day & sleeper cab)	
Wheelbase	150 - 220 hp
2700	5010528680
2950	5010528251
3250	**5010528252**
3850	5010528253
4450	5010528254
5050	5010528255

7 - Click on **“Visualize PDF format”.**

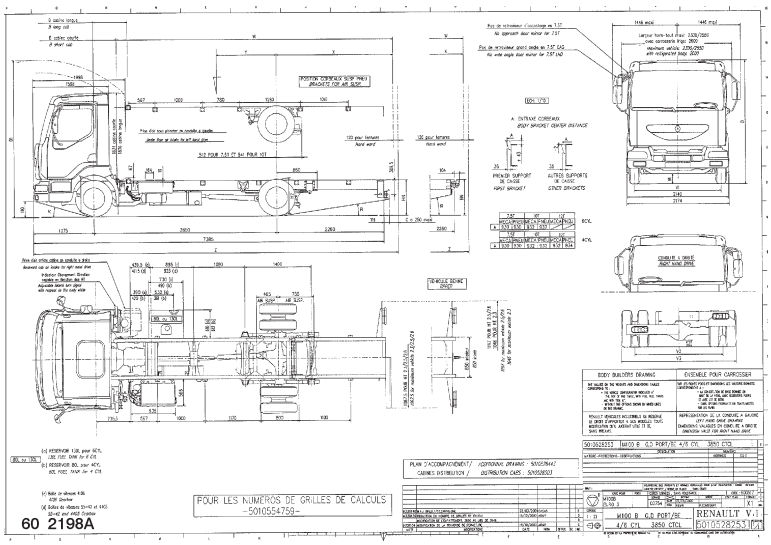
Drawing N° 5010528253

Visualization of PDF format

Recording of DXF format

Access to grids

8 - Visualize the drawing and print out.



9 - Go back to the last screen.

10 - Click on **“Access to grids”**.

11 - Choose the vehicle model and the engine power rating” (click on **“RENAULT MIDLUM B” 150 to 180 hp).**

Rigid							
Midlum B	Midlum C’	Midlum C	Midlum D	Tanker	RCV	Sweeper	Sweeper tander
150 to 180 hp	180 hp	180 hp	220 hp	220 hp	220 hp	180 to 200 hp	220 hp
220 hp	220 hp	220 hp	270 hp	270 hp			
		270 hp					
		Wheel rims 22.5”					
Tractor							
220 hp							

Choose grid N° **“5010554392”** according to GVW, suspension and cab.

Midlum B 150 to 180 hp			
GVW MAX. FRONT/REAR	SUSPENSION	CAB	GRID N°
6T 3,2/4,8–3,2/5,2	Parabolique	Courte	**5010554392**
6T 3,2/4,8–3,2/5,2	Parabolique	Profonde	5010554453
6T 3,2/4,8–3,2/5,2	Pneumatique	Courte	5010554393
6T 3,2/4,8–3,2/5,2	Pneumatique	Profonde	5010554454

13 - Click on **“Visualize PDF format”**

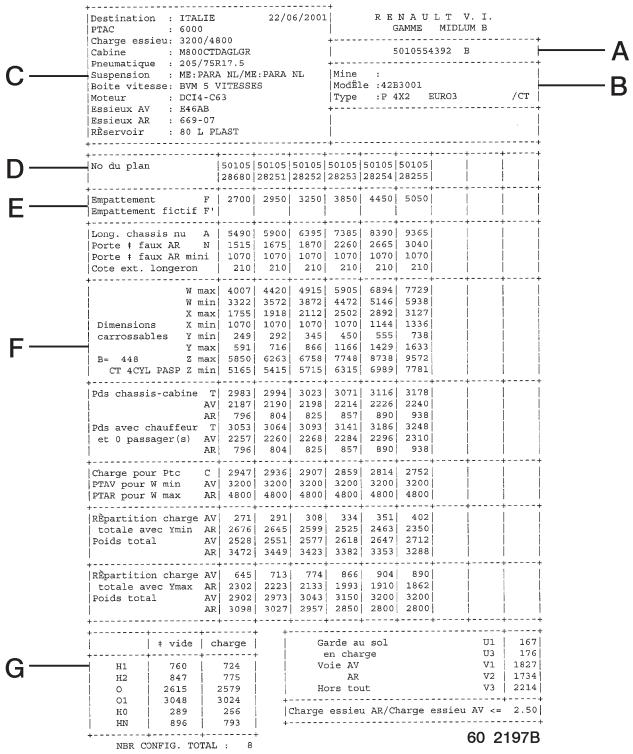
Grid N° 5010554392

Visualization of PDF format

14 - Visualize the grid and print out.

A - calculation grid Number
B - vehicle identification
C - vehicle make-up
D - 1/20th scale drawings number
E - wheelbase
F - body start dimension
G - height

See without fail;
- cab accompanying drawings (overall dimensions, tilting radius...)
- chassis accompanying drawings (position of appliances...).



3.3 Body start dimension

3.3.1 Day cab (1.6 m)

Vehicle		Minimum body start dimension			
Type	**Driving position side**	**B1**	**B2**	**B3**	**B4**
MIDLUM B 4 cylinders	left	448	540	600	448
	right				
MIDLUM B 6 cylinders	left	423			423
	right				492
MIDLUM C'/C 4 cylinders	left	398	490	490	398
	right				
MIDLUM C'/C 6 cylinders	left	373	490	490	373
	right				442
MIDLUM HD/construction 6 cylinders	left	401	503	505	401
	right		490		442
MIDLUM D 6 cylinders	left	373	490	490	373
	right		490		442
MIDLUM 4x4 TA 6 cylinders	left	401	503	505	401
	right		490		442
MIDLUM 4x4 TC 6 cylinders	left	401	503	505	401
	right		490		442
RENAULT MIDLUM RCV	left			490	
Road sweeper	right		490		

B1 - minimum body start dimension for version with under-floor engine air intake
B2 - minimum body start dimension for version with roof level engine air intake
B3 - minimum body start dimension for version with vertical exhaust
B4 - minimum body start dimension for version with air intake to aft of cab

NOTE
The values **(B1 - B2 - B3 - B4)** are calculated for a body positioned at a height more than 130 mm from the upper face of the sidemembers.
To move the position of the side direction indicator lights (see chapter B-3.10).

3.3.2 Behind-cab surrounds

To prevent the components forming the rear surrounds of the cab from entering into contact with the bodywork, a minimum body start dimension, depending on the height of the sub-frame employed, is to be observed.

The components forming the rear surrounds of the cab are:

- direction change indicator lamps,
- cab rear fireproof screen for ADR vehicles,
- front wings and wing brackets.

Key to diagram on next page

A - front axle centre-line

C - between-centres distance between front axle and rear extremity of direction indicator lamps (see chapter B-3.10).

B - body start dimension

F - height of front wing bracket in relation to the chassis

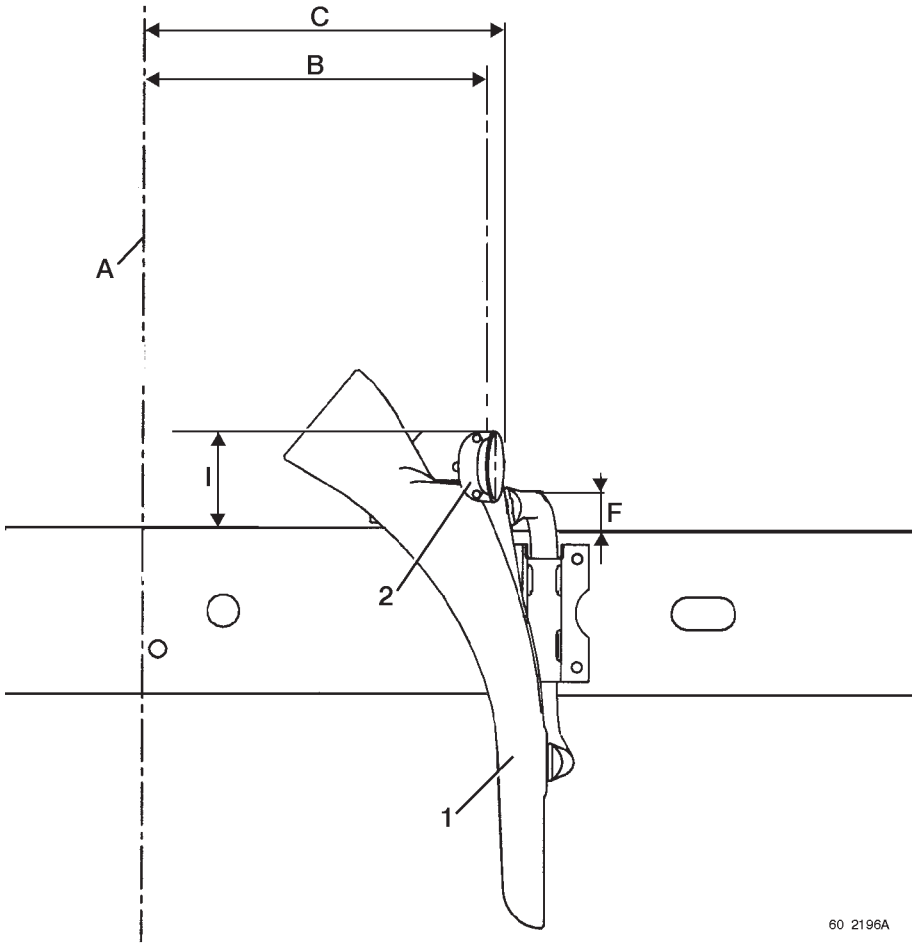
I - protrusion of side direction indicator lamps in relation to top of sidemembers

1 - front wing

2 - side direction change indicator lamp

Table of overall dimensions of components to the rear of the cab

	MIDLUM B	MIDLUM C'/C	MIDLUM HD/ Construction	MIDLUM D
C	470	420	400	
F	50	63	50	
I	130		260	



3.3.3 Sleeper cab (2 m)

Vehicle		Minimum body start dimension			
Type	**Driving position side**	**B1**	**B2**	**B3**	**B4**
MIDLUM B 4 cylinders	left	770	876	950	770
	right				
MIDLUM C'/C 4 & 6 cylinders	left	720	826	870	720
	right				
MIDLUM HD/Construction	left	720	826	910	
	right				
MIDLUM D 6 cylinders	left	720	826	870	720
	right				

B1 - minimum body start dimension for version with under-floor engine air intake
B2 - minimum body start dimension for version with roof level engine air intake
B3 - minimum body start dimension for version with vertical exhaust
B4 - minimum body start dimension for version with air intake to aft of cab

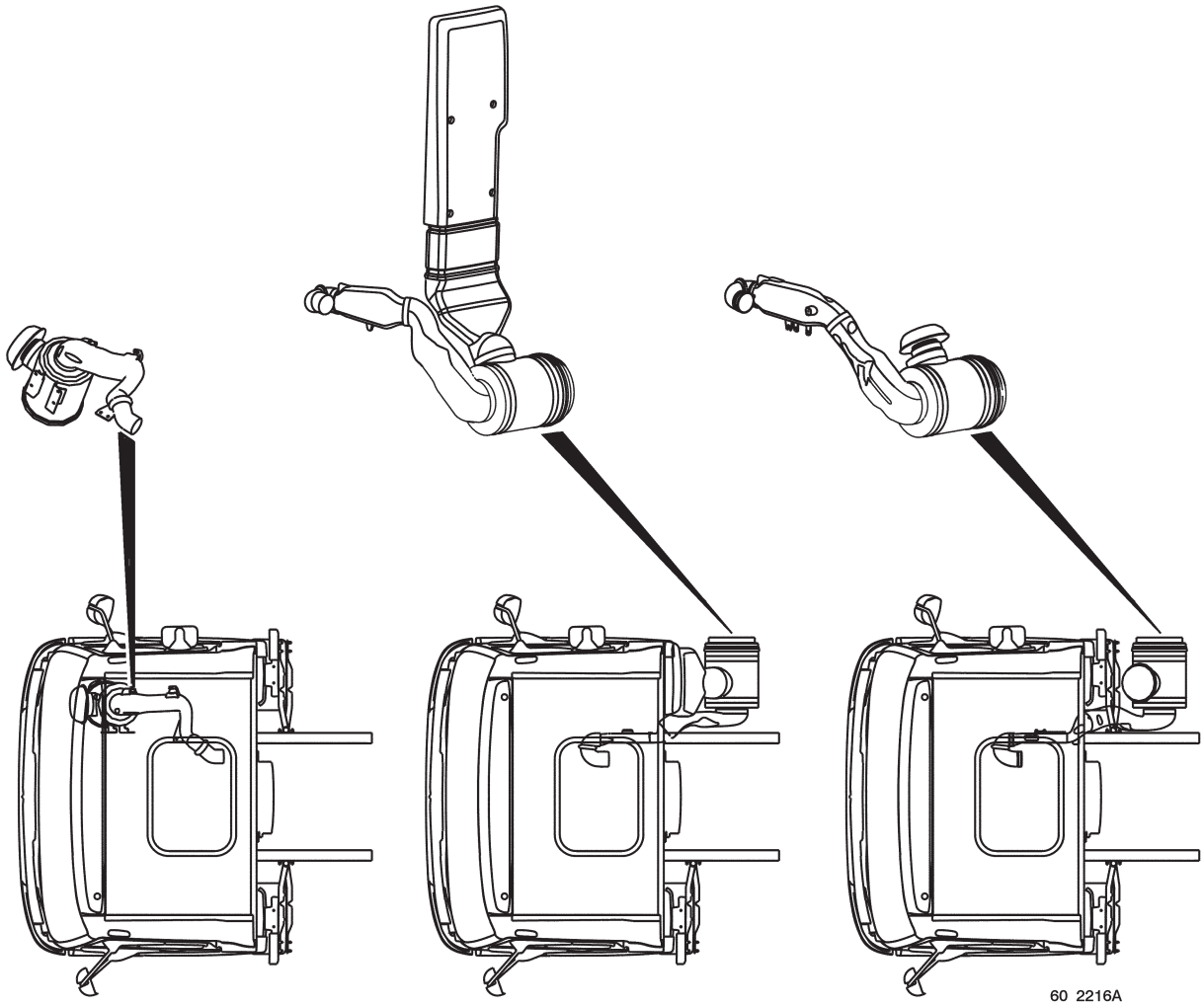
3.3.4 4-door cab

Vehicle	Minimum body start dimension
MIDLUM B 4 cylinders	1752
MIDLUM C'/C 4 cylinders	1702
MIDLUM HD/Construction 6 cylinders	
MIDLUM 4x4 TA 6 cylinders	
MIDLUM 4x4 TC 6 cylinders	

3.3.5 Presentation of the different air intakes

When changing the position of equipment or for trade applications (refuse collectors, road sweepers...), take care to not take up the place of the original filtration system or change its position. In fact, its size and position are defined to get optimum yield from the engine by avoiding the ingress of foreign matter (water, gravel, dust...).

When fitting the vehicle body, take care to maintain access to the air filter box so as to be able to replace the filter.



1 - under-floor engine air intake
2 - roof level engine air intake
3 - air intake to aft of cab

Capability of adjusting the behind-cab air intake nozzle according to bodybuilder requirements.

3.4 Sub-frame sections

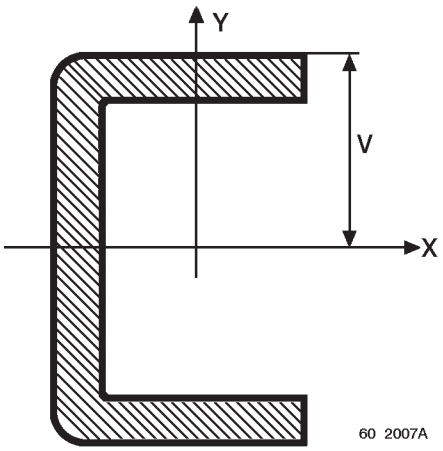
3.4.1 Minimum height according to range of suspension movement

A minimum sub-frame height is imposed by the range of movement of the rear suspension. The use of a subframe with insufficient height would result in possible damage to the underbody or equipment due to friction by the rear wheel tyres.

<table>
<tr><th colspan="3">Minimum sub-frame height according to suspension type</th></tr>
<tr><th rowspan="2">Vehicles</th><th colspan="2">Suspension type</th></tr>
<tr><th>Mechanical</th><th>Air</th></tr>
<tr><td>MIDLUM B 4 cylinders 7.5 tonnes</td><td>90 mm</td><td>55 mm</td></tr>
<tr><td>MIDLUM B 6 cylinders 7.5 tonnes</td><td rowspan="2">100 mm</td><td>60 mm</td></tr>
<tr><td>MIDLUM B 4 & 6 cylinders 10 tonnes</td><td rowspan="2">55 mm</td></tr>
<tr><td>MIDLUM B 4 cylinders 12 tonnes</td><td>110 mm</td></tr>
<tr><td>MIDLUM C’ 12 tonnes</td><td>80 mm</td><td>55 mm</td></tr>
<tr><td>MIDLUM C 180 & 220 12 tonnes</td><td rowspan="2">110 mm</td><td>60 mm</td></tr>
<tr><td>MIDLUM C 270 12 tonnes</td><td rowspan="2">75 mm</td></tr>
<tr><td>MIDLUM C 180 & 220 14 tonnes</td><td rowspan="4">120 mm</td></tr>
<tr><td>MIDLUM C 270 14 tonnes</td><td rowspan="2">90 mm</td></tr>
<tr><td>MIDLUM C 180 & 220 16 tonnes</td></tr>
<tr><td>MIDLUM C 270 16 tonnes</td><td>105 mm</td></tr>
<tr><td>MIDLUM HD 14 tonnes</td><td>145 mm</td><td rowspan="4"></td></tr>
<tr><td>MIDLUM construction 14 tonnes</td><td>125 mm</td></tr>
<tr><td>MIDLUM HD 16 tonnes</td><td>160 mm</td></tr>
<tr><td>MIDLUM construction 16 tonnes</td><td>135 mm</td></tr>
<tr><td>MIDLUM D 18 tonnes</td><td>170 mm</td><td>150 mm</td></tr>
<tr><td>MIDLUM 4x4 TA 14 & 16 tonnes</td><td>10 mm</td><td></td></tr>
<tr><td>MIDLUM 4x4 TC 11 tonnes</td><td>30 mm</td><td></td></tr>
<tr><td>MIDLUM 4x4 TC 12 tonnes single fitment</td><td>100 mm</td><td></td></tr>
<tr><td>MIDLUM 4x4 TC 13 & 14 tonnes</td><td>65 mm</td><td></td></tr>
<tr><td>RENAULT MIDLUM 4x4 TC 15 & 16 tonnes</td><td>85 mm</td><td></td></tr>
</table>

3.4.2 Sub-frame start dimensions

Vehicle	Sub-frame minimum inertia (mm^4)	
	Along axis (X)	Along axis (Y)
MIDLUM B	700 000	1 250 000
MIDLUM C'		
MIDLUM C	850 000	3 500 000
MIDLUM HD Construction		
MIDLUM D 18 tonnes	1 000 000	5 505 500



Reminder of formula for calculating maximum normal surface stress

$$\sigma = \frac{Mf}{\left(\frac{I}{v}\right)}$$

σ : maximum stress at surface edge (N/mm^2)
Mf : bending moment (Nm)
I : surface quadratic moment (mm^4)
v : distance between section extremity and neutral fibre (mm)

3.5 Finishing of sub-frame start dimensions

Depending on:
- cab length (day cab, sleeper cab, 6/7 place crew cab),
- position of engine air intake (roof level air intake or under-floor air intake),
- width of section making up the sub-frame,

the finishing of the sub-frame must be:
- symmetrical or asymmetrical (LH side start dimension different from that of the RH side),
- provided or not with horizontal cut-outs (reduction in width), allowing passage of the cab rear soundproofing screen and the roof level air intake.

Key to drawings, following pages.
A - Front axle centre-line,
e - Width of sub-frame section,
L - Distance from centre-line of the first bracket in relation to the centre-line of the front axle,
F - Sub-frame start dimension (symmetrical sub-frame),
Fg - Sub-frame LH start dimension (asymmetrical sub-frame),
Fd - Sub-frame RH startdimension (asymmetrical sub-frame),
Xg - Distance between LH end of sub-frame and first bracket centre-line (asymmetrical sub-frame),
Xd - Distance between RH end of sub-frame and first bracket centre-line (asymmetrical sub-frame),
1 - Air intake pipe,
2 - Cab rear soundproofing screen,
3 - Sub-frame,
4 - First bracket,
5 - Chassis sidemember,
6 - Cab rear attachment.

IMPORTANT
ADR vehicles (transport of dangerous materials) are equipped with a screen behind the cab and a screen on the gearbox. To limit cut-outs at the extremities of the sub-frame, the recommended width of the sections is 50 mm. If this width is greater, provide horizontal cut-outs (reduction in width) allowing passage of the rear screen.

RENAULT MIDLUM day cab and under-floor air intake

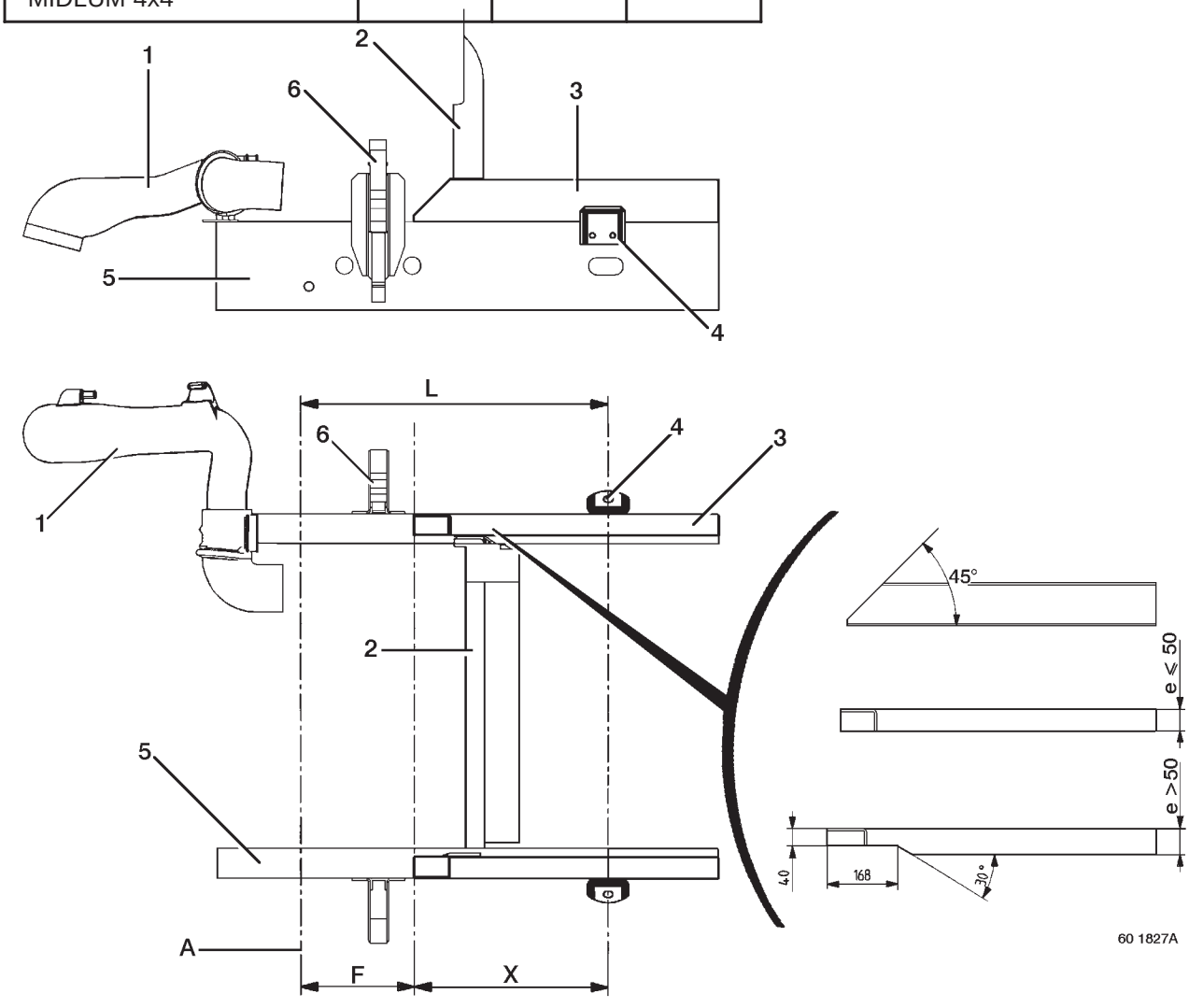
Symmetrical sub-frame finishing

Vehicle	F	L	X
MIDLUM B	273	735.5	462.5
MIDLUM C'/C	223	835.5	612.5
MIDLUM HD/ Construction			
MIDLUM D			
MIDLUM 4x4			

RENAULT MIDLUM sleeper cab whatever the air intake

Symmetrical sub-frame finishing

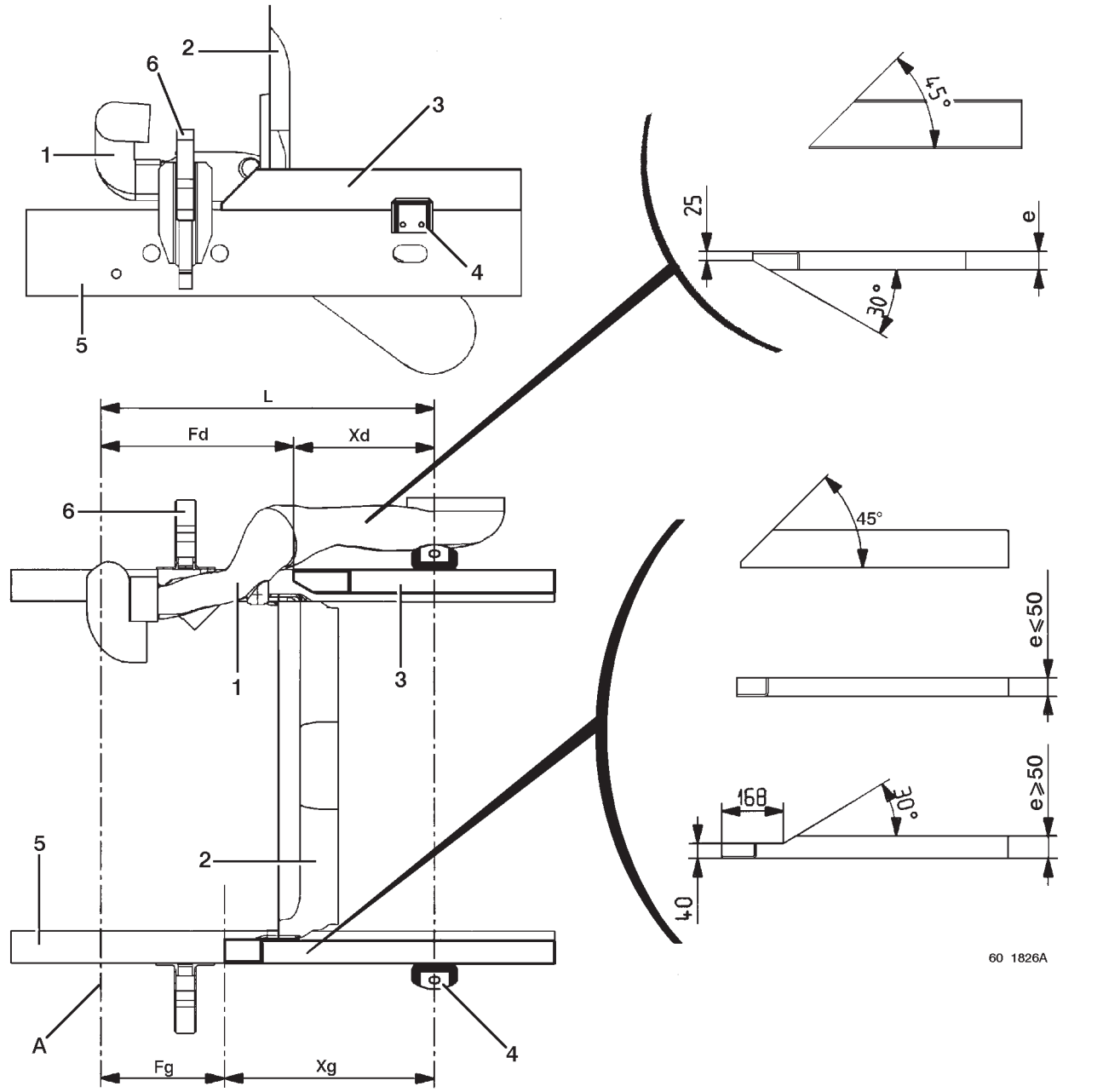
Vehicle	F	L	X
MIDLUM B	620	735.5	115.5
MIDLUM C'/C	570	835.5	265.5
MIDLUM HD/ Construction			
MIDLUM D			
MIDLUM 4x4			



RENAULT MIDLUM day cab and roof level air intake

Symmetrical sub-frame finishing:
- asymmetrical sub-frame,
- cut-out on the RH side whatever the width **(e)** of the section.
- cut-out on the LH side if the width **(e)** of the section is greater than 50 mm.

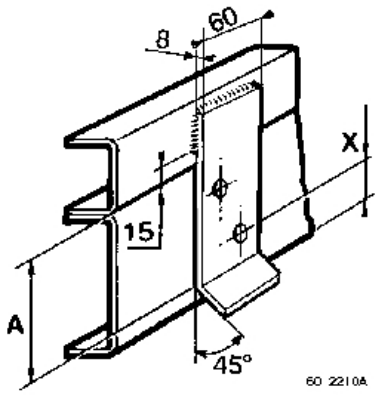
Vehicle	Fg	Fd	L	Xg	Xd
MIDLUM B	273	425	735.5	462.5	310.5
MIDLUM C'/C	223	375	835.5	612.5	460.5
MIDLUM HD/Construction					
MIDLUM D					
MIDLUM 4x4					



3.6 Lateral guiding

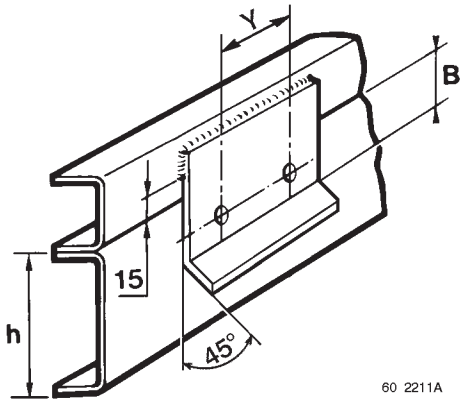
All bodies must be fitted with lateral guides to the fore and aft of the sub-frame.

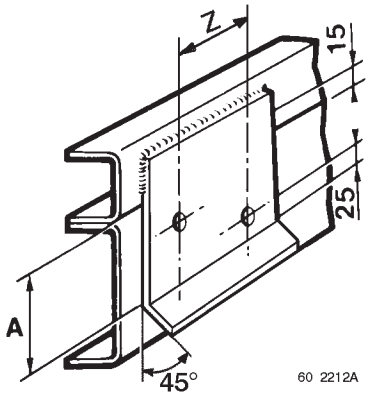
At the front:
For vehicles fitted with flush first brackets, lateral guiding must be assured by two guide plates that are:
- welded to the sub-frame,
- bolted to the sub-frame or the chassis, but never both at the same time.



IMPORTANT
For vehicles fitted with raised first brackets, the latter play the part of front guides.
The fitting of guide plates is therefore unnecessary.

At the rear:
Lateral guiding must be assured by two guide plates. These are drilled and screwed to the sidemembers if they also fulfil the function of inertia stop.





For positioning the drillings to the guides, observe the sidemember drilling recommendations described in the chapter “Drilling of sidemembers”.

A: minimum support height, 3/4 of height (**h**) of the sidemember
B: minimum support height, 1/4 of height (**h)** of the sidemember

X (mm)	Y (mm)	Z (mm)
30	50	45

Inertia stop

All bodies or equipment must be fitted with an inertia stop to the aft of each sidemember to retain the body against motion.

3.7 Attachment of bodywork

It is essential to comply with the stipulations hereafter for attaching bodywork of equipment to our vehicles.

For special cases, contact the RENAULT TRUCKS Product Application Department.

The bodywork must be correctly attached so that both the static and dynamic stresses are freely transmitted without causing excessive local strain, which could prejudice the reliability of the chassis frame or affect the road behaviour of the vehicle.

The use of brackets mounted in production to the chassis is compulsory.

The fastening of body sub-frames or undercarriages must be carried out according to the recommendations defined in this document (consult the “Bodywork fastening type” chapter).

Sub-frames or undercarriages must be continuous and fit perfectly over the entire length of the chassis. They may however be intermittent for a few specific applications (e.g. tankers). In such case, their attachment remains entirely under the bodybuilder’s responsibility.

Sub-frames or undercarriages should always be tapered towards the front (i.e. under the cab), so as to avoid sudden variations in inertia.

Behind-cab overall dimensions are given in the “Cab footprint” and “Behind-cab surrounds” chapters.

Protection against exhaust heat radiation: the closeness of the bodywork to the exhaust pipe and the fitting of certain accessories (electric retarder, etc...) may require the installation of a suitable eat shield by the body-builder.

BANS

WE FORBID:

- Attachment of sub-frames by U-bolts, clamps or equivalent systems (hooks).
- Use, drilling or welding of spring hangers.
- Any modification to: chassis, driveline, suspension (except if contained in the Guide for Fitting Bodywork).
- Attachment of sub-frames by welding to sidemembers.
- Drilling of stiffener gussets.
- Welding, notching of sidemembers, gussets or cross-members.
- Use or modification of our nut and bolt hardware for the attachment of a body or a sub-frame (except for special cases specified in this document).
- Dismantling of brackets attached to the chassis (unless specified otherwise in this document).
- Insertion of wooden blocks between sub-frames and the chassis.

3.8 Attachment of sub-frames to brackets

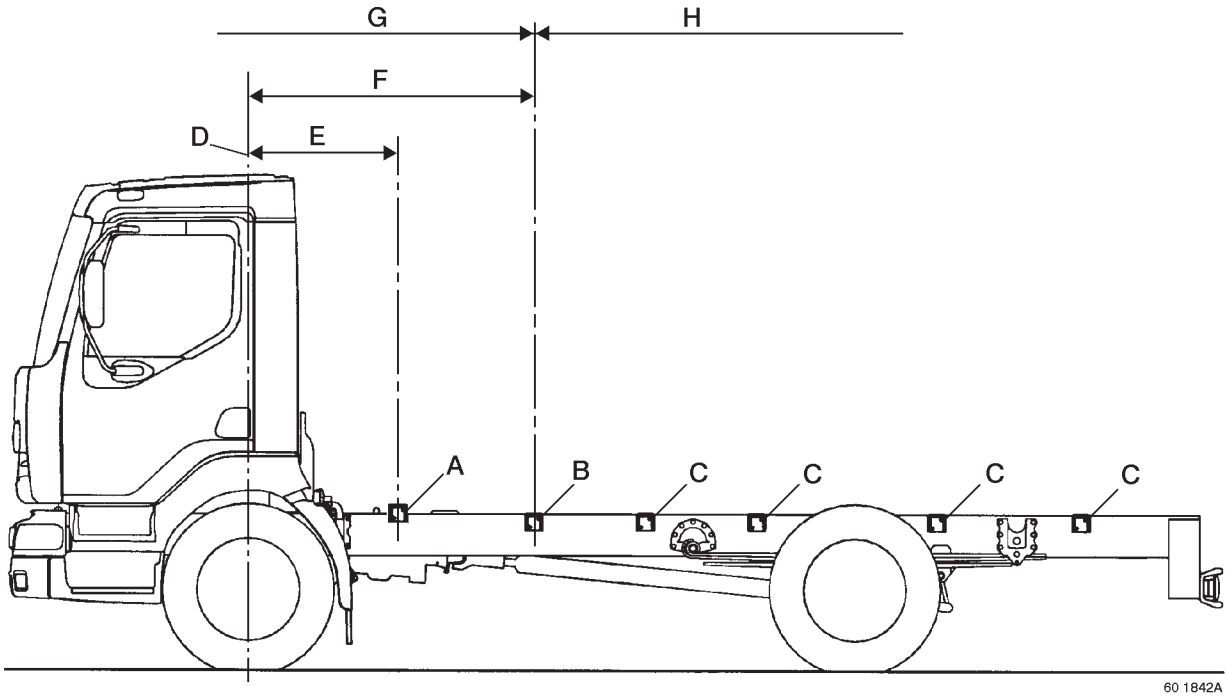
3.8.1 Fastening types

A - Flexible attachment (first bracket)
B - Semi-flexible attachment (second bracket)
C - Rigid attachment (all other brackets)

Guiding and fastening zone

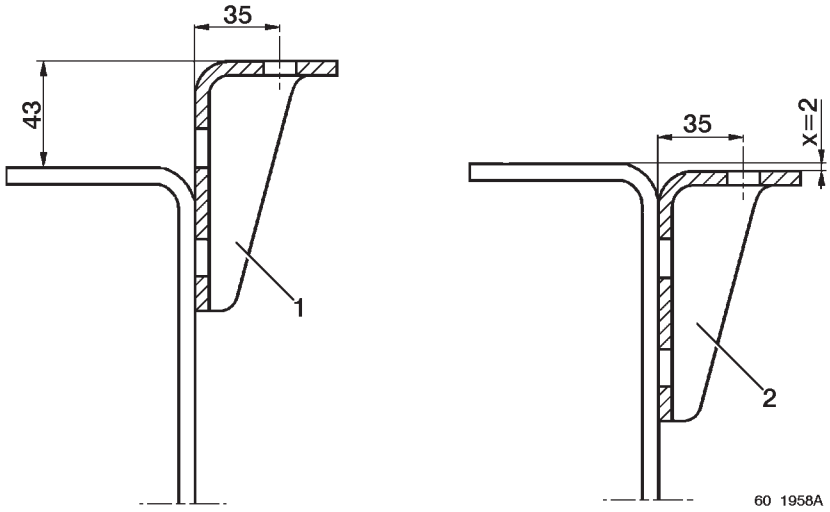
Vehicles	E	F
MIDLUM B	735,5	1302,5
MIDLUM C'/C	835,5	1585,5
MIDLUM HD/Construstion		
MIDLUM D		
MIDLUM 4x4		

D - Front axle centre-line
E - Flexible fastening position **(A)** (first bracket) in relation to front axle centre-line
F - Semi-flexible fastening position **(B)** (second bracket) in relation to front axle centre-line
G - Lateral guiding and elastic fastening zone
H - Guiding and rigid fastening zone
(See following pages).



Assembly conditions

Raised bracket (first bracket)
Flush brackets (other brackets)

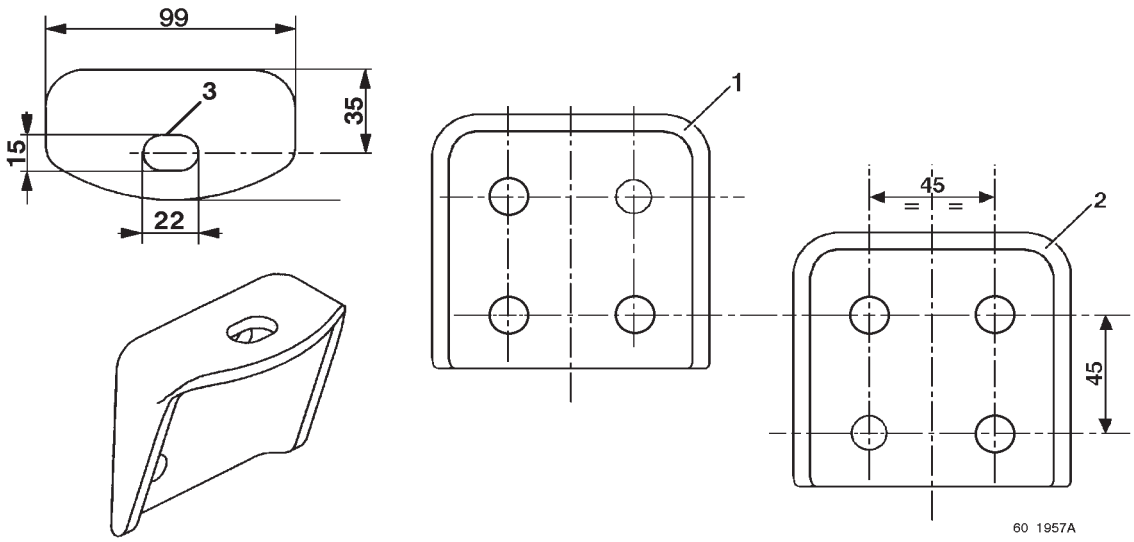


3.8.2 Vertical positioning of brackets

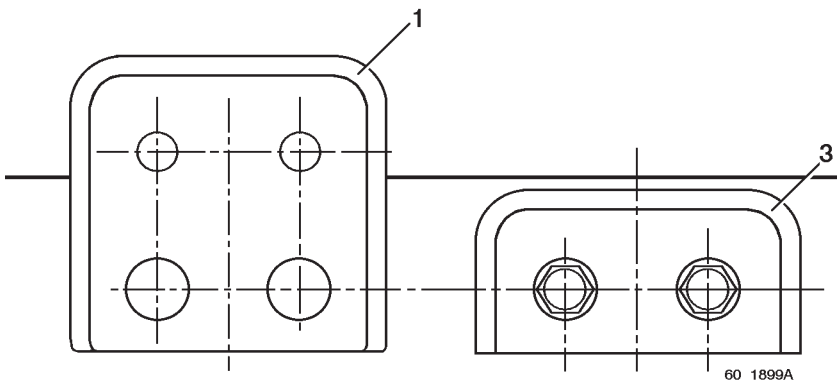
Two bracket assemblies are fitted on the RENAULT MIDLUM chassis :

- The first bracket (**1**) is raised in relation to the other brackets.
- All the other brackets (**2**) are flush with the top face of the sidemembers.

The size and position of the slotted hole (**3**) is the same for all the brackets.



If need be, the first bracket (**1**) can be assembled in a flush position (**3**). In this case, the installation of a front lateral guide is necessary. Reduce the height of the bracket by sawing off, if necessary (see chapter B-3.6).

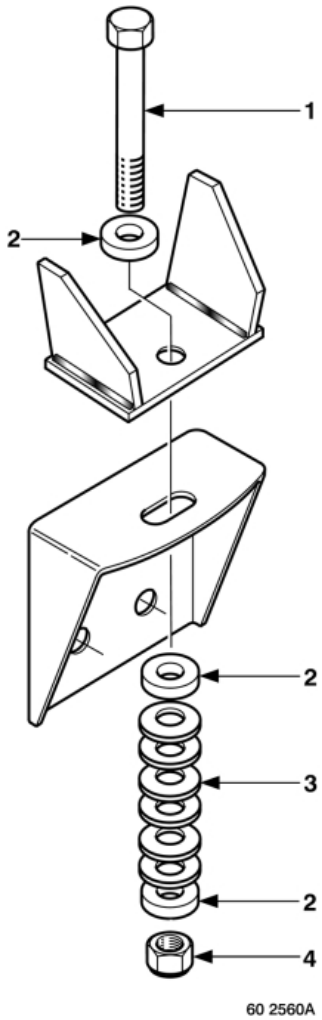


3.8.3 Types of bodywork attachment

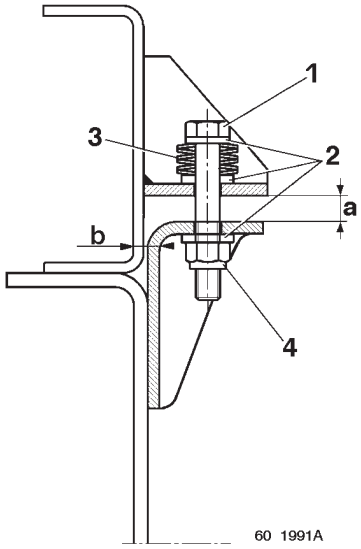
A - Flexible attachment
Kit 50 01 839 172

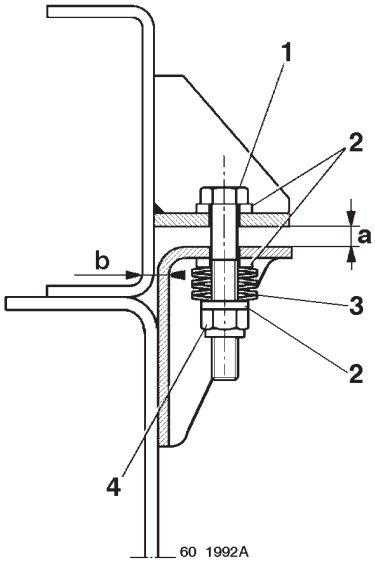
1 - Hexagon bolt M 14 x 150 x 90, class 10.9
2 - 3 plain washers 14 x 30 x 5
3 - 6 spring washers:
    i/d 14.5 mm
    o/d 35 mm
    thickness 1.8 mm
    unit preload 400 kg
4 - Flanged nut DRH M 14 class 10, or other
    locknut except nut with nylon ring (e.g. Nyloc)
a - Clearance: 10 to 15 mm max.
b - Clearance: 2 mm max.

Tightening :
Place nut (4) in contact with spring washers (3) by hand, then tighten mechanically as far as crushing of the spring washers by 3 to 4 mm.

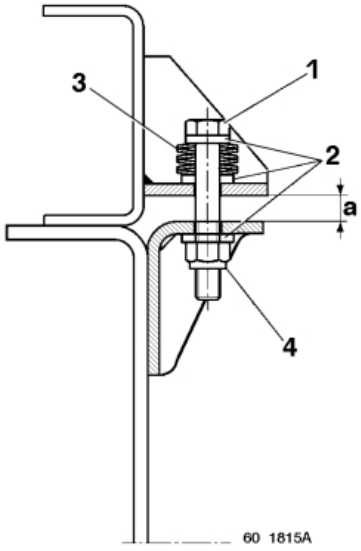


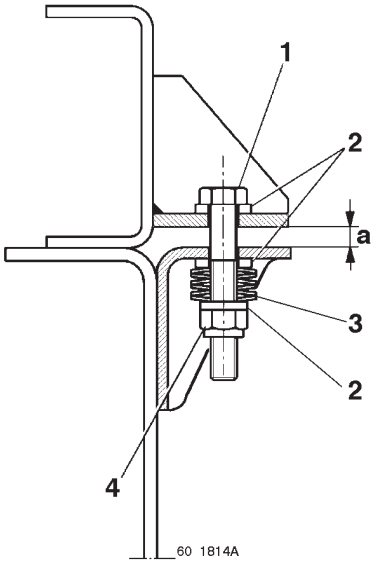
First raised bracket (works assembly)





First flush bracket (assembly reworked by bodybuilder)





Bodywork attachment kit
The bodywork attachment kit is supplied with level 1 and level 2 electrical pre-arrangements (see chapters B-4 and B-5).

Note
An equivalent fastening technique solution is permitted (e.g. rubber sandwich mounting), if it keeps the same preload.

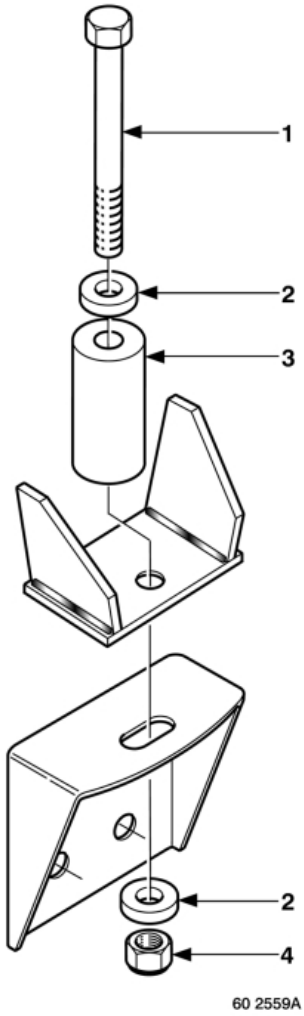
B - Semi-flexible attachment

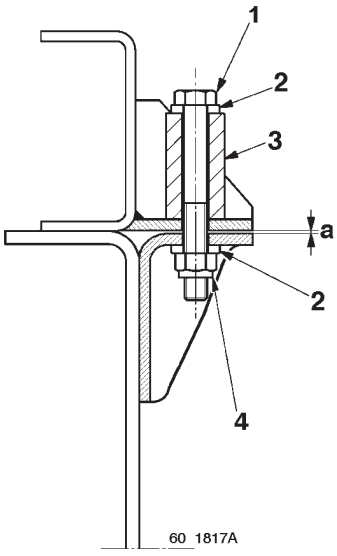
Kit 50 01 839 172

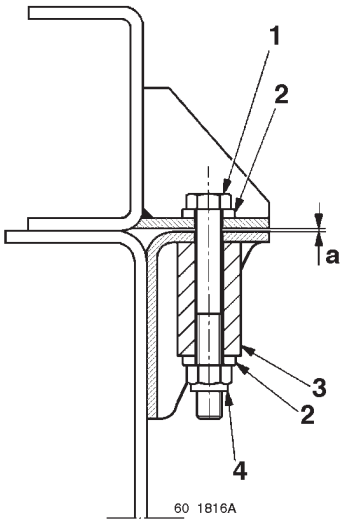
1 - Hexagon bolt M 14 x 150 x 110, class 10.9
2 - 2 plain washers 14 x 30 x 5
3 - Steel spacer 15x38-65 (min.)
(after cutting, true both faces)
4 - Flanged nut DRH M 14 class 10, or
other locknut except nut
with nylon ring (e.g. Nyloc)
a - Slight clearance before tightening
Contact under torque 20 to 30 Nm
b - Clearance 2 mm max.

Tightening torque : 170 Nm

Note : Give priority to assembling with spacer positioned at top of bracket.







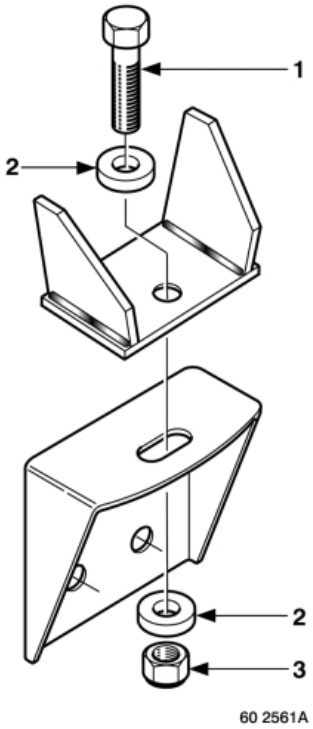
Bodywork attachment kit

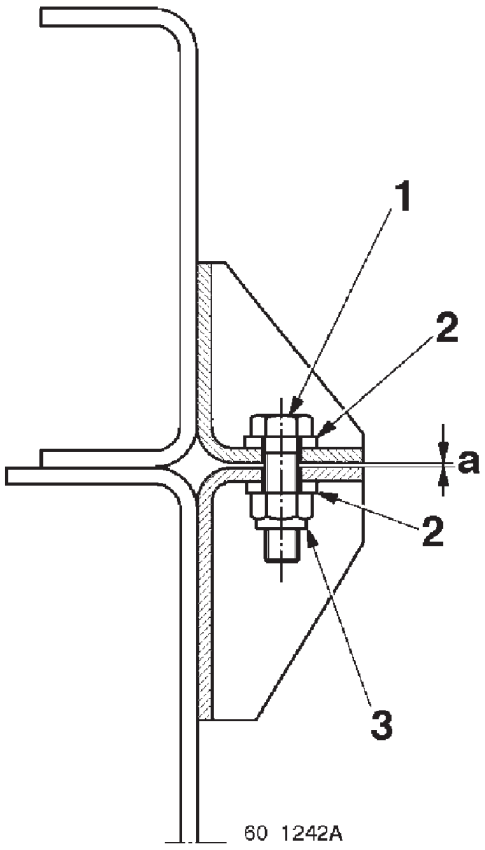
The bodywork attachment kit is supplied with level 1 and level 2 electrical pre-arrangements (see chapters B-4 and B-5).

C - Rigid attachment (all other brackets)

1 - Hexagon bolt M 14 x 150 x 50, class 10.9
2 - 2 plain washers 14 x 30 x 5
3 - Nut Flanged nut DRH M 14 class 10,
or other locknut
except nut with nylon ring
(e.g. Nyloc)
a - Contact mandatory

Tightening torque : 170 Nm



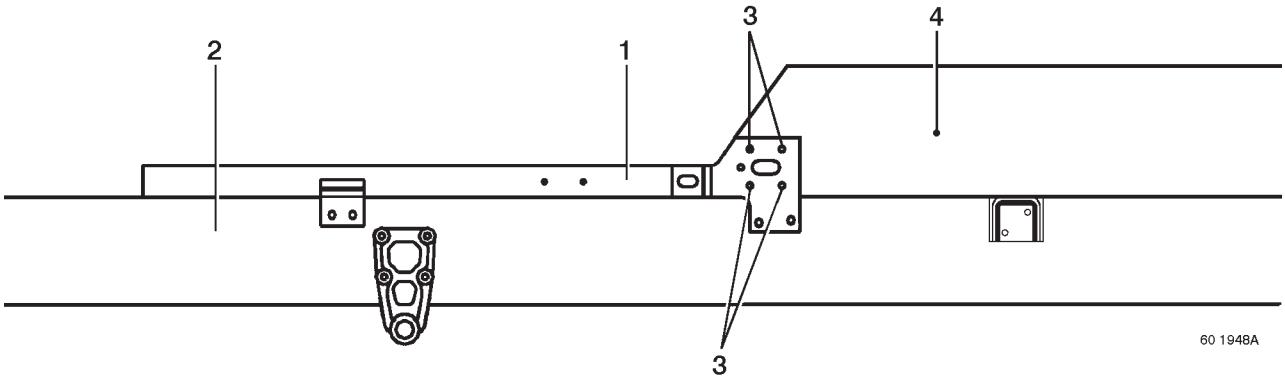


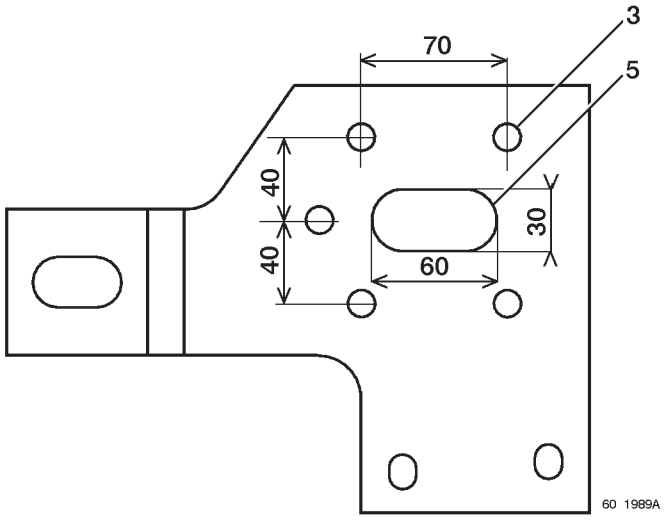
Bodywork attachment kit

The bodywork attachment kit is supplied with level 1 and level 2 electrical pre-arrangements (see chapters B-4 and B-5).

3.8.4 Special features of vehicles with 4-door cab

Vehicles equipped with the 4-door cab are fitted with a reinforcement **(1)** bolted to the chassis **(2)** under the cab. This reinforcement must be screwed to the front end of the sub-frame **(4)** using drillings **(3)** or plug welded using slotted hole (**5**).





Use M12 class 10.9 bolts with locknuts.

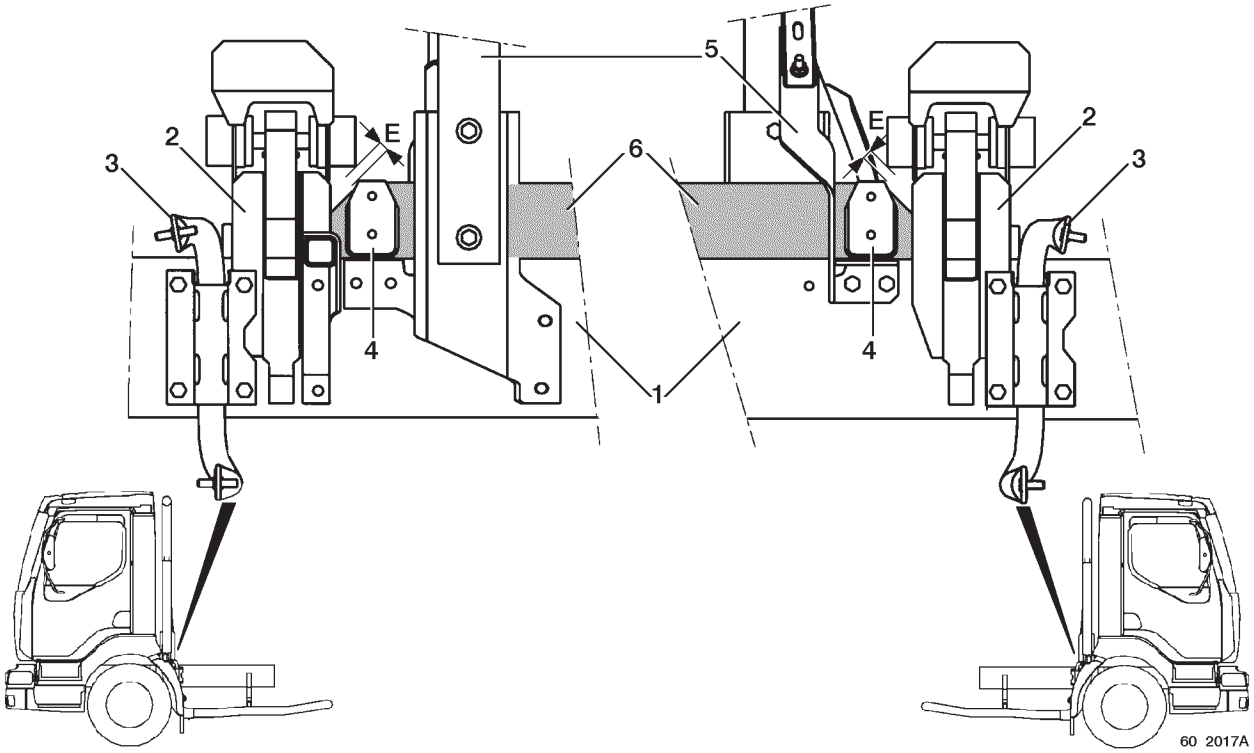
IMPORTANT
*Reinforcements **(1)** can in no way substitute for sub-frame lateral guide stops. The assembly of guides is still vital for vehicles with 4-door cabs.*

3.8.5 Special features of vehicles with sleeper cab and vertical exhaust

The vertical exhaust support brackets prevent passage of the sub-frame if the sub-frame brackets are welded on top. It is therefore important to:
- fasten the first bracket to the sub-frame by bolting.
- ban any welding on the sub-frame subsequent to its assembly on-vehicle.

Watch out to leave sufficient clearance (**E**) between the cab suspension and the first sub-frame bracket.
If necessary, notch it.
The width of this bracket should not exceed 90 mm.

1 - chassis
2 - cab rear support bracket
3 - wheelarch support
4 - first sub-frame bracket
5 - vertical exhaust support bracket
6 - sub-frame

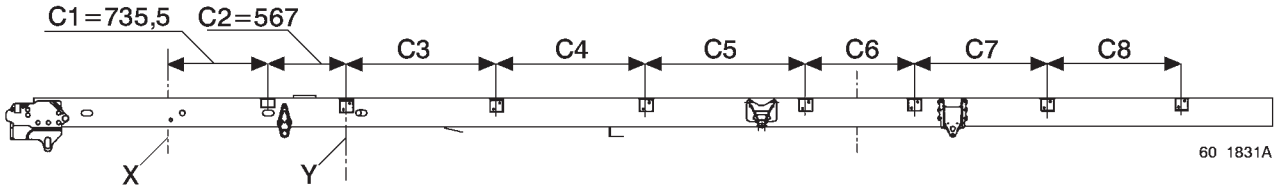


IMPORTANT
To prevent exhaust gases from dirtying the cab, the vertical exhaust pipe nozzle is adjustable over a height of 250 mm.

3.9 Longitudinal positioning of brackets on chassis

3.9.1 RENAULT MIDLUM B 2-door day & sleeper cabs

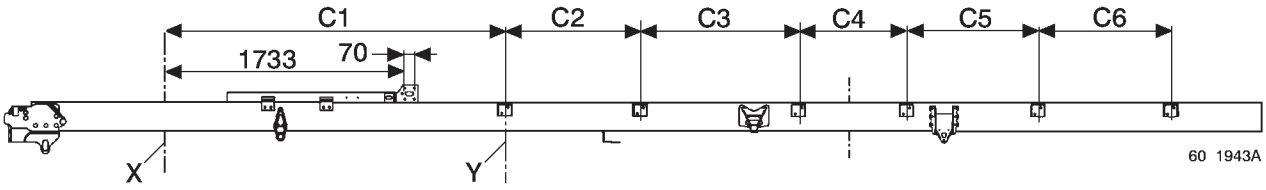
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C3	C4	C5	C6	C7	C8
Mechanical suspension	2700	1020	800	640			
	2950	1270		725			
	3250	930	640	800	850		
	3850	1000	1170		1100		
	4450	800	900	1070	800	805	840
	5050	1100		1170		970	980
Air suspension	3850	1000	780	1280	1010		
	4450	800	900	680	1280	715	840
	5050	1100		780		880	980

3.9.2 RENAULT MIDLUM B 4-door cab

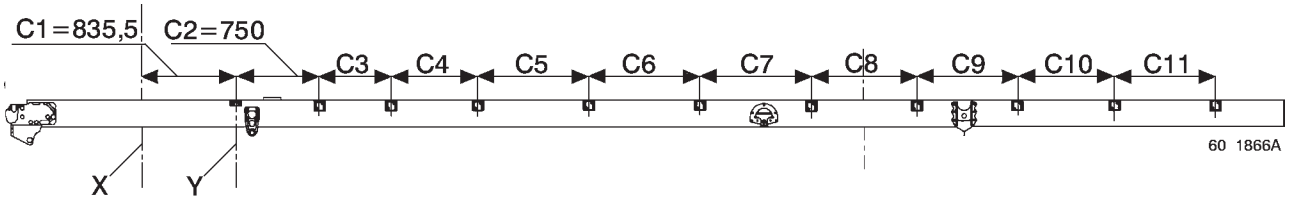
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C1	C2	C3	C4	C5	C6
Mechanical suspension	3250	2157	715	800	850		
	3850	2402	1070		1100		
	4450	2152	850	1070	800	805	840
	5050	2502	1000	1170		970	980

3.9.3 RENAULT MIDLUM C'/C 2-door day & sleeper cabs

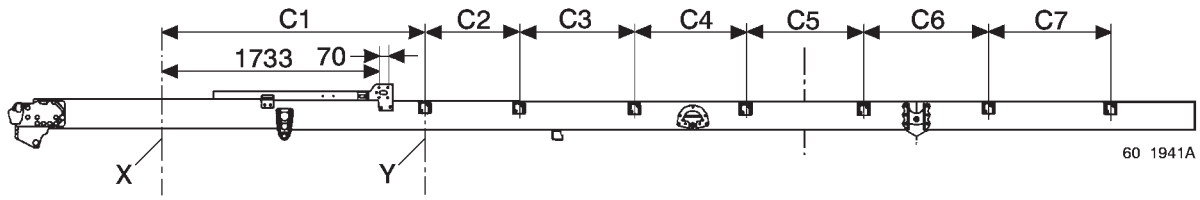
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C3	C4	C5	C6	C7	C8	C9	C10	C11
Mechanical suspension	3070	1012	950	692						
	3350	640	650	950	917					
	3650		950		962					
	3950	910	980							
	4550	640	830	1020	950	782	810			
	5150		630	830	990	950	1000	997		
	5750		900	1100	1050		1100	1100		
	6480		780	1000			950	900	872	900
Air suspension	3650	640	670	1250	942					
	3950	910	700							
	4550	640	830	740	1250	762	810			
	5150		630	830	710	1250	980	997		
	5750		900	1100	770		1080	1077		
	6480		780	1000		720	1250	880	872	900

3.9.4 RENAULT MIDLUM C'/C 4-door cab

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

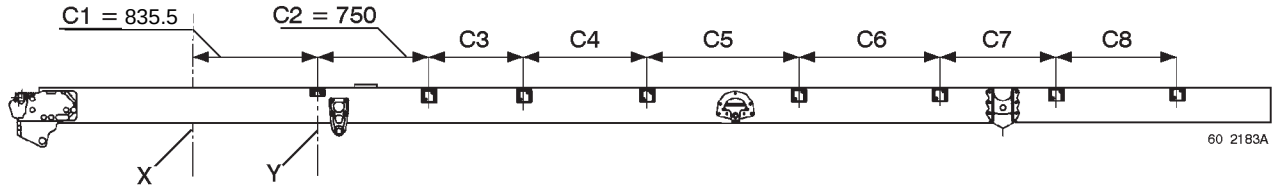


Vehicle C'	E	C1	C2	C3	C4	C5	C6	C7
Mechanical suspension	3350	2151	724	950				
	3650	2322	853					
	3950	2362	419	694	950	977		
	4550	2702	709	664		797	810	
	5150	2360	495	945	875	950	1000	997

Vehicle C	E	C1	C2	C3	C4	C5	C6	C7
Mechanical suspension	3350	2107	768	950				
	3650	2309	866		778			
	3950		546	620	950	957		
	4550	2107	948	1020		782	802	
	5150		748	930	890	950	1000	977

3.9.5 RENAULT MIDLUM HD / Construction 2-door day & sleeper cabs

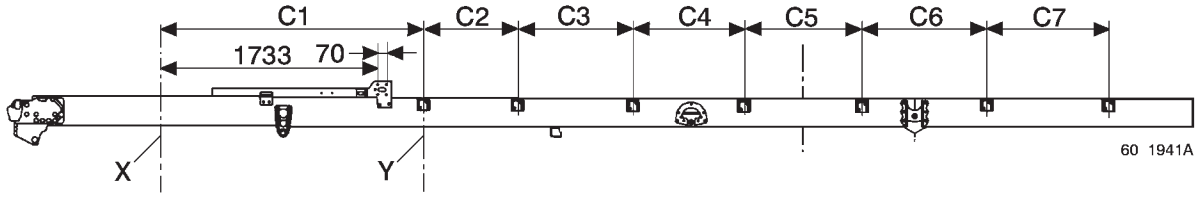
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C3	C4	C5	C6	C7	C8
Mechanical suspension	3070	1012	950	692			
	3350	640	650	950	917		
	3650		950		962		
	3950	910	980				
	4550	640	830	1020	950	782	810

3.9.6 RENAULT MIDLUM HD / Construction 4-door cab

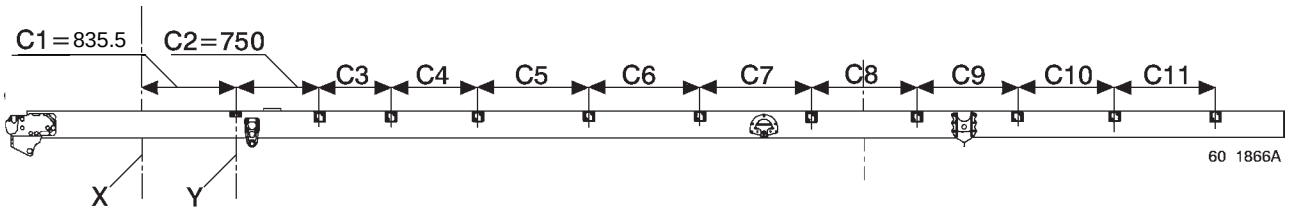
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C1	C2	C3	C4	C5	C6	C7
Mechanical suspension	3350	2107	768	950				
	3650	2309	866		778			
Air suspension	3950		546	620	950	957		
	4550	2107	948	1020		782	802	

3.9.7 RENAULT MIDLUM D 2-door day & sleeper cabs

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

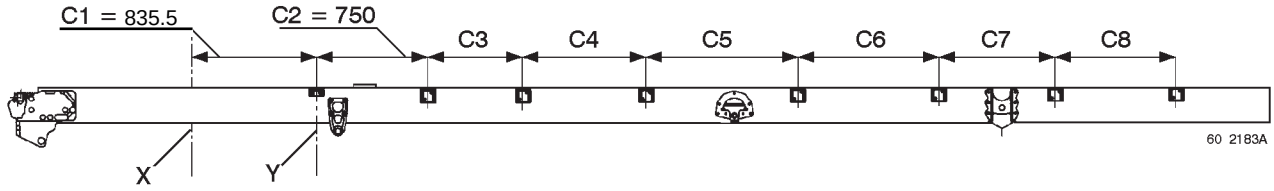


Vehicle	E	C3	C4	C5	C6	C7	C8	C9	C10	C11
Mechanical suspension	3650	640	950	950						
	3950	910	980							
	4250	640	950	600	950	800				
	4550		730	1120		782				
	4850		750		650	950	800			
	5150		630	830	990		1000			
	5750			990	1130		950			
	6050		900	1100	1050		1100			
	6480				700	650	950	1100		
	6780		780	1000				900	872	
Air suspension	3650	960	1050	700						
	3950	1200	1110							
	4250	900	660	1050	700	635				
	4550	640	1170	1100						
	4850		750	770	1050	700	635			
	5150		640	1180			820			
	5750			740	740	1050	700	815		
	6050		900	1030	600	940		952		
	6480			1100	720	1050		940		
	6780		780	1160		1100		770	900	

3.9.8 RENAULT MIDLUM 4x4 2-door cab

RENAULT MIDLUM 4x4 TA (all-wheel grip) vehicles are equipped with body brackets.
RENAULT MIDLUM 4x4 TC (unkept tracks) vehicles are without body brackets (fixing holes available)

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

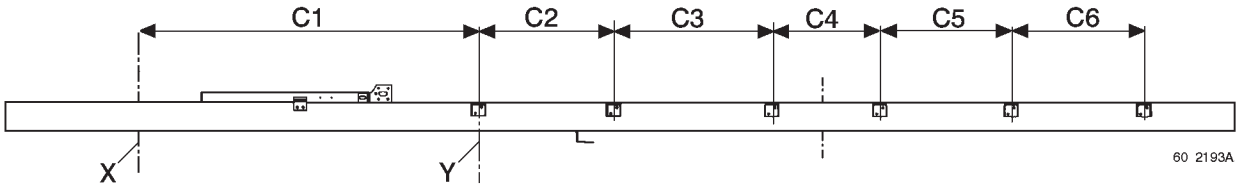


Vehicle	E	C3	C4	C5	C6	C7	C8
Mechanical suspension	3070	1012	950	692			
	3350	640	650	950	917		
	3650	730	860		962		
	3950	910	980				
	4550	727	830	933	950	782	810

3.9.9 RENAULT MIDLUM 4x4 4-door cab

RENAULT MIDLUM 4x4 TA (all-wheel grip) vehicles are equipped with body brackets.
RENAULT MIDLUM 4x4 TC (unkept tracks) vehicles are without body brackets (fixing holes available)

E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C1	C2	C3	C4	C5	C6
Mechanical suspension	3350	2062,5	813	950			
	3650	2252,5	923		778		
	3950		603	620	950	957	
	4550	2312,5	875	888		782	802

3.10 Changing the position of lateral flashing direction indicators

When installing a body on a vehicle equipped with a day cab with under-floor air intake and a body situated at a height lower than 140 mm in relation to the sidemembers, the position of flashing direction indicator lamps must be moved to prevent them from entering into contact with the body.

They can be fastened on the front end or on the sidewalls of the body.

Assembly on body front end

The lamps must be positioned according to the overall width of the bodywork in accordance with the regulations in force.

Install sealed crimping nuts compatible with the body material on the front end of the bodywork.

Make spacers allowing flat support of the lamp brackets and a sufficient spacing **(e)** between the body and the side lamp rim.

For bodies fitted with side doors, check that the door does not enter into contact with the lamps while it is being opened.

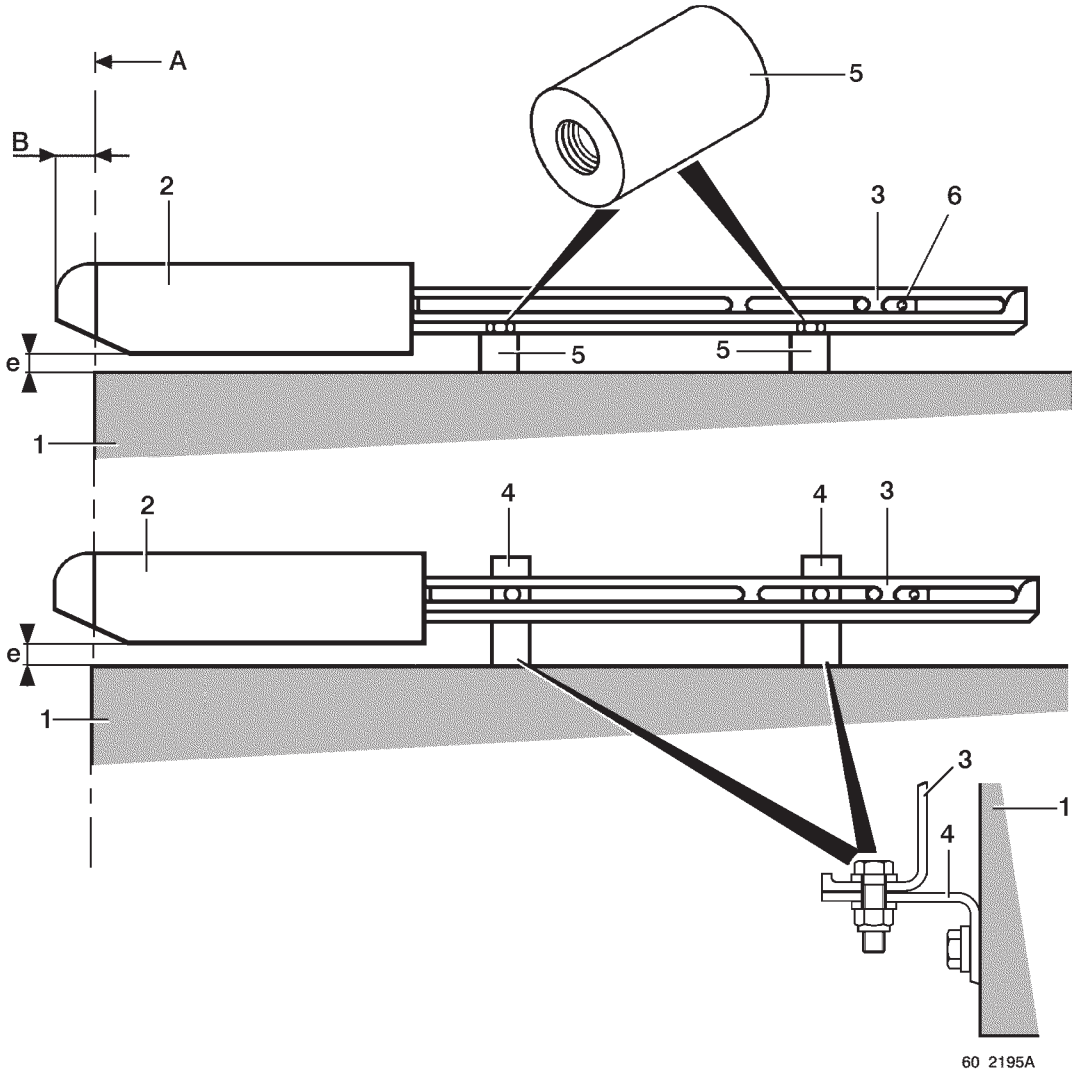
The lateral lamp brackets can also be carried by angle-brackets. This assembly makes it possible to adjust the lateral position of the lamps.

So that the position of lateral flashing direction indicators complies with EEC regulations, their height must not exceed 1500 mm and they must not be arranged at a distance of more than 1800 mm away from the front of the vehicle.

Depending on the overall width of the equipment, it may be necessary to change the position of the lateral direction indicator lamps **(2)**. Comply with the regulations in force. Oblong holes made in the lamp brackets **(3)** serve for this modification.

The overall position **(B)** of the lateral direction indicator lamp in relation to the lateral dimensions **(A)** of the body **(1)** must be complied with.

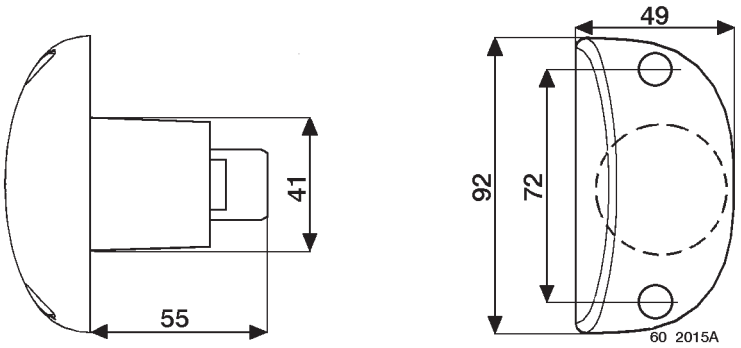
e > 10 mm

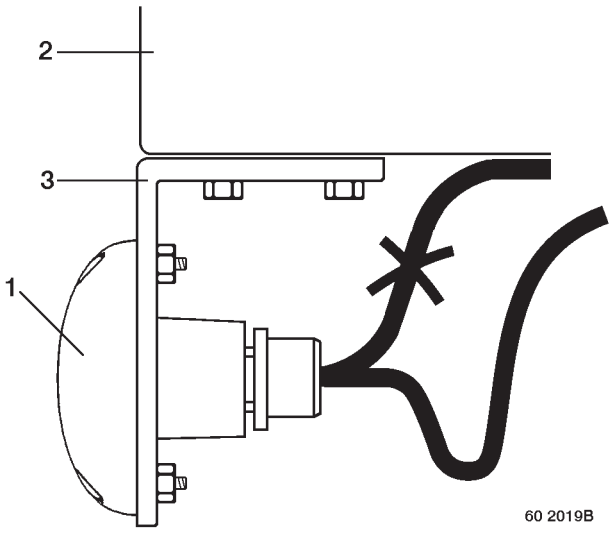


Assembly on body sidewalls

The lateral lamps **(1)** can be either carried on angle-brackets **(3)** or fastened directly to the edge of the body **(2)**. The latter assembly nevertheless requires a housing to be contrived to allow passage of the connector through the partition.

So that the position of lateral flashing direction indicators complies with EEC regulations, their height must not exceed 1500 mm and they must not be arranged at a distance of more than 1800 mm away from the front of the vehicle.





ELECTRICAL PRE-ARRANGEMENTS
LEVEL 1

COMMERCIAL VARIANT 15502
Supplied with the “Tail lift” installation pre-arrangement

Available as option on vehicles

4. LEVEL 1 ELECTRICAL PRE-ARRANGEMENTS

4.1 Available power supplies

The basic vehicle is available without electrical pre-arrangement, but as option it can be equipped with level 1 or level 2 electrical pre-arrangements.
Trade vehicles (tankers, buildings and public works) are equipped with level 2 electrical pre-arrangement as standard.
The bodybuilder pre-arrangements as option include the level 1 or level 2 electrical pre-arrangement.
Refuse collector vehicles and light fire tenders are equipped with special electrical pre-arrangements.

The electrical pre-arrangements are necessary to obtain certain functions (e.g. chassis-mounted fast idling control) and contribute towards improvement assembly quality for optimized cost price.

These optional assemblies cannot be installed as aftermarket and must be ordered when purchasing the new vehicle.

4.2 Level 1 electrical pre-arrangements

This option serves for the following, without modification to the vehicle wiring harnesses:
- power supply, control and monitoring of equipment (interior lighting, tail lift lighting),
- monitoring of equipment (tail lift),
- easy fitting of body lateral signalling.

A specific wiring harness routes the power supplies and information from the warning lights and switches located in the cab as far as the battery compartment.

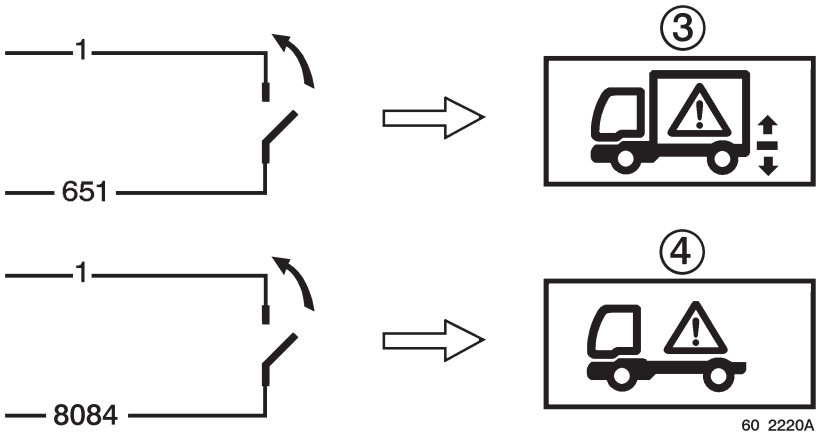
A lateral signalling installation kit is supplied in the cab, not assembled with the new vehicle.

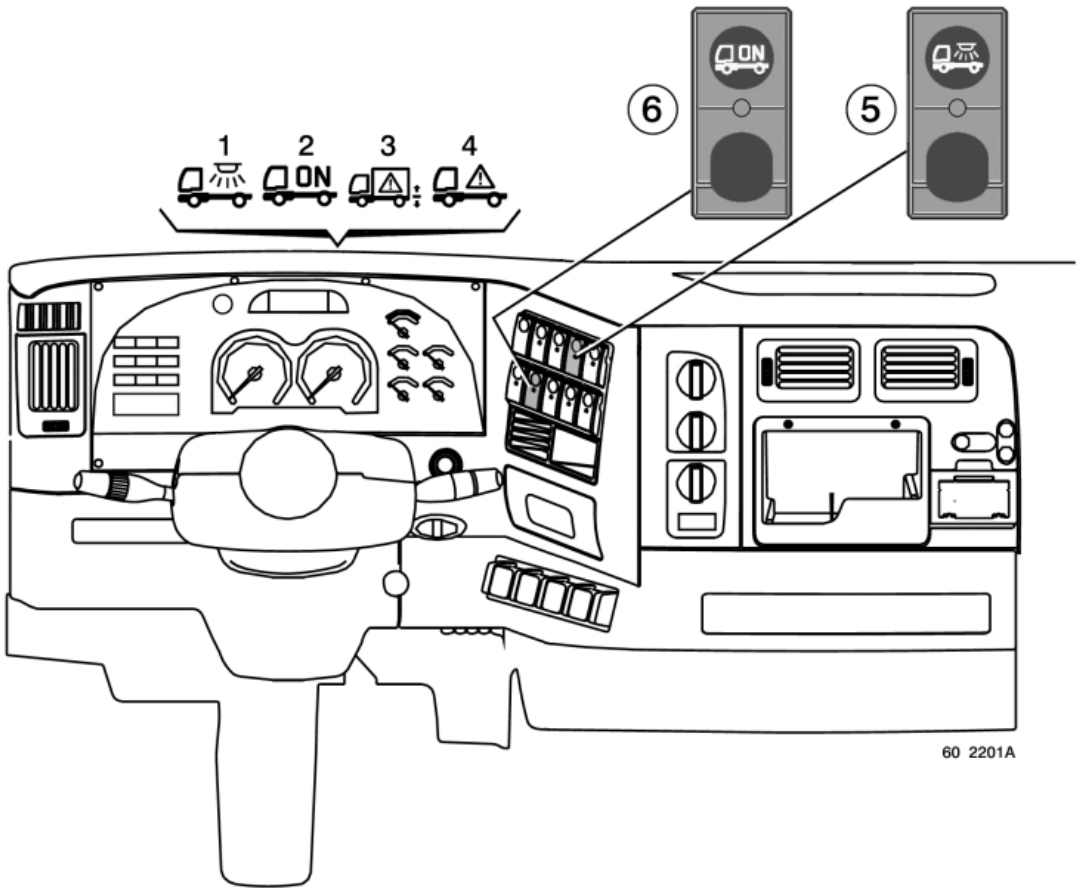
A bodywork attachment kit, comprising all the threaded hardware necessary for fitting the body is supplied in a box in the cab.

Make-up:

In the cab on the display

- Four pictograms integrated in the instrument panel are dedicated to the bodybuilder function:
  - pictogram (**1**): vehicle interior lighting,
  - pictogram (**2**): equipment power supply, machine unlocking,
  - pictogram (**3**): tail lift in working position (coupled to stop light and tripping of buzzer if the road speed is above 5 km/h),
  - pictogram (**4**): chassis equipment alert (available to bodybuilder, coupled with stop light).
- Display of pictograms:
  - pictograms (**1**) & (**2**) are displayed when the corresponding switches (**5**) & (**6**) are actuated.
  - pictograms (**3**) & (**4**) are displayed when the corresponding wires are connected to earth:
  - pictogram (**3**): wire 651 on stand-by in battery compartment,
  - pictogram (**4**): wire 8084 on stand-by in battery compartment.


1
651
3
1
8084
4
60 2220A

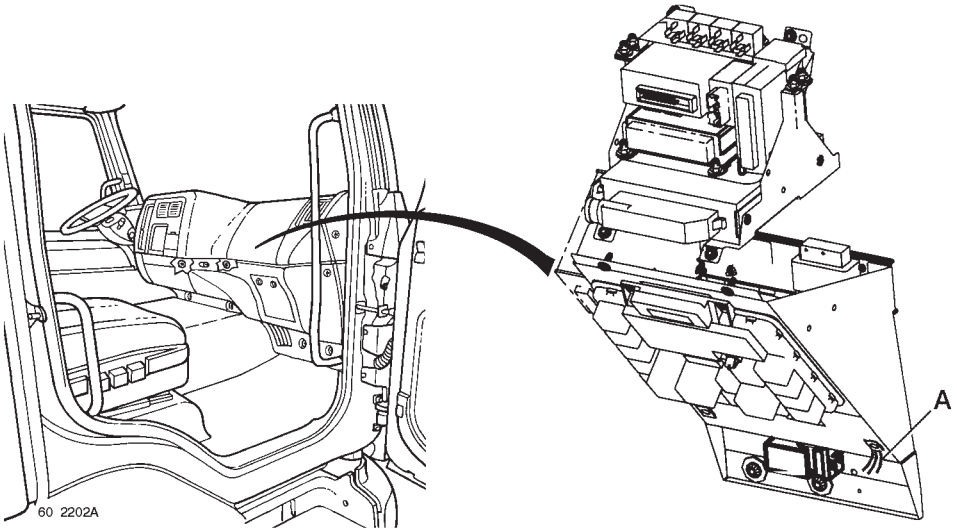

6
5
1
2
ON
3
4
60 2201A

Available power supplies in the cab under the connection unit

Three wires (**A**) on stand-by, equipped with 6.35 spade terminals deliver cab available power supplies:
- wire 208: after master switch “+” power supply
- wire 632: lighting, side lights “+” power supply
- wire 275: after ignition “+” power supply.

To make the earth, connect up to an earthing point on the inside of the cab (see chapter C-3.1).

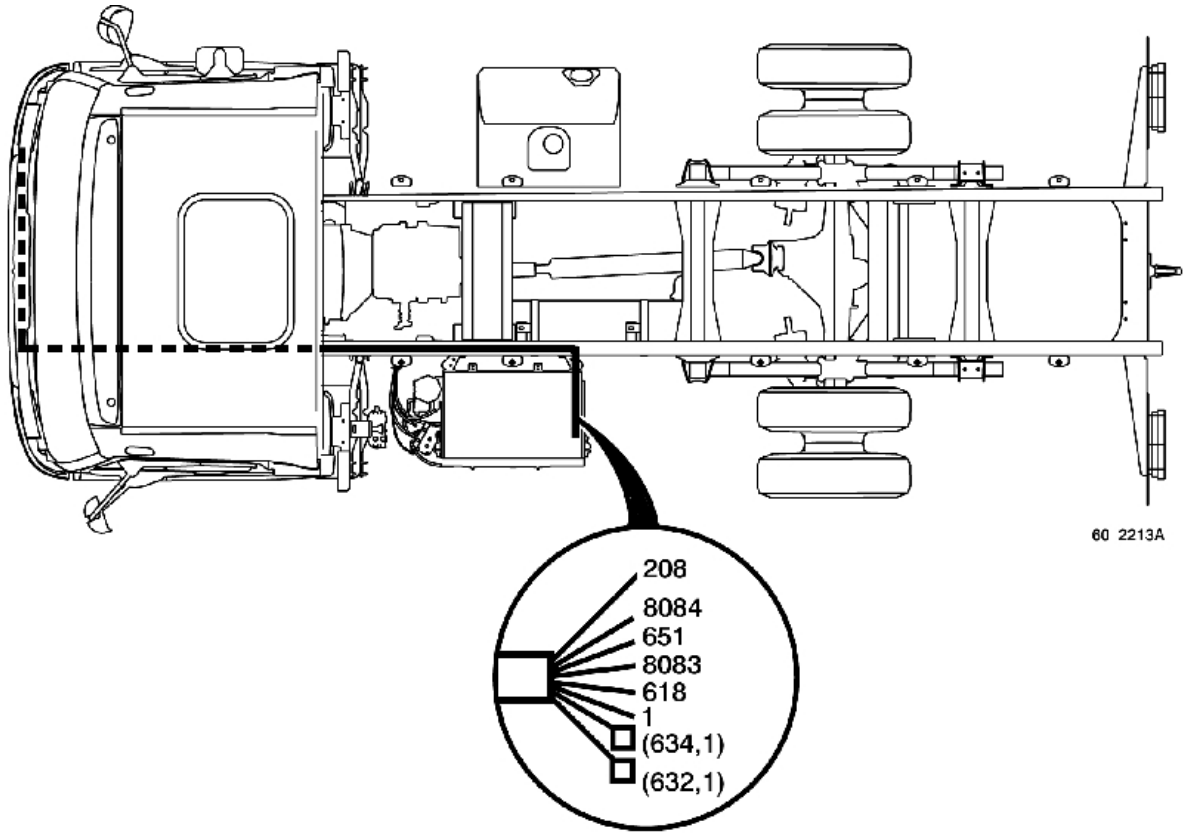
IMPORTANT
Wires 208 and 632, each supplied through one single fuse, deliver the available power supplies in parallel into the cab and to the front end. Consequently, the amperage crossing the supply fuse is equal to the sum of the amperages delivered by the two ends of each line. This amperage should not exceed 15 Amps.



In the battery compartment

- Power supplies available at the ends of the wiring harness on stand-by in the battery compartment :
  Two 2-way connectors: lateral lights power supply (earth: wire 1, “+” lighting: wire 632 on RH side and 634 on LH side).
  wire 208 : after master switch “+” power supply
  wire 618 : chassis lighting (10A) “+” power supply, controlled by chassis lighting switch
  wire 8083 : equipment “+” power supply, controlled by machine unlocking switch
  wire 651 & 8084 : display of pictograms (see preceding pages).

- High power “+” power supply available before master switch on 200 Amp fuse-holder for vehicles equipped with a “Tail lift” trade pack only.
  Spotface and stainless steel threaded hardware available in rear overhang for fastening the earth.



4.3 Assembly of lateral signalling installation kit

This optional kit is supplied in the cab, not assembled upon delivery of the new vehicle.
It serves for installing the lateral signalling feature of the equipment without having to convert the vehicle's electrical system.
Comply with the regulations in force for positioning the lateral lamps. The wiring harnesses for the lateral lamps must be fastened and protected against heat radiation (electric retarder and exhaust in particular).

Make-up

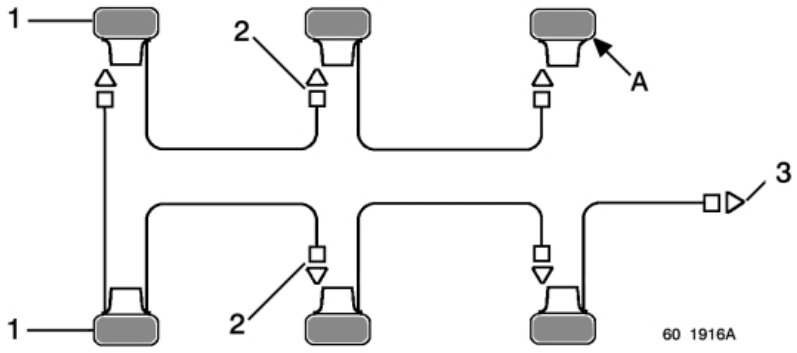
- Vehicle with wheelbase less than 5150 mm, the kit comprises 6 lamps
- Vehicle with wheelbase greater than or equal to 5150 mm, the kit comprises 8 lamps.

On-vehicle hook-up

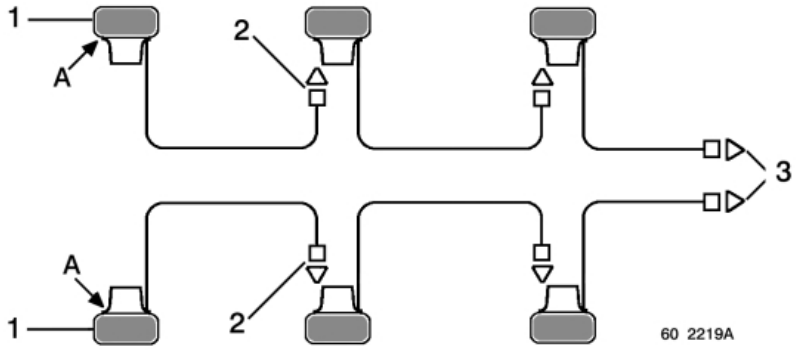
The lamps are connected in series to one another, the first in the chain being connected to the vehicle.
The connection points on-vehicle isare : 2-way connectors JPT of the available power supplies wiring harness in the battery compartment if the vehicle is thus equipped.

1 - lateral signalling lamps
2 - connector to be plugged into the connector of the next lamp
3 - connector to be plugged into the vehicle (battery compartment)
A - Blank off to avoid any infiltration.

On-vehicle hook-up RH & LH side with one single wiring harness

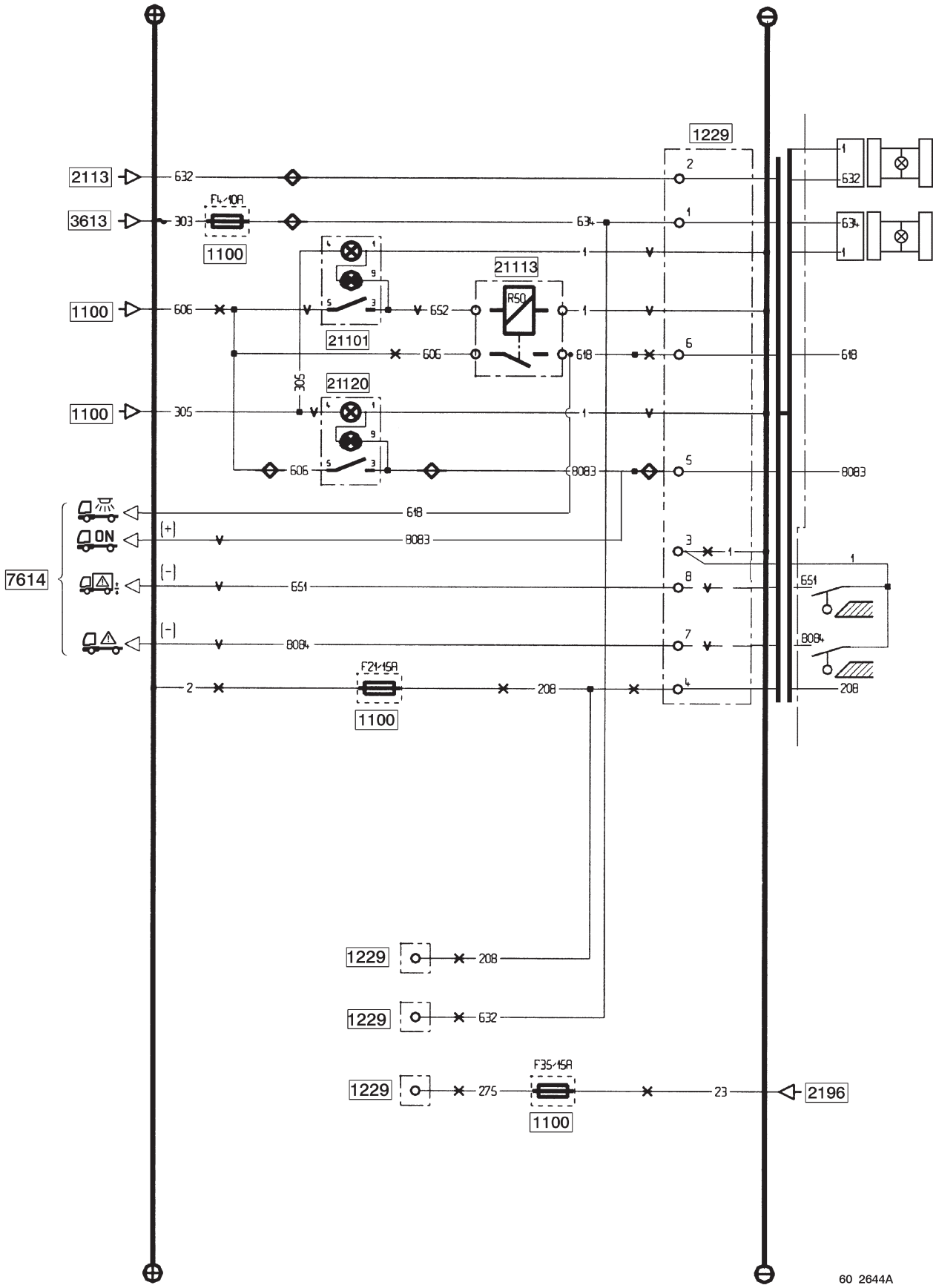


Possibility of hooking up RH & LH sides separately



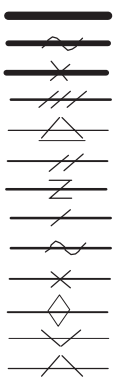
Parts available from the RENAULT TRUCKS Spare Parts Department:
- single function lamp N° 50 01 855 565,
- clip-holder box N° 50 10 214 895,
- plug N° 50 10 214 931.

4.4 Electrical diagram for level 1 available power supplies



Key
1100 - Fuses
1229 - Chassis-cab connection unit
1335 - Bodybuilder available power supplies connector
2113 - Trailer socket, 7-pin type 24 N
2196 - After ignition “+” power supply (**R1**)
3613 - RH front side/parking lamp
7614 - Principal display
21101 - Bodybuilder equipment control
21113 - Bodybuilder equipment available power supply relay (**R50**)
21120 - Bodybuilder equipment control N° 2

Cable cross-section and colour



75 mm^2
60 mm^2
50 mm^2
25 mm^2
16 mm^2
10 mm^2 – Ivory
7 mm^2 – Pink
5 mm^2 – Ivory
3 mm^2 – Pink
2 mm^2 – Grey
1 mm^2 – Green
0,6 mm^2 – Grey
0,35 mm^2 – Orange

Assignment of fuses concerning electrical pre-arrangements

Fuse	Amperage	Wire N°	Function
F4	10	634	LH lateral lights power supply
F5	10	632	RH lateral lights power supply
F21	15	208	After master switch “+” power supply
F43	10	618	Power lighting power supply
		8083	Equipment power supply - Machine unlocking power supply
F35	15	275	After ignition “+” power supply

Do not exceed the max. currents of the switches; if you do, relay the power supply.

4.5 Bodywork attachment kit (located in cab and supplied with this pre-arrangement)

20 setbolts HM 14x150x60, class 10.9
2 setbolts HM 14x150x69, class 10.9
2 setbolts HM 14x150x110, class 10.9
50 plain washers 14x30x5
12 cone washers “Belleville” type
24 flanged locknuts DRH M14 class 10

ELECTRICAL PRE-ARRANGEMENTS
LEVEL 2

COMMERCIAL VARIANT 15503
Standard with
“Tanker” - “Buildings and Public Works” - “Road sweeper” vehicles

Supplied with the “Crane” installation pre-arrangement

Available as option on vehicles

5. LEVEL 2 ELECTRICAL PRE-ARRANGEMENTS

5.1 Available power supplies

The basic vehicle is available without electrical pre-arrangement, but as option it can be equipped with level 1 or level 2 electrical pre-arrangements.
Trade vehicles (tankers, buildings and public works) are equipped with level 2 electrical pre-arrangement as standard.
The bodybuilder pre-arrangements as option include the level 1 or level 2 electrical pre-arrangement.
Refuse collector vehicles and light fire tenders are equipped with special electrical pre-arrangements.

The electrical pre-arrangements are necessary to obtain certain functions (e.g. chassis-mounted fast idling control) and contribute towards improvement assembly quality for optimized cost price.

These optional assemblies cannot be installed as aftermarket and must be ordered when purchasing the new vehicle

5.2 Level 2 electrical pre-arrangements

This option serves for the following, without modification to the vehicle wiring harnesses:
- power supply, control and monitoring of equipment (chassis lighting),
- monitoring of equipment (tipper, crane, sideboards...),
- easy fitting of body lateral signalling.

Specific wiring harnesses route the power supplies and information from the warning lights and switches located in the cab as far as the battery compartment.

A lateral signalling installation kit is supplied in the cab, not assembled with the new vehicle.

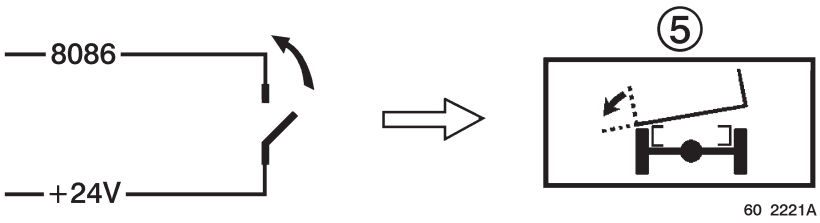
A bodywork attachment kit, comprising all the threaded hardware necessary for fitting the body is supplied in a box in the cab.

Make-up:

In the cab on the display

- Seven pictograms integrated in the instrument panel are dedicated to the bodybuilder function:
  - pictogram (**1**): vehicle interior lighting,
  - pictogram (**2**): equipment power supply, machine unlocking,
  - pictogram (**3**): tail lift in working position (coupled to stop light and tripping of buzzer if the road speed is above 5 km/h),
  - pictogram (**4**): chassis equipment alert (available to bodybuilder, coupled with stop light),
  - pictogram (**5**): sideboard open(coupled to stop light and tripping of buzzer if the road speed is above 5 km/h),
  - pictogram (**6**): tipper raised (coupled to stop light and tripping of buzzer if the road speed is above 5 km/h),
  - pictogram (**7**): crane or cradle (coupled to stop light and tripping of buzzer if the road speed is above 5 km/h),

- Display of pictograms:
  - pictograms (**1**) & (**2**) are displayed when the corresponding switches (**8**) & (**9**) are actuated.
  - pictograms (**3**), (**4**), (**6**) & (**7**) are displayed when the corresponding wires are connected to earth:
  - pictogram (**3**): wire 651 on stand-by in battery compartment,
  - pictogram (**4**): wire 8084 on stand-by in battery compartment,
  - pictogram (**5**): is displayed when wire 8086 is connected to “+” 24V,
  - pictogram (**6**): wire 8087 on stand-by in RH sidemember,
  - pictogram (**7**): wire 8085 on stand-by in RH sidemember.



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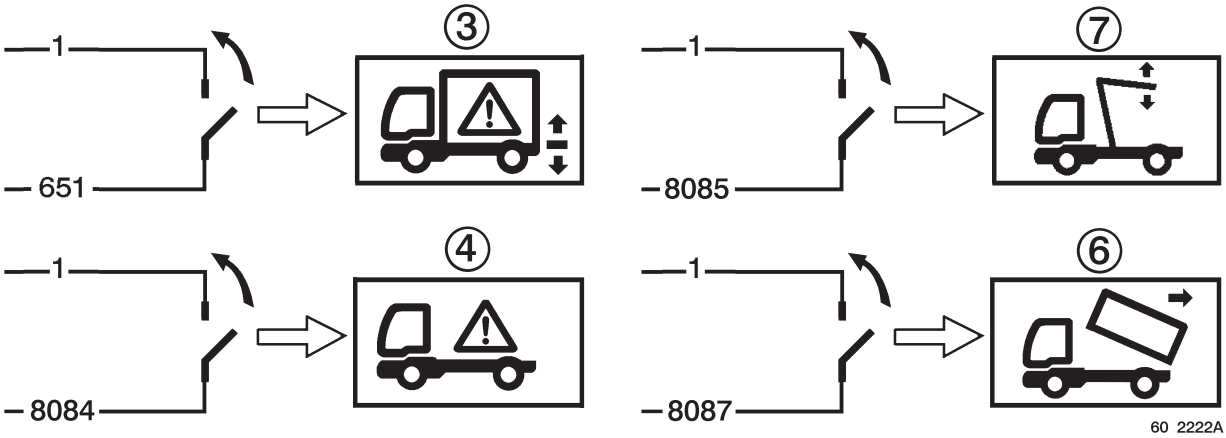

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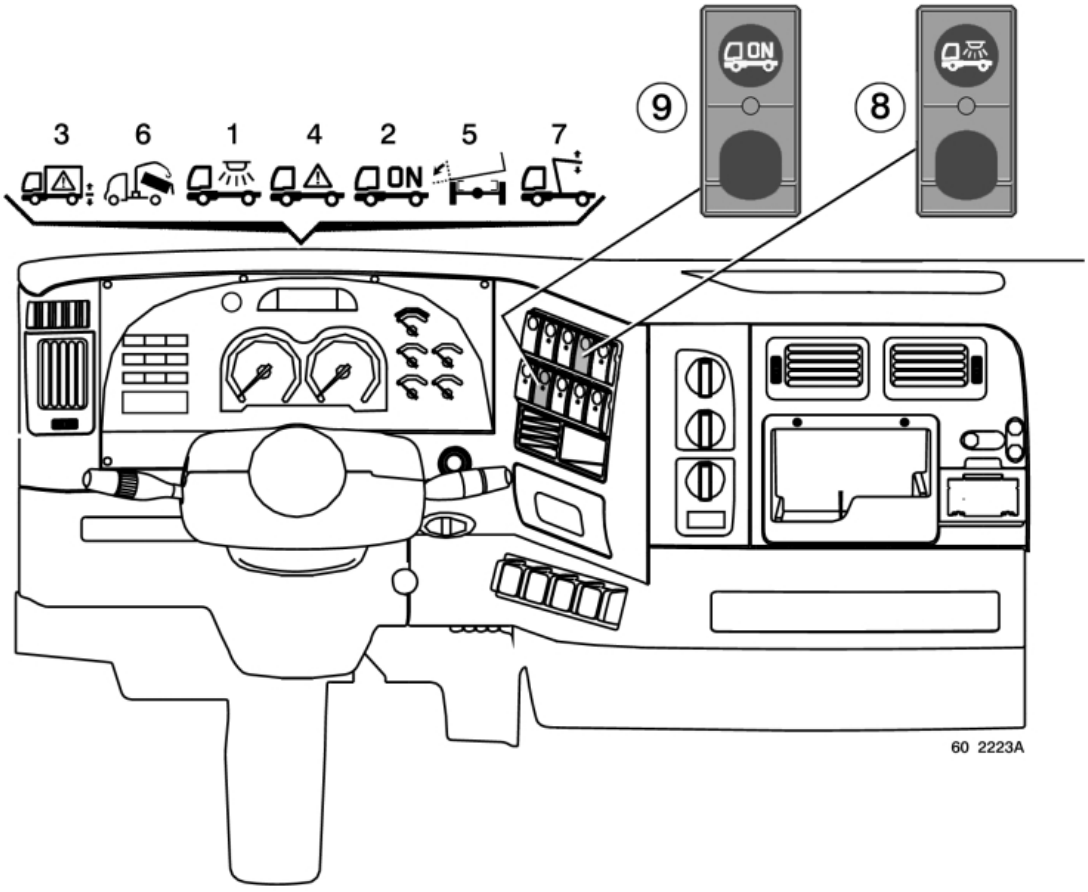

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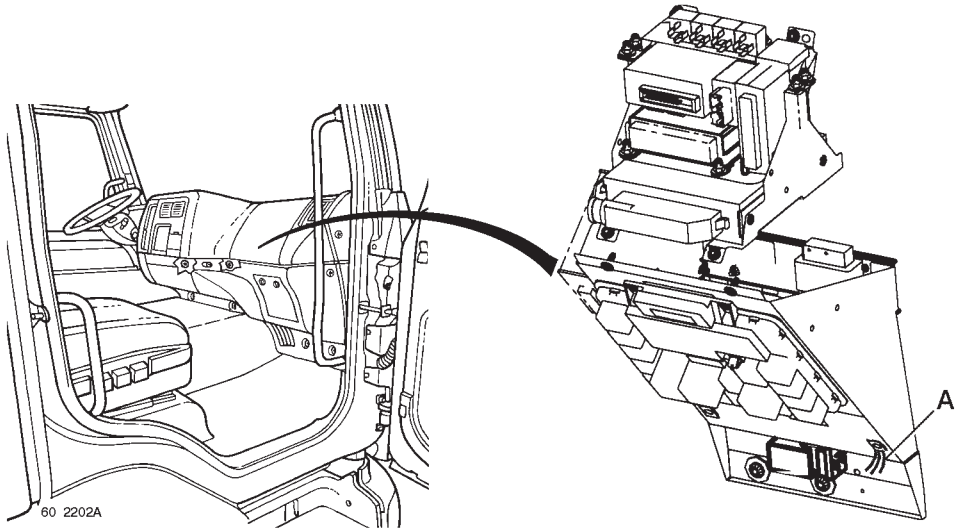
Available power supplies in the cab under the connection unit

Three wires (**A**) on stand-by, equipped with 6.35 spade terminals deliver cab available power supplies:
- wire 208 : after master switch “+” power supply
- wire 632 : lighting, side lights “+” power supply
- wire 275 : after ignition “+” power supply.

To make the earth, connect up to an earthing point on the inside of the cab (see chapter C-3.1).

IMPORTANT
Wires 208 and 632, each supplied through one single fuse, deliver the available power supplies in parallel into the cab and to the front end. Consequently, the amperage crossing the supply fuse is equal to the sum of the amperages delivered by the two ends of each line. This amperage should not exceed 15 Amps.



In the battery compartment

- power supplies available at the ends of the wiring harness on stand-by in the battery compartment:

Two 2-way connectors : lateral lights power supply (earth: wire 1, “+” lighting : wire 632 on RH side and 634 on LH side).

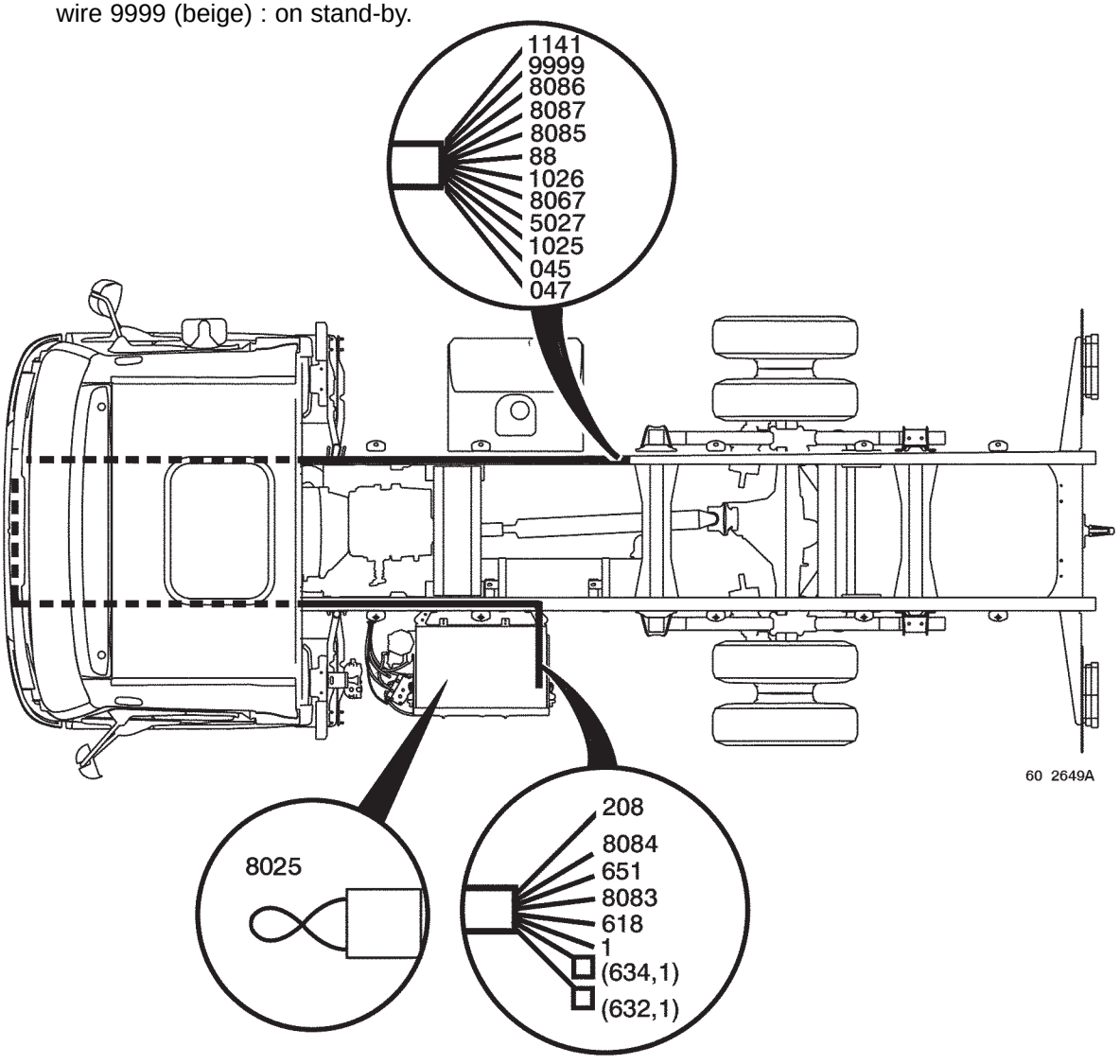
wire 208 : after master switch “+” power supply
wire 618 : chassis lighting (10A) “+” power supply, controlled by chassis lighting switch
wire 8083 : equipment “+” power supply, controlled by machine unlocking switch
wire 651 & 8084 : display of pictograms (see preceding pages)
wire 8025 : chassis-mounted engine stop control power supply.

- high power “+” power supply available before master switch on 200 Amp fuse-holder for vehicles equipped with a “Tail lift” trade pack only.

If necessary, it can be connected in the aftermarket to the after master switch “+” power supply.
Spotface and stainless steel threaded hardware available in rear overhang for fastening the earth.

In the RH sidemember

wire 8085 (orange) : display of pictogram **(7)**,
wire 8086 (grey) : display of pictogram **(5)**,
wire 8087 (violet) : display of pictogram **(6)**,
wire 045 (light blue) : chassis-mounted variable speed control,
wire 88 (brown) : PTO A engaged information,
wire 1026 (green) : PTO B engaged information or engine speed selection,
wire 1141 (pink) : engine speed selection,
wire 5027 (white) : vehicle 30 km/h speed limitation control,
wire 8067 (red) : fast idling speed control,
wire 1025 (yellow) : vehicle zero speed information,
wire 9999 (beige) : on stand-by.



5.3 Management of engine speed

There are 2 ways of operating the fast idling mode:
- by the steering wheel fingertip control,
- by the variable speed contrôles.

5.4 Power take-off wiring

5.4.1 Vehicle fitted with one PTO

- A) Determining the rotating speed

When the vehicle is equipped with a power take-off, engagement of the PTO causes earthing of wire 88 (brown) corresponding to a regulation speed.

Engagement of PTO = earthing of wire 88 (brown)

For other regulation speeds, it is necessary to connect wires 1026 (green) and/or 1141 (pink) to earth.

Engagement of PTO alone (wire 88 (brown) earthed) = Regulation at 1st regulation speed, PTO A speed of RENAULT TRUCKS diagnostics tool (DIAGNOSTICA) OR Engagement of PTO and wires 88 (brown) and/or 1026 (green) and/or 1141 (pink) earthed = Regulation at 2nd, 3rd or 4th regulation speed

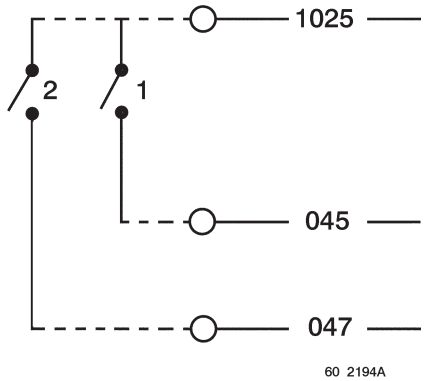
Note:
- Wires 1026 (green) and 1141 (pink) can be connected to earth from the chassis pre-arrangement.
- Engagement of the PTO can be simulated by earthing wire 88 (brown).

B) Using the chassis-mounted fast idling variable speed control

Variable chassis-mounted speed control (example of connection)

- Install a single-function switch **(1)** between wires 1025 (yellow) and 045 (light blue).
- Install a single-function switch **(2)** between wires 1025 (yellow) and 047 (black).

When switch **(1)** is closed, the engine speed increases.
When switch **(2)** is closed, the engine speed decreases.

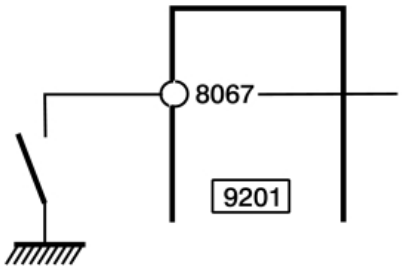


It is possible to install a single-function 3-position switch to avoid having to use the two acceleration and deceleration controls at the same time.
Upon the first pulse on one of the two controls, the engine passes to the pre-programmed speed, then the engine speed is adjusted by means of the controls (if a PTO is engaged).

IMPORTANT *All the chassis-mounted controls are doubled up on the steering wheel fingertip controls.*

C) Controlling speed regulation without cruise control (e.g. demand for fast idling)

The earthing of wire 8067 (red) is used either as demand for compacting for refuse collectors or as demand for engagement of PTO A for vehicles equipped with ASTRONIC gearbox and allows regulation of the rotating speed from the chassis.
This thus replaces moving the steering wheel fingertip control ring to the ON position.



60 2623A

5.4.2 Vehicle fitted with two PTOs

A) Determining the rotating speed

When the vehicle is provided with two PTOs, engagement of the 1st PTO causes earthing of wire 88 (brown) corresponding to a regulation speed and engagement of the 2nd PTO causes earthing of wire 1026 (green) corresponding to a different regulation speed.

Engagement of PTO A = earthing of wire 88 (brown) Engagement of PTO B = earthing of wire 1026 (green)

If both PTOs are engaged at the same time (and therefore if wires 88 (brown) and 1026 (green) are earthed at the same time), regulation will be made at the lowest regulation speed.

Earthing of wire 88 (brown) = Regulation of PTO A at two regulation speeds of RENAULT TRUCKS diagnostics tool (DIAGNOSTICA) OR Earthing of wire 1026 (green) = Regulation of PTO B at two regulation speeds of RENAULT TRUCKS diagnostics tool (DIAGNOSTICA) OR Two PTOs engaged = Regulation at lowest regulation speeds of RENAULT TRUCKS diagnostics tool (DIAGNOSTICA) (as a function of the combination of the earthing of wires 88 (brown) and/or 1026 (green) and/or 1141 (pink))

B) Using the chassis-mounted fast idling variable speed control

(See chapter 5.4.1 – B).

C) Controlling speed regulation without cruise control

(See chapter 5.4.1 – C).

5.4.3 Vehicle fitted with three PTOs

A) Determining the rotating speed

When the vehicle is provided with three PTOs, engagement of the 1st PTO causes earthing of wire 88 (brown) corresponding to a regulation speed and engagement of the 2nd PTO causes earthing of wire 1026 (green) corresponding to a different regulation speed and engagement of the 3rd PTO causes earthing of wire 1141 (pink).

Engagement of PTO A = earthing of wire 88 (brown)

Engagement of PTO B = earthing of wire 1026 (green)

Engagement of PTO C = earthing of wire 1141 (pink)

If the three PTOs are engaged at the same time (and therefore if wires 88 (brown), 1026 (green) and 1141 (pink) are earthed at the same time), regulation will be made at the lowest regulation speed.

Earthing of wire 88 (brown) = Regulation of PTO A at regulation speed
of RENAULT TRUCKS diagnostics tool (DIAGNOSTICA)
OR
Earthing of wire 1026 (green) = Regulation of PTO B at regulation speed
of RENAULT TRUCKS diagnostics tool (DIAGNOSTICA)
OR
Earthing of wire 1141 (pink) = Regulation of PTO C at regulation speed
of RENAULT TRUCKS diagnostics tool (DIAGNOSTICA)
Two or three PTOs engaged =
Regulation at lowest regulation speeds of RENAULT TRUCKS diagnostics tool (DIAGNOSTICA)
(as a function of the combination of the earthing of wires 88 (brown) and/or 1026 (green) and/or 1141 (pink))

B) Using the chassis-mounted fast idling variable speed control

(See chapter 5.4.1 – B).

C) Controlling speed regulation without cruise control

(See chapter 5.4.1 – C).

5.4.4 Vehicle fitted with one engine rear PTO or no PTOs at all

In this case, it is the bodybuilder who will earth wires 88 (brown) and/or 1026 (green) and/or 1141 (pink) according to the situation.

A) Determining the rotating speed
When the vehicle is not provided with any PTO, to declare the desired regulation speed, it is necessary to earth the corresponding wires 88 (brown), 1026 (green) and/or 1141 (pink), where each combination corresponds to a different regulation speed.

1, 2 or 3 wires earthed (88 (brown), 1026 (green) and/or 1141 (pink)) =
Combination corresponding to one regulation speed

Note:
These wires can be earthed from the chassis pre-arrangement.

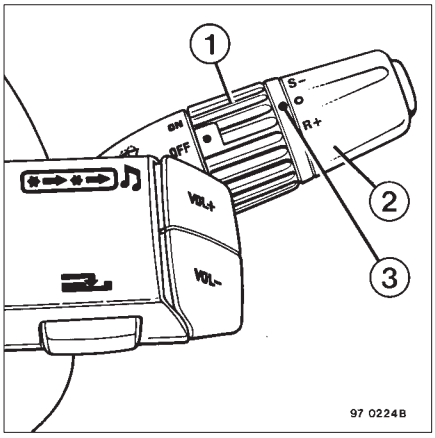
IMPORTANT
For modification to the regulation speeds, it is necessary to consult your RENAULT TRUCKS dealer, who will change the settings using the diagnostics tool (Diagnostica).

5.5 Use of the steering wheel fast idling control

Move the ring (**1**) to the “ON” position and turn the ring (**2**) to bring “R+” or “S-” opposite the mark (**3**), then release it.
Depress the accelerator pedal to bring the engine to the required engine speed and in this position, turn the ring (**2**) to bring to bring “S-” opposite the mark (**3**) so as to memorize the speed, then release the accelerator pedal.
To fine tune the engine speed:

- Turn ring (**2**) to bring “R+” opposite the mark (**3**) to increase the speed.
- Turn ring (**2**) to bring “S-” opposite the mark (**3**) to reduce the speed.

Any action on the brake pedal or any gearshifting or moving the ring (1) to the “OFF” position overrides the feature.



5.3.3 Vehicle fitted with a power take-off

When the PTO is in operation, the first action on the ring (**2**) (“S-” or “R+”) calls up the works set engine rotating speed (1100 or 950 rpm).

Rotating speed
In the event of hydraulic pump drive, do not exceed the rotating speed indicated by the equipment manufacturer.
The engine speed is limited to 1400 rpm by the works setting.
Depending on the equipment fitted by the equipment manufacturer, this engine speed can be modified by means of the RENAULT TRUCKS test tool.

IMPORTANT
Avoid actuating the accelerator pedal during the use of the fast idling feature.

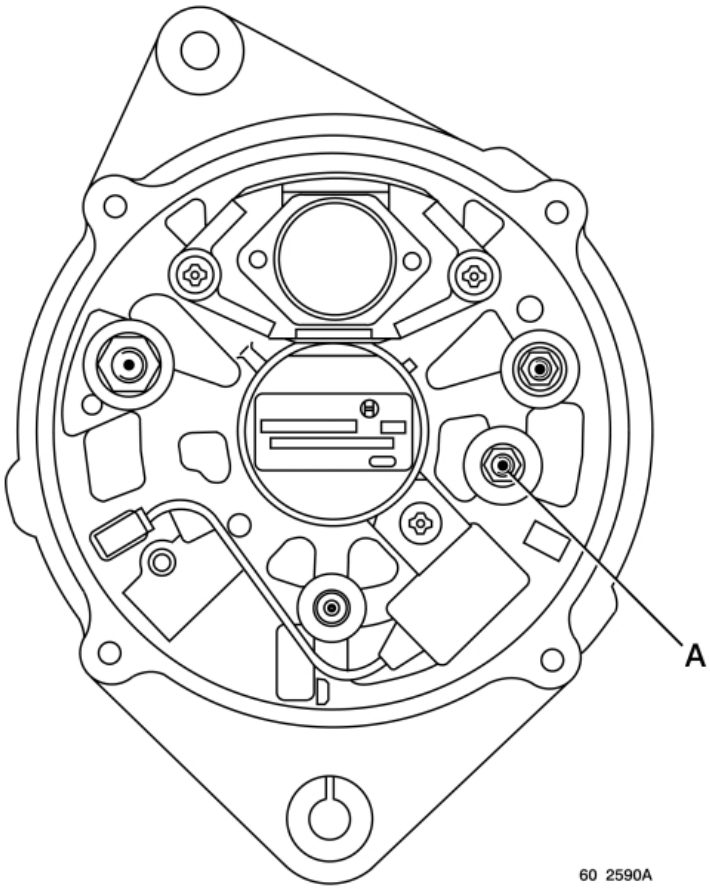
5.6 Engine speed information

It is possible to retrieve engine speed information by connecting up to terminal W (A) of the alternator.

- Drive ratio of engine with capacity higher than 6 litres : 3.2
- Drive ratio of engine with capacity of 4 to 6 litres : 2.71

Lugs used on terminal W :
The nut type lug is recommended for ease of use and quality (resistance to fatigue and vibration).

- Nut lug M4: 5010 306 473, 5010 480 479, 5010 306 616
- Nut lug M5: 5010 306 474, 5010 306 617
- Nut lug M6: 5010 306 579, 5010 480 495

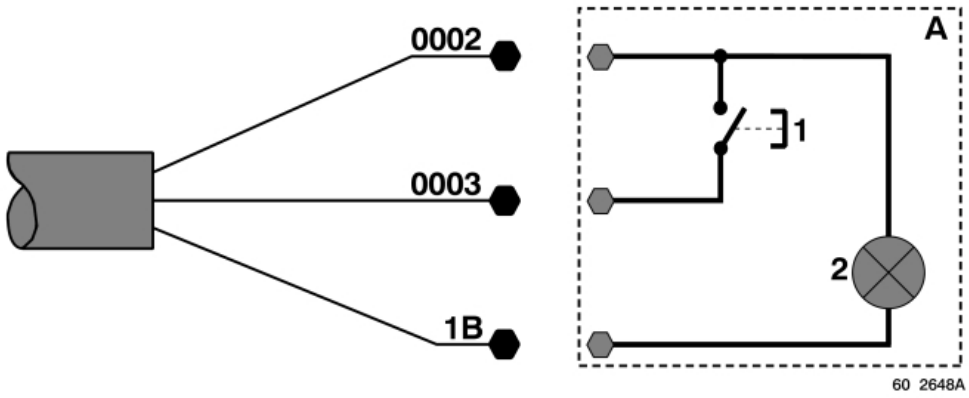


5.7 Chassis-mounted starting and stop controls

Non-standard equipment is available (engine starting box ref. N° 50 10 567 213).

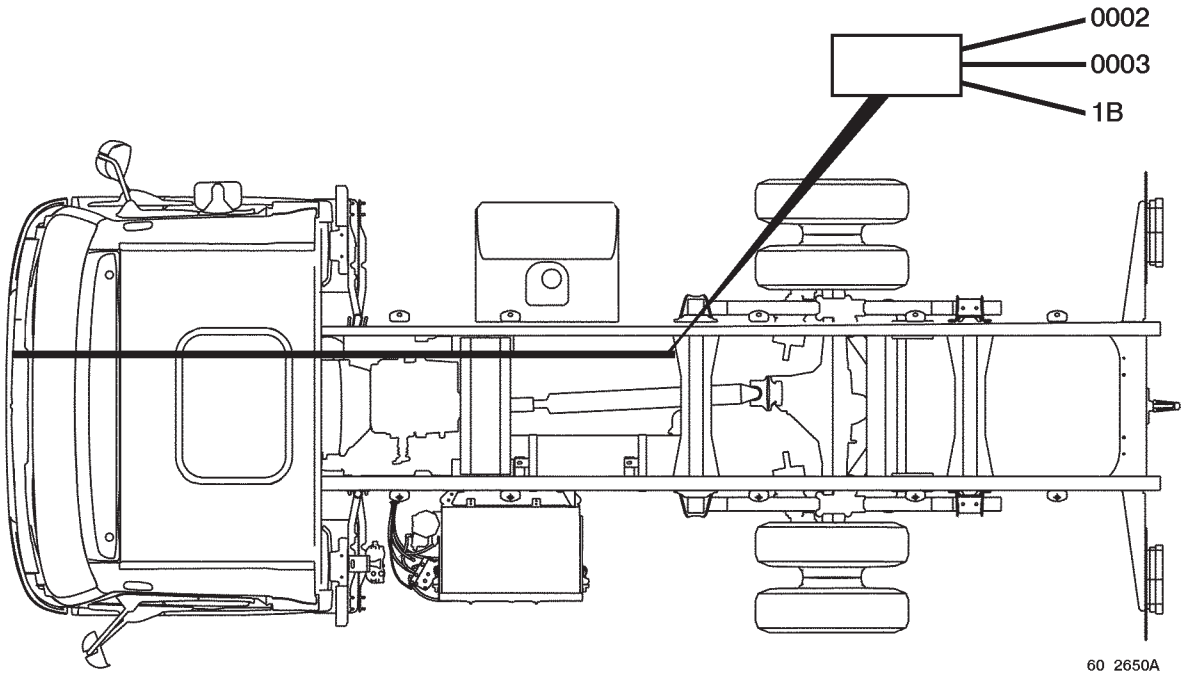
Chassis-mounted engine starting control

A - Cable fitted by bodybuilder
1 - Engine starting pushbutton
2 - Engine starting authorization tell-tale light



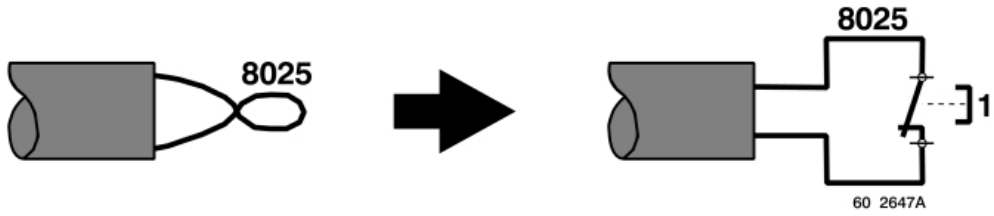
IMPORTANT

The chassis-mounted engine starting control only becomes operational after an engine starting sequence in the cab (key-operated cab control) followed by stopping of the engine with the chassis-mounted control.



Chassis-mounted engine stopping control

Wire 8025 forms a loop (pre-arrangement in the battery compartment on all vehicles), identified by red adhesive tape leading to the engine ECU.
Cut the wire and insert a switch.
Opening of the electric circuit stops running of the engine.



5.8 Parking brake information

Wire 1025 (yellow) gives parking information. This wire is earthed when the vehicle speed is below 3 km/h and the parking brake is applied.

5.9 Vehicle Speed limitation speed limitation

Earthing of wire 5027 (white) limits the vehicle speed to 30 km/h. The parameter for this value can be defined in the dealership for special needs.
This function is accessible if the vehicle is travelling at a speed below 25 km/h. It is de-activated when the road speed is below 5 km/h.

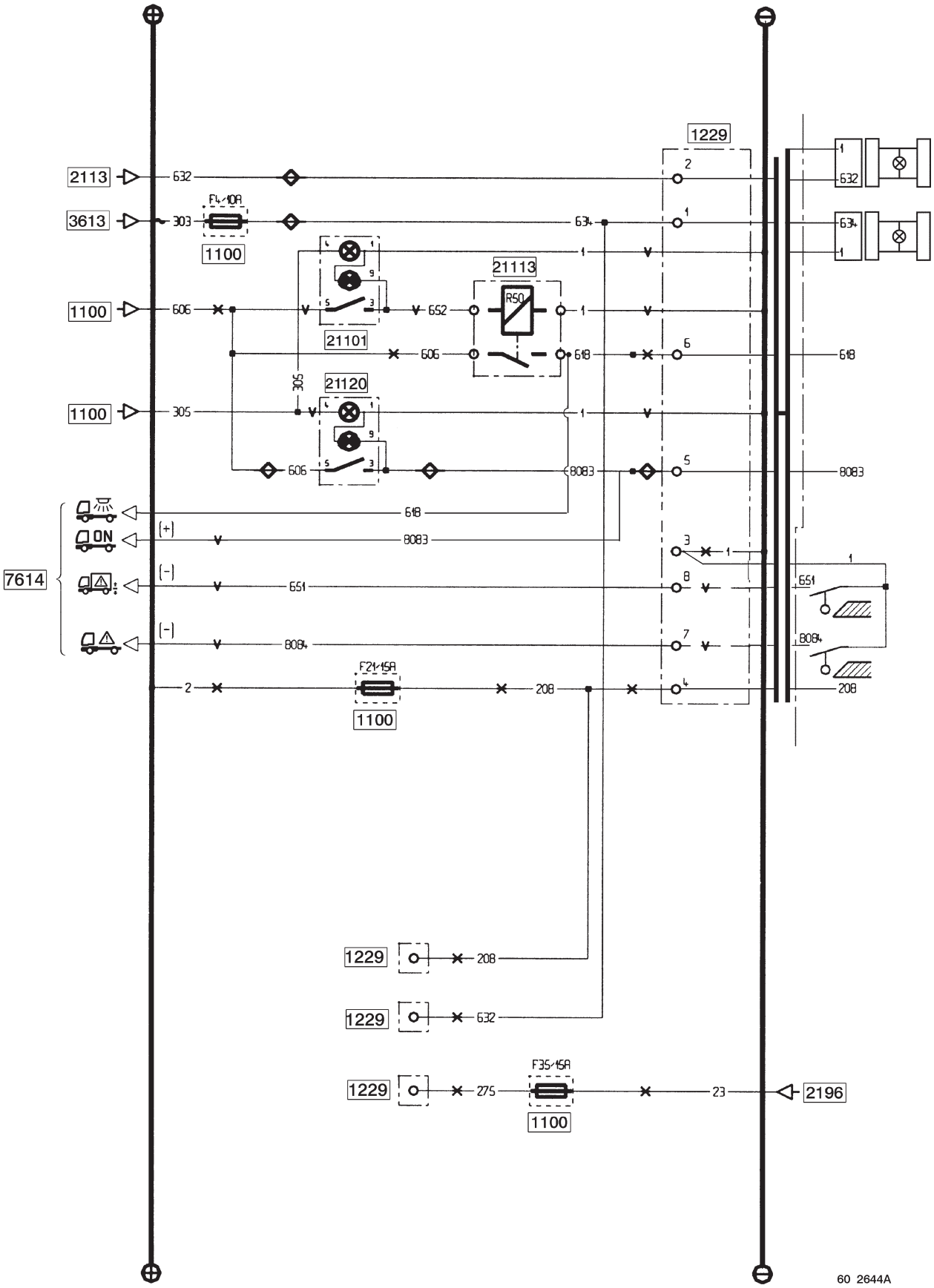
IMPORTANT

Access to the regulated speeds (see chapters 5.3.2 to 5.3.5) is subject to the following conditions:
- engine running,
- PTO engaged,
- road speed below 15 k/h,
- parking brake applied,
- gear selector in neutral.
Any action or modification to the above-mentioned conditions will lead to exit from the regulated mode.

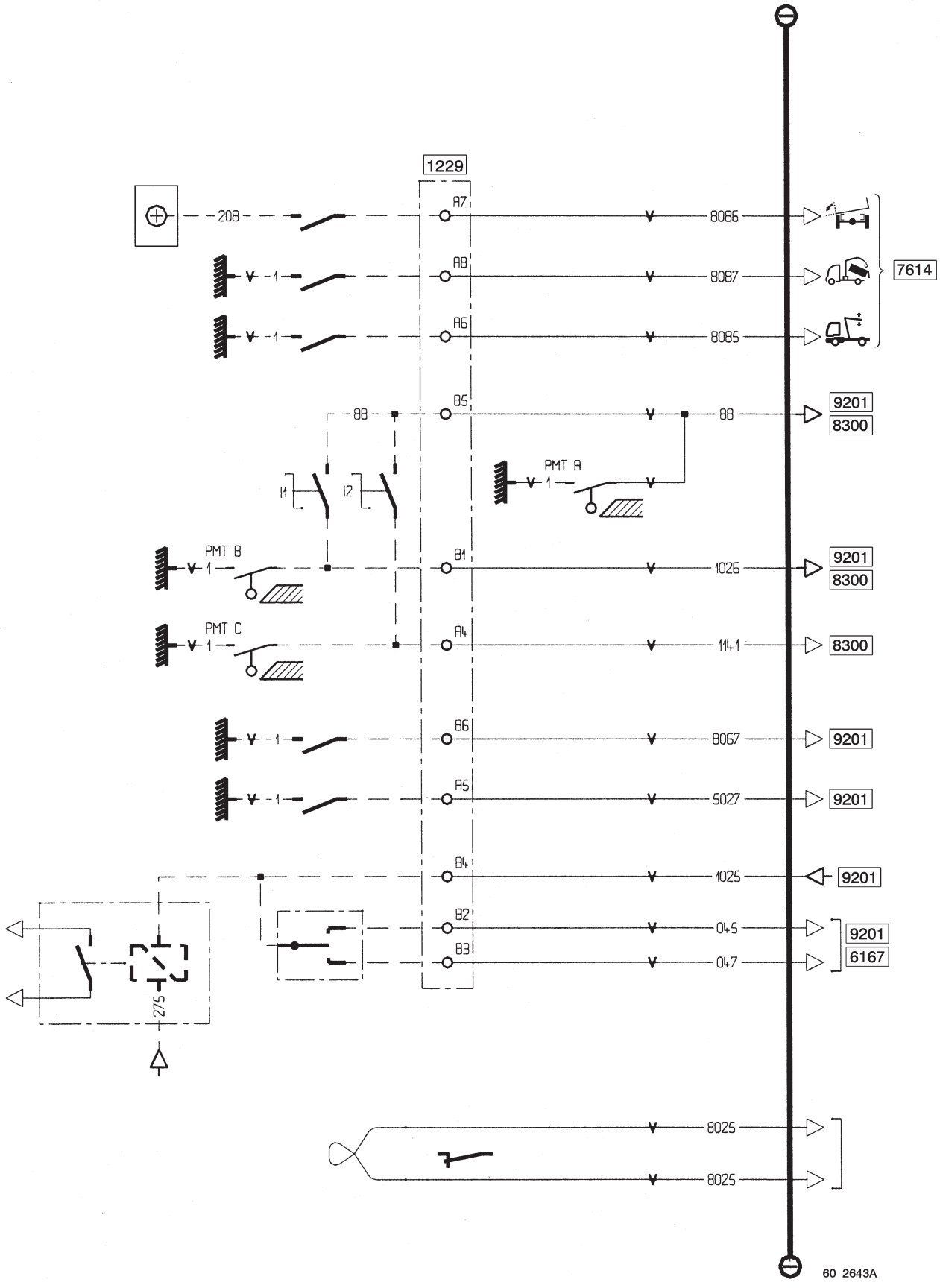
5.10 Assembly of lateral signalling installation kit

See chapter 4.3.

5.11 Electrical diagram for level 2 available power supplies

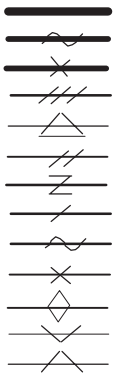


Electrical diagram for level 2 available power supplies



Key
1100 - Fuses
1229 - Chassis-cab connection unit
1335 - Bodybuilder available power supplies connector
2113 - Trailer socket, 7-pin type 24 N
2196 - After ignition “+” power supply (**R1**)
3613 - RH front side/parking lamp
7614 - Principal display
8300 - Power take-off
9201 - Vehicle electronic control unit (VECU)
21101 - Bodybuilder equipment control
21113 - Bodybuilder equipment available power supply relay (**R50**)
21120 - Bodybuilder equipment control N° 2

Cable cross-section and colour



75 mm^2
60 mm^2
50 mm^2
25 mm^2
16 mm^2
10 mm^2 – Ivory
7 mm^2 – Pink
5 mm^2 – Ivory
3 mm^2 – Pink
2 mm^2 – Grey
1 mm^2 – Green
0,6 mm^2 – Grey
0,35 mm^2 – Orange

Assignment of fuses concerning electrical pre-arrangements

Fuse	Amperage	Wire N°	Function
F4	10	634	LH lateral lights power supply
F5	10	632	RH lateral lights power supply
F21	15	208	After master switch “+” power supply
F43	10	618	Power lighting power supply
		8083	Equipment power supply - Machine unlocking power supply
F35	15	275	After ignition “+” power supply

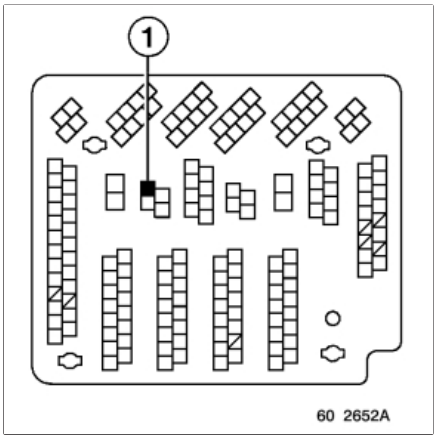
Do not exceed the max. currents of the switches; if you do, relay the power supply.

5.12 Bodywork attachment kit (located in cab and supplied with this pre-arrangement)

20 bolts HM 14x150x60, class 10.9
2 bolts HM 14x150x69, class 10.9
2 bolts HM 14x150x110, class 10.9
50 plain washers 14x30x5
12 cone washers “Belleville” type
24 flanged locknuts DRH M14 class 10

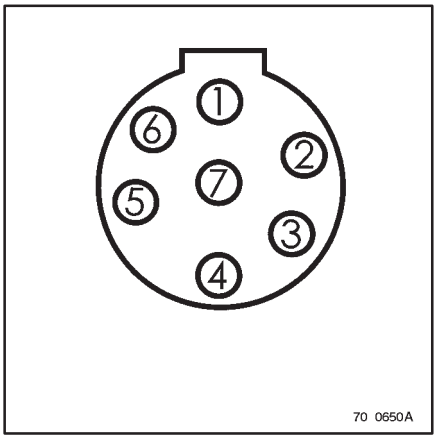
5.13 Alarm

Body perimetric protection box (rigid),
wire 0403 located on connector **(1)**.



Electrical socket
7-pin trailer socket type 24 S

Trailer perimetric protection box,
terminal **(2)**.



TAIL LIFT INSTALLATION PRE-ARRANGEMENT
COMMERCIAL VARIANT 20295

Available as option on all vehicles

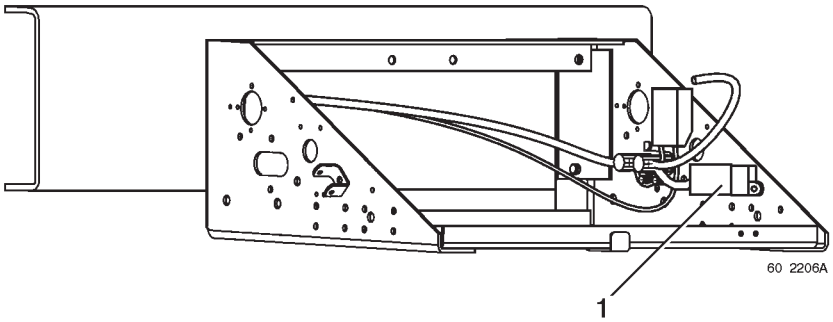
6. VEHICLE EQUIPPED WITH A TAIL LIFT

“Tail lift” installation pre-arrangement
- level 1 bodybuilder electrical pre-arrangement for installation of a tail lift (see chapter B-4),
- reinforced rear suspension,
- without rear run-under guard (option for column type tail lifts),
- 80 Amp alternator,
- 170 Amp-hour batteries,
- 200 Amp fuse-holder located in battery compartment,
- tail lift earth available in the rear overhang,
- earth screw in rear overhang.

Options
- Level 2 bodybuilder electrical pre-arrangement, with use of PTO – for other needs (see chapter B-5).

Note:
Before fitting the tail lift, the bodybuilder must ensure that the dimension under the laden chassis and the height of the floor meet the requirements of the tail lift supplier.

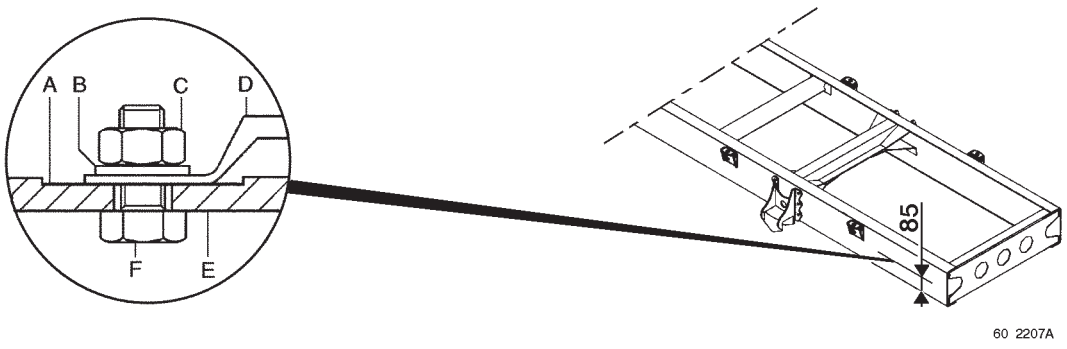
6.1 Fuse-holder 200 A



A high-power fuse-holder (**1**) is on stand-by in the battery compartment for supplying power to the tail lift.

6.2 Tail lift earth in rear overhang

A - Spotface diameter 30 mm
B - Plain washer diameter 10 mm, stainless steel
C - Nut H 10x150, stainless steel
D - Earth lug or braid
E - Sidemember
F - Bolt M10x150, stainless steel



“TANKER” VEHICLE

7. TANKER VEHICLE

- 16 tonnes GVW available in three wheelbases 3350, 3650, 3950 on RENAULT MIDLUM C base,
- 15.7 tonnes GVW (single tyre fitment at rear) available in three wheelbases 3350, 3650, 3950 on RENAULT MIDLUM C base,
- 18 tonnes GVW available in four wheelbases 3650, 3950, 4250, 4450 on RENAULT MIDLUM D base.

Day cab only.

Tanker special features

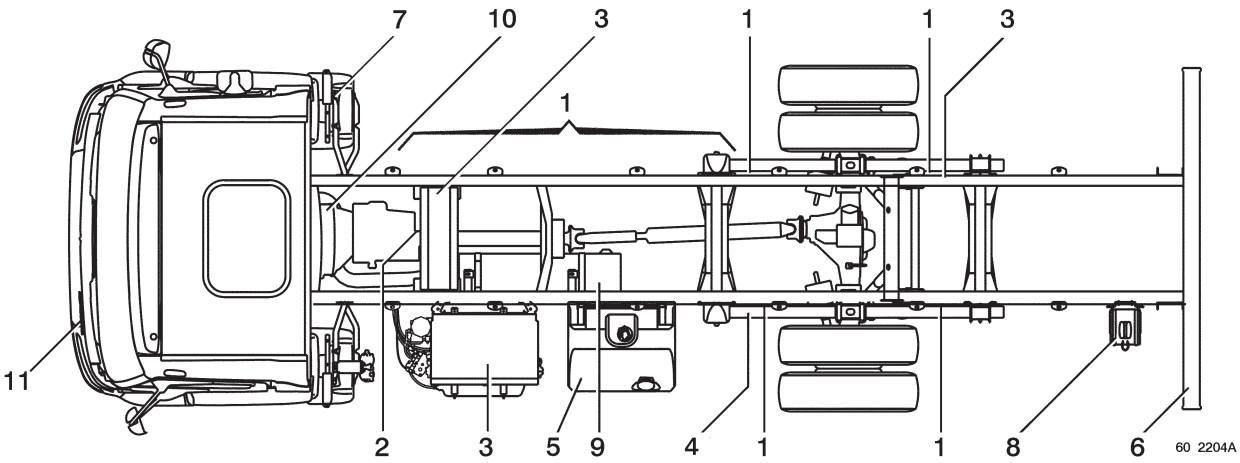
- RH sidemember **(1)** cleared, without lateral accessories for the installation of specific accessories,
- punchings on chassis for fastening accessories and wing brackets **(1)**,
- gearbox-mounted PTO **(2)** type 2264 B with flange output, speed 950 or 100 rpm,
- adjustable fast idling,
- remote controlled clutch release operating ram,
- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- reinforced front and rear parabolic leaf spring suspensions **(4)**,
- tachograph,
- tanker lateral signalling installation kit,
- fuel tank on left side **(5)**.

ADR equipment

- rear run-under guard for tanker overall width 2350 mm, **(6)**
- chassis-mounted “palm switch” stop control **(7)**,
- 2 kg fire extinguisher in cab,
- portable orange wander lamps in cab,
- wheel chock **(8)**,
- exhaust silencer shield **(9)**,
- behind-cab shield **(10)**,
- ABS,
- pre-arrangement for fixing ADR plate **(11)**,
- battery isolation switch with pneumatic control.

Options

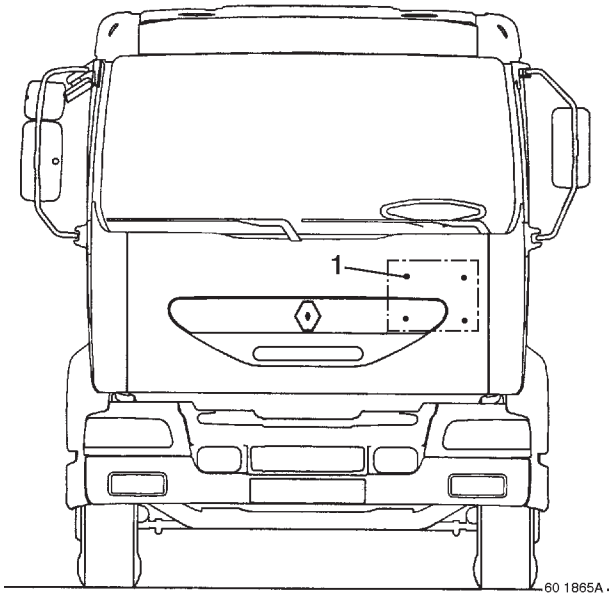
- spare wheel,
- gearbox-mounted PTO with splined shaft output,
- without “ADR” (“transport of dangerous materials”) equipment,
- towing cross-member capacity > 3.5 tonnes,
- engine hourmeter in cab.



7.1 ADR plate

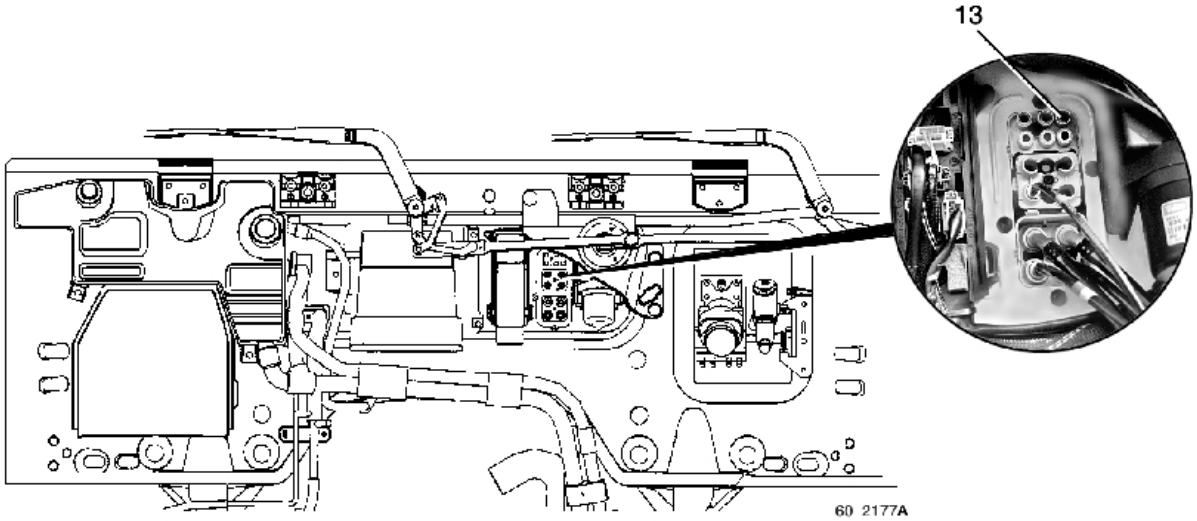
Punchings **(1)** made on the inner face of the front grille mark the position of the drilling points for fixing the ADR plate.

The plate bracket must be provided with a retaining system to keep the plate in its housing when the front grille is opened.



7.2 Remote controlled clutch release operating ram

A remote controlled single-acting clutch release operating ram is installed as option on the clutch pedal. It is pre-wired on the front end through port **(13)**. Connect the compressed air supply to this port to actuate the ram.



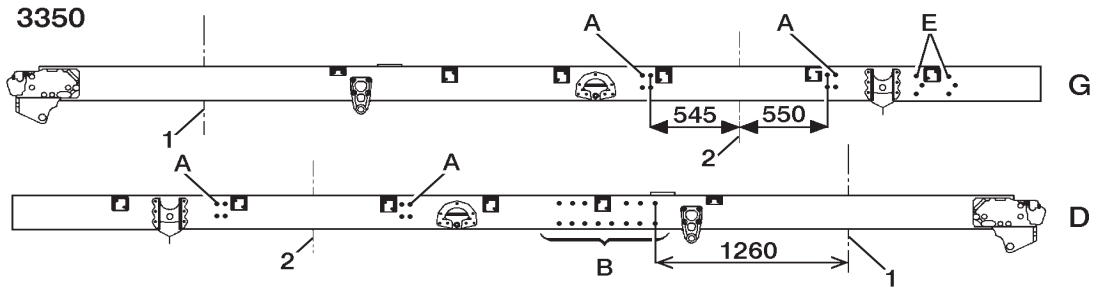
7.3 Assembly of chassis accessories

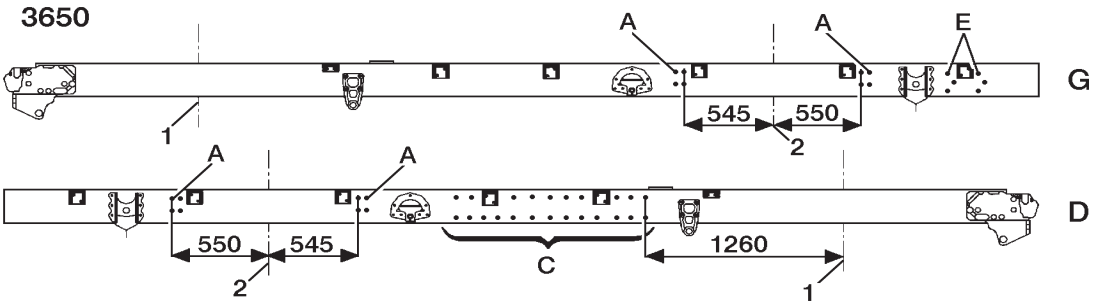
Drillings in the sidemembers serve for attaching equipment such as:
- wing brackets (stakes),
- fuel tank in the wheelbase or rear overhang, LH side,
- various equipment items (e.g. off-loading pump) in the wheelbase, RH side.

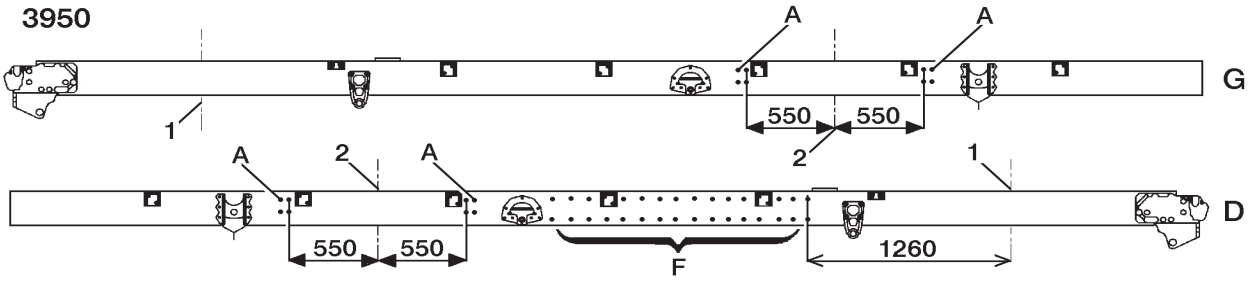
Punchings in the rear overhang serving for adjusting the position of the rear run-under guard are identical to those of the RENAULT MIDLUM C having the same wheelbase (consult the “Changing the position of equipment” chapter).

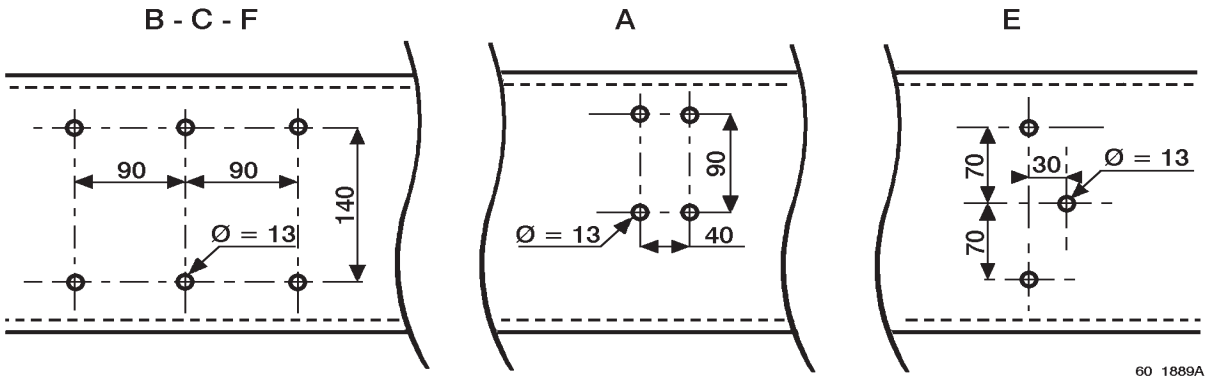
Key to diagram

1 - front axle centre-line
2 - rear drive axle centre-line
A - drillings for assembly of wing brackets
B - drillings for assembly of equipment: 23 drillings distributed over a length of 990 mm
C - drillings for assembly of equipment: 27 drillings distributed over a length of 1260 mm
D - RH sidemember
E - drillings for assembly of fuel tank in rear overhang
F - drillings for assembly of equipment: 34 drillings distributed over a length of 1620 mm
G - LH sidemember





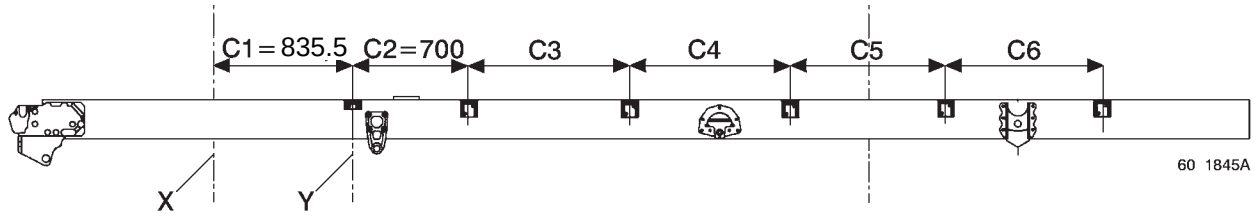




7.4 Longitudinal positioning of brackets on chassis

7.4.1 RENAULT MIDLUM C tanker

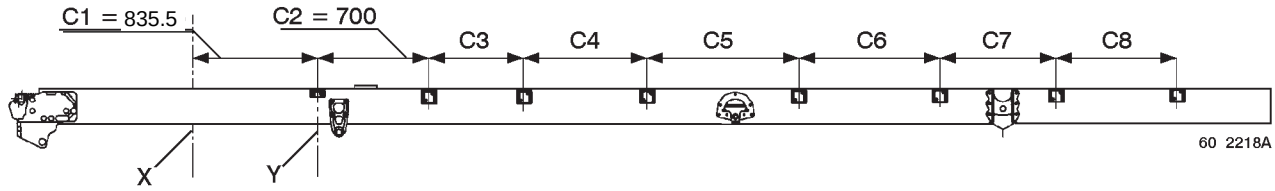
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



E	C3	C4	C5	C6
3350	700	640	940	740
3650		940		
3950	970	970		970

7.4.2 RENAULT MIDLUM D 18 tonnes tanker

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

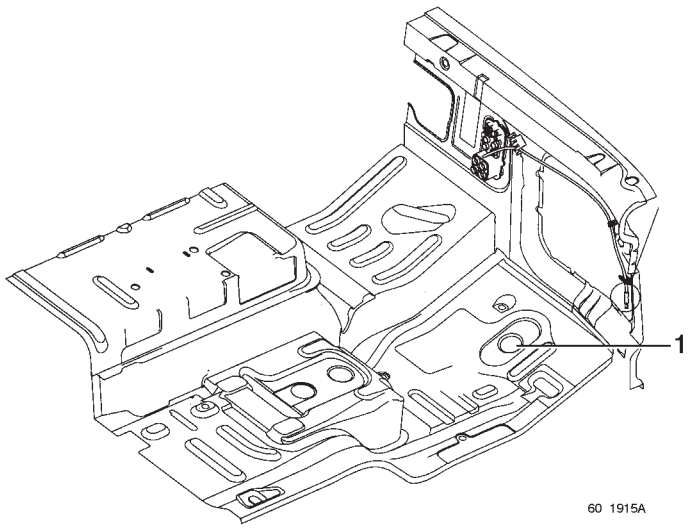


Vehicle	E	C3	C4	C5	C6	C7	C8
Mechanical suspension	3650	700	940	940			
	3950	970					
	4250	700	630	910	940	727	
	4550		925	915		860	
Air suspension	3650	970	1165	875			
	3950	790	660	735	875		
	4250		960			547	
	4550	700	673	677	735	875	680

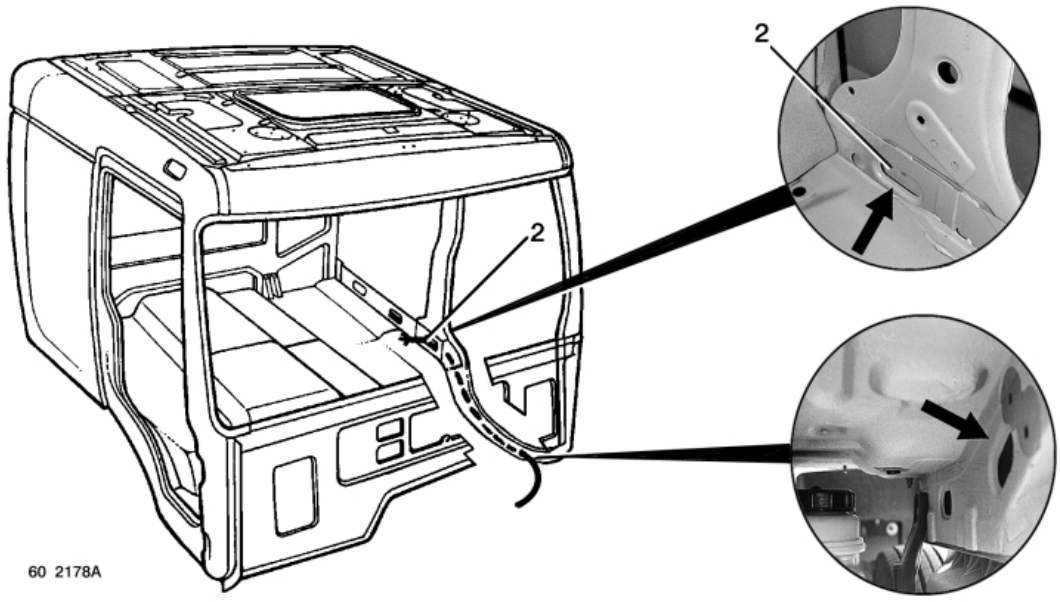
7.5 Passage of wiring harnesses and compressed air pipes through cab

Three passages are possible for routing the wiring harnesses from the inside to the outside of the cab:

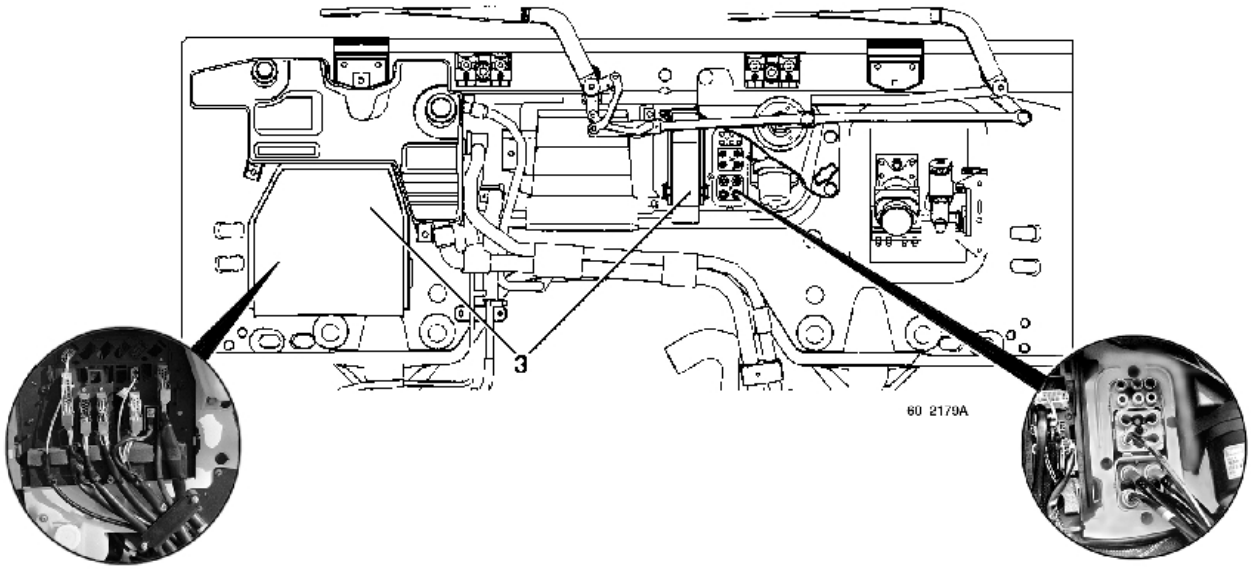
1 - Hole with maximum dia. 45 mm to be drilled in the circular impression on the passenger side floor. Watch out for the screen wash reservoir located under the floor near this impression.



2 - Passage through the RH or LH side rail of the cab. Cut the interior lining.



3 - Passage of wiring harnesses through unused locations in front end connecting zones.



“REFUSE COLLECTOR” VEHICLE

8. “REFUSE COLLECTOR” VEHICLE

- 16 tonnes GVW (twin tyre fitment at rear) available in three wheelbases 3070, 3350, 3650 on RENAULT MIDLUM C base,
- 15.7 tonnes GVW (single tyre fitment at rear) available in three wheelbases 3070, 3350, 3650 on RENAULT MIDLUM C base,

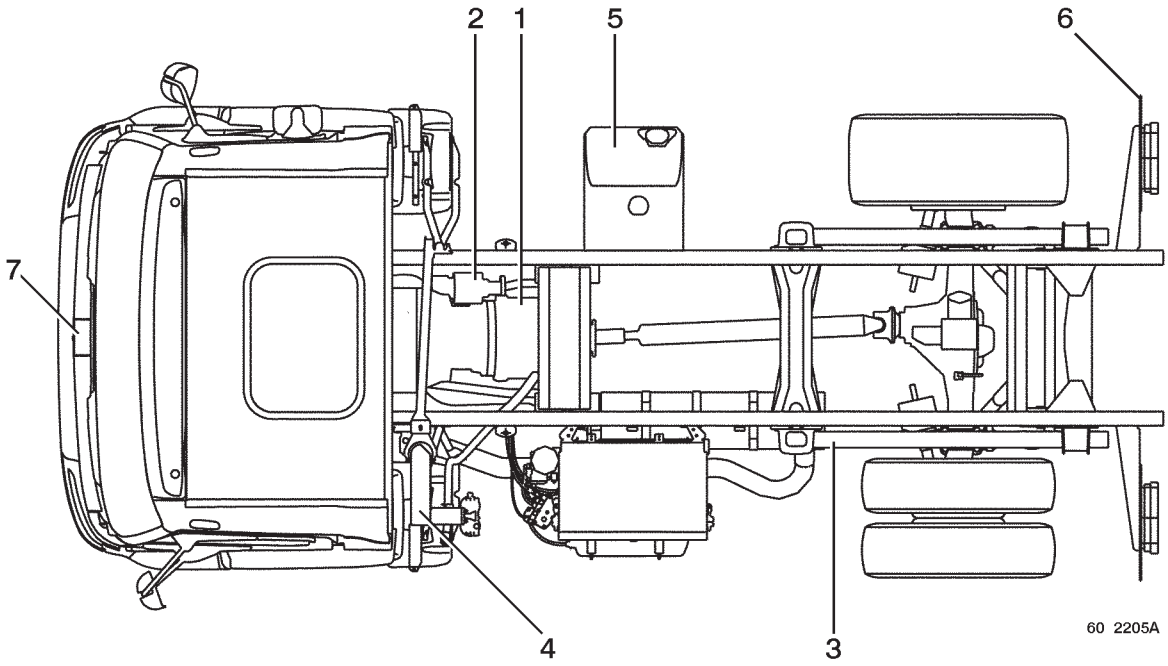
Day cab only.

Refuse collector special features

- refuse collector bodybuilder electrical pre-arrangement,
- automatic transmission **(1)**,
- gearbox-mounted continuous high-power PTO **(2)** with regulated fast idling control, (2 programmed engine speeds available, plus chassis-mounted variable speed control),
- reinforced front parabolic leaf spring suspension,
- reinforced dissymmetrical rear suspension **(3)**,
- vertical exhaust **(4)**,
- 80 litre fuel tank **(5)**,
- without rear run-under guard **(6)**,
- RH door with peep window,
- reversing buzzer,
- ripper presence 30 km/h speed limiter,
- without spare wheel,
- mileometer without tachograph,
- frontview mirror **(7)**,
- passenger bench seat,
- adapted grab handles,
- central passenger holding bar.

Options

- roof level engine air intake,
- single rear tyre fitment,
- fixed passenger seat,
- engine hourmeter in cab.

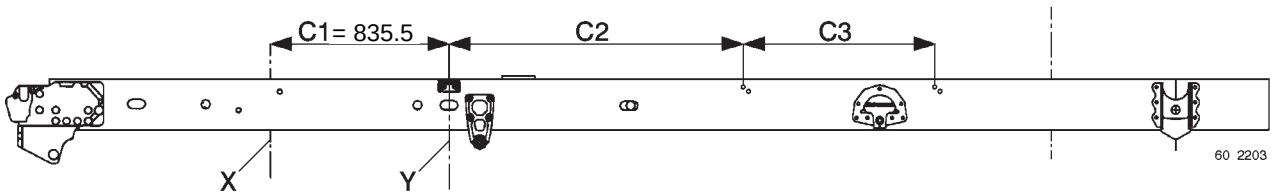


8.1 Longitudinal positioning of brackets on chassis

The first bracket is installed on the vehicle - the other brackets are not supplied. The dimensions indicate the position of the drilling only.

8.1.1 RENAULT MIDLUM C refuse collector

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

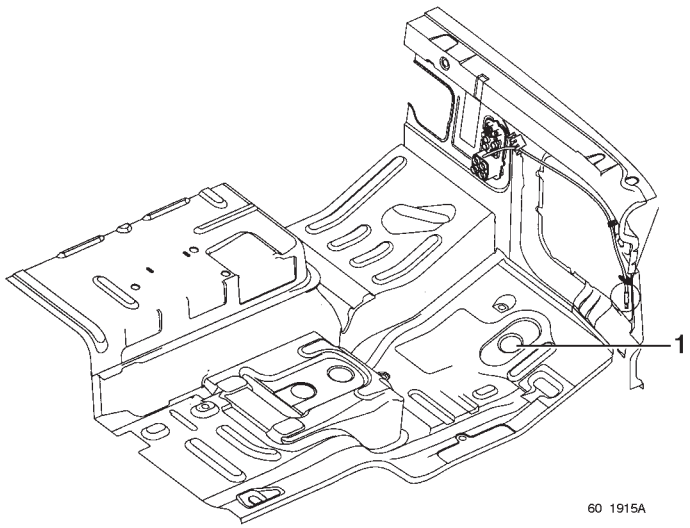


E	C2	C3
3070	1739.5	
3350	1367.5	650
3650		950

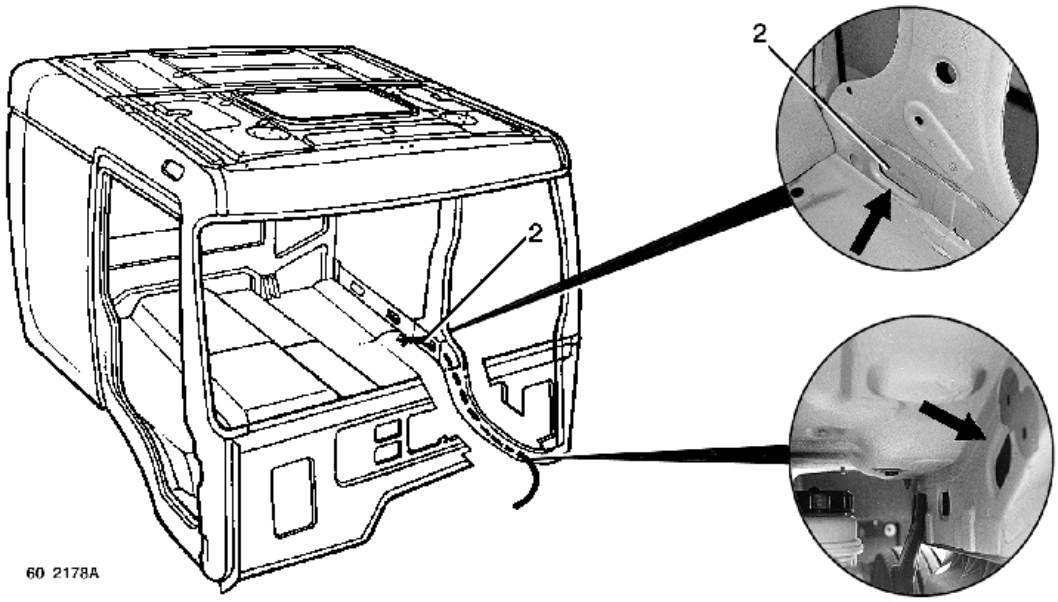
8.2 Passage of wiring harnesses and compressed air pipes through cab

Three passages are possible for routing the wiring harnesses from the inside to the outside of the cab:

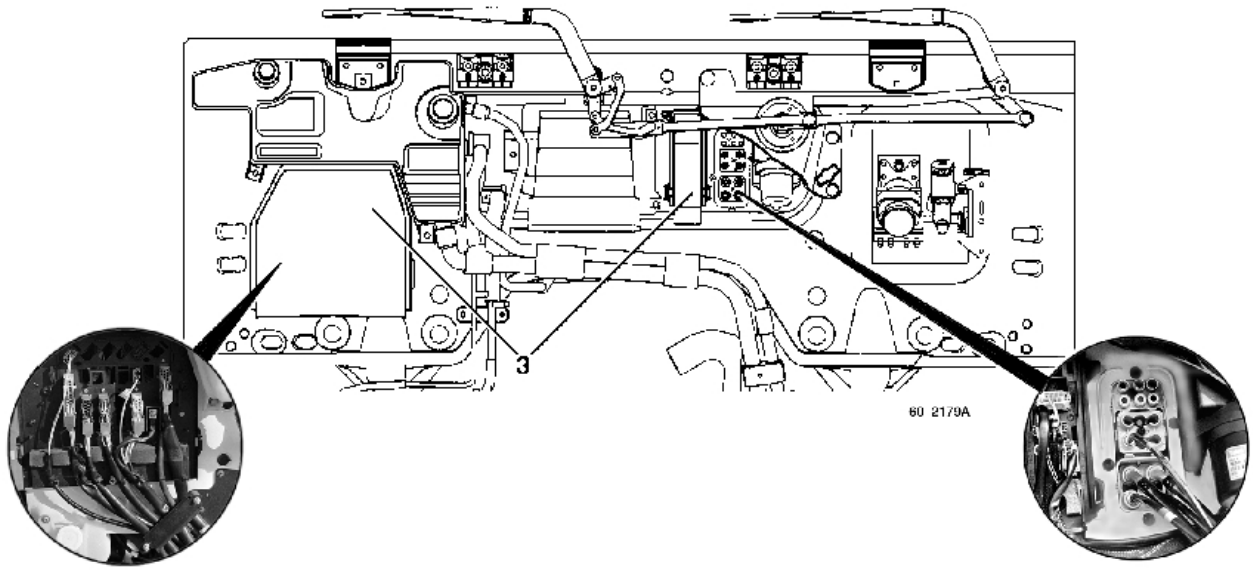
1 - Hole with maximum dia. 45 mm to be drilled in the circular impression on the passenger side floor. Watch out for the screen wash reservoir located under the floor near this impression.



2 - Passage through the RH or LH side rail of the cab. Cut the interior lining.



3 - Passage of wiring harnesses through unused locations in front end connecting zones.



8.3 Electrical pre-arrangements for refuse collectors

Available power supplies in cab under the connection unit

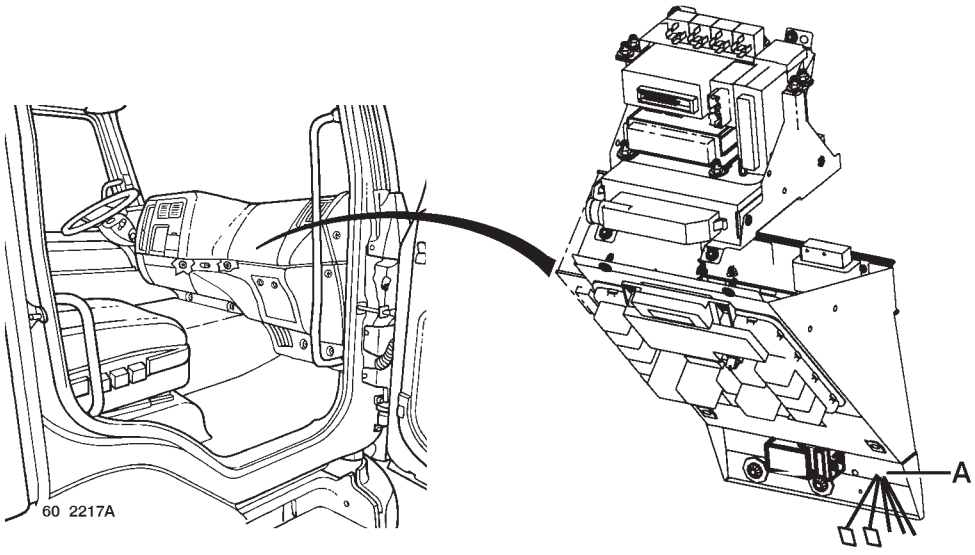
4-way yellow connector FCI **(A)**:
- terminal 1: ALLISON automatic transmission PTO engagement (wire 818)
- terminal 2: 30 km/h speed limitation (wire 5027)
- terminal 3: compacting demand (wire 8067)
- terminal 4: reversing forbidden (wire 5026).

8-way red connector FCI **(A)**:
- terminal 1: PTO 1 fast idling (wire 88)
- terminal 2: revolving beacons information (wire 323)
- terminal 3: fast idling variable speed deceleration (wire 045)
- terminal 4: fast idling variable speed acceleration (wire 047).
- terminal 5: zero speed information (wire 1025).
- terminal 6: PTO 2 fast idling (wire 1026).
- terminal 7: reversing lights information (wire 608).
- terminal 8: chassis alert warning light (wire 8084).

Four wires **(A)** on stand-by, equipped with 6.35 spade terminals deliver cab available power supplies:
- wire 208: after master switch “+” power supply
- wire 632: lighting, side lights “+” power supply
- wire 275: after ignition “+” power supply
- wire 202: batteries “+” power supply

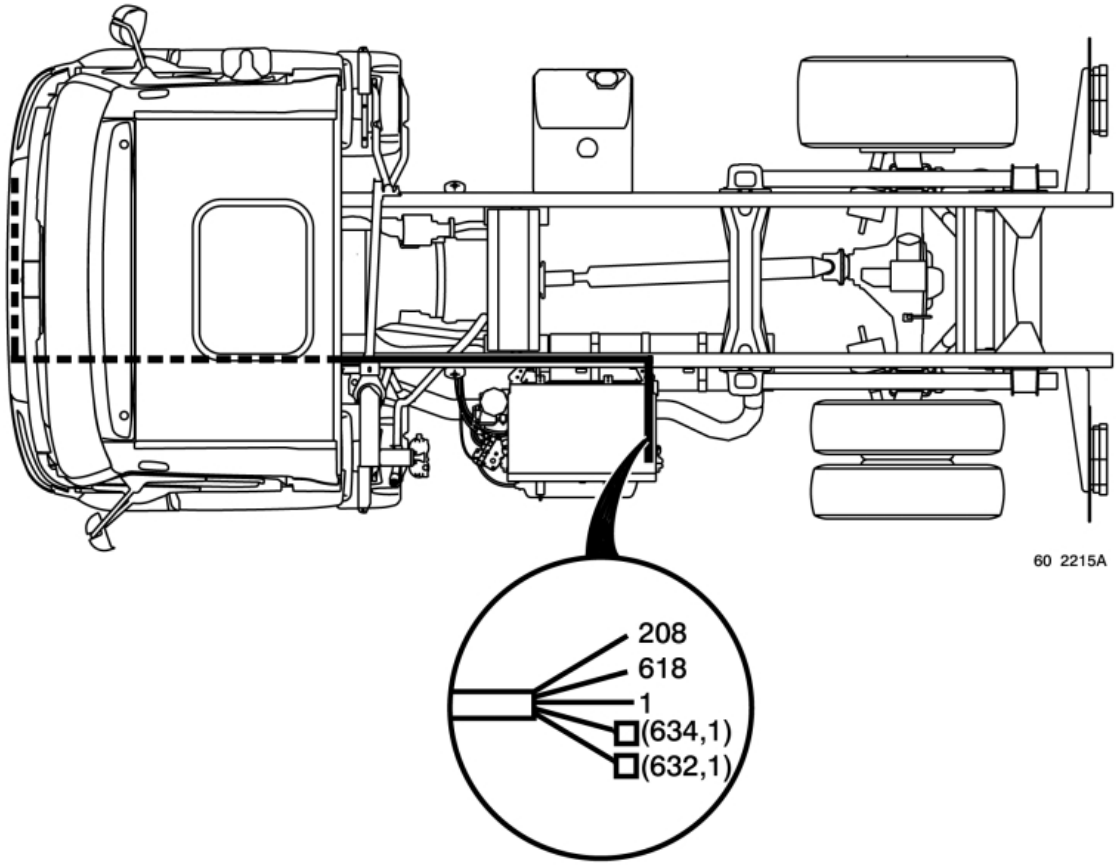
To make the earth, connect up to an earthing point on the inside of the cab (see chapter C-3.1).

IMPORTANT
Wires 208 and 632, each supplied through one single fuse, deliver the available power supplies in parallel into the cab and to the front end. Consequently, the amperage crossing the supply fuse is equal to the sum of the amperages delivered by the two ends of each line. This amperage should not exceed 15 Amps.



In the battery compartment

- Power supplies available at the ends of the wiring harness on stand-by in the battery compartment:
  Two 2-way connectors: lateral lights power supply (earth: wire 1, “+” lighting: wire 632 on RH side and 634 on LH side).
  wire 208 : after master switch “+” power supply
  wire 618 : chassis lighting (10A) “+” power supply, controlled by chassis lighting switch



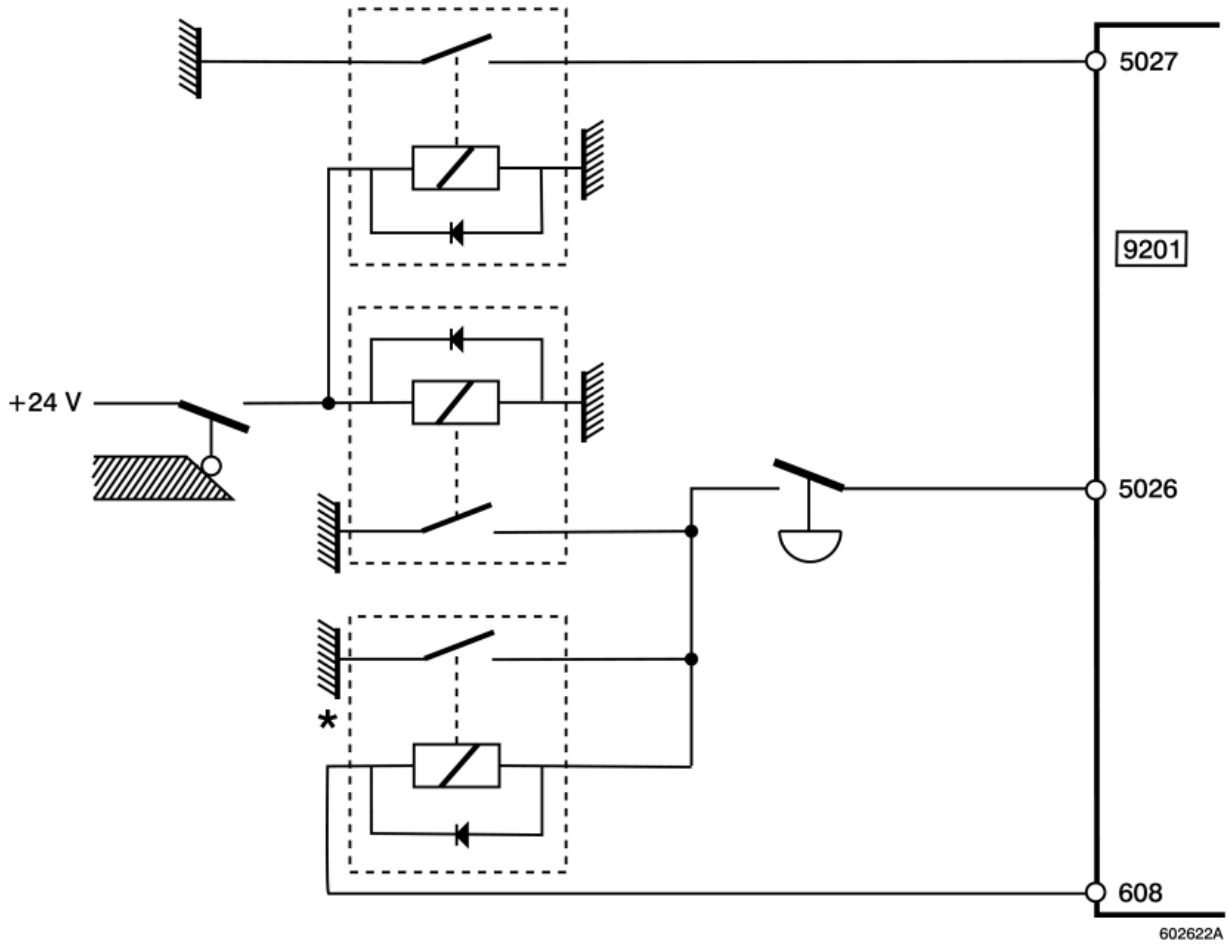
8.4 Reversing safety

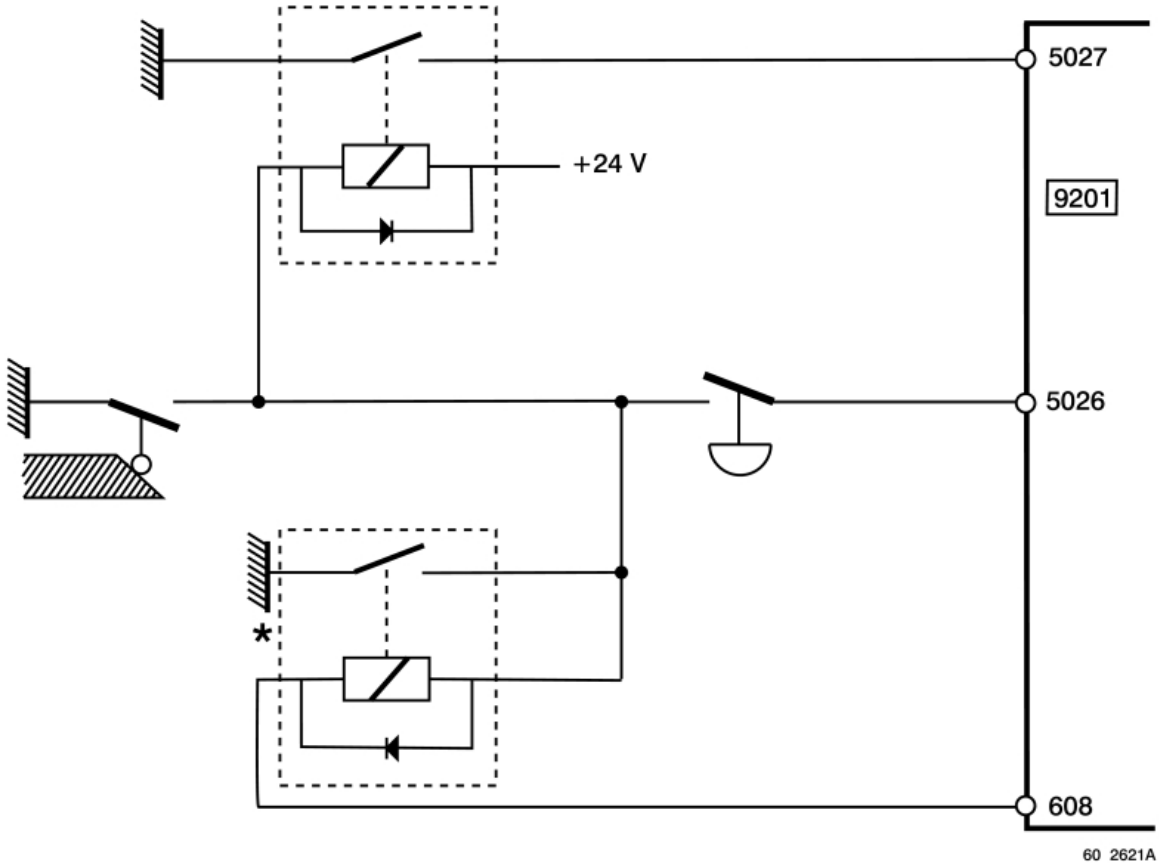
When the ripper is active, relay R19 is energized (together with relay R20 in the case where ripper is controlled by a +24V current), which limits the vehicle speed to 30 km/h.

As soon as reverse gear is engaged, reversing is prohibited by the earthing of wire 5026. Relay R21 is also energized because reverse gear is engaged and enables the prohibition to be maintained if the ripper is no longer active (operator getting down from ripper).

In all situations, the emergency stop control enables the reverse gear to be used.

Note:
Relay R19 is essential for insulating wire 5027 from any coil terminal. In effect, this wire is connected to an ECU input that must be protected against voltage surges.
Relay R21 is essential with an automatic transmission, but is unnecessary with a manual gearbox.

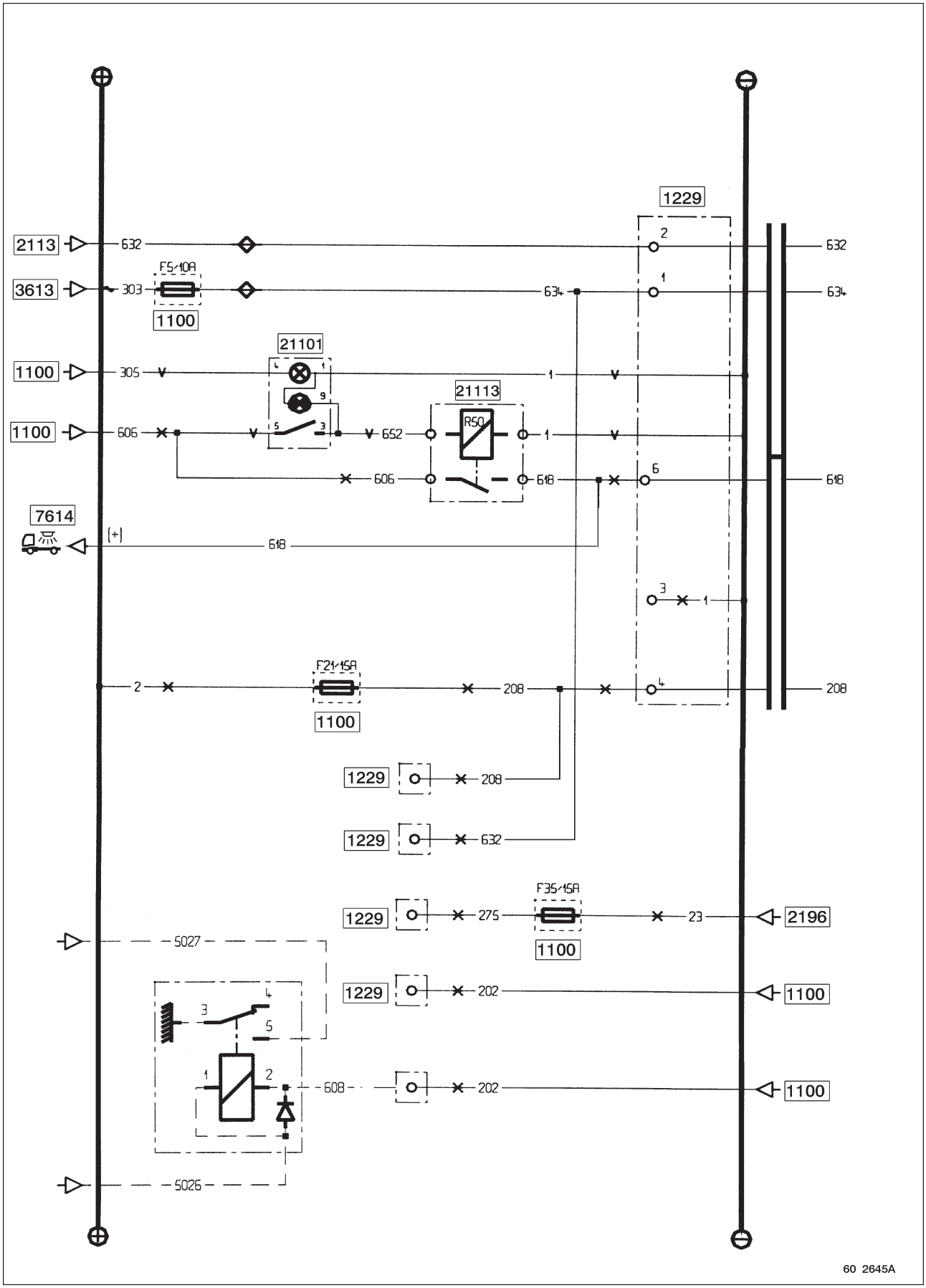




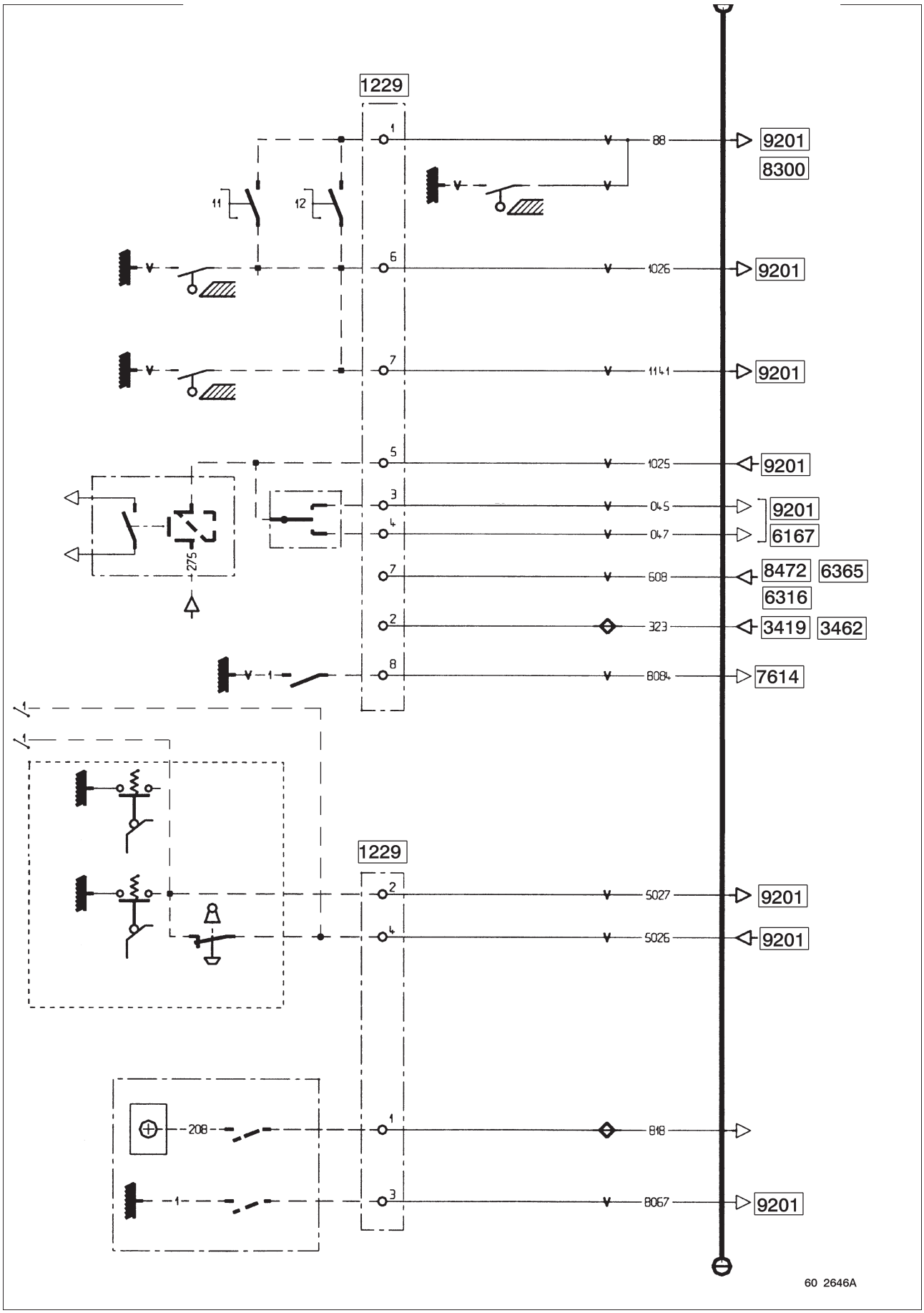
8.5 Assembly of lateral signalling installation kit

See chapter 4.3.

8.6 Electrical diagram for “refuse collector” optional available power supplies

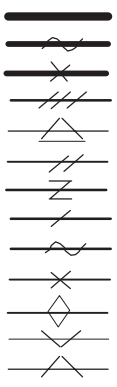


Electrical diagram for “refuse collectors” optional available power supplies



Key
1100 - Fuses
1229 - Chassis-cab connection unit
1335 - Bodybuilder available power supplies connector
2113 - Trailer socket, 7-pin type 24 N
2196 - After ignition “+” power supply **(R1)**
3419 - Revolving beacon(s) relay
3462 - Revolving beacon(s) control
3613 - RH front side/parking lamp
6167 - Steering column fingertip controls (lights, signalling, windscreen wiper, transponder, cruise control)
6316 - reversing lights relay
6365 - reversing buzzer control
7614 - Principal display
8300 - Power take-off
8472 - Reverse gear switch
9201 - Vehicle electronic control unit (VECU)
21101 - Bodybuilder equipment control
21113 - Bodybuilder equipment available power supply relay **(R50)**
21120 - Bodybuilder equipment control N° 2

Section et couleur des cables



75 mm^2
60 mm^2
50 mm^2
25 mm^2
16 mm^2
10 mm^2 – Ivory
7 mm^2 – Pink
5 mm^2 – Ivory
3 mm^2 – Pink
2 mm^2 – Grey
1 mm^2 – Green
0,6 mm^2 – Grey
0,35 mm^2 – Orange

Assignment of fuses concerning electrical pre-arrangements

Fuse	Amperage	Wire N°	Function
F4	10	634	LH lateral lights power supply
F5	10	632	RH lateral lights power supply
F21	15	208	After master switch “+” power supply
F43	10	618	Power lighting power supply
		8083	Equipment power supply - Machine unlocking power supply
F35	15	275	After ignition “+” power supply

Do not exceed the max. currents of the switches; if you do, relay the power supply.

All the other available power supplies that are not mentioned in this chapter are identical to those mentioned in chapter 4.

8.7 Bodywork attachment kit (located in cab and supplied with this pre-arrangement)

20 bolts HM 14 x 150 x 60, class 10.9
2 bolts HM 14 x 150 x 69, class 10.9
2 bolts HM 14 x 150 x 110, class 10.9
50 plain washers 14x30x5
12 cone washers “Belleville” type
24 flanged locknuts DRH M14 class 10

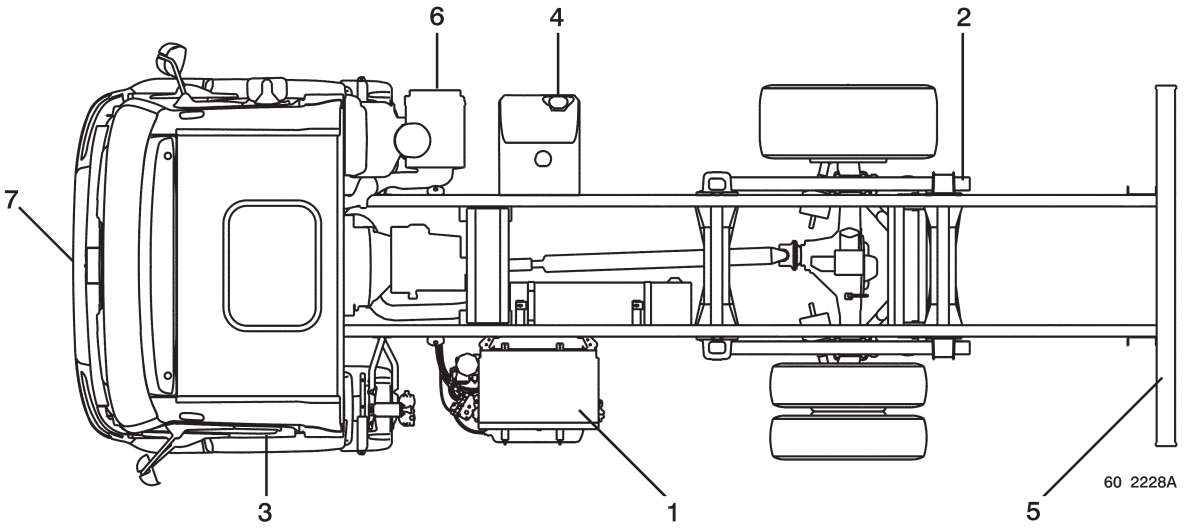
“ROAD SWEEPER” VEHICLE

9. ROAD SWEEPER VEHICLE

- 10 & 12 tonnes GVW (twin tyre fitment at rear) available in two wheelbases 3070, 3350 on RENAULT MIDLUM C' base,
- 15 tonnes GVW (single tyre fitment at rear) available in three wheelbases 3350, 3650, 3950 on RENAULT MIDLUM C base.
- Single tyre fitment solution non-standard.

Road sweeper special features

- level 2 bodybuilder electrical pre-arrangement **(1)** (see chapter B-5),
- dissymmetrical rear suspension **(2)**,
- right-hand drive,
- LH door with peep window **(3)**,
- lateral exhaust,
- plastic 80 litre main fuel tank **(4)**,
- with run-under guard **(5)**,
- mileometer,
- with battery isolation switch,
- reversing buzzer,
- roof level engine air intake **(6)**,
- without spare wheel,
- frontview mirror **(7)**.

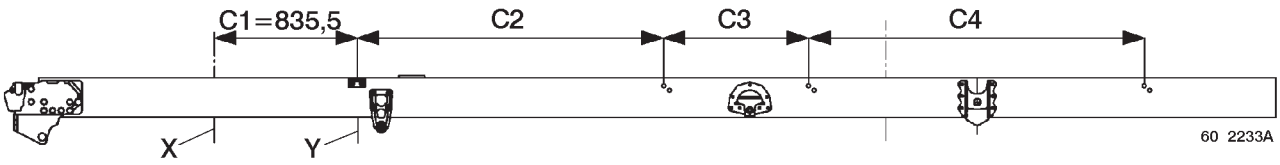


9.1 Longitudinal positioning of brackets on chassis

The first bracket is installed on the vehicle - the other brackets are not supplied. The dimensions indicate the position of the drilling only.

9.1.1 RENAULT MIDLUM C'/C road sweeper

E - wheelbase
X - axle centre-line
Y - first bracket centre-line

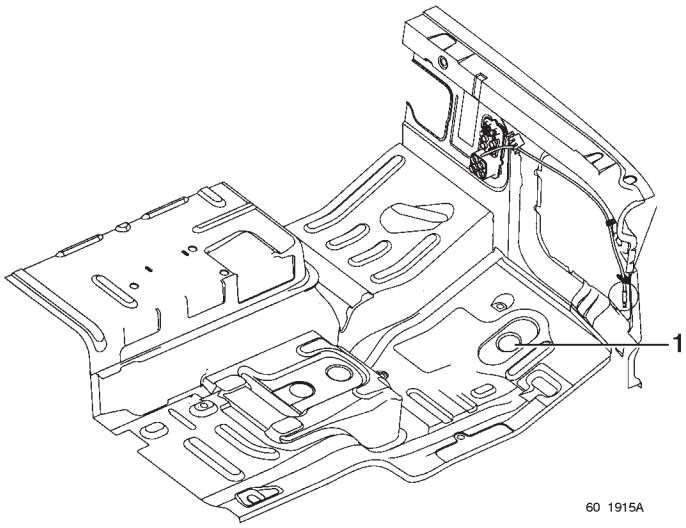


E	C2	C3	C4
3070	1740	1642	
3350	1368	650	1867
3650		950	1912
3950	1638	980	

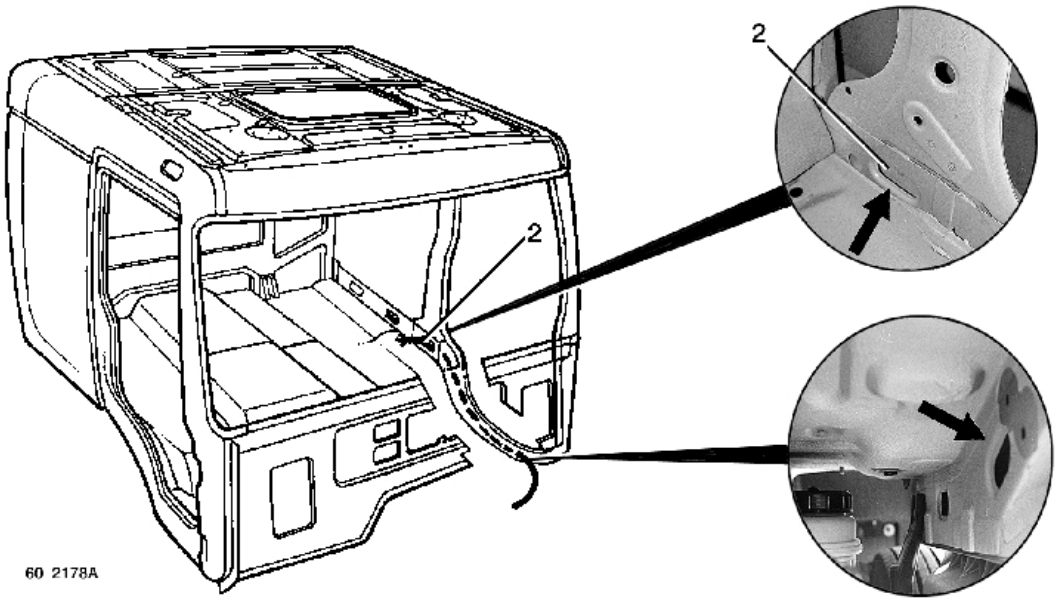
9.2 Passage of wiring harnesses and compressed air pipes through cab

Three passages are possible for routing the wiring harnesses from the inside to the outside of the cab:

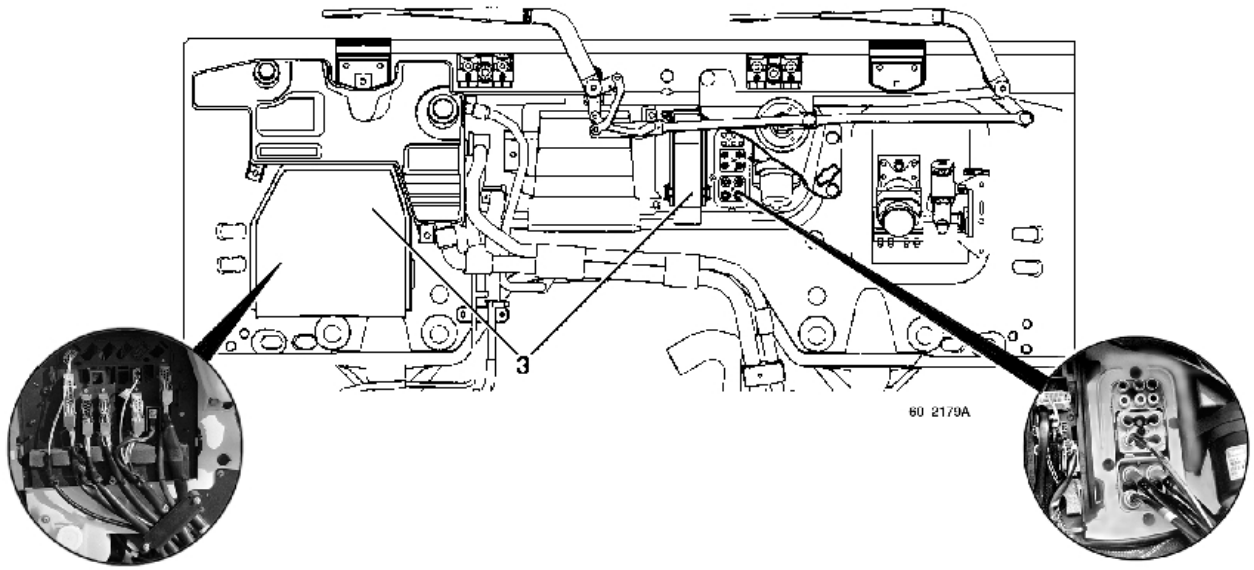
1 - Hole with maximum diameter 45 mm to be drilled in the circular impression on the passenger side floor. Watch out for the screen wash reservoir located under the floor near this impression.



2 - Passage through the RH or LH side rail of the cab. Cut the interior lining.



3 - Passage of wiring harnesses through unused locations in front end connecting zones.



“LIGHT FIRE TENDER” VEHICLE

10. LIGHT FIRE TENDER VEHICLE

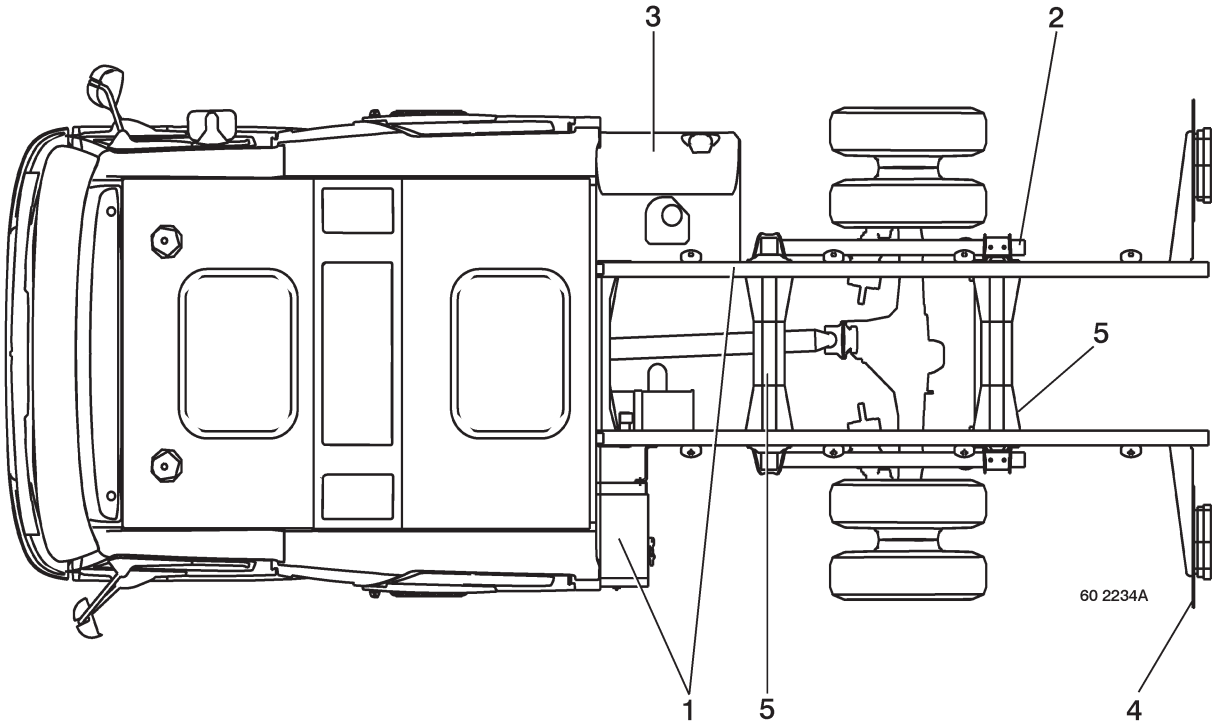
- 10 tonnes GVW available in one wheelbase 3250 on RENAULT MIDLUM B base,

Light fire tender special features

- fire brigade bodybuilder electrical pre-arrangements (**1**),
- EATON 4106 OD gearbox + power take-off 2903P,
- 4-door cab (6/7 places),
- reinforced front parabolic leaf spring suspension,
- reinforced rear parabolic leaf spring suspension (**2**),
- lateral exhaust with internal outlet,
- plastic 130 litre main fuel tank (**3**),
- adjustable fast idling,
- lamps mounted on lighting bar (**4**),
- pneumatic battery isolation switch,
- loose spare wheel,
- 9.5 R 17.5 XYZ tyres,
- turned over rear spring hanger cross-members (**5**),
- white bumper,
- cab pre-arrangements (working spotlamp with remote control, radio antenna, earth braid on doors, foot-operated horn control, special steering column trim, self-adhesive reflectors on doors...).

Options

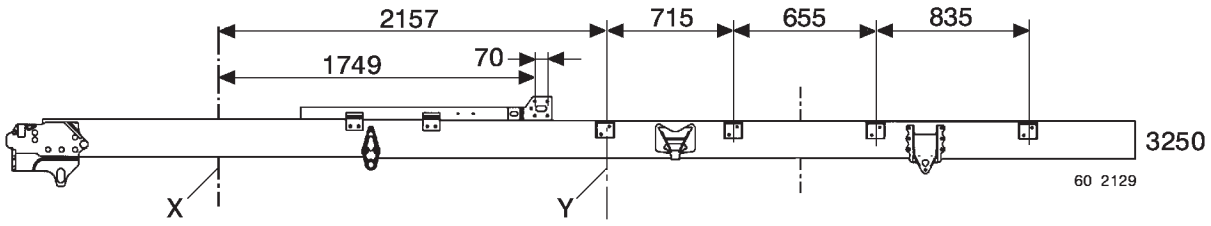
- blue revolving beacons.



10.1 Longitudinal positioning of brackets on chassis

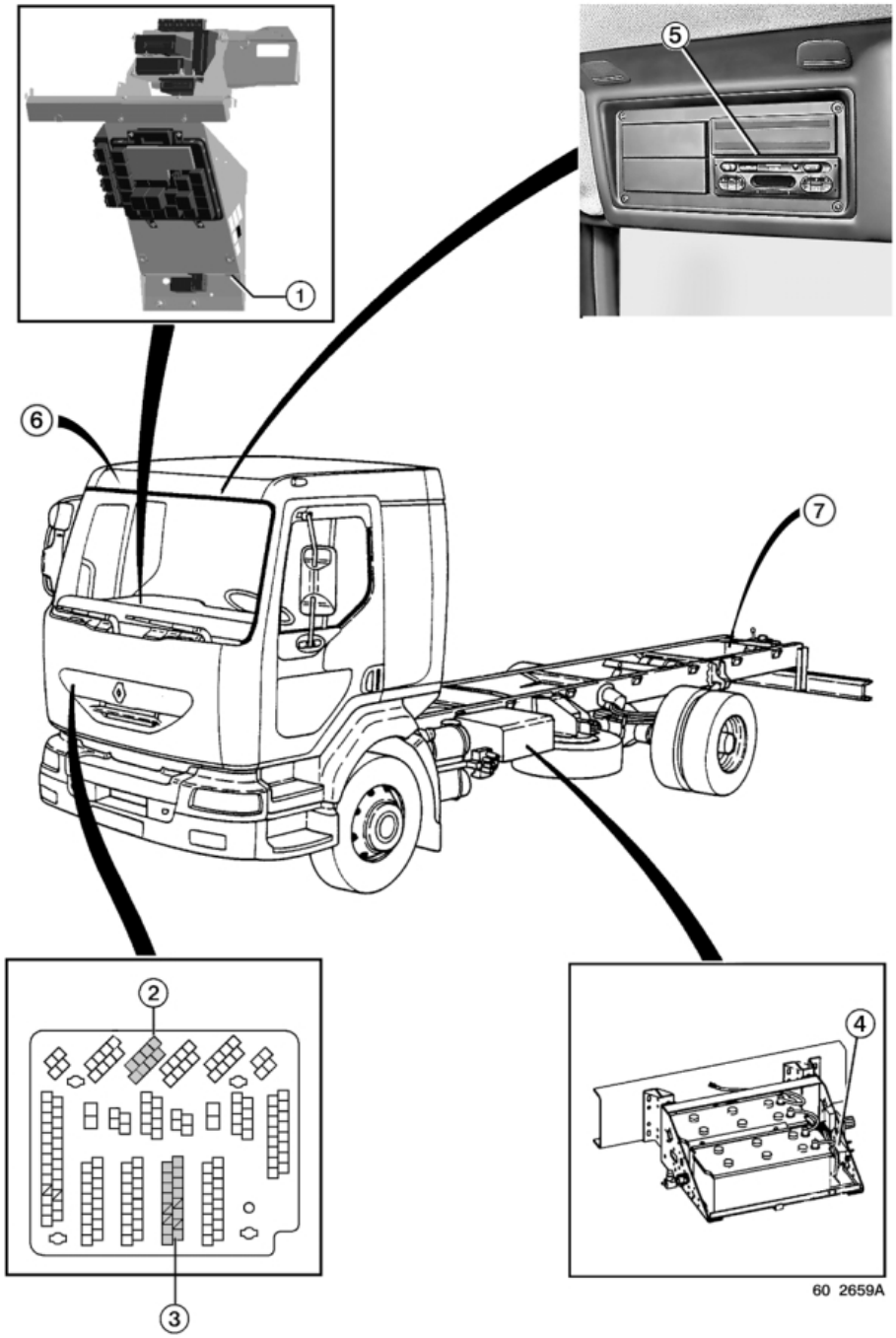
10.1.1 RENAULT MIDLUM B 10 tonnes 4-door light fire tender

E - wheelbases
X - axle centre-line
Y - first bracket centre-line



10.2 Light fire tender electrical pre-arrangements

Any electrical connection must mandatorily be made to the available power supplies made available by RENAULT TRUCKS
It is forbidden to make any electrical tapping to the different wiring harnesses on the vehicle.
Use and adapt the connectors and wiring harnesses approved and distributed by RENAULT TRUCKS.
The cable sections must be adapted to the required use (5 Amps per mm^2).
Comply with the circuit protections recommended by RENAULT TRUCKS.
It is forbidden to change the rating of the fuses.



Location 1
3 insulated stand-by wires

Assignment	Wire	Fuse
Available power supply (after master siwtch)	208	F21
Available power supply (lighting)	632	F5
Available power supply (after ignition)	275	F35

Location 2
Brown connector

Assignment	Wire	Fuse
Earth	1	-
Available power supply (lighting)	632	-
Available power supply (lighting)	634	F5
Available power supply	971	F4
Available power supply	972	-
Available power supply	973	-
Available power supply	974	-
Available power supply	975	-

Pre-equipped vehicles
With a fire tender" electrical bodywork pre-equipment, the ends of the available lines are free in locations **(2)** and **(7)**.

Location 3
Green connector

Assignment	Wire	Fuse
Available power supply (engine speed)	045	-
Available power supply (engine speed)	047	-
Available power supply (PTO)	88	-
Available power supply (rear compartment switch open)	151	-
Available power supply (PTO warning light)	249	-
Available power supply (after ignition)	275	F47
Available power supply (rear revolving beacon)	357	-
Available power supply (rear compartment lighting)	623	-
Available power supply (rear swiveling spotlamp)	644	-
Available power supply (extra signalling lights)	647	-
Available power supply (engine speed)	1025	-
Available power supply (PTO)	1026	-
Available power supply (rear loudspeaker "+")	4065	-
Available power supply (rear loudspeaker "-")	4066	-
Available power supply (rear loudspeaker shielding)	4067	-
Available power supply (fast idling)	8067	-

Pre-equipped vehicles
With a fire tender" electrical bodywork pre-equipment, a wiring harness connected to locations **(2)** and **(3)** brings in the available power supplies to location **(7)**.

Location 4

Assignment	Wire	Fuse
Available power supply (before master switch)	201	F200

Location 5
Yellow connector

Assignment	Wire	Fuse
+ 12 V available power supply (radiotelephone)	46	F17
- available power supply (radiotelephone)	155	-

Location 6
White connector

Assignment	Wire	Fuse
Radio - power supply	1	-
Radio + power supply	47	F30
Radio – 12 V power supply	144	-
Radio power supply (memory)	202	F34
+ 12 V available power supply	4000	F17
Available power supply (rear loudspeaker +)	4065	-
Available power supply (rear loudspeaker -)	4066	-
Available power supply (shielding)	4067	-
Radiotelephone antenna		

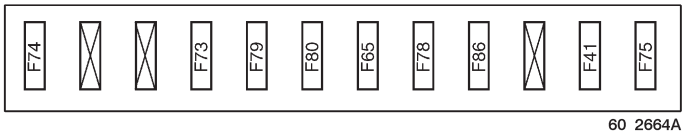
Location 7
24 insulated stand-by wires

Assignment	Wire	Fuse
Available power supply (engine speed)	045	-
Available power supply (engine speed)	047	-
Available power supply (PTO)	88	-
Available power supply (rear compartment switch open)	151	-
Available power supply (PTO warning light)	249	-
Available power supply (after ignition)	275	F47
Available power supply (rear revolving beacon)	357	-
Available power supply (rear compartment lighting)	623	-
Available power supply (lighting)	632	F5
Available power supply (lighting)	634	F4
Available power supply (rear swiveling spotlamp)	644	-
Available power supply (extra signalling lights)	647	-
Available power supply	971	-
Available power supply	972	-
Available power supply	973	-
Available power supply	974	-
Available power supply	975	-
Available power supply (engine speed)	1025	-
Available power supply (PTO)	1026	-
Available power supply (rear loudspeaker “+”)	4065	-
Available power supply (rear loudspeaker “-“)	4066	-
Available power supply (rear loudspeaker shielding)	4067	-
Available power supply (fast idling)	8067	-

Light fire tender fuses

To gain access to the fuses:
- Remove cover **(1)** from the light fire tender fuses support bracket.
- Use tweezers **(3)** to be found on the fuses support bracket for other vehicle functions.

Always replace a fuse with another fuse with the same rating.

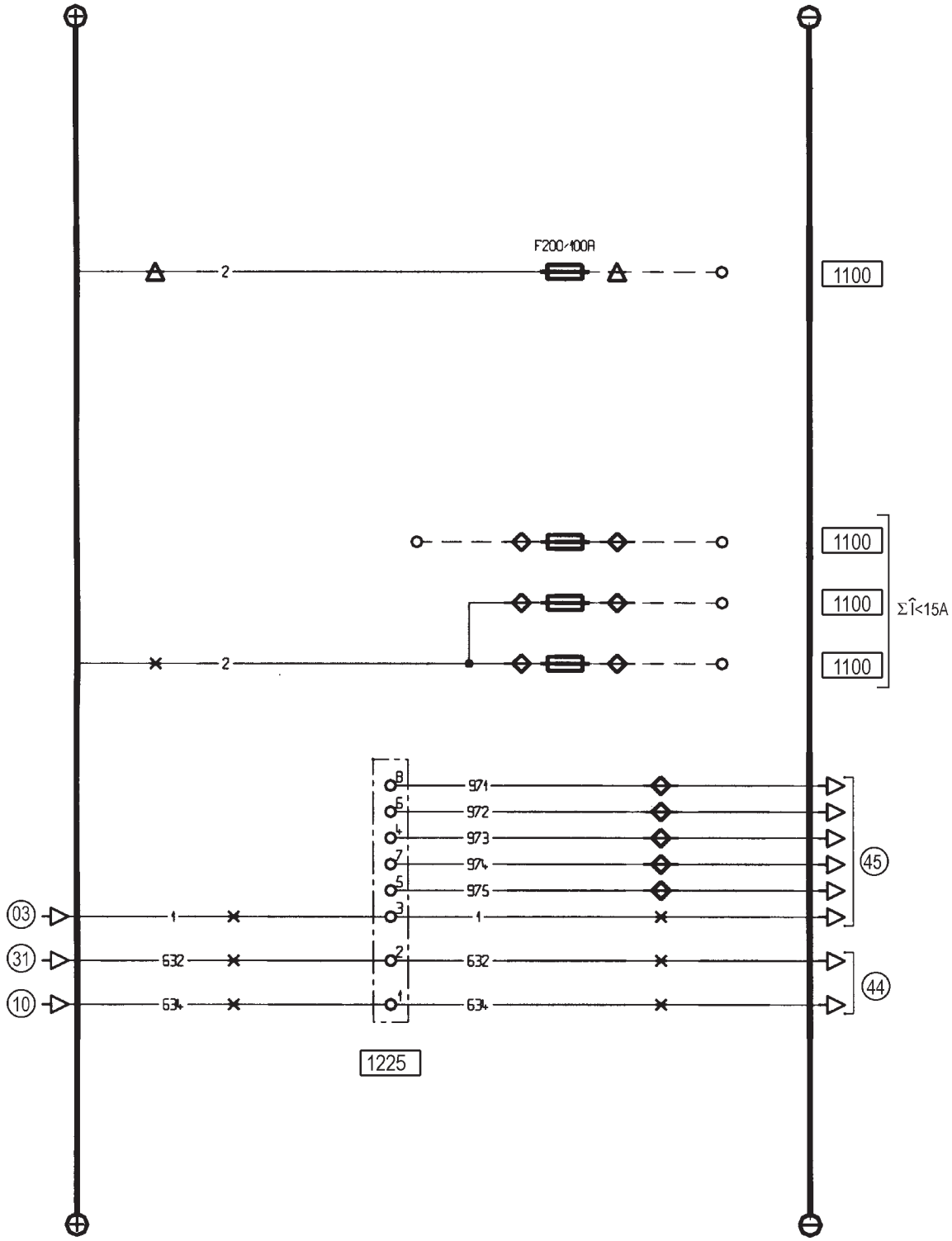


Assignment	Item	Amp.
Front search spotlamp	F41	10
Front search spotlight control	F41	10
Front search spotlight remote control	F41	10
Rear search spotlamp	F41	10
Rear search spotlight control	F41	10
Day / night lighting	F65	5
Available power supply (rear compartment lighting)	F73	5
12 V electrical socket	F74	10
Rear compartment lighting signaling	F74	10
Day / night lighting relay	F74	10
Rear box available power supply (after key ignition)	F75	10
Extra signaling lights	F78	10
Extra signaling lights control	F78	10
PTO hourmeter	F79	10
PTO cab warning light	F79	10
PTO in service relay	F79	10
Penetration / intervention lights (revolving beacons)	F80	15
Front grille extra lighting	F80	15
Switch lighting (upper console)	F86	10

For the assignment of other fuses, refer to the vehicle handbook.

Electrical diagrams for “light fire tender” available power supplies

For the cross-references in circles, refer to the vehicle “Electrics” workshop manual.



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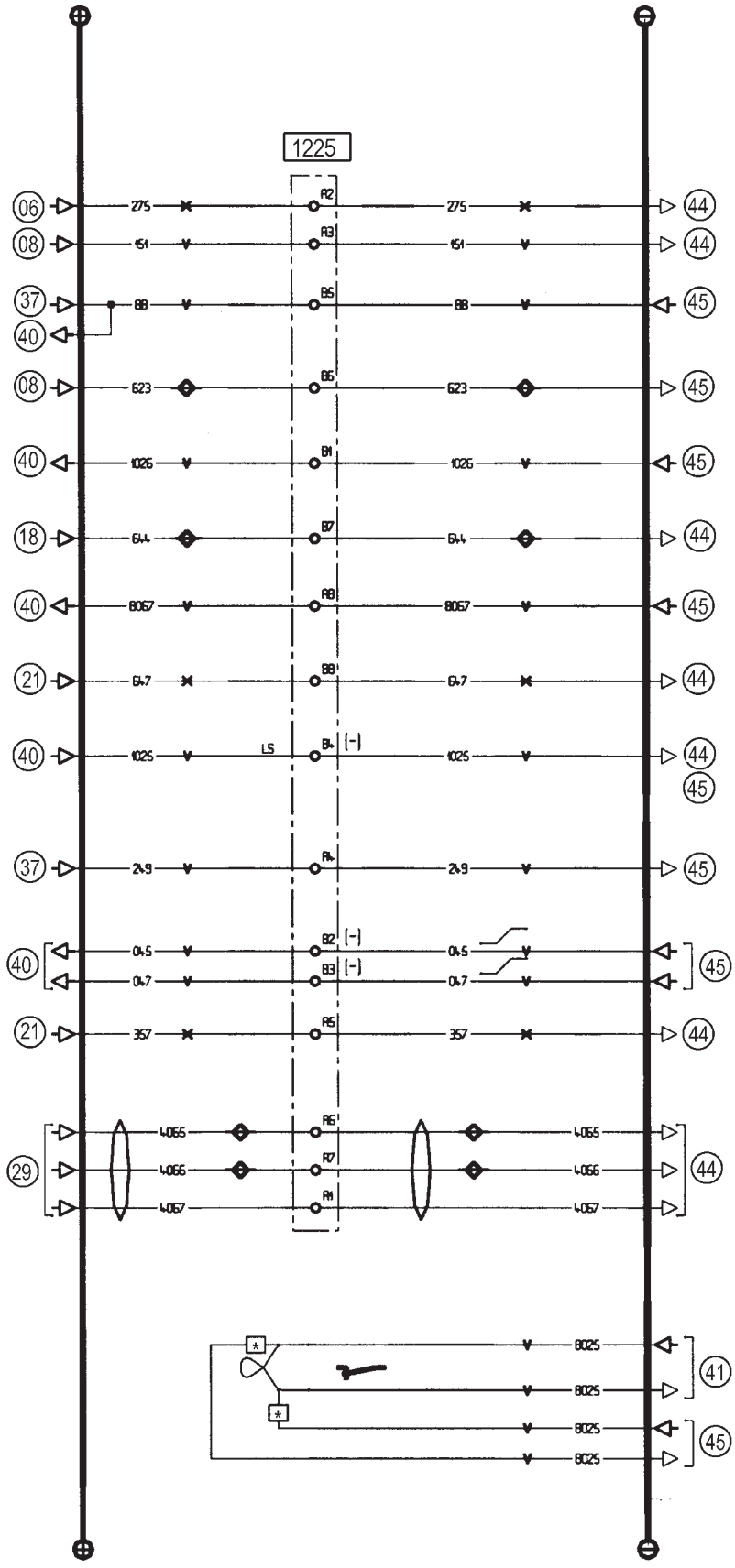
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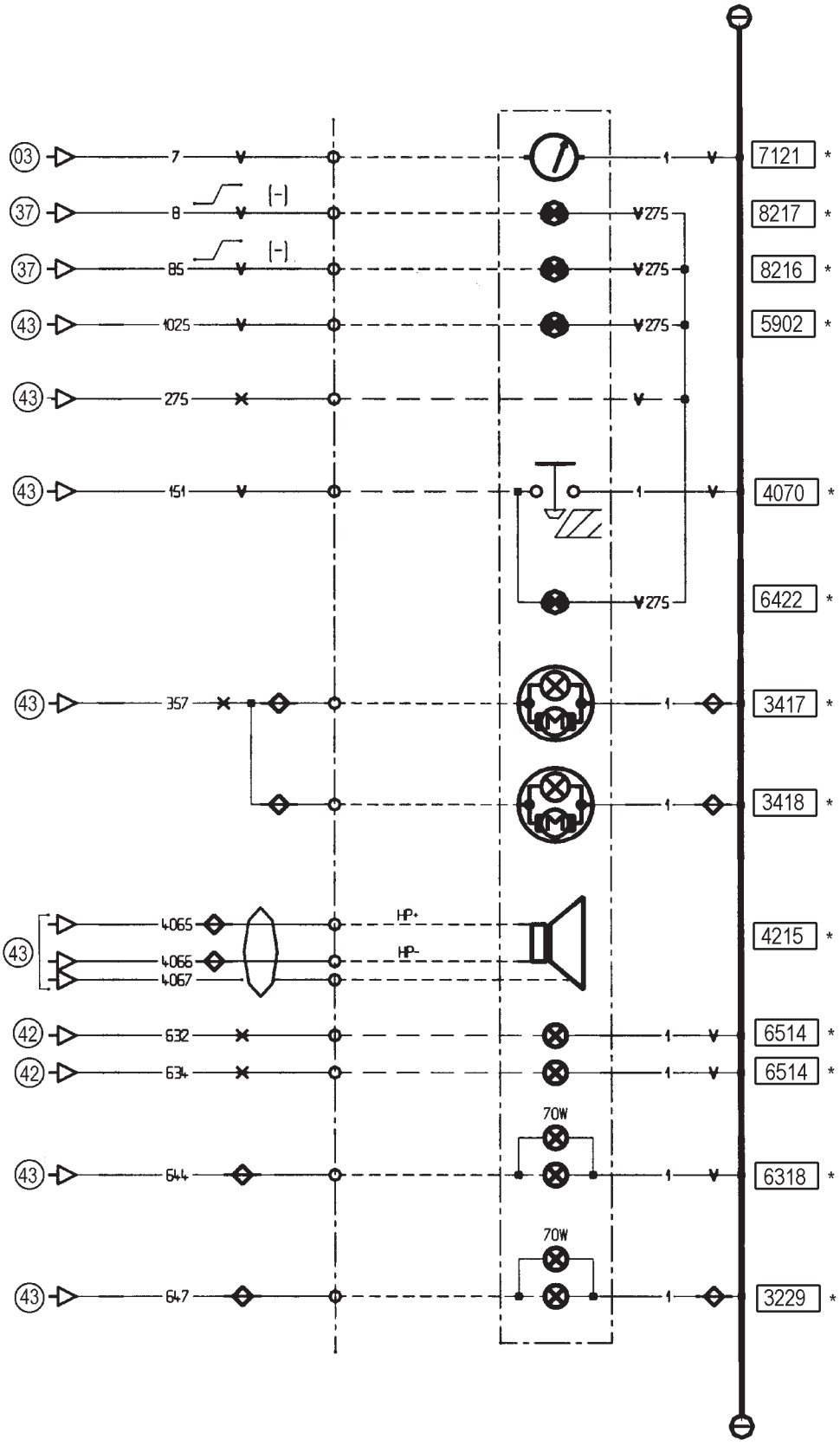
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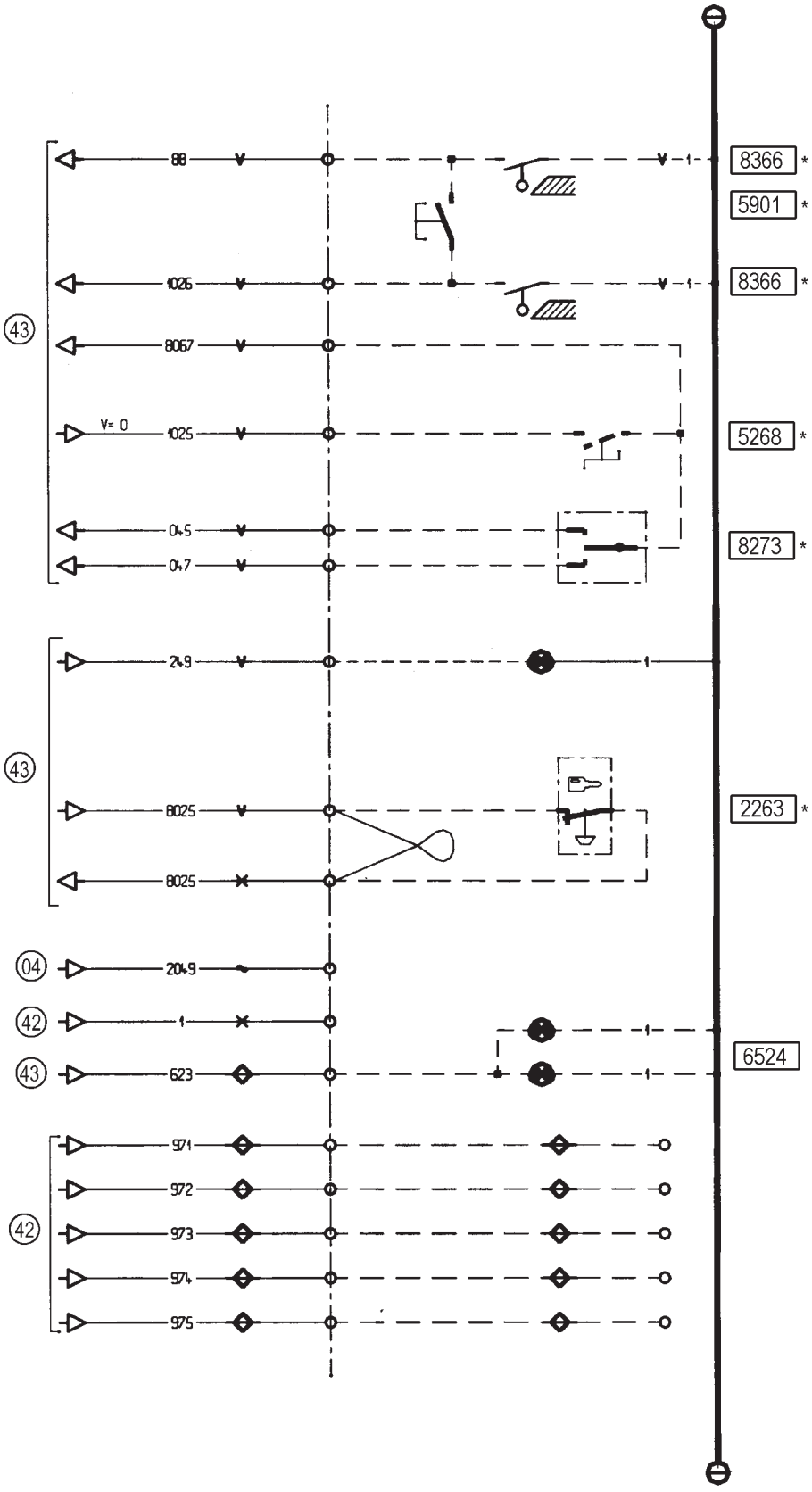
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“BUILDINGS & PUBLIC WORKS” VEHICLE

11. BUILDINGS & PUBLIC WORKS VEHICLE

- 7.5 - 8.5 - 10 tonnes GVW available in four wheelbases 2700, 2950, 3250, 3850 on RENAULT MIDLUM B base,
- 12 tonnes GVW available in four wheelbases 3070, 3350, 3650, 3950 on RENAULT MIDLUM C' base,
- 13 - 14 - 15 - 16 tonnes GVW available in four wheelbases 3070, 3350, 3650, 3950 on RENAULT MIDLUM C/HD/Construction base,
- 18 tonnes GVW available in four wheelbases 3650, 3950, 4250, 4450 on RENAULT MIDLUM D base,
- 11.99 - 14 - 16 tonnes GVW available in four wheelbases 3070, 3350, 3650, 3950 on RENAULT MIDLUM 4x4 base.

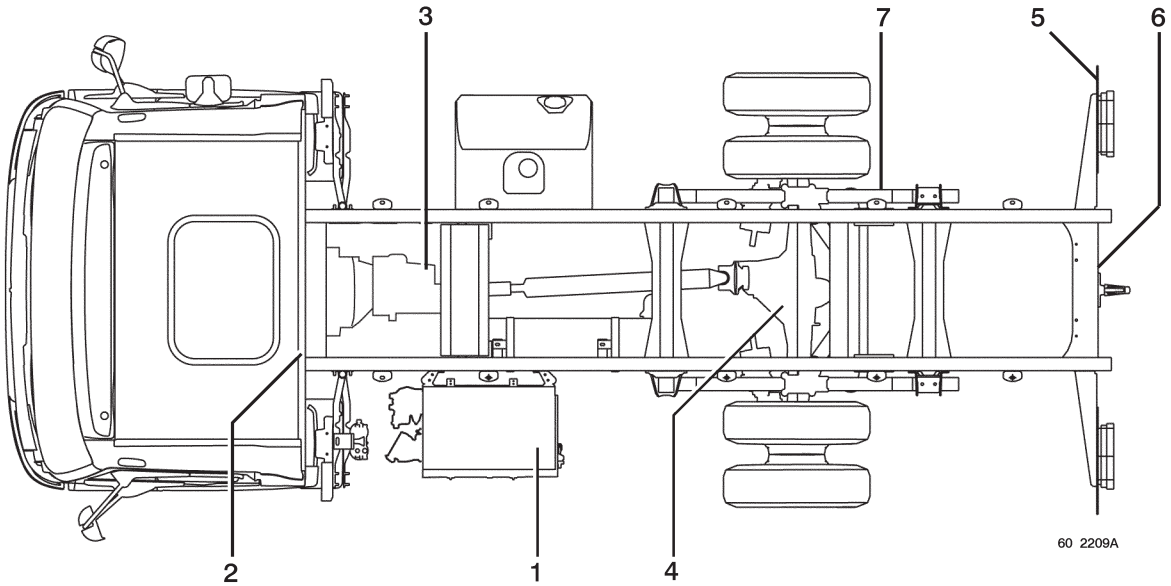
For 4-door cabs, larger wheelbases are available.

Buildings and public works vehicle special features

- level 2 bodybuilder electrical pre-arrangement (**1**) (see chapter B-5),
- glazed cab rear panel **(2)**,
- gearbox-mounted PTO (**3**), power supply for engine speed limitation 1400 rpm, PTO engaged,
- rear drive axle differential lock (**4**),
- without run-under guard (**5**) (depending on country),
- towing cross-member and hook (**6**) capacity 3.5 tonnes,
- front and rear parabolic leaf spring suspensions (**7**),
- 2-place bench seat,
- changing of position of air braking appliances for installation of tipper tilting ram.

Options

- vertical exhaust,
- roof level engine air intake,
- engine hourmeter in cab,
- with rear under-run guard,
- pre-arrangement for installation of a crane.

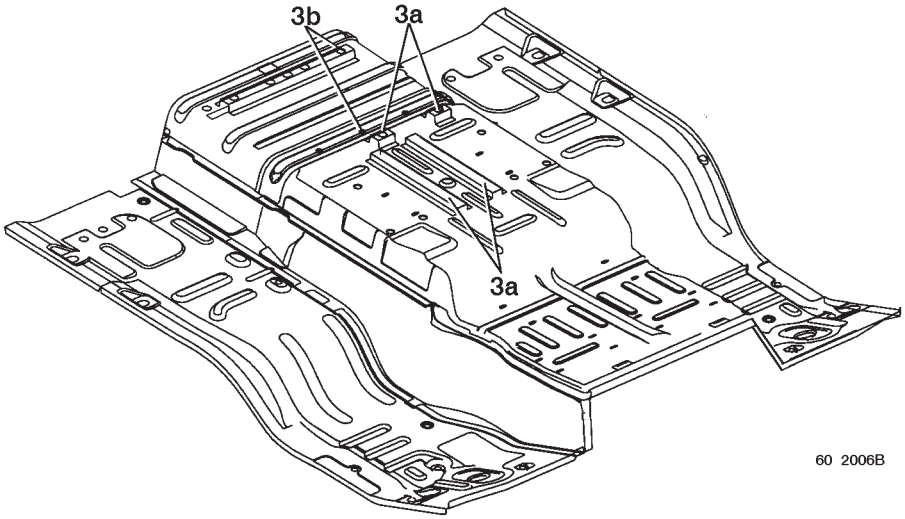


11.1 Fastening of tipper control in cab

We propose 3 ways of fastening the control in the cab.

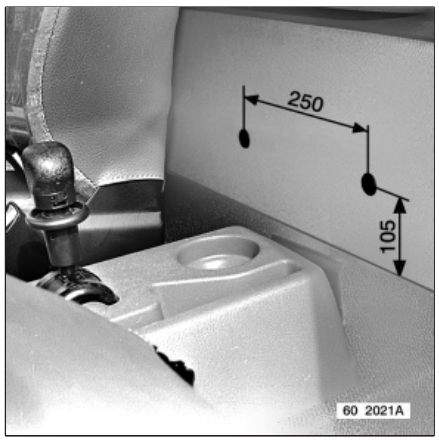
11.1.1 Location on engine tunnel

In case of absence of storage chest and bench seat on the engine tunnel, the fittings (3) can be used:
3a - day & sleeper cab
3b - sleeper cab only.



11.1.2 Location on cab rear end

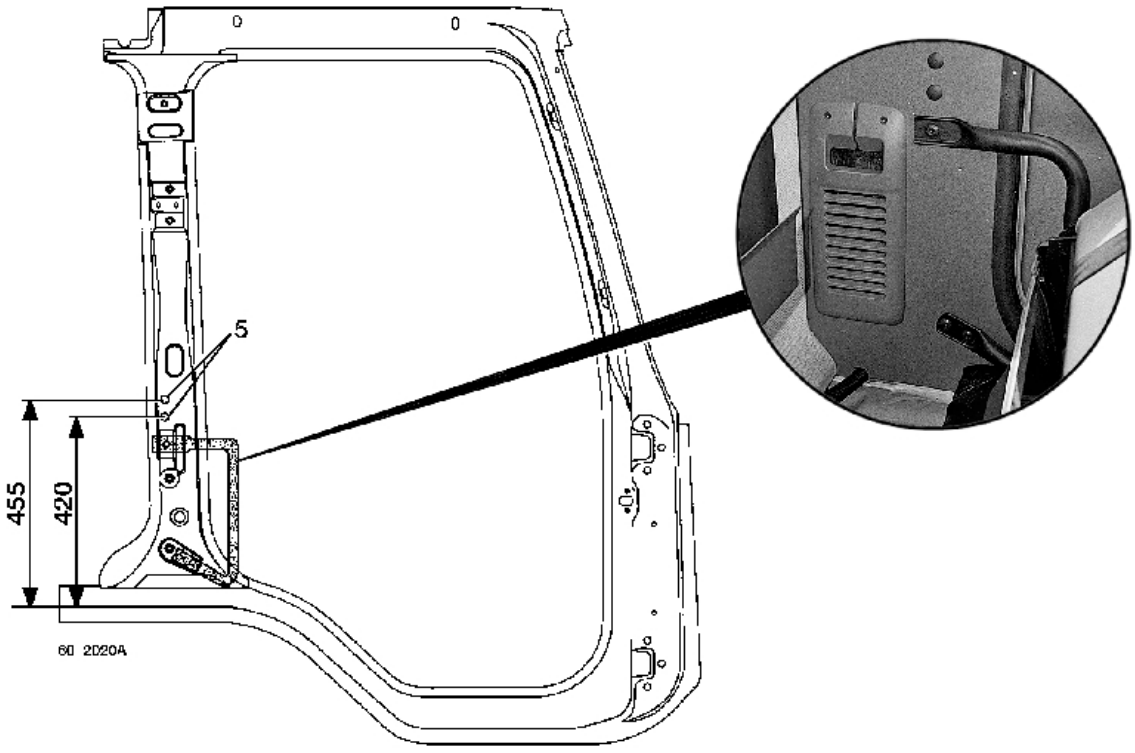
The cab rear end comprises two M6 crimping nuts. Remove the two blanking plugs **(4)** to gain access to the nuts (or by taking out the setscrews securing the fire extinguisher in the day cab).



11.1.3 Location on side pillar

The side pillar comprises two M6 crimping nuts. To gain access to the crimping nuts:
- for plastic trim, remove the two blanking plugs (**5**).
- for textile trim, take off the pre-cut-out parts of the trim (**5**).

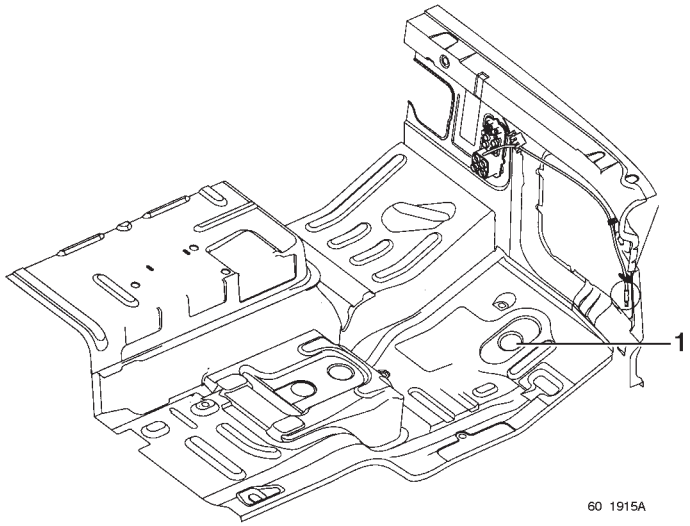
On account of its good accessibility, this location is recommended for fastening an equipment control (e.g. tipper).



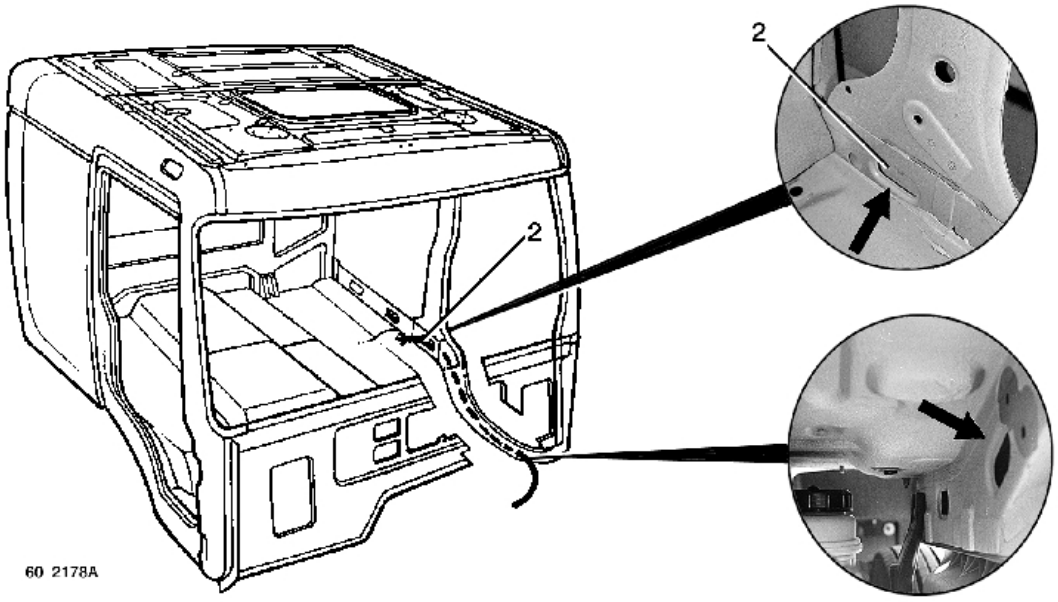
11.2 Passage of wiring harnesses and compressed air pipes through cab

Three passages are possible for routing the wiring harnesses from the inside to the outside of the cab:

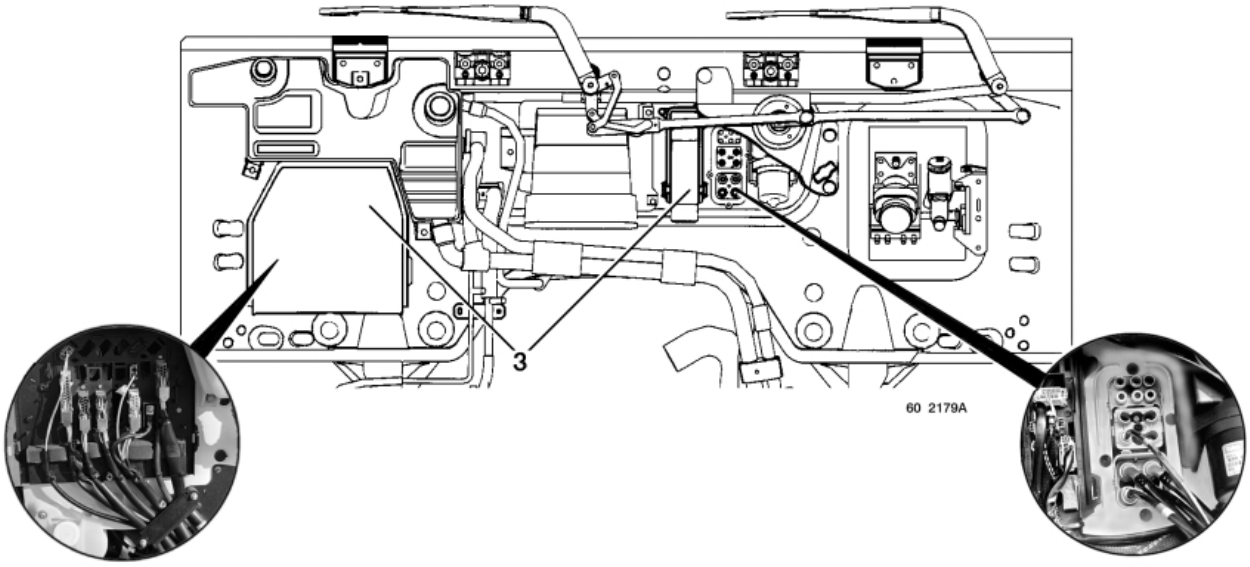
1 - Hole with maximum diameter 45 mm to be drilled in the circular impression on the passenger side floor. Watch out for the screen wash reservoir located under the floor near this impression.



2 - Passage through the RH or LH side rail of the cab. Cut the interior lining.



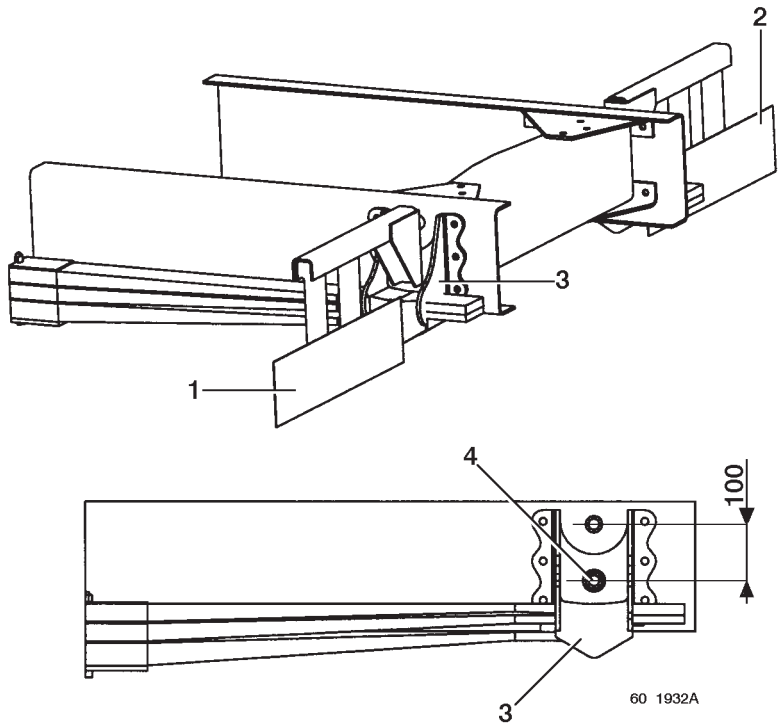
3 - Passage of wiring harnesses through unused locations in front end connecting zones.



11.3 Assembly of rear lamps to lighting bar - tractor version (on RENAULT MIDLUM C/C'/D/HD/Construction only)

In the event of reduction of the rear overhang, the rear lamps can be assembled on a rear lighting bar in accordance with the assembly of RENAULT MIDLUM tractors. It is then necessary to replace the lamp brackets.
Drill a 13 mm diameter hole at point **(4)**.
Fit the nuts and bolts and tighten to torque.

Procurement:
- LH bracket ref. N° 50 10 478 943
- RH bracket ref. N° 50 10 478 944
- 4 collar screws M12x125x80 class 10.9 ref. N° 50 03 002 067
- 4 flanged nuts DRH M12 class 10.9 ref. N° 50 03 033 012



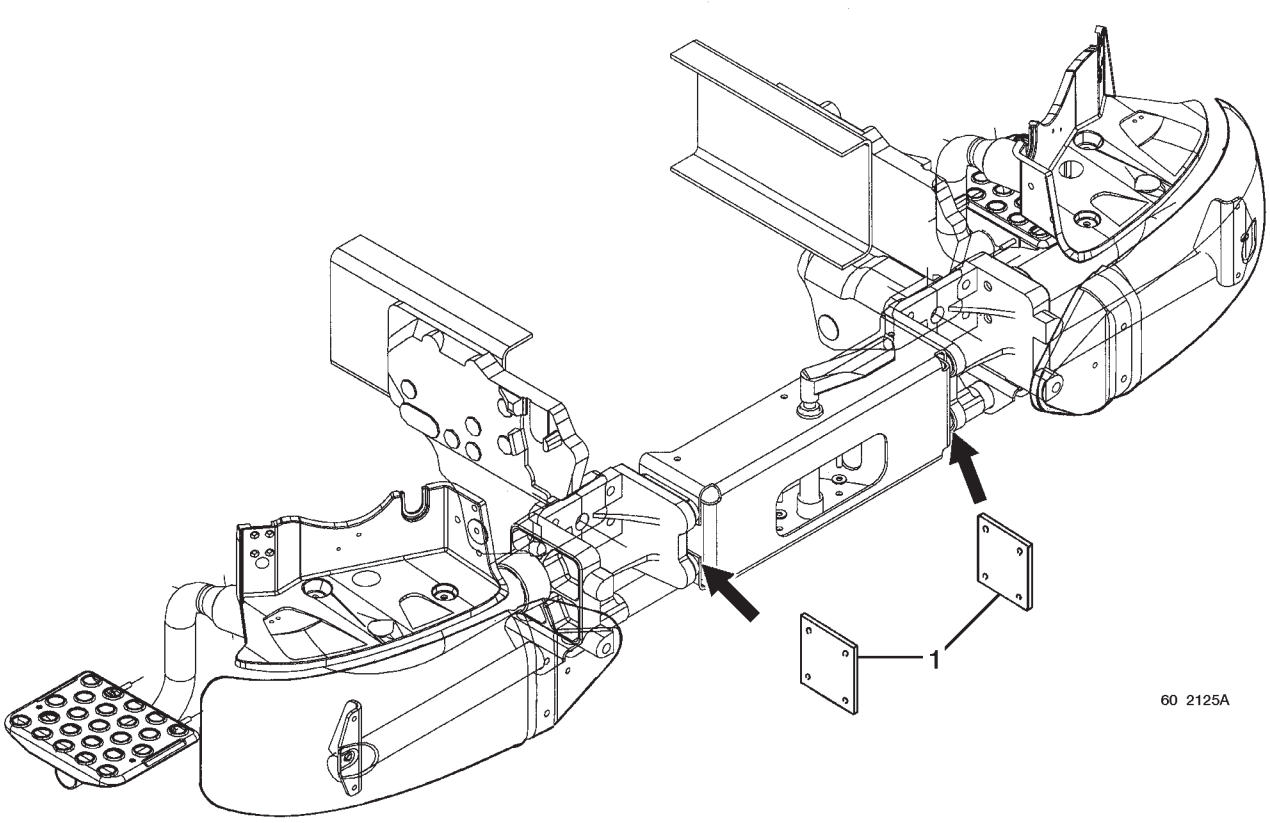
1 - LH lamp bracket
2 - RH lamp bracket
3 - spring rear hanger
4 - hole dia. 13 mm to be drilled

11.4 Fitting a tool-holder to the front of a vehicle with sheet metal bumper

RENAULT MIDLUM HD/Construction/4x4/18 tonnes Construction vehicles are fitted with a sheet metal bumper from the KERAX series.

Use the shims **(1)** supplied only with the tool-holder pre-arrangement for installing the plates.

Order variant 67406, which allows the vehicle to accommodate 10 mm thick shims - take them out and replace them with the tool-holder brackets.



PRE-ARRANGEMENTS FOR INSTALLATION OF A CRANE COMMERCIAL VARIANT 20294

Available as option on all vehicles

12. BEHIND-CAB HANDLING CRANES

Assembly of the crane requires checking the conformity to regulations of the location of side/parking lights and side impact beams.
Before assembling the crane, make sure it does not exceed maximum permissible values peculiar to the vehicle (lifting moment, distribution of loads, height of centre of gravity).
Assembly of the crane to the bracket remains under the full responsibility of the equipment manufacturer.

12.1 Maximum lifting moment

GVW (tonnes)	Maximum moment (tonne.metres)
7.5	$M \leq 5$
10	$M \leq 7$
12	$M \leq 8$
14	$M \leq 9$
16	$M \leq \times 10$

12.2 Attachment

On vehicles with day or sleeper cabs, the crane must be fastened using support plates defined by RENAULT TRUCKS (variants 20288, 20289 for tippers with or without crane - 20296, 20297 for platforms with or without crane - 20295 for tail lifts) and are available from the RENAULT TRUCKS Spare Parts department.

The plates are specific to the vehicle (RENAULT MIDLUM B, C', C, D, HD/Construction) and its cab (day, sleeper).

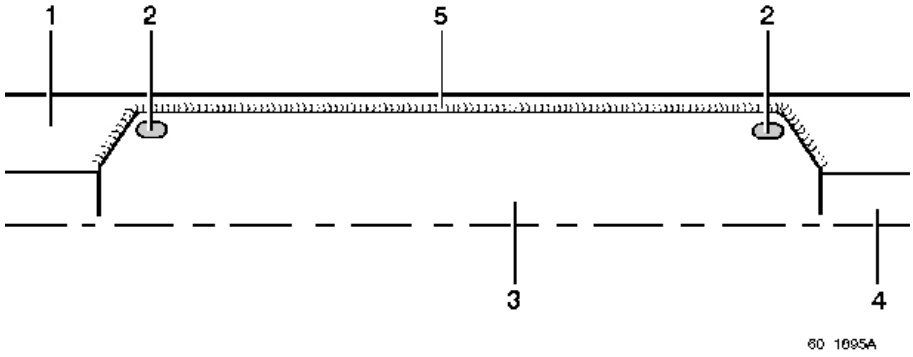
Assembly of a one-piece sub-frame from the rear of the cab to the extremity of the chassis, with bevelled cut-out at the front is compulsory.

Before carrying out any work, remove the first body fixing bracket and any rivets impeding the positioning of the plates to the sidemembers.

IMPORTANT at the time of subsequent assembly
The plates assembly operation may require work on such components as;
- electrical cables,
- compressed air pipe bundles,
- cab tilting hydraulic assistance pipes,
- air tanks, fuel tanks, wings, battery brackets,
- cab rear brackets,
- gearbox cross-member,
- engine brackets.
To limit on-vehicle modifications as much as possible, it is permitted to practise recesses in the brackets to enable them to be installed without having to touch flexible pipes, wiring harnesses and compressed air pipes.
Assembly of the plates should not impair the fastening of components affected by the work.
Such elements must be re-assembled in the original configuration of the vehicle while observing general safety rules (consult the section "General features").
On account of manipulations on the cab tilting hydraulic system, the plates must be fitted when the cab is fully tilted and properly wedged.
Upon re-assembly, bleed the cab tilting hydraulic system without fail, while observing the recommendations described in the vehicle driving and servicing handbook.
All removed rivets must be replaced by nuts and bolts.

12.2.1 Attachment of crane brackets to the sub-frame

Crane brackets (**3**) must be welded without fail to the sub-frame (**1**). These welds must consist of a continuous weld bead (**5**) and pluggings in slotted holes (**2**). It is on the other hand strictly forbidden to weld brackets (**3**) to the chassis (**4**).



12.2.2 Attachment of crane brackets to the chassis

Use collar bolts diameter M12x125, class 10.9 with locknuts. The use of nuts with nylon ring (e.g. Nyloc) are forbidden. Tighten to torque.

Crane support plates assignment table

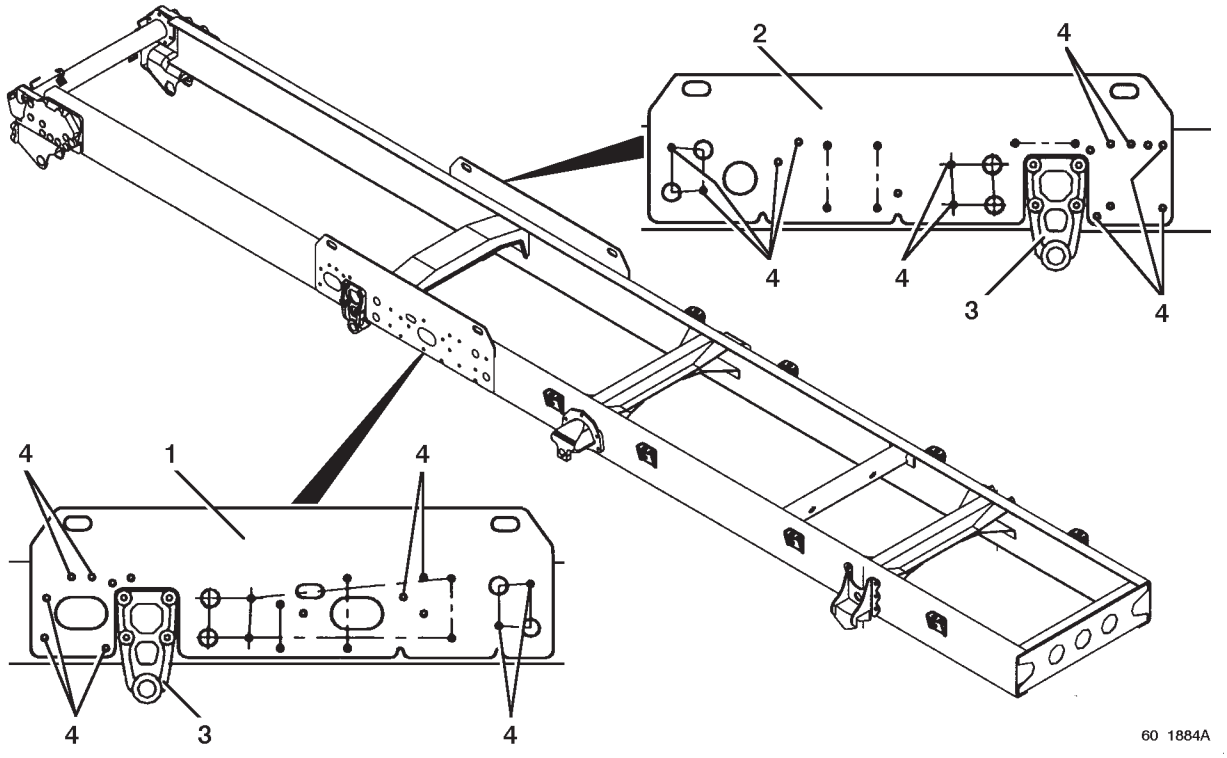
Vehicle	Cab type	Brackets reference N°	
		LH bracket	RH bracket
MIDLUM B	day	50 10 496 653	5010 496654
	sleeper	50 10 496 655	50 10 496 656
MIDLUM C'/C Construction *	day	50 10 496 659	50 10 496 660
	sleeper	50 10 496 661	50 10 496 662
MIDLUM D	day	50 10 528 429	50 10 528 430
	sleeper	50 10 528 431	50 10 528 432

(*) Crane support plates are only available for EEC vehicles.

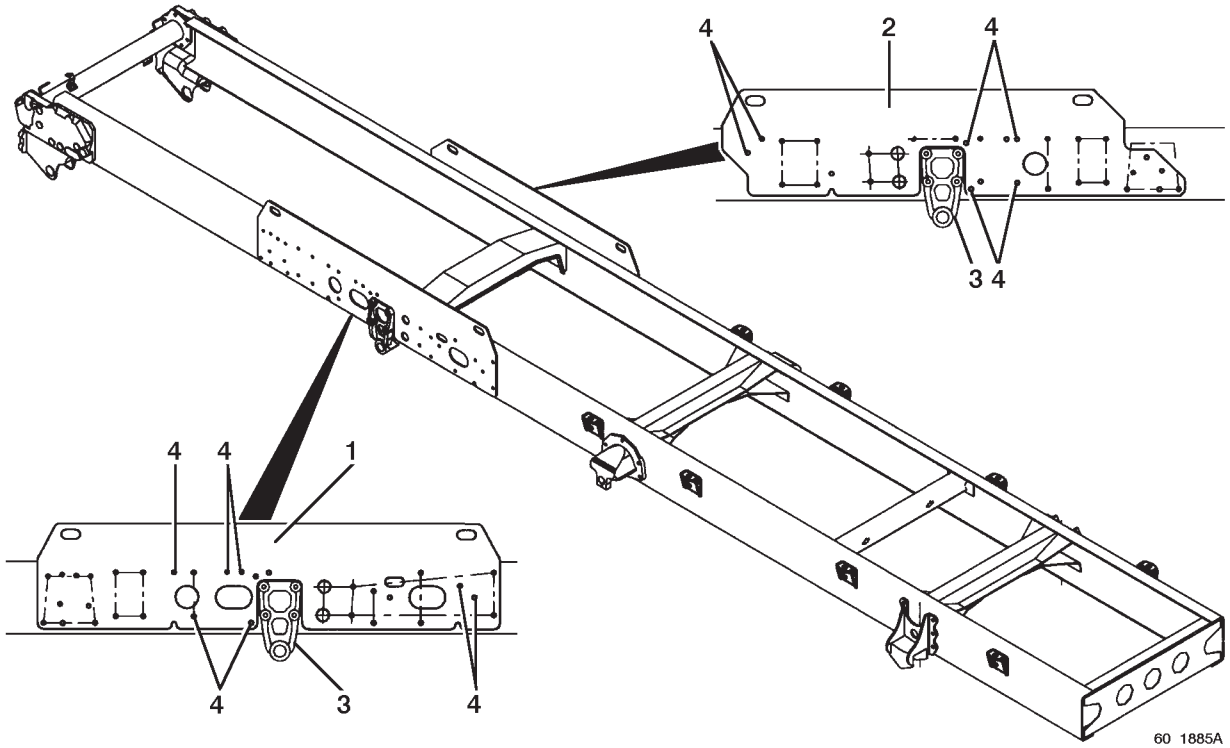
Key to diagrams on following pages:
1 - LH bracket
2 - RH bracket
3 - Front spring rear hanger
4 - Collar bolt M12x125 class 10.9 with locknut

Note
The diagrams indicate only the nuts and bolts (**4**) that must compulsorily be used on the chassis to ensure correct fastening of plates (**1-2**). These nuts and bolts may be present on-vehicle prior to assembly of the brackets (fastening the brackets). If this is not the case, use the specified nuts and bolts and tighten to torque.

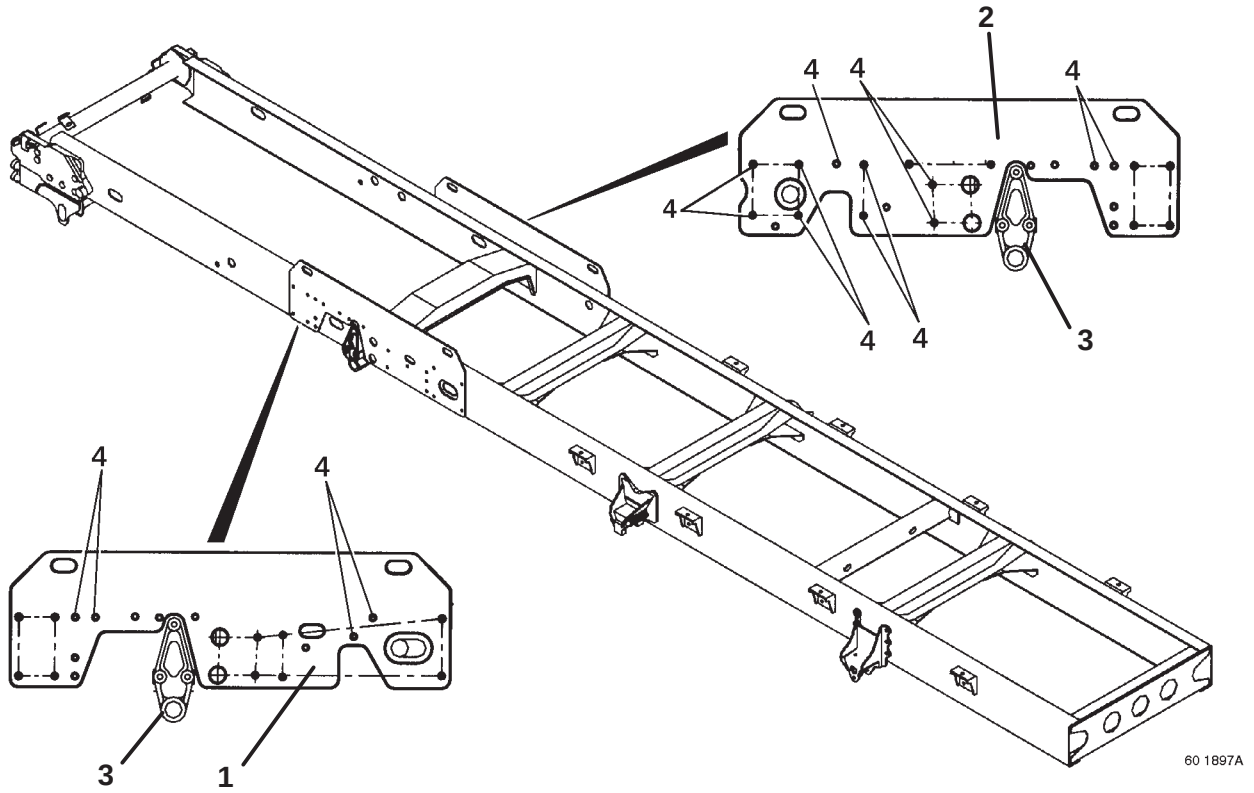
RENAULT MIDLUM C'/C/D/HD Construction day cab



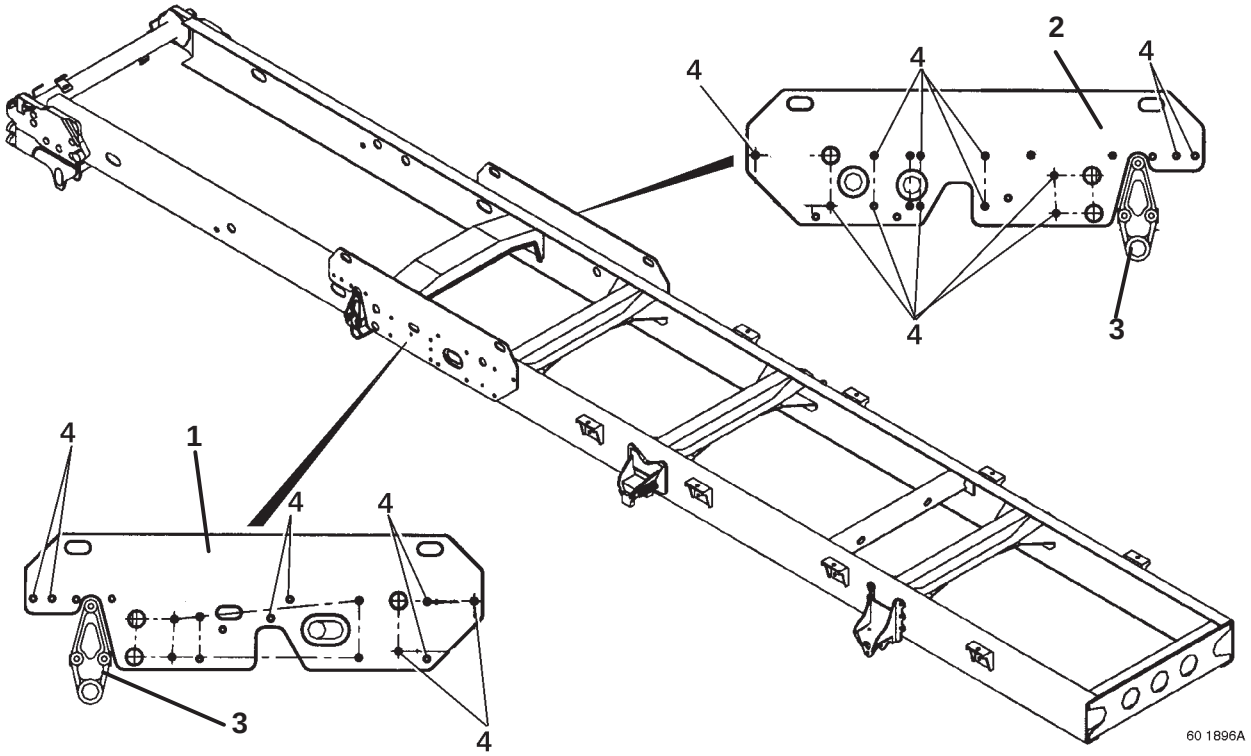
RENAULT MIDLUM C'/C/D/HD Construction sleeper cab



RENAULT MIDLUM B day cab



RENAULT MIDLUM B sleeper cab



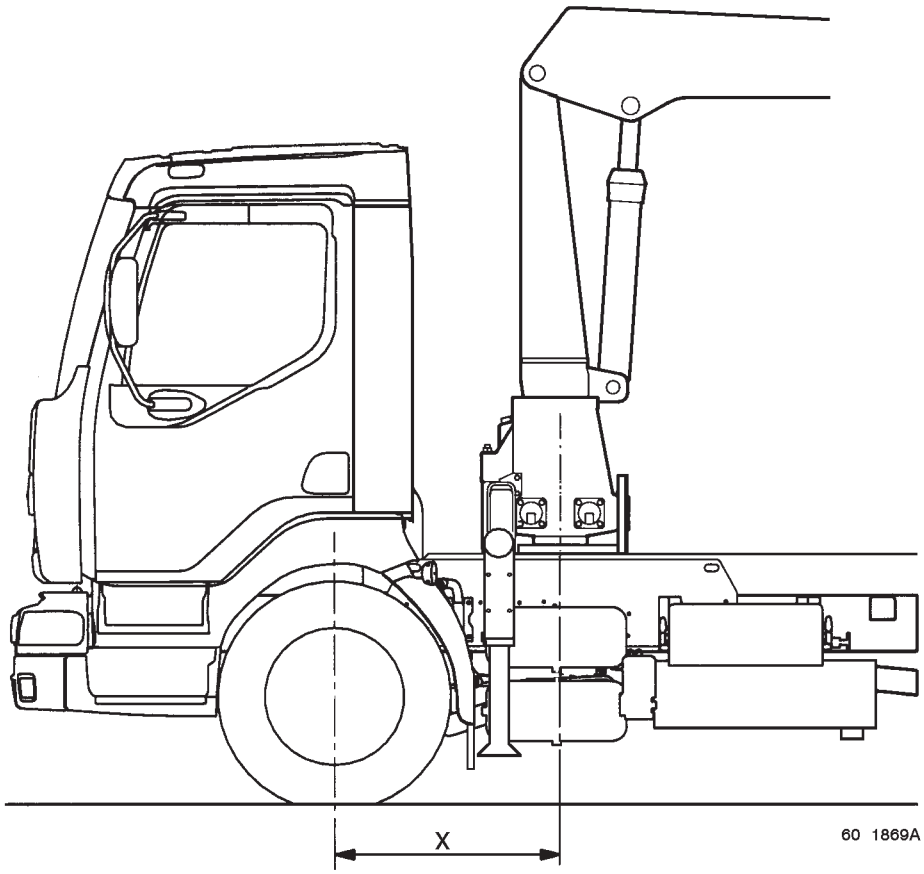
12.3 Position of vertical centre-line of crane

12.3.1 Day cab

Vehicle	Crane centre-line / front axle centre line distance (X)	
	Under-floor air intake	Vertical exhaust
MIDLUM B	900	1020
MIDLUM C'	923	1100
MIDLUM C		
MIDLUM Construction*		
MIDLUM D		

(*) Crane support plates are only available for EEC vehicles.

Positioning of the crane: the vertical axis of rotation of the crane must be situated approximately in the middle of the plates.

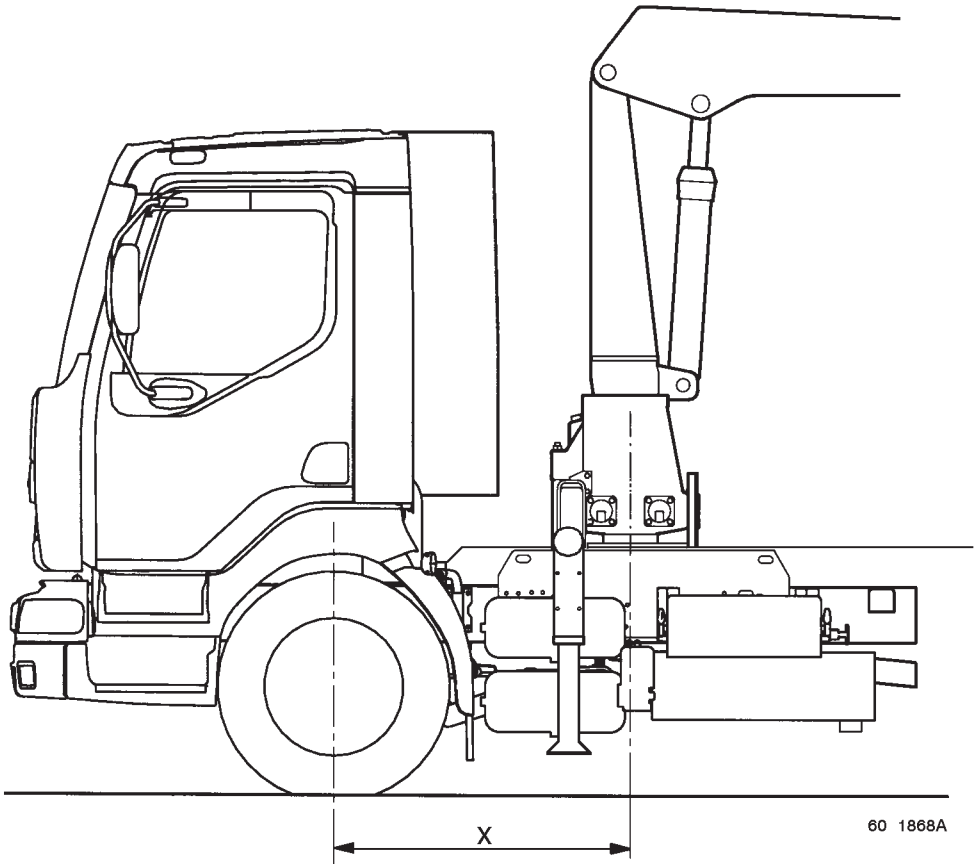


12.3.2 Sleeper cab

Vehicle	Crane centre-line / front axle centre line distance (X)	
	Under-floor air intake	Vertical exhaust
MIDLUM B	1220	1350
MIDLUM C'		
MIDLUM C		
MIDLUM Construction*		
MIDLUM D		

(*) Crane support plates are only available for EEC vehicles.

Positioning of the crane: the vertical axis of rotation of the crane must be situated approximately in the middle of the plates.



MANUFACTURER'S TECHNICAL RECOMMENDATIONS FOR REFRIGERATED VEHICLES

13. INDEPENDENT REFRIGERATOR UNIT LOCATED ABOVE THE CAB

Maximum permissible load on front axle

The installation of a refrigerator unit requires the maximum permissible load on the front axle being greater than or equal to the load necessary for installing a refrigerator unit. In the event of the maximum permissible load on the front axle being insufficient, the weight of the refrigerator unit shall be limited.

Vehicle	Maximum load on front axle (kg)		Maximum weight of refrigerator unit (kg)
	Standard	Optional	
RENAULT MIDLUM B 7.5 tonnes	3400	3700 (*)	450
RENAULT MIDLUM B 10 tonnes	3700	4000 (*)	
RENAULT MIDLUM B 12 tonnes	4000	4200(*)	
RENAULT MIDLUM C' 12 tonnes	4480	–	550
RENAULT MIDLUM C 12 tonnes		5000 (*)	
RENAULT MIDLUM C 14 tonnes	5000	5800	
RENAULT MIDLUM C 16 tonnes	5800	–	
RENAULT MIDLUM D 16.9 tonnes	6300	–	–
RENAULT MIDLUM D 17.9 tonnes	7100	–	–
RENAULT MIDLUM HD/Construction 13 tonnes	5000	–	550
RENAULT MIDLUM HD/Construction 14 tonnes	5600	–	
RENAULT MIDLUM HD/Construction 15 tonnes	6000	–	
RENAULT MIDLUM HD/Construction 16 tonnes	6300	–	

(*) essential option for the assembly of a refrigerator unit

13.1 Mechanical receiver on crankshaft pulley

A mechanical receiver (refrigerator compressor, hydraulic pump, electricity generator...), driven by the crankshaft pulley can be installed on the engine.
Transmission is via a type “AV13” vee belt.
Maximum torque transmitted by crankshaft pulley: 47 Nm.

Depending on the vehicle’s equipment, the crankshaft drive pulley for the mechanical receiver differs (two or three grooves). The extra pulley can be assembled as first fitment or as aftermarket, but it can only be installed on 3-groove crankshaft pulleys.

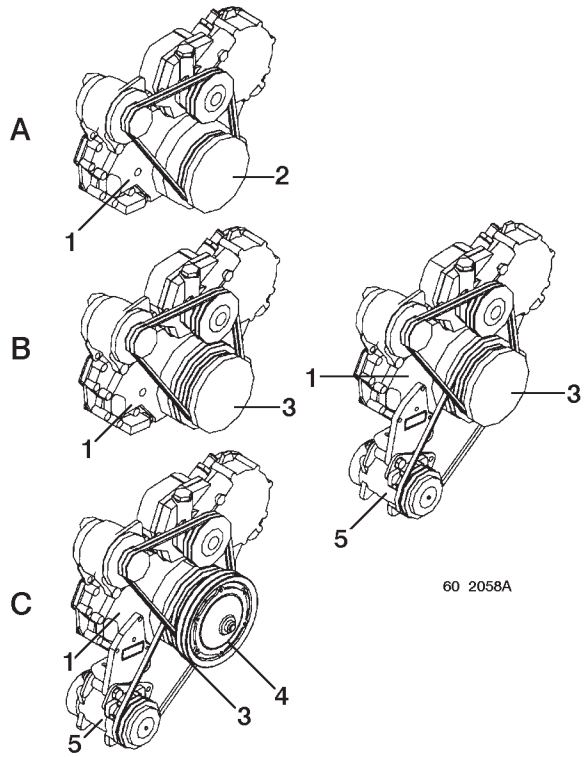
There may be four cases corresponding to three possible pulley assemblies:

IMPORTANT
To obtain the 3-groove pulley together with the accessories drive pulley, order the vehicle with variant 73410 (accessories drive pre-arrangement).

A: 2-groove crankshaft pulley
- vehicle without air conditioning and without drive pre-arrangement

B: 3-groove crankshaft pulley
- vehicle without air conditioning and with drive pre-arrangement
- vehicle with air conditioning and without drive pre-arrangement

C: 3-groove crankshaft pulley
- vehicle with air conditioning and with drive pre-arrangement



1 - engine front end
2 - two-groove crankshaft pulley
3 - three-groove crankshaft pulley
4 - extra pulley
5 - air conditioning compressor

Position of receiver on the engine
- vehicle without air conditioning:

The receiver is installed in the location provided for the air conditioning compressor. This installation requires the assembly of a 3-groove pulley.

In case (**A**), installation of the mechanical receiver requires expensive conversion of the vehicle as aftermarket and is to be proscribed.

- vehicle with air conditioning:

The receiver is installed to the LH side of the engine. This installation requires the assembly of an extra pulley.

For installation of the receiver to the engine, use an assembly kit marketed by the firms FRIDGE KING, THERMO KING and CARRIER, in strict compliance with the assembly instructions included in the kit.

Only two assemblies are officially approved by RENAULT TRUCKS and do not require technical agreement insofar as the installation complies with the directives of the assembly handbook.

13.2 Additional fuel tapping on fuel tank

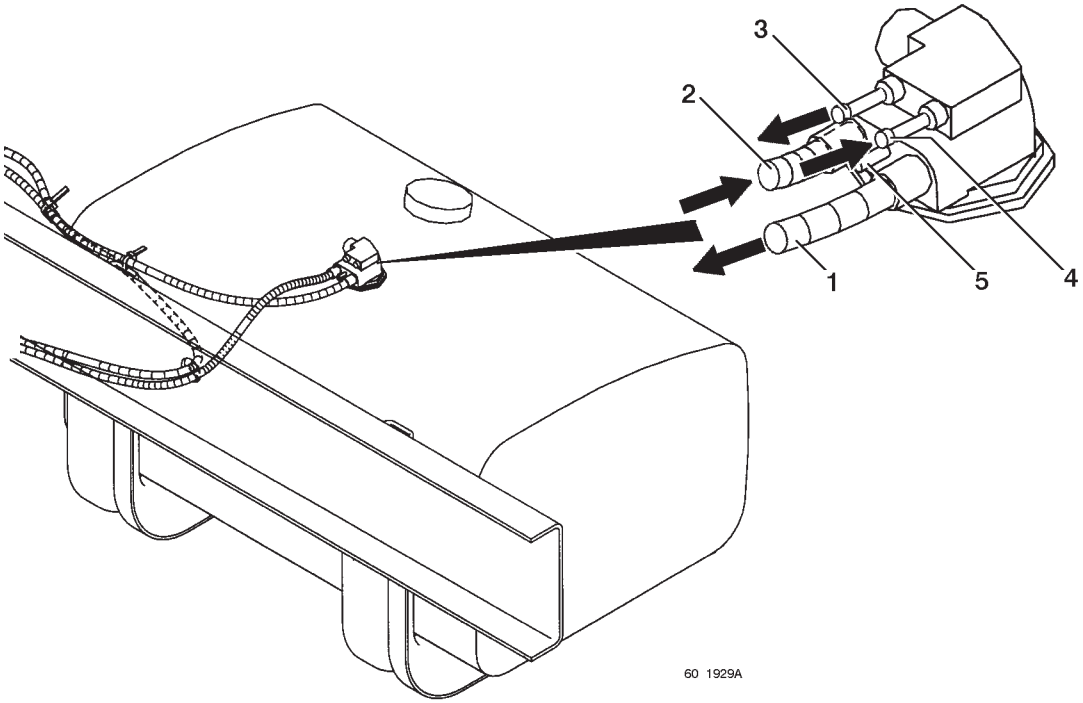
The fuel gauge includes two pipes blanked off by a breakstem blanking plug. These pipes can be used to feed an additional consumer on the vehicle (add-on heater, refrigerator unit, heat engine...).

The pipes are provided with two hexagonal sections to allow the blanking plug to be broken using two spanners. After removing the blanking plugs, deburr the pipe ends.

Installation must be performed according to standard workshop practice while observing constraints connected with heat radiation and remains under the full responsibility of the installer.

It is strictly forbidden:

- to modify the vehicle's standard fuel supply system,
- to drill the fuel tank to install an extra pick-off.



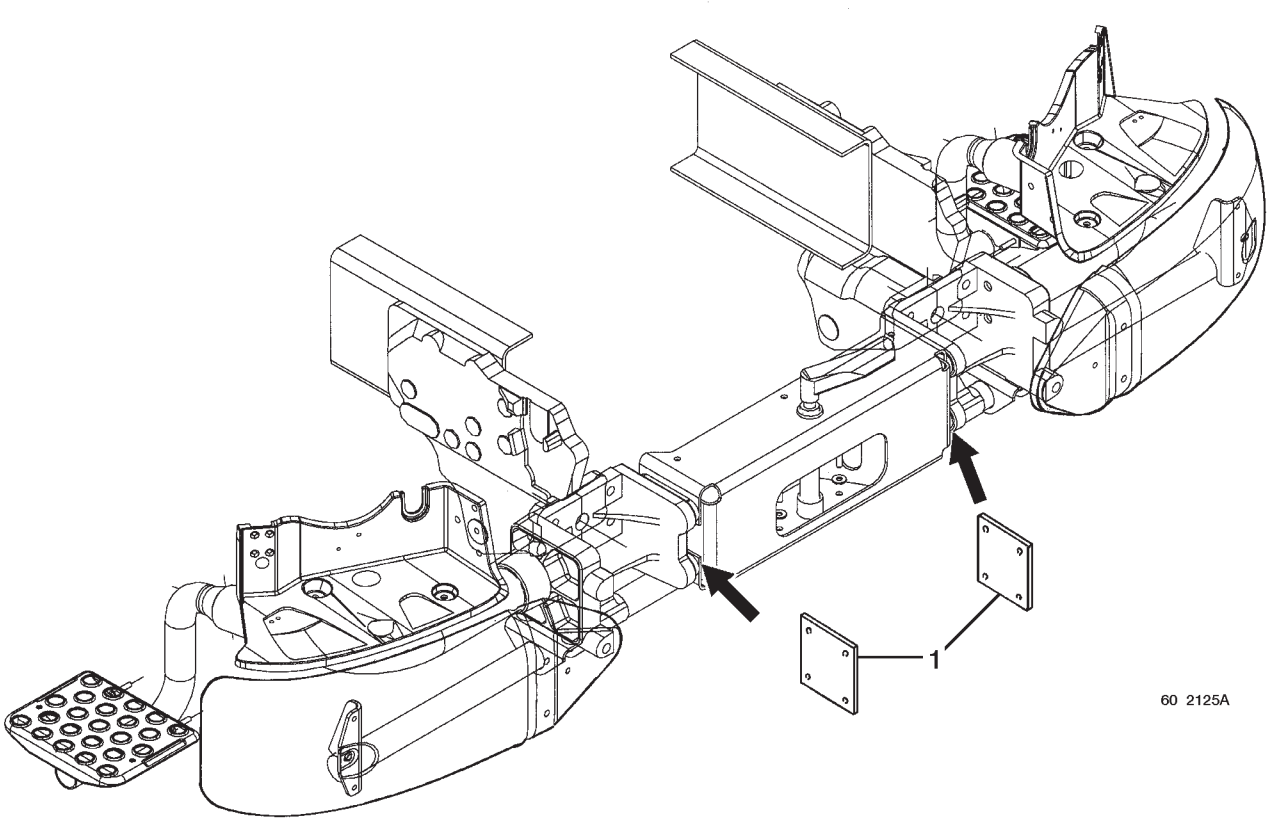
1 - engine suction
2 - engine return
3 - extra consumer suction
4 - extra consumer return
5 - fuel tank air vent

MANUFACTURER'S TECHNICAL RECOMMENDATIONS FOR SNOW CLEARING VEHICLES

14. SNOW CLEARING VEHICLE

14.1 Sheet metal bumper

To facilitate installation of the tool-holder plate, some RENAULT MIDLUM versions (HD/Construction/4x4/18 tonnes Construction) are fitted with a sheet metal bumper. See that you order the tool-holder plate pre-arrangement option.
Use the shims (**1**) supplied only with the tool-holder pre-arrangement for installing the plates.



14.2 Signalling

To facilitate installation of the roof signalling system on the cab roof, you can order the roof gantry pre-arrangement (variant 46802: roof gantry and electrical power supply).

IMPORTANT
The gantry is a component that requires the presence of a stiffener welded as standard to the cab for its installation. This stiffener, located in an inaccessible zone, cannot be assembled as aftermarket fitment.

14.3 Hydraulic pump drive

To obtain the 3-groove pulley together with the accessories drive pulley, order the vehicle with variant 73410.

CHAPTER -C-
SUPPLEMENTARY INFORMATION ON THE “RENAULT MIDLUM” VEHICLE

1. MOUNTING OF POWER TAKE-OFFS

1.1 Auxiliary belt drive pulley

To install an auxiliary belt drive pulley, three layouts are possible:
- on gearbox-mounted PTO,
- on flywheel-mounted PTO,
- on crankshaft pulley.

1.1.1 Gearbox-mounted PTO

Table of possible gearbox-mounted PTO assemblies

Power take-off	Gearbox						
	ZF S5 – 42	EATON 4106 A/B/OD	EATON 5206 A	EATON 6309 A	EATON 6406 A	EATON 8209 A	EATON 8309 A
ZF NS 42/2	X						
HYDROCAR 2264		X	X		X		
HYDROCAR 2266						X	X
HYDROCAR 2903		X					
HYDROCAR 2904		X					
HYDROCAR 2907				X			X
HYDROCAR 2908				X			X
HYDROCAR 2903 + 2250 *		X					
HYDROCAR 2904 + 2250 *		X					

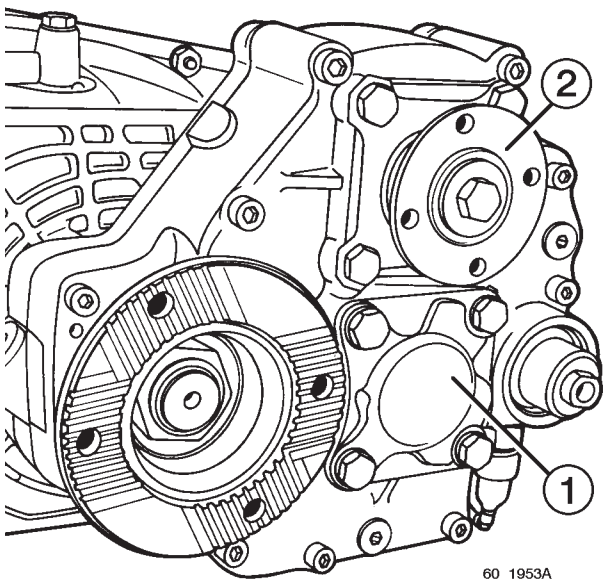
(*) PTO 2250 is installed on PTO 2903 or 2904 output N° 1.

NOTE
The letter "**B**" or "**C**" added after the PTO type indicates the type of coupling mounted on the PTO output :
B - flange
C - splined shaft.

HYDROCAR 2903 & 2904 PTOs with two independent outputs

1 - Output N° 1: direct and full-time drive which can possibly be used. To control engagement, it is necessary to install an extra PTO (HYDROCAR 2250, 2264, 2266). The maximum torque transmissible by the unit is thus the lowest of the two PTOs.

2 - Output N° 2: stepped down drive with engagement control integrated in the PTO.



PTO characteristics

Type	Maximum output torque (Nm)	Maximum weight torque (Nm)	Direction of rotation	Drive ratio	Weight (kg)
NS 42/2**	300	20	clockwise	0,87	11,5
2264***			anticlockwise	4106 A : 0,84 4106 B : 1 5206 A : 0,84	12
2903*et***	Output n°1 : 600 Output n°2 : 300		clockwise	4106 OD : Output n°1 : 0.587 Output n°2 : 1.73	16
2903+2250					
2904*et***	Output n°1 : 600 Output n°2 : 245			4106 OD : Output n°1 : 0.587 Output n°2 : 2.01	
2904+2250					
2266***	400		anticlockwise	4106 A : 0,6 4106 B : 0,72 6309 A : 1,07 8209 A : 1,07 8309 A : 1,07	
2907***	Output n°1 : 600 Output n°2 : 450	20	clockwise	6309 et 8309 : Output n°1 : 0.787 Output n°2 : 1.7	
2908***	Output n°1 : 600 Output n°2 : 300	20	clockwise	6309 et 8309 : Output n°1 : 0.767 Output n°2 : 2.26	

Maximum torques are given for a rotating speed at the PTO input of 1000 rpm and in part-time use.

(*) Continuous use (do not exceed half the maximum torque) – in case of use at full power, it is essential to equip the PTO with a lubrication kit.
(**) Intermittent use < 30 minutes.
(***) Intermittent use < 30 minutes – for full-time use, provide a lubrication kit.
Consult the RENAULT TRUCKS Product Applications Department.

IMPORTANT
For 4-cylinder and 6-cylinder vehicles equipped with a 6-speed gearbox, it is impossible to fit a 2903 or 2904 PTO to a 4106 or 5206 gearbox not pre-arranged in the works.

Engine flywheel-mounted PTO (positioned at 12 o'clock)

	DCI 6	DCI 6
Type	**PAM 0631**	**PAM 0632**
Characteristics	- hollow shaft - direction 12 o'clock - direct drive	- flange shaft 120 DIN - direction 12 o'clock - direct drive
Output torque (Nm)	600	1000
Drive ratio	1.098	
Direction of rotation	same as engine	

Tightening torque (See chapter A).

Make : ZF
Type : NMV 130
- maximum output torque: maximum engine torque
- drive ratio : 1.03
- flange output only
- engagement by multi-plate clutch

Maximum power transmissible by the PTO

$$P = \frac{C \times n \times \eta}{9550}$$

P : power (kW)
C : drive torque (Nm)
n : engine rotating speed (rpm)
η : PTO drive ratio

Maximum permissible torque for use of a flanged hydraulic pump

$$C = \frac{15,92 \times Q \times p}{n \times \eta}$$

C : torque (Nm)
Q : output (l/min)
P : pressure (bar)
n : engine rotating speed (rpm)
η : efficiency

Frequency of use of PTO s
- Full-time use :
  Do not exceed half the maximum torque. In case of use at full power, it is essential to fit the PTO with a
- Part-time use :
  The maximum operating time is 30 minutes, followed by a minimum stopping time of 30 minutes (for cooling down).

The maximum rotating speed of the PTO output shaft is 3000 rpm.

For any PTO modification (output shaft, lubrication kit), contact the manufacturer's commercial network.

1.2 Instructions for the assembly of auxiliary hydraulic pumps to ZF type “C” PTOs (ZF or Hydrocar)

Connection of the hydraulic pump must correspond to standard ISO 7653, type D.

1.2.1 Supplementary instructions

Fluidtight seal between pump and PTO

The seal between the pump and the PTO must be made by two gaskets (J1 & J2) with an air drain **(E)** between the gaskets **(L1 & J2)**.

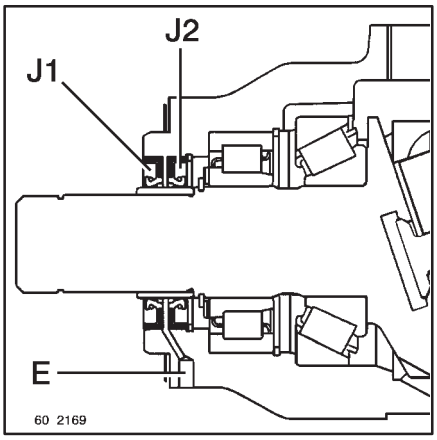
IMPORTANT
*The air drain **(E)** allows the chamber to communicate with the outside and must guarantee that gearbox oil is not aspirated and that hydraulic oil does not penetrate inside the gearbox.*

The gaskets must be capable of withstanding temperatures reaching as high as 120°C.

The gasket **(J1)**, fitted on the PTO side, must guarantee fluidtightness of the gearbox filled with oil specified by the manufacturer.

The gasket **(J2)**, fitted on the pump side, must guarantee fluidtightness of the pump containing hydraulic oil.

Correct operation of the air drain must be guaranteed at all times (do not paint it, blank it off or let it become fouled).



IMPORTANT
*In the event of oil leakage through **(E)**, the entire system must be immediately checked out.*

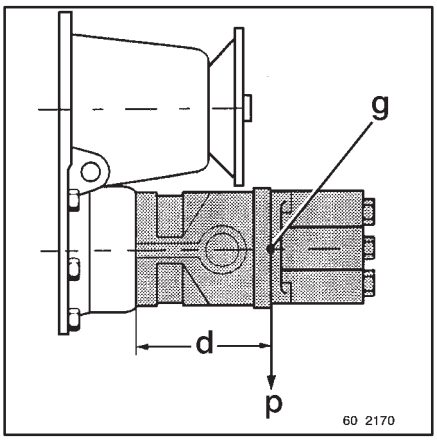
1.2.2 Calculation of the weight torque

In the event of direct assembly of a hydraulic pump or another receiver **(2)** on the PTO **(1)** (see chapter C-1.1.1), the weight torque should not exceed the value given in the PTOs characteristics table. Overstepping this value may lead to fast damage to the PTO or the gearbox.

Calculation method

$$Cp = P \times d$$

Cp : weight torque (Nm)
P : pump weight (N)
d : distance separating PTO contact face from the vertical passing through the centre of gravity (g) of the pump



1.2.3 Fastening the hydraulic pump (A)

Apply a tightening torque of 70 Nm + 15% (Hydrocar), 65 Nm + 15% (ZF).
- Use the nuts delivered with the PTO (class 10.9).
- This torque is to checked periodically according to a frequency to be defined by the bodybuilder.
- In exceptional situations compelling removal of the PTO, refer to the PTO manufacturer’s assembly instructions.

Stud tightening torque: 20 Nm + 15% with Loctite 242 or 542.

IMPORTANT
The assembly of equipment to the PTO remains under the responsibility of the installer.

2. AIR-OPERATED EQUIPMENT

2.1 Connection of extra auxiliary equipment

The addition of extra auxiliary equipment not planned by the manufacturer must without fail be connected to the specific auxiliary equipment circuit.

The compressed air consumption of this auxiliary equipment should in no way compromise the braking circuit filling times laid down by the legislation in force.

The extra piping must be routed on the LH inner side of the chassis. Ensure fastening using nylon clamps.

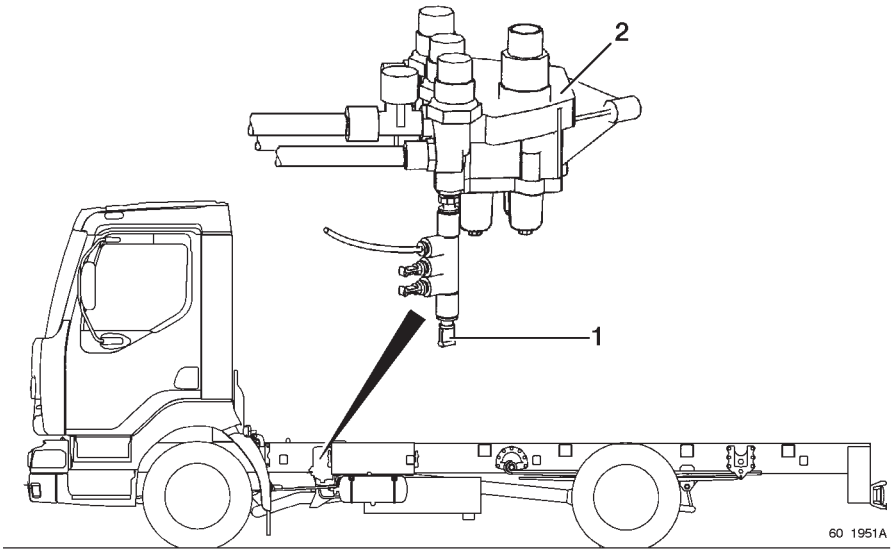
If the vehicle is equipped with an electric retarder, route the piping in a heat shield.

For any further information, consult the RENAULT TRUCKS Product Applications Department.

2.1.1 Coupling for extra auxiliary equipment to chassis

There is a coupling for the connection of extra auxiliary equipment to the chassis provided on vehicles with a "Trade pack" or a power take-off:
- road sweeper,
- refuse collector,
- "Trade pack" (crane, tipper, tail lift...) pre-arrangement.

A "multiple T" snap-on coupling, dia.r 6 mm, closed by a blanking plug **(1)** is arranged on the manometric block **(2)** in the vicinity of the air dryer.



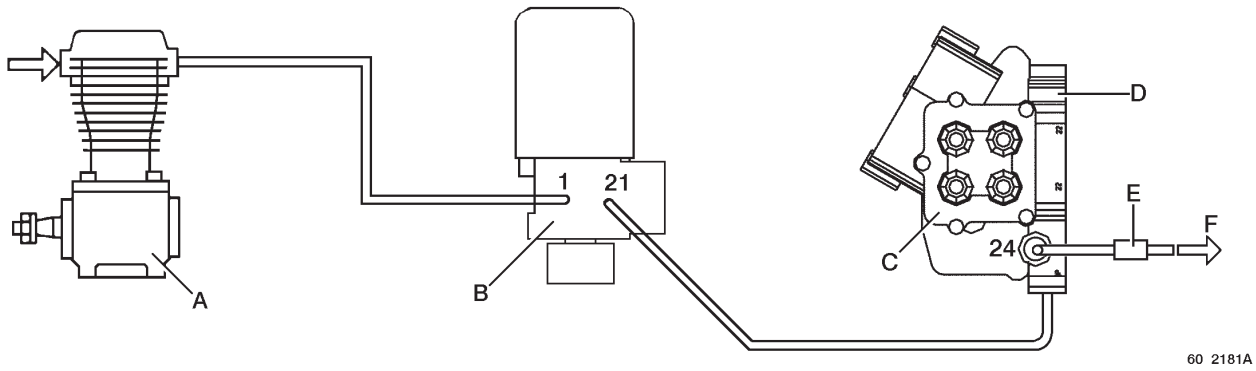
For pneumatic connection on-vehicle not provided with coupling, hook up to the auxiliary equipment circuit (brown coloured mark) close to the air dryer.

Use snap-on couplings for connection:
- "**Y**" coupling dia.r 6 mm ref. N° 50.05.330.278
- "**T**" coupling dia. 6 mm ref. N° 50.05.330.159.

The additional circuit should not cause any mechanical stress to the bracket.

Connection diagram

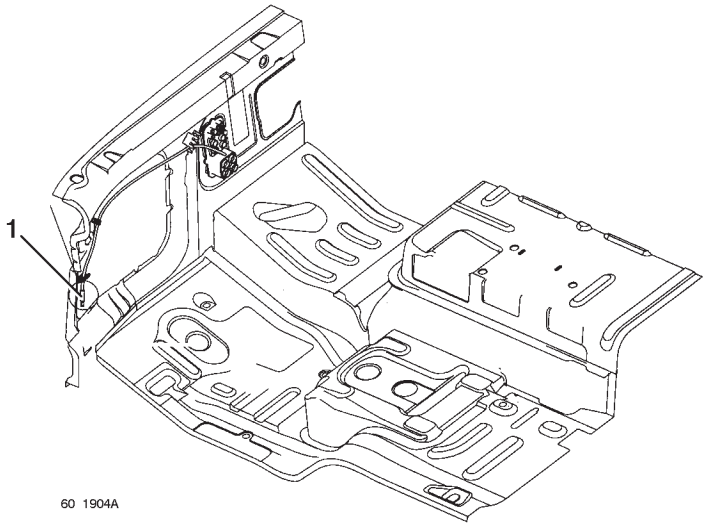
A - Compressor
B - Air dryer
C - Four-way protection valve
D - Manometric block
D - Brown coloured ring
F - To auxiliary equipment (presence of a “multiple T” for vehicles with “Trade pack” or PTO)



2.1.2 Coupling for extra auxiliary equipment in cab

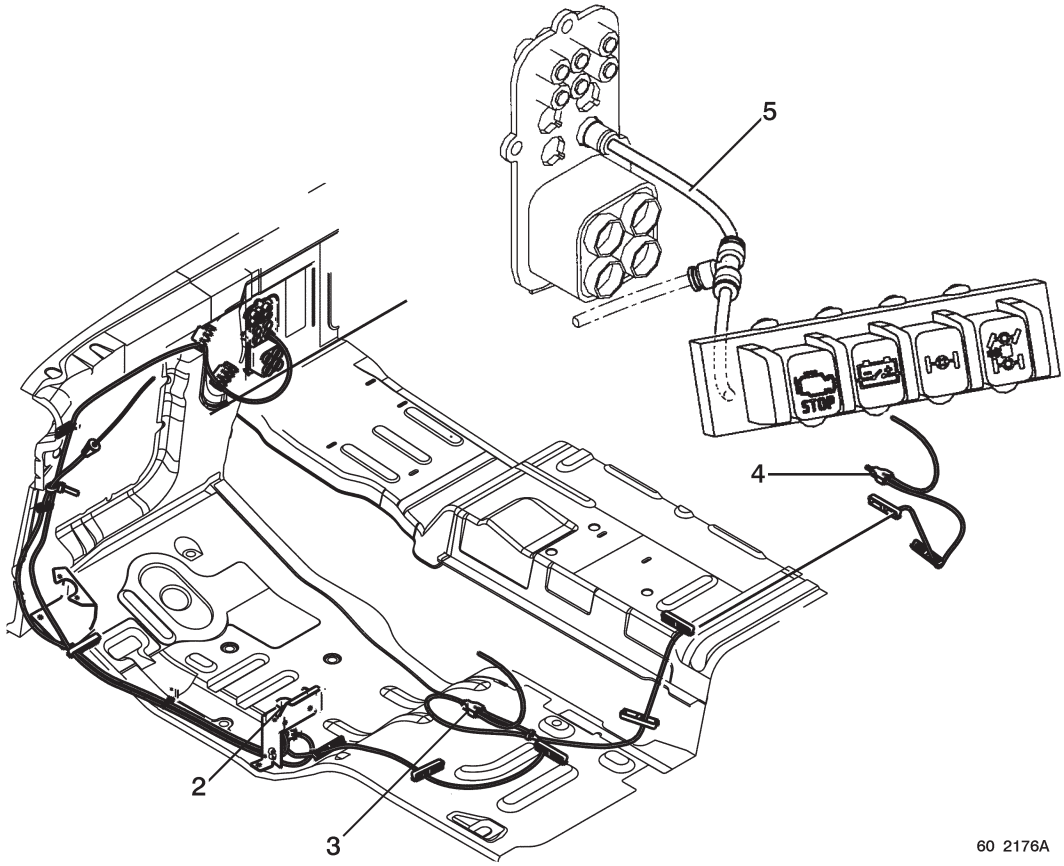
Cab not equipped with air-operated appliances

An available pneumatic feed fitted with a 6 mm snap-on coupling at its end stopped up by a blanking plug (1) is located on the LH inner face of the dash cowl.



Cab equipped with air-operated appliances

Install on the cab auxiliary equipment feed circuit a snap-on “T” or “Y” coupling dia. 6 mm.
Routing of auxiliary equipment circuit in cab:
- Steering column lock (**2**),
- Air suspension seat(s) (**3-4**),
- Chassis pneumatic controls (**5**) (PTO, differential dog clutch),
- “Y” snap-on coupling dia. 6 mm, ref. N° 50.05.330.278,
- “T” snap-on coupling dia. 6 mm, ref. N° 50.05.330.159.



2.2 Table of compressors

According to vehicle equipment

Compressor displacement	Duty pressure	Compressor output at duty pressure according to rotating speed		
		1000 rpm	1500 rpm	2000 rpm
single cylinder 150 cc	9,5 bar	87 l/min	132 l/min	176 l/min
twin cylinder 250 cc		130 l/min	212 l/min	285 l/min

Compressor drive ratio: 1.03

3. ELECTRICS

3.1 Earths

3.1.1 Cab earths

Cab fastenings are by means of M6 stainless steel studs welded to the cab.

Door earths

On light fire tender only:

- earth braids meeting the fire brigade standard are installed on all the doors.

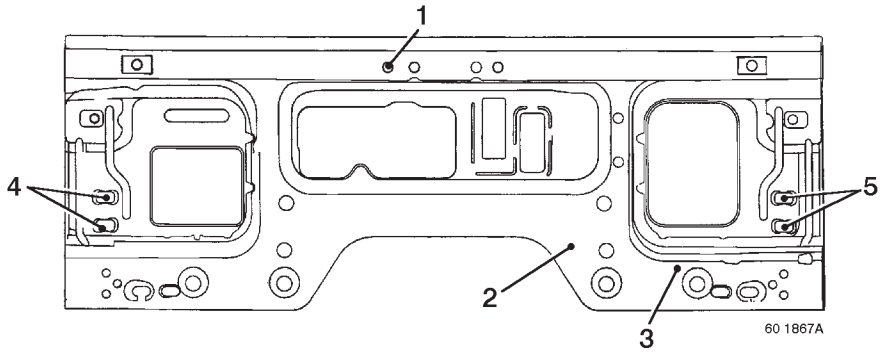
Front end earths

Cab exterior:

1 - heated windscreen earth stud
2 - chassis earth braid stud (RH drive vehicles)
3 - chassis earth braid stud (LH drive vehicles)

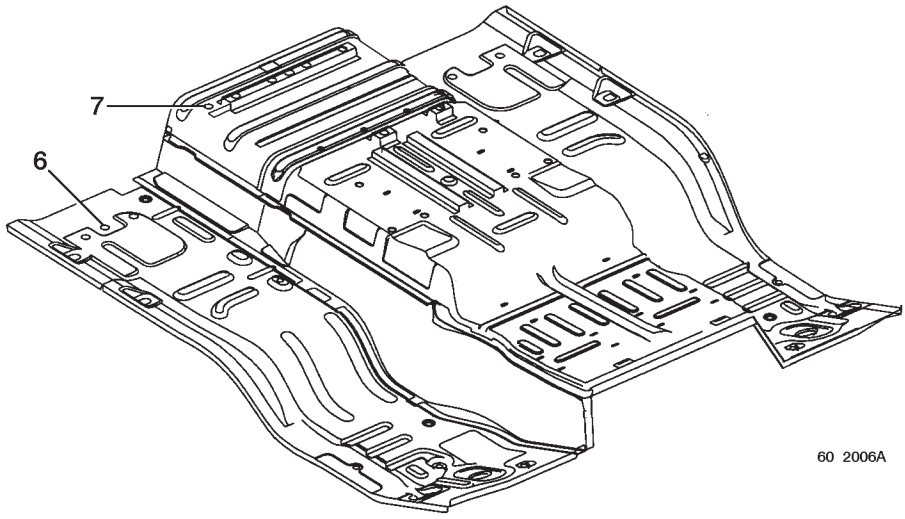
Cab interior:

4 - cab earth (RH drive vehicles)
5 - cab earth (LH drive vehicles)



Cab floor earths

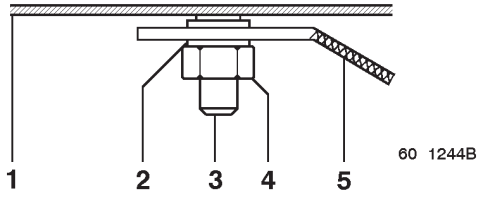
6 - independent heating earth on sleeper cab (on RH rear floor)7 - earth (on engine tunnel)



Fastening of earth lug or braid to cab

1 - Front end panel
2 - Stainless steel washer dia. 6 mm
3 - Front end M6 stainless steel stud
4 - M6 stainless steel nut
5 - Earth lug or braid

Nut (**4**) tightening torque : 9 ± 1 Nm



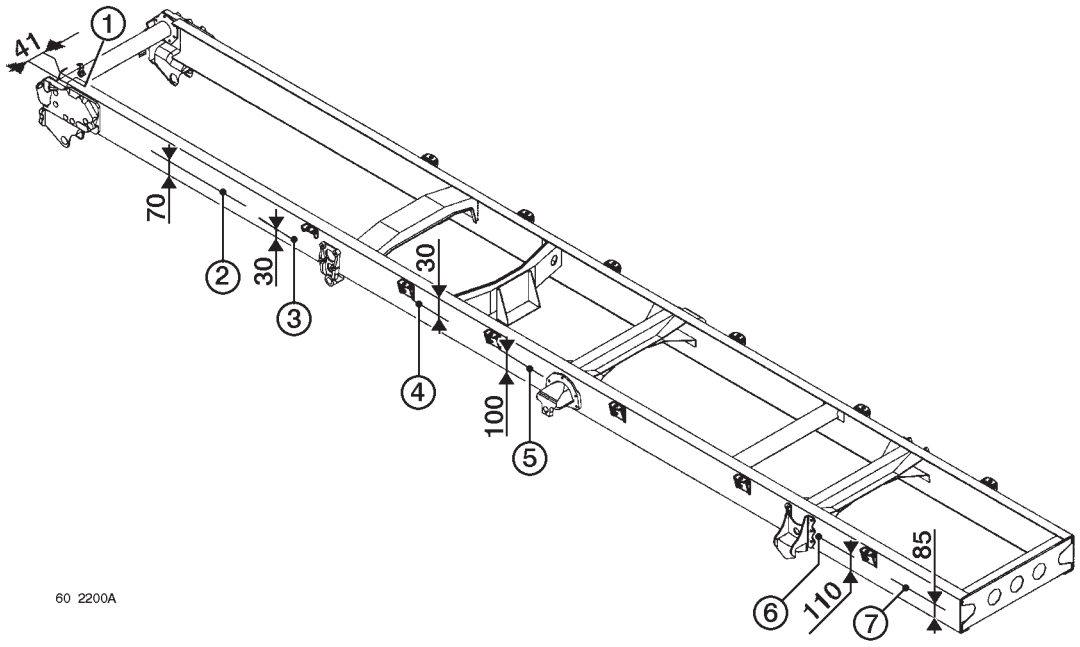
3.1.2 Chassis earths

All chassis earths are on the LH sidemember through 11 mm diameter holes.
1 - cab earth
2 - starter earth
3 - fuel preheater earth
4 - batteries earth
- automatic transmission earth (ALLISON MD 3060)
- trailer socket earth

5 - rear wiring harness earth
- electric retarder earth

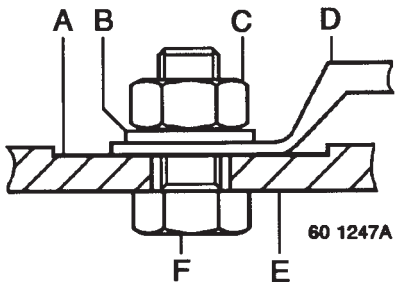
6 - tail lift installation earth (standard fitment stainless steel threaded hardware)
7 - trailer socket earth (drawbar rigid vehicles)

Apart from the battery and cab earths located to the outside of the chassis, all the earths are fastened to the inside of the sidemember.



Assembly to electrical earth points dia. 11 mm

A - spotface dia.r 30 mm
B - plain stainless steel washer diameter 10 mm
C - stainless steel nut H10 x 150
D - earth lug or braid
E - sidemember
F - stainless steel bolt M10 x 150.
Tightening torque: 45 ± 9 Nm.



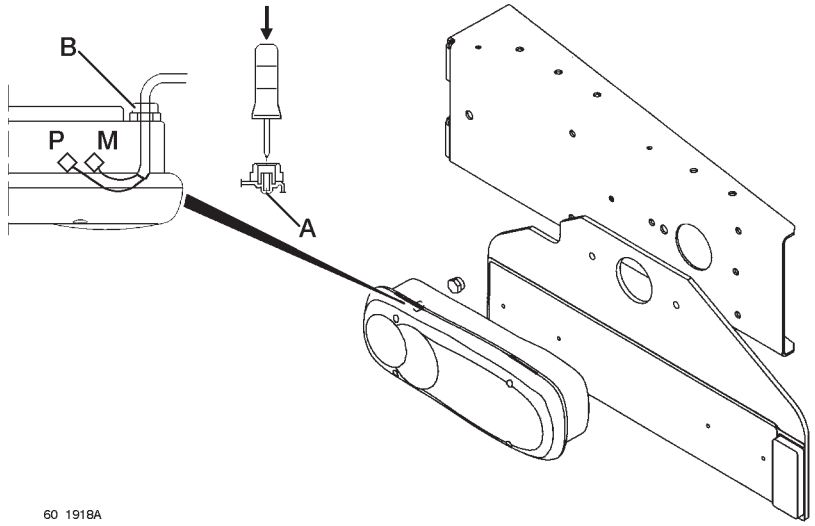
Some equipment items need connection of the earth to a point other than the originally planned earths. In such case, use any free drilling (13 mm diameter). Make a spotface to give anti-corrosion protection by means of tin-coating or a zinc aerosol spray prior to assembly. Use 12 mm stainless steel threaded hardware.

Zinc aerosol paint spray ref. N° 77.01.406.425 available from the RENAULT TRUCKS Spare Parts Department.

3.2 Hook-up of lateral lamps to the rear lamp (vehicle with rear lighting bar, without variant 155 02 & 155 03)

Make a small opening at point (**A**) on the rear lamp.
Cut the 2-way connector of the lateral signalling lamp.
Engage the wiring harness in the rear lamp and connect the wires to the available terminals in the rear lamp:
- brown wire to earth (terminal "**M**"),
- blue wire to side/parking lamps power supply (terminal "**P**").

At point (**A**), fit the stuffing box and tightening nut (**B**) supplied in the installation kit on the wiring harness to the rear lamp.
Make an undercut in the rear lamp bracket to allow passage of the additional wiring harness.



For safety reasons, it is recommended to cross over the wiring harnesses connecting the lateral lamps:
- RH signalling connected to the LH rear lamp
- LH signalling connected to the RH rear lamp

3.3 Hook-up in front end connection zone (vehicles without "bodybuilder pack" and refuse collectors)

Cut the 2-way JPT connector on the wiring harness of a lateral lamp and crimp each wire with a JPT clip ref. N° 50 10 214 346.
In the front end connection zone:
Clip the two wires in the 8-way connector if present on the vehicle - if not, clip the wires to a connector ref. N° 50 10 214 495 and hook up the assembly in the connection zone.
Position the wires on the 8-way connector:
- terminal 2: lighting power supply
- terminal 1: earth.

Connect the other signalling lamps in festoon fashion.

The lateral lamps wiring harness must follow the routing of the other wiring harnesses and allow tilting of the cab without causing any damage.

Procurement:
- 8-way connector (hook-up on front end) ref. N° 50 10 214 495
- electrical clips ref. N° 50 10 214 345

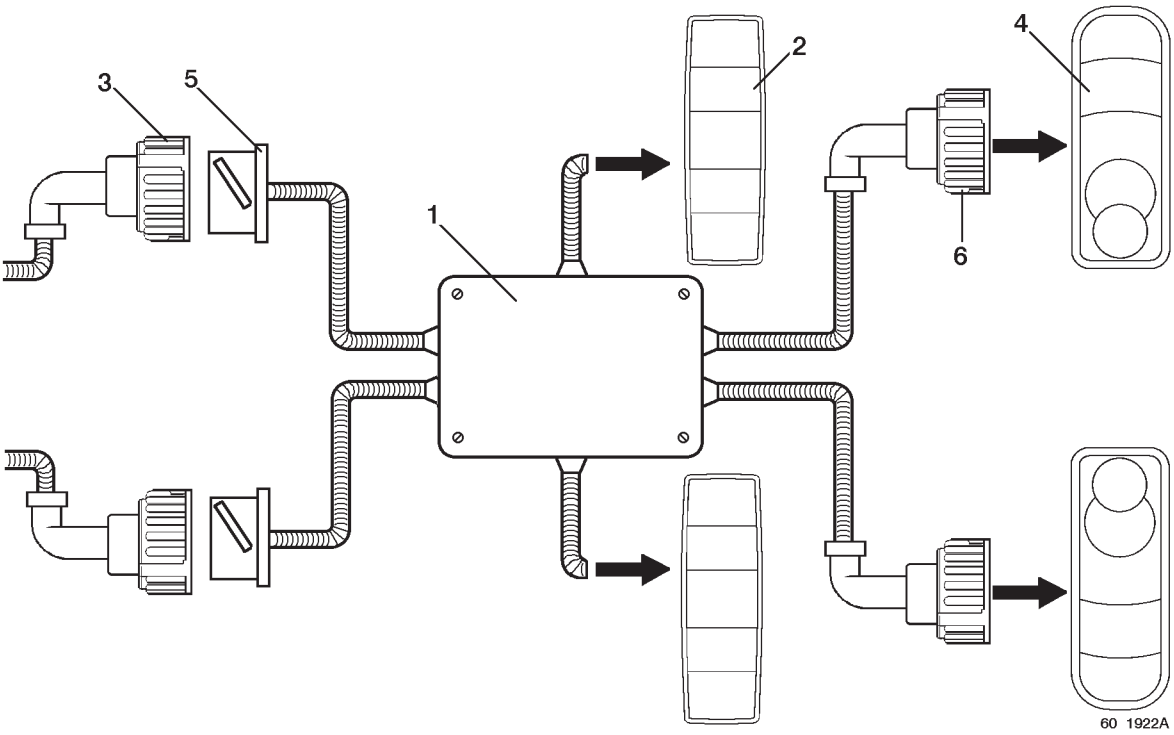
3.4 Changing the position of vehicle rear lamps

Rear lamps mounted in series on lighting bar and on run-under guard are officially approved in the horizontal or vertical position.
If the lamp is mounted in the vertical position, the lens gasket must be repositioned so that the slot (junction between the two ends of the seal) is facing downwards.

3.5 Doubling up the rear lamps

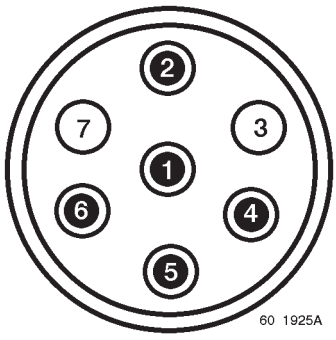
It is possible to install two additional rear lamps by inserting a junction box between the existing rear lamps and their wiring harness. Each additional rear lamp must be connected in parallel with a vehicle lamp.

Key
1 - Junction box
2 - Additional lamps
3 - Vehicle wiring harness
4 - Vehicle rear lamps
5 - Junction box connectors to vehicle wiring harness
6 - Junction box connectors to rear lamps



Assignment of connector terminals

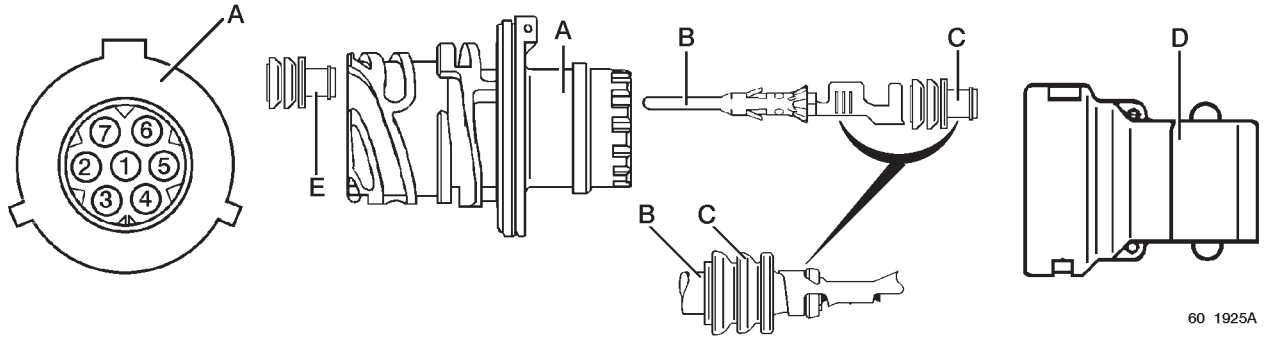
Terminal	Function	
	LH connector	RH connector
1	earth	earth
2	LH side/parking lamp	LH side/parking lamp
3	not assigned	reversing lamp
4	LH flashing lamp	RH flashing lamp
5	LH stop lamp	RH stop lamp
6	fog lamp	braking information
7	not assigned	not assigned

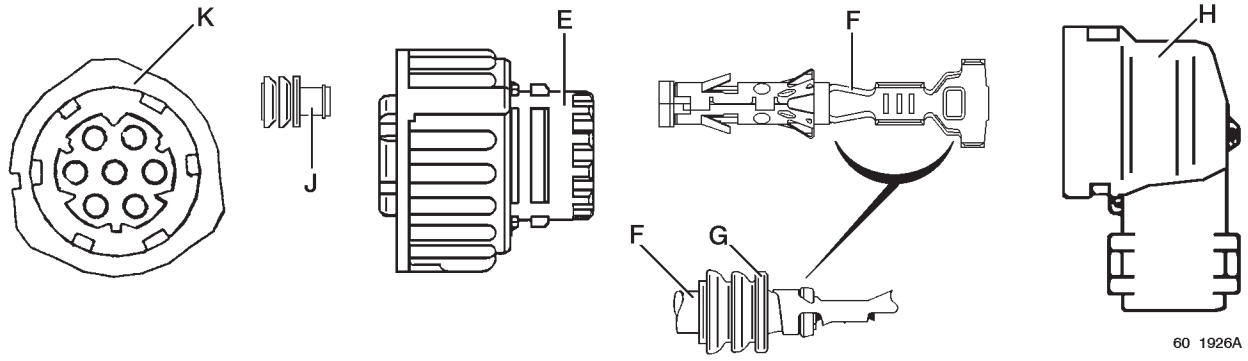


Procurement
Connector (**5**):
A - 7-way pin-holder box ref. N° 50 10 306 943
B - 1 mm2 pin ref. N° 50 10 306 944
C - 1 mm2 wire grommet seal ref. N° 50 10 214 624
D - straight adapter ref. N° 50 10 306 096
E - blanking plug ref. N° 50 10 241 931

Connector (**6**):
K - 7-way socket-holder box ref. N° 50 10 306 490
F - 1 mm2 socket ref. N° 50 10 306 491
G - 1 mm2 wire grommet seal ref. N° 50 10 214 624
H - elbow adapter ref. N° 50 10 306 097
J - blanking plug ref. N° 50 10 214 931

Blanking plugs (**E-J**) are to be installed without fail in the ways of pin-holder (**A**) and of socket-holder (**K**) that are not provided with wires (terminal 7). They give a fluidtight seal to the connector.
Use the 10 mm diameter ringed sheath and position it in the immobilization grooves of the adapters (**D-H**) before crimping them.





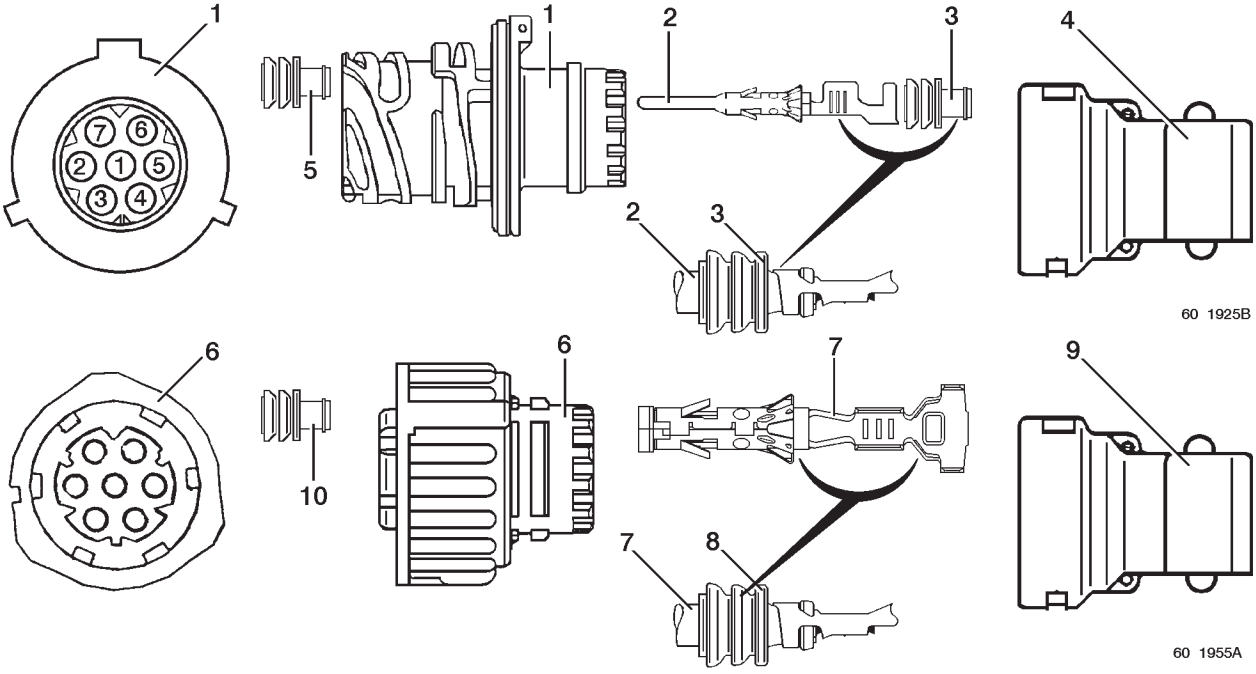
3.6 Extension of the wiring harness

If the chassis is elongated, it may be necessary to extend the vehicle wiring harness.
For this operation, section the harness and insert an electrical extension.
The cables of this extension must without fail be of a cross-section identical to that of the corresponding cable on the vehicle. The maximum amperage passing through each cable should be no greater than 5 Amps/mm2.
Use one or several connectors recommended hereafter. The pins or sockets should be adapted to the cable cross-sections on which they are mounted.

Procurement:

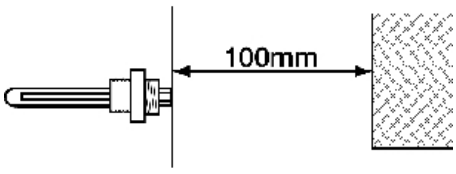
1 - 7-way pin-holder box ref. N° 50 10 306 943
2 - 1 mm^2 pin ref. N° 50 10 306 944
2 - 2.5 mm^2 pin ref. N° 50 10 306 945
3 - 1 mm^2 wire grommet seal ref. N° 50 10 214 624
4 - straight adapter ref. N° 50 10 306 096
5 - blanking plug ref. N° 50 10 241 931
6 - 7-way socket-holder box ref. N° 50 10 306 490
7 - 1 mm^2 socket ref. N° 50 10 306 491
7 - 2.5 mm^2 socket ref. N° 50 10 306 494
8 - 1 mm^2 wire grommet seal ref. N° 50 10 214 624
9 - elbow adapter ref. N° 50 10 306 097
10 - blanking plug ref. N° 50 10 214 931

Blanking plugs (**5-10**) are to be installed without fail in the ways of pin-holder (**1**) and of socket-holder (**6**) that are not provided with wires. They give a watertight seal to the connector.
Use the 10 mm diameter ringed sheath and position it in the immobilization grooves of the adapters (**4-9**) before crimping them.



3.7 Assembly of the immersion heater

If the height of the sub-frame is less than 150 mm, provide a free space of at least 100 mm behind the immersion heater for removal purposes.
Do not knock the electrical connection during bodybuilding.



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4. CHASSIS

4.1 Steel classes for sidemembers

Sidemembers are cascade down into two classes of steel (chapter A-2.1.4):
- class F for a minority of cases (identified by an asterisk (*) in the table below).
- class D for all other cases.

4.2 Sidemember sections

RENAULT MIDLUM B

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
7.5	2700	200 x 70 x 5		
	2950			
	3250			200 x 70 x 7
	3850		200 x 70 x 5	
	4450		200 x 70 x 6	
	5050			
10	2700	200 x 70 x 5		
	2950			
	3250			200 x 70 x 7
	3850	200 x 70 x 6	200 x 70 x 6	
	4450		200 x 70 x 7	
	5050			
12	2950	200 x 70 x 5		
	3250			
	3850	200 x 70 x 6	200 x 70 x 7 (*)	
	4450			
	5050			

RENAULT MIDLUM C'

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
12	3070	220 x 70 x 5		
	3350			220 x 70 x 7
	3650		220 x 70 x 6	
	3950			
	4550		220 x 70 x 7	
	5150	220 x 70 x 6		
	5750	220 x 70 x 7	220 x 70 x 8 (*)	
	6480			

RENAULT MIDLUM C

<table>
<tr><th rowspan="2">GVW (tonnes)</th><th rowspan="2">Wheelbase (mm)</th><th colspan="3">Sidemember section</th></tr>
<tr><th>2-door cab
mechanical suspension</th><th>2-door cab
air suspension</th><th>4-door cab</th></tr>
<tr><td rowspan="10">11–12</td><td>3070</td><td rowspan="6">220 x 70 x 5</td><td rowspan="2"></td><td></td></tr>
<tr><td>3350</td><td rowspan="5">220 x 70 x 7</td></tr>
<tr><td>3650</td><td rowspan="2">220 x 70 x 6</td></tr>
<tr><td>3950</td></tr>
<tr><td>4550</td><td rowspan="2">220 x 70 x 7</td></tr>
<tr><td>5150</td><td>220 x 70 x 6</td></tr>
<tr><td>5750</td><td rowspan="2">220 x 70 x 7</td><td rowspan="2">220 x 70 x 8 (*)</td><td rowspan="2"></td></tr>
<tr><td>6480</td></tr>
<tr><td rowspan="10">13–14</td><td>3070</td><td rowspan="4">220 x 70 x 6</td><td rowspan="2"></td><td></td></tr>
<tr><td>3350</td><td rowspan="4">220 x 70 x 8 (*)</td></tr>
<tr><td>3650</td><td rowspan="3">220 x 70 x 7</td></tr>
<tr><td>3950</td></tr>
<tr><td>4550</td><td rowspan="2">220 x 70 x 7</td></tr>
<tr><td>5150</td><td rowspan="3">220 x 70 x 8 (*)</td></tr>
<tr><td>5750</td><td rowspan="2">220 x 70 x 8 (*)</td><td></td></tr>
<tr><td>6480</td></tr>
<tr><td rowspan="10">15–16</td><td>3070</td><td rowspan="5">220 x 70 x 7</td><td rowspan="2"></td><td></td></tr>
<tr><td>3350</td><td rowspan="4">220 x 70 x 8 (*)</td></tr>
<tr><td>3650</td><td rowspan="3">220 x 70 x 7</td></tr>
<tr><td>3950</td></tr>
<tr><td>4550</td></tr>
<tr><td>5150</td><td rowspan="3">220 x 70 x 8 (*)</td><td rowspan="3">220 x 70 x 8 (*)</td></tr>
<tr><td>5750</td><td rowspan="2">220 x 70 x 8 (*)</td><td rowspan="2"></td></tr>
<tr><td>6480</td></tr>
</table>

RENAULT MIDLUM D & RENAULT MIDLUM D Construction**

<table>
<tr><th rowspan="2">GVW (tonnes)</th><th rowspan="2">Wheelbase (mm)</th><th colspan="2">Sidemember section</th></tr>
<tr><th>2-door cab
mechanical suspension</th><th>2-door cab
air suspension</th></tr>
<tr><td rowspan="11">18</td><td>3650 **</td><td rowspan="6">244 x 70 x 7(*)</td><td rowspan="6">244 x 70 x 7(*)</td></tr>
<tr><td>3950 **</td></tr>
<tr><td>4250 **</td></tr>
<tr><td>4550 **</td></tr>
<tr><td>4850</td></tr>
<tr><td>5150</td></tr>
<tr><td>5450</td><td rowspan="5">244 x 70 x 8(*)</td><td rowspan="5">244 x 70 x 8(*)</td></tr>
<tr><td>5750</td></tr>
<tr><td>6050</td></tr>
<tr><td>6480</td></tr>
<tr><td>6780</td></tr>
</table>

RENAULT MIDLUM HD/Construction

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
12–13–14	3070	220 x 70 x 7		220 x 70 x 7
	3350			
	3650			
	3950			
	4550			
15–16	3070	220 x 70 x 8 (*)		220 x 70 x 8 (*)
	3350			
	3650			
	3950			
	4550			

RENAULT MIDLUM 4x4

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
TA 12–13–14	3070	220 x 70 x 7		220 x 70 x 7
	3350			
	3650			
	3950			
TC 15–16	3070	220 x 70 x 8 (*)		220 x 70 x 8 (*)
	3350			
	3650			
	3950			

Trade vehicles

Vehicle	GVW (tonnes)	Wheelbase (mm)	Sidemember section
Tanker	16	3350	220 x 70 x 7
		3650	
		3950	
Tanker	18	3650	244 x 70 x 7 (*)
		3950	
		4250	
		4550	
Refuse collector	16	3070	220 x 70 x 7
		3350	
		3650	
Tractor	16	3650	
Road sweeper	10/12	3070	220 x 70 x 5
		3350	
	15	3350	220 x 70 x 7
		3650	
		3950	

4.3 Reinforcement, extension, shortening of sidemembers

If the bodywork or fitted equipment do not modify the chassis weight and dimensions entered in the descriptive notice, the vehicle can be presented to the Type Approval department without intervention from RENAULT TRUCKS (within the permitted limits in force).
In the event of chassis extension, take care to use a section with size and steel grade identical to those of the sidemembers (consult the chapter “Section and class of sidemember steels”). Contact the RENAULT TRUCKS Product Applications Department for any further information or to get a list of sales outlets marketing such sections.

4.3.1 Modification to the rear overhang

In the event of extension of the rear overhang, take into consideration the regulations in force and in particular the overhang / wheelbase ratio and recommendations of the bodybuilders guide.

4.3.2 Modification to the wheelbase

For a given vehicle, the section and class of steel for sidemembers depend on:
- GVW,
- suspension type (air or mechanical),
- cab,
- wheelbase.

The maximum extended wheelbase length is that of the largest wheelbase on the same vehicle (same GVW, cab, suspension) fitted with sidemembers of identical section. It is strictly forbidden to overstep this limit.
Vehicles having the maximum permitted length for a given sidemember section cannot therefore have their wheelbase extended.

RENAULT MIDLUM B

<table>
<tr><th rowspan="2">GVW (tonnes)</th><th rowspan="2">Wheelbase (mm)</th><th colspan="3">Sidemember section</th></tr>
<tr><th>2-door cab
mechanical suspension</th><th>2-door cab
air suspension</th><th>4-door cab</th></tr>
<tr><td rowspan="6">7.5</td><td>2700</td><td rowspan="5">5050</td><td rowspan="3"></td><td rowspan="2"></td></tr>
<tr><td>2950</td></tr>
<tr><td>3250</td><td rowspan="2">4550</td></tr>
<tr><td>3850</td><td>extension forbidden</td></tr>
<tr><td>4450</td><td>5050</td><td>extension forbidden</td></tr>
<tr><td>5050</td><td>extension forbidden</td><td>extension forbidden</td><td></td></tr>
<tr><td rowspan="6">10</td><td>2700</td><td rowspan="2">3250</td><td rowspan="3"></td><td rowspan="2"></td></tr>
<tr><td>2950</td></tr>
<tr><td>3250</td><td>extension forbidden</td><td rowspan="4">4550</td></tr>
<tr><td>3850</td><td rowspan="2">5050</td><td>extension forbidden</td></tr>
<tr><td>4450</td><td>5050</td></tr>
<tr><td>5050</td><td>extension forbidden</td><td>extension forbidden</td><td>extension forbidden</td></tr>
<tr><td rowspan="5">12</td><td>2950</td><td>3250</td><td rowspan="2"></td><td rowspan="5"></td></tr>
<tr><td>3250</td><td>extension forbidden</td></tr>
<tr><td>3850</td><td rowspan="2">5050</td><td rowspan="2">5050</td></tr>
<tr><td>4450</td></tr>
<tr><td>5050</td><td>extension forbidden</td><td>extension forbidden</td></tr>
</table>

RENAULT MICLUM C'

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
12	3070	4550		
	3350			5150
	3650		3950	
	3950		extension forbidden	
	4550	extension forbidden	5150	
	5150		extension forbidden	extension forbidden
	5750	6480	6480	
	6480	extension forbidden	extension forbidden	

RENAULT MICLUM C

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
11–12	3070	4550		
	3350			5150
	3650		3950	
	3950		extension forbidden	
	4550	extension forbidden	5150	
	5150		extension forbidden	extension forbidden
	5750	6480	6480	
	6480	extension forbidden	extension forbidden	
13–14	3070	3950		
	3350			5150
	3650		4550	
	3950	extension forbidden		
	4550	5150	extension forbidden	
	5150	extension forbidden	6480	extension forbidden
	5750	6480		
	6480	extension forbidden	extension forbidden	
15–16	3070	4550		
	3350			
	3650		4550	5150
	3950			
	4550	extension forbidden	extension forbidden	
	5150	6480	6480	extension forbidden
	5750			
	6480	extension forbidden	extension forbidden	

RENAULT MICLUM D

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
18	3650	5150	5150	
	3950			
	4250			
	4550			
	4850			
	5150	extension forbidden	extension forbidden	
	5450	6780	6780	
	5750			
	6050			
	6480			
	6780	extension forbidden	extension forbidden	

RENAULT MICLUM D Construction

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
18	3650	4550	4550	
	3950			
	4250			
	4550	extension forbidden	extension forbidden	

RENAULT MICLUM HD/Construction

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
12–13 14–15 16	3070	4550		4550
	3350			
	3650			
	3950			
	4550	extension forbidden		extension forbidden

Trade vehicles

Vehicle	GVW (tonnes)	Wheelbase (mm)	Sidemember section
Tanker	16	3350	3950
		3650	
		3950	extension forbidden
Tanker	18	3650	4550
		3950	
		4250	
		4550	extension forbidden
Refuse collector	16	3070	3650
		3350	
		3650	extension forbidden
Tractor	16	3350	extension forbidden
Road sweeper	10/12	3070	3350
		3350	extension forbidden
	15	3350	3950
		3650	
		3950	extension forbidden

4.4 Intermediate cross-member

After extension to the rear overhang or the wheelbase:
The fitting of an intermediate cross-member or relay cross-member is vital if the number of cross-members in the extended vehicle is less than those for the corresponding standard vehicle.
It is therefore essential to consult the 1/20th scale bodybuilder's drawing for the vehicle with lesser or equal wheelbase so as to find out which cross-members are to be added.

Note
The cross-member that may have to be added will be different depending on the place where the sidemember is sectioned for the purpose of extension. It is therefore strongly advised, before proceeding with cutting, to determine:
- if there is any need to add a cross-member,
- the point where the fitting of the cross-member will be the easiest (e.g. fitting of a simple cross-member rather than a relay cross-member). Consult the RENAULT TRUCKS Product Applications Department.

Procurement
On account of the diversity of assemblies, consult the RENAULT TRUCKS Product Applications Department to find out the reference number and position of the cross-member to be added.
Threaded hardware to be used for fastening cross-members to chassis:
- collar bolt HM12x125x40 class 10.9
- flanged locknut DRH M12.
Tighten to torque.

5. CHANGING THE POSITION OF EQUIPMENT ON CHASSIS

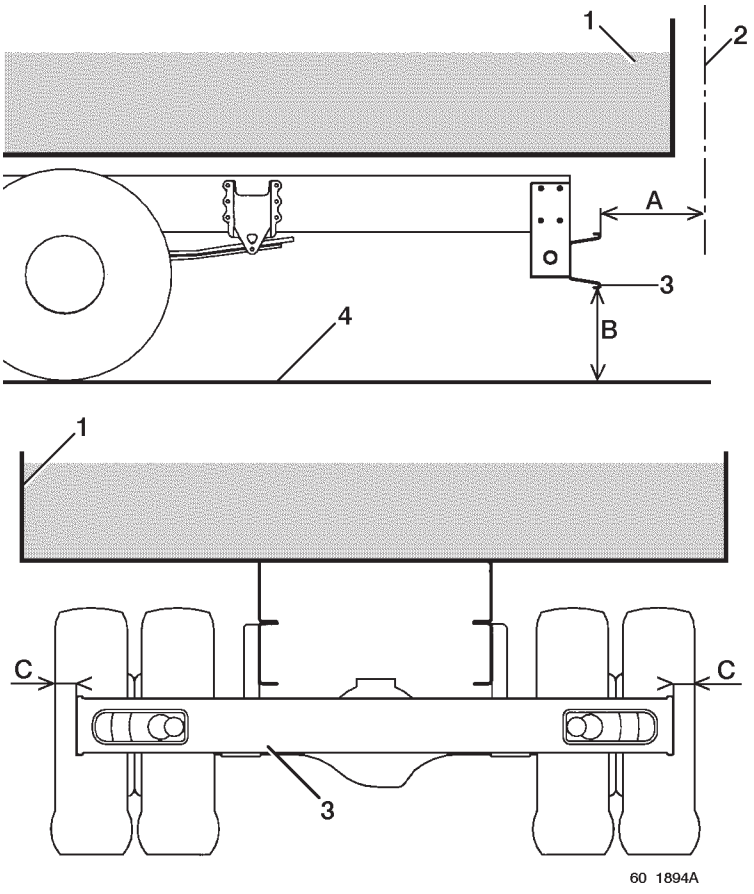
Depending on the vehicle's equipment, drillings existing in the web of sidemembers make it possible to change the position of: rear run-under guard, rear lighting bar, towing cross-member.
Apart from cutting the sidemember, this modification is made without converting the chassis.

5.1 Rear run-under guard

Whatever the position of the rear run-under guard in relation to the chassis, distances **(A)** and **(B)** are to be observed without fail.
1 - Body
2 - Body rear overall (including mountings, hinges...)
3 - Run-under guard
4 - Ground
The thickness of mountings and hinges should not exceed 120 mm (distance between centre-line **(2)** and the rear face of the body).

Vehicle	GVW	A (mm)	B (mm)	C (mm)
MIDLUM B	7.5	250	550	C < 100
	10	375		
	12	250		
MIDLUM C/C'	12	230		
	14			
	16			
MIDLUM HD/Construction	14	219		
	16			
MIDLUM D	18			

A - maximum distance separating the run-under guard to the body rear overall
B - maximum height of run-under guard in relation to ground, vehicle unladen



5.2 Changing the position of the rear run-under guard

The rear run-under guard can be displaced horizontally owing to the presence of drillings in the sidemembers and vertically owing to drillings in its brackets (see drawings on following pages).

Table of possible vertical positionings

Vehicle	Number of position	Maximum movement (mm)	Pitch (mm)
MIDLUM B	2	25	25
MIDLUM C'/C	3	50	
MIDLUM D			
MIDLUM Construction			

The rear run-under guard must be fastened with threaded hardware with dimensions and quality identical to the original. Tighten to torque.

5.3 Changing the position of rear lighting bar lamps

The position of rear lighting bar lamps can be moved horizontally owing to the presence of drillings in the sidemembers.
The rear lighting bar lamps must be fastened with threaded hardware with dimensions and quality identical to the original. Tighten to torque.

Note:
For vehicles RENAULT MIDLUM C'/C/D/HD/Construction vehicles, the rear lighting bar lamps can be fastened to the rear spring hangers (tractor version assembly). This assembly requires the use of appropriate parts (see chapter B-5.5).

5.4 Changing the position of the towing cross-member

The position of the towing cross-member can be moved horizontally owing to the presence of drillings in the sidemembers.
The towing cross-member must be fastened with threaded hardware with dimensions and quality identical to the original.
Tighten to torque.

Table of possible horizontal positionings

Vehicle	E	A	D	Z
RENAULT MIDLUM B 2-door cab	2700	35	630	1515
	2950	35	770	1675
	3250	35	980	1870
	3850	35	1330	2260
	4450	35	1680	2665
	5050	35	1820	3040
RENAULT MIDLUM B 4-door cab	3250	35	840	1870
	3850	35	1190	2260
	4450	35	1610	2665
	5050	35	1750	3040
RENAULT MIDLUM Fire Tender 10 tonnes 4-door cab	3250	35	840	1870

Key to diagrams on following pages:
a - High position
b - Low position
W - Maximum vertical displacement
X - Rear axle centre-line
Z - Maximum overhang
1 - Run-under guard
2 - Lighting bar lamps
3 - Towing cross-member

RENAULT MIDLUM B

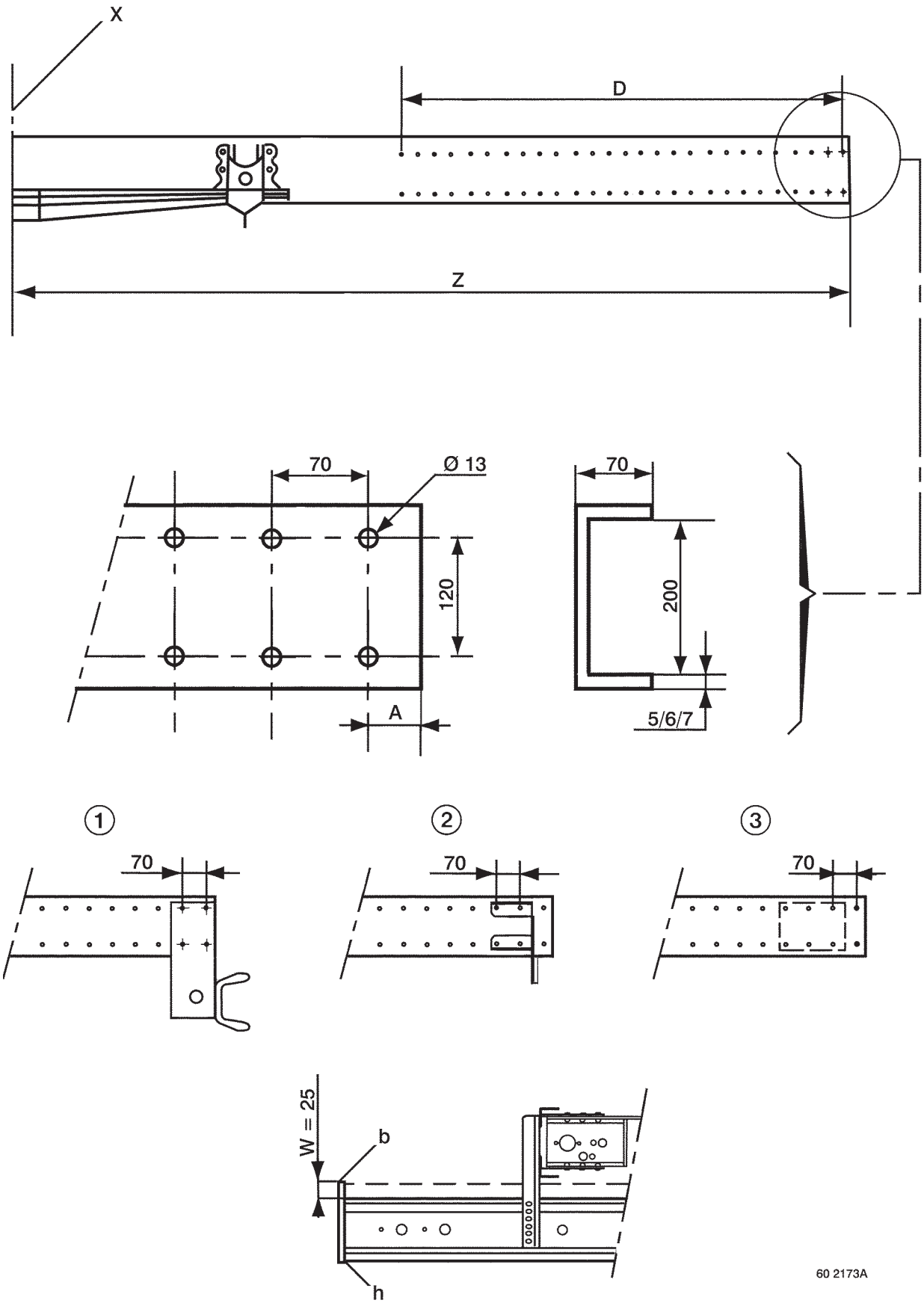
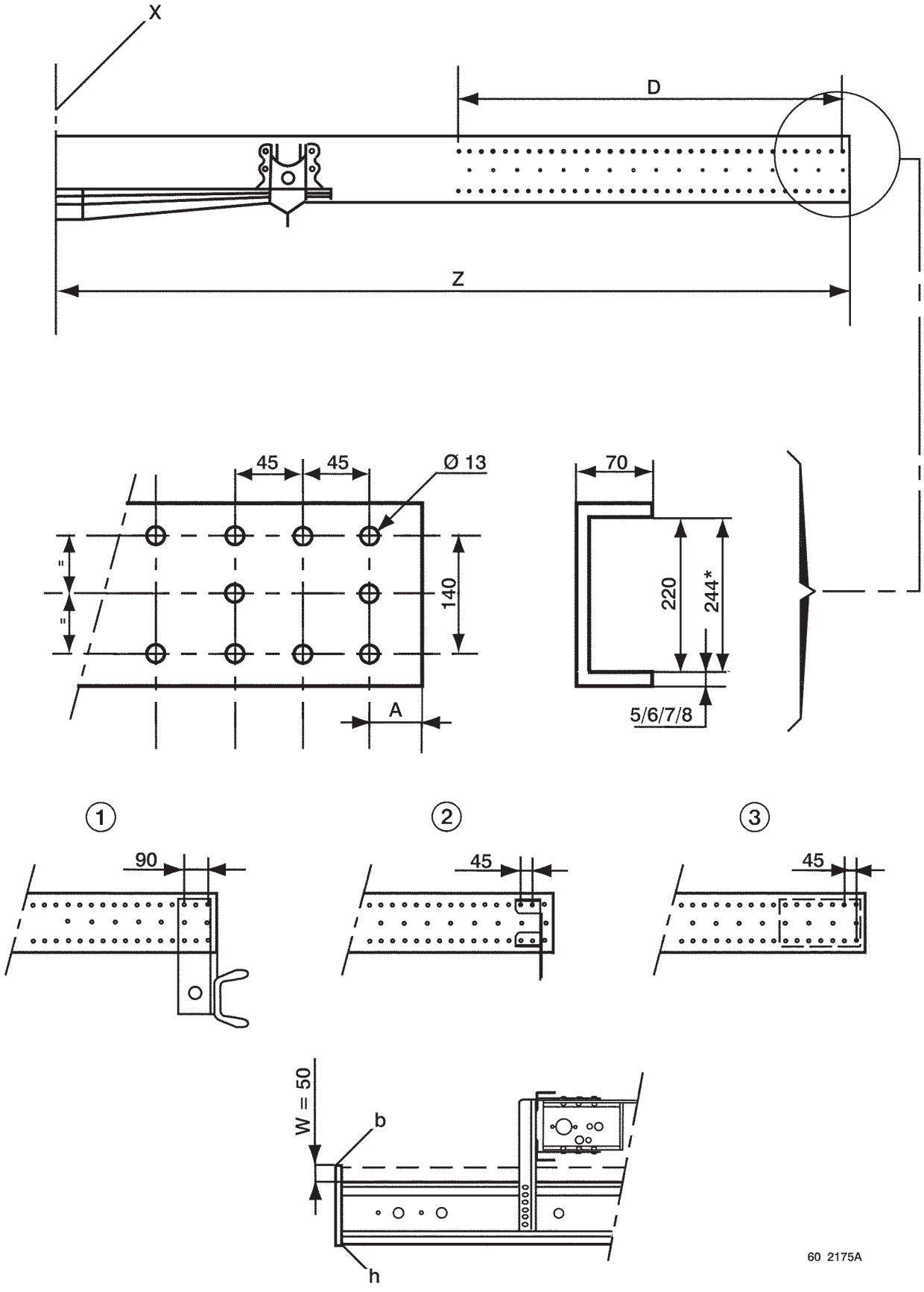


Table of possible horizontal positionings

Vehicle	E	A	D	Z
RENAULT MIDLUM C/C' 2-door cab	3070	37	585	1700
	3350	37	765	1882
	3650	37	990	2107
	3950	37	1170	2287
	4550	37	1440	2692
	5150	37	1485	3097
	5750	37	1710	3457
	6480	37	1485	3817
RENAULT MIDLUM D 2-door cab	3650	32	270	1362
	3950	32	360	1452
	4250	32	540	1632
	4550	32	675	1767
	4850	32	800	1902
	5150	32	990	2082
	5450	32	1125	2217
	5750	32	990	2397
	6050	32	990	2522
	6480	32	1305	2757
	6780	32	1305	2907
RENAULT MIDLUM HD/Construction 2-door cab	3070	37	585	1700
	3350	37	765	1882
	3650	37	990	2107
	3950	37	1170	2287
	4550	37	1440	2692
RENAULT MIDLUM C' 4-door cab	3350	37	270	1367
	3650	37	405	1507
	3950	37	675	1807
	4550	37	1170	2437
	5150	37	1485	3097
RENAULT MIDLUM C 4-door cab	3350	37	360	1467
	3650	37	540	1652
	3950	37	855	1967
	4550	37	1350	2597
	5150	37	1530	3122
RENAULT MIDLUM HD/Construction 4-door cab	3350	37	360	1467
	3650	37	540	1652
	3950	37	855	1967
	4550	37	1350	2597

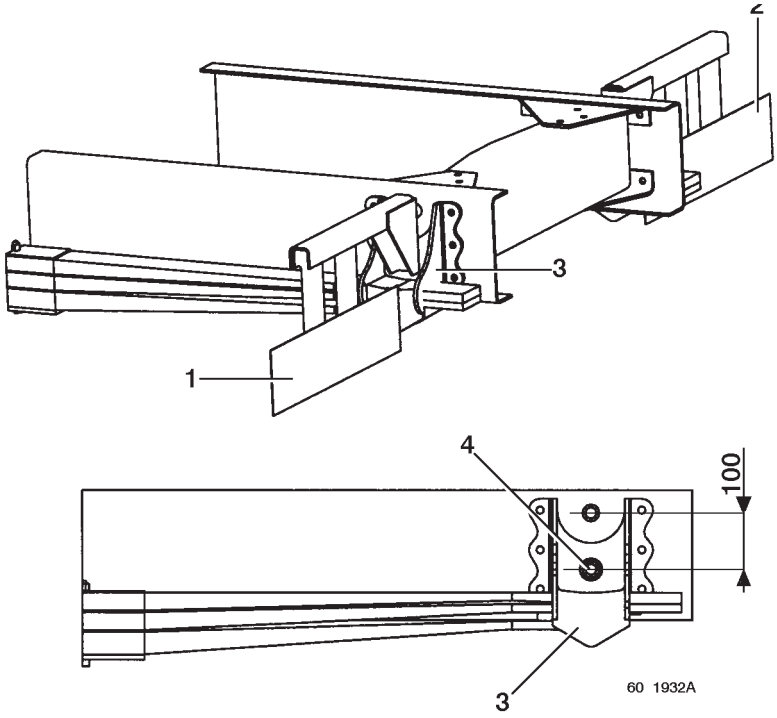
Key to diagrams on following pages:
a - High position
b - Low position
W - Maximum vertical displacement
X - Rear axle centre-line
Z - Maximum overhang
1 - Run-under guard
2 - Lighting bar lamps
3 - Towing cross-member


X
D
Z
45
45
Ø 13
140
A
70
220
244*
5/6/7/8
1
2
3
90
45
45
W = 50
b
h
60 2175A

5.5 Assembly of rear lamps to lighting bar - tractor version (on RENAULT MIDLUM C/C'/HD/Construction only)

In the event of reduction of the rear overhang, the rear lamps can be assembled on a rear lighting bar in accordance with fittings to RENAULT MIDLUM tractors. It is then necessary to replace the lamp brackets.
Drill a dia. 13 mm hole at point (**4**).
Fit the nuts and bolts and tighten to torque.

Procurement:
- LH bracket ref. N° 50 00 452 773
- RH bracket ref. N° 50 00 452 775
- 4 collar bolts M12x125x80 class 10.9 ref. N° 50 03 002 067
- 4 flanged nuts DRH M12 class 10.9 ref. N° 50 03 033 012



1 - LH lamp bracket
2 - RH lamp bracket
3 - spring rear hanger
4 - hole dia. 13 mm to be drilled

5.6 Changing the position of the cab tilting manual pump

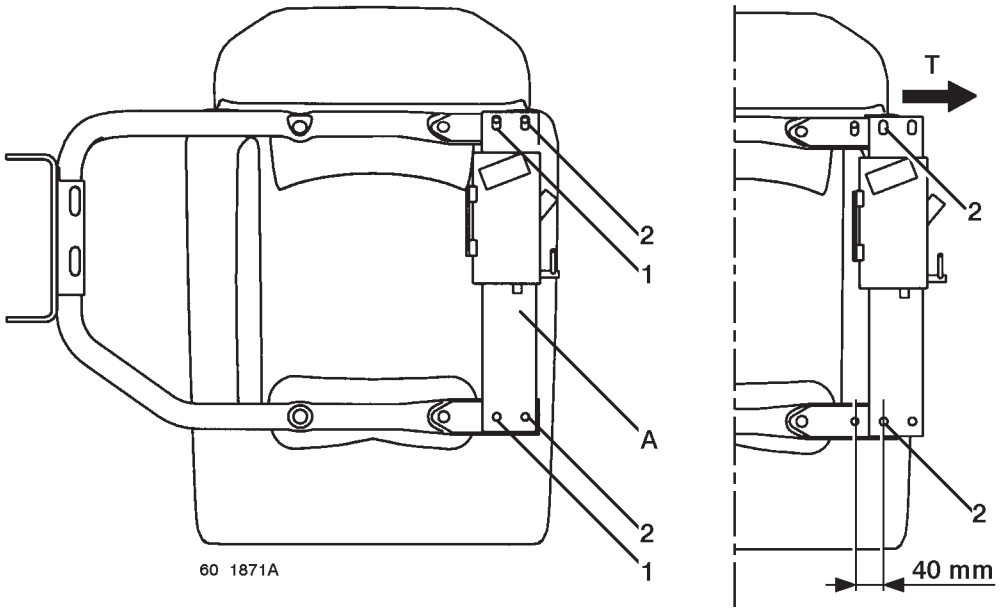
When fitting a body with overall width greater than or equal to 2550 mm, check that the cab tilting pump lever runs its full travel and that it does not abut with the lower RH corner of the bodywork.

If necessary, change the position of the cab tilting manual pump.
Depending on the vehicle, there are two possible positions for the change.

Any other method of changing position is authorized only if:
- it does not involve work on the tilting hydraulic system,
- it does not generate any mechanical, thermal or wear stress to high-pressure piping.

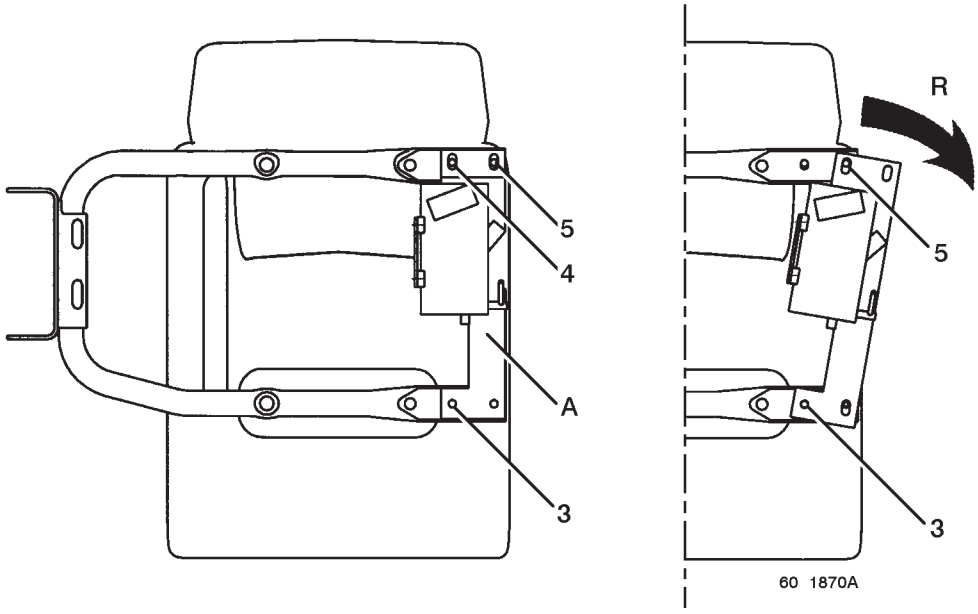
RENAULT MIDLUM C/C'/HD/Construction

The position of the pump is changed by pushing the bracket in direction (**T**) towards the exterior.
The internal oblong holes in bracket (**A**) are to be moved from (**1**) to (**2**).



RENAULT MIDLUM B

The position of the pump is changed by rotating the bracket in direction (**R**) in relation to the stud (**3**).
The internal oblong hole in bracket (**A**) is to be moved from (**4**) to (**5**).

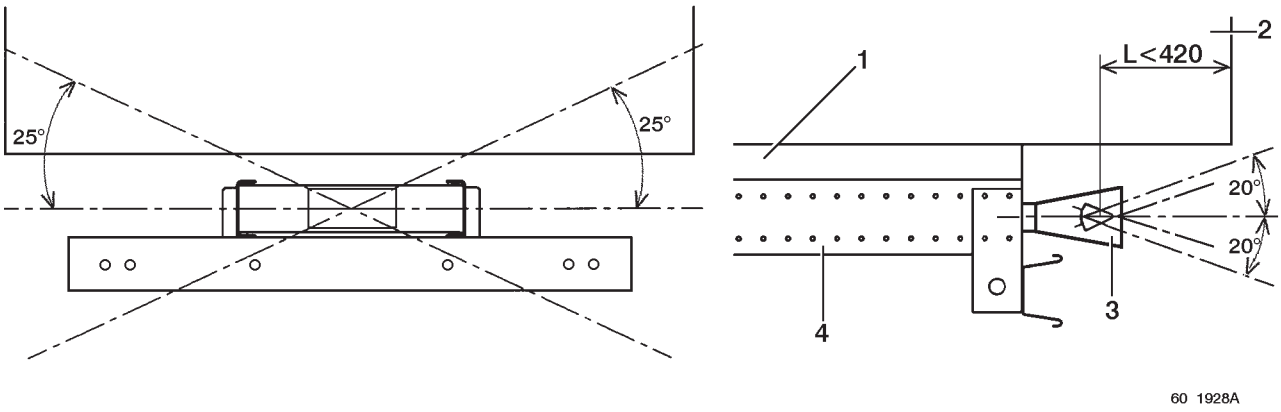


5.7 Trailer hitch coupling

5.7.1 Maximum permissible range of movement

The maximum permissible range of movement is given for guidance for a sub-frame with height 100 mm, a towbar dia. of 65 mm and a body protrusion distance (L) less than 420 mm.

1 - Sub-frame
2 - Body
3 - Towing hook
4 - Chassis



5.7.2 Towing cross-member

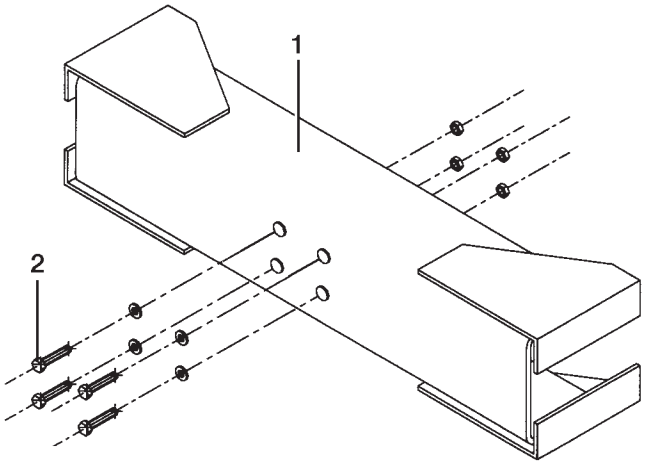
Table of towing cross-members in relation to towed load

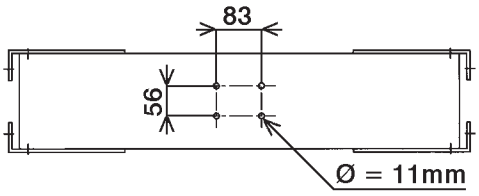
Vehicle	Maximum towable load (C)	
	C ≤ 3500 kg	C > 3500 kg
MIDLUM B	50 10 238 113	50 10 228 647
MIDLUM C'/C	50 10 228 650	50 10 228 649
MIDLUM D		
MIDLUM HD/ construction		

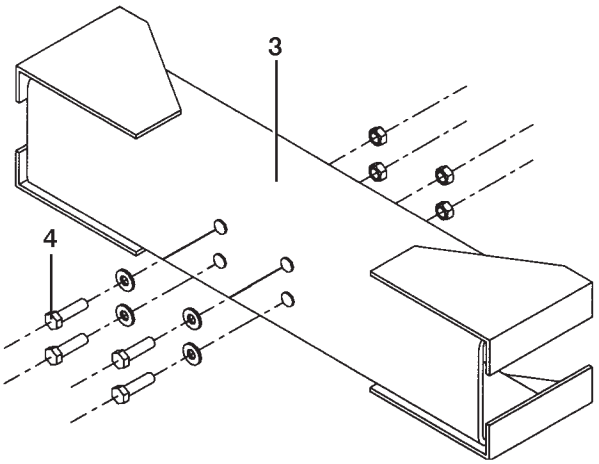
The towing cross-member is to be attached to the chassis by means of bolt hardware 12x125 with locknuts, class 10.9 with S2S protection. The use of nuts with nylon ring (e.g. Nyloc) is forbidden. Tighten to torque.
The towing hook is to be attached to the cross-member by means of nut and bolt hardware, class 10.9 with S2S protection. The use of nuts with nylon ring (e.g. Nyloc) is forbidden. Tighten to torque.

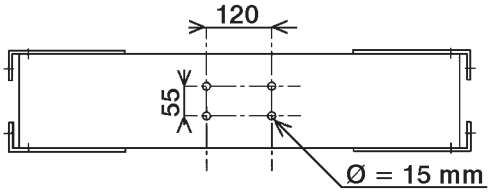
Key to diagram

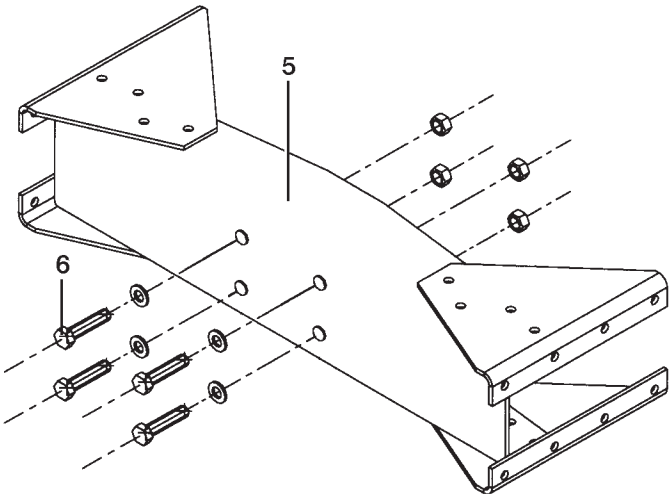
1 - Cross-member 50.10.328.113 & 50.10.228.650
2 - Bolt HM10x125x50, washer 10x20x2.5, flanged nut DRH M10
3 - Cross-member 50.10.228.647
4 - Bolt HM14x150x80, washer 14x30x3.2, flanged nut DRH M14
5 - Cross-member 50.10.228.649
6 - Bolt HM16x150x70, washer 16x30x3, flanged nut DRH M16

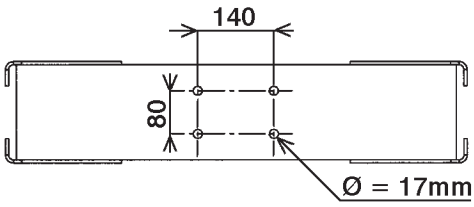












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5.7.3 Hitch coupling for drawbar rigid trailers

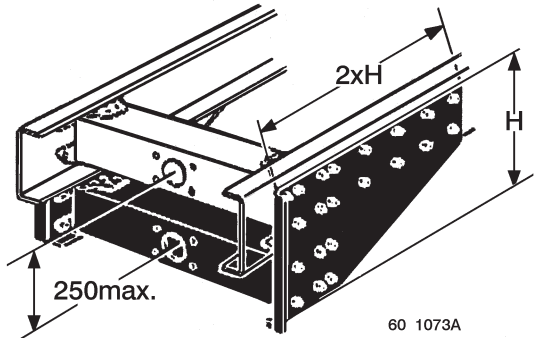
Installation of an additional cross-member

If the rear cross-member fitted as standard is too high, it is possible to adapt a second cross-member underneath it.
It is to be assembled with stiffener plates attached to the sides of the chassis sidemembers.
The upper cross-member securing bolts serve to hold the stiffener plates.
In addition, two rows of eight bolts are to be fitted to the sidemembers on each side.

The cross-member is attached to the stiffener plates with the same alignment as the standard cross-member.
Use all the cross-member holes for fastening the cross-member.
Position a spacer on each side to take up the gap between the new cross-member and the stiffener plate.

Minimum thickness (E) of stiffener plates

E = 1.2 x sidemember thickness



6. CAB FOOTPRINT

When fitting equipment behind and above the cab (e.g. reefer unit), consideration must be taken of cab overall dimensions due to:
- cab vertical and horizontal range of movement (suspended cab),
- cab tilting.

The clearance zone for cab tilting takes into consideration:
- range of movement of cab suspension,
- safety clearance to be kept between cab and equipment.

No built-on element is to be located in this zone.

The minimum clearance (**J**) should be no less than the minimum clearance recommended in the tables so as to avoid contact between the bodywork and the rear end of the cab.

The values (**H - J - K**) are to be observed for vehicles fitted with under-floor engine air intakes and lateral exhausts.

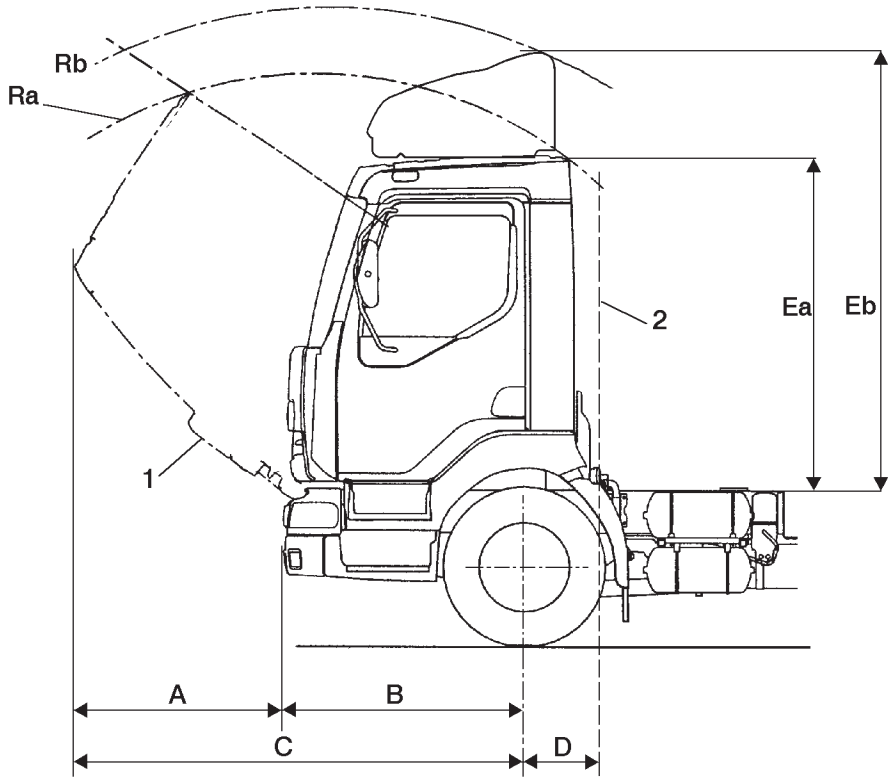
6.1 Day cab

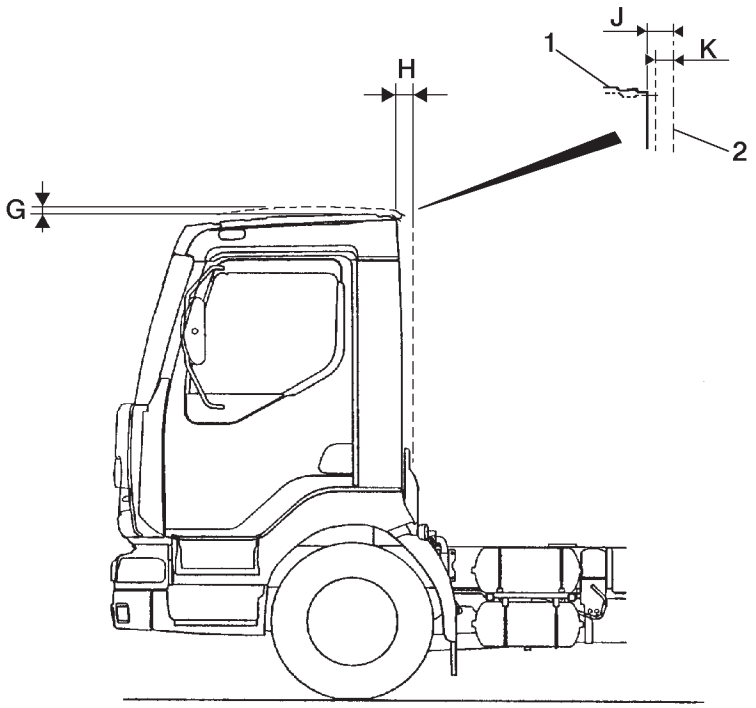
Vehicle	**MIDLUM B**	**MIDLUM C' / C**		**MIDLUM HD construction/4x4**		**MIDLUM D**	
Cab suspension	**Rubber mountings**	**Rubber mountings**	**Mixed**	**Rubber mountings**	**Mixed**	**Mixed**	**Springs**
A	1138			1073		1138	
B	1275	1325		1390		1325	
C	2413	2463					
Ea	1877						
Eb	2479						
G	25		35	25	35		
H	30		50	30	50		
J	100						128
K	95	70	50	70	50		70
Ra	2320						2342
Rb	2774						2796

Key
1 - Cab
2 - Bodywork maximum advance
A - Front protrusion of tilted cab in relation to shield
B - Front overhang
C - Front protrusion of tilted cab in relation to front axle centre-line
Ea - Height of cab in relation to sidemember (without RENAULT TRUCKS roof-mounted deflector)
Eb - Height of cab in relation to sidemember (with RENAULT TRUCKS roof-mounted deflector)
G - Cab maximum vertical movement
H - Cab maximum horizontal movement
J - Minimum clearance between cab and body at standstill
K - Minimum clearance between cab and body upon start-up
Ra - Radius of clearance necessary for tilting the cab (without RENAULT TRUCKS roof-mounted deflector)
Rb - Radius of clearance necessary for tilting the cab (with RENAULT TRUCKS roof-mounted deflector)

- Mixed cab suspension: cab suspended on 2 flexible mountings to the front and 2 spring/shock absorber combinations to the rear.
- Cab suspension with flexible mountings : cab suspended on 4 flexible mountings.

- Integral spring suspension: cab suspended by 4 spring/shock absorber combinations.





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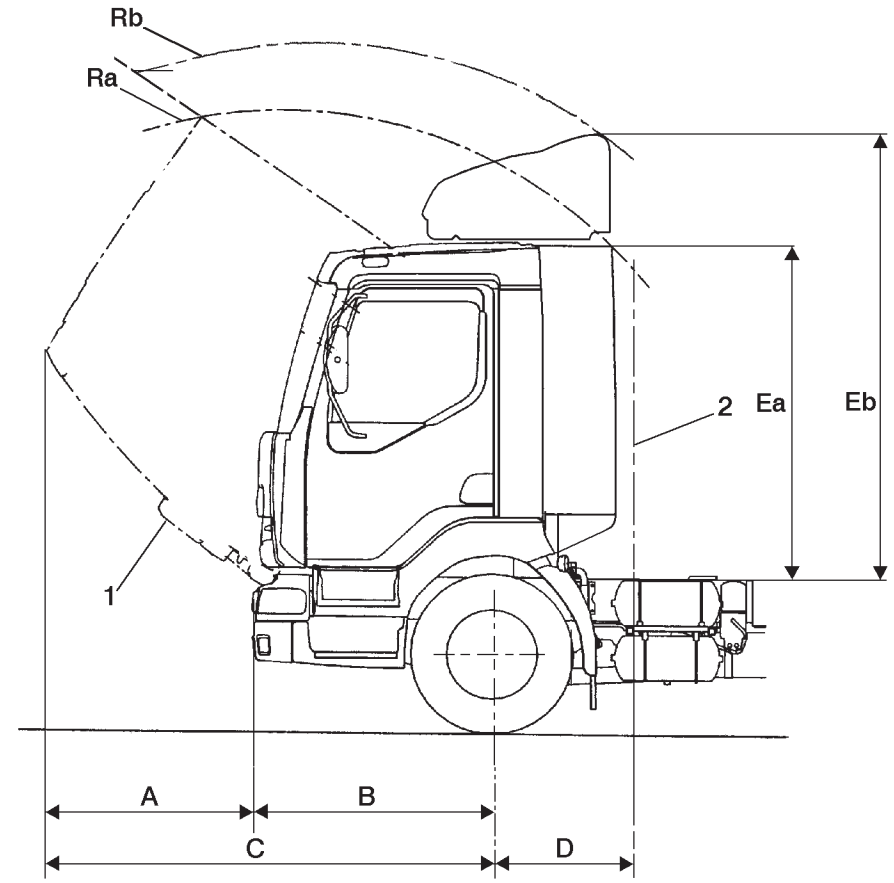
6.2 Sleeper cab

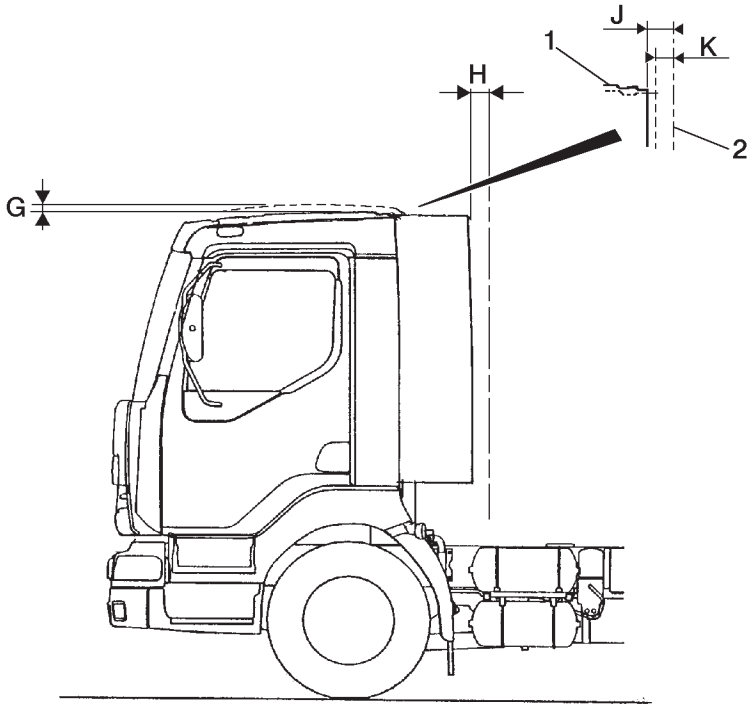
Vehicle	MIDLUM B	MIDLUM C' / C		MIDLUM HD construction		MIDLUM D	
Cab suspension	**Rubber mountings**	**Rubber mountings**	**Mixed**	**Rubber mountings**	**Mixed**	**Mixed**	**Springs**
A	1138			1073		1138	
B	1275	1325		1390		1325	
C	2413	2463					
Ea	1877						
Eb	2487						
G	25		28	25	28		30
H	30						35
J	45						
K	15						10
Ra	2585						2608
Rb	2944						2967

Key
1 - Cab
2 - Bodywork maximum advance
A - Front protrusion of tilted cab in relation to shield
B - Front overhang
C - Front protrusion of tilted cab in relation to front axle centre-line
Ea - Height of cab in relation to sidemember (without RENAULT TRUCKS roof-mounted deflector)
Eb - Height of cab in relation to sidemember (with RENAULT TRUCKS roof-mounted deflector)
G - Cab maximum vertical movement
H - Cab maximum horizontal movement
J - Minimum clearance between cab and body at standstill
K - Minimum clearance between cab and body upon start-up
Ra - Radius of clearance necessary for tilting the cab (without RENAULT TRUCKS roof-mounted deflector)
Rb - Radius of clearance necessary for tilting the cab (with RENAULT TRUCKS roof-mounted deflector)

- Mixed cab suspension : cab suspended on 2 flexible mountings to the front and 2 spring/shock absorber combinations to the rear.
- Cab suspension with flexible mountings: cab suspended on 4 flexible mountings.

- Integral spring suspension: cab suspended by 4 spring/shock absorber combinations.





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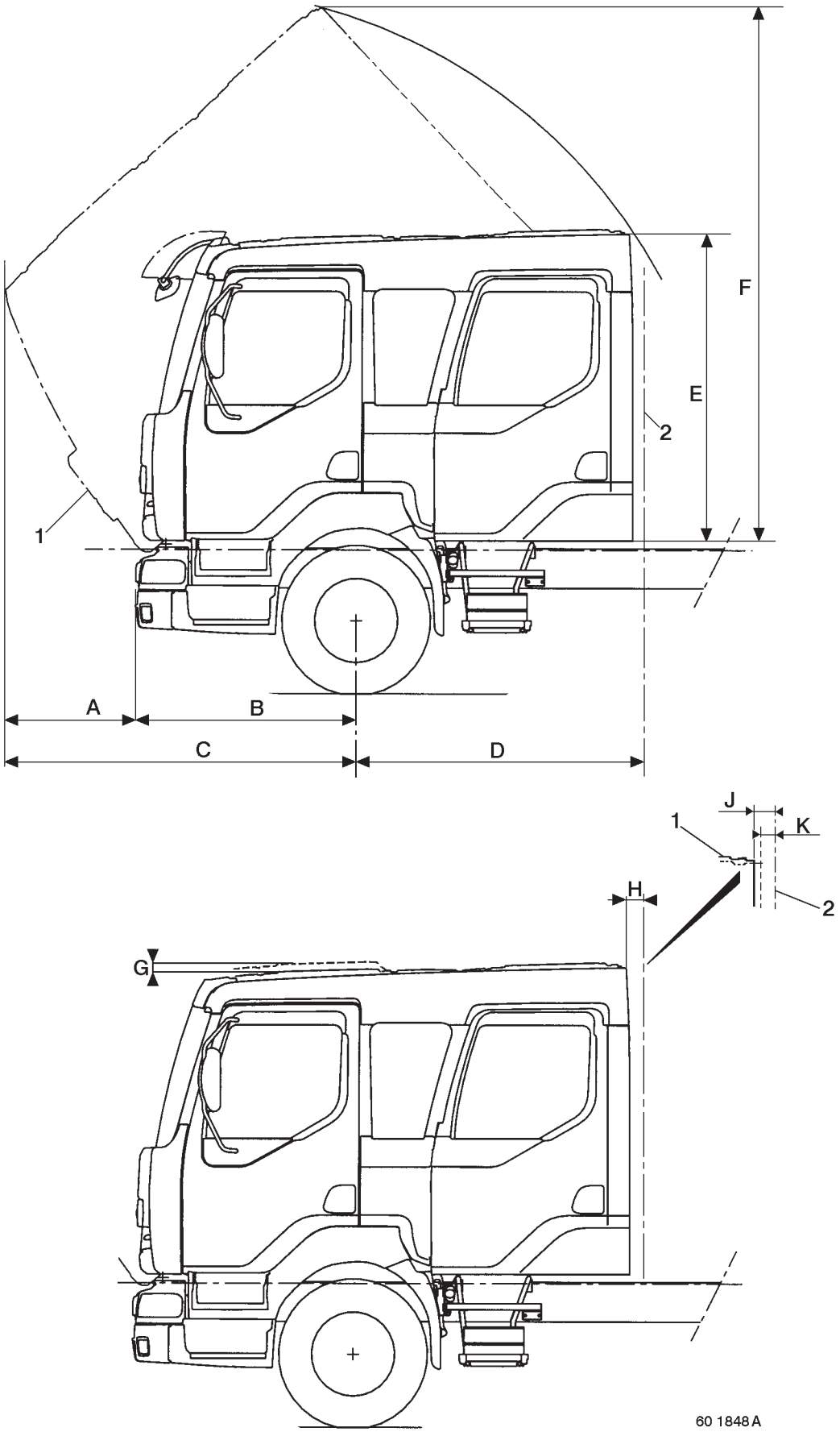
6.3 6/7 place cab

	MIDLUM B	MIDLUM C / C'	MIDLUM HD construction / 4x4
A	777		712
B	1275	1325	1390
C	2052	2102	
E	1882		
F	3230		
G	28		
H	30		
J	50		
K	20		
R	3344		

Key
1 - cab
2 - bodywork maximum advance
A - front protrusion of tilted cab in relation to shield
B - front overhang
C - front protrusion of tilted cab in relation to front axle centre-line
E - height of cab (in relation to sidemember)
F - maximum height of tilted cab (in relation to sidemember)
G - cab maximum vertical movement
H - cab maximum horizontal movement
J - minimum clearance between cab and body at standstill
K - minimum clearance between cab and body upon start-up
R - radius of clearance zone necessary for tilting the cab


F
E
2
1
A
B
C
D
J
K
1
H
2
G
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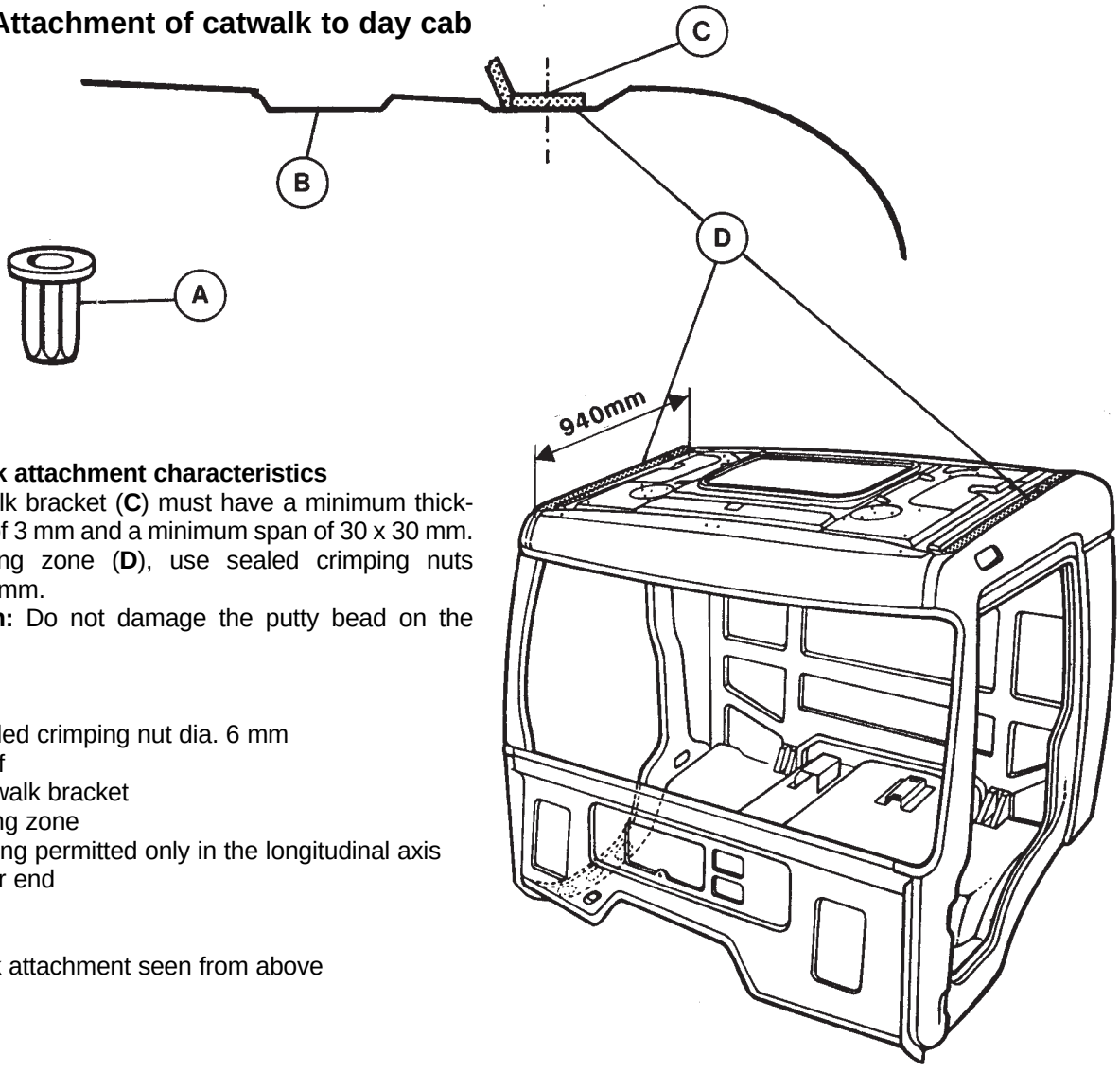
7. ASSEMBLY OF EQUIPMENT TO CAB

7.1 Roof catwalk

The cab roofs are designed to accommodate the attachment of a catwalk.

7.1.1 Attachment of catwalk to day cab



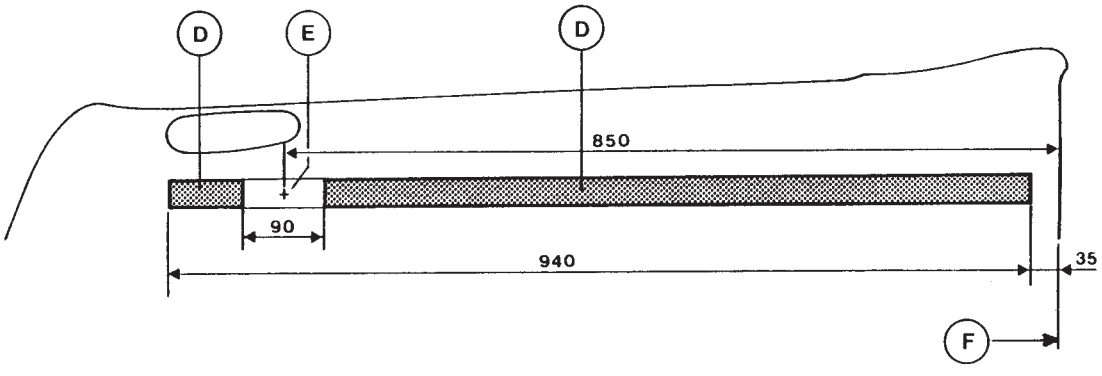
Catwalk attachment characteristics

- Catwalk bracket (**C**) must have a minimum thickness of 3 mm and a minimum span of 30 x 30 mm.
- In fixing zone (**D**), use sealed crimping nuts dia. 6 mm.

Caution: Do not damage the putty bead on the roof.

A - Sealed crimping nut dia. 6 mm
B - Roof
C - Catwalk bracket
D - Fixing zone
E - Drilling permitted only in the longitudinal axis
F - Rear end

Catwalk attachment seen from above



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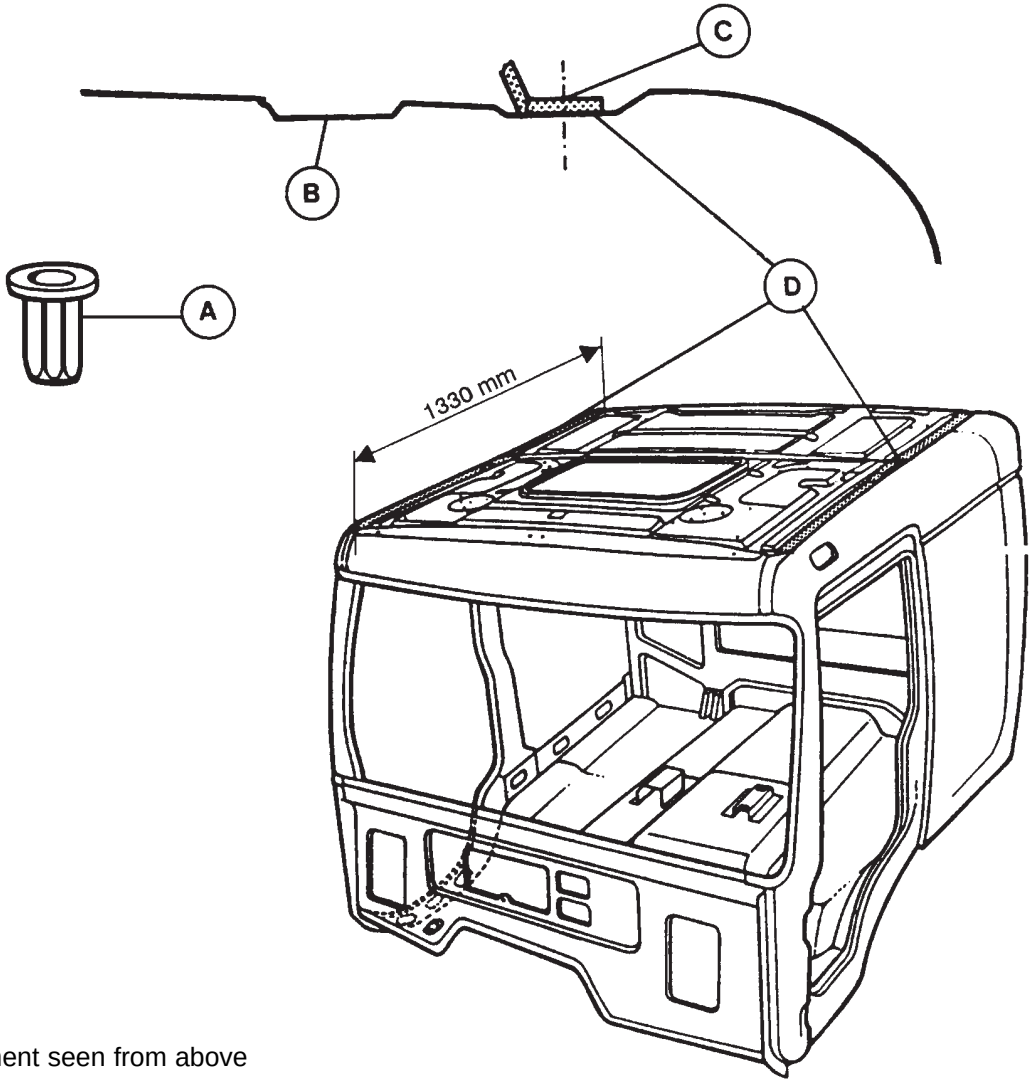
7.1.2 Attachment of catwalk to sleeper cab

Catwalk attachment characteristics

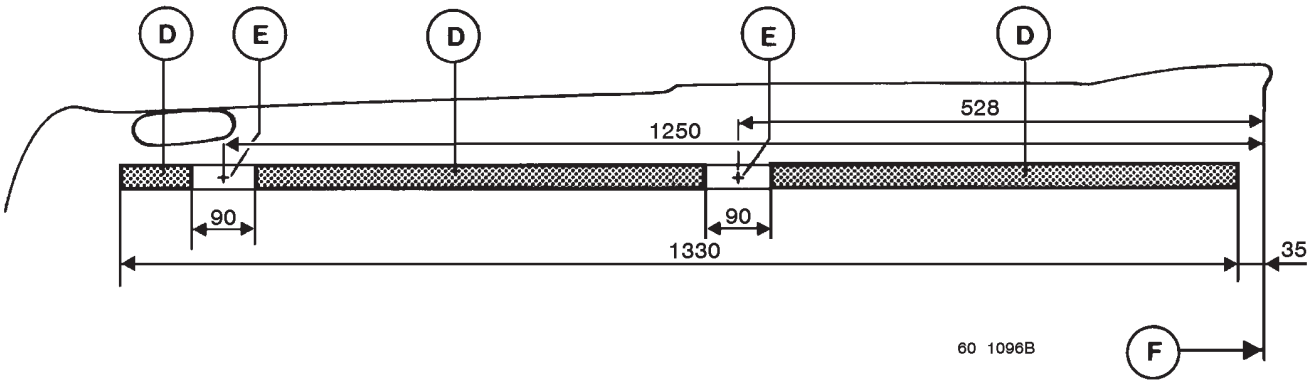
- Catwalk bracket **(C)** must have a minimum thickness of 3 mm and a minimum span of 30 x 30 mm.
- In fixing zone **(D)**, use sealed crimping nuts dia. 6 mm.

Caution: Do not damage the putty bead on the roof.

A - Sealed crimping nut dia. 6 mm
B - Roof
C - Catwalk bracket
D - Fixing zone
E - Drilling permitted only in the longitudinal axis
F - Rear end



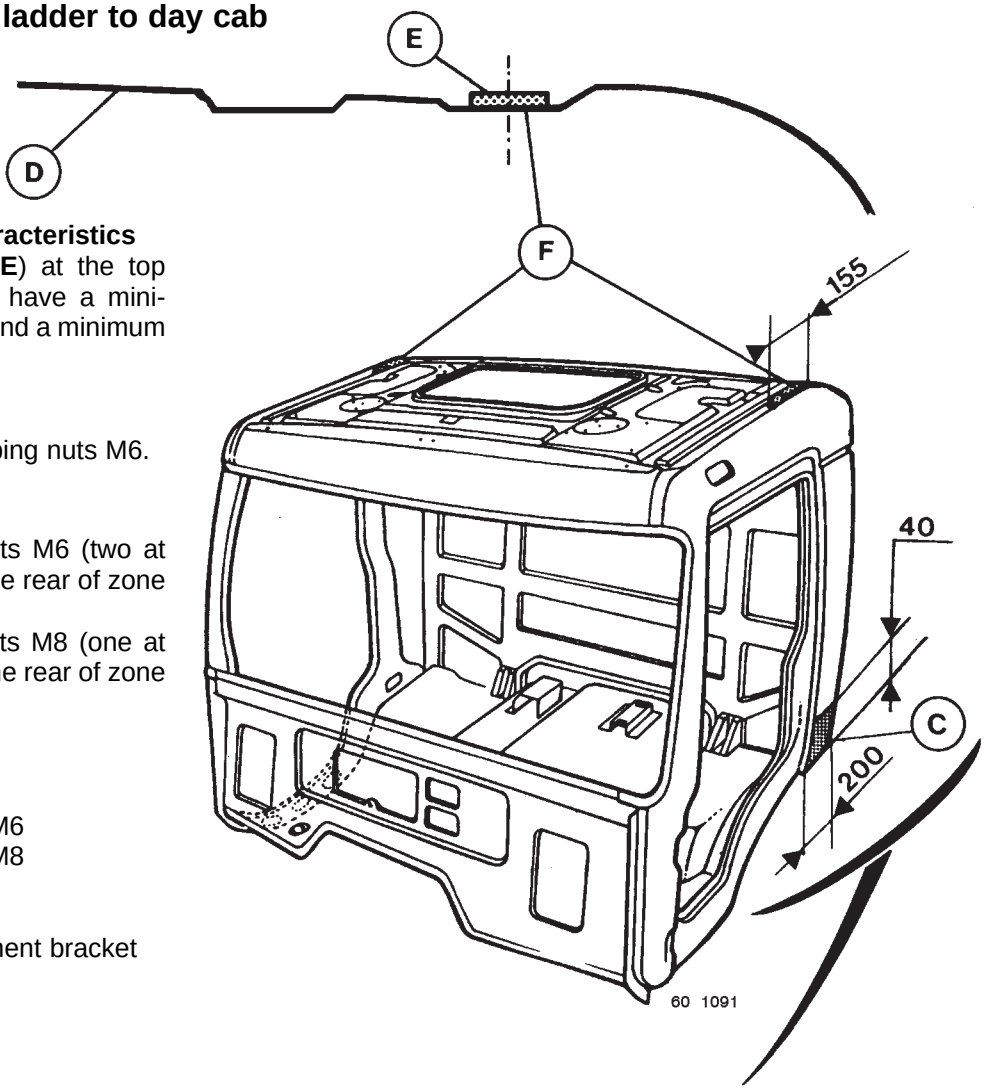
Catwalk attachment seen from above



7.2 Ladder

The design of the roof and the lower parts of the cab sides allow a ladder to be attached on the LH side or on the RH side, except for the RH side of day cabs.

7.2.1 Attachment of ladder to day cab



Ladder attachment characteristics

The ladder brackets (**C-E**) at the top and at the bottom must have a minimum thickness of 3 mm and a minimum span of 30 x 30 mm.

Top part (zone F):

- one or two sealed crimping nuts M6.

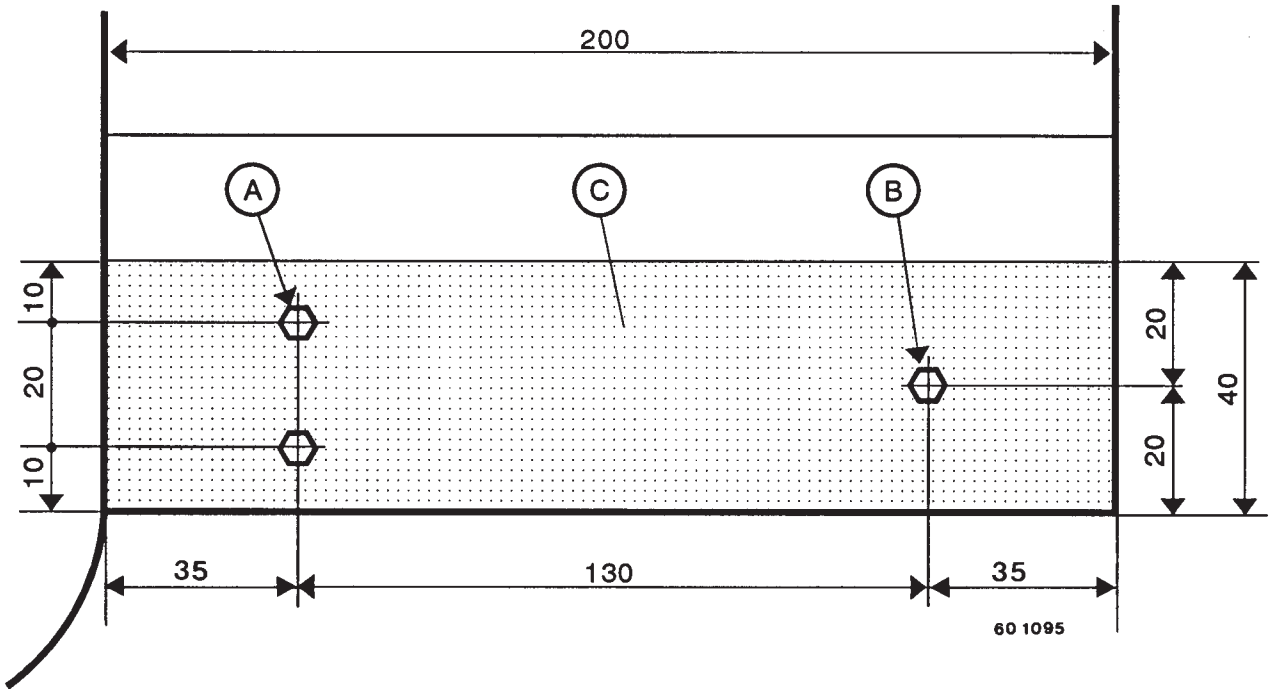
Bottom part (zone C):

Two possibilities:

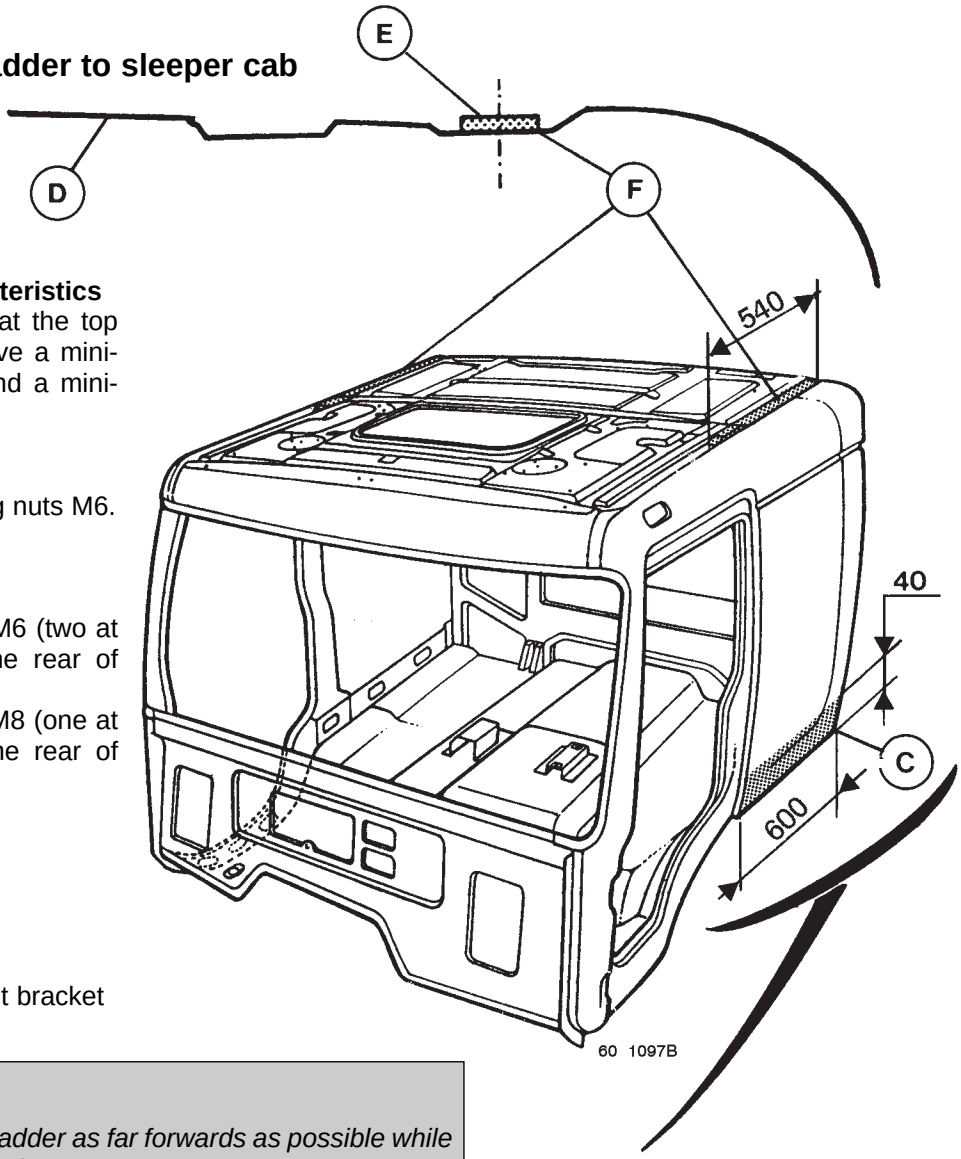
A - 4 sealed crimping nuts M6 (two at the front and two at the rear of zone (**C**).

B - 2 sealed crimping nuts M8 (one at the front and one at the rear of zone (**C**).

A - Sealed crimping nut M6
B - Sealed crimping nut M8
C - Lower fixing zone
D - Roof
E - Ladder upper attachment bracket
F - Upper fixing zone



7.2.2 Attachment of ladder to sleeper cab



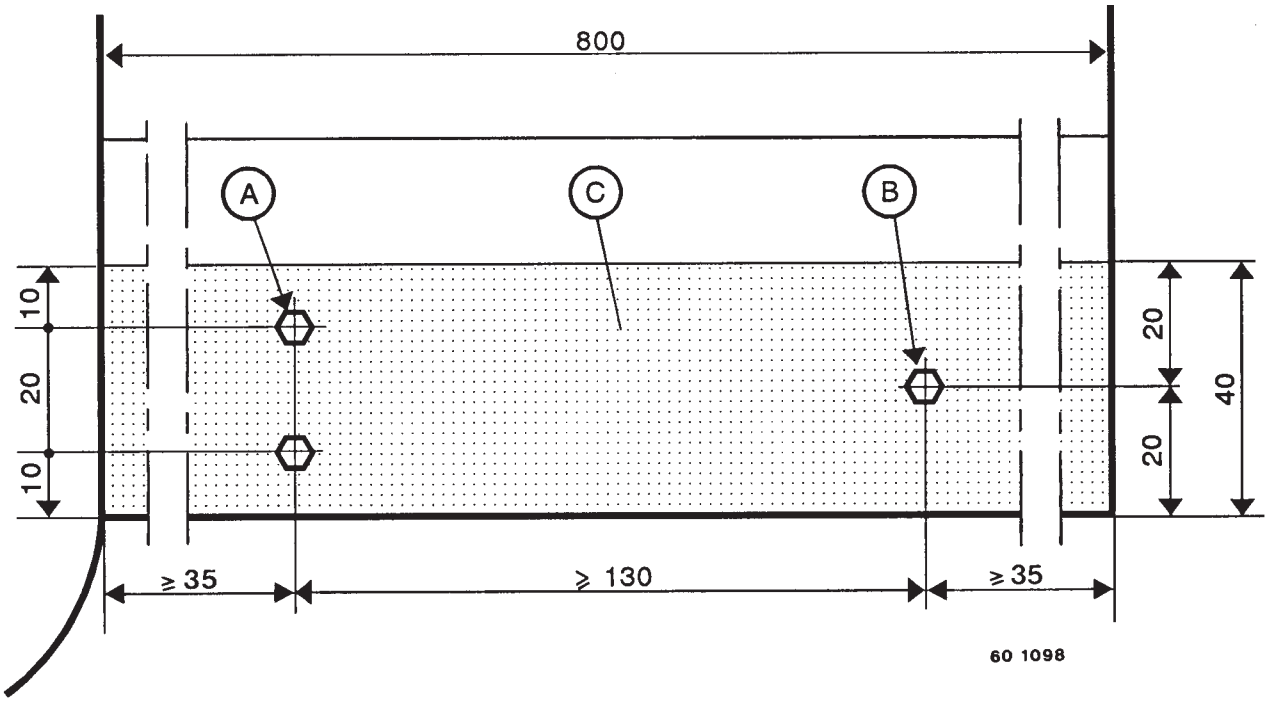
Ladder attachment characteristics
The ladder brackets (**C-E**) at the top and at the bottom must have a minimum thickness of 3 mm and a minimum span of 30 x 30 mm.

Top part (zone F):
- one or two sealed crimping nuts M6.

Bottom part (zone C):
Two possibilities:
A - 4 sealed crimping nuts M6 (two at the front and two at the rear of zone (**C**).
B - 2 sealed crimping nuts M8 (one at the front and one at the rear of zone (**C**).

A - Sealed crimping nut M6
B - Sealed crimping nut M8
C - Lower fixing zone
D - Roof
E - Ladder upper attachment bracket
F - Upper fixing zone

IMPORTANT
It is advised to position the ladder as far forwards as possible while observing the dimensions below, so as to:
- facilitate access to the ladder,
- avoid any interference between the ladder and external lugs on chassis or cab.



7.3 Assembly of accessories on roof

IMPORTANT
The roof is different according to the cab original fitment equipment:
*- Welded fixing nuts **(1)** for the deflector are used only with roof stiffeners on cabs equipped with deflector as standard.*
*- Sunshade, frontview mirror and gantry are components requiring the presence of a stiffener **(2)** welded as standard to the cab for their installation. This stiffener, located in an inaccessible zone, cannot be assembled as aftermarket fitment. On account of this, installation of sunshade, gantry and frontview mirror can only be carried out if certain conditions are met. Installation possibilities are detailed in chapter C-7.3.5, 7.3.6, 7.3.7.*

1 - Weld nuts
2 - Canopy reinforcement
3 - Canopy
4 - Roof
5 - Roof extension (sleeper cab)
6 - Stiffener extension (sleeper cab)
7 - Stiffener

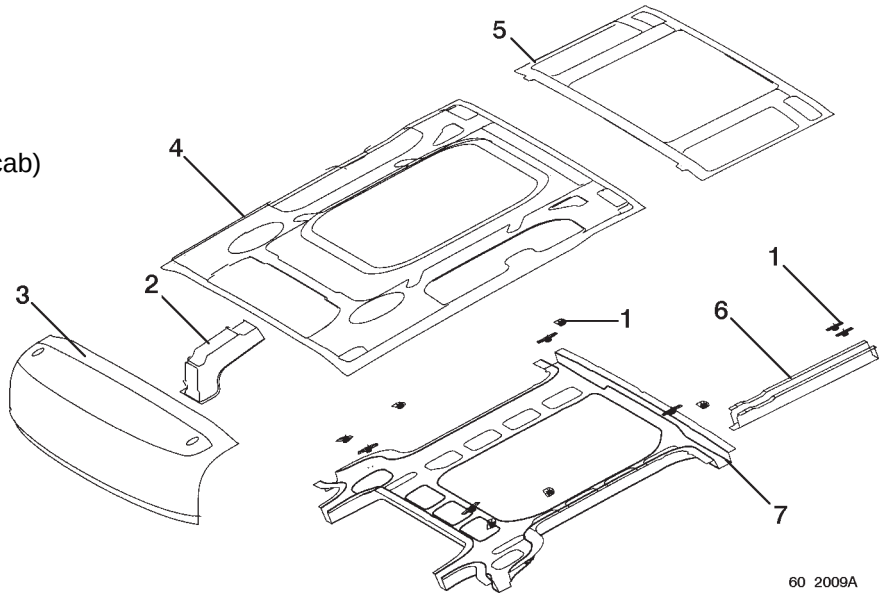


Table of roof assembly possibilities

The following table indicates:
- the exhaustive list of possible assemblies and combinations,
- the minimum configuration necessary for assembly.

Any combination other than that quoted in the table is forbidden (especially deflector / gantry incompatibility).

Assembly possibility according to roof	Roof configuration	
	Nuts (1)	Stiffener (2)
Gantry	X	X
Gantry and sunshade	X	X
Gantry and frontview mirror	X	X
Gantry, sunshade and frontview mirror	X	X
Deflector and sunshade	X	X
Deflector and frontview mirror	X	X
Deflector, sunshade and frontview mirror	X	X
Sunshade		X
Frontview mirror		X
Sunshade and frontview mirror		X
Deflector	X (*)	

(*) Weld nuts are used in the case of replacement of a deflector by a gantry.
If not, it is essential to use the clamping segments available from the RENAULT TRUCKS Spare Parts Department.

Equipment capable of being assembled, whatever the roof:
- Revolving beacons
- CB antenna
- Telephone antenna
- Air horns.

On the roof, impressions locate the position of accessory fastenings

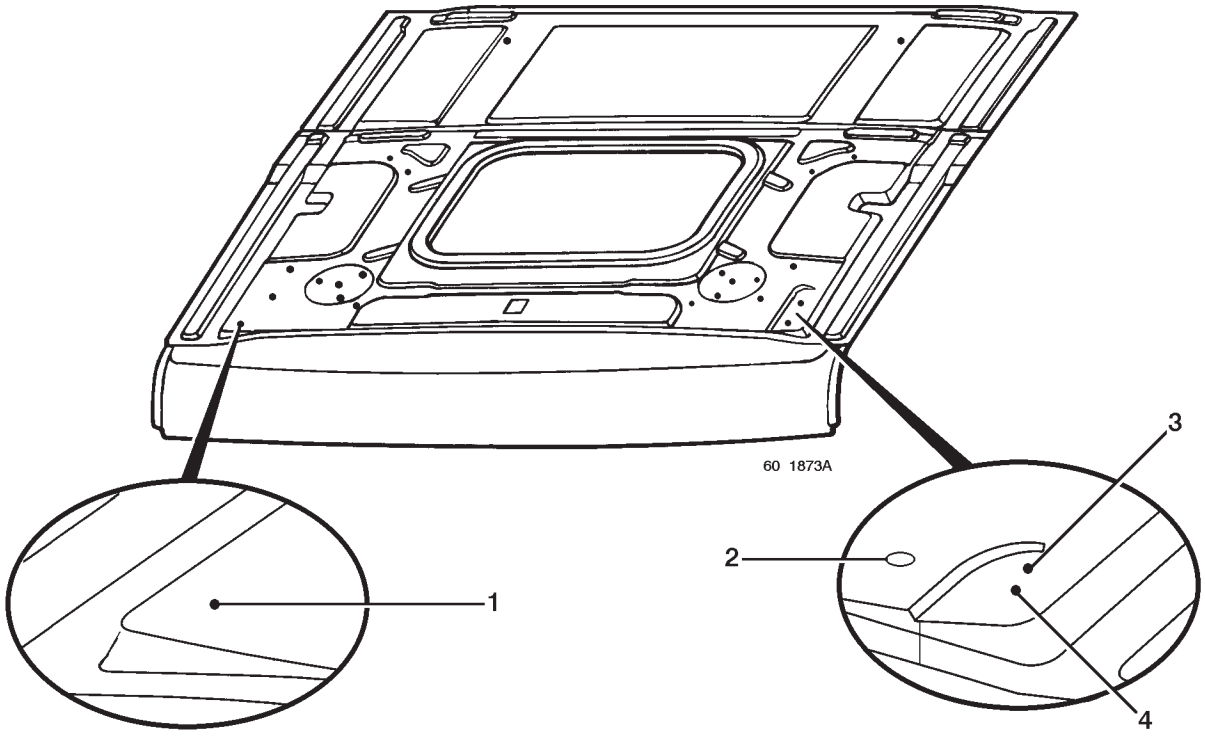
7.3.1 Installation of antennae

CB antenna:
- Wiring harness passage: at point (**3**), drill a hole dia. 4.5 mm.
- Antenna fastening: at point (**4**), drill a hole dia. 8.5 mm.

Telephone antenna
- At point (**1**), drill a hole dia. 14.5 mm.

Fire antenna
- Locate drilling point (**2**) using the template supplied in the installation kit
- Drill a hole dia. 24.5 mm

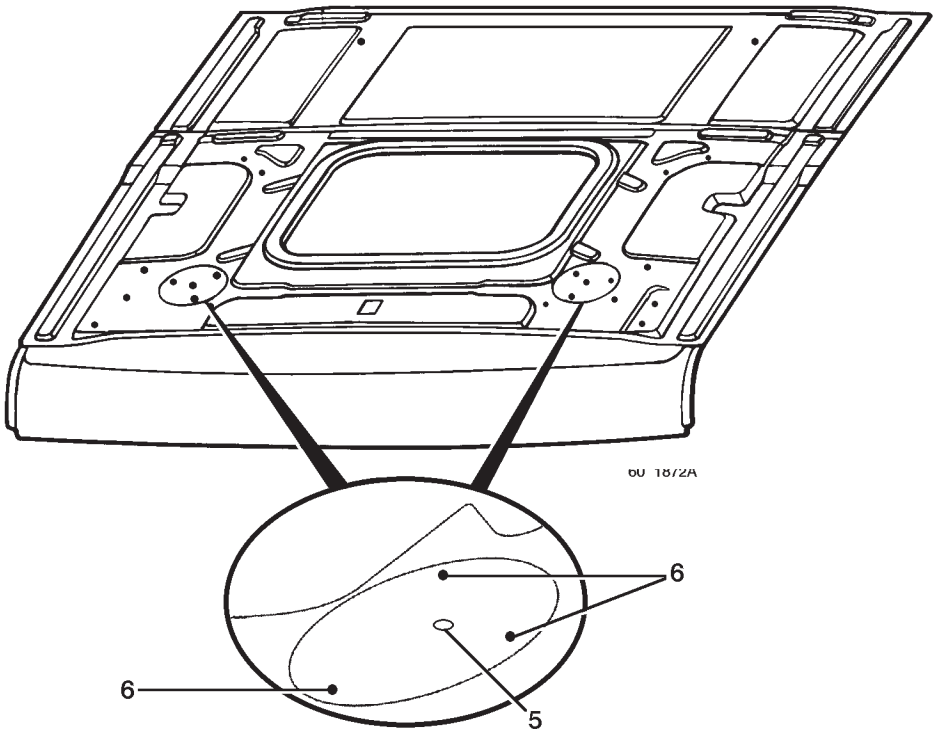
The wiring harness passages must be hermetically sealed. Use a wire grommet and sealing compound, if necessary



7.3.2 Installation of revolving beacons

- Wiring harness passage: at point (**5**), drill a hole dia. 35 mm.
- Revolving beacon fastening: at points (**6**), drill a hole dia. 7 mm.

The wiring harness passages must be hermetically sealed. Use a wire grommet and sealing compound, if necessary.

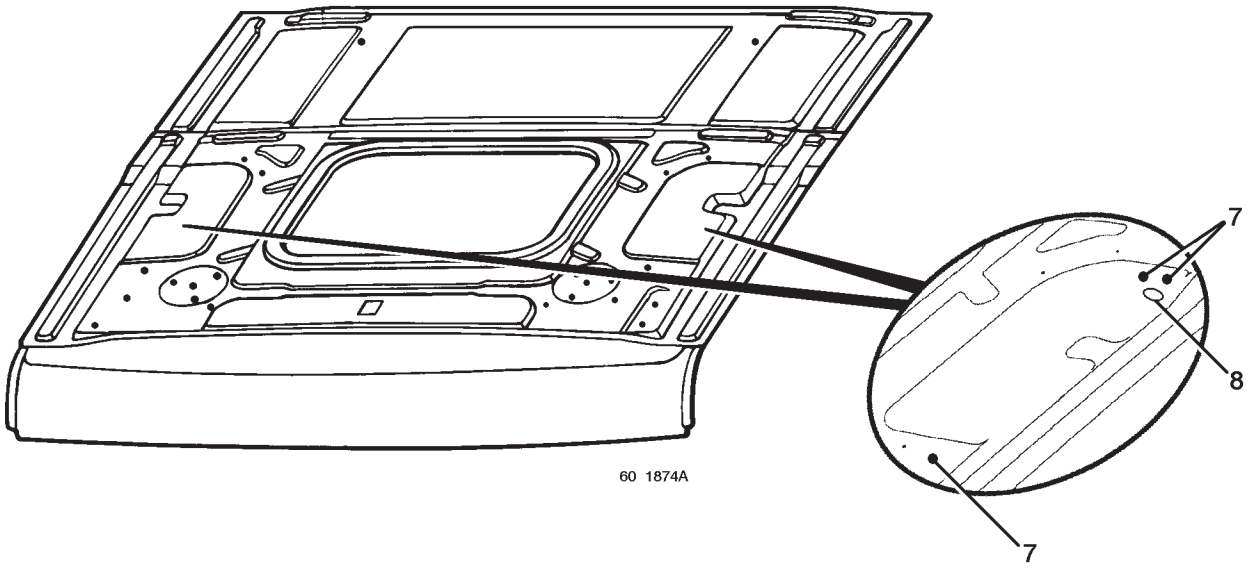


7.3.3 Installation of air horns

- Horns fastening: at points (**7**), drill a hole dia. 7 mm.
- Compressed air pipes passage: at point (8), drill a hole dia. 16.5 mm.

For positioning the drilling points (**7-8**), use the template provided for that purpose in the horns assembly kit.

The compressed air pipes passage must be hermetically sealed. Use a wire grommet and sealing compound, if necessary.



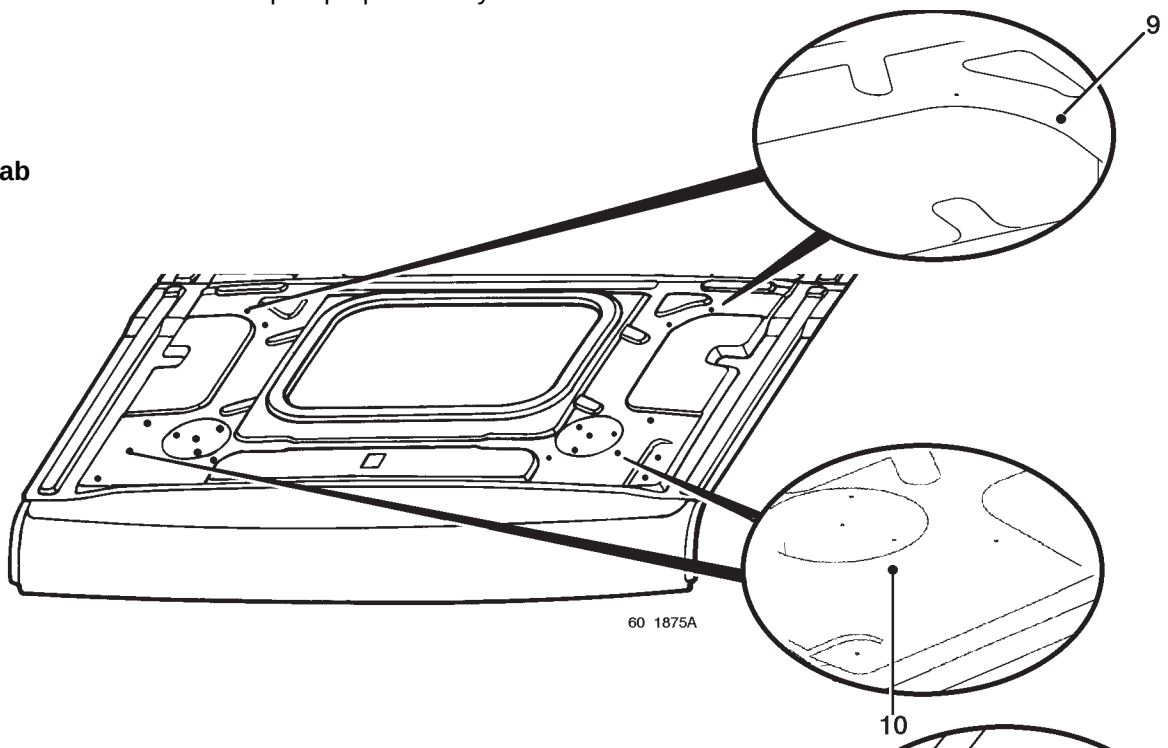
7.3.4 Installation of roof deflector

Impressions (**9-10-11-12**) locate the deflector fastenings. Nuts are welded to the roof stiffener if the vehicle is provided with a gantry as standard. If it is not, it is essential to use the clamping segments available from the RENAULT TRUCKS Spare Parts Department. Drill holes dia 12.5 mm at points (**9-10**) or (**11-12**).

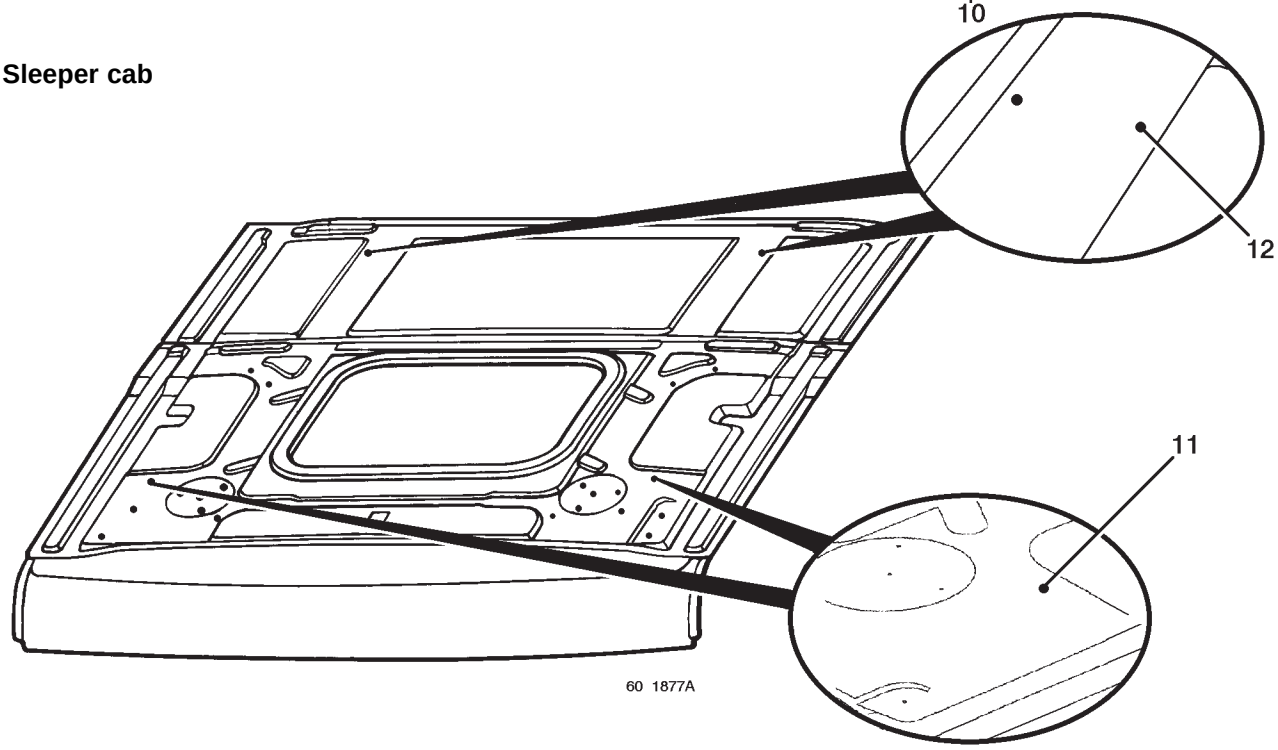
Note
Assembly of the roof deflector is incompatible with the presence of a gantry.

Upon reception of vehicles fitted with a deflector as standard, do not forget to remove the wooden board to be found inside the deflector.
This is used for transport purposes only.

Day cab



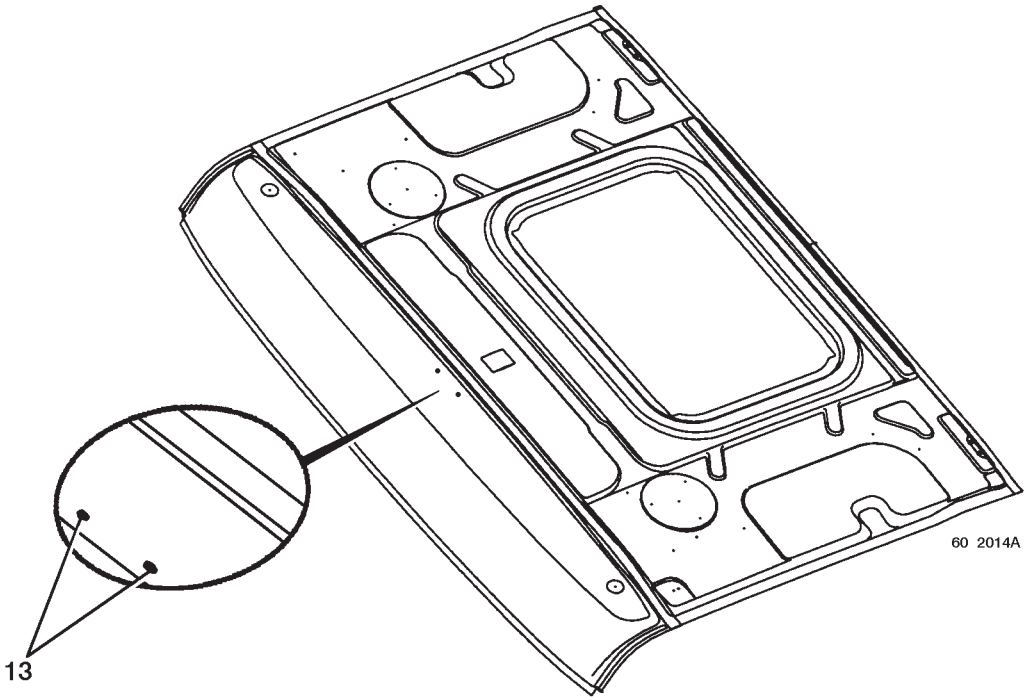
Sleeper cab



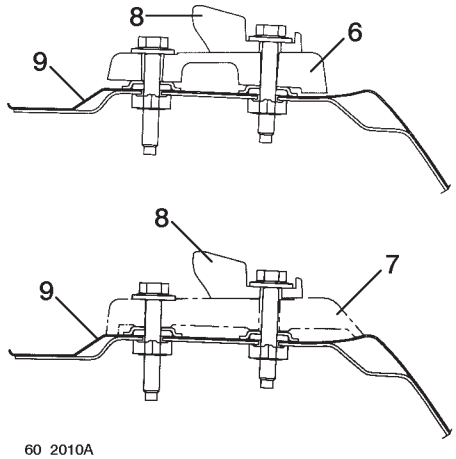
7.3.5 Installation of frontview mirror

Assembly of a frontview mirror is possible if the standard vehicle is equipped with gantry and/or sunshade.
If the vehicle is equipped with gantry and/or sunshade, there are fastening drillings on the existing canopy.
The frontview mirror base-plate takes the place of the gantry fastening spacer.

If the vehicle is not equipped with gantry, drillings **(13)** must be made in the canopy.
Drilling dia.: 12.5 mm.

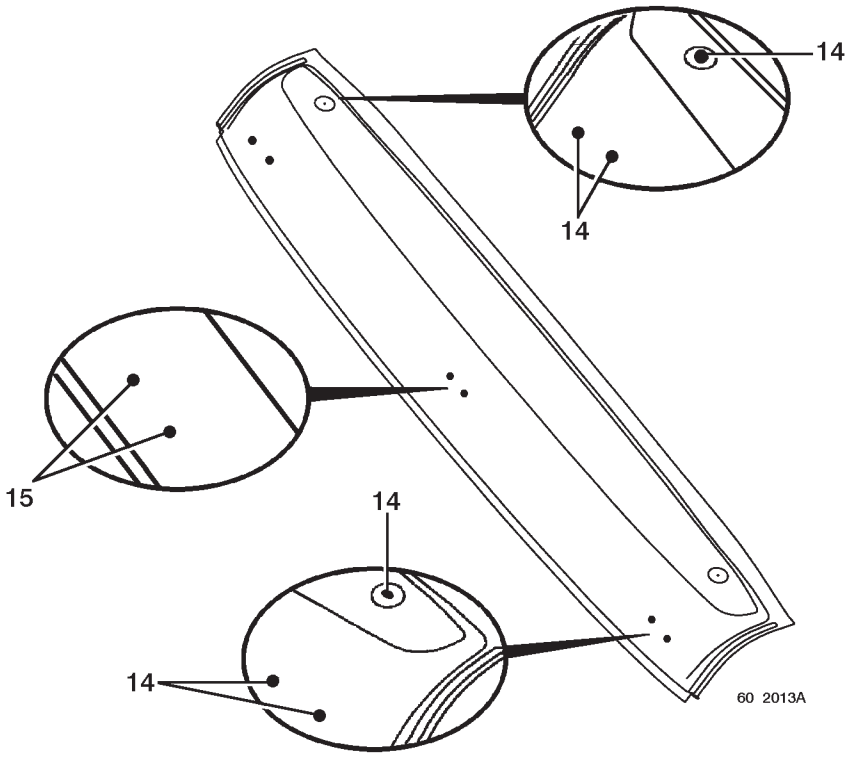


Assembly of a frontview mirror on vehicle equipped with a gantry :
The spacer (**6**) located on the central front fixing point (**8**) of the gantry is to be removed before installing the frontview mirror on the roof (**9**). The frontview mirror base-plate (**7**) plays the part of spacer.



7.3.6 Installation of sunshade

Assembly of the sunshade is possible if the standard vehicle is equipped with gantry and/or frontview mirror.
Drillings to be made on the canopy:
14 - 2 drillings dia. 12.5 mm.
15 - 6 drillings for fitting sealed crimping nuts M8.



7.3.7 Installation of gantry

The gantry can only be assembled as replacement for the deflector on the following assemblies:
- deflector and sunshade,
- deflector and frontview mirror,
- deflector, sunshade and frontview mirror.

The gantry allows a maximum loading weight of 30 kg to be supported.

Fastening the gantry:
- At points **(16-17)**, make drillings dia. 12.5 mm.

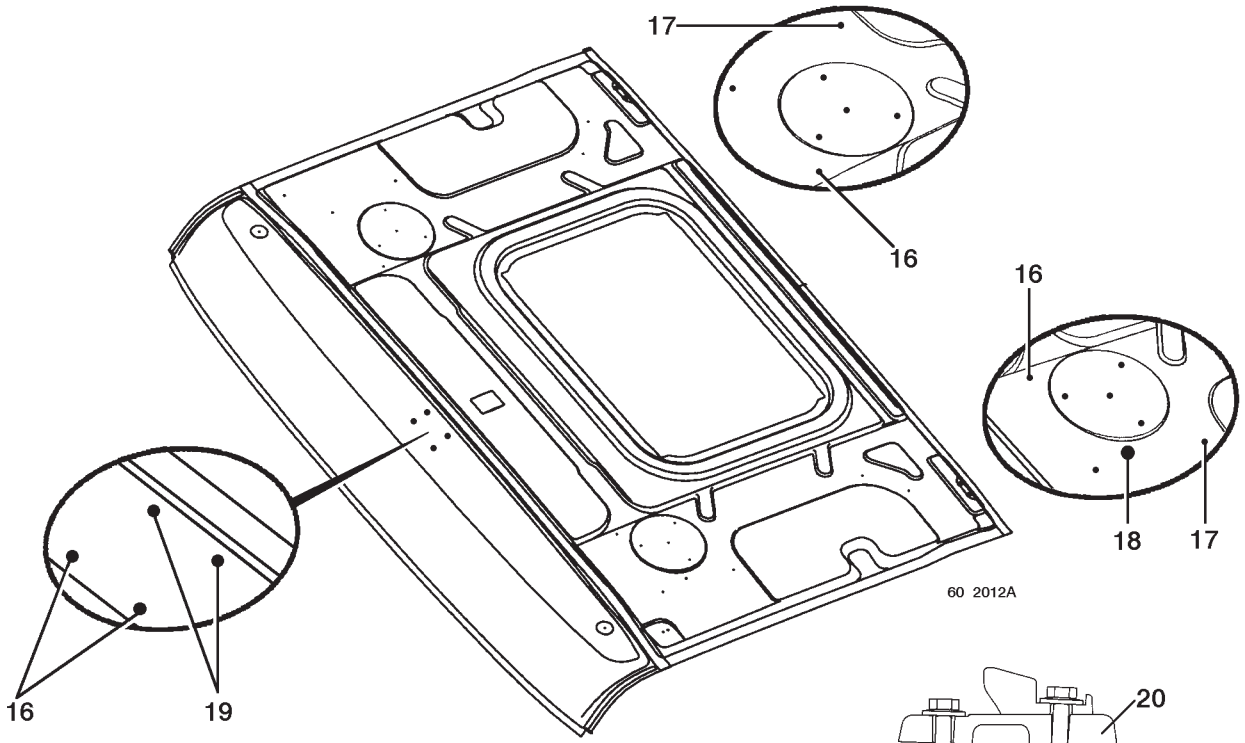
Wiring harness passage aperture:
- At point (**18**), make a drilling dia. 27 mm to allow passage of the wiring harness.

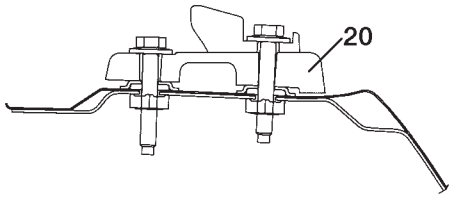
Passage (**18**) of the wiring harness must be hermetically sealed. Use a wire grommet and sealing compound, if necessary.

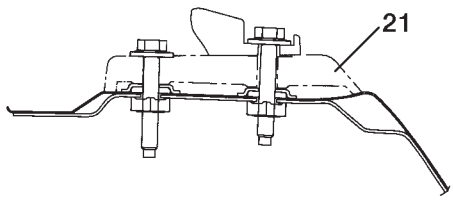
Note
Holes (**19**) already exist.
Holes (**17**) exist on sleeper cabs in the case of replacement of a deflector by a gantry.

IMPORTANT
All the unused deflector fixing holes must be blanked off with M8 screws and sealed washers.

Assembly of a gantry equipped with a frontview mirror:
Do not assemble spacer (**20**) as the frontview mirror base-plate (**21**) does the same job.





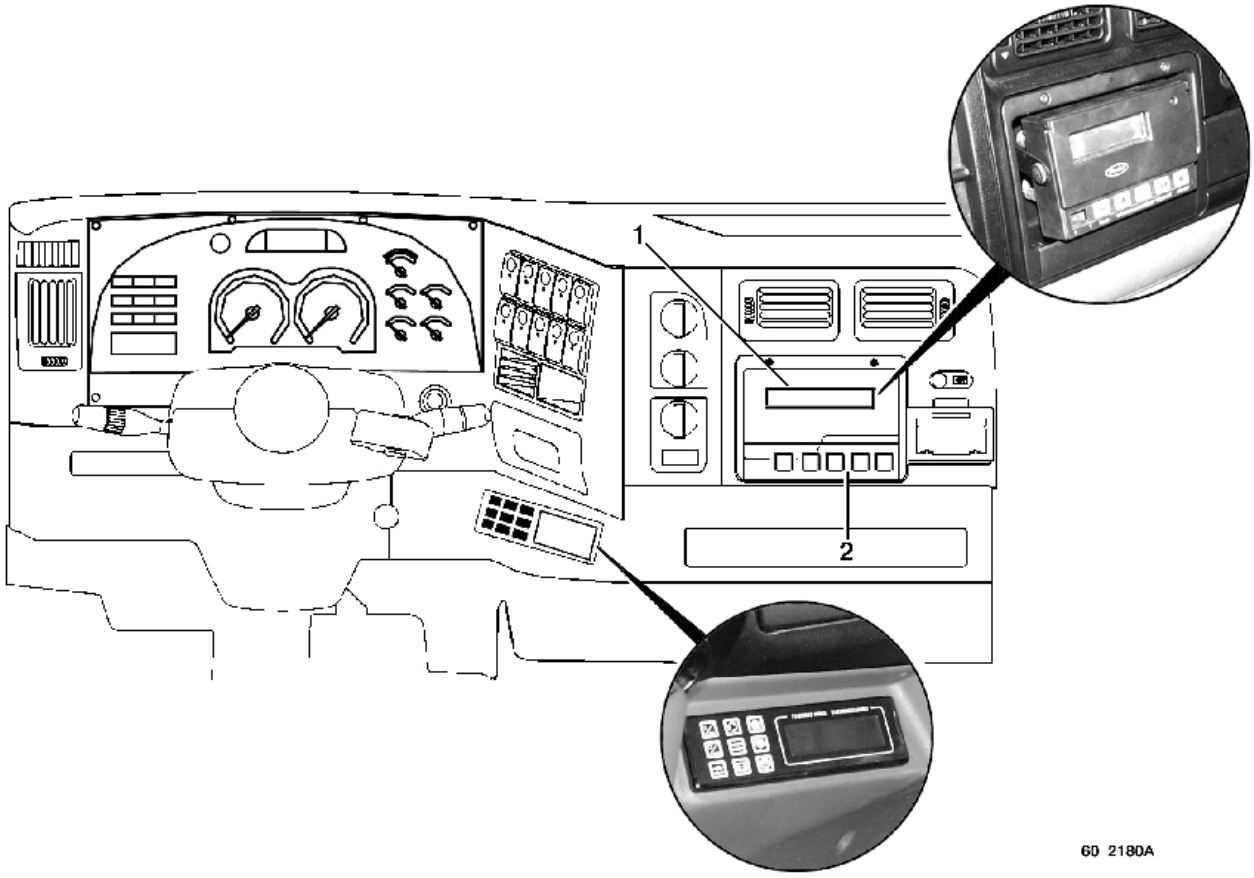


7.4 Assembly of accessories in cab

The cab is provided with several fixing points for the installation of cab equipment and various storage and stowage spaces.

7.4.1 Location in dashboard

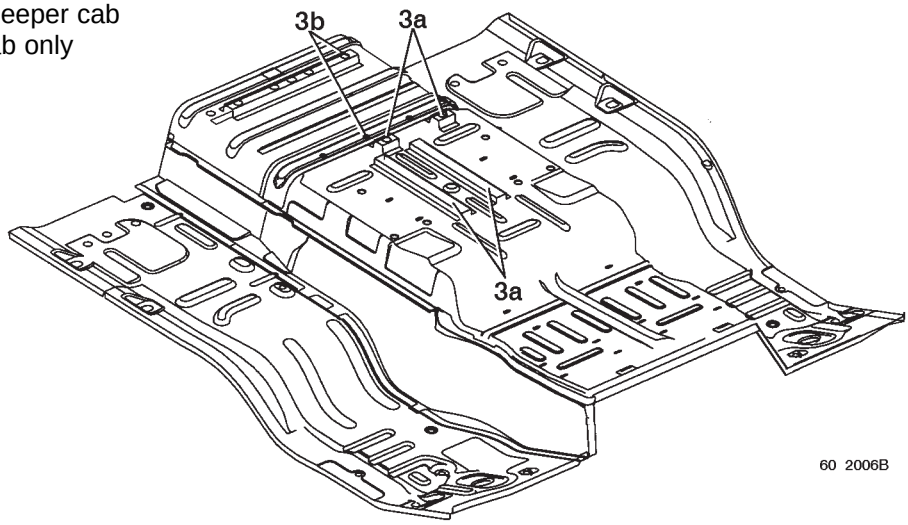
Housing (**1**) allows stowage of rectangular equipment items.
Remove the partition (**2**), if necessary.
In the event of absence of pneumatic switches (**3**), this location is available for stowing equipment (control box).



7.4.2 Location on engine tunnel

In the case of absence of a storage locker and front bench seat on the engine tunnel, mountings **(3)** can be used.

3a - day and sleeper cab
3b - sleeper cab only



8. AIRBAG

Depending on your vehicle's equipment

IMPORTANT
Any work on the airbag system must be carried out by qualified personnel who have undergone suitable training.

8.1 Identification of a vehicle equipped with an airbag system

A vehicle equipped with a driver's airbag can be identified by:
- the inscription "airbag" in the middle of the steering wheel.
- a sticker placed in the bottom corner of the windscreen, on the driver's side. (If the windscreen has to be replaced, affix a new sticker in the bottom corner of the new windscreen, on the driver's side).

8.2 Work on the vehicle (excluding the airbag) requiring precautions to be taken to avoid inadvertent deployment of the airbag

During repair or adaptation work, the vehicle is not to undergo significant knocks (hammer blows...) nor is welding work to be undertaken without previously disconnecting the battery and waiting for a period of 5 minutes.
No electrical accessories should be installed, as aftermarket fitment, within the close surrounds of an airbag (loudspeaker or any other appliance generating a magnetic field might cause the airbag to release).
Before removing the steering wheel, it is essential to unplug the airbag module connector so as to avoid any damage.
In the event of any work requiring uncoupling of the steering box universal joint, the roadwheels must be in the straight ahead position and the steering wheel must be immobilized, in order to keep to the mid-point of the rotary switch.

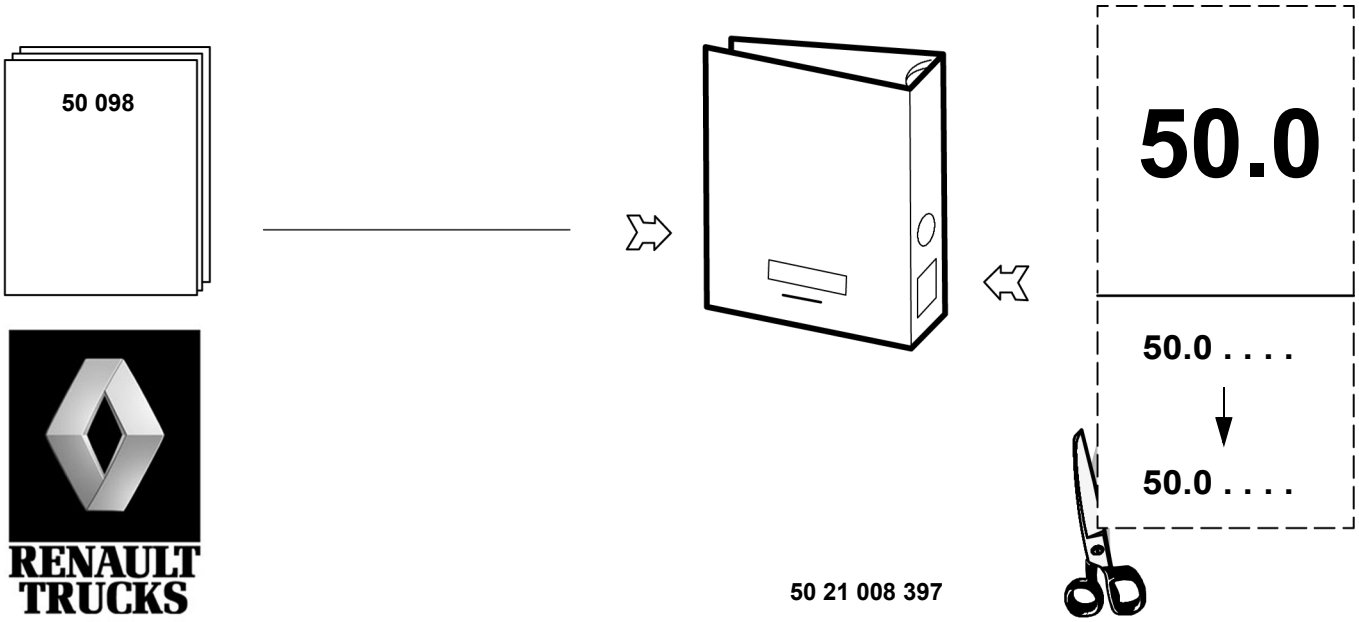
IMPORTANT
- *If an airbag system is fitted, the seat belt must be worn.*
- *If the driver's seat designed for the airbag system has to be changed, it must be replaced by a seat identical to the one originally fitted.*
- *Adjust the seat cushion and squab correctly so that the airbag offers optimum protection. The driver, with his back against the squab, should hold the steering wheel with his arms slightly bent.*
- *The protective cover **p**must be free from any article (ledge, clock, adhesive, various accessories...).*
- *There should be no objects within the airbag deployment area (dia. 80 cm).*
- *To avoid any inadvertent deployment of the airbag capable of causing bodily injury, it is forbidden to remove the steering wheel or work on the airbag system. Only the RENAULT TRUCKS network is qualified to work on the airbag system.*
- *Get the airbag system checked out in the case of accident or if there has been attempted theft of or from the vehicle.*
- *For safety reasons, replace the airbag and the pretensioner every 15 years.*
- *If water is splashed onto or gets into the electronic box located under the driver's seat, replace the box.*
- *Any significant modification to the front end of the vehicle or any overloading of the vehicle may lead to inadvertent release of the airbag system.*
- *When lending or reselling the vehicle, inform the borrower or purchaser of all these conditions. Get him to read the driving and servicing handbook.*

50 098 - GB - 06/2003

BRAKES

RANGE	FAMILY	VARIANT
MIDLUM 4X2	-	-

The above information may change in the course of time. Only the "Consult" section of the workshop manuals repertory in standard N° 10320 serves as reference.



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— Tightening torques . . . . . B1-2 → 3
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— Technical data. . . . . B3-1 → 22

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Testing/adjustment . . . . . **E-1 → 21**

GENERALITIES

Warnings

In this document, safety instructions are symbolized as follows:

DANGER! NON-OBSERVANCE OF THE PROCEDURE DESCRIBED OR LACK OF CARE OR ATTENTION RISK CAUSING SERIOUS INJURY OR EVEN DEATH.

WARNING! Any different or inappropriate working method risks causing damage to the product.

NOTE! Draws attention to particular or important points of the method.

Environment

Comply with the regulations in force relative to the recovery and treatment of used parts and waste.

Conventional symbols

Fitting

	Tighten to torque (Nm) (left-hand thread)		Tighten by indicated value
	Tighten to torque (Nm) (right-hand thread)		Loosen by indicated value
	Tightening torque with lubricated threaded hardware		

Dimensioning

	Tightening		... Greater than or equal to ...
	Equal to		Wear limit
	... Less than ...		Machining limit or dimension
	... Greater than ...		Maximum out-of-true
	... Less than or equal to ...		Maximum parallelism error

Repair

	Force to be exerted in the direction shown (hammer - press)		Smear or coat (see "Consumables" table)
	Heat or cool: Temperature in degrees Celsius (e.g. + 80 °C)		Fill to level (see "Technical Data" and "Consumables" table)
	Weld bead		Grease or oil (see "Consumables" table)
	Repair time - Heating time		Mark - Assemble according to marking

Adjustment

	Rotating friction torque		Turn anti-clockwise
	Turn in alternate directions		Turn anti-clockwise (the figure shows the number of turns)
	Turn clockwise		Turn clockwise (the figure shows the number of turns)
	Place in contact		Move in the direction shown
	Dimension to be assured (mm)		

Various information

	Exhaust - Outlet		Operation with a sequence
	Intake - Inlet		Involves
	Weight in kg (example: 275 kg)		Return to numbered operation - Connected with numbered operation
	Depending on versions or options		Withdraw - Delete
	Wrong		Direction of disassembly (the arrow shows the direction)
	Correct		Direction of assembly (the arrow shows the direction)
	Injection		... to ...
	Repair dimension		Inspect - Check condition of part
	Part to be replaced		Danger for persons, vehicle or equipment

TECHNICAL DATA

Tightening torques

Definition

There are several types of tightening:
- Tightening to torque (in **Nm)**
- Tightening to angle (en °)
- Tightening to torque-angle (en **Nm + °)**

Torques given in **Nm. are nominal torques (average value calculated on the basis of the minimum torque and the maximum torque).**
The tightening precision class defines the tolerance of this torque in percent as a function of the nominal torque applied.

Tightening precision classes:
- **Class I: Special threaded hardware (tolerances ± 10% of the final torque).**
- **Class II: Reserved for precise tightening (tolerance ± 10% of the nominal torque).**
- **Class III: Reserved for normal standard tightening (tolerance ± 20% of the nominal torque)**

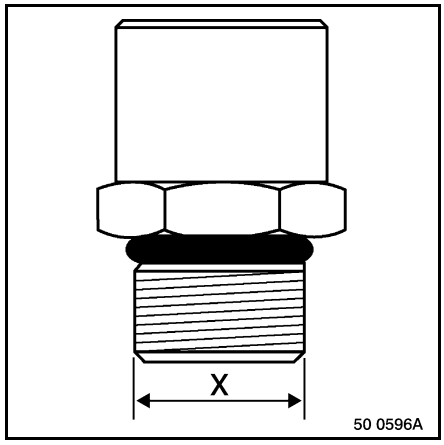
For standard threaded hardware indicated in the table below, use tightening class **III).**
For other torques, see the following page(s).

Unless indicated otherwise, fit the nut and bolt hardware dry (without oiling).

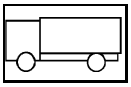
Tightening torques for conventional nut and bolt hardware to "metric system" standard 01.504.002		
Diameter and pitch of nuts and bolts	**Quality class 8.8**	**Quality class 10.9**
	Tightening class III (± 20 %)	**Tightening class III (± 20 %)**
6 x 1.00	7.4	10.8
7 x 1.00	12.1	17.8
8 x 1.00	19.2	28.2
8 x 1.25	17.9	26.3
10 x 1.00	39.4	58
10 x 1.25	37.4	55
10 x 1.50	35.4	52
12 x 1.25	67	98
12 x 1.50	64	94
12 x 1.75	61	90
14 x 1.50	105	155
14 x 2.00	98	143
16 x 1.50	161	237
16 x 2.00	151	222
18 x 1.50	235	346
18 x 2.50	210	308
20 x 1.50	328	481
20 x 2.50	296	435
22 x 1.50	444	652
22 x 2.50	406	596

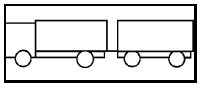
Tightening of unions

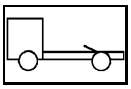
dia. X	Tightening torque
1/8 gaz	**9** ± **1** Nm
M 10x100	**9** ± **1** Nm
M 12x150	**15** ± **3** Nm
M 14x150	**15** ± **3** Nm
M 16x150	**25** ± **5** Nm
M 22x150	**25** ± **5** Nm

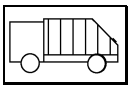


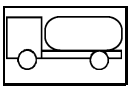
Vehicle axle spread identification

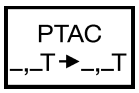

Solo rigid


Drawbar rigid

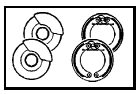

Tractor

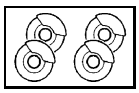

Municipal vehicle

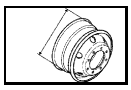

Tanker

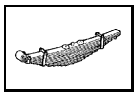


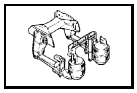
Plated gross vehicle weight "GVW"


Vehicle equipped with disc brakes at front and drum brakes at rear


Vehicle equipped with disc brakes at front and rear

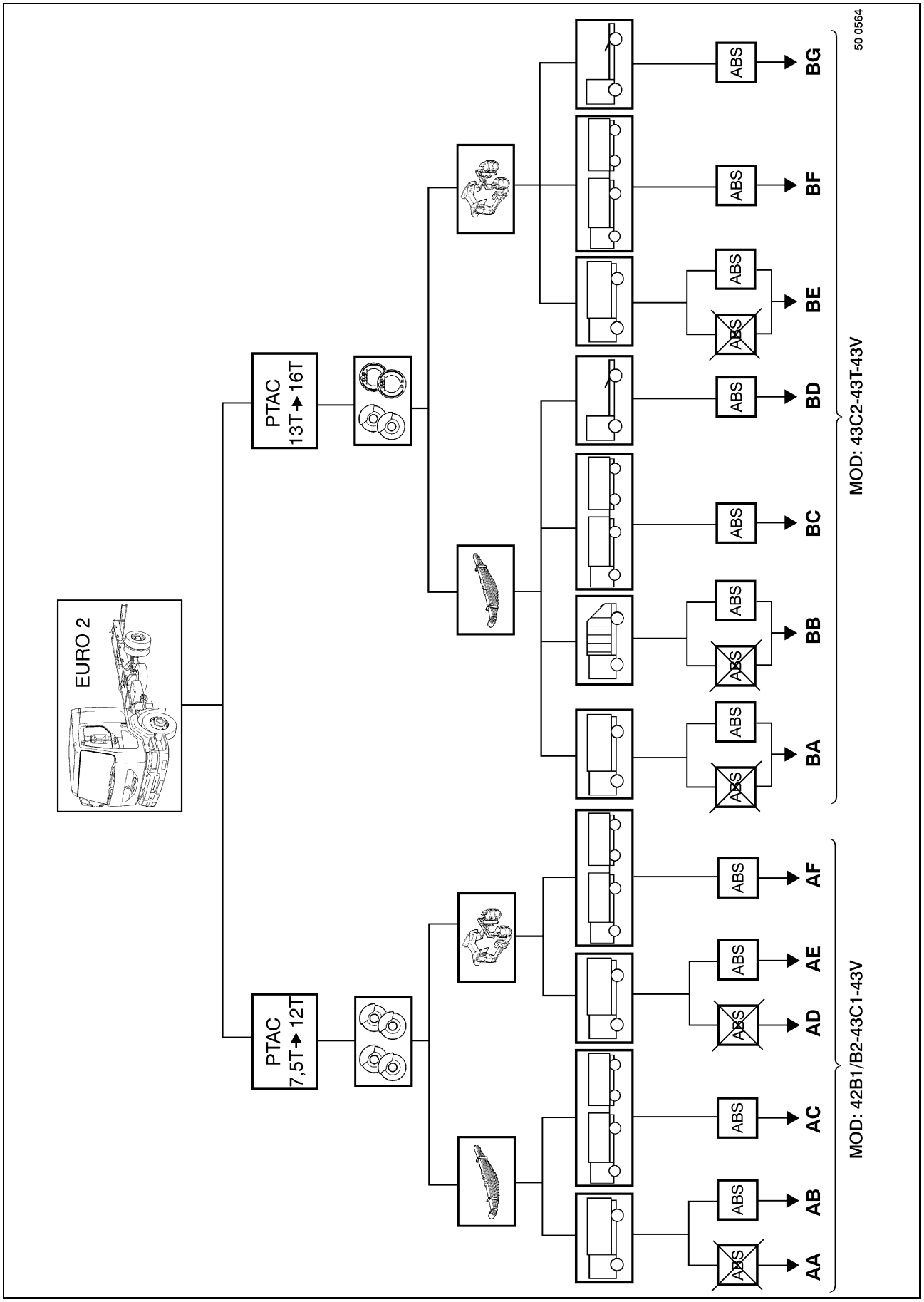

Wheel rim dimensions

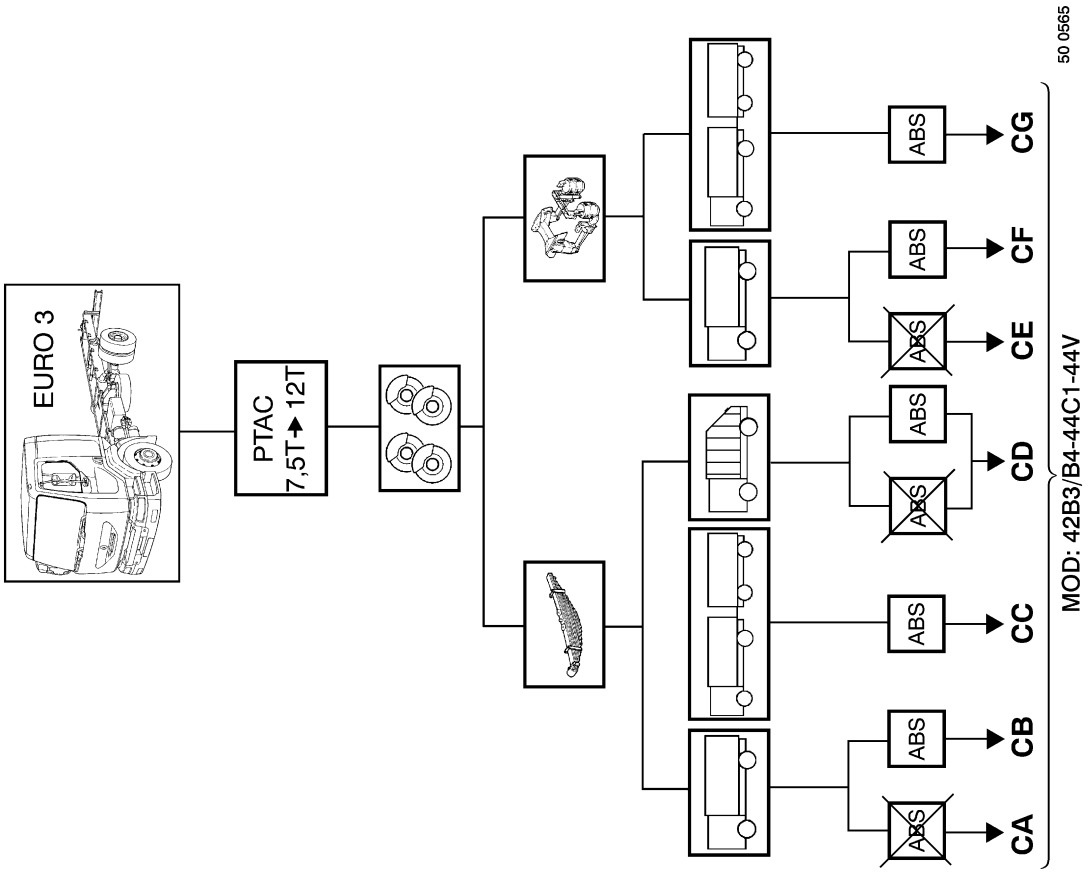

Vehicle equipped with rear mechanical suspension

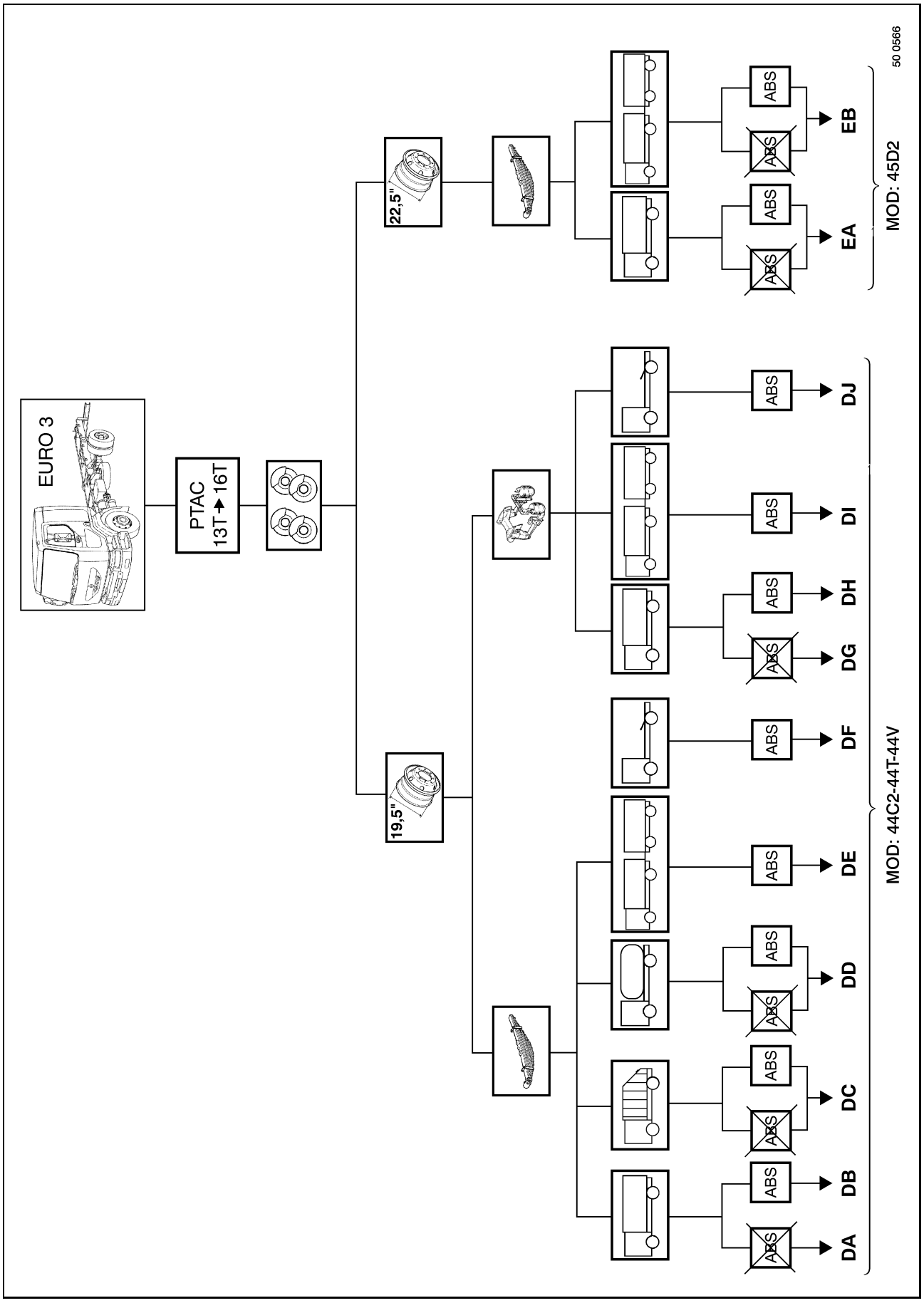

Vehicle equipped with rear air suspension

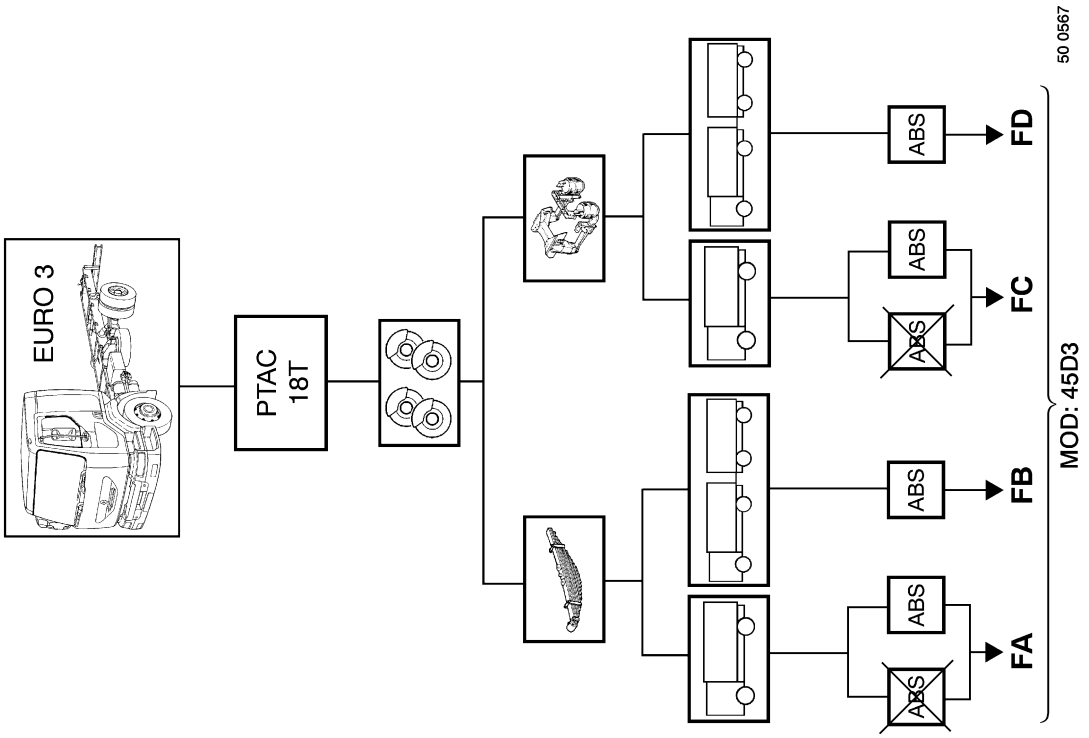
Vehicle without "ABS" anti-lock braking system

Vehicle with "ABS" anti-lock braking system


EURO 2
PTAC 7,5T→12T
PTAC 13T→16T
ABS
AA
AB
AC
AD
AE
AF
BA
BB
BC
BD
BE
BF
BG
MOD: 42B1/B2-43C1-43V
MOD: 43C2-43T-43V
50 0564


EURO 3
PTAC
7,5T→12T
ABS
CA
CB
CC
CD
CE
CF
CG
MOD: 42B3/B4-44C1-44V
50 0565


EURO 3
PTAC
13T → 16T
22,5"
19,5"
ABS
DA
DB
DC
DD
DE
DF
DG
DH
DI
DJ
EA
EB
MOD: 44C2-44T-44V
MOD: 45D2
50 0566


EURO 3
PTAC
18T
ABS
ABS
ABS
ABS
ABS
ABS
FD
FC
FB
FA
MOD: 45D3
50 0567

Technical data

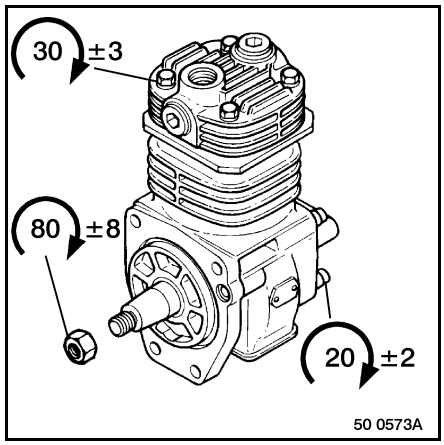
IMPORTANT

These values serve for vehicle testing or diagnostics purposes and cannot be used to check conformity of the vehicle with the legislation in force.
These values are given for appliances on the test bench.

0100 – Air compressor

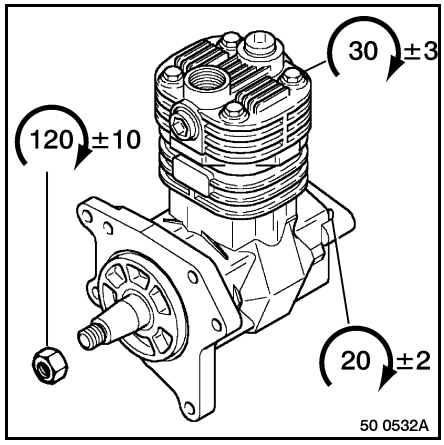
Single-cylinder compressor KNORR LK1554
=> 06/01/2001

Axle spread(s)	**–**
Displacement	**150cm^3**
Port screw-threads **0 - 2**	**M 26x150**



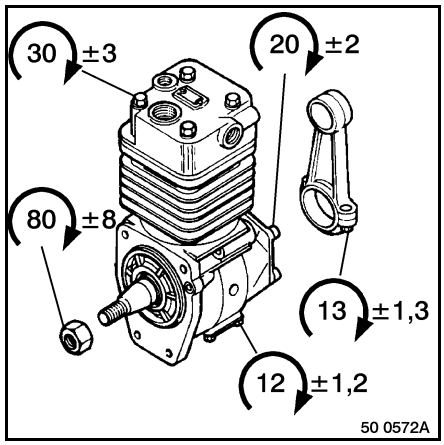
Single-cylinder compressor KNORR LK1567
08/01/2001 =>

Axle spread(s)	**–**
Displacement	**150cm^3**
Port screw-threads **0 - 2**	**M 26x150**



Single-cylinder compressor KNORR LP3861

Axle spread(s)	–
Displacement	**250cm^3**
Port screw-threads **0 - 2**	**M 26x150**
Port screw-threads **91 - 92**	**M 18x150**



0500 – Air dryer

Single-canister air dryer WABCO 4324150380

Axle spread(s)	**AA → AF / CA → CG / DA → DJ / EA, EB / FA → FD**
Cut-out pressure	**10 $^{+\ 0.4}$bar**
Cut-in pressure	**9 $^{+\ 0.4}$bar**
Safety pressure	**25bar**
Port screw-threads	**M 22x150**

Single-canister air dryer KNORR LA8015

Axle spread(s)	**BA, BB, BE**
Cut-out pressure	**8.6 $^{+\ 0.4}$bar**
Cut-in pressure	**7.8$^{+\ 0.4}$bar**
Safety pressure	**15bar**
Port screw-threads	**M 22x150**

Single-canister air dryer KNORR LA8011

Axle spread(s)	**BC, BD, BF, BG**
Cut-out pressure	**8.6$^{+\ 0.4}$bar**
Cut-in pressure	**7.8$^{+\ 0.4}$bar**
Safety pressure	**15bar**
Port screw-threads	**M 22x150**

0800 – Protection valve

Protection valve WABCO 9347141300

Axle spread(s)	**AA → AF / CA → CG / DA → DJ / EA, EB / FA → FD**

Opening pressure

- circuit **21 - 22**	**$7^{-0.3}$ bar**
- circuit **23**	**$7.5^{-0.3}$ bar**
- circuit **24**	**$7^{-0.3}$ bar**
Static closing pressure	**$4.5^{+0.5}$bar**
Port screw-threads **1 - 21 - 22 - 23**	**M 22x150**
Port screw-threads **24**	**M 16x150**

Protection valve KNORR AE4440

Axle spread(s)	**BA, BB, BE**
Axle spread(s)	**BC, BD, BF, BG => 10/02/2001**

Opening pressure

- circuit **21 - 22**	**$7^{-0.3}$ bar**
- circuit **23**	**$7.3^{-0.3}$ bar**
- circuit **24**	**$7^{-0.3}$ bar**
Static closing pressure	**$4.5^{+0.5}$ bar**
Port screw-threads **1**	**M 22x150**
Port screw-threads **21 - 22 - 23 - 24**	**Flanged**

Protection valve KNORR AE4605

Axle spread(s)	**BC, BD, BF, BG 12/02/2001 =>**

Opening pressure

- circuit **21 - 22**	**$7^{-0.3}$ bar**
- circuit **23**	**$7.3^{-0.3}$ bar**
- circuit **24**	**$7^{-0.3}$ bar**
Static closing pressure	**$4.5^{+0.5}$ bar**
Port screw-threads **1**	**M 22x150**
Port screw-threads **21 - 22 - 23 - 24**	**Flanged**

1001 – Front brake air tank

Air tank capacity 15 L

Axle spread(s)	**AA → AF / CA → CG**
Diameter	**200 mm**
Validity time	**15 year(s)**
Port screw-threads	**M 22x150**

Air tank capacity 25 L

Axle spread(s)	**BA → BG / DA → DJ / EA, EB / FA → FD**
Diameter	**250 mm**
Validity time	**15 year(s)**
Port screw-threads	**M 22x150**

1010 – Rear brake air tank

Air tank capacity 15 L

Axle spread(s)	**AA → AF / CA → CG**
Diameter	**200 mm**
Validity time	**15 year(s)**
Port screw-threads	**M 22x150**

Air tank capacity 25 L

Axle spread(s)	**BA → BG / DA → DJ / EA, EB / FA → FD**
Diameter	**250 mm**
Validity time	**15 year(s)**
Port screw-threads	**M 22x150**

1021 – Trailer brake air tank

Air tank capacity 15 L

Axle spread(s)	**AC, AE, CC, CG, DE, DI, EB, FB, FD**
Diameter	**200 mm**
Validity time	**15 year(s)**
Port screw-threads	**M 22x150**

Air tank capacity 20 L

Axle spread(s)	**BC, BD, BF, BG, DF, DJ**
Diameter	**250 mm**
Validity time	**15 year(s)**
Port screw-threads	**M 22x150**

1050 – Auxiliary equipment air tank

Air tank capacity 30 L

Axle spread(s)	**AD, AE, AF, CE, CF, CG, DG, DH, DI, DJ, FC, FD**
Diameter	**250 mm**
Validity time	**15 year(s)**
Port screw-threads	**M 22x150**

Air tank capacity 30 L

Axle spread(s)	**BE, BF, BG**
Diameter	**300 mm**
Validity time	**15 year(s)**
Port screw-threads	**M 22x150**

2600 – Duplex service brake control valve

Brake valve WABCO 4614945100

Axle spread(s)	**AA → AF**
Difference between 2 sections	**0.3 ± 0.15 bar**
Maximum operating pressure	**10.4bar**
Port screw-threads	**Flanged**

Brake valve WABCO 4614945110

Axle spread(s)	**BA → BG**
Difference between 2 sections	**0.15 ± 0.15 bar**
Maximum operating pressure	**10.4bar**
Port screw-threads	**Flanged**

Brake valve WABCO 4614945322

Axle spread(s)	**CA → CG**
Difference between 2 sections	**0.3 ± 0.15 bar**
Maximum operating pressure	**10.4bar**
Port screw-threads	**Flanged**

Brake valve WABCO 4614945352

Axle spread(s)	**DA → DJ / EA, EB / FA → FD**
Difference between 2 sections	**0.15 ± 0.15 bar**
Maximum operating pressure	**10.4bar**
Port screw-threads	**Flanged**

3000 – Quick release valve

Quick release valve WABCO 9735000450
Front brake circuit

Axle spread(s)	**DA → DJ / EA, EB / FA → FD**
Port screw-threads	**M 22x150**

Quick release valve WABCO 9735000390
Parking brake circuit

Axle spread(s)	**BA → BG**
Port screw-threads	**M 22x150**

Quick release valve WABCO 9735000450
Parking brake circuit

Axle spread(s)	**AA → AF / CA → CG / DA → DJ / EA, EB / FA → FD**
Port screw-threads	**M 22x150**

3100 – Pressure reduction valve

Pressure reduction valve KNORR 1101686000

Axle spread(s)	**BC, BD, BF, BG**
Reduction ratio	**1.5/1**
Maximum operating pressure	**10bar**
Port screw-threads	**M 16x150**

3150 – Adaptation valve

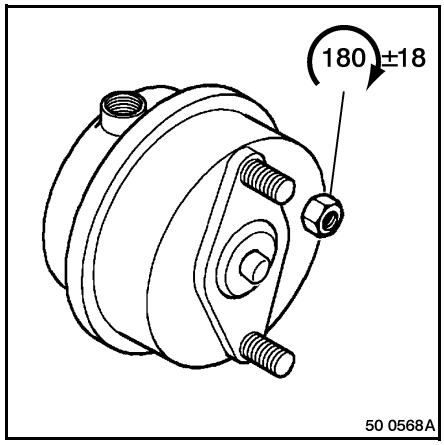
Adaptation valve KNORR DB2145

Axle spread(s)	**BA, BB, BE**
Maximum operating pressure	**10bar**
Port screw-threads	**M 16x150**

3600 – Single diaphragm brake cylinder

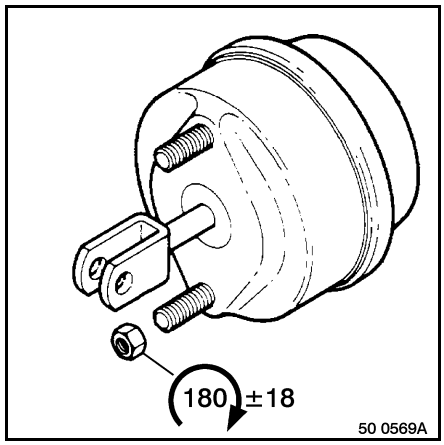
Diaphragm chamber WABCO type "16"

Axle spread(s)	**AA → AF / CA → CF**
Reference	**4235040120**
Active diameters	**146 mm**
Travel	**57mm**
Port screw-threads	**M 16x150**



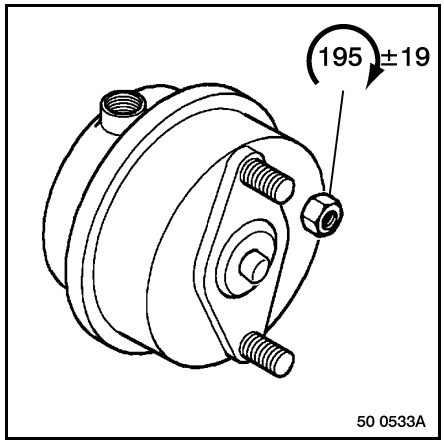
Diaphragm chamber KNORR type "24"

Axle spread(s)	**BA → BG**
Reference	**BZ 3593**
Active diameters	**161 mm**
Travel	**75 mm**
Port screw-threads	**M 16x150**



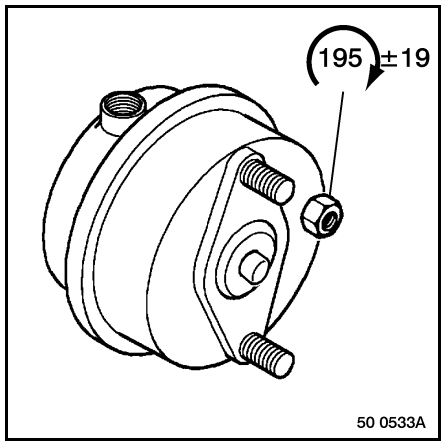
Diaphragm chamber WABCO type "20"

Axle spread(s)	**DA, DB, DE, DG, DH, DI (13-14T)**
Reference	**4235050000**
Active diameters	**152.7 mm**
Travel	**62 mm**
Port screw-threads	**M 16x150**



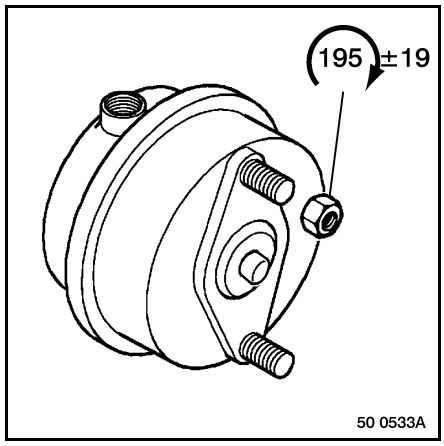
Diaphragm chamber WABCO type "24"

Axle spread(s)	**DA, DB, DE, DG, DH, DI (15-16T)**
Axle spread(s)	**DC, DD, DF, DJ, EA, EB**
Reference	**4235060010**
Active diameters	**160.5 mm**
Travel	**62 mm**
Port screw-threads	**M 16x150**



Diaphragm chamber M.G.M type "20"

Axle spread(s)	**FA → FD**
Reference	**68322891**
Active diameters	**153 mm**
Travel	**75 mm**
Port screw-threads	**M 16x150**



3740 – Air shoe brake

Wedge type brake backplate BOSCH 360x170
Rear brake

Axle spread(s)	**BA → BG**
Fastening	**Nuts + bolts M 16x200**
Tightening torque	**255 ± 25 Nm**

Brake linings

Quality (asbestos-free)	**ABEX 927**
Original thickness	**17 mm**
Minimum permissible thickness	**5 mm**

Lenght

- leading shoe	**362 mm**
- trailing shoe	**270 mm**
Width	**170 mm**

Brake drum

Original inside diameter	**360 mm**
Maximum grinding diameter	**363 mm**
Maximum wear diameter	**364 mm**
Linings/drum clearance	**0.8 mm**

3741 – Air brake caliper

Single-disc brake caliper MERITOR C-Lisa
Front brake

Axle spread(s)	**BA → BG**
Fastening	**Setscrews M 20x150**
Tightening torque	**600 ± 60 Nm**

Brake pads

Quality (asbestos-free)	**TEXTAR T3016**
Original thickness	**25 mm**
Minimum permissible thickness	**10 mm**

Brake disc

Outside diameter	**380 mm**
Original thickness	**45 mm**
Minimum grinding thickness	**42 mm**
Minimum permissible thickness	**41 mm**
Parallelism of tracks	**< 0.05 mm**
Support face/disc inner track buckle	**< 0.25 mm**
Fastening	**Setscrews M 14x150**
Tightening torque	**230 ± 23 Nm**

Single-disc brake caliper WABCO PAN17
Front and rear brakes

Axle spread(s)	**AA → AF / CA → CG**
Fastening	**Setscrews M 14x150**
Tightening torque	**180 ± 18 Nm**

Brake pads

Quality (asbestos-free)	**TEXTAR T3016**
Original thickness	**26 mm**
Minimum permissible thickness	**9 mm**

Brake disc

Outside diameter	**330 mm**
Original thickness	**34 mm**
Minimum permissible thickness	**28 mm**
Parallelism of tracks	**< 0.05 mm**
Support face/disc inner track buckle	**< 0.15 mm**
Front disc fastening	**Setscrews M 14x150**
Tightening torque	**230 ± 23 Nm**
Rear disc fastening	**Wheel studs**

Single-disc brake caliper WABCO PAN19
Front and rear brakes

Axle spread(s)	**DA → DJ / EA, EB**
Fastening	**Setscrews M 18x150**
Tightening torque	**390 ± 39 Nm**

Brake pads

Quality (asbestos-free)	**TEXTAR T3016**
Original thickness	**30 mm**
Minimum permissible thickness	**11 mm**

Brake disc

Outside diameter	**375 mm**
Original thickness	**45 mm**
Minimum permissible thickness	**38 mm**
Parallelism of tracks	**< 0.05 mm**
Support face/disc inner track buckle	**< 0.15 mm**
Front disc fastening	**Setscrews M 14x150**
Tightening torque	**230 ± 23 Nm**
Rear disc fastening	**Wheel studs**

Single-disc brake caliper MERITOR D-Elsa2
Front and rear brakes

Axle spread(s)	**FA → FD**
Fastening	**Setscrews M 18x150**
Tightening torque	**390 ± 39 Nm**

Brake pads

Quality (asbestos-free)	**TEXTAR T3016**
Original thickness	**30 mm**
Minimum permissible thickness	**11 mm**

Brake disc

Outside diameter	**434 mm**
Original thickness	**45 mm**
Minimum grinding thickness	**42 mm**
Minimum permissible thickness	**41 mm**
Parallelism of tracks	**< 0.05 mm**
Support face/disc inner track buckle	**< 0.25 mm**
Front disc fastening	**Setscrews M 16x150**
Tightening torque	**330 ± 33 Nm**
Rear disc fastening	**Wheel studs**

4500 – Pressure reducing valve

Pressure reducing valve WABCO 4750150330
For trailer brake air circuit

Axle spread(s)	**AC, AF, CC, CG, DE, DF, DI, DJ, EB, FB, FD**
Supply pressure	**10 bar**
Delivery pressure	**$7^{\pm 0.2}$ bar**
Port screw-threads	**M 16x150**

Pressure reducing valve KNORR AC 157C
For auxiliary equipment air circuit

Axle spread(s)	**AA → AF / CA → CG / DA → DJ / EA, EB / FA → FD**
Supply pressure	**10 bar**
Delivery pressure	**$8^{\pm 0.2}$ bar**
Port screw-threads	**M 16x150**

4700 – Load sensing valve

WABCO 4757200010 lever type load sensing valve

Axle spread(s)	**AA, CA, DA, DC, DD, EA, EB, FA, FB**
Adjustment	**See chapter C**
Port screw-threads **1 - 2**	**M 22x150**
Port screw-threads **4**	**M 16x150**

WABCO 4757205000 lever type load sensing valve

Axle spread(s)	**AB, AC, CB, CC, DB, DE, DF**
Adjustment	**See chapter C**
Port screw-threads **1 - 2**	**M 22x150**
Port screw-threads **4**	**M 16x150**

Air-controlled load sensing valve WABCO 4757210000

Axle spread(s)	**AD, CE**
Adjustment	**See chapter C**
Port screw-threads **1 - 2**	**M 22x150**
Port screw-threads **4 - 41 - 42**	**M 16x150**

Air-controlled load sensing valve WABCO 4757215000

Axle spread(s)	**AE, AF, CF, CG**
Adjustment	**See chapter C**
Port screw-threads **1 - 2**	**M 22x150**
Port screw-threads **4 - 41 - 42**	**M 16x150**

KNORR BR4455 lever type load sensing valve

Axle spread(s)	**BA, BB, BC, BD**
Adjustment	**See chapter C**
Port screw-threads **1**	**M 22x150**
Port screw-threads **2 - 4**	**M 16x150**

Air-controlled load sensing valve WABCO 4757111310

Axle spread(s)	**BE, BF, BG**
Adjustment	**See chapter C**
Port screw-threads **1 - 2**	**M 22x150**
Port screw-threads **4 - 41 - 42**	**M 16x150**

Air-controlled load sensing valve WABCO 4757210110

Axle spread(s)	**DG**
Adjustment	**See chapter C**
Port screw-threads **1 - 2**	**M 22x150**
Port screw-threads **4 - 41 - 42**	**M 16x150**

Air-controlled load sensing valve WABCO 4757215010

Axle spread(s)	**DH, DJ**
Axle spread(s)	**DI variants 10031+11012 / 10032**
Adjustment	**See chapter C**
Port screw-threads **1 - 2**	**M 22x150**
Port screw-threads **4 - 41 - 42**	**M 16x150**

Air-controlled load sensing valve WABCO 4757215020

Axle spread(s)	**DI variants 10031+11035**
Adjustment	**See chapter C**
Port screw-threads **1 - 2**	**M 22x150**
Port screw-threads **4 - 41 - 42**	**M 16x150**

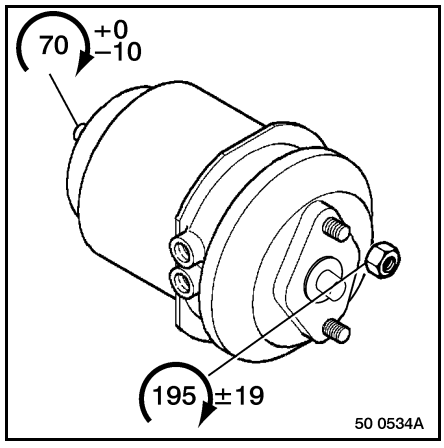
Air-controlled load sensing valve WABCO 4757210120

Axle spread(s)	**FC, FD**
Adjustment	**See chapter C**
Port screw-threads **1 - 2**	**M 22x150**
Port screw-threads **4 - 41 - 42**	**M 16x150**

5000 – Rear brake cylinder

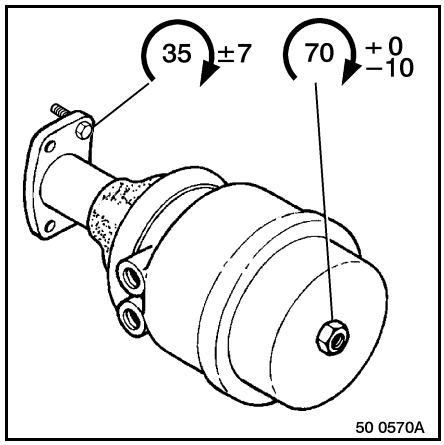
Spring cylinder WABCO type "14/16"

Axle spread(s)	**AA → AF / CA → CG**
Reference	
- left	**9254263000**
- right	**9254263010**
Active diameters	**146/158.5 mm**
Travel	**57 mm**
Neutralizing pressure	**5.5 ± 0.3 bar**
Port screw-threads	**M 22x150**



Spring cylinder KNORR type "16/24"

Axle spread(s)	**BA → BG**
Reference	**BY9321**
Active diameters	**140/175 mm**
Travel	**53 mm**
Neutralizing pressure	**5.1 ± 0.3 bar**
Port screw-threads	**M 16x150**

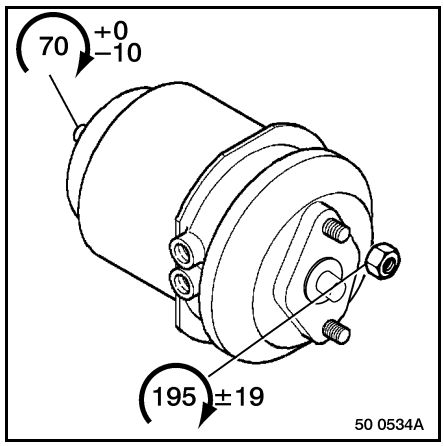


Spring cylinder WABCO type "18/24"

Axle spread(s)	**DA, DB, DE, DG, DH, DI (13-14T)**

Reference

- left	**9254635090**
- right	**9254635100**
Active diameters	**153/173.5 mm**
Travel	**62 mm**
Neutralizing pressure	**5.5 ± 0.3 bar**
Port screw-threads	**M 22x150**

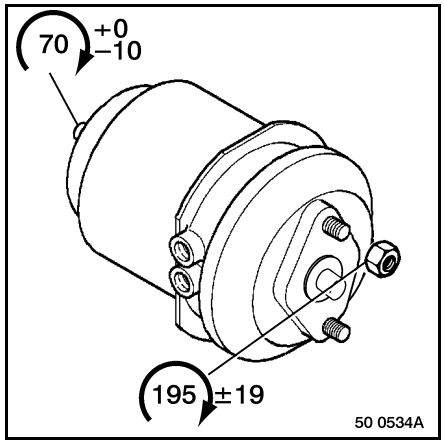


Spring cylinder WABCO type "20/24"

Axle spread(s)	**DA, DB, DE, DG, DH, DI (15-16T)**
Axle spread(s)	**DC, DB, DF, DJ, EA, EB**

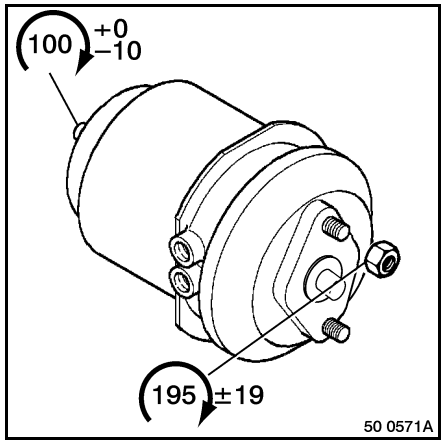
Reference

- left	**9254601090**
- right	**9254601100**
Active diameters	**153/173.5 mm**
Travel	**62 mm**
Neutralizing pressure	**5.5 ± 0.3 bar**
Port screw-threads	**M 22x150**



Spring cylinder M.G.M type "16/24"

Axle spread(s)	**FA → FD**
Reference	**–**
Active diameters	**150/173.5 mm**
Travel	**62 mm**
Neutralizing pressure	**5.5 $\pm$ 0.3 bar**
Port screw-threads	**M 16x150**



5500 – Parking brake valve

Parking brake valve WABCO 9617230330 without "test" position

Axle spread(s)	**AA, AB, AD, AE, BA, BB, BE,**
Supply pressure	**10 bar**
Port screw-threads	**M 16x150**

Parking brake valve WABCO 9617231230 with "test" position

Axle spread(s)	**AC, AF, BC, BD, BF, BG**
Supply pressure	**10 bar**
Port screw-threads	**M 16x150**

Parking brake valve WABCO 9617230360 without "test" position

Axle spread(s)	**CA, CB, CD, CE, CF, DA, DB, DC, DD, DG, DH, EA, FA, FC**
Supply pressure	**10 bar**
Port screw-threads	**M 16x150**

Parking brake valve WABCO 9617231340 with "test" position

Axle spread(s)	**CC, CG, DE, DF, DI, DJ, EB, FB, FD**
Supply pressure	**10 bar**
Port screw-threads	**M 16x150**

6700 – Overflow valve

**Overflow valve KNORR 1111503000 with limited return
=> 04/04/2000**

Axle spread(s)	**AD, AE, AF, BE, BF, BG**
Opening pressure	**6.1 $^{+0.5/-0.2}$ bar**
Overflow pressure	**5.5 $\pm$ 0.2 bar**
Port screw-threads	**M 22x150**

**Overflow valve WABCO 4341002530 with limited return
06/04/2000 =>**

Axle spread(s)	**AD, AE, AF, BE, BF, BG, CE, CF, CG, DG, DH, DI, DJ, FC, FD**
Opening pressure	**6.1 $^{+0.5/-0.2}$ bar**
Overflow pressure	**5.5 $\pm$ 0.2 bar**
Port screw-threads	**M 22x150**

6900 – Back pressure valve

Back pressure valve ANOFLEX 699937098

Axle spread(s)	**AA, AB, AD,AE, BA, BB, BE, CA, CB, CD, CE, CF**
Axle spread(s)	**DA, DB, DC, DD, DG, DH, EA, FA, FC**
Port screw-threads	**M 16x150**

Back pressure valve WABCO 4340140110

Axle spread(s)	**AC, AF, BC, BD, BF, BG, CC, CG, DE, DF, DI, DJ, EB, FB, FD**
Port screw-threads	**M 22x150**

7200 – Trailer control valve

Trailer control valve WABCO 973 009 009 0

Axle spread(s)	**AC, AF, CC, CG (7.5T)**
Axle spread(s)	**FB, FD variants 59052**
Pressure lead	**0.6 bar**
Pressure lead adjustment band	**1.2 bar**
Port screw-threads **11 - 12 - 22 - 41 - 42**	**M 22x150**
Port screw-threads **43**	**M 16x150**

Trailer control valve WABCO 973 009 007 0

Axle spread(s)	**AC, AF, CC, CG (10T/12T) – EB (16T)**
Pressure lead	**0.0 bar**
Pressure lead adjustment band	**1.2 bar**
Port screw-threads **11 - 12 - 22 - 41 - 42**	**M 22x150**
Port screw-threads **43**	**M 16x150**

Trailer control valve KNORR AB 2838

Axle spread(s)	**BC, BF**
Pressure lead	**0.4 bar**
Pressure lead adjustment band	**1.5 bar**
Port screw-threads **11 - 12 - 22 - 41 - 42 - 43**	**M 16x150**

Trailer control valve KNORR AB 2860

Axle spread(s)	**BD, BG**
Pressure lead	**0.0 bar**
Pressure lead adjustment band	**1.5 bar**
Port screw-threads **11 - 12 - 22 - 41 - 42 - 43**	**M 16x150**

Trailer control valve WABCO 973 009 008 0

Axle spread(s)	**DE, DF, DI, DJ – EB (14T)**
Axle spread(s)	**FB, FD variants 59020/24/53/78**
Pressure lead	**0.4 bar**
Pressure lead adjustment band	**1.2 bar**
Port screw-threads **11 - 12 - 22 - 41 - 42**	**M 22x150**
Port screw-threads **43**	**M 16x150**

8014/8015/8016/8017 – ABS electrovalve

Electrovalve WABCO type NO

Axle spread(s)	**AB, AC, AE, AF / BA → BG / CB, CC, CD , CF, CG**
Axle spread(s)	**DB → DF ,DH, DI, DJ / EA, EB / FA → FD**
Reference	**4721950160**
Maximum operating pressure	**11 bar**
Operating voltage	**24V**
Port screw-threads	**M 22x150**

8092 – Inverse relay valve

Inverse relay valve KNORR RE 3310
=> 03/11/2001

Axle spread(s)	**BB, DC**
Maximum operating pressure	**10bar**
Port screw-threads	**M 22x150**

Inverse relay valve KNORR RE 3312
05/11/2001 =>

Axle spread(s)	**DC**
Maximum operating pressure	**10 bar**
Port screw-threads	**M 22x150**

8140 – Reversing safety electrolvalve

Electrovalve HONEYWELL type 3/2 NF

Axle spread(s)	**BB, DC**
Reference	**E 131K 06 05**
Operating voltage	**24V**
Electrical resistance	**45Ω**
Port screw-threads	**M 12x150**

Pressure switch and air pressure transmitter

8104 – Air pressure transmitter

Axle spread(s)	**–**
Maximum operating pressure	**16bar**
Connector type	**DIN 2.5**
Code	**A1 2.1**
Installation diameter	**M 16x150**
Tightening torque	**$20^{\pm 4}$ Nm**

8165/8166/8174 – Min. pressure indicator pressure switch
Pressure drop contact

Axle spread(s)	**AA → AF / CA → CG / DA → DJ / EA, EB / FA → FD**
Contact pressure	**$6.0^{\pm 0.6}$ bar**
Axle spread(s)	**BA → BG**
Contact pressure	**$5.2^{0/-0.8}$ bar**
Connector type	**DIN 2.5**
Code	**A4 2.1**
Installation diameter	**M 16x150**
Tightening torque	**$20^{\pm 4}$ Nm**

8178 – Parking indicator pressure switch
Pressure drop contact

Axle spread(s)	**–**
Contact pressure	**0.7 ± 0.07 bar**
Connector type	**DIN 2.5**
Code	**A4 2.1**
Installation diameter	**M 16x150**
Tightening torque	**20 ± 4 Nm**

TOOLS

Generalities

RENAULT TRUCKS divide tools into three categories:

- **General-purpose tools:** proprietary tools.
  - **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department).
  - **4-figure reference number** (tools classified by RENAULT TRUCKS but available from the supplier).

- **Special tools:** specifically created tools distributed by the RENAULT TRUCKS Spare Parts Department.

- **Locally manufactured tools:** these tools are classified differently according to their degree of sophistication:
  - **4-figure reference number** (represented by a drawing): tools that are simple to make without need for special qualification.
  - **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department): a certain amount of skill is needed to make these tools.

Three levels (or echelons) determine their assignment:
- **Level 1:** tools for servicing, maintenance and minor tasks.

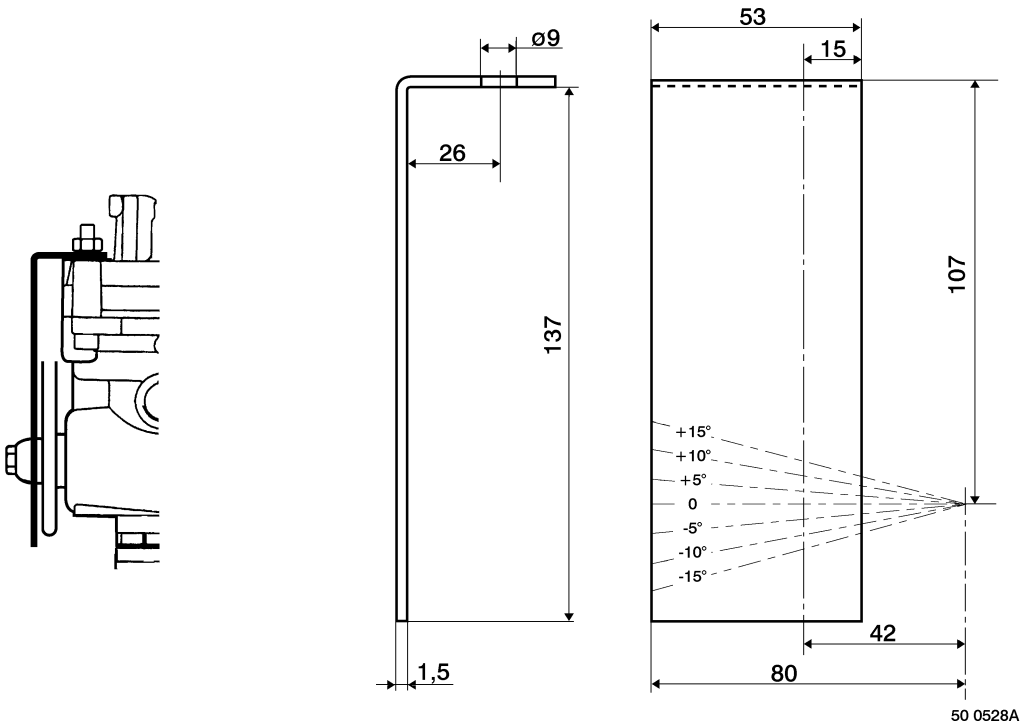
- **Level 2:** tools for major repairs.

- **Level 3:** tools for refurbishment.

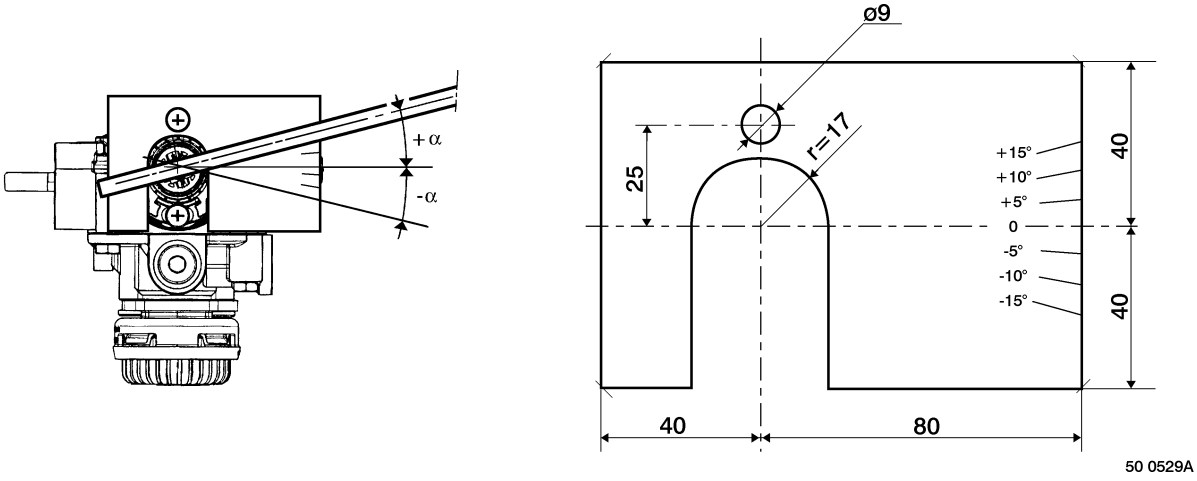
Proprietary tools mentioned in this manual do not appear in the tools list.
These tools are identified in the standard tools manual (MO) by a 4-figure number.

Installation of testing templates

KNORR lever type load sensing valve

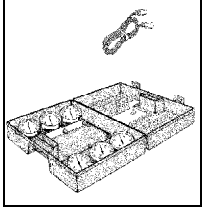


WABCO lever type load sensing valve

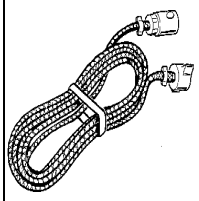
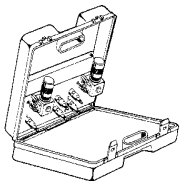


LIST OF TOOLS

General-purpose tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer code	Level	Qty
	**5000262423**	TEST CASE			1	1

Special Tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer Code	Level	Qty
	**5000267096**	FLEXIBLE PIPE			1	1
	5000262587	TEMPLATE			1	1
	5000262588	TEMPLATE			1	1
	**5000267093**	TEST CASE			1	1

BRAKING DIAGRAMS

IDENTIFICATION OF BRAKE AIR PIPES

RENAULT TRUCKS. standard

Polyamide braking circuit pipes are identified according to a code using rings of different colours. A colour range indicates the function of the circuit. Two extra colours specify the sub-function of the circuit.

Function codes :

Orange	→	Front service brake
Blue	→	Rear service brake
Green	→	Parking brake
Red	→	Trailer brake
Brown	→	Auxiliary equipment
Without identification	→	Air supply circuit

Sub-function codes :

Function colour only	→	Constant pressure
Yellow	→	Pilot-control pressure
White	→	Delivered pressure

Colour abbreviations :

Bc	→	White
Bu	→	Blue
J	→	Yellow
M	→	Brown
Or	→	Orange
R	→	Red
Ve	→	Green

Marking example :

(M) = Brown
(M-M) = Brown / Brown
(M-J-Bc) = Brown / Yellow / White

CODIFICATION OF APPLIANCE PORTS

D.I.N. - I.S.O. 6786 STANDARDS

The numbering of ports, used by the majority of braking equipment manufacturers, conforms to DIN and ISO standards.
The ports are coded according to their function :

- **0** ..... Air aspiration
- **1** ..... Supply pressure
- **2** ..... Delivered pressure
- **3** ..... Atmospheric air venting
- **4** ..... Control pressure
- **5** ..... Available
- **6** ..... Available
- **7** ..... Antifreezer
- **8** ..... Lubrication
- **9** ..... Water cooling

Some ports include 2 figures.

The **first** figure indicates the function
The **second** figure indicates a sequence number

Example :
41 : Control port N° **1**
42 : Control port N° **2**

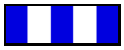
COLOUR KEY TO BRAKING DIAGRAMS

Compressed air supply	

Front service brake circuit

Constant pressure	
Pilot-control pressure	
Delivered pressure	

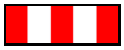
Rear service brake circuit

Constant pressure	
Pilot-control pressure	
Delivered pressure	

Parking brake circuit

Constant pressure	
Pilot-control pressure	
Delivered pressure	

Trailer brake circuit

Constant pressure	
Pilot-control pressure	
Delivered pressure	

Auxiliary equipment circuit

Constant pressure	
Pilot-control pressure	
Delivered pressure	

KEY TO BRAKING DIAGRAMS

Key to appliances

0100 – Air compressor
0500 – Air dryer
0800 – Protection valve
1001 – Front brake air tank
1010 – Rear brake air tank
1021 – Trailer brake air tank
1050 – Auxiliary equipment air tank
2600 – Duplex service brake control valve
3000 – Quick release valve
3100 – Pressure reduction valve
3150 – Adaptation valve
3600 – Single diaphragm brake cylinder
3740 – Air shoe brake
3741 – Air brake caliper
4500 – Pressure reducing valve
4700 – Load sensing valve
5000 – Rear brake cylinder
5500 – Parking brake valve
6700 – Overflow valve
6900 – Back pressure valve
7200 – Trailer control valve
7601 – Supply brake coupling head (red)
7610 – Control brake coupling head (yellow)
8014 – LH front roadwheel ABS electrovalve
8015 – RH front roadwheel ABS electrovalve
8016 – LH rear roadwheel ABS electrovalve
8017 – RH rear roadwheel ABS electrovalve
8092 – Inverse relay valve
8104 – Air pressure transmitter
8115 – Parking brake indicator lamp
8123 – Air pressure alert warning lamp
8140 – Reversing safety electrolvalve

8141 – Air pressure indicator

8165 – Rear brake minimum pressure sensor

8166 – Front brake minimum pressure sensor

8174 – Parking brake or trailer brake minimum pressure sensor

8178 – Parking brake indicator sensor

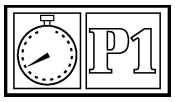
OPTIONAL ASSEMBLY

1 – ABS option (variant **24308**)

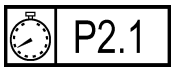
KEY TO CROSS-REFERENCES

12 –To suspension air springs
13 –To clutch servo
14 –To other auxiliary equipment

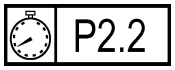
AIR BRAKES TEST POINTS



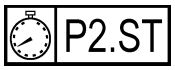
Braking reference point (priority circuit). Load sensing valve port **4**.



Pressure delivered to front axle cylinders.



Pressure delivered to rear axle cylinders (port **11**).



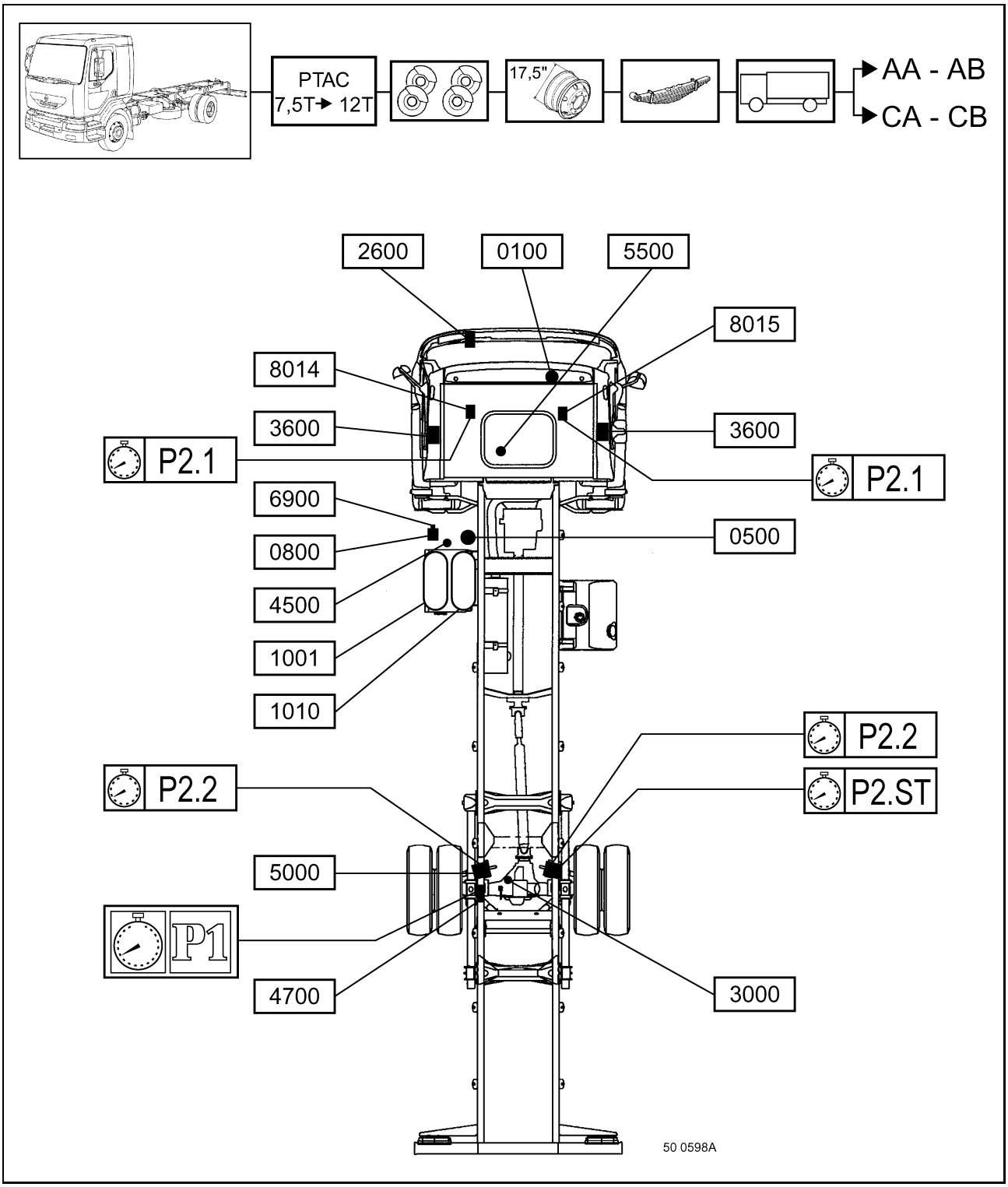
Pressure delivered to parking brake spring cylinders (port **12**).

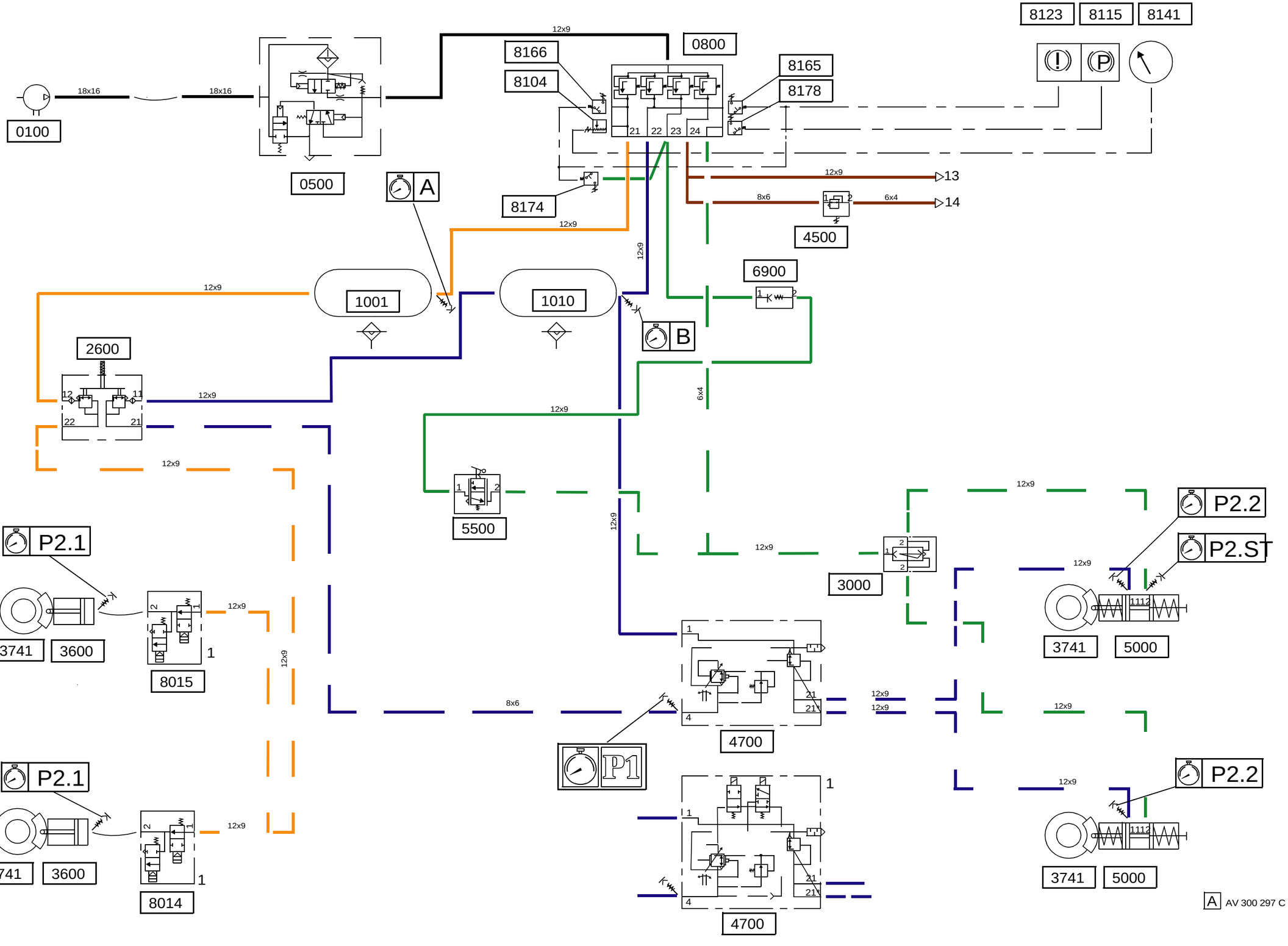
Front service brake air tank pressure.

Rear service brake air tank pressure.

Parking brake air tank pressure.

Location of appliances





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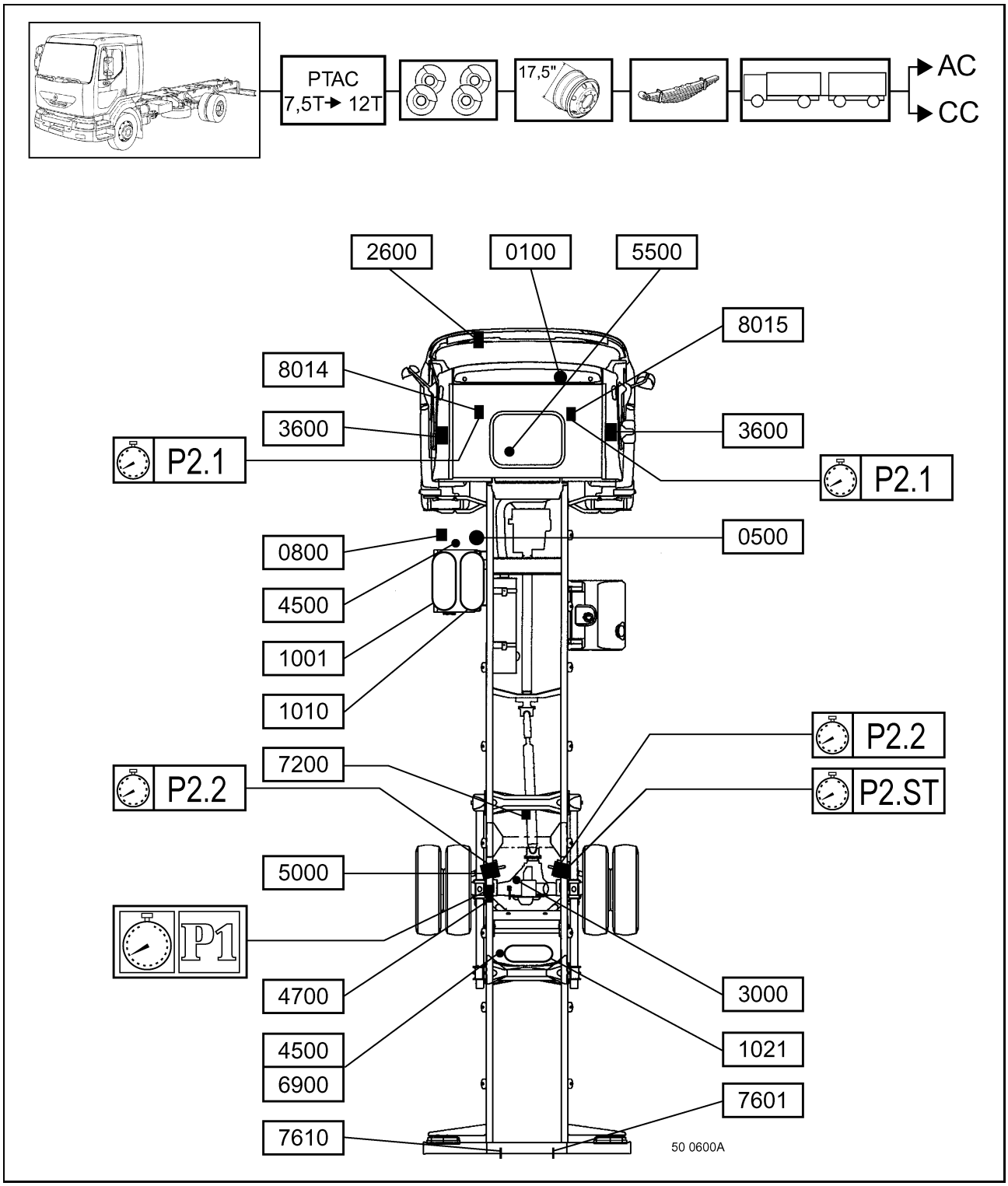
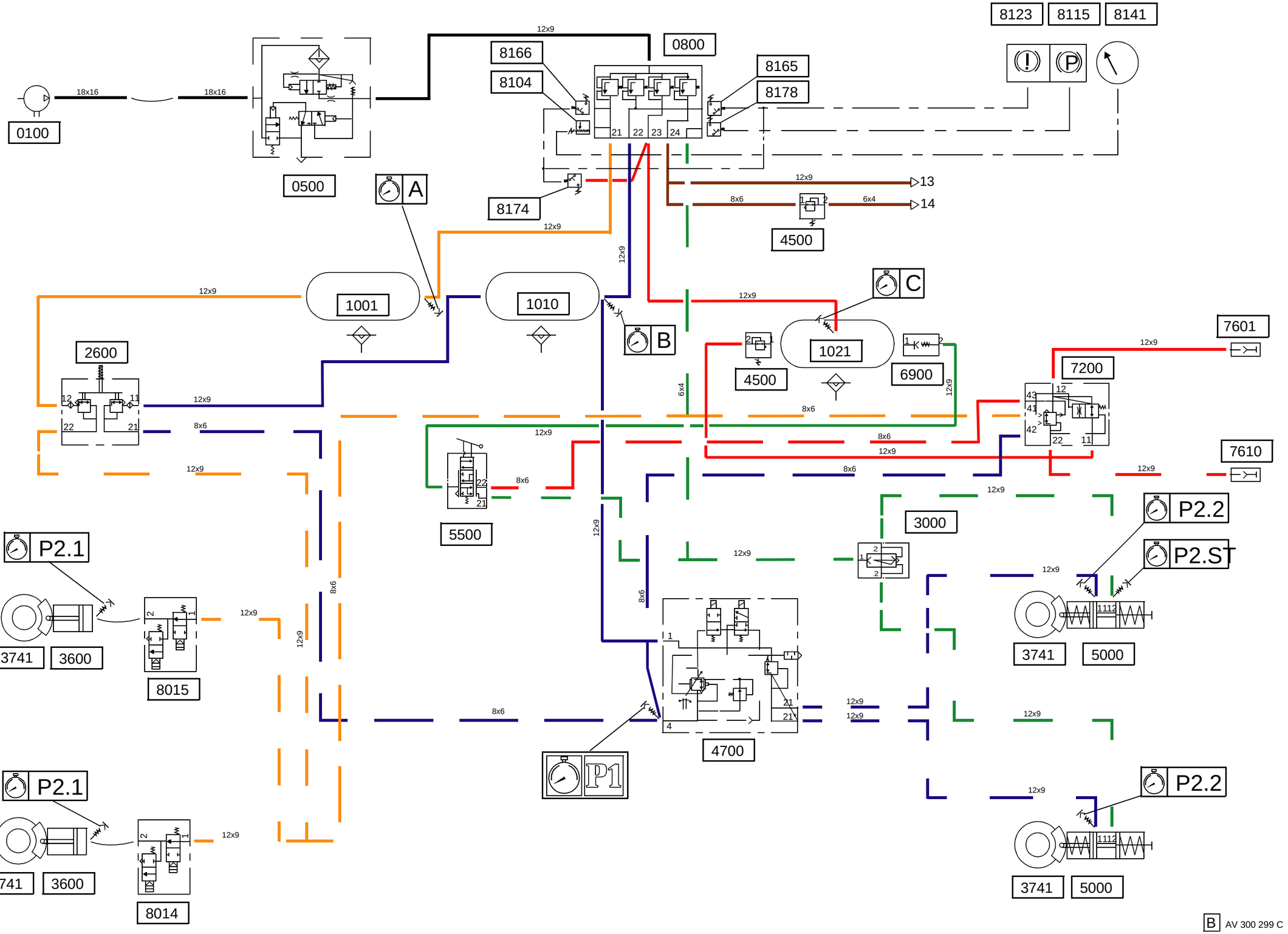
Location of appliances





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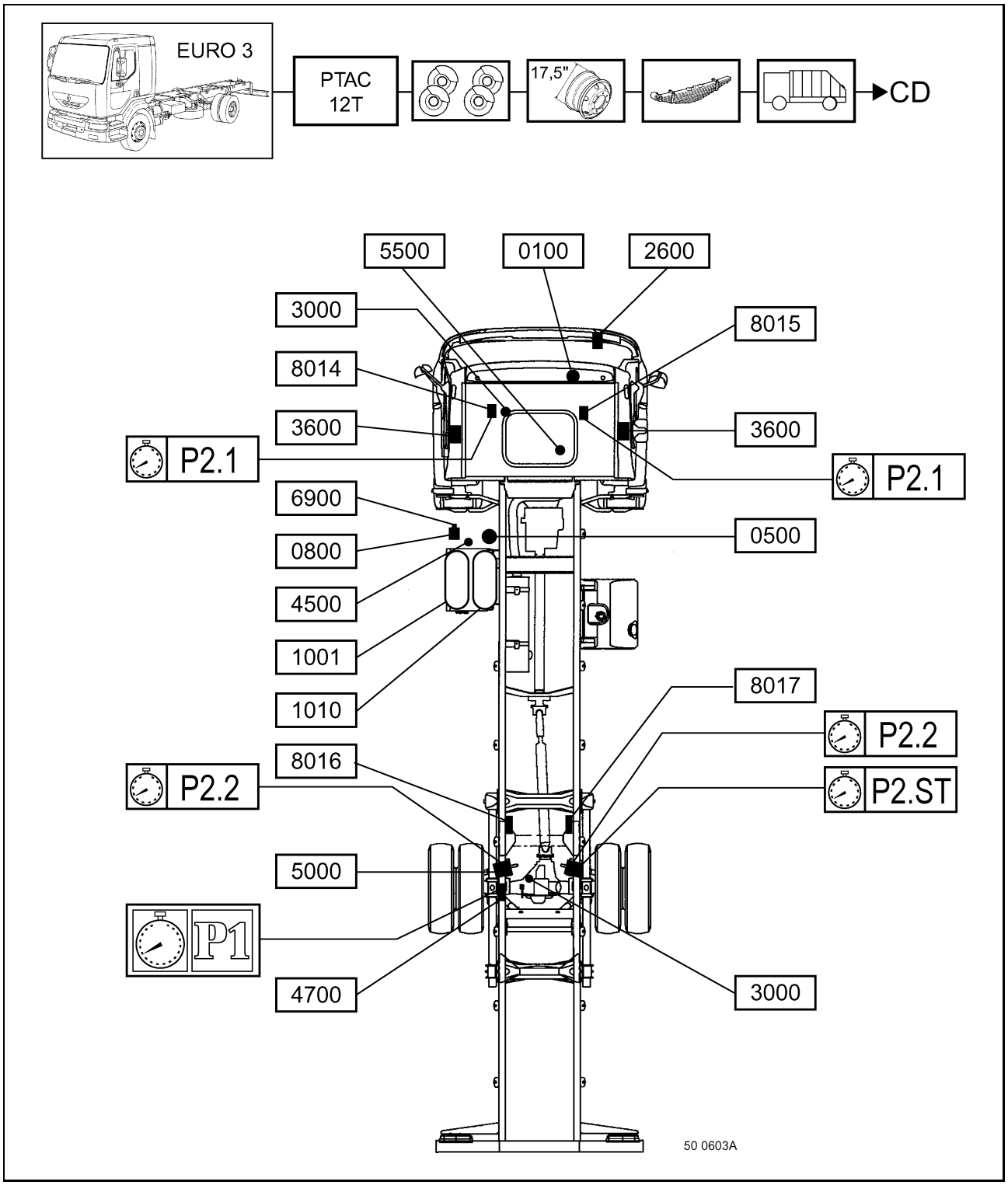
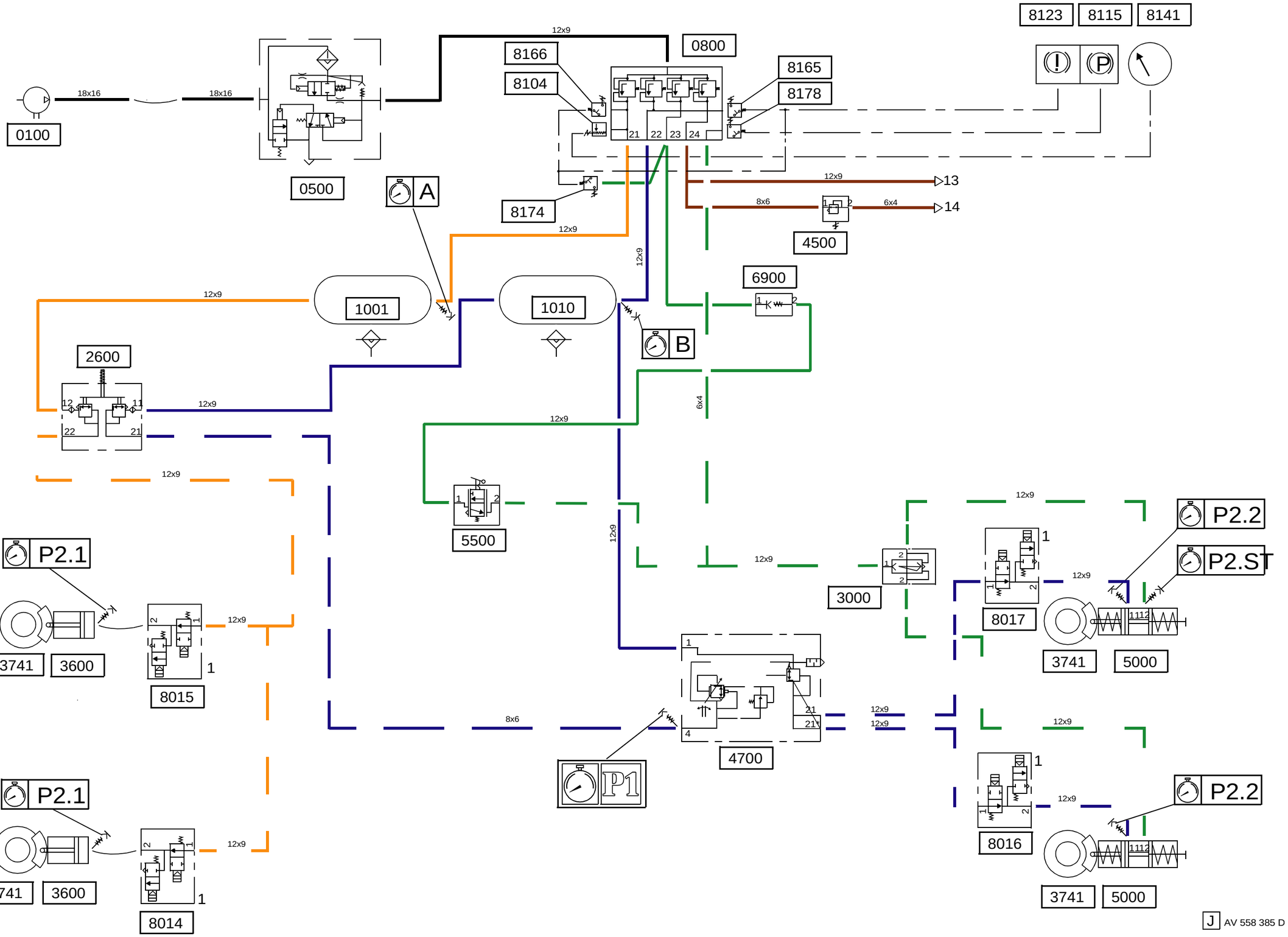
Location of appliances





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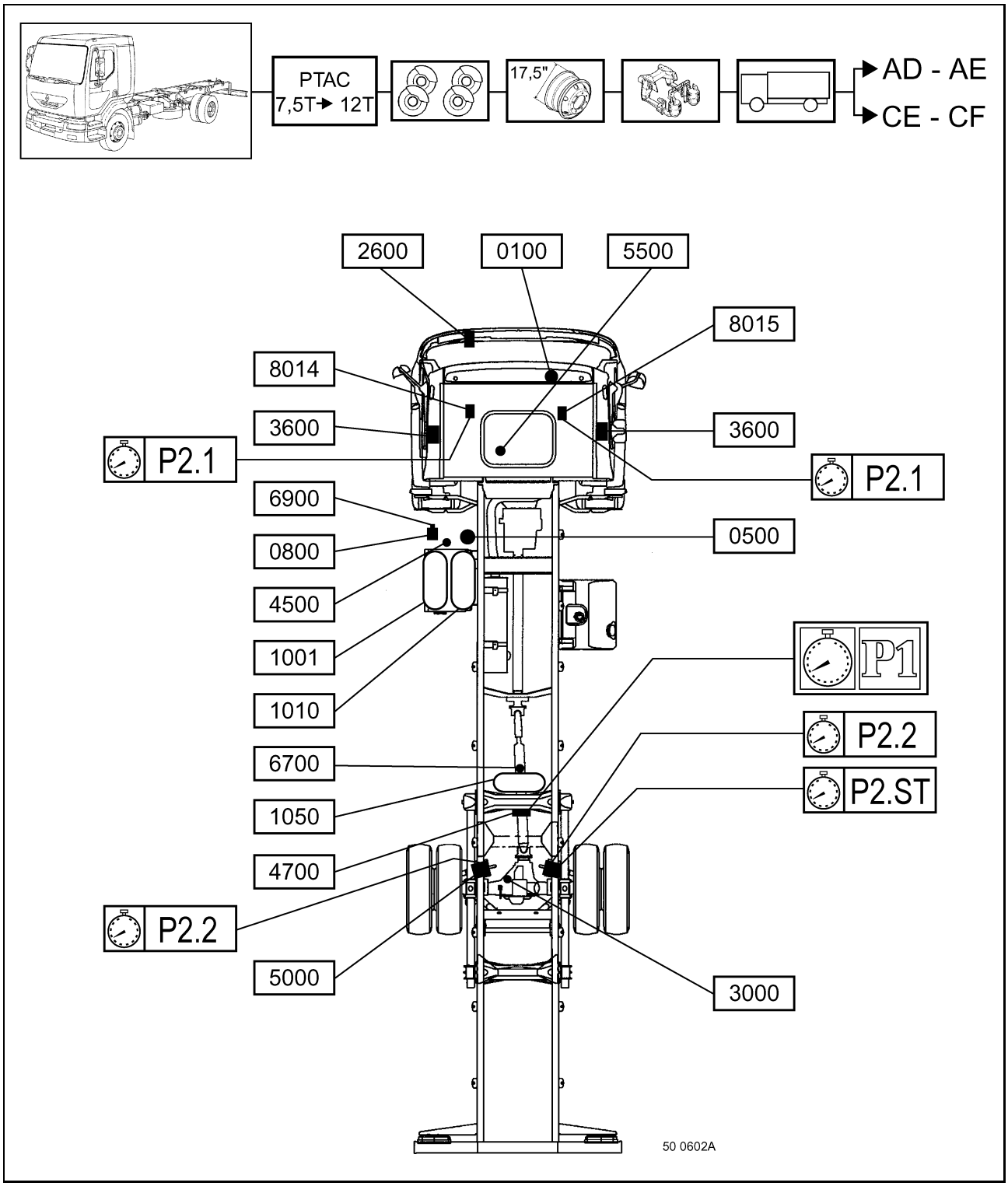
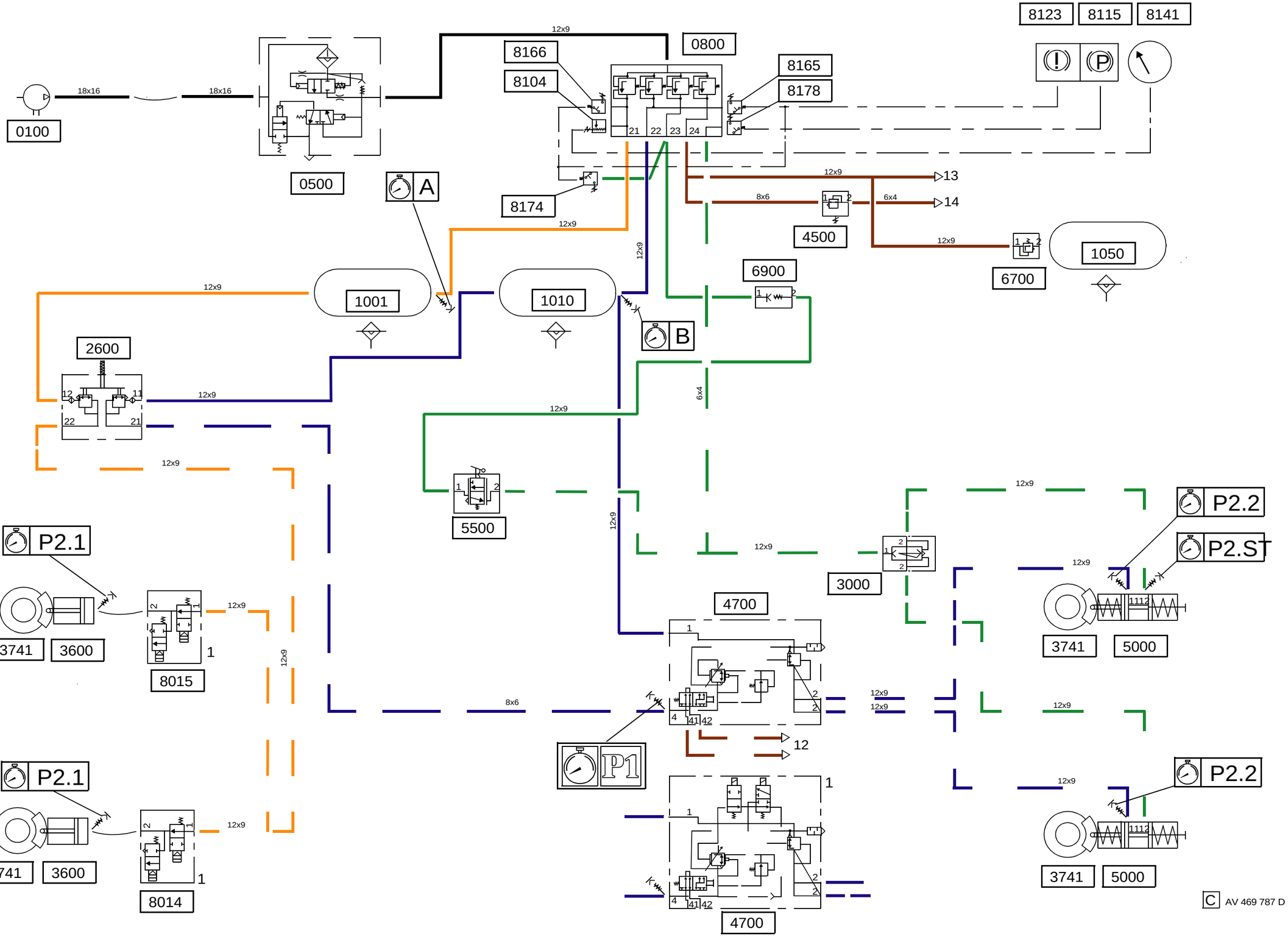
Location of appliances





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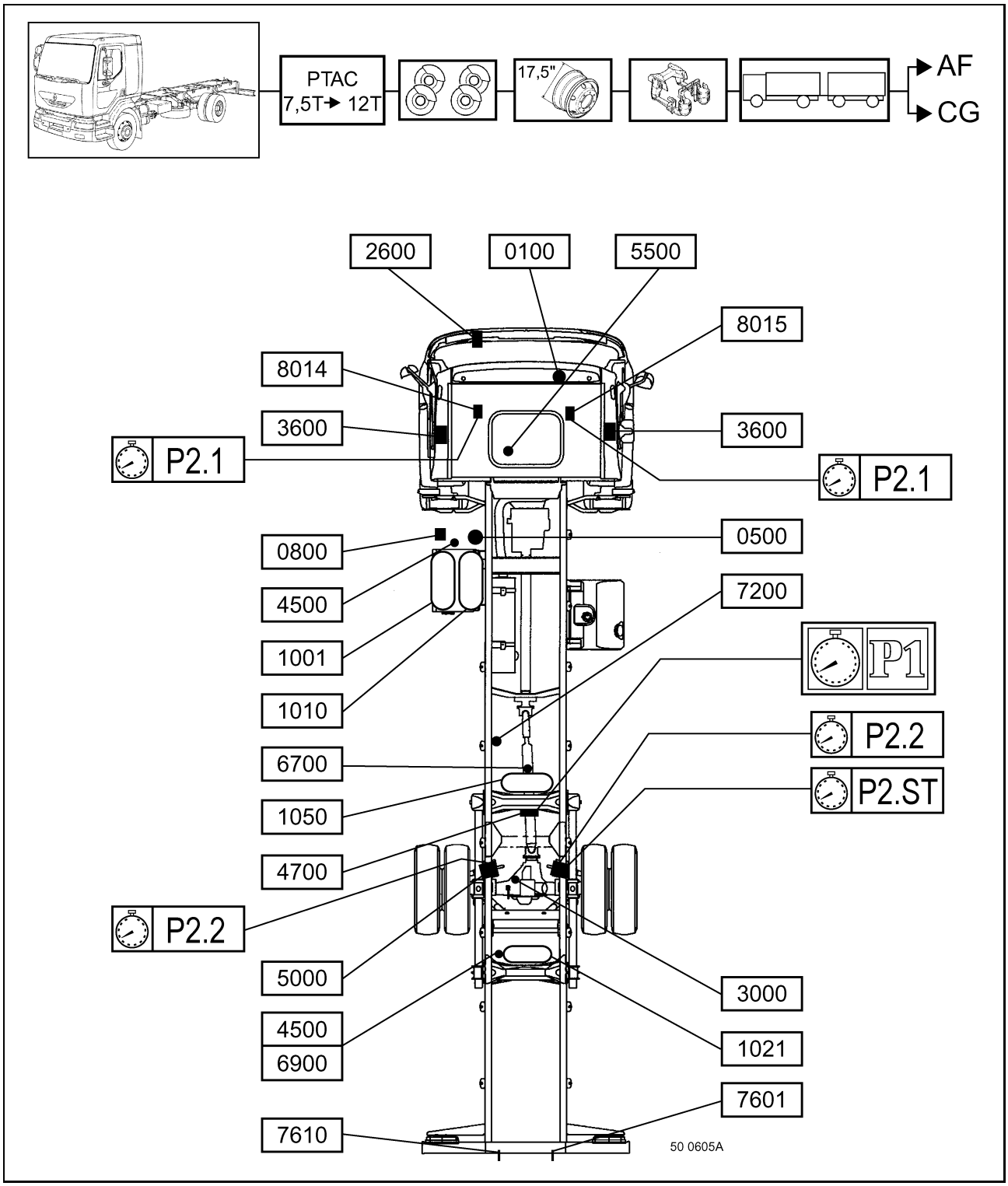
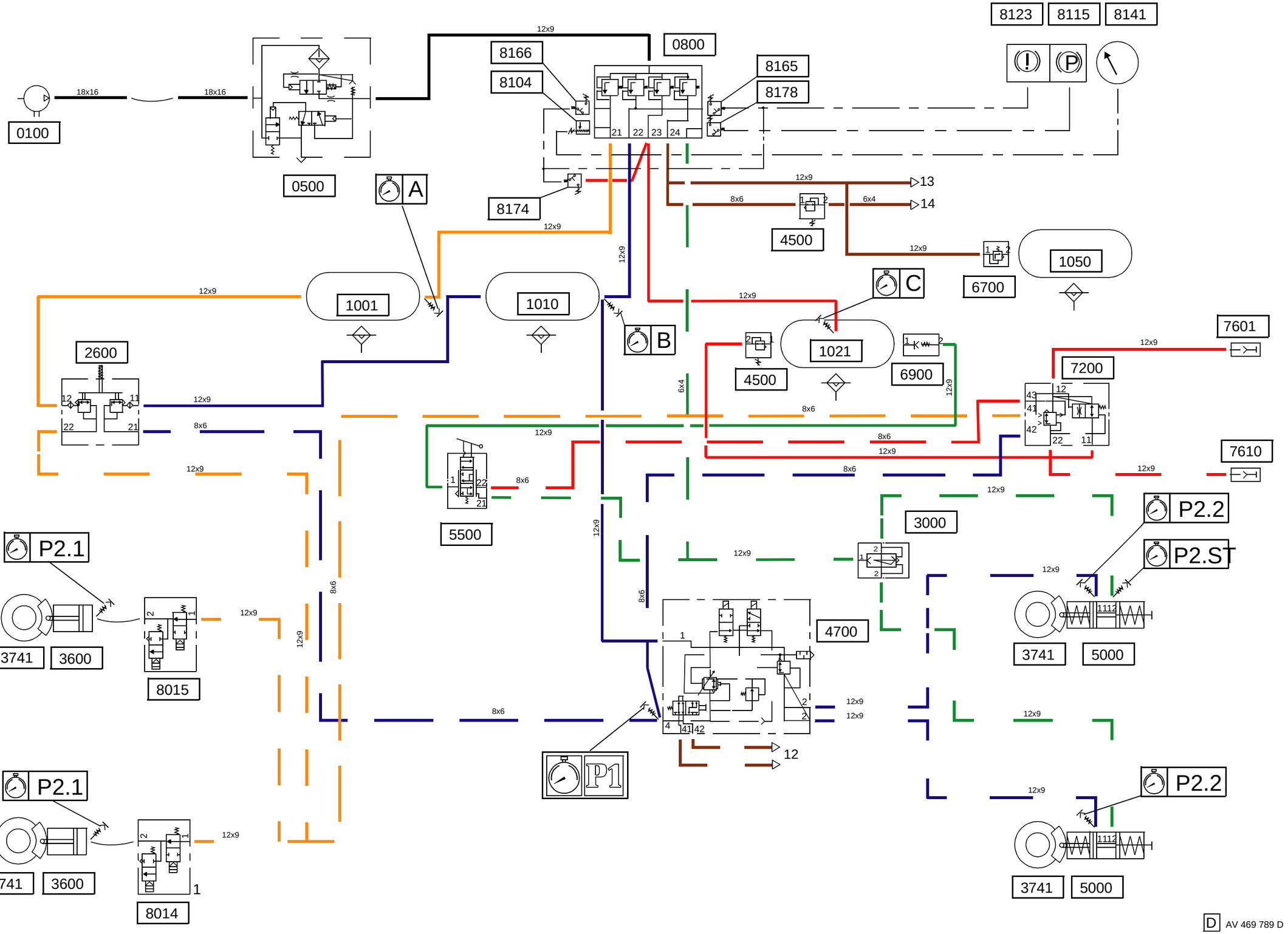
Location of appliances





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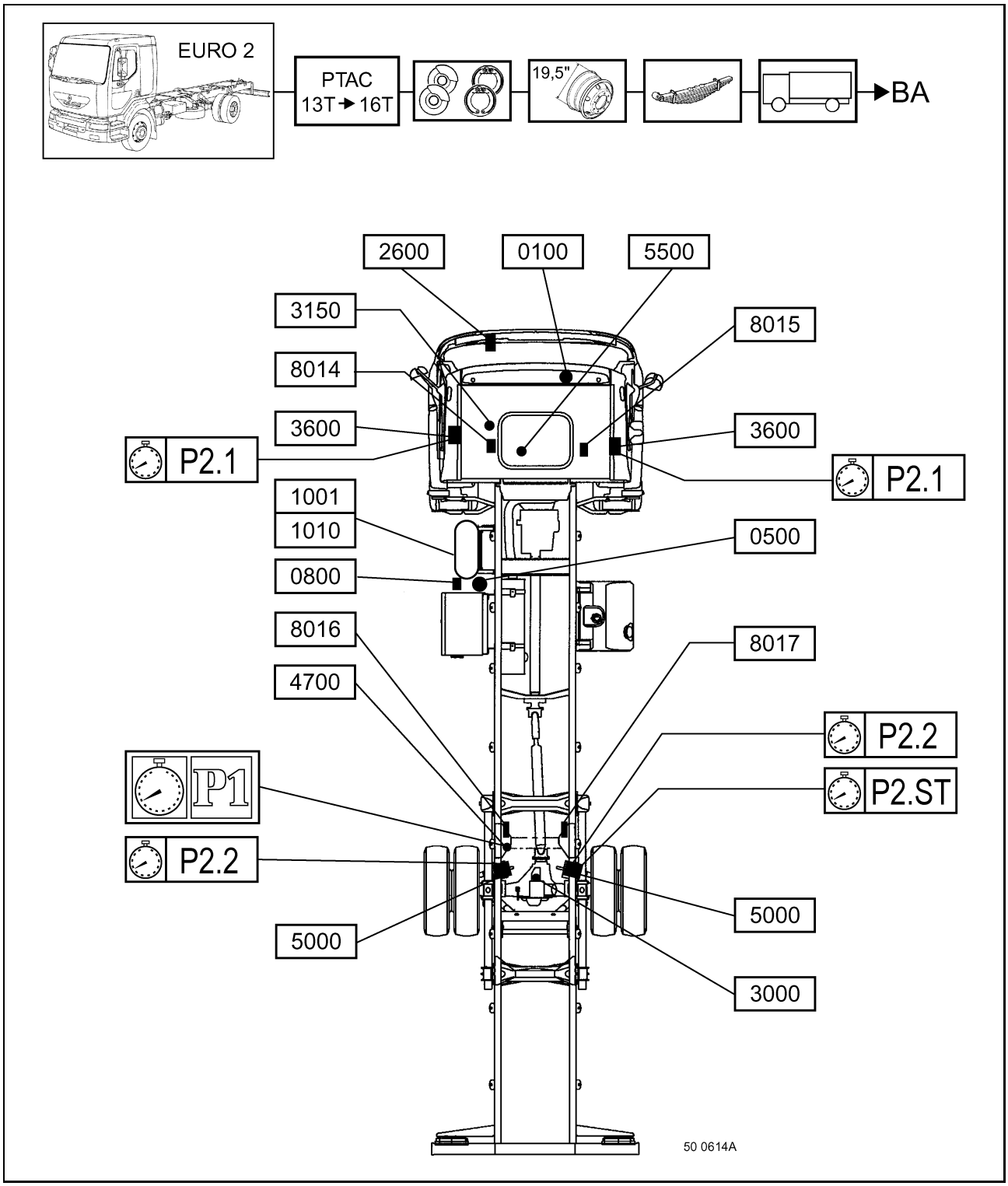
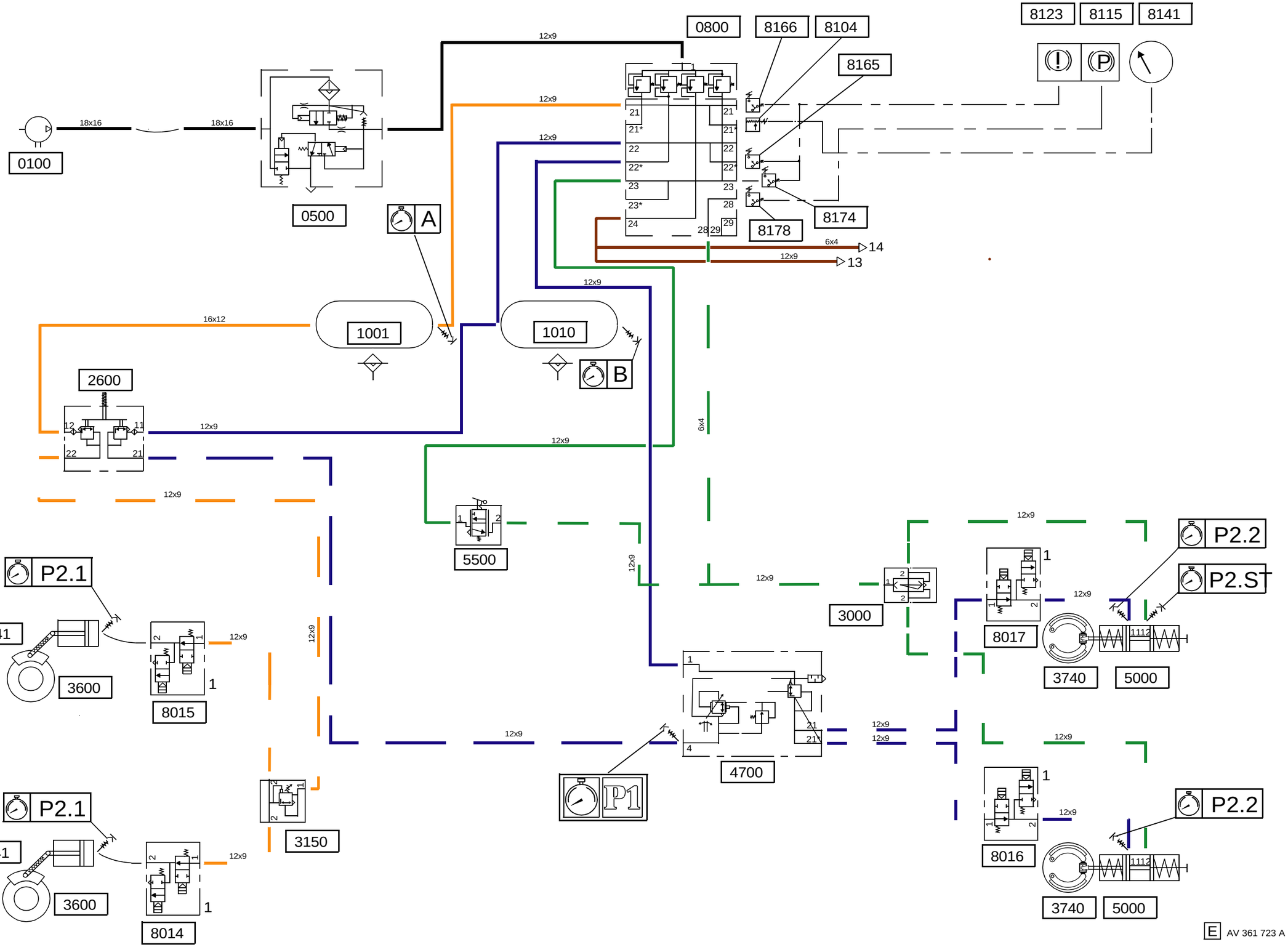
Location of appliances

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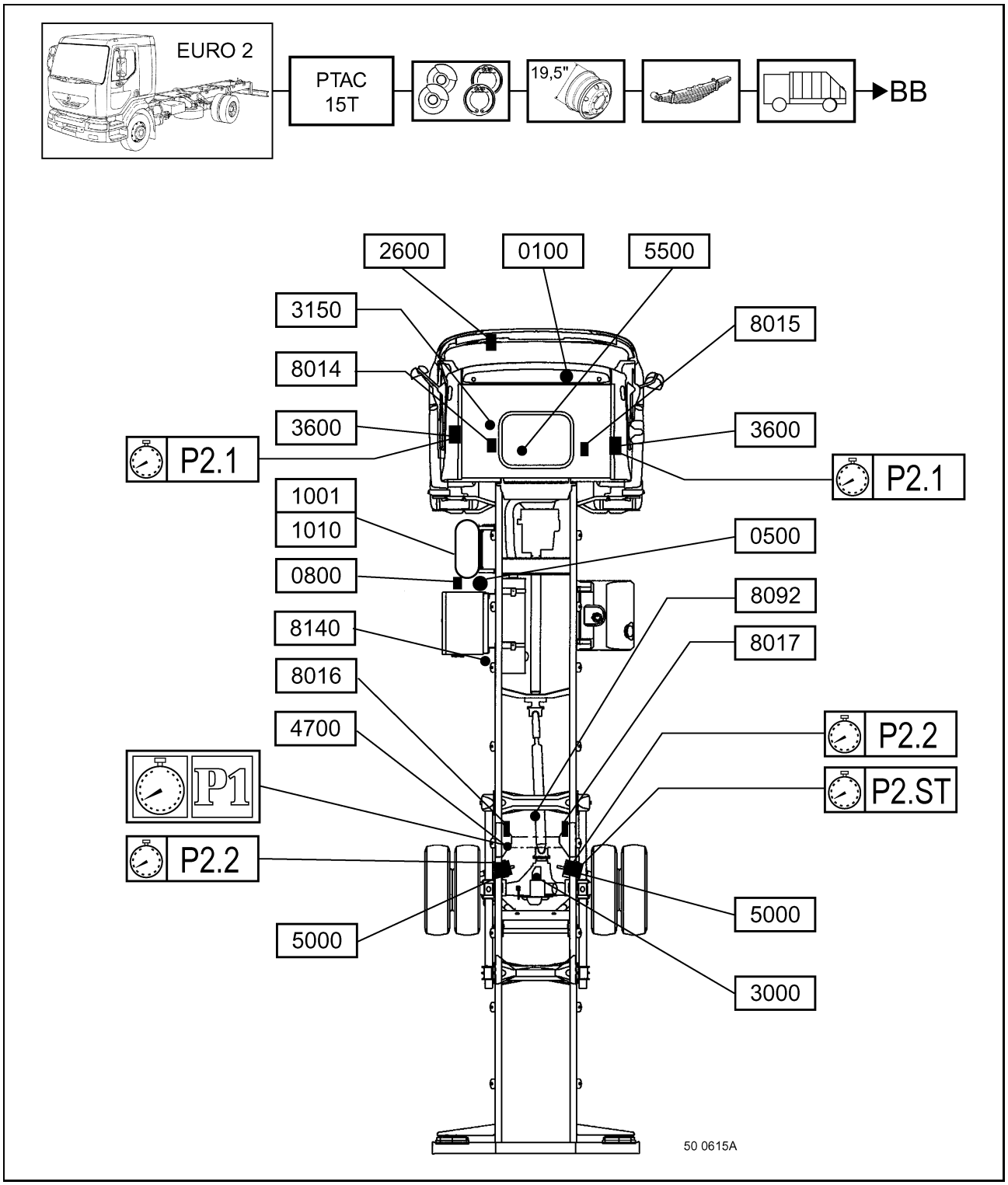
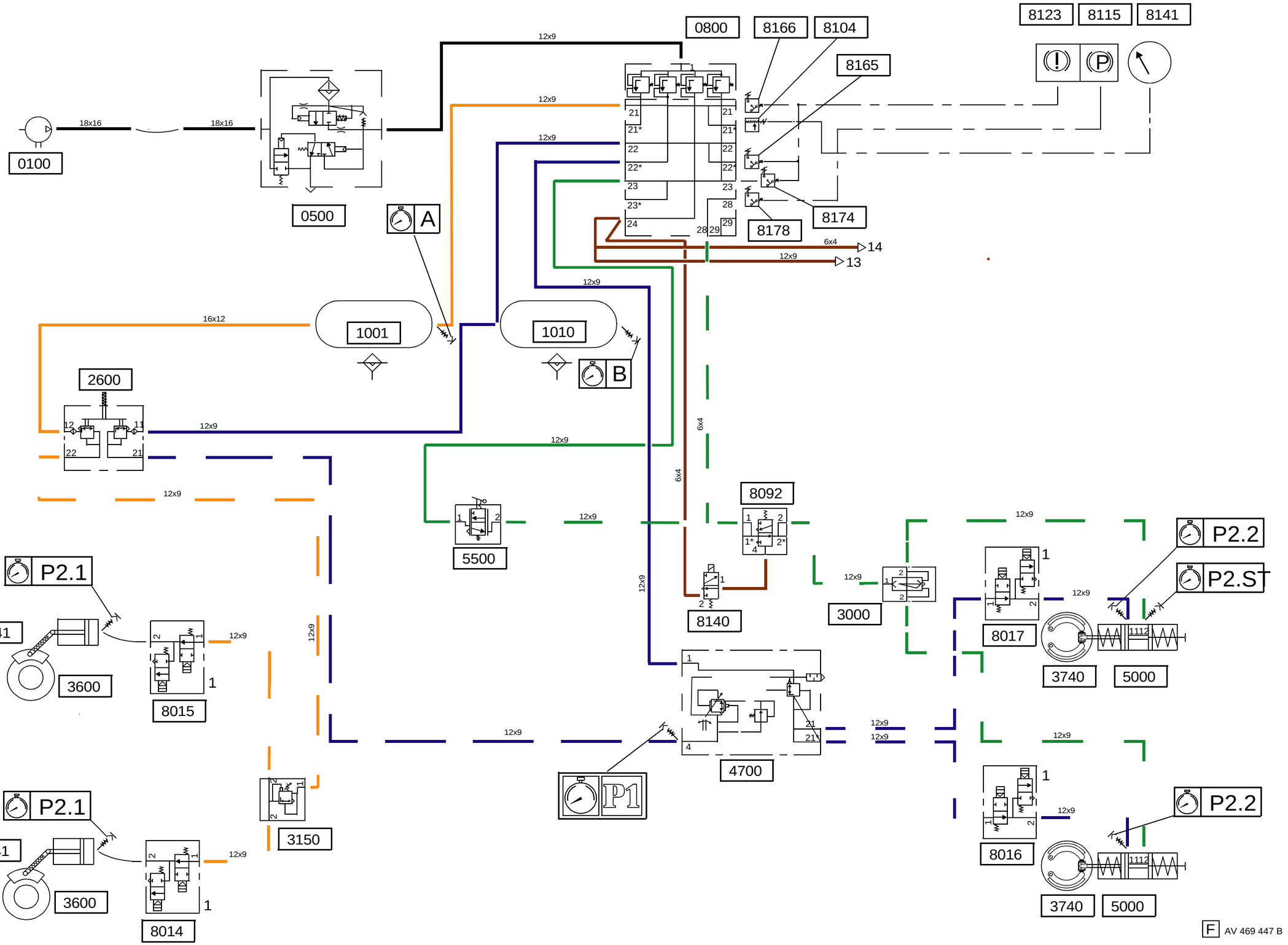
Location of appliances





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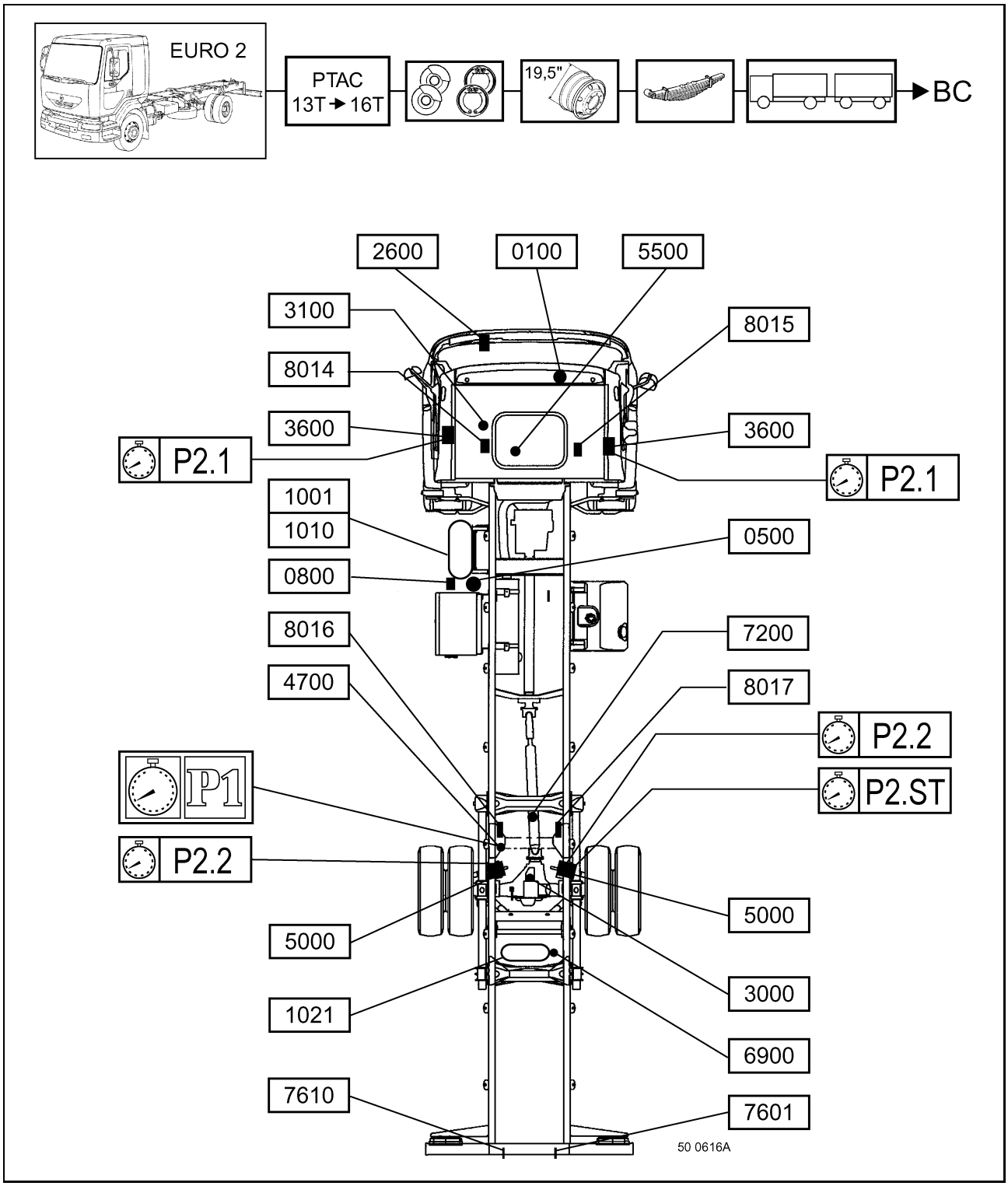
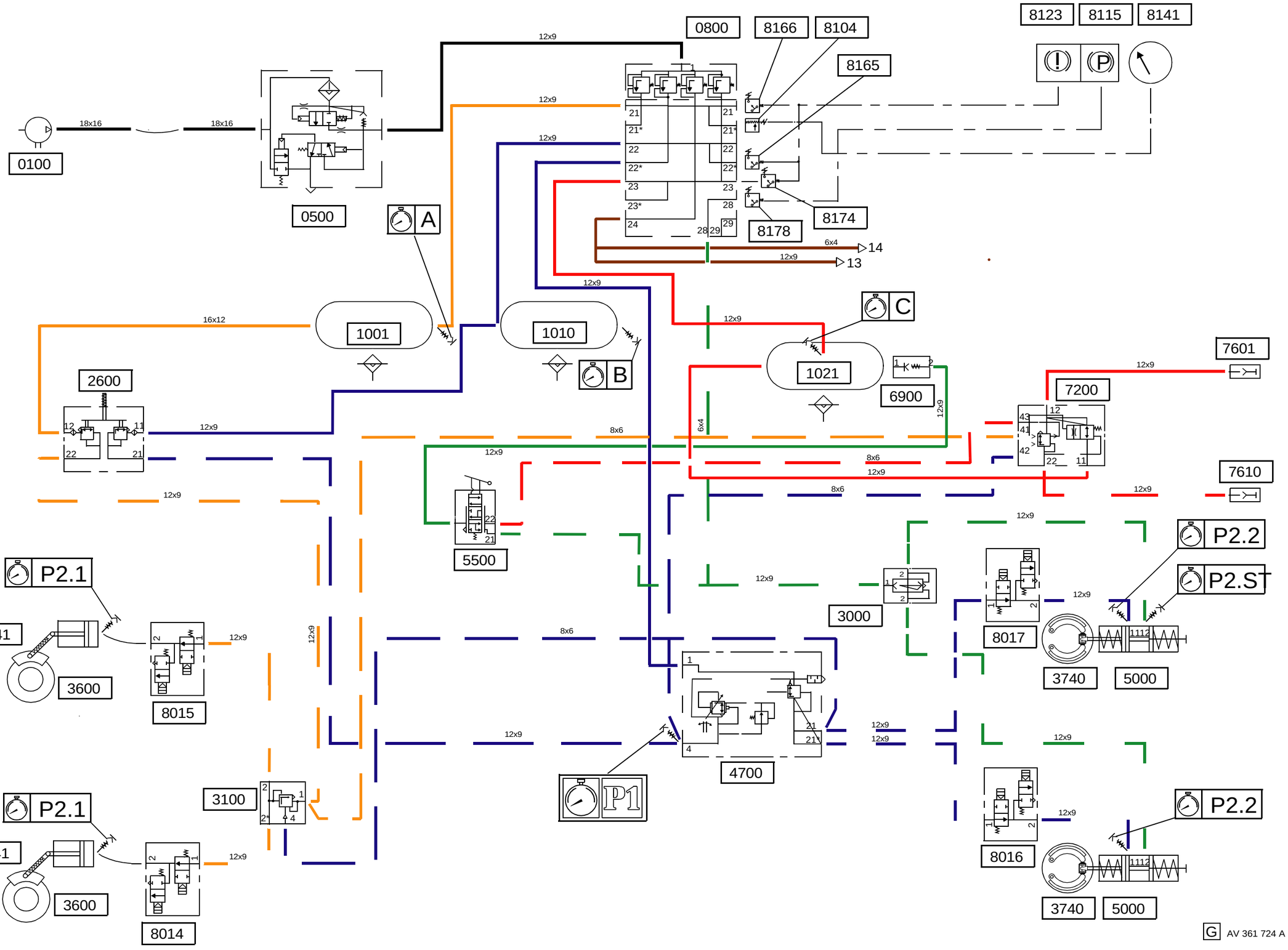
AV 469 447 B

Location of appliances

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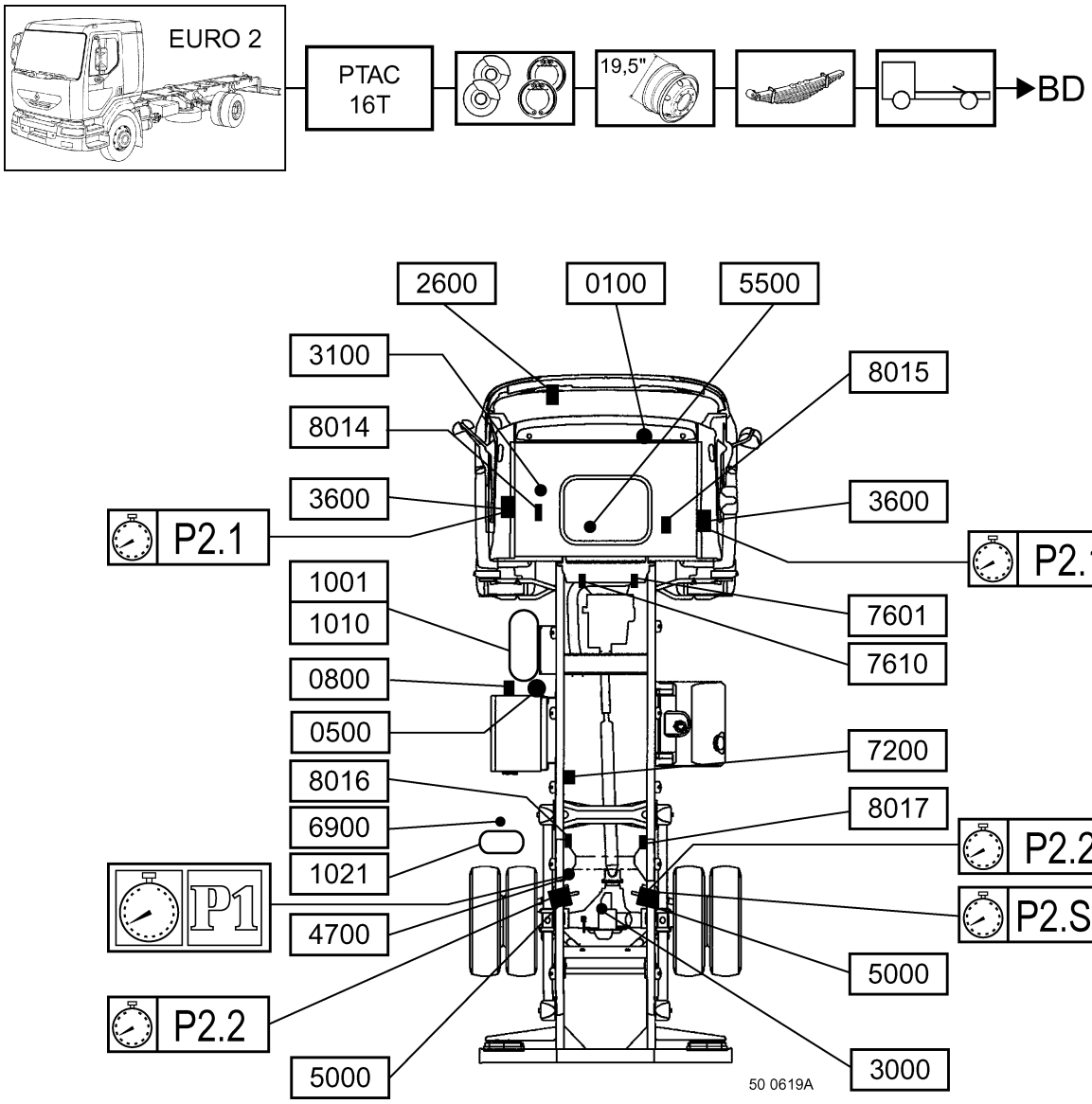
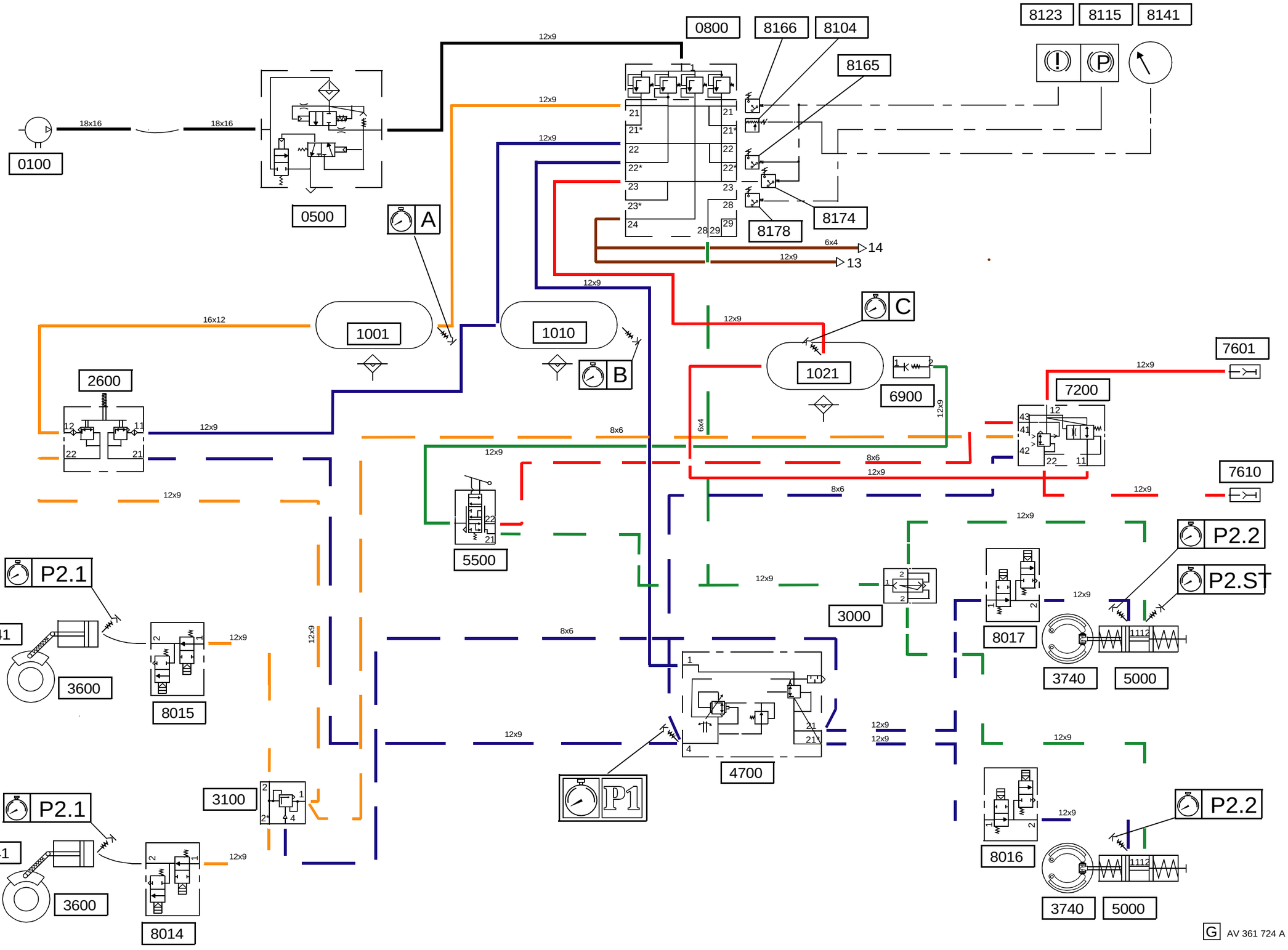
G AV 361 724 A

Location of appliances

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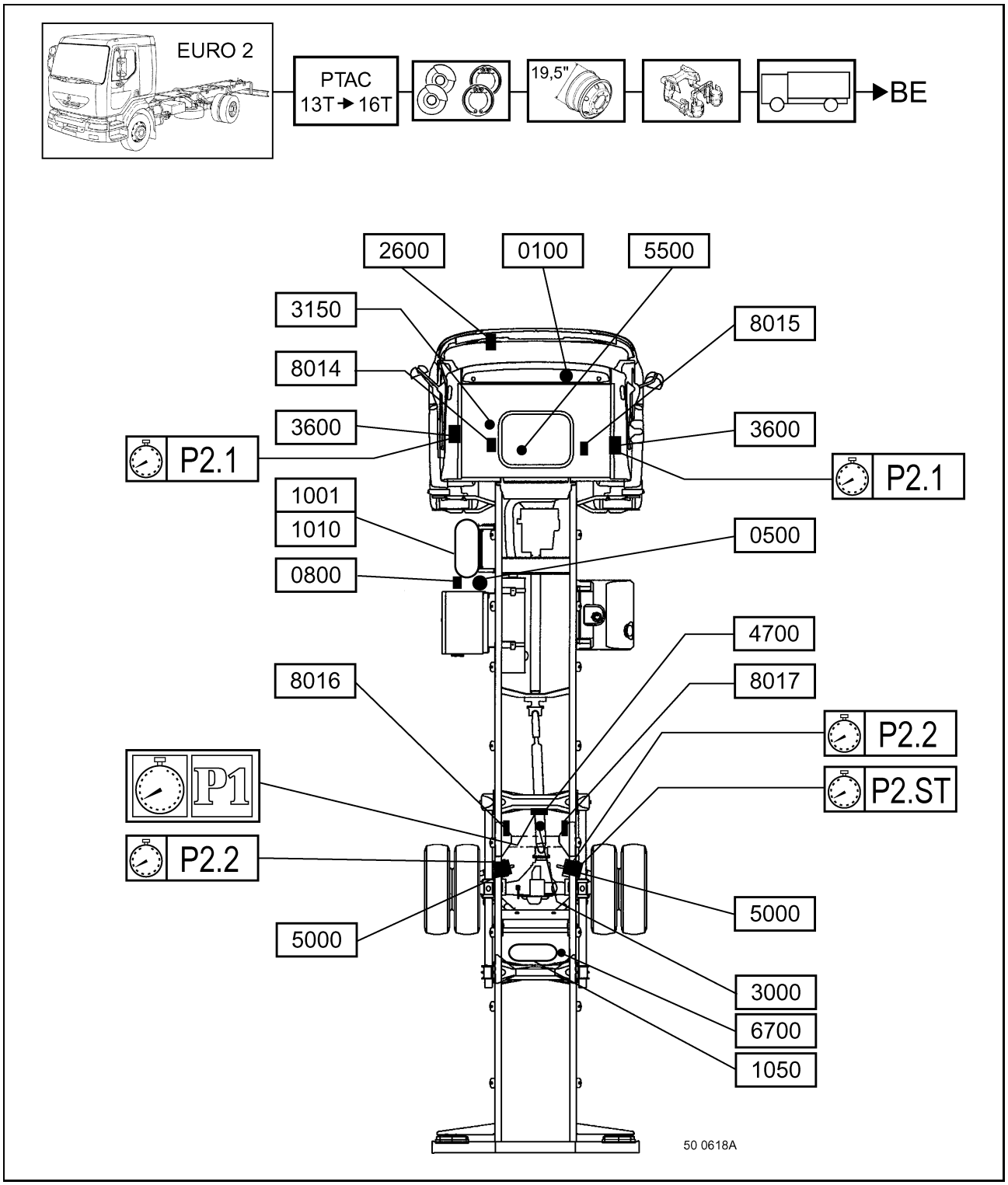
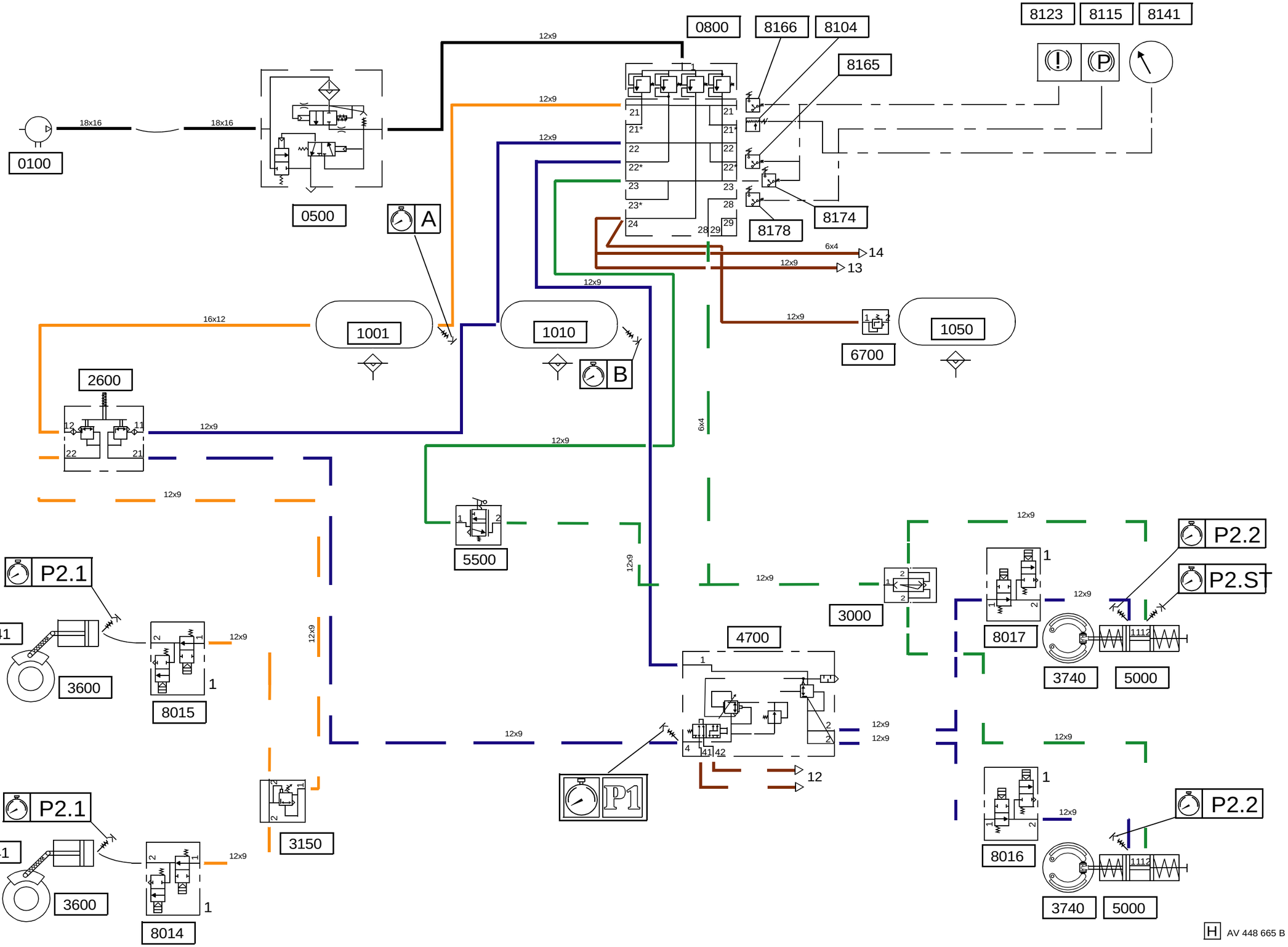
Location of appliances





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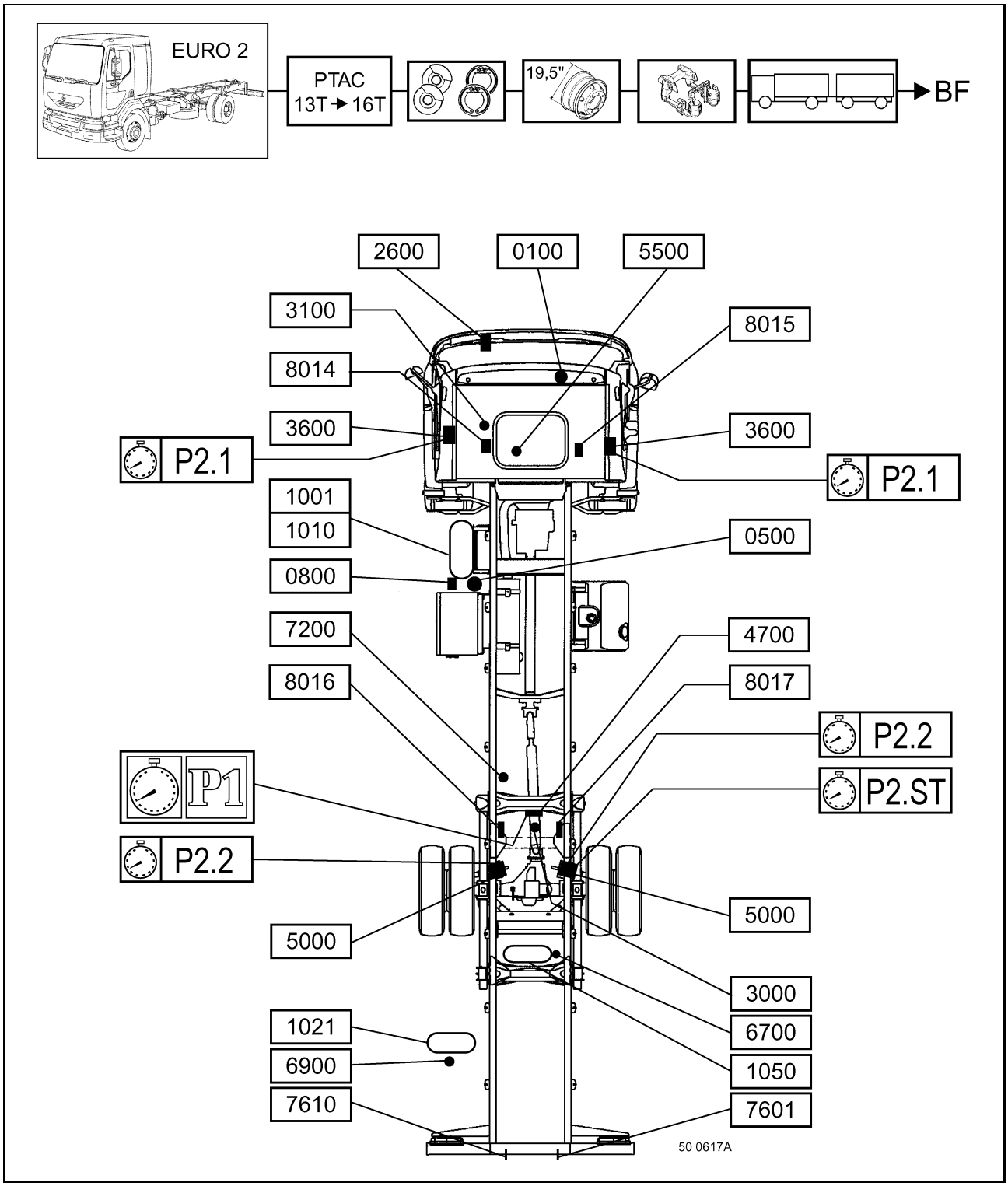
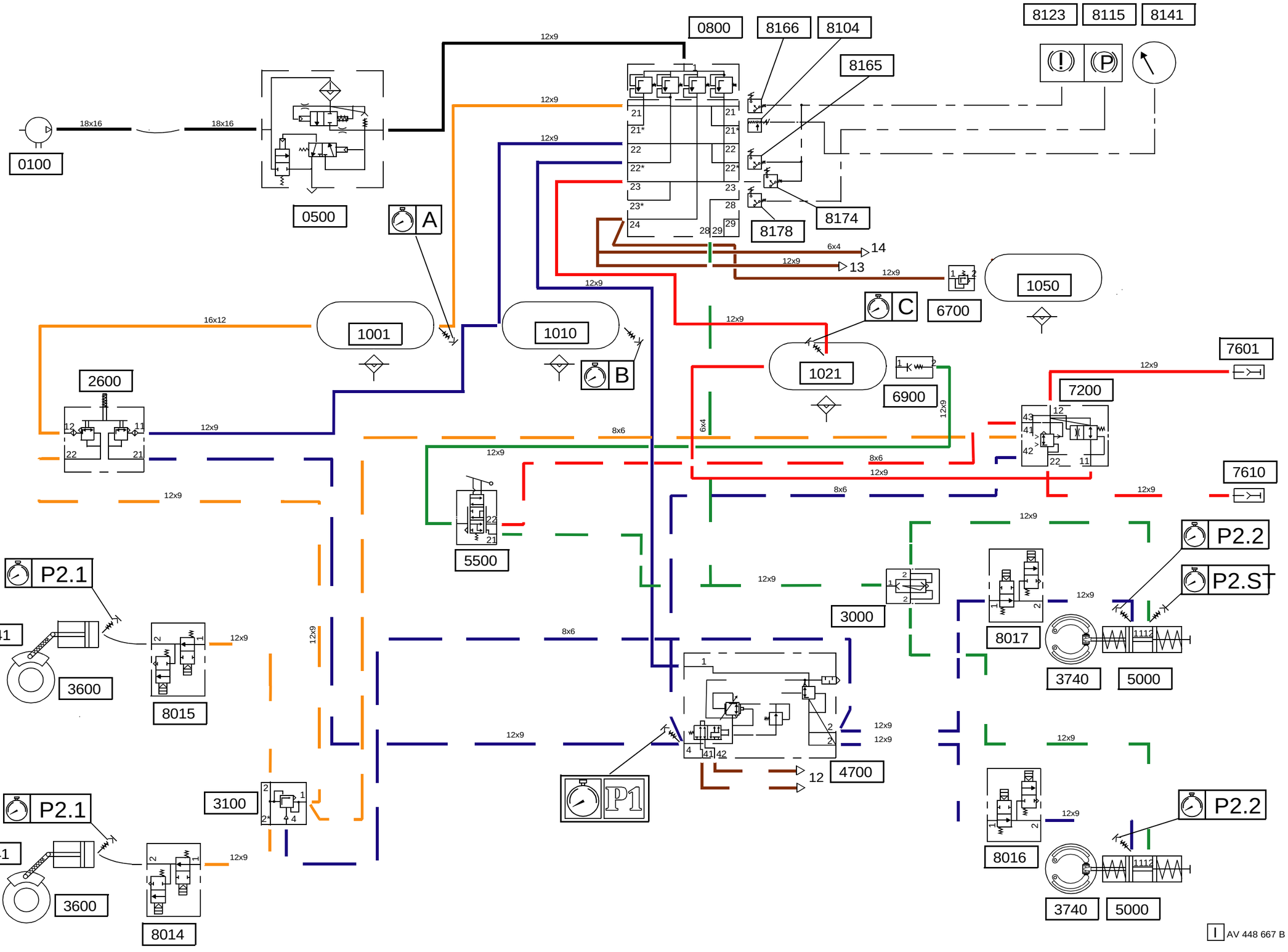
AV 448 665 B

Location of appliances





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7601
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5500
3000
8017
3740
5000
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P2.ST
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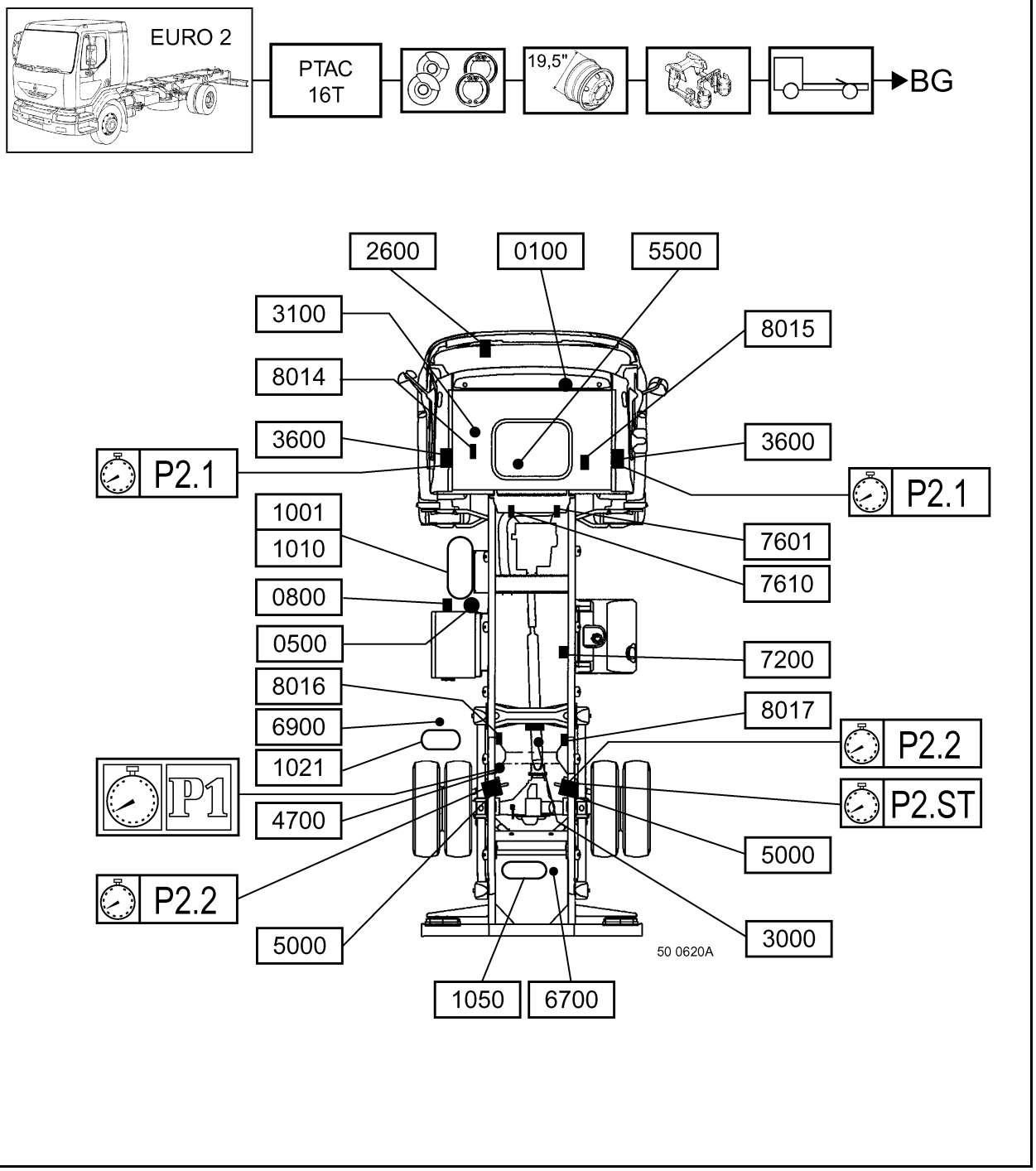
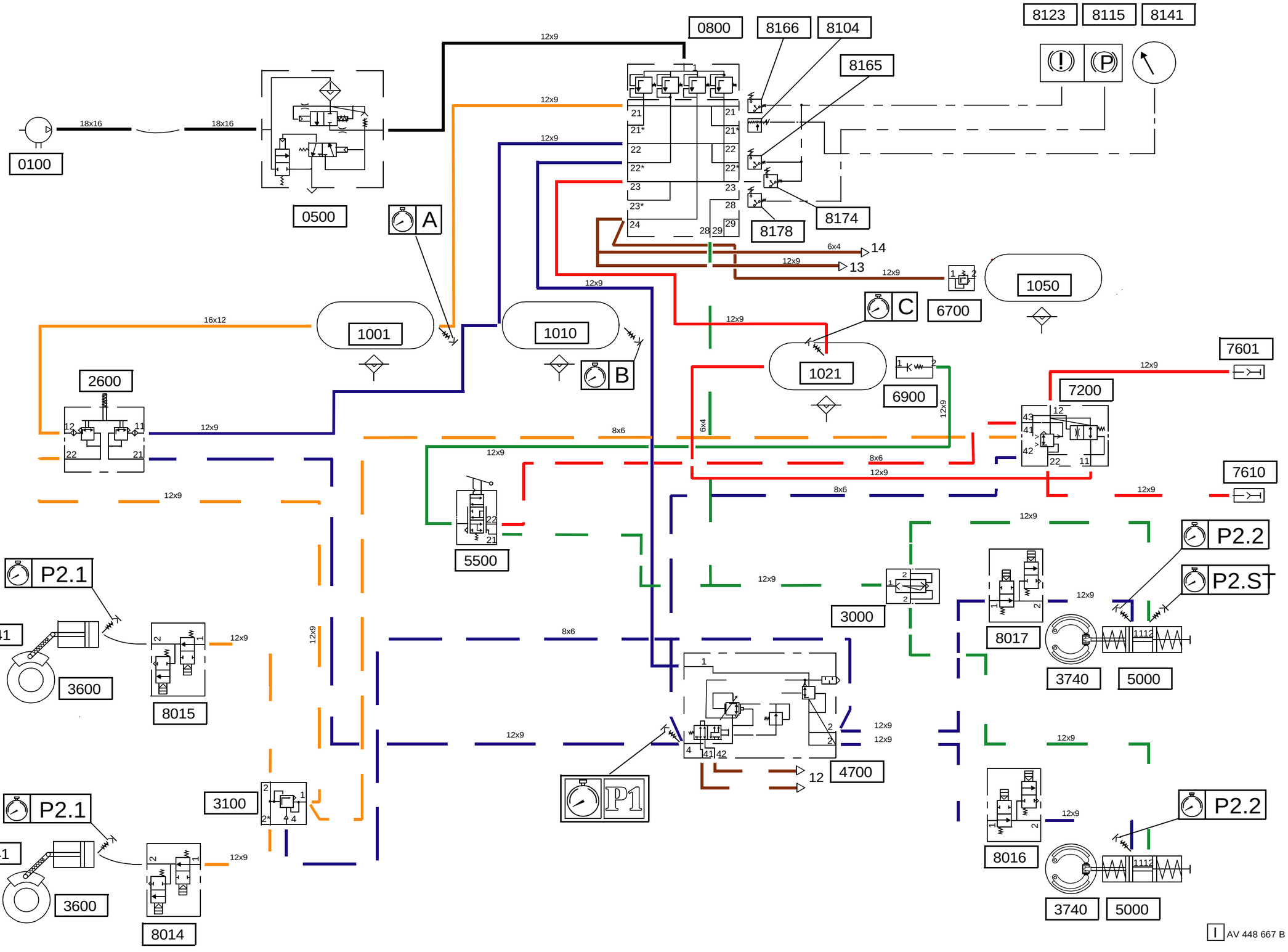
AV 448 667 B

Location of appliances





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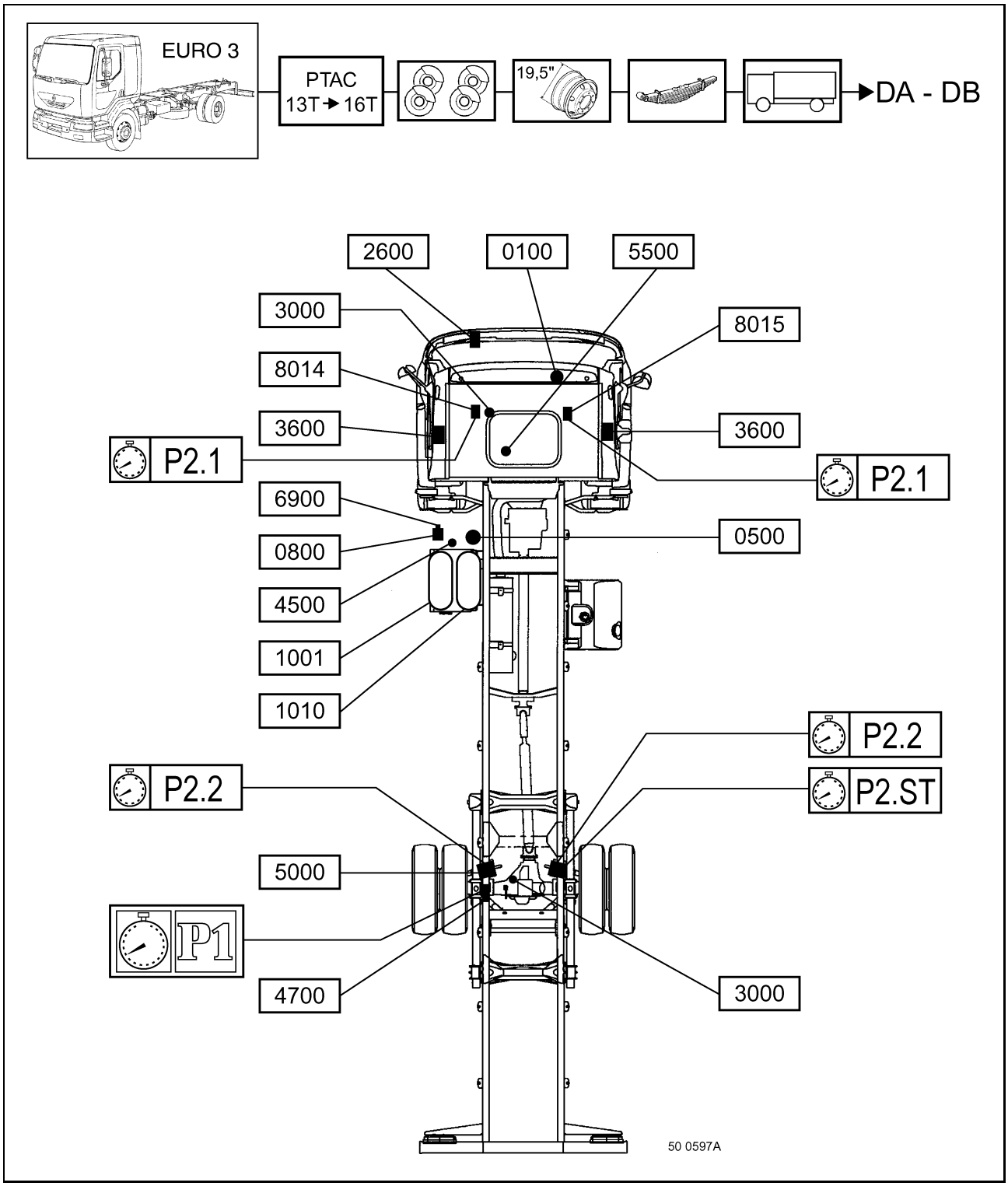
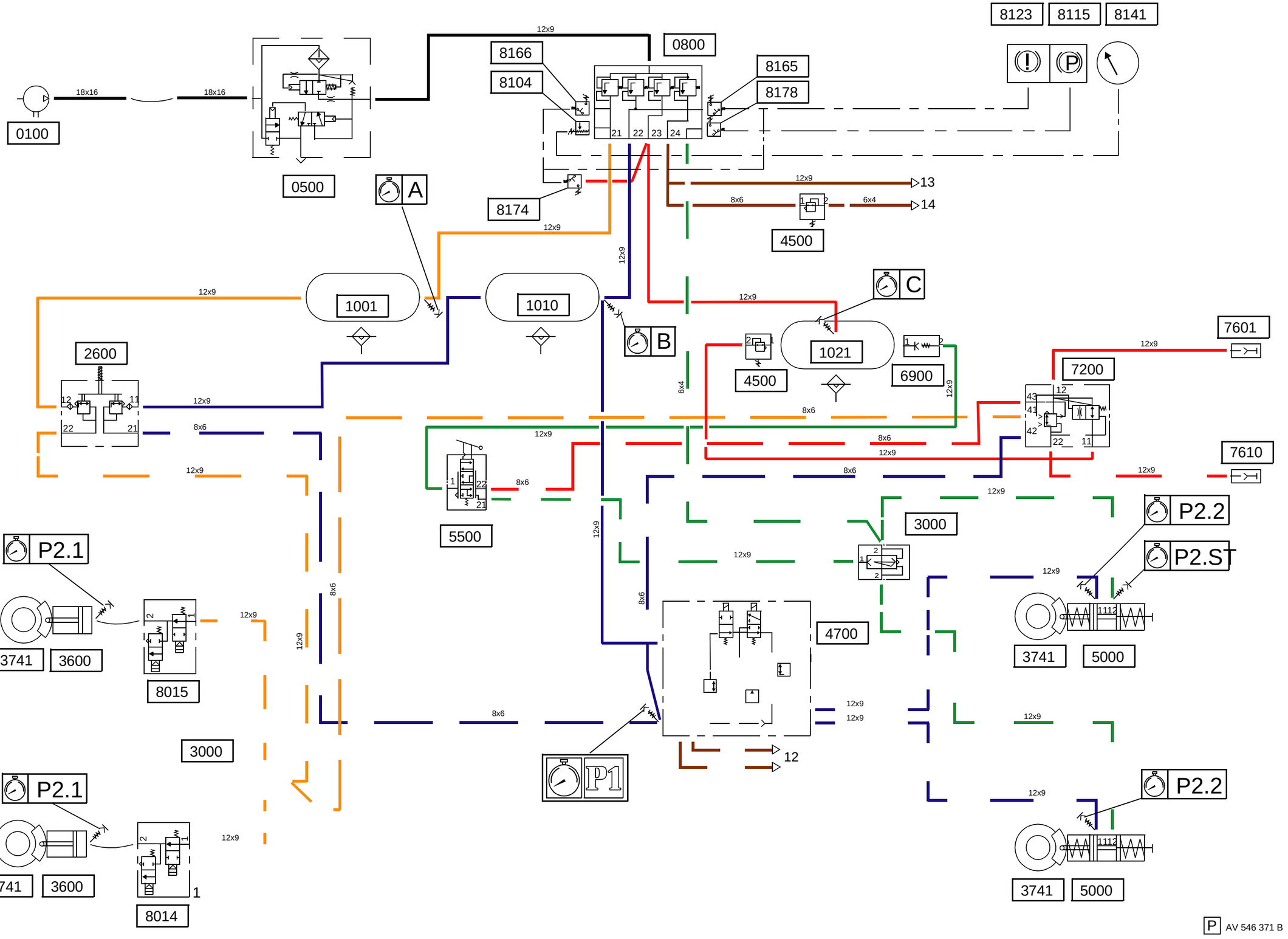
Location of appliances





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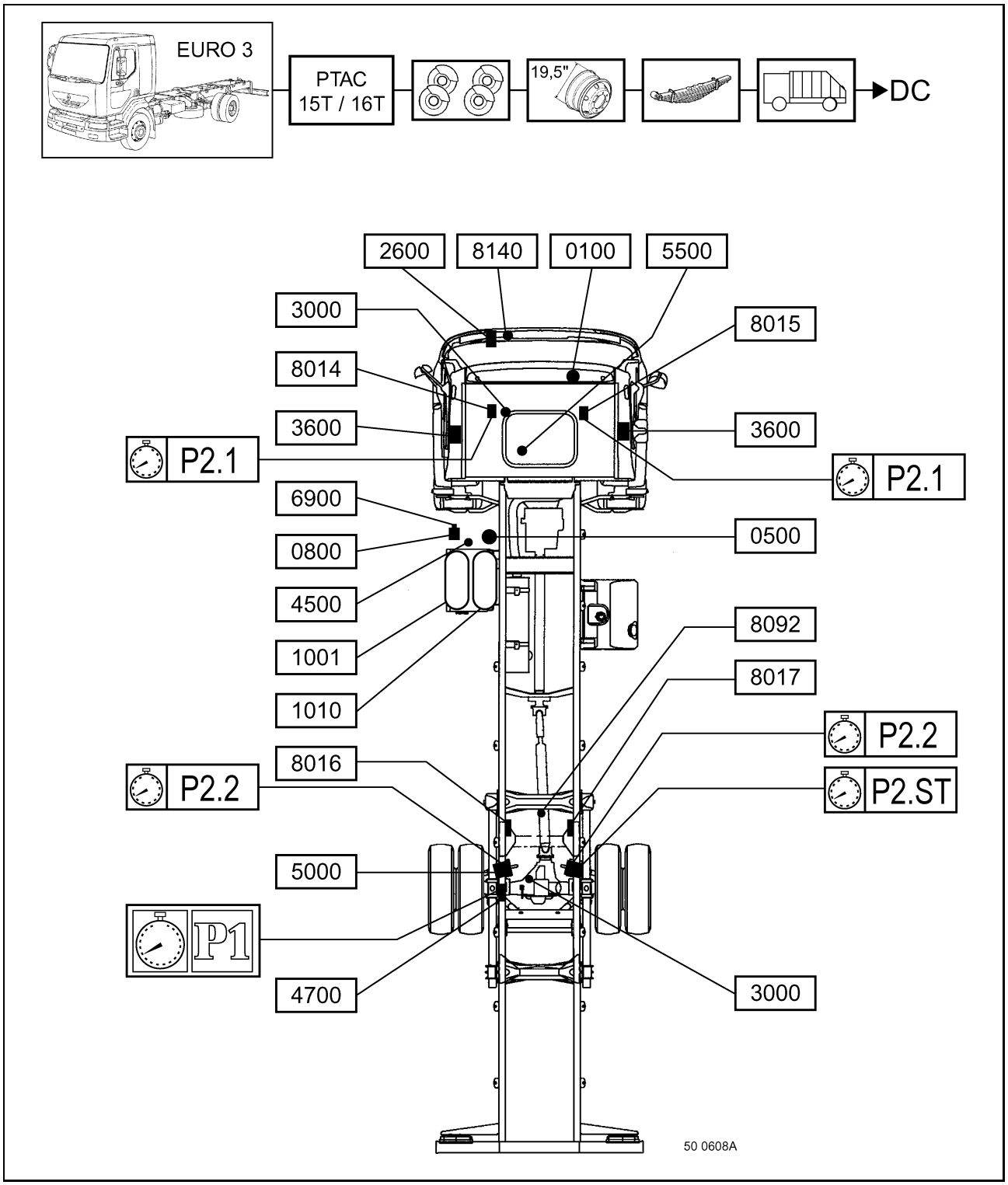
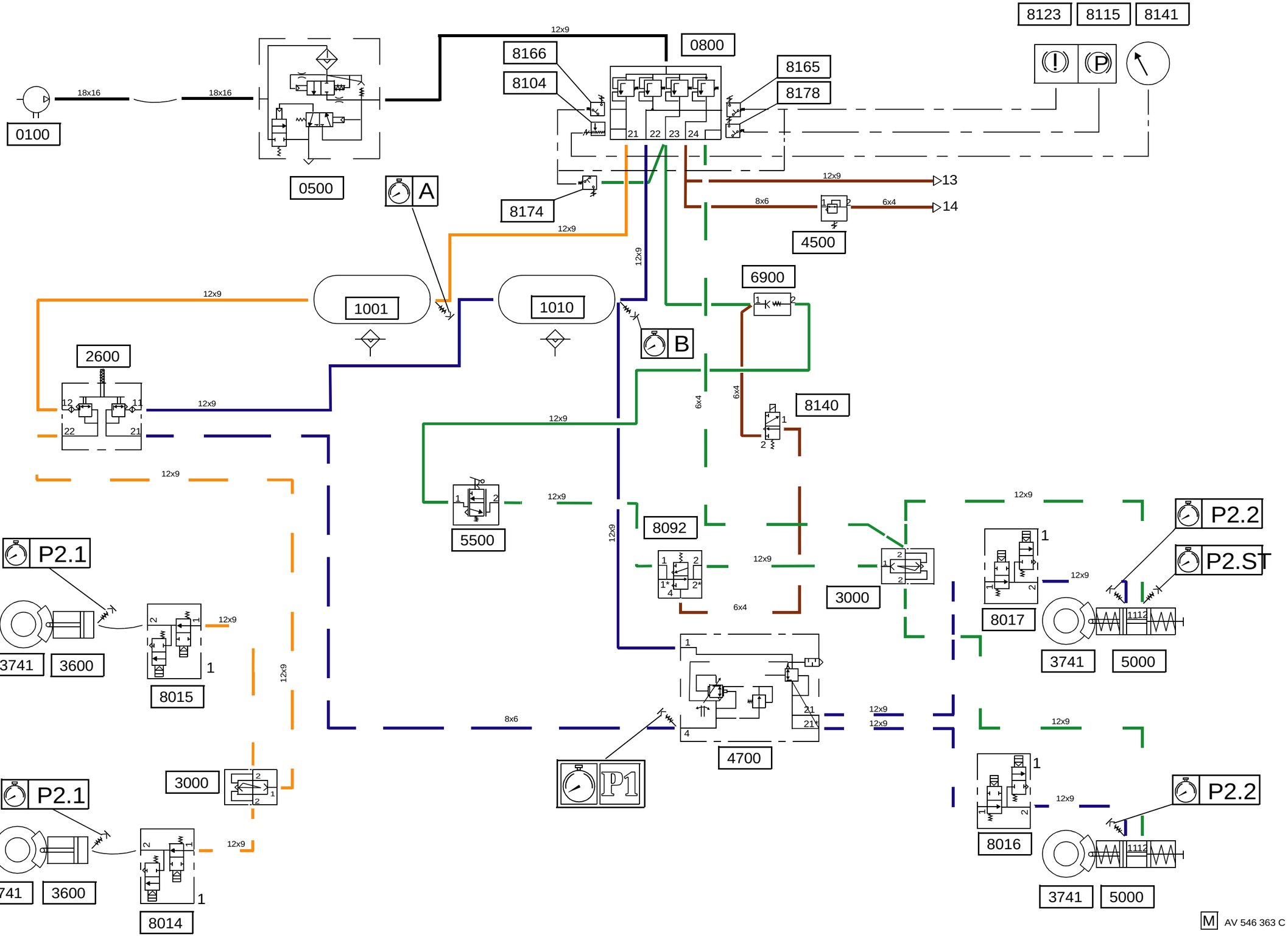
Location of appliances

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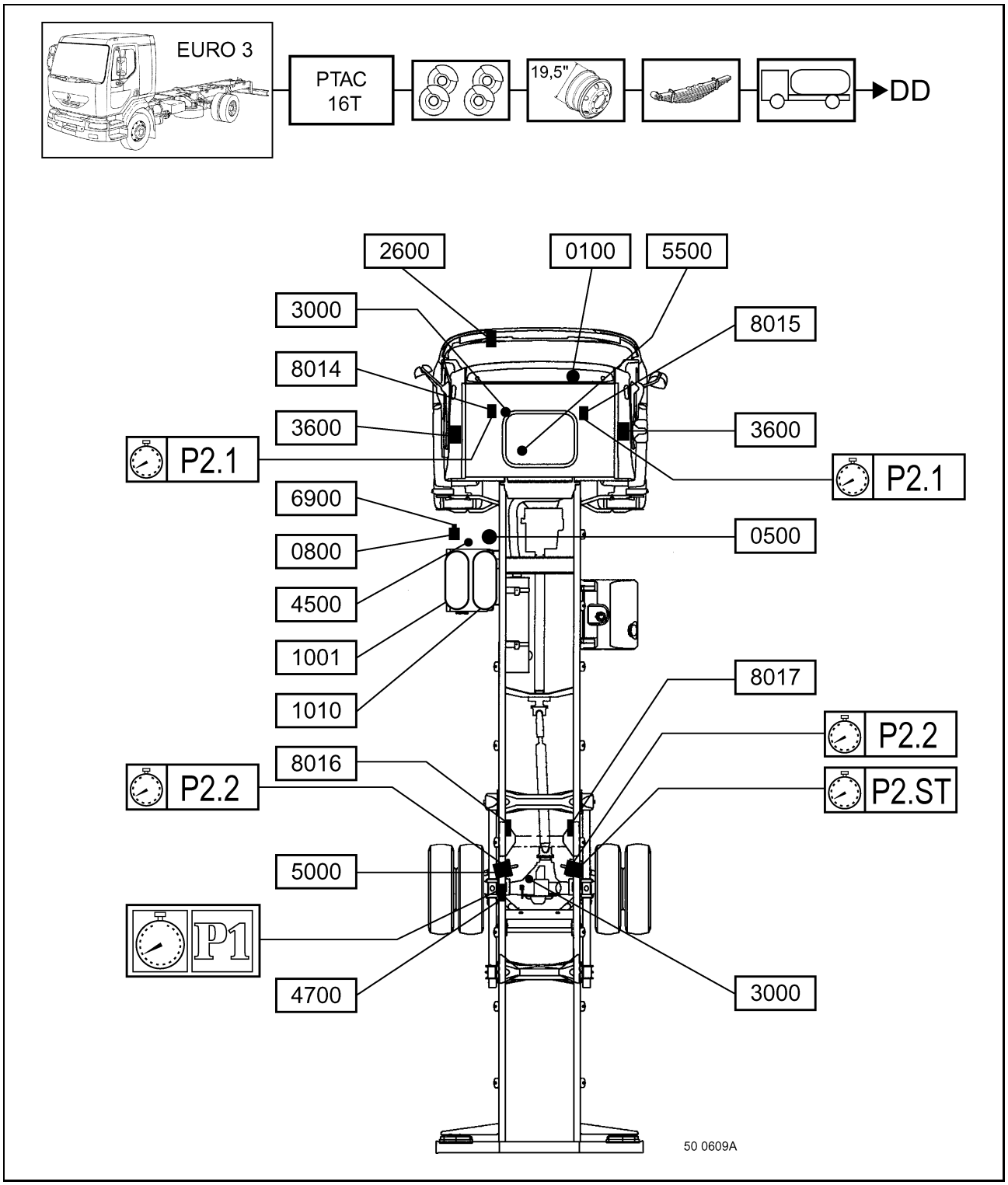
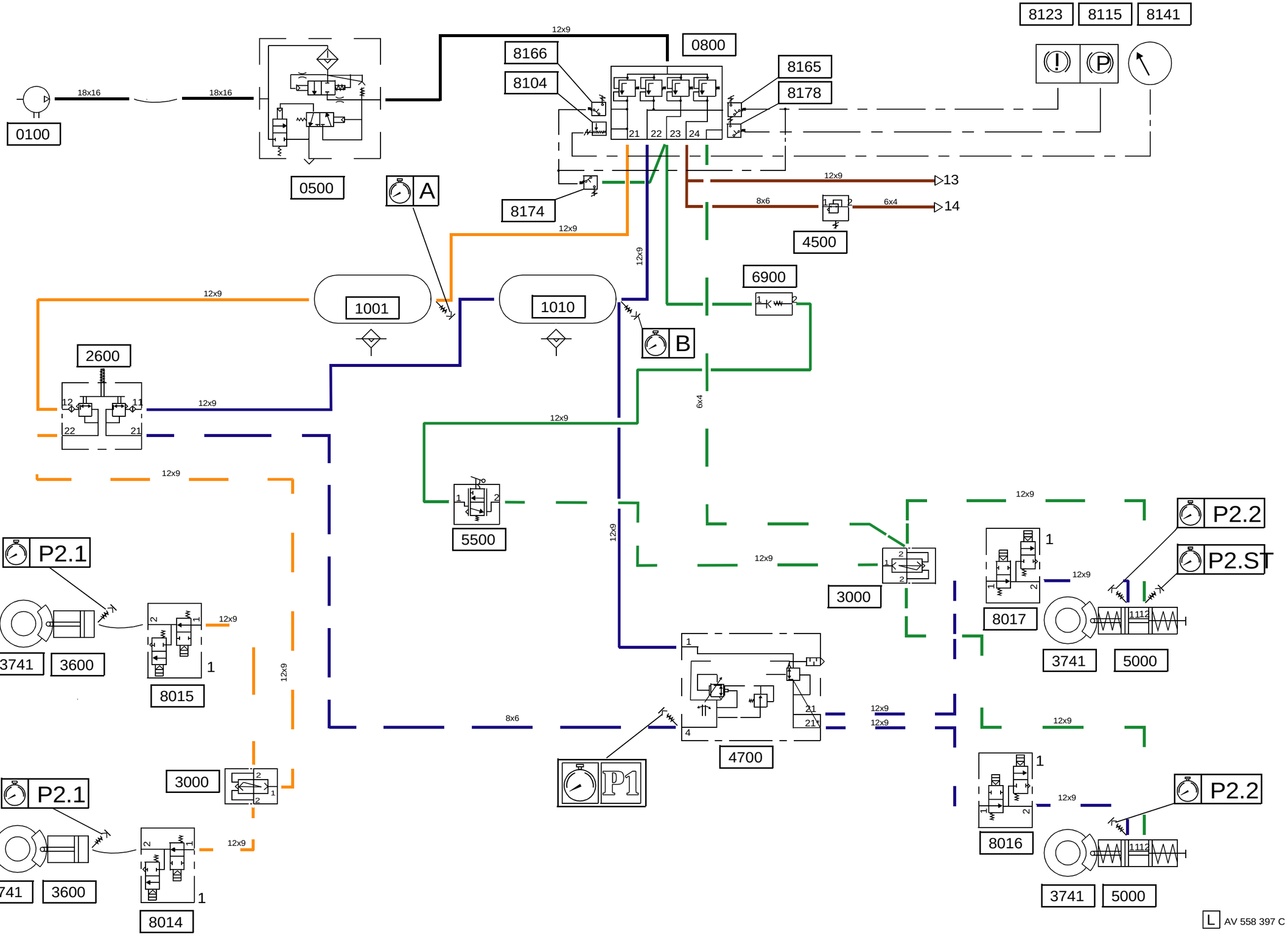
Location of appliances





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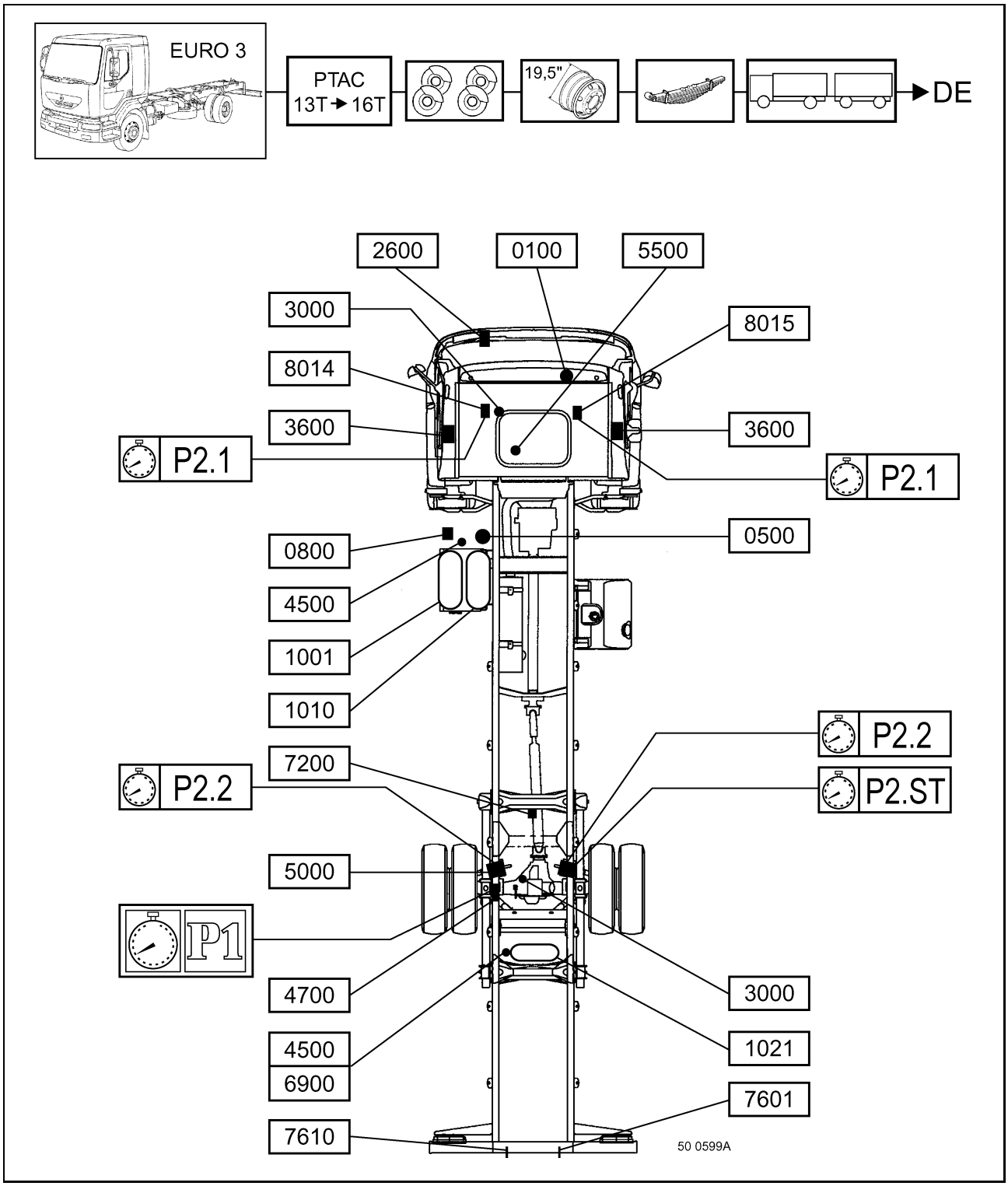
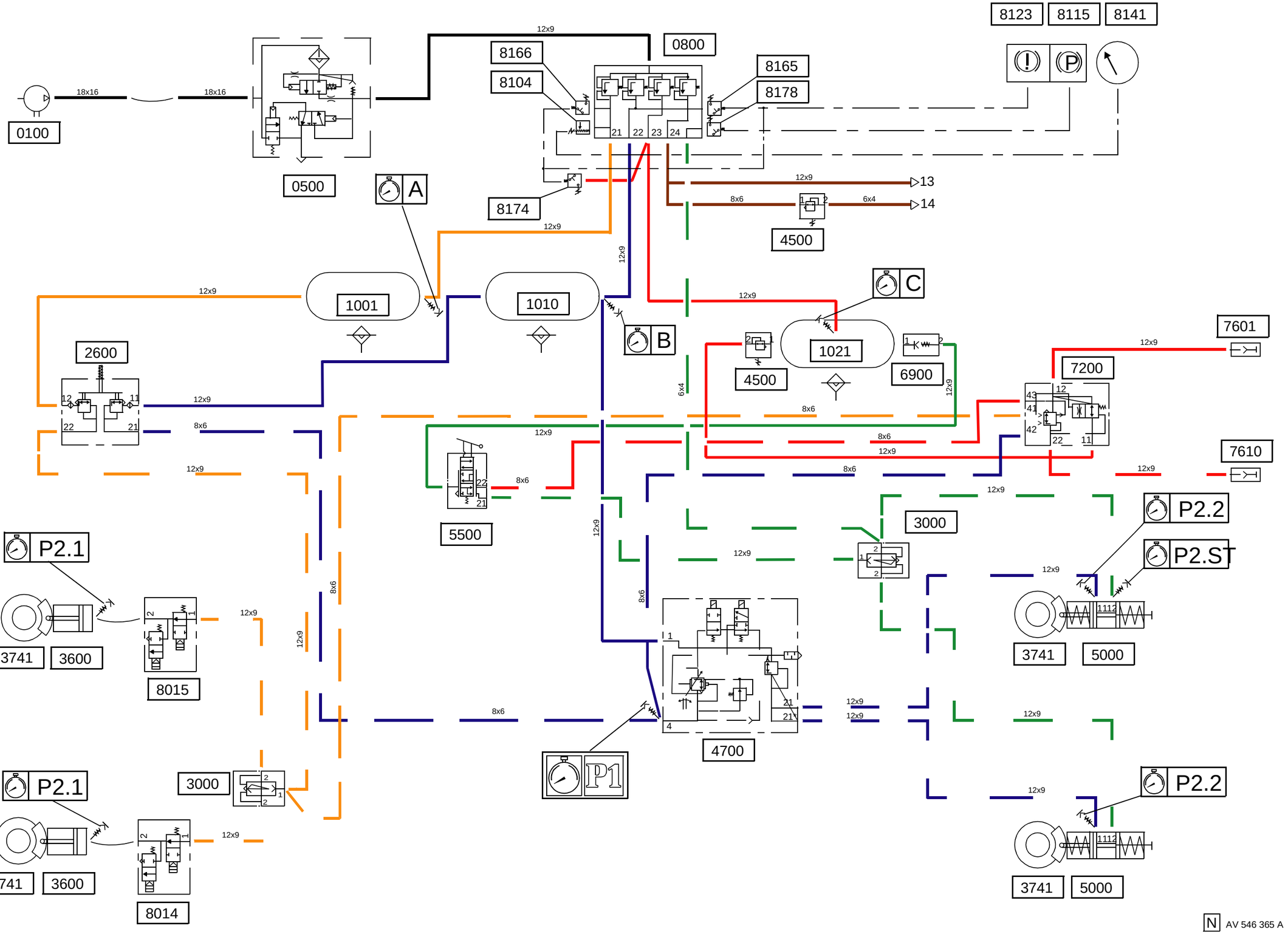
Location of appliances





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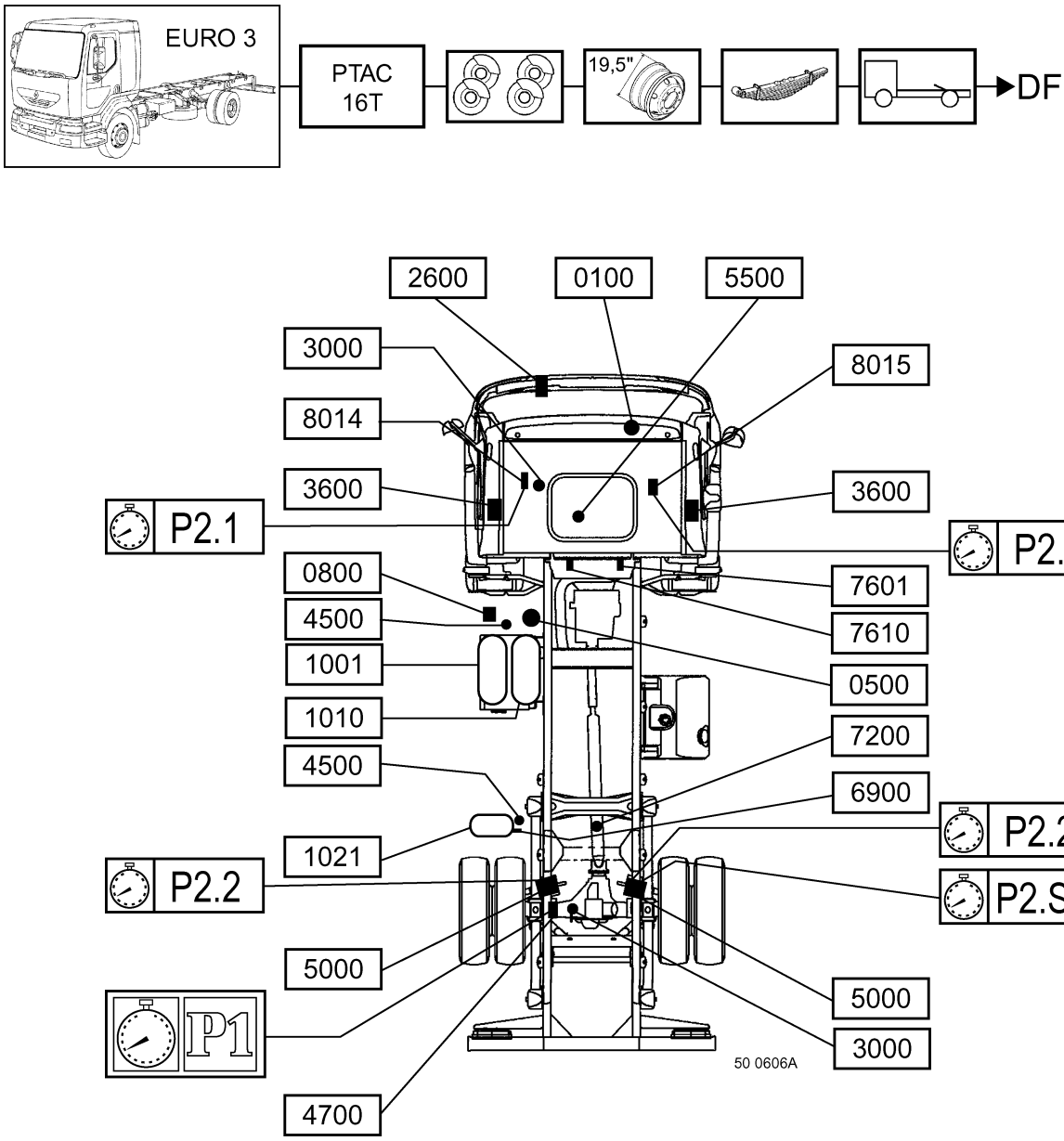

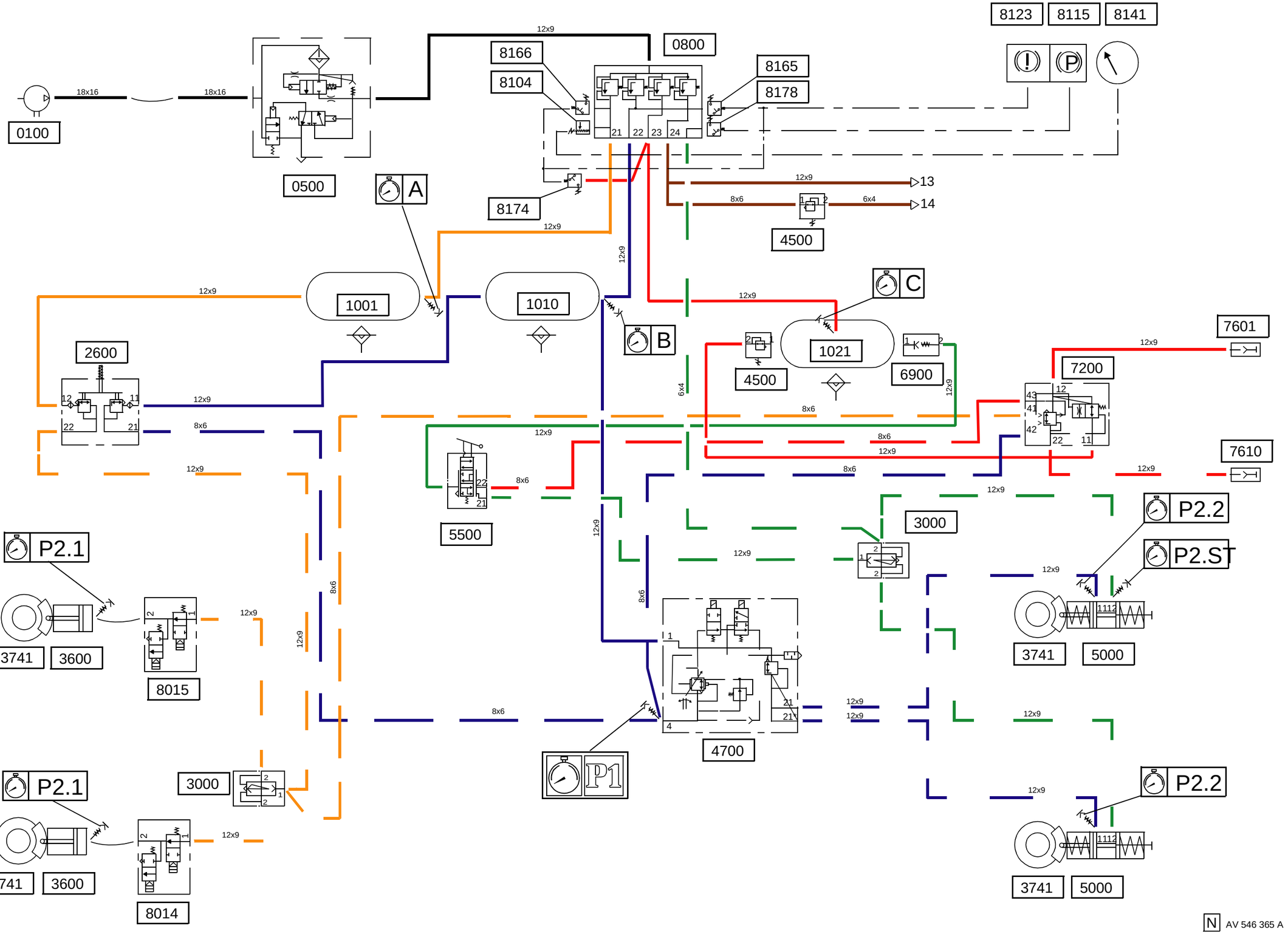

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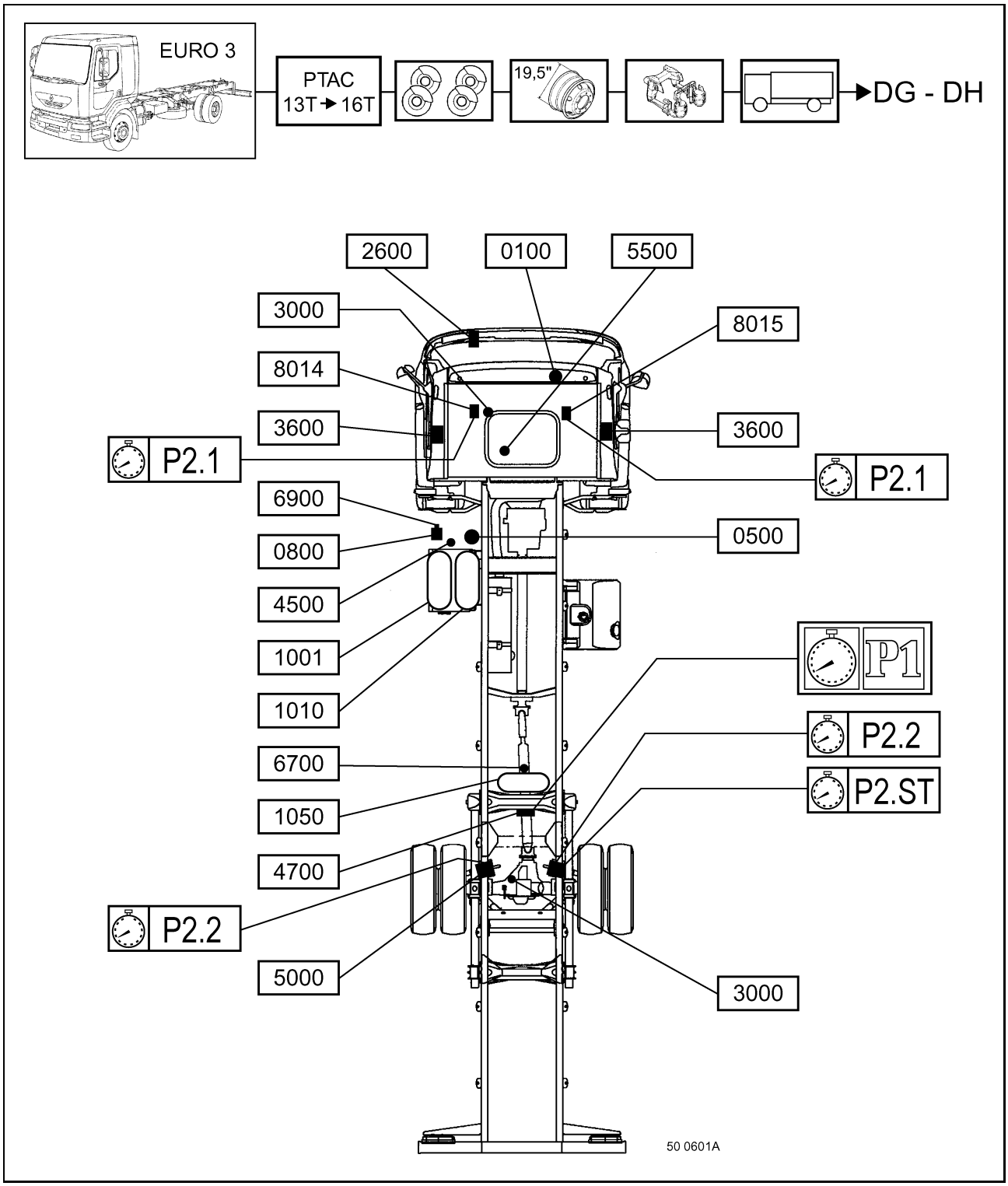
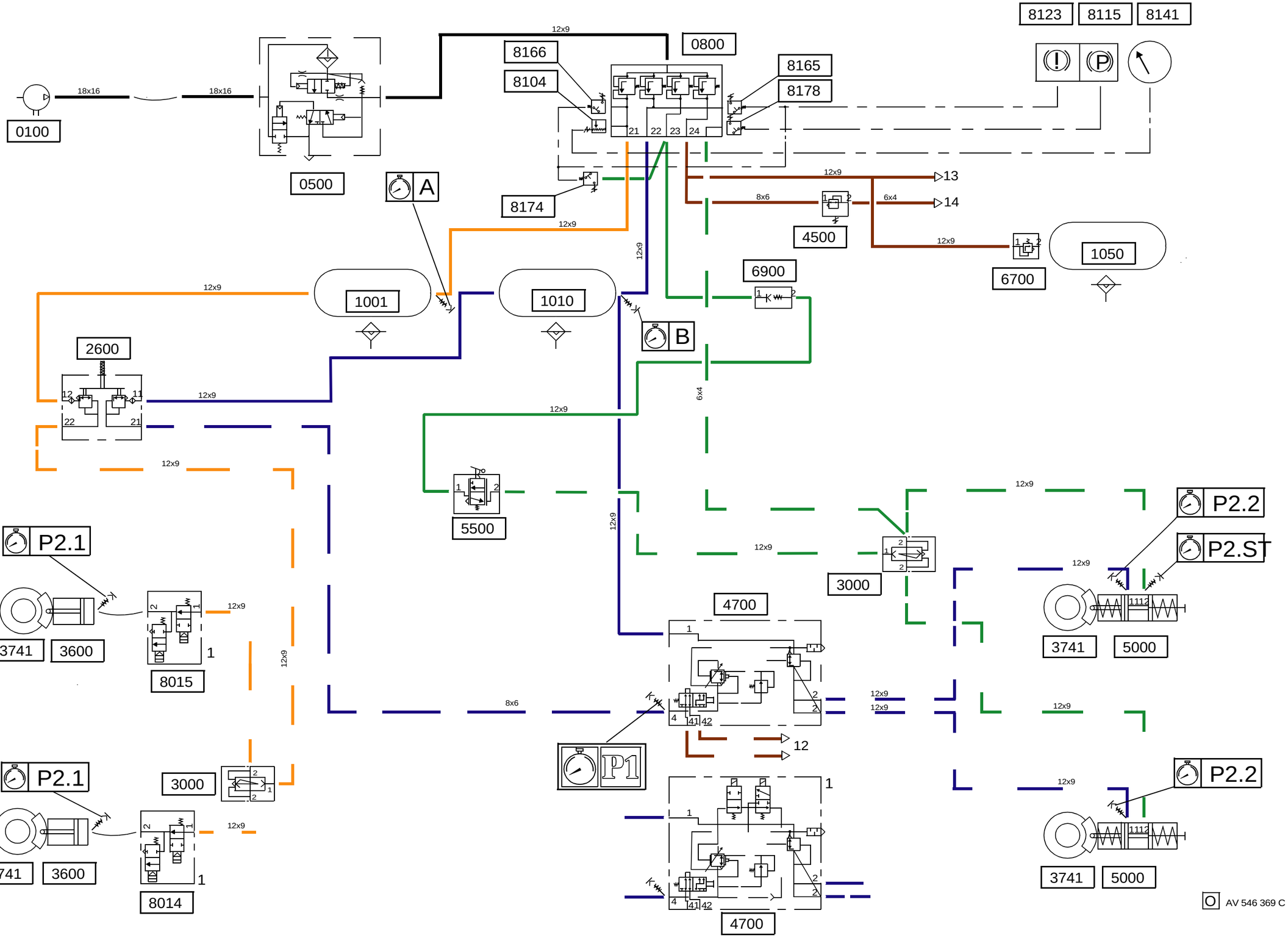
Location of appliances





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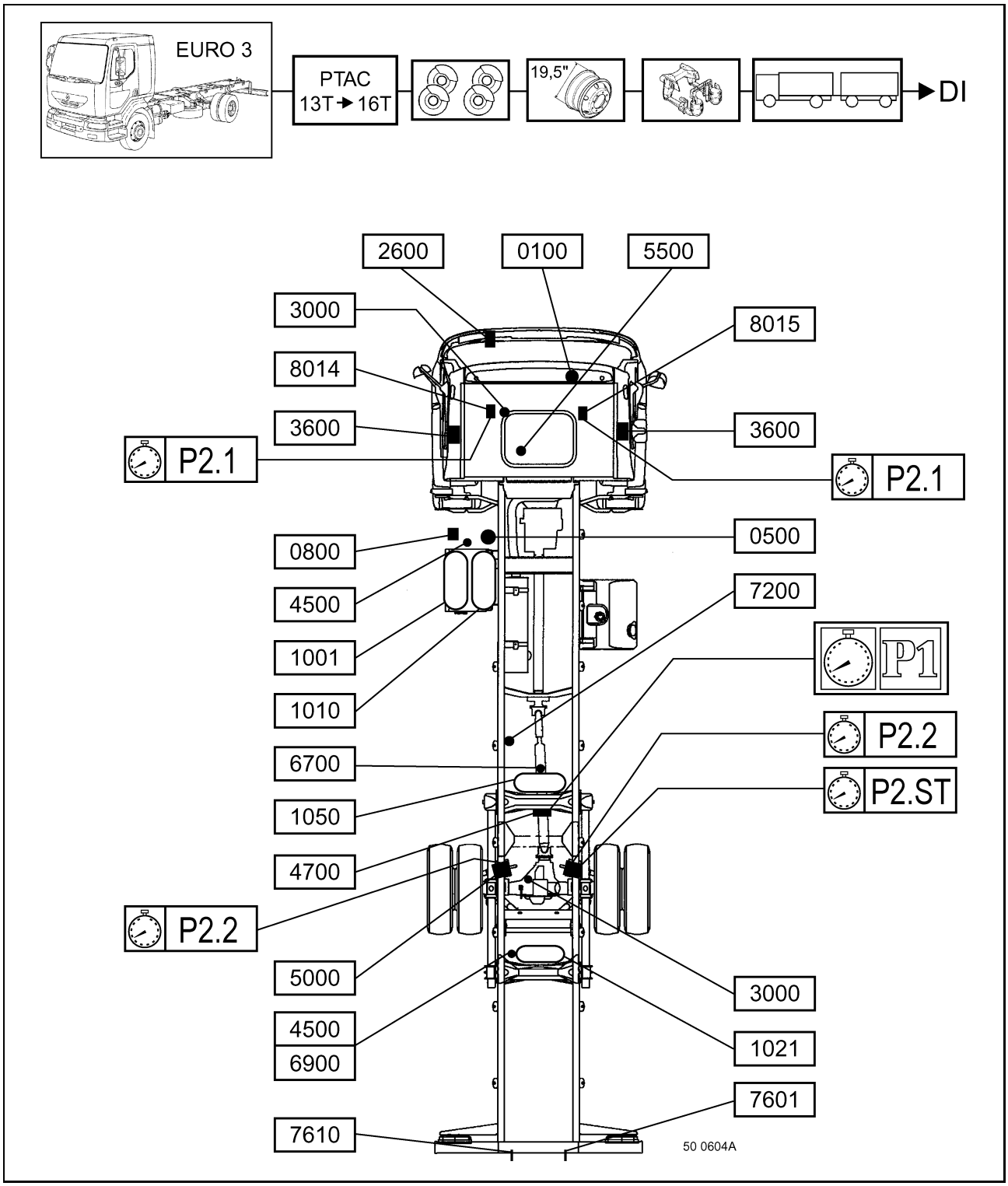

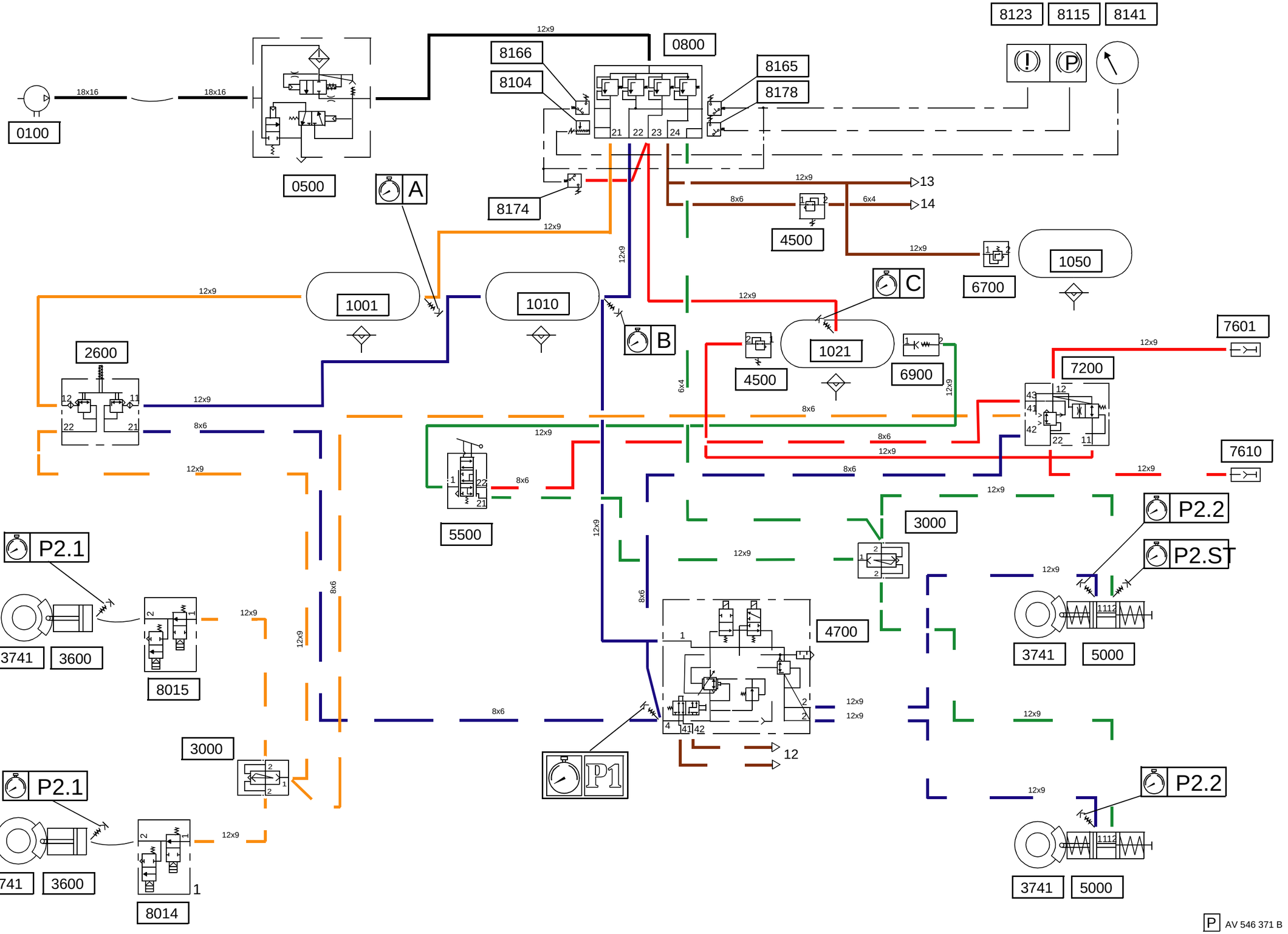

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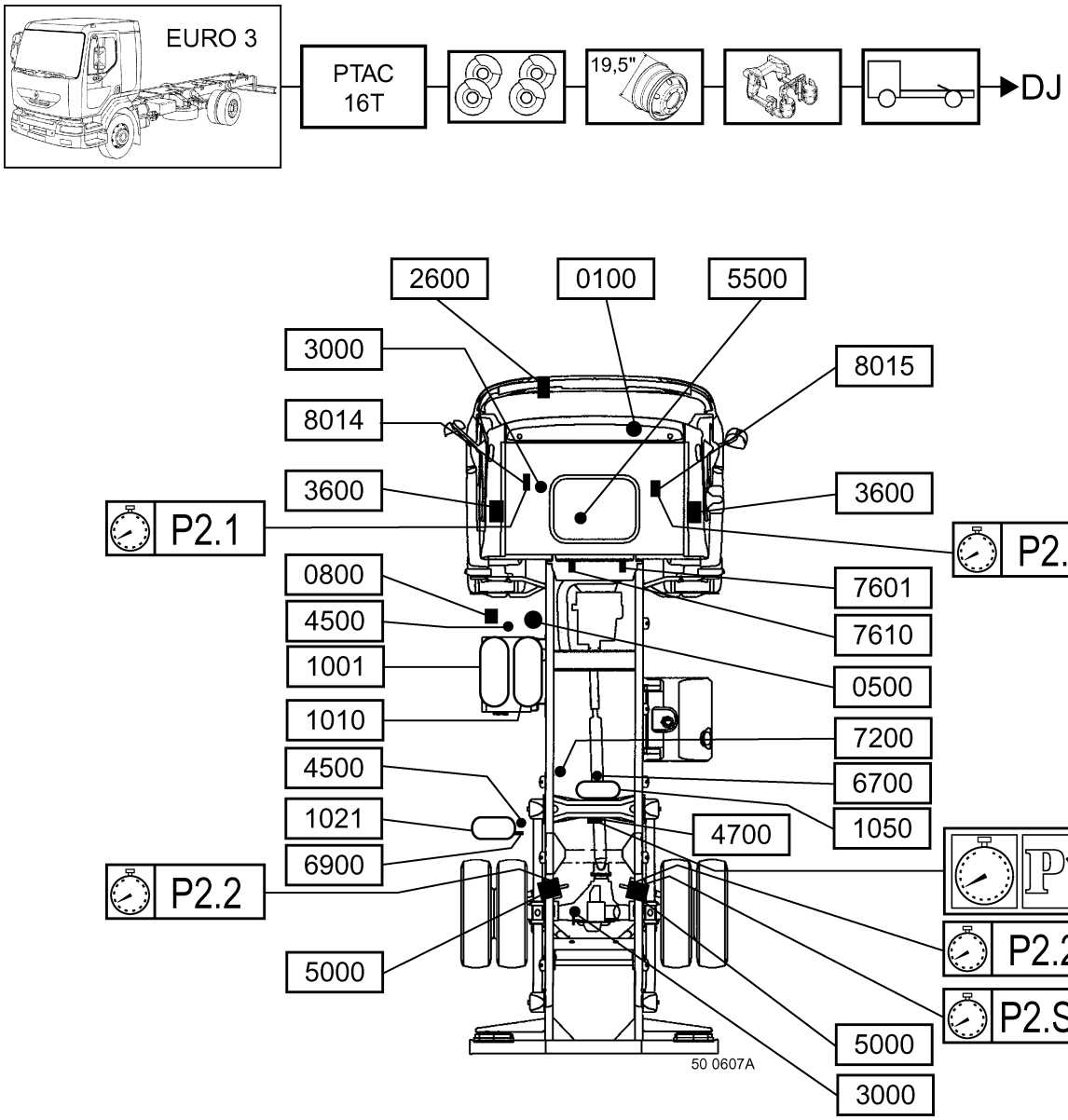
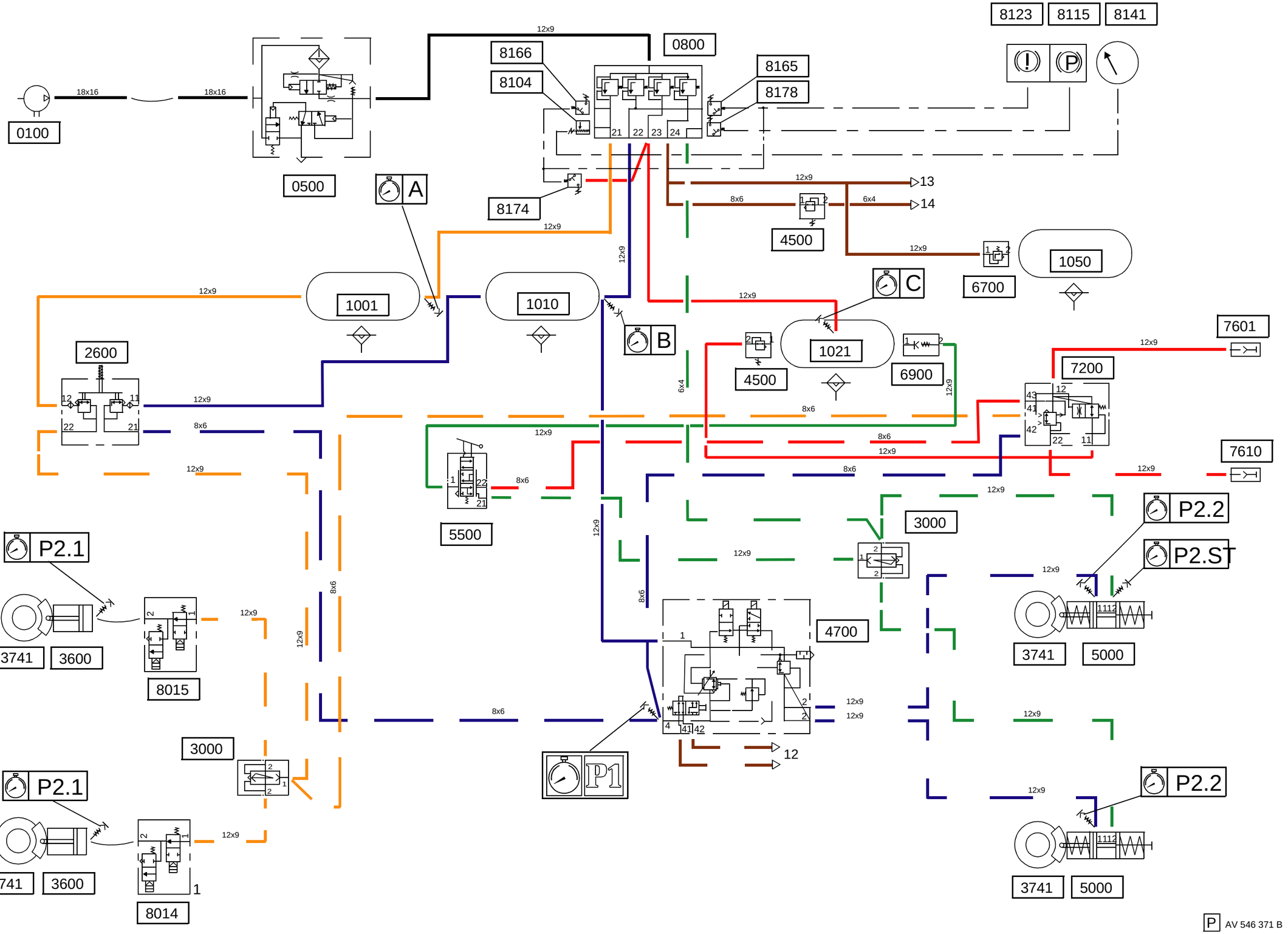
Location of appliances





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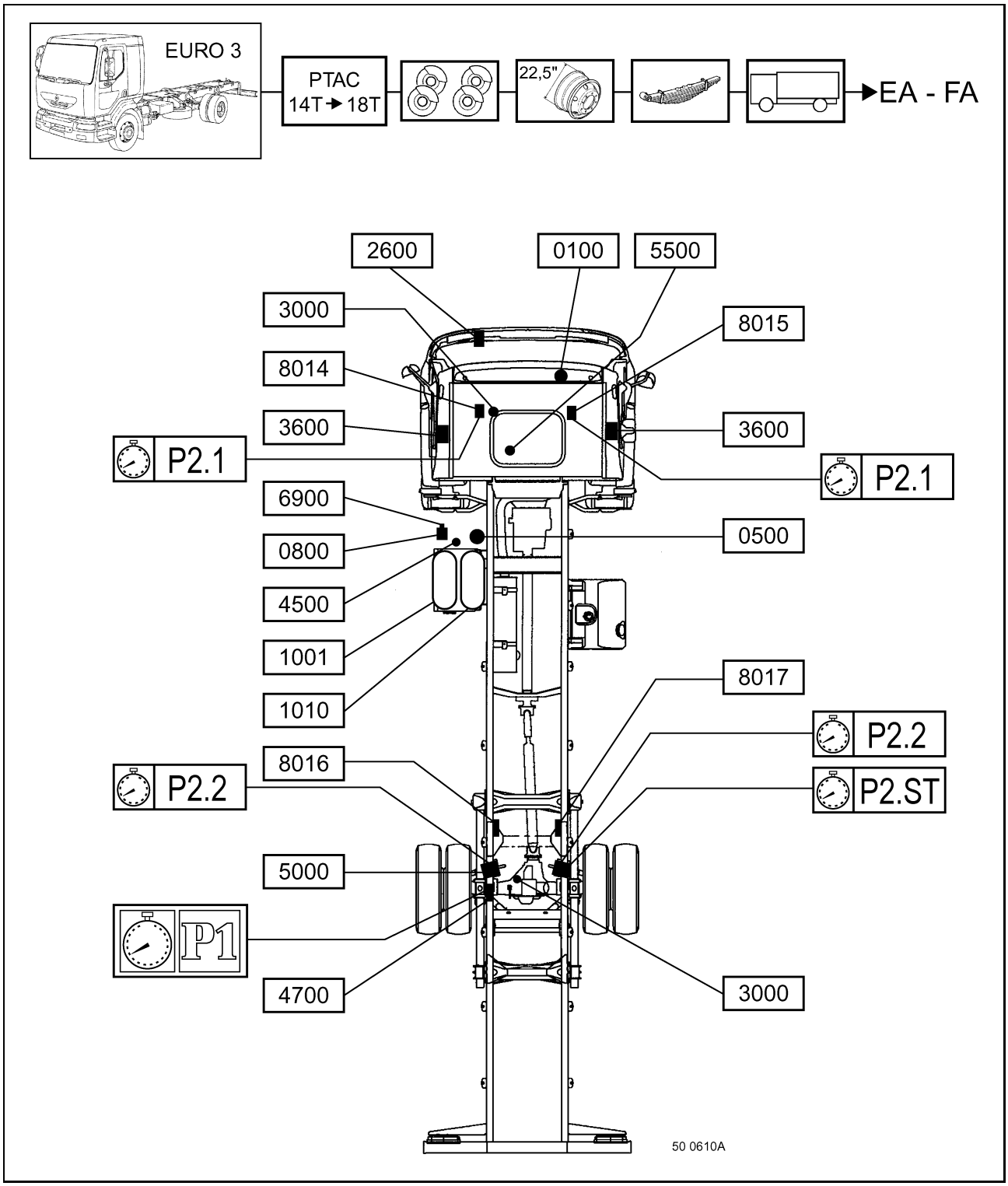

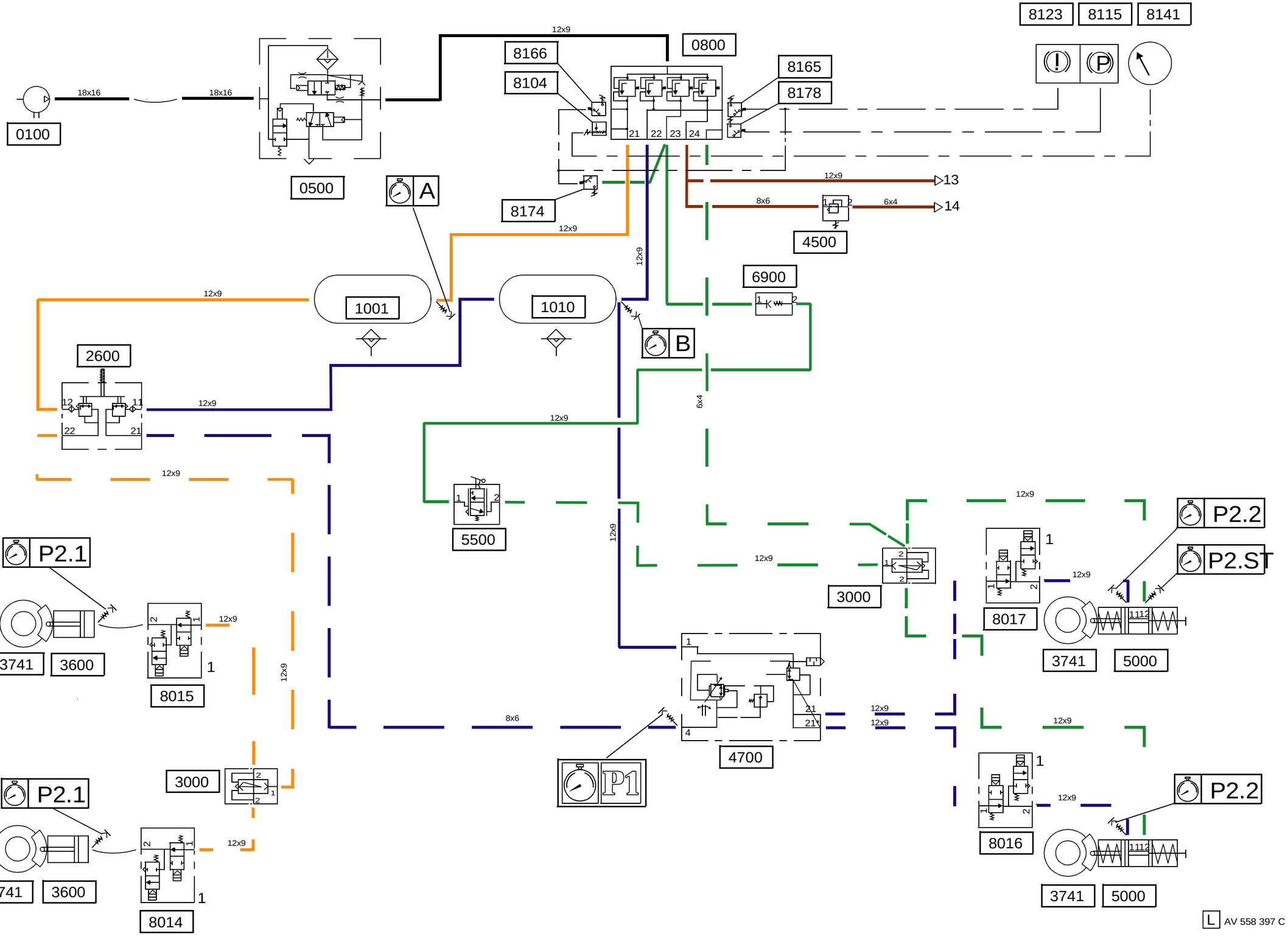

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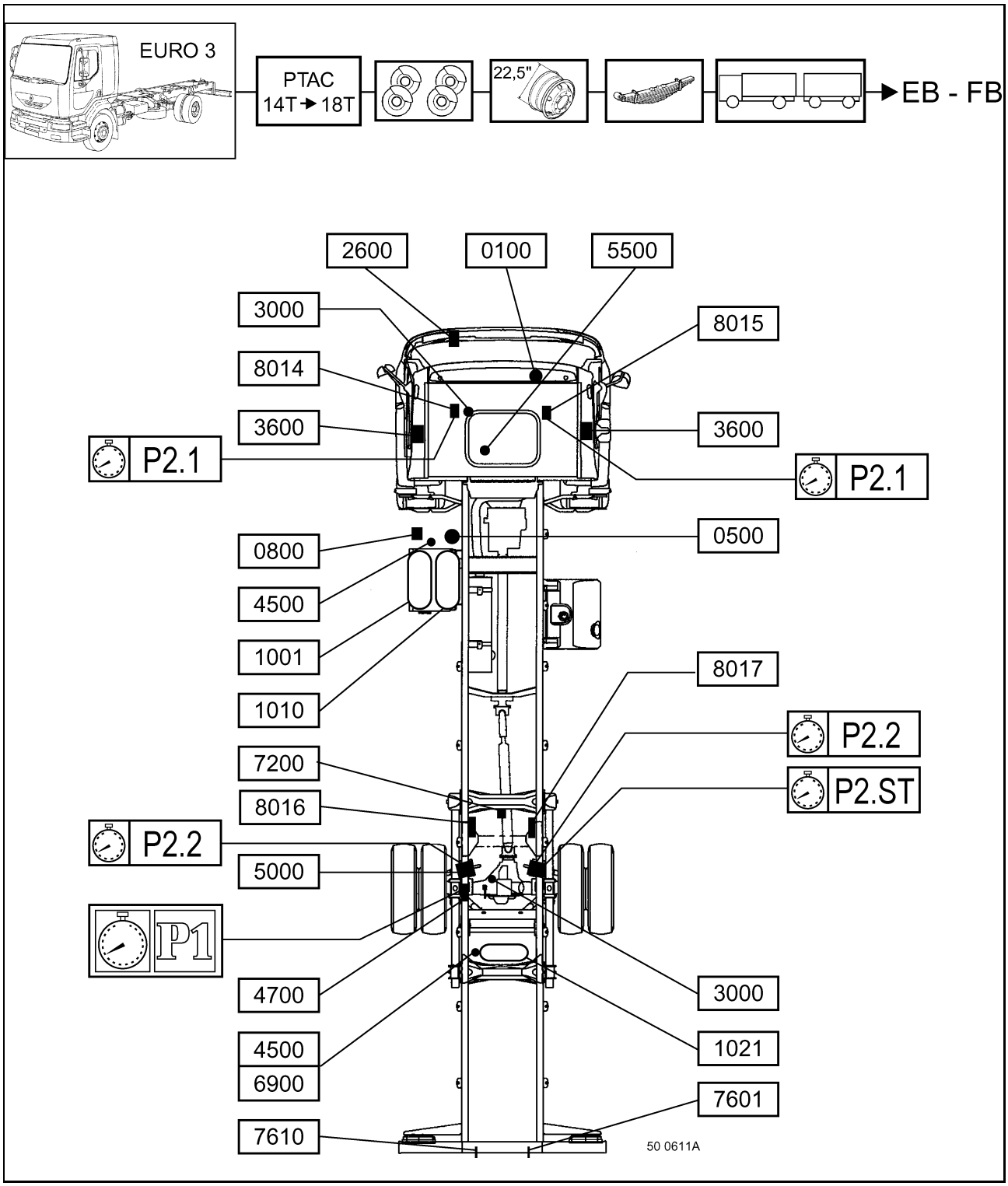
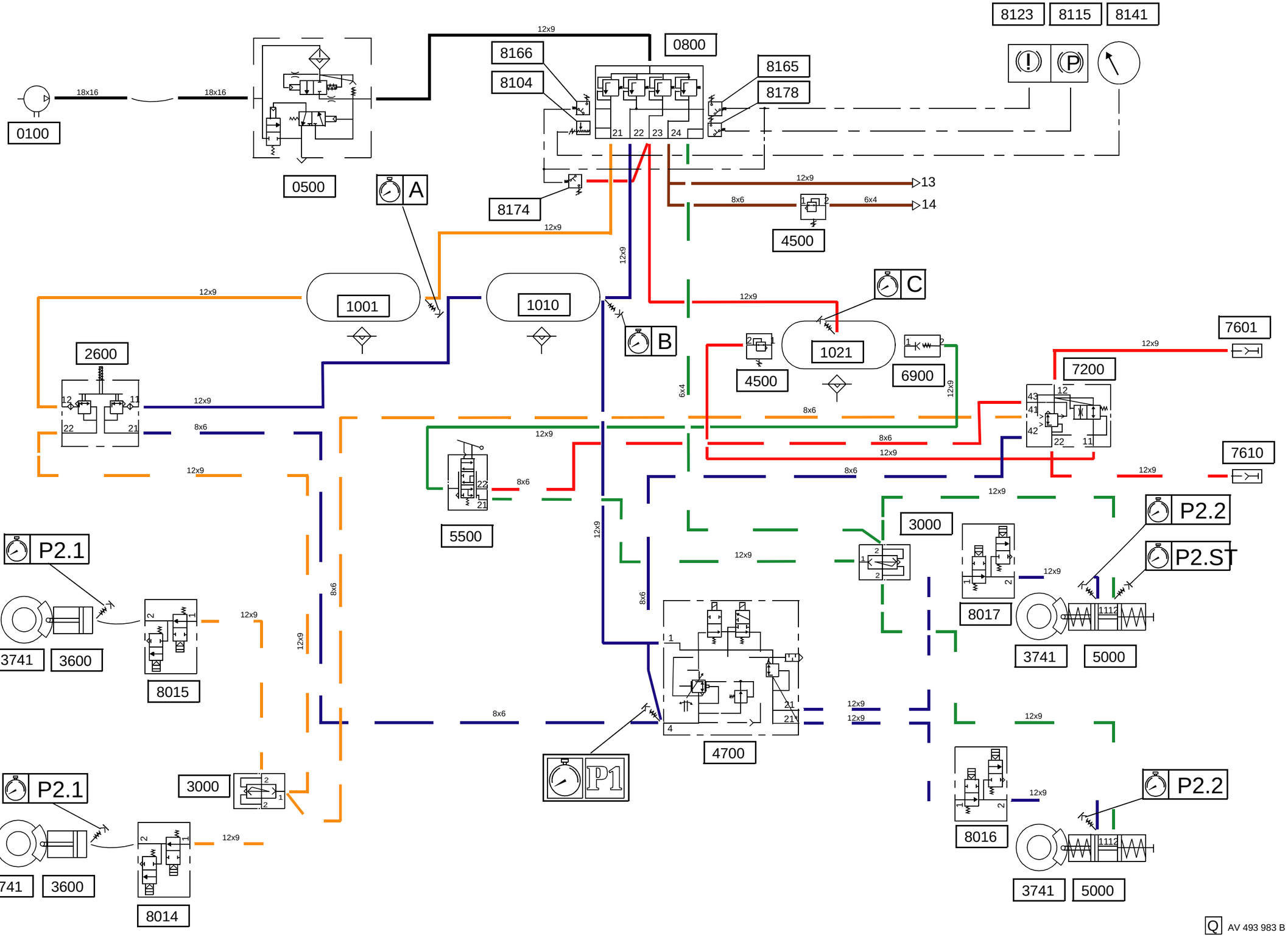
Location of appliances





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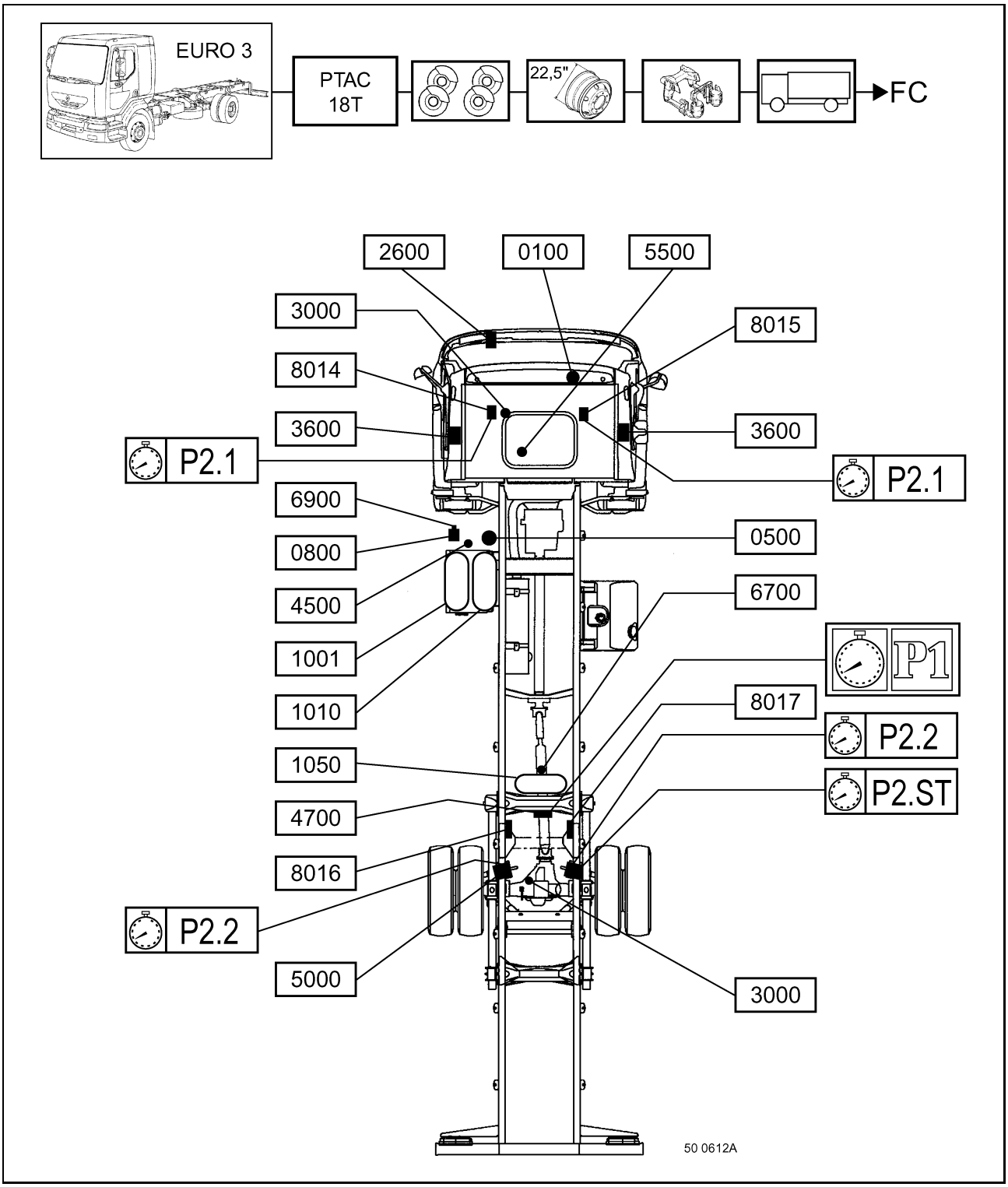
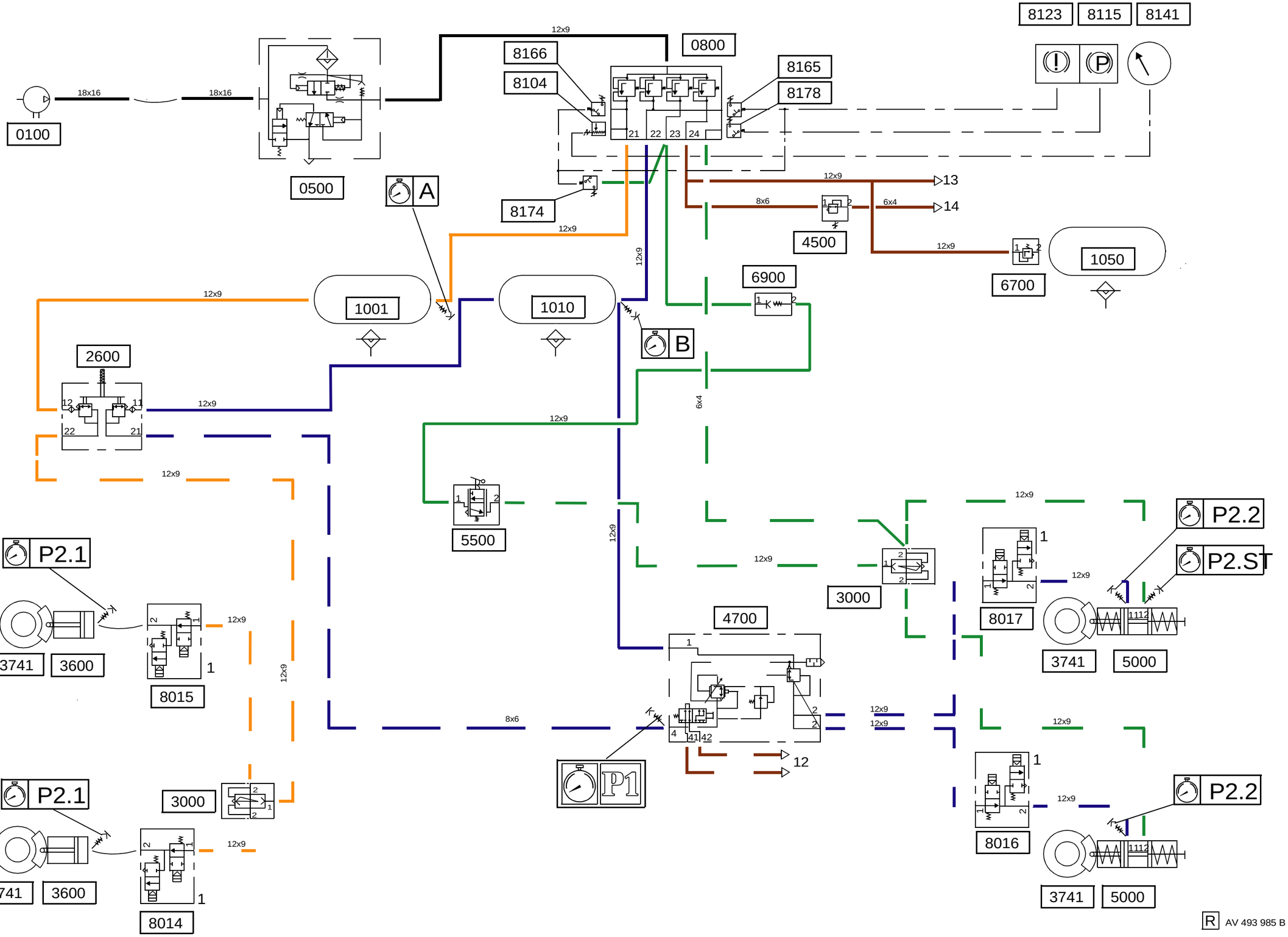
Location of appliances





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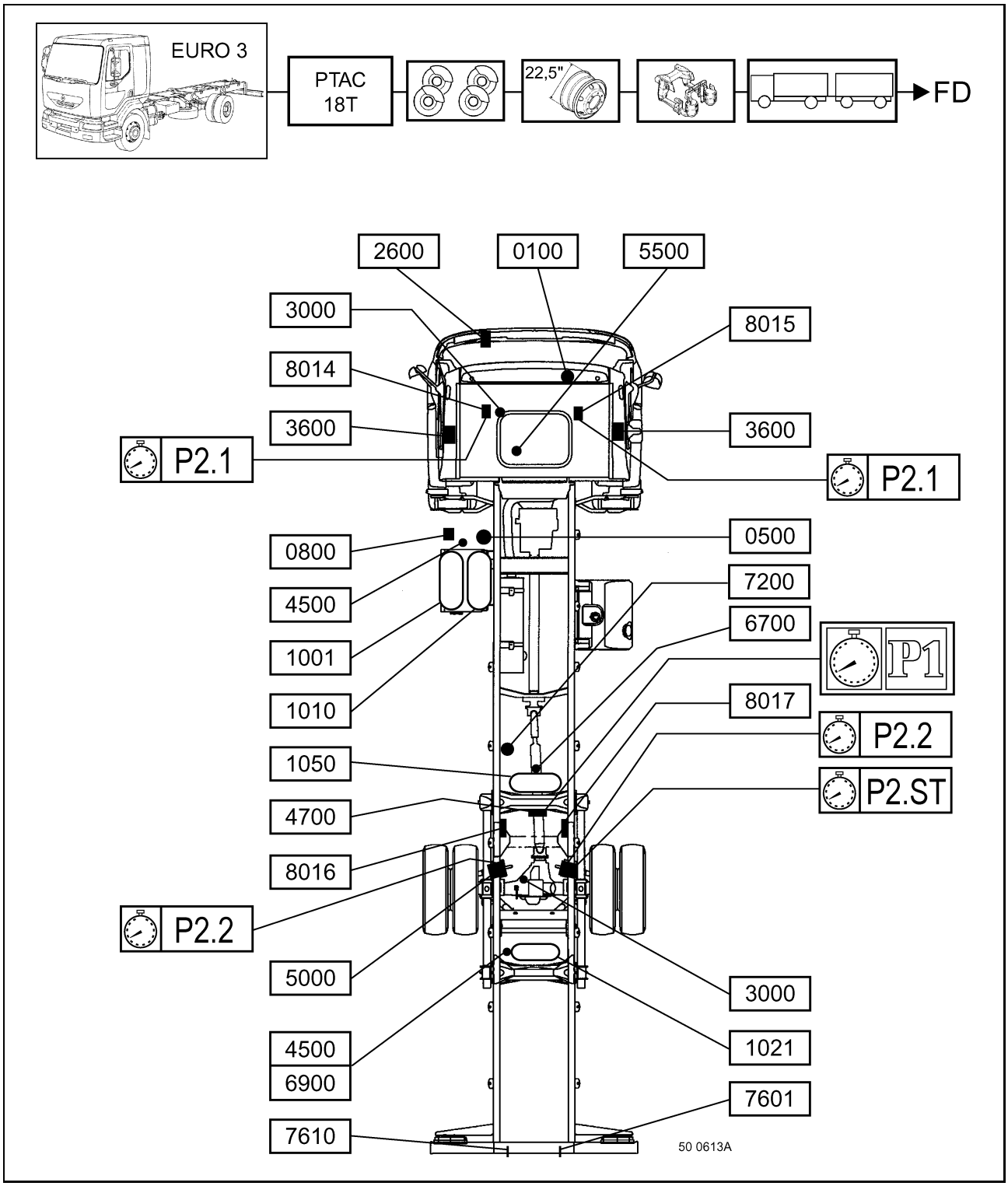
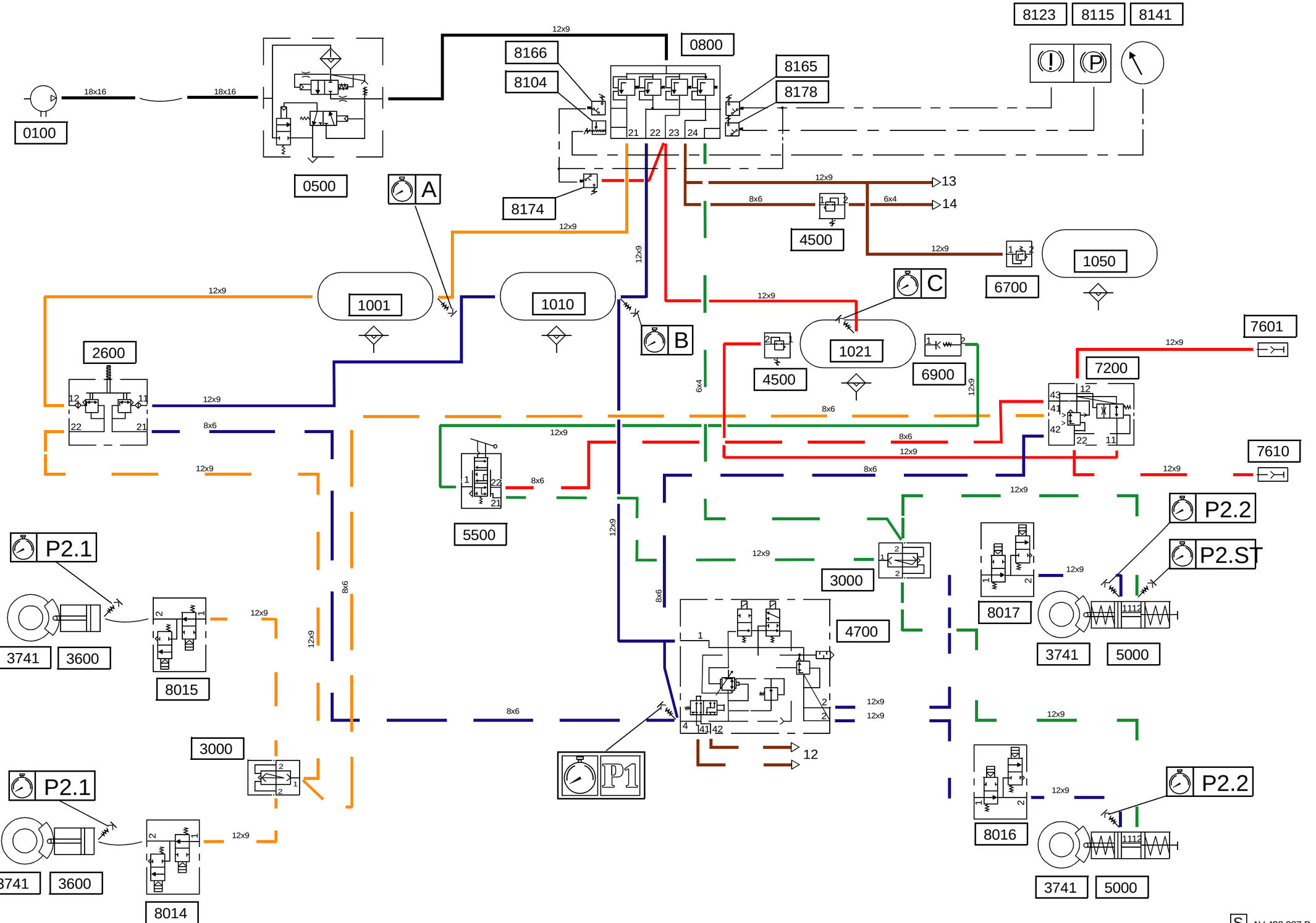
Location of appliances





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TESTING/ADJUSTMENT

TESTING THE BRAKES

Generalities

Braking circuits must be tested not only systematically when there is trouble with the braking system but also periodically to make sure that the safety functions of each circuit are in order.
Recommendation: test whenever replacing brake linings.

Preliminary checks :
Before testing a compressed air circuit, proceed as follows:

- Make a quick mechanical check of the following :
- Brake pedal clearance,
- Adjustment and operation of brake levers,
- Brakes operating clearance,
- Absence of seizure,
- Conformity to original assembly.

- Test circuits for leaks :
- This can be done with soapy water, foam sprayed from an aerosol canister, or using an ultrasonic detector.

The vehicle compressed air system must be held at governing pressure for the whole duration of testing.

Since July 1992 (NF standard "EN286-2"), compressed air tanks have a validity period of **15 years** and are not to be re-used. After that period, **they must be replaced.**

VEHICLE IN "ROAD" POSITION

Use test case n° **2423**.

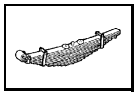
Testing the air supply and the governing pressure

Drain the air from the tanks and check for absence of water in tanks (the presence of water is indicative of air dryer malfunction).
Using a flexible pipe n° **7096**, connect a pressure gauge to point(s) **A, B, C**.
Re-pressurize the air circuit and, during this operation, check the pressure at which the instrument panel air pressure warning lights go out (see value in "Technical Data" chapter).
Check the cut-out pressure: at point(s) **A, B** (see value in "Technical Data" chapter according to vehicle type).
Actuate the brake pedal several times until the air dryer cuts in again. Check the cut-in pressure (see value in "Technical Data" chapter).
Using a flexible pipe n° **7096**, connect a pressure gauge to point(s) **P2.ST**.
Create a steady leak at the protection valve inlet (Caution: pressurized circuit). The minimum guaranteed pressure should be at **4.5** $^{0/+0.5}$ **bar** at point(s) **A, B, C**.
The pressure at point(s) **P2.ST** should not drop below **4.5 bar**.

Testing the service brake circuit

Using a flexible pipe n° **7096**, connect a pressure gauge to point(s) **P1, P2.1, P2.2**.
Progressively depress the brake pedal as far as maximum braking.
Check the progressiveness and simultaneousness of change in pressure and their values at point(s) **P1, P2.1, P2.2**.

Testing the load sensing valve



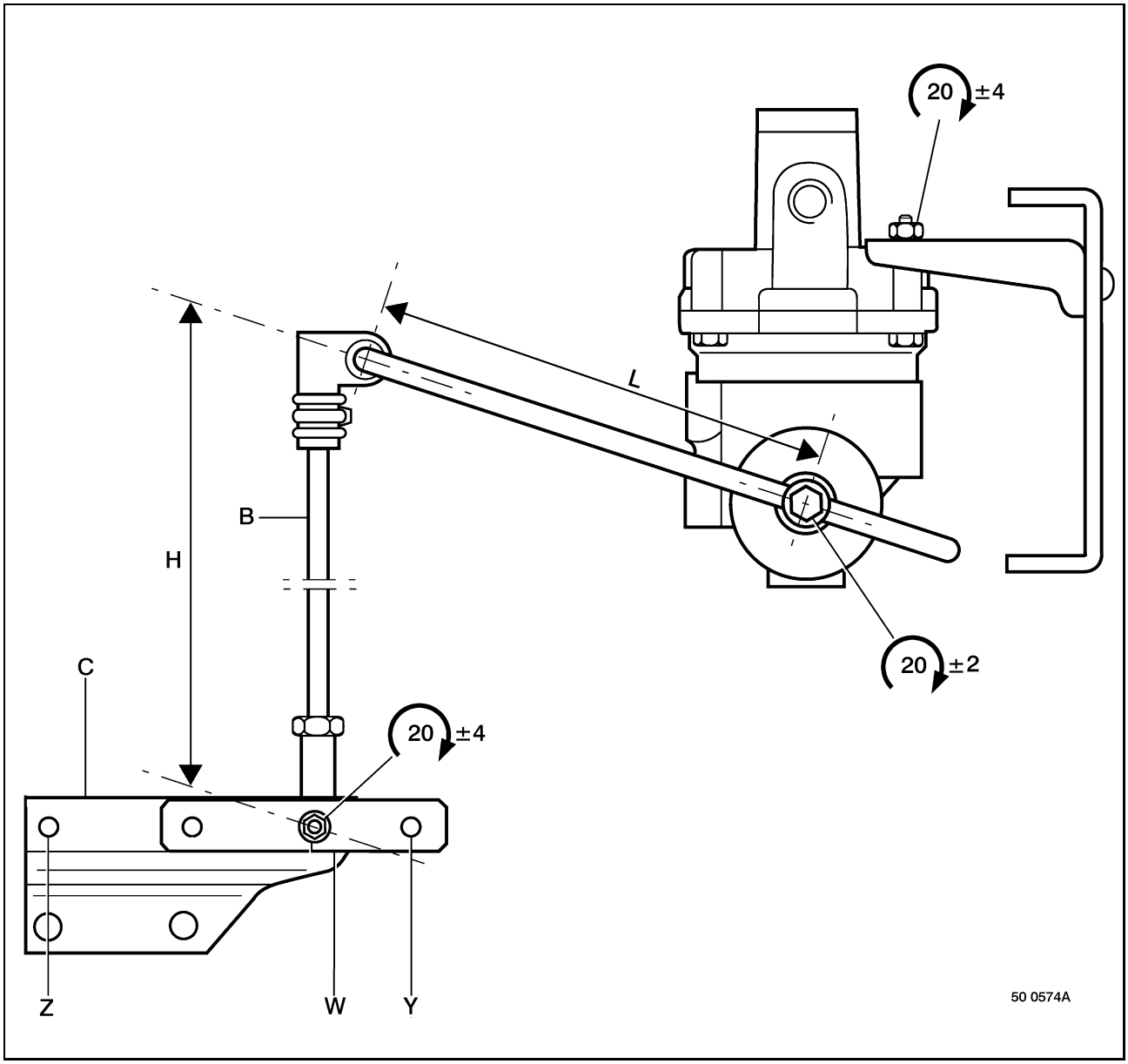
Vehicle equipped with rear mechanical suspension

Testing can be carried out :
- either according to the vehicle load, using the rating plate glued to the inside of the RH door of the cab (Check that the vehicle type agrees with the reference number on the rating plate - see table page E-17) ;
- or according to the angle of the control arm **(A)**, using the diagram in the workshop manual according to the load sensing valve type.

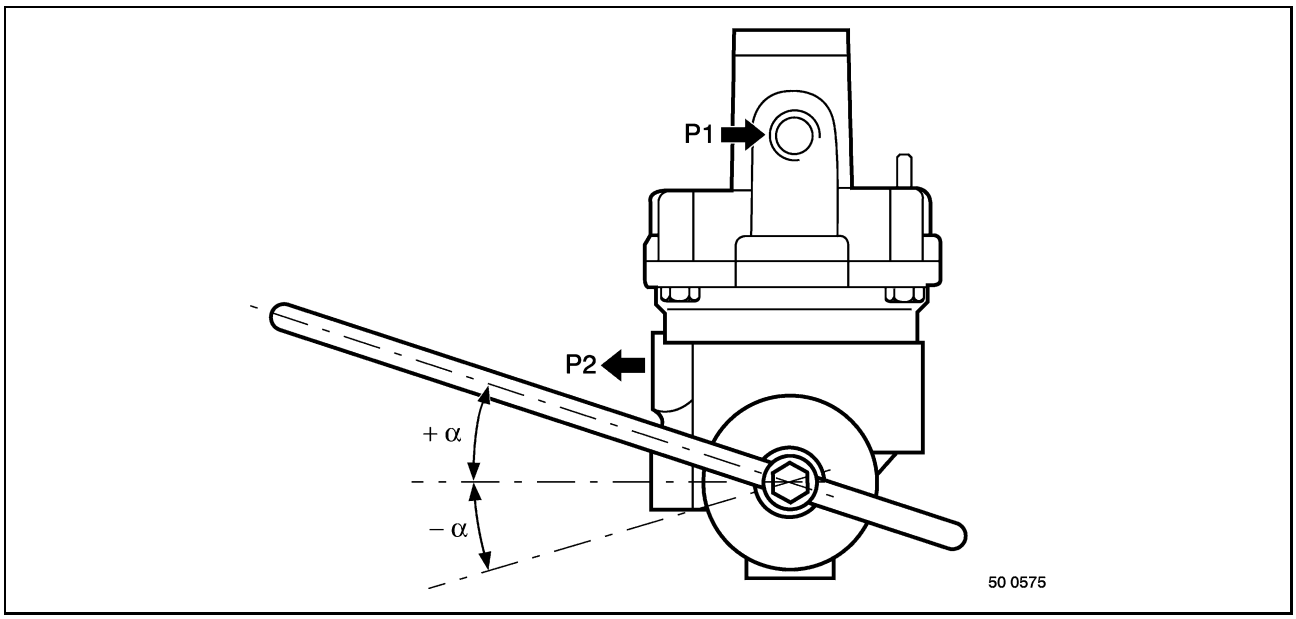
Testing using the control arm.

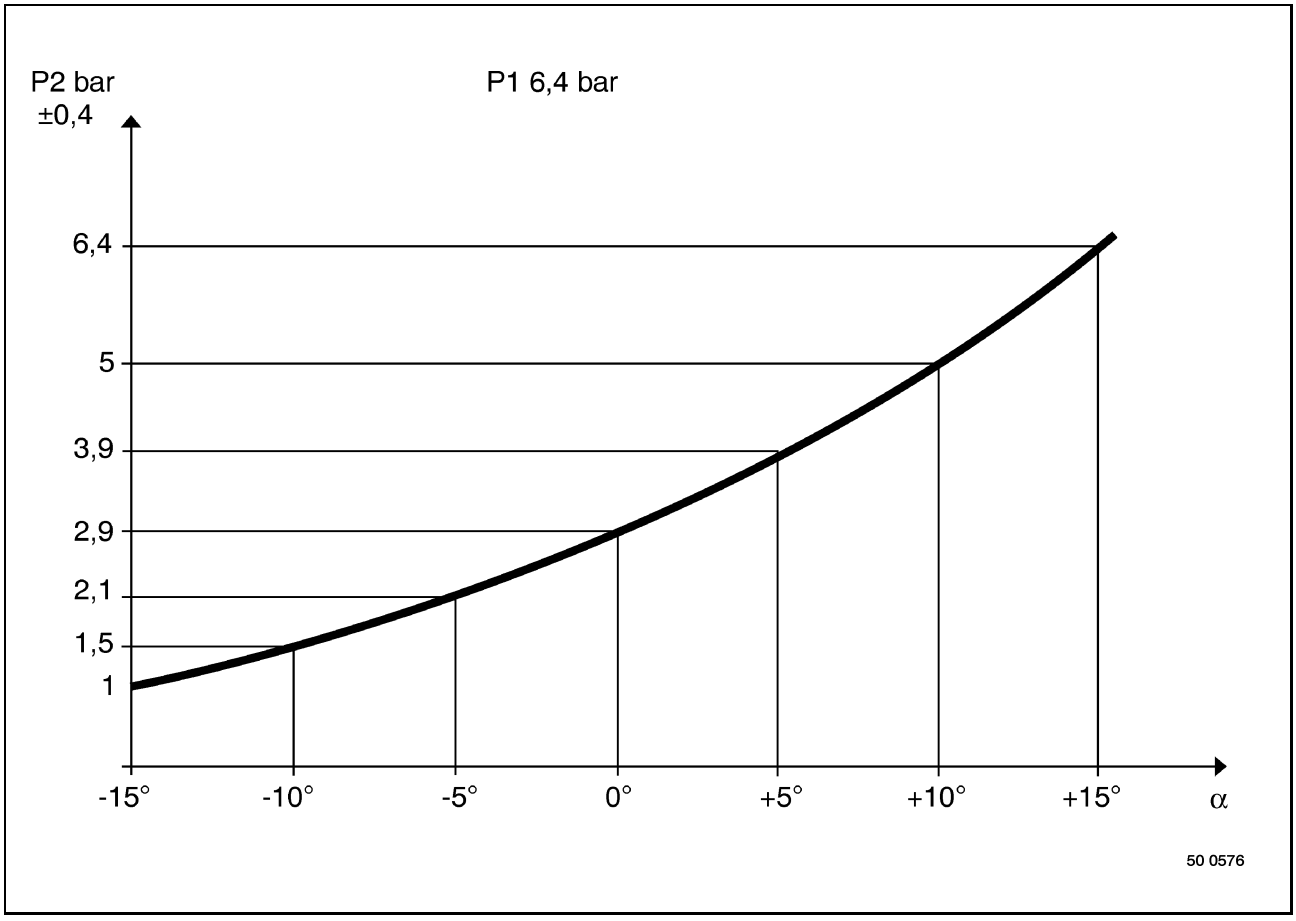
KNORR lever type load sensing valve

Axle spread(s)	**BA → BD**



With the vehicle's compressed air system at governing pressure.
Disconnect link rod **(B)**.
Install test template n° **2587**, (see page C-3).
Using a flexible pipe n° **7096**, connect a pressure gauge to point(s) **P1 – P2.2**.
Actuate the brake pedal until a pressure at **P1** of **6.4 bars** is obtained.
Position control arm **(A)** at different angles in succession and note down the pressures **P2** obtained.
Compare the pressures **P2** obtained with those shown in the diagrams hereafter.
If these values are not within the tolerances, the yellow coupling head must be replaced or adjusted on a test bench.





Withdraw the test template.
If necessary, adjust the length **L** of the control arm **(A)** according to the vehicle type (see table hereafter) to change the angular position of the control arm.
Check the length **H** of link rod **(B)**, then reconnect the rod to bracket **(C)** fastened to the rear drive axle taking its position according to the vehicle type into account (see table hereafter).

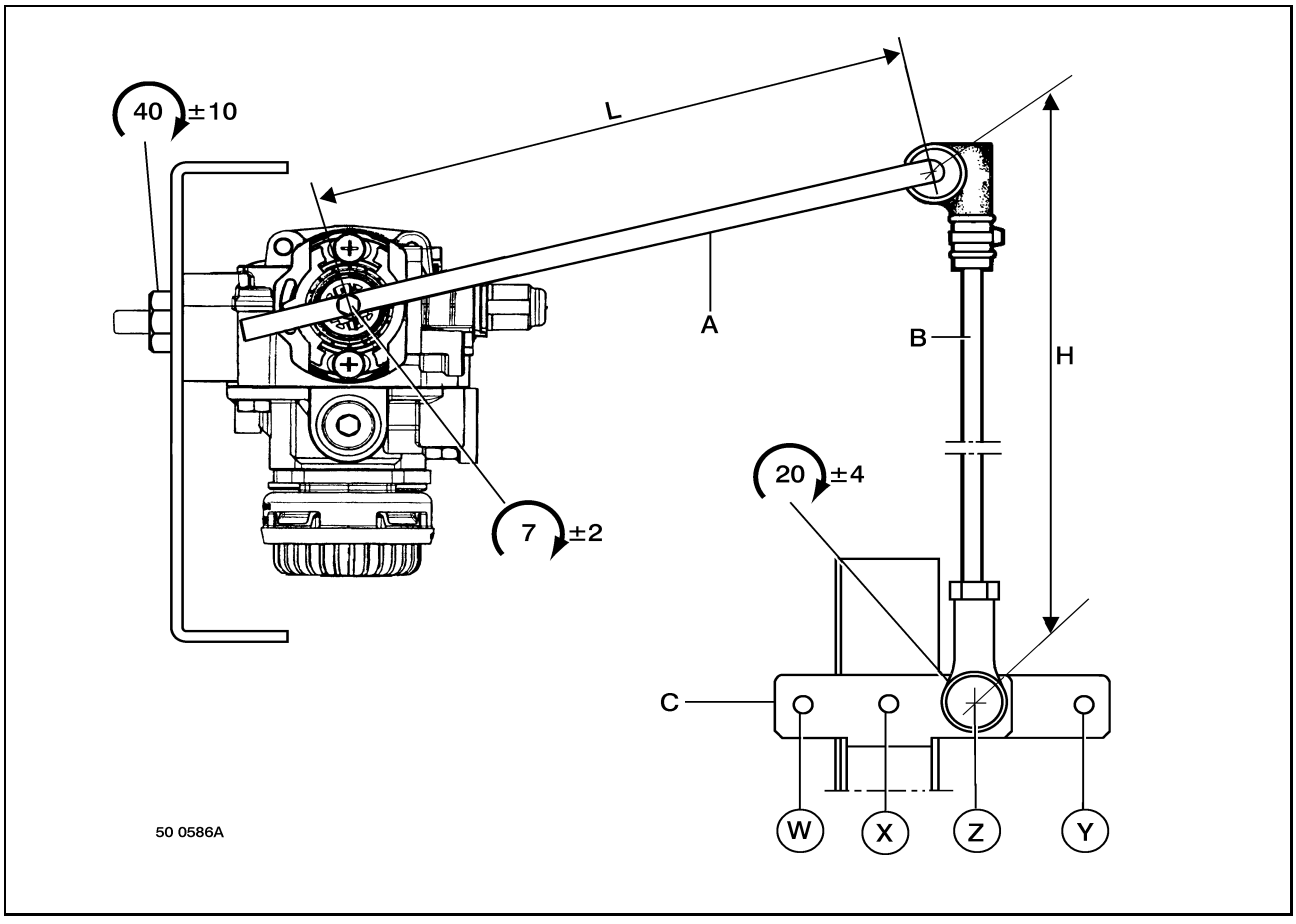
Vehicle(s)	Variant(s)	L (mm)	H (mm)	Ball-joint position
43C2	20802	295	190	Z
43C2	20809	160	160	W
43T		295	190	Z
43V (15T)	10009+20126	130	175	Y
43V (15T)	10009+20135	130	230	W

Testing using the control arm.

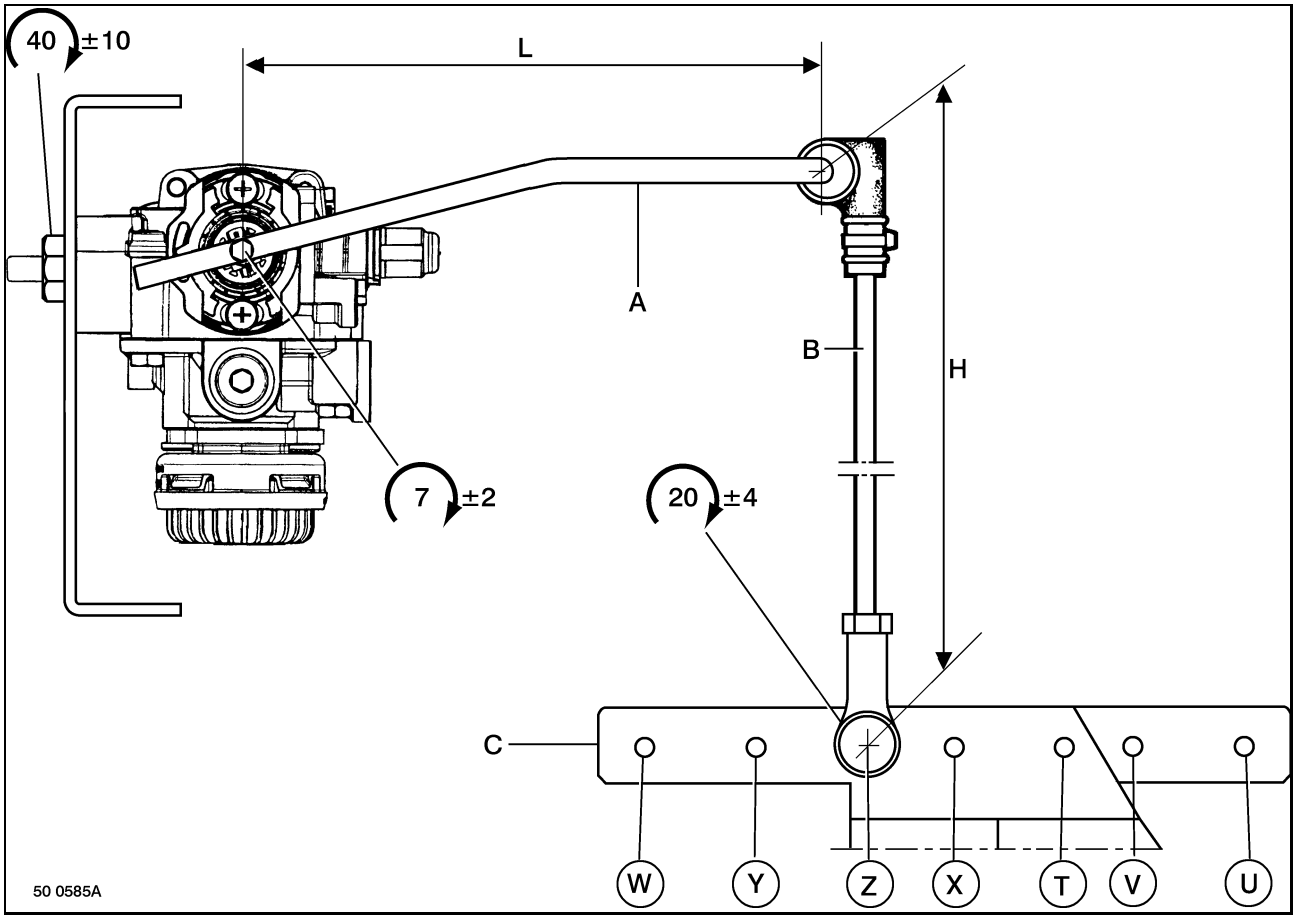
WABCO lever type load sensing valve

Axle spread(s) **AA → AC / CA → CD / DA → DF / EA, EB, FA, FB**

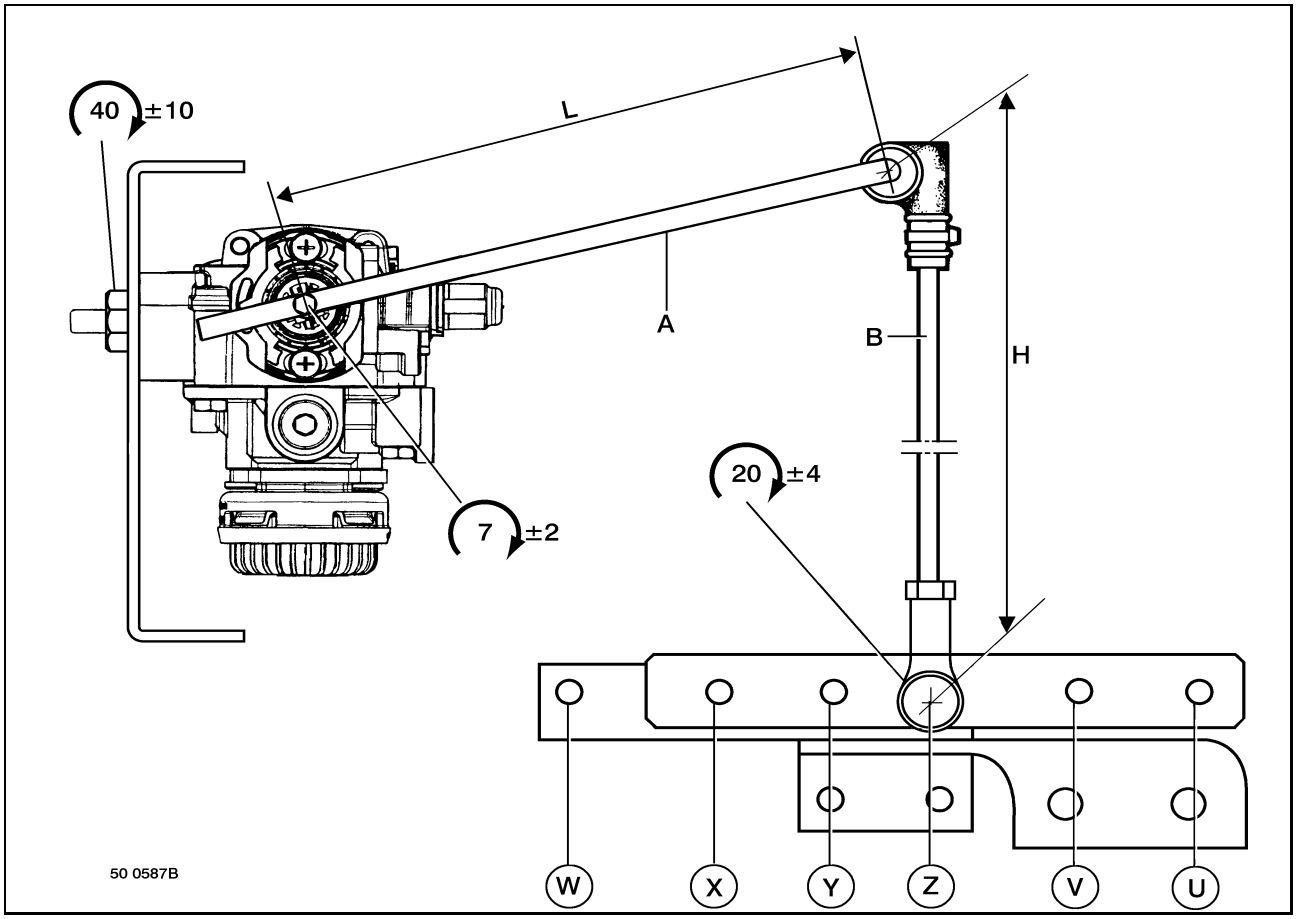
Assembly with rear drive axle **P669** (variant **15223**).



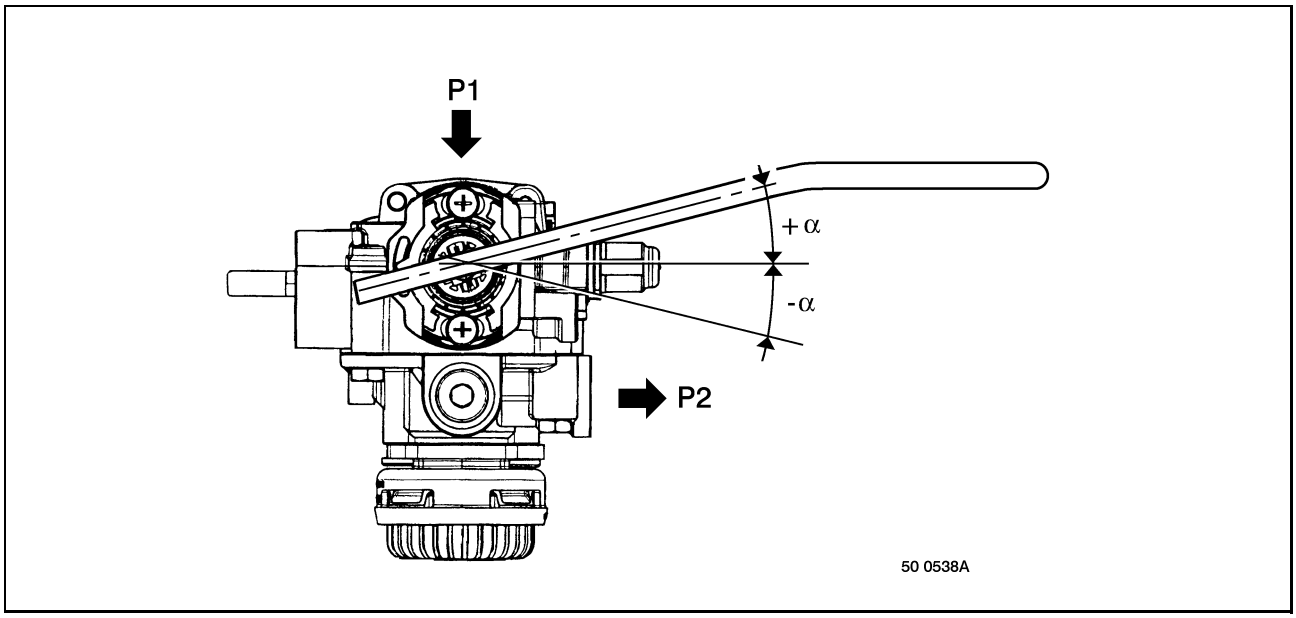
Assembly with rear drive axle **P920/P1120/P1121** (variant **152AB/AH/AI/BG**).

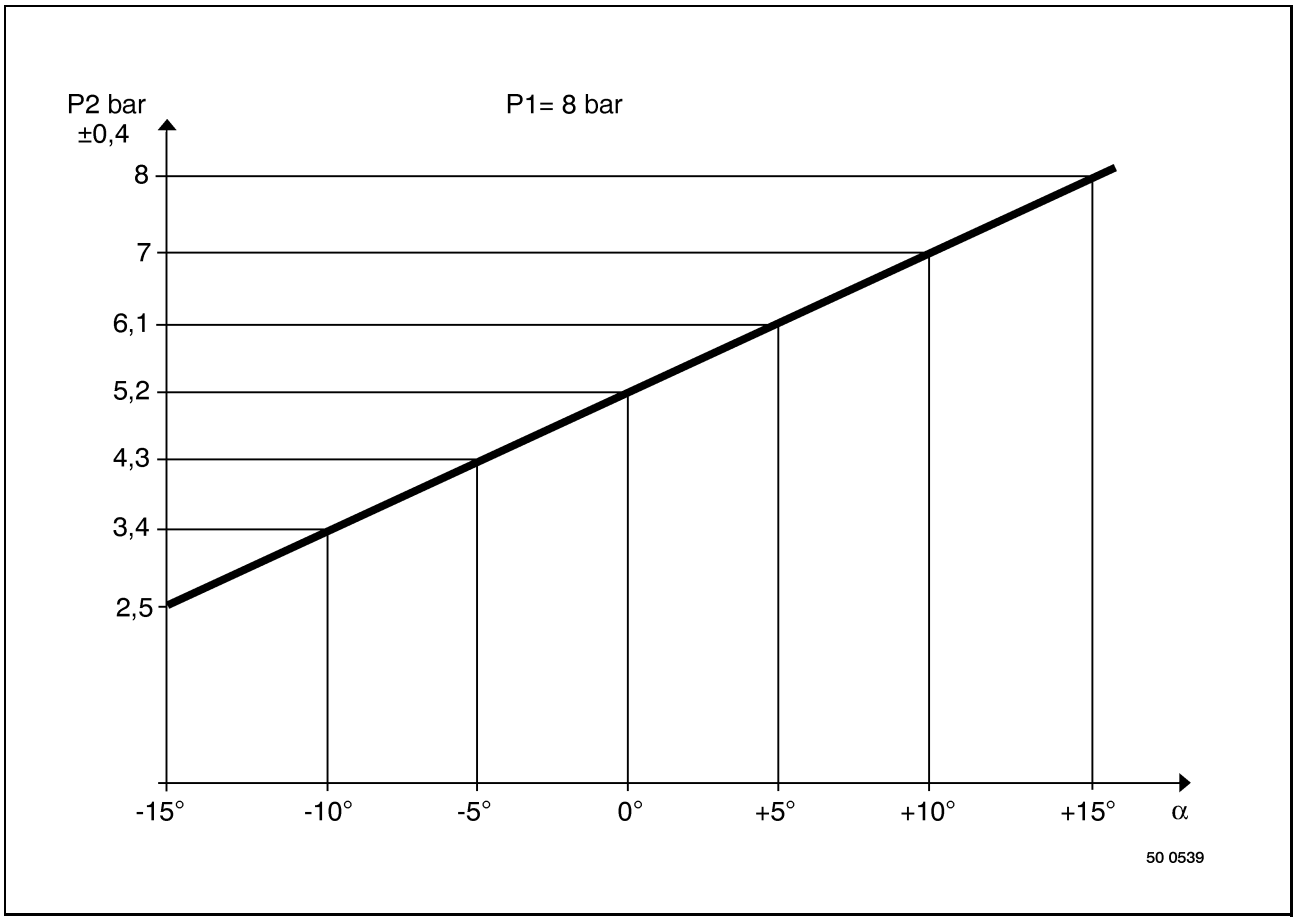


Assembly with rear drive axle **P1170** (variant **152AJ**).



With the vehicle's compressed air system at governing pressure.
Disconnect link rod **(B)**.
Install test template n° **2588**, (see page C-3).
If necessary, take off control arm **(A)** then put it back.
Using a flexible pipe n° **7096**, connect a pressure gauge to point(s) **P1 – P2.2**.
Actuate the brake pedal until a pressure at **P1** of **8 bars** is obtained.
Position control arm **(A)** at different angles in succession and note down the pressures **P2** obtained.
Compare the pressures **P2** obtained with those shown in the diagrams hereafter.
If these values are not within the tolerances, the yellow coupling head must be replaced or adjusted on a test bench.





Withdraw the test template.
If necessary, adjust the length **L** of the control arm **(A)** according to the vehicle type (see table hereafter) to change the angular position of the control arm.
Check the length **H** of link rod **(B)**, then reconnect the rod to bracket **(C)** fastened to the rear drive axle taking its position according to the vehicle type into account (see table hereafter).

42B1 - 42B3 with rear drive axle P669 (variant 15223)				
Vehicle(s)	**Variant(s)**	**L (mm)**	**H (mm)**	**Ball-joint position**
42B1	10101+20802	300	190	Z
42B1	10101+20809	170	240	W
42B1	10103+20802	400	240	Y
42B1	10103+20809	230	220	W
42B3	08802+10101+20802	300	190	Z
42B3	08802+10101+20809	170	240	W
42B3	08802+10103+20802	400	165	Y
42B3	08802+10103+20809	230	220	W
42B3	08803+10101+20802+11219	210	210	W
42B3	08803+10101+20802+11230/39/58	225	205	W
42B3	08803+10101+20809+11219	190	225	W
42B3	08803+10101+20809+11230/39/58	210	210	W
42B3	08803+10103+20802+11026/27/58+11219	210	210	W
42B3	08803+10103+20802+11026/27/58+11230/39/58	225	205	W
42B3	08803+10103+20802+11033+11030/39/58	300	200	Z
42B3	08803+10103+20809+11026/27/58+11219	190	225	W
42B3	08803+10103+20809+11026/27/58+11230/39/58	210	210	W
42B3	08803+10103+20809+11033+11230/39/58	280	185	X

42 B1/B2/B3/B4 - 43C1 - 43V - 44C1 - 44V with rear drive axle P920 (variants 152AB/BG)				
Vehicle(s)	**Variant(s)**	**L (mm)**	**H (mm)**	**Ball-joint position**
42B1/B2	10006+10101+20802	300	125	V
42B1/B2	10006+10101+20809	170	170	Y
42B1/B2	10006+10103+20802	400	95	U
42B1/B2	10006+10103+20809	230	160	W
42B1/B2	10011+10101/03+20802	220	155	W
42B1/B2	10011+10101/03+20809	190	140	Y
42B1/B2	10013+20292/93/94	190	140	Y
42B1/B2	10013+20295	190	165	Y
42B3/B4	08802+10006+10101+20802	300	125	V
42B3/B4	08802+10006+10101+20809	170	170	Y
42B3/B4	08802+10006+10103+20802	400	95	U

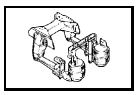
42 B1/B2/B3/B4 - 43C1 - 43V - 44C1 - 44V with rear drive axle P920 (variants 152AB/BG)				
Vehicle(s)	**Variant(s)**	**L (mm)**	**H (mm)**	**Ball-joint position**
42B3/B4	08802+10006+10103+20809	230	160	Z
42B3/B4	08802+10011+10101/03+20101+20802	220	155	Z
42B3/B4	08802+10011+10101/03+20101+20809	190	140	Y
42B3/B4	08802+10011+10101+20132+20809	110	180	W
42B3/B4	08802+10013+20288/89/92/96/97	190	140	Y
42B3/B4	08802+10013+20295	190	165	Y
42B3/B4	08803+10006+10101+20802+11219	210	170	Z
42B3/B4	08803+10006+10101+20802+11230/39/58	225	155	Z
42B3/B4	08803+10006+10101+20809+11219	190	165	Y
42B3/B4	08803+10006+10101+20809+11230/39/58	210	170	Z
42B3/B4	08803+10006+10103+20802+11026/27/58+11219	210	170	Z
42B3/B4	08803+10006+10103+20802+11026/27/58+11230/39/58	225	155	Z
42B3/B4	08803+10006+10103+20802+11033+11230/39/58	300	130	T
42B3/B4	08803+10006+10103+20809+11026/27/58+11219	190	165	Y
42B3/B4	08803+10006+10103+20809+11026/27/58+11230/39/58	210	170	Z
42B3/B4	08803+10006+10103+20802+11033+11230/39/58	280	165	X
42B3/B4	08803+10011+10101/03+20802	210	170	Z
42B3/B4	08803+10011+10101/03+20809	190	165	Y
42B3/B4	08803+10013+20288/89/92/96/97	190	165	Y
42B3/B4	08803+10013+20295	190	185	Y
43C1	20802	280	140	Z
43C1	20809	280	185	Z
43V	10013	90	295	W
44C1	20802	280	175	X
44C1	20809	280	190	X
44V	10013	90	295	W

44C2 - 44T - 44V - 45D2 with rear drive axle P1120/1121 (variants 152AH/AI)				
Vehicle(s)	**Variant(s)**	**L (mm)**	**H (mm)**	**Ball-joint position**
44C2	10031+10101+20802	265	175	Z
44C2	10031+10101+20809	140	220	W
44C2	10031+10103+20802+11012/37	265	175	Z

44C2 - 44T - 44V - 45D2 with rear drive axle P1120/1121 (variants 152AH/AI)				
Vehicle(s)	**Variant(s)**	**L (mm)**	**H (mm)**	**Ball-joint position**
44C2	10031+10103+20809+11012/37	140	220	W
44C2	10031+10103+20802+11035	350	160	T
44C2	10031+10103+20809+11035	185	205	Y
44C2	10032+20802	225	200	Z
44C2	10032+20809	125	210	W
44T		225	200	Z
44V	10009+20135	95	285	W
44V	10032+20126	95	235	W
45D2	10031+11221/24	140	235	W
45D2	10031+11233	140	215	W
45D2	10032+20101	125	270	W
45D2	10032+20132	125	290	W

44C2 - 44T - 45D2 - 45D3 with rear drive axle P1170 (variant 152AJ)				
Vehicle(s)	**Variant(s)**	**L (mm)**	**H (mm)**	**Ball-joint position**
44C2	10031+10101+20802	265	135	Z
44C2	10031+10101+20809	140	120	W
44C2	10031+10103+20802+11012/37	265	135	Z
44C2	10031+10103+20809+11012/37	140	120	W
44C2	10031+10103+20802+11035	350	115	V
44C2	10031+10103+20809+11035	185	130	X
44C2	10032+20802	225	120	X
44C2	10032+20809	125	125	W
44T		225	120	X
45D2	10031+11221/24	140	175	W
45D2	10031+11233	140	155	W
45D2	10032	125	180	W
45D3	20802	235	155	Y
45D3	20809	145	140	W

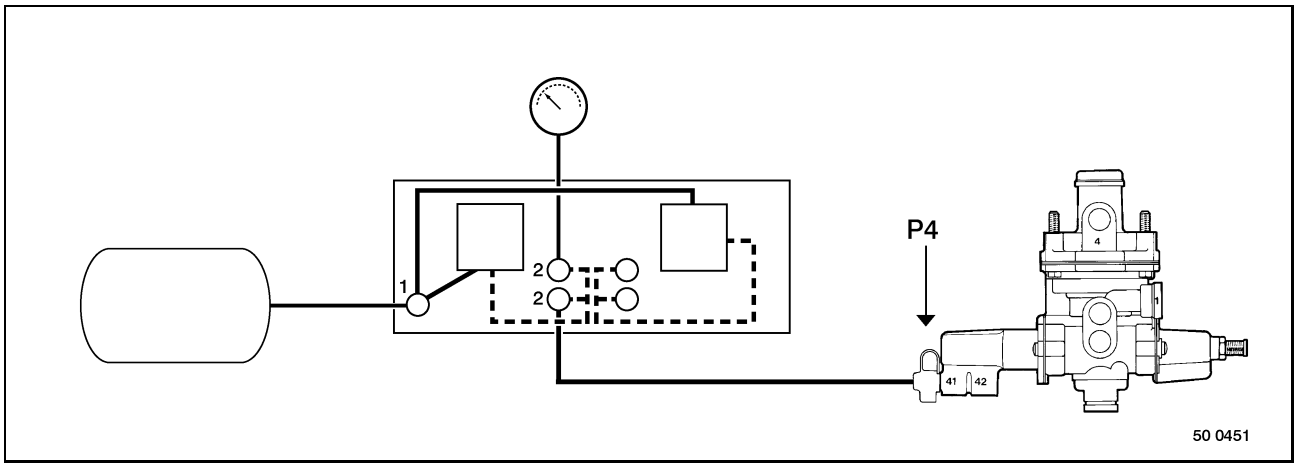
Testing the load sensing valve



Vehicle equipped with rear air suspension

Testing can be carried out :
- either according to the vehicle load, using the rating plate glued to the inside of the RH door of the cab (Check that the vehicle type agrees with the reference number on the rating plate - see table page E-17) ;
- or according to the angle of the control arm A, using the diagram in the workshop manual according to the load sensing valve type.

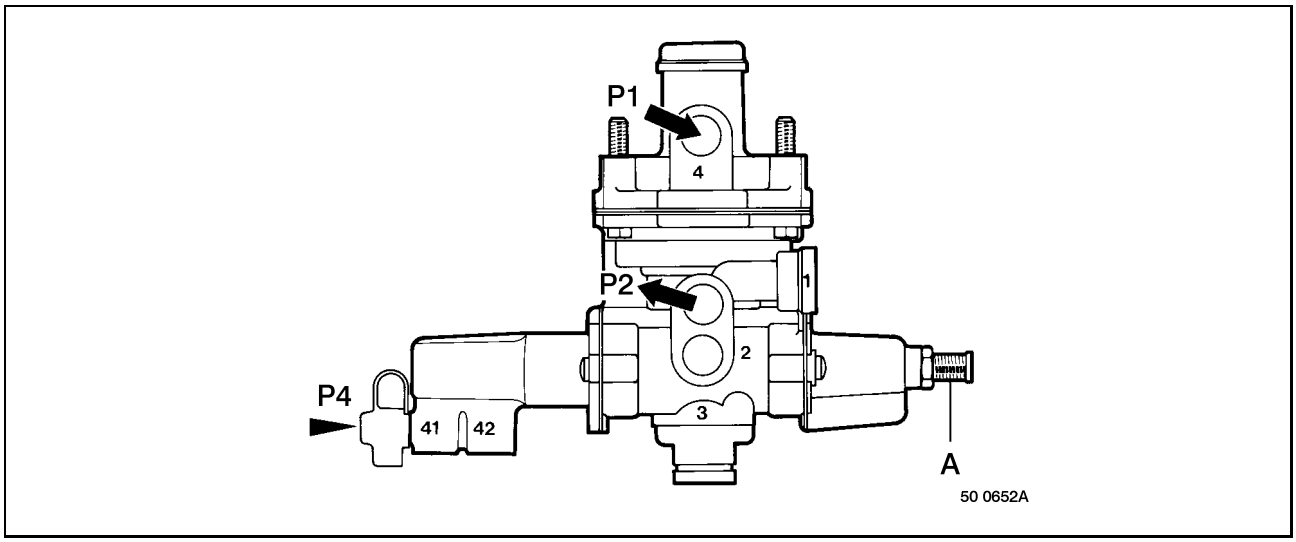
Testing using the suspension air springs pressure.
With the vehicle's compressed air system at governing pressure.
Using a flexible pipe n° **7096**, connect a pressure gauge to point(s) **P1 – P2.2**.
Using the suspension control box, move the suspension to the "down" position (safety level), then switch off the master switch.
Plug in test case n° **7093** as shown below.

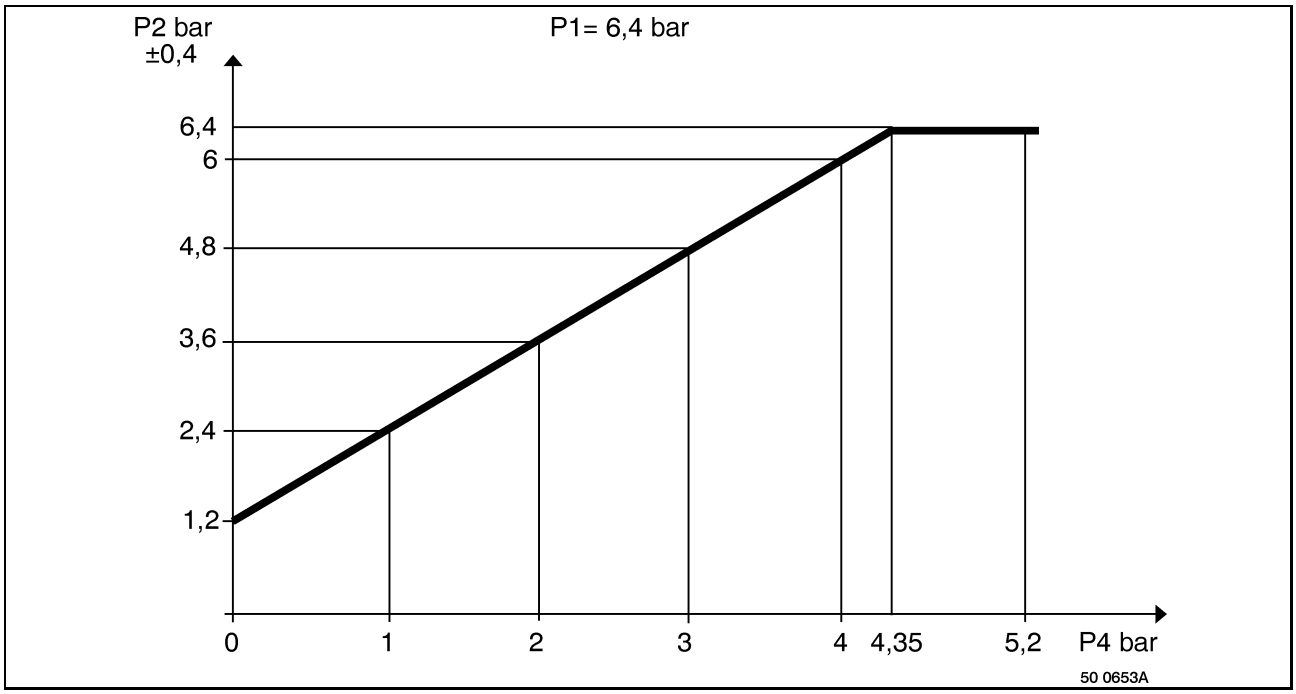


WABCO 475711.... Air-controlled load sensing valve

Axle spread(s)	**BE, BF, BG**

Actuate the brake pedal until a pressure at **P1** of **6.4 bars** is obtained.
Using the test case pressure reducer, vary the pressure **P4** and note down the pressures **P2** obtained.
Compare the pressures **P2** obtained with those shown in the diagrams hereafter.
If these values are within the tolerances, the load sensing valve is in order. If not, slight adjustment can be made by turning screw **(A)**.
If the correction is > **0.5 bar**, the load sensing valve must be replaced or adjusted on a test bench.

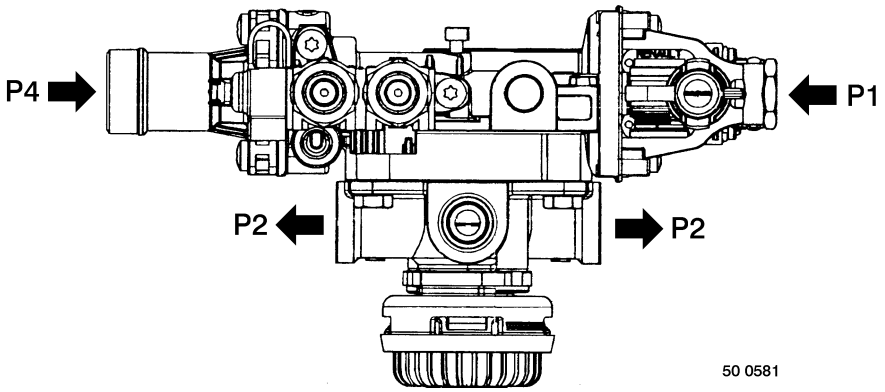




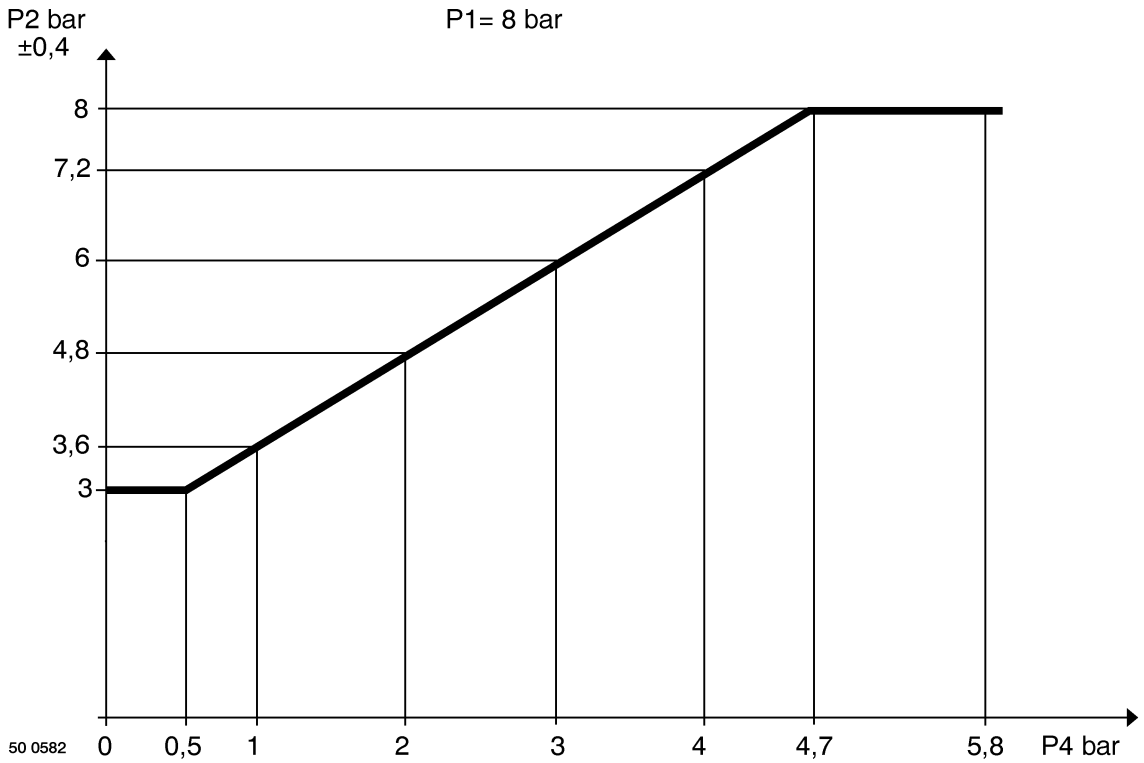
WABCO 475721.... Air-controlled load sensing valve

Axle spread(s)	**AD, AE, AF, CE, CF, CG, DG → DJ, FC, FD**

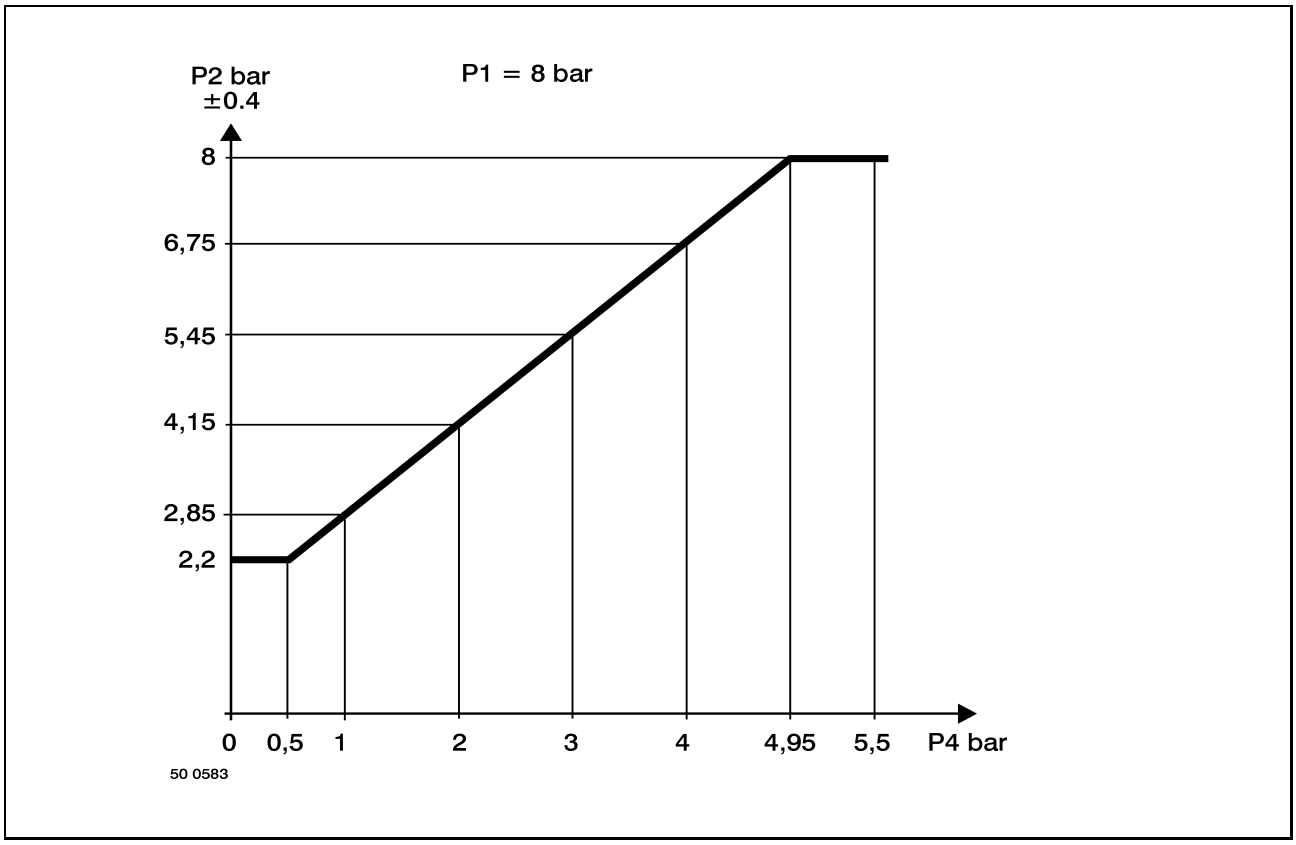
Actuate the brake pedal until a pressure at **P1** of **8 bars** is obtained.
Using the test case pressure reducer, vary the pressure **P4** and note down the pressures **P2** obtained.
Compare the pressures **P2** obtained with those shown in the diagrams hereafter.
If these values are not within the tolerances, the yellow coupling head must be replaced or adjusted on a test bench.



Vehicle(s) : **42B1/B2/B3/B4 / 44C1**



Vehicle(s) : **44C2** variant(s) **10101**.
Vehicle(s) : **44C2** variant(s) **10103+11012/37**.
Vehicle(s) : **44T**



Vehicle(s) : **44C2** variant(s) **10103+11035**.
Vehicle(s) : **45D3**

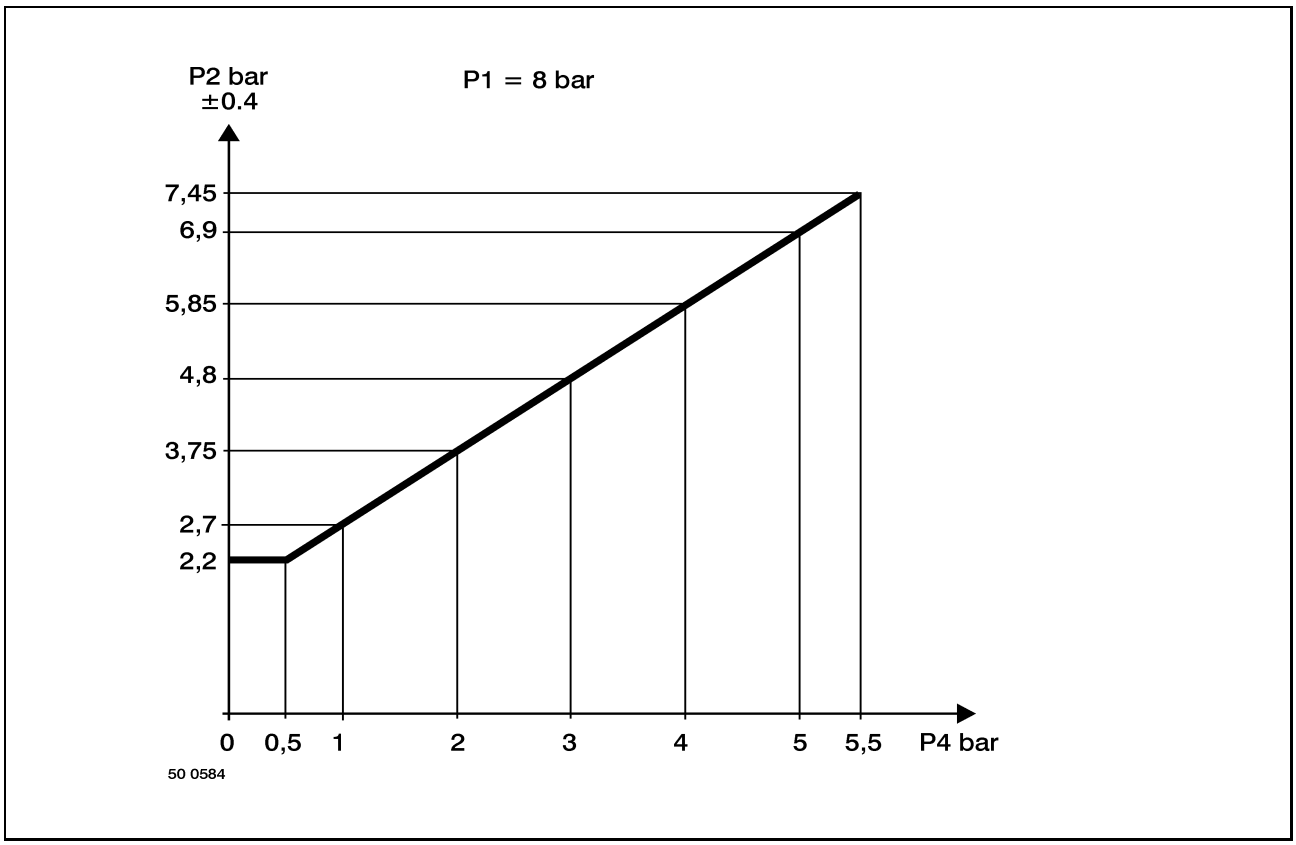


Table of load sensing valve plates

Vehicle(s)	Variant(s)	Plate reference N°
42B1/B2	10006+10101+20802	5010469829
42B1/B2	10006+10101+20809	5010493465
42B1/B2	10006+10103+20802	5010493571
42B1/B2	10006+10103+20809	5010493570
42B1/B2	10011+20802	5010469846
42B1/B2	10011+20809	5010469851
42B1/B2	10013+20802	5010469851
42B1/B2	20804	5010493464
42B3/B4	08802+10006+10101+20802	5010469829
42B3/B4	08802+10006+10101+20809	5010493465
42B3/B4	08802+10006+10103+20802	5010493571
42B3/B4	08802+10006+10103+20809	5010493570
42B3/B4	08802+10011+20101+20802	5010469846
42B3/B4	08802+10011++20101+20809	5010469851
42B3/B4	08802+10011++20132+20809	5010543814
42B3/B4	08802+10013	5010469851
42B3/B4	08803+10006+10101+20802+11219	5010558810
42B3/B4	08803+10006+10101+20802+11230/39/58	5010558808
42B3/B4	08803+10006+10101+20809+11219	5010469851
42B3/B4	08803+10006+10101+20809+11230/39/58	5010558810
42B3/B4	08803+10006+10103+20802+11026/27/58+11219	5010558810
42B3/B4	08803+10006+10103+20802+11026/27/58+11230/39/58	5010558808
42B3/B4	08803+10006+10103+20802+11033+11230/39/58	5010558809
42B3/B4	08803+10006+10103+20809+11026/27/58+11219	5010469851
42B3/B4	08803+10006+10103+20809+11026/27/58+11230/39/58	5010558810
42B3/B4	08803+10006+10103+20809+11033+11230/39/58	5010569758
42B3/B4	08803+10011+20802	5010558810
42B3/B4	08803+10011+20809	5010469851
42B3/B4	08803+10013+20802	5010469851
42B3/B4	08804+20804	5010493464
43C1	20802/09	5010469853
43C1	20804	5010493464
43C2	10101+20802	5010361692
43C2	10101+20804	5010361694

Vehicle(s)	Variant(s)	Plate reference N°
43C2	10101+20809	5010361693
43C2	10103+20802	5010361695
43C2	10103+20804	5010361697
43C2	10103+20809	5010361696
43T	20802	5010361695
43T	20809	5010361697
43V	10009	5010493026
43V	10013	5010469854
44C1	20802/09	5010469853
44C1	20804	5010493464
44C2	10031+10101+20802	5010546007
44C2	10031+10101+20804	5010546708
44C2	10031+10101+20809	5010546008
44C2	10031+10103+20802+11012/37	5010546007
44C2	10031+10103+20802+11035	5010546005
44C2	10031+10103+20804+11012/37	5010546708
44C2	10031+10103+20804+11035	5010546709
44C2	10031+10103+20809+11012/37	5010546008
44C2	10031+10103+20809+11035	5010546006
44C2	10032+20802	5010546009
44C2	10032+20804	5010546708
44C2	10032+20809	5010546010
44T	20802	5010546009
44T	20804	5010546708
44V	10009/32	5010549798
44V	10013	5010469854
45D2	10031	5010546008
45D2	10032	5010546010
45D3	20802	5010569469
45D3	20804	5010569468
45D3	20809	5010569470

Testing the adaptation valve

Axle spread(s)	**BA, BB, BE**

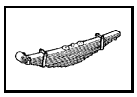
With the vehicle's compressed air system at governing pressure.
Using a flexible pipe n° **7096**, connect a pressure gauge to point(s) **P1 – P2.1**.
Actuate the brake pedal.
For **P1 = 0.45 bar** ..... **P2.1 = 0.10 $\pm$ 0.02 bar**
For **P1 = 5.10 bar** ..... **P2.1 = 3.65 $\pm$ 0.2 bar**
For **P1 = 6.00 bar** ..... **P2.1 = 6.00 $\pm$ 0.3 bar**

If these values are not within the tolerances, the yellow coupling head must be replaced or adjusted on a test bench.

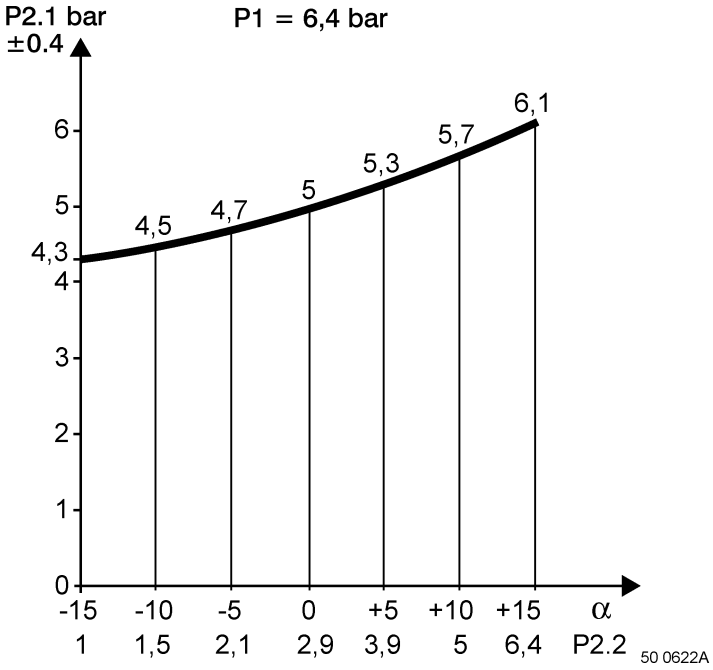
Testing the pressure reduction valve

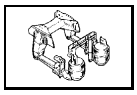
Axle spread(s)	**BC, BD, BF, BG**

After testing the load sensing valve, if it is correct, test the piloted front brakes pressure reduction valve.
With the vehicle's compressed air system at governing pressure.
Using a flexible pipe n° **7096**, connect a pressure gauge to point(s) **P2.1**.
Repeat the same operations as for testing the load sensing valve according to the suspension type.
Note down the pressures obtained at point(s) **P2.1**.
Compare the pressures **P2.1** obtained with those shown in the diagrams hereafter.
If these values are not within the tolerances, the yellow coupling head must be replaced or adjusted on a test bench.

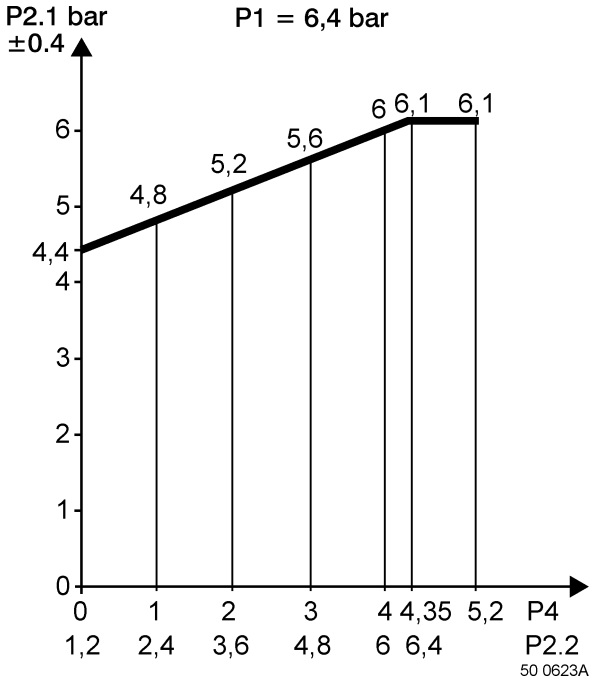


Vehicle equipped with rear mechanical suspension





Vehicle equipped with rear air suspension



Testing the ABS

See workshop manual section MR **50 099**.

Testing the trailer control valve

Remove the yellow coupling head.
In its place, fit a coupling and a pressure take-off (spare parts N° **5005430260 / 5005430259**) and, using a flexible pipe n° **7096**, connect a pressure gauge to the yellow coupling head point.
With the vehicle's compressed air system at governing pressure.
Using a flexible pipe n° **7096**, connect a pressure gauge to point(s) **P1**.
Actuate the brake pedal until a pressure at **P1** of **2 bars** is obtained.

Trailer control valve KNORR AB2838
Pressure at yellow coupling head : **2.4** $^{\pm 0.1}$ **bar**.

Trailer control valve KNORR AB2860
Pressure at yellow coupling head : **2** $^{\pm 0.1}$ **bar**.

Trailer control valve WABCO 973009007
Pressure at yellow coupling head : **2** $^{+ 0.2}$ **bar**.

Trailer control valve WABCO 973009008
Pressure at yellow coupling head : **2.4** $^{\pm 0.1}$ **bar**.

Trailer control valve WABCO 973009009
Pressure at yellow coupling head : **2.6** $^{\pm 0.1}$ **bar**.

See "Technical data" chapter to determine the trailer control valve according to the vehicle.
If these values are not within the tolerances, the yellow coupling head must be replaced or adjusted on a test bench.
If the values are correct, refit the yellow coupling head.

VEHICLE IN THE "PARKING" POSITION

Testing the parking brake circuit

Using a flexible pipe n° **7096**, connect a pressure gauge to point(s) **P2.ST**.
Progressively actuate the parking brake valve until the lever locks.
Check mechanical locking of the lever.
The pressure at point(s) **P2.ST** should drop to **0 bar**.
The instrument panel warning light should come on.

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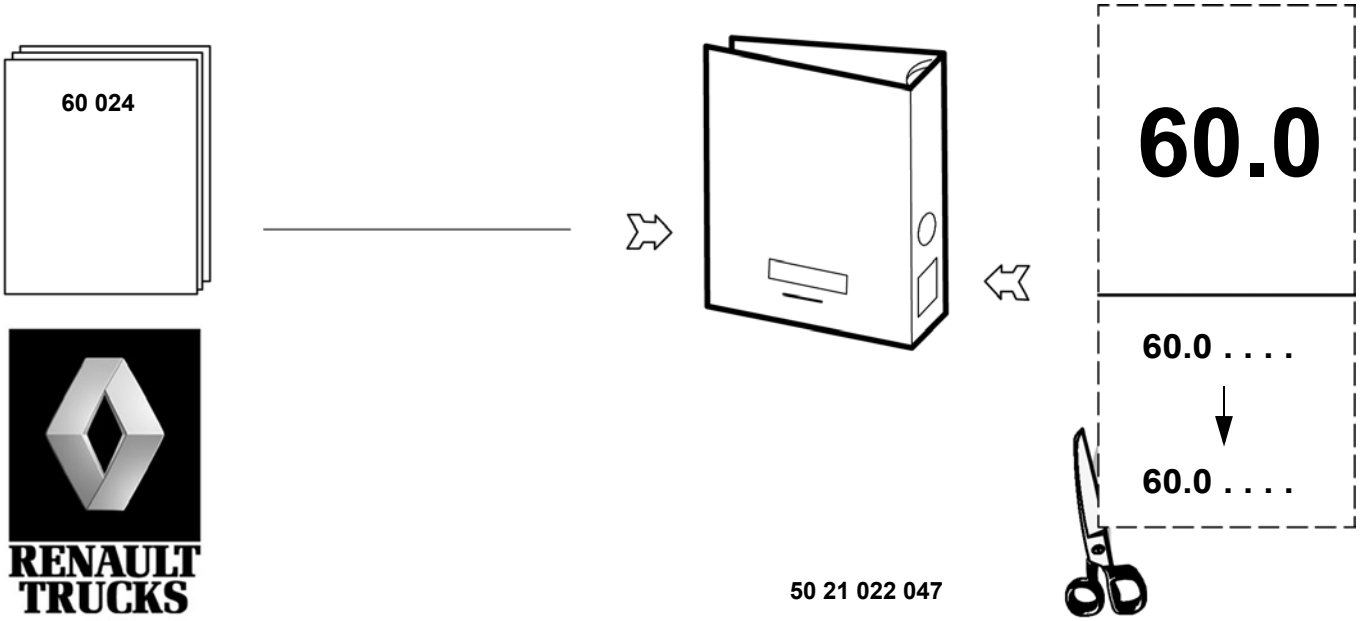
CAB REMOVAL / FITTING

RANGE	FAMILY	VARIANT
RENAULT MIDLUM 12 -16 t Euro 2	-	-
RENAULT MIDLUM 12-16 t Euro 3		
RENAULT MIDLUM 16-18 t		
RENAULT MIDLUM 4x4		
RENAULT MIDLUM 7-12 t		

The above information may change in the course of time. Only the "Consult" section of the workshop manuals repertory in standard N° 10320 serves as reference.



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— 4-door cab . . . . . D2-1 → 13
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Airbag . . . . . **E-1 → 6**
— Operation . . . . . E1-6 → 6
— Fuses . . . . . E2-1 → 1
— Warnings . . . . . E3-1 → 2
— Layout of appliances . . . . . E4-1 → 2
— Diagnostics . . . . . E5-1 → 1
— Removal / Fitting . . . . . E6-1 → 8

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GENERALITIES

APPLICABILITY

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Warnings				31/03/2003	A-4
RENAULT MIDLUM 12-16 t Euro 3							
RENAULT MIDLUM 16-18 t							
RENAULT MIDLUM 4x4							
RENAULT MIDLUM 7-12 t							
RENAULT MIDLUM 12 -16 t Euro 2		Recommendations for repair subsequent to impact suffered by the cab.				04/02/2005	A-4
RENAULT MIDLUM 12-16 t Euro 3							
RENAULT MIDLUM 16-18 t							
RENAULT MIDLUM 4x4							
RENAULT MIDLUM 7-12 t							
RENAULT MIDLUM 12 -16 t Euro 2		Conventional symbols				23/05/2002	A-5
RENAULT MIDLUM 12-16 t Euro 3							
RENAULT MIDLUM 16-18 t							
RENAULT MIDLUM 4x4							
RENAULT MIDLUM 7-12 t							

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		**Practical advice**				**11/03/2004**	**A-7**
RENAULT MIDLUM 12-16 t Euro 3							
RENAULT MIDLUM 16-18 t							
RENAULT MIDLUM 4x4							
RENAULT MIDLUM 7-12 t							

Warnings

In this document, safety instructions are symbolized as follows:

DANGER! NON-OBSERVANCE OF THE PROCEDURE DESCRIBED OR LACK OF CARE OR ATTENTION, RISK CAUSING SERIOUS INJURY OR EVEN DEATH.

WARNING! Any different or inappropriate working method risks causing damage to the product.

NOTE! Draws attention to particular or important points of the method.

Comply without fail with the regulations in force relative to the recovery and treatment of used parts and waste.

Recommendations for repair subsequent to impact suffered by the cab.

The cab tilt ram, besides its primary function, forms an integral part of the vehicle's passive safety arrangement, by contributing towards damping and absorbing head-on impacts in the event of accident.

CONSEQUENTLY, IF THE IMPACT (WHETHER IT BE HEAD-ON, ON THE SIDE OR AT THE REAR) HAS CAUSED DISTORTION OF THE CAB OR OF A LINKAGE PART BELONGING TO THE CAB SUSPENSION SYSTEM, IT IS COMPULSORY TO REPLACE THE TILT RAM COMPLETE WITH FASTENING COMPONENTS (LOWER AND UPPER), TOGETHER WITH THE FRONT AND REAR LINKAGE PARTS FASTENED TO THE CHASSIS AND TO THE CAB.

EXAMPLE: STRIKER, CAB TILT REAR LOCK, SHOCK ABSORBER FRONT AND REAR BRACKETS, BEARING, SECURING BOLTS, ETC...

Conventional symbols

Fitting

	Tighten to torque (Nm) (left-hand thread)		Tighten by indicated value
	Tighten to torque (Nm) (right-hand thread)		Loosen by indicated value
	Tightening torque with lubricated threaded hardware		

Dimensioning

	Tightening		... Greater than or equal to ...
	Equal to		Wear limit
	... Less than ...		Machining limit or dimension
	... Greater than ...		Maximum out-of-true
	... Less than or equal to ...		Maximum parallelism error

Repair

	Force to be exerted in the direction shown (hammer - press)		Smear or coat (see "Consumables" table)
	Heat or cool: Temperature in degrees Celsius (e.g. + 80 °C)		Fill to level (see "Technical Data" and "Consumables" table)
	Weld bead		Grease or oil (see "Consumables" table)
	Repair time - Heating time		Mark - Assemble according to marking

Adjustment

	Rotating friction torque		Turn anti-clockwise
	Turn in alternate directions		Turn anti-clockwise (the figure shows the number of turns)
	Turn clockwise		Turn clockwise (the figure shows the number of turns)
	Place in contact		Move in the direction shown
	Dimension to be assured (mm)		

Various information

	Exhaust - Outlet		Operation with a sequence
	Intake - Inlet		Involves
	Weight in kg (example: 275 kg)		Return to numbered operation - Connected with numbered operation
	Depending on versions or options		Withdraw - Delete
	Wrong		Direction of disassembly (the arrow shows the direction)
	Correct		Direction of assembly (the arrow shows the direction)
	Injection		... to ...
	Repair dimension		Inspect - Check condition of part
	Part to be replaced		Danger for persons, vehicle or equipment

Practical advice

Practical advice

Prior to any work:

- Clean the major unit and its surrounds (See Driving Servicing Handbook: "Vehicle washing").
- Ensure the batteries are disconnected.
- Mark the pipes and wiring harnesses, if necessary.
- Protect all ports to prevent the ingress of foreign matter.
- To blank off the ports, the Spare Parts Department supplies blanking plugs part N° **50 01 859 753**.
- Before disconnecting an air pipe, drop the circuit pressure.
- If liquid is splashed onto the bodywork, clean quickly with a cleaning product.

Before tilting the cab, ensure that nothing can risk causing damage to the vehicle.

ESTABLISH A SAFE AREA AROUND THE VEHICLE.

TECHNICAL DATA

APPLICABILITY

Cab

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Cab weights	17101/03/10/11			14/05/2004	B1-6
RENAULT MIDLUM 12-16 t Euro 3			17101/03/10/11				
RENAULT MIDLUM 16-18 t			17101/03/10/11				
RENAULT MIDLUM 4x4			17101/03/10/11				
RENAULT MIDLUM 7-12 t			17101/03/10/11				

Standard tightening torques

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Definitions				27/02/2003	B2-1
RENAULT MIDLUM 12-16 t Euro 3							
RENAULT MIDLUM 16-18 t							
RENAULT MIDLUM 4x4							
RENAULT MIDLUM 7-12 t							
RENAULT MIDLUM 12 -16 t Euro 2		Standard nut and bolt tightening torques table				06/06/2003	B2-2
RENAULT MIDLUM 12-16 t Euro 3							
RENAULT MIDLUM 16-18 t							
RENAULT MIDLUM 4x4							
RENAULT MIDLUM 7-12 t							

Specific tightening torques

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		2-door cab	17101/11			24/03/2004	B3-1
RENAULT MIDLUM 12-16 t Euro 3			17101/11				
RENAULT MIDLUM 16-18 t			17101/11				
RENAULT MIDLUM 4x4	47XA		17101/11				
	47XC		17101/11				
RENAULT MIDLUM 7-12 t			17101/11				
RENAULT MIDLUM 12 -16 t Euro 2		4-door cab	17103			24/03/2004	B3-2
RENAULT MIDLUM 12-16 t Euro 3			17103				
RENAULT MIDLUM 16-18 t			17103				
RENAULT MIDLUM 4x4	47XA		17103				
	47XC		17103				
RENAULT MIDLUM 7-12 t			17103				
RENAULT MIDLUM 4x4	47XF	CCF (forest fire tanker) cab	17110			24/03/2004	B3-3
RENAULT MIDLUM 12 -16 t Euro 2		Steering column	17101/03/10/11			12/05/2004	B3-4
RENAULT MIDLUM 12-16 t Euro 3			17101/03/10/11				
RENAULT MIDLUM 16-18 t			17101/03/10/11				
RENAULT MIDLUM 4x4			17101/03/10/11				
RENAULT MIDLUM 7-12 t			17101/03/10/11				

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Gearshift control	17101/03/10/11			12/05/2004	B3-5
RENAULT MIDLUM 12-16 t Euro 3			17101/03/10/11				
RENAULT MIDLUM 16-18 t			17101/03/10/11				
RENAULT MIDLUM 4x4			17101/03/10/11				
RENAULT MIDLUM 7-12 t			17101/03/10/11				
RENAULT MIDLUM 12 -16 t Euro 2		Airbag device	35902			12/05/2004	B3-6
RENAULT MIDLUM 12-16 t Euro 3			35902				
RENAULT MIDLUM 16-18 t			35902				
RENAULT MIDLUM 7-12 t			35902				

Cab

Cab weights

Type(s)	**M800** **M129**
Day cab	**565 → 670 kg**
Sleeper cab	**665 → 685 kg**
4-door cab	**950 → 990 Kg**
Forest fire tanker truck cab	**990 → 1030 Kg**

Grease

Symbols	Renault Trucks Oils	Standards
	RAM	Lithium soap grease NLGI 2 with molybdenum bisulphide

Oil capacities and specifications (see Driving & Servicing Handbook)

Standard tightening torques

Definitions

There are several types of tightening:
- Tightening to torque (in **Nm**)
- Tightening to angle (in °)
- Tightening to torque-angle (in **Nm + °**)

Torques given in **Nm** are nominal torques (average value calculated on the basis of the minimum torque and the maximum torque).
The tightening precision class defines the tolerance of this torque in percent as a function of the nominal torque applied.

Tightening precision classes:
- **Class I:** Special threaded hardware (tolerances ± 10% of the final torque).
- **Class II:** Reserved for precise tightening (tolerance ± 10% of the nominal torque).
- **Class III:** Reserved for normal standard tightening (tolerance ± 20% of the nominal torque)

For standard threaded hardware indicated in the table below, use tightening class **III**.
For other torques, see the following page(s).

"FIH" type (Nylstop) locknuts must be replaced whenever removed. "DRH" type (oval) locknuts can be re-used. If locknuts (DRH, FIH or other) are re-used, make absolutely certain that the screw-thread of the bolt protrudes least two threads above the top edge of the nut.

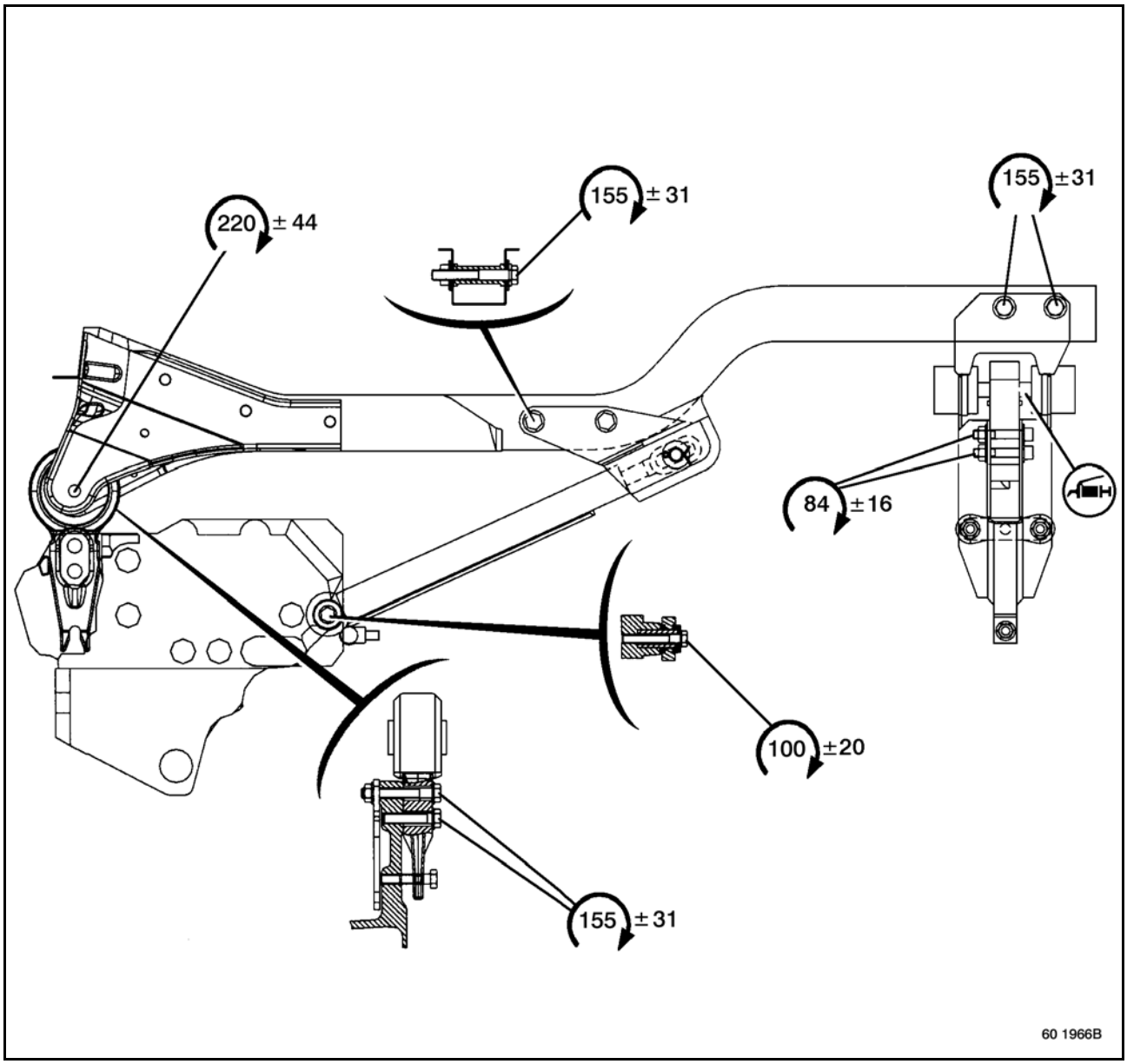
Standard nut and bolt tightening torques table

The tightening torque values given in the table are based on standard 01.50.4002 and apply to new nuts and bolts fitted dry and re-used nuts and bolts with oil applied to the screw-threads. If any nuts and bolts are replaced, ***it is absolutely essential to use nuts and bolts recommended by the RENAULT TRUCKS Spare Parts Department (coefficient of friction in compliance with standard 01.50.4002)****.*

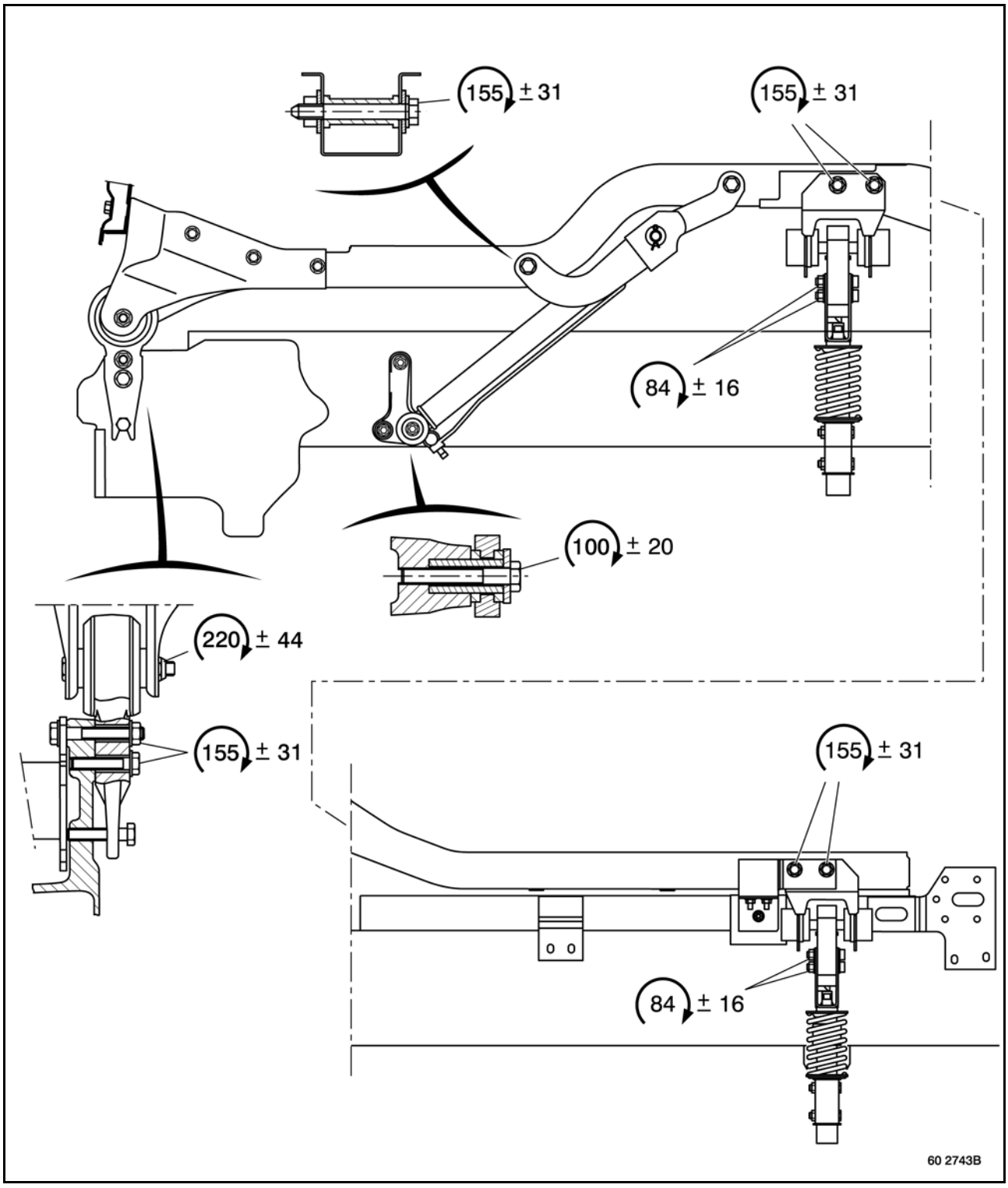
Tightening torque values in Nm for conventional "metric system" threaded hardware based on standard 01.50.4002 (H: normal and HE: with flange)		
Diameter and pitch of nuts and bolts	**Quality class III**	
	Quality class 8.8	**Quality class 10.9**
6 x 1.00	7.5 ± 1.5	11 ± 2.2
7 x 1.00	15 ± 3	20 ± 4
8 x 1.00	20 ± 4	30 ± 6
8 x 1.25	20 ± 4	27 ± 5.4
10 x 1.00	40 ± 8	60 ± 12
10 x 1.25	40 ± 8	60 ± 12
10 x 1.50	40 ± 8	50 ± 10
12 x 1.25	70 ± 14	100 ± 20
12 x 1.50	65 ± 13	95 ± 19
12 x 1.75	60 ±12	90 ± 18
14 x 1.50	105 ± 21	155 ± 31
14 x 2.00	100 ± 20	145 ± 29
16 x 1.50	160 ± 32	220 ± 44
16 x 2.00	150 ± 30	220 ± 44
18 x 1.50	240 ± 48	340 ± 68
18 x 2.50	210 ± 42	310 ± 62
20 x 1.50	330 ± 66	480 ± 96
20 x 2.50	300 ± 60	435 ± 87
22 x 1.50	450 ± 90	650 ± 130
22 x 2.50	410 ± 82	595 ± 119
24 x 2.00	560 ± 112	820 ± 164
24 x 3.00	510 ± 102	750 ± 150

Specific tightening torques

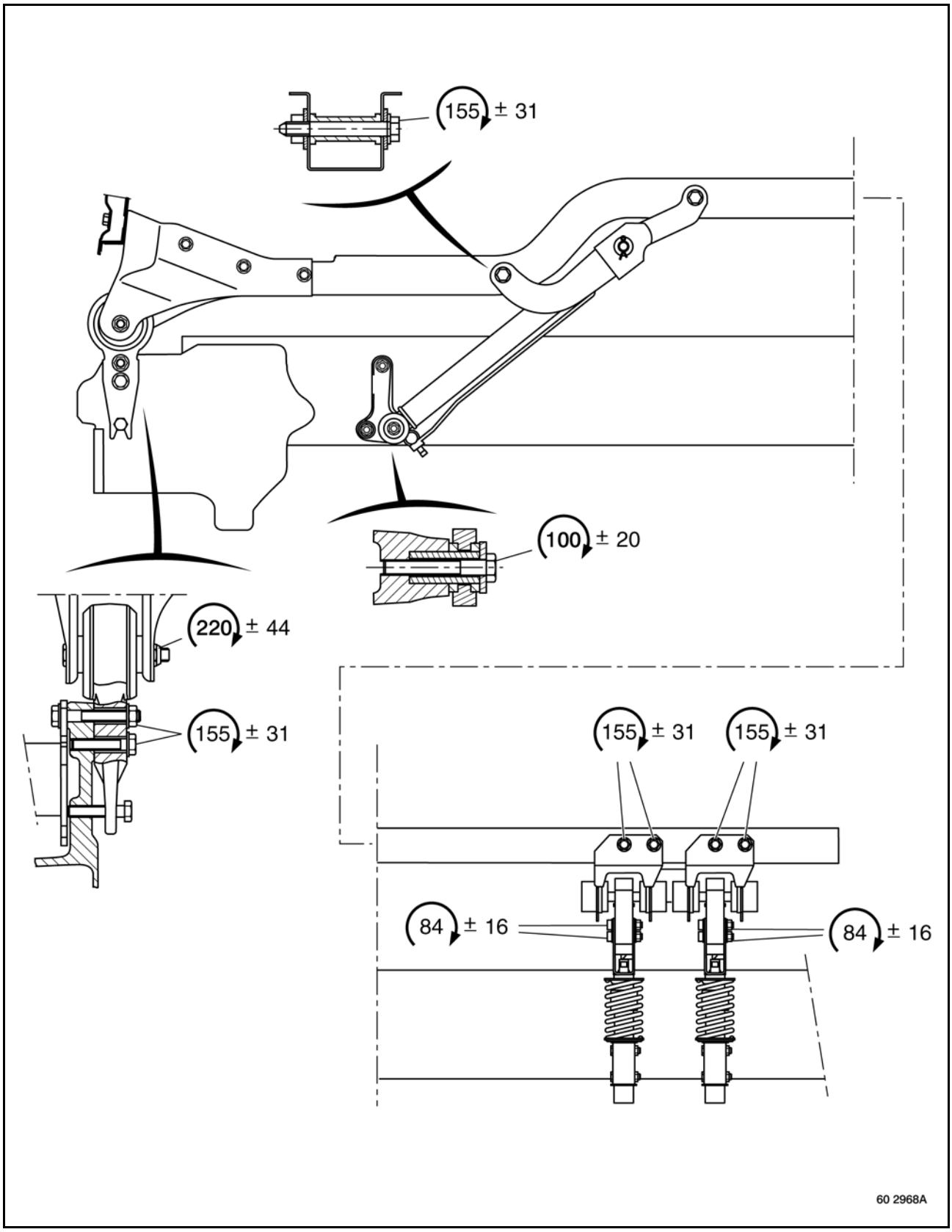
2-door cab



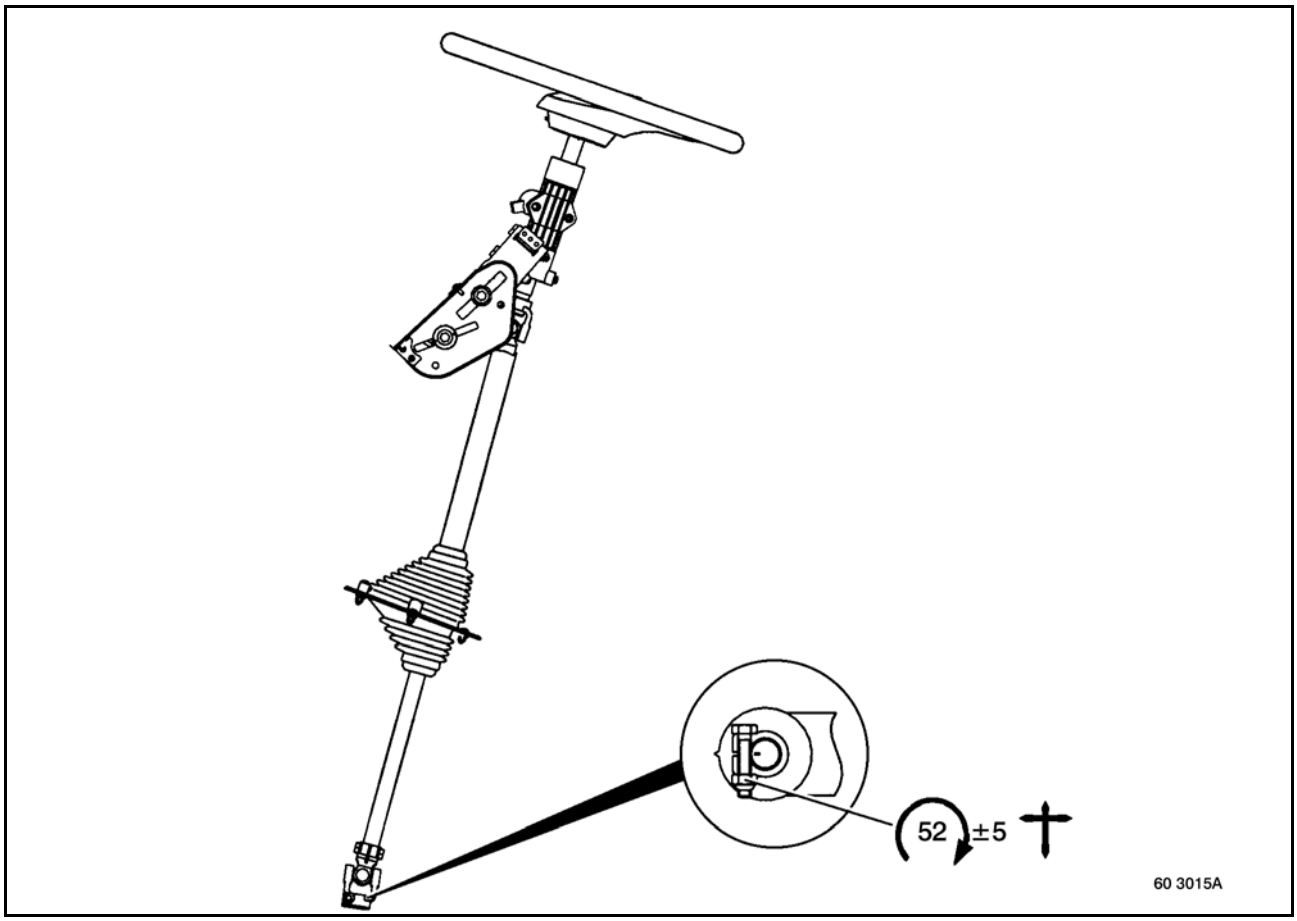
4-door cab



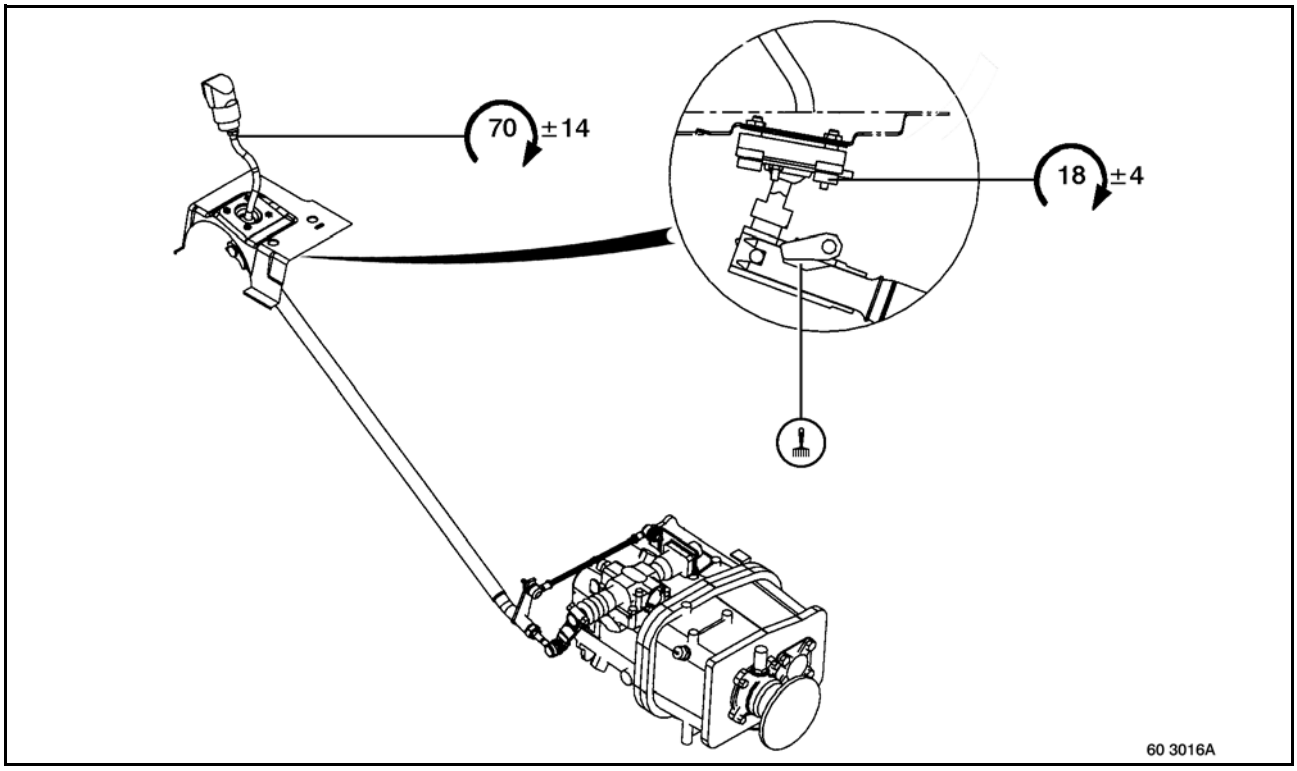
CCF (forest fire tanker) cab



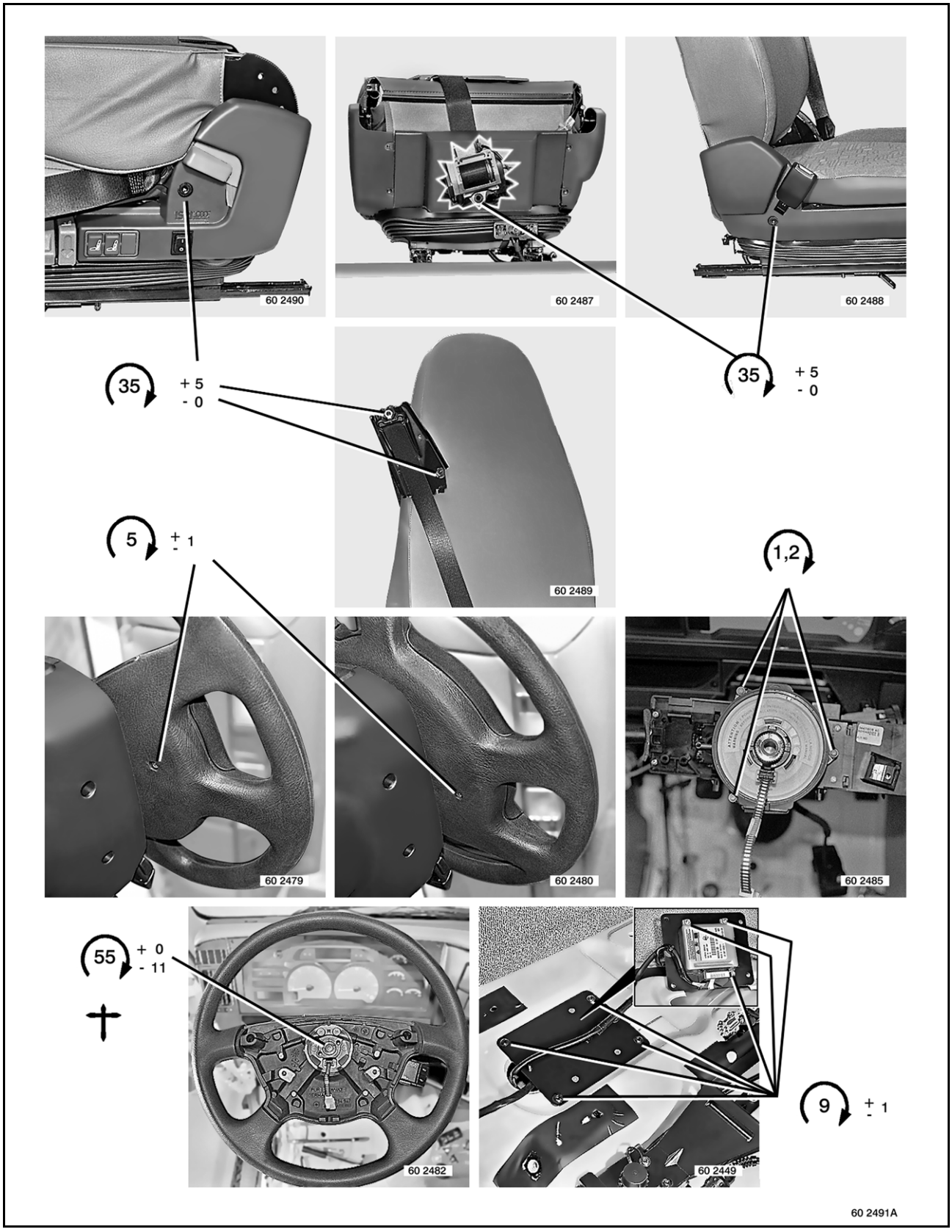
Steering column



Gearshift control



Airbag device



TOOLS

APPLICABILITY

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		**Generalities**				**12/12/2001**	**C-3**
RENAULT MIDLUM 12-16 t Euro 3							
RENAULT MIDLUM 16-18 t							
RENAULT MIDLUM 4x4							
RENAULT MIDLUM 7-12 t							

Generalities

RENAULT TRUCKS divide tools into three categories:

- **General-purpose tools:** proprietary tools.
  - **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department).
  - **4-figure reference number** (tools classified by RENAULT TRUCKS but available from the supplier).
- **Special tools:** specifically created tools distributed by the RENAULT TRUCKS Spare Parts Department.
- **Locally manufactured tools:** these tools are classified differently according to their degree of sophistication:
  - **4-figure reference number** (represented by a drawing): tools that are simple to make without need for special qualification.
  - **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department): a certain amount of skill is needed to make these tools.

Three levels (or echelons) determine their assignment:
- **Level 1:** tools for servicing, maintenance and minor tasks.
- **Level 2:** tools for major repairs.
- **Level 3:** tools for refurbishment.

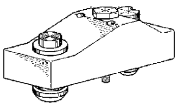
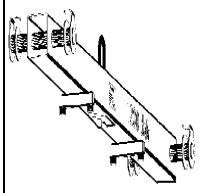
Proprietary tools mentioned in this manual do not appear in the tools list.
These tools are identified in the standard tools manual (MO) by a 4-figure number.

LIST OF TOOLS

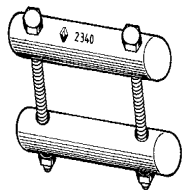
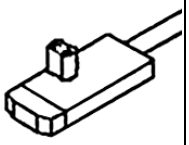
General-purpose tools

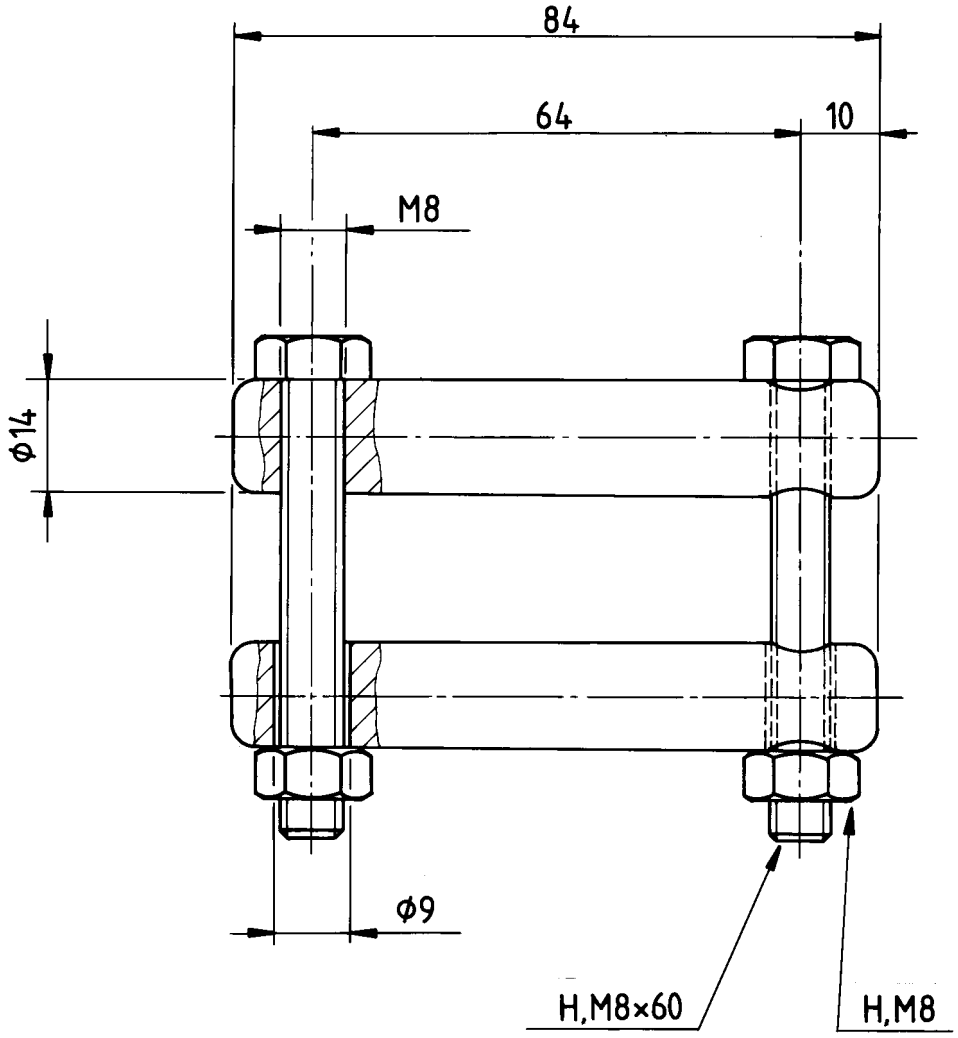
Illustration	RENAULT TRUCKS Ref.	Designation	Manufac-turer reference	Manufac-turer code	Level	Qty
	5000269804	STRAP			1	1

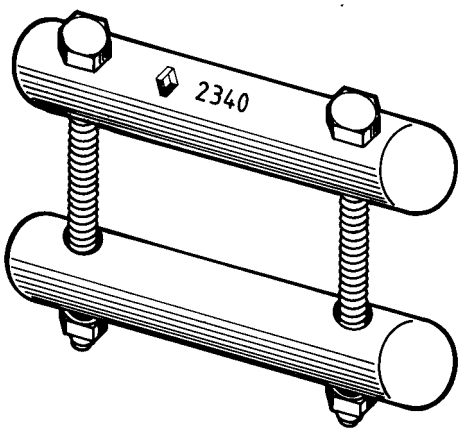
Special Tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufac-turer reference	Manufac-turer Code	Level	Qty
	**5000262359**	BLANKING PLUG			1	1
	**5000262370**	LIFTING BEAM			2	1
	85600	EXTENSION			1	1

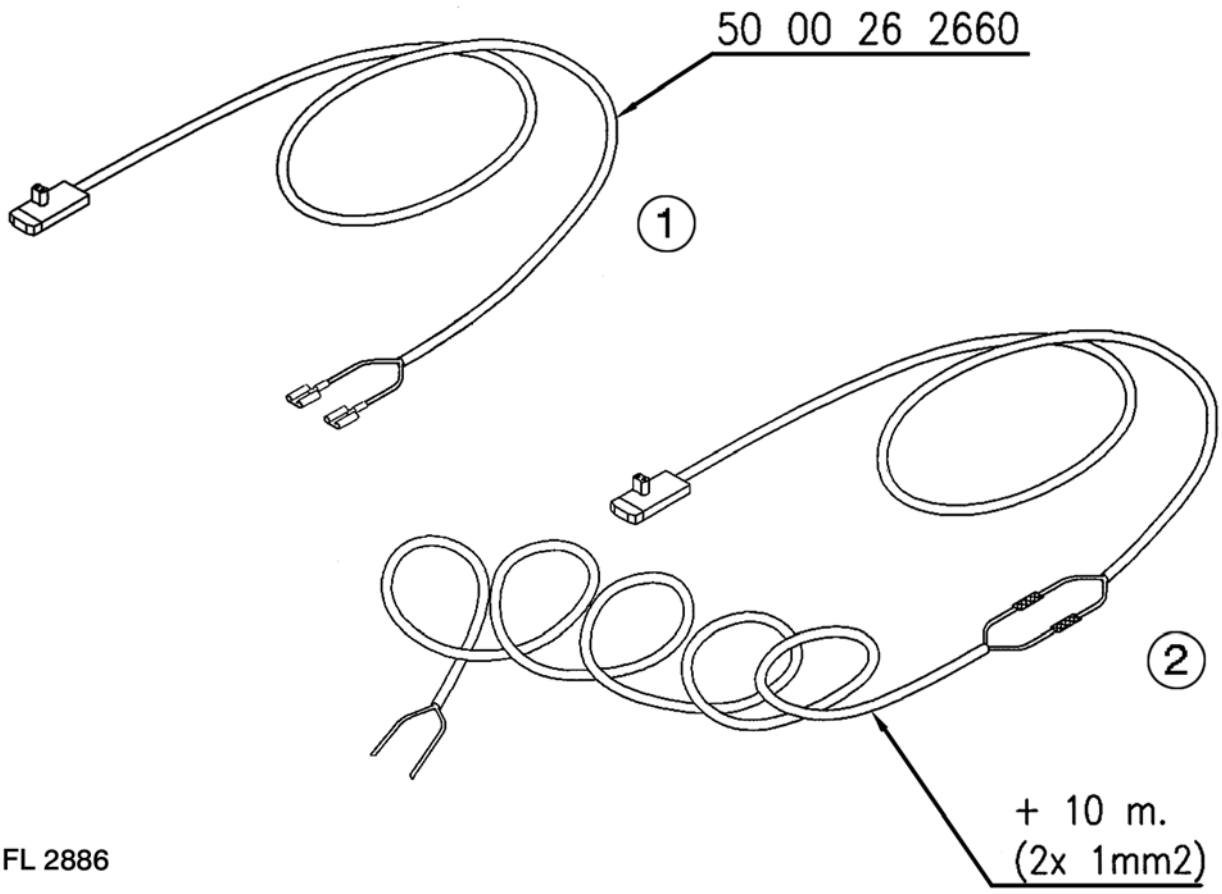
Locally manufactured tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufac-turer Reference	Manufac-turer Code	Level	Qty
	**2340**	CLAMP			2	1
	**2886**	AIRBAG DESTRUC-TION DEVICE			1	1





FL 2340



FL 2886

REMOVAL / FITTING

APPLICABILITY

2-door cab

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Removal / Fitting	17101/11			11/03/2004	D1-7
RENAULT MIDLUM 12-16 t Euro 3			17101/11				
RENAULT MIDLUM 16-18 t			17101/11				
RENAULT MIDLUM 4x4	47XA		17101/11				
	47XC		17101/11				
RENAULT MIDLUM 7-12 t			17101/11				
RENAULT MIDLUM 12 -16 t Euro 2		Cab suspension	17101/11			12/03/2004	D1-11
RENAULT MIDLUM 12-16 t Euro 3			17101/11				
RENAULT MIDLUM 16-18 t			17101/11				
RENAULT MIDLUM 4x4	47XA		17101/11				
	47XC		17101/11				
RENAULT MIDLUM 7-12 t			17101/11				
RENAULT MIDLUM 12 -16 t Euro 2		Cab tilting system	17101/11			12/03/2004	D1-12
RENAULT MIDLUM 12-16 t Euro 3			17101/11				
RENAULT MIDLUM 16-18 t			17101/11				
RENAULT MIDLUM 4x4	47XA		17101/11				
	47XC		17101/11				
RENAULT MIDLUM 7-12 t			17101/11				

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Cab lock(s)	17101/11			12/03/2004	D1-13
RENAULT MIDLUM 12-16 t Euro 3			17101/11				
RENAULT MIDLUM 16-18 t			17101/11				
RENAULT MIDLUM 4x4	47XA		17101/11				
	47XC		17101/11				
RENAULT MIDLUM 7-12 t			17101/11				
RENAULT MIDLUM 12 -16 t Euro 2		Cab tilt ram(s)	17101/11			12/03/2004	D1-14
RENAULT MIDLUM 12-16 t Euro 3			17101/11				
RENAULT MIDLUM 16-18 t			17101/11				
RENAULT MIDLUM 4x4	47XA		17101/11				
	47XC		17101/11				
RENAULT MIDLUM 7-12 t			17101/11				

4-door cab

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Removal / Fitting	17103			15/03/2004	D2-1
RENAULT MIDLUM 12-16 t Euro 3			17103				
RENAULT MIDLUM 16-18 t			17103				
RENAULT MIDLUM 4x4	47XC		17103				
RENAULT MIDLUM 7-12 t			17103				
RENAULT MIDLUM 12 -16 t Euro 2		Cab suspension	17103			15/03/2004	D2-8
RENAULT MIDLUM 12-16 t Euro 3			17103				
RENAULT MIDLUM 16-18 t			17103				
RENAULT MIDLUM 4x4	47XC		17103				
RENAULT MIDLUM 7-12 t			17103				
RENAULT MIDLUM 12 -16 t Euro 2		Cab tilting system	17103			15/03/2004	D2-9
RENAULT MIDLUM 12-16 t Euro 3			17103				
RENAULT MIDLUM 16-18 t			17103				
RENAULT MIDLUM 4x4	47XC		17103				
RENAULT MIDLUM 7-12 t			17103				

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Cab lock(s)	17103			15/03/2004	D2-10
RENAULT MIDLUM 12-16 t Euro 3			17103				
RENAULT MIDLUM 16-18 t			17103				
RENAULT MIDLUM 4x4	47XC		17103				
RENAULT MIDLUM 7-12 t			17103				
RENAULT MIDLUM 12 -16 t Euro 2		Cab tilt ram(s)	17103			15/03/2004	D2-11
RENAULT MIDLUM 12-16 t Euro 3			17103				
RENAULT MIDLUM 16-18 t			17103				
RENAULT MIDLUM 4x4	47XC		17103				
RENAULT MIDLUM 7-12 t			17103				
RENAULT MIDLUM 12 -16 t Euro 2		Centring the cab	17103			13/05/2004	D2-13
RENAULT MIDLUM 12-16 t Euro 3			17103				
RENAULT MIDLUM 16-18 t			17103				
RENAULT MIDLUM 4x4	47XC		17103				
RENAULT MIDLUM 7-12 t			17103				

Forest fire tanker truck cab (CCF)

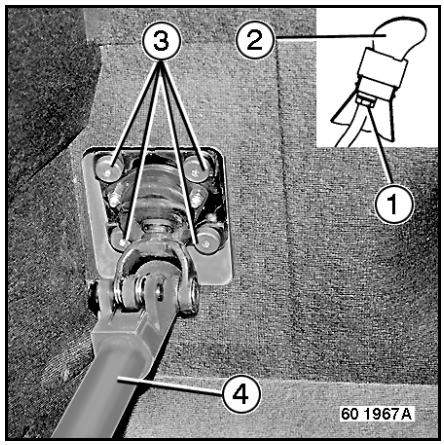
Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 4x4	47XF	Removal / Fitting	17110			16/03/2004	D3-1
RENAULT MIDLUM 4x4	47XF	Cab suspension	17110			16/03/2004	D3-8
RENAULT MIDLUM 4x4	47XF	Cab tilting system	17110			16/03/2004	D3-9
RENAULT MIDLUM 4x4	47XF	Cab lock(s)	17110			16/03/2004	D3-10
RENAULT MIDLUM 4x4	47XF	Cab tilt ram(s)	17110			16/03/2004	D3-11

2-door cab

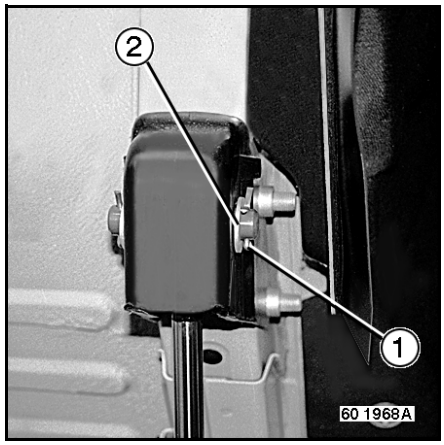
Removal / Fitting

Removal

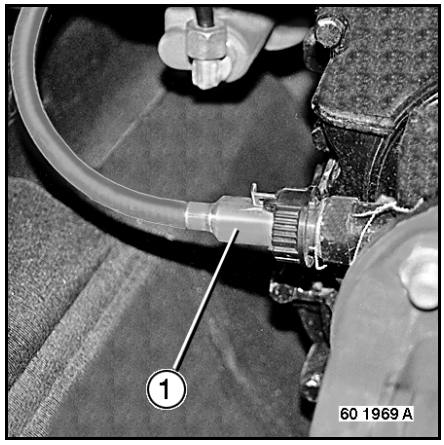
Euro 2 Vehicle(s)
Drain the cooling system (see "Driving and Servicing" handbook).
Loosen nut **(1)**.
Remove the gear lever knob **(2)**.
Tilt the cab.
Remove bolts **(3)**.
Withdraw gearshift control **(4)**.



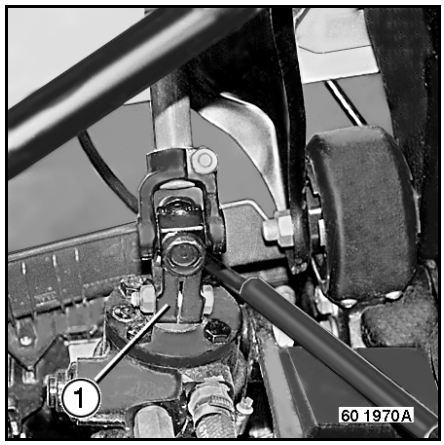
Extract the lock pin **(1)**.
Withdraw washer **(2)**.



Euro 2 Vehicle(s)
Remove the lead seal and disconnect the speed sensor wiring harness **(1)**.

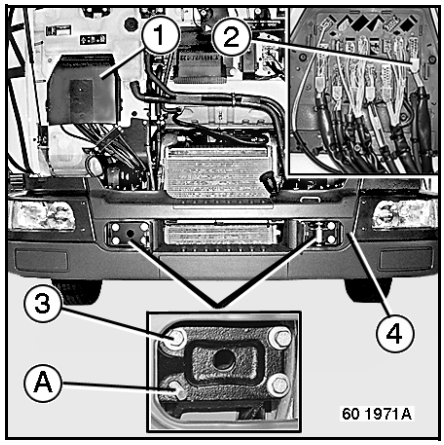


Mark and uncouple steering gear shaft **(1)**.
Return the cab to the "road" position.

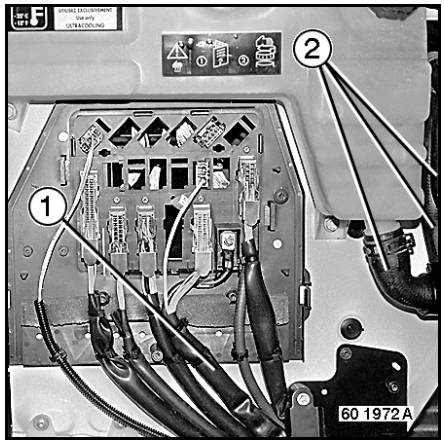


Remove guard **(1)**.
Unplug connector **(2)**.

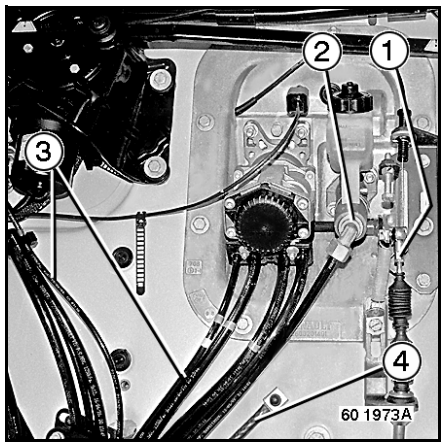
Euro 2 Vehicle(s)
Remove bolts **(3)**.
Remove front bumper **(4)**.
Use **(2)** headless screws **(A)** diameter: **12** mm, length: **100** mm.



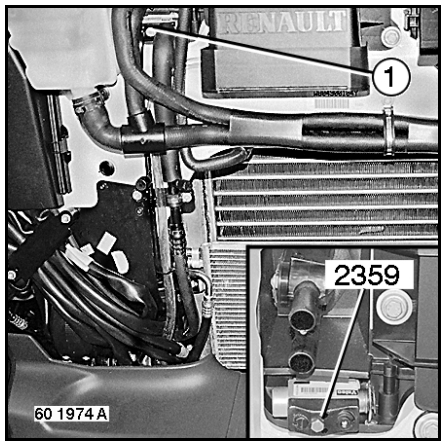
Unplug connectors **(1)**.
Remove hoses **(2)** and blank off the ports.



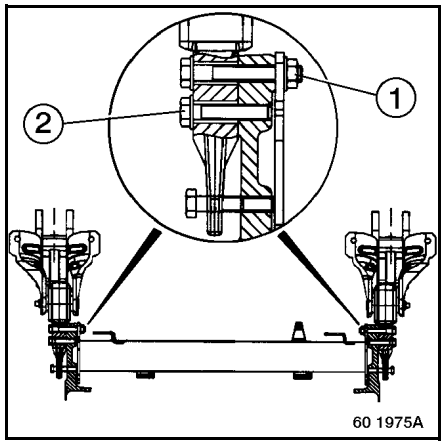
Euro 2 Vehicle(s)
Disconnect accelerator cable **(1)**.
Without disconnecting the flexible hydraulic pipe, remove clutch master cylinder **(2)**.
Mark and remove pipes **(3)**.
Remove earth braid **(4)**.



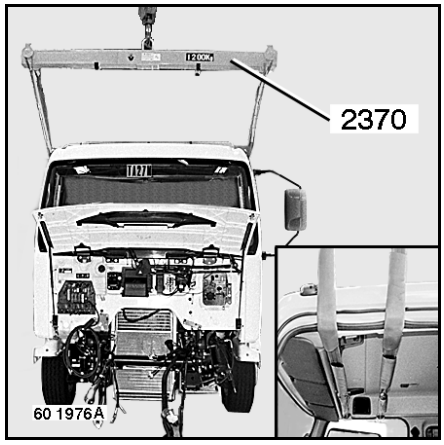
Cab equipped with air conditioning
Drain the air conditioning system.
See Workshop Manual section MR **63614**.
Remove bolt **(1)** from the pressure reducer retaining flange .
Blank off the pressure reducer ports.
Use tool **2359**.
Blank off the high and low pressure pipes.



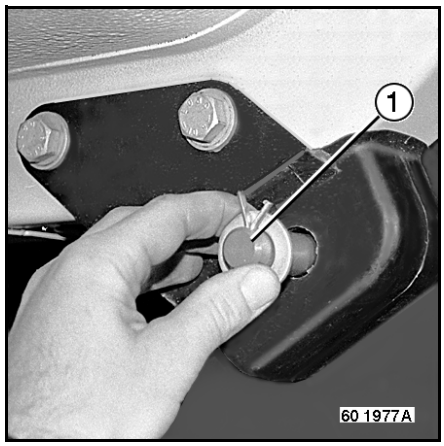
Remove nuts and bolts **(1)**.
Remove bolts **(2)**.



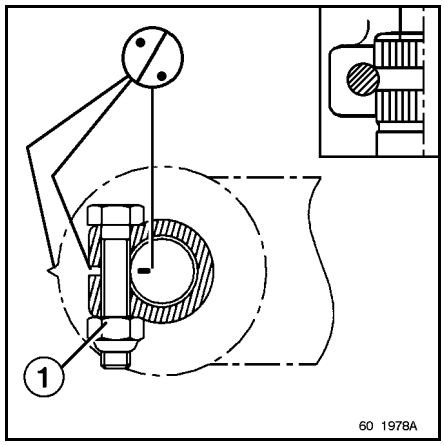
Mount tool **2370**.
Actuate the hydraulic pump to open the locks and simultaneously lift the cab.



Strike out shaft **(1)**.
Remove the cab.



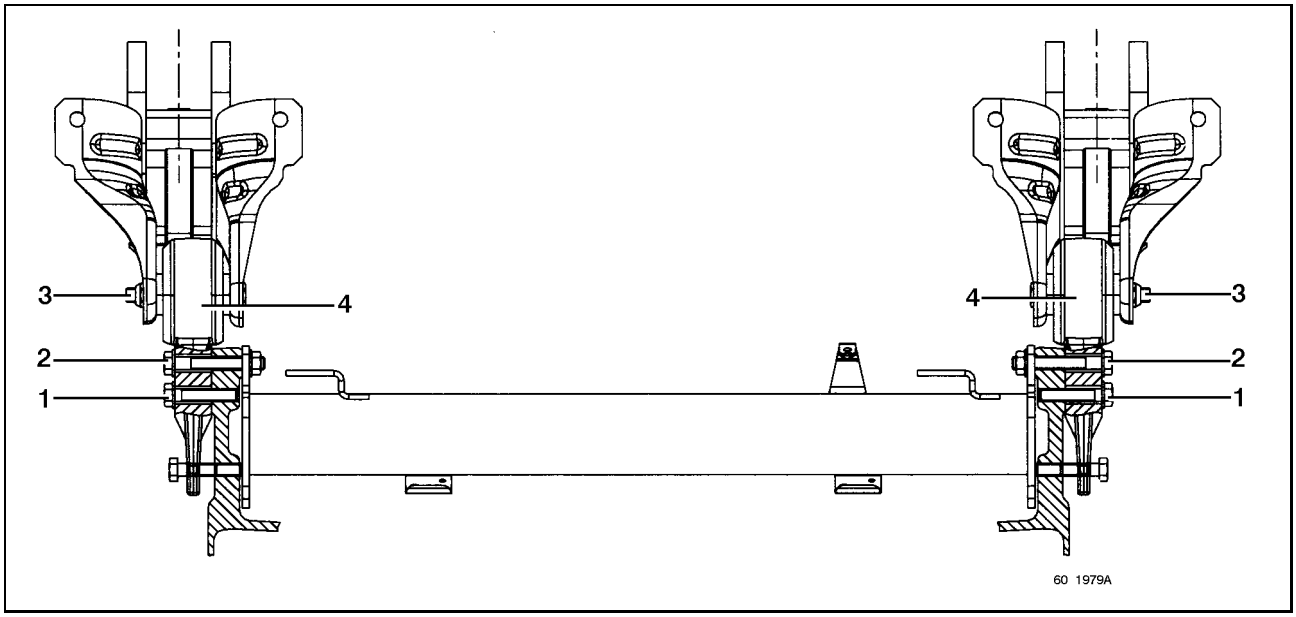
Fitting
To fit, proceed in the reverse sequence to removal.
Couple up steering gear shaft **(2)**.
Fit the nut and bolt **(1)**.
Tighten to torque.
See page(s) B-3-4.



Euro 2 Vehicle(s)
Connect the accelerator cable and adjust the control.
Connect the speed sensor wiring harness and get a lead seal fitted by an SIM-approved workshop.
Fill the cooling system (see "Driving and Servicing" handbook).

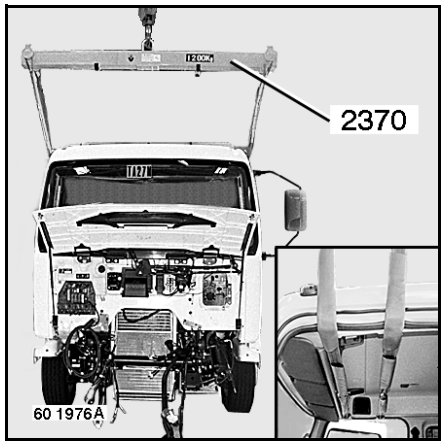
Cab equipped with air conditioning
Recharge the air conditioning system.
See Workshop Manual section MR **63614**.

Cab suspension

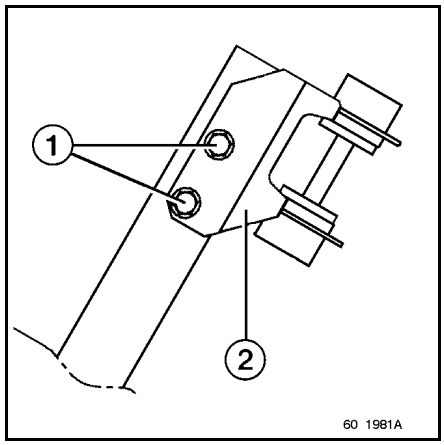


Removal

Front mountings
After removing the front bumper.
See pages D-1-8.
Remove bolts **(1)**.
Remove nuts and bolts **(2)**.
Mount tool **2370**.
Lift up the cab to relieve the load on front mountings **(4)**.
Remove nuts and bolts **(3)**.
Remove front mounting(s) **(4)**.

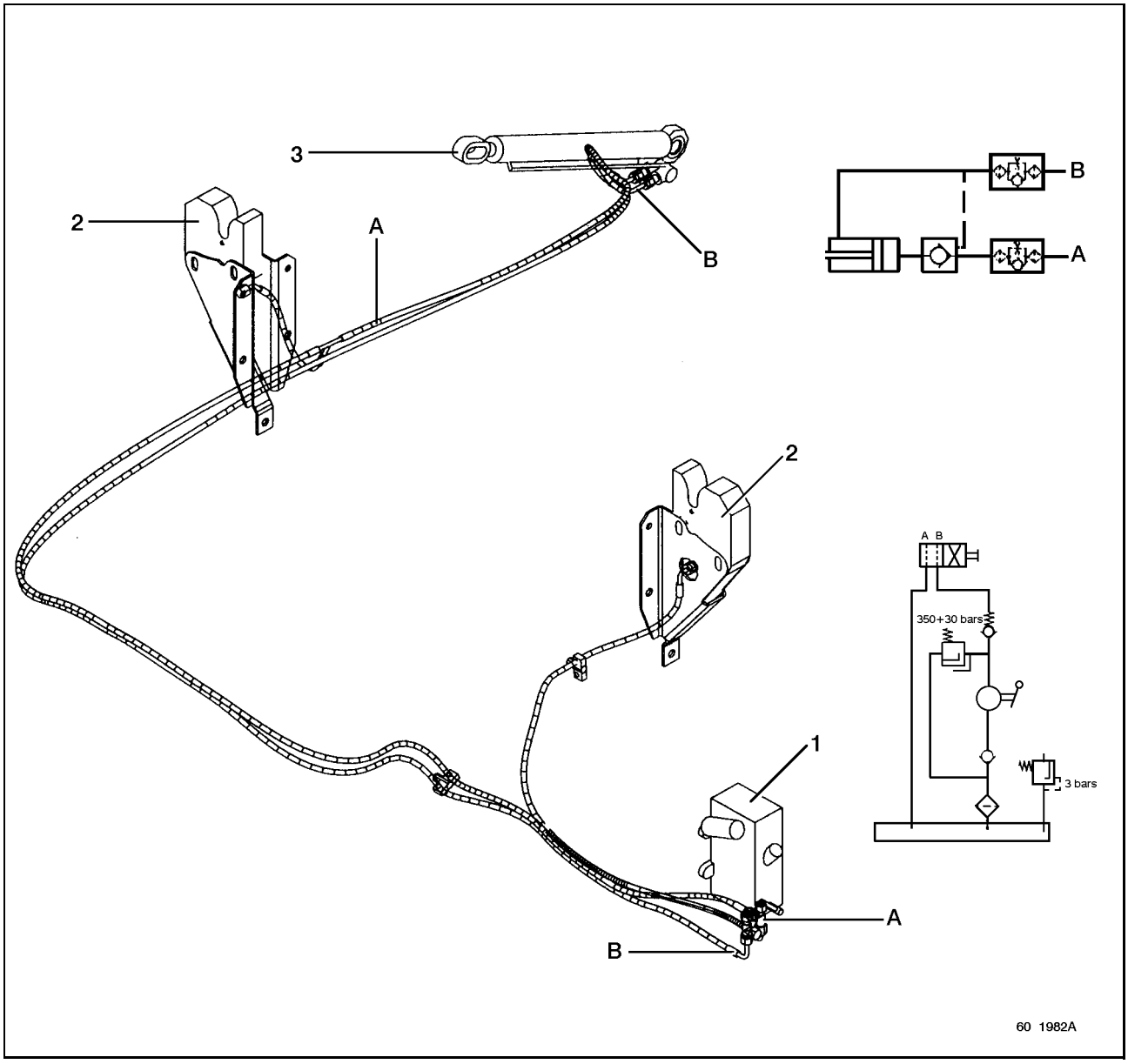


Rear mountings
Tilt the cab.
Remove nuts and bolts **(1)**.
Remove rear mounting(s) **(2)**.



Fitting
To fit, proceed in the reverse sequence to removal.
Tighten to torque.

Cab tilting system



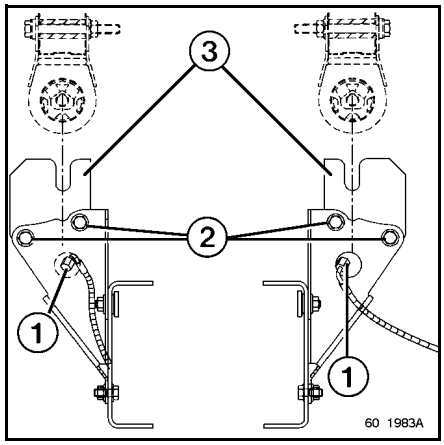
Hydraulic system

- Manual tilt pump **(1)**
- Locks **(2)**
- Tilt ram(s) **(3)**
- Pushing circuit (cab tilting) **(A)**
- Pulling circuit (cab return) **(B)**

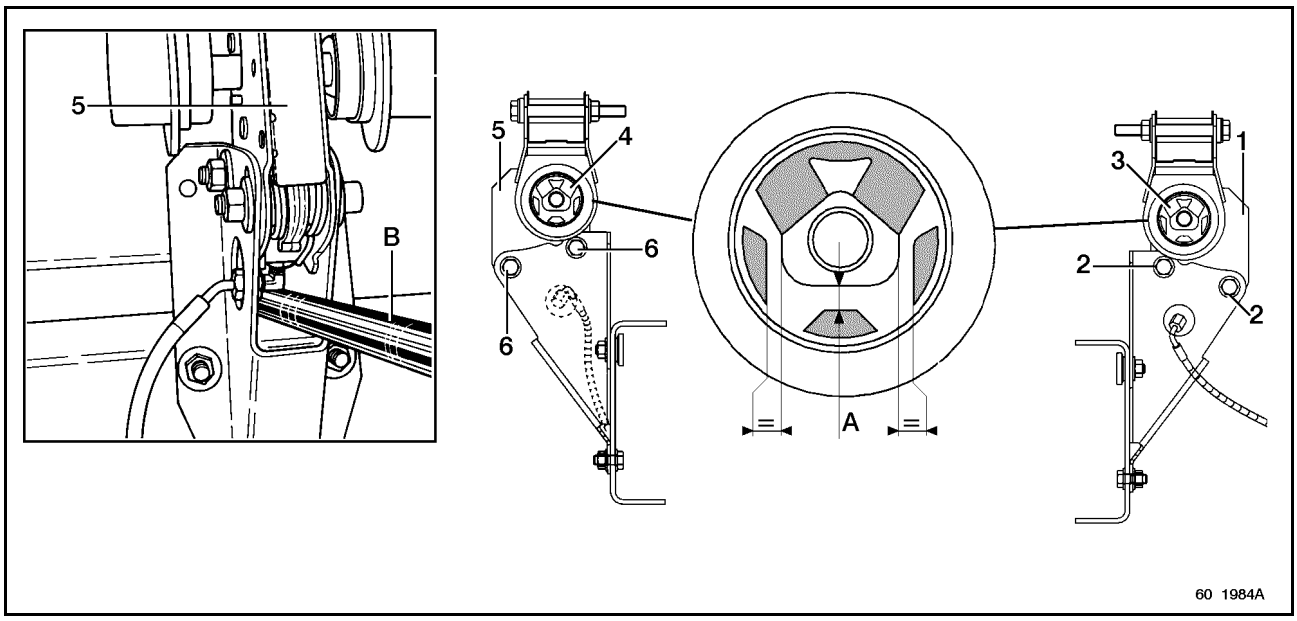
Prior to carrying out any work on the hydraulic system (pipes, ram, pumps...), secure the cab against motion, when tilted, as a safety precaution.

Cab lock(s)

Removal
Tilt the cab.
Disconnect pipe **(1)**.
Blank off the ports.
Remove nuts and bolts **(2)**.
Remove lock(s) **(3)**.



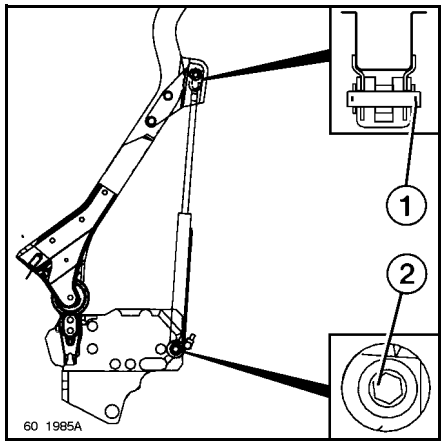
Fitting
To fit, proceed in the reverse sequence to removal.
Do not tighten nuts and bolts **(2)** so as to allow locks **(3)** to be adjusted.



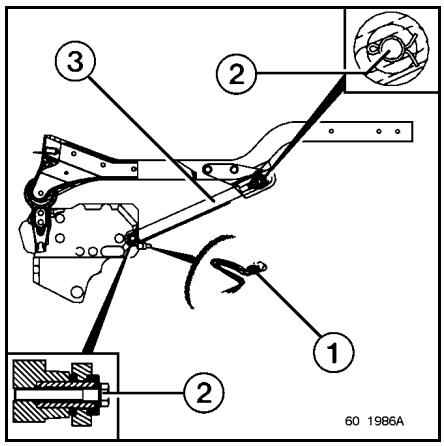
Adjustment
- Actuate the hydraulic pump in the cab return direction until the lever hardens up.
- The RH side lock **(1)** falls into position naturally. Tighten nuts and bolts **(2)**.
- Using a set of feeler gauges, measure dimension **(A)** du of RH side mounting **(3)**.
- Vary the height of **(5)** using a lever **(B)** to give the same dimension **(A)** to LH side mounting **(4)**
- In that position, tighten nuts and bolts **(6)**.
- Bleed the hydraulic system (see page D-1-14).
- Tilt the cab and tighten nuts and bolts **(2 - 6)** to torque.

Cab tilt ram(s)

Removal
Tilt the cab.
Extract the lock pin **(1)**.
Loosen bolt **(2)**.



Return the cab to the "road" position.
Disconnect pipe **(1)**.
Withdraw pins **(2)**.
Remove ram **(3)**.



Fitting
To fit, proceed in the reverse sequence to removal.
Bleed the hydraulic system.

The ram is supplied with oil. Avoid draining the oil upon assembly.

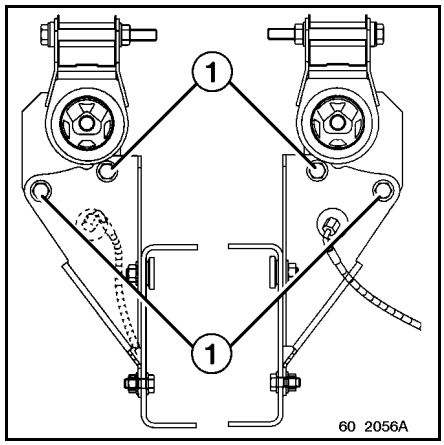
To replace a pump or a pipe
After completing the task, fill the system with oil and bleed.

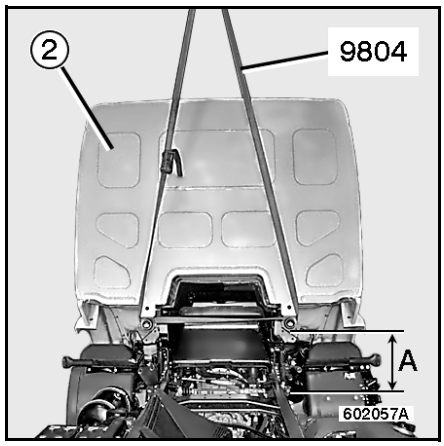
Filling the system with oil and bleeding the air
With the cab in the road position, fill with oil through the oil reservoir filler.
Actuate the hydraulic pump in the "up" direction to tilt the cab. The air escapes through the reservoir.
Actuate the hydraulic pump in the "down" direction to return the cab to the road position. Check the oil level and top up, if necessary. Carry out a complete cab tilting operation again.
Finish off bleeding the air by actuating the pump and loosening first the ram unions, then the cab lock unions.

Prior to carrying out any work on the hydraulic system (pipes, ram, pumps...), secure the cab against motion, when tilted, as a safety precaution.

If normal cab tilting is impossible, proceed as follows to enable it to tilt:
- Withdraw nuts and bolts **(1)**,
- Tilt cab **(2)** without exceeding a dimension **A** of **800** mm.

Use tool **9804**.

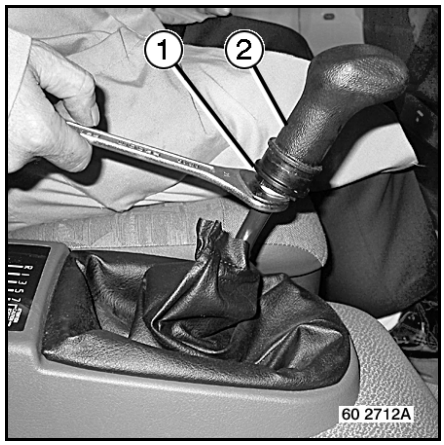




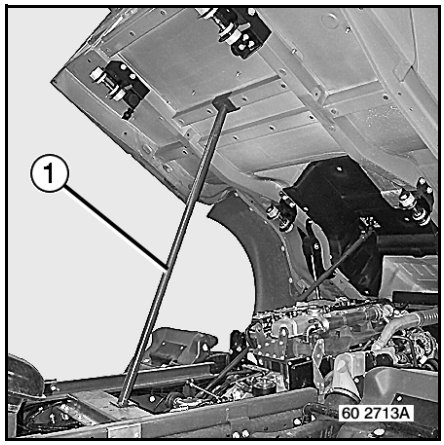
4-door cab

Removal / Fitting

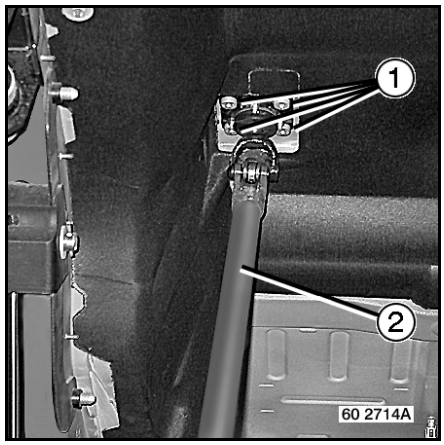
Removal
Loosen nut **(1)**.
Remove the gear lever knob **(2)**.



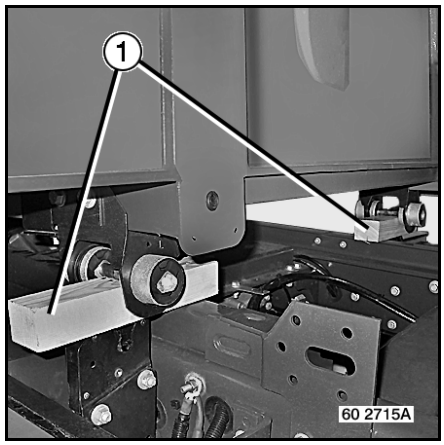
Tilt the cab.
Place safety bar **(1)** in position.



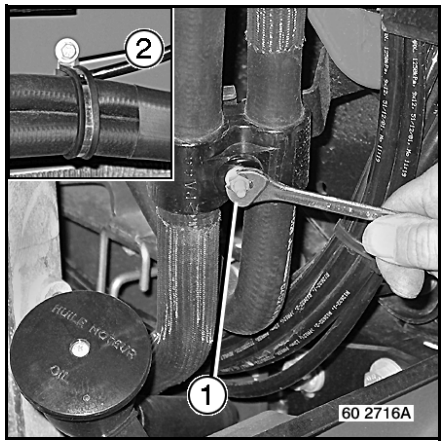
Remove bolts **(1)**.
Withdraw gearshift control **(2)**.
(Lash it to the chassis).



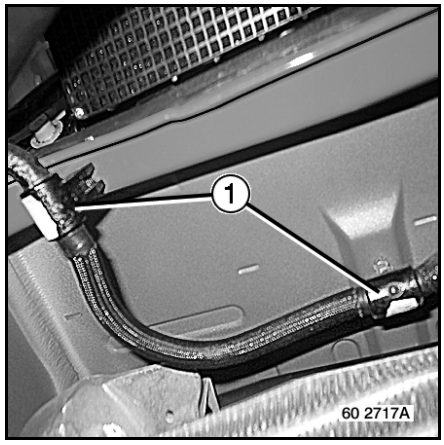
Place two wedging blocks **(1)** in position on the cab locks.
Return the cab to the "road" position.



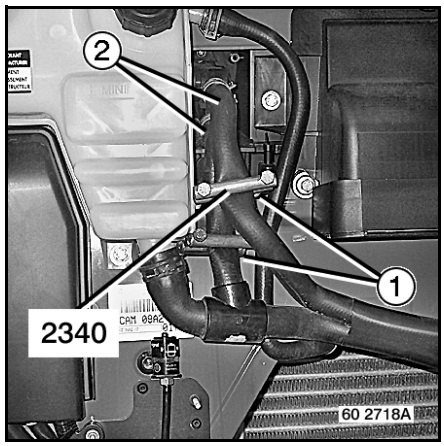
Remove flange **(1)**.
Remove clamp **(2)**.



Unclip brackets **(1)**.

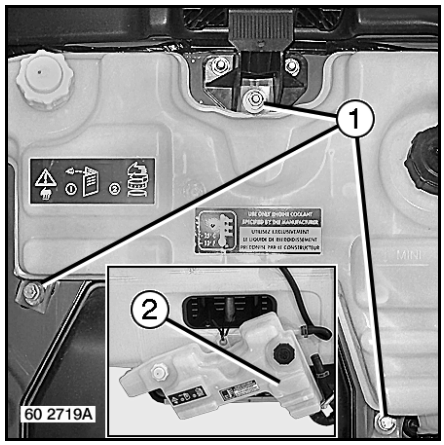


Clamp hoses **(1)**.
Use tool **2340**.
Remove clamps **(2)**.

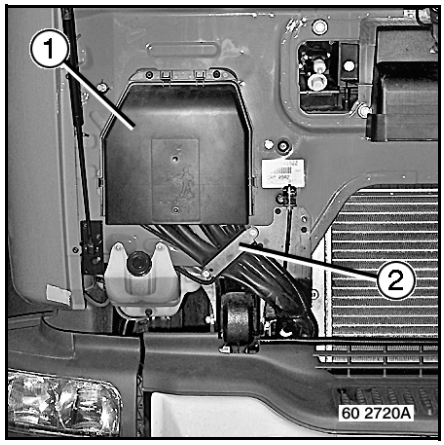


Cab equipped with air conditioning
Drain the air conditioning system.
See Workshop Manual section MR **63614**.

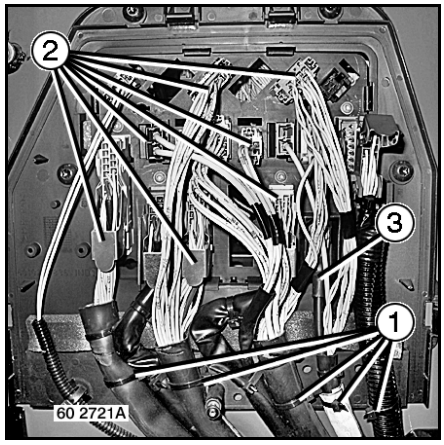
Remove bolts **(1)**.
Lash expansion bottle **(2)** to the front bumper.



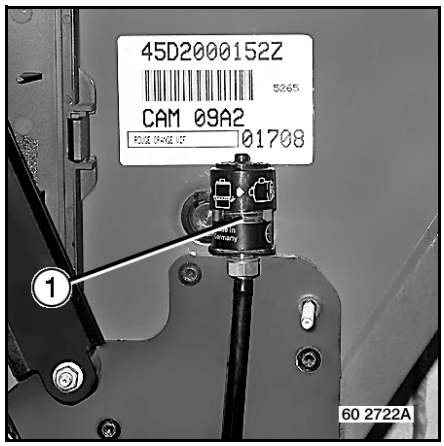
Remove guard **(1)**.
Open clamp **(2)** securing the wiring harnesses.



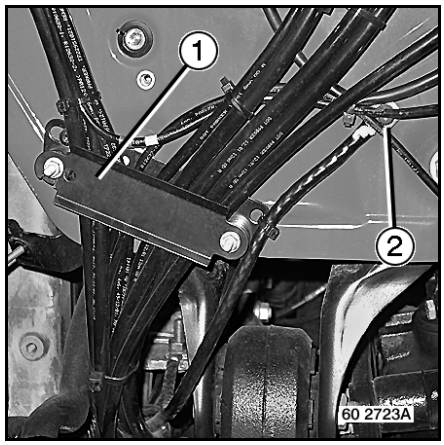
Withdraw the clamps **(1)**.
Unplug connectors **(2)**.
Disconnect earth cable **(3)**.



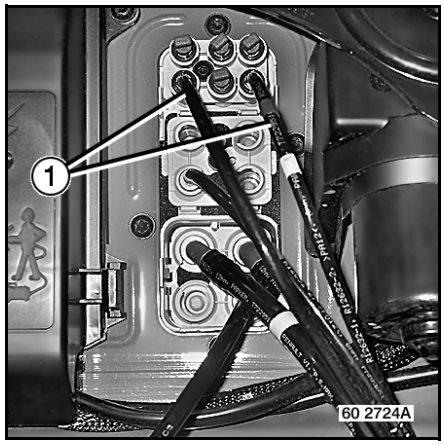
Remove air filter clogging detector **(1)**.



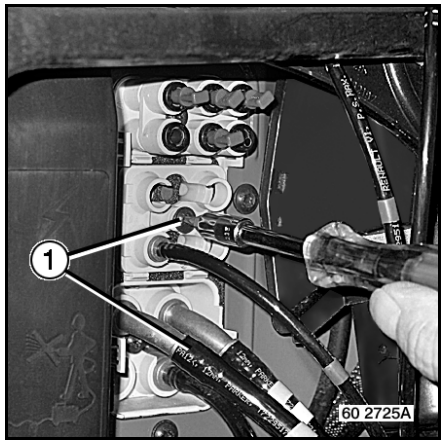
Open clamp **(1)** securing the pipes.
Disconnect earth cable **(2)**.



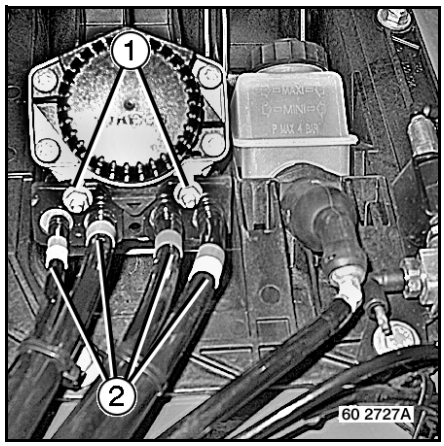
Disconnect pipes **(1)** from the cab pneumatic junction block.



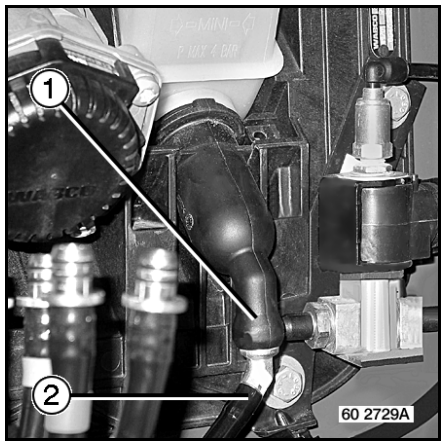
Unscrew and remove air take-offs **(1)** from the cab pneumatic junction block.



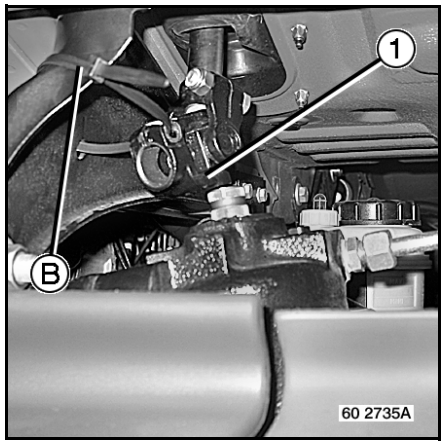
Remove flange **(1)**.
Mark and remove pipes **(2)**.



Drain the clutch system.
Remove circlip **(1)**.
Disconnect pipe **(2)**.



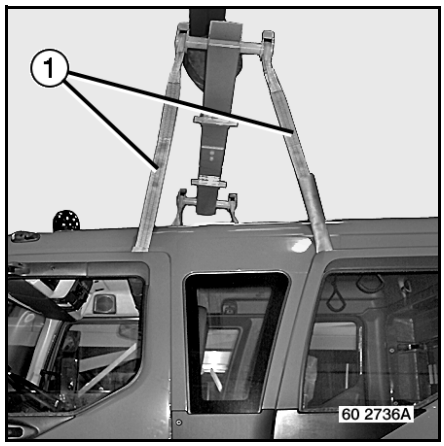
Mark and uncouple steering gear shaft **(1)**.
Lash the steering gear shaft to the cab as shown at **(B)**.



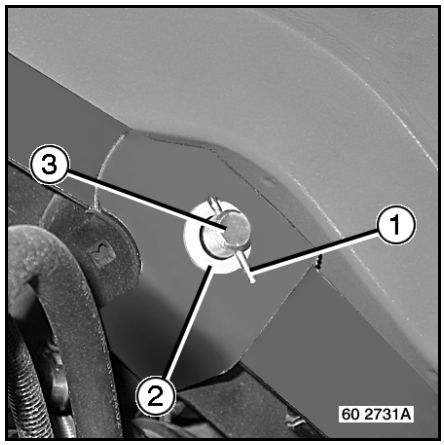
Vehicle equipped with an airbag
(Refer to precautions to be taken in the Airbag chapter)

Mount tool **2370**.

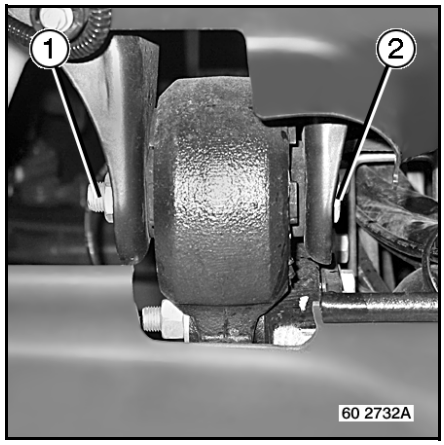
Place straps **(1)**.



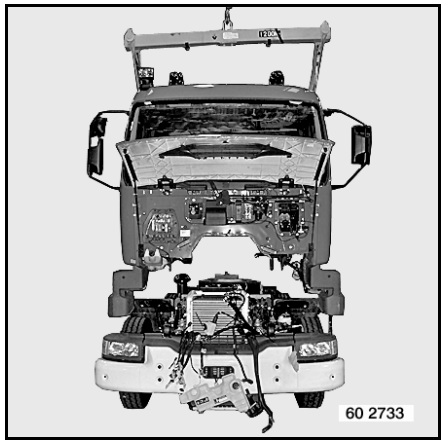
Attachment of cab tilt rams (RH & LH)
Remove pins **(1)**.
Remove washers **(2)**.
Remove pins **(3)**.



Attachment of cab front (RH & LH)
Remove nuts and washers **(1)**.
Remove bolts and washers **(2)**.

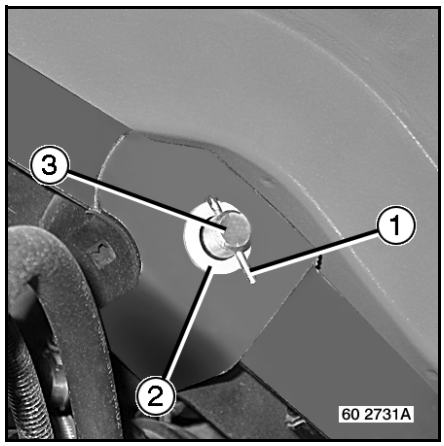


Remove the cab.

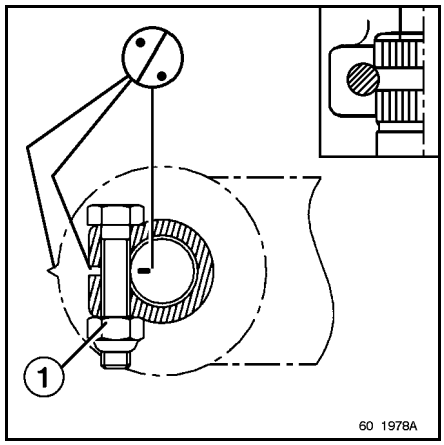


Fitting
To fit, proceed in the reverse sequence to removal.

Attachment of cab tilt rams (RH & LH)
Do not forget to put washers **(2)** and pins **(1)** back into place.



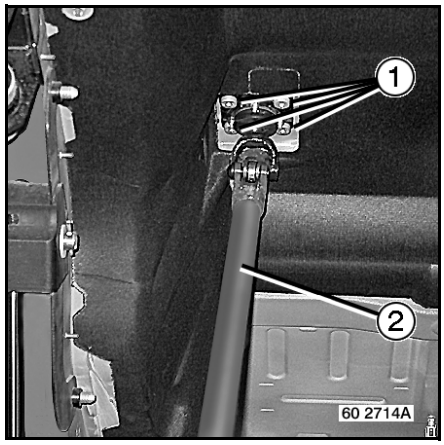
Steering control
Couple up steering gear shaft **(2)**.
Fit bolt **(1)**.
Tighten to torque.



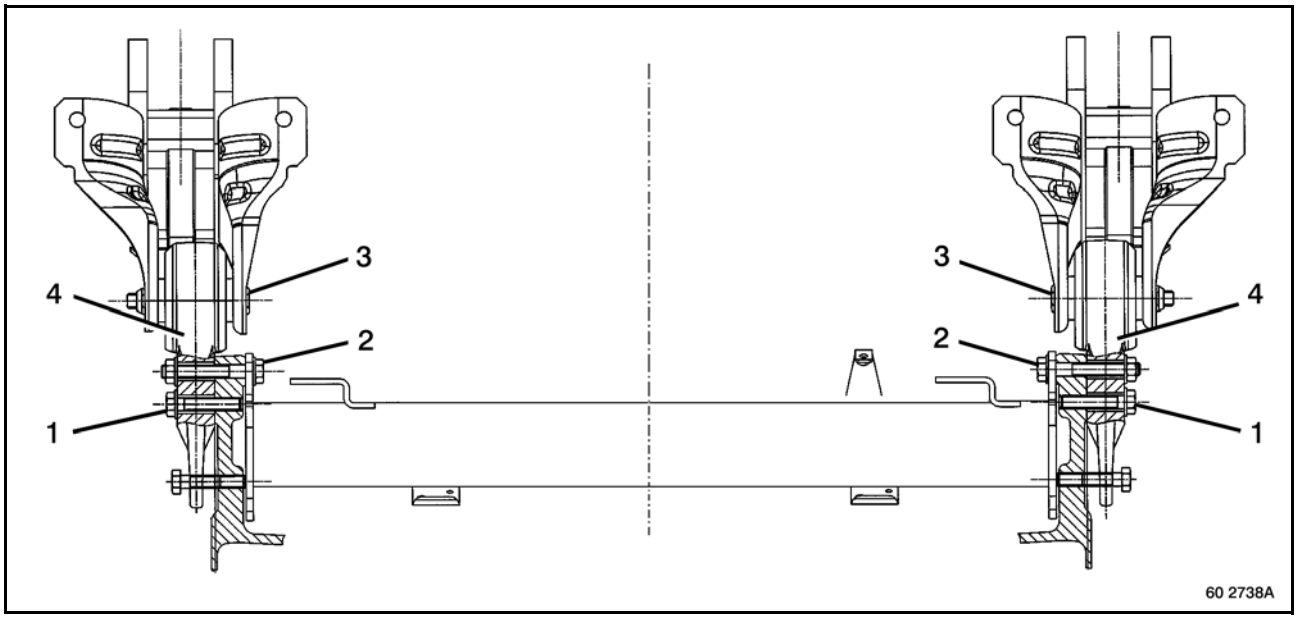
Clutch system
Fill and bleed the clutch system.

Gearshift control
Replace bolts **(1)**.
Tighten to torque.
See pages B-3-5.

Cab equipped with air conditioning
Recharge the air conditioning system.
See Workshop Manual section MR **63614**.

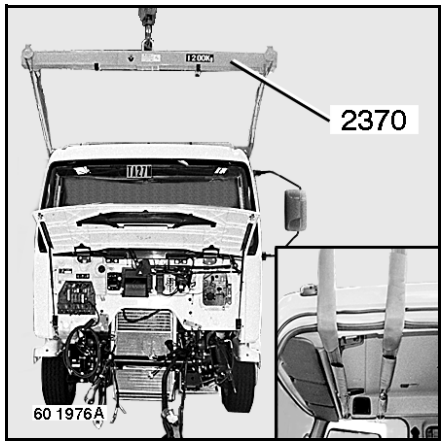


Cab suspension

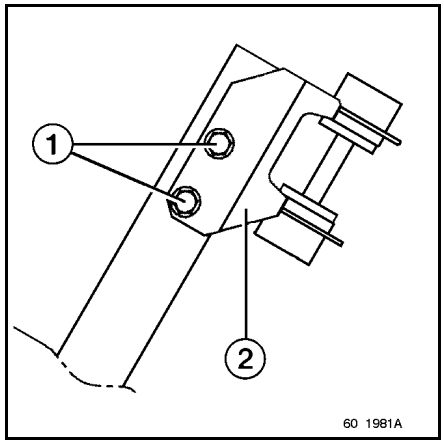


Removal

Front mountings
After removing the front bumper.
See pages D-1-8.
Remove bolts **(1 - 2)**.
Mount tool **2370**.
Lift up the cab to relieve the load on front mountings **(4)**.
Remove bolts **(3)**.
Remove front mounting(s) **(4)**.

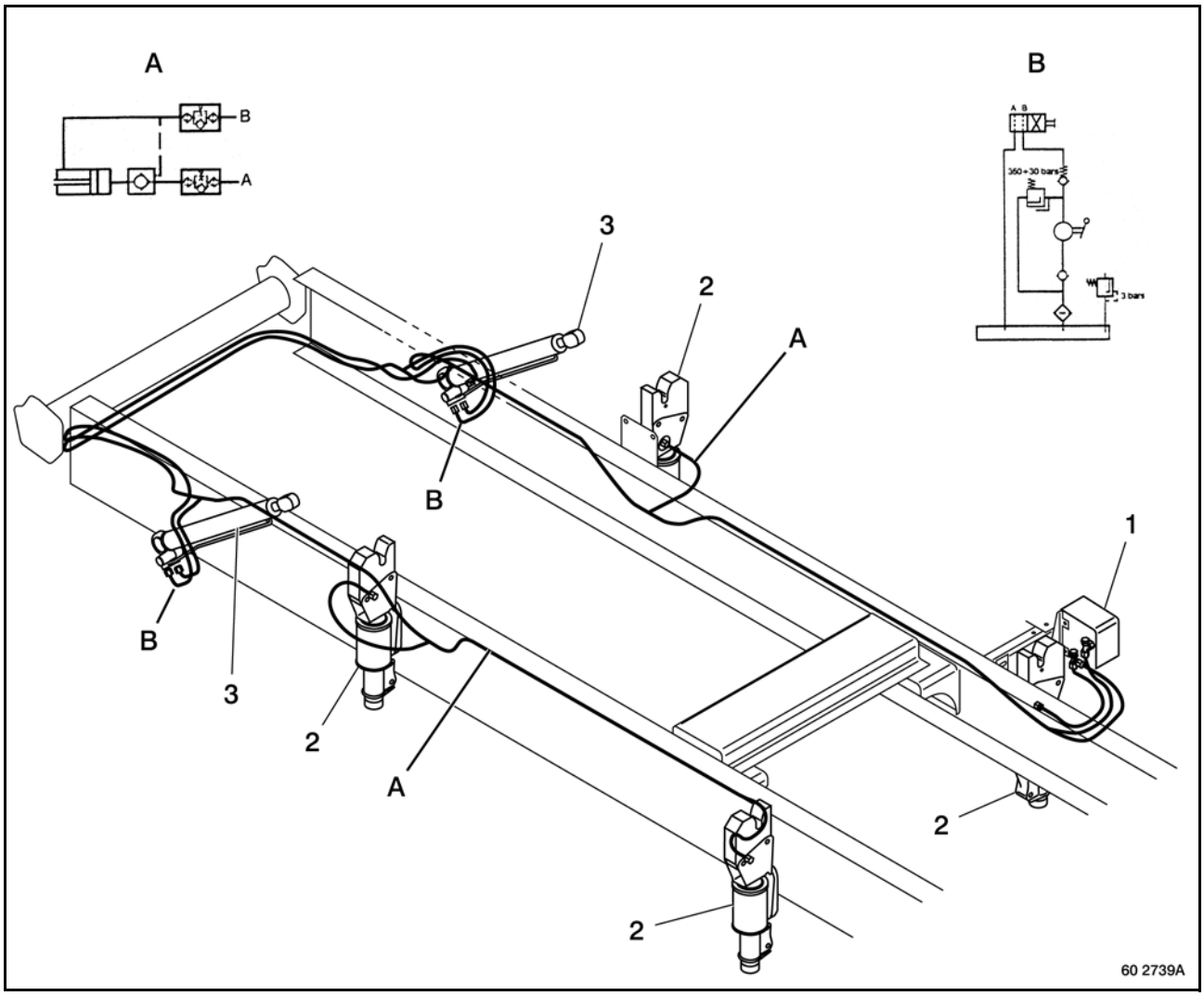


Rear mountings
Tilt the cab.
Remove bolts **(1)**.
Remove rear mounting(s) **(2)**.



Fitting
To fit, proceed in the reverse sequence to removal.
Tighten to torque.

Cab tilting system



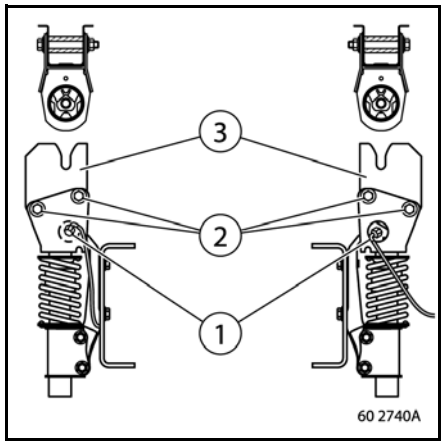
Hydraulic system

- Manual tilt pump **(1)**
- Locks **(2)**
- Tilt ram(s) **(3)**
- Pushing circuit (cab tilting) **(A)**
- Pulling circuit (cab return) **(B)**

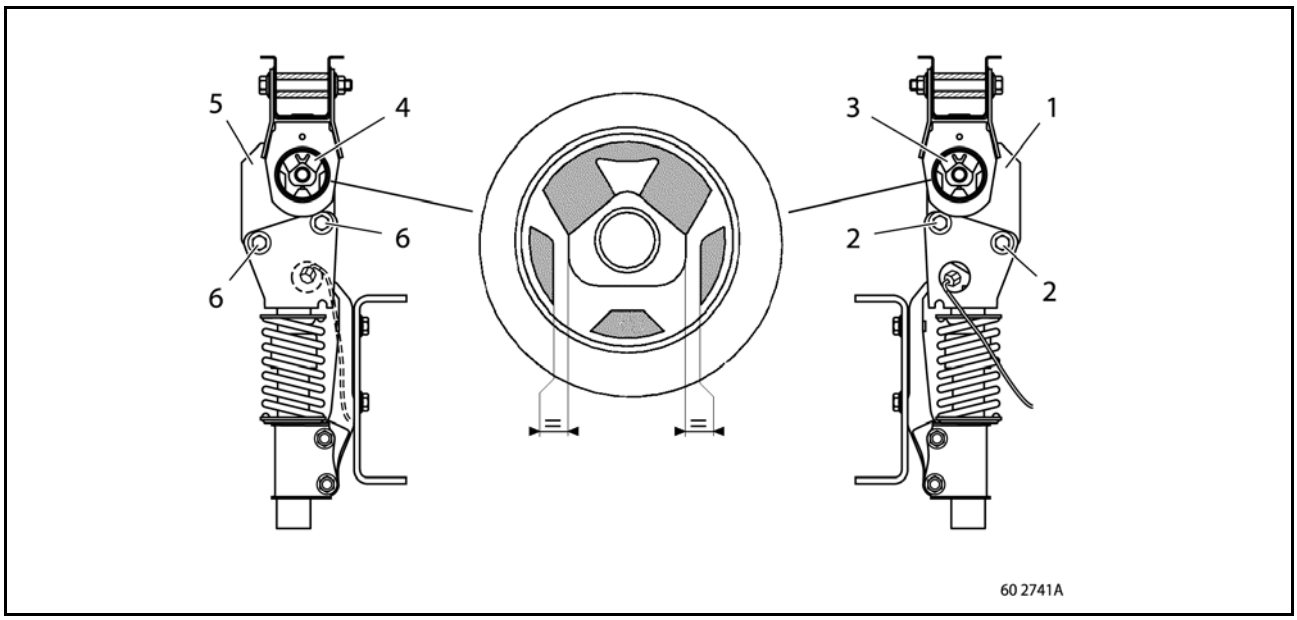
Prior to carrying out any work on the hydraulic system (pipes, ram, pumps...), secure the cab against motion, when tilted, as a safety precaution.

Cab lock(s)

Removal
Tilt the cab.
Disconnect pipe **(1)**.
Blank off the ports.
Remove bolts **(2)**.
Remove lock(s) **(3)**.



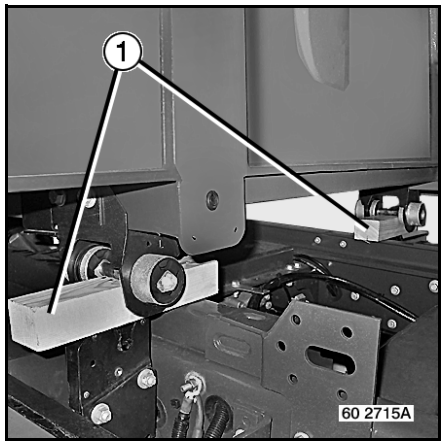
Fitting
To fit, proceed in the reverse sequence to removal.
Do not tighten nuts and bolts **(2)** so as to allow locks **(3)** to be adjusted.



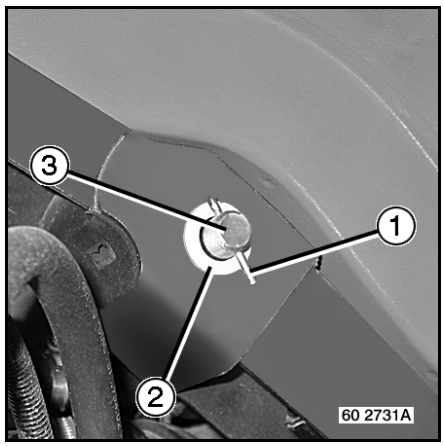
Adjustment
Actuate the hydraulic pump in the cab return direction until the lever hardens up.
The locks **(1 - 5)** fall into position naturally. Tighten nuts and bolts **(2 - 6)**.
Bleed the hydraulic system.
See pages D-2-12.
Tilt the cab and tighten nuts and bolts **(2 - 6)** to torque.

Cab tilt ram(s)

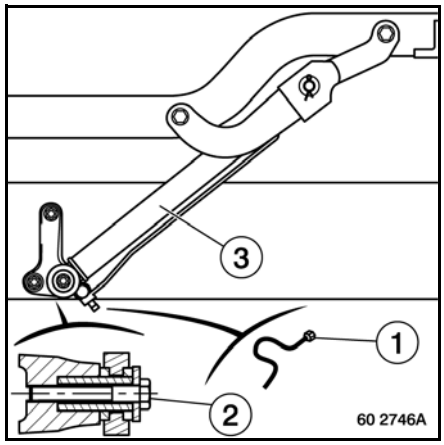
Removal
Place two wedging blocks **(1)** in position on the cab locks.
Return the cab to the "road" position.



Remove pins **(1)**.
Remove washers **(2)**.
Remove pins **(3)**.

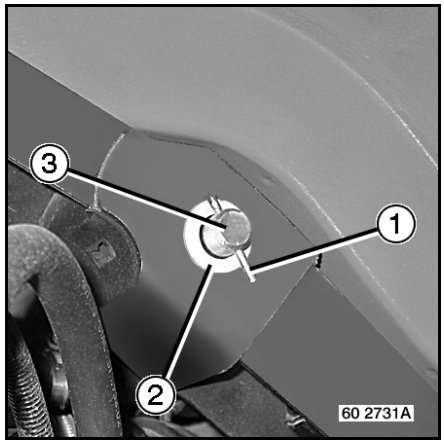


Disconnect pipe **(1)**.
Remove bolts **(2)**.
Remove ram(s) **(3)**.



Fitting
To fit, proceed in the reverse sequence to removal.
Do not forget to put washers **(2)** and pins **(1)** back into place.
Bleed the hydraulic system.

The ram is supplied with oil. Avoid draining the oil upon assembly.

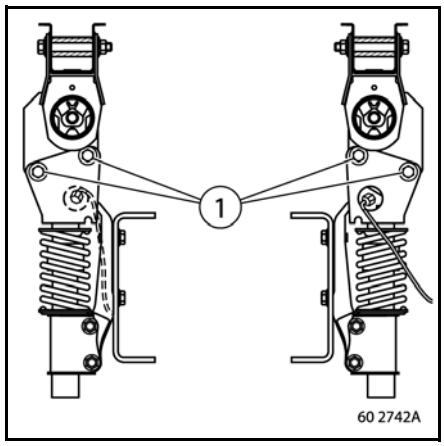


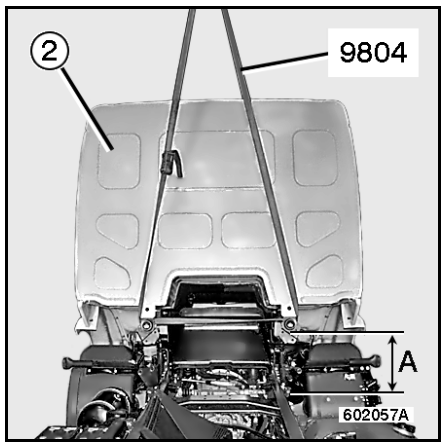
To replace a pump or a pipe
After completing the task, fill the system with oil and bleed.

Filling the system with oil and bleeding the air
With the cab in the road position, fill with oil through the oil reservoir filler.
Actuate the hydraulic pump in the "up" direction to tilt the cab. The air escapes through the reservoir.
Actuate the hydraulic pump in the "down" direction to return the cab to the road position. Check the oil level and top up, if necessary. Carry out a complete cab tilting operation again.
Finish off bleeding the air by actuating the pump and loosening first the ram unions, then the cab lock unions.

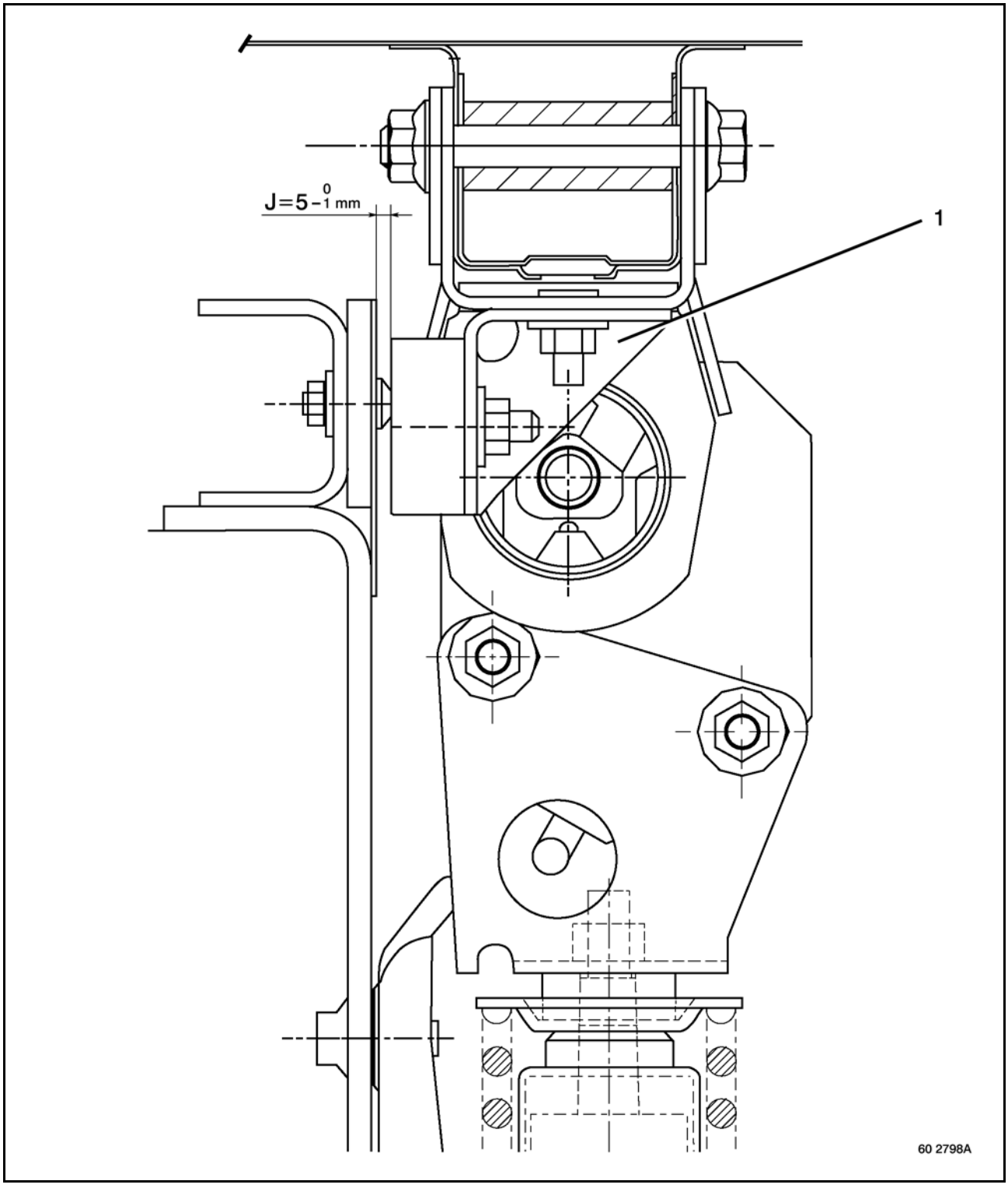
Prior to carrying out any work on the hydraulic system (pipes, ram, pumps...), secure the cab against motion, when tilted, as a safety precaution.

If normal cab tilting is impossible, proceed as follows to enable it to tilt:
- Withdraw nuts and bolts **(1)**,
- Tilt cab **(2)** without exceeding a dimension **A** of **800** mm.
Use tool **9804**.





Centring the cab

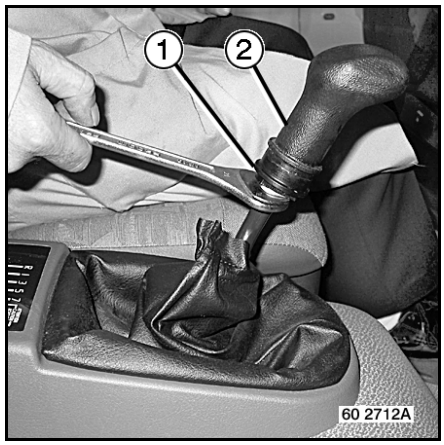


The cab is centred by moving runners **(1)** to ensure dimension **(J)**.

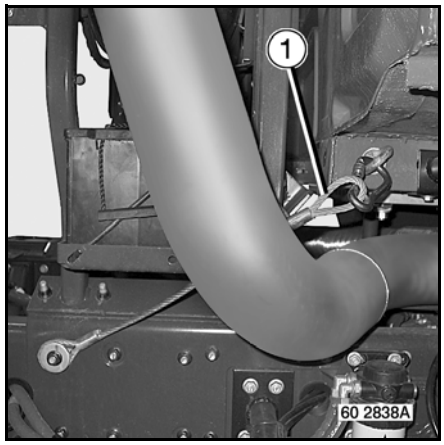
Forest fire tanker truck cab (CCF)

Removal / Fitting

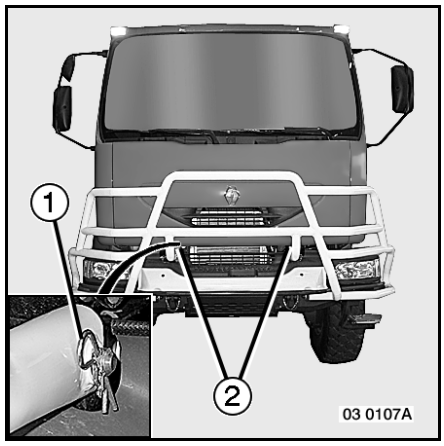
Removal
Loosen nut **(1)**.
Remove the gear lever knob **(2)**.



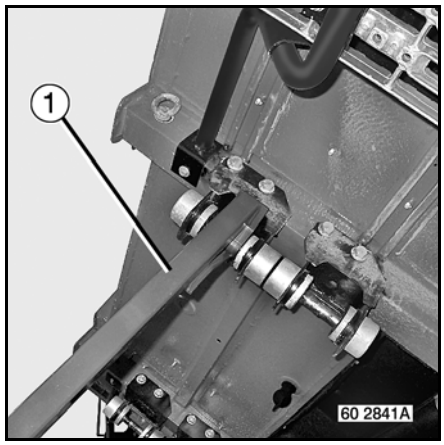
Place safety rope **(1)**.



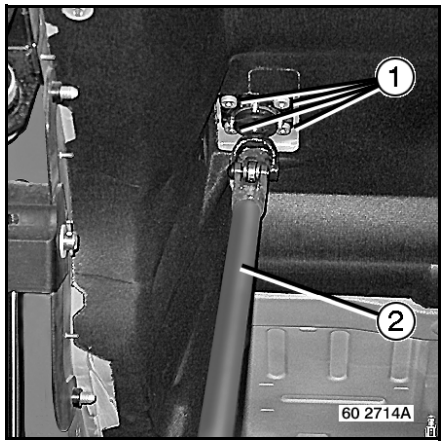
Take out pins **(1)**. While holding the shield, free pins **(2)** and pivot the shield.
Open the front grille.



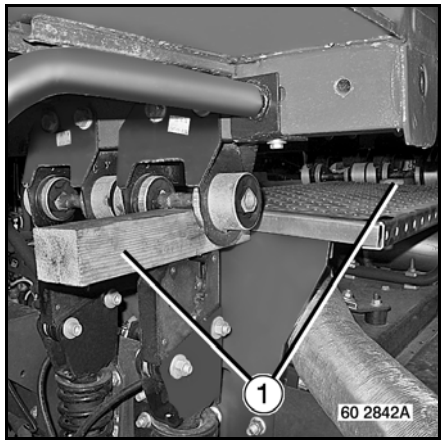
Tilt the cab.
Place safety bar **(1)** in position.



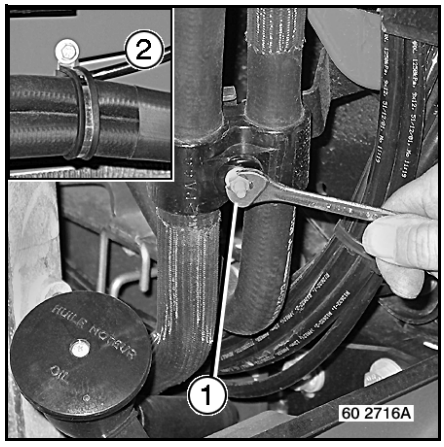
Remove bolts **(1)**.
Withdraw gearshift control **(2)**.
(Lash it to the chassis).



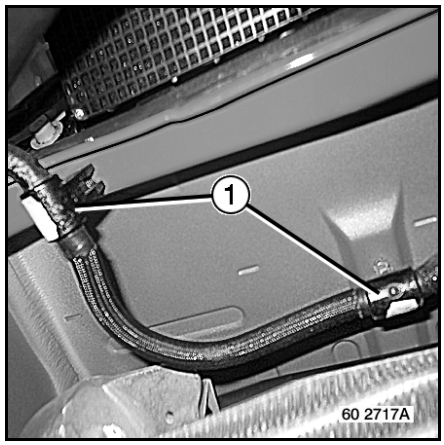
Place two wedging blocks **(1)** in position on the cab locks.
Return the cab to the "road" position.



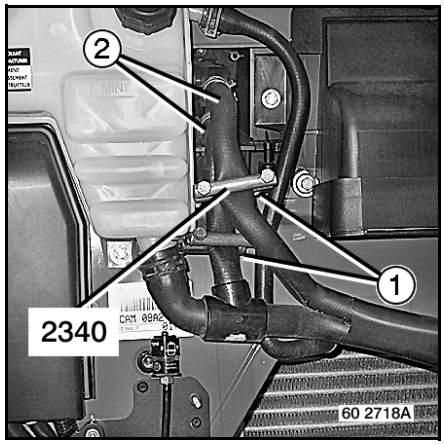
Remove flange **(1)**.
Remove clamp **(2)**.



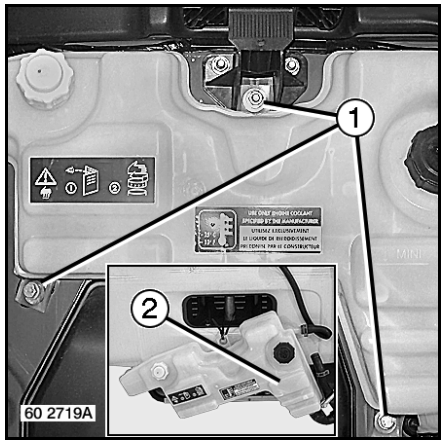
Unclip brackets **(1)**.



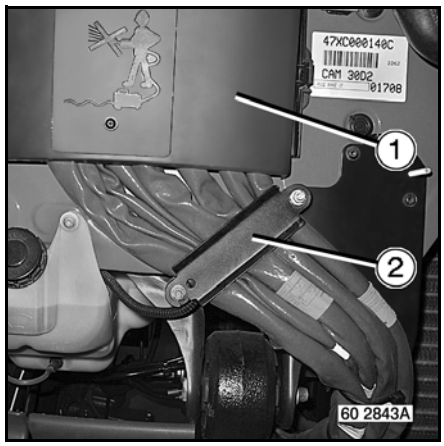
Clamp hoses **(1)**.
Use tool **2340**.
Remove clamps **(2)**.



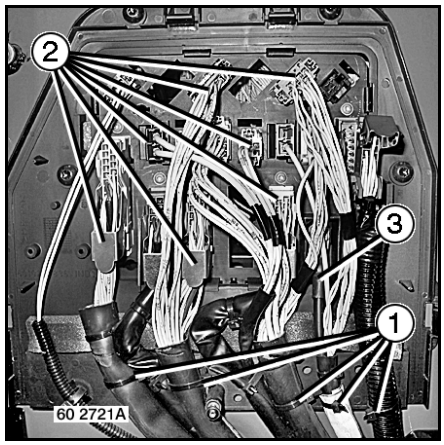
Remove bolts **(1)**.
Lash expansion bottle **(2)** to the front bumper.



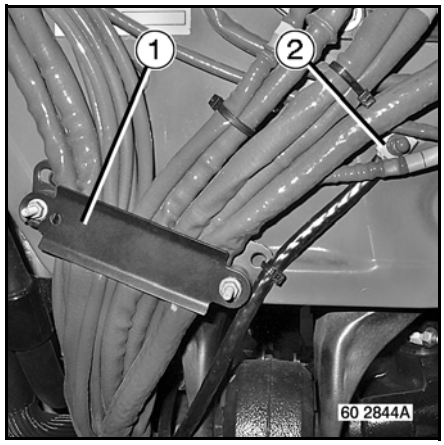
Remove guard **(1)**.
Open clamp **(2)** securing the wiring harnesses.



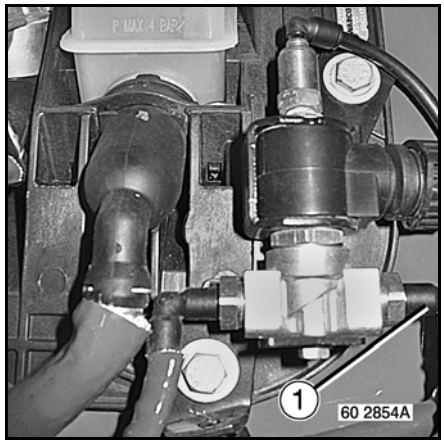
Withdraw the clamps **(1)**.
Unplug connectors **(2)**.
Disconnect earth cable **(3)**.



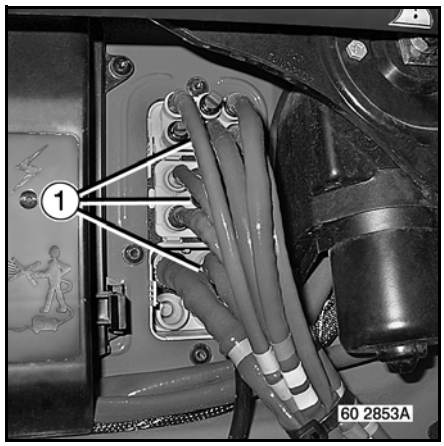
Open clamp **(1)** securing the pipes.
Disconnect earth cable **(2)**.



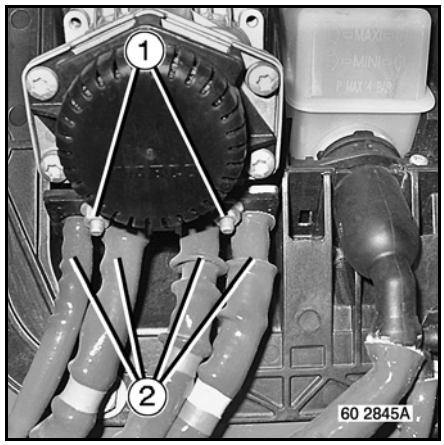
Disconnect pipe **(1)**.



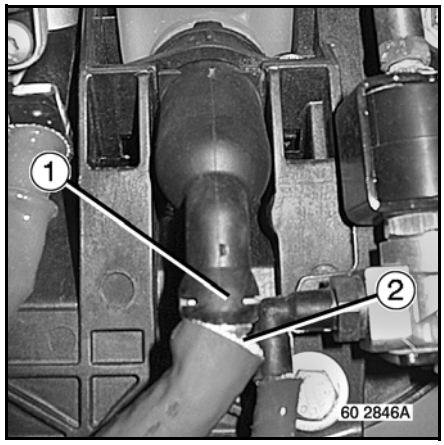
Unscrew and remove air take-offs **(1)** from the cab pneumatic junction block.



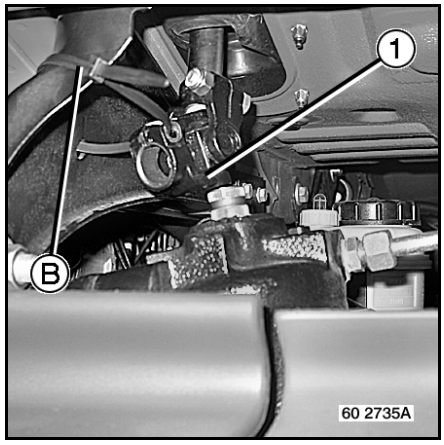
Remove flange **(1)**.
Mark and remove pipes **(2)**.



Drain the clutch system.
Remove circlip **(1)**.
Disconnect pipe **(2)**.

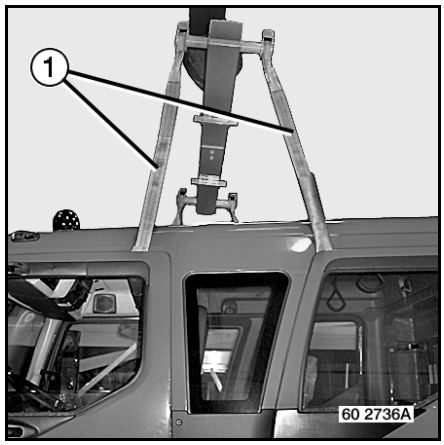


Mark and uncouple steering gear shaft **(1)**.
Lash the steering gear shaft to the cab as shown at **(B)**.

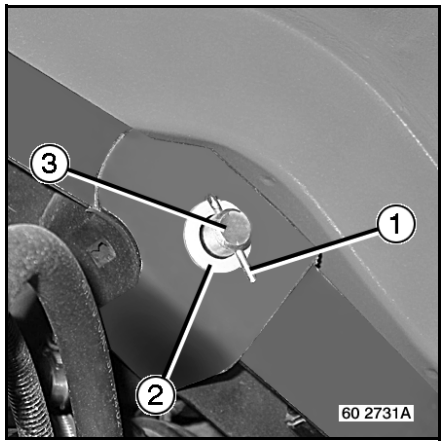


Mount tool **2370**.

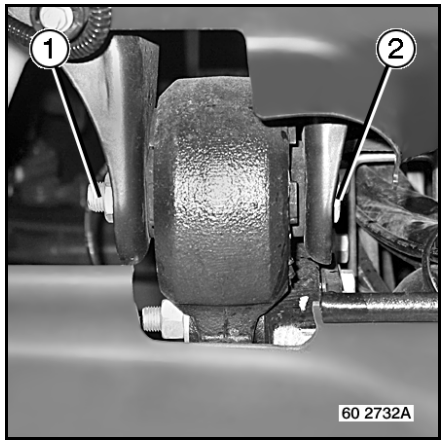
Place straps **(1)**.



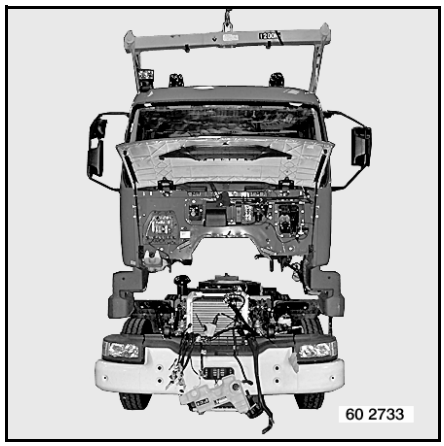
Attachment of cab tilt rams (RH & LH)
Remove pins **(1)**.
Remove washers **(2)**.
Remove pins **(3)**.



Attachment of cab front (RH & LH)
Remove nuts and washers **(1)**.
Remove bolts and washers **(2)**.

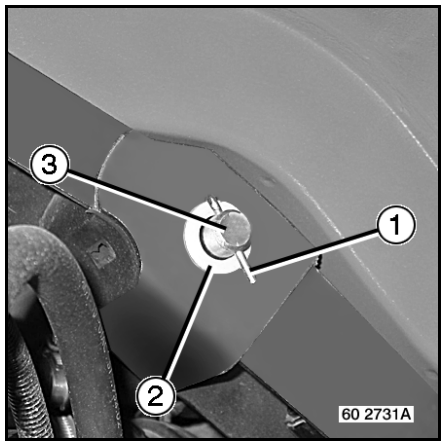


Remove the cab.

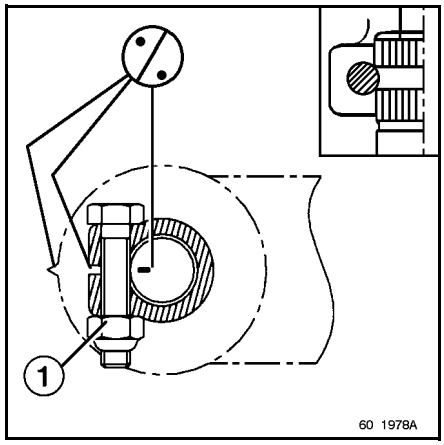


Fitting
To fit, proceed in the reverse sequence to removal.

Attachment of cab tilt rams (RH & LH)
Do not forget to put washers **(2)** and pins **(1)** back into place.

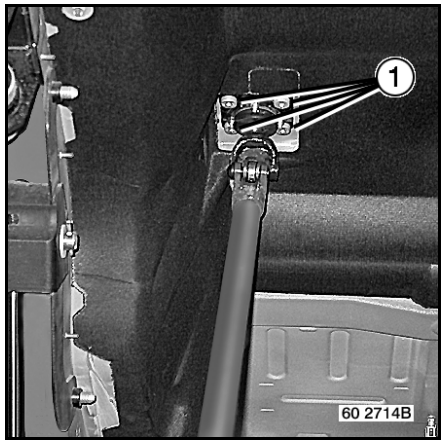


Steering control
Couple up steering gear shaft **(2)**.
Fit bolt **(1)**.
Tighten to torque.
See pages B-3-4.

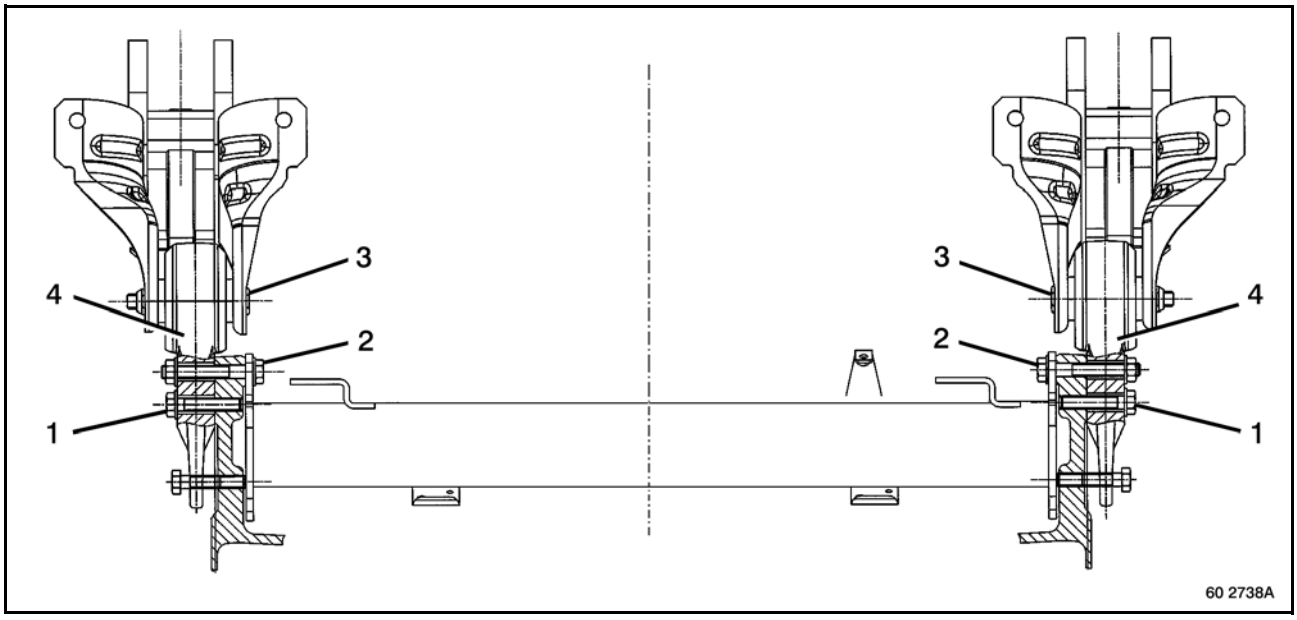


Clutch system
Fill and bleed the clutch system.

Gearshift control
Replace bolts **(1)**.
Tighten to torque.
See pages B-3-5.

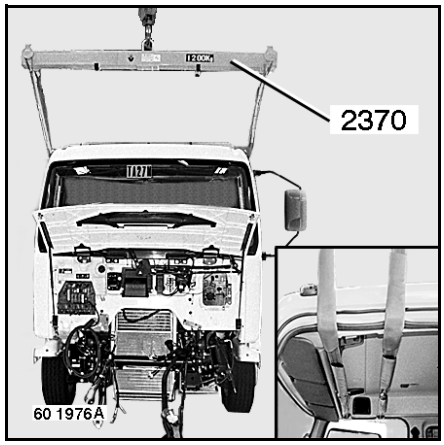


Cab suspension

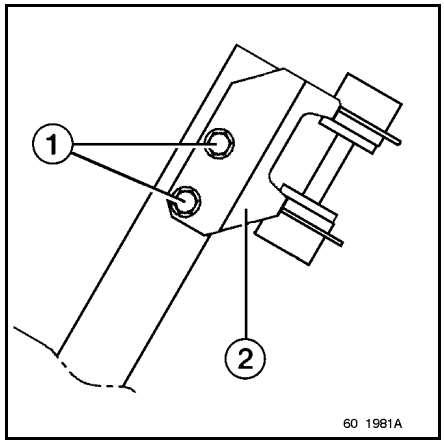


Removal

Front mountings
Remove bolts **(1)**.
Remove bolts **(2)**.
Mount tool **2370**.
Lift up the cab to relieve the load on front mountings **(4)**.
Remove bolts **(3)**.
Remove front mounting(s) **(4)**.

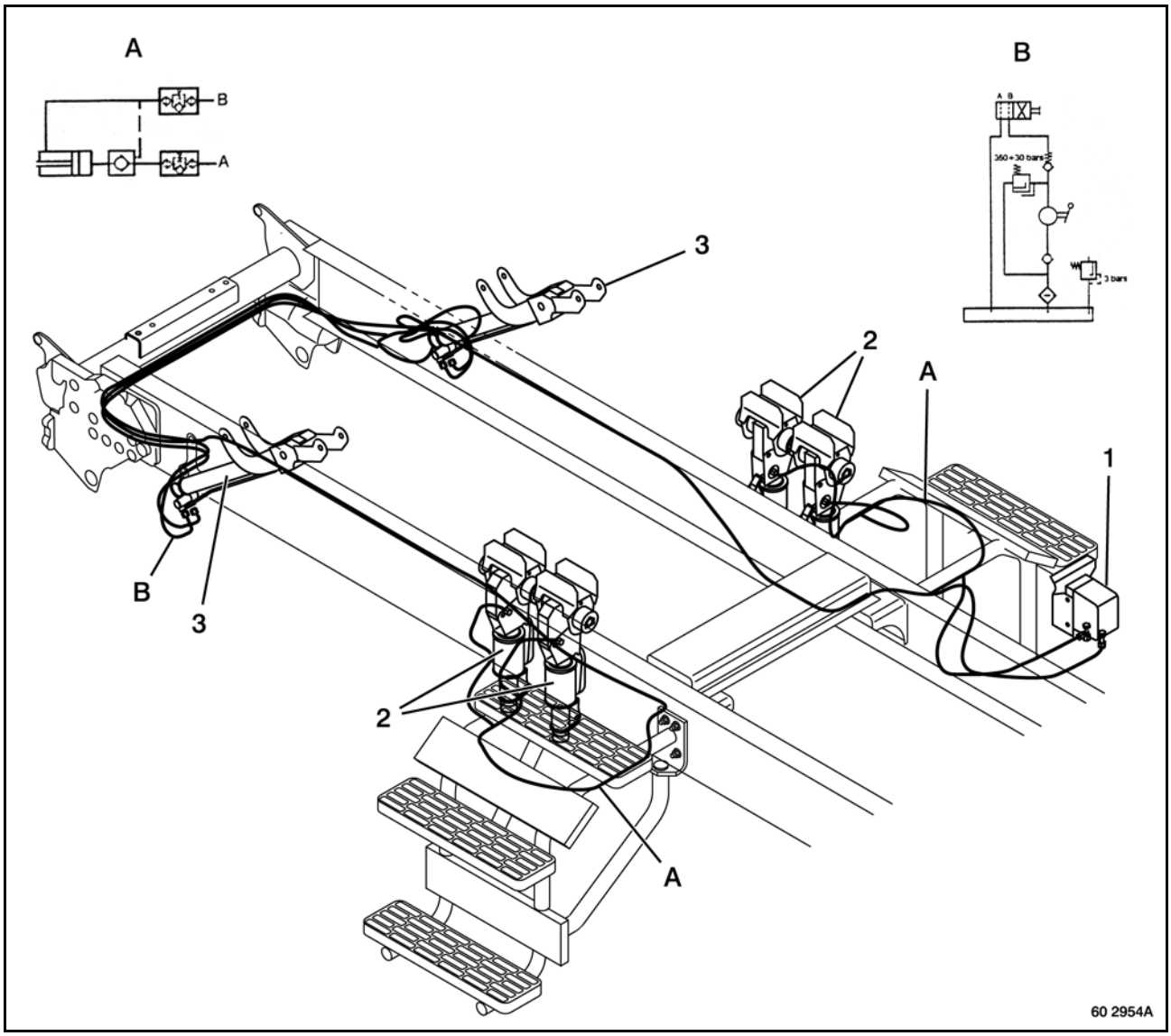


Rear mountings
Tilt the cab.
Remove bolts **(1)**.
Remove rear mounting(s) **(2)**.



Fitting
To fit, proceed in the reverse sequence to removal.
Tighten to torque.

Cab tilting system



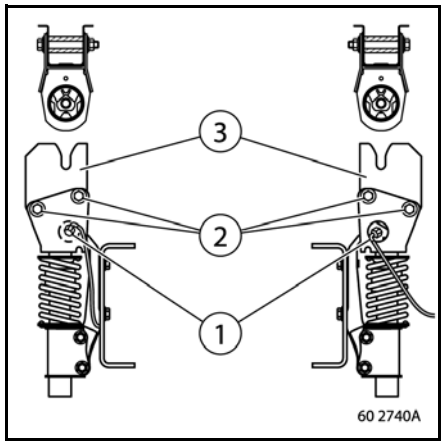
Hydraulic system

- Manual tilt pump **(1)**
- Locks **(2)**
- Tilt ram(s) **(3)**
- Pushing circuit (cab tilting) **(A)**
- Pulling circuit (cab return) **(B)**

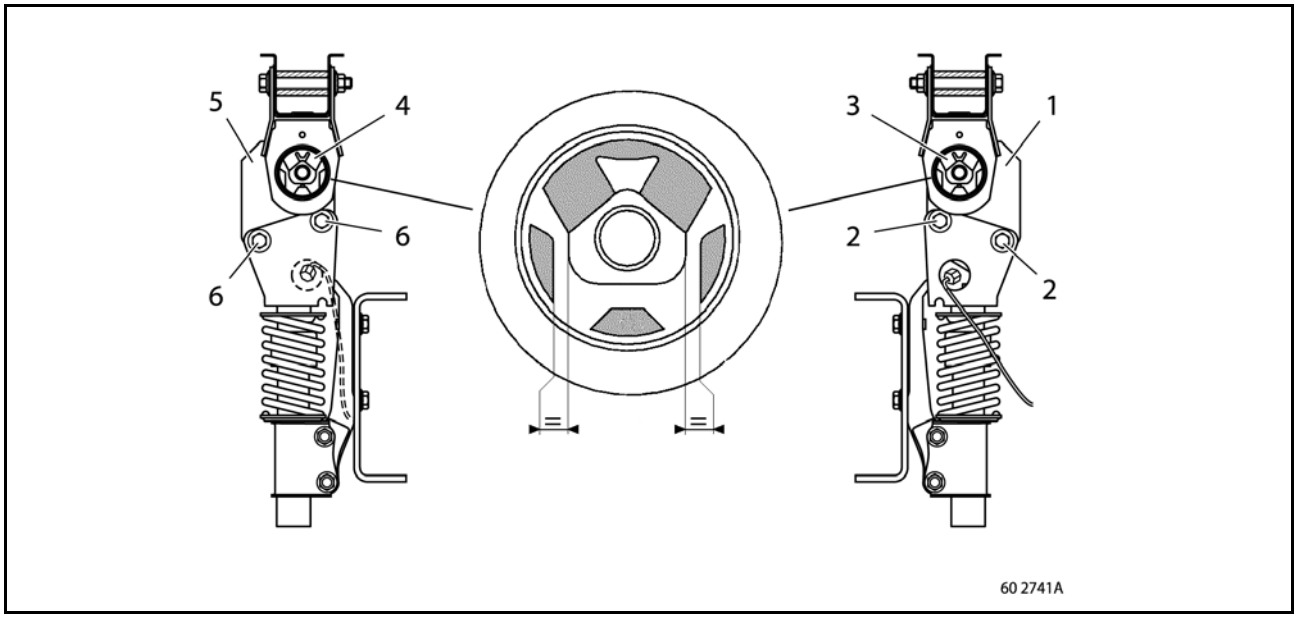
Prior to carrying out any work on the hydraulic system (pipes, ram, pumps...), secure the cab against motion, when tilted, as a safety precaution.

Cab lock(s)

Removal
Tilt the cab.
Disconnect pipe **(1)**.
Blank off the ports.
Remove bolts **(2)**.
Remove lock(s) **(3)**.



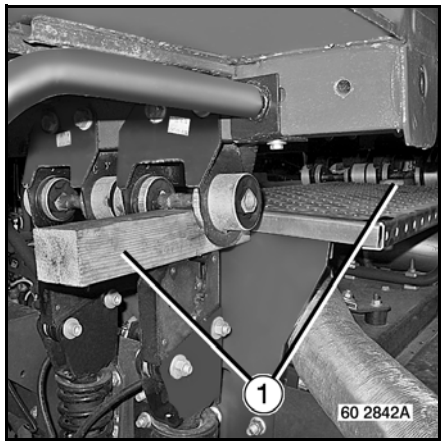
Fitting
To fit, proceed in the reverse sequence to removal.
Do not tighten nuts and bolts **(2)** so as to allow locks **(3)** to be adjusted.



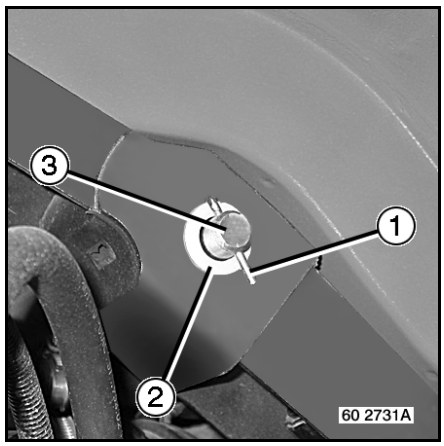
Adjustment
Actuate the hydraulic pump in the cab return direction until the lever hardens up.
The locks **(1 - 5)** fall into position naturally. Tighten nuts and bolts **(2 - 6)**.
Bleed the hydraulic system.
See pages D-3-12.
Tilt the cab and tighten nuts and bolts **(2 - 6)** to torque.

Cab tilt ram(s)

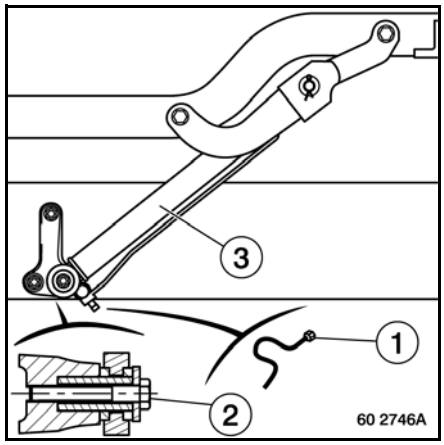
Removal
Place two wedging blocks **(1)** in position on the cab locks.
Return the cab to the "road" position.



Remove pins **(1)**.
Remove washers **(2)**.
Remove pins **(3)**.

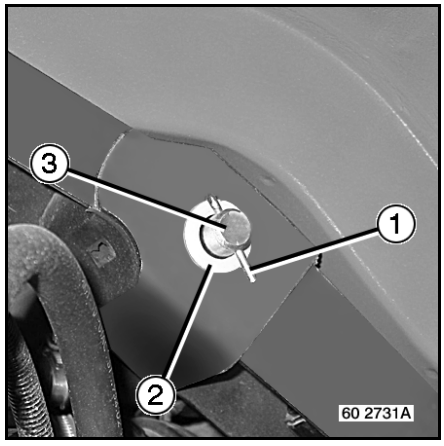


Disconnect pipe **(1)**.
Remove bolts **(2)**.
Remove ram(s) **(3)**.



Fitting
To fit, proceed in the reverse sequence to removal.
Do not forget to put washers **(2)** and pins **(1)** back into place.
Bleed the hydraulic system.

The ram is supplied with oil. Avoid draining the oil upon assembly.



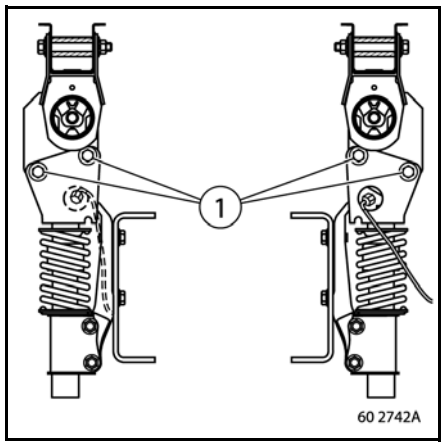
To replace a pump or a pipe
After completing the task, fill the system with oil and bleed.

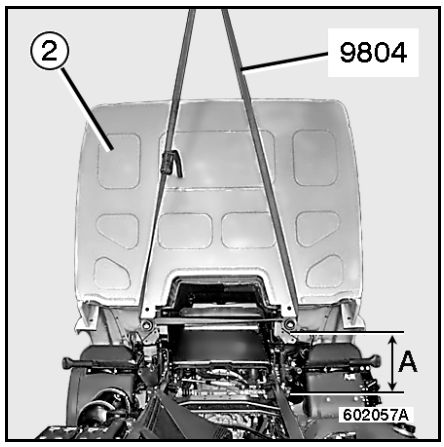
Filling the system with oil and bleeding the air
With the cab in the road position, fill with oil through the oil reservoir filler.
Actuate the hydraulic pump in the "up" direction to tilt the cab. The air escapes through the reservoir.
Actuate the hydraulic pump in the "down" direction to return the cab to the road position. Check the oil level and top up, if necessary. Carry out a complete cab tilting operation again.
Finish off bleeding the air by actuating the pump and loosening first the ram unions, then the cab lock unions.

Prior to carrying out any work on the hydraulic system (pipes, ram, pumps...), secure the cab against motion, when tilted, as a safety precaution.

If normal cab tilting is impossible, proceed as follows to enable it to tilt:
- Withdraw nuts and bolts **(1)**,
- Tilt cab **(2)** without exceeding a dimension **A** of **800** mm.

Use tool **9804**.





AIRBAG

APPLICABILITY

Operation

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Operating principle	35902			18/03/2004	E1-6
RENAULT MIDLUM 12-16 t Euro 3			35902				
RENAULT MIDLUM 16-18 t			35902				
RENAULT MIDLUM 7-12 t			35902				

Fuses

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Airbag fuse	35902			26/03/2004	E2-1
RENAULT MIDLUM 12-16 t Euro 3			35902				
RENAULT MIDLUM 16-18 t			35902				
RENAULT MIDLUM 7-12 t			35902				

Warnings

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		General instructions	35902			26/03/2004	E3-1
RENAULT MIDLUM 12-16 t Euro 3			35902				
RENAULT MIDLUM 16-18 t			35902				
RENAULT MIDLUM 7-12 t			35902				

Layout of appliances

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Layout of appliances in cab	35902			26/03/2004	E4-1
RENAULT MIDLUM 12-16 t Euro 3			35902				
RENAULT MIDLUM 16-18 t			35902				
RENAULT MIDLUM 7-12 t			35902				

Diagnostics

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Aid-to-trouble-shooting	35902			26/03/2004	E5-1
RENAULT MIDLUM 12-16 t Euro 3			35902				
RENAULT MIDLUM 16-18 t			35902				
RENAULT MIDLUM 7-12 t			35902				

Removal / Fitting

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Airbag ECU	35902			26/03/2004	E6-1
RENAULT MIDLUM 12-16 t Euro 3			35902				
RENAULT MIDLUM 16-18 t			35902				
RENAULT MIDLUM 7-12 t			35902				
RENAULT MIDLUM 12 -16 t Euro 2		Driver's airbag module	35902			26/03/2004	E6-2
RENAULT MIDLUM 12-16 t Euro 3			35902				
RENAULT MIDLUM 16-18 t			35902				
RENAULT MIDLUM 7-12 t			35902				
RENAULT MIDLUM 12 -16 t Euro 2		Rotary switch	35902			26/03/2004	E6-3
RENAULT MIDLUM 12-16 t Euro 3			35902				
RENAULT MIDLUM 16-18 t			35902				
RENAULT MIDLUM 7-12 t			35902				
RENAULT MIDLUM 12 -16 t Euro 2		Pretensioner(s)	35902			26/03/2004	E6-6
RENAULT MIDLUM 12-16 t Euro 3			35902				
RENAULT MIDLUM 16-18 t			35902				
RENAULT MIDLUM 7-12 t			35902				

Range	Family	Title	Variant	Applicability date		Updating	Page N°
				Start	End		
RENAULT MIDLUM 12 -16 t Euro 2		Airbag module destruction procedure	35902			26/03/2004	E6-7
RENAULT MIDLUM 12-16 t Euro 3			35902				
RENAULT MIDLUM 16-18 t			35902				
RENAULT MIDLUM 7-12 t			35902				
RENAULT MIDLUM 12 -16 t Euro 2		Pretensioner destruction procedure	35902			14/05/2004	E6-8
RENAULT MIDLUM 12-16 t Euro 3			35902				
RENAULT MIDLUM 16-18 t			35902				
RENAULT MIDLUM 7-12 t			35902				

Operation

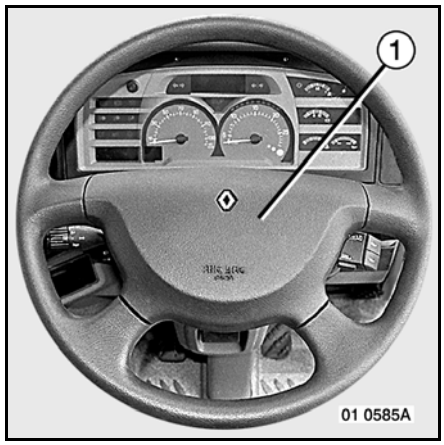
Operating principle

Airbag + pretensioner

The system consists of:

- An inflatable bag and its gas generator mounted under the steering wheel protective cover **(1)**.
- Seat belt pretensioner.
- An electronic box located under the driver's seat.
- An "AIRBAG" "Information" and defect test warning light **(G24)**.
- A rotary switch under the steering wheel.

A marking "Airbag" on the steering wheel protective cover **(1)** and a self-adhesive sticker on the windscreen remind the presence of this equipment.



Airbag

The airbag system uses a pyrotechnic principle which explains why, upon deployment, it produces heat, gives off smoke (which is not the sign of an outbreak of fire) and generates a detonating noise. Deployment of the airbag, which must be immediate, may cause minor, reversible injuries to the surface of the skin.

Seat belt pretensioner

The pretensioner system **(1)** uses a pyrotechnic principle, which instantaneously retracts the seat belt buckle, flattening the belt against the body and thus increasing its effectiveness.

Electronic box

The box is an electronic control unit (ECU) which is provided with an independent accelerations acquisition system allowing it to trigger off detonation of the system igniter squibs.

Warning pictogram

When the ignition is switched on, warning pictogram **(G24)** is illuminated for **10** seconds and is then extinguished. The system is henceforth operational. An illumination fault or permanent illumination of the warning pictogram **(G24)** means system trouble or locking (airbag inactive).

Operation

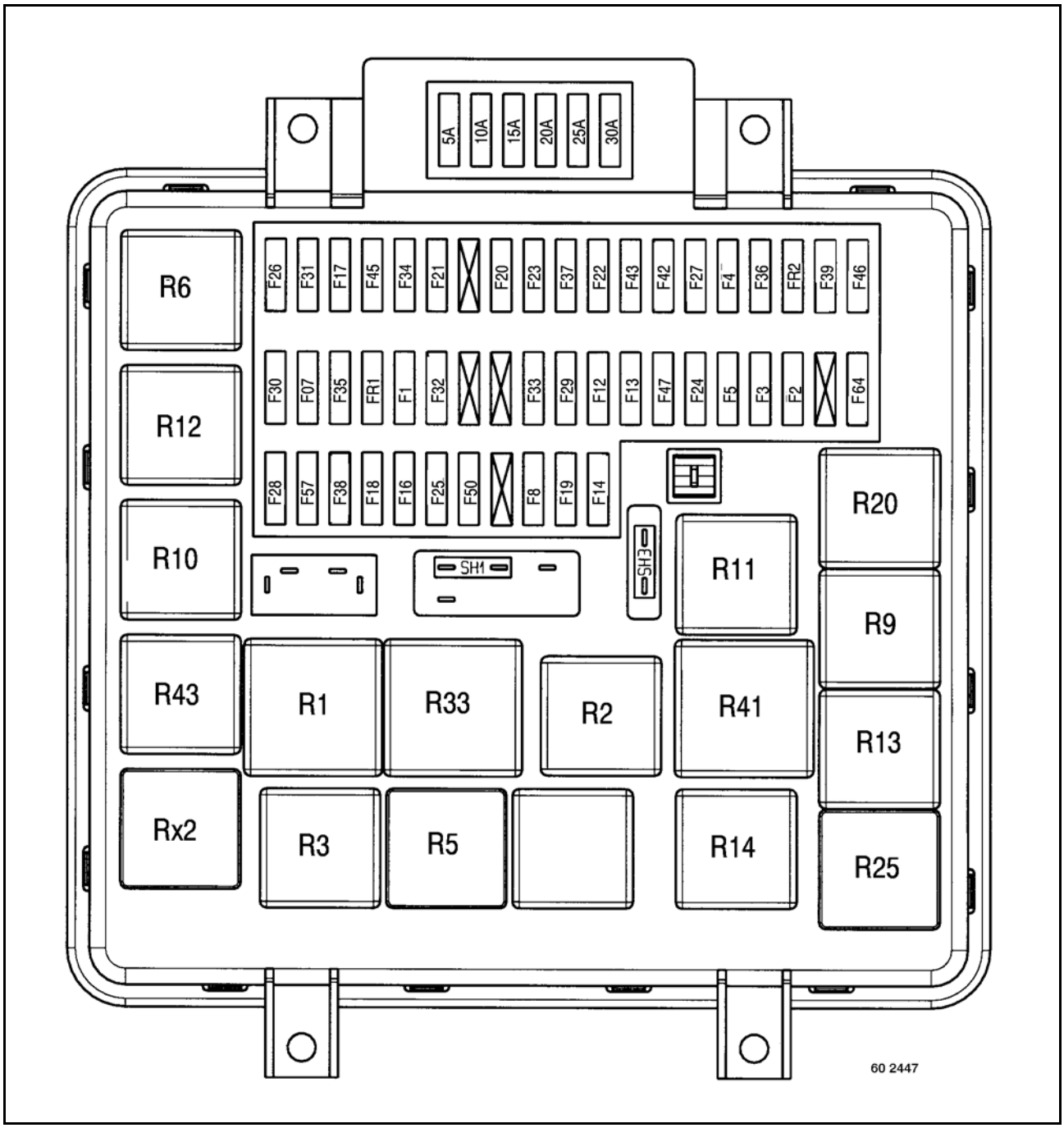
In the event of **head-on**, these systems combined with the seat belt are designed to protect the occupants according to the violence of the impact. There are two possible cases:

1° Only the seat belt provides protection.

2° The pretensioner is triggered to further tauten the seat belt and the airbag inflates, thus deadening the impact suffered by the driver against the steering wheel and by the passenger(s) against the dashboard, then deflates.

Fuses

Airbag fuse



Code N°	Name of function	Fuse item N°	amper-age
9400	Airbag ECU	F64	15

Warnings

General instructions

ANY WORK ON THE AIRBAG SYSTEM SHOULD BE CARRIED OUT BY QUALIFIED PERSONNEL WHO HAVE UNDERGONE SUITABLE TRAINING.

Identification of a vehicle fitted with an airbag
A vehicle equipped with a driver's airbag can be identified by:
- the inscription "Airbag" in the middle of the steering wheel,
- a sticker affixed to the lower corner of the windscreen on the driver's side (if the windscreen is replaced, place the sticker in the same corner of the new windscreen).

Work on the airbag
The RENAULT TRUCKS diagnostics tool serves to check out:
- the ECU,
- the wiring harness,
- the connecting arrangement.

BEFORE CARRYING OUT ANY WORK ON THE AIRBAG SYSTEM, LOCK THE ECU USING THE RENAULT TRUCKS TEST TOOL, DISCONNECT THE BATTERIES AND WAIT FOR 5 MINUTES.

Wiring harness
In the event of discrepancy on the wiring or a connector, it is essential to replace the wiring harness (do not repair it).

ECU
The airbag ECU should not suffer any knocks or distortion and should not be subjected to splashing water. Protect the electrical connections from dust. The mounting surface of the ECU should be clean and free from any foreign matter.
Subsequent to the triggering at least one item in the system, the ECU locks up and illuminates the airbag pictogram. From that time onwards, the ECU cannot be unlocked and must be replaced.

Airbag module and pretensioner
It is forbidden to fit any component that has suffered knocks, distortion or scratching. Take the component out of its packaging at the very last moment before fitting it.
During fitting of the component, do not forget to remove any foreign bodies (screwbolts, clips...) and ensure the connector is properly engaged.
The components of an airbag module or a pretensioner cannot be separated.

DO NOT TAKE ANY READINGS ON THESE SYSTEMS USING A MULTI-METER OR ANY ELECTRICAL MEASURING APPARATUS WHATSOEVER.
DO NOT HANDLE THE PYROTECHNIC DEVICES NEAR A NAKED FLAME OR ANY OTHER HEAT SOURCE.

Instructions to be followed after the airbag and/or pretensioner has/have been set off.
It is essential to replaceIl est impératif de changer:
- the pretensioner (if it has been set off),
- the airbag module (if it has been set off),
- the rotary switch (if the airbag has been set off),
- the seat wiring harness (if the pretensioner has been set off),
- the airbag ECU,
- the seat belt buckle (if the pretensioner has been set off).

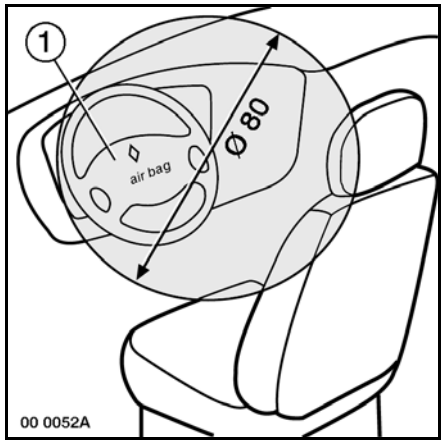
It is vital to keep the airbag ECU and the list of faults recorded on the airbag system after the accident.

Instructions to be followed after an incident involving an airbag system
When returning an airbag electronic box that has been involved in an incident for expert appraisal, it must be accompanied by at least the following information:
- chassis number of vehicle on which the box was fitted,
- state of the connecting arrangement (connector locked or not),
- state of the fastening (tightness of securing bolts),
- context of the incident (place, date, vehicle moving or not),
- state of the warning pictogram prior to the incident,
- names and addresses of the persons to contact.

In the special case where expert appraisal by a supplier is necessary, it is **vital** to not dismount or unplug the box, to not remove the wiring harness and to not detonate live initiator squibs by hand.

Scrapping a vehicle
Before scrapping a vehicle in which the airbag or the pretensioners have not been triggered, it is essential to proceed with their destruction by following the recommended method (see page(s) E-6-7**,** E-6-8).

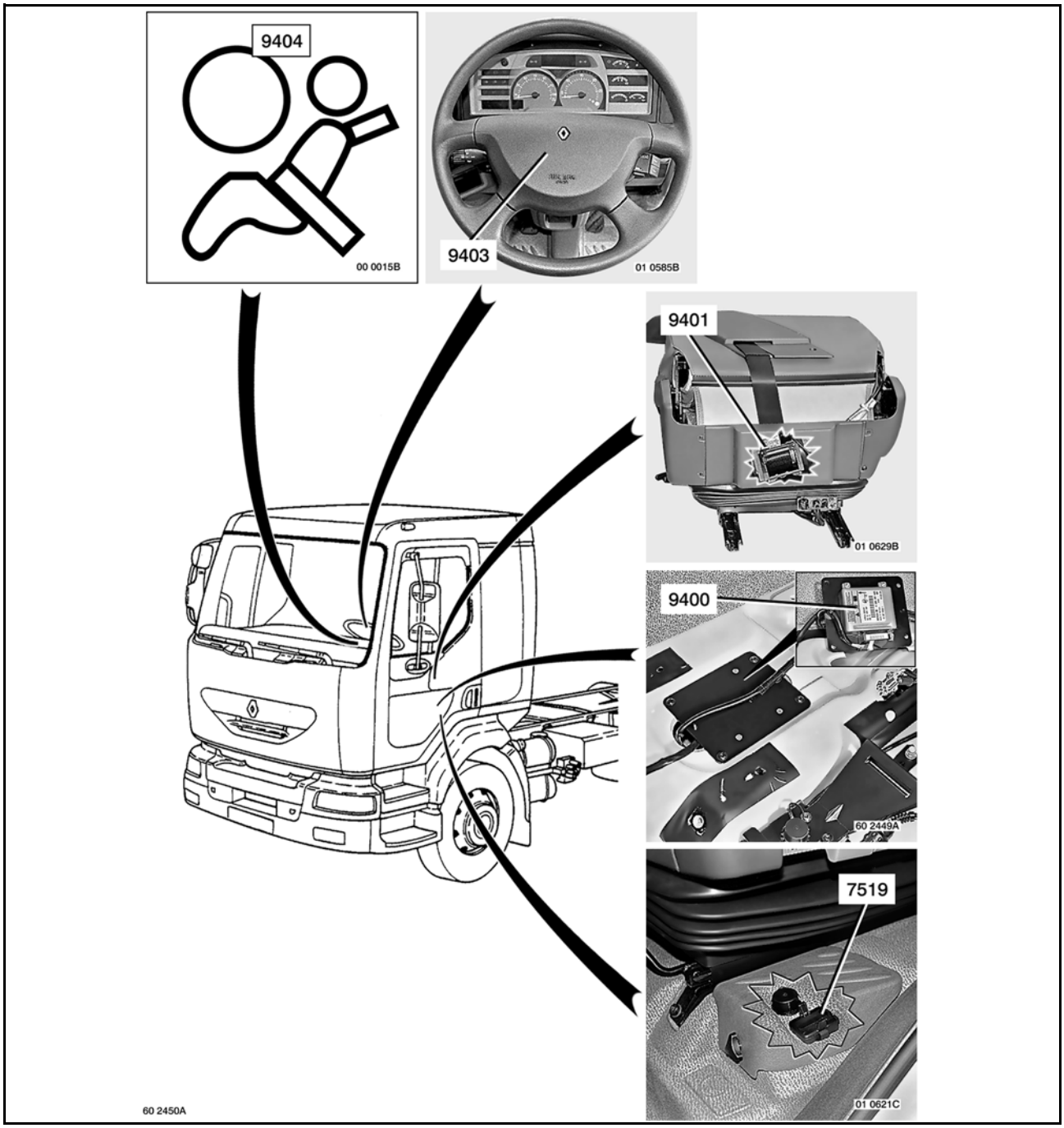
Work on the vehicle (excluding work on airbag) implying precautions to be taken to avoid inadvertent deployment of the airbag
During repair or adaptation work, the vehicle is not to undergo significant knocks (hammer blows...) nor is welding work to be undertaken without previously locking the electronic box using the RENAULT TRUCKS diagnostics tool, disconnecting the batteries and waiting for at least **5** minutes.
No aftermarket electrical accessory should be installed within the close surrounds of an airbag electronic box. (A loudspeaker or any other appliance generating a magnetic field might cause deployment of the airbag).
Before removing the steering wheel, it is essential to unplug the airbag module connector so as to avoid any damage.
In the event of any work requiring uncoupling of the steering box universal joint, the roadwheels must be in the straight-ahead position and the steering wheel must be immobilized, in order to keep to the mid-point of the rotary switch.
No other electrical consumer should use the airbag electronic box fastening points as earth points.
Non-observance of these instructions might cause malfunction or even inadvertent deployment of the airbag.



- **If the seat designed for the airbag system has to be changed, it must be replaced by a seat identical to the one originally fitted.**
- **The airbag module protective cover must be free from any article (ledge, clock, adhesive, various accessories...).**
- **There should be no objects within the airbag deployment area (∅dia. 80 cm).**
- **Get the airbag system checked out in the case of accident or if there has been attempted theft of or from the vehicle and at the time of second-hand resale of the vehicle.**
- **For safety reasons, replace the airbag and the pretensioner every 15 years.**
- **If water is splashed onto or gets into the electronic box, replace it.**
- **Any significant modification to the suspension or the front end of the vehicle or any overloading of the vehicle may lead to inadvertent detonation of the airbag igniter squib.**
- **Do not drive a vehicle in which the airbag system has been activated and whose bag is still left on the steering wheel. Get the vehicle towed.**
- **It is forbidden to install a bull-bar or forward winch on a vehicle equipped with an airbag.**

Layout of appliances

Layout of appliances in cab



Code N°	Name of function
7519	Diagnostics socket
9400	Airbag ECU
9401	Driver's seat belt pretensioner
9403	Airbag rotary switch
9404	Airbag test and fault "Information" warning lamp

Diagnostics

Aid-to-troubleshooting

Faults can be viewed visualized using the RENAULT TRUCKS diagnostics tool plugged into the vehicle diagnostic socket.

DO NOT MAKE ANY READINGS ON THESE SYSTEMS USING A MULTI-METER OR ANY ELECTRICAL MEASURING INSTRUMENT WHATSOEVER AS THERE IS A RISK OF TRIGGERING INADVERTENT DEPLOYMENT OF THE AIRBAG DUE TO THE OPERATING CURRENT OF SUCH INSTRUMENTS.
BEFORE WORKING ON THE AIRBAG SYSTEM, DISCONNECT THE BATTERIES AND WAIT FOR 5 MINUTES.

To obtain more accurate diagnostics, use an inert igniter squib. Tool **2886**
Disconnect the batteries and wait for **5** minutes.
Connect the inert igniter squib to the airbag wiring harness in the place of the module or pretensioner of the line concerned.
Reconnect the batteries and switch the ignition back on.
If the fault is no longer present, it originates from the module or the pretensioner.
If the fault is still present, it originates from the line.
The lines includelignes:
- airbag: main wiring harness + rotary switch,
- pretensioner: main wiring harness + seat wiring harness.

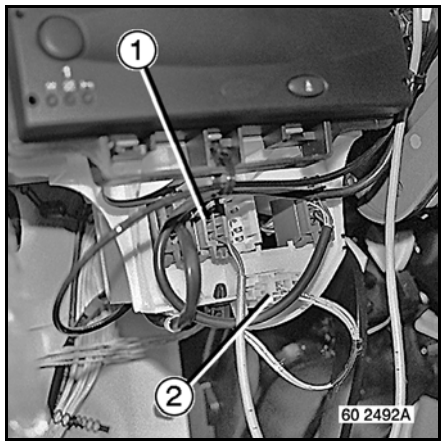
The seat wiring harness and the rotary switch cannot be tested directly as they contain a capacitive component.
If the fault does not originate from the airbag module or the pretensioner and the continuity of the main wiring harness is in order, it may be deduced that the fault originates from the rotary switch or the seat wiring harness.

Testing the wiring harness
The wiring harness and the rotary switch can be tested using a multi-meter if they are completely disconnected from the other components including the rotary switch and the pretensioners wiring harness.

Airbag line
- Main wiring harness continuity:
  - wire **(0053)**,
  - wire **(0054)**.
- Dashboard wiring harness continuity:
  - blue wire,
  - brown wire.

Pretensioner line
- Main wiring harness continuity:
  - wire **(0051)**,
  - wire **(0052)**.
- Dashboard connecting arrangement:
  - grey connector **(1)** → line air bag,
  - white connector **(2)** → power supply, diagnostics, airbag warning light.

Some connectors short-circuit when they are unplugged in order to avoid any risk of inadvertent deployment of the airbag.



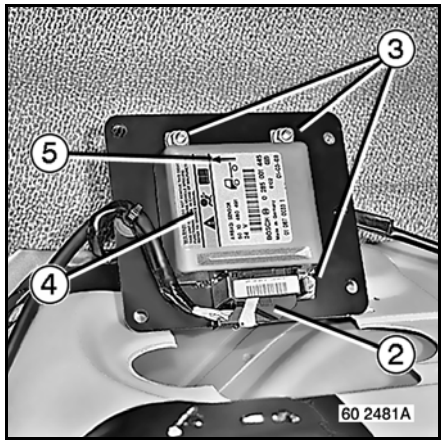
After the work, erase the fault codes using the RENAULT TRUCKS diagnostics tool.

Removal / Fitting

Airbag ECU

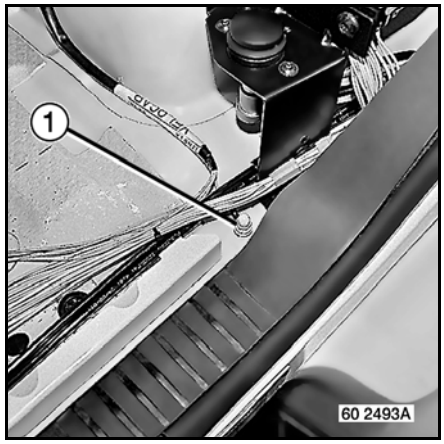
BEFORE CARRYING OUT ANY WORK ON THE AIRBAG SYSTEM, LOCK THE ECU USING THE RENAULT TRUCKS TEST TOOL, DISCONNECT THE BATTERIES AND WAIT FOR 5 MINUTES.

Removal
Remove the driver's seat.
Depending on the vehicle's equipment
Drain the compressed air circuits through the air tanks.
Disconnect air pipe.
Unplug the heated seat and pretensioner.
Unplug the seat wiring harness connector.
Remove bracket **(1)**.
Unplug connector **(2)**.
Remove bolts **(3)**.
Remove airbag ECU **(4)**.



Fitting
Fit airbag ECU **(4)**, arrow **(5)** pointing towards the front of the vehicle.
To fit, proceed in the reverse sequence to removal.
Tighten to torque.
Check that the ECU connector is locked.
Plug in the seat wiring harness connector.

Testing:
Turn the ignition key to the 'ignition' position.
Get out of the cab and make arrangements to forbid access.
Reconnect the batteries and switch the ignition back on.
After **10** seconds, airbag warning pictogram **(G24)** should be extinguished.



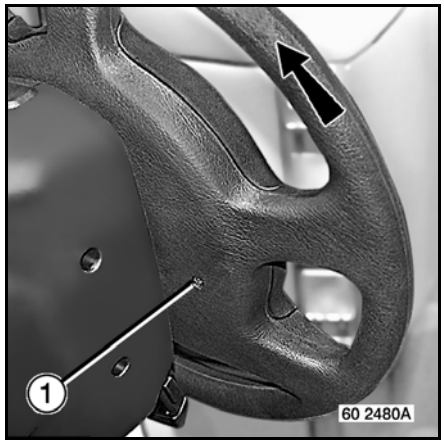
*The earth **(1)** for the electronic box is located on the cab floor.*

IF THE AIRBAG AND/OR THE PRETENSIONER HAVE BEEN SET OFF, IT IS ESSENTIAL TO REPLACE THE AIRBAG ELECTRONIC BOX WITHOUT FAIL.
IT LOCKS AUTOMATICALLY AND CANNOT BE UNLOCKED (SOME COMPONENTS LOSE THEIR RATED CHARACTERISTICS AFTER THE DETONATION ENERGY HAS PASSED THROUGH.

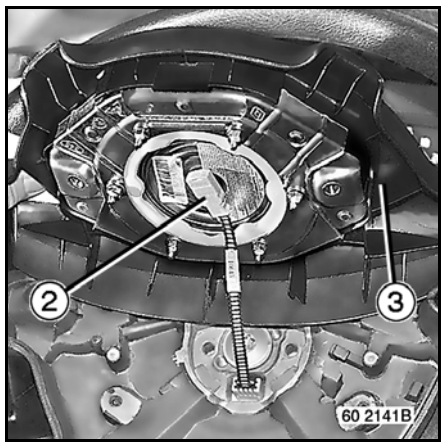
Driver's airbag module

BEFORE CARRYING OUT ANY WORK ON THE AIRBAG SYSTEM, DISCONNECT THE BATTERIES AND WAIT FOR 5 MINUTES.
MOVE THE ROADWHEELS TO THE STRAIGHT-AHEAD POSITION.
THE COMPONENTS OF AN AIRBAG MODULE CANNOT BE SEPARATED.
DO NOT HANDLE THE PYROTECHNIC DEVICES CLOSE TO A NAKED FLAME OR ANY SOURCE OF HEAT AS THERE IS A RISK OF TRIGGERING OFF THE AIRBAG DEPLOYMENT SYSTEM.
DO NOT MAKE READINGS ON THESE SYSTEMS USING A MULTIMETER OR ANY ELECTRICAL MEASURING INSTRUMENT WHATSOEVER AS THERE IS A RISK OF TRIGGERING INADVERTENT DEPLOYMENT OF THE AIRBAG DUE TO THE OPERATING CURRENT OF SUCH INSTRUMENTS.

Removal
Move the roadwheels to the straight-ahead position.
Turn the steering wheel slightly.
Remove bolts **(1)**.
Move the roadwheels back to the straight-ahead position.



Unplug connector **(2)**.
Remove the airbag module **(3)**.



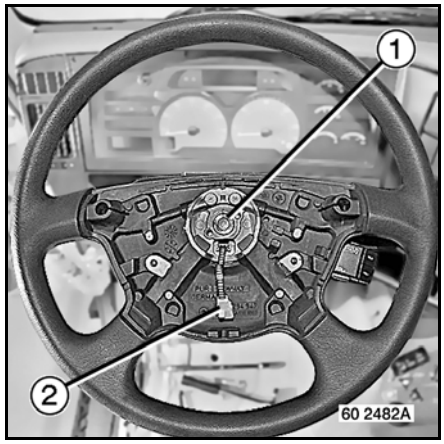
Fitting
Put airbag module **(3)** back into place.
Plug in connector **(2)**.
(tight clip fit).
Tighten bolts **(1)**.
If you change the bolts **(1)**, replace them with original bolts of the same length.
Tighten to torque.

Testing:
Turn the ignition key to the 'ignition' position.
Get out of the cab and make arrangements to forbid access.
Reconnect the batteries and switch the ignition back on.
After **10** seconds, airbag warning pictogram **(G24)** should be extinguished.

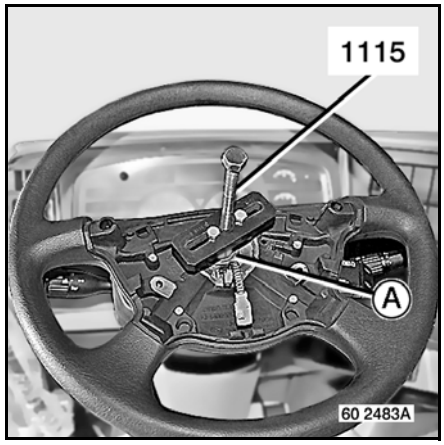
Rotary switch

BEFORE CARRYING OUT ANY WORK ON THE AIRBAG SYSTEM, LOCK THE ECU USING THE RENAULT TRUCKS TEST TOOL, DISCONNECT THE BATTERIES AND WAIT FOR 5 MINUTES.
MOVE THE ROADWHEELS TO THE STRAIGHT-AHEAD POSITION.

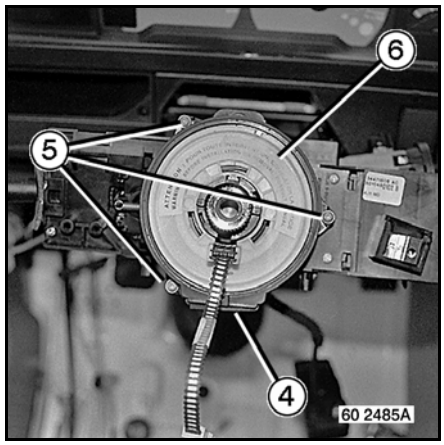
Removal
Remove the airbag module.
See pages E-6-2.
Do not bend or damage connector **(2)**.
Ensure that the roadwheels are still in the straight-ahead position.
Remove bolt **(1)**.
Remove the steering wheel.



Use a bolt **(A = M12x1.75x20)**.
Use tool **1115**.
When the steering wheel is removed, a device immobilizes the rotary switch.
Remove the steering column trim.

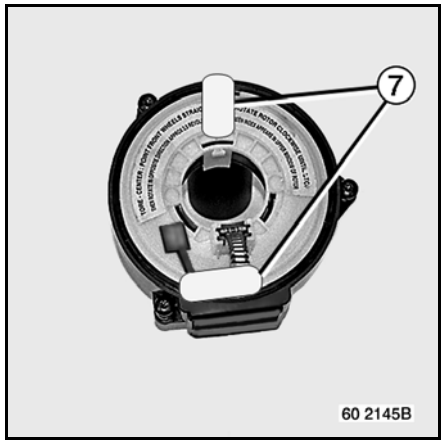


Retain rotary switch against motion with a piece of adhesive tape.
Unplug connector **(4)**.
Remove bolts **(5)**.
Remove rotary switch **(6)**.

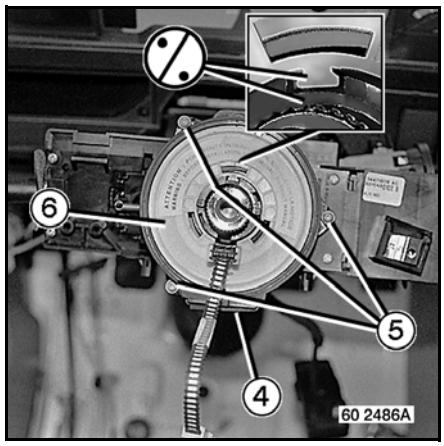


Fitting
Fitting a new rotary switch.

DO NOT BEND OR DAMAGE THE CONNECTOR.
THE NEW ROTARY SWITCH IS SUPPLIED HELD IN THE CENTRED POSITION BY A LABEL (7) THAT IS TORN OFF THE FIRST TIME THE STEERING WHEEL IS TURNED.
CHECK THAT THE ROTARY SWITCH IS STILL IMMOBILIZED PRIOR TO ASSEMBLY. (IF THIS IS NOT THE CASE, SEE "FINDING THE MID-POINT").
ASSEMBLY MUST BE CARRIED OUT WITH THE ROADWHEELS IN THE STRAIGHT-AHEAD POSITION.
IF THESE INSTRUCTIONS ARE NOT OBEYED, IT MAY LEAD TO MALFUNCTION OR EVEN PREMATURE DETONATION OF THE AIRBAG SQUIB.

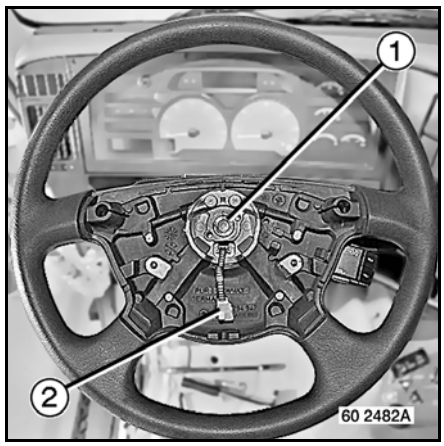


Fit rotary switch **(6)**.
Keep in the mid-point position.
The lug of the rotary switch should be properly engaged in the steering column.
Tighten bolts **(5)**.
Tighten to torque.
Plug in connector **(4)**.
Fit the steering column trim.



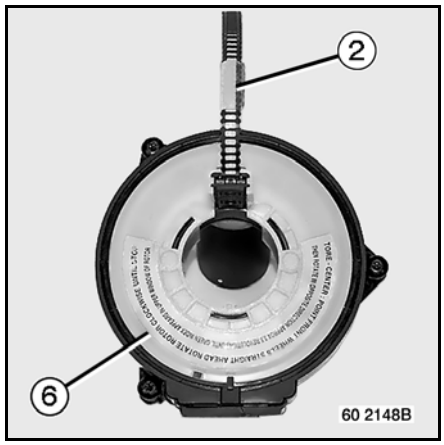
Align and fit the steering wheel.
Replace screwbolt **(1)** without fail.
Fit bolt **(1)**.
Tighten to torque.
Fit the driver's airbag module.
See pages E-6-2.

Testing:
Turn the ignition key to the 'ignition' position.
Get out of the cab and make arrangements to forbid access.
Reconnect the batteries and switch the ignition back on.
After **10** seconds, airbag warning pictogram **(G24)** should be extinguished.

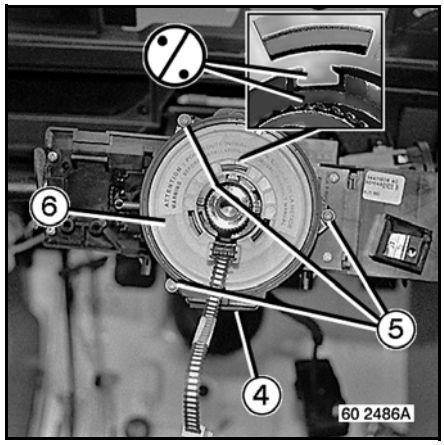


Fitting a re-used rotary switch.

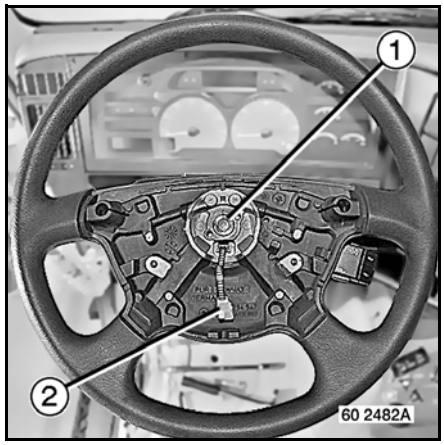
Do not bend or damage connector (2).
Keep the rotary switch in the mid-point position prior to installation (procedure hereafter).



Finding the mid-point
Turn the rotary switch as far as abutment in one direction, without forcing.Mark its position.Turn the rotary switch as far as abutment in the other direction and count the number of turns.
Turn the rotary switch to the mid-point position (by dividing the number of turns by two).
Fit rotary switch **(6)**.
Keep in the mid-point position.
The lug of the rotary switch should be properly engaged in the steering column.
Tighten bolts **(5)**.
Tighten to torque.
Plug in connector **(4)**.
If it is the same rotary switch that has been removed, pull off the adhesive tape.



Align and fit the steering wheel.
Replace screwbolt **(1)** without fail.
Fit bolt **(1)**.
Tighten to torque.
Fit the driver's airbag module.
See pages E-6-2.

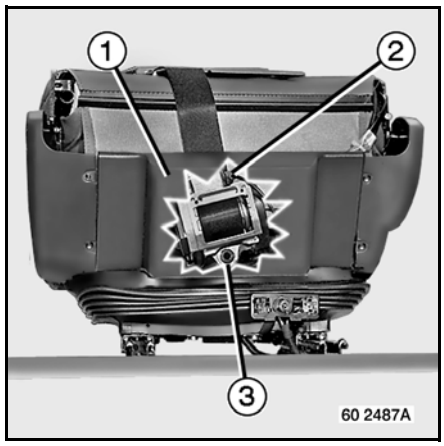


Testing:
Turn the ignition key to the 'ignition' position.
Get out of the cab and make arrangements to forbid access.
Reconnect the batteries and switch the ignition back on.
After **10** seconds, airbag warning pictogram **(G24)** should be extinguished.

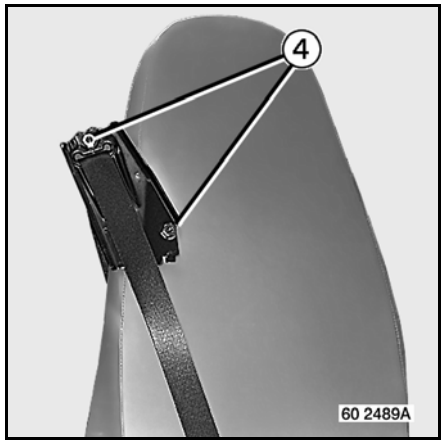
Pretensioner(s)

BEFORE CARRYING OUT ANY WORK ON THE AIRBAG SYSTEM, LOCK THE ECU USING THE RENAULT TRUCKS DIAGNOSTICS TOOL, DISCONNECT THE BATTERIES AND WAIT FOR 5 MINUTES.
THE COMPONENTS OF AN AIRBAG MODULE OR PRETENSIONER CANNOT BE SEPARATED.
DO NOT HANDLE THE PYROTECHNIC DEVICES CLOSE TO A NAKED FLAME OR ANY SOURCE OF HEAT AS THERE IS A RISK OF TRIGGERING OFF THE AIRBAG DEPLOYMENT SYSTEM.
DO NOT MAKE READINGS ON THESE SYSTEMS USING A MULTI-METER OR ANY ELECTRICAL MEASURING INSTRUMENT WHATSOEVER AS THERE IS A RISK OF TRIGGERING INADVERTENT DEPLOYMENT OF THE AIRBAG DUE TO THE OPERATING CURRENT OF SUCH INSTRUMENTS.

Removal
Remove the seat.
Remove the cover **(1)**.
Unplug connector **(2)**.
Remove bolt **(3)**.
Remove the pretensioner.
Remove the seat belt cover behind the seat.
Remove bolts **(4)**.
Remove bolt **(5)**.



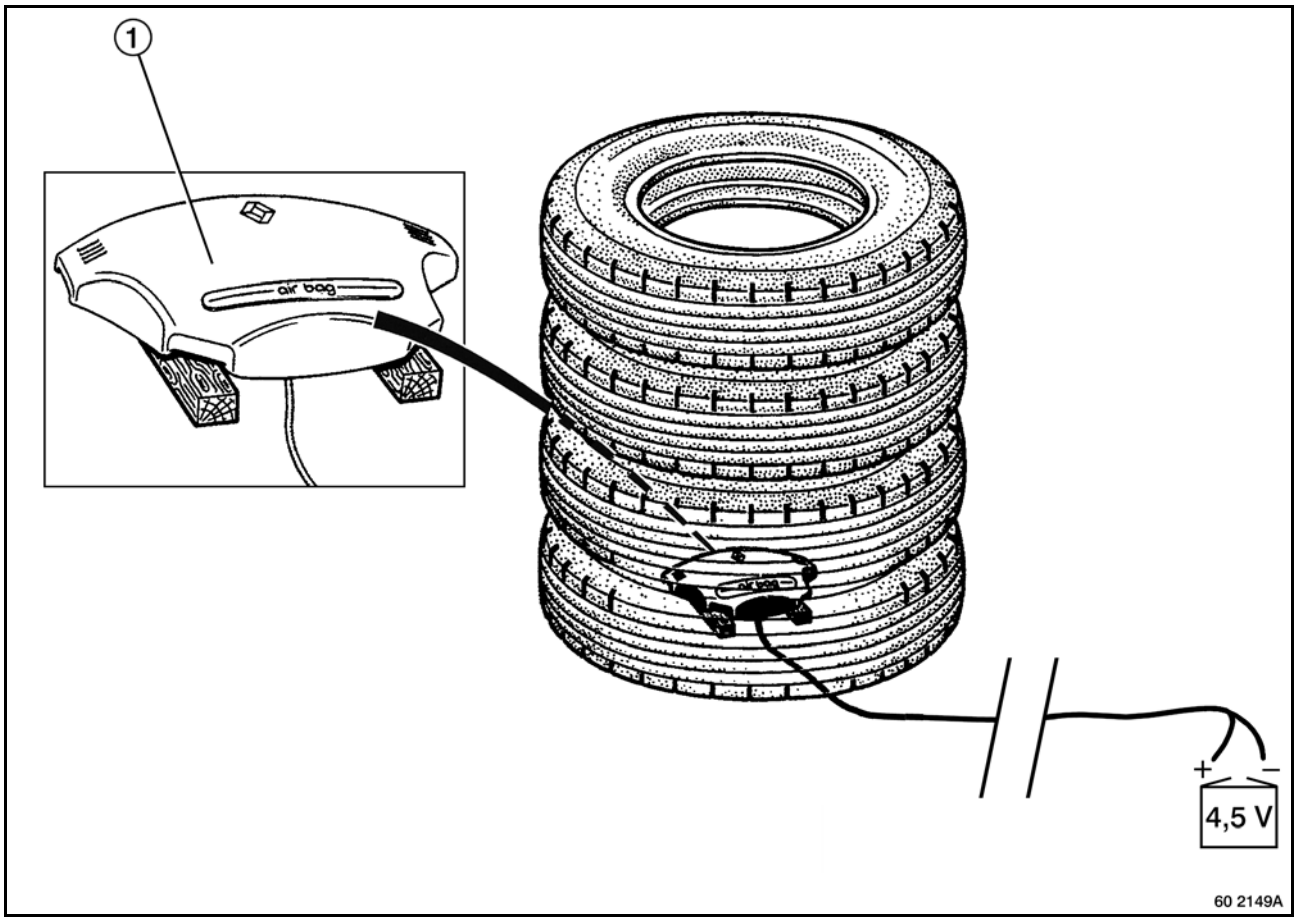
Fitting
Replace screwbolt **(3)** without fail.
Proceed in the reverse sequence to dismantling.
Tighten to torque.
Plug in connector **(2)**.
(tight clip fit).
Match the direction of orientation.



Testing:
Turn the ignition key to the 'ignition' position.
Get out of the cab and make arrangements to forbid access.
Reconnect the batteries and switch the ignition back on.
After **10** seconds, airbag warning pictogram **(G24)** should be extinguished.

AFTER A PRETENSIONER IS TRIGGERED, THE STRAIN EXERTED ON THE BUCKLE IS PASSED ON TO THE INERTIA REEL AND RISKS DAMAGING THE MECHANISM, SO THE SEAT BELT MUST BE REPLACED IF IT WAS ATTACHED AT THE TIME OF TRIGGERING OR IF ANY DOUBT REMAINS ON THE FACTS OF THE MATTER.

Airbag module destruction procedure



This procedure complies with French regulations.
For other countries, refer to the national regulations in force.

This operation must be performed outside the workshop.
To avoid any risk of accident, the pyrotechnic igniter squibs must be detonated before the vehicle or the single component is scrapped.

Method:

1° Connect tool **2886** to the module.
2° Place the module **(1)** on two wooden blocks, with the conductor wires directed downwards to prevent them from getting damaged.
3° Cover the unit over with a stack of four used tyres.
4° Unwind two wires over a distance of about 10 metres so as to be well away from the detonation zone.
5° Ensure there is nobody nearby.
6° Proceed with destruction of the airbag by connecting the two conductor wires to a **4.5** Volt battery (there is no polarity to be observed).

DO NOT TOUCH THE METAL PART AROUND THE CONNECTOR AFTER DESTRUCTION: RISK OF SERIOUS BURNING.
DISCONNECT TOOL 2886 IMMEDIATELY AFTER DESTRUCTION TO PREVENT IT FROM MELTING.

Do not detonate modules and pretensioners that have to be returned under the warranty, as this would make analysis impossible.
It is essential to return the defective part in the original packing for the new part.

Pretensioner destruction procedure

This procedure complies with French regulations.
For other countries, refer to the national regulations in force.

This operation must be performed in the vehicle outside the workshop.

BEFORE CARRYING OUT ANY WORK ON THE AIRBAG SYSTEM, LOCK THE ECU USING THE RENAULT TRUCKS TEST TOOL, DISCONNECT THE BATTERIES AND WAIT FOR 5 MINUTES.

Unplug the connector of the pretensioner to be destroyed.
Method:

1° Connect tool **2886** to the pretensioner.
2° Unwind two wires over a distance of about 10 metres so as to be well away from the detonation zone.
3° Ensure there is nobody nearby.
4° Proceed with destruction of the pretensioner by connecting the two conductor wires to a **4.5** Volt battery (there is no polarity to be observed).

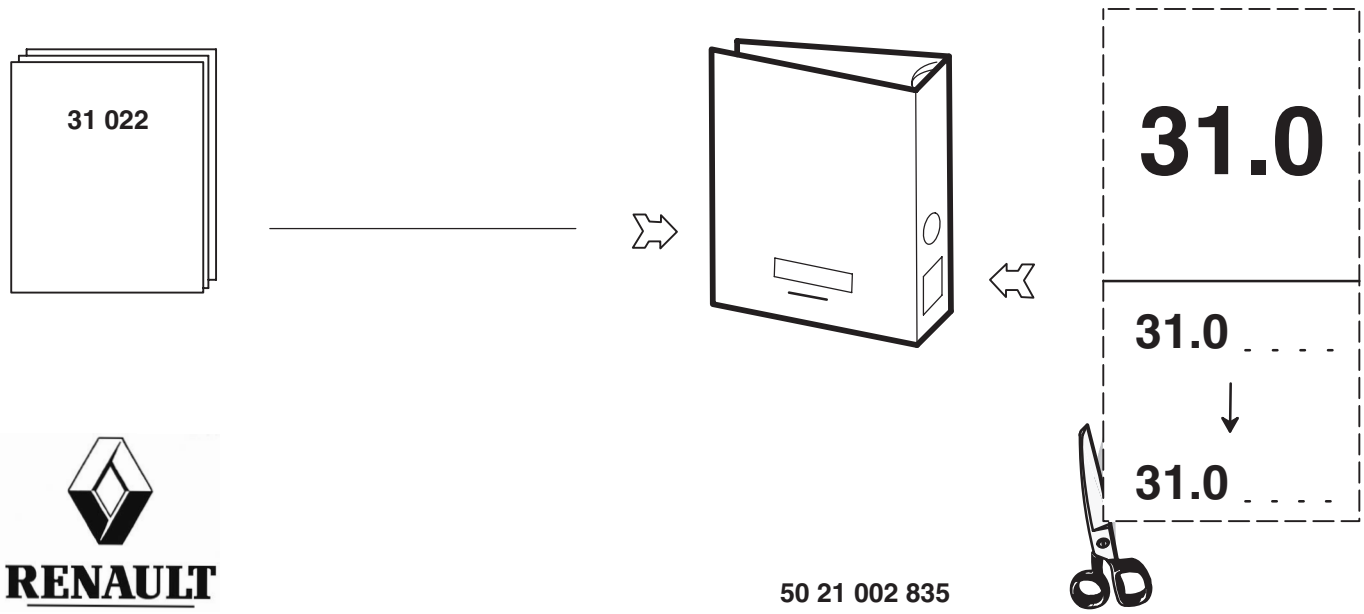
Do not detonate modules and pretensioners that have to be returned under the warranty, as this would make analysis impossible.
It is essential to return the defective part in the original packing for the new part.

31 022 – AN – 09.2001

CLUTCH

CLUTCH	VEHICLE
310 DTR 350 DTR MFZ 395 362 DBE 395 DBE	RENAULT MIDLUM

NOTE
The above information may change in the course of time.
Only the “Consult” section of the workshop manuals repertory in standard N° 10320 serves as reference.



RENAULT

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C	Clutch mechanism	C1 → C3
D	Engine flywheel	D1 → D4
E	Operating fork	E1 → E3
F	Clutch master cylinder	F1 → F3
G	Clutch slave cylinder	G1 → G3
H	Lining wear indicator	H1 → H3
I	Tools	I1 → I2

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CONVENTIONAL SYMBOLS

Tighten at indicated torque (Nm) (right–hand thread)

Tighten by the indicated value

Weight in kg (e.g.: 275 kg)

Smear (see “Consumables” table)

Dimension to be assured (mm)

Danger for persons, the vehicle or the equipment

Correct

Incorrect

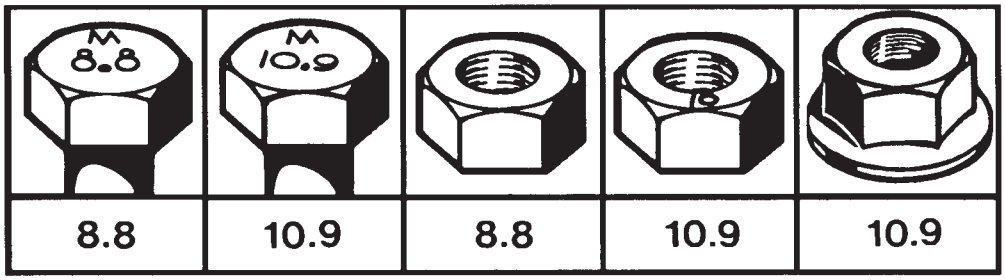
Operation with sequence number

Part to be replaced

Inspect – Check the condition of parts

Force to be exerted in direction of arrow (hammer–press)

SPECIFICATIONS



21 0122

Tightening torques
There are several types of tightening:
– Tightening to torque (in **Nm**)
– Tightening to angle (in °)
– Tightening to torque–angle (in **Nm +** °).

Torques given in Nm are nominal torques (average value calculated on the basis of the minimum torque and the maximum torque).
The tightening accuracy class defines the tolerance of this torque in percent as a function of the nominal torque applied.

Tightening accuracy classes:
– **Class I** : Special threaded hardware (tolerances variable depending on assembly).
– **Class II** : Reserved for precise tightening (tolerance ± 10% of the nominal torque).
– **Class III** : Reserved for normal standard tightening (tolerance ± 20% of the nominal torque).

For standard threaded hardware indicated in the table below, use tightening class **III**.

For other torques, see page **A4** → **A8**.

Tightening torques for conventional nut and bolt hardware to "METRIC system" standard 01.504.002		
Ø and pitch of nuts and bolts (in mm)	**Quality class 8.8**	**Quality class 10.9**
	Tightening class III (± 20%)	**Tightening class III (± 20%)**
6 x 1.00	7.4	10.8
7 x 1.00	12.1	17.8
8 x 1.00	19.2	28.2
8 x 1.25	17.9	26.3
10 x 1.00	39.4	58
10 x 1.25	37.4	55
10 x 1.50	35.4	52
12 x 1.25	67	98
12 x 1.50	64	94
12 x 1.75	61	90
14 x 1.50	105	155
14 x 2.00	98	143
16 x 1.50	161	237
16 x 2.00	151	222
18 x 1.50	235	346
18 x 2.50	210	308
20 x 1.50	328	481
20 x 2.50	296	435
22 x 1.50	444	652
22 x 2.50	406	596

Consumables

Fastening, locking and sealing products	
Industrial reference	**Automotive reference**
Loctite 542	LT 542 Oil sealing

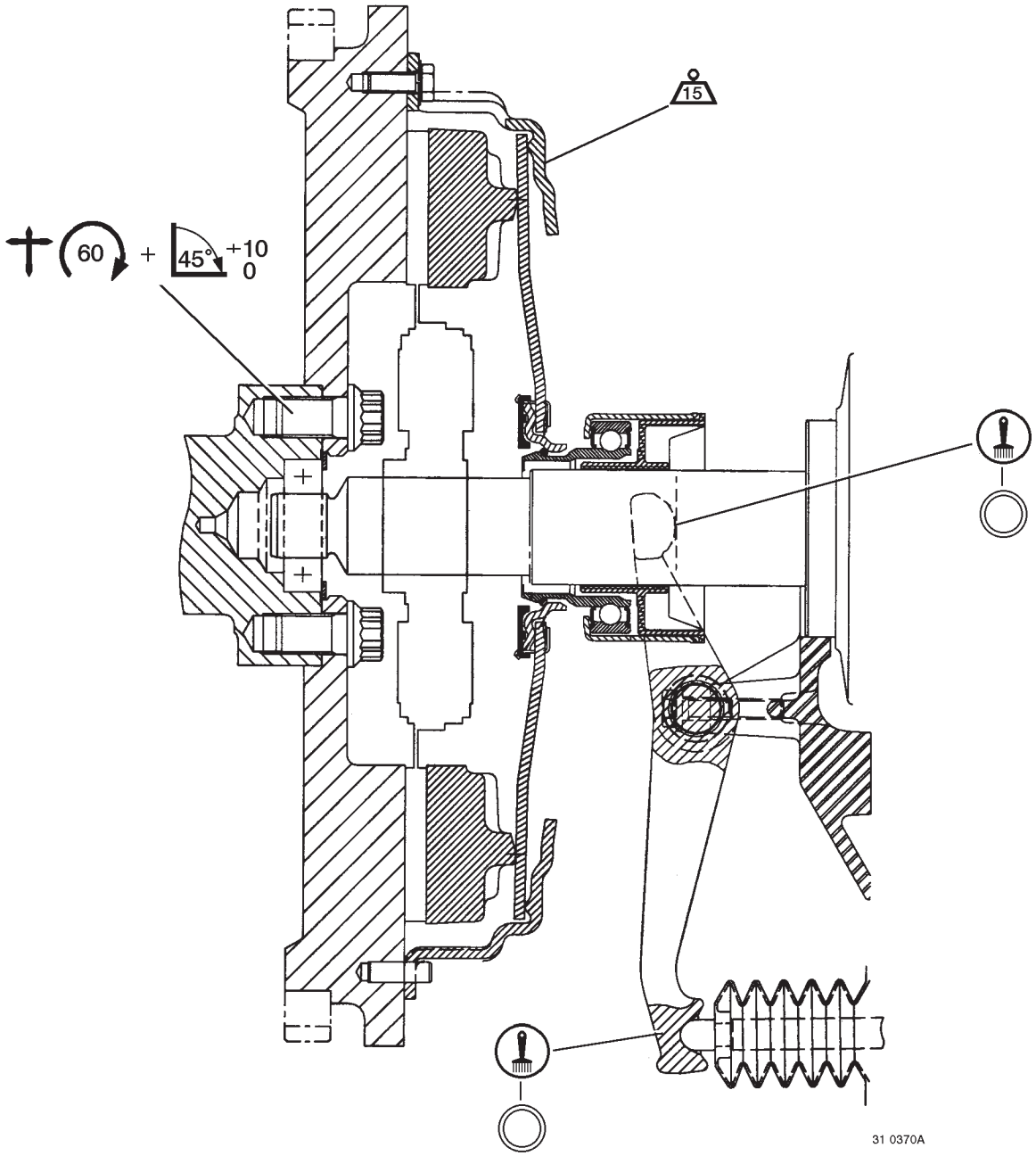
Oils

RENAULT V.I. recommend Huiles Renault Diesel

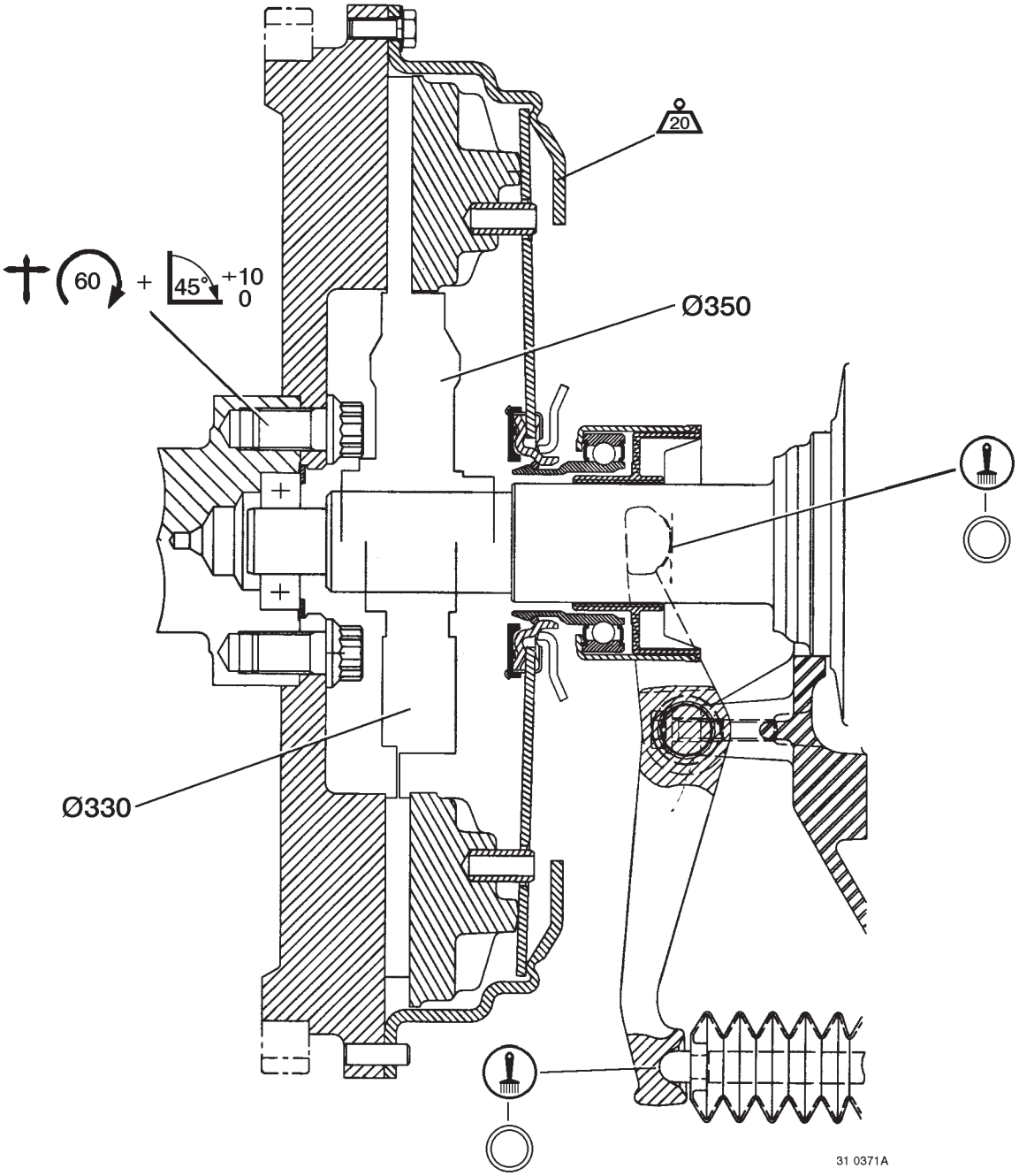
Circuit	Huiles Renault Diesel	Standards
Hydraulic clutch circuit	Fluid FE4	SAE J 1703F / DOT4

Grease

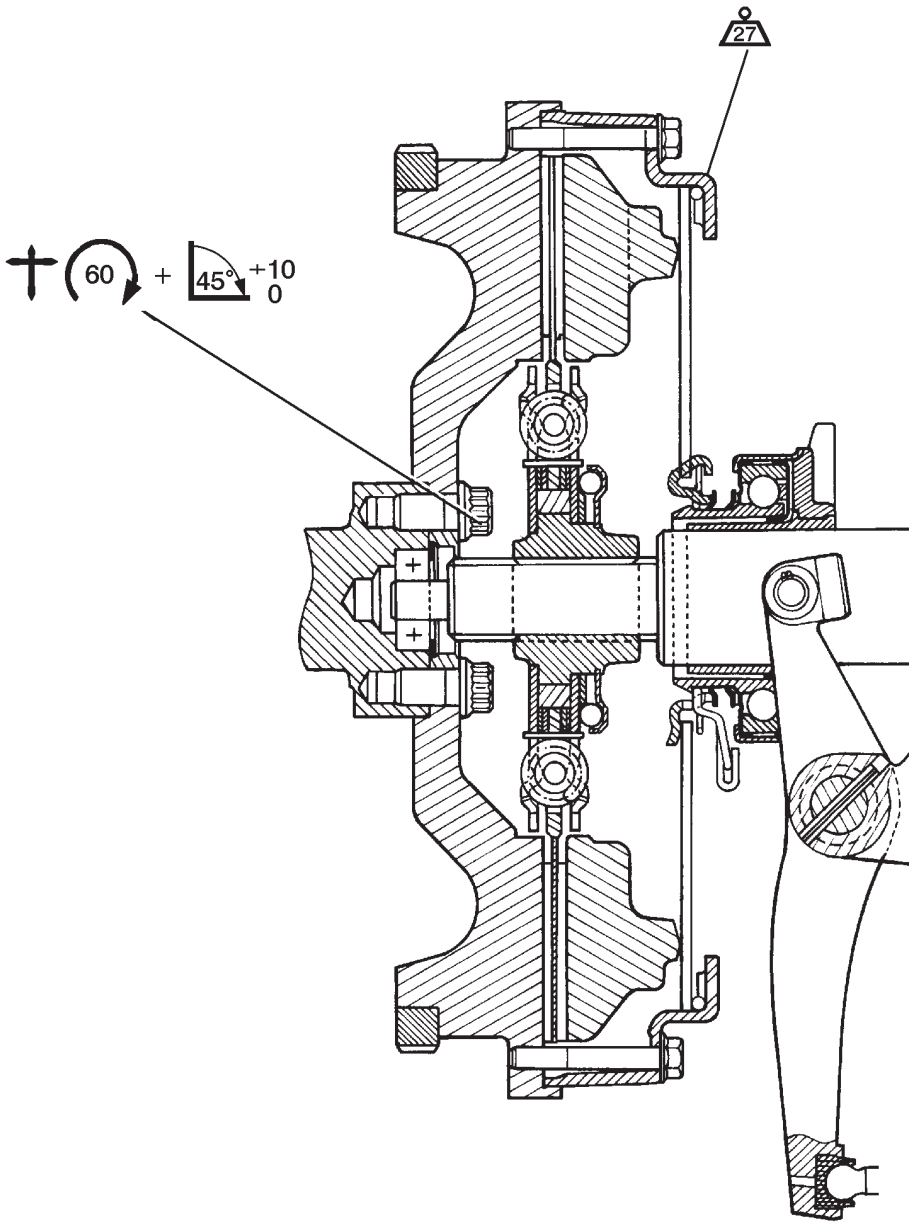
..... RAM ..... NLGI 2 grease – lithium soap molybdenum bisulphide



Engine	Clutch			Gearbox
MIDR 06.02.26 MIDR 04.02.26	310 DTR			EATON 4106 ZF S5 42
Engine flywheel (see pages)	**Mechanism** (see pages)	**Thrust bearing** (see pages)	**Control system** (see pages)	**Operating fork** (see pages)
D1 → D3	C1 → C3	B1 → B3	F1 → F2 G1 → G2	–

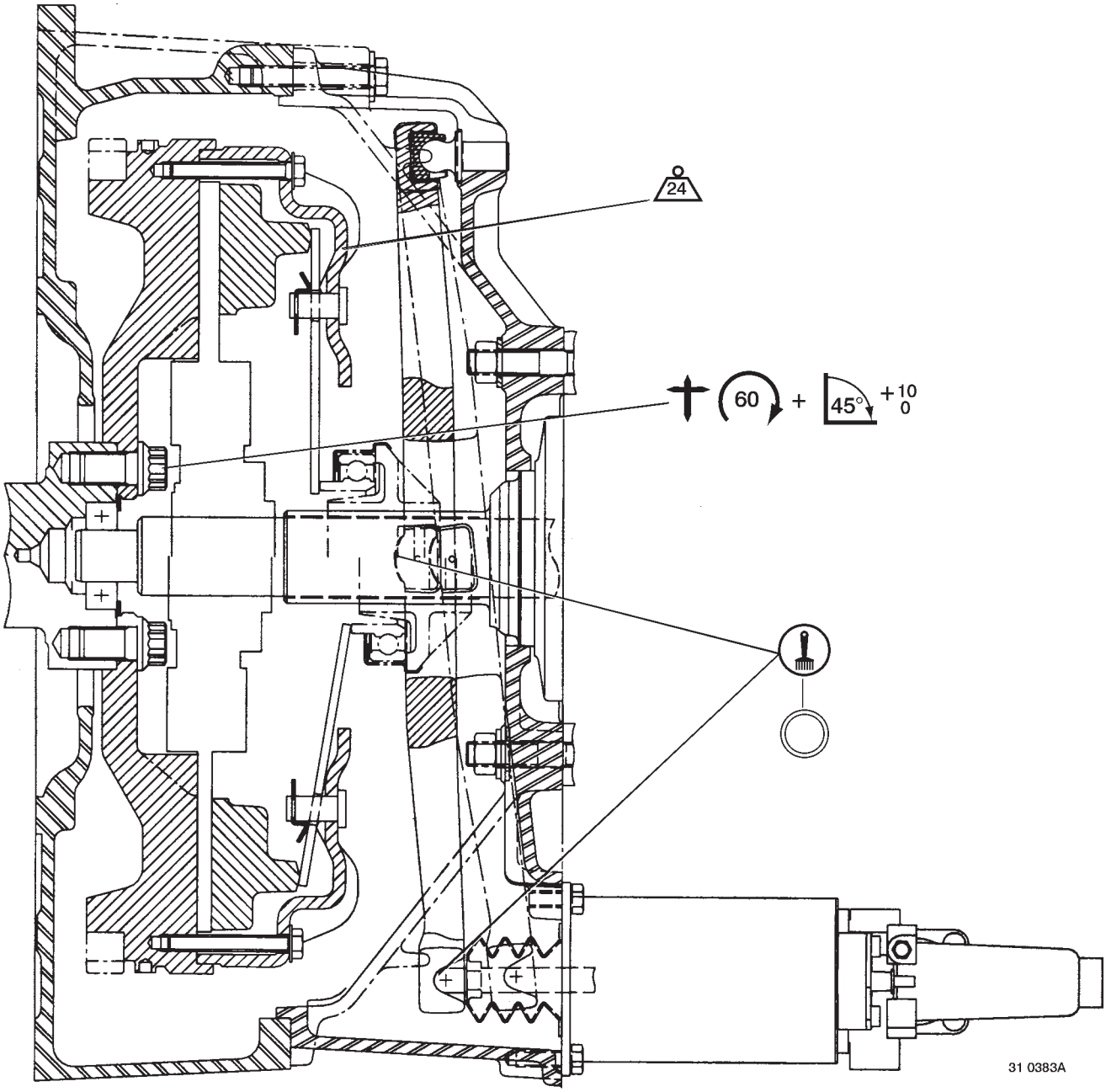


Engine	Clutch			Gearbox
MIDR 06.02.26 MIDR 04.02.26	350 DTR			EATON 4106 ZF S5 42
Engine flywheel (see pages)	**Mechanism** (see pages)	**Thrust bearing** (see pages)	**Control system** (see pages)	**Operating fork** (see pages)
D1 → D3	C1 → C3	B1 → B3	F1 → F2 G1 → G2	–

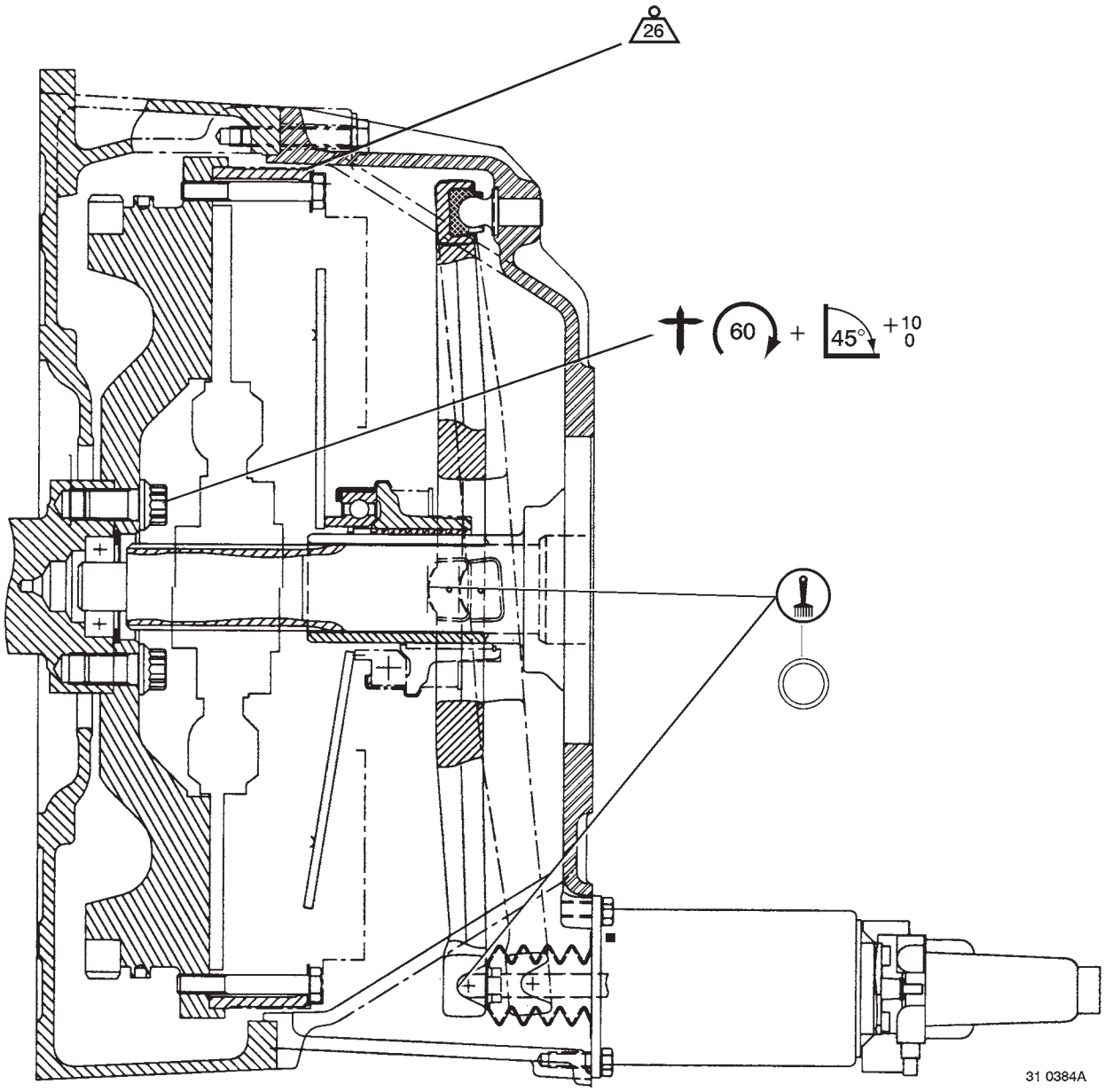


31 0319B

Engine	Clutch			Gearbox
MIDR 06.02.26	F & S MFZ 395			EATON 8209
Engine flywheel (see pages)	**Mechanism** (see pages)	**Thrust bearing** (see pages)	**Control system** (see pages)	**Operating fork** (see pages)
D1 → D3	C1 → C3	B1 → B3	F1 → F2 G1 → G2 H1 → H2	E1 → E2



Engine	Clutch			Gearbox
DCI 4 DCI 6	362 DBE			ZF S5 42 EATON 4106 / 5206
Engine flywheel (see pages)	**Mechanism** (see pages)	**Thrust bearing** (see pages)	**Control system** (see pages)	**Operating fork** (see pages)
D1 → D3	C1 → C3	B4	F1/F3 G1/G3 H1/H3	E3



Engine	Clutch			Gearbox
DCI 6	395 DBE			EATON 6406 / 8309
Engine flywheel (see pages)	**Mechanism** (see pages)	**Thrust bearing** (see pages)	**Control system** (see pages)	**Operating fork** (see pages)
D1 → D3	C1 → C3	B4	F1/F3 G1/G3 H1/H3	E3

RELEASE THRUST BEARING

Clutch 310 DTR / 350DTR / 395 MFZ

Gearbox
ZF S5 42
EATON 4106 / EATON 8209

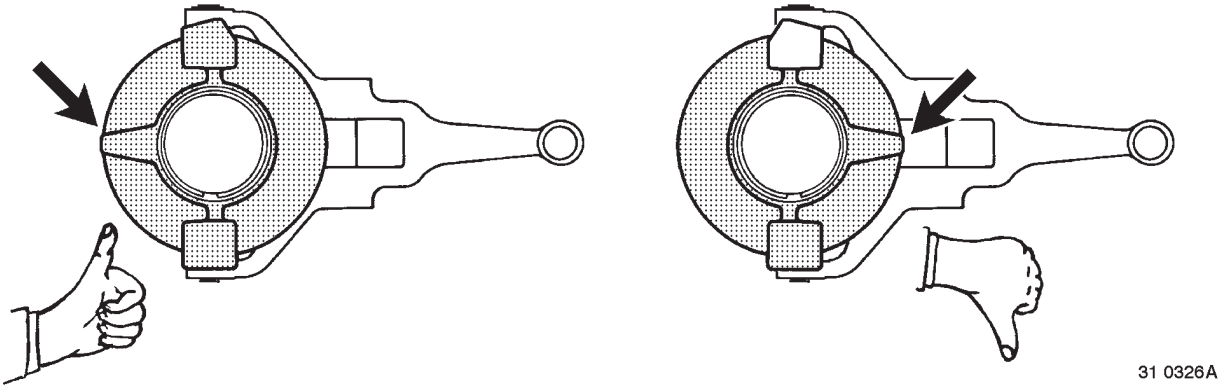
Removal

The release thrust bearing retaining ring is opened out after the gearbox has been removed.
The release thrust bearing remains on the mechanism.
Withdraw the release thrust bearing. There are three possible assemblies (see page **B3**). Respect the sequence of operations.

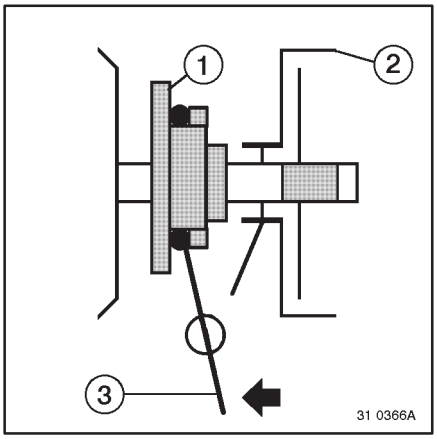
Fitting

Remove dust from the bearing–carrier and from the release thrust bearing.
Do not use any degreasing product.
Install the thrust bearing to the bearing–carrier.

WARNING
The release bearing thrust ring is made from plastic. Upon assembly, do not grease either the thrust ring or the thrust bearing–carrier.

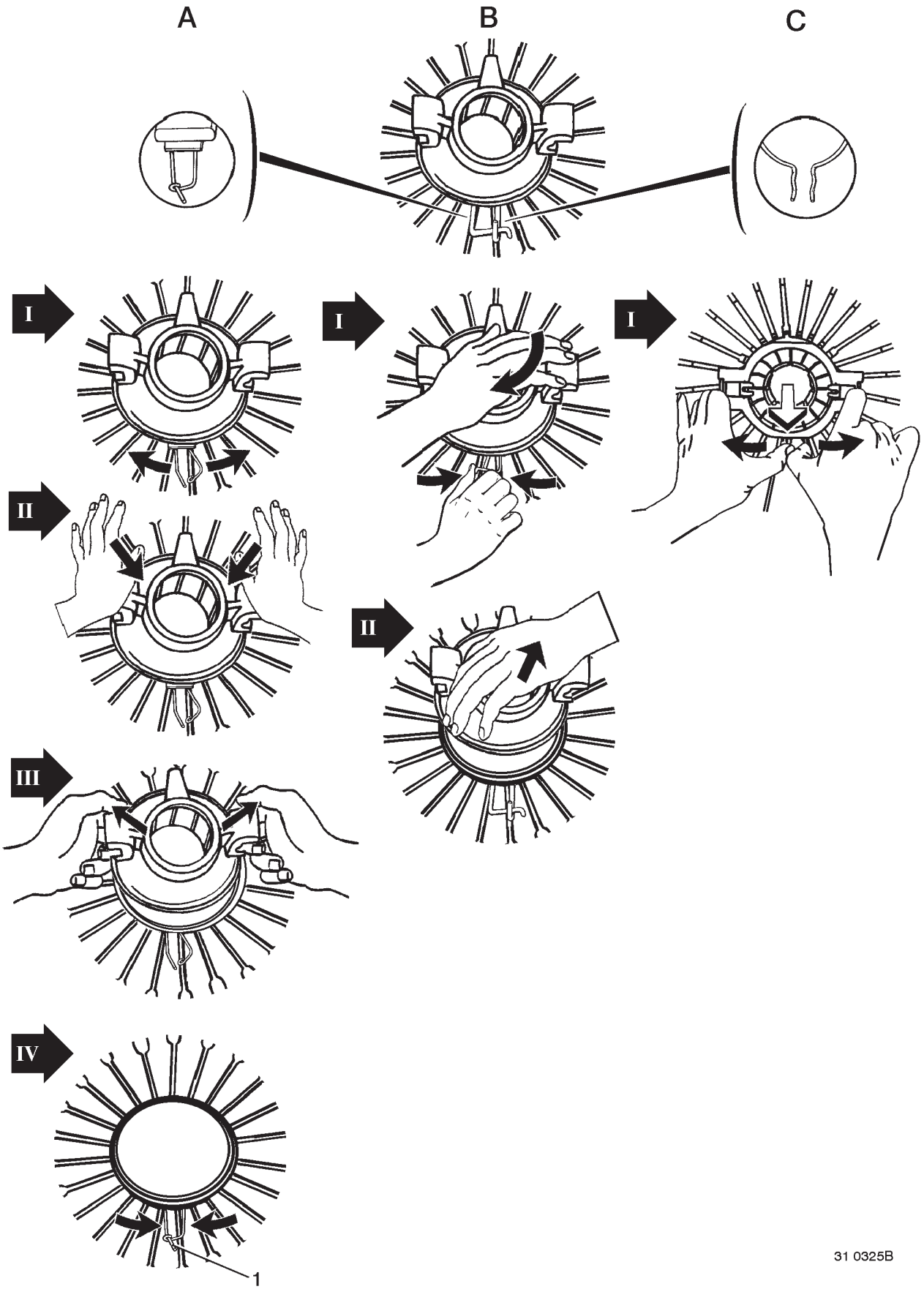


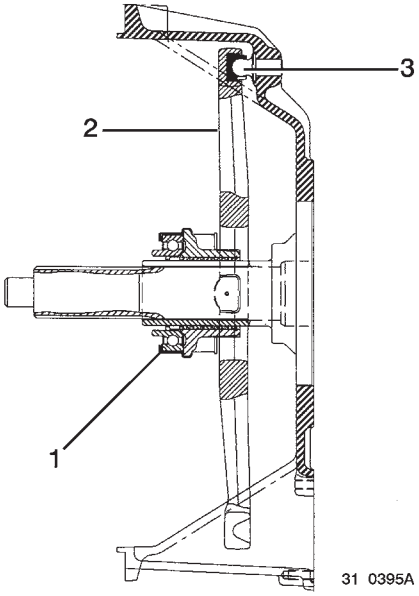
Assembly
Depending on the assembly.
Close the retaining ring (**1**).
Respect the orientation.
See page(s) **B3**.



Fit the gearbox.
Move the operating fork (**3**) rearwards to lock the release thrust bearing (**1**) to the clutch mechanism (**2**).

Move the operating fork (**3**) forwards to check correct locking of the release thrust bearing (**1**).


A
B
C
I
I
I
II
II
III
IV
1
31 0325B



Clutch VALEO 362 DBE / 395 DBE

Gearbox
ZF S5 42
EATON 4106 / 5206 / 6406 / 8309

Removal

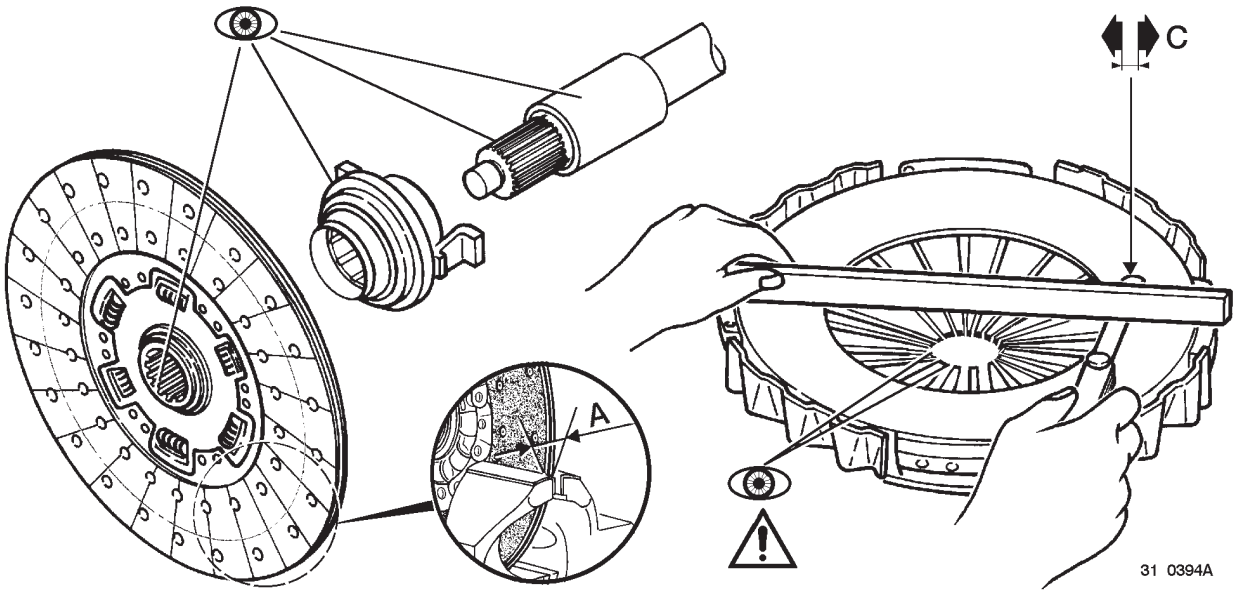
To remove the release thrust bearing (**1**), dislodge the operating fork (**2**) from the ball–joint (**3**).

Fitting

Check the wear of the ball–joint (**3**).
Remove dust from the bearing–carrier and from the release thrust bearing.
Do not use any degreasing product.
Grease the fork and thrust bearing supports.
For fitting, proceed in the reverse sequence to removal.

WARNING
The release bearing thrust ring is made from plastic. Upon assembly, do not grease either the thrust ring or the thrust bearing–carrier.

CLUTCH MECHANISM



Removal

Loosen the screws securing the mechanism progressively and in diametrically opposed sequence to avoid placing any strain on the clutch.
Remove the clutch mechanism.

Inspection

Checking the clutch plate

– Replace any clutch plates with broken, torn, burnt or greasy linings.
– Check the lining wear.
– Check the condition of the hub and gearbox shaft splines.
– With damped centre plates, check the condition of the springs.

Depending on the assembly.

To inspect the mechanism

– Check that the pressure plate is free from cracks.
– Check the taper.
– Check the wear on the diaphragm spring fingers.
– Check that the connecting straps are neither blued, distorted or torn apart.
– Check the snap ring retaining the thrust bearing for wear and distortion.

To inspect the thrust release bearing

– Check that the thrust bearing is not seized.
– Check the contact surface of the snap ring.
– Check the condition of the spring washers.

NEVER SOAK THE BEARING IN, NOR SPRAY IT WITH DEGREASING PRODUCTS.

To inspect the thrust bearing carrier

– If the thrust bearing carrier presents signs of wear or seizure, replace it.

Mechanism	Lining thickness min. dimension A (mm)	Pressure plate Taper C (mm)
310 DTR	6	–
350 DTR	6.4	0.7
362 DBE	7	0.7
395 MFZ/DBE	7	0.7

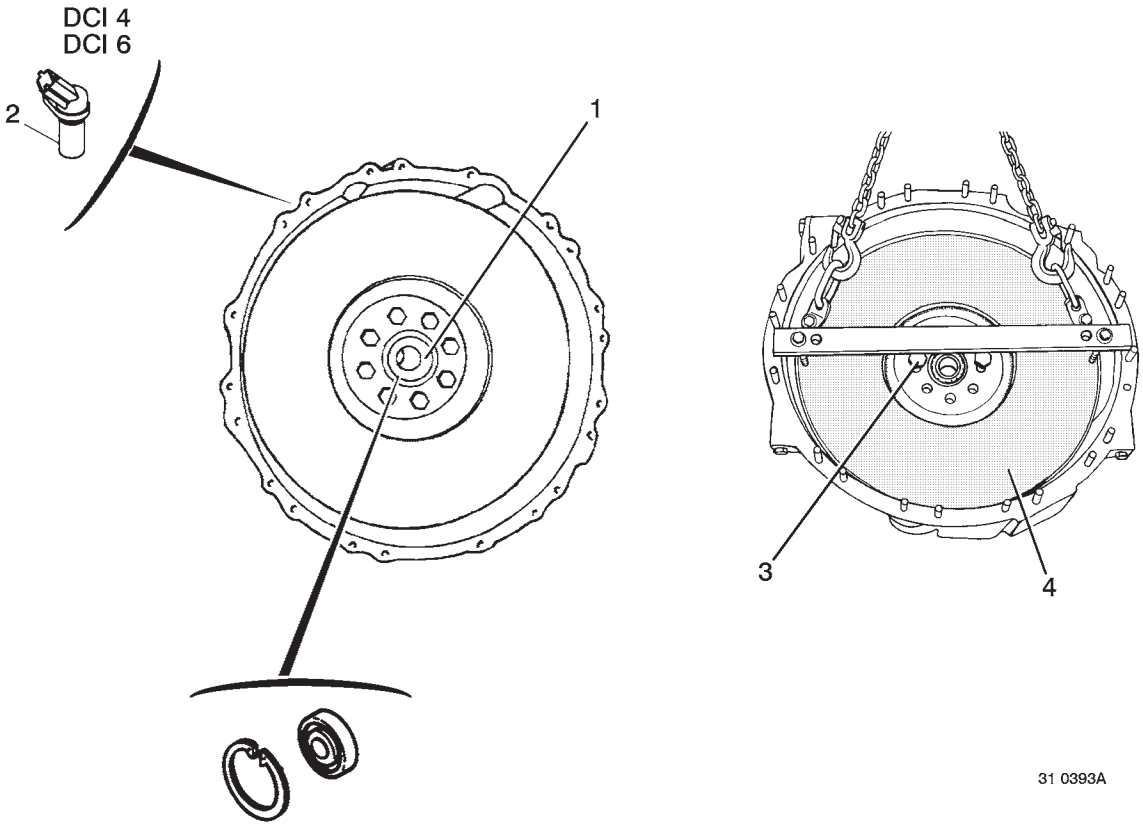
Fitting

Depending on the assembly.

Upon assembly

– Degrease the flywheel friction track.
– Install the centre plate, using a centring tool, ensuring that it is fitted the right way round.
– Progressively tighten the diametrically opposed setscrews at the recommended tightening torque (see page **A2**) (the diaphragm spring should gradually sink in).
– Ensure that the centring tool slides freely in the hub of the centre plate.
– Ensure that the height of the diaphragm spring fingers is constant.

ENGINE FLYWHEEL



Removal

The item numbers indicated in the drawing on the page correspond to the **sequence of disassembly**.

The table indicates the designation and reference number of the tools required for assembly / disassembly of the itemized parts.

Item	Tool designation	Reference N°	Assembly	Disassembly
1	Puller	0978		X
3	Torque multiplier	9774	X	X
3	Angular dial	9777	X	
4	Puller	1291		X

Inspection

To inspect the flywheel

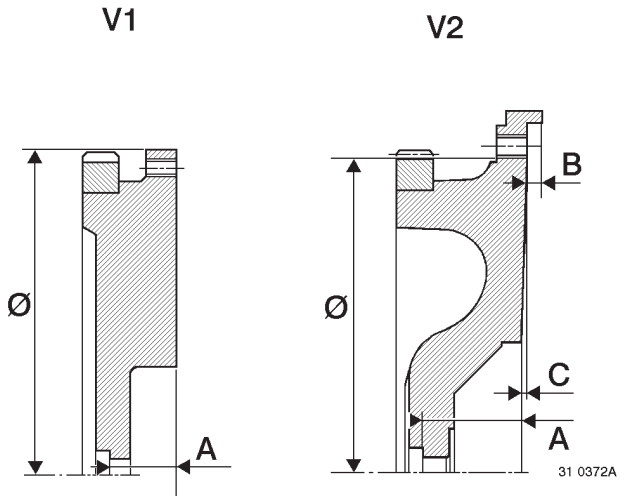
– Check for oil leaks at the rear of the engine and at the front of the gearbox.
– Check the surface condition of the flywheel (cracks, significant distortion, friction track wear).
– Grind or replace, as necessary (for values, see page **D3**).
– Check the condition of the pilot bearing or guide ring.

Fitting

Remove dust from the flywheel.
For fitting, proceed in the reverse sequence to removal.

Engine flywheel screws

Progressively tighten the diametrically opposed setscrews at the recommended tightening torque (see page **A4** → **A8**).

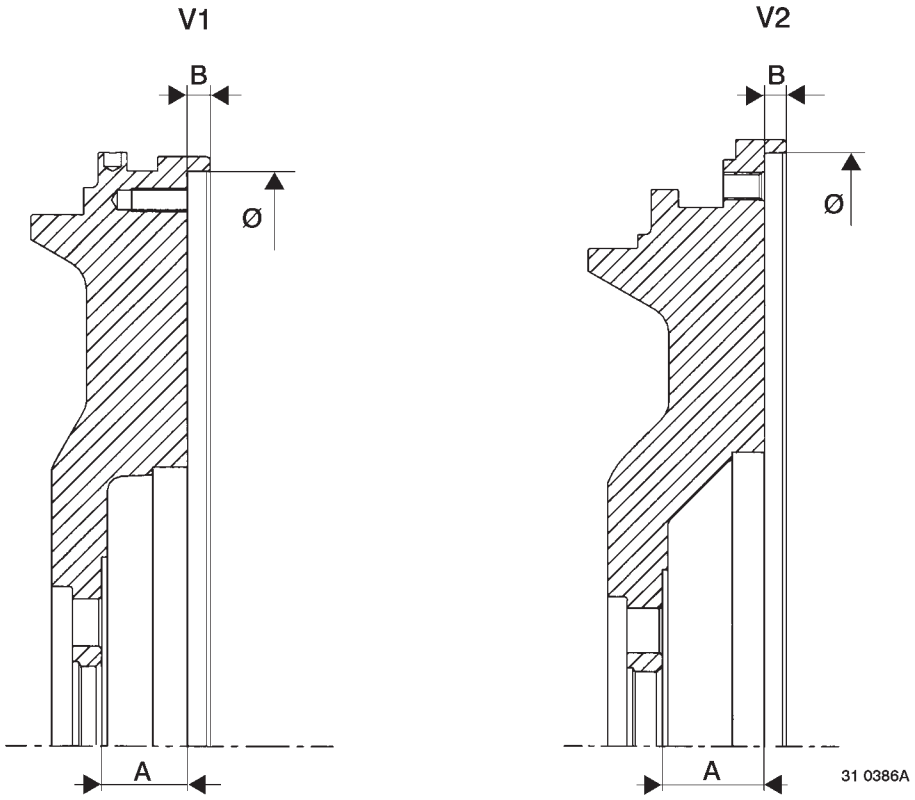


Clutch 310 DTR / 350DTR / 395 MFZ

Engine flywheel grinding values

Engine	Clutch	Flywheel	A (mm)	B (mm)	Taper C	Ø (mm)
MIDR 04.02.26	310 DTR	V1	32 → 33± 0.1	–	0	408
MIDR 04.02.26	350 DTR	V1	32 → 33± 0.1	–	0	408
MIDR 06.02.26	350 DTR	V1	32 → 33± 0.1	–	0	408
MIDR 06.02.26	MFZ 395	V2	49.3 → 50	8 → 8.7	0.5 % = 20 ’	395

Surface finish : **CLA 3.2**.



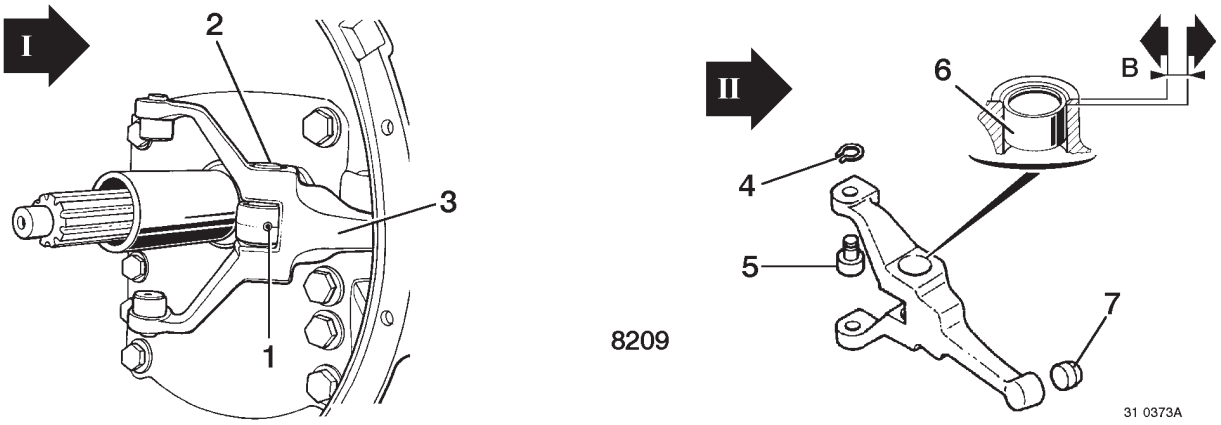
Clutch VALEO 362 DBE / 395 DBE

Engine flywheel grinding values

Engine	Clutch	Flywheel	A (mm)	B (mm)	Taper C	Ø (mm)
DCI 4	362 DBE	V1	29.5 → 28.8	8 → 8.7	0	395
DCI 6	395 DBE	V2	37 → 36.3	8 → 8.7	0	435

Surface finish : **CLA 3.2**.

OPERATING FORK



Clutch MFZ 395

Gearbox EATON 8206

Removal

The item numbers indicated in the drawing on the page correspond to the **sequence of disassembly**.

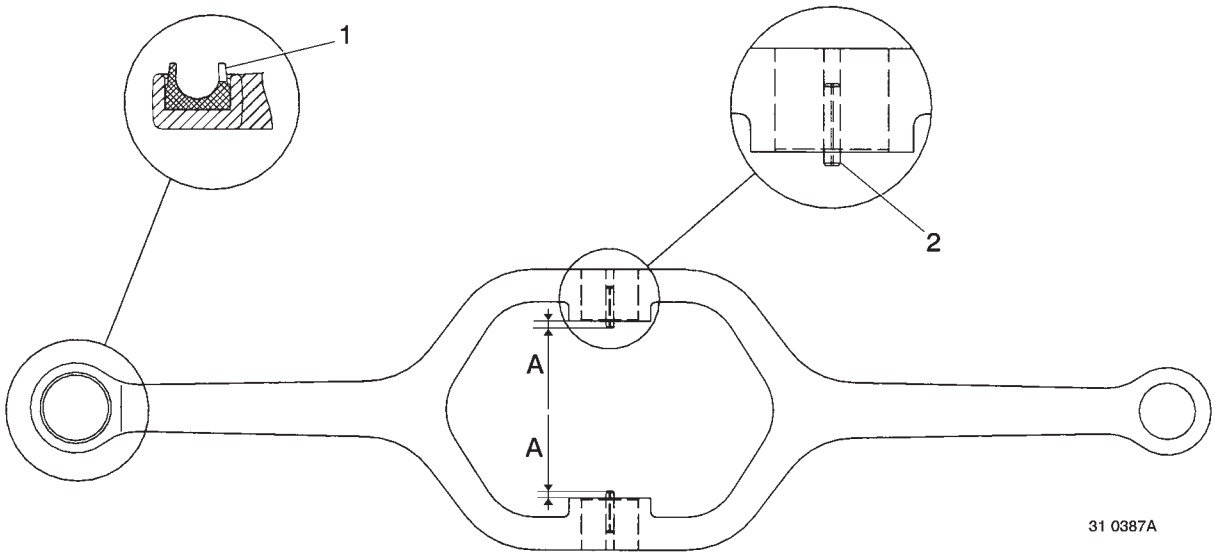
The table indicates the designation and reference number of the tools required for assembly / disassembly of the itemized parts.

Gearbox EATON 8209

Item	Tool designation	Reference N°	Assembly	Disassembly
6	Puller	0978		X
6	Set of pushers	2363 Ø 25–28	X	
6	Handle	3016	X	

Fitting

For fitting, proceed in the reverse sequence to removal.
Respect dimension **B = 4 ± 0.5 mm**.



Clutch VALEO 362 DBE / 395 DBE

Gearbox
ZF S5 42
EATON 4106 / 5206 / 6406 / 8309

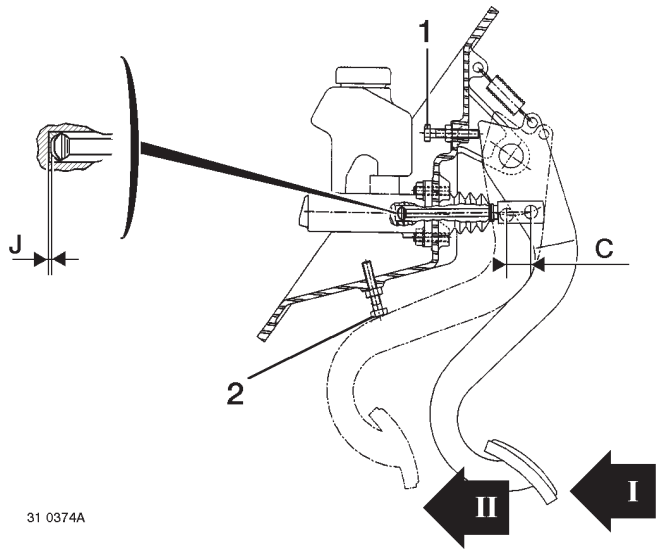
Removal

The item numbers indicated in the drawing on the page correspond to the **sequence of disassembly**.

Fitting

For fitting, proceed in the reverse sequence to removal.
Respect the dimension **A = 2.5 ± 0.3 mm**.

CLUTCH MASTER CYLINDER



Clutch 310 DTR / 350 DTR / 395 MFZ

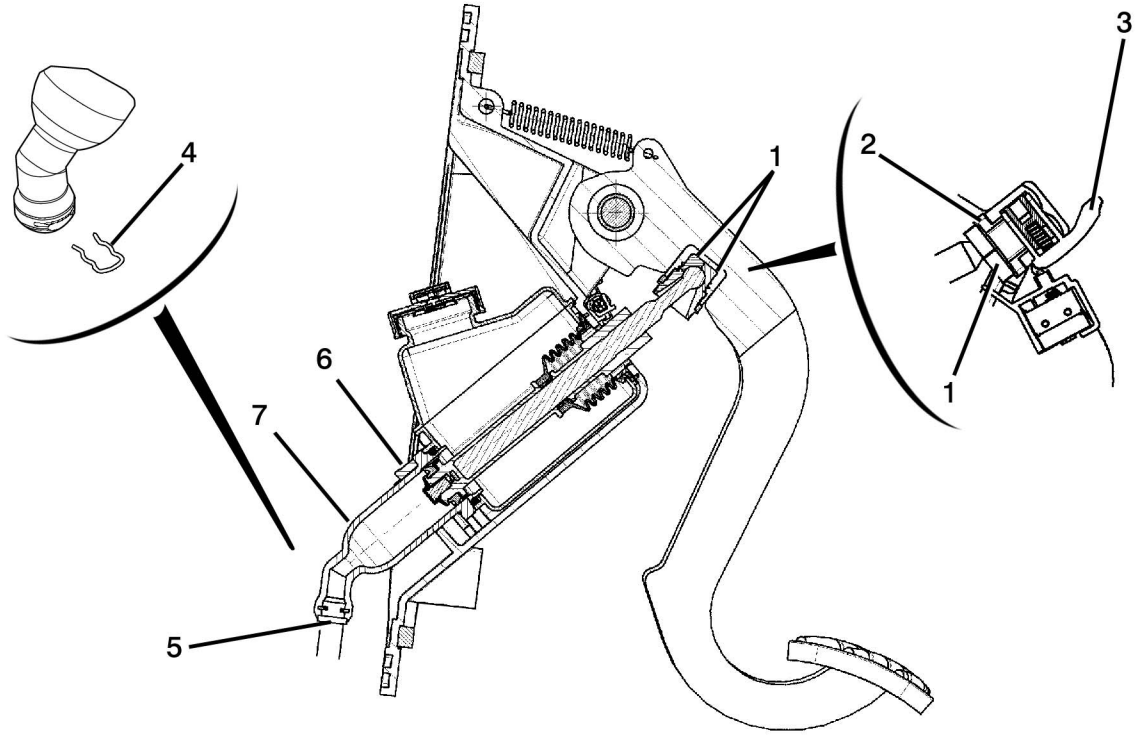
Gearbox ZF S5 42 / EATON 4106 / 8209

Adjustment

IMPORTANT
It is essential to bleed the power–assisted clutch circuit before checking the effective slave cylinder travel and before implicating the different units making up the clutch function.

Adjusting the clearance :
Turn screw (**1**) to obtain a clearance **J = $0.5^{+0.5}$ mm**.
Tighten the locknut.

Adjusting the travel :
Turn screw (**2**) to obtain dimension **C = 21 $\pm$ 0.5 mm**.
Tighten the locknut.



31 0396A

Clutch VALEO 362 DBE / 395 DBE

Gearbox
ZF S5 42
EATON 4106 / 5206 / 6406 / 8309

Removal

Remove the pedal gear cover under the steering wheel.
Remove the two half–shells (**1**).
Remove the clutch pedal switch bracket (**2**) and pad (**3**)
Remove the clip (**4**) and take out the coupling (**5**).
Remove the clamp (**6**) then the master cylinder unit (**7**).

Fitting

For fitting, proceed in the reverse sequence to removal.
Bleed the hydraulic system.
There is no adjustment to be made for the master cylinder travel.

IMPORTANT
It is essential to bleed the power–assisted clutch circuit before checking the effective slave cylinder travel and before implicating the different units making up the clutch function.

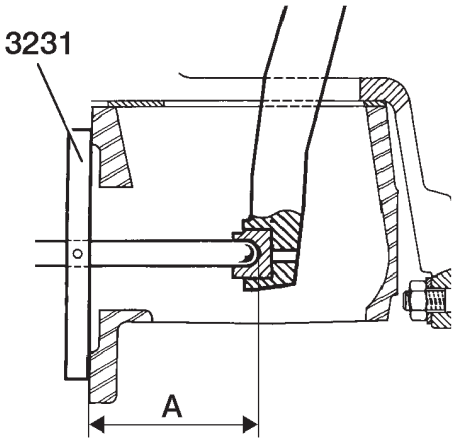
CLUTCH SLAVE CYLINDER

Manufacturer's reference	Renault V.I. reference	Adjustment (see page)
Kongsberg Assy 626853	50 10 245 752	G2
Kongsberg Assy 625524	50 10 244 224	G2
Wabco 970 051 4300	50 10 452 472	G3
Wabco 970 051 4290	50 10 452 429	G3

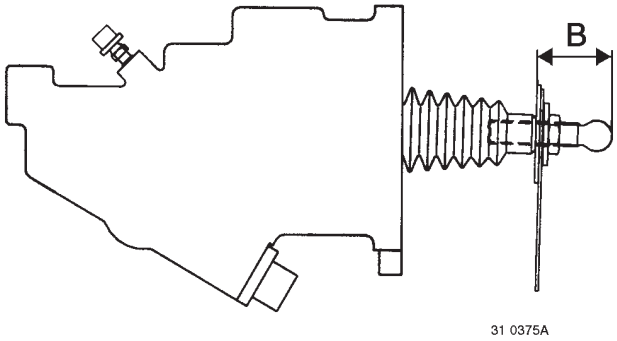
IMPORTANT
It is essential to bleed the power–assisted clutch circuit before checking the effective slave cylinder travel and before implicating the different units making up the clutch function.

NOTA
Do not actuate the clutch control if the slave cylinder is not fastened to its bracket.

I



II



Clutch 310 DTR / 350 DTR / 395 MFZ

Gearbox EATON 4106 / ZF S5 42

Adjustment

Dimension **B** does not need to be readjusted whenever a clutch component is exchanged.

Note down dimension **A** from the bottom of the fork impression to the mounting face of the clutch release servo, using tool **3231** and a depth gauge.

NOTE
Keep the fork in support during the reading.

Adjust dimension **B** so that :
B = A – 69 ± 1 mm

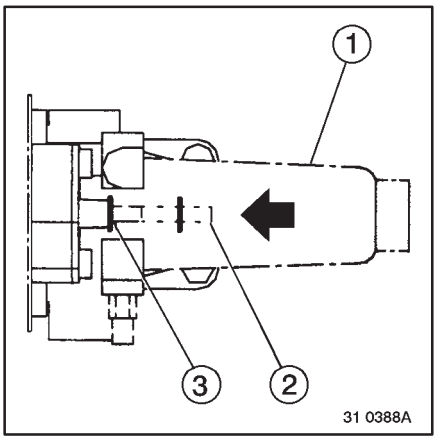
Dimension **B** needs to be readjusted whenever a clutch component is exchanged.

Clutch VALEO 362 DBE / 395 DBE

Gearbox
ZF S5 42
EATON 4106 / 5206 / 6406 / 8309

Adjustment

There is no adjustment to be made upon assembly of the clutch servo.

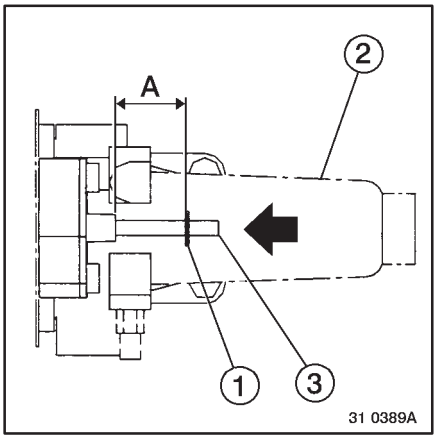


In case of replacement of the clutch plate:

Fit and attach the slave cylinder (**1**).
Push the push–rod (**2**) as far as abutment and put the pointer (**3**) in that position.

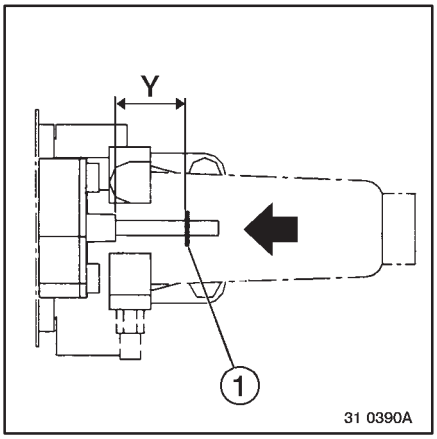
In case of replacement of the clutch servo:

Note down dimension **A** and mark the position of the pointer (**1**).
Fit and attach the slave cylinder (**2**).
Push the push–rod (**3**) as far as abutment and reposition the pointer (**1**) while respecting dimension **A**.

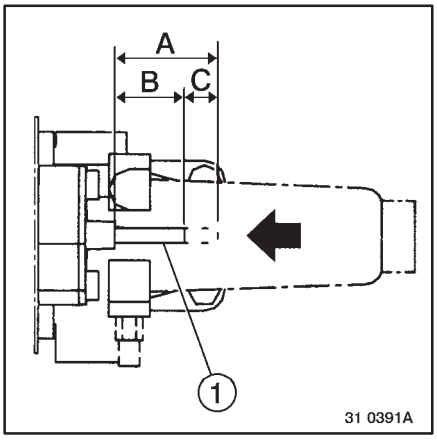


Checking the clutch travel

Measure dimension **Y** and mark the position of the pointer (**1**)
Remove the pointer (**1**).



Measure the dimension **A**.
Fully release the clutch.
Push the push–rod (**1**) as far as abutment.
Measure the dimension **B**.
The clutch travel **C** is equal to **A–B**.
C = 22±1 mm
Reposition the pointer (**1**) while respecting dimension **Y**.



LINING WEAR INDICATOR

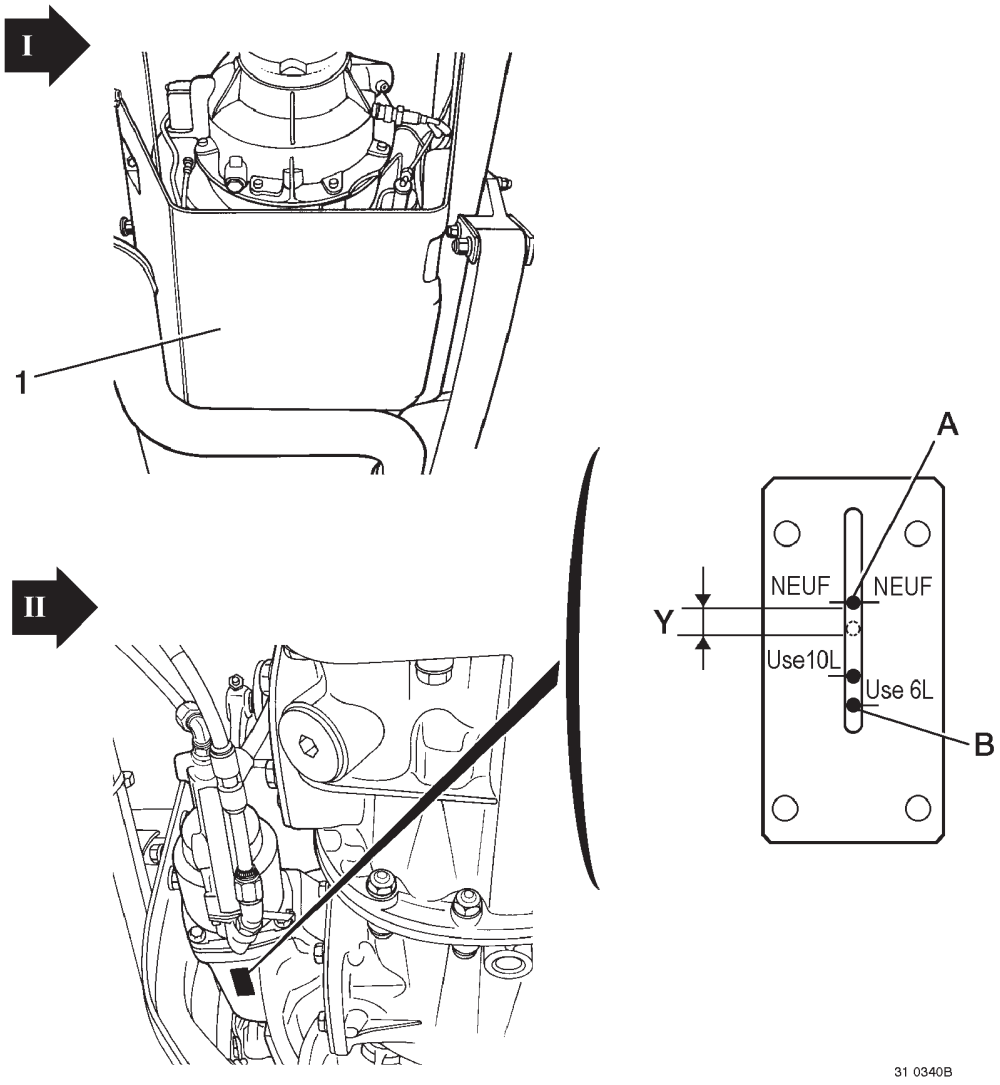
Depending on the assembly.

Inspection

To gain access to the underside of the gearbox, remove the soundproofing screen.
After taking action, put the soundproofing screen properly back into place.

Soundproofing screen(s)
Any damage to the interior protective film of the screen requires replacement of the film.
See that no flammable products are applied to the screen protective films.
The screens are to be cleaned using a cloth.
If necessary, use soapy water (any other product is strictly forbidden).

IMPORTANT
If the clutch slave cylinder is to be removed without replacement of the centre plate, mark the position of the pointer prior to disassembly and put it back into the same position upon assembly.



The item numbers indicated in the drawing on the page correspond to the **sequence of disassembly**.

Gearbox EATON 8209

Clutch MFZ 395

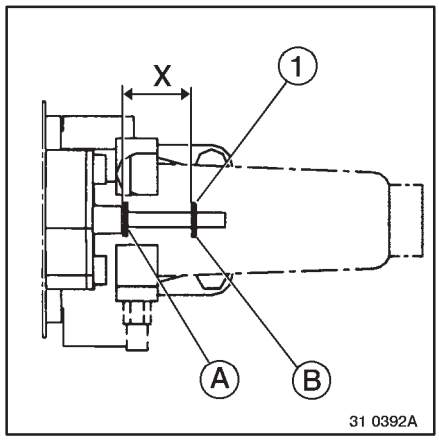
The position of pointer signifies :
A = new lining
B = worn lining (to be replaced)
Y = setting before disassembly

For fitting, proceed in the reverse sequence to removal.

Gearbox
ZF S5 42
EATON 4106 / 5206 / 6406 / 8309

Clutch VALEO 362 DBE / 395 DBE

The position of the pointer (**1**) corresponds to:
A = new lining
B = worn lining
X = 26±1



TOOLS

RENAULT V.I. divide tools into 3 categories :

– **General–purpose tools :** Commercially available tools.
  . **50 00 26 .... reference number** (possibility of purchasing through the Renault V.I. Spare Parts department).
  . **4–figure reference number** (tools with Renault V.I. reference number, but available from the supplier).

– **Special tools :** Specially created tools, distributed by the RENAULT V.I. spare parts division.

– **Locally manufactured tools :** these tools are classified differently according to their degree of sophistication :

  . **4–figure reference number** (represented by a drawing) : tools that are simple to make without need for special qualification.

  . **50 00 26 .... reference number** (possibility of purchasing through the Renault V.I. Spare Parts department) : a certain skill is needed to make these tools.

Three levels (or echelons) determine their assignment :

– **LEVEL1 :** Tools for servicing and minor tasks.

– **LEVEL 2 :** Tools for major repairs.

– **LEVEL 3 :** Tools for refurbishment.

NOTE
Tools mentioned in this manual no longer appear in the tools list on account of the new tools classification.

List of tools according to major unit type

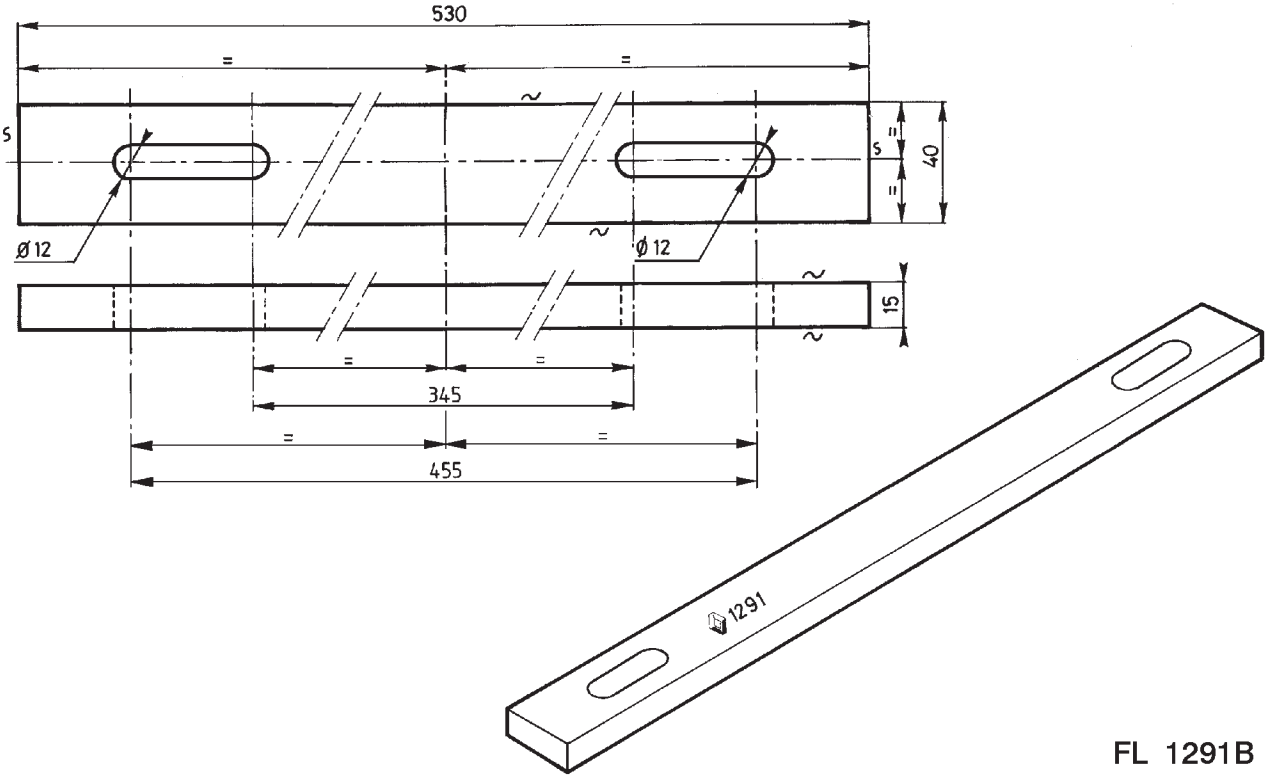
ZF S5.42 : 2437+0978+1291+9774+9777
EATON 4106 / 5206 / 6406 / 8309 : 2437+0978+1291+9774+9777
EATON 8209 : 2437+0978+1291+9774+2363+3016+9777+3231

General–purpose tools				
Renault V.I. Ref.	**Description**	**Level**	**Quantity**	**Page**
50 00 26 **0978**	Puller	1	1	D2 / E2
50 00 26 **2363**	Set of pushers	1	1	E2
50 00 26 **9774**	Torque multiplier	1	1	D2
50 00 26 **9777**	Angular dial	1	1	D2
50 00 26 **2437**	Centring tool	1	1	C3

Special tools				
Renault V.I. ref.	**Description**	**Level**	**Quantity**	**Page**
50 00 26 **3231**	Gauging pin	1	1	G2
50 00 26 **3016**	Gauging pin	1	1	E2

Locally manufactured tools				
Renault V.I. ref.	**Description**	**Level**	**Quantity**	**Page**
1291	Puller	1	1	D2

Locally manufactured tools



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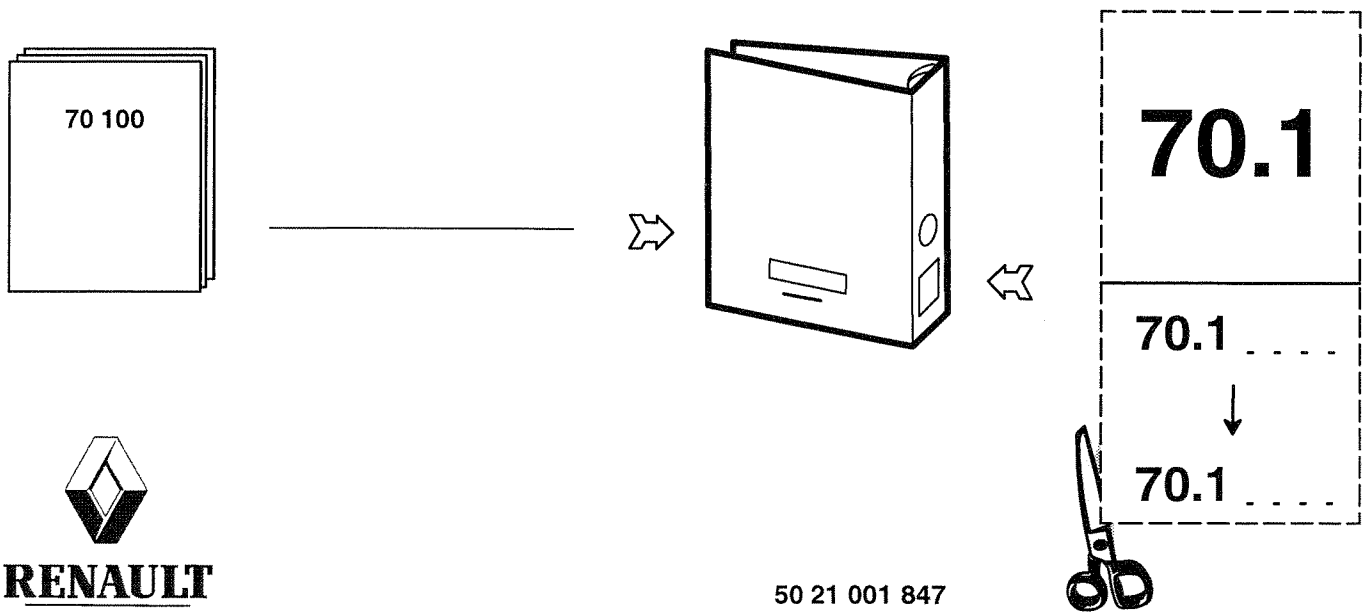
ELECTRICS

ELECTRICS	VEHICLES
ELECTRICAL EQUIPMENT	RENAULT MIDLUM DCI

NOTE
The above information may change in the course of time.
Only the "Consult" section of the workshop manuals repertory in standard N° 10320 serves as reference.



RENAULT

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A	Generalities	A1 → A5
B	Schematic diagrams	B1 → B58
C	Pinpointing of electrical appliances	C1 → C12
D	Fuses	D1 → D5
	Relays	D6 → D8
E	Available power supplies	E1 → E6
F	Connection unit – Fuse and relay box	F1 → F18
	Connection unit – Bulkhead grommet	F19 → F32
G	Wiring harnesses	Ga1 → Gq5

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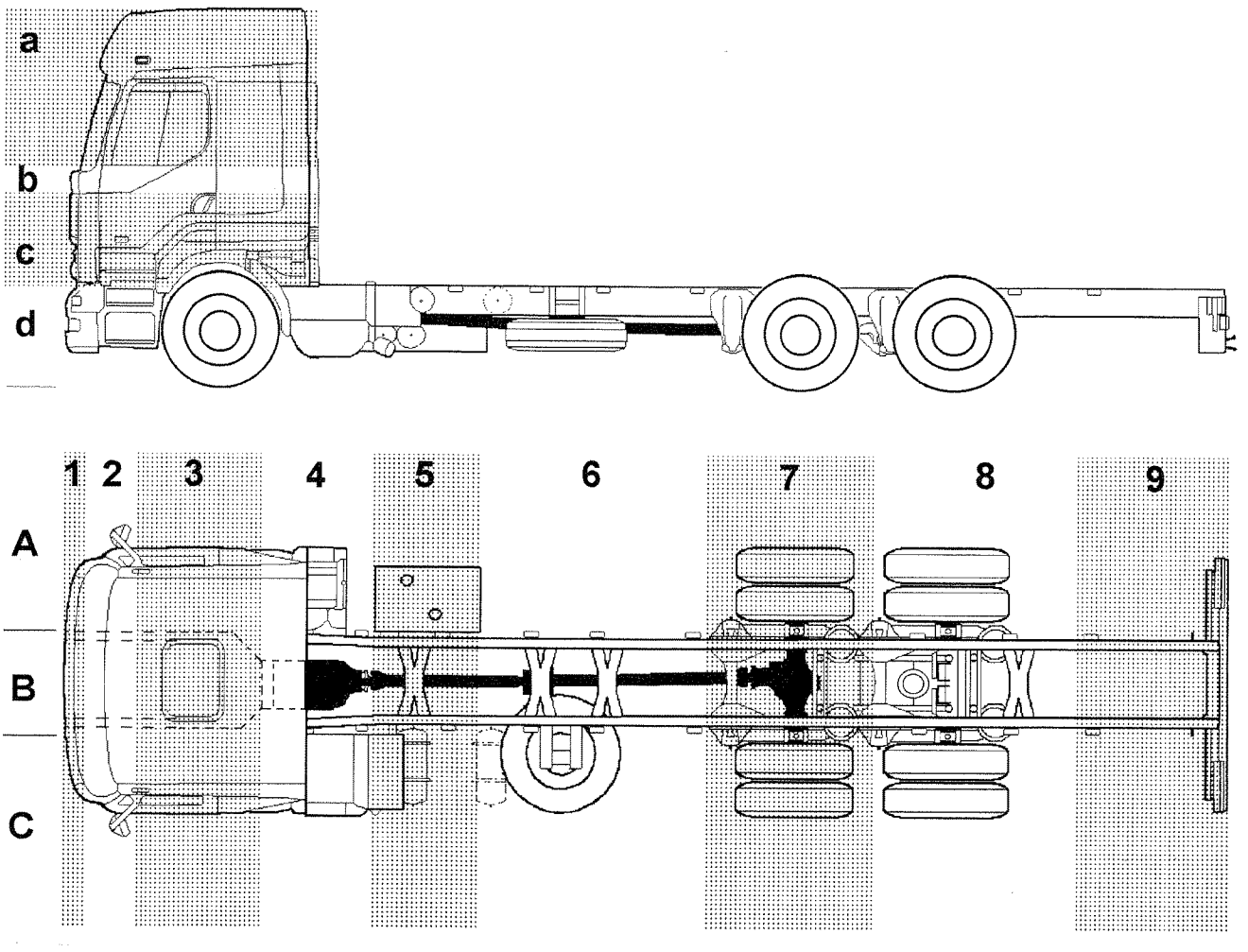
GENERALITIES


a
b
c
d
1 2 3 4 5 6 7 8 9
A
B
C
70 0001

VEHICLE VOLUMINAL BREAKDOWN

The vehicle is broken down into several zones each designated by an item number.

Heightwise breakdown
Reserved for the cab, four zones designated by a small letter.

Widthwise breakdown
Three zones designated by a capital letter.
A: RH side and RH sidemember,
B: central part,
C: LH side and LH sidemember.

Lengthwise breakdown
Nine zones designated by a figure.
Zone 1 includes:
– on the chassis, the bumper and the appliances it supports.
– on the cab, the front end elements with access through the front grille.

Example :
A1 : RH bumper (headlamps...)
C3 : LH front roadwheels (ABS sensor)
C2b : LH fascia panel
A3c : passenger seat

PINPOINTING OF APPLIANCES

A "Pinpointing of Appliances" booklet situates each on–vehicle electrical appliance (on chassis, in cab and on major unit).

NOTE
Each appliance may be pinpointed:
– In the electrical diagram by the voluminal breakdown.
– On the vehicle in the "Pinpointing of Appliances" booklet. Such localization refers to the plate.

PINPOINTING EXAMPLES

In the "Electrical diagram" booklet:
2101 – Battery N°1 .... (01A) A5d

2101: Appliance reference
Battery N° 1: key to appliance
A5d: Pinpointing of appliance after voluminal breakdown (see page A2).
01A : Pinpointing of appliance in electrical diagram (plate 01A).

In the "Electrical diagram" booklet:
9201 – Vehicle master ECU
9201: Appliance reference
Vehicle master ECU: key to appliance
27B/C: Pinpointing of appliance in electrical diagram (plate 27B and plate 27C).

Such localization also applies for fuses, relays and diodes.

HOW TO READ THE DIAGRAMS

The diagram consists of several plates numbered in the bottom right–hand corner.
A wire connecting appliances located in different plates includes a connection address.
Example:
08A = see plate 08A
4001 –B = Doors central locking box

NOTE
The index "–B" is not to be interpreted.

Connectors :
The connectors are identified by a figure indicating the number of ways and by one or several letters indicating the colour.

BLACK	(N)
BROWN	(M)
RED	(R)
ORANGE	(Or)
YELLOW	(J)
GREEN	(Ve)
BLUE	(Bu)
PURPLE	(Vi)
GREY	(G)
WHITE	(Bc)

Example: 8J = yellow coloured 8–way connector

An index is added when several connectors on the same appliance have an identical number of ways and the same colour.
Example:
– 43N1 = 43–way black connector N° 1
– 43N2 = 43–way black connector N° 2

A connector on the connection unit is identified by 3 figures.
Example:
– 970N = black connector N° 970 (C970).

PRE–EQUIPMENT
Circuits represented with dotted lines indicate a connection solution or an optional assembly.

CONNECTION UNIT

The connection unit provides the electrical link between chassis and cab.
Each face of the unit is detailed in the "Connection unit" booklet.

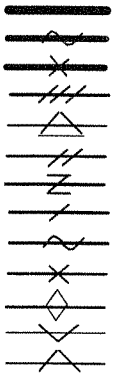
Interface connector
This type of connector makes a direct link between two faces of the connection unit.

Example:
D / C interface connector
C 918 / *C 815* : The reference N5 in italics corresponds to the face C connector.

Wire – connector links
A table links each wire to its connectors. The section and terminal number of each connector are specified.
The wire numbers are classified numerically.

Example: Wire **51** = section **1**, connector **821**: terminal **3** and connector **906**: terminal **B1**.

CROSS–SECTION AND COLOUR OF CABLES



75 mm^2
60 mm^2
50 mm^2
25 mm^2
16 mm^2
10 mm^2 – Ivory
7 mm^2 – Pink
5 mm^2 – Ivory
3 mm^2 – Pink
2 mm^2 – Grey
1 mm^2 – Green
0.6 mm^2 – Grey
0.35 mm^2 – Orange

WIRING HARNESSES

Each plate represents the routing of one or several wiring harnesses connected to a sub–assembly or function.
The outline of the vehicle pinpoints the wiring harnesses.
Connectors identified by the letter **C** followed by 3 figures are indicated on each harness.
A key opposite each plate defines their assignment.
On the back of the key are given details of connectors linked to the harnesses of the plate.

Key to connectors
C129 ..... 4618 – Driver's overhead lamp

C129 : connector item number
4618 : appliance reference number
Driver's overhead lamp : key to the appliance
The appliance reference number and key provide the link to the electrical diagram.

Optional wiring harnesses
Connectors assigned with indexes ***1** or ***2** belong to optional harnesses.

Example of connector reference number
C129 : connector on standard harness
C137*1 : connector on option 1 harness
C141*2 : connector on option 2 harness

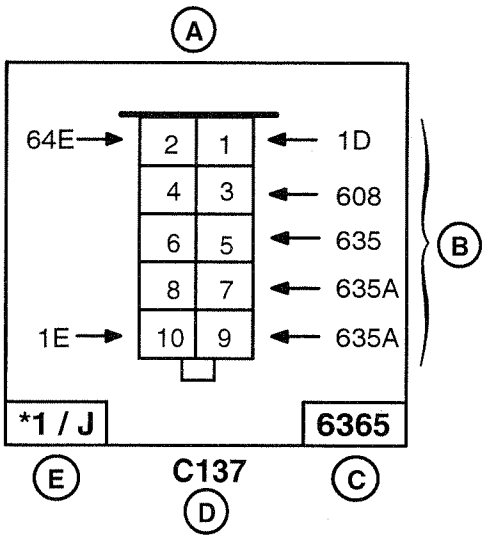
At the end of the key is shown the make–up of each optional harness.

Links between wiring harnesses
Some harnesses are joined together by link–up connectors. These are indicated at the end of the key.

Example :
C476*1 → *C477*1 (Gb14)*
Connector **C476*1** on plate Ga2 is linked to connector C477*1 on plate Gb14.

Detail of connectors
Each drawing represents the structure of a connector.

Example :
A : outline of the connector
B : item number and location of the wires
C : reference number of the appliance
D : item number of the connector
E : option or colour of the connector



IMPORTANT
Bearing in mind the presence of numerous electronic appliances, the use of a test lamp is to be avoided. Preferably use a needle or digital type multi–meter.
It is forbidden to apply voltage to the terminals of electronic appliances or you may cause irreparable damage to the hardware. Consequently, no line continuity measurement should be made on the wires without having previously disconnected the appliances from the lines concerned.

SCHEMATIC DIAGRAMS

KEY TO THE APPLIANCES

0102 – Electrical connection terminal	–	C4d
0117 – Protection diodes	18	A2c
1100 – Fuse	–	–
1200 – Fuses and relays connection unit "BFR"	–	A2b
1211 – Connecting board	–	–
1220 – Cab top ledge	47	C2a
1228 – Battery tray	–	C4d
1229 – Chassis–cab connection unit	46/47/48	A2d
2100 – Trailer socket, 15–pin	–	B9d
2101 – Battery N° 1	1/2/3	C4d
2102 – Battery N° 2	1/2/3	C4d
2112 – 24 Volt socket	27	C2c
2113 – Trailer socket, 7–pin type 24 N	30	B9d
2115 – Trailer socket, 7–pin type 24 S	30	B9d
2116 – Trailer socket, 7–pin type "EBS"	30	B9d
2133 – 12 volt socket	27	B2d
2141 – Available power supply (lighting)	46/47/48	C4d
2142 – Available power supply (after ignition)	46/47/48	C4d
2147 – Available power supply (after master switch)	46/47/48	C4d
2154 – Plug socket (150 Amps)	–	C4d
2164 – Electrical master switch	2	C4d
2165 – Master switch	1	C4d
2200 – Anti–theft electronic box	5/21	C2a
2196 – After ignition power supply relay N° 1	4	A2c
2197 – After ignition power supply relay N° 2	4	A2c
2211 – Starter	7	B3d
2212 – Starting relay	7	A2c
2219 – Transponder antenna	5	C2b
2220 – Transponder ignition key	5	C2b
2221 – Electronic anti–theft "Information" warning lamp	35	C2b
2261 – Steering lock and starting control	1/2/3/5/21	C2b
2266 – Engine stop control (cab tilted)	43/44	A2c
2311 – Alternator	1/2/3	B2c
2314 – Battery charge warning lamp	35	C2b
2400 – Fuel filter clogging pressure switch	43/44	C4d
2414 – Preheating relay	6	C4d
2422 – Fuel preheater relay	8	A2b
2423 – Renault V.I. fuel preheater	8	C4c
2452 – Preheating resistor N° 1	6	B3c
3101 – Flasher unit	14/21	A2a
3117 – Rigid or tractor flasher repeater lamp	35	C2b
3118 – Trailer flasher repeater lamp	35	C2b
3161 – Hazard lights control	14/21	B2b
3211 – RH front flashing lamp	14	A1d
3212 – LH front flashing lamp	14	C1c
3213 – RH side flashing lamp	14	A3d
3214 – LH side flashing lamp	14	C2d
3410 – Roof trumpet horn solenoid valve	14	C2d
3411 – Horn	14	A2b
3417 – Revolving beacon 1	15	C3a
3418 – Revolving beacon 2	15	A3a
3419 – Revolving beacon(s) relay	15	A2b
3462 – Revolving beacon(s) control	15	C2a
3512 – Stop lights relay	15	A2b
3513 – Fog light(s) relay	10	A2b
3517 – Fog light(s) warning lamp	34	C2b
3611 – RH front marker lamp	9	A3a
3612 – LH front marker lamp	9	C3a
3618 – Side/parking lights relay	9	A2b
3716 – LH central marker lamp	9	C5d
3717 – RH central marker lamp	9	A4d
3721 – RH rear lights	–	A0d
– flashing	14	A9d
– stop	15	A9d
– fog	–	A9d
– reverse	15	A9d
– side/parking	9	A9d

KEY TO THE APPLIANCES

3722 – LH rear lights	–	C9d
– flashing	15	C9d
– stop	15	C9d
– fog	10	C9d
– reverse	–	C9d
– side/parking	9	C9d
4001 – Doors central locking box	18	B2a
4047 – Passenger's side electric door striker	18	A3b
4048 – Driver's side electric door striker	18	C3b
4078 – LH door switch	24	C2C
4079 – RH door switch	24	C2c
4111 – Cigar lighter	26/27/28	C2b
4122 – LH swivelling defrosting rearview mirror	22	C2a
4126 – Defrosting rearview mirrors relay	22	A2c
4135 – Electric roof ventilator motor	19	B3a
4136 – Comfort accessories relay	27	A2c
4137 – Windscreen defrosting resistor	29	A1c
4138 – Windscreen defrosting time–delay relay	29	A1c
4160 – Electric roof ventilator control	19	C2a
4161 – External rearview mirrors swivelling control	22	C2b
4163 – Defrosting rearview mirror control	22	C2a
4200 – Voltage dropper (12 Volt socket)	27/28	A2c
4202 – Radio	26/27/28	C2a
4209 – Voltage dropper (telecommunications)	26/27/28	C2a
4210 – Antenna	26/27/28	B2a
4012 – LH rear door contact	24	A4c
4013 – RH rear door contact	24	C4c
4214 – Driver's loudspeaker	26/27/28	C2a
4220 – Radio remote control	34	C2b
4221 – Passenger's loudspeaker	26/27/28	A2a
4222 – Driver's heated seat	27	C3c
4123 – RH swivelling defrosting rearview mirror	22	A2a
4228 – C.B. radio	26/27/28	C2a
4229 – Telephone	26/27/28	C2a
4250 – Voltage dropper (headlamps adjustment)	13	A2c
4251 – Voltage dropper (extra 12V socket)	27	A4c
4271 – On–board management pre–arrangement (TMC 2001)	21	A1b
4272 – On–board management pre–arrangement (EUTEL TRACS)	21	A1b
4311 – Driver's window winder motor	19	C2c
4312 – Passenger's window winder motor	19	A2c
4313 – RH rear door window winder motor	19	A3a
4314 – LH rear door window winder motor	19	A3c
4361 – Driver's window winder control	19	C2b
4362 – Passenger's window winder control	19	A2b
4363 – RH rear door window winder control	19	A3c
4364 – LH rear door window winder control	19	A3c
4365 – Passenger's window winder control (driver's side)	19	C2b
4421 – Fan coil heater(s)	32	B2c
4423 – Independent heater	33	A3c
4469 – Independent heater timer control	33	C3a
4479 – Driver's cab ventilation control	32	B3c
4487 – Temperature variator	33	C3a
4512 – Air conditioning compressor	32	B2c
4566 – External temperature sensor	42	A2b
4602 – Rear map reader	24	A3d
4605 – LH rear door overhead lamp	24	A3c
4606 – RH rear door overhead lamp	24	C3a
4607 – LH rear door step lamp	24	C3a
4608 – RH rear door step lamp	24	A3c
4617 – Top bunk overhead lamp	24	C4a
4618 – Driver's overhead lamp	24	B2a
4625 – Passenger's overhead lamp	24	B2a
4650 – Driver's step lighting	24	C2c
4651 – Passenger's step lighting	24	A2c
4919 – Fuel feed pump	33	B3c
5266 – Accelerator pedal position sensor	42	C2c
5301 – Windscreen wiper speed controller	25	A2c

KEY TO THE APPLIANCES

5310 – Headlamp washer time–delay relay	25	A2C
5311 – Windscreen wiper motor	25	B1c
5314 – Windscreen washer pump	25	C1c
5319 – Headlamps washer pump	25	A2d
5320 – Windscreen wiper disabling relay	25	A2c
5561 – Gate valves illumination control	24	C2a
6119 – Dipped beam headlights relay	10	A2b
6121 – Main beam headlights relay	10	A2b
6123 – Main beam headlights warning lamp	35	C2b
6124 – Headlight, dipped headlight and left side lamp	9	C1b
6125 – Headlight, dipped headlight and right side lamp	9	A1d
6132 – Dipped beam headlights warning lamp	35	C2b
6138 – LH headlamp adjustment motor	13	C1d
6139 – RH headlamp adjustment motor	13	C2b
6145 – Daytime lights shunt	12	A2b
6166 – Headlights adjustment control	13	C2b
6167 – Steering column fingertip controls	5	C2b
– anti–theft	5	C2b
– side/parking lights	9	C2b
– main/dipped beam headlights	10	C2b
– fog driving lamps / fog lamps	10	C2b
– horn / direction indicator	14	C2b
– windscreen wiper / screen wash / headlamp wash	25	C2b
– cruise control	42	C2b
6211 – LH fog driving lamp	10	C1d
6212 – RH fog driving lamp	10	A1d
6214 – Fog driving lights relay	10	A2b
6215 – Long range driving lights relay	11	A2b
6218 – Fog driving lights warning lamp	35	C2b
6221 – RH long range driving lamp	11	A1d
6222 – LH long range driving lamp	11	C1d
6261 – Long range driving lights control	11	B2b
6315 – Working floodlight warning lamp	35	C2b
6316 – Reversing lights relay	15	A2c
6325 – Reverse gear buzzer	15	B9d
6365 – Reverse gear buzzer control	15	C2a
7100 – Current limiter	16	C4d
7114 – Electronic tachograph	16	C2b
7115 – Hourmeter	36	A3c
7362 – Coolant temperature sensor	43/44	B3c
7368 – Oil pressure sensor	43/44	–
7411 – Fuel level gauge	34	C2b
7462 – Fuel level transmitter	34	A5d
7519 – Diagnostics socket	17	C3c
7520 – Diagnostics socket N° 2	42	–
7524 – "SAE" socket	17	C3c
7614 – Principal display	21/34/35	C2b
8001 – ABS/ASR ECU	37/38	A2c
8011 – ABS safety warning lamp	35	C2b
8013 – Trailer ABS safety warning lamp	35	C2b
8014 – ABS LH front roadwheel electrovalve	37/38	C3d
8015 – ABS RH front roadwheel electrovalve	37/38	A3d
8016 – ABS LH rear roadwheel electrovalve	37/38	B7d/B8d
8017 – ABS RH rear roadwheel electrovalve	37	B7d/B8d
8032 – Electric retarder relay box	31	A2c
8034 – Electric retarder	31	B5d
8036 – Electric retarder cut–off relay	37/38	A2b
8059 – Electric or hydraulic retarder control	31	C2b
8061 – ABS LH front roadwheel sensor	37/38	C3d
8062 – ABS RH front roadwheel sensor	37/38	A3D
8063 – ABS LH rear roadwheel sensor	37/38	C7d/C8d
8064 – ABS RH rear roadwheel sensor	37/38	C7d/A8d
8100 – LH front brake pads wear switch sensor	36	C3d
8105 – Rear air pressure transmitter	34	C5d
8108 – RH front brake pads wear switch sensor	36	A3d
8109 – LH rear brake pads wear switch sensor	36	C9d
8117 – Brake lining wear warning lamp	34	C2b
8123 – Air pressure alert warning lamp	34	C2b
8138 – Brakes air pressure gauge	34	C2b

KEY TO THE APPLIANCES

8140 – Braking circuit electrovalve (reversing safety)	15	–
8150 – Exhaust brake electrovalve	43/44	B3c
8159 – RH rear brake pads wear switch sensor	36	A9d
8165 – Rear brakes air pressure switch	34	C5d
8166 – Front brakes air pressure switch	34	C5d
8174 – Trailer and parking brakes air pressure switch	34	C5d
8178 – Parking brake indicator air pressure switch	42	B3c
8275 – Engine oil level sensor	43/44	B3d
8300 – ALLISON automatic gearbox–mounted PTO	42	B4c
8318 – Inter–wheel differential lock warning lamp	34	C2b
8364 – Inter–wheel differential lock switch	34	B7d/B8d
8439 – Neutral relay	40	B2c
8461 – Vehicle speed sensor	16	B4d
8466 – Neutral switch	7	B4d
8472 – Reverse gear switch	15	B4d
8502 – Suspension ECU	45	A2c
8522 – Suspension information warning lamp	34	C2b
8523 – Suspension alert warning lamp	34	C2b
8524 – Rear suspension electrovalve block	45	B7d/B8d
8560 – Remote control box	45	C3c
8572 – Suspension level RH rear sensor	45	A7d/A8d
8573 – Suspension level LH rear sensor	45	C7d/C8d
8602 – Automatic gearbox ECU	40/41	B3c
8663 – Gearbox control lever	41	B3c
8675 – Gearbox control solenoid valves block	40/41	B4c
8676 – Automatic gearbox turbine speed sensor	40	B4c
8677 – Automatic gearbox speed sensor	40	B4c
8678 – Automatic gearbox oil pressure sensor	40	B4c
8679 – Automatic gearbox oil level sensor	40	B4c
8680 – Gearbox oil temperature sensor	40	B4c
9200 – Boost air pressure and temperature sensor	43/44	B3c
9204 – EGR electrovalve	43	B3c
9201 – Vehicle master ECU (VECU)	21/42	B3c
9202 – Engine master ECU (EECU)	43/44	B3c
9208 – Fuel high pressure sensor	43/44	B3c
9210 – "VECU / EECU" ECU power supply relay	42	B3c
9212 – High Pressure pump, solenoid valve cylinder "2"	43/44	B3c
9213 – High Pressure pump, solenoid valve cylinder "1"	43/44	B3c
9220 – Unit pump N° 1 incorporating solenoid valve	43/44	B3c
9221 – Unit pump N° 2 incorporating solenoid valve	43/44	B3c
9222 – Unit pump N° 3 incorporating solenoid valve	43/44	B3c
9223 – Unit pump N° 4 incorporating solenoid valve	43/44	B3c
9224 – Unit pump N° 5 incorporating solenoid valve	43	B3c
9225 – Unit pump N° 6 incorporating solenoid valve	43	B3c
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9230 – Camshaft speed sensor	43/44	B3c
9400 – Airbag ECU	39	B3d
9401 – Driver's seat belt pretensioner	39	B3C
9403 – Airbag rotary switch	39	C2b
9420 – Anti–theft alarm ECU	20/21	A2b
9421 – Road train perimetric protection pre–arrangement	20/21	A2b
9423 – Anti–theft alarm siren	20	A1d
9424 – Ultrasound transmitter	20	C2a
9425 – Ultrasound receiver	20	A2a
9426 – Road train monitoring module	20/21	A2b
9427 – Anti–aggression control	20	C2c
9428 – Front grille switch	20	A1c
21117 – Extra 12V socket	27	C3b
21119 – Available power supply (chassis)	32	B1c
45144 – Two–level air–conditioning pressure controller	15	C3c
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21101 – Bodybuilder equipment control	46	A2b
21113 – Bodybuilder equipment available power supply relay	46	C2c
21120 – Bodybuilder equipment control N° 2	46	C2c

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CAN COMMUNICATIONS NETWORKS
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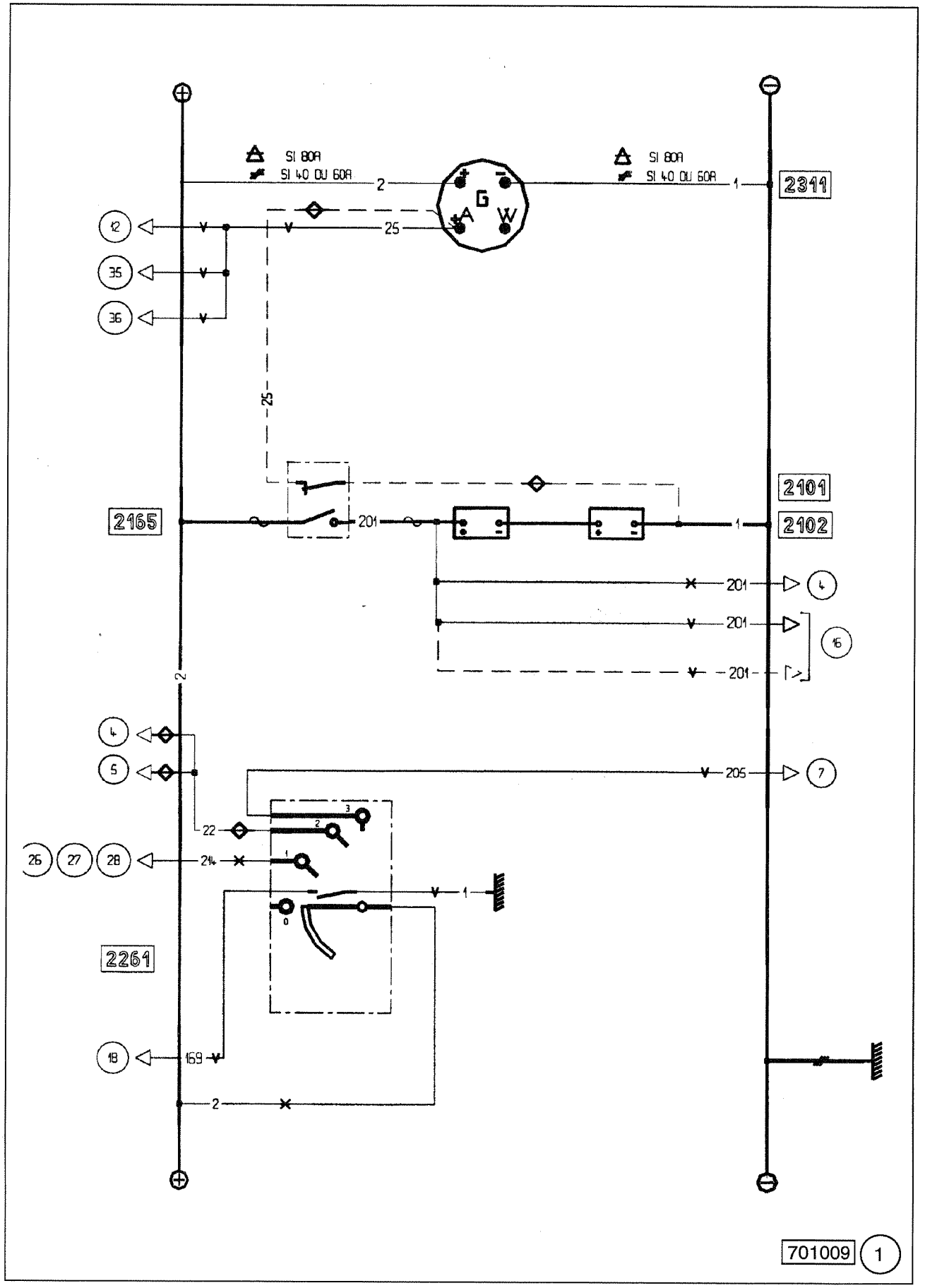
CAN COMMUNICATIONS NETWORKS



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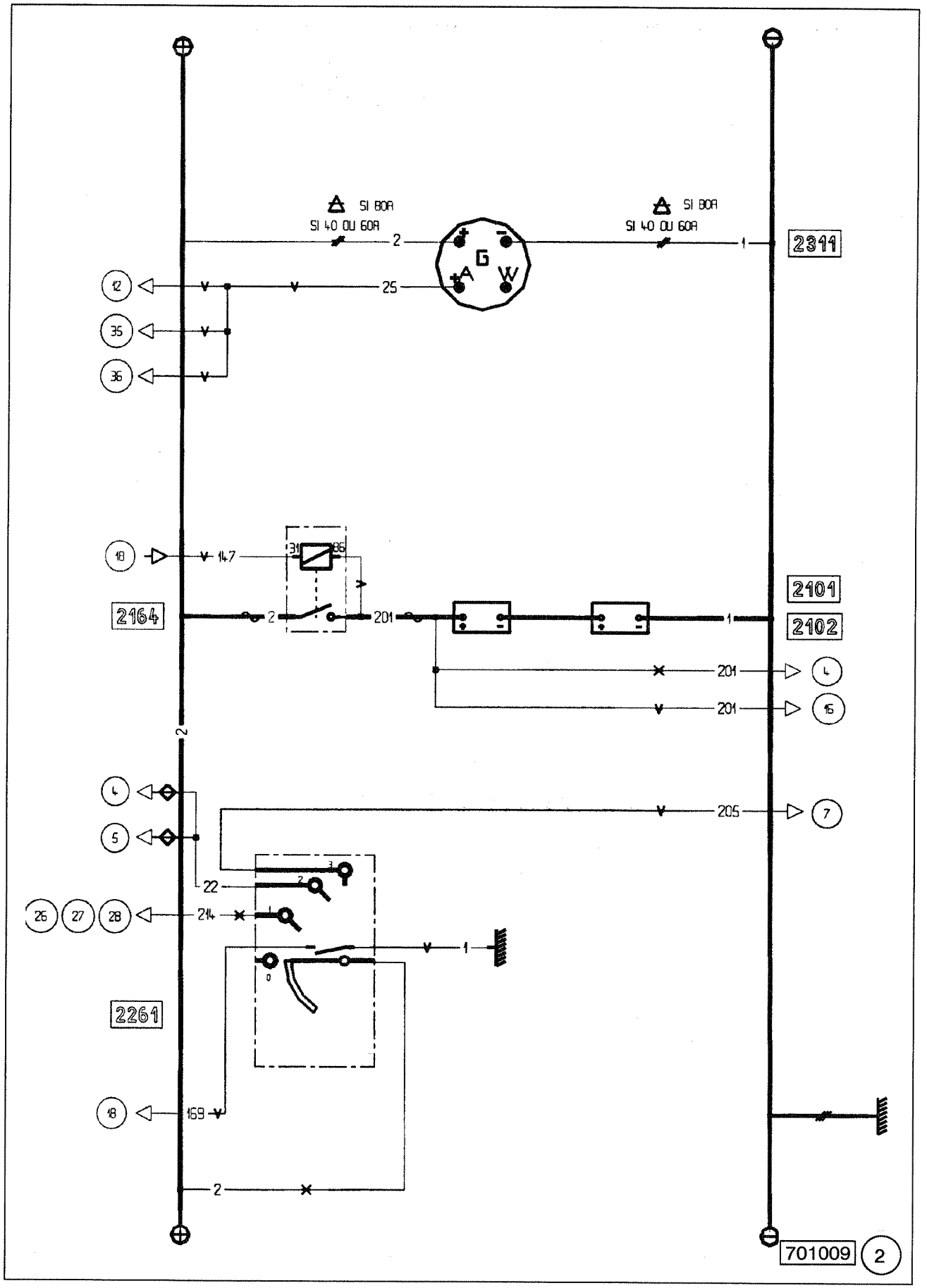

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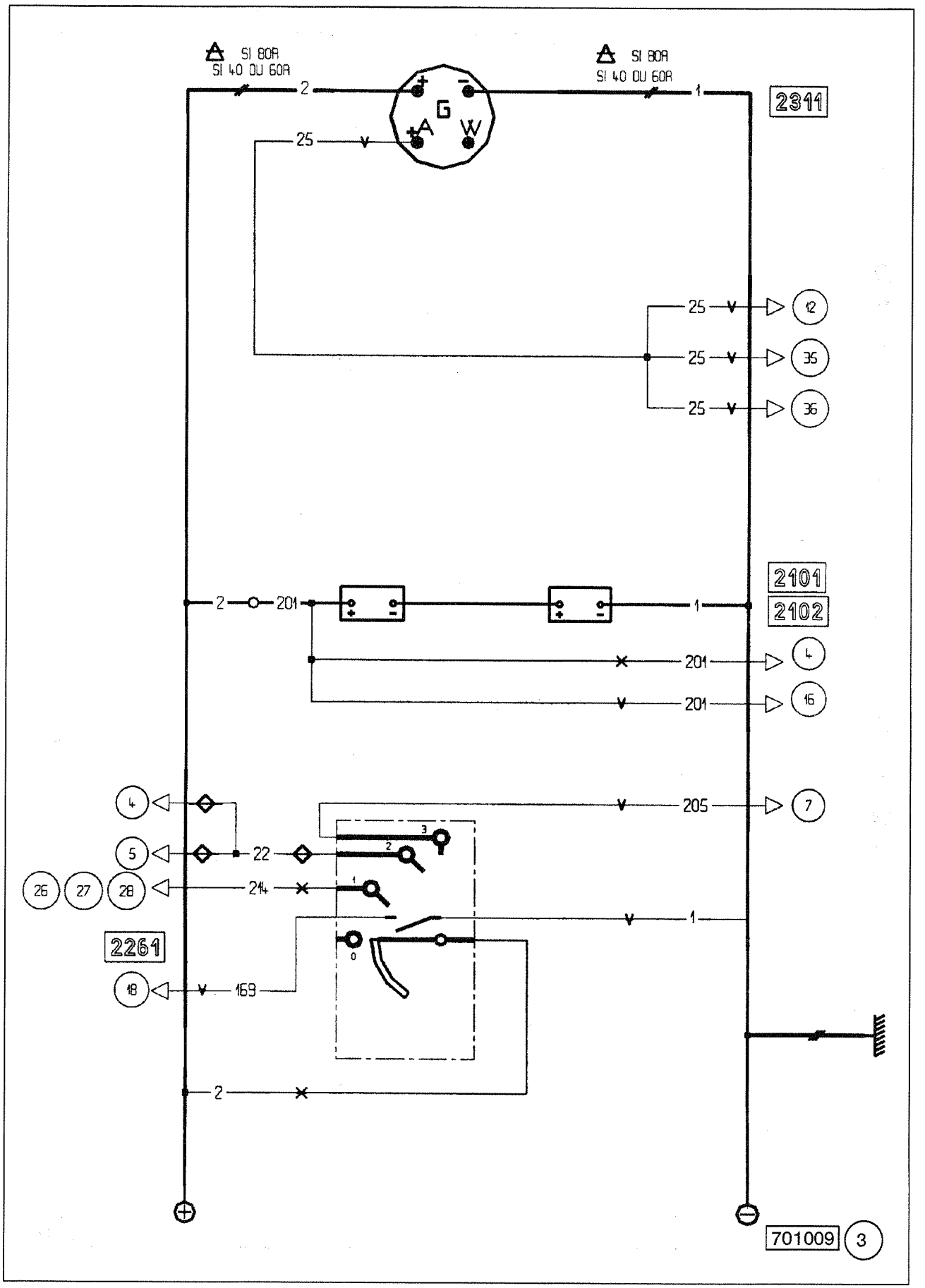

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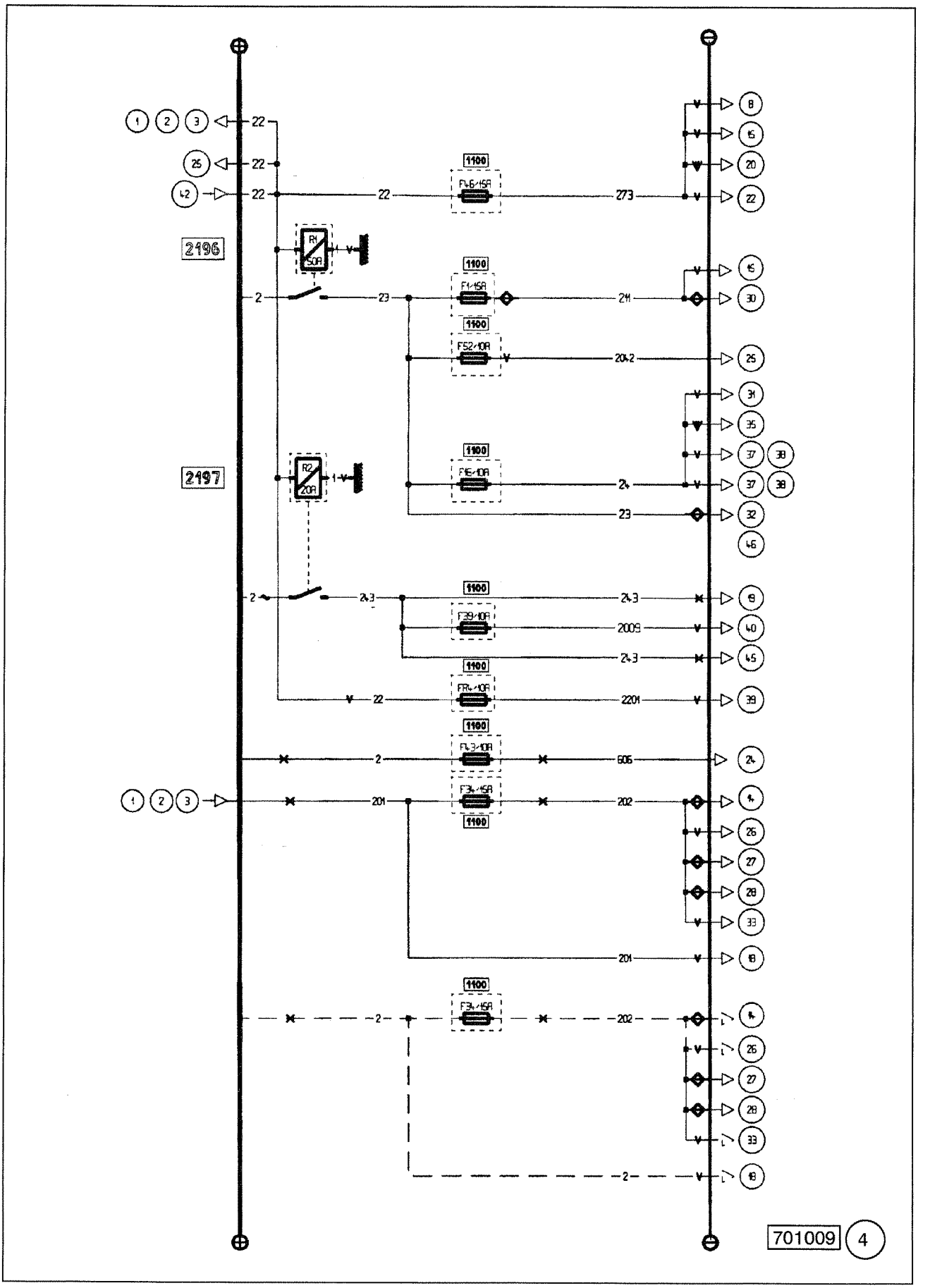

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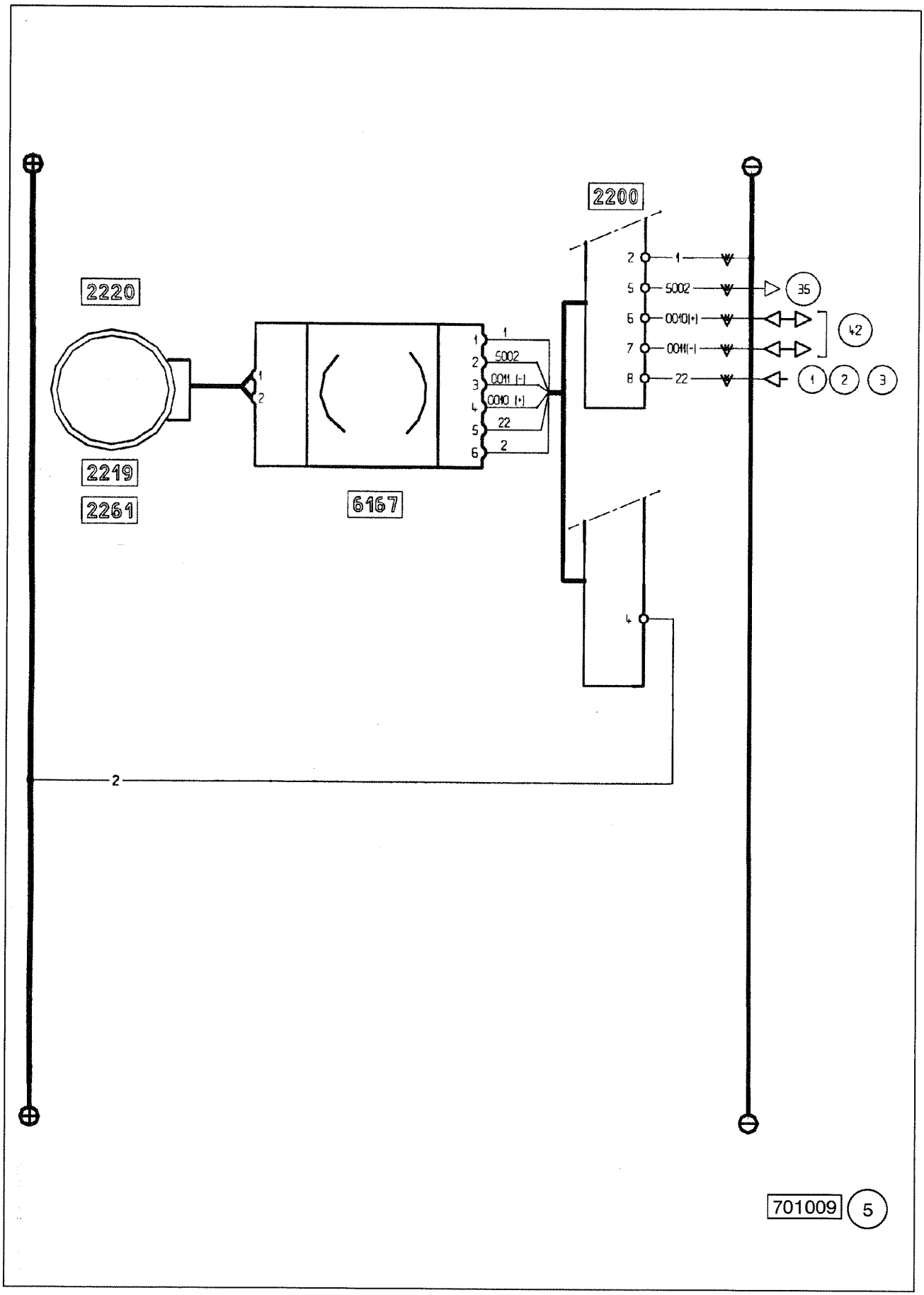
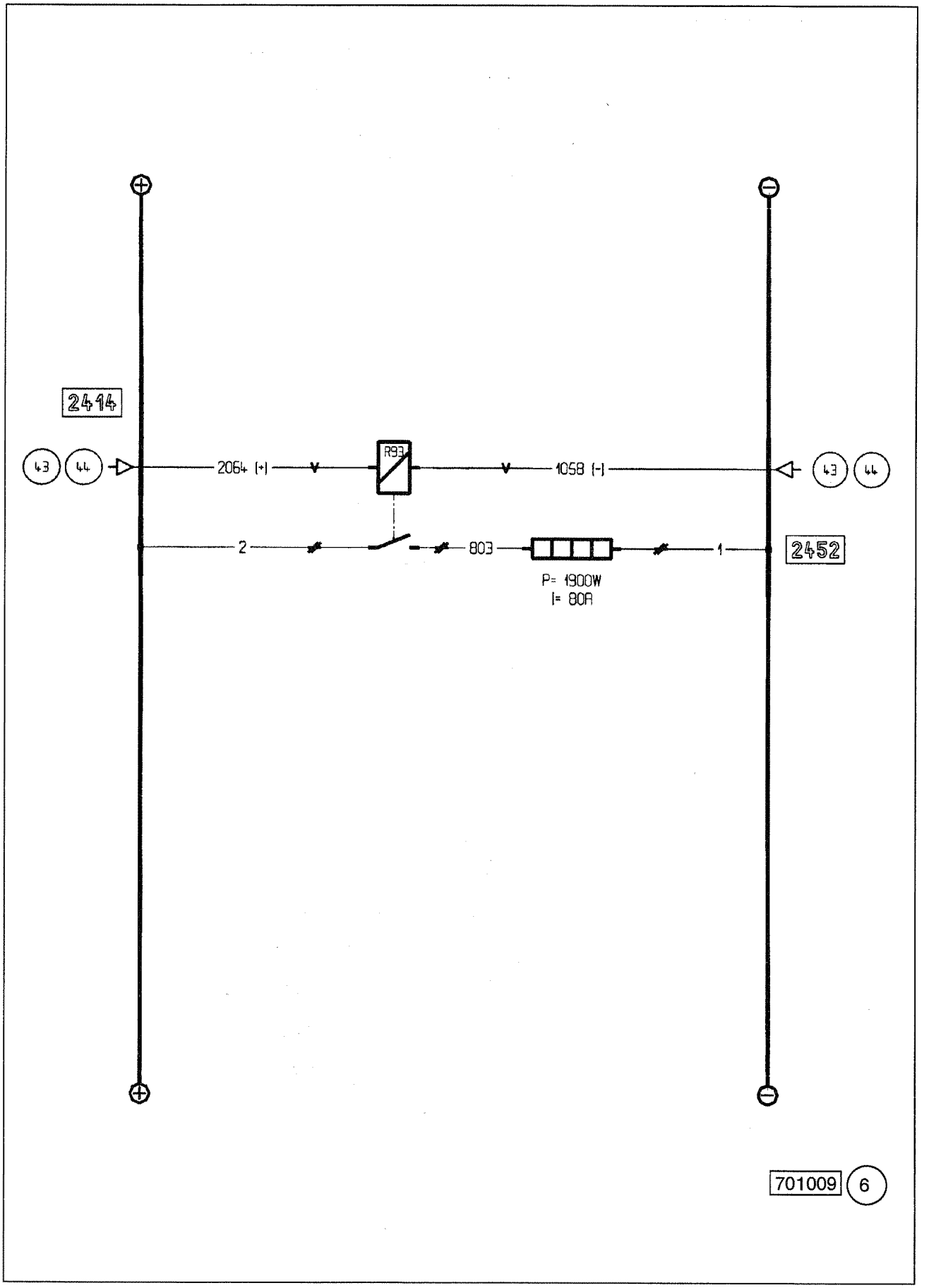


ELECTRONIC THEFT PROTECTION SYSTEM



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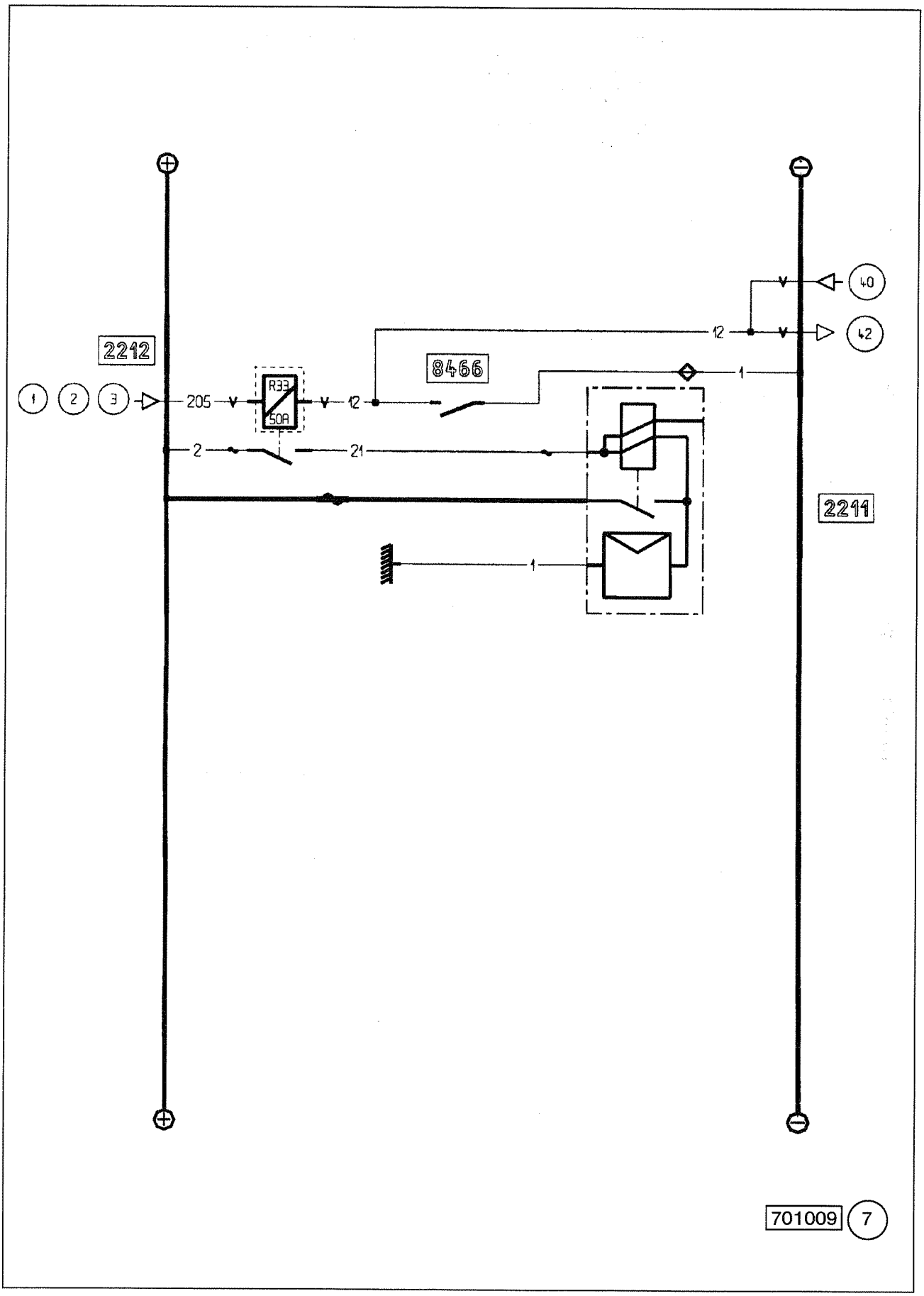

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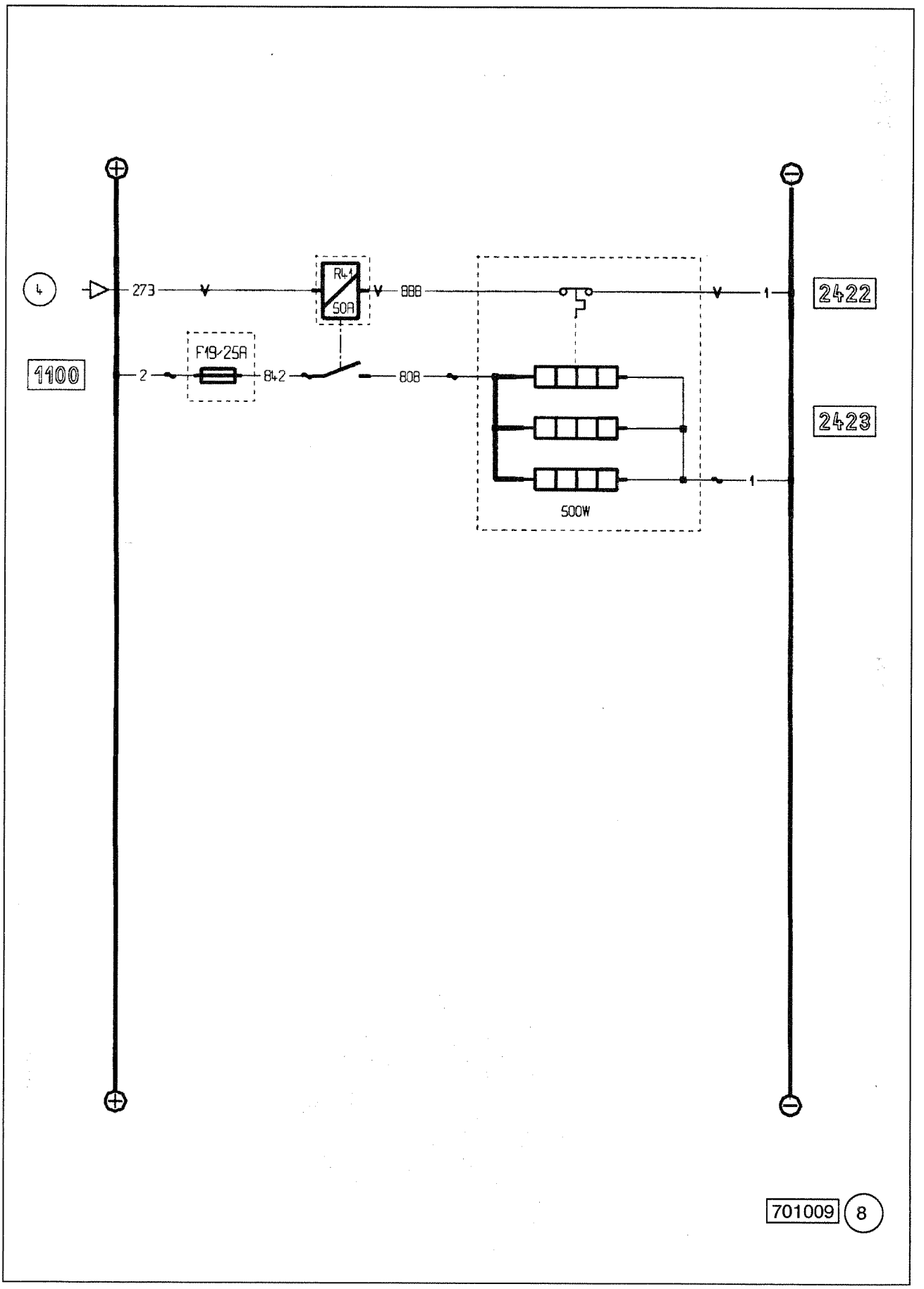

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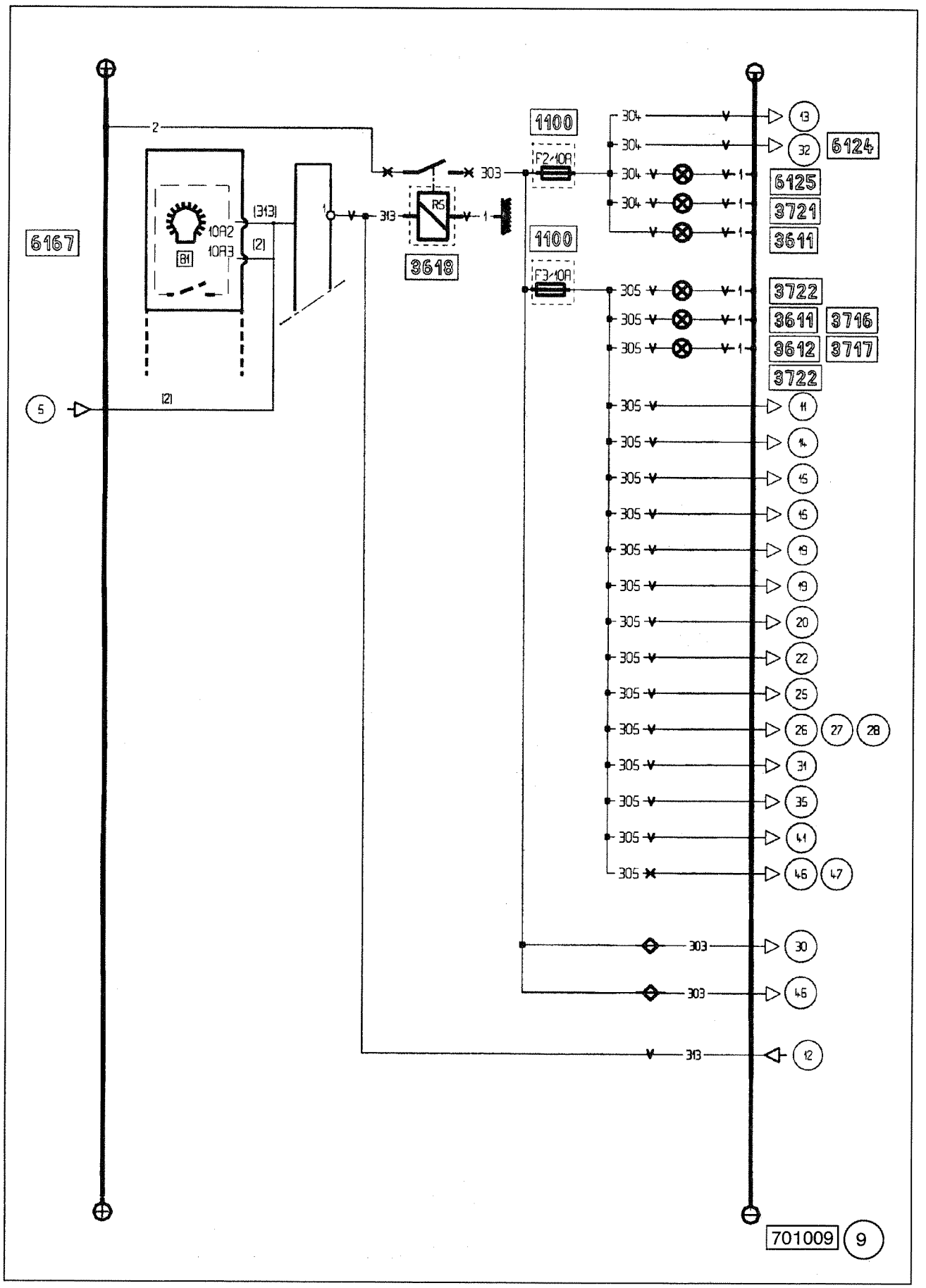
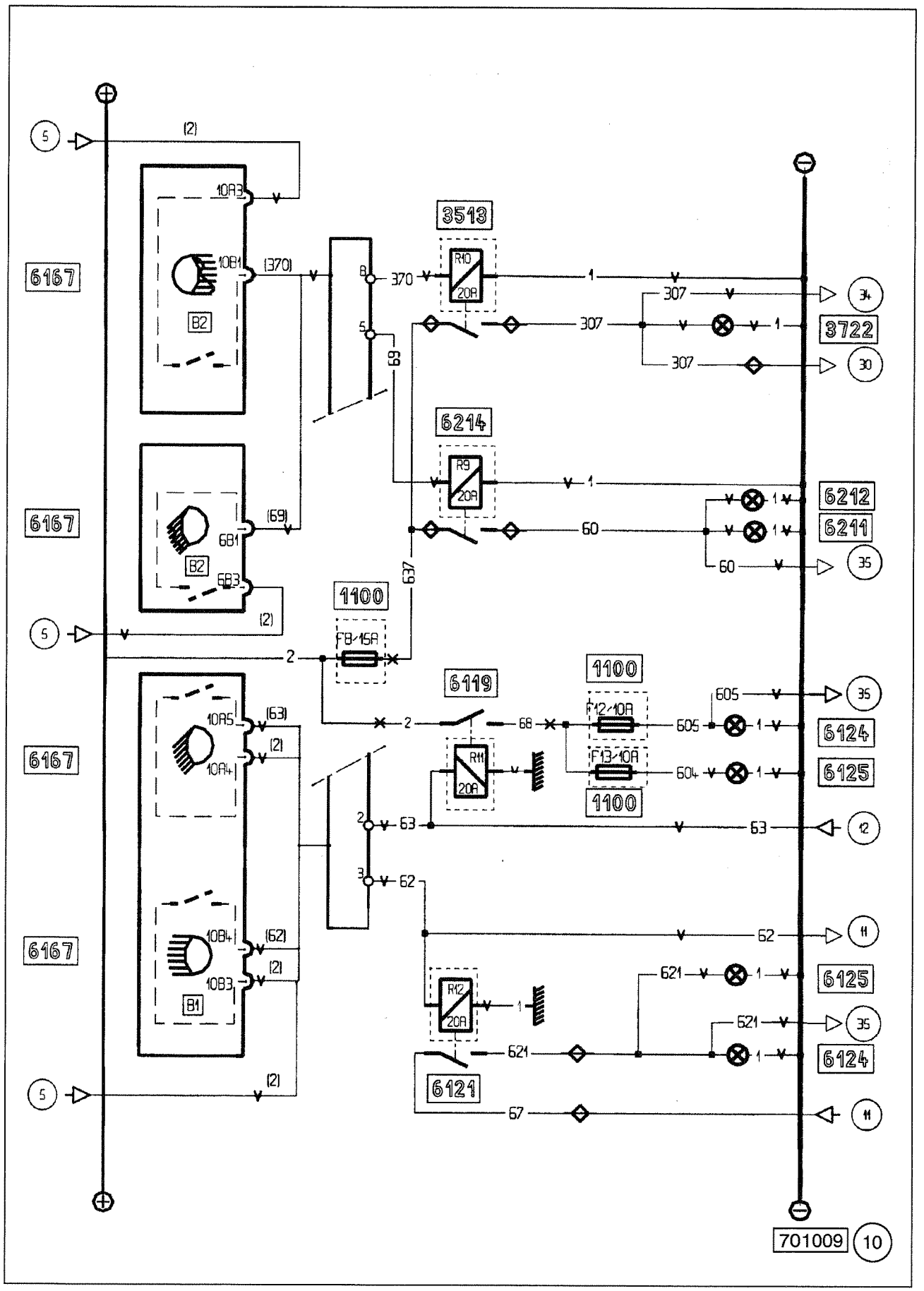


ROAD LIGHTING



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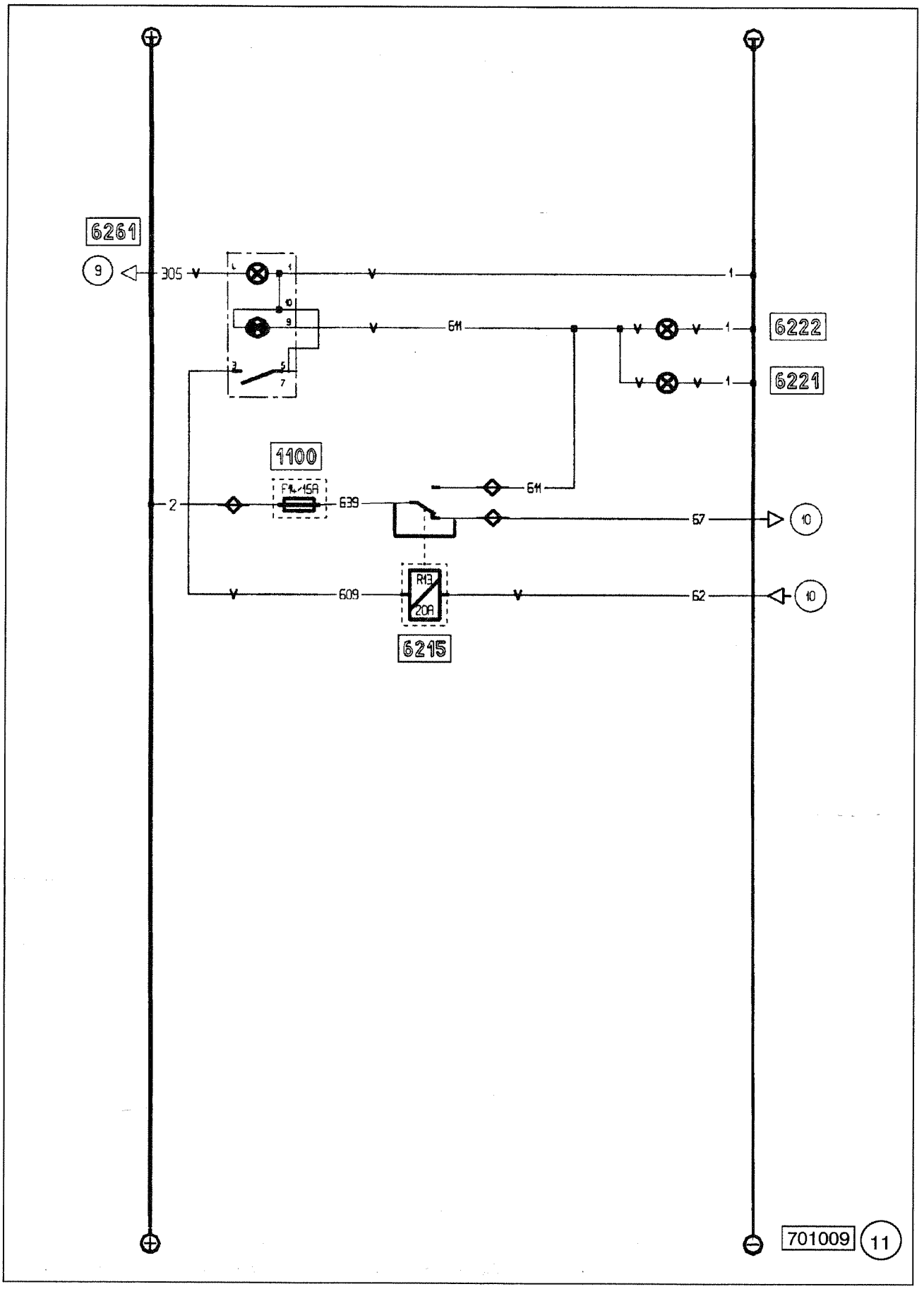

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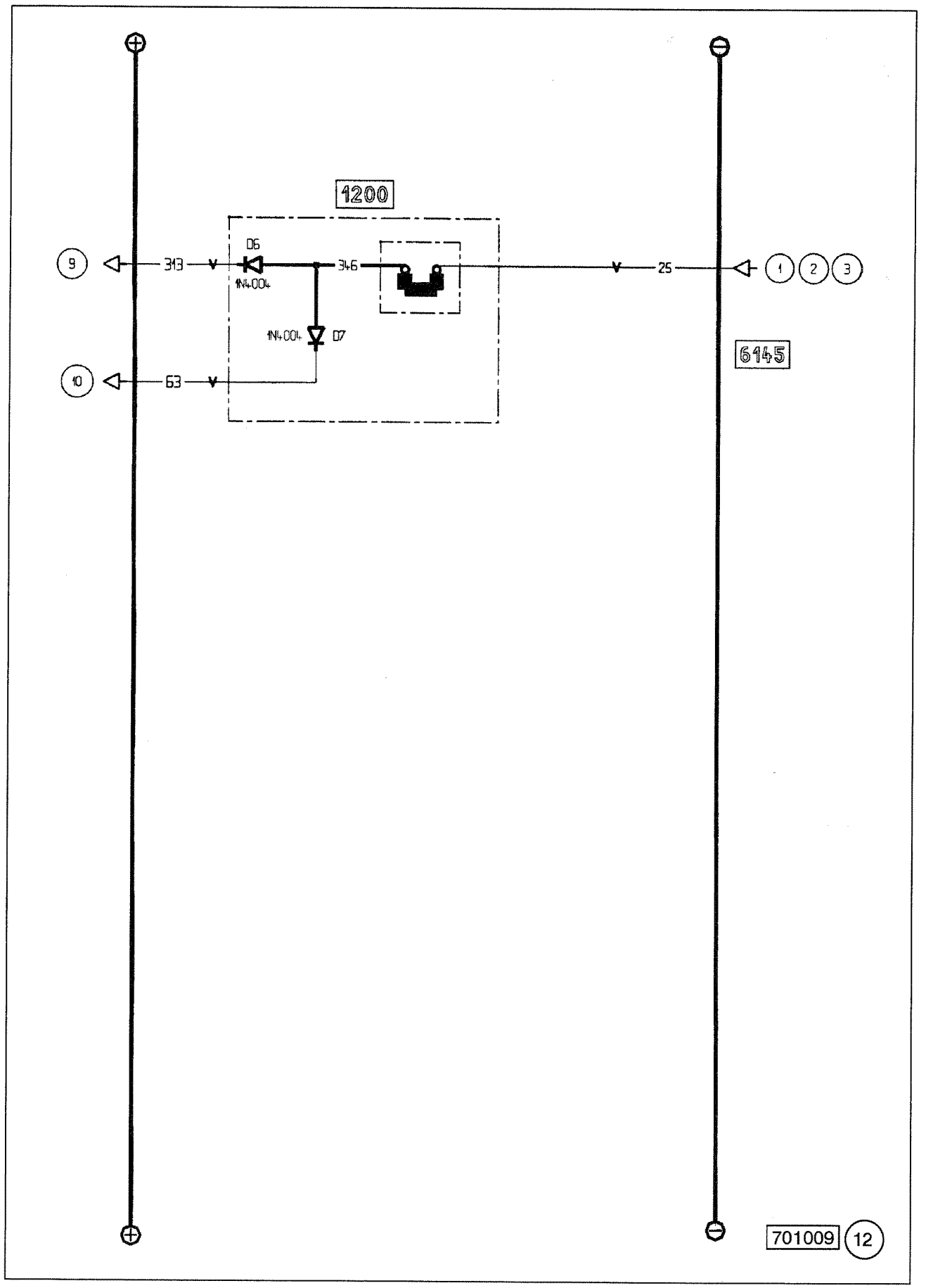
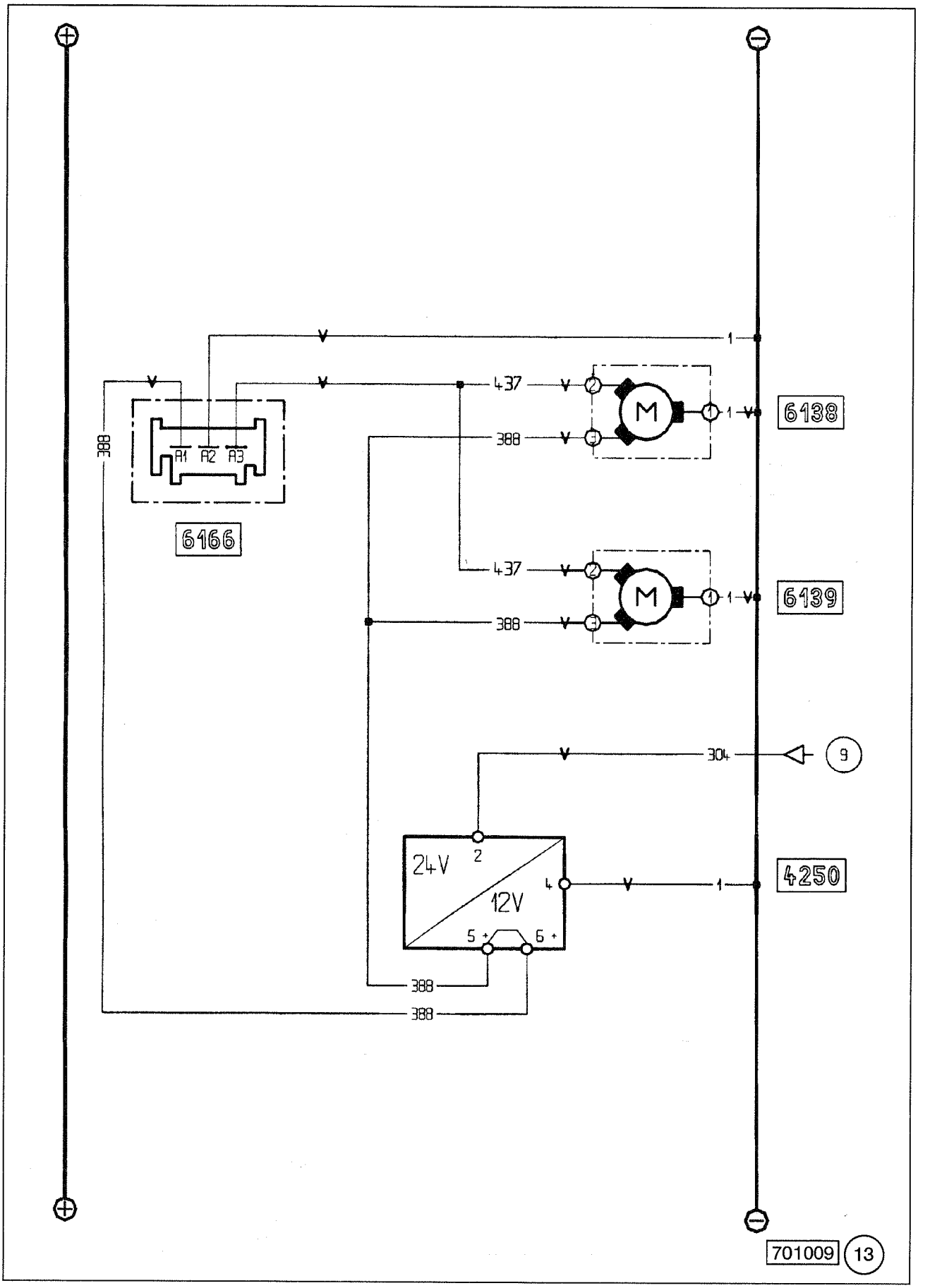


DAYTIME LIGHTS DIMMER



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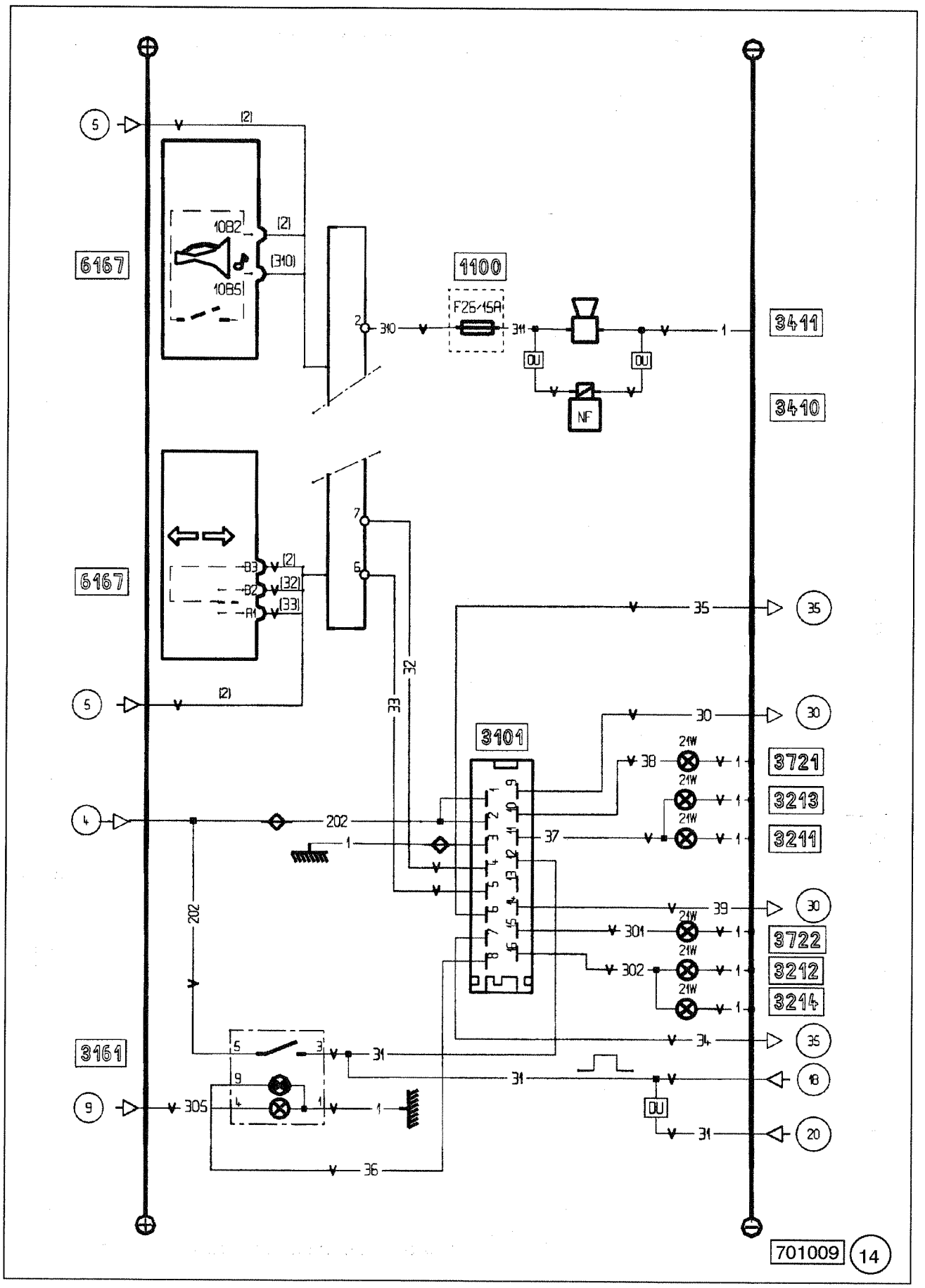
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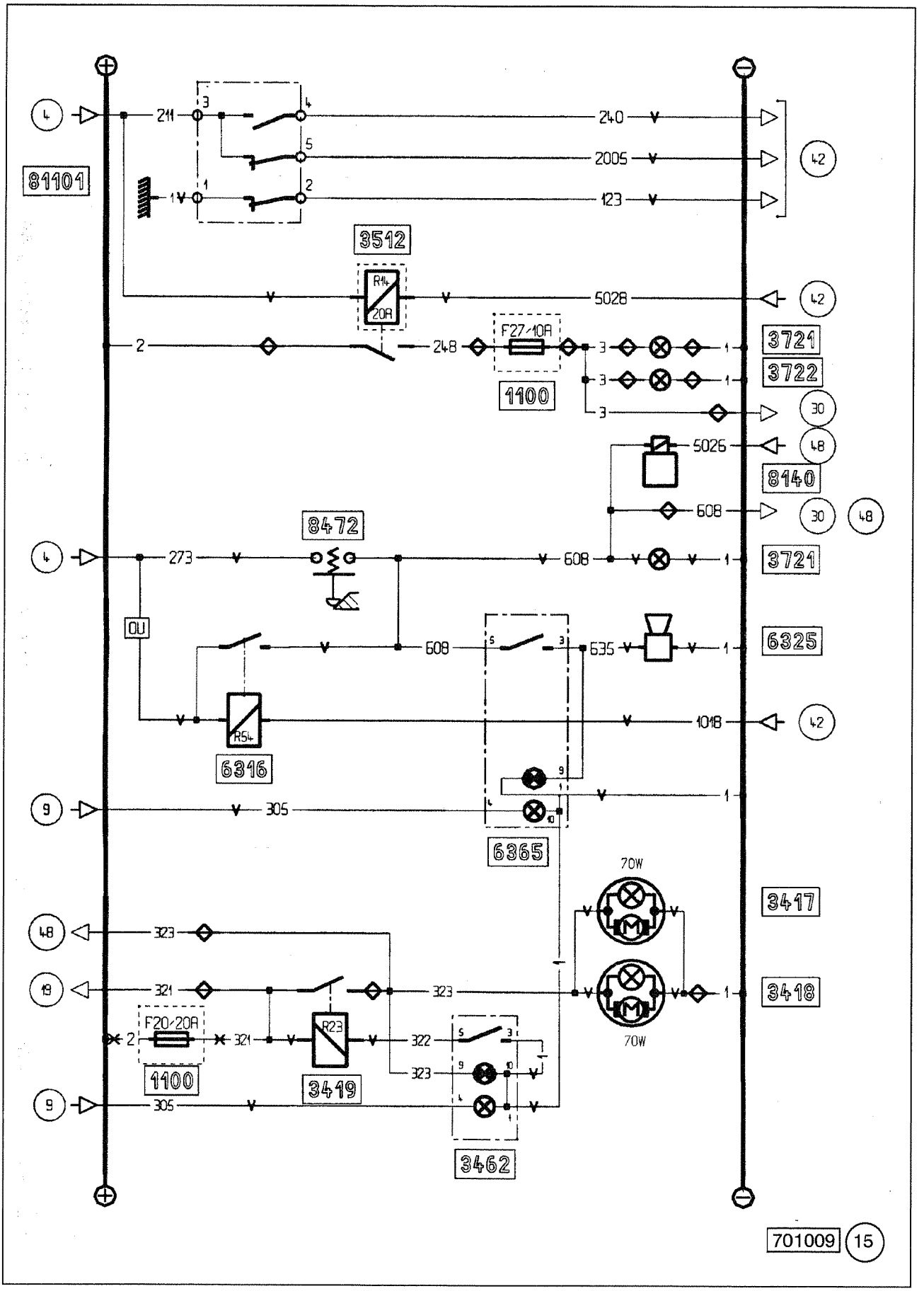
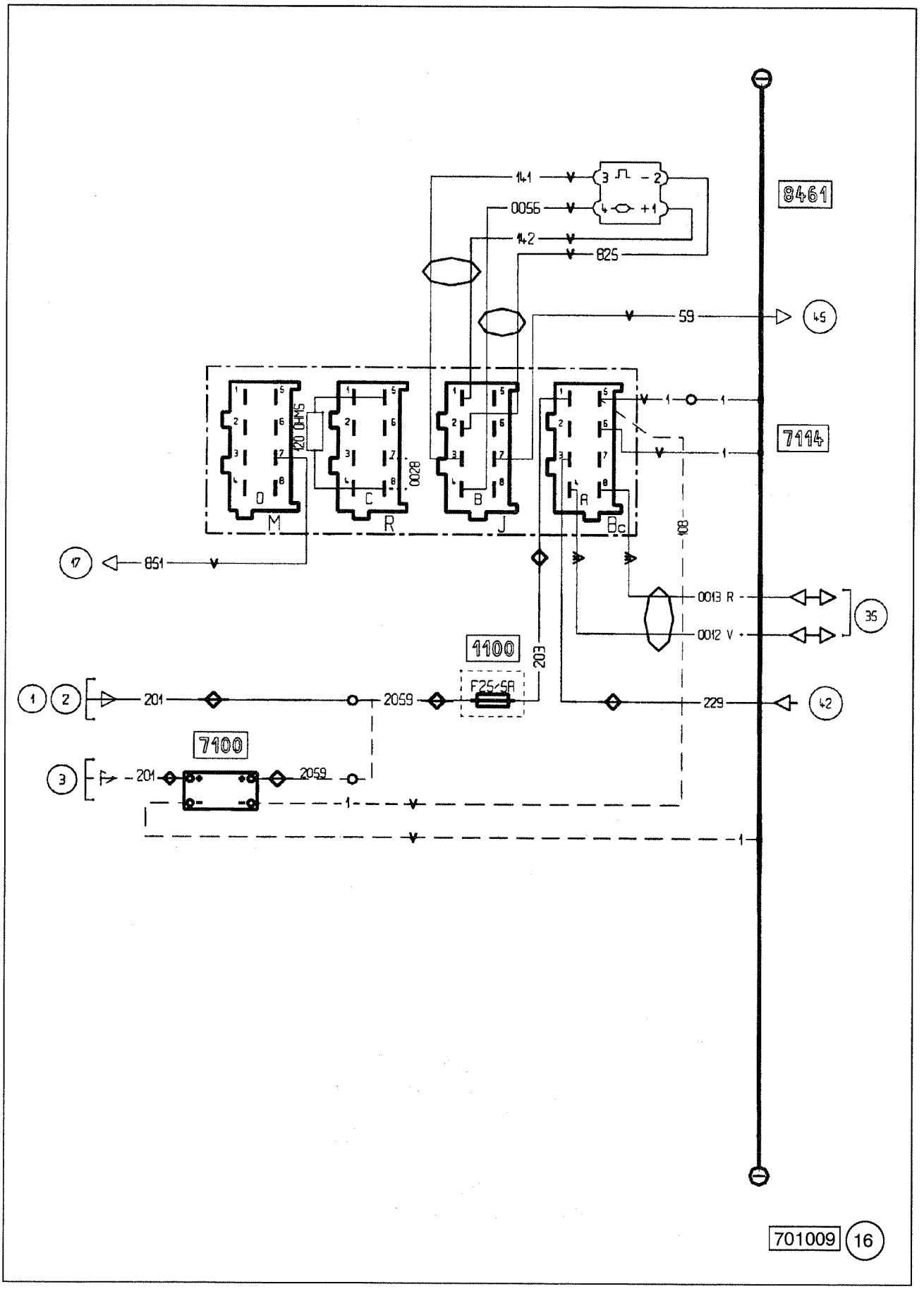


STOP LIGHTS / REVERSING LIGHTS / REVOLVING BEACONS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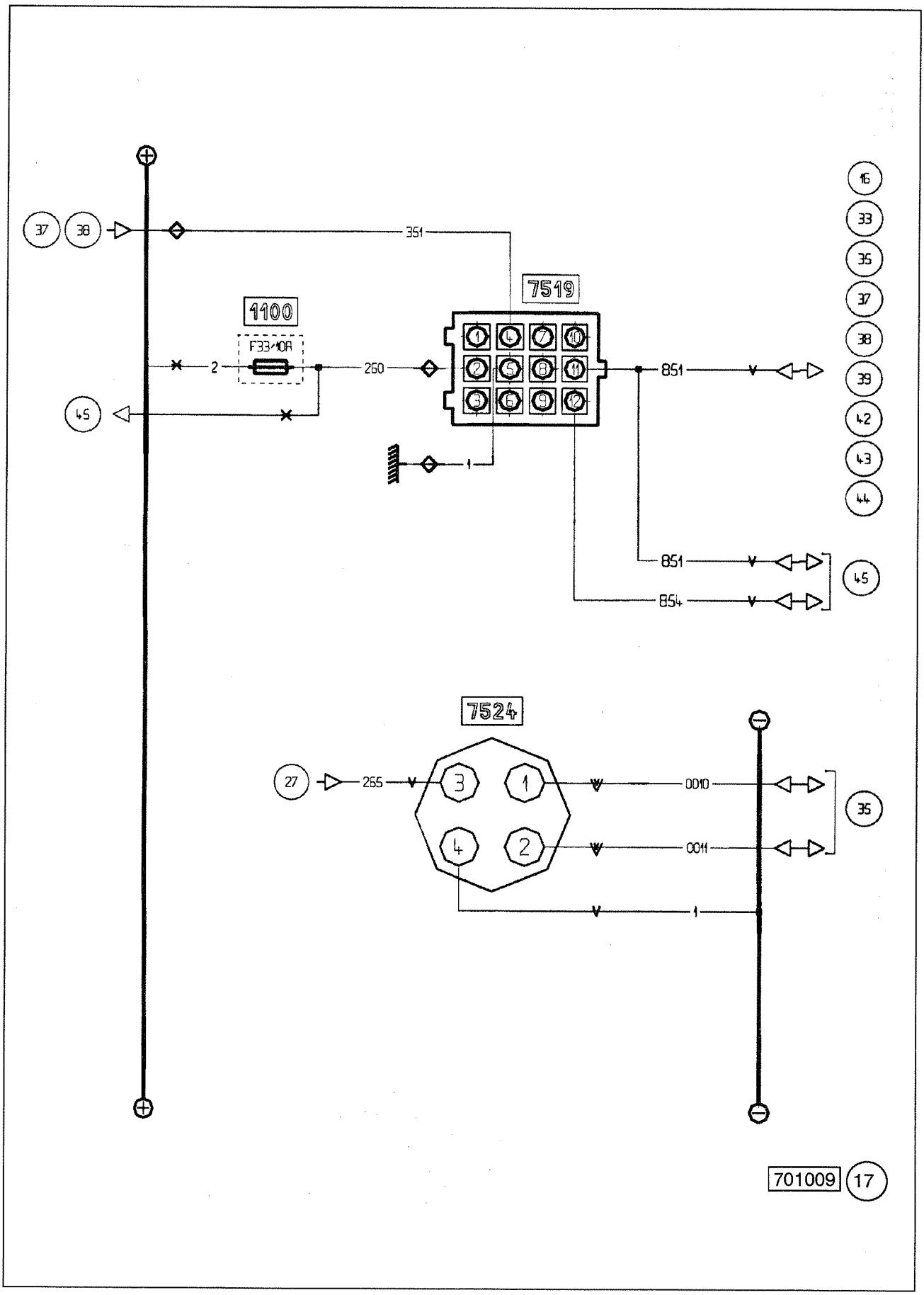
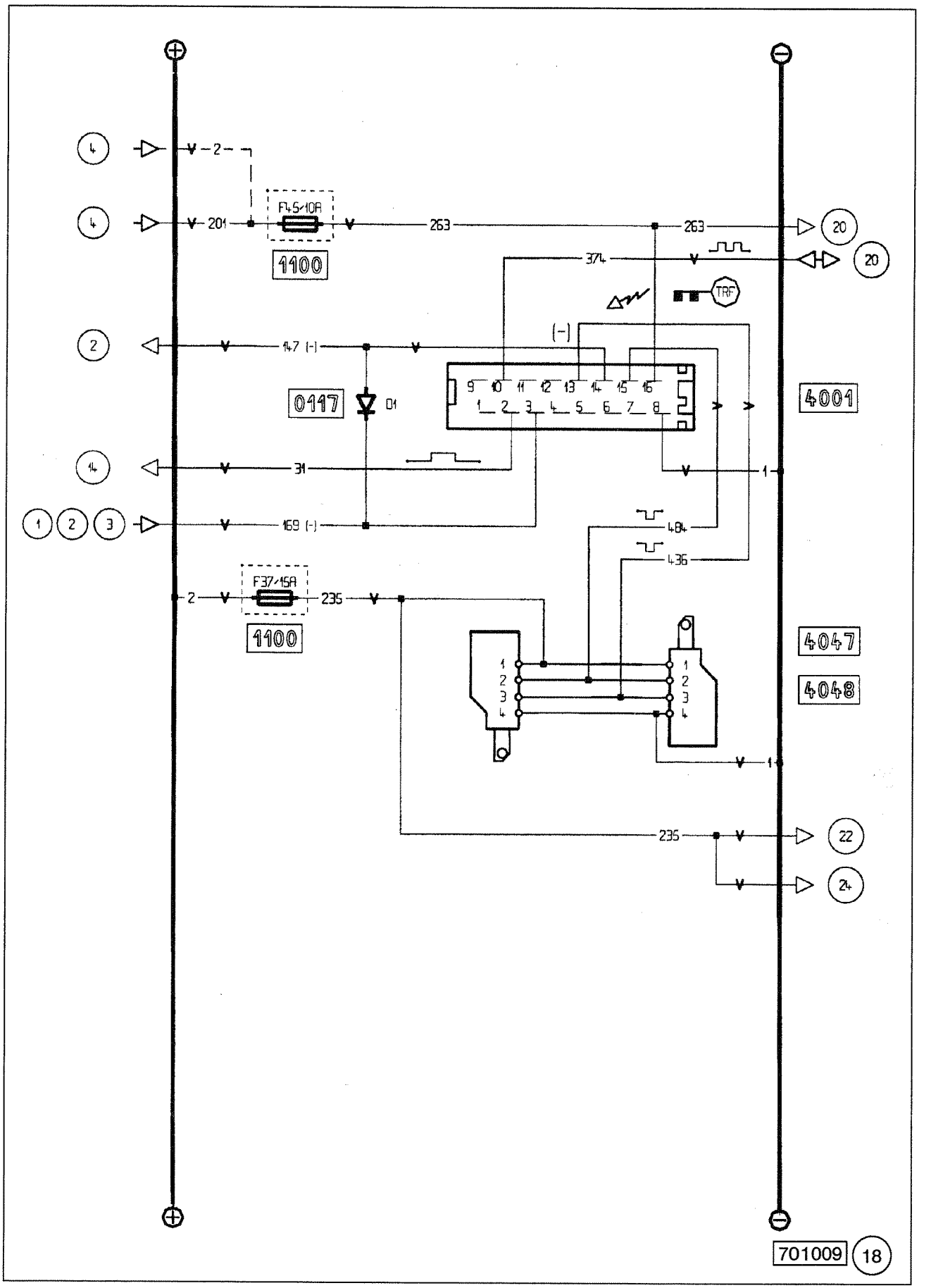


DIAGNOSTICS SOCKETS



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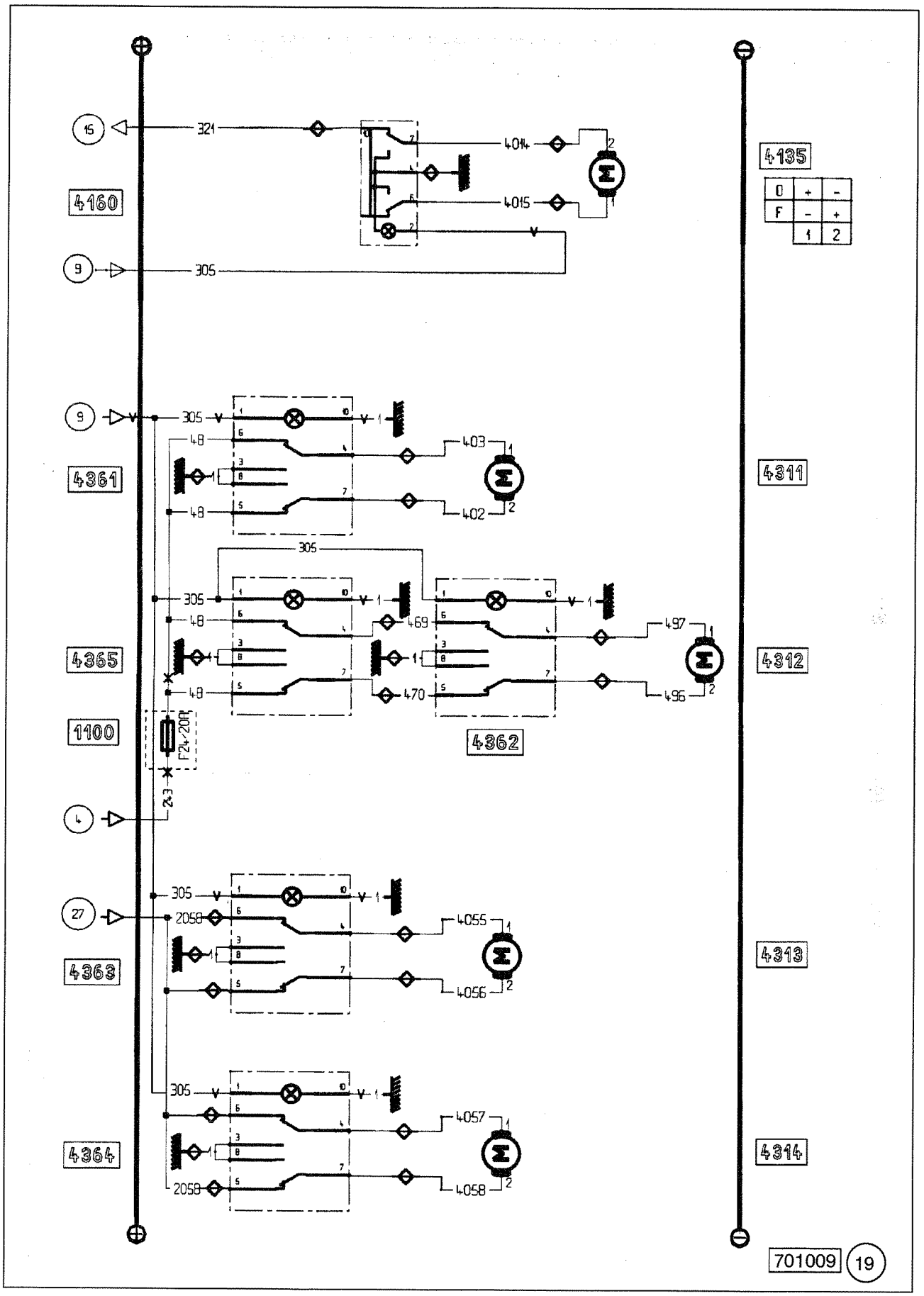

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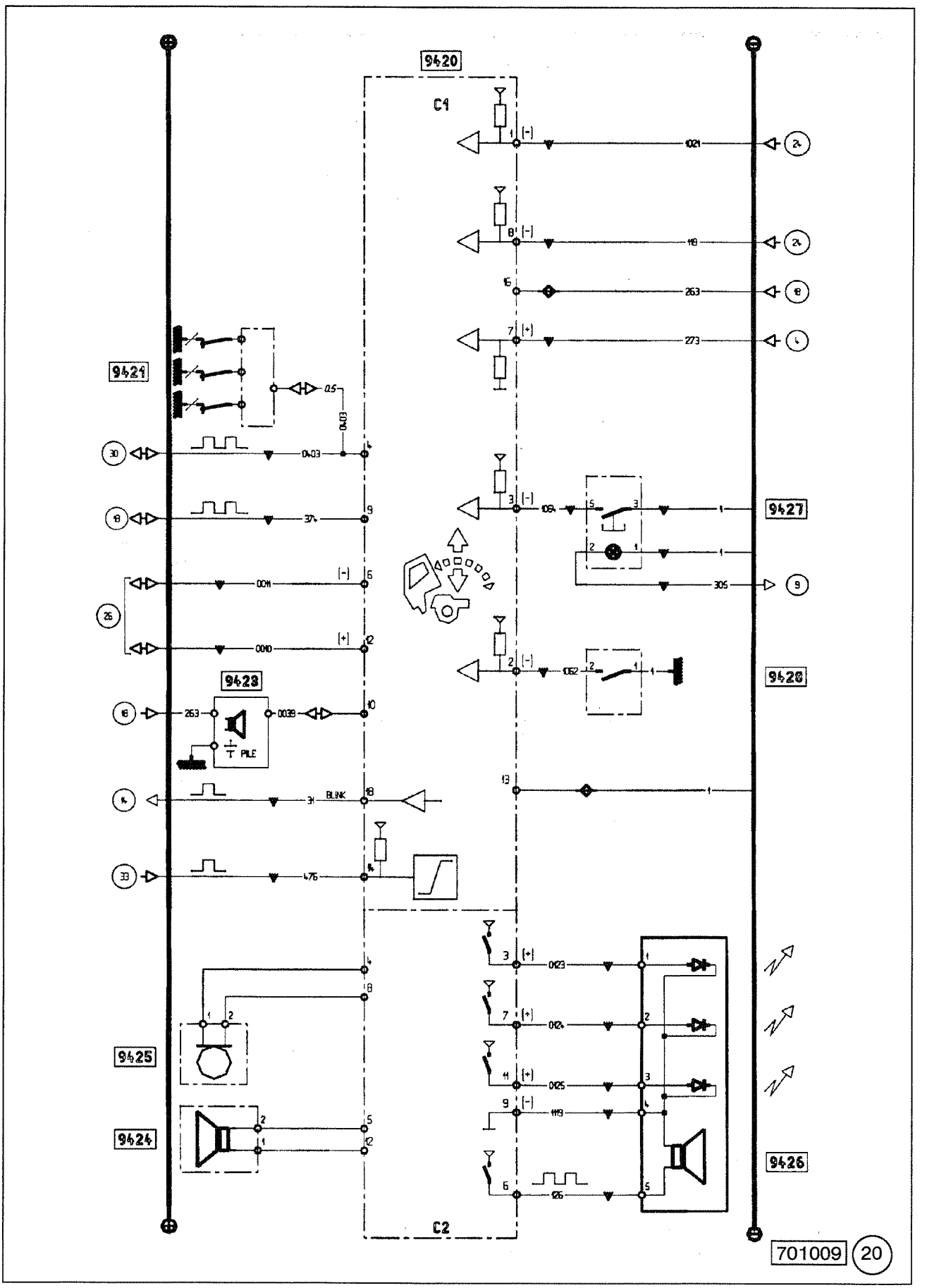
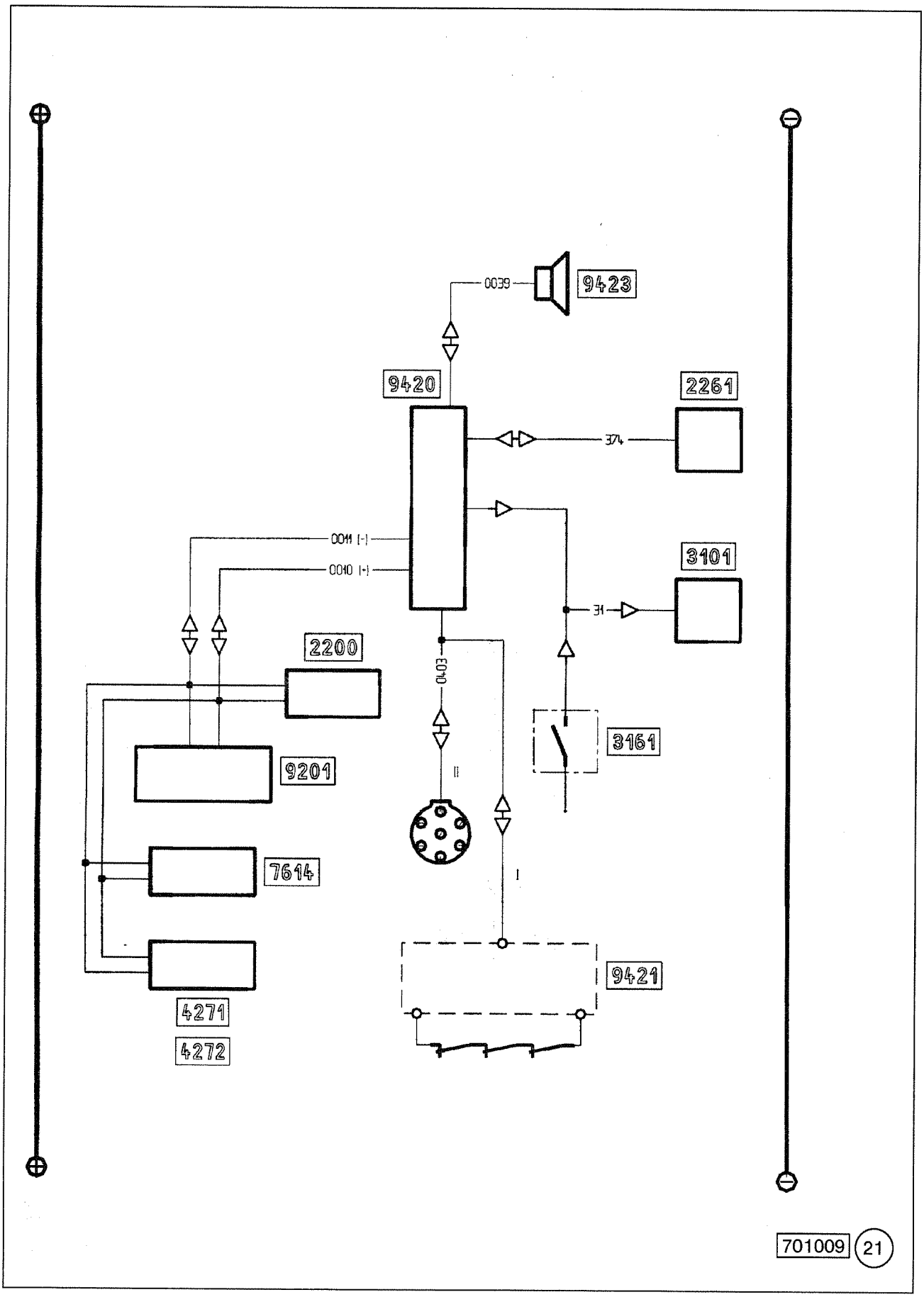


VEHICLE PROTECTION



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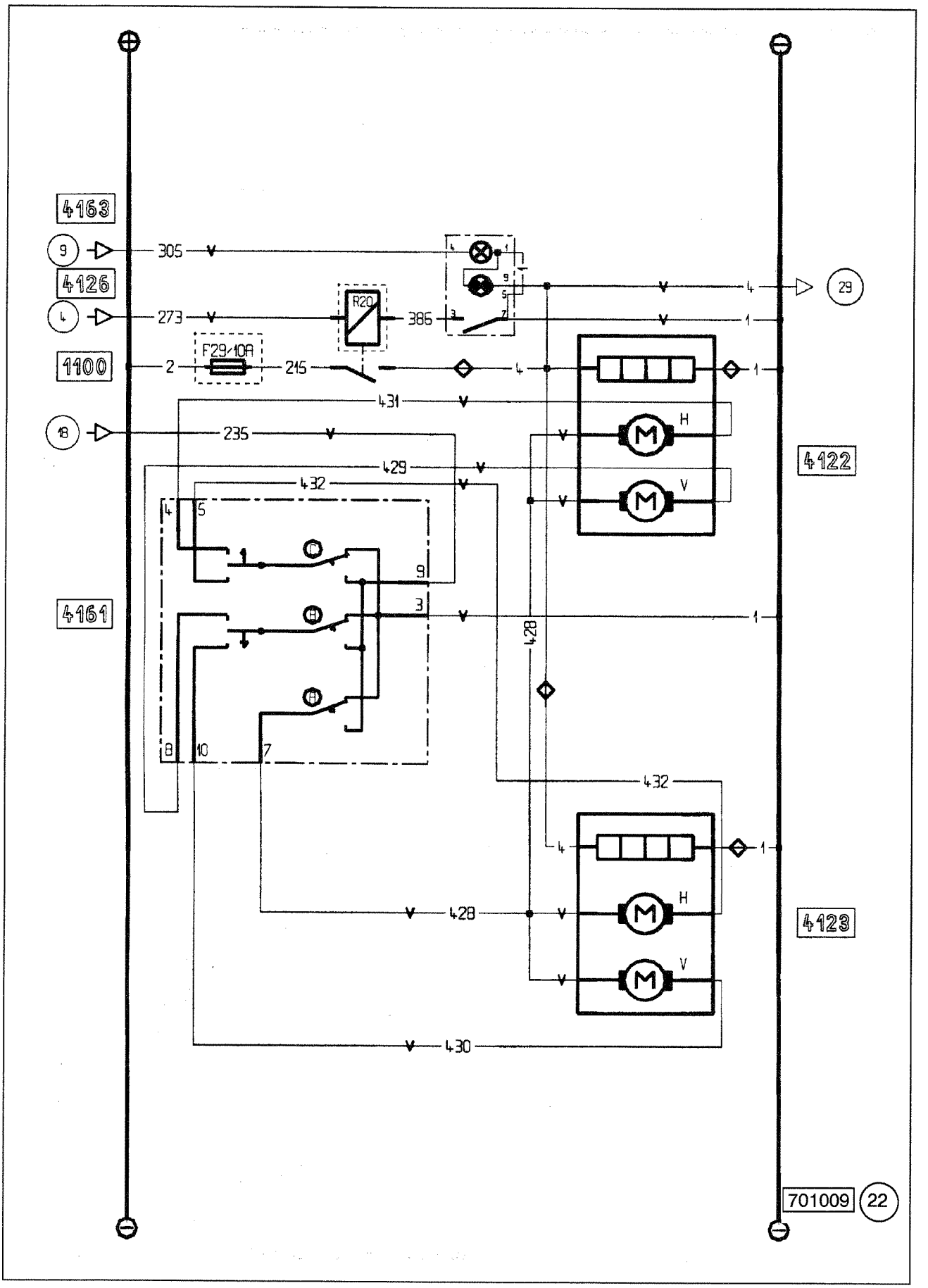
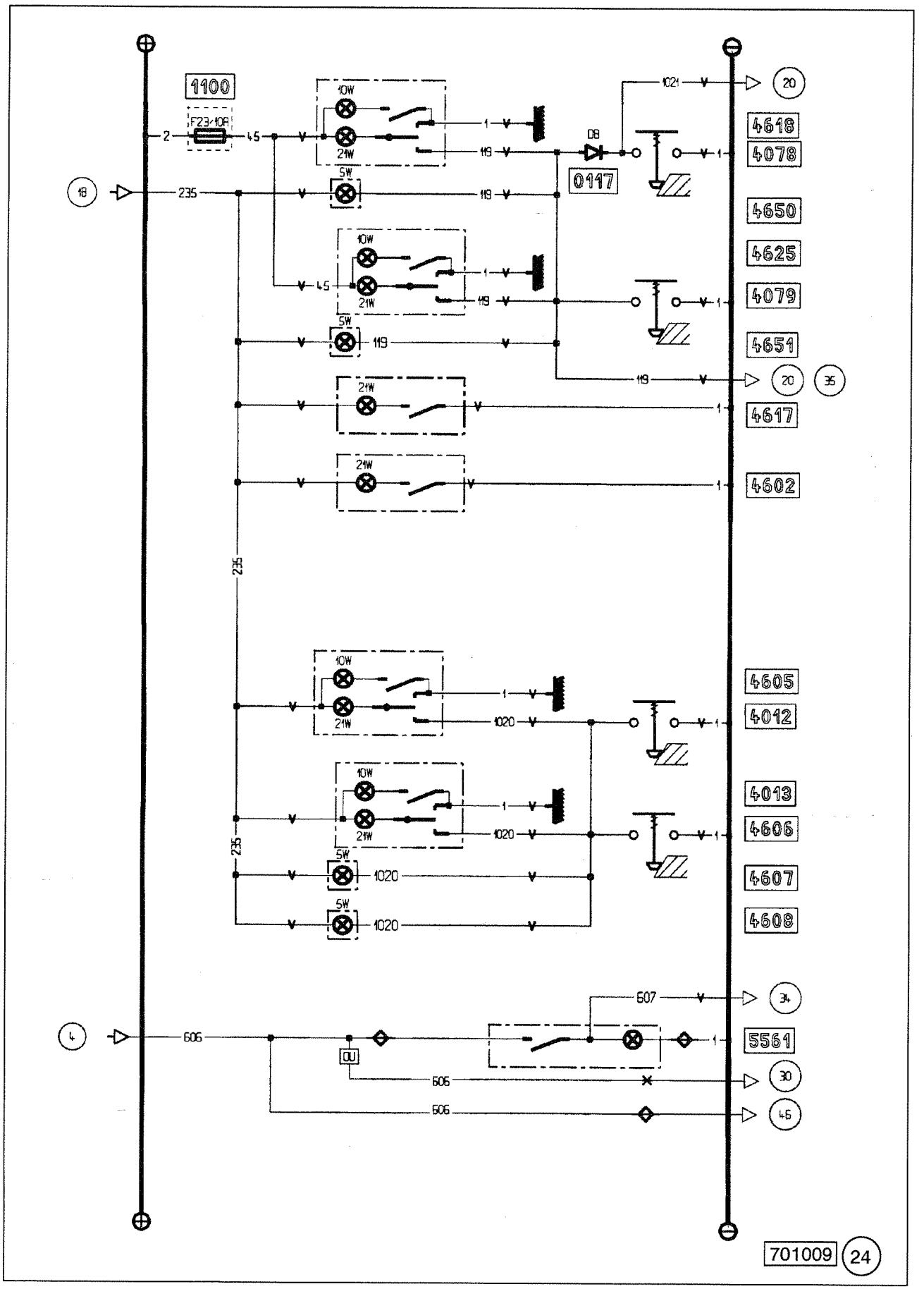
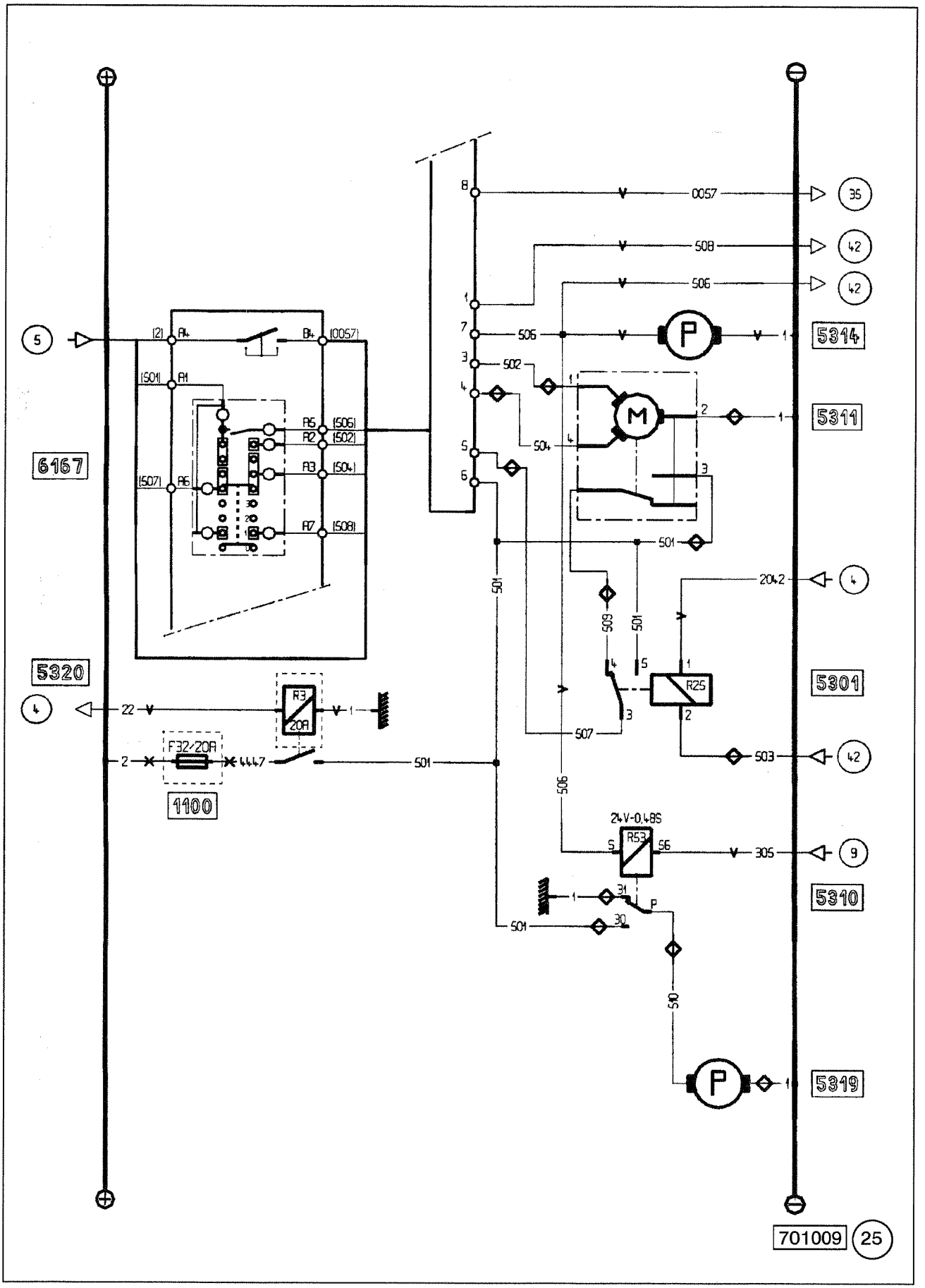


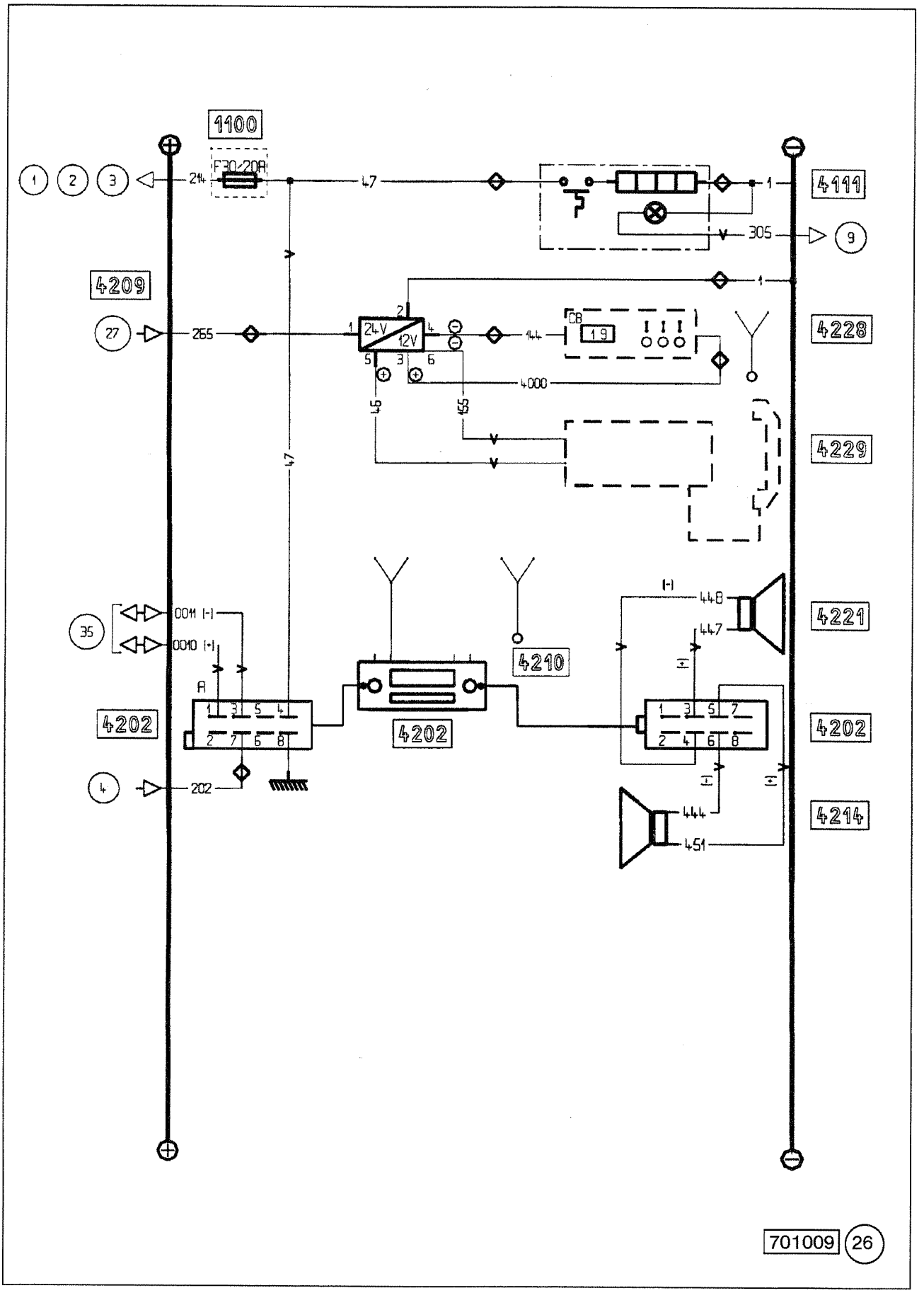
ELECTRIC DEFROSTING REARVIEW MIRROR



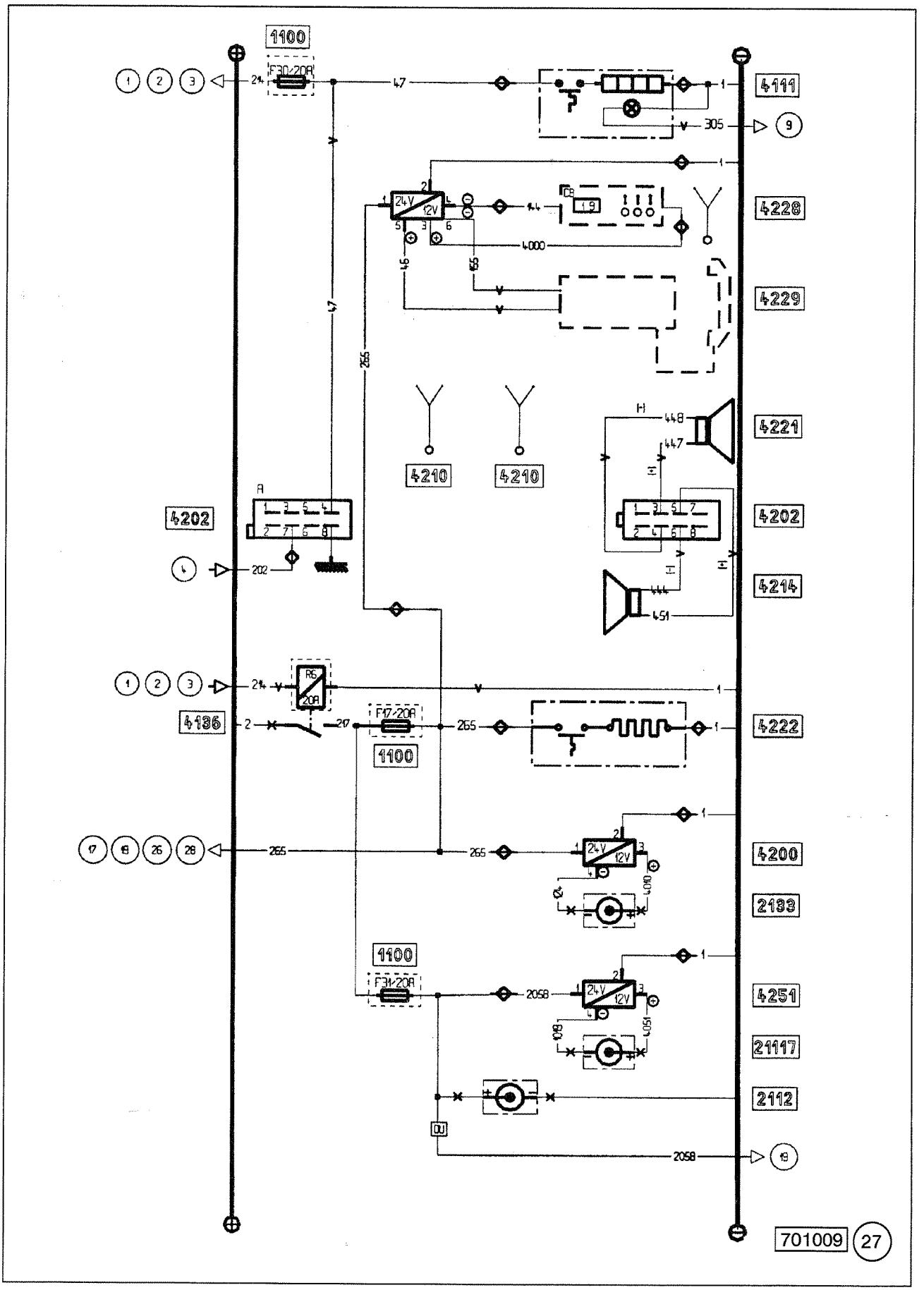
CAB INTERIOR LIGHTING / LOADING FLOODLIGHT



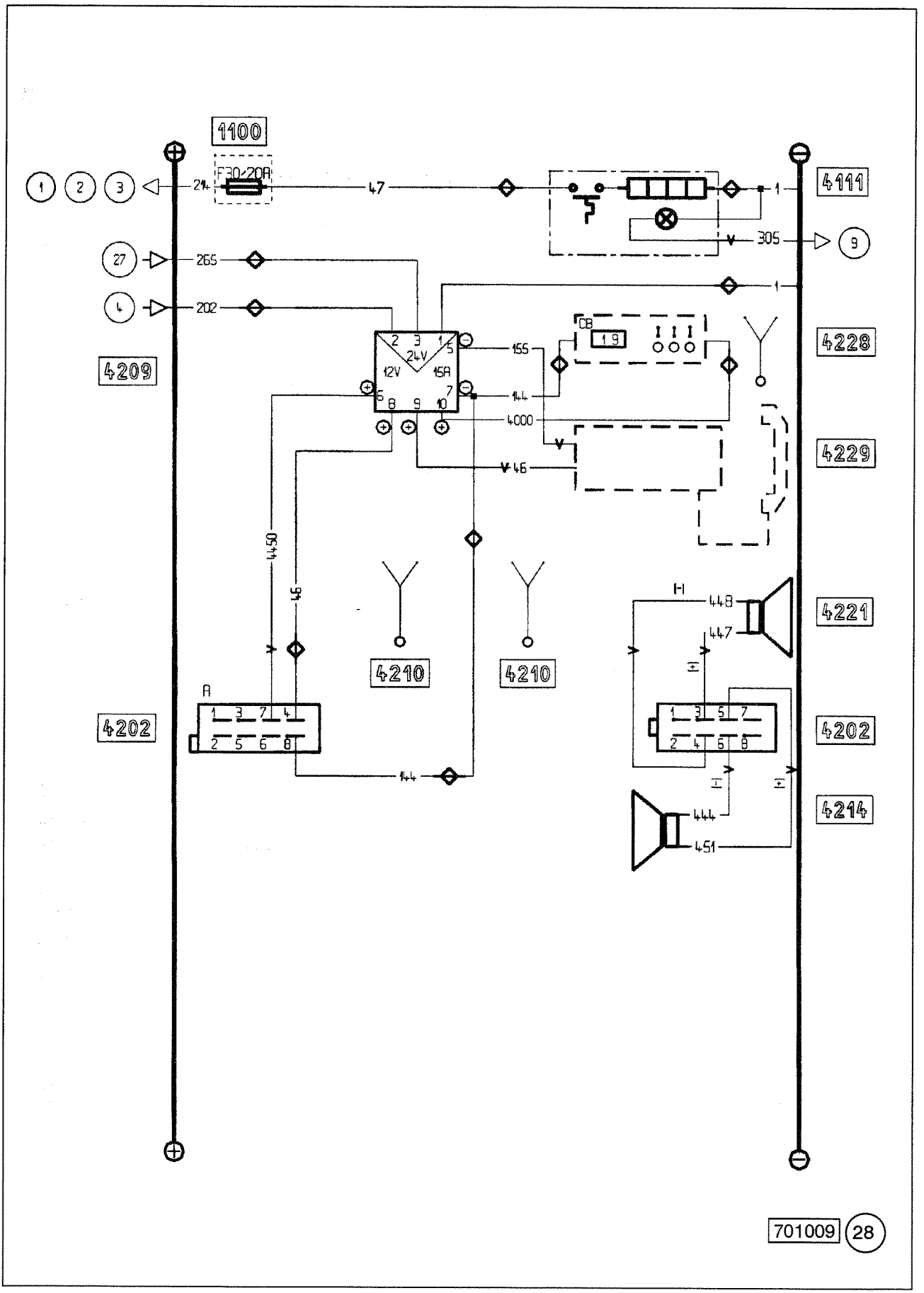
WINDSCREEN WIPER / SCREEN WASH / HEADLAMP WASH



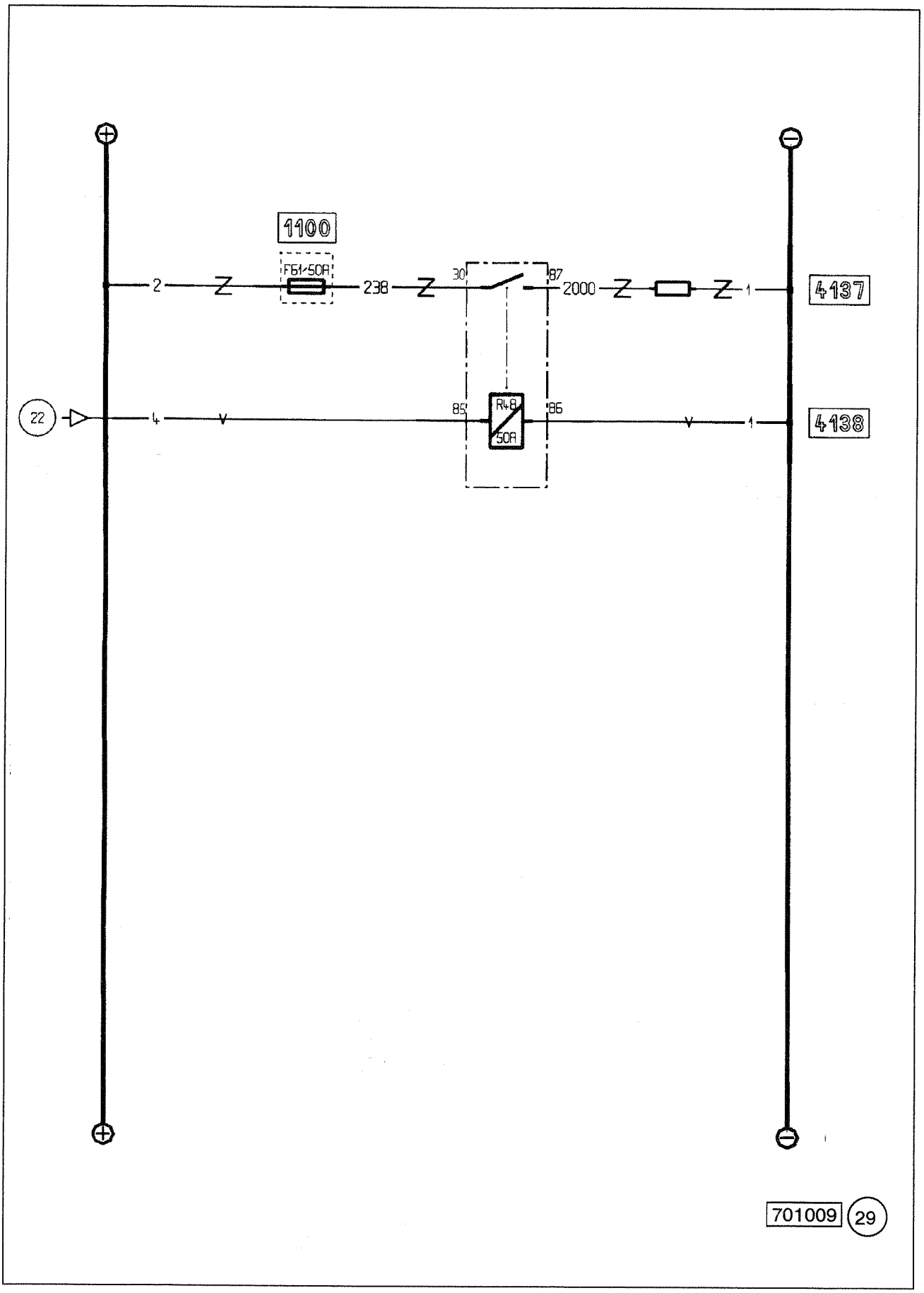
HEATED SEAT / CIGAR LIGHTER / 12V SOCKET/RADIO SET / TELEPHONE / CB



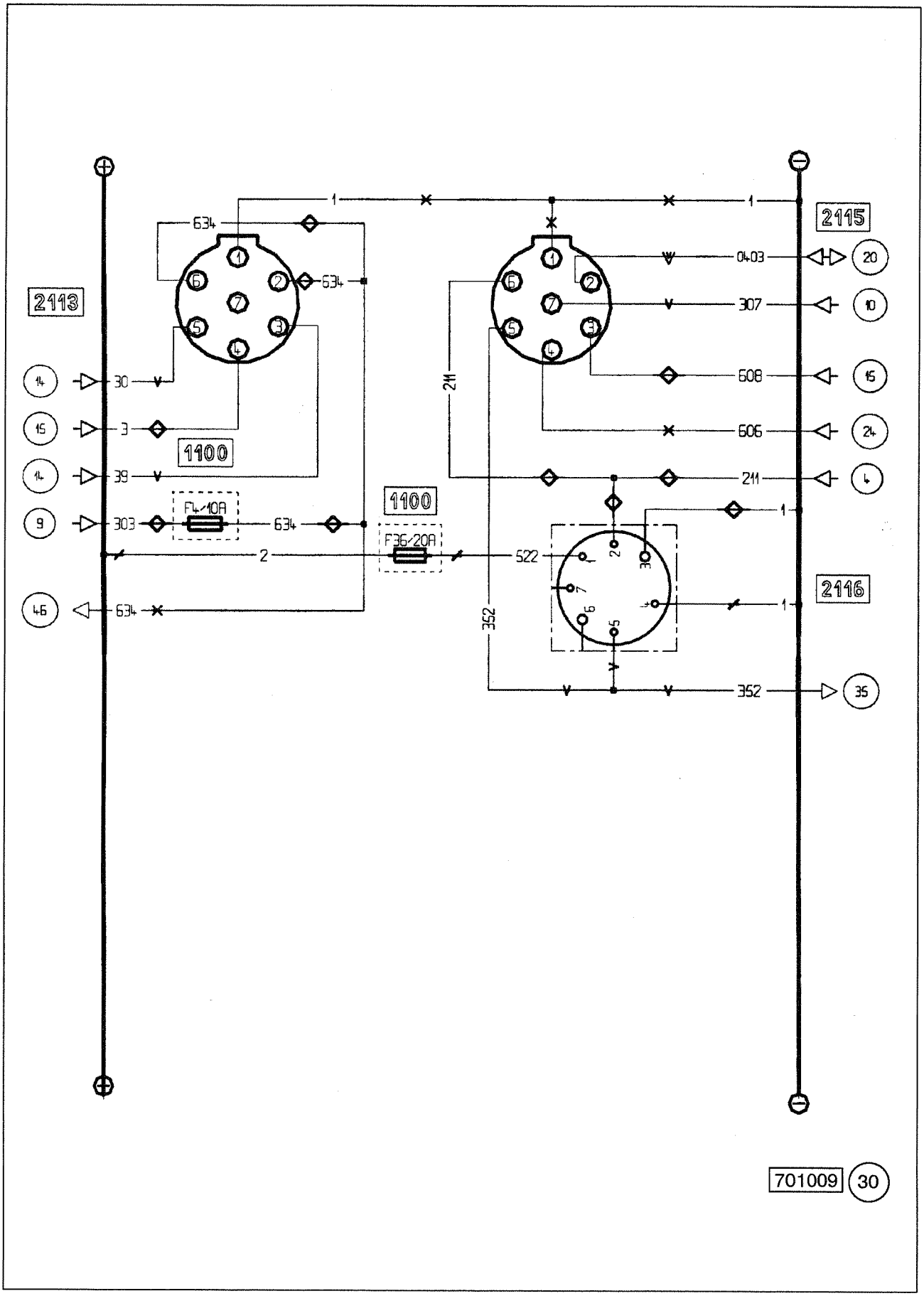
HEATED SEAT / CIGAR LIGHTER / 12V SOCKET/RADIO SET / TELEPHONE / CB



HEATED SEAT / CIGAR LIGHTER / 12V SOCKET/RADIO SET / TELEPHONE / CB



WINDSCREEN DEFROSTING



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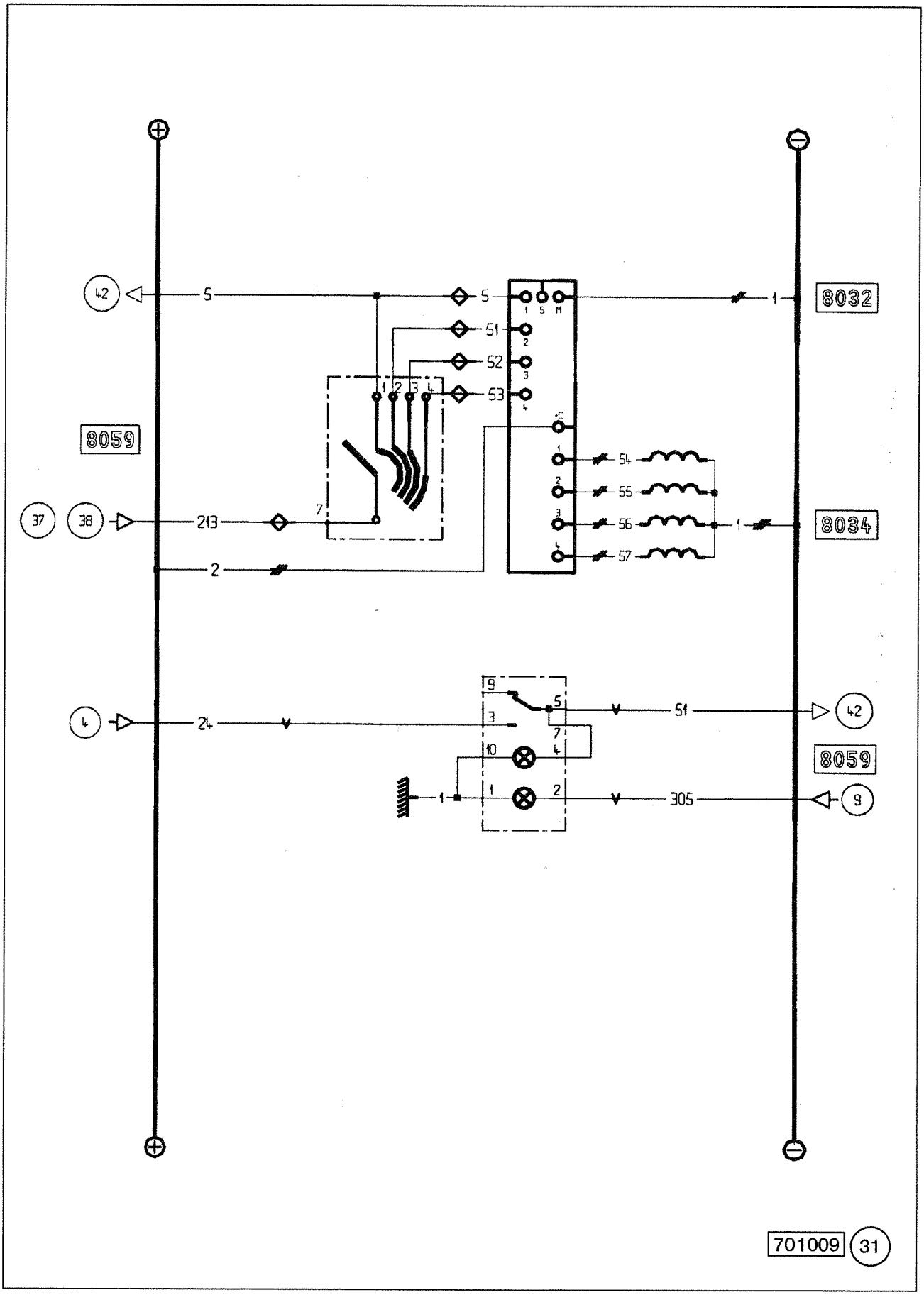
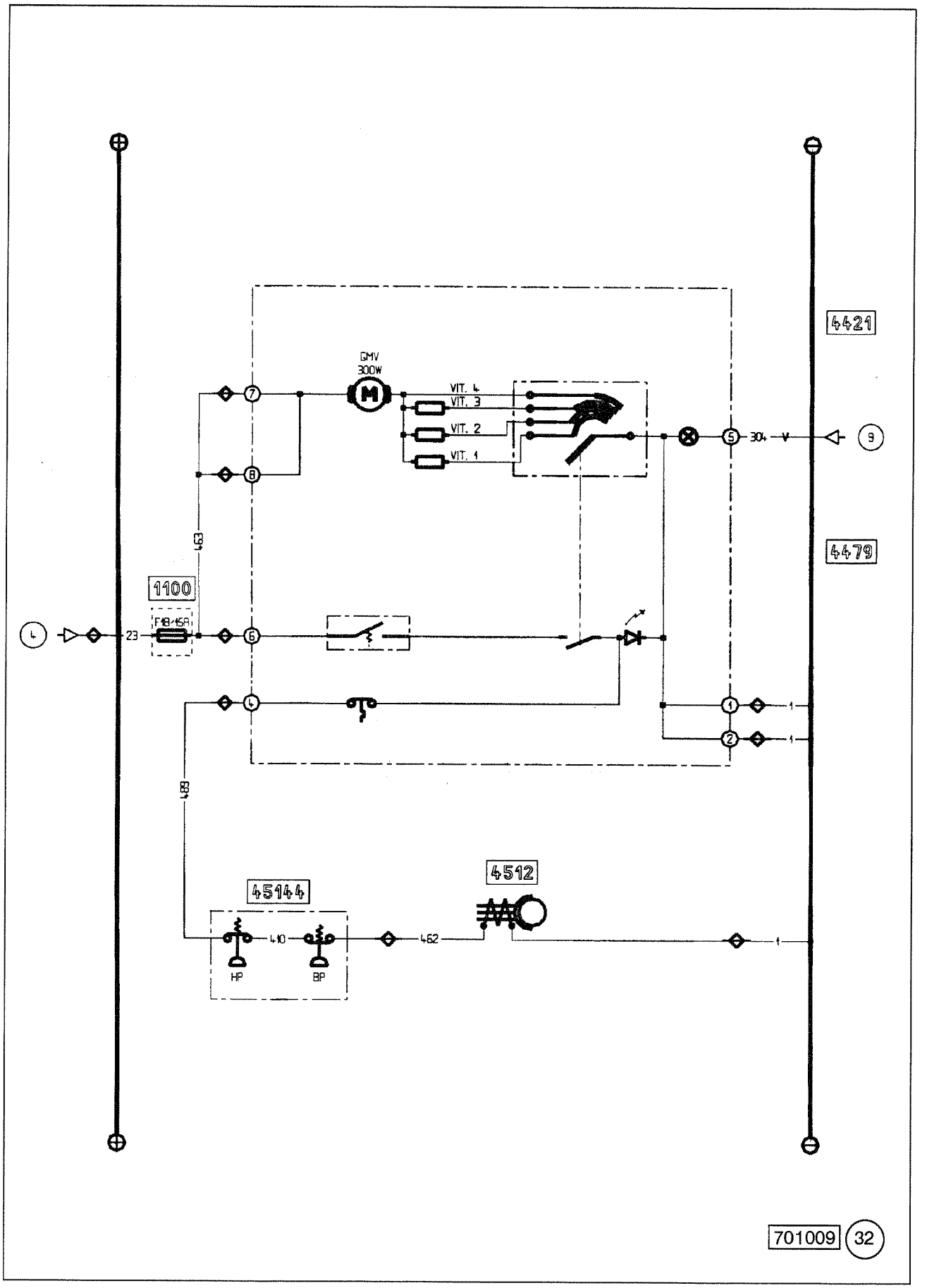
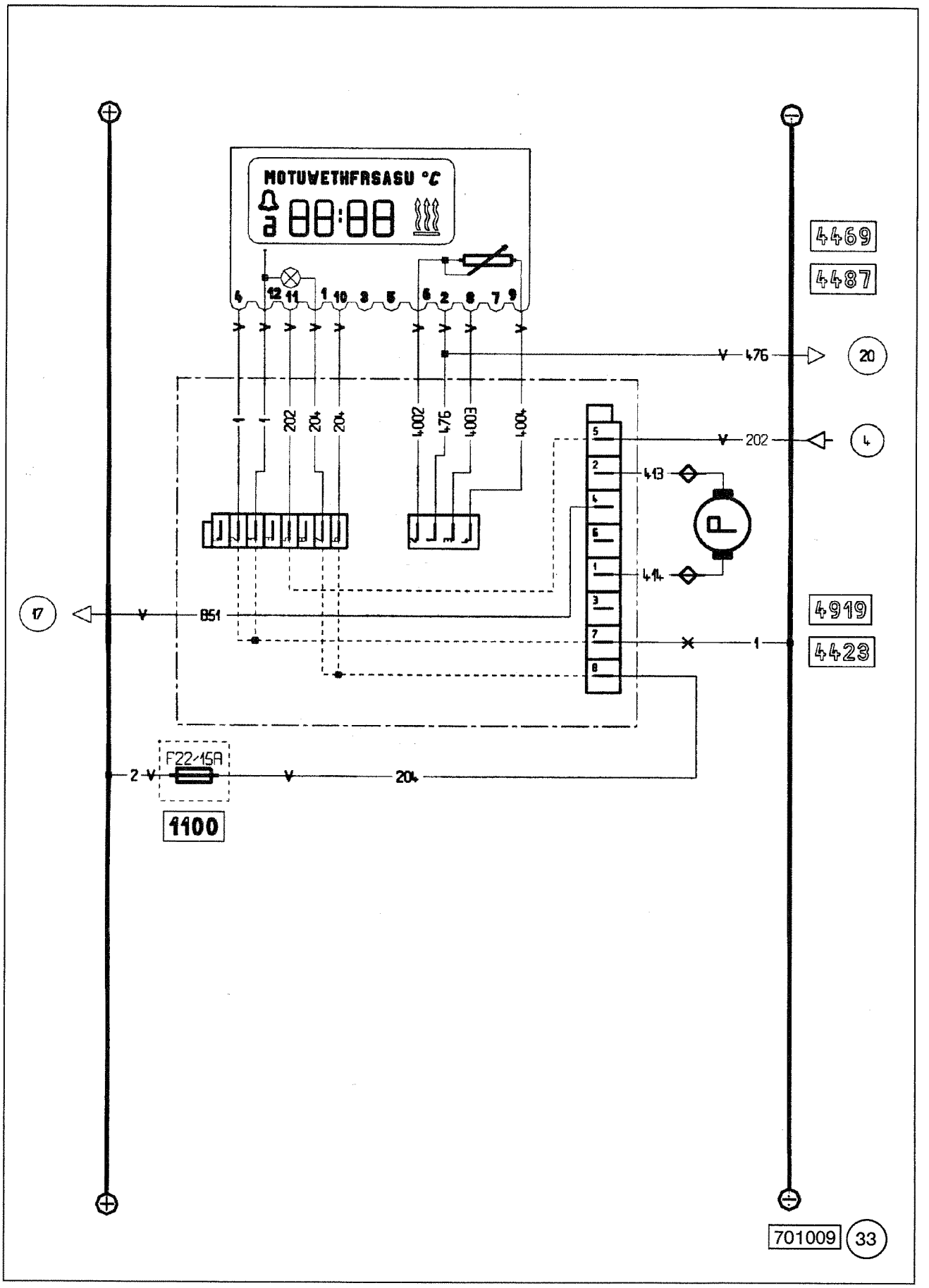

42
5
5
51
52
53
1 S M
1
8032
8059
54
55
56
57
37
38
213
7
2
8034
4
24
9
5
3
7
10
4
1
2
51
305
42
8059
9
701009
31

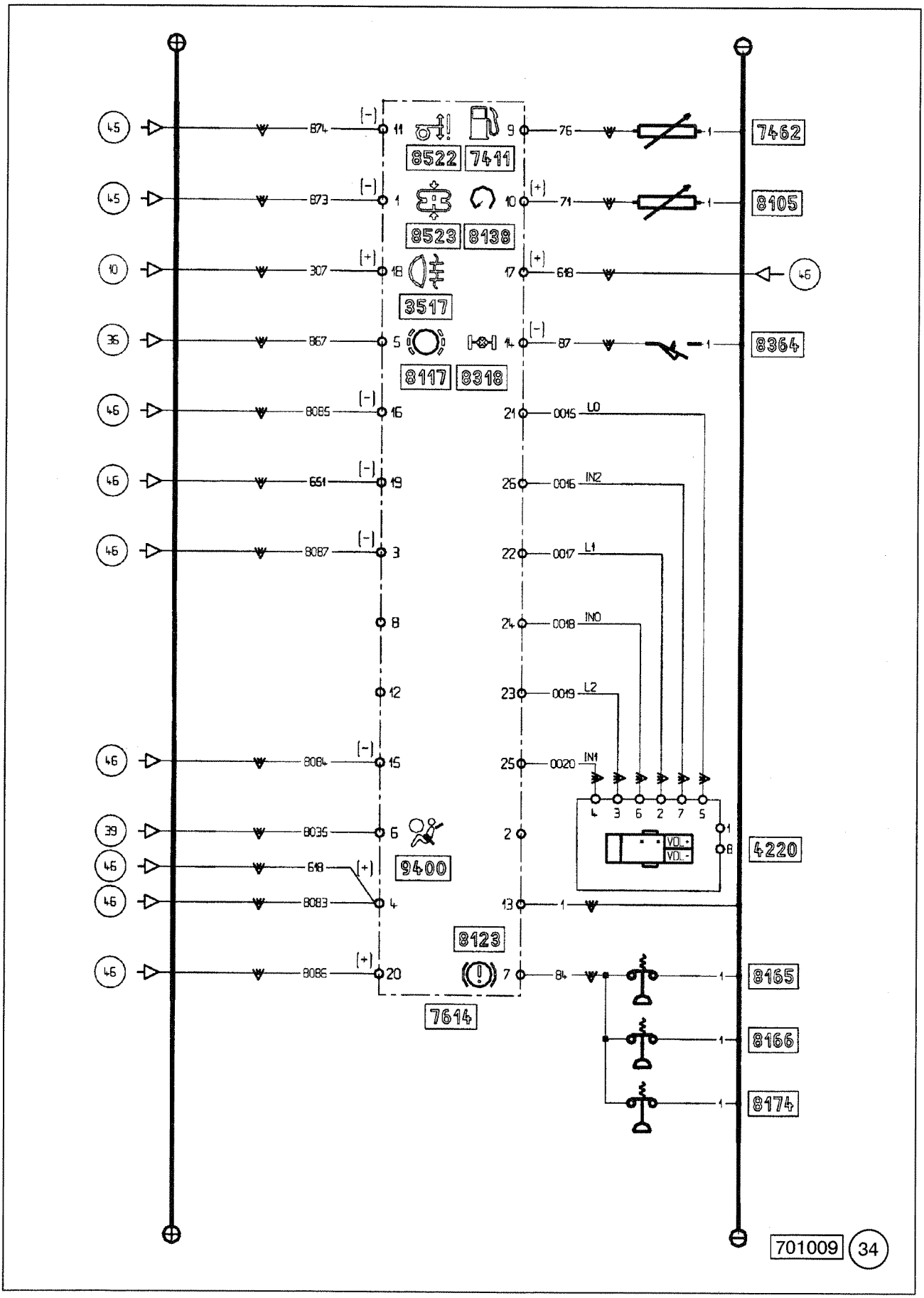
RETARDER



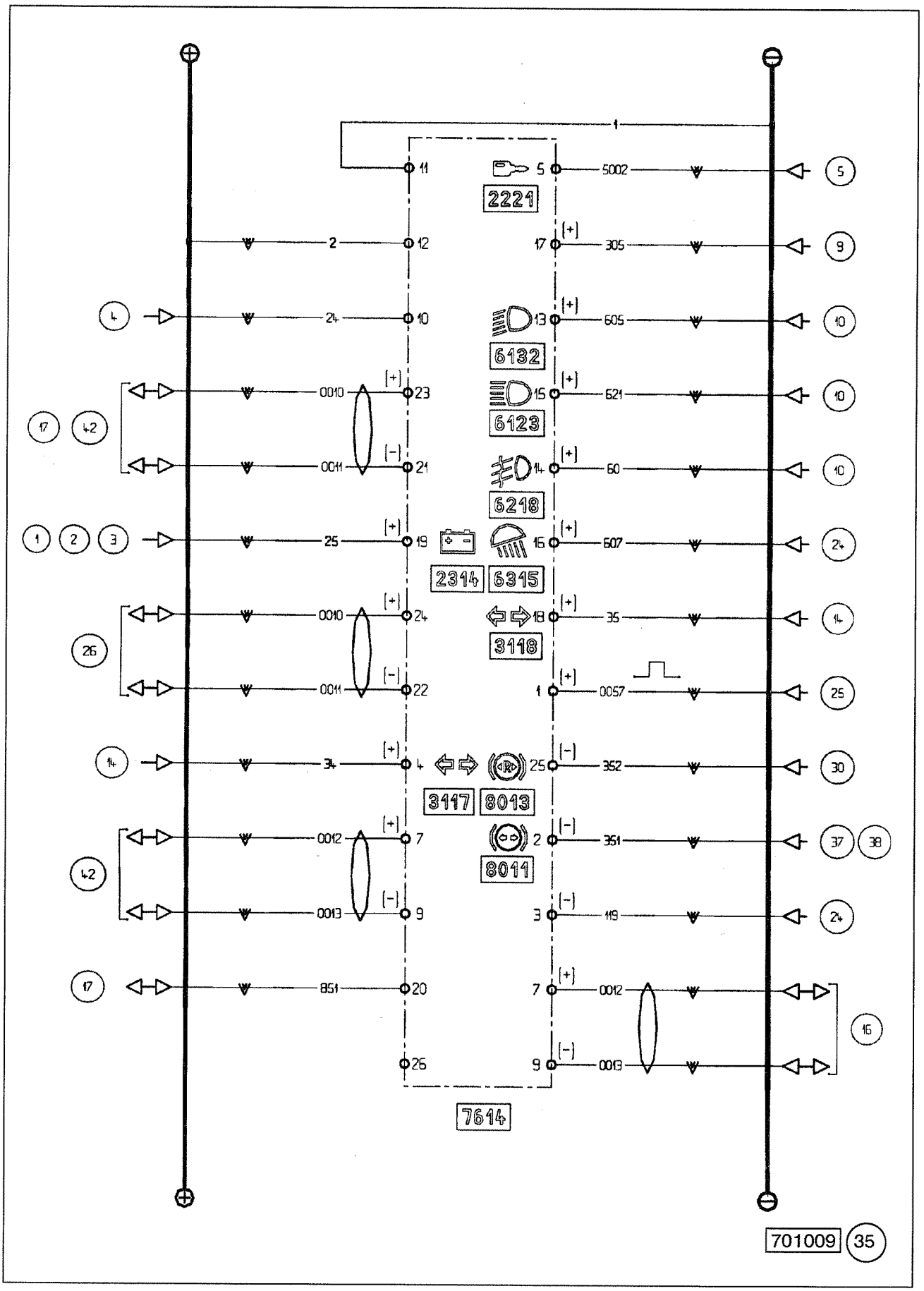
AIR CONDITIONING



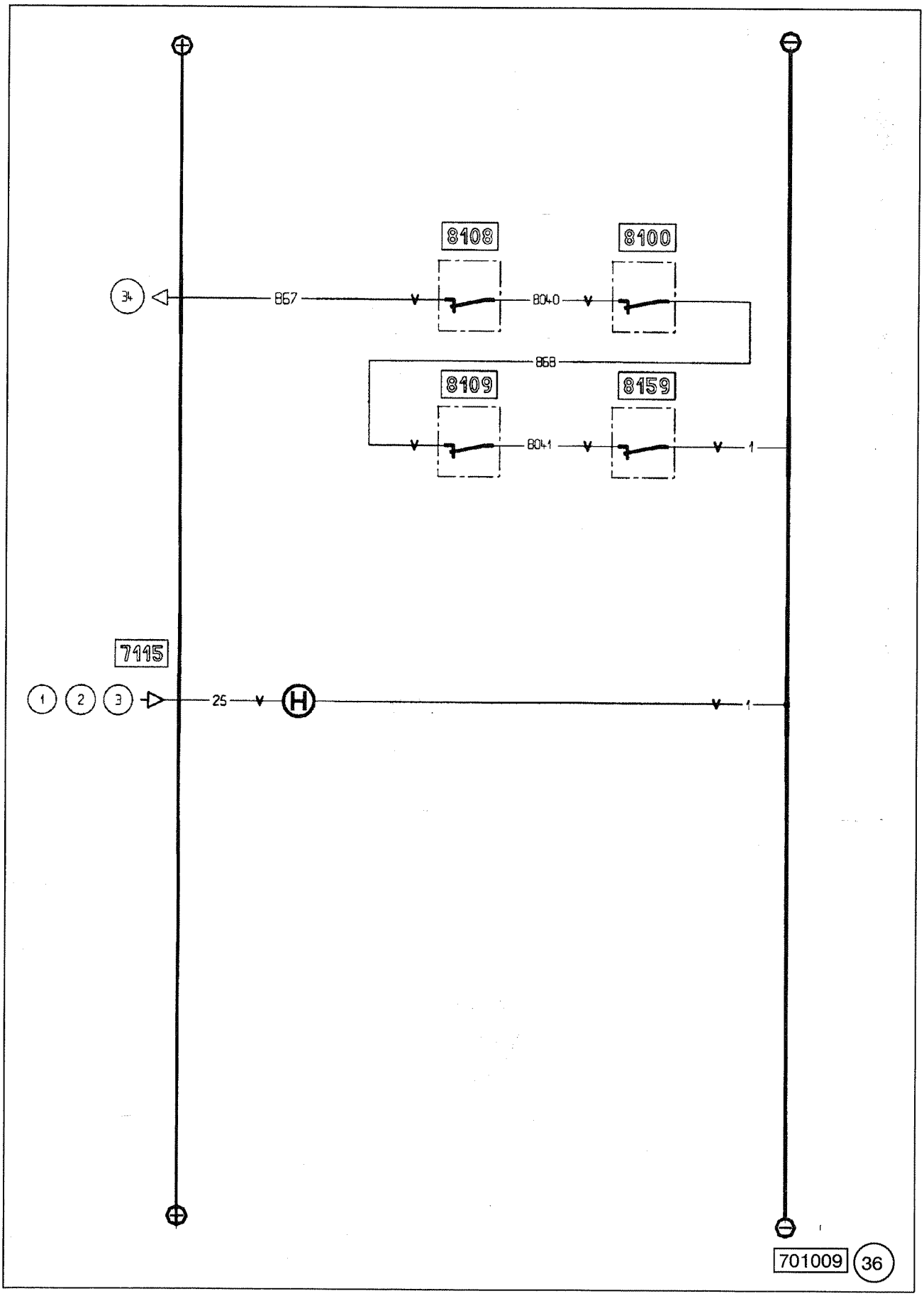
INDEPENDENT HEATING



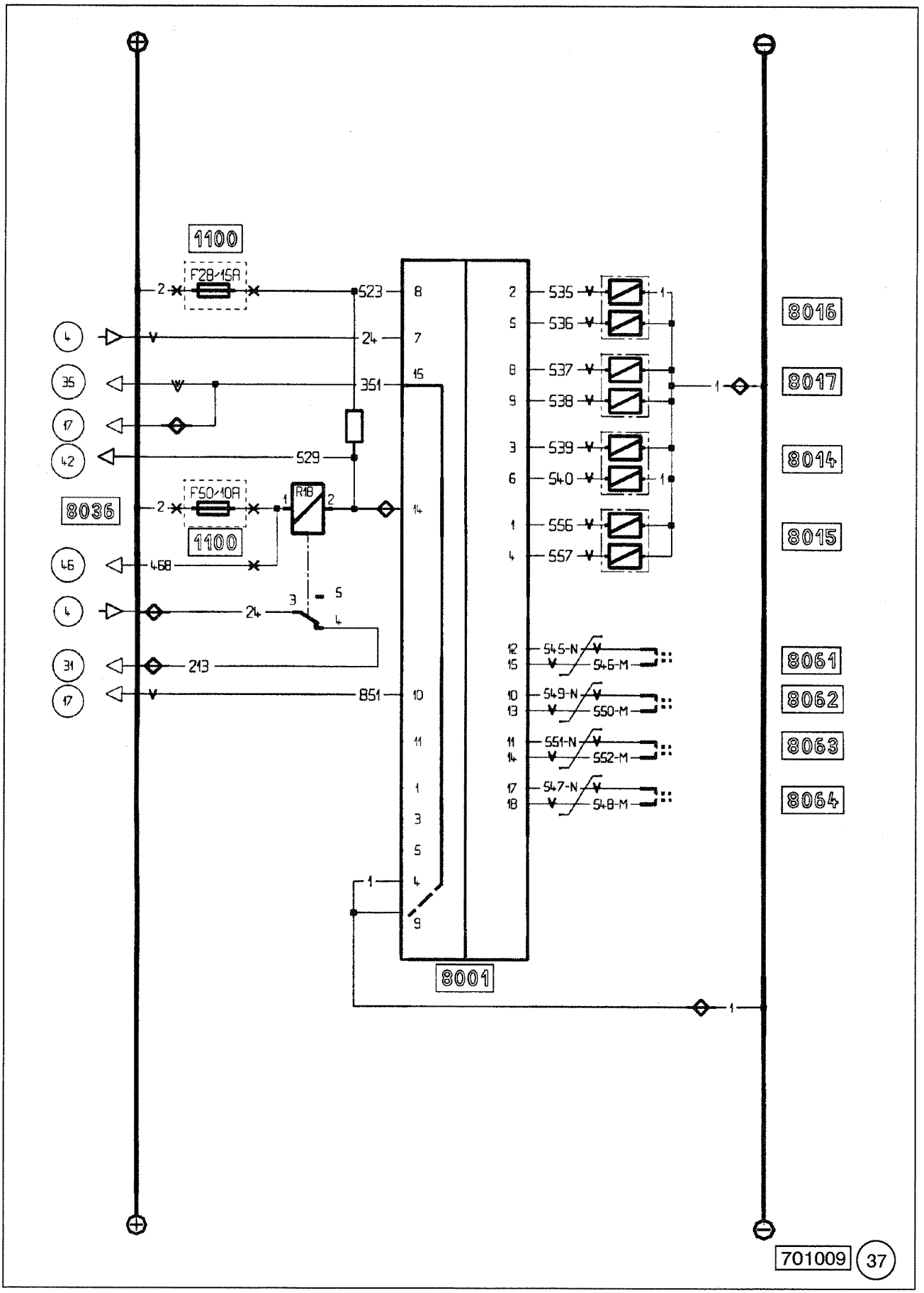
PRINCIPAL DISPLAY



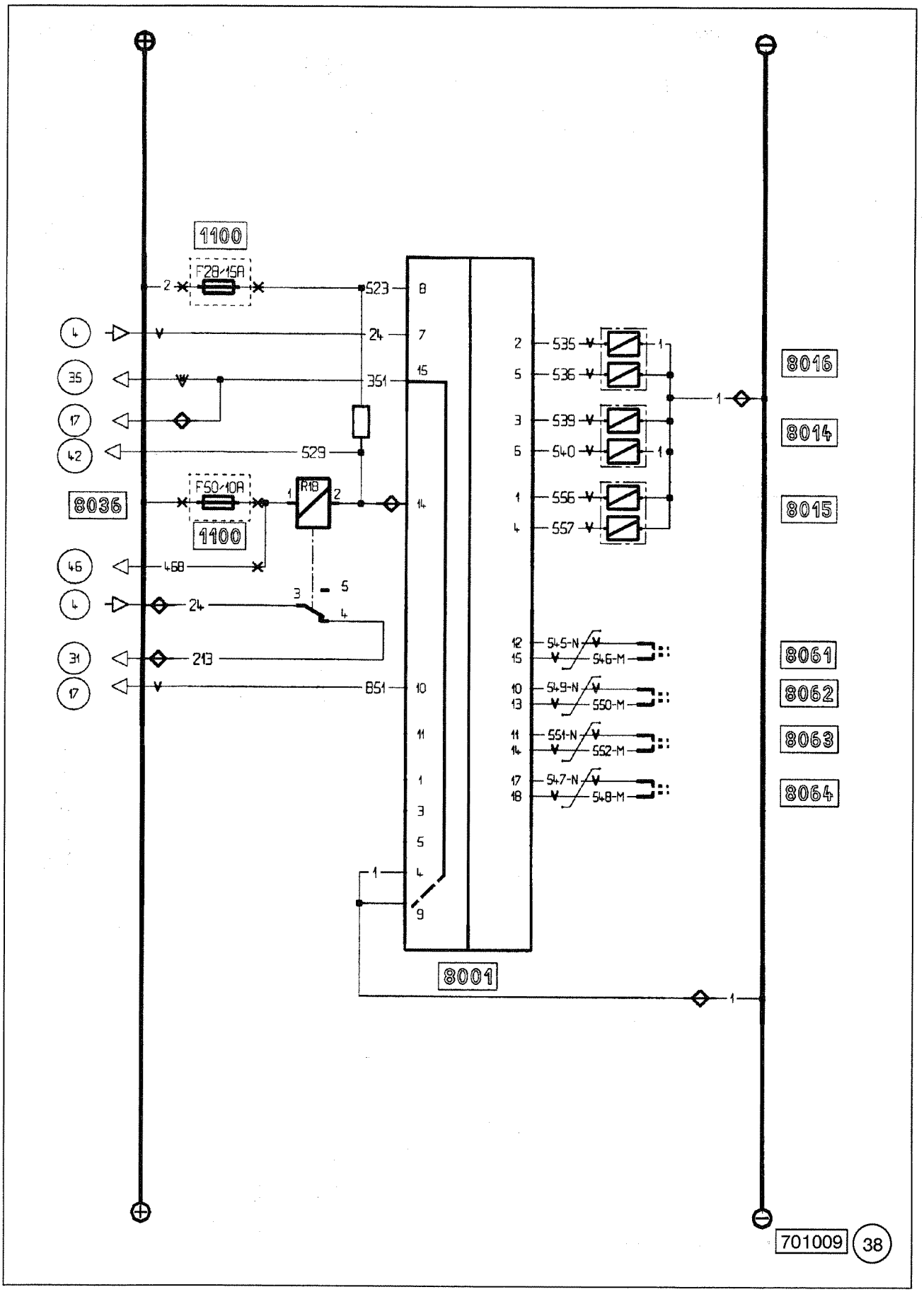
PRINCIPAL DISPLAY



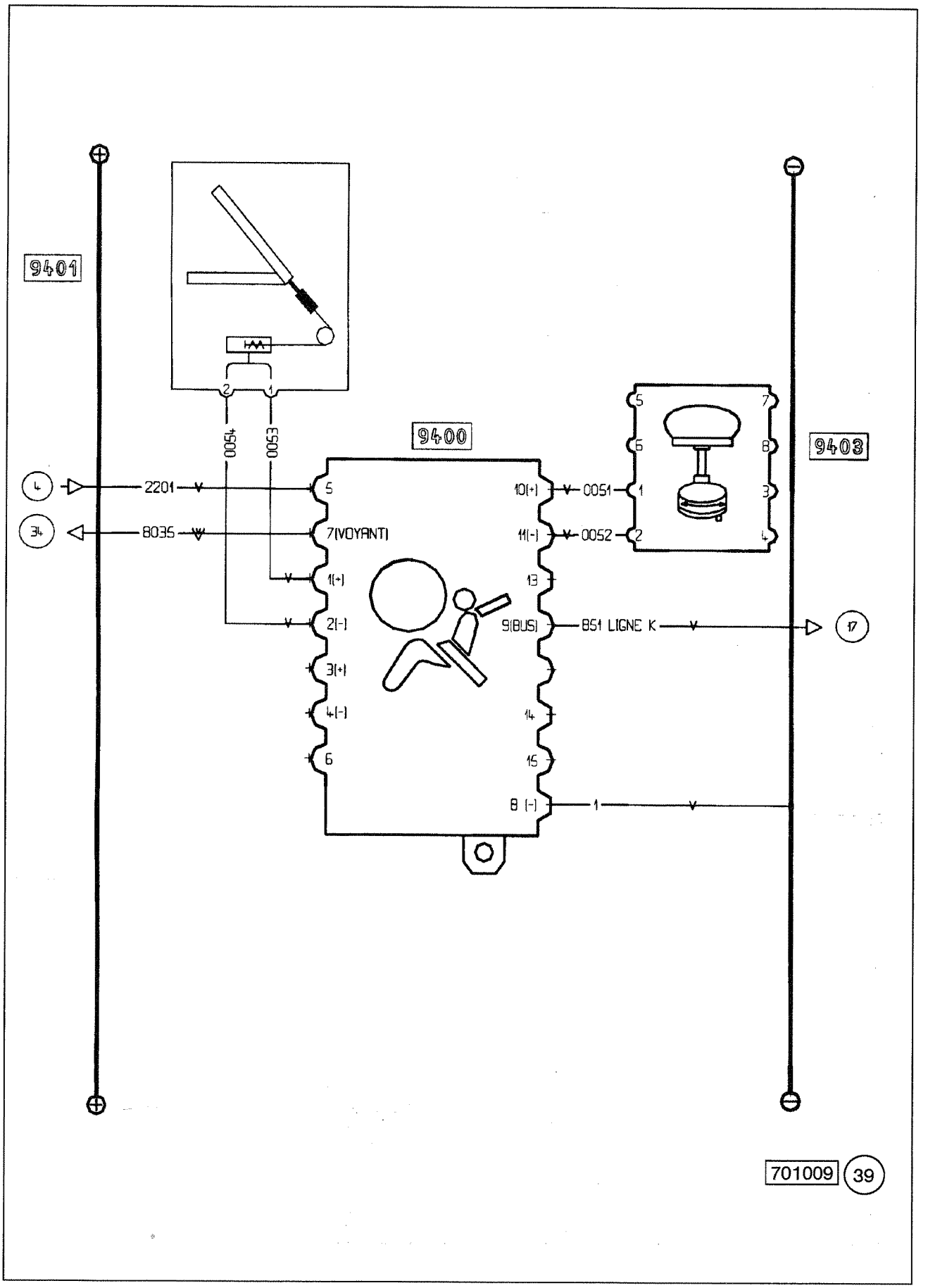
BRAKE PAD WEAR



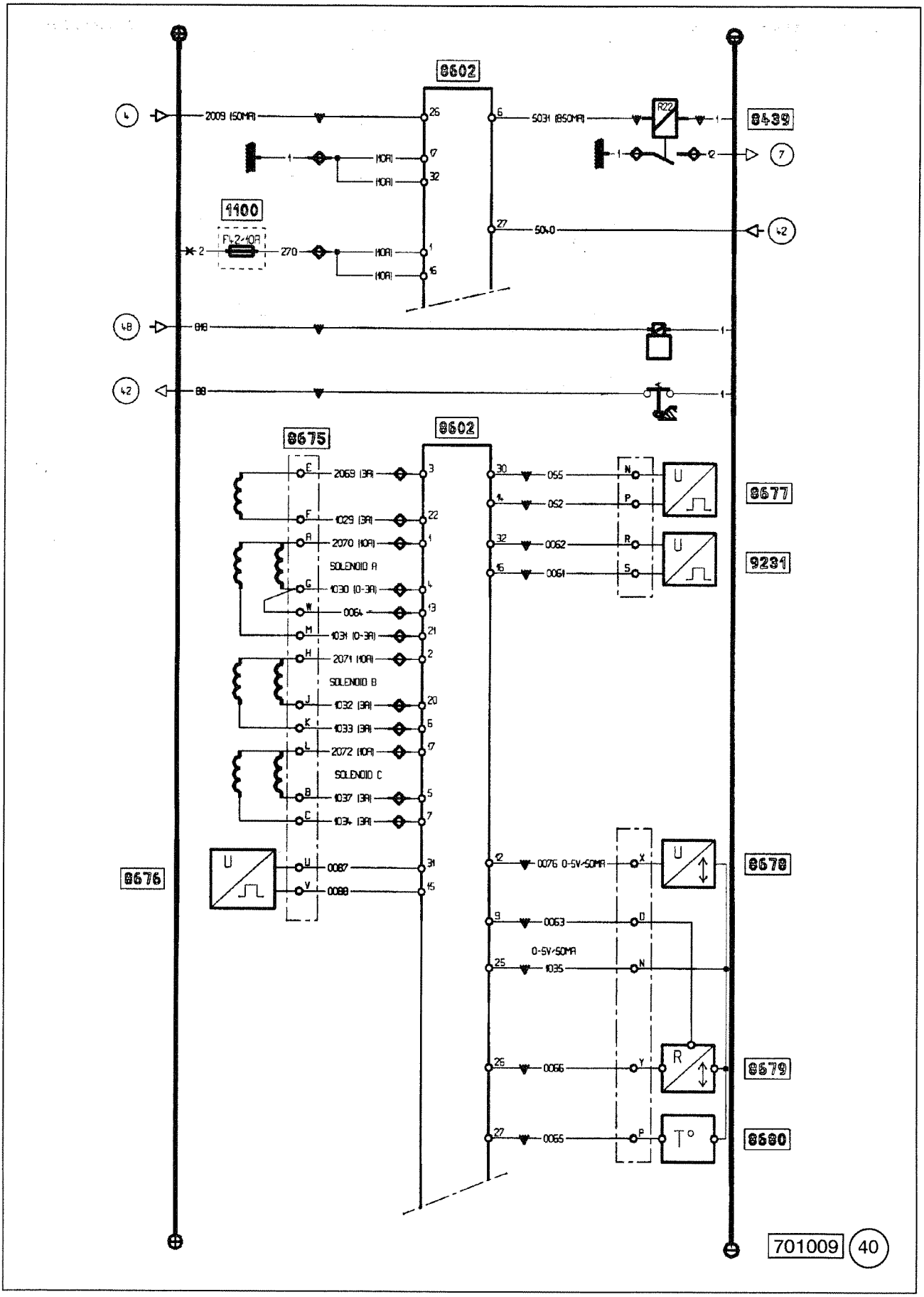
ABS / ASR EQUIPMENT



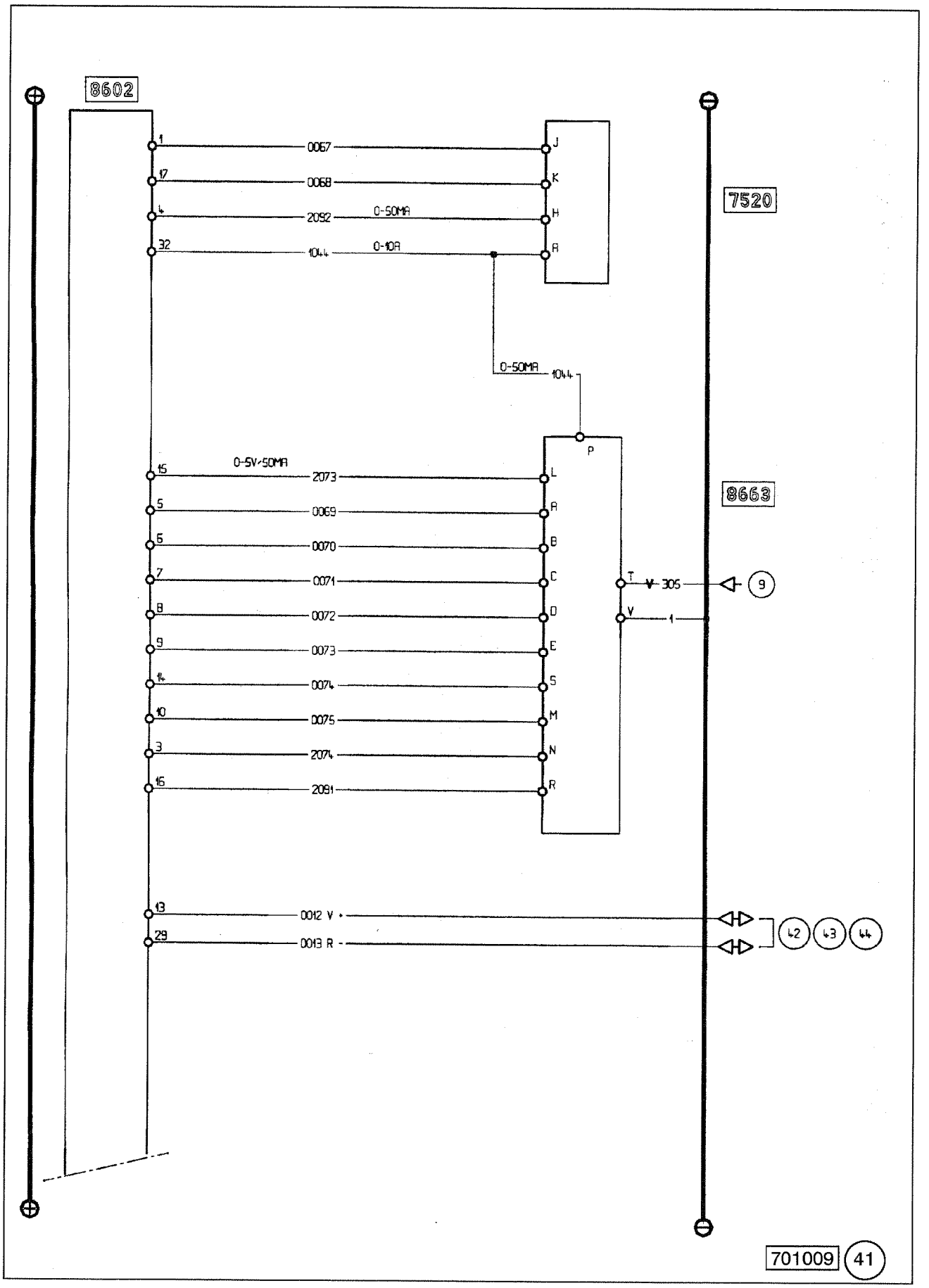
ABS / ASR EQUIPMENT


9401
9400
9403
0054
0053
2201
8035
7(VOYANT)
1(+)
2(-)
3(+)
4(-)
6
5
10(+)
11(-)
13
9(BUS)
14
15
8 (-)
0051
0052
851 LIGNE K
701009
39

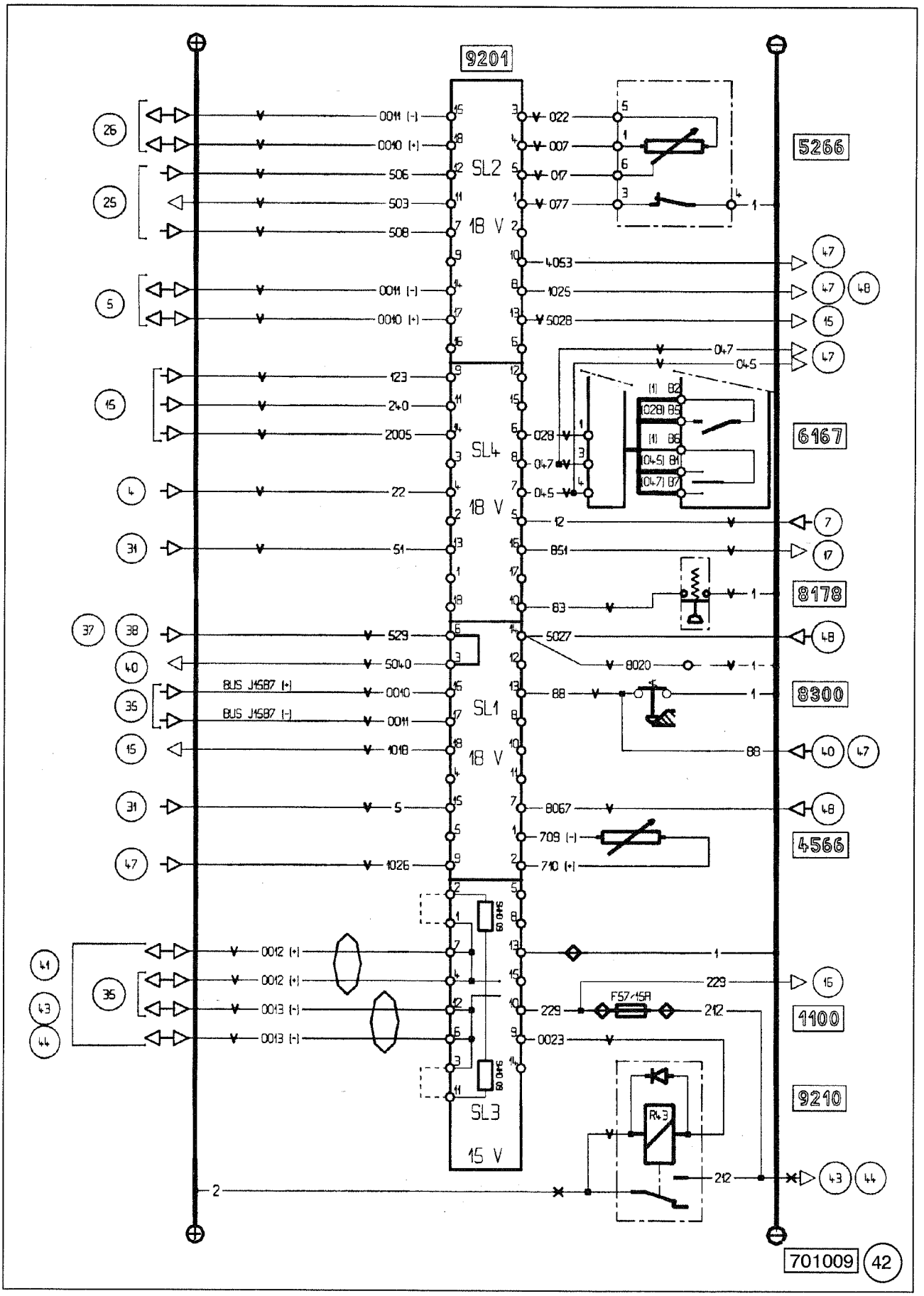
AIRBAG



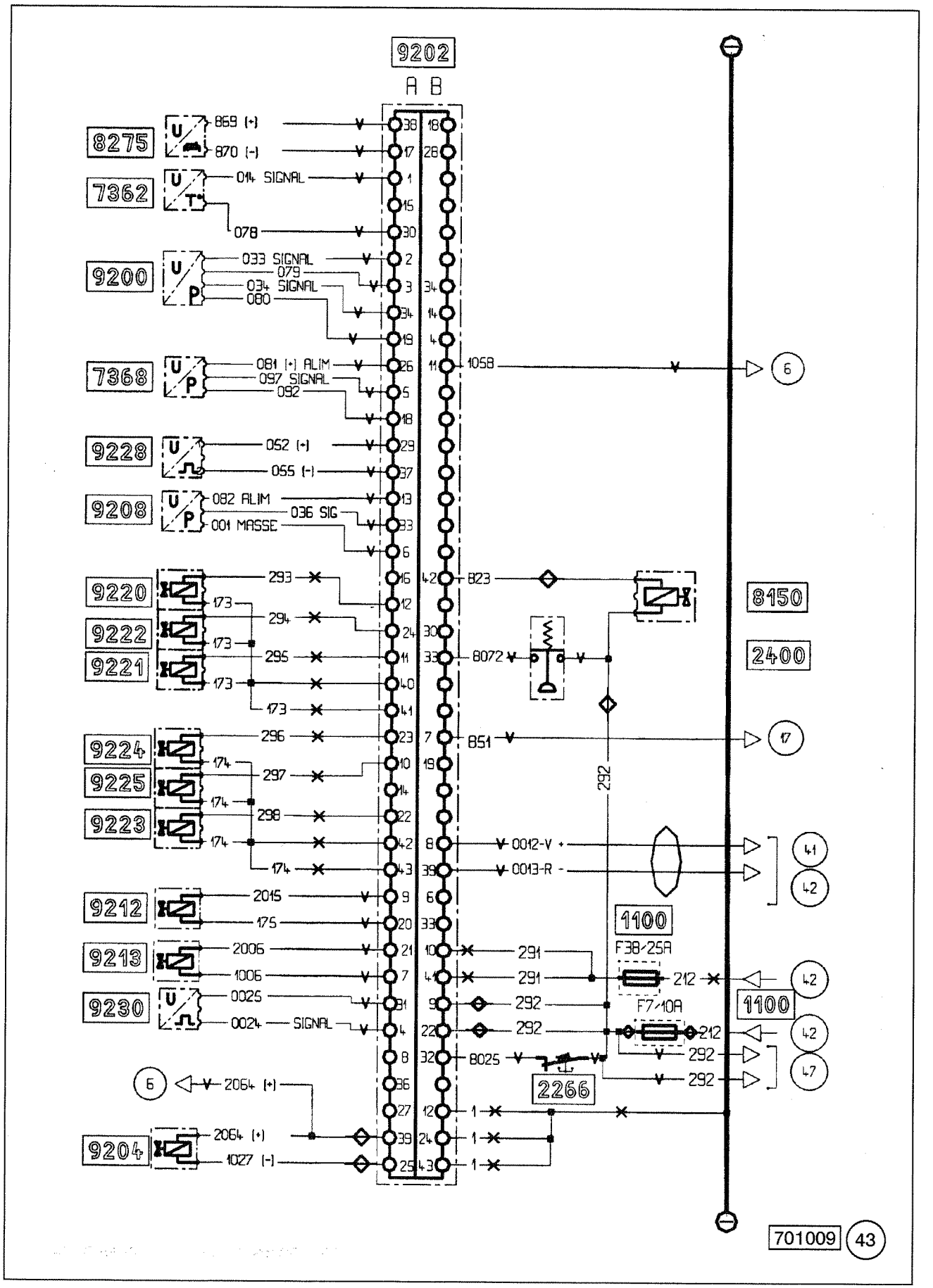
AUTOMATIC GEARBOX



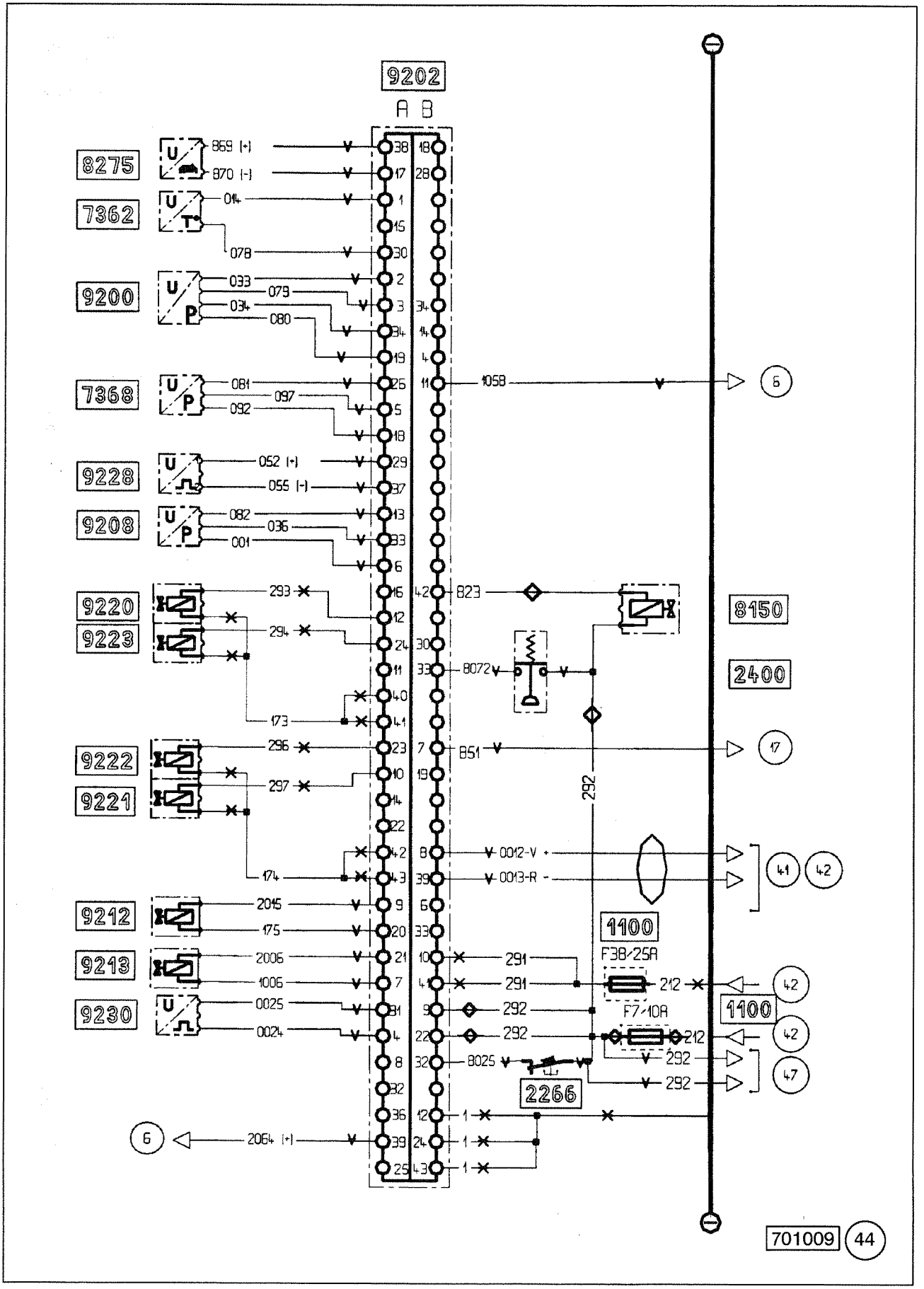
AUTOMATIC GEARBOX



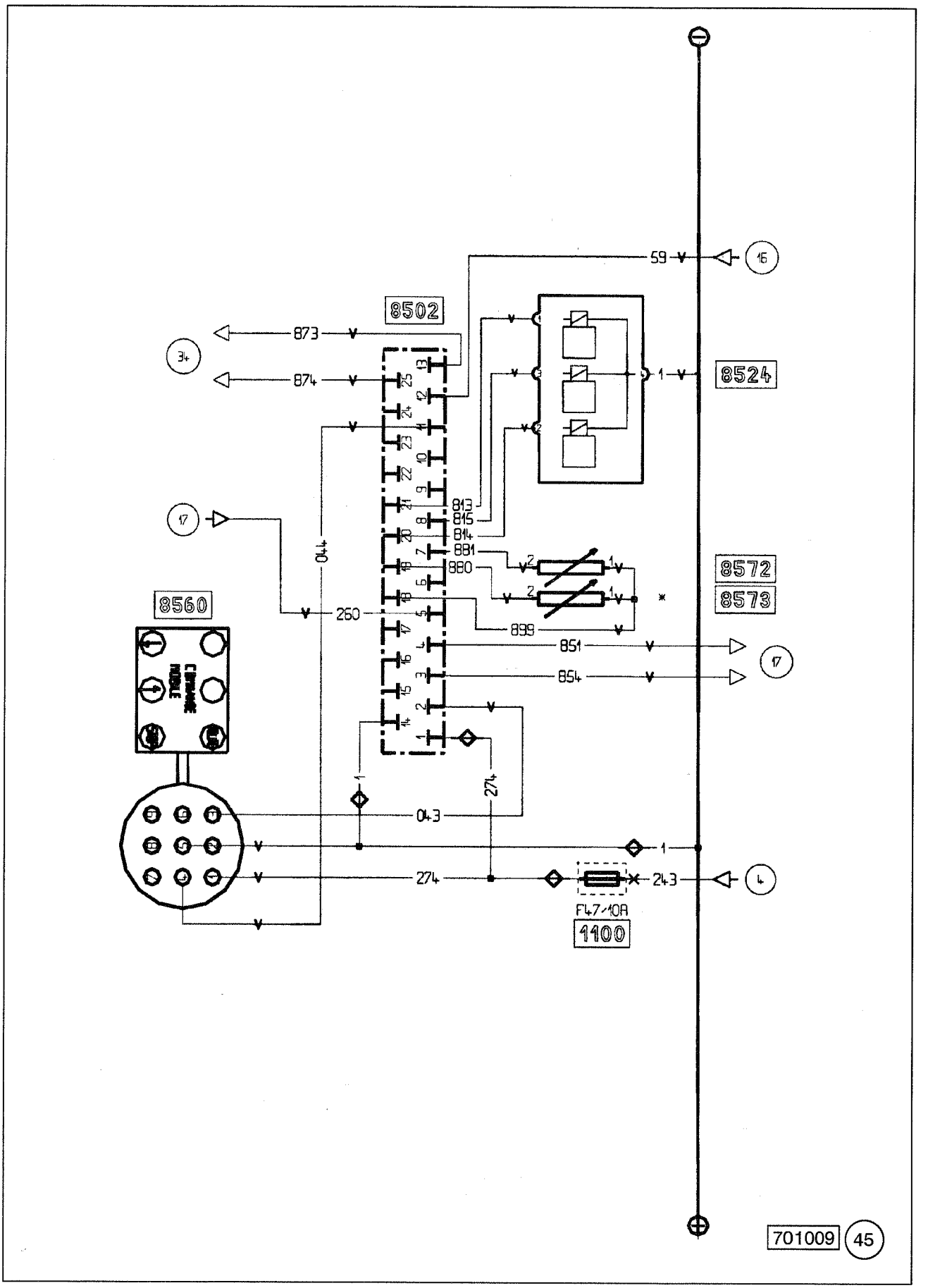
CAB INJECTION CONTROL



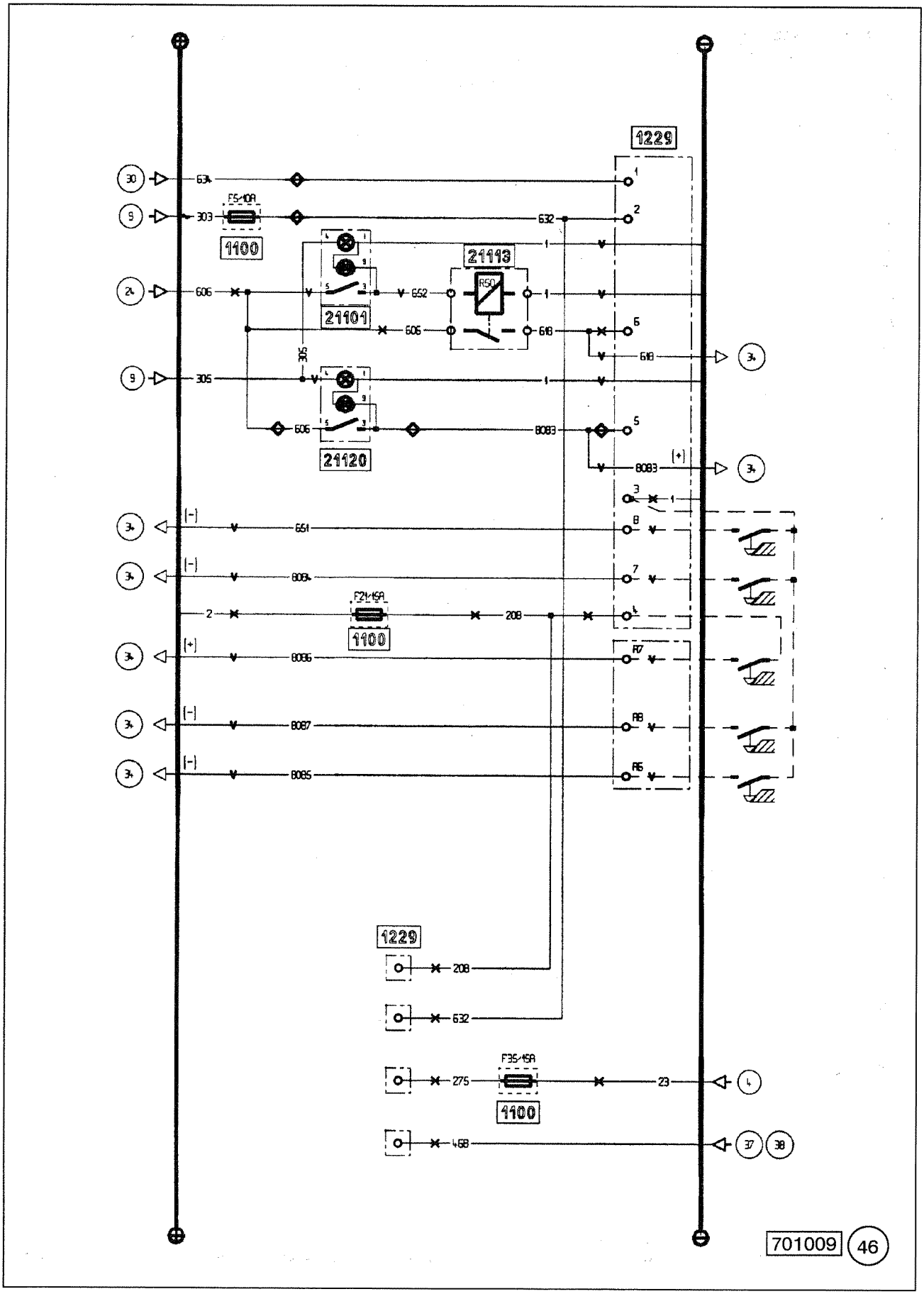
DCI6 ENGINE INJECTION CONTROL



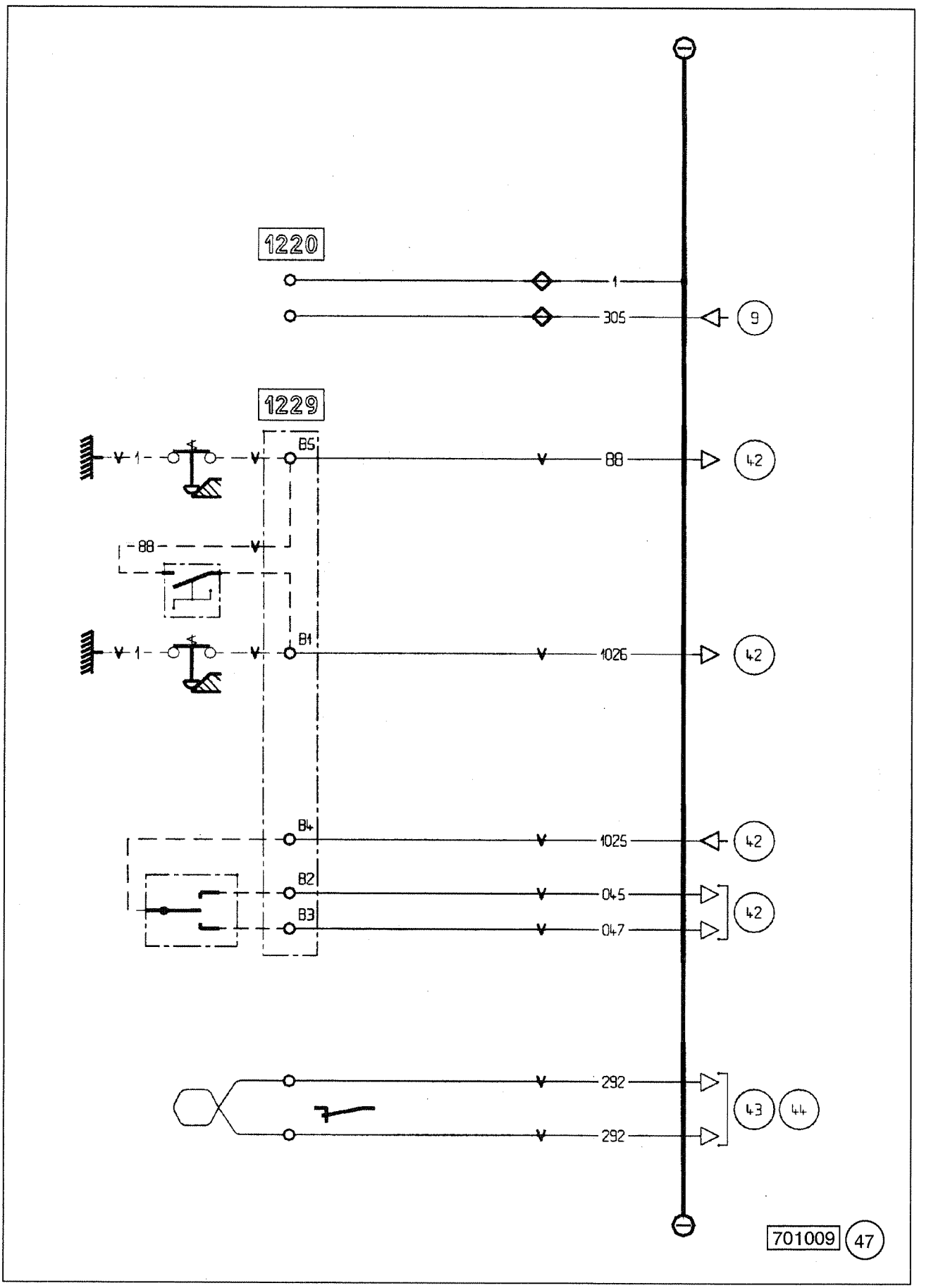
DCI4 ENGINE INJECTION CONTROL



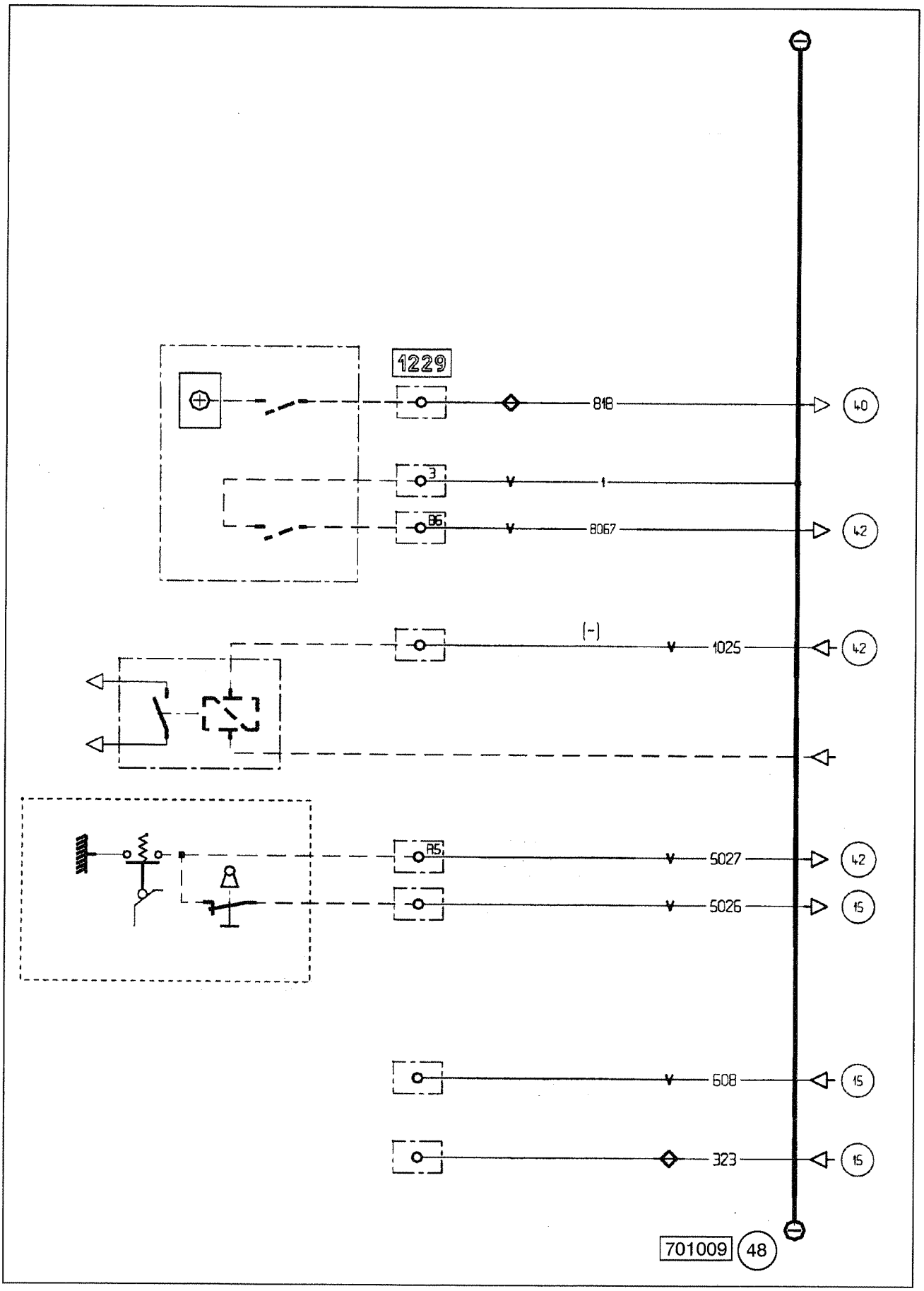
AIR SUSPENSION



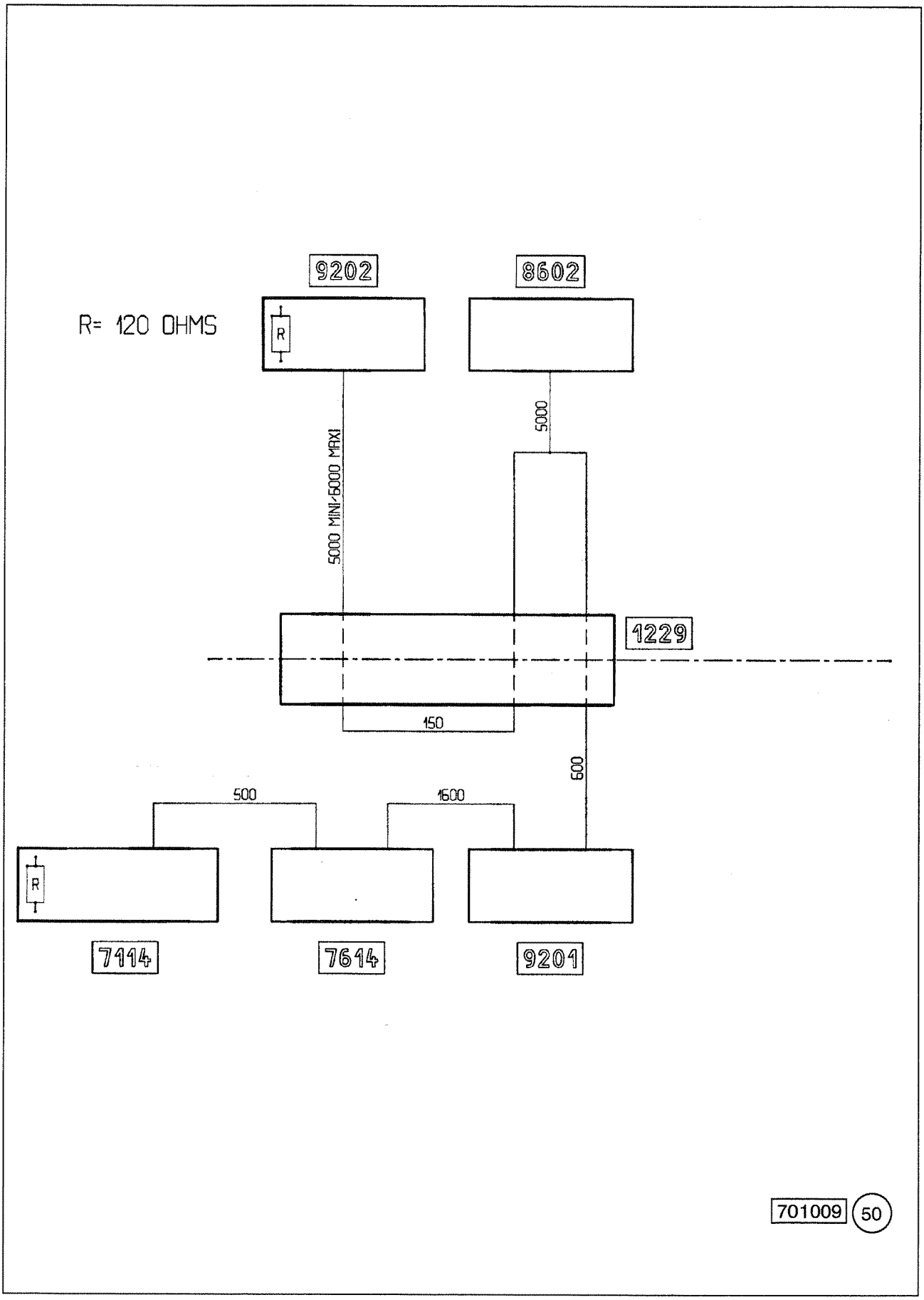
AVAILABLE POWER SUPPLY



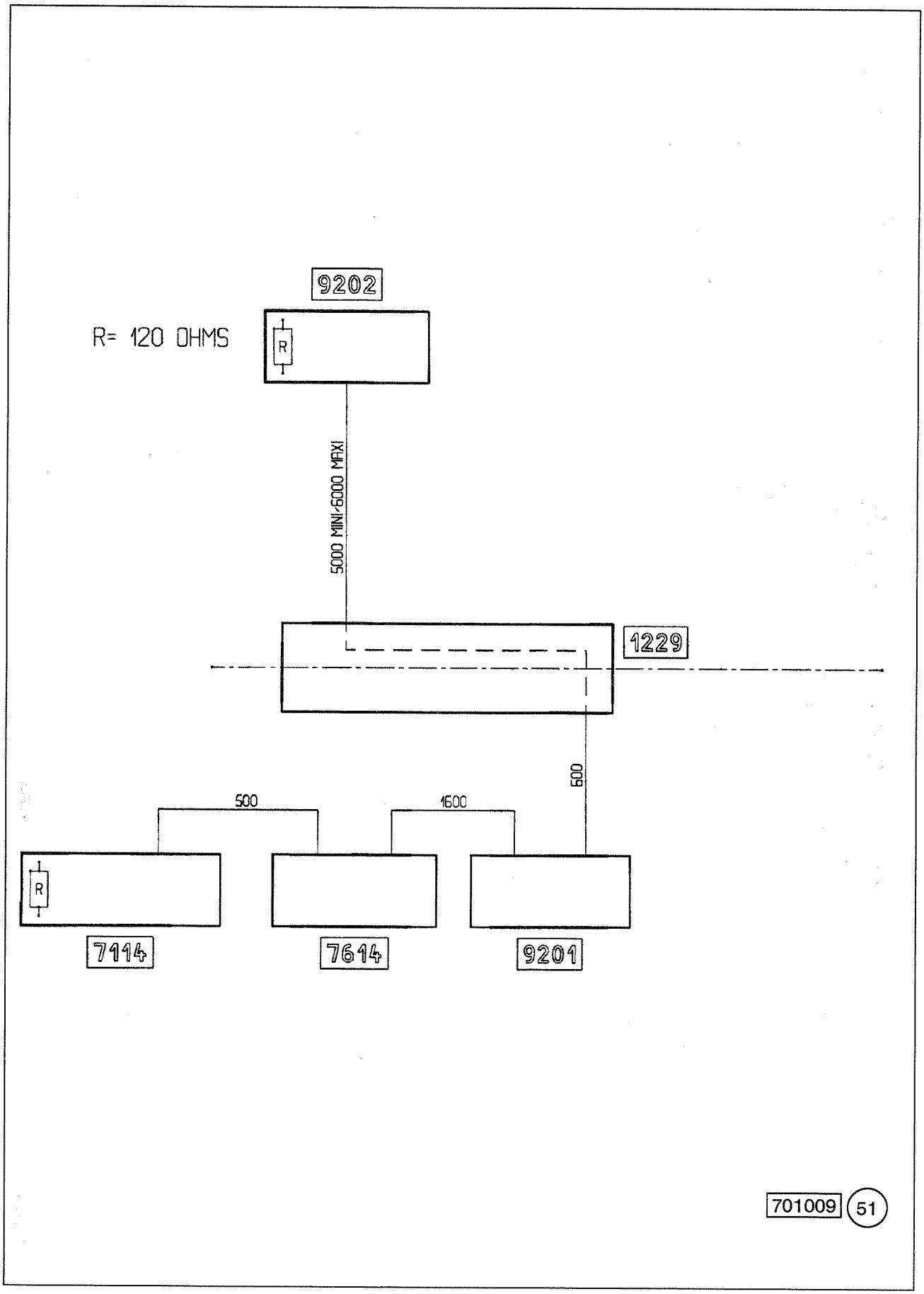
AVAILABLE POWER SUPPLY



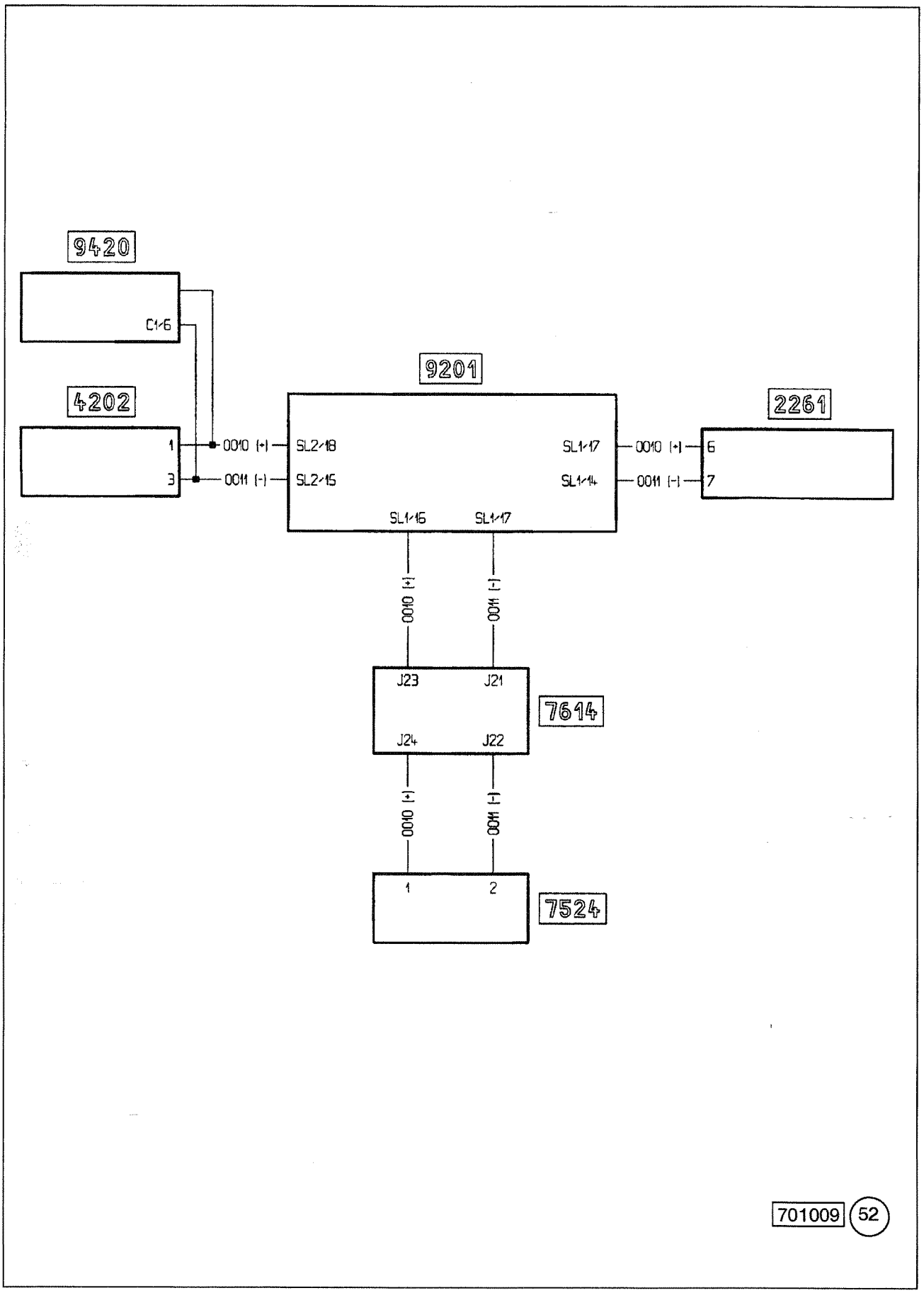
AVAILABLE POWER SUPPLY



"CAN" COMMUNICATION NETWORK



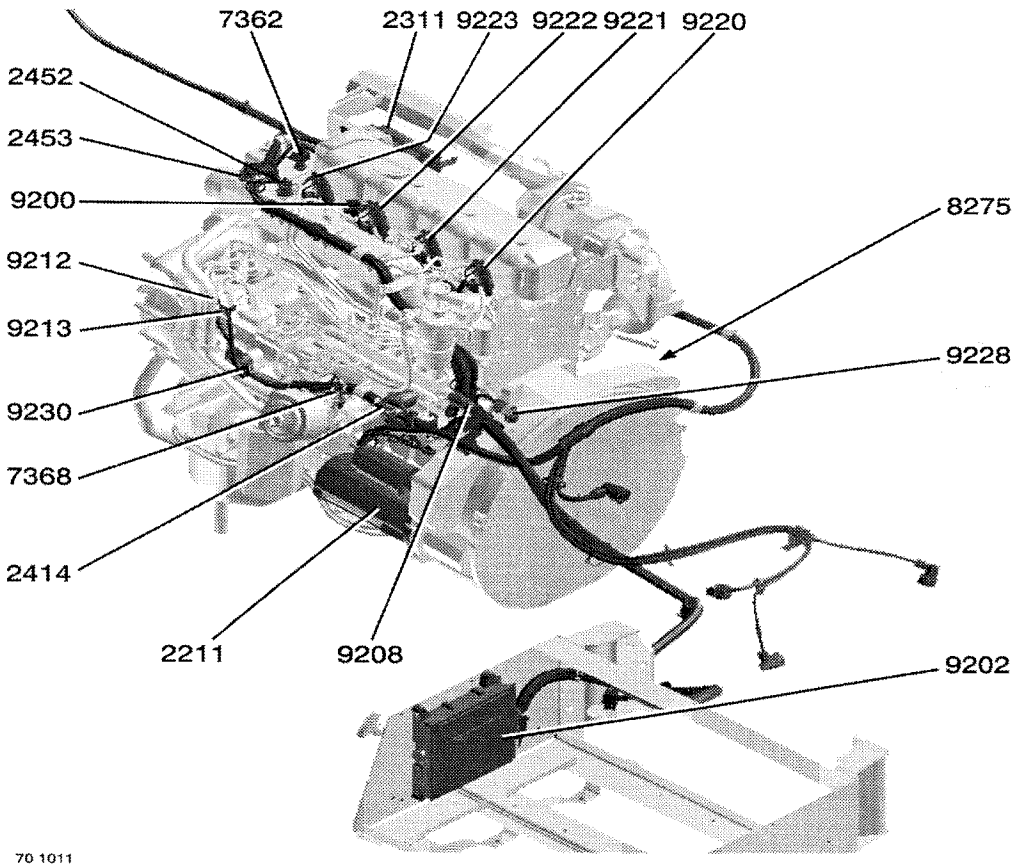
"CAN" COMMUNICATION NETWORK



"CAN" COMMUNICATION NETWORK

PINPOINTING OF ELECTRICAL APPLIANCES

Electrical equipment on DCI4 engine
Electrical equipment on DCI6 engine
Vehicle electronic management
Electronic air suspension
"ABS" equipment
Trailer sockets

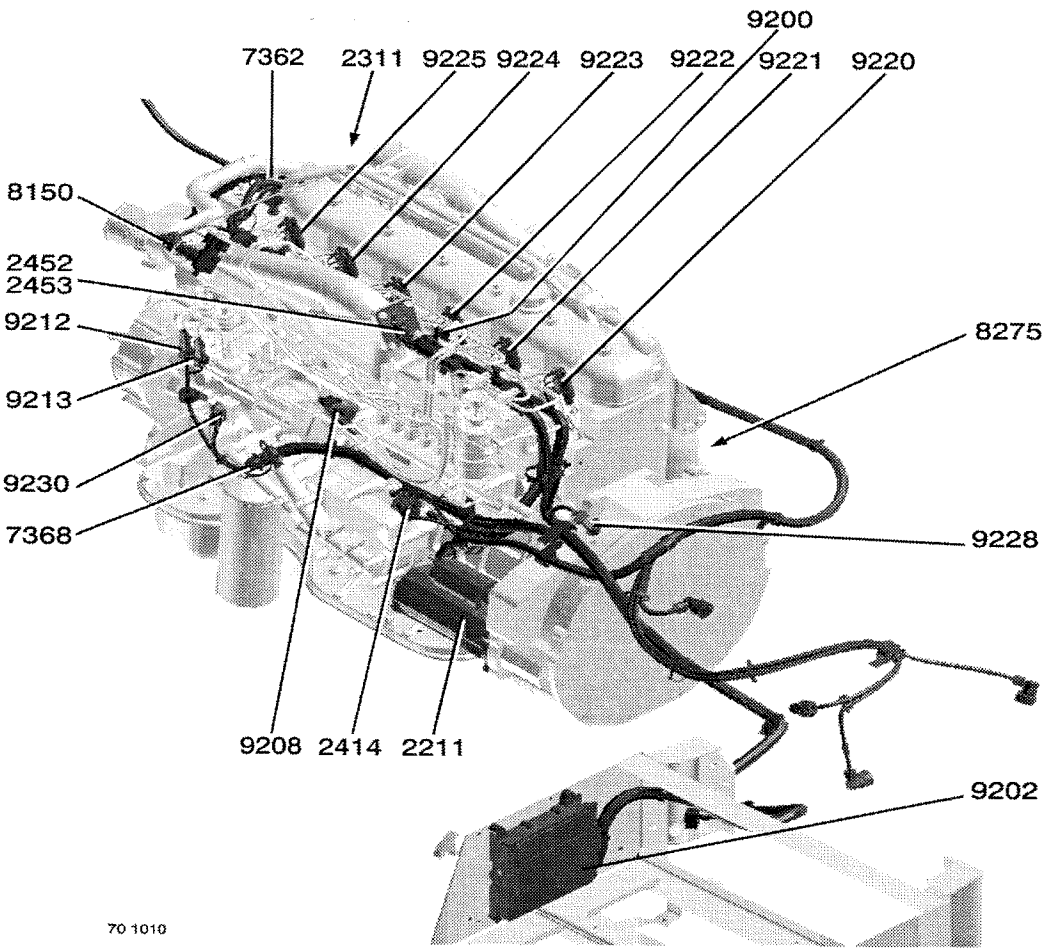


Electrical equipment on DCI4 engine

Electrical equipment on DCI4 engine

Layout of appliances on engine

Appliance	Plate
2211 – Starter	7
2311 – Alternator	1/2/3
2414 – Preheating relay	6
2452 – Preheating resistor N° 1	6
2453 – Preheating resistor N° 2	6
7362 – Coolant temperature sensor	44
7368 – Oil pressure sensor	44
8275 – Engine oil level sensor	44
9200 – Boost air pressure and temperature sensor	44
9202 – "EUP" engine master ECU (EECU)	44
9208 – Fuel high pressure sensor	44
9212 – Fuel flow regulation solenoid valve "2"	44
9213 – Fuel flow regulation solenoid valve "1"	44
9220 – Unit pump N° 1 incorporating solenoid valve	44
9221 – Unit pump N° 2 incorporating solenoid valve	44
9222 – Unit pump N° 3 incorporating solenoid valve	44
9223 – Unit pump N° 4 incorporating solenoid valve	44
9228 – Flywheel speed sensor	44
9230 – Camshaft speed sensor	44

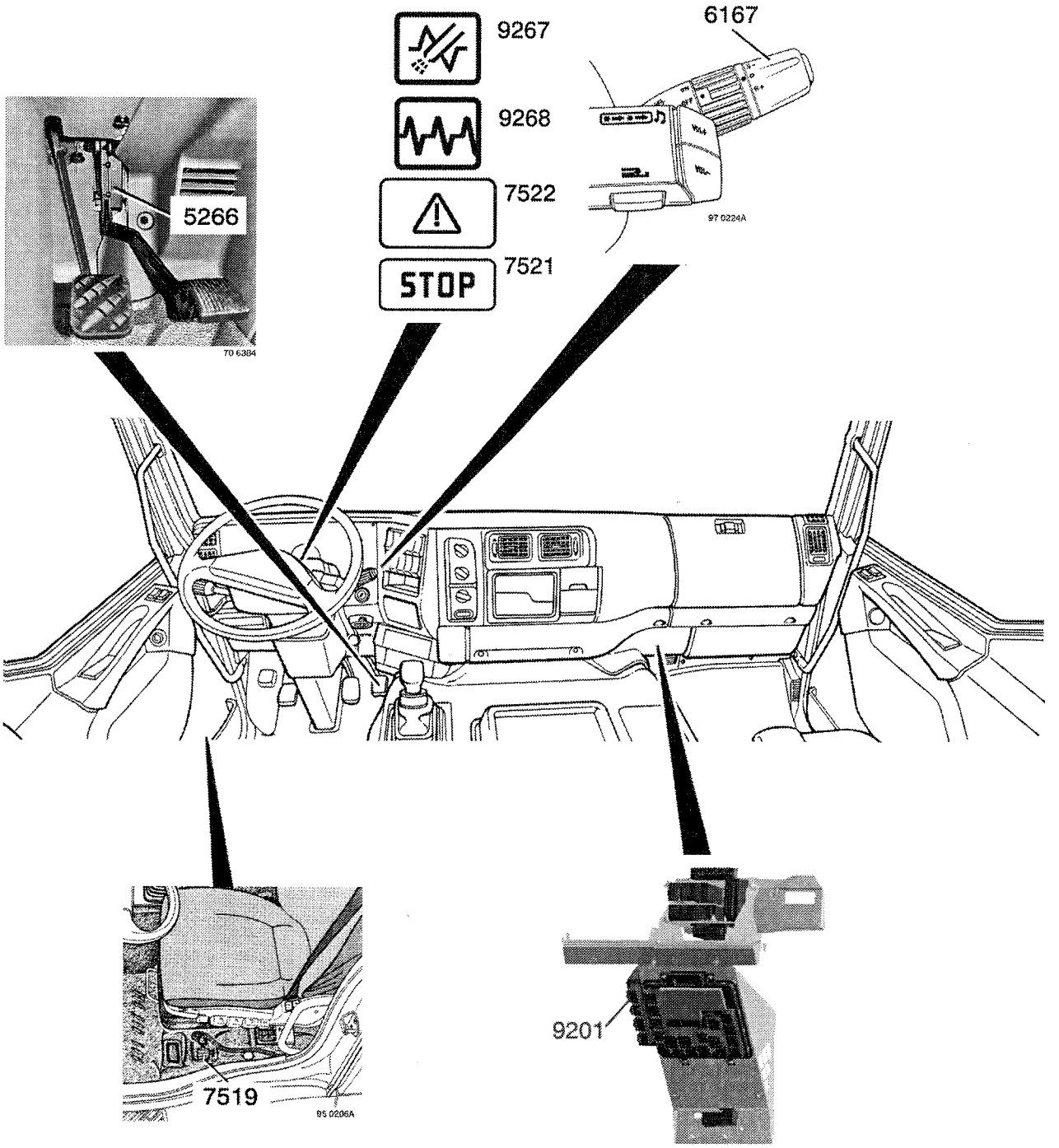


Electrical equipment on DCI6 engine

Electrical equipment on DCI6 engine

Layout of appliances on engine

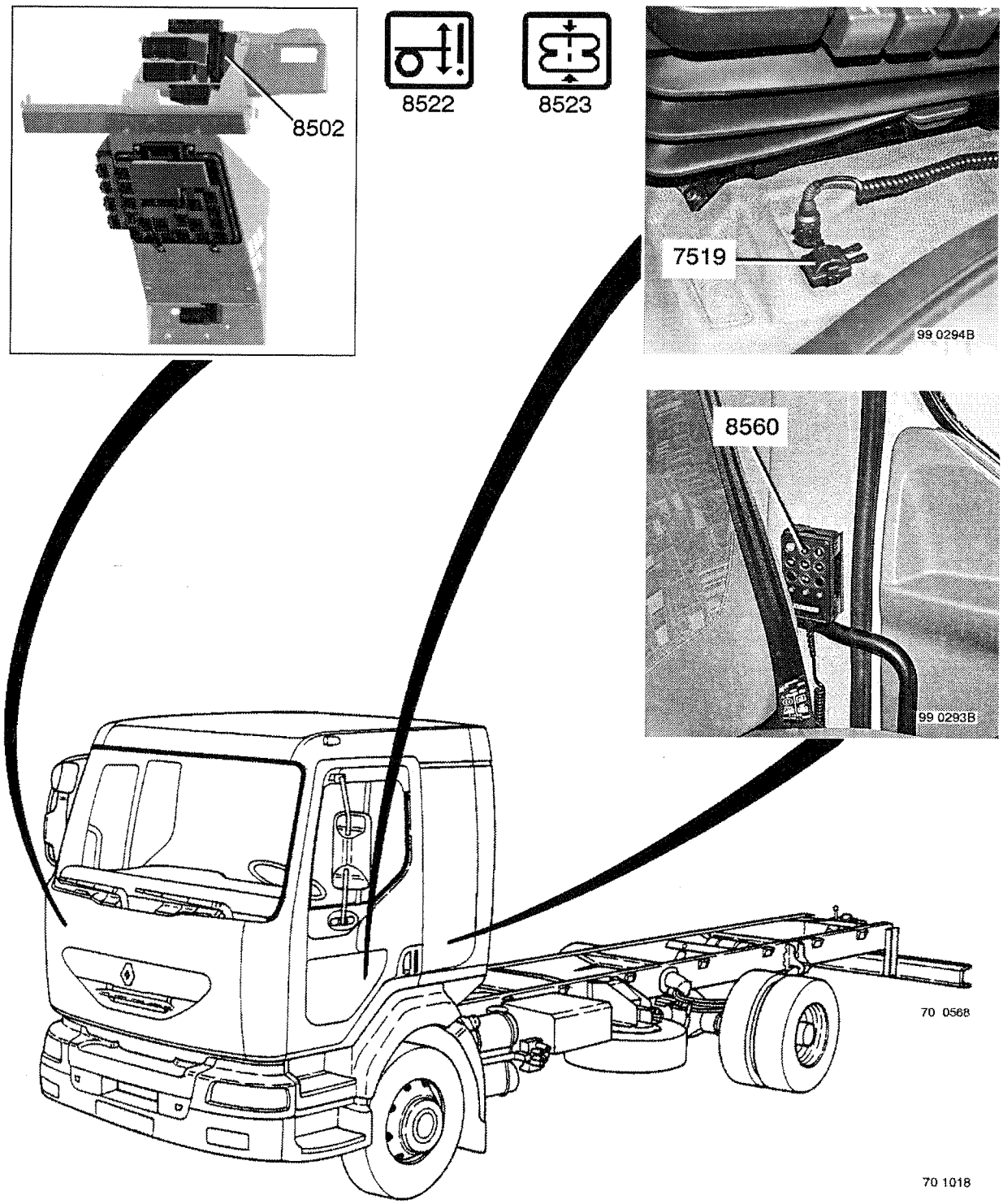
Appliance	Plate
2211 – Starter	7
2311 – Alternator	1/2/3
2414 – Preheating relay	6
2452 – Preheating resistor N° 1	6
2453 – Preheating resistor N° 2	6
7362 – Coolant temperature sensor	43
7368 – Oil pressure sensor	43
8150 – Exhaust brake electrovalve	43
8275 – Engine oil level sensor	43
9200 – Boost air pressure and temperature sensor	43
9202 – "EUP" engine master ECU (EECU)	43
9208 – Fuel high pressure sensor	43
9212 – Fuel flow regulation solenoid valve "2"	43
9213 – Fuel flow regulation solenoid valve "1"	43
9220 – Unit pump N° 1 incorporating solenoid valve	43
9221 – Unit pump N° 2 incorporating solenoid valve	43
9222 – Unit pump N° 3 incorporating solenoid valve	43
9223 – Unit pump N° 4 incorporating solenoid valve	43
9224 – Unit pump N° 5 incorporating solenoid valve	43
9225 – Unit pump N° 6 incorporating solenoid valve	43
9228 – Flywheel speed sensor	43
9230 – Camshaft speed sensor	43


9267
9268
7522
7521
STOP
6167
97 0224A
5266
70 6384
7519
95 0206A
9201
70 6389

Fuel–injection electronic management

Layout of appliances in cab

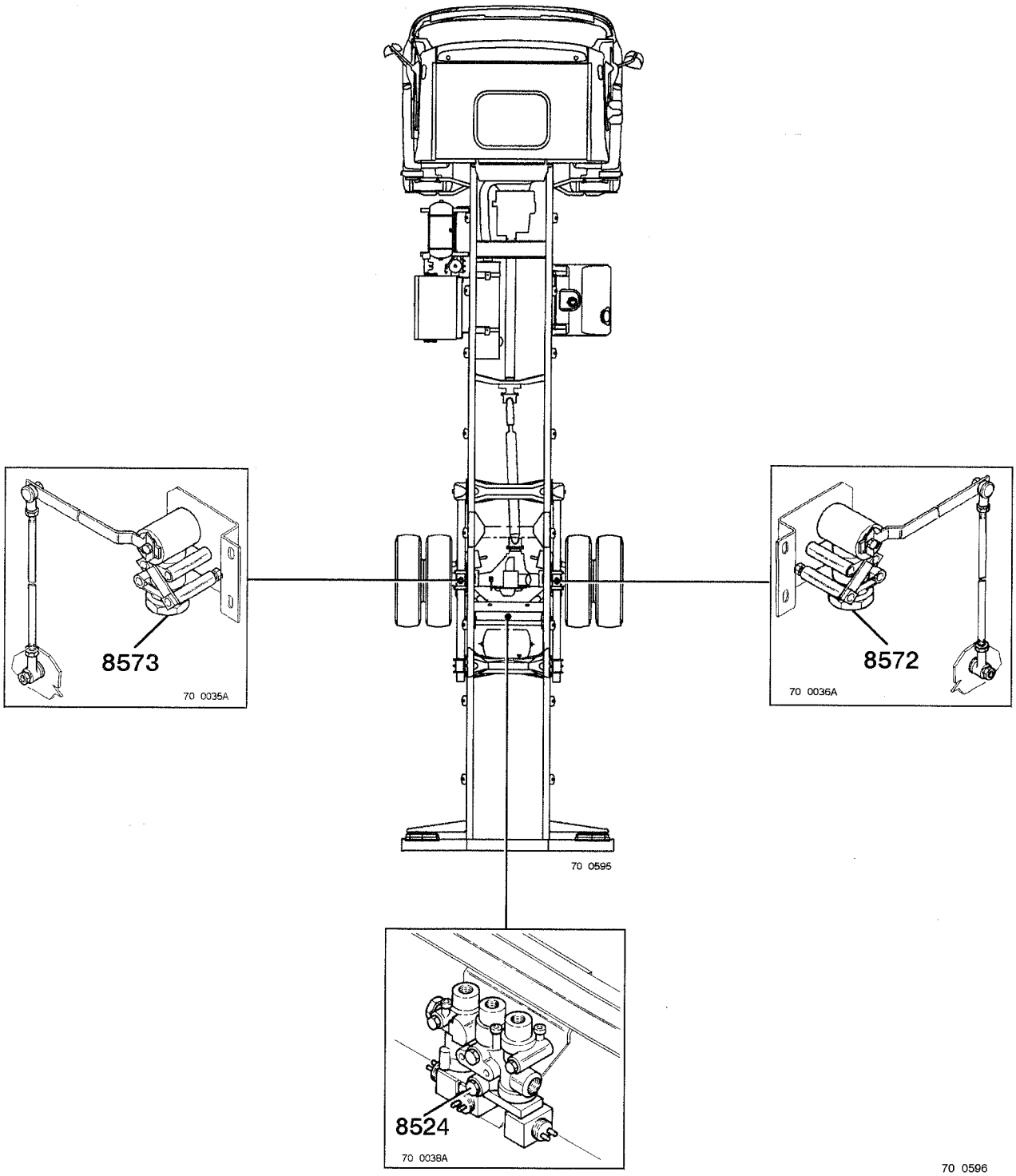
Appliance	Plate
5266 – Accelerator pedal position sensor	42
6167 – Steering column fingertip controls (lights, signalling, windscreen wiper transponder, cruise control)	5/9/10/14/25/42
7519 – Diagnostics socket	17
7521 – Immediate stop "DANGER" warning lamp	–
7522 – "SERVICE" warning lamp	–
7524 – "SAE" socket	17
9201 – Vehicle master ECU (VECU)	21/42
9267 – Vehicle major electronic defect warning lamp	–
9268 – Vehicle minor electronic defect warning lamp	–



Electronic air suspension

Layout of appliances in cab

Appliance	Plate
7519 – Diagnostics socket	17
8502 – Suspension ECU	45
8522 – Suspension information warning lamp	34
8523 – Suspension alert warning lamp	34
8560 – Remote control box	45

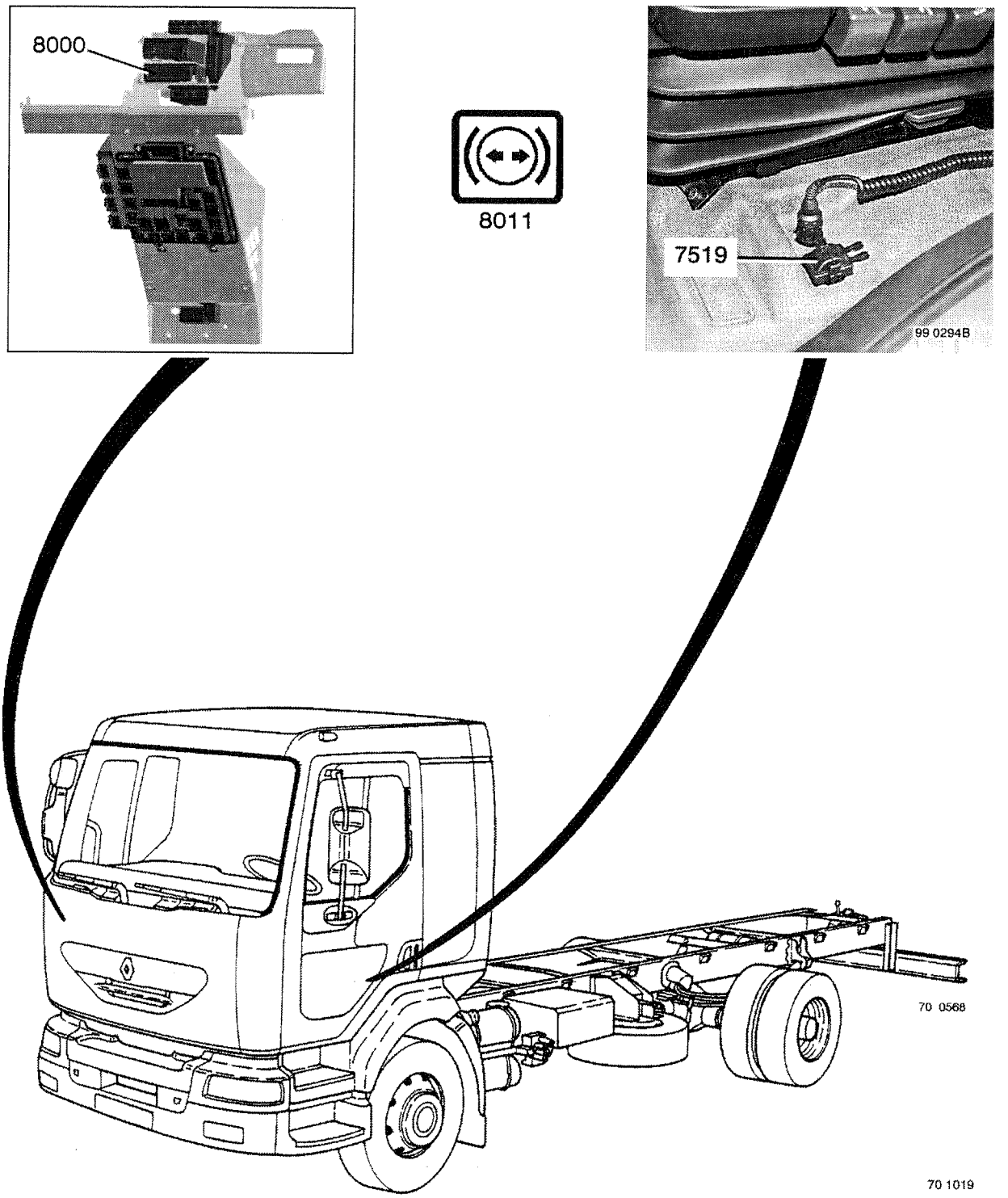


Electronic air suspension

Layout of appliances on chassis

Appliance **Plate**

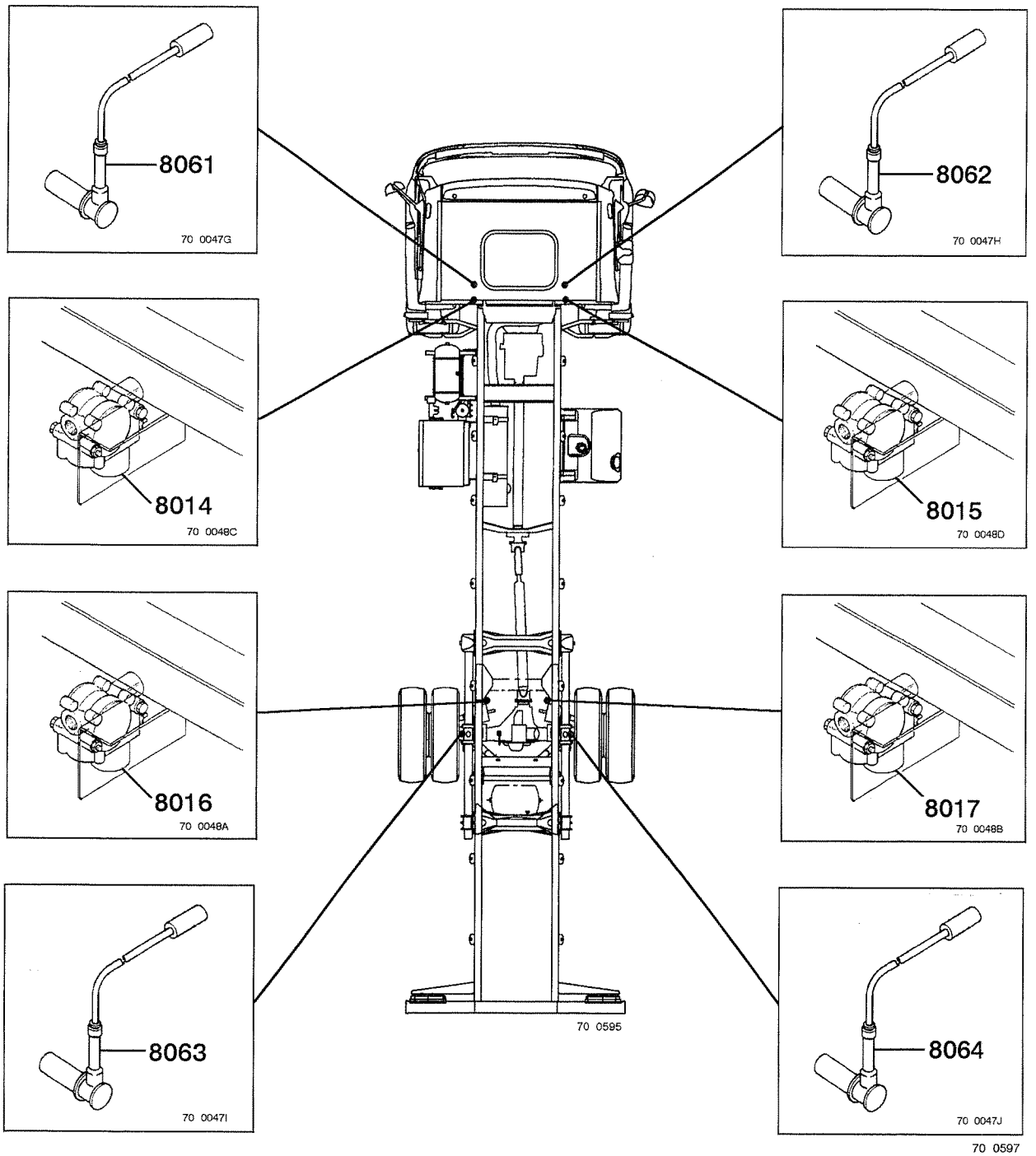
8524 – Rear suspension electrovalve block 45
8572 – Suspension level RH rear sensor 45
8573 – Suspension level LH rear sensor 45



"ABS" equipment

Layout of appliances in cab

Appliance	Plate
7519 – Diagnostics socket	17
8000 – "ABS" ECU	37/38
8011 – ABS safety warning lamp	35



"ABS" equipment

Layout of appliances on chassis

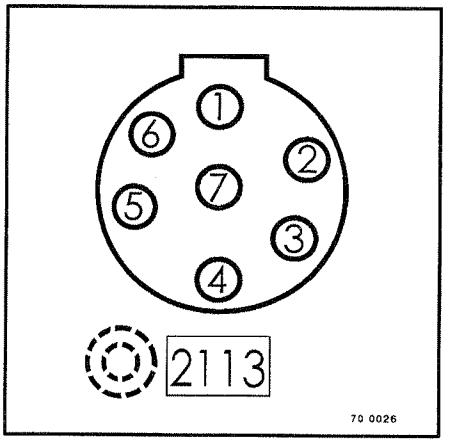
Appliance **Plate**

8014 – ABS LH front roadwheel electrovalve 37/38
8015 – ABS RH front roadwheel electrovalve 37/38
8016 – ABS LH rear roadwheel electrovalve 37/38
8017 – ABS RH rear roadwheel electrovalve 37/38
8061 – ABS LH front roadwheel sensor 37/38
8062 – ABS RH front roadwheel sensor 37/38
8063 – ABS LH rear roadwheel sensor 37/38
8064 – ABS RH rear roadwheel sensor 37/38

Trailer sockets

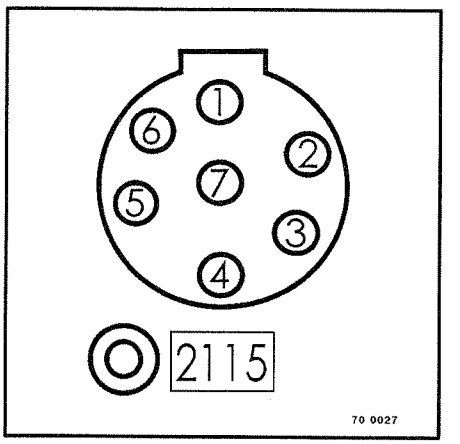
2113 – Trailer socket, 7–pin type 24 N

Terminal	Assignment	Fuse	Amp.	Wire
1	Earth	–	–	1
2	Trailer LH side/parking lights	F4	10A	634
3	Trailer LH flashing lights	F34	15A	39
4	Trailer stop lights	F27	10A	3
5	Trailer RH flashing lights	F34	15A	30
6	Trailer RH side/parking lights	F4	10A	634
7	Available	–	–	–



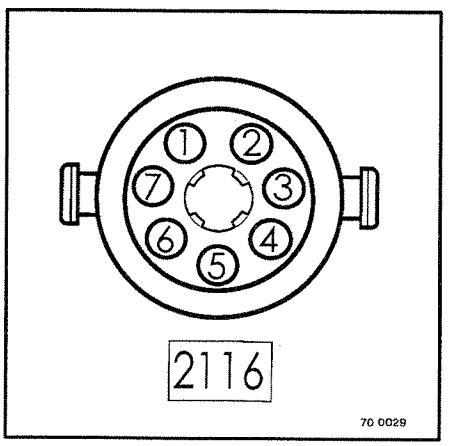
2115 – Trailer socket, 7–pin type 24 S

Terminal	Assignment	Fuse	Amp.	Wire
1	Earth	–	–	1
2	Vehicle protection	–	–	0403
3	Trailer reversing lights	F46	10A	608
4	Power supply (after master switch)	F43	10A	606
5	Trailer "ABS" safety warning light	–	–	352
6	Power supply (after ignition)	F1	10A	211
7	Trailer fog lights	F8	15A	307

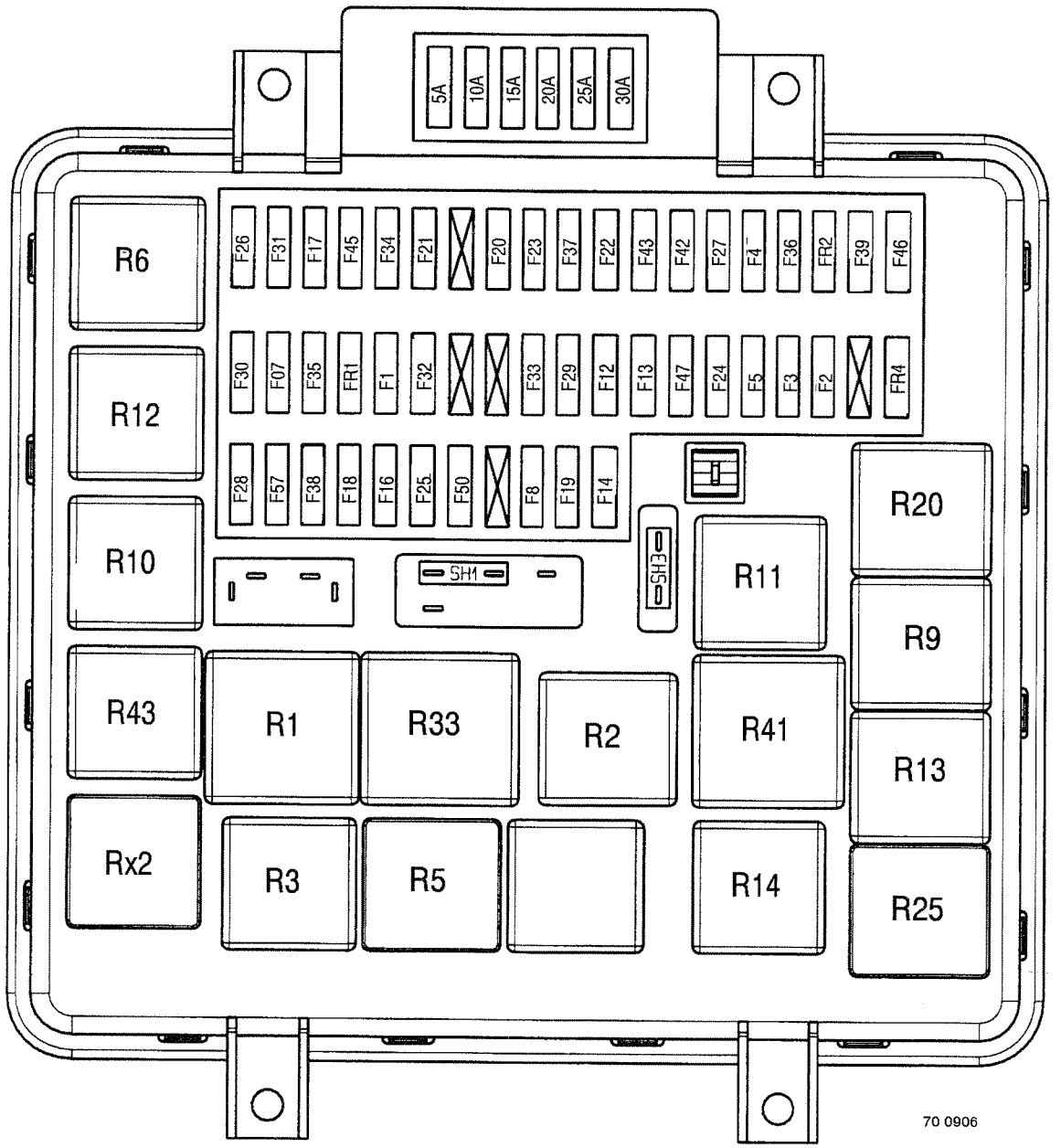


2116 – Trailer socket, 7–pin type ABS

Terminal	Assignment	Fuse	Amp.	Wire
1	Power supply (after master switch)	F36	20A	522
2	Power supply (after ignition)	F1	10A	211
3	Earth	–	–	1
4	Earth	–	–	1
5	Trailer "ABS" safety warning light	–	–	352
6	Available	–	–	–
7	Available	–	–	–



FUSES
RELAYS


5A
10A
15A
20A
25A
30A
F26
F31
F17
F45
F34
F21
F20
F23
F37
F22
F43
F42
F27
F4
F36
FR2
F39
F46
F30
F07
F35
FR1
F1
F32
F33
F29
F12
F13
F47
F24
F5
F3
F2
FR4
F28
F57
F38
F18
F16
F25
F50
F8
F19
F14
SH1
SH3
R6
R12
R10
R43
Rx2
R1
R33
R3
R5
R2
R41
R11
R14
R20
R9
R13
R25
70 0906

FUSES

Table of fuses on connection unit

Assignment	Item	Amp.	Plate
Trailer socket 7–pin ("ABS")	F1	15	4
Trailer socket, 7–pin type 24 S	F1	15	4
Stop lights relay	F1	15	4
Front side/parking lights	F2	10	9
RH rear side/parking lights	F2	10	9
Registration plate RH light	F2	10	9
Voltage dropper (headlamps adjustment)	F2	10	9
Marker lights	F3	10	9
LH rear side/parking lights	F3	10	9
Registration plate LH light	F3	10	9
Dashboard instruments lighting	F3	10	9
Switch lighting	F3	10	9
Trailer side/parking lights	F4	10	30
Available power supply (lighting)	F5	10	46
Jake brake electrovalves	F7	10	43/44
Engine stop control	F7	10	43/44
Fuel filter clogging	F7	10	43/44
"EUP" ECU	F7	10	43/44
Fog light(s)	F8	15	10
Fog driving lights	F8	15	10
LH dipped beam headlight	F13	10	10
RH dipped beam headlight	F12	10	10
RH main beam headlight	F14	15	11
LH main beam headlight	F14	15	11
Long beam driving lights	F14	15	11
Dashboard warning lights and instruments power supply	F16	10	4
Electric or hydraulic retarder control	F16	10	4
Exhaust brake electrovalve	F16	10	4
"ABS–ASR" ECU	F16	10	4
Heated driver's seat	F17	20	27
Voltage dropper (12V socket)	F17	20	27
Voltage dropper (telecommunications)	F17	20	27
Fan coil heaters	F18	15	32
Fuel filter preheater	F19	25	8
Revolving beacons	F20	20	15
Roof air vent motor	F20	20	15
Power supply (after master switch)	F21	10	46
Independent heater AT 2000	F22	20	33
Driver's overhead light	F23	10	24
Passenger(s) overhead light	F23	10	24
Driver's window winder motor	F24	20	19
Passenger's window winder motor	F24	20	19
Tachograph clock	F25	5	16
Horn	F26	15	14
Stop lights	F27	10	15
"ABS" ECU	F28	15	37/38
Electric retarder cut–off relay	F28	15	37/38
Defrosting rearview mirrors	F29	10	22/23
Windscreen defrosting time–delay relay	F29	10	22/23
Cigar lighter	F30	10	26/27/28
Radio	F30	10	26/27/28
Socket 24 Volts	F31	20	27
Voltage dropper (extra 12V socket)	F31	20	27
Windscreen wiper speed controller	F32	20	25
Windscreen washer pump	F32	20	25
Headlamps washer pump	F32	20	25
Windscreen wiper motor	F32	20	25

FUSES

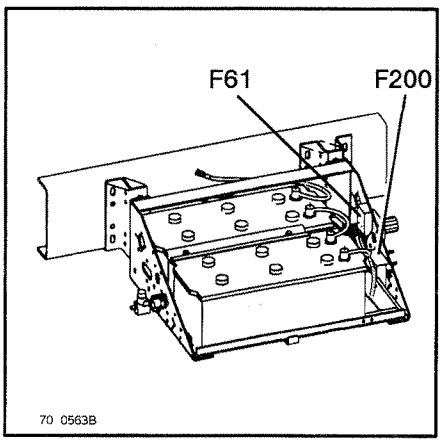
Table of fuses on connection unit

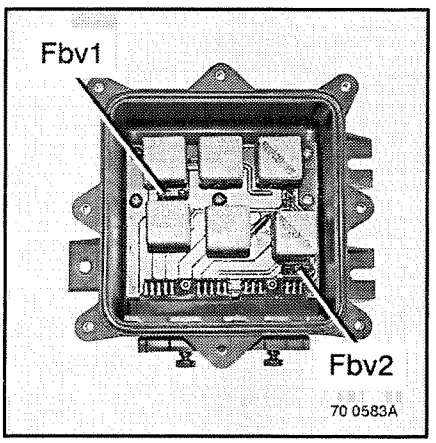
Assignment	Item	Amp.	Plate
Diagnostics socket	F33	20	17
Suspension ECU	F33	20	17
Radio tuner memory power supply	F34	15	4
Independent heater AT 2000	F34	15	4
Flasher unit	F34	15	4
Trailer socket 7–pin ("ABS")	F36	20	30
LH door lock electric striker	F37	15	18
RH door lock electric striker	F37	15	18
External rearview mirrors swivelling control	F37	15	18
Step light	F37	15	18
LH rear door overhead light	F37	15	18
RH rear door overhead light	F37	15	18
"EUP" ECU	F38	25	43/44
Automatic gearbox ECU	F39	10	4
Automatic gearbox ECU power supply	F42	10	40
Loading floodlight (tractor)	F43	10	4
Trailer socket, 7–pin type 24 S	F43	10	4
Bodybuilder equipment control	F43	10	4
Gate valves illumination control	F43	10	4
Exhaust brake cut–off relay	F43	10	4
Doors central locking box	F45	10	18
Fuel preheater relay	F46	15	4
Reversing lamp(s)	F46	15	4
Reversing buzzer	F46	15	4
Rearview mirrors defrosting relay	F46	15	4
Suspension ECU	F47	10	45
Suspension remote control box	F47	10	45
Windscreen wiper time–delay relay	F52	10	4
"EUP" VECU ECU	F57	15	42
Electronic tachograph	F57	15	42

FUSES

Table of fuses away from connection unit

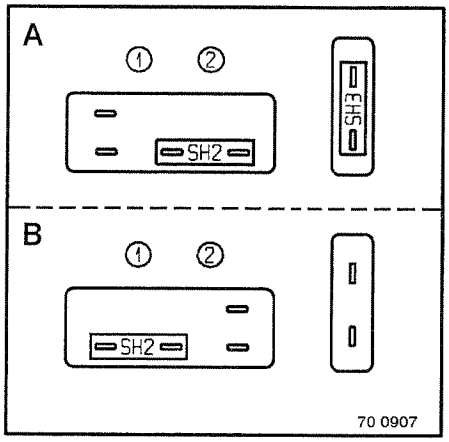
Assignment	Item	Amp.	Plate
Windscreen defrosting	F61	50	29
Available power supply (before master switch)			
Automatic gearbox relays box			
Automatic gearbox relays box			

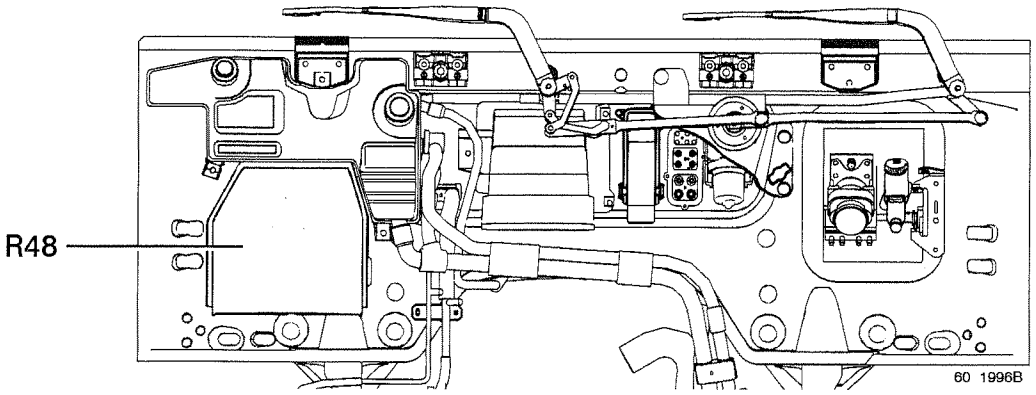




Shunts
Depending on assembly, the vehicle is fitted with the following shunts :
SH1 : not used
SH2 : ADR shunt
SH3 : daytime lights shunt. Depending on applicable legislation, in some countries, when the engine is started up, side/parking lights and dipped beam headlights must be on.

Configuration A : With ADR and with daytime lights.
Configuration B : Without ADR and without daytime lights.

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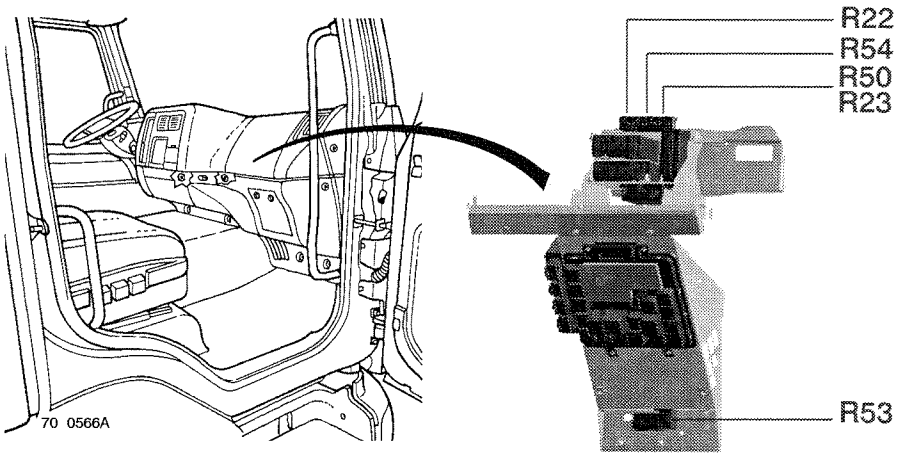
60 1996B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R54
R50
R23
R53
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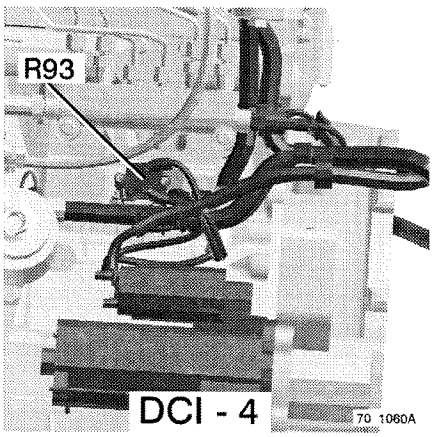
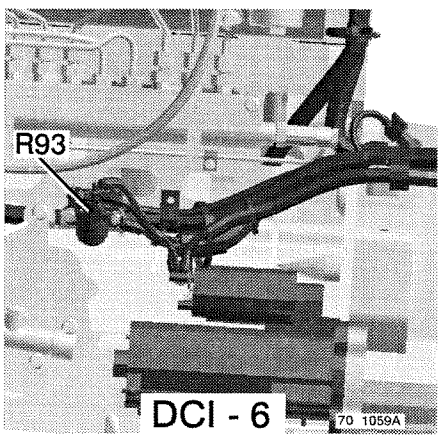

R93
DCI - 4
70 1060A


R93
DCI - 6
70 1059A

70 1062A

RELAYS

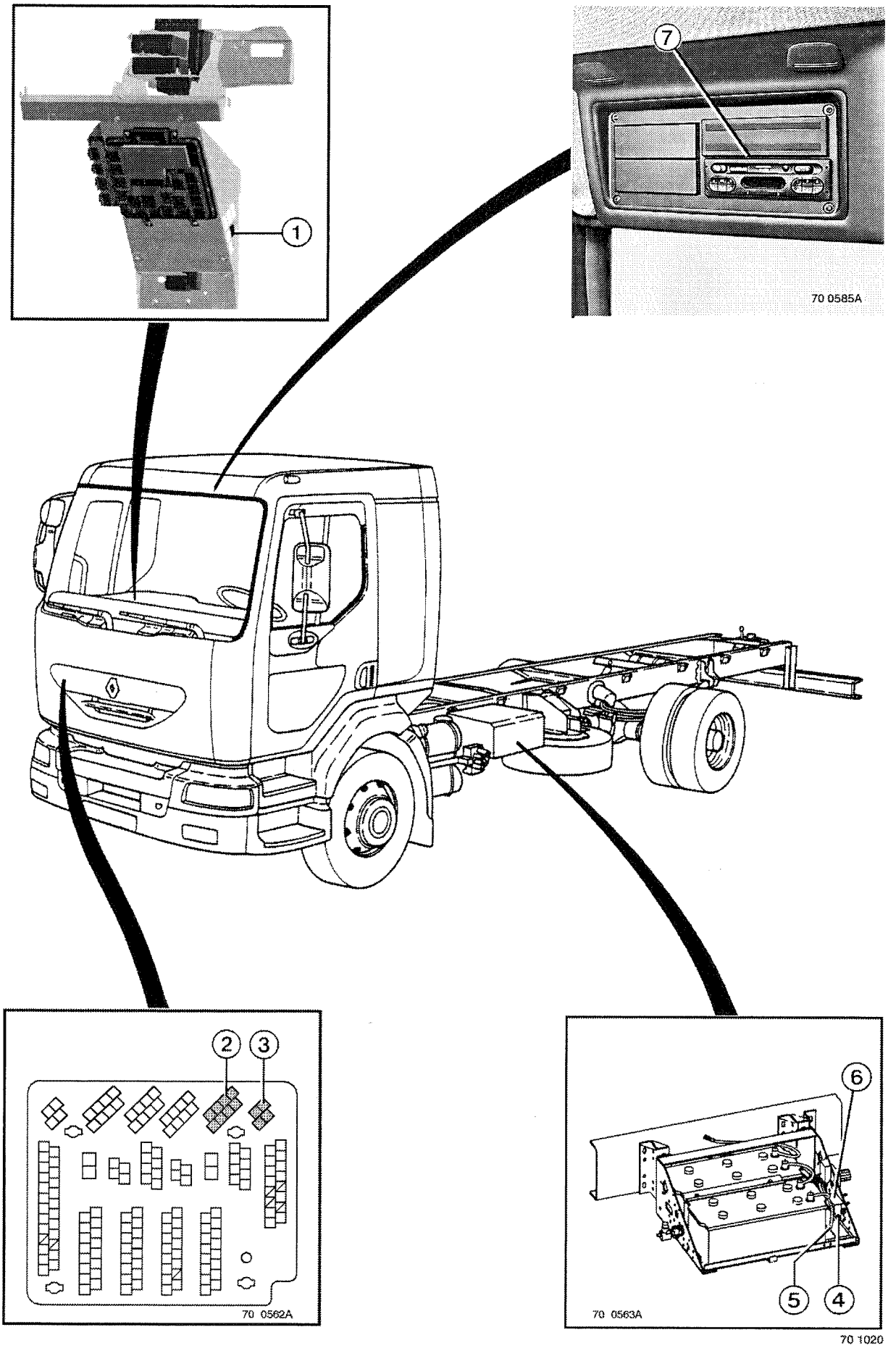
Table of relays on connection unit

Assignment	Item	Amp.	Plate
After ignition power supply relay N° 1	R1	50	4
Power after ignition relay	R2	20	4
Windscreen wiper safety relay	R3	20	25
Side / parking lights relay	R5	20	9
Comfort accessories relay	R6	20	27
Fog driving lights relay	R9	20	10
Fog lights relay	R10	20	10
Dipped beam headlights relay	R11	20	10
Main beam headlights relay	R12	20	10
Long range driving lights	R13	20	11
Stop lights relay	R14	20	15
Electric retarder cut–off relay	R18	20	37/38
Rearview mirrors and windscreen defrosting relay	R20	50	22/23
Revolving beacon(s) relay	R23	20	15
Windscreen wiper relay	R25	20	15
Starting relay	R33	50	7
Fuel preheater relay	R41	50	8
"VECU / EECU" ECU power supply relay	R43	50	42

Table of relays away from connection unit

Assignment	Item	Amp.	Plate
Neutral relay	R22	20	40
Revolving beacon(s) relay	R23	20	15
Zero speed relay	R34	20	...
"ALLISON" gearbox zero speed relay	R34	20	–
Windscreen defrosting relay (time–delayed)	R48	20	29
Exhaust brake cut–off relay	R70	20	–
Preheating relay	R93	50	6
Headlamp washer time–delay relay	R53	20	25
Available power supplies relay (bodybuilder equipment)	R50	20	46
Reversing lights relay	R54	20	15

AVAILABLE POWER SUPPLIES



70 1020

AVAILABLE POWER SUPPLIES

REFUSE COLLECTOR Equipment

LOCATION 1

3 insulated stand–by wires

Assignment	Wire	Fuse	Amp.
Available power supply (after master switch)	208	F21	15
Available power supply (lighting)	632	F5	10
Available power supply (after ignition)	275	F35	10

LOCATION 2

BROWN connector

Assignment	Wire	Fuse	Amp.
Earth	1	–	–
Available power supply (after master switch)	208	F21	15
Available power supply (lighting)	618	F43	10
Available power supply (lighting)	632	F5	10
Available power supply (lighting)	634	F4	10
Available power supply (equipment in working position "Alert" warning light)	651	F16	10
Available power supply (bodybuilder's equipment control)	8083	–	–
Available power supply (handrail deployed "Alert" warning light)	8084	–	–

LOCATION 4

2 insulated stand–by wires

Assignment	Wire	Fuse	Amp.
Earth	1	–	–
Available power supply (lighting)	632	F5	10

LOCATION 5

6 insulated stand–by wires

Assignment	Wire	Fuse	Amp.
Earth	1	–	–
Available power supply (after master switch)	208	F21	15
Available power supply (lighting)	618	F43	10
Available power supply (lighting)	632	F5	10
Available power supply (lighting)	634	F4	10
Available power supply (equipment in working position "Alert" warning light)	651	F16	10
Available power supply (bodybuilder's equipment control)	8083	–	–
Available power supply (handrail deployed "Alert" warning light)	8084	–	–

LOCATION 6

Assignment	Wire	Fuse	Amp.
Power supply (before master switch)	201	F200	200

Pre–equipped vehicles
With an electrical bodywork pre–equipment, a tailgate, a refrigerator unit, a tipper or a crane, a wiring harness connected to the location, brings in the available power supplies to the locations.

LOCATION 7

4 insulated stand–by wires

Assignment	Wire	Fuse	Amp.
Available + 12V power supply (radiotelephone)	46	F17	20
Available – power supply (radiotelephone)	155	–	–
Available + 12V power supply (CB)	4000	F17	20
Available – power supply (CB)	144	–	–
Radiotelephone antenna cable			
CB antenna cable			

WHITE connector

Assignment	Wire	Fuse	Amp.
Radio power supply (memory)	202	F34	15
Radio + power supply	47	F30	10
Radio – power supply	1	–	–

REFUSE COLLECTOR Equipment

LOCATION 8

10 insulated stand–by wires

Available power supply (engine speed)	045	–	–
Available power supply (engine speed)	047	–	–
Available power supply (PTO)	88	–	–
Available power supply (engine speed)	1025	–	–
Available power supply (PTO)	1026	–	–
Available power supply (30 km/h speed limitation)	5027	–	–
Available power supply (fast idling control)	8067	–	–
Available power supply ("pod or crane deployed" warning light)	8085	–	–
Available power supply ("sideboard open" warning light)	8086	–	–
Available power supply ("tipper raised" warning light)	8087	–	–

AVAILABLE POWER SUPPLIES

REFUSE COLLECTOR Equipment BOM

LOCATION 1

YELLOW connector

Assignment	Wire	Fuse	Amp.
Available power supply (30 km/h speed limitation)	5027	–	–
Available power supply ("ALLISON" power take–off)	818	–	–
Available power supply (compacting request)	8067	–	–
Available power supply (reversing forbidden)	5026	–	–

RED connector

Assignment	Wire	Fuse	Amp.
Available power supply (engine speed)	045	–	–
Available power supply (engine speed)	047	–	–
Available power supply (PTO)	88	–	–
Available power supply (revolving beacons)	323	–	–
Available power supply (reversing lights)	608	–	–
Available power supply (engine speed)	1025	–	–
Available power supply (PTO)	1026	–	–
Available power supply (chassis warning light)	8084	–	–

4 insulated stand–by wires

Assignment	Wire	Fuse	Amp.
Power supply 24 V	202	–	–
Available power supply (after master switch)	208	F21	15
Available power supply (after ignition)	275	F35	10
Available power supply (lighting)	632	F5	10

LOCATION 3

BLUE connector

Assignment	Wire	Fuse	Amp.
Available power supply (engine speed)	045	–	–
Available power supply (engine speed)	047	–	–
Available power supply (PTO)	88	–	–
Available power supply (engine speed)	1025	–	–
Available power supply (PTO)	1026	–	–
Available power supply (30 km/h speed limitation)	5027	–	–
Available power supply (fast idling control)	8067	–	–
Available power supply ("pod or crane deployed" warning light)	8085	–	–
Available power supply ("sideboard open" warning light)	8086	–	–
Available power supply ("tipper raised" warning light)	8087	–	–

LOCATION 4

2 insulated stand–by wires

Assignment	Wire	Fuse	Amp.
Earth	1	–	–
Available power supply (lighting)	632	F5	10

LOCATION 5

6 insulated stand–by wires

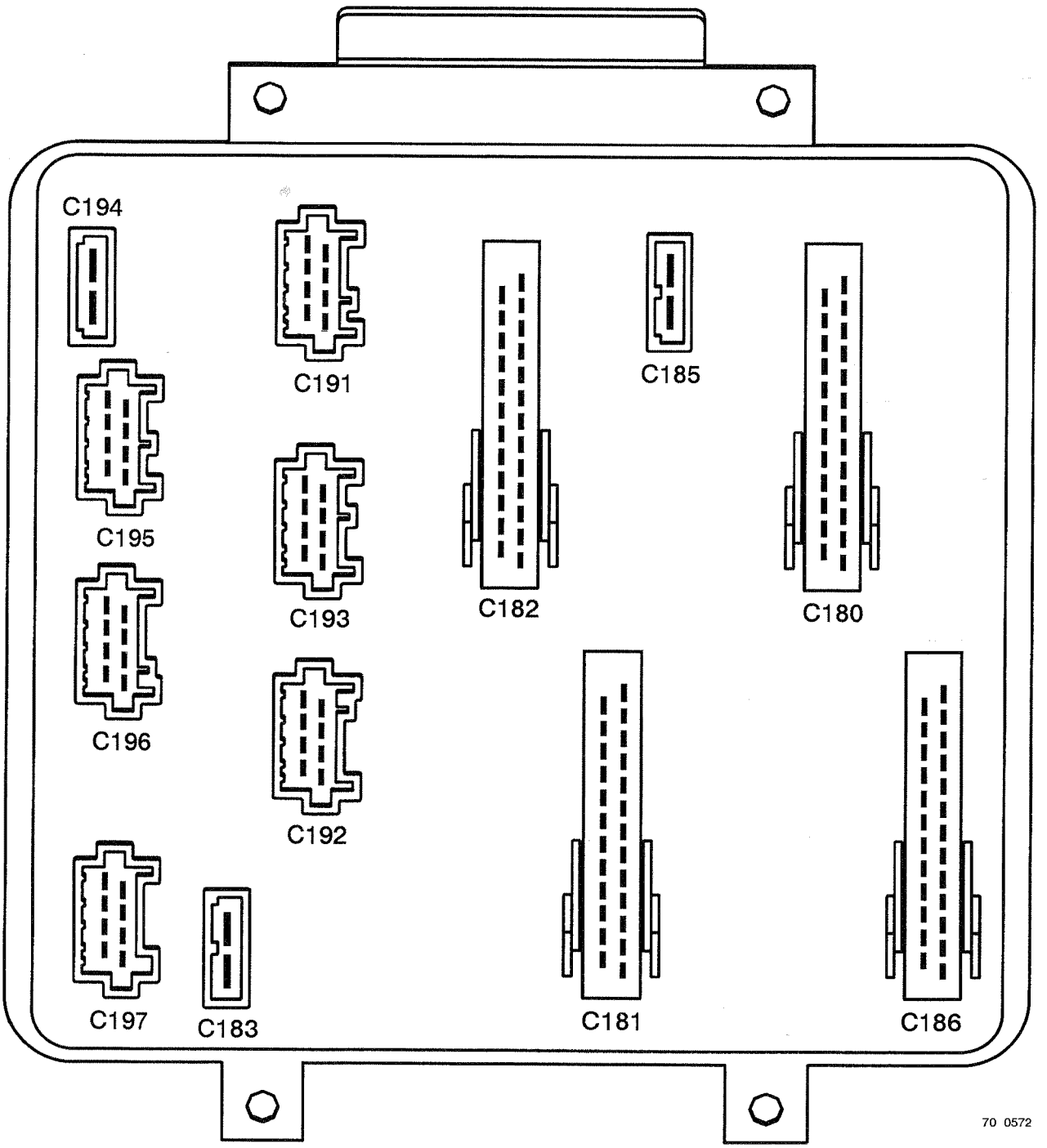
Assignment	Wire	Fuse	Amp.
Earth	1	–	–
Available power supply (after master switch)	208	F21	15
Available power supply (lighting)	618	F43	10
Available power supply (lighting)	632	F5	10
Available power supply (lighting)	634	F4	10
Available power supply (equipment in working position "Alert" warning light)	651	F16	10
Available power supply (bodybuilder's equipment control)	8083	–	–
Available power supply (handrail deployed "Alert" warning light)	8084	–	–

LOCATION 6

Assignment	Wire	Fuse	Amp.
Power supply (before master switch)	201	F200	200

CONNECTION UNIT

Fuses and relays box


C194
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C182
C180
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C181
C186
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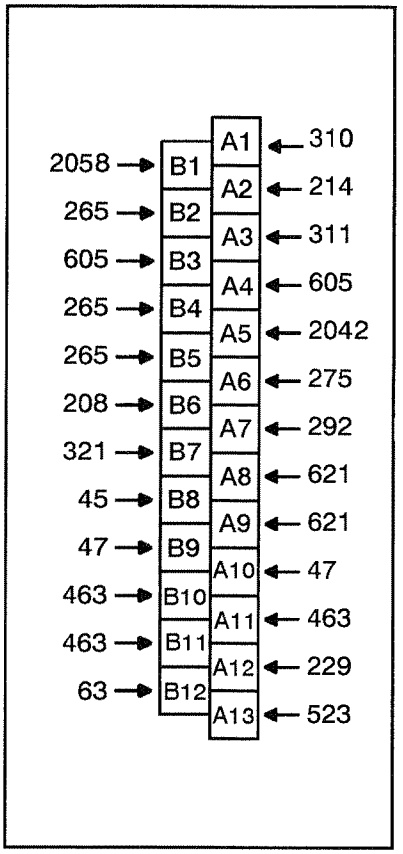
Connection unit – Fuses and relays box

Face A connectors

Number	Assignment	Colour	Number of ways
C180	Dashboard	Bc	25
C181	Dashboard	J	25
C182	Dashboard	R	25
C183	Dashboard	M	2
C185	+ 24V power supply	G	2
C186	Available	M	25
C191	Trailer socket	J	8
C192	Independent heating / Starting aid	V	8
C193	Step light / Defrosting rearview mirrors	R	8
C194	Trailer socket	N	2
C195	Reversing buzzer / Fast idling / Revolving beacons / Hourmeter	M	8
C196	Fog driving and long range driving lights / Headlamp washer	G	8
C197	Electronic air suspension	Bc	8



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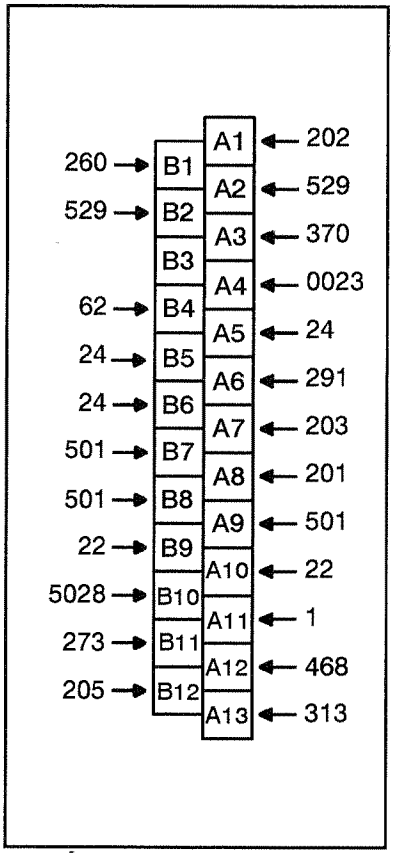

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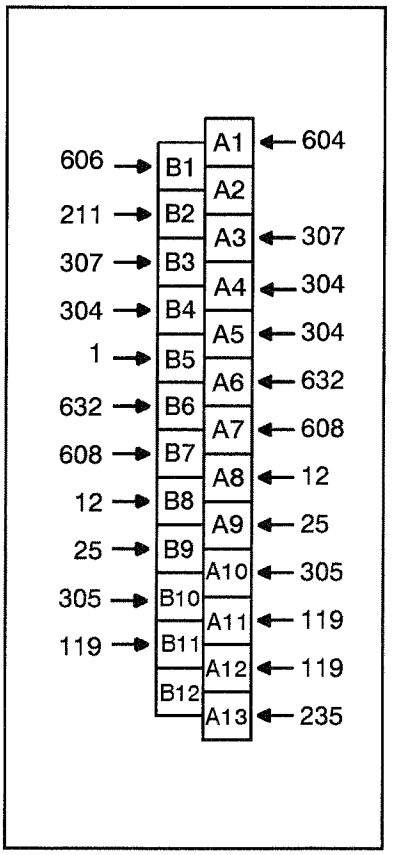

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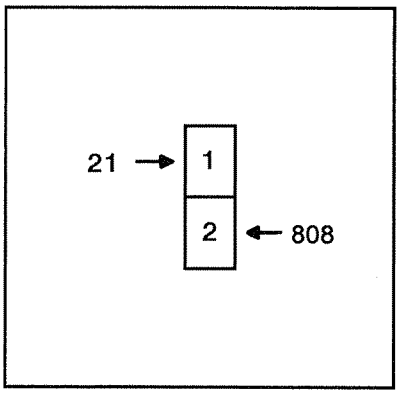

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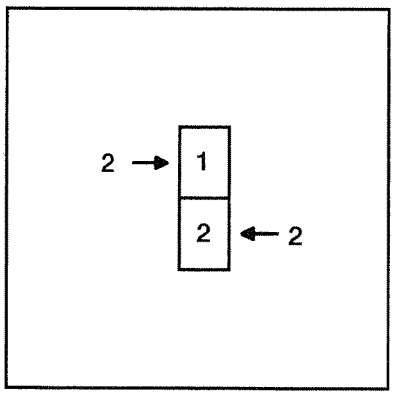

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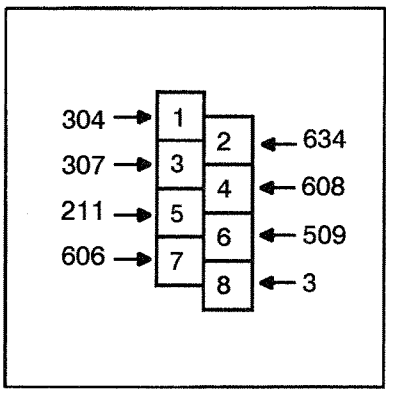

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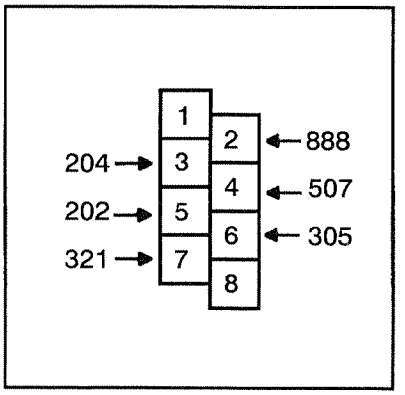

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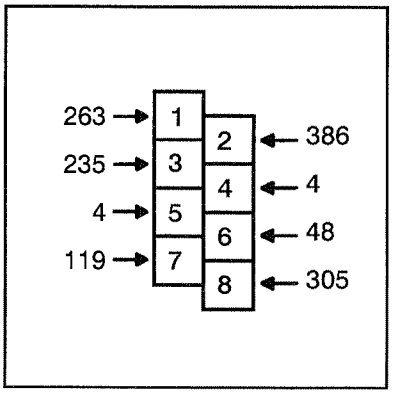

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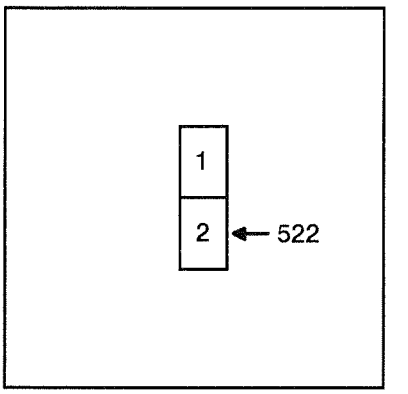

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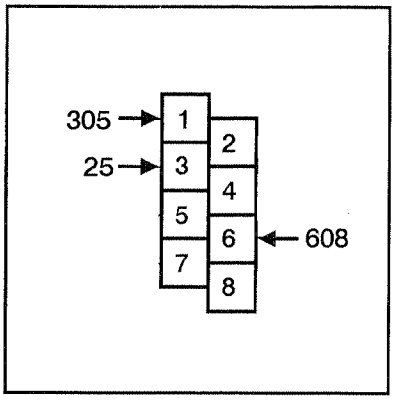

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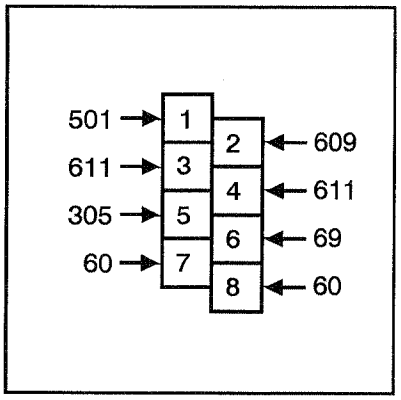

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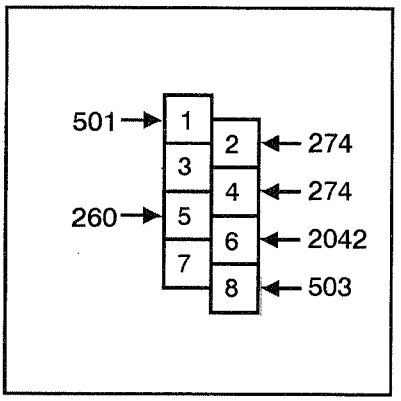

C197

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WIRES – CONNECTORS LINKS

Fuses and relays box

Wire N°	Wire section (mm^2)	Connectors	
		Terminal	Number
0023	0.6	A4	181
1	0.6	A11	181
2	7	1	185
2	7	2	185
3	1	B5	182
3	1	8	191
4	1	7	193
4	0.6	6	193
12	0.6	B8	182
12	0.6	A8	182
21	3	1	183
22	0.6	A10	181
22	1	B9	181
24	0.6	B5	181
24	1	B6	181
24	1	A5	181
25	0.6	B9	182
25	0.5	A9	182
25	0.6	3	195
45	0.6	B8	180
47	1	A10	180
47	1	B9	180
48	2	4	193
60	0.5	8	196
60	1	7	196
62	0.6	B4	181
63	0.6	B12	180
69	0.6	6	196
119	0.6	B11	182
119	0.6	A11	182
119	0.6	B11	182
119	0.6	7	193
201	2	A8	181
202	2	A1	181
202	0.6	5	192
203	0.6	A7	181
204	2	3	192
205	0.6	B12	181

Wire N°	Wire section (mm^2)	Connectors	
		Terminal	Number
208	1	B6	180
208	1	B6	180
211	0.6	B2	182
211	1	5	191
214	2	A2	180
229	1	A12	180
235	0.6	A13	182
235	0.6	3	193
260	1	B1	181
260	1	5	197
263	0.6	1	193
265	1	B4	180
265	1	B5	180
265	1	B2	180
265	0.6	B2	180
273	1	B11	181
274	2	2	197
274	0.6	4	197
275	0.6	A6	180
291	2	A6	181
292	2	A7	180
304	0.6	B4	182
304	0.6	A4	182
304	0.6	A5	182
304	0.6	1	191
305	0.6	A10	182
305	0.6	B10	182
305	0.6	6	192
305	0.6	8	193
305	0.6	1	195
305	0.6	5	196
307	1	B3	182
307	0.5	A3	182
307	1	3	191
310	0.6	A1	180
311	0.6	A3	180
313	0.6	A13	181
321	1	A10	180
321	1	7	192

Wire N°	Wire section (mm^2)	Connectors	
		Terminal	Number
321	0.6	B7	180
370	0.6	A3	181
386	0.6		193
463	1	A11	180
463	1	B10	180
463	1	B11	180
501	1	B7	181
501	1	B8	181
501	1	A9	181
501	1	1	196
503	0.6	8	197
507	1	4	192
509	1	6	191
522	5	2	194
523	1	A13	180
529	0.6	A2	181
529	0.6	B2	181
604	0.6	A1	182
605	0.5	A4	180
605	0.6	B3	180
606	2	B1	182
606	2	7	191
608	1	B7	182
608	0.6	A7	182
608	1	4	191
608	0.6	6	195
609	0.6	2	196
611	0.6	3	196
611	1	4	196
621	0.5	A8	180
621	1	A9	180
632	1	B6	182
632	1	B6	182
632	0.6	A6	182
634	1	2	191
808	3	2	183
888	0.6	2	192
2042	0.6	A5	180

Wire N°	Wire section (mm^2)	Connectors	
		Terminal	Number
2050	2	B1	182
5028	0.6	B10	181

CONNECTION UNIT

Fuses and relays box

Internal diagram

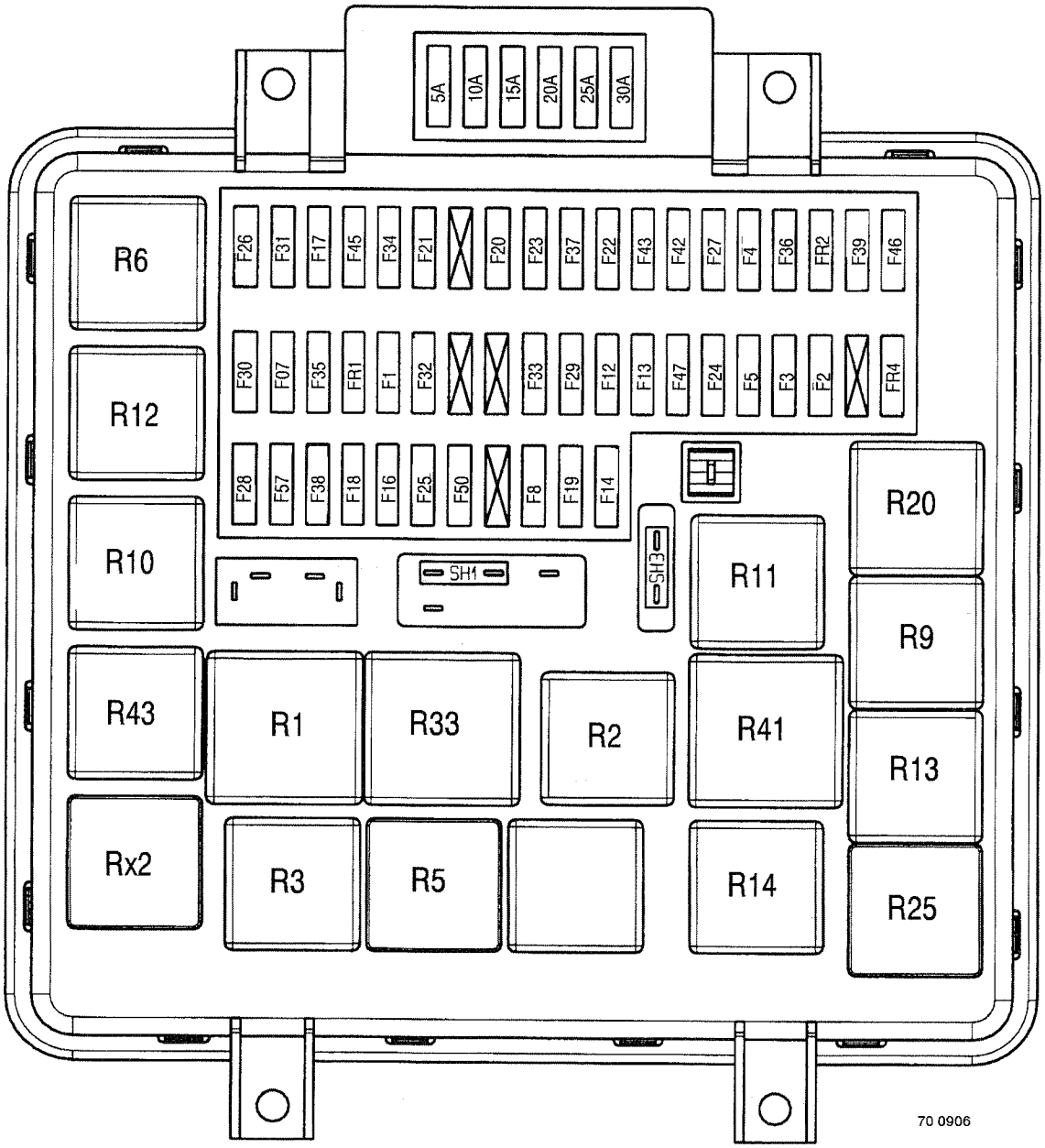
Connection unit – Fuses and relays box

Relays

Item	Assignment	Plate
R1	2121 – Power after ignition relay	BFR1
R2	2121 – Power after ignition relay	BFR1
R3	5320 – Windscreen wiper disabling relay	BFR2
R5	3618 – Side/parking lights relay	BFR2
R6	4136 – Comfort accessories relay	BFR2
R9	6214 – Fog driving lights relay	BFR2
R10	3513 – Fog lights relay	BFR2
R11	6119 – Dipped beam headlights relay	BFR2
R12	6121 – Main beam headlights relay	BFR1
R13	6215 – Long range driving lights	BFR1
R14	3512 – Stop lights relay	BFR1
R20	4139 – Rearview mirrors and windscreen defrosting relay	BFR1
R25	5301 – Windscreen wiper time–delay	BFR1
R33	2212 – Starting relay	BFR2
R41	2422 – Fuel preheater relay	BFR1

Fuses

Item	Plate	Item	Plate	Item	Plate
F1	BFR1	F19	BFR1	F32	BFR2
F2	BFR2	F20	BFR1	F33	BFR2
F3	BFR2	F21	BFR2	F34	BFR2
F4	BFR2	F22	BFR1	F35	BFR1
F5	BFR2	F23	BFR2	F36	BFR2
F7	BFR1	F24	BFR1	F37	BFR1
F8	BFR2	F25	BFR2	F38	BFR1
F9	BFR2	F26	BFR2	F39	BFR1
F12	BFR2	F27	BFR1	F42	BFR1
F13	BFR2	F28	BFR1	F43	BFR2
F14	BFR1	F29	BFR1	F45	BFR2
F16	BFR1	F30	BFR2	F46	BFR1
F17	BFR2	F31	BFR2	F47	BFR1
F18	BFR1	–	–	F57	BFR1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F4
F36
FR2
F39
F46
F30
F07
F35
FR1
F1
F32
F33
F29
F12
F13
F47
F24
F5
F3
F2
FR4
F28
F57
F38
F18
F16
F25
F50
F8
F19
F14
SH1
SH3
R6
R12
R10
R43
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R2
R11
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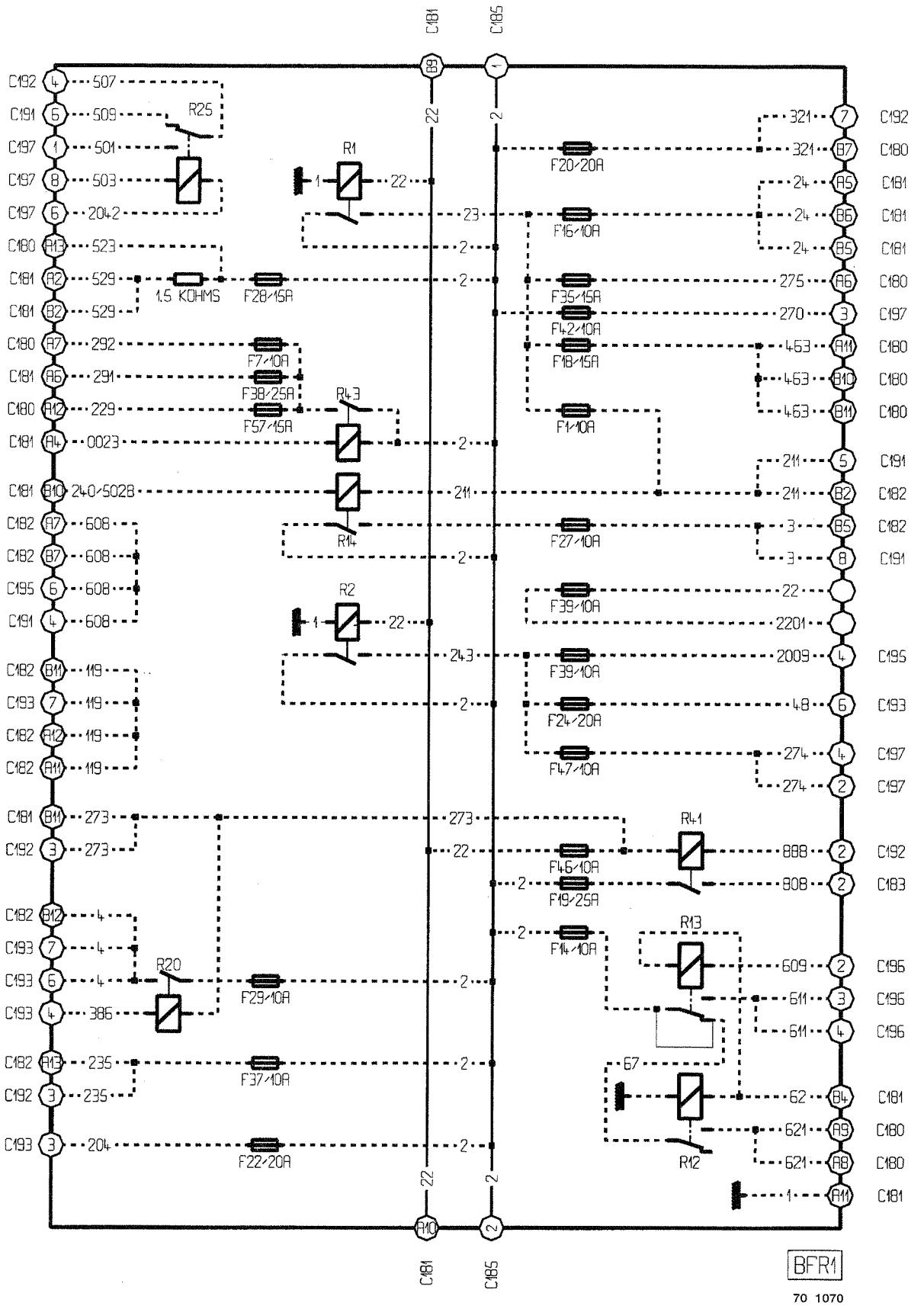
R14
R20
R9
R13
R25
70 0906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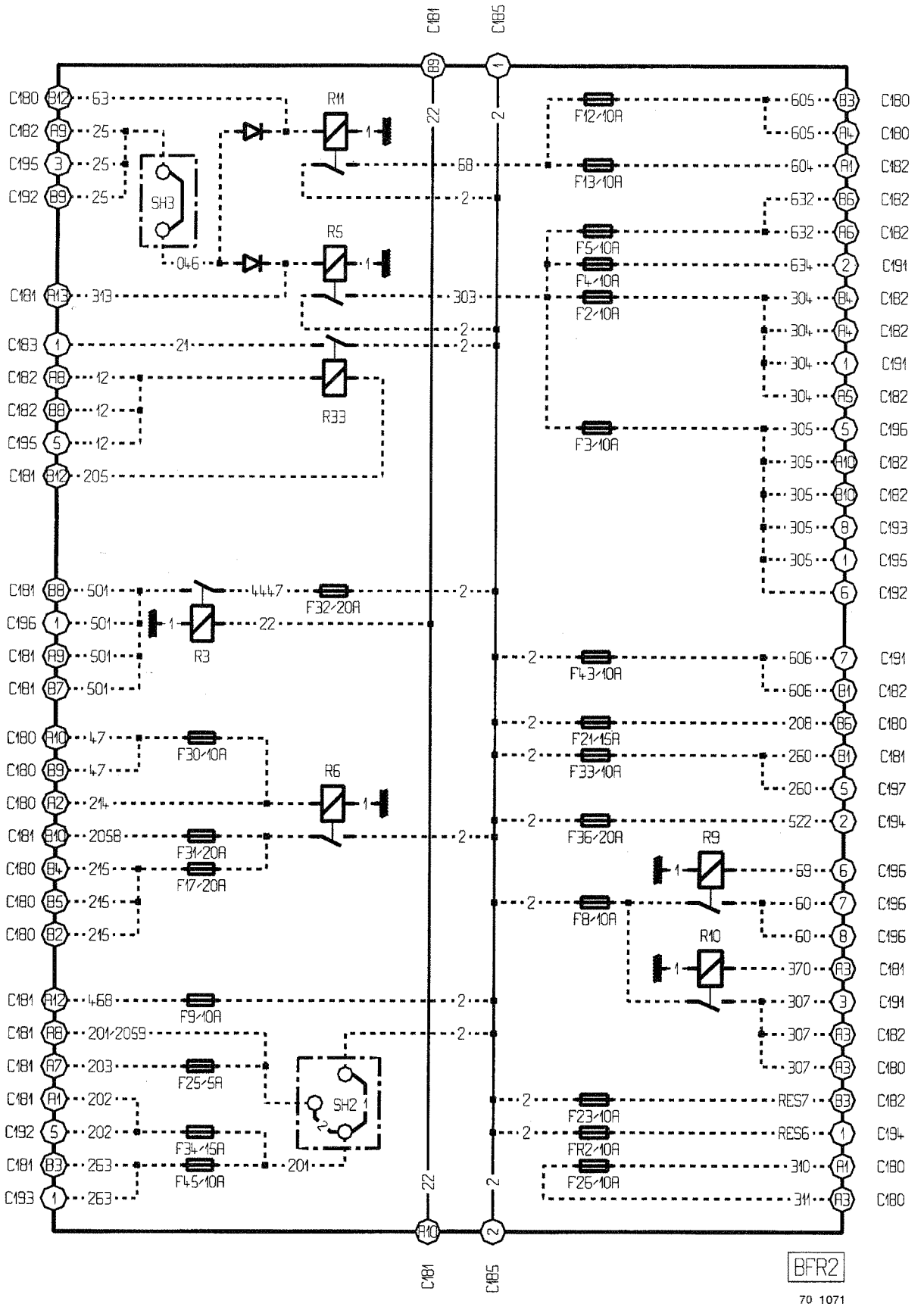
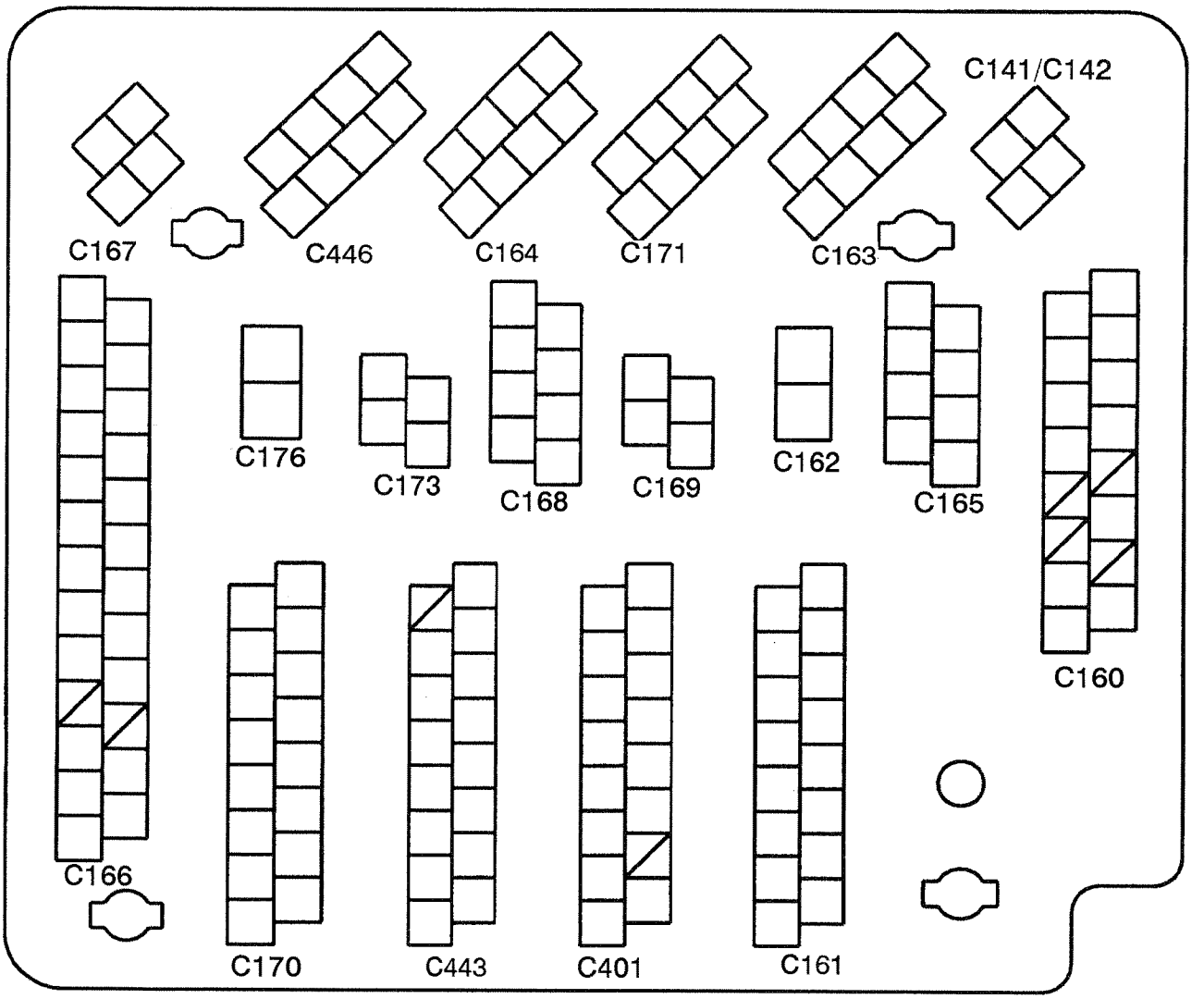
C191
C197
C180
C181
C180
C197
C180
C181
C180
C181
C182
C182
C195
C191
C182
C193
C182
C182
C181
C192
C182
C193
C193
C193
C182
C192
C193
R25
R1
R43
R14
R2
R20
R41
R13
R12
1.5 KOHMS
F28/15A
F7/10A
F38/25A
F57/15A
F20/20A
F16/10A
F35/15A
F42/10A
F18/15A
F1/10A
F27/10A
F39/10A
F39/10A
F24/20A
F47/10A
F46/10A
F19/25A
F14/10A
F29/10A
F37/10A
F22/20A
BFR1
70 1070


C181
C185
C180 B12 63
C182 A9 25
C195 3 25
C192 B9 25
SH3
046
R11
R5
68
2
C181 A13 313
303
C183 1 21
C182 A8 12
C182 B8 12
C195 5 12
C181 B12 205
R33
C181 B8 501
C196 1 501
C181 A9 501
C181 B7 501
4447
F32/20A
R3
22
C180 A10 47
C180 B9 47
C180 A2 214
C181 B10 2058
C180 B4 215
C180 B5 215
C180 B2 215
F30/10A
F31/20A
F17/20A
R6
C181 A12 468
C181 A8 201/2059
C181 A7 203
C181 A1 202
C192 5 202
C181 B3 263
C193 1 263
F9/10A
F25/5A
F34/15A
F45/10A
SH2
201
F12/10A
F13/10A
F5/10A
F4/10A
F2/10A
F3/10A
F43/10A
F21/15A
F33/10A
F36/20A
F8/10A
F23/10A
FR2/10A
F26/10A
605 B3 C180
605 A4 C180
604 A1 C182
632 B6 C182
632 A6 C182
634 2 C191
304 B4 C182
304 A4 C182
304 1 C191
304 A5 C182
305 5 C196
305 A10 C182
305 B10 C182
305 8 C193
305 1 C195
6 C192
606 7 C191
606 B1 C182
208 B6 C180
260 B1 C181
260 5 C197
522 2 C194
R9
69 6 C196
60 7 C196
60 8 C196
R10
370 A3 C181
307 3 C191
307 A3 C182
307 A3 C180
RES7 B3 C182
RES6 1 C194
310 A1 C180
311 A3 C180
A10
BFR2
70 1071

CONNECTION UNIT

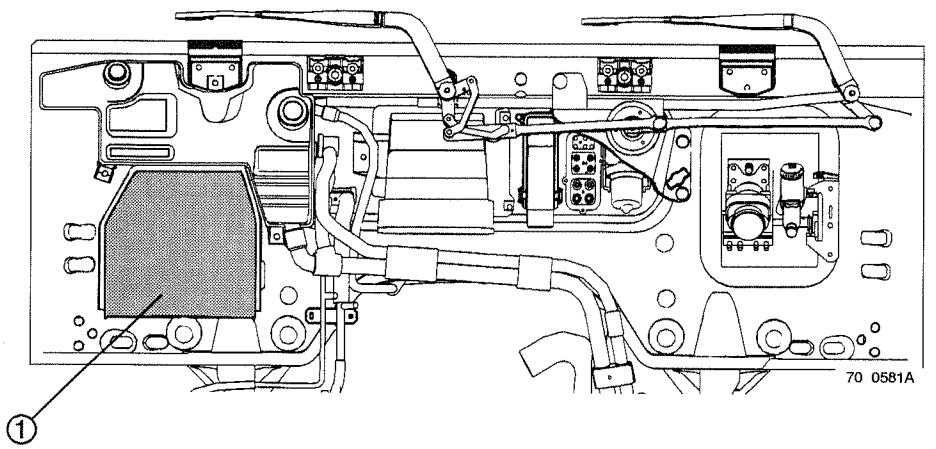
Bulkhead grommet

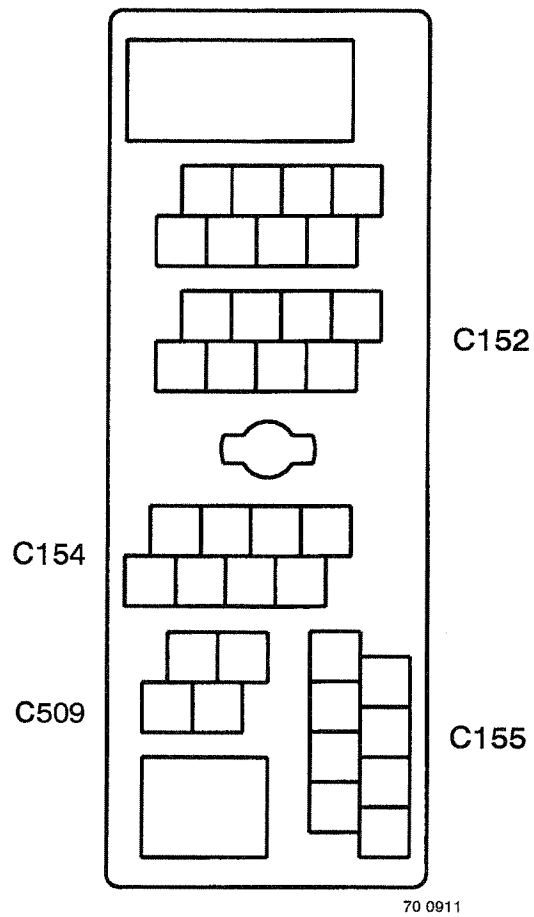

C167
C446
C164
C171
C163
C141/C142
C176
C173
C168
C169
C162
C165
C160
C166
C170
C443
C401
C161
70 0910

Connection unit – Bulkhead grommet 1

Connectors interface

Number	Assignment	Colour	Number of ways
C141	Available power supply "BOM"	N	4
C142	Available power supply "RTMDR"	N	4
C160	Front signalling / lighting	Bu	16
C161	LH front wiring harness	Bc	16
C162	Starter	G	2
C163	Power unit	G	8
C164	Available power supply	M	8
C165	Fuel–injection electronic management	Bc	8
C166	Rear wiring harness	J	25
C167	Windscreen wash pump	G	4
C168	Trailer socket	J	8
C169	Power unit	Bc	4
C170	RH front wiring harness	M	16
C171	Electric retarder relay box	Vi	8
C173	Trailer socket	J	8
C401	Trailer socket, 7–pin type ABS	N	2
C401	Automatic gearbox "ALLISON – BOM"	Ve	16
C443	Automatic gearbox "ALLISON – BOM"	R	16
C446	Drive axle link–up for 4X4 vehicle	R	8

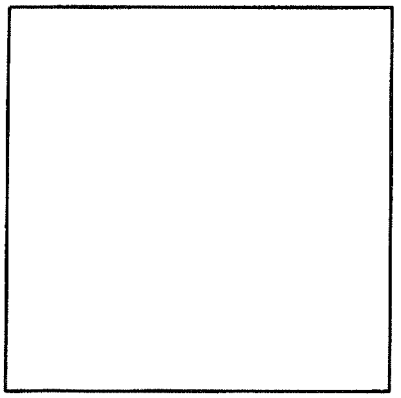



C152
C154
C509
C155
70 0911

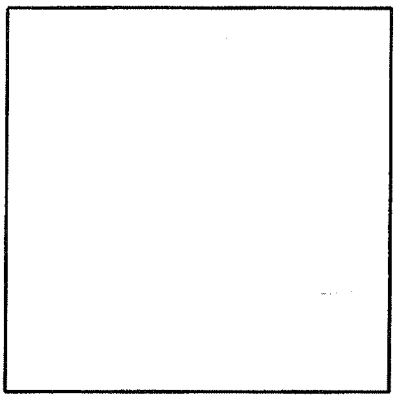
Connection unit – Bulkhead grommet 2

Connectors interface

Number	Assignment	Colour	Number of ways
C152	Doors equipment	Bc	8
C154	Doors and front end equipment	R	8
C155	Windscreen wiper motor	J	8
C509	Reversing forbidden solenoid valves	Gr	4



C141



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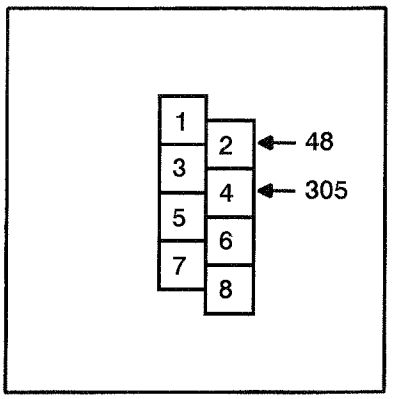

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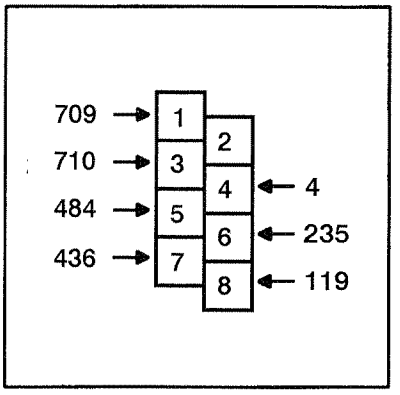

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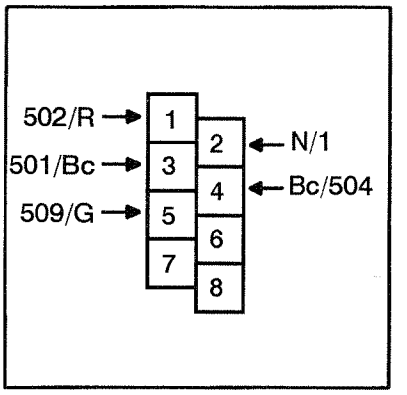

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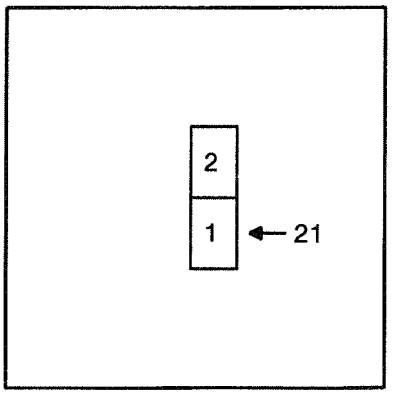

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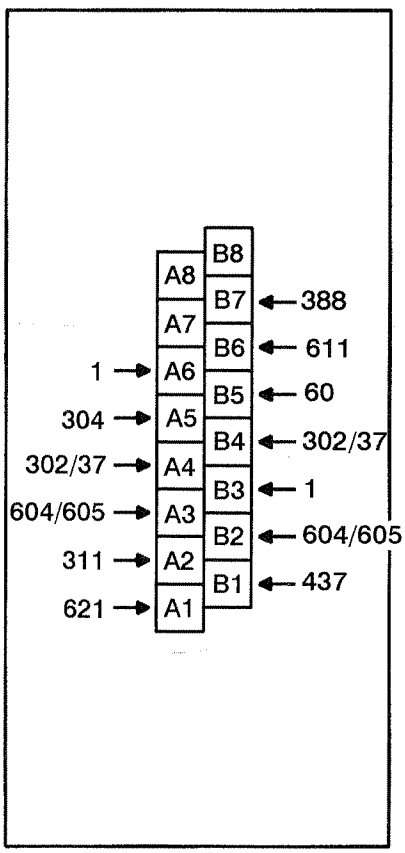

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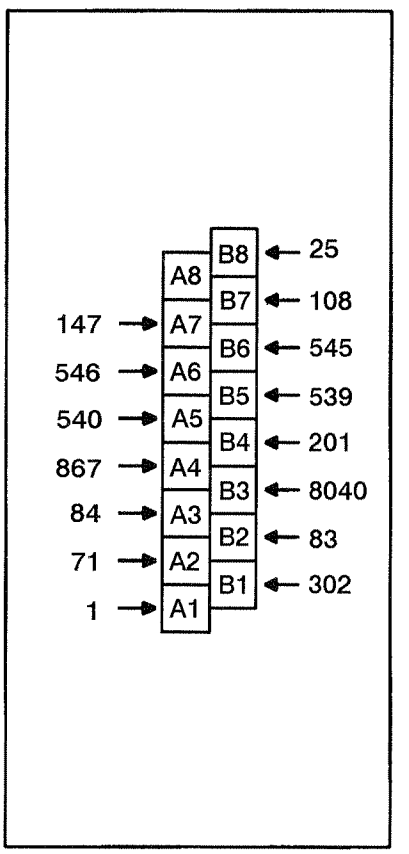

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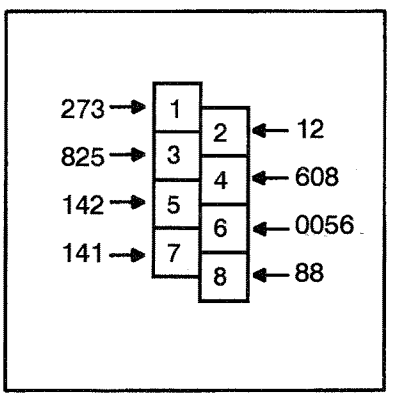
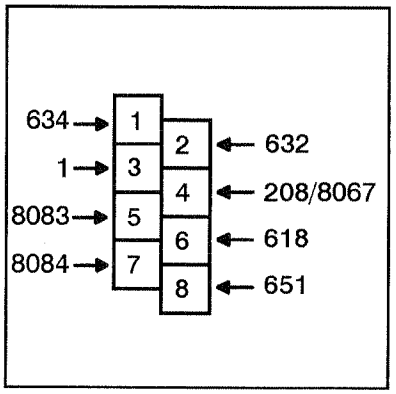


C163

700912



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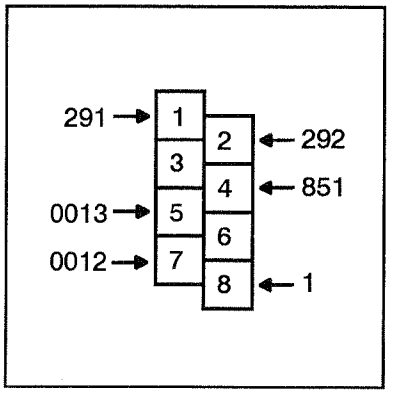

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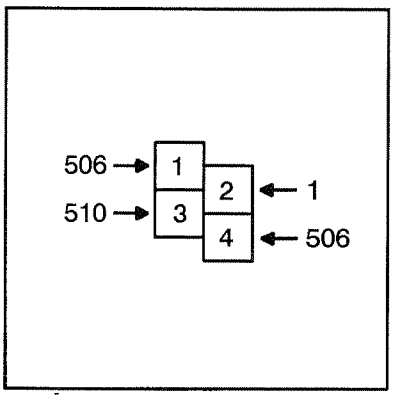

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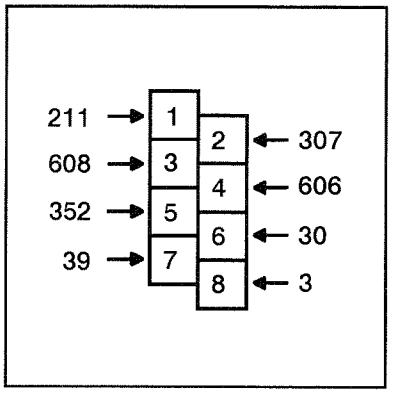

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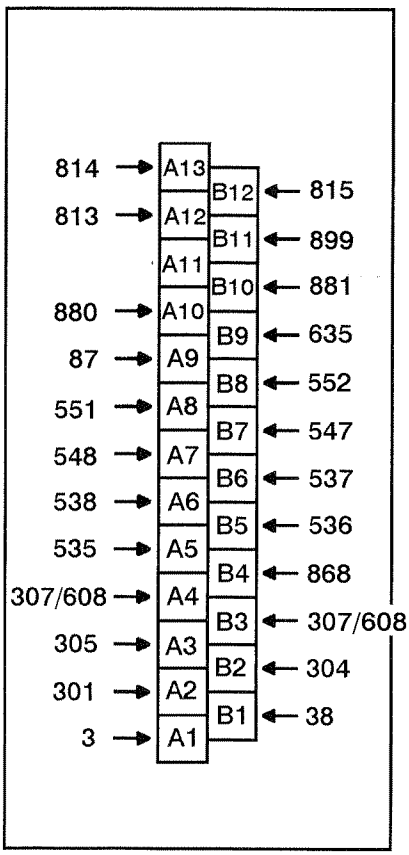

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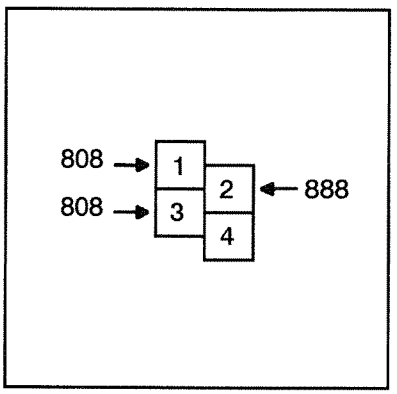

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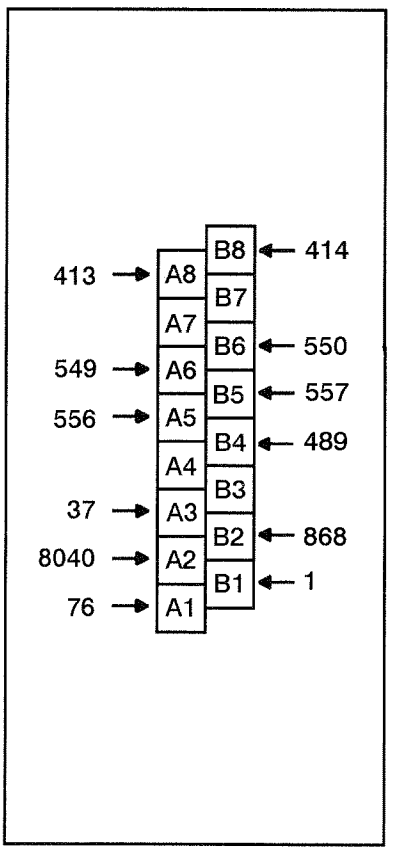
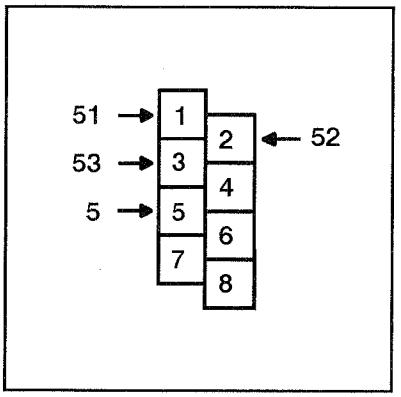


C170

70 0914



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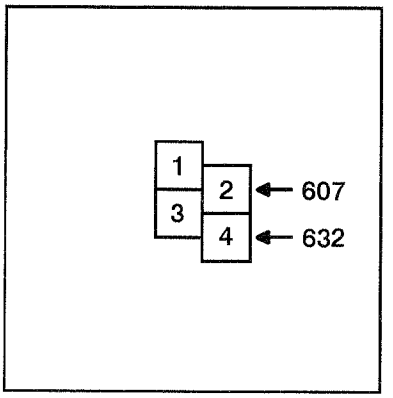

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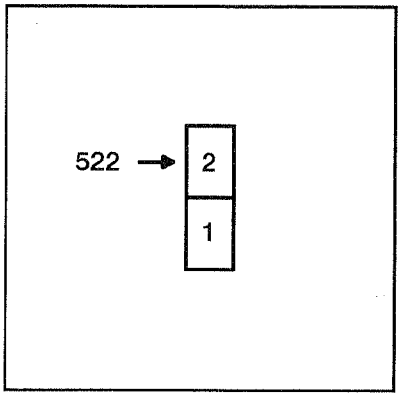

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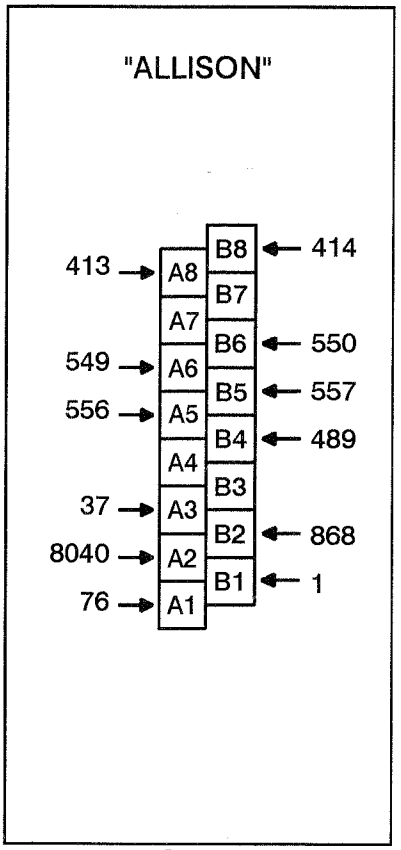

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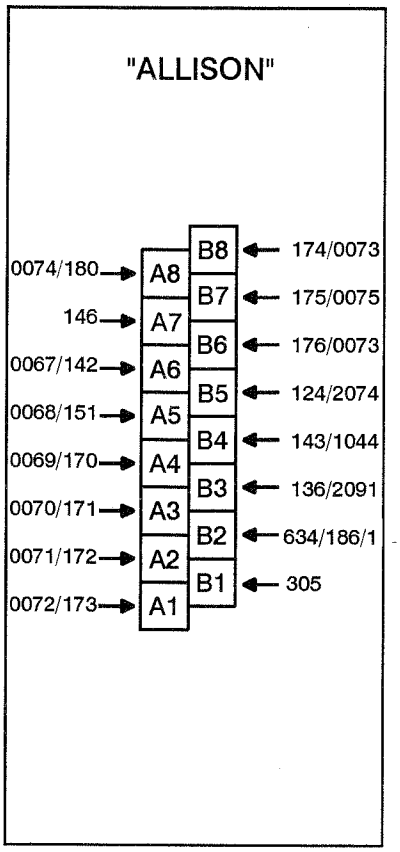


C401

70 0915

WIRES – CONNECTORS LINKS

Bulkhead grommet

Wire N°	Wire section (mm^2)	Connectors	
		Terminal	Number
1	0.6	2	155
1	0.6	A6	160
1	2	B3	160
1	1	A1	161
1	0.6	8	165
1	0.6	3	164
1	0.6	A11	166
1	2	2	167
1	1	B1	170
1	1	B2	401
3	1	A1	166
3	1	8	168
4	1	4	154
5	1	5	171
12	0.6	2	163
21	3	1	162
25	0.6	B8	161
30	0.6	B5	160
30	0.6	6	168
37	0.6	A4	160
37	0.6	B4	160
37	0.6	A3	170
37	0.6	A3	443
38	0.6	B1	166
39	0.6	7	168
48	2	2	152
51	1	1	171
52	1	2	171
53	1	3	171
60	1	B5	160
71	0.5	A2	161
76	0.5	A1	170
76	0.5	A1	443
83	0.6	B2	161
84	0.5	A3	161
88	0.6	8	163
108	0.6	B7	161
119	0.6	8	154
124	1	B5	401
136	1	B3	401

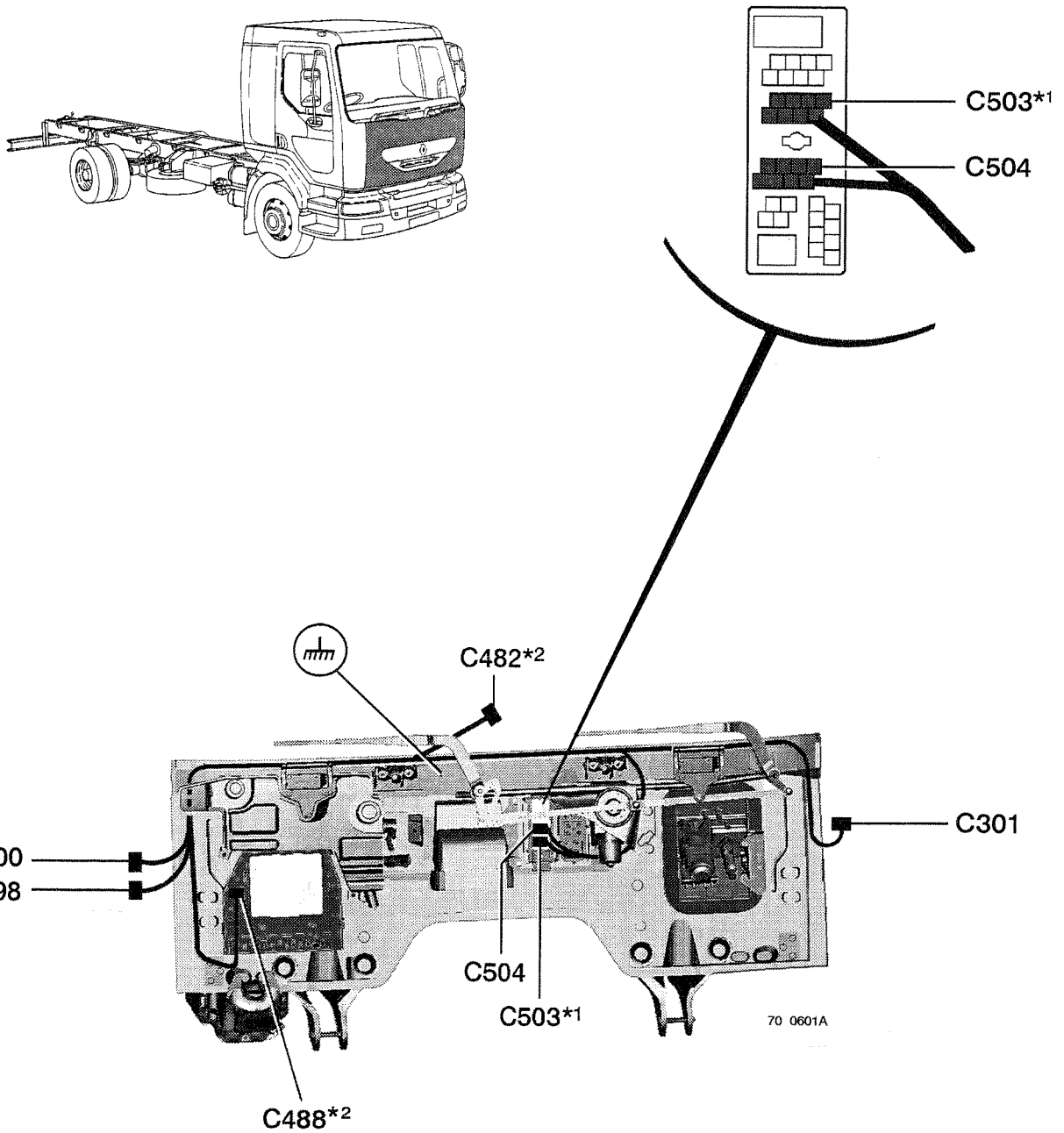
Wire N°	Wire section (mm^2)	Connectors	
		Terminal	Number
141	0.6	7	163
142	0.6	5	163
142	1	A6	401
143	0.6	A2	401
143	0.6	B4	401
146	0.6	A7	401
147	0.6	A7	161
151	1	A5	401
170	1	A4	401
171	1	A3	401
172	1	A2	401
173	1	A1	401
174	1	B8	401
175	1	B7	401
176	1	B6	401
180	1	A8	401
186	1	B2	401
201	2	B4	161
208	1	4	164
211	1	1	168
213	1	4	142
235	2	6	154
273	1	A1	163
274	2	4	141
291	2	1	165
292	2	2	165
301	0.6	A2	166
302	0.6	A4	160
302	0.6	B4	160
302	0.6	B1	161
304	0.6	A5	160
304	0.6	B2	166
305	0.6	4	152
305	0.6	A3	166
305	0.6	B1	401
307	1	A4	166
307	1	B3	166
307	1	2	168
311	0.6	A2	160

Wire N°	Wire section (mm^2)	Connectors	
		Terminal	Number
352	0.5	5	168
388	0.6	B7	160
413	1	A8	170
413	1	A8	443
414	1	B8	170
414	1	B8	443
436	0.6	7	154
437	0.6	B1	160
484	0.6	5	154
489	1	B4	170
489	1	B4	443
501	1	3	155
502	1	1	155
504	1	4	155
506	1	1	167
506	1	4	167
509	1	5	155
510	1	3	167
522	5	2	176
535	0.6	A5	166
536	0.6	B5	166
537	0.6	B6	166
538	0.6	A6	166
539	0.6	B5	161
540	0.6	A5	161
545	0.6	B6	161
546	0.6	A6	161
547	0.6	B7	166
548	0.6	A7	166
549	0.6	A6	170
549	0.6	A6	443
550	0.6	B6	170
550	0.6	B6	443
551	0.6	A8	166
552	0.6	B8	166
556	0.6	A5	170
556	0.6	A5	443
557	0.6	B5	170
557	0.6	B5	443

Wire N°	Wire section (mm^2)	Connectors	
		Terminal	Number
604	0.6	A3	160
604	0.6	B2	160
605	0.6	A3	160
605	0.6	B2	160
606	2	4	168
607	0.5	2	173
608	1	4	163
608	1	A4	166
608	1	B3	166
608	1	3	168
611	1	B6	160
618	2	6	164
621	1	A1	160
632	1	2	164
634	1	4	173
634	1	B2	401
635	0.6	B9	166
651	0.5	8	164
709	0.6	1	154
710	0.6	3	154
808	3	2	169
808	3	3	169
813	0.6	A12	166
814	0.6	A13	166
815	0.6	B12	166
825	0.6	3	163
828	0.6	3	164
851	0.6	4	165
868	0.6	B4	166
868	0.6	B2	170
880	0.6	A10	166
881	0.6	B10	166
888	0.6	2	169
899	0.6	B11	166
1044	0.6	B4	401
2074	0.6	B5	401
2091	0.6	B3	401
5026	0.6	2	141

Wire N°	Wire section (mm^2)	Connectors	
		Terminal	Number
5026	0.6	1	221
5027	0.6	1	141
8040	0.6	B3	401
8040	0.6	A2	401
8067	1	4	164
0067	0.6	A6	401
0068	0.6	A5	401
0069	0.6	A4	401
0070	0.6	A3	401
0071	0.6	A2	401
0072	0.6	A1	401
0073	0.6	B8	401
0074	0.6	A8	401
0075	0.6	B7	401
0056	0.6	6	163
0012	0.5	7	165
0013	0.5	5	165

FRONT END WIRING HARNESSES



70 0602

Front end wiring harnesses

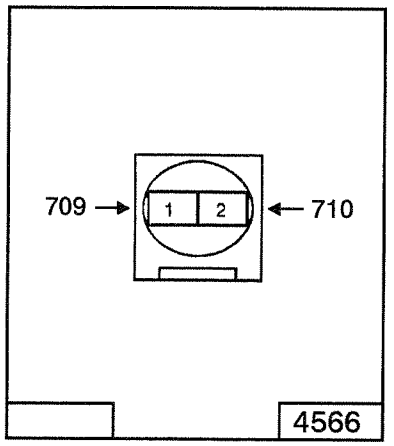
Front end wiring harnesses

Connectors	Assignments
C198	4566 – External temperature sensor
C482[*1]	4137 – Windscreen defrosting resistor
C488[*1]	4138 – Windscreen defrosting time–delay relay

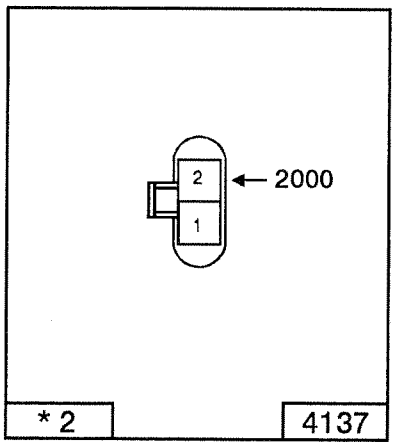
Links between harnesses

C300 → C249 (Gb7)
C301 → C250 (Gb3)
C503 → C152 (F24)
C504 → C154 (F24)

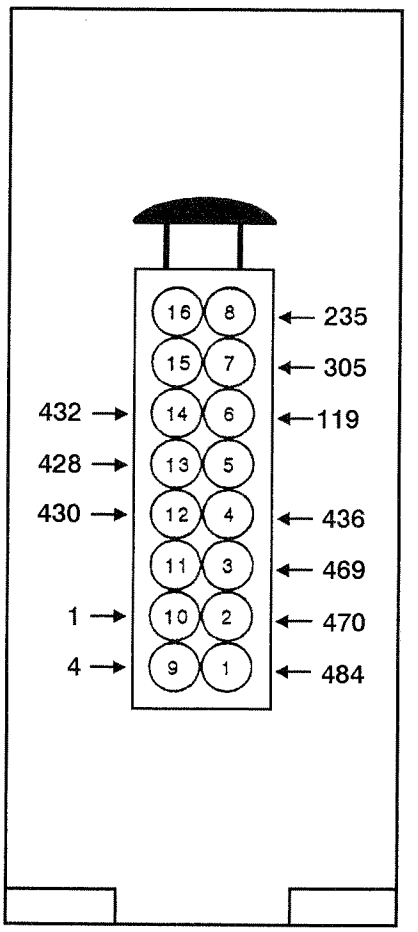
Option 1 (*1) includes : C482*1,C488*1,C503*1



C198



C482



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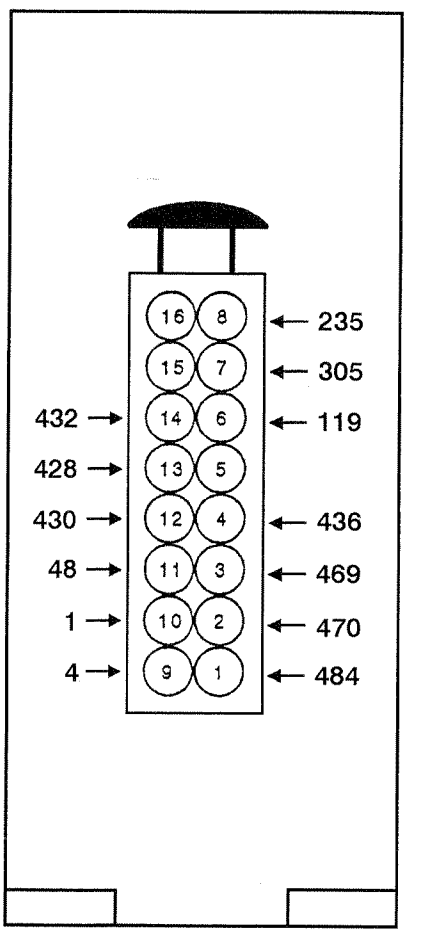

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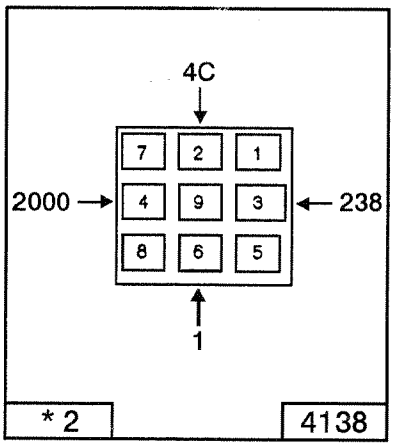
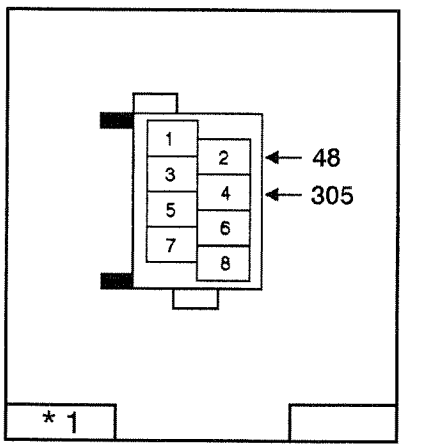
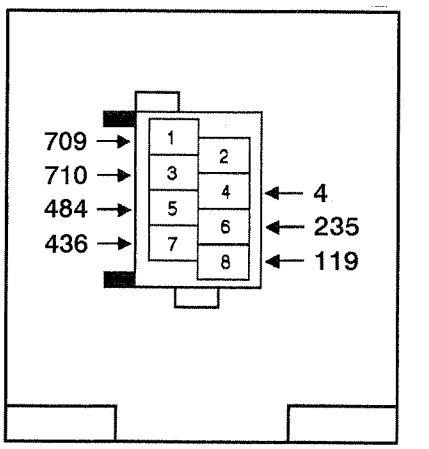


C488



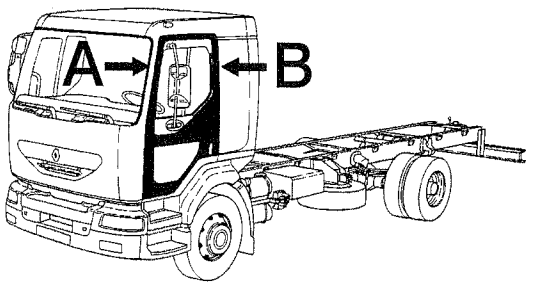
C503

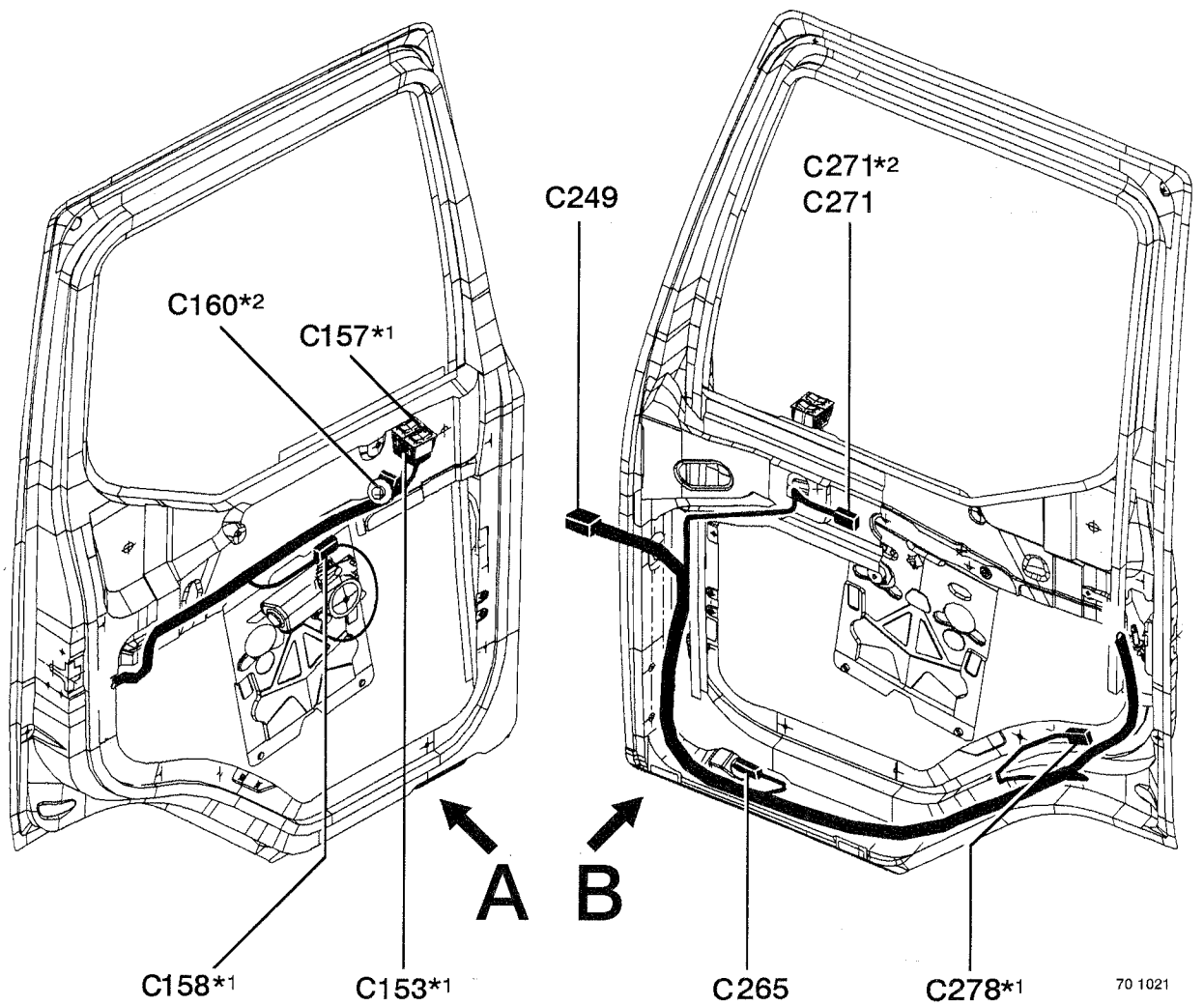


C504

70 0930

DOORS WIRING HARNESSES





Driver's door wiring harnesses

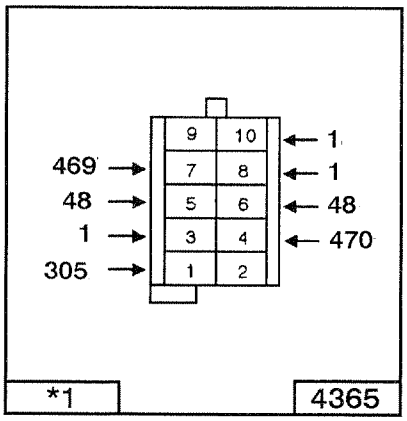
Driver's door wiring harnesses

Connectors	Assignments
C157	4365 – Passenger's window winder control (driver's side)
C278	4048 – Driver's side electric door striker
C158	4311 – Driver's window winder motor
C153	4361 – Driver's window winder control
C160	4161 – External rearview mirrors swivelling control
C265	4650 – Driver's step lighting
C271	4122 – LH swivelling defrosting rearview mirror
C271	4122 – LH swivelling defrosting rearview mirror

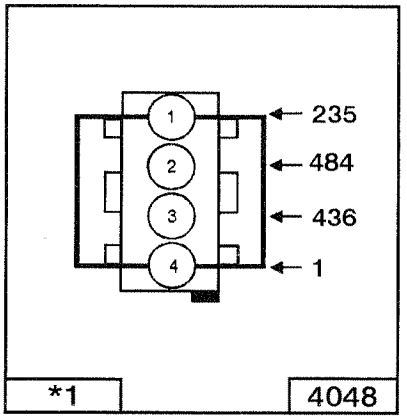
Links between harnesses
C259 → C301 (Ga4)

Option 1 (*1) includes : C157*1,C153*1,C158*1,C278*1

Option 2 (*2) includes : C171*2,C160*2



C157



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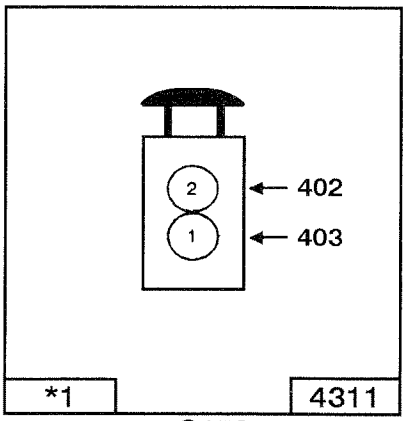
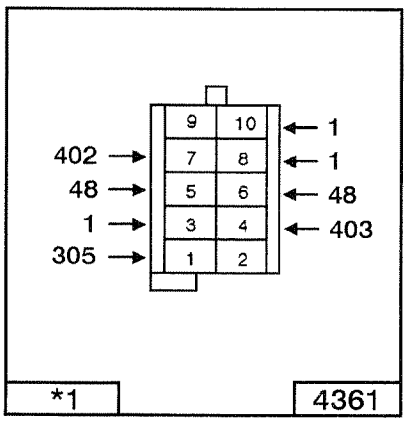


C158



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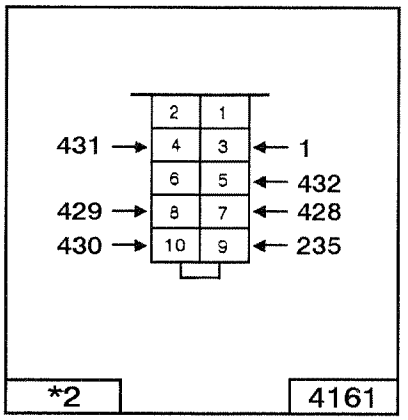
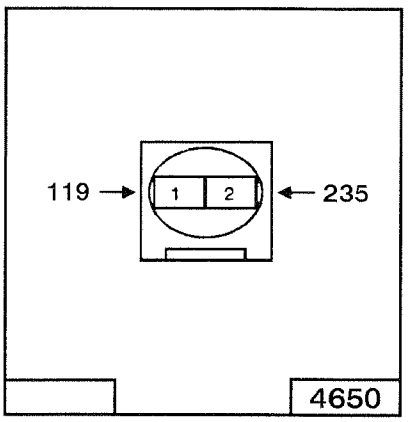


C160



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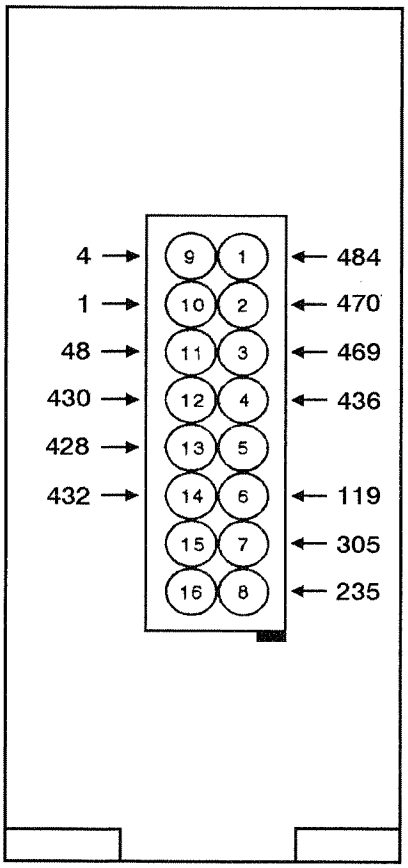

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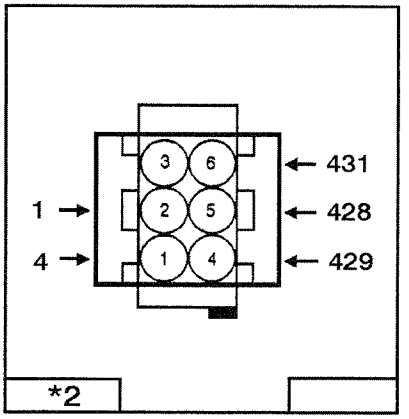

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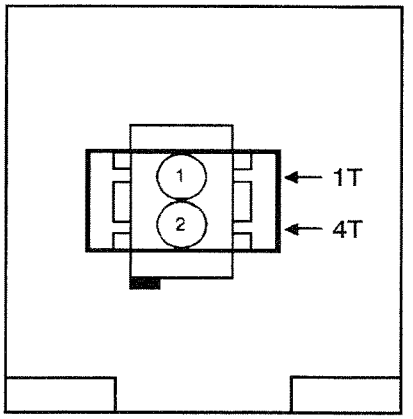
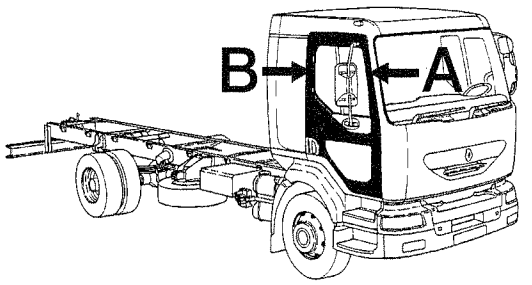
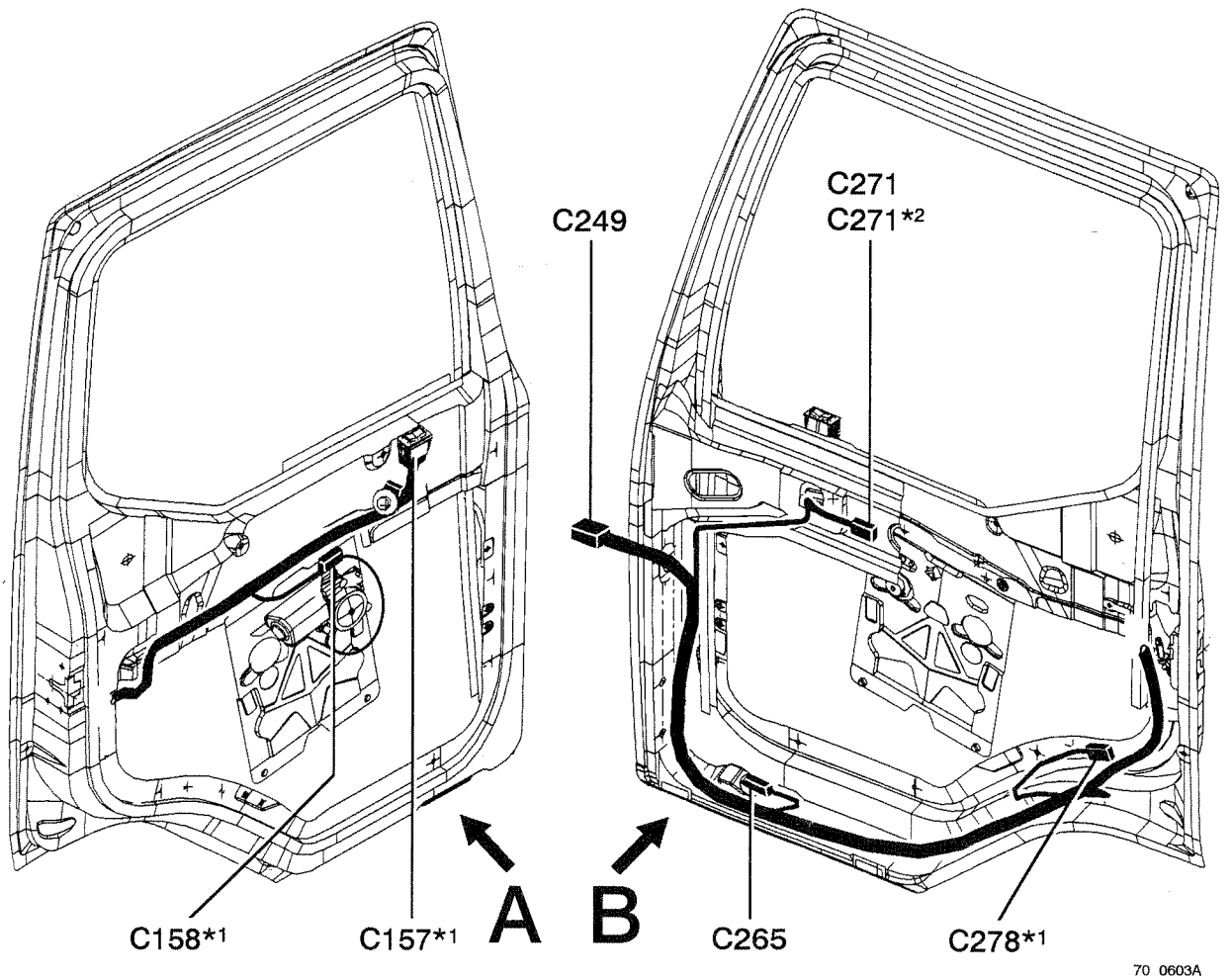


C271 70 0932





Passenger's door wiring harnesses

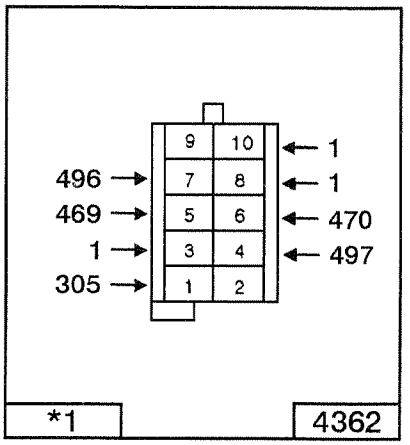
Passenger's door wiring harnesses

Connectors	Assignments
C157	4362 – Passenger's window winder control
C158	4312 – Passenger's window winder motor
C265	4651 – Passenger's step lighting
C271	4123 – RH swivelling defrosting rearview mirror
C271	4123 – RH swivelling defrosting rearview mirror
C278	4047 – Passenger's side electric door striker

Links between harnesses
C249 → C300 (Ga3)

Option 1 (*1) includes : C157*1,C158*1,C278*1

Option 2 (*2) includes : C271*2



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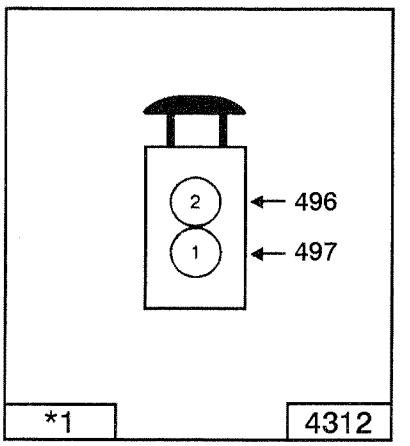

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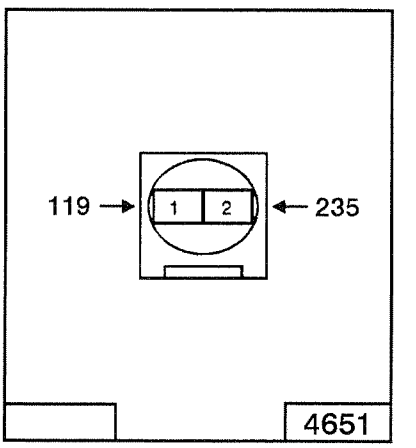

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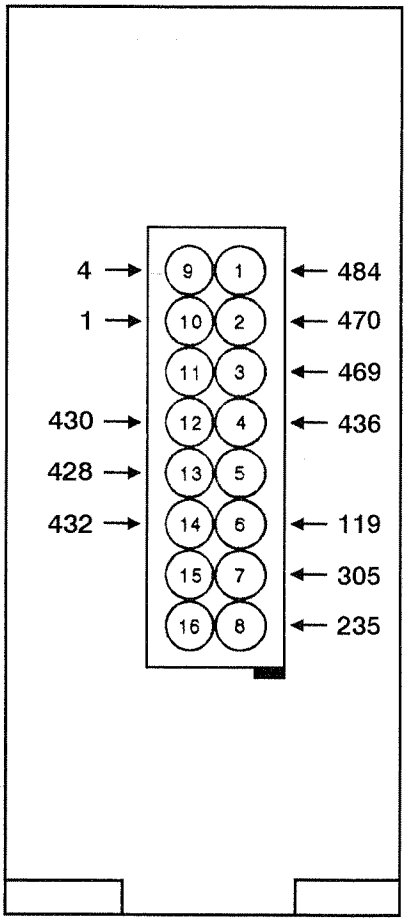

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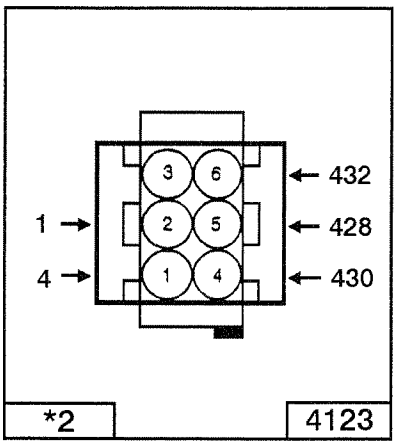

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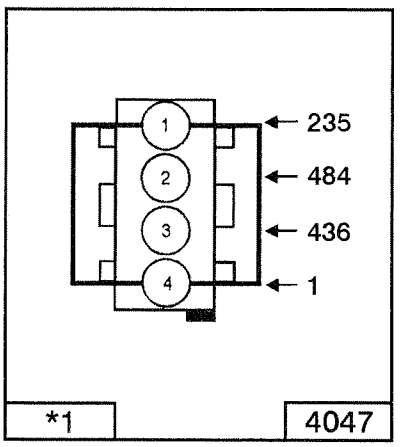
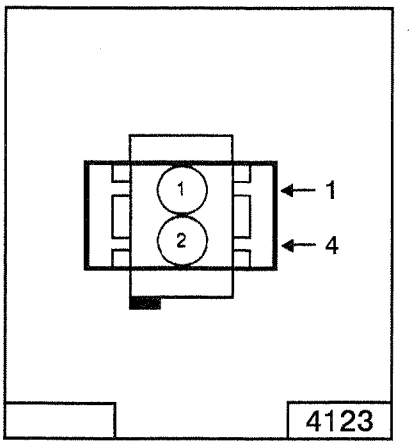


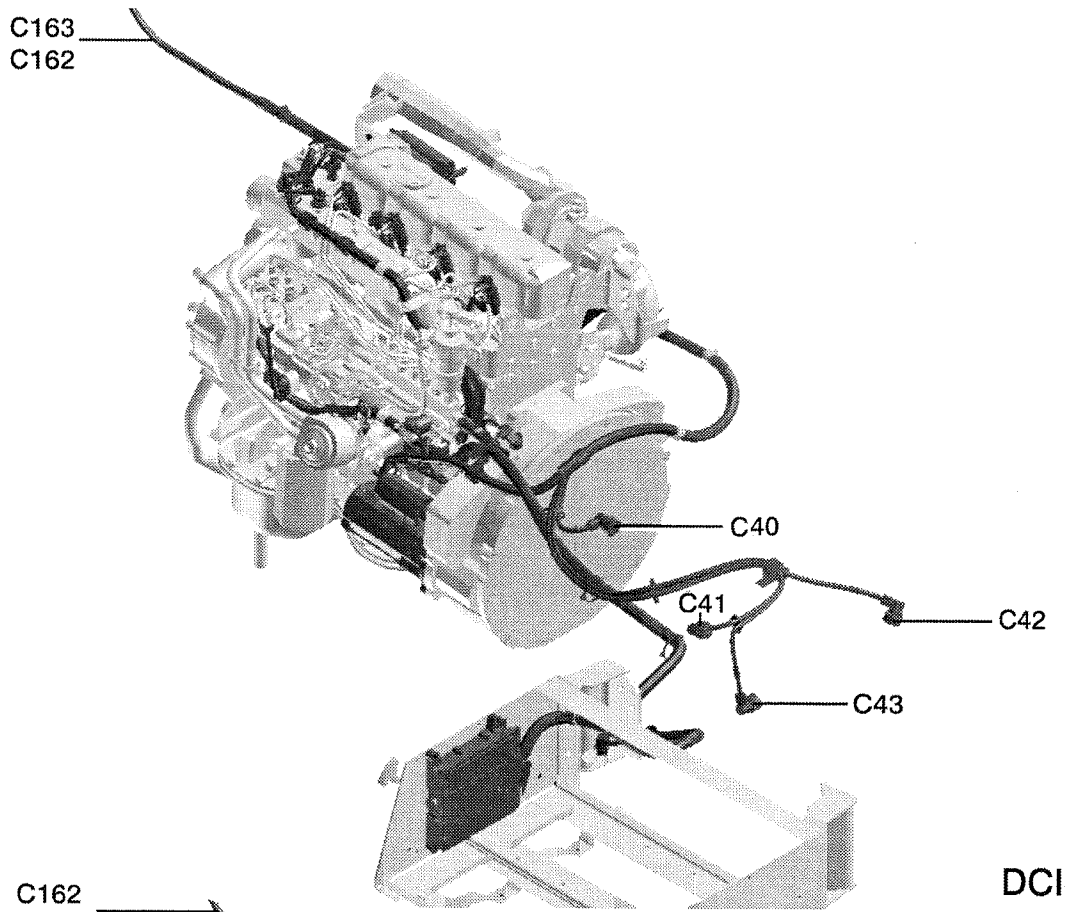
C278

70 0931

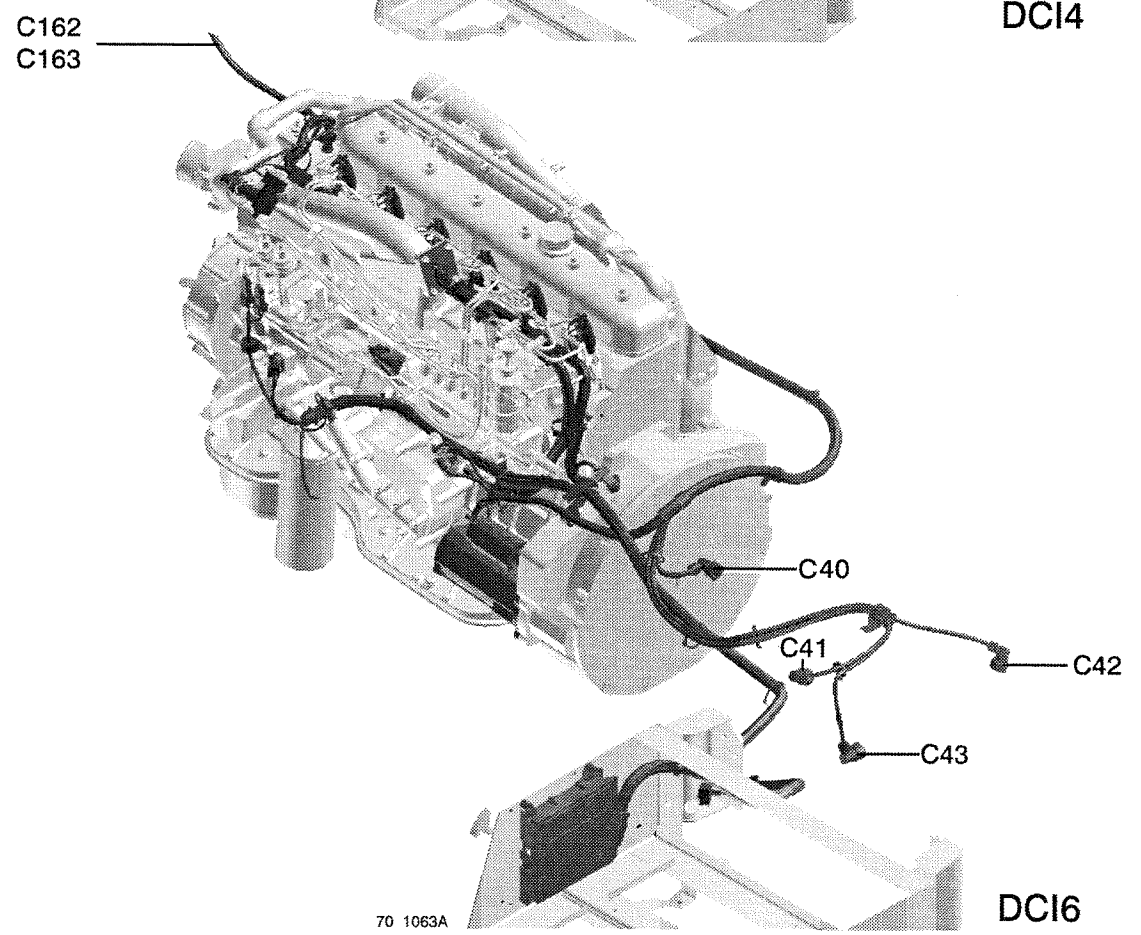


C271

ENGINE WIRING HARNESSES



DCI4

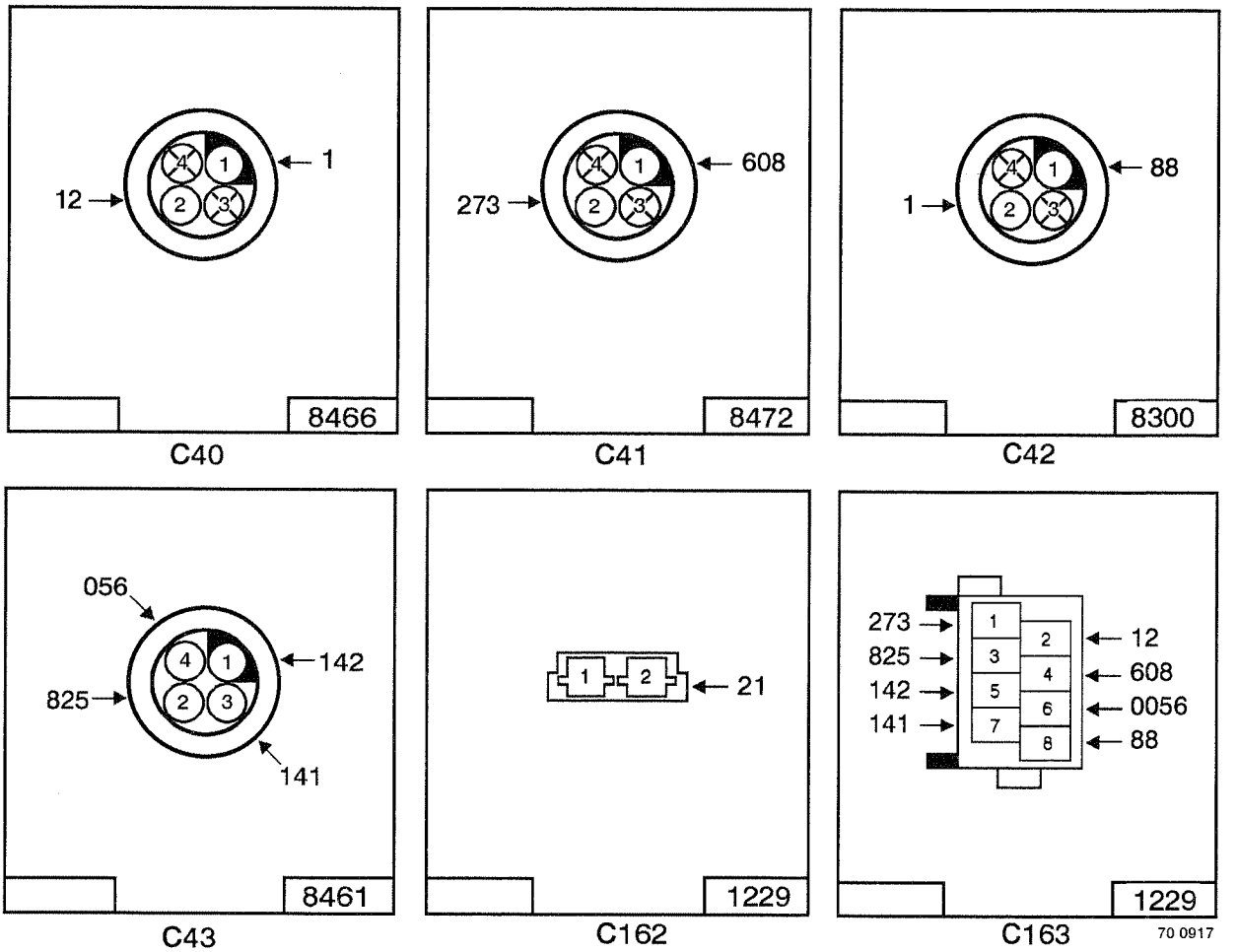


DCI6

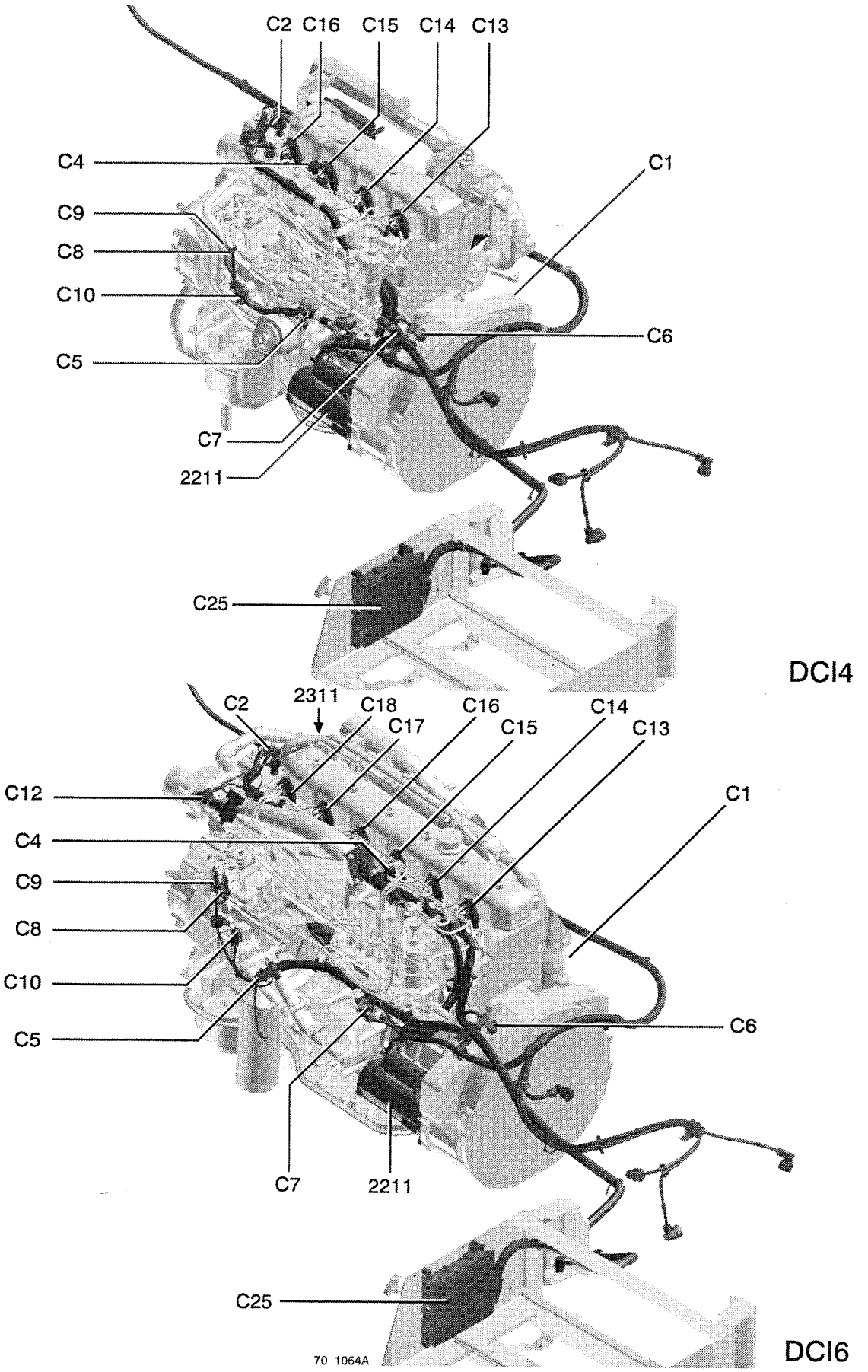
DC4 / DCI6 wiring harnesses

Engine wiring harnesses

Connectors	Assignments
C40	8466 – Neutral switch contact sensor
C41	8472 – Reverse gear switch contact sensor
C42	8300 – Power take–off switch contact sensor
C43	8461 – Vehicle speed sensor


12
1
4
1
2
3
8466
C40
273
608
8472
C41
1
88
8300
C42
056
142
825
141
8461
C43
21
1229
C162
273
825
142
141
1
2
3
4
5
6
7
8
12
608
0056
88
1229
C163
70 0917

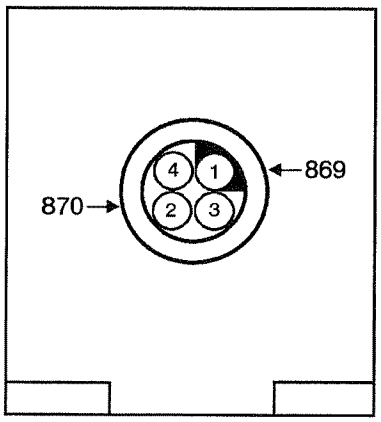
FUEL–INJECTION ELECTRONIC MANAGEMENT WIRING HARNESSES


C2
C16
C15
C14
C13
C4
C1
C9
C8
C10
C6
C5
C7
2211
C25
DCI4
C2
2311
C18
C16
C14
C17
C15
C13
C12
C1
C4
C9
C8
C10
C6
C5
C7
2211
C25
70 1064A
DCI6

DC4 / DCI6 wiring harnesses

Fuel–injection wiring hamesses

Connectors	Assignments
C2	7362 – Coolant temperature sensor
C5	7368 – Oil pressure sensor
C12	8150 – Exhaust brake electrovalve
C1	8275 – Engine oil level sensor
C4	9200 – Boost air temperature and pressure sensor
C25	9202 – Engine master ECU "EECU"
C7	9208 – Fuel high pressure sensor
C8	9212 – Cylinder solenoid valve high pressure pump
C9	9213 – Cylinder solenoid valve high pressure pump
C14	9220 – Injection control solenoid valve N° 1
C15	9221 – Injection control solenoid valve N° 2
C16	9222 – Injection control solenoid valve N° 3
C16	9223 – Injection control solenoid valve N° 4
C18	9224 – Injection control solenoid valve N° 5
C19	9225 – Injection control solenoid valve N° 6
C6	9228 – Engine flywheel speed sensor
C10	9230 – Camshaft speed sensor



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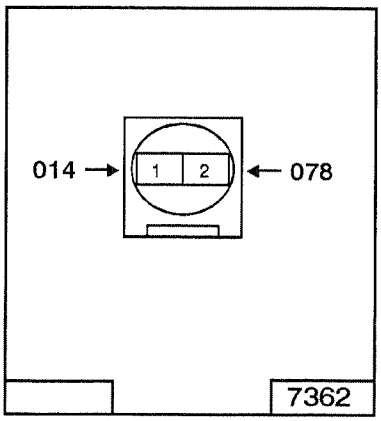

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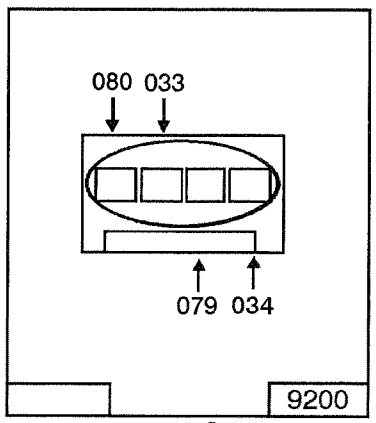

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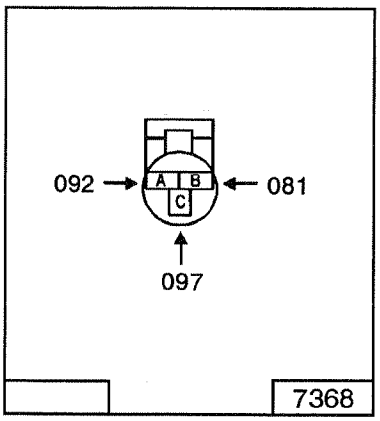

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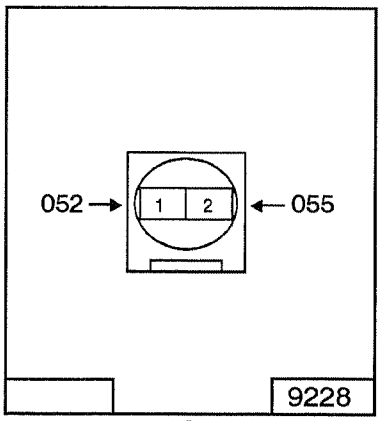

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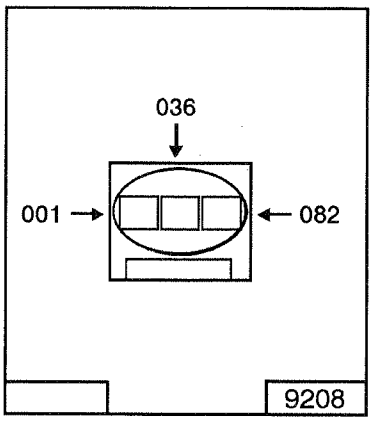

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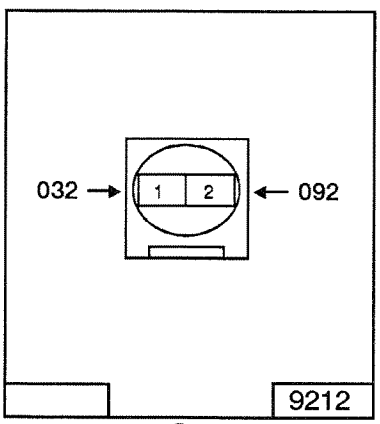
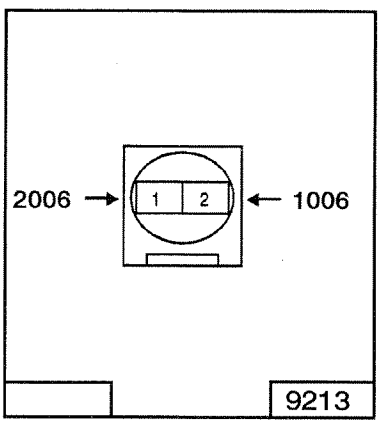
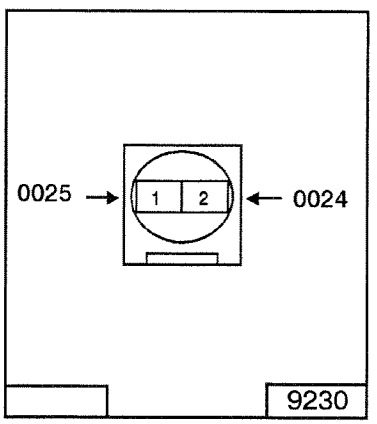


C8

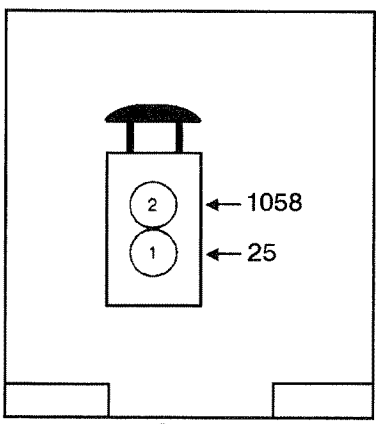


C9



C10

70 0918



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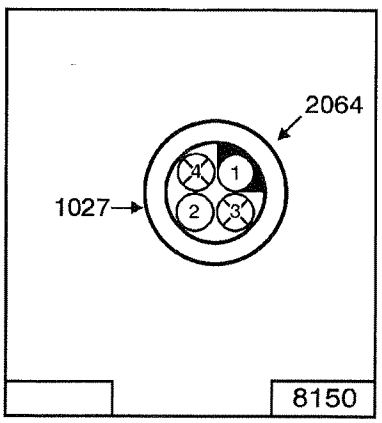

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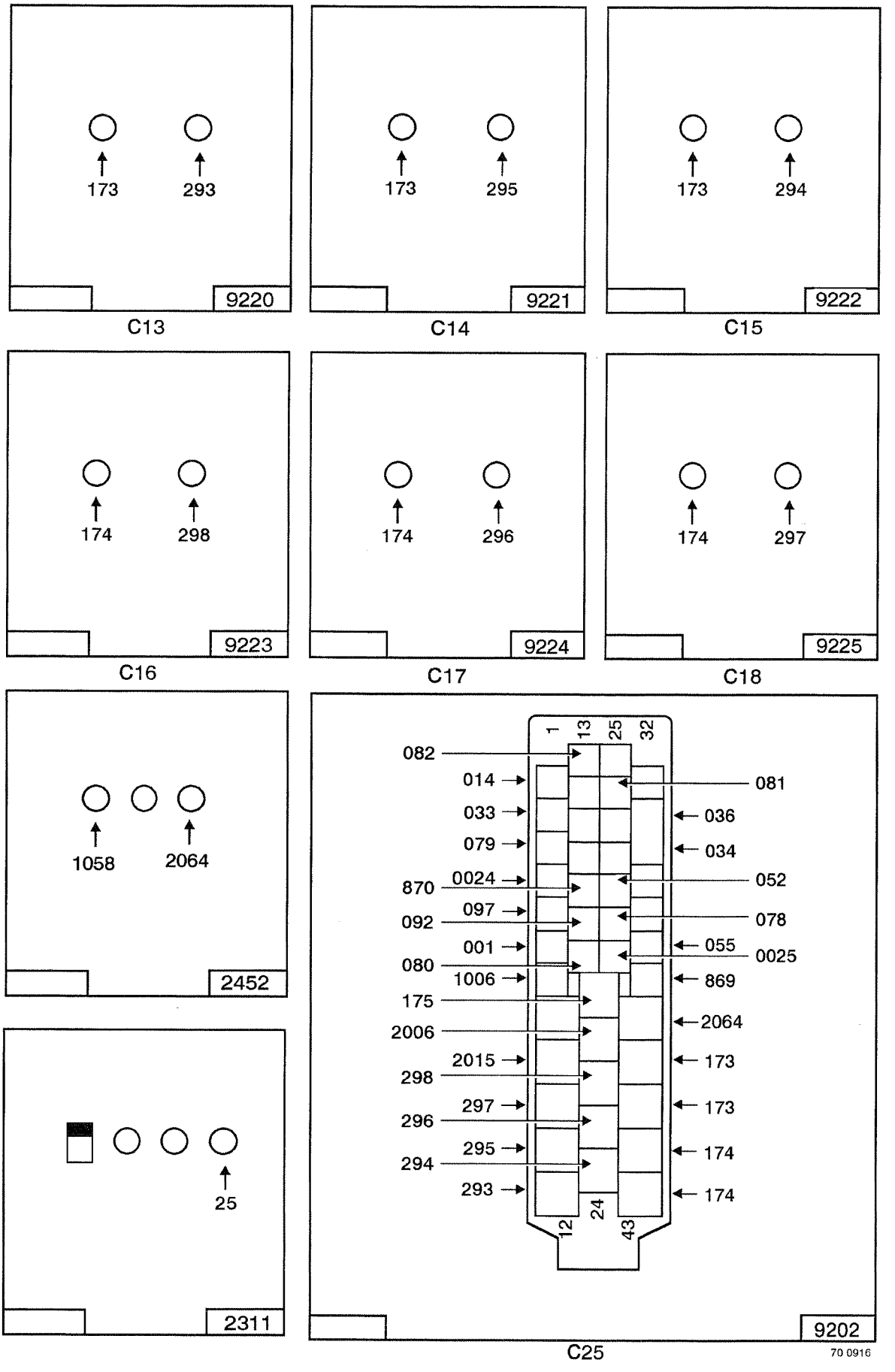
173
293
9220
C13
173
295
9221
C14
173
294
9222
C15
174
298
9223
C16
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C17
174
297
9225
C18
1058
2064
2452
25
2311
1
13
25
32
082
014
033
079
0024
870
097
092
001
080
1006
175
2006
2015
298
297
296
295
294
293
081
036
034
052
078
055
0025
869
2064
173
173
174
174
12
24
43
9202
C25
70 0916

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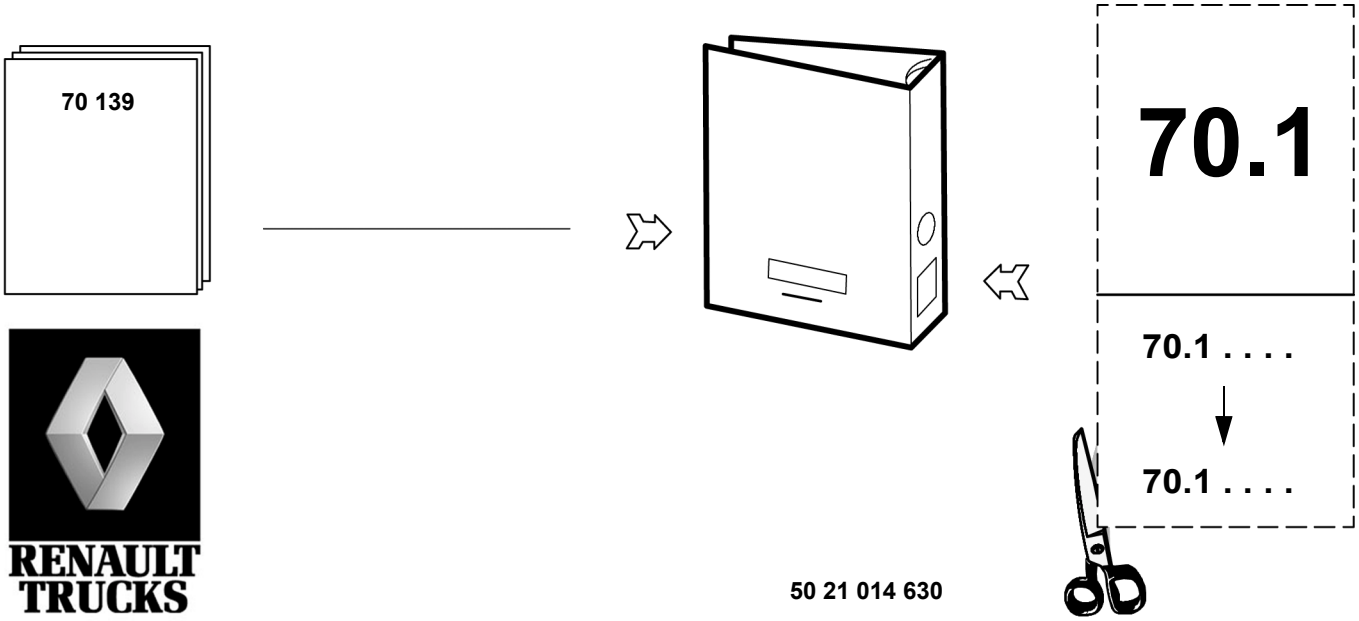
ELECTRICS

RANGE	FAMILY	VARIANT
MIDLUM 12-16 t Euro 3	44C1	-
	44C2	
	44T	
	44V	
MIDLUM 16-18 t	45D2	
	45D3	
	45E2	
MIDLUM 4x4	47XA	
	47XC	
	47XF	
MIDLUM 7-12 t	42B3	
	42B4	
	45D2	

The above information may change in the course of time. Only the "Consult" section of the workshop manuals repertory in standard N° 10320 serves as reference.



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Electrical diagram . . . . . **B-1 → 83**

Dealer Network and Customer Follow-up . . . . . **C-1 → 2**

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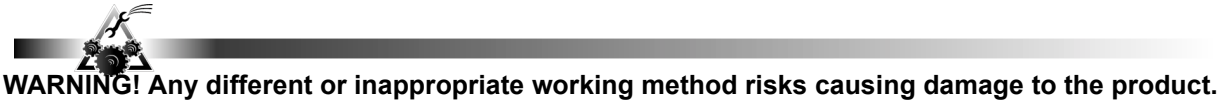
GENERALITIES

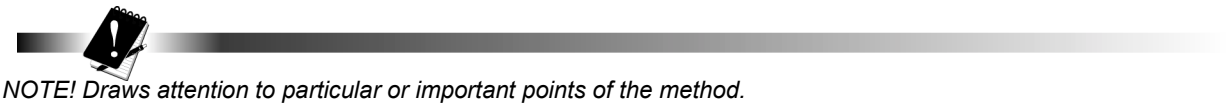
Warnings

In this document, safety instructions are symbolized as follows:

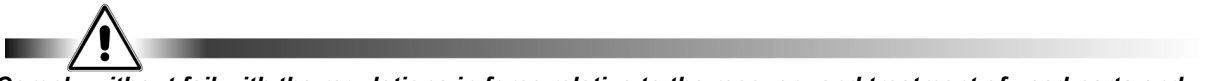
DANGER! NON-OBSERVANCE OF THE PROCEDURE DESCRIBED OR LACK OF CARE OR ATTENTION, RISK CAUSING SERIOUS INJURY OR EVEN DEATH.



WARNING! Any different or inappropriate working method risks causing damage to the product.

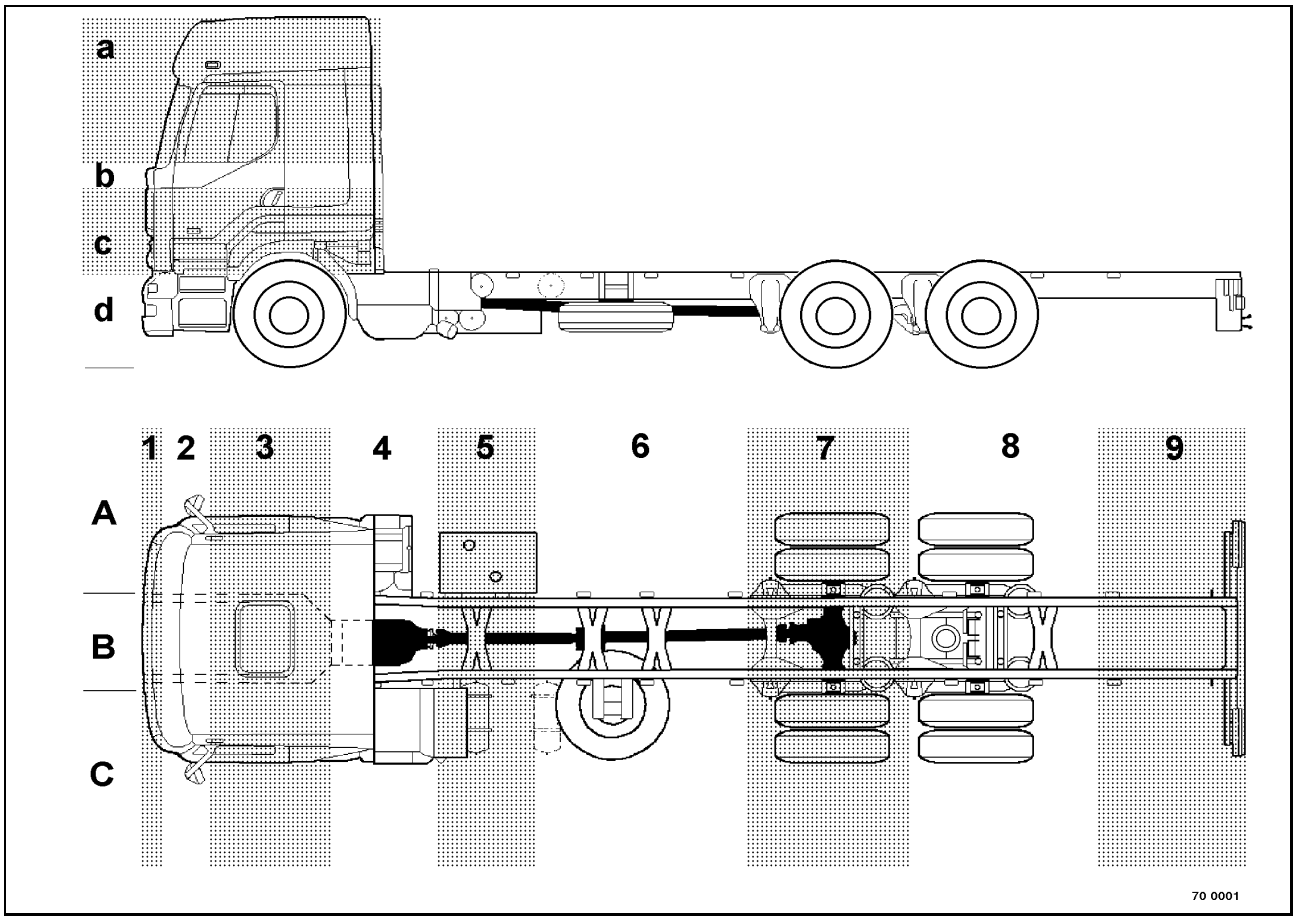


NOTE! Draws attention to particular or important points of the method.



Comply without fail with the regulations in force relative to the recovery and treatment of used parts and waste.

Vehicle voluminal breakdown



The vehicle is broken down into several zones each designated by an item number.
Heightwise breakdown
Reserved for the bodywork, **4** zones designated by a small letter
Widthwise breakdown
3 zones designated by a capital letter
A: RH side and RH sidemember
B: Central part
C: LH side and LH sidemember
Lengthwise breakdown:
9 zones designated by a figure.
Zone **7** is specific for **6x4 - 6x6**.
Zone 1 indicates:
- on the chassis, the bumper and the components it supports.
-on the cab, the front end components accessible through the grille
Example:
A1: bumper RH section (headlamps, ...)
C3: LH front wheel (ABS sensor, ...)
C2b: dashboard
A3c: passenger's seat

How to read the diagrams

Definition of an illustration

The diagram consists of several plates.
The plates are defined in the bottom right-hand corner by:

- a six-figure number, which is the reference number of the illustration.
- a letter, which is the revision index of the illustration. This letter is to be found on the same line as the reference number.
- a three-figure number, which defines the folio number.

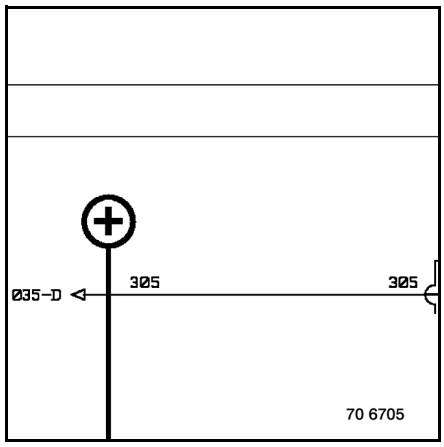
A diagram plate is broken down into **5** zones in the vertical direction.
These zones are identified by letters ranging from **A** to **E**.

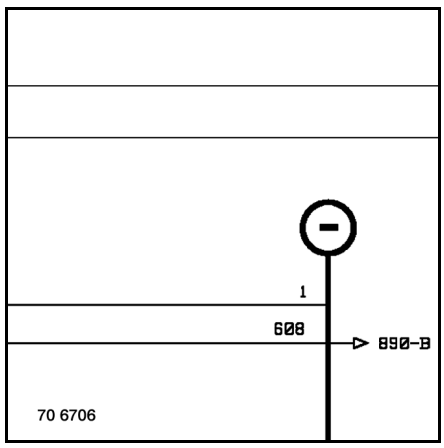
Definitions of symbols used in a diagram

Cross-references

The folio co-ordinates to be found on the right always refer back to a preceding page.
The folio co-ordinates to be found on the left always refer forward to a following page.
The cross-reference is defined by:

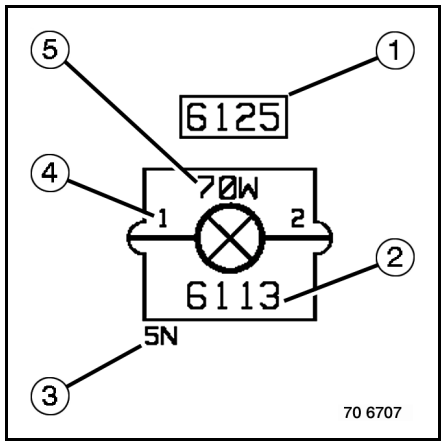
- a three-figure number, which gives information on the order number of the destination folio,
- a letter, which gives information on the zone in which the cross-reference is to be found.





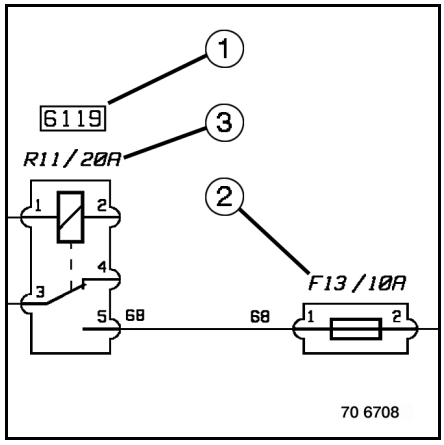
Appliances

Each appliance shown in the diagram is identified by an after-sales code number.
If the after-sales code number is framed (item **(1)** of the illustration opposite), it indicates a single appliance or an assembly comprising several functions.
If the after-sales code number is not framed (item **(2)** of the illustration opposite), it indicates a single appliance. It is then to be found inside the symbol.
Underneath each appliance, we define, wherever possible, the colour and the number of ways of the connector with which it is associated (item **(3)** of the illustration opposite).
All the terminals of each appliance are defined by a numerical or alphanumerical code number, if necessary (item **(4)** of the illustration opposite).
For certain appliances, we define, wherever possible, the power with which it is associated (item **(5)** of the illustration opposite).



Fuses and relays

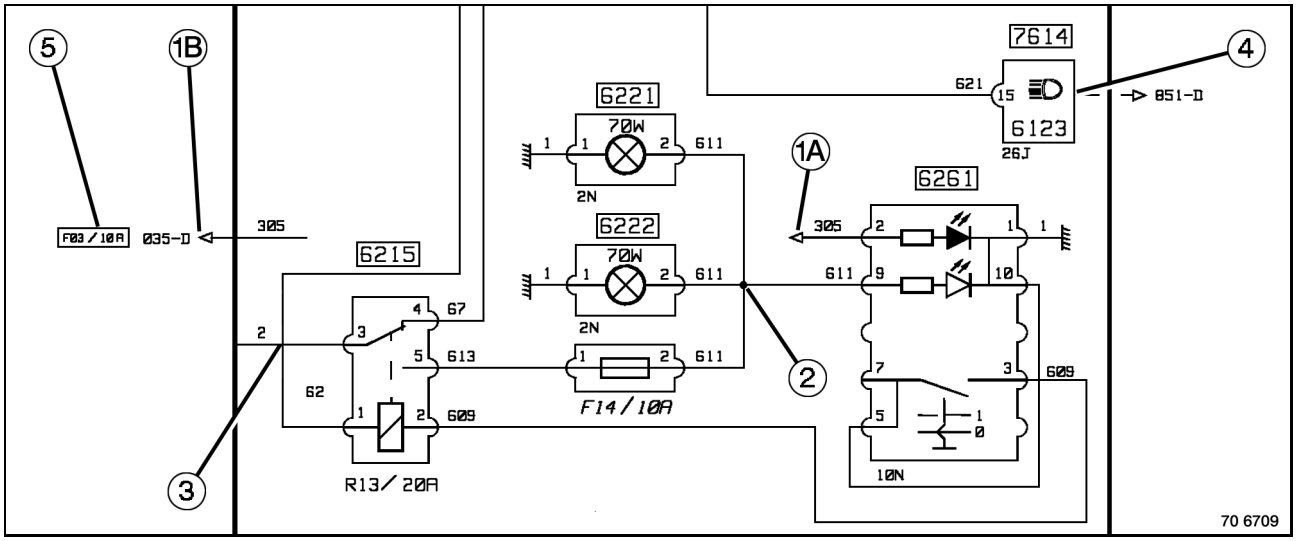
Relays are designated by an after-sales code number (item **(1)** of the illustration opposite).
They are also designated by an alphanumerical code number and by the value of the rated current capable of crossing them (item **(2 - 3)** of the illustration opposite).
Fuses are merely designated by an alphanumerical code number and by the value of the rated current capable of crossing them.



Polarities

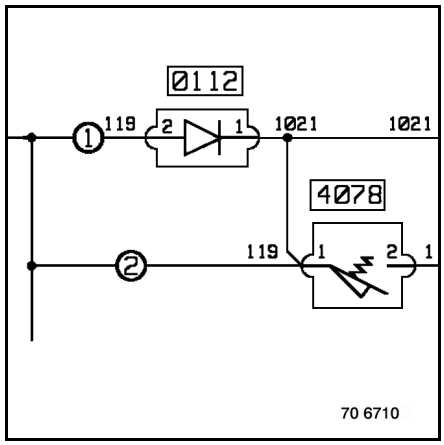
Polarities are identified by a numerical code number.
For each function, there is one same, single code number.
Example:
2 = battery "positive" direct current power supply.
1 = earth.
Circuits where polarities are represented by dotted lines indicate a connection solution or an optional assembly.

Graphic conventions

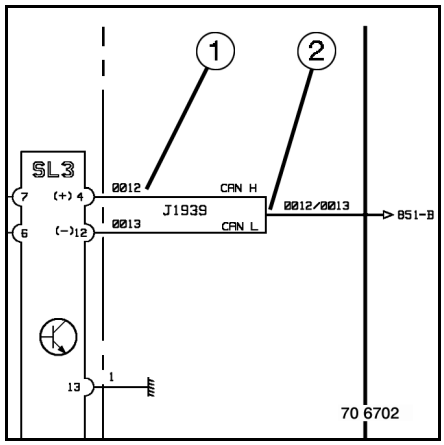


A folio cross-reference can consist of two sections.
The first in a zone of the diagram (item **(1A)** of the illustration above).
The second to the right or left of the zone of the diagram according to its destination (item **(1B)** of the illustration above).
In all cases, both sections are always on the same line.
This principle is applied whenever it makes it possible to avoid polarity crossovers that may prejudice clear legibility of the diagram.
A folio cross-reference may be made by fuse **(5)** or by warning light **(4)**.
If an intersection is not reinforced by a connection point, the polarities cross over and are distinct **(3)**.
If an intersection is reinforced by a connection point, we have the same level of information on the wires (same potential)
It is possible for extra connection points to be applied to the diagram for legibility reasons (item **(2)** of the illustration above).

It is possible for a function to have several technical responses.
In this case, we call upon the notion of "variant" or "option".
This notion is represented by a figure inside a circle. This symbol is placed on the polarity in question.
An explanation to be found on the page opposite the diagram describes the possible options.
If a folio represents several assemblies, it goes without saying that a vehicle can have only one single option.



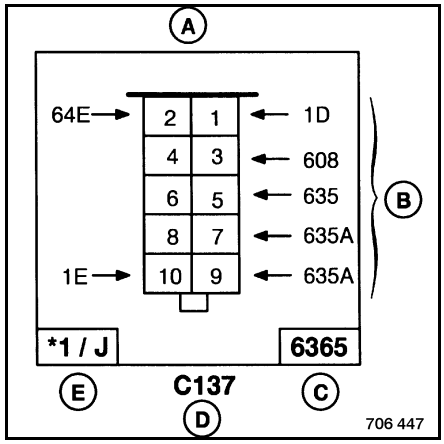
To make for easier reading, communication buses are represented as follows:
Only the ends of conductors are represented (item **(1)** of the illustration opposite).
The "body" of the wiring harness is shown in diagrammatic form by one thicker single line. Page cross-references are made according to the same principle as for polarities (item **(2)** of the illustration opposite).



Wiring harnesses

Each plate represents the routing of one or several wiring harnesses connected to a sub-assembly or function.
The outline of the vehicle pinpoints the wiring harnesses.
Connectors identified by the letter "C" followed by figures are indicated on each harness.
A key opposite each plate defines their assignment.
The detail of the connectors connected to wiring harnesses on the plate enable the polarity of each pocket to be situated.
Key to connectors:
C129 .....4618 - Driver's overhead lamp
C129: connector item number
4618: appliance reference number
Driver's overhead light: key to the apparatus
The appliance reference number and key provide the link to the electrical diagram.
Optional wiring harnesses:
Connectors assigned with indexes "*1" or "*2" belong to optional harnesses.
Example of connector reference number:
C129: connector on standard harness
C137 $_{*1}$: connector on option 1 harness
C141 $_{*2}$: connector on option 2 harness
At the end of the key is shown the make-up of each optional harness.

Detail of connectors:
Each drawing represents the structure of a connector.
Example:
A: Outline of the connector
B: Item number and location of the wires
C: Reference number of the appliance
D: Item number of the connector
E: Option and/or colour of the connector



Electrical distribution

The cab electrical distributing box contains the majority of the fuses and relays necessary for operation of the vehicle.
Fuses and relays that are connected on the electrical distribution box are represented as surrounded by a fine dotted line in the electrical diagram.
Each face of the electrical distribution box is detailed in the "Electrical distribution unit" chapter.
The chassis-cab connection box enables the information to be found inside the cab to cross the bulkhead and be routed to the outside and vice versa.
Each connector of the chassis-cab connection box is detailed in the "Electrical distribution unit" chapter.

Precautions to be taken when making electrical measurement readings

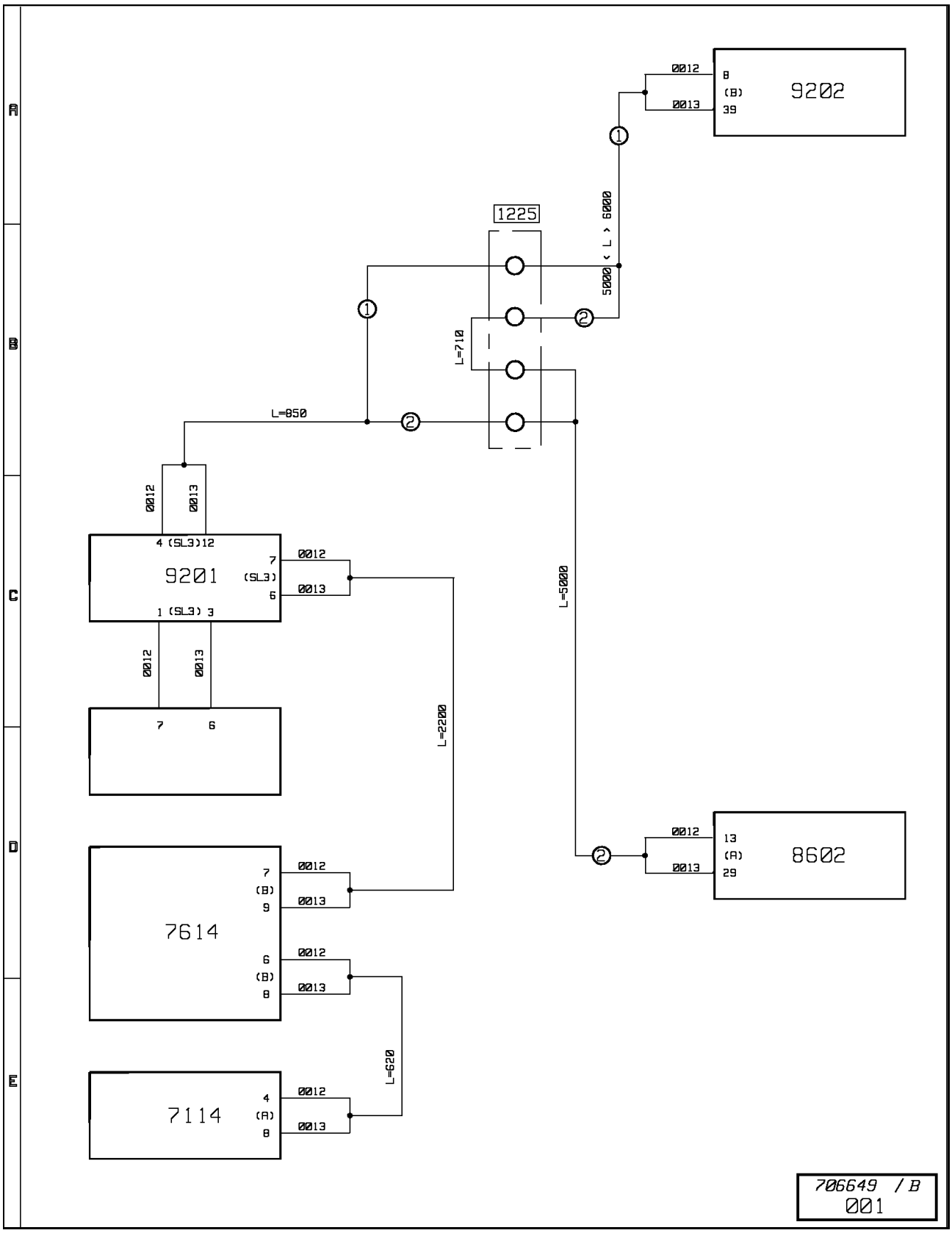
Protection of appliances

Bearing in mind the presence of numerous electronic appliances, the use of a test lamp is to be avoided. Preferably use a needle or digital type multi-meter.

It is forbidden to apply voltage to the terminals of electronic appliances or you may cause irreparable damage to the hardware. Consequently, no line continuity measurement should be made on the wires without having previously disconnected the appliances from the lines concerned.

ELECTRICAL DIAGRAM

CAN BUS "J1939" architecture



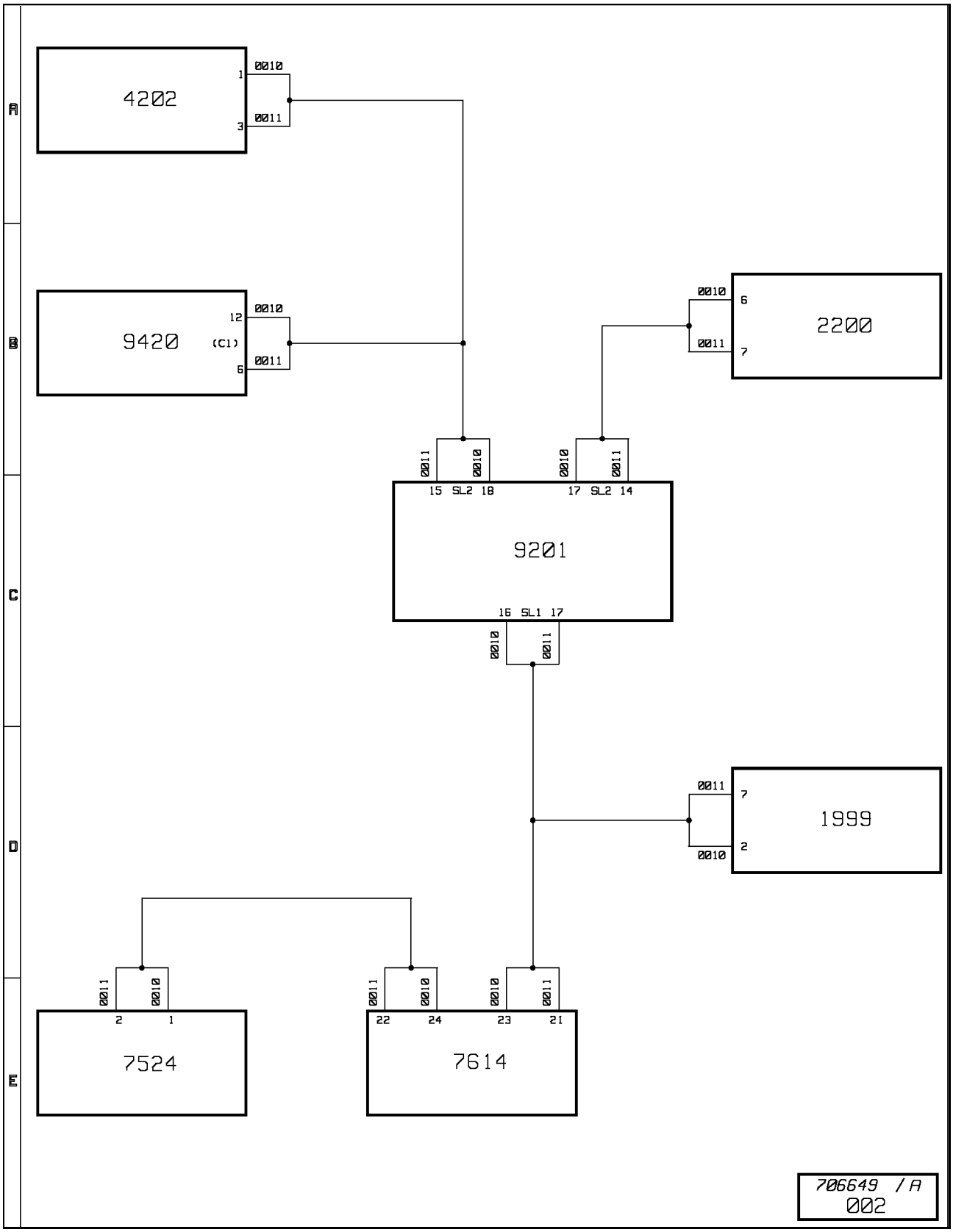
CAN BUS "J1939" architecture

Key to appliances

Code N°	Name of function	Location
1225	Chassis cab junction box	A2c
7114	Electronic tachograph	C2b
7614	Principal display	C2b
8602	Automatic gearbox ECU	B3c
9201	Vehicle master ECU (VECU)	B3c
9202	Engine master ECU (EECU)	B3c

1: with "ALLISON" gearbox
2: without "ALLISON" gearbox

CAN BUS "J1587" architecture

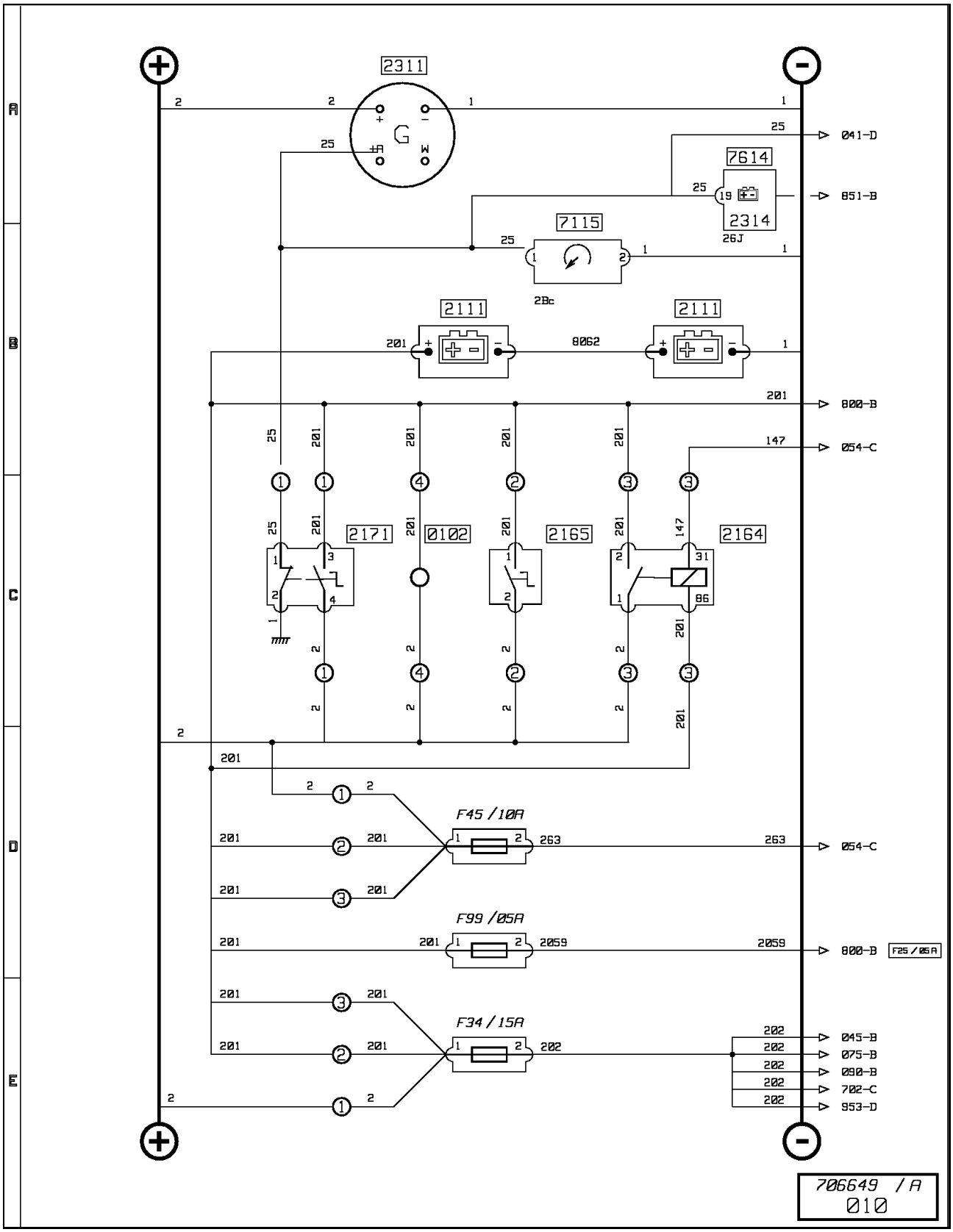


CAN BUS "J1587" architecture

Key to appliances

Code N°	Name of function	Location
1999	ECU for bodybuilder pre-arrangement	A2c
2200	Anti-theft electronic box	C2a
4202	Radio	C2a
7524	"SAE" diagnostic socket	C3c
7614	Principal display	A2b
9201	Vehicle master ECU (VECU)	B3c
9420	Anti-theft alarm ECU	C2a

Energy production



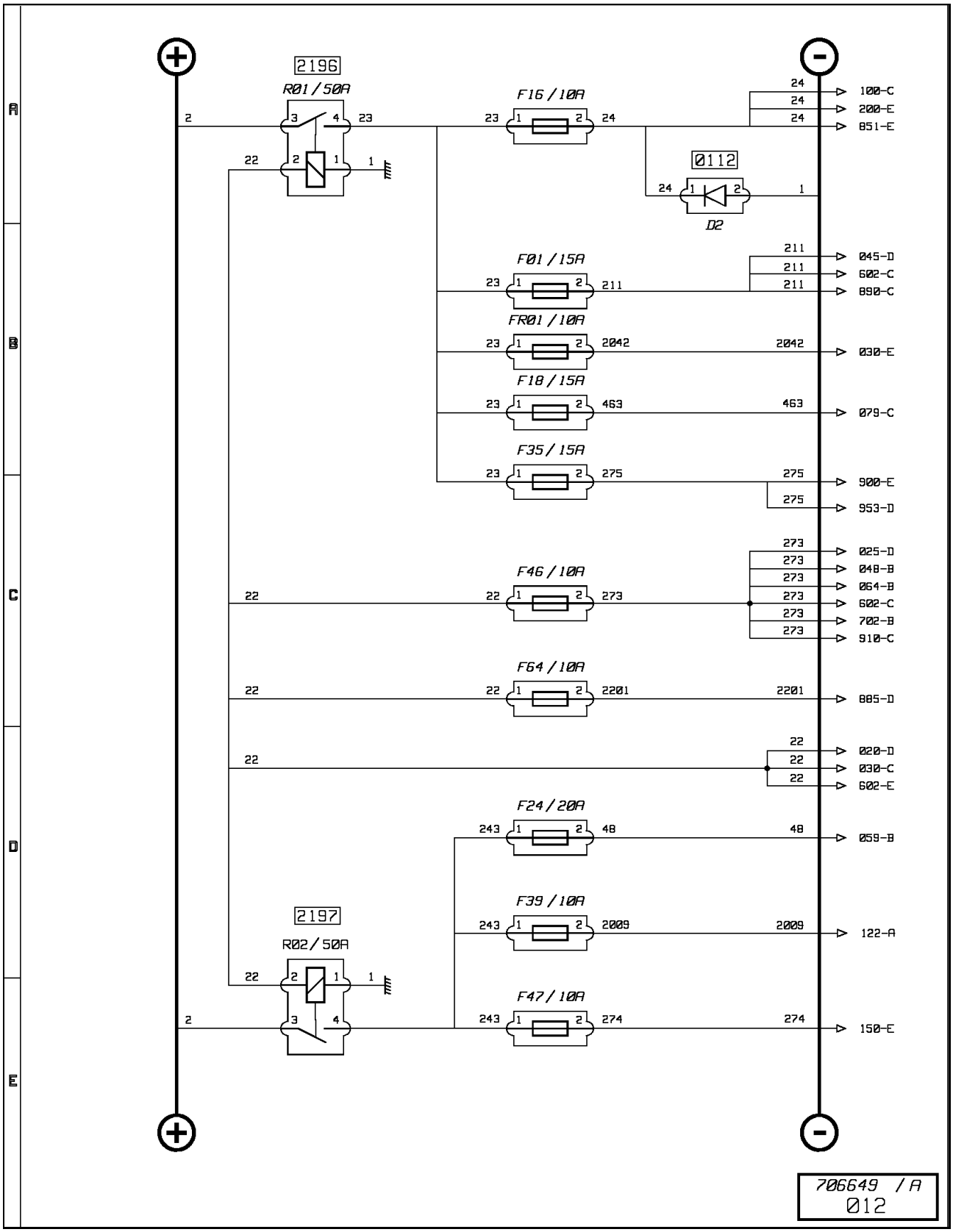
Energy production

Key to appliances

Code N°	Name of function	Location
0102	Electrical connection terminal	C4d
2111	Battery (set of batteries)	C4d
2164	Electrical master switch	C4d
2165	Master switch	C4d
2171	Pneumatic master switch	C4d
2311	Alternator	B2c
2314	Battery charge warning lamp	C2b
7115	Hourmeter	A3c
7614	Principal display	C2b

1: with "ADR" master switch
2: with mechanical master switch
3: with electrical master switch
4: without master switch

After ignition distribution

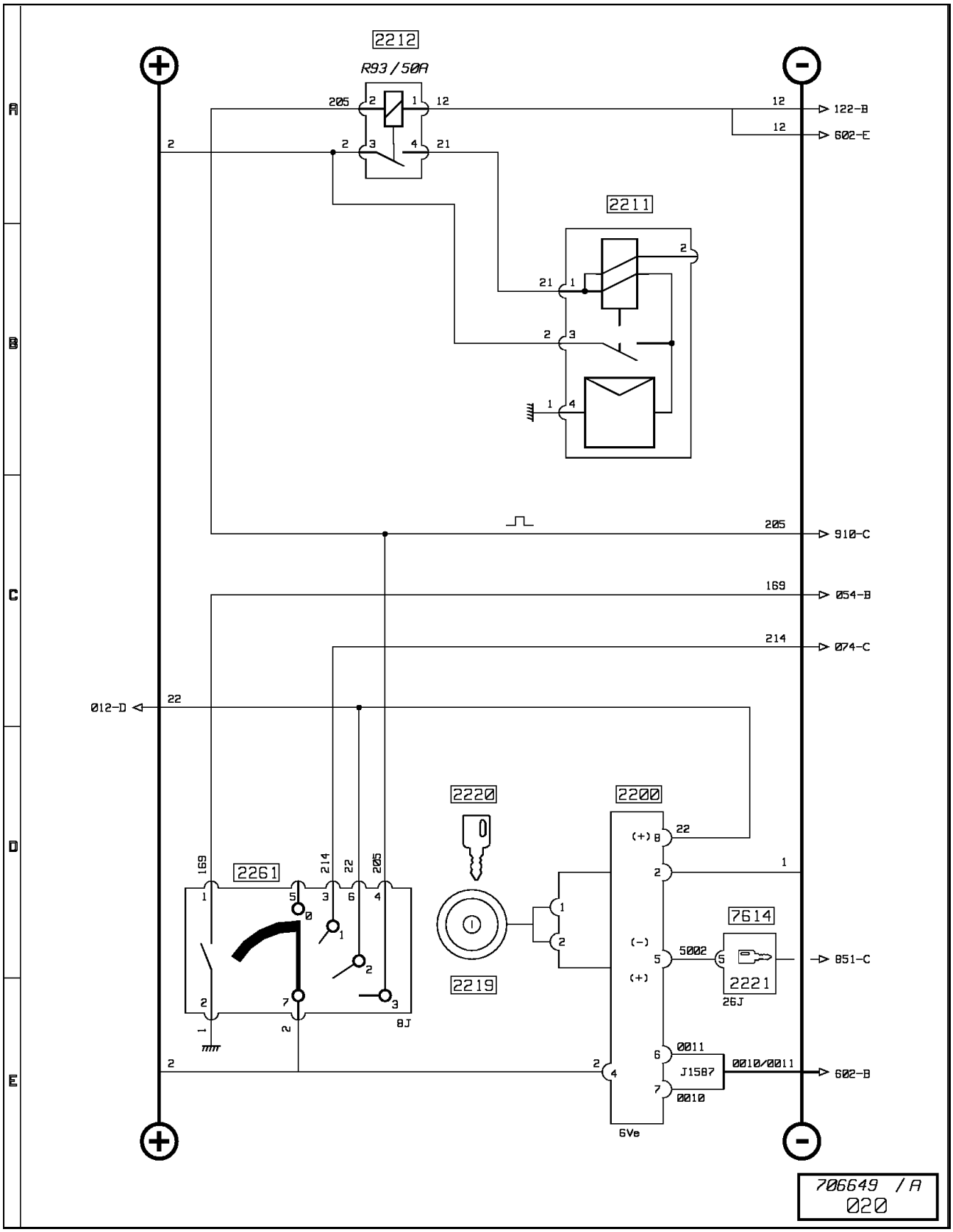


After ignition distribution

Key to appliances

Code N°	Name of function	Location
0112	Diode(s)	A2c
2196	After ignition power supply relay N°1	A2c
2197	After ignition power supply relay N°2	A2c

Engine starting

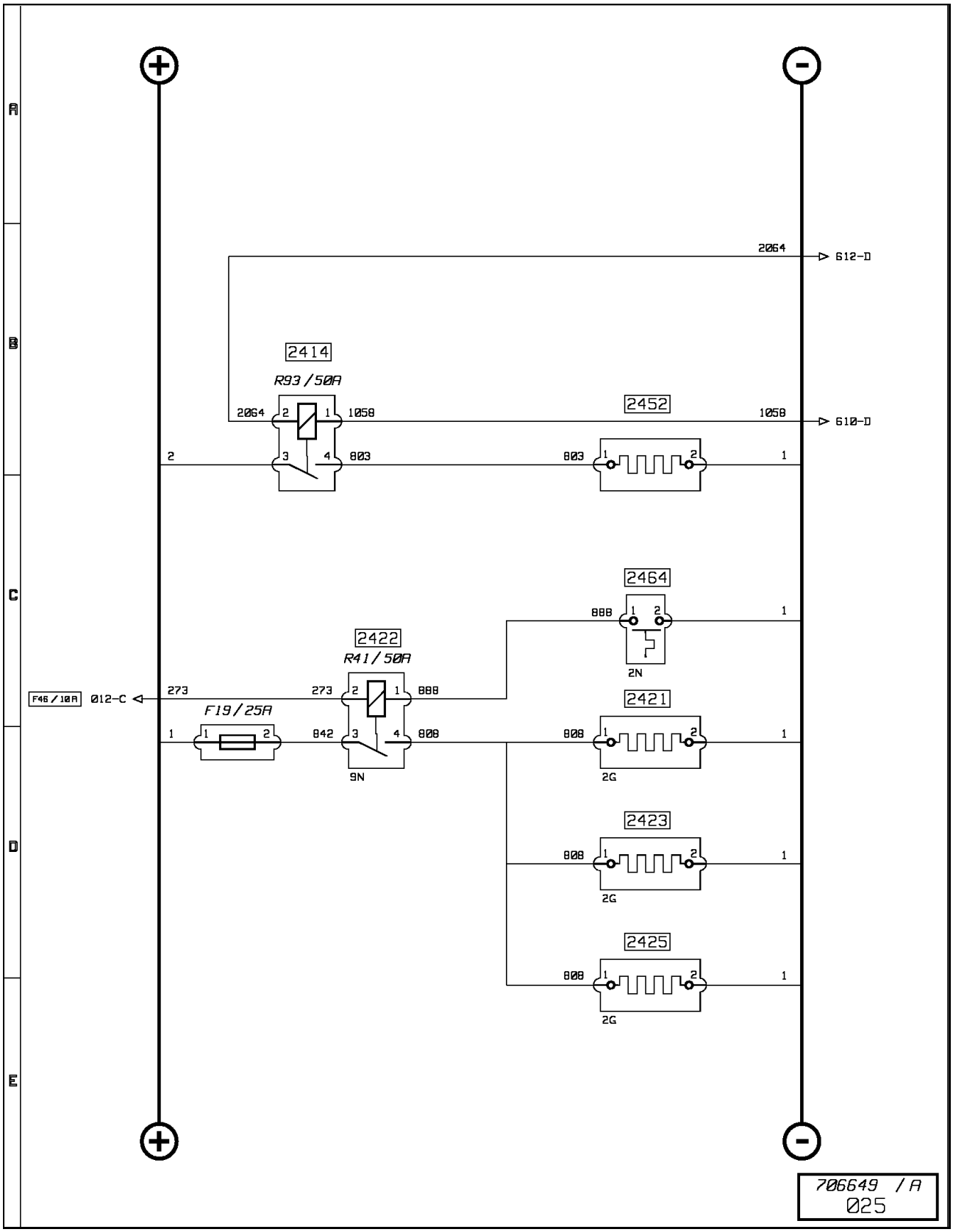


Engine starting

Key to appliances

Code N°	Name of function	Location
2200	Anti-theft electronic box	C2a
2211	Starter	B3c
2212	Starting relay	A2c
2219	Transponder antenna	C2a
2220	Transponder ignition key	C2a
2221	Electronic anti-theft "Information" warning lamp	C2b
2261	Steering lock and starting control	C2b
7614	Principal display	C2b

Engine starting aid

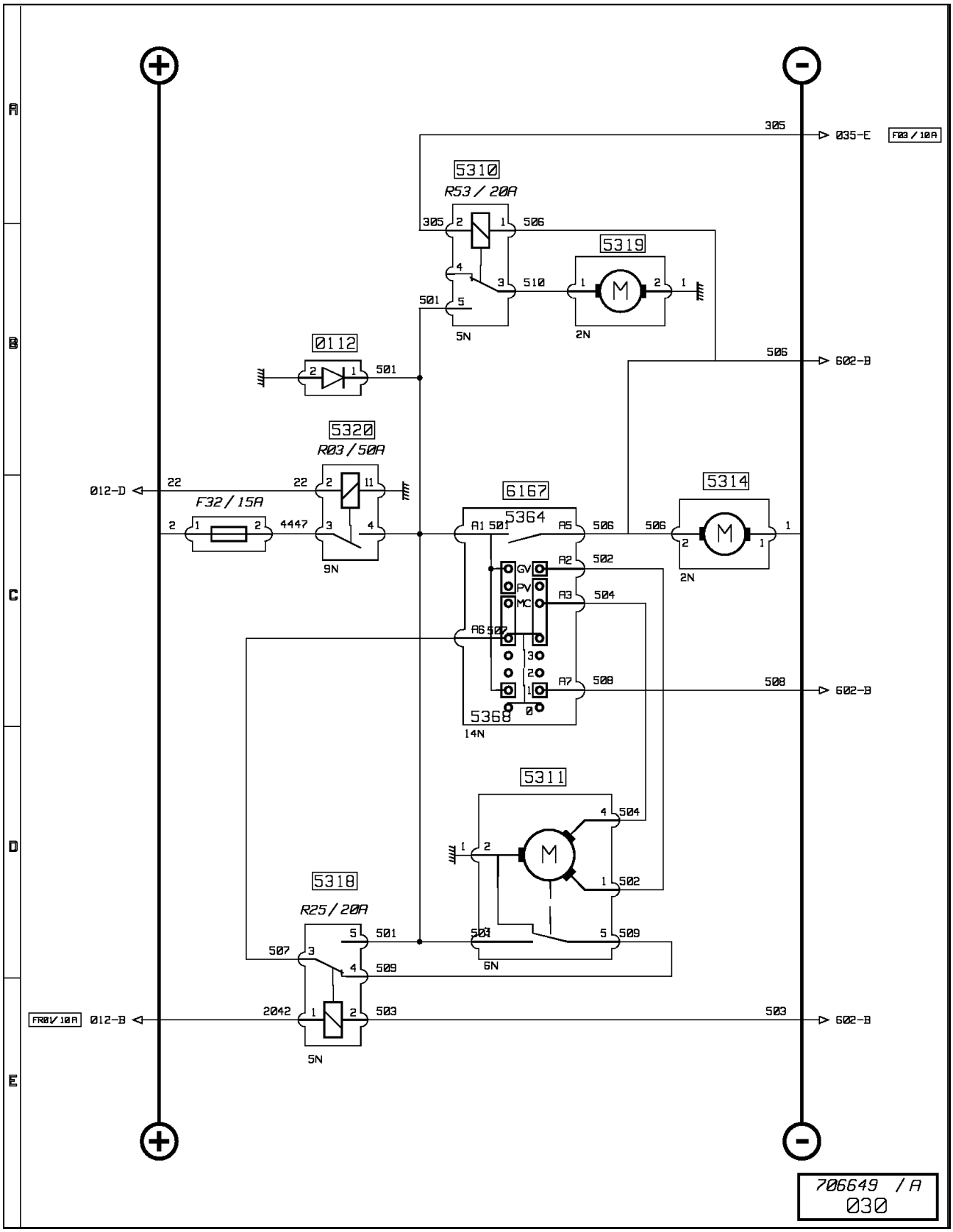


Engine starting aid

Key to appliances

Code N°	Name of function	Location
2414	Preheating relay N°1	B3d B2c
2421	Fuel preheater resistor N°1	B3c
2422	Fuel preheater relay	A2b
2423	Fuel preheater resistor N°2	B3c
2425	Fuel preheater resistor N°3	B3c
2452	Preheating resistor N°1	B3c
2464	Fuel preheater thermal switch	B3d

Windscreen wiper(s) and headlamps wash

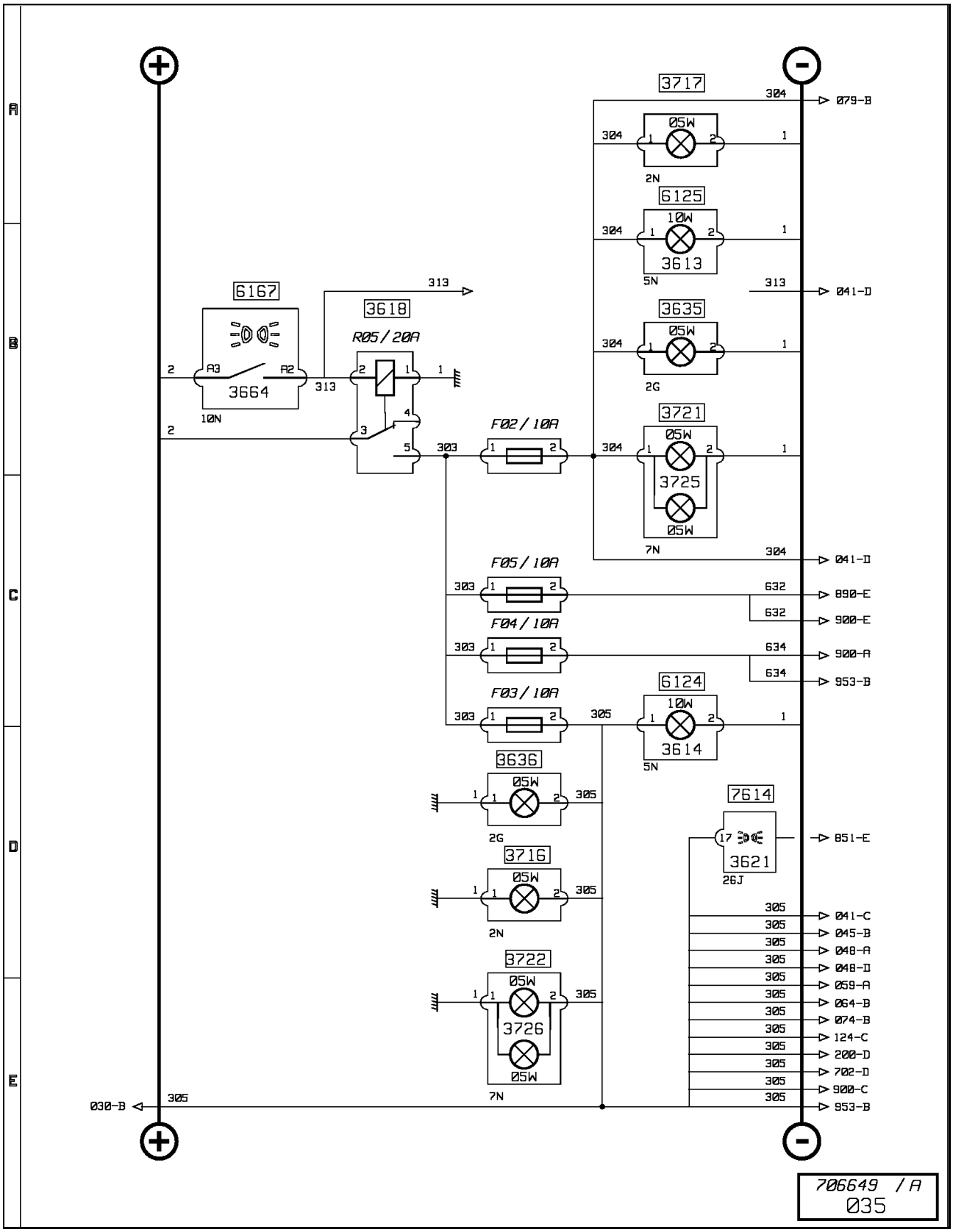


Windscreen wiper(s) and headlamps wash

Key to appliances

Code N°	Name of function	Location
0112	Diode(s)	A2c
5310	Headlamps wash pump time-delay power supply relay	A2c
5311	Windscreen wiper motor	B1c
5314	Windscreen wash pump	C1c
5319	Headlamps wash pump motor	A2d
5320	Windscreen wiper prohibition relay	A2c
5364	Windscreen wash control	C2b
5368	Windscreen wipe control	C2b
6167	Steering column fingertip controls	C2b

Side/parking lights

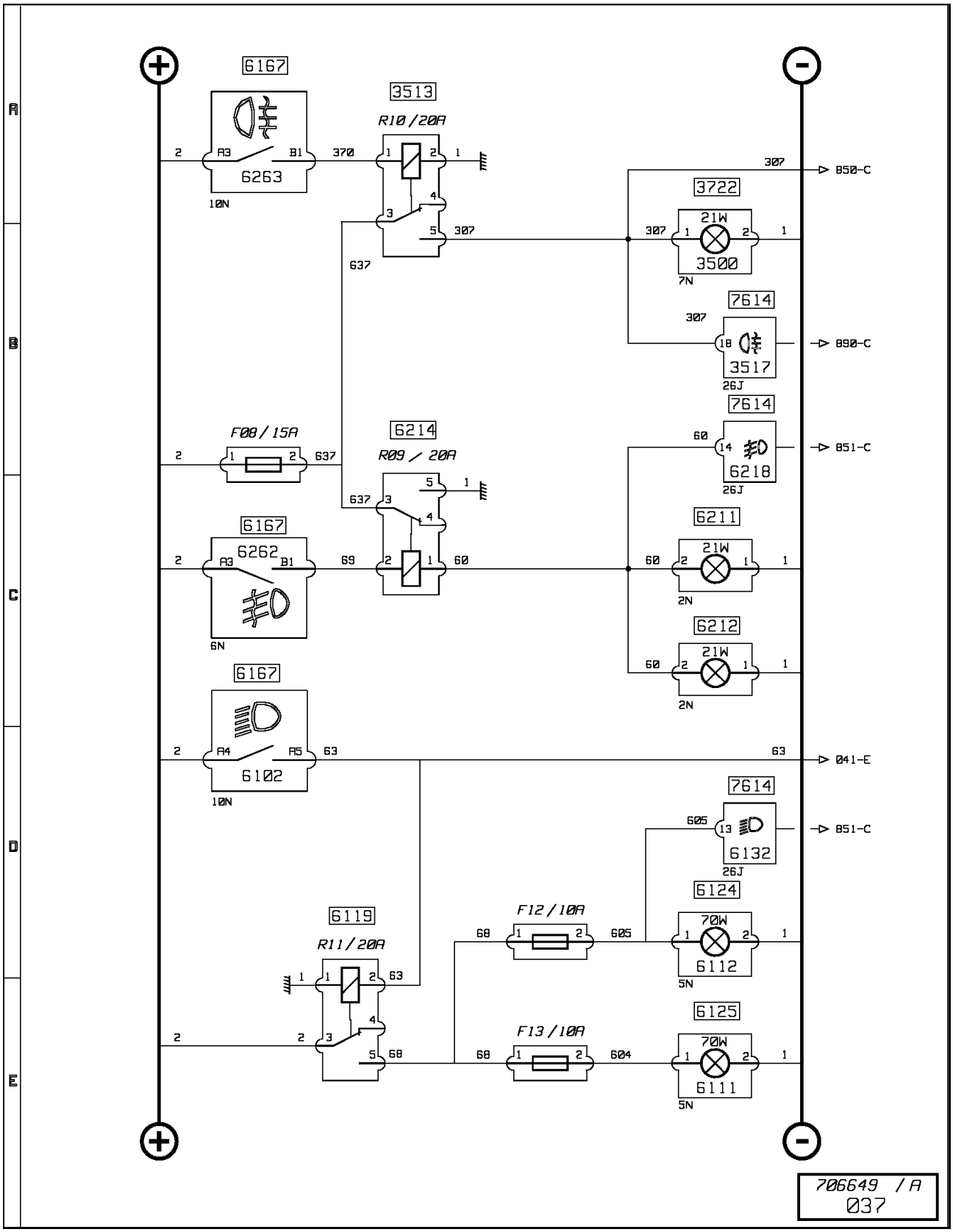


Side/parking lights

Key to appliances

Code N°	Name of function	Location
3613	RH front side/parking lamp	A1d
3614	LH front side/parking lamp	C1d
3618	Side/parking lights power supply relay N°1	A2b
3621	Side/parking lights warning lamp	C2b
3635	RH marker lights (bodybuilder equipment)	A2c
3636	LH marker lights (bodybuilder equipment)	A2c
3664	Side/parking lights control	C2b
3716	LH central marker lamp	C5d
3717	RH central marker lamp	A4d
3721	RH rear light(s) (flashing, stop, fog, reversing, side/parking)	A9d
3722	LH rear lights (flashing, stop, fog, reverse, side/parking)	C9d
3725	RH rear side/parking lamp	A9d
3726	LH rear side/parking lamp	C9d
6124	Headlight, dipped headlight and left side lamp	C1d
6125	Headlight, dipped headlight and right side lamp	A1d
6167	Steering column fingertip controls	C2b
7614	Principal display	C2b

Fog and fog driving lights / Dipped beam headlights

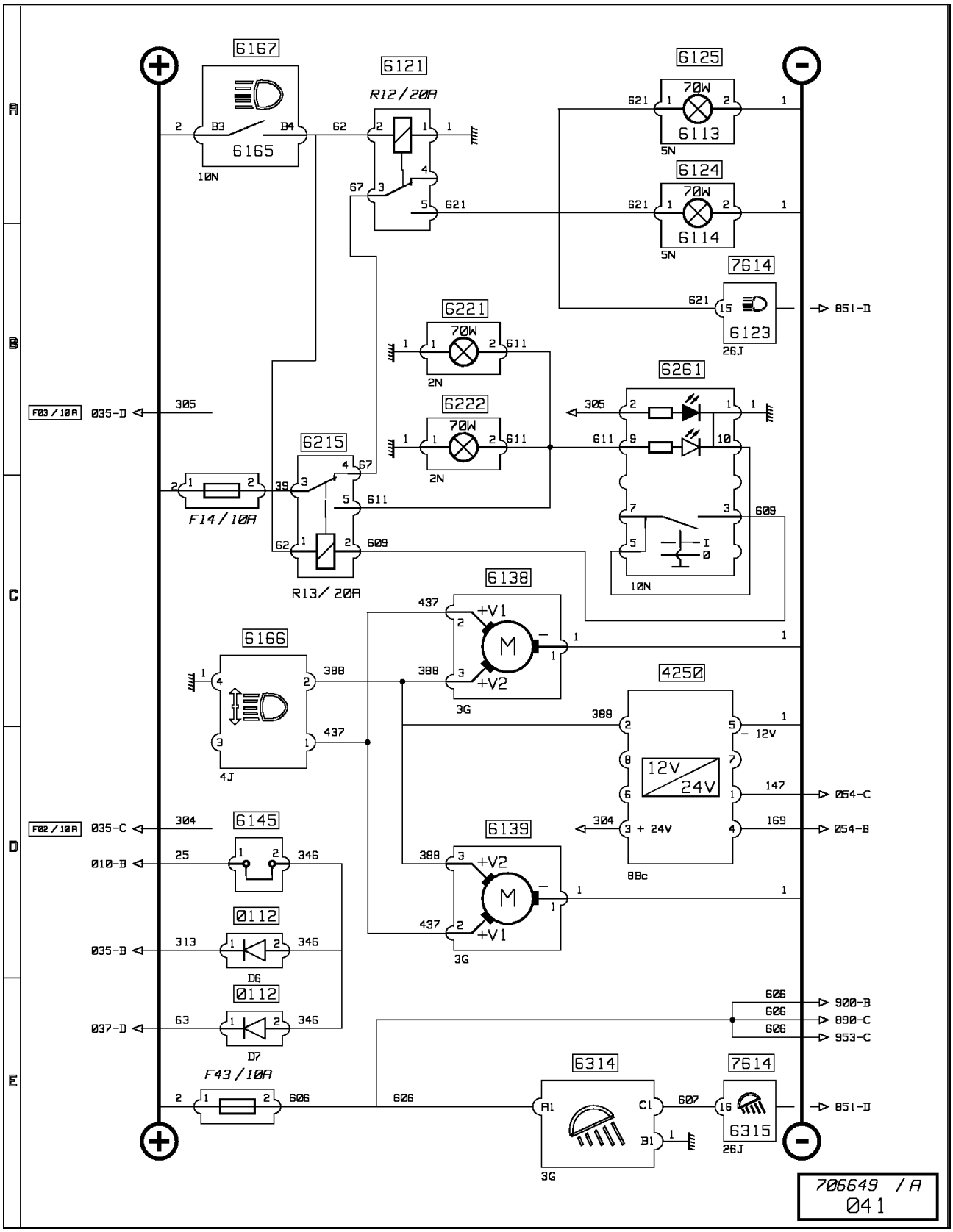


Fog and fog driving lights / Dipped beam headlights

Key to appliances

Code N°	Name of function	Location
3500	LH fog lamp	C9d
3513	Fog light(s) power supply relay	A2b
3517	Fog light(s) warning lamp	C2b
3722	LH rear lights (flashing, stop, fog, reverse, side/parking)	C9d
6102	Dipped beam headlights control	C2b
6111	RH dipped beam headlamp	C1d
6112	LH dipped beam headlamp	A1d
6119	Dipped beam headlights relay	A2b
6124	Headlight, dipped headlight and left side lamp	C1d
6125	Headlight, dipped headlight and right side lamp	A1d
6132	Dipped beam headlights warning lamp	C2b
6167	Steering column fingertip controls	C2b
6211	LH fog driving lamp	C1d
6212	RH fog driving lamp	A1d
6214	Fog driving lights relay	A2b
6218	Fog driving lights warning lamp	C2b
6262	Fog driving lights control	B2b
6263	Fog driving light(s) control	B2b
7614	Principal display	C2b

Main beam headlights and extra lights

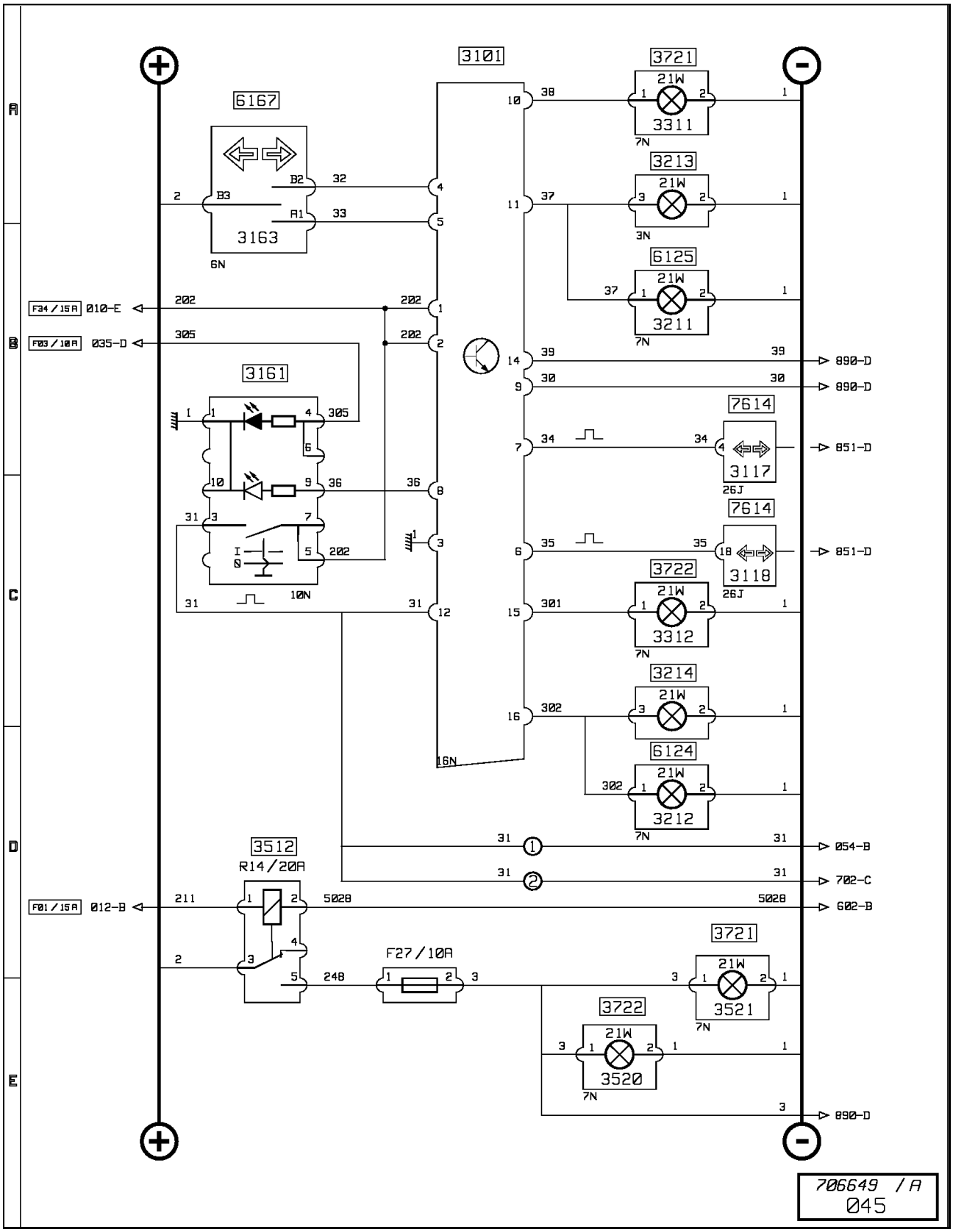


Main beam headlights and extra lights

Key to appliances

Code N°	Name of function	Location
0112	Diode(s)	A2b
4250	Voltage dropper (24V/12V) for main beam headlamps adjustment motor	C2b
6113	RH main beam headlamp	A1d
6114	LH main beam headlamp	C1d
6121	Main beam headlights power supply relay	A2b
6124	Headlight, dipped headlight and left side lamp	C1d
6125	Headlight, dipped headlight and right side lamp	A1d
6123	Main beam headlights warning lamp	C2b
6138	LH headlight adjustment motor	C2d
6139	RH headlight adjustment motor	A2d
6145	Day running lights shunt	A2b
6165	Main beam headlights control	C2b
6166	Headlights adjustment control	C2b
6167	Steering column fingertip controls	C2b
6215	Long range driving lights power supply relay	A2b
6221	RH long range driving lamp	A1d
6222	LH long range driving lamp	C1d
6261	Long range driving lights control	B2b
6314	Working floodlamp (tractor)	C4c
6315	Working floodlight warning lamp	C2b
7614	Principal display	C2b

Direction change indication



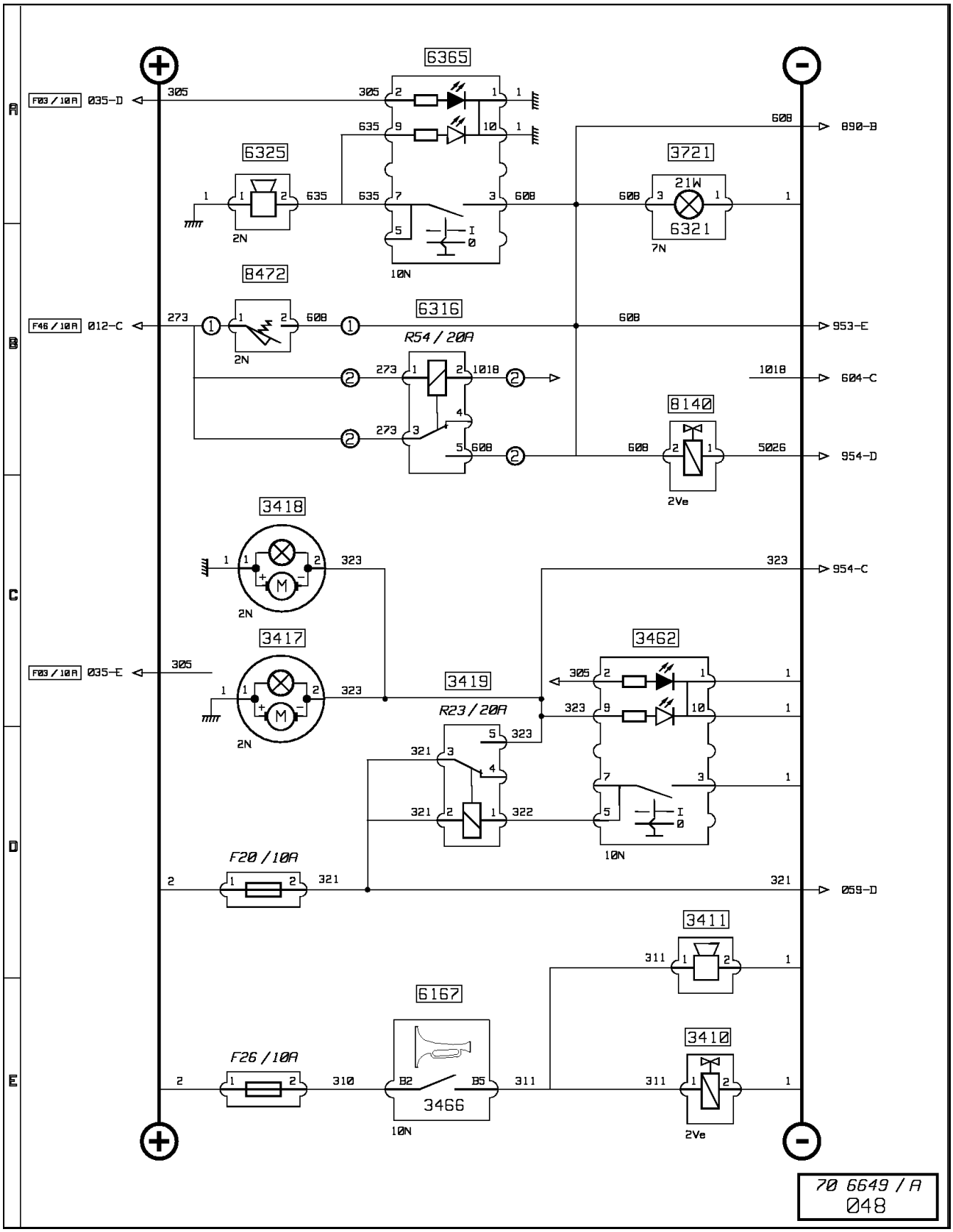
Direction change indication

Key to appliances

Code N°	Name of function	Location
3101	Flasher unit	A2a
3117	Rigid or tractor flasher repeater lamp	C2b
3118	Trailer flasher repeater lamp	C2b
3161	Hazard lights control	B2b
3163	Direction indicator control	C2b
3211	RH front direction indicator lamp(s)	A1d
3212	LH front direction indicator lamp(s)	C1d
3213	RH side flashing lamp	A3d
3214	LH side flashing lamp	C2d
3311	RH rear direction indicator lamp(s)	A9d
3312	LH front direction indicator lamp(s)	C9d
3512	Stop lights power supply relay	A2b
3520	LH rear stop lamp	C9d
3521	RH rear stop lamp	A9d
3721	RH rear light(s) (flashing, stop, fog, reversing, side/parking)	A9d
3722	LH rear lights (flashing, stop, fog, reverse, side/parking)	C9d
6124	Headlight, dipped headlight and left side lamp	C1d
6125	Headlight, dipped headlight and right side lamp	A1d
6167	Steering column fingertip controls	C2b
7614	Principal display	C2b

1: without alarm
2: with alarm

Reversing lights and horns

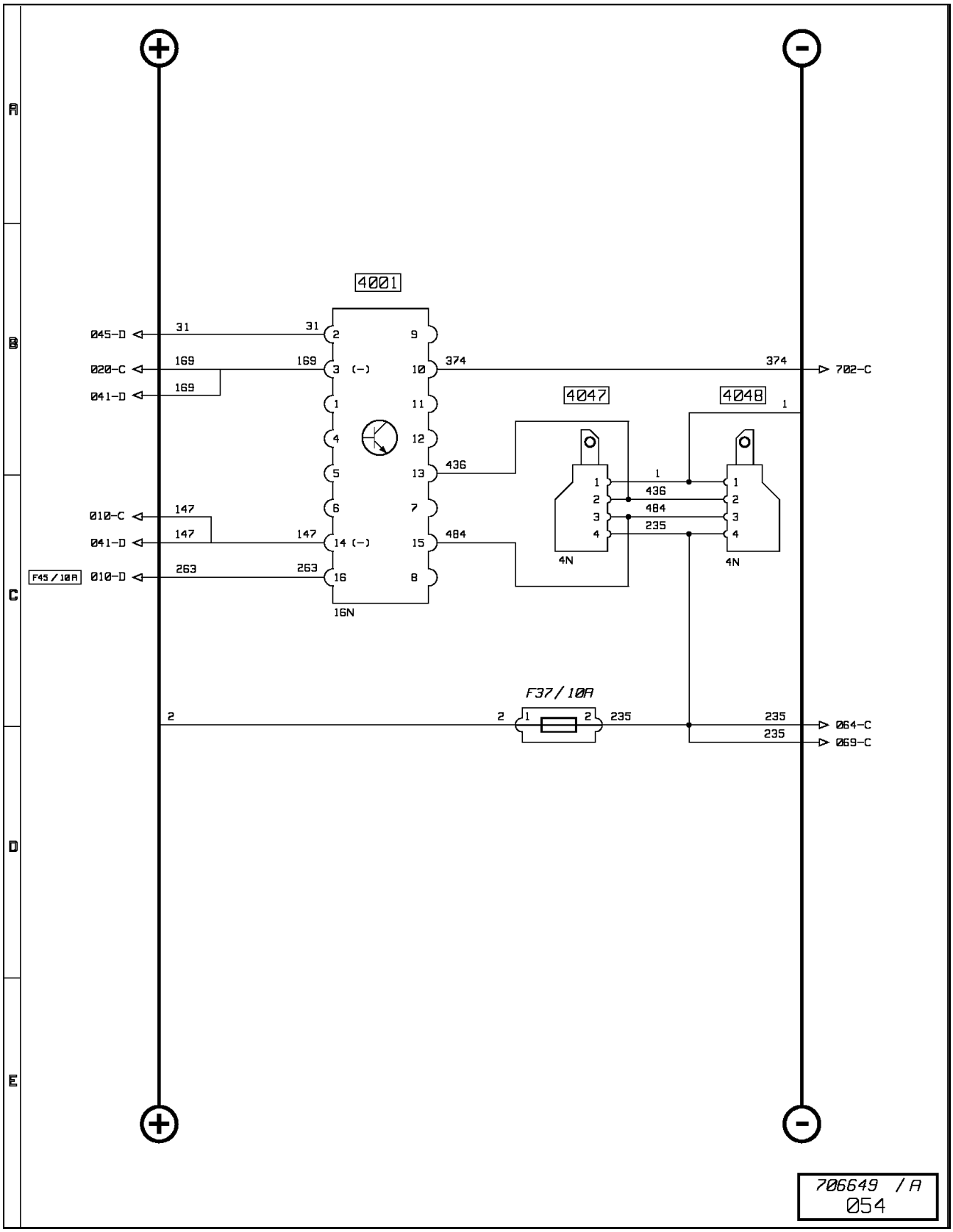


Reversing lights and horns

Key to appliances

Code N°	Name of function	Location
3410	Roof trumpet horn solenoid valve	C2d
3411	Horn	A2d
3417	Revolving beacon 1	C3a
3418	Revolving beacon 2	A3a
3419	Revolving beacon(s) power supply relay	A2b
3462	Revolving beacon(s) control	C2a
3466	Horn control	C2b
3721	RH rear light(s) (flashing, stop, fog, reversing, side/parking)	A9d
6167	Steering column fingertip controls	C2b
6316	Reversing lights power supply relay	A2c
6321	RH reversing lamp	A9d
6325	"Reversing" external buzzer	B9d
6365	"Reversing" buzzer control	C2a
8140	Braking circuit electrovalve (reversing safety)	C5d
8472	Reverse gear switch	B4d

Doors central locking

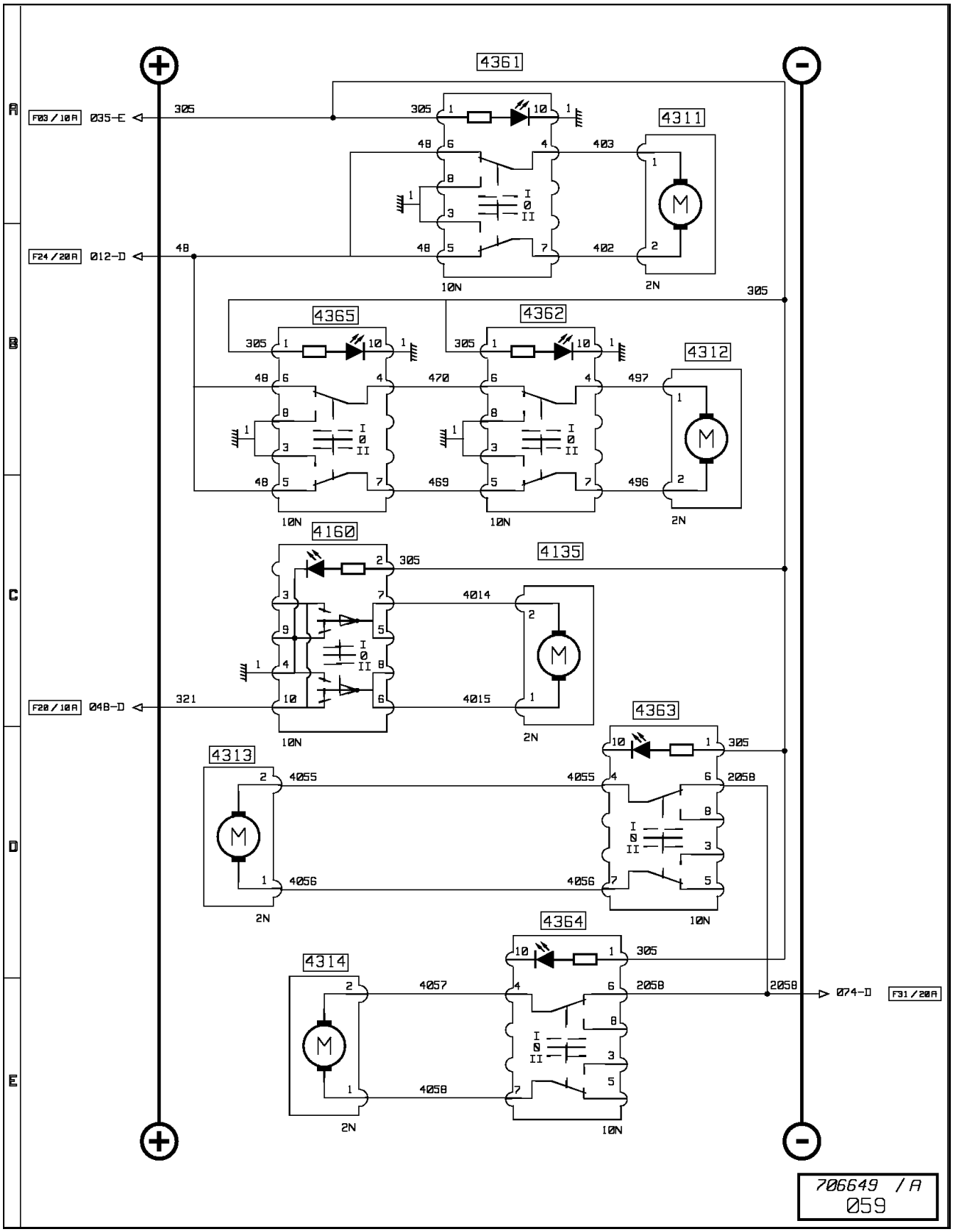


Doors central locking

Key to appliances

Code N°	Name of function	Location
4001	Central locking box (doors)	B2a
4047	Passenger's side electric striker motor	A3b
4048	Driver's side electric striker motor	C3b

Electric window raiser

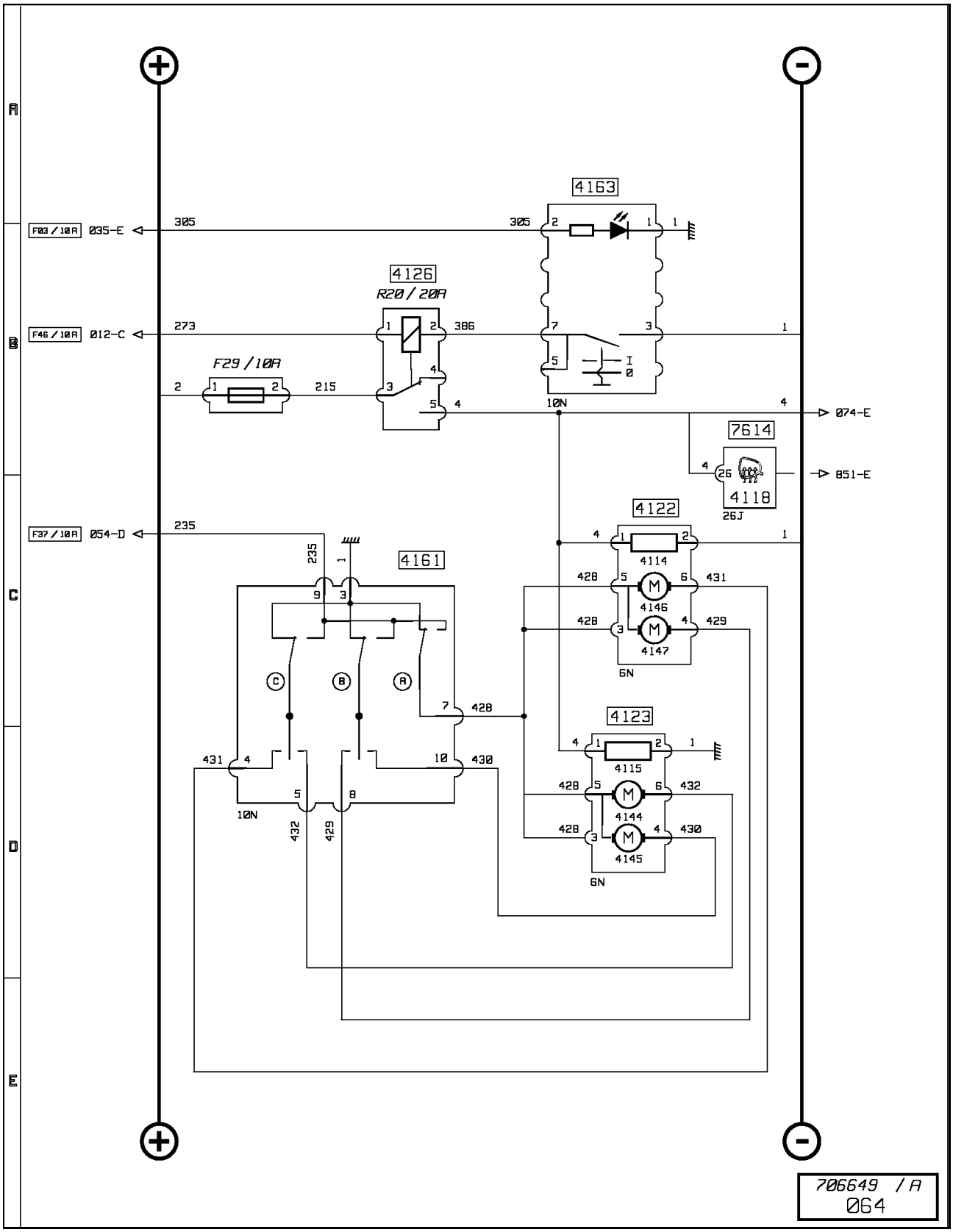


Electric window raiser

Key to appliances

Code N°	Name of function	Location
4135	Electric roof ventilator motor	B3a
4160	Electric roof ventilator control	C2a
4311	Driver's window winder motor	C2c
4312	Passenger's window winder motor	A2c
4313	RH rear door window winder motor	A3a
4314	LH rear door window winder motor	A3c
4361	Driver's window winder control	C2b
4362	Passenger's window winder control	A2b
4363	RH rear door window winder control	A3a
4364	LH rear door window winder control	A3c
4365	Passenger's window winder control (driver's side)	C2b

Swivelling heated rearview mirrors

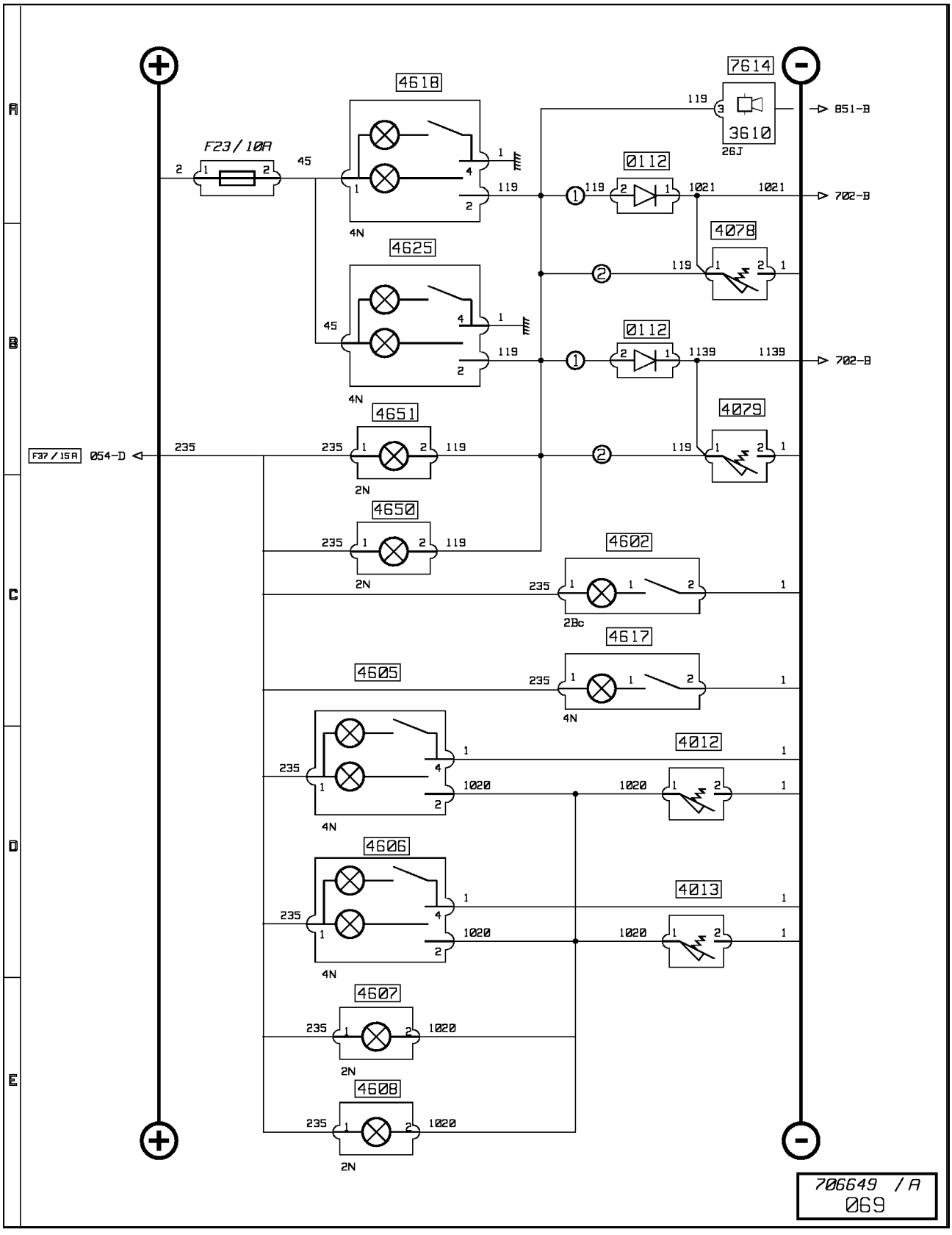


Swivelling heated rearview mirrors

Key to appliances

Code N°	Name of function	Location
4114	LH defrosting rearview mirror	C2a
4115	RH de-icing rearview mirror	A2a
4118	Defrosting rearview mirrors warning lamp	C2b
4122	LH swivelling defrosting rearview mirror	C2a
4123	RH swivelling defrosting rearview mirror	A2a
4126	Defrosting rearview mirrors resistor power supply relay	A2c
4144	RH rearview mirror horizontal swivelling control	A2a
4145	RH rearview mirror vertical swivelling control	A2a
4146	LH rearview mirror horizontal swivelling control	C2a
4147	LH rearview mirror vertical swivelling control	C2a
4161	External rearview mirrors swivelling control	C2b
4163	Defrosting rearview mirror control	C2a
7614	Principal display	C2b

Comfort lighting



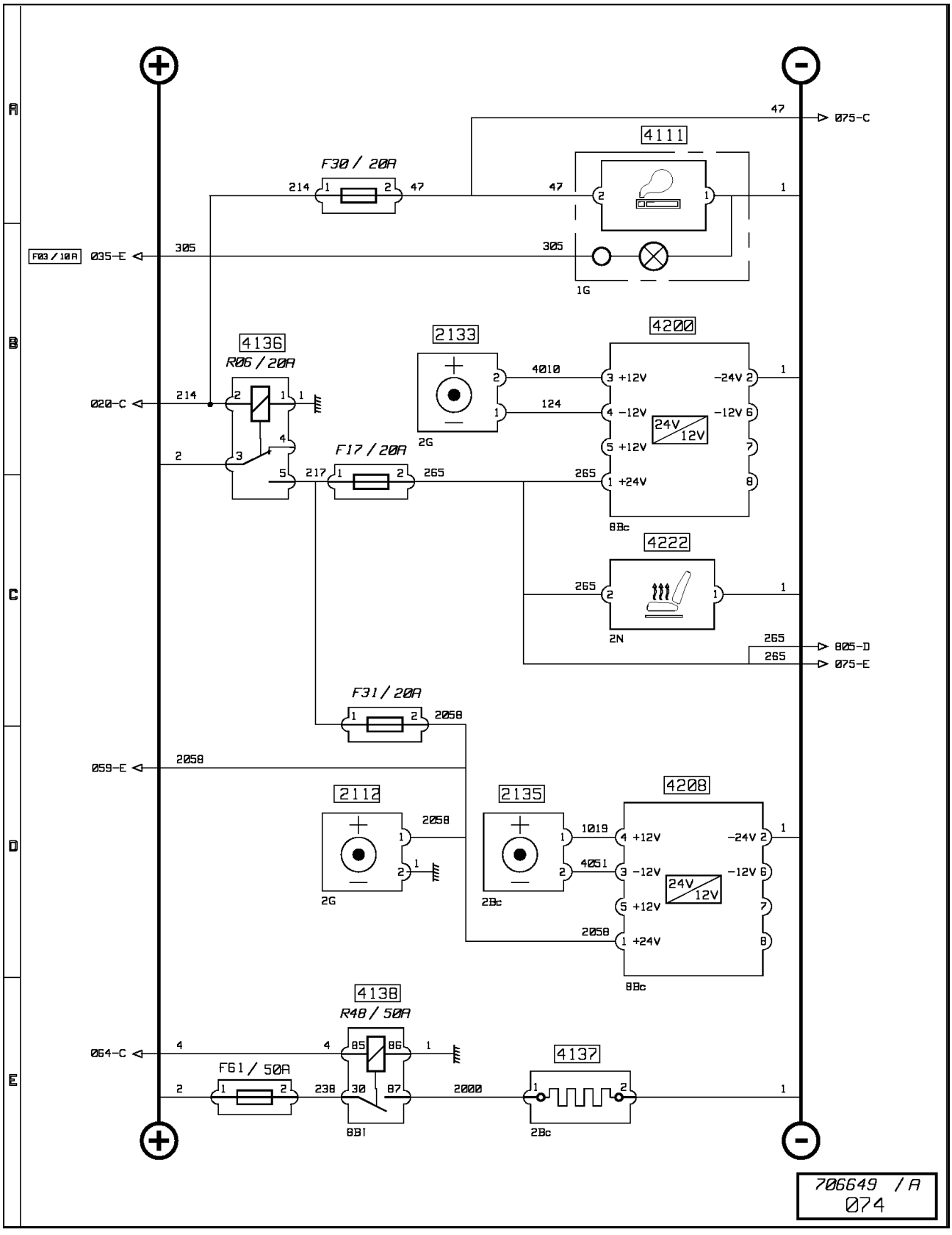
Comfort lighting

Key to appliances

Code N°	Name of function	Location
0112	Diode(s)	B2a C2b A2c
3610	Lights forgotten alarm	C2b
4012	LH rear door switch	A3a
4013	RH rear door switch	A3c
4078	Drivers door switch	C2c
4079	Passenger's door switch	A2c
4602	Rear map reader lighting	C4a
4605	LH rear door overhead lamp	A3c
4606	RH rear door overhead lamp	A3a
4607	LH rear door step lamp	C3c
4608	RH rear door step lamp	C3a
4617	Top bunk overhead lamp	C4a
4618	Driver's overhead lamp	B2a
4625	Passenger's overhead lamp	B2a
4650	Driver's step lighting	C2c
4651	Passenger's step lighting	A2c
7614	Principal display	C2b

1: with "ALLISON" gearbox or alarm
2: without "ALLISON" gearbox and without alarm
3: with alarm
4: without alarm

Comfort accessories

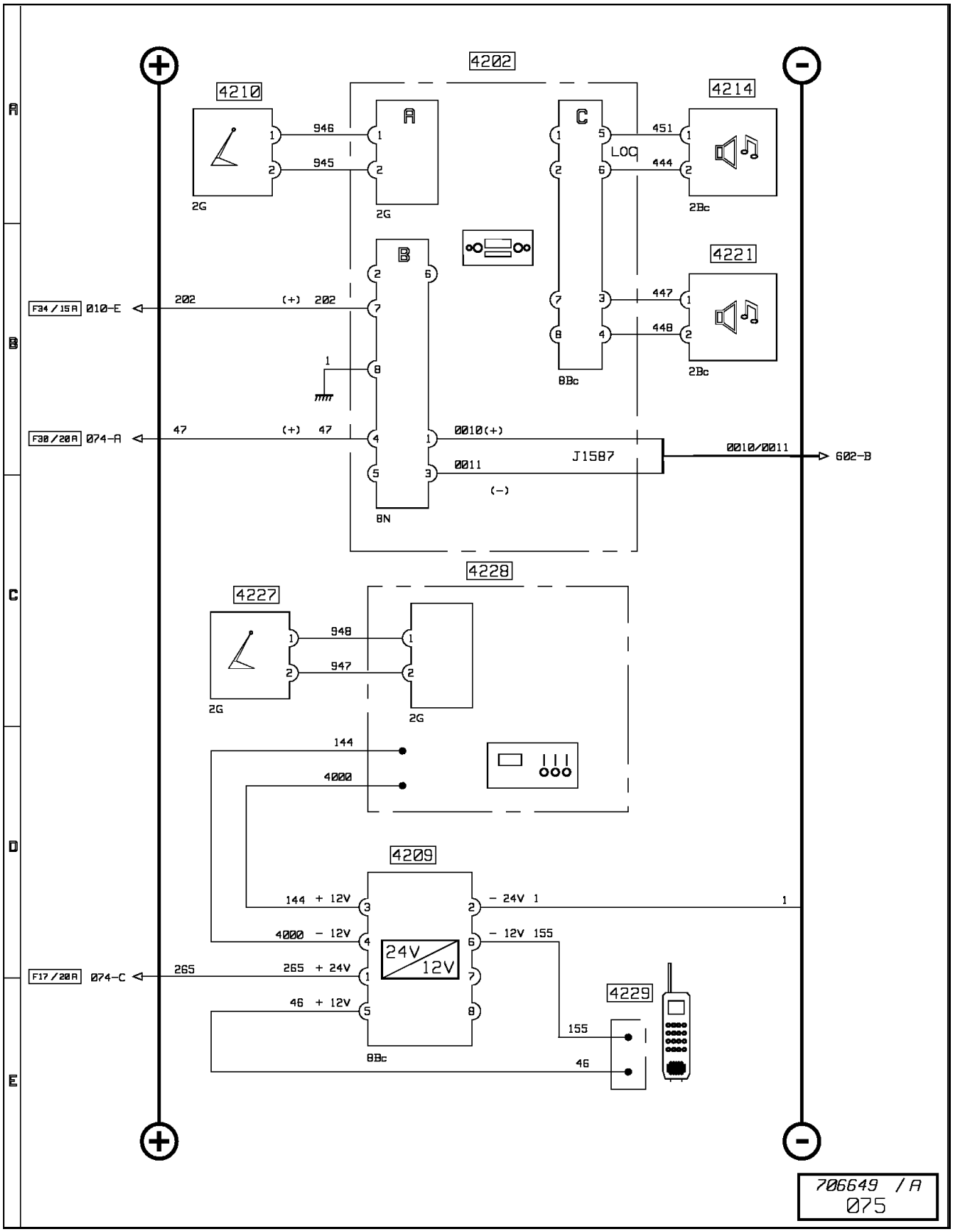


Comfort accessories

Key to appliances

Code N°	Name of function	Location
2112	"24 Volts" plug socket	C2c
2133	"12 Volts" plug socket	B2b
2135	Extra 12 Volts socket	B2b
4111	Cigar lighter	C2b
4136	Comfort accessories power supply relay	A2c
4137	Windscreen defrosting resistor	A1a
4138	Windscreen defrosting resistor power supply time-delay relay	B1c
4200	Voltage dropper (12 Volts socket)	A2c
4208	Voltage dropper (24V / 12V) - Secondary 12 Volts socket	A2c
4222	Driver's heated seat resistor	C3c

Radio, CB radio and telephone

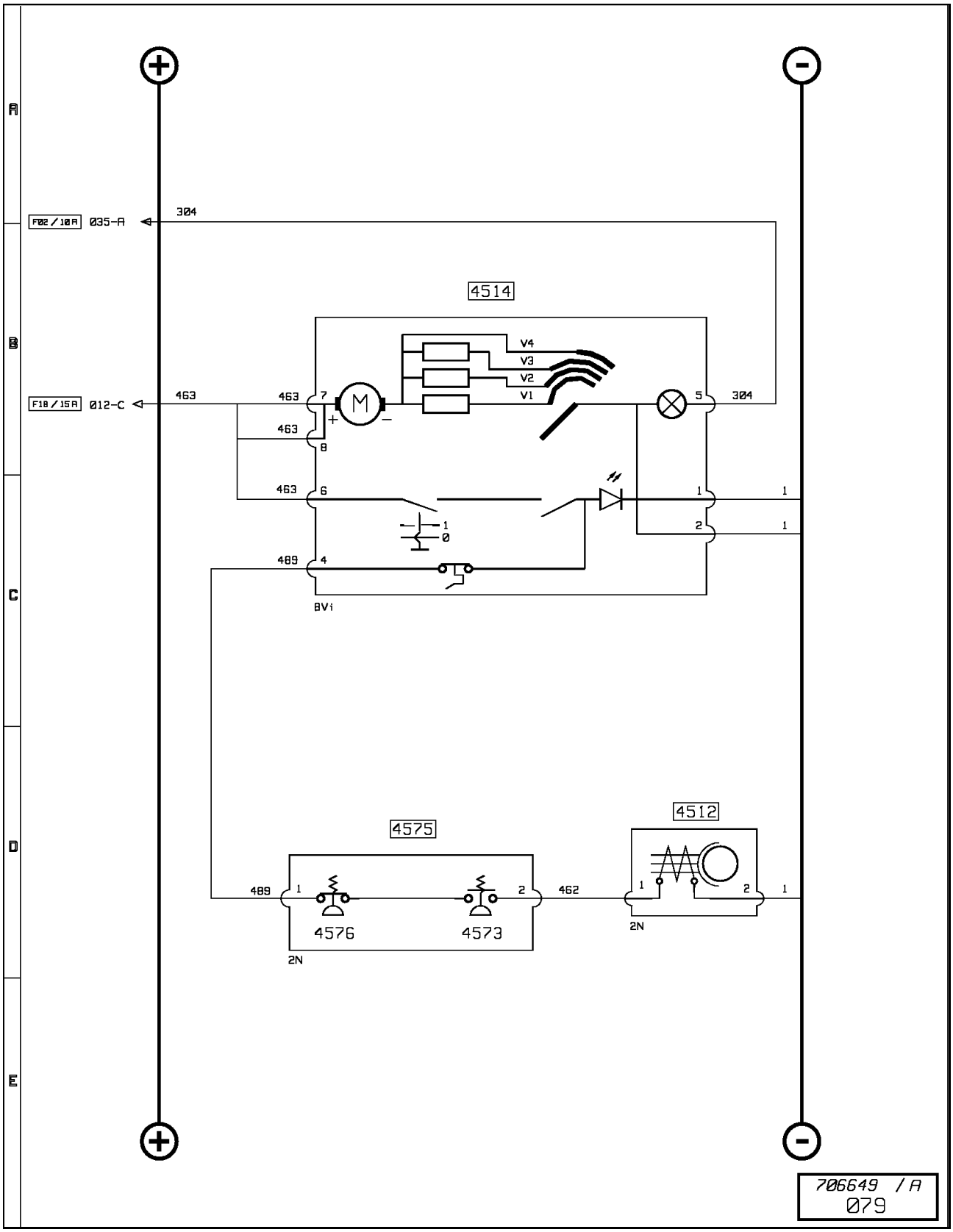


Radio, CB radio and telephone

Key to appliances

Code N°	Name of function	Location
4202	Radio	C2a
4209	Voltage dropper (24V / 12V) - telecommunications	C2a
4210	Antenna	B2a
4214	Driver's loudspeaker	C2b
4221	Passenger's loudspeaker	A2a
4227	CB antenna	C3a
4228	CB radio	C2a
4229	Telephone	C2a

Air conditioning

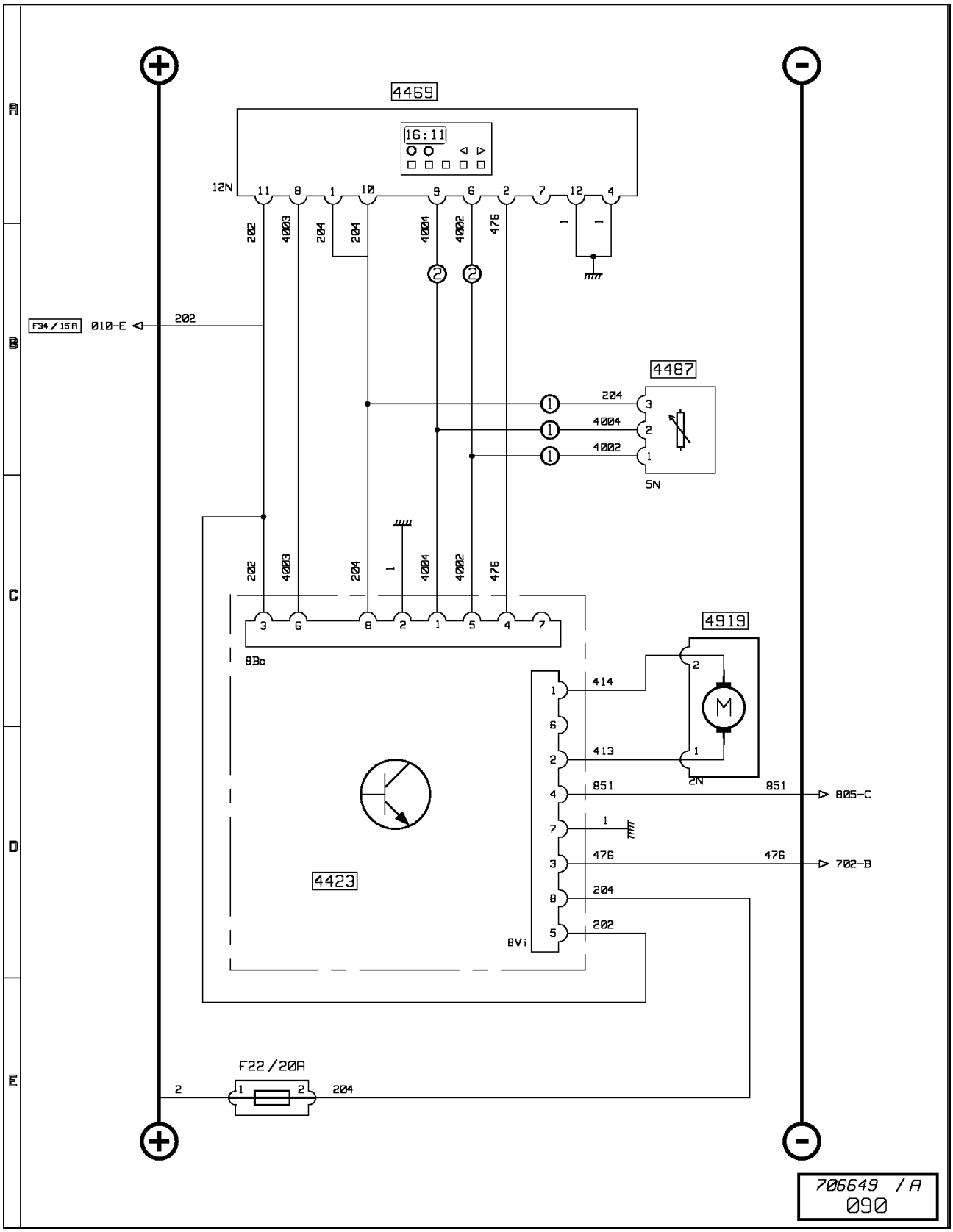


Air conditioning

Key to appliances

Code N°	Name of function	Location
4512	Air conditioning compressor	B2d
4514	Air conditioning	B2c
4573	Low pressure controller	B1c
4575	3-level air conditioning pressure controller	B1c
4576	High pressure controller	B1c

Air/air independent (add-on) heating "AT2000" (except "ADR")



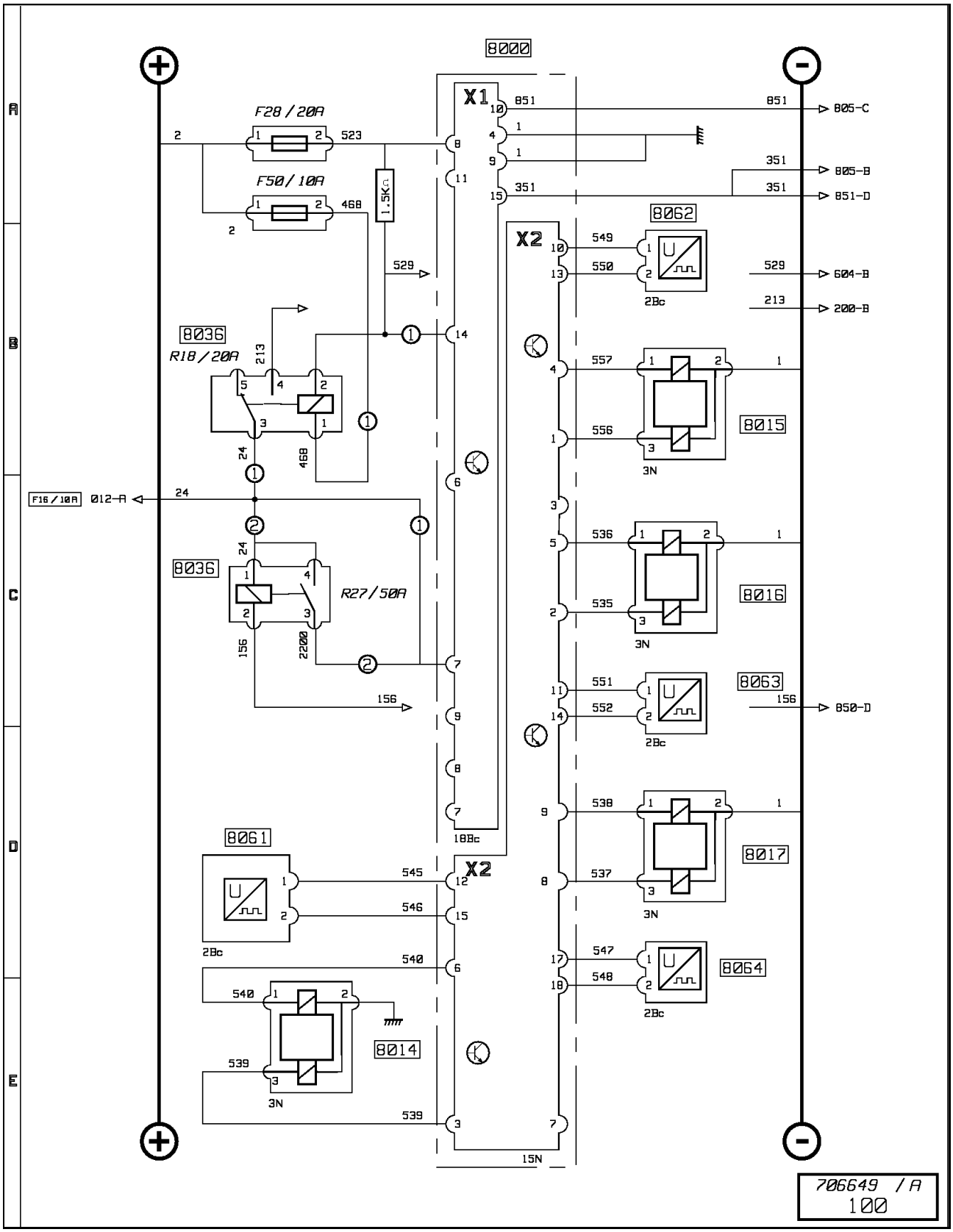
Air/air independent (add-on) heating "AT2000" (except "ADR")

Key to appliances

Code N°	Name of function	Location
4423	Air/air independent heater	A3c
4469	Independent heater timer control	C3a
4487	Temperature variator	C3a
4919	Fuel feed pump	B3c

1: without 2-metre cab
2: with 2-metre cab

"ABS" braking system



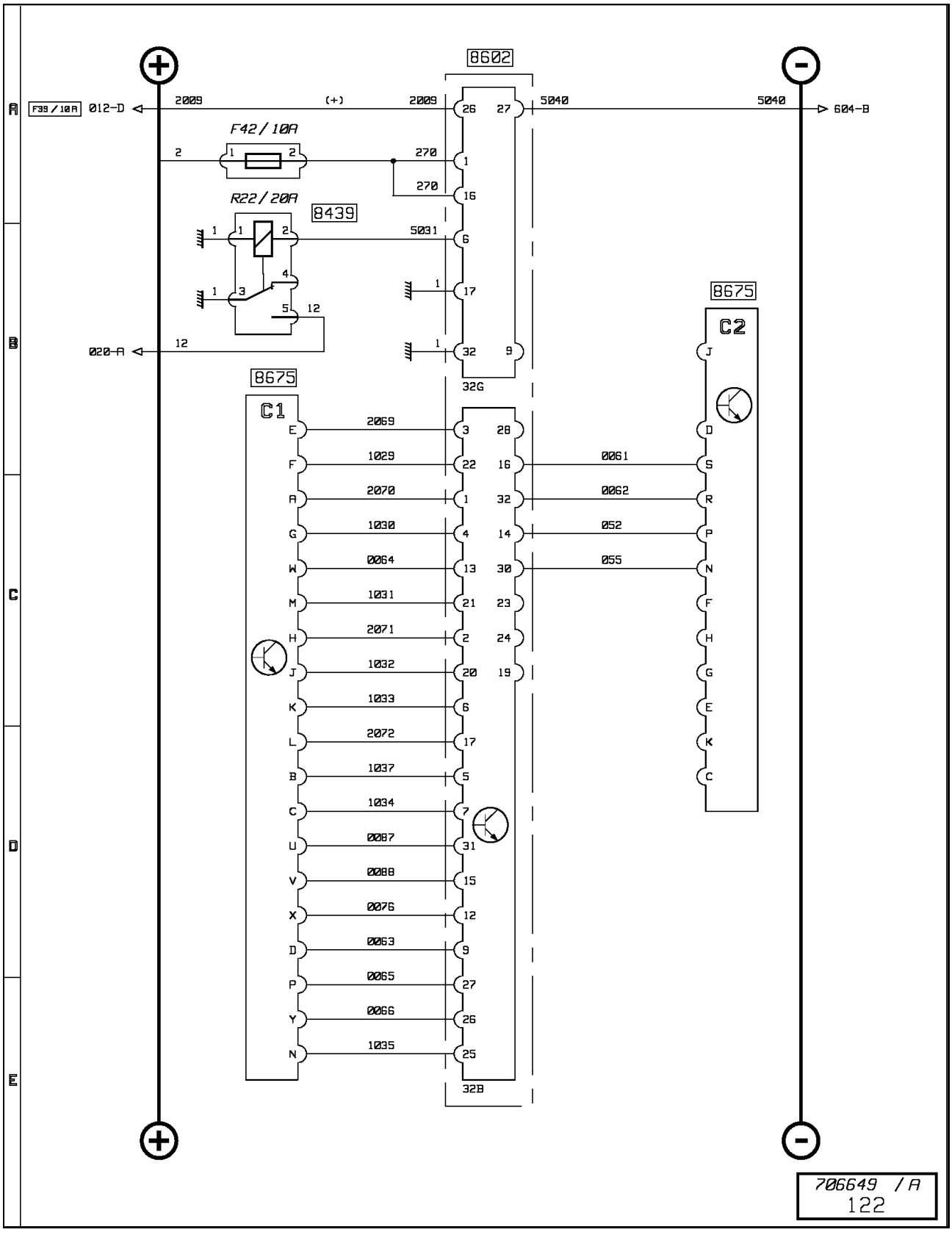
"ABS" braking system

Key to appliances

Code N°	Name of function	Location
8000	"ABS" ECU	A2c
8014	ABS LH front roadwheel electrovalve	C3d
8015	ABS RH front roadwheel electrovalve	A3d
8016	ABS LH rear roadwheel electrovalve	B7d B8d
8017	ABS RH rear roadwheel electrovalve	B7d B8d
8036	"ABS" retarder phase cut-off relay	A2b
8061	ABS LH front roadwheel sensor	C3d
8062	ABS RH front roadwheel sensor	A3d
8063	ABS LH rear roadwheel sensor	C7d / C8d
8064	ABS RH rear roadwheel sensor	C7d / C8d

1: with all-terrain option
2: without all-terrain option

Gearbox "ALLISON" (1/2)

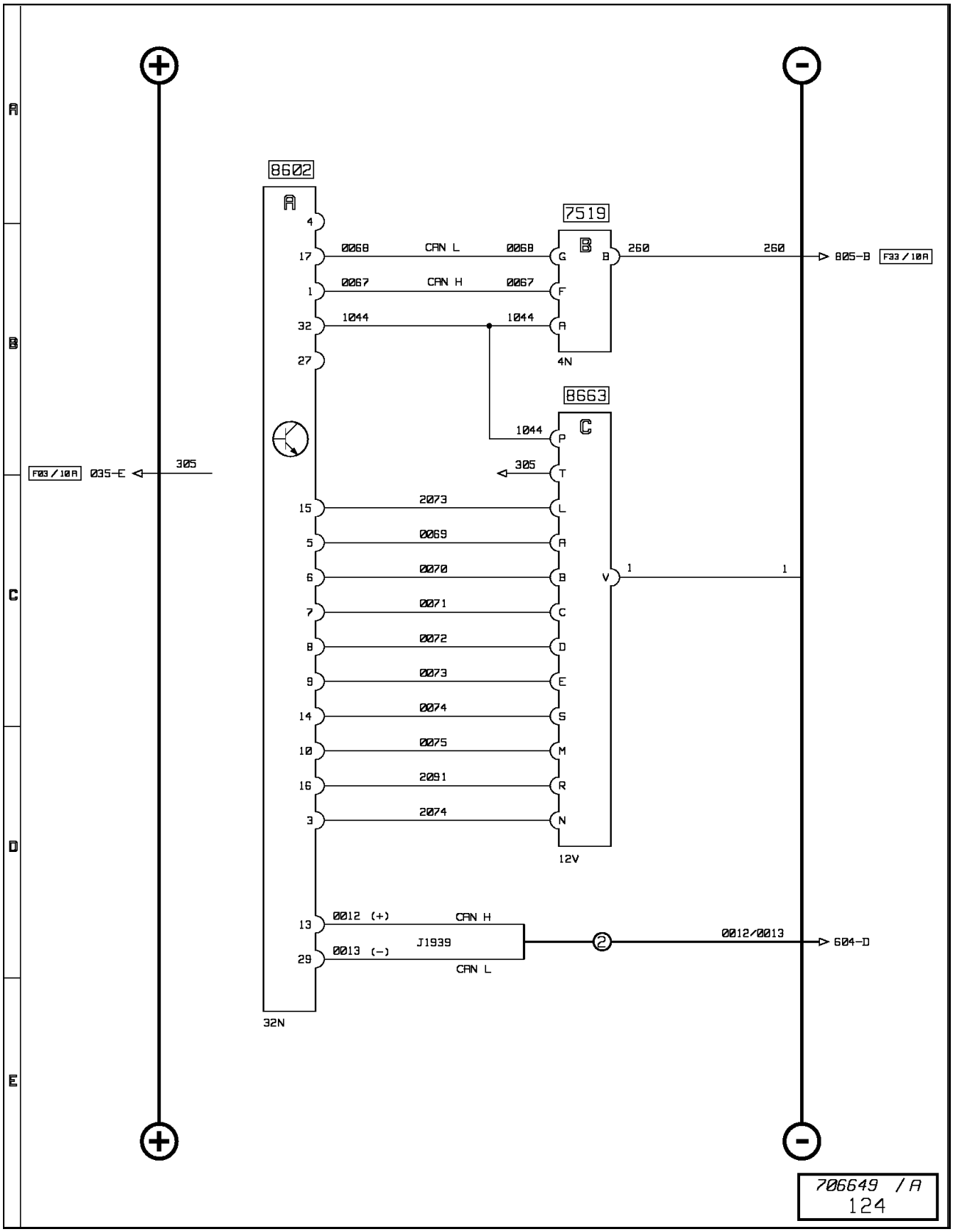


Gearbox "ALLISON" (1/2)

Key to appliances

Code N°	Name of function	Location
8602	Automatic gearbox ECU	A2c
8439	Neutral relay	B2c
8675	Gearbox control solenoid valves block	B4c

Gearbox "ALLISON" (2/2)

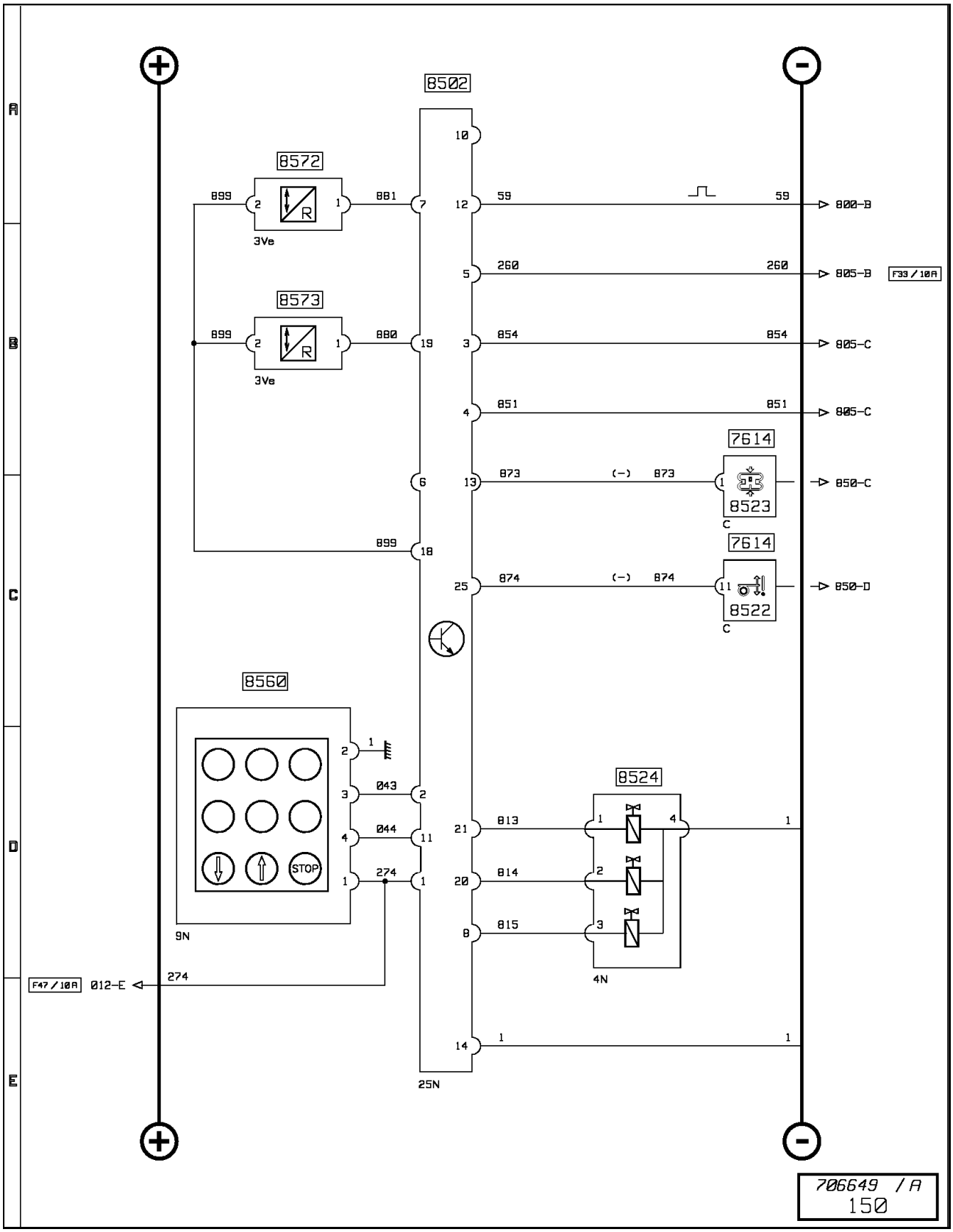


Gearbox "ALLISON" (2/2)

Key to appliances

Code N°	Name of function	Location
7519	Diagnostics socket	C3c
8602	Automatic gearbox ECU	A2c
8663	Gear control lever or gearshift control box	B3c

Air suspension "4X2"

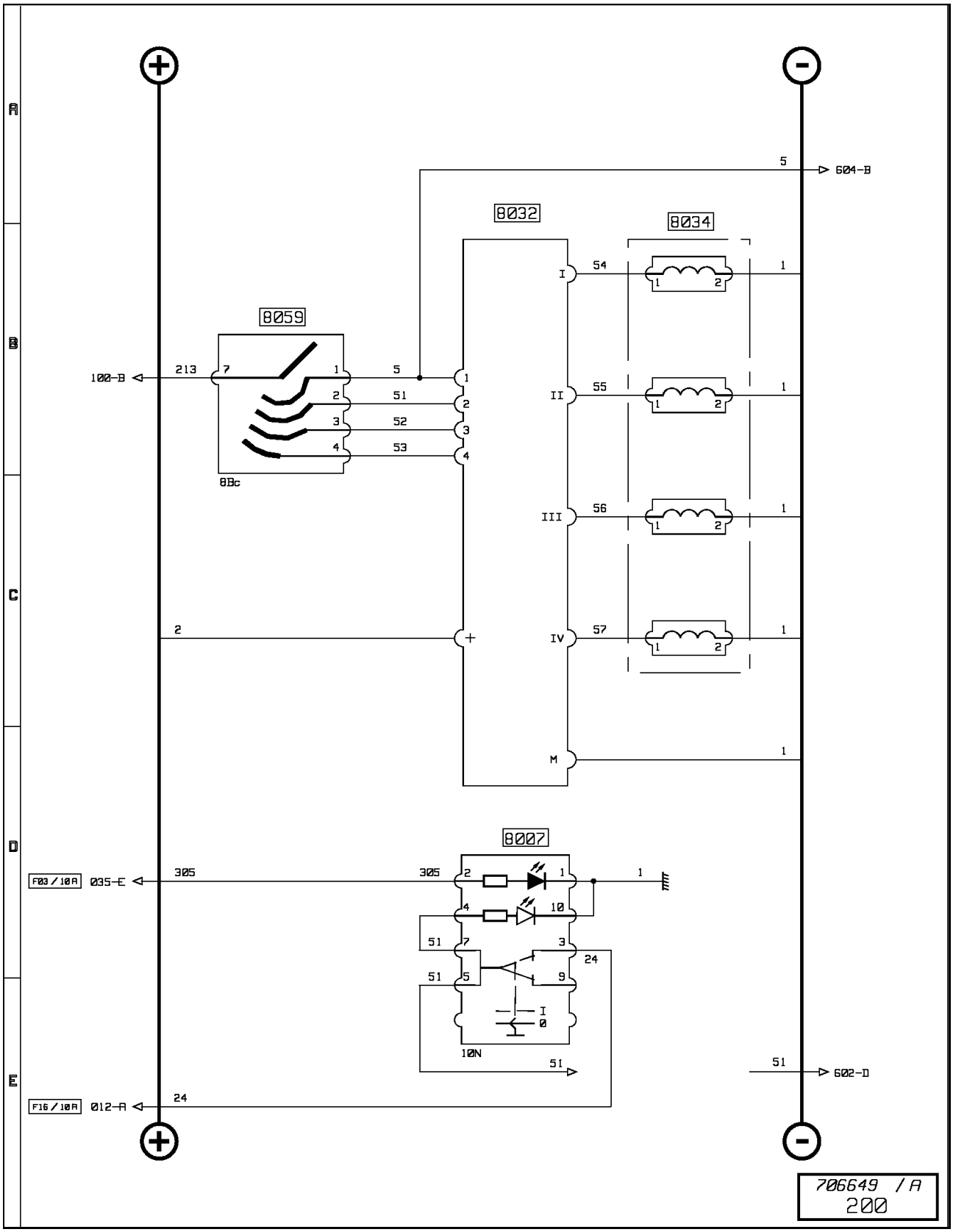


Air suspension "4X2"

Key to appliances

Code N°	Name of function	Location
7614	Principal display	C2b
8502	Suspension ECU	A2c
8522	Suspension information warning lamp	C2b
8523	Suspension alert warning lamp	C2b
8524	Rear suspension electrovalve block	B7d B8d
8560	Air suspension remote control box	C3c
8572	Suspension level RH rear sensor	A7d A8d
8573	Suspension level LH rear sensor	C7d C8d

Electric retarder

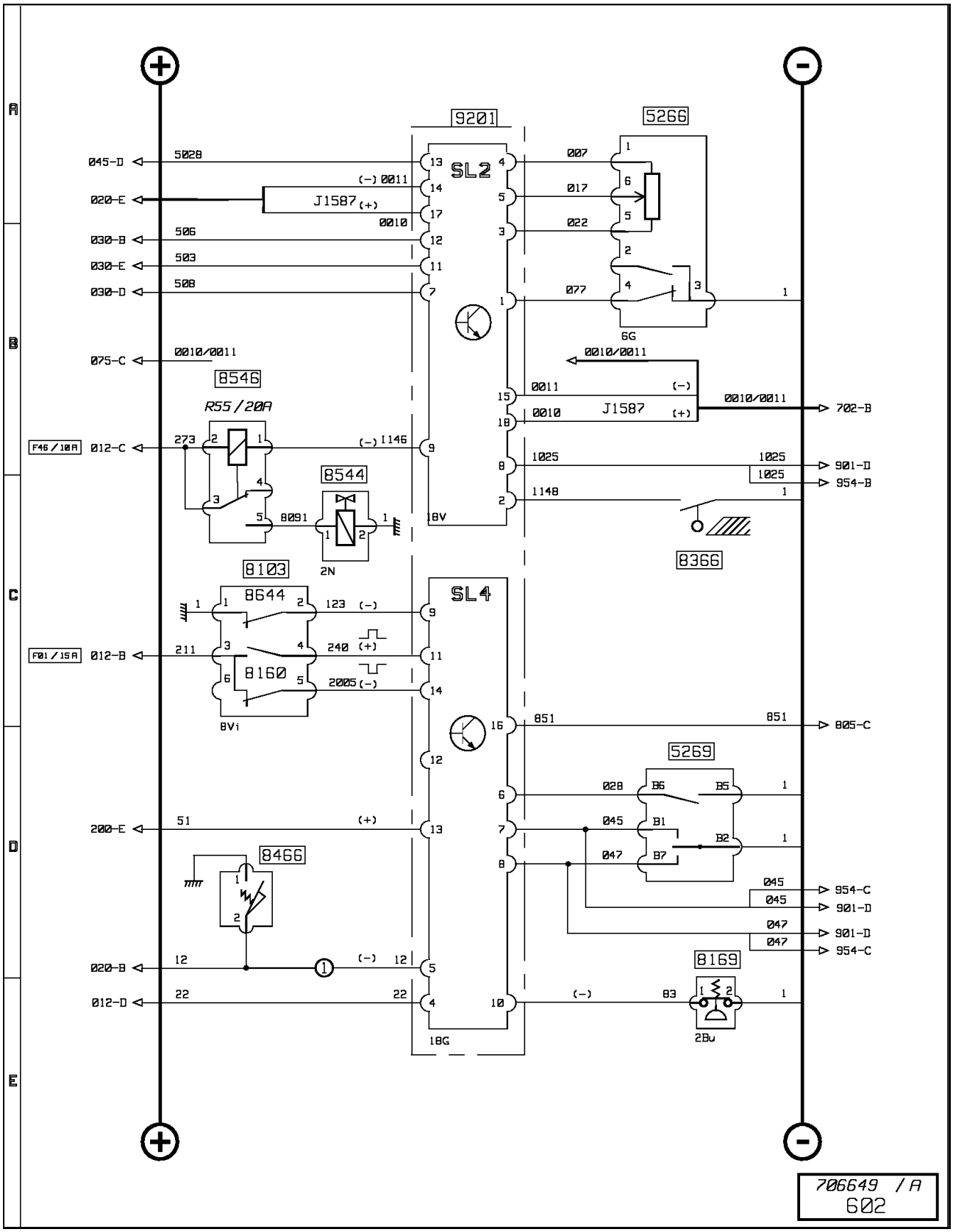


Electric retarder

Key to appliances

Code N°	Name of function	Location
8007	Exhaust brake and engine brake control	B2b
8032	Electric retarder relay box	A2c
8034	Electric retarder	B5d
8059	Electric or hydraulic retardation control	C2b

Vehicle electronic management (1/2)

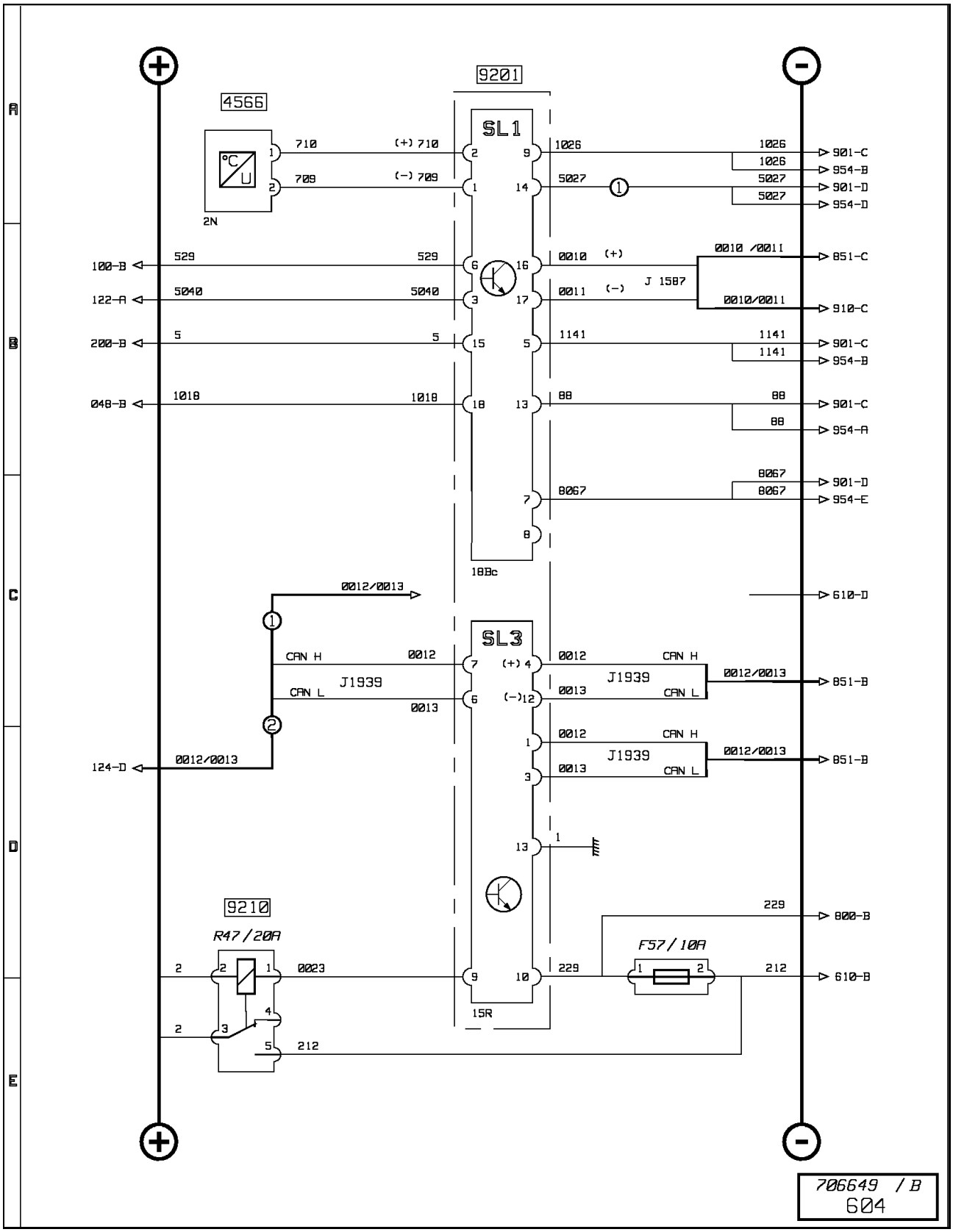


Vehicle electronic management (1/2)

Key to appliances

Code N°	Name of function	Location
5266	Accelerator pedal position sensor	C2c
5269	Engine cruise control and speed regulator adjustment control	C2b
8103	Clutch switch and stop lights switch position sensor	C2c
8169	Parking brake air pressure switch	C5d
8366	Power take-off position sensor	B4d
8466	Neutral switch position sensor	B4d
8544	Self-tracking axle electrovalve	B7c
8546	Self-tracking axle safety relay	B7c
8644	Clutch switch contact position sensor	C2c
8660	"Gearbox input" speed sensor	C2c
9201	Vehicle master ECU (VECU)	B3c

Vehicle electronic management (2/2)



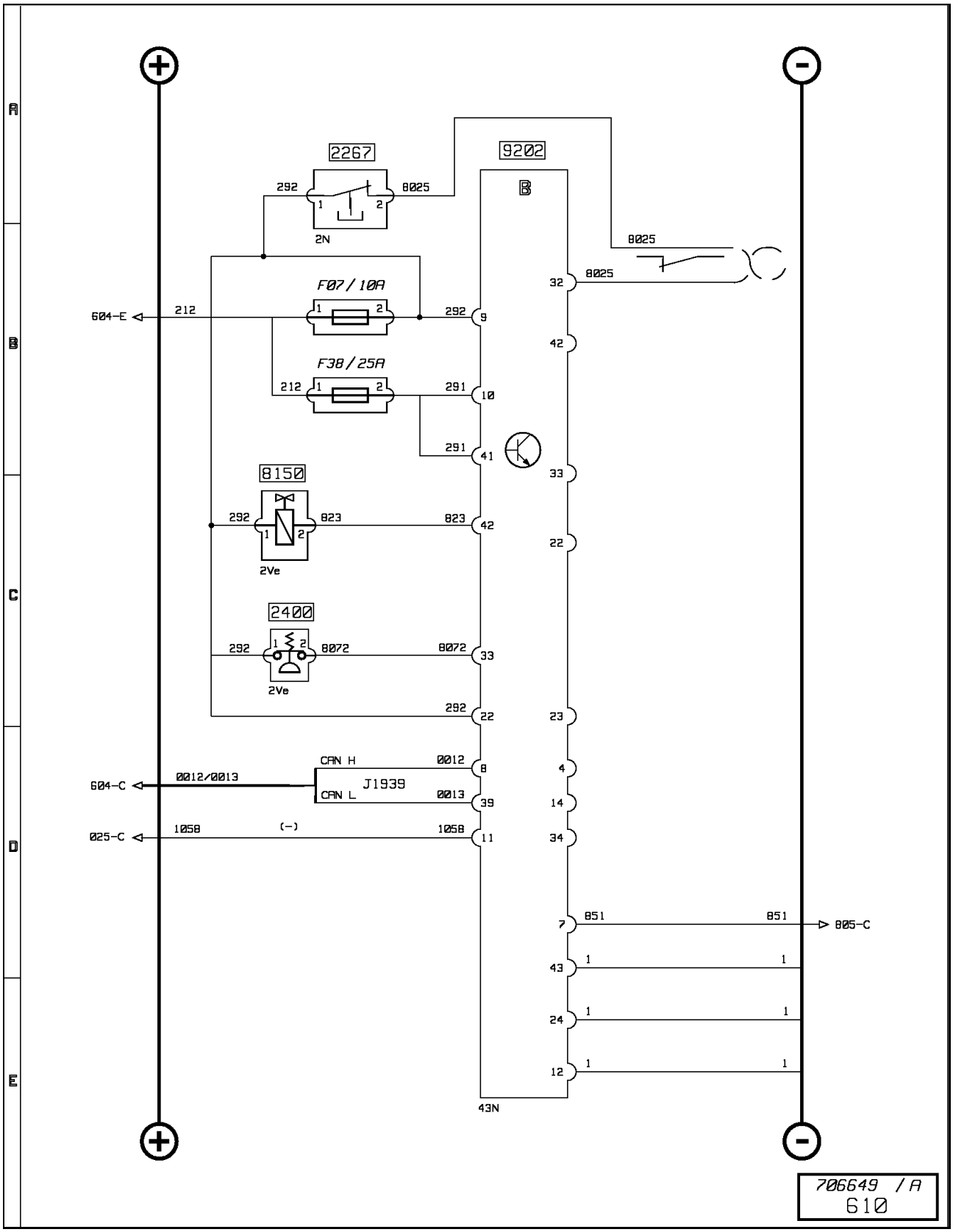
Vehicle electronic management (2/2)

Key to appliances

Code N°	Name of function	Location
4566	External temperature sensor	A1c
9201	Vehicle master ECU (VECU)	B3c
9210	"VECU / EECU" power supply relay	B3c

1: with other gearboxes
2: with "ALLISON" gearbox

Engine electronic management (1/2)

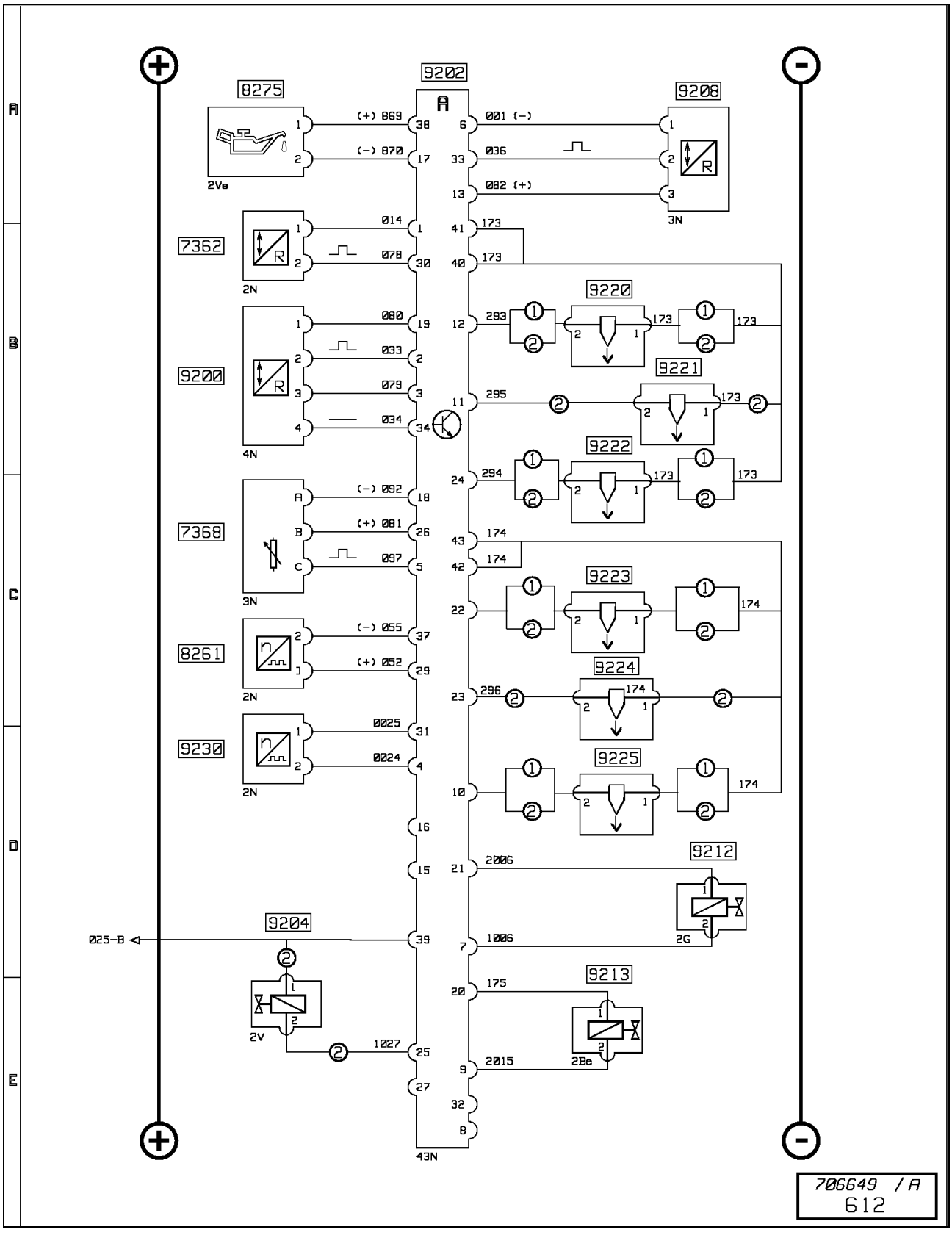


Engine electronic management (1/2)

Key to appliances

Code N°	Name of function	Location
2267	Engine compartment engine stop control	A2c
2400	Fuel filter clogging pressure switch	C3c B3b
8150	Exhaust brake electrovalve	B3c
9202	Engine master ECU (EECU)	B3c

Engine electronic management (2/2)



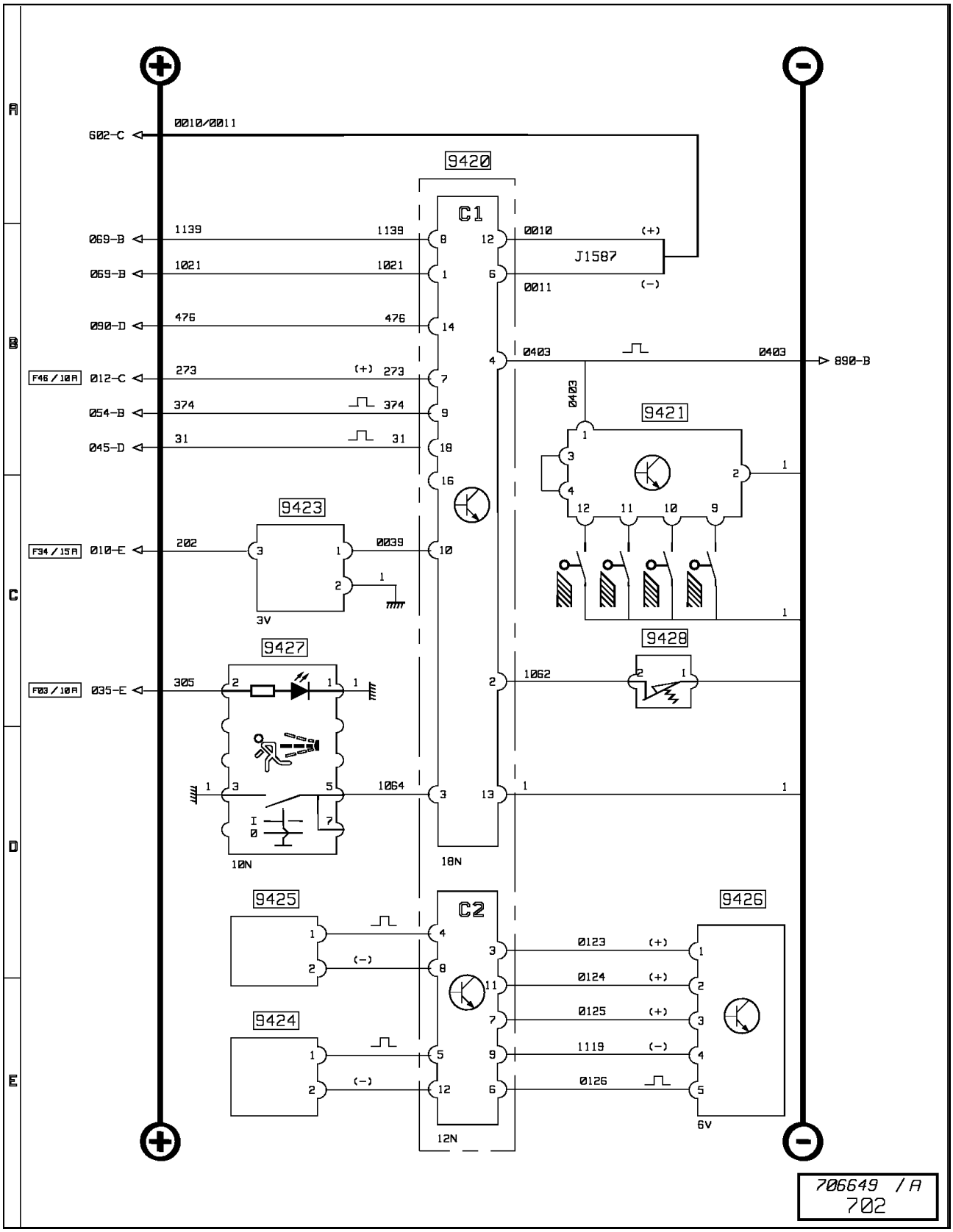
Engine electronic management (2/2)

Key to appliances

Code N°	Name of function	Location
7362	Coolant temperature sensor	B3c
7368	Oil pressure sensor	B3c
8261	Engine speed sensor	B3c
8275	Engine oil level sensor	B3d
9200	Boost air pressure and temperature sensor	B3c
9202	Engine master ECU (EECU)	B3c
9204	"EGR" electrovalve	B3c
9208	Fuel high pressure sensor	B3c
9212	High Pressure pump, solenoid valve cylinder	B3c
9213	High Pressure pump, solenoid valve cylinder	B3c
9220	Unit pump N°1 incorporating solenoid valve	B3c
9221	Unit pump N°2 incorporating solenoid valve	B3c
9222	Unit pump N°3 incorporating solenoid valve	B3c
9223	Unit pump N°4 incorporating solenoid valve	B3c
9224	Unit pump N°5 incorporating solenoid valve	B3c
9225	Unit pump N°6 incorporating solenoid valve	B3c
9230	Camshaft speed sensor	B3c

1: with engine **dCi4**
2: with engine **dCi6**
3: with "EGR" option

Alarm

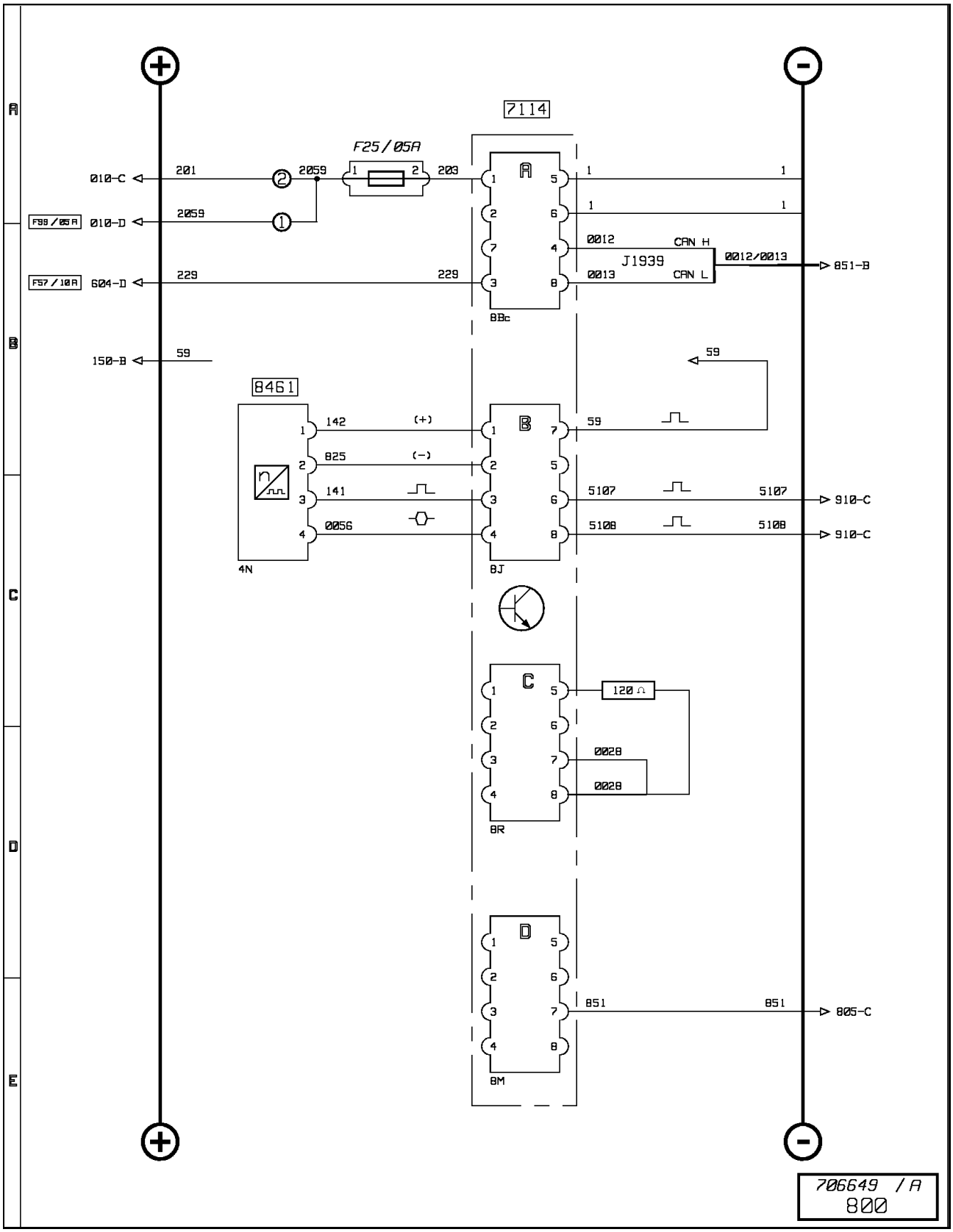

602-C
0010/0011
9420
C1
069-B
1139
069-B
1021
090-D
476
F46/10A
012-C
273
054-B
374
045-D
31
J1587
0010
(+)
0011
(-)
0403
890-B
9421
9423
F34/15A
010-E
202
0039
3V
9427
F03/10A
035-E
305
1064
10N
9428
1062
18N
9425
9424
C2
0123
0124
0125
1119
0126
9426
6V
12N
706649 /A
702

Alarm

Key to appliances

Code N°	Name of function	Location
9420	Anti-theft alarm ECU	C2a
9421	Rigid perimeter detection module	C2a
9423	Anti-theft alarm buzzer	A1d
9424	Ultrasonic transmitter	C2a
9425	Ultrasonic receiver	B2b
9426	Truck combination monitoring module	B2b
9427	Anti-aggression control	B2b
9428	Front grille closed position sensor	A1c

Tachograph


7114
F25/05A
010-C
201
2059
203
F98/05A
010-D
2059
F57/10A
604-D
229
229
150-B
59
8461
142
(+)
825
(-)
141
0056
4N
8Bc
8J
8R
8M
0012
CAN H
J1939
0013
CAN L
0012/0013
851-B
59
5107
5107
910-C
5108
5108
910-C
120 Ω
0028
0028
851
851
805-C
706649 /A
800

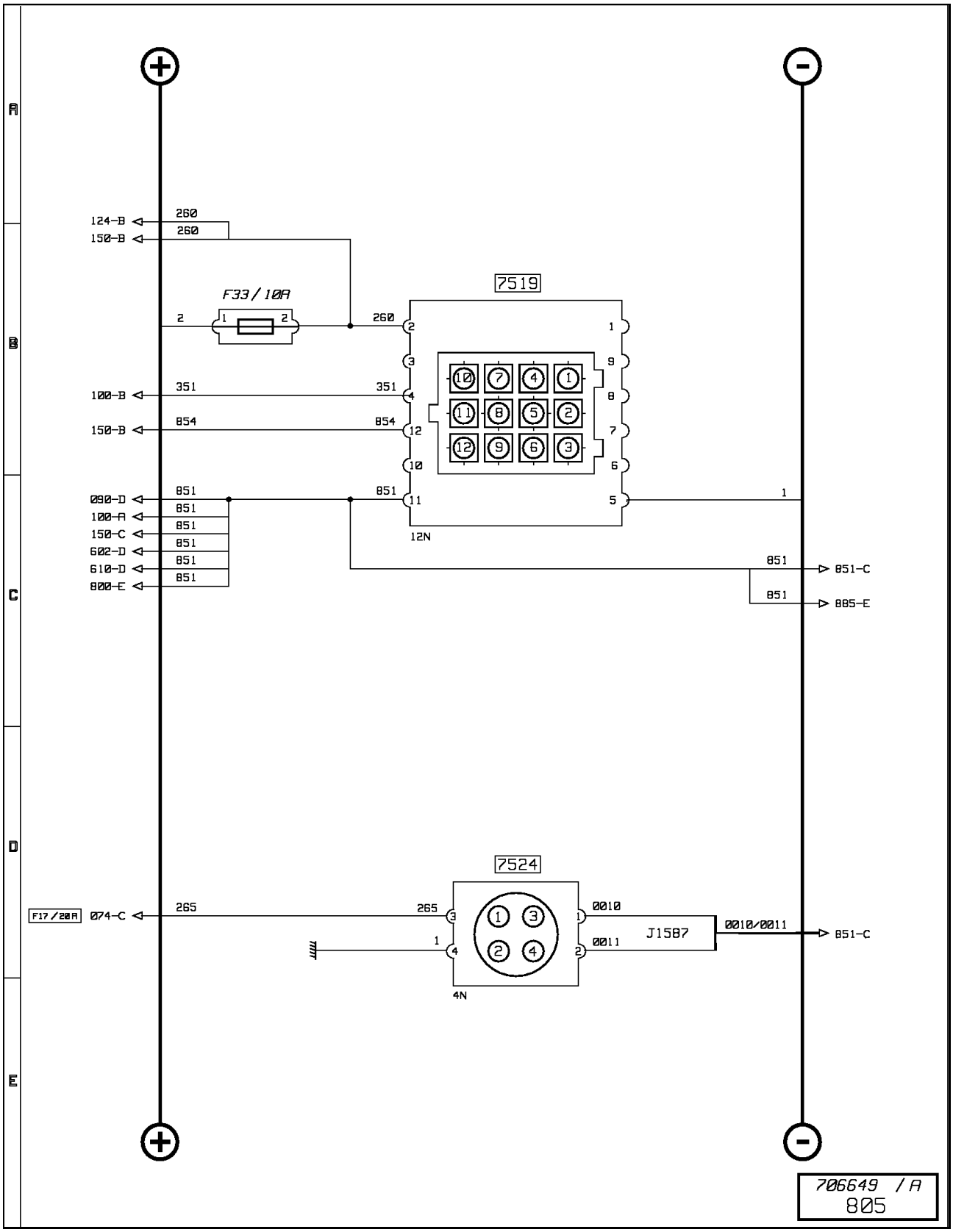
Tachograph

Key to appliances

Code N°	Name of function	Location
7114	Electronic tachograph	C2b
8461	Vehicle speed sensor	B4d

1: with "ADR" equipment
2: without "ADR" equipment

Diagnostics socket

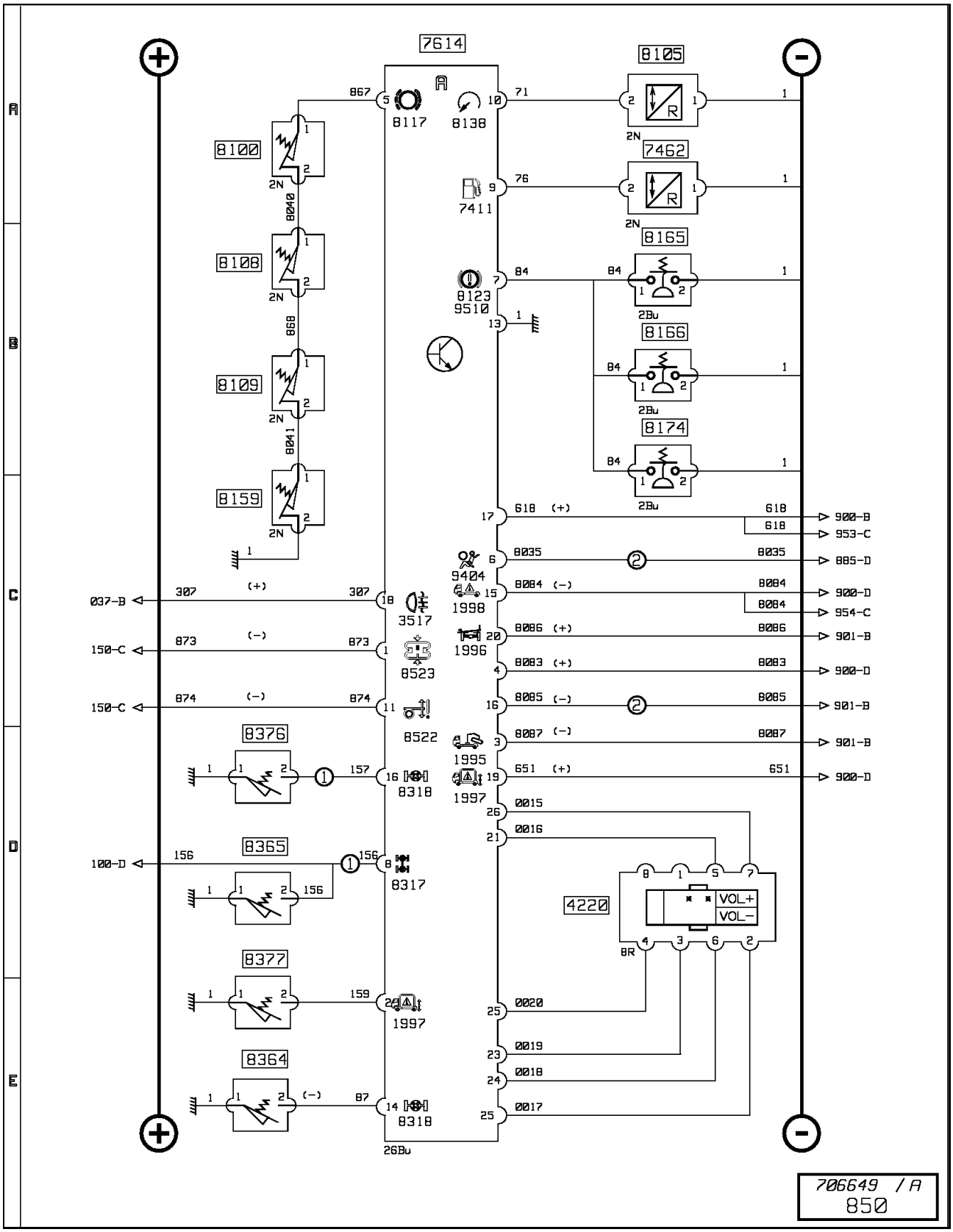


Diagnostics socket

Key to appliances

Code N°	Name of function	Location
7519	Diagnostics socket	C3c
7524	"SAE" diagnostic socket	C3c

Principal display (1/2)

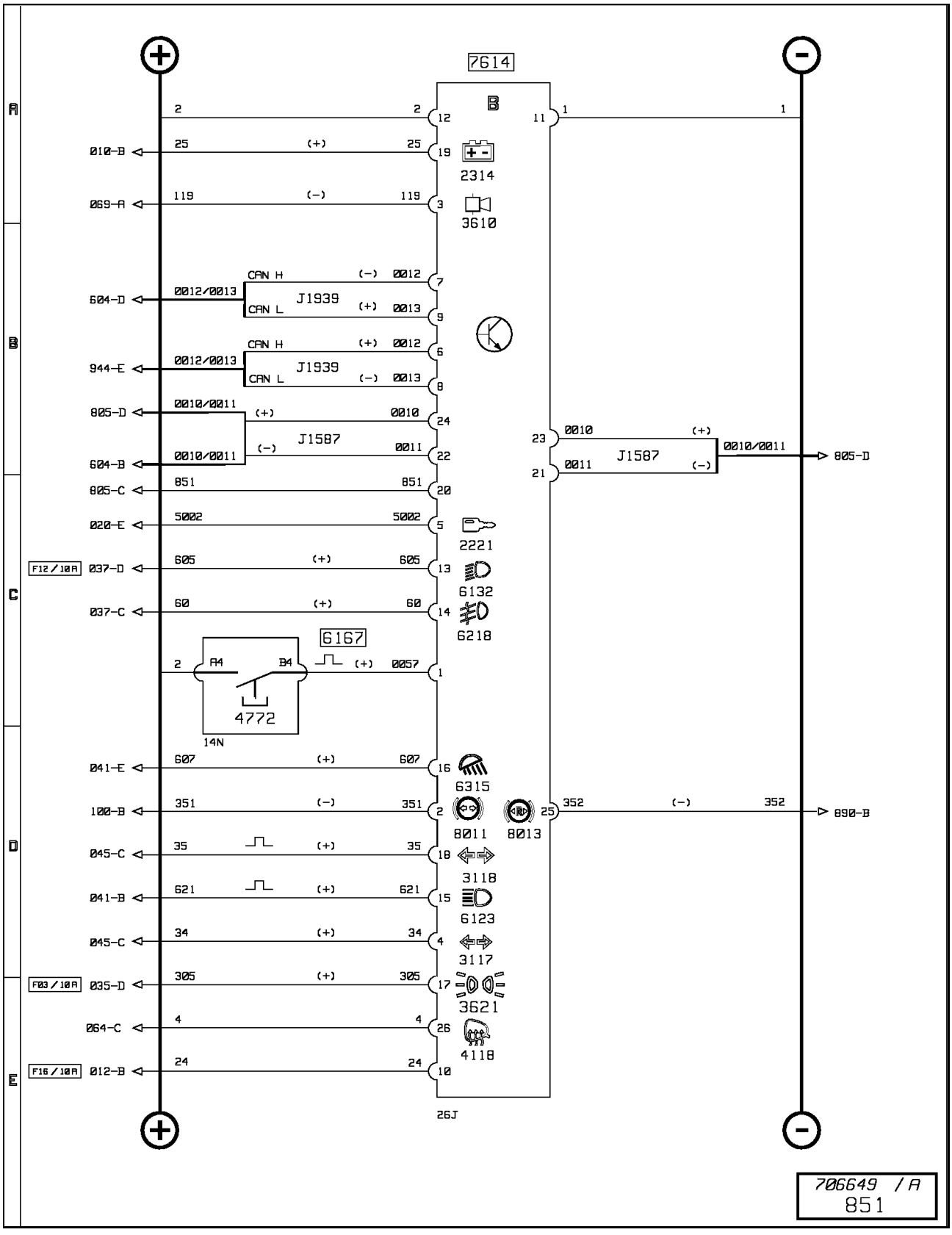


Principal display (1/2)

Key to appliances

Code N°	Name of function	Location
1833	Available power supply (equipment "working" position "ALERT" warning lamp)	C2b
1995	Tipper raised "ALERT" warning lamp	C2b
1996	Sideboard open "ALERT" warning lamp	C2b
1997	Handrail folded "INFORMATION" warning lamp	C2b
1998	Work position equipment "ALERT" warning lamp	C2b
3517	Fog light(s) warning lamp	C2b
4220	Radio remote control	C2b
7411	Fuel level gauge	C2b
7462	Fuel level transmitter	A5c / C6c
7614	Principal display	A2b
8100	LH front brake pads wear switch sensor	C3d
8105	Rear air pressure transmitter	C5d
8108	RH front brake pads wear switch sensor	A3d
8109	LH rear brake pads wear switch sensor	A7d
8117	Brake lining wear warning lamp	C2b
8123	Air pressure alert warning lamp	C2b
8138	Brakes air pressure gauge	C2b
8159	RH rear brake pads wear switch sensor	C7d
8165	Rear brakes air pressure switch	C5d
8166	Front brakes air pressure switch	C5d
8174	Parking or trailer brake air pressure sensor	C5d
8317	Inter-axle differential lock warning lamp	C2b
8318	Inter-wheel differential lock warning lamp	C2b
8364	Inter-wheel differential lock switch	B7d B8d
8365	Inter axle diff. lock position sensor	B7d / B8d
8376	Front drive axle diff. lock position sensor	B3d
8377	Transfer box low speed position sensor	B4c
8522	Suspension information warning lamp	C2b
8523	Suspension alert warning lamp	C2b
9404	Airbag test and fault "Information" warning lamp	C2b
9510	Truck combination braking "ALERT" warning lamp	C2b

Principal display (2/2)

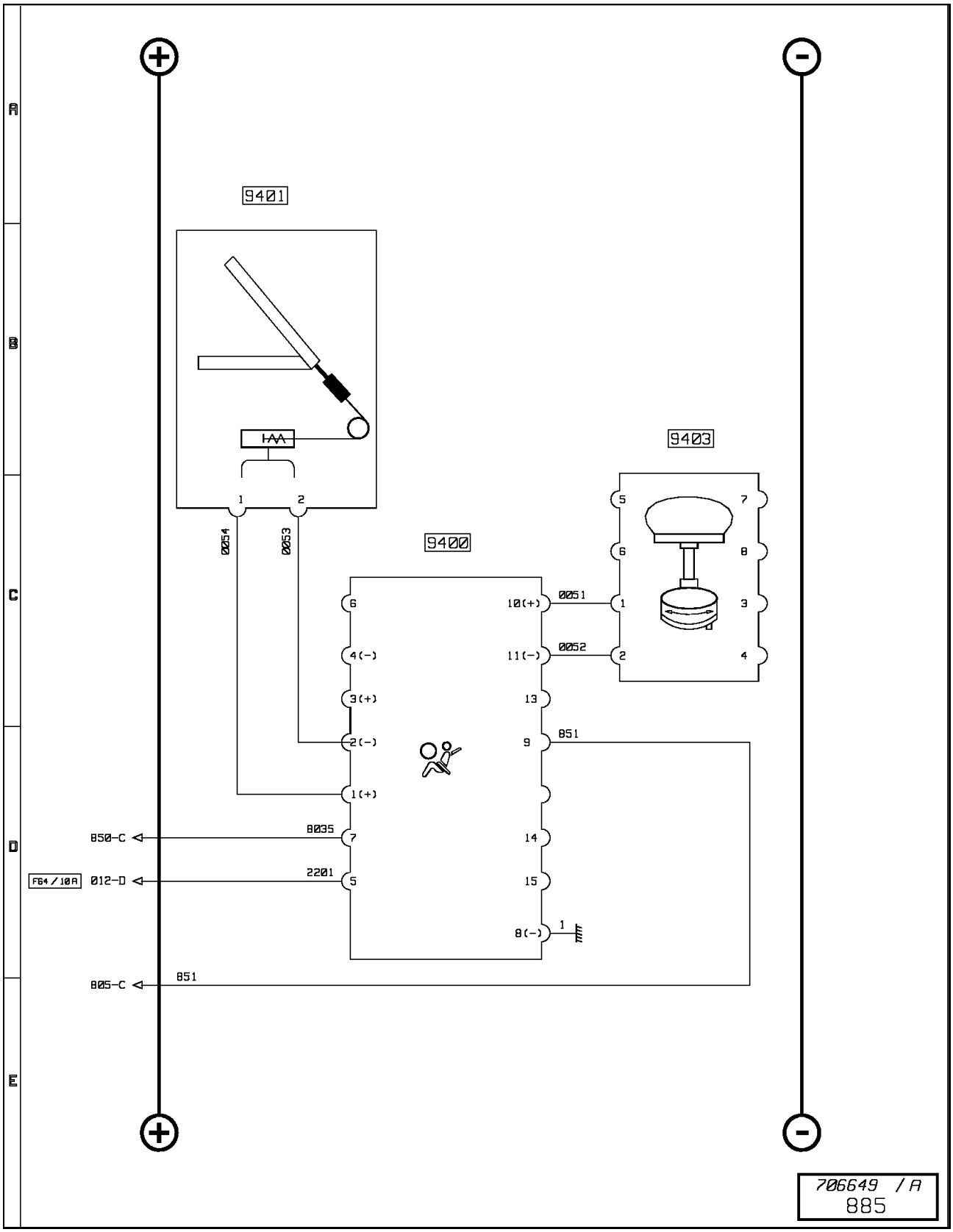


Principal display (2/2)

Key to appliances

Code N°	Name of function	Location
2221	Electronic anti-theft "Information" warning lamp	C2b
2314	Battery charge warning lamp	C2b
3117	Rigid or tractor flasher repeater lamp	C2b
3118	Trailer flasher repeater lamp	C2b
3610	Lights forgotten alarm	C2b
3621	Side/parking lights warning lamp	C2b
4118	Defrosting rearview mirrors warning lamp	C2b
4772	Display scrolling menu control	C2b
6123	Main beam headlights warning lamp	C2b
6132	Dipped beam headlights warning lamp	C2b
6167	Steering column fingertip controls	C2b
6218	Fog driving lights warning lamp	C2b
6315	Working floodlight warning lamp	C2b
7614	Principal display	C2b
8011	ABS safety warning lamp	C2b
8013	Trailer ABS safety warning lamp	C2b

Seat belt pretensioner

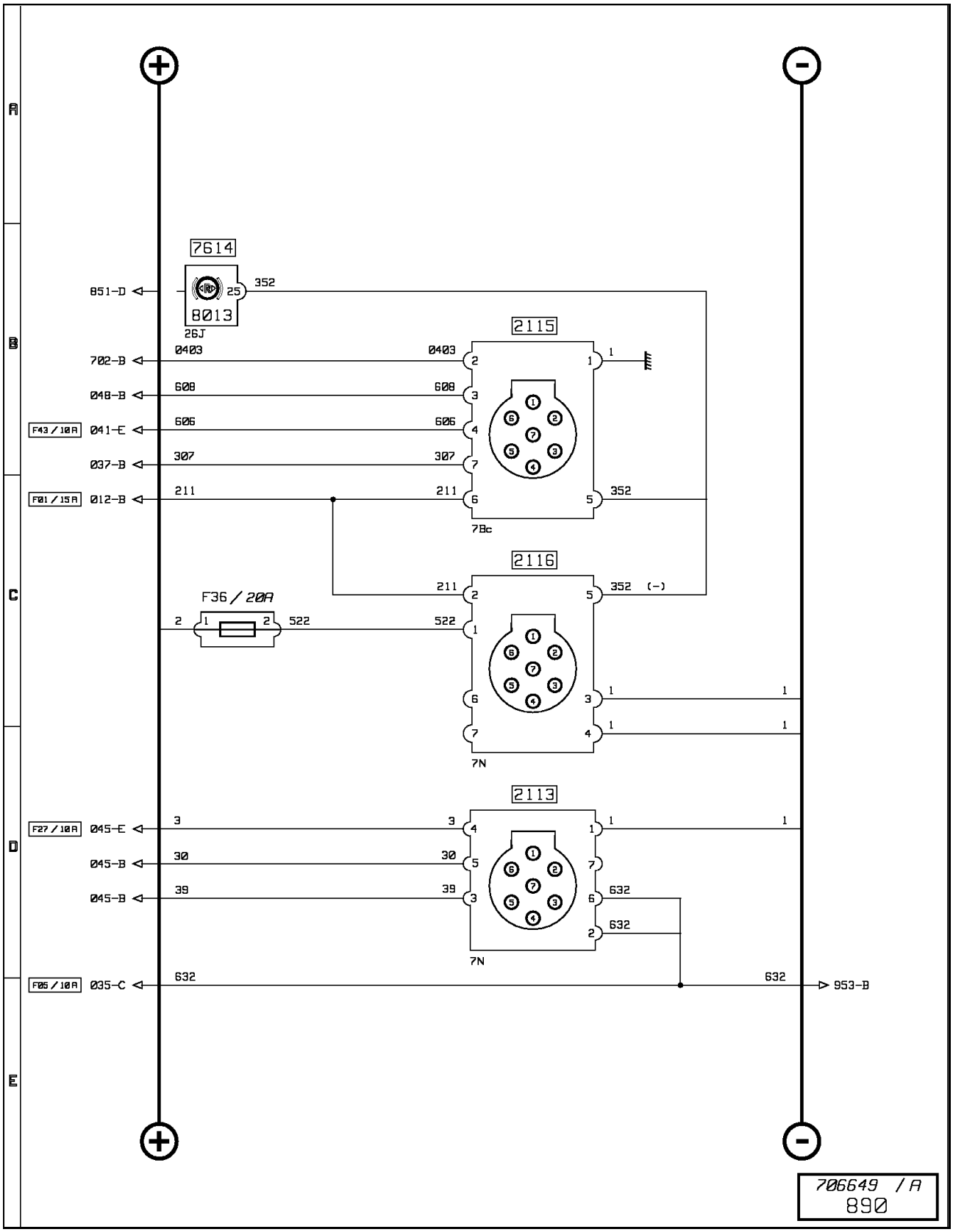


Seat belt pretensioner

Key to appliances

Code N°	Name of function	Location
9400	Airbag ECU	B3d
9401	Driver's seat belt pretensioner	B3c
9403	Airbag rotary switch	C2b

Trailer sockets

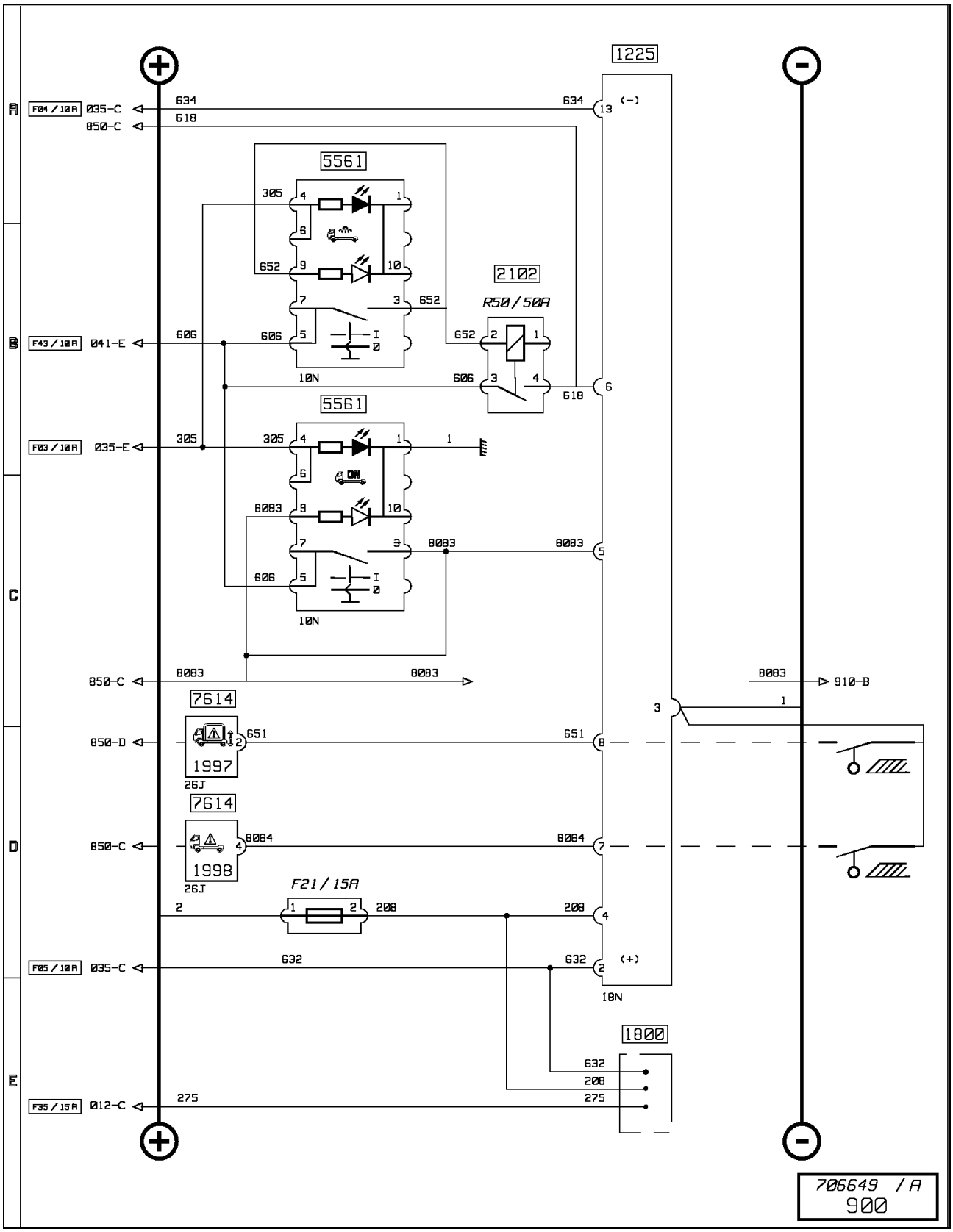


Trailer sockets

Key to appliances

Code N°	Name of function	Location
2113	Trailer socket, 7-pin type 24 N	B9d
2115	Trailer socket, 7-pin type 24 S	B9d
2116	"ABS / EBS" 7-pin trailer socket	B9d
7614	Principal display	B2c
8013	Trailer ABS safety warning lamp	B2c

Available power supplies (1/2)

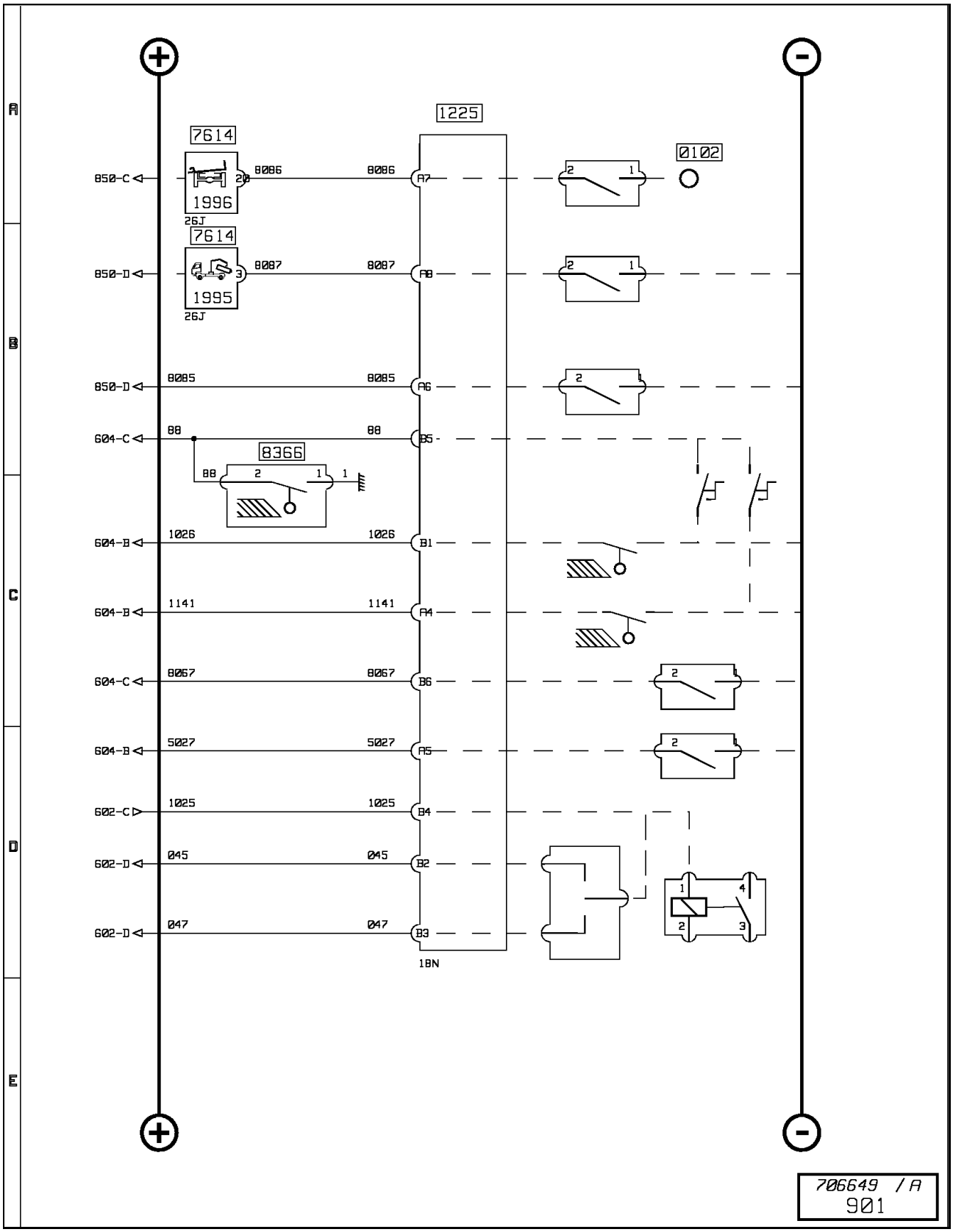


Available power supplies (1/2)

Key to appliances

Code N°	Name of function	Location
1225	Chassis cab junction box	A1c
1800	Available power supply (insulated wires cut)	A2c
1997	Handrail folded "INFORMATION" warning lamp	C2b
1998	Work position equipment "ALERT" warning lamp	C2b
2102	Bodybuilder equipment available power supply relay	A2c
5561	Valves lighting control	C2a
7614	Principal display	C2b

Available power supplies (2/2)

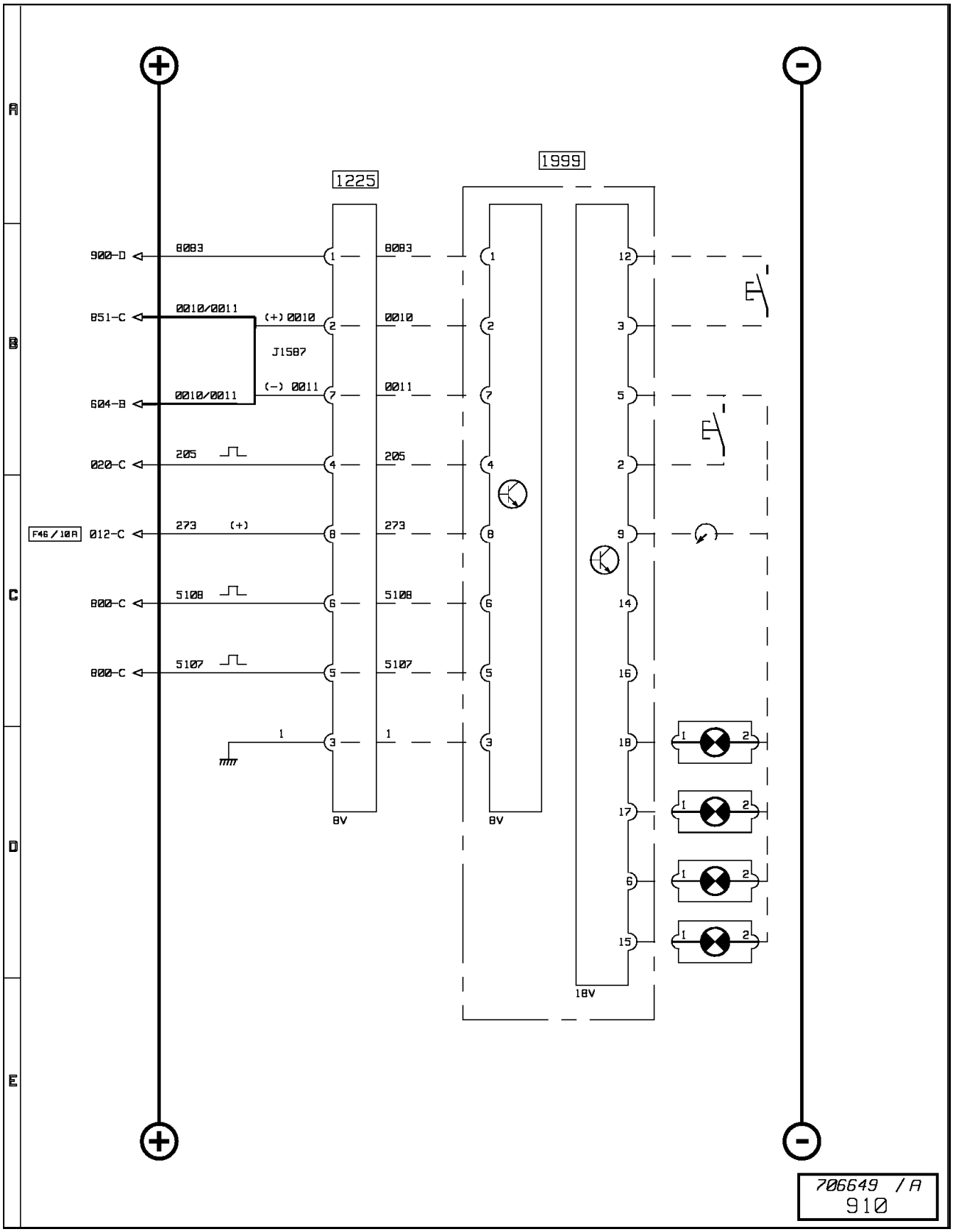


Available power supplies (2/2)

Key to appliances

Code N°	Name of function	Location
0102	Electrical connection terminal	C4d
1225	Chassis cab junction box	A1c
1995	Tipper raised "ALERT" warning lamp	C2b
1996	Sideboard open "ALERT" warning lamp	C2b
7614	Principal display	C2b
8366	Power take-off position sensor	B4d

ECU "CECU"

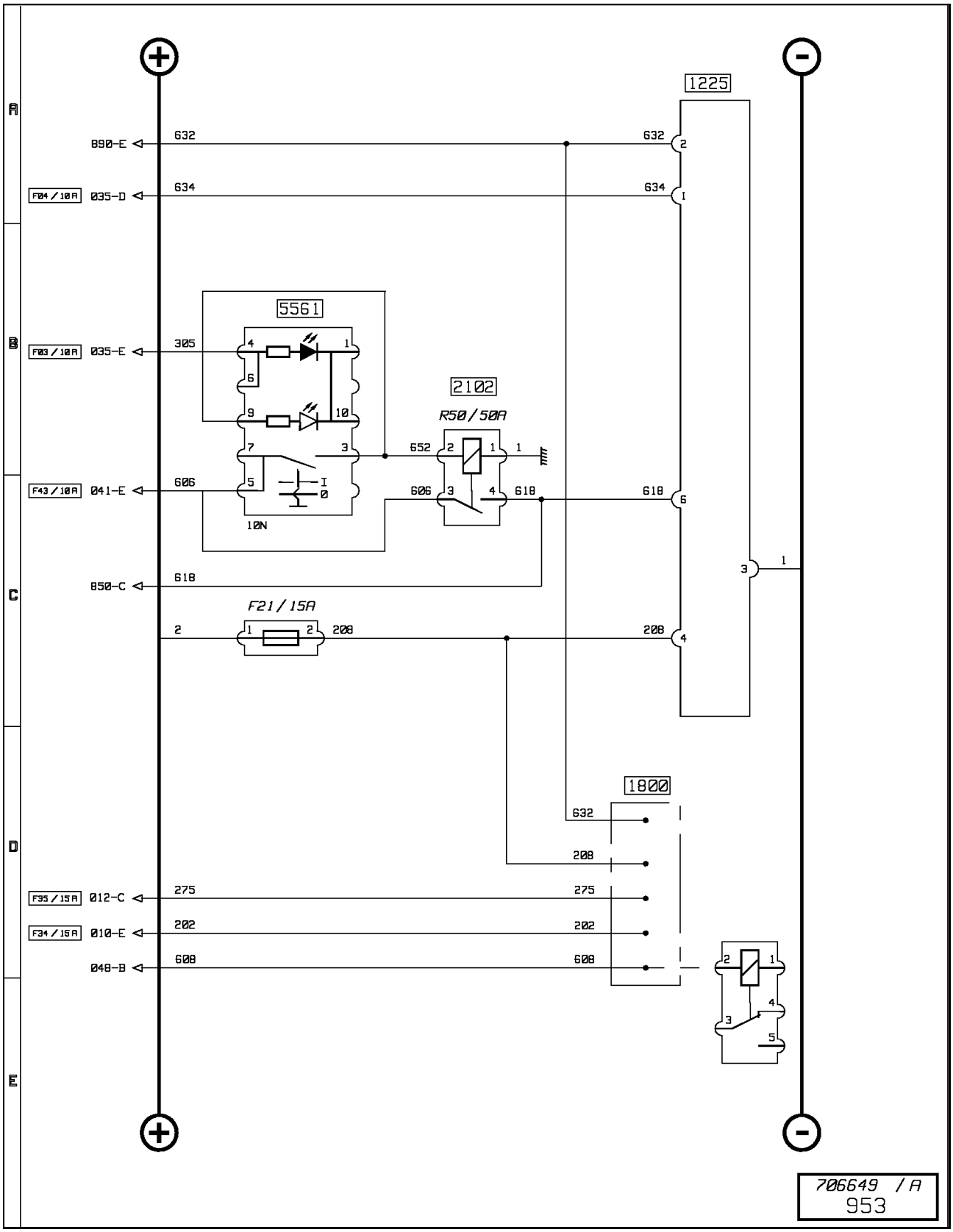

1225
1999
900-D
851-C
804-B
020-C
F46/10A
012-C
800-C
800-C
8083
0010/0011
(+) 0010
J1587
(-) 0011
0010/0011
205
273
(+)
5108
5107
1
8V
8V
18V
706649 /A
910

ECU "CECU"

Key to appliances

Code N°	Name of function	Location
1225	Chassis cab junction box	A1c
1999	ECU for bodybuilder pre-arrangement	A2c

Available power supplies ("RCV" specificity) (1/2)

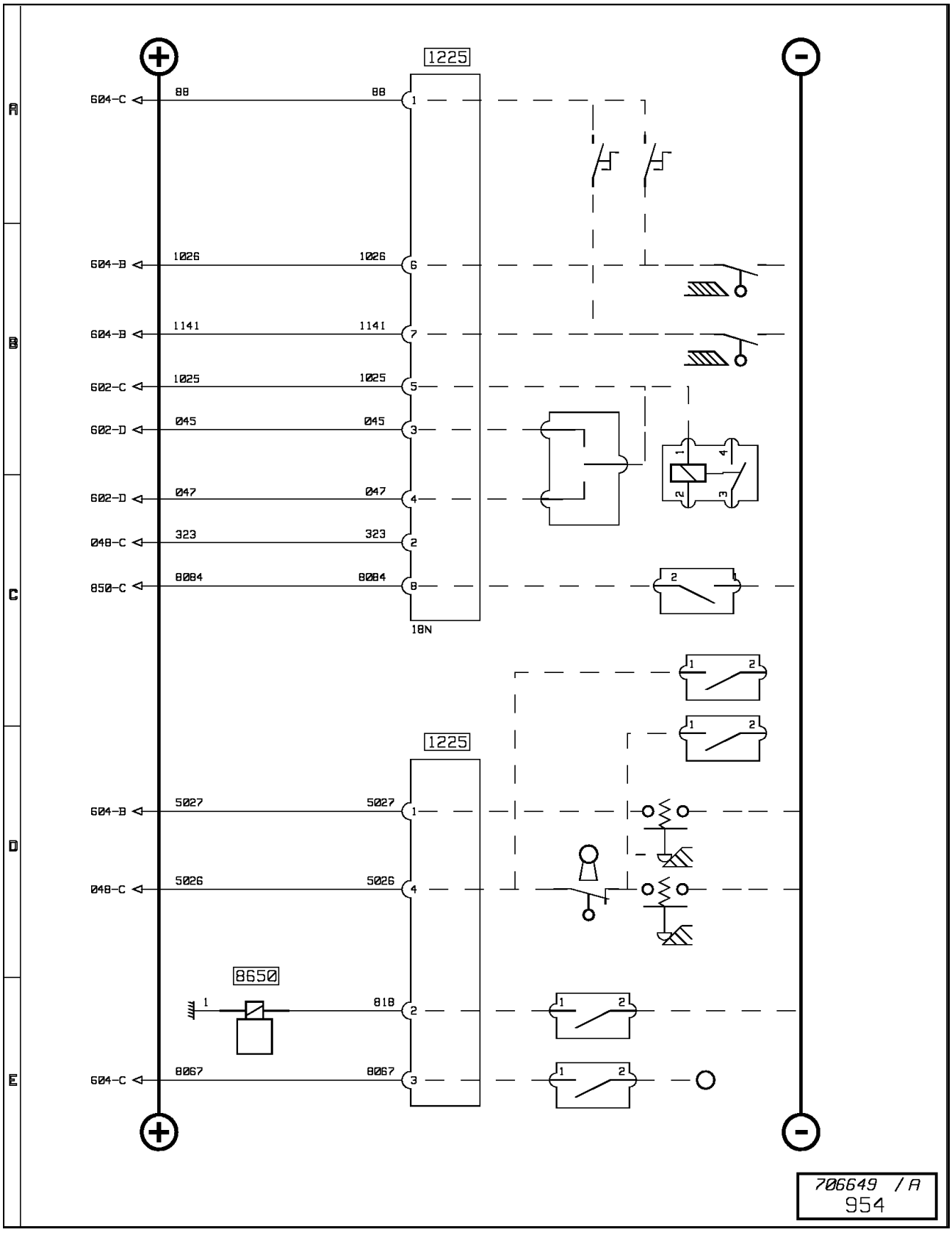


Available power supplies ("RCV" specificity) (1/2)

Key to appliances

Code N°	Name of function	Location
1225	Chassis cab junction box	A1c
1800	Available power supply (insulated wires cut)	A2c
2102	Bodybuilder equipment available power supply relay	A2c
5561	Valves lighting control	C2b

Available power supplies ("RCV" specificity) (2/2)



Available power supplies ("RCV" specificity) (2/2)

Key to appliances

Code N°	Name of function	Location
1225	Chassis cab junction box	A1c
8650	Automatic gearbox PTO solenoid valve	B4c

DEALER NETWORK AND CUSTOMER FOLLOW-UP

Customer services liaison

Our ambition is to give you access - you who work on diagnostics, repairs and maintenance (using documents issued by the After-Sales Department) - to information that is as exact and accurate as possible.
By giving us our opinion, by informing us on divergences found between what is written in this manual and what exists on the vehicle or major unit concerned, by letting us have your suggestions and sharing your experience with us, you will contribute in helping us devise top quality technical documentation.
You can write down your remarks and suggestions on a copy of this information sheet or on plain paper and send them by fax or by mail to the address below.

Address:

After-Sales Technical Service Department
API: COM 00B 1 02
99, Route de Lyon
69806 - SAINT PRIEST Cedex
FRANCE

FAX: +33 (0)4 72 96 93 36

Concerns manual: .....

Opinion and suggestions:

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Divergences(s) noted:

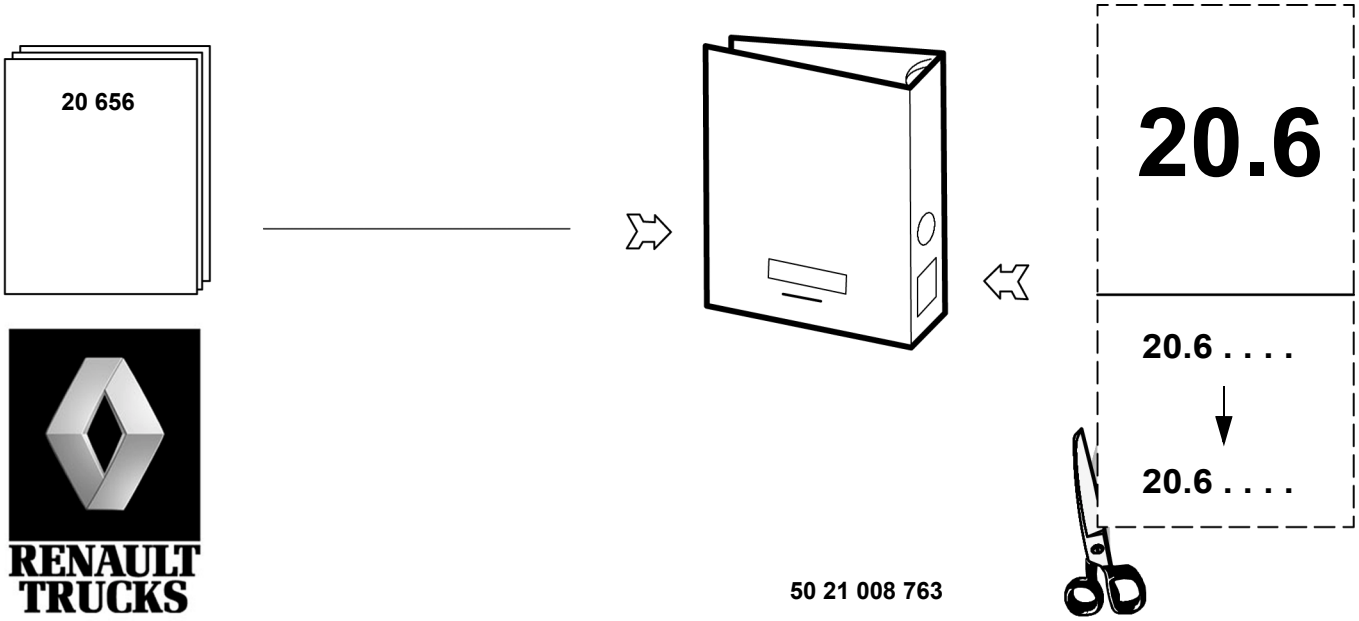
Pages	Description of problem

20 656 - GB - 08/2003

ENGINE

RANGE	FAMILY	VARIANT
MIDLUM	42B3 PR 17,5 4CYL	-
	44C1 PR 17,5 6CYL	
	44C2 PR 19,5 6CYL	
	44V P 4/6CYL	

The above information may change in the course of time. Only the "Consult" section of the workshop manuals repertory in standard N° 10320 serves as reference.



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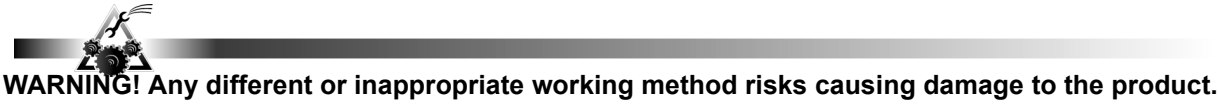
GENERALITIES

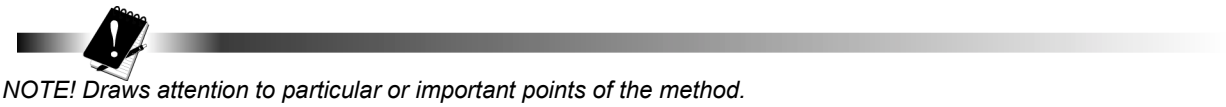
Warnings

In this document, safety instructions are symbolized as follows:

DANGER! NON-OBSERVANCE OF THE PROCEDURE DESCRIBED OR LACK OF CARE OR ATTENTION RISK CAUSING SERIOUS INJURY OR EVEN DEATH.



WARNING! Any different or inappropriate working method risks causing damage to the product.



NOTE! Draws attention to particular or important points of the method.

Environment

Comply with the regulations in force relative to the recovery and treatment of used parts and waste.

Conventional symbols

Fitting

	Tighten to torque (Nm) (left-hand thread)		Tighten by indicated value
	Tighten to torque (Nm) (right-hand thread)		Loosen by indicated value
	Tightening torque with lubricated threaded hardware		

Dimensioning

	Tightening		... Greater than or equal to ...
	Equal to		Wear limit
	... Less than ...		Machining limit or dimension
	... Greater than ...		Maximum out-of-true
	... Less than or equal to ...		Maximum parallelism error

Repair

	Force to be exerted in the direction shown (hammer - press)		Smear or coat (see "Consumables" table)
	Heat or cool: Temperature in degrees Celsius (e.g. + 80 °C)		Fill to level (see "Technical Data" and "Consumables" table)
	Weld bead		Grease or oil (see "Consumables" table)
	Repair time - Heating time		Mark - Assemble according to marking

Adjustment

	Rotating friction torque		Turn anti-clockwise
	Turn in alternate directions		Turn anti-clockwise (the figure shows the number of turns)
	Turn clockwise		Turn clockwise (the figure shows the number of turns)
	Place in contact		Move in the direction shown
	Dimension to be assured (mm)		

Various information

	Exhaust - Outlet		Operation with a sequence
	Intake - Inlet		Involves
	Weight in kg (example: 275 kg)		Return to numbered operation - Connected with numbered operation
	Depending on versions or options		Withdraw - Delete
	Wrong		Direction of disassembly (the arrow shows the direction)
	Correct		Direction of assembly (the arrow shows the direction)
	Injection		... to ...
	Repair dimension		Inspect - Check condition of part
	Part to be replaced		Danger for persons, vehicle or equipment

General instructions

Practical advice
Prior to any work:
- Clean the major unit and its surrounds (See Driving Servicing Handbook, "Vehicle washing").
- Ensure the batteries are disconnected.
- Mark the pipes and wiring harnesses, if necessary.
- Protect all ports to prevent the ingress of foreign matter.
- Before disconnecting an air pipe, drop the circuit pressure.
- If liquid is splashed onto the bodywork, clean quickly with a cleaning product recommended by RENAULT TRUCKS.

Preparation prior to assembly:
Carefully clean and check all the parts.
Do not unpack a new bearing until you are ready to install it. Do not clean off the protective grease on new bearings.
Old seals and lock-plates must be discarded and new ones fitted.
Never force fit parts with copper or brass punches or drifts. Always use a specially adapted driver to prevent ingress of metal particles into the casings and bearings. Always oil parts prior to force fitting.
Always apply grease on the inside of seal ring lips.
Shrink fitted parts are to be heated with a hot air blower or in an oven. etc. Flame heating is strictly forbidden.

When using a torque multiplier, calibrate the torque wrench/multiplier unit at the required torque loading.

Fastening, locking, sealing and adhesive products:
Prior to assembly, carefully clean the product application surfaces of the parts. Old product residue is to be removed. Threaded portions are to be brushed, tapped and, if necessary, cleaned with a suitable product.
Using the product:
Always adapt the recommended product while observing the utilization conditions appearing on the pack:
- Surface finish,
- Working temperature,
- Reaction, drying, etc. time,
- Shelf life.

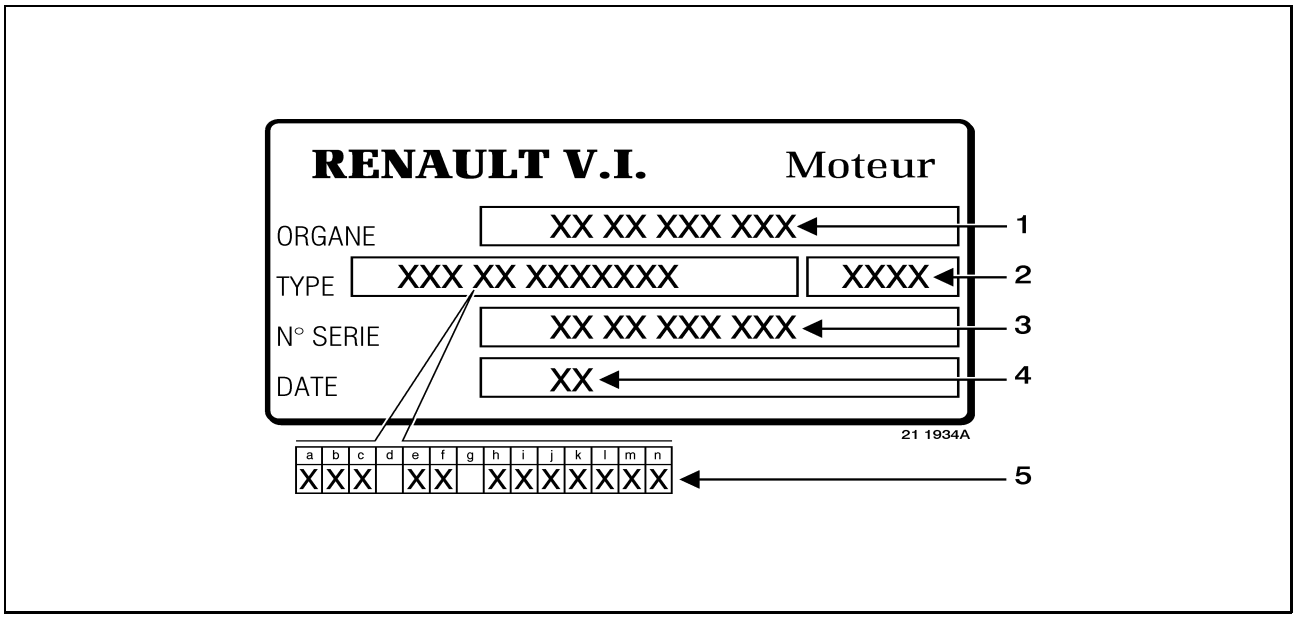
Observe the assembly method so as to guarantee the quality of the repair.

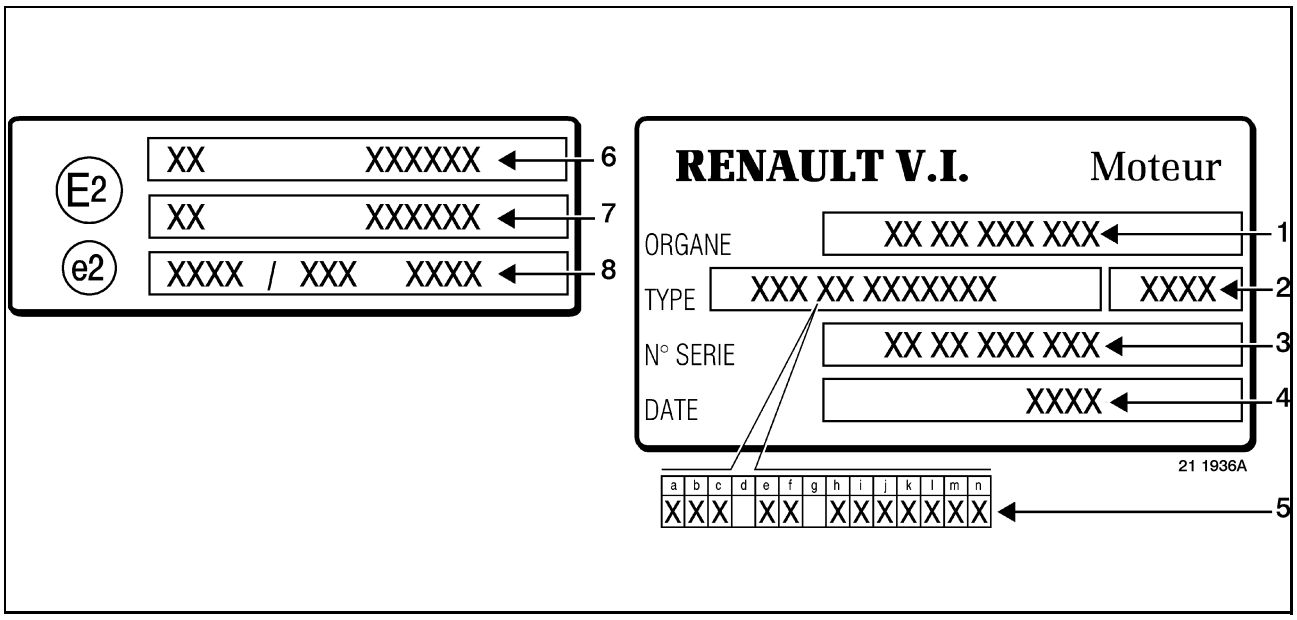
TECHNICAL DATA

General features

Identification plate (EEC origin engine)

Depending on the vehicle's equipment.





- **1**: Spare parts reference N°
- **2**: Family N°
- **3**: Manufacturing serial N°
- **4**: Manufacturing date
- **5**: Engine type (see "Symbolization")
- **6**: Power rating
- **7**: Smoke
- **8**: Emissions

Service exchange engine
To identify service exchange engines: see Spare Parts department technical comments.

Symbolization

a	**D**	Diesel
b	**C**	Common Rail
c	**I**	Injection
d		
e	**4**	Capacity: 11: 11 litres 6: 6 litres 4: 4 litres
f		
g		
h	**B** **C**	Power setting
i		
j		+: Multi-mode (several power ratings available) Blank space: Single-mode (one single power rating available)
k	**J**	Month of application of pollutant emissions regulation: A: January B: February C: March ..... L: December
l	**01** **99**	Year of application of pollutant emissions regulation: 00: 2000 01: 2001 02: 2002 .....
m		
n		Post-combustion equipment (particulate filter): Blank space or 0: without 1: with

General features

Power setting index	**CJ01-BJ01**
Cubic capacity	**4.118 l**
Bore	**102 mm**
Stroke	**126 mm**
Compression ratio	**16.5/1**
Firing order	**1.3.4.2**
n°1 cylinder:	**flywheel end**
Fuel:	**diesel fuel**
Lubrication:	**fully-forced by lobed gear pump**

Min. oil pressure at **85 C**
- at **600rpm: 1bar(s)**
- at **2400rpm: 3.5bar(s)**.

Cooling:
Circulating coolant activated by thermostat-regulated pump.

Beginning of opening:	**86 °C**
End of opening:	**96 °C**
Min. full opening dimension:	**7.9 mm**
Turbocharger	**SCHWITZER S200**

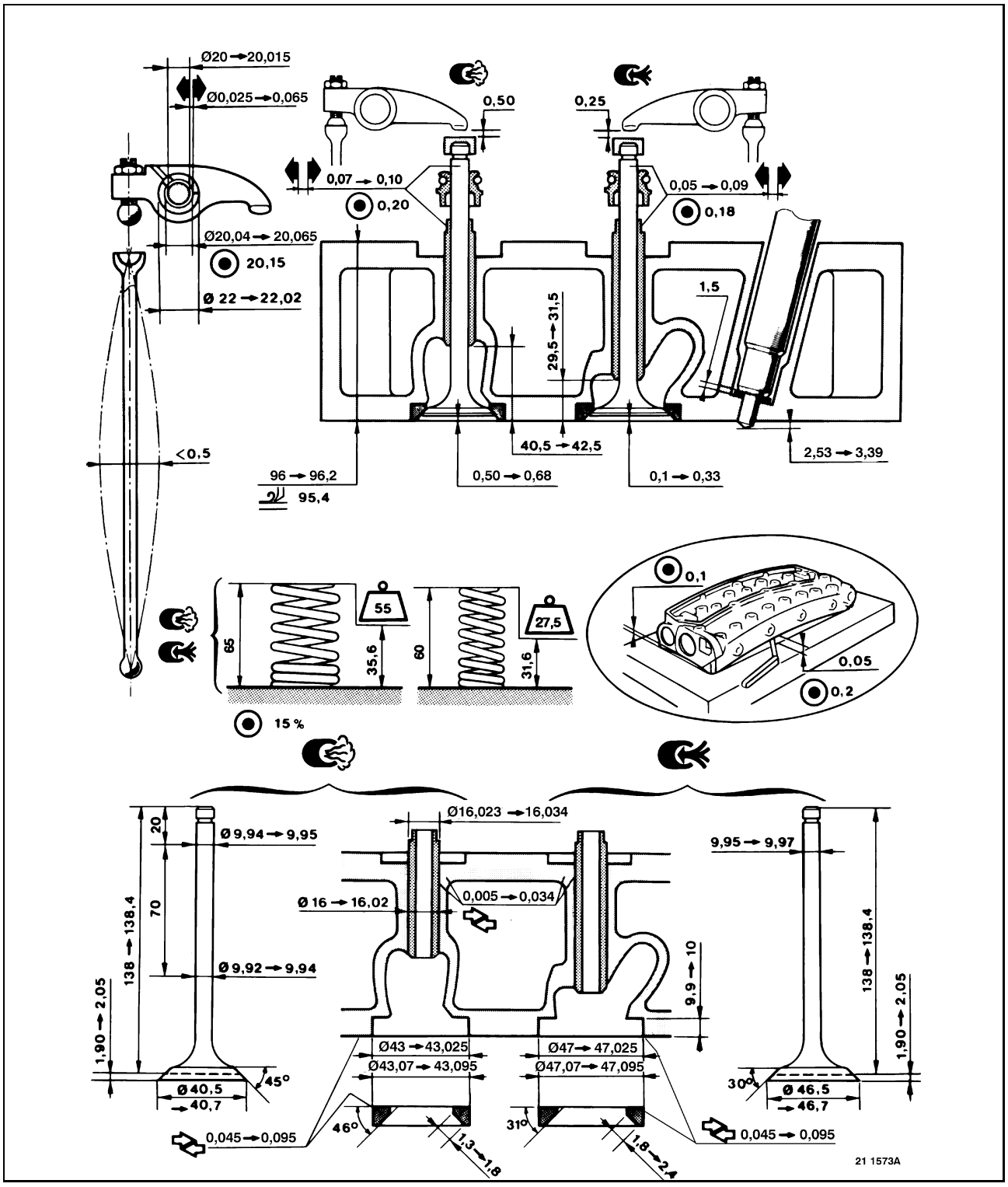
Weight

Undressed engine:	**440 Kg**

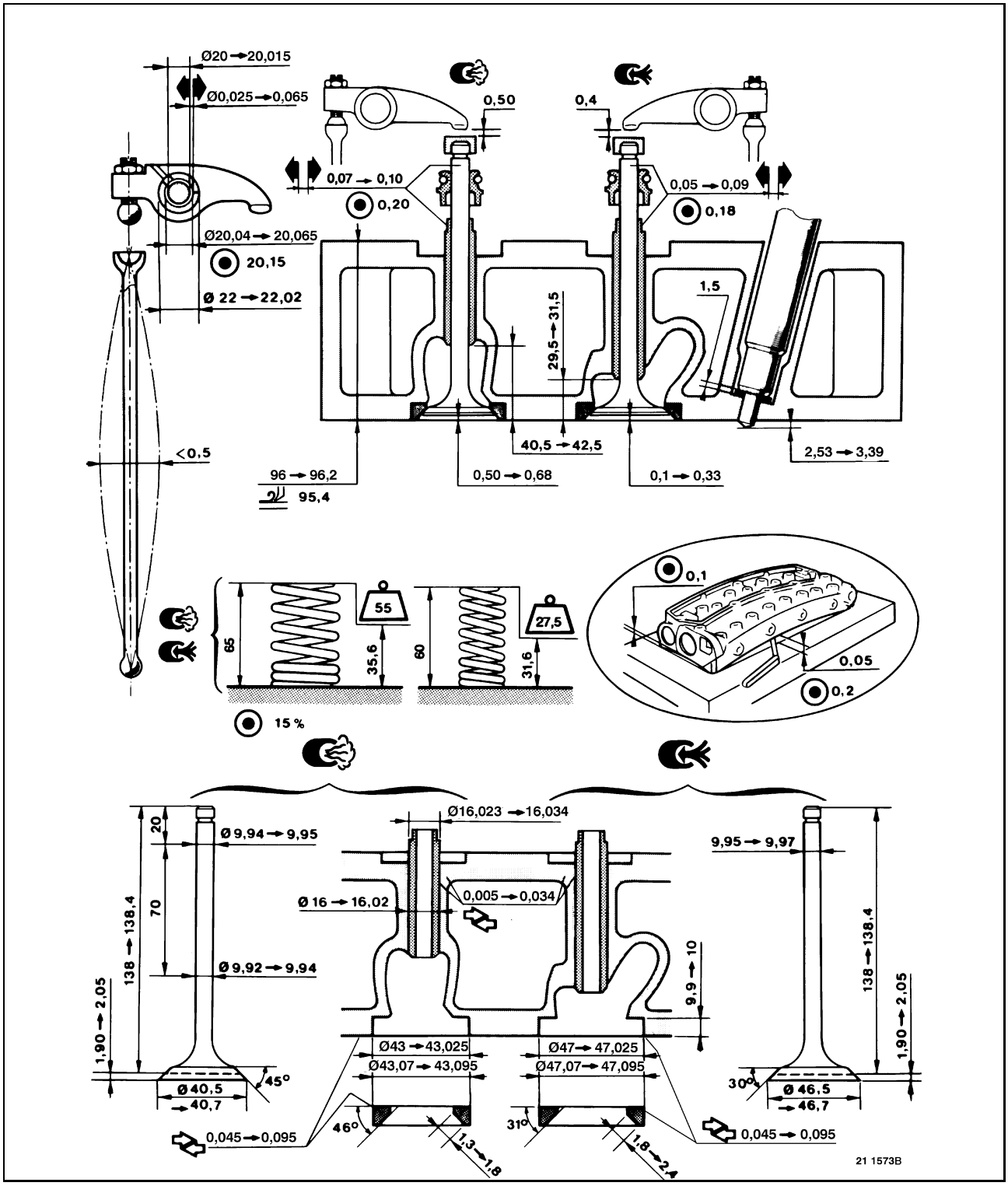
Dimensions and tolerances

Cylinder head

Up to engine **n° 543 370**.

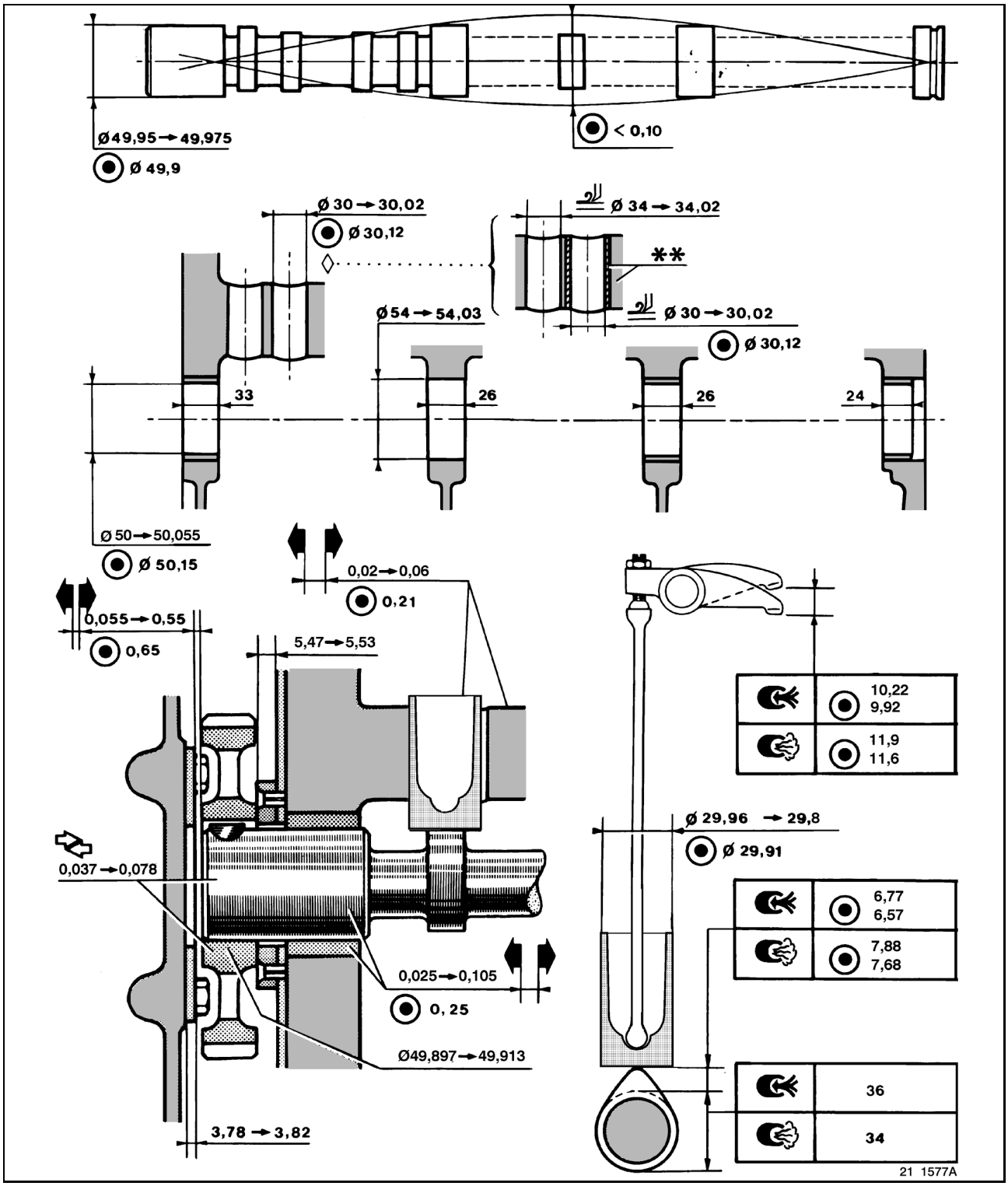


Since engine **n° 543 371**.

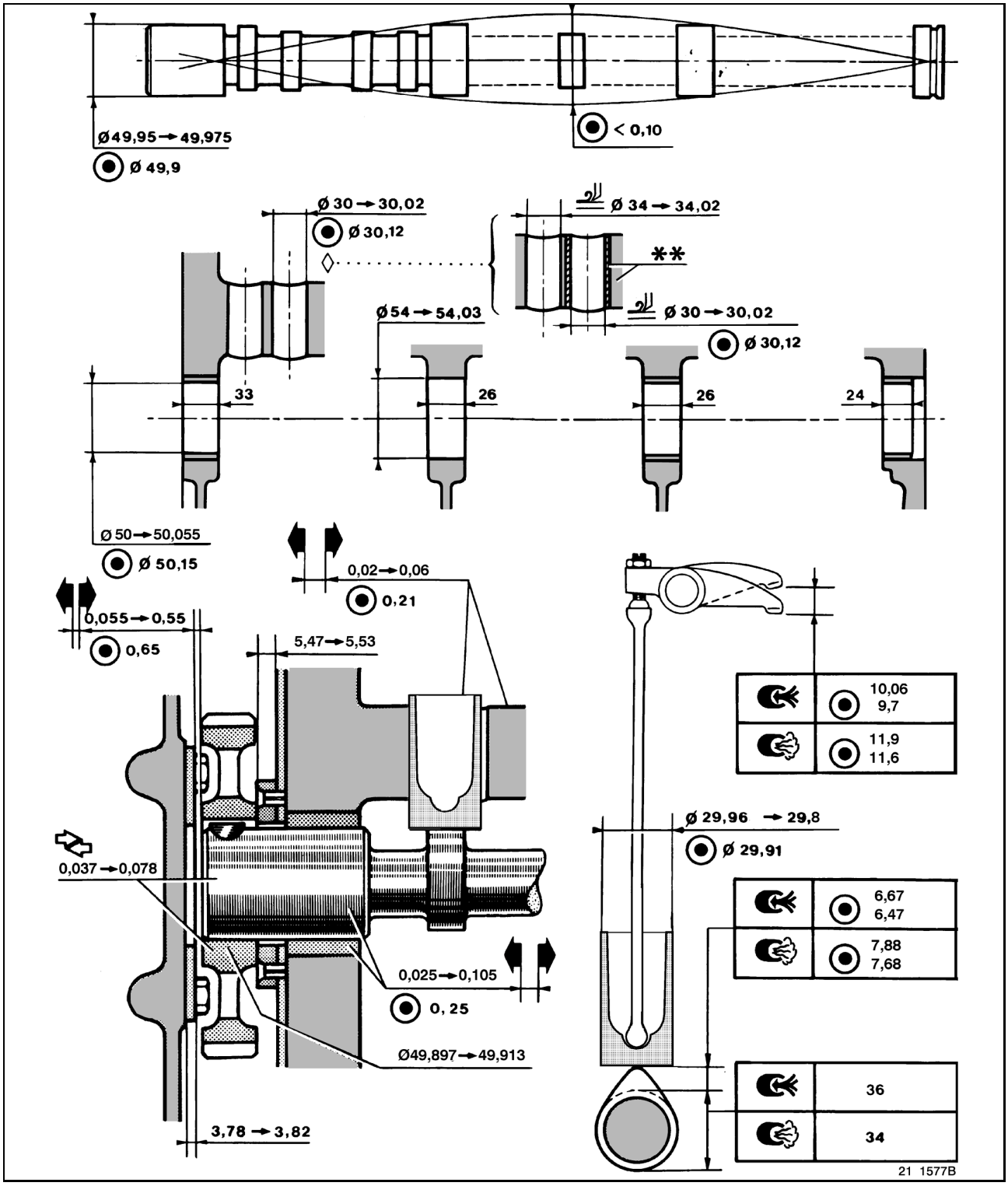


Timing

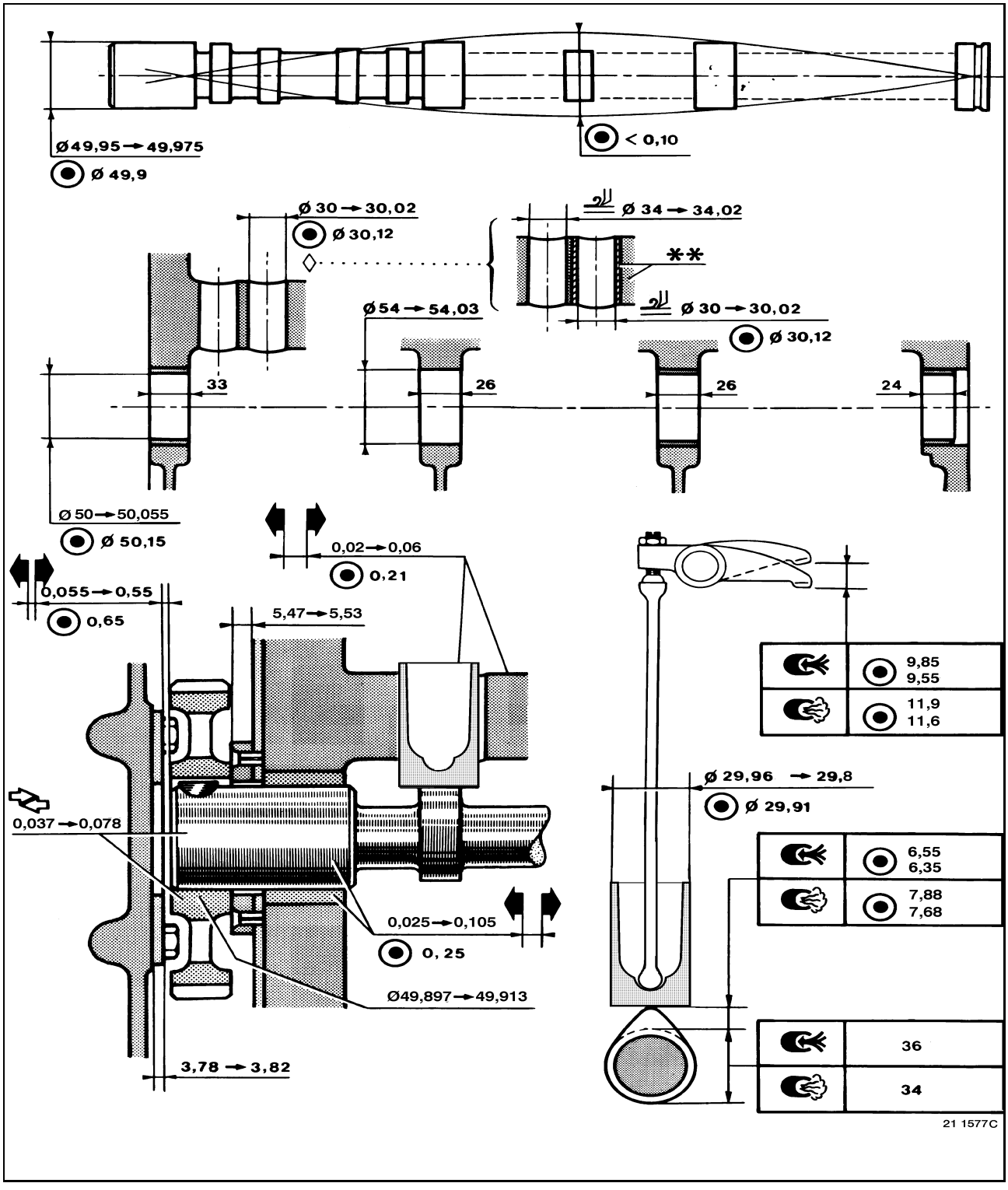
Up to engine **n° 496 850**.



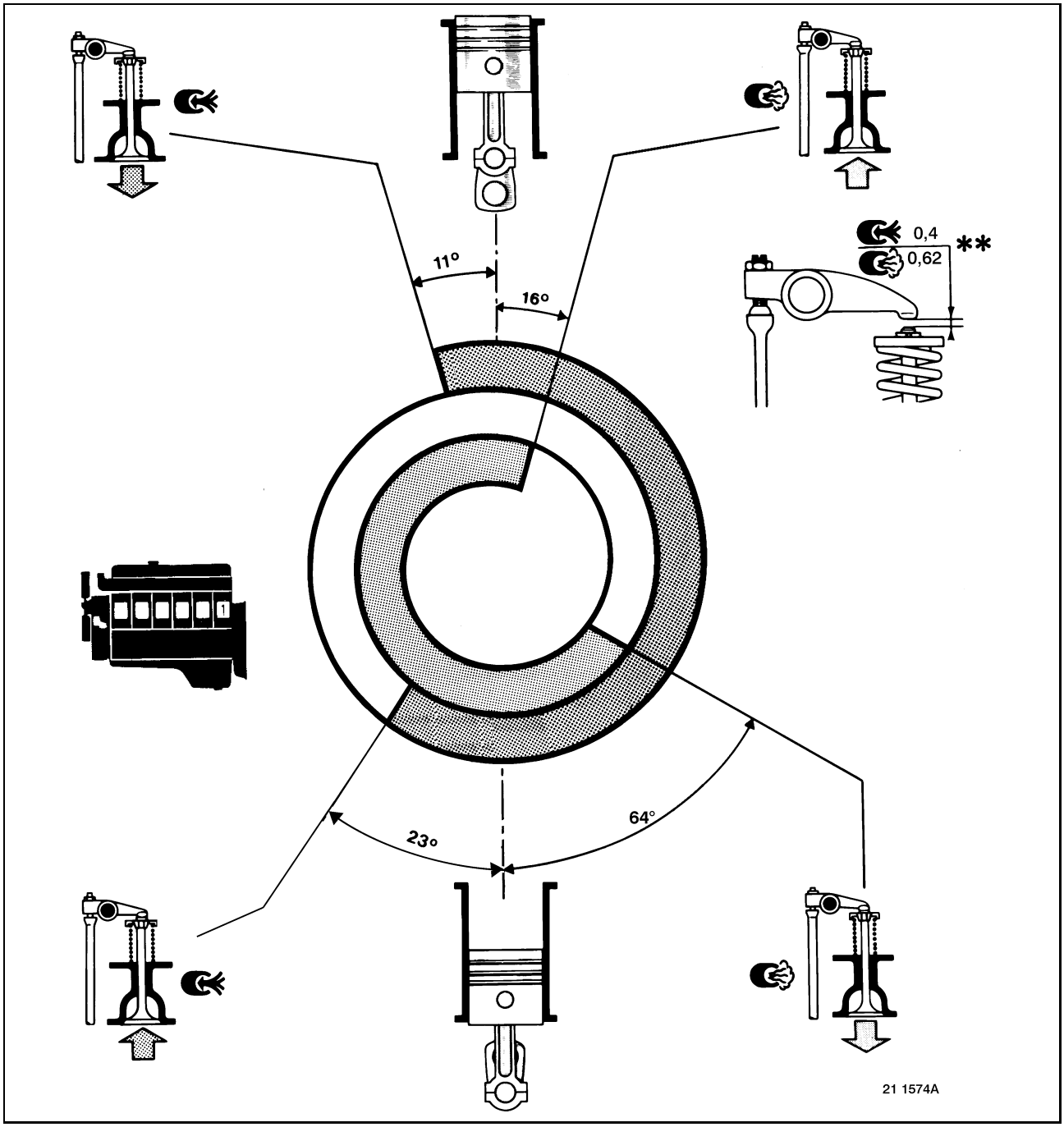
Since engine **n° 496 851** up to engine **n° 543 370**.



Since engine **n° 543 371**.



Up to engine **n° 543 370**.



Quick timing check:

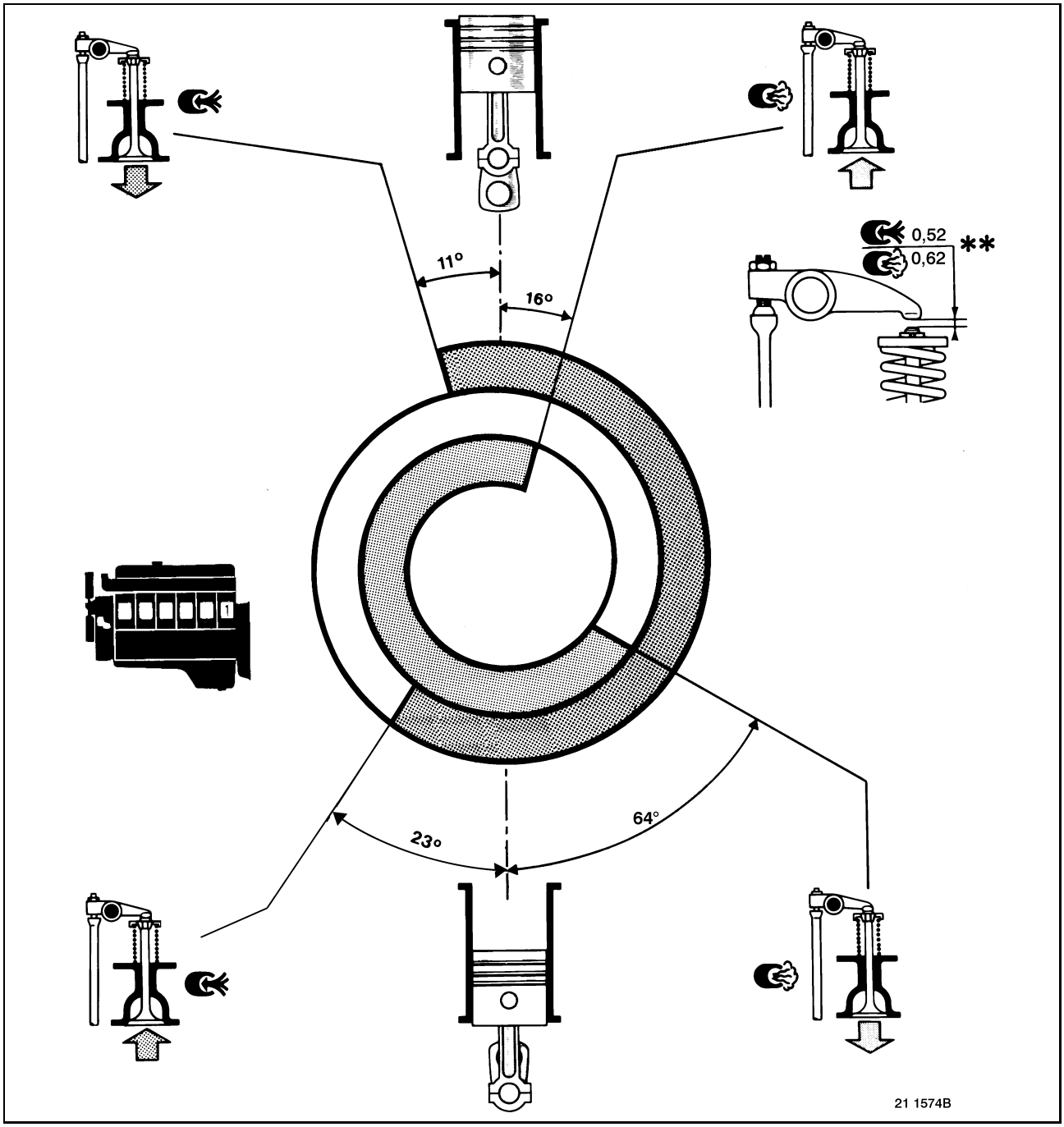
- Position the piston of N° **1** cylinder at end of exhaust/beginning of intake TDC (in the direction of rotation).
- Scribe a mark on the crankshaft pulley.
- Adjust the valve clearances to zero (without compressing the control springs).
- Crank the engine through one revolution while lining up the marks on the crankshaft pulley so as to arrive at "compression TDC".
- Check the valve clearances, which should be:
- **.** Inlet: **0.65 → 1.3 mm**.
  . Exhaust: **1.05 → 1.65 mm**.

WARNING

Repeat this check twice so as to provide more accuracy when adjusting the rocker arm clearance to zero.

****** Theoretical setting clearance

Since engine **n° 543 371**.



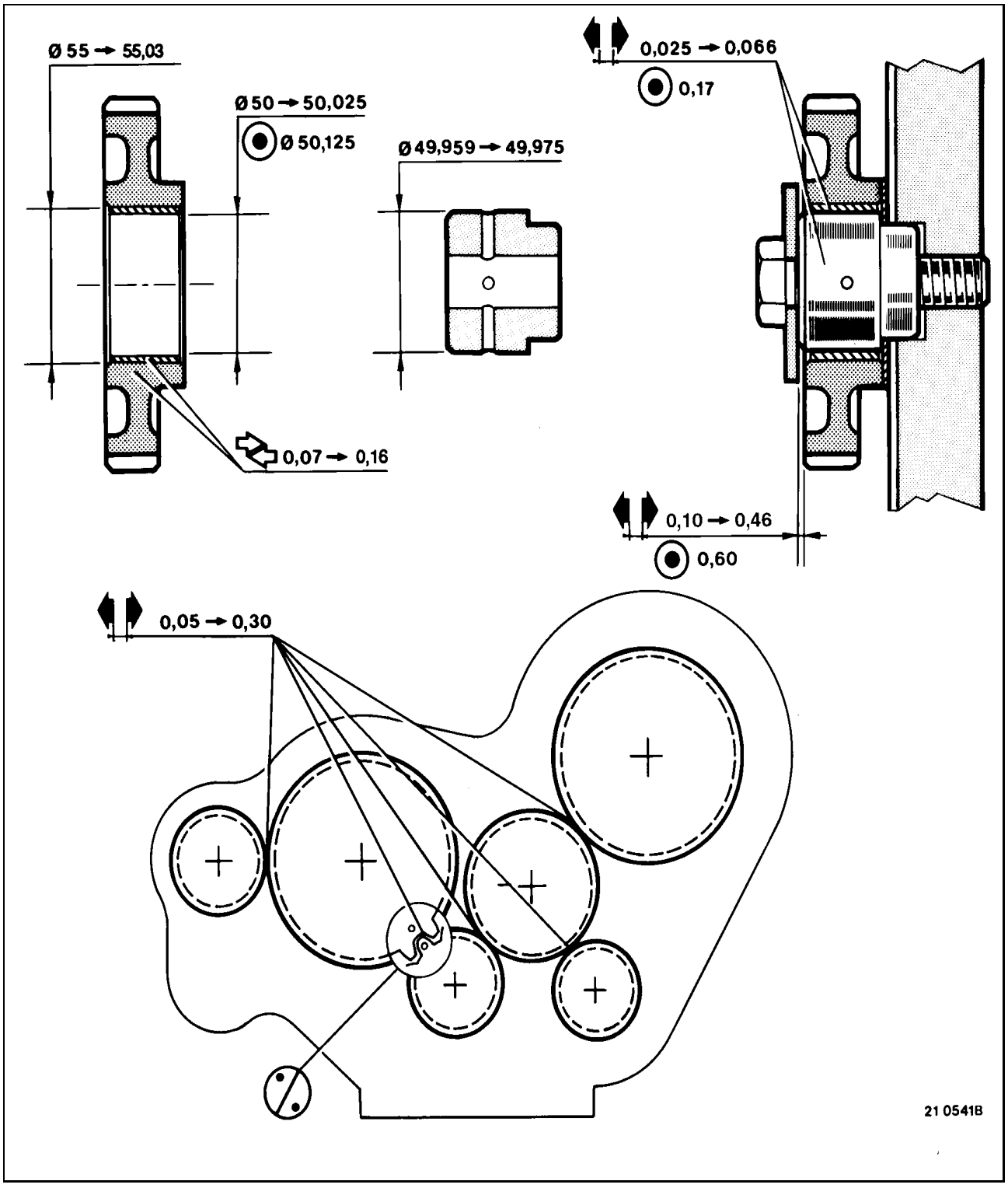
Quick timing check:

- Position the piston of N° **1** cylinder at end of exhaust/beginning of intake TDC (in the direction of rotation).
- Scribe a mark on the crankshaft pulley.
- Adjust the valve clearances to zero (without compressing the control springs).
- Crank the engine through one revolution while lining up the marks on the crankshaft pulley so as to arrive at "compression TDC".
- Check the valve clearances, which should be:
- **.** Inlet: **0.8 → 1.5 mm**.
  . Exhaust: **1.05 → 1.65 mm**.

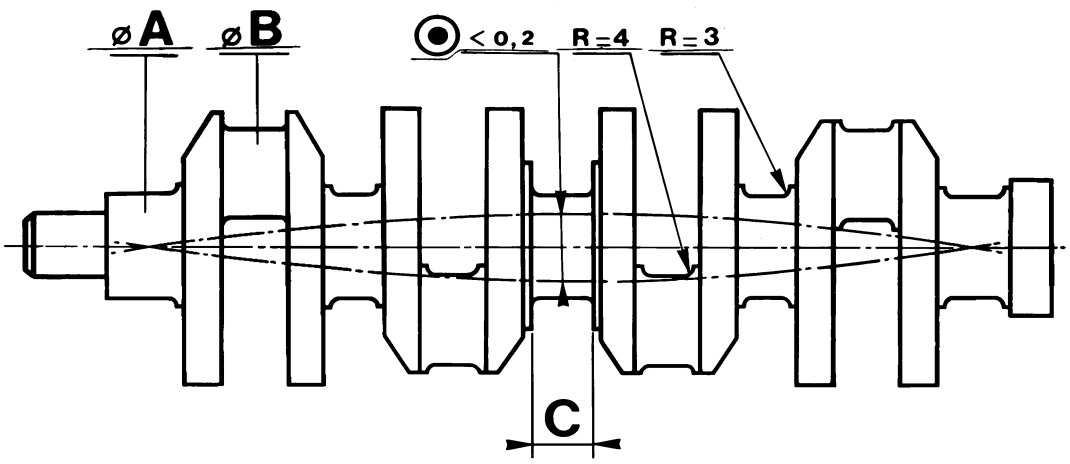
WARNING

Repeat this check twice so as to provide more accuracy when adjusting the rocker arm clearance to zero.

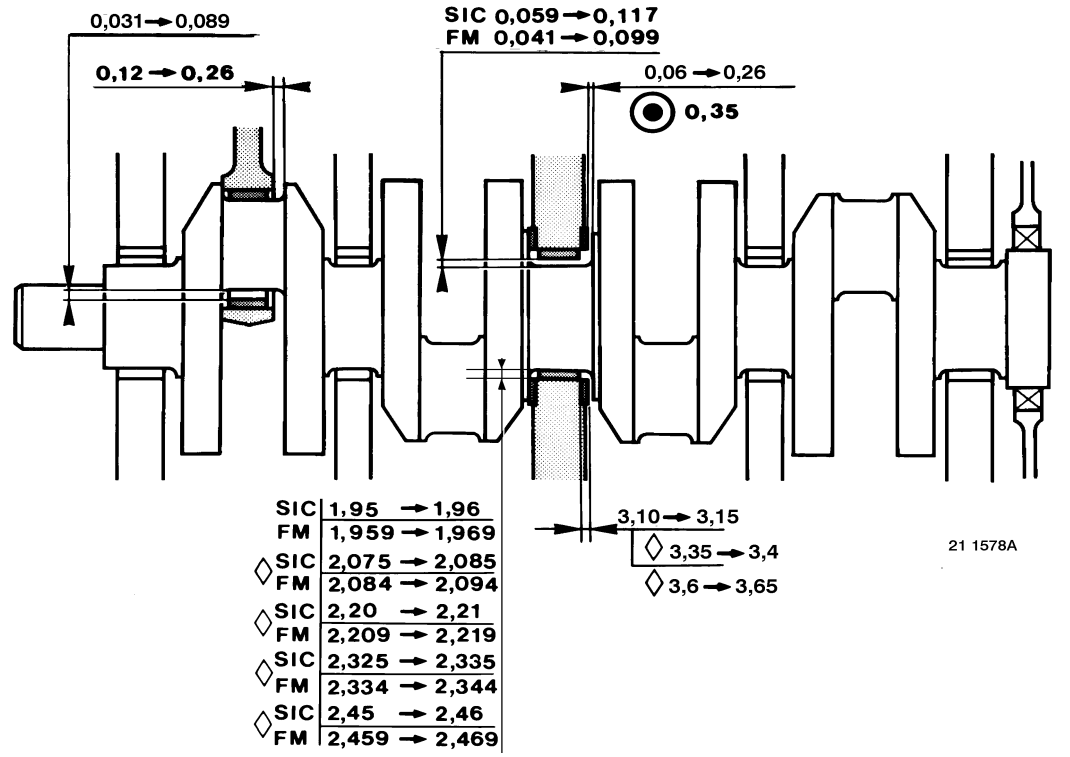
****** Theoretical setting clearance

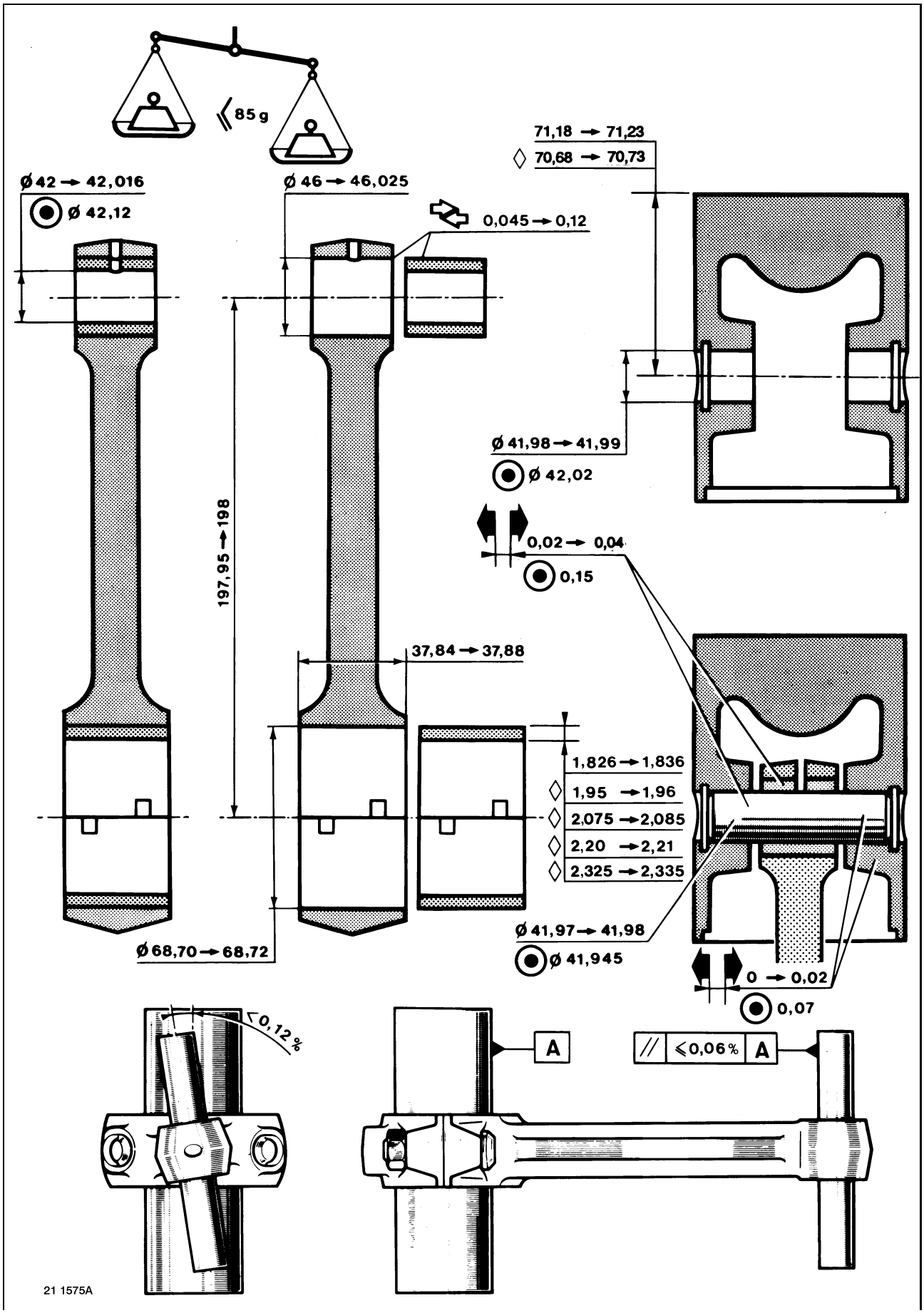

Ø 55 → 55,03
Ø 50 → 50,025
Ø 50,125
Ø 49,959 → 49,975
0,07 → 0,16
0,025 → 0,066
0,17
0,10 → 0,46
0,60
0,05 → 0,30
21 0541B

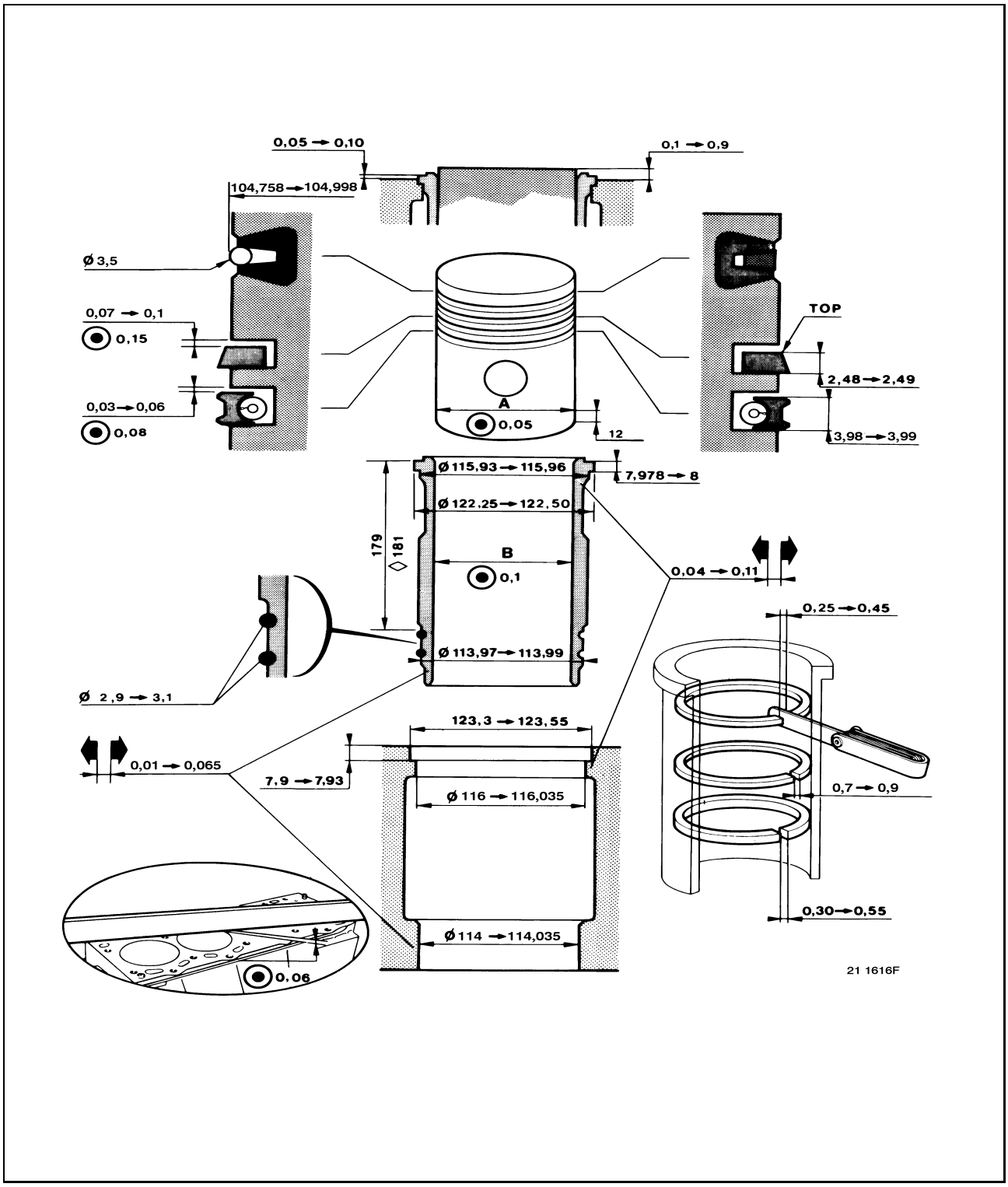
Reciprocating gear



		Ø A	Ø B	C
		76,00 → 76,02	64,98 → 65,00	39,00 → 39,062
◇	1	75,75 → 75,77	64,73 → 64,75	39,50 → 39,562
	2	75,50 → 75,52	64,48 → 64,50	
	3	75,25 → 75,27	64,23 → 64,25	40,00 → 40, 075
	4	75,00 → 75,02	63,98 → 64,00	




85 g
Ø 42 → 42,016
Ø 42,12
Ø 46 → 46,025
0,045 → 0,12
71,18 → 71,23
◊ 70,68 → 70,73
Ø 41,98 → 41,99
Ø 42,02
0,02 → 0,04
0,15
197,95 → 198
37,84 → 37,88
1,826 → 1,836
◊ 1,95 → 1,96
◊ 2,075 → 2,085
◊ 2,20 → 2,21
◊ 2,325 → 2,335
Ø 68,70 → 68,72
Ø 41,97 → 41,98
Ø 41,945
0 → 0,02
0,07
< 0,12 %
A
// ⩽ 0,06 % A
21 1575A



LINER - PISTON PAIRING		
Item	**Liner Ø B**	**Piston Ø A**
A	**102.015→102.027**	**101.945→101.957**
B	**102.023→102.035**	**101.953→101.965**

Tightening torques

Definition

There are several types of tightening:
- Tightening to torque (in **Nm**)
- Tightening to angle (in °)
- Tightening to torque-angle (en **Nm + °**)

Torques given in **Nm** are nominal torques (average value calculated on the basis of the minimum torque and the maximum torque).
The tightening precision class defines the tolerance of this torque in percent as a function of the nominal torque applied.

Tightening precision classes:
- **Class I:** Special threaded hardware (tolerances ± 10% of the final torque).
- **Class II:** Reserved for precise tightening (tolerance ± 10% of the nominal torque).
- **Class III: Reserved for normal standard tightening** (tolerance ± 20% of the nominal torque)

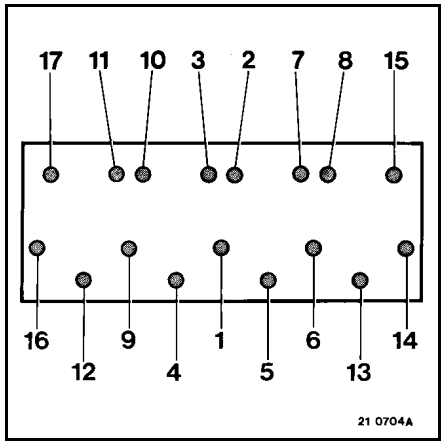
For standard threaded hardware indicated in the table below, use tightening class **III**.
For other torques, see the following page(s).

Unless indicated otherwise, fit the nut and bolt hardware dry (without oiling).

Tightening torques for conventional nut and bolt hardware to "metric system" standard 01.504.002		
Diameter and pitch of nuts and bolts	**Quality class 8.8**	**Quality class 10.9**
	Tightening class III (± 20 %)	**Tightening class III (± 20 %)**
6 x 1.00	7.4	10.8
7 x 1.00	12.1	17.8
8 x 1.00	19.2	28.2
8 x 1.25	17.9	26.3
10 x 1.00	39.4	58
10 x 1.25	37.4	55
10 x 1.50	35.4	52
12 x 1.25	67	98
12 x 1.50	64	94
12 x 1.75	61	90
14 x 1.50	105	155
14 x 2.00	98	143
16 x 1.50	161	237
16 x 2.00	151	222
18 x 1.50	235	346
18 x 2.50	210	308
20 x 1.50	328	481
20 x 2.50	296	435
22 x 1.50	444	652
22 x 2.50	406	596

Cylinder head

Tighten the setbolts in a 1st phase at a torque of **125 Nm** in the specified sequence ; then tighten at an angle of **180**°.
Slacken the setbolts one-by-one and retighten at a torque of **125 Nm** then turn through an angle of **180**° always in the specified sequence.



Intake manifold setscrew (see page F-7)	**30 ± 3 Nm**
Exhaust manifold setscrew (see page F-7)	**55 ± 5.5 Nm**
Cylinder head rear plate setscrew (see page F-7)	**25 ± 5 Nm**
Rocker shaft setscrew	**80 ± 12 Nm**
Rocker arm adjusting nut	**15 + 5 Nm**
Cylinder head cover setscrew (see page F-10)	

Reciprocating gear

Crankshaft bearing setbolts (see page H-13)	
- Ø **14** bolt	**80 Nm + 180° (+10°)**
- Ø **16** bolt	**100 Nm + 90° (-10°)**
Connecting rod cap setbolt (see page H-13)	**35 Nm + 150° (-10°)**
Flywheel housing setscrew (14 × 200)	**130 ± 13 Nm**
Flywheel housing setscrew (see page H-13)	
- with washers	**250 ± 50 Nm**
- without washers	**60 Nm + 45° (+10°)**
Pulley damper setscrew	**50 ± 5 Nm**
Crankshaft pulley setscrew (see page G-4)	**100 Nm + 60° (±5°)**

Lubrication

Oil pump pinion securing nut	**40 ± 4 Nm**
Oil sump drain plug	**70 ± 14 Nm**
Turbocharger lube pipe union	**32 ± 6 Nm**
Oil suction strainer securing nut	**28 ± 4 Nm**
Oil sump setscrew (see page G-9)	**28 ± 2.8 Nm**
Oil pump valve plug	**80 ±16 Nm**
Oil level probe	**50 ± 10 Nm**

Fuel-Injection

High pressure pipe gallery union nut (see page K-18)	
Nozzle holder setscrew	**60 ± 6 Nm**
High pressure pump pinion setscrew	**195 ± 15 Nm**
High pressure pump securing nut (tighten in diametrically opposed sequence, then retighten first nut only)	**60 ± 12 Nm**
Speed sensor	**6.5 ± 1.5 Nm**
Pressure and boost air sensor setscrew	**6.5 ± 1.5 Nm**
Coolant temperature sensor	**18 ± 5 Nm**
Oil pressure sensor	(**FRENETANCH 242**) **18 ± 5 Nm**
Oil level transmitter	**50 ± 10 Nm**
High pressure pump inspection plug	**35 ± 5 Nm**
Rail return low pressure pipe securing nut	**3.5 ± 0.7 Nm**
Fuel leak-off return union setscrew	**32 ± 6 Nm**
Fuel leak-off return union setscrew	**12 ± 2 Nm**
Low pressure polyamide pipes securing clamp nut	**15 ± 3 Nm**
Prefilter unions	**33 ± 7 Nm**
Pump unions	**40 ± 8 Nm**
Flow limiter	**85 ± 5 Nm**
Common rail pressure limiter	**45 ± 5 Nm**
Common rail pressure sensor	**35 ± 5 Nm**
Scavenge valve	**35 ± 5 Nm**
Scavenge valve plug	**15 ± 5 Nm**
Fuel injector gallery securing nut	**1.5 ± 0.25 Nm**
Rail setscrews	**21 ± 2 Nm**
Booster pump securing bolts (tighten in diametrically opposed sequence)	**8 ± 1 Nm**

Timing

Air compressor pinion securing nut	**120 ± 8 Nm**
Oil sump anti-rattle plate securing bolts	**7.25 ± 0.75 Nm**
Intermediate gear setscrew (**16 × 150**): - Preliminary tighten - Loosen, then retighten	 **200 Nm** **75 Nm + 70° (+10°)**
Tappet cover setscrews	**28 ± 2.8 Nm**

Various

Air compressor **250** cm^3 securing nut	**40 ± 8 Nm**
Air compressor **150** cm^3 securing nut	**40 ± 8 Nm**
Steering fluid pump setscrew	**52 ± 10 Nm**
Setscrew securing spacer between compressor and steering pump	**20 + 2 Nm**
Oil filter bracket unit setscrew	**95 ± 15 Nm**
Engine block stiffener setscrew (see page G-9)	**52 ± 10 Nm**
Setscrew securing turbocharger to exhaust manifold	**25 ± 5 Nm**
Breather impeller setscrew	**13 ± 1 Nm**

CONSUMABLES

Lubricants

Consumables and oil capacity: (see Driving & Servicing Handbook).

CONSUMABLES

Automotive reference	Industrial reference
FRENETANCH 242	FRENETANCH 242
FRENBLOC 271	FRENBLOC 271
OMNIFIT 50H	OMNIFIT 50H
GRAISSE GRIPCOTT NF	GRAISSE GRIPCOTT NF
OLEOETANCHE 542	OLEOETANCHE 542
SILMATE RTV 1473	SILMATE RTV 1473
RHODORSEAL 131	RHODORSEAL 131
RHODORSEAL 5661	RHODORSEAL 5661
FROMETANCH 572	FROMETANCH 572

TOOLS

Generalities

RENAULT TRUCKS divide tools into three categories:

- **General-purpose tools:** proprietary tools.
  - **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department).
  - **4-figure reference number** (tools classified by RENAULT TRUCKS but available from the supplier).

- **Special tools:** specifically created tools distributed by the RENAULT TRUCKS Spare Parts Department.

- **Locally manufactured tools:** these tools are classified differently according to their degree of sophistication:
  - **4-figure reference number** (represented by a drawing): tools that are simple to make without need for special qualification.
  - **50 00 26 ....** reference number (possibility of purchasing through the RENAULT TRUCKS Spare Parts department): a certain amount of skill is needed to make these tools.

Three levels (or echelons) determine their assignment:
- **Level 1:** tools for servicing, maintenance and minor tasks.

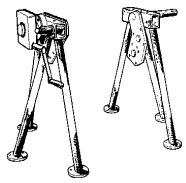
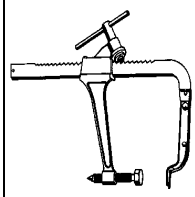
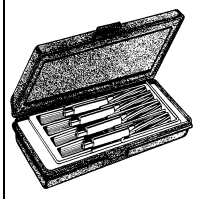
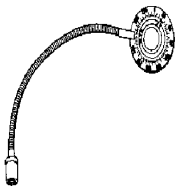
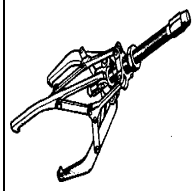
- **Level 2:** tools for major repairs.

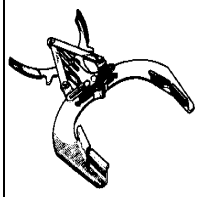
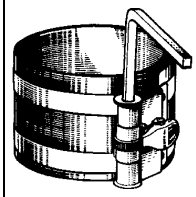
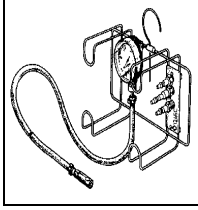
- **Level 3:** tools for refurbishment.

Proprietary tools mentioned in this manual do not appear in the tools list.
These tools are identified in the standard tools manual (MO) by a 4-figure number.

LIST OF TOOLS

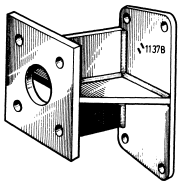
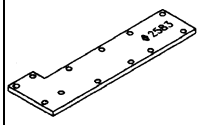
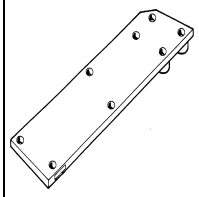
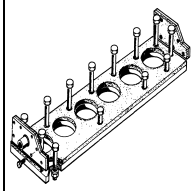
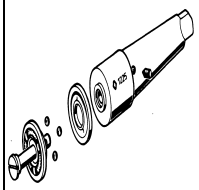
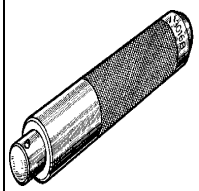
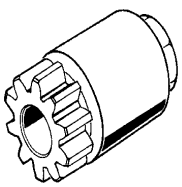
General-purpose tools

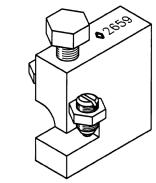
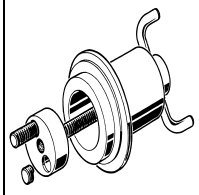
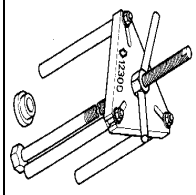
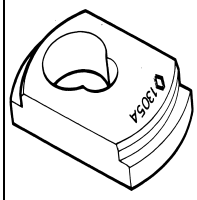
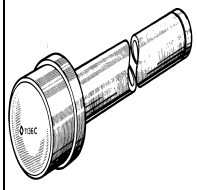
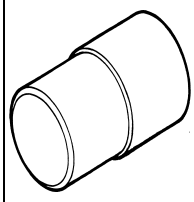
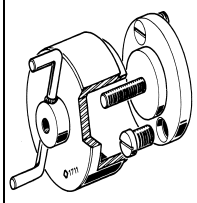
Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer code	Level	Qty
	**5000261000**	UNIVERSAL STAND			1	1
	**5000260846**	COMPRESSING TOOL			1	1
	**9732**	BOX OF CUTTERS	CN 109 B	AF	1	1
	**5000269776**	ANGULAR DIAL			1	1
	**5000260843**	PULLER			1	1
	5000268251	BELT TENSION TESTER			1	1
	50 00 26 0934	PULLER			1	1

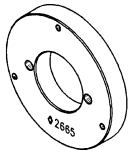
	**5000260825**	PISTON RING CLAMP			1	1
	**5000260824**	PISTON RING CLAMP			1	1
	**5000261246**	PRESSURE GAUGE			1	1

AF	**CEVMI**			
	15, avenue Paul Doumer			
	75116 PARIS			FRANCE
	01 45 53 97 03	01 45 53 37 05		

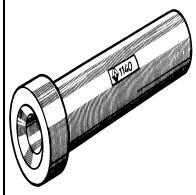
Special Tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufac-turer reference	Manufac-turer Code	Level	Qty
	**5000261137**	FITTING			1	1
	**50 00 26 2583**	SUPPORT			1	1
	**5000261682**	FITTING			1	1
	**5000261227**	SEAL PLATE			1	1
	**5000261225**	RIVET SNAP			1	1
	**5000263016**	HANDLE			1	1
	**5000261380**	CONTROL			1	1

	**5000262659**	CRIMPER			1	1
	**5000261710**	PUSHER			1	1
	**5000261230**	PULLER			1	1
	**5000261305**	FLANGE			1	1
	**5000261136**	MANDREL			1	1
	**5000261314**	PUSHER			1	1
	**5000261711**	PUSHER			1	1
	5000262589	UNCLIPPER			1	1

	**5000262665**	ADAPTER			1	1

Locally manufactured tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufac-turer Reference	Manufac-turer Code	Level	Qty
	**1140**	FLANGE			1	1
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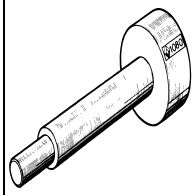
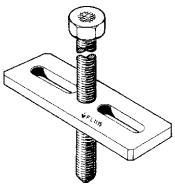
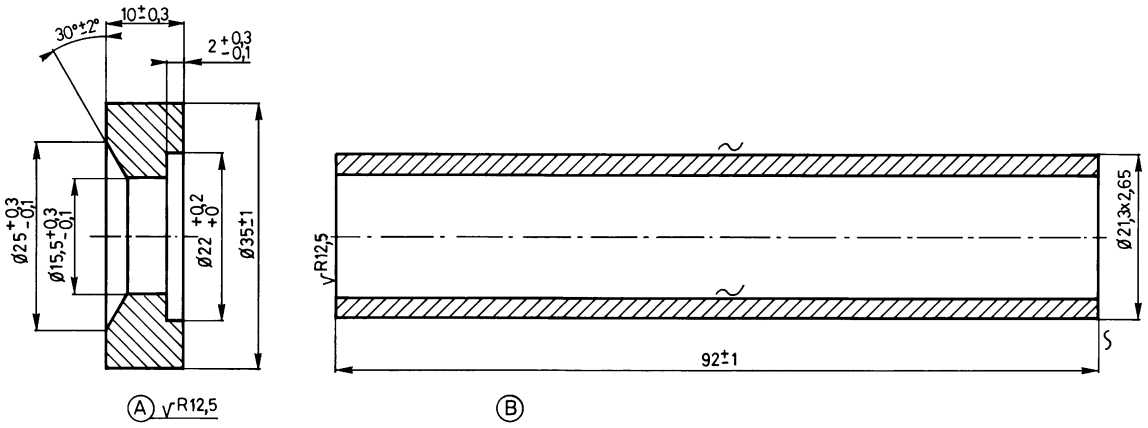
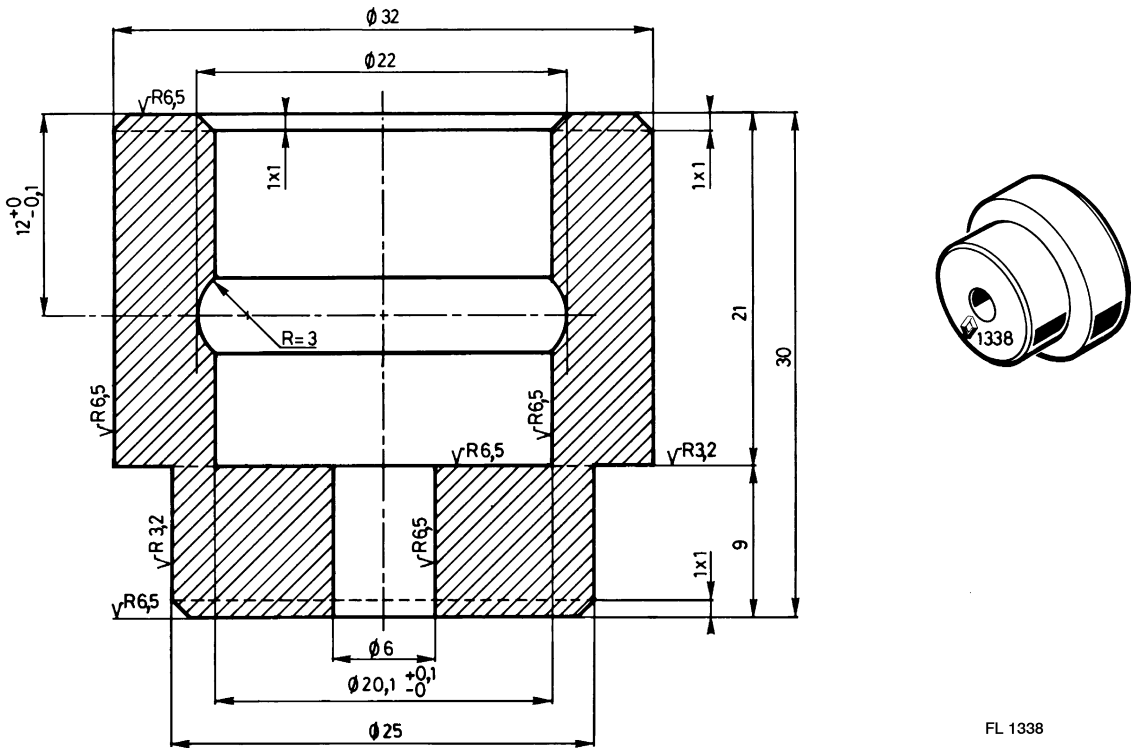
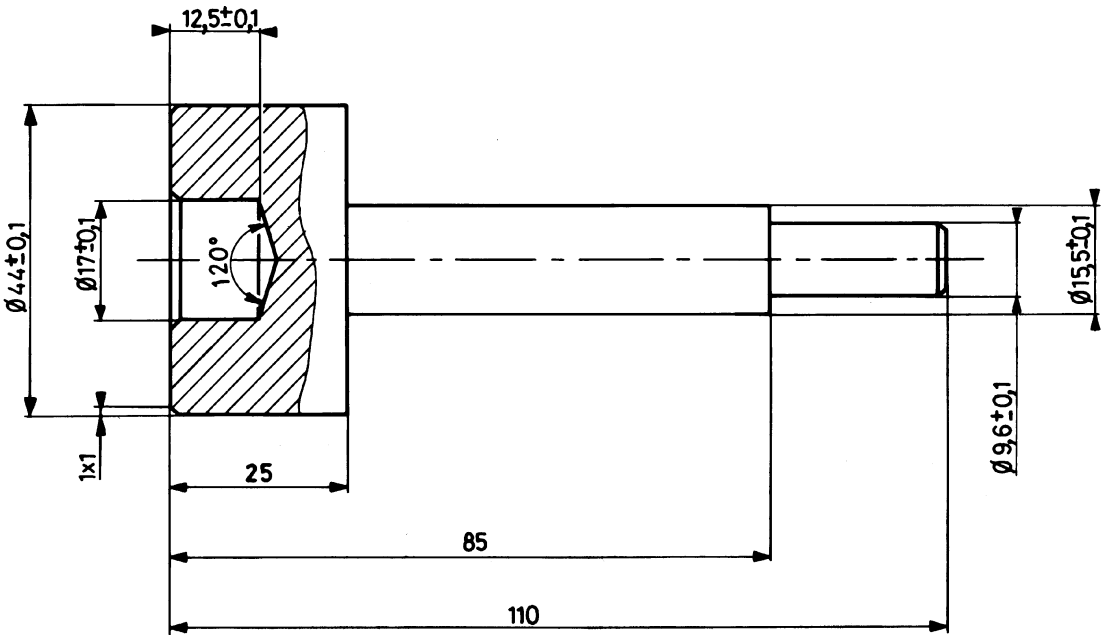
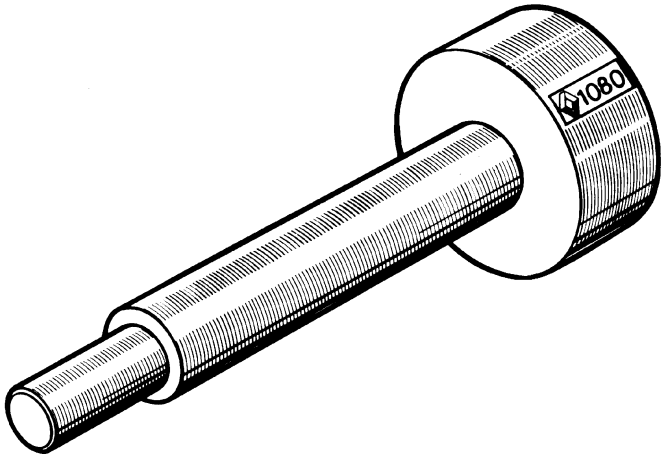
	**1080**	PUSHER			1	1
	2648	ENDPIECE			1	1
	**1115**	FLANGE			1	1


30°±2°
10±0,3
2 +0,3 -0,1
Ø25 +0,3 -0,1
Ø15,5 +0,3 -0,1
Ø22 +0,2 +0
Ø35±1
R12,5
Ø21,3x2,65
92±1
A R12,5
B

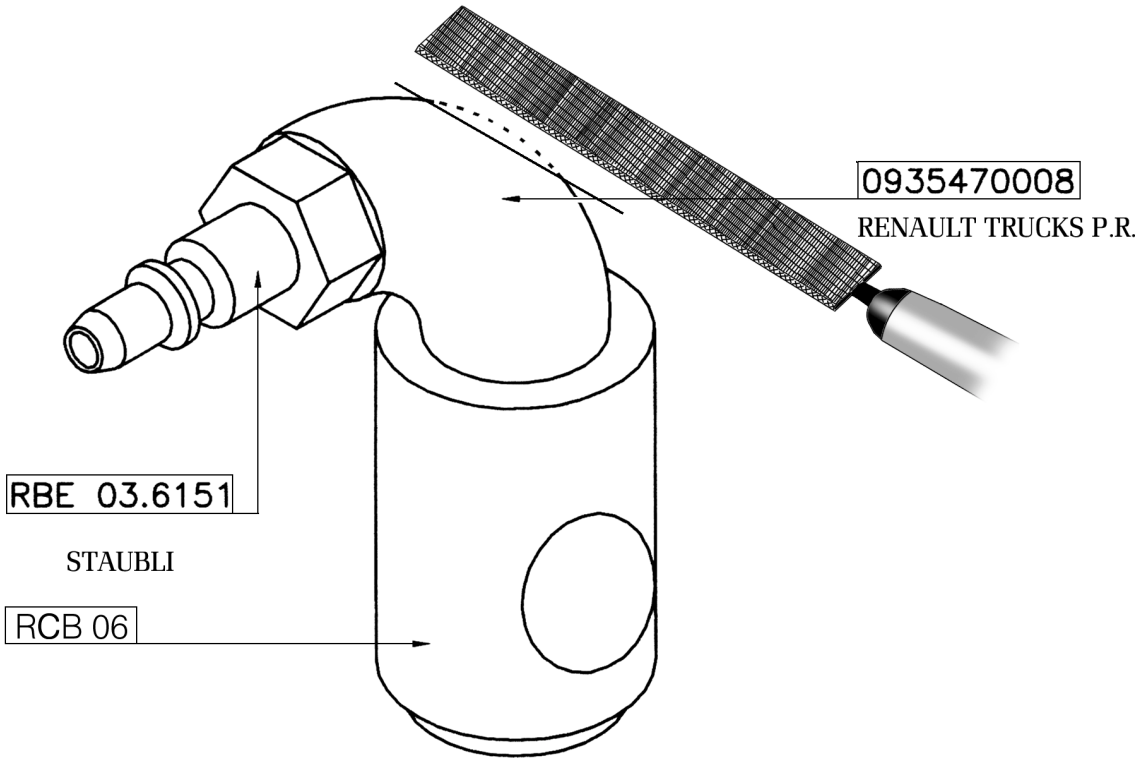
100±1
1140
FL 1140


Ø32
Ø22
R6,5
1x1
1x1
12 +0 -0,1
R=3
21
30
R6,5
R6,5
R6,5
R3,2
R3,2
R6,5
9
1x1
R6,5
Ø6
Ø20,1 +0,1 -0
Ø25
1338
FL 1338

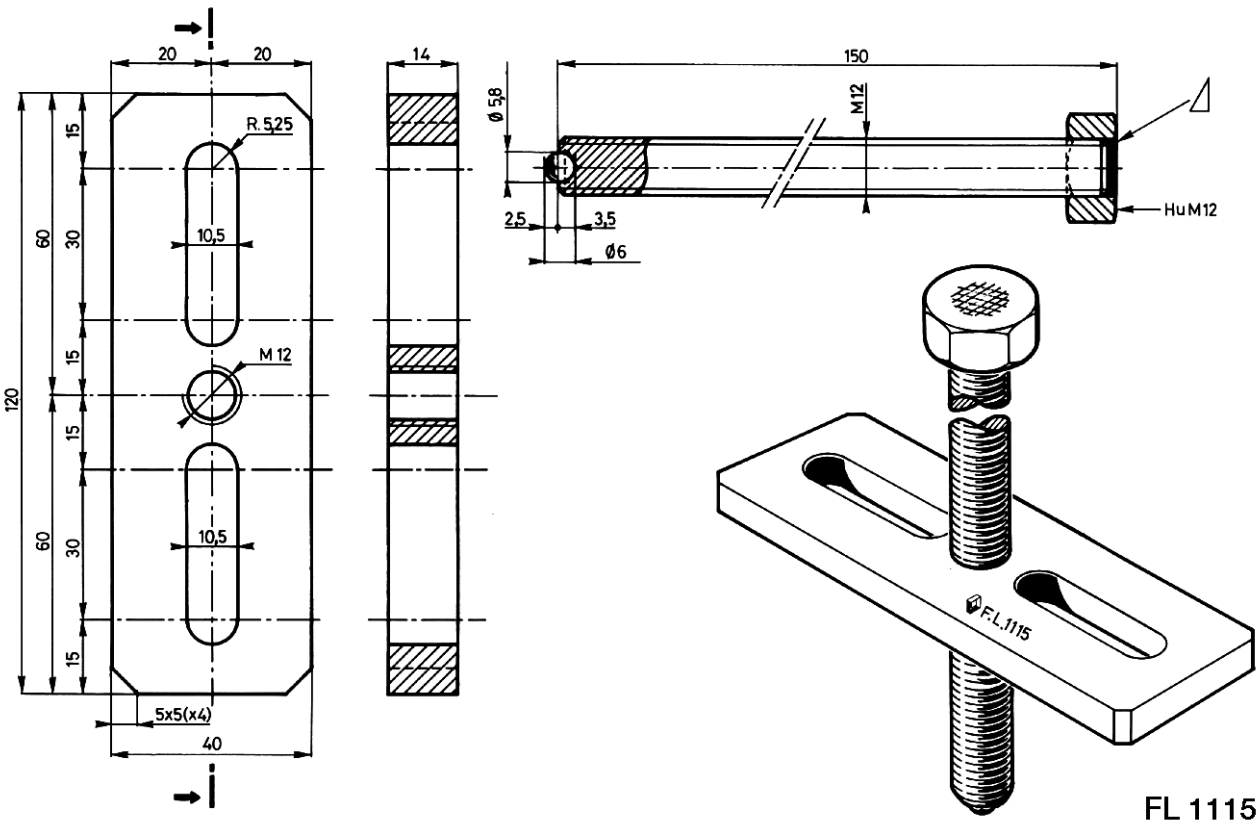




FL 1080

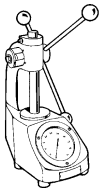


FL 2648



FL 1115

Proprietary tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer code	Level	Qty
	**50 00 26 9452**	SPRING SETTING TESTER	M 250 E	AM	1	1
	50 00 26 9675	THERMOMETER	APPA 51 + 80110	AL	1	1
	50 00 26 2565	WRENCH		AB	1	1

AM	**MULLER**		
	Le jardin d'entreprises 1, avenue Gustave Eiffel		
	28070 CHARTRES CEDEX		FRANCE
	02 37 33 34 26	02 37 33 35 00	

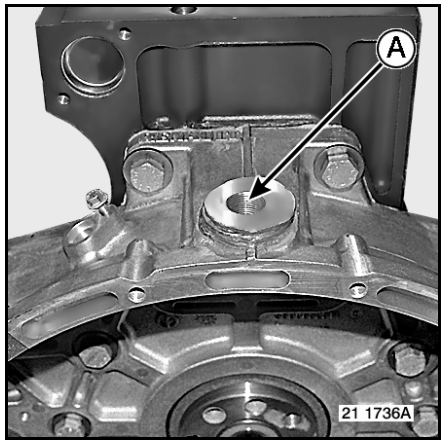
AL	**CHAUVIN ARNOUX**		
	190, rue Championnet		
	75890 PARIS CEDEX 18		FRANCE
	01 44 85 44 85	01 46 27 73 89	
AB	**FACOM**		
	6 et 8, rue Gustave Eiffel BP 99		
	91423 MORANGIS CEDEX		FRANCE
	01 64 54 45 45	01 69 09 60 93	

STRIPPING AND MOUNTING ON STAND

Stand 1000

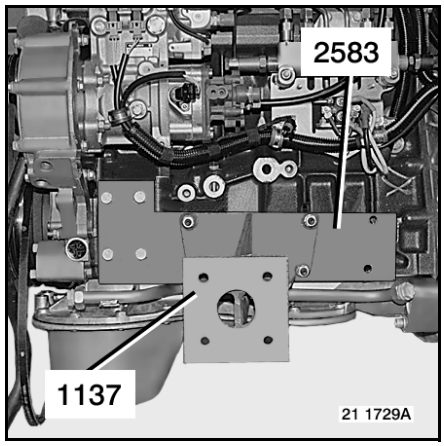
Mounting

IT IS FORBIDDEN TO USE THE TAPPED HOLE (A) IN THE FLYWHEEL HOUSING AS LIFTING POINT.

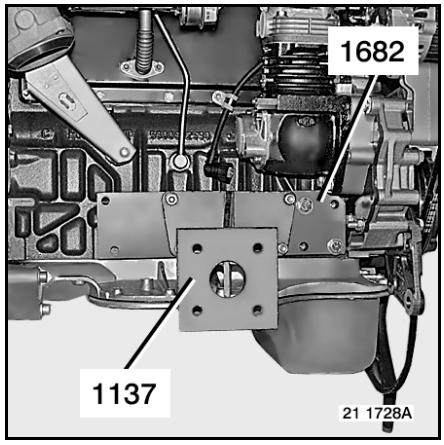


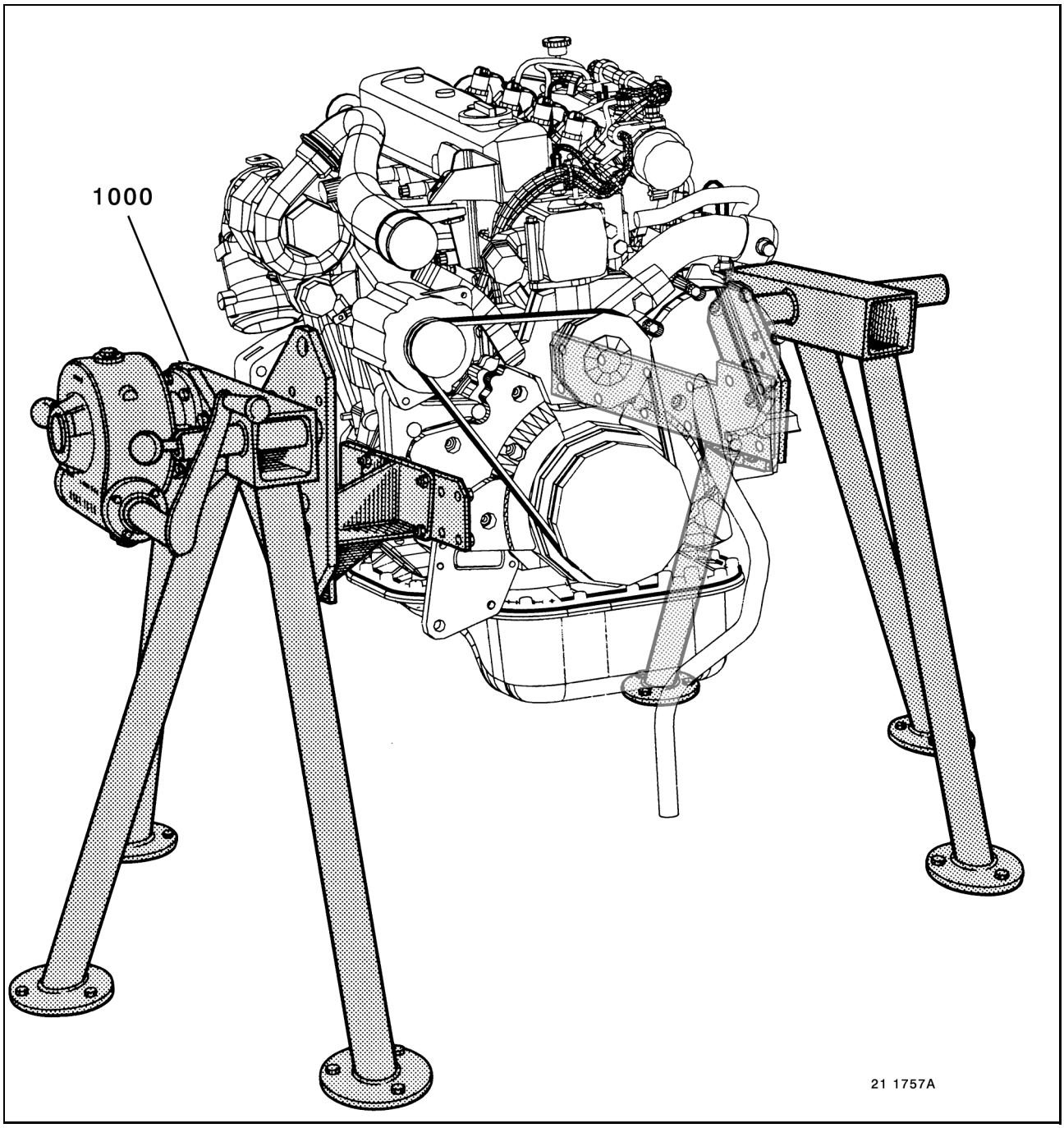
LH side
Remove the heat exchanger oil filter / bracket unit **(1)**.
Remove the starter motor.

Install tool **1137** + **2583**.



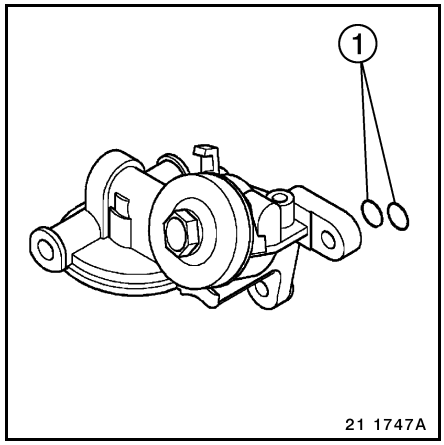
RH side
Withdraw the electrical oil gauge.
If necessary
Disconnect the dipstick guide tube.
Install tool **1137** + **1682****.
****To be modified, if necessary.





Fasten the engine to stand N°**1000**.

Removal



Remove the engine from stand N°**1000**.
Remove the brackets **2583 - 1137 - 1682**.
Install seals **(1)**.
Fit the filter(s) / filter head assembly.
Tighten to torque.
Fit the electrical oil gauge.
Connect the gauge guide tube.

Throw-away oil filter cartridge
To replace, unscrew the cartridge.
Upon fitting:
Fill the cartridge with oil.
Oil the seal
Screw up the cartridge(s) until contact is made with the support bracket.

- **Tighten at a torque of 25±5 Nm**
- **Use tool 2684**
- **Use a torque wrench**

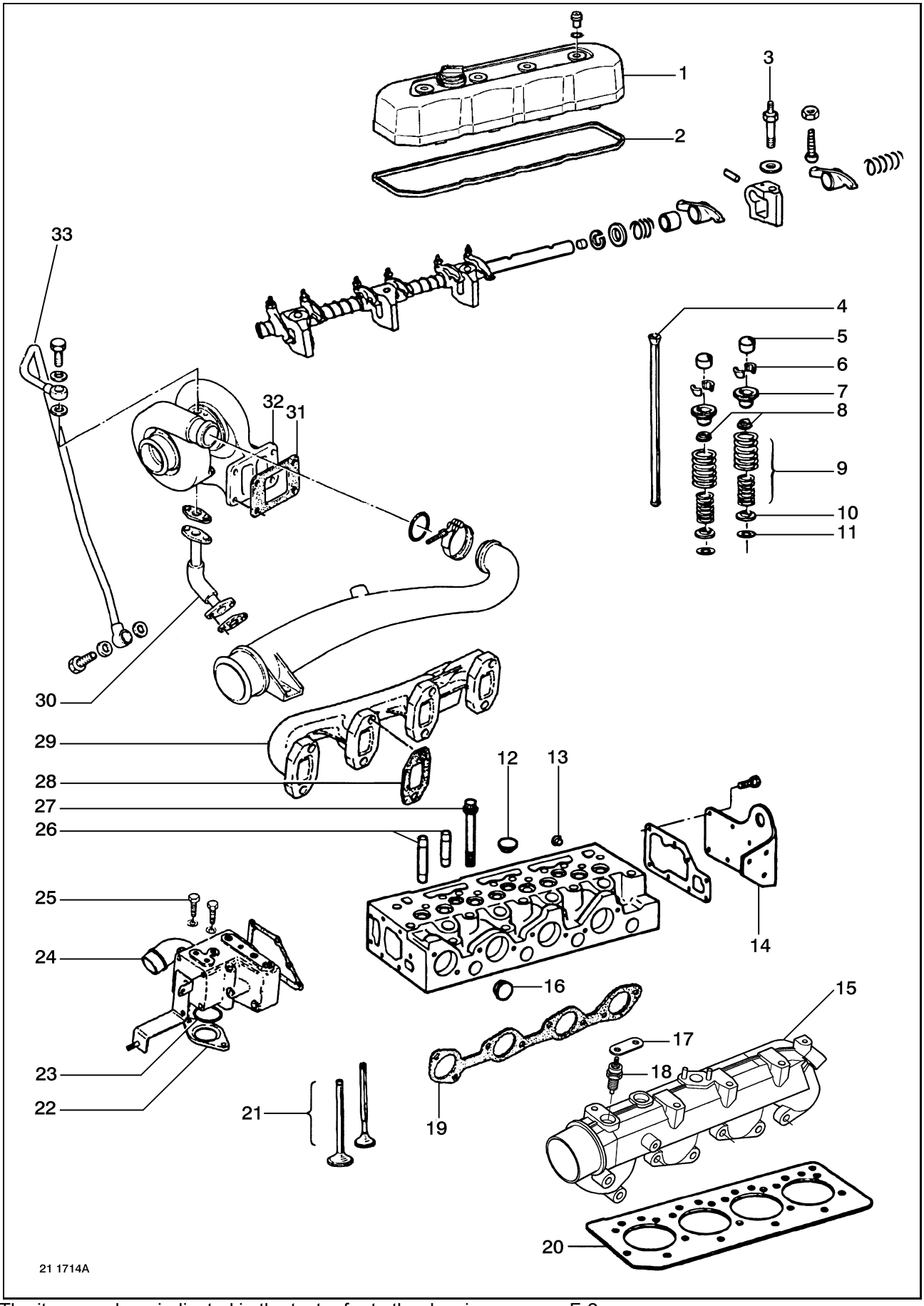
Run the engine and check for leaks.
In the event of leakage, remove the cartridge(s), inspect the joint face and repeat the fitting operations.

If the engine is equipped with an immersion heating rod:
- **It should not be connected unless the cooling system has been thoroughly drained.**
- **It should not be connected when the engine is started.**

In both cases, there is risk of destruction of the resistor.

CYLINDER HEAD

Exploded view



The item numbers indicated in the text refer to the drawing on page F-2.

Removal

Remove the fuel prefilter.
Remove setscrews.
Remove the injector pipes.
See page(s) K-18.
Remove the wiring harnesses.
Remove the nozzle-holders.
Take out the seals.

It is forbidden to use the top part of the nozzle-holder to extract it.

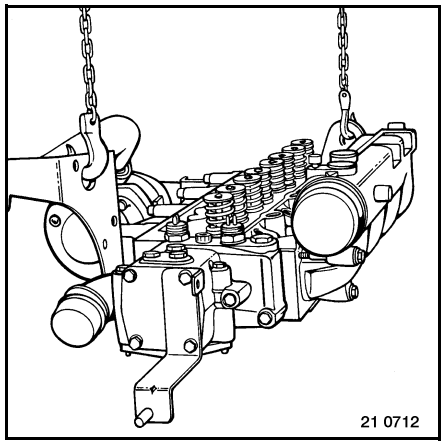
Remove the pipes **(30 - 33)**.
Remove the cylinder head cover **(1)**.
Remove setscrews **(3)**.
Remove the rocker assembly.
Take off the thimbles **(5)**.
Withdraw the push-rods **(4)**.

Turn the push-rods to unstick them from the tappets.

Disconnect the air compressor pipes.
Remove setscrews **(25)**.
Remove setbolts **(27)** by loosening them in the reverse sequence to tightening.
See page(s) F-8.

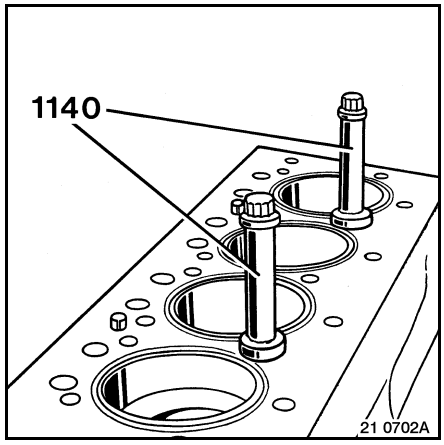
Remove the cylinder head.

*It is essential to use all the lifting points. Maximum chain angle: **45** °.*



Save the seal **(20)**.
Take out O-ring **(23)**.
Remove the flange **(22)**.

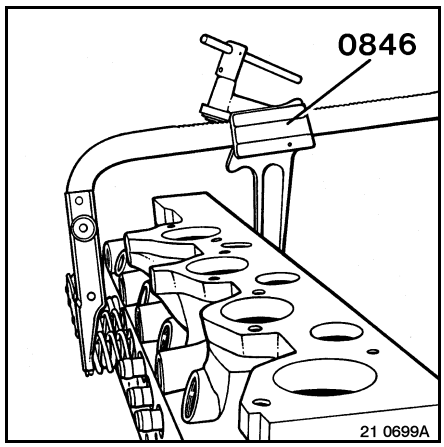
Immobilize the liners.
Use tool **1140**.



Disassembly

Remove the inlet manifold **(15)**.
Remove the turbocharger **(32)**.
Remove exhaust manifold **(29)**.
Remove the plate **(14)**.
Remove thermostat housing **(24)**.
Remove gasket.
Remove the plate before manipulating.

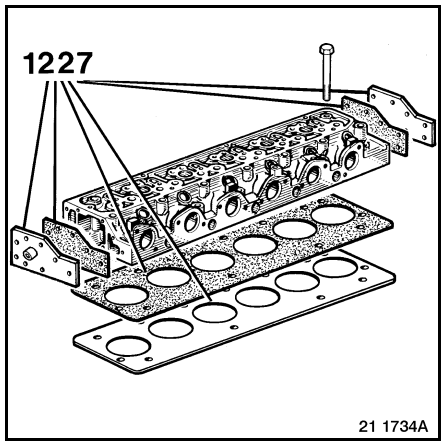
Remove the springs **(9)**.
Use tool **0846**.
Save valve cotters **(6)**.
Withdraw cups **(7 - 10)**.
Withdraw washers **(11)**.
Withdraw the seal rings **(8)**.
Remove valves **(21)**.
Classify the parts in order.



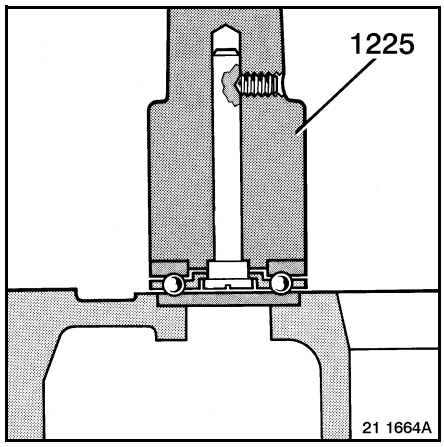
Assembly

Inspection
Check the mating surface.

Cylinder head seal
Test the cylinder head for leaks before commencing the overhaul. In a bath of hot water (**80°C**), air pressure **6 bars**, check for the absence of air bubbles.
Install tool **1227****
****To be modified, if necessary.
To decarbonize, take out core plugs **(12 - 16)**.

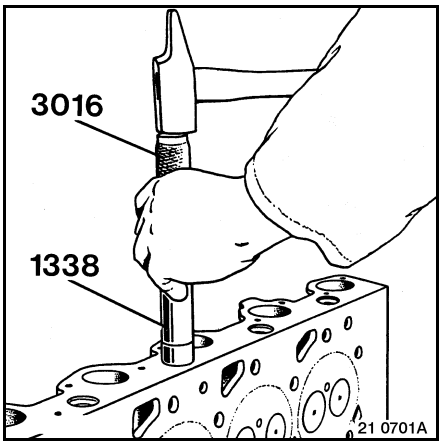


Fit plugs **(12)** and crimp them.
Use a thread locking product "**FRENBLOC 271**".
Use tool **1225**.

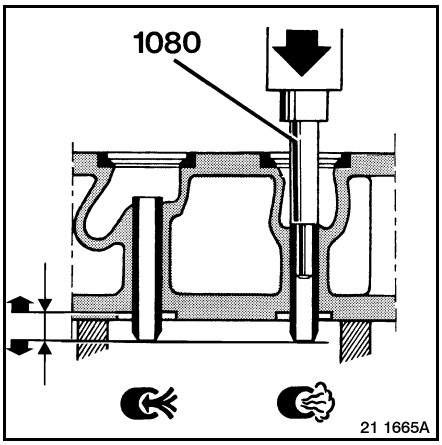


Fit plugs **(16)** and crimp them.
Use a thread locking product "**FRENBLOC 271**".
Use tool **1338** + **3016**
Test for leaks.

Valve guides
Check the radial clearance of the valves in their guides.

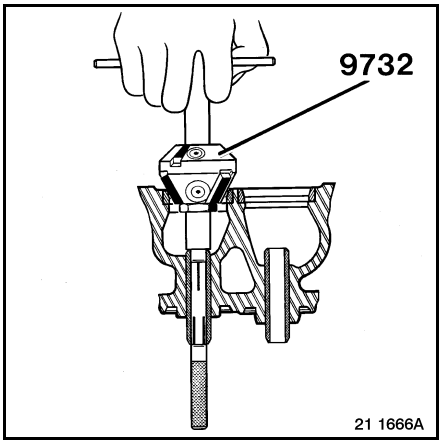


If necessary.
Classify the parts in order **(26)**.
Use tool **1080**.
Use a press.
Apply tallow.
Press fit valve guides.
Use tool **1080**.
Use a press.
Guide protrusion: **19.8 mm**



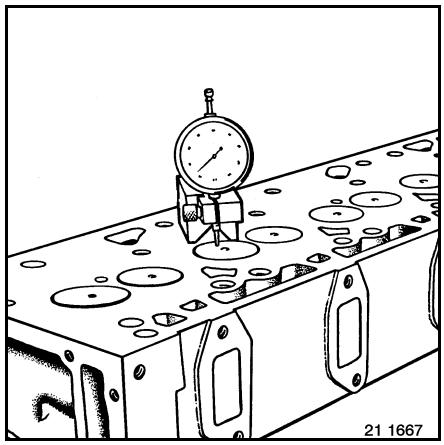
Valve seats

Valve seat grinding:
Remove as little metal as possible. Take valve set-back into account.
Use tool **9732**.
Do not grind the valves.



Check the valves set-back or protrusion.

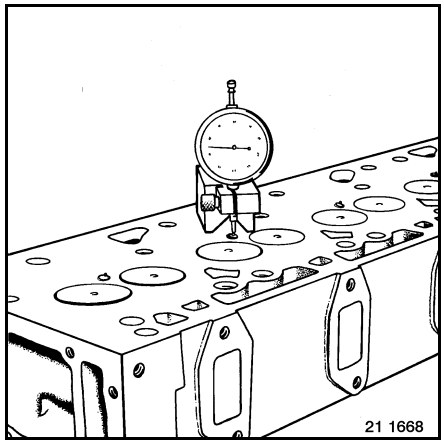
Rocker assemblies
Check the bore dimensions of the rocker arm bushes.
Check the rocker shaft.



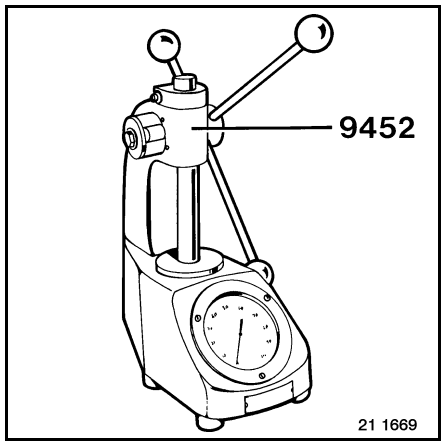
Injector protrusion

Install seals.
Install the nozzle-holders.
Tighten to torque.

Check the injector protrusion.
Remove the nozzle-holders.
Take out seals.
Classify the parts in order.



Check the calibration of the springs **(9)**.
Use tool **9452**.

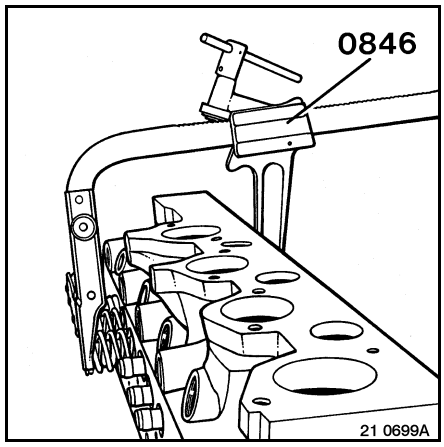


Valves

Oil the valve stems and install the valves.
Install seals **(8)**.
Fit the washers **(11)**.
Fit cups **(10)**.

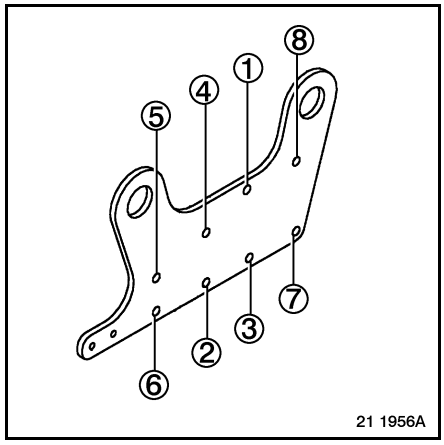
Fit the springs **(9)**.

The closed-spirals end of the springs is to be fitted against the lower cups.

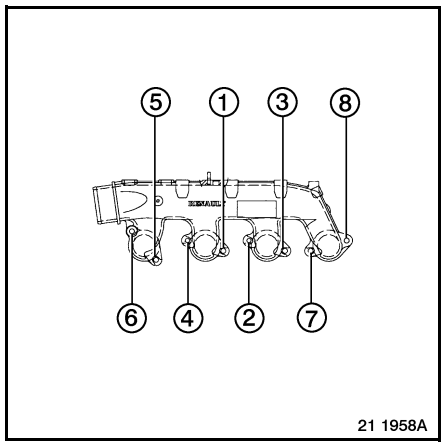


Fit cups **(7)**.
Fit valve cotters **(6)**.
Use tool **0846**.
Fit the casing **(24)**.
Fit the seal.
Apply "**OMNIFIT 50H**" oiltight threadlocking compound to give a fluidtight seal.

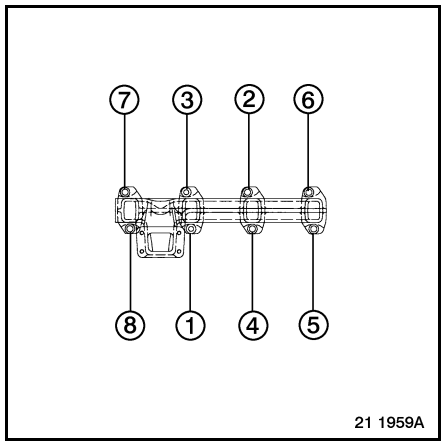
Fit the plate **(14)**.
Follow the tightening sequence.
Tighten to torque.



Install seal **(19)**.
Fit intake manifold **(15)**.
Follow the tightening sequence.
Tighten to torque.

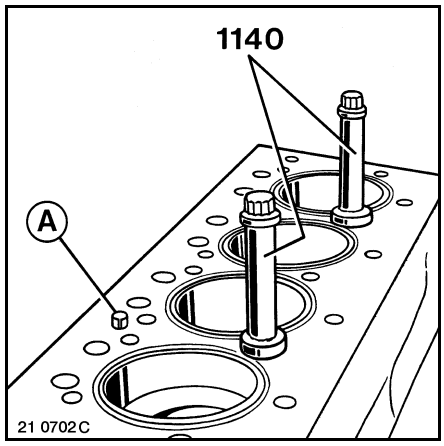


Install seals **(28)**.
Fit exhaust manifold **(29)**.
Smear the screwthreads with **GRAISSE GRIPCOTT NF** copper grease.
Fit the setscrews.
Follow the tightening sequence.
Tighten to torque.
Install seal **(31)**.
Assemble turbocharger **(32)**.
Tighten to torque.

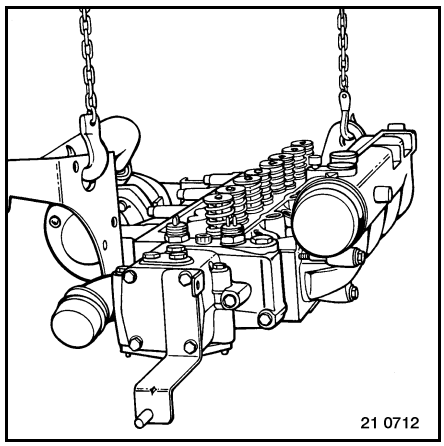


Fitting

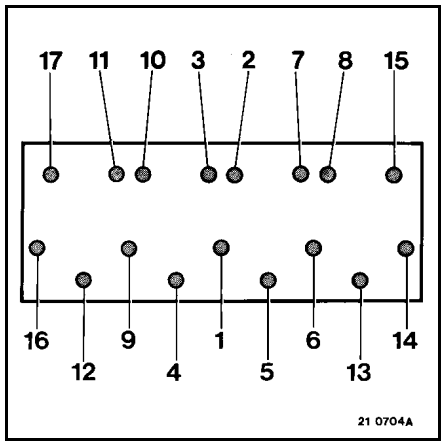
Withdraw tool **1140**.
Check that locating pin **(A)** is in position.



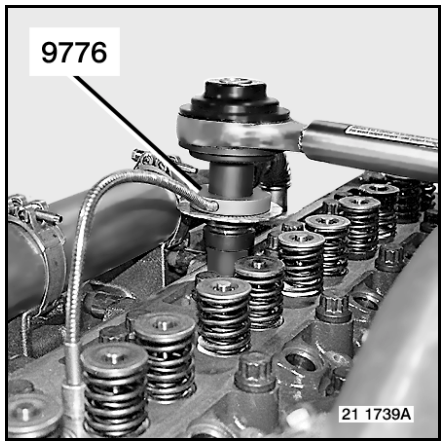
Install seal **(20)**.
Fit the flange **(22)**.
Install O-ring **(23)**.
Fit the cylinder head.
Apply oil.
Tighten the setscrews **(27)**.



To tighten down the cylinder head(s)
Tighten the setbolts in a 1st phase at a torque of **125 Nm** in the specified sequence ; then tighten at an angle of **180** °.
Slacken the setbolts one-by-one and retighten at a torque of **125 Nm** then turn through an angle of **180** ° always in the specified sequence.



Use tool **9776**.
Tighten the setscrews **(25)**.
Put the push-rods **(4)** into place.
Position caps **(5)**.
Remove the rocker assembly.
Tighten setscrews **(3)** moderately.
Tighten to torque.
Adjust the valve rocker clearances.
N° 1 cylinder flywheel end
Depending on the assembly.
See page B-2-1



Adjustment of valve rocker clearances:
Adjustment values: engine cold
- Exhaust: **0.50 mm**.
- Inlet: **0.25 mm**.

Adjustment of valve rocker clearances:
Adjustment values: engine cold
- Exhaust: **0.50 mm**.
- Inlet: **0.4 mm**.

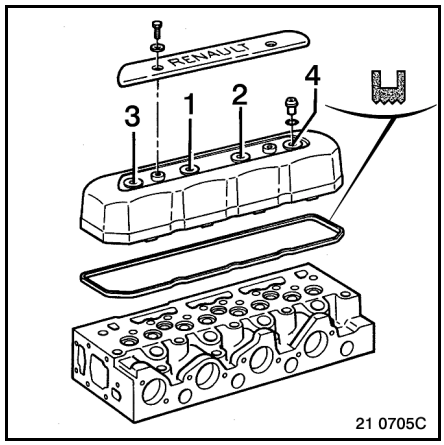
The different types of camshaft are interchangeable. However, camshafts where the valve rocker clearance setting is 0.25 mm must without fail be adjusted to that value to prevent premature wear. Camshafts where the valve rocker clearance setting is 0.4 mm tolerate adjustment to 0.25 mm. In case of doubt of the camshaft fitted to the engine, adjust the valve rocker clearances on the inlet valves to 0.25 mm without fail.

Valves in balance (cylinder end of exhaust/ beginning of intake)	**Adjust the clearance** of cylinder valves
4	1
2	3
1	4
3	2

Install the nozzle-holders.
Tighten to torque.
Fit new fuel leak-off return pipes.
Fit the wiring harness.
Fit pipes **(30 - 33)**.
Fit injector pipes.
Tighten to torque.

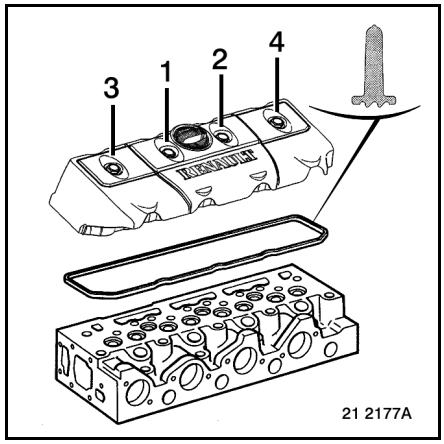
Install seal.
Remove the nuts.
Clean contact facings thoroughly.
Fit the rocker cover.
Tighten to torque.
In two passes.
In the indicated sequence
Depending on the assembly.

Aluminium cylinder head cover.
- Preliminary tighten at: **8 Nm**.
- Tighten at: **30±3 Nm**.



Composite material cylinder head cover.
- Preliminary tighten at: **8 Nm**.
- Tighten at: **25±2 Nm**.

For composite material cylinder head covers, ensure that the heat shields are a least 2 mm away from the cylinder head cover.

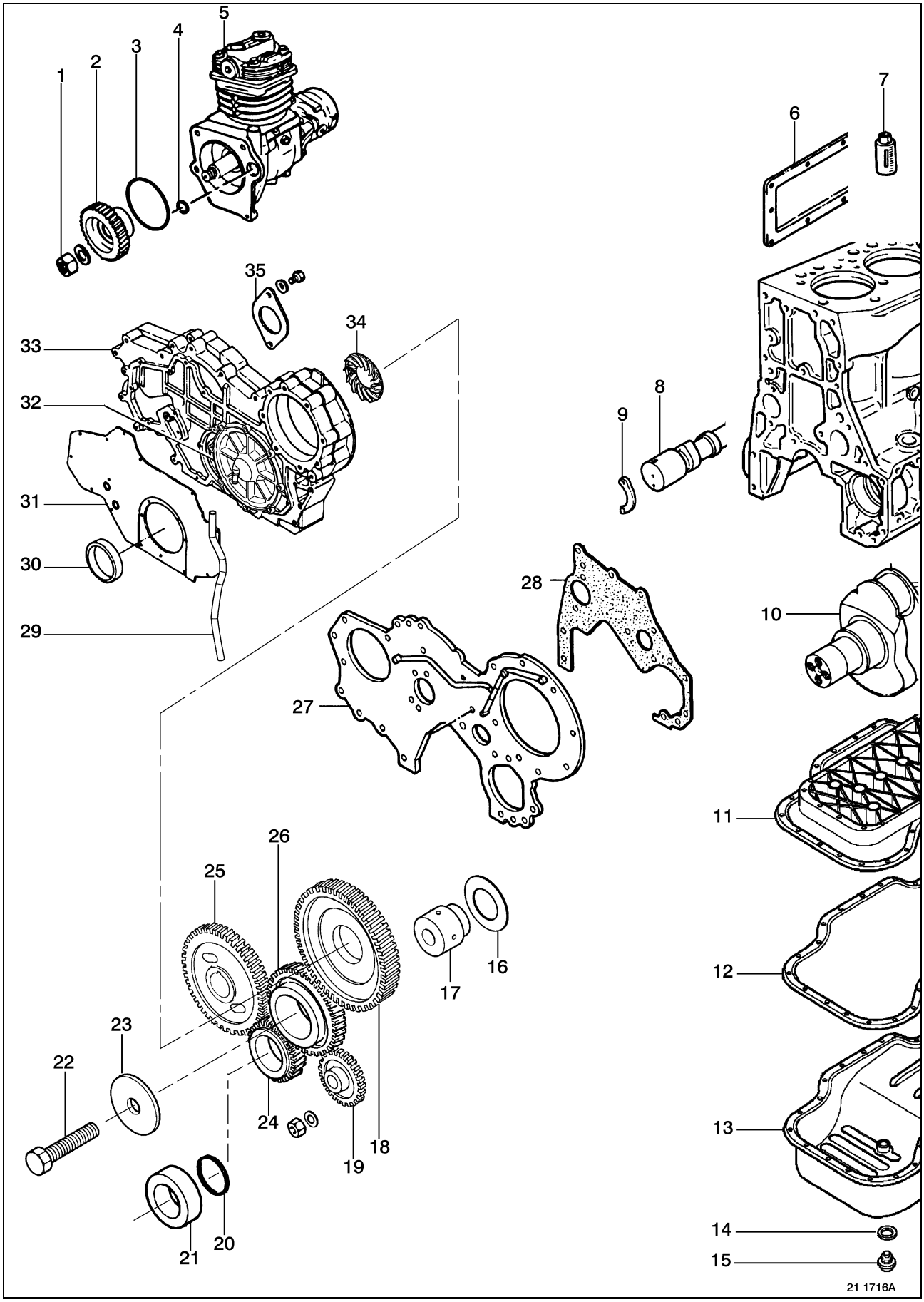


If the engine is equipped with an immersion heating rod:
- **It should not be connected unless the cooling system has been thoroughly drained.**
- **It should not be connected when the engine is started.**

In both cases, there is risk of destruction of the resistor.

TIMING

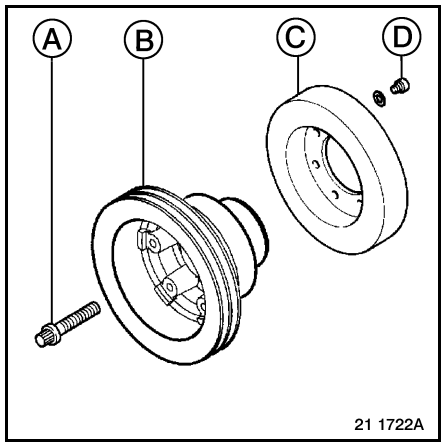
Exploded view



The item numbers indicated in the text refer to the drawing on page G-2.

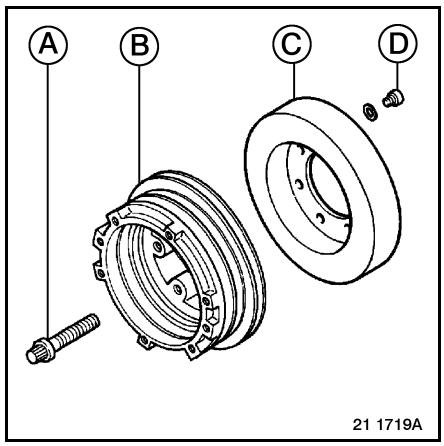
Removal

Remove setscrew **A**.
Remove damper **C**.
Withdraw spacer **(21)** (with 3-groove pulley only).
Take out O-ring **(20)**.



Disassembly

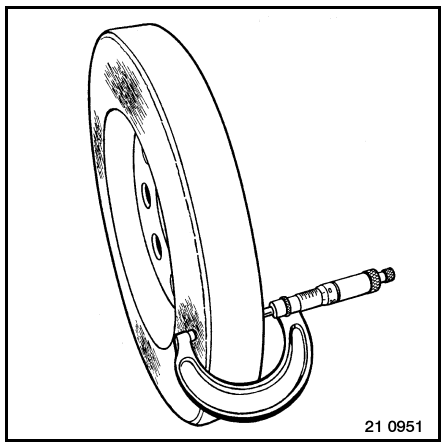
Remove setscrews **D**.
Remove pulley **B**.



Inspection

Check for the absence of:
- knock marks and bellmouthing of fixing holes.
- any cracks.
- points of impact.
- distortion on the outer part.
- convexity.
- noise when shaking the damper.

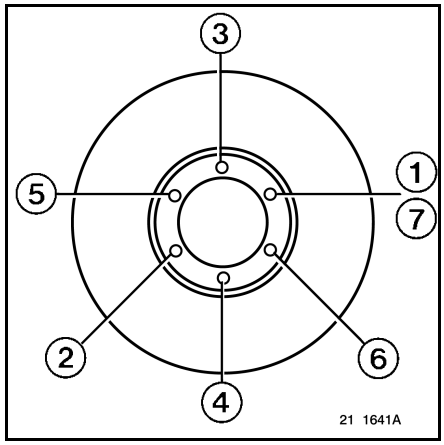
Remove the paint at 4 points on both sides and measure the thickness of the damper. The deviation between the check points should be less than 0.25 mm.
If any one of the above faults is noted, replace the damper.



Assembly

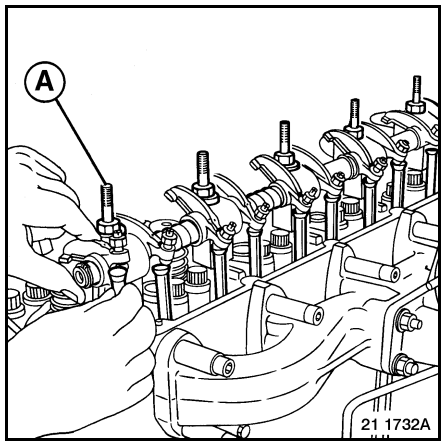
Install O-ring **(20)**.
Fit spacer **(21)** (with 3-groove pulley only).
Match the direction of orientation.
Assemble pulley **B** and damper **C**.
Follow the tightening sequence.
Tighten to torque.
Fit damper **B**.
Fit the setscrews **A**.
Tighten to torque.

- 1st phase at **100 Nm** (at least 3 diagonally opposed passes),
- 2nd phase at **60° ± 5** (at least 1 diagonally opposed pass).

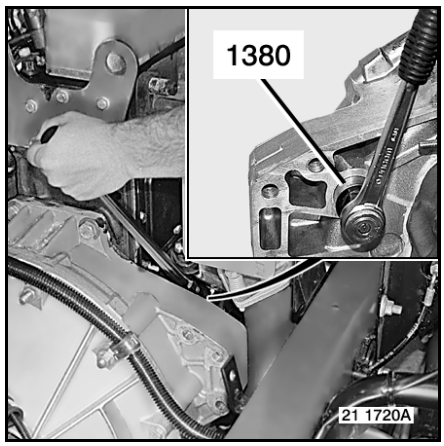


Disassembly

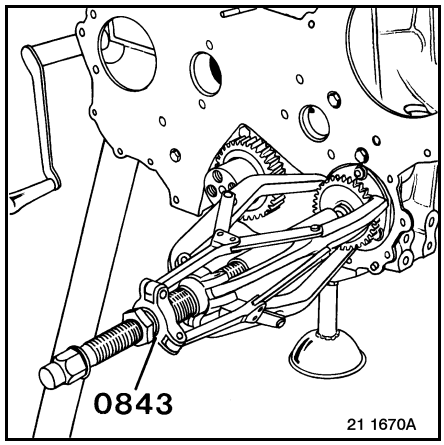
Remove the alternator.
Remove the water pump.
Take off breather plate **(32)**.
Remove the breather impeller **(34)**.
Remove the cylinder head cover.
Loosen setscrews **(A)**.
Remove the rocker assembly.
Withdraw the push-rods.



Immobilize crankshaft **(10)**.
Use tool **1380**.
Loosen the high pressure pump pinion nut.
Remove pump pinion **(18)**.
See "Fuel-injection" chapter.
Remove the high-pressure pump.
Remove the damper setscrews.
Remove damper **(C)**.
See page(s) G-3.
Remove compressor **(5)**.
Remove the air compressor spacer.
Take out seals **(3 - 4)**.
Remove oil sump **(13)**.
Remove the oil strainer.
Remove engine block stiffener **(11)**.
Remove engine block stiffener **(31)**.
Remove timing case **(33)**.
Remove setscrews.
Remove thrust bearing **(35)**.
Remove tappet cover **(6)**.
Withdraw tappets **(7)**.
Classify the parts in order.
Remove the nut.

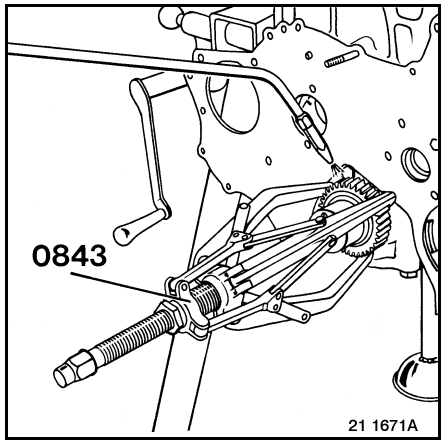


Extract pinion **(19)**.
Use tool **0843**.
Loosen nut.
Remove pinion **(19)**.

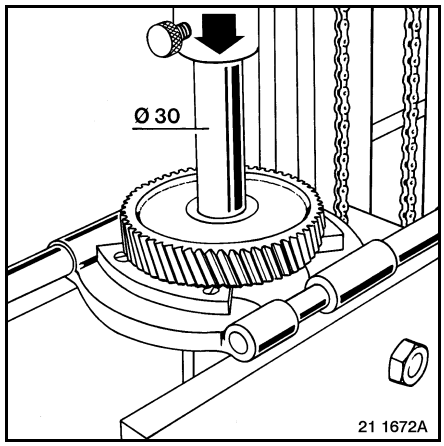


Intermediate gear
Remove setscrew **(22)**.
Withdraw washer **(23)**.
Remove pinion **(26)**.
Fit support **(17)**.
Withdraw washer **(16)**.
Remove setscrews.
Withdraw the oil pump.
Withdraw tool **1380**.
Remove the camshaft assembly **(8 - 25)**.

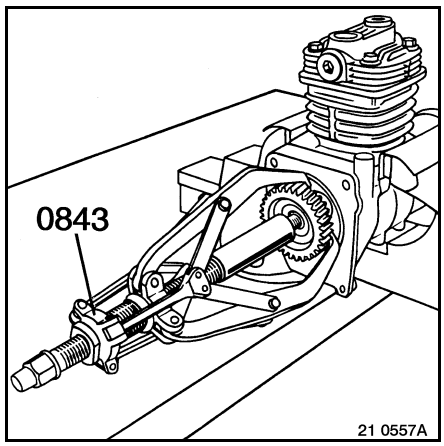
For replacement only.
Extract crankshaft pinion **(24)**.
Use tool **0843**.
Apply tension.
Heat part **(24)** to **200 °C.**
(Heat quickly).
Remove front plate **(27)**.
Take off seal **(28)**.
Remove thrust bearing **(9)**.
If necessary
Drill the crimpings to remove the lube pipe .



Extract pinion **(25)**.



Loosen nut **(1)**.
Extract pinion **(2)**.
Use tool **0843**.
Loosen nut **(1)**.
Remove pinion **(2)**.



Inspection

On the camshaft, inspect:
- Coaxiality.
- Cam lift.
- Bearing surface diameter.
- Bushes.

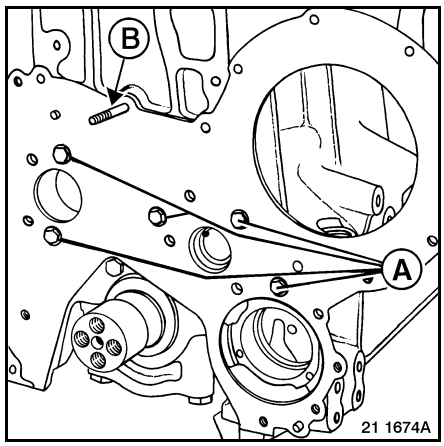
On the idler gear, inspect:
- Bush bore.
- Support diameter.

On the tappets, inspect:
- Diameter and housing.

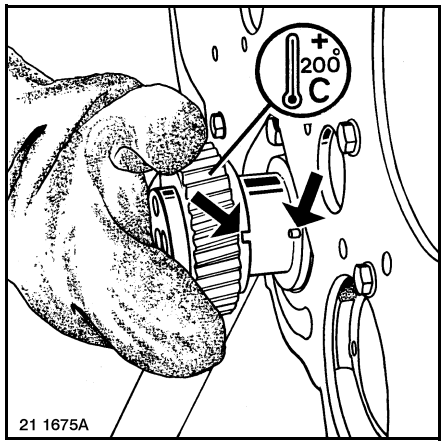
Assembly

Crimp the lube pipe.
Use tool **2659**.

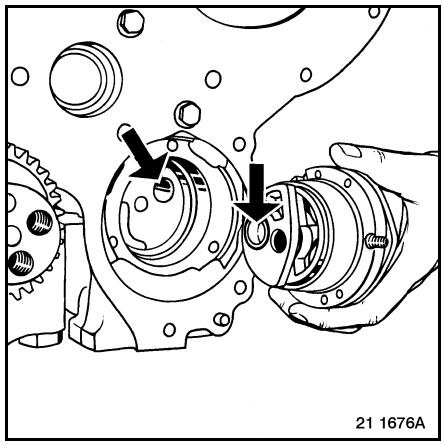
Install seal **(28)**.
Fit front plate **(27)**.
Fit the setscrews **(A)**.
Tighten to torque.
Install stop **(9)**.
Assemble stud **(B)** with **OLEOETANCHE 542** oiltight thread sealant.



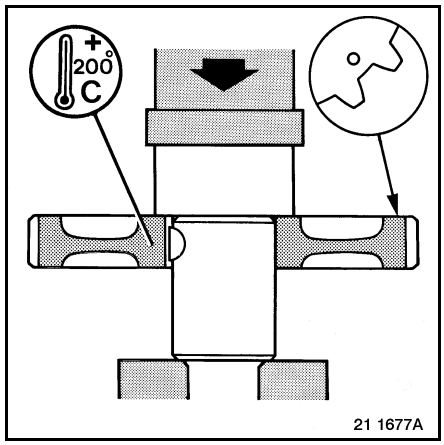
Fit the clamps.
Heat part **(24)** to **200 °C.**
Assemble gear **(24)**.



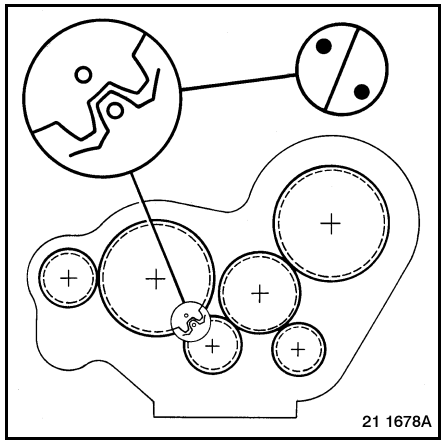
Install seals.
Apply oil.
Assemble the oil pump.
Line up the lubrication holes.
Fit the setscrews.
Use a thread locking product "**OLEOETANCHE 542**".
Tighten to torque.



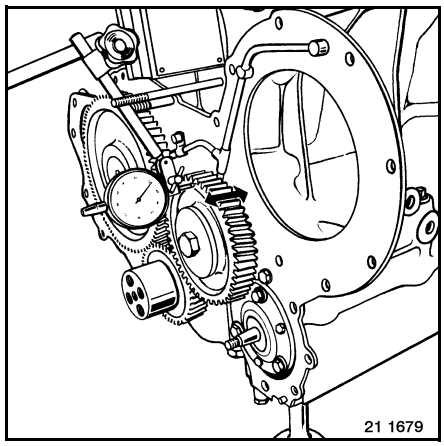
Install the key.
Heat part **(25)** to **200 °C.**
Assemble gear **(25)**.
Match the direction of orientation.
Use a press.



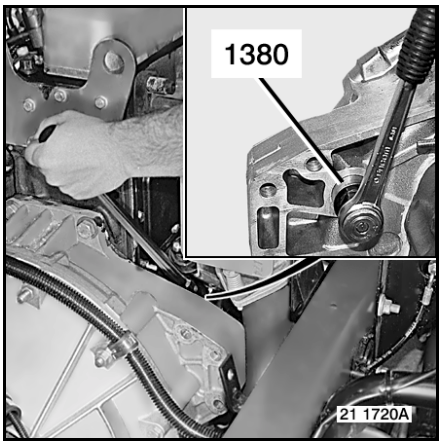
Apply oil.
Fit the camshaft assembly **(8 - 25)**.



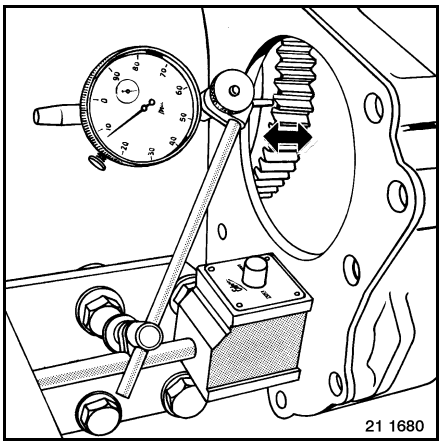
Intermediate gear
Fit the washer **(16)**.
Fit support **(17)**.
Apply oil.
Assemble gear **(26)**.
Fit the washer **(23)**.
Fit screw **(22)**.
Tighten to torque.
Check the play.



Immobilize crankshaft **(10)**.
Use tool **1380**.
Install oil pump pinion **(19)** .
Fit the washer.
Screw up nut.
Tighten to torque.
Install stop **(35)**.
Fit the setscrews.
Tighten to torque.
Fit timing case **(33)**.
Apply "**SILMATE RTV 1473**" oiltight threadlocking compound to give a fluidtight seal.
Tighten the setscrews.



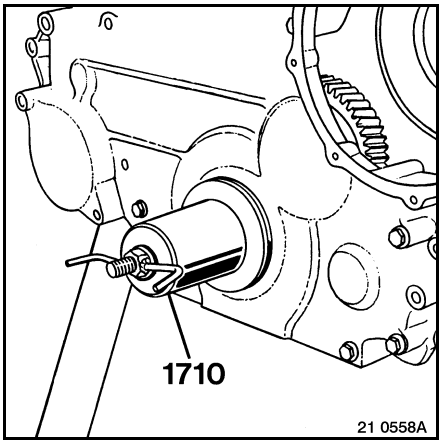
Check the play.



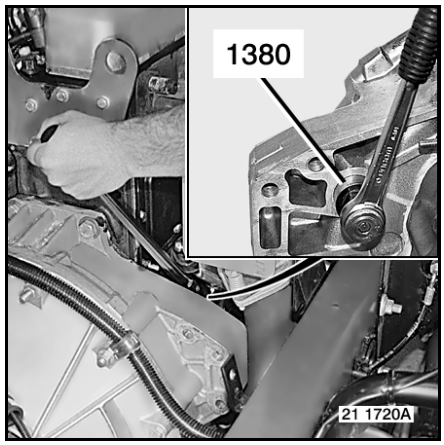
Install seal **(30)**.

Hold the seal on the protection ring until it is installed on the tool so as to avoid distortion of the lip.
Prior to assembly, oil the exterior of the seal - do not grease the lip.

Use tool **1710**.
Fit anti-rattle plate **(31)**.
Position spacer **(20)**.
Fit spacer **(21)**.
Match the direction of orientation.
Fit damper **B**.
See page(s) G-4.



Withdraw tool **1380**.

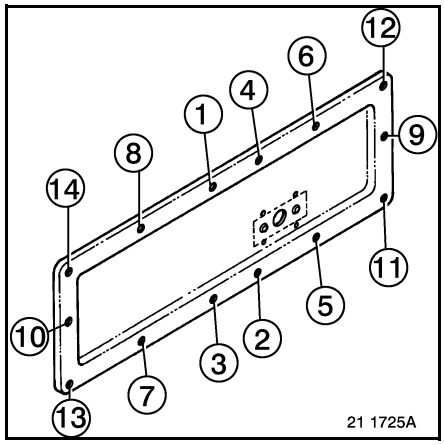


Engine block stiffener
Assemble engine block stiffener **(11)**.
Engine block stiffener **66 mm** thick
Apply "**SILMATE RTV 1473**" oiltight threadlocking compound to give a fluidtight seal.
Engine block stiffener **65 mm** thick
Install seal.
Offer up the engine block setscrews.
Preliminary tighten the flywheel housing setscrews or nuts at a torque of **5 Nm.**
Tighten the engine block setscrews at a torque of **28 ± 2.8 Nm.**

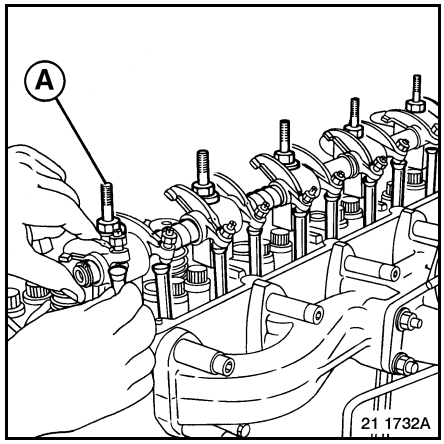
Depending on the assembly.
Tighten the flywheel housing setscrews at a torque of **55 Nm ± 5.5 Nm.**
Tighten the flywheel housing setscrews at a torque of **35 Nm ± 7 Nm.**
Fit the oil strainer.
Install seal **(12)**.
Fit the oil sump **(13)**.
Tighten **2** opposing setscrews in the central position, then tighten the peripheral setscrews.
Retighten the first **2** setscrews.

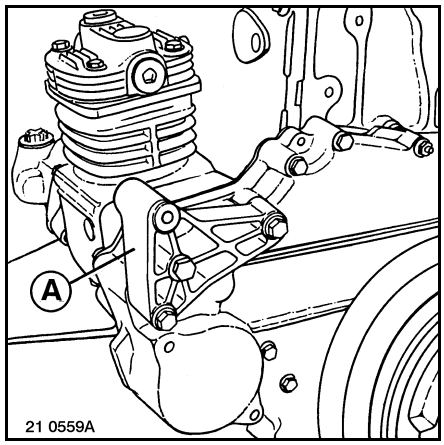
Tighten to torque.
Apply oil.
Put tappets **(7)** into place.
Put the push-rods into place.

Fit the tappet cover.
Apply a coat of "**RHODOSEAL 131**" tackifying primer.
Apply "**RHODORSEAL 5661**" oiltight threadlocking compound to give a fluidtight seal.
Follow the tightening sequence.
Preliminary tighten at **15 Nm.**
Tighten to torque.



Check that there are caps on the valve stems.
Remove the rocker assembly.
Tighten setscrews **A** moderately.
Tighten to torque.
Check the timing.

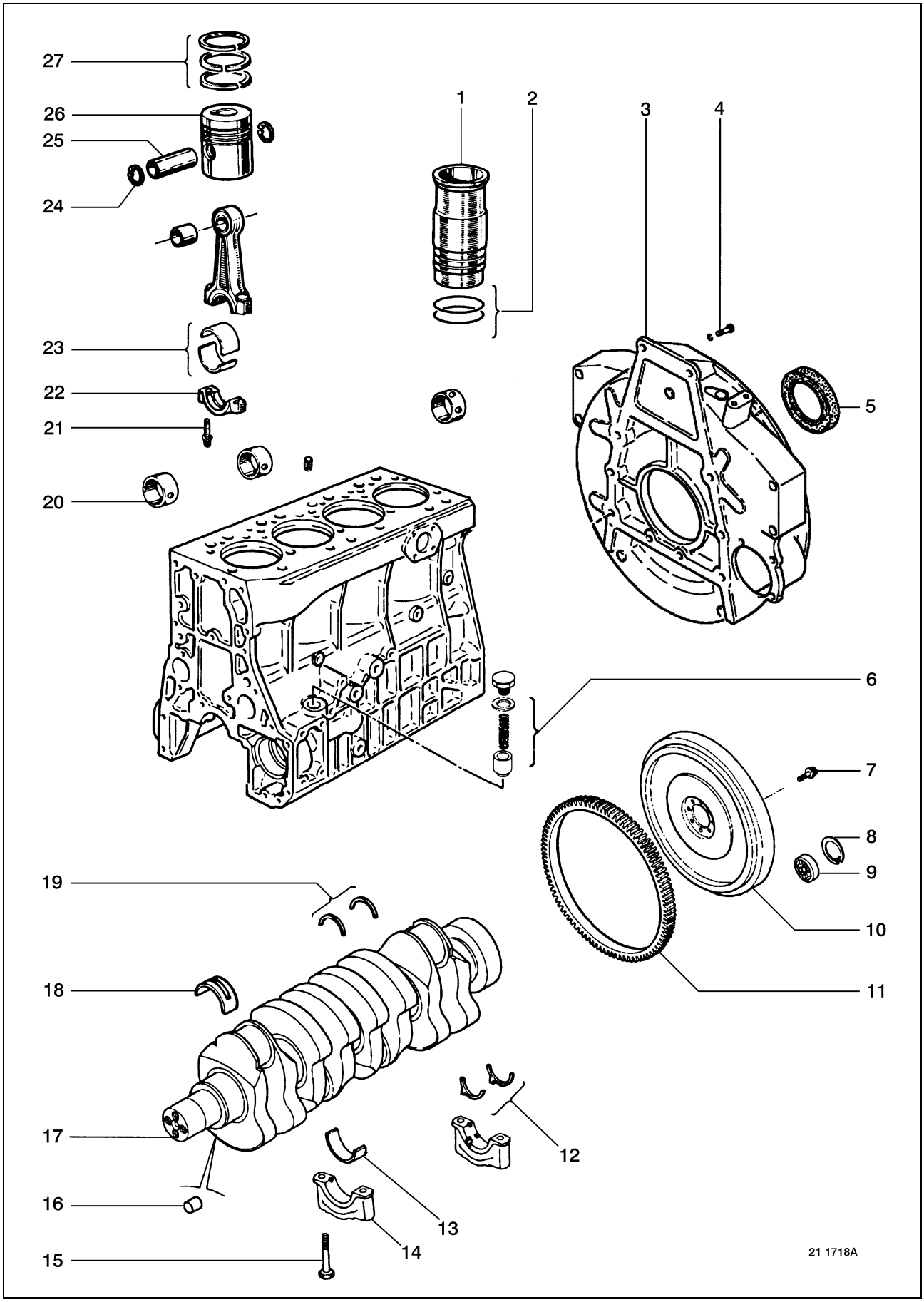




Position spacer **(3)**.
Position spacer **(4)**.
Install the air compressor spacer.
Fit the air compressor.
Fit support **A**.
Tighten the setscrews.
Assemble gear **(2)**.
Fit the washer.
Screw up nut **(1)**.
Tighten to torque.
Install and time the high pressure pump.
See page(s) K-25.
Tighten to torque.
Fit breather impeller **(34)**.
Fit the breather plate **(32)**.
Apply "**SILMATE RTV 1473**" oiltight threadlocking compound to give a fluidtight seal.
Tighten to torque.
Fit the rocker cover.
Fit the coolant pump.
Fit the alternator.
Fit and tension the drive belts.
Use tool **8251**.

RECIPROCATING GEAR

Exploded view

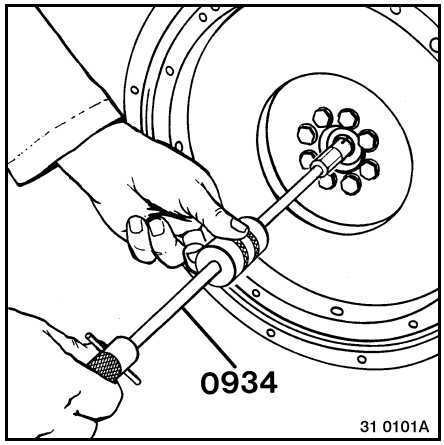


The item numbers indicated in the text refer to the drawing on page H-2.

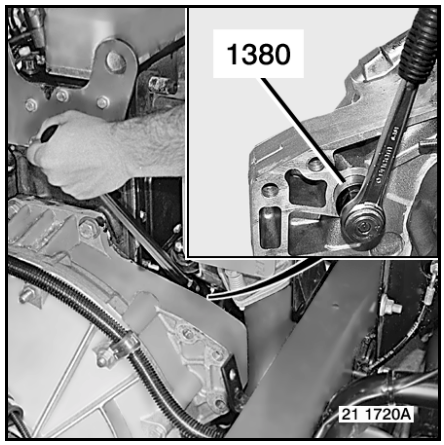
Disassembly

Remove the cylinder head.
Remove the timing gear.

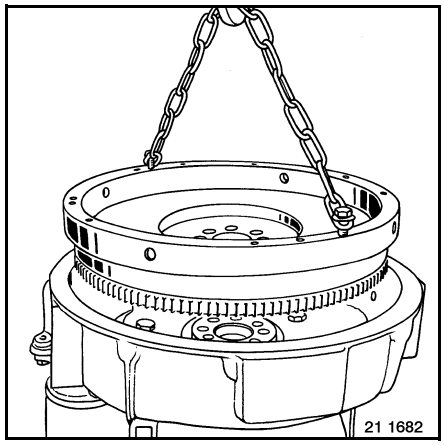
Remove circlip **(8)**.
Extract bearing **(9)**.
Use tool **0934**.



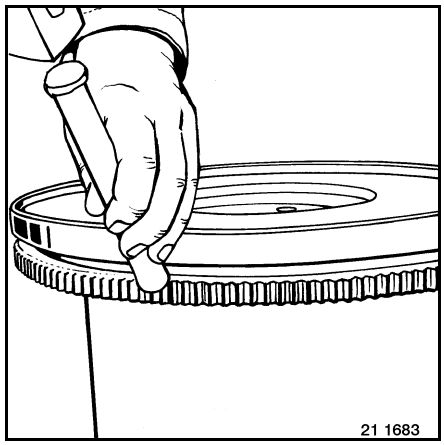
Immobilize crankshaft.
Use tool **1380**.
Tighten nuts **(7)**.
Withdraw tool **1380**.



Flywheel
Remove speed sensor.
Remove flywheel **(10)**.

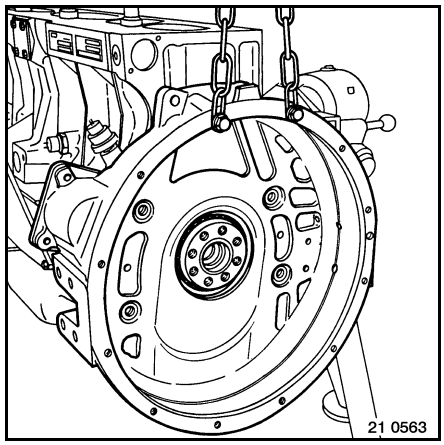


For replacement only.
Heat the part **(11)** to **200°C.**
Minimum heating time: **30** minutes.
Remove the gear ring **(11)**.

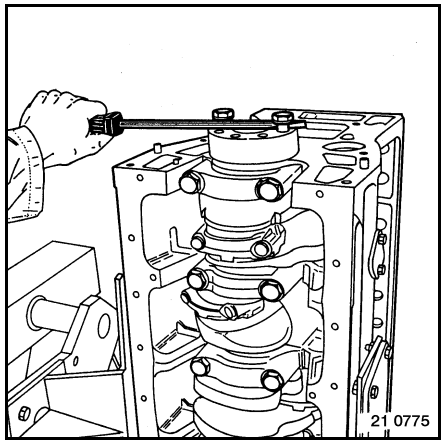


Tighten nuts **(4)**.
Remove the casing **(3)**.

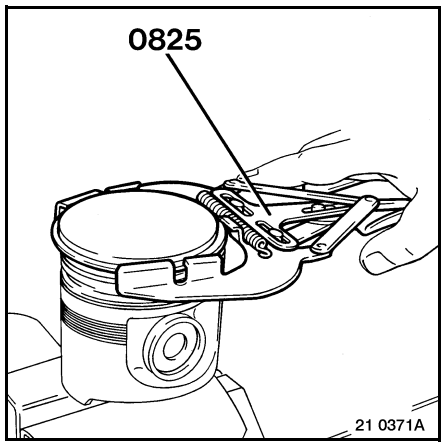
IT IS FORBIDDEN TO USE THE TAPPED HOLE (A) IN THE FLYWHEEL HOUSING AS LIFTING POINT.



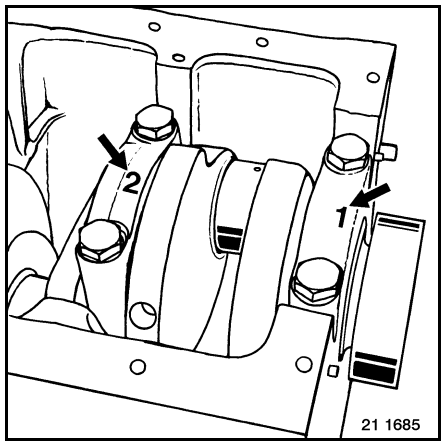
Check for the presence of connecting rod marks (camshaft side).
Tighten nuts **(21)**.
Remove connecting rod caps **(22)**.
Withdraw connecting rod/piston assemblies.
Remove bearing half-shells **(23)**.
Classify the parts in order.



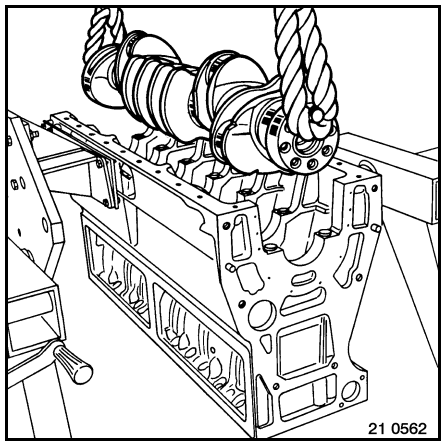
Remove piston rings **(27)**.
Use tool **0825**.
Withdraw circlips **(24)**.
Drive out gudgeon pins **(25)**.
Withdraw pistons **(26)**.



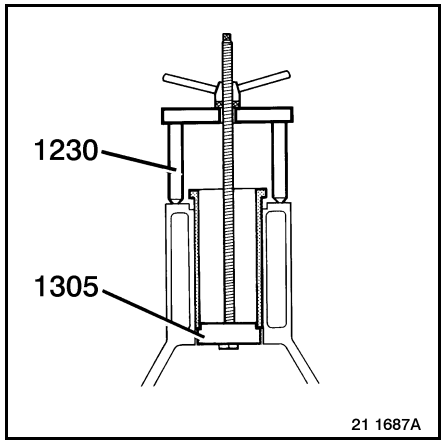
Check for the presence of main bearing cap marks.
Tighten nuts **(15)**.
Remove the bearing caps **(14)**.
Remove bearing half-shells **(13)**.
Classify the parts in order.
Remove the half-rings **(12)**.
Remove the half-rings **(19)**.



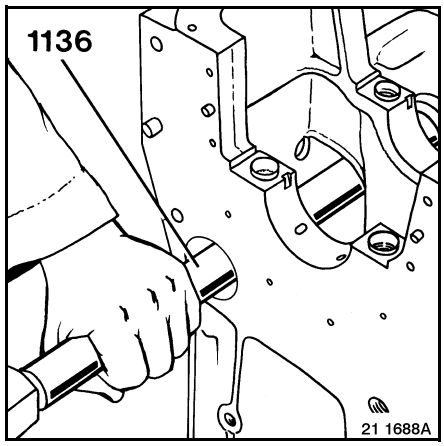
Remove crankshaft **(17)**.
Remove bearing half-shells **(18)**.
Remove the pressure relief valve **(6)**.



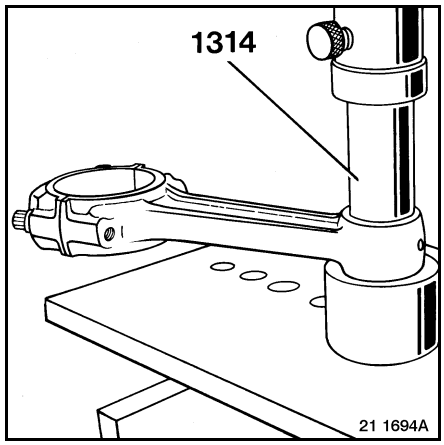
Liners
If necessary
Withdraw liners **(1)**.
Use tool **1230** + **1305**



Camshaft bushes
If necessary
Withdraw bushes **(20)**.
Use tool **1136**.

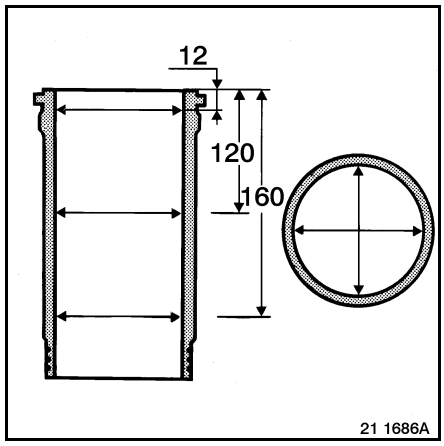


Connecting rods
If necessary
Withdraw bushes.
Use tool **1314**.



Inspection

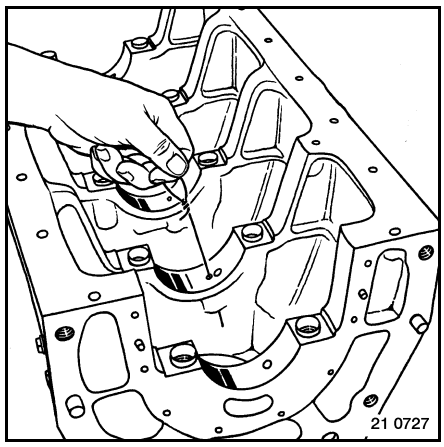
Liners
Inspect the liners
- out-of-round,
- taper.



Cylinder block
Check the mating surface.
Thoroughly clean all conduits.

Camshaft bushes
Check bushes.

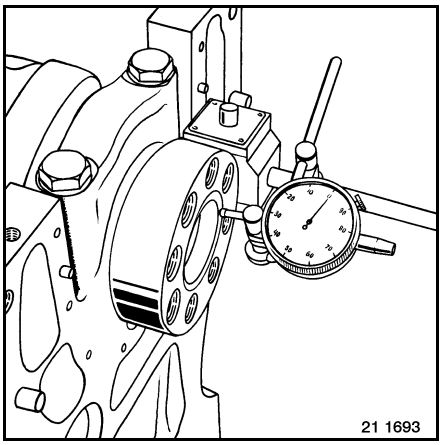
Crankshaft
Inspect the crankshaft:
- co-axiality,
- crankpin diameters,
- crank journal diameters.



Straightening of the crankshaft is forbidden.

Thoroughly clean all the crankshaft channels and passages.
Check the shell bearings **(13 - 18)**.

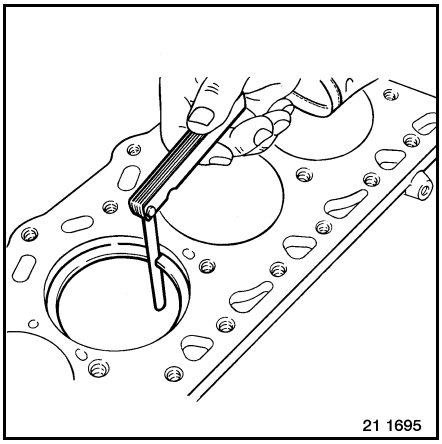
Check the clearance.
Correct, if necessary.



Connecting rods
Inspect the connecting rods::
- weight,
- squareness and truing up,
- bushes.

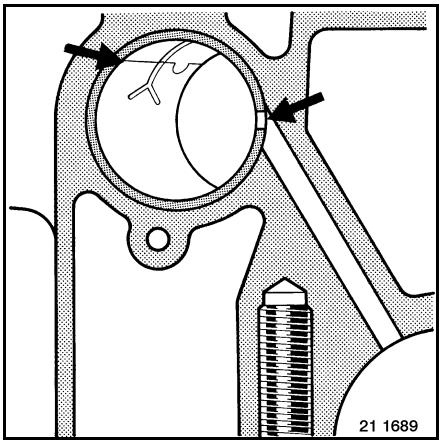
Pistons
Inspect the pistons:
- weight,
- diameter,
- gudgeon pin and its housing,
- ring grooves.

Inspect the piston rings:
- thickness,
- piston groove clearance,
- joint gap.

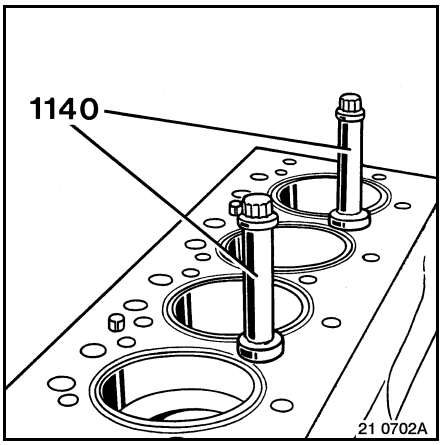


Assembly

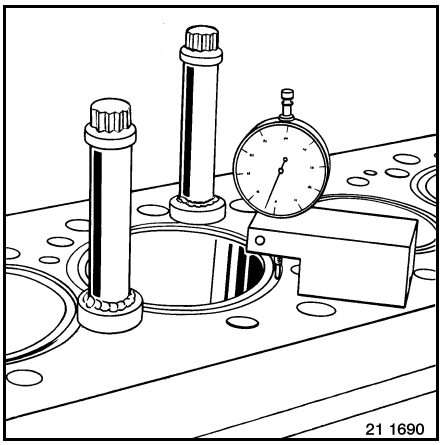
Camshaft bushes
Apply tallow.
Match the direction of orientation.
Line up the lubrication holes.
Use tool **1136**.



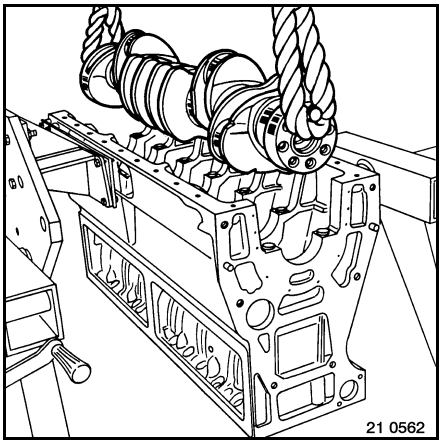
Liners
Install seals.
This operation requires special care.
Apply oil **SAE J 1703**.
Fit liners **(1)**.
Immobilize the liners.
Use tool **1140**.
Check the protrusion of the liners.



Crankshaft
Fit bearing half-shells **(18)**.
Apply oil.



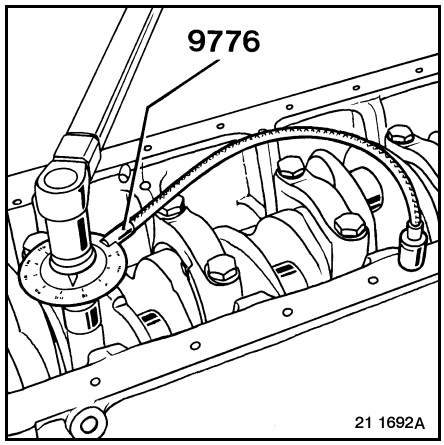
Fit crankshaft.
Install thrust half-rings **(19)**.



Apply oil.
Install thrust half-rings **(12)**.
Fit bearing caps **(14)**.

The setbolts should not be oiled when refitted.

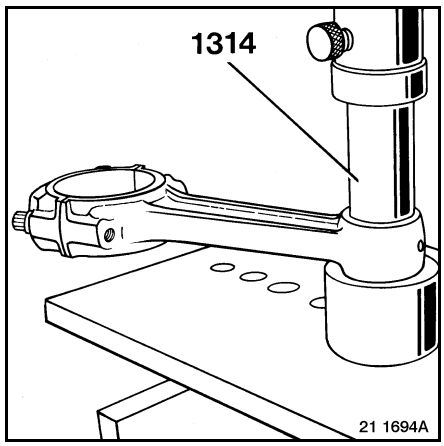
Tighten to torque.
Use tool **9776**.
Check the rotation.



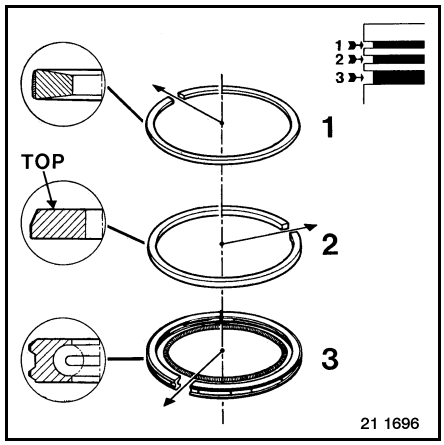
It is essential to replace crankshaft bearing setbolts whenever the crankshaft is dismantled.

Connecting rods
Apply tallow.
Line up the lubrication holes.
Fit bushes.
Use tool **1314**.
Reamer out.

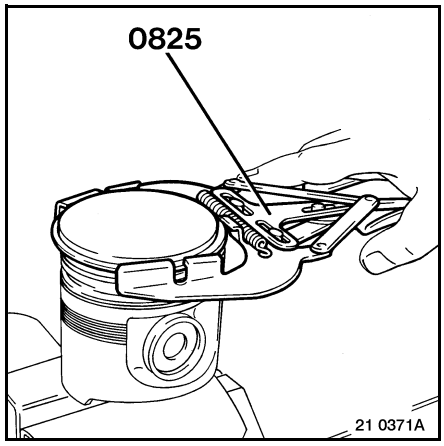
Join together connecting rods/pistons.
Match the direction of orientation.
See following page(s).



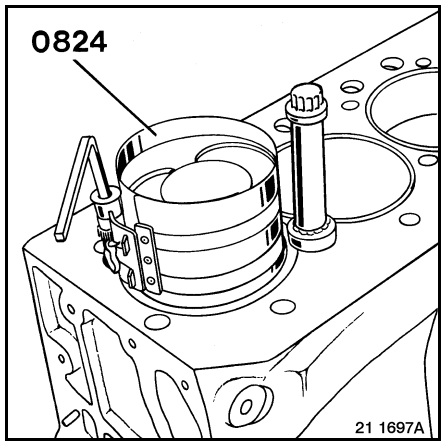
Piston rings
Install piston rings **(27)**.



Use tool **0825**.
Fit bearing half-shells **(23)**.
Apply oil.

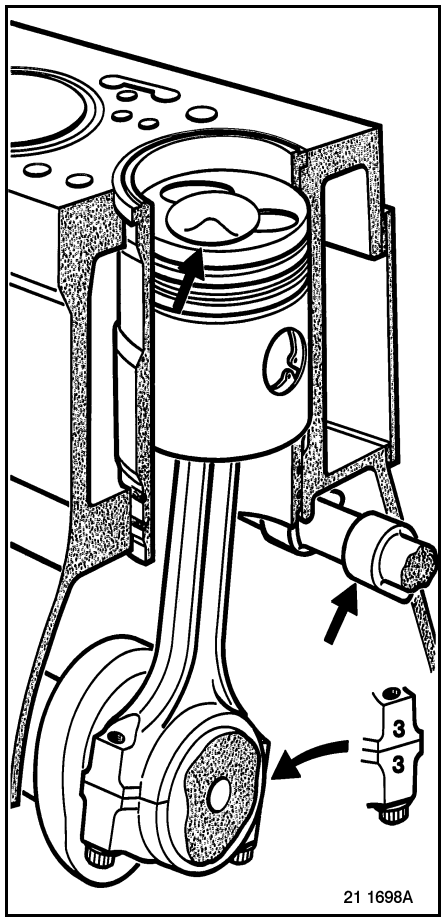


Assemble connecting rod/piston assemblies.
Use tool **0824**.



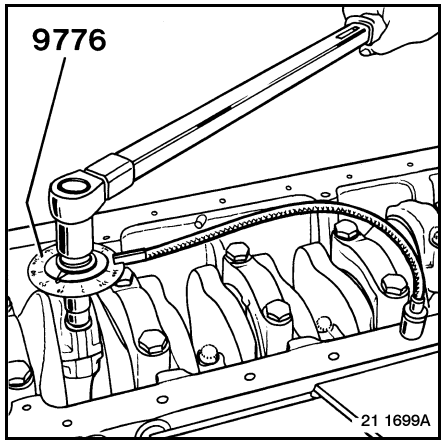
Connecting rod / piston assembly
Match the direction of orientation.
Since the connecting rods are symmetrical, there is no functional direction of assembly. For ease of assembly reasons, direct the marks towards the camshaft end.
Check the clearance between the bearing half-shells and the crankshaft (product used: "**Plastigage Perfect Circle**")
Place a plastic strip on the crankpin or on the main journal. Assemble the corresponding bearing cap fitted with half-shell. Tighten to torque. Disassemble the bearing and measure the width of the strip.

Prior to tightening the connecting rod cap to measure play, push the connecting rod hard up against the crankshaft.

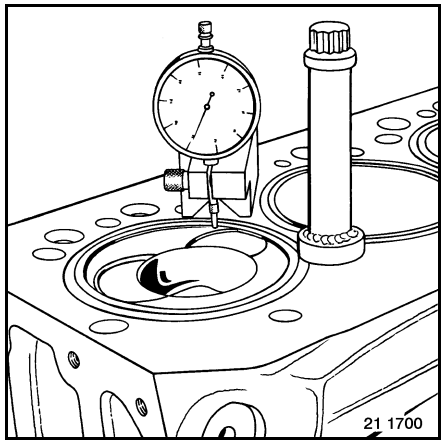


Fit the setscrews **(21)**.
Tighten to torque.
Use tool **9776**.
Check for free rotation.

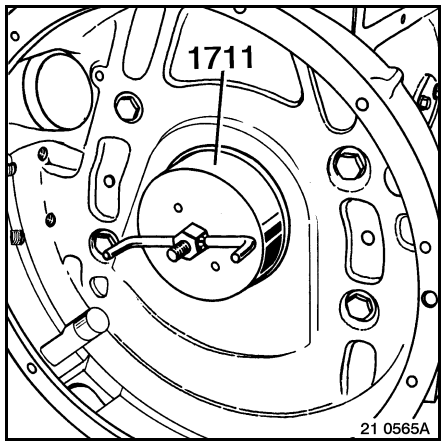
It is essential to replace crankshaft bearing setbolts whenever the crankshaft is dismantled.



Check the pistons protrusion.

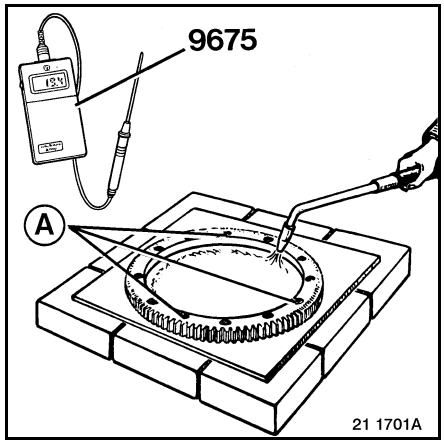


Apply oil.
Fit the relief valve **(6)**.
Flywheel housing thickness **124 mm**:
Apply "**FROMETANCH 572**" oiltight threadlocking compound to give a fluidtight seal.
Fasten casing **(3)**.
Tighten to torque.
Flywheel housing thickness **123 mm**:
Install seal.
Fasten casing **(3)**.
Tighten to torque.
Install seal **(5)**.
Use tool **1711**.



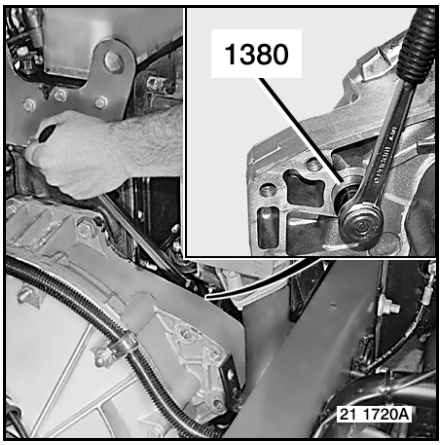
Leave the seal on its protective ring until fitting it the tool, so as to avoid damage to the lip.
Before assembly, oil the outsideof the seal, and do not grease the lip.

Heat the part **(11)** to **200°C.**
Use tool **9675**.
If a welding torch is used, take a sheet metal plate and heat it to distribute the heat evenly. Check the temperature at 3 points **A**.



Fit crown wheel **(11)**.
Match the direction of orientation.
Fit the engine flywheel **(10)**.
Fit the setscrews **(7)**.
Ensure a seal with "**OLEOETANCHE 542**" oiltight compound.

Immobilize crankshaft.
Use tool **1380**.
Tighten the flywheel in diametrically opposed sequence.
Tighten to torque.

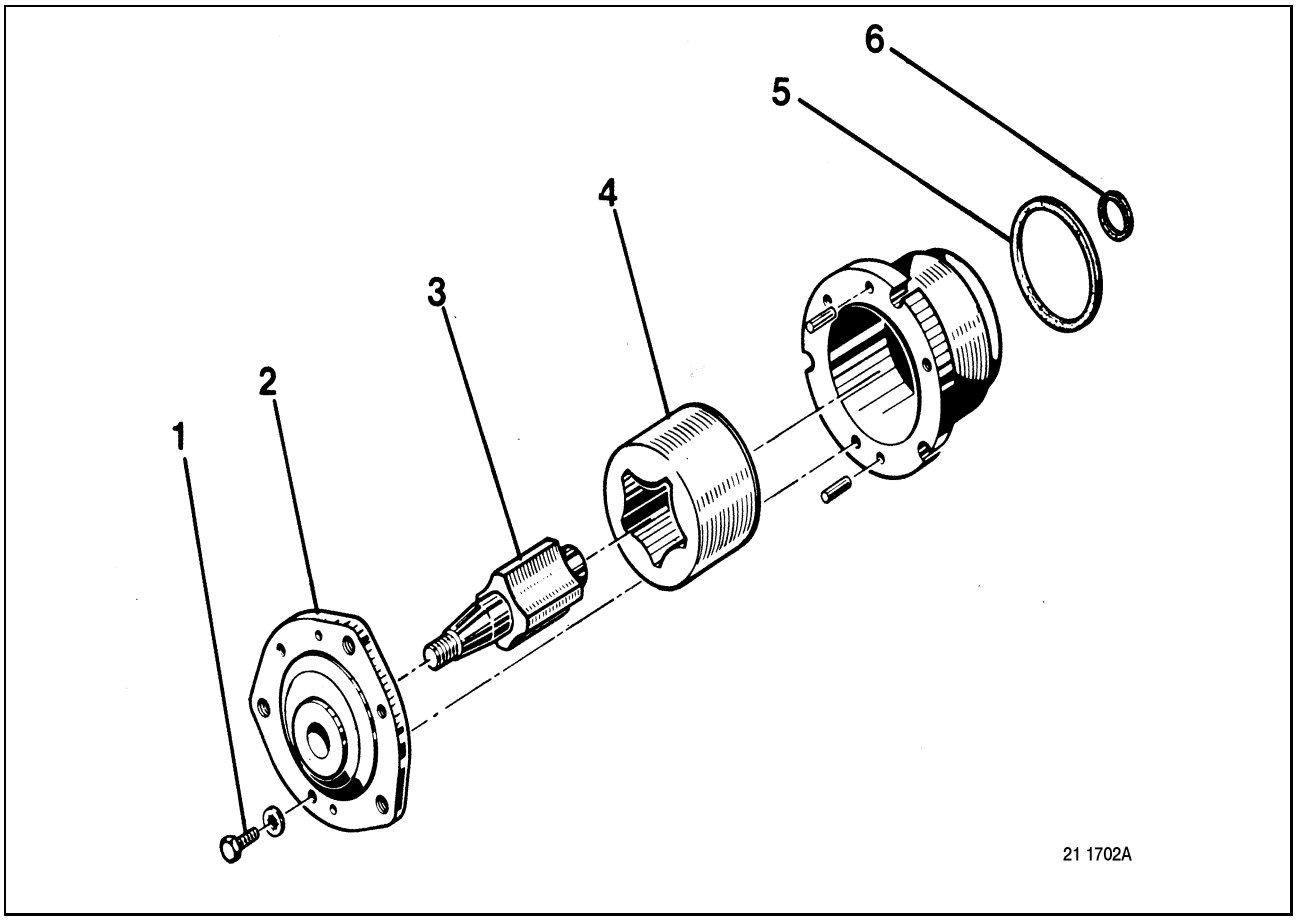


Re-use of setscrews
These setscrews can be re-used no more than once.
Whenever you re-use them, mark the screw with an indentation using a centre punch.
It is vital to replace any setscrews already bearing a centre punch mark.
Withdraw tool **1380**.
Install bearing **(9)**.
Install circlip **(8)**.
Fit the starter motor.
Fit the timing gear.

LUBRICATION

Oil pump

Disassembly / assembly

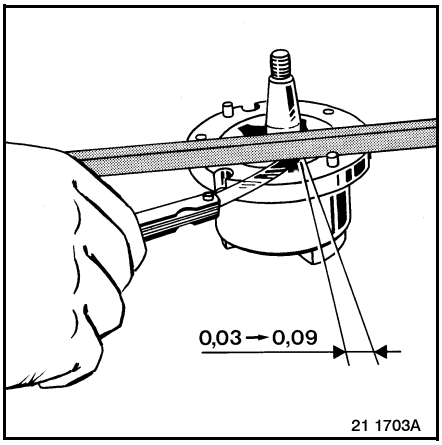


The item numbers indicated in the text refer to the drawing on page I-1-2.

Disassembly
Tighten nuts **(1)**.
Remove cover **(2)**.
Withdraw rotors **(3 - 4)**.
Take out seals **(5 - 6)**.

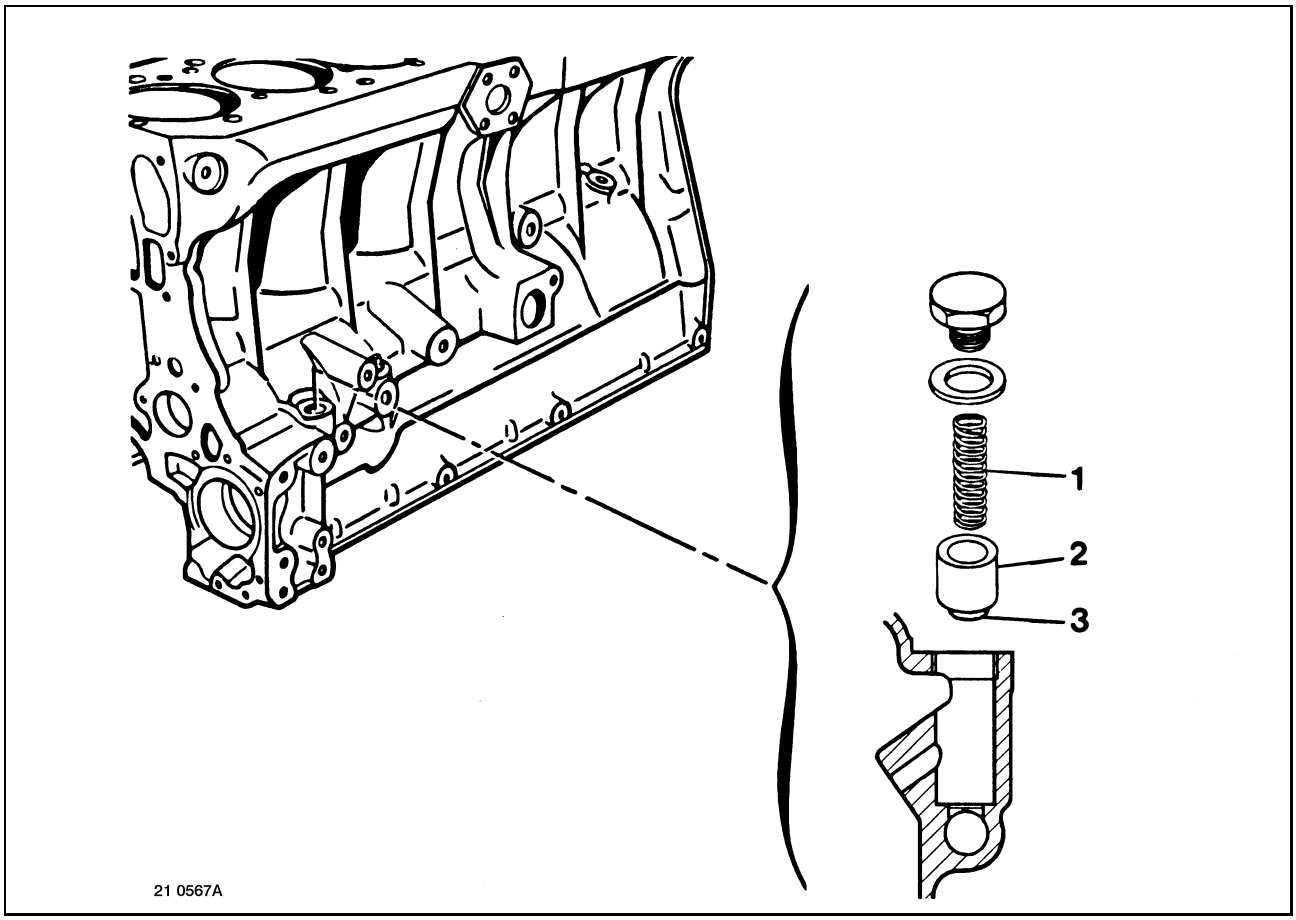
Assembly
Install seals **(5 - 6)**.
Install rotors **(3 - 4)**

Check the clearance.
Apply oil.
Position cover **(2)**.
Fit the setscrews **(1)**.
Tighten to torque.



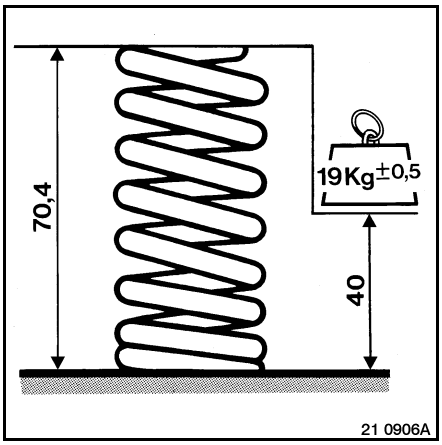
Relief valve

Inspection

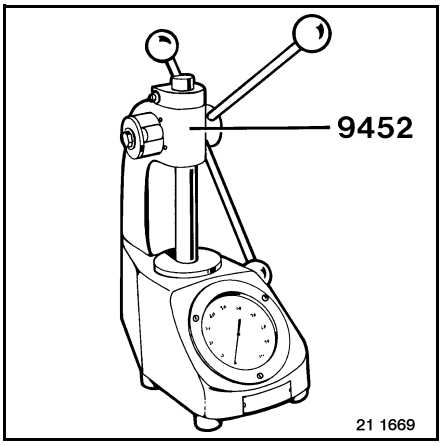


The item numbers indicated in the text refer to the drawing on page I-2-1.

Check piston **(2)**.
Clean sized hole **(3)**.
Check the setting of spring **(1)**.



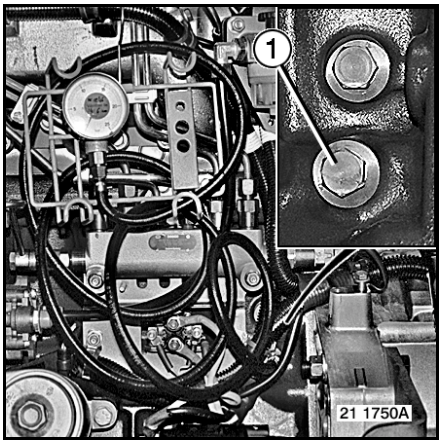
Use tool **9452**.



Checking the oil pressure

Remove plug **(1)**.
Use tool **1246**.

Throw-away oil filter cartridge
To replace, unscrew the cartridge.
Upon fitting:
Fill the cartridge with oil.
Oil the seal
Screw up the cartridge(s) until contact is made with the support bracket.



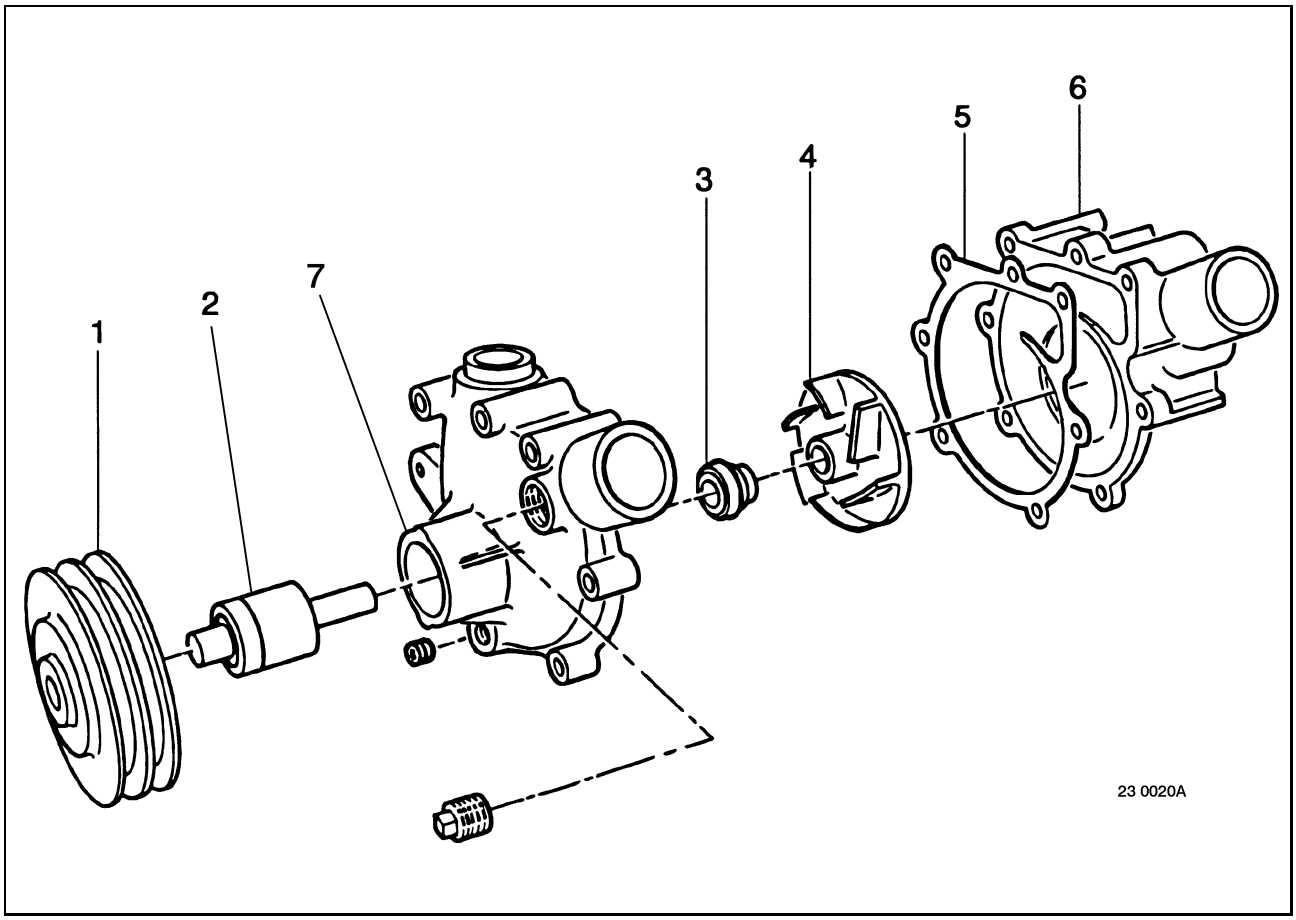
- **Tighten at a torque of 25±5 Nm**
- **Use tool 2684**
- **Use a torque wrench**

Run the engine and check for leaks.
In the event of leakage, remove the cartridge(s), inspect the joint face and repeat the fitting operations.

COOLING

Water pump

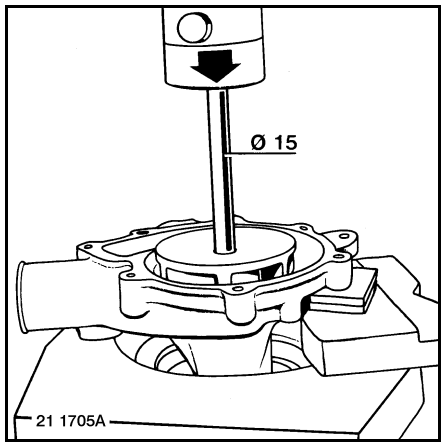
Exploded view



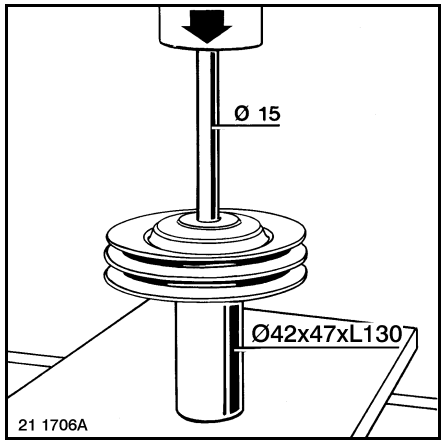
The item numbers indicated in the text refer to the drawing on page J-1-2.

Disassembly

Remove cover **(6)**.
Withdraw gasket **(5)**.
Drive out shaft **(2)**.
Use a press.

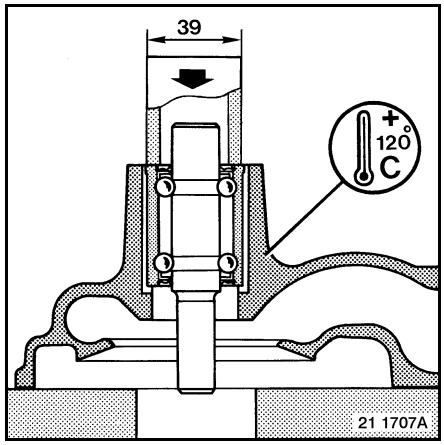


Separate pulley **(1)** from shaft **(2)**.
Use a press.
Withdraw "Cyclam" ring **(3)**.

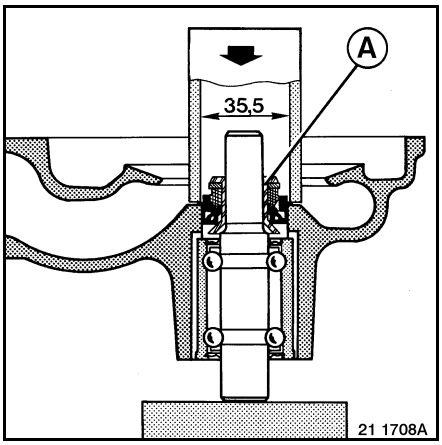


Assembly

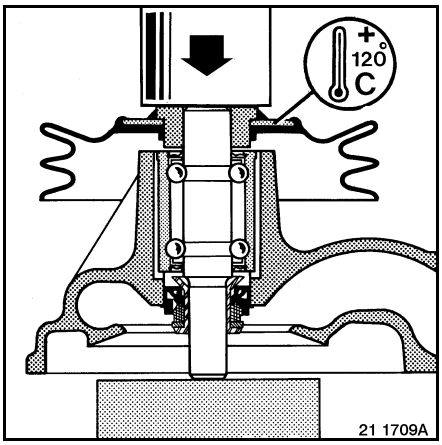
Heat the part **(7)** to **120°C.**
Fit the shaft **(2)**.
Use a press.
Let cool.



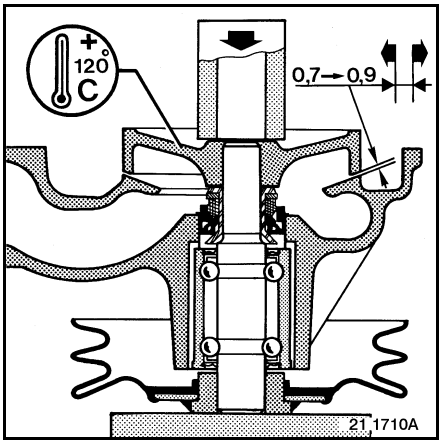
Assemble "Cyclam" ring **(3)**.
A = Water + **10**% liquid soap.



Heat the part **(1)** to **120°C.**
Assemble the pulley **(1)**.
Use a press.



Heat the part **(4)** to **120°C.**
Assemble impeller **(4)**.
Ensure correct clearance.
Use a press.
Install seal **(5)**.
Position cover **(6)**.
Fit the setscrews.
Tighten to torque.



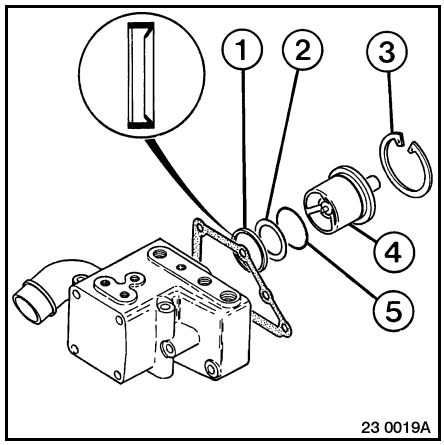
Thermostat

Disassembly / assembly

Depending on the assembly.

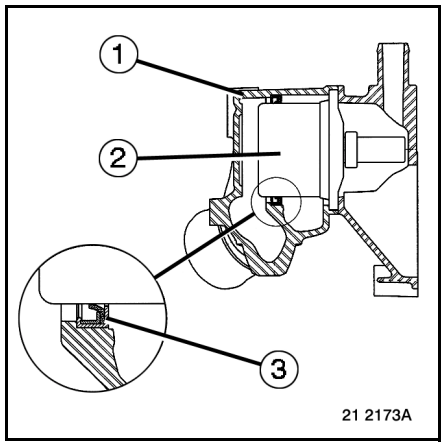
Remove thermostat housing.
Remove circlip **(3)**.
Remove thermostat **(4)**.
Take out O-ring **(5)**.
Fit nuts **(2)**.
Withdraw seal ring **(1)**.

Upon assembly
Fit seal ring **(1)**.
Match the direction of orientation.

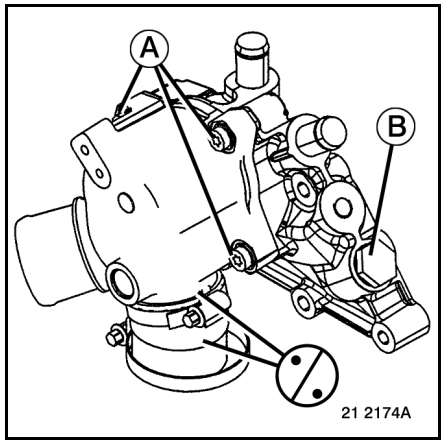


Remove thermostat housing **(1)**.
Remove thermostat **(2)**.
Withdraw seal ring **(3)**.

Upon assembly
Fit seal ring **(3)**.
Fit dry.



Match the direction of orientation.
Tighten setscrews **(A)** at a torque of **18±3.5 Nm.**
Tighten plug **(B)** at a torque of **25±5 Nm.**

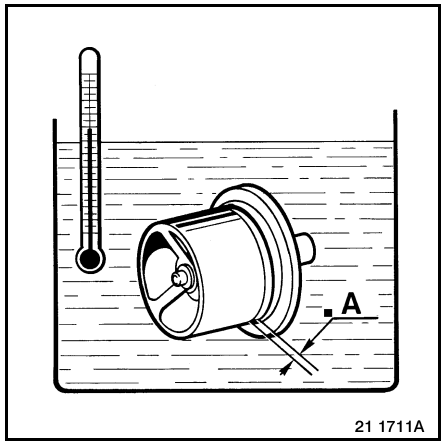


Inspection

Plunge the thermostat in a water bath. Heat progressively while stirring the water. Check the temperature at the commencement of opening. Measure dimension **(A)** at a temperature of **96°C.**
Beginning of opening: **86**°C ± **1.5**.

Thermostat with circlip.
A = **7.9 mm.**

Thermostat without circlip.
A = **10.2 mm.**



INJECTION

Description of system

"COMMON RAIL" electronic fuel-injection system components:

- Electronic control unit (ECU) **(1)**
- Fuel hand priming pump and prefilter **(3)**
- Booster pump **(4)**
- Fuel filters **(5)**
- Fuel metering housing **(6)**
- Scavenge valve **(7)**
- Fuel flow regulation solenoid valves **(8)**
- High pressure pump **(9)**
- Common rail **(10)**
- Rail pressure limiter **(11)**
- Fuel injectors **(13)**
- Rail pressure sensor **(14)**
- Flywheel speed sensor **(20)**
- High pressure pump speed sensor **(21)**
- Flow limiters **(12)**
- Cooling circuit temperature sensor **(17)**
- Boost air pressure and temperature sensor **(19)**
- Engine oil level sensor **(18)**
- Engine oil pressure sensor **(15)**
- Engine stop control (cab tilted) **(23)**
- Fuel tank **(29)**
- Alert warning lamp **(25)**
- Fuel filters clogging sensor **(30)**

Information delivered by sensors common to several functions

These information items are collected by vehicle management ECU **(26)**, which sends them to the different peripheral systems ECUs and to the engine ECU in digital form via "CAN BUS" **(27)**.

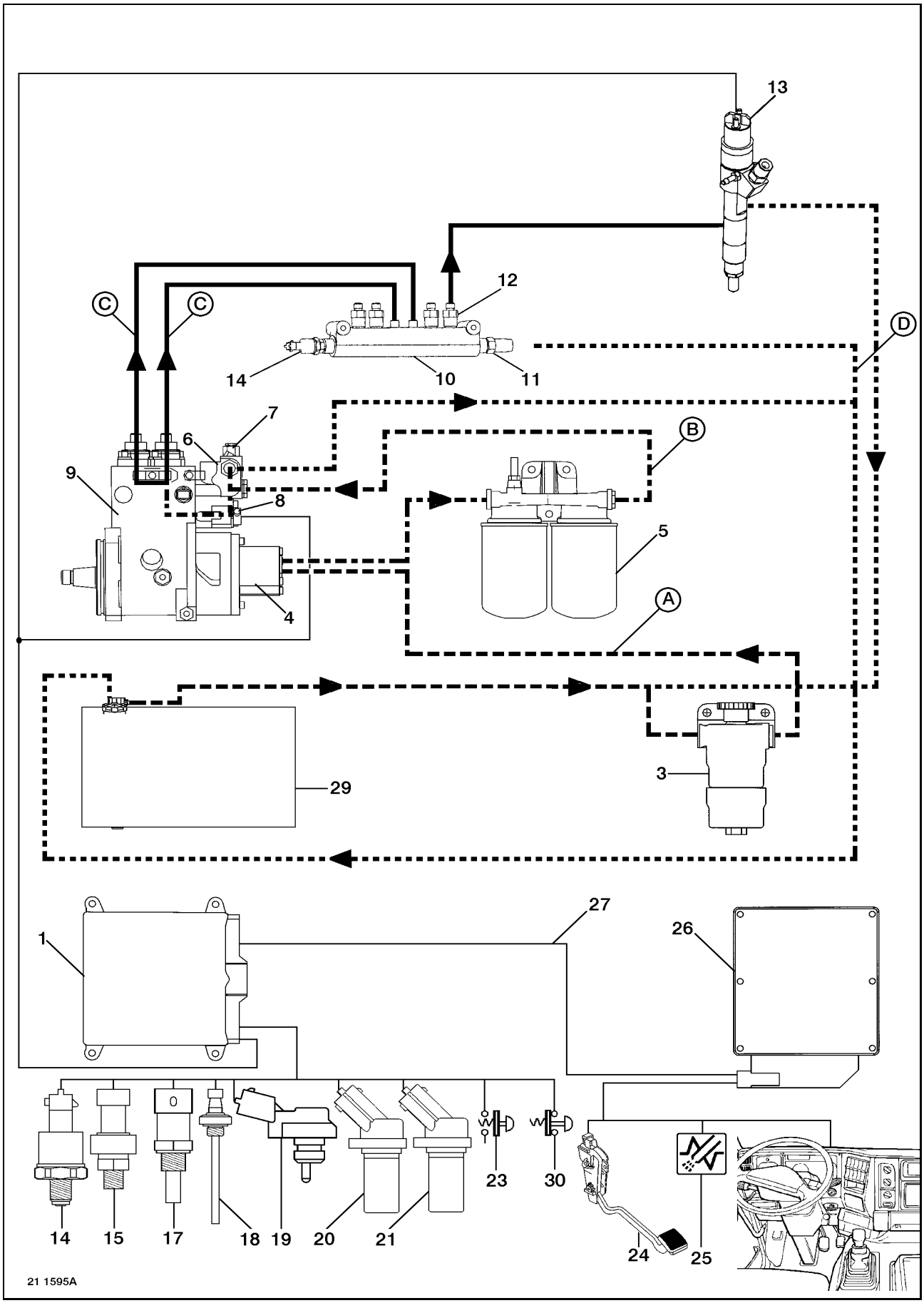
Examples:

- Engine temperature, oil pressure...
- Tachograph speed information
- Accelerator pedal position sensor **(24)** information
- PTO information
- Braking information
- Engine immobilizer information

Hydraulic circuits:

- **(A)**: Aspiration
- **(B)**: Low pressure
- **(C)**: High pressure
- **(D)**: Leak-off return to fuel tank

*For work on the engine wiring harness, use tool **2589***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Operation of the system

The new pollutant emissions and harmful noise standards and the research into controlling vehicle operating costs have led to the advent of more precise and more sophisticated fuel-injection systems in the matter of environmental protection and specific fuel consumption.
To meet these requirements, the "COMMON RAIL" fuel-injection system operates according to the following principles:

- High pressure variable according to engine needs independent of load and rotating speed,
- Timing variable according to engine needs independent of load and rotating speed,
- Pressure-time type fuel metering,
- Pre-injection if required (to reduce engine knock),
- Multi-point injection managed integrally by onboard electronics.

Fuel metering and injection:
The fuel stored in the fuel tank is aspirated by the booster pump and sent at low pressure to the high pressure pump inlet. The high pressure value (200 to 1400 bars) is determined by the amount of fuel taken in by the high pressure pump. This quantity is piloted by flow regulation solenoid valves located in the metering housing. The fuel is directed to the common rail, then distributed to the injectors whose opening is controlled electrically by the ECU. The flow limiters forbid leaks in the high pressure circuit downstream from the rail in the event of component fracture (pipe...) and protect the engine in the event of injector malfunction.
To manage the system, the ECU receives information from:

- Vehicle electronic control unit "VECU",
- Common rail pressure sensor,
- Flywheel and high pressure pump speed sensors,
- Cooling circuit temperature sensor,
- Accelerator pedal position sensor,
- Boost air pressure and temperature sensor,
- Cruise control and idling adjustment control.

Functions ancillary to the "COMMON RAIL" system:

- Engine cooling management,
- Cruise control,
- Engine immobilizer,
- Engine protection (overheating, torque limitation),
- Exhaust brake management,
- Adjustable idling variable according to conditions (air conditioning, engine temperature),
- Fast idling adjustable from the driving position.

Operation in fall-back mode
Detected faults change the features provided by the system to fall-back mode, the effects of which are felt more or less while driving:

- Reduction of maximum rail pressure (several levels),
- Longer starting time,
- Stopping of operation of retarder,
- Stopping of operation of one or several injectors,
- Etc.

Depending on the gravity of the fault, the consequences might be negligible (e.g. an engine speed sensor) or seriously affect the features provided by the system, which may go as far as forbidding starting. With the aim of minimum vehicle lay-up, in the event of not too serious a fault, the ECU functions by approximate calculation on the basis of values that are still available or by means of values contained in the mapping.

Whatever the fault, it is absolutely essential to get the system overhauled as soon as possible.

Layout of components on-vehicle

See following page(s).

Fuel aspiration circuit
- Injectors aspiration and leak-off return pipe **(1)**
- Fuel hand priming pump and prefilter **(2)**
- Rail leak-off return pipe **(3)**

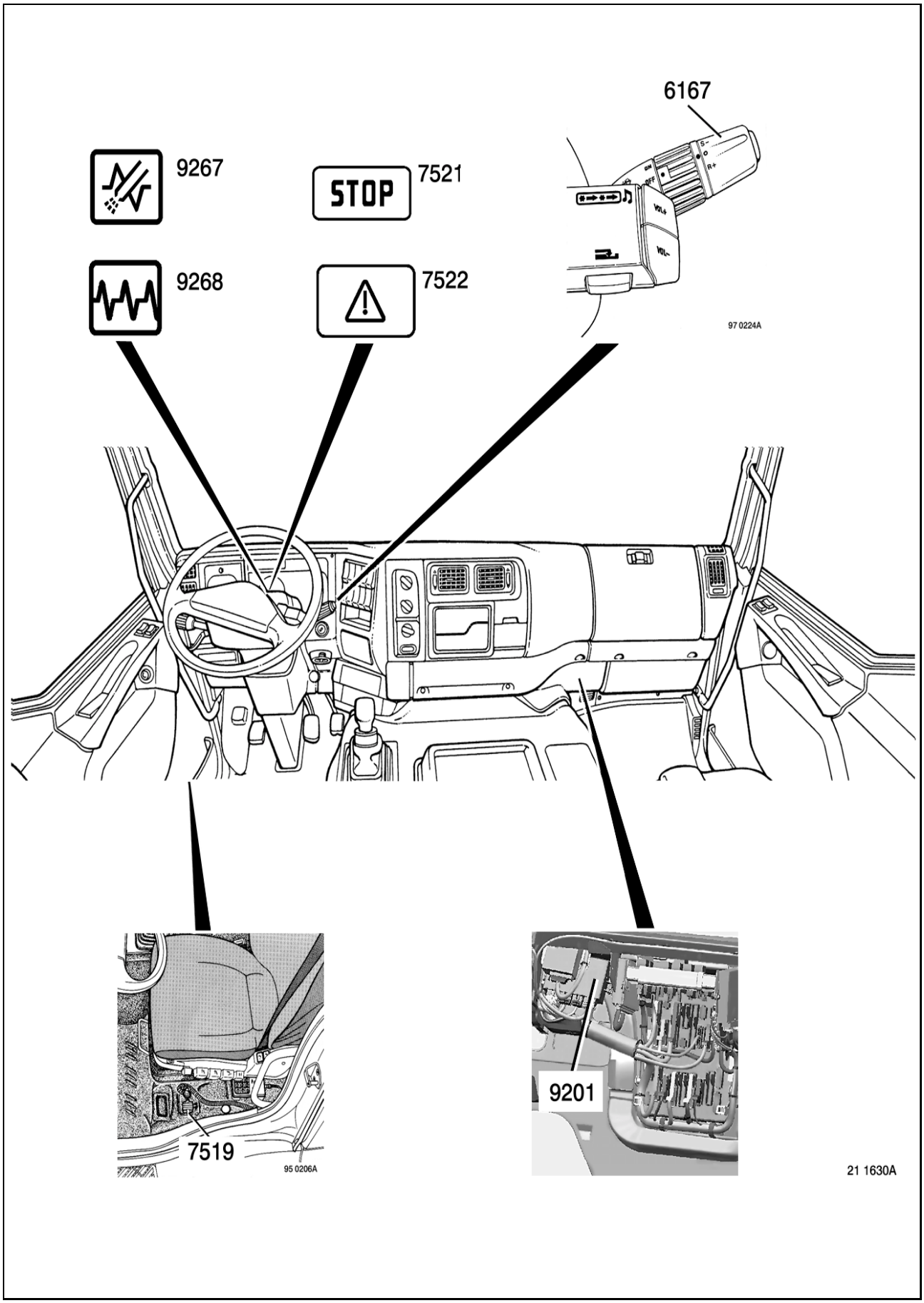
Low pressure (boosting) circuit
- Booster pump **(4)**
- Low pressure pipes **(5)**
- Fuel filter
- Scavenge valve **(6)**
- Fuel metering housing **(7)**

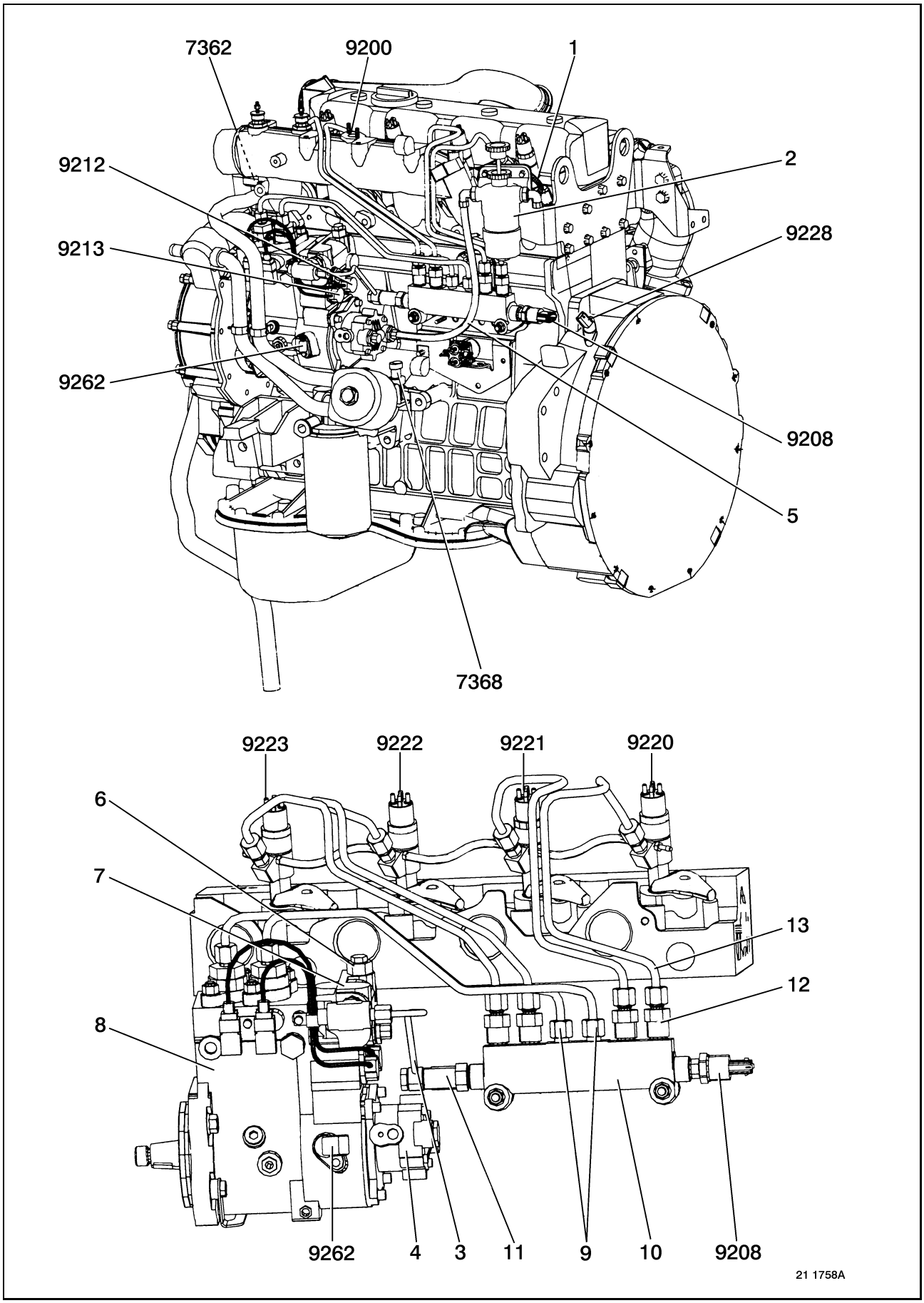
High pressure circuit
- High pressure pump **(8)**
- Rail delivery pipe gallery **(9)**
- Common rail **(10)**
- Rail pressure limiter **(11)**
- Flow limiters **(12)**
- Injector pipe gallery **(13)**
- Injection control solenoid valve **(9220/9221/9222/9223)**

Electrical components
- Engine electronic control unit (EECU) **(9202)**
- High pressure fuel sensor **(9208)**
- N° 1 cylinder high pressure pump solenoid valve **(9213)**
- N° 2 cylinder high pressure pump solenoid valve **(9212)**
- Flywheel speed sensor **(9228)**
- Pump (injection or high pressure) speed sensor **(9262)**
- Engine coolant circuit temperature transmitter **(7362)**
- Boost air pressure and temperature sensor **(9200)**
- Engine oil level sensor **(8275)**
- Engine stop control (cab tilted) **(2267)**
- Engine oil pressure sensor **(7368)**
- Fuel filters clogging sensor (on filter head) **(2400)**

Ancillary functions components
- Exhaust brake solenoid valve**(8150)**
- Vehicle electronic control unit (VECU) **(9201)**
- Diagnostics socket**(7519)**

Driver interface
- Accelerator pedal position sensor **(5266)**
- Steering wheel fingertip controls (cruise control) **(5269)**
- "DANGER" immediate stop warning lamp **(7521)**
- "SERVICE" warning lamp **(7522)**
- Engine electronic fault warning lamp **(9267)**
- Vehicle electronic fault warning lamp **(9268)**


6167
9267
STOP
7521
9268
7522
97 0224A
7519
95 0206A
9201
21 1630A


7362
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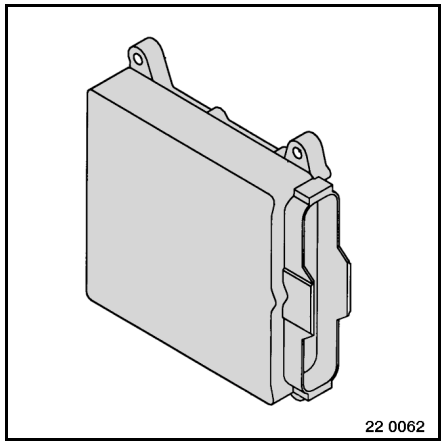
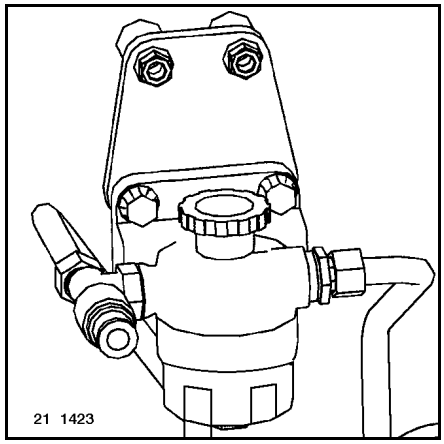
Technical data

Engine master electronic control unit (EECU)
The EECU receives information from the sensors and the vehicle electronic control unit (VECU). Depending on the input data, it pilot-controls fuel-injection and certain ancillary functions (engine cooling fan, retarder, fast idling).
It informs the driver of the status of the system by means of instrument panel tell-tale lights and, in the event of fault, operates in fall-back mode or emergency mode (refer to the "Diagnostics" chapter).

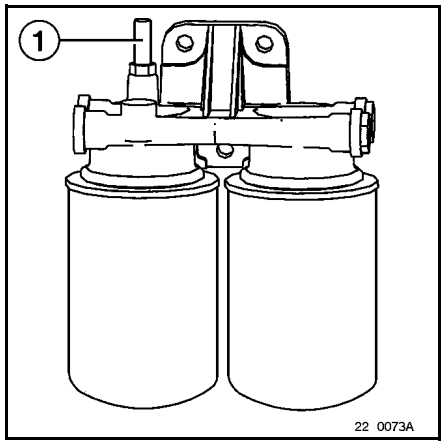


Fuel hand priming pump and prefilter
The fuel priming pump incorporates a gauze prefilter that can be washed in diesel fuel.

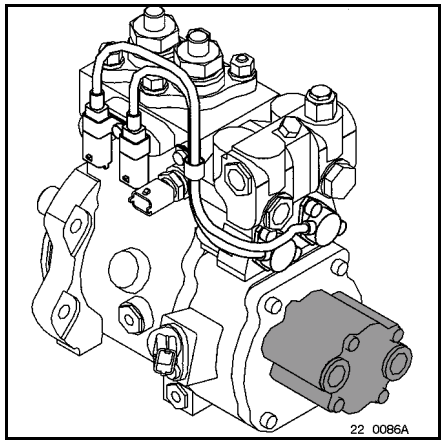


Fuel filters
(1): bleed screw and low pressure take-off.

The oil filters, owing to their capacity and their specific filtration level, must be replaced only by filters approved by RENAULT TRUCKS. Upon fitting, do not full the filter cartridges with fuel.

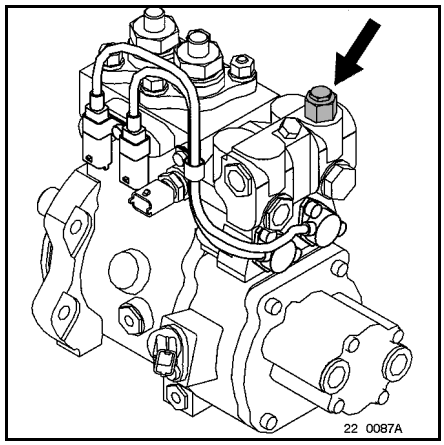


Booster pump
The booster pump is of the gear type. It is fastened to the high pressure pump casing.
The booster pump cannot be repaired.
Output: up to **500 litres/hour.**

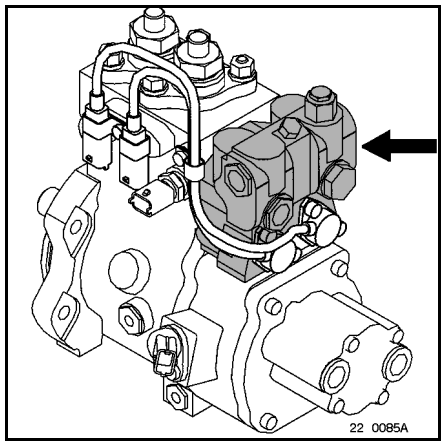


Scavenge valve
The scavenge valve keeps the low pressure circuit pressure to values between **4** and **5 bars** at idling and between **6** and **7 bars** at an engine speed of **2000 rpm.**

The valve calibration value should be between **1.8 bars** and **2.2 bars.**

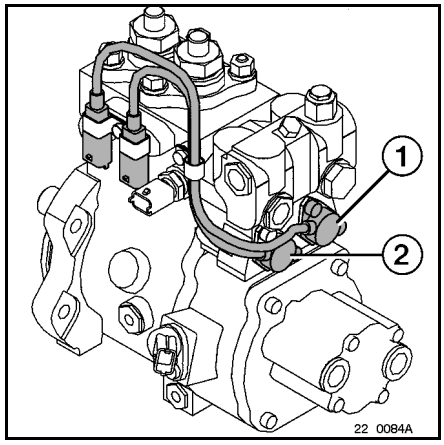


Fuel metering housing
The fuel metering housing integrates the two fuel flow regulation solenoid valves. These valves each pilot-control a shuttle valve that manages the fuel flowrate to the high pressure pump inlet.
The metering housing cannot be repaired.

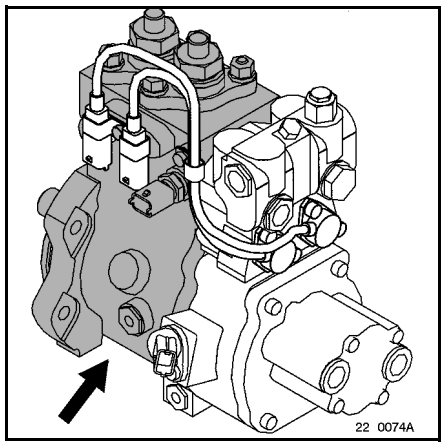


Fuel flow regulation solenoid valves
The two fuel flow regulation solenoid valves are mounted on the fuel metering housing. Their job is to adjust the fuel flow so as to maintain the pressure in the rail at the required value.
Without electrical supply, the solenoid valves are in the "normally-closed" position (maximum rail pressure).
- **1**: solenoid valve N°1
- **2**: solenoid valve N°2

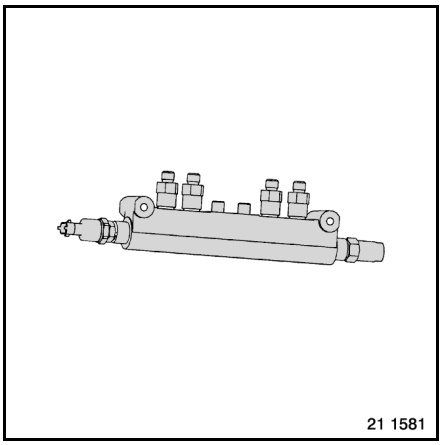
Resistance: **15 Ω**
In the event of solenoid valve failure, replace the high pressure pump.



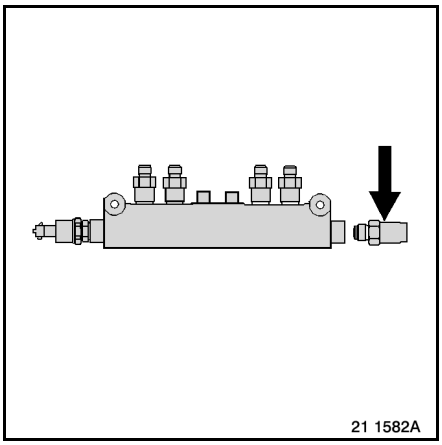
High pressure pump
The high pressure pump consists of two pumping elements. The pistons are controlled by a camshaft. The high pressure pump cannot be repaired.



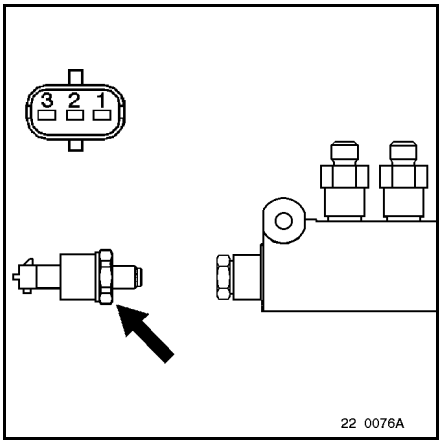
Common rail
The common rail provides the link between the high pressure pump and the fuel injectors.
The rail is equipped with:
- a pressure sensor,
- flow limiters,
- a pressure limiter.



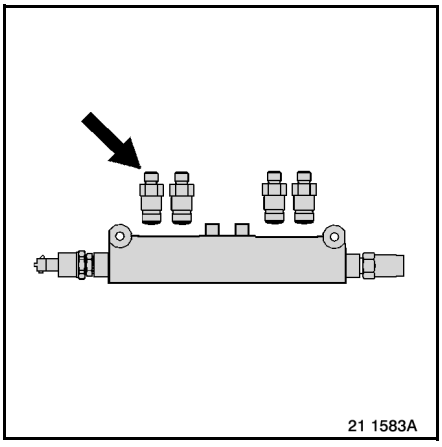
Rail pressure limiter
The pressure limiter protects the high pressure circuit against any excessively high pressure due to by-pass of fuel to the leak-off return circuit (e.g.: failure of a fuel flow regulation solenoid valve). If such occurs, it is essential to replace the rail pressure limiter.
Limiter calibration: **1650 ± 50 bars.**



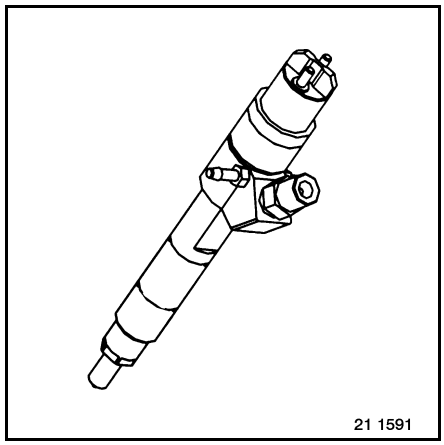
High pressure fuel sensor
The rail pressure sensor is of the piezo-resistive type. Supplied with 5 Volts current, it delivers an output current (0.5 to 4.5 V) as a function of the measured pressure value. This value is sent to the ECU. The sensor can only be fully tested using the RENAULT TRUCKS DIAGNOSTICA test tool.



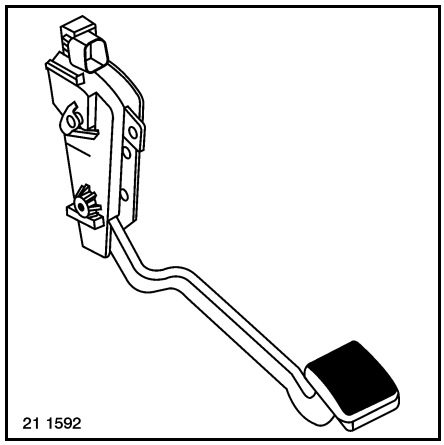
Flow limiter
Flow limiters are fitted to each rail outlet. They isolate a section of the high pressure circuit in the event of too high a flowrate or in case of continuous leak-off (fracture of injector pipe, injector malfunction, etc.).
Maximum flow without jamming the limiter: **450 mm^3/shot.**



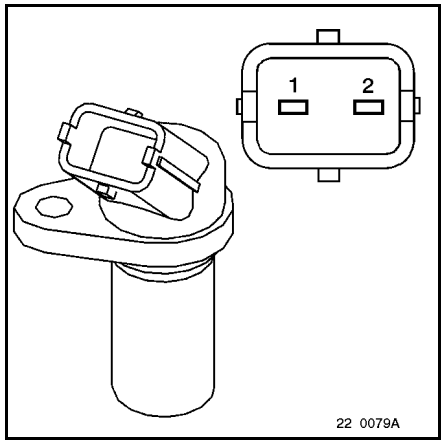
Fuel injector / nozzle-holder
Each unit consists of a solenoid valve fitted to the nozzle-holder that controls opening and closing of the injector. Fuel injector / nozzle-holder units cannot be repaired. All seals must be replaced without fail each time the unit is removed.
Solenoid valve resistance: **0.33 Ω** at **20°C.**
Non-polarized terminals.



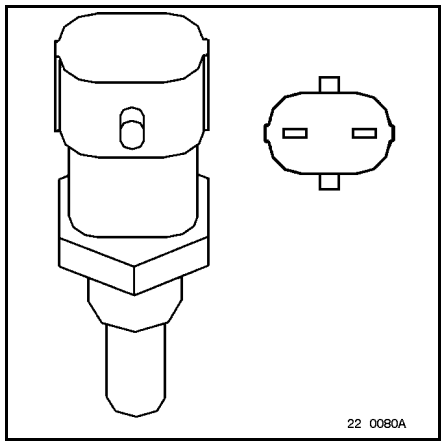
Accelerator pedal
The accelerator pedal position sensor consists of a rheostat bridge and a "foot raised" position switch.
The sensor can only be fully tested using the RENAULT TRUCKS DIAGNOSTICA test tool.



Speed sensors
The speed sensors are of the inductive type and deliver a sinusoidal voltage generated by passage of the flywheel notches and the pump toothed wheel. The frequency of this signal is proportional to the engine rotating speed.
The flywheel is provided with **58** notches **(60 - 2)**. The two missing notches indicate the top dead centre position of N° 1 cylinder.
The pump toothed wheel is provided with**7** teeth (one tooth per top dead centre of each cylinder and two side-by-side teeth for the top dead centre of N° 1 cylinder).
Sensor resistance: **770 → 950 Ω** at **20°C**.

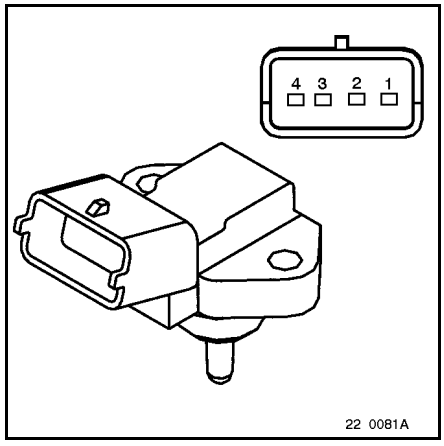


Engine cooling circuit temperature sensor
The sensors are of the CTN thermistance type
Characteristics:

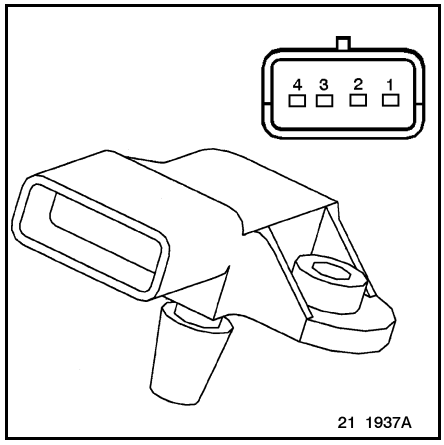


Temperature (°C)	Resistance (Ω)
-20	13 500 → 17 700
-10	8 250 → 10 650
0	5 200 → 6 650
20	2 200 → 2 800
30	1 550 → 1 860
40	1 000 → 1 300
60	550 → 640
80	200 → 300
100	170 → 200

Boost air pressure and temperature sensor
The single boost air pressure and temperature sensor incorporates two measuring elements and is mounted on the intake manifold:
A pressure sensor of the piezo-resistive type:
Supplied with 5 Volts current, it delivers an output current of between 0.5 to 4.5 Volts.
A temperature sensor of the CTN thermistance type:
Characteristics (between terminals N° **1** and N ° **2**)

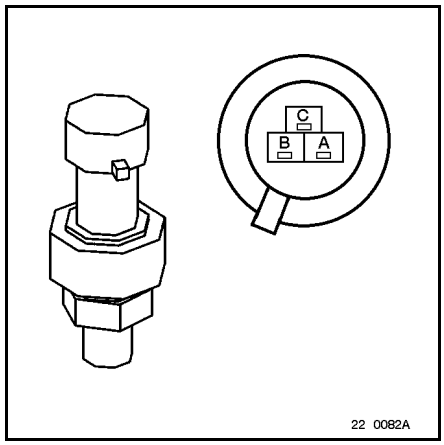


Temperature (°C)	Resistance (Ω)
0	5 900 → 6 600
10	3 800 → 4 200
20	2 500 → 2 760
30	1 700 → 1 870
40	1 180 → 1 280
50	830 → 900



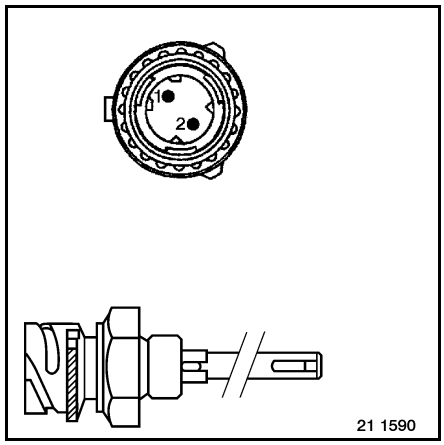
Temperature (°C)	Resistance (Ω)
0	5 600 → 6 150
10	3 600 → 3 950
20	2 400 → 2 600
30	1 650 → 1 800
40	1 150 → 1 250
50	820 → 900

Engine oil pressure sensor
The engine oil pressure sensor is of the piezo-resistive type: supplied with 5 Volts current, it delivers an output current of 5 Volts as a function of the engine oil circuit pressure (0 to 7 bars).
The sensor can only be fully tested using the RENAULT TRUCKS DIAGNOSTICA test tool.

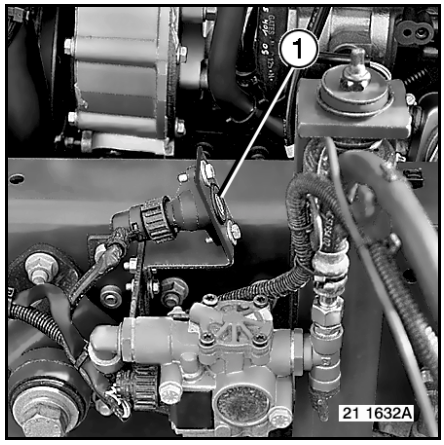


Engine oil level sensor
The engine oil level sensor features a thermo-resistive heating wire. It is supplied by the ECU. The rise in temperature of the wire and therefore the change in its resistance allows the ECU to define the engine oil level.
Characteristics:

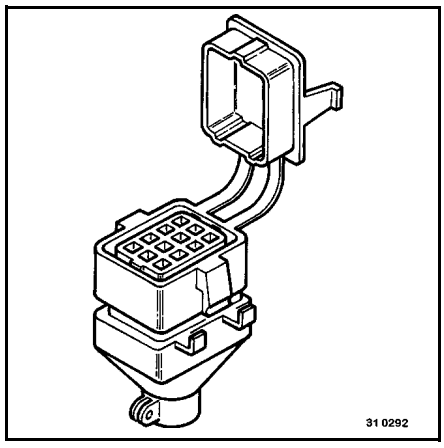
Temperature (°C)	Resistance (Ω)
-30	8.85
20	10.6
150	18.4



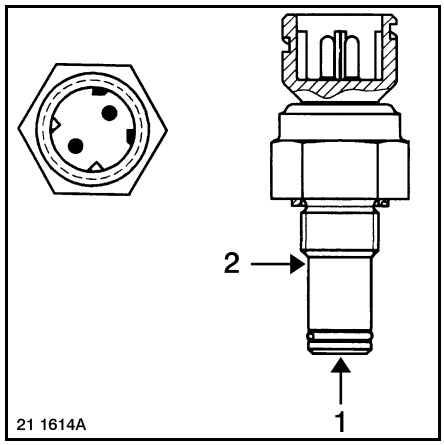
MIDLUM engine stop control (cab tilted)
The engine stop control is a switch **(1)** with normally-open contacts that serves to shut down the engine when the cab is tilted.



Diagnostics socket
The diagnostics socket allows the "COMMON RAIL" system to communicate with the RENAULT TRUCKS diagnostics tool for the purpose of full diagnostics and parameter definition.



Fuel filters clogging sensor
This sensor is a switch with normally-closed contacts. It changes state when the pressure difference between P1 **(1)** and P2 **(2)** is around **3 bars.**
The clogged filters information is time-delayed and is sent to the display only when the engine is at its operating temperature. This is to avoid the appearance of faults due to pressure peaks or to diesel fuel that is frozen in very cold weather.



Precautions

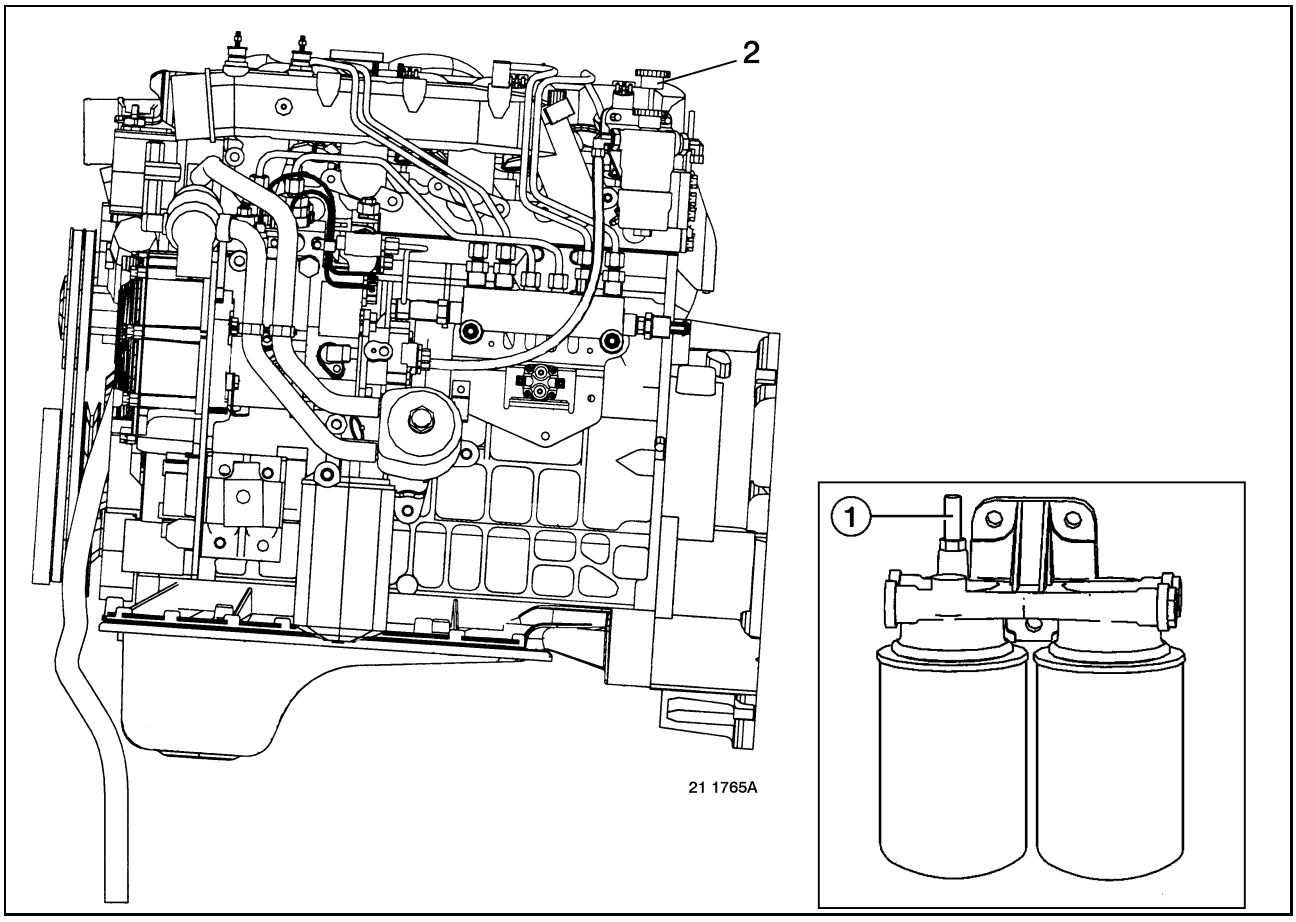
The "COMMON RAIL" system is a high-performance fuel-injection system
Since this system is more sensitive to cleanliness than in-line injection pump systems, risks of damage are all the more important. Hence, it is essential to comply with the fitting of genuine spare parts guaranteed by the manufacturer and observe operating, maintenance and repair instructions for the system.

Work on the "COMMON RAIL" system
The system works with very high injection pressures (up to **1400 bars**) and with medium voltage current (control of injectors by discharge of capacitors).
Prior to dismantling, carefully clean the surrounds then take all necessary precautions to prevent the ingress of foreign matter. Use a clean thinner then blow through with compressed air.
Using the RENAULT TRUCKS DIAGNOSTICA test tool, ensure that the circuit pressure has dropped completely. In fact, under normal operating condition, the pressure drops rapidly in the high pressure circuit after the vehicle has stopped (between 1 and 3 minutes). In extreme cases of malfunction (several or all the flow limiters jammed) high pressure may prevail for a long time, even not drop. In such case, create a fuel leak by loosening an injector pipe union while protecting your hand and keeping it as far away as possible from the point of leak.
Any work on the fuel-injection system must be carried out with the engine shut-down (check: injectors, voltage, resistance, tightening, etc.).

Upon dismantling
Repairs must be carried out in a clean room, free from dust and using suitable tools.
The wearing of gloves made from fibrous material is to be banned.
Carefully clean the parts with a clean solvent, then inspect. Use top quality small brushes that are perfectly clean and in very good condition. Use unsoiled lint-free cloths.
The spare parts department supplies cleaning cloths, blanking plugs and storage bags suitable for one-way use.
Blank off the ports with plugs as soon as the pipes are dismantled.
Avoid using compressed air.
Cleaned components must be protected to avoid any trace of corrosion in the circuit.
The injector nozzle-holder cannot be repaired. Systematically replace the unit in the event of malfunction.
Do not expose yourself to sprayed fuel when testing injector sprays or high pressure circuit dribble.
Follow the chronological disassembly / assembly sequence outlined in the workshop manual.
Reassembly must be carried out without any modification or stress (torsion, welding, distortion, connecting arrangement, fastening, routing, etc...). Replace the part, if necessary. Tighten to the recommended torque.
Circuits are to bled without using the starter.
All these recommendations guarantee you "COMMON RAIL" system quality and reliability.

New pipes
The inside of the gallery pipes is protected by a rust-inhibitive product.
The walls are greasy and easily retain dust.
The pipes must be rinsed with solvent or industrial alcohol then fitted immediately (risk of oxidation).

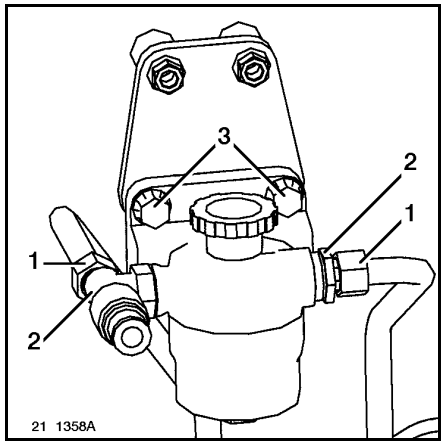
Bleeding the fuel circuit



Open bleed screw **(1)**, then unscrew and actuate hand pump **(2)** until the fuel flows without air bubbles. Close the bleed screw and actuate the hand pump until it hardens. Screw up the hand pump control before starting the engine.
Actuate the starter until the engine fires.

It is forbidden to bleed the low pressure circuit using the starter.

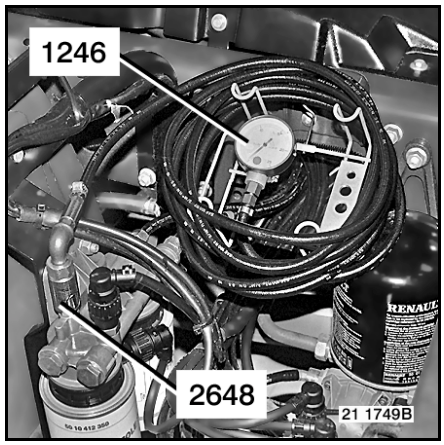
Fuel hand priming pump and prefilter



Removal
Unscrew unions **(1)**.
Hold unions **(2)** while loosening unions **(1)**.
Remove setscrews **(3)**.
Watch out not to bend the pipes.
Remove the hand priming pump.

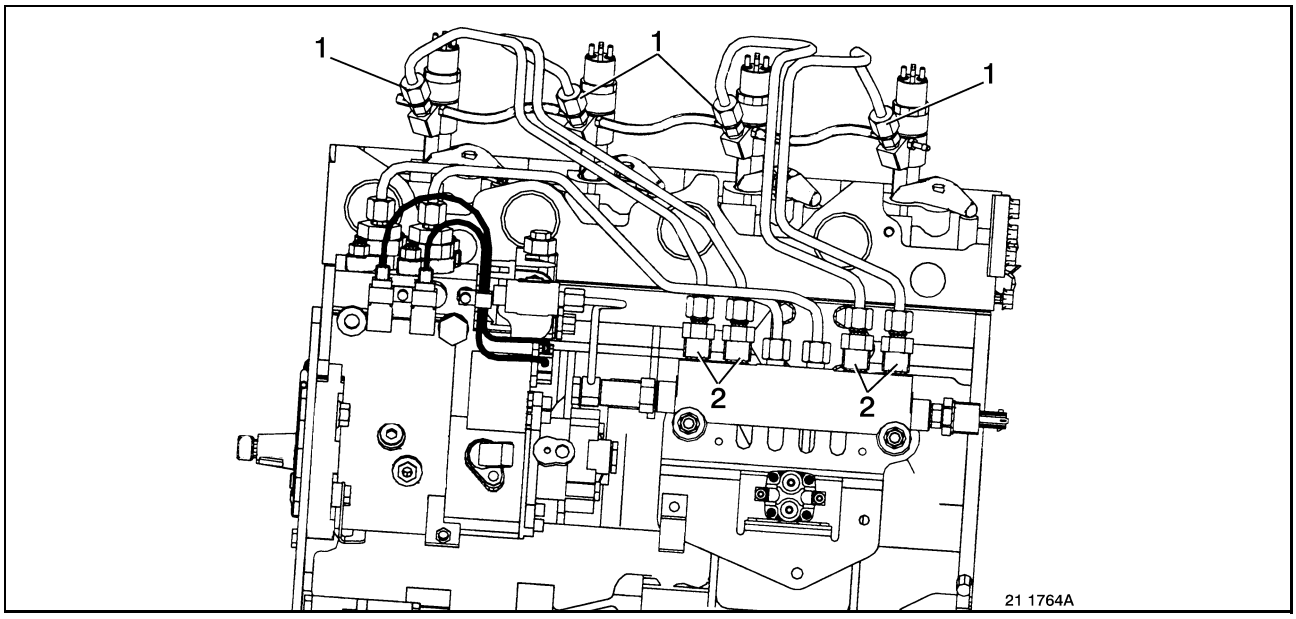
Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten unions **(1)** to torque.
Hold unions **(2)** while tightening unions **(1)**.

Checking the fuel pressure (low pressure circuit)



Use tool **2648** + **1246**
Loosen bleed screw **(1)** slightly.
Pressure values (see page K-9).

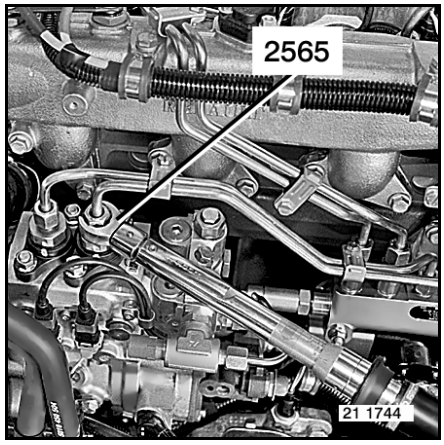
Injector pipe gallery



Removal
Unscrew unions **(1)**.
While loosening unions **(1)**, hold flow limiters **(2)** and the high pressure nozzle-holder unions to prevent them from working loose.
Remove high pressure pipe gallery.

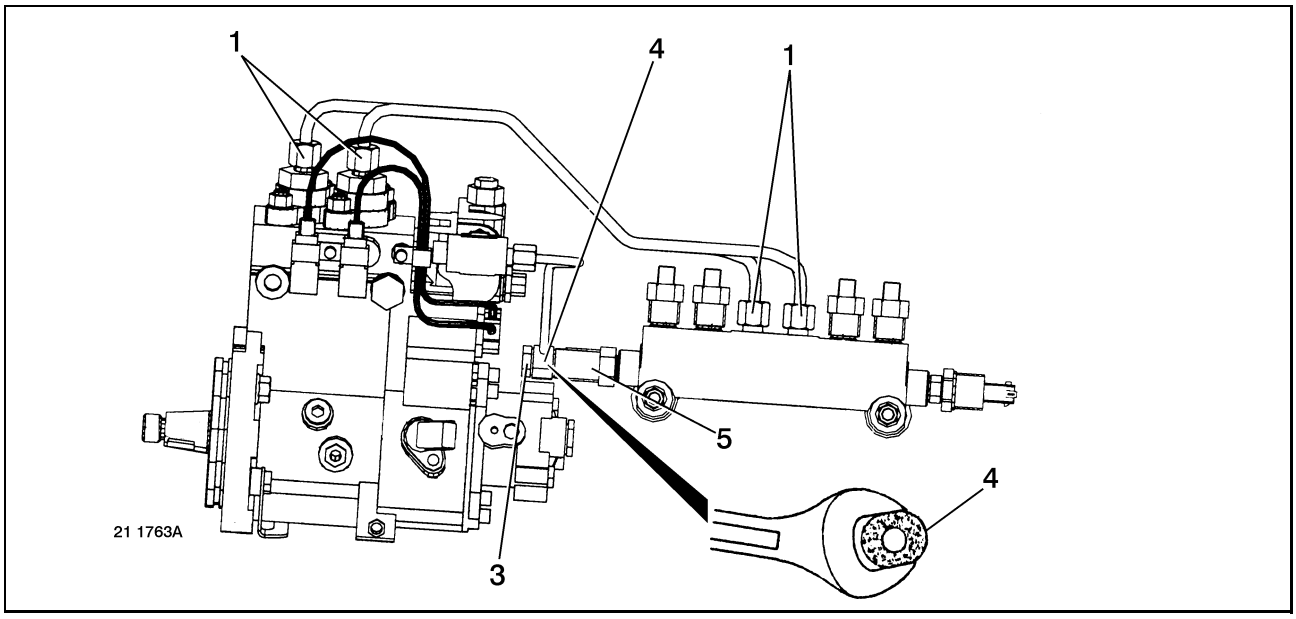
Blank off the ports.
Put each part in a new watertight plastic bag immediately after its removal.

Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten pipe unions **(1)** to a torque of **40 ± 8 Nm**, without holding flow limiters **(2).**
Use tool **2565**.
In the event of leakage at a nut, loosen the nut in question by 1/4 of a turn, then retighten at a maximum torque of **50 Nm**. If the leak persists, the pipe gallery must be replaced.



It is essential to replace the complete pipe gallery. Under no circumstance should the flanges connecting the pipes in the same gallery be dismantled.

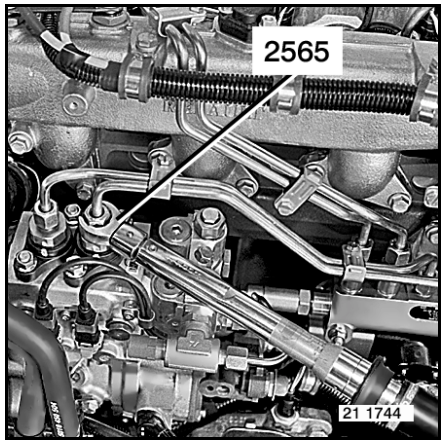
Common rail delivery pipe gallery



Removal
Unscrew unions **(1)**.
Remove high pressure pipe gallery.
Blank off the ports.
Put each part in a new watertight plastic bag immediately after its removal.

Fitting
It is absolutely essential to follow the pipe gallery assembly procedure detailed below.

Install the pipe gallery to the engine.
If necessary, exert a force on the pipes by hand to bring the pipe unions into position on the high pressure pump and common rail unions. A 5 mm maximum vertical and horizontal displacement of the unions is permitted due to torsion of the pipes.
Use of a lever arm is forbidden.
Screw up pipe unions **(1)** without tightening.
Tighten unions **(1)** to a torque of **40 ± 8 Nm.**
Use tool **2565**.
In the event of leakage at a nut, loosen the nut in question by 1/4 of a turn, then retighten at a maximum torque of **50 Nm**. If the leak persists, the pipe gallery must be replaced.



It is essential to replace the complete pipe gallery. Under no circumstance should the flanges connecting the pipes in the same gallery be dismantled.

Rail leak-off return pipe

The items numbers indicated in the text refer to the figure on page K-19 .

Removal
Loosen union **(3)** while holding end **(4)** of leak-off return pipe with a wrench.
Loosen pipe **(4)** at the pump end while holding the union.
Save the pipe fastening clamps.
Blank off the ports.
Remove pipe **(4)**.
Watch out not to bend the pipes.
Put each part in a new watertight plastic bag immediately after its removal.

Fitting
For fitting, proceed in the reverse sequence to removal.
Replace all seals and gaskets without fail.
Tighten union **(3)** while holding end **(4)** of leak-off return pipe with a wrench.
Tighten pipe **(4)** at the pump end.
Tighten to torque.
Bleed the fuel system.

Rail pressure limiter

The items numbers indicated in the text refer to the figure on page K-19 .

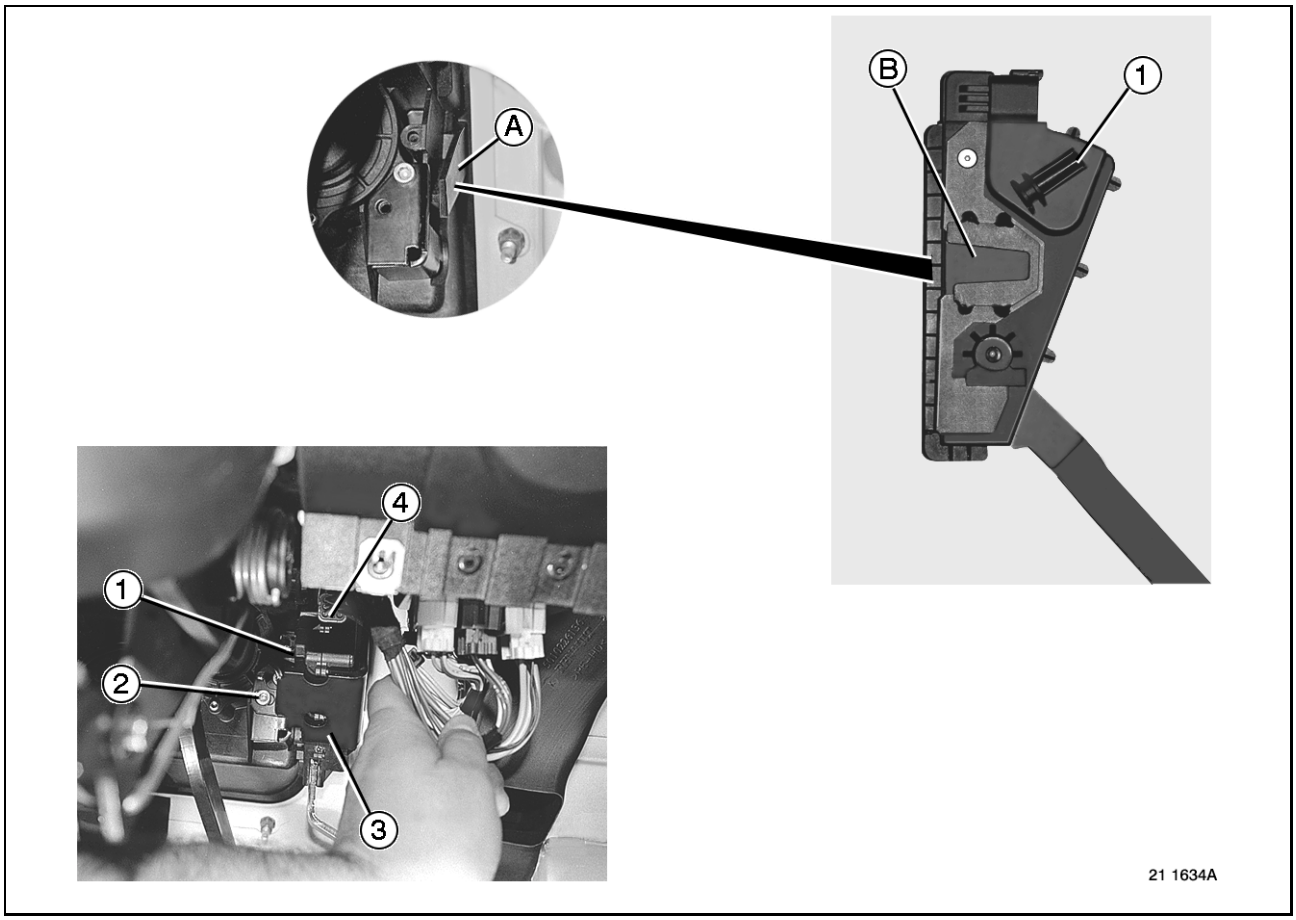
To remove and fit the other components quoted in the paragraph, refer to their respective chapters.

Pressure limiter **(5)** is to be replaced without fail if the engine is running at abnormally high pressure ("fuel flow regulation solenoid valve" or "fuel injection pressure outside operating band" fault).

Removal
Remove pipe **(4)** as described above.
Remove pressure limiter **(5)**.
Blank off the ports.
Put each part in a new watertight plastic bag immediately after its removal.

Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten pressure limiter **(5)**.
Tighten to torque.

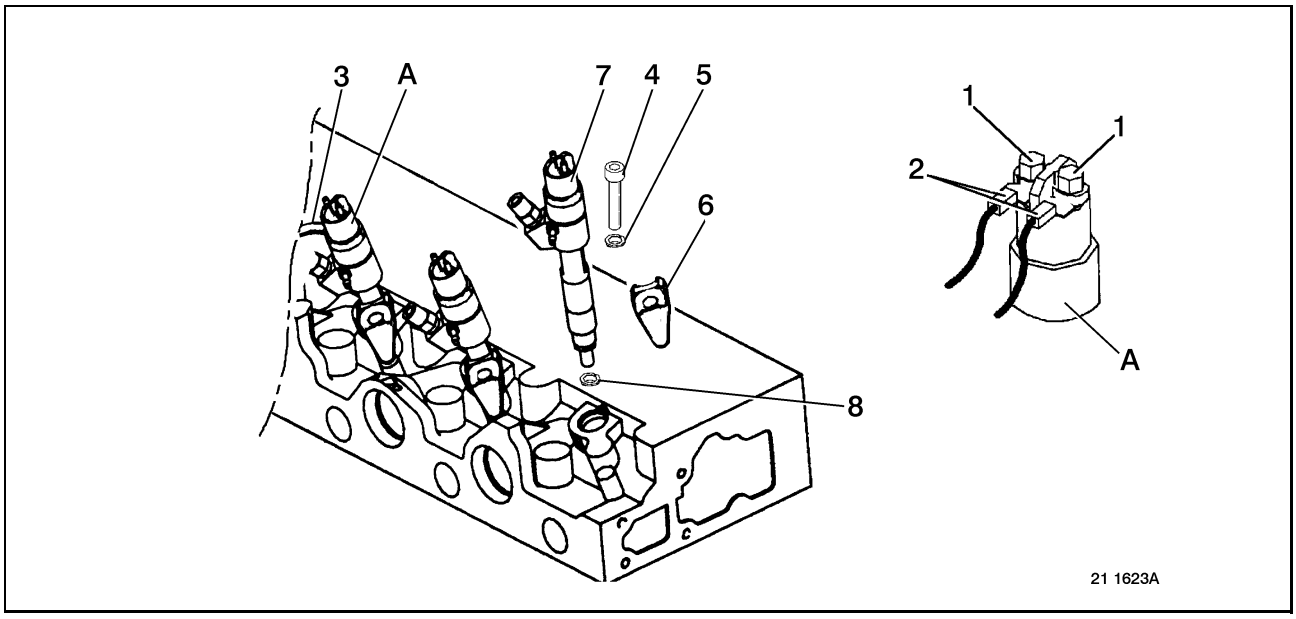
Accelerator pedal



Removal
Remove the steering column trim.
Remove setscrew **(1)**.
Remove setscrew **(2)**.
Pull the accelerator pedal and holding plate **(3)** towards yourself to remove.
Unplug the connector **(4)**.

Fitting
Offer up the holding plate **(3)** / accelerator pedal assembly.
Slide the bracket **(B)** in the rail **(A)**.
Tighten setbolt **(1)** moderately.
Tighten setscrew **(2)**.
Plug in connector **(4)**.
Fit the steering column trim.

Fuel injector / nozzle-holder



It is strictly forbidden to work on the fuel injectors while the engine is running (high voltage).

To remove and fit the other components quoted in the paragraph, refer to their respective chapters.

Removal
Remove the corresponding injector pipe gallery.
Blank off the ports.
Unscrew nuts **(1)**.
Remove fuel leak-off return pipes **(3)**.

Do not use any tool liable to damage the firtree unions when removing the leak-off pipes. If you do damage a firtree union, you must replace it with a new part without fail.

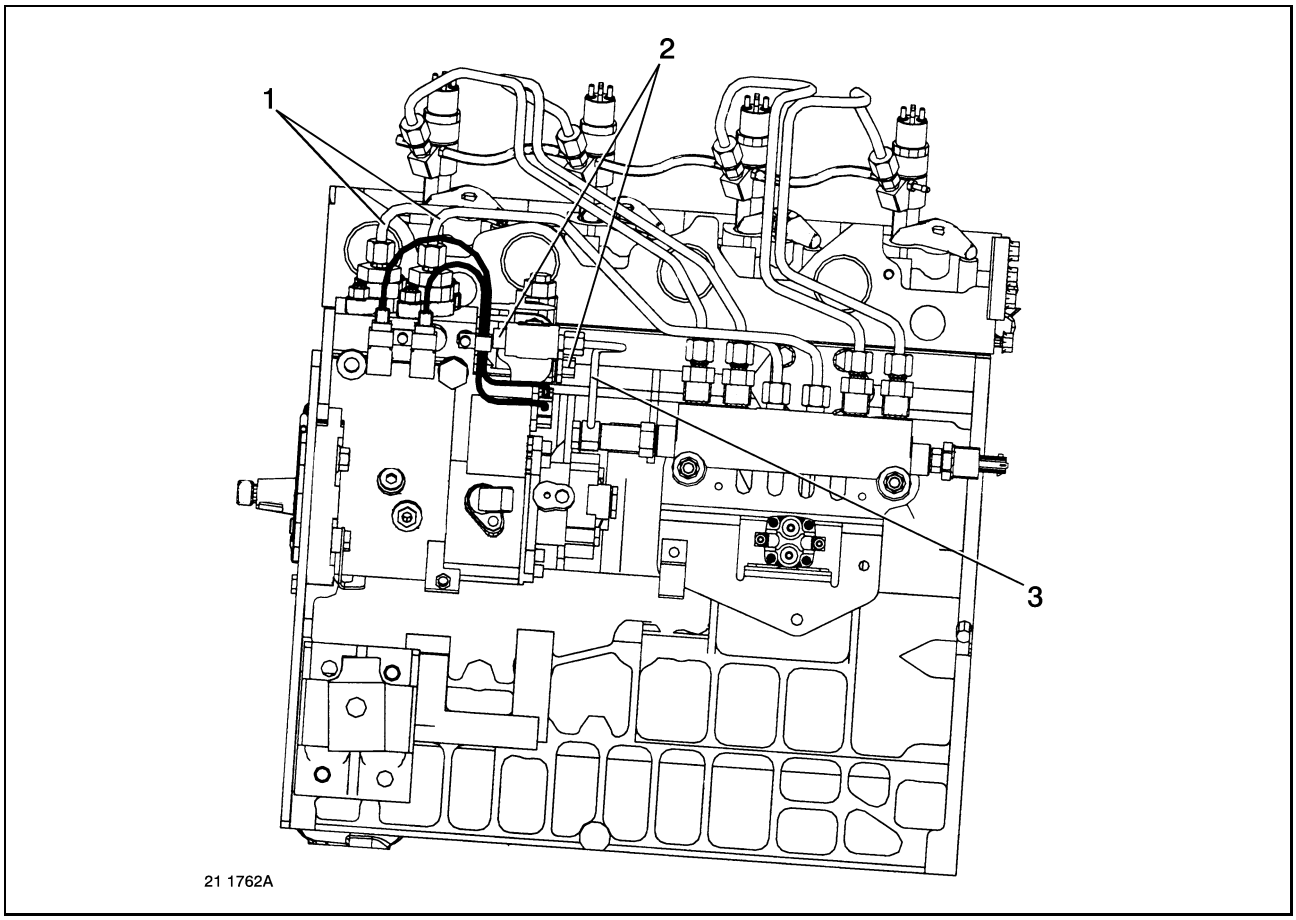
Remove setscrew **(4)**.
Save spherical washer **(5)**.
Remove flange **(6)**.
Withdraw injector **(7)**.

It is forbidden to use the top part of the nozzle-holder to extract it.

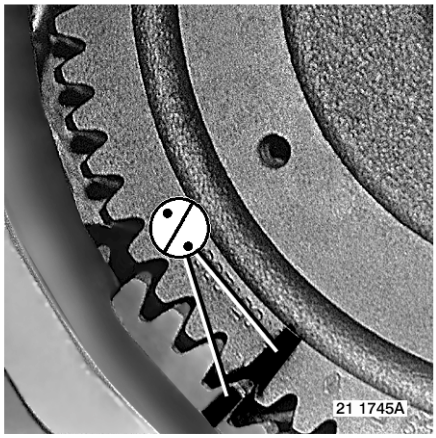
Take off seal **(8)**.
Put each part in a new watertight plastic bag immediately after its removal.

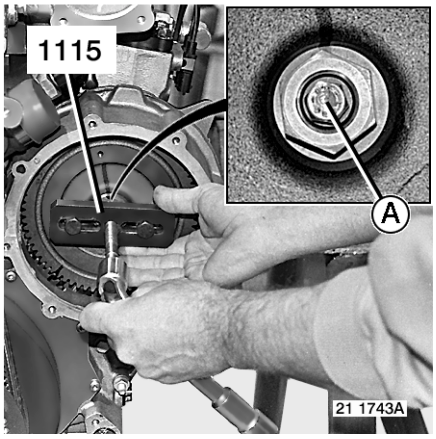
Fitting
Replace seal **(8)** without fail.
Replace leak-off return pipes **(3)** without fail.
Fit injector **(7)**.
Fit flange **(6)**.
Fit spherical washer **(5)**.
Fit setscrew **(4)**.
Tighten setscrew **(4)** to torque.
For the rest of the fitting operations, proceed in the reverse sequence to removal.
Hold terminal lugs **(2)** of the wiring harness with pliers when tightening nuts **(1)** to torque.

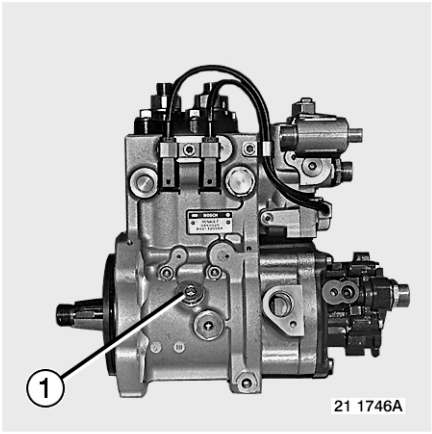
High pressure pump



Removal
Remove high pressure pipe gallery **(1)**.
Remove pipes **(2)**.
Remove rail return pipe **(3)**.
Blank off the ports.
Put each part in a new watertight plastic bag immediately after its removal.
Remove the rocker cover.
Unplug connectors.
Remove the engine speed sensor.
Use tool **1380**.
Turn the engine in the direction of normal running, as far as compression **TDC** of **N° 1** cylinder (valves of cylinder in balance with valves of **N° 6** cylinder).
Turn the engine in the direction of normal running as far as the **2**nd appearance of the hole-free zone on the flywheel through the speed sensor well.
Turn the engine in the direction of normal running, and bring the **3**rd hole after this zone opposite the speed sensor well.
In this position, the pump shaft key is directed upwards to prevent it from falling into the timing case.







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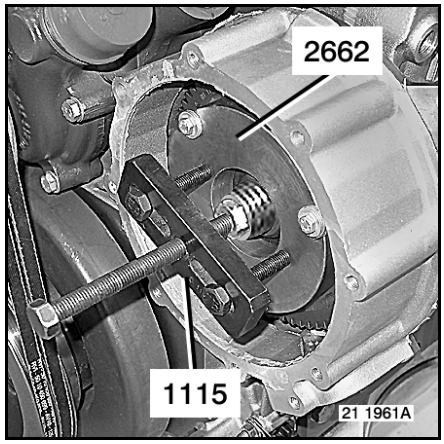
Take off breather plate.
Remove the breather impeller.
Mark the relative positions of the idler gear and the high pressure pump pinion.
Remove the nut.
Extract the high pressure pump pinion.
Use tool **1115**.
Place a **6 mm** dia. screw, cut about **5 mm** under the head so as to protect the shaft (item **A**).

*If the high pressure pump pinion does not have any tapped holes for fastening tool **1115**, use adapter **2665**.*

Remove the high pressure pump setbolts.
The nuts for the three least accessible bolts are captive inside a plate.
Remove the high-pressure pump.



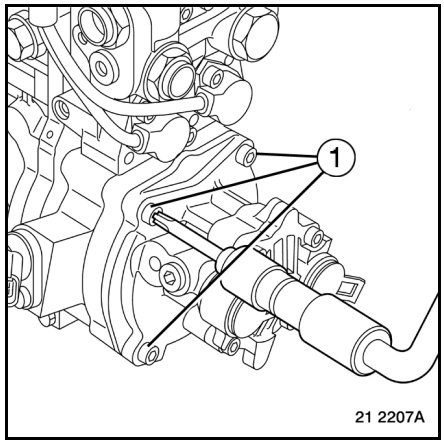
Fitting

Replace all seals and gaskets without fail.
Replace the sealing washers for the high pressure pump setbolts without fail.
Apply oil to the O-rings.
Degrease the tapers.
Install high-pressure pump.
Tighten the high pressure pump nuts to torque.
Fit the high pressure pump pinion.
Align the shaft key with the keyway in the pinion.
Line up the marks made prior to removal.
Tighten the nut of the high pressure pump pinion to torque.
Fill the high pressure pump with **0.2 litre** of engine oil through port **(1).**
Put back the seal and tighten plug **(1)** to torque.
For the rest of the fitting operations, proceed in the reverse sequence to removal.
Fit the breather plate.
Apply "**SILMATE RTV 1473**" oiltight threadlocking compound to give a fluidtight seal.
Bleed the fuel system.

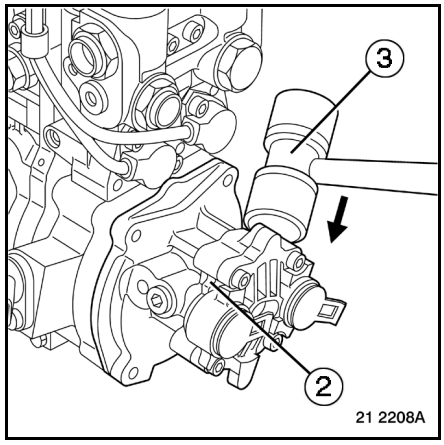
Booster pump ZP5

Removal

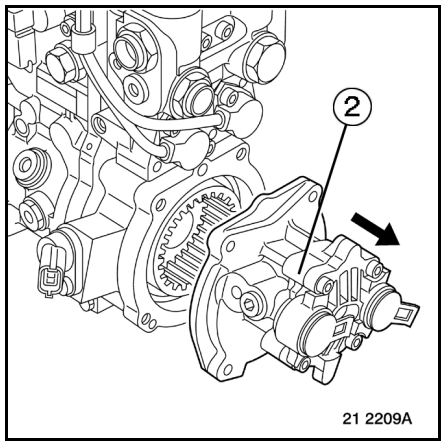
Remove securing nuts and bolts **(1)**.



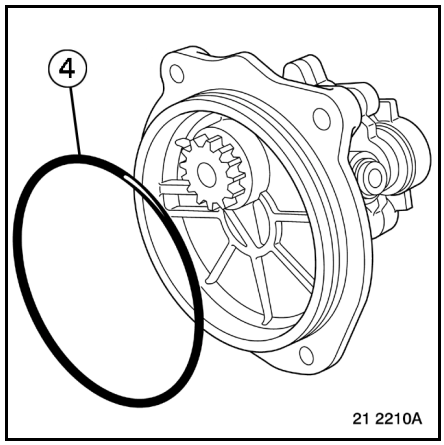
Dislodge booster pump **(2)** using a plastic mallet **(3)**.



Remove booster pump **(2)**.



Fitting
To fit, proceed in the reverse sequence to removal.
Replace gasket **(4)** without fail.
Apply oil to the gasket **(4)** (engine oil).
Carefully align the booster pump with the high pressure pump.
Preliminary tighten the booster pump setscrews in diametrically opposed sequence.
Tighten to torque.
See page B-3-4

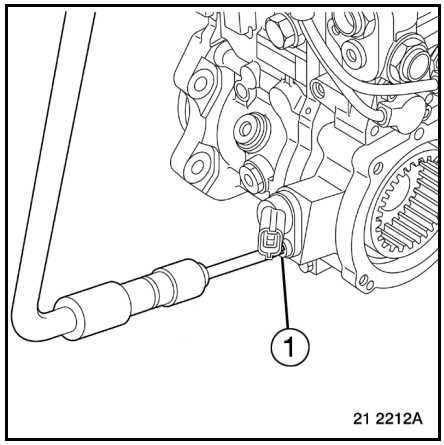


High pressure pump speed sensor

Booster pump ZP5 removed.

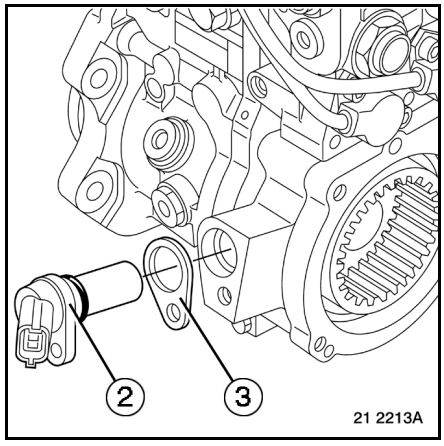
Removal

Remove setscrew **(1)**.



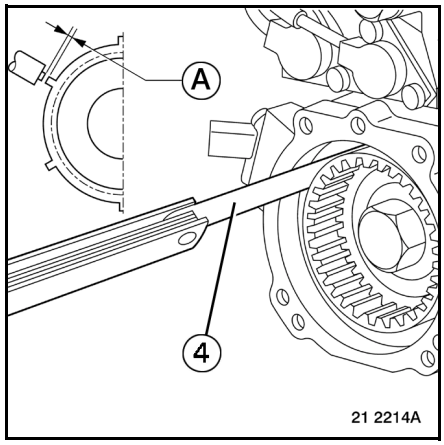
Remove sensor **(2)**.

Remove shim **(3)**.



Fitting
For fitting, proceed in the reverse sequence to removal.
Apply oil to the gasket (engine oil).

Check the size of air gap **A = 0.3 ± 0.1 mm** using feeler gauge **(4)**.
If the size of the air gap does not conform, replace adjusting shim **(3)**.
Tighten to torque.
See page B-3-4



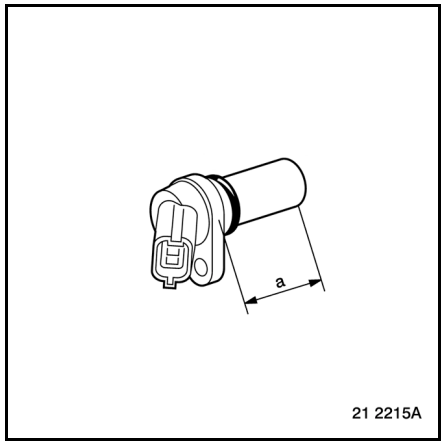
High pressure pump speed sensor

Booster pump ZP5 fitted.

Removal
See page K-27

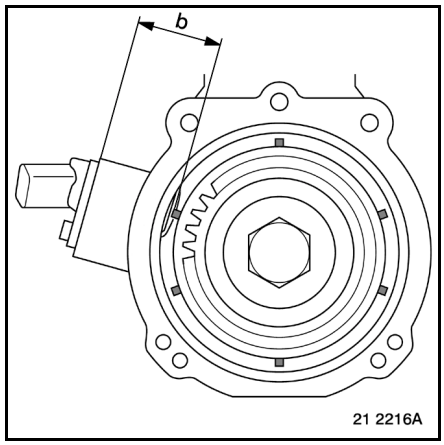
Calculation of the shim thickness to obtain an air gap of 0.3 ± 0.1 mm.

Measure dimension **(a)** corresponding to the length of the sensor.



Measure dimension **(b)** corresponding to the distance between the sensor support face and the high pressure pump target.
Thickness of sensor shim = **0.3 + (a) - (b)**.

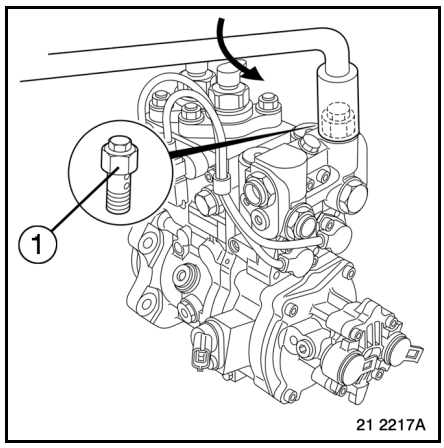
Fitting
See page K-27



Scavenge valve

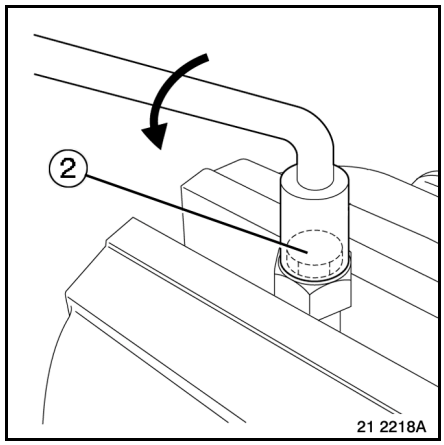
Removal

Remove scavenge valve **(1)**.



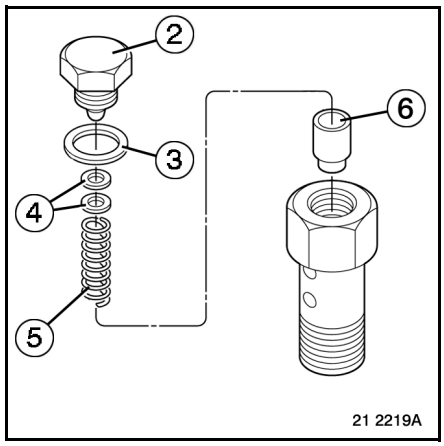
Disassembly

Tighten the scavenge valve in a vice.
Loosen plug **(2)**.



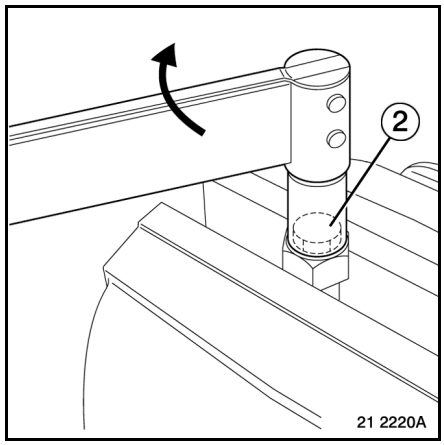
Remove plug **(2)**.
Remove gasket **(3)**.
Withdraw shims **(4)**.
Remove spring **(5)**.
Remove valve **(6)**.
Carefully clean all the parts.
Visually check the condition of the contact surface of valve **(6)**.

*If any of these parts are lost, except for gasket **(3)**, the high pressure pump will have to be replaced.*

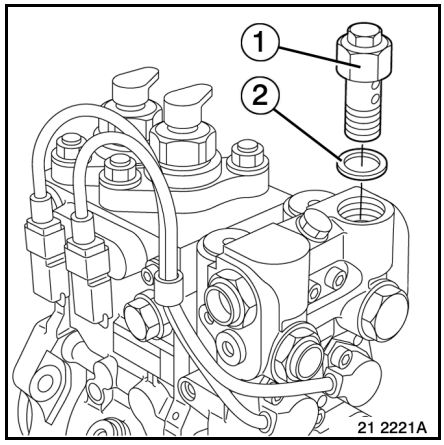


Assembly
Proceed in the reverse sequence to dismantling.
Replace gasket **(3)**.

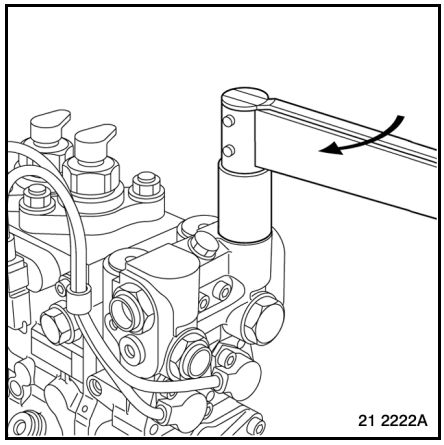
Tighten plug **(2)** to torque.
See page B-3-4



Fitting
To fit, proceed in the reverse sequence to removal.
Replace gasket **(2)**.

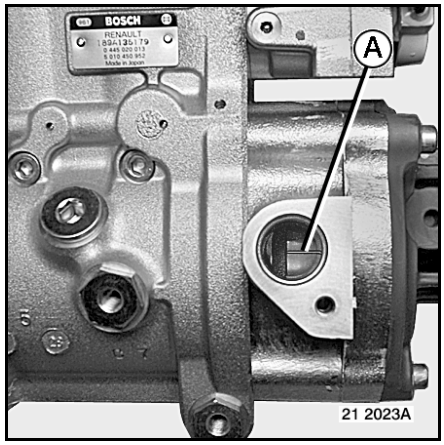


Tighten to torque.
See page B-3-4

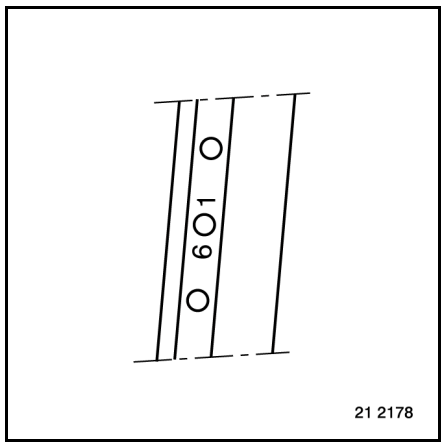


Checking the high pressure pump timing

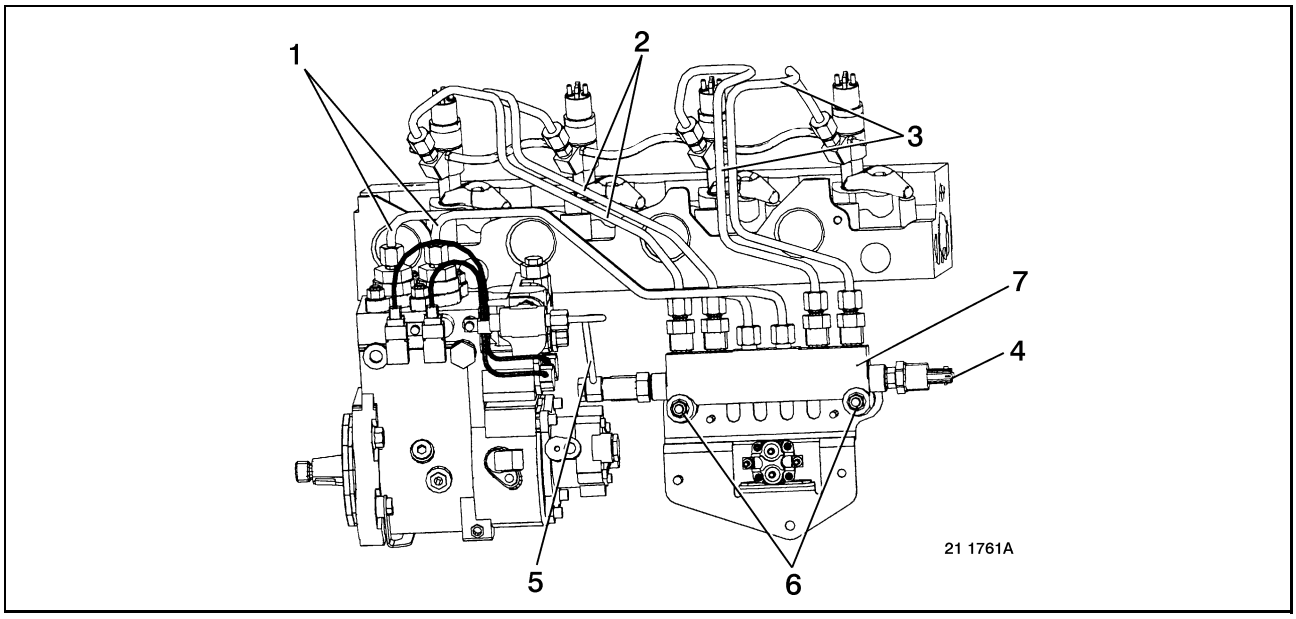
Remove the rocker cover.
Remove the engine speed and high pressure pump speed sensor.
Turn the engine in the direction of normal running, as far as compression**TDC** of **N° 1** cylinder (valves of cylinder in balance with valves of **N° 4** cylinder).
Mark **(A)** should appear centred in the high pressure pump speed sensor well.



*The **TDC** of N° 1 cylinder is situated at the **36 th** hole after the hole-free zone on the flywheel through the engine speed sensor well (on certain flywheels, this hole is marked on both sides).*



Common rail

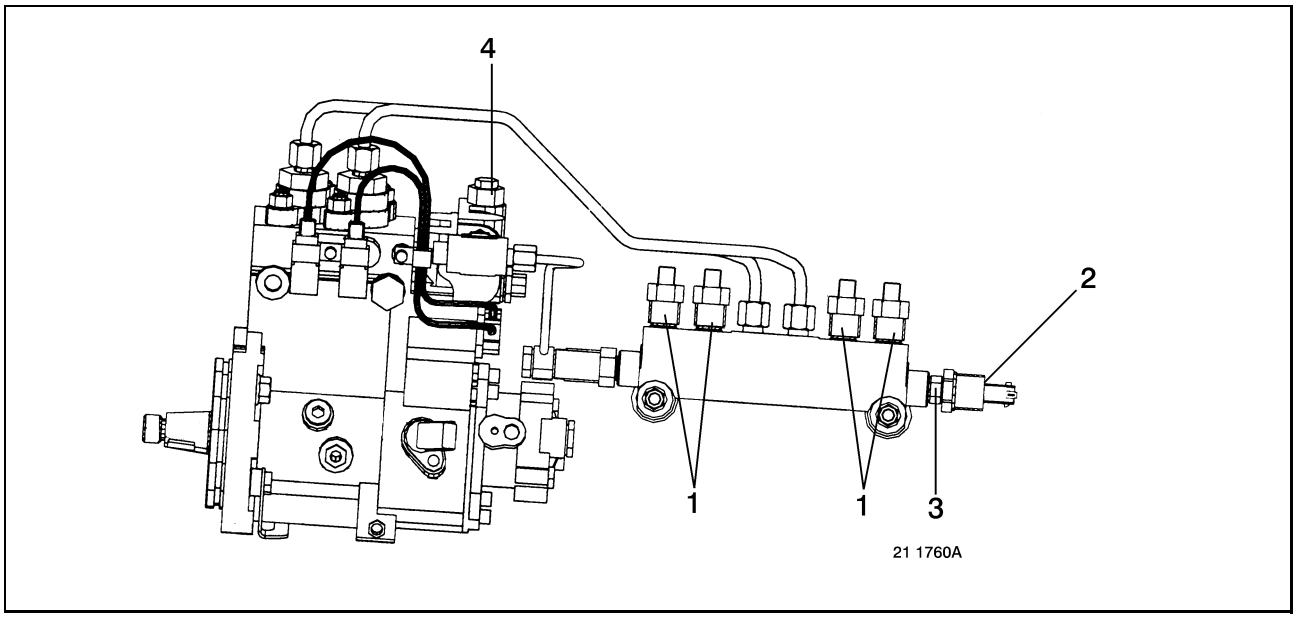


To remove and fit the other components quoted in the paragraph, refer to their respective chapters.

Removal
Remove high pressure pipe gallery **(1/2/3)**.
Remove pipe **(5)**.
Blank off the ports.
Unplug the connector **(4)**.
Remove nuts **(6)**.
Remove common rail **(7)**.
Put each part in a new watertight plastic bag immediately after its removal.

Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten to torque.
Bleed the fuel system.

Flow limiter



To remove and fit the other components quoted in the paragraph, refer to their respective chapters.

Removal
Remove the corresponding injector pipe gallery.
Remove flow limiter **(1)**.
Blank off the ports.
Put each part in a new watertight plastic bag immediately after its removal.

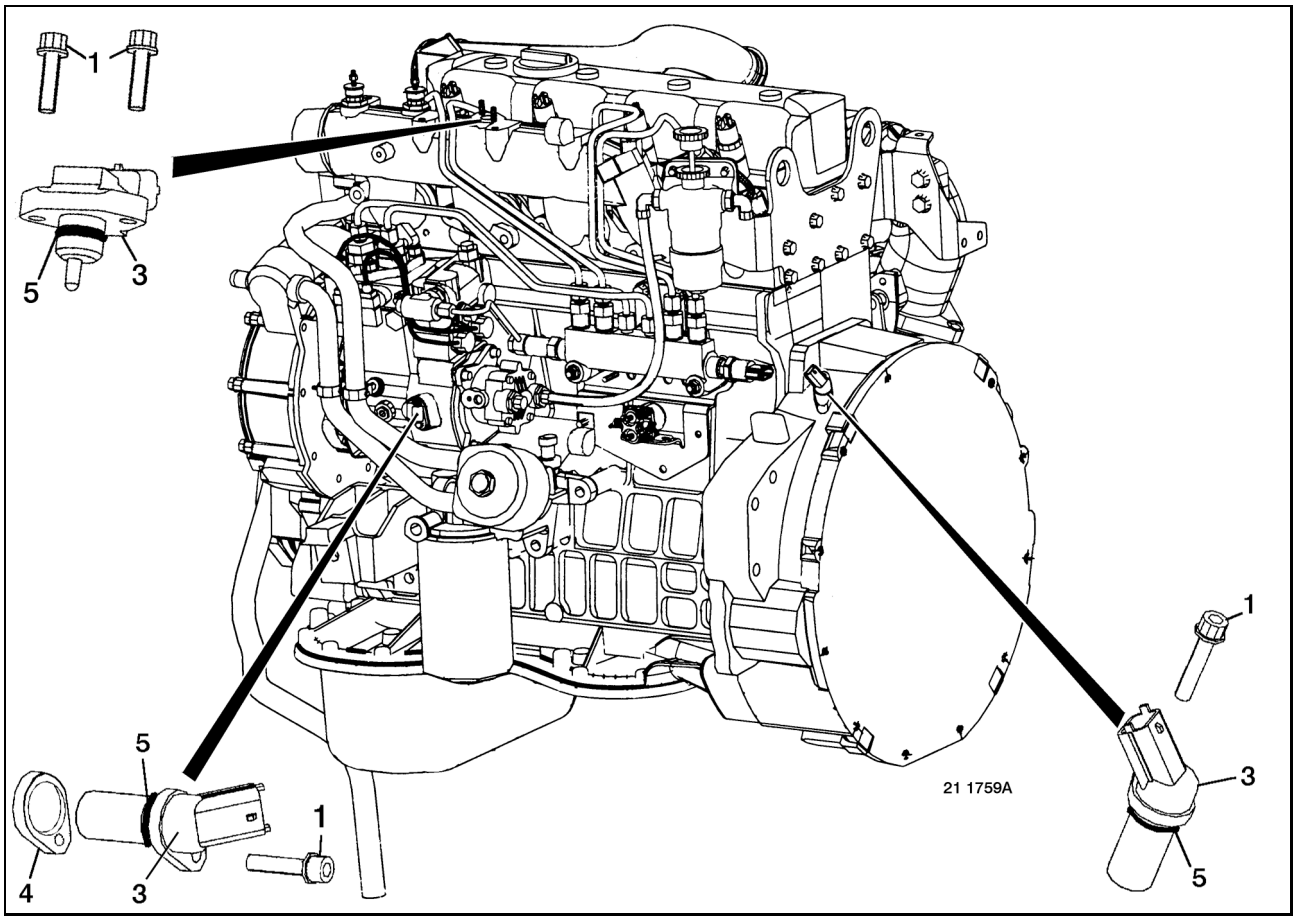
Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten to torque.

High pressure fuel sensor

Removal
Unplug the connector.
Unscrew sensor **(2)** while holding sleeve **(3)**.
Blank off the ports.
Put each part in a new watertight plastic bag immediately after its removal.

Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten to torque.
Bleed the fuel system.

Speed sensors / Boost air pressure and temperature sensor



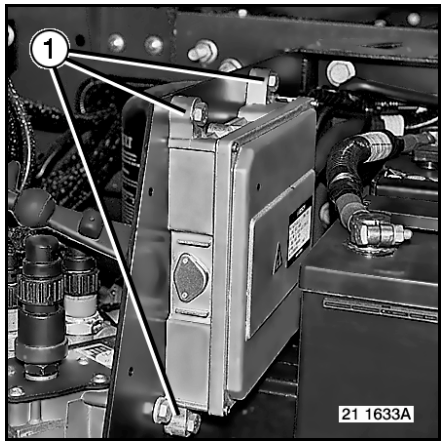
To remove and fit the other components quoted in the paragraph, refer to their respective chapters.

Removal
Remove setscrew(s) **(1)**.
Unplug the connector.
Remove sensors **(3)**.
Save adjusting shim **(4)**.

Fitting
Replace seals **(5)**.
Insert adjusting shim **(4)**.
Grease seals **(5)**.
For fitting, proceed in the reverse sequence to removal.
Tighten to torque.

The speed sensors air gaps cannot be adjusted.

MIDLUM engine master ECU

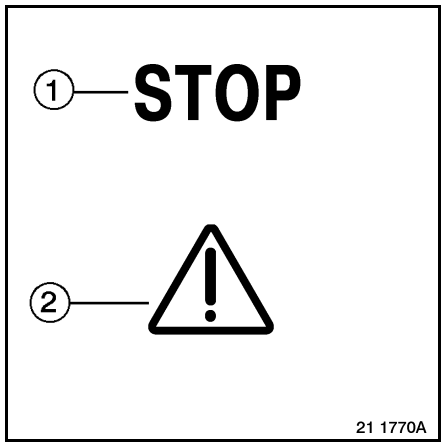


Removal
Pull out the catches and unplug the connectors.
Remove setscrews **(1)**.

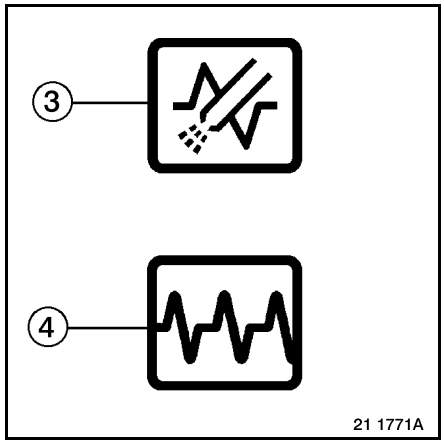
Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten to torque.

Instrument panel indicator lights

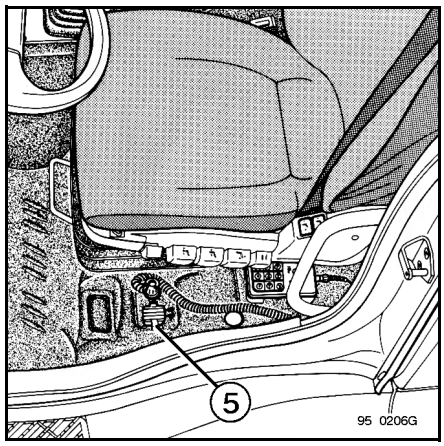
Indicator lights **(1-2-3-4)** inform the driver on the state of the system and on the kind of faults possibly detected or memorized.
Warning light **(1)** indicates a major fault and requires the vehicle to be stopped immediately.
Warning light **(2)** indicates a minor fault.
Tell-tale light **(3)** indicates that the fault originates from a component managed by the engine master electronic control unit (EECU). Tell-tale light **(4)** indicates that the fault originates from a component managed by the vehicle master electronic control unit (VECU).



The system functions by virtue of default values that replace values that can no longer be measured. Certain functions may be inhibited or work in fall-back mode.
In all cases, the fuel-injection system needs urgent overhaul.
In the case of detection of fault, engine performance may be impaired.



The faults can be visualized by using the RENAULT TRUCKS diagnostics tool plugged into the vehicle diagnostics socket **(5)**.
The faults can also be visualized on the instrument panel display by displaying the code numbers on the present or memorized faults sub-menu.
After taking action, erase the fault code numbers using the RENAULT TRUCKS diagnostics tool.



Use of the RENAULT TRUCKS diagnostics tool "DIAGNOSTICA"

The use of this tool provides great ease of diagnostics and its employment is strongly recommended.
It is absolutely essential for erasing faults.
Plug the diagnostics tool into the socket.

Available functions:

1/ Present faults
- component
- fault
- remedies

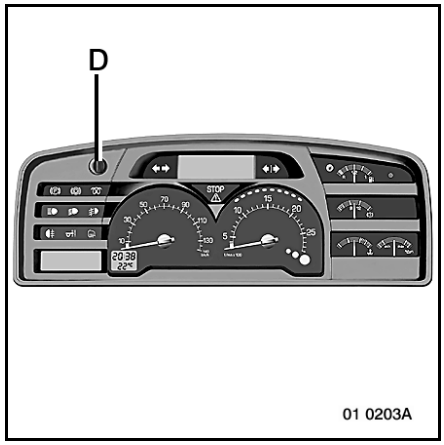
2/ Memorized faults
- component
- fault
- remedies
- erasure

3/ Diagnostic
- Diagnostic
  - Engine brake
  - Injection pressure
  - PTO
  - Warm up
  - Exhaust brake strangler
- Visualization of inputs (digital displays and/or graphics of next values)
  - Engine operating time
  - Accelerator pedal position (%)
  - Battery voltage
  - Engine oil level
  - Coolant temperature
  - Boost air temperature
  - Atmospheric pressure
  - Engine oil pressure
  - Boost air pressure
  - Injection pressure
  - Engine speed
  - Vehicle speed
  - Injected fuel quantity
  - Injection timing
  - Exhaust brake presence
  - Exhaust brake pilot-control set-point
  - Air conditioning system in operation
  - Fast idling speed set-point (PTO).

Diagnostics using instrument panel display

Controls

*You are advised to used button (**D**) while the vehicle is stationary and correctly parked.*

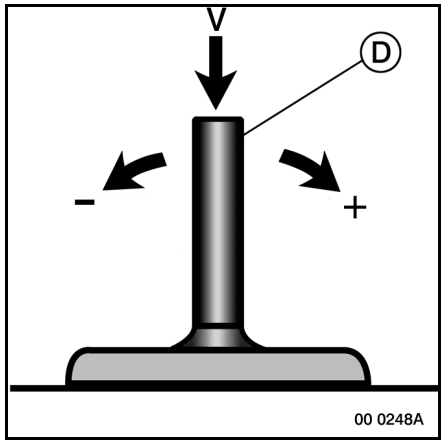


Button (**D**)**:**

Push towards **(+) or (-)**
- to gain access to the different menus and sub-menus.
- to make an adjustment or choice in the opened menu.

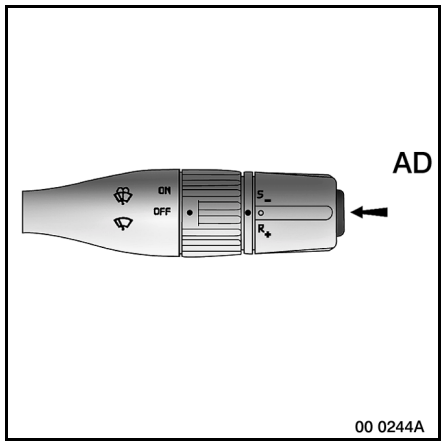
Short pulses **(V):**

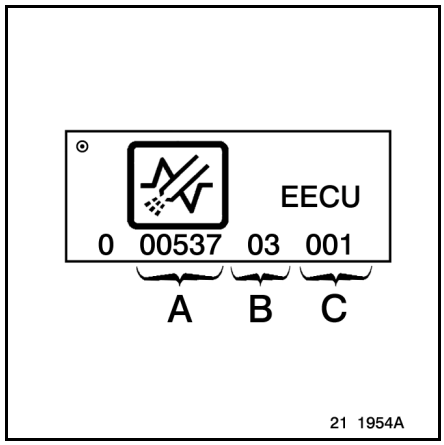
- opens a selected menu.
- validates an adjustment or a choice in the menu selected.
- scrolls through present or memorized faults in succession.



Button **(AD):**

Short pulses:
- serves to go back to the default display.
- closes an opened menu without validating the adjustment or choice.
- displays the different "driver's supplementary driving menu information.





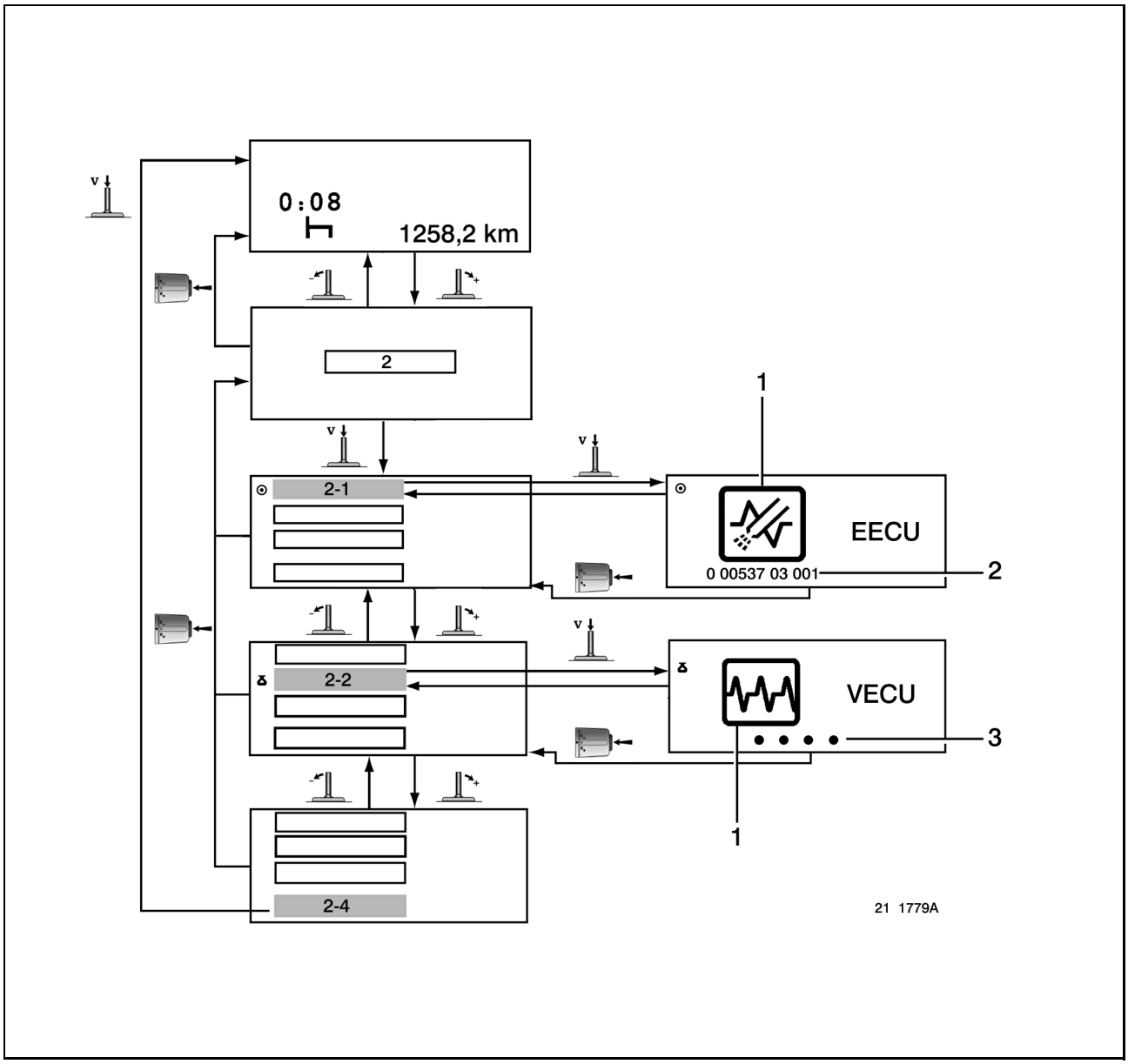
Meaning of fault codes

- **A:** fault number.
- **B:** fault type.
- **C:** number of appearances of fault.

The fault type **B** can only be used for "Phase 1" vehicles (see **List of fault code numbers** chapter).

Fault type

- 0: Data valid but above the normal operating band
- 1: Data valid but below the normal operating band
- 2: Data irregular, intermittent or incorrect
- 3: Voltage higher than rated voltage or amperage high
- 4: Voltage lower than rated voltage or amperage low
- 5: Voltage lower than normal or open-circuit
- 6: Voltage lower than normal or short-circuit to earth
- 7: Incorrect response from mechanical system
- 8: Frequency, pulse width or period abnormal
- 9: Refreshing speed abnormal
- 10: Variation rhythm abnormal
- 11: Failure mode non-identifiable
- 12: Smart peripheral or component defective
- 13: Outside calibration limits
- 14: Special instructions
- 15: Data valid but above the normal operating band (very low level of gravity)
- 16: Data valid but above the normal operating band (low level of gravity)
- 17: Data valid but below the normal operating band (very low level of gravity)
- 18: Data valid but below the normal operating band (low level of gravity)
- 19: Network data received illogical
- 31: Not available



Select the diagnostics menu (2)
When the menu is open, the **STOP** warning light comes on.

Sub-menus
- **2-1:** Present faults
- **2-2:** Memorized faults
- **2-4:** Quit

In all cases, pictogram **(1)** indicates the function concerned. To obtain the desired function, use control **(D)** whenever necessary.
For "present faults" and "memorized faults" sub-menus, code number **(2)** characterizes the fault, or 4 dots **(3)** mean there are no faults.

List of fault code numbers

The repercussion of the fault code numbers listed hereafter is only significant in the event of one single fault being present. If there are several present faults, the impairment of the system features provided may be greater and lead to operating impossibility.

Only code numbers specific to fuel-injection are covered in this document.
Faults relative to other functions may impair the features provided by the fuel-injection system (refer to the workshop manual sections corresponding to the systems incriminated).
To perform more comprehensive diagnostics on vehicle wiring harness runs, refer to the "Electrics" workshop manual section for the Premium vehicle or for the Midlum vehicle.
There are **2** lists of fault code numbers with different fall-back modes and display messages.
The first list concerns engines variant 14101 (pre-phase 1).
The second list concerns engines variant 14102 (phase 1).

It is possible to identify the list corresponding to the engine (original engine) on the identification plate (see "Technical data" chapter):

- Engine with plate without power, smoke, emissions index (pre-phase 1) -> list N° 1.
- Engine with plate with power, smoke, emissions index (phase 1) -> list N° 2.

Recap table of fault code numbers

List N° 1

Fault code	Kind of incident	See page
91	Accelerator pedal	L-2
513	Parameter definition	L-2
529	Engine oil pressure sensor	L-2
530	Fuel filters clogging sensor	L-3
531	Boost air pressure sensor	L-3
533	Engine cooling circuit temperature sensor	L-4
534	Boost air temperature sensor	L-4
537	Engine oil level sensor	L-4
546	Flywheel speed sensor	L-5
547	High pressure pump rotating speed sensor	L-5
551	Clogged fuel filters	L-5
552	Engine stop control (cab tilted)	L-6
558	Accelerator pedal	L-2
562	Exhaust brake solenoid valve	L-6
568	Starting aids	L-7
577	N° 1 cylinder fuel injector	L-7
578	N° 2 cylinder fuel injector	L-7
579	N° 3 cylinder fuel injector	L-7
580	N° 4 cylinder fuel injector	L-7
597 (EECU)	Battery charge voltage incorrect	L-8
597 (VECU)	Cruise control	L-9
598	Cruise control	L-9
600	Engine master ECU fault	L-8
601	Cruise control	L-9
604	Cruise control	L-9
804	High pressure fuel sensor	L-9
805	Sensors "+" 5 Volts current supply	L-10
818	Exhaust brake solenoid valve	L-10
824	Starting aids	L-10
833	N° 1 cylinder fuel injector	L-11
834	N° 2 cylinder fuel injector	L-11
835	N° 3 cylinder fuel injector	L-11
834	N° 4 cylinder fuel injector	L-11

Fault code	Kind of incident	See page
849	Fuel flow regulation solenoid valve N° 1	L-12
850	Fuel flow regulation solenoid valve N° 2	L-12
851	Injection pressure outside operating band	L-13
853	Battery charge voltage incorrect	L-13
854	Communication line between engine and vehicle ECUs	L-14
856	Engine master ECU fault	L-14

List N° 2

Fault code	Kind of incident	See page
16	Fuel filters clogging sensor	M-2
91	Accelerator pedal	L-2
94	High pressure fuel sensor	M-3
95	Clogged fuel filters	M-3
98	Engine oil level sensor	M-3
100	Engine oil pressure sensor	M-4
102	Boost air pressure sensor	M-4
105	Boost air temperature sensor	M-5
110	Engine cooling circuit temperature sensor	M-5
164	Injection pressure outside operating band	M-6
168	Battery charge voltage incorrect	M-6
190	Flywheel speed sensor	M-7
558	Accelerator pedal	L-2
597	Cruise control	M-7
598	Cruise control	M-7
601	Cruise control	M-7
604	Cruise control	M-7
611	Engine master ECU fault	M-8
628	Parameter definition	M-8
629	Engine master ECU fault	M-8
630	Parameter definition	M-8
631	Engine master ECU fault	M-8
636	High pressure pump speed sensor	M-9
651	N° 1 cylinder injector	M-9
652	N° 2 cylinder injector	M-9
653	N° 3 cylinder injector	M-9
654	N° 4 cylinder injector	M-9
676	Starting aids	M-10
970	Engine master ECU fault	M-8
1074	Exhaust brake solenoid valve	M-11
1079	Sensors "+" 5 Volts current supply	M-11
1231	Communication line between engine and vehicle management ECUs	M-12
1267	Engine stop control (cab tilted)	M-12
1347	Fuel delivery solenoid valve N° 1	M-12

Fault code	Kind of incident	See page
1348	Fuel delivery solenoid valve N° 2	M-12
1479	Engine master ECU fault	M-14

DIAGNOSTICS AID PRE-PHASE 1

91 / 558 Accelerator pedal

Display message
– PEDAL FAULT.

Major fault

Repercussion:
– Engine speed permanently steady at **890 rpm.**

Test:
The test on the accelerator pedal should only be performed using the RENAULT TRUCKS test tool
– Continuity of dashboard wiring harness between:
  • Terminal N° **1** of the black connector **18** and sensor connector terminal **5**.
  • Terminal N° **3** of the black connector **18** and sensor connector terminal **6**.
  • Terminal N° **4** of the black connector **18** and sensor connector terminal **1**.
  • Terminal N° **5** of the black connector **18** and sensor connector terminal **3**.

513 Parameter definition

Display message
– PARAMETER DEFINITION

Minor fault
– Parameters of ECU supplied by BOSCH not redefined by RENAULT TRUCKS.

Repercussion:
– No drop in engine power

Remedy:
– Define the EECU parameters.

529 Engine oil pressure sensor

Display message
– SENSOR FAULT.

Minor fault

Repercussion:
– No drop in engine power
– Default value: oil pressure = **6 bars.**

Test:
– Correct operation of sensor using the RENAULT TRUCKS diagnostics tool.
– Continuity of engine wiring harness between:
  • ECU connector terminal **A5** and sensor connector terminal **C**.
  • ECU connector terminal **A18** and sensor connector terminal **A**.
  • ECU connector terminal **A26** and sensor connector terminal **B**.
– Insulation of each wire.
– Sensor current supply (ECU connected, ignition switched on):
  • Presence of + **5 Volts** at sensor connector terminal **B.**
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **A**.

530Fuel filters clogging sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– No drop in engine power

Test:
– Correct operation of switch:
  • Switch contacts open in the rest position.
  • Switch contacts open when **P1** ≥ **3 bars P2.**
  • Button returns to rest position under effect of return spring.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at one of the switch connector terminals (wire **292**).
– Continuity of vehicle wiring harness between:
  • **EECU** connector terminal **B33** and one of the sensor terminals (wire **8072**).
  • **EECU B9, B22 B32** and one of the sensor terminals (wire **292**).
– Insulation of each wire.

531 Boost air pressure sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– Protectionmode (low output)
– Default value: boost air pressure = **1013 mbar(s).**
– Default value: atmospheric air pressure = **0 mbar(s).**

Test:
– Resistance at sensor terminals (at **20 °C) between:**
  • Terminals N° **3** N° **4**: R = **3400 → 8200 Ω**.
  • Terminals N° **3** N° **1**: R = **2400 → 8200 Ω**.
– Continuity of engine wiring harness between:
  • ECU connector terminal **A19** and sensor connector terminal **1**.
  • ECU connector terminal **A3** and sensor connector terminal **3**.
  • ECU connector terminal **A34** and sensor connector terminal **4**.
– Insulation of each wire.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of + **5 Volts** at sensor connector terminal **3**.
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **1**.

533 Engine cooling circuit temperature sensor

Display message
– SENSOR FAULT.

Minor fault

Repercussion:
– Protection mode.
– Default value: coolant temperature = **98 °C.**

Test:
– Resistance of sensor (see "Features" chapter for the values).
– Continuity of engine wiring harness between:
  • ECU connector terminal **A30** and sensor connector terminal **2**.
  • ECU connector terminal **A1** and sensor connector terminal **1**.
    - Presence of + **5 Volts** at sensor connector terminal **B**.
    - Presence of earth (R< **10 Ω**) at sensor connector terminal **A**.

534 Boost air temperature sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– Protection mode.
– Default value: boost air temperature = **60°C**

Test:
– Resistance of sensor (see "Features" chapter for the values).
– Continuity of engine wiring harness between:
  • ECU connector terminal **A19** and sensor connector terminal **1**.
  • ECU connector terminal **A2** and sensor connector terminal **2**.
– Insulation of each wire.
– Sensor current supply (ECU connected, ignition switched on):
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **1**.
  • Presence of + **5 Volts** at sensor connector terminal **2**.

537 Engine oil level sensor

Display message
– SENSOR FAULT.

Minor fault

Repercussion:
– No drop in engine power
– Default value: engine oil circuit empty

Test:
– Resistance of sensor (see "Features" chapter for the values).
– Continuity of engine wiring harness between:
  • ECU connector terminal **A17** and sensor connector terminal **2**.
  • ECU connector terminal **A38** and sensor connector terminal **1**.
– Insulation of each wire.

546 Flywheel speed sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Engine operation impaired if there is reversal of polarity
– Longer starting time (about 6 seconds)
– Operation on pump speed sensor

Test:
– Resistance at sensor terminals (at **20°C**): **R = 770 → 950 Ω**
– Insulation of each wire.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A29** and sensor connector terminal **1**.
  • ECU connector terminal **A37** and sensor connector terminal **2**.

547 High pressure pump speed sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– No drop in engine power
– Longer starting time (about 6 seconds)
– Operation of engine speed sensor on flywheel

Test:
– Resistance at sensor terminals (at **20°C**): **R = 770 → 950 Ω**
– Insulation of each wire.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A4** and sensor connector terminal **2**.
  • ECU connector terminal **A31** and sensor connector terminal **1**.

551 Clogged fuel filters

Display message
– FUEL FILTERS

Minor fault
– No drop in engine power
– Cut-off speed **1300** to **1400 rpm.**

Test:
– Replace the fuel filters

552 Engine stop control (cab tilted)

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– No drop in engine power
– Operating failure of the engine stop function with the switch

Test:
– Correct operation of switch:
  • Switch contacts open in the rest position.
  • Switch contacts closed when the button is depressed
  • Button returns to rest position under effect of return spring.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of **24 Volts** at one of the switch connector terminals.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **B32** and switch terminal **2**.
  • ECU connector terminal **B22 B9** and switch terminal **1**.
– Insulation of each wire.

562 Exhaust brake solenoid valve

Open-circuit or short-circuit to + 24 Volts current supply

Display message
– EXHAUST BRAKE INOPERATIVE

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Operating failure of the exhaust brake function

Test:
– Resistance of solenoid valve winding (at **20°C**): R = **43 → 49 Ω**
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **B42** and electrovalve terminal **1**.
  • ECU connector terminal **B22 B9** and electrovalve terminal **2**.
– Electrovalve current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at electrovalve connector terminal **2**.
– Insulation of each wire.

568 Starting aids

Open-circuit or short-circuit to + 24 Volts current supply

Display message
– PREHEATING INOPERATIVE

Minor fault
– No air preheating

Repercussion:
– Drop in engine power (120 seconds after the information)

Test:
– Continuity of engine wiring harness between:
  • ECU connector terminal **B11** and relay **R93** terminal **2**.
  • ECU connector terminal **A39** and relay **R93** terminal **1**.
  • Relay **R93** terminal **3** and resistance.
  • Resistance and earth.
  • Relay **R93** terminal **5** and **+**
– Insulation of each wire.

577 → 580 Fuel injectors

577 N° 1 cylinder fuel injector

578 N° 2 cylinder fuel injector

579 N° 3 cylinder fuel injector

580 N° 4 cylinder fuel injector

Electrical system open-circuit

Display message
– INJECTOR FAULT

Minor fault

Repercussion:
– Operating failure of fuel injector in question
– Injection pressure limited to **1000 bars**

Test:
Resistance of fuel injector solenoid valve winding (at **20°C**): **R = 0.3 → 0.5 Ω**
– Continuity of engine wiring harness between:
  • ECU connector terminal **A40**, **A41** and **173** cylinder injector terminal wire **1/2**
  • ECU connector terminal **A42**, **A43** and **174** cylinder injector terminal wire **3/4**
  • ECU connector terminal **A12** and N° **1** injector terminal wire **293**.
  • ECU connector terminal **A11** and N° **2** injector terminal wire **295**.
  • ECU connector terminal **A24** and N° **3** injector terminal wire **294**.
  • ECU connector terminal **A22** and N° **4** injector terminal wire **298**.

597 Battery charge voltage incorrect

9.6 V < Battery voltage > 18.5 V

31 V < Battery voltage > 34 V

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– No drop in engine power

Test:
– Correct operation of charging system
  • Charge voltage
  • Voltage regulator
  • Conformity, condition and connection of charging system
  • Condition and connection of batteries

600 Engine master ECU fault

Memory fault or fault memorizing procedure fault

Display message
– ENGINE FAULT

Minor fault

Repercussion:
– No drop in engine power
– No memorizing of faults

Engine / pump speed sensor acquisition interface fault

Display message
– ENGINE FAULT

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Erratic operation of the engine

Test:
EECU box using the RENAULT TRUCKS diagnostics tool.

597/598/601/604 Cruise control

Display message
– CRUISE CONTROL

Minor fault

Repercussion:
– Operating failure of cruise control, idling speed adjustment and fast idling functions

Test:
– Correct operation of cruise control:
  • Control in **"ON"** position: contact closed between terminals **B5**, **B6**
  • Control in **"OFF"** position: contact closed between terminals **B5, B6**
  • Control in **"R/+"** position: contact closed between terminals **B7**, **B2**
  • Control in **"S/-"** position: contact closed between terminals **B1, B2**
  • Control in **"O"** position: contact closed between terminals **B1**, **B2** and terminals **B7**, **B2**
– Continuity of wiring harness
– The control connector is the one connected directly to the cruise control
– Continuity of dashboard wiring harness between:
  • VECU **18**-way black connector terminal **6** and control connector terminal **B5**.
  • VECU **18**-way black connector terminal **7** and control connector terminal **B1**.
  • VECU **18**-way black connector terminal **8** and control connector terminal **B7** .
– Control current supply
  • Presence of earth at control connector terminal **B2**.
  • Presence of + **24 V** at control connector terminals **B1/B5/B7**.

804 High pressure fuel sensor

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power
– Default pressure mapping (**1500 bars**)
– Cut-off speed: **1300** to **1400 rpm**
– Injection pressure maximum value regulated by the rail pressure limiter

Test:
– Correct operation of sensor using the RENAULT TRUCKS diagnostics tool.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A6** and sensor connector terminal **1**.
  • ECU connector terminal **A33** and sensor connector terminal **2**.
  • ECU connector terminal **A13** and sensor connector terminal **3**.
– Insulation of each wire.
– Sensor current supply (ECU connected, ignition switched on):
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **1**.
  • Presence of + **5 Volts** at sensor connector terminal **3**.

Replace the rail pressure regulator without fail

805 Sensor (or several sensors) + 5 Volts current supply

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power
– Operation of sensors in fall-back mode.
– Cut-off speed: **1300** to **1400 rpm**

Test:
– Presence of **+5 Volts** at the sensor terminals (ECU connected, ignition switched on):
  • Engine oil pressure sensor terminal **B**
  • Injection pressure sensor terminal **3**
  • Boost air pressure sensor terminal **3**
– Continuity of engine wiring harness between:
  • ECU connector terminal **A26** and engine oil pressure sensor connector terminal **B**
  • ECU connector terminal **A13** and injection pressure sensor connector terminal **3**
  • ECU connector terminal **A3** and boost air pressure sensor connector terminal **3**
– Insulation of each wire.

818 Exhaust brake electrovalve

Short-circuit to earth

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Exhaust brake strangler jammed in closed position

Test:
– Resistance of electrovalve winding (at **20°C**): R = **43 → 49 Ω**
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **B42** and electrovalve terminal **1**.
  • ECU connector terminal **B22**, **B9** and electrovalve terminal **2**.
– Electrovalve current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at electrovalve connector terminal **2**.
– Insulation of each wire.

824 Starting aids

Short-circuit to earth

Display message
– IMMEDIATE STOP

Major fault
– Preheating permanently activated

Repercussion:
– Drop in engine power (120 seconds after the information)

Test:
– Continuity of engine wiring harness between:
  • ECU connector terminal **B11** and relay **R93** terminal **2**.
  • ECU connector terminal **A39** and relay **R93** terminal **1**.
  • Relay **R93** terminal **3** and resistance.
  • Resistance and earth.
  • Relay **R93** terminal **5** and **+**

833 → 836 Fuel injectors

833 N° 1 cylinder fuel injector

834 N° 2 cylinder fuel injector

835 N° 3 cylinder fuel injector

836 N° 4 cylinder fuel injector

Short-circuit to earth

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- Operating failure of N° **1/2** cylinder injectors or N° **3/4** cylinder injectors
- About **50%** drop in engine power
- Injection pressure limited to **1000 bars**

Test:
- Insulation of wires (injector in question disconnected)

849 → 850 Fuel flow regulation solenoid valve

849 Fuel flow regulation solenoid valve N° 1

850 Fuel flow regulation solenoid valve N° 2

Line open-circuit or short-circuit to earth

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- No drop in engine power
- Cut-off speed: **1300** to **1400 rpm**
- Flow regulation ensured by non-defective solenoid valve
- High injection pressure (defective solenoid valve jammed in the open position)
- Injection pressure maximum value regulated by the rail pressure limiter

Replace the rail pressure regulator without fail

Line short-circuit to +

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- No drop in engine power
- Cut-off speed: **1300** to **1400 rpm**
- Flow regulation ensured by non-defective solenoid valve
- High injection pressure (defective solenoid valve jammed in the closed position)

Test:
- Resistance of solenoid valve winding (at **20°C**): R = **14 → 16 Ω**

Solenoid valve N° **1**
- Continuity of engine wiring harness between:
  - ECU connector terminal **A9** and solenoid valve terminal **1**.
  - ECU connector terminal **A20** and solenoid valve terminal **2**.

Solenoid valve N° **2**
- Continuity of engine wiring harness between:
  - ECU connector terminal **A7** and solenoid valve terminal **2**.
  - ECU connector terminal **A21** and solenoid valve terminal **1**.

851 Injection pressure outside operating band

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power
– Cut-off speed: **1300** to **1400 rpm**
– Operation with a random rail pressure
– Injection pressure maximum value regulated by the rail pressure limiter

Test:
Fuel aspiration system.
– for leaks.
– for fouling (especially the prefilter).
Low pressure circuit.
– for leaks.
– correct operation of booster pump.
– for fouling (especially the filters).
High pressure circuit.
– for leaks.
– correct operation of high pressure pump.
– correct operation of fuel flow regulation solenoid valves.
– rail leak-off return circuit.
– correct operation of flow limiters.
– correct operation of fuel injectors.

Replace the rail pressure regulator without fail if the injection pressure is too high.

853 Battery charge voltage incorrect

Battery voltage < 9.6V

Battery voltage > 34V

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power

Test:
– Correct operation of charging system
  • Charge voltage
  • Voltage regulator
  • Conformity, condition and connection of charging system
  • Condition and connection of batteries

854 Communication line between engine and vehicle ECUs (CAN BUS)

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– Engine speed permanently steady at **890 rpm.**

Test:
– Continuity of vehicle wiring harness between:
  • Injection ECU connector terminal **B8** and vehicle ECU connector terminal **7** (green wire).
  • Injection ECU connector terminal **B39** and vehicle ECU connector terminal **6** (red wire).
– Insulation of each wire.
– ECU current supply (vehicle ECU connected):
  • Presence of earth at injection ECU connector terminals **B12, B24, B43**.
  • Presence of after ignition + at terminals **B9, B22, B10, B41**.

856 Engine master ECU fault

Internal fault

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– Operating failure of N° **1/2** cylinder injectors or N° **3/4** cylinder injectors
– About **50%** drop in engine power

Test:
EECU box using the RENAULT TRUCKS diagnostics tool.

DIAGNOSTICS AID PHASE 1

16 Fuel filters clogging sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– No drop in engine power

Test:
– Correct operation of switch:
  • Switch contacts open in the rest position.
  • Switch contacts open when **P1** ≥ **3 bars P2.**
  • Button returns to rest position under effect of return spring.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at one of the switch connector terminals (wire **292**).
– Continuity of vehicle wiring harness between:
  • **EECU** connector terminal **B33** and one of the sensor terminals (wire **8072**).
  • **EECU B9, B22 B32** and one of the sensor terminals (wire **292**).
– Insulation of each wire.

91 / 558 Accelerator pedal

Display message
– PEDAL FAULT.

Major fault

Repercussion:
– Engine speed permanently steady at **890 rpm**.

Test:
The test on the accelerator pedal should only be performed using the RENAULT TRUCKS test tool
– Continuity of dashboard wiring harness between:
  • Terminal N° **1** of the black connector **18** and sensor connector terminal **5**.
  • Terminal N° **3** of the black connector **18** and sensor connector terminal **6**.
  • Terminal N° **4** of the black connector **18** and sensor connector terminal **1**.
  • Terminal N° **5** of the black connector **18** and sensor connector terminal **3**.

94 High pressure fuel sensor

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power
– Default pressure mapping (**1500 bars**)
– Cut-off speed: **1300** to **1400 rpm**
– Injection pressure maximum value regulated by the rail pressure limiter

Test:
– Correct operation of sensor using the RENAULT TRUCKS diagnostics tool.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A6** and sensor connector terminal **1**.
  • ECU connector terminal **A33** and sensor connector terminal **2**.
  • ECU connector terminal **A13** and sensor connector terminal **3**.
– Insulation of each wire.
– Sensor current supply (ECU connected, ignition switched on):
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **1**.
  • Presence of + **5 Volts** at sensor connector terminal **3.**

Replace the rail pressure regulator without fail

95 Clogged fuel filters

Display message
– FUEL FILTERS CLOGGED

Minor fault

Repercussion:
– No drop in engine power
– Cut-off speed **1300** to **1400 rpm.**

Test:
– Replace the fuel filters

98 Engine oil level sensor

Display message
– SENSOR FAULT.

Minor fault

Repercussion:
– No drop in engine power
– Default value: engine oil circuit empty

Test:
– Resistance of sensor (see "Features" chapter for the values).
– Continuity of engine wiring harness between:
  • ECU connector terminal **A17** and sensor connector terminal **2**.
  • ECU connector terminal **A38** and sensor connector terminal **1**.
– Insulation of each wire.

100 Engine oil pressure sensor

Display message
– URGENT REPAIR.

Minor fault

Repercussion:
– No drop in engine power
– Default value: oil pressure = **6 bars.**

Test:
– Correct operation of sensor using the RENAULT TRUCKS diagnostics tool.
– Continuity of engine wiring harness between:
  • ECU connector terminal **A5** and sensor connector terminal **C**.
  • ECU connector terminal **A18** and sensor connector terminal **A**.
  • ECU connector terminal **A26** and sensor connector terminal **B**.
– Insulation of each wire.
– Sensor current supply (ECU connected, ignition switched on):
  • Presence of + **5 Volts** at sensor connector terminal **B**.
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **A**.

102 Boost air pressure sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– Protectionmode (low output)
– Default value: boost air pressure = **1013 mbar(s).**
– Default value: atmospheric air pressure = **0 mbar(s).**

Test:
– Resistance at sensor terminals (at **20 °C**) between:
  • Terminals N° **3** N° **4**: R = **3400 → 8200 Ω**.
  • Terminals N° **3** N° **1**: R = **2400 → 8200 Ω**.
– Continuity of engine wiring harness between:
  • ECU connector terminal **A19** and sensor connector terminal **1**.
  • ECU connector terminal **A3** and sensor connector terminal **3**.
  • ECU connector terminal **A34** and sensor connector terminal **4**.
– Insulation of each wire.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of + **5 Volts** at sensor connector terminal **3**.
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **1**.

105 Boost air temperature sensor

Display message
– POWER LOSS

Minor fault

Repercussion:
– Protection mode.
– Default value: boost air temperature = **60°C**

Test:
– Resistance of sensor (see "Features" chapter for the values).
– Continuity of engine wiring harness between:
  • ECU connector terminal **A19** and sensor connector terminal **1**.
  • ECU connector terminal **A2** and sensor connector terminal **2**.
– Insulation of each wire.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **1**.
  • Presence of + **5 Volts** at sensor connector terminal **2**.

110 Engine cooling circuit temperature sensor

Display message
– URGENT REPAIR.

Minor fault

Repercussion:
– Protection mode.
– Default value: coolant temperature = **98 °C.**

Test:
– Resistance of sensor (see "Features" chapter for the values).
– Continuity of engine wiring harness between:
  • ECU connector terminal **A30** and sensor connector terminal **2**.
  • ECU connector terminal **A1** and sensor connector terminal **1**.
    - Presence of + **5 Volts** at sensor connector terminal **1**.
    - Presence of earth (R< **10 Ω**) at sensor connector terminal **2**.

164 Injection pressure outside operating band

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power
– Cut-off speed: **1300** to **1400 rpm**
– Operation with a random rail pressure
– Injection pressure maximum value regulated by the rail pressure limiter

Test:
Fuel aspiration system.
– for leaks.
– for fouling (especially the prefilter).
Low pressure circuit.
– for leaks.
– correct operation of booster pump.
– for fouling (especially the filters).
High pressure circuit.
– for leaks.
– correct operation of high pressure pump.
– correct operation of fuel flow regulation solenoid valves.
– rail leak-off return circuit.
– correct operation of flow limiters.
– correct operation of fuel injectors.

Replace the rail pressure regulator without fail if the injection pressure is too high.

168 Battery charge voltage incorrect

9.6 V < Battery voltage > 18.5 V

31 V < Battery voltage > 34 V

Display message
– VOLTAGE FAULT

Minor fault

Battery voltage < 9.6V

Battery voltage > 34V

Display message
– VOLTAGE FAULT

Major fault

Repercussion:
– No drop in engine power

Test:
– Correct operation of charging system
  • Charge voltage
  • Voltage regulator
  • Conformity, condition and connection of charging system
  • Condition and connection of batteries

190 Flywheel speed sensor

Display message
– URGENT REPAIR.

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Engine operation impaired if there is reversal of polarity
– Longer starting time (about 6 seconds)
– Operation on pump speed sensor

Test:
– Resistance at sensor terminals (at **20°C): R = 770 → 950 Ω**
– Insulation of each wire.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A29** and sensor connector terminal **1**.
  • ECU connector terminal **A37** and sensor connector terminal **2**.

597 / 598 / 601 /604 Cruise control

Display message
– CRUISE CONTROL INOPERATIVE

Minor fault

Repercussion:
– Operating failure of cruise control, idling speed adjustment and fast idling functions

Test:
– Correct operation of cruise control:
  • Control in **"ON"** position: contact closed between terminals **B5, B6**
  • Control in **"OFF"** position: contact closed between terminals **B5, B6**
  • Control in **"R/+"** position: contact closed between terminals **B7, B2**
  • Control in **"S/-"** position: contact closed between terminals **B1, B2**
  • Control in **"O"** position: contact closed between terminals **B1, B2** and terminals **B7, B2**
– Continuity of wiring harness
– The control connector is the one connected directly to the cruise control
– Continuity of dashboard wiring harness between:
  • VECU **18**-way black connector terminal **6** and control connector terminal **B5**.
  • VECU **18**-way black connector terminal **7** and control connector terminal **B1**.
  • VECU **18**-way black connector terminal **8** and control connector terminal **B7**.
– Control current supply
  • Presence of earth at control connector terminal **B2**.
  • Presence of + **24 V** at control connector terminals **B1/B5/B7.**

611 Engine master ECU fault

Internal fault

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– Operating failure of N° **1/2** cylinder injectors or N° **3/4** cylinder injectors
– About **50%** drop in engine power

Test:
EECU box using the RENAULT TRUCKS diagnostics tool.

628 / 630 Parameter definition

Display message
– PARAMETER DEFINITION

Minor fault
– Parameters of ECU supplied by BOSCH not redefined by RENAULT TRUCKS.

Repercussion:
– No drop in engine power

Remedy:
– Define the EECU parameters.

629 / 631 / 970 Engine master ECU fault

Memory fault or fault memorizing procedure fault

Display message
– ENGINE FAULT

Minor fault

Repercussion:
– No drop in engine power
– No memorizing of faults

Engine / pump speed sensor acquisition interface fault

Display message
– ENGINE FAULT

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Erratic operation of the engine

Test:
EECU box using the RENAULT TRUCKS diagnostics tool.

636 High pressure pump speed sensor

Display message
– URGENT REPAIR

Minor fault

Repercussion:
– No drop in engine power
– Longer starting time (about 6 seconds)
– Operation of engine speed sensor on flywheel

Test:
– Resistance at sensor terminals (at **20°C**): **R = 770 → 950 Ω**
– Insulation of each wire.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A4** and sensor connector terminal **2**.
  • ECU connector terminal **A31** and sensor connector terminal **1**.

651 → 654 Fuel injectors

651 N° 1 cylinder fuel injector

652 N° 2 cylinder fuel injector

653 N° 3 cylinder fuel injector

654 N° 4 cylinder fuel injector

Electrical system open-circuit

Display message
– INJECTOR FAULT

Minor fault

Repercussion:
– Operating failure of fuel injector in question
– Injection pressure limited to **1000 bars**

Test:
Resistance of fuel injector solenoid valve winding (at **20°C**): **R = 0.3 → 0.5 Ω**
– Continuity of engine wiring harness between:
  • ECU connector terminal **A40, A41** and **173** cylinder injector terminal wire **1/2**
  • ECU connector terminal **A42, A43** and **174** cylinder injector terminal wire **3/4**
  • ECU connector terminal **A12** and N° **1** injector terminal wire **293**.
  • ECU connector terminal **A11** and N° **2** injector terminal wire **295**.
  • ECU connector terminal **A24** and N° **3** injector terminal wire **294**.
  • ECU connector terminal **A22** and N° **4** injector terminal wire **298**.

Short-circuit to earth

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– Operating failure of N° **1/2** cylinder injectors or N° **3/4** cylinder injectors
– About **50%** drop in engine power
– Injection pressure limited to **1000 bars**

Test:
– Insulation of wires (injector in question disconnected)

676 Starting aids

Open-circuit or short-circuit to + 24 Volts current supply

Display message
– AIR PREHEATING: SWITCH OFF IGNITION

Major fault
– No air preheating

Repercussion:
– Drop in engine power (120 seconds after the information)

Test:
– Continuity of engine wiring harness between:
  • ECU connector terminal **B11** and relay **R93** terminal **2**.
  • ECU connector terminal **A39** and relay **R93** terminal **1**.
  • Relay **R93** terminal **3** and resistance.
  • Resistance and earth.
  • Relay **R93** terminal **5** and **+**
– Insulation of each wire.

Short-circuit to earth

Display message
– IMMEDIATE STOP

Major fault
– Preheating permanently activated

Repercussion:
– Drop in engine power (120 seconds after the information)

Test:
– Continuity of engine wiring harness between:
  • ECU connector terminal **B11** and relay **R93** terminal **2**.
  • ECU connector terminal **A39** and relay **R93** terminal **1**.
  • Relay **R93** terminal **3** and resistance.
  • Resistance and earth.
  • Relay **R93** terminal **5** and **+**

1074 Exhaust brake solenoid valve

Open-circuit or short-circuit to + 24 Volts current supply

Display message
– ENGINE BRAKE INOPERATIVE

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Operating failure of the exhaust brake function

Test:
– Resistance of solenoid valve winding (at **20°C**): R = **43 → 49 Ω**
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A42** and electrovalve terminal **1**.
  • ECU connector terminal **B22 B9** and electrovalve terminal **2**.
– Electrovalve current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at electrovalve connector terminal **2**.
– Insulation of each wire.

Short-circuit to earth

Display message
– ENGINE BRAKE INOPERATIVE

Major fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Exhaust brake strangler jammed in closed position

Test:
– Resistance of electrovalve winding (at **20°C**): R = **43 → 49 Ω**
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **B42** and electrovalve terminal **1**.
  • ECU connector terminal **B22 B9** and electrovalve terminal **2**.
– Electrovalve current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at electrovalve connector terminal **2**.
– Insulation of each wire.

1079 Sensor (or several sensors) + 5 Volts current supply

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power
– Operation of sensors in fall-back mode.
– Cut-off speed: **1300** to **1400 rpm**

Test:
– Presence of **+5 Volts** at the sensor terminals (ECU connected, ignition switched on):
  • Engine oil pressure sensor terminal **B**
  • Injection pressure sensor terminal **3**
  • Boost air pressure sensor terminal **3**
– Continuity of engine wiring harness between:
  • ECU connector terminal **A26** and engine oil pressure sensor connector terminal **B**
  • ECU connector terminal **A13** and injection pressure sensor connector terminal **3**
  • ECU connector terminal **A3** and boost air pressure sensor connector terminal **3**
– Insulation of each wire.

1231 Communication line between engine and vehicle ECUs (CAN BUS)

Display message
– URGENT REPAIR

Major fault

Repercussion:
– Engine speed permanently steady at **890 rpm.**

Test:
– Continuity of vehicle wiring harness between:
  • Injection ECU connector terminal **B8** and vehicle ECU connector terminal **7** (green wire).
  • Injection ECU connector terminal **B39** and vehicle ECU connector terminal **6** (red wire).
– Insulation of each wire.
– ECU current supply (vehicle ECU connected):
  • Presence of earth at injection ECU connector terminals **B12, B24, B43**.
  • Presence of after ignition + at terminals **B9, B22, B10, B41**.

1267 Engine stop control (cab tilted)

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– No drop in engine power
– Operating failure of the engine stop function with the switch

Test:
– Correct operation of switch:
  • Switch contacts open in the rest position.
  • Switch contacts closed when the button is depressed
  • Button returns to rest position under effect of return spring.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of **24 Volts** at one of the switch connector terminals.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **B32** and switch terminal **2**.
  • ECU connector terminal **B22, B9** and switch terminal **1**.
– Insulation of each wire.

1347 → 1348 Fuel flow regulation solenoid valve

1347 Fuel flow regulation solenoid valve N° 1

1348 Fuel flow regulation solenoid valve N° 2

Line open-circuit or short-circuit to earth

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- No drop in engine power
- Cut-off speed: **1300** to **1400 rpm**
- Flow regulation ensured by non-defective solenoid valve
- High injection pressure (defective solenoid valve jammed in the open position)
- Injection pressure maximum value regulated by the rail pressure limiter

Replace the rail pressure regulator without fail

Line short-circuit to +

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- No drop in engine power
- Cut-off speed: **1300** to **1400 rpm**
- Flow regulation ensured by non-defective solenoid valve
- High injection pressure (defective solenoid valve jammed in the closed position)

Test:
- Resistance of solenoid valve winding (at **20°C**): R = **14 → 16 Ω**

Solenoid valve N° **1**
- Continuity of engine wiring harness between:
  - ECU connector terminal **A9** and solenoid valve terminal **1**.
  - ECU connector terminal **A20** and solenoid valve terminal **2**.

Solenoid valve N° **2**
- Continuity of engine wiring harness between:
  - ECU connector terminal **A7** and solenoid valve terminal **2**.
  - ECU connector terminal **A21** and solenoid valve terminal **1**.

1479 Engine master ECU fault

Memory fault or fault memorizing procedure fault

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- No drop in engine power
- No memorizing of faults

Engine / pump speed sensor acquisition interface fault

Display message
- ENGINE FAULT

Minor fault

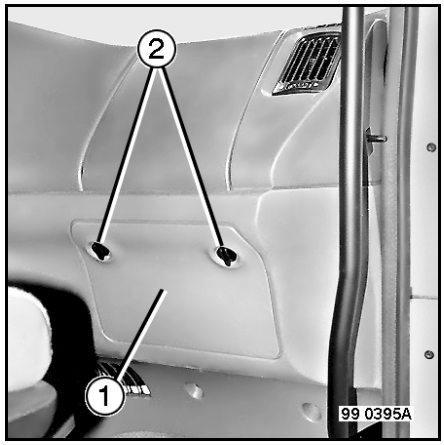
Repercussion:
- Drop in engine power (120 seconds after the information)
- Erratic operation of the engine

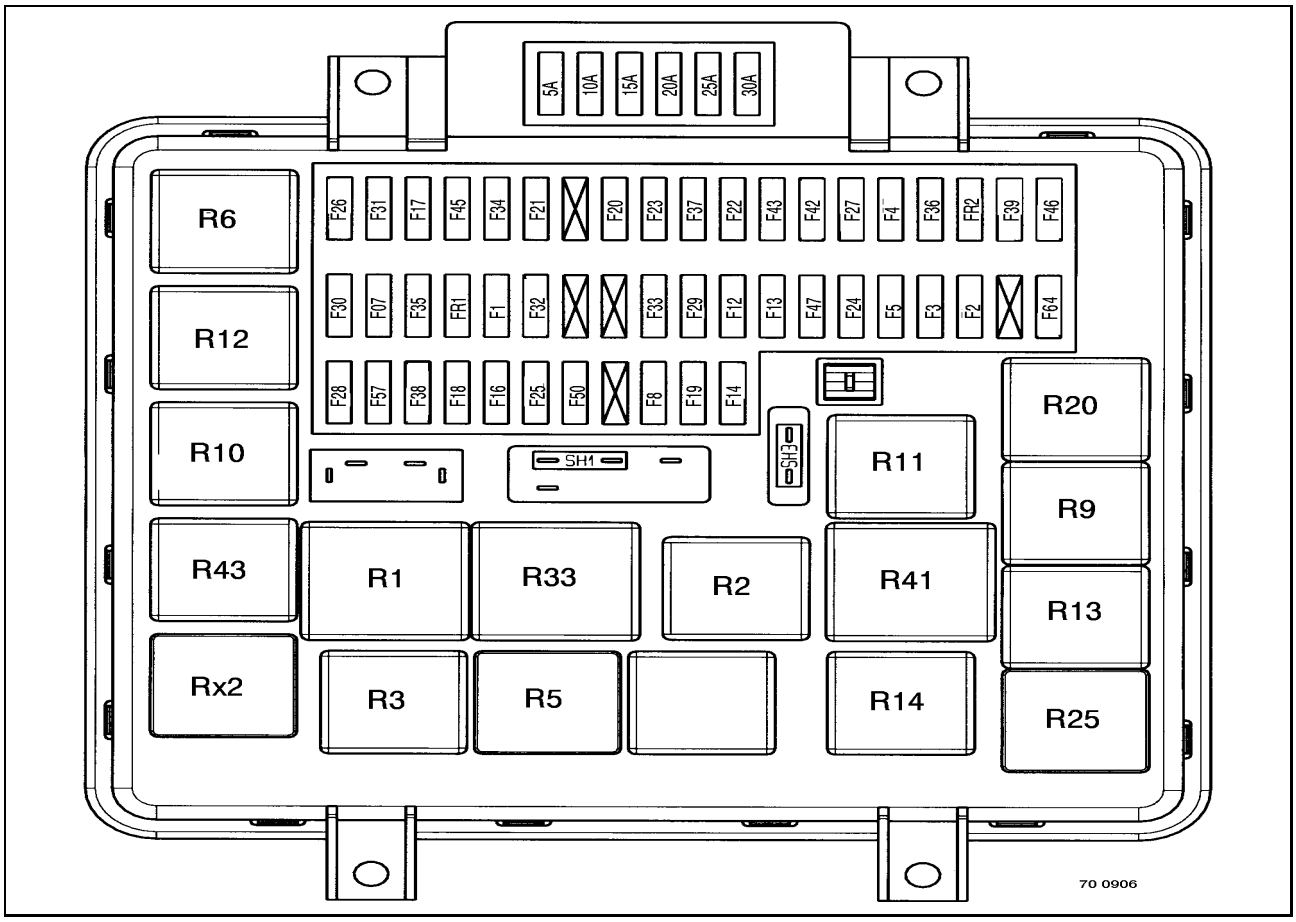
Test:
EECU box using the RENAULT TRUCKS diagnostics tool.

ELECTRICS

Electrics (MIDLUM)

Fuses:
To gain access to the fuses:
- Turn both catches **(2)**.
- Tilt cover **(1)**.

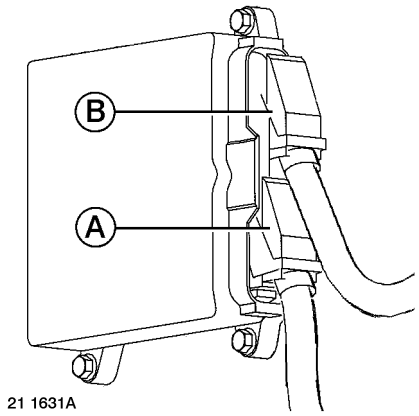




Code N°	Name of function	Fuse item N°	am-per-age
9202	Engine master ECU (EECU)	F7	10
9202	Engine master ECU (EECU)	F38	25
9201	Vehicle master ECU (VECU)	F57	10
7614	Principal display	F16	10

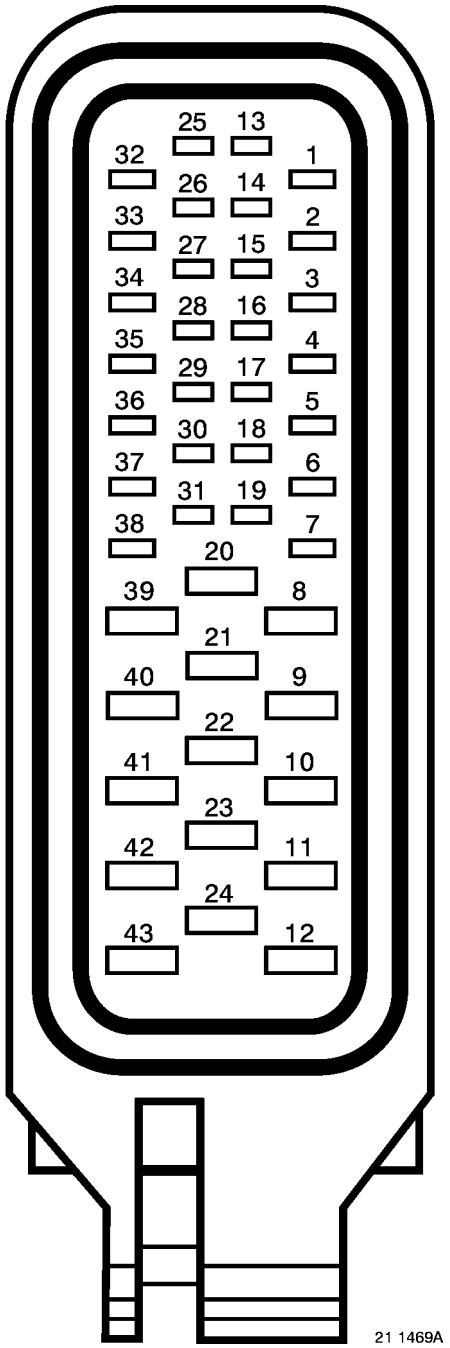
Assignment of pins to ECU wiring harness connector

(Connector face view)



21 1631A

21 1962A



21 1469A

Electrical diagram

How to read the diagrams

The following electrical diagrams represent only the electrical wiring involved in the fuel-injection function. For further details, consult the workshop manual "Electrics" section for the vehicle.

Key to appliances

2196 After ignition power supply relay N° 1

2200 Anti-theft electronic box

2261 Steering lock and starting control

2267 Engine compartment engine stop control

2400 Fuel filter clogging pressure switch

2414 Preheating relay N°1

5266 Accelerator pedal position sensor

5269 Engine cruise control and speed regulator adjustment control

7362 Coolant temperature sensor

7368 Oil pressure sensor

7519 Diagnostics socket

7614 Principal display

8059 Electric or hydraulic retardation control

8150 Exhaust brake electrovalve

8178 Parking brake indicator air pressure sensor

8275 Engine oil level sensor

8366 Power take-off position sensor

8466 Neutral switch position sensor

9200 Boost air pressure and temperature sensor

9201 Vehicle master ECU (VECU)

9202 Engine master ECU (EECU)

9208 Fuel high pressure sensor

9210 "VECU / EECU" power supply relay

9212 High Pressure pump, solenoid valve cylinder

9213 High Pressure pump, solenoid valve cylinder

9220 Unit pump N° 1 incorporating solenoid valve

9221 Unit pump N° 2 incorporating solenoid valve

9222 Unit pump N° 3 incorporating solenoid valve

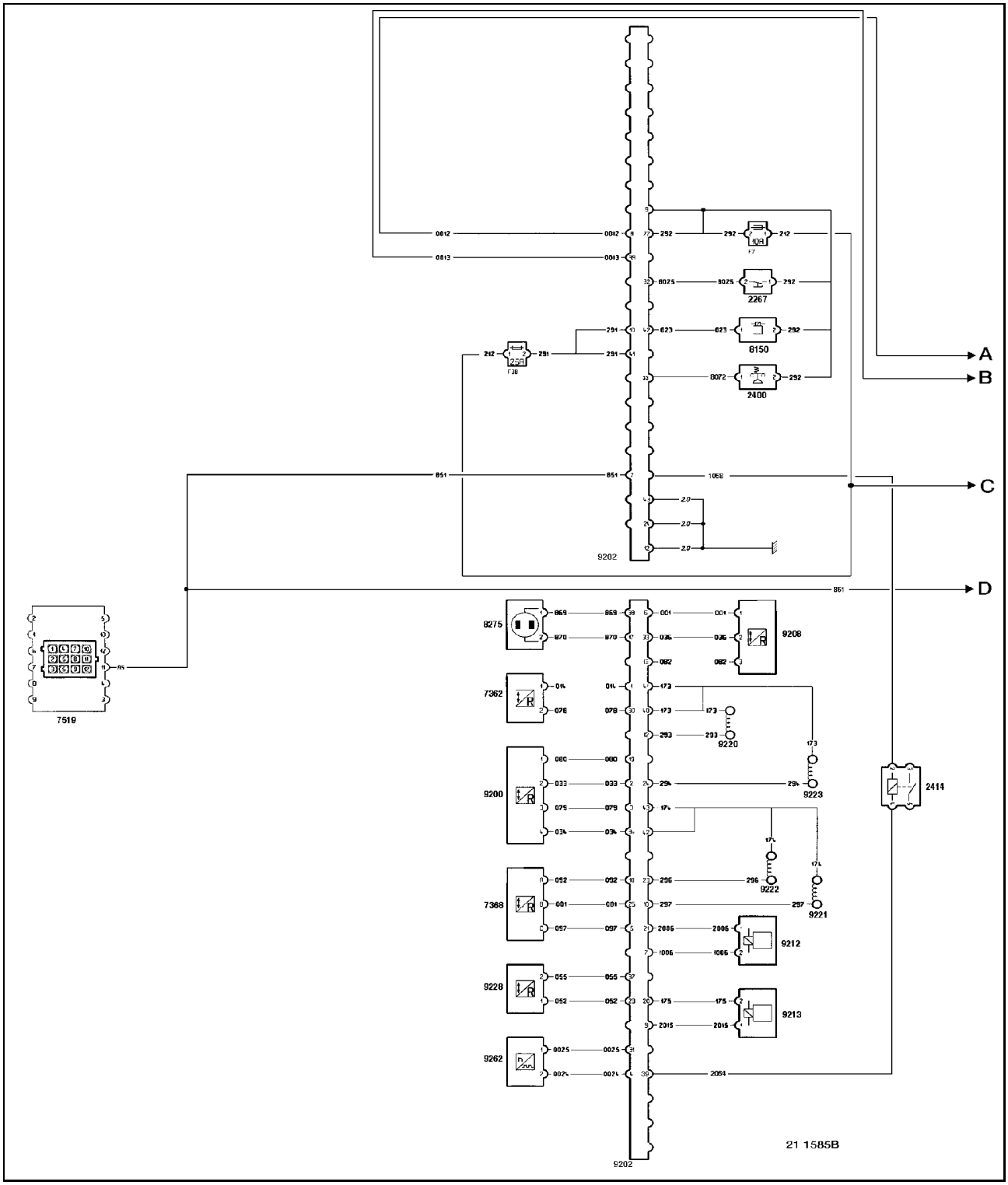
9223 Unit pump N° 4 incorporating solenoid valve

9228 Flywheel speed sensor

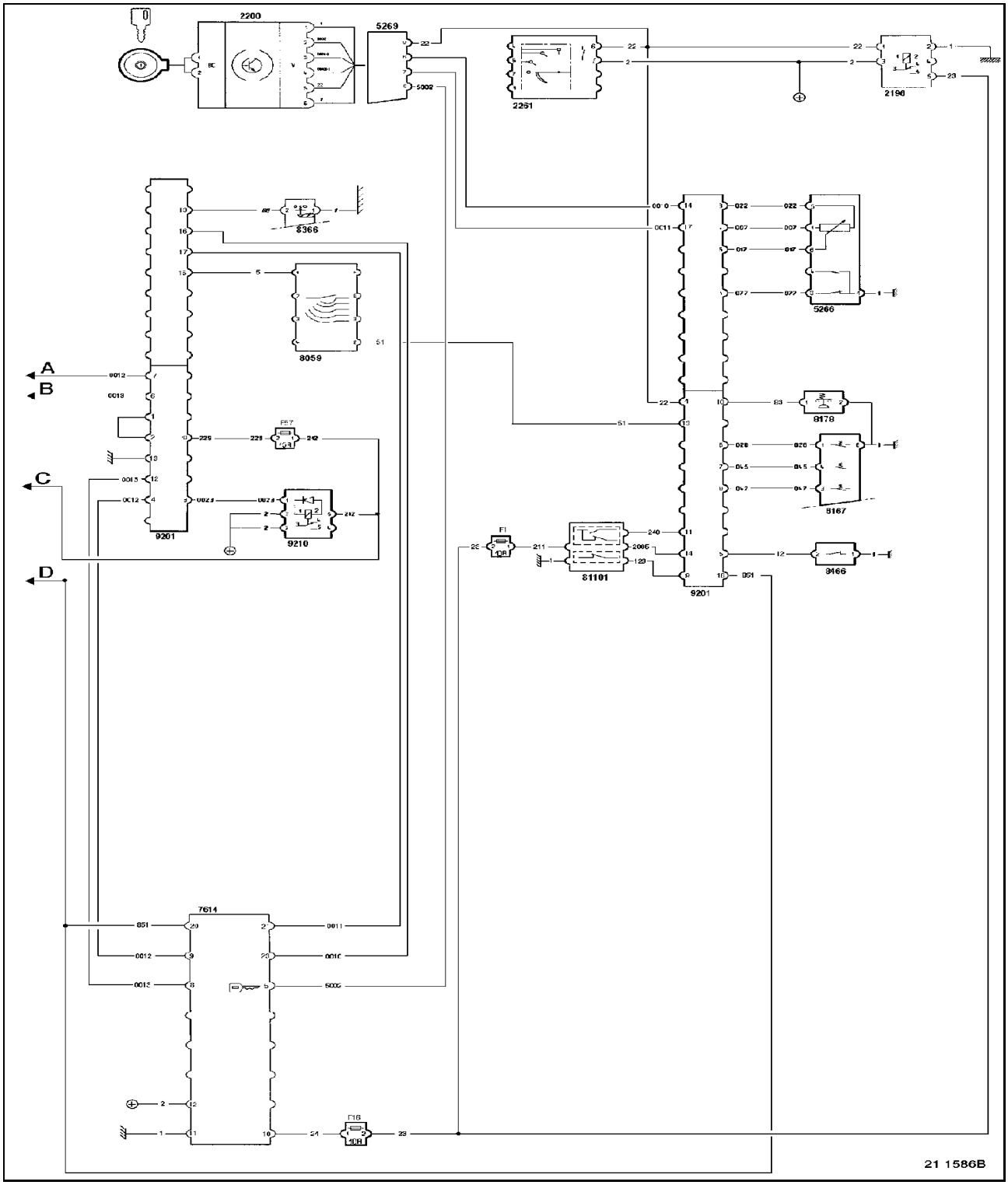
9262 Pump speed sensor (injection or high pressure)

8103 Clutch switch and stop lights switch position sensor

Master electronic control unit **EECU**



Master electronic control unit **VECU**



TURBOCHARGER

Operating trouble

Each turbocharged engine possesses its own characteristic sound. Owing to this, many defects can be detected merely by noticing a change in the customary noise signature.
If the sound level becomes sharper, it may be due to leaking charge air (between turbocharger and intake manifold) or exhaust gas, or a drive shaft defect.
An intermittent change in noise level may be due to turbocharger fouling or use of the engine at underspeed in relation to load.
The appearance of vibration may indicate a drive shaft defect.
A sudden reduction in noise, accompanied by the appearance of black or blue exhaust smoke is the sign of total break-up of the turbocharger.
In all cases, immediately stop the engine to avoid more serious damage to the turbocharger and to the engine.

On-vehicle checks

Engine stopped:
Refer to technical document "**DT 357**".
Engine idling:
Check the air pipes between air filter and turbocharger for leaks by spraying Start Pilote fluid. Leakage will be indicated by an increase in engine speed.
Engine running at 1 200 rpm.:
Check for leaks between turbocharger and engine using a leak detector.Check for exhaust gas leaks (actuate the exhaust brake). Replace gaskets, if necessary.A gas leak can be detected by a change in colour at the place of the leak.
Removal / fitting of turbocharger
These operations do not present any difficulty.Clean all the air conduits and make sure there is no foreign matter left.Before tightening the exhaust manifold setscrews, smear the screw-threads with high temperature-resistant grease (Renault Trucks Oils Gripcott NF grease) or equivalent.
Tighten to torque (see page B-3-5).

Any turbocharger replacement, where the cause of damage has not been defined, may lead to new incidents and serious engine damage.
Do not use jointing compound on the turbocharger lubrication pipe fastening flanges.Before installing the turbocharger, pour fresh oil through the oil inlet port and turn the rotor by hand to lubricate the journals and the thrust bearing.
After installing the turbocharger, run the engine and wait for 30 seconds before accelerating.

Incidents and probable causes

Before implicating the turbocharger, ensure that the engine and its surrounds are in perfect condition.

Lack of engine power
- Air filter clogged
- Aftercooler air/air heat exchanger (tube stack fouled)
- Aspiration air manifold blockage or crushing (between air filter and turbocharger)
- Boost air manifold blockage or crushing (between turbocharger and engine)
- Foreign matter between air filter and turbocharger
- Exhaust blockage or crushing
- Air or gas leak between turbocharger and engine
- Turbine housing damaged or fouled
- Turbo impeller vanes damaged
- Turbocharger pressure regulation system (wastegate) malfunction*

Black exhaust smoke
- Air filter clogged
- Aspiration air manifold blockage or crushing (between air filter and turbocharger)
- Boost air manifold blockage or crushing (between turbocharger and engine)
- Air or gas leak between turbocharger and engine
- Turbocharger damaged or fouled
- Turbocharger pressure regulation system (wastegate) malfunction*

Blue exhaust smoke
- Engine breather clogged
- Oil consumption
- Oil return pipe clogged or crushed
- Turbocharger damaged or fouled
- Prolonged running at idling speed
- Air compressor defective

Strange noise
- Air filter clogged
- Air filter / turbocharger link leakage
- Aspiration air manifold blockage or crushing (between air filter and turbocharger)
- Boost air manifold blockage or crushing (between turbocharger and engine)
- Foreign matter between air filter and turbocharger
- Exhaust blockage or crushing
- Air or gas leak between turbocharger and engine
- Turbocharger lubrication defect
- Turbocharger damaged or fouled
- Engine used at underspeed in relation to load
- Turbocharger pressure regulation system (wastegate) malfunction*

Incidents and probable causes (cont.)

Excessive oil consumption
- Air filter clogged
- Engine breather clogged
- Aspiration air manifold blockage or crushing (between air filter and turbocharger)
- Turbocharger lubrication defect
- Oil return pipe clogged or crushed
- Turbocharger damaged or fouled
- Prolonged running at idling speed
- Air compressor defective

Oil in air pipes before turbocharger
- Air filter clogged
- Aspiration air manifold blockage or crushing (between air filter and turbocharger)
- Air compressor defective

Oil in air pipes after turbocharger
- Air filter clogged
- Engine breather clogged
- Aspiration air manifold blockage or crushing (between air filter and turbocharger)
- Oil return pipe clogged or crushed
- Turbocharger damaged or fouled
- Prolonged running at idling speed

Oil in exhaust manifold
- Prolonged running at idling speed

Oil in exhaust pipes after turbocharger
- Engine breather clogged
- Oil return pipe clogged or crushed
- Turbocharger damaged or fouled
- Prolonged running at idling speed

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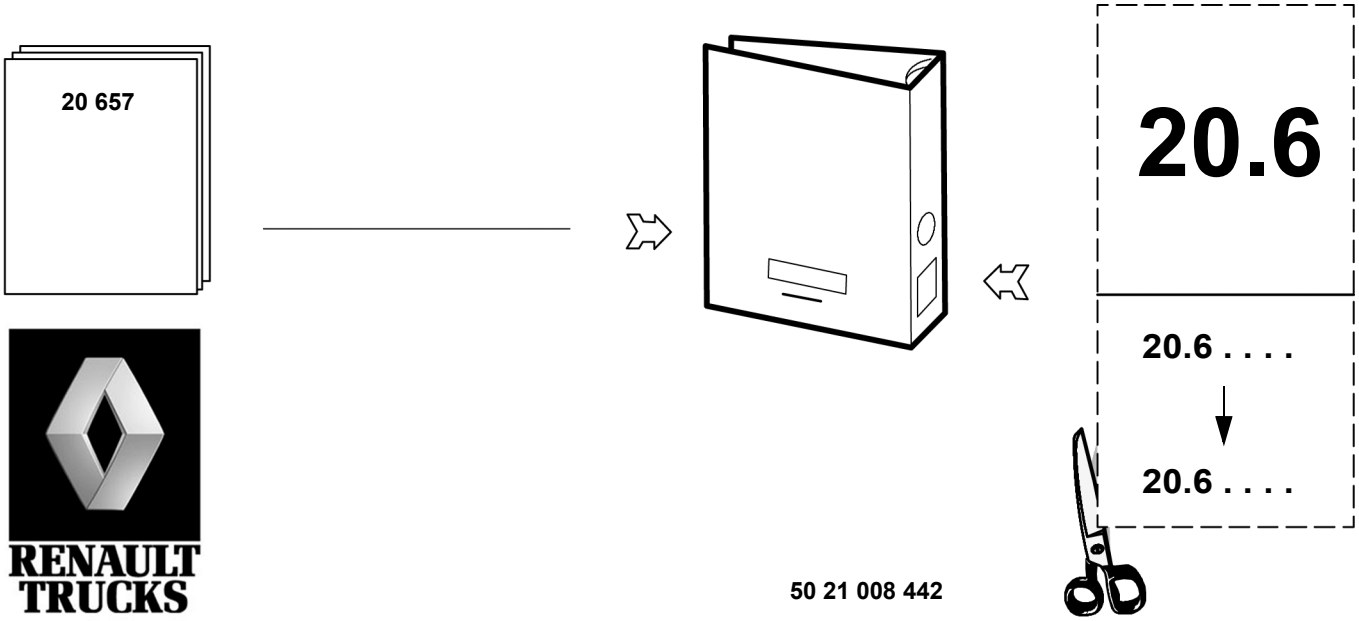
ENGINE

RANGE	FAMILY	VARIANT
PREMIUM	22HB P 6X2/4	-
	22AB P 4X2	
MIDLUM	45E2	
	45D2	
	44V	
	44T	
	44C2	
	44C1	
	42B4	
MIDLUM 4x4	-	

The above information may change in the course of time. Only the "Consult" section of the workshop manuals repertory in standard N° 10320 serves as reference.



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— Dimensions and tolerances . . . . . B2-1 → 11
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— Water pump . . . . . J1-2 → 5
— Thermostat . . . . . J2-1 → 4

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GENERALITIES

Warnings

In this document, safety instructions are symbolized as follows:

DANGER! NON-OBSERVANCE OF THE PROCEDURE DESCRIBED OR LACK OF CARE OR ATTENTION RISK CAUSING SERIOUS INJURY OR EVEN DEATH.

WARNING! Any different or inappropriate working method risks causing damage to the product.

NOTE! Draws attention to particular or important points of the method.

Environment

Comply with the regulations in force relative to the recovery and treatment of used parts and waste.

Conventional symbols

Fitting

	Tighten to torque (Nm) (left-hand thread)		Tighten by indicated value
	Tighten to torque (Nm) (right-hand thread)		Loosen by indicated value
	Tightening torque with lubricated threaded hardware		

Dimensioning

	Tightening		... Greater than or equal to ...
	Equal to		Wear limit
	... Less than ...		Machining limit or dimension
	... Greater than ...		Maximum out-of-true
	... Less than or equal to ...		Maximum parallelism error

Repair

	Force to be exerted in the direction shown (hammer - press)		Smear or coat (see "Consumables" table)
	Heat or cool: Temperature in degrees Celsius (e.g. + 80 °C)		Fill to level (see "Technical Data" and "Consumables" table)
	Weld bead		Grease or oil (see "Consumables" table)
	Repair time - Heating time		Mark - Assemble according to marking

Adjustment

	Rotating friction torque		Turn anti-clockwise
	Turn in alternate directions		Turn anti-clockwise (the figure shows the number of turns)
	Turn clockwise		Turn clockwise (the figure shows the number of turns)
	Place in contact		Move in the direction shown
	Dimension to be assured (mm)		

Various information

	Exhaust - Outlet		Operation with a sequence
	Intake - Inlet		Involves
	Weight in kg (example: 275 kg)		Return to numbered operation - Connected with numbered operation
	Depending on versions or options		Withdraw - Delete
	Wrong		Direction of disassembly (the arrow shows the direction)
	Correct		Direction of assembly (the arrow shows the direction)
	Injection		... to ...
	Repair dimension		Inspect - Check condition of part
	Part to be replaced		Danger for persons, vehicle or equipment

General instructions

Practical advice
Prior to any work:
- Clean the major unit and its surrounds (See Driving Servicing Handbook, "Vehicle washing").
- Ensure the batteries are disconnected.
- Mark the pipes and wiring harnesses, if necessary.
- Protect all ports to prevent the ingress of foreign matter.
- Before disconnecting an air pipe, drop the circuit pressure.
- If liquid is splashed onto the bodywork, clean quickly with a cleaning product recommended by RENAULT TRUCKS.

Preparation prior to assembly:
Carefully clean and check all the parts.
Do not unpack a new bearing until you are ready to install it. Do not clean off the protective grease on new bearings.
Old seals and lock-plates must be discarded and new ones fitted.
Never force fit parts with copper or brass punches or drifts. Always use a specially adapted driver to prevent ingress of metal particles into the casings and bearings. Always oil parts prior to force fitting.
Always apply grease on the inside of seal ring lips.
Shrink fitted parts are to be heated with a hot air blower or in an oven. etc. Flame heating is strictly forbidden.

When using a torque multiplier, calibrate the torque wrench/multiplier unit at the required torque loading.

Fastening, locking, sealing and adhesive products:
Prior to assembly, carefully clean the product application surfaces of the parts. Old product residue is to be removed. Threaded portions are to be brushed, tapped and, if necessary, cleaned with a suitable product.
Using the product:
Always adapt the recommended product while observing the utilization conditions appearing on the pack:
- Surface finish,
- Working temperature,
- Reaction, drying, etc. time,
- Shelf life.

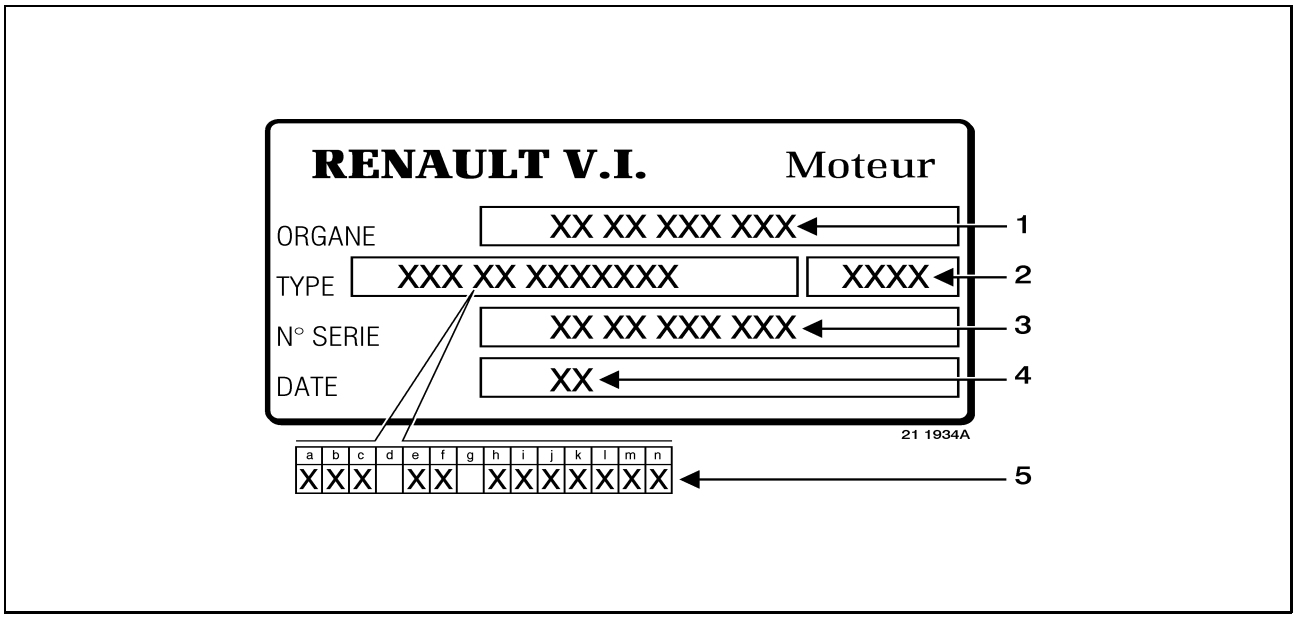
Observe the assembly method so as to guarantee the quality of the repair.

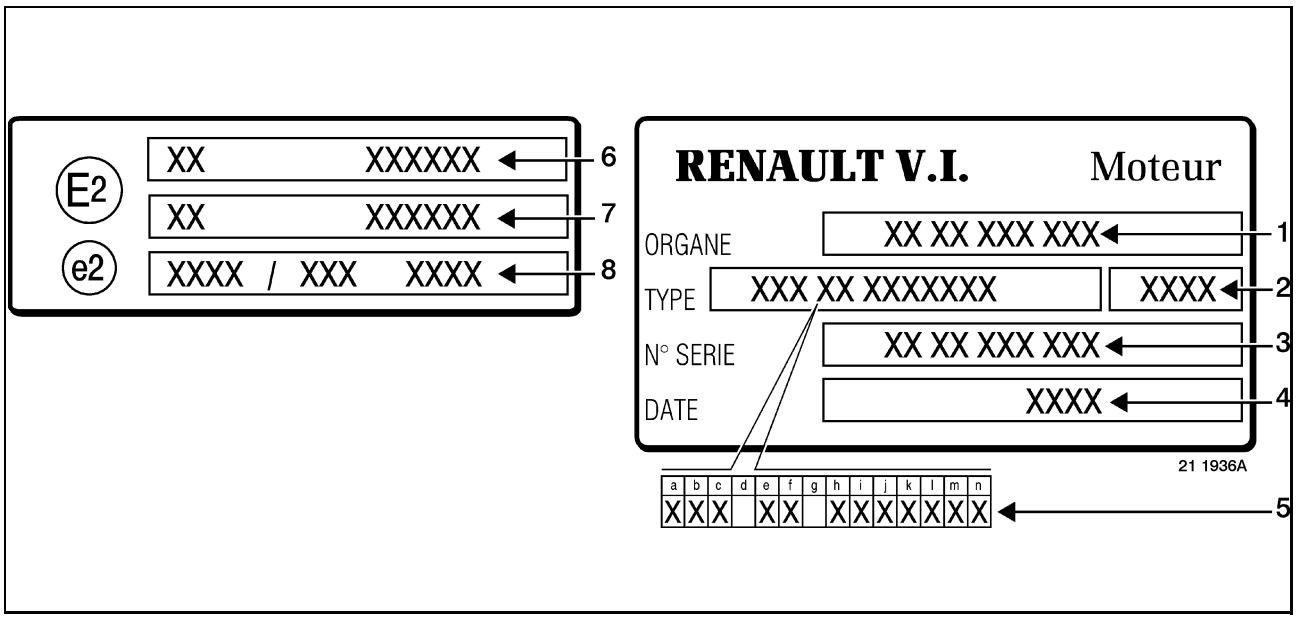
TECHNICAL DATA

General features

Identification plate (EEC origin engine)

Depending on the vehicle's equipment.





- **1**: Spare parts reference N°
- **2**: Family N°
- **3**: Manufacturing serial N°
- **4**: Manufacturing date
- **5**: Engine type (see "Symbolization")
- **6**: Power rating
- **7**: Smoke
- **8**: Emissions

Service exchange engine
To identify service exchange engines: see Spare Parts department technical comments.

Symbolization

a	**D**	Diesel
b	**C**	Common Rail
c	**I**	Injection
d		
e	**6**	Capacity: 11: 11 litres 6: 6 litres 4: 4 litres
f		
g		
h	**W** **AC** **AE** **AF**	Power setting
i		
j		+: Multi-mode (several power ratings available) Blank space: Single-mode (one single power rating available)
k	**J**	Month of application of pollutant emissions regulation: A: January B: February C: March ..... L: December
l	**01** **99**	Year of application of pollutant emissions regulation: 00: 2000 01: 2001 02: 2002 .....
m		
n		Post-combustion equipment (particulate filter): Blank space or 0: without 1: with

General features

Power setting index	**ACJ01-WJ01-AFG990-AEG990**
Cubic capacity	**6.177 l l**
Bore	**102 mm**
Stroke	**126 mm**
Compression ratio	**16.5/1**
Firing order	**1.5.3.6.2.4**
n°1 cylinder:	**flywheel end**
Fuel:	**diesel fuel**
Lubrication:	**fully-forced by lobed gear pump**

Min. oil pressure at **85 C**
- at **600 rpm: 1 bar(s)**
- at **2400 rpm: 3.5 bar(s)**.

Engine with injection setting **AFG990**.
Min. oil pressure at **85 C**
- at **600 rpm: 1 bar(s)**
- at **2300 rpm: 3.5 bar(s)**.

Cooling:
Circulating coolant activated by thermostat-regulated pump.

Beginning of opening:	**86 °C**
End of opening:	**96 °C**
Min. full opening dimension:	**7.9 mm**
Turbocharger	**SCHWITZER S200**

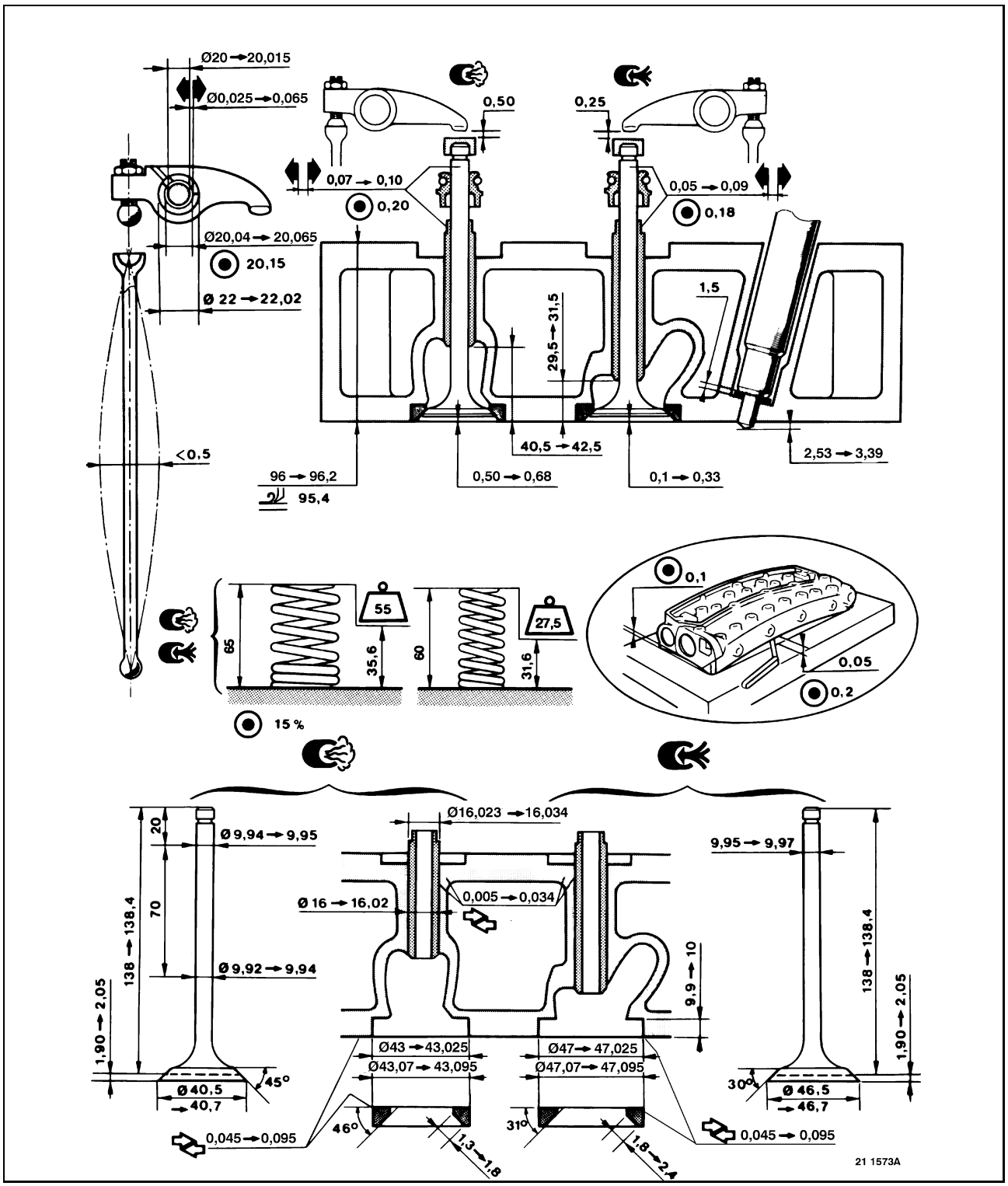
Weight:

Undressed engine:	**570 Kg**

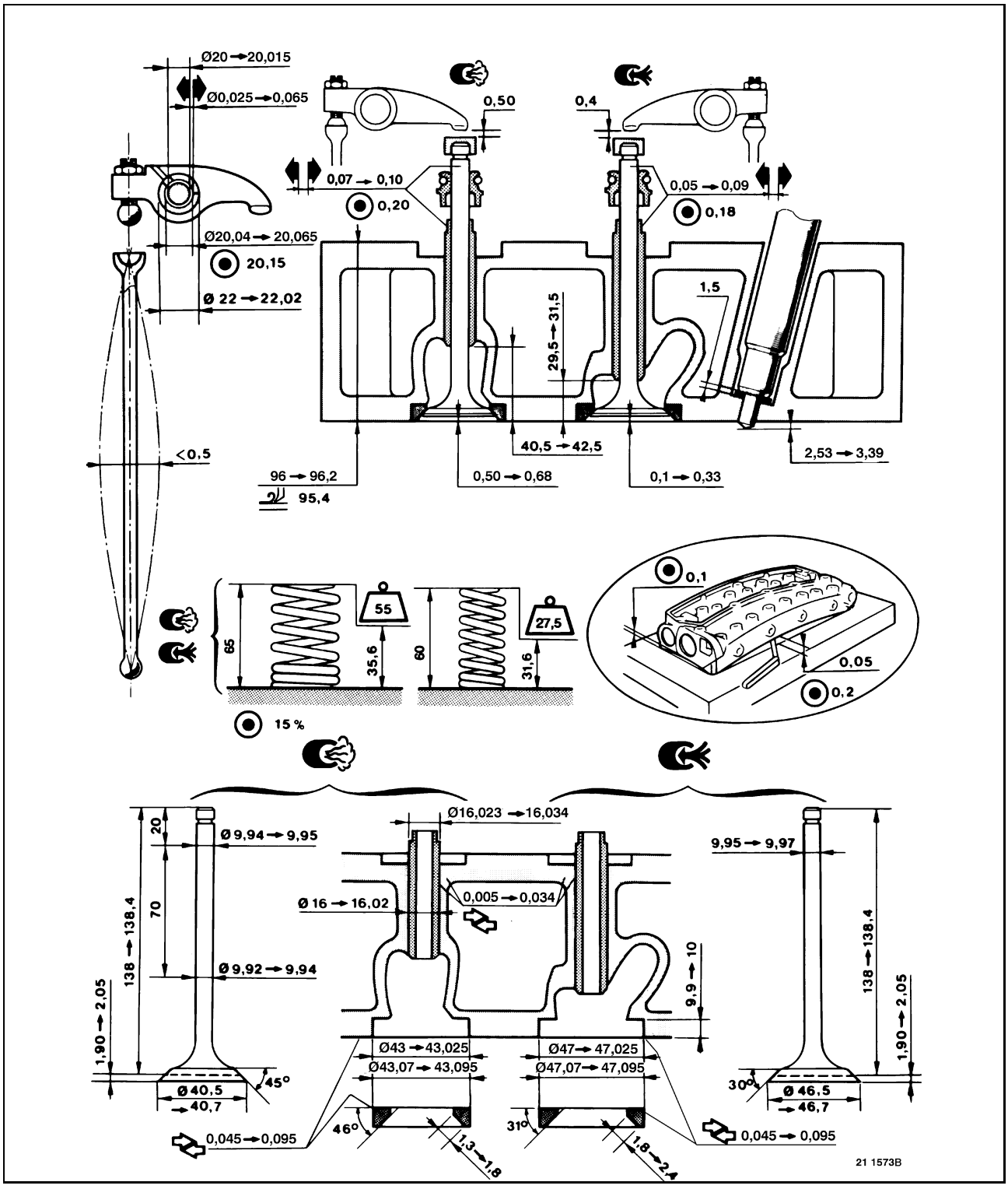
Dimensions and tolerances

Cylinder head

Up to engine **n°543 026.**
Since engine **n°543 159** up to engine **n°543 529.**

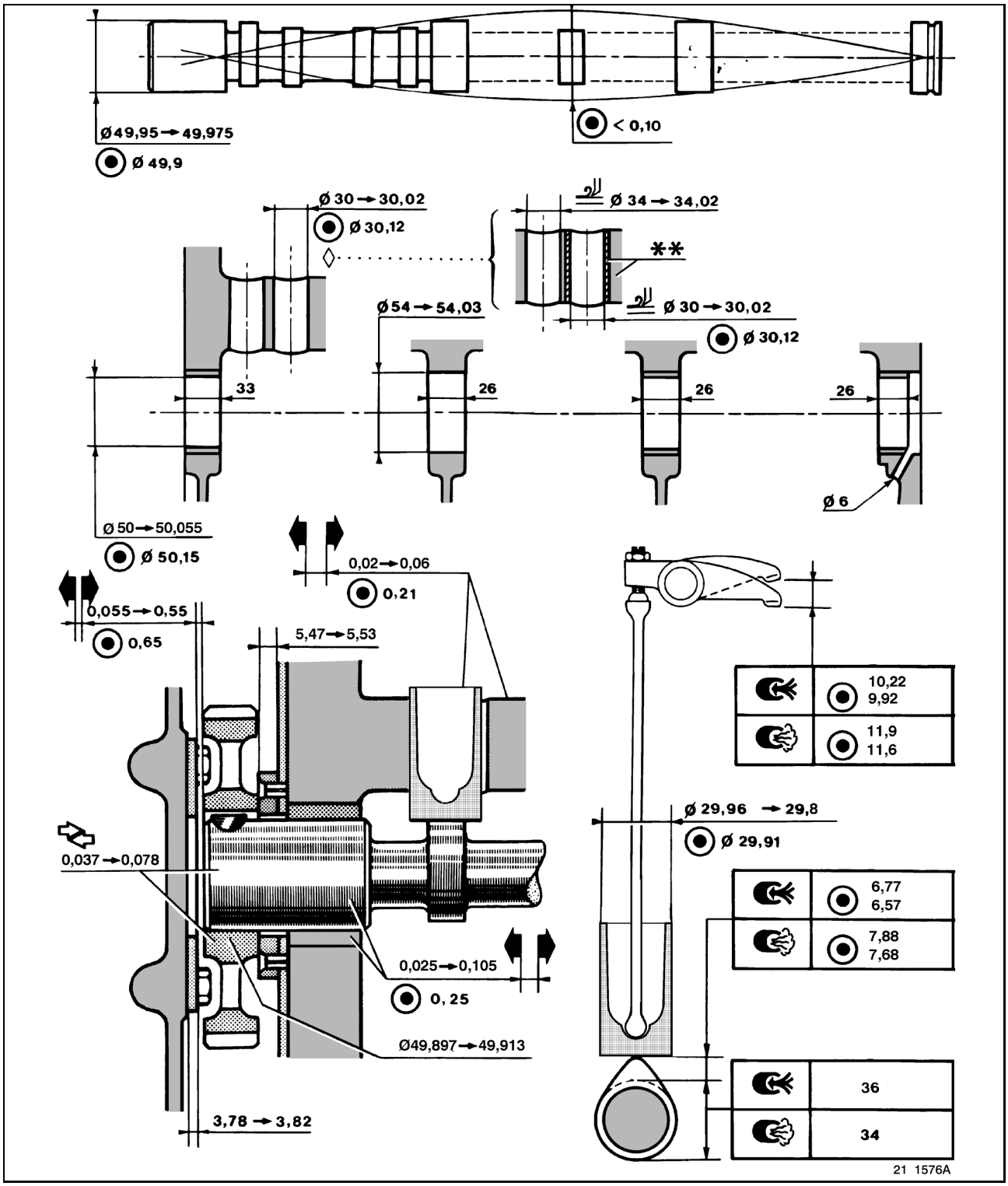


Since engine **n°543 027** up to engine **n°543 158.**
Since engine **n°543 530.**

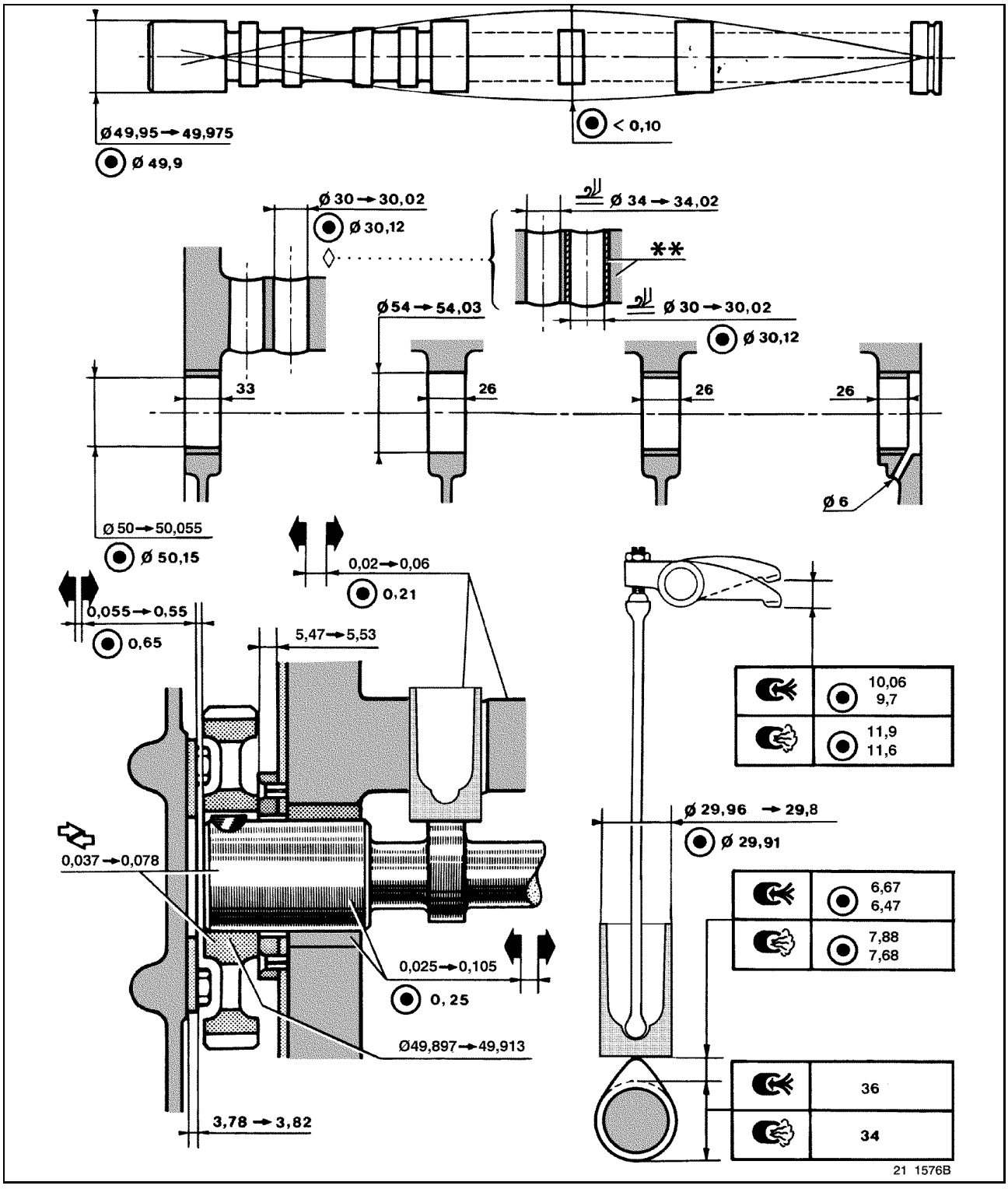


Timing

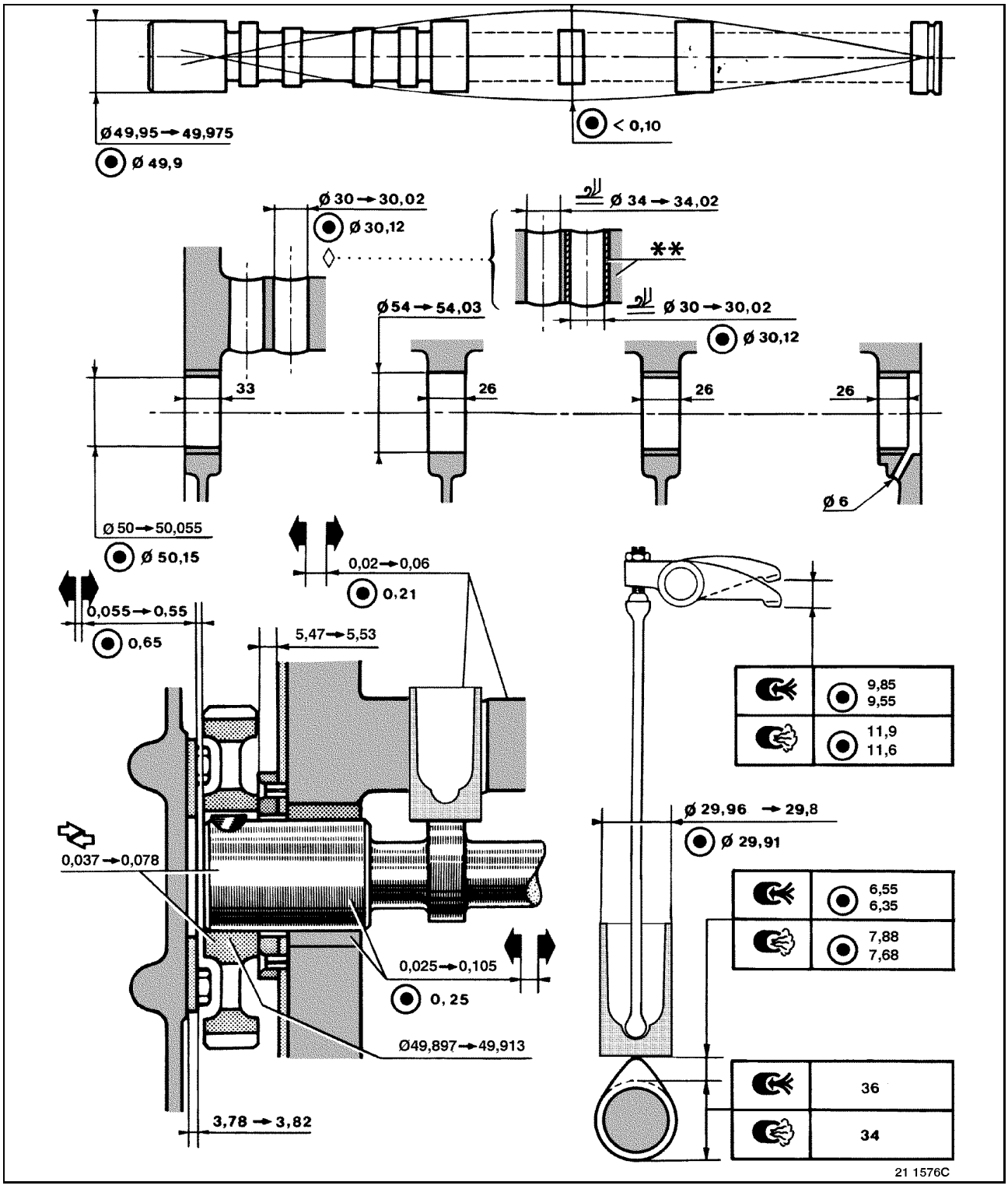
Up to engine **n°497 036.**



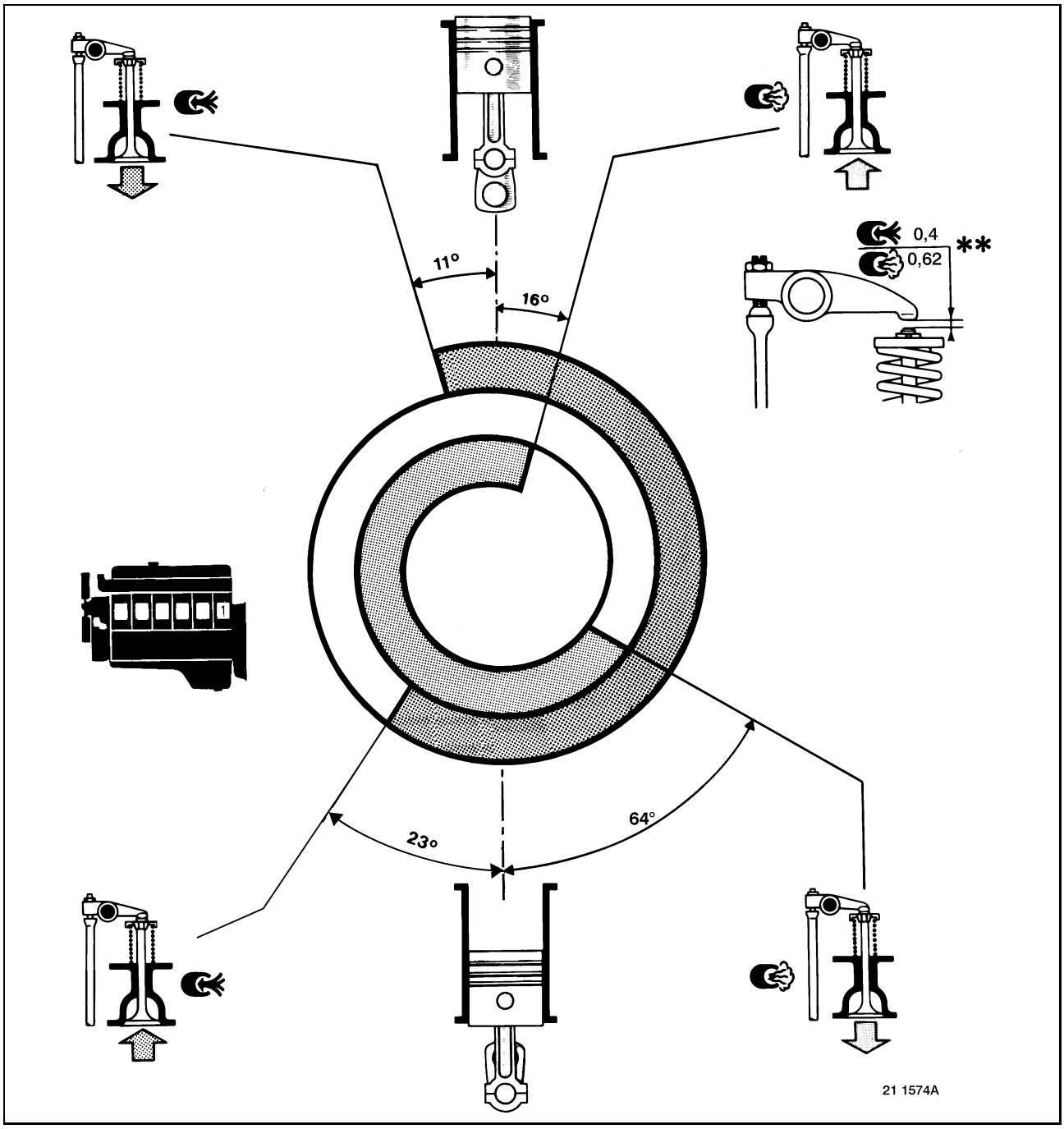
Since engine **n°497 037** up to engine **n°543 026.**
Since engine **n°543 159** up to engine **n°543 529.**



Since engine **n°543 027** up to engine **n°543 158.**
Since engine **n°543 530.**



Up to engine **n°543 026.**
Since engine **n°543 159** up to engine **n°543 529.**

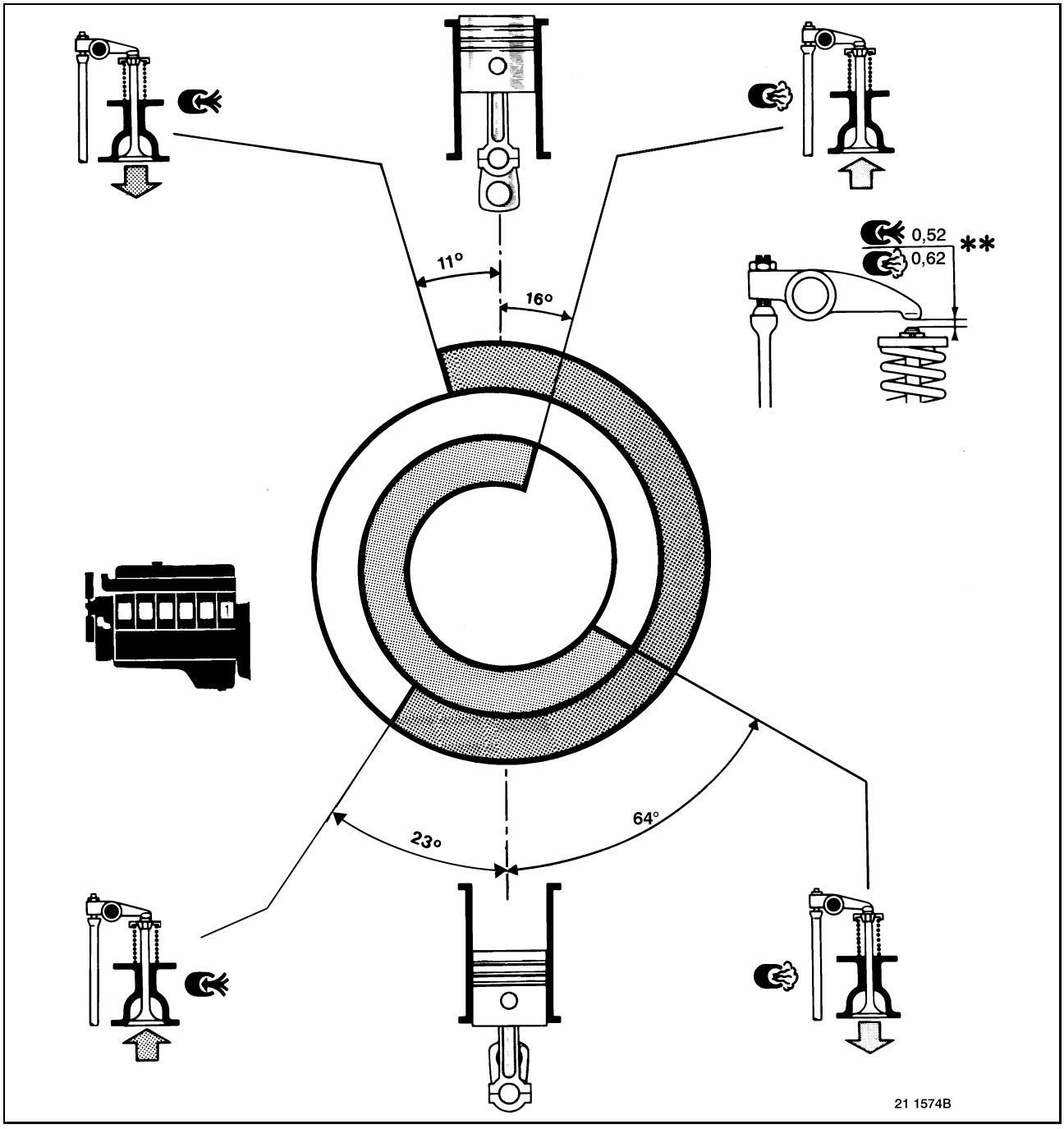


Quick timing check:

- Position the piston of N° **1** cylinder at end of exhaust/beginning of intake TDC (in the direction of rotation).
- Scribe a mark on the crankshaft pulley.
- Adjust the valve clearances to zero (without compressing the control springs).
- Crank the engine through one revolution while lining up the marks on the crankshaft pulley so as to arrive at "compression TDC".
- Check the valve clearances, which should be:
- **.** Inlet: **0.65 → 1.3 mm.**
  . Exhaust: **1.05 → 1.65 mm.**

WARNING
Repeat this check twice so as to provide more accuracy when adjusting the rocker arm clearance to zero.
****** Theoretical setting clearance

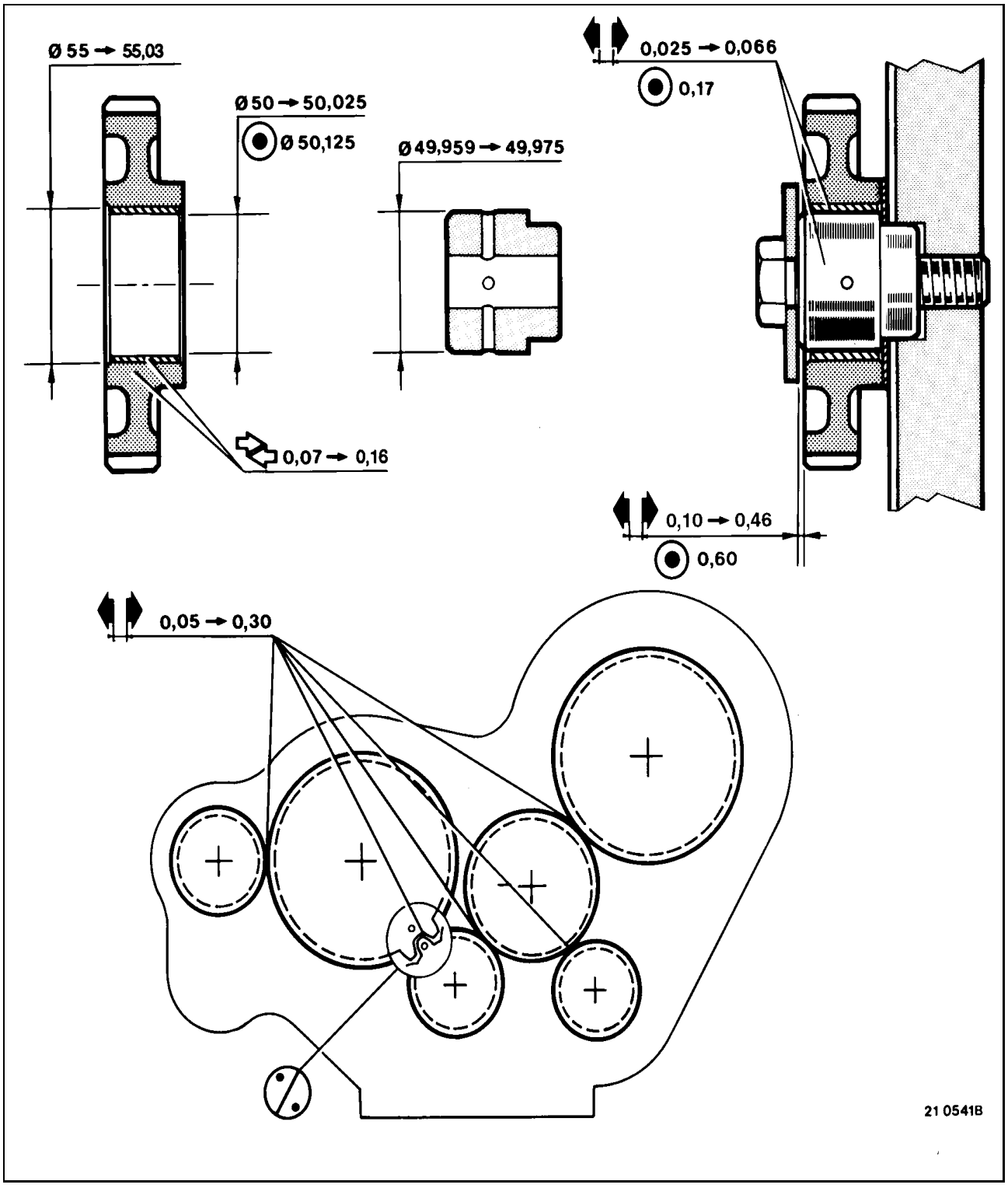
Since engine **n°543 027** up to engine **n°543 158.**
Since engine **n°543 530.**



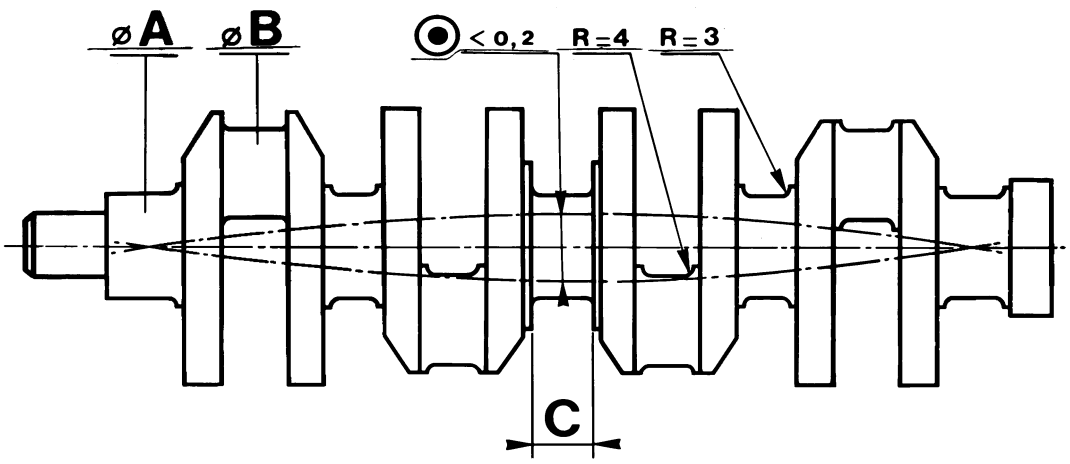
Quick timing check:

- Position the piston of N° **1** cylinder at end of exhaust/beginning of intake TDC (in the direction of rotation).
- Scribe a mark on the crankshaft pulley.
- Adjust the valve clearances to zero (without compressing the control springs).
- Crank the engine through one revolution while lining up the marks on the crankshaft pulley so as to arrive at "compression TDC".
- Check the valve clearances, which should be:
- **.** Inlet: **0.8 → 1.5 mm.**
  . Exhaust: **1.05 → 1.65 mm.**

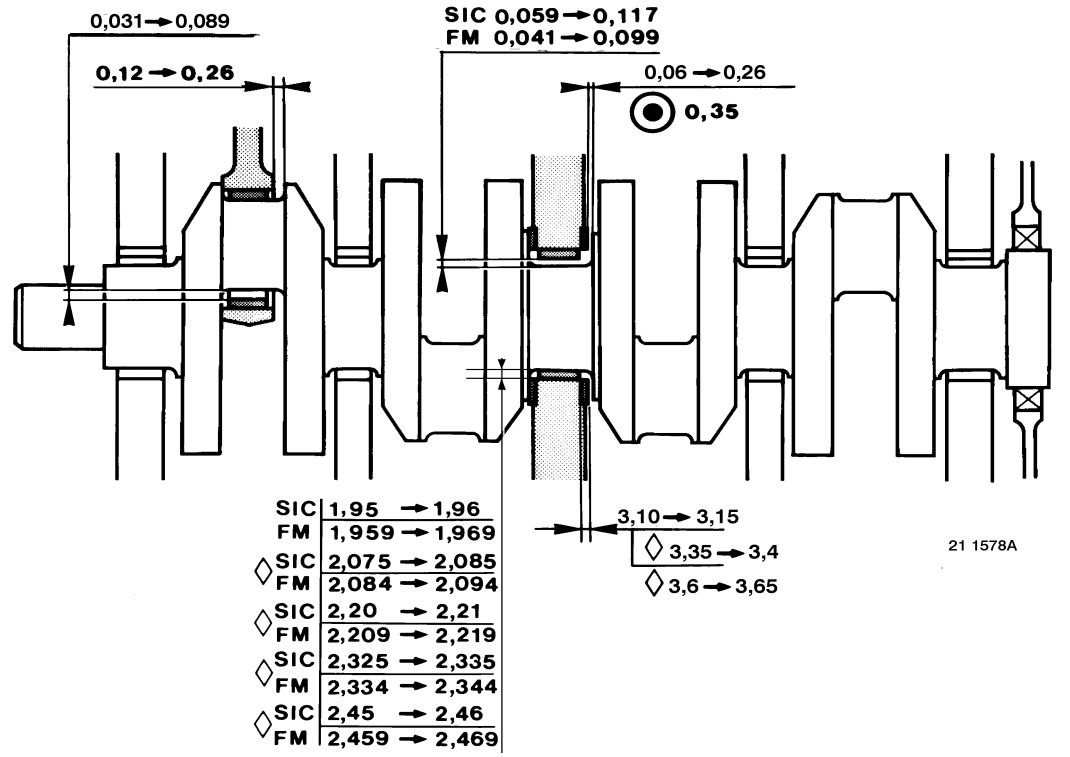
WARNING
Repeat this check twice so as to provide more accuracy when adjusting the rocker arm clearance to zero.
****** Theoretical setting clearance

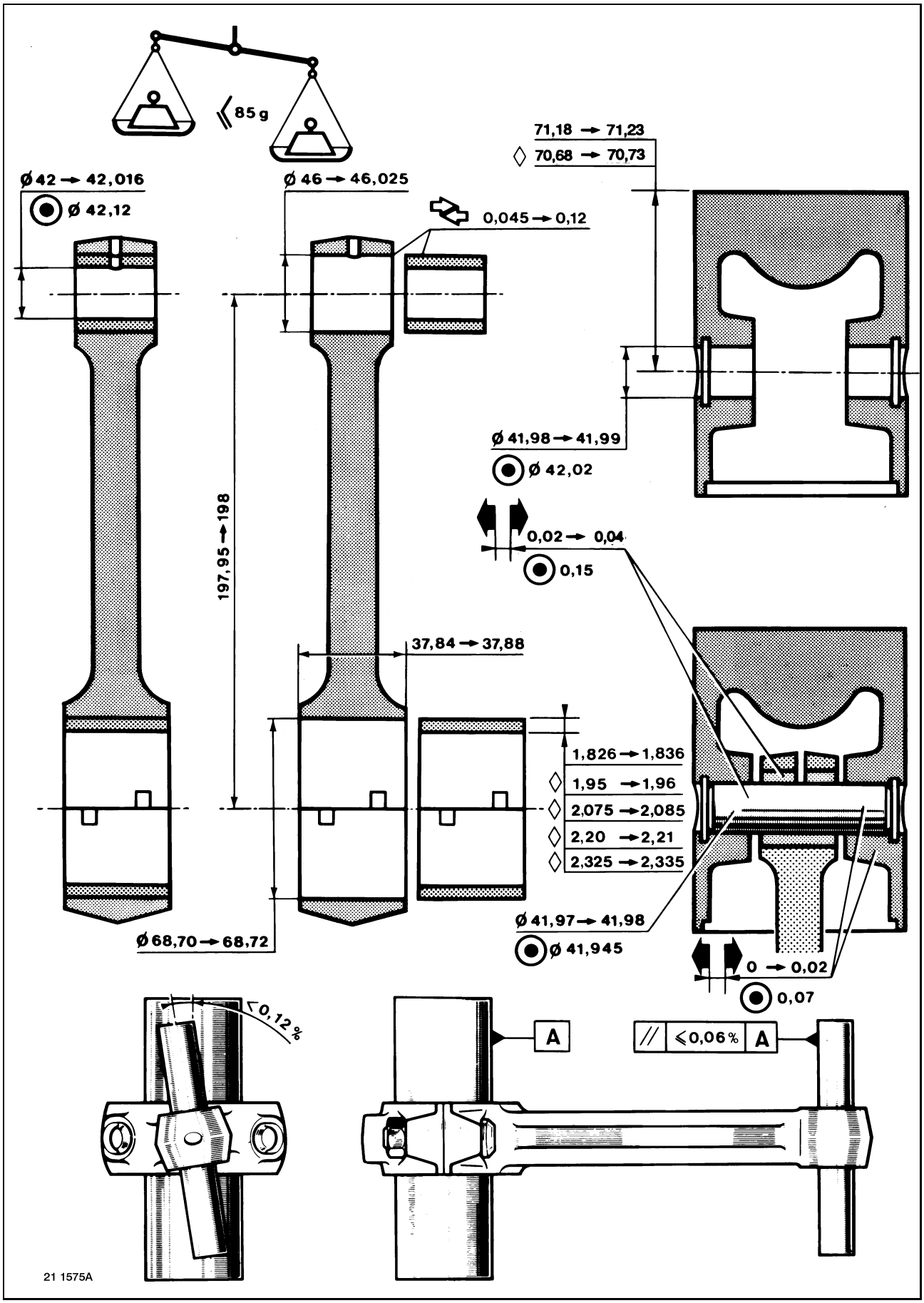

Ø 55 → 55,03
Ø 50 → 50,025
Ø 50,125
Ø 49,959 → 49,975
0,07 → 0,16
0,025 → 0,066
0,17
0,10 → 0,46
0,60
0,05 → 0,30
21 0541B

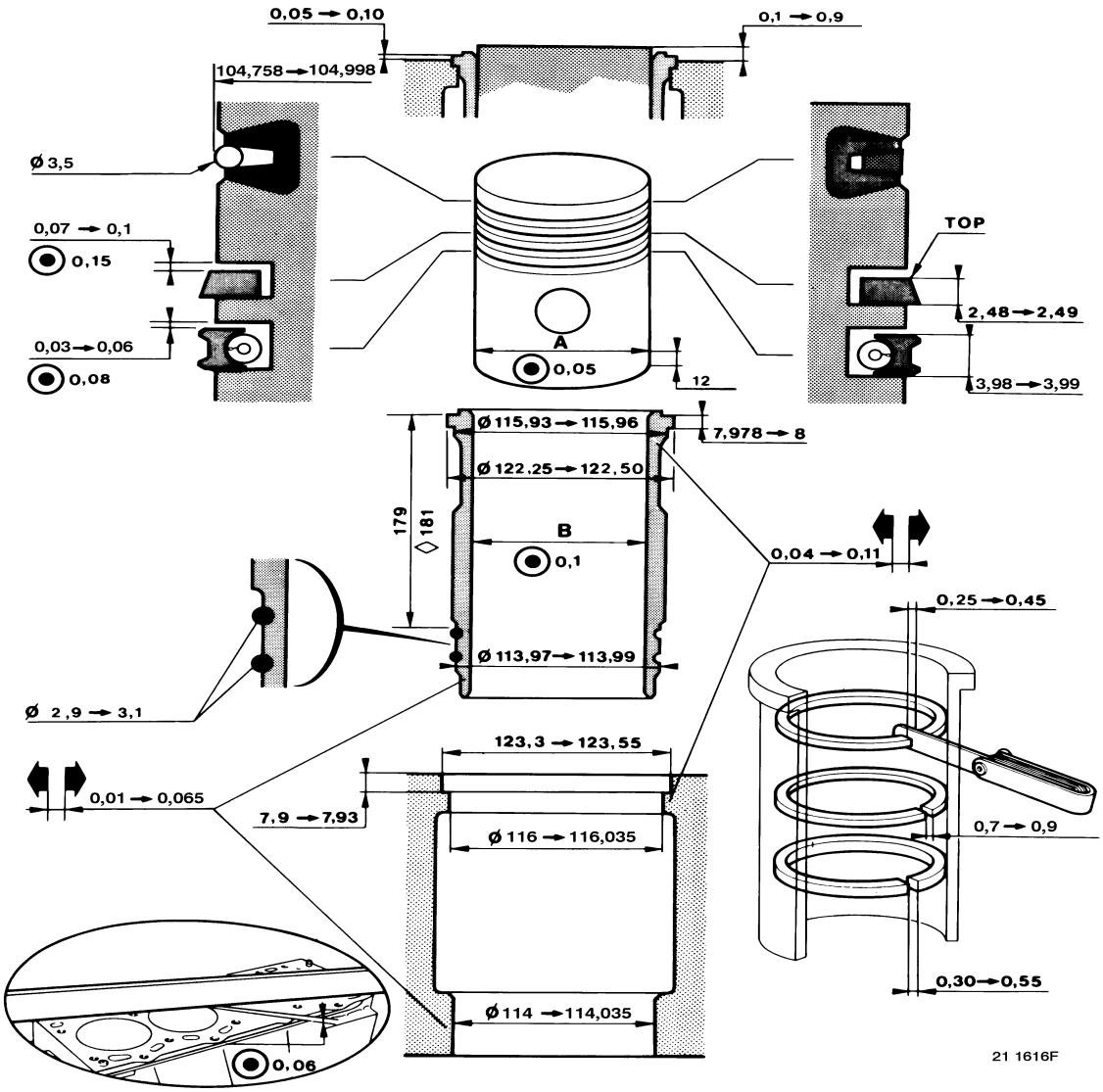
Reciprocating gear



		Ø A	Ø B	C
		76,00 → 76,02	64,98 → 65,00	39,00 → 39,062
◇	1	75,75 → 75,77	64,73 → 64,75	39,50 → 39,562
	2	75,50 → 75,52	64,48 → 64,50	
	3	75,25 → 75,27	64,23 → 64,25	40,00 → 40, 075
	4	75,00 → 75,02	63,98 → 64,00	




85 g
Ø 42 → 42,016
Ø 42,12
Ø 46 → 46,025
0,045 → 0,12
71,18 → 71,23
◊ 70,68 → 70,73
Ø 41,98 → 41,99
Ø 42,02
0,02 → 0,04
0,15
197,95 → 198
37,84 → 37,88
1,826 → 1,836
◊ 1,95 → 1,96
◊ 2,075 → 2,085
◊ 2,20 → 2,21
◊ 2,325 → 2,335
Ø 68,70 → 68,72
Ø 41,97 → 41,98
Ø 41,945
0 → 0,02
0,07
< 0,12 %
A
// ⩽ 0,06 % A
21 1575A



LINER - PISTON PAIRING		
Item	**Liner Ø B**	**Piston Ø A**
A	**102.015→ 102.027**	**101.945→ 101.957**
B	**102.023→ 102.035**	**101.953→ 101.965**

Tightening torques

Definition

There are several types of tightening:
- Tightening to torque (in **Nm**)
- Tightening to angle (in °)
- Tightening to torque-angle (en **Nm + °**)

Torques given in **Nm** are nominal torques (average value calculated on the basis of the minimum torque and the maximum torque).
The tightening precision class defines the tolerance of this torque in percent as a function of the nominal torque applied.

Tightening precision classes:
- **Class I:** Special threaded hardware (tolerances ± 10% of the final torque).
- **Class II:** Reserved for precise tightening (tolerance ± 10% of the nominal torque).
- **Class III: Reserved for normal standard tightening** (tolerance ± 20% of the nominal torque)

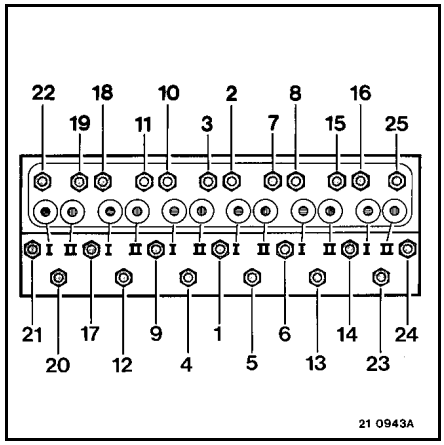
For standard threaded hardware indicated in the table below, use tightening class **III**.
For other torques, see the following page(s).

Unless indicated otherwise, fit the nut and bolt hardware dry (without oiling).

Tightening torques for conventional nut and bolt hardware to "metric system" standard 01.504.002		
Diameter and pitch of nuts and bolts	**Quality class 8.8**	**Quality class 10.9**
	Tightening class III (± 20 %)	**Tightening class III (± 20 %)**
6 x 1.00	7.4	10.8
7 x 1.00	12.1	17.8
8 x 1.00	19.2	28.2
8 x 1.25	17.9	26.3
10 x 1.00	39.4	58
10 x 1.25	37.4	55
10 x 1.50	35.4	52
12 x 1.25	67	98
12 x 1.50	64	94
12 x 1.75	61	90
14 x 1.50	105	155
14 x 2.00	98	143
16 x 1.50	161	237
16 x 2.00	151	222
18 x 1.50	235	346
18 x 2.50	210	308
20 x 1.50	328	481
20 x 2.50	296	435
22 x 1.50	444	652
22 x 2.50	406	596

Cylinder head

Tighten the setbolts in a 1st phase at a torque of **125 Nm** in the specified sequence ; then tighten at an angle of **180°.**
Slacken the setbolts one-by-one and retighten at a torque of **125 Nm** then turn through an angle of **180°** always in the specified sequence.



Intake manifold setscrew (see page F-9)	**30 ± 3 Nm**
Preheating grille setscrew	**7.5 ± 1.5 Nm**
Nuts securing wiring harness to preheating grille	**7.5 ± 1.5 Nm**
Exhaust manifold setscrew (see page F-9)	**55 ± 5.5 Nm**
Cylinder head rear plate setscrew (see page F-9)	**25 ± 5 Nm**
Rocker shaft setscrew	**80 ± 12 Nm**
Rocker arm adjusting nut	**15 + 5 Nm**
Cylinder head cover setscrew (see page F-11)	

Reciprocating gear

Crankshaft bearing setbolts (see page H-8)	
- Ø **14** bolt	**80 Nm + 180° (+10°)**
- Ø **16** bolt	**100 Nm + 90° (-10°)**
Connecting rod cap setbolt (see page H-8)	**35 Nm + 150° (-10°)**
Flywheel housing setscrew (14 × 200)	**130 ± 13 Nm**
Flywheel setscrews (see page H-8)	
- with washers	**250 ± 50 Nm**
- without washers	**60 Nm + 45° (+10°)**
- with automatic transmission	**60 Nm + 60° (+10°)**
- with engine rear PTO	**60 Nm + 180° (±18°)**
Pulley damper setscrew	**50 ± 5 Nm**
Crankshaft pulley setscrew (see page G-4)	**100 Nm + 60° (±5°)**

Lubrication

Oil pump pinion securing nut	**40 ± 4 Nm**
Oil sump drain plug	**70 ± 14 Nm**
Turbocharger lube pipe union	**32 ± 6 Nm**
Oil suction strainer securing nut	**28 ± 4 Nm**
Oil sump setscrew (see page G-6)	**28 ± 2.8 Nm**
Oil pump valve plug	**80 ±16 Nm**
Oil level probe	**50 ± 10 Nm**

Fuel-Injection

High pressure pipe gallery union nut (see page K-18)	
Nozzle holder setscrew	**60 ± 6 Nm**
High pressure pump pinion setscrew	**195 ± 15 Nm**
High pressure pump securing nut (tighten in diametrically opposed sequence, then retighten first nut only)	**60 ± 12 Nm**
Speed sensor	**6.5 ± 1.5 Nm**
Pressure and boost air sensor setscrew	**6.5 ± 1.5 Nm**
Coolant temperature sensor	**18 ± 5 Nm**
Oil pressure sensor	(**FRENETANCH 242**) **18 ± 5 Nm**
Oil level transmitter	**50 ± 10 Nm**
High pressure pump inspection plug	**35 ± 5 Nm**
Rail return low pressure pipe securing nut	**60 ± 9 Nm**
Fuel leak-off return union setscrew	**32 ± 6 Nm**
Fuel leak-off return union setscrew	**12 ± 2 Nm**
Low pressure polyamide pipes securing clamp nut	**15 ± 3 Nm**
Prefilter unions	**33 ± 7 Nm**
Pump unions	**40 ± 8 Nm**
Flow limiter	**85 ± 5 Nm**
Common rail pressure limiter	**45 ± 5 Nm**
Common rail pressure sensor	**35 ± 5 Nm**
Scavenge valve	**35 ± 5 Nm**
Scavenge valve plug	**15 ± 5 Nm**
Fuel injector gallery securing nut	**1.5 ± 0.25 Nm**
Rail setscrews	**21 ± 2 Nm**
Booster pump securing bolts (tighten in diametrically opposed sequence)	**8 ± 1 Nm**

Timing

Air compressor pinion securing nut	**120 ± 8 Nm**
Oil sump anti-rattles plate securing bolts	**7.25 ± 0.75 Nm**
Intermediate gear setscrew (**16 × 150**): - Preliminary tighten - Loosen, then retighten	 **200 Nm** **75 Nm + 70° (+10°)**
Tappet cover setscrews	**28 ± 2.8 Nm**

EGR

EGR valve vee securing clamp	**7 ± 0.5 Nm**
Setscrew securing elbow tube between exhaust and EGR heat exchanger	**25 ± 5 Nm**
Setscrew securing tube between EGR heat exchanger and intake	**25 ± 5 Nm**
EGR hose end	**32 ± 6 Nm**

Various

Air compressor **250** cm3 securing nut	**40 ± 8 Nm**
Air compressor **150** cm3 securing nut	**40 ± 8 Nm**
Steering fluid pump setscrew	**52 ± 10 Nm**
Setscrew securing spacer between compressor and steering pump	**20 + 2 Nm**
Heat exchanger setscrew	**25 ± 2.5 Nm**
Plate type heat exchanger cover setscrew (see page J-2-3): - **10 × 150** setscrew - **12 × 175** setscrew	 **55 ± 10 Nm** **95 ± 15 Nm**
Engine block stiffener setscrew (see page G-6)	**52 ± 10 Nm**
Setscrew securing turbocharger to exhaust manifold	**40 ± 8 Nm**
Breather impeller setscrew	**13 ± 1 Nm**
Cold unit compressor bracket setscrew (see page E-1-4)	

CONSUMABLES

Lubricants

Consumables and oil capacity: (see Driving & Servicing Handbook).

CONSUMABLES

Automotive reference	Industrial reference
FRENETANCH 242	THREAD LOCKING COMPOUND 242
FRENBLOC 271	THREAD SEALANT 271
OMNIFIT 50H	OMNIFIT 50H SEALING COMPOUND
GRAISSE GRIPCOTT NF	GRIPCOTT NF GREASE
OLEOETANCHE 542	OILTIGHT THREAD SEALANT 542
SILMATE RTV 1473	SILMATE RTV 1473
RHODORSEAL 131	RHODORSEAL 131
RHODORSEAL 5661	RHODORSEAL 5661
FROMETANCH 572	THREAD SEALANT 572

TOOLS

Generalities

RENAULT TRUCKS divide tools into three categories:

- **General-purpose tools:** proprietary tools.
  - **50 00 26 ....** reference number (possibility of purchasing through the RENAULT TRUCKS Spare Parts department).
  - **4-figure reference number** (tools classified by RENAULT TRUCKS but available from the supplier).

- **Special tools:** specifically created tools distributed by the RENAULT TRUCKS Spare Parts Department.

- **Locally manufactured tools:** these tools are classified differently according to their degree of sophistication:
  - **4-figure reference number** (represented by a drawing): tools that are simple to make without need for special qualification.
  - **50 00 26 ....** reference number (possibility of purchasing through the RENAULT TRUCKS Spare Parts department): a certain amount of skill is needed to make these tools.

Three levels (or echelons) determine their assignment:
- **Level 1:** tools for servicing, maintenance and minor tasks.

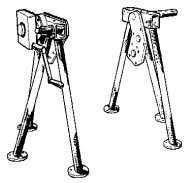
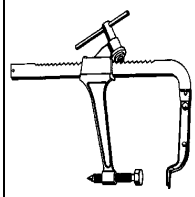
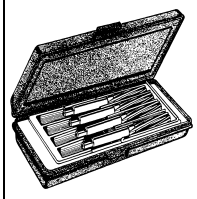
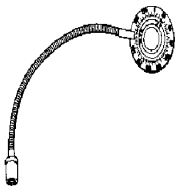
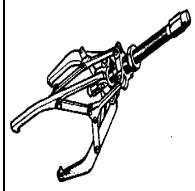
- **Level 2:** tools for major repairs.

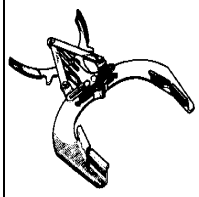
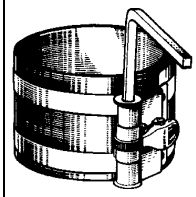
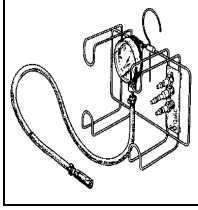
- **Level 3:** tools for refurbishment.

Proprietary tools mentioned in this manual do not appear in the tools list.
These tools are identified in the standard tools manual (MO) by a 4-figure number.

LIST OF TOOLS

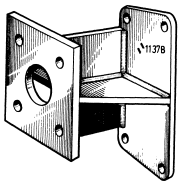
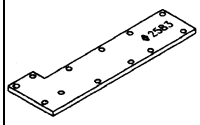
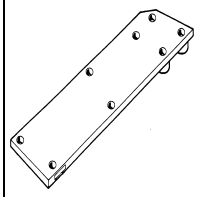
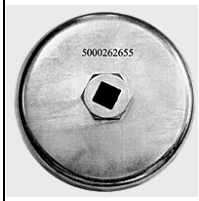
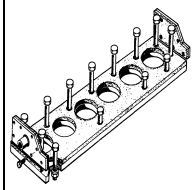
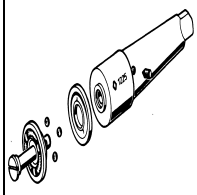
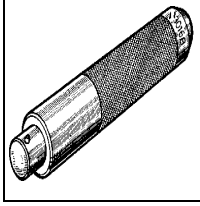
General-purpose tools

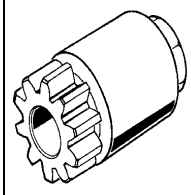
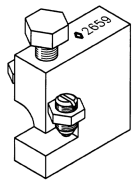
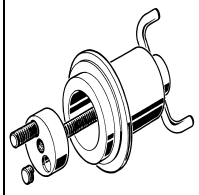
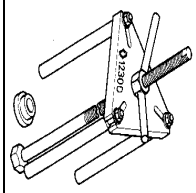
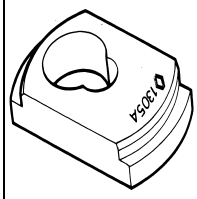
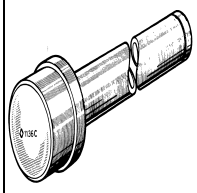
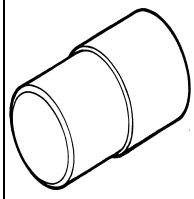
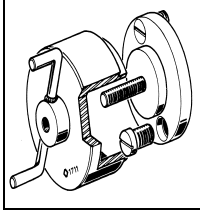
Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer code	Level	Qty
	**5000261000**	UNIVERSAL STAND			1	1
	**5000260846**	COMPRESSING TOOL			1	1
	**9732**	BOX OF CUTTERS	CN 109 B	AF	1	1
	**5000269776**	ANGULAR DIAL			1	1
	**5000260843**	PULLER			1	1
	5000268251	BELT TENSION TESTER			1	1
	50 00 26 0934	PULLER			1	1

	**5000260825**	PISTON RING CLAMP			1	1
	**5000260824**	PISTON RING CLAMP			1	1
	**5000261246**	PRESSURE GAUGE			1	1

AF	**CEVMI**			
	15 avenue Paul Doumer			
	75116 PARIS			FRANCE
	01 45 53 97 03	01 45 53 37 05		

Special Tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer Code	Level	Qty
	**5000261137**	FITTING			1	1
	**50 00 26 2583**	SUPPORT			1	1
	**5000261682**	FITTING			1	1
	**5000262655**	FILTER WRENCH			1	1
	**5000261227**	SEAL PLATE			1	1
	**5000261225**	RIVET SNAP			1	1
	**5000263016**	HANDLE			1	1

	**5000261380**	CONTROL			1	1
	**5000262659**	CRIMPER			1	1
	**5000261710**	PUSHER			1	1
	**5000261230**	PULLER			1	1
	**5000261305**	FLANGE			1	1
	**5000261136**	MANDREL			1	1
	**5000261314**	PUSHER			1	1
	**5000261711**	PUSHER			1	1

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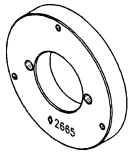	**5000262665**	ADAPTER			1	1

Locally manufactured tools

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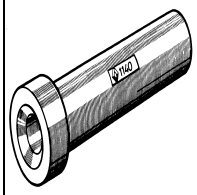
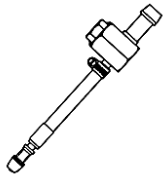
	**1140**	FLANGE			1	1
	**2586**	SEALING ENDPIECE			1	1
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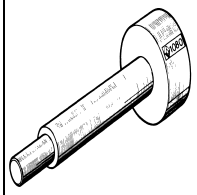
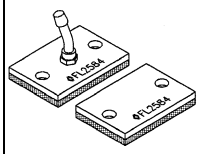
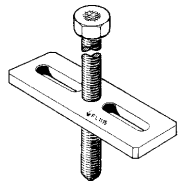
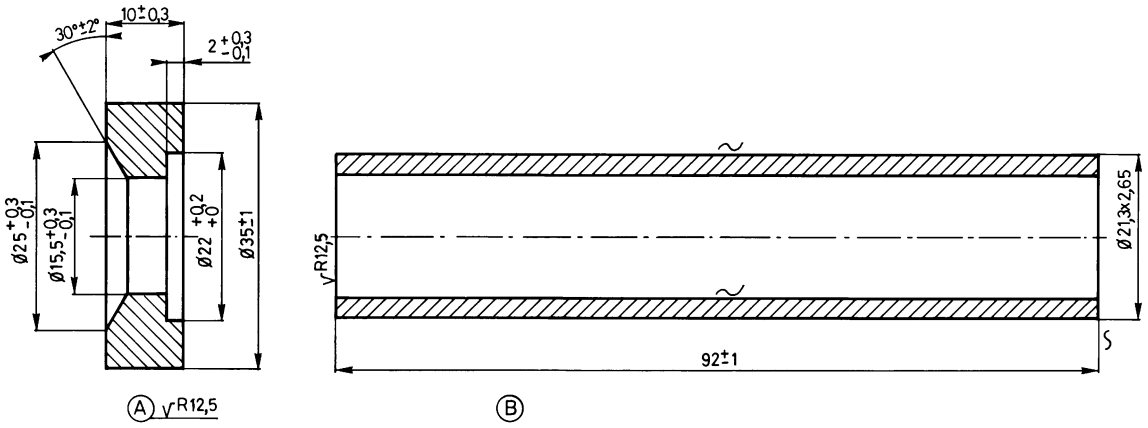
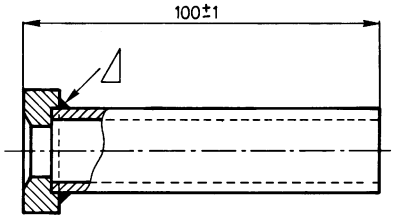
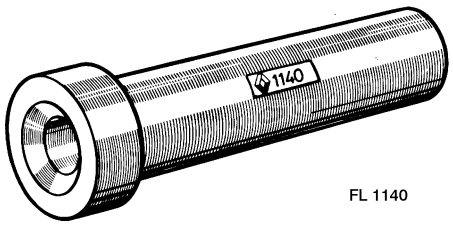
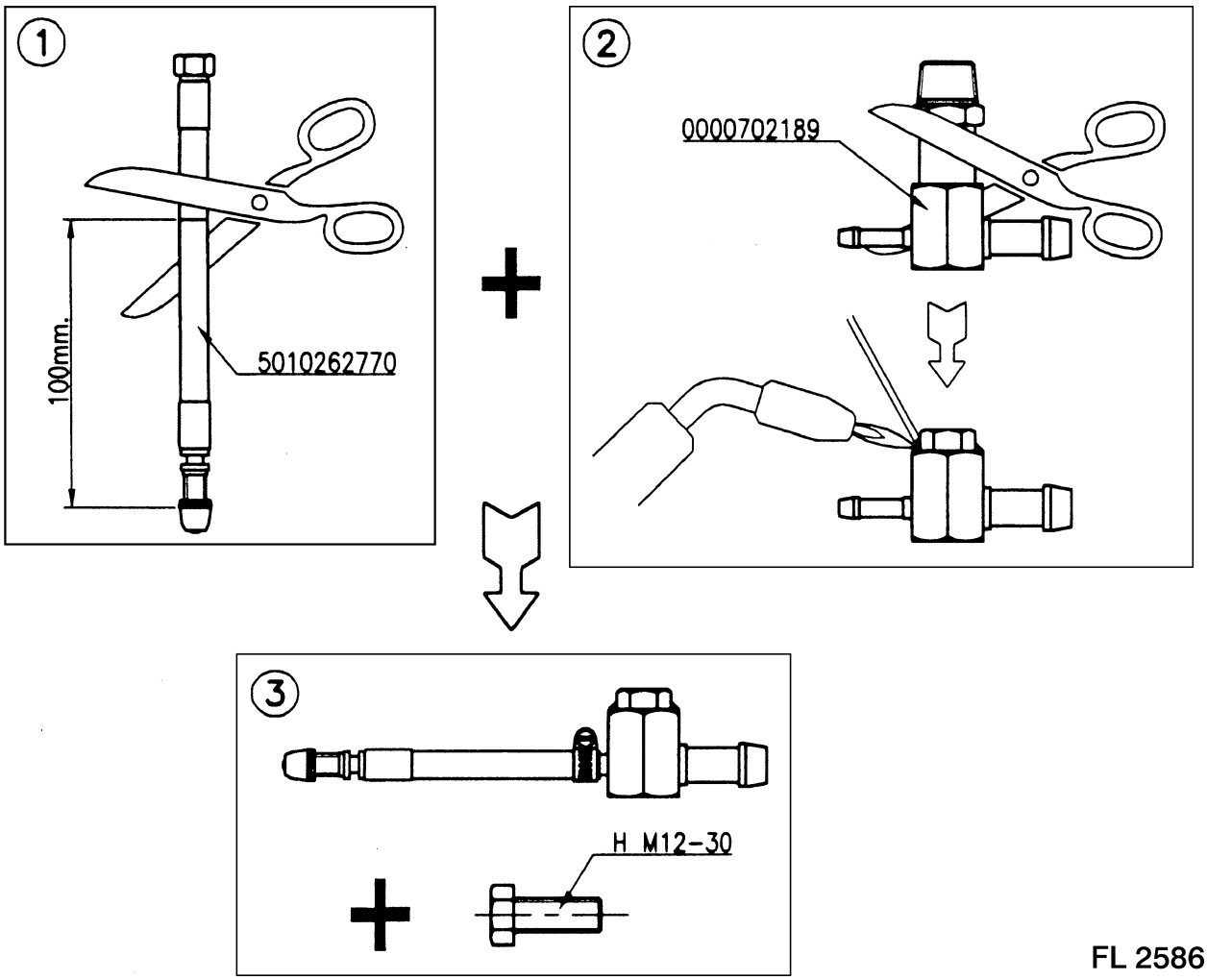
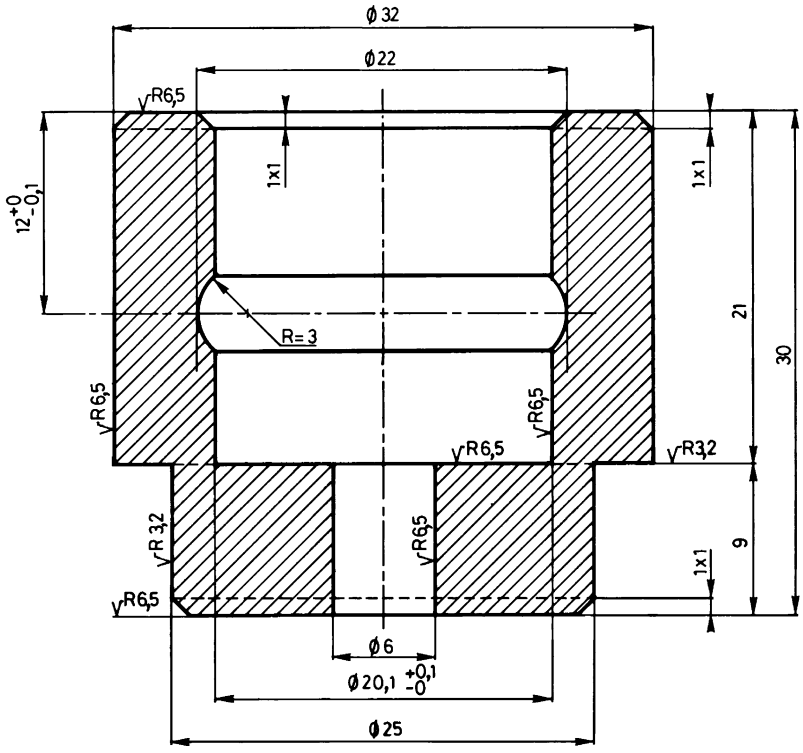
	**1080**	PUSHER			1	1
	**2584**	SEAL PLATE			1	1
	2648	ENDPIECE			1	1
	**1115**	FLANGE			1	1


30°±2°
10±0,3
2 +0,3 -0,1
Ø25 +0,3 -0,1
Ø15,5 +0,3 -0,1
Ø22 +0,2 +0
Ø35±1
R12,5
Ø21,3x2,65
92±1
A
B


100±1

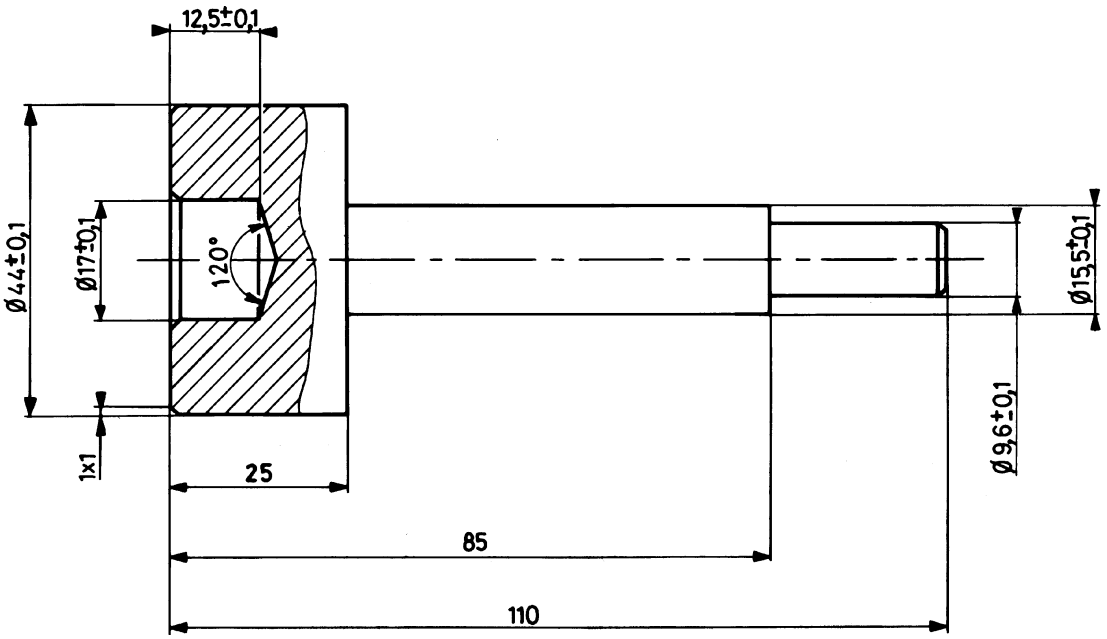

1140
FL 1140

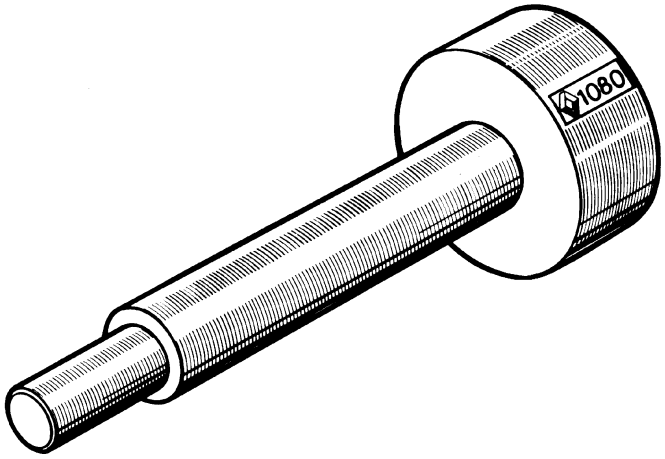

1
100mm.
5010262770
2
0000702189
3
H M12-30
FL 2586


Ø 32
Ø22
R6,5
1x1
1x1
12+0 -0,1
R=3
21
30
R6,5
R6,5
R6,5
R3,2
R3,2
R6,5
9
1x1
R6,5
Ø6
Ø20,1 +0,1 -0
Ø25

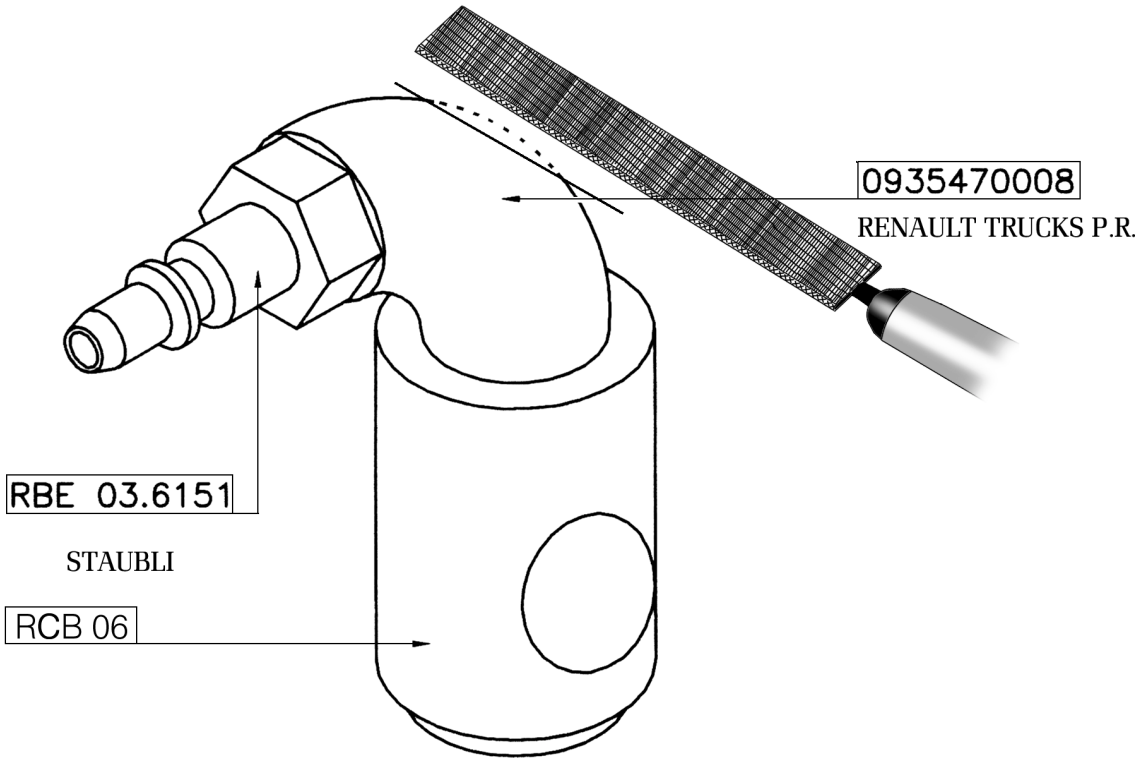
1338

FL 1338

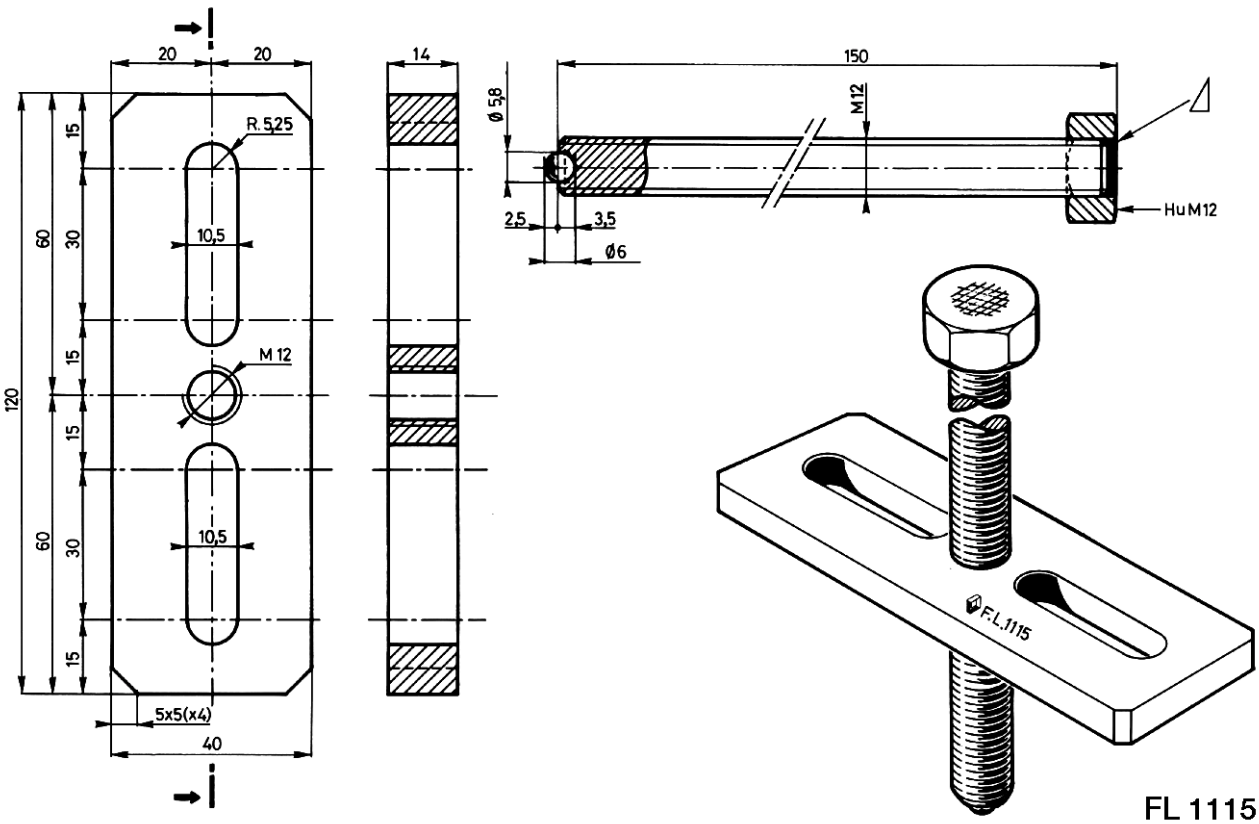




FL 1080

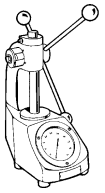


FL 2648



FL 1115

Proprietary tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer code	Level	Qty
	**50 00 26 9452**	SPRING SETTING TESTER	M 250 E	AM	1	1
	50 00 26 9675	THERMOMETER	APPA 51 + 80110	AL	1	1
	50 00 26 2565	WRENCH		AB	1	1

AM	**MULLER**			
	Le jardin d'entreprises 1 avenue Gustave Eiffel			
	28070 CHARTRES CEDEX			FRANCE
	02 37 33 34 26		02 37 33 35 00	

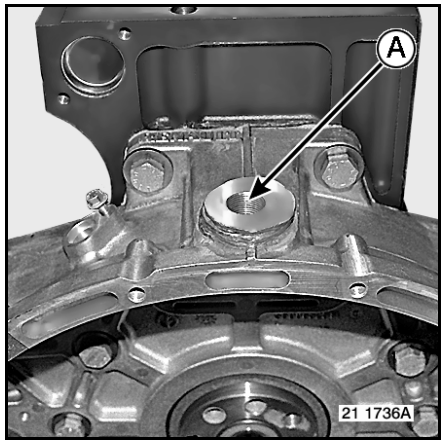
AL	**CHAUVIN ARNOUX**			
		190 rue Championnet		
		75890 PARIS CEDEX 18		FRANCE
		01 44 85 44 85	01 46 27 73 89	
AB	**FACOM**			
		6 et 8, rue Gustave Eiffel BP 99		
		91423 MORANGIS CEDEX		FRANCE
		01 64 54 45 45	01 69 09 60 93	

STRIPPING AND MOUNTING ON STAND

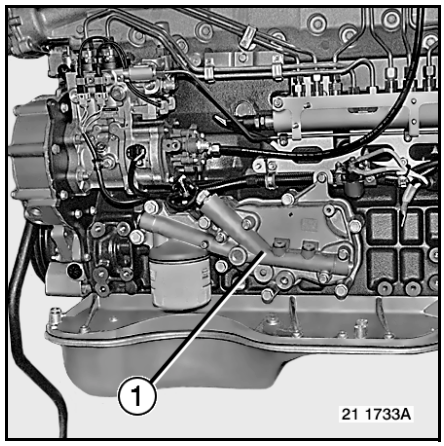
Stand 1000

Mounting

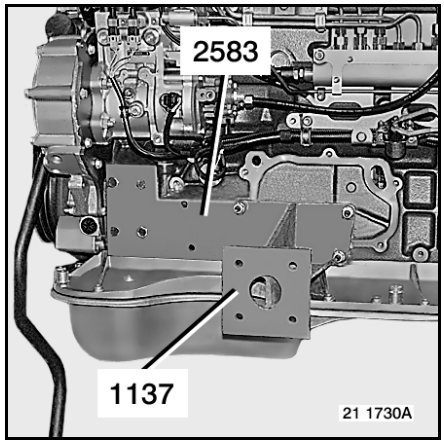
IT IS FORBIDDEN TO USE THE TAPPED HOLE (A) IN THE FLYWHEEL HOUSING AS LIFTING POINT.



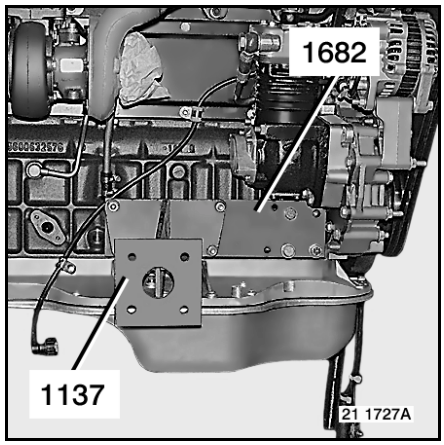
LH side
Remove the heat exchanger oil filter / bracket unit **(1)**.
Depending on the assembly.
Remove the cold unit compressor bracket.

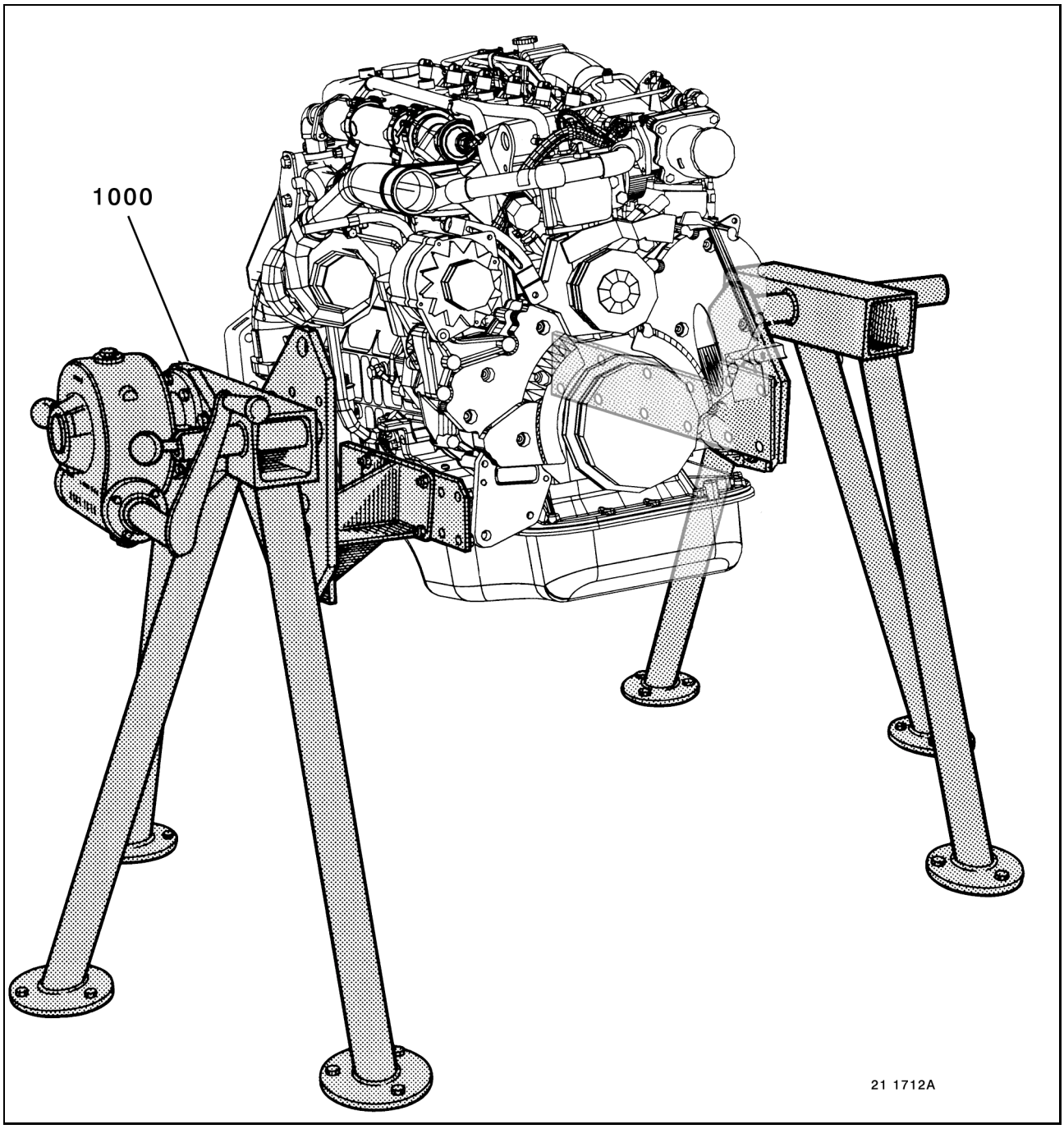


Install tool **1137** + **2583**.



RH side
Withdraw the electrical oil gauge.
If necessary
Disconnect the dipstick guide tube.
Install tool **1137** + **1682****.
****To be modified, if necessary.

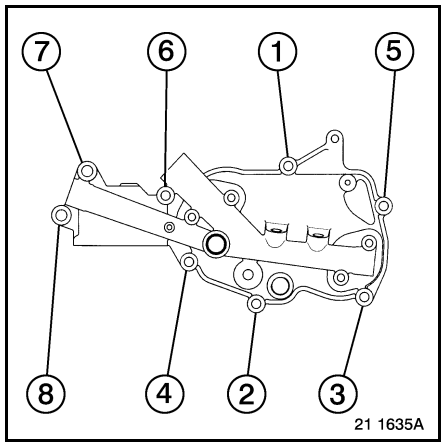




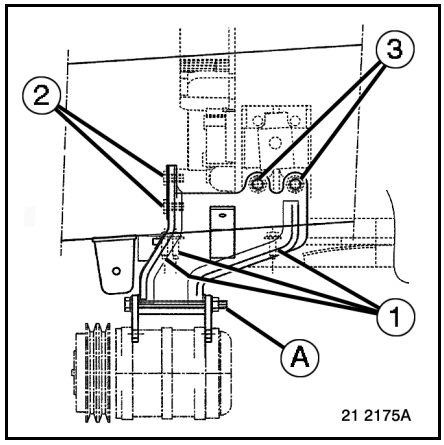
Fasten the engine to stand N°**1000**.

Removal

Remove the engine from stand N°**1000**.
Remove the brackets **2583 - 1137 - 1682**.
Install the heat exchanger.
Follow the tightening sequence.
Tighten to torque.



Fit the cold unit compressor bracket.
In the indicated sequence:
– Start the setscrews
Follow the tightening sequence.
Tighten setscrews **(1-2)** at a torque of **19.5±4 Nm.**
Tighten setscrews **(3)** at a torque of **120±24 Nm.**
Tighten setscrews **(A)** at a torque of **40±6 Nm.**



Throw-away oil filter cartridge
To replace, unscrew the cartridge.
Upon fitting:
Fill the cartridge with oil.
Oil the seal
Screw up the cartridge(s) until contact is made with the support bracket.

- **Tighten at a torque of 25±5 Nm**
- **Use tool 2684**
- **Use a torque wrench**

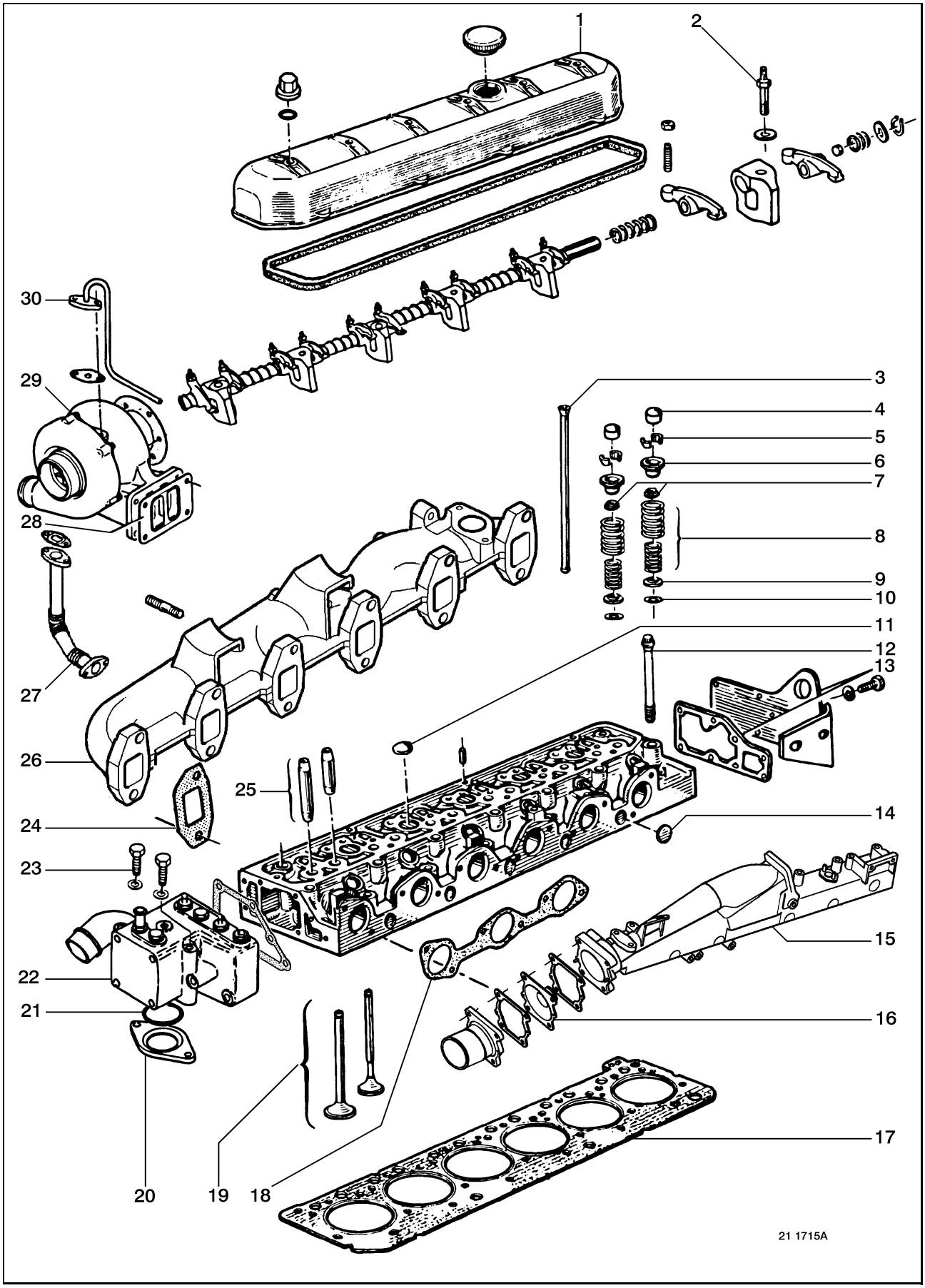
Run the engine and check for leaks.
In the event of leakage, remove the cartridge(s), inspect the joint face and repeat the fitting operations.

If the engine is equipped with an immersion heating rod:
- **It should not be connected unless the cooling system has been thoroughly drained.**
- **It should not be connected when the engine is started.**

In both cases, there is risk of destruction of the resistor.

CYLINDER HEAD

Exploded view



The item numbers indicated in the text refer to the drawing on page F-2.

Removal

Remove the fuel prefilter.
Remove setscrews.
Remove the injector pipes.
See page(s) K-18.
Remove the wiring harnesses.
Remove the hose between compressor and thermostat housing.
Disconnect the hose between EGR heat exchanger and water pump.
Remove the nozzle-holders.
Take out the seals.

It is forbidden to use the top part of the nozzle-holder to extract it.

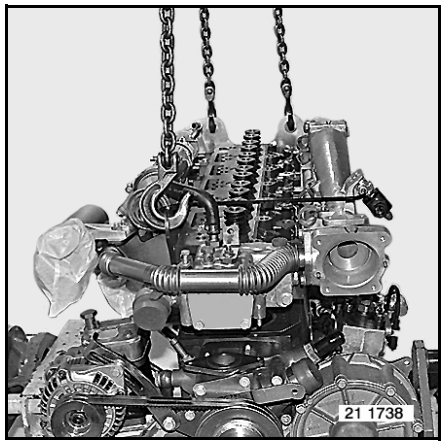
Remove the pipes **(27 - 30)**.
Remove the cylinder head cover **(1)**.
Remove setscrews **(2)**.
Remove the rocker assembly.
Take off the thimbles **(4)**.
Withdraw the push-rods **(3)**.

Turn the push-rods to unstick them from the tappets.

Disconnect the air compressor pipes.
Remove setscrews **(23)**.
Remove setbolts **(12)** by loosening them in the reverse sequence to tightening.
See page(s) F-11.

Remove the cylinder head.

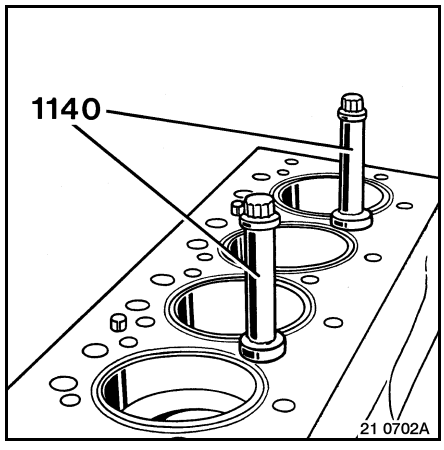
*It is essential to use all the lifting points. Maximum chain angle: **45** °.*



Save the seal **(17)**.
Take out O-ring **(21)**.
Remove the flange **(20)**.

Do not use the EGR tubes to handle the cylinder head.

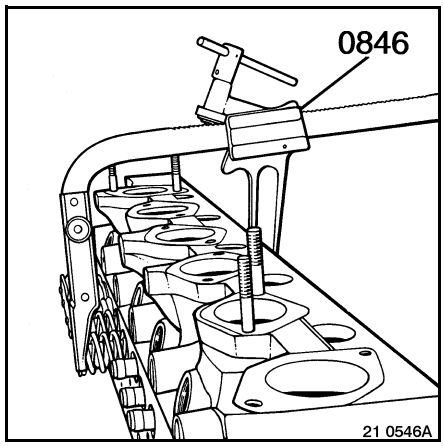
Immobilize the liners.
Use tool **1140**.



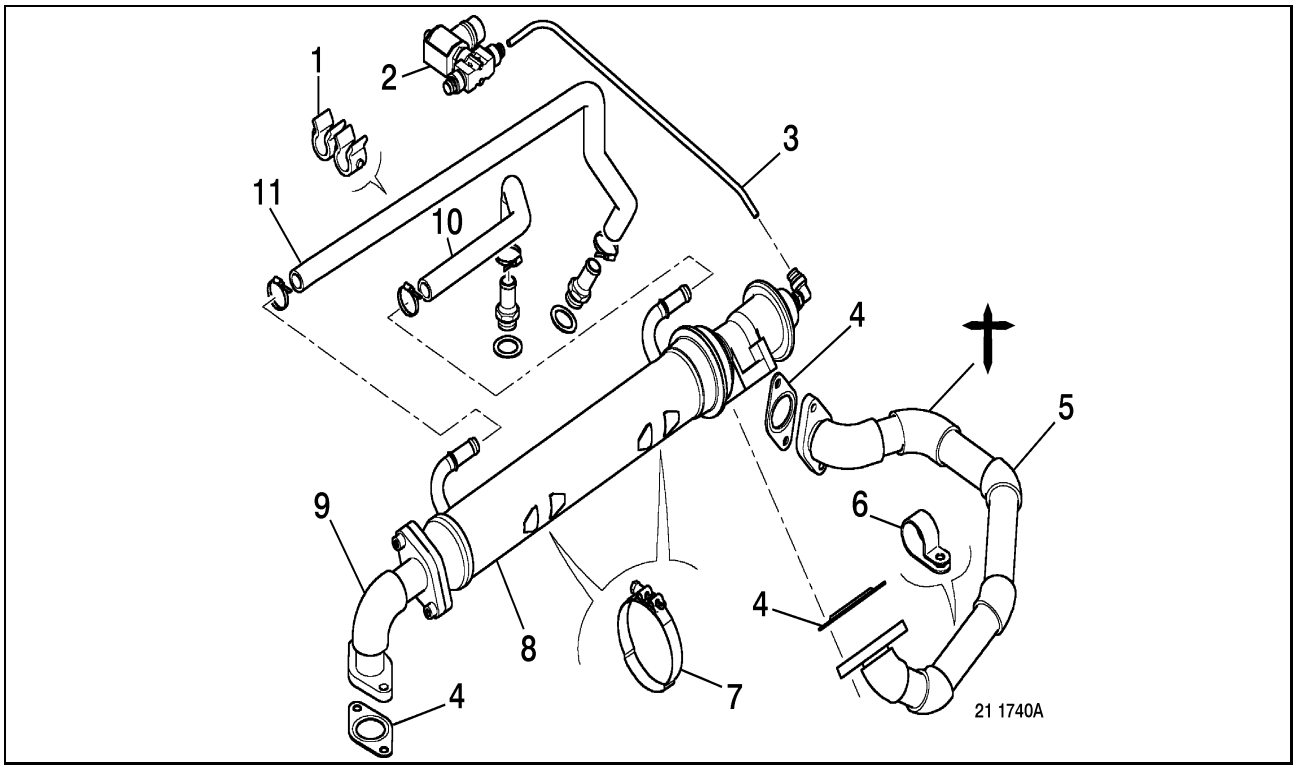
Disassembly

Remove the inlet manifold **(15)**.
Remove the turbocharger **(29)**.
Remove exhaust manifold **(26)**.
Remove the plate **(13)**.
Remove thermostat housing **(22)**.
Remove gasket.
If necessary
Remove the sleeve.
Remove gasket.
Remove gasket **(16)**.
Remove gasket.

Remove the springs **(8)**.
Use tool **0846**.
Save valve cotters **(5)**.
Withdraw cups **(6 - 9)**.
Withdraw washers **(10)**.
Withdraw the seal rings **(7)**.
Remove valves **(19)**.
Classify the parts in order.



Exploded view



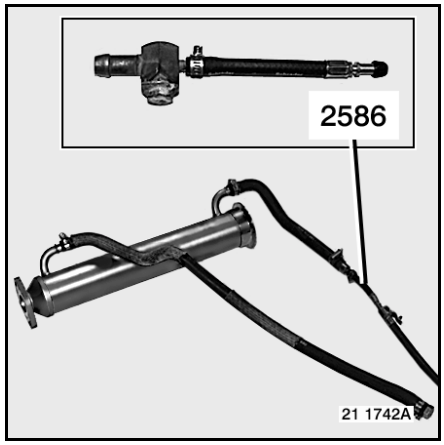
The item numbers indicated in the text refer to the drawing on page F-5.

Removal
Remove air pipe **(3)** between the electrovalve and the EGR valve.
Remove spring clip **(1)**.
Remove hoses **(10 - 11)**.
Remove clamp **(6)**.
Remove EGR tube **(5)**.
Remove EGR by-pass elbow tube **(9)**.
Remove gaskets **(4)**.
Remove clamps **(7)**.
Remove EGR heat exchanger **(8)**.
Remove electrovalve **(2)**.

Fitting
Proceed in the reverse sequence to removal.
Tighten to torque.

Inspection

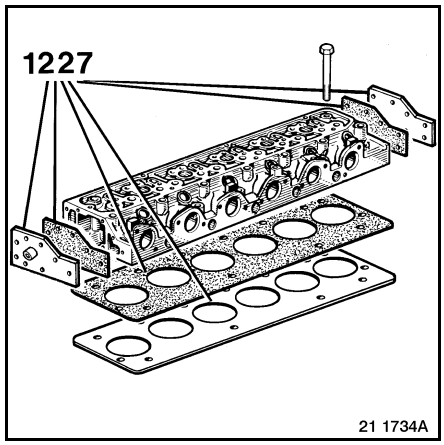
Remove the EGR valve.
Blank off one of the hoses with a clamp and screw.
Connect tool **2586** to the other hose.
Test for leaks in a hot water bath (**80°C**), air pressure: **1 bar(s)**, check for the absence of air bubbles.
Check for the absence of air bubbles.



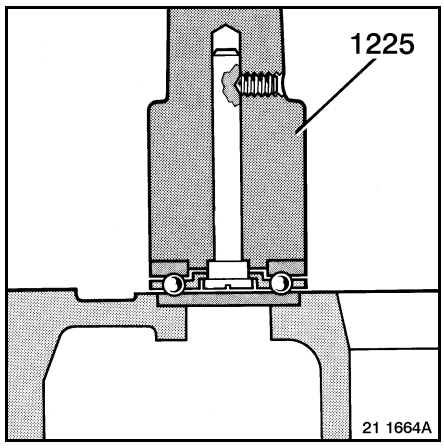
Assembly

Inspection
Check the mating surface.

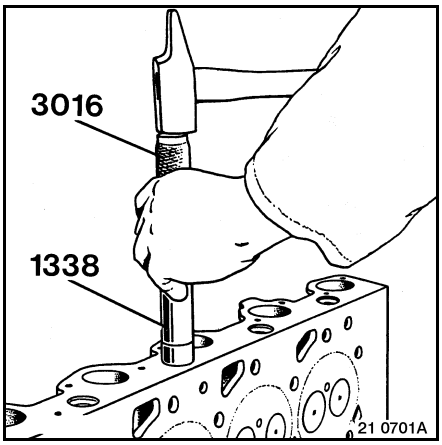
Cylinder head seal
Test the cylinder head for leaks before commencing the overhaul. In a bath of hot water (**80°C**), air pressure **6 bars**, check for the absence of air bubbles.
Use tool **1227**.
To decarbonize, take out core plugs **(11 - 14)**.



Fit plugs **(11)** and crimp them.
Use a thread locking product "**FRENBLOC 271**".
Use tool **1225**.

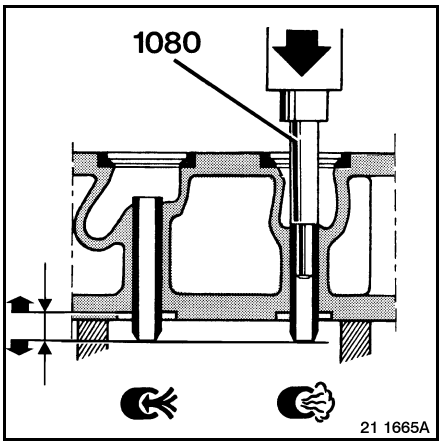


Fit plugs **(14)** and crimp them.
Use a thread locking product "**FRENBLOC 271**".
Use tool **1338** + **3016**
Test for leaks.



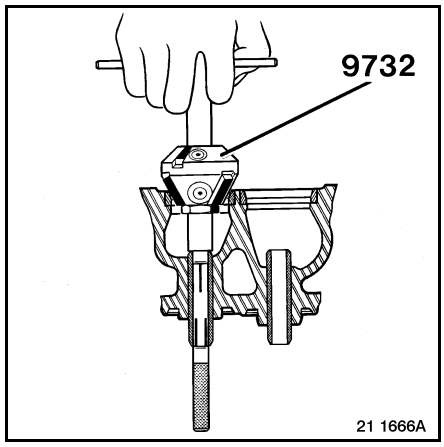
Valve guides
Check the radial clearance of the valves in their guides.

If necessary.
Classify the parts in order **(25)**.
Use tool **1080**.
Use a press.
Apply tallow.
Press fit valve guides.
Use tool **1080**.
Use a press.
Guide protrusion: **19.8 mm**



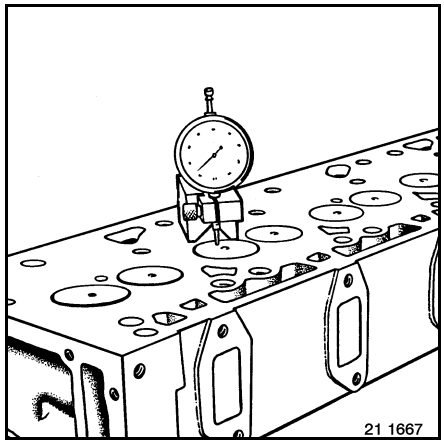
Valve seats

Valve seat grinding:
Remove as little metal as possible. Take valve set-back into account.
Use tool **9732**.
Do not grind the valves.



Check the valves set-back or protrusion.

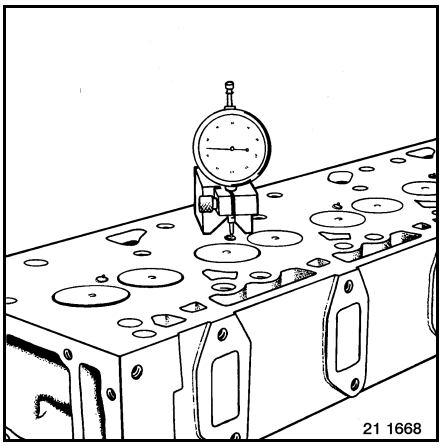
Rocker assemblies
Check the bore dimensions of the rocker arm bushes.
Check the rocker shaft.



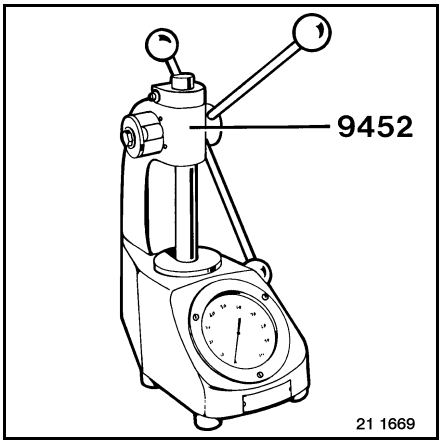
Injector protrusion

Install seals.
Install the nozzle-holders.
Tighten to torque.

Check the injector protrusion.
Remove the nozzle-holders.
Take out seals.
Classify the parts in order.



Check the calibration of the springs **(8)**.
Use tool **9452**.



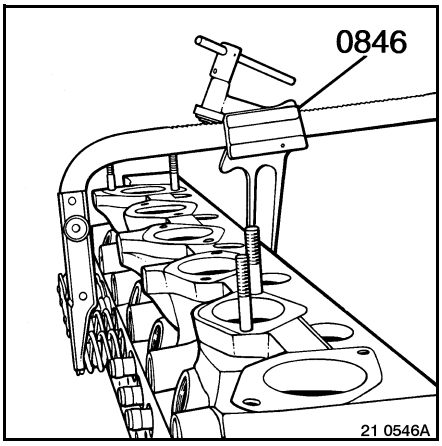
Valves

Oil the valve stems and install the valves.
Install seals **(7)**.
Fit the washers **(10)**.
Fit cups **(9)**.

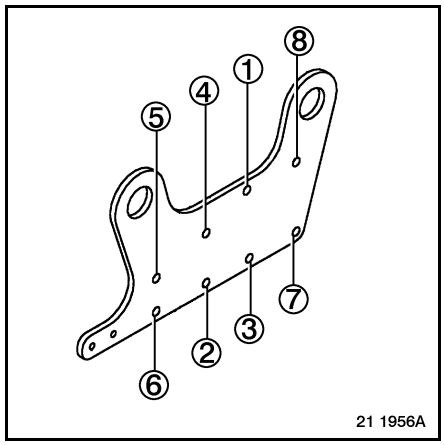
Fit the springs **(8)**.

The closed-spirals end of the springs is to be fitted against the lower cups.

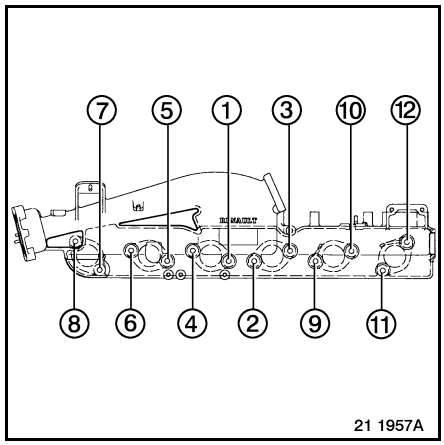
Fit cups **(6)**.
Fit valve cotters **(5)**.
Use tool **0846**.
Fit the casing **(22)**.
Fit the seal.
Apply "**OMNIFIT 50H**" oiltight threadlocking compound to give a fluidtight seal.



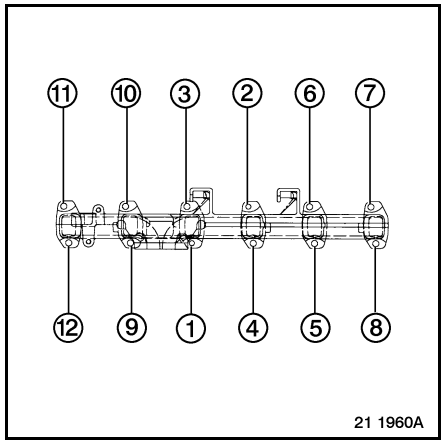
Fit the plate **(13)**.
Follow the tightening sequence.
Tighten to torque.



Install seals **(18)**.
Fit intake manifold **(15)**.
Follow the tightening sequence.
Tighten to torque.

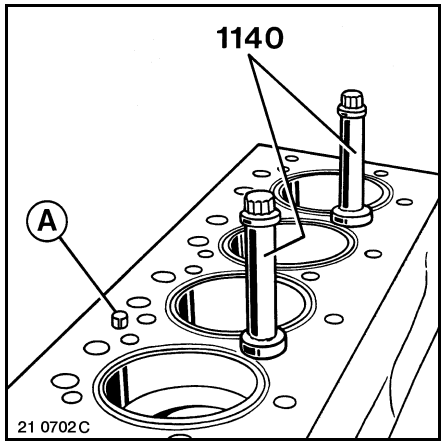


Install seals **(24)**.
Fit exhaust manifold **(26)**.
Smear the screwthreads with **GRAISSE GRIPCOTT NF** copper grease
Fit the setscrews.
Follow the tightening sequence.
Tighten to torque.
Install seal **(28)**.
Assemble turbocharger **(29)**.
Tighten to torque.
Fit the seal.
Fit venturi **(16)**.
Match the direction of orientation.
Fit the seal.
Fit the sleeve.
Tighten to torque.

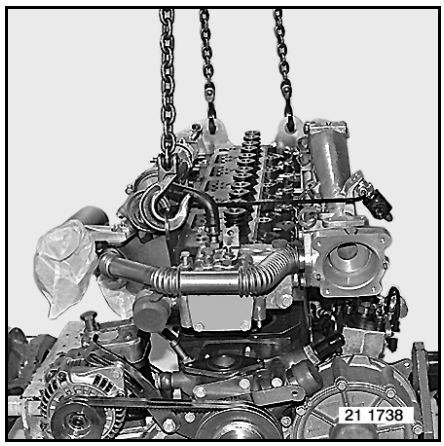


Fitting

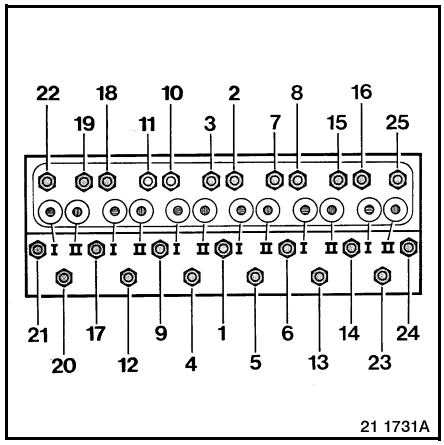
Withdraw tool **1140**.
Check that locating pin **(A)** is in position.



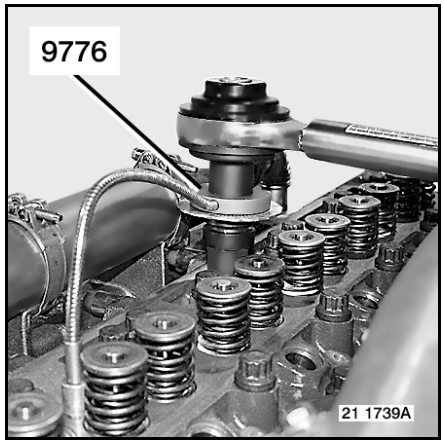
Install seal **(17)**.
Fit the flange **(20)**.
Install O-ring **(21)**.
Fit the cylinder head.
Apply oil.
Tighten the setscrews **(12)**.



To tighten down the cylinder head(s)
Tighten the setbolts in a 1st phase at a torque of **125 Nm** in the specified sequence ; then tighten at an angle of **180 °.**
Slacken the setbolts one-by-one and retighten at a torque of **125 Nm** then turn through an angle of **180 °** always in the specified sequence.



Use tool **9776**.
Tighten the setscrews **(23)**.
Put the push-rods into place.
Position caps.
Remove the rocker assembly.
Tighten setscrews moderately.
Tighten to torque.
Adjust the valve rocker clearances.
N 1 cylinder flywheel end
Depending on the assembly.
See page B-2-1



Adjustment of valve rocker clearances:
Adjustment values: engine cold
- Exhaust: **0.50 mm.**
- Inlet: **0.25 mm.**

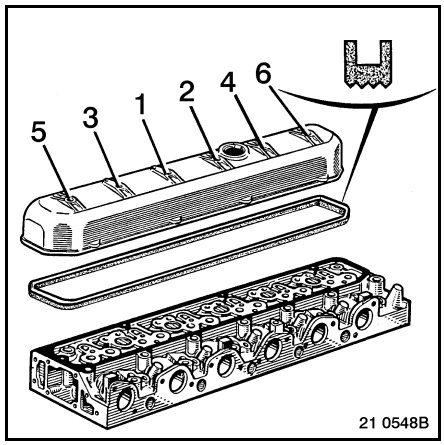
Adjustment of valve rocker clearances:
Adjustment values: engine cold
- Exhaust: **0.50 mm.**
- Inlet: **0.4 mm.**

The different types of camshaft are interchangeable. However, camshafts where the valve rocker clearance setting is 0.25 mm must without fail be adjusted to that value to prevent premature wear. Camshafts where the valve rocker clearance setting is 0.4 mm tolerate adjustment to 0.25 mm. In case of doubt of the camshaft fitted to the engine, adjust the valve rocker clearances on the inlet valves to 0.25 mm without fail.

Valves in balance (end of exhaust, start of induction in cylinder N°)	**Adjust the clearances of** the valves in cylinder N°
6	1
2	5
4	3
1	6
5	2
3	4

Install the nozzle-holders.
Tighten to torque.
Fit new fuel leak-off return pipes .
Fit the wiring harness.
Fit pipes **(27 - 30)**.
Fit injector pipes.
Tighten to torque.
Install seal.
Remove the nuts.
Clean contact facings thoroughly.
Fit the rocker cover.
Tighten to torque.
In two passes.
In the indicated sequence
Depending on the assembly.

Aluminium cylinder head cover.
- Preliminary tighten at: **8 Nm.**
- Tighten at: **30±3 Nm.**

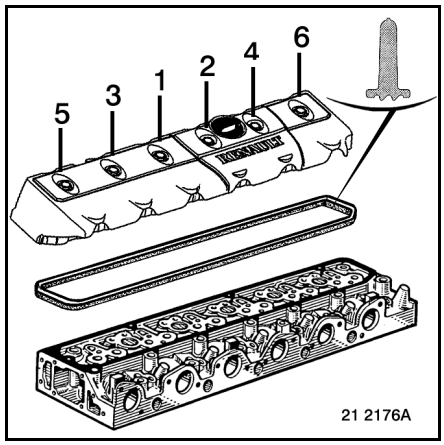


Composite material cylinder head cover.
- Preliminary tighten at: **8 Nm.**
- Tighten at: **25±2 Nm.**

For composite material cylinder head covers, ensure that the heat shields are a least 2 mm away from the cylinder head cover.

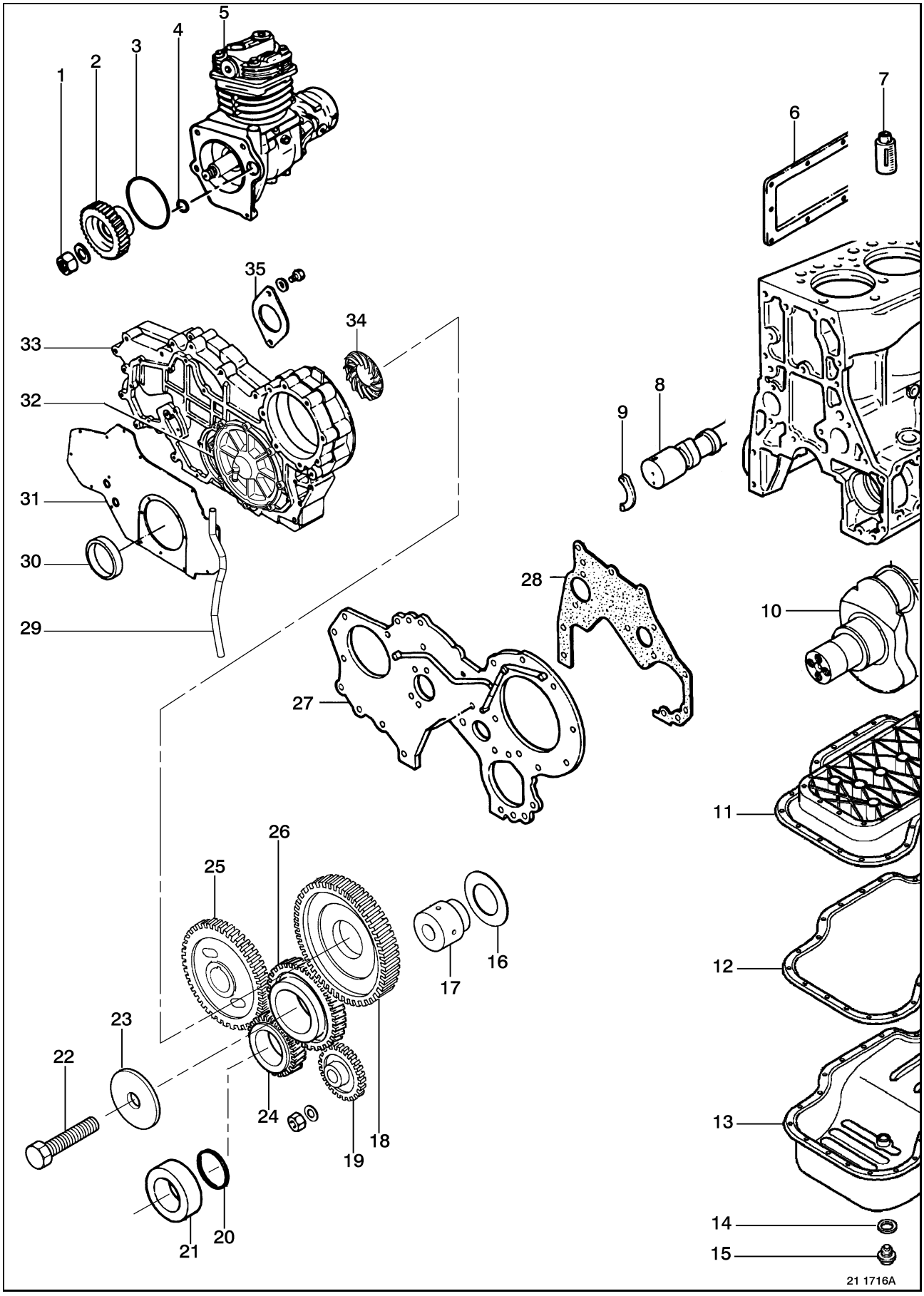
If the engine is equipped with an immersion heating rod:
- **It should not be connected unless the cooling system has been thoroughly drained.**
- **It should not be connected when the engine is started.**

In both cases, there is risk of destruction of the resistor.



TIMING

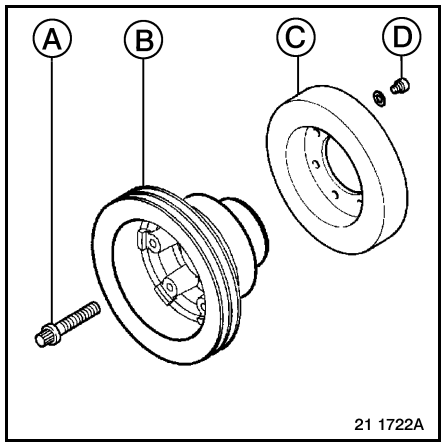
Exploded view



The item numbers indicated in the text refer to the drawing on page G-2.

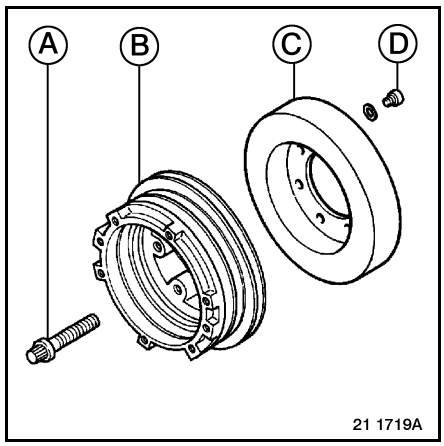
Removal

Remove setscrew **A**.
Remove damper **C**.
Withdraw spacer **(21)** (with 3-groove pulley only).
Take out O-ring **(20)**.



Disassembly

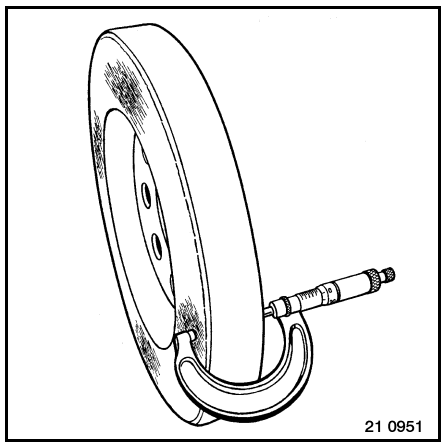
Remove setscrews **D**.
Remove pulley **B**.



Inspection

Check for the absence of:
- knock marks and bellmouthing of fixing holes.
- any cracks.
- points of impact.
- distortion on the outer part.
- convexity.
- noise when shaking the damper.

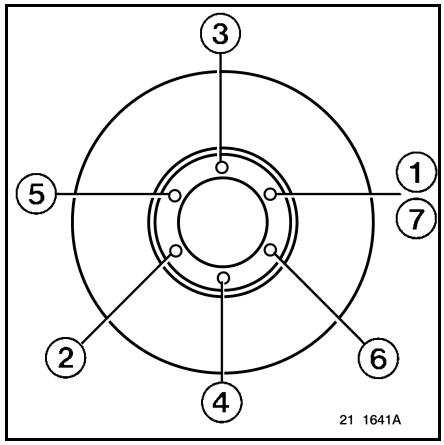
Remove the paint at 4 points on both sides and measure the thickness of the damper. The deviation between the check points should be less than 0.25 mm.
If any one of the above faults is noted, replace the damper.



Assembly

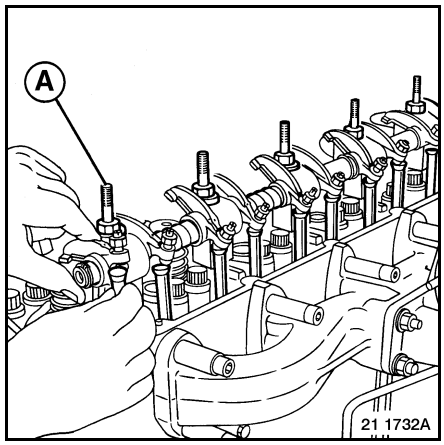
Install O-ring **(20)**.
Fit spacer **(21)** (with 3-groove pulley only).
Match the direction of orientation.
Assemble pulley **B** and damper **C**.
Follow the tightening sequence.
Tighten to torque.
Fit damper **B**.
Fit the setscrews **A**.
Tighten to torque.

- 1st phase at **100 Nm** (at least 3 diagonally opposed passes),
- 2nd phase at **60° ± 5** (at least 1 diagonally opposed pass).

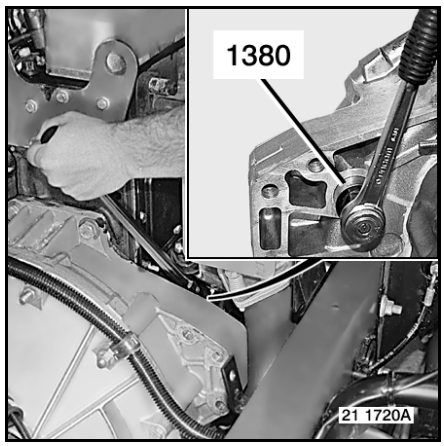


Disassembly

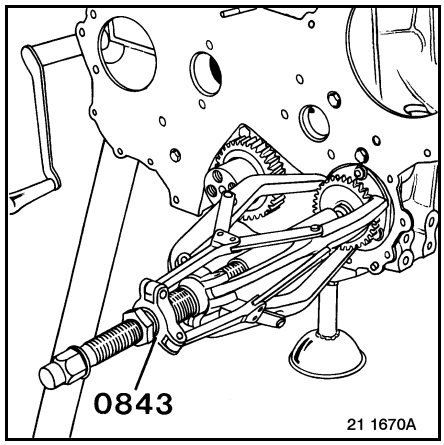
Remove the alternator.
Remove the water pump.
Take off breather plate **(32)**.
Remove the breather impeller **(34)**.
Remove the cylinder head cover.
Loosen setscrews **(A)**.
Remove the rocker assembly.
Withdraw the push-rods.



Immobilize crankshaft **(10)**.
Use tool **1380**.
Loosen the high pressure pump pinion nut.
Remove pump pinion **(18)**.
See "Fuel-injection" chapter.
Remove the high-pressure pump.
Remove the damper setscrews.
Remove damper **(C)**.
See page(s) G-3.
Remove compressor **(5)**.
Remove the air compressor spacer.
Take out seals **(3 - 4)**.
Remove oil sump **(13)**.
Remove the oil strainer.
Remove engine block stiffener **(11)**.
Remove engine block stiffener **(31)**.
Remove timing case **(33)**.
Remove setscrews.
Remove thrust bearing **(35)**.
Remove tappet cover **(6)**.
Withdraw tappets **(7)**.
Classify the parts in order.
Remove the nut.

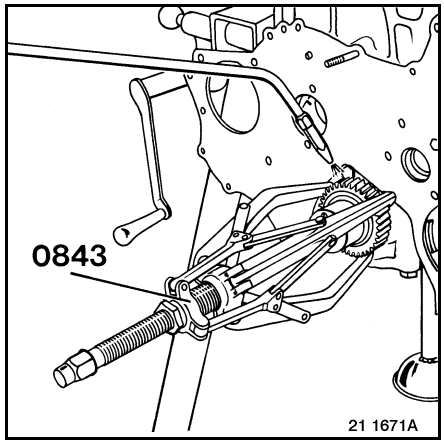


Extract pinion **(19)**.
Use tool **0843**.
Loosen nut.
Remove pinion **(19)**.

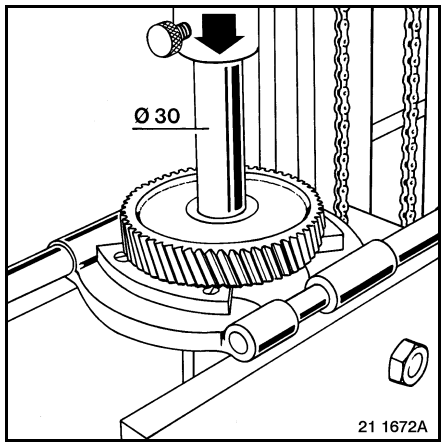


Intermediate gear
Remove setscrew **(22)**.
Withdraw washer **(23)**.
Remove pinion **(26)**.
Fit support **(17)**.
Withdraw washer **(16)**.
Remove setscrews.
Withdraw the oil pump.
Withdraw tool **1380**.
Remove the camshaft assembly **(8 - 25)**.

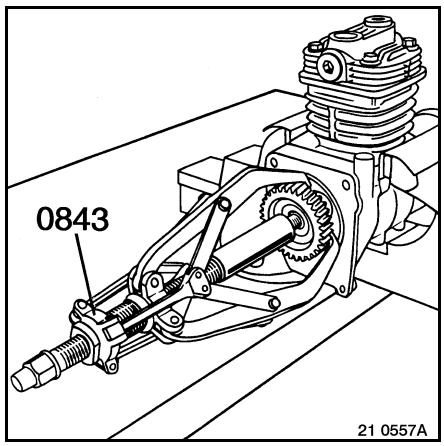
For replacement only.
Extract crankshaft pinion **(24)**.
Use tool **0843**.
Apply tension.
Heat part **(24)** to **200 °C.**
(Heat quickly).
Remove front plate **(27)**.
Take off seal **(28)**.
Remove thrust bearing **(9)**.
If necessary
Drill the crimpings to remove the lube pipe .



Extract pinion **(25)**.



Loosen nut **(1)**.
Extract pinion **(2)**.
Use tool **0843**.
Loosen nut **(1)**.
Remove pinion **(2)**.



Inspection

On the camshaft, inspect:
- Coaxiality.
- Cam lift.
- Bearing surface diameter.
- Bushes.

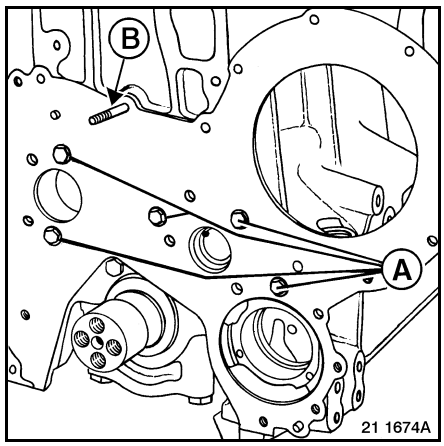
On the idler gear, inspect:
- Bush bore.
- Support diameter.

On the tappets, inspect:
- Diameter and housing.

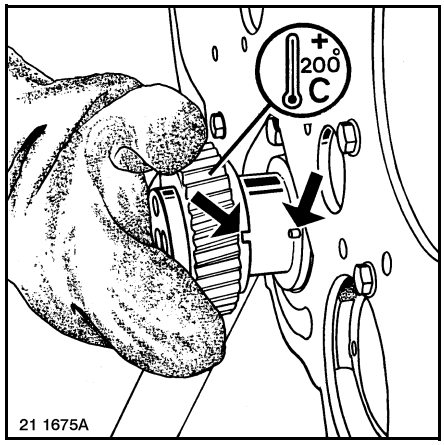
Assembly

Crimp the lube pipe.
Use tool **2659**.

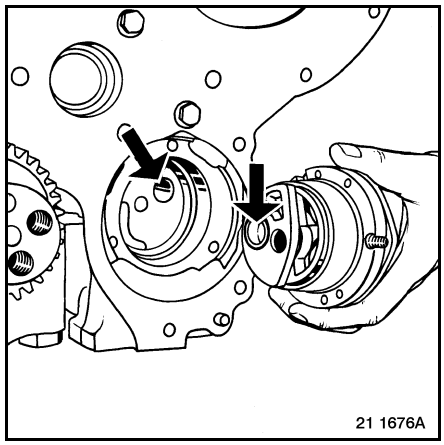
Install seal **(28)**.
Fit front plate **(27)**.
Fit the setscrews **(A)**.
Tighten to torque.
Install stop **(9)**.
Assemble stud **(B)** with **OLEOETANCHE 542** oiltight thread sealant.



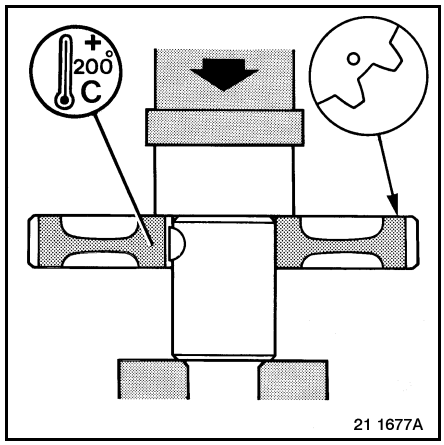
Fit the clamps.
Heat part **(24)** to **200°C.**
Assemble gear **(24)**.



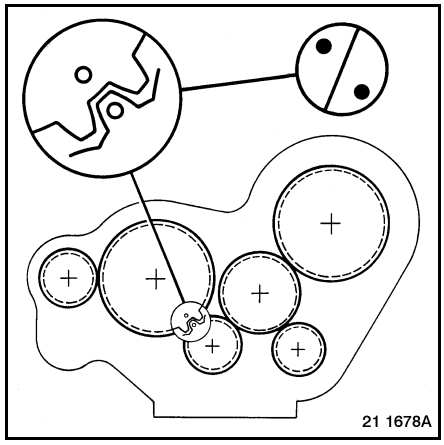
Install seals.
Apply oil.
Assemble the oil pump.
Line up the lubrication holes.
Fit the setscrews.
Use a thread locking product "**OLEOETANCHE 542**".
Tighten to torque.



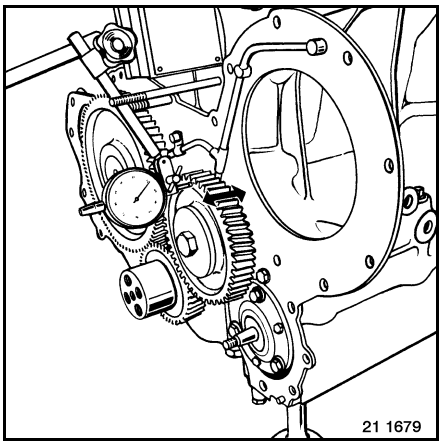
Install the key.
Heat part **(25)** to **200°C.**
Assemble gear **(25)**.
Match the direction of orientation.
Use a press.



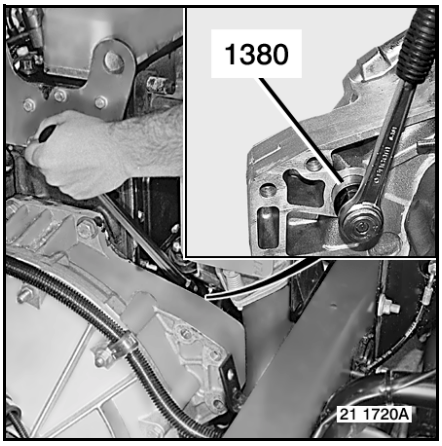
Apply oil.
Fit the camshaft assembly **(8 - 25)**.



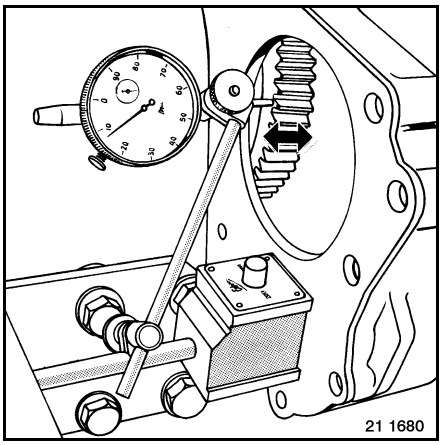
Intermediate gear
Fit the washer **(16)**.
Fit support **(17)**.
Apply oil.
Assemble gear **(26)**.
Fit the washer **(23)**.
Fit screw **(22)**.
Tighten to torque.
Check the play.



Immobilize crankshaft **(10)**.
Use tool **1380**.
Install oil pump pinion **(19)**.
Fit the washer.
Screw up nut.
Tighten to torque.
Install stop **(35)**.
Fit the setscrews.
Tighten to torque.
Fit timing case **(33)**.
Apply "**SILMATE RTV 1473**" oiltight threadlocking compound to give a fluidtight seal.
Tighten the setscrews.

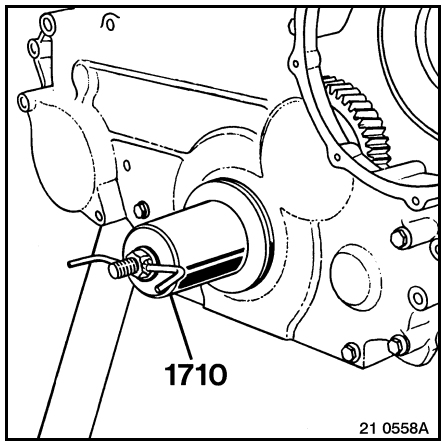


Check the play.



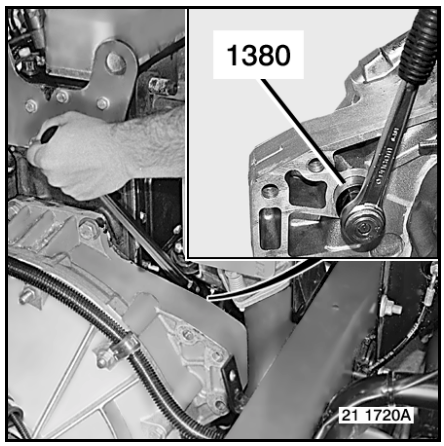
Install seal **(30)**.

Hold the seal on the protection ring until it is installed on the tool so as to avoid distortion of the lip.
Prior to assembly, oil the exterior of the seal - do not grease the lip.



Use tool **1710**.
Fit anti-rattle plate **(31)**.
Position spacer **(22)**.
Fit spacer **(21)**.
Match the direction of orientation.
Fit damper **B**.
See page(s) G-4.

Withdraw tool **1380**.

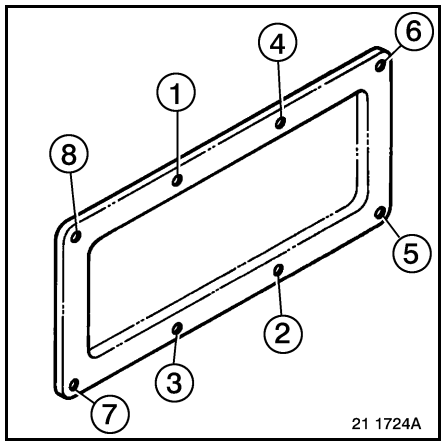


Engine block stiffener
Assemble engine block stiffener **(11)**.
Engine block stiffener **66 mm** thick
Apply "**SILMATE RTV 1473**" oiltight threadlocking compound to give a fluidtight seal.
Engine block stiffener **65 mm** thick
Install seal.
Offer up the engine block setscrews.
Preliminary tighten the flywheel housing setscrews or nuts at a torque of **5 Nm.**
Tighten the engine block setscrews at a torque of **28 ± 2.8 Nm.**
Depending on the assembly.
Tighten the flywheel housing setscrews at a torque of **55 Nm ± 5.5 Nm.**
Tighten the flywheel housing setscrews at a torque of **35 Nm ± 7 Nm.**
Fit the oil strainer.
Install seal **(12)**.
Fit the oil sump **(13)**.
Tighten **2** opposing setscrews in the central position, then tighten the peripheral setscrews.
Retighten the first **2** setscrews.
Tighten to torque.

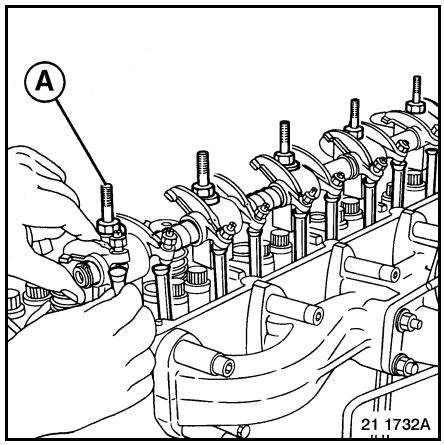
For industrial engines (without engine block stiffener), the aluminium oil sump is tightened in the same way at the same torque as for a sheet steel oil sump with stiffener.

Apply oil.
Put tappets **(7)** into place.
Put the push-rods into place.

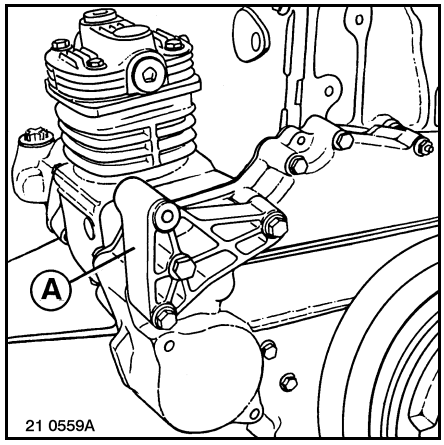
Fit the tappet cover.
Apply a coat of "**RHODOSEAL 131**" tackifying primer.
Apply "**RHODORSEAL 5661**" oiltight threadlocking compound to give a fluidtight seal.
Follow the tightening sequence.
Preliminary tighten at **15 Nm.**
Tighten to torque.



Check that there are caps on the valve stems.
Remove the rocker assembly.
Tighten setscrews **A** moderately.
Tighten to torque.
Check the timing.

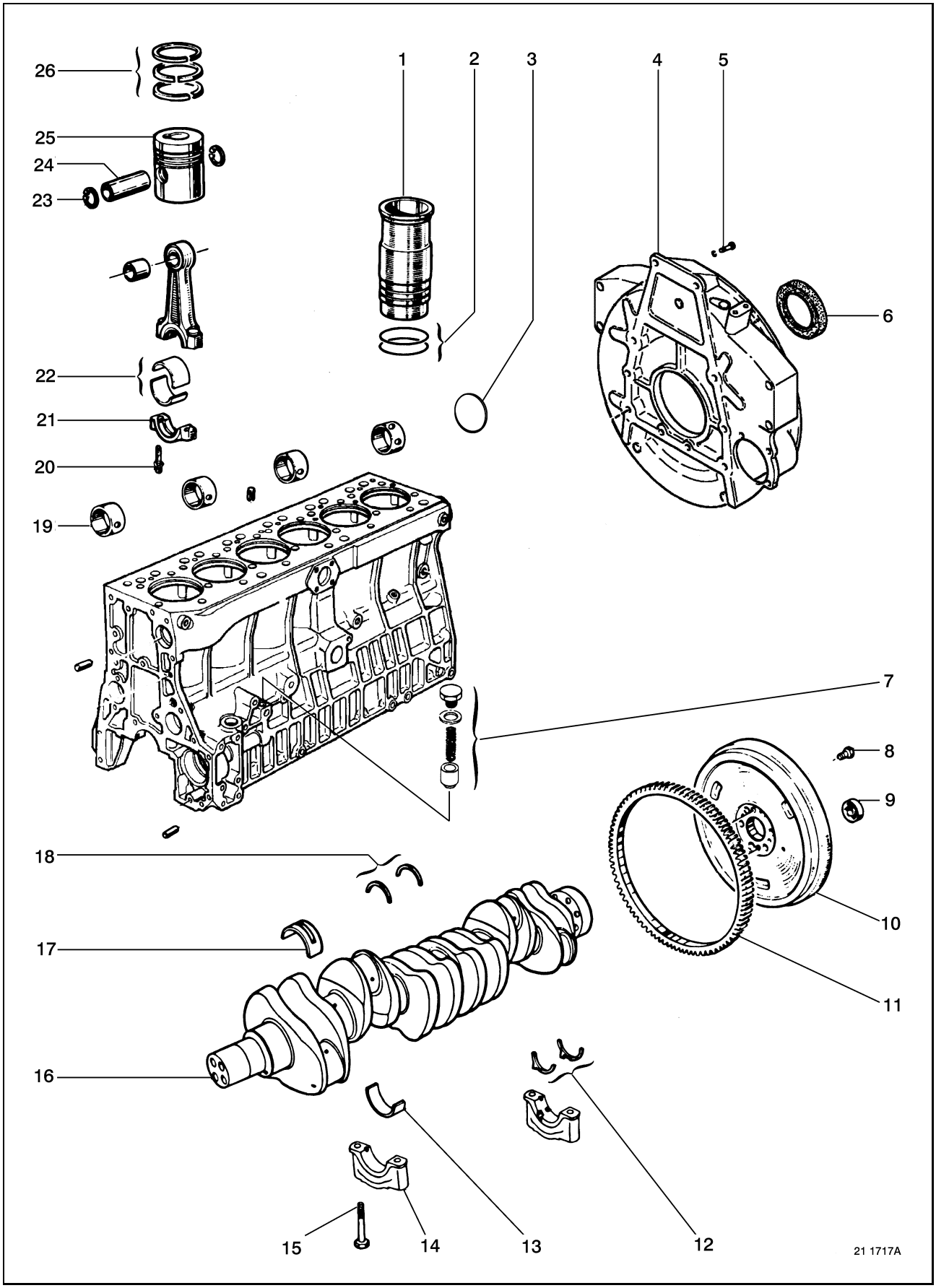


Position spacer **(3)**.
Position spacer **(4)**.
Install the air compressor spacer.
Fit the air compressor.
Fit support **A**.
Tighten the setscrews.
Assemble gear **(2)**.
Fit the washer.
Screw up nut **(1)**.
Tighten to torque.
Install and time the high pressure pump.
Tighten to torque.
Fit breather impeller **(34)**.
Fit the breather plate **(32)**.
Apply "**SILMATE RTV 1473**" oiltight threadlocking compound to give a fluidtight seal.
Tighten to torque.
Fit the rocker cover.
Fit the coolant pump.
Fit the alternator.
Fit and tension the drive belts.
Use tool **8251**.



RECIPROCATING GEAR

Exploded view

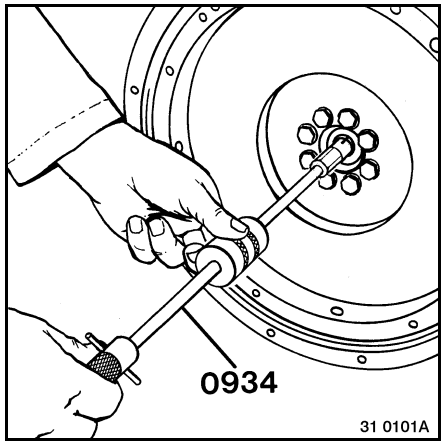


The item numbers indicated in the text correspond to the figure on page H-2.

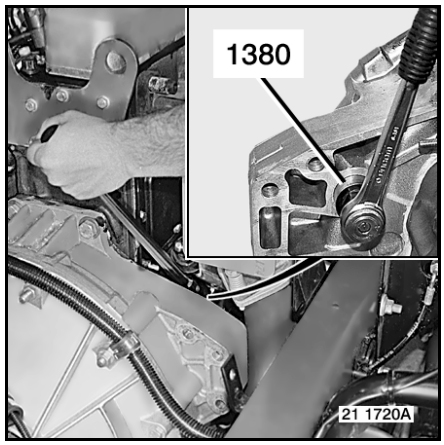
Disassembly

Remove the cylinder head.
Remove the timing gear.
Remove the starter motor.

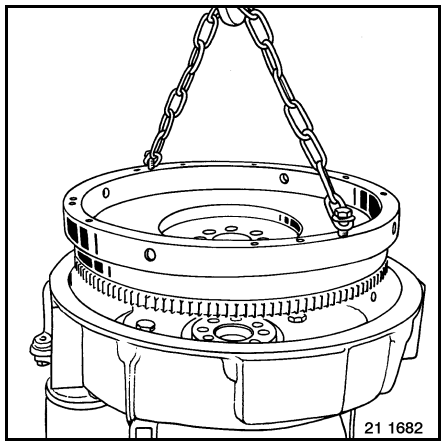
Remove circlip.
Extract bearing **(9)**.
Use tool **0934**.



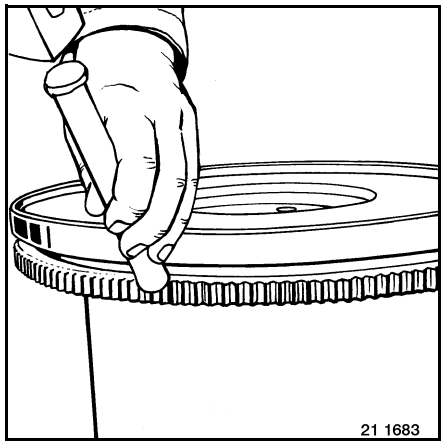
Immobilize crankshaft.
Use tool **1380**.
Tighten nuts **(8)**.
Withdraw tool **1380**.



Flywheel
Remove speed sensor.
Remove flywheel **(10)**.

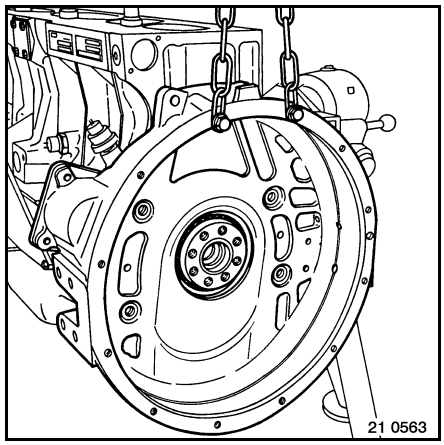


For replacement only.
Heat the part **(11)** to **200°C.**
Minimum heating time: **30** minutes.
Remove the gear ring **(11)**.

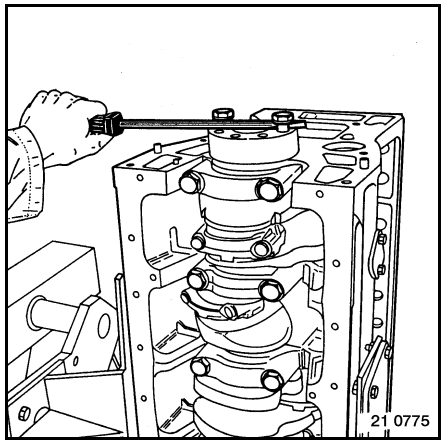


Tighten nuts **(5)**.
Remove the casing **(4)**.

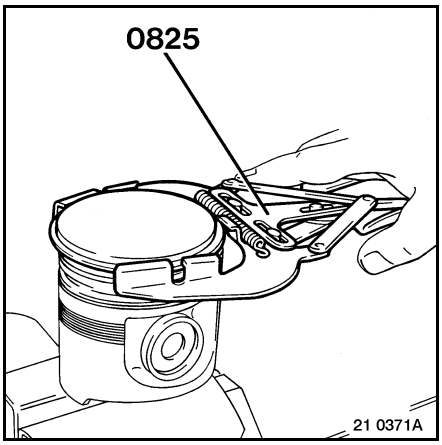
IT IS FORBIDDEN TO USE THE TAPPED HOLE (A) IN THE FLYWHEEL HOUSING AS LIFTING POINT.



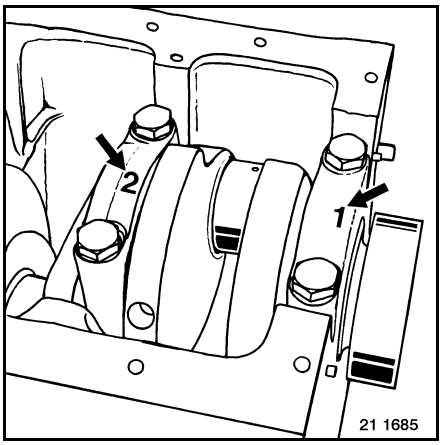
Check for the presence of connecting rod marks (camshaft side).
Tighten nuts **(20)**.
Remove connecting rod caps **(21)**.
Withdraw connecting rod/piston assemblies.
Remove bearing half-shells.
Classify the parts in order.



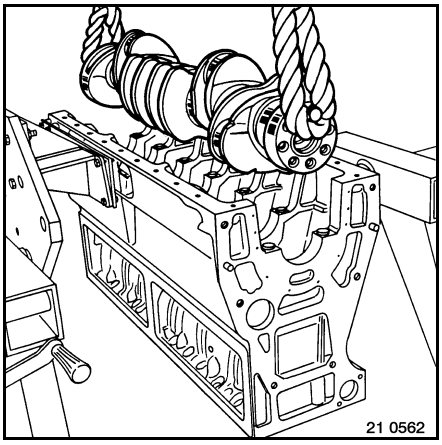
Remove piston rings **(26)**.
Use tool **0825**.
Withdraw circlips **(23)**.
Drive out gudgeon pins **(24)**.
Withdraw pistons **(25)**.



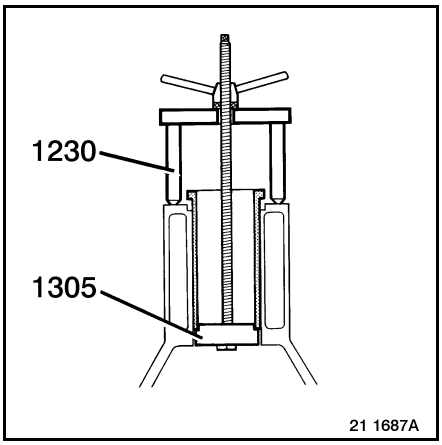
Check for the presence of main bearing cap marks.
Tighten nuts **(15)**.
Remove the bearing caps **(14)**.
Remove bearing half-shells **(13)**.
Classify the parts in order.
Remove the half-rings **(12)**.
Remove the half-rings **(18)**.



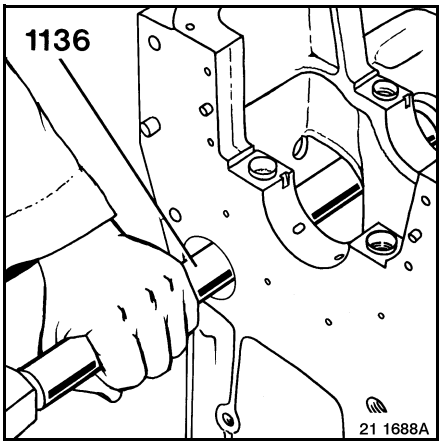
Remove crankshaft **(16)**.
Remove bearing half-shells **(17)**.
Remove the pressure relief valve **(7)**.



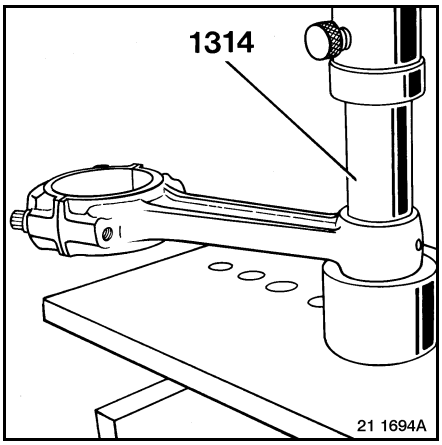
Liners
If necessary
Withdraw liners **(1)**.
Use tool **1230** + **1305**



Camshaft bushes
If necessary
Withdraw bushes **(19)**.
Use tool **1136**.

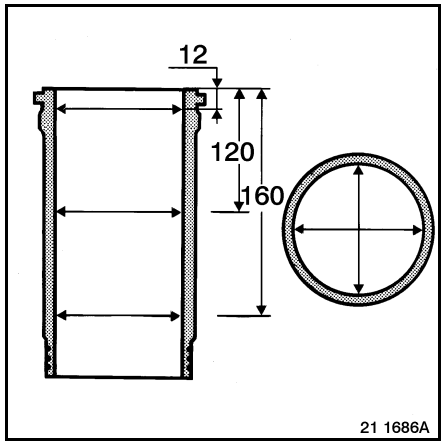


Connecting rods
If necessary
Withdraw bushes.
Use tool **1314**.

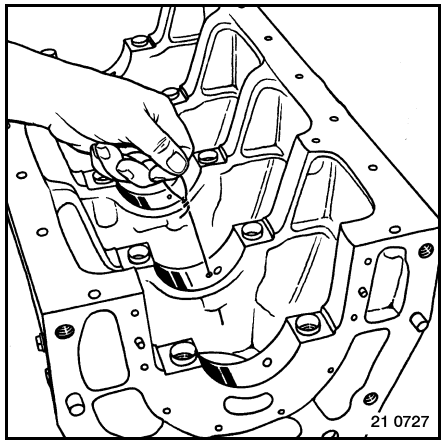


Inspection

Liners
Inspect the liners
- out-of-round,
- taper.



Cylinder block
Check the mating surface.
Thoroughly clean all conduits.



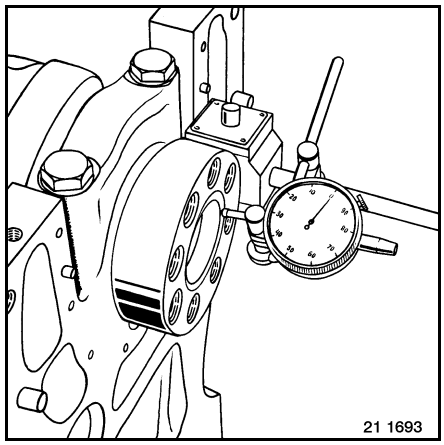
Camshaft bushes
Check bushes.

Crankshaft
Inspect the crankshaft:
- co-axiality,
- crankpin diameters,
- crank journal diameters.

Straightening of the crankshaft is forbidden.

Thoroughly clean all the crankshaft channels and passages.
Check the shell bearings **(13 - 17)**.

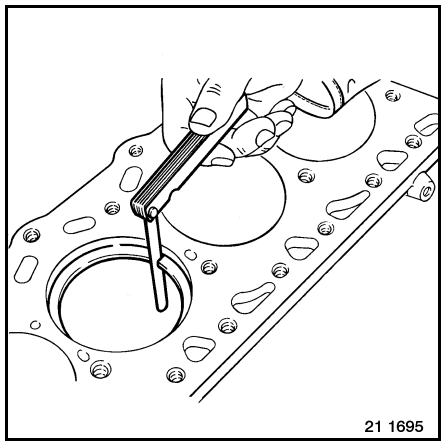
Check the clearance.
Correct, if necessary.



Connecting rods
Inspect the connecting rods::
- weight,
- squareness and truing up,
- bushes.

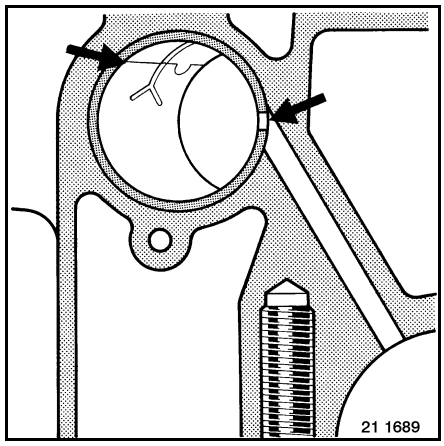
Pistons
Inspect the pistons:
- weight,
- diameter,
- gudgeon pin and its housing,
- ring grooves.

Inspect the piston rings:
- thickness,
- piston groove clearance,
- joint gap.

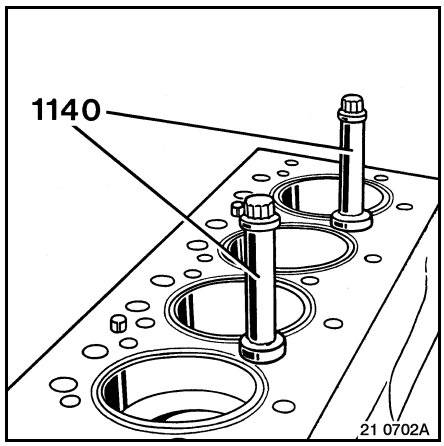


Assembly

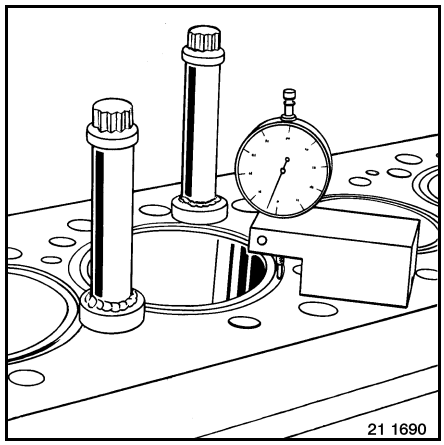
Camshaft bushes
Apply tallow.
Match the direction of orientation.
Line up the lubrication holes.
Use tool **1136**.



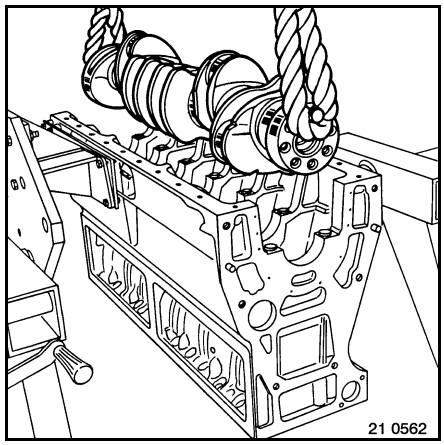
Liners
Install seals.
This operation requires special care.
Apply oil.
Use engine oil.
Fit liners **(1)**.
Immobilize the liners.
Use tool **1140**.
Check the protrusion of the liners.



Crankshaft
Fit bearing half-shells **(17)**.
Apply oil.



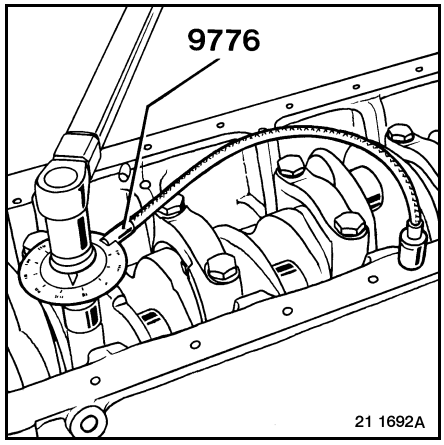
Fit crankshaft.
Install thrust half-rings **(18)**.



Apply oil.
Install thrust half-rings **(12)**.
Fit bearing caps.

The setbolts should not be oiled when refitted.

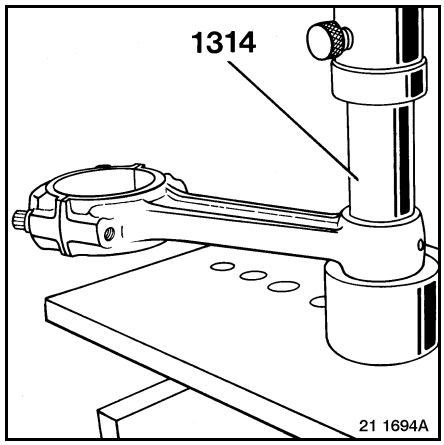
Tighten to torque.
Use tool **9776**.
Check the rotation.



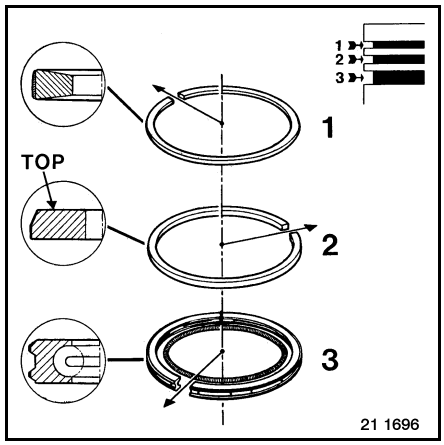
It is essential to replace crankshaft bearing setbolts whenever the crankshaft is dismantled.

Connecting rods
Apply tallow.
Line up the lubrication holes.
Fit bushes.
Use tool **1314**.
Reamer out.

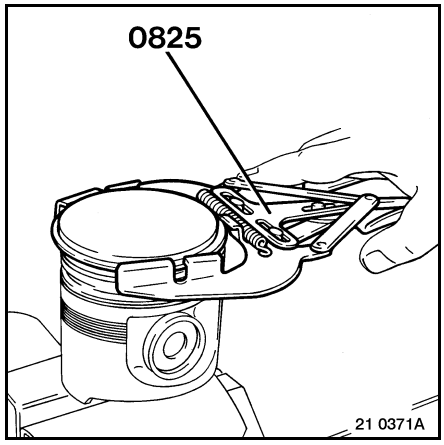
Join together connecting rods/pistons.
Match the direction of orientation.
See following page(s).



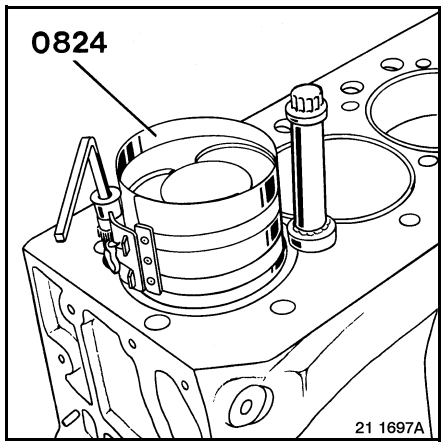
Piston rings
Install piston rings **(26)**.



Use tool **0825**.
Fit bearing half-shells **(22)**.
Apply oil.

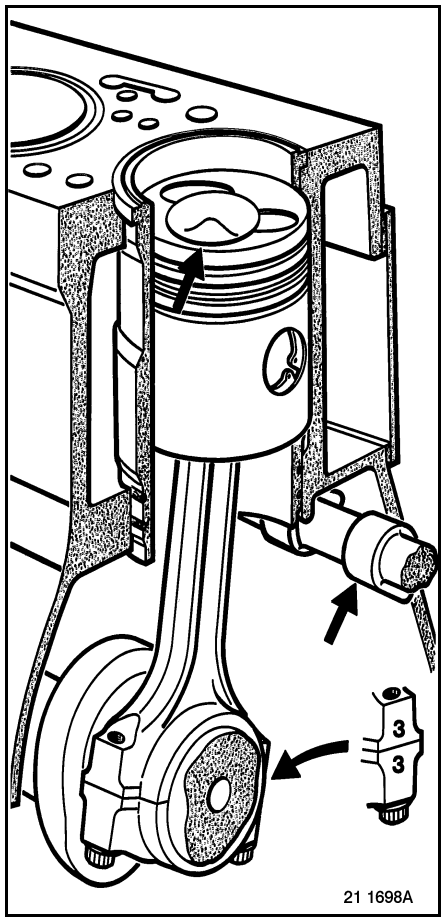


Assemble connecting rod/piston assemblies.
Use tool **0824**.



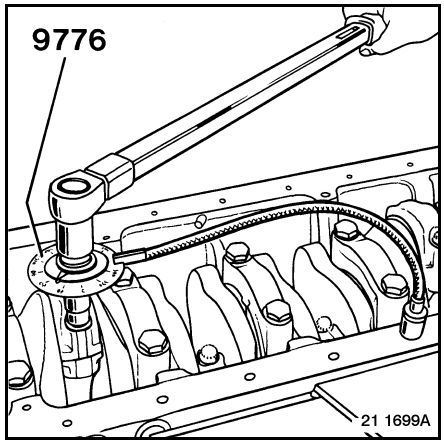
Connecting rod / piston assembly
Match the direction of orientation.
Since the connecting rods are symmetrical, there is no functional direction of assembly. For ease of assembly reasons, direct the marks towards the camshaft end.
Check the clearance between the bearing half-shells and the crankshaft (product used: "**Plastigage Perfect Circle"**)
Place a plastic strip on the crankpin or on the main journal. Assemble the corresponding bearing cap fitted with half-shell. Tighten to torque. Disassemble the bearing and measure the width of the strip.

Prior to tightening the connecting rod cap to measure play, push the connecting rod hard up against the crankshaft.

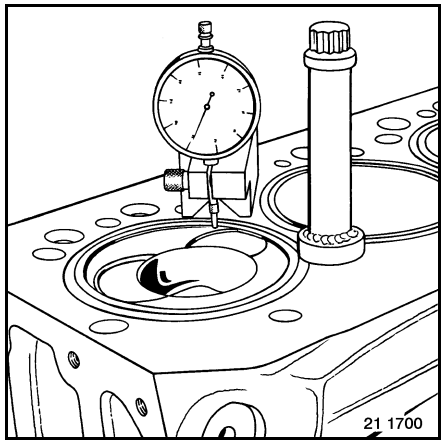


Fit the setscrews **(20)**.
Tighten to torque.
Use tool **9776**.
Check for free rotation.

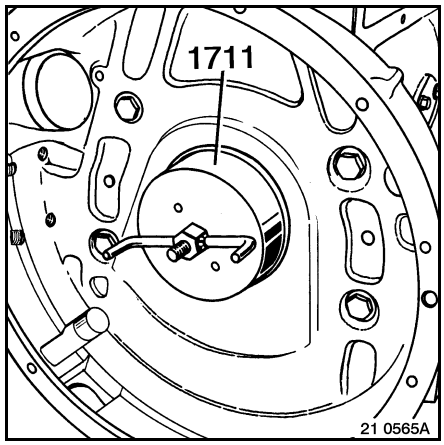
It is essential to replace crankshaft bearing setbolts whenever the crankshaft is dismantled.



Check the pistons protrusion.

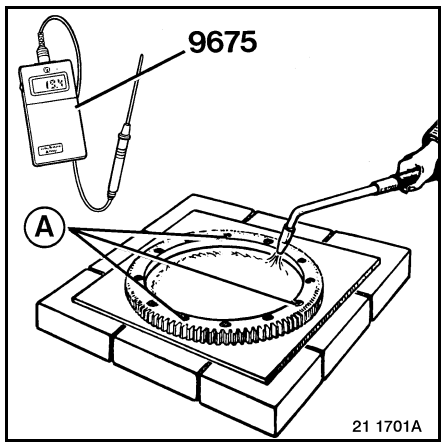


Apply oil.
Fit the relief valve **(7)**.
Flywheel housing thickness **124 mm:**
Apply "**FROMETANCH 572**" oiltight threadlocking compound to give a fluidtight seal.
Fasten casing **(4)**.
Tighten to torque.
Flywheel housing thickness **123 mm:**
Install seal.
Fasten casing **(4)**.
Tighten to torque.
Install seal **(6)**.
Use tool **1711**.
With engine rear PTO.
See workshop manual section MR **36 621**.



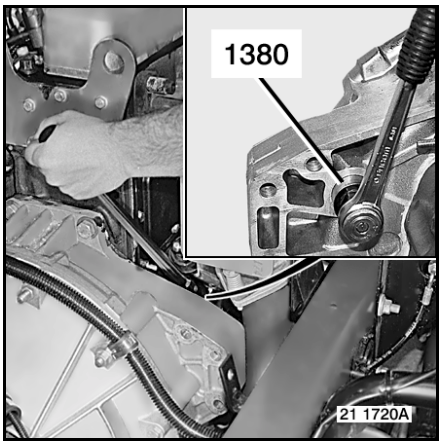
Leave the seal on its protective ring until fitting it to the tool, so as to avoid damage to the lip. Before assembly, oil the outside of the seal, and do not grease the lip.

Heat the part **(11)** to **200°C.**
Use tool **9675**.
If a welding torch is used, take a sheet metal plate and heat it to distribute the heat evenly. Check the temperature at 3 points **A**.



Fit crown wheel **(11)**.
Match the direction of orientation.
Fit the engine flywheel **(10)**.
Fit the setscrews **(8)**.
Ensure a seal with "**OLEOETANCHE 542**" oiltight compound.

Immobilize crankshaft.
Use tool **1380**.
Tighten the flywheel in diametrically opposed sequence.
Tighten to torque.

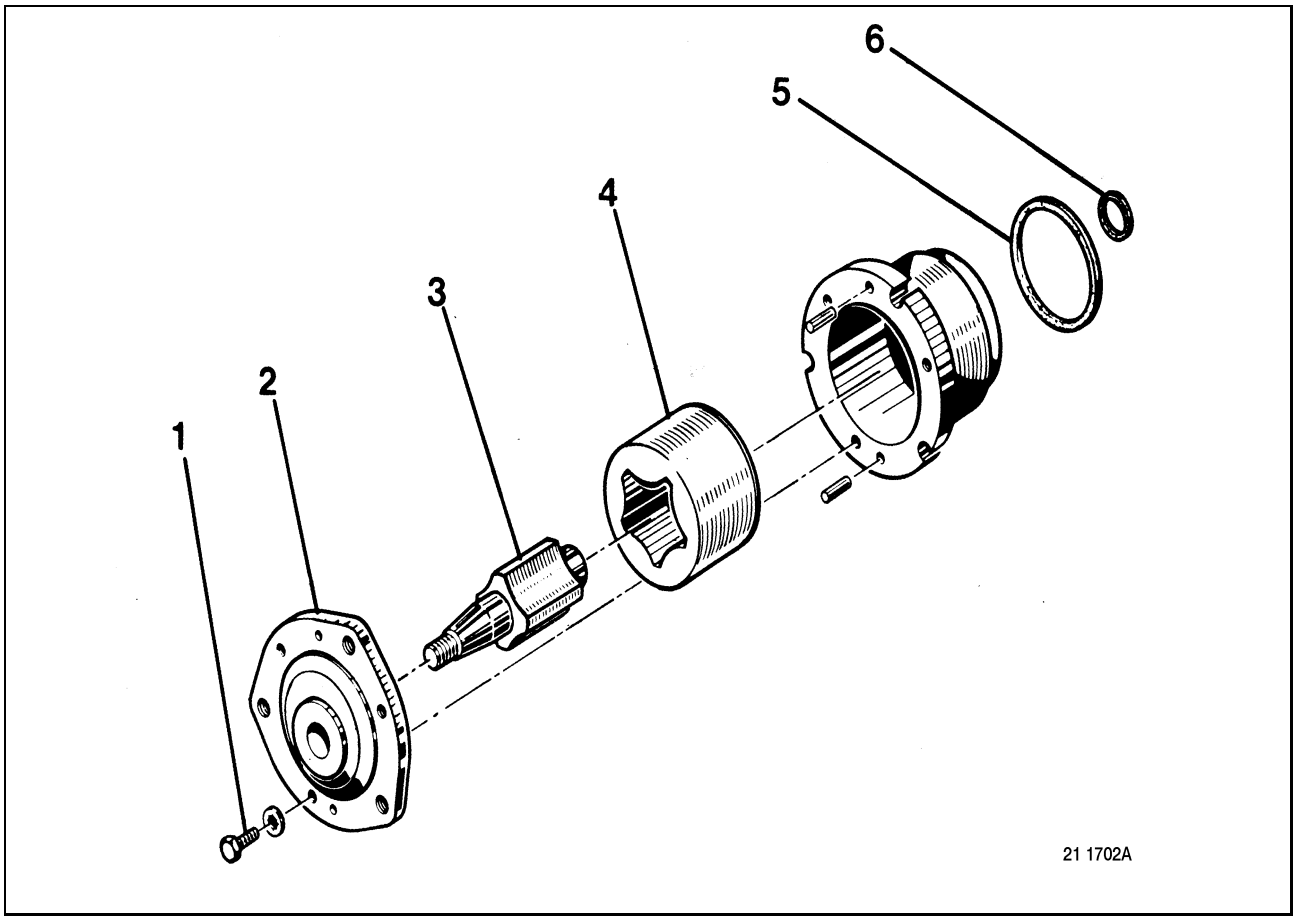


Re-use of setscrews
These setscrews can be re-used no more than once.
Whenever you re-use them, mark the screw with an indentation using a centre punch.
It is vital to replace any setscrews already bearing a centre punch mark.
Withdraw tool **1380**.
Install bearing **(9)**.
Install circlip.
Fit the starter motor.
Fit the timing gear.

LUBRICATION

Oil pump

Disassembly / assembly

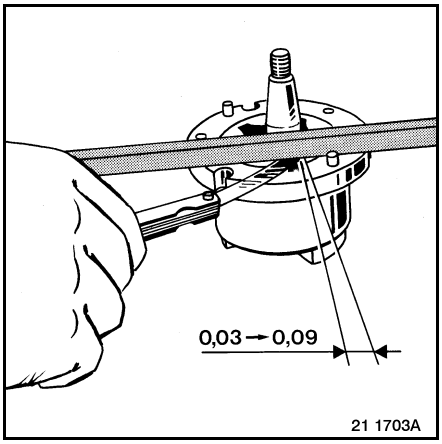


The item numbers indicated in the text refer to the drawing on page I-1-2.

Disassembly
Tighten nuts **(1)**.
Remove cover **(2)**.
Withdraw rotors **(3 - 4)**.
Take out seals **(5 - 6)**.

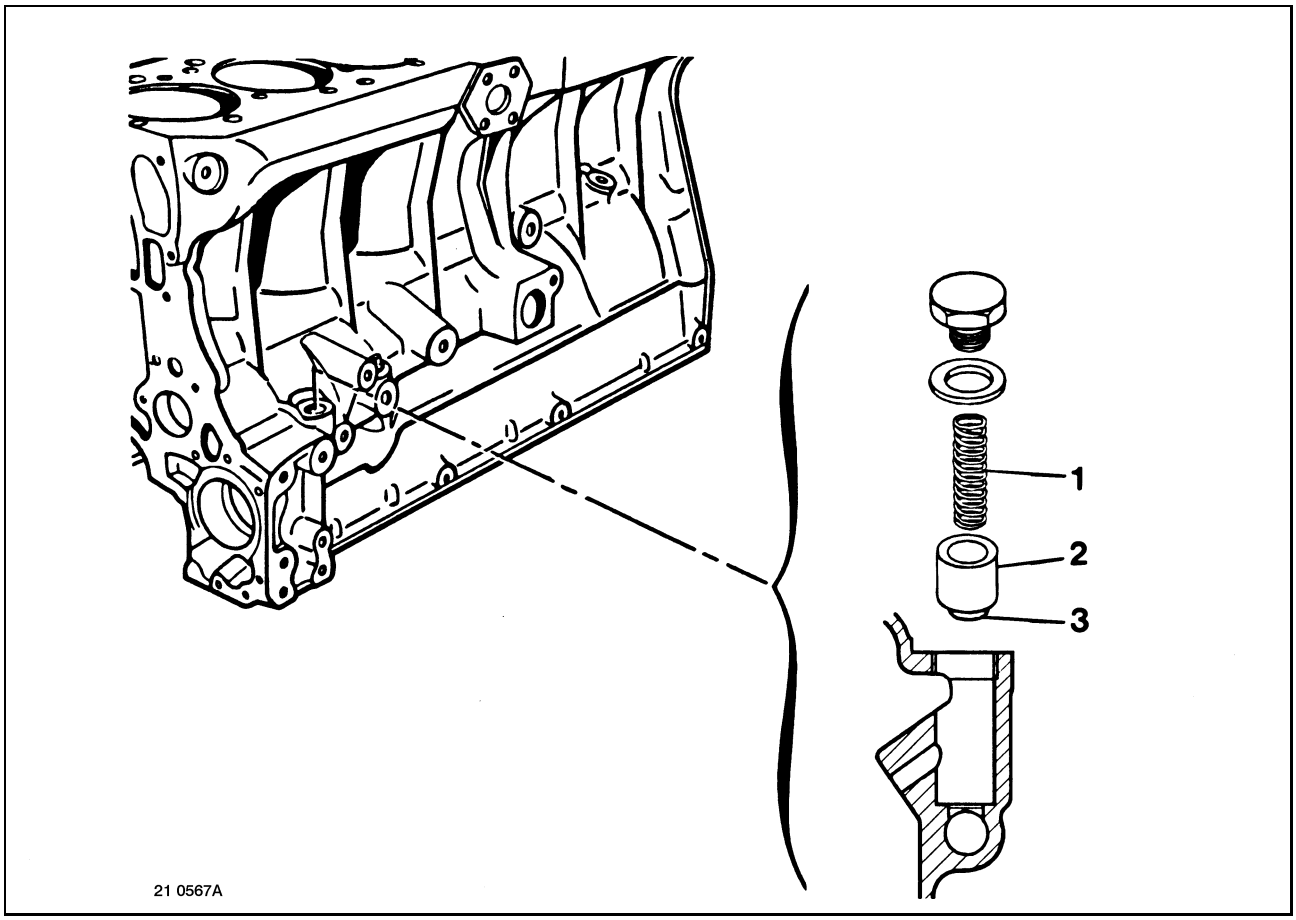
Assembly
Install seals **(5 - 6)**.
Install rotors **(3 - 4)**

Check the clearance.
Apply oil.
Position cover **(2)**.
Fit the setscrews **(1)**.
Tighten to torque.



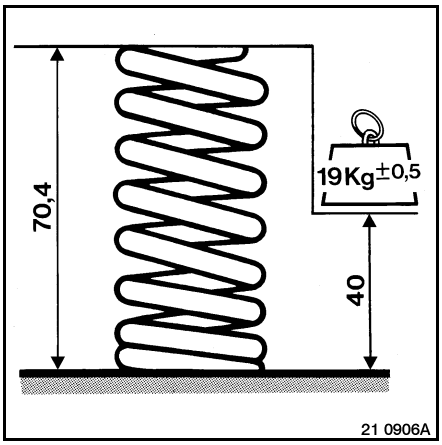
Regulating valve

Inspection

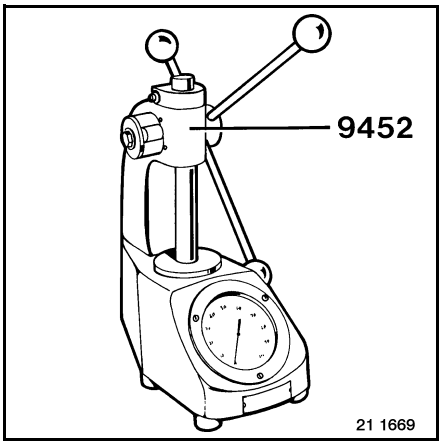


The item numbers indicated in the text refer to the drawing on page I-2-1.

Check piston **(2)**.
Clean sized hole **(3)**.
Check the setting of spring **(1)**.



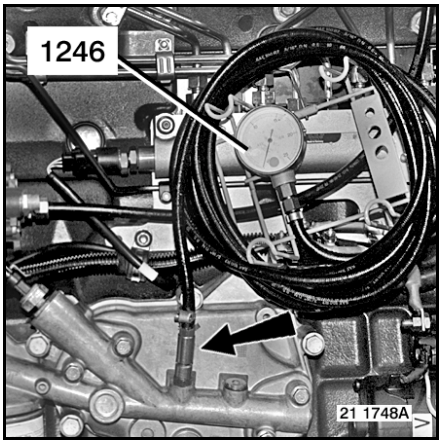
Use tool **9452**.



Checking the oil pressure

Use tool **1246**.

It is possible to compare pressures between the pressure gauge (upstream from the heat exchanger) and the Diagnostica unit (downstream from the heat exchanger) - any significant difference means that the heat exchanger is fouled.



The minimum pressure values given in the "Technical data" chapter must be measured upstream from the heat exchanger.

Throw-away oil filter cartridge
To replace, unscrew the cartridge.
Upon fitting:
Fill the cartridge with oil.
Oil the seal
Screw up the cartridge(s) until contact is made with the support bracket.

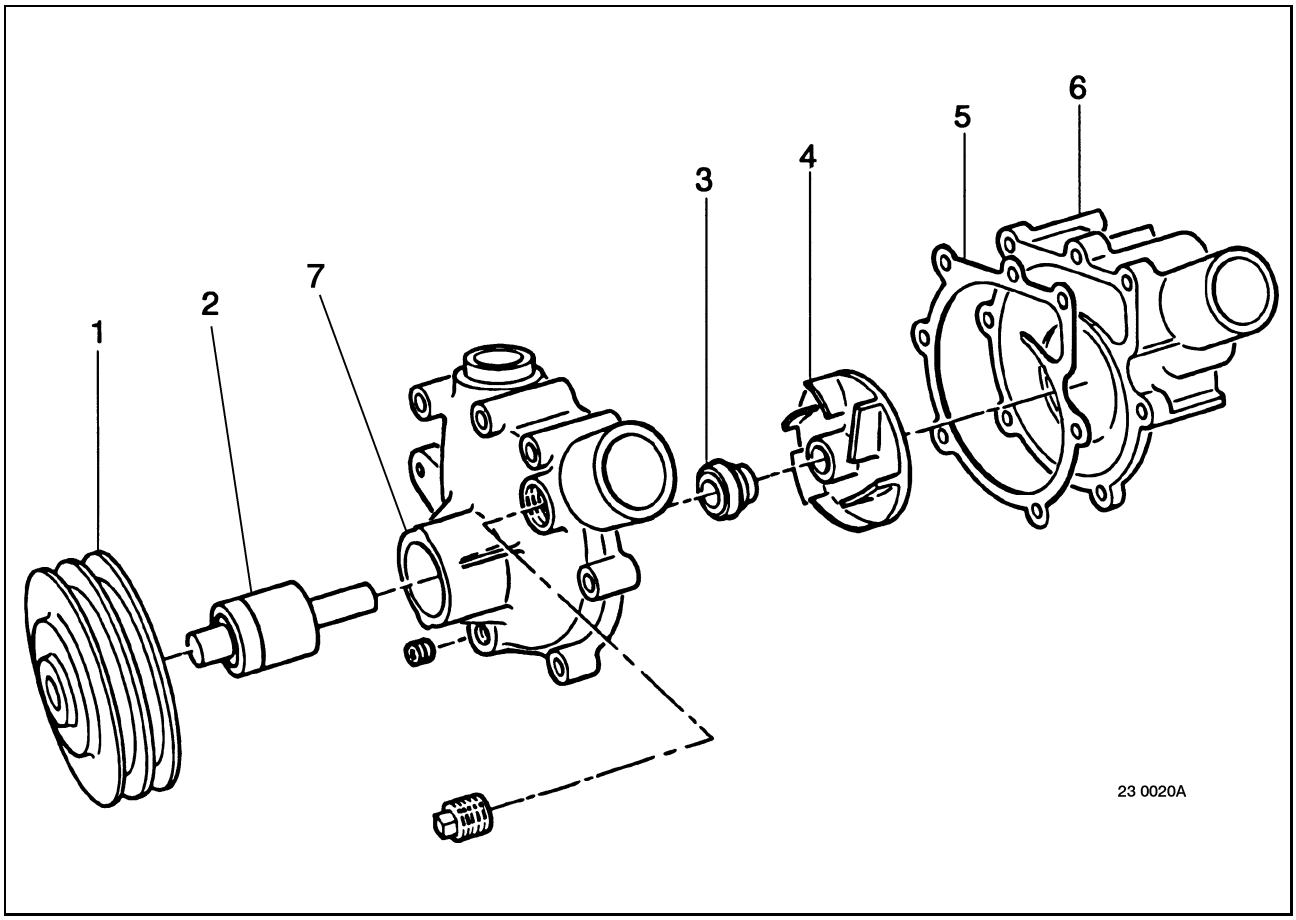
- **Tighten at a torque of 25±5 Nm**
- **Use tool 2684**
- **Use a torque wrench**

Run the engine and check for leaks.
In the event of leakage, remove the cartridge(s), inspect the joint face and repeat the fitting operations.

COOLING

Water pump

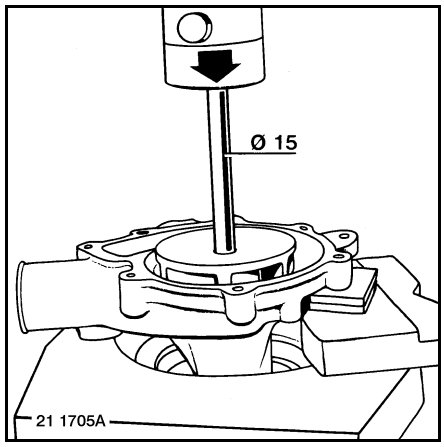
Exploded view



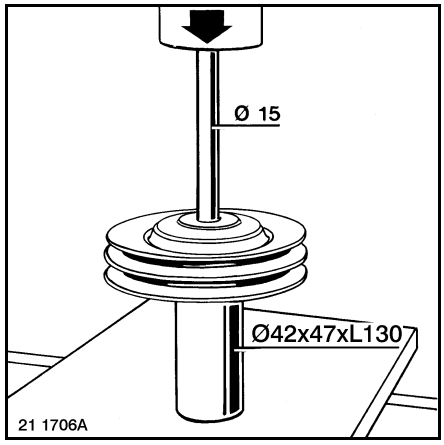
The item numbers indicated in the text refer to the drawing on page J-1-2.

Disassembly

Remove cover **(6)**.
Withdraw gasket **(5)**.
Drive out shaft **(2)**.
Use a press.

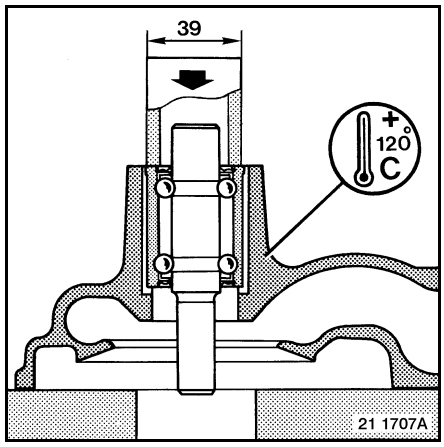


Separate pulley **(1)** from shaft **(2)**.
Use a press.
Withdraw "Cyclam" ring **(3)**.

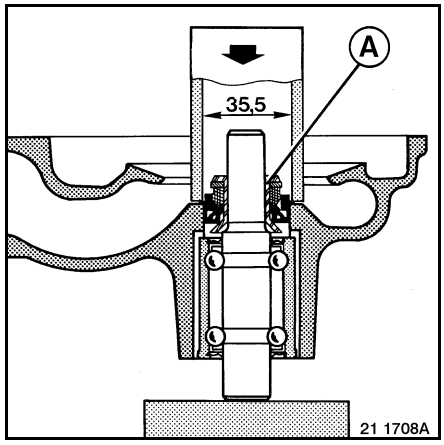


Assembly

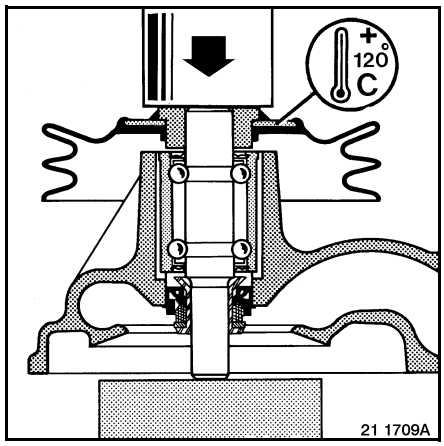
Heat the part **(7)** to **120°C.**
Fit the shaft **(2)**.
Use a press.
Let cool.



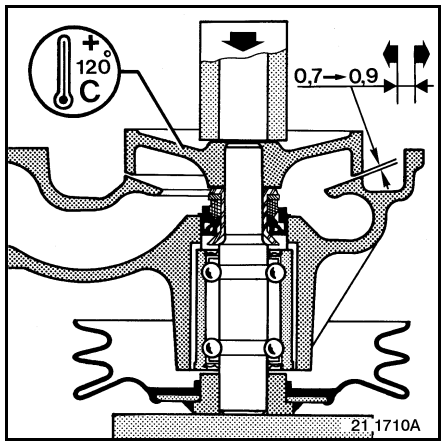
Assemble "Cyclam" ring **(3)**.
A = Water + **10**% liquid soap.



Heat the part **(1)** to **120°C.**
Assemble the pulley **(1)**.
Use a press.



Heat the part **(4)** to **120°C.**
Assemble impeller **(4)**.
Ensure correct clearance.
Use a press.
Install seal **(5)**.
Position cover **(6)**.
Fit the setscrews.
Tighten to torque.



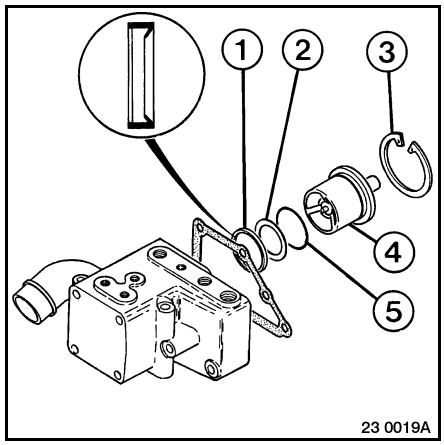
Thermostat

Disassembly / assembly

Depending on the assembly.

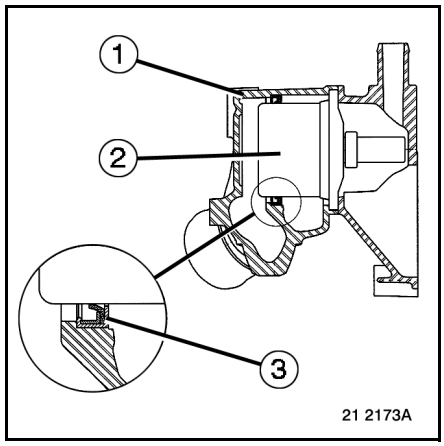
Remove thermostat housing.
Remove circlip **(3)**.
Remove thermostat **(4)**.
Take out O-ring **(5)**.
Fit nuts **(2)**.
Withdraw seal ring **(1)**.

Upon assembly
Fit seal ring **(1)**.
Match the direction of orientation.

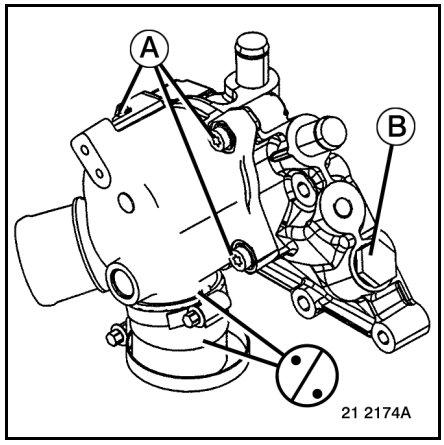


Remove thermostat housing **(1)**.
Remove thermostat **(2)**.
Withdraw seal ring **(3)**.

Upon assembly
Fit seal ring **(3)**.
Fit dry.



Match the direction of orientation.
Tighten setscrews **(A)** at a torque of **18±3.5 Nm.**
Tighten plug **(B)** at a torque of **25±5 Nm.**

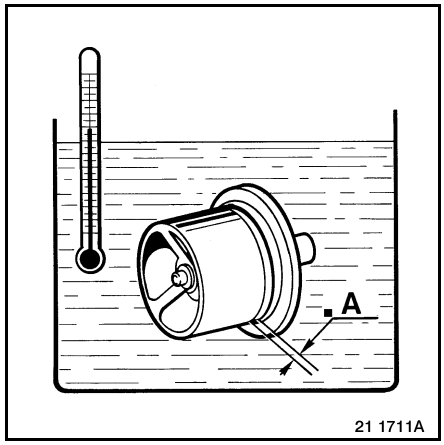


Inspection

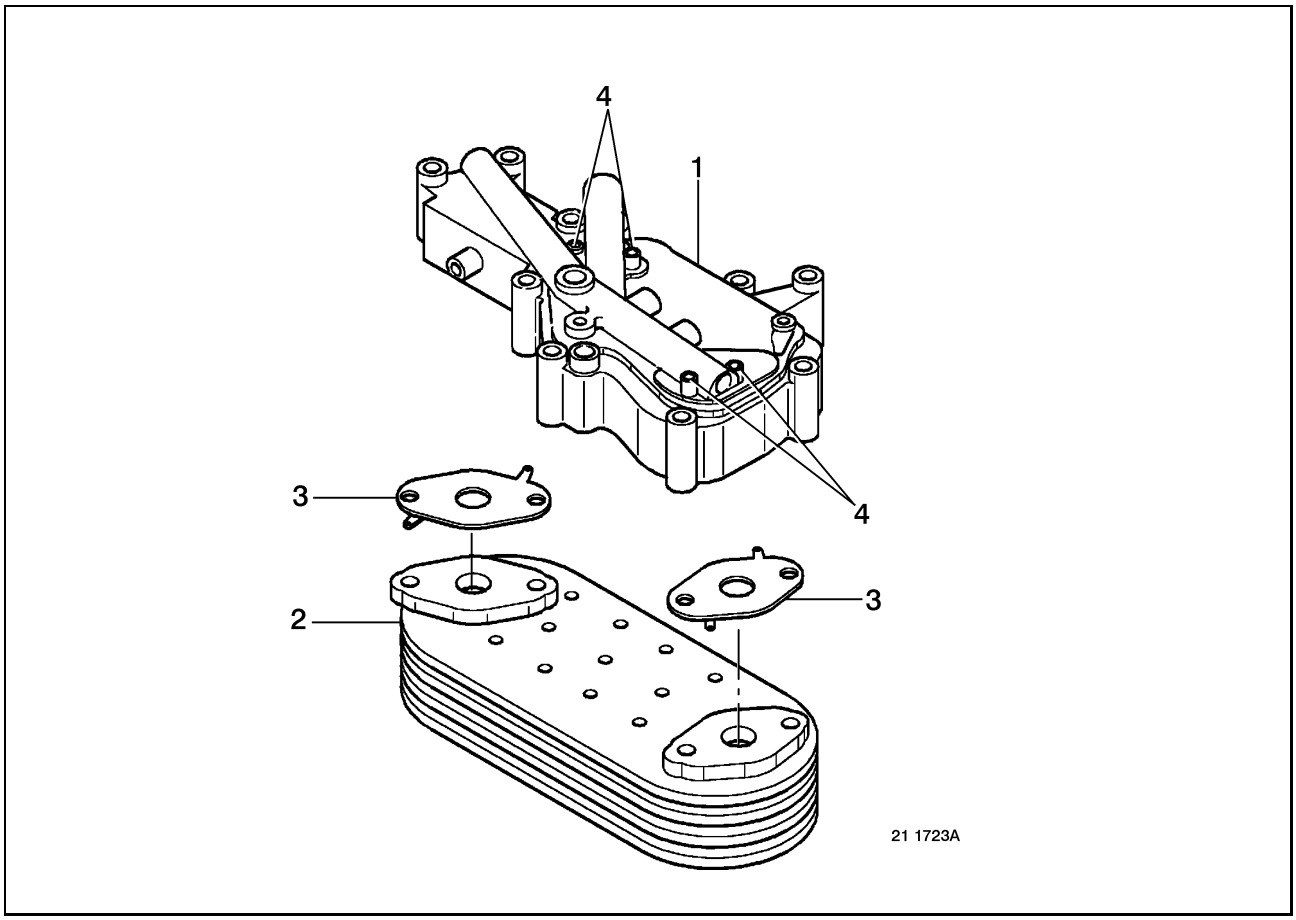
Plunge the thermostat in a water bath. Heat progressively while stirring the water. Check the temperature at the commencement of opening. Measure dimension **(A)** at a temperature of **96°C.**
Beginning of opening: **86°C ± 1.5**.

Thermostat with circlip.
A = **7.9 mm.**

Thermostat without circlip.
A = **10.2 mm.**



Exploded view

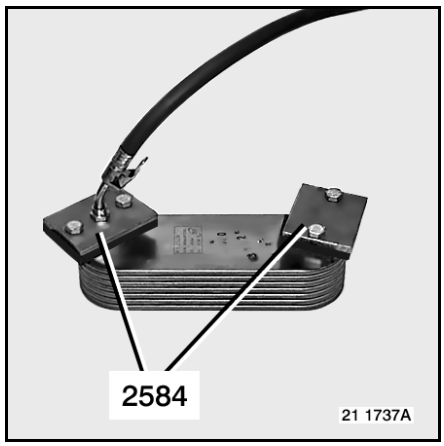


The item numbers indicated in the text refer to the drawing on page J-2-3.

Disassembly
Remove securing bolts **(4)**.
Remove heat exchanger **(2)** and gaskets **(3)**.

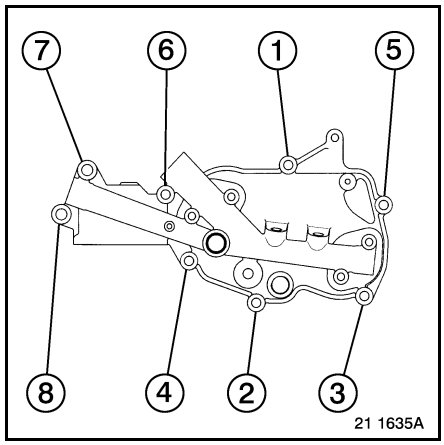
Cleaning
Oil circuit: Use trichlorethylene.
Coolant circuit: Use water mixed with a solution of 5 to 6 % hydrochloric acid. Allow to soak for about 30 minutes while stirring occasionally. Rinse with water mixed with a solution of 2 to 3 % bicarbonate of soda. Rinse with plenty of water. Dry the parts.

Inspection
Test for leaks in a hot water bath (**80°C**), air pressure: **6 bar(s)**, check for the absence of air bubbles.
Use tool **2584**.



Assembly
Proceed in the reverse sequence to dismantling.

Fitting
Follow the tightening sequence.
Tighten at the recommended torque.



INJECTION

Description of system

"COMMON RAIL" electronic fuel-injection system components:

- Electronic control unit (ECU) **(1)**
- Fuel hand priming pump and prefilter **(3)**
- Booster pump **(4)**
- Fuel filters **(5)**
- Fuel metering housing **(6)**
- Scavenge valve **(7)**
- Fuel flow regulation solenoid valves **(8)**
- High pressure pump **(9)**
- Common rail **(10)**
- Rail pressure limiter **(11)**
- Fuel injectors **(13)**
- Rail pressure sensor **(14)**
- Flywheel speed sensor **(20)**
- High pressure pump speed sensor **(21)**
- Flow limiters **(12)**
- Cooling circuit temperature sensor **(17)**
- Boost air pressure and temperature sensor **(19)**
- Engine oil level sensor **(18)**
- Engine oil pressure sensor **(15)**
- Engine stop control (cab tilted) **(23)**
- Fuel tank **(29)**
- Alert warning lamp **(25)**
- Fuel filters clogging sensor **(30)**

Information delivered by sensors common to several functions

These information items are collected by vehicle management ECU **(26)**, which sends them to the different peripheral systems ECUs and to the engine ECU in digital form via "CAN BUS" **(27)**.

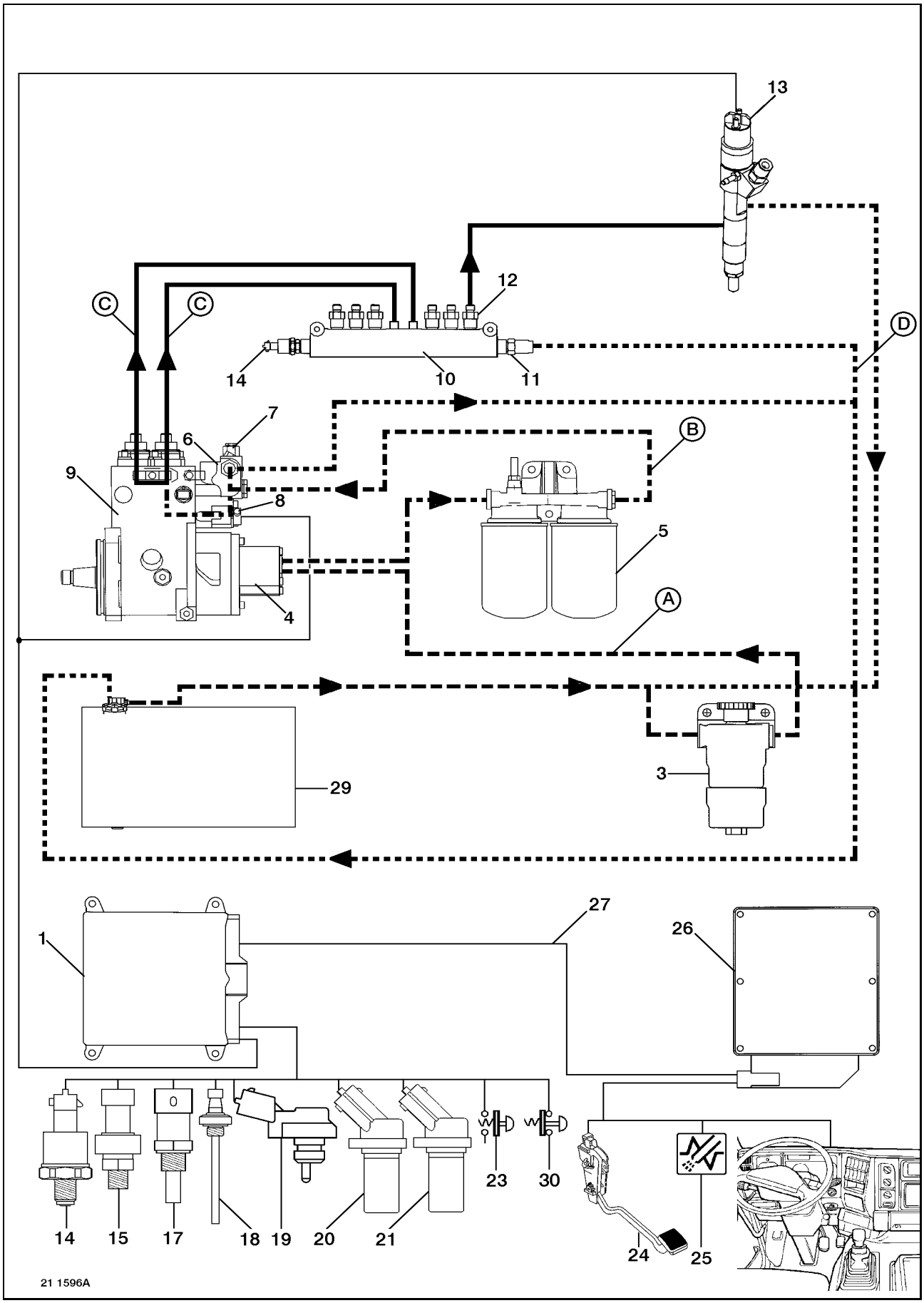
Examples:

- Engine temperature, oil pressure...
- Tachograph speed information
- Accelerator pedal position sensor **(24)** information
- PTO information
- Braking information
- Engine immobilizer information

Hydraulic circuits:

- **(A)**: Aspiration
- **(B)**: Low pressure
- **(C)**: High pressure
- **(D)**: Leak-off return to fuel tank

*For work on the engine wiring harness, use tool **2589***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Operation of the system

The new pollutant emissions and harmful noise standards and the research into controlling vehicle operating costs have led to the advent of more precise and more sophisticated fuel-injection systems in the matter of environmental protection and specific fuel consumption.
To meet these requirements, the "COMMON RAIL" fuel-injection system operates according to the following principles:

- High pressure variable according to engine needs independent of load and rotating speed,
- Timing variable according to engine needs independent of load and rotating speed,
- Pressure-time type fuel metering,
- Pre-injection if required (to reduce engine knock),
- Multi-point injection managed integrally by onboard electronics.

Fuel metering and injection:
The fuel stored in the fuel tank is aspirated by the booster pump and sent at low pressure to the high pressure pump inlet. The high pressure value (200 to 1400 bars) is determined by the amount of fuel taken in by the high pressure pump. This quantity is piloted by flow regulation solenoid valves located in the metering housing. The fuel is directed to the common rail, then distributed to the injectors whose opening is controlled electrically by the ECU. The flow limiters forbid leaks in the high pressure circuit downstream from the rail in the event of component fracture (pipe...) and protect the engine in the event of injector malfunction.
To manage the system, the ECU receives information from:

- Vehicle electronic control unit "VECU",
- Common rail pressure sensor,
- Flywheel and high pressure pump speed sensors,
- Cooling circuit temperature sensor,
- Accelerator pedal position sensor,
- Boost air pressure and temperature sensor,
- Cruise control and idling adjustment control.

Functions ancillary to the "COMMON RAIL" system:

- Engine cooling management,
- Cruise control,
- Engine immobilizer,
- Engine protection (overheating, torque limitation),
- Exhaust brake management,
- Adjustable idling variable according to conditions (air conditioning, engine temperature),
- Fast idling adjustable from the driving position.

Operation in fall-back mode
Detected faults change the features provided by the system to fall-back mode, the effects of which are felt more or less while driving:

- Reduction of maximum rail pressure (several levels),
- Longer starting time,
- Stopping of operation of retarder,
- Stopping of operation of one or several injectors,
- Etc.

Depending on the gravity of the fault, the consequences might be negligible (e.g. an engine speed sensor) or seriously affect the features provided by the system, which may go as far as forbidding starting. With the aim of minimum vehicle lay-up, in the event of not too serious a fault, the ECU functions by approximate calculation on the basis of values that are still available or by means of values contained in the mapping.

Whatever the fault, it is absolutely essential to get the system overhauled as soon as possible.

Layout of components on-vehicle

Fuel aspiration circuit
- Injectors aspiration and leak-off return pipe **(1)**
- Fuel hand priming pump and prefilter **(2)**
- Rail leak-off return pipe **(3)**

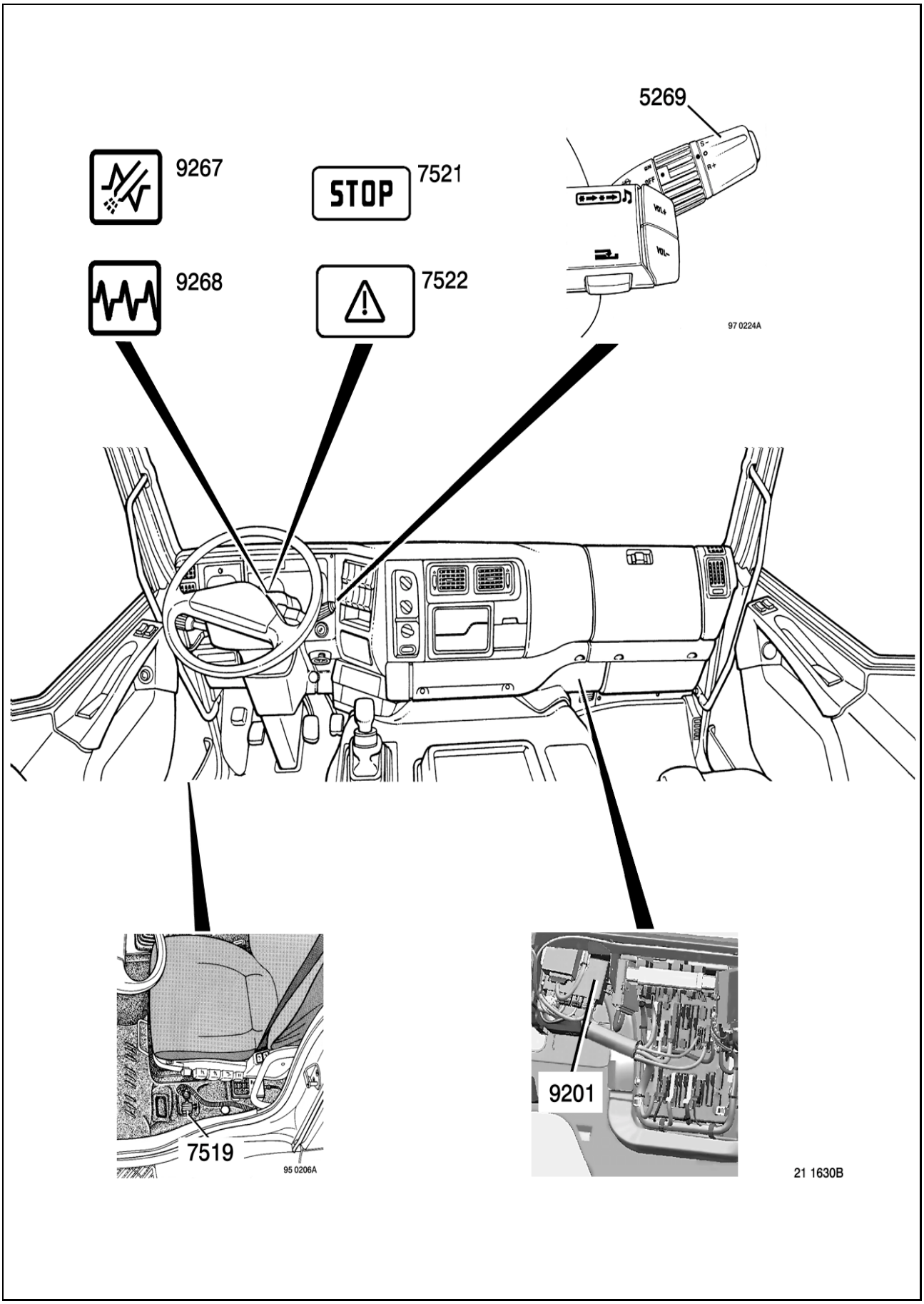
Low pressure (boosting) circuit
- Booster pump **(4)**
- Low pressure pipes **(5)**
- Fuel filter
- Scavenge valve **(6)**
- Fuel metering housing **(7)**

High pressure circuit
- High pressure pump **(8)**
- Rail delivery pipe gallery **(9)**
- Common rail **(10)**
- Rail pressure limiter **(11)**
- Flow limiters **(12)**
- Injector pipe gallery **(13)**
- Injection control solenoid valve **(9220/9221/9222/9223/9224/9225)**

Electrical components
- Engine electronic control unit (EECU) **(9202)**
- High pressure fuel sensor **(9208)**
- N° 1 cylinder high pressure pump solenoid valve **(9213)**
- N° 2 cylinder high pressure pump solenoid valve **(9212)**
- Flywheel speed sensor **(9228)**
- Pump (injection or high pressure) speed sensor **(9262)**
- Engine coolant circuit temperature transmitter **(7362)**
- Boost air pressure and temperature sensor **(9200)**
- Engine oil level sensor **(8275)**
- Engine stop control (cab tilted) **(2267)**
- Engine oil pressure sensor **(7368)**
- Fuel filters clogging sensor (on filter head) **(2400)**

Ancillary functions components
- Exhaust brake electrovalve **(8150)**
- Vehicle electronic control unit **(9201)**
- Diagnostics socket **(7519)**
- EGR electrovalve **(9204)**

Driver interface
- Accelerator pedal position sensor **(5266)**
- Steering wheel fingertip controls (cruise control) **(5269)**
- "DANGER" immediate stop warning lamp **(7521)**
- "SERVICE" warning lamp **(7522)**
- Engine electronic fault warning lamp **(9267)**
- Vehicle electronic fault warning lamp **(9268)**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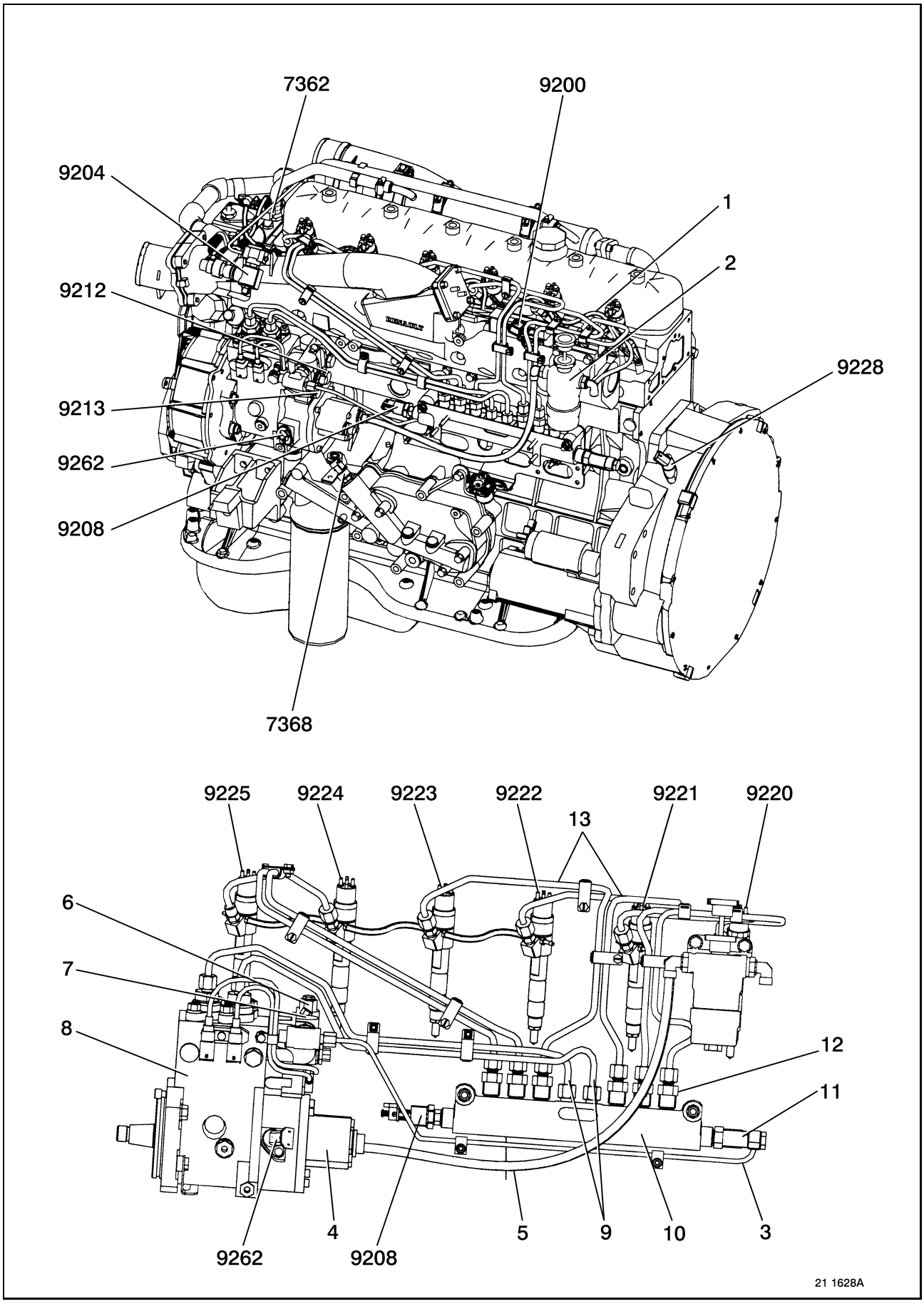
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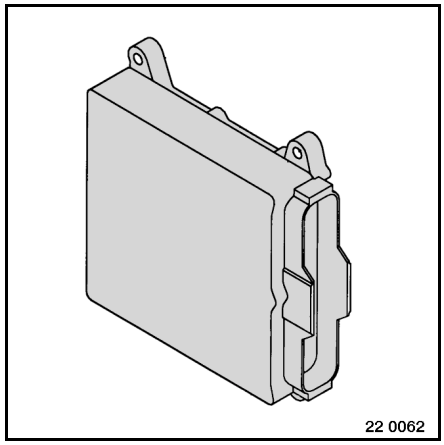
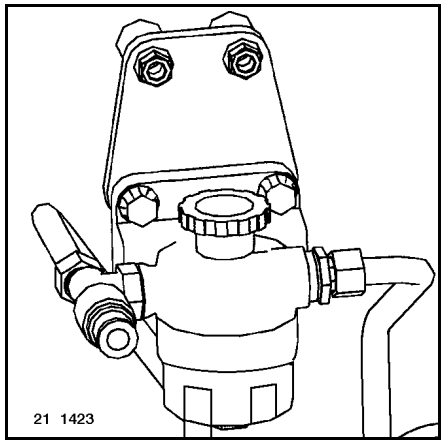
Technical data

Engine master electronic control unit (EECU)
The EECU receives information from the sensors and the vehicle electronic control unit (VECU). Depending on the input data, it pilot-controls fuel-injection and certain ancillary functions (engine cooling fan, retarder, fast idling).
It informs the driver of the status of the system by means of instrument panel tell-tale lights and, in the event of fault, operates in fall-back mode or emergency mode (refer to the "Diagnostics" chapter).

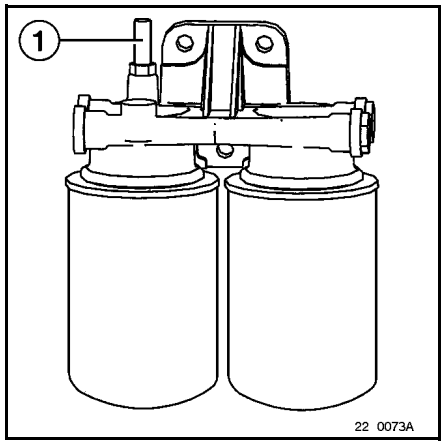


Fuel hand priming pump and prefilter
The fuel priming pump incorporates a gauze prefilter that can be washed in diesel fuel.

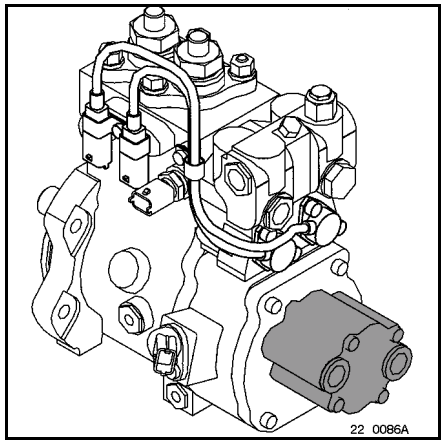


Fuel filters
(1): bleed screw and low pressure take-off.

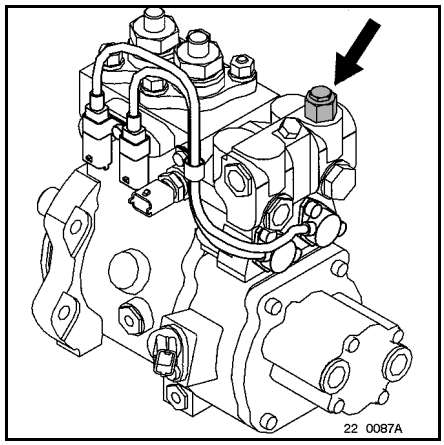
The oil filters, owing to their capacity and their specific filtration level, must be replaced only by filters approved by RENAULT TRUCKS. Upon fitting, do not full the filter cartridges with fuel.



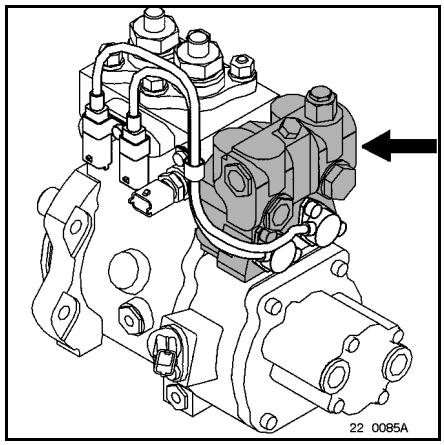
Booster pump
The booster pump is of the gear type. It is fastened to the high pressure pump casing.
The booster pump cannot be repaired.
Output: up to **500 litres/hour.**



Scavenge valve
The scavenge valve keeps the low pressure circuit pressure to values between **4** and **5 bars** at idling and between **6** and **7 bars** at an engine speed of **2000 rpm.**
The valve calibration value should be between **1.8 bars** and **2.2 bars**.

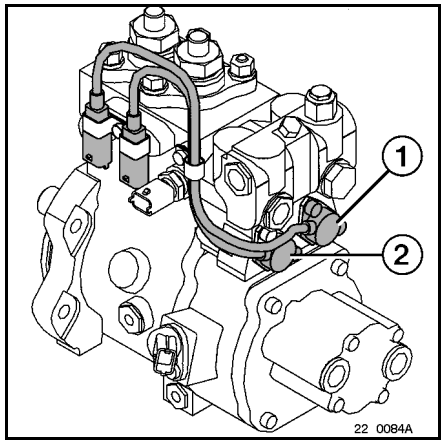


Fuel metering housing
The fuel metering housing integrates the two fuel flow regulation solenoid valves. These valves each pilot-control a shuttle valve that manages the fuel flowrate to the high pressure pump inlet.
The metering housing cannot be repaired.

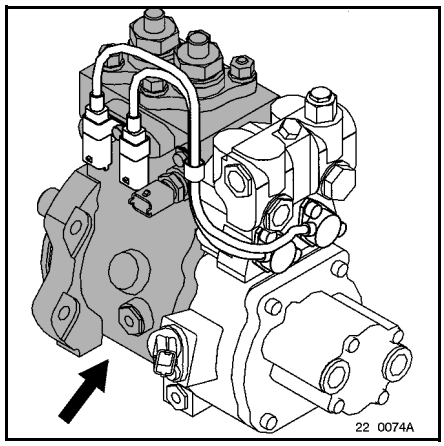


Fuel flow regulation solenoid valves
The two fuel flow regulation solenoid valves are mounted on the fuel metering housing. Their job is to adjust the fuel flow so as to maintain the pressure in the rail at the required value.
Without electrical supply, the solenoid valves are in the "normally-closed" position (maximum rail pressure).
- **1**: solenoid valve N°1
- **2**: solenoid valve N°2

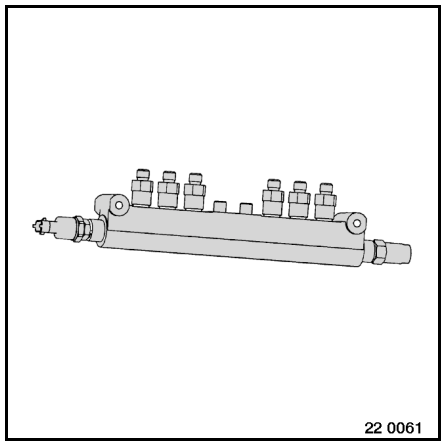
Resistance: **15 Ω**
In the event of solenoid valve failure, replace the high pressure pump.



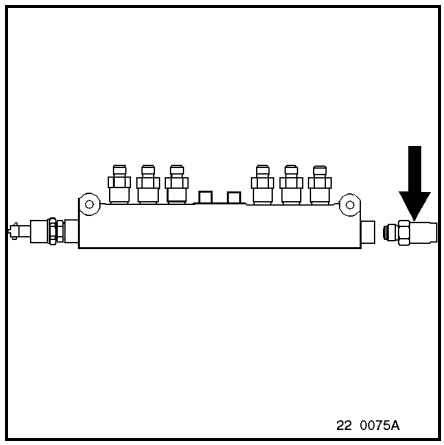
High pressure pump
The high pressure pump consists of two pumping elements. The pistons are controlled by a camshaft. The high pressure pump cannot be repaired.



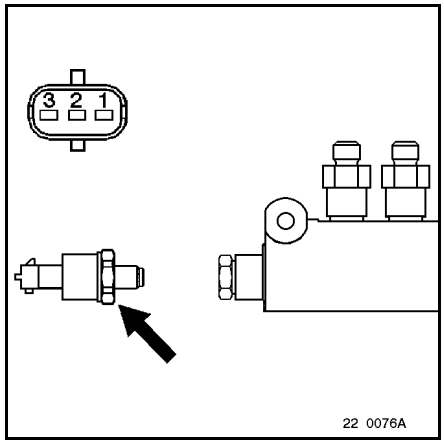
Common rail
The common rail provides the link between the high pressure pump and the fuel injectors.
The rail is equipped with:
- a pressure sensor,
- flow limiters,
- a pressure limiter.



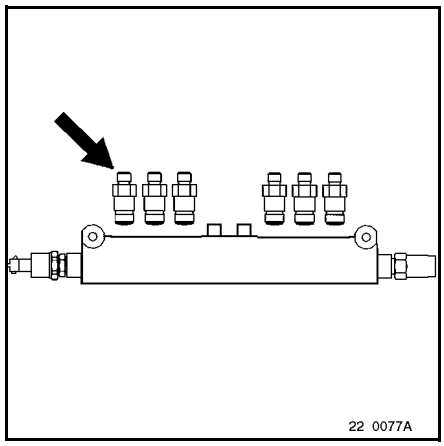
Rail pressure limiter
The pressure limiter protects the high pressure circuit against any excessively high pressure due to by-pass of fuel to the leak-off return circuit (e.g.: failure of a fuel flow regulation solenoid valve).
If such occurs, it is essential to replace the rail pressure limiter.
Limiter calibration: **1650 ± 50 bars.**



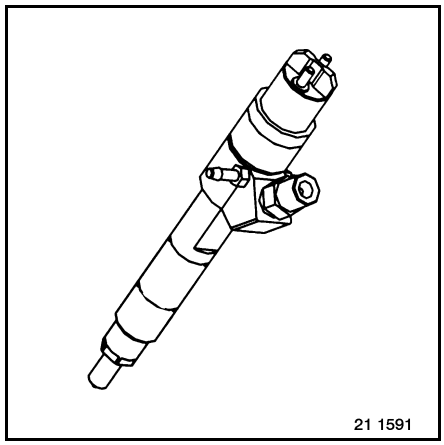
High pressure fuel sensor
The rail pressure sensor is of the piezo-resistive type. Supplied with 5 Volts current, it delivers an output current (0.5 to 4.5 V) as a function of the measured pressure value. This value is sent to the ECU.
The sensor can only be fully tested using the RENAULT TRUCKS DIAGNOSTICA test tool.



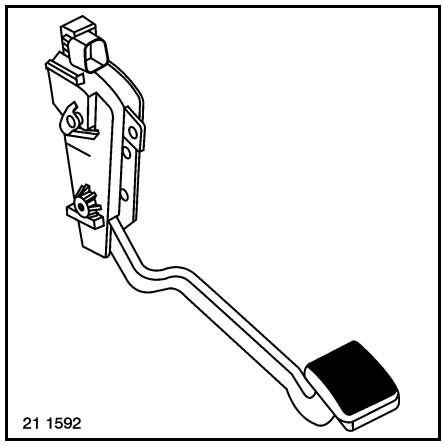
Flow limiter
Flow limiters are fitted to each rail outlet. They isolate a section of the high pressure circuit in the event of too high a flowrate or in case of continuous leak-off (fracture of injector pipe, injector malfunction, etc.).
Maximum flow without jamming the limiter: **450 mm3/shot.**



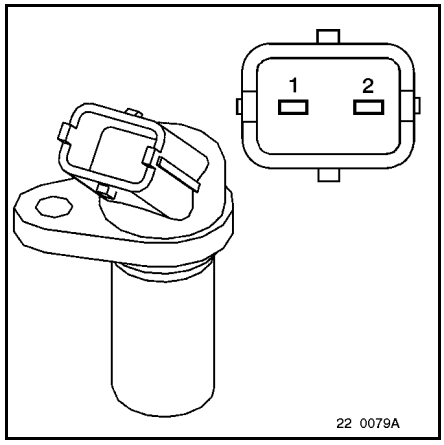
Fuel injector / nozzle-holder
Each unit consists of a solenoid valve fitted to the nozzle-holder that controls opening and closing of the injector. Fuel injector / nozzle-holder units cannot be repaired. All seals must be replaced without fail each time the unit is removed.
Solenoid valve resistance: **0.33 Ω** at **20°C.**
Non-polarized terminals.



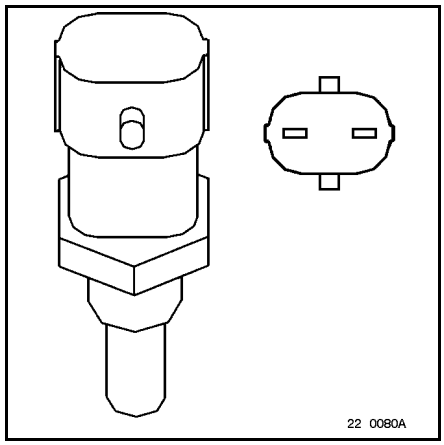
Accelerator pedal
The accelerator pedal position sensor consists of a rheostat bridge and a "foot raised" position switch.
The sensor can only be fully tested using the RENAULT TRUCKS DIAGNOSTICA test tool.



Speed sensors
The speed sensors are of the inductive type and deliver a sinusoidal voltage generated by passage of the flywheel notches and the pump toothed wheel. The frequency of this signal is proportional to the engine rotating speed.
The flywheel is provided with **58** notches **(60 - 2)**. The two missing notches indicate the top dead centre position of N 1 cylinder.
The pump toothed wheel is provided with **7** teeth (one tooth per top dead centre of each cylinder and two side-by-side teeth for the top dead centre of N 1 cylinder).
Sensor resistance: **770 → 950 Ω** at **20°C**.

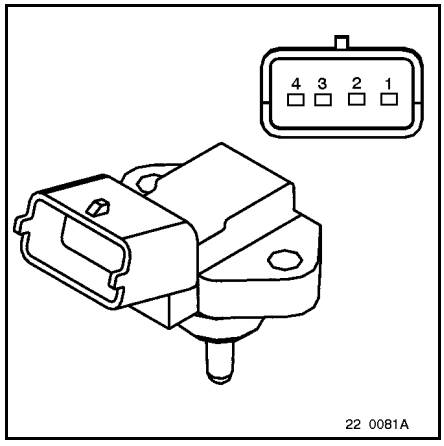


Engine cooling circuit temperature sensor
The sensors are of the CTN thermistance type
Characteristics:

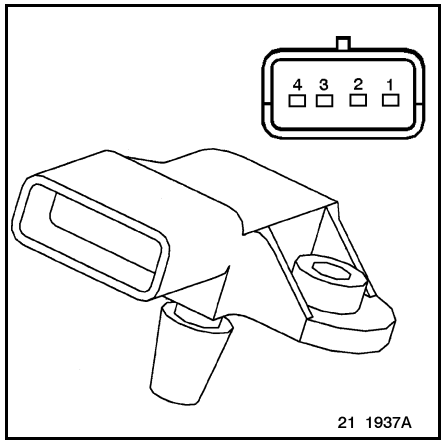


Temperature (°C)	Resistance (Ω)
-20	13 500 → 17 700
-10	8 250 → 10 650
0	5 200 → 6 650
20	2 200 → 2 800
30	1 550 → 1 860
40	1 000 → 1 300
60	550 → 640
80	200 → 300
100	170 → 200

Boost air pressure and temperature sensor
The single boost air pressure and temperature sensor incorporates two measuring elements and is mounted on the intake manifold:
A pressure sensor of the piezo-resistive type:
Supplied with 5 Volts current, it delivers an output current of between 0.5 to 4.5 Volts.
A temperature sensor of the CTN thermistance type:
Characteristics (between terminals N° **1** and N ° **2**)

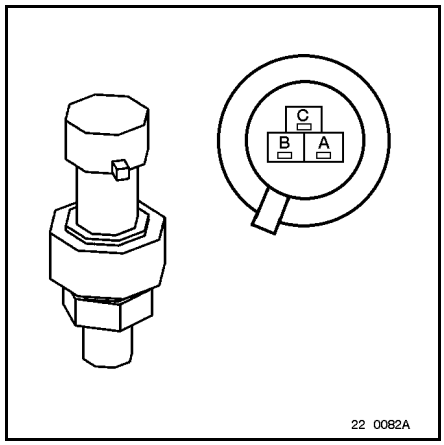


Temperature (°C)	Resistance (Ω)
0	5 900 → 6 600
10	3 800 → 4 200
20	2 500 → 2 760
30	1 700 → 1 870
40	1 180 → 1 280
50	830 → 900



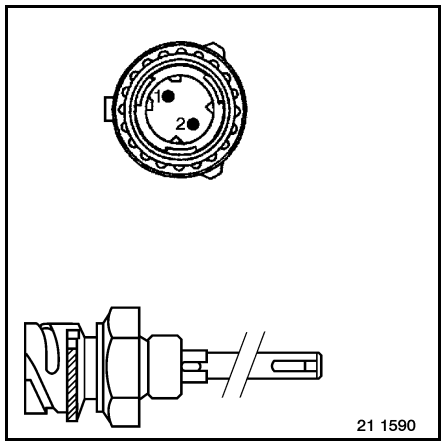
Temperature (°C)	Resistance (Ω)
0	5 600 → 6 150
10	3 600 → 3 950
20	2 400 → 2 600
30	1 650 → 1 800
40	1 150 → 1 250
50	820 → 900

Engine oil pressure sensor
The engine oil pressure sensor is of the piezo-resistive type: supplied with 5 Volts current, it delivers an output current of 5 Volts as a function of the engine oil circuit pressure (0 to 7 bars).
The sensor can only be fully tested using the RENAULT TRUCKS DIAGNOSTICA test tool.

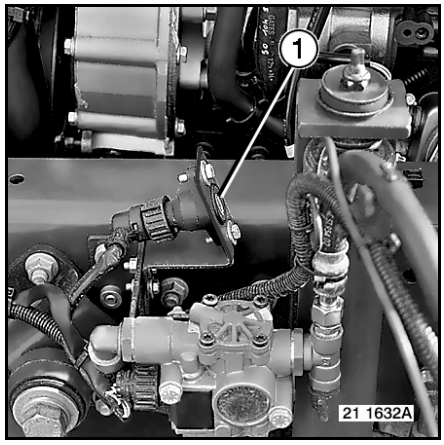


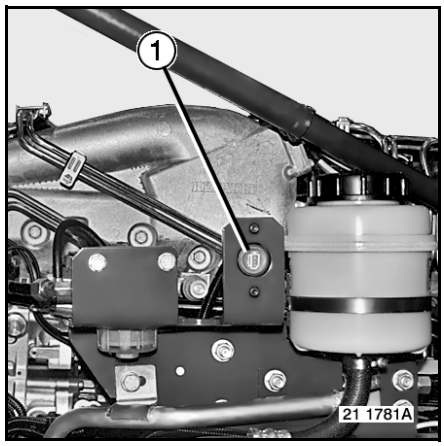
Engine oil level sensor
The engine oil level sensor features a thermo-resistive heating wire. It is supplied by the ECU. The rise in temperature of the wire and therefore the change in its resistance allows the ECU to define the engine oil level.
Characteristics:

Temperature (°C)	Resistance (Ω)
-30	10
20	12.35
150	18.1



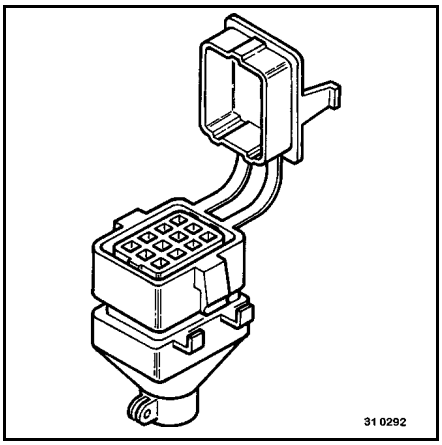
MIDLUM engine stop control (cab tilted)
The engine stop control is a switch **(1)** with normally-open contacts that serves to shut down the engine when the cab is tilted.



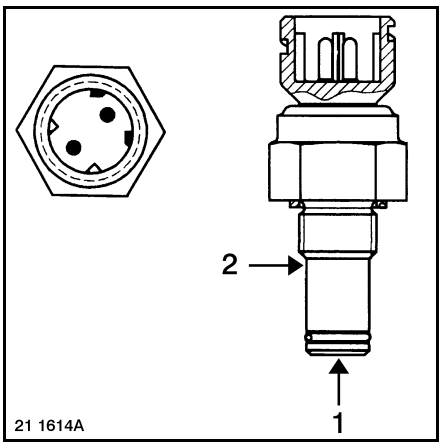


PREMIUM engine stop control (cab tilted)

Diagnostics socket
The diagnostics socket allows the "COMMON RAIL" system to communicate with the RENAULT TRUCKS diagnostics tool for the purpose of full diagnostics and parameter definition.



Fuel filters clogging sensor
This sensor is a switch with normally-closed contacts. It changes state when the pressure difference between P1 **(1)** and P2 **(2)** is around **3 bars.**
The clogged filters information is time-delayed and is sent to the display only when the engine is at its operating temperature. This is to avoid the appearance of faults due to pressure peaks or to diesel fuel that is frozen in very cold weather.



Precautions

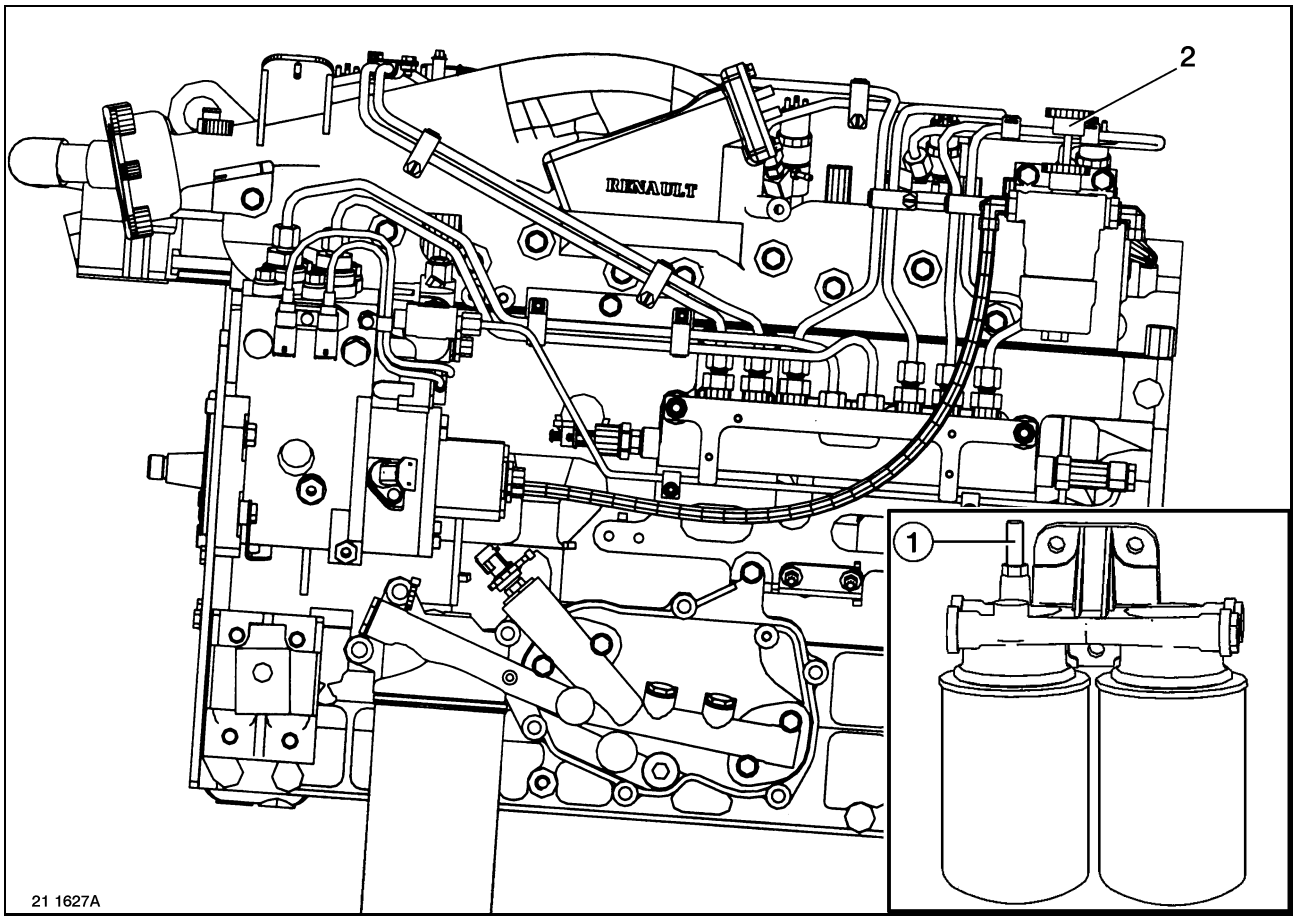
The "COMMON RAIL" system is a high-performance fuel-injection system
Since this system is more sensitive to cleanliness than in-line injection pump systems, risks of damage are all the more important. Hence, it is essential to comply with the fitting of genuine spare parts guaranteed by the manufacturer and observe operating, maintenance and repair instructions for the system.

Work on the "COMMON RAIL" system
The system works with very high injection pressures (up to **1400 bars**) and with medium voltage current (control of injectors by discharge of capacitors).
Prior to dismantling, carefully clean the surrounds then take all necessary precautions to prevent the ingress of foreign matter. Use a clean thinner then blow through with compressed air.
Using the RENAULT TRUCKS DIAGNOSTICA test tool, ensure that the circuit pressure has dropped completely.
In fact, under normal operating condition, the pressure drops rapidly in the high pressure circuit after the vehicle has stopped (between 1 and 3 minutes). In extreme cases of malfunction (several or all the flow limiters jammed) high pressure may prevail for a long time, even not drop. In such case, create a fuel leak by loosening an injector pipe union while protecting your hand and keeping it as far away as possible from the point of leak.
Any work on the fuel-injection system must be carried out with the engine shut-down (check: injectors, voltage, resistance, tightening, etc.).

Upon dismantling
Repairs must be carried out in a clean room, free from dust and using suitable tools.
The wearing of gloves made from fibrous material is to be banned.
Carefully clean the parts with a clean solvent, then inspect. Use top quality small brushes that are perfectly clean and in very good condition. Use unsoiled lint-free cloths.
The spare parts department supplies cleaning cloths, blanking plugs and storage bags suitable for one-way use.
Blank off the ports with plugs as soon as the pipes are dismantled.
Avoid using compressed air.
Cleaned components must be protected to avoid any trace of corrosion in the circuit.
The injector nozzle-holder cannot be repaired. Systematically replace the unit in the event of malfunction.
Do not expose yourself to sprayed fuel when testing injector sprays or high pressure circuit dribble.
Follow the chronological disassembly / assembly sequence outlined in the workshop manual.
Reassembly must be carried out without any modification or stress (torsion, welding, distortion, connecting arrangement, fastening, routing, etc...). Replace the part, if necessary. Tighten to the recommended torque.
Circuits are to bled without using the starter.
All these recommendations guarantee you "COMMON RAIL" system quality and reliability.

New pipes
The inside of the gallery pipes is protected by a rust-inhibitive product.
The walls are greasy and easily retain dust.
The pipes must be rinsed with solvent or industrial alcohol then fitted immediately (risk of oxidation).

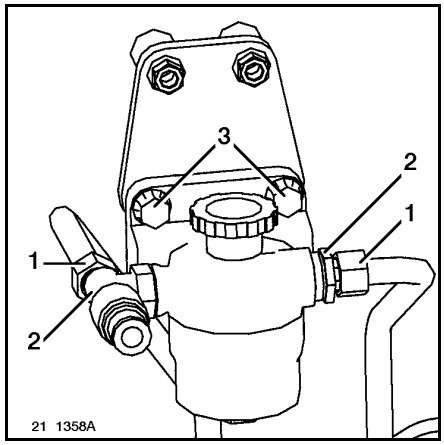
Bleeding the fuel circuit



Open bleed screw **(1)**, then unscrew and actuate hand pump **(2)** until the fuel flows without air bubbles. Close the bleed screw and actuate the hand pump until it hardens. Screw up the hand pump control before starting the engine.
Actuate the starter until the engine fires.

It is forbidden to bleed the low pressure circuit using the starter.

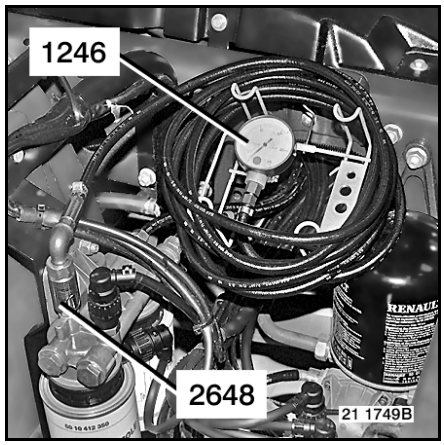
Fuel hand priming pump and prefilter



Removal
Unscrew unions **(1)**.
Hold unions **(2)** while loosening unions **(1)**.
Remove setscrews **(3)**.
Watch out not to bend the pipes.
Remove the hand priming pump.

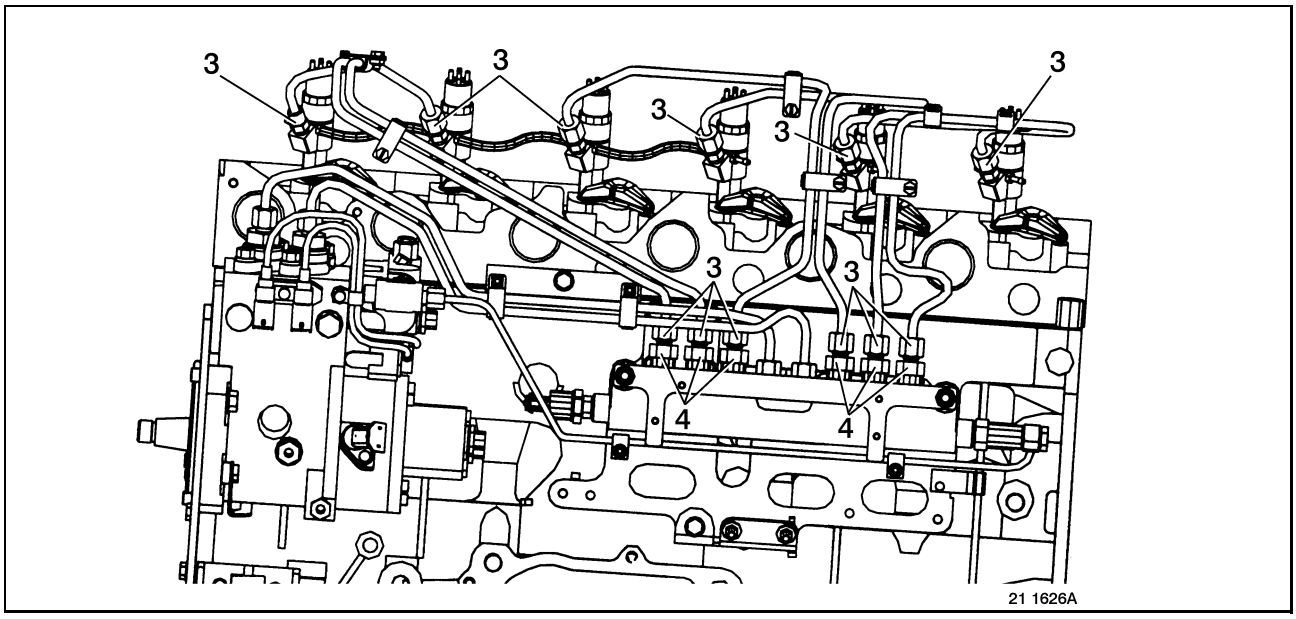
Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten unions **(1)** to torque.
Hold unions **(2)** while tightening unions **(1)**.

Checking the fuel pressure (low pressure circuit)



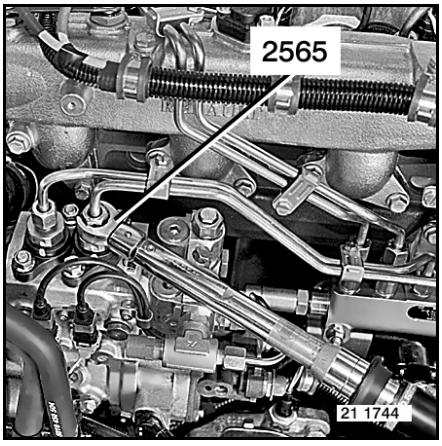
Use tool **2648** + **1246**
Loosen bleed screw **(1)** slightly.
Pressure values (see page K-8).

Injector pipe gallery



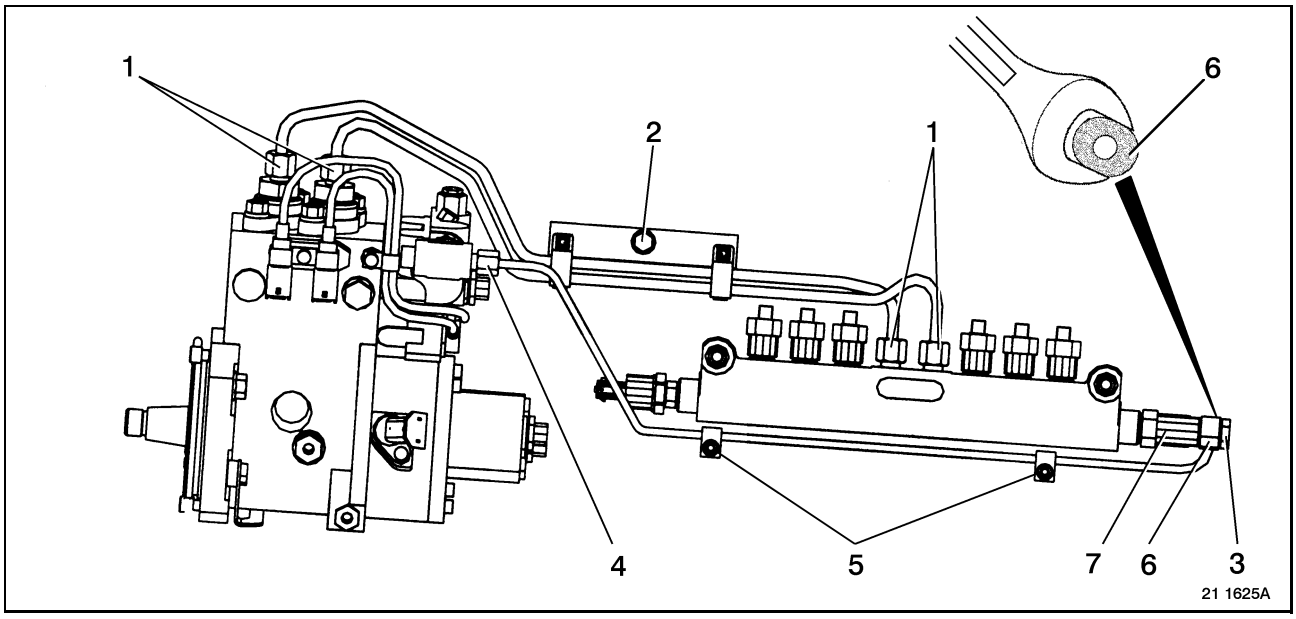
Removal
Unscrew unions **(3)**.
While loosening unions **(3)**, hold flow limiters **(4)** and the high pressure nozzle-holder unions to prevent them from working loose.
Remove high pressure pipe gallery.
Blank off the ports.
Put each part in a new watertight plastic bag immediately after its removal.

Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten pipe unions **(3)** to a torque of **40 ± 8 Nm**, without holding flow limiters **(4)**.
Use tool **2565**.
In the event of leakage at a nut, loosen the nut in question by 1/4 of a turn, then retighten at a maximum torque of **50 Nm**. If the leak persists, the pipe gallery must be replaced.



It is essential to replace the complete pipe gallery. Under no circumstance should the flanges connecting the pipes in the same gallery be dismantled.

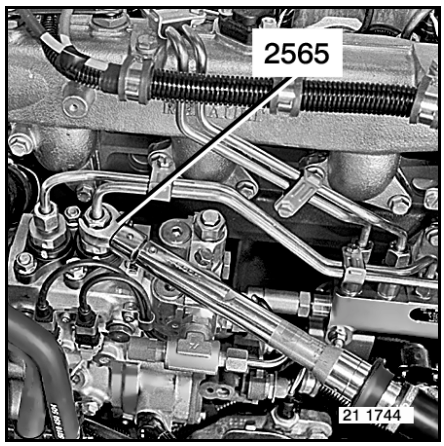
Common rail delivery pipe gallery



Removal
Remove setscrew **(2)**.
Unscrew unions **(1)**.
Remove high pressure pipe gallery.
Blank off the ports.
Put each part in a new watertight plastic bag immediately after its removal.

Fitting
It is absolutely essential to follow the pipe gallery assembly procedure detailed below.

Install the pipe gallery to the engine.
Screw up setscrew **(2)** securing the bracket, without tightening.
If necessary, exert a force on the pipes by hand to bring the pipe unions into position on the high pressure pump and common rail unions. A 5 mm maximum vertical and horizontal displacement of the unions is permitted due to torsion of the pipes.
Use of a lever arm is forbidden.
Screw up pipe unions **(1)** without tightening.
Tighten the bracket **(2)** securing bolts to torque.
Tighten unions **(1)** to a torque of **40 ± 8 Nm.**
Use tool **2565**.
In the event of leakage at a nut, loosen the nut in question by 1/4 of a turn, then retighten at a maximum torque of **50 Nm**. If the leak persists, the pipe gallery must be replaced.



It is essential to replace the complete pipe gallery. Under no circumstance should the flanges connecting the pipes in the same gallery be dismantled.

Rail leak-off return pipe

The items numbers indicated in the text refer to the figure on page K-19 .

Removal
Remove nuts **(5)**.
Loosen union **(3)** while holding end **(6)** of leak-off return pipe with a wrench.
Loosen the union **(4)** while holding the union.
Blank off the ports.
Remove pipe **(6)**.
Save the pipe fastening clamps.
Watch out not to bend the pipes.
Put each part in a new watertight plastic bag immediately after its removal.

Fitting
For fitting, proceed in the reverse sequence to removal.
Replace all seals and gaskets without fail.
Tighten union **(3)** while holding end **(6)** of leak-off return pipe with a wrench.
Tighten union **(4)** while holding the union.
Tighten to torque.
Bleed the fuel system.

Rail pressure limiter

The items numbers indicated in the text refer to the figure on page K-19 .

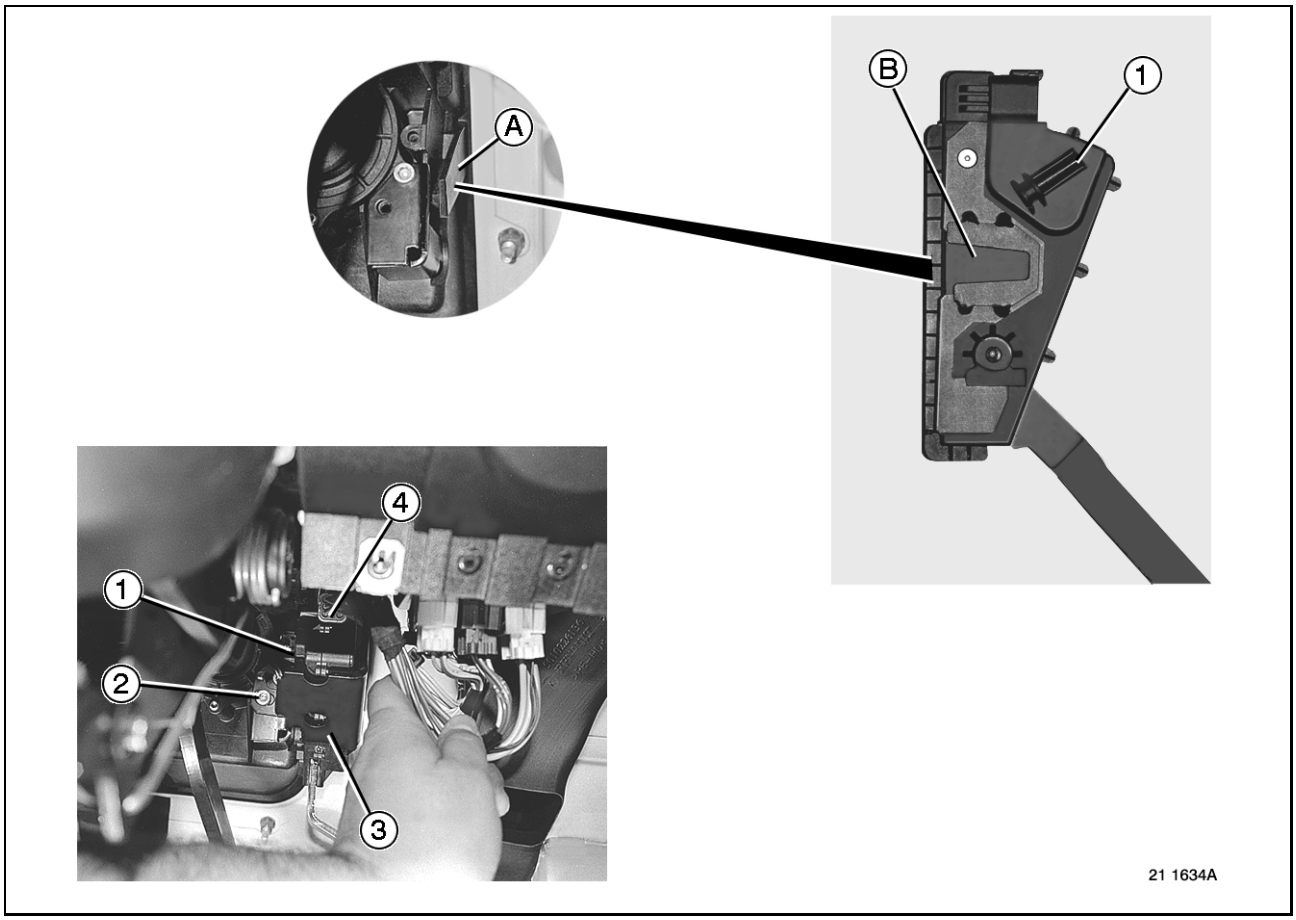
To remove and fit the other components quoted in the paragraph, refer to their respective chapters.

Pressure limiter **(7)** is to be replaced without fail if the engine is running at abnormally high pressure ("fuel flow regulation solenoid valve" or "fuel injection pressure outside operating band" fault).

Removal
Remove pipe **(6)** as described above.
Remove pressure limiter **(7)**.
Blank off the ports.
Put each part in a new watertight plastic bag immediately after its removal.

Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten pressure limiter **(7)**.
Tighten to torque.

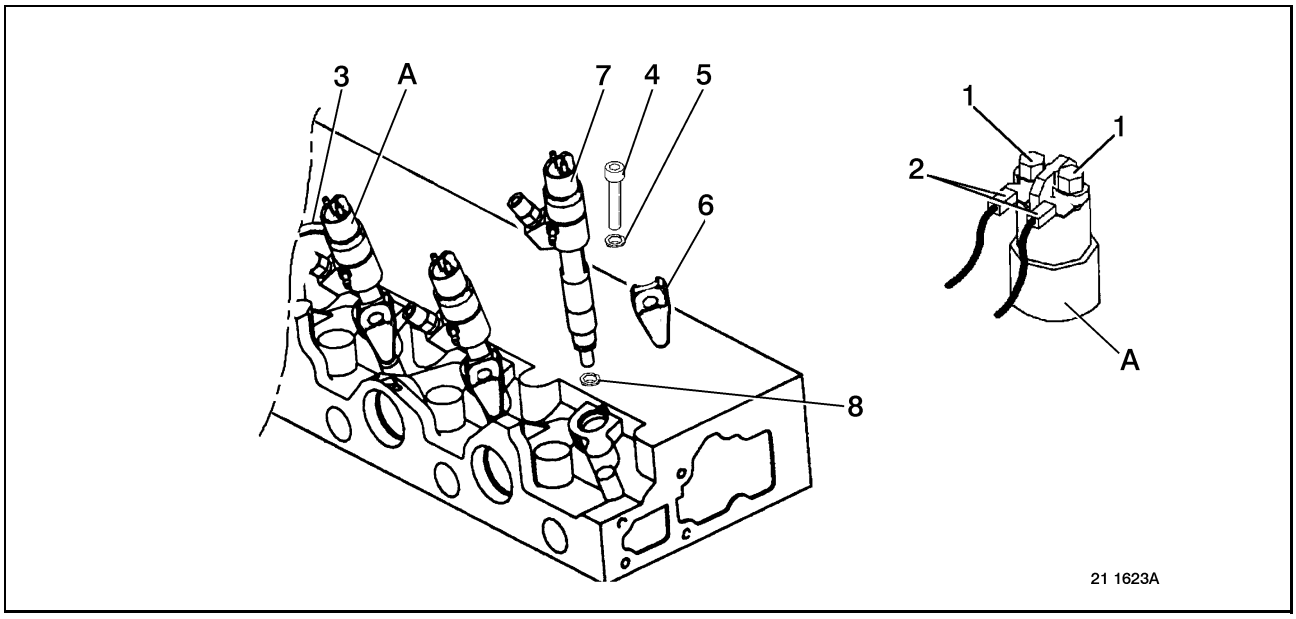
Accelerator pedal



Removal
Remove the steering column trim.
Remove setscrew **(1)**.
Remove setscrew **(2)**.
Pull the accelerator pedal and holding plate **(3)** towards yourself to remove.
Unplug the connector **(4)**.

Fitting
Offer up the holding plate **(3)** / accelerator pedal assembly.
Slide the bracket **(B)** in the rail **(A)**.
Tighten setbolt **(1)** moderately.
Tighten setscrew **(2)**.
Plug in connector **(4)**.
Fit the steering column trim.

Fuel injector / nozzle-holder



It is strictly forbidden to work on the fuel injectors while the engine is running (high voltage).

To remove and fit the other components quoted in the paragraph, refer to their respective chapters.

Removal
Remove the corresponding injector pipe gallery.
Blank off the ports.
Unscrew nuts **(1)**.
Remove fuel leak-off return pipes **(3)**.

Do not use any tool liable to damage the firtree unions when removing the leak-off pipes. If you do damage a firtree union, you must replace it with a new part without fail.

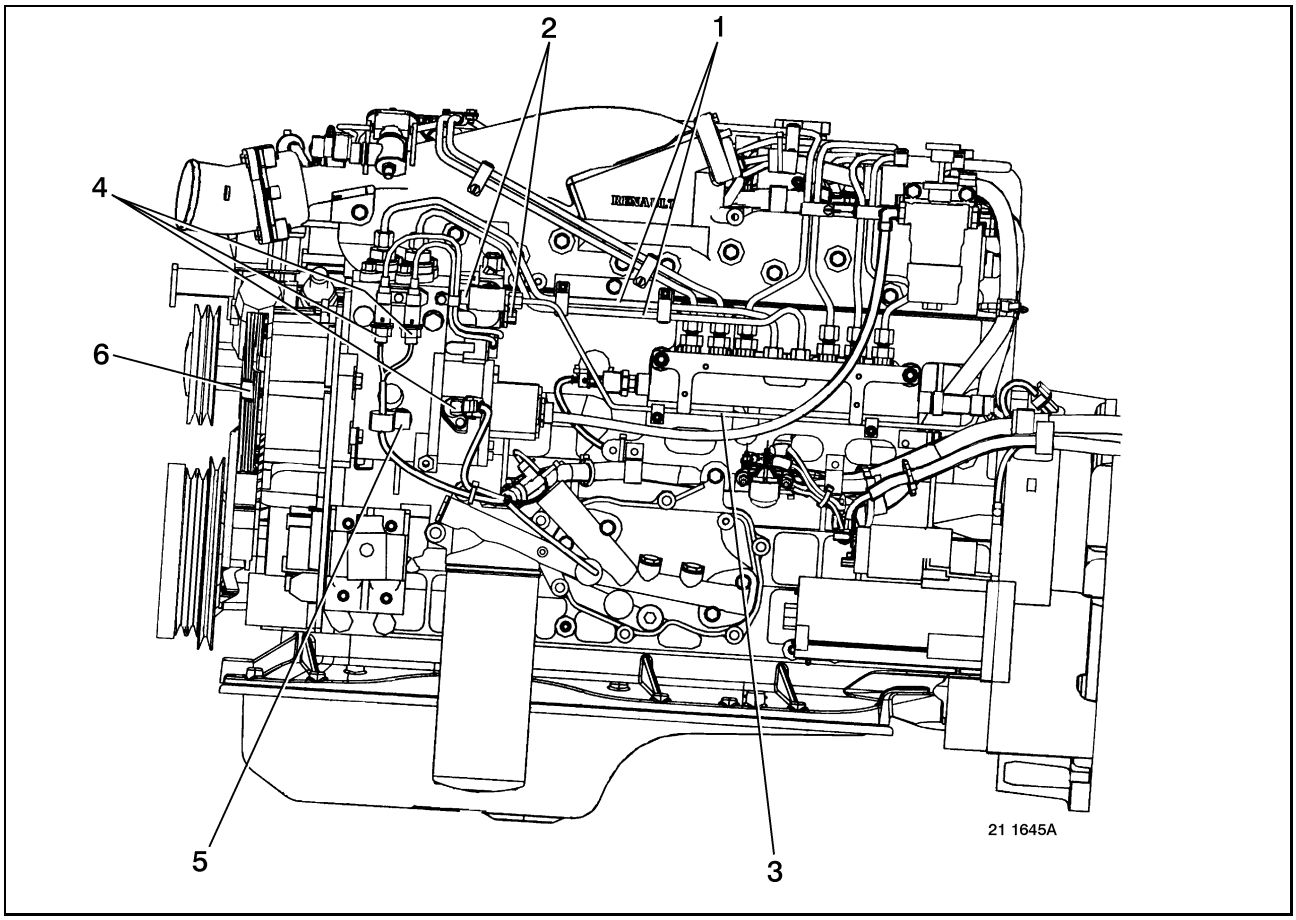
Remove setscrew **(4)**.
Save spherical washer **(5)**.
Remove flange **(6)**.
Withdraw injector **(7)**.

It is forbidden to use the top part of the nozzle-holder to extract it.

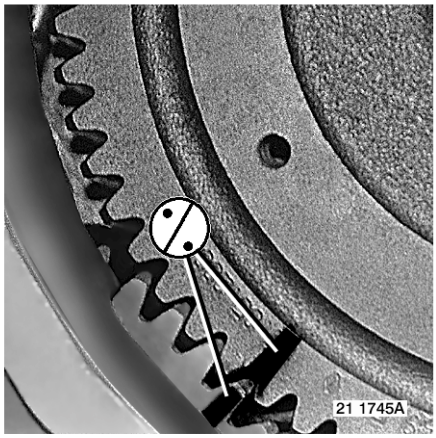
Take off seal **(8)**.
Put each part in a new watertight plastic bag immediately after its removal.

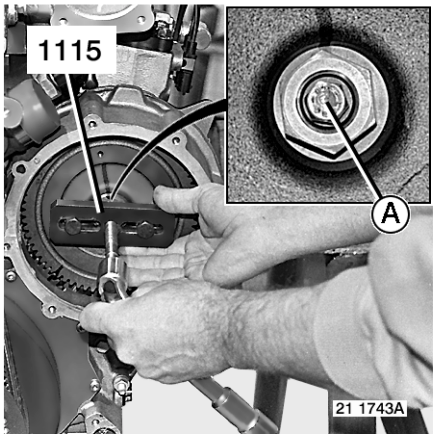
Fitting
Replace seal **(8)** without fail.
Replace leak-off return pipes **(3)** without fail.
Fit injector **(7)**.
Fit flange **(6)**.
Fit spherical washer **(5)**.
Fit setscrew **(4)**.
Tighten setscrew **(4)** to torque.
For the rest of the fitting operations, proceed in the reverse sequence to removal.
Hold terminal lugs **(2)** of the wiring harness with pliers when tightening nuts **(1)** to torque.

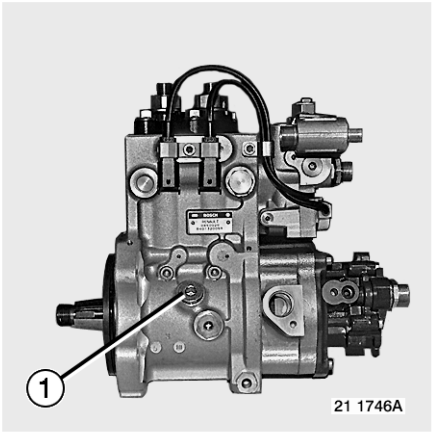
High pressure pump



Removal
Remove high pressure pipe gallery **(1)**.
Remove pipes **(2)**.
Remove rail return pipe **(3)**.
Blank off the ports.
Unplug connectors **(4)**.
Take off clamp **(5)**.
Put each part in a new watertight plastic bag immediately after its removal.
Remove the rocker cover.
Remove the engine speed sensor.
Use tool **1380**.
Turn the engine in the direction of normal running, as far as compression **TDC** of N° **1** cylinder (valves of cylinder in balance with valves of N° **6** cylinder).
Turn the engine in the direction of normal running as far as the **2**nd appearance of the hole-free zone on the flywheel through the speed sensor well.
Turn the engine in the direction of normal running, and bring the **2**nd hole after this zone opposite the speed sensor well.
In this position, the pump shaft key is directed upwards to prevent it from falling into the timing case.







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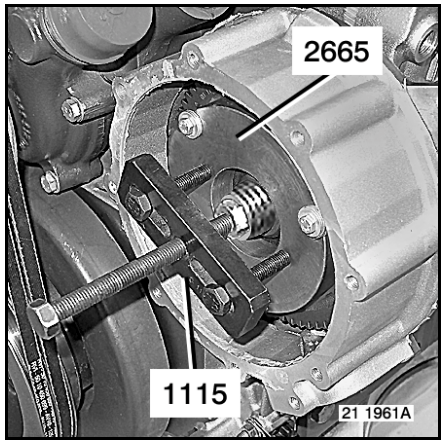
Take off breather plate **(6)**.
Remove the breather impeller.
Mark the relative positions of the idler gear and the high pressure pump pinion.
Remove the nut.
Extract the high pressure pump pinion.
Use tool **1115**.
Place a **6** mm dia. screw, cut about **5 mm** under the head so as to protect the shaft (item **A**).

*If the high pressure pump pinion does not have any tapped holes for fastening tool **1115**, use adapter **2665**.*



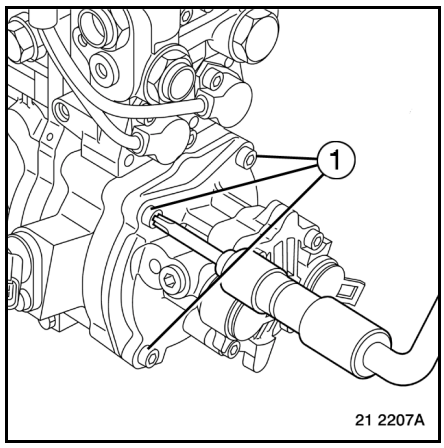
Remove the high pressure pump setbolts.
The nuts for the three least accessible bolts are captive inside a plate.
Remove the high-pressure pump.

Fitting
Replace all seals and gaskets without fail.
Replace the sealing washers for the high pressure pump setbolts without fail.
Apply oil to the O-rings.
Degrease the tapers.
Install high-pressure pump.
Tighten the high pressure pump nuts to torque.
Fit the high pressure pump pinion.
Align the shaft key with the keyway in the pinion.
Line up the marks made prior to removal.
Tighten the nut of the high pressure pump pinion to torque.
Fill the high pressure pump with **0.2 litre** of engine oil through port **(1).**
Put back the seal and tighten plug **(1)** to torque.
For the rest of the fitting operations, proceed in the reverse sequence to removal.
Fit the breather plate.
Apply "**SILMATE RTV 1473**" oiltight threadlocking compound to give a fluidtight seal.
Bleed the fuel system.

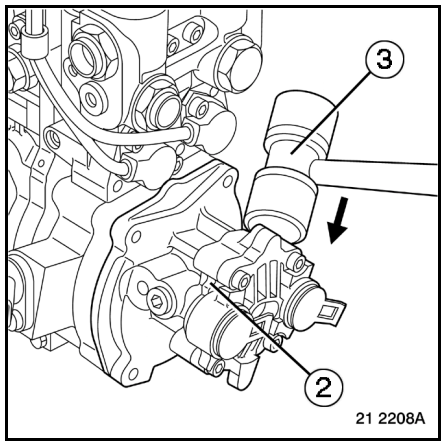
Booster pump ZP5

Removal

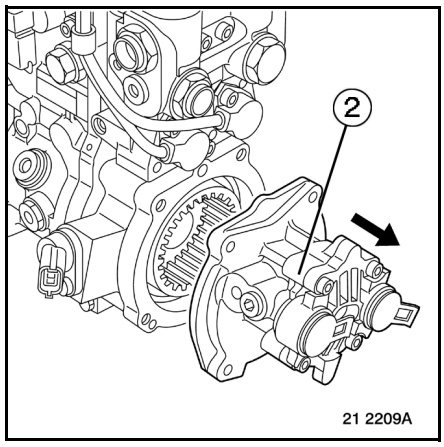
Remove securing nuts and bolts **(1)**.



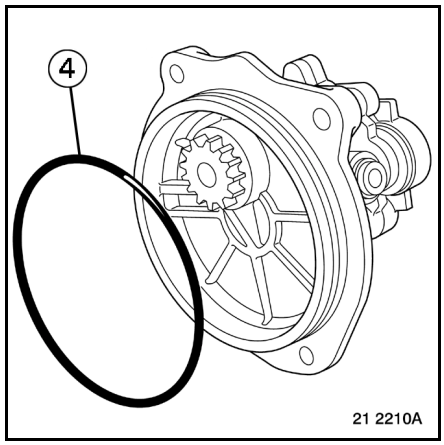
Dislodge booster pump **(2)** using a plastic mallet **(3)**.



Remove booster pump **(2)**.



Fitting
To fit, proceed in the reverse sequence to removal.
Replace gasket **(4)** without fail.
Apply oil to the gasket **(4)** (engine oil).
Carefully align the booster pump with the high pressure pump.
Preliminary tighten the booster pump setscrews in diametrically opposed sequence.
Tighten to torque.
See page B-3-4

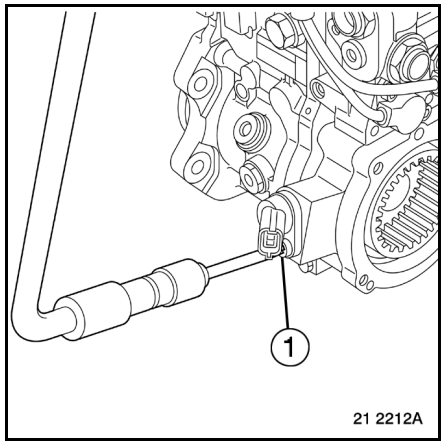


High pressure pump speed sensor

Booster pump ZP5 removed.

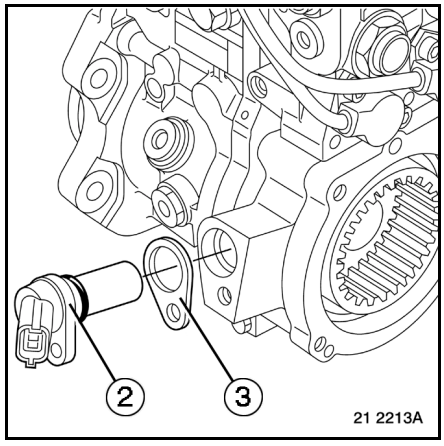
Removal

Remove setscrew **(1)**.



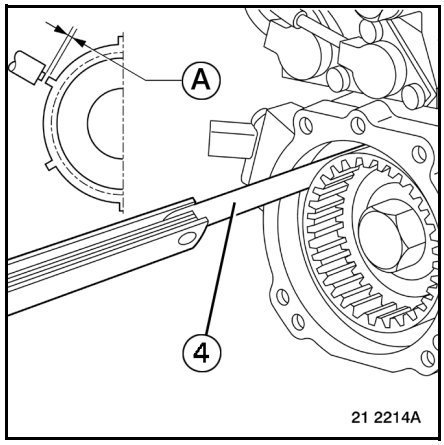
Remove sensor **(2)**.

Remove shim **(3)**.



Fitting
For fitting, proceed in the reverse sequence to removal.
Apply oil to the gasket (engine oil).

Check the size of air gap **A = 0.3 ± 0.1 mm** using feeler gauge **(4)**.
If the size of the air gap does not conform, replace adjusting shim **(3)**.
Tighten to torque.
See page B-3-4



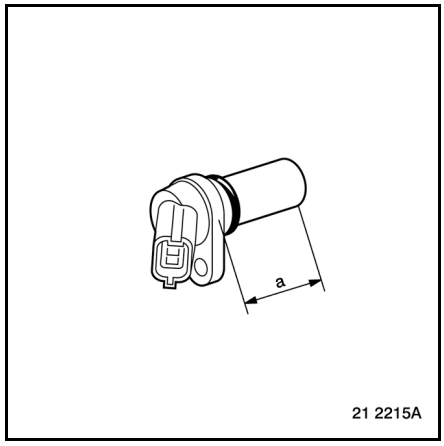
High pressure pump speed sensor

Booster pump ZP5 fitted.

Removal
See page K-28

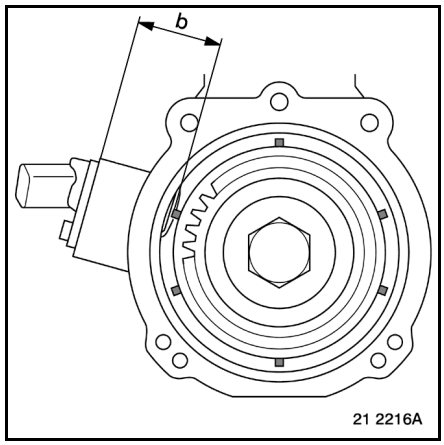
Calculation of the shim thickness to obtain an air gap of 0.3 ± 0.1 mm.

Measure dimension **(a)** corresponding to the length of the sensor.



Measure dimension **(b)** corresponding to the distance between the sensor support face and the high pressure pump target.
Thickness of sensor shim = **0.3 + (a) - (b)**.

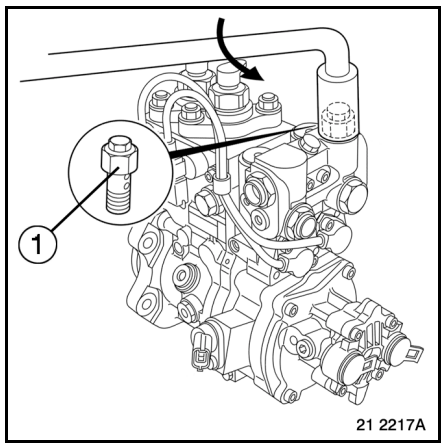
Fitting
See page K-28



Scavenge valve

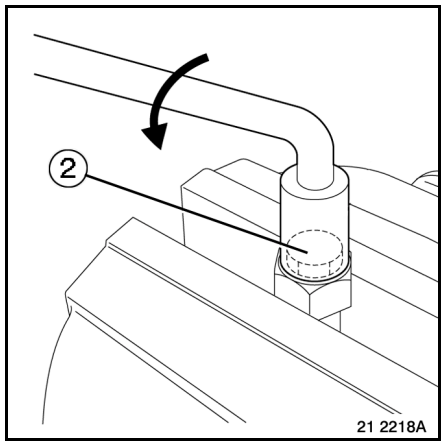
Removal

Remove scavenge valve **(1)**.



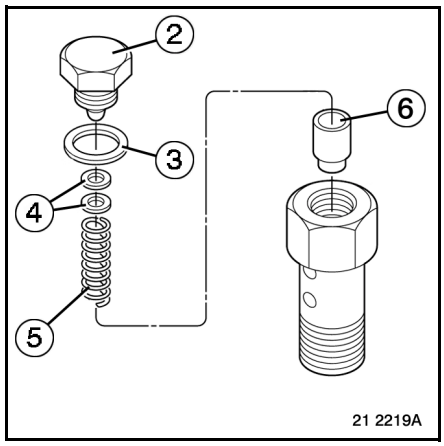
Disassembly

Tighten the scavenge valve in a vice.
Loosen plug **(2)**.



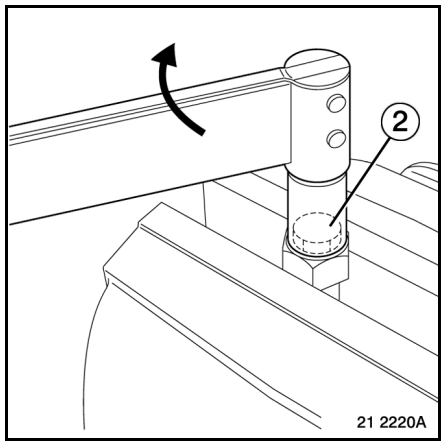
Remove plug **(2)**.
Remove gasket **(3)**.
Withdraw shims **(4)**.
Remove spring **(5)**.
Remove valve **(6)**.
Carefully clean all the parts.
Visually check the condition of the contact surface of valve **(6)**.

*If any of these parts are lost, except for gasket **(3)**, the high pressure pump will have to be replaced.*

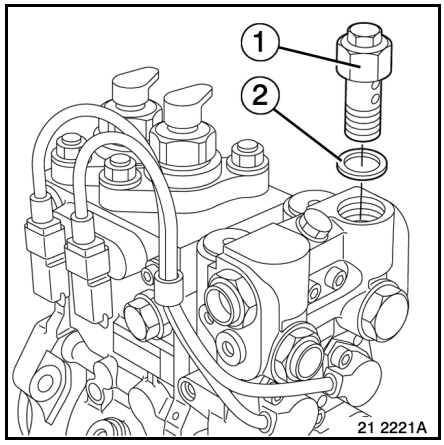


Assembly
Proceed in the reverse sequence to dismantling.
Replace gasket **(3)**.

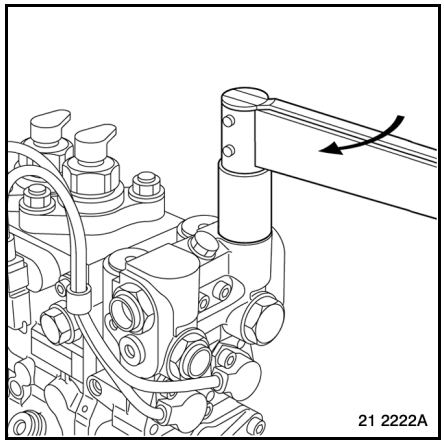
Tighten plug **(2)** to torque.
See page B-3-4



Fitting
To fit, proceed in the reverse sequence to removal.
Replace gasket **(2)**.



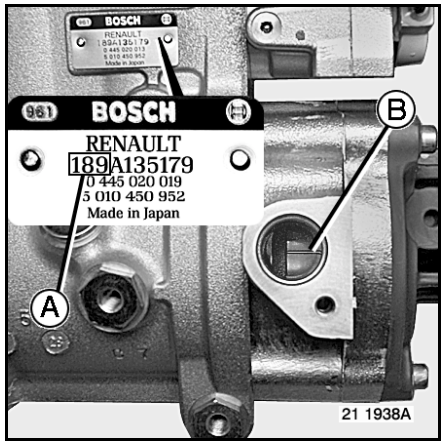
Tighten to torque.
See page B-3-4



Checking the high pressure pump timing

Remove the rocker cover.
High pressure pump with number **(A)** < **182**.

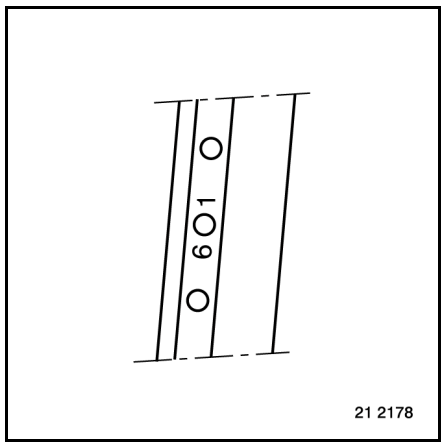
Remove the engine speed and HP pump speed sensors.



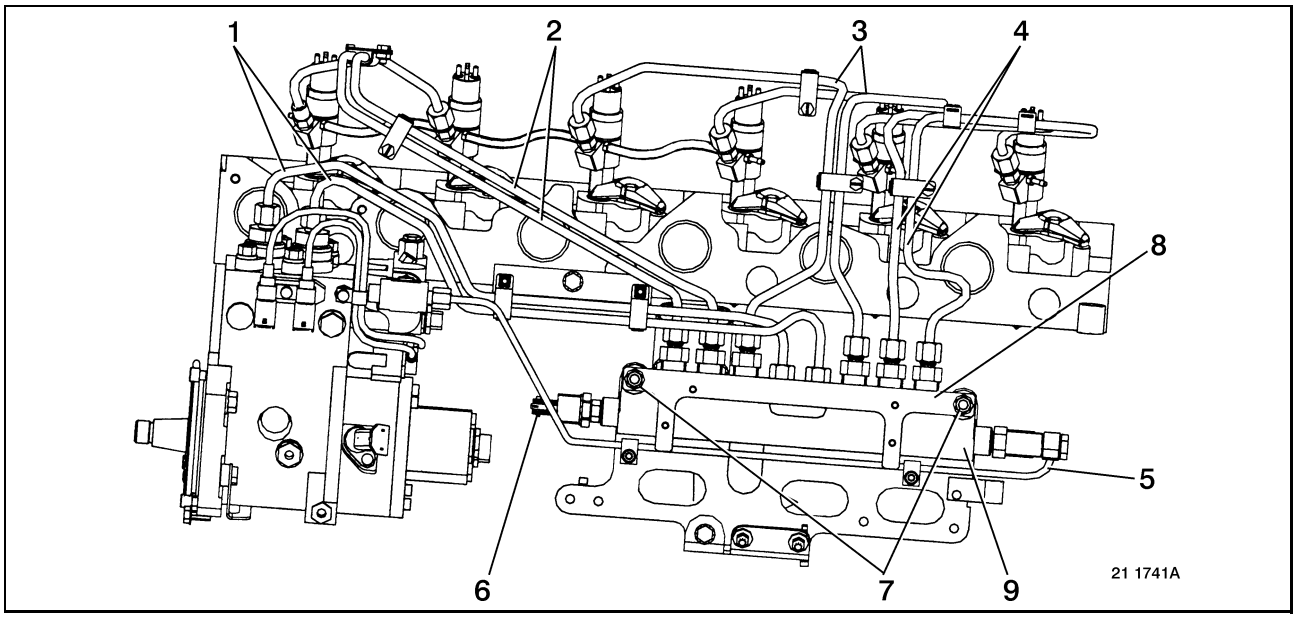
*Mark **(B)** cannot be used for timing the high pressure pump.*

Turn the engine in the direction of normal running, as far as compression**TDC** of N° **1** cylinder (valves of cylinder in balance with valves of N° **6** cylinder).
Turn the engine in the direction of normal running as far as the **2**nd appearance of the hole-free zone on the flywheel through the speed sensor well.
Turn the engine in the direction of normal running, and bring the **22**rd hole after this zone opposite the speed sensor well.
Check that the 1st tooth of the double-tooth of the HP pump target is visibly in the centre through the pump speed sensor well.
High pressure pump with number **(A)** ≥ **182**.
Remove the engine speed and high pressure pump speed sensor.
Turn the engine in the direction of normal running, as far as compression **TDC** of N° **1** cylinder (valves of cylinder in balance with valves of N° 6 cylinder).
Mark **(B)** should appear centred in the high pressure pump speed sensor well.

*The **TDC** of N° 1 cylinder is situated at the **36th** hole after the hole-free zone on the flywheel through the engine speed sensor well (on certain flywheels, this hole is marked on both sides).*



Common rail

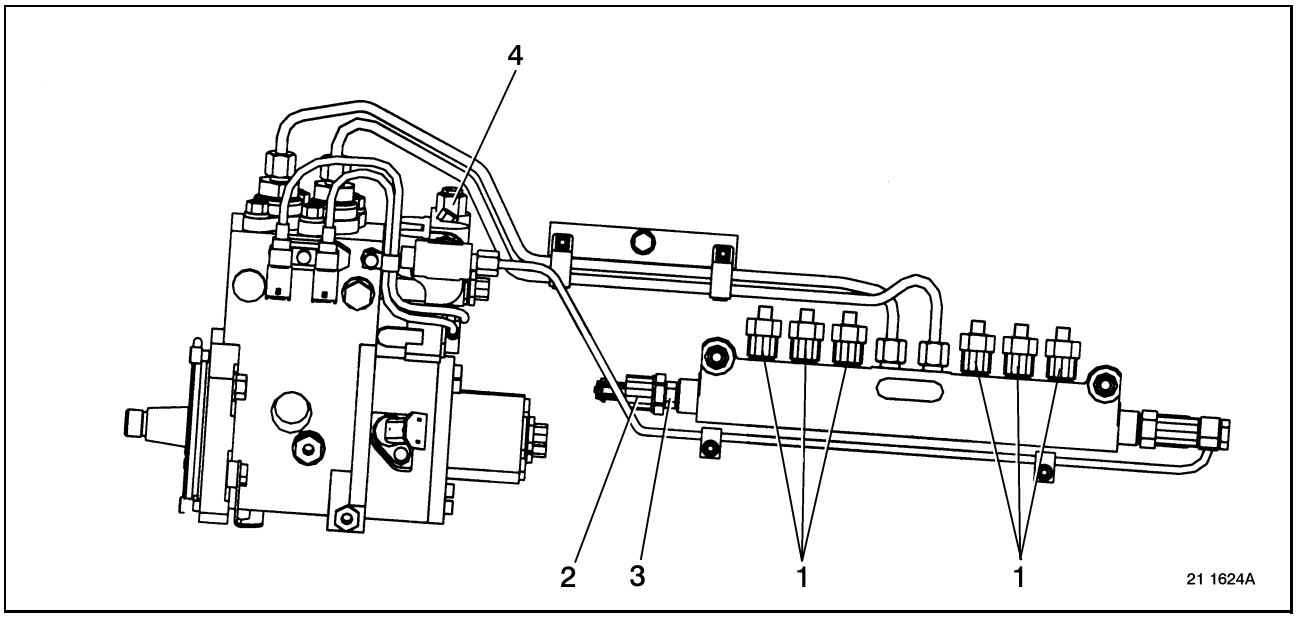


To remove and fit the other components quoted in the paragraph, refer to their respective chapters.

Removal
Remove high pressure pipe gallery **(1/2/3/4)**.
Remove pipe **(5)**.
Blank off the ports.
Unplug the connector **(6)**.
Remove nuts **(7)**.
Remove sheet metal plate **(8)**.
Remove common rail **(9)**.
Put each part in a new watertight plastic bag immediately after its removal.

Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten to torque.
Bleed the fuel system.

Flow limiter



To remove and fit the other components quoted in the paragraph, refer to their respective chapters.

Removal
Remove the corresponding injector pipe gallery.
Remove flow limiter **(1)**.
Blank off the ports.
Put each part in a new watertight plastic bag immediately after its removal.

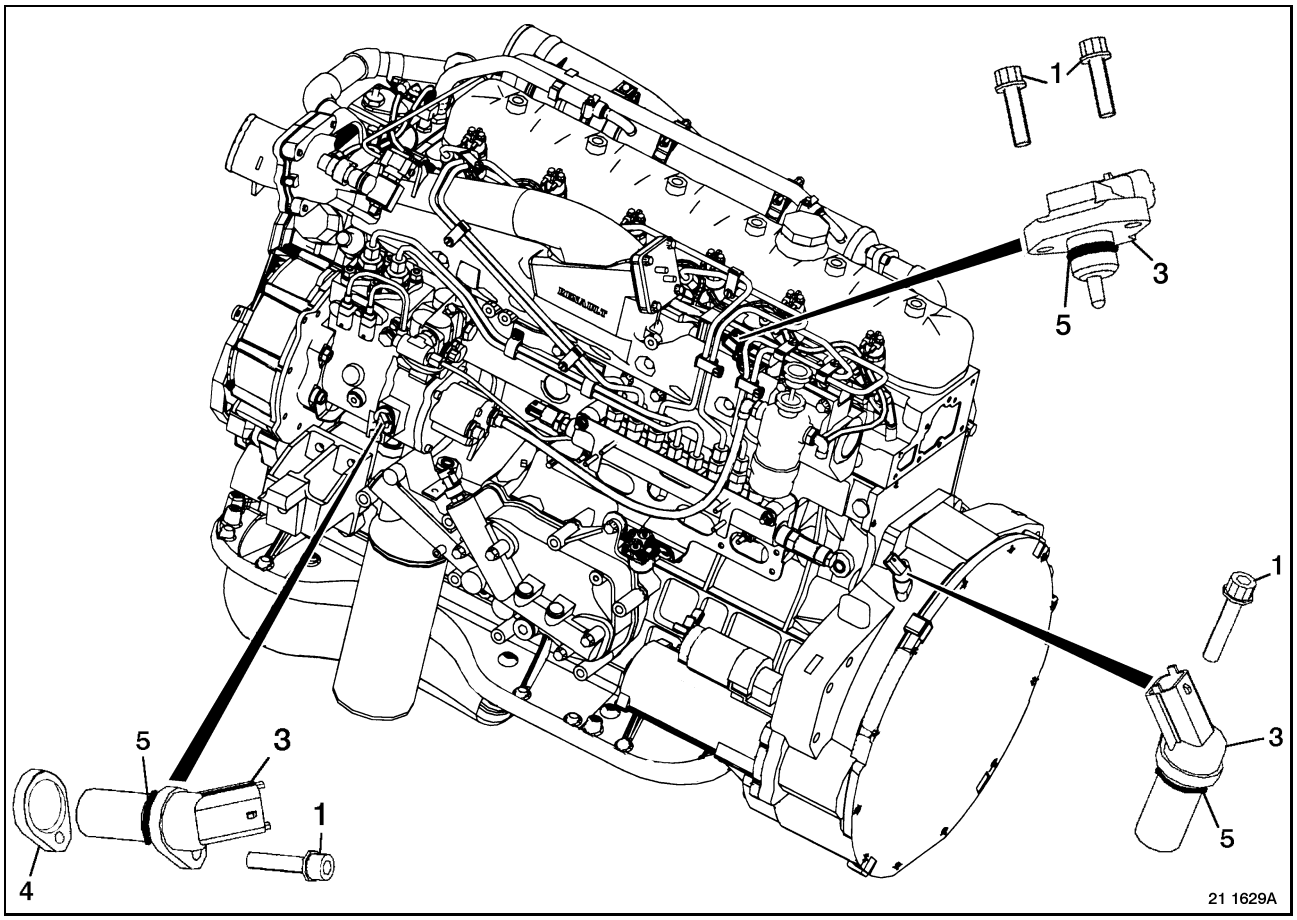
Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten to torque.

High pressure fuel sensor

Removal
Unplug the connector.
Unscrew sensor **(2)** while holding sleeve **(3)**.
Blank off the ports.
Put each part in a new watertight plastic bag immediately after its removal.

Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten to torque.
Bleed the fuel system.

Speed sensors / Boost air pressure and temperature sensor



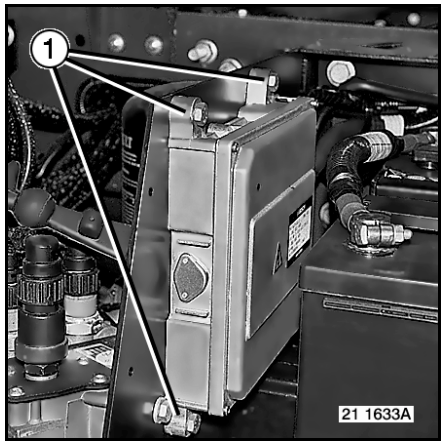
To remove and fit the other components quoted in the paragraph, refer to their respective chapters.

Removal
Remove setscrew(s) **(1)**.
Unplug the connector.
Remove sensors **(3)**.
Save adjusting shim **(4)**.

Fitting
Replace seals **(5)**.
Insert adjusting shim **(4)**.
Grease seals **(5)**.
For fitting, proceed in the reverse sequence to removal.
Tighten to torque.

The speed sensors air gaps cannot be adjusted.

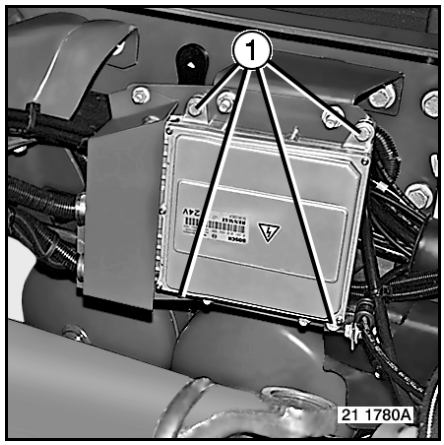
MIDLUM engine master ECU



Removal
Pull out the catches and unplug the connectors.
Remove setscrews **(1)**.

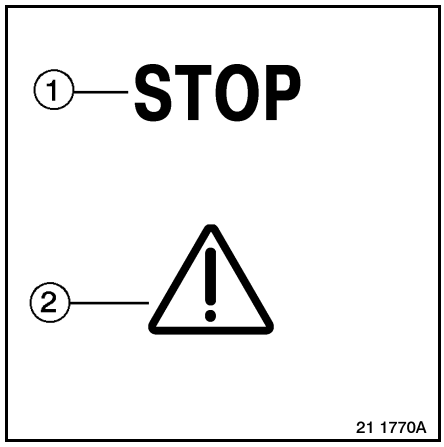
Fitting
For fitting, proceed in the reverse sequence to removal.
Tighten to torque.

PREMIUM engine master ECU

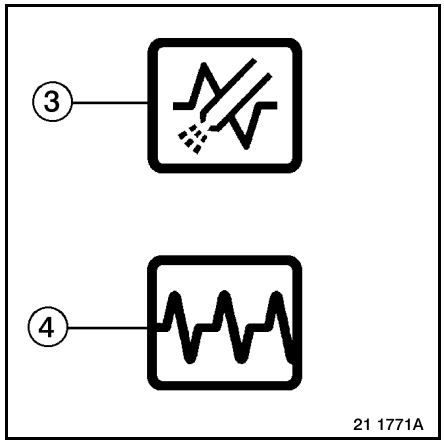


Instrument panel indicator lights

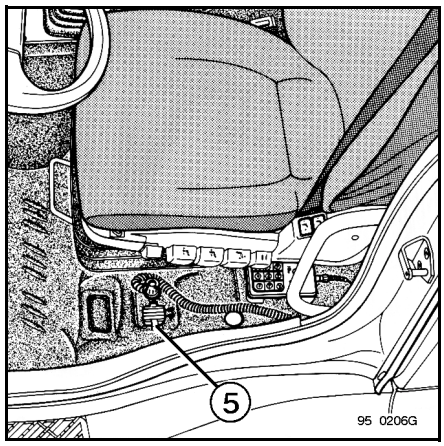
Indicator lights **(1-2-3-4)** inform the driver on the state of the system and on the kind of faults possibly detected or memorized.
Warning light **(1)** indicates a major fault and requires the vehicle to be stopped immediately.
Warning light **(2)** indicates a minor fault.
Tell-tale light **(3)** indicates that the fault originates from a component managed by the engine master electronic control unit (EECU).
Tell-tale light **(4)** indicates that the fault originates from a component managed by the vehicle master electronic control unit (VECU).



The system functions by virtue of default values that replace values that can no longer be measured. Certain functions may be inhibited or work in fall-back mode.
In all cases, the fuel-injection system needs urgent overhaul.
In the case of detection of fault, engine performance may be impaired.



The faults can be visualized by using the RENAULT TRUCKS diagnostics tool plugged into the vehicle diagnostics socket **(5)**.
The faults can also be visualized on the instrument panel display by displaying the code numbers on the present or memorized faults sub-menu.
After taking action, erase the fault code numbers using the RENAULT TRUCKS diagnostics tool.



Use of the RENAULT TRUCKS diagnostics tool "DIAGNOSTICA"

The use of this tool provides great ease of diagnostics and its employment is strongly recommended. It is absolutely essential for erasing faults.
Plug the diagnostics tool into the socket.

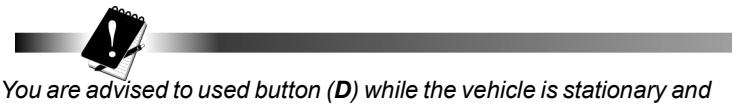
Available functions:
1/ Present faults
- component
- fault
- remedies

2/ Memorized faults
- component
- fault
- remedies
- erasure

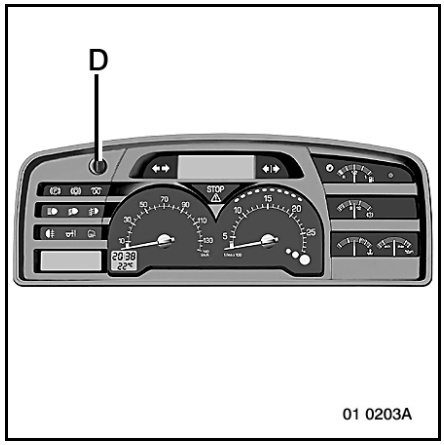
3/ Diagnostic
- Diagnostic
  - Engine brake
  - Injection pressure
  - PTO
  - Warm up
  - Exhaust brake strangler
- Visualization of inputs (digital displays and/or graphics of next values)
  - Engine operating time
  - Accelerator pedal position (%)
  - Battery voltage
  - Engine oil level
  - Coolant temperature
  - Boost air temperature
  - Atmospheric pressure
  - Engine oil pressure
  - Boost air pressure
  - Injection pressure
  - Engine speed
  - Vehicle speed
  - Injected fuel quantity
  - Injection timing
  - Exhaust brake presence
  - Exhaust brake pilot-control set-point
  - Air conditioning system in operation
  - Fast idling speed set-point (PTO).

Diagnostics using instrument panel display

Controls



*You are advised to used button (**D**) while the vehicle is stationary and correctly parked.*

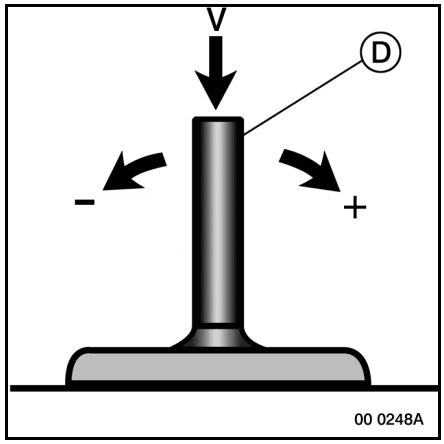


Button (**D**):

Push towards (**+**) or (**-**)
- to gain access to the different menus and sub-menus.
- to make an adjustment or choice in the opened menu.

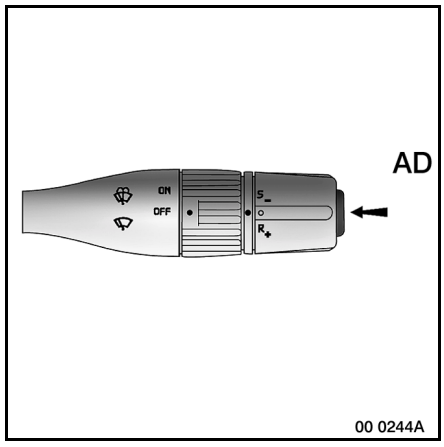
Short pulses (**V**):

- opens a selected menu.
- validates an adjustment or a choice in the menu selected.
- scrolls through present or memorized faults in succession.



Button (**AD**):

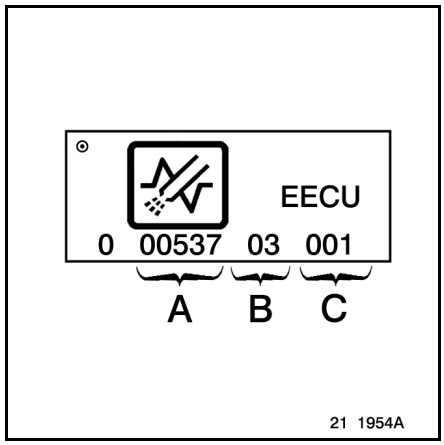
Short pulses:
- serves to go back to the default display.
- closes an opened menu without validating the adjustment or choice.
- displays the different "driver's supplementary driving menu information.



Meaning of fault codes

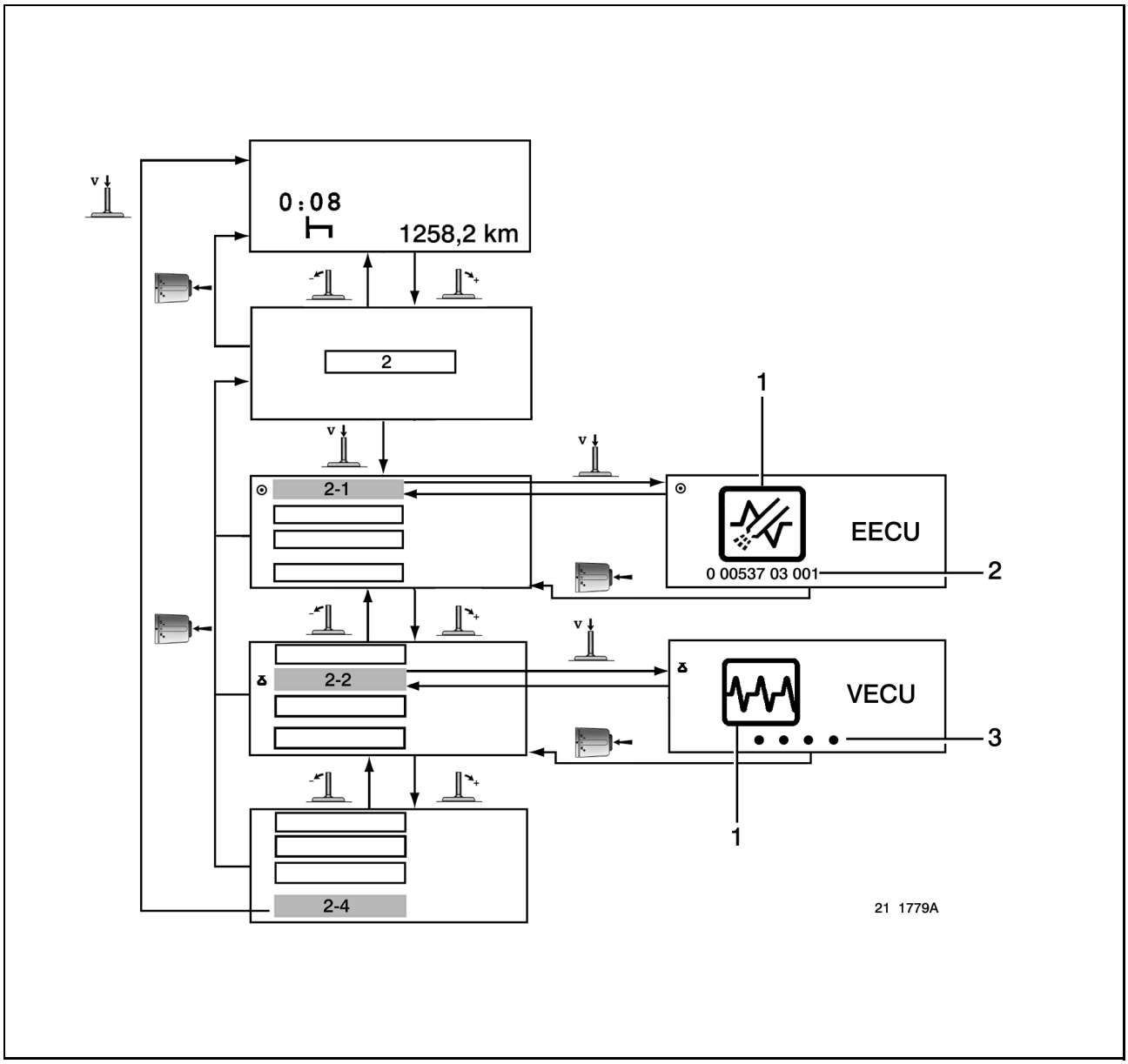
- **A:** fault number.
- **B:** fault type.
- **C:** number of appearances of fault.

The fault type **B** can only be used for "Phase 1" vehicles (see **List of fault code numbers** chapter).



Fault type

- 0: Data valid but above the normal operating band
- 1: Data valid but below the normal operating band
- 2: Data irregular, intermittent or incorrect
- 3: Voltage higher than rated voltage or amperage high
- 4: Voltage lower than rated voltage or amperage low
- 5: Voltage lower than normal or open-circuit
- 6: Voltage lower than normal or short-circuit to earth
- 7: Incorrect response from mechanical system
- 8: Frequency, pulse width or period abnormal
- 9: Refreshing speed abnormal
- 10: Variation rhythm abnormal
- 11: Failure mode non-identifiable
- 12: Smart peripheral or component defective
- 13: Outside calibration limits
- 14: Special instructions
- 15: Data valid but above the normal operating band (very low level of gravity)
- 16: Data valid but above the normal operating band (low level of gravity)
- 17: Data valid but below the normal operating band (very low level of gravity)
- 18: Data valid but below the normal operating band (low level of gravity)
- 19: Network data received illogical
- 31: Not available



Select the diagnostics menu (2)
When the menu is open, the **STOP** warning light comes on.

Sub-menus
- **2-1:** Present faults
- **2-2:** Memorized faults
- **2-4:** Quit

In all cases, pictogram **(1)** indicates the function concerned. To obtain the desired function, use control **(D)** whenever necessary.
For "present faults" and "memorized faults" sub-menus, code number **(2)** characterizes the fault, or 4 dots **(3)** mean there are no faults.

List of fault code numbers

The repercussion of the fault code numbers listed hereafter is only significant in the event of one single fault being present. If there are several present faults, the impairment of the system features provided may be greater and lead to operating impossibility.

Only code numbers specific to fuel-injection are covered in this document.
Faults relative to other functions may impair the features provided by the fuel-injection system (refer to the workshop manual sections corresponding to the systems incriminated).
To perform more comprehensive diagnostics on vehicle wiring harness runs, refer to the "Electrics" workshop manual section for the Premium vehicle or for the Midlum vehicle.
There are **2** lists of fault code numbers with different fall-back modes and display messages.
The first list concerns engines variant 14101 (pre-phase 1).
The second list concerns engines variant 14102 (phase 1).

It is possible to identify the list corresponding to the engine (original engine) on the identification plate (see "Technical data" chapter):

- Engine with plate without power, smoke, emissions index (pre-phase 1) -> list N° 1.
- Engine with plate with power, smoke, emissions index (phase 1) -> list N° 2.

Recap table of fault code numbers

List N° 1

Fault code	Kind of incident	See page
91	Accelerator pedal	L-2
513	Parameter definition	L-2
529	Engine oil pressure sensor	L-2
530	Fuel filters clogging sensor	L-3
531	Boost air pressure sensor	L-3
533	Engine cooling circuit temperature sensor	L-4
534	Boost air temperature sensor	L-4
537	Engine oil level sensor	L-4
546	Flywheel speed sensor	L-5
547	High pressure pump rotating speed sensor	L-5
551	Clogged fuel filters	L-5
552	Engine stop control (cab tilted)	L-6
558	Accelerator pedal	L-2
561	EGR electrovalve	L-6
562	Exhaust brake electrovalve	L-6
568	Starting aids	L-7
577	N° 1 cylinder fuel injector	L-7
578	N° 2 cylinder fuel injector	L-7
579	N° 3 cylinder fuel injector	L-7
580	N° 4 cylinder fuel injector	L-7
581	N° 5 cylinder fuel injector	L-7
582	N° 6 cylinder fuel injector	L-7
597 (EECU)	Battery charge voltage incorrect	L-8
597 (VECU)	Cruise control	L-9
598	Cruise control	L-9
600	Engine Master ECU fault	L-8
601	Cruise control	L-9
604	Cruise control	L-9
804	High pressure fuel sensor	L-9
805	Sensors "+" 5 Volts current supply	L-10
818	Exhaust brake electrovalve	L-10
824	Starting aids	L-10
833	N° 1 cylinder fuel injector	L-11

Fault code	Kind of incident	See page
834	N° 2 cylinder fuel injector	L-11
835	N° 3 cylinder fuel injector	L-11
836	N° 4 cylinder fuel injector	L-11
837	N° 5 cylinder fuel injector	L-11
838	N° 6 cylinder fuel injector	L-11
849	Fuel flow regulation solenoid valve N° 1	L-12
850	Fuel flow regulation solenoid valve N° 2	L-12
851	Injection pressure outside operating band	L-13
853	Battery charge voltage incorrect	L-13
854	Communication line between engine and vehicle ECUs	L-14
856	Engine Master ECU fault	L-14

List N° 2

Fault code	Kind of incident	See page
16	Fuel filters clogging sensor	M-2
91	Accelerator pedal	L-2
94	High pressure fuel sensor	M-3
95	Clogged fuel filters	M-3
98	Engine oil level sensor	M-3
100	Engine oil pressure sensor	M-4
102	Boost air pressure sensor	M-4
105	Boost air temperature	M-5
110	Engine cooling circuit temperature sensor	M-5
164	Injection pressure outside operating band	M-6
168	Battery charge voltage incorrect	M-7
190	Flywheel speed sensor	M-7
558	Accelerator pedal	L-2
597	Cruise control	M-8
598	Cruise control	M-8
601	Cruise control	M-8
604	Cruise control	M-8
611	Engine master ECU fault	M-8
628	Parameter definition	M-8
629	Engine master ECU fault	M-9
630	Parameter definition	M-8
631	Engine master ECU fault	M-9
636	High pressure pump speed sensor	M-9
651	N° 1 cylinder injector	M-10
652	N° 2 cylinder injector	M-10
653	N° 3 cylinder injector	M-10
654	N° 4 cylinder injector	M-10
655	N° 5 cylinder injector	M-10
656	N° 6 cylinder injector	M-10
676	Starting aids	M-11
732	EGR solenoid valve	M-11
970	Engine master ECU fault	M-9
1074	Exhaust brake electrovalve	M-12
1079	Sensors "+" 5 Volts current supply	M-12

Fault code	Kind of incident	See page
1231	Communication line between engine and vehicle management ECUs	M-13
1267	Engine stop control (cab tilted)	M-13
1347	Fuel delivery solenoid valve N° 1	M-14
1348	Fuel delivery solenoid valve N° 2	M-14
1479	Engine master ECU fault	M-15

DIAGNOSTICS AID PRE-PHASE 1

91 / 558 Accelerator pedal

Display message
– PEDAL FAULT.

Major fault

Repercussion:
– Engine speed permanently steady at **890 rpm.**

Test:
The test on the accelerator pedal should only be performed using the RENAULT TRUCKS test tool
– Continuity of dashboard wiring harness between:
  • Terminal N° **1** of the black connector **18** and sensor connector terminal **5**.
  • Terminal N° **3** of the black connector **18** and sensor connector terminal **6**.
  • Terminal N° **4** of the black connector **18** and sensor connector terminal **1**.
  • Terminal N° **5** of the black connector **18** and sensor connector terminal **3**.

513 Parameter definition

Display message
– PARAMETER DEFINITION

Minor fault
– Parameters of ECU supplied by BOSCH not redefined by RENAULT TRUCKS.

Repercussion:
– No drop in engine power

Remedy:
– Define the EECU parameters.

529 Engine oil pressure sensor

Display message
– SENSOR FAULT.

Minor fault

Repercussion:
– No drop in engine power
– Default value: oil pressure = **6 bars.**

Test:
– Correct operation of sensor using the RENAULT TRUCKS diagnostics tool.
– Continuity of engine wiring harness between:
  • ECU connector terminal **A5** and sensor connector terminal **C**.
  • ECU connector terminal **A18** and sensor connector terminal **A**.
  • ECU connector terminal **A26** and sensor connector terminal **B**.
– Insulation of each wire.
– Sensor current supply (ECU connected, ignition switched on):
  • Presence of + **5 Volts at sensor connector terminal B.**
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **A**.

530 Fuel filters clogging sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– No drop in engine power

Test:
– Correct operation of switch:
  • Switch contacts open in the rest position.
  • Switch contacts open when **P1** ≥ **3 bars P2.**
  • Button returns to rest position under effect of return spring.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at one of the switch connector terminals (wire **292**).
– Continuity of vehicle wiring harness between:
  • **EECU** connector terminal **B33** and one of the sensor terminals (wire **8072**).
  • **EECU B9, B22 B32** and one of the sensor terminals (wire **292**).
– Insulation of each wire.

531 Boost air pressure sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– Protection mode (low output, without EGR).
– Default value: boost air pressure = **1013 mbar(s).**
– Default value: atmospheric air pressure = **0 mbar(s).**

Test:
– Resistance at sensor terminals (at **20 °C**) between:
  • Terminals N° **3** N° **4**: R = **3400 → 8200 Ω**.
  • Terminals N° **3** N° **1**: R = **2400 → 8200 Ω**.
– Continuity of engine wiring harness between:
  • ECU connector terminal **A19** and sensor connector terminal **1**.
  • ECU connector terminal **A3** and sensor connector terminal **3**.
  • ECU connector terminal **A34** and sensor connector terminal **4**.
– Insulation of each wire.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of + **5 Volts** at sensor connector terminal **3**.
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **1**.

533 Engine cooling circuit temperature sensor

Display message
– SENSOR FAULT.

Minor fault

Repercussion:
– Protection mode.
– Default value: coolant temperature = **98 °C.**

Test:
– Resistance of sensor (see "Features" chapter for the values).
– Continuity of engine wiring harness between:
  • ECU connector terminal **A30** and sensor connector terminal **2**.
  • ECU connector terminal **A1** and sensor connector terminal **1**.
    - Presence of + **5 Volts** at sensor connector terminal **B**.
    - Presence of earth (R< **10 Ω**) at sensor connector terminal **A**.

534 Boost air temperature sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– Protection mode.
– Default value: boost air temperature = **60°C**

Test:
– Resistance of sensor (see "Features" chapter for the values).
– Continuity of engine wiring harness between:
  • ECU connector terminal **A19** and sensor connector terminal **1**.
  • ECU connector terminal **A2** and sensor connector terminal **2**.
– Insulation of each wire.
– Sensor current supply (ECU connected, ignition switched on):
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **1**.
  • Presence of + **5 Volts** at sensor connector terminal **2**.

537 Engine oil level sensor

Display message
– SENSOR FAULT.

Minor fault

Repercussion:
– No drop in engine power
– Default value: engine oil circuit empty

Test:
– Resistance of sensor (see "Features" chapter for the values).
– Continuity of engine wiring harness between:
  • ECU connector terminal **A17** and sensor connector terminal **2**.
  • ECU connector terminal **A38** and sensor connector terminal **1**.
– Insulation of each wire.

546 Flywheel speed sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Engine operation impaired if there is reversal of polarity
– Longer starting time (about 6 seconds)
– Operation on pump speed sensor

Test:
– Resistance at sensor terminals (at **20°C**): **R = 770 → 950 Ω**
– Insulation of each wire.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A29** and sensor connector terminal **1**.
  • ECU connector terminal **A37** and sensor connector terminal **2**.

547 High pressure pump speed sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– No drop in engine power
– Longer starting time (about 6 seconds)
– Operation of engine speed sensor on flywheel

Test:
– Resistance at sensor terminals (at **20°C**): **R = 770 → 950 Ω**
– Insulation of each wire.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A4** and sensor connector terminal **2**.
  • ECU connector terminal **A31** and sensor connector terminal **1**.

551 Clogged fuel filters

Display message
– FUEL FILTERS

Minor fault
– No drop in engine power
– Cut-off speed **1300** to **1400 rpm.**

Test:
– Replace the fuel filters

552 Engine stop control (cab tilted)

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– No drop in engine power
– Operating failure of the engine stop function with the switch

Test:
– Correct operation of switch:
  • Switch contacts open in the rest position.
  • Switch contacts closed when the button is depressed
  • Button returns to rest position under effect of return spring.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of **24 Volts** at one of the switch connector terminals.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **B32** and switch terminal **2**.
  • ECU connector terminal **B22 B9** and switch terminal **1**.
– Insulation of each wire.

561 EGR solenoid valve

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– EGR valve closed

Test:
– Resistance of solenoid valve winding (at **20 °C**): R = **43 → 49 Ω**
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A25** and electrovalve terminal **1** .
  • ECU connector terminal **A39** and electrovalve terminal **2** .
– Electrovalve current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at electrovalve connector terminal **2 .**
– Insulation of each wire.

562 Exhaust brake solenoid valve

Open-circuit or short-circuit to + 24 Volts current supply

Display message
– EXHAUST BRAKE INOPERATIVE

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Operating failure of the exhaust brake function

Test:
– Resistance of solenoid valve winding (at **20°C**): R = **43 → 49 Ω**
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **B42** and electrovalve terminal **1**.
  • ECU connector terminal **B22 B9** and electrovalve terminal **2**.
– Electrovalve current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at electrovalve connector terminal **2**.
– Insulation of each wire.

568 Starting aids

Open-circuit or short-circuit to + 24 Volts current supply

Display message
– PREHEATING INOPERATIVE

Minor fault
– No air preheating

Repercussion:
– Drop in engine power (120 seconds after the information)

Test:
– Continuity of engine wiring harness between:
  • ECU connector terminal **B11** and relay **R93** terminal **2**.
  • ECU connector terminal **A39** and relay **R93** terminal **1**.
  • Relay **R93** terminal **3** and resistance.
  • Resistance and earth.
  • Relay **R93** terminal **5** and **+**
– Insulation of each wire.

577 → 582 Fuel injectors

577 N° 1 cylinder fuel injector

578 N° 2 cylinder fuel injector

579 N° 3 cylinder fuel injector

580 N° 4 cylinder fuel injector

581 N° 5 cylinder fuel injector

582 N° 6 cylinder fuel injector

Electrical system open-circuit

Display message
– INJECTOR FAULT

Minor fault

Repercussion:
– Operating failure of fuel injector in question
– Injection pressure limited to **1000 bars**

Test:
Resistance of fuel injector solenoid valve winding (at **20°C): R = 0.3 → 0.5 Ω**
– Continuity of engine wiring harness between:
  • ECU connector terminal **A40 A41** and **173** cylinder injector terminal wire **1/2/3**
  • ECU connector terminal **A42 A43** and **174** cylinder injector terminal wire **4/5/6**
  • ECU connector terminal **A12** and N° **1** injector terminal wire **293**.
  • ECU connector terminal **A11** and N° **2** injector terminal wire **295**.
  • ECU connector terminal **A24** and N° **3** injector terminal wire **294**.
  • ECU connector terminal **A22** and N° **4** injector terminal wire **298**.
  • ECU connector terminal **A23** and N° **5** injector terminal wire **296**.
  • ECU connector terminal **A10** and N° **6** injector terminal wire **297**.

597 Battery charge voltage incorrect

9.6 V < Battery voltage > 18.5 V

31 V < Battery voltage > 34 V

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– No drop in engine power

Test:
– Correct operation of charging system
  • Charge voltage
  • Voltage regulator
  • Conformity, condition and connection of charging system
  • Condition and connection of batteries

600 Engine master ECU fault

Memory fault or fault memorizing procedure fault

Display message
– ENGINE FAULT

Minor fault

Repercussion:
– No drop in engine power
– No memorizing of faults

Engine / pump speed sensor acquisition interface fault

Display message
– ENGINE FAULT

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Erratic operation of the engine

Test:
EECU box using the RENAULT TRUCKS diagnostics tool.

597/598/601/604 Cruise control

Display message
– CRUISE CONTROL

Minor fault

Repercussion:
– Operating failure of cruise control, idling speed adjustment and fast idling functions

Test:
– Correct operation of cruise control:
  • Control in **"ON"** position: contact closed between terminals **B5 B6**
  • Control in **"OFF"** position: contact closed between terminals **B5 B6**
  • Control in **"R/+"** position: contact closed between terminals **B7 B2**
  • Control in **"S/-"** position: contact closed between terminals **B1 B2**
  • Control in **"O"** position: contact closed between terminals **B1 B2** and terminals **B7 B2**
– Continuity of wiring harness
– The control connector is the one connected directly to the cruise control
– Continuity of dashboard wiring harness between:
  • VECU **18**-way black connector terminal **6** and control connector terminal **B5**.
  • VECU **18**-way black connector terminal **7** and control connector terminal **B1**.
  • VECU **18**-way black connector terminal **8** and control connector terminal **B7** .
– Control current supply
  • Presence of earth at control connector terminal **B2**.
  • Presence of + **24 V** at control connector terminals **B1/B5/B7**.

804 High pressure fuel sensor

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power
– Default pressure mapping (**1500 bars**)
– Cut-off speed: **1300** to **1400 rpm**
– Injection pressure maximum value regulated by the rail pressure limiter

Test:
– Correct operation of sensor using the RENAULT TRUCKS diagnostics tool.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A6** and sensor connector terminal **1**.
  • ECU connector terminal **A33** and sensor connector terminal **2**.
  • ECU connector terminal **A13** and sensor connector terminal **3**.
– Insulation of each wire.
– Sensor current supply (ECU connected, ignition switched on):
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **1**.
  • Presence of + **5 Volts** at sensor connector terminal **3**.

Replace the rail pressure regulator without fail

805 Sensor (or several sensors) + 5 Volts current supply

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power
– Operation of sensors in fall-back mode.
– Cut-off speed: **1300** to **1400 rpm**

Test:
– Presence of **+5 Volts** at the sensor terminals (ECU connected, ignition switched on):
  • Engine oil pressure sensor terminal **B**
  • Injection pressure sensor terminal **3**
  • Boost air pressure sensor terminal **3**
– Continuity of engine wiring harness between:
  • ECU connector terminal **A26** and engine oil pressure sensor connector terminal **B**
  • ECU connector terminal **A13** and injection pressure sensor connector terminal **3**
  • ECU connector terminal **A3** and boost air pressure sensor connector terminal **3**
– Insulation of each wire.

818 Exhaust brake electrovalve

Short-circuit to earth

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Exhaust brake strangler jammed in closed position

Test:
– Resistance of electrovalve winding (at **20°C**): R = **43 → 49 Ω**
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **B42** and electrovalve terminal **1**.
  • ECU connector terminal **B22 B9** and electrovalve terminal **2**.
– Electrovalve current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at electrovalve connector terminal **2**.
– Insulation of each wire.

824 Starting aids

Short-circuit to earth

Display message
– IMMEDIATE STOP

Major fault
– Preheating permanently activated

Repercussion:
– Drop in engine power (120 seconds after the information)

Test:
– Continuity of engine wiring harness between:
  • ECU connector terminal **B11** and relay **R93** terminal **2**.
  • ECU connector terminal **A39** and relay **R93** terminal **1**.
  • Relay **R93** terminal **3** and resistance.
  • Resistance and earth.
  • Relay **R93** terminal **5** and **+**

833 → 838 Fuel injectors

833 N° 1 cylinder fuel injector

834 N° 2 cylinder fuel injector

835 N° 3 cylinder fuel injector

836 N° 4 cylinder fuel injector

837 N° 5 cylinder fuel injector

838 N° 6 cylinder fuel injector

Short-circuit to earth

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- Operating failure of N° **1/2/3** cylinder injectors or N° **4/5/6** cylinder injectors
- About **50%** drop in engine power
- Injection pressure limited to **1000 bars**

Test:
- Insulation of wires (injector in question disconnected)

849 → 850 Fuel flow regulation solenoid valve

849 Fuel flow regulation solenoid valve N° 1

850 Fuel flow regulation solenoid valve N° 2

Line open-circuit or short-circuit to earth

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- No drop in engine power
- Cut-off speed: **1300** to **1400 rpm**
- Flow regulation ensured by non-defective solenoid valve
- High injection pressure (defective solenoid valve jammed in the open position)
- Injection pressure maximum value regulated by the rail pressure limiter

Replace the rail pressure regulator without fail

Line short-circuit to +

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- No drop in engine power
- Cut-off speed: **1300** to **1400 rpm**
- Flow regulation ensured by non-defective solenoid valve
- High injection pressure (defective solenoid valve jammed in the closed position)

Test:
- Resistance of solenoid valve winding (at **20°C**): R = **14 → 16 Ω**

Solenoid valve N° **1**
- Continuity of engine wiring harness between:
  - ECU connector terminal **A9** and solenoid valve terminal **1**.
  - ECU connector terminal **A20** and solenoid valve terminal **2**.

Solenoid valve N° **2**
- Continuity of engine wiring harness between:
  - ECU connector terminal **A7** and solenoid valve terminal **2**.
  - ECU connector terminal **A21** and solenoid valve terminal **1**.

851 Injection pressure outside operating band

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power
– Cut-off speed: **1300** to **1400 rpm**
– Operation with a random rail pressure
– Injection pressure maximum value regulated by the rail pressure limiter

Test:
Fuel aspiration system.
– for leaks.
– for fouling (especially the prefilter).
Low pressure circuit.
– for leaks.
– correct operation of booster pump.
– for fouling (especially the filters).
High pressure circuit.
– for leaks.
– correct operation of high pressure pump.
– correct operation of fuel flow regulation solenoid valves.
– rail leak-off return circuit.
– correct operation of flow limiters.
– correct operation of fuel injectors.

Replace the rail pressure regulator without fail if the injection pressure is too high.

853 Battery charge voltage incorrect

Battery voltage < 9.6V

Battery voltage > 34V

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power

Test:
– Correct operation of charging system
  • Charge voltage
  • Voltage regulator
  • Conformity, condition and connection of charging system
  • Condition and connection of batteries

854 Communication line between engine and vehicle ECUs (CAN BUS)

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– Engine speed permanently steady at **890 rpm.**

Test:
– Continuity of vehicle wiring harness between:
  • Injection ECU connector terminal **B8** and vehicle ECU connector terminal **7** (green wire).
  • Injection ECU connector terminal **B39** and vehicle ECU connector terminal **6** (red wire).
– Insulation of each wire.
– ECU current supply (vehicle ECU connected):
  • Presence of earth at injection ECU connector terminals **B12, B24, B43**.
  • Presence of after ignition + at terminals **B9, B22, B10, B41**.

856 Engine master ECU fault

Internal fault

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– Operating failure of N° **1/2/3** cylinder injectors or N° **4/5/6** cylinder injectors
– About **50%** drop in engine power

Test:
EECU box using the RENAULT TRUCKS diagnostics tool.

DIAGNOSTICS AID PHASE 1

16 Fuel filters clogging sensor

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– No drop in engine power

Test:
– Correct operation of switch:
  • Switch contacts open in the rest position.
  • Switch contacts open when **P1** ≥ **3 bars P2.**
  • Button returns to rest position under effect of return spring.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at one of the switch connector terminals (wire **292**).
– Continuity of vehicle wiring harness between:
  • **EECU** connector terminal **B33** and one of the sensor terminals (wire **8072**).
  • **EECU B9, B22 B32** and one of the sensor terminals (wire **292**).
– Insulation of each wire.

91 / 558 Accelerator pedal

Display message
– PEDAL FAULT.

Major fault

Repercussion:
– Engine speed permanently steady at **890 rpm.**

Test:
The test on the accelerator pedal should only be performed using the RENAULT TRUCKS test tool
– Continuity of dashboard wiring harness between:
  • Terminal N° **1** of the black connector **18** and sensor connector terminal **5**.
  • Terminal N° **3** of the black connector **18** and sensor connector terminal **6**.
  • Terminal N° **4** of the black connector **18** and sensor connector terminal **1**.
  • Terminal N° **5** of the black connector **18** and sensor connector terminal **3**.

94 High pressure fuel sensor

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power
– Default pressure mapping (**1500 bars**)
– Cut-off speed: **1300** to **1400 rpm**
– Injection pressure maximum value regulated by the rail pressure limiter

Test:
– Correct operation of sensor using the RENAULT TRUCKS diagnostics tool.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A6** and sensor connector terminal **1**.
  • ECU connector terminal **A33** and sensor connector terminal **2**.
  • ECU connector terminal **A13** and sensor connector terminal **3**.
– Insulation of each wire.
– Sensor current supply (ECU connected, ignition switched on):
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **1**.
  • Presence of + **5 Volts** at sensor connector terminal **3**.

Replace the rail pressure regulator without fail

95 Clogged fuel filters

Display message
– FUEL FILTERS CLOGGED

Minor fault

Repercussion:
– No drop in engine power
– Cut-off speed **1300** to **1400 rpm.**

Test:
– Replace the fuel filters

98 Engine oil level sensor

Display message
– SENSOR FAULT.

Minor fault

Repercussion:
– No drop in engine power
– Default value: engine oil circuit empty

Test:
– Resistance of sensor (see "Features" chapter for the values).
– Continuity of engine wiring harness between:
  • ECU connector terminal **A17** and sensor connector terminal **2**.
  • ECU connector terminal **A38** and sensor connector terminal **1**.
– Insulation of each wire.

100 Engine oil pressure sensor

Display message
– URGENT REPAIR.

Minor fault

Repercussion:
– No drop in engine power
– Default value: oil pressure = **6 bars.**

Test:
– Correct operation of sensor using the RENAULT TRUCKS diagnostics tool.
– Continuity of engine wiring harness between:
  • ECU connector terminal **A5** and sensor connector terminal **C**.
  • ECU connector terminal **A18** and sensor connector terminal **A**.
  • ECU connector terminal **A26** and sensor connector terminal **B**.
– Insulation of each wire.
– Sensor current supply (ECU connected, ignition switched on):
  • Presence of + **5 Volts** at sensor connector terminal **B**.
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **A**.

102 Boost air pressure sensor

Display message
– POWER LOSS

Minor fault

Repercussion:
– Protection mode (low output, without EGR).
– Default value: boost air pressure = **1013 mbar(s).**
– Default value: atmospheric air pressure = **0 mbar(s).**

Test:
– Resistance at sensor terminals (at **20 °C**) between:
  • Terminals N° **3** N° **4**: R = **3400 → 8200 Ω**.
  • Terminals N° **3** N° **1**: R = **2400 → 8200 Ω**.
– Continuity of engine wiring harness between:
  • ECU connector terminal **A19** and sensor connector terminal **1**.
  • ECU connector terminal **A3** and sensor connector terminal **3**.
  • ECU connector terminal **A34** and sensor connector terminal **4**.
– Insulation of each wire.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of + **5 Volts** at sensor connector terminal **3**.
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **1**.

105 Boost air temperature sensor

Display message
– POWER LOSS

Minor fault

Repercussion:
– Protection mode.
– Default value: boost air temperature = **60°C**

Test:
– Resistance of sensor (see "Features" chapter for the values).
– Continuity of engine wiring harness between:
  • ECU connector terminal **A19** and sensor connector terminal **1**.
  • ECU connector terminal **A2** and sensor connector terminal **2**.
– Insulation of each wire.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of earth (R< **10 Ω**) at sensor connector terminal **1**.
  • Presence of + **5 Volts** at sensor connector terminal **2**.

110 Engine cooling circuit temperature sensor

Display message
– URGENT REPAIR.

Minor fault

Repercussion:
– Protection mode.
– Default value: coolant temperature = **98 °C.**

Test:
– Resistance of sensor (see "Features" chapter for the values).
– Continuity of engine wiring harness between:
  • ECU connector terminal **A30** and sensor connector terminal **2**.
  • ECU connector terminal **A1** and sensor connector terminal **1**.
    - Presence of + **5 Volts** at sensor connector terminal **1**.
    - Presence of earth (R< **10 Ω**) at sensor connector terminal **2**.

164 Injection pressure outside operating band

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- No drop in engine power
- Cut-off speed: **1300** to **1400 rpm**
- Operation with a random rail pressure
- Injection pressure maximum value regulated by the rail pressure limiter

Test:
Fuel aspiration system.
- for leaks.
- for fouling (especially the prefilter).

Low pressure circuit.
- for leaks.
- correct operation of booster pump.
- for fouling (especially the filters).

High pressure circuit.
- for leaks.
- correct operation of high pressure pump.
- correct operation of fuel flow regulation solenoid valves.
- rail leak-off return circuit.
- correct operation of flow limiters.
- correct operation of fuel injectors.

Replace the rail pressure regulator without fail if the injection pressure is too high.

168 Battery charge voltage incorrect

9.6 V < Battery voltage > 18.5 V

31 V < Battery voltage > 34 V

Display message
– VOLTAGE FAULT

Minor fault

Battery voltage < 9.6V

Battery voltage > 34V

Display message
– VOLTAGE FAULT

Major fault

Repercussion:
– No drop in engine power

Test:
– Correct operation of charging system
  • Charge voltage
  • Voltage regulator
  • Conformity, condition and connection of charging system
  • Condition and connection of batteries

190 Flywheel speed sensor

Display message
– URGENT REPAIR.

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Engine operation impaired if there is reversal of polarity
– Longer starting time (about 6 seconds)
– Operation on pump speed sensor

Test:
– Resistance at sensor terminals (at **20°C**): **R = 770 → 950 Ω**
– Insulation of each wire.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A29** and sensor connector terminal **1**.
  • ECU connector terminal **A37** and sensor connector terminal **2**.

597 / 598 / 601 /604 Cruise control

Display message
– CRUISE CONTROL INOPERATIVE

Minor fault

Repercussion:
– Operating failure of cruise control, idling speed adjustment and fast idling functions

Test:
– Correct operation of cruise control:
  • Control in **"ON"** position: contact closed between terminals **B5 B6**
  • Control in **"OFF"** position: contact closed between terminals **B5 B6**
  • Control in **"R/+"** position: contact closed between terminals **B7 B2**
  • Control in **"S/-"** position: contact closed between terminals **B1 B2**
  • Control in **"O"** position: contact closed between terminals **B1 B2** and terminals **B7 B2**
– Continuity of wiring harness
– The control connector is the one connected directly to the cruise control
– Continuity of dashboard wiring harness between:
  • VECU **18**-way black connector terminal **6** and control connector terminal **B5**.
  • VECU **18**-way black connector terminal **7** and control connector terminal **B1**.
  • VECU **18**-way black connector terminal **8** and control connector terminal **B7**.
– Control current supply
  • Presence of earth at control connector terminal **B2**.
  • Presence of + **24 V** at control connector terminals **B1/B5/B7.**

611 Engine master ECU fault

Internal fault

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– Operating failure of N° **1/2/3** cylinder injectors or N° **4/5/6** cylinder injectors
– About **50%** drop in engine power

Test:
EECU box using the RENAULT TRUCKS diagnostics tool.

628 / 630 Parameter definition

Display message
– PARAMETER DEFINITION

Minor fault
– Parameters of ECU supplied by BOSCH not redefined by RENAULT TRUCKS.

Repercussion:
– No drop in engine power

Remedy:
– Define the EECU parameters.

629 / 631 / 970 Engine master ECU fault

Memory fault or fault memorizing procedure fault

Display message
– ENGINE FAULT

Minor fault

Repercussion:
– No drop in engine power
– No memorizing of faults

Engine / pump speed sensor acquisition interface fault

Display message
– ENGINE FAULT

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Erratic operation of the engine

Test:
EECU box using the RENAULT TRUCKS diagnostics tool.

636 High pressure pump speed sensor

Display message
– URGENT REPAIR

Minor fault

Repercussion:
– No drop in engine power
– Longer starting time (about 6 seconds)
– Operation of engine speed sensor on flywheel

Test:
– Resistance at sensor terminals (at **20°C**): **R = 770 → 950 Ω**
– Insulation of each wire.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A4** and sensor connector terminal **2**.
  • ECU connector terminal **A31** and sensor connector terminal **1**.

651 → 656 Fuel injectors

651 N° 1 cylinder fuel injector

652 N° 2 cylinder fuel injector

653 N° 3 cylinder fuel injector

654 N° 4 cylinder fuel injector

655 N° 5 cylinder fuel injector

656 N° 6 cylinder fuel injector

Electrical system open-circuit

Display message
- INJECTOR FAULT

Minor fault

Repercussion:
- Operating failure of fuel injector in question
- Injection pressure limited to **1000 bars**

Test:
Resistance of fuel injector solenoid valve winding (at **20°C): R = 0.3 → 0.5 Ω**
- Continuity of engine wiring harness between:
  - ECU connector terminal **A40 A41** and **173** cylinder injector terminal wire **1/2/3**
  - ECU connector terminal **A42 A43** and **173** cylinder injector terminal wire **4/5/6**
  - ECU connector terminal **A12** and N° **1** injector terminal wire **293**.
  - ECU connector terminal **A11** and N° **2** injector terminal wire **295**.
  - ECU connector terminal **A24** and N° **3** injector terminal wire **294**.
  - ECU connector terminal **A22** and N° **4** injector terminal wire **298**.
  - ECU connector terminal **A23** and N° **5** injector terminal wire **296**.
  - ECU connector terminal **A10** and N° **6** injector terminal wire **297**.

Short-circuit to earth

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- Operating failure of N° **1/2/3** cylinder injectors or N° **4/5/6** cylinder injectors
- About **50%** drop in engine power
- Injection pressure limited to **1000 bars**

Test:
- Insulation of wires (injector in question disconnected)

676 Starting aids

Open-circuit or short-circuit to + 24 Volts current supply

Display message
– AIR PREHEATING: SWITCH OFF IGNITION

Major fault
– No air preheating

Repercussion:
– Drop in engine power (120 seconds after the information)

Test:
– Continuity of engine wiring harness between:
  • ECU connector terminal **B11** and relay **R93** terminal **2**.
  • ECU connector terminal **A39** and relay **R93** terminal **1**.
  • Relay **R93** terminal **3** and resistance.
  • Resistance and earth.
  • Relay **R93** terminal **5** and **+**
– Insulation of each wire.

Short-circuit to earth

Display message
– IMMEDIATE STOP

Major fault
– Preheating permanently activated

Repercussion:
– Drop in engine power (120 seconds after the information)

Test:
– Continuity of engine wiring harness between:
  • ECU connector terminal **B11** and relay **R93** terminal **2**.
  • ECU connector terminal **A39** and relay **R93** terminal **1**.
  • Relay **R93** terminal **3** and resistance.
  • Resistance and earth.
  • Relay **R93** terminal **5** and **+**

732 EGR solenoid valve

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– EGR valve closed

Test:
– Resistance of solenoid valve winding (at **20°C**): R = **43 → 49 Ω**
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A25** and electrovalve terminal **1**.
  • ECU connector terminal **A39** and electrovalve terminal **2**.
– Electrovalve current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at electrovalve connector terminal **2**.
– Insulation of each wire.

1074 Exhaust brake solenoid valve

Open-circuit or short-circuit to + 24 Volts current supply

Display message
– ENGINE BRAKE INOPERATIVE

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Operating failure of the exhaust brake function

Test:
– Resistance of solenoid valve winding (at **20°C**): R = **43 → 49 Ω**
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **A42** and electrovalve terminal **1**.
  • ECU connector terminal **B22 B9** and electrovalve terminal **2**.
– Electrovalve current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at electrovalve connector terminal **2**.
– Insulation of each wire.

Short-circuit to earth

Display message
– ENGINE BRAKE INOPERATIVE

Major fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Exhaust brake strangler jammed in closed position

Test:
– Resistance of electrovalve winding (at **20°C**): R = **43 → 49 Ω**
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **B42** and electrovalve terminal **1**.
  • ECU connector terminal **B22 B9** and electrovalve terminal **2**.
– Electrovalve current supply (ECU connected, ignition switched on):
  • Presence of + **24 Volts** at electrovalve connector terminal **2**.
– Insulation of each wire.

1079 Sensor (or several sensors) + 5 Volts current supply

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power
– Operation of sensors in fall-back mode.
– Cut-off speed: **1300** to **1400 rpm**

Test:
– Presence of **+5 Volts** at the sensor terminals (ECU connected, ignition switched on):
  • Engine oil pressure sensor terminal **B**
  • Injection pressure sensor terminal **3**
  • Boost air pressure sensor terminal **3**
– Continuity of engine wiring harness between:
  • ECU connector terminal **A26** and engine oil pressure sensor connector terminal **B**
  • ECU connector terminal **A13** and injection pressure sensor connector terminal **3**
  • ECU connector terminal **A3** and boost air pressure sensor connector terminal **3**
– Insulation of each wire.

1231 Communication line between engine and vehicle ECUs (CAN BUS)

Display message
– URGENT REPAIR

Major fault

Repercussion:
– Engine speed permanently steady at **890 rpm.**

Test:
– Continuity of vehicle wiring harness between:
  • Injection ECU connector terminal **B8** and vehicle ECU connector terminal **7** (green wire).
  • Injection ECU connector terminal **B39** and vehicle ECU connector terminal **6** (red wire).
– Insulation of each wire.
– ECU current supply (vehicle ECU connected):
  • Presence of earth at injection ECU connector terminals **B12, B24, B43**.
  • Presence of after ignition + at terminals **B9, B22, B10, B41**.

1267 Engine stop control (cab tilted)

Display message
– WORKSHOP STOP.

Minor fault

Repercussion:
– No drop in engine power
– Operating failure of the engine stop function with the switch

Test:
– Correct operation of switch:
  • Switch contacts open in the rest position.
  • Switch contacts closed when the button is depressed
  • Button returns to rest position under effect of return spring.
– Switch current supply (ECU connected, ignition switched on):
  • Presence of **24 Volts** at one of the switch connector terminals.
– Continuity of vehicle wiring harness between:
  • ECU connector terminal **B32** and switch terminal **2**.
  • ECU connector terminal **B22 B9** and switch terminal **1**.
– Insulation of each wire.

1347 → 1348 Fuel flow regulation solenoid valve

1347 Fuel flow regulation solenoid valve N° 1

1348 Fuel flow regulation solenoid valve N° 2

Line open-circuit or short-circuit to earth

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- No drop in engine power
- Cut-off speed: **1300** to **1400 rpm**
- Flow regulation ensured by non-defective solenoid valve
- High injection pressure (defective solenoid valve jammed in the open position)
- Injection pressure maximum value regulated by the rail pressure limiter

Replace the rail pressure regulator without fail

Line short-circuit to +

Display message
- IMMEDIATE STOP

Major fault

Repercussion:
- No drop in engine power
- Cut-off speed: **1300** to **1400 rpm**
- Flow regulation ensured by non-defective solenoid valve
- High injection pressure (defective solenoid valve jammed in the closed position)

Test:
- Resistance of solenoid valve winding (at **20°C**): R = **14 → 16 Ω**

Solenoid valve N° **1**
- Continuity of engine wiring harness between:
  - ECU connector terminal **A9** and solenoid valve terminal **1**.
  - ECU connector terminal **A20** and solenoid valve terminal **2**.

Solenoid valve N° **2**
- Continuity of engine wiring harness between:
  - ECU connector terminal **A7** and solenoid valve terminal **2**.
  - ECU connector terminal **A21** and solenoid valve terminal **1**.

1479 Engine master ECU fault

Memory fault or fault memorizing procedure fault

Display message
– IMMEDIATE STOP

Major fault

Repercussion:
– No drop in engine power
– No memorizing of faults

Engine / pump speed sensor acquisition interface fault

Display message
– ENGINE FAULT

Minor fault

Repercussion:
– Drop in engine power (120 seconds after the information)
– Erratic operation of the engine

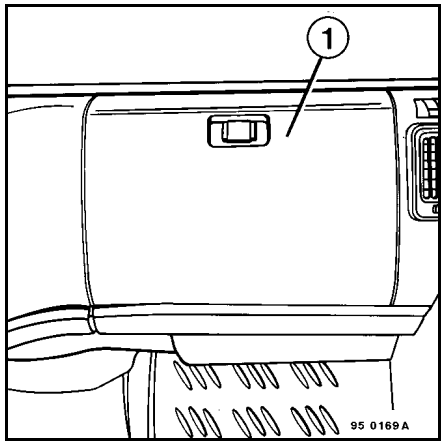
Test:
EECU box using the RENAULT TRUCKS diagnostics tool.

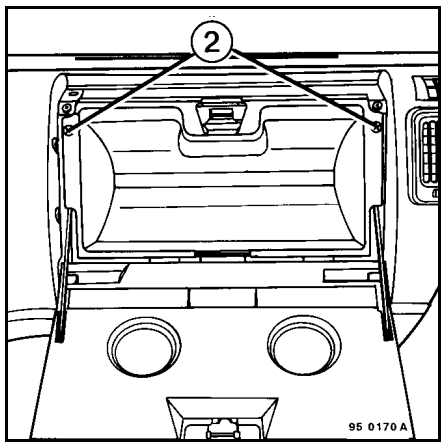
ELECTRICS

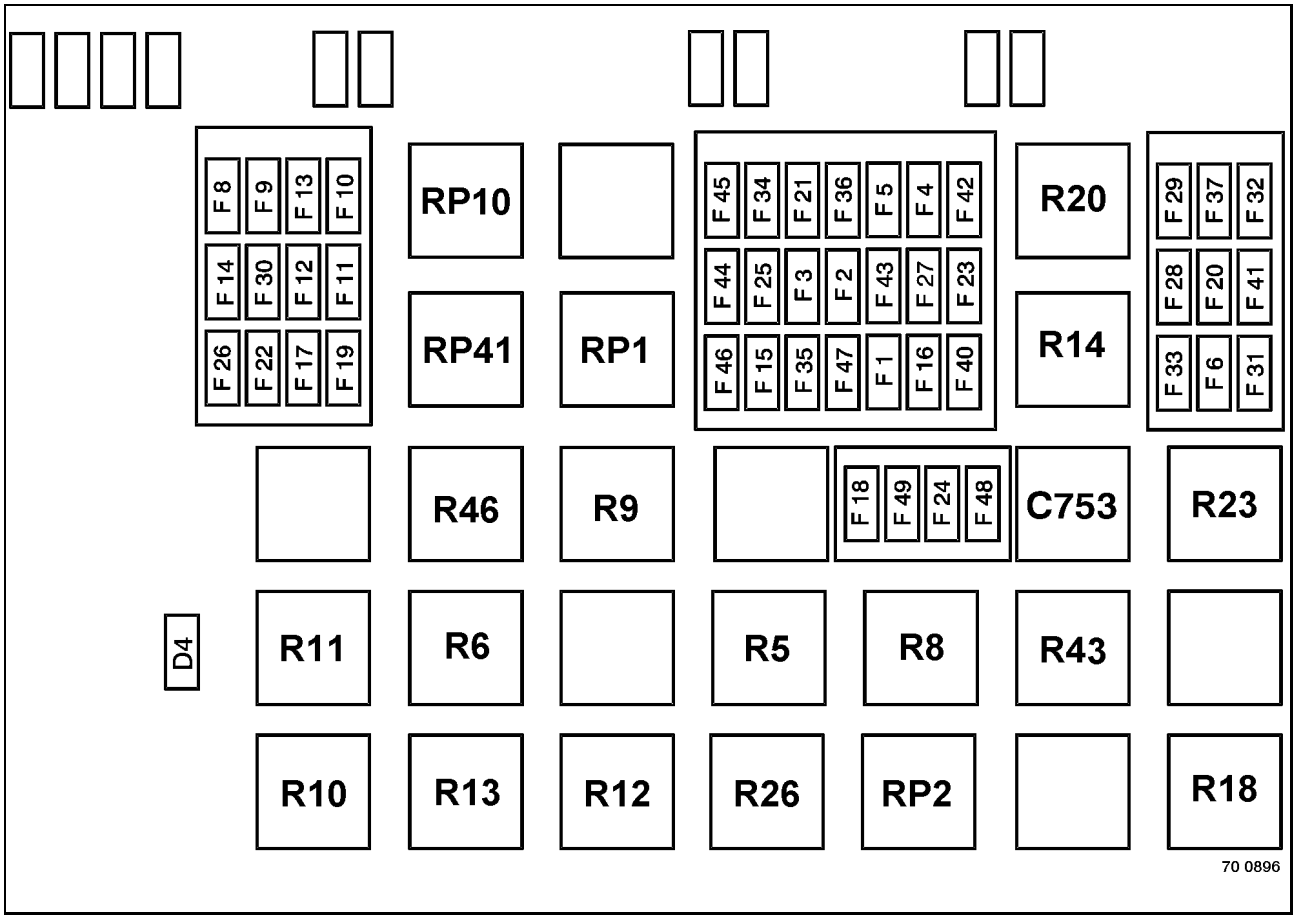
Electrics (PREMIUM)

Fuses:
To gain access to the fuses:
- Tilt cover **(1)**.
- Turn both catches **(2)**.

Tilt the oddments box.



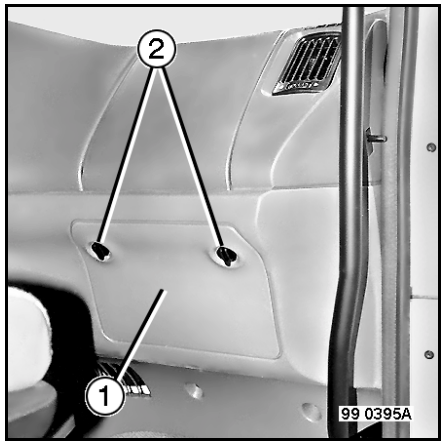


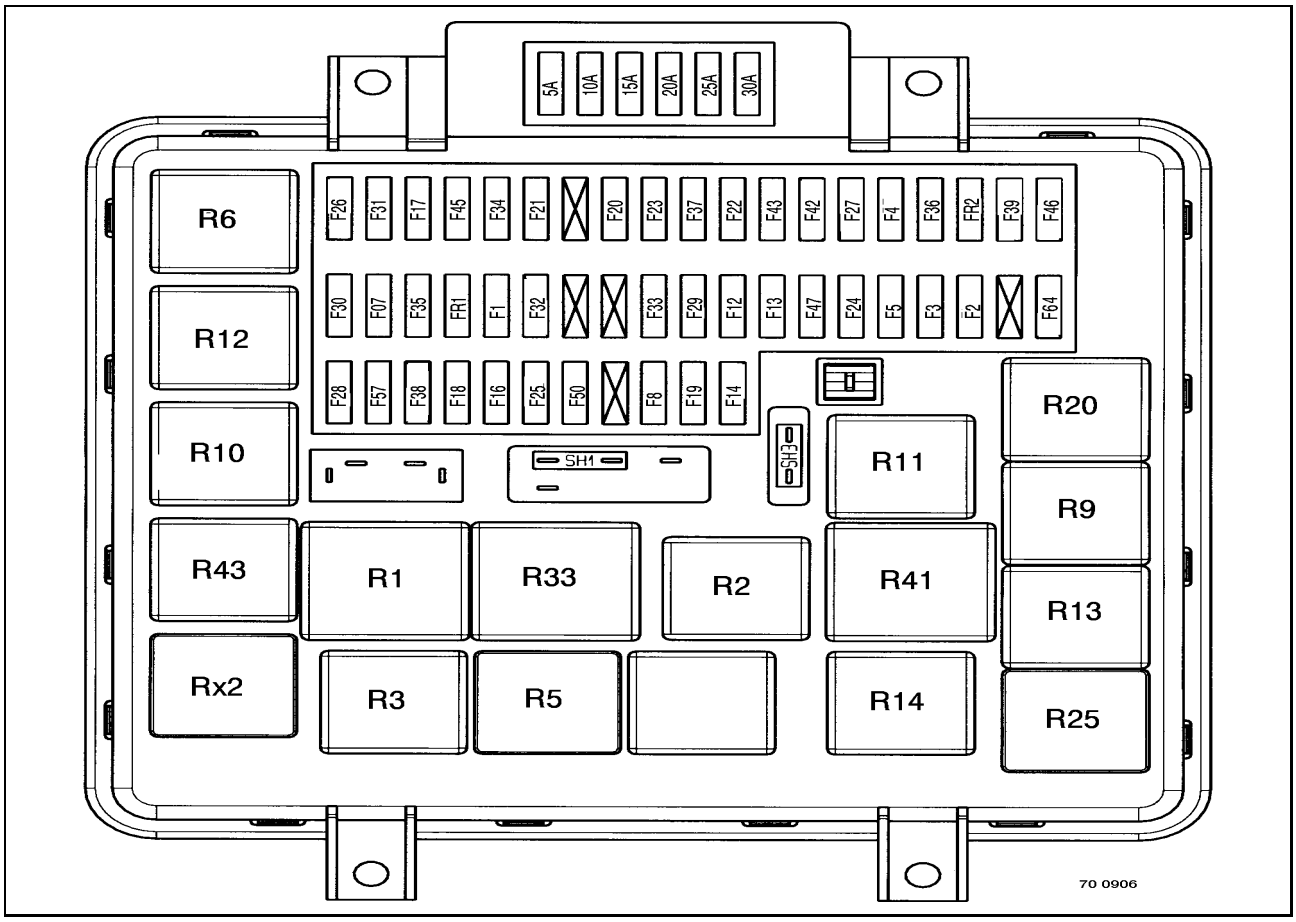


Code N°	Name of function	Fuse item N°	am-per-age
9202	Engine master ECU (EECU)	F7	10
9202	Engine master ECU (EECU)	F38	25
9201	Vehicle master ECU (VECU)	F57	10
7614	Principal display	F1	10

Electrics (MIDLUM)

Fuses:
To gain access to the fuses:
- Turn both catches **(2)**.
- Tilt cover **(1)**.

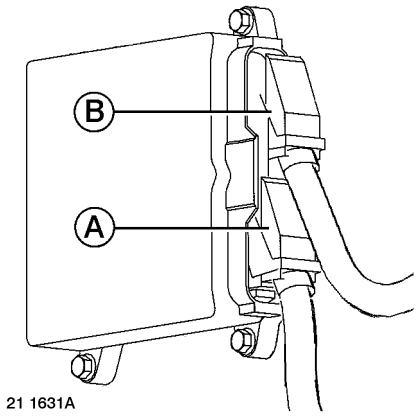




Code N°	Name of function	Fuse item N°	am-per-age
9202	Engine master ECU (EECU)	F7	10
9202	Engine master ECU (EECU)	F38	25
9201	Vehicle master ECU (VECU)	F57	10
7614	Principal display	F16	10

Assignment of pins to ECU wiring harness connector

(Connector face view)



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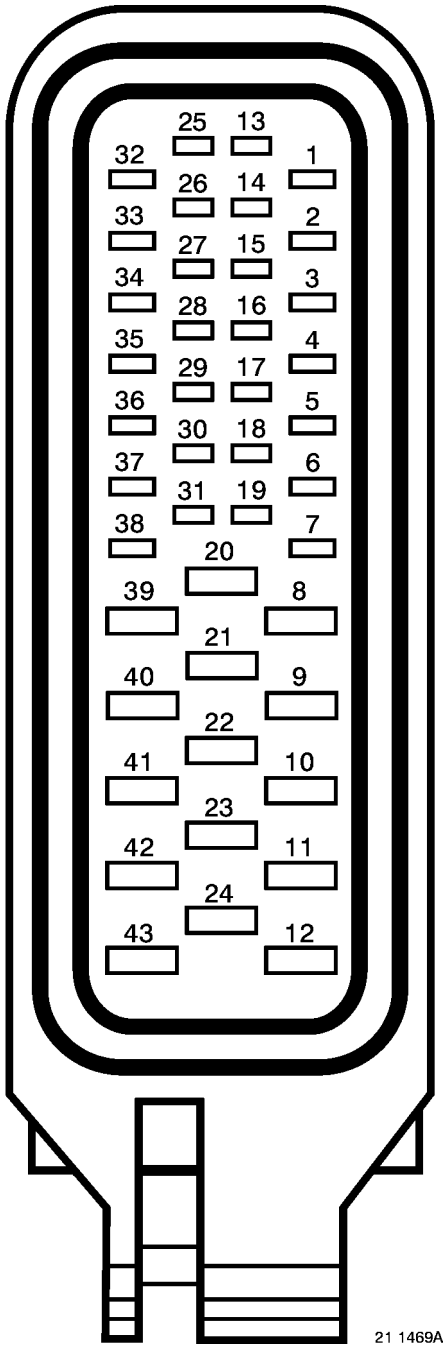

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Electrical diagram

How to read the diagrams

The following electrical diagrams represent only the electrical wiring involved in the fuel-injection function. For further details, consult the workshop manual "Electrics" section for the vehicle.

Key to appliances

2196 After ignition power supply relay N° 1

2200 Anti-theft electronic box

2261 Steering lock and starting control

2267 Engine compartment engine stop control

2400 Fuel filter clogging pressure switch

2414 Preheating relay N°1

5266 Accelerator pedal position sensor

5269 Engine cruise control and speed regulator adjustment control

7362 Coolant temperature sensor

7368 Oil pressure sensor

7519 Diagnostics socket

7614 Principal display

8059 Electric or hydraulic retardation control

8150 Exhaust brake electrovalve

8178 Parking brake indicator air pressure sensor

8275 Engine oil level sensor

8366 Power take-off position sensor

8466 Neutral switch position sensor

9200 Boost air pressure and temperature sensor

9201 Vehicle master ECU (VECU)

9202 Engine master ECU (EECU)

9204 "EGR" electrovalve

9208 Fuel high pressure sensor

9210 "VECU / EECU" power supply relay

9212 High Pressure pump, solenoid valve cylinder

9213 High Pressure pump, solenoid valve cylinder

9220 Unit pump N° 1 incorporating solenoid valve

9221 Unit pump N° 2 incorporating solenoid valve

9222 Unit pump N° 3 incorporating solenoid valve

9223 Unit pump N° 4 incorporating solenoid valve

9224 Unit pump N° 5 incorporating solenoid valve

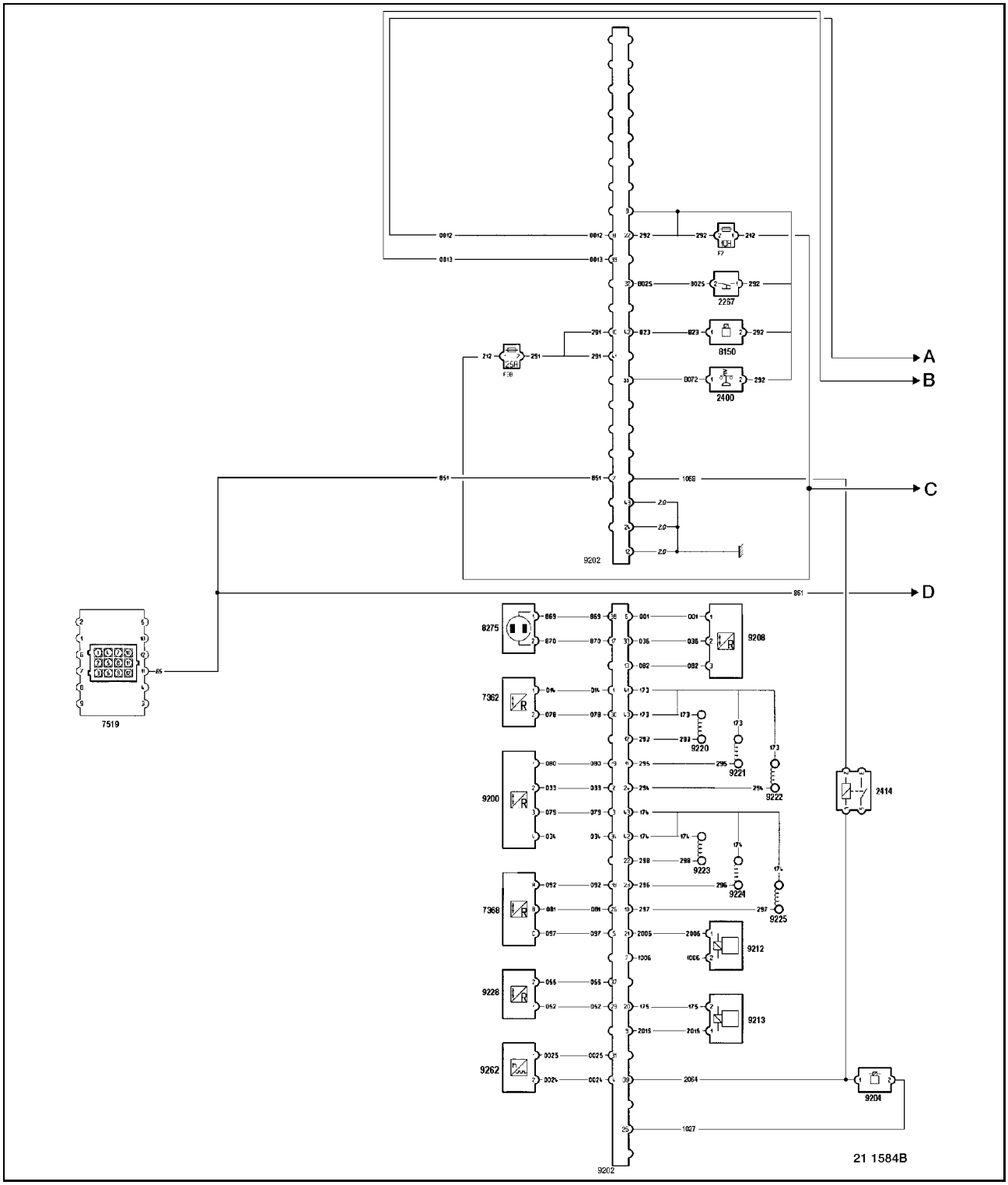
9225 Unit pump N° 6 incorporating solenoid valve

9228 Flywheel speed sensor

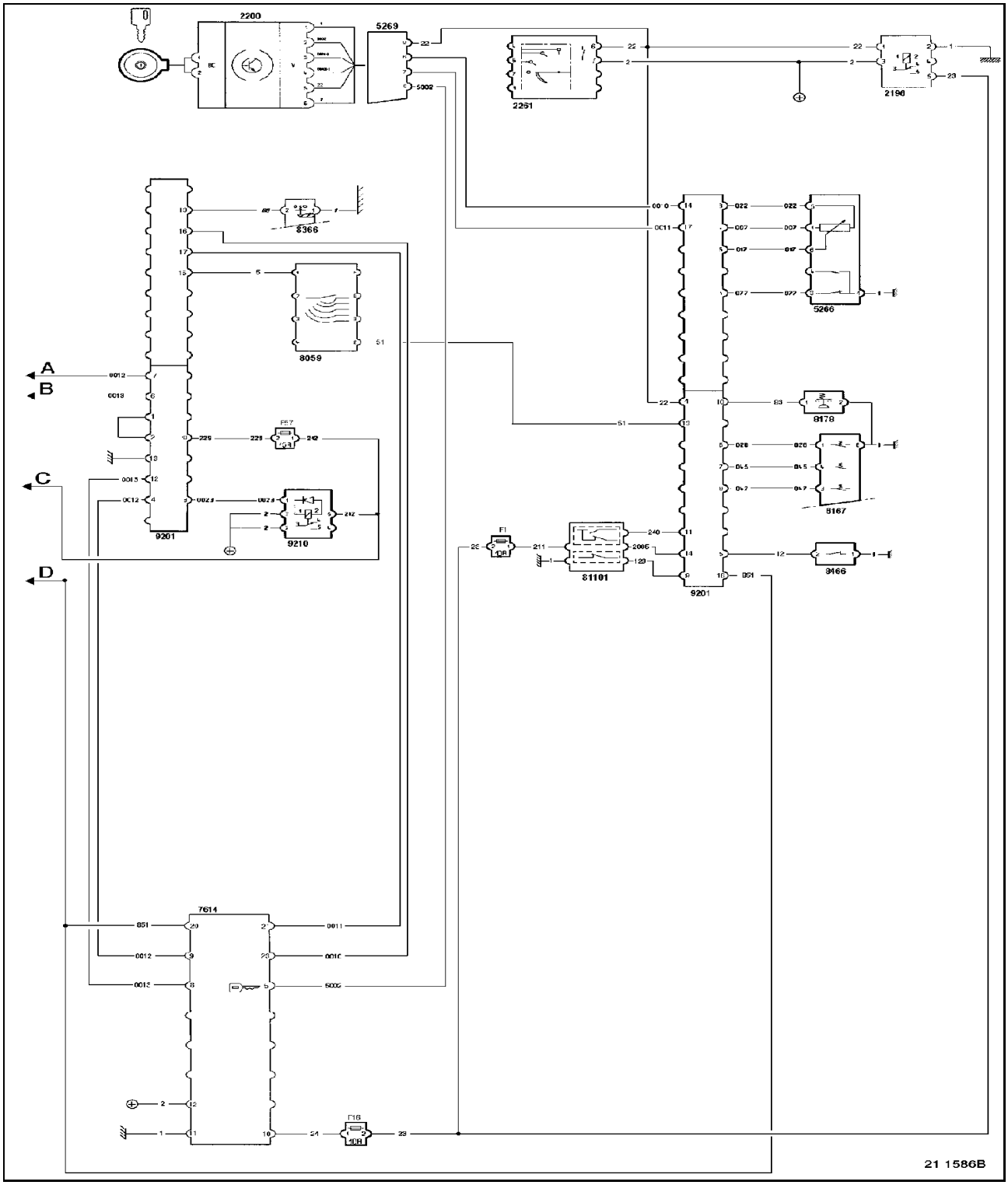
9262 Pump speed sensor (injection or high pressure)

8103 Clutch switch and stop lights switch position sensor

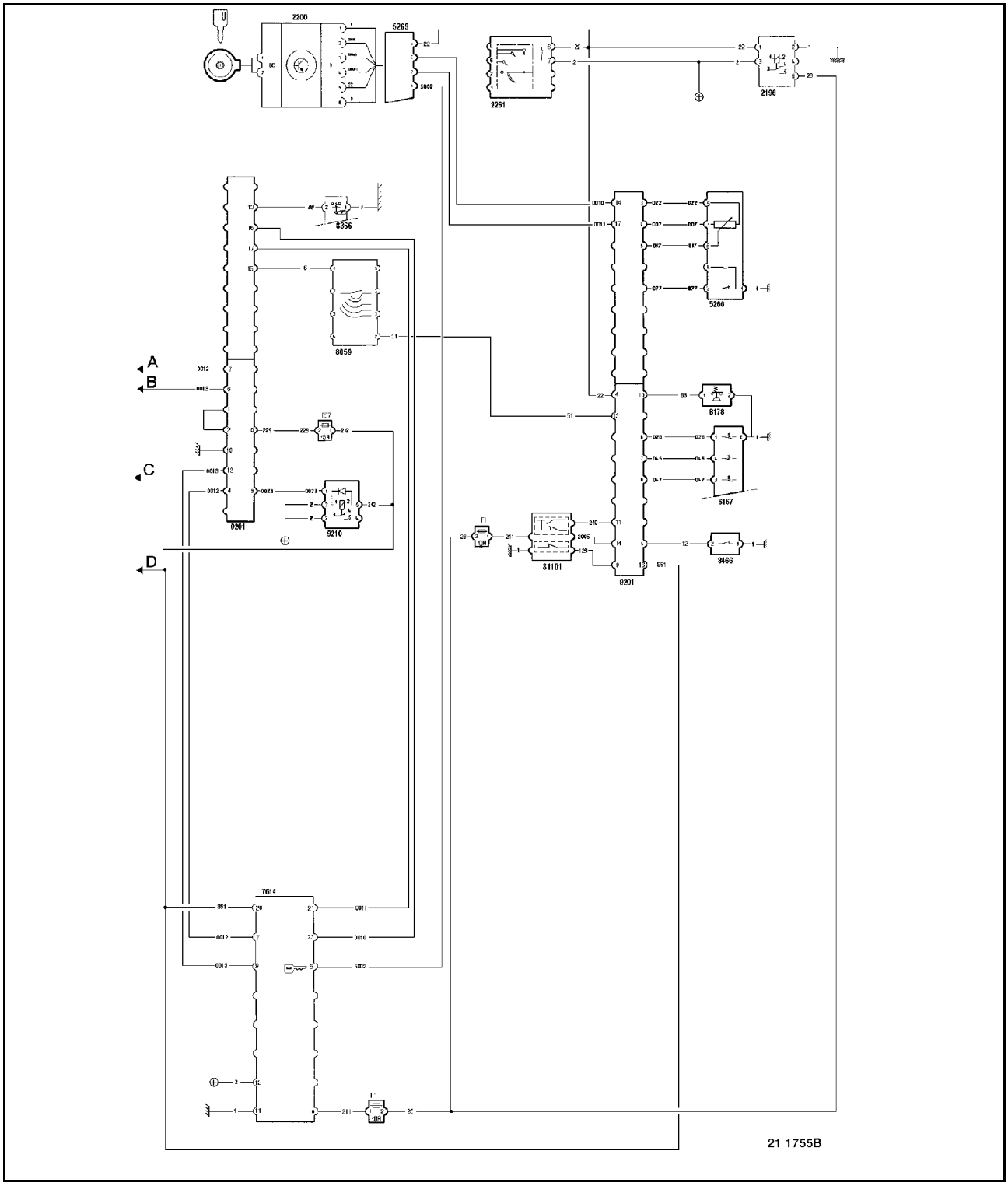
Master electronic control unit **EECU**



Master electronic control unit **VECU MIDLUM**



Master electronic control unit **VECU PREMIUM**



TURBOCHARGER

Operating trouble

Each turbocharged engine possesses its own characteristic sound. Owing to this, many defects can be detected merely by noticing a change in the customary noise signature.
If the sound level becomes sharper, it may be due to leaking charge air (between turbocharger and intake manifold) or exhaust gas, or a drive shaft defect.
An intermittent change in noise level may be due to turbocharger fouling or use of the engine at underspeed in relation to load.
The appearance of vibration may indicate a drive shaft defect.
A sudden reduction in noise, accompanied by the appearance of black or blue exhaust smoke is the sign of total break-up of the turbocharger.
In all cases, immediately stop the engine to avoid more serious damage to the turbocharger and to the engine.

On-vehicle checks

Engine stopped:
Refer to technical document "**DT 357**".
Engine idling:
Check the air pipes between air filter and turbocharger for leaks by spraying Start Pilote fluid. Leakage will be indicated by an increase in engine speed.
Engine running at 1 200 rpm.:
Check for leaks between turbocharger and engine using a leak detector.Check for exhaust gas leaks (actuate the exhaust brake). Replace gaskets, if necessary.A gas leak can be detected by a change in colour at the place of the leak.
Removal / fitting of turbocharger
These operations do not present any difficulty.Clean all the air conduits and make sure there is no foreign matter left.Before tightening the exhaust manifold setscrews, smear the screw-threads with high temperature-resistant grease (Renault Trucks Oils Gripcott NF grease) or equivalent.
Tighten to torque (see page B-3-5).

Any turbocharger replacement, where the cause of damage has not been defined, may lead to new incidents and serious engine damage.
Do not use jointing compound on the turbocharger lubrication pipe fastening flanges.Before installing the turbocharger, pour fresh oil through the oil inlet port and turn the rotor by hand to lubricate the journals and the thrust bearing.
After installing the turbocharger, run the engine and wait for 30 seconds before accelerating.

Incidents and probable causes

Before implicating the turbocharger, ensure that the engine and its surrounds are in perfect condition.

Lack of engine power
- Air filter clogged
- Aftercooler air/air heat exchanger (tube stack fouled)
- Aspiration air manifold blockage or crushing (between air filter and turbocharger)
- Boost air manifold blockage or crushing (between turbocharger and engine)
- Foreign matter between air filter and turbocharger
- Exhaust blockage or crushing
- Air or gas leak between turbocharger and engine
- Turbine housing damaged or fouled
- Turbo impeller vanes damaged
- Turbocharger pressure regulation system (wastegate) malfunction*

Black exhaust smoke
- Air filter clogged
- Aspiration air manifold blockage or crushing (between air filter and turbocharger)
- Boost air manifold blockage or crushing (between turbocharger and engine)
- Air or gas leak between turbocharger and engine
- Turbocharger damaged or fouled
- Turbocharger pressure regulation system (wastegate) malfunction*

Blue exhaust smoke
- Engine breather clogged
- Oil consumption
- Oil return pipe clogged or crushed
- Turbocharger damaged or fouled
- Prolonged running at idling speed
- Air compressor defective

Strange noise
- Air filter clogged
- Air filter / turbocharger link leakage
- Aspiration air manifold blockage or crushing (between air filter and turbocharger)
- Boost air manifold blockage or crushing (between turbocharger and engine)
- Foreign matter between air filter and turbocharger
- Exhaust blockage or crushing
- Air or gas leak between turbocharger and engine
- Turbocharger lubrication defect
- Turbocharger damaged or fouled
- Engine used at underspeed in relation to load
- Turbocharger pressure regulation system (wastegate) malfunction*

Incidents and probable causes (cont.)

Excessive oil consumption
- Air filter clogged
- Engine breather clogged
- Aspiration air manifold blockage or crushing (between air filter and turbocharger)
- Turbocharger lubrication defect
- Oil return pipe clogged or crushed
- Turbocharger damaged or fouled
- Prolonged running at idling speed
- Air compressor defective

Oil in air pipes before turbocharger
- Air filter clogged
- Aspiration air manifold blockage or crushing (between air filter and turbocharger)
- Air compressor defective

Oil in air pipes after turbocharger
- Air filter clogged
- Engine breather clogged
- Aspiration air manifold blockage or crushing (between air filter and turbocharger)
- Oil return pipe clogged or crushed
- Turbocharger damaged or fouled
- Prolonged running at idling speed

Oil in exhaust manifold
- Prolonged running at idling speed

Oil in exhaust pipes after turbocharger
- Engine breather clogged
- Oil return pipe clogged or crushed
- Turbocharger damaged or fouled
- Prolonged running at idling speed

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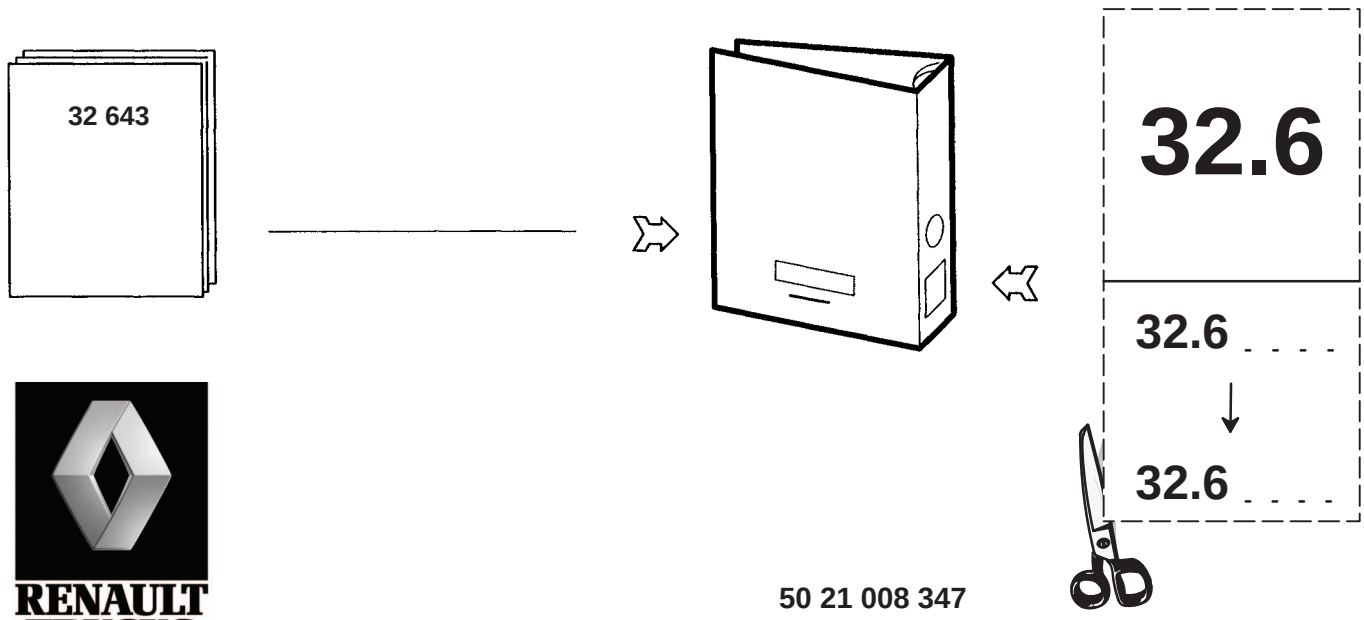
GEARBOX

GEARBOX	VEHICLE
EATON 4106 / 5206	MIDLINER 4x2 / 4x4 MIDLUM 4x2 / 4x4 PA 210 TRM 180 TRM 200 GBC 180 PREMIUM

NOTE
The above information may change in the course of time.
Only the "Consult" section of the workshop manuals directory in standard N° 10320 serves as reference.



RENAULT TRUCKS

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Section 6 Tools

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Generalities

Model designation

Example: FSO - 4106 A

FS	Standard prefix
O	Overdrive
4	Rated torque in ft.lbs
1	Series 1
06	Number of forward gears
A	Standard ratio set
B, C	Other ratio sets

Gearbox identification

All gearboxes are fitted with an identification plate on the left-hand side of the front half-casing, showing:

1. Gearbox serial number.
2. Gearbox model.
3. Manufacturing date code number.
4. Gearbox specification number.

The gearbox specification number is unique to each customer and gives precise details of the gearbox design level. This number must be quoted when ordering spare parts.

There are currently two design levels of the 4106 gearbox. Each level is identified by the specification number:

Y 04000
Y 04100

The middle digit denotes the design level.

Generalities

Technical data

MODEL			4106
Max. input torque	FS-4106A FS-4106B	640 Nm 650 Nm*	65 ft. lbs 66 ft. lb
for engine performance up to		134 kW	182 hp
Weight (1)		117 kg	
Length (2)		555 mm	
Oil capacity (4) Horizontal mounting Vertical mounting		 6.5 litres 7.5 litres	
Clutch housing		SAE Standard	
Power take-off ports		Left side (vertical mounting) Bottom right (horizontal mounting) SAE 6 bolt facing plus extended layshaft for Eaton PTO	

PTO driving gears (3)		Rotation to engine
driven from the reverse idler gear at :	Engine speed x	
FS-4106A (standard ratio)	0.226	same
FS-4106B (alternative ratio)	0.271	same
FSO-4106B (overdrive ratio)	0.336	same
driven from layshaft front gear at :	Engine speed x	
FS-4106A (standard ratio)	0.434	opposite
FS-4106B (alternative ratio)	0.519	opposite
FSO-4106B (overdrive ratio)	0.644	opposite

Gear	Standard ratio	% staging	Standard ratio	% staging	Overdrive ratio	% staging
6	1.00		1.00		0.79	
	—	38	—	30	—	26
5	1.38		1.30		1.00	
	—	45	—	44	—	35
4	2.00		1.87		1.35	
	—	55	—	50	—	55
3	3.10		2.80		2.09	
	—	69	—	57	—	69
2	5.25		4.38		3.53	
	—	72	—	72	—	72
1	9.03		7.54		6.08	
	—		—		—	
Bak	8.07		6.74		5.43	

(1) Including output coupling, low remote control; excluding clutch housing.
(2) Front face of gearbox casing to rear face of output flange.
(3) Recommended backlash: from 0.15 to 0.25 mm.
(4) Oil capacity without PTO.
* Higher torques: subject to approval by Eaton.

Generalities

Lubrication

Correct oil level

Before checking the oil level or refilling, the vehicle should be on level ground.
Make sure the oil level is flush with the filler port.

Draining the oil

Drain the gearbox while the oil is hot.
To drain the oil, remove the drain plug at the bottom of the casing.
Clean the drain plug before refitting.

Refilling with oil

Clean the surrounds of the filler plug.
Fill the gearbox until the oil is flush with the filler port.
The exact amount of oil depends on the inclination of the gearbox.
In every instance, fill until the oil is flush with the filler port.
Do not overfill - this causes oil to be forced out of the casing past the main shaft and input shaft seals.

Adding oil

It is recommended that different types and brands are not intermixed because of possible incompatibility.

Operating temperature

It is important that the gearbox operating temperature does not exceed 120 °C (250 °F) for an extended period of time. Operating temperatures above 120 °C cause breakdown of the oil and shorten gearbox service life.

Any combination of the following conditions can cause operating temperatures in excess of 120 °C:

1. Consistent operation at road speeds below 32 km/h (20 mph).
2. High engine speeds.
3. High ambient temperature.
4. Restricted air flow around gearbox.
5. Exhaust system too close to gearbox.
6. Engine operation at maximum power in overdrive.
7. High power PTO operation for extensive periods while stationary.

High operating temperatures may require more frequent oil changes.

Towing

When towing the vehicle, the propeller shaft must be disconnected between the gearbox and the drive axle.

Generalities

Recommended lubricants

Oils

Choice of lubricants according to operating temperature:

Renault Trucks Oils

Oil	Temperature range
MV3 20 W 30	da – 20° C to + 30° C
MV3 25 W 40	da – 10° C to + 40° C
EP 90	da – 10° C to + 30° C
EP 80 W	da – 20° C to + 20° C
SUPERTRANS EPX	da – 10° C to + 50° C

International standards

Oil	Mil-L	API	Temperature range
SAE 30	2104 E	CE/SF	da – 20° C to + 30° C
SAE 40	2104 E	CE/SF	da – 10° C to + 40° C
SAE 90	2104 D	GL 4	da – 10° C to + 30° C
SAE 80 W	2104 D	GL 4	da – 20° C to + 20° C
SAE 80 W 90	2104 D	GL 4	da – 10° C to + 30° C
SAE 80 W 85 W	2104 D	GL 4	da – 20° C to + 25° C

DO NOT use oil additives, friction modifiers or synthetic lubricants.

CONSUMABLE PRODUCTS

Industrial reference	Automotive reference	Bottle	RENAULT TRUCKS ref N°
Loctite 242	Thread locking compound	24 ml 60 ml	50 00 336 949 50 00 336 950
Loctite 270	Adhesive sealant	24 ml 60 ml	50 00 336 947 50 00 336 948
Loctite 518	Joint sealant	25 ml	50 00 630 985
Loctite 648	Flange sealant	240 ml	50 00 630 037
Activator T 747	Activator	165 ml	50 00 630 036

Generalities

Recommended tightening torques

Screws and nuts

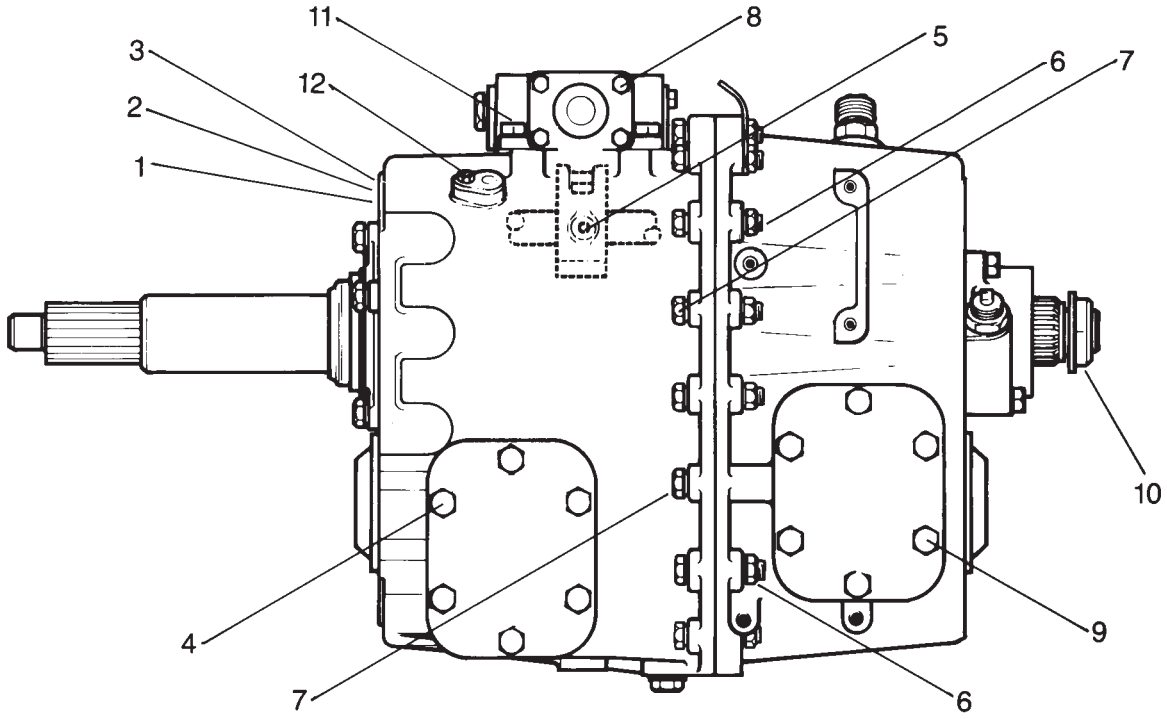
1. Clutch housing
12 studs - M12 screw-thread - 59 Nm (43 ft.lbs) minimum. Installed with Loctite 242.

2. Clutch housing
12 nuts - M12 screw-thread - 69 to 78 Nm (51 to 58 ft.lbs). With plain washers and spring washers.

3. Clutch housing
12 cap screws - M12 screw-thread - 69 to 78 Nm (51 to 58 ft.lbs). With plain washers and spring washers.

4. Front PTO cover
06 cap screws - M10 screw-thread - 35 to 39 Nm (25 to 29 ft.lbs).

5. Selector block tapered lockscrew
1 screw - M10 screw-thread - 35 to 39 Nm (25 to 29 ft.lbs). “Patchlock” or screw-threads coated with Loctite 242.



6. Main half-casings
15 cap screws with plain nuts - M10 screw-thread - 51 to 58 Nm (38 to 43 ft.lbs). With plain washers under cap screws and nuts.

7. Main half-casings
3 cap screws - M10 screw-thread - 51 to 58 Nm (38 to 43 ft.lbs). Plain washers.

8. Remote control housing end cover
4 cap screws - M8 screw-thread - 20 to 24 Nm (15 to 18 ft.lbs). Spring washers.

9. PTO/reverse idler gear cover
6 cap screws - M10 screw-thread - 35 to 39 Nm (25 to 29 ft.lbs).

10. Output shaft
Locknut - M33 screw-thread - 490 to 588 Nm (362 to 434 ft.lbs). With nylon locking insert.

11. Remote control housing
4/6/8 cap screws - M10 screw-thread - 35 to 39 Nm (25 to 29 ft.lbs). Plain washers and spring washers.

12. Overdrive selector fork pivot
2 cap screws - M10 screw-thread (with spring washers) - 20 to 24 Nm (15 to 18 ft.lbs).

Generalities

Recommended tightening torques (continued)

Screws and nuts

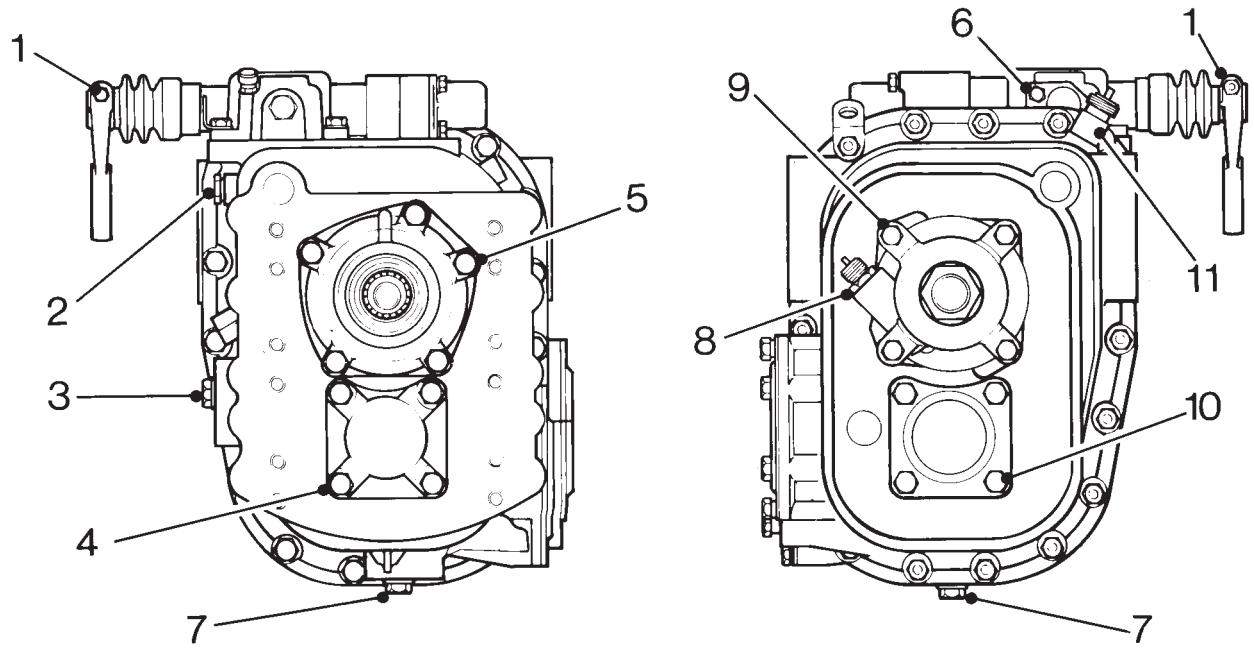
1. Remote control shaft lever
1 cap screw and nut - M8 screw-thread - 20 to 27 Nm (15 to 20 ft.lbs). With spring washer.
or
1 cap screw and nut - M10 screw-thread - 35 to 39 Nm (55 to 29 ft.lbs). With spring washer.

2. Selector shaft detent cover
2 cap screws - M8 screw-thread - 20 to 24 Nm (15 to 18 ft.lbs). With spring washer.

3. Oil filler plug
M24 screw-thread - 32 to 37 Nm (24 to 27 ft.lbs).

4. Layshaft front bearing cover
4 cap screws - M12 screw-thread - 69 to 78 Nm (51 to 58 ft.lbs). With spring washer.

5. Input shaft front bearing cover
5 cap screws - M10 screw-thread - 35 to 39 Nm (25 to 29 ft.lbs). With spring washer.



6. Remote control housing detent cover
2 cap screws - M8 screw-thread - 20 to 24 Nm (15 to 18 ft.lbs). With lockwasher.

7. Oil drain plug (magnetic)
M24 screw-thread - 32 to 37 Nm (24 to 27 ft.lbs).

8. Speedometer drive pinion adapter
M22 screw-thread - 20 to 27 Nm (15 to 20 ft.lbs). With copper washer.

9. Speedometer housing
4 cap screws - M10 screw-thread - 35 to 39 Nm (25 to 29 ft.lbs). With plain washer and spring washer.

10. Layshaft rear bearing cover (rear PTO)
4 cap screws - M12 screw-thread - 69 to 78 Nm (51 to 58 ft.lbs). With spring washer.

11. Reverse lamp switch
M16 screw-thread - 16 to 22 Nm (12 to 17 ft.lbs).

Generalities

Disassembly precautions

It is assumed in the detailed disassembly instructions that the lubricant has been drained and the necessary linkages and air lines (if fitted) have been removed from the chassis.
Removal of the gearshift remote control housing assembly is included in the detailed instructions. However, this assembly may also be removed from the gearbox before removing the unit from the vehicle.
Follow each procedure closely in each section, making use of both the text and the pictures.

1. Bearings - Carefully wash and relubricate all bearings as removed and protectively wrap until ready for use. Remove bearings with pullers designed for that purpose.

2. Assemblies - When disassembling the various assemblies, such as main shaft, layshaft and remote control housing, lay all parts on a clean bench in the same sequence as removal. This procedure will simplify reassembly and reduce the possibility of losing parts. When pulling off synchronizer hubs, follow the procedures detailed in “Disassembly”, using a suitable puller of adequate capacity. Failure to adhere to the recommended procedures may cause irreparable damage.

3. Circlips - Remove circlips and snap rings with pliers designed for that purpose. New selective circlips must be fitted as specified in “Reassembly”.

4. Input shaft - The input shaft can be removed without removing the layshaft or the main shaft. Take care not to misplace or lose the main shaft spigot bearing.

5. Cleanliness - Provide a clean place in which to work. It is important that no dirt or foreign matter enters into the unit during repairs. The outside of the unit should be carefully cleaned before commencing disassembly. Dirt is abrasive and can damage bearings.

6. Press fitting - Apply force to shafts, housings, etc… with restraint. Movement of some parts is restricted. Do not apply force after the part being driven stops solidly. Use soft hammers for all disassembly work.
Do not use pry bars or chisels to separate half-casings or irreparable damage may be caused.

Inspection of fast wearing parts

Before reassembling the gearbox, individual parts should be carefully checked and damaged parts discarded. They must be replaced. This inspection procedure should be carefully followed to ensure maximum service life from the rebuilt unit.
The cost of a new part is generally a small fraction of the total cost of downtime and labour, should the use of a questionable part make additional repairs necessary before the next regularly scheduled overhaul.
Recommended inspection procedures are set out in the following checklist:

A. Bearings

1. Wash all bearings in clean solvent. Check rollers and races for pitting and crumbling. Replace damaged bearings.

2. Lubricate undamaged bearings and check end play and radial play. Replace bearings presenting excessive play.

3. Check the fits of bearings in housing bores. If the outer races turn too freely in the bores, the housing should be replaced. Check housing bores for signs of wear prior to taking such action. Only replace the housing if wear is due to bearing spin.

B. Gears

1. Check gear teeth for tooth face pitting. Gearwheels with pitted teeth should be replaced. Check the reverse gear dog clutch engagement teeth for freedom from damage.

2. Check internal bearing surfaces for wear and effects of overheating.

3. Check gear end play. Where excessive play is found, check both gearwheel and hub for excessive wear.
Maintain the specified end play on main shaft forward gears.

C. Bearing sleeves - Main shaft

1. Sleeves presenting scoring, pitting or signs of overheating or wear must be replaced.

Generalities

Inspection of fast wearing parts (continued)

D. Synchronizer assemblies

1. Check to ensure that all splines are free from excessive wear.

2. Check that the dog clutch engagement teeth on sliding sleeves, synchronizer flanges and synchronizer rings are free from flaking and burrs.

3. Check that synchronizer cone rings are not excessively worn or show signs of overheating. Check that the clearance between synchronizer ring and synchronizer flange is between 1.9 mm maximum and 0.5 mm minimum.

4. Replace springs, plungers and rollers.

E. Splines

1. Check splines on all shafts for wear. If synchronizer hubs, output drive flange or clutch hub have worn into the sides of the splines, shafts in such condition must be replaced.

F. Thrust washers

1. Check the surfaces of all thrust washers. Washers presenting scoring or reduction in thickness should be replaced.

G. Reverse idler gear

1. Check bearings and shaft for wear due to the action of roller bearings.

H. Clutch release parts

1. Check clutch release parts, yoke and bearing carrier. Check pedal shafts. Replace worn shafts and bearings.

I. Gear selector shaft assembly

1. Check forks and keys for wear at points of contact. Replace worn parts.

2. Check forks for excessive and uneven wear. Replace worn forks.

3. Check selector block lockscrews. Lockscrews with worn taper must be replaced.

4. Check condition and fit of selector key and interlock key in gearshift shaft. Worn or damaged keys must be replaced.

J. Gearshift remote control

1. Check spring tension on cross shaft. Replace tension springs if the shaft moves too freely.

2. If the housing is dismantled, check cross shaft, inner lever and bearing bushes for wear. Replace worn parts.

3. Check all seals and locating journals. Replace worn parts.

K. Bearing covers

1. Check covers for wear due to bearing thrust. Replace covers worn or scored by thrust due to bearing outer races.

2. Check cover bores for wear. Replace excessively worn covers.

L. Oil return seals

1. Check oil seal in front bearing cover for damage and wear. Replace if necessary.

2. Check oil seal in speedometer housing for damage or wear. Replace if necessary. Replace grit shield if worn or loose on flange.

3. Check oil seal journals for wear and replace if worn or grooved.

M. O-rings

1. Replace all O-rings.

Generalities
Reassembly precautions

Make sure that the interiors of all housings are clean. It is important that dirt be kept out of the gearbox during reassembly. Dirt is abrasive and can damage the polished surfaces of bearings and washers. Observe certain precautions, as listed below, during reassembly.

1. Gaskets - Use new gaskets only where indicated (neutral detent cover and remote control housing covers). In all other locations, ensure that mating surfaces are clean and undamaged and apply a continuous bead of Loctite 518 Flange Sealant to one face only. Do not apply excessive sealant or allow it to penetrate into the bearings.

2. Threaded hardware - Use thread sealant (Loctite 641) on all screws. The corresponding torque loadings are to be found in "Recommended tightening torques for screws and nuts".

3. O-rings - Lubricate all O-rings lightly with silicone lubricant.

4. Initial lubrication - Lubricate bearings with gearbox oil during reassembly.

5. End play - Maintain the end float of main shaft gears as detailed in the chart on the following page.

6. Bearings - The use of flanged bearing mandrels is recommended for the installation of bearings. Such drivers apply equal force to both bearing races, preventing damage to balls and races and maintain correct bearing alignment with shaft and bore. Tubular type mandrels, if used, will apply force to the inner race only. Heating the bearing inner tracks will aid installation.

7. Output shaft drive flange - Tighten the nut at the correct torque.

8. Synchronizer hubs - All synchronizer hubs are an interference fit on the main shaft splines and must be heated at approximately 85 °C (180 °F) before installation.

9. Layshaft - The layshaft gears are a shrink and press fit on the layshaft body. The gearwheels must be heated to 150 °C (300 °F) before assembly.

10. Prior to fitting a flange (or yoke), ensure that the seal track is not grooved, scored or pitted. If in doubt, it must be replaced.

11. All synchronizer flanges are now fitted to the gears using Loctite. Loctite 648 + Loctite "T 747" Activator are used. It is recommended to mix the sealant and activator before commencing reassembly to allow sufficient time for the Loctite to cure.

Generalities

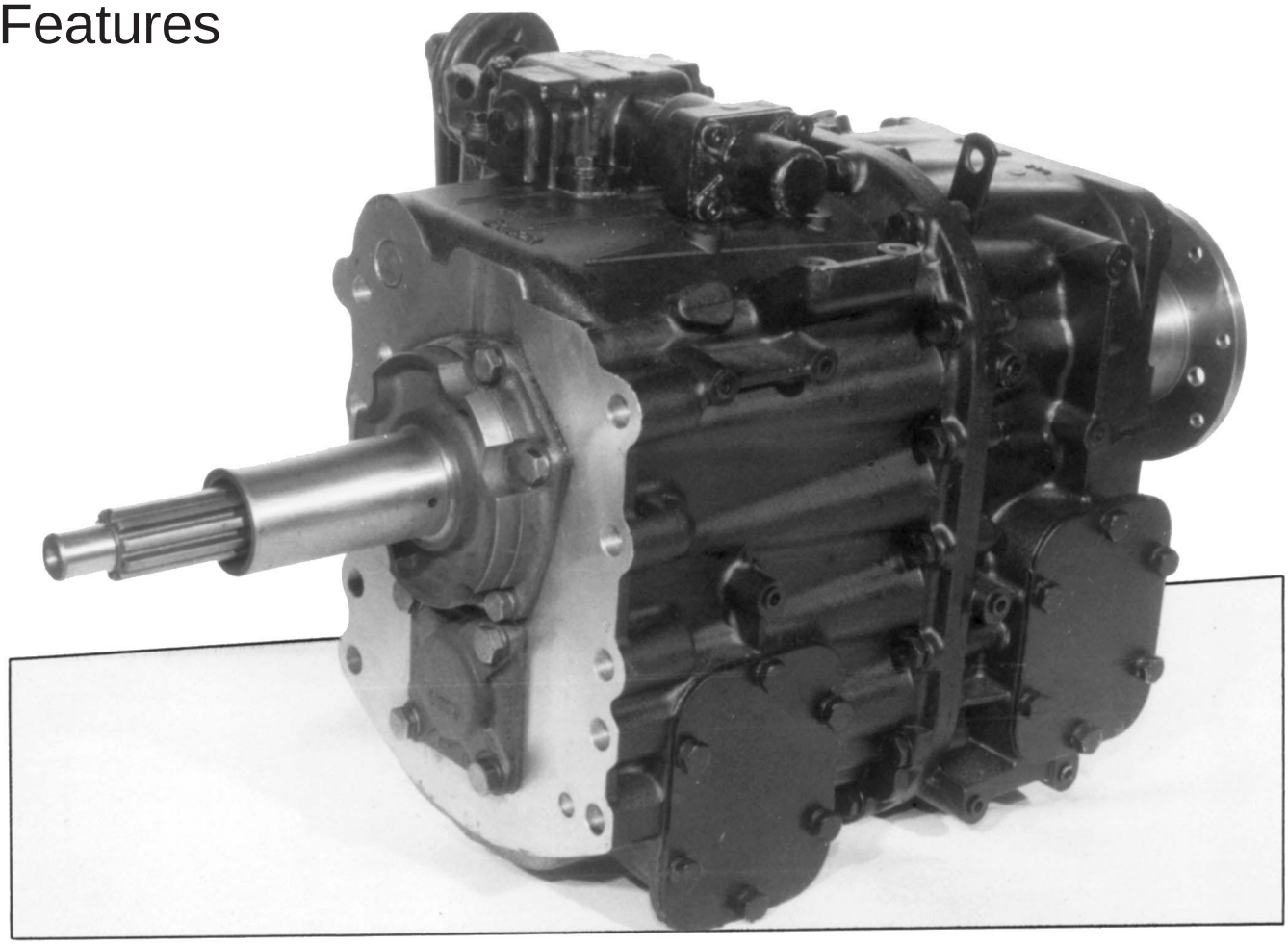
Gear end float

All dimensions in millimetres (mm)

Gear	5th (6th overdrive)	4th	3rd	2nd	1st	Reverse
Low limit High limit Range	0.31 0.53 0.22	0.35 0.48 0.13	0.35 0.48 0.13	0.35 0.48 0.13	0.40 0.57 0.17	Sliding gear

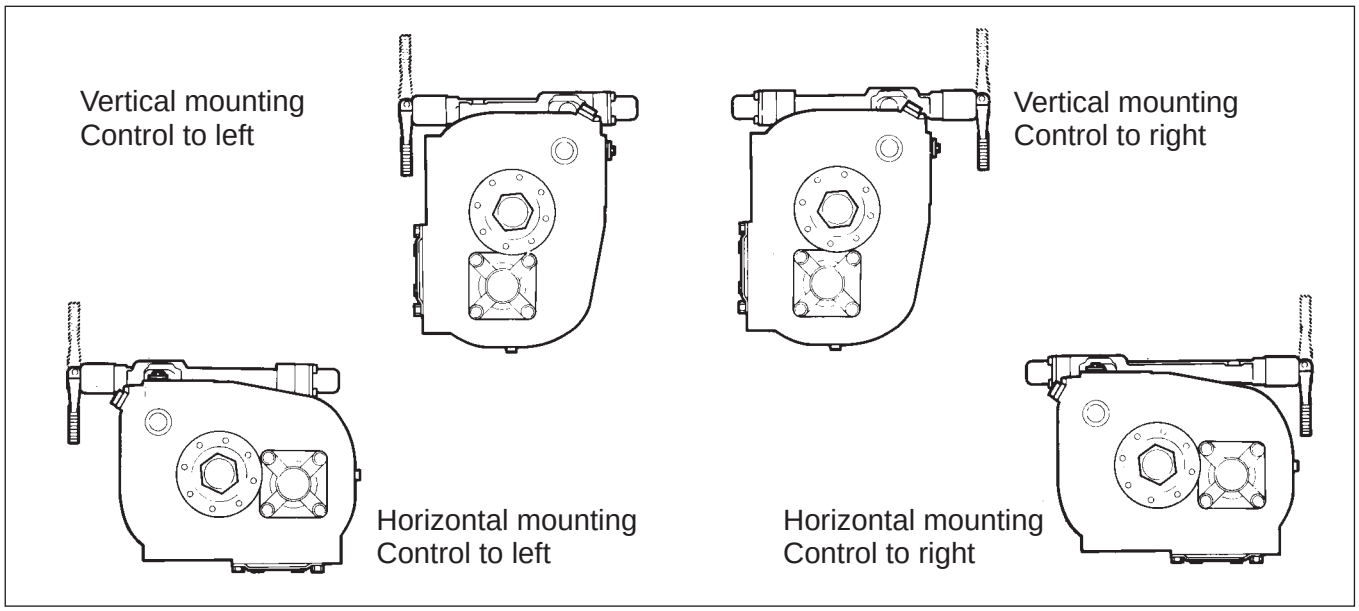
General description

Features



The Eaton 4106 gearbox has six forward speeds and is one of a new family of synchromesh gearboxes. It has a simple shift pattern using a unique single rail selector mechanism.

The gearbox may be mounted vertically or horizontally and in both positions the gear change remote control may be to the right or to the left.

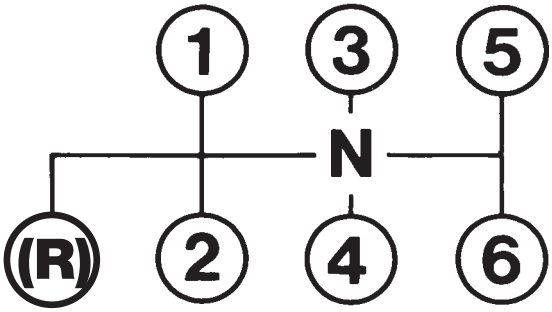


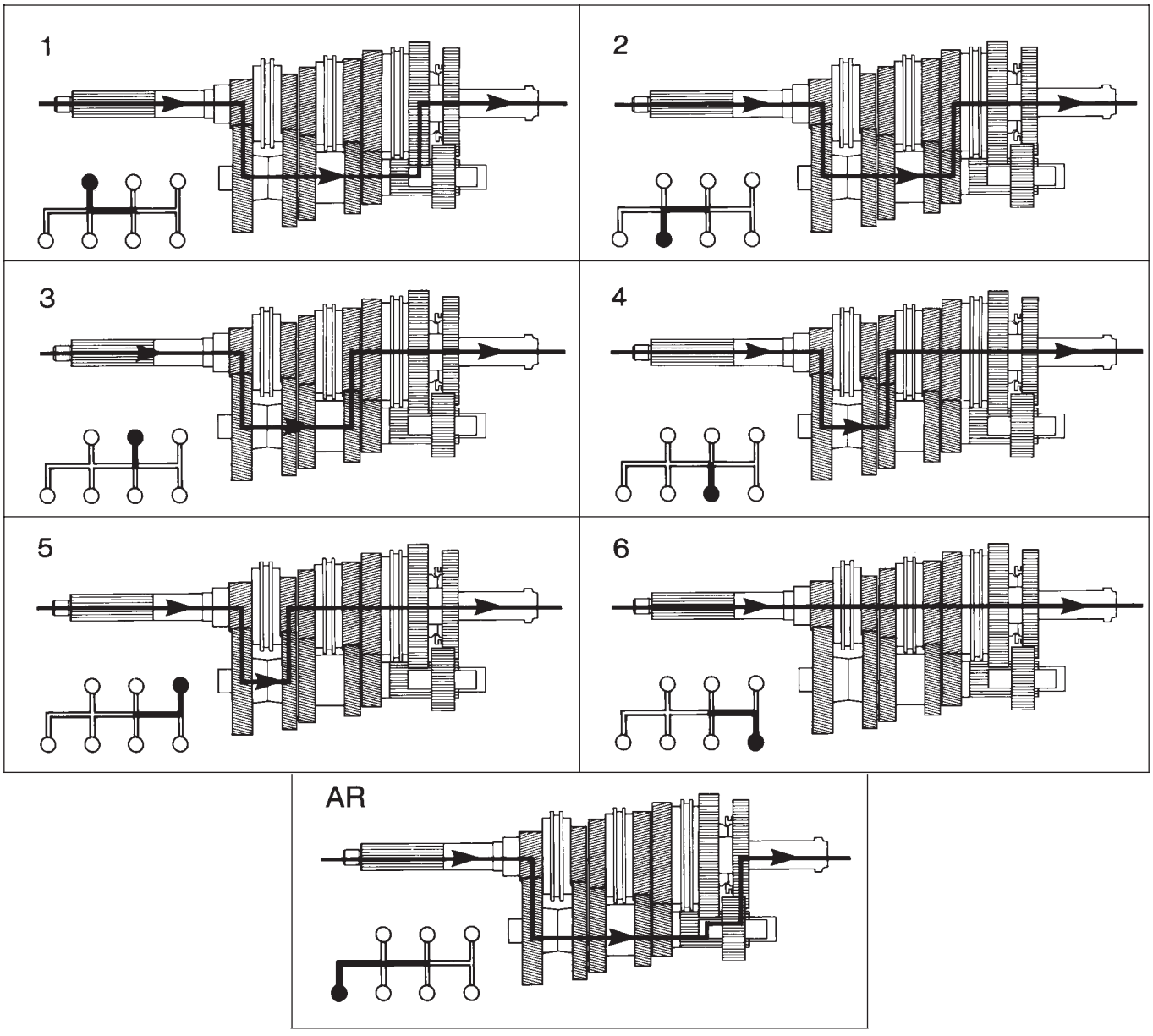
The synchronizer assemblies are of the baulk ring type with the gear ring cones manufactured separately from the gears. This allows the synchronizer rings and flanges to be replaced without need to replace the gears themselves. Reverse gear is engaged by sliding the reverse gear on the main shaft into mesh with a dog clutch ring splined to the main shaft.

General description

Gear change pattern

Simple shift pattern with the mechanism biased in neutral between 3rd and 4th gears.





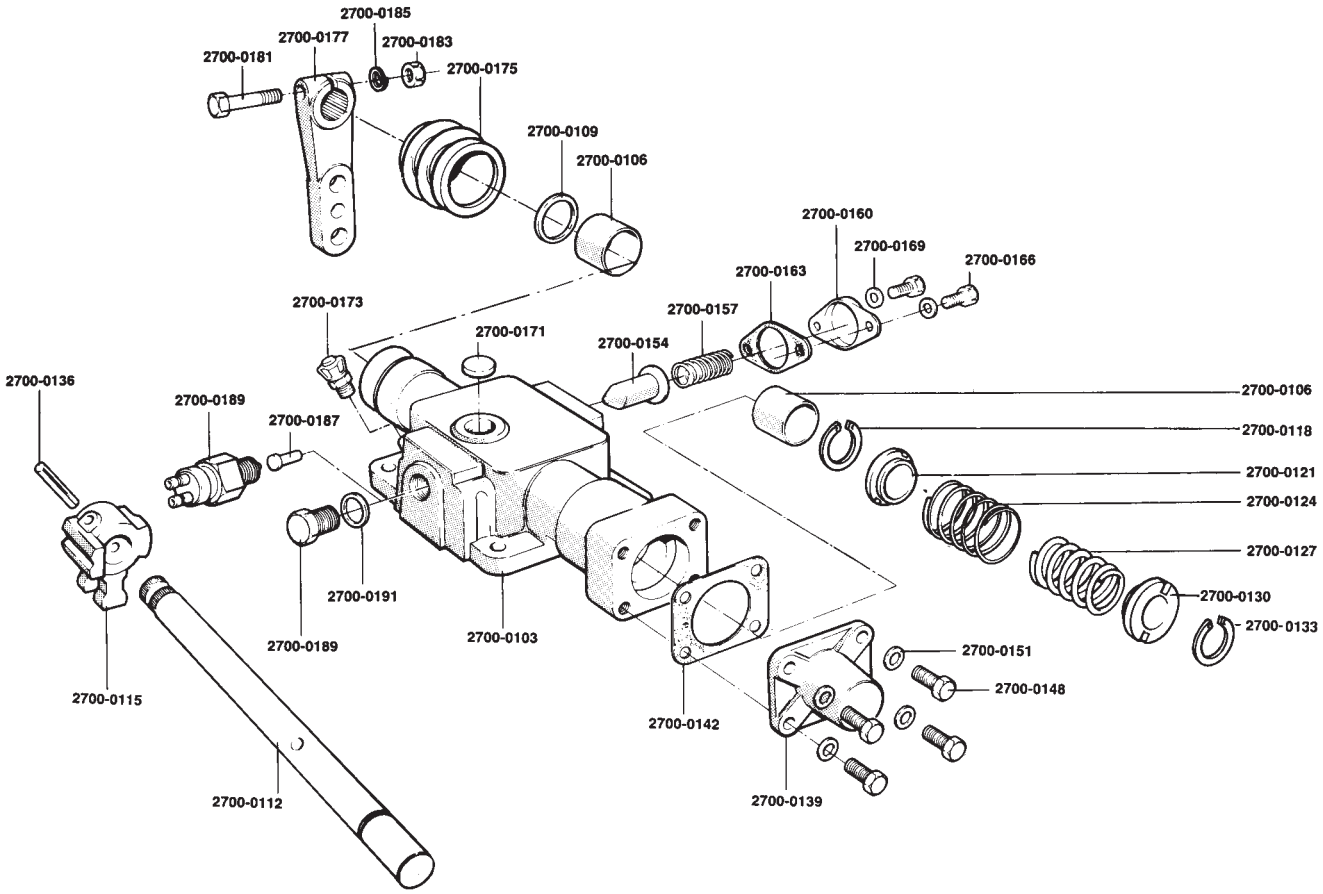
Power flow diagrams - direct drive top gear version

Gearshift control

Remote control

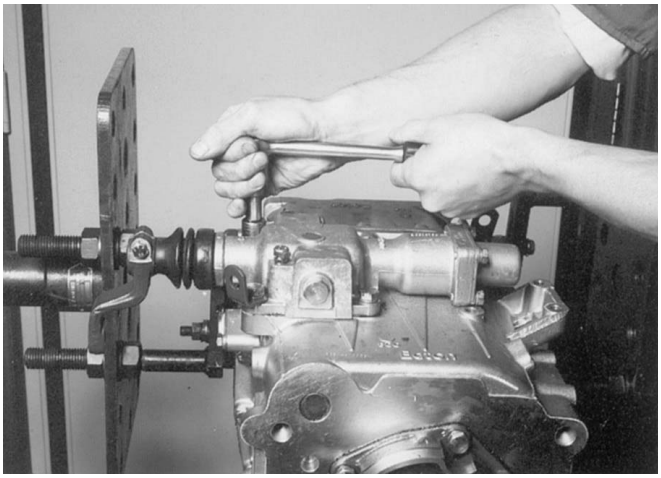
Gearshift control

Remote control - Exploded view

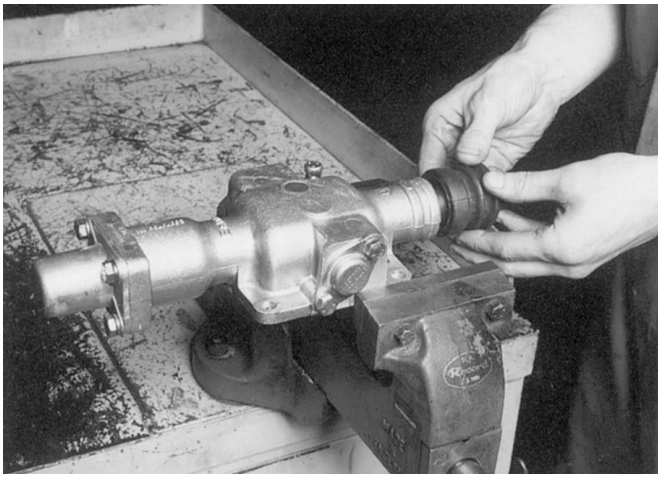


Sequence N°	Description
2700-0103	Housing
2700-0106	Bush
2700-0109	Oil seal
2700-0112	Cross shaft
2700-0115	Inner striking lever
2700-0136	Grooved pin
2700-0121	Spring retainer
2700-0124	Spring
2700-0127	Spring (LH only)
2700-0130	Spring retainer
2700-0139	End cover
2700-0142	Gasket
2700-0148	Screw, M8
2700-0151	Spring washer, M8
2700-0154	Plunger-reverse
2700-0157	Spring-reverse detent
2700-0160	Detent cover
2700-0163	Gasket, detent cover
2700-0166	Screw, M8
2700-0169	Spring washer, M8
2700-0171	Plug
2700-0173	Breather
2700-0175	Rubber boot
2700-0177	Router lever
2700-0181	Bolt, M10 x 50
2700-0183	Nut, M10 x 1.0
2700-0118	Circlip
2700-0133	Circlip
2700-0185	Washer
2700-0187	Pin
2700-0189	Plug or Neutral switch
2700-0191	Washer

A. Remote control disassembly

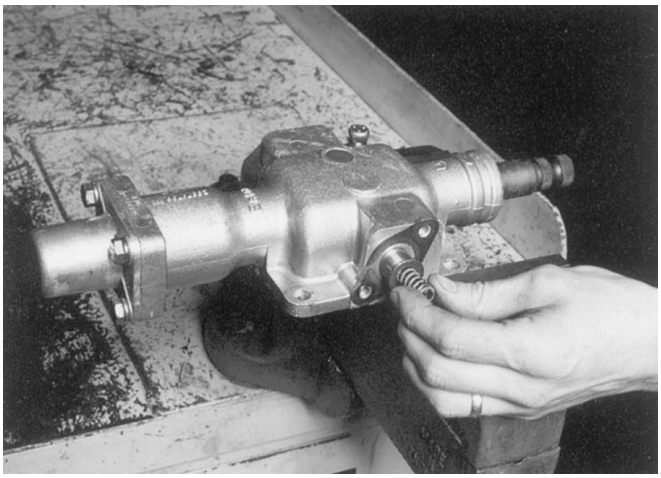


1. Ensure that neutral is selected and remove the remote control assembly from the gearbox.

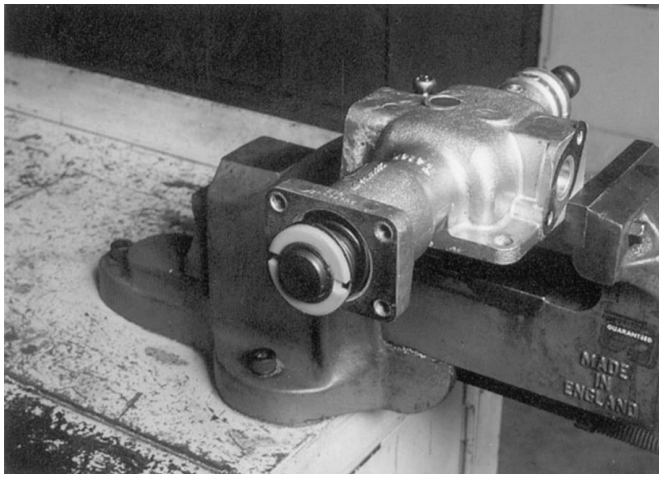


2. Remove the outer gear change lever and the rubber boot. Remove the neutral switch and the pin (if fitted).

Note: The position of the lever is marked on the shaft. Check before removal.



3. Remove the reverse detent plunger cover and pull out the spring and the plunger.

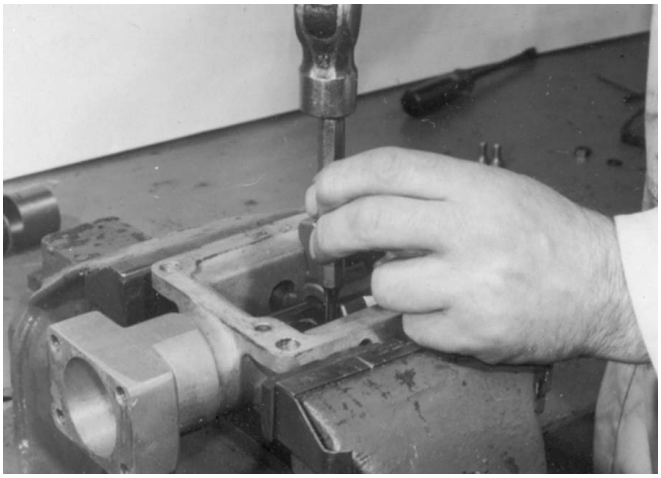


4. Remove the four cap screws and lift off the end cover.

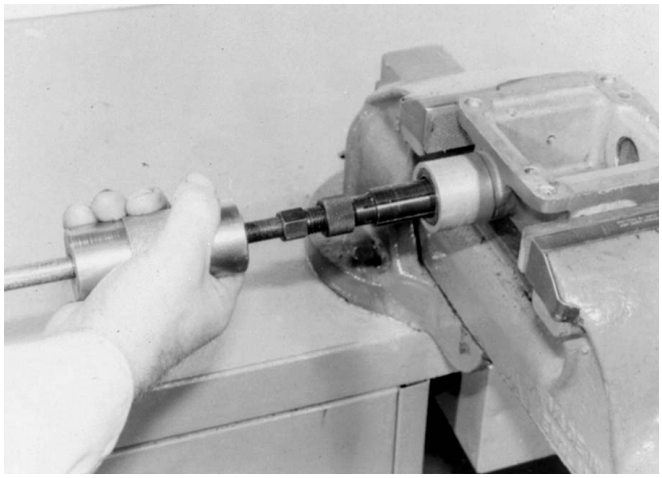
5. Remove the circlip from the shaft and remove the spring retainer.

6. Withdraw the booster spring, bias spring and inner retainer.

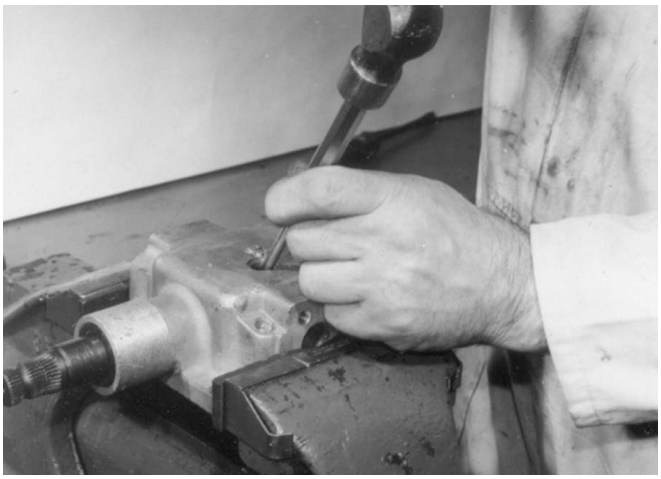
B. Remote control reassembly



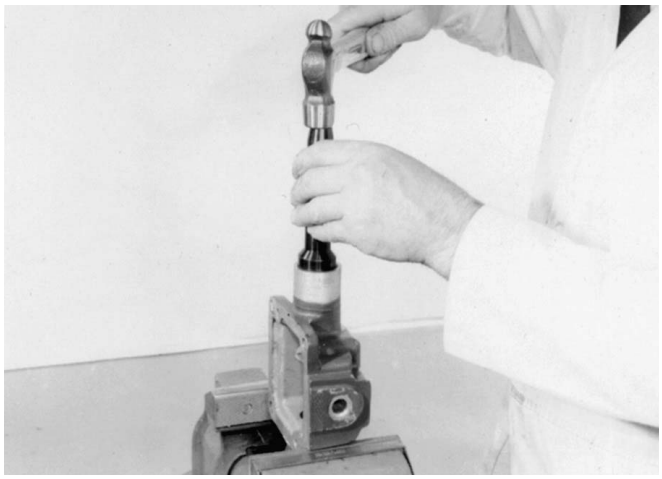
7. Reverse the position of the housing and carefully drive out the expansion plug.



1. If necessary:
Take out the bearing bushes. Use tool **N° 001.**
Press fit new bushes. (Use the removed part as a pusher).

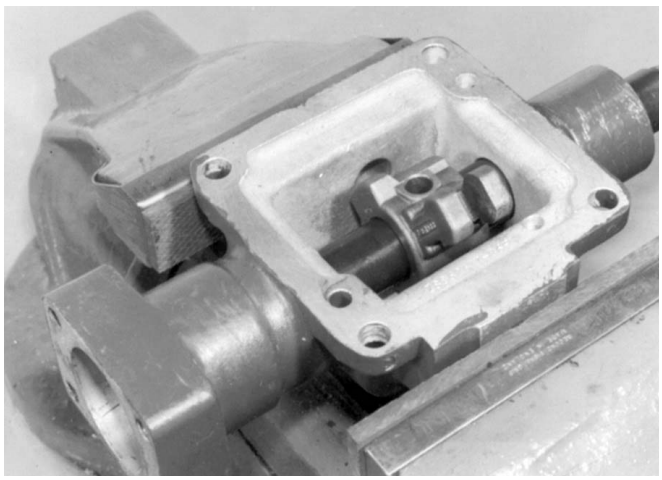


8. Reverse the position of the housing. Align the grooved pin in the inner lever with the expansion plug hole and carefully drive out the pin.



2. Replace the oil seal.
Install the new seal, using a tube.

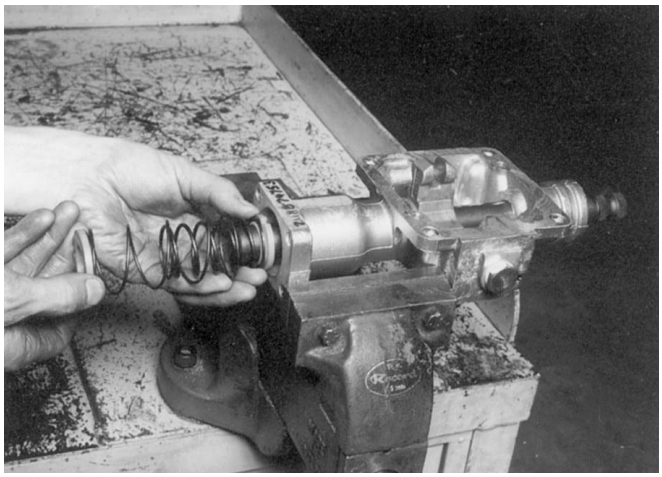
9. Remove the shaft and the inner lever.



3. Install the inner lever, with the long plain groove towards the front of the housing, and install the shaft from the right-hand side of the housing.

4. Align the inner lever on the shaft and install a new grooved pin.

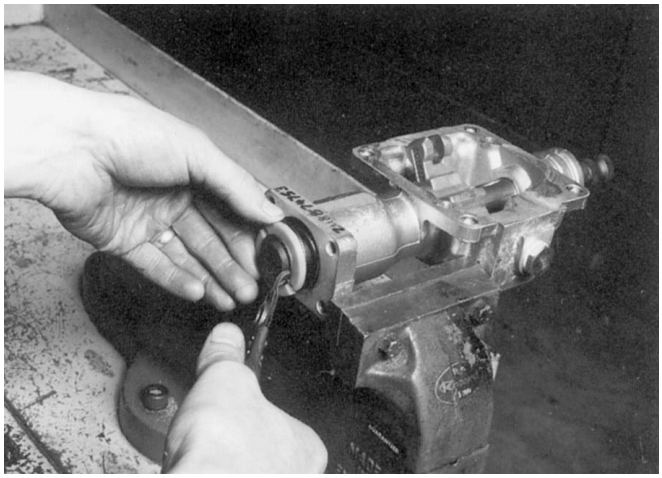
Note: The inner lever should be supported whilst driving the pin, to prevent damage to the bushes.



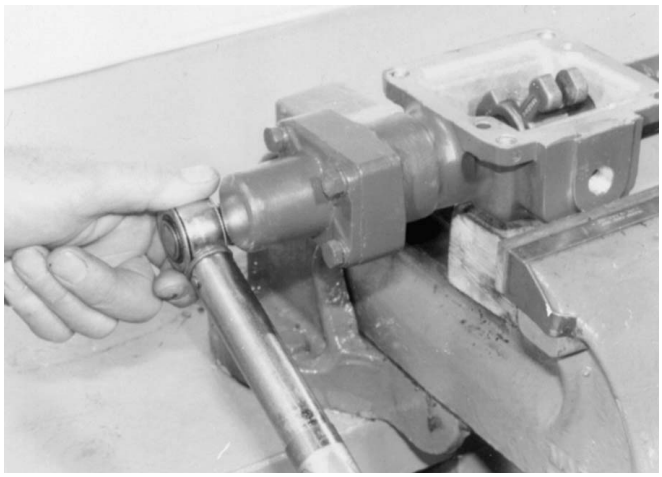
5. Fit the inner circlip on the shaft. Install the smaller spring retainer.

6. Insert the springs and the outer retainer.

Note: Right-hand drive versions need one large retainer whereas left-hand drive versions use one large (outer) and one small (inner) retainer.

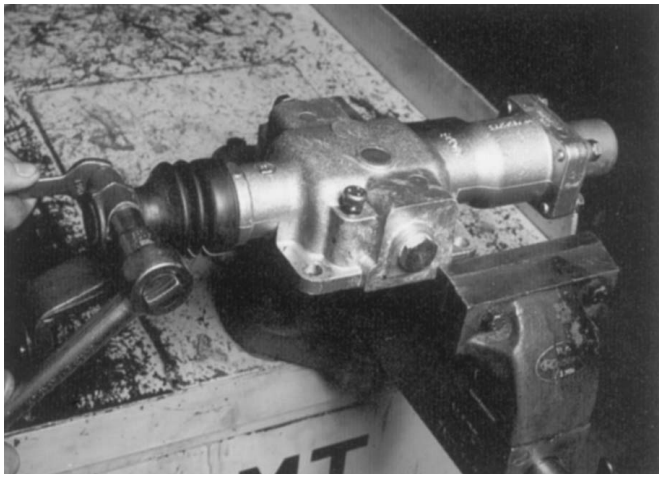


7. Fit the outer circlip on the shaft.

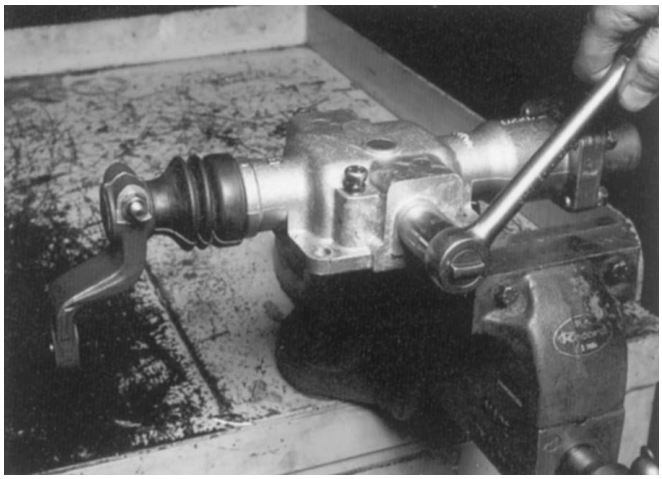


8. Fit a new gasket and secure the end cover to the housing. Tighten at the correct torque (20 to 24 Nm).

9. Install the reverse detent plunger and the spring and fit the cover (using a new gasket). Tighten the cap screws at the correct torque (20 to 24 Nm).



10. Fit the rubber boot on the housing. Align the outer lever with the setting mark on the shaft. Fit the pinch bolt and tighten at a torque of 35 to 39 Nm.

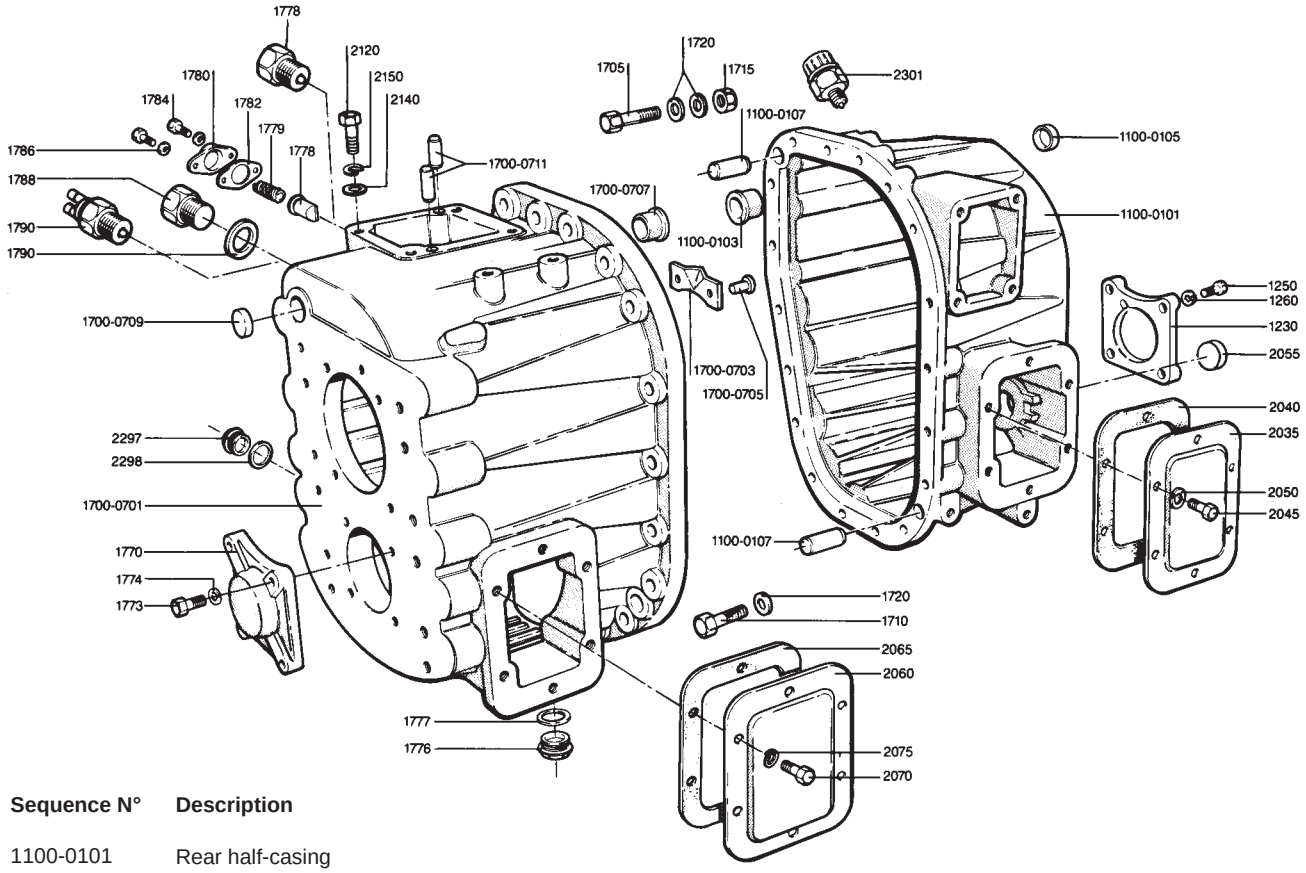


11. Fit the breather. Install the pin and the neutral switch. Tighten at the correct torque (15 to 22 Nm). Apply sealant and install a new expansion plug.

Gearbox overhaul

Gearbox casing

Exploded view

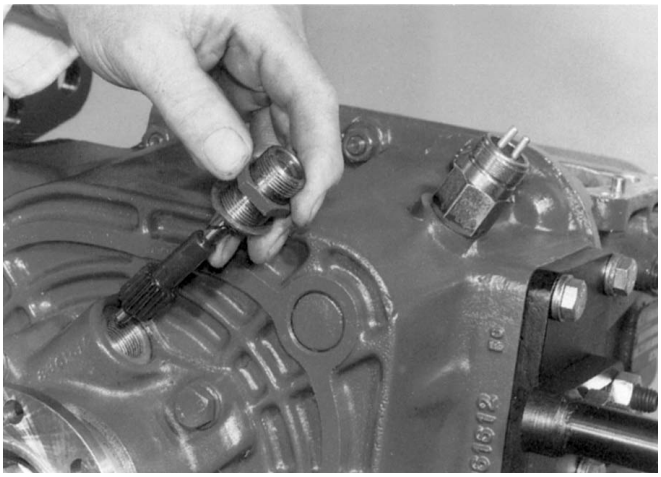


Sequence N°	Description
1100-0101	Rear half-casing
1100-0103	Bush
1100-0105	Core plug
1100-0107	Dowel
2035	Oil trough
2040	Drive screw
2045	Cover
2050	Screw
1230	Spring washer
1250	Cover
1260	Screw
1700-0701	Spring washer
1700-0703	Front half-casing
1700-0705	Oil trough
1700-0707	Drive screw
1700-0709	Bush
1700-0711	Core plug
2060	Dowel
2065	Cover
2070	Screw
2075	Washer
1705	Bolt
1710	Screw
1715	Nut
1720	Washer
1770	Cover
1773	Screw
1774	Washer
1176	Magnetic drain plug
1777	Rotation pin
1778	Screw
1779	Washer
1780	Copper washer
1782	Neutral detent plunger
1784	Spring, detent
1786	Gasket
1788	Screw
1790	Spring washer
	Plug
	Neutral switch or Washer
2055	Cup plug
2120	Screw
2140	Washer
2150	Washer
2297	Oil filler plug
2298	Copper washer
2301	Indicator switch, rev. light

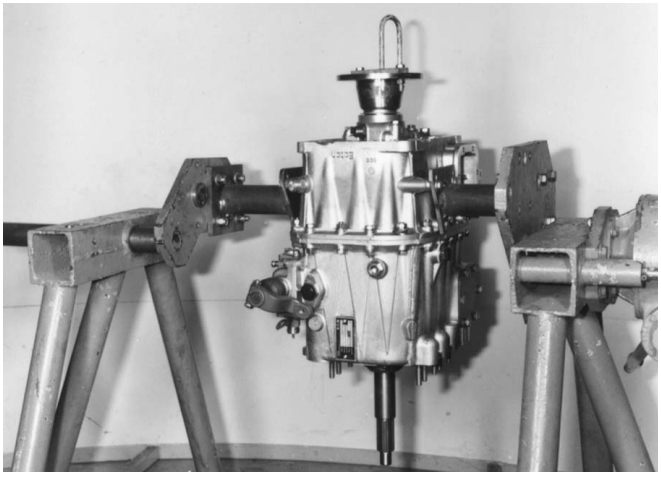
A. Gearbox casing disassembly

Caution: Drain the oil from the gearbox. Clean and refit the drain and filler plugs.

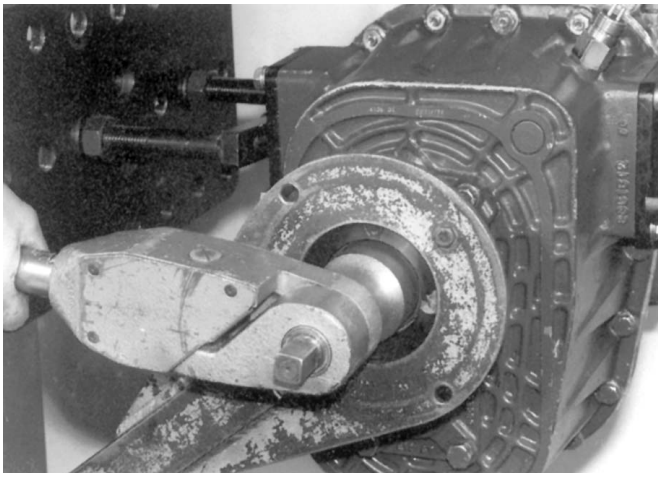
Note: The gearbox illustrated in this section is a standard ratio vertically mounted unit. The procedure is the same for all gearboxes but the physical size and number of teeth on some of the gears will vary from those illustrated on overdrive and alternative ratio models.
Horizontally mounted units have the remote control on the side of the gearbox and different filler and drain plug positions.



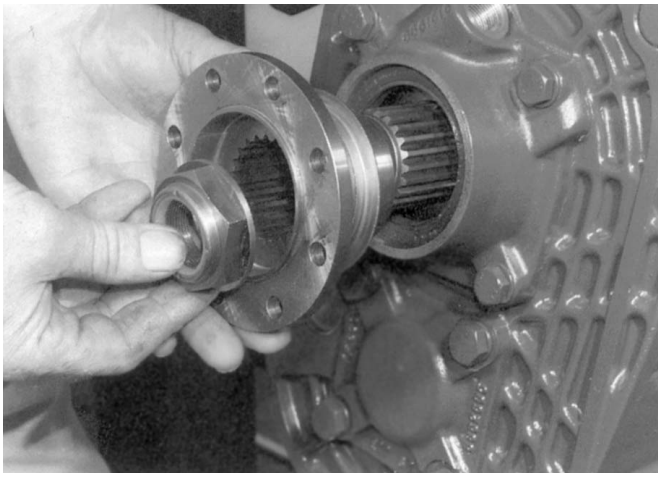
3. Remove the speedometer drive pinion and housing assembly or electronic tachometer sender unit. Remove the reverse lamp switch.



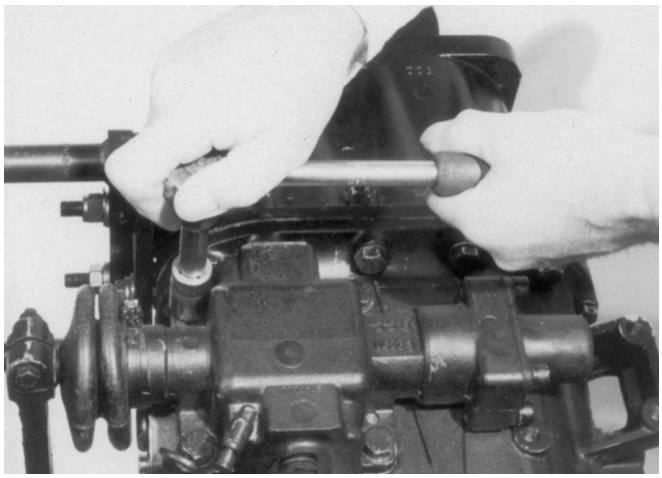
1. Lift up the gearbox using a hoist.
Install the unit on stand **N° 002.**
Use tool **N° 003.**



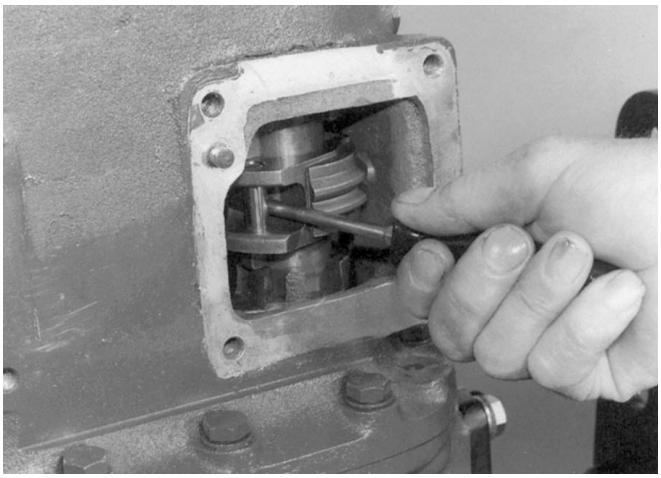
4. Using a flange-holding wrench, remove the output drive flange retaining nut.
Use tool **N° 004.**



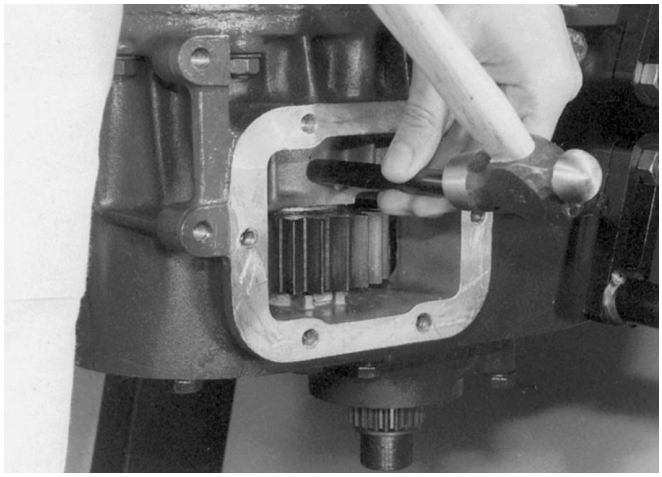
5. Remove the output drive flange, using a suitable puller, if necessary. DO NOT use a hammer as there is risk of damaging the flange.
Use tool **N° 005.**



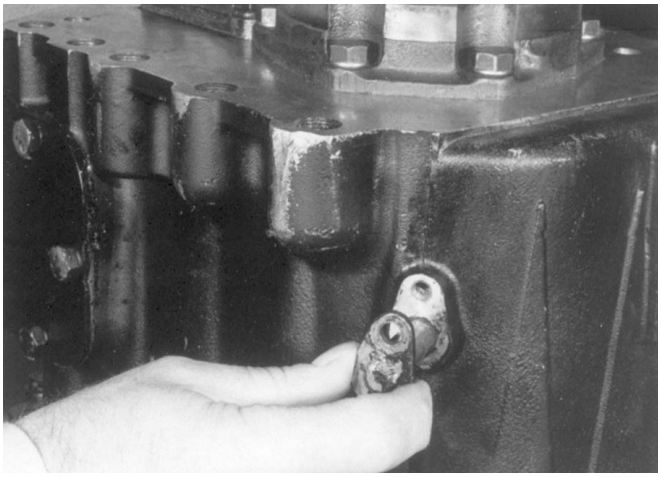
6. Ensure that neutral is engaged, then remove the remote control housing bolts. Use a soft-faced mallet to separate the housing from the gearbox.



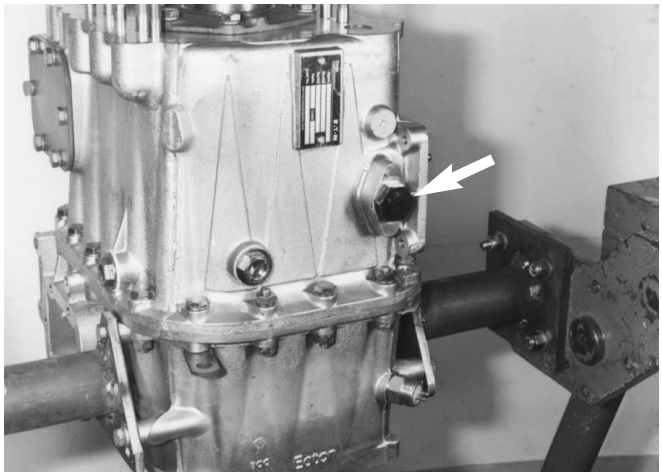
9. Rotate the gear selector shaft anticlockwise (vertical mounting) or clockwise (horizontal mounting) to prevent the casing from fouling the selector block upon removal.



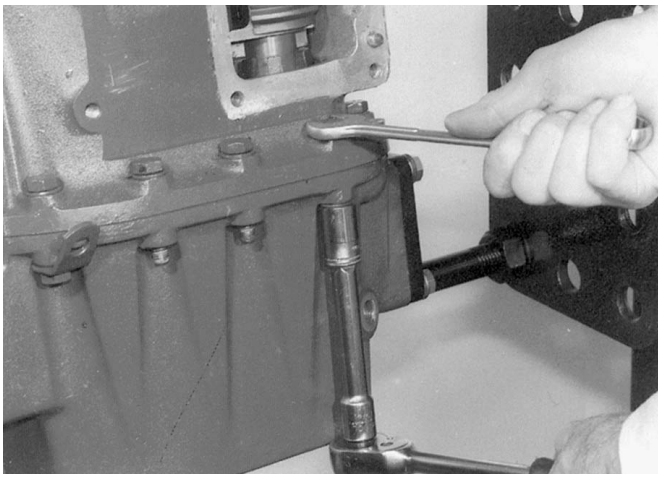
7. Remove the rear PTO cover. Using an 8 mm punch, drive the reverse idler shaft grooved pin INWARDS until the end is approximately 12 mm below the face of the hole. Do not allow the pin to "bottom" against the shaft bore.



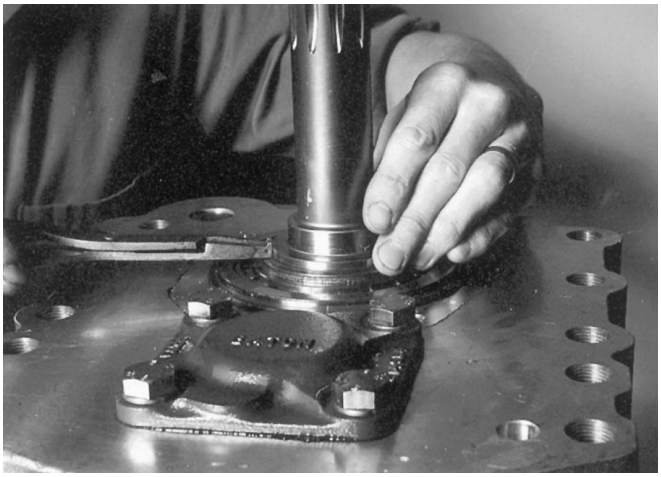
9A. On overdrive models, unscrew the cap screws retaining the two overdrive fork pivot pins and remove the pins.



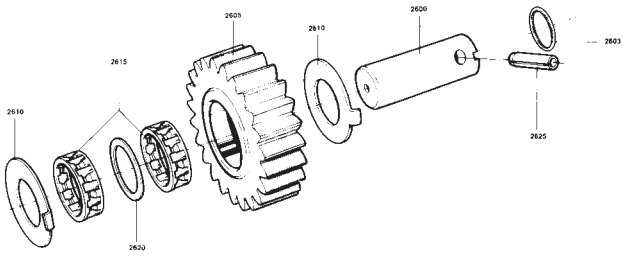
8. Remove the gear selector shaft detent plunger.



10. Remove the half-casing flange cap screws and nuts. Note down the position of the shorter cap screws fitted in the casing.

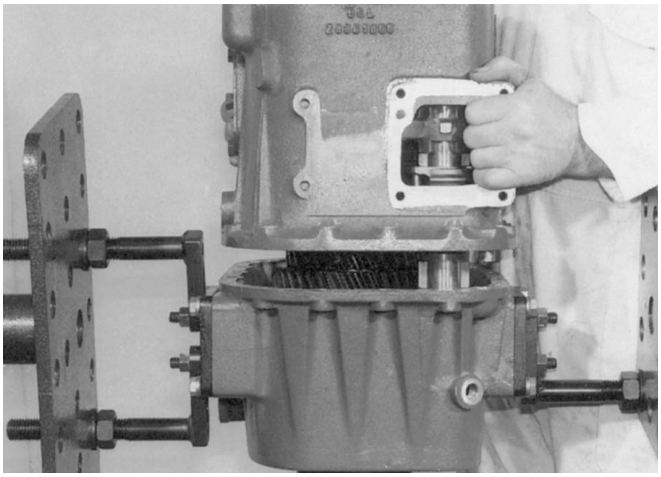


11. Remove the cap screws securing the input shaft cover and remove the cover. Remove the outer circlip from the input shaft bearing.

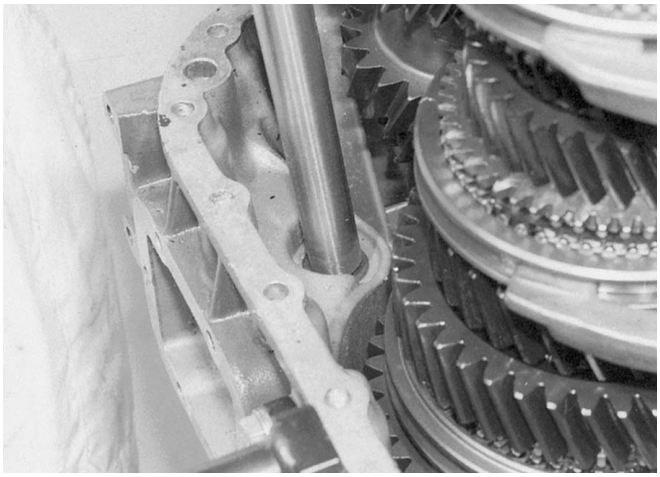


Sequence N°	Description
2600	Reverse idler gear shaft
2603	O-ring
2605	Reverse idler gear
2610	Thrust washer
2615	Needle roller bearing
2620	Spacer
2625	Pin

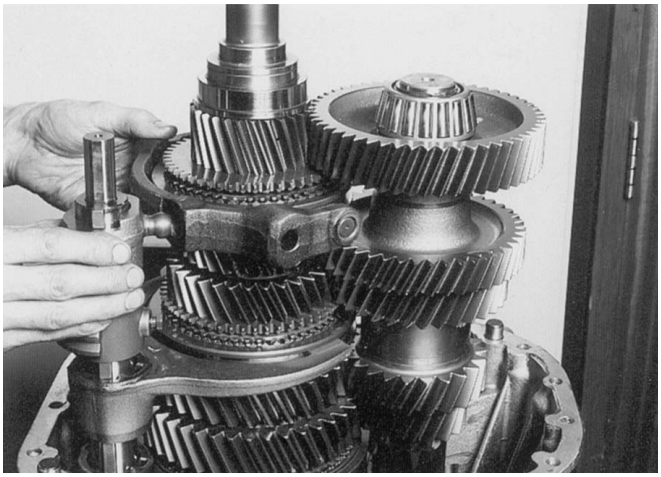
Reverse idler gear assembly.



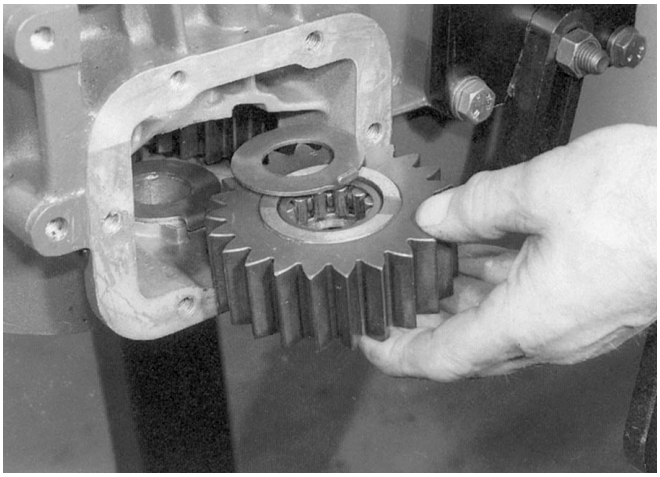
12. Using a soft metal mallet, break the seal and separate the front half-casing from the rear half-casing. DO NOT USE PRY BARS OR CHISELS. Lift off the front half-casing, leaving the input shaft, complete with bearing, in place.



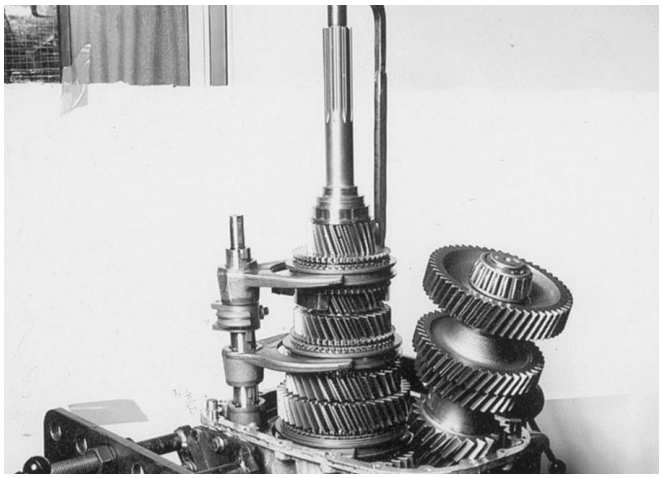
14. Using a sufficiently long drift, drive out the reverse idler gear shaft and expansion plug from the casing.



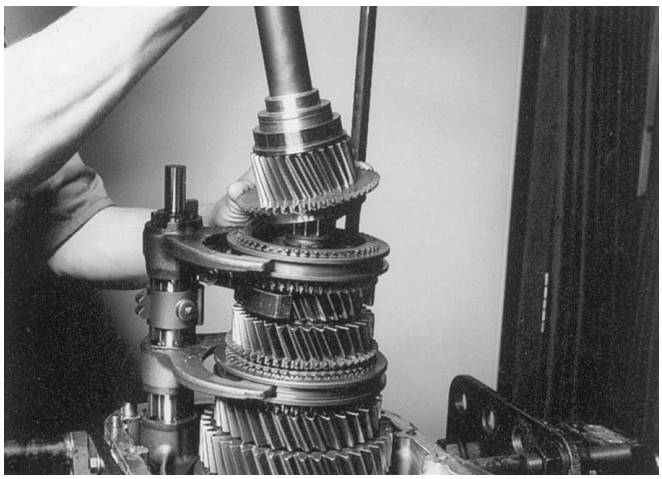
13. On overdrive models, disengage and remove the overdrive fork and pads.



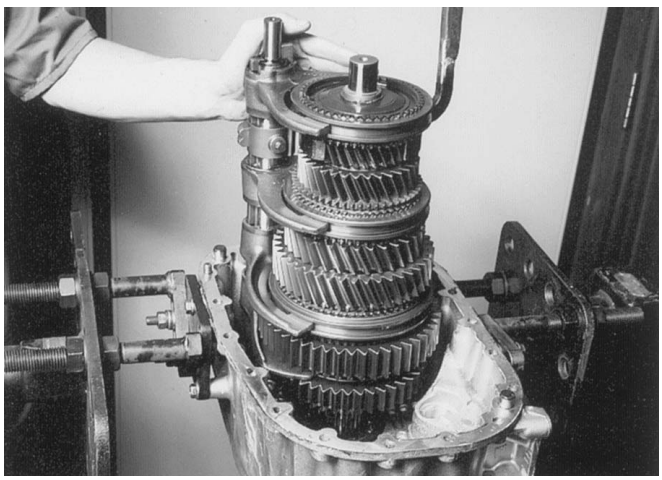
15. Remove the reverse idler gear and the thrust washers. Remove the bearings and spacers from the gear and the O-ring from the shaft.



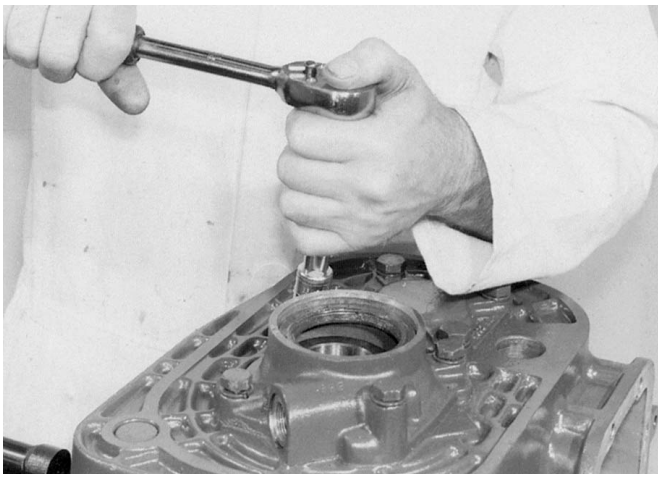
16. Mount the special lifting tool on the main shaft under the 5th/6th speed synchronizer. Lift up the shaft by approximately 20 mm. This allows the layshaft to be lifted clear. Use tool **N° 006.**



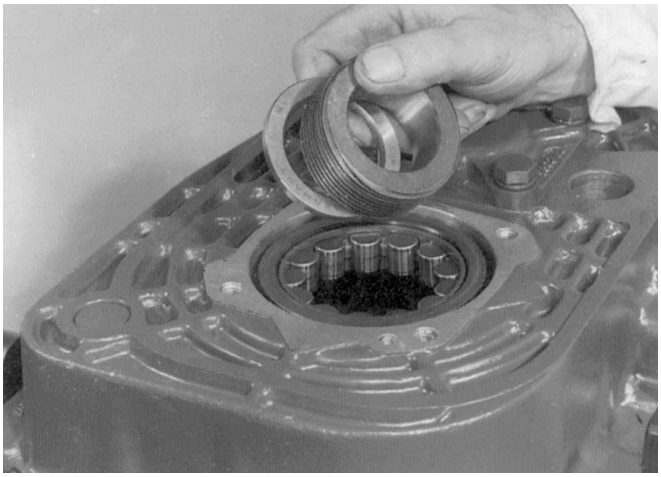
17. Lift off the input shaft complete with the 6th speed flange. Lift out the layshaft. Remove the 6th speed synchronizer ring.



18. Raise the hoist and lift out the main shaft/selector shaft/forks assembly. Carefully lower the assembly onto a clean bench and withdraw the special tool. Separate the selector shaft and forks from the main shaft.

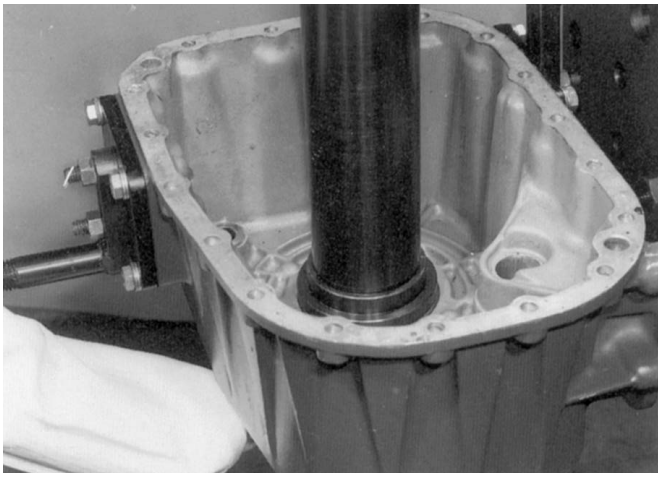


19. Reverse the position of the rear half-casing on the stand and remove the cap screws securing the speedometer housing. Note down the positions of the different length cap screws. Remove the housing. If necessary, drive out the oil seal.

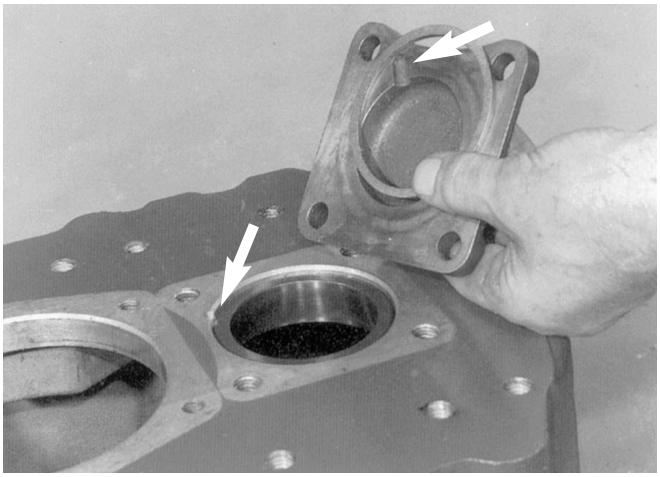


20. Remove the speedometer drive pinion or tachograph rotor and the bearing spacer from the rear half-casing.

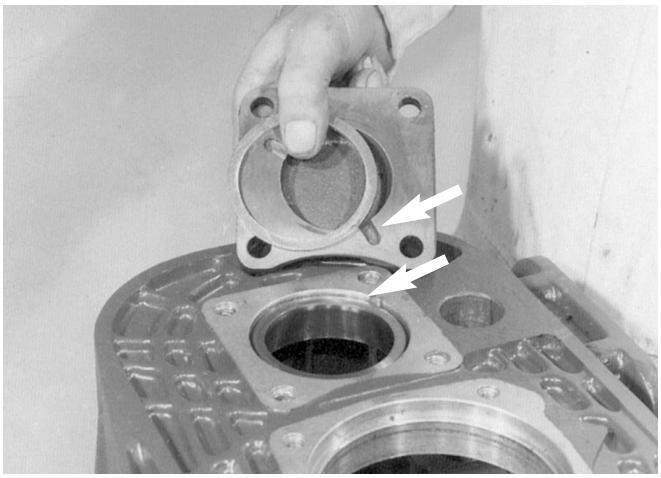
23. Drive out the outer cup from the layshaft rear bearing. Use tool **N° 007.**



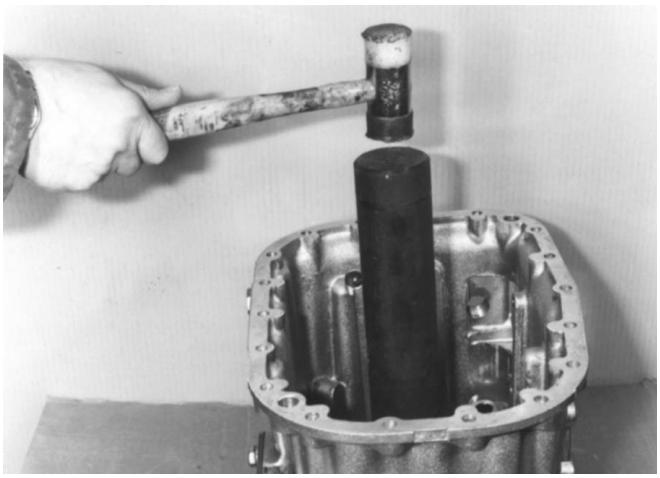
21. Reverse the position of the casing on the stand and, using the special tool, drive out the rear bearing from the main shaft. Do not allow the bearing to fall onto the floor.



24. Remove the front bearing retaining plate from the layshaft and the graded-fit spacer from the front half-casing. Drive out the front bearing from the layshaft, using the special tool.
Use tool **N° 007.**

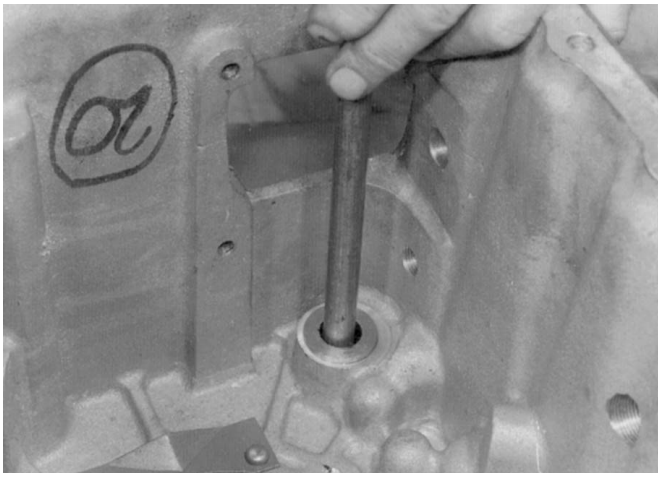


22. Reverse the position of the casing on the stand and remove the layshaft rear bearing cover and bearing spacer.

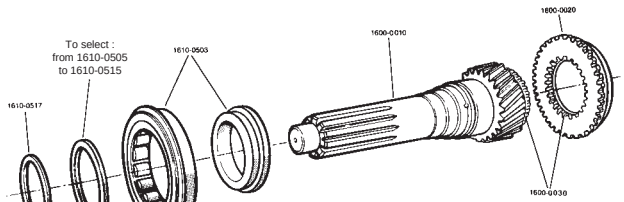


25. Drive out the front bearing from the main shaft. Use a tube.

B. Input shaft disassembly

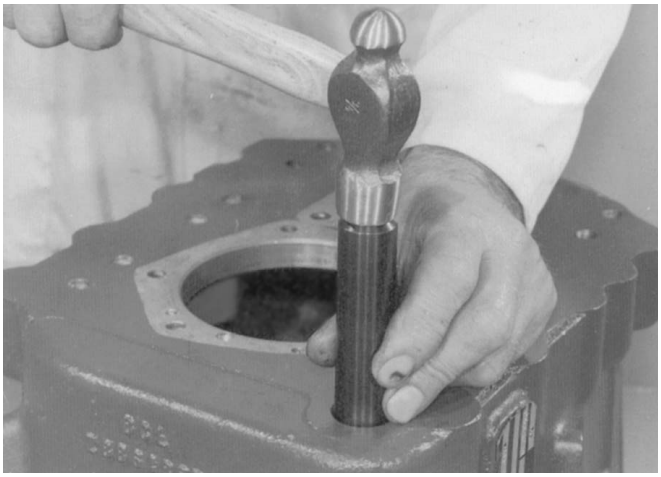


26. If necessary, to replace the selector shaft bushes, drive the selector shaft bore blanking plugs outwards from the half-casings.



Sequence N°	Description	Sequence N°	Description
1600-0010	Input shaft	1610-0509	Spacer 3.80 mm
1600-0020	Synchro flange	1610-0511	Spacer 3.85 mm
1600-0030	Loctite 648	1610-0513	Spacer 3.90 mm
1610-0503	Roller bearing	1610-0515	Spacer 3.95 mm
1610-0505	Spacer 3.70 mm	1610-0517	Circlip
1610-0507	Spacer 3.75 mm		

Input shaft
For replacement only
Remove the synchronizer flange (see page 4/12).



27. Reverse the position of the half-casings and, using the special tool or a suitable mandrel (25 mm in diameter), push the selector shaft bushes out of the casings.

1. If necessary:
Remove the bearing cage.

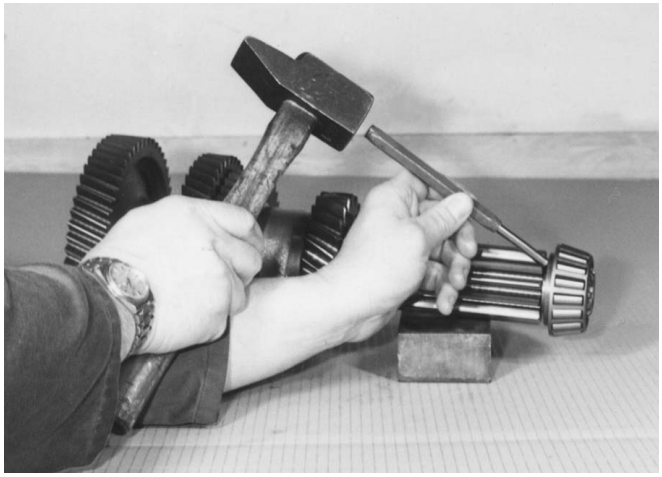
C. Input shaft reassembly

Note: Heat the bearing cage at a uniform temperature of approximately 85 °C (180 °F) prior to assembly. This will greatly ease assembly and, in most cases, the bearing cage will be able to be slid over the shaft without forcing.
In the event of removal:
Install the synchronizer flange (see page 4/12).

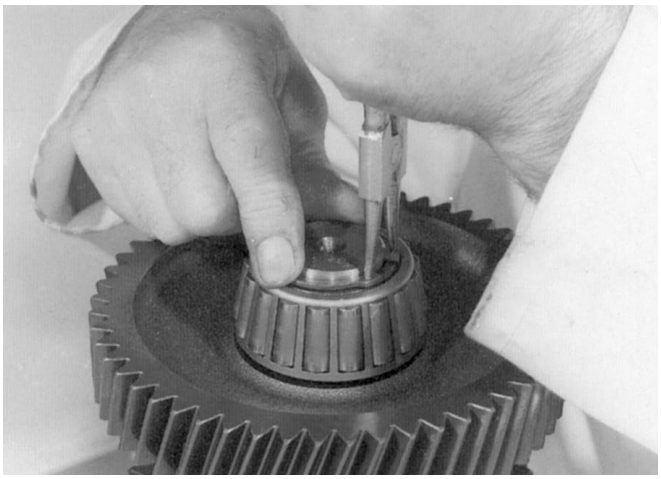
In the event of removal:
Install the bearing cage.

D. Layshaft disassembly

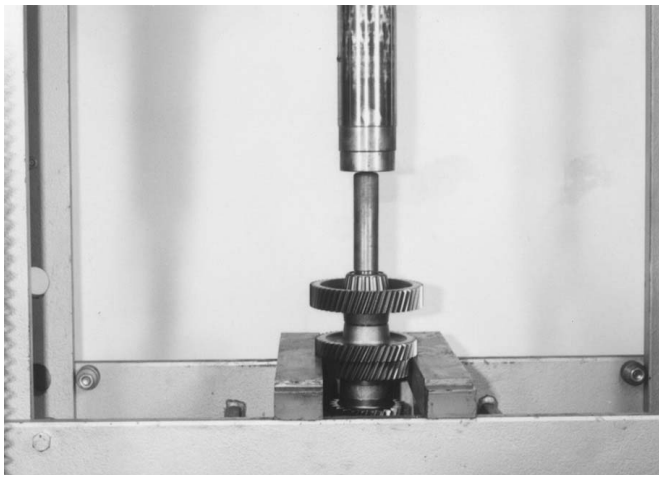
Note: To disassemble the gears on the layshaft, a 30/50 tonne hydraulic press will be required. In-service, it is only possible to replace the driving and 5th speed gears.



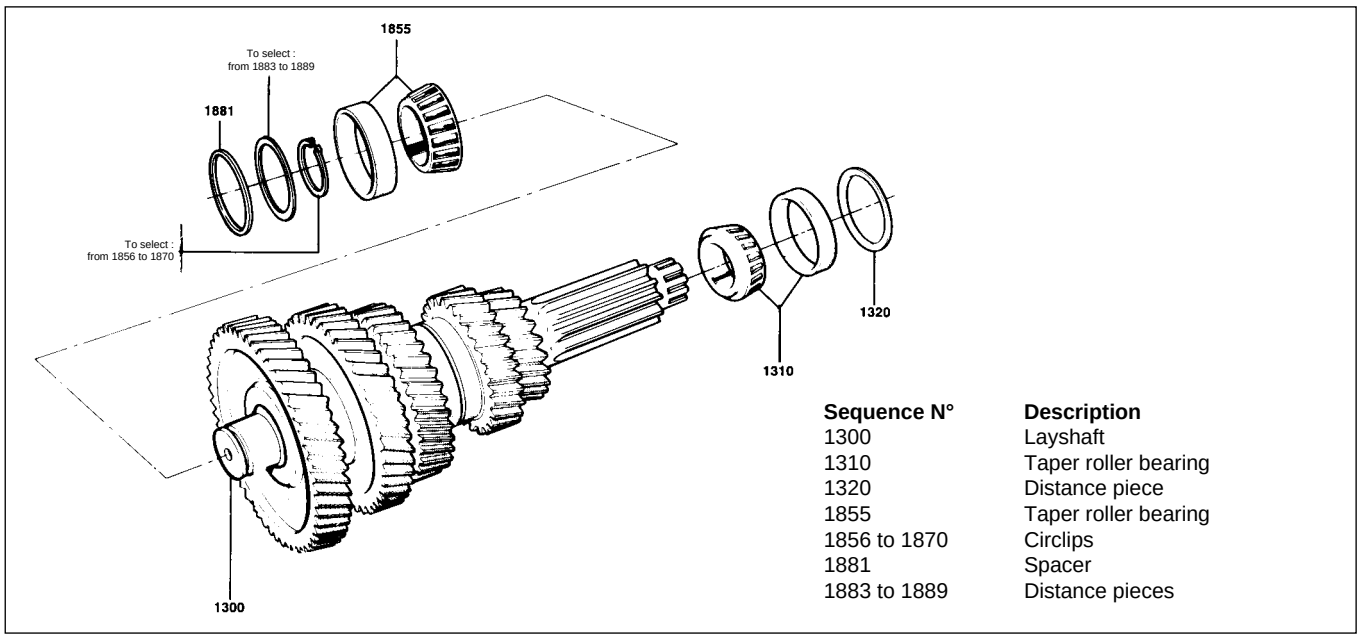
2. If necessary, remove the bearing.



1. Support the shaft assembly and removes the graded-fit circlip retaining the front taper roller bearing.



3. For replacement only:
Remove the 5th speed gear/bearing assembly.

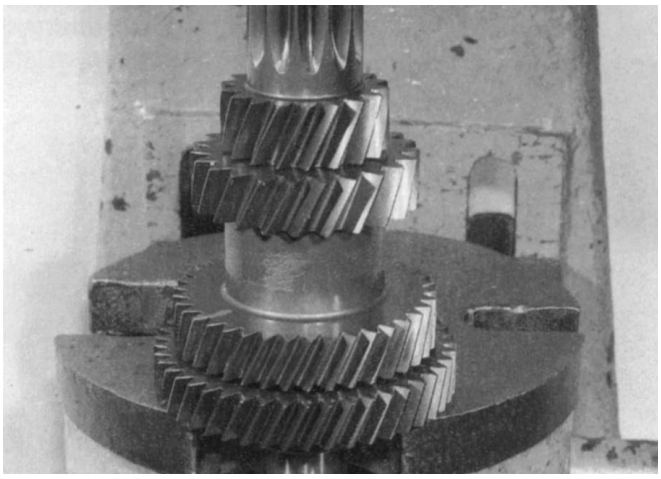


Sequence N°	Description
1300	Layshaft
1310	Taper roller bearing
1320	Distance piece
1855	Taper roller bearing
1856 to 1870	Circlips
1881	Spacer
1883 to 1889	Distance pieces

Layshaft assembly

E. Layshaft reassembly

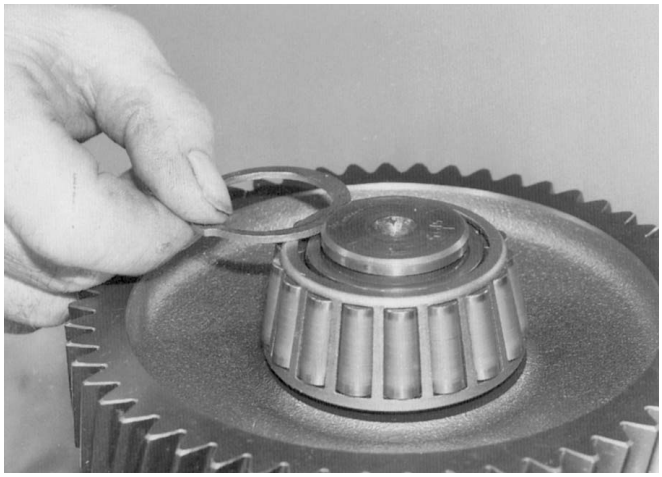
Note: During reassembly, in order to maintain the proper interference fit, it is necessary to chill the shaft body and any gears remaining attached to it at a temperature of - 10 °C (15 °F) and, at the same time, to heat the new gearwheels at a temperature of 150 °C (300 °F) before **quickly** press fitting the shaft. When pressing the shaft into the gears, the pressing operation must not be stopped once it has been begun until the gears are completely and firmly installed on the shaft. If two gears are being fitted, they should be pressed over the shaft separately and as quickly as possible. The assembled shaft and gears must remain under the press, with the appropriate pressure applied, until the temperature has returned to normal (some 10 minutes).



1. Chill the layshaft thoroughly and uniformly in a freezer or suitable refrigerator. Heat the gear(s) thoroughly at a temperature of 150 °C (300 °F). Use a Tempilstick crayon to make sure the gears are at the required temperature.

2. Place the 5th speed gear on the bed of the press. Offer up the layshaft in the gear and press fit the shaft into the gear, without delay. Repeat this operation for the drive pinion. Allow to cool.

3. Heat the layshaft taper roller bearing inner races at a temperature of 85 °C (180 °F). Support the shaft. The forward end facing upwards, and place the heated cone/rollers assembly on the shaft. Use a suitable mandrel to ensure that the bearing is fully home.



4. From the available range of graded-fit circlips, select the one that fits into the groove with the minimum of free play.

Circlips are available in the following sizes:

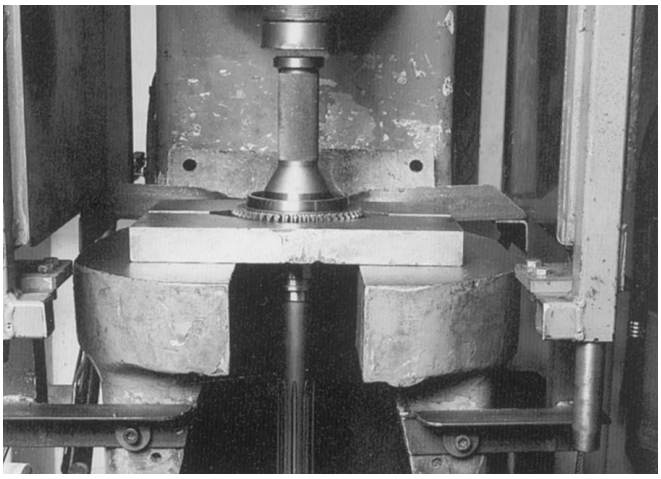
Part N°	Thickness
8870370	2.12
8870371	2.07
8870372	2.02
8871536	1.97
8871537	1.92
8871538	1.87
8871539	1.82
8871540	1.77

Reverse the position of the layshaft and fit the heated rear taper roller bearing inner race on the shaft. Use a suitable mandrel to ensure that the bearing is fully home.

The synchronizer flanges are rendered integral with the gears by the use of Loctite.

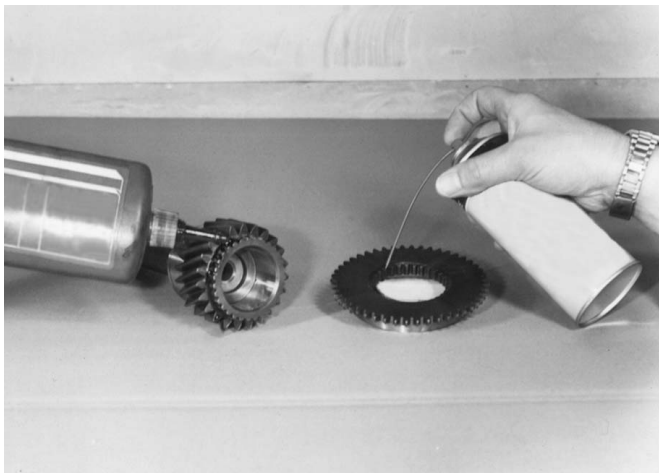
Disassembly

1. Heat the gear/synchronizer flange assembly. This operation softens up the “thread-locking” compound. Remove the flange from the gear.



Note: This also applies to the synchronizer flange of the 6th speed gear on the input shaft. Use a press.

Assembly



1. Apply a thin bead of Loctite 648 to the spline teeth of the gear.
Spray the splines of the synchronizer flange with Loctite T 747 activator.

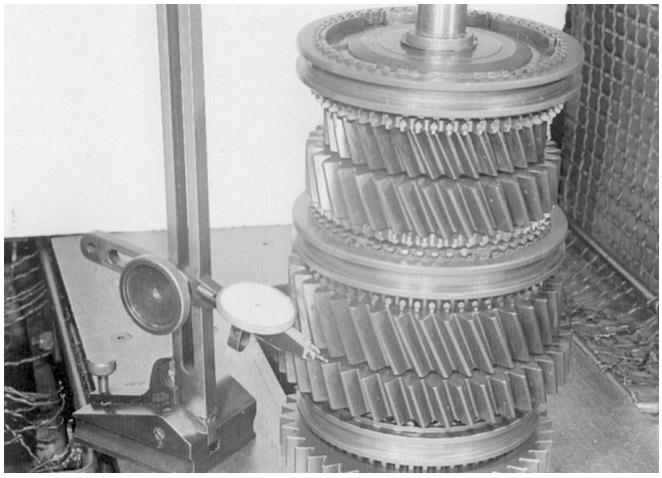
2. Allow the parts to cure for a minimum of two hours.
Note: If the flange is not seated squarely, the procedure must be repeated.

F. Main shaft disassembly

Note: All snap rings and the circlip on the shaft are graded for selective fit. Take care not to score the bearing surfaces of the main shaft when removing the snap rings.
Note: The end float of the gears on the shaft is established during manufacture by machining the components with very tight tolerances. Before disassembly of the main shaft, the end floats should be checked to find out whether they enter within the recommended limits.
Where excessive end float is found, it is necessary to check the gears, main shaft, synchronizer hubs and bearing sleeve for wear. Refer to “Inspection of fast wearing parts” and replace as required.

End float check

End float can be checked with the shaft assembled by using a dial gauge (as shown below).



1. Mount the main shaft assembly vertically on a suitable stand. Position the stylus of the dial gauge on the gear. Zero the gauge. Lift up the gear and record the reading on the dial.

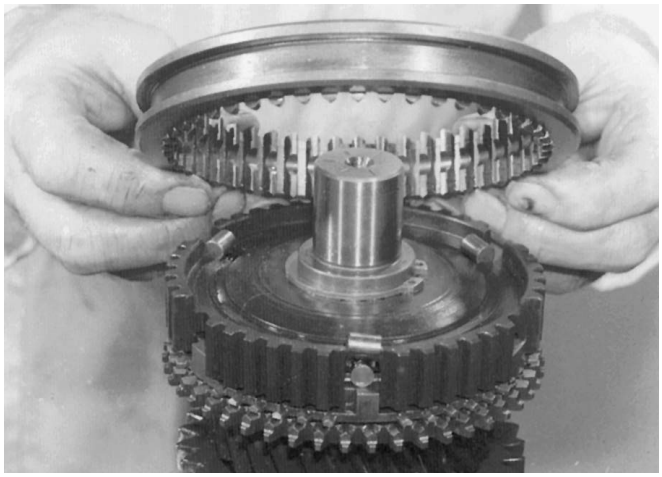
Gear end float

Pinion	5th (6th overdrive)	4th	3rd	2nd	1st
Low limit	0.31	0.35	0.35	0.35	0.40
High limit	0.53	0.48	0.48	0.48	0.57
Range	0.22	0.13	0.13	0.13	0.17

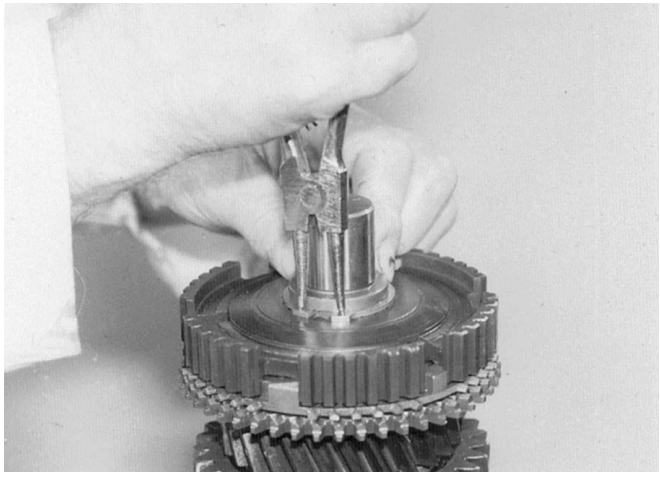
All dimensions in mm.

Note: The reverse gear is a sliding gear.

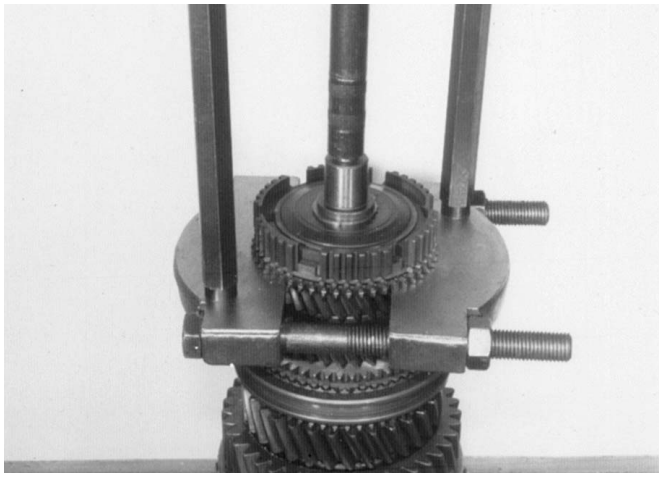
Disassembly



1. Mount the shaft assembly in a vice fitted with soft jaws. Carefully slide the 5th/6th speed synchronizer sleeve upwards until the three rollers are clear of the groove in the sleeve. Remove rollers, sleeve and three plungers and springs from the synchronizer fixed hub.



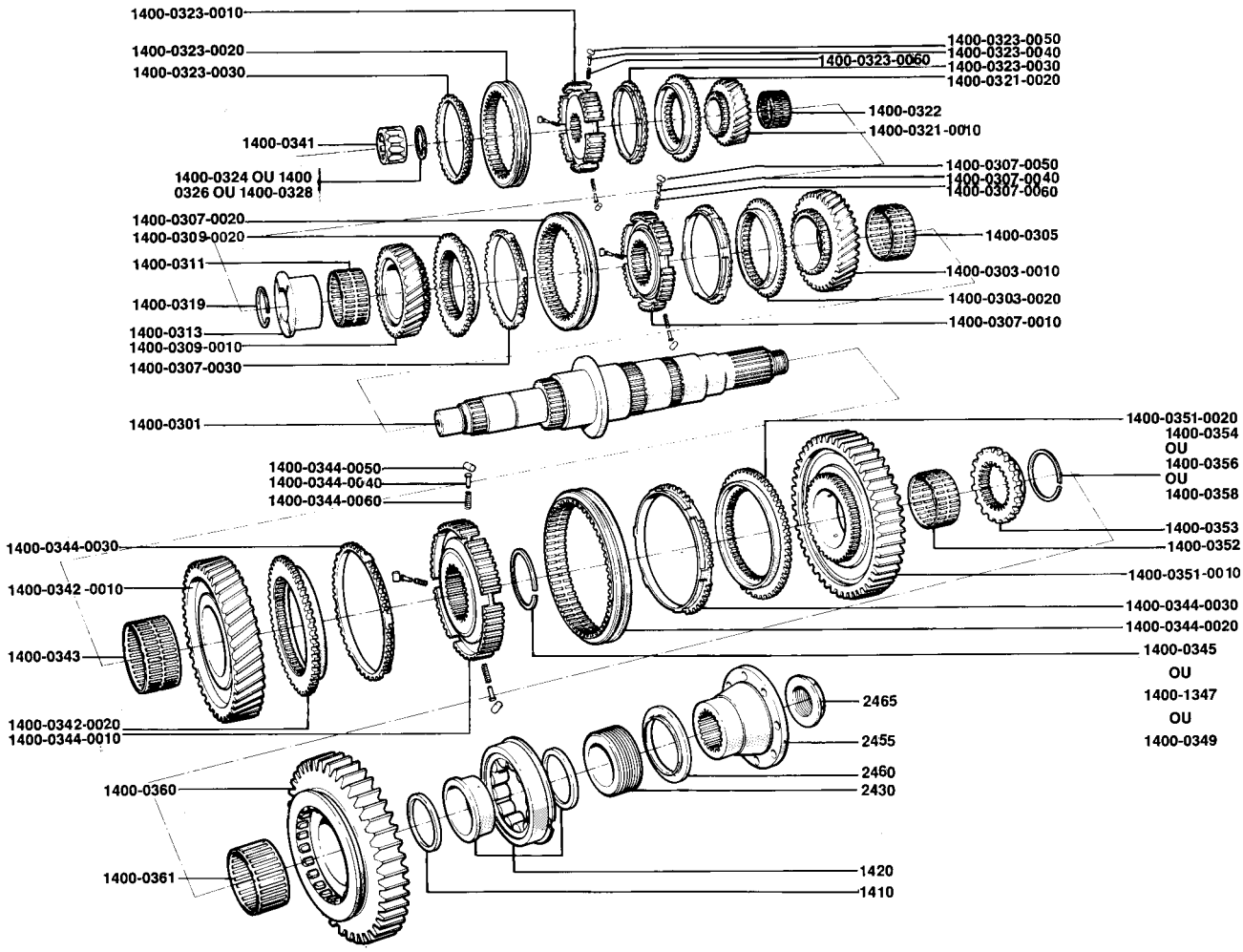
2. Remove the circlip retaining the 5th/6th speed synchronizer hub.



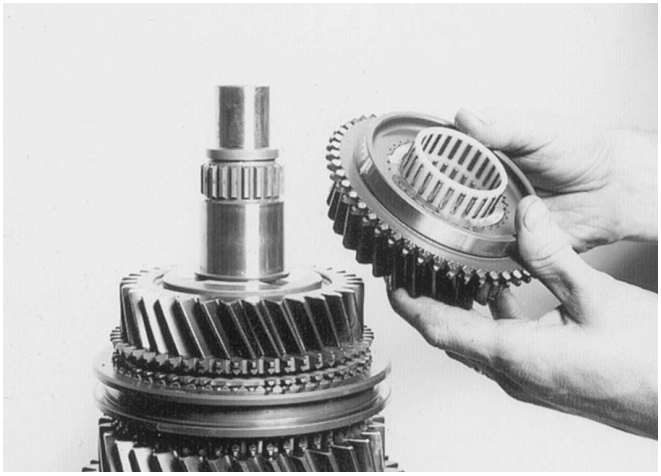
3. Mount the puller over the 5th/6th speed synchronizer hub and the 5th speed synchronizer ring, taking care not to damage the teeth of the ring. Pull off the hub, cone and ring.
(On overdrive models, it may be necessary to engage the puller over the 6th speed gear also).
Use tool **N° 008.**

Main shaft assembly

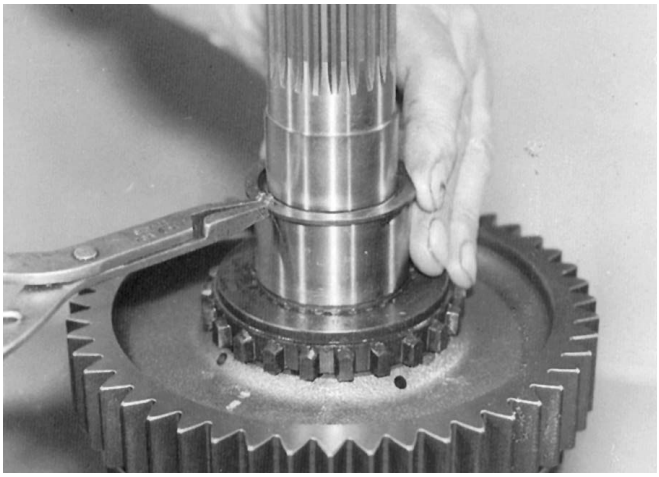
Exploded view



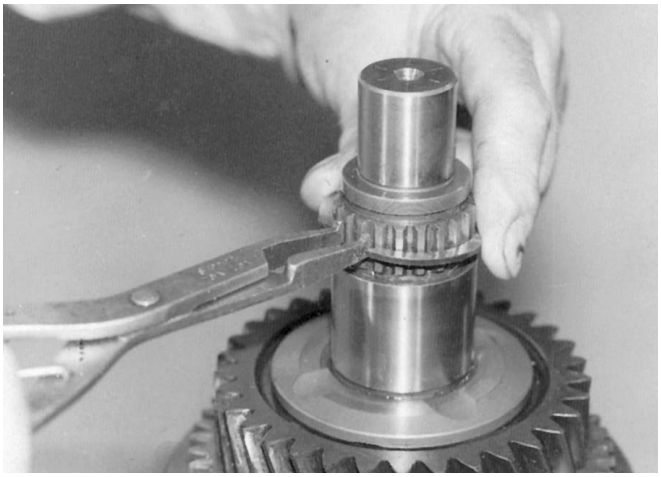
Sequence N°	Description
1400-0301	Main shaft
1400-0303-0010	3rd speed gear
1400-0303-0020	Synchro flange
1400-0303 0010	3rd speed gear (B ratio)
1400-0303-0030	Loctite 648
1400-0305	Needle roller bearing
1400-0307-0010	Fixed hub
1400-0307-0020	Sliding sleeve
1400-0307-0030	Synchro ring
1400-0307-0040	Plunger
1400-0307-0050	Roller
1400-0307 0060	Synchro spring
1400-0309-0010	4th speed gear
1400-0309-0020	Synchro flange
1400-0309-0010	4th speed gear (B ratio)
1400-0309-0030	Loctite 648
1400-0311	Needle roller bearing
1400-0313	4th gear bearing sleeve
1400-0319	Circlip 2.00 mm
1400-0321-0010	5th speed gear
1400-0321-0020	Synchro flange
1400-0321-0010	Overdrive gear
1400-0322	Needle roller bearing
1400-0323-0010	Fixed hub
1400-0323-0020	Sliding sleeve
1400-0323-0030	Synchro ring
1400-0323-0040	Plunger
1400-0323-0050	Roller
1400-0323-0060	Synchro spring
1400-0324	Circlip 2.12 mm
1400-0326	Circlip 2.07 mm
1400-0328	Circlip 2.02 mm
1400-0341	Needle roller bearing
1400-0342-0010	2nd speed gear
1400-0342-0020	Synchro flange
1400-0342-0030	Loctite 648
1400-0343	Needle roller bearing
1400-0344-0010	Fixed hub
1400-0344-0020	Sliding sleeve
1400-0344-0030	Synchro ring
1400-0344-0040	Plunger
1400-0344-0050	Roller
1400-0344-0060	Synchro spring
1400-0345	Circlip 2.10 mm
1400-0347	Circlip 2.05 mm
1400-0349	Circlip 2.00 mm
1400-0351-0020	Synchro flange
1400-0351-0010	1st speed gear
1400-0352	Needle roller bearing
1400-0353	Reverse fixed hub
1400-0354	Circlip 2.10 mm
1400-0356	
1400-0358	Circlip 2.05 mm
1400-0360	Circlip 2.00 mm
1400-0361	Needle roller bearing
1410	Spacer
1420	Roller bearing
2430	Speedometer drive pinion
2455	Coupling flange
2460	Grit shield
2465	Nyloc nut M33



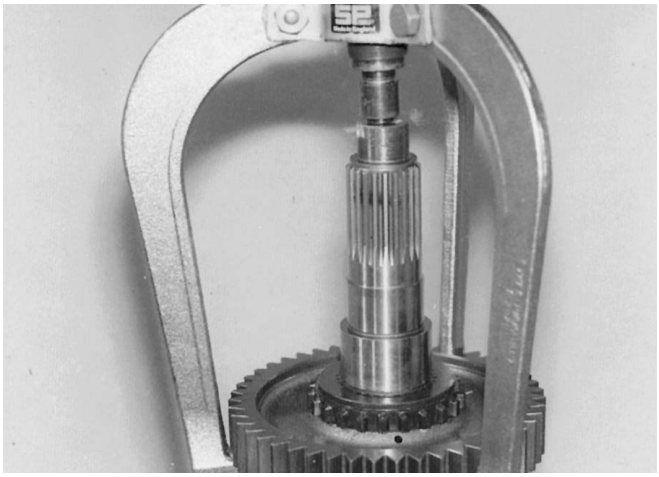
4. Lift off the 5th speed gear and the 5th speed needle roller bearing.
(On overdrive models, this will be the 6th speed gear).



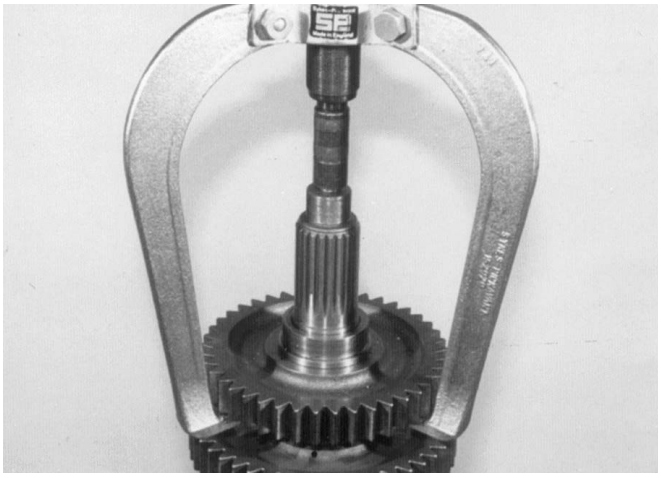
7. Remove the snap ring retaining the reverse gear fixed hub.



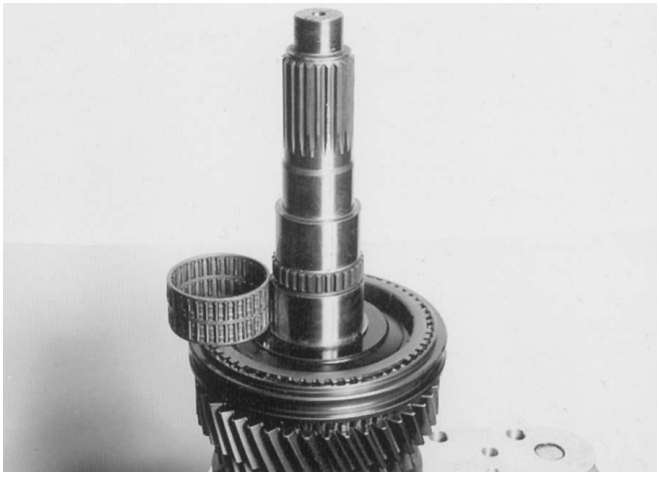
5. Carefully remove the snap ring retaining the 4th speed bearing sleeve.



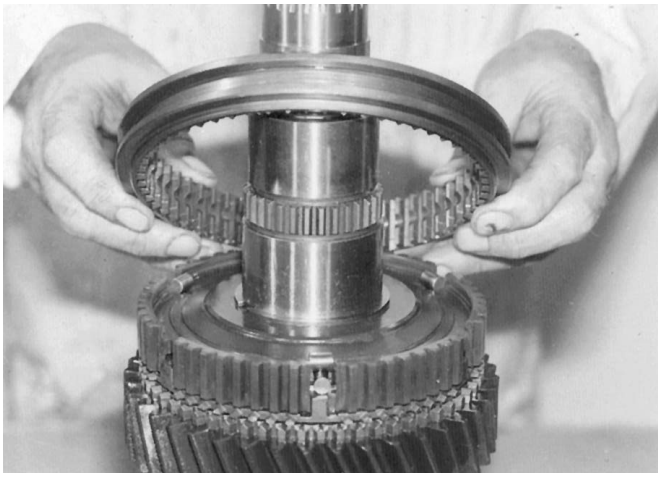
8. Using a vice or a suitable puller, pull off the 1st speed gear and the reverse gear fixed hub. Use tool **N° 009.**



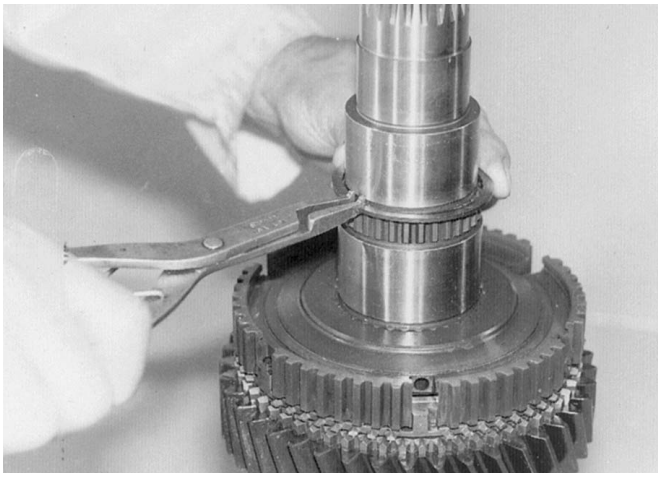
6. Reverse the position of the shaft assembly, hold in a vice and, using a suitable puller placed under the reverse gear, remove the gearwheel, thrust washer and bearing. Remove the reverse gear needle roller bearing. Use tool **N° 009.**



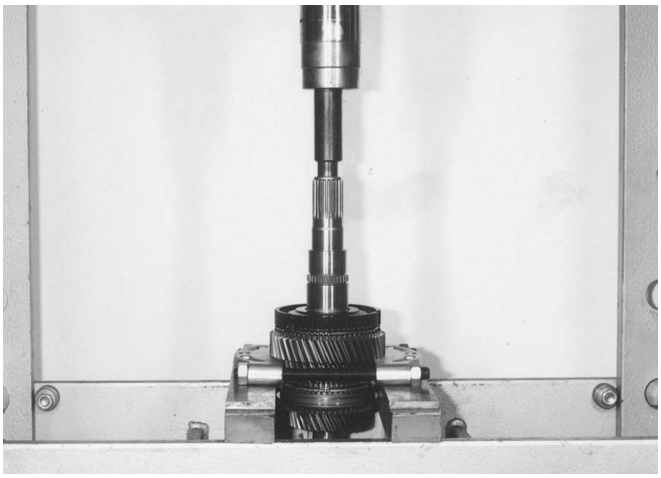
9. Lift out the steel cage bearing and remove the 1st speed synchronizer ring.



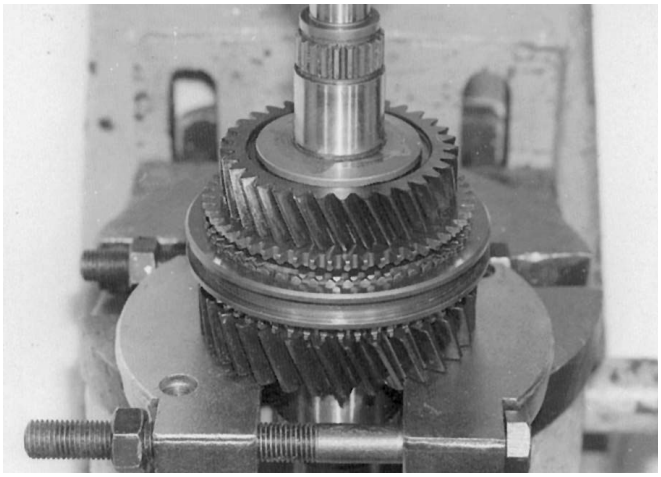
10. Carefully slide the 1st/2nd speed synchronizer ring rearwards until the three rollers are clear of the groove in the sleeve. Remove the rollers, sleeve and three plungers and springs from the synchronizer hub.



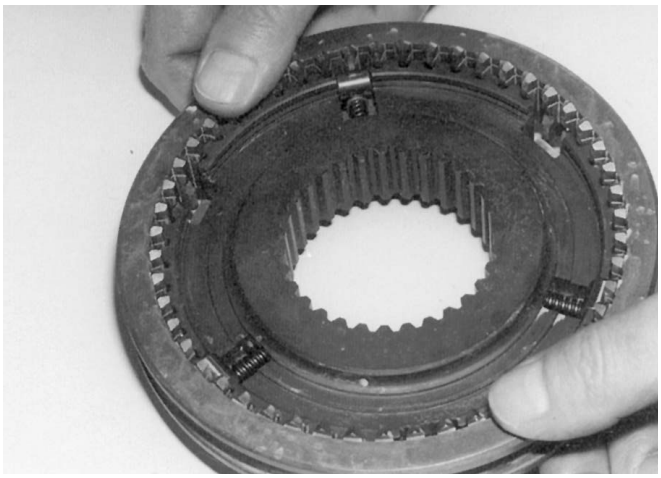
11. Remove the snap ring retaining the 1st/2nd speed synchronizer hub.



12. Mount the puller on the 2nd speed gear and pull off the 2nd speed gear, 2nd speed synchronizer ring and flange, 1st/2nd speed synchronizer hub and bearing.



13. Clamp the shaft in the press, under the 3rd speed gear.
Note: It is vital that the 3rd speed gear is supported and that the flange on the shaft does not foul the supporting blocks or the bed of the press when the shaft is being pushed through. Press or pull the shaft through the 3rd speed gear, 3rd/4th speed synchronizer hub and 4th speed bearing sleeve. Use tool **N° 008.**

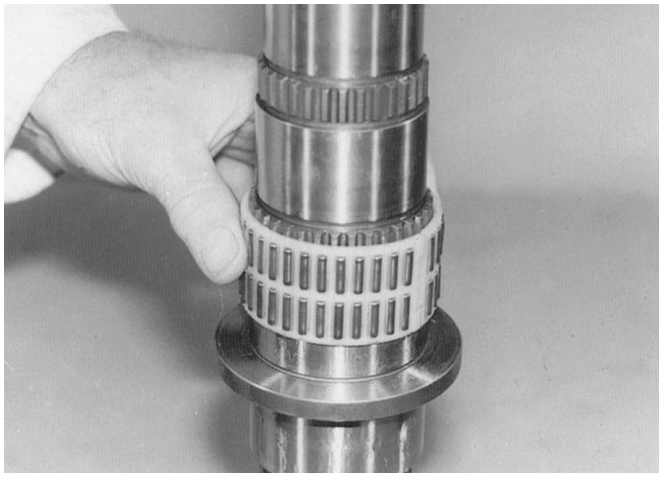


14. Dismantle the 3rd/4th speed synchronizer hub, as previously described in step 1.

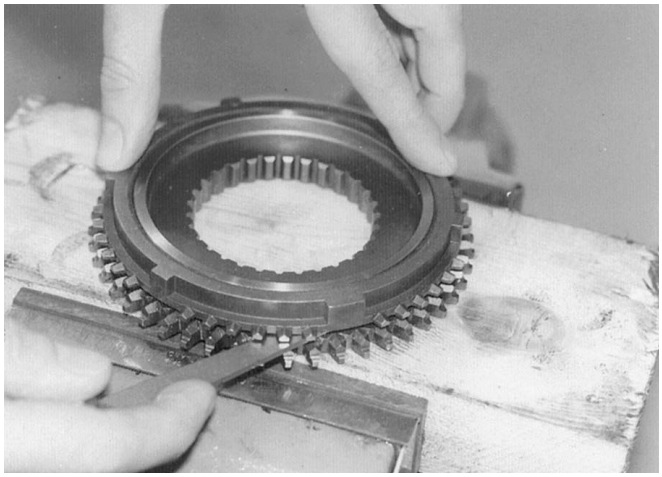
G. Main shaft reassembly

Note: The following parts must be heated at the recommended temperatures prior to assembly. Place the parts on a hotplate or in a temperature-controlled oven for at least 30 minutes to make sure they are thoroughly heated before placing them in position. Once fitted and cooled, the parts will shrink to give an interference fit.

	Sequence N°
4th speed bearing sleeve	1400-0313
Reverse fixed hub	1400-0353
Reverse bearing inner race	1420
Synchronizer hubs (3 off)	1400-0323-0010
	1400-0307-0010
	1400-0344-0010
Recommended temperature	85 °C (180 °F)



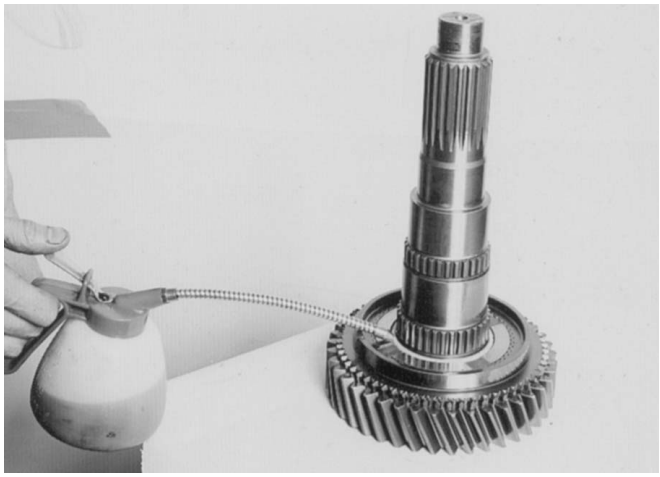
2. Support the main shaft, with the rear end facing upwards. Fit the 2nd speed bearing.



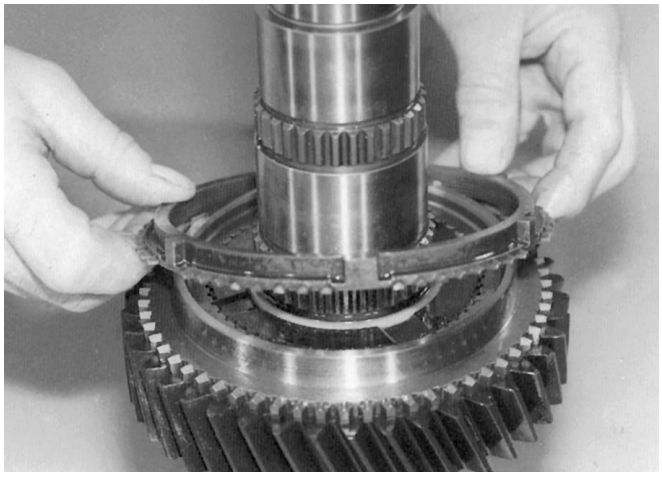
1. Before installing the synchronizer assemblies on the main shaft, check the fit of each synchronizer ring to its synchronizer flange. Place the synchronizer ring on its mating flange and, while holding the two parts firmly together, measure the clearance between the two rings using feeler gauges at several points around the circumference, as shown. The clearance should be between 0.5 and 1.9 mm. Replace both parts if the reading is not within the specified limits. Keep the synchronizer rings and flanges in respective pairs for assembly in the same relative positions.

The synchronizer flanges must be fitted to the gears using Loctite (see page 4/12-1).

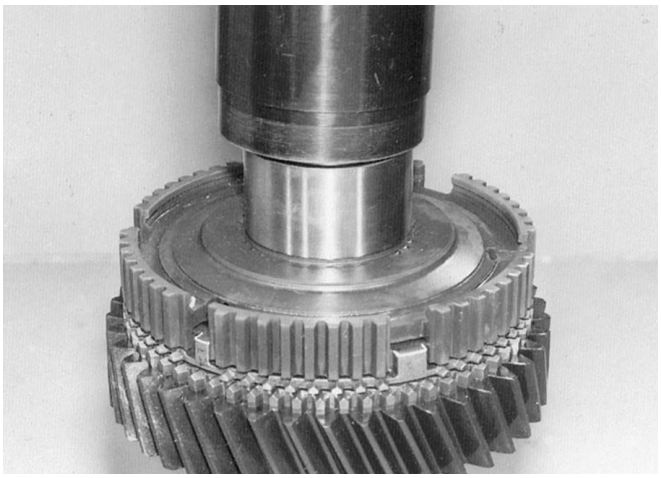
The gearwheel and flange are then treated as a single assembly.



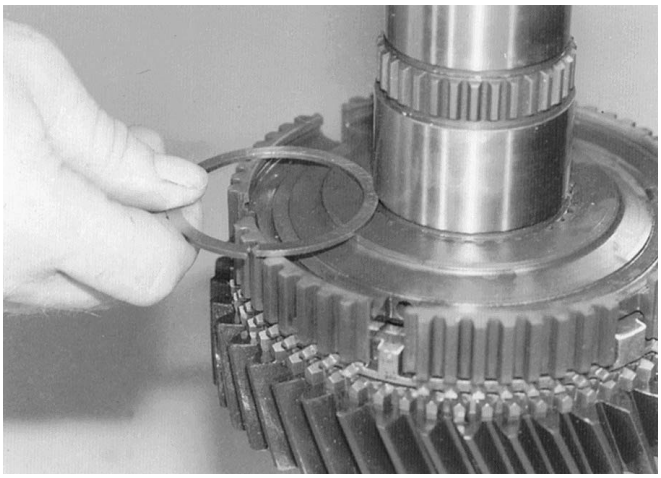
3. Lubricate the bearing with clean oil and slide the 2nd speed gear over the bearing.



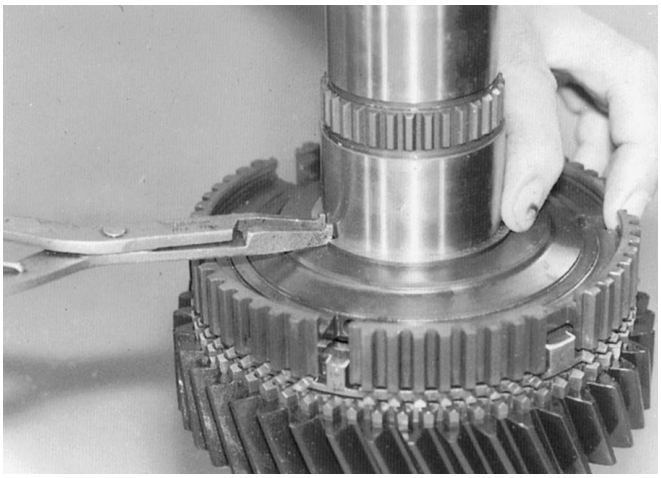
4. Fit the 2nd speed gear/bearing assembly. Then fit the synchronizer ring.



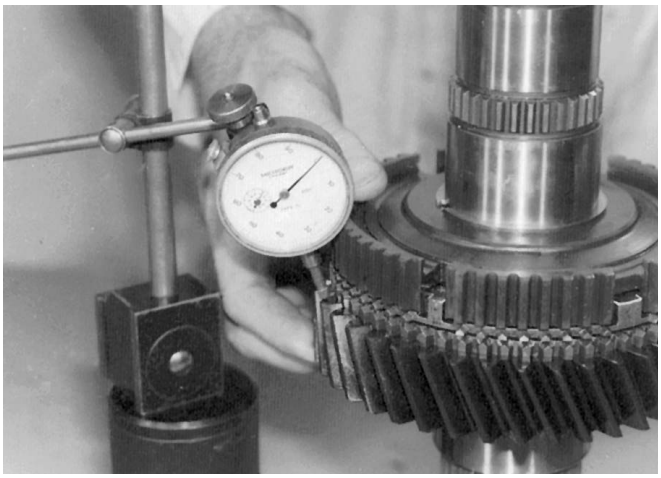
5. Take the heated 1st/2nd speed synchronizer hub and place it over the splines on the main shaft, ensuring that the wide slots in the hub align with the wide shoulders on the synchronizer ring. Allow to cool for 4/5 minutes, then use a soft metal hammer or a suitable mandrel to push the hub fully home.



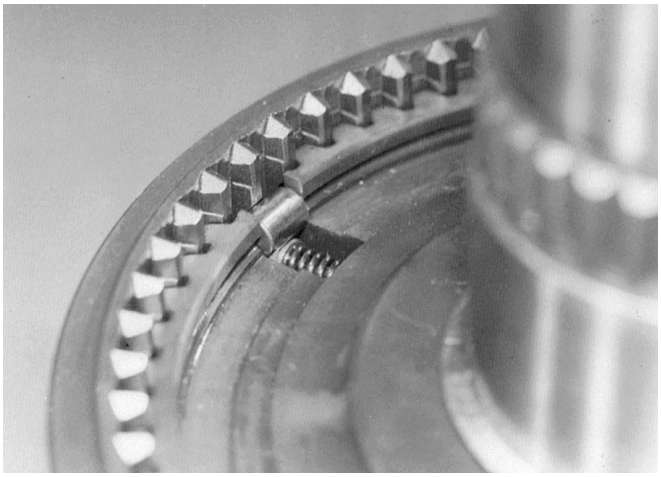
6. From the range of graded-fit snap rings, select the thickest one that fits into the groove with the minimum of free play.



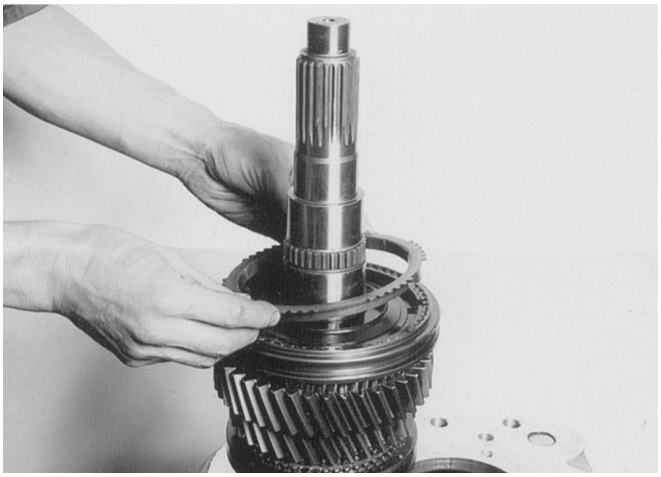
7. Install the snap ring in the groove, taking care not to damage the main shaft bearing surfaces.



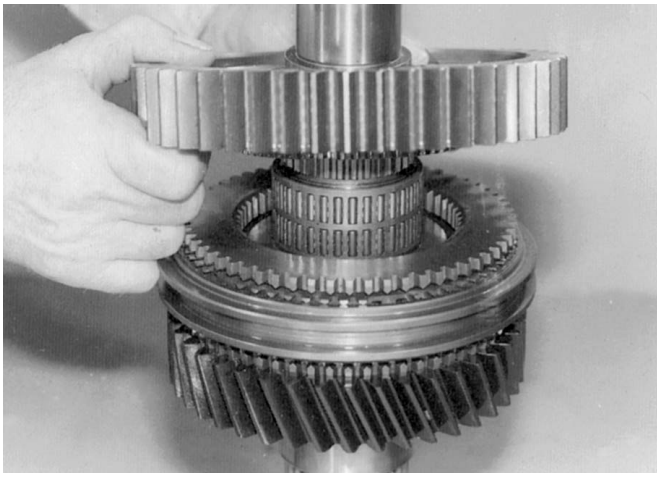
8. Check that the gear end float is within the tolerances stated in the chart.



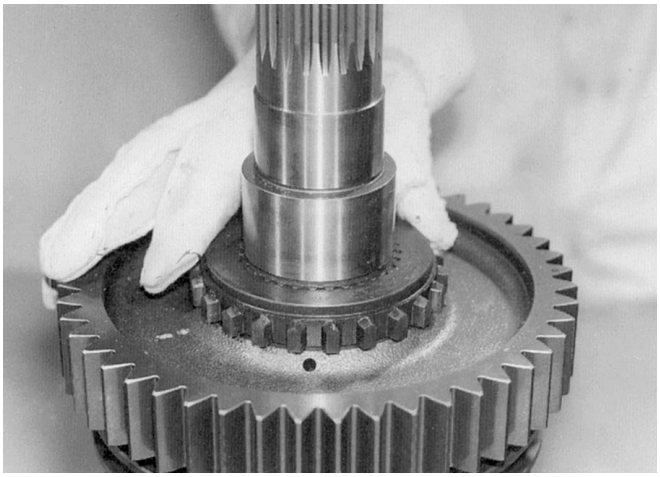
9. Install the three springs and plungers in the synchronizer hub. Place the synchronizer sleeve over the hub and support it, with the internal annular groove just above the hub. Position the three rollers as shown, resting on the heads of the plungers, and press downwards on the sleeve. This compresses the springs, allowing the sleeve to centralize in the neutral position.



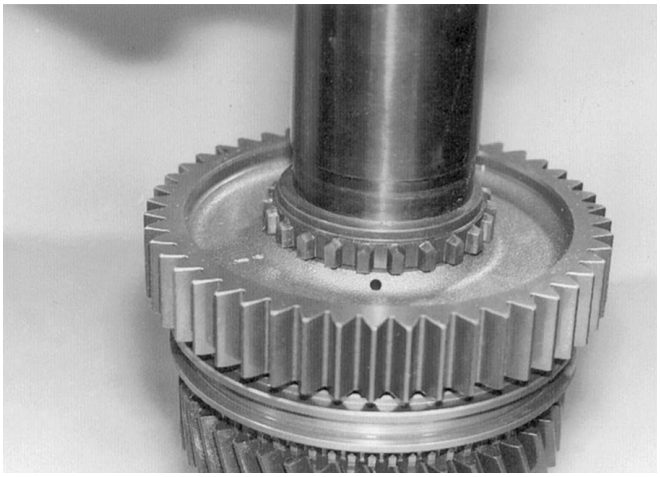
10. Install the 1st speed synchronizer ring on the synchronizer hub.



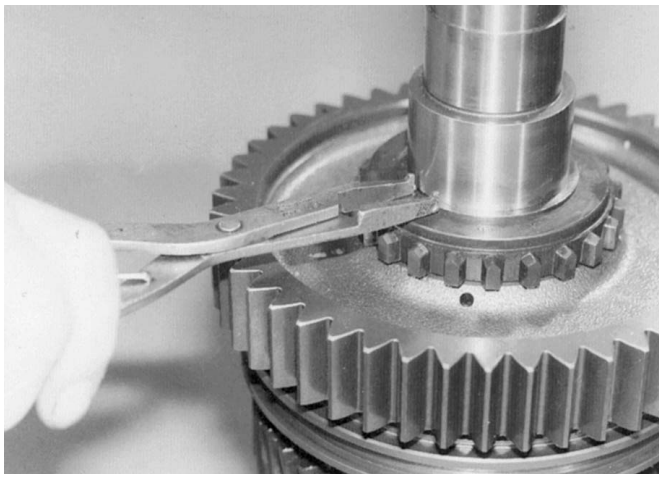
11. Lubricate the 1st speed bearing and install the steel cage bearing in the gear. Place the gear/bearing assembly on the shaft and in the synchronizer ring.



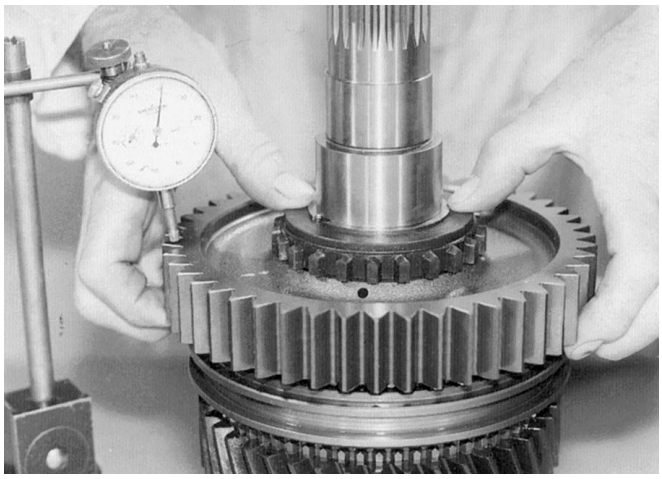
12. Take the heated reverse gear fixed hub and slide it, boss facing upwards, over the splines on the main shaft.



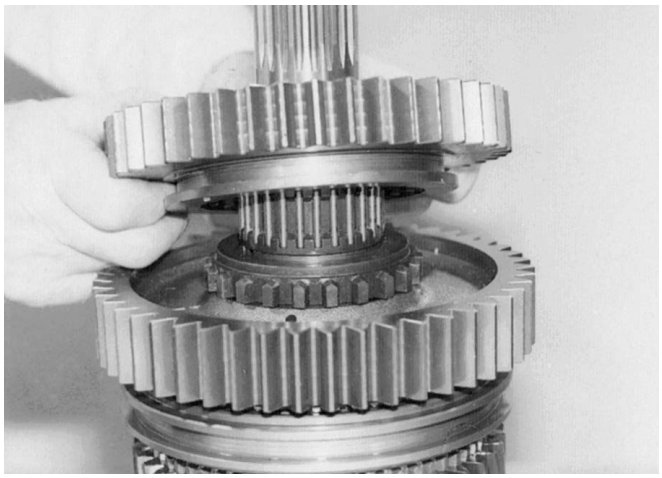
13. Use a soft metal hammer or a suitable flanged mandrel to ensure that the hub is pushed fully home against the shoulder.



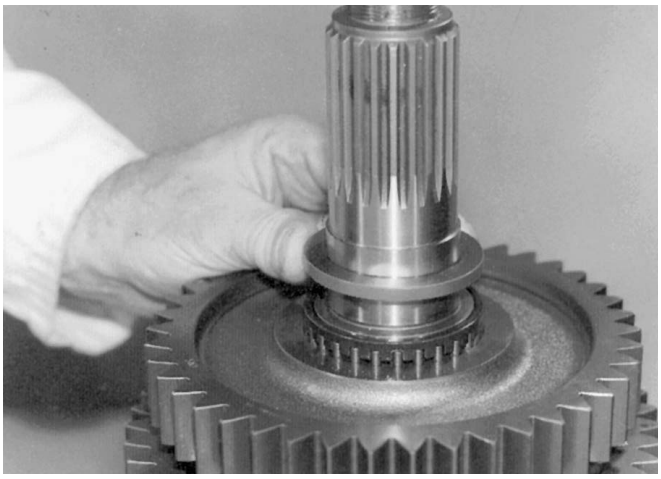
14. From the range of graded-fit snap rings, select the thickest one that fits into the groove with the minimum of free play, taking care not to damage the main shaft bearing surface.



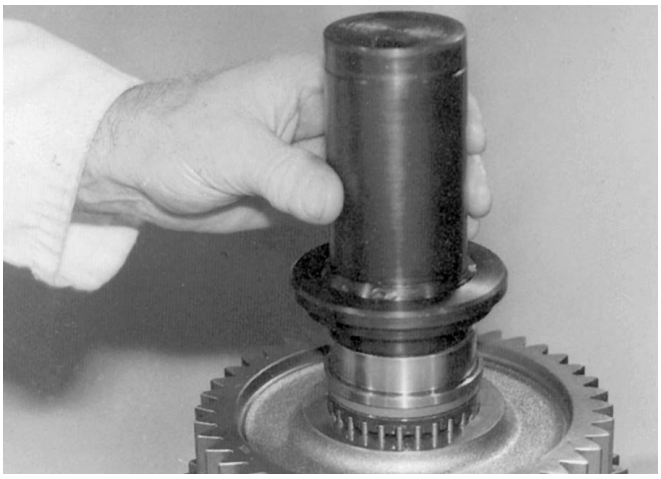
15. Check that the gear end float is within the tolerances stated in the chart.



16. Lubricate the reverse gear bearing and install the bearing and reverse gear on the shaft.

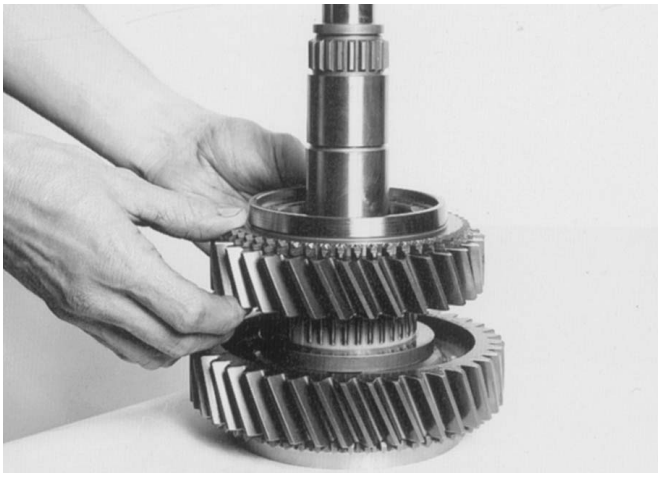


17. Fit the spacer.

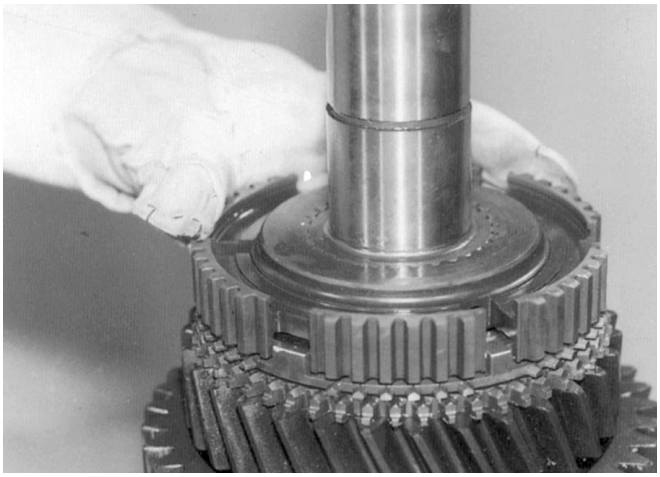


18. Take the heated inner race of the main shaft rear bearing and slide it over the shaft, with the flange facing inwards, against the spacer. Use a soft metal hammer or a suitable flanged mandrel to ensure that bearing hub is pushed fully home against the shoulder.

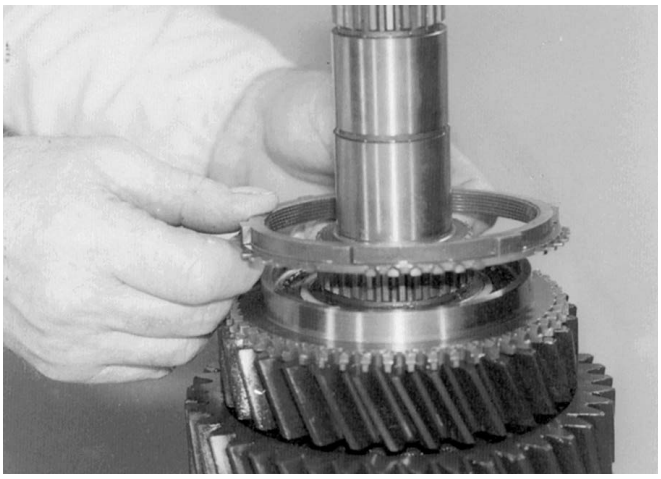
Note: When cooled, the bearing inner race should be sufficiently tight on the shaft to be able to retain the reverse gear on the shaft. Use a tube.



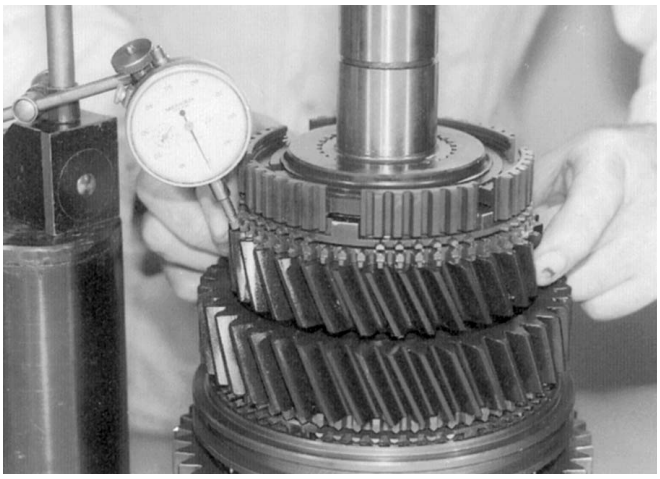
19. Reverse the position of the shaft in a vice. Lubricate and install the 3rd speed bearing and the 3rd speed gear.



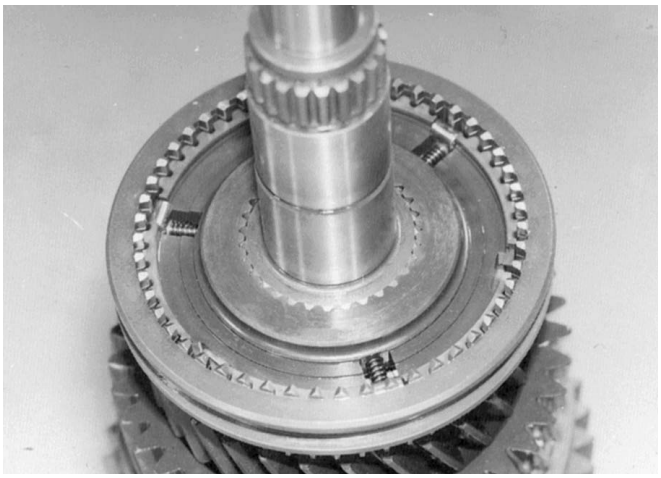
21. Take the heated 3rd/4th speed synchronizer hub and slide it over the splines on the main shaft, ensuring that the wide slots in the hub align with the wide shoulders on the synchronizer ring. Use a soft metal hammer or a suitable mandrel to push the hub fully home. Check again that the shoulders are in the correct slots.



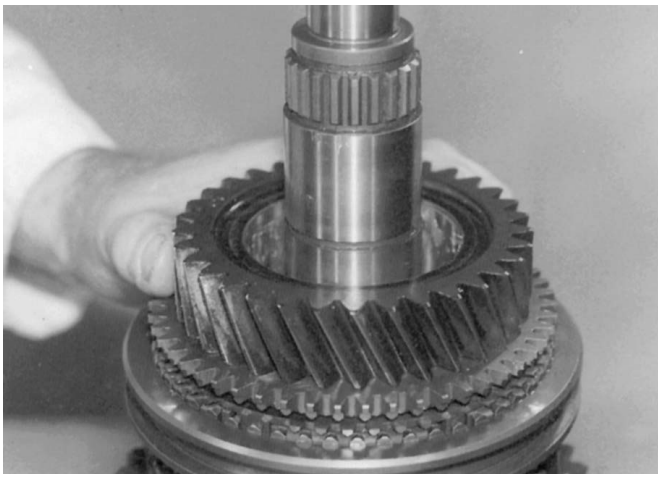
20. Install the 3rd speed synchronizer ring over the flange.



22. Check that the gear end float is within the tolerances stated in the chart.

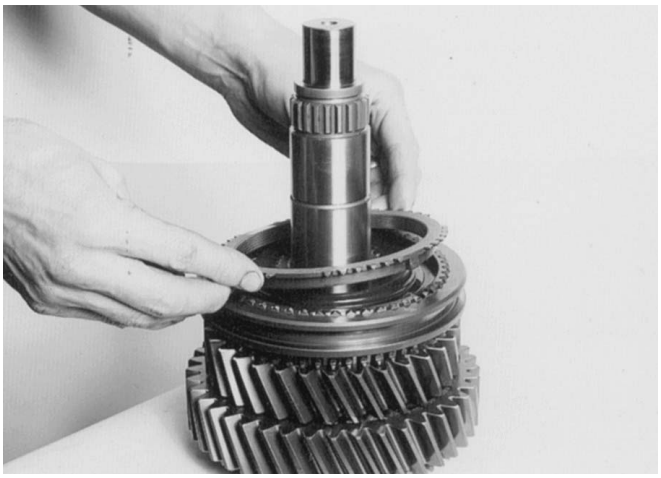


23. Install the three springs and plungers in the synchronizer hub and install the synchronizer sleeve and rollers as described in step 9.

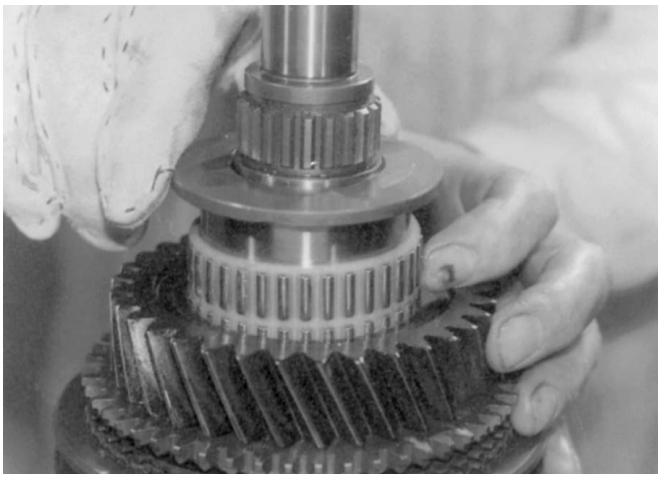


25. Lubricate the 4th speed bearing and position the gear in the synchronizer ring and the bearing in the gear.

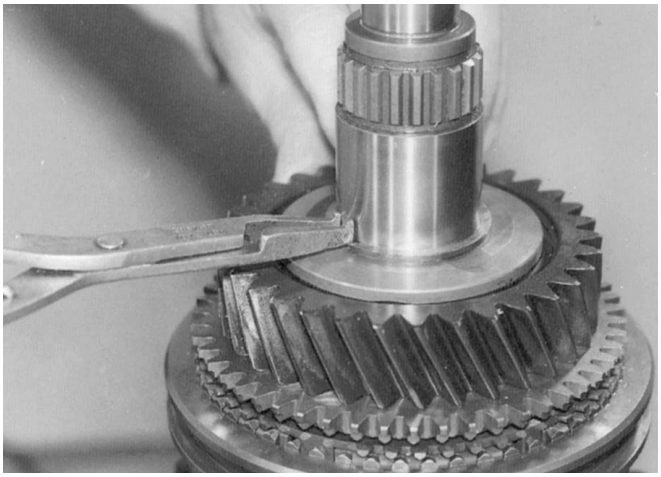
Note: If a smear of petroleum jelly is applied to the outer edge of the bearing, this will support the bearing and it will stand proud of the gear and simplify alignment of the bearing sleeve in the next operation.



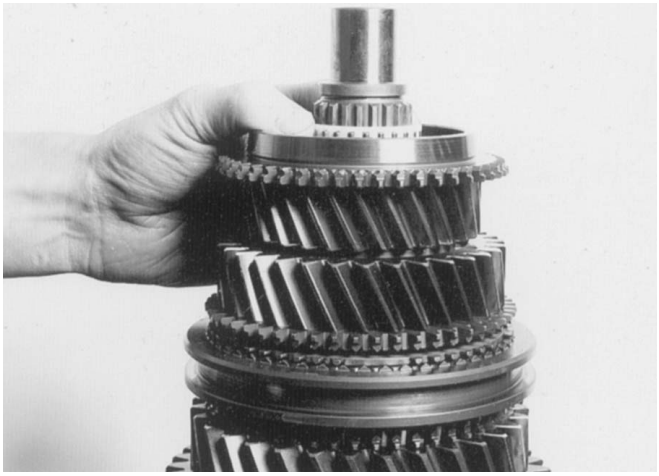
24. Install the 4th speed synchronizer ring on the synchronizer hub.



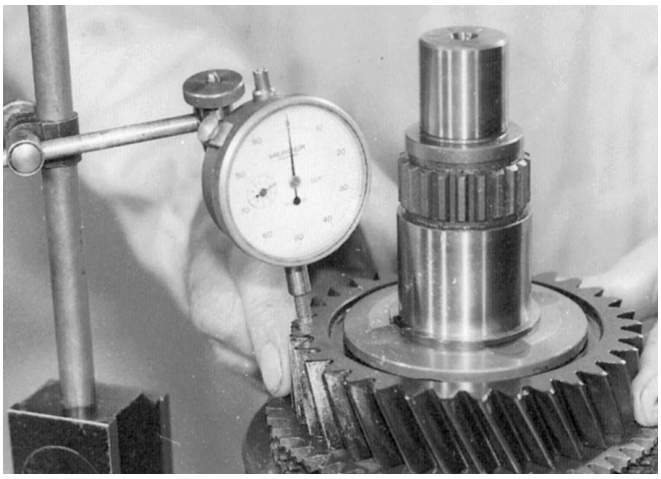
26. Take the heated 4th speed bearing sleeve and place it inside the bearing and over the shaft. Use a soft metal hammer or a suitable flanged mandrel to ensure that the hub is pushed fully home against the synchronizer hub.



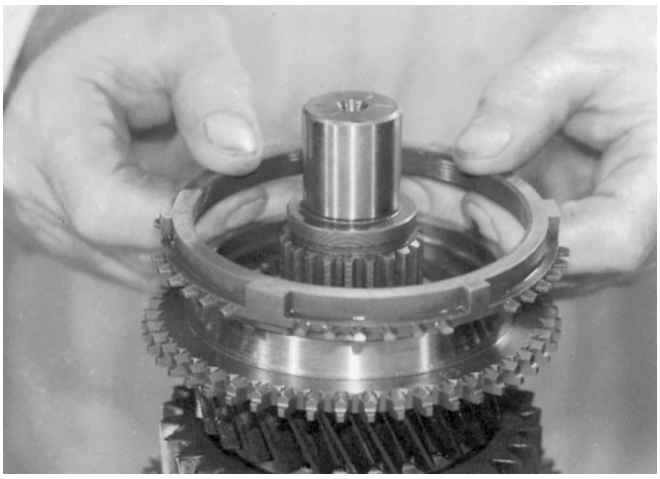
27. Fit a new snap ring in the groove, taking care to not damage the main shaft bearing surface.



29. Lubricate the 5th speed bearing and install the 5th speed bearing and gear on the shaft.

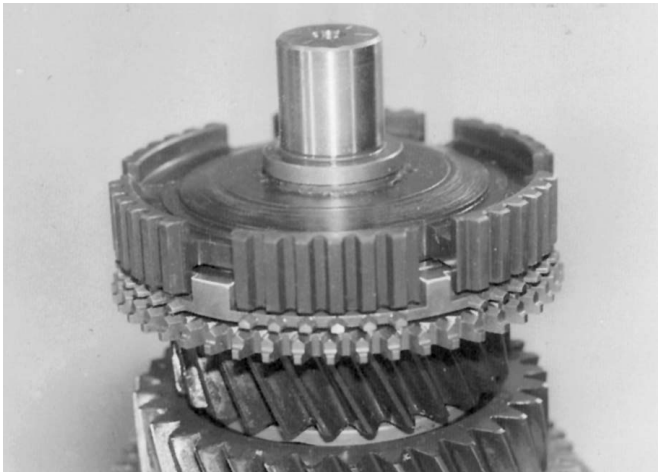


28. Check that the gear end float is within the tolerances stated in the chart.

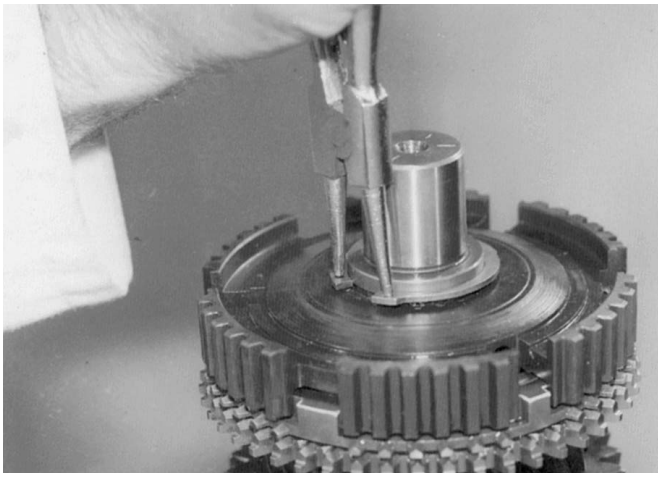


30. Position the 5th speed synchronizer ring on the 5th speed synchronizer flange.

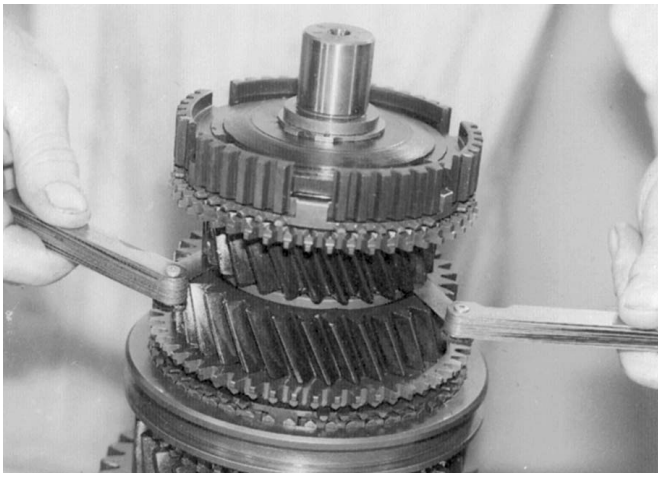
Caution: Take care to use the correct flange when fitting the synchronizer flange to the 5th speed gear. On overdrive models, it is possible to fit the overdrive flange to the 5th speed gear.



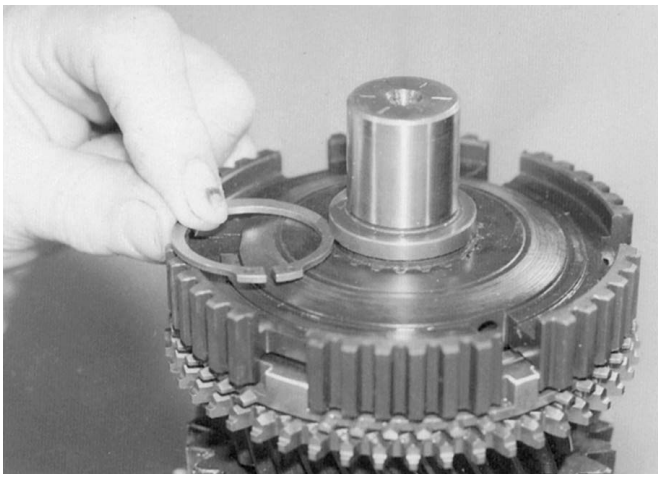
31. Take the heated 5th/6th speed synchronizer hub and slide it, boss facing downwards, over the splines on the main shaft, ensuring that the wide slots in the hub align with the wide shoulders on the synchronizer ring. Use a soft metal hammer or a suitable flanged mandrel, if necessary, to push the hub fully home against the shoulder. Check again that the shoulders are in the correct slots.



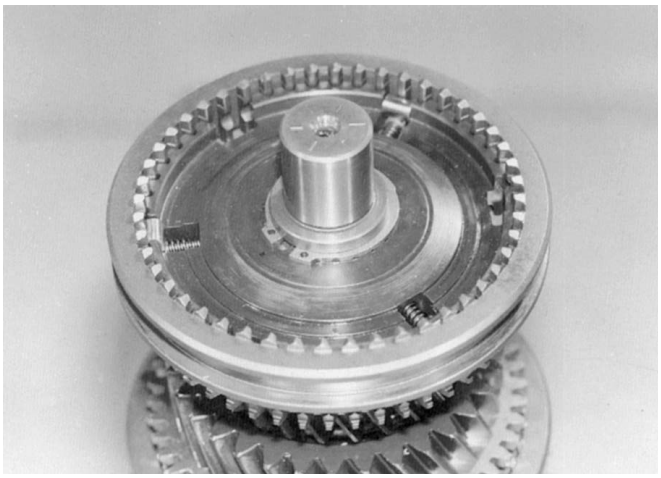
33. Install the circlip in the groove in the main shaft.



34. Check the gear end float using feeler gauges.



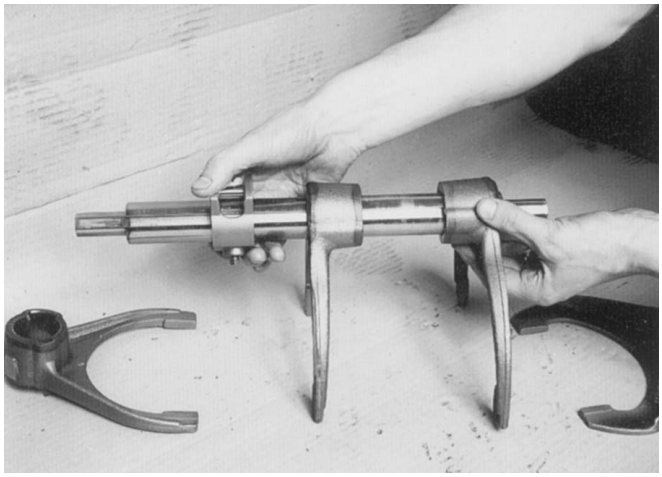
32. From the range of graded-fit circlips, select the thickest one that fits into the groove with the minimum of free play.



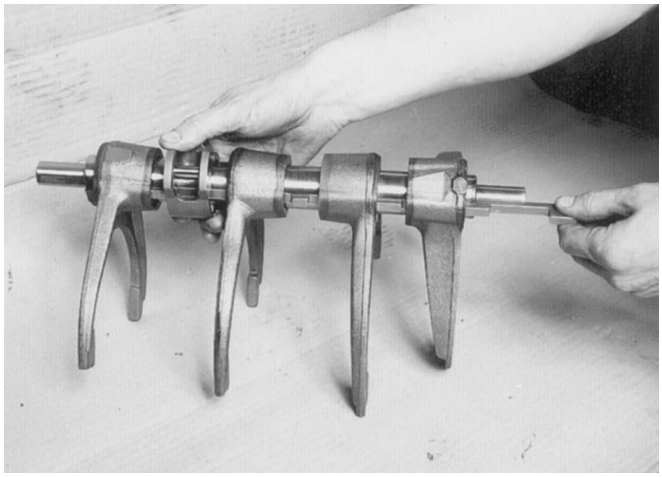
35. Install the three springs and plungers in the synchronizer hub and install the synchronizer sleeve and rollers as described in step 9.

H. Selector shaft disassembly

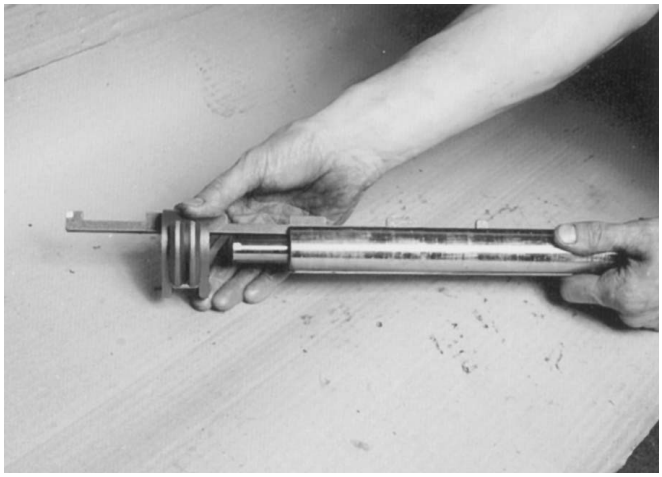
1. Place the selector assembly on the bench with the selector block to the left. Mark the front of the shaft and the keys to aid reassembly.



3. Remove the selector forks from the shaft.

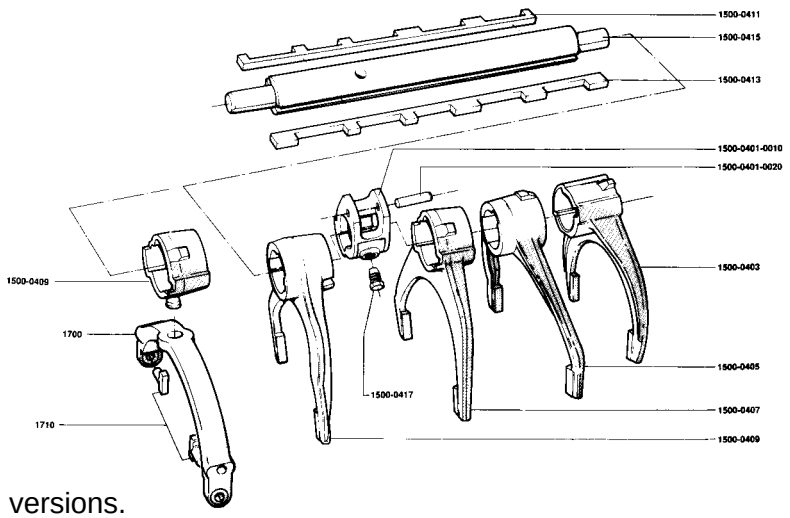


2. Hold the assembly by the selector block and withdraw the interlock key from the rear.



4. Remove the cap screw from the selector block and slide the block off the shaft.

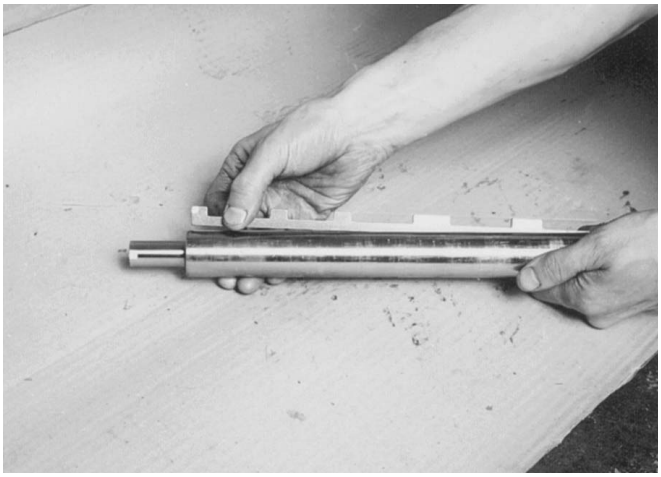
Sequence N°	Description
1500-0401-0010	Selector block
1500-0401-0020	Pin
1500-0403	Reverse shift fork
1500-0405	1st/2nd shift fork
1500-0407	3rd/4th shift fork
1500-0409	5th/6th shift fork
1500-0409	Overdrive selector
1500-0411	Selector key
1500-0413	Interlock key
1500-0415	Selector shaft
1500-0417	Set screw
1700	Overdrive fork
1710	Shift pad



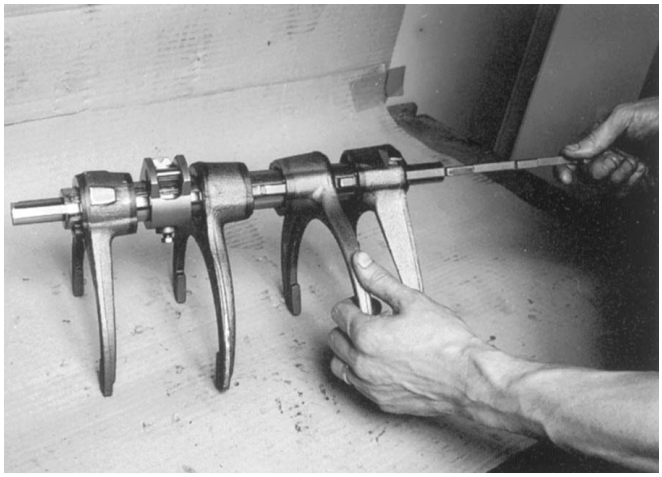
Note: The tapered cap screw is fitted on the opposite side on horizontal mounting versions.

Selector shaft assembly (vertical mounting version)

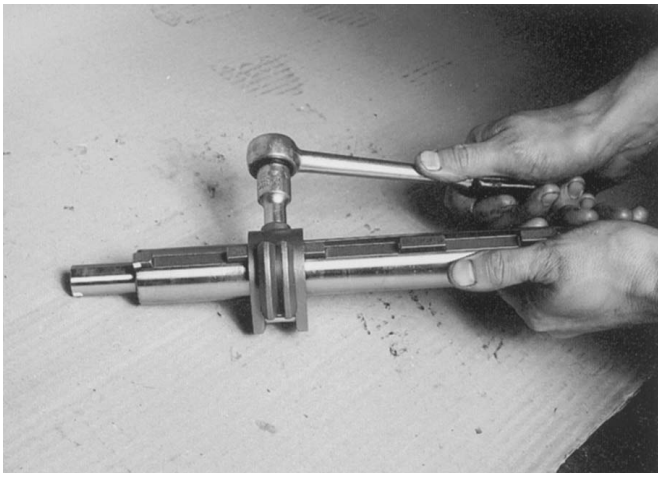
I. Selector shaft reassembly



1. Place the selector key in the keyway on the selector shaft, with the three small bosses towards the front.



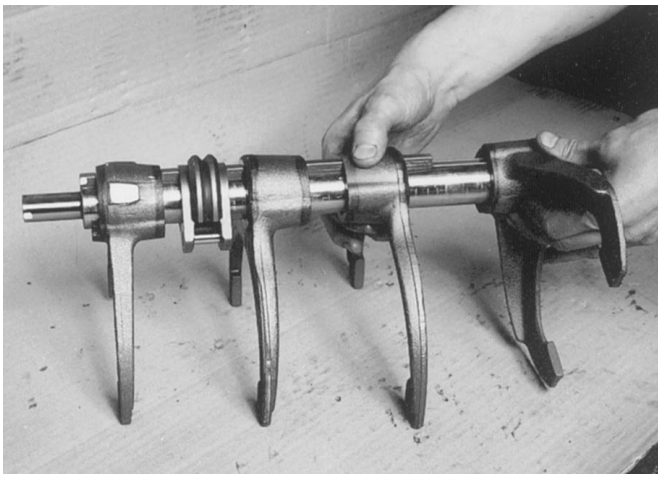
4. Support the selector shaft and slide in the interlock key from the rear.



2. Put the selector block on the shaft and tighten the cap screw at a torque of 35 to 39 Nm.

Note: If re-using the screw, apply Loctite 270 to the screw-thread before fitting.

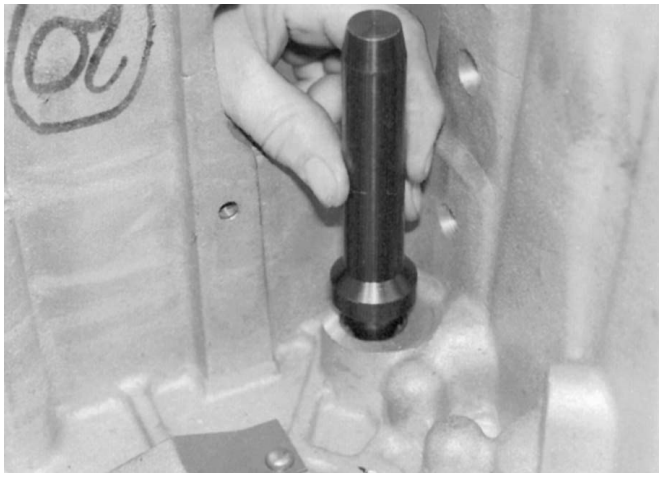
5. On overdrive models, the 5th/6th speed fork is replaced by a selector. Check the fit of the selector before reassembling the gearbox.



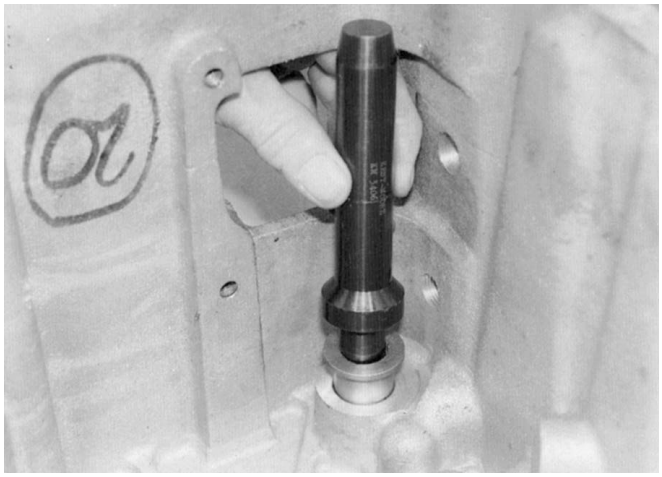
3. Place the selector forks in their respective positions on the selector shaft.

J. Gearbox casing reassembly

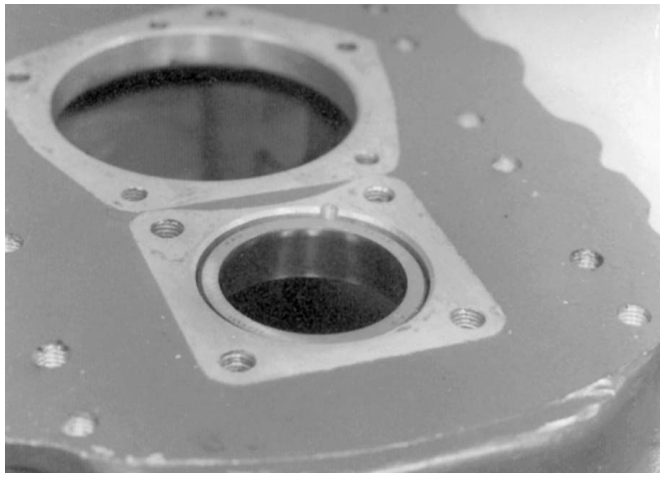
Note: Before reassembling the gearbox casing, ensure that each half-casing and the covers are perfectly clean and that all gaskets and jointing/sealing products are cleaned from the mating faces. When re-using bolts coated with thread locking compound (Patchlock) or when fitting cap screws in through holes, apply the recommended thread locking product or sealant (Loctite 641).



1. Support the front half-casing on wooden blocks. If removed, apply Loctite 518 sealant and install a new selector shaft core plug in the casing, from the inside, with the dished side facing inwards. Use a tube.



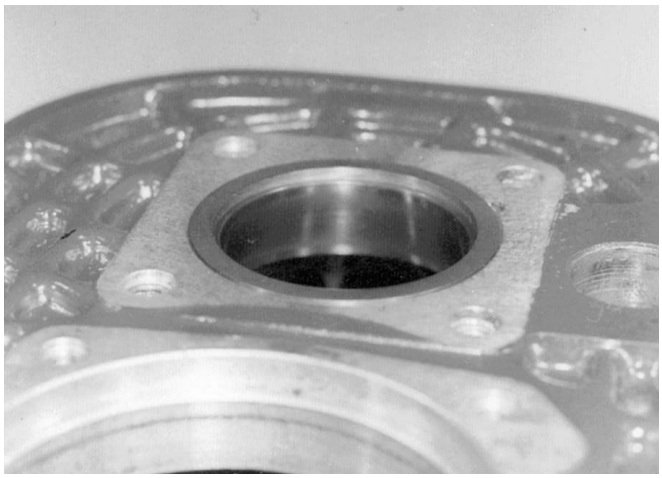
2. Using the special tool, install the selector shaft bush in the casing. Drive in until fully home. Use a tube.



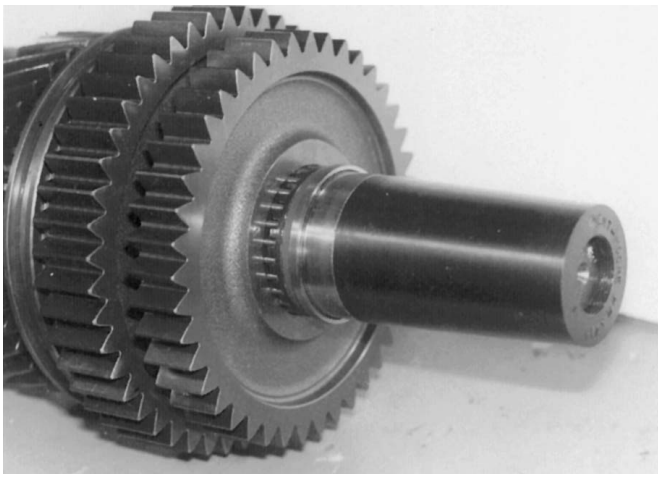
3. Reverse the position of the casing and install the outer cup of the layshaft front bearing in the casing until it is approximately 5 mm below the front face of the casing.

4. Mount the rear half-casing on the stand and, if removed, install new core plugs and rear bushes on the selector shaft, as described in steps 1 and 2.

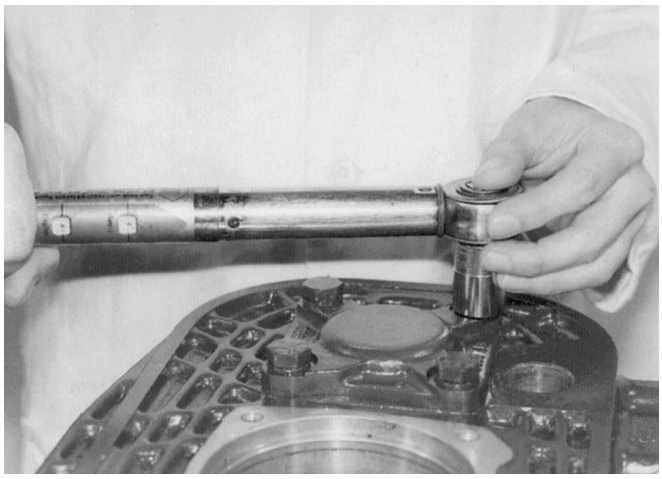
5. Reverse the position of the casing and, using the special tool, install the outer cup of the layshaft rear bearing in the casing until it is just below the rear face of the casing.
Use tool **N° 007.**



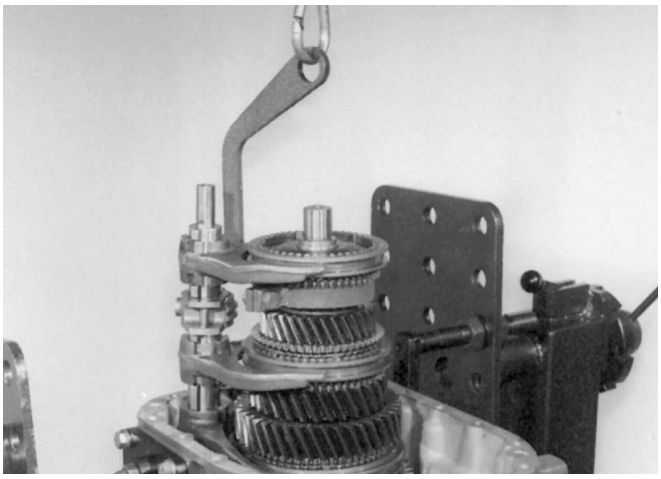
6. Place the spacer on the bearing cup, making sure it is protruding above the rear face of the casing.



9. Install the special locating sleeve over the main shaft. Use tool **N° 010.**

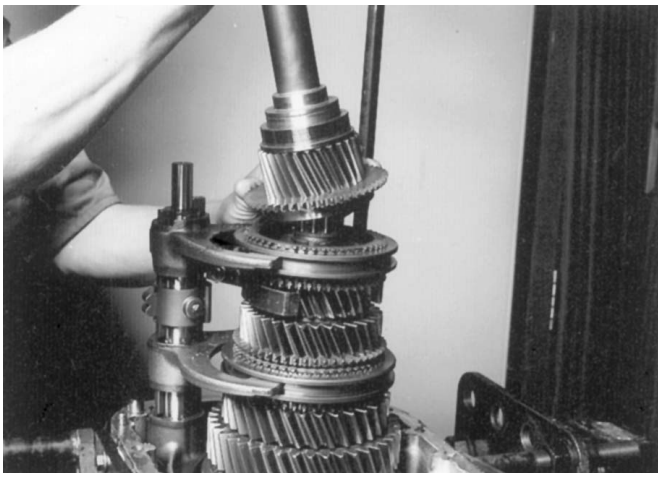


7. Install the layshaft rear bearing cover on the casing. Tighten the cap screws evenly at the correct torque, making sure that the bearing cup is pressed into the casing. Torque = 69 to 78 Nm. **CAUTION:** Take care to not obstruct the lubrication hole. Respect the orientation of the cover plate (see Fig. 22, page 4/7).

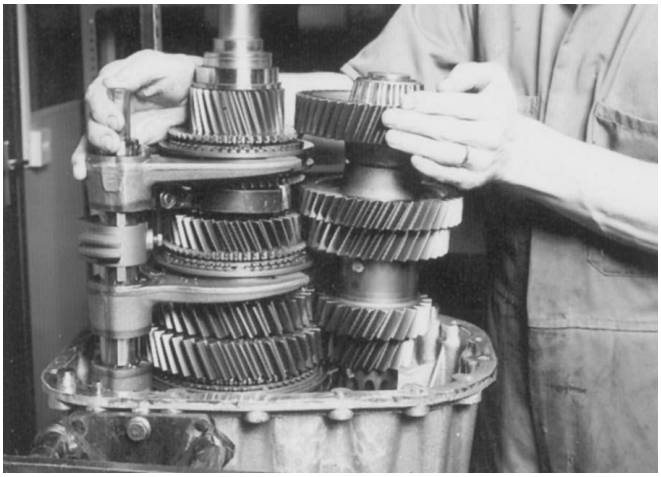


10. Position the selector shaft on the main shaft. Support the main shaft using the special tool and a hoist, and lower the assembly into the casing, making sure that the selector shaft enters into the rear bush. Support the main shaft and the selectors approximately 20 mm above the final installation position.

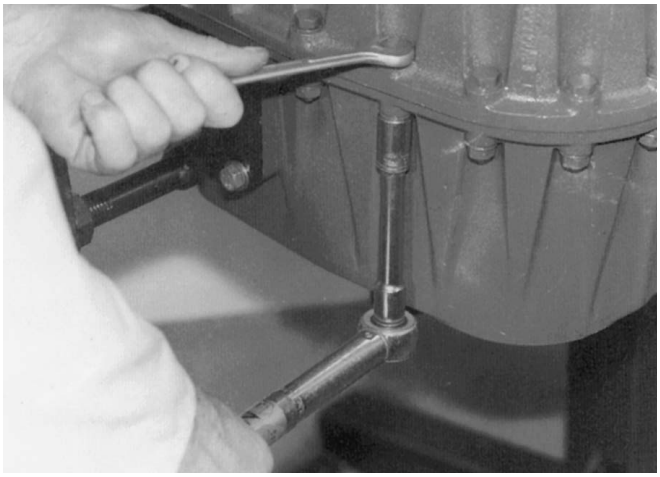
8. Install the main shaft rear bearing outer cage/rollers assembly in the casing, with the snap ring groove facing outwards. Temporarily install the speedometer housing with two or three cap screws. Use a tube.



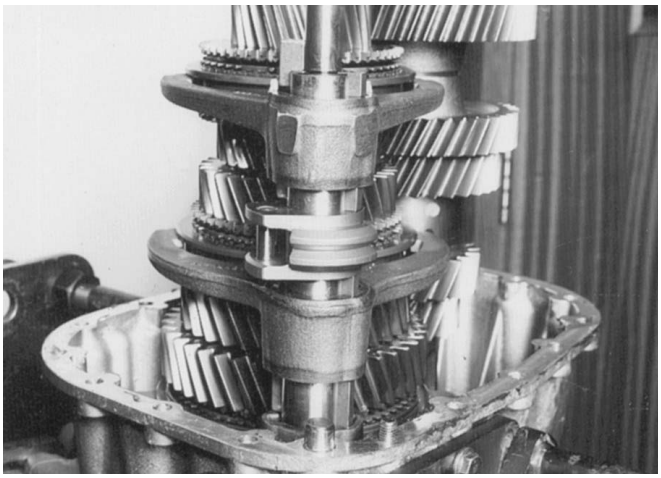
11. Lubricate and install the spigot bearing on the main shaft. Fit the synchronizer ring and install the input shaft assembly.



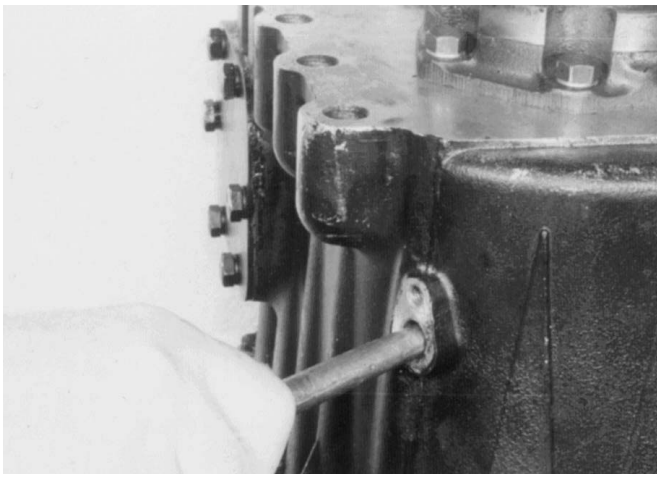
12. Position the layshaft to mesh with the main shaft.



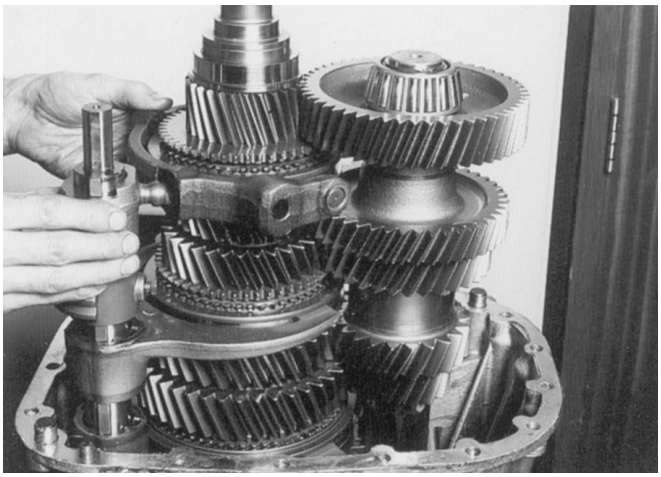
15. Apply sealant to the rear half-casing mating flange and install the front half-casing. Fit the cap screws and nuts. Tighten at a torque of 51 to 58 Nm.



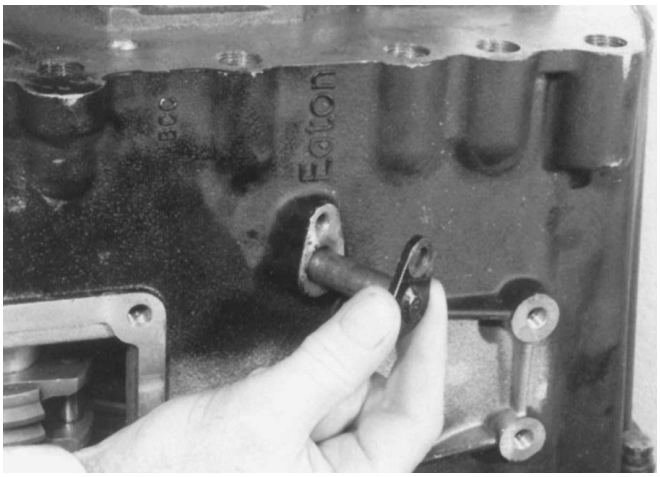
13. Lower the hoist to allow the main shaft, layshaft and selector shaft to seat in their respective bearings and bushes. Remove the special tool. Ensure that the selector block is positioned so that it does not foul the front half-casing.



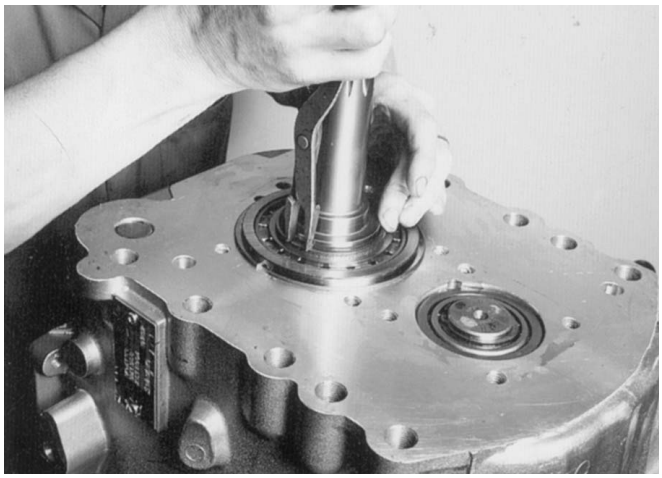
16. On overdrive models, using a suitable probe (as illustrated), align the pivot pins with the holes in the casing. Apply sealant (Loctite 518) to the pivot pin flanges and insert the pins.



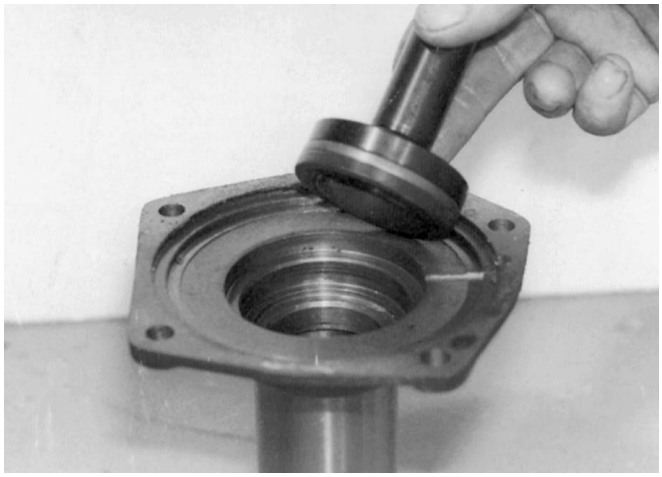
14. On overdrive models, install the fork pads in the 5th/6th overdrive selector fork. Engage the fork and the pads in the synchronizer sleeve.



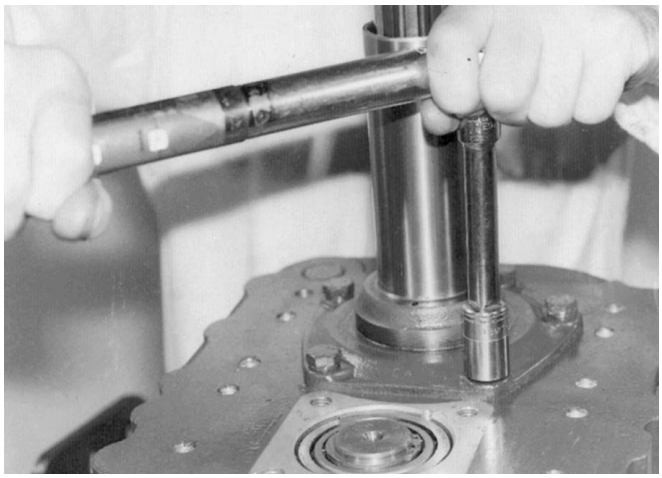
17. When aligning the right-hand pivot pin, lift up the selector using a screwdriver through the remote control aperture. Tighten the cap screws at the correct torque (20 to 40 Nm).



18. Fit the spacer ring and the inner circlip on the input shaft.



19. If removed, install a new oil seal in the front cover of the input shaft bearing, using the special tool. Press the seal firmly down to the shoulder, taking care to not damage the seal.
Use a tube dia. 60.3 x 54.5 mm.



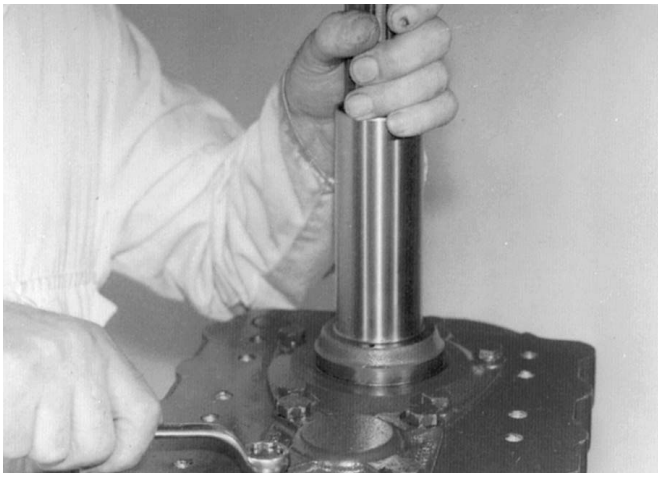
20. Lubricate the shaft seal surface and apply flange sealant to the front cover mating face. Install the front cover and tighten the cap screws at the correct torque (35 to 39 Nm).

21. Select the thickest shim and place it against the layshaft bearing cup. Place the spacer on top of the shim.

Note: The spacer must stand proud of the front face of the casing when the bearing cup is fully seated against the bearing cone/rollers assembly.

Shims are available in the following thicknesses:

Part Nº	Thickness (mm)
F88891	0.051
F88892	0.127
F88893	0.254
F88894	0.508
Spacer	2.40

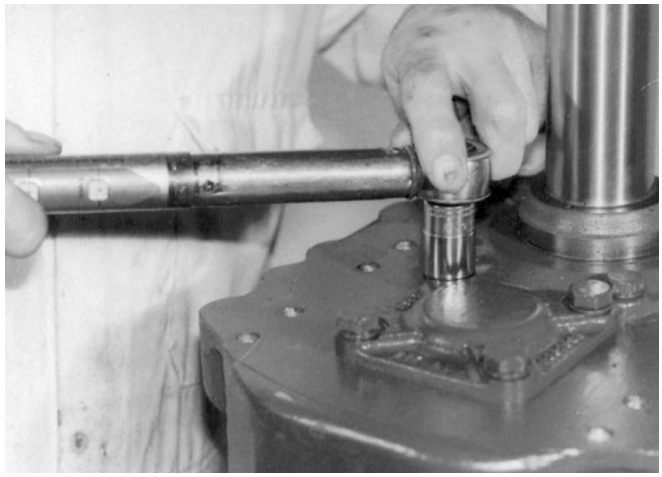


22. Install the layshaft front bearing cover (without sealant). Fit the cap screws without spring washers. Tighten the cap screws tightly and evenly while rotating the input shaft forwards then backwards to settle the bearings. Continue to tighten the cap screws until some resistance can be felt on the input shaft.

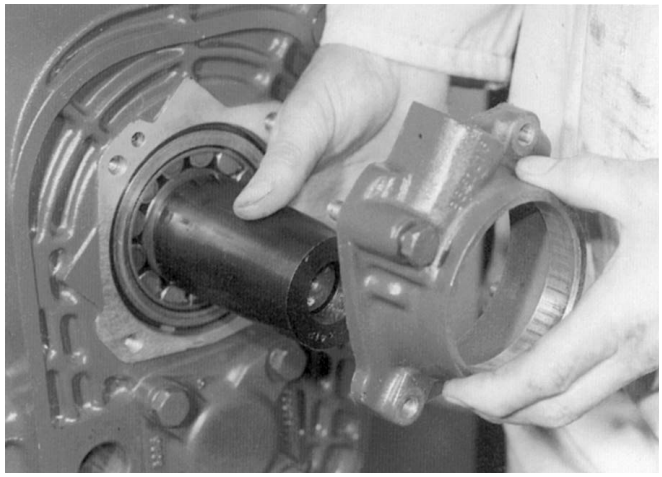
23. Loosen the four cap screws as far as zero torque loading, then retighten just sufficiently to nip the bearing cover plate. Using feeler gauges, measure the clearance between the cover and the casing at several points. From the range of graded-fit spacers, select the thickest one that will give the required preload on the layshaft bearings from 0.075 to 0.125 mm for new bearings and from 0.00 to 0.05 mm for used bearings.

Example

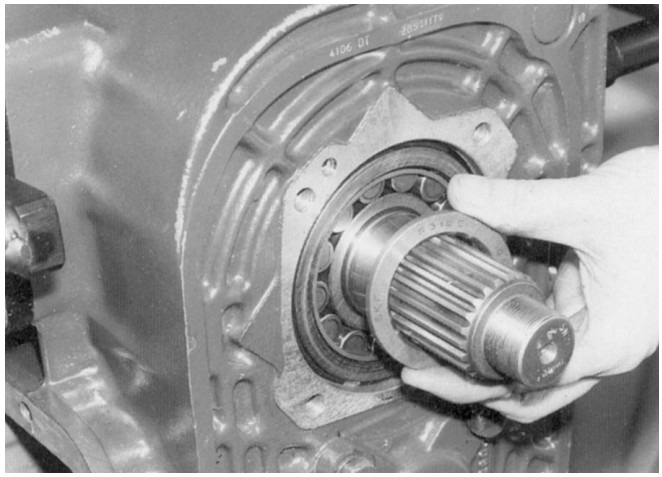
Spacer thickness		2.40 mm
add shim	+	0.508 mm
	=	2.908 mm
subtract clearance	-	0.30 mm
	=	2.608 mm
add preload	+	0.05 mm
	=	2.658 mm
subtract spacer	-	2.40 mm
	=	0.258 mm
Shim required		0 254 mm



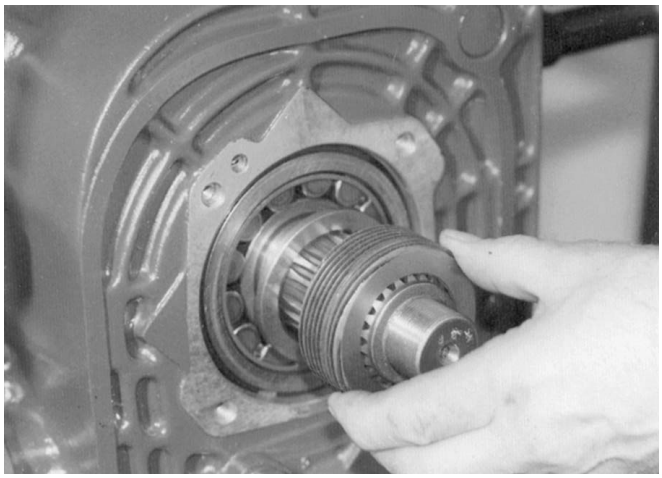
24. Lubricate the layshaft bearing, install the graded spacer of the selected thickness, apply flange sealant and install the cover plate. Apply sealant and tighten the cap screws at the correct torque (69 to 78 Nm).
CAUTION: Take care to not obstruct the lubrication hole. Respect the orientation of the cover plate (see Fig. 24, page 4/7).



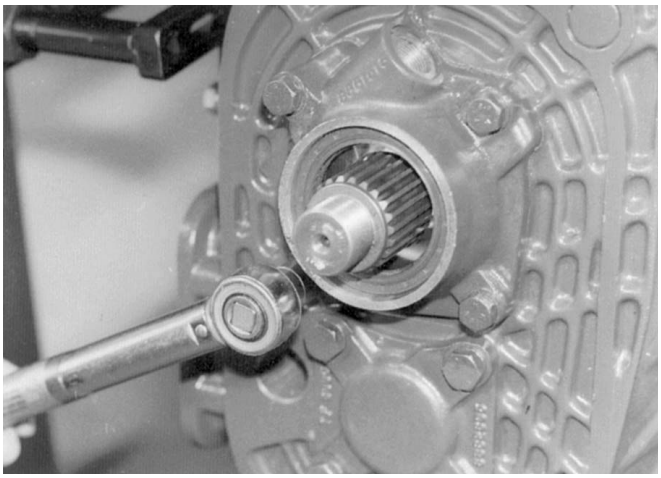
25. Turn the gearbox into the horizontal position and remove the speedometer housing and the locating sleeve from the main shaft.



26. Place the bearing thrust washer on the main shaft, above the shoulder, against the rear bearing. Make sure that the oil groove is against the rollers.



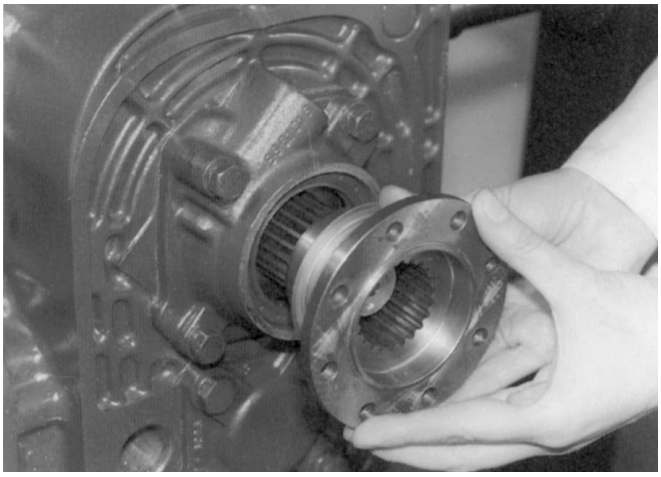
27. Install the speedometer drive pinion or tachograph rotor on the main shaft, against the spacer.



29. Apply flange sealant and install the speedometer housing. Note down the position of the longer cap screw. Tighten the cap screws at the correct torque (35 to 39 Nm).

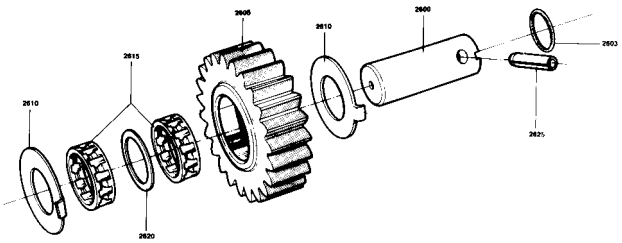
CAUTION: It may be necessary to install the speedometer drive pinion prior to this stage.

28. If removed, install a new oil seal at the correct depth in the speedometer housing, using the special tool. Press the seal firmly down to the shoulder, taking care to not damage the seal. Use tool **N° 011.**



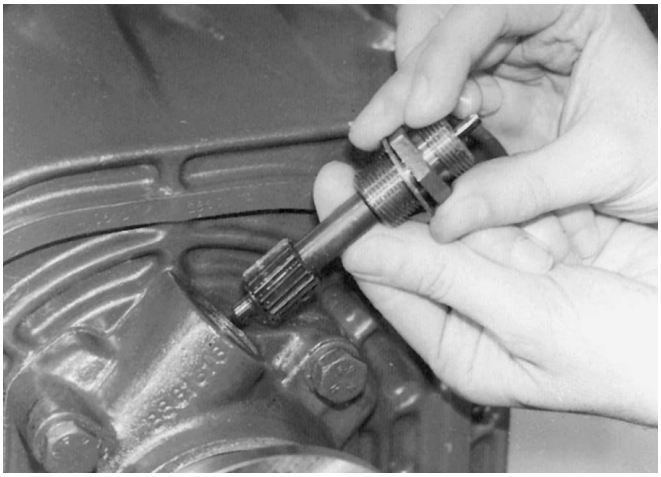
30. Apply a light grease to the lips of the oil seal and install the drive flange. DO NOT hammer the flange onto the shaft as the bearing spacer may be dislodged from its position on the shaft. This could cause serious damage to the spacer, bearing or shaft and/or seriously affect the main shaft end float.

31. Fit and tighten the flange retaining locknut at the correct torque, using a flange-holding wrench (490 to 588 Nm).

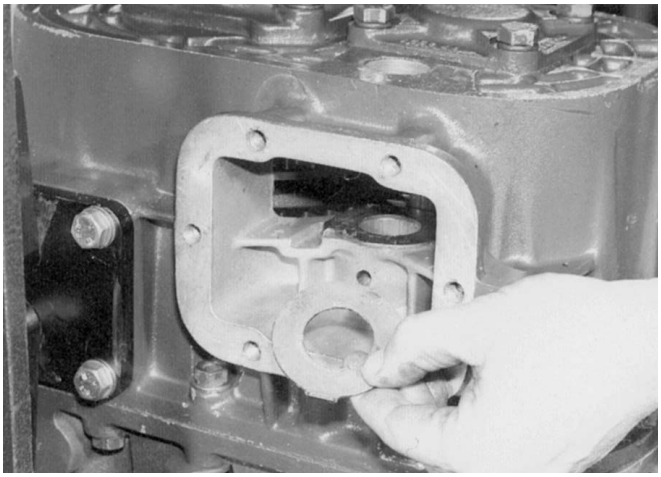


Sequence N°	Description
2600	Reverse idler gear shaft
2603	O-ring
2605	Reverse idler gear
2610	Thrust washer
2615	Needle bearing
2620	Spacer
2625	Pin

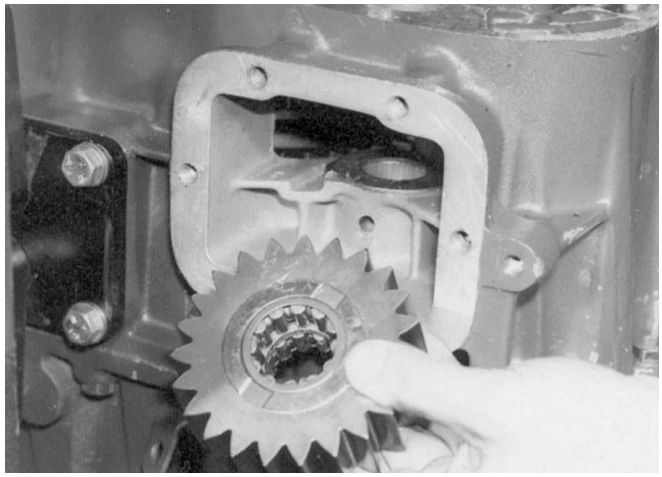
Reverse idler gear assembly



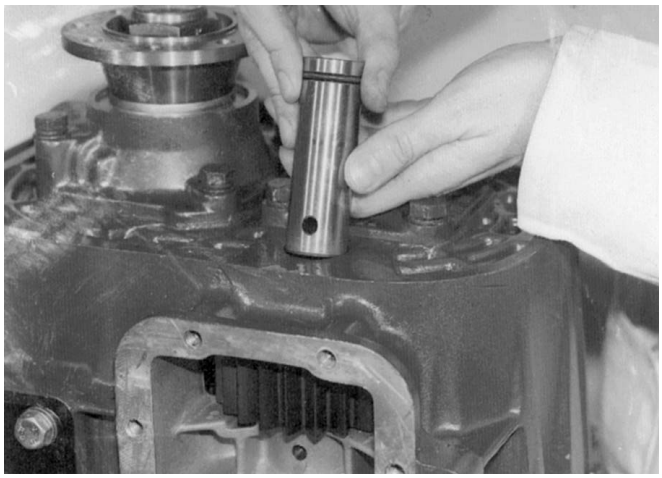
32. Install the tachometer sender unit or the speedometer drive pinion and housing with a new sealing washer. Tighten at the correct torque (20 to 27 Nm).



33. Apply a thick coat of petroleum jelly to the reverse idler gear thrust washers and position them in the gearbox casing.

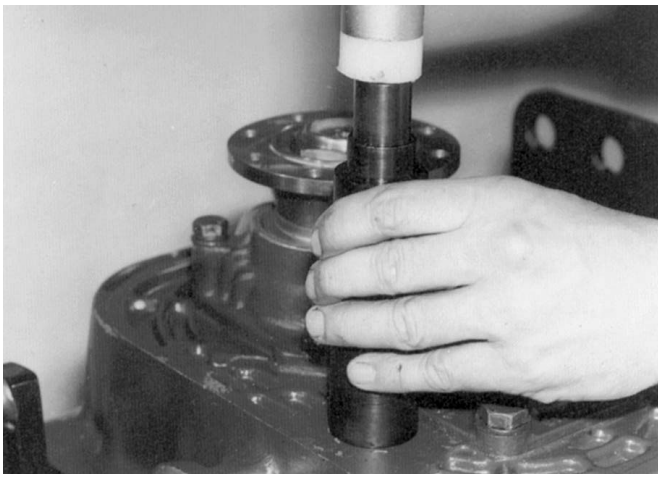


34. Install the bearings and bearing spacer in the reverse idler gear and position the assembled gear between the thrust washers and in mesh with the layshaft and the main shaft reverse gear.

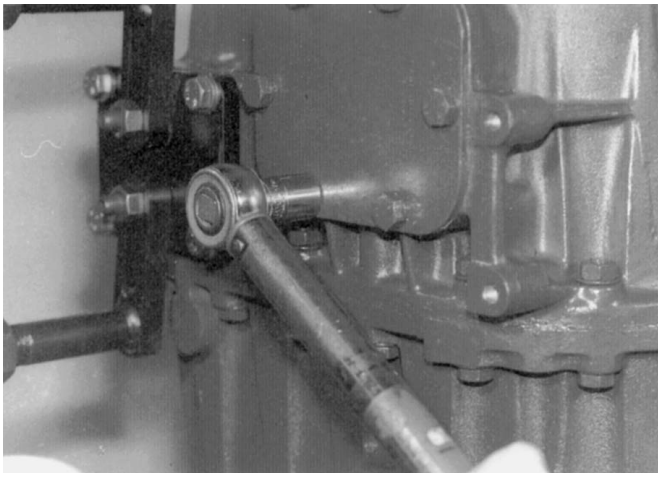


35. Ensure that the thrust washer and the gear are correctly positioned and that the parallel groove pin holes are correctly aligned and install the reverse idler gear shaft with a new O-ring in the casing. Take care not to dislodge the components when the shaft is driven home using a soft metal mallet.

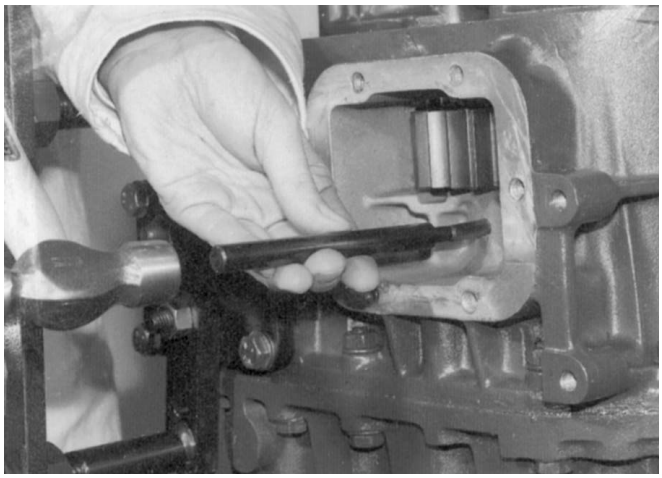
Note: The pin hole in the idler gear shaft is tapered.
The larger diameter must be fitted towards the exterior of the gearbox.



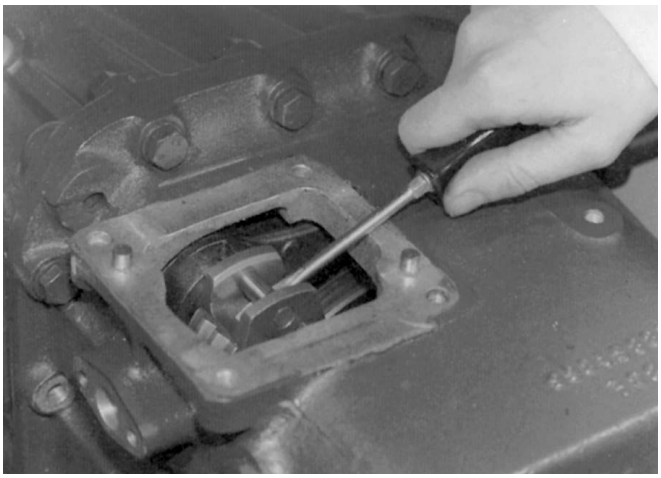
37. Apply the specified sealant and install a new expansion plug in the bore of the reverse idler shaft.



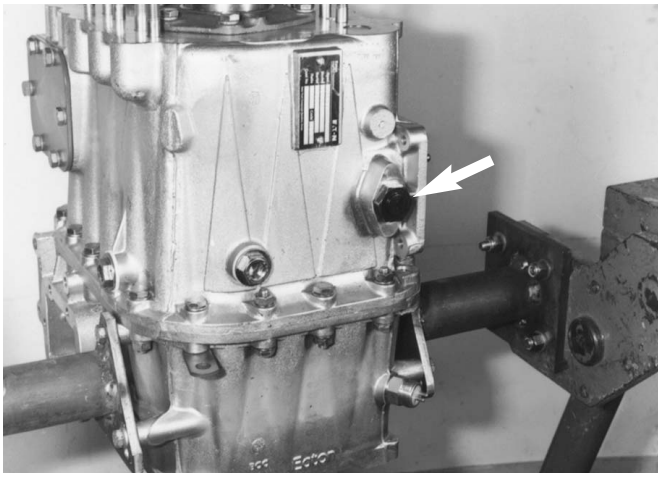
38. Install the reverse idler gear/PTO cover plate with a new gasket. Tighten the cap screws at the correct torque (35 to 39 Nm).



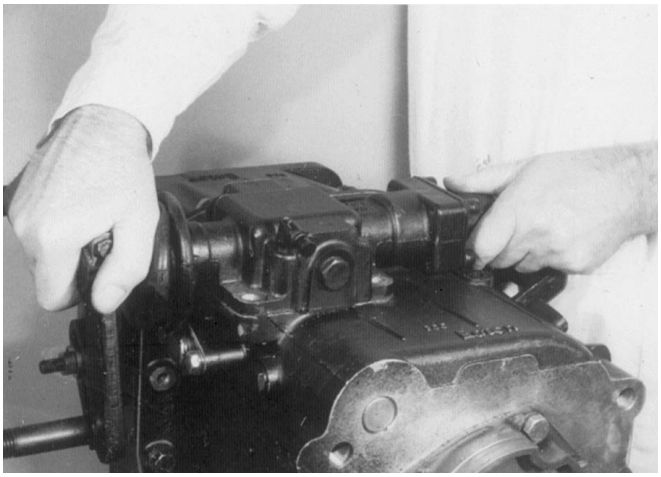
36. Align the pin holes and fit a new parallel groove pin. Drive in until flush.



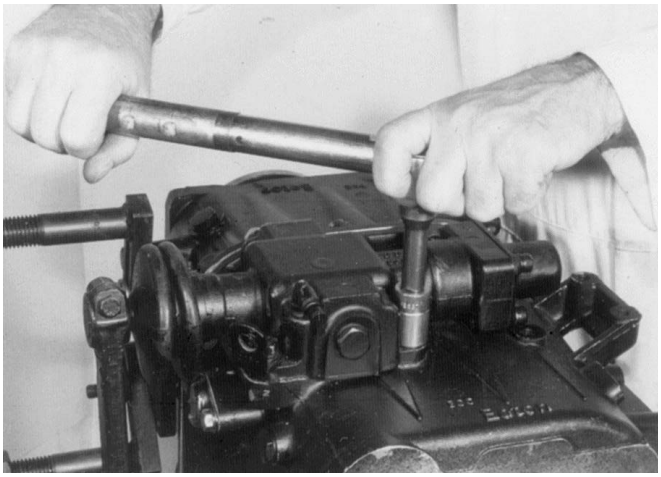
39. Turn the gearbox into the horizontal position. Rotate the selector block until the pin is in the upwards position.



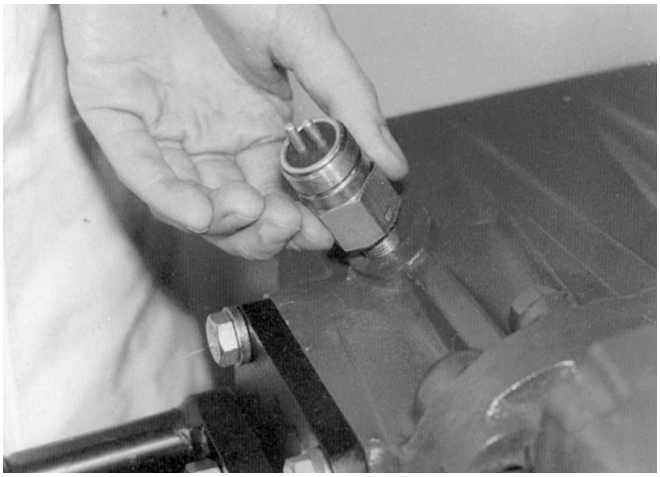
40. Install the selector shaft detent plunger. Apply **Loctite 242** sealant to give an efficient seal.



41. Apply a flange sealant and install the remote control, making sure that the inner lever is located above the selector block.



42. Tighten the cap screws at the correct torque (35 to 39 Nm).

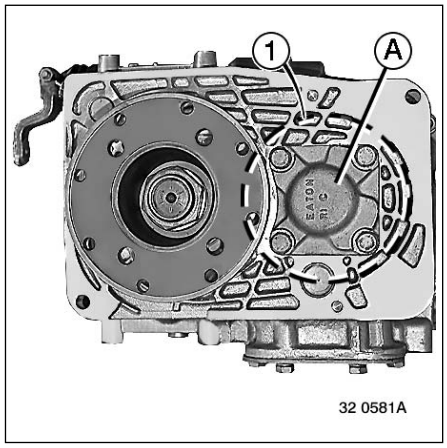


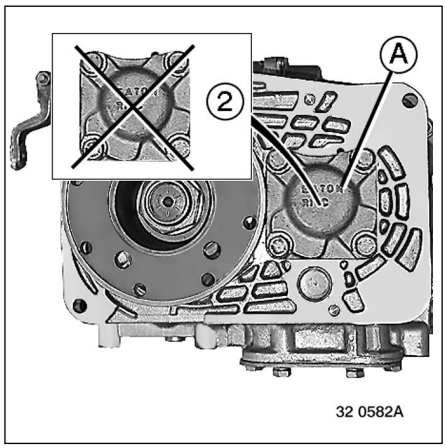
43. Apply sealant and install the reverse lamp switch. Tighten at the correct torque (16 to 22 Nm).

44. Check manually, using the gear change lever, that all the gears can be engaged. It may be necessary to rotate the input shaft in order to fully engage the gears.

WARNING
Rear casing closing plate (A) reassembly (gearbox 4106 A) :

- correct assembly (1)
- wrong assembly (2)





Double Cone Synchronizers

Mainshaft Disassembly

Note: All snap rings and circlips on the mainshaft are graded for selective fit. Take care not to score the bearing surfaces of the mainshaft when removing or fitting the snap rings or circlips.

Note: The end float of the gears on the mainshaft is established in manufacture by machining the components to fine tolerances. Before disassembly of the mainshaft the end floats should be checked to ascertain whether they are within the recommended limits.

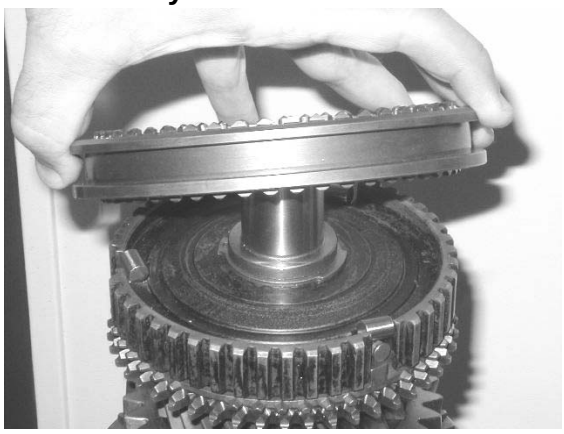
Where end float is found to be excessive it is necessary to check the gears, mainshaft, synchroniser hubs and bearing sleeve for wear.
See **'Inspection of expendable parts'** and renew where necessary.

End float check

Gear	FS – 5th FSO – 6th	4th	3rd	2nd	1st
Minimum	0.31 mm	0.35 mm	0.35 mm	0.35 mm	0.40 mm
Maximum	0.53 mm	0.48 mm	0.48 mm	0.48 mm	0.57 mm
Tolerance	0.22 mm	0.13 mm	0.13 mm	0.13 mm	0.17 mm

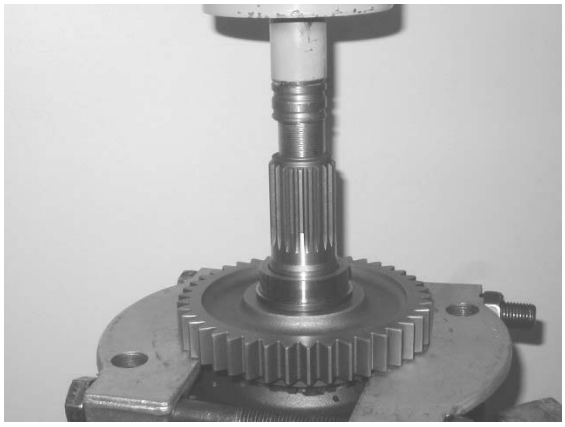
1. End float may be checked with the mainshaft assembled by using a dial gauge, as shown, or feeler gauges. Mount the mainshaft assembly on a suitable stand. Locate the dial gauge on the gear and zero the gauge. Raise the gear and record the reading.

Disassembly

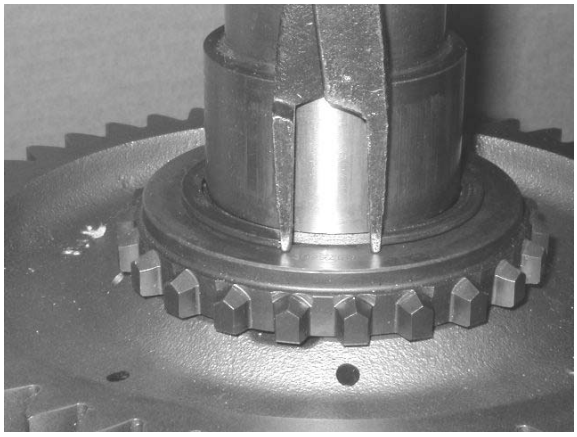


1. Mount the mainshaft assembly, plain end uppermost, in a soft jawed vice. Remove the synchronizer ring. Carefully slide the 5th/6t synchronizer sleeve upwards until the three rollers are clear of the groove in the synchronizer sleeve. Remove the three rollers, the synchronizer sleeve, the three plungers and three springs from the synchronizer hub.

2. Remove the 5th/6th-gear synchronizer hub retaining circlip.

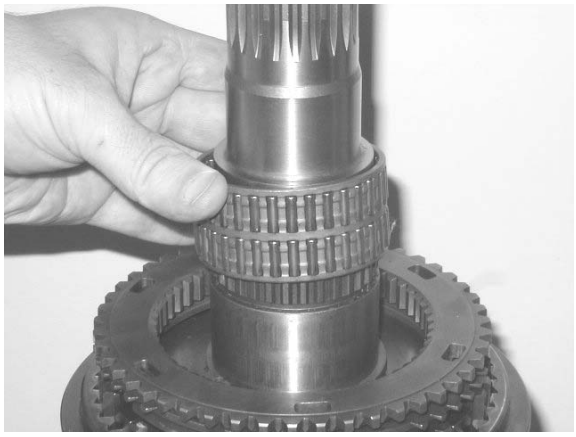


3. Invert the mainshaft assembly. Using a press or suitable puller remove the mainshaft bearing inner, reverse gear and reverse gear needle roller bearing.

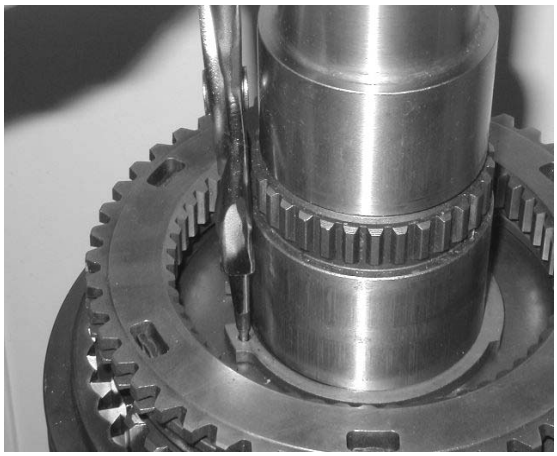


4. Remove the reverse gear fixed hub retaining snap ring.

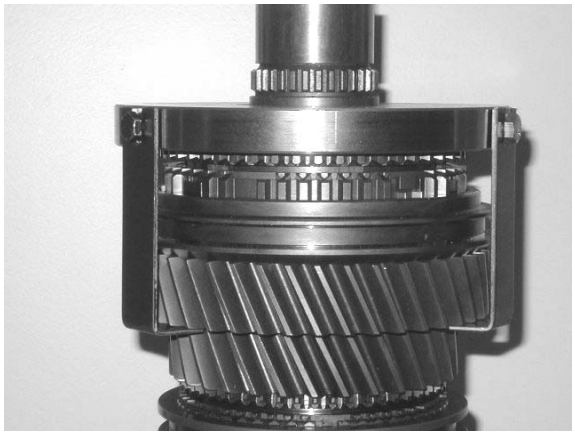
5. Using a press or suitable puller remove the reverse gear fixed hub and 1st speed gear.



6. Remove the 1st speed gear needle roller bearing.

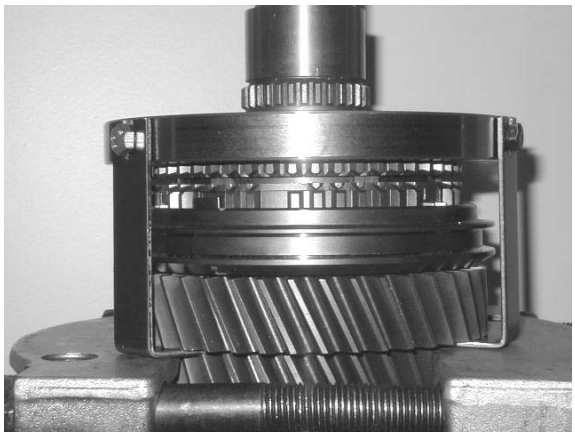


7. Remove the synchronizer assembly retaining circlip.

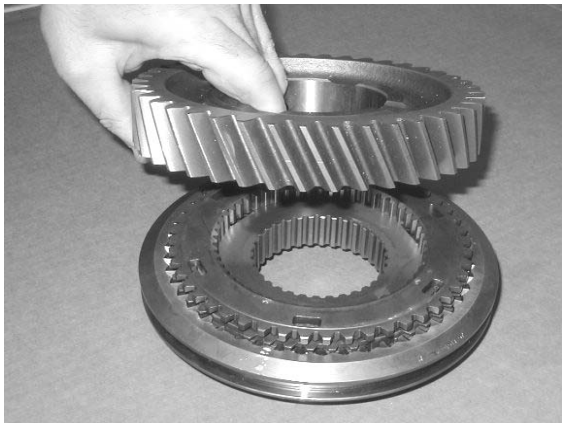


8. To prevent the synchronizer assembly from separating during removal fit the retaining tool. The tool fits onto the mainshaft, boss down, with the three retainers located underneath 2nd speed gear. Adjust the retainers so that there is no free play between 2nd speed gear and synchronizer assembly

Note : Should the synchronizer separate then refer to the relevant section for assembly instructions.

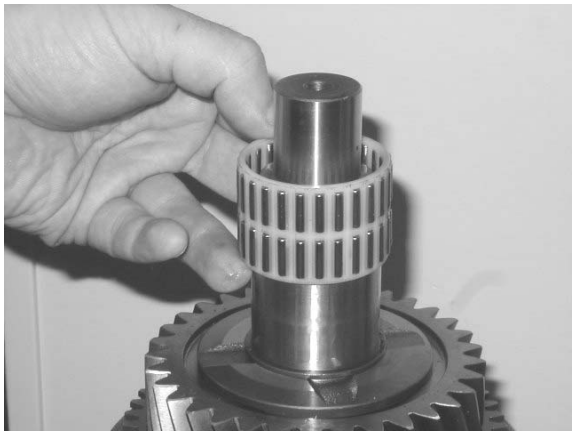


9. Using a press or suitable tool remove the synchronizer assembly and 2nd speed gear. Remove the needle roller bearing

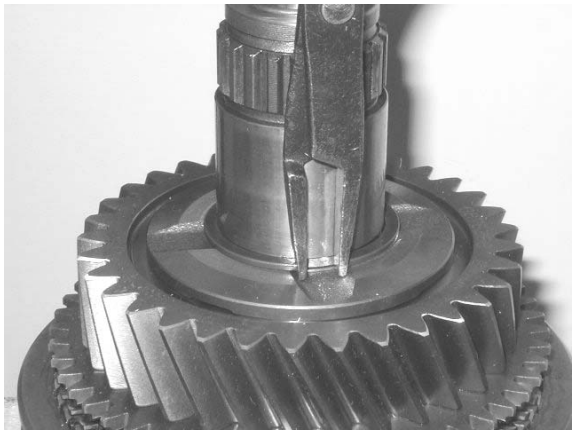


10. Carefully remove the retaining tool and then place the synchronizer assembly and 2nd speed gear onto a suitable work surface. Remove the 2nd speed gear.

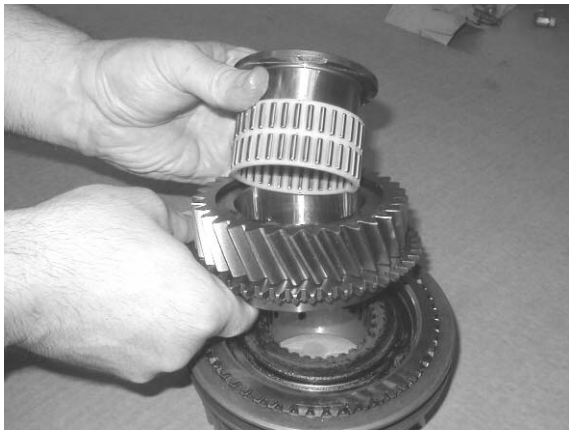
11. Invert the mainshaft. As the 5th/6th-gear synchronizer hub is not symmetrical, identify its orientation. Using a press, or suitable puller, remove the 5th/6th-gear synchronizer hub, synchronizer ring and 5th speed gear assembly. Note: Care must be taken to ensure that damage to the teeth on the synchronizer flange does not occur.
    (On an overdrive transmission it may be necessary to engage the press/puller also over the gear)



12. Remove the 5th gear needle roller bearing. (On overdrive transmissions this will be 6th gear)



13. Carefully remove the 4th gear-bearing sleeve retaining snap ring.

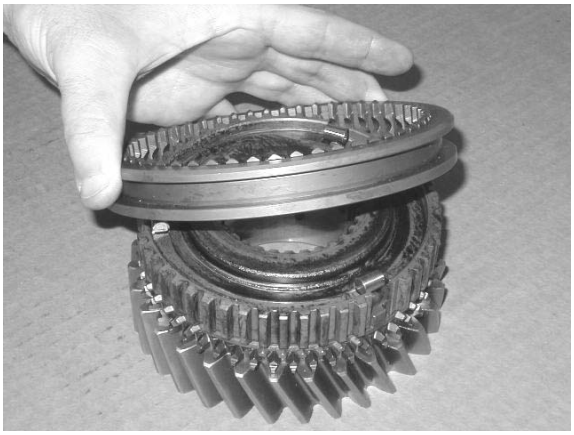


14. Using a suitable press or puller support the mainshaft assembly underneath, 3rd speed gear.

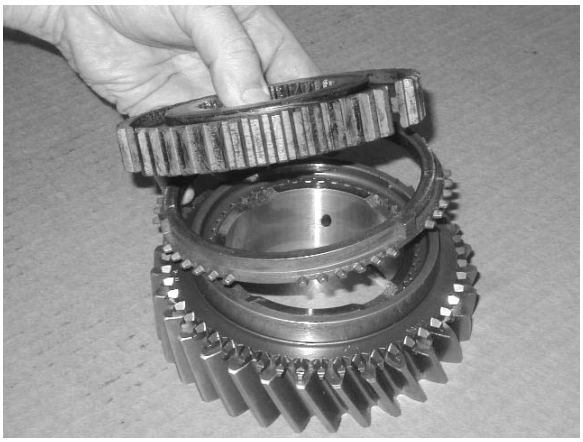
Note : It is imperative that the flange, which is part of the mainshaft, does not foul the press or puller legs as this may result in damage to the mainshaft.

Press or pull the 4th speed gear bearing sleeve, 4th speed needle roller bearing, 4th speed gear assembly, 3rd/4th-speed synchronizer assembly and 3rd speed gear assembly off. Remove the 3rd speed gear needle roller bearing from the mainshaft.

15. Place the assembly on to a suitable work surface, 4th speed gear, uppermost. Remove the bearing sleeve, needle roller bearing and 4th gear assembly.



16. Dismantle the 3rd/4th-speed synchronizer assembly as previously described in paragraph one.

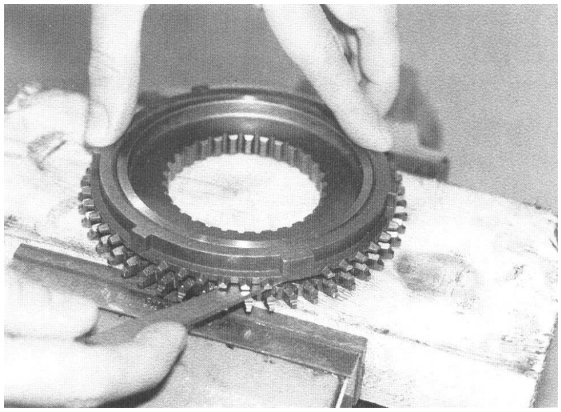


17. Lift off the synchronizer hub and synchronizer ring.

Mainshaft reassembly

Before assembling the synchronizer assemblies on to the mainshaft, check the fit of each synchronizer ring to the relevant synchronizer flange.

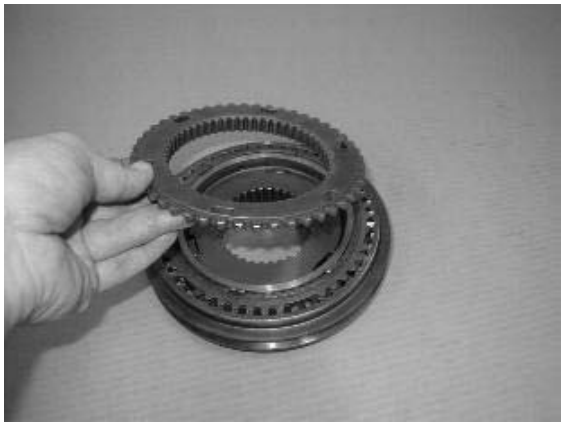
Procedure for 3rd, 4th, 5th and 6th speed synchronisers.



Place the synchronizer ring to the relevant flange and while holding the two parts firmly together, measure the clearance between the two component parts using feeler gauges at several points around the circumference as shown. The clearance should be between 0.5 and 1.9 mm. Renew both parts if the measurement is not within the specified limits. Retain the synchronizer rings and flanges in their respective pairs for assembly in the same relative position.

Procedure for 1st and 2nd speed synchronizers

a) Stand the synchronizer assembly on to a flat surface (Either way up).



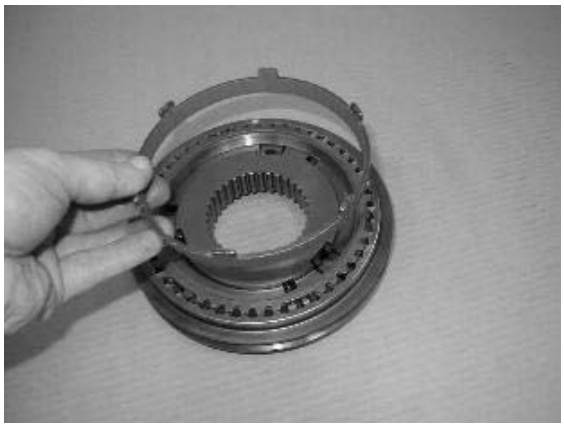
b) Remove the synchronizer flange.

c) Place the synchronizer flange, spigot uppermost onto the bench.

d) Remove the synchronizer inner ring.

e) Fit the synchronizer inner ring, tangs uppermost, on to the synchronizer flange.

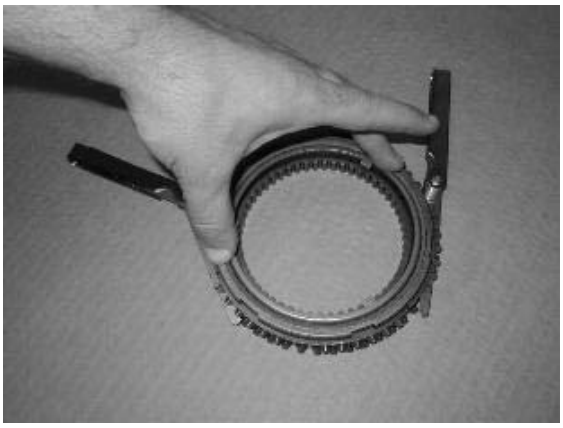
g) Fit the synchronizer friction ring on to the synchronizer flange ensuring that the tabs on the synchronizer friction ring locate into the slots on the synchronizer flange.



f) Remove the synchronizer friction ring.

h) Remove the synchronizer ring.

i) Fit the synchronizer ring onto the assembly.



j) While holding the parts firmly together, measure the clearance between the synchronizer ring and synchronizer flange using feeler gauges at several points around the circumference as shown. The clearance should be between 0.5 and 1.9 mm. If the measured dimension is outside these tolerances then the synchronizer assembly must be changed.

k) Refer to paragraphs twelve to fifteen of the assembly procedure in the section '1st/2nd speed synchronizer assembly'.

l) Invert the synchronizer assembly and repeat the process.

Assembly

Note : The synchronizer flanges, apart from those fitted to the 1st and 2nd speed gears, must be loctited to the gears.

1. Place the retaining tool, boss uppermost, on to a suitable surface.

2. Place the 1st/2nd speed synchronizer assembly onto the retaining tool ensuring that the chamfer on the synchronizer sleeve is uppermost.

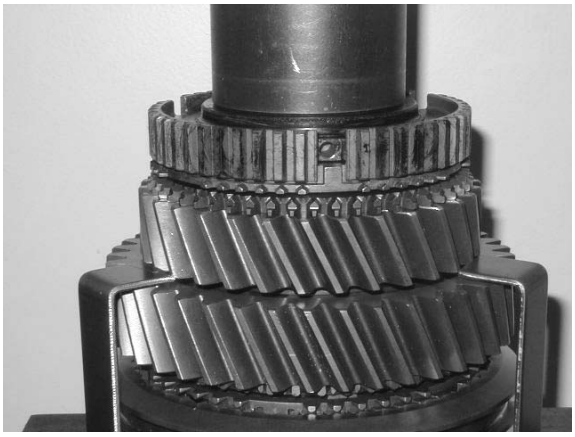
3. Heat the assembly to 85° Centigrade and then place the retaining tool and synchronizer assembly onto the press table.

4. Fit the 2nd speed gear to the synchronizer assembly ensuring that the splines on the gear engage into the splines on the synchronizer assembly. Fit and lubricate the needle roller bearing.

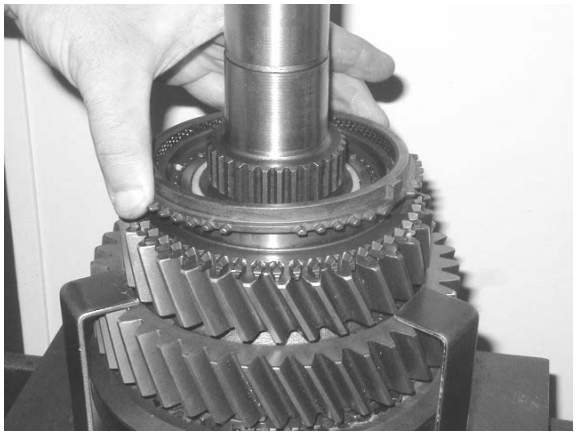
5. Fit the mainshaft, plain end uppermost, into the 2nd speed gear and synchronizer assembly ensuring that the splines on the mainshaft engage into the splines of the synchronizer assembly. Press the mainshaft into the synchronizer assembly.

6. To prevent the synchronizer assembly separating the retainers should be used. Adjust the retainers so that there is no free play between 2nd speed gear and the synchronizer assembly.

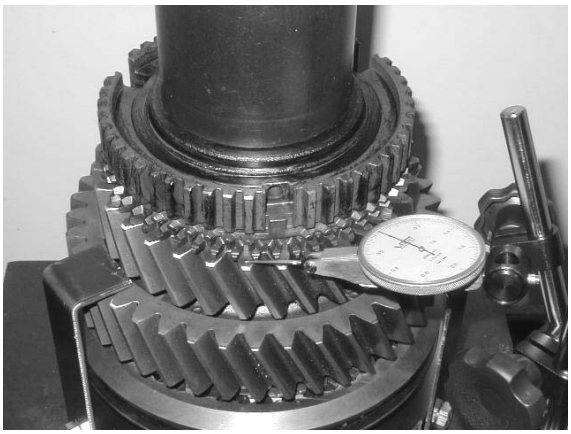
7. Lubricate and install the 3rd gear needle roller bearing and 3rd gear assembly.



9. Heat the 3rd/4th-gear synchronizer hub to 85° Centigrade. Fit the synchronizer hub over the splines on the mainshaft ensuring that the large slots in the synchronizer hub align with the large shoulders on the synchronizer ring. Press the synchronizer fully home.

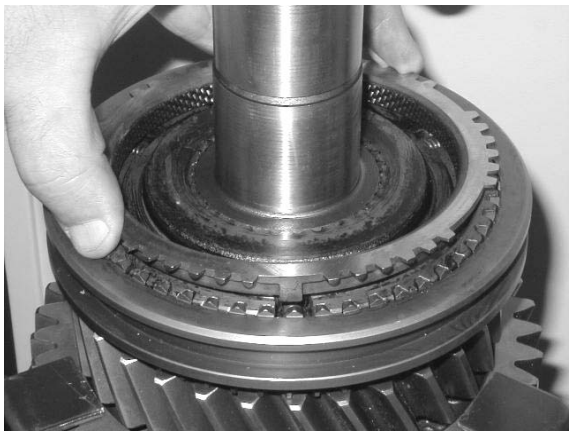


8. Lubricate the 3rd gear synchronizer flange and then fit the synchronizer ring.



10. Check that the 3rd gear end float is within the tolerance stated in the chart.

11. Assemble the three springs and plungers into the synchronizer hub. Place the synchronizer sleeve over the synchronizer hub and support it with the internal groove just above the synchronizer hub. Position the three rollers as shown, resting on the heads of the plungers, and press downward on the synchronizer sleeve. This compress the springs allowing the synchronizer sleeve to centralise in the neutral position.

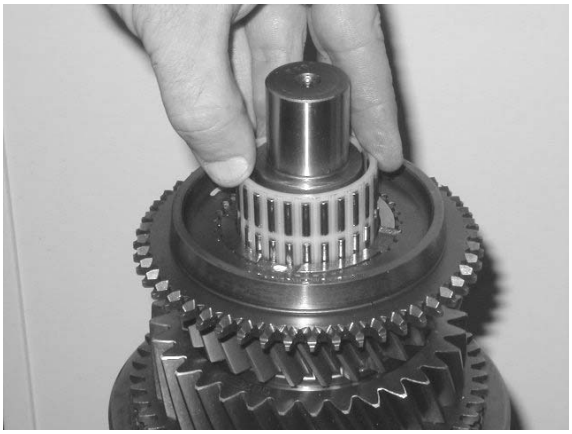


12. Place the 4th gear synchronizer ring onto the synchronizer assembly ensuring that the shoulders on the synchronizer ring locate into the slots of the synchronizer hub. Lubricate the synchronizer ring.

13. Fit the 4th speed gear assembly. Lubricate the needle roller bearing and then install it into the gear.

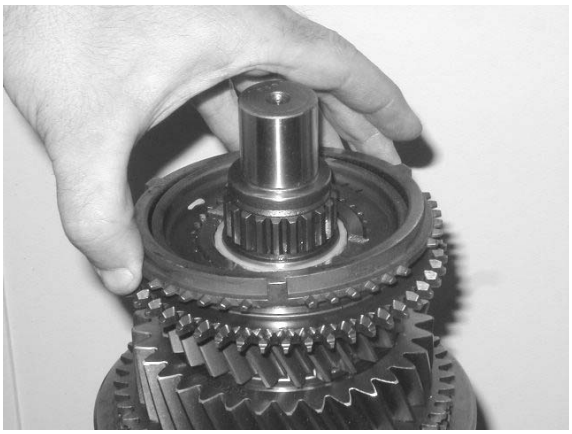
14. Heat the 4th speed gear-bearing sleeve to 85° Centigrade and locate it onto the mainshaft and inside the needle roller bearing. Press the bearing sleeve into position.

15. Fit a new snap ring into the mainshaft groove taking care not to damage the mainshaft-bearing surface.



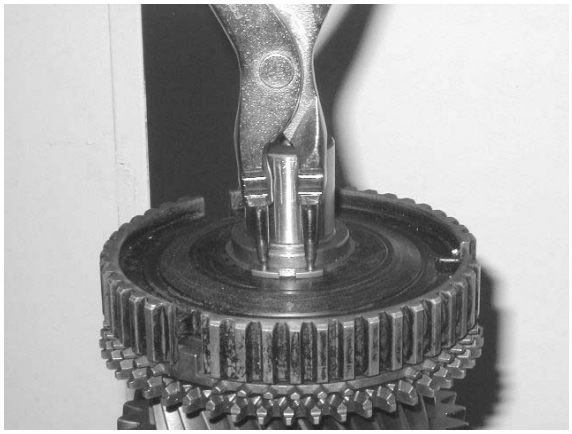
17. Fit the 5th speed gear assembly. Lubricate the needle roller bearing and then install it into the gear.

16. Check that the 4th gear end float is within the tolerance stated in the chart.

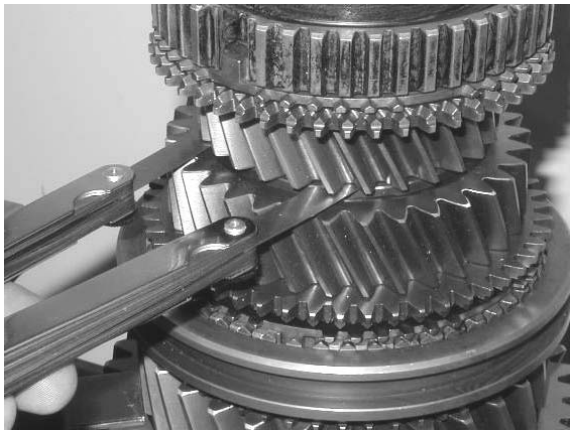


18. Lubricate the 5th gear synchronizer flange. Fit the synchronizer ring.

19. Heat the 5th/6th-speed synchronizer hub to 85° Centigrade and then install it, boss downwards, onto the mainshaft. Ensure that the large slots on the synchronizer hub align with the large shoulders on the synchronizer ring. Press the synchronizer hub until it is fully seated.

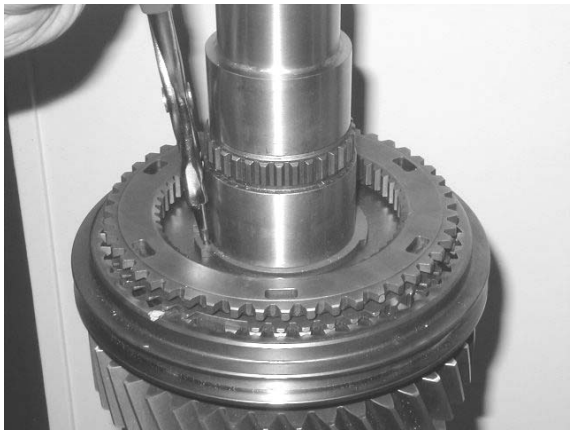


20. From the range of graded circlips select the one which fits into the mainshaft groove with the least amount of free play. Fit the Circlip into the groove.

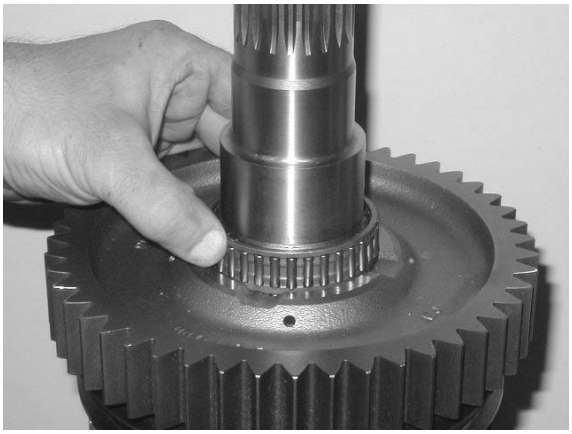


21. Using feeler gauges check that the 5th gear end float is within the tolerance stated in the chart.

22. Invert the mainshaft and then remove the retaining tool.

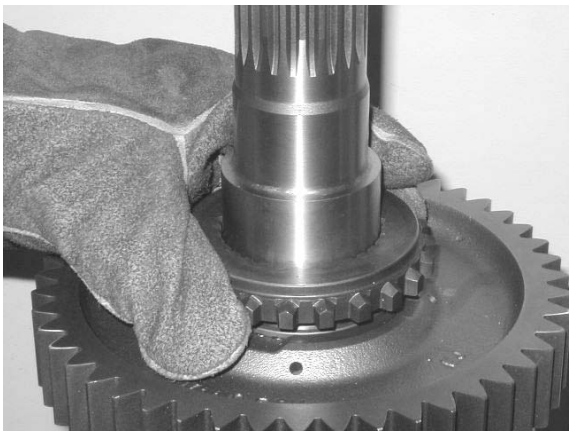


23. Install the circlip into the groove of the mainshaft. Take care not to damage the mainshaft bearing surface.



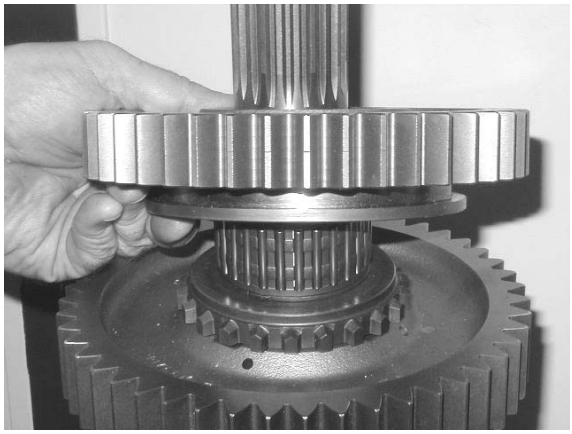
25. Fit and lubricate the needle roller bearing. Fit the 1st speed gear ensuring that the splines on the 1st speed gear engage into the splines of the synchronizer flange.

24. Check that the 2nd speed gear end float is within the tolerances stated in the chart.



26. Heat the reverse gear hub to 85° Centigrade and then, with the boss uppermost, fit it onto the splines of the mainshaft. Press the reverse gear hub until it is fully seated.

27. From the range of graded circlips select the one which fits into the mainshaft groove with the least amount of free play. Fit the Circlip into the groove taking care not to damage the mainshaft needle roller bearing surface.



29. Fit the reverse gear needle roller bearing. Lubricate the bearing and then fit the reverse gear, boss down, onto the mainshaft.

28. Check that the 1st speed gear is within the specified tolerance stated in the chart.

30. Heat the mainshaft bearing inner to 85° Centigrade and then fit it, shoulder down, onto the mainshaft. Use a press, if necessary, to ensure that the bearing is fully home against the shoulder.

31. Invert the mainshaft. Assemble the three springs and plungers into the synchronizer hub and then install the synchronizer sleeve and rollers as described in paragraph eleven.

32. Fit the synchronizer ring ensuring that the three bosses on the synchronizer ring locate into the three slots on the synchronizer hub. Lubricate the synchronizer ring.

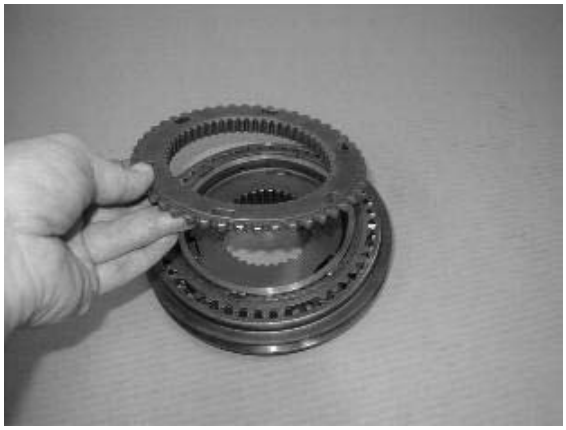
1st/2nd speed synchronizer assembly

Note : The synchronizer is supplied as an assembly. Parts that are used to make the complete assembly are not available separately.

Disassembly

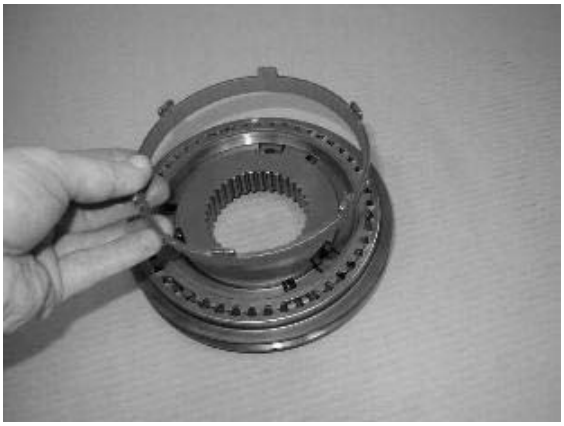
1. Stand the synchronizer assembly on a flat surface with the spigot of the synchronizer sleeve uppermost.

2. Push the synchronizer sleeve downwards.



3. Remove the synchronizer flange.

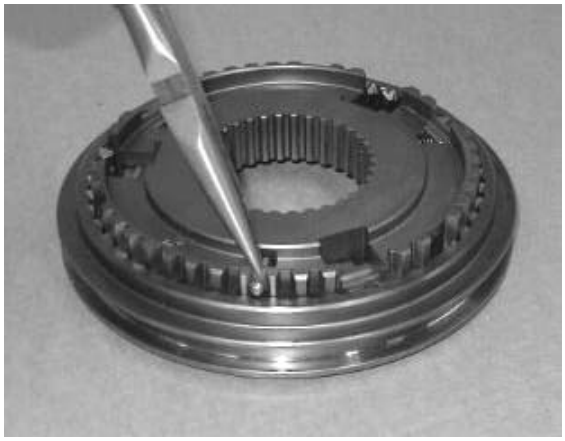
4. Remove the synchronizer inner ring.



5. Remove the synchronizer friction ring.

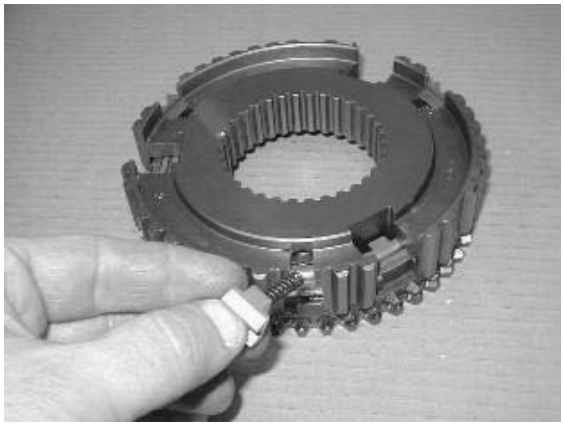
6. Remove the synchronizer ring.

7. Remove the three retainers.



8. Taking care not to lose the balls or springs lift the detent poppets to release the balls. Once the balls have been removed it is possible to remove the detent poppets and springs.

9. Remove the synchronizer sleeve.



10. If not already removed at step eight remove the detent poppets and springs.

11. Remove the synchronizer hub.

12. Remove the synchronizer ring.

13. Remove the synchronizer friction ring.

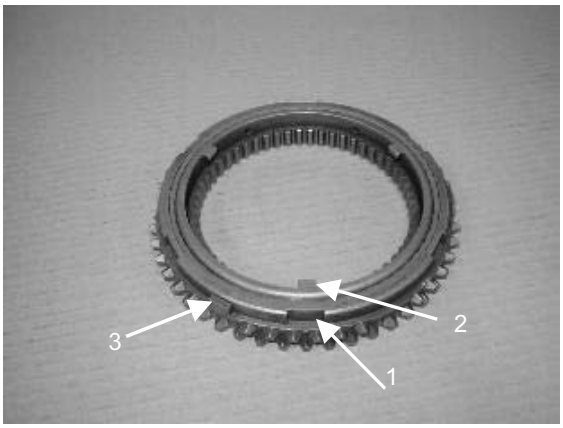
14. Remove the synchronizer inner ring.

Assembly

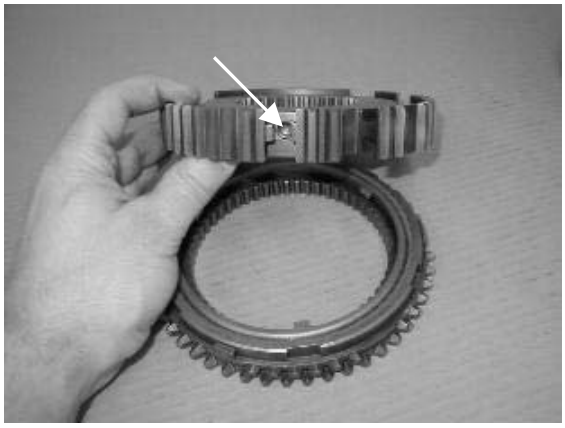
1. Place the synchronizer flange, spigot uppermost onto the bench.

3. Lubricate all surfaces of the synchronizer friction ring. Fit the synchronizer friction ring ensuring that the tabs locate in to the slots of the synchronizer flange.

2. Fit the synchronizer inner ring, tangs uppermost, on to the synchronizer flange.

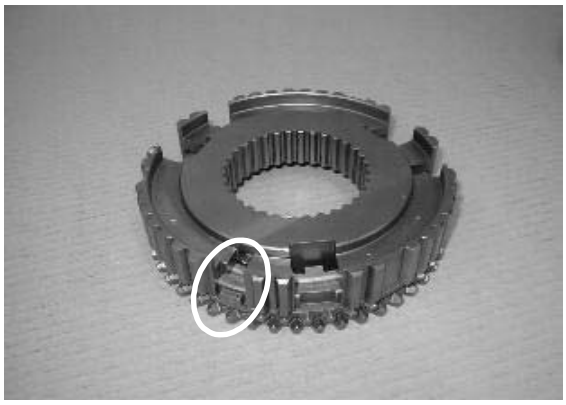


4. Fit the synchronizer ring ensuring that the undercuts (1) line up with the tabs (2) of the synchronizer inner ring and that bosses (3) of the synchronizer ring are to the left hand side of tabs (2) of the synchronizer inner ring as shown.

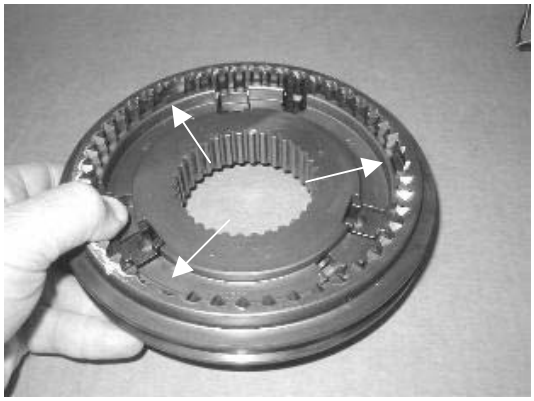


5. With the holes in the synchronizer hub uppermost.

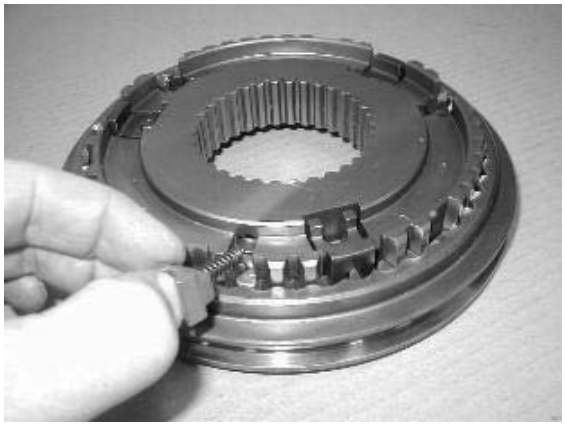
7. Place the three retainers in the large recesses of the synchronizer hub so that the legs of the blocks engage with the tabs of the synchronizer inner ring and the undercuts of the synchronizer ring.



6. Fit the synchronizer hub ensuring that the narrow slots are in line with the bosses of the synchronizer ring.



8. Take the synchronizer sliding sleeve, stepped side uppermost, and fit it on to the synchronizer hub ensuring that the three internal bosses of the synchronizer sleeve locate in the slots of the synchronizer hub.

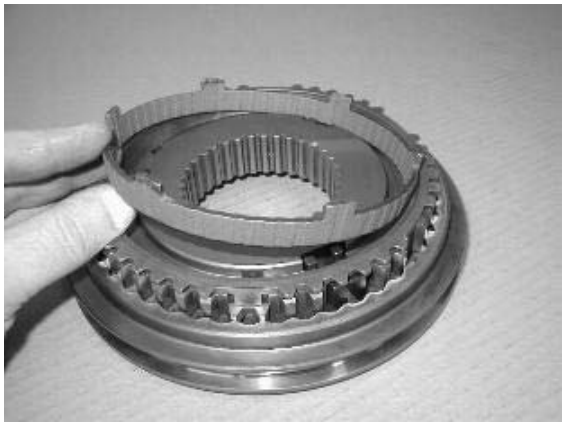


9. Place the detent poppets and springs into the holes of the synchronizer hub.

11. Whilst the spring is compressed push the detent poppet downwards into the synchronizer hub until the ball engages with the annular groove of the sleeve. Fit the remaining detent springs, balls and plungers into position.

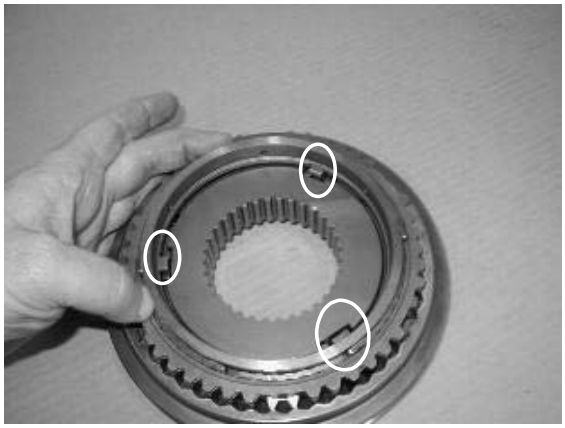
10. Place the detent ball onto the spring and then using a suitable tool push against the detent ball to compress the spring.

12. Place the synchronizer ring on to the synchronizer hub so that the three bosses engage with the three narrow slots on the synchronizer hub.



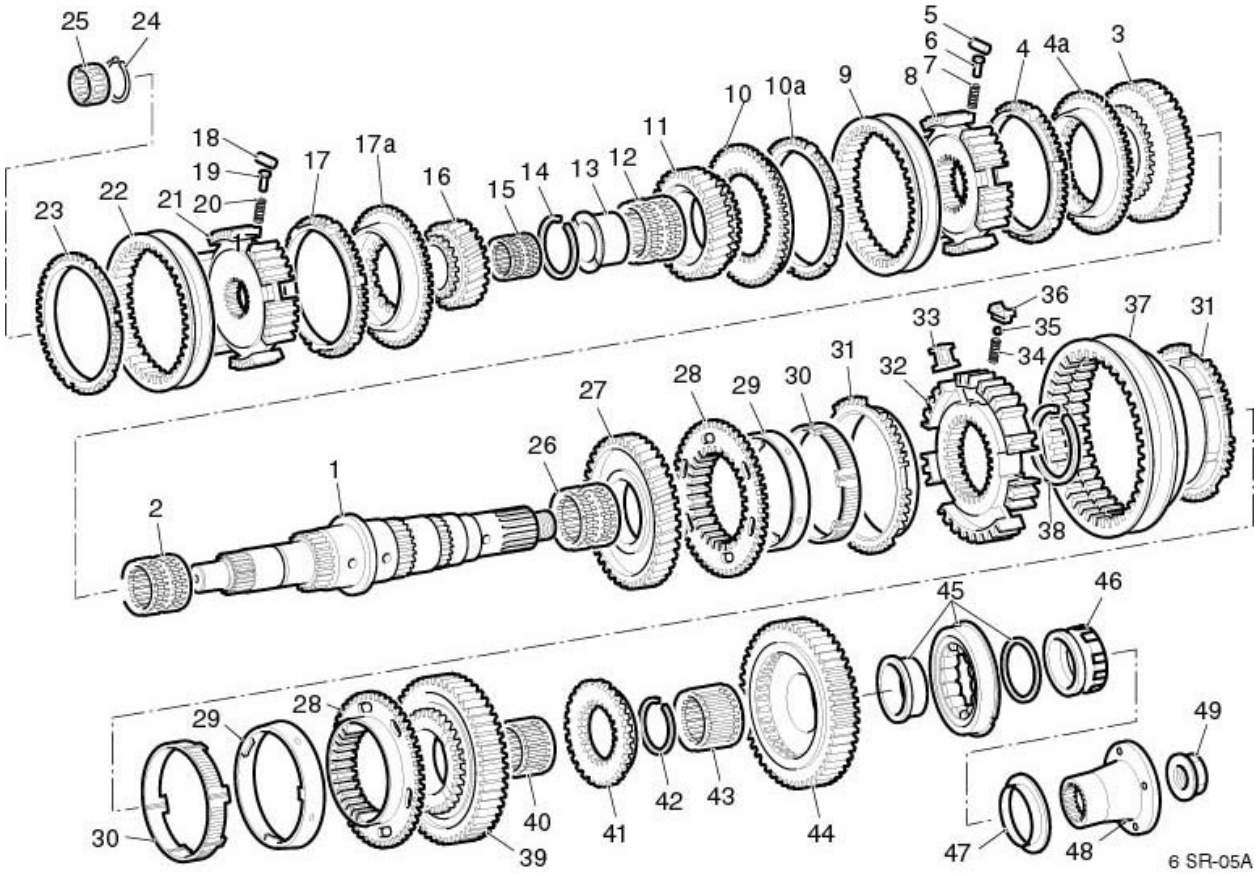
13. Lubricate all surfaces of the synchronizer friction ring. Place the synchronizer friction ring, tabs uppermost, on to the synchronizer hub.

15. Place the synchronizer flange in to position ensuring that the slots of the synchronizer flange align with the tabs of the synchronizer friction ring.



14. Place the synchronizer inner ring in to position ensuring that the three tabs align with the legs of the blocks.

16. Hold the synchronizer assembly down against the bench and at the same time lift the synchronizer sleeve upwards to engage the neutral position.



1. Mainshaft
2. 3rd gear needle roller bearing
3. 3rd speed gear
4. 3rd gear synchronizer ring
4a. 3rd gear synchronizer flange
5. Roller
6. Plunger
7. Spring
8. 3rd/4th speed synchronizer hub
9. 3rd/4th speed synchronizer sleeve
10. 4th gear synchronizer flange
10a. 4th gear synchronizer ring
11 4th gear
12 4th gear needle roller bearing
4th gear sleeve
13. Snap ring
14. 5th gear needle roller bearing (FS)
15. 6th gear needle roller bearing (FSO)
16. 5th speed gear (FS)
6th speed gear (FSO)
17. 5th gear synchronizer ring (FS)
6th gear synchronizer ring (FSO)
17a. 5th gear synchronizer flange (FS)
6th gear synchronizer flange (FSO)
18. Roller
19. Plunger
20. Spring
21. 5th/6th gear synchronizer hub
22. 5th/6th gear synchronizer sleeve
23. 6th gear synchronizer ring (FS)
5th gear synchronizer ring (FSO)
24. Circlip
25. 6th gear needle roller bearing (FS)
5th gear needle roller bearing (FSO)
26. 2nd gear needle roller bearing

27. 2nd gear
28. Synchronizer flange
29. Synchronizer inner ring
30. Synchronizer friction ring
31. Synchroniser ring
32. 1st/2nd gear Synchronizer hub
33. Retainer
34. Spring
35. Ball
36. Detent poppet
37. 1st/2nd speed Synchronizer sleeve
38. Circlip
39. 1st speed gear
40. 1st gear needle roller bearing
41. Reverse gear hub
42. Snap ring
43. Reverse gear needle roller bearing
44. Reverse gear
45. Mainshaft bearing
46. Tachograph
47. Dust shield
48. Coupling flange
49. Nut

Tools

RENAULT TRUCKS divide tools into 3 categories :

— **General-purpose tools :** Commercially available tools.
- **50 00 26… reference number** (possibility of purchasing through the Renault Trucks Spare Parts department).
- **4-figure reference number** (tools with Renault Trucks reference number, but available from the supplier).

— **Special tools :** Specially created tools, distributed by the Renault Trucks spare parts division.

— **Locally manufactured tools :** these tools are classified differently according to their degree of sophistication :

- **4-figure reference number** (represented by a drawing) : tools that are simple to make without need for special qualification.
- **50 00 26 … reference number** (possibility of purchassing through the Renault Trucks Spare Parts department) : a certain skill is needed to make these tools.

Three levels (or echelons) determine their assignment :

— **LEVEL 1 :** Tools for servicing and minor tasks.

— **LEVEL 2 :** Tools for major repairs.

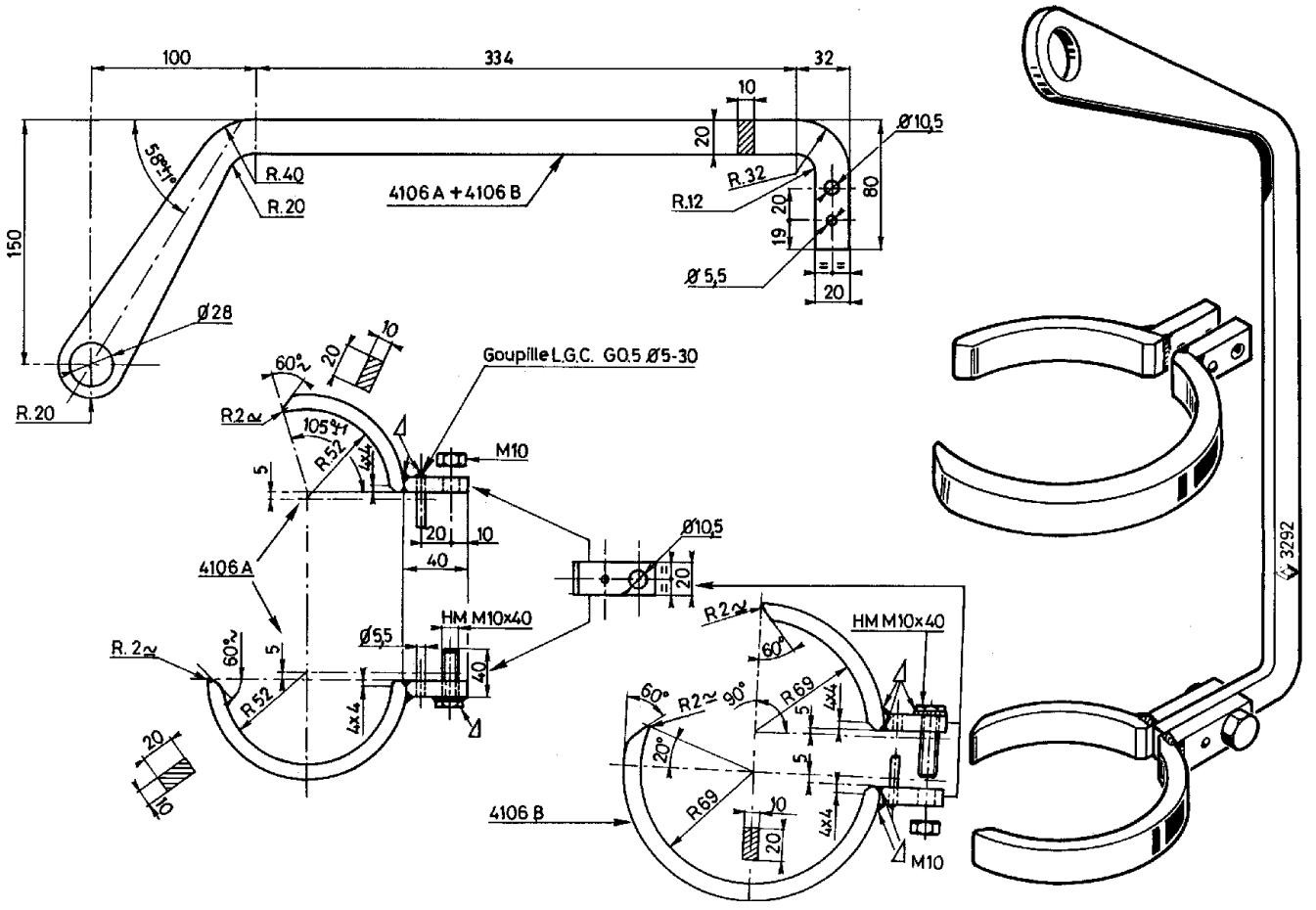
— **LEVEL 3 :** Tools for refurbishment.

General-purpose tools					
Tool ref. N°	**Renault Trucks ref N°**	**Designation**	**Level**	**Qty**	**Page**
009	50 00 26 **0821**	Puller	2	1	4/15
008	50 00 26 **0827**	Puller	2	1	4/13
001	50 00 26 **0832**	Puller	2	1	3/4
005	50 00 26 **0843**	Puller	2	1	4/3
002	50 00 26 **1000**	Universal stand	2	1	4/3

Special or specific tools					
Tool ref. N°	**Renault Trucks ref N°**	**Designation**	**Level**	**Qty**	**Page**
010	50 00 26 **3295**	Guide	2	1	4/28
003	50 00 26 **3296**	Fitting	2	2	4/3
004	50 00 26 **9134**	Holding wrench	3	1	4/3

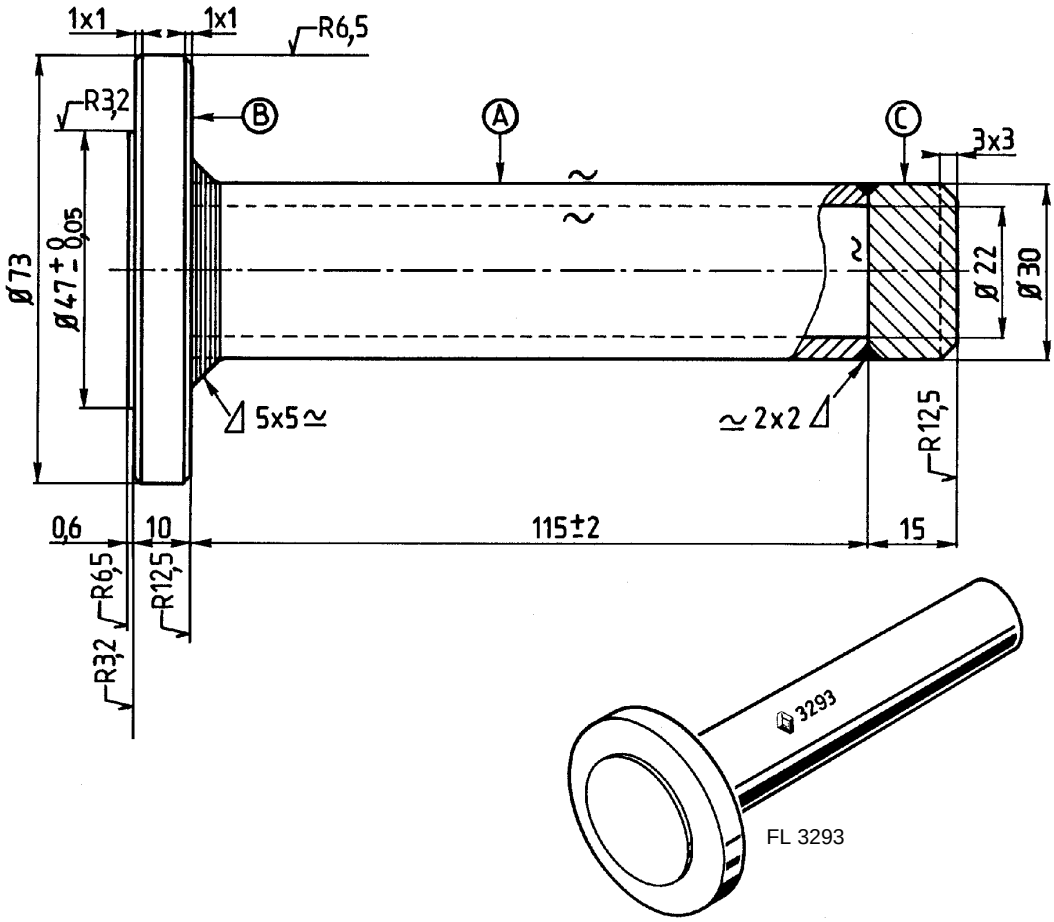
Locally manufactured tools					
Tool ref. N°	**Renault Trucks ref N°**	**Designation**	**Level**	**Qty**	**Page**
006	**3292**	Hook	2	1	4/6
007	**3293**	Pusher	3	1	4/7
011	**3294**	Pusher	1	1	4/32

Locally manufactured tool

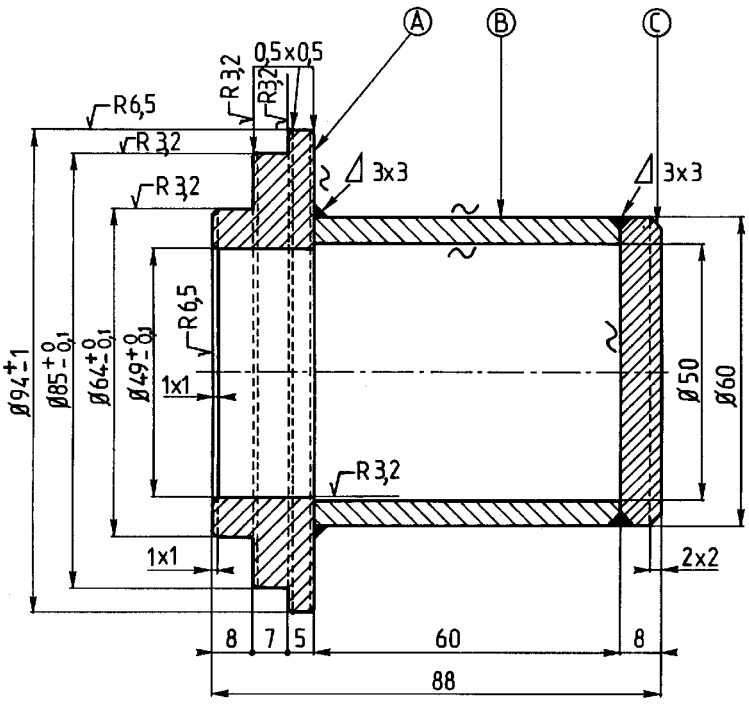


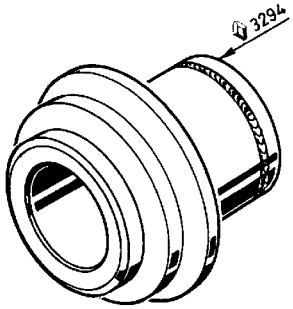
FL 3292

Locally manufactured tool



FL 3293





FL 3294

NE 6/3911 AN

english edition

MIDLUM

150 dCi – 180 dCi
220 dCi – 270 dCi
220/250 dCi Export

50 21 024 094 – 07/05
édition anglaise

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RENAULT TRUCKS

Société Anonyme au capital de 50 000 000 €
Siège social : 99, route de Lyon
69802 Saint–Priest
Siret 954 506 077 00 120 – RCS LYON B 954 506 077

WELCOME ON BOARD YOUR NEW RENAULT
You have now taken possession of your new vehicle.
We trust that it will give you the entire satisfaction you have the right to expect and which was the reason for your original choice.
This driving and servicing handbook has been compiled to provide all the information you need and will enable you to:
– Get to know your Renault better to derive maximum benefit from its advanced technical features in optimum working conditions.
– Permanently guarantee optimum operations by following the maintenance recommenda–tions.
– Cope with any minor problems not requiring assistance from a specialist, without losing too much time.

NOTE
This handbook covers all the options proposed to customers. Take into consideration only the indications regarding the model owned by you.

The few moments devoted to reading this handbook will be well worthwhile for the information it contains and by the new technical features you will discover. If any details remain unclear, our Dealer Staff will be pleased to provide you with any further information you may require.

HOW TO READ CROSS–REFERENCES
The reference numbers, figures and letters mentioned in the text refer back to two types of illustration:
– *figures correspond to figures or photographs situated in proximity to the text*
– *letters, sometimes followed by a figure, correspond to the Instrument Panel diagram to be found inside the handbook.*

"Bon voyage" at the wheel of your Renault !

RENAULT TRUCKS AND BUSES: FRONTIER–FREE SERVICE
Renault Service 24 has been in operation in Europe for several years now.
19 emergency call centres are listening in for you 365 days a year.
Spare parts officially approved by RENAULT TRUCKS meet both the requirements of the vehicle specification and the regulations in force. Only premium Renault parts will ensure:
– Original Equipment safety standards.
– Maintenance of original characteristics and performance.
– Full Manufacturer's Warranty.

The manufacturer reserves the right to make any modifications deemed necessary during production. This handbook should not be considered as a specification for the model in question.

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GENERAL USAGE INSTRUCTIONS FOR COMMERCIAL VEHICLES

If you are a professional driver using your own vehicle, or a haulier entrusting one of your vehicles to a member of your staff, it is essential to follow and ensure the application of the following instructions. They are only a reminder of the basics of the trade and standard professional practice and in no way are to be taken as exhaustive. In this way you will obtain the maximum profit from your material and prevent any risk of accidents and incidents.

1. BASIC INSTRUCTIONS

- Every driver must possess all necessary licences and should only drive when physically fit and sufficiently rested.
- The vehicle must be in conformity with current legislation in the country or countries in which it is used.
- Any signs or panels indicating hazardous substances must be affixed and be in good condition.
- Loads:
  - All–up or per–axle weights (regulatory or technical) must not be exceeded.
  - Loading and securing of loads must be carried out using conventional procedures, tarpaulins and side curtains must be correctly stretched and fastened and doors and sideboards locked, etc.
- In the cab:
  - Never carry dangerous products (such as petroleum, trichlorethylene, thinner, etc.).
  - If an animal Is carried, it must be kept away from the driving position.
- Getting in and out of the vehicle:
  - Use the steps and the handles provided. Never jump down from the vehicle.
  - When leaving the vehicle, observe the traffic flow, particularly if you have been driving for a long time.
  - Take extra care when the climatic conditions are bad (rain, snow, ice) and at night.

2. BEFORE GETTING INTO THE VEHICLE, CHECK

- General condition of your vehicle, visually (as per handbook).
- Tyre condition, tyre pressures (including the spare wheel), and that nothing is jammed between the twin wheels.
- Cleanliness of cab windows, rearview mirrors, headlights and other lights and number plates.
- Regulatory and optional lighting systems for correct operation.
- Semi–trailer and/or trailer for correct coupling (hook, brake hoses – colour coding – electrical connector...).
- For the presence and contents of the onboard tool kit.
- In winter, for the presence of anti–skid chains and that they are securely fastened.
- Vehicles equipped with side guard panels and beams should be permanently provided with this equipment. At the time of removal, make sure that the locks are correctly locked and tighten the setbolts moderately.

3. ONCE ONBOARD

– Check the condition of the non–slip pedal covers.
– Ensure that the safety controls. steering wheel, pedals, gear lever etc. are never cleaned with a slippery product like silicone.
– Adjust your driving position:
  . Steering wheel: check that the steering column is locked.
  . Seat: check that the seat is firmly locked.
  . Rearview mirrors.
  . If the vehicle is fitted with a seat belt, use it.
– Prior to starting the engine. ensure that the gear lever is in neutral.
– Check that all instrument panel indications are normal (if you are not certain of what the nominal readings are supposed to be, refer to the driving handbook) and that the tachograph disc is in place and that the unit is working properly.

4. WHEN DRIVING

– If you detect any anomaly in the way the vehicle is operating, stop and locate the mal–function.
  Do not move off again until you are sure that the incident has not impaired technical performance and safety.
– When driving, the use of some of the standard–fitted equipment, and other optional or added equipment is strictly forbidden (CB, telephone, i.e. hand–operated sun–roofs, television sets, etc.) or only permitted if all necessary precautions are taken so as not to affect road safety (cigar lighter, manual selection of radio stations...).
– Adapt your driving style to suit your load (cant or bend, if the centre of gravity is high, etc.) to take account of weather conditions and the time of day.
  If necessary, adjust the headlight beam levels.
– Never shut down the engine when the vehicle is moving (as this will cut off the supply to the power–assisted steering system and could decrease brake effectiveness).

5. WHEN PARKING

– Check that the vehicle is correctly parked (i.e. that it does not obstruct traffic flow or threaten the security of neighbouring installations).
– If the vehicle is going to remain stationary for some time, use one or more wheel chocks to Prevent it from moving (e.g. semi–trailer compressed air leakage, or in black ice conditions...).
– Check that:
  . parking brake is locked and immobilizes the road train or rig,
  . gear lever is in neutral,
  . battery isolating switch is OFF,
  . electromagnetic retarder is switched OFF,
  . air vents are not blocked (i.e. if an independent heating system is used),
  . parking lights are on at night.
– Check that you have not left in the cab:
  . important documents (personal, vehicle, load),
  . unaccompanied animals.

6. WHEN REPAIRING / SERVICING THE VEHICLE

IMPORTANT
Prior to carrying out any work on the electronic air suspension (other than calibration), place axle stands under the chassis.

– Check the tightness of the wheel nuts according to recommendations.
– Prior to tilting the cab:
  . Check that there is enough space in front of the vehicle and take care that during this manipulation nobody tries to cross this area or park in it.
  . Stop the engine, put the gear lever into neutral and make sure that no object is likely to fall onto the windscreen. If a refrigerator is fitted, drain it. Close the doors.
  . Tilt the cab as far as possible. If the cab is only partially tilted, wedge it to prevent accidental movement.
– If the engine is running:
  . Do not approach moving parts (fan, drive belts, etc.).
  . Do not turn off the electrical power supply (shut down the engine first).
– When climbing up onto or down from the catwalk behind the cab (tractor), use the steps and grab handles provided. Never jump down from the catwalk. Take care not to burn yourself (on the vertical exhaust pipe and silencer).
– Fuel is inflammable, if the fuel filler cap is open, smoking is forbidden and there must be no naked flame in the vicinity.
– Batteries are filled with acids which can cause serious injuries. They must be handled with great care.
– If you start the engine using an external power source:
  . Use cables of the correct dimensions.
  . Make sure that the + and – polarities are connected properly.
– When changing a fuse, it is vital to use another fuse of the same size.
– Only specialists should install additional power lines.
– The installation of additional air lines requires a technical study to be carried out or approved by the manufacturer.
– It is strictly forbidden to heat polyamide hoses (braking circuit pipes).
– Raising the vehicle with a jack: chock the wheels prior to jacking.
– Immobilizing the vehicle: use one or several wheel chocks as necessary.
– Wheels and tyres:
  . Never check tyre pressures or inflate or deflate a tyre which is hot.
  . Never stand in front of a tyre when checking the pressure or inflating it.
  . When fitting a roadwheel, take great care to centre wheels fitted with centring clamps (for trilex wheels, position the clamp at the segment crossover point).
– Repairs on the open road: collect all fluids which have been drained (such as oil, fuel, coolant...).
– With an eye to environmental protection, take into consideration the laws in force (recovery of oil / anti–freeze / cartridges).

– When draining oils (engine / gearbox / drive axles), you run the risk of burning yourself (hot oil).
– Independent heater, use vehicle diesel fuel only.
– If anti–skid chains are used, the rear wings should be removed, road speed should be reduced and chain tension should he tested at regular intervals.

Any modification to circuits (electrical, electronic or compressed air) may have serious consequences. Such work should only be undertaken in agreement with the manufacturer. RENAULT TRUCKS decline any responsibility in the event of non–conformity in assembly.
Only original RENAULT TRUCKS parts and circuits defined by the manufacturer guarantee quality, safety and reliability.

By observing the above instructions, you will be using your vehicle in the best possible way. However, you must also carefully read the driving handbook and consult the RENAULT TRUCKS network whenever you need any further information.

We remind you that application of the contractual warranty by RENAULT TRUCKS is subject, among other things, to proof by the customer that servicing and maintenance of the vehicle have been carried out according to our recommendations (frequency, operations to be performed, quality of expendable and consumable products guaranteed by genuine certified or recommended spare parts, quality and training of repair staff and use of specific tools...). Observance of these recommendations will also guarantee long–term reliability of the vehicle.
Servicing and maintenance conducted by the RENAULT TRUCKS network is a guarantee of observance of these recommendations. If the operations are conducted outside our network, the customer must provide formal proof that our recommendations have been observed.

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B1 specifications

ENGINE

Depending on your vehicle's equipment

Turbocharged engine with intercooler

	DCI 4 B J01
Capacity	4 120 cm3
Bore/stroke	102/126 mm
Injection equipment "BOSCH"	COMMON RAIL
Firing order	1.3.4.2
Maximum no–load speed	2 700 rpm
Idling speed	650 rpm

Turbocharged engine with intercooler

	DCI 4 C J01
Capacity	4 120 cm3
Bore/stroke	102/126 mm
Injection equipment "BOSCH"	COMMON RAIL
Firing order	1.3.4.2
Maximum no–load speed	2 700 rpm
Idling speed	650 rpm

Turbocharged engine with intercooler

	DCI 6 W J01
Capacity	6 177 cm3
Bore/stroke	102/126 mm
Injection equipment "BOSCH"	COMMON RAIL
Firing order	1.5.3.6.2.4
Exhaust gas recycling	E.G.R.
Maximum no–load speed	2 700 rpm
Idling speed	650 rpm

Turbocharged engine with intercooler

	DCI 6 AC J01
Capacity	6 177 cm3
Bore/stroke	102/126 mm
Injection equipment "BOSCH"	COMMON RAIL
Firing order	1.5.3.6.2.4
Exhaust gas recycling	E.G.R.
Maximum no–load speed	2 700 rpm
Idling speed	650 rpm

B2 specifications

Turbocharged engine with intercooler

	DCI 6 AI J96 (Export)
Capacity	6 177 cm3
Bore / stroke	102/126 mm
Injection equipment “BOSCH”	COMMON RAIL
Firing order	1.5.3.6.2.4
Maximum no–load speed	2 700 rpm
Idling speed	650 rpm

Turbocharged engine with intercooler

	DCI 6 AJ J96 (Export)
Capacity	6 177 cm3
Bore / stroke	102/126 mm
Injection equipment “BOSCH”	COMMON RAIL
Firing order	1.5.3.6.2.4
Maximum no–load speed	2 700 rpm
Idling speed	650 rpm

CLUTCH

Depending on your vehicle’s equipment

362 DBE

395 DBE

GEARBOX

Depending on your vehicle’s equipment

ZF S 5.42

EATON 4106

EATON 5206

EATON 6309

EATON 6406

EATON 8309

B3 specifications

POWER TAKE–OFF

Depending on your vehicle's equipment

NS 42**
HYDROCAR 26 Z1**
2264**
2266**
2903**
2904**
2907 *
2908 *
2250**
PAM 0631
PAM 0632

*: continuous service
**: intermittent service < 30 mins (30 minute break between two periods of use)

PROPELLER SHAFTS

Tubular shafts fitted with universal joints.

REAR DRIVE AXLE

Depending on your vehicle's equipment

669
P 920 SL
P 1120 SL
P 1121 SL
P 1170

With inter–wheel differential lock.

B4 specifications

FRONT AXLE

Depending on your vehicle's equipment

E46
E42
E62
E63
E72

STEERING

Depending on your vehicle's equipment

ZF 8090
ZF 8095
ZF 8098

Hydraulic power assisted

FRONT SUSPENSION

Leaf springs, hydraulic shock absorbers and anti–roll bars.

REAR SUSPENSION

Depending on your vehicle's equipment
Leaf springs, hydraulic shock absorbers and anti–roll bars.
Air suspension.

BRAKES

Air

Depending on your vehicle's equipment
Anti–lock braking system "ABS"

VERY IMPORTANT
For increased safety, the brake levers of this vehicle are equipped with AUTOMATIC SLACK ADJUSTERS to take up brake lining wear.
It is strongly advised to equip the trailer or semi–trailer with the same system to give HARMONY, RELIABILITY and LONG SERVICE LIFE to the road combination braking installation.

B5 specifications

RETARDER

Depending on your vehicle's equipment

Exhaust brake

Electric retarder

ELECTRICS

Depending on your vehicle's equipment

24 Volts

2 batteries . . . . . 95 Ah
140 Ah
170 Ah
190 Ah

Alternator: . . . . . "MITSUBISHI" A003TA8291 60 A
"MITSUBISHI" A003TA8491 80 A
"BOSCH" NL1 80 A
MELCO 80 A

Starter: . . . . . "BOSCH" EV 24

KEYS:

Make a note of your key numbers here:

– Ignition key:

– Door key:

B6 specifications

BODYWORK

It is essential to obtain 1/20 scale chassis drawings from your dealer when fitting bodywork or special equipment (loading crane, fifth wheel, etc.). For the attachment of this bodywork or equipment and also electrical connections, we ask manufacturers and body builders to comply with the RENAULT TRUCKS specifications and standards drawn up for this purpose. These are readily available from your dealer.

Soundproofing screen(s)

Any damage to the interior protective film of the screen requires replacement of the film. See that no flammable products are applied to the screen protective films. The screens are to be cleaned using a cloth. If necessary, use soapy water (any other product is strictly forbidden).

The application of solvent or paint to either inner or outer faces of soundproofing screens is to be prohibited.

WELDING ON VEHICLE

Important precautions

The vehicle is equipped with numerous electronic circuits.

Prior to carrying out any electric welding work, disconnect the positive (+) cable from the terminals of the battery and connect it to earth.

Place the earthing clamp as close as possible to the weld, but never attach it to a rotating part (prop shaft, hub, fan, etc.), nor to any sub–assembly having moving parts (air compressor, turbocharger, etc.).

Nearby plastic pipes and electrical cables are to be protected or removed. This also applies for grinding or drilling work.

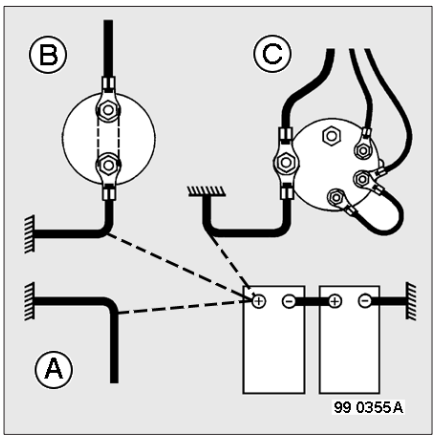


Diagram A: Vehicle without master switch

Diagram B: Vehicle with mechanical master switch

The master switch must be closed.

Diagram C: Vehicle with electrical master switch

Disconnect the two cables and connect them together.

B7 specifications

CAPACITIES

Depending on your vehicle's equipment

Litres

OIL

Engine DCI 4
– engine dry 15.9
– without filter change 14
– with filter change 14.5

Engine DCI 6
– engine dry 28
– without filter change 24
– with filter change 25.3

Gearbox ZF S 5.42 . . . . . 3.5

Power take–off . . . . . (NS 42) 0.8
(26 Z1) 0.8

Gearbox EATON 4106 . . . . . 6.5

Gearbox EATON 5206 . . . . . 6.5

Gearbox EATON 6309 . . . . . 8.5

Gearbox EATON 6406 . . . . . 9.2

Gearbox EATON 8309 . . . . . 8.5

Power take–off . . . . . (2264/2266) 0.25
(2903/2904/2907/2809) 1
(2903+2250) 1
(2904+2250) 1

Rear drive axle 669
Pan 6.2

Wheel hub 2x0.15

Rear drive axle P 920 SL
Pan 11.5

Wheel hub 2x0.35

Rear drive axle(s) P 1120 SL
Pan 11.5

Wheel hub 2x0.5

Rear drive axle(s) P 1121 SL
Pan 11.5

Hub reduction units 2x0.8

B8 specifications

CAPACITIES

Litres

OIL

Rear drive axle(s) P 1170
Pan 14

Wheel hub 2x1.0

Clutch hydraulic system 0.5

Power steering hydraulic system 3.5

COOLANT

Cooling system . . . . . (DCI 4) 22
(DCI 6) 30

WATER

Screen wash and headlamps wash reservoir 11

FUEL

Depending on your vehicle's equipment

Plastic fuel tank 80
130
200

Steel fuel tank 80
200
300

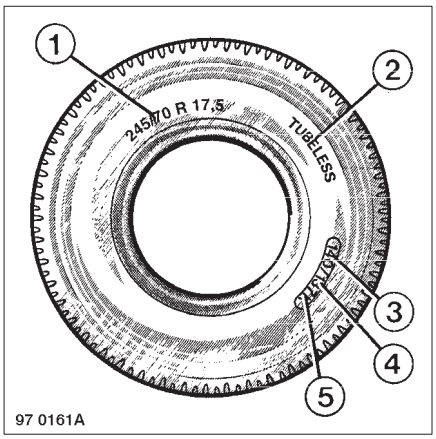
Aluminium fuel tank 150

Extra steel fuel tank 200

B9 specifications

TYRES

1 – Tyre type
2 – "Tubeless"
3 – Load index: single fitment
4 – Load index: twin fitment
5 – Symbol indicating maximum speed authorized for tyre



Tyre pressures

NOTE
These pressures are given for guidance. Consult the manufacturer's data concerning specific type and usage information. Respect the load/speed indices marked on the sidewalls of the tyres.

IMPORTANT
Your vehicle is equipped with a specific tyre fitment. To change the fitment, ensure from your dealer or approved agent that the new fitment is compatible with your vehicle.
Wheel rims fitted with protected valve*: when removing/fitting a tyre, observe the tyre manufacturer's instructions. Draw it to the operator's attention.*

Tyre type	Load in kg as per fitment Single	Twin	Pressure in Bars
	2 750	5 190	5.0
	2 980	5 650	5.5
9.5 R 17.5	3 220	6 100	6.0
	3 460	6 550	6.5
	3 700	7 000	7.0
	2 320	4 300	4.5
	2 540	4 750	5.0
205/75 R 17.5	2 760	5 200	5.5
	2 980	5 600	6.0
	3 200	6 000	6.5
	2 475	4 655	4.5
	2 700	5 085	5.0
215/75 R 17.5	2 935	5 525	5.5
	3 165	5 960	6.0
	3 400	6 400	6.5
	2 700	5 240	5.0
	2 950	5 680	5.5
	3 200	6 120	6.0
225/75 R 17.5	3 450	6 560	6.5
	3 700	7 000	7.0

B10 specifications

Tyre type	Load in kg as per fitment Single	Twin	Pressure in Bars
	3 100	6 000	5.5
	3 350	6 450	6.0
235/75 R 17.5	3 600	6 900	6.5
	3 850	7 350	7.0
	4 000	7 600	7.25
245/70 R 17.5	4 480	8 480	8.0
	3 560	6 720	6.0
	3 820	7 220	6.5
245/70 R 19.5	4 080	7 720	7.0
	4 350	8 230	7.5
	4 480	8 480	7.75
	3 920	7 400	6.5
	4 190	7 910	7.0
265/70 R 19.5	4 460	8 420	7.5
	4 730	8 930	8.0
	5 000	9 440	8.5
285/70 R 19.5	5 800	10 900	8.0
	3 710	6 830	5.0
	4 030	7 420	5.5
900 R 20	4 350	8 010	6.0
	4 680	8 610	6.5
	5 000	9 200	7.0
	3 860	7 100	6.0
	4 140	7 620	6.5
255/70 R 22.5	4 430	8 150	7.0
	4 710	8 670	7.5
	5 000	9 200	8.0
	5 000	10 000	8.5**
	4 260	8 200	6.0
	4 600	8 800	6.5
10 R 22.5	4 930	9 400	7.0
	5 260	10 000	7.5
	5 600	10 600	8.0

**: according to load index and speed symbol.

B11 specifications

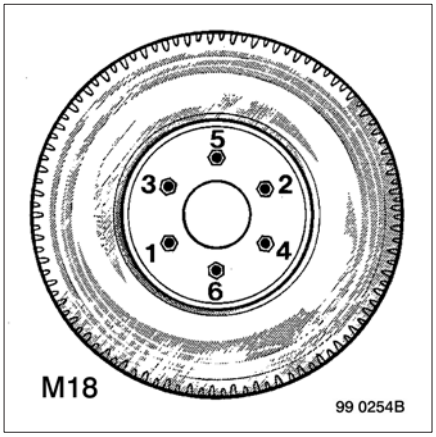
Tyre type	Load in kg as per fitment Single	Twin	Pressure in Bars
	4 760	8 660	6.0
	5 120	9 300	6.5
1000 R 20	5 470	9 940	7.0
	5 820	10 580	7.5
	6 000	10 900	7.75
	4 860	8 960	6.0
	5 220	9 620	6.5
11 R 22.5	5 580	10 280	7.0
	5 940	10 940	7.5
	6 300	11 600	8.0
295/60 R 22.5	6 500	12 000	9.0
	5 560	10 550	7.0
	6 030	11 240	7.5
315/60 R 22.5	6 390	11 920	8.0
	6 760	12 600	8.5
	7 100		9.0
	5 010	9 720	7.0
275/70 R 22.5	5 330	10 350	7.5
	5 650	10 970	8.0
	5 980	11 600	8.5
	5 660	10 555	7.0
	6 030	11 240	7.5
305/70 R 22.5	6 395	11 920	8.0
	6 760	12 600	8.5
	7 100		9.0
	6 700	12 300	8.5**
275/80 R 22.5	6 300	11 600	8.5
	5 560	9 880	6.5
	5 950	10 560	7.0
295/80 R 22.5	6 330	11 240	7.5
	6 720	11 920	8.0
	7 100	12 600	8.5

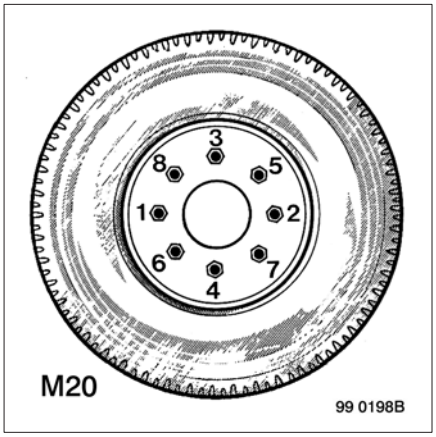
**: according to load index and speed symbol.

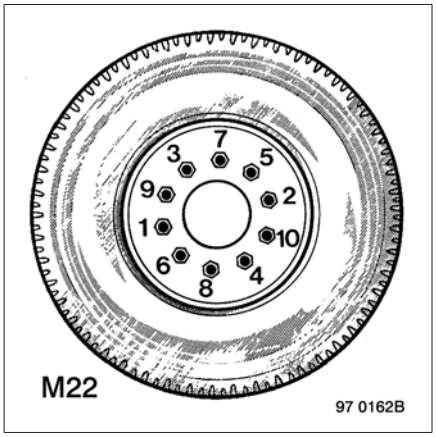
B12 specifications

Tightening sequence
– Disc wheels

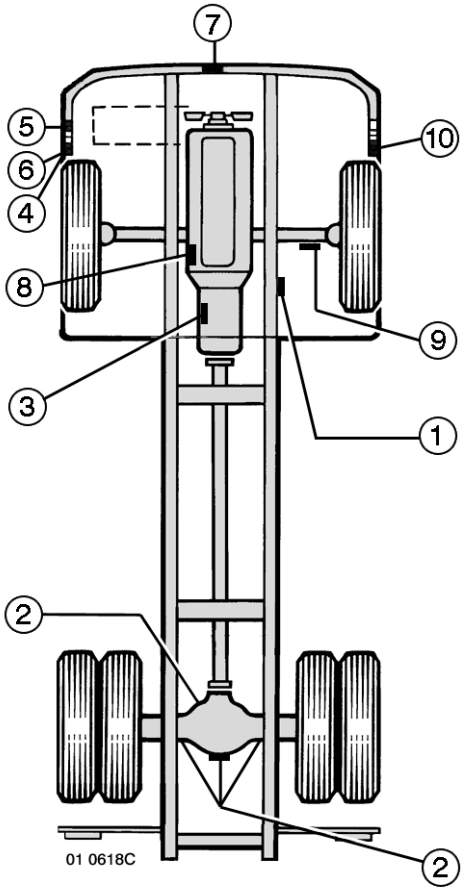
Steel wheels
Wheel nuts tightening torque
– M18 = 270 ± 27 N.m
– M20 = 400 ± 40 N.m
– M22 = 500 ± 50 N.m

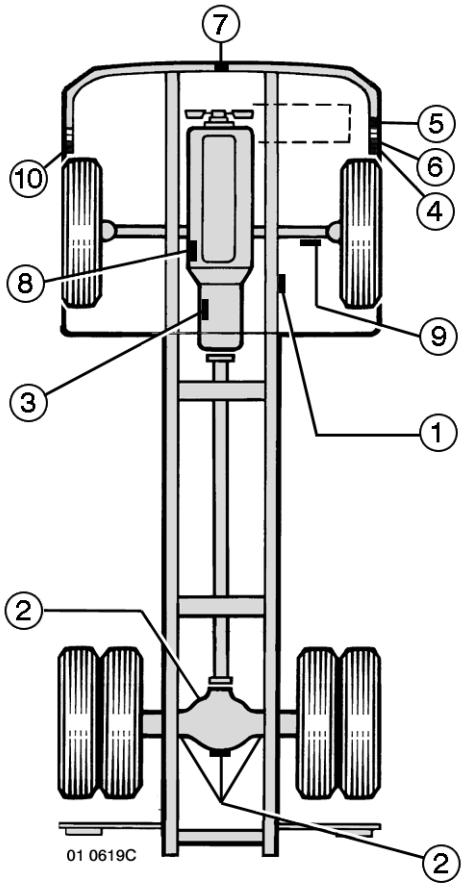






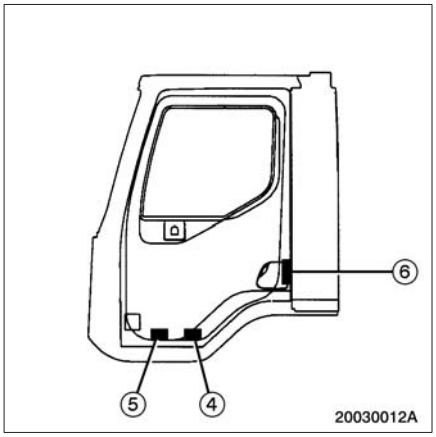
B13 specifications



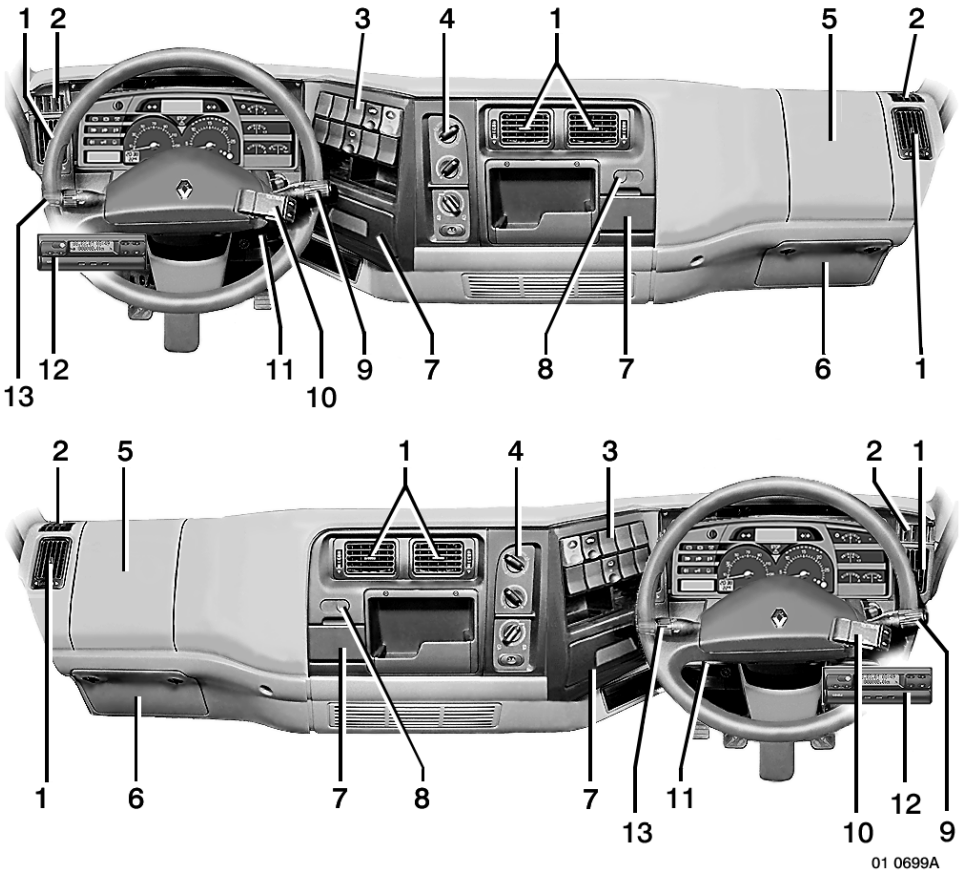


VEHICLE IDENTIFICATION

1 – Chassis
2 – Rear drive axle
3 – Gearbox
4 – OEM's plate
4 – Pollution index
5 – Manufacturing plate
6 – Tachograph plate
7 – CAM reference
7 – Paint reference
8 – Engine
9 – Front axle
10 – Load sensing valve curve plate



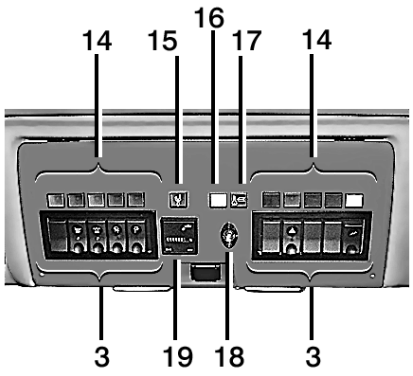
C1 use of the vehicle

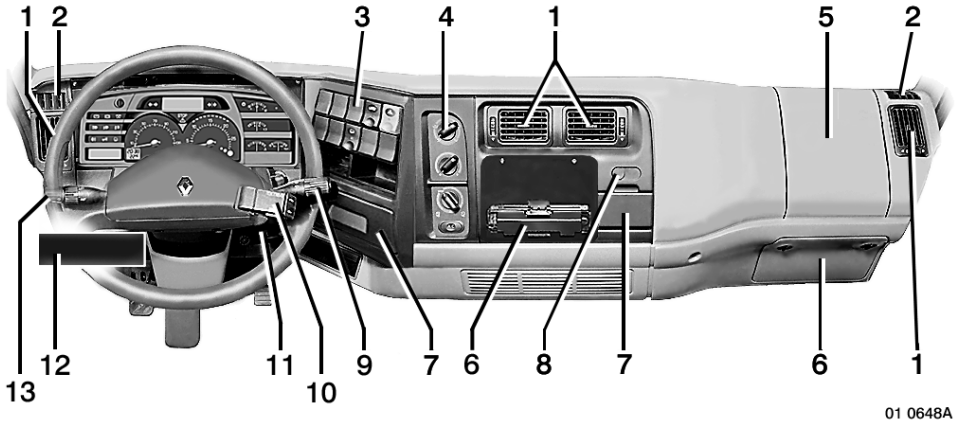


DRIVING POSITION

Depending on your vehicle's equipment

1 – Air vent
2 – Defrosting nozzles
3 – Switches (see page C10)
4 – Climate control panel
5 – Electronic boxes location
6 – Fuses
7 – Ashtray
8 – Portable lamp socket 12 V
9 – Windscreen wash/wipe control
10 – Radio remote control
11 – Headlights adjustment control
12 – Tachograph/Tachograph simulator
13 – Lighting/direction indicator/horn stalk switch



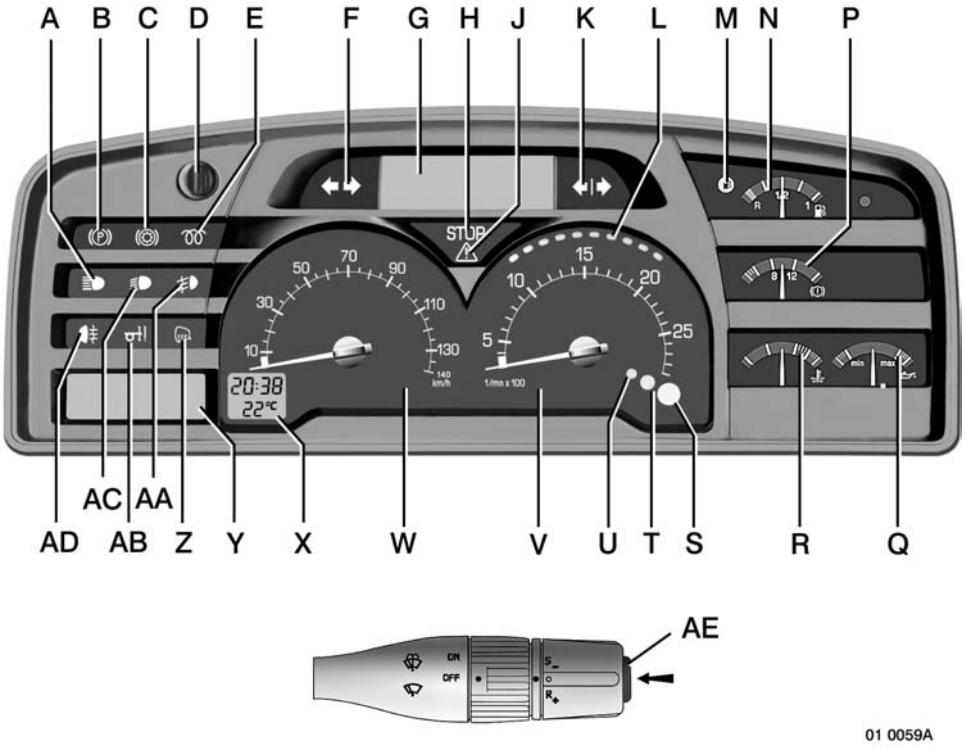


DRIVING POSITION

Depending on your vehicle's equipment

1 – Air vent
2 – Defrosting nozzles
3 – Switches (see page C10, C11)
4 – Climate control panel
5 – Electronic boxes location
6 – Fuses
7 – Ashtray
8 – Portable lamp socket 12 V
9 – Windscreen wash/wipe control
10 – Radio remote control
11 – Headlights adjustment control
12 – Tachograph simulator
13 – Lighting/direction indicator/horn stalk switch
14 – Warning lights module

15 – Pump engaged warning light (F.T.P.)
16 – Doors open warning light
17 – Lockers open warning light
18 – Portable lamp socket
19 – Power take–off hourmeter



DASHBOARD

Depending on your vehicle's equipment

A – Main beam headlights warning light
B – Parking brake warning light
C – Electric retarder warning light
D – Menu selection control
E – Preheating warning light
F – Tractor direction indicator lights warning light
G – Multi–function display (see page C13 → C27)
H – "DANGER" warning light: immediate stop
J – "SERVICE" warning light: drive to your dealer or nearest approved agent
K – Trailer direction indicators warning light
L – Engine operating speed zone

M – Fuel minimum reserve warning light
N – Fuel level gauge
P – Air pressure gauge
Q – Engine oil level and pressure gauge
R – Engine cooling system temperature gauge
S – Engine overspeed warning light
T – Engine brake in operation warning light
U – Engine–brake pre–selection and in operation warning light
V – Rev counter
W – Speedometer
X – Comfort display:
. clock
. external temperature indicator
Y – Radio display
Z – Windscreen defrosting warning light
AA – Fog driving lights warning light
AB – Electronic air suspension “Information” warning light
AC – Dipped beam headlights warning light
AD – Rear fog lights warning light
AE – Driving information selection button

C6 use of the vehicle

MULTI–FUNCTION DISPLAY

Key to illuminated warning pictograms

Depending on your vehicle's equipment

G1 – Display defect

G2 – Batteries:
. small pictogram: complementary information
. large pictogram: charging defect

G3 – Engine oil pressure

G4 – Vehicle electronics

G5 – Engine electronics

G6 – Minimum air pressure "Alert"

G7 – Trailer "ABS/EBS":
. small pictogram: check–out of device upon ignition switch–on (no defect)
. large pictogram: device defect "alert"

G8 – Tractor "ABS/EBS":
. small pictogram: check–out of device upon ignition switch–on (no defect)
. large pictogram: device defect "alert"

G9 – Maintenance alert

G10 – Brake pads wear

G11 – Servo steering oil insufficient level or pressure defect

G12 – Electronic air suspension “Alert”

G13 – Engine cooling system temperature “Alert”

G14 – Engine coolant low level

G15 – Air filter clogging and/or fuel filter clogging

G16 – Tachograph defect

G17 – Automatic transmission defect warning

G18 – Electronic anti–theft defect

G19 – Engine overspeed

G20 – Engine downrated (fall–back mode)

G21 – Retarder defect

G22 – Gearbox PTO in operation

G23 – Inter–wheel diff. lock in operation

C8 use of the vehicle

Key to illuminated warning pictograms

Depending on your vehicle's equipment

G24 – AIRBAG
. small pictogram: check–out of device upon ignition switch–on (no defect)
. large pictogram: device defect "alert"

G25 – Working spotlight

G26 – Tailgate in dangerous position

G27 – Tipper raised "Information"

G28 – Body interior lighting

G29 – Special machine (tanker handrail) deployed

G30 – Machine (tailgate, crane, concrete mixer) control unlocking

G31 – Sideboard open

G32 – Crane / tower platform deployed

C9 use of the vehicle

Key to tachograph tell–tale pictograms

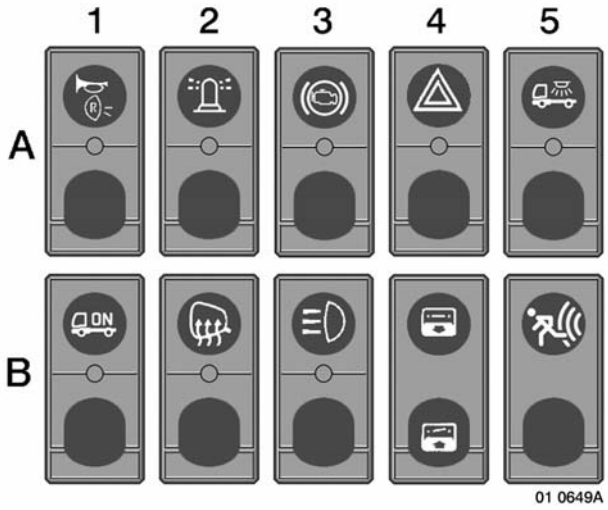
G33 – Cumulated driving time indication

G34 – Cumulated rest time indication

G35 – Rest in progress indication

G36 – Availability time indication

G37 – Working time indication

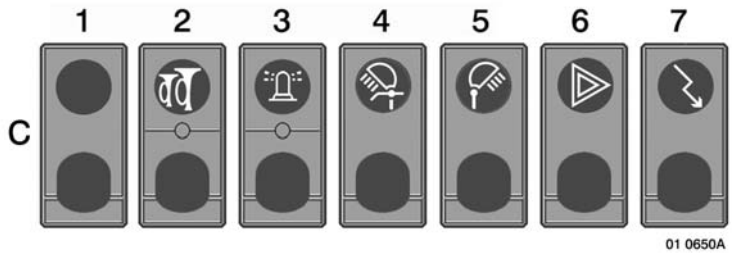


KEY TO SWITCHES

Depending on your vehicle's equipment

A1 – Reversing buzzer cancellation switch
A2 – Revolving beacon switch
A3 – Exhaust brake control
A4 – Hazard lights control
A5 – Bodybuilder's lighting switch
B1 – Bodybuilder's equipment control
B2 – Heated rearview mirrors control
B3 – Long beam driving lights switch
B4 – Sun–roof switch
B5 – "Panic" alarm button

C11 use of the vehicle



KEY TO SWITCHES

Depending on your vehicle's equipment

C1 – Daytime/night–time control
C2 – Two–tone horn control
C3 – Revolving beacon switch
C4 – Front searchlight control
C5 – Working spotlight control
C6 – Extra signalling control
C7 – Master switch

C12 use of the vehicle

MULTI–FUNCTION DISPLAY

Controls

NOTE
For safety reasons, you are advised to use button (D) while the vehicle is stationary and parked correctly.

Button (D) features 3 control capabilities (+ / – / V).

Nudge or push towards (+) or (–):
- to gain access to the different menus and sub–menus.
- to make an adjustment or choice in an opened menu.

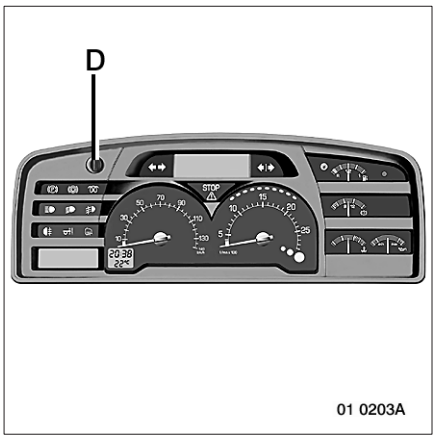
Short pulses (V):
- to open a selected menu.
- to validates an adjustment or a choice in the menu selected.
- to scroll through present or memorized defects in succession.

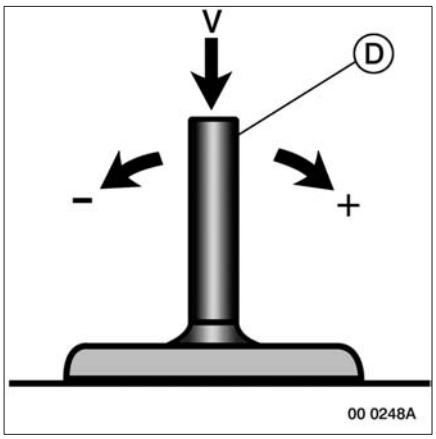
Long push (V):
- to return to zero in the maintenance menu.

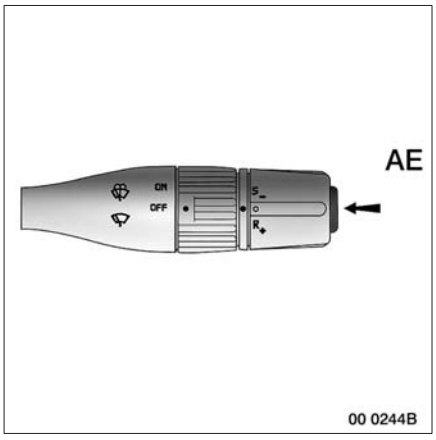
Button (AE) features 2 control capabilities.

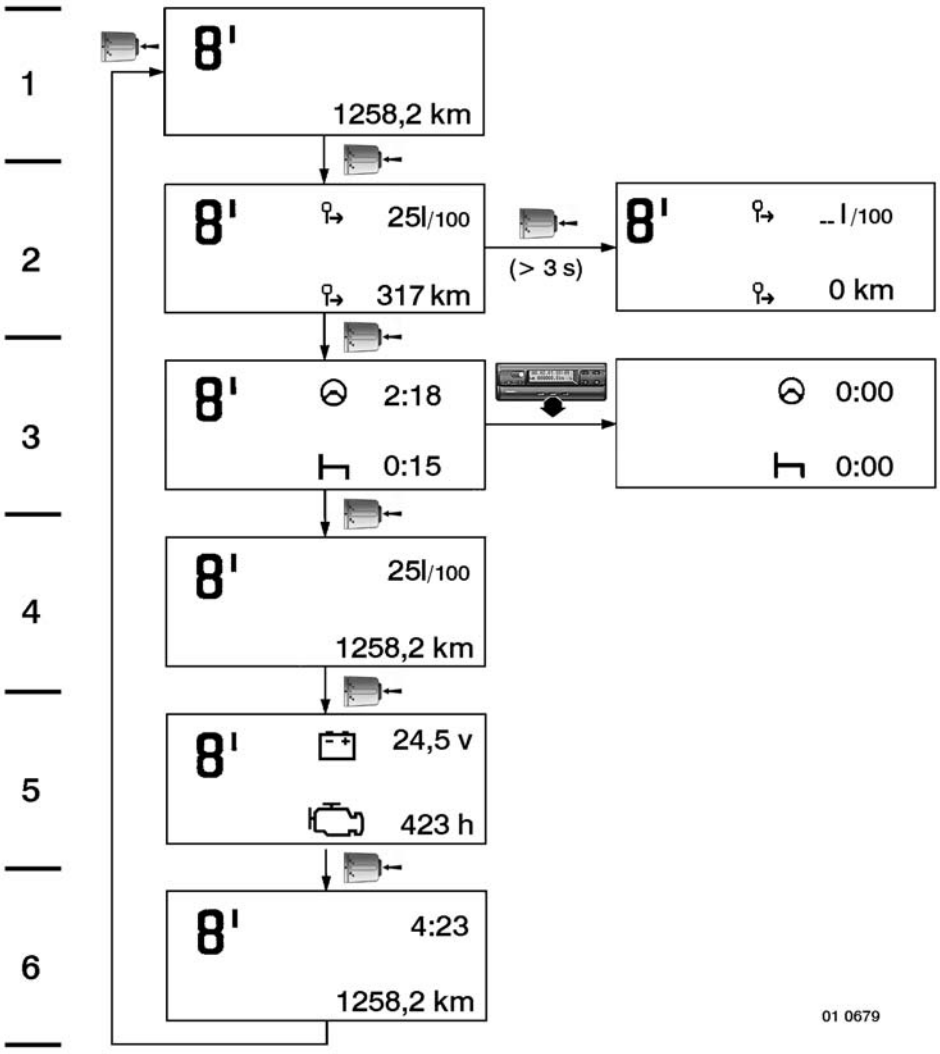
Short pulses:
- to go back to the default display.
- to close an opened menu without validating the adjustment or choice.
- to display the different driver's supplementary driving menus.

Long push:
- to return to partial mileage and average fuel consumption per 100 km.








1
2
3
4
5
6
8'
1258,2 km
25l/100
317 km
(> 3 s)
--l/100
0 km
2:18
0:15
0:00
0:00
25l/100
1258,2 km
24,5 v
423 h
4:23
1258,2 km
01 0679

C15 use of the vehicle

Supplementary driving information
Using the control (AE) (see page C13), it is possible to display different information items in succession, which can amount to 6 and vary depending on your vehicle's equipment .
The display of this information is time–delayed when the ignition is switched on, with the engine running or shutdown, and when the vehicle is not moving.
As soon as the vehicle moves off, if you select an information item, it remains permanently displayed, provided you have not selected another one, except for total mileage counter information.

1 – Total mileage counter (in km).

2 – Average fuel consumption in litres per 100 km and partial mileage (in km). When a zero (0) is placed before the partial mileage value, it means the vehicle has covered 9999 km.
To zero this information, press button (AE).and keep it depressed for more than 3 seconds.

3 – Cumulative driving time and cumulative rest time.
The cumulative rest time is increased in increments based on 15 minutes periods of rest or availability in one stretch.
The cumulative driving time displayed on the instrument panel corresponds to the effective vehicle running time (speed different from 0 km/h).
Brief stops, connected with traffic conditions, are automatically deducted.
This information is zeroed:
– When the tachograph disk tray is closed.
– When driving or working is resumed after 45 minutes of cumulative rest.

> ***IMPORTANT***
> *The times displayed are given for information purposes. Only the information recorded on the chart has legal value.*

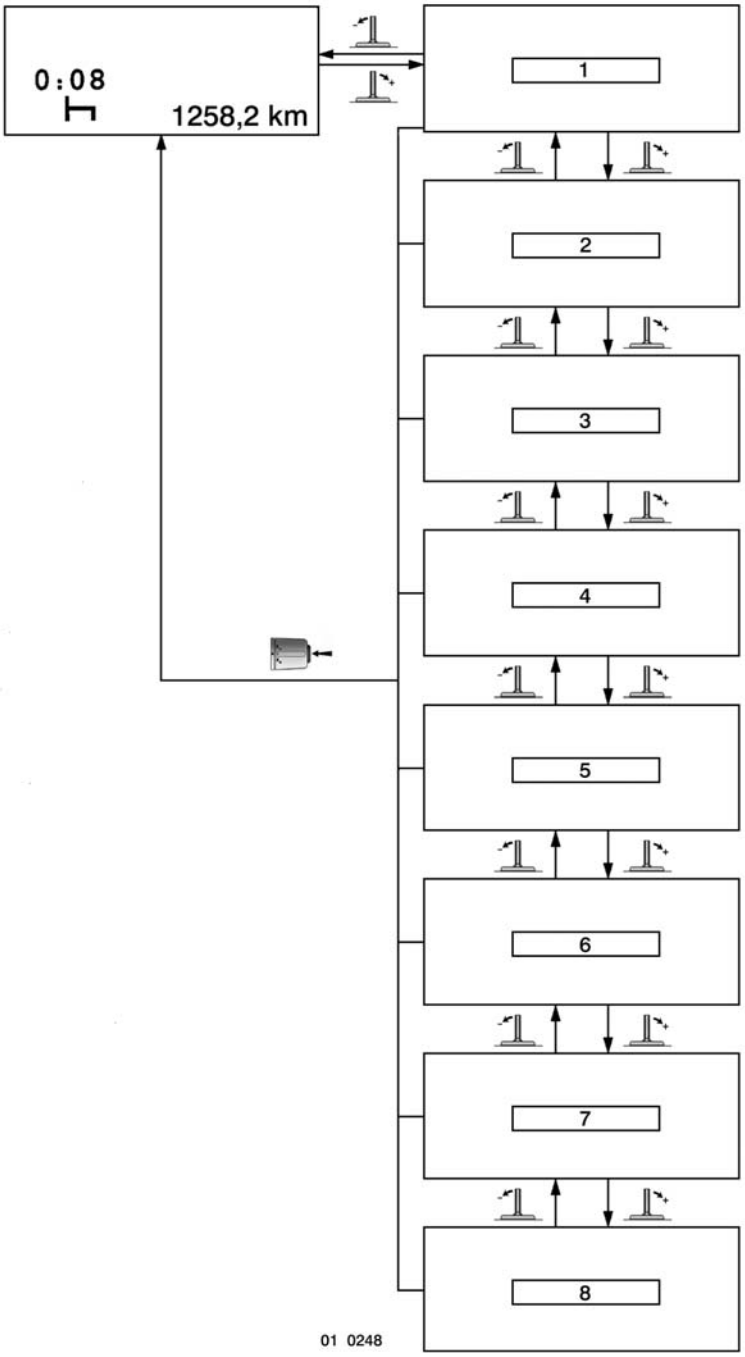
4 – Instant fuel consumption in litres per 100 km and total mileage (in km).
The instant fuel consumption is given for guidance purposes – it may reach substantial proportions during acceleration or when moving off, but it is not significant of the vehicle's average fuel consumption.

5 – Battery voltage and engine operating hourmeter.

6 – Legal time of day and total mileage counter.

NOTE
Vehicles equipped with a tachograph simulator: Do not take item 3 into account.

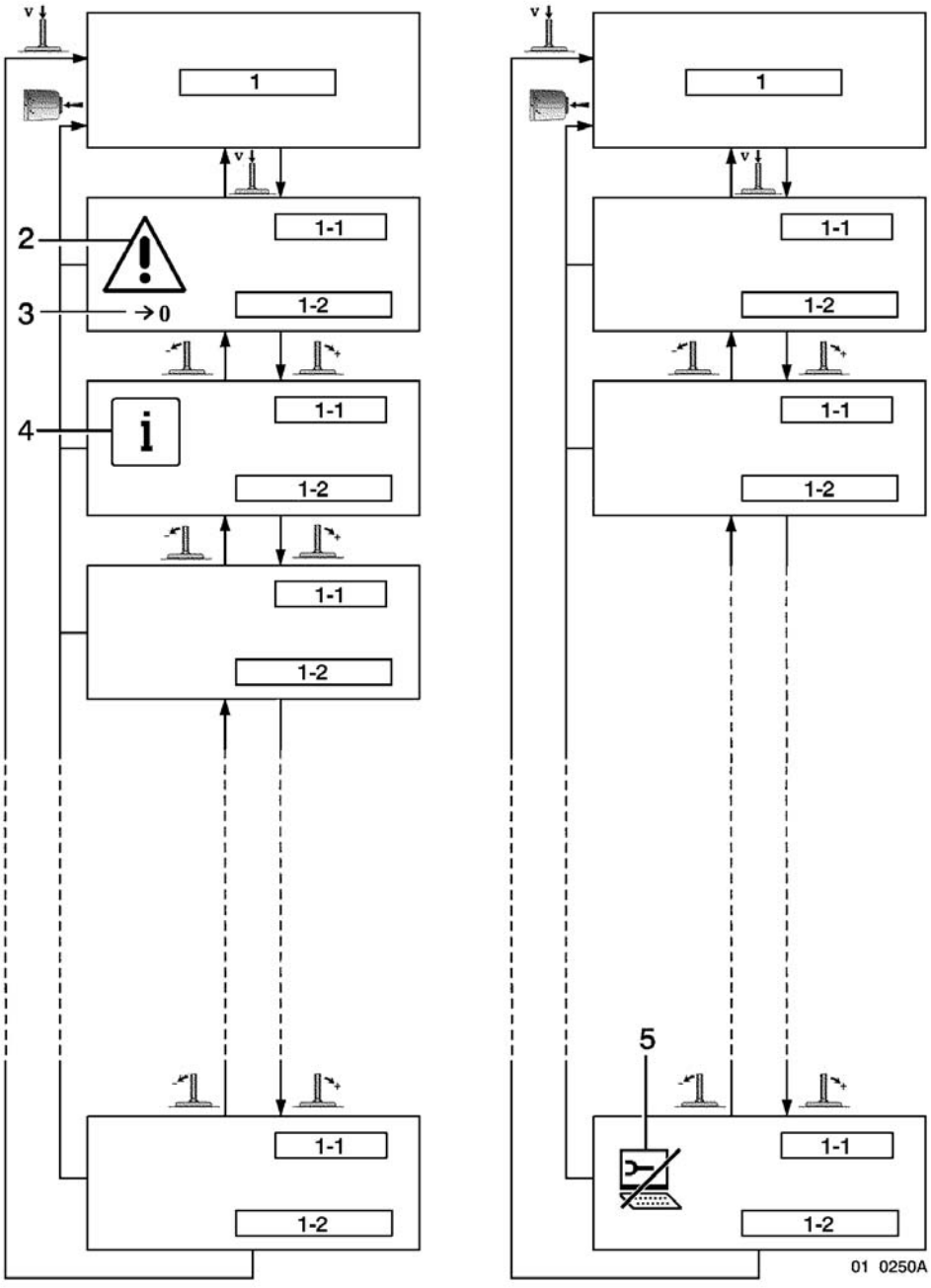
C16 use of the vehicle



C17 use of the vehicle

Menus
Use controls (AE/D) (see page C13)
- **1** – Maintenance
- **2** – Diagnostics
- **3** – Auto–test
- **4** – Brightness adjustment
- **5** – Sound volume
- **6** – Choice of language
- **7** – Tachograph recording legal time of day adjustment
- **8** – Warm–up selection

To use the different menus, see the following pages.


1
1-1
1-2
2
3
→0
4
i
5
01 0250A

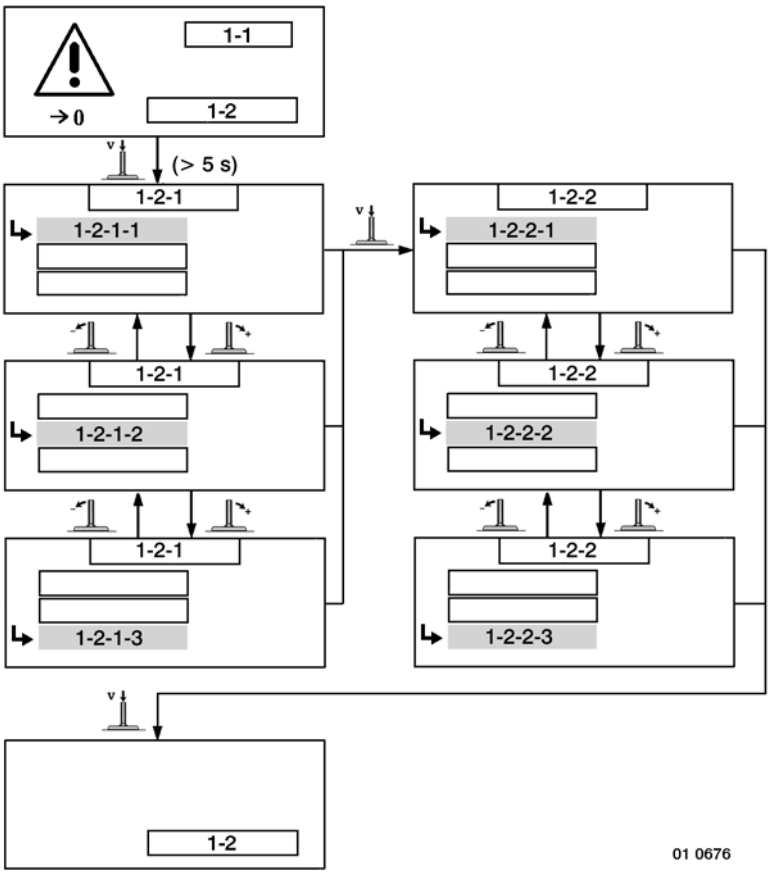
C19 use of the vehicle

1 – Maintenance menu
Use controls (AE/D) (see page C13)
When consulting the maintenance menu, only engine oil and air dryer information items are active. It is possible to activate other maintenance features (see page F2) by using the RENAULT DIAGNOSTICA tool or the INFOMAX software after the first oil change has been carried out.

1–1 : Time when the maintenance should be carried out.
The display is shown in kilometres, date or engine operating time depending on which term is closest.

1–2 : Display of maintenance features (see page F2).
The “pre–alert” pictogram (4) means that the maintenance term in question is close.
The “alert” pictogram (2) means that the maintenance term is due.
The display “0” (3) means that zeroing of the term is possible by the user (after carrying out the maintenance operations). Such zeroing may be forbidden by using the RENAULT DIAGNOSTICA tool or INFOMAX software.
The pictogram (5) means that the predictive maintenance feature is no longer active. Contact a dealer or approved agent.

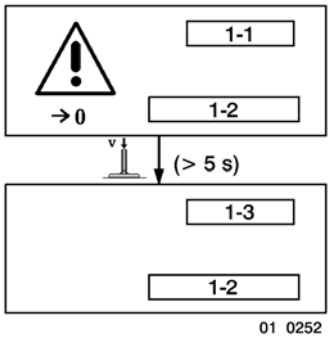
C20 use of the vehicle



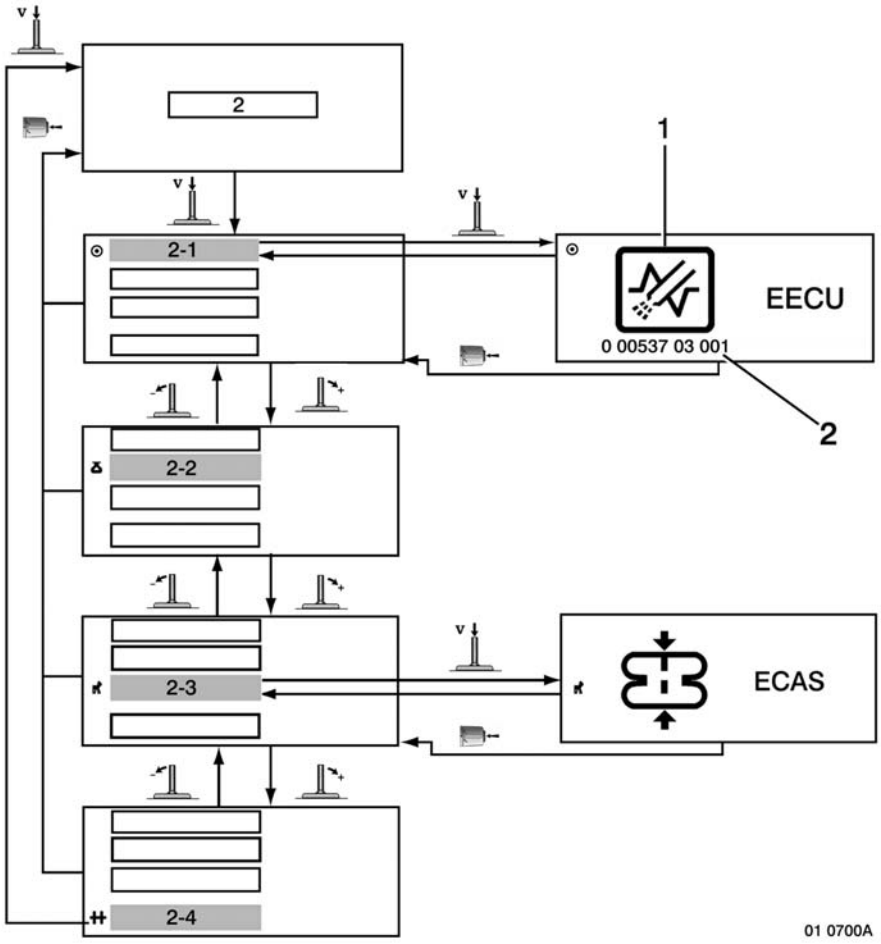
Zeroing the engine oil maintenance feature
Use control (D) (see page C13)
This maintenance feature involves the choice of oil grade and diesel fuel sulphur content. This choice sets a new term which will be calculated and changed according to engine use. The new term will be displayed after 100 or so hours of engine operation.

1–1 : Term
1–2 : Engine oil
1–2–1 : Engine oil grade
1–2–1–1 : RD
1–2–1–2 : RLD
1–2–1–3 : RXD
1–2–2 : Diesel fuel sulphur %
1–2–2–1 : 0 to 0.05
1–2–2–2 : 0.05 to 0.3
1–2–2–3 : 0.3 to 1

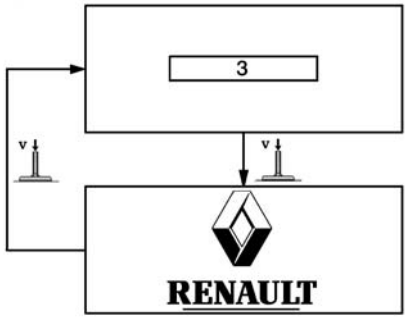
C21 use of the vehicle



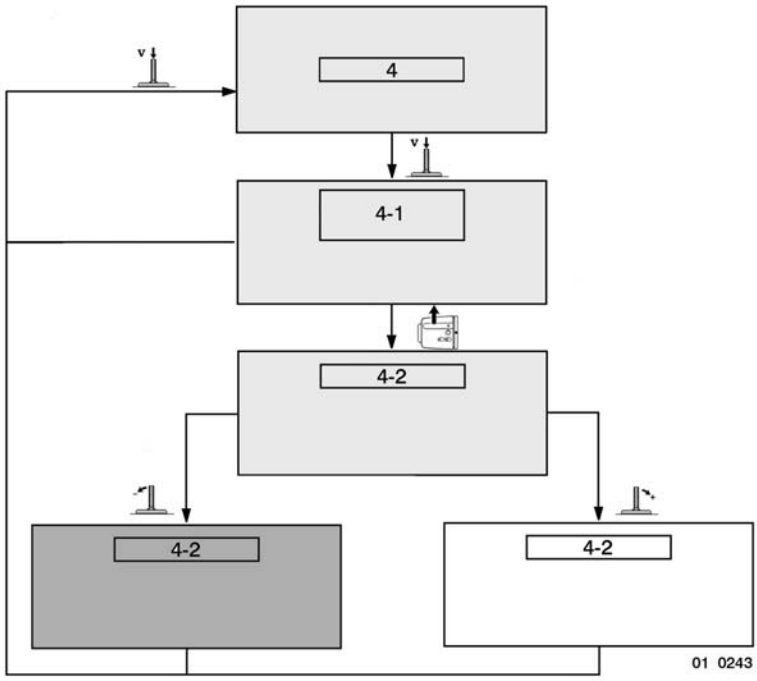
Zeroing another maintenance feature other than engine oil
1–1 : Term due
Press control (D) and keep it depressed for more than 5 seconds to zero the term (see page C13).
1–2 : Display of the maintenance feature
1–3 : New term after zeroing



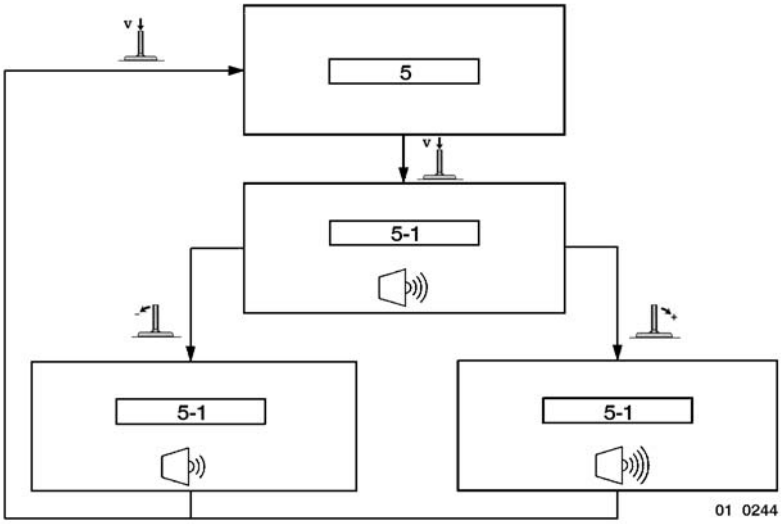
2 – Diagnostics menu
Use controls (AE/D) (see page C13)
When the menu is open, the stop warning light (H) comes on.
Sub–menus
2–1 : Present defects
Whatever the case, the pictogram (1) shows the function or system presenting a defect. To see the other defects, actuate the control (D) as often as necessary. The code number (2) characterizes the present defect.
2–2 : Sub–menu reserved for the dealer or approved agent
2–3 : Blink code
2–4 : Quit



3 – Auto–test menu
Use control (D) (see page C13)
Tests all the instrument panel warning lights and indicators.

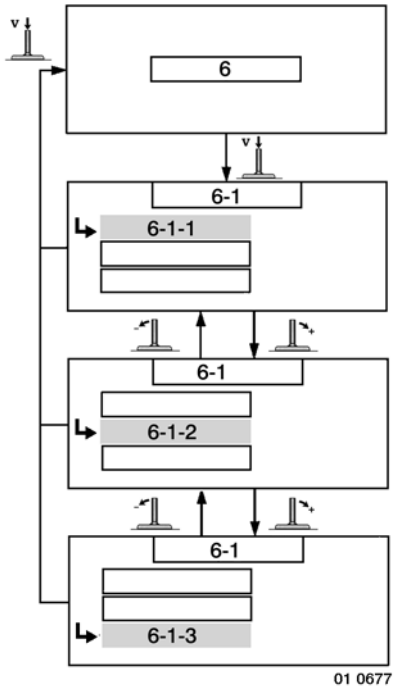


4 – Brightness adjustment menu
Use controls (AE/D) (see page C13)
4–1 : Side/parking lights switched on
4–2 : Brightness adjustment
Perform this adjustment at night with the side/parking lights switched on. During the day, a cell corrects and adapts the brightness of the display according to the ambient light.



5 – Sound volume menu
Use control (D) (see page C13)
5–1 : Sound volume

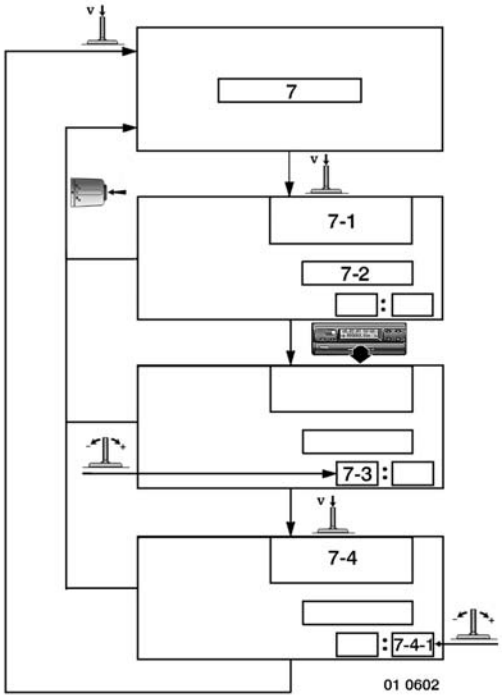
C25 use of the vehicle



6 – Choice of language menu
Use control (D) (see page C13)
6–1 : Memorized language active
6–1–1 : First language
6–1–2 : Second language
6–1–3 : Third language

Three languages are proposed to you, by default. The choice of language can be modified by a dealer or approved agent.

C26 use of the vehicle

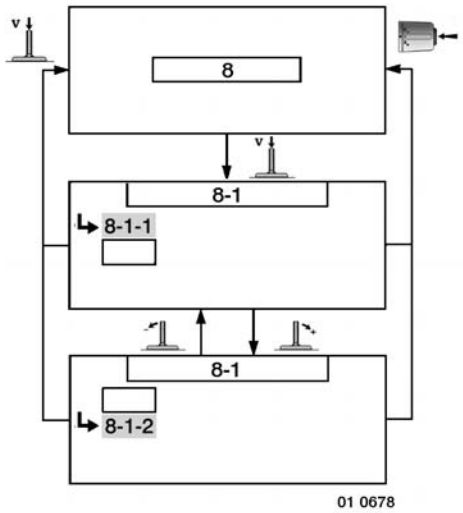


7 – Time of day adjustment menu
Use controls (AE/D) (see page C13)
7 – 1 : Hour display
Open tray or remove chart.
7 – 2 : Date display.
7 – 3 : Adjustment of hour.
7 – 4 : Minutes display
Open tray or remove chart.
7 – 4 – 1 : Adjustment of minutes.

For vehicles equipped with a VDO tachograph, the tachograph chart(s) must be removed and the tray closed.
For vehicles equipped with a TVI tachograph, the tray must be open.
To open the tray, see the tachograph operating instructions.

NOTE
The date cannot be adjusted.
Closing of the tachograph tray with the chart inside causes automatic zeroing of display of the driving time and cumulative rest time.
Vehicles equipped with a tachograph simulator are not concerned by item 7 – 1**.**

C27 use of the vehicle



Depending on your vehicle's equipment

8 – Warm–up selection menu

Use controls (AE/D) (see page C13)

8–1 : Warm–up selection

8–1–1 : Yes

8–1–2 : No

For operation, see page D1.

FRONT DOORS

Opening from the exterior
Unlock by inserting the key into lock (1).
Tilt handle (2) upwards and pull the door.
Closing
Push the door until it engages automatically.
Lock by inserting the key into lock (1).

NOTE
When the master switch is engaged, opening of the door actuates lighting of the step and of the cab overhead light.

Opening from the interior
Unlocking
Tilt handle (3) upwards and push the door.
Closing
Pull the door until it engages.
Locking
With the door closed, tilt handle (3) downwards.

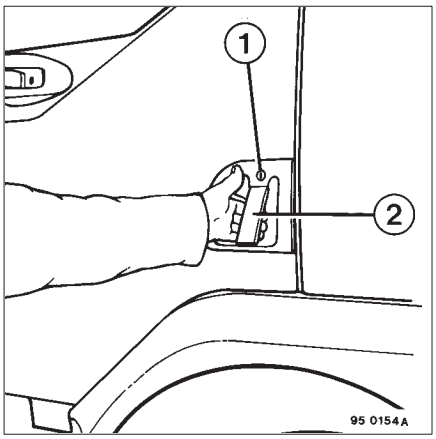
NOTE
With the door open, handle (3) tilted downwards, the door unlocks automatically upon closing.

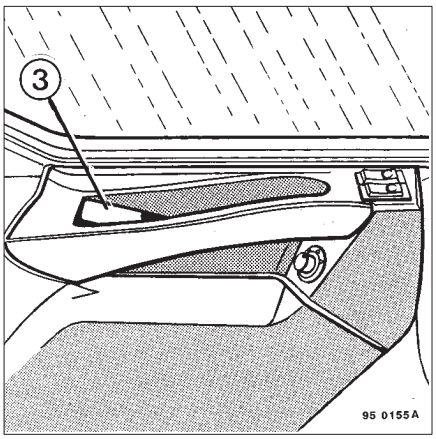
Depending on your vehicle's equipment

Central locking from the inside
Proceed as follows for central locking:
– Push handle (3) by hand.
– Press one of the buttons (4–5) on the remote control .

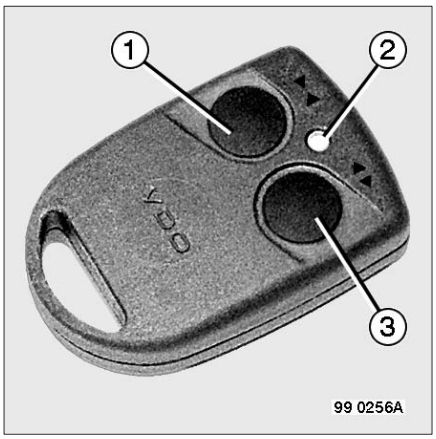
Using the remote control:
Upon locking, the direction indicator warning light and the hazards light warning light flash:
– twice with button (4),
– four times with button (5).
Upon unlocking, they flash once when one of the buttons (4–5) is pressed.

NOTE
When the door is open, central locking is neutralized.





Depending on your vehicle's equipment



DOORS RADIO FREQUENCY REMOTE CONTROL

This device does the same job as the door keys and manual action on the master switch.
The doors can be locked and unlocked without discrimination by keys or by the remote control.

Use
The remote control is powered by batteries (CR 1620 – 3 V) that have to be replaced when the battery warning light (2) flashes rapidly or no longer comes on. The warning light (2) stays on for the entire time the buttons (1–3) are pressed.

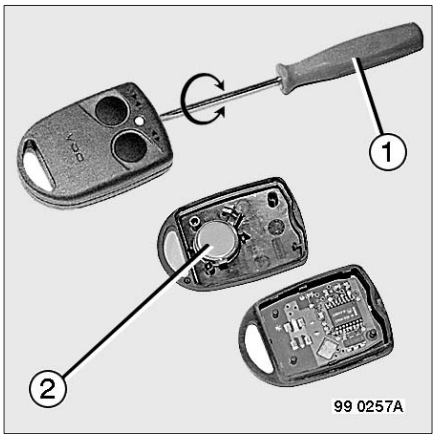
Unlocking the doors and turning on the master switch
Press one of the buttons (1–3). This action, signalled by the flashing lights flashing once, orders the master switch to be turned on, the engine immobilizer to be de–activated and the doors to be unlocked.

Locking the doors only
Press the button (1). This action, signalled by the flashing lights flashing twice, orders the doors to be locked. The master switch remains on and the engine immobilizer is de–activated.

Locking the doors and turning off the master switch
Press the button (3). This action, signalled by the flashing lights flashing four times, orders the doors to be locked, the master switch to be turned off and the engine immobilizer to be de–activated.

NOTE
When the ignition key is in the ignition switch, the remote control is inoperative.
If the flashing lights flash more than four times (after replacing the batteries, for example), press one of the buttons twice while the lights are flashing to re–activate the remote control.

To replace the batteries
Using a screwdriver (1), open the casing and replace the batteries (2), while observing the polarity engraved on the cover. Use alkaline type batteries: **CR 1620 – 3 V**.
The service life of such batteries is about 1 year.



IMPORTANT
Do not forget to make a note of the number of your keys.
If you lose them or would like another set of keys or remote control, contact your Renault dealer. Tell him the numbers and show him the vehicle documents.

C30 use of the vehicle

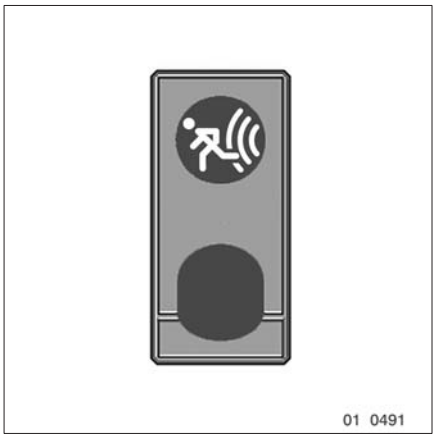
ALARM

Features
– Panic button in the event of aggression to the driver.
– Cab volumetric protection.
– Perimetric protection of cab doors.
– Cab tilting protection.
– “After ignition positive” protection.
– Protection against disconnection of batteries and disconnection of siren (self–powered siren).
– Surveillance of the protected zone by means of a control box.
– Display, on the control box, of a “blink code” to identify the nature of the aggression.

Features according to equipment
– Remote transmission of aggression information by means of the onboard management sys–tem.

NOTE
The following features are only possible if the vehicle body and/or the coupled trailer is equipped with the freight protection box distributed by the RENAULT TRUCKS Boutique.
– Perimetric protection of vehicle body and/or trailer doors.
– Surveillance of onboard freight while at a standstill or when moving (opening of doors and unplugging of trailer electrical socket).

Panic button
In the event of aggression, press the “panic” button” (B5), for about 2 seconds to give the alert. The siren sounds immediately and the hazard lights flash. To stop the siren and the hazard lights, press the button (B5) again for about 2 seconds.
Depending on the vehicle’s equipment, it may be possible to link up with the onboard manage-ment system.



C31 use of the vehicle

Activating the alarm

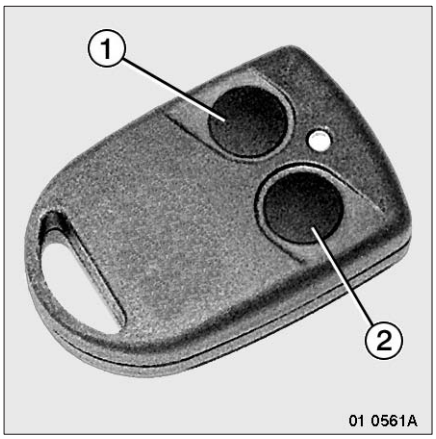
NOTE
It is essential for the onboard radio to be switched off.

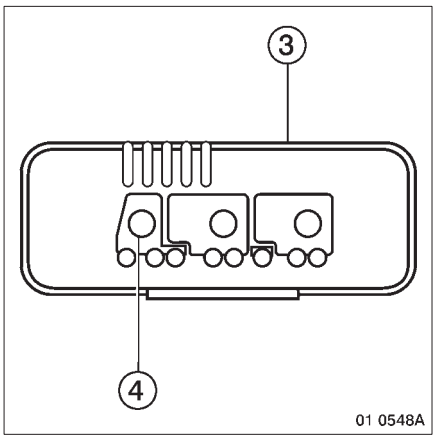
The alarm is activated and de–activated by means of the radio frequency remote control. If the vehicle body and/or trailer are equipped with the freight protection box, it will be automatically taken into account by the central alarm box.

Vehicle powered up (master switch closed): there are two possibilities proposed, depending on use.

1– Press the remote control button (1):
– The cab doors lock.
– The hazard lights flash twice.
– The red Led (4) of the control box (3) comes on for 40 seconds, then flashes – the alarm is activated.

2– Press the remote control button (2):
– The cab doors lock.
– The hazard lights flash twice.
– The vehicle is powered down (only for vehicles equipped with an electrical master switch).
– The red Led (4) of the control box (3) comes on for 40 seconds, then flashes – the alarm is activated.





C32 use of the vehicle

Activation of the alarm without volumetric protection and without cab tilting protection

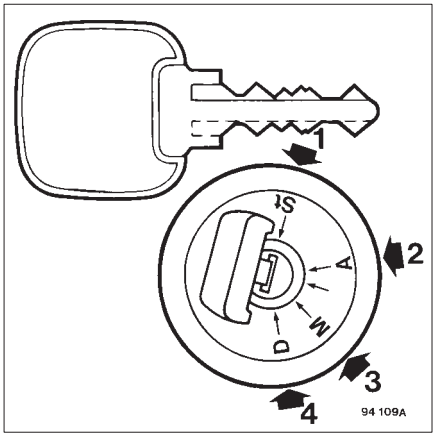
Vehicle powered up (master switch closed), there are two possibilities proposed:

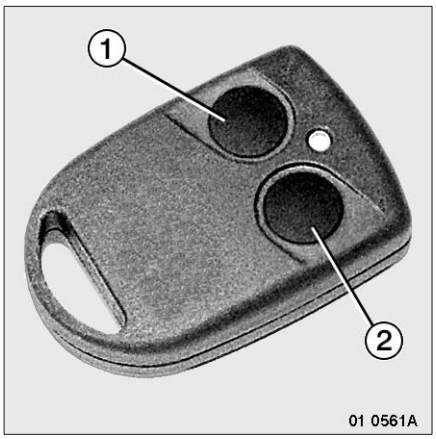
1– From the inside of the cab, anti–theft ignition key in position (1).
Press the remote control button (1) or (2):
– The cab doors lock.
– The hazard lights flash 4 times and the alarm buzzer sounds once.
– The red Led (4) of the control box (3) comes on for 40 seconds, then flashes – the perime–tric alarm is activated.

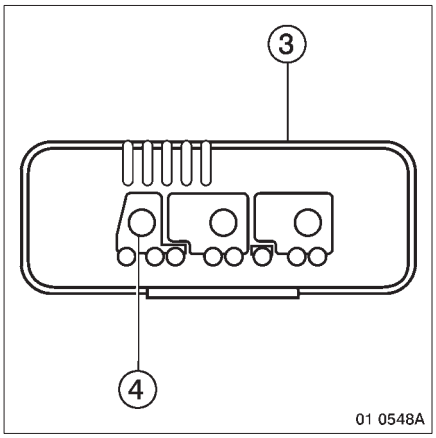
2– From the outside of the cab, anti–theft ignition key in your possession.
Press the remote control button (1) or (2):
– The cab doors lock.
– The hazard lights flash 4 times.

Power down the vehicle (automatic for vehicles equipped with an electrical master switch and if you use the remote control button (2):
– The red Lede (4) of the control box (3) stay lit for 40 seconds.
During this period of time only, simultaneously press remote control buttons (1) and (2):
– The hazard lights flash 4 times and the alarm buzzer sounds once.
– After 40 seconds have elapsed, the red Led (4) of the control box (3) flashes – the perimetric alarmis activated.

NOTE
When your vehicle is being transported by boat or rail convoy, activate the alarm without volu-metric protection and without cab tilting protection to avoid any inadvertent triggering of the alarm.





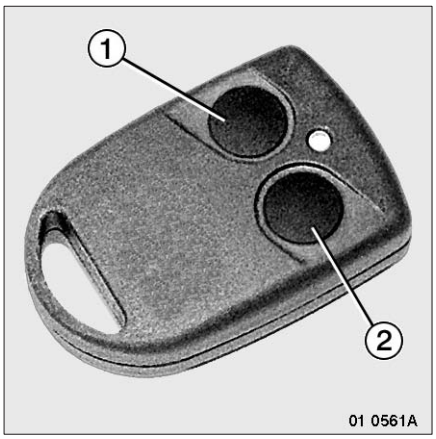


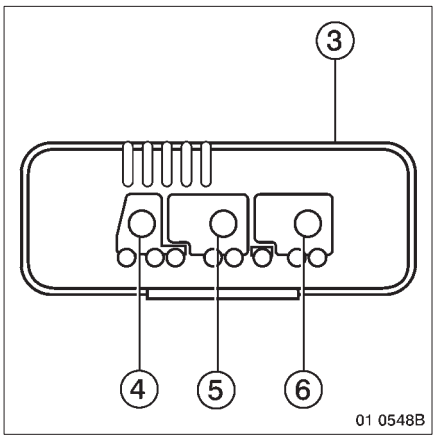
Fall–back mode
During the 40 seconds when the Led (4) is lit, all the alarm sensors are checked out. If a door has been left open, the siren sounds to draw attention to the problem. After 40 seconds, the door in question will be excluded and not protected. The fall–back mode can be used while freight is being unloaded.

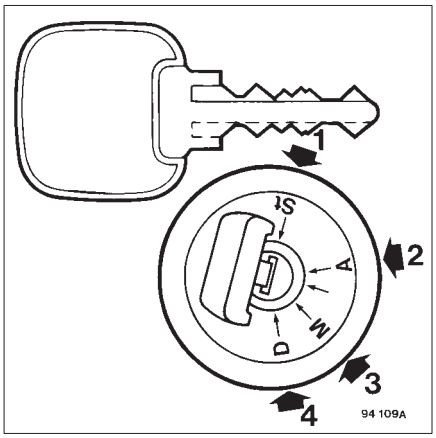
De–activating the alarm
With the vehicle powered up (master switch closed), press the remote control button (1) or (2), or, if the vehicle has been subjected to aggression, close the cab doors and press remote control button (1) ou (2) twice:
– The vehicle is powered up (only for vehicles equipped with an electrical master switch).
– The cab doors lock.
– The red Led (4) of the control box (3) goes out.

NOTE
In the event of remote control malfunction, you can de–activate the alarm by moving the anti–theft ignition key to the "ignition" position (3). After this, it is necessary to re–synchronize the remote control with the alarm by activating and de–activating the system once.

If there is an attempt at theft of the vehicle or its freight, the siren sounds after the alarm has been de–activated. It is possible to find out what kind of intrusion has been perpetuated by means of the Leds (4–5–6) of the control box (3) that display a "blink code".
Each Led corresponds to a monitored zone (see table, page C35).
The "blink code" is erased when the ignition is switched one, with the anti–theft ignition key in position (3).





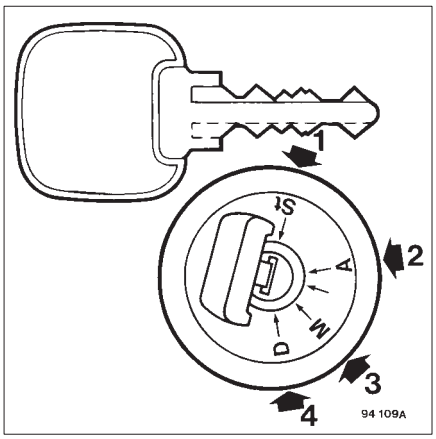


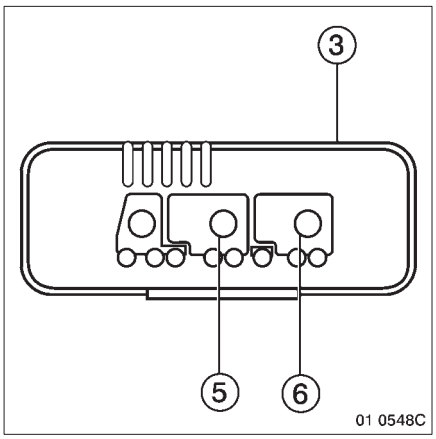
C34 use of the vehicle

Control box position (1)

C35 use of the vehicle

Surveillance of the freight
Surveillance of onboard freight is active as soon as the ignition key is moved to position (3).
If there is an attempt at theft of the onboard freight, the control box (3) buzzer sounds for 3 seconds (short 2–tone signal corresponding to the trailer). A “blink code” is simultaneously displayed by means of the Leds (5–6) of the control box (3), to identify the intrusion.
Each Led corresponds to a surveillance zone (see table below).
If you switch on the ignition while a vehicle or trailer door is open, that door will not be taken into account by the freight surveillance system. In such case, the control box (3) buzzer sounds for a few seconds and the corresponding Led flashes.





Number of LED flashes	Cab zone red LED	Vehicle body zone yellow LED	Trailer zone orange LEDLed
1	Driver’s door	Door 1	Door 1
2	Ultrasonic sensor	Door 2	Door 2
3	–	Door 3	Door 3
4	After ignition positive	Door 4	Door 4
5	Cab tilting	–	–
6	Passenger’s door	–	–
8	Siren sabotage	Body sabotage	Trailer unhitching

Depending on your vehicle's equipment

SHIELD

When opening the front grille or when tilting the cab, tilt the shield.
To tilt
While holding the shield with the jack bar (1), free the lock (2) and pivot the shield.
In the "road" position, make sure the shield is properly locked.

FRONT GRILLE

Pull the bottom part of the radiator grille to open it. Push it to close.

WARNING
When working at the front end of the vehicle with the front grille open, ensure that the windscreen wiper switch is in the "OFF" position.
It might prove to be dangerous if you place your hands on the screen wiper linkage.
If possible, disengage the master switch.

ACCESS TO WINDSCREEN

With the front grille shut, windscreen wiper control in the "off" position, use the step and the handles to gain access to the windscreen.

Depending on your vehicle's equipment

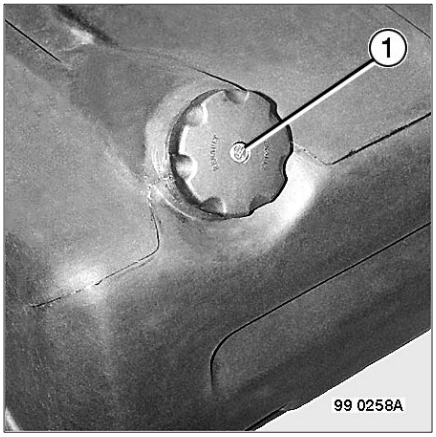
ROOF DEFLECTOR

IMPORTANT
Vehicle equipped with refrigerator unit:
If the vehicle is equipped with a roof deflector, ensure that the deflector does not interfere with correct operation of the refrigerator unit (limited cooling of the condenser).

FUEL TANK

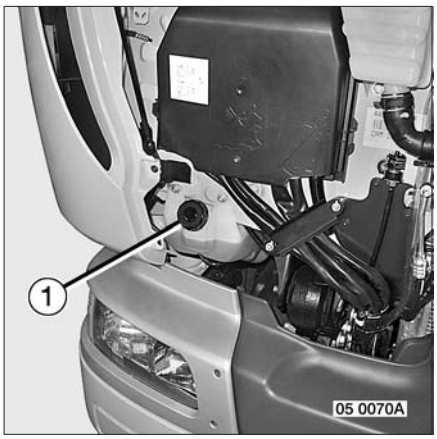
Depending on your vehicle's equipment

Filler cap
The filler cap is locked by means of a key (1).



WINDSCREEN AND HEADLAMPS WASHER RESERVOIR

Regularly check the water level in the reservoir (1). If necessary, top up with soft water. To avoid scale deposits and jet and tube clogging, we recommend the addition of a RENAULT TRUCKS windscreen washer product. As this product also contains an anti–freeze, it can be used all the year round.

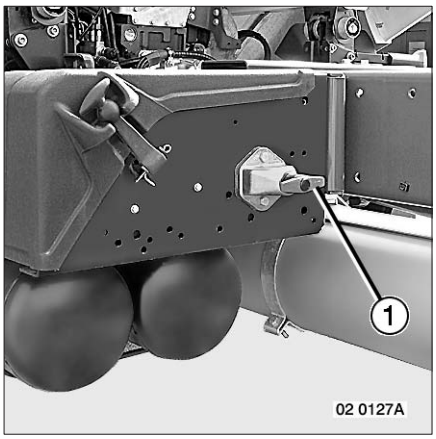


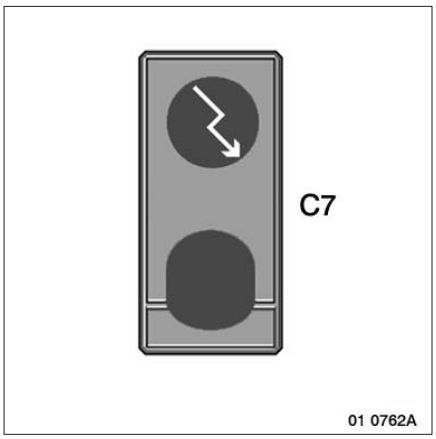
MASTER SWITCH

Depending on your vehicle's equipment

Turn the handle (1) through one quarter of a turn to isolate the electrical installation except for alarm, central door locking, tachograph, independent heating timer and hazard lights.

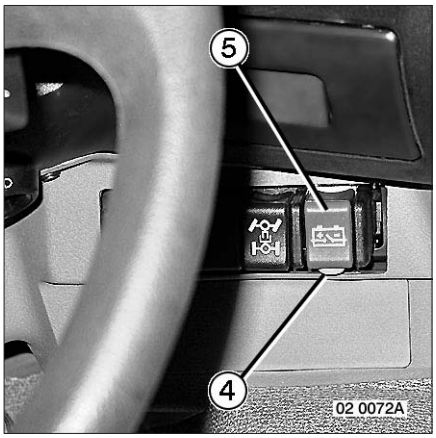
NOTE
If the vehicle is equipped with a remote control for electrically locking the doors and for actuating the master switch, refer to page (C29) for details on how to use it.
If the vehicle is provided with an upper console, press switch (C7).





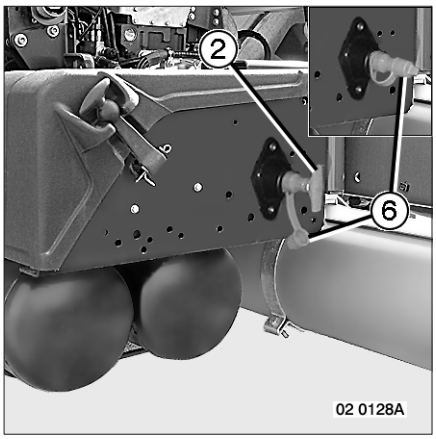
"ADR" MASTER SWITCH (Transport of Hazardous Substances)

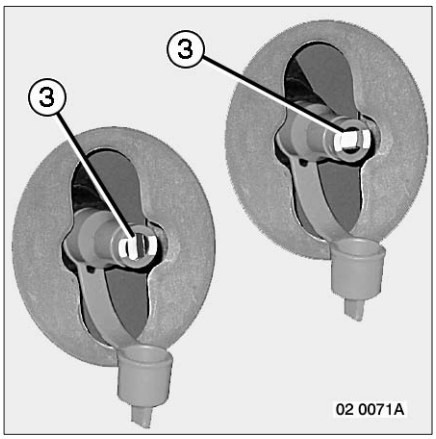
Master switch control in cab (normal use or case of emergency)
To open the circuit: press the button (4) and the control (5) until the engine stops.
To close the circuit: press the button (4) and pull the control (5) or use the removable handle.



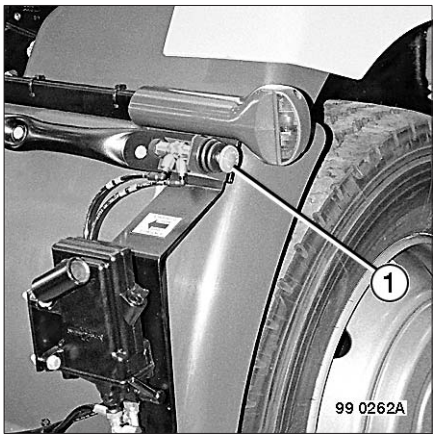
C39 use of the vehicle

Use in the event of air pressure loss
Remove the guard cap (6). Place the removable handle (2), supplied with the vehicle keys, in position and turn it through one quarter of a turn to open and close the electrical circuit except for the tachograph.
Circuit open: electrical current does not pass - only the tachograph remains powered. The mark (3) is in a vertical position.
Circuit closed: electrical current passes. The mark (3) is in a horizontal position.
Put back the guard cap (6) each time after use.

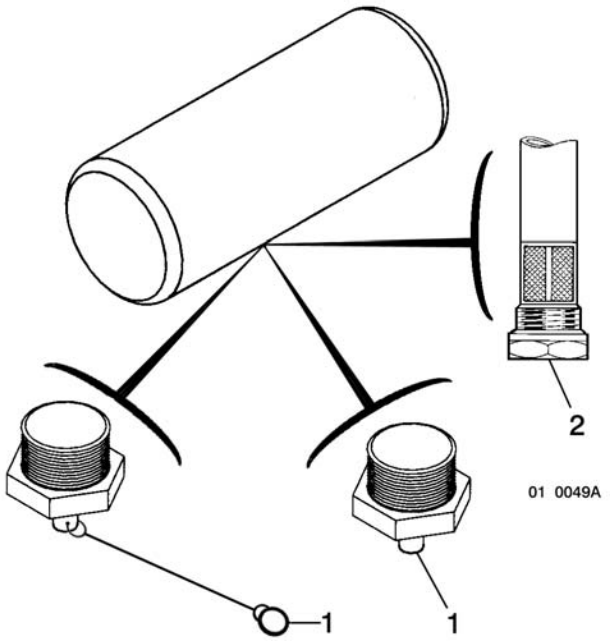




Master switch control on the outside (normal use or case of emergency)
To open the circuit: press and rotate the control (1) until the engine stops.
To close the circuit: press the button (4) and pull the control (5) or use the removable handle (2).



C40 use of the vehicle



AIR TANKS

Actuate the drain valves (1) to ensure there is no water in the air tanks.
Perform this operation:
- Daily (in winter).
- Weekly (outside winter).

If there is water in the tanks, get the air dryer checked out (see page F43).

NOTE
As safety precaution, move the gear lever into neutral before draining the air tanks.

The air bleed valves (2) are automatic (see page F42).

Depending on your vehicle's equipment

COMBINED LIGHTS/HORN STALK SWITCH

Direction indicator (flashers)
Push the control stalk parallel to the steering wheel in the direction you are going to turn.
1 – RH indicator lights.
2 – LH indicator lights.
The control stalk incorporates an automatic return feature.

Horn
Push down on the end of the control stalk to sound.

Headlamps flasher warning unit
Lightly pull the stalk towards you to flash. Warning light (A) comes on.

Lighting

Parking/side lights
Turn the control to position "3".

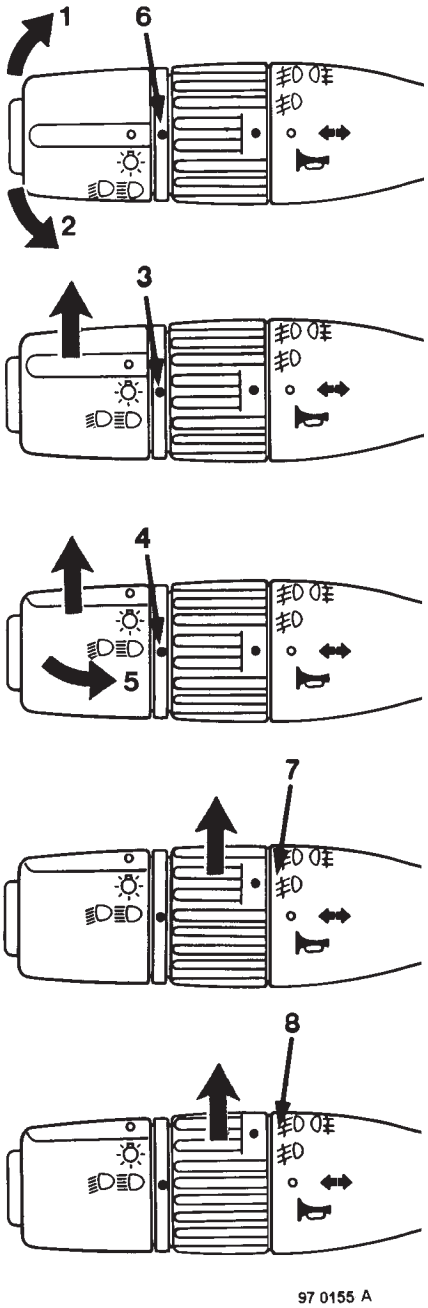
Dipped beam headlights
Turn the control to position "4". Warning light (AC) comes on.

Main beam headlamps
With the control stalk in position "4", pull the stalk towards you in the direction of position "5". Warning light (A) comes on.
To revert to dipped headlights, pull the stalk again towards you in the direction of position The instrument panel lighting comes on in all "Lights On" positions.

Lights out
The control stalk must be in position "6".

Fog driving lights
With the side lights on or the headlamps dipped, turn the ring to position "7". Warning light (AA) comes on.

Fog driving lights and fog lights
With the side lights on or the headlamps dipped, turn the ring to position "8". Warning lights (AA – AD) come on.

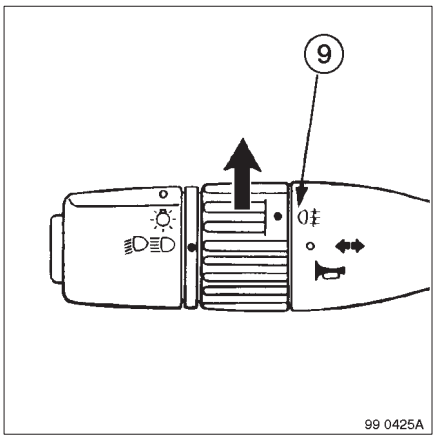


Depending on your vehicle's equipment

COMBINED LIGHTS / HORN STALK SWITCH

Control without fog driving lights

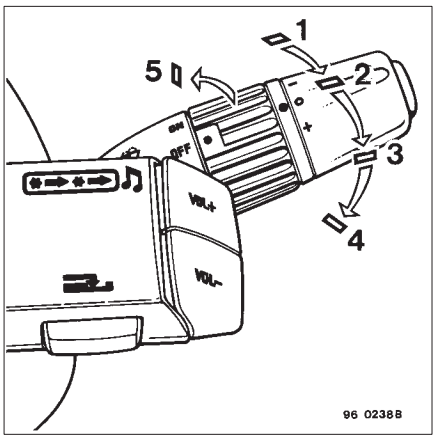
Fog lights
With the headlamps dipped, turn the ring to position "9". Warning light (AD) comes on.

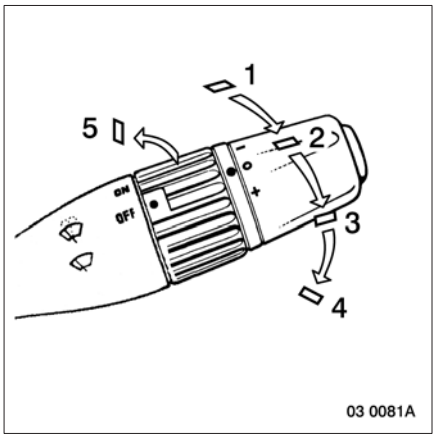


WINDSCREEN WASH/WIPE AND HEADLAMPS WASHER CONTROL STALK

Move the stalk parallel to the steering wheel:
1 – Stop position
2 – Intermittent wiping
3 – Slow wiping
4 – Fast wiping

Flick wiping:
Move the control to position "5", and let it return automatically to its initial position. The wiper will make two fast forward and backward movements.
Hold the stalk in position "5" to simultaneously operate:
– windscreen wiper and washer
– headlamps washer (if fitted to the vehicle) provided that the headlights are ON.
When you release the pressure on the stalk, the wiper will stop after a few wipes.





C43 use of the vehicle

Depending on your vehicle's equipment

RADIO

Carefully read the notice supplied in the onboard kit.

> ***IMPORTANT***
> *For any work on the radio, consult a dealer or approved agent.*
> *Any modification to the radio installation may lead to vehicle malfunction.*

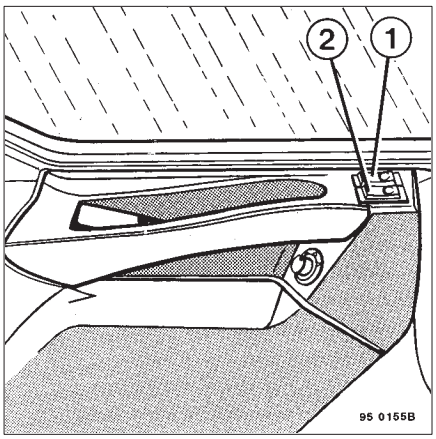
The radio is powered by 24 V current. It can be used with the ignition switched off but the master switch must be engaged.

Depending on your vehicle's equipment

ELECTRIC WINDOW WINDERS CONTROL

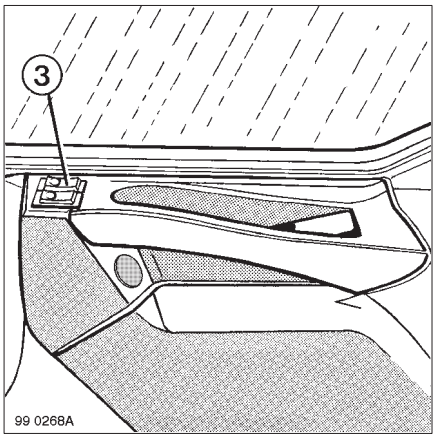
1 – LH side window control, driver's side.
2 – RH side window control, driver's side.
3 – RH side window control, passenger's side.

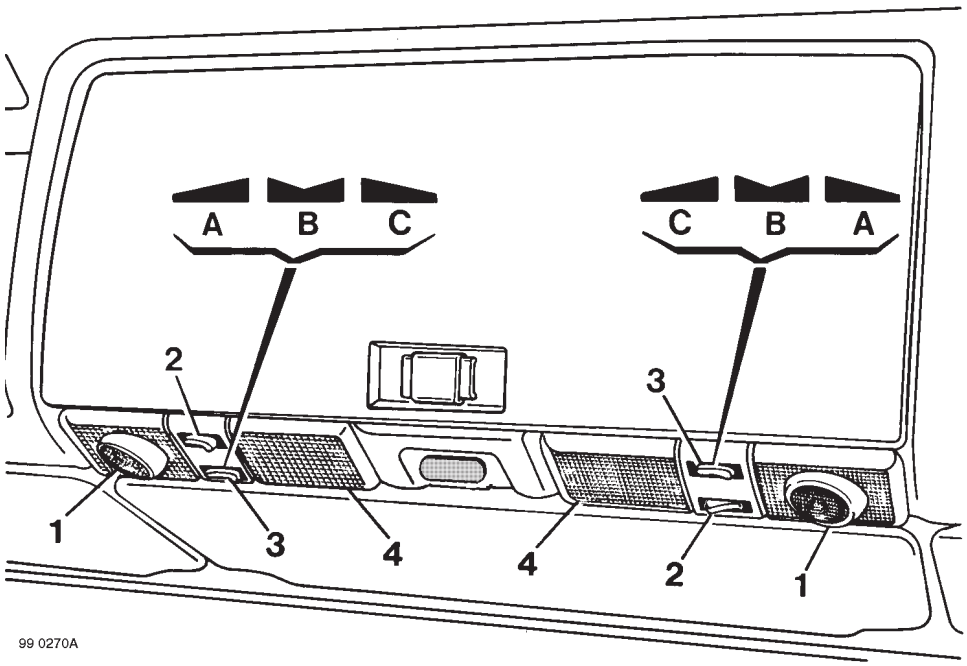
To use the controls:
To lower: press the rear of the control.
To raise: press the front of the control.



SLIDING WINDOWS

Use of the controls:
To open: press the rear of the control.
To close: press the front of the control.

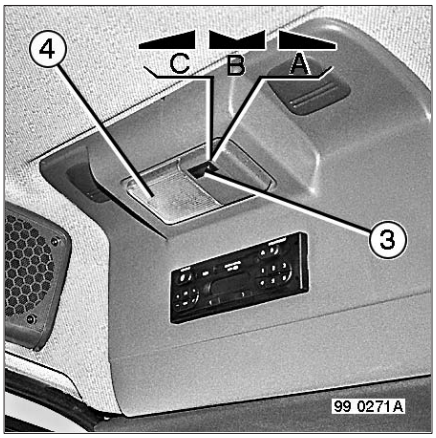




CAB OVERHEAD LIGHTS

Switch (2) illuminates the swivelling map reader (1).
Each overhead light (4) features one 3–position lighting switch (3).

A = lighting upon opening of the doors.
B = permanently off.
C = continuous lighting.



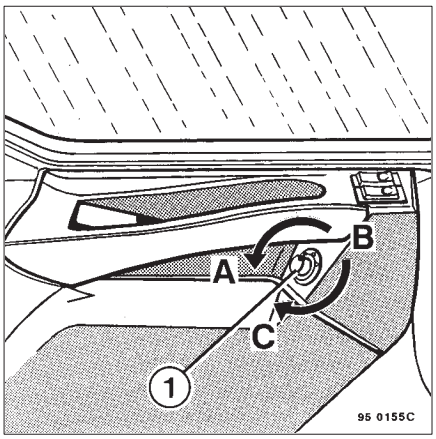
Depending on your vehicle's equipment

ELECTRICALLY OPERATED REAR-VIEW MIRRORS

Move control (1) to position:
- **A** to adjust the LH rearview mirror,
- **C** to adjust the RH rearview mirror,
- **B** to make it inactive.

Adjustment
Select the rearview mirror to be adjusted, then press control (1). It is of the omnidirectional type.

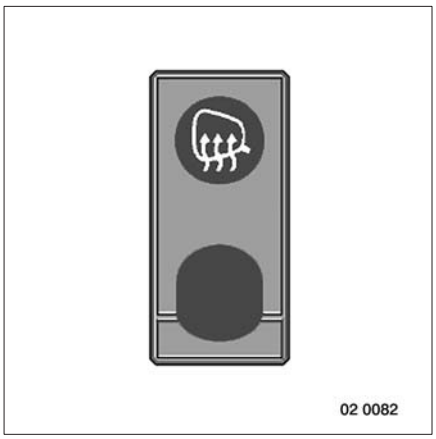
Defrosting
To defrost, actuate the control (B2).
The warning light (Z) remains on for the 13 minutes that the defrosting operation lasts.



Depending on your vehicle's equipment

HEATED WINDSCREEN

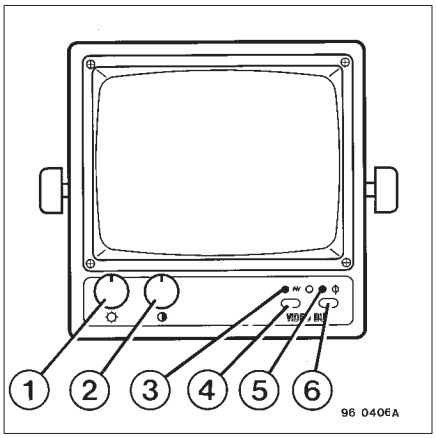
Defrosting:
The windscreen is defrosted in conjunction with the electrically controlled rearview mirrors.
When switch (B2) is actuated, the windscreen defrosting operation lasts for 12 minutes.
Defrosting of the rearview mirrors is permanent.
The built–in warning light (Z) comes on during the defrosting operation.



Depending on your vehicle's equipment

REARWARD VISION

With the master switch engaged and the ignition switched on, press control (6).
Warning light (5) comes on and the image appears.
To adjust the contrast, use control (2).
To adjust the brightness, use control (1). To inverse the image, use control (4). Warning light (3) comes on.



Depending on your vehicle's equipment

ADJUSTING THE STEERING WHEEL
Depress foot control (1).
Pull, lift, raise or push the steering wheel to the required position.
Release foot control (1).

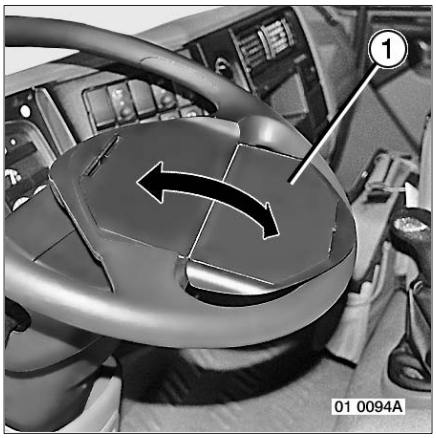
NOTE
The foot control (1) is operative only when the circuit air pressure is sufficient.

Depending on your vehicle's equipment

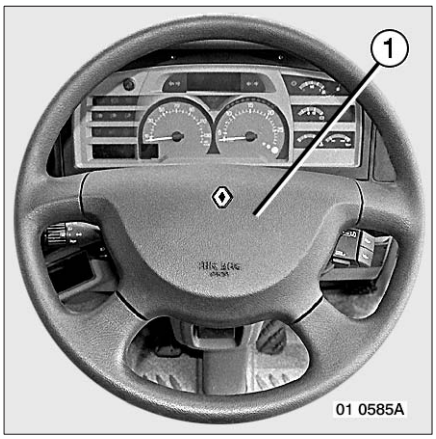
Adjusting the steering wheel
Keep the handle (1) raised.
Angle the steering wheel to the desired position.
Release the handle (1).

Depending on your vehicle's equipment

Shelf
When unfolded, the central part of the steering wheel serves as a ledge (1).



Depending on your vehicle's equipment



AIRBAG + Pretensioner
The system consists of:
– An inflatable bag and its gas generator mounted under the steering wheel protective cover (1).
– Seat belt pretensioner.
– An electronic box located under the driver's seat.
– An "AIRBAG" "Information" and defect test warning light (G24)
– A rotary switch under the steering wheel.
A marking "Airbag" on the steering wheel protective cover (1) and a self–adhesive sticker on the windscreen remind the presence of this equipment.

Airbag
The airbag system uses a pyrotechnic principle which explains why, upon deployment, it produces heat, gives off smoke (which is not the sign of an outbreak of fire) and generates a detonating noise. Deployment of the airbag, which must be immediate, may cause minor, reversible injuries to the surface of the skin.

Seat belt pretensioner
The pretensioner system (1) instantly retracts the inertia reel, flattening the seat belt against the person's body and thus increasing its efficiency.

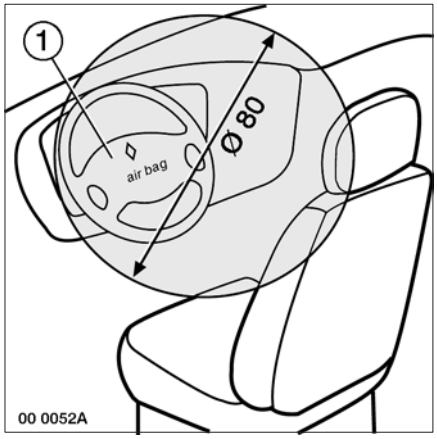
When the ignition is switched on, the warning light (G24) comes on for 10 seconds then goes out. The system is operational. An illumination defect or permanent illumination of the warning light (G24) means system trouble. Call upon your dealer or an approved agent.

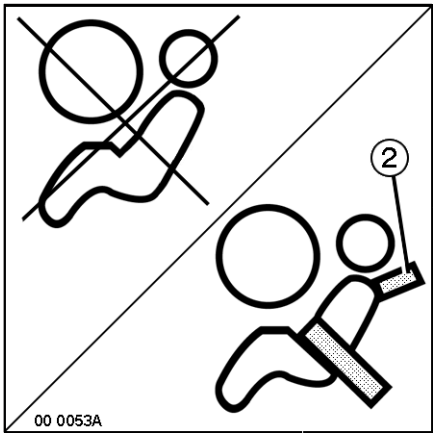
Operation
In the event of **head–on** impact, these systems combined with a set belt are provided to work separately or in conjunction according to the violence of the impact. There are 3 possible cases:

1– Only the seat belt provides protection.
2– The pretensioner is triggered.
3– The bag inflates and deadens the impact of the driver against the steering wheel, then deflates.

NOTE
If the ignition is not switched on, the airbag system is inoperative.
If the warning light (G24) is on, the airbag system cannot function.
The AIRBAG system does not offer any protection in the event of side or rear impact or rollover.

C49 use of the vehicle





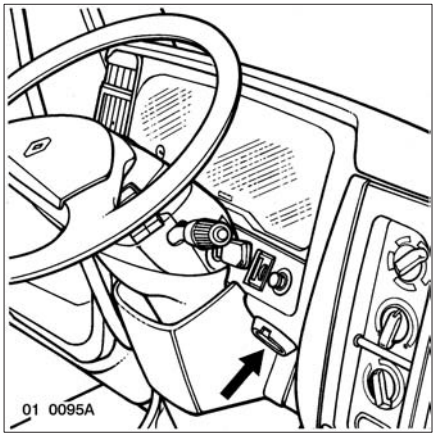
IMPORTANT

– *If an airbag system is fitted, the seat belt (2) must be worn.*
– *If the driver's seat designed for the airbag system has to be changed, it must be replaced by a seat identical to the one originally fitted.*
– *Adjust the seat cushion and squab correctly so that the airbag offers optimum protec– tion. When the driver has his back against the squab his arms must be slightly bent upon reaching the steering wheel.*
– *The protective cover (1) must be free from any article (ledge, clock, adhesive, various accessories...).*
– *There should be no objects within the airbag deployment area (Ø 80 cm).*
– *To avoid any inadvertent release of the airbag capable of causing bodily injury, it is forbidden to remove the steering wheel or work on the airbag system. Only the RENAULT TRUCKS network is qualified to work on the airbag system.*
– *Get the airbag system checked out in the case of accident or if there has been attempted theft of or from the vehicle.*
– *For safety reasons, replace the airbag and the pretensioner every 15 years.*
– *If water is splashed onto or gets into the electronic box, replace it.*
– *Any significant modification to the front end of the vehicle or any overloading of the vehicle may lead to inadvertent release of the airbag system.*
– *When lending or reselling the vehicle, inform the borrower or purchaser of all these conditions. Get him to read the driving and servicing handbook.*
– *Do not drive a vehicle in which the AIRBAG system has been activated and whose bag is still left on the steering wheel. Get the vehicle towed.*
– ***It is forbidden to fit a bull–bar (cattle guard) or a forward winch on a vehicle equipped with an AIRBAG system.***

C50 use of the vehicle

ADJUSTING THE HEADLIGHTS

Vehicle unladen: the control is in position 0.
Vehicle laden: turn the control anti–clockwise to correct the beam height.
Wait until the light beam is stable before changing its position again. Avoid fast forward / return movements on the control.



FIRE EXTINGUISHER

A fire extinguisher (1) is located close to the driving position. Its exact location varies according to its capacity.
This appliance is subject to regulations. It must be regularly inspected by an approved body.

TWO–TONE HORN

Depending on your vehicle's equipment

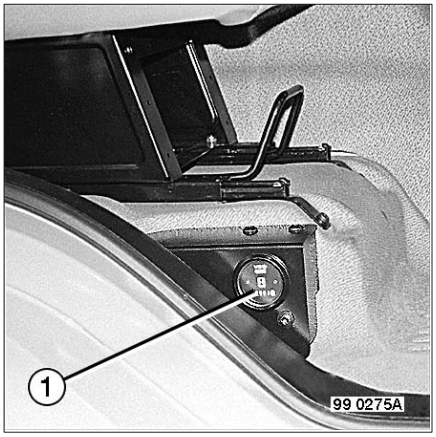
The control (1), on the passenger's side, serves to engage the horn part–time.

The control (C2), on the upper console, serves to engage the horn full–time.

C51 use of the vehicle

Depending on your vehicle's equipment

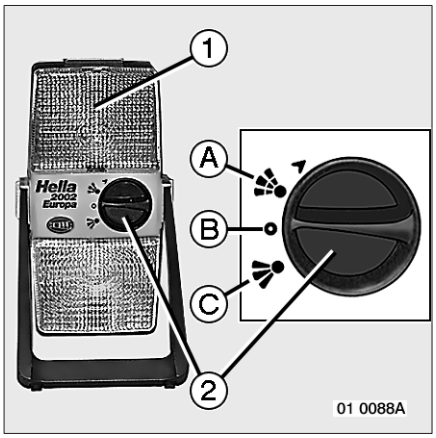
ENGINE HOURMETER
The hourmeter (1) indicates the aggregate engine operating time.



POWER TAKE–OFF HOURMETER
The hourmeter (2) indicates the aggregate PTO operating time.

Depending on your vehicle's equipment
ADR vehicle (transport of hazardous substances)
Self–contained lights (1).
The switch (2) features three positions:
A orange flashing light
B off
C white steady light

NOTE
The self–contained lights are supplied without battery.



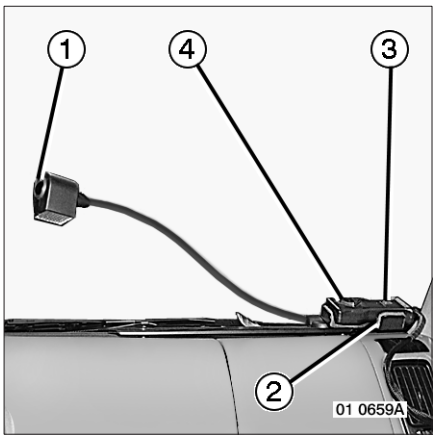
FRONT SEARCHLIGHT

Depending on your vehicle's equipment

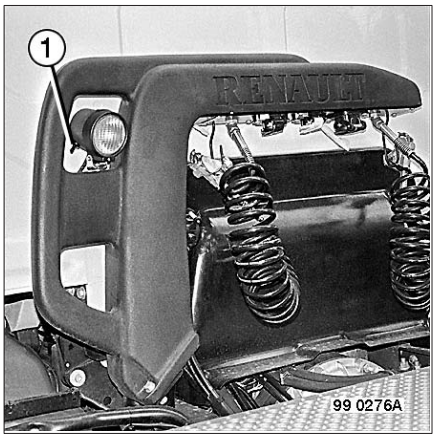
Map light
With the master switch engaged, actuate the switch (1) to turn on the map light.

Front searchlight
With the master switch engaged, press switch (C4), then switch (3) to turn on the searchlight (5).
Use the control (4) to swivel the searchlight.

NOTE
The remote control (2) can be used away from its bracket. Put it back into place after use.



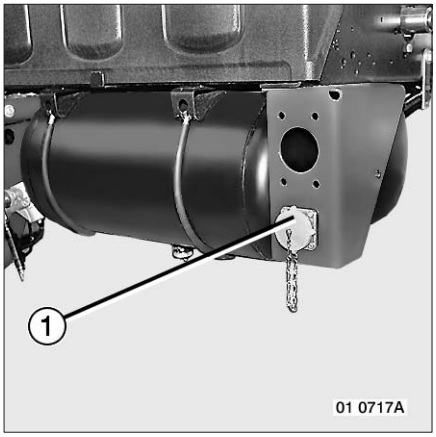
WORKING SPOTLIGHT (tractor)
1 – Light switch
Instrument panel warning pictogram (G25) is displayed.



C53 use of the vehicle

Depending on your vehicle's equipment
CHARGING SOCKET

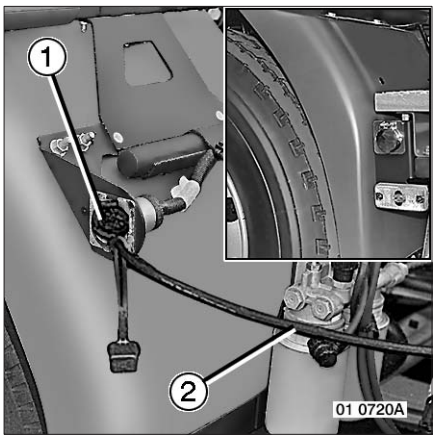
With the master switch disengaged, plug a battery charger into the charging socket (1).



Depending on your vehicle's equipment
PREHEATING THE ENGINE COOLING SYSTEM
The connector (1) serves to supply power to the cooling system preheater.
With the engine shut down, plug the electrical extension (2) from the onboard kit into the connector (1) to connect up with an external power source of 220 / 240 V 16 A meeting the standards in force.

WARNING
220 V current is present on the cooling system preheater when an electrical cord is plugged into the connector.

Unplug the elctrical extension and stow it away before using the vehicle.



INFOMAX

"SAE" socket (1) for plugging in Infomax.

C54 use of the vehicle

SEATS

Driver's seat

Passenger(s) seat

> ***IMPORTANT***
> *For your own safety, it is essential to remove the plastic protective cover when putting the vehicle into commission.*

Depending on your vehicle's equipment
Seat suspension
Adjust the flexibility of the suspension according to the state of the road and the user's weight.

Air–operated seats
Controls will only work if there is sufficient air pressure.

NOTE
Depending on seat use (i.e. driver, passenger, left or right hand drive), controls are located to one side or the other. The seat type shown is just one possible solution.

1 – Suspension "vertical" flexibility adjustment
Upwards: hard suspension
Downwards: supple suspension

2 – Fast suspension lowering

3 – "Lower" lumbar support adjustment control

4 – "Upper" lumbar support adjustment control

5 – Side support adjustment

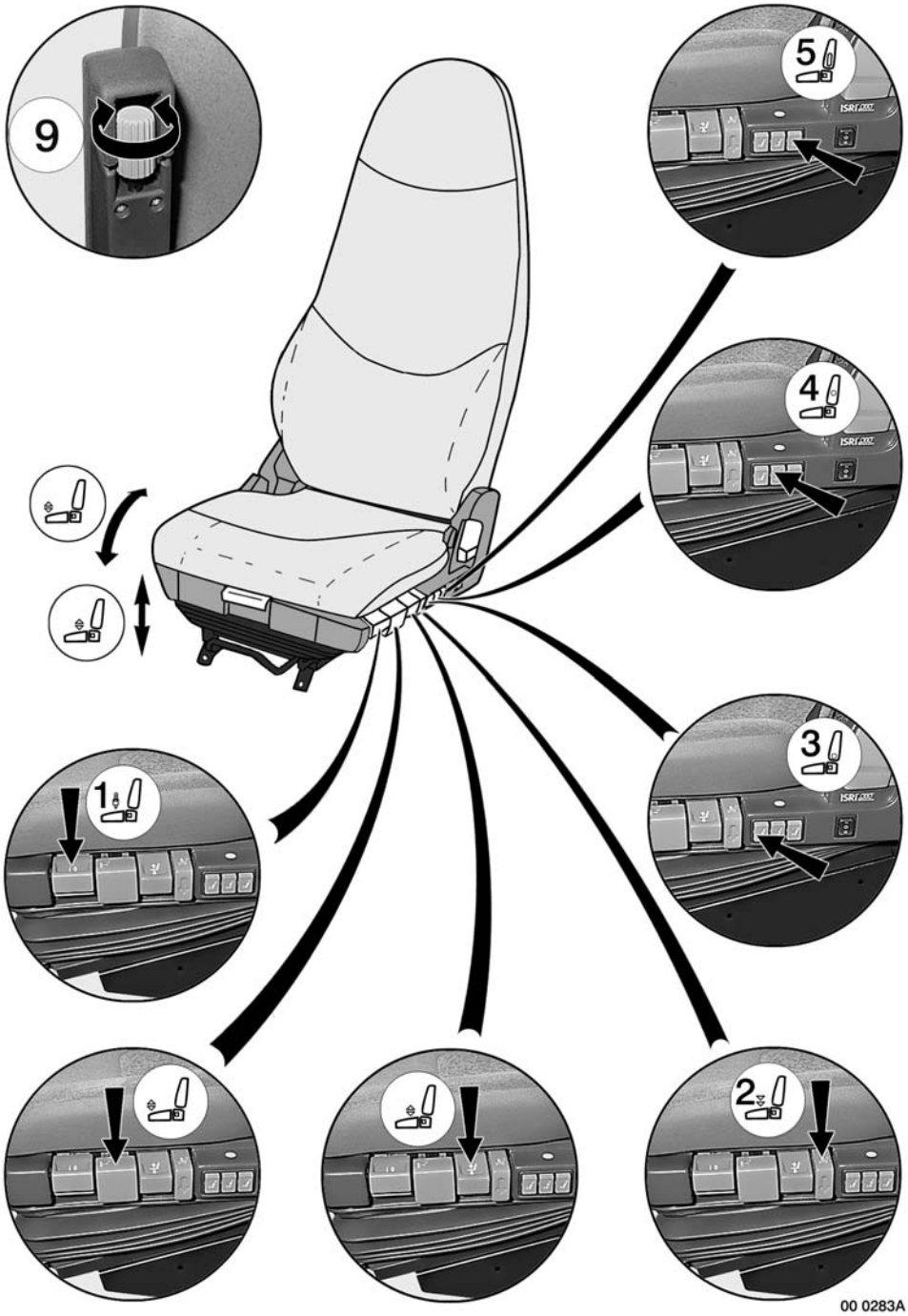
6 – Heated seat cushion and squab (automatic thermostat–regulated operation)

7 – Rest position changeover lever, to be used simultaneously with control (8) (it is forbidden to use this position while driving).

8 – Seat adjustment, fore–and–aft.

9 – Armrest tilt adjustment.

> ***IMPORTANT***
> *For safety reasons, all seat adjustment operations must be carried out when the vehicle is at a standstill.*
> *When the vehicle is moving, any use of the seats in a position other than that of "facing the road" involves the responsibility of the users.*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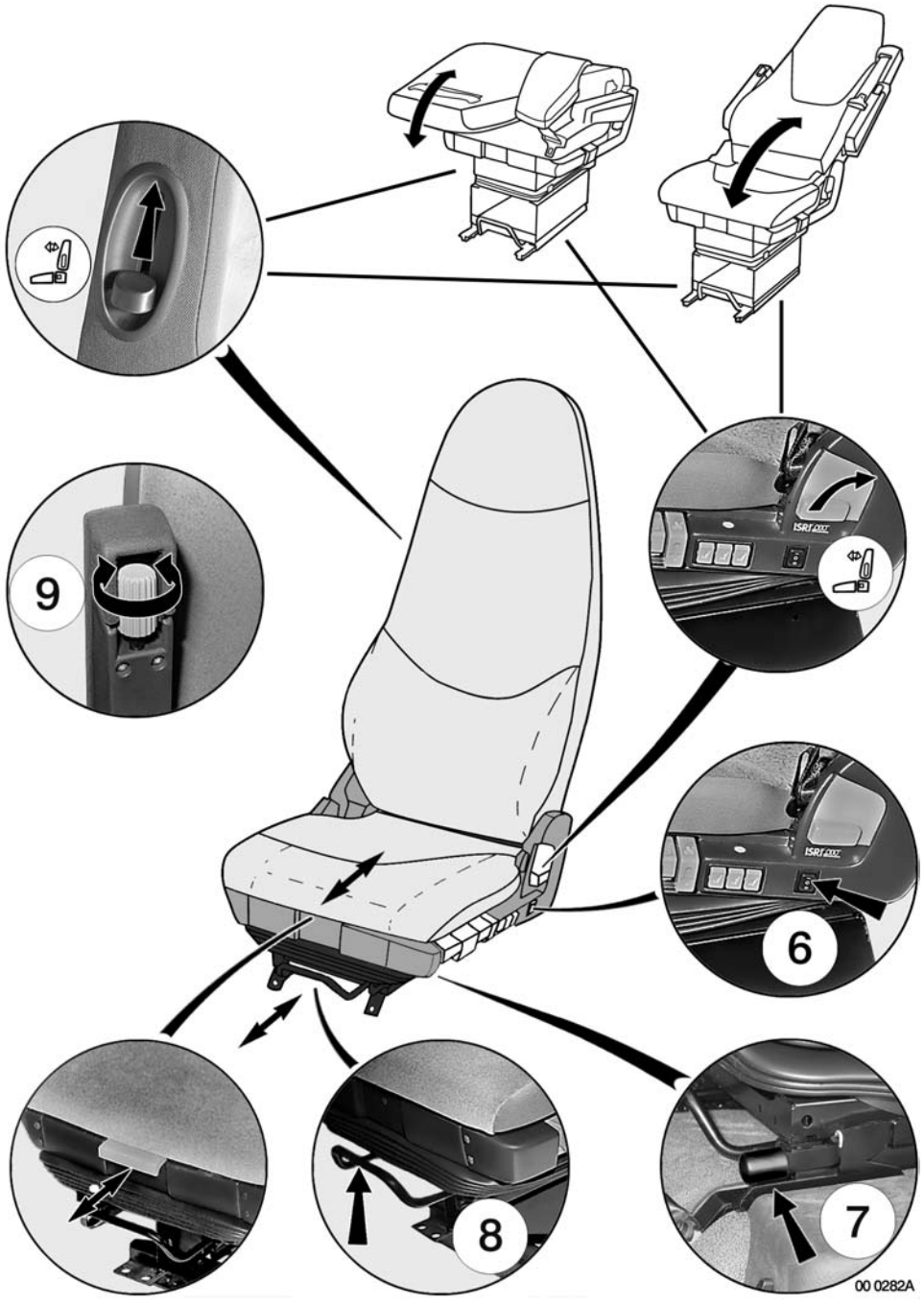
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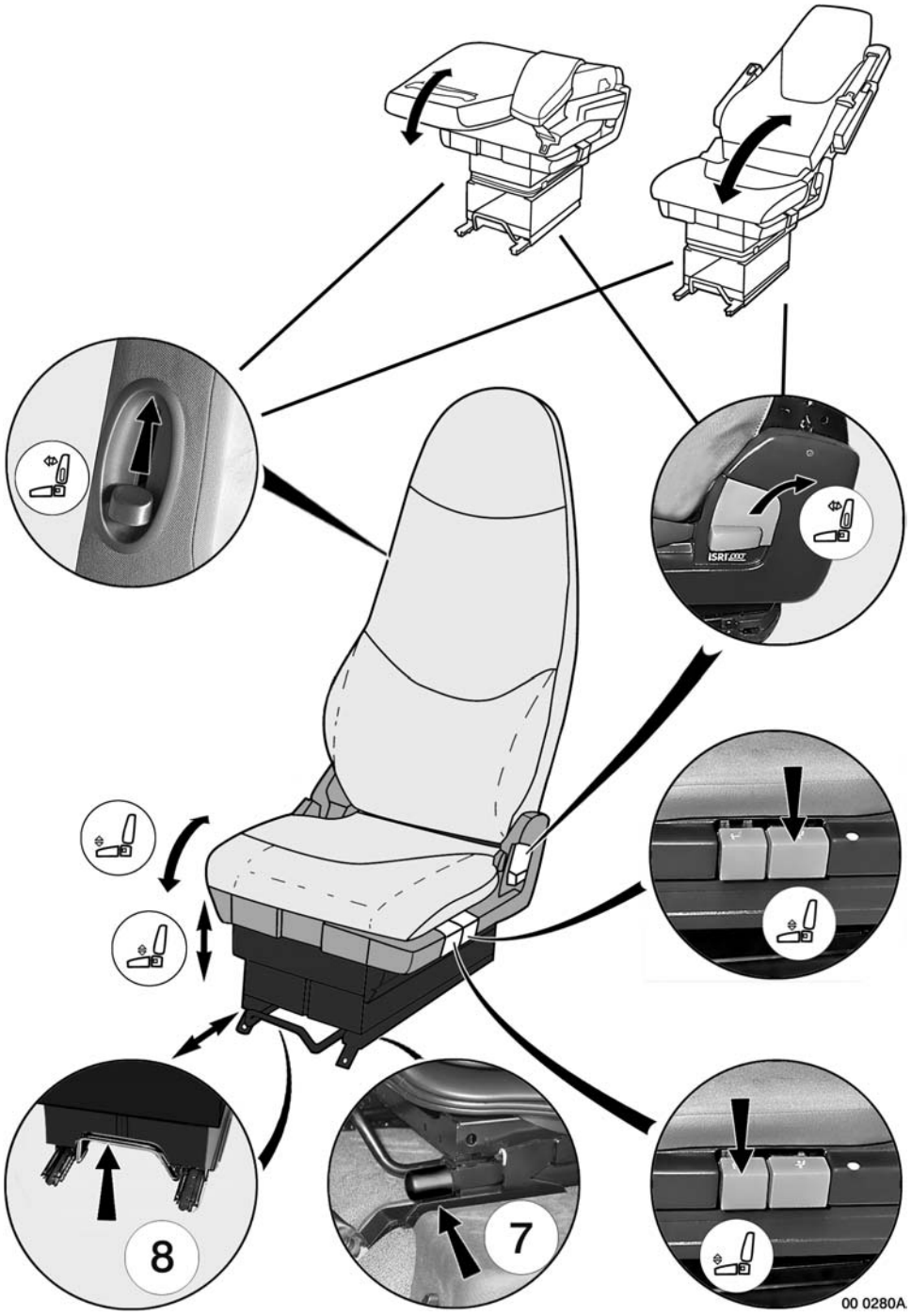
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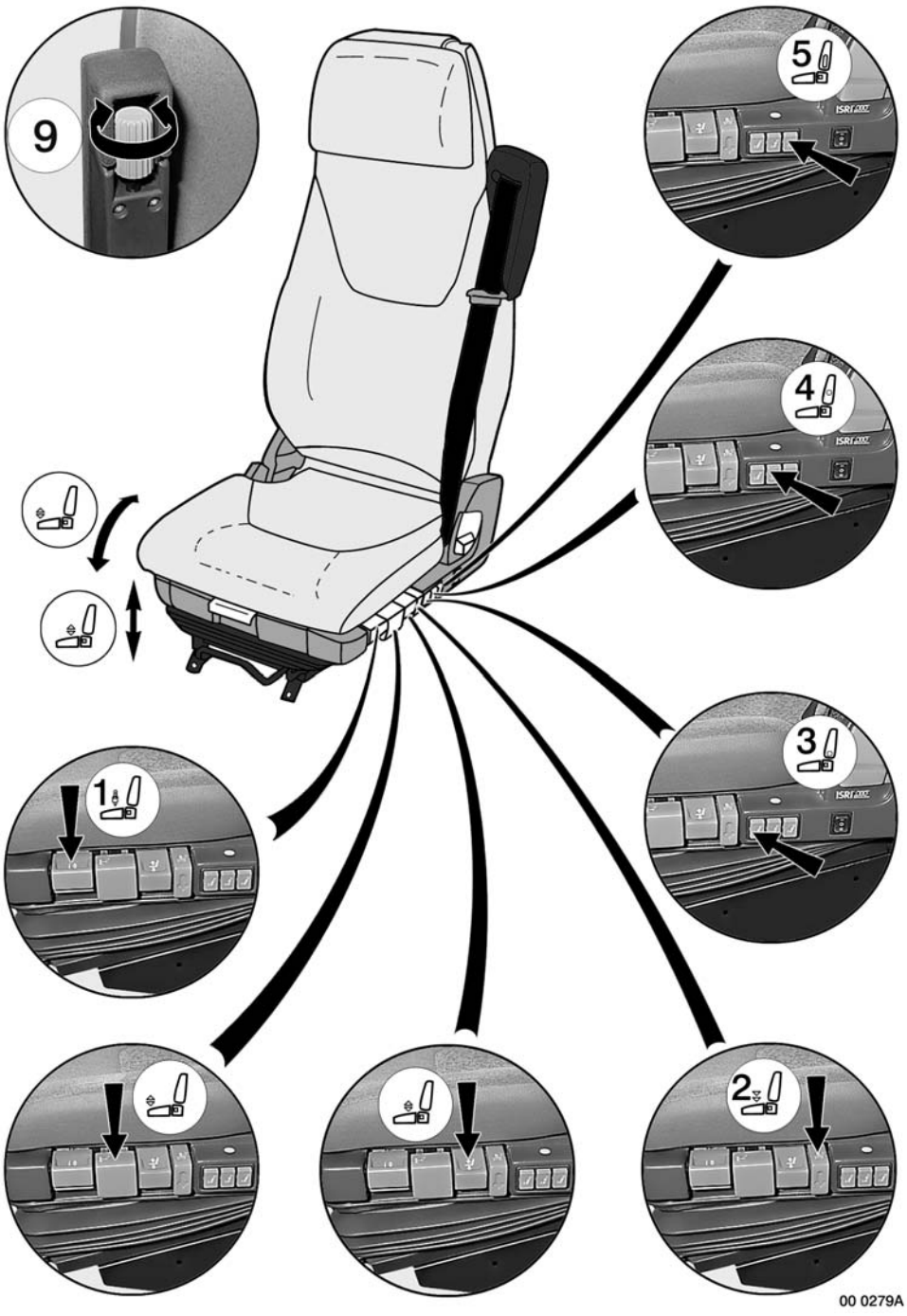
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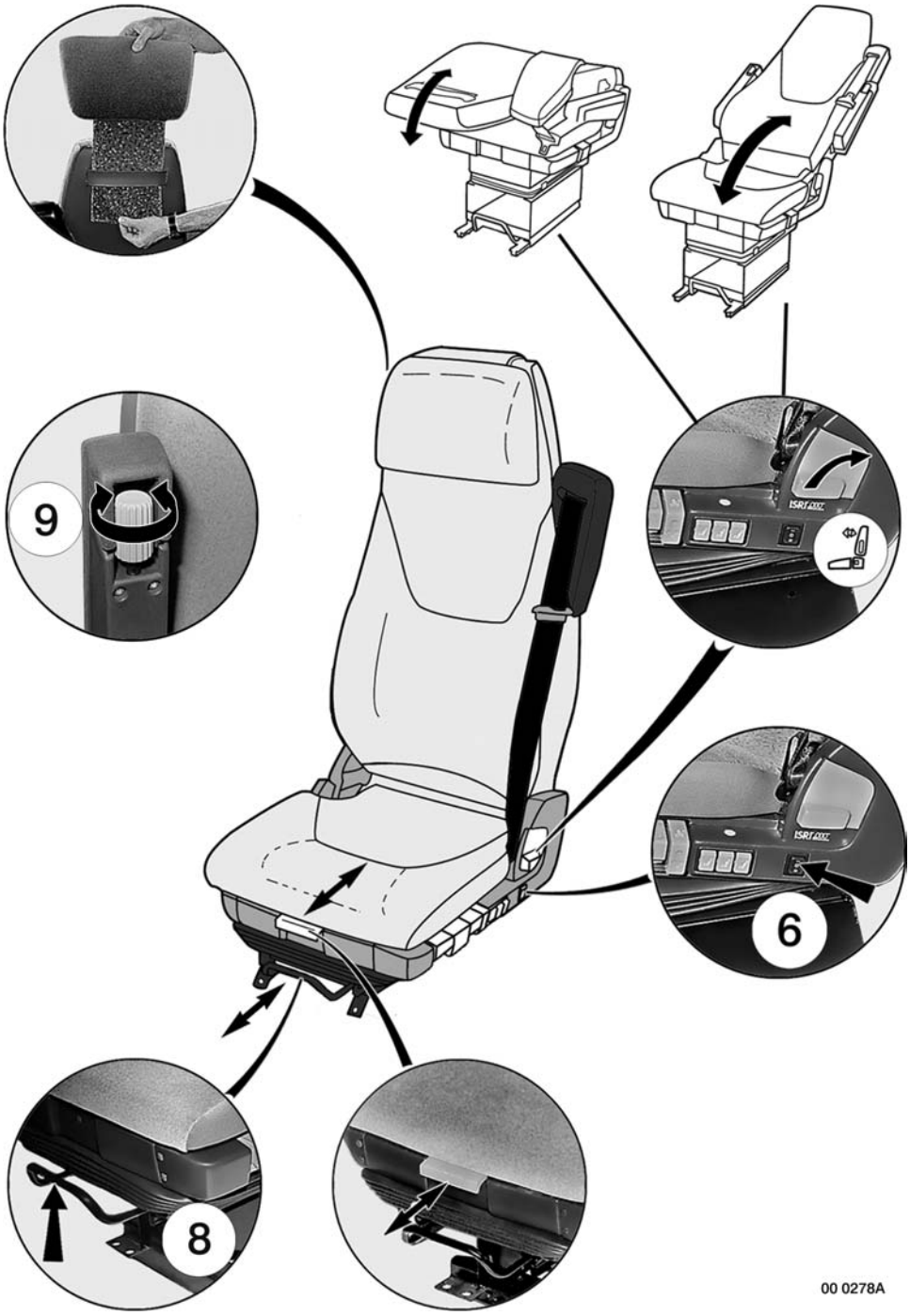
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C60 use of the vehicle

Depending on your vehicle's equipment

8 – Seat tilting lever

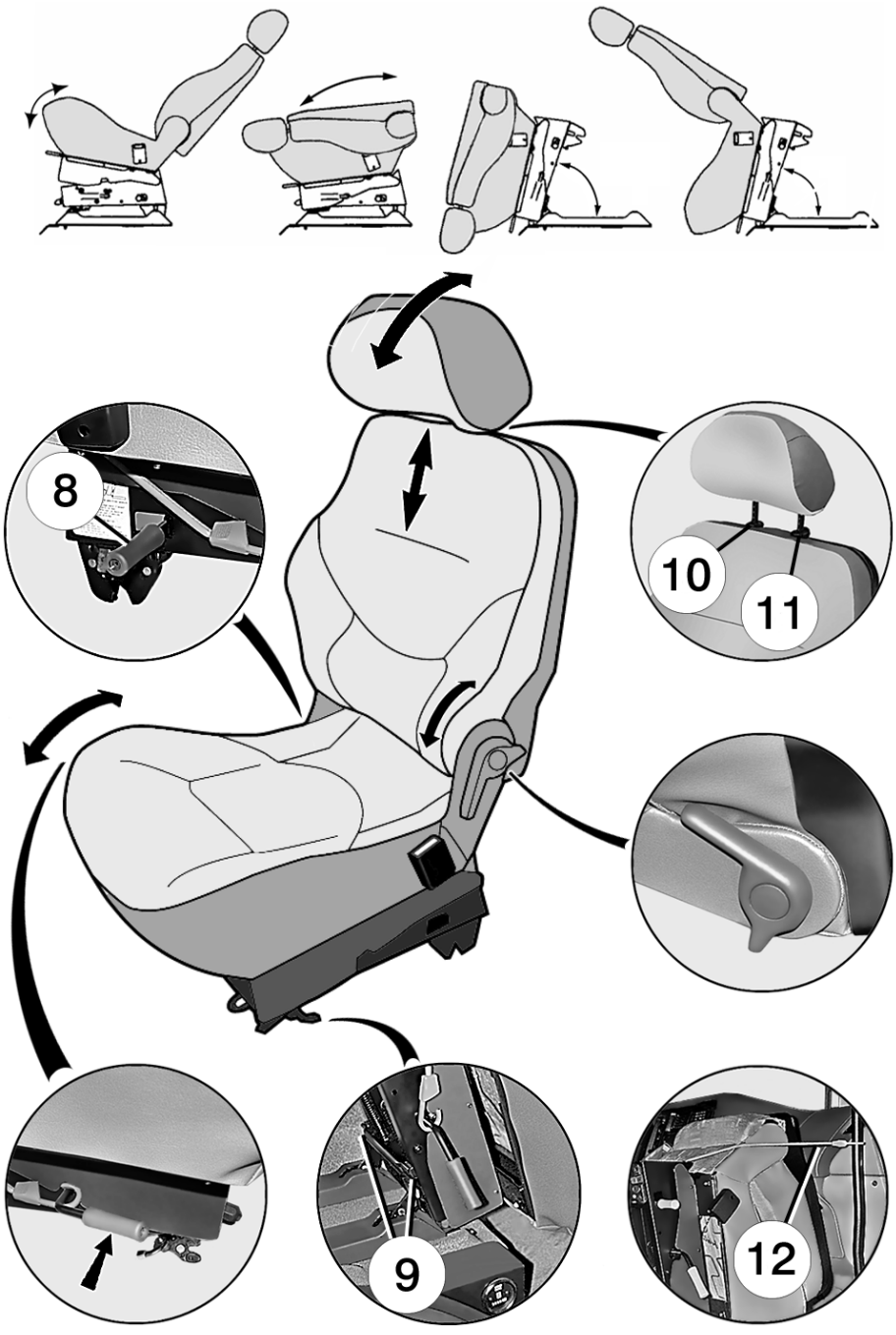
9 – Seat holding lock
(levers downwards: unlocking – upwards: locking).

Head–rest
Adjusting the height
To raise, just slide the head–rest upwards.
To lower, simultaneously press the tab (10) and the head–rest.
Adjusting the rake angle
To angle forwards, just tilt the head–rest.
To go back, tilt the head–rest fully forwards, then release.
Removal
Raise the head–rest, then press the tabs (10–11) to free it.
Fitting
Insert the rods in the sleeves, then simultaneously press the tab (10) and the head–rest.

NOTE
The head–rest must be adjusted for each user (as close as possible to the top of the head).

Securing cord (12)
Use
Lower the head–rest and move it rearwards.
Fold back the squab.
Press the squab firmly with both hands to lock it in position.
Lower the cushion as far as possible.
Use the control lever (8) to tilt the seat and secure it using the elastic cord (12).

IMPORTANT
For safety reasons, all seat adjustment operations must be carried out when the vehicle is at a standstill.
When the vehicle is moving, any use of the seats in a position other than that of "facing the road" involves the responsibility of the users.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C62 use of the vehicle

1 – Height–adjustable head–rest

2 – "Upper" lumbar support adjustment control

3 – "Lower" lumbar support adjustment control

4 – Suspension "vertical" flexibility adjustment:
Upwards: hard suspension
Downwards: supple suspension

5 – Squab tilt adjustment

6 – Seat cushion height and rearward tilt adjustment

7 – Seat cushion height and forward tilt adjustment

8 – Suspension "vertical" locking
Upwards: seat in "down" position (easy access to driving position)
Downwards: suspension in operation

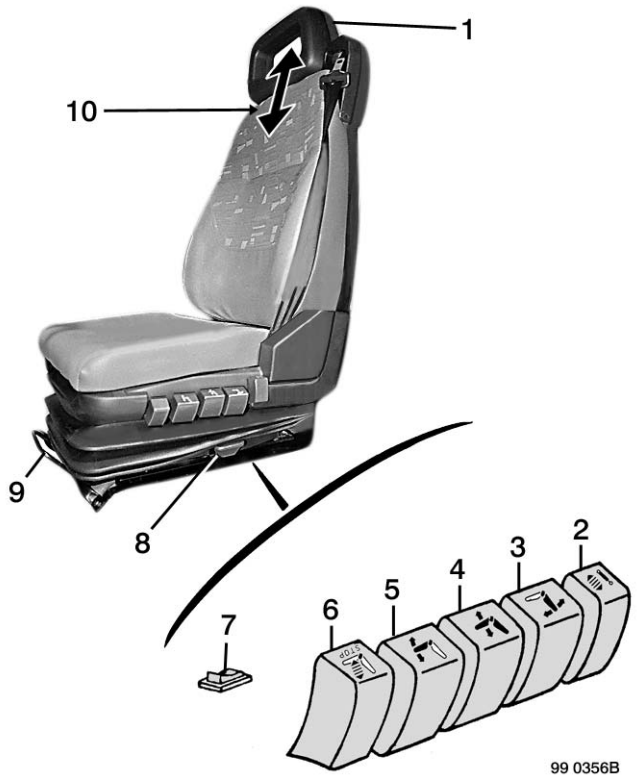
9 – Heated seat cushion and squab (automatic thermostat–regulated operation)

10 – Rest position changeover lever, to be used simultaneously with control (11) (it is forbidden to use this position while driving).

11 – Seat adjustment, fore–and–aft.

Removing the head–rest
Raise the head–rest as far as abutment.
Press the lock (12) (sunk in the upholstery) and withdraw the head–rest. Reassemble the head–rest without pressing the lock.

IMPORTANT
For safety reasons, all seat adjustment operations must be carried out when the vehicle is at a standstill.
When the vehicle is moving, any use of the seats in a position other than that of "facing the road" involves the responsibility of the users.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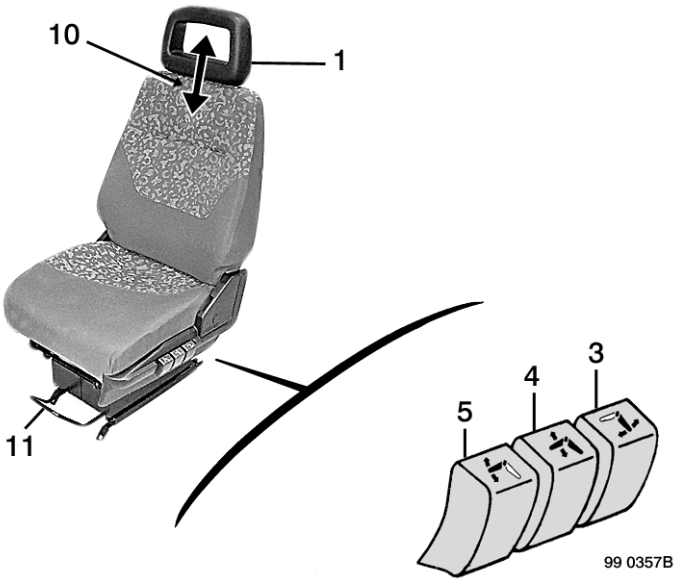
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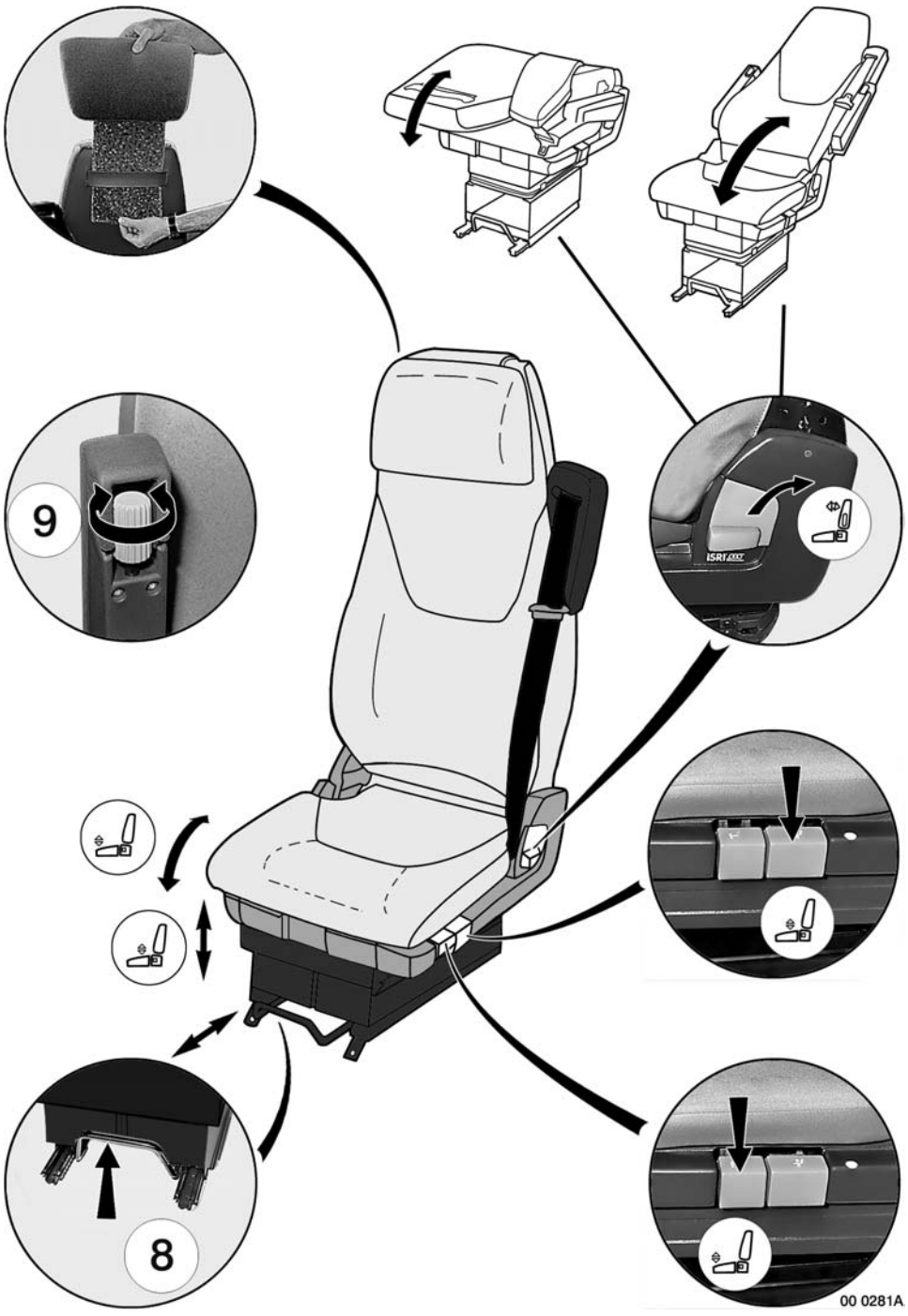
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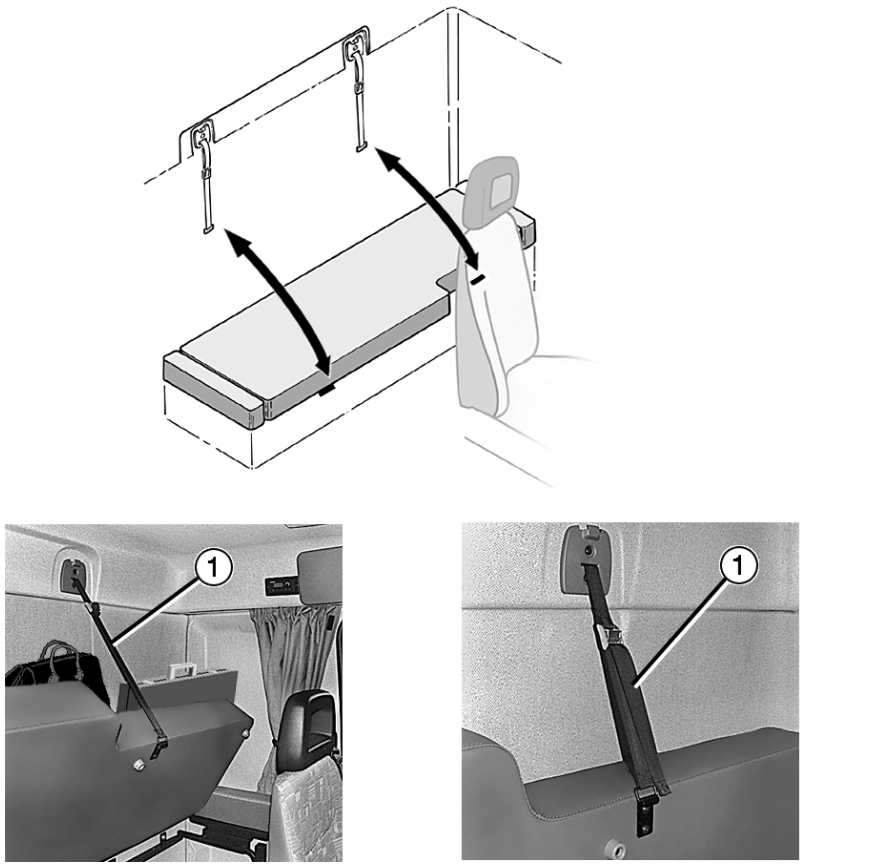


02 0257A

Depending on your vehicle's equipment

Bunk
Use the straps (1) to position the bunk.

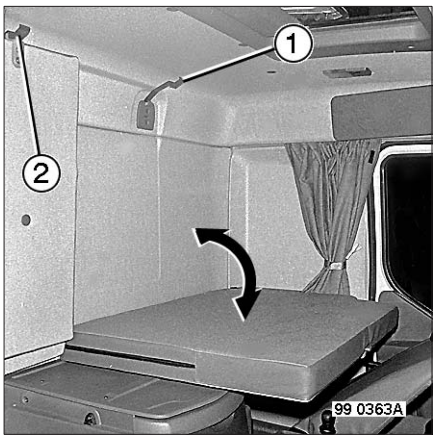
IMPORTANT
Remember to remove any baggage left on the bunk before you tilt the cab.

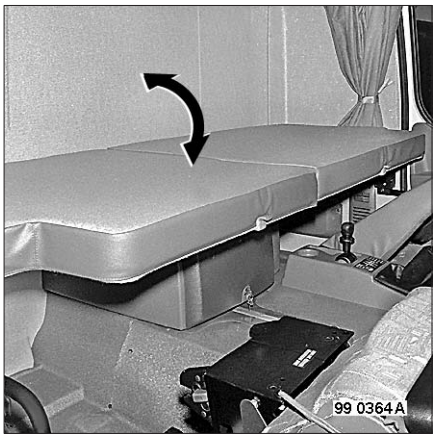
Depending on your vehicle's equipment

Passenger(s) bench seat
Operate the handle (1) to tilt the squab.
Tilting of the squab gives access to a shelf.

Depending on your vehicle's equipment

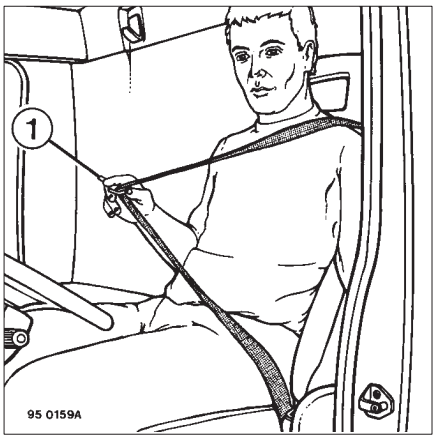
Bunk
The bunk is in 2 pieces.
To position the bunk:
Move the driver's seat forwards and fold down the squab.
Raise the hook (1) and position the first part of the bunk.
Fold down the passenger's seat, raise the hook (2) and position the second part of the bunk.
Before taking the road, ensure that the bunk is correctly locked by the hooks.

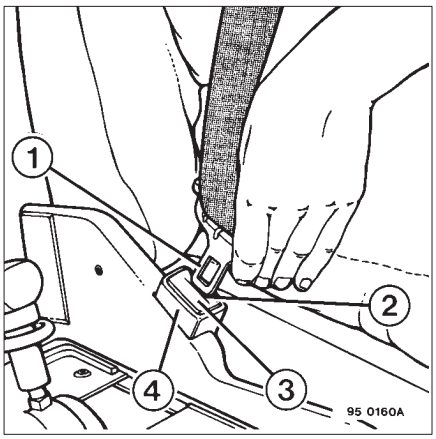


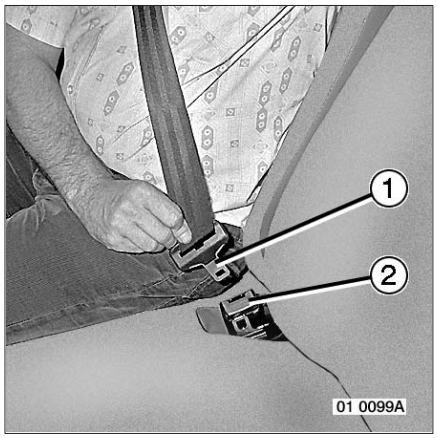


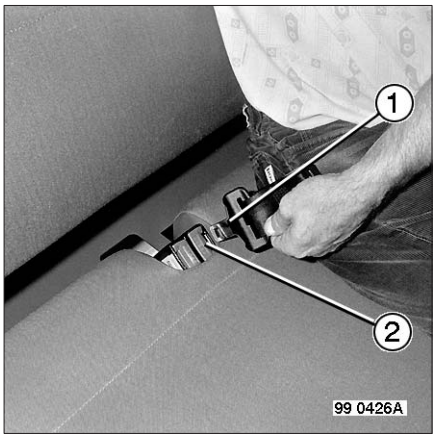
SEAT– BELTS
Inertia reel safety belts
Slowly unwind the strap so as to be able to engage tongue (1) in buckle (2).
If the strap locks, pull it back a little, then continue unwinding.

Unlocking
Press button (3) on buckle (4), the belt is returned by the retractor.
Accompany tongue (1) with your hand to facilitate this operation.





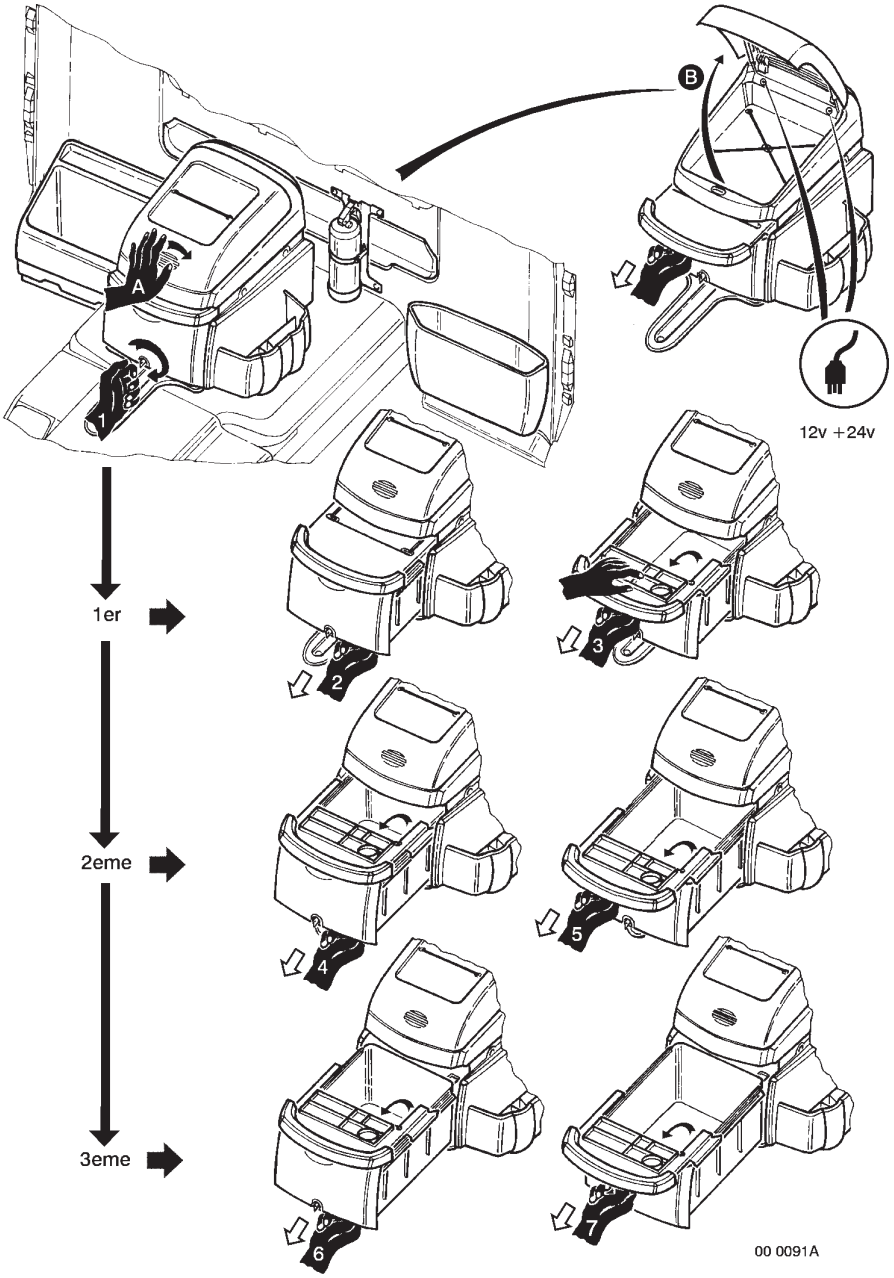


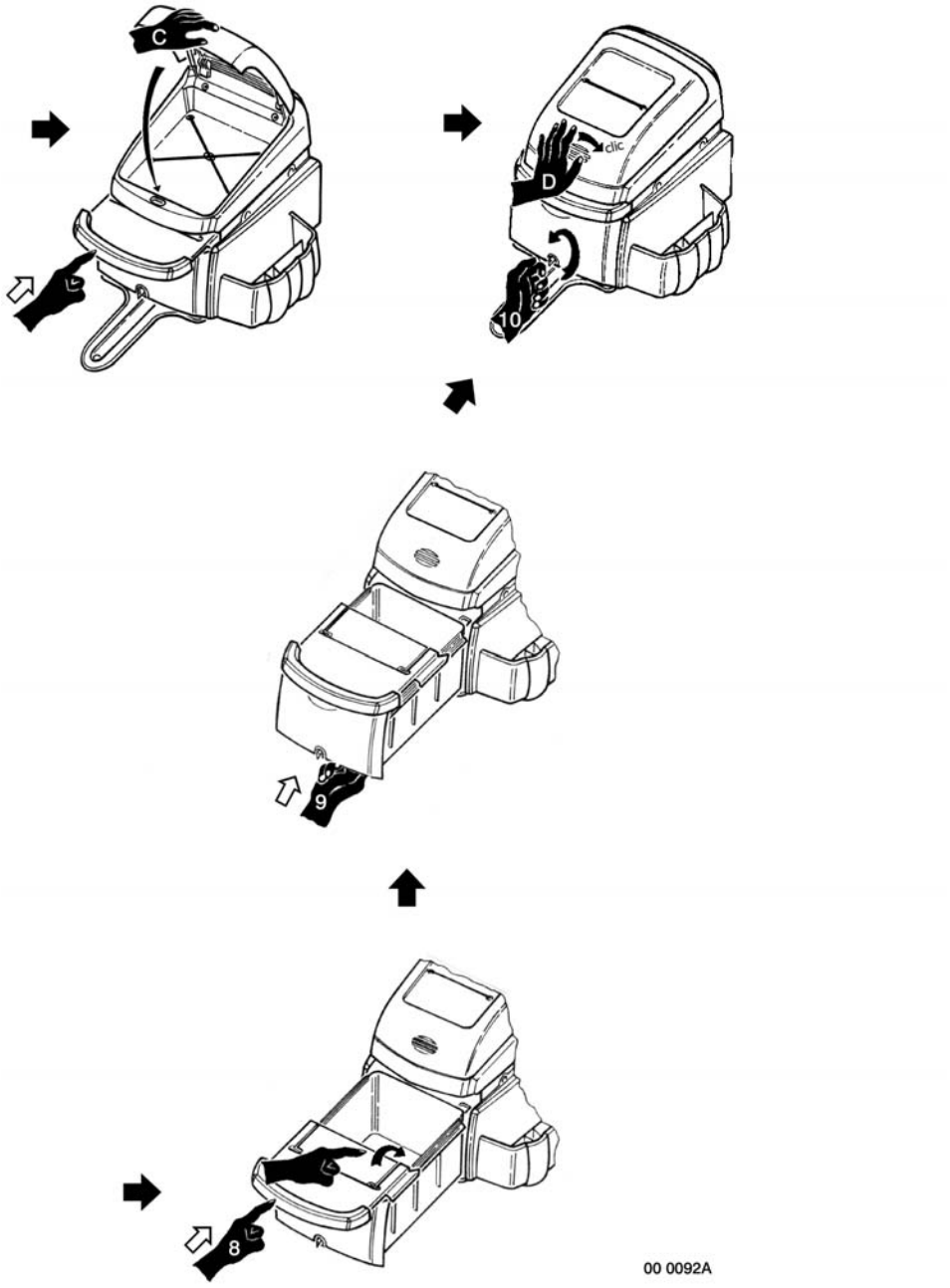


C68 use of the vehicle

Storage lockers

Depending on your vehicle's equipment

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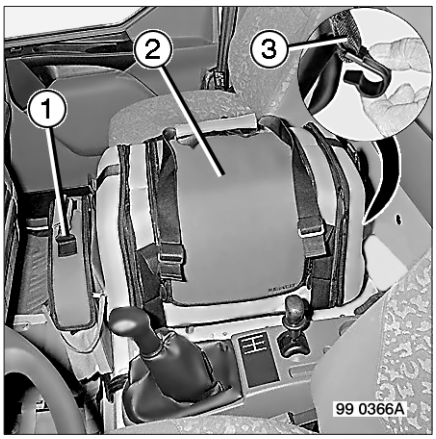
Storage lockers

Top ledge
Depending on the assembly, the ledge is fitted with doors. To open, press the buttons (1) and pull the door.
To close, push the door until it snaps shut automatically.

NOTE
Avoid storing heavy objects (load limited to 5 kg). Make yourself aware of the risk of falling and any injury or damage that might result.
Before tilting the cab, empty the top ledge, if necessary.

Depending on your vehicle's equipment

Removable bags
A cradle serves for fastening the document–holder (1) and a travel bag (2). A strap (3) holds the bag (2) while the vehicle is moving and when the cab is tilted.



C71 use of the vehicle

EMERGENCY BRAKE

Emergency brake operating procedures are described in the certificate of conformity supplied with each vehicle model.

IMPORTANT
The parking brake is only to be used when the vehicle is at a standstill.
It should never be used on the road to slow down the vehicle.
According to the definition of the vehicle acceptance document, it can under exceptional circumstances be used as an emergency brake.

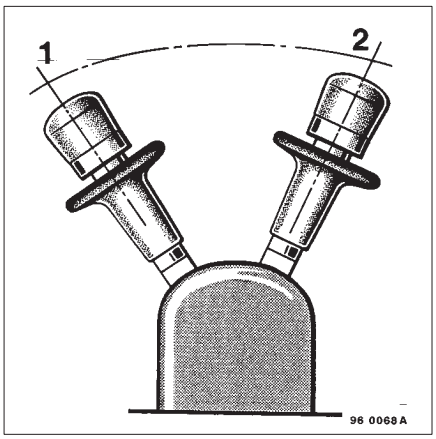
Rigid vehicle

PARKING BRAKE

Release
Lift the locking sleeve and move the lever from position (2) to position (1). Warning light (B) goes out.

Application
Lift the locking sleeve and move the lever from position (1) to position (2). Release the locking sleeve and make sure the lever is locked in position (2). Warning light (B) comes on.
The vehicle is immobilized by the rear axle.

NOTE
If warning light (B) stays on during release of the brake, it may be due to lack of air pressure in the circuit.
Position (2) can be used for moving away on hills.



Drawbar rigid and tractor vehicles

PARKING BRAKE

This valve acts simultaneously on the rear axle of the drawbar rigid / tractor and on the trailer/ semi–trailer.

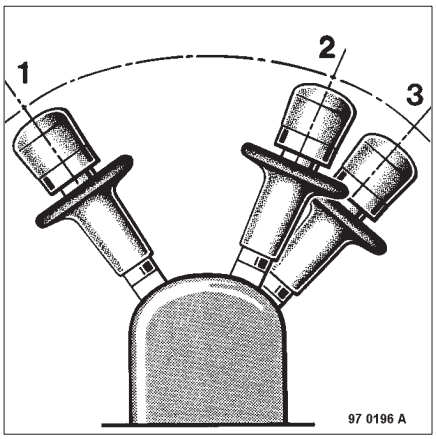
Application
Lift the locking sleeve and move the lever from position (2) to position (1). Warning light (B) goes out.

Release
Move the lever from position (1) to position (2) (negotiate the hard spot). Warning light (B) comes on.
Before leaving the vehicle, move the lever to the "**Test**"position to ensure efficiency of the parking brake.

Test
Press the lever and move it from position (2) to position (3). This position frees the trailer brake and the entire vehicle is immobilized by the drawbar rigid / tractor. This position serves to ensure that the drawbar rigid / tractor vehicle can alone hold the entire immobilized vehicle.
As soon as the lever is released, it returns automatically to position (2), i.e. to the parking position.

Hill starts
To facilitate moving away on hills, you can use the parking brake up to the hard spot, without pushing through it. As soon as the lever is released, it returns automatically to position (1).

NOTE
If the warning light (B) stays on while the parking brake is being released, it may be due to lack of circuit air pressure.



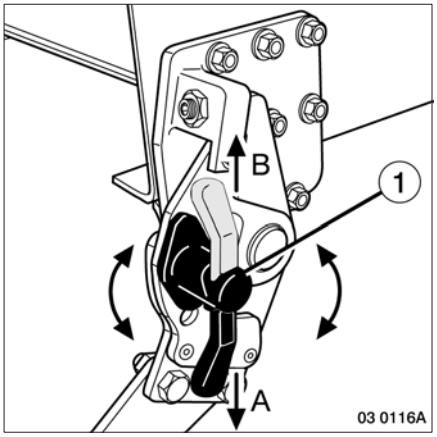
C73 use of the vehicle

Depending on your vehicle's equipment

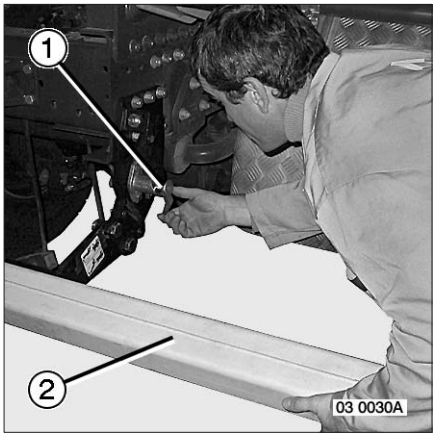
LIFT–UP REAR RUN–UNDER GUARD

IMPORTANT
Use on the public highway
Lock the rear under–run guard in the "down" position, without fail.

Use on construction sites
Lock the rear under–run guard in the "up" position, without fail.



Unlocking
To make for easy unlocking of handle (1), take hold of under–run guard (2) to take any strain off it.
Turn handle (1) clockwise or anti–clockwise to bring it to position **B**.



IMPORTANT
To move the run–under guard from the "up" position to the "down" position, and vice versa, take hold of it to prevent it from falling under the effect of its own weight.

Before unlocking handle (1) make sure you can do so without danger (vehicle stationary, accessibility, risk of bumping).

Locking
Move handle (1) to position **A** to lock the run–under guard.

C74 use of the vehicle

PRIOR TO GETTING INTO THE VEHICLE

Check in particular:
– That there are no traces of oil, coolant or fuel under the vehicle.

– Oil levels

  . clutch circuit

  . power steering

– Coolant level.

– Tyre pressures.

– Cab locking system.

– Leaks from major units. Should a leak occur, clean the breather. A clogged breather allows pressure to build up in the casing and leads to leaks.

Depending on your vehicle's equipment

– Air filter clogging indicator.

– That the connections between tractor and trailer have been made correctly.

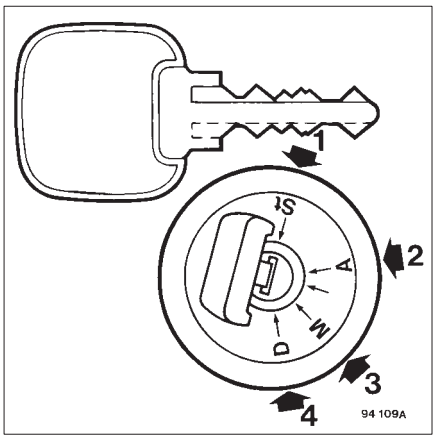
– That water has been drained from the fuel prefilter.

Air dryer: Actuate the drain valves to ensure there is no water in the air tanks.
Perform this operation:
  – **Daily**: in winter.
  – **Weekly**: outside winter.
If there is water in the tanks, get the air dryer checked out (see page F43).

Depending on your vehicle's equipment

Engage the master switch.

PRIOR TO STARTING



Ignition switch / Steering lock:
– "Engine stop and column lock" position (1): take out the ignition key and turn the steering wheel until the steering lock clicks.
– "Comfort accessories power supply" position (2): engine stopped, steering wheel free.
– "Ignition" position (3).
– "Start" position (4).

NOTE
To stop the engine, move the ignition key from position (3) to position (1).
If the key remains jammed, do not force it, but call in an electrician.
On fire tender vehicles (FPT), the key is integral with the switch.

Starting switch with electronic anti–theft device
The vehicle is supplied with coded keys paired up to the electronic anti–theft device.
With the master switch engaged, insert the ignition key and turn it to the "ignition" position (3).
Warning pictogram (G18) is displayed for a few seconds, then disappears unless a defect is displayed.
The system has recognized the code number of the key and authorizes engine starting (turn the key to the "starting" position (4)).

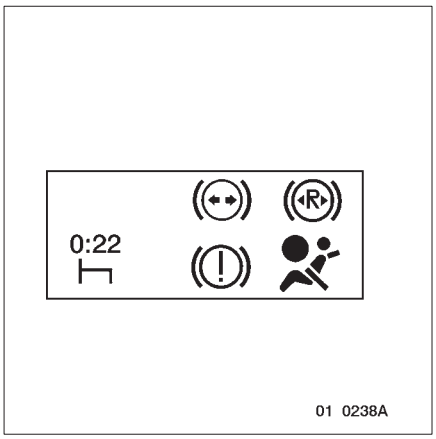
If warning pictogram (G18) stays displayed, the starter will operate but the engine will not start. In such case, contact a dealer or approved agent.

IMPORTANT
Any fraudulent action on the electronic anti–theft system will lead to malfunction and represents a real danger when using the vehicle.

Switch on the ignition.

Display test
When the ignition is switched on, an auto–test runs for 4 seconds. This test serves to check all the instrument panel indicators for correct operation.

Regulatory test display
After the display test, the regulatory test mode is activated.
Depending on your vehicle's equipment, warning pictograms (G6–G7–G8–G24) for the functions to be tested are displayed for about 3 seconds.

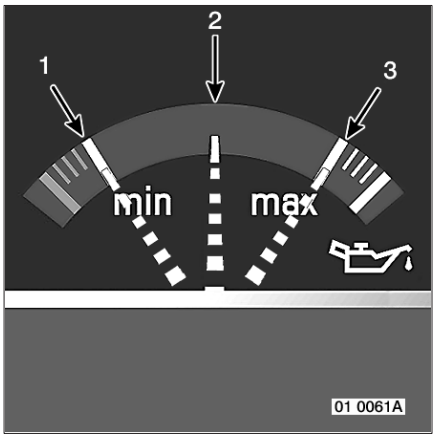


State after display test
The sector of the zone (L) remaining lit shows the engine speeds for optimum fuel consumption.
The comfort display (X) shows the time of day and the outside temperature.
The radio display (Y) can show different information concerning the radio (see page C43).

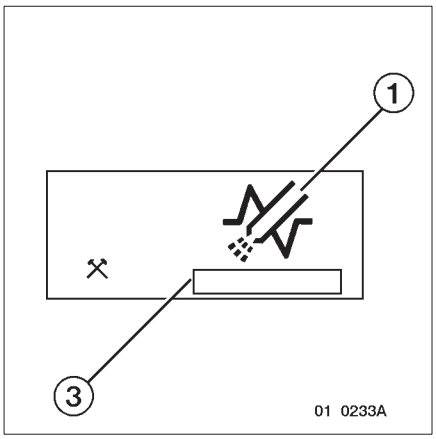
Engine oil level and pressure gauge:
Engine shutdown: Oil level gauge
Switch on the ignition and wait for the pointer to stabilize:
1 – Danger (top up with oil)
2 – Medium level
3 – Maximum level

NOTE
Always make the reading on flat horizontal ground 2 hours after the engine has been shut down.

Engine running: Oil pressure gauge

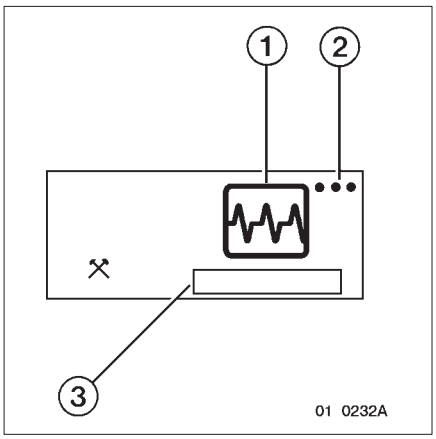


Defect(s) display
In the event of defects, one or several instrument panel warning pictograms (1) are displayed. In this case, the (STOP or SERVICE) warning light comes on simultaneously to distinguish the importance level of the defect(s).
There are 2 possible cases:
If the SERVICE warning light (J) comes on: you must, if possible, identify the problem and get it remedied or drive to your dealer or nearest approved agent.
If the STOP warning light (H) comes on: you must, if possible, identify the problem and, where applicable, consult your dealer or nearest approved agent.
If the warning pictogram (G6) is displayed, start the engine so as to pressurize the compressed air circuit to see if it disappears. If it stays displayed, it may involve an EBS defect or a compressed air system problem.
If different defects are present (STOP and SERVICE), only STOP warning light (H) comes on.

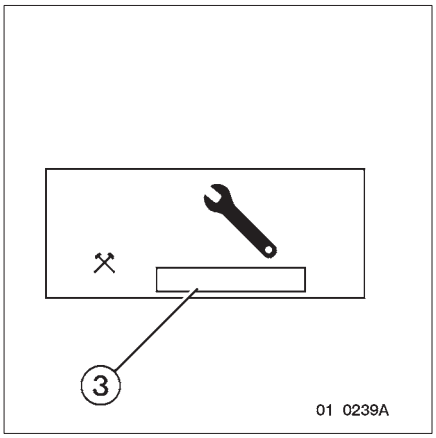


NOTE
When several defects are present, points of suspension (2) appear and the warning pictograms (1) (that depend on the nature of the defect) are displayed every 3 seconds in succession.

A text (3), showing the steps to take or information on the defect, is displayed below the pictogram (1).



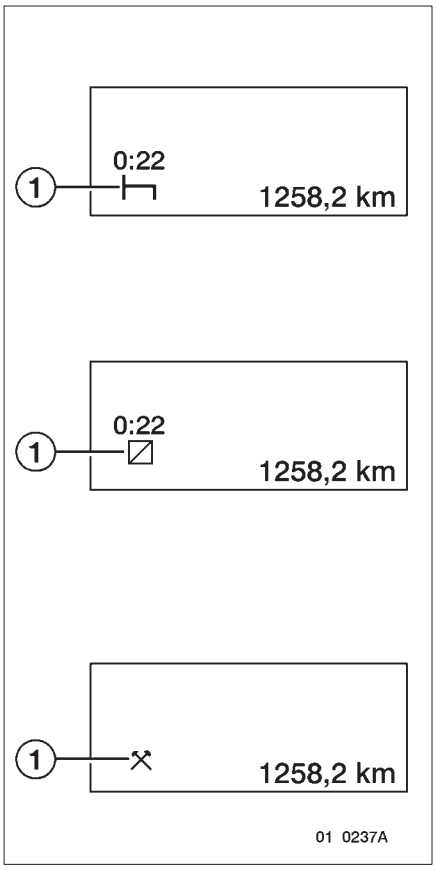
Maintenance display
The maintenance pictogram (G9) may be displayed in 2 possible cases:
– The warning pictogram (G9) is displayed, as pre–alert, about 30 seconds after the regulatory test. Consult the maintenance menu (see page C19).
– The warning pictogram (G9) is displayed, as alert, and the warning light (J) comes on. Consult the maintenance menu (see page C19) and drive to your dealer or nearest approved agent to get the maintenance carried out.



Tachograph
To avoid damage to the tachograph, carefully read the manufacturer's instruction book supplied with your vehicle's onboard documents.
If warning pictogram (G16) is displayed, make sure the disk is inserted in the tachograph. If this is not the case, drive to your dealer or nearest approved agent to get the repair carried out.

IMPORTANT
To open the tachograph disk tray, the vehicle must be at a standstill and the ignition switched on. Upon opening the tray, the driving time and rest time information shown on the multi–function display is automatically zeroed.

The multi–function display (G) indicates the driver's activity (1) according to the tachograph selection chosen.



use of the vehicle

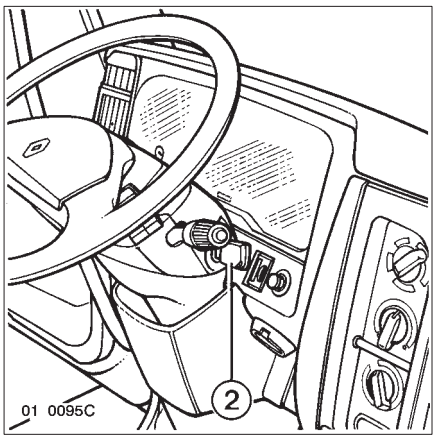
STARTING

IMPORTANT
Depending on your vehicle's equipment, check that the engine cooling system preheater is disconnected. Do not start the engine if the preheater is connected for you run the risk of destroying the preheater resistor.

Make sure the parking brake is applied.

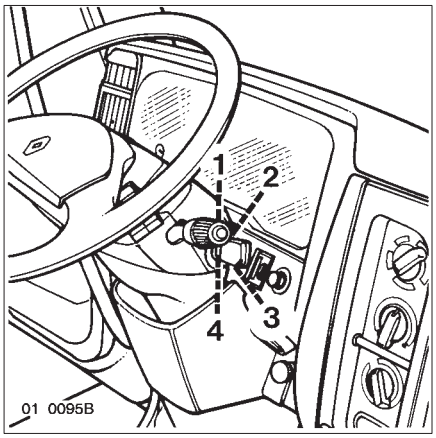
Make sure the gear lever is in neutral.

Starting the engine
Turn the ignition key (2), without accelerating, to actuate the starter.
Temperatures below 5° C: see page D1.
Temperatures above 5° C: the engine speed varies according to engine temperature.



Temperatures below 0°C: Move the ignition key to position (3) (preheating), wait for warning light (E) to go out, turn the key to position (4) to actuate the starter and release the key as soon as the engine fires.
In all cases, the engine speed varies according to engine temperature.

IMPORTANT
The use of "Start pilote" type products (ether) for starting the engine is strictly forbidden (serious risk of spontaneous combustion or explosion).

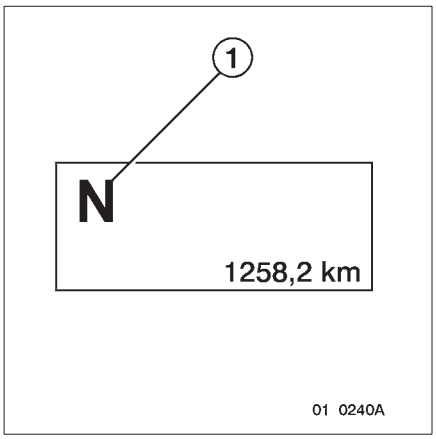


Do not move away until:

– Brakes air pressure warning light (G6) has gone out and all circuits are operating correctly.

– You are certain that warning light (B) goes out when the parking brake lever is moved to the “road” position.

Check that there is no defect warning pictogram displayed on the multi–function display (G).
The symbol (N) (1) means that the gearbox is in neutral.



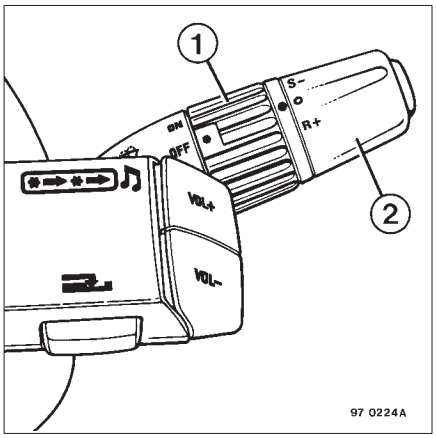
Depending on your vehicle’s equipment

Vehicle equipped with an electric fuel preheater
Fuel preheating is controlled automatically according to the temperature of the fuel.

Engine idling adjustment device
This device serves to adjust the engine idling speed in a band of between 650 and 680 rpm.

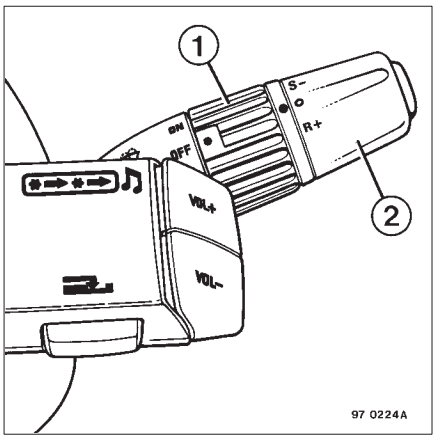
Use
With the vehicle at a standstill, parking brake engaged, engine idling, turn ring (1) from the “OFF” to the “ON” position three times in less than 2 seconds (OFF → ON → OFF → ON → OFF → ON).
With ring (1) on “ON”, the engine speed rises to 650 rpm.
To again adjust the idling speed:
– Turn ring (2) to bring “R+” opposite the mark, to increase the engine speed.
– Turn ring (2) to bring “S–” opposite the mark, to lower the engine speed.

Once the engine idling speed is defined: depress, then release either the clutch pedal or the brake pedal to memorize the new engine speed and quit the adjustment mode.



C81 use of the vehicle

Fast idling device



Use
With the parking brake applied, gearbox in neutral, move ring (1) to the “ON” position (except RCV vehicles). To alter the idling speed, turn ring (2) to bring “R+” or “S–” opposite the mark, then release it.
Depress the accelerator pedal to bring the engine to the required engine speed and in this position, turn ring (2) to bring “S–” opposite the mark so as to memorize the speed, then release the ring.
Release the accelerator pedal.
To fine tune the engine speed:

- Turn and hold ring (2) to bring “R+” opposite the mark to progressively increase the speed.
  Or nudge ring (2) to bring “R+” opposite the mark to increase the speed by a fraction.
- Turn and hold ring (2) to bring “S–” opposite the mark to progressively reduce the speed.
  Or nudge ring (2) to bring “S–” opposite the mark to reduce the speed by a fraction.

Any action on the brake pedal or any changing of gear or moving of ring (1) to the “OFF” position cancels the feature (except RCV vehicles).

Vehicle fitted with power take–off: When the PTO is in operation, move ring (1) to the “ON” position. The first action on ring (2) (“S–” or “R+”) calls up the engine rotating speed preset in the factory 1100 rpm (or 950 rpm for vehicles fitted with a second PTO).
This engine speed can be adjusted by means of ring (2) but is limited to 1400 rpm (see page C92).
Depending on the equipment fitted by the equipment manufacturer, this engine speed can be modified by means of the RENAULT TRUCKS test tool or the RENAULT TRUCKS BODY-BUILDER test tool.

NOTE
For RCV vehicles, a road speed of more than 3 km/h overrides the feature.

WARNING
Avoid actuating the accelerator pedal during use of the fast idling feature.

use of the vehicle

SPECIAL CONDITIONS

USE DURING THE WINTER OR IN COLD CLIMATES

Engine starting
(see "Starting")
Prior to driving away, allow the engine to run for a few minutes to ensure that oil circulation is established. It is best not to warm up the engine by prolonged running at idle or no–load, but, to drive it slowly using the lower gears until normal running temperature is achieved. Never demand maximum power from your engine until the water temperature reaches 80°C.

WARNING
Under no circumstances should a radiator blind or shutter be fitted on vehicles equipped with turbocharged engine with intercooler.

Engine cooling system
The cooling system is supplied with "ULTRACOOLING" coolant (a RENAULT HUILES DIESEL product) conforming to RENAULT TRUCKS specifications. Depending on its destination, this fluid gives frost protection down to – 25°C or – 40°C.

Batteries
Keep the batteries well charged since their resistance to frost depends on their charge level.

USE DURING THE SUMMER OR IN HOT CLIMATES

Check the battery electrolyte level frequently. Do not labour the engine, change gear as often as necessary to maintain optimum engine speed (see page C85). Thus, the circulation of water in the cooling system will be improved, keeping the engine temperature within the required specification limits. Frequently clean the exterior of the radiator by blowing compressed air through the core from the engine side, to remove any insects or dust that may restrict the air flow. Ensure that the radiator is in good condition and, if necessary, descale.

USE IN DUSTY ATMOSPHERES

It is recommended that careful inspection of the air filter clogging indicator be carried out daily.

Air filter
Normal servicing (see page F13/F14/F15).
Do not forget that clogging of the filter depends on the amount of low gear driving involved. If low gear ratios are constantly used (mountainous terrain), then the filter should be serviced on a time basis rather than distance travelled.
A blocked filter can cause serious damage.

USE AT HIGH ALTITUDE

Use of the vehicle at high altitudes affects engine performance. A decrease in power of approximately 10% for normally aspirated engines and approximately 5% for turbocharged can be expected per 1,000 metres of altitude. Also remember that the boiling point of water decreases by 3.5°C every 1,000 metres increase in altitude.

C83 use of the vehicle

RUNNING–IN

During the running–in period (5,000 km approximately), do not run the engine at maximum revs, except for short distances.
Do not use high engine speeds or allow the engine to labour at low or high speeds.
A careful watch should be kept on the water temperature gauge and the oil level.
The vehicle must be loaded as for normal operation.

ECONOMIC DRIVING
To obtain the very best performance from your gearbox, and more particularly lower fuel consumption, carefully observe the following driving rules:
Always select a gear ratio which will enable you to keep the engine in the optimum speed range. The maximum engine torque giving the lowest fuel consumption lies within this range.
Carefully select the gear ratio in relation to the contour of the road.
Remember that: **ALL GEAR CHANGES ENTAIL AN INCREASE IN FUEL CONSUMPTION.**

DRIVING A SOLO TRACTOR UNIT
With no load, rear wheel grip is reduced. Drive carefully.

RATIONAL USE OF BATTERIES
Only fully charged batteries will allow you to start your vehicle properly.
The original battery / alternator unit ensures the usage of different electrical equipment and optimum battery charging.
Get the charging capacity of your batteries checked regularly. It diminishes in cold weather. In winter, only use necessary electrical equipment.
In the case of numerous accessories (refrigerator, coffee–maker, micro–wave, television, add–on heater, etc.) being mounted on the vehicle, it is desirable to fit batteries with higher rated capacity. Get advice from your dealer.
The capacity of a battery is expressed in ampere–hours (Ah).
The consumption of an electrical appliance in amperes (A) is connected with the time of use.
e.g.: Television (2 A) x 2 hours = 4 Ah.
Engine running: the alternator supplies the energy; the batteries compensate, if necessary.
Engine shut–down: only the batteries supply the energy.
Limit your consumption and realize that a minimum of 50% of the battery capacity is necessary for starting the engine.

Main appliances and their consumption in 1 hour:
- Ignition position = 4 A
- Side lights = 5 A
- "Air" add–on heater = 2 A
- "Air/water" add–on heater = 10 A
- Cab overhead light = 2 A
- Refrigerator = 3 A
- Tailgate = 150 A
- Coffee maker = 10 A

If the forecast calculation reveals a battery discharge of more than 50%, limit the number of appliances or compensate by intermediate charging (engine running at 1500 rpm for at least 1 hour).

NOTE
Batteries in parallel: the capacities add together (2 x 12V – 140 Ah = 12V – 280 Ah).
Batteries in series: invariable capacity (2 x 12V – 140 Ah = 24V – 140 Ah).

FIFTH WHEEL COUPLING

NOTE
Only the fifth wheels mounted by RENAULT TRUCKS are covered in this document. For using fifth wheels mounted as adaptation, refer to the manufacturer's brochure.
These instructions are only a reminder as they form part of the rules of the road haulage profession. Use of the locking handle and safety system: see pages C85.

Hitching
Prior to hitching the trailer, check that:
- the fifth wheel locking system is open,
- the support face of the semi–trailer is slightly below the fifth wheel skid plate (about 5 cm). If necessary, adjust the height of the semi–trailer or of the tractor if it is equipped with air suspension,
- the skid plate, the locking system and the kingpin are plentifully greased,
- there is no foreign matter on the friction surfaces,
- the trailer is immobilized by its parking brake or by wheel chocks.

Reverse the tractor slowly into the alignment of the semi–trailer until the skid plate comes into contact with the semi–trailer. Engage the vehicle under the semi–trailer until the fifth wheel locks automatically.

Visually ensure that:
- the fifth wheel is properly locked and in particular that the unlocking prevention system (snap–hook, lock pin, safety lever or catch) is engaged (see pages C85),
- the semi–trailer is applied over the full extent of the skid plate.

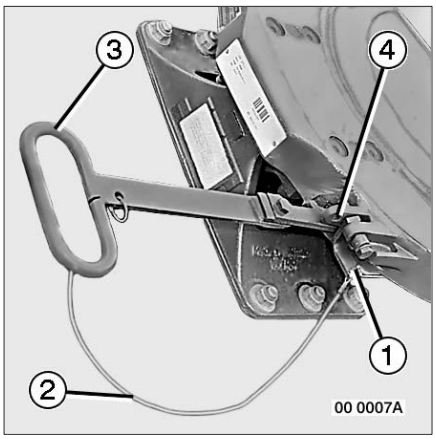
Carry out a pulling test (with the semi–trailer brake applied, begin to move away gently to ensure that the kingpin is correctly locked in the fifth wheel: the tractor must be held by the semi–trailer).
Connect the yellow brake line, then the red brake line, in sequence.
Connect the hydraulic and electric pipes and lines.
Release the semi–trailer parking brake, according to the assembly.
Raise the landing legs and return the suspension to the "normal" position.
The vehicle is ready to move off.

IMPORTANT
If the fifth wheel is provided with an instruction plate, scrupulously follow the directives it contains.
*Checks on correct locking (visual and towing test) are **vital**. They avoid inadvertent unhitching of the semi–trailer and all serious consequences that may entail. If the coupling has not been performed correctly, repeat the hitching operation **in full**.*
Vehicles equipped with double oscillation systems: free the double oscillation when driving on hilly ground.

Unhitching
Immobilize the semi–trailer on flat and stable ground.
Apply the parking brake and scotch the semi–trailer wheels with chocks.
Lower the landing legs and raise the semi–trailer to the coupling level.
Disconnect the red brake line, then the yellow brake line, in sequence.
Disconnect the electric and hydraulic lines and pipes.
Take the strain off the coupling by reversing the tractor very slightly and operate the handle in the direction of “unlocking”.

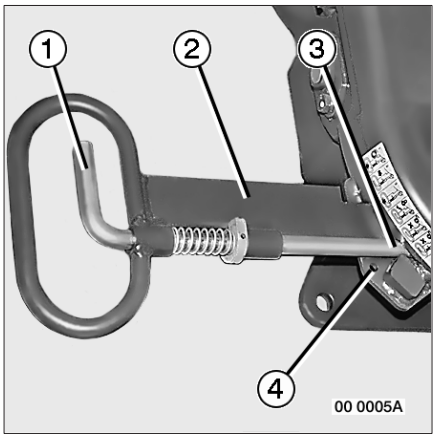
NOTE
Vehicles with air suspension: see page C96.

Fifth wheel coupling “JOST”
Unlocking
Pull the cable (1) to lift the bolt (2).
Swing the lever (3) forwards and pull it fully outwards. The lever (3) immobilizes in the “unlocking” position.
Locking
Locking takes place automatically when the lever (3) is returned to its initial position during the hitching phase.
Checking locking
Make sure the bolt (1), back in the “locking” position, forbids any forward movement of the lever (3).
The opening (4) can be used to place a snap–hook in position.



NOTE
The fifth wheel “JSK 38” is not provided with a cable (2). Lift the bolt (1) by hand.

Fifth wheel coupling “VBG”
Unlocking
Pull the handle (1). Swing the lever (2) forwards and pull it fully outwards. The lever (2) immobilizes in the “unlocking” position.
Locking
Locking takes place automatically when the lever (2) is returned to its initial position during the hitching phase.
Checking locking
Make sure the bevelled end (3) of the handle (1) is engaged in its housing.
The opening (4) must be fully uncovered. It can be used to place a snap–hook in position.



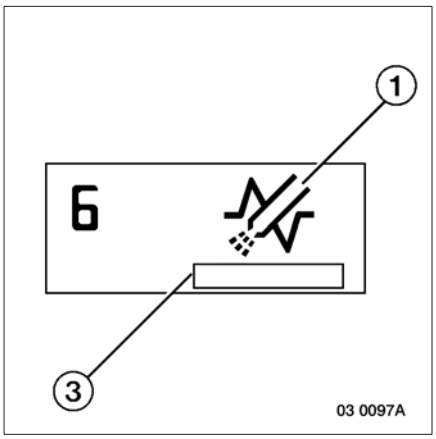
C86 use of the vehicle

ON THE ROAD

Engine operating speed
Choose the step–down ratio allowing you to use the engine at its best operating speed: green zone.

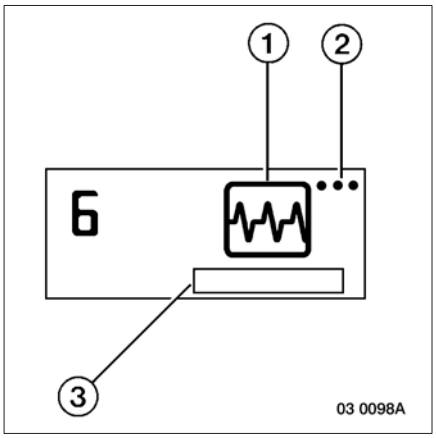
Defect(s) display
In the event of defects, one or several instrument panel warning pictograms (1) are displayed. In this case, the (STOP or SERVICE) warning light comes on simultaneously to distinguish the importance level of the defect(s).
There are 2 possible cases:
– The SERVICE warning light (2) means that you must drive to your dealer or nearest approved agent.
– The STOP warning light (H) (danger immediate stop) means that you must immediately stop the vehicle.

If different defects are present (STOP and SERVICE), only STOP warning light (H) comes on.

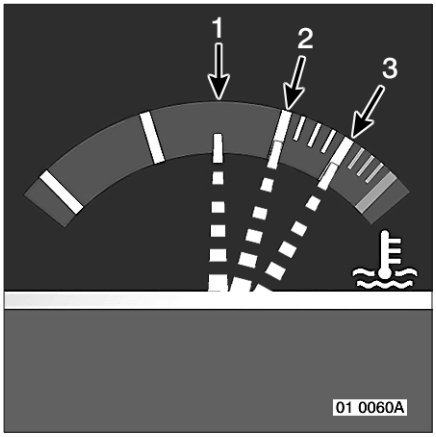


NOTE
When several defects are present, points of suspension (2) appear and the warning pictograms (1) (that depend on the nature of the defect) are displayed every 3 seconds in succession.

A text (3), showing the steps to take or information on the defect, is displayed below the pictogram (1).



Keep an eye on the coolant temperature gauge (R): the temperature should stabilize at around 85/90°C. If the coolant temperature alert pictogram (G13) is displayed, stop the vehicle and find the cause.



Coolant temperature gauge (R)
Needle in position:
1 – approx. 85°C
2 – approx. 100°C
3 – approx. 105°C

ELECTRONIC SPEED LIMITER

The vehicle is equipped with the "COMMON RAIL" system. Speed limitation is managed by the system. In the event of malfunction, warning pictograms (G4–G5) are displayed. Only RENAULT TRUCKS approved workshops are empowered to take action.

Depending on your vehicle's equipment
ANTI–LOCK BRAKING SYSTEM (ABS)

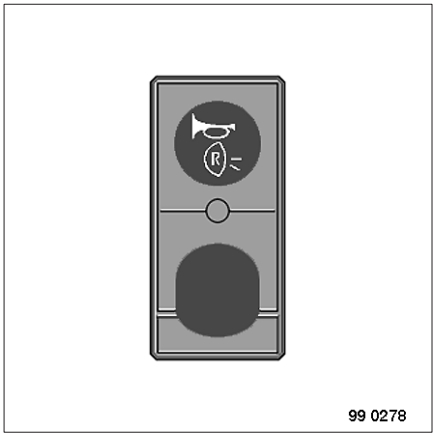
This system prevents the roadwheels from locking when you apply your brakes sharply.
– When the ignition is switched on, warning pictograms (G7–G8) are displayed during the regulatory test to signal presence of the "ABS" system on the vehicle and on the trailer.
– Vehicle coupled to a trailer with anti–lock braking system: below the threshold, variable from 5 to 15 km/h, depending on the system installed, warning pictogram (G7) must be displayed. Above the limit, it must disappear.
– Vehicle coupled to a trailer without anti–lock braking system: warning pictogram (G7) is not displayed.

In the event of system trouble or malfunction (warning pictograms displayed), its action is cancelled and the vehicle reverts to normal braking. Consult your dealer or an approved agent rapidly, to get the system overhauled.

GEARBOX

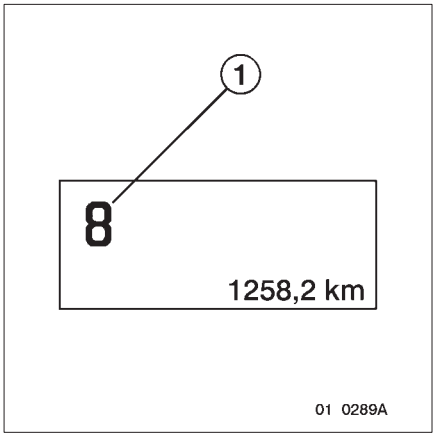
Always start off in first gear, then change through the gears in a regular sequence to prevent premature wear of the clutch.

Depending on your vehicle's equipment
Reversing buzzer
When you change into reverse gear, a buzzer sounds to warn passers–by that the vehicle is reversing.
A switch (A1) overrides the "buzzer" feature when the built–in warning light is out.



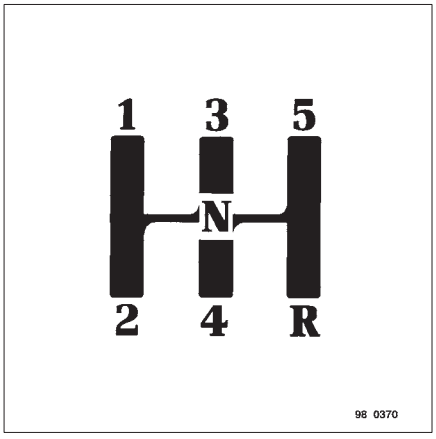
While the vehicle is moving, the gear engaged (1) is displayed.

NOTE
1st gear and reverse (as well as 2nd gear on some gearboxes) are not displayed.

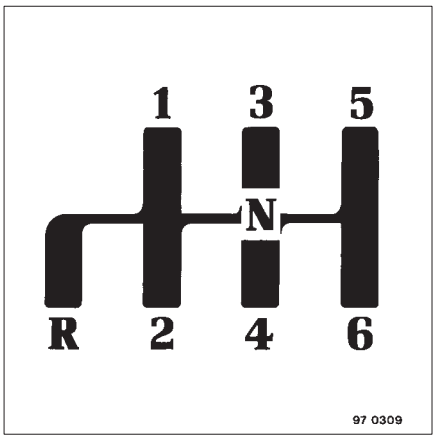


Gear changing
Gear pattern.

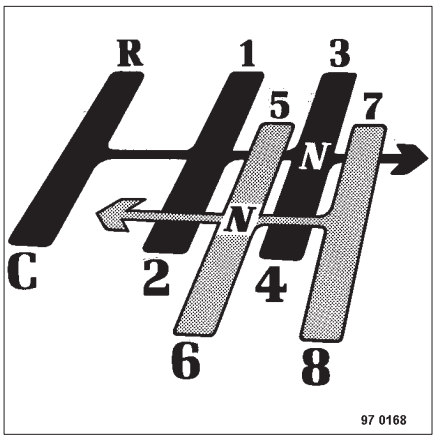
Type "ZF S 5.42"



Type "EATON 4106 – 5206"



Gearbox EATON 6309 – 8309
(Single H shift pattern)
Driving
Since the gearbox is synchronized, gear changes should be made without double declutching. The special low gear "C", also called crawler, is to be used for difficult manoeuvres and possibly when moving off.



CAUTION
The gear pattern is a single H.
The "High Speed range" plane is superimposed on the "Low Speed range" plane.
To change range, move the gear lever to the left for the low range, or to the right for the high range.
To do this, it is necessary to overcome the hard spot.
The gear lever returns automatically to its central position.
There are two neutral positions for the gear lever:
– in plane 3/4 of the low range,
– in plane 5/6 of the high range.

Do not change from 5th to 4th gear at speeds in excess of 30 km/h.

VERY IMPORTANT
This gearbox is equipped with an oil lubrication pump, therefore coasting downhill in neutral (free–wheeling) will cause rapid damage to the gearbox (for towing, see Towing paragraph).

C90 use of the vehicle

Type “EATON 6406”

Depending on your vehicle's equipment
Cruise control

IMPORTANT
Do not use the cruise control on slippery roads.

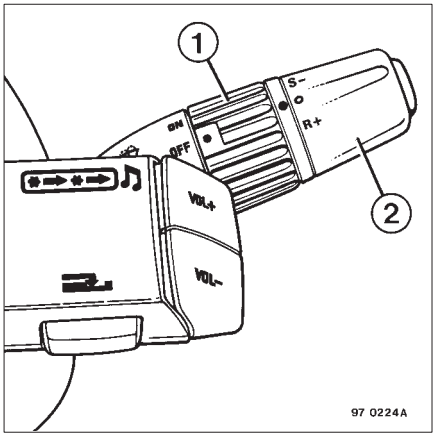
At speeds of more than 30 km/h, this feature allows you to travel at the required steady road speed without having to use the accelerator pedal, whatever the road contour.
Use:
- Bring the vehicle to the required road speed.
- Move ring (1) to the "ON" position.
- Turn ring (2) to bring "S–" opposite the mark so as to memorize the speed.
- Release the accelerator pedal.
- The information "CRUISE" (3) is displayed.

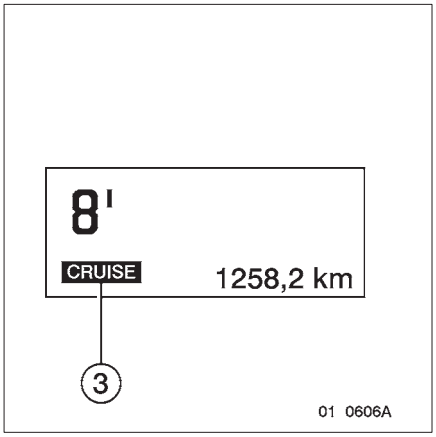
To adjust the cruise control speed:
- Turn ring (2) to bring "R+" opposite the mark to increase the speed.
- Turn ring (2) to bring "S–" opposite the mark to reduce the speed.

Holding ring (2) in one of the (R+ / S–) positions varies the speed until the ring is released.
At any moment, any action on the accelerator pedal allows the vehicle road speed to be momentarily exceeded.

Any action on the clutch pedal momentarily overrides the feature. Release the clutch pedal: the cruise control feature is automatically resumed.
The feature is cancelled if:
- The road speed drops by more than 2 km/h below the set–point road speed.
- The road speed is less than 20 km/h.

To return to the memorized road speed, turn ring (2) to bring "R+" opposite the mark.
Moving ring (1) to the "OFF" position, cancels the feature.



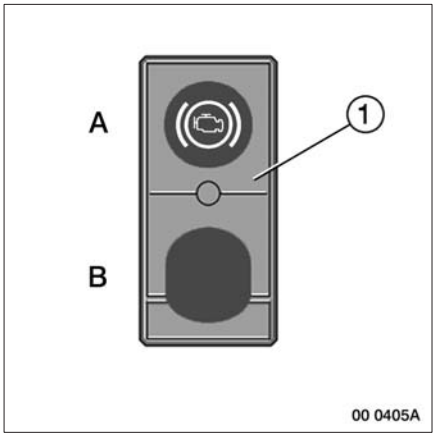


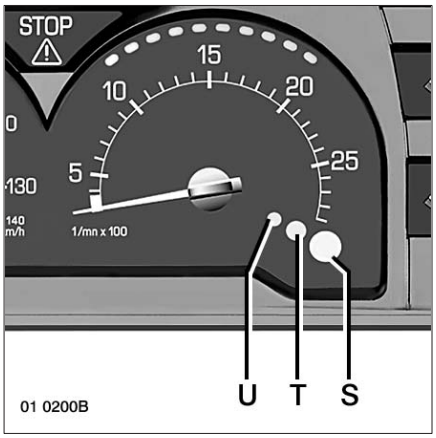
RETARDER

IMPORTANT
Choose the step–down ratio allowing you to use the engine at its best speed. On hilly runs, use the retarder, if necessary. Never drive downhill in neutral.
Do not use the retarder on slippery surfaces.

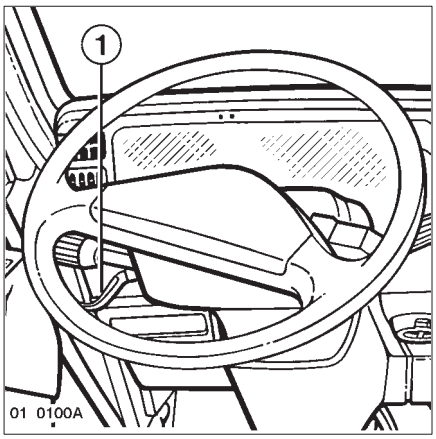
Depending on your vehicle's equipment
NOTE
On downhill sections, with the accelerator pedal released, the cruise control commands the exhaust brake except if your vehicle is equipped with an electric retarder.

Exhaust brake
Use the gearbox ratios to select a gear suitable for the gradient you are descending. To slow the vehicle, release the accelerator pedal and move control (1) to position (B). Warning light (U) comes on.
Below 900 rpm, the exhaust brake is inoperative.
Above 900 rpm, the exhaust brake is active.
Any action on the accelerator pedal interrupts the exhaust brake function.
The exhaust brake function is resumed when the accelerator pedal is released.
Warning light (T) signals optimum efficiency of the exhaust brake.
Do not drive while warning light (S) is on (engine overspeed).
To override operation of the exhaust brake, move control (1) to position (A). Warning light (U) goes out.





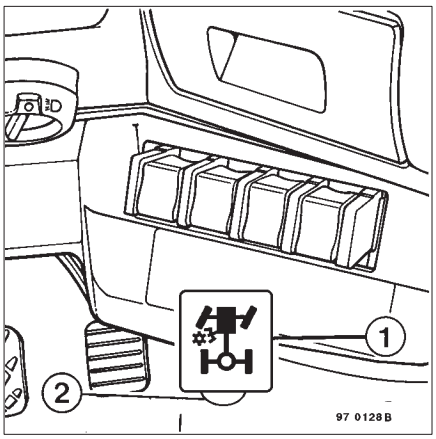
Depending on your vehicle's equipment
Electric retarder
Move the lever (1) gradually to obtain the required retardation (4 positions), then return the lever to a lower setting, but, be ready to increase the effect of the retarder should the speed increase. Only in a case of emergency should a descent be made with the retarder at its highest (4th position) setting. A warning light (C) will come on when the retarder is in operation. Return to the OFF position (0) can be made in one movement. **Never leave the retarder lever in the engaged position when the vehicle is stationary.**



Depending on your vehicle's equipment
POWER TAKE–OFF (PTO)

Gearbox–mounted PTO

With the vehicle at a standstill, engine idling, gearbox in neutral, release the clutch and wait for 6 seconds.
Depress control (1).
Engage the clutch. At this moment, the PTO rotates. Warning pictogram (G22) should be displayed. To put the PTO into neutral, release the clutch and depress control (2). Control (1) returns to its initial position. Warning pictogram (G22) disappears.



Rotating speed
In the event of hydraulic pump drive, do not exceed the rotating speed indicated by the equipment manufacturer.

Adjusting the engine speed (see page C82).

The engine speed is limited upon leaving the works to: 1 400 rpm.
Depending on the equipment fitted by the equipment manufacturer, the engine speed can be modified using the RENAULT TRUCKS test tool.

For vehicles equipped with PTO speed limitation device; respect the maximum engine speed determined by the equipment manufacturer.

For RCVs (refuse collector vehicles) with ALLISON gearbox, the PTO is controlled by the tipper function. Warning pictogram (G22) is displayed when the PTO is in operation.

NOTE
Some PTOs can be used for continuous service, others for intermittent service.
It is essential to comply with the maximum usage times recommended in the "Specifications" chapter.

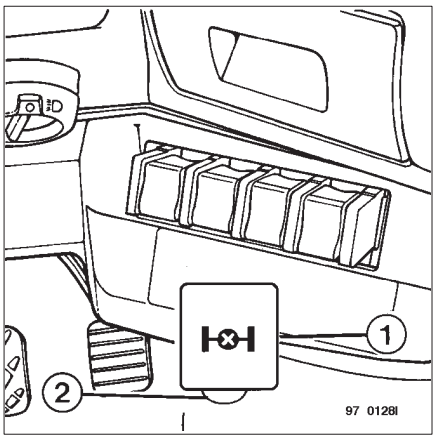
Depending on your vehicle's equipment
DIFFERENTIAL

"Rear drive axle" inter–wheel differential lock
Do not use:
– On ground giving a firm grip (roads, dry or rocky ground).
– On bends.
– When the vehicle is equipped with an anti–skid device (chains, etc.).

Engagement
Never engage the diff. lock when one of the drive wheels is slipping. In such case, release the clutch and actuate control (1). Engage the clutch and do not accelerate until warning pictogram (G23) is displayed.

NOTE
Never engage the diff. lock when one of the drive wheels is slipping. In such case, release the clutch and actuate control (1).
Engage the clutch and do not accelerate until warning pictogram (G23) is displayed.

Disengagement
Press button (2).
Control (1) returns to its initial position. Warning pictogram (G23) should disappear. If it does not, gently lock the steering over to the right and to the left, while driving very slowly, to enable release of the dog clutch and put out the warning pictogram.



C95 use of the vehicle

Depending on your vehicle's equipment

ELECTRONIC AIR SUSPENSION

This is an air suspension system controlled and piloted by an electronic microprocessor based device. On top of the advantages of a conventional air suspension system, it contributes the following benefits:
– Optimization of loading bay services and memorizing of the last level setting (even after a power cut).
– Automatic level correction to bring the suspension parallel with the centre–line of the vehicle (even if the load is poorly distributed).
– Savings on tyre wear (with lift–up axle option).
– Operations controlled by one remote control box.
– Reduced number of air lines.
– Speedy adjustment of level and low air consumption.
– Built–in safety systems (alarm, fall–back operation).
– System programming depending on the vehicle and legislation in the country of use.
– At speeds of more than 10 km/h, return of chassis to the "normal" level.

Operation
– Automatic mode
The system keeps the suspension at a "normal" level, defined by programming.
– Manual mode
Manual mode is programmed, but operation in manual mode is only possible at speeds below 10 km/h.
The manual mode allows the height of the chassis to be adjusted to the required level.
Press any of the keys on the remote control box to change from automatic mode to manual mode.
Press the "normal level" key on the remote control box to return to automatic mode.
– Information warning light (AB)
This light comes on when the vehicle level is different from the normal level or during shedding of the load from the lift–up axle (if fitted).
– Alert warning pictogram (G12)
This pictogram is displayed as soon as a defect is identified. The electronic box safety device automatically neutralizes the control system, partly or in full.

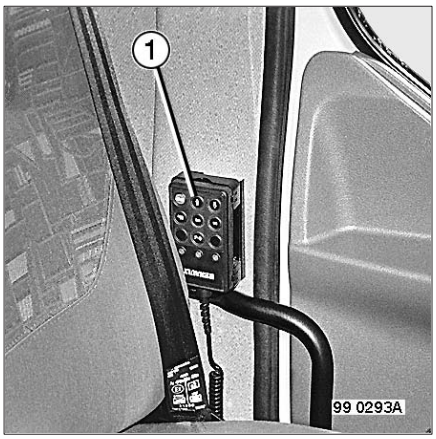
WARNING
Braking efficiency may be greatly reduced. Immobilize your vehicle and run a test.

At a standstill
Warning pictogram (G12) is displayed when a suspension malfunction is detected. Run a test (see page C98).

C96 use of the vehicle

Remote control box
For each suspension model, there is a corresponding control box type.

Location of remote control box (1) in cab.



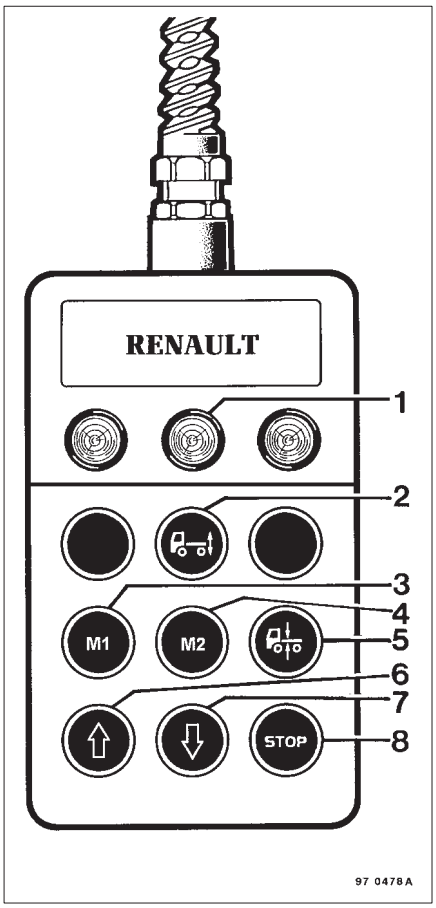
IMPORTANT
Loading and unloading operations must be carried out with the master switch engaged and the ignition switched on.

Coupling/Uncoupling a trailer to/from vehicle equipped with air suspension
To unhitch the semi–trailer:
- Raise the suspension to the “UP” position.
- Lower the trailer landing legs.
- Unlock the fifth wheel coupling.
- Move the vehicle forwards slightly to disengage the kingpin.
- Lower the vehicle slightly to dislodge the fifth wheel.
- Disengage the tractor, then return the suspension to the “NORMAL” position before moving off.

To hitch the trailer:
- Adjust the height of the fifth wheel before engaging the vehicle.
- When coupling is completed, return the suspension to the “NORMAL” position before moving off.
- Retract the trailer landing legs.
- Return the vehicle suspension to the “normal” position before moving off.

Using the remote control box
Engage the master switch.
Switch on the ignition (if the air pressure is too low, start the engine).
To activate the function
Press key (2). Warning light (1) comes on.
To de–activate the function, press key (2) again. Warning light (1) goes out.
Lowering the chassis
Keep key (7) depressed to reach the required height. Release the key when the required height is reached.
Raising the chassis
Keep key (6) depressed to reach the required height. Release the key when the required height is reached.
Adjusting to "normal" height
Press key (2) to activate the remote control. Warning light (1) comes on.
Press key (5) once. The chassis returns to the "normal" level.
To de–activate the remote control, press key (2) again. Warning light (1) goes out.

IMPORTANT
In the event of danger, it is possible to stop the movement straight away by pressing key (8) once.



Memorizing the levels
This control box allows two reference levels to be memorized. Press button (2) to activate the remote control. Warning light (1) comes on. Press "Up" button (6) or "Down" button (7) to obtain the required height. Simultaneously press "Stop" button (8) and "Memory 1" button (3) to memorize that height.
To memorize a second chassis height: after the adjustment operations, simultaneously press "Stop" button (8) and "Memory 2" button (4) to memorize that height.
Whenever you wish to return to one of the two memorized chassis heights, just press one of the memory buttons. To modify an already memorized height**,** repeat the above adjustment operations.
Button (5) serves for return to the "normal" position.

WARNING
Never move off when warning lights (AB–G12) are on. Give a pulse on button (5) to bring the chassis height to the "normal" position. The system changes into automatic mode.

Time–delayed stabilization of suspension height (ignition switched off)
Once the required loading bay height is adjusted, either by memory button or manual adjustment, you can stabilize that height for one hour by simultaneously pressing the stop control button and switching off the ignition.

Test procedure
Disengage the master switch and wait for 10 seconds before turning it on again.
If warning pictogram (G12) is displayed again, consult the nearest dealer or approved agent.
Press the “Stop” key on the remote control box to neutralize the system.
Drive at a low speed (20 km/h maximum) and take extra care to maintain ample stopping distances.
If warning pictogram (G12) disappears, the defect has cleared. Nevertheless, consult your dealer or approved agent.
Fault finding and maintenance are to be carried out using the RENAULT TRUCKS test tool plugged into socket (1).

Customizing the system
All the electronic boxes are identical and are subsequently customized for use on a specific vehicle in conformity with the legislation in force in each country.
Plug the RENAULT TRUCKS test tool into socket (1), so as to enter the programs and access the calibration data.
Testing and programming operations must be carried out by qualified personnel.

WARNING
Never alter the customized settings of your vehicle.
Any modification to the programs, defined at the time of assembly, may result in breakdown.
Any work carried out on sensors, linkages or controls, or replacement of the electronic control unit, requires the system to be recalibrated.

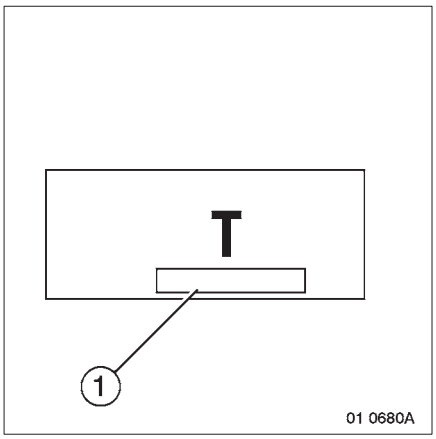
C99 use of the vehicle

STOPPING

Apply the parking brake and move the gear lever into neutral. Always wait for the engine to return to idling speed before actuating the shut–down control.
To stop the engine, turn off the ignition.

Disengage the master switch to cut the current. Never turn off the master switch while the engine is running to avoid damage to the alternator and the vehicle's electronic components.

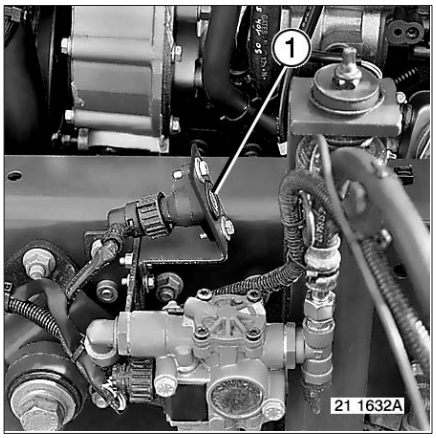
If the tachograph tray is open when the ignition is switched off, the buzzer sounds and the message (1) "tachograph tray open" is displayed for around 6 seconds. Close the tachograph tray before getting out of the vehicle.



IMPORTANT
If the vehicle is to be laid up for a prolonged period of time (more than 10 days), disconnect the circuit by means of the circuit–breaker or remove the fuse (F25) to avoid discharging the batteries through the tachograph or the tachograph simulator

NOTE
In the event of fracture of a propeller shaft, if the gearbox is in neutral and the output shaft is moving, take out the fuse (F25) and switch off the ignition to stop the engine.

Engine stop control, cab tilted (1).



C100 use of the vehicle

ADR vehicle (transport of hazardous substances)

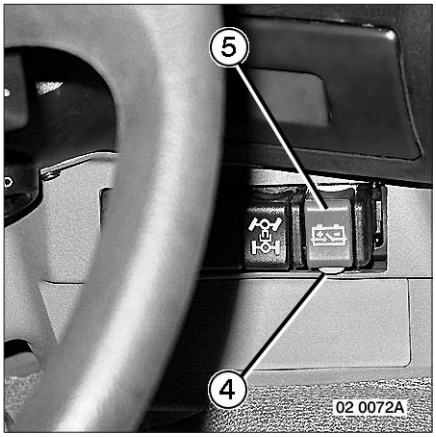
> ***IMPORTANT***
> *It is absolutely essential to follow engine stopping instructions according to the situation with which you are confronted. Any other procedure could prove to be dangerous.*

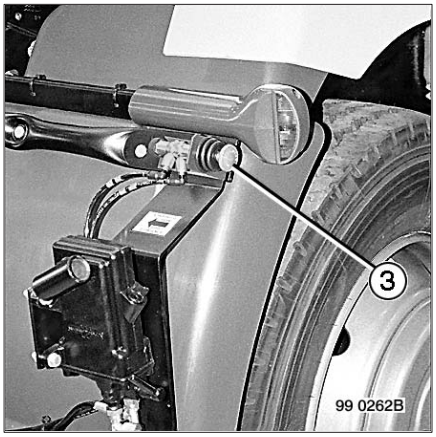
Control (5) inside the vehicle
Press button (4) and the control (5) until the engine stops. The master switch is open.

Control (3) outside the vehicle
Press and rotate the control (3) until the engine stops. The master switch is open.

The master switch can be re–engaged manually or by using the control (5) (see pages C38 – C39).

> ***IMPORTANT***
> *Use these controls to stop the engine only in case of emergency.*



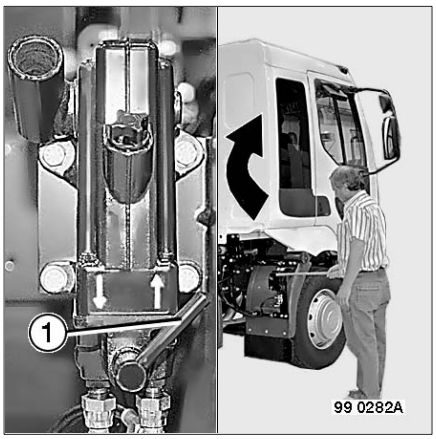


C101 use of the vehicle

CAB TILTING

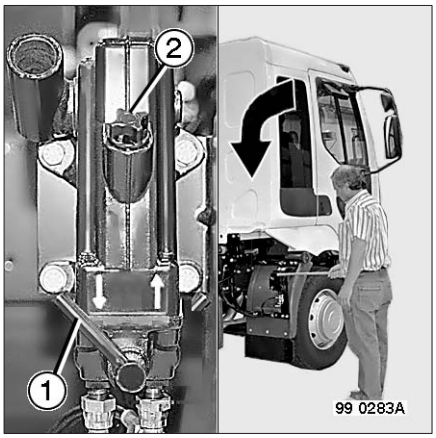
IMPORTANT
On all vehicles not fitted with double raising rams, empty the lockers and remove all loose articles and equipment before tilting the cab.
Never tilt the cab with the engine running.
Before restarting the engine, check:
– Cab raised: That the gear lever is inneutral.
– Cab lowered: That the gearshift linkage is locked, after checking that all gears shift correctly.
When working underneath the cab (on the engine, etc.) the cab must be fully tilted.
Any work on the cab tilt hydraulic system implies strict observance of the safety instructions and must be carried out by a dealer or approved agent.

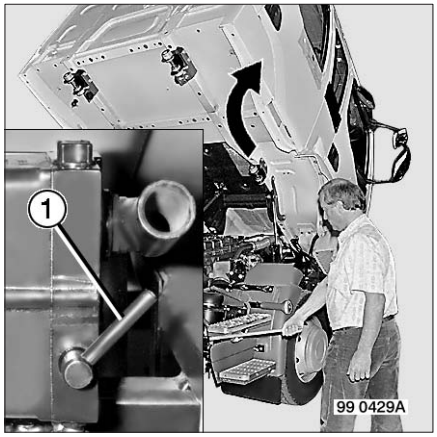
Mechanical control
With the vehicle stationary (parking brake applied), engine shut down, gear lever in neutral, doors properly closed, make sure that no loose articles in the cab can be thrown against the windscreen. Clear the area in front of the cab. Place lever (1) in the "up" position.
Since unlocking is automatic, pump until the cab tilts fully. Use jack bar.
To return the cab to the "road" position, place lever (1) in the "down" position, pump until the cab locks automatically and until hardening of the pump lever.



NOTE
If you experience difficulty in tilting, return the cab to the "road" position and check the oil level. With the ram rod retracted, the oil should be flush with the screw–thread of the filler port (2). Top up with oil, if necessary.
Carefully carry out a complete tilting manoeuvre (up and down), then check the oil level again. In the event of malfunction, consult a dealer or approved agent.

It is impossible to open the front grille when the cab is tilted.





CAB TILTING

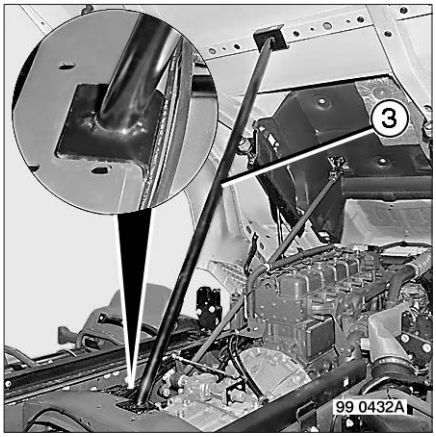
4–door cab

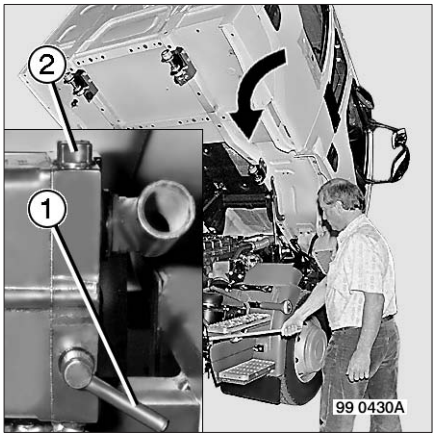
With the vehicle at a standstill, engine shut down, gear lever in neutral, doors properly closed, make sure that no loose articles can be thrown against the windscreen. Clear the area in front of the cab. Place the pump lever (1) in the “up” position.
Unlocking is automatic, so pump until the cab is fully tilted. Use the jack bar.

Put the safety bar (3) into position and pull the cab down slightly to hold it in place.
To return the cab to the “road” position, take hold of safety bar (3), lift up the cab and remove the bar.
Remove the safety bar (3).
Place the pump lever (1) in the “down” position.
Pump until the cab locks automatically.

NOTE

If you experience difficulty in tilting, return the cab to the “road” position and check the oil level. Top up with oil, if necessary. With the ram rod retracted, the oil should be 2 cm from the filler port (2). Top up with oil, if necessary. Carefully carry out a complete tilting manoeuvre (up and down), then check the oil level again. In the event of malfunction, consult a dealer or approved agent.





C103 use of the vehicle

TYRES

ROADWHEELS – TYRES

Changing a roadwheel
Precautions to be taken when fitting the wheels on the vehicle:

Before fitting
Carefully clean the wheel naves and hubs. In particular, clean all parts in contact with the wheels and remove all grease, earth, mud, metal burrs, excess paint, etc.

Upon fitting
Lightly lubricate the studs and nuts with engine oil. Tighten the nuts gradually using the wheel nut spanner provided in the onboard tool kit. Correct tightening pressure is obtained by pulling the tool lever harm.

> ***IMPORTANT***
> *Overtightening may cause damage. Do not use tubes, bars or other devices to increase the leverage.*

In–service checks
Check the tightness of the wheel nuts after fitting a new wheel or after a wheel change: after 20 to 30 km then between 150 km and 250 km.
Failure to carry out these elementary precautions may result in loosening of the wheel nuts and lead to serious consequences.

Principal causes of premature tyre wear
– Manner of driving (excessive braking, driving through potholes, etc.).
– Overloading of vehicle or bad load distribution of loads.
– Over–inflation or under–inflation (inflate to pressure corresponding to the weight per axle).
– Incorrect pairing (always twin tyres of the same dimension, type and same degree of wear).
– Incorrect front end steering geometry.

Tyre inflation chart (vehicle laden)
See “Specifications” chapter.

Checking tyre pressures
Frequency
The tyre pressures must be checked regularly.

Method
The tyre pressures must always be checked when the tyres are cold.

It is essential to never deflate hot tyres.

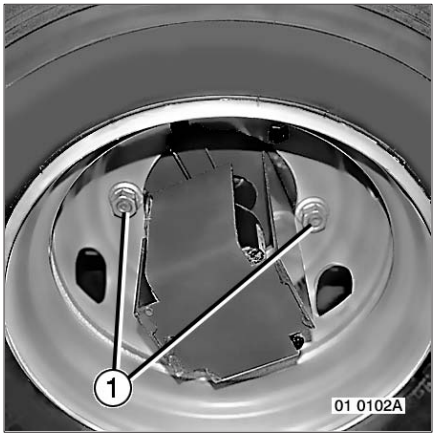
Safety
In the event of a tyre hitting an obstacle or if it is necessary to stop as the result of a puncture, it is essential to get the tyre immediately checked by a specialist.

C104 use of the vehicle

Depending on your vehicle's equipment
SPARE WHEEL CARRIER

To remove the wheel
Remove the nuts (1) and turn the winch to lower the wheel (2).
Withdraw the jack and is bracket (3).
To fit the wheel
Install the bracket (3) and the jack. Hoist up the wheel using the winch (2) and lock the nuts (1).

WARNING
Lock the spare wheel on the spare wheel carrier, then slacken the winch rope.



C105 use of the vehicle

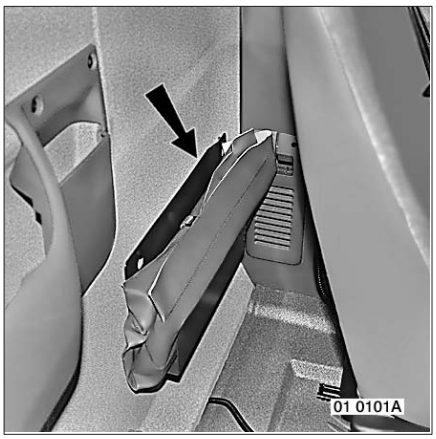
Depending on your vehicle's equipment
SPARE WHEEL CARRIER

Removal
Unscrew nuts (2) and lower the wheel using winch (1).

Replacement
Raise the wheel using winch (1) and tighten nuts (2).

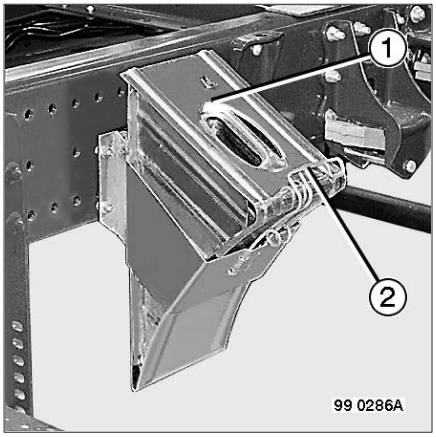
CAUTION
After locking the spare wheel to the spare wheel carrier, slacken the winch rope.

Location of the onboard tool kit
Behind the driver's seat in day cabs.
Under the bench seat in sleeper cabs.



C106 use of the vehicle

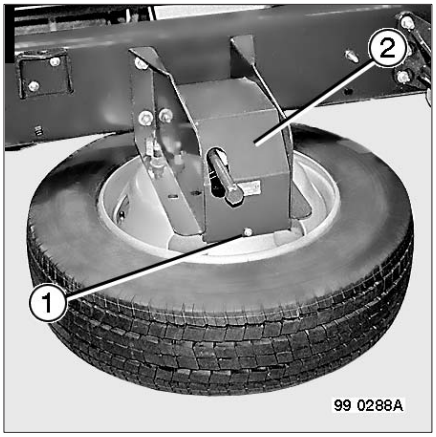
Depending on your vehicle's equipment
Wheel chocks
Top remove the chock (1), undo clip (2). Upon assembly, ensure the correct position fo chock (1) and lock the clip (2) .

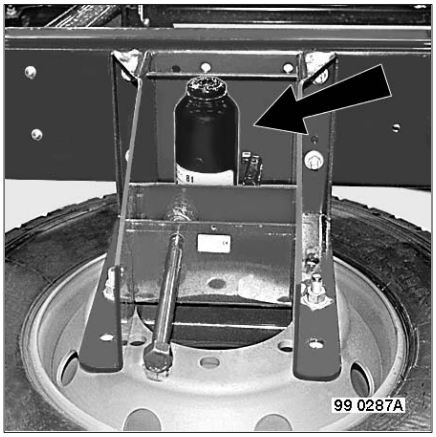


Depending on your vehicle's equipment
Location of jack:

To open the locker: Remove screw (1) and withdraw cover (2).

To close the locker: Put the cover (2) into position and tighten the screw (1).





C107 use of the vehicle

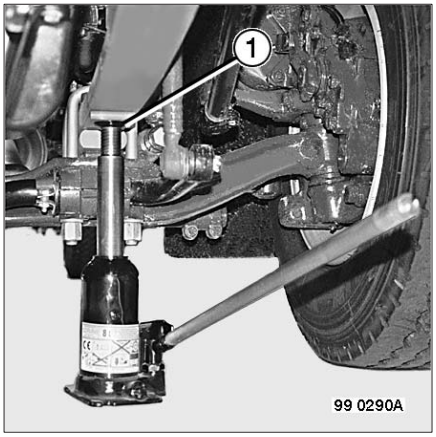
Depending on your vehicle's equipment

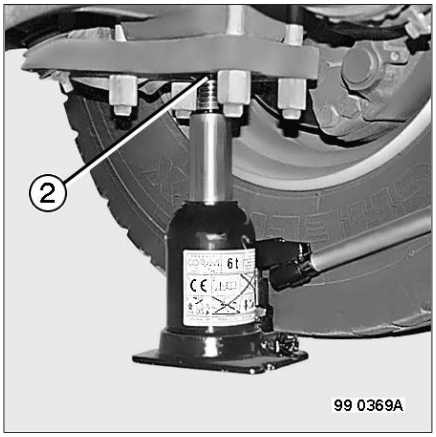
Using the jack
Front end support points (1).
If necessary, tilt the cab to facilitate positioning of the jack.

IMPORTANT
Chock the rear roadwheels.

Rear end support points (2).

IMPORTANT
Chock the front roadwheels.
Air suspension: move the suspension to the "down" position.





C108 use of the vehicle

HYDRAULIC POWER ASSISTED STEERING

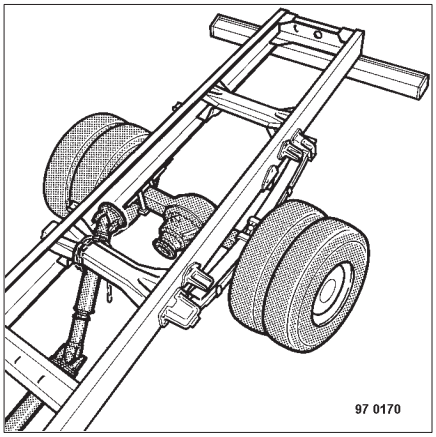
CAUTION
When the engine is shut–down, power assistance to the steering is lost and between 5 and 7 times as much effort is needed to turn the steering wheel. In general, if loss of assistance is experienced, proceed as follows: Check the fluid level in the reservoir, check for leaks from hose and pipe unions and rectify if possible (tighten the unions or change the hoses). Top up the reservoir with clean fluid to the recommended specification. Restart the engine and check that the pump performs normally. Test at low engine and road speed (see page F37).
If any doubt remains concerning the pump's efficiency, the unit must be inspected by an approved specialist.

Under no circumstances must hydraulic components be removed or their initial settings altered. This work must be carried out by a specialist.

A hydraulic system can only operate efficiently if it is kept perfectly clean. Great care must therefore be taken to ensure that no dirt enters the system when the above operations are carried out.

TOWING

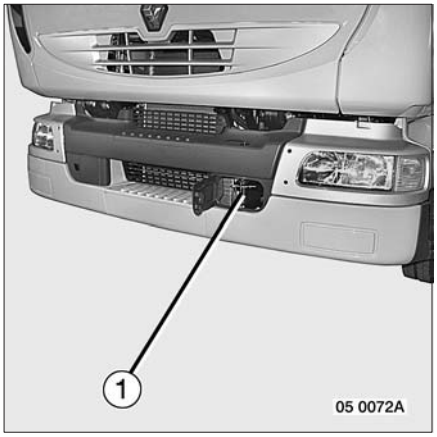
– Put the gear lever into neutral.
– Uncouple the propeller shaft at the drive axle.
– Use the towing yoke.

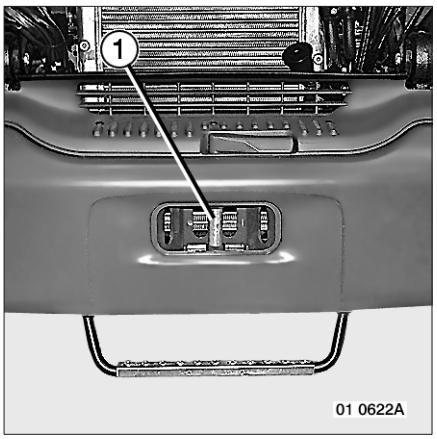


C109 use of the vehicle

WARNING
The yoke (1) attached to the front cross–member is designed for on–road towing under normal conditions. When pulling bogged down vehicles with spinning drive wheels out of mud or loose soil, it is vital to take the customary precautions.
Proceed with towing only when the engine is running.

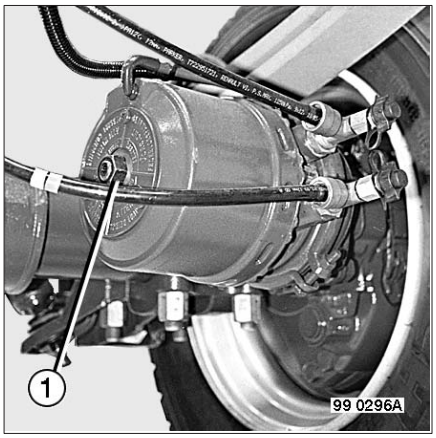
In the event of engine breakdown
– Mechanically neutralize the brake cylinders if the vehicle has suffered loss of air.
– The steering will be hard to turn as the power assistance system is inoperative.





Releasing the parking brake
To enable a disabled vehicle that has suffered accidental loss of air pressure to be towed, the spring brakes can be wound off until the roadwheels are free.
This can be done by unscrewing the bolt (1) on each brake chamber, using a 24 mm wrench.
To put the vehicle back into service: apply a pressure of approximately 5 bars to the circuit, bring the bolt (1) into contact with the cylinder and tighten at a torque of 70 Nm.

IMPORTANT
Chock the roadwheels.



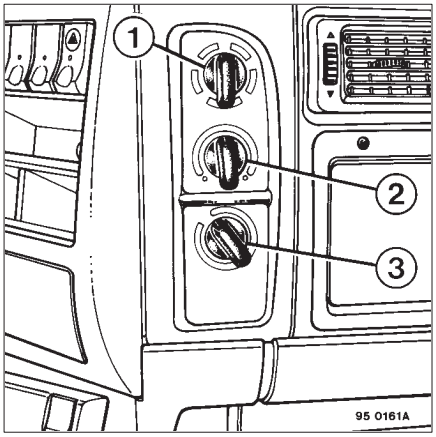
D1 air conditioning

HEATING – VENTILATION

Depending on your vehicle's equipment

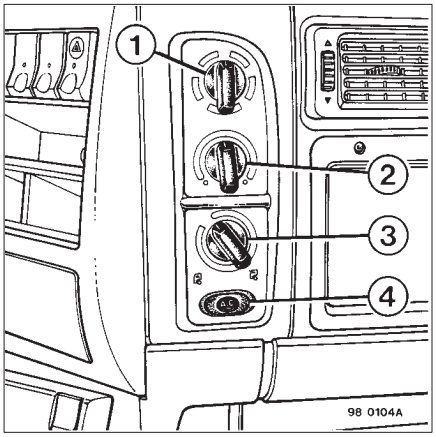
Version without air conditioning

1 – Cab air distribution control knob (see detail, page D2).
2 – Temperature variator knob (see detail, page D5).
3 – Ventilation control knob (see detail, page D4).



Version with non–regulated air conditioning

1 – Cab air distribution control knob (see detail, page D2).
2 – Temperature variator knob (see detail, page D5).
3 – Ventilation control knob (see detail, page D4).
4 – Air conditioner control (see detail, page D4).



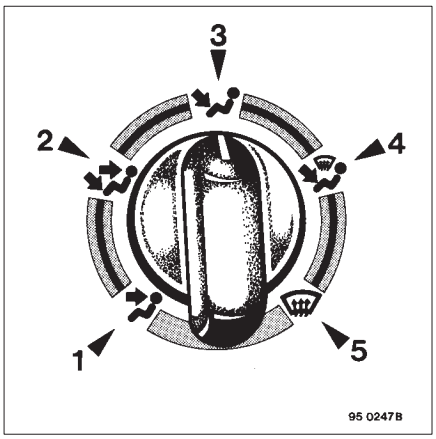
IMPORTANT
So as to limit risks of leaks due to prolonged standstill, it is recommended to run the air conditioning for about 15 minutes at least once a week.

Quick defrosting (quick engine warm–up feature)

This device accelerates the defrosting feature described on page D5
With the vehicle at a standstill, for a temperature below 5°C, a device for accelerating the engine to a speed of 1 200 rpm and actuating the exhaust brake enables fast build–up of the temperature of the engine cooling system.
This feature is overridden when the cooling system temperature reaches 70 °C, when the accelerator is actuated or when the vehicle is moving.

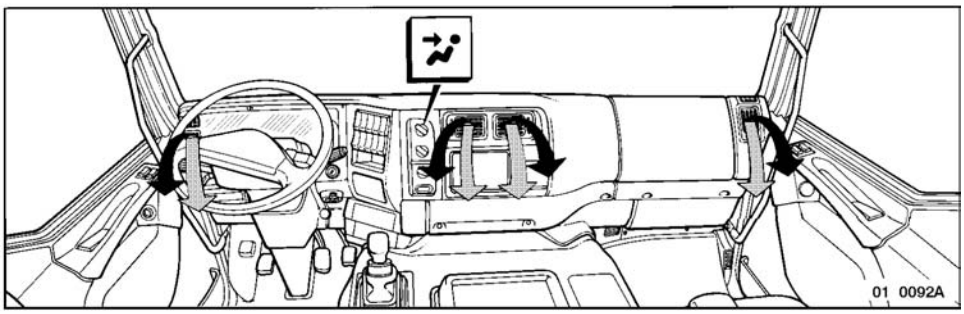
D2 air conditioning

Air distribution control knob
The control distributes the air between the various outlet ports according to the position chosen.
Combined with the temperature variator and the ventilation control, it assures optimized temperature according to the positioning of the outlets.

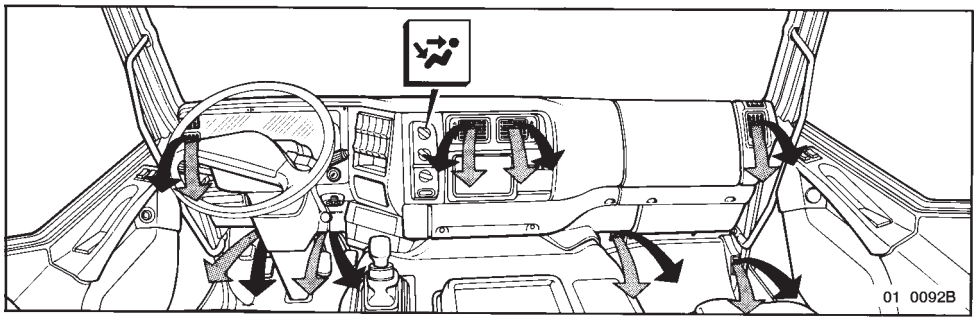


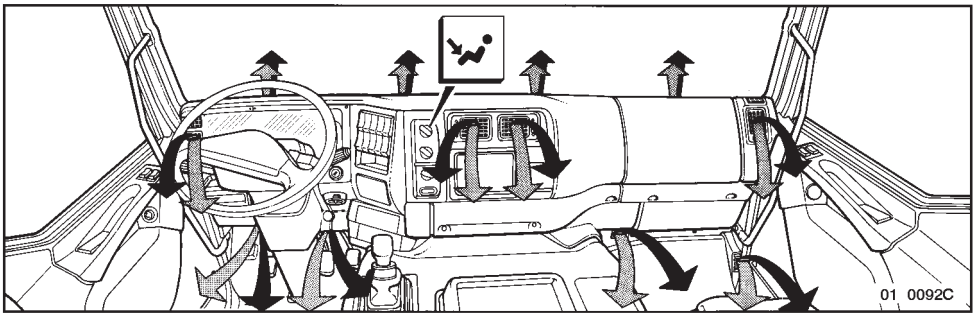
Position 1
Air directed upwards (to the dashboard air vents) and gentle flow downwards (to the footwell).
Position 2
Air directed upwards (to the dashboard air vents) and downwards (to the footwell).
Position 3
Air directed downwards (to the footwell) and gentle flow upwards (to the windscreen).
Position 4
Air directed downwards (to the footwell) and gentle flow upwards (to the windscreen and side windows).
Position 5
Air directed upwards only (to the windscreen and side windows).

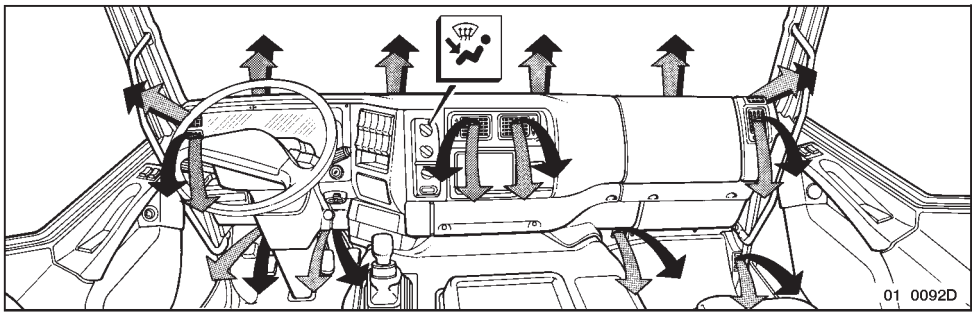
NOTE
When the side and central air vents are open, the air flow is distributed between the different ports selected for each control position.

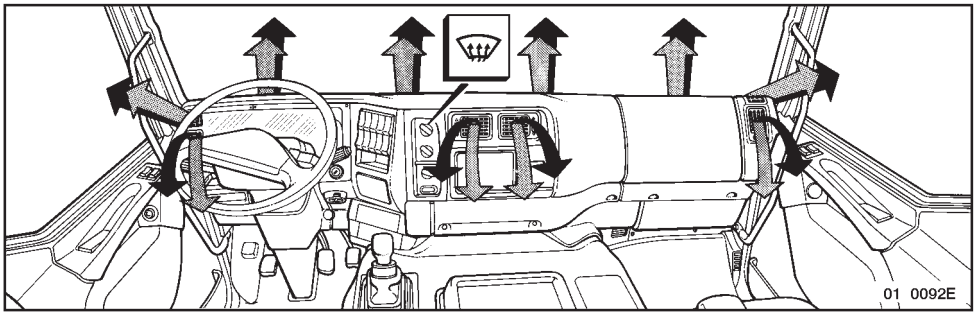


D3 air conditioning





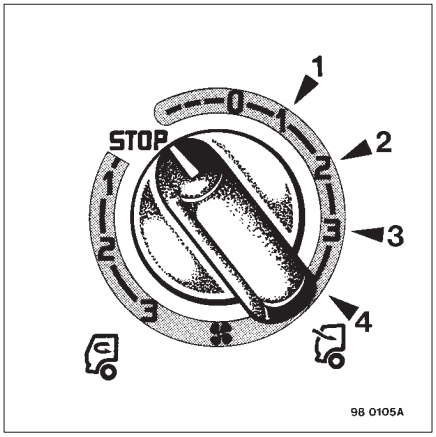




D4 air conditioning

Ventilation control knob
This control knob incorporates two features:

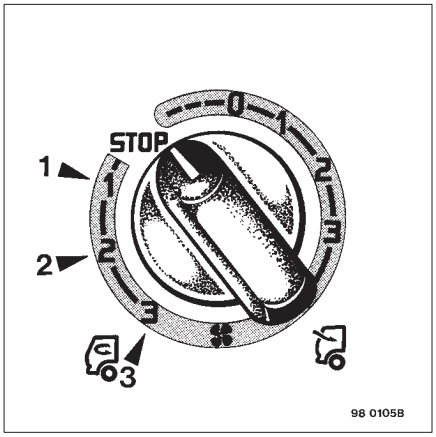
External air ventilation feature
Turn the knob clockwise:
- Position STOP: stop (air intake closed).
- Position 0: stop (air intake slightly open).
- Position 1: fan control (1st speed).
- Position 2: fan control (2nd speed).
- Position 3: fan control (3rd speed).
- Position 4: fan control (4th speed).



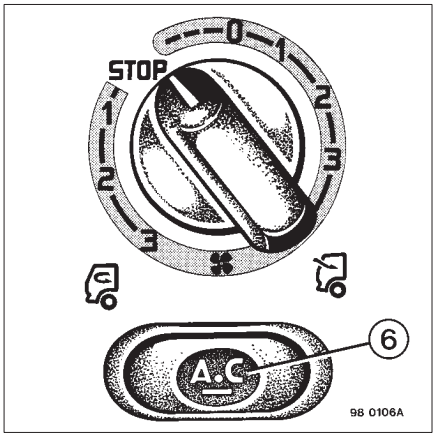
Internal air ventilation feature
Turn the knob anti–clockwise:
- Position STOP: stop (air intake closed).
- Position 1: fan control (1st speed).
- Position 2: fan control (2nd speed).
- Position 3: fan control (3rd speed).

Recycling makes it possible to:
- avoid breathing in stale air from the exte–rior (road tunnel, polluted area...),
- obtain maximum cooling or maximum heating power from the air conditioner.

Only use the recycling feature in short spells.



Air conditioner control button (6)
With the engine running, move the ventilation control knob to at least position 1 and press the air conditioner control button to operate the air conditioning.
A built–in warning light comes on when the air conditioning feature is activated.
Set the temperature variator to the desired temperature.



D5 air conditioning

Temperature variator knob
Move the temperature variator knob to the desired temperature:
– blue zone: cold
– blue/red zone: temperate
– red zone: hot.

Once you have made the adjustment, wait for a few moments to appraise the result before changing it slightly, if necessary.

Use in cold weather:
Defrosting / demisting
– Close the side and central air vents.
– Move the fan control to position “0” (external air side).
– Move the air distribution control knob to the “defrosting/demisting”.
– Move the temperature variator knob into the “hot” zone.

As soon as the temperature rises:
– Move the ventilation control knob to position 1.
With air conditioning:
– Press the air conditioner control button.
With or without air conditioning:
– Increase the air flow as the engine temperature rises.

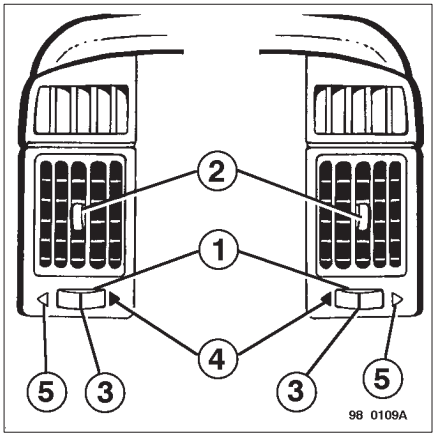
When the “defrosting/demisting” action is finished, move the temperature variator into the desired zone. The reaction time varies according to the position chosen. Maintain a minimum air flow for better efficiency.

Use in hot weather:
If the temperature inside the cab is higher than the outside temperature:
– Aerate the cab by driving for a few minutes with the windows down.
– Move the temperature variator knob to “max. cold” and the ventilation control knob to position 4 to obtain maximum air flow.
With air conditioning:
– Press the air conditioner control button.
As soon as the desired level of comfort is reached:
With or without air conditioning:
– Return the temperature variator knob to a more moderate position.
– Choose the air distribution control knob position.
– Reduce the ventilation. Maintain a minimum air flow for better efficiency (position 1 minimum).

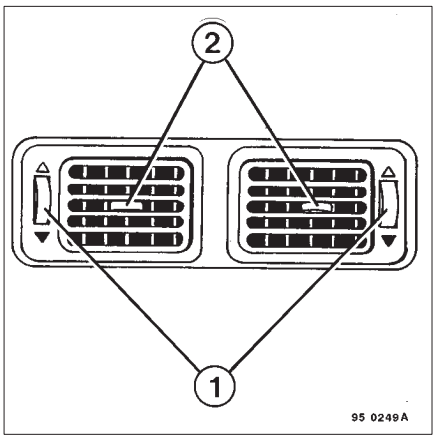
If you wish to increase the heating or cooling power, use the cab air recycling feature with the air conditioner engaged. Only use the recycling feature in short spells.

D6 air conditioning

Side air vents
These are located on each side of the dashboard.
To open: Turn knurled wheel (1), pointer (3) towards mark (4) (solid triangle).
To close: Turn knurled wheel (1), pointer (3) towards mark (5).
To swivel vertically: Use control (2).
To swivel horizontally: Tilt the air vent.



Central air vents
These are located in the middle of the dashboard.
To open: Turn knurled wheel (1) upwards.
To close: Turn knurled wheel (1) downwards.
To swivel vertically: Use control (2).
To swivel horizontally: Tilt the air vent.

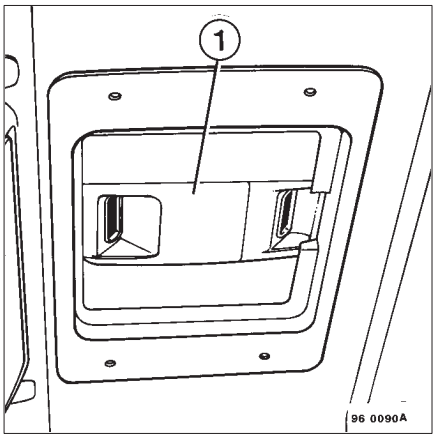


IMPORTANT
The evolution of climate control and soundproofing have led to cabs becoming more and more hermetically sealed. It is therefore necessary, when you have to stay inside the cab for a long period, to provide adequate ventilation (windows partly open, roof air vent) to avoid confinement of the air.

Depending on your vehicle's equipment

Roof air vent
To open
Push air flap (1) until the required opening is obtained.

To close
Return the flap to its original position.



D7 air conditioning

Depending on your vehicle's equipment

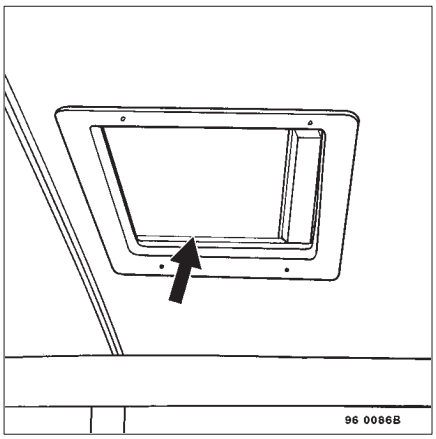
Electrically operated roof air vent

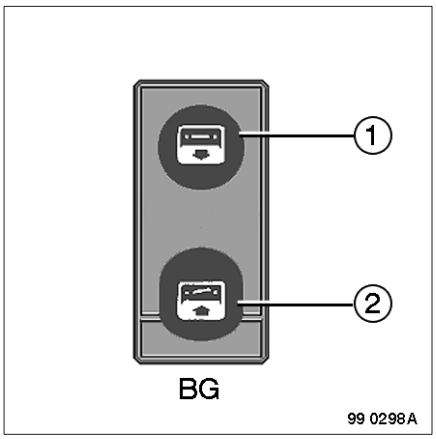
The air vent is operated by means of a 2–position control.

To open
Press end "1" of the control until the required opening is obtained.

To close
Press end "2" of the control until the flap is fully closed.

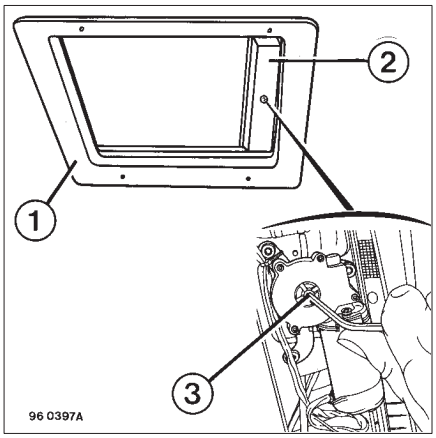
Before leaving your vehicle, as a precaution, ensure the air vent is properly closed.





Electrically operated roof air vent

In the event of problem, it is possible to operate the air vent manually.
Remove trim (2) to gain access to the emergency control.
Insert a 5 mm Allen key into socket (3). Drive in the key to release the motor clutch and turn the key to open/close the air vent.



D8 air conditioning

INDEPENDENT HEATING

IMPORTANT
The evolution of climate control and soundproofing have led to cabs becoming more and more hermetically sealed. It is therefore necessary, when you have to stay inside the cab for a long period, to provide adequate ventilation (windows partly open, roof air vent) to avoid confinement of the air.

INDEPENDENT HEATER FUEL SUPPLY

The independent add–on heater operates perfectly with commercial diesel fuel. If the heater is supplied from a separate tank, it must contain the same diesel fuel as the vehicle fuel tank. When changing over from summer diesel fuel to winter diesel fuel, run the independent heater to purge the fuel pipes.

IMPORTANT
Shut off the heater unit near filling stations. Whenever electric welding is carried out on the vehicle it is absolutely essential to disconnect the batteries to avoid destruction of the electronic monitoring system.
Stop the heater before disengaging the master switch.

D9 air conditioning

INDEPENDENT ADD–ON HEATER "AT 2 000"

Prior to making any manoeuvre, make sure the suction and discharge apertures are not obstructed. There should be nothing cluttering up the area reserved for the heater.

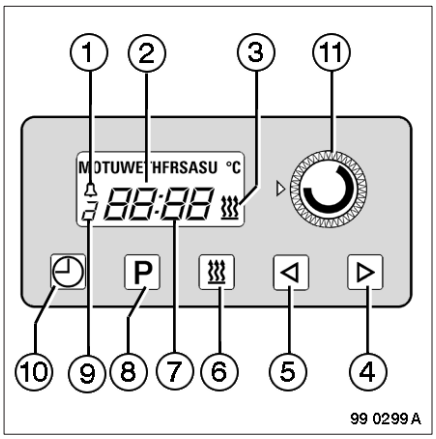
Regulating the temperature
Set the required temperature on ambient temperature thermostat (11).

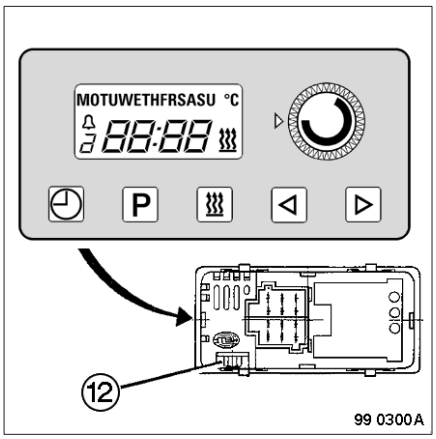
SETTING THE TIMER INTO SERVICE

When the heater is switched on, the control panel lights up.
If there is an electrical power cut at the timer, all the indications flash. Press button (10). **12: 00** is displayed and flashes for 5 seconds, then the day flashes for 5 seconds and the screen becomes dim.

Adjusting the time of day and the day
Press and hold down button (10). When the time of day display (7) flashes, press button (4) or (5) to set the time of day.
When the day display (2) flashes, press buttons (4–5) to set the day.

mo	**tu**	**we**	**th**	**fr**	**sa**	**su**
Mon	Tues	Wed	Thurs	Fri	Sat	Sun





Replacing bulb (12)
A kit sold by RENAULT TRUCKS Spare Parts with directions for use serves for replacing the control panel bulb.

D10 air conditioning

Depending on your vehicle's equipment

Alarm clock function

Press button (8) four times. The "alarm clock" symbol (1) (a bell) appears. Press button (4) or (5) to make the time of day display flash. Adjust the time of day (7) using buttons (4 – 5). The time of day display (7) disappears after 5 seconds. Choice of the day is not possible.

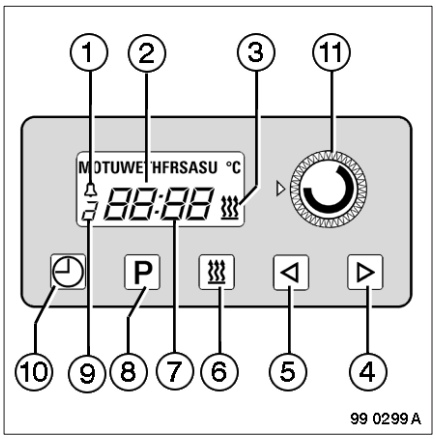
To activate:

Press button (8) four times. The "alarm clock" symbol (1) (a bell) appears.

The buzzer goes off at the preselected time and stops, either automatically after 5 minutes, or by pressing button (4) or (5).

To de–activate:

Press buttons (8) five times. The "alarm clock" symbol (1) (a bell) disappears.



Diagnostics socket (1)

The diagnostics socket serves to check the state of the independent add–on heater using the RENAULT TRUCKS tester.

D11 air conditioning

Engage the master switch.

HEATING FEATURE

Start–up without programming
Press button (6). Symbol (3) appears together with the heating period of time.
Press buttons (4–5) to alter the heating period of time. See “Heating operating time” paragraph to memorize the period of time.
The flame glow plug is supplied with voltage and the blower runs at low speed. After about 30 seconds, combustion commences. Check that the heater is operating correctly. The blower speed varies according to temperature.

Start–up with programming
3 time of day and day possibilities:

Selection 1: Press button (8) once. Warning display “1” (9) flashes. Press buttons (4–5) to select the time of day. Wait for the day display to flash and press buttons (4–5) to choose the day. The selection is memorized. Warning display “1” stays on. The time of day display (7) disappears after 10 seconds.
Selection 2: Press button (8) twice. Warning display “2” (9) flashes. Proceed as per selection 1 to adjust the time of day and the day.
Selection 3: Press button (8) three times. Warning display “3” (9) flashes. Proceed as per selection 1 to adjust the time of day and the day.

Heating operating time:
The timer has a heating duration limited to 120 minutes.
“Heating de–activated”: Press button (5) for 3 seconds: a heating duration display appears. As soon as it flashes, press buttons (4–5) to adjust the duration (adjustment from 10 to 120 minutes possible). The screen goes dim, the heating duration is memorized. This heating time is common to all heating selections.
“Heating activated”: You can alter the heating duration at any moment when it is activated. Press button (4) or (5) to alter the duration (adjustment from 1 to 120 minutes possible). Such forced duration does not modify the memorized duration.

When the heating is started up again (forced or preselected mode), the memorized duration is displayed.

To activate a preselection:
Press button (8) once, twice or three times, depending on the chosen selection. The corresponding warning display (9) appears.
To de–activate a preselection:
If you have activated a preselection, press button (8) several times until the selections disappear.

Stopping
Press button (6). Warning light (3) disappears together with the preselection. The blower continues turning to cool the heater (retarded shutdown) and stops automatically.

D12 air conditioning

TROUBLESHOOTING

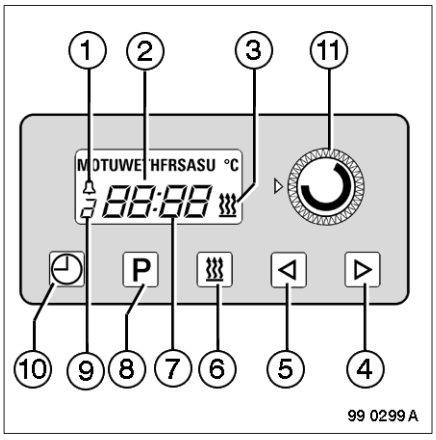
Heater will not start:
The control panel allows the heating function to be programmed, but the heater will not start.
Check fuse (F22). Actuate button (6) again.
The control panel no longer displays any information. Check fuse (F34).
Reprogram the timer and actuate button (6) again.
If after the starting cycle, the heater will not start, call in a qualified agent.

Heater stops when in operation:
Heater overheating:
Make sure the suction and discharge apertures are not obstructed.
After a few minutes, restart the heater (warning light (3) visible).
If it stops again, call in a qualified agent.

Flame goes out: Determine the cause.
- . Fuel supply defect.
- . Electrical power supply failure.
- . Appliance or regulation control unit defect.

To restart, press button (6) and repeat the procedure (no more than three times).
If the heater stops again, call in a qualified agent.

IMPORTANT
If the vehicle is laid up for a prolonged period of time, remove fuse (F34).
It is forbidden to use the heater in closed premises or in places where inflammable or explosive vapours or accumulations of dust might be present.
Avoid exposing gas cartridges and spray canisters to the hot air flow.
If electric welding work is carried out on the vehicle, it is essential to disconnect the batteries to prevent causing irreparable damage to the electronic monitoring system.
Stop the heater before disengaging the master switch.



E1 consumable products

LUBRICANTS

Adapt the viscosity of the oil used to the climatic conditions of the region in which you use your vehicle.
The use of lower grade oil calls for more frequent oil changes. Our dealer is at your disposal to advise you.

Engine oil filter cartridge
For correct engine functioning and long service life, use original filters only. Their filtration threshold and filtering capacity have been specially studied by the manufacturer.

Diesel fuel
The sulphur content of the diesel fuel is taken into account by the oil wear calculation system and must be configured without fail (see page C20).
If the fixed engine oil change interval is chosen, it must be divided by two if the sulphur content is more than 0.3%.

Greasing the king pin
For street gutter sweepers, double the greasing frequency.

Engine oil(s)

Renault Trucks Oils	RENAULT TRUCKS specifications
Maxima 15 W 40 / Maxima Eco 15 W 30	**RD**
Maxima RLD 15 W 40 / Maxima RLD Eco 10 W 30	**RLD**
Extensia 10 W 40 / Extensia Eco 5 W 30	**RXD**

RD: Specification for RENAULT TRUCKS lubricant to level ACEA 99–E3.

RLD: Specification for RENAULT TRUCKS lubricant to level ACEA 99–E5 and meeting the requirements of test MACK T9 according to specification MACK EO–M PLUS.

RXD: Specification for RENAULT TRUCKS lubricant to level ACEA E4–99 and meeting the requirements of test MACK T9 according to specification MACK EO–M PLUS.

E2 consumable products

Gearbox oils

Renault Trucks Oil	API standards
Prexima 40	CF–4 / SF
Longevia 75 W 80	GL4*

75W80 (GL4)*: Synthetic oil conforming to ZF specifications: TE–ML 02 (ZFN 13010)

For the choice of lubricants according to operating temperatures, see pages E3 – E4.

Drive axle oil 669 / P 920 SL / P 1120 SL / P 1121 SL

Renault Trucks Oils	API standards
HD Eco 80 W 90	GL5
HD 80 W 90	GL5
Longevia P 80 W 90	GL5**
Longevia PXD 75 W 90	GL5**

Drive axle oil P 1170

Renault Trucks Oils	API standards
Longevia P 80 W 90	GL5**
Longevia PXD 75 W 90	GL5**

(GL5) High temperature extreme pressure oil conforming to oxidation test N° CEC L48A95 at 140° C.**

For the choice of lubricants according to operating temperatures, see pages E3 – E4.

E3 consumable products

INTERNATIONAL STANDARDS

Choice of lubricants according to operating temperature

Engine

Oil	**Operating temperature**
SAE 5 W 30	– 25°C to + 30°C
SAE 10 W 30	– 20°C to + 30°C
SAE 10 W 40	– 20°C to + 50°C
SAE 15 W 30	– 15°C to + 30°C
SAE 15 W 40	– 15°C to + 50°C

Gearbox ZF / EATON

Power take–off

Oil	**MIL–L**	**API**	**Operating temperature**
SAE 40	2104 E	CE / SF	– 10°C to + 40°C
SAE 75 W 80	2105	GL4*	– 25°C to + 40°C

75W80 (GL4)*: Synthetic oil conforming to ZF specifications: TE–ML 02 (ZFN 13010)

Rear drive axle 669 / P 920 SL / P 1120 SL / P 1121 SL

Wheel hubs

Hub reduction units

Oil	**MIL–L**	**API**	**Operating temperature**
SAE 80 W 90	2105 D	GL5	– 25°C to + 30°C
SAE 75 W 90	2105 D	GL5**	– 35°C to + 40°C

Rear drive axle P 1170

Wheel hubs

Oil	**MIL–L**	**API**	**Operating temperature**
SAE 80 W 90	2105 D	GL5**	– 25°C to > + 50°C
SAE 75 W 90	2105 D	GL5**	– 35°C to + 40°C

(GL5) High temperature extreme pressure oil conforming to oxidation test N° CEC L48A95 at 140° C.**

E4 consumable products

We recommend Renault Trucks Oils

Choice of lubricants according to operating temperature

Engine

Oil	**Operating temperature**
Maxima 15 W 40	– 15°C to + 50°C
Maxima ECO 15 W 30	– 15°C to + 30°C
Maxima RLD 15 W 40	– 15°C to + 50°C
Maxima RLD ECO 10 W 30	– 20°C to + 30°C
Extensia 10 W 40	– 20°C to + 50°C
Extensia ECO 5 W 30	– 25°C to + 30°C

Gearbox ZF / EATON

Power take–off

Oil	**Operating temperature**
Prexima 40	– 10°C to + 40°C
Longevia 75W80	– 25°C to + 40°C

Rear drive axle 669 / P 920 SL / P 1120 SL / P 1121 SL

Wheel hubs

Hub reduction units

Oil	**Operating temperature**
HD 80 W 90	– 25°C to + 30°C
HD ECO 80 W 90	– 25°C to + 30°C
Longevia P 80 W 90	– 25°C to + 50°C
Longevia PXD 75 W 90	– 35°C to + 40°C

Rear drive axle P 1170

Wheel hubs

Oil	**Operating temperature**
Longevia P 80 W 90	– 25°C to + 50°C
Longevia PDX 75 W 90	– 35°C to + 40°C

E5 consumable products

Hydraulic system(s)

Circuit	Renault Trucks Oils	Standards
Clutch	FLUID FE 4	SAE J 1703 F / DOT4
Brake	FLUID FE 4	SAE J 1703 F / DOT4
Steering	STARMATIC 3	ATF DEXRON III
Cab tilting T>–15°C	STARMATIC 3	ATF DEXRON III
Cab tilting T<–15°C	ST 15M	HV ISO 15
Engine coolant	Ultracooling Plus	RENAULT Type D*

* : Organic

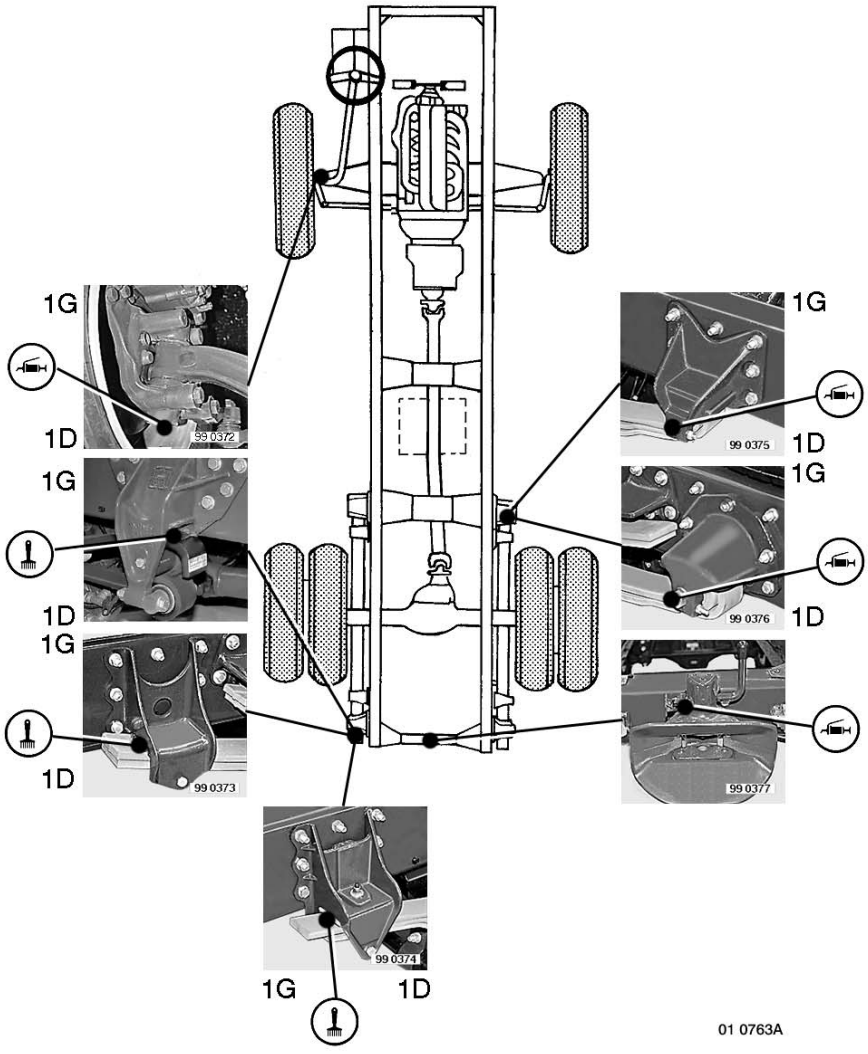
Grease

..... RAE ..... NLGI 2 lithium soap grease
EP additive

Greasing

2 G	Two grease nipples on left	Location on chassis
1 D	One grease nipple on right	

E6 consumable products



F1 servicing

WARRANTY

Servicing is the prime guarantee
Recommended inspection and servicing intervals are given as a guide and are intended for vehicles operating under normal road conditions. The tougher the operating conditions, the shorter the service and inspection intervals. In some cases it will be necessary to consider servicing and inspection intervals in terms of hours rather than mileage. The Manufacturer cannot be held responsible for damage caused by driving errors, or failure to comply with the recommendations made in this handbook, particularly regarding the use of lubricants that are not in conformity with the performance specifications given.

First service: see recommendations pages F5 → F8.
This is obligatory and **at the customer's expense**.

NOTE
The engine lubrication system is to be topped up with **E3 (RD)** grade oil until the first service is performed. Subsequently, the choice of oil to be used is defined by the customer according to use of the vehicle.

Implementation of the above checks are essential for the validity of vehicle warranty. To obtain these inspections, consult your normal dealer and give him the warranty certificate you received when the vehicle was supplied.

Lubrication
The manufacturer specifies the performance levels of the lubricants required for the correct operation of the vehicles supplied, and also defines the lubrication intervals.

These recommendations must be strictly followed.
Their observance will increase the service life of the equipment and components. Failure to comply can invalidate the warranty offered.

IMPORTANT
Draining major units: always drain oils on level ground with the oils hot to aid the flow. When refitting the drain plugs, fit new gaskets.

Checking the oil levels (all major units). Oil levels must always be checked on flat ground and conditions should always be identical (i.e. vehicle empty or laden). Wait for 5 minutes after the vehicle has stopped before carrying out the check.

NOTE
Engine oil level: for a more accurate reading, the oil level should be checked when the engine is cold, after prolonged shutdown (2 hours minimum), in the morning, prior to start–up, for example:
- Vehicle with mechanical suspension: check the level with the vehicle empty.
- Vehicle with air suspension: check the level with the suspension in the "road" position.

Road tests
After the first service, the dealer should make sure that the user clearly understands all the driving and servicing instructions in the handbook.

F2 servicing

SERVICING FREQUENCIES
Your vehicle is equipped with a system for optimizing servicing intervals in relation to its use. The maintenance alert warning pictogram (G9) is displayed on the instrument panel to warn the driver that the term for a maintenance operation is close or due, based on the works parameter definitions.
If the pictogram is displayed, with the vehicle at a standstill, consult the maintenance menu on the display (see page C18 – C19) to visualize the term and the operation(s) concerned.
The display is shown in kilometres, date or engine operating time depending on which term is closest.

Table of maintenance features consultable on the dashboard display in relation to parameter definitions

Component	Fixed	Predictive	km	Date	Time
Engine oil	x*	X	X		
Gearbox oil	X		X	X	X
Drive axle oil	X		X	X	X
Coolant	X		X	X	X
Brake linings	X		X	X	X
Drive belts	X		X	X	X
Air filter	X		X	X	X
Air dryer	X		X	X	X
Regulatory test	X			X	
Tachograph test	X			X	

x* : Fixed up to M0, then predictive.

New vehicle: only engine and air dryer maintenance features are active. At the time of the first maintenance operations (M0), it is possible to initialize the other components, as well as the type of maintenance best suited to the use of your vehicle (predictive or fixed), using the INFOMAX software or the RENAULT TRUCKS DIAGNOSTICA tool. To do this, consult a dealer.
Predictive maintenance: means that the terms are worked out by the onboard electronic boxes and vary according to vehicle use.
Fixed maintenance: means that the terms are predetermined and invariable.

F3 servicing

First oil change (first term reached)

UNIT	KM	
	All uses	
Engine DCI 4	15 000 or 6 months (M0)	
Engine DCI 6	20 000 or 6 months (M0)	
Drive axle Wheel hubs or reduction gears	15/20 000 or 6 months (M0)	
	Harsh use	**Standard use**
ZF gearbox PTO	240 000 or 2 years	300 000 or 2 years
EATON gearbox PTO	200 000 or 2 years	300 000 or 3 years

IMPORTANT
1 hour's operation = 50 km.
Every 10 000 km: Grease the fifth wheel locking mechanism and the towing hook.

F4 servicing

Maximum intervals after the first oil change (first term reached)

UNIT	RENAULT TRUCKS OILS	KM	
		All uses	
		Predictive maintenance	Fixed maintenance
Engine DCI 4	Maxima Eco Maxima	Term calculated according to use, oil grade, fuel sulphur rate	20 000 or 2 years
	Maxima RLD Eco Maxima RLD		
	Extensia Eco Extensia		
Engine DCI 6	Maxima Eco Maxima		
	Maxima RLD Eco Maxima RLD		
	Extensia Eco Extensia		

UNIT	RENAULT TRUCKS OILS	KM	
		Fixed maintenance	
		Harsh use	Standard use
ZF gearbox PTO	Prexima 40	120 000 or 2 years	160 000 or 2 years
	Longevia 75W80	240 000 or 2 years	300 000 or 2 years
EATON gearbox PTO	Prexima 40	90 000 or 2 years	160 000 or 2 years
	Longevia 75W80	200 000 or 2 years	300 000 or 3 years
Drive axle P 669 – P 920 SL – P 1120 SL – P 1121 Wheel hubs or reduction gears	HD 80W90 HD Eco 80W90	80 000 or 2 years	120 000 or 2 years
	Longevia P 80W90	120 000 or 2 years	240 000 or 2 years
	Longevia PXD 75W90	240 000 or 2 years	400 000 or 3 years
Drive axle P 1170 Wheel hubs	Longevia P 80W90	120 000 or 2 years	240 000 or 2 years
	Longevia PXD 75W90	240 000 or 2 years	400 000 or 3 years

IMPORTANT
1 hour's operation = 50 km.
Every 10 000 km: Grease the fifth wheel locking mechanism and the towing hook.

F5 servicing

M0: First maintenance (at time of first engine oil change)
M1: With each engine oil change (as from the second engine oil change)
M3: Every year
MP: Special maintenance
A : Every 100 / 120 000 km
B : Every year or 100 / 120 000 km
C : Every 2 years or 100 / 120 000 km
D : Every 2 years or 180 / 200 000 km
E : Every 3 years or 360 / 400 000 km

SERVICE	M0	M1	M3	MP
Drain and refill:				
Gearbox / PTO (see page **F3/F4**)				X
Hydraulic servo clutch system				E
Cooling system and replace pressure–vacuum cap				E
Engine	X	X		
Rear drive axle(s) (**see page F3/F4)**	X			X
Hub reduction units (**see page F3/F4**)	X			X
Fuel tank (drain water)			X	
Carry out the following:				
Replace preheat plugs **(DCI 4)**				B
Replace air dryer cartridge				C
Renew power steering reservoir filter element				E
Renew fuel filter element(s)	X	X		
Replace engine oil filter cartridge(s)	X	X		
Replace drive belts				A
Replace fan coil heater filter			X	
Renew chilling fluid and dehydrator filter				D
Replace the fuel prefilter				B
Lubricate all points without grease nipples: door hinges, locks, striker plates, cab lock, etc.			X	
Grease all points	X	X		
Drain fuel prefilter	X	X		
Drain air tanks	X	X	X	
Adjust valve rocker clearances				A

F6 servicing

M0: First maintenance (at time of first engine oil change)
M1: With each engine oil change (as from the second engine oil change)
M3: Every year
MP: Special maintenance

SERVICE	M0	M1	M3	MP
Clean:				
Air conditioner condenser by blowing low pressure compressed air (or hot water) from the engine side of the condenser **(Carry out this operation early in spring or summer)**			X	
Fuel prefilter(s) sediment bowl and filter element	X	X		
Cab heater inlet filter		X		
Automatic bleed valve filter			X	
Radiator(s) by blowing low pressure compressed air (or hot water) from the engine side of the radiator **(Carry out this operation early in spring or summer)**			X	
Electric retarder			X	
Check:				
Batteries (attachment), battery isolation switch (operation)		X		
Major units for leaks	X	X		
Air supply system for leaks (position of hoses, tightness of clamps...)	X	X		
Condition of wiring harnesses, supports, pipes		X		
Condition of brake discs and pads	X	X		
Condition of steering components (hub/swivel play)		X		
Condition of suspension springs, pads and front and rear anti–roll bars		X		
Condition and security of fastening of engine cooling system preheater wiring harnesses and connections			X	
Condition and security of engine, transmission and radiator rubber sandwich mountings			X	
Condition and tension of drive belts	X	X		
Condition and wear of tyres, spare wheel and security of attachment		X		
General condition of bodywork (doors, locks, remote controls)		X		

F7 servicing

M0: First maintenance (at time of first engine oil change)
M1: With each engine oil change (as from the second engine oil change)
M3: Every year
MP: Special maintenance

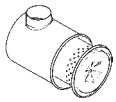
SERVICE	M0	M1	M3	MP
Check:				
Cab mounting security		X		
Attachment and condition of shock absorbers		X		
Operation of steering		X		
Operation of signalling devices (lighting, headlamps, marker lights, stop lights, reversing lights, overhead lights, windscreen wiper, horns, etc.)		X		
Independent heating operation			X	
Operation of air filter clogging indicator		X	X	
Operation of electric retarder and exhaust brake		X		
Cab locking system for correct operation (by a dealer or approved agent)		X	X	
Operation of towing hook locking and safety system (rigid vehicle)		X		
Operation of 5th wheel attachment and locking system (tractor)		X		
Operation of dashboard instrumentation (warning lights, pressure gauges, heating controls)		X		
Air filter inlet grille (clean if necessary)			X	
Clutch wear indicators		X		
Propeller shaft(s) play		X		
End play of electric retarder bearings and air gap			X	
Clearance between fifth wheel coupling and semi–trailer (**see page F46**)		X		
Clutch release servo slave cylinder piston travel			X	
Cooling system degree of protection			X	
Circuits for leaks (fuel, braking, auxiliary equipment, steering, cooling)	X	X		
Atmospheric venting of fuel tanks		X		
Gearshifting and reaction of clutch, clutch clearance		X		

F8 servicing

M0: First maintenance (at time of first engine oil change)
M1: With each engine oil change (as from the second engine oil change)
M3: Every year
MP: Special maintenance

SERVICE	M0	M1	M3	MP
Check:				
Tyre and spare wheel inflation pressures	X	X		
External cleanliness of radiator cores		X		
Drain air tanks		X		
Braking reaction and directional stability		X		
Wheel nut tightness	X			
Security of prop shaft universal joint nuts and bolts			X	
Air suspension and remote control		X		
All levels	X	X	X	

AIR FILTRATION



Replace dry air filter cartridge and clean bowl

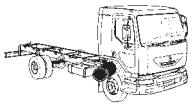
"Express" vehicle (> 80,000 km / year)

3 years

2 years

2 years

1 year



2 years

1 year

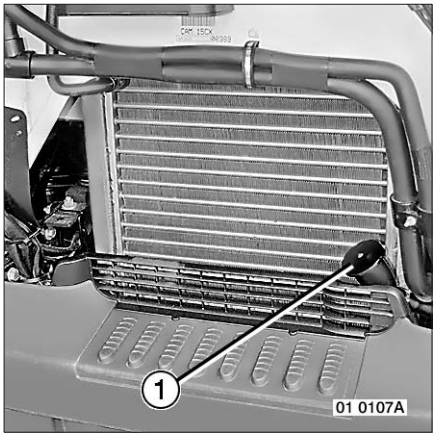
ENGINE

Type DCI 4

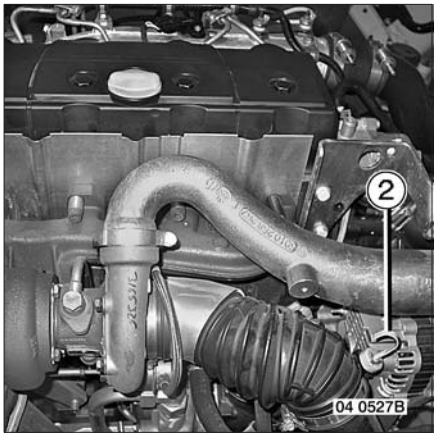
Check the oil level with dipstick (2).

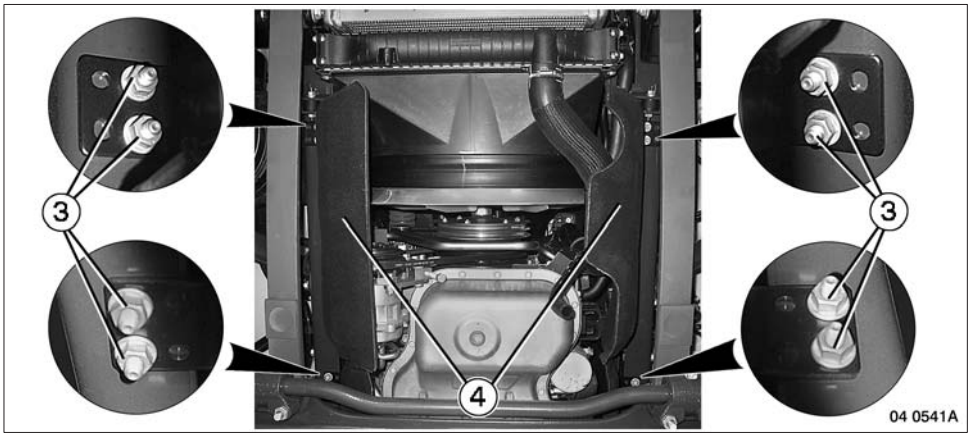
If necessary, top up with oil through port (1).

To gain access to the underside of the engine, withdraw setscrews (3) and remove soundproofing screen (4).
After completing the work, refit the soundproofing screen in its correct position.

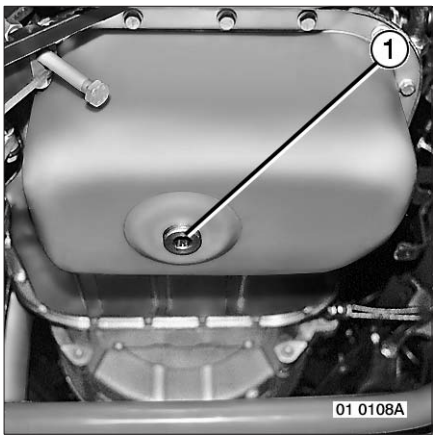


Depending on your vehicle's equipment
Soundproofing screens (4)
Any damage to the interior protective film of the screen requires replacement of the film.
See that no flammable products are applied to the screen protective films. The screens are to be cleaned using a cloth. If necessary, use soapy water (any other product is strictly forbidden).
The application of any solvent or paint on the inner and outer faces of soundproofing screens is strictly forbidden.



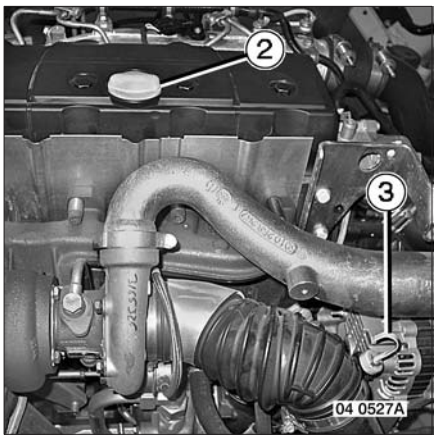


Drain plug (1).



Filler plug (2).

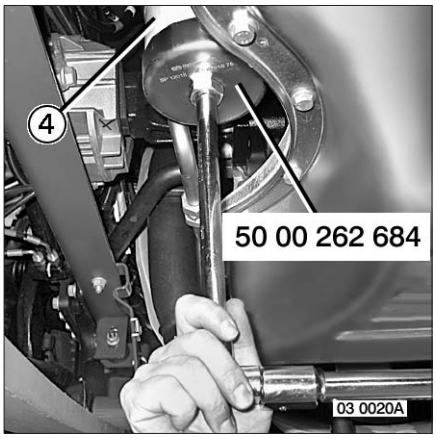
Check the oil level with dipstick (3).



OIL FILTERS

Oil filter with throw–away cartridge(s)
To replace, unscrew the cartridge(s) (4).
When fitting:
Fill the cartridge(s) (4) with oil.
Oil the seals.
Tighten the cartridge(s) by hand until contact is made with the filter head.

IMPORTANT
– Tighten to a torque of 25^{+5} Nm
– Use tool part N° 5000262655
– Use a torque wrench.



Run the engine and check for leaks.
In the event of leakage, remove the cartridge, inspect the joint face and repeat the fitting operations

WARNING

Fit only cartridges references **50 10 240 400**.

F11 servicing

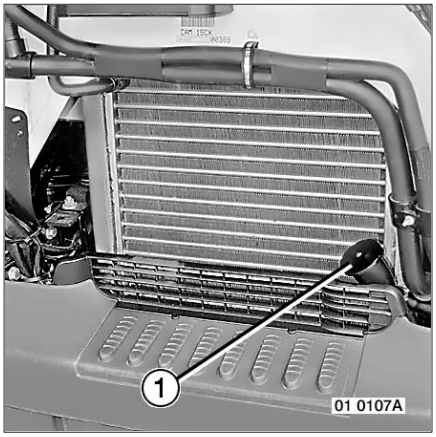
ENGINE

Type DCI 6

Check the oil level with dipstick (2).

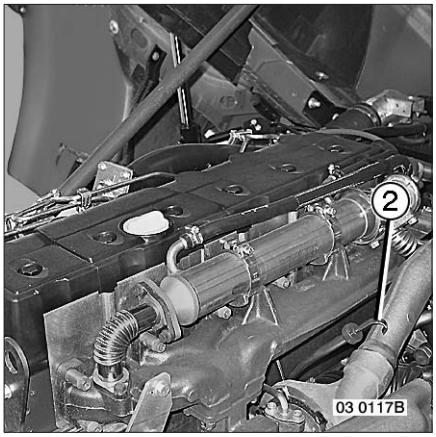
If necessary, top up with oil through port (1).

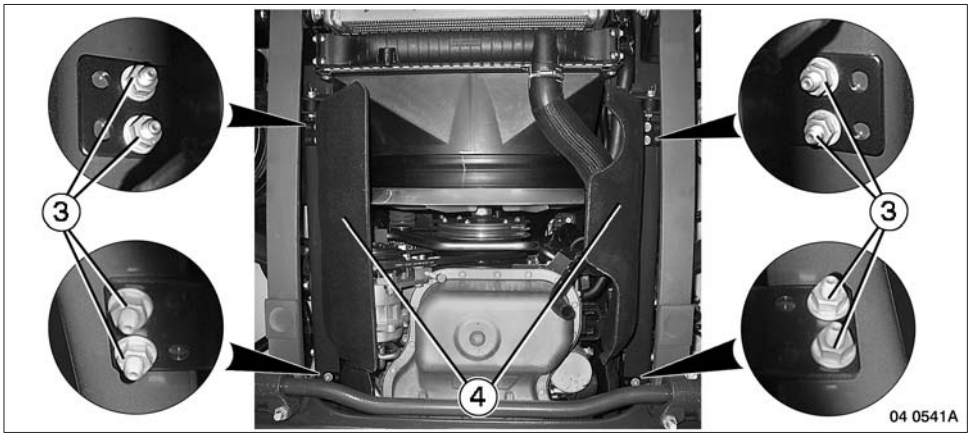
To gain access to the underside of the engine, withdraw setscrews (3) and remove soundproofing screen (4).
After completing the work, refit the soundproofing screen in its correct position.



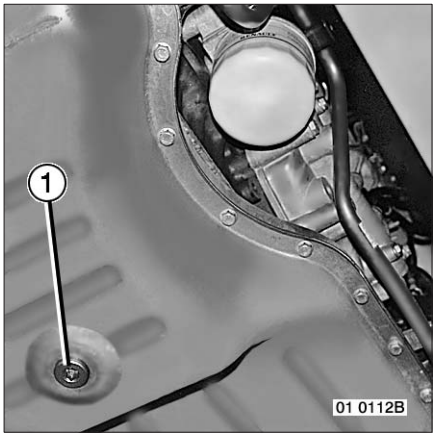
Depending on your vehicle's equipment

Soundproofing screens (4)
Any damage to the interior protective film of the screen requires replacement of the film.
See that no flammable products are applied to the screen protective films. The screens are to be cleaned using a cloth. If necessary, use soapy water (any other product is strictly forbidden).
The application of any solvent or paint on the inner and outer faces of soundproofing screens is strictly forbidden.



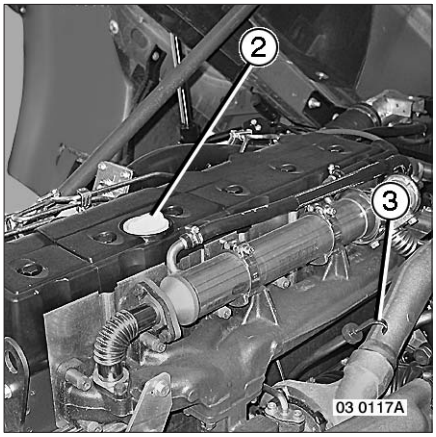


Drain plug (1).



Filler plug (2).

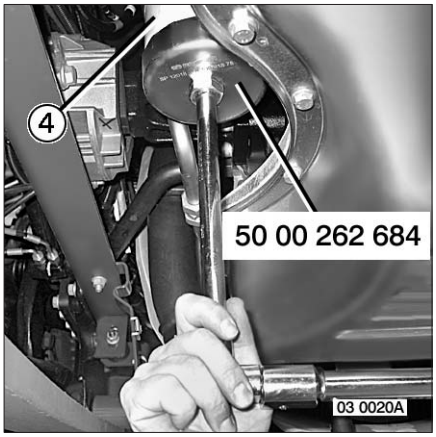
Check the oil level with dipstick (3).



OIL FILTERS

Oil filter with throw–away cartridge(s)
To replace, unscrew the cartridge(s) (4).
When fitting:
Fill the cartridge(s) (4) with oil.
Oil the seals.
Tighten the cartridge(s) by hand until contact is made with the filter head.

IMPORTANT
– Tighten to a torque of 25^{+5} Nm
– Use tool part N° 5000262655
– Use a torque wrench.



Run the engine and check for leaks.
In the event of leakage, remove the cartridge, inspect the joint face and repeat the fitting operations

WARNING

Fit only cartridges reference **50 00 670 700**.

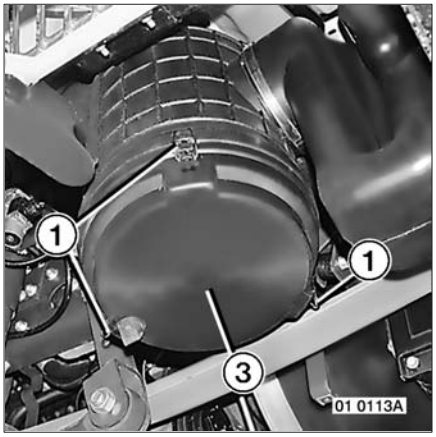
AIR FILTERS

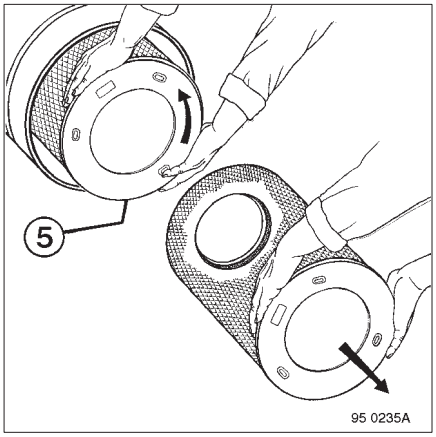
Depending on your vehicle's equipment

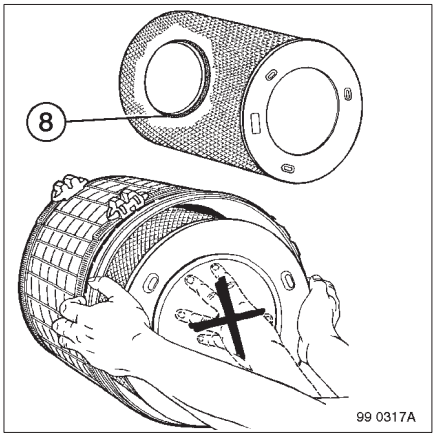
Dry element air filter
When the clogging indicator gives the alert, or once a year, replace element (5).
Undo clips (1). Withdraw cover (3).
Remove element (5). Turn and pull out the element.

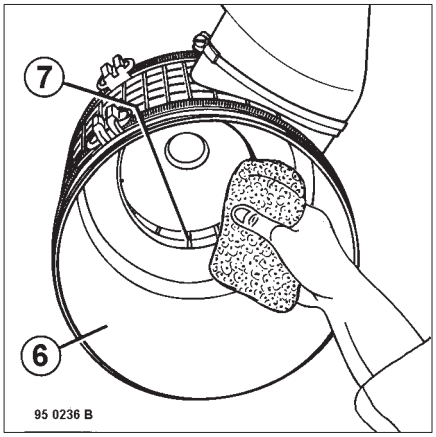
Prior to installing the element, clean and carefully inspect the bowl (6) and the sealing zone (7). The sealing zone should not be damaged.
The new element should be free from signs of knocks and distortion. Inspect sealing zone (8) in particular.
Upon assembly, ensure the element is correctly positioned. Exert firm pressure on the ends of the elements.
Before clipping the cover (3) shut, check it is clean and position the bleed valve facing the rear of the vehicle.

Bleed valve
Check that the valve is not blocked (pressure on the lip extremities).
Clean if necessary.
If damaged, replace.









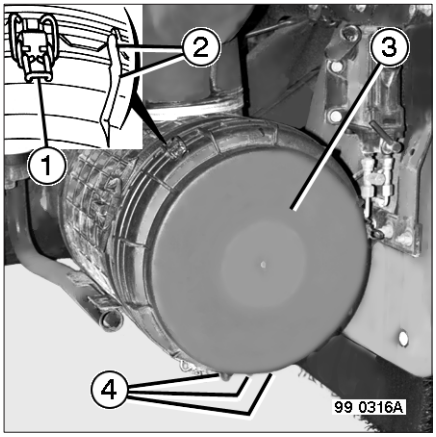
F14 servicing

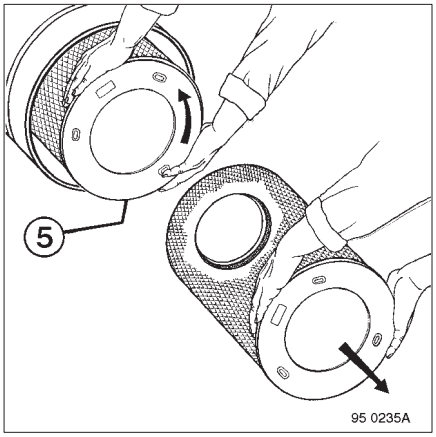
Depending on your vehicle's equipment

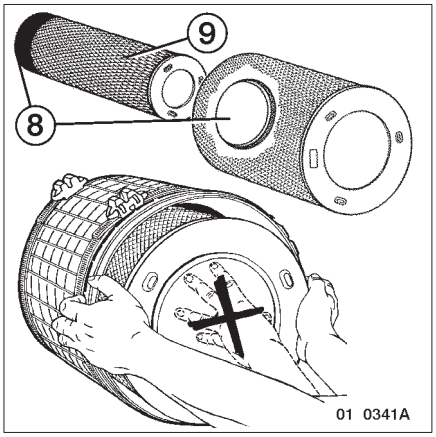
Dry element air filter
When the clogging indicator gives the alert, or at the recommended servicing frequencies, replace primary element (5).
Undo clips (1). Withdraw cover (3).
Remove primary element (5). Turn and pull out the element.

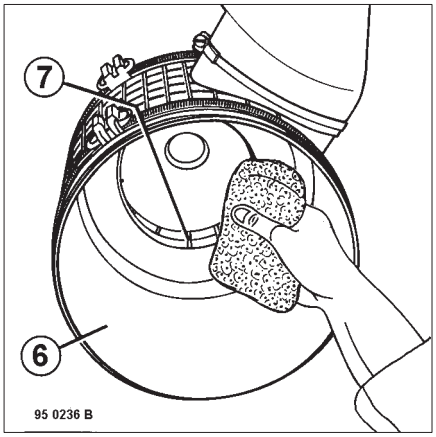
Depending on the assembly, the filter is fitted with a safety element (9). Replace safety element (9) every three primary element changes (5).

Prior to installing the element, clean and carefully inspect the bowl (6) and the sealing zone (7). The sealing zone should not be damaged.
The new element should be free from signs of knocks and distortion. Inspect sealing zone (8) in particular.
Upon assembly, ensure the element is correctly positioned. Exert firm pressure on the ends of the element.
Before clipping the cover (3), check it is clean and ensure that the drain holes (4) are not obstructed. Position the cover according to pointer (2).





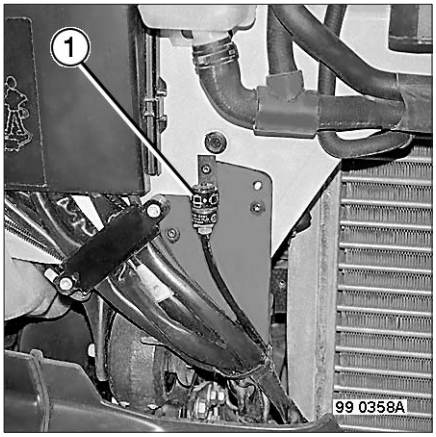




Clogging indicator (1)
To be checked regularly.
If the pointer is situated in the:

Transparent zone
This means the filter cartridge is not clogged. This indication is valid only if the unit (filter/ piping) is hermetically sealed and the element is not torn.

Red zone
This means the filter cartridge is clogged. Each time after replacing the cartridge press the diaphragm to reset the indicator.
Regularly check that the clogging indicator is working correctly by blanking off the inlet to the filter (engine running at 1500 rpm). Then reset.



F16 servicing

COOLING SYSTEM

Protecting the system throughout the year
This vehicle is supplied with Renault Trucks Oils “ULTRACOOLING PLUS” which is in conformity with RENAULT TRUCKS specifications. Besides its antifreeze properties, this fluid ensures protection of the cooling system (anticorrosion, scale inhibition, etc.). It gives frost protection in temperatures down to –25°C.
For temperatures below this, it is essential to replace part of the cooling fluid with undiluted “MAXIGEL PLUS”.
. + 5 % of “MAXIGEL PLUS” for circuit protection down to –33°C.
. + 10 % of “MAXIGEL PLUS” for circuit protection down to –40°C.

NOTE
Coolant can remain in the cooling circuit for 3 years or 400,000 kilometres.
In all countries, whatever the climate or the season, only use “ULTRACOOLING PLUS” coolant.
Depending on the destination, the vehicle is delivered with cooling system filled with a “ULTRACOOLING PLUS –35” (cold climate) coolant mix. This protection is indicated on a label affixed to the vehicle.

CAUTION
Never mix the recommended coolant with other anti–freezes or coolants. It is strictly forbidden to use additives.

Radiator(s): external cleaning
Once a year, preferably at the beginning of spring or summer, or if the water temperature “DANGER” warning light comes on, clean the radiator tube bank by blowing compressed air or a high pressure hot water/detergent mixture through the radiator core from the engine side.

IMPORTANT
Never use greasy products such as kerosene, paraffin, diesel fuel, etc.

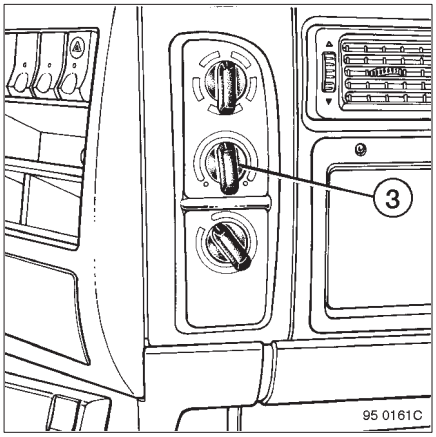
Viscous fan
The engagement of this fan depends on the temperature of the cooling air after it has passed through the radiator. If the fan fails to engage for any length of time and the water temperature exceeds 95°C on the temperature gauge, get the fan repaired by qualified personnel (dealer or approved agent).

Draining the system

IMPORTANT
If, for some reason, it is necessary to check the coolant level when the engine is hot, first of all carefully release the pressure–vacuum cap (1) by 1/4 of a turn to decompress the system. Once the pressure is released, retighten the pressure–vacuum cap. Then remove the filler cap and top up if necessary.

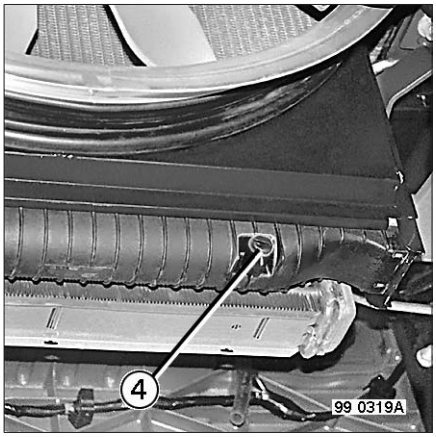
Set temperature control (3) to “maximum heat”.

Remove filler cap (2).



Remove radiator drain plug (4).

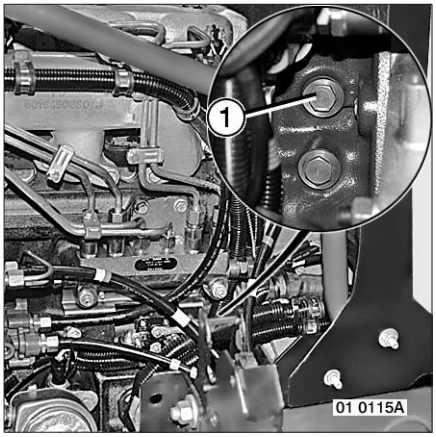
Before withdrawing the drain plug (4), make sure you can do so without danger (risk of burning).



F18 servicing

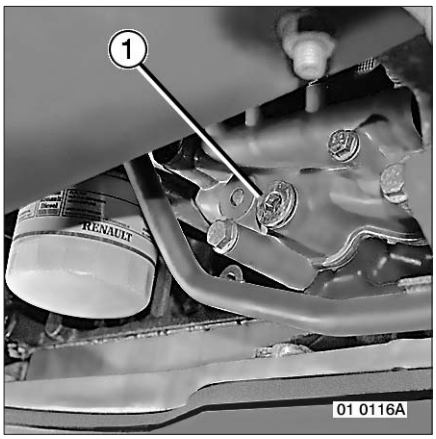
Type DCI 4

Remove engine block drain plug (1).



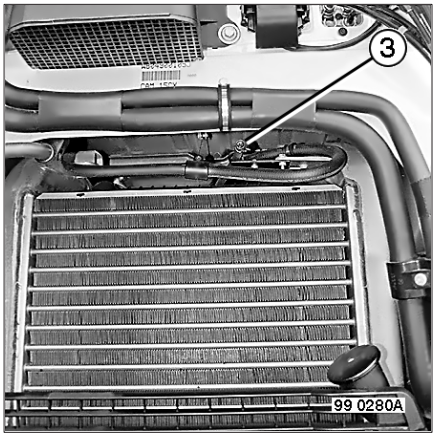
Type DCI 6

Remove heat exchanger plug(s) (1).



Filling the system
Check that the drain plugs are quite tight.
Open bleed screw (3).
Move the temperature variator to the "max. hot position".
Take off the filler cap (2). Fill with coolant througt the filler port (2) until flush with the opening. Pour the coolant slowly so as to enable all the air to escape from the system. Close the bleed screw (3) as soon as coolant flows through. Put back the filler cap (2).
Run the engine for 3 minutes at a speed of 1000 rpm, then stop it.
Carefully take off the filler cap (2).
Check the coolant level and top up, if necessary.
Put back the filler cap (2).
Run the engine until the coolant reaches its operating temperature (thermostat open), then stop it.
Allow to cool, check the coolant level again and top up, if necessary.

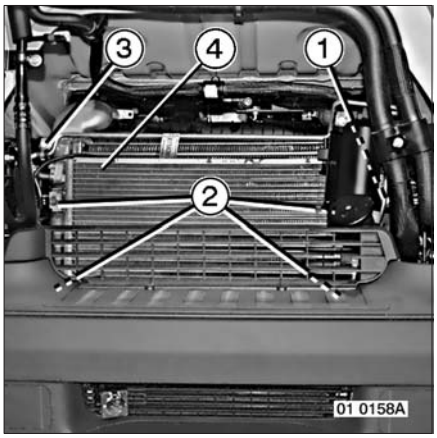
IMPORTANT
If for some vital reason it is necessaru to check the coolant level when the engine is hot, first of all carefully release the cap (1) by 1/4 of a turn to decompress the system. Wait until the tank is fully vented before taking off the cap (2). Top up with coolant, if necessary.



Cleaning the exterior of the radiator

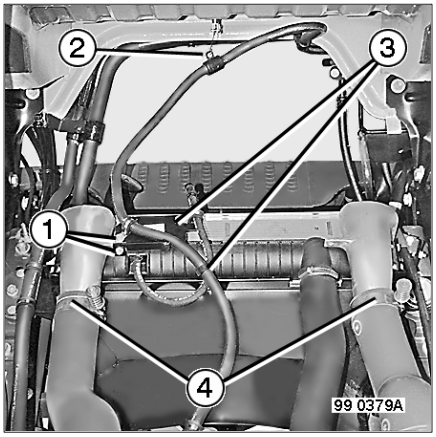
With air conditioning: Without disconnecting the pipes, remove the setscrews (1) from the dehydrator, the setscrews (2) from the condenser (4) and the screw fastening the clamp (3).
Move the turbocharger aftercooler unit aside.

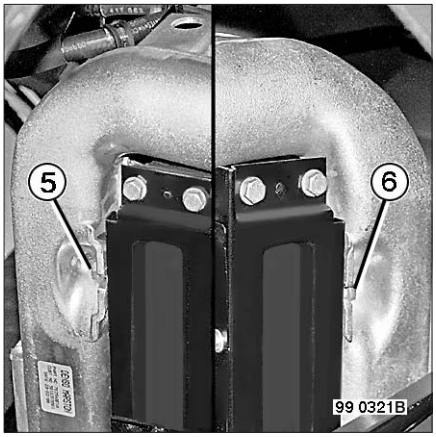
To clean the radiator, it is necessary to remove the turbocharger aftercooler.

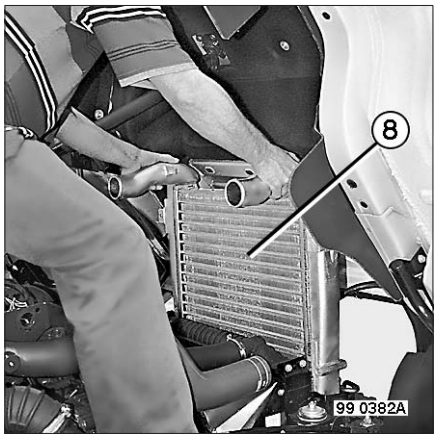


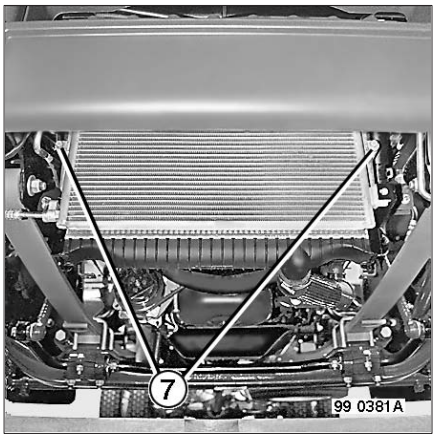
Type DCI 4

Loosen the clamps (4) and disconnect the hoses.
Unhook the spring (2) .
Remove the screws (1), disengage the bracket and the hose (3).
Remove the screws (5–6–7) and remove the aftercooler (8) through the top.
After cleaning, refit the aftercooler. Proceed in the reverse sequence to removal.
Tighten the clamps (4) at a torque of 6 Nm.
Test the turbocharger air system for leaks.



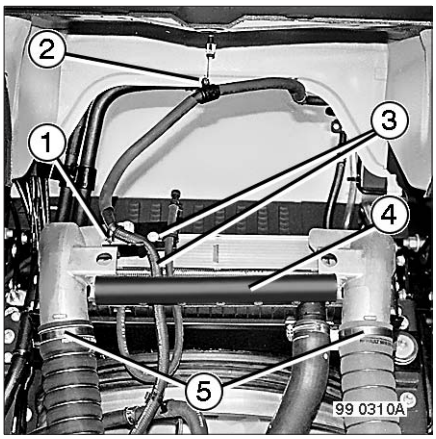


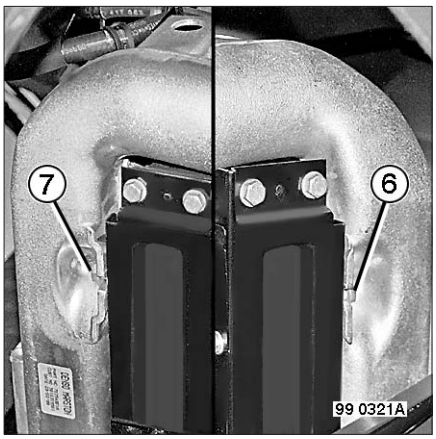


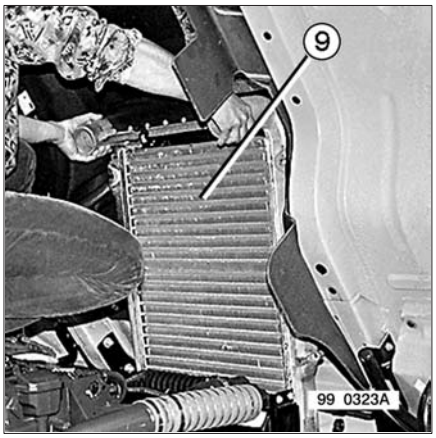


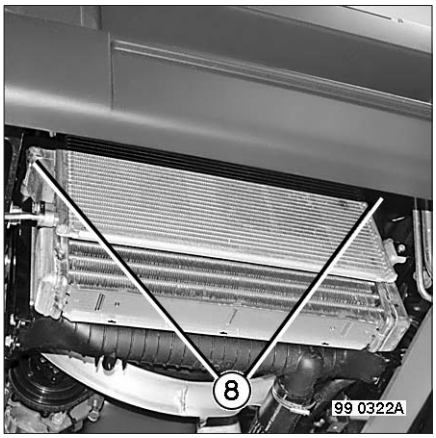
Type DCI 6

Loosen the clamps (5) and disconnect the hoses.
Remove the screen (4).
Unhook the spring (2).
Remove the screw (1), disengage the bracket and the hose (3).
Remove the screws (6 – 7 – 8) and remove the aftercooler (9) through the top.
After cleaning, refit the aftercooler. Proceed in the reverse sequence to removal.
Tighten the clamps (5) at a torque of 6 Nm.
Test the turbocharger air system for leaks.









FUEL SYSTEM

IMPORTANT
Avoid splashing fuel on the soundproofing screens. Clean them, if necessary.

"COMMON–RAIL" injection system: It is formally forbidden to work on the fuel system when the engine is running (risk of serious injury).

Fuel tank
At the scheduled intervals, it is recommended that any impurities which may have been deposited in the tank are cleaned out. This is achieved by removing the drain plug in the bottom of the tank, allowing the contaminated fuel to drain off, and then replacing the plug.

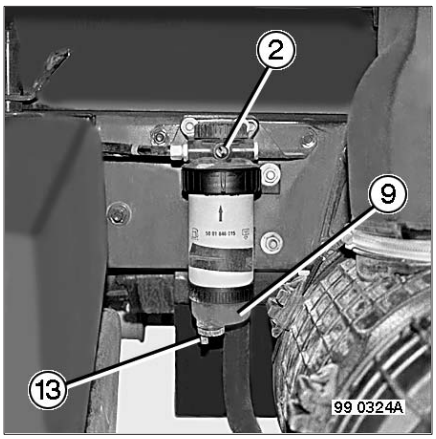
Depending on your vehicle's equipment

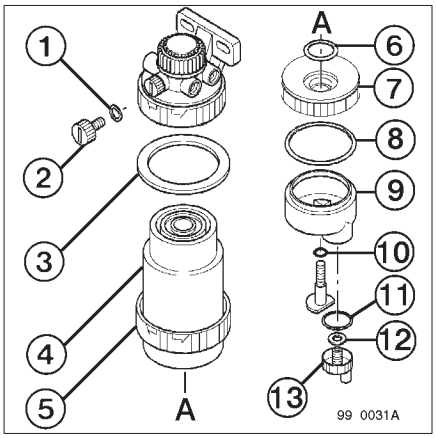
Fuel prefilter

IMPORTANT
Prior to disassembly, carefully clean the surrounds, then take all necessary precautions to prevent the ingress of impurities (see workshop manual).

Draining the sediment bowl
Unscrew the bleed screw (2) by 2 turns.
Loosen the bleed screw (13). Drain the contents of the sediment bowl (9) until all the water has been eliminated.
Screw up the bleed screws (2–13).

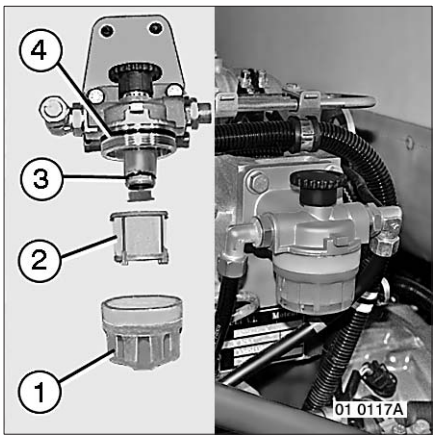
Replacing the filter element
After draining the sediment bowl (9), unscrew the nut (7) and remove the bowl.
Unscrew the nut (5) by 1/4 of a turn and pull the element (4) downwards to remove.
Separate the nut (7) from the bowl (9) and withdraw the O–ring (8). Clean the assembly exclusively with diesel fuel and compressed air.
Check the condition of the seals (1–3–6–8–10–11–12), and replace, if necessary.
Fit a new element (4) and reassemble the unit.
Tighten the nuts (5–7) by hand.





F23 servicing

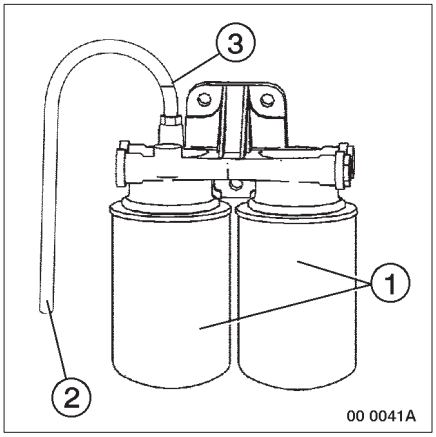
Remove sediment bowl (1). Take out filter (2). Clean with diesel fuel and refit the unit. Upon reassembly, inspect the condition of seals (3 – 4).



“COMMON RAIL” fuel–injection
This is a high precision unit – any work on it must be carried out by a specialist.

NOTE
Contact a dealer or approved agent.

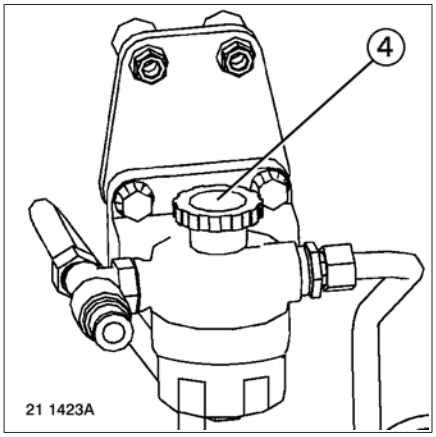
IMPORTANT
Fuel filters
Your vehicle is equipped with a high–performance fuel–injection system. It is vital to used fuel filters provided for that purpose.
The use of poorly adapted filters may lead to serious damage.
Since this fuel–injection system is more sensitive to pollution than in–line pump systems, risks of damage are much higher. Therefore, it is essential to assemble genuine, original parts guaranteed by the manufacturer. Storage of diesel fuel in drums or jerry cans might allow the ingress of impurities capable of causing fuel supply system malfunction. In such case, it is necessary to filter the diesel fuel before pouring it into the fuel tank..
Additives
You are advised against using diesel fuel containing additives.
The use of diesel fuel containing additives might invalidate the vehicle warranty.



Fuel filter
For full reliability, use original filters only.
Upon assembly, do not fill the cartridges with diesel fuel.

Replacing the filter element
Unscrew the filter element (1). Upon assembly, watch out for cleanliness of the gasket, smear it with diesel fuel and tighten the element by hand.

Bleeding the fuel system
Place a pipe (2) in position. Open the bleed screw (3). Unscrew the feed pump plunger (4), then operate it until fuel flows without air bubbles.
Close the bleed screw (3). Pump until the plunger (4) becomes hard.
Screw up the pump plunger (4) and withdraw the pipe (2).



Protecting diesel fuel against freezing

Different makes of diesel fuel are commercially available. The quality of the diesel fuel differs according to the period of use (winter or summer). The filterability limit temperature (FLT) varies according to the type of diesel fuel used. At a temperature close to the filterability threshold, paraffin crystals begin to form in diesel fuel and these block the fuel lines and filters.
So as to improve the properties of the diesel fuel when cold, it is possible to incorporate an additive: paraffin or kerosene, or the special product sold by our network Spare Parts warehouses.
The use of products lowering the viscosity of the diesel fuel is strictly forbidden outside the winter period.

– For protection down to **– 15° C**: use diesel fuel Class "**E**" (**TLF – 15 °C**)
– For protection down to **– 20° C**: use diesel fuel Class "**E**" + 20 % kerosene (or paraffin).
– For protection as from **– 25 °C**: use diesel fuel Class "**ARTIC 4**" (**TLF – 44 °C**)

NOTE
a) For maximum efficiency, the additives should be mixed with the fuel at a temperature above 0°C.
b) In France, do not exceed 30 % paraffin or kerosene (Customs regulations).
c) In other countries, always limit paraffin or kerosene addition to 50 % maximum (check national regulations).
d) However, we recommend that at all times the percentage be kept to the minimum necessary and that paraffin be used in preference to petrol.
e) On the other hand, the use of the RENAULT TRUCKS additive is not subject to any legal restriction.

IMPORTANT
Use only commercially available diesel fuel for automotive vehicles (to standard EN 590).
A maximum rate of 5% "bio–diesel" (with rapeseed oil base) is authorized on condition that it meets the requirements of standard EN 590.
You are advised against using diesel fuel containing additives.
The use of diesel fuel containing additives might invalidate the vehicle warranty.
Storage of diesel fuel in drums or jerry cans might allow the ingress of impurities capable of causing fuel supply system malfunction. In such case, it is necessary to filter the diesel fuel before pouring it into the fuel tank.
The use of "Aquazole"** (emulsified fuel) **is strictly forbidden.

Fuel preheater
This equipment serves to lower the filterability limit threshold temperature of the diesel fuel. The filterability limit temperature is different according to the type of diesel fuel used.

WARNING
If your vehicle is equipped with a fuel preheater, the incorporation of additives (paraffin or kerosene) is strictly forbidden.

TURBOCHARGER

Turbocharger problems
Indications of incorrect turbocharger operation are lack of engine power, strange noise or the presence of oil in the inlet manifold.
Should this occur, consult the nearest dealer or service point. On no account must any internal work be carried out on the turbocharger.

DRIVE BELT TENSION

CAUTION
When a unit is driven by two belts, and one belt becomes worn or damaged, it is essential to replace both belts with a matched pair.

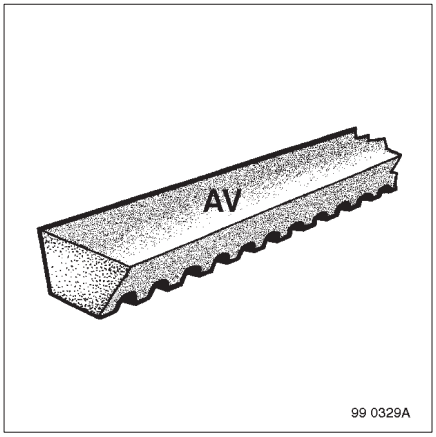
Checking tool: SEEM 8251

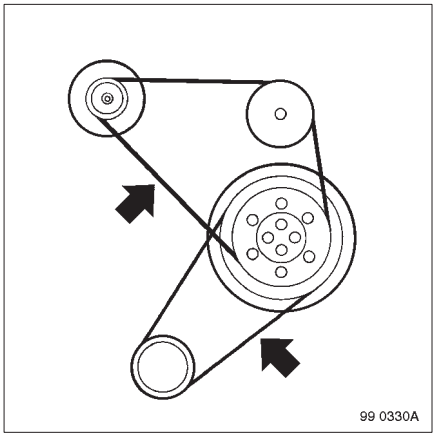
Procedure
- Adjust the belt tension.
- Run the engine at idling speed for about 1 minute.
- Check the belt tension and re–adjust.

NOTE
For a twin belt assembly, the measurement must be made on both belts simultaneously.
During maintenance operations, avoid splashing oil, coolant or even paint on the drive belts.

Tension values
Tensions are given in SEEM points.

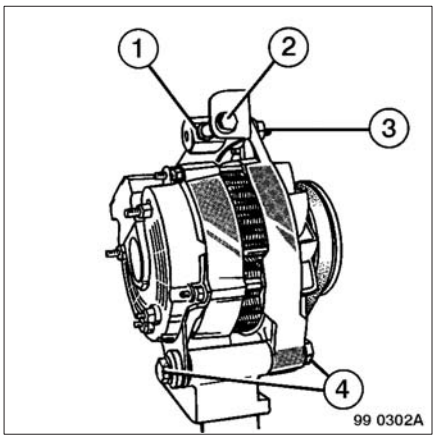
Drive belts				Min. value
Type	Number	New	Run–in	
AV 10	2	87 → 95	66 → 73	56
AV 13	1	65 → 70	52 → 57	48





Alternator

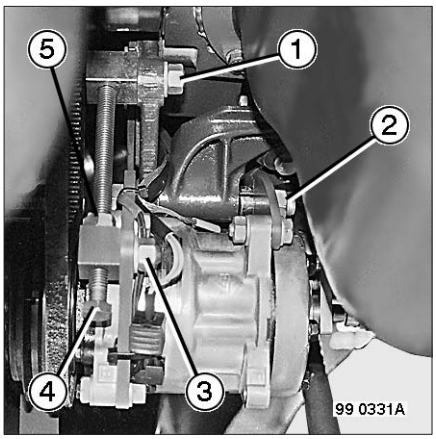
Loosen the nuts and bolts (1–3–4). Turn screw (2) to adjust the tension. Tighten the nuts and bolts (3–4–1).



Depending on your vehicle's equipment

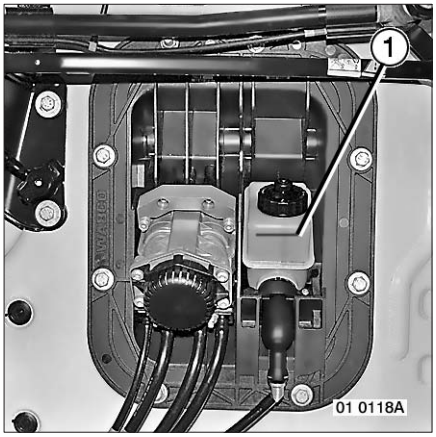
Air conditioner

Loosen the nuts and bolts (1–2–3–5). Turn screw (4) to adjust the tension. Tighten the nuts and bolts (2–3–1–5).



CLUTCH

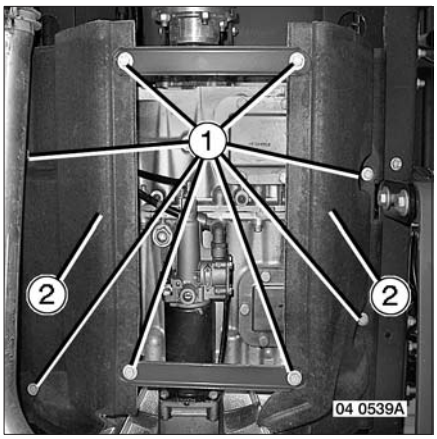
Hydraulic system
– Check the fluid level in reservoir (1).
– Use recommended fluid only.



To gain access to the underside of the engine, withdraw setscrews (1) and remove soundproofing screen (2).
After completing the work, refit the soundproofing screen in its correct position.

Depending on your vehicle's equipment

Soundproofing screens (2)
Any damage to the interior protective film of the screen requires replacement of the film.
See that no flammable products are applied to the screen protective films. The screens are to be cleaned using a cloth. If necessary, use soapy water (any other product is strictly forbidden).
The application of any solvent or paint on the inner and outer faces of soundproofing screens is strictly forbidden.



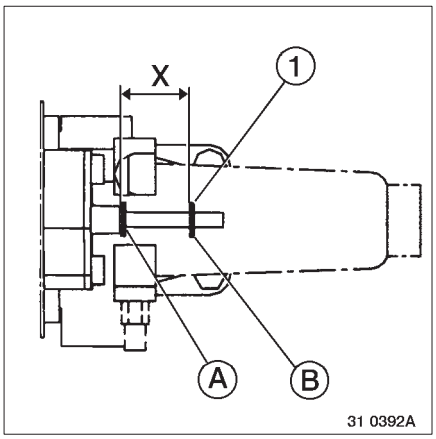
F29 servicing

Depending on your vehicle's equipment

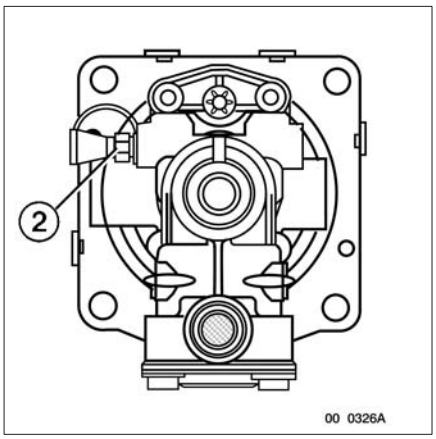
Lining wear indicator (1)
With the engine stopped, check the driven plate wear (with the clutch engaged).

A: new plate.
B: worn plate.

When the value "X" is equal to 26 ± 1 mm, the clutch plate is to be replaced.



Bleeding the system
Using a pressure bleeder, pressurize the reservoir (2 bar approx.). Bleed the clutch servo by means of bleed screw (2).

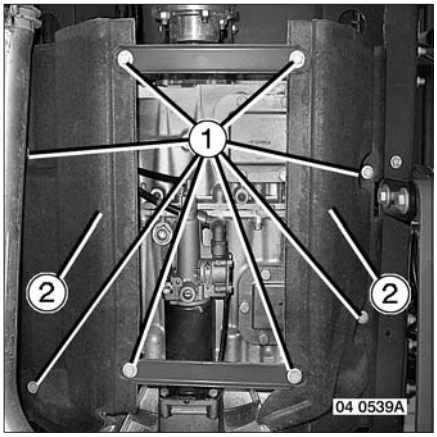


GEARBOX

To gain access to the underside of the gearbox, withdraw setscrews (1) and remove soundproofing screen (2).
After completing the work, refit the soundproofing screen in its correct position.

Depending on your vehicle's equipment

Soundproofing screens (2)
Any damage to the interior protective film of the screen requires replacement of the film.
See that no flammable products are applied to the screen protective films. The screens are to be cleaned using a cloth. If necessary, use soapy water (any other product is strictly forbidden).
The application of any solvent or paint on the inner and outer faces of soundproofing screens is strictly forbidden.

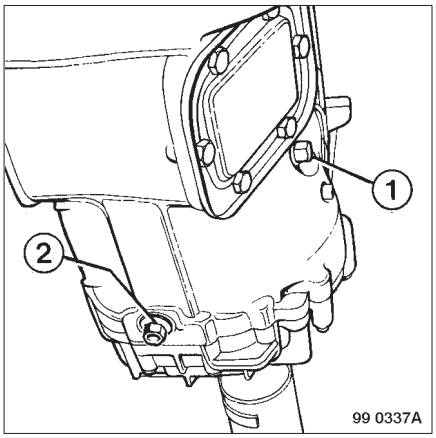


GEARBOX S5.42

Filler and level plug (1).

Drain plug (2).

Breather
Wash the breather in diesel fuel and dry it with compressed air before refitting.

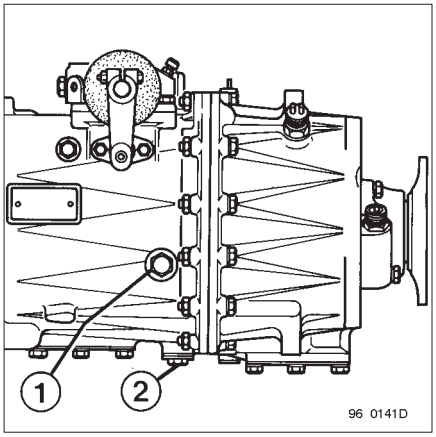


GEARBOX EATON 4106 – 5206

Filler and level plug (1).

Drain plug (2).

Breather
Wash the breather in diesel fuel and dry it with compressed air before refitting.



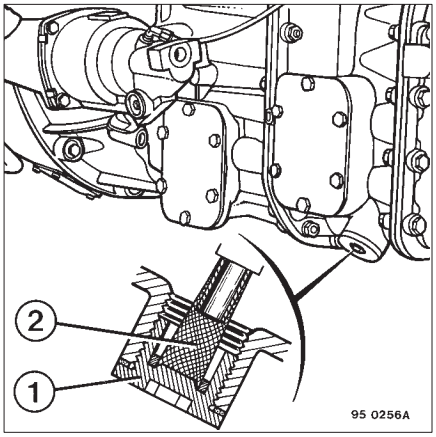
GEARBOX EATON 6309 – 8309

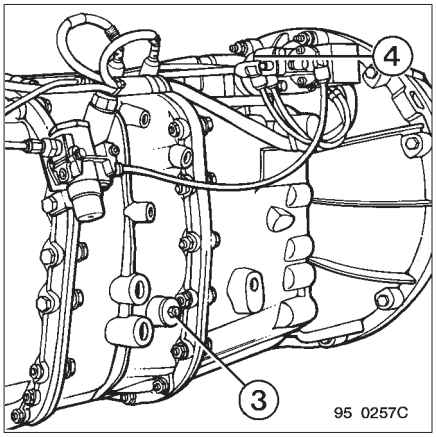
Drain plug (1).

NOTE
The gauze (2) is integral with the plug. Clean the assembly and blow through with compressed air.

Filler and level plug (3).

Breather (4)
Wash the breather in diesel fuel and dry it with compressed air before refitting.



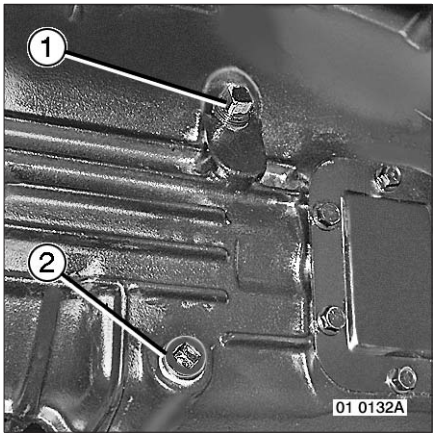


GEARBOX EATON 6406

Filler and level plug (1).

Drain plug (2).

Breather
Wash the breather in diesel fuel and dry it with compressed air before refitting.

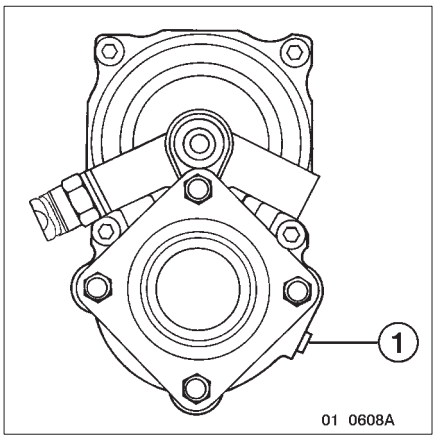


POWER TAKE–OFF

Depending on your vehicle's equipment

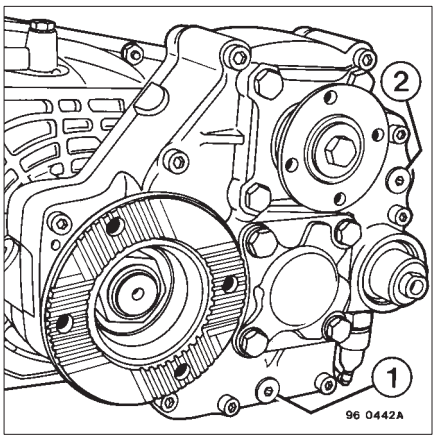
Type 2264 / 2266
Drainage
Remove plug (1).
Filling
Add 0.25 litre more oil than when filling the gearbox alone.

NOTE
Replace the seal(s) whenever you change the oil.



Type 2903 / 2904 / 2907 / 2908
Drainage
Remove plug (1).
Filling
Before filling the gearbox, pour 1 litre of oil through port (2).
Check the gearbox oil level and top up, if necessary.

NOTE
Replace the seal(s) whenever you change the oil.



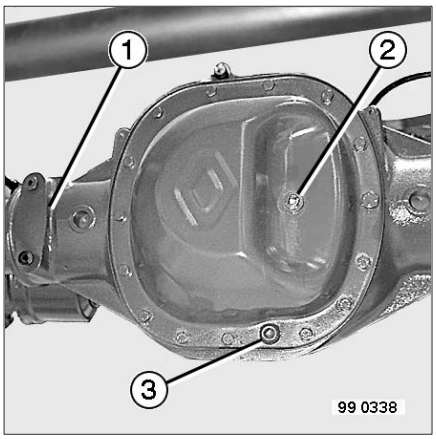
PROPELLER SHAFTS

When washing down, limit the jet pressure to 80 bars and do not dwell on bearing cup seals and joints.

REAR DRIVE AXLE 669

Filler and level plug (2).
Drain plug (3).

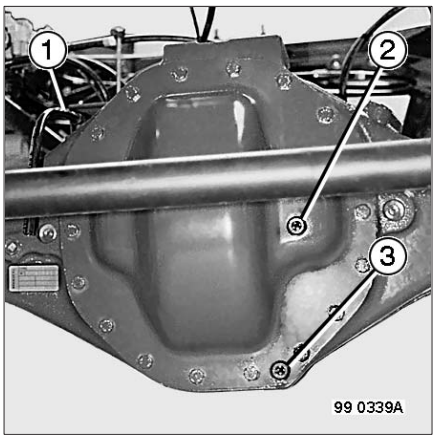
Breather (1)
Disconnect the pipe and blow through with compressed air.



REAR DRIVE AXLE P 920 SL – P 1120 SL P 1121 SL

Filler and level plug (2).
Drain plug (3).

Breather (1)
Disconnect the pipe and blow through with compressed air.

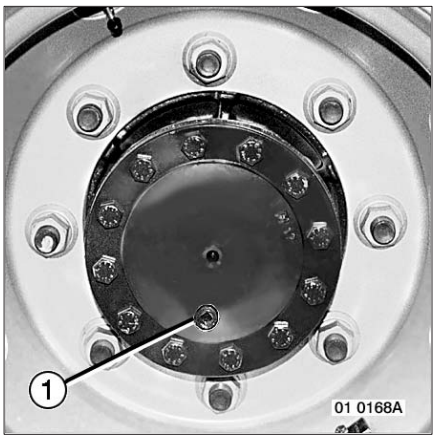


Depending on your vehicle's equipment
Wheel hubs

To drain: Remove the plug from port (1) placed in the downwards position.

To fill: With the port (1) placed in the upwards position, pour 1 litre of oil into each hub, then refit the plug. Any surplus oil will flow into the drive axle pan where the overall level can be checked.

NOTE
When fitting the plug, clean the magnet and tighten at a torque of 30 Nm.



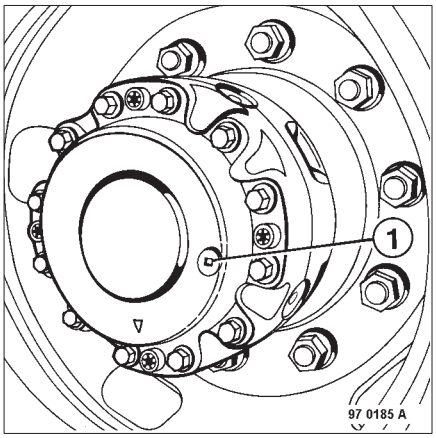
Wheel hub reduction units

To drain: Remove the plug from port (1) placed in the downwards position.
To fill: With the port (1) placed in the upwards position, pour 1 litre of oil into each hub, then refit the plug. Any surplus oil will flow into the drive axle pan where the overall level can be checked.

Level: With the arrow in the downwards position, the oil should be flush with the port (1).

NOTE
Replace the seal(s) and clean the magnet whenever you change the oil.

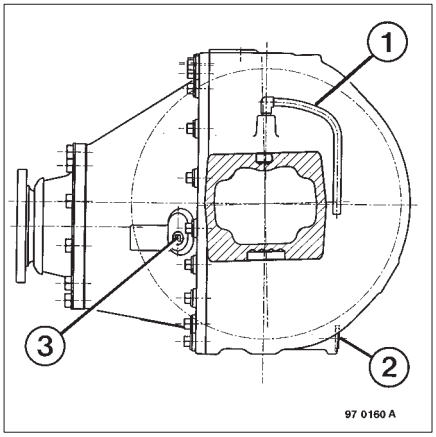
Plug tightening torque: 30 Nm.



REAR DRIVE AXLE P 1170

Filler and level plug (3).
Drain plug (2).

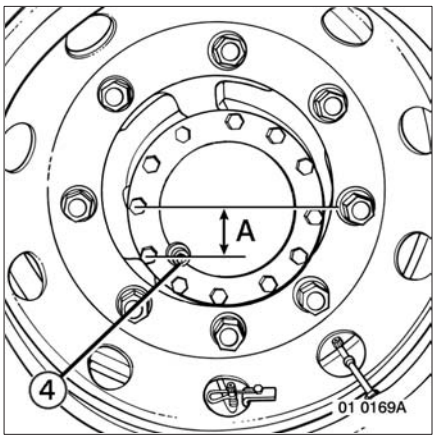
Breather (1)
Disconnect the pipe and blow through with compressed air.



Wheel hub
Drainage: Remove plugs (4) in the downwards position.

Level: When plug (4) is in position **"A = 30 mm"**, the oil should be at the same level as the hole.

Filling
With plug (4) in the upwards position, pour 1 litre of oil into each hub and refit plug (4). The surplus will drain into the axle pan. End the filling phase through the pan plug (4) until the correct level is obtained.



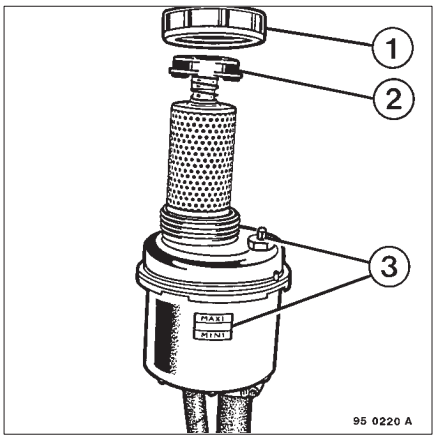
NOTE
Replace the gasket(s) each time and clean the magnet.

Plug tightening torque: 30 Nm.

STEERING

Replacing the filter element

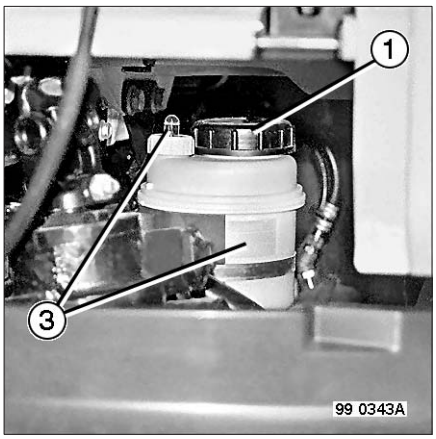
Remove filler cap (1). Press handle (2) and turn by 1/4 of a turn. Withdraw the filter element assembly. Fit a new filter element, press and turn handle (2) so as to engage it under the catches on the reservoir.
Check the oil level (3).



Filling the system and bleeding

Raise the front of the vehicle.

Fill the reservoir with fluid via filler (1). When the reservoir level stabilizes, operate the starter a few times to turn the pump, top up accordingly. When the level is stabilized once again, run the engine at idling speed.
Turn the steering wheel fairly quickly from one lock to the other several times so as to bleed air from the system.
Watch the fluid level during this operation, top up if necessary. Repeat this until the fluid level remains constant.

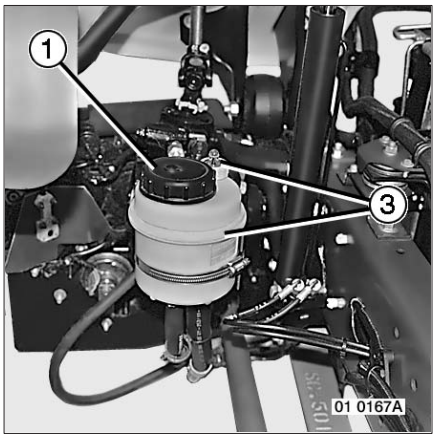


Stop the engine and top up the level. Lower the roadwheels onto the ground.

Continue moving the steering wheel until no fluid flow noise is heard and until the fluid in the reservoir has become clear and is no longer emulsified.

NOTE

A hydraulic circuit can only operate if it is perfectly clean. The utmost care must therefore be taken to ensure that no dirt enters the system when performing the above operations.

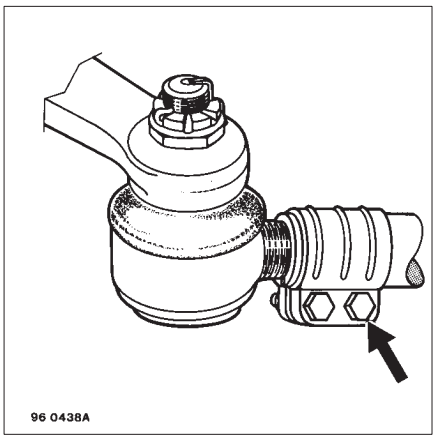


FRONT AXLE

NOTE
To avoid any risk of damage to the steering system, it is essential that the stub axle lock stops are adjusted after any changes to the stub axle assy (i.e. change of steering arms, track rod arms, etc.). Consult your dealer or an approved agent.

Track rod clamps

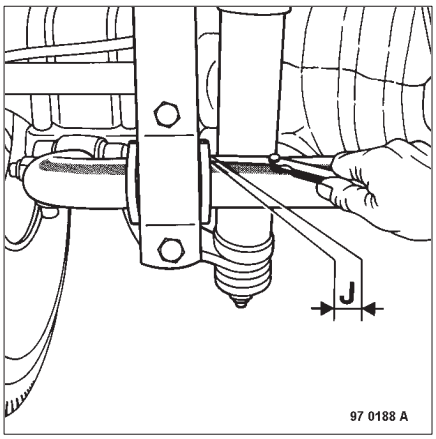
IMPORTANT
Whenever you work on the track rod clamps (e.g. when adjusting wheel alignment), you must systematically replace the nuts and bolts.



FRONT SUSPENSION

REAR SUSPENSION

Anti–roll bar play
At the scheduled intervals, check the play between the bushes and the anti–roll bars. The play “J” should not exceed 2 mm.



U–bolt tightening torques
Front:
– ∅ 16 mm = 220 ± 20 N.m
– ∅ 20 mm = 450 ± 30 Nm
Rear:
– ∅ 18 mm = 350 ± 35 N.m
– ∅ 20 mm = 450 ± 45 N.m
– ∅ 22 mm = 575 ± 55 Nm

Suspension components
Shock absorbers do not require any special maintenance. However, at the scheduled intervals, remove them and make sure they are checked by a specialist.

Whenever the vehicle receives a major overhaul, strip the springs, clean the faces of the leaves in contact with one another and grease them before reassembling (except for parabolic leaf springs). Lack of maintenance is often the cause of leaf spring fracture.

Air suspension

CAUTION
Never spray oil or diesel fuel on the flexible rubber air bellows or pipes. Regularly check the external condition of the air bellows.

Electronic air suspension
Any work on sensors, control linkage or replacement of the electronic control unit require the system to be calibrated.
Troubleshooting and maintenance are to be carried out using the RENAULT TRUCKS tester plugged in to socket (1).
These test and programming operations should be carried out by a qualified agent.

IMPORTANT
Before carrying out any work on the suspension (other than calibration), place axle stands under the chassis.

F40 servicing

RETARDER

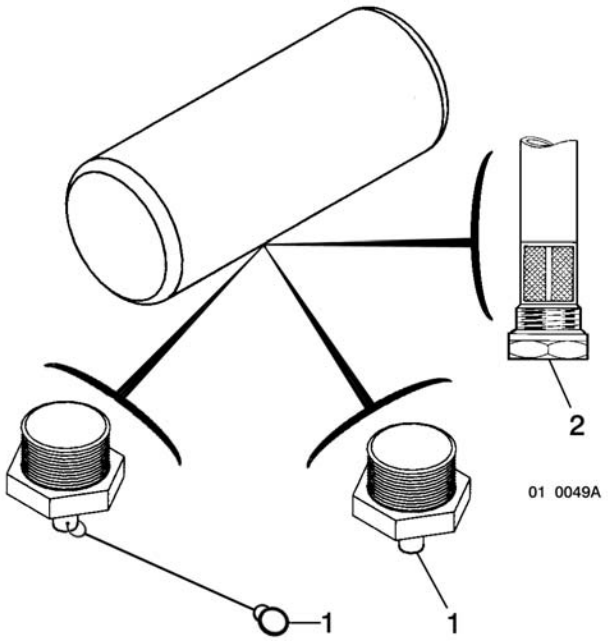
Depending on your vehicle's equipment

Electric retarder
Servicing
At the scheduled interval, check the bearing end float and air gap setting. Entrust these operations to a specialist.
Washing
Pronounced fouling of the electric retarder requires high pressure washing. This is to be carried out when the retarder is cold. Then dry through with compressed air.

BRAKING SYSTEM

CAUTION
We remind you that it is forbidden to modify the brake circuit or brake components. Users are advised that they are fully responsible for ensuring that when any additional pneumatic equipment is connected to the vehicle, all the regulations in force are complied with.

Brake valve
This does not require any special maintenance. In the event of malfunction, get it checked by an approved specialist.



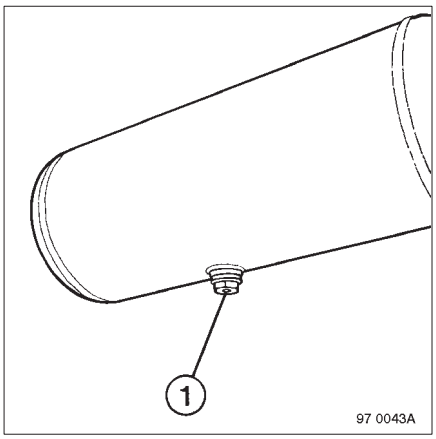
Air tanks (absence of water)
Actuate the bleed valves (1) to ensure there is no water in the air tanks.
If there is water, bleed the air tanks.
Get the air dryer checked out by an approved specialist and replace the air dryer canister.

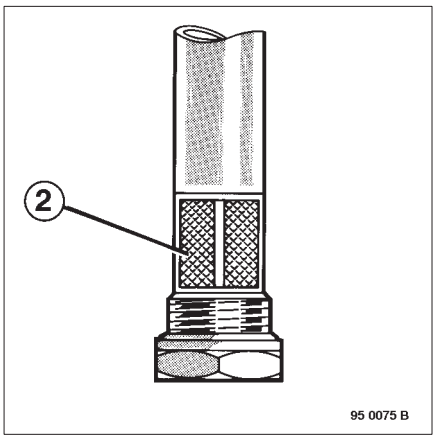
The vehicle is equipped with sealed snap–on unions. If at a standstill the air pressure in the braking system air tanks drops suddenly, get the compressed air circuit checked out by the nearest dealer or approved agent.

The bleed valves (2) are of the automatic type (see page F42).

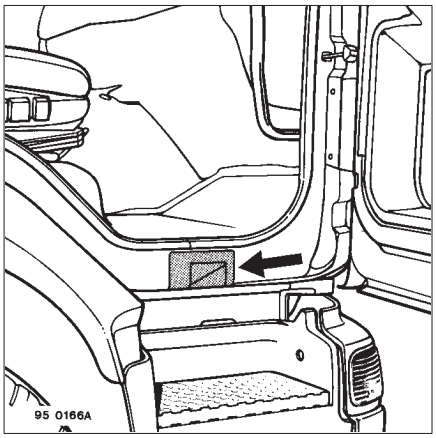
Depending on your vehicle's equipment

Automatic bleed valves
At the recommended intervals, press the plunger (1) to empty the air tank.
Remove the bleed valve assembly and clean filter (2) with diesel fuel.
Dry the filter before reassembly.





Load sensing valve
Use the curve to check the load sensing valve.

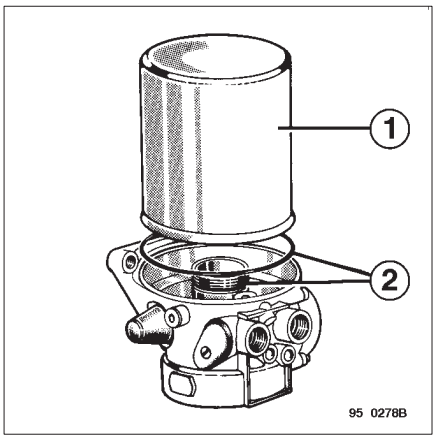


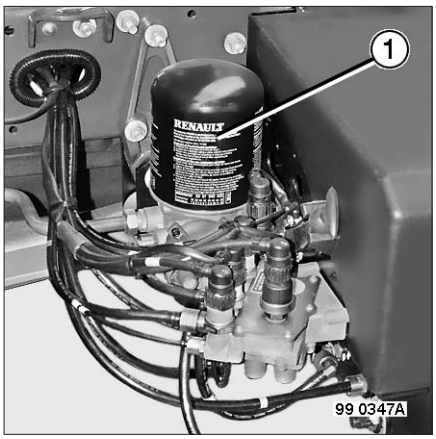
F43 servicing

Air dryer (1–canister)
At the scheduled intervals, replace the canister.

Canister replacement:
Clean the air dryer and its surrounds.
Fully bleed all air tanks.
Replace canister (1). Tighten by hand.
When refitting, lightly grease seals (2).

NOTE
Spent canisters should be considered as special industrial waste and must meet treatment regulations. Take the laws in force into account.





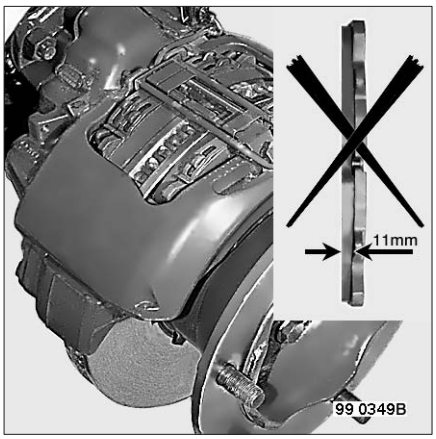
Front brakes

Rear brakes

Depending on your vehicle's equipment

Brake pads
At the scheduled intervals, or if warning light (G10) comes on, check brake pad wear.
To check wear, the roadwheels have to be removed.

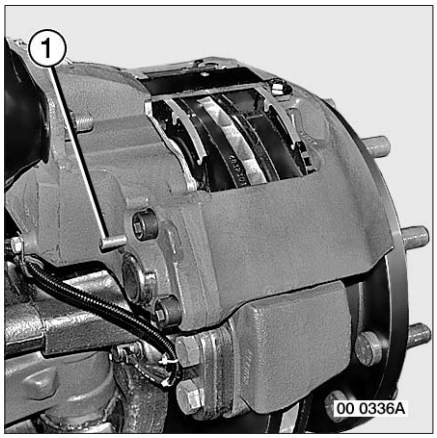
NOTE
Replacement of a brake pad requires replacement of all the pads on the same axle.

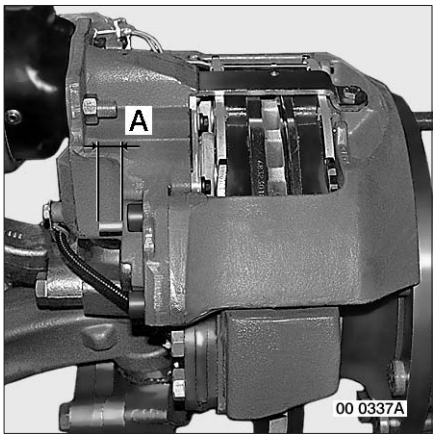


Depending on your vehicle's equipment

The visual indicator (1) serves for assessing the brake pad wear without having to remove the roadwheel.

New brake pads: A is equal to 21 mm approx.
Worn brake pads: A is equal to 0 mm approx.





F45 servicing

BODYWORK

Washing
To prolong bodywork life and maintain the sparkle of the paintwork, we recommend that your vehicle be washed regularly. We advise against the use of brushes, especially during the first few months of use of the vehicle. Do not use a high temperature steam spray.
Neutral washing products are commercially available which do not dull the paintwork.
For grease spot removal, use cleaning fluid (and not automobile petrol).
If the aluminium components are very dirty, clean them with water to which has been added a small amount of non–alkaline washing product, and rinse with clean water.

Cleaning the interior
Spray or wipe a cleaning product on with a rag (soapy water, methylated spirits).
Never use petroleum–based or trichlorethylene–based products.
Lightly smear the door and window seals and runners with talc.

Cleaning the fascia panel
Only use soapy water (and no other product whatsoever).

Cleaning windows and headlamps
Only use soapy water or the windscreen wash product marketed by the RENAULT TRUCKS network.
Any other products (alcohols, hydrocarbons, solvents, etc.) are strictly forbidden.

Cleaning the seats:
Plastic parts: Use soapy water or an alcohol–based product.
Fabric parts: Clean with a degreasing product (spirits of turpentine, stain–remover, etc.).
Leather parts : To supple and preserve the gloss of the leather, use a damp cloth. For other products, take a visit to the RENAULT TRUCKS boutique.

Washing the vehicle:
To limit any risk of damage, do not apply too much water to:
– electronic boxes, electrical junction boxes and electrical appliances.
– window runner seals.
– hinge pins.
– air inlets to heater, engine intake and air filter.
– pneumatic units.
– noise baffles and soundproofing screens.

WARNING
Limit wash jet pressure to a maximum of 80 bar.

IMPORTANT
When washing the vehicle, grease all points. More particularly, grease fifth wheel locking mechanism and the towing hook locking mechanism.

F46 servicing

Depending on your vehicle's equipment

Fifth wheel coupling
At the recommended intervals, check the clearance between the fifth wheel coupling and the semi–trailer. This clearance should not originate from play in either the locking mechanism or the bearings.

- Play in locking mechanism: Check the kingpin. Adjust locking.
  If adjustment is impossible, replace the locking mechanism.
- Play in bearings: Check bearings for wear. Replace, if necessary.

NOTE
The fifth wheel is a coupling unit that must meet extreme safety requirements.
Contact your dealer, the original equipment manufacturer or an approved specialist to obtain the tools, gauges and parts needed for inspecting and repairing the fifth wheel.

IMPORTANT
Grease the fifth wheel coupling before taking the road for the very first time.
Every 10,000 km: grease the fifth wheel locking mechanism.

F47 servicing

INDEPENDENT HEATING

Depending on your vehicle's equipment

At the scheduled intervals, get the heater serviced by an approved agent.
Outside the heating period, the heater should be run for 15 minutes every month.
Check the suction and discharge apertures and clean, if necessary.

IMPORTANT
If electric welding work is carried out on the vehicle, it is essential to disconnect the batteries to prevent causing irreparable damage to the electronic monitoring system.

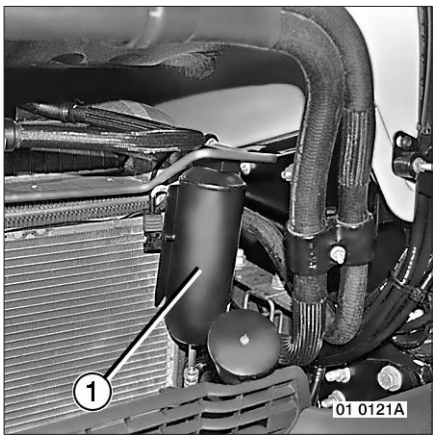
HEATING – VENTILATION

Depending on your vehicle's equipment

Air conditioner

Dehydrator filter
At the scheduled intervals, replace the filter (1).

WARNING
Any work on the chilling circuit or appliances requires special safety instructions to be observed.
Consult a dealer or approved agent.



Depending on your vehicle's equipment

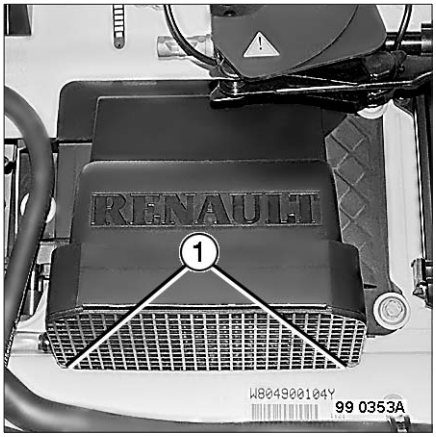
Fan coil heater filter

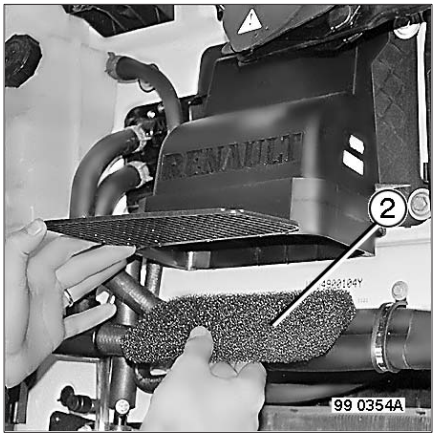
Removal
Withdraw the screws (1), tilt the front grille and remove the filter (2).

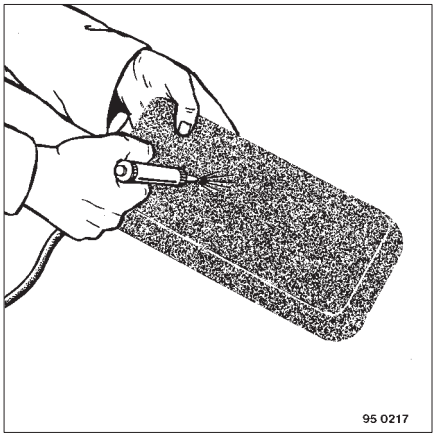
Cleaning with compressed air
At the scheduled intervals, clean the filter (2). Apply a maximum pressure of 7 bars. Direct the jet of air in the direction opposite to that of filtration. Keep the nozzle a minimum of 5 cm away from the filter.

Cleaning with water
Immerse the filter in a mixture of detergent and water for approximately 15 minutes. Rinse the filter until the rinsing water remains clear. Leave to dry in the open air or use compressed air.
If the filter presents irregularities, replace it.

Fitting
Position the filter (2). Make sure the front grille is properly in position and tighten the screws (1).







G1 electrical equipment

Before working on the electrical system, disconnect the batteries. Always remove the negative (–) terminal first.

BATTERIES

Prior to checking the electrolyte level, clean the filler plugs and their surrounds. The electrolyte level must stay at 3 cm above the plates. Top up with distilled water, if necessary. Resistance to freezing depends on the state of charge. In addition, the available capacity of a fully charged battery varies with temperature as follows:
100% at 27°C
66% at 0°C
41% at –20°C
Never use a naked flame near the cell vents (risk of explosion).

Checking the state of charge

Carry out this operation on a battery while in the idle state (battery not having been charged for 2 hours) or after a run: switch on the headlights for 5 minutes, switch them off and wait for 3 minutes before making the check. Measure the voltage across the terminals (battery isolation switch contacts fully open) (see table). This should be slightly higher than the rated voltage. A lower voltage indicates that the battery needs recharging. To ascertain the exact condition of the battery, use a battery tester.
Trickle charge the batteries at 1/10th of their capacity for 10 hours.

No–load voltage (Volts)	Specific gravity (g/cm^3)	State of charge (%)	Temperature withstood (° C)
12.8	1.273	100	– 70
12.6	1.241	80	– 45
12.4	1.205	60	– 35
12.2	1.170	40	– 20
11.9	1.130	20	– 15
11.7	1.080	0	– 5

If the state of charge is below 80%, recharge the batteries and conduct an electrical check–up on the vehicle.
If a battery has to be removed, always disconnect the negative terminal first.
When refitting a battery, always start with the positive terminal. Terminal post tightening torque: 0.65 daNm.

Maintenance–free batteries

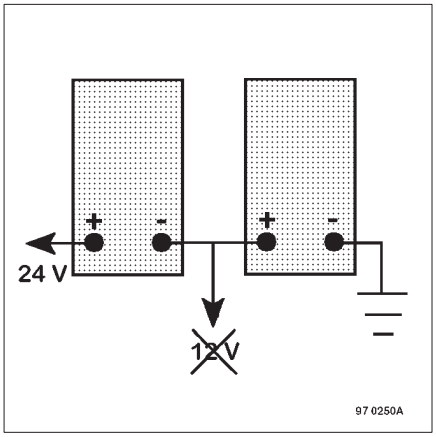
For these vehicles, this type of battery does have filler plugs.
Take the same precautions as for ordinary batteries. However, the trickle charging current must not exceed 1 Amp.

Before using a charger, disconnect the batteries.
If starting with an auxiliary battery, make sure to connect the (+) terminal of the auxiliary battery to the (+) terminal of the vehicle battery and the (–) terminal of the auxiliary battery to the (–) terminal of the vehicle battery.

G2 electrical equipment

IMPORTANT
Subsequent to exposure to fire, make a visual check on the battery trays to ensure they have not suffered any distortion due to heat.
If they have, replace the batteries.

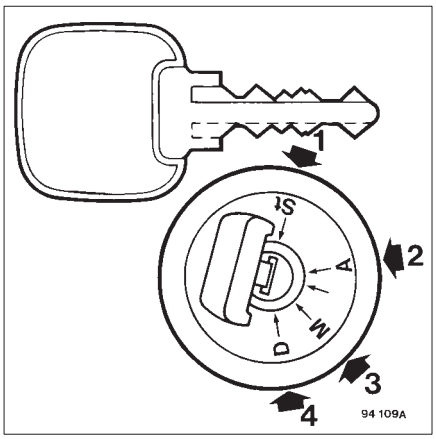
12 Volts power supply
The supply voltage for the installed equipment must be equal to the vehicle's rated voltage.
Any appliance having a 12 Volts rated voltage needs the use of a voltage dropper.
Connection to the mid–point of the two batteries is strictly forbidden.



IMPORTANT
It is forbidden to start the engine and use the vehicle when the batteries are disconnected (destruction of electronic boxes).

Vehicle batteries

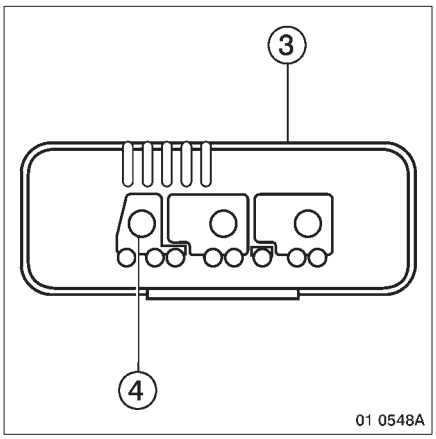
To disconnect the batteries:
De–activate the alarm, switch on the ignition (anti–theft ignition key in position (3)), take out the fuse (F34), switch off the ignition (ignition key in position (1)), wait for 10 seconds, and then disconnect the batteries.
To reconnect the batteries:
Switch on the ignition, put back the fuse (F34), switch off the ignition, then reconnect the batteries.



ALARM

Siren power supply

If the internal power supply to the siren becomes insufficient, the control box (3) buzzer sounds, which means that the siren must be replaced.
To disconnect the siren, the procedure is identical as for disconnection of the batteries.

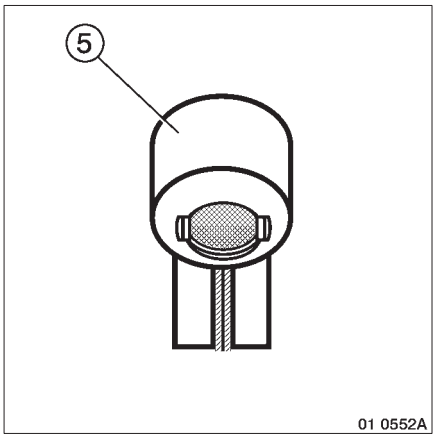


Defective sensors

If the siren sounds when you activate the alarm with vehicle doors and windows closed, de–activate the alarm for the 40 seconds that the LED (4) remains lit.
A “blink code” is displayed on the control box (3) to pinpoint the defective sensor (see table, page (C35)).

Ultrasonic sensors test

To check out the operation of the ultrasonic sensors (5), proceed as follows:
Activate the alarm for the 40 seconds that the red LED (4) on the control box (3) remains lit, pass your hand in front of each ultrasonic sensor (5): the red LED (4) should go out then come back on if the sensors are functioning normally.



G4 electrical equipment

Starting the vehicle using an external power source
If the engine will not start due to discharged batteries, it is possible to use an external power source (battery cart).
Procedure:
- Switch off the ignition.
- Connect up the battery cart, while respecting polarities.
- Switch on the ignition.
- Actuate the starter.
- Run the engine at a speed of **1 300 rpm** for about **5 minutes**.
- Switch on the dipped beam headlights before lowering the engine speed to idling.
- Let the engine run at idling speed for 1 minute.
- Disconnect the battery cart, starting with the negative terminal.
- Switch off the headlights.

IMPORTANT
The use of a power charger as starting aid is forbidden (damage to electronic systems).

ALTERNATOR

The voltage regulator may be integral with the alternator, or external to it. Never leave the alternator switched on when the vehicle is stopped (ignition key, master switch). Never break the circuit while the engine is running. Avoid making any connection errors. Never run an engine with batteries disconnected or removed.

FLASHER UNIT

(with electronic protection)
In the event of an overload, the unit ceases to operate. To reset the unit:
1) Move the flasher stalk to the “OFF” position.
2) Trace and eliminate the cause of the overload (cables or lights).
You may then re–use your direction indicators normally.

IMPORTANT
Overloading the electrical system by adding bulbs or supplementary or more powerful equipment than that for which the system was designed may cause extremely serious damage to all the equipment installed and may produce abnormal discharging of the batte–ries. Such action will invalidate the manufacturer’s warranty.

Problems with electrical equipment on tractor vehicles are very often caused by defects in the trailer electrical system. Before connecting to a trailer, carefully check that its electrical system is in order, to avoid blowing of fuses, and pay particular attention to the earth connection.

G5 electrical equipment

BULBS

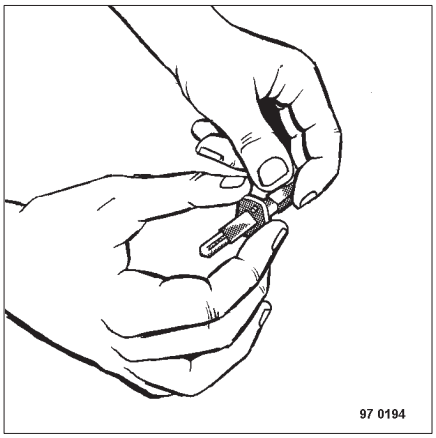
If a bulb has to be changed, always replace it with a bulb of the same wattage and type.

Table of bulbs:

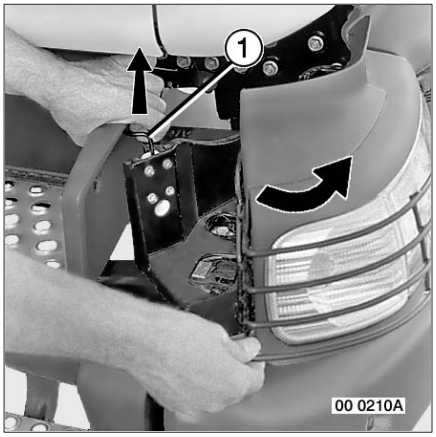
Assignment	Power
Cab overhead light	21W
Map reader	10W
Dipped beam headlights	70W
Main beam headlights	70W
Fog driving lights	70W
Long beam driving lights	70W
Front side / parking lights	5W
Front flashing lights	21W
Side flashing lights	21W
Fog light(s)	21W
Step lighting	5W
Rear flashing lights	21W
Stop lights	21W
Reversing light(s)	21W
Marker lights	5W
Number plate light	10W
Rear side / parking lights	10W
Map light	5W

Quartz–Halogen bulbs

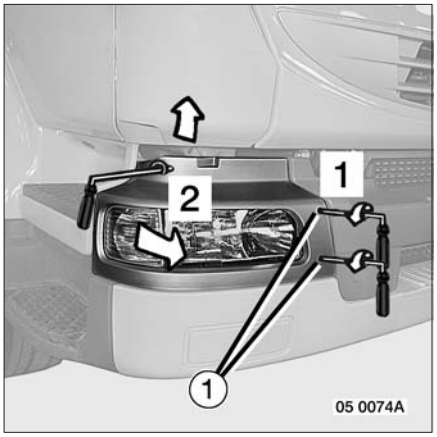
CAUTION
To fit these bulbs, preferably hold them by their metal end–piece.
If you have to take hold of the glass part, use a rag or clean paper. The least trace of a finger-mark or grease risks making the bulb ineffective when lighting up. If you are not sure whether the bulb is clean before fitting, clean it with alcohol. Before removing a bulb, if it has been previously lit, wait for it to cool down for a few minutes to avoid the risk of being seriously burned.

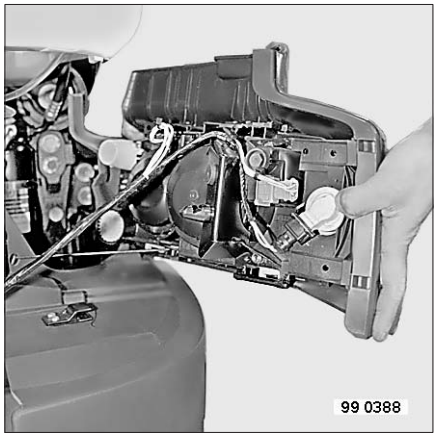


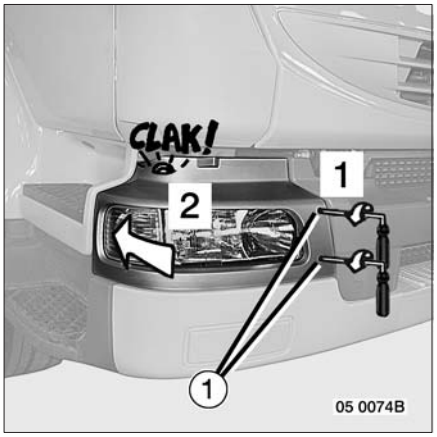
Depending on your vehicle's equipment
Changing bulbs
To gain access to the front bulbs, release spring clip (1) and pivot the headlamp unit.



Depending on your vehicle's equipment
Replacing a bulb
To gain access to the headlamp insert bulbs, unscrew the two screws (1), actuate the pull lever and pivot the headlamp insert unit.
Replace the bulb and refit in the reverse sequence to removal.
Tighten the screws (1).







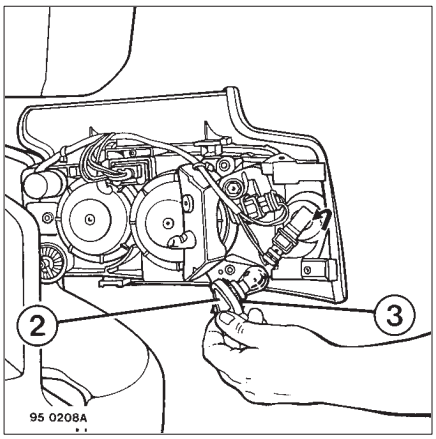
Front flashing lights
Withdraw socket (2). Upon installation, check for the presence of seal (3).

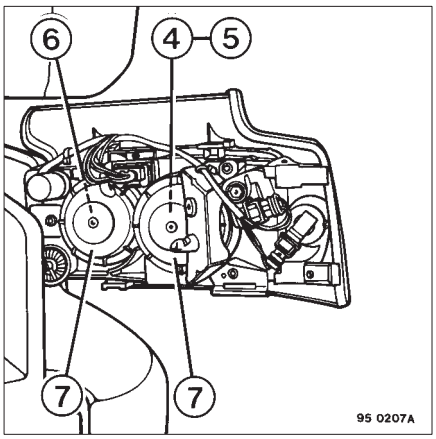
Front side/parking lights (4)
To gain access to the bulb, withdraw blanking plug (7).

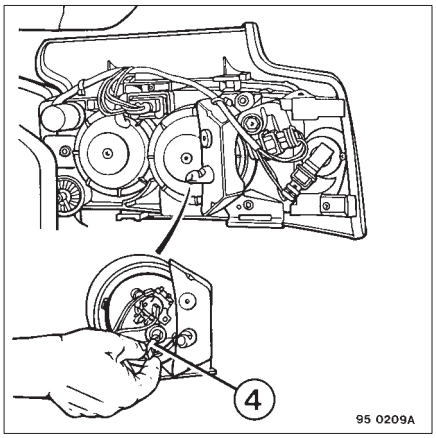
Dipped beam headlights (5)
To gain access to the bulb, withdraw blanking plug (7).

Main beam headlights (6)
To gain access to the bulb, withdraw blanking plug (7).

NOTE
When changing a bulb, carefully put back the rubber or plastic blanking plug to ensure perfect sealing of the headlamp insert unit.

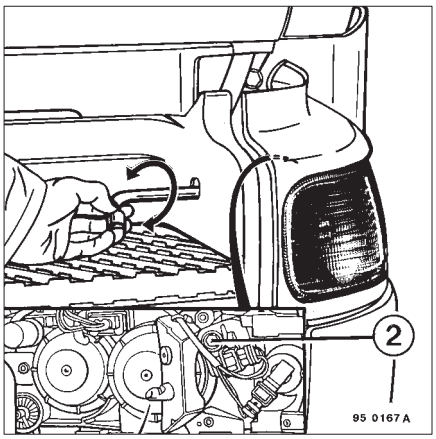


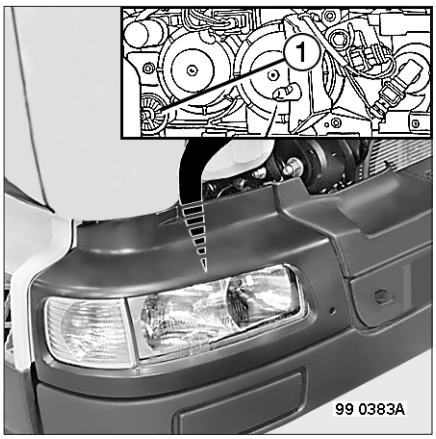




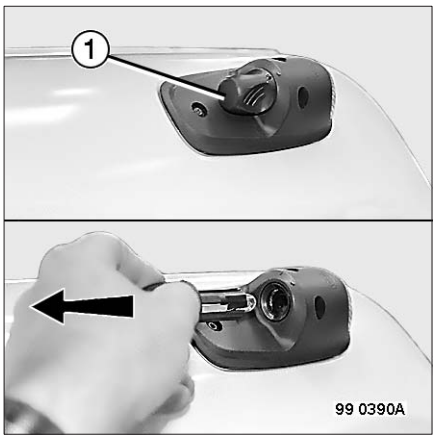
ADJUSTING THE HEADLIGHTS

Headlight beam adjustment
– Vertical (2)
– Horizontal (1).

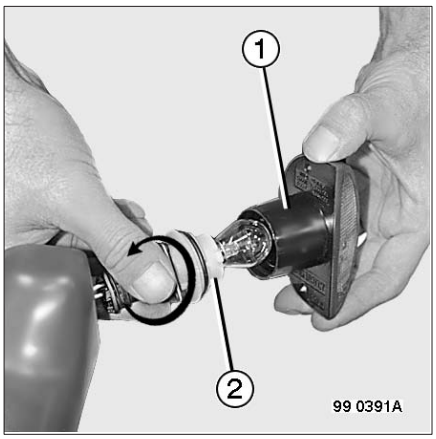




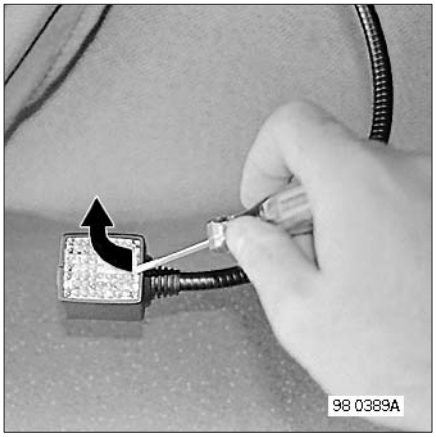
Replacing a roof light bulb
Turn the bulb–holder (1) through 1/4 of a turn and take out the bulb.
Replace the bulb and refit in the reverse sequence to removal.



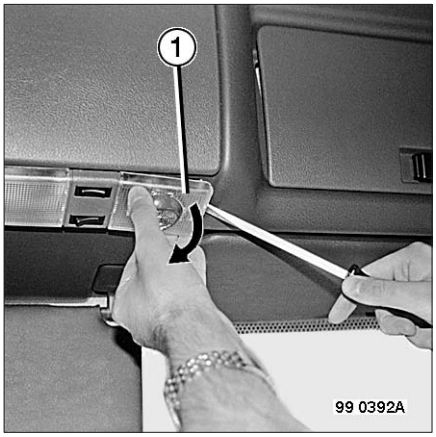
Replacement of a side flashing lamp bulb
Unscrew attaching screws (1) and remove the lamp.
Turn the connector / bulb–holder assembly (2) through 1/4 of a turn and take out the bulb.
Replace the bulb and reassemble in the reverse sequence to dismantling.



Map light
Replacing the bulb
To gain access to the bulb, withdraw the diffuser.



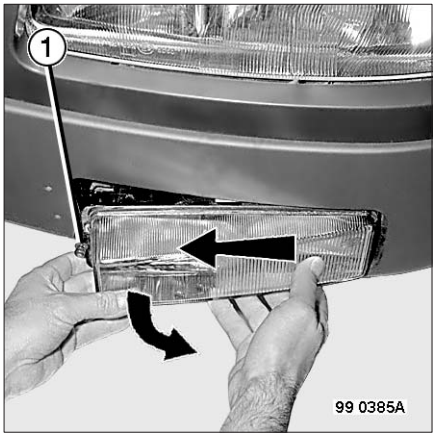
Replacing an overhead light bulb
Unclip the glass casing concerned (1–2–3) using a flat–ended screwdriver to gain access to the bulb.



G11 electrical equipment

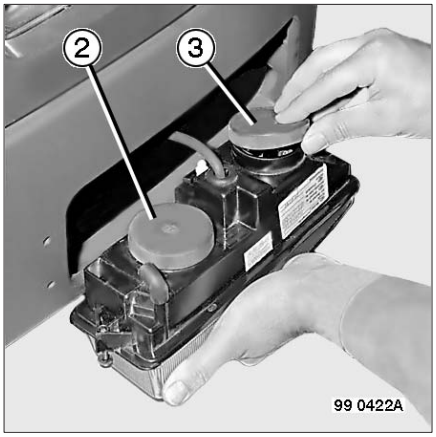
Depending on your vehicle's equipment

Fog / long range driving lamps
To gain access to the lamps, unscrew the screw (1) and disengage the driving lamp unit.

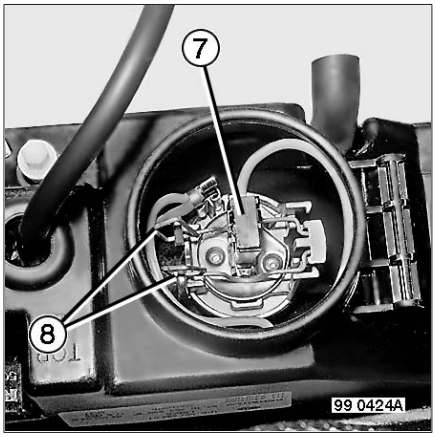


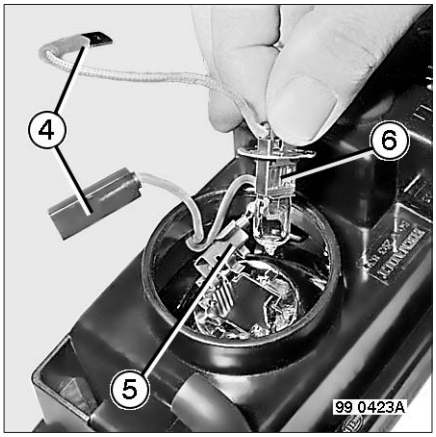
Replacing a long range driving lamp bulb
Withdraw the blanking plug (2), unplug the connector (4), unhook and lift up the tab (5).
Replace the bulb (6) and refit in the reverse sequence to removal.

Replacing a fog driving lamp bulb
Withdraw the blanking plug (3), unplug the connector (7), unhook and lift up the clip (8).
Replace the bulb and refit in the reverse sequence to removal.



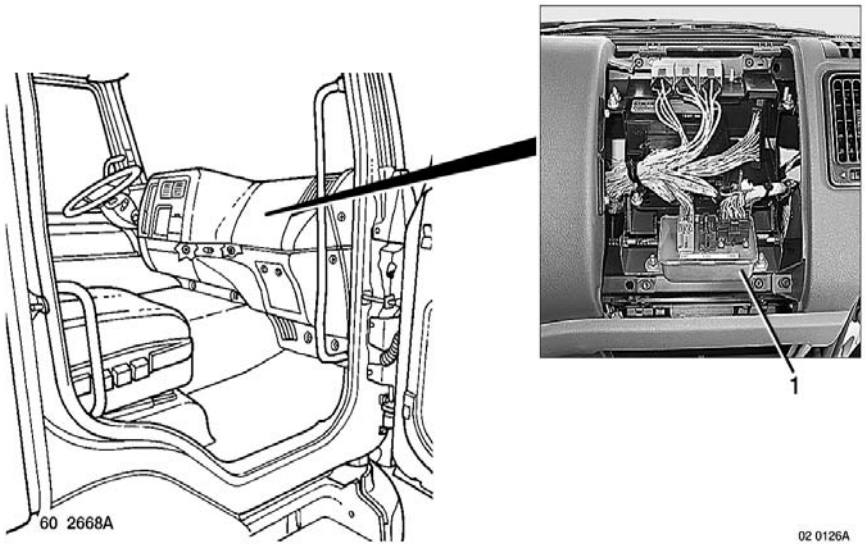
NOTE
When changing a bulb, carefully put back the rubber or plastic blanking plug to ensure perfect sealing of the headlamp insert unit.





G12 electrical equipment

Depending on your vehicle's equipment



1 – Bodybuilder's pre–arrangements management electronic control unit (CECU)

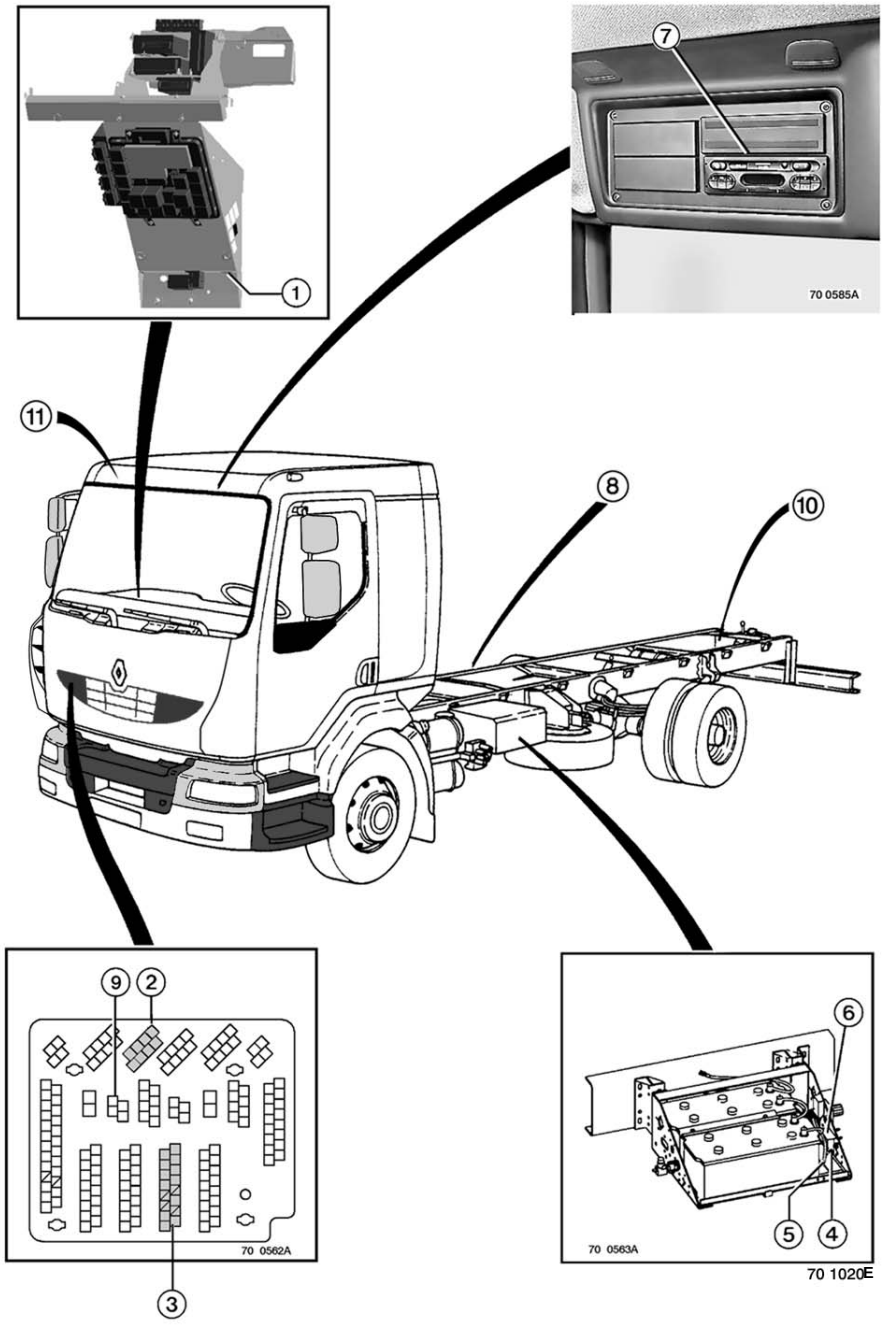
NOTE:
In the event of the vehicle being CECU pre–equipped, the grey connector is on standby. This connector is to be plugged in only to a bodybuilder's pre–arrangements ECU (consult a RENAULT TRUCKS dealer or approved agent).

DAYTIME RUNNING LIGHTS

Depending on the laws in force in certain countries, the side/parking lights as well as the dipped beam headlights should come on when the engine is started.
To obtain this feature, position a shunt in the location **SH 3**.
(See page G 22).

G13 electrical equipment

G14 electrical equipment



G15 electrical equipment

AVAILABLE POWER SUPPLY

All electrical connections must be made without fail at the available power points made available by RENAULT TRUCKS.
It is forbidden to hook up to the different wiring harnesses on the vehicle.
Use and adapt connectors and wiring harnesses approved and distributed by RENAULT TRUCKS.
The cross–section of the cables should be adapted to the desired use (5 Ampères per mm^2).
Respect the circuit protections recommended by RENAULT TRUCKS: it is forbidden to change fuse ratings.

Depending on your vehicle's equipment

LOCATION 1

3 Insulated stand–by wires

Application	Wire	Fuse
Available power supply (after master switch)	208	F21
Available power supply (lighting)	632	F5
Available power supply (after ignition)	275	F35

LOCATION 2

BROWN connector

Application	Wire	Fuse
Earth	1	–
Available power supply (after master switch)	208	F21
Available power supply (lighting)	618	F43
Available power supply (lighting)	632	F5
Available power supply (lighting)	634	F4
Available power supply (equipment in road position "Alert" warning light)	651	–
Available power supply (bodybuilder's equipment control)	8083	–
Available power supply (handrail deployed "Alert" warning light)	8084	–

G16 electrical equipment

LOCATION 3

GREEN connector

Application	Wire	Fuse
Available power supply (engine speed)	045	–
Available power supply (engine speed)	047	–
Available power supply (PTO)	88	–
Available power supply (engine speed)	1025	–
Available power supply (PTO)	1026	–
Available power supply (PTO)	1141	–
Available power supply (30 km/h speed limitation)	5027	–
Available power supply (fast idling)	8067	–
Available power supply (crane or tower platform deployed warning pictogram)	8085	–
Available power supply (sideboard open warning pictogram)	8086	–
Available power supply (tipper tilter “alert” warning pictogram)	8087	–

LOCATION 4

2 Insulated stand–by wires

Application	Wire	Fuse
Earth	1	–
Available power supply (lighting)	632	F5

LOCATION 5

6 Insulated stand–by wires

Application	Wire	Fuse
Earth	1	–
Available power supply (after master switch)	208	F21
Available power supply (lighting)	618	F43
Available power supply (lighting)	632	F5
Available power supply (lighting)	634	F4
Available power supply (equipment in road position "Alert" warning light)	651	–
Available power supply (bodybuilder's equipment control)	8083	–
Available power supply (handrail deployed "Alert" warning light)	8084	–

LOCATION 6

Application	Wire	Fuse
Available power supply (before master switch)	201	F200

Pre–equipped vehicles
With a bodybuilder's pre–equipment: tail lift, refrigerator unit, tipper, crane – a wiring harness connected to location (2) brings in the available power supplies to locations (4–5–8).

LOCATION 7

4 Insulated stand–by wires

Application	Wire	Fuse
Available + 12V power supply (radiotelephone)	46	F17
Available – power supply (radiotelephone)	155	–
Available + 12V power supply (CB)	4000	F17
Available – power supply (CB)	144	–
Radiotelephone antenna		
CB radio antenna		

WHITE connector

Application	Wire	Fuse
Radio power supply (memory)	202	F34
Radio + power supply	47	F30
Radio – power supply	1	–

G18 electrical equipment

LOCATION 8

10 Insulated stand–by wires

Application	Wire	Fuse
Available power supply (engine speed)	045	–
Available power supply (engine speed)	047	–
Available power supply (PTO)	88	–
Available power supply (engine speed)	1025	–
Available power supply (PTO)	1026	–
Available power supply (30 km/h speed limitation)	5027	–
Available power supply (fast idling)	8067	–
Available power supply (crane or tower platform deployed warning pictogram)	8085	–
Available power supply (sideboard open warning pictogram)	8086	–
Available power supply (tipper tilter “alert” warning pictogram)	8087	–

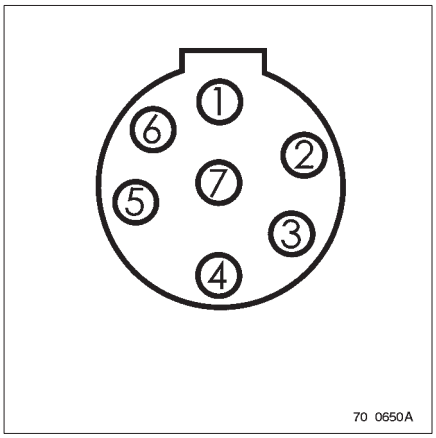
LOCATION 9

Application	Wire	Fuse
Body perimetric protection box (rigid)	0403	–

Electrical socket

7–pin trailer socket 24S

Assignment	Terminal	Fuse
Trailer perimetric protection box	2	–



G19 electrical equipment

REFUSE COLLECTOR (BOM) EQUIPMENT

LOCATION 1

YELLOW connector

Application	Wire	Fuse
Available power supply (30 km/h speed limitation)	5027	–
Available power supply (PTO)	818	–
Available power supply (compacting request)	8067	–
Available power supply (reversing safety)	5026	–

RED connector

Application	Wire	Fuse
Available power supply (engine speed)	045	–
Available power supply (engine speed)	047	–
Available power supply (PTO)	88	–
Available power supply (revolving beacons)	323	F20
Available power supply (engine speed)	1025	–
Available power supply (PTO)	1026	–
Available power supply (bodybuilder's warning light)	8084	–

24 Insulated stand–by wires

Application	Wire	Fuse
Power supply 24 V	202	F34
Available power supply (after master switch)	208	F21
Available power supply (after ignition)	275	F35
Available power supply (reversing lights)	608	–
Available power supply (lighting)	632	F5

LOCATION 3

GREEN connector

Application	Wire	Fuse
Available power supply (engine speed)	045	–
Available power supply (engine speed)	047	–
Available power supply (PTO)	88	–
Available power supply (engine speed)	1025	–
Available power supply (PTO)	1026	–
Available power supply (PTO)	1141	–
Available power supply (30 km/h speed limitation)	5027	–
Available power supply (fast idling)	8067	–
Available power supply (crane or tower platform deployed warning pictogram)	8085	–
Available power supply (sideboard open warning pictogram)	8086	–
Available power supply (tipper tilter "alert" warning pictogram)	8087	–

G20 electrical equipment

LOCATION 4

2 Insulated stand–by wires

Application	Wire	Fuse
Earth	1	–
Available power supply (lighting)	632	F5

LOCATION 5

6 Insulated stand–by wires

Application	Wire	Fuse
Earth	1	–
Available power supply (after master switch)	208	F21
Available power supply (lighting)	618	F43
Available power supply (lighting)	632	F5
Available power supply (lighting)	634	F4
Available power supply (equipment in road position "Alert" warning light)	651	–
Available power supply (bodybuilder's equipment control)	8083	–
Available power supply (handrail deployed "Alert" warning light)	8084	–

LOCATION 6

Application	Wire	Fuse
Available power supply (before master switch)	201	F200

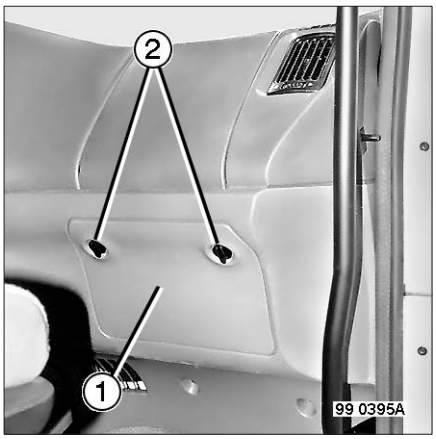
G21 electrical equipment

FUSES

Depending on your vehicle's equipment

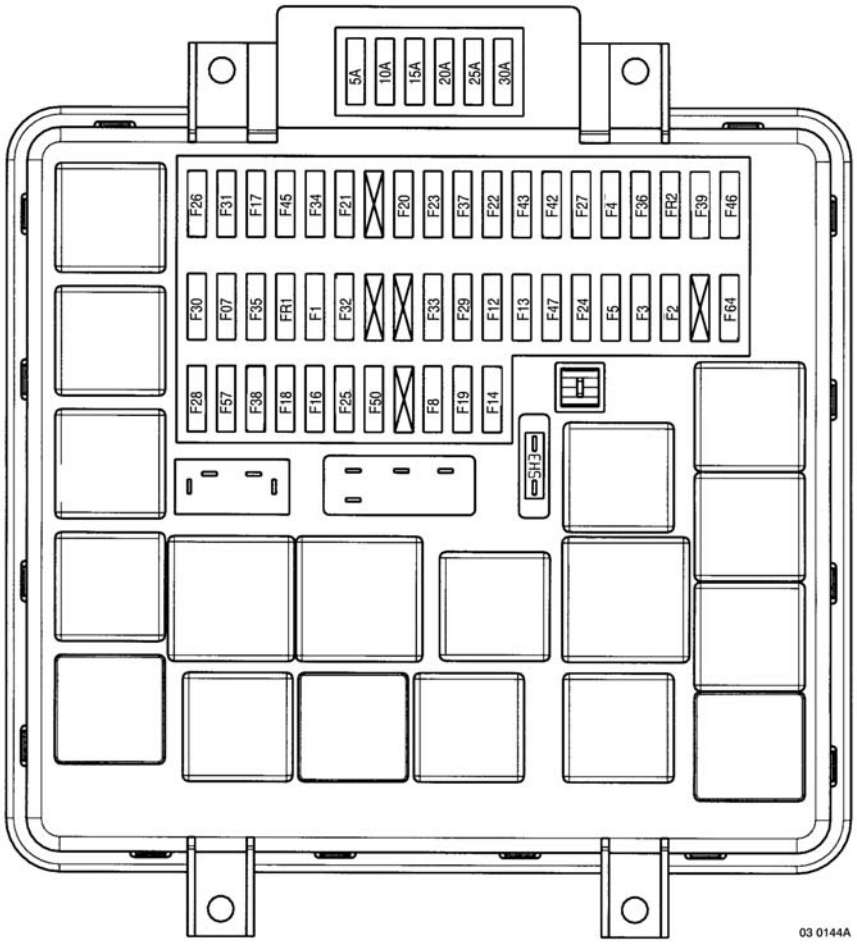
To gain access to the fuses:
- Turn the two catches (2) through 1/4 of a turn.
- Remove cover (1).

When you have finished, refit cover (1) and turn the catches (2) through 1/4 of a turn.



Replace faulty fuses using the tweezers (3).

G22 electrical equipment



G23 electrical equipment

TABLE OF FUSES

Always replace a fuse by another fuse with the same rating.

Depending on your vehicle's equipment

Assignment	Item	Amp.
Connector, 7–pin ("ABS")	F1	15
Trailer socket, 7–pin type 24 S	F1	15
Stop lights relay	F1	15
Front side/parking lights	F2	10
RH rear side/parking light	F2	10
Registration plate RH light	F2	10
Voltage dropper (headlights adjustment)	F2	10
Fan coil heater lighting	F2	10
RH side marker lights	F2	10
Cab marker lights	F3	10
LH side marker lights	F3	10
LH rear side/parking light	F3	10
Registration plate RH light	F3	10
Dashboard instruments lighting	F3	10
Switch lighting	F3	10
Trailer side lights	F5	10
Available power supply (lighting)	F5	10
Engine stop control, cab tilted	F7	10
Fuel filter clogging	F7	10
"EUP" EECU ECU	F7	10
Exhaust brake cut–off electrovalve	F7	10
Fog light(s)	F8	15
Fog driving lights	F8	15
LH dipped beam headlight	F12	10
RH dipped beam headlight	F13	10
RH main beam headlight	F14	15
LH main beam headlight	F14	15
Long beam driving lights	F14	15
Dashboard warning lights and instruments power supply	F16	10
Electric retarder control	F16	10
Exhaust brake electrovalve	F16	10
"ABS–ASR" ECU	F16	10
Heated driver's seat	F17	20
Voltage dropper (12V socket)	F17	20
Voltage dropper (telecommunications)	F17	20
Fan coil heaters	F18	15
Fuel filter preheater	F19	25
Revolving beacons	F20	20
Roof air vent motor	F20	20
Power supply (after master switch)	F21	15
Independent heater	F22	15
Driver's overhead light	F23	10
Passenger(s) overhead light	F23	10

G24 electrical equipment

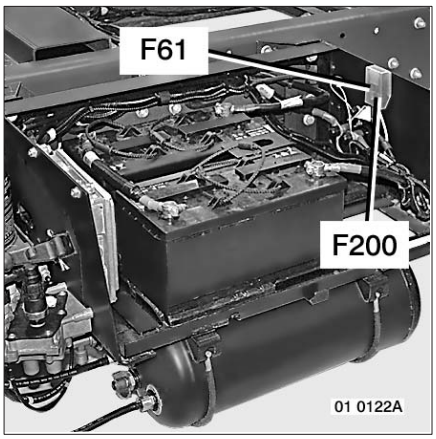
Depending on your vehicle's equipment

Assignment	Item	Amp.
Driver's window winder motor	F24	20
Passenger's window winder motor	F24	20
Electronic tachograph	F25	5
Horn	F26	15
Stop lights	F27	10
"ABS" ECU	F28	15
Defrosting rearview mirrors	F29	10
Windscreen defrosting time–delay relay	F29	10
Cigar lighter	F30	20
Radio	F30	20
Socket 24 Volts	F31	20
Voltage dropper (extra 12V socket)	F31	20
Rear window winder motors (4–door cab)	F31	20
Windscreen wiper speed controller	F32	20
Windscreen washer pump	F32	20
Headlamps washer pump	F32	20
Windscreen wiper motor	F32	20
Diagnostics socket	F33	10
Automatic gearbox diagnostics socket	F33	10
Suspension ECU	F33	10
Radio tuner memory power supply	F34	15
Independent heater	F34	15
Flasher unit	F34	15
Anti–theft alarm siren	F34	15
Available power supply (after key ignition)	F35	15
Connector, 7–pin ("ABS")	F36	20
LH door lock electric striker	F37	15
RH door lock electric striker	F37	15
External rearview mirrors swivelling control	F37	15
Step light	F37	15
LH rear door overhead light	F37	15
RH rear door overhead light	F37	15
"EUP" EECU ECU	F38	25
Automatic gearbox ECU	F39	10
Automatic gearbox ECU power supply	F42	10
Working spotlight (tractor)	F43	10
Trailer socket, 7–pin type 24 S	F43	10
Bodybuilder's equipment control	F43	10
Valve lighting control	F43	10
Exhaust brake cut–off relay	F43	10
Machine control unlocking switch	F43	10
Doors central locking box	F45	10
Anti–theft alarm box power supply	F46	10
Fuel filter preheater relay	F46	10
Reversing light(s)	F46	10
Reversing buzzer	F46	10
Rearview mirrors defrosting relay	F46	10
Anti–theft alarm box key after ignition power supply	F46	10
Bodybuilder's pre–arrangements management ECU	F46	10

G25 electrical equipment

Depending on your vehicle's equipment

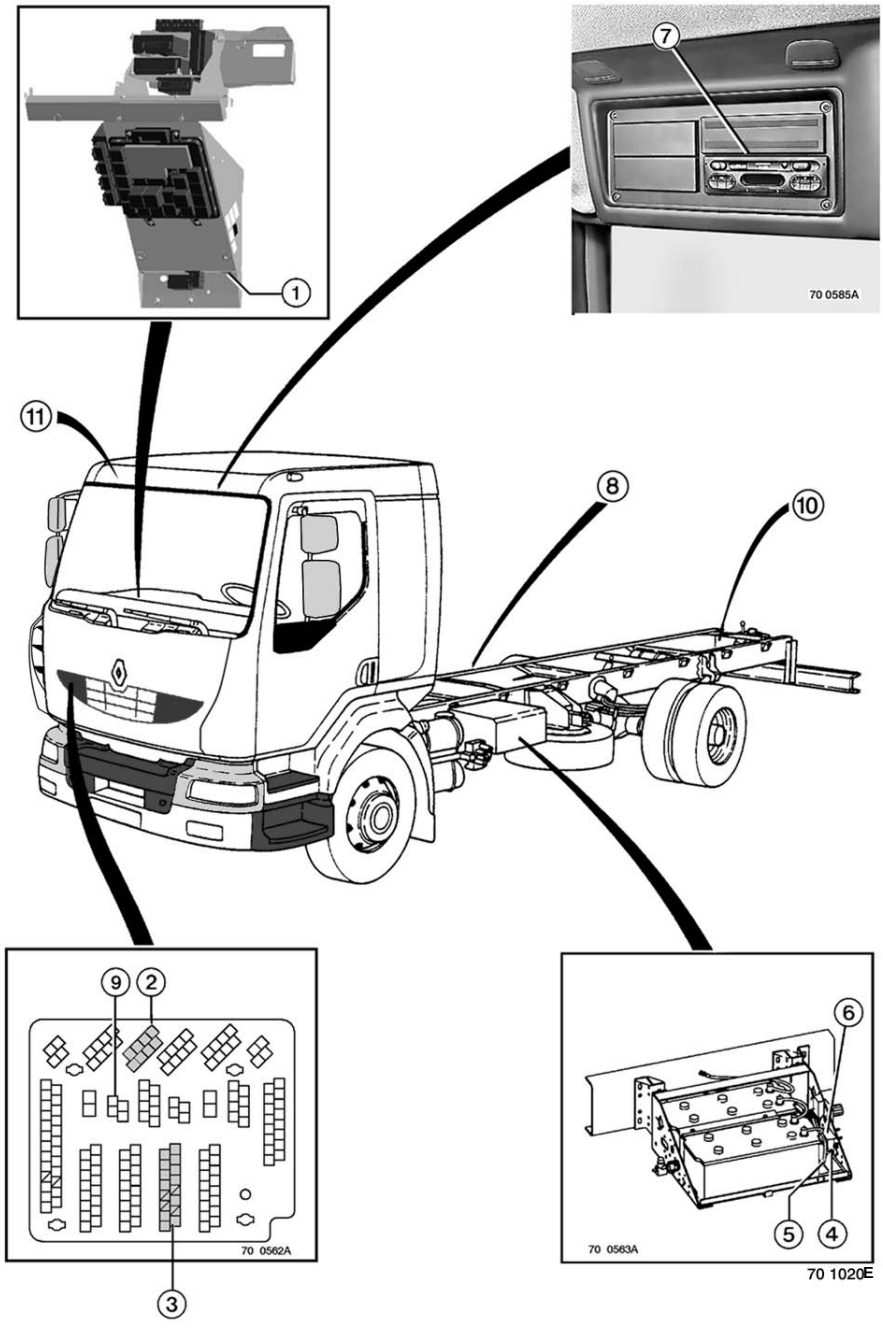
Assignment	Item	Amp.
Suspension ECU	F47	10
Suspension remote control box	F47	10
Electric retarder cut–off relay	F50	10
Windscreen wiper speed controller relay	F52	10
"VECU" vehicle master ECU	F57	15
Electronic tachograph	F57	15
Air bag	F64	10



Depending on your vehicle's equipment

Assignment	Item	Amp.
Windscreen defrosting	F61	50
Available power supply (before master switch)	F200	200

G26 electrical equipment



G27 electrical equipment

"FIRE TENDER" (FPT) EQUIPMENT

AVAILABLE POWER SUPPLY

All electrical connections must be made without fail at the available power points made available by RENAULT TRUCKS.
It is forbidden to hook up to the different wiring harnesses on the vehicle.
Use and adapt connectors and wiring harnesses approved and distributed by RENAULT TRUCKS.
The cross–section of the cables should be adapted to the desired use (5 Ampères per mm^2).
Respect the circuit protections recommended by RENAULT TRUCKS: it is forbidden to change fuse ratings.

Depending on your vehicle's equipment

LOCATION 1

3 Insulated stand–by wires

Application	Wire	Fuse
Available power supply (after master switch)	208	F21
Available power supply (lighting)	632	F5
Available power supply (after ignition)	275	F35

LOCATION 2

BROWN connector

Application	Wire	Fuse
Earth	1	–
Available power supply (lighting)	632	F5
Available power supply (lighting)	634	F4
Available line	971	–
Available line	972	–
Available line	973	–
Available line	974	–
Available line	975	–

Pre–equipped vehicles
With ìfire tenderî (FPT) electrical pre–equipment, the ends of the available lines are free in locations 2 and 10.

LOCATION 3

GREEN connector

Application	Wire	Fuse
Available power supply (engine speed)	045	–
Available power supply (engine speed)	047	–
Available power supply (PTO)	88	–
Available power supply (rear box contact open)	151	–
Available power supply (PTO warning light)	249	–
Available power supply (after ignition)	274	F47
Available power supply (rear revolving beacon)	357	–
Available power supply (rear box lighting)	623	–
Available power supply (rear swivelling spotlight)	644	–
Available power supply (extra signalling lights)	647	–
Available power supply (engine speed)	1025	–
Available power supply (PTO)	1026	–
Available power supply (rear loudspeaker +)	4065	–
Available power supply (rear loudspeaker –)	4066	–
Available power supply (rear loudspeaker screening)	4067	–
Available power supply (fast idling)	8067	–

Pre–equipped vehicles
With ìfire tenderî (FPT) electrical pre–equipment, a wiring harness connected to locations 2 and 3, brings the available power supplies to location 10.

LOCATION 6

Application	Wire	Fuse
Available power supply (before master switch)	201	F200

G29 electrical equipment

LOCATION 7

YELLOW connector

Application	Wire	Fuse
Available + 12V power supply (radiotelephone)	46	F17
Available – power supply (radiotelephone)	155	–

LOCATION 9

24 Insulated stand–by wires

Application	Wire	Fuse
Earth	1	–
Available power supply (engine speed)	045	–
Available power supply (engine speed)	047	–
Available power supply (PTO)	88	–
Available power supply (rear box contact open)	151	–
Available power supply (PTO warning light)	249	–
Available power supply (after ignition)	274	F47
Available power supply (rear revolving beacon)	357	–
Available power supply (rear box lighting)	623	–
Available power supply (lighting)	632	F5
Available power supply (lighting)	634	F4
Available power supply (rear swivelling spotlight)	644	–
Available power supply (extra signalling lights)	647	–
Available line	971	–
Available line	972	–
Available line	973	–
Available line	974	–
Available line	975	–
Available power supply (engine speed)	1025	–
Available power supply (PTO)	1026	–
Available power supply (rear loudspeaker +)	4065	–
Available power supply (rear loudspeaker –)	4066	–
Available power supply (rear loudspeaker screening)	4067	–

G30 electrical equipment

LOCATION 11

WHITE connector

Application	Wire	Fuse
Radio – power supply	1	–
Radio + power supply	47	F30
Available –12V power supply	144	–
Radio power supply (memory)	202	F34
Available +12V power supply	4000	F17
Available power supply (rear loudspeaker +)	4065	–
Available power supply (rear loudspeaker –)	4066	–
Available power supply (rear loudspeaker screening)	4067	–
Radiotelephone antenna		

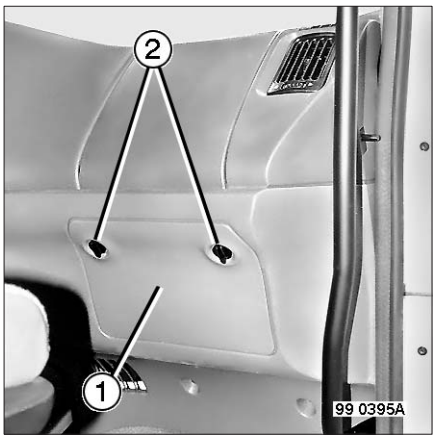
G31 electrical equipment

FUSES

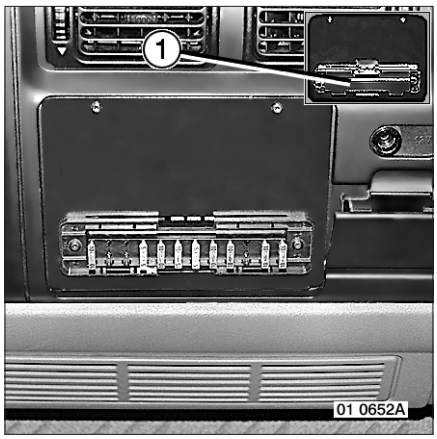
Depending on your vehicle's equipment

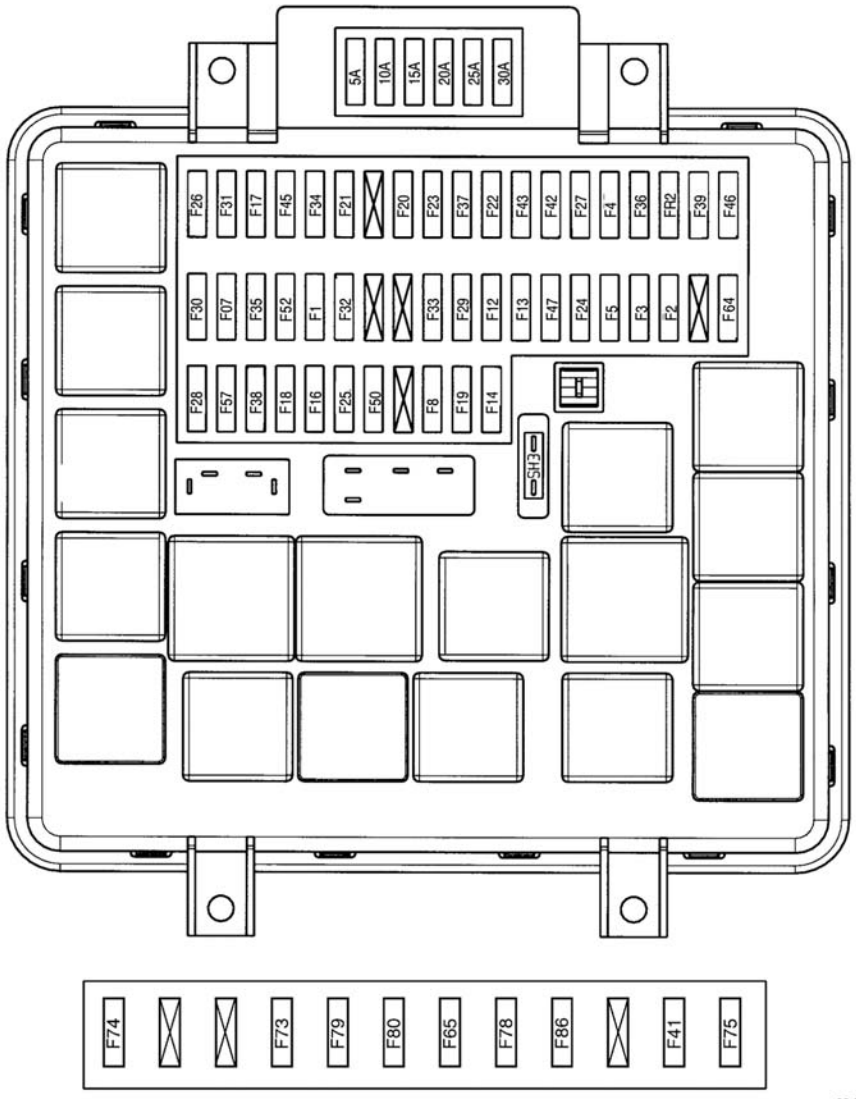
To gain access to the fuses:
- Turn the two catches (2) through 1/4 of a turn.
- Remove cover (1).

When you have finished, refit cover (1) and turn the catches (2) through 1/4 of a turn.



Replace faulty fuses using the tweezers (3).




5A
10A
15A
20A
25A
30A
F26
F31
F17
F45
F34
F21
F20
F23
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F43
F42
F27
F4
F36
FR2
F39
F46
F30
F07
F35
F52
F1
F32
F33
F29
F12
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F47
F24
F5
F3
F2
F64
F28
F57
F38
F18
F16
F25
F50
F8
F19
F14
SH3
F74
F73
F79
F80
F65
F78
F86
F41
F75
03 0145A

G33 electrical equipment

TABLE OF FUSES

Always replace a fuse by another fuse with the same rating.

Depending on your vehicle's equipment

Assignment	Item	Amp.
Trailer socket, 7–pin type 24 S	F1	15
Stop lights relay	F1	15
Front side/parking lights	F2	10
RH rear side/parking light	F2	10
Registration plate RH light	F2	10
Voltage dropper (headlights adjustment)	F2	10
Fan coil heater lighting	F2	10
RH side marker lights	F2	10
Cab marker lights	F3	10
LH side marker lights	F3	10
LH rear side/parking light	F3	10
Registration plate RH light	F3	10
Dashboard instruments lighting	F3	10
Switch lighting	F3	10
Available power supply (rear box side/parking lights)	F4	10
Available power supply (rear box instrument panel lighting)	F5	10
Trailer side lights	F5	10
Engine stop control, cab tilted	F7	10
Fuel filter clogging	F7	10
"EUP" EECU ECU	F7	10
Exhaust brake cut–off electrovalve	F7	10
Fog light(s)	F8	15
Fog driving lights	F8	15
LH dipped beam headlight	F12	10
RH dipped beam headlight	F13	10
RH main beam headlight	F14	15
LH main beam headlight	F14	15
Long beam driving lights	F14	15
Dashboard warning lights and instruments power supply	F16	10
Exhaust brake control	F16	10
"ABS–ASR" ECU	F16	10
Heated driver's seat	F17	20
Operational assistance system	F17	20
Fan coil heaters	F18	15
Fuel filter preheater	F19	25
Not usable	F22	15
Driver's overhead light	F23	10
Passenger(s) overhead light	F23	10
Driver's window winder motor	F24	20
Passenger's window winder motor	F24	20
Tachograph simulator	F25	5

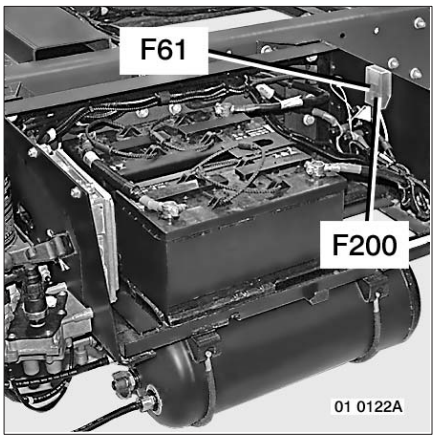
Depending on your vehicle's equipment

Assignment	Item	Amp.
Horn	F26	15
Stop lights	F27	10
"ABS" ECU	F28	15
Defrosting rearview mirrors	F29	10
Windscreen defrosting time–delay relay	F29	10
Cigar lighter	F30	20
Rear window winder motors (4–door cab)	F31	20
Windscreen wiper speed controller	F32	20
Windscreen washer pump	F32	20
Headlamps washer pump	F32	20
Windscreen wiper motor	F32	20
Diagnostics socket	F33	10
Flasher unit	F34	15
Hazard lights control	F34	15
Voltage dropper (telecommunications)	F34	15
Available power supply (after key ignition)	F35	15
External rearview mirrors swivelling control	F37	15
Step light	F37	15
LH rear door overhead light	F37	15
RH rear door overhead light	F37	15
"EUP" EECU ECU	F38	25
Not usable	F39	10
Front searchlight	F41	10
Front searchlight control	F41	10
Front searchlight remote control	F41	10
Rear spotlight	F41	10
Rear spotlight control	F41	10
Trailer socket, 7–pin type 24 S	F43	10
Fuel filter preheater relay	F46	10
Reversing light(s)	F46	10
Reversing buzzer	F46	10
Rearview mirrors defrosting relay	F46	10
Bodybuilder's pre–arrangements management ECU	F46	10
Windscreen wiper speed controller relay	F52	10
"VECU" vehicle master ECU	F57	15
Tachograph simulator	F57	15
Air bag	F64	10
Day / night lighting	F65	5
Available power supply (rear box)	F72	15
Available power supply (rear box lighting)	F73	5
24 V socket lighting	F74	10
Rear box lighting signalling	F74	10
Day / night lighting relay	F74	10

G35 electrical equipment

Depending on your vehicle's equipment

Assignment	Item	Amp.
Rear box available power supply (after key ignition)	F75	10
Extra signalling lights	F78	10
Extra signalling lights control	F78	10
PTO hourmeter	F79	10
PTO cab warning light	F79	10
PTO in service relay	F79	10
Penetration / intervention lights (revolving beacons)	F80	15
Front grille extra lighting	F80	15
Switch lighting (upper control panel)	F86	10



Depending on your vehicle's equipment

Assignment	Item	Amp.
Windscreen defrosting	F61	50
Available power supply (before master switch)	F200	200

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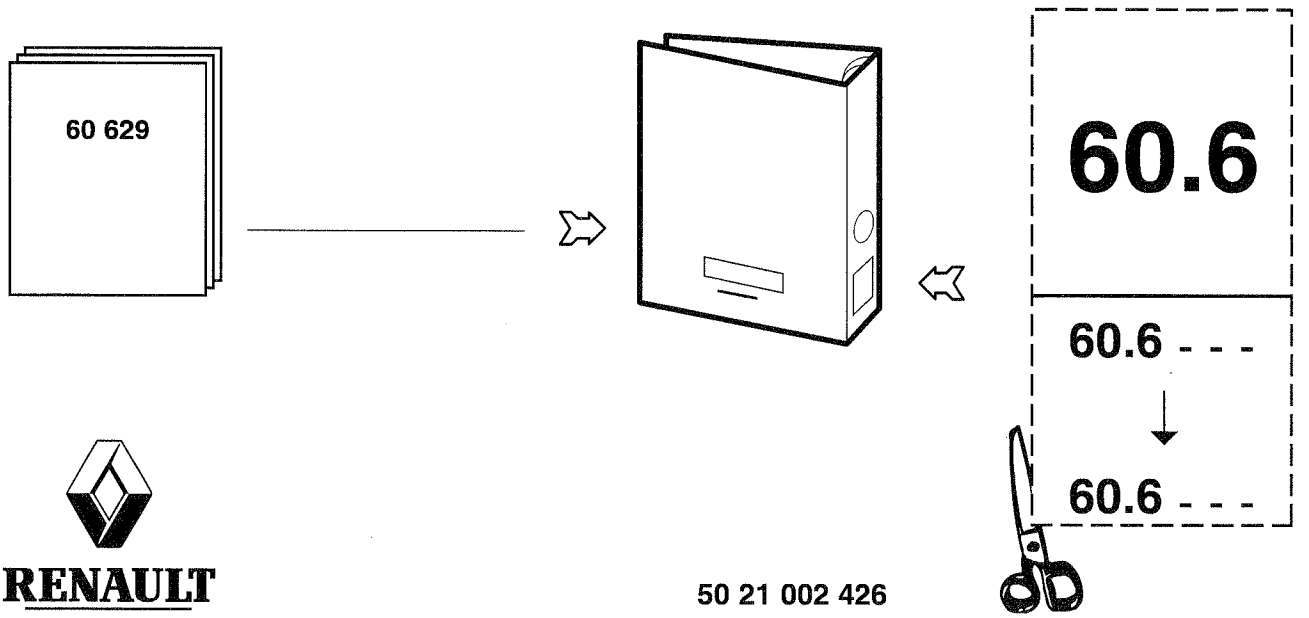
BODYWORK

SEAT	VEHICLES
"ISRI" 6830/870 — 1030/870 (880)	RENAULT MAGNUM RENAULT PREMIUM RENAULT KERAX RENAULT MIDLUM

NOTE
The above information may change in the course of time.
Only the "Consult" section of the workshop manuals repertory in standard N° 10320 serves as reference.



RENAULT

CONTENTS

BODY - "ISRI" 6830/1030 SEAT

PARTS	DESCRIPTIONS	PAGES
A	General points :	
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	- control elements 6830 / 870	A2
	- serial number 6830 / 870	A3
	- control elements 1030 / 870	A4
	- variations	A5
	- pneumatic diagram	A6
	- pneumatic components	A7
	- ingredients	A8
	- tightening torques	A8
B	Dismantling – re-assembly :	
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Important recommendations

- Only qualified staff are authorised to carry out repairs on seats.

- The drawings featured in this manual generally represent the left seat or the left side of the seat. Repairs to the right seat or right side of the seat must be transposed accordingly.

- The descriptions featured in Chapter 2 explain the dismantling of various components making up the seat.
  Generally speaking the re-assembly of the seat will be the same in reverse order.

- Before replacing any control parts (e.g. height adjustment valve, seat lowering lever) disconnect the main connection plug and the compressed air connection.

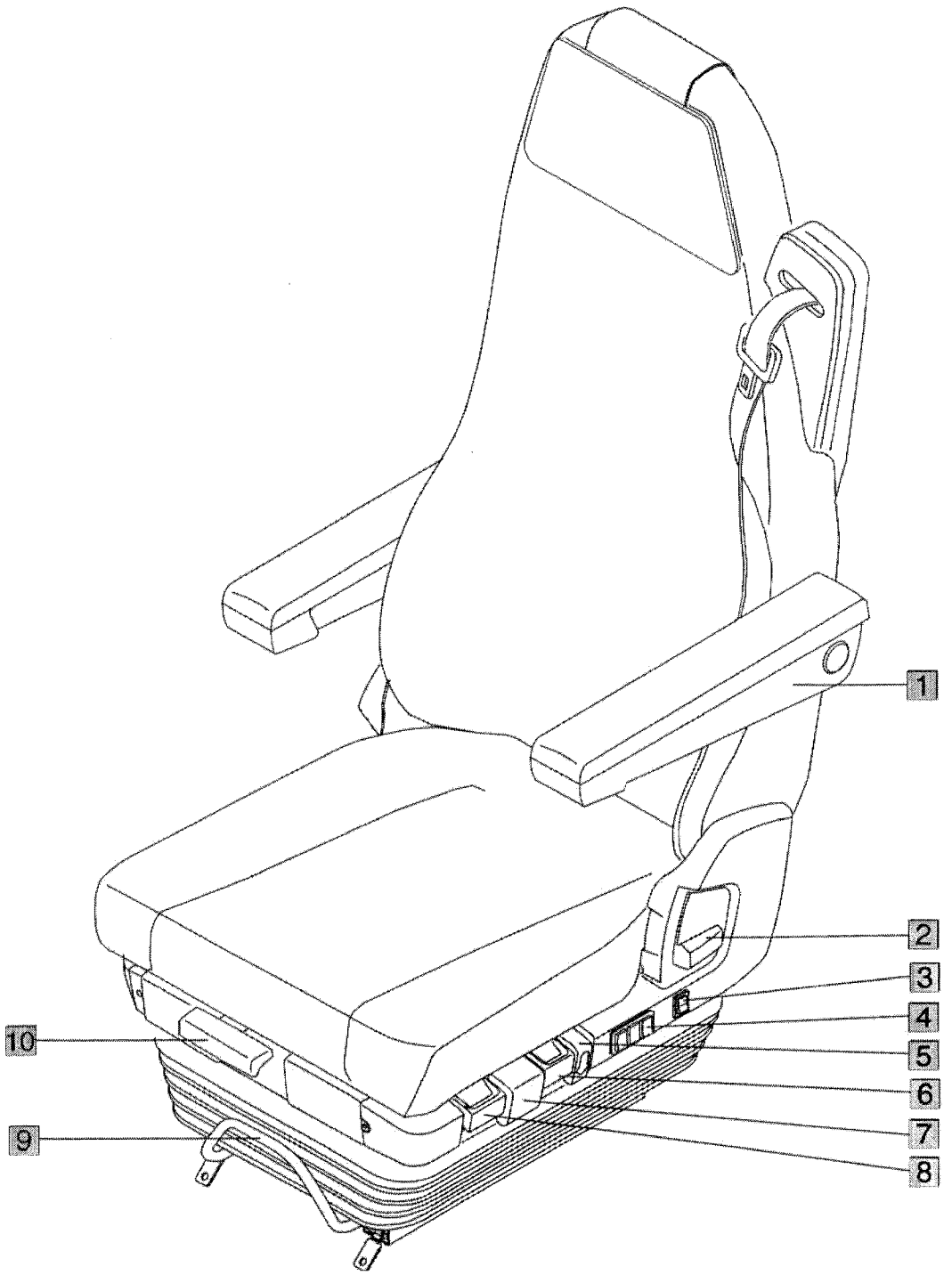
- The support elements for hoses and cables (e.g. cable links) as well as the cable terminals are not mentioned in detail.
  It is nevertheless necessary to re-place, after the repair work is finished, the hoses and cables as well as their supports and their safety devices in their original positions1.
  Similarly, when mounting the hoses, ensure that their exact attributions are respected (colour coding).

- Hoses and cables must not be bent.

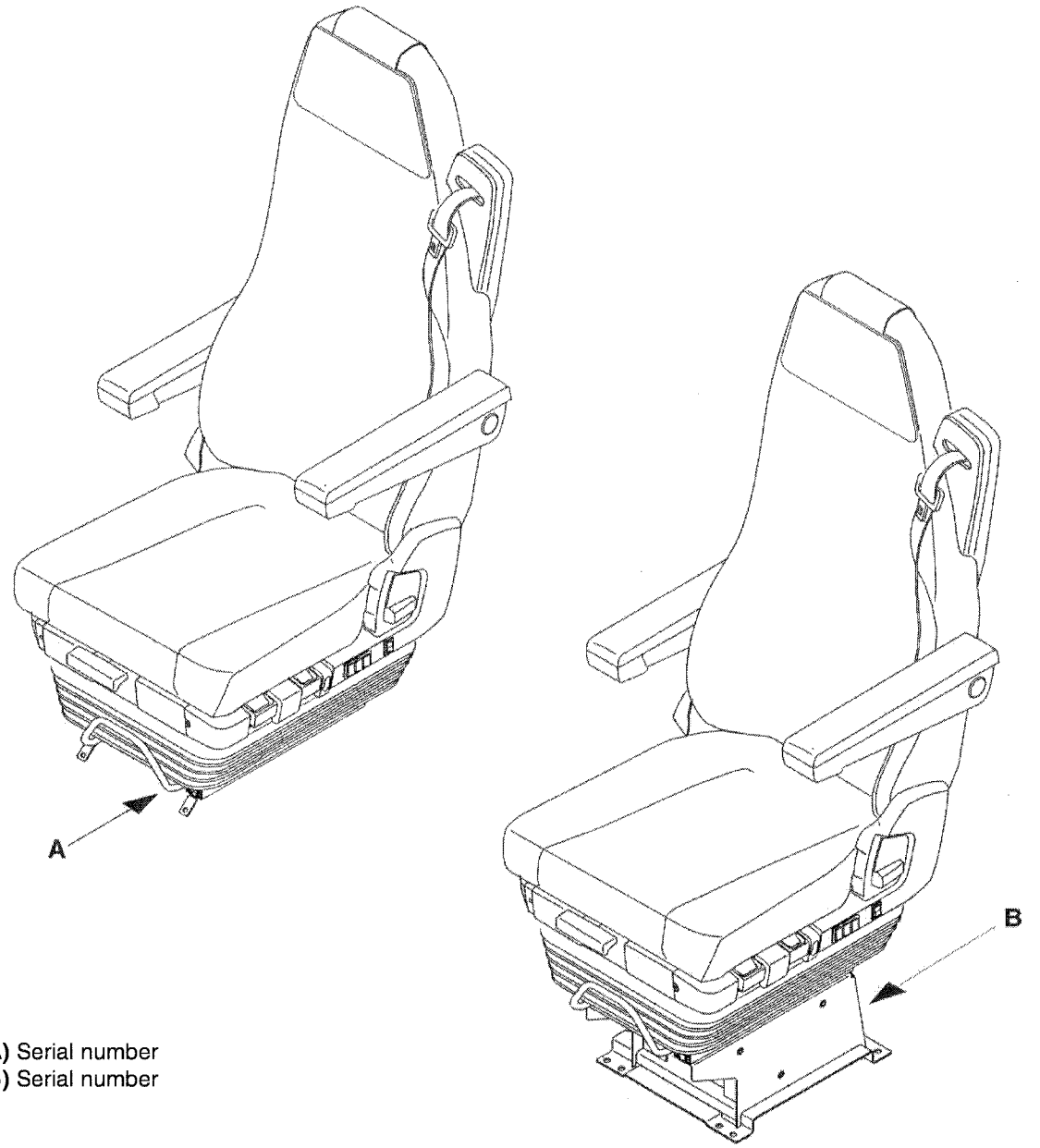
- For technical reasons, if exchanging parts situated in the force radius of the fixing points of the seat belt, ensure that they are correctly positioned and that the tightening torques of the fixing screws are respected.

- After each repair job, check the functions and if the repairs involved parts of the pneumatic system, check the air tightness.

- Do not use the lowered backrest as a support.

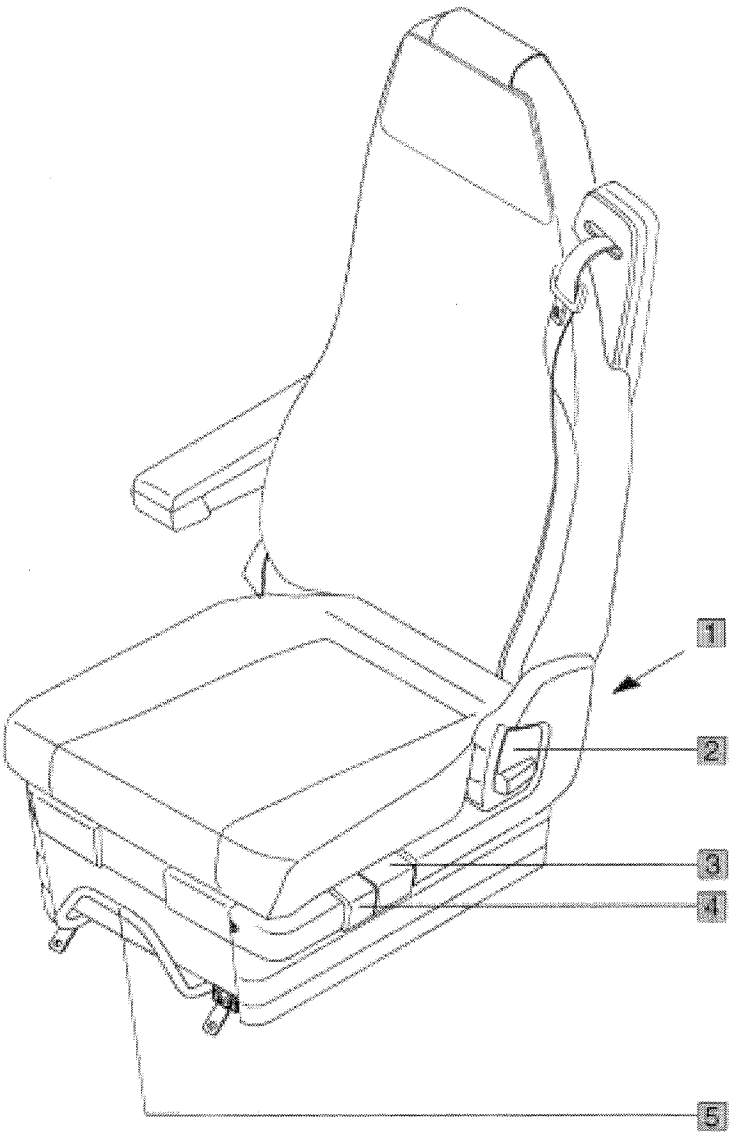


(1) Armrests
(2) Backrest adjustment
(3) Heating
(4) Lumbar support
(5) Vertical lowering
(6) Height adjustment
(7) Angle adjustment
(8) Adjustable vertical damper
(9) Forward/backward position adjustment
(10) Seat cushion depth adjustment

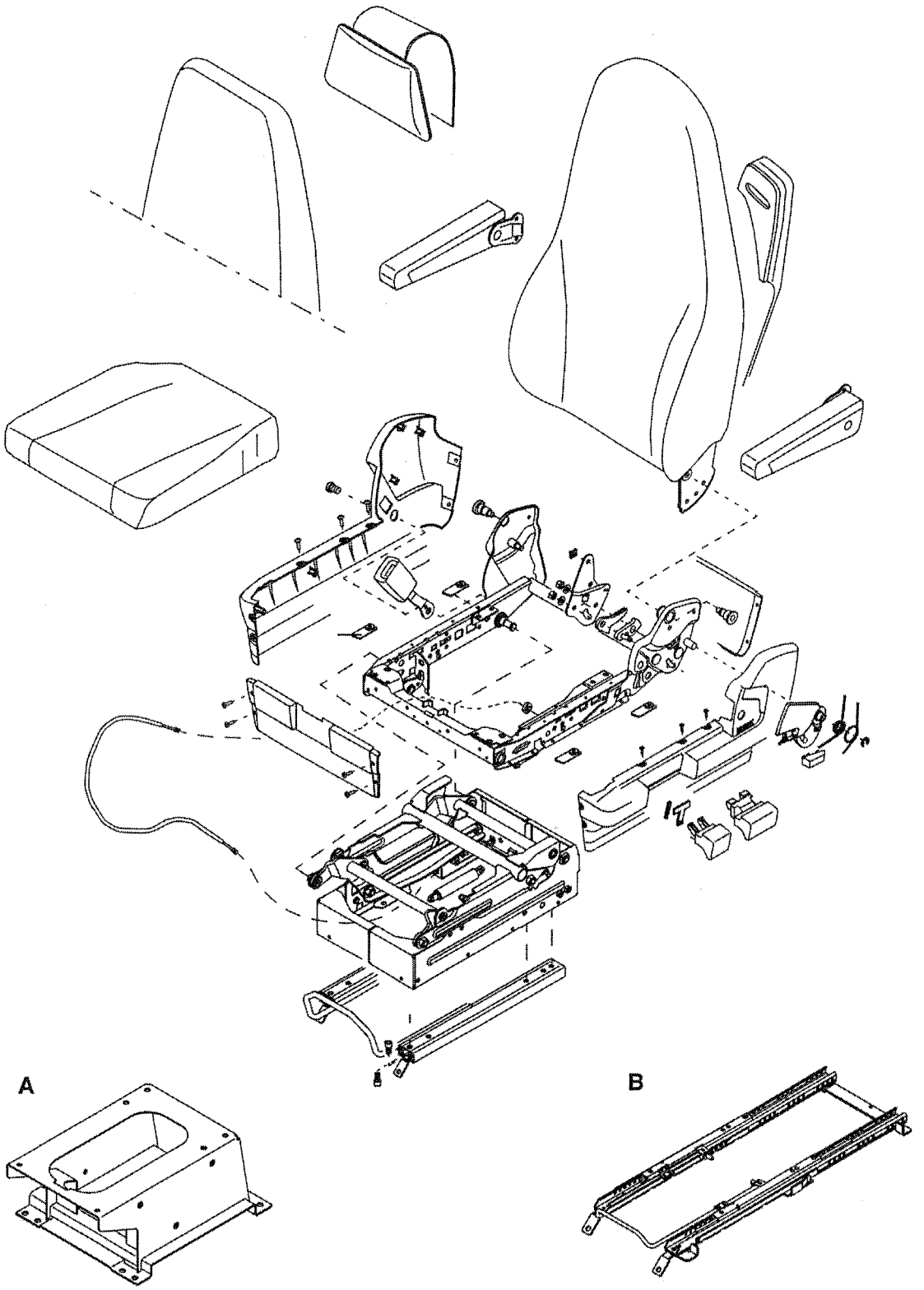


(A) Serial number
(B) Serial number

The serial number can be found on the back of the static underframe. On the rear side for seats mounted on a sheet metal underframe.

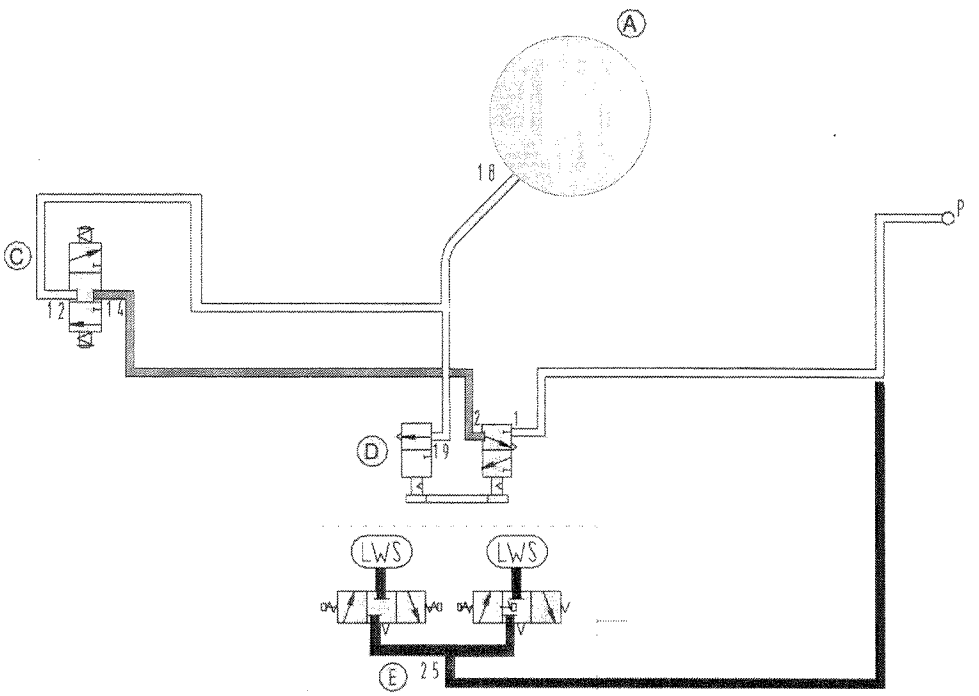


(1) Serial number
(2) Backrest adjustment
(3) Height adjustment
(4) Angle adjustment
(5) Forward / back adjustment



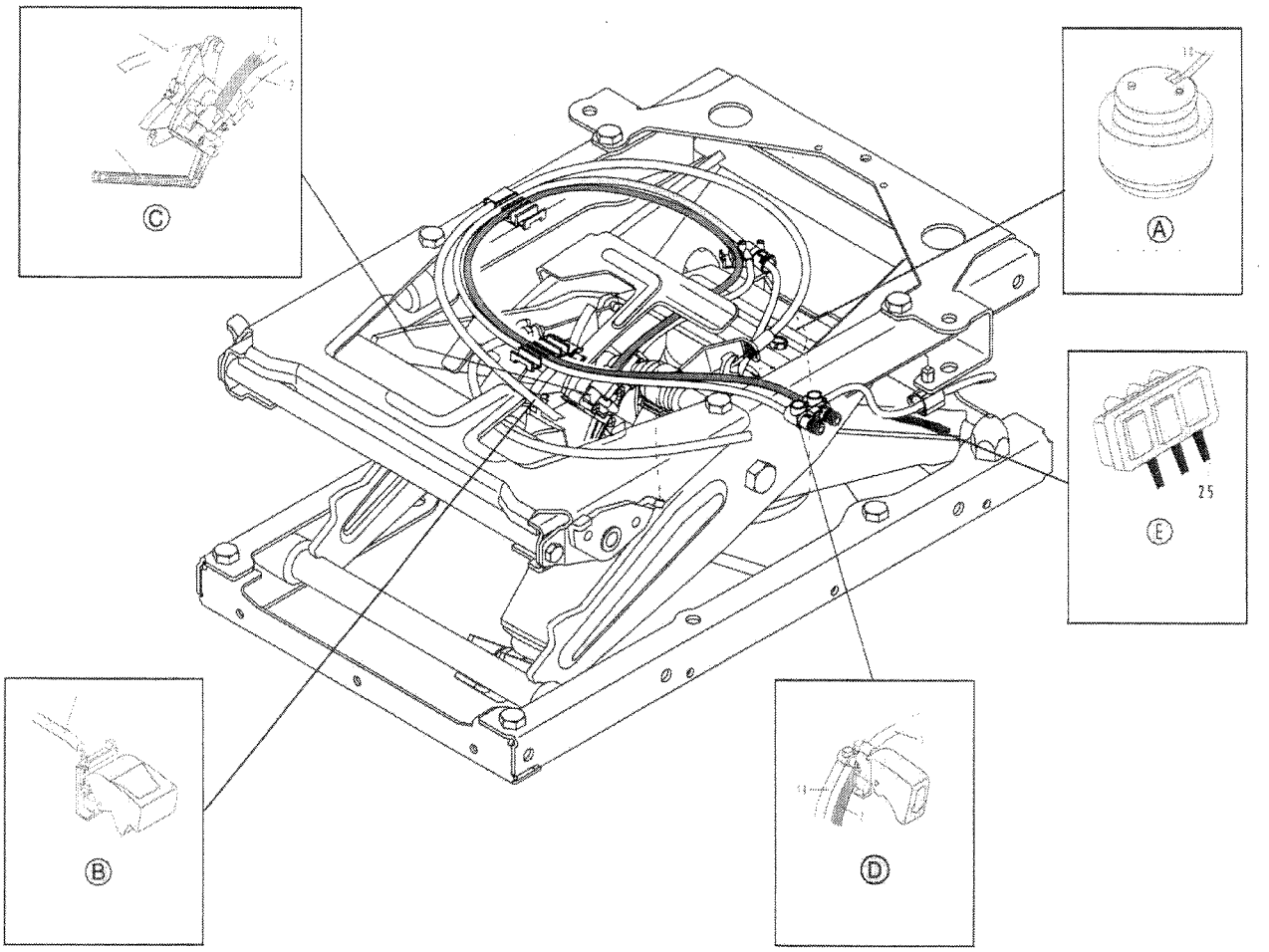
A) Sheet metal underframe
B) Long runners

Pneumatic diagram



(A) – Air cushion
(C) – Level valve
(D) – Quick lowering valve
(E) – Lumbar support valve (according to version)
(P) – Air inlet (max. 12 bars)

Pneumatic components



(**A**) – Air cushion
(**B**) – Height adjustment
(**C**) – Level valve
(**D**) – Quick lowering valve
(**E**) – Lumbar support valve (according to version)

SPECIFICATIONS

Consumables

Fastening, locking and sealing products	
Industrial reference	**Automotive reference**
Loctite Normal thread–locking compound	Loctite 243

Tightening torques

There are several types of tightening :
- Tightening to torque (in **Nm.**)
- Tightening to angle (in °)
- Tightening to torque and angle (in **Nm. +** °)

Torques given in **Nm** are nominal torques (average value calculated on the basis of the minimum torque and the maximum torque).
The tightening accuracy class defines the tolerance of this torque in percent as a function of the nominal torque applied.

Tightening accuracy classes :
- **Classe I** : Special threaded hardware (tolerances variable depending on assembly)
- **Classe II** : Reserved for precise tightening (tolerance ± 10% of the nominal torque)
- **Classe III** : Reserved for normal standard tightening (tolerance ± 20% of the nominal torque)

For standard threaded hardware indicated in the table below, use tightening class **III**.

Seat belt (7/16"UNF–2B) ..... **35 +5 Nm**

All other hardware should be tightened in accordance with the table below.

Tightening torques for conventional "metric system" nut and bolt hardware to standard 01.50.4002		
Dia. and pitch of nuts and bolts (in mm)	**Quality class 8.8**	**Quality class 10.9**
	Tightening class III (± 20 %)	**Tightening class III (± 20 %)**
6 x 1.00	7.4	10.8
7 x 1.00	12.1	17.8
8 x 1.00	19.2	28.2
8 x 1.25	17.9	26.3
10 x 1.00	39.4	58
10 x 1.25	37.4	55
10 x 1.50	35.4	52
12 x 1.25	67	98
12 x 1.50	64	94
12 x 1.75	61	90
14 x 1.50	105	155
14 x 2.00	98	143
16 x 1.50	161	237
16 x 2.00	151	222
18 x 1.50	235	346
18 x 2.50	210	308
20 x 1.50	328	481
20 x 2.50	296	28.2
22 x 1.50	444	26.3
22 x 2.50	406	58

Complete seat

Take the seat off its sheet metal underframe :

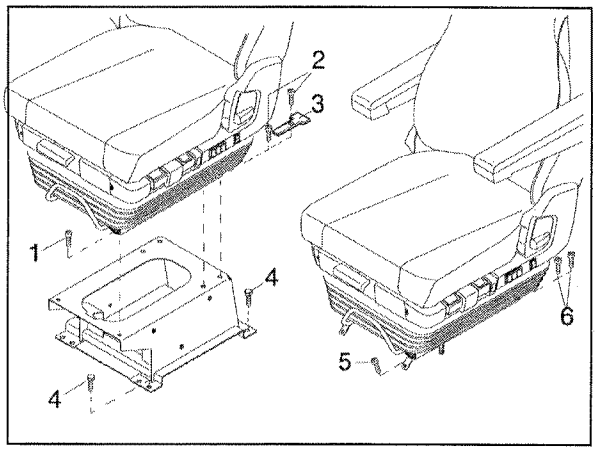
- Unfasten the electric connection and the air piping from the underframe.
- Move the seat back and remove the screws **(1).**
- Move the seat forward and remove the other four screws **(2)** . (Put back the the stops **(3)** when re-assembling)

Take out the seat, with the sheet metal underfame

- Disconnect the connections on the vehicle side and remove the fastening screws **(4)**

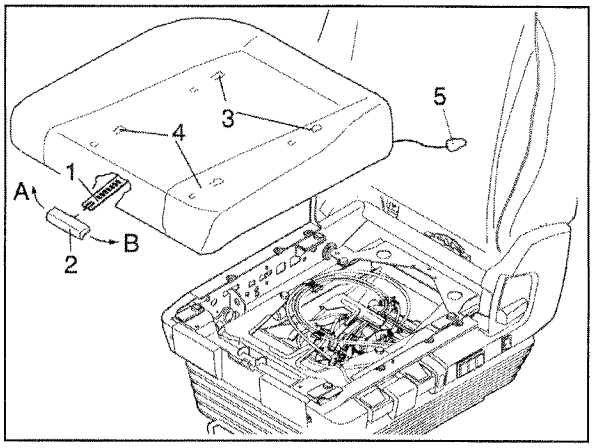
Take out the seat without a sheet metal underframe :

- Disconnect the connections on the vehicle side.
- Move the seat back and remove the screws (**6**).
- Remove screw **(5).**



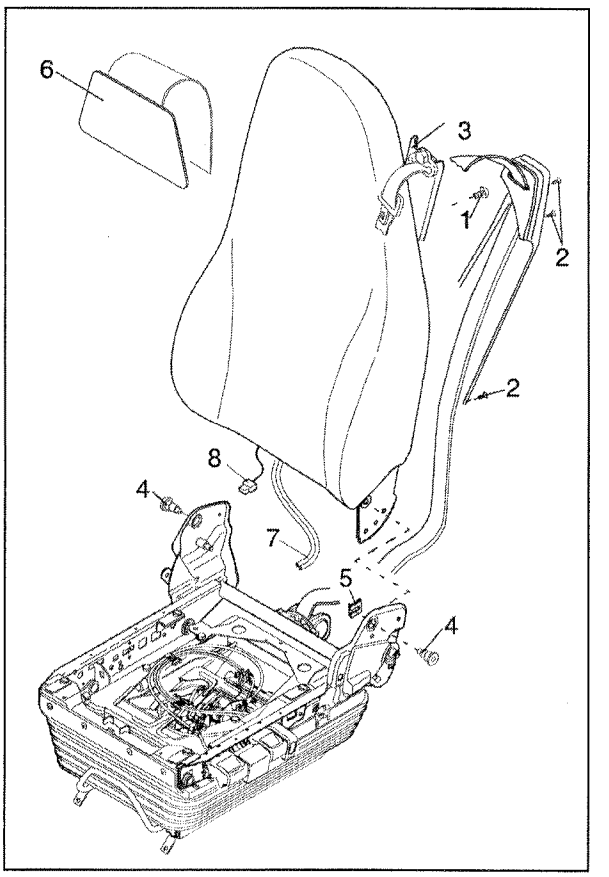
Seat cushion

- Lift the lever **(1)** and move the seat cushion forward as far as it will go.
- Where required, undo the the flap of fabric at the back of the seat cushion.
- Push the lever **(1)** in the lifted position in direction A, pull the seat cushion foward and lift.
- Where applicable, unplug the heating connector **(5)**.
- Take the handle **(2)** off the lever – it will be re-used when the new cushion is fitted.



Backrest

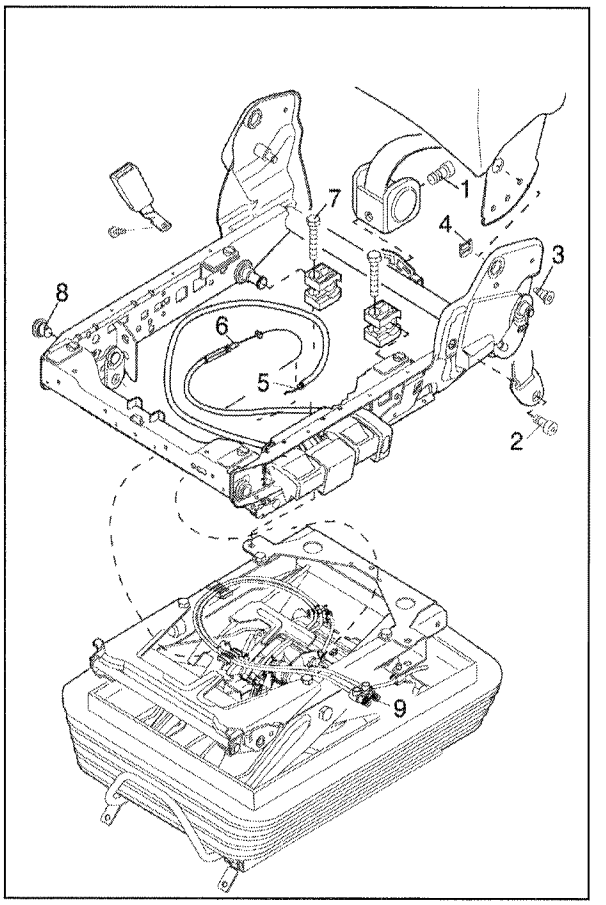
- Remove the seat cushion (see above)
- Remove the side covers – see page **(B4)**
- Remove the screws **(2)** of the belt cover and push the cover of the belt guide **(3)**
- Remove screw **(1).**
- Remove the backrest screws **(4)** and clip **(5).**
- Remove the headrest **(6).**
- Disconnect the air piping for the lumbar support **(7).**
- Where applicaable, unplug the heating connector **(8).**



Seat frame

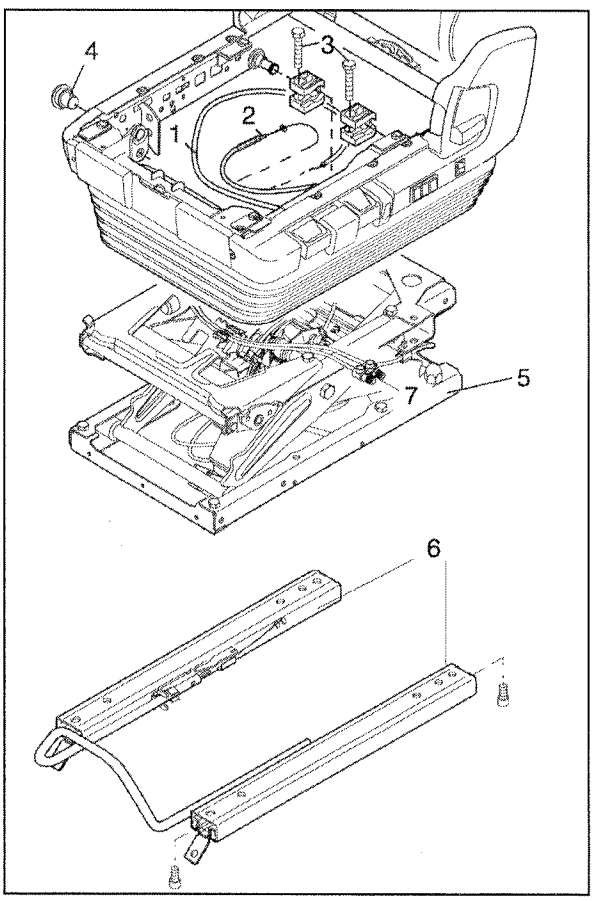
- Take off the seat cushion **(see page B1).**
- Remove the side covers **(see page B4).**
- Remove the front cover and rear cover **(see page B3) and (see page B4)**
- Remove the screws **(1)** and **(2).**
- Remove the screws **(3)** and the clip **(4)** and take off the backrest.
- Remove the gaiter attached to the seat frame.
- Disconnect the cables for adjusting the damper **(5)** and the height **(6)** on the suspension **(see page B5**, Dismantling of the damper and height adjustment mechanism).
- Remove the 2 screws at the back **(7).**
- Tilt the seat and remove the quick lowering valve **(9)** from the seat frame **(see page B8** set of hoses)

- Tilt the seat frame as far as possible and loosen the 2 screws at the front **(8).**
- Unhook the air hose and flexible electric cable, the fastening lug, and, where applicable, unscrew the fastening elements.



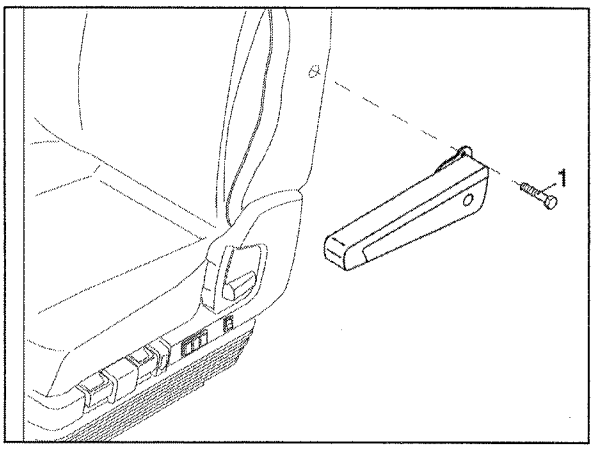
Suspension

- Dismantle the seat **(see page B1)**
- Undo the gaiter on the seat frame **(5).**
- Disconnect the cables for adjusting the damper **(1)** and the height **(2)** on the suspension **(see page B5** Dismantling of the damper and height adjustment mechanism).
- Tilt the seat and remove the quick lowering valve **(9)** from the seat frame **(see page B8 pneumatic bundle**).
- Remove the 2 screws at the back **(3).**
- Tilt the seat frame as far as possible and loosen the 2 screws at the front **(4).**
- Unhook the air hose and flexible electric cable, the fastening lug, and, where applicable, unscrew the fastening elements.
- Remove the runners **(6)** from the suspension **(5) (see page B7).**



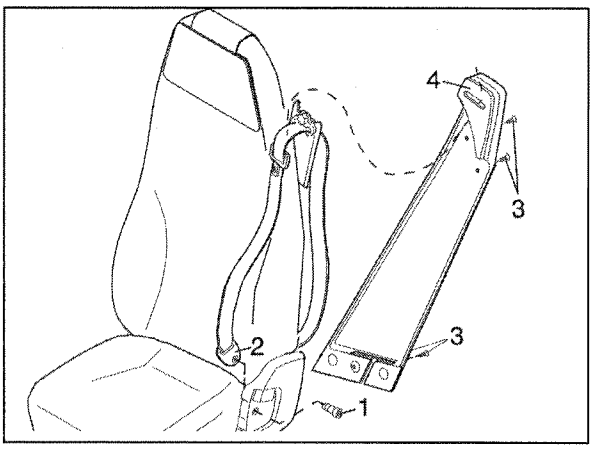
Armrests

- Remove the two screws **(1)**.



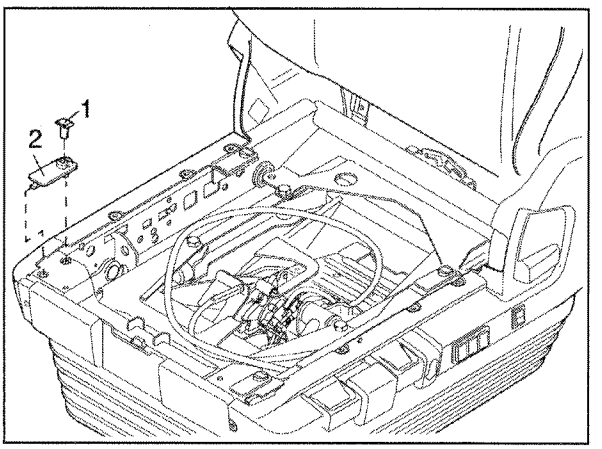
Belt cover

- Pull the backrest handle upwards remove the screw **(1)** from the belt fastener **(2)** and the 4 screws **(3)** from the belt cover.
- Take off the belt cover and push it upwards. Slide the belt fastening tab **(2)** through the opening **(4)**.



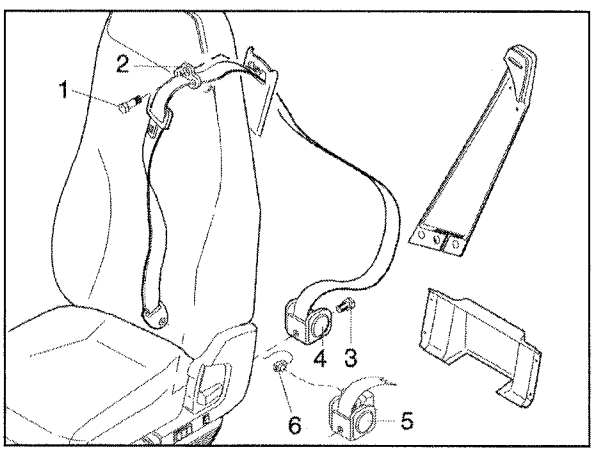
Seat cushion guides :

- Remove the cushion **(see page B1)**
- Remove the tightening rivet **(1)** from the guide **(2)** and remove the latter from the seat frame.
- When fitting a new guide, press in the tightening rivet **(1)** (flush with the upper surface of the guide).



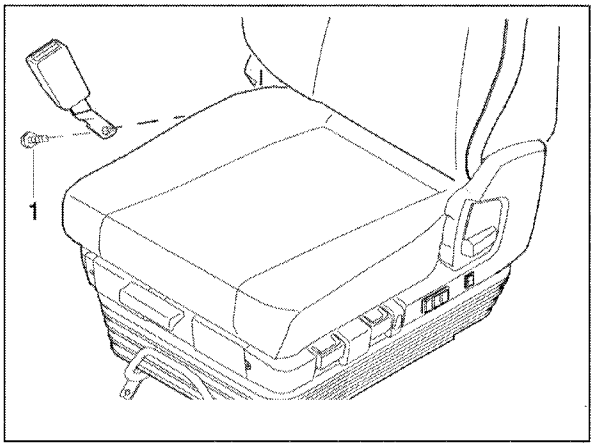
3-point seat belt

- Remove the belt cover **(see above)**
- Remove the rear cover **(see above)**
- Take out the screw **(1)** from the belt guide **(2)** and the screw **(3)** from the winder (4).
- If the winder is fitted with a pre-tensioner **(5)**, unplug the connector **(6)**.
- Tightening torque : 7/16"UNF-2B = 35 Nm + 5 Nm
- Replace seatbelts if they have been forced in an accident. Check the seatbelt anchorage. Replace damaged seat belts.
  Do not pass the belt over any sharp edges.



Seat belt buckle strap

- Remove the screw **(1)**
- For buckle straps fitted with contactors, dismantle the seat cushion **(see page B 1)** and unplug the electric connector.
- Tightening torque 7/16"UNF-2B = 35 Nm + 5 Nm



Side covers / Front cover / Rear cover

Side cover on control side :

- Remove the 2 rivets **(1)** from the rear cover.
- Remove the 3 screws **(2),** tilt the backrest forward and remove the screw **(3).**
- Lift the backrest adjustment handle and remove the side cover over the handle.
  Warning ! When you lift the backrest handle, the latter is not in the engaged posiition and you must hold it back.
- Remove the side cover over the handles, remove the stirrup **(4)** from the hole and remove the rivet **(5)** from the front cover.
- Where applicable, dismantle the lumbar support valve **(8)** and the heating switch **(9) (see page B8)**
  If the backrest no longer engages after the cover is removed, the torsional spring **(6)** must be placed on the pin **(7).**

Side cover on opposite side :

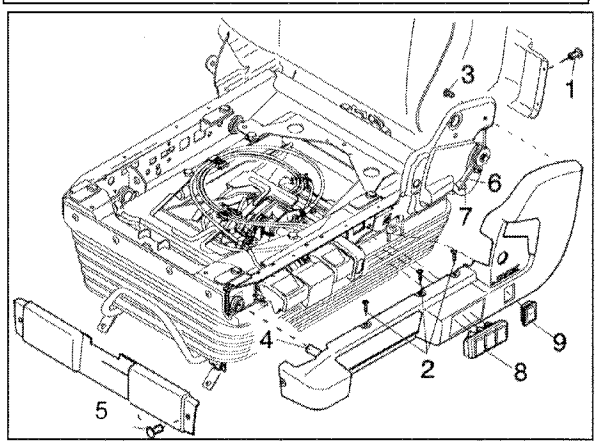
- Proceed as with the side cover on the control side.
- However, this time also remove the seat belt buckle strap (see above).

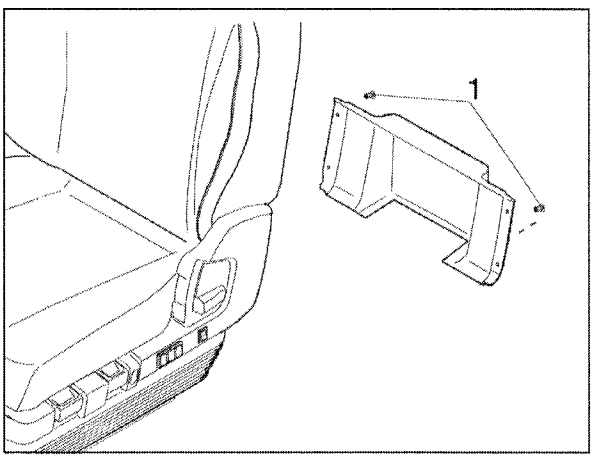
Front cover :

- Remove the rivets **(5).**
- Remove the front cover, and, where applicable, unfasten the side cover at the front.

Rear cover :

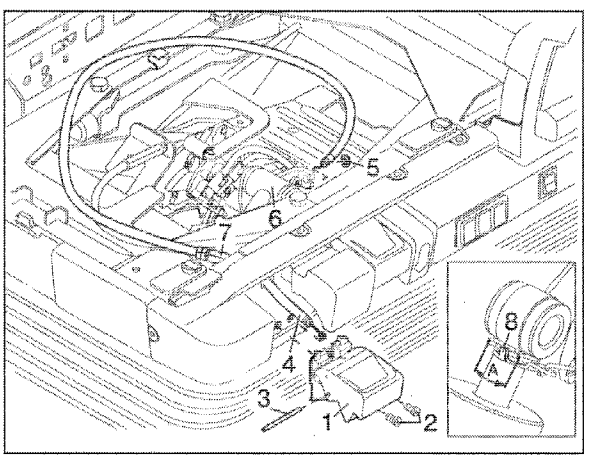
- Remove the 4 rivets **(1)** from the rear cover.





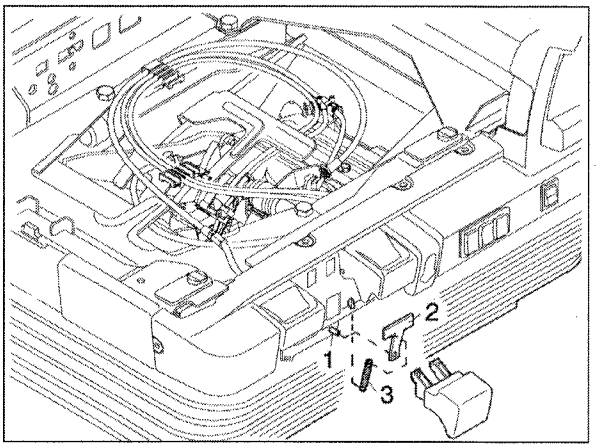
Adjustment of the damper

- Pull the damper adjustment handle **(1)** as far up as it will go.
- Unscrew the 2 screws **(2)** and take the handle out of the side cover.
- Remove the pin **(3),** unfasten the adjusting cable **(4)** and take it out from the back.
- Remove the safety clip **(5)** from the damper **(6)** and take the adjusting cable **(4)** off the damper adjustment lever.
- *When inserting the new sheathed cable, undo the counternut of the adjustment of the adjusting cable **(7)** and adjust the cable so that in the top position of the adjusting lever, the lowest vertical damping is obtained. Tighten the counternuts.*
- *By activating the damper handle, the damper tab **(8)** must be able to cover **all** zone A (see diagram).*



Angle adjustment

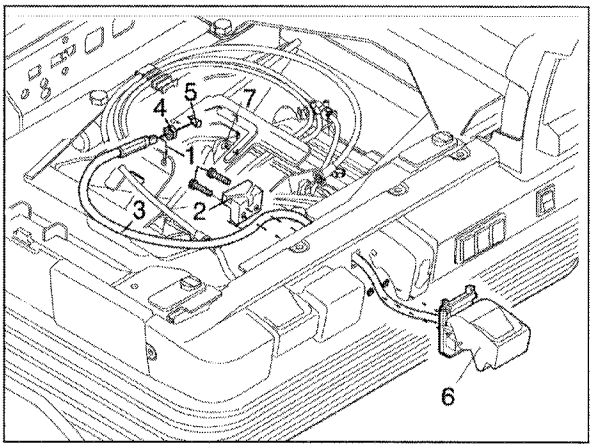
- Press the pin **(1)** until the lever **(2)** comes off.
- Unhook the spring **(3)** and remove the lever **(2).**
- Detach the handle from the side plate.



Height adjustment

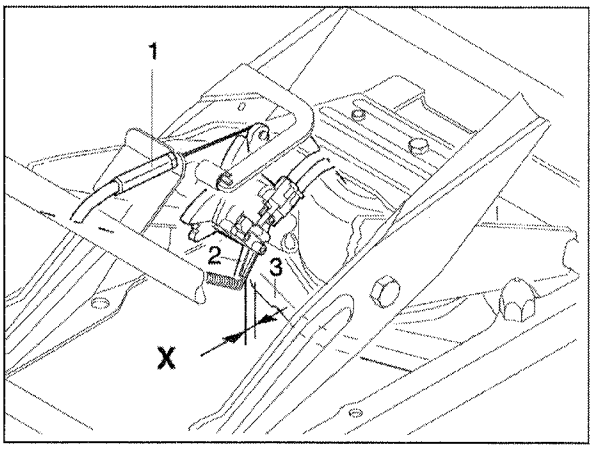
- Press the lever **(6)** downwards.
- Remove the 2 screws **(1).**
- Push the adjusting cable **(3)** out of the groove **(2).**
- Loosen the nut **(4)** and remove the adjusting cable.
- Detach the threaded cable stop **(5)** from the toothed segment of the valve **(7).**

- Once the new lever is in place, adjust the cable (see below)



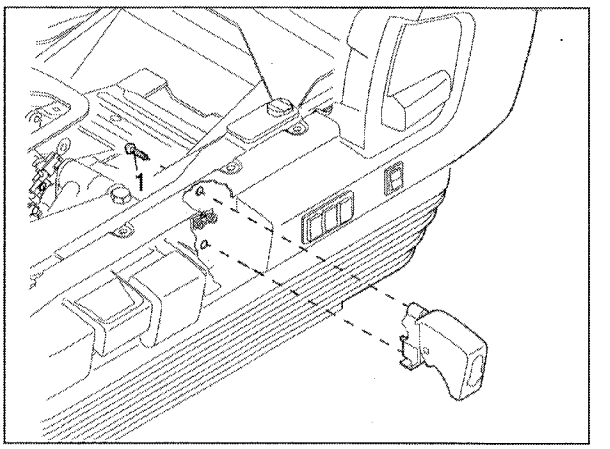
Adjusting the height adjustment cable

- Loosen the counternut of the adjustment of the adjusting cable **(1)** and adjust the sheathed cable so that with the adjusting lever in the top position and after having lowered the seat, the fastening lug **(2)** of the height adjustment valve spring is placed at least 1 mm, at most 2mm (dimension X) from the air cushion support **(3).**
- Tighten the counter nut again **(1).**



Lowering

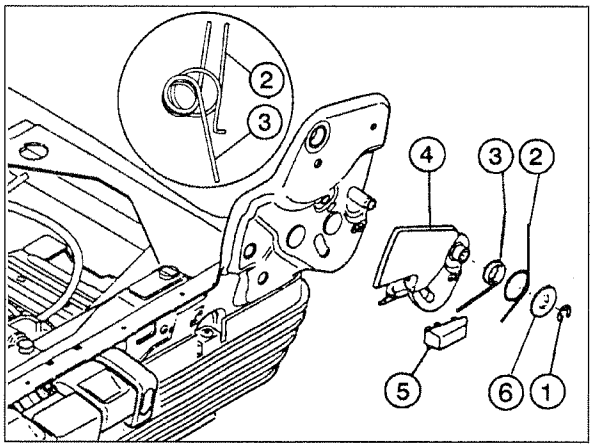
- Remove the seat cushion **(see page B1)**
- Tilt the seat as far back as it will go. Remove the 2 screws **(1).**



Backrest handle

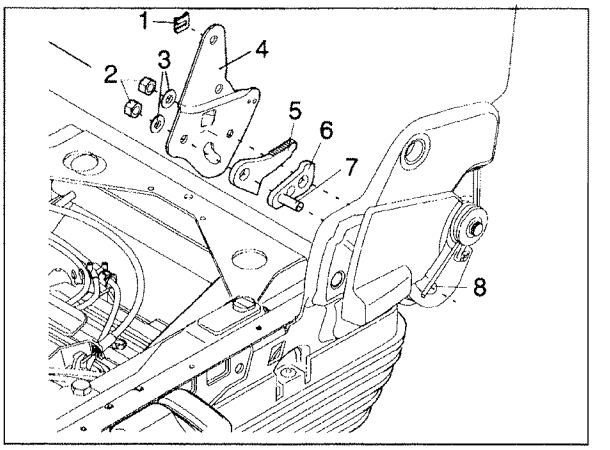
- Remove the side cover on the control side **(see page B4)**
- Remove the clip **(1),** the washer **(6)** and the springs **(2) and (3).**

- When re-assembling the backrest handle **(4)** clip the articulated part **(5)** onto the handle.



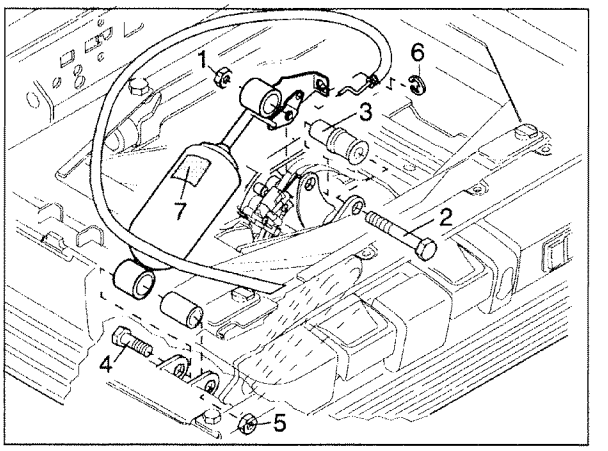
Backrest notching

- Remove the seat cushion **(see page B1)**
- Detach the torsional sping **(8)** from the peg **(7).**
- Press the backrest backwards in the notched zone and remove the clip from the pin **(1).**
- Remove the nuts **(2)** and the washers **(3).**
- Remove the interior support **(4),** the toothed lever **(5)** and the locking lever **(6).**



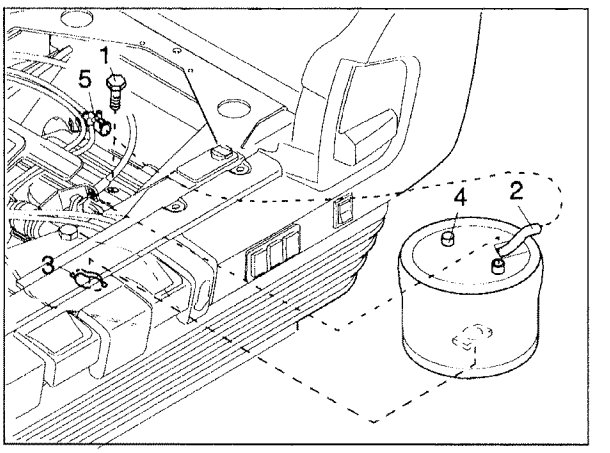
Damper

- Remove the seat cushion **(see page B1).**
- Bring the mechanism into its highest position and block it, so that it cannot be lowered **(see page B8).**
- Remove the nut **(1).**
- Remove the screw **(2)** and remove the bushing **(3).**
- Detach the gaiter located on the lower frame.
- Remove the nut **(5)** from the screw **(4).**
- Remove the safety clip **(6)** and disengage the adjusting cable.
- *Waning ! When re-assembling the damper, ensure that :*
  - the cable is properly adjusted ***(see page B5)***
  - the sticker ***(7)*** *is facing upwards.*



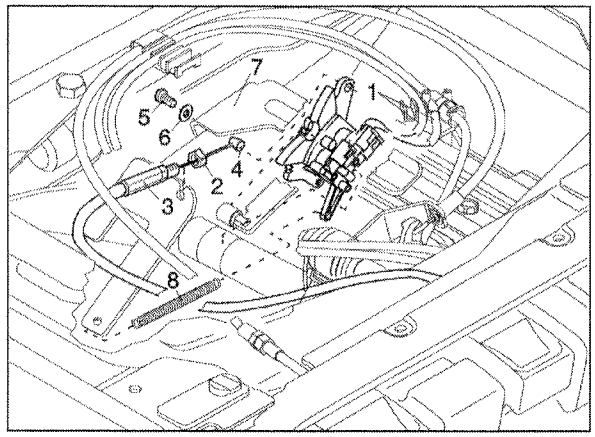
Air cushion

- Remove the seat cushion **(see page B1).**
- Undo the lower fastening of the gaiter at the back and the side.
- Bring the mechanism into its highest position and block it to avoid any uncontrolled lowering **(see page B8).**
- Remove the screw **(1).**
- Undo the hose connection **(2)** on the Y-piece **(5).**
- Remove the sleeve **(2)** and the hose connection.
- Turn the air cushion 90° and extract it from the support **(3).**
- Lift the gaiter and remove the air cushion from behind.
- When putting in the new air cusion, ensure that the tab (4) engages in the hole in the retaining stirrup.



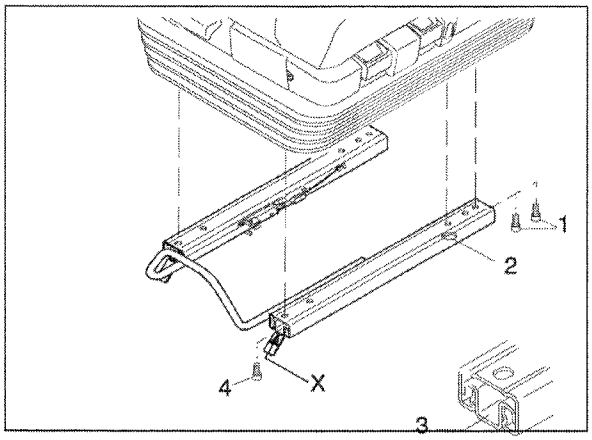
Height regulation valve

- Remove the seat cushion **(see page B1)**
- Take the hoses **(1)** off the valve.
- Loosen the nut **(2)** and the adjusting cable **(3).**
- Remove the end cap **(4)** from the toothed segment of the valve.
- Remove the spring **(8).**
- Take the gaiter off sideways, remove the screw placed on the front **(5)** and the washer **(6)** from the stirrup **(7).**
- Tilt the stirrup **(7)** backwards.
- Adjust the cable **(see page B5)**



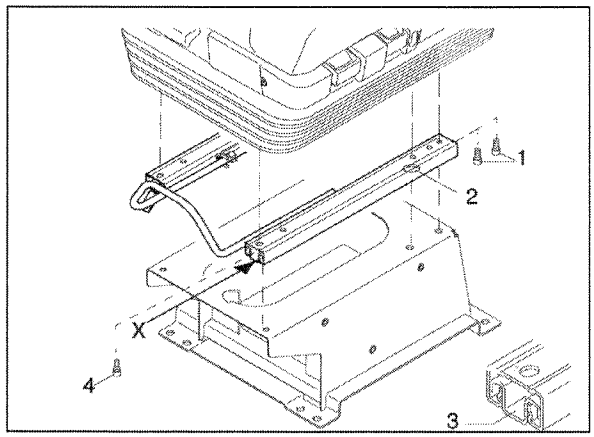
Premium runners (seat without sheet metal underframe)

- Take the seat out of the vehicle **(see page B1)**
- Adjust the runners so that on each runner two screws **(1)** are accessible through the mounting hole **(2)** situated in the lower profile of the runner **(3).**
- Unscrew the screws **(1).**
- Adjust the runners so that on each runner the screw **(4)** is accessible.
- Unscrew the screws **(4).**



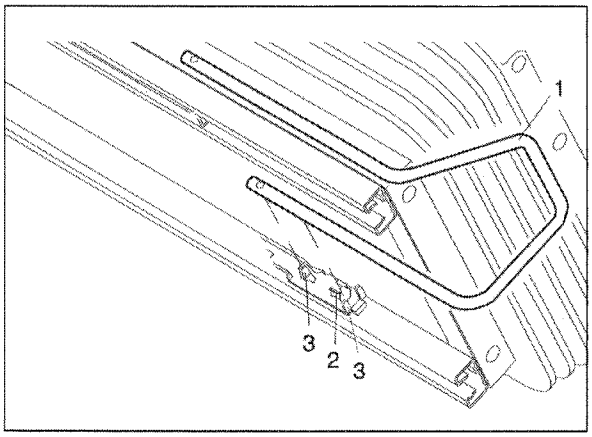
Magnum runners (seat with sheet metal underframe)

- Remove the seat from its support **(see page B1)**
- Adjust the runners so that on each runner two screws are accessible through the mounting hole **(2)** situated in the lower profile of the runner **(3).**
- Unscrew the screws **(1).**
- Adjust the runners so that on each runner the screw **(4)** is accessible.
- Unscrew the screws **(4).**



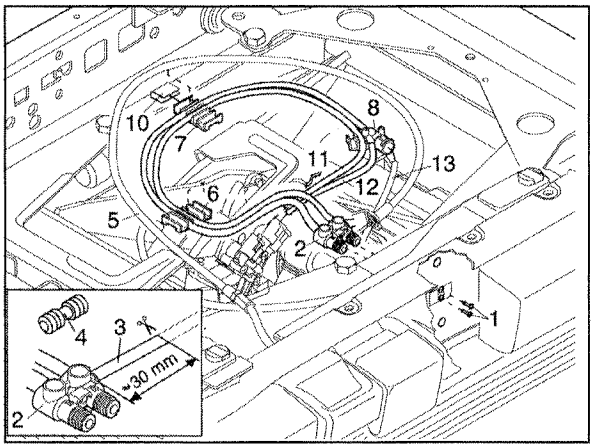
Runner control bar

- Bring the seat as far forward as it will come.
- Remove the bar **(1)** first on one side out of the fastener **(2)** and the peg **(3)** by pressing on them then disengage them on the other side.



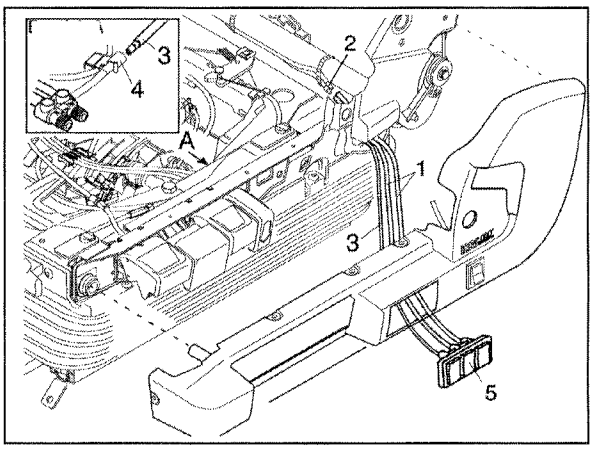
Pneumatic bundle

- Remove the seat lowering control **(see page B5)**
- Remove the 2 screws **(1)** and push the lowering valve **(2)** backwards to remove it.
- Separate the hose **(3)** (natural) about 30 mm from the valve. When re-assembling the pneumatic bundle, connect the hose **(3)** using a connecting piece **(4)** fixed onto the new valve (where necessary, adjust the hoses).
- Remove the support **(7)** from the clamp **(10)** and undo the damper adjusting cable **(5)** at the support **(7).**
- Remove the hoses **(11)** (red) and **(12)** (yellow) from the height adjustment valve and the hose **(13)** (yellow) from the support **(8).**



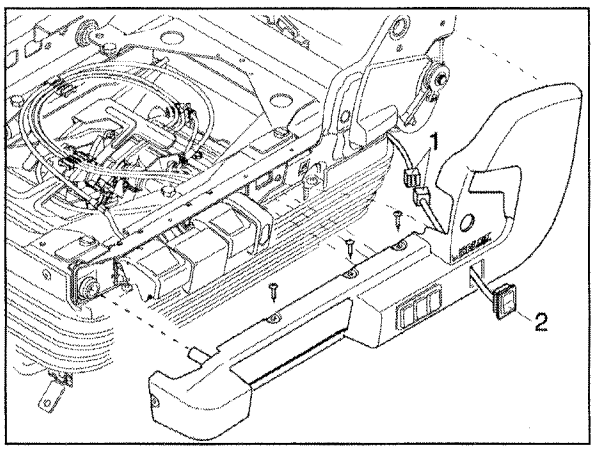
Lumbar support

- Remove the side cover on the control side **(see page B4)**
- Undo the rubber hoses **(1)** at the junction **(2)** of the transverse tube.
  Warning ! When putting the bundle in, check the attribution of the two rubber hoses (white strip).
- Undo the hose **(3)** (black) from the distribution device **(4).**
- Press the hooks hooks at the bottom of the lumbar support valve **(5)** and remove the valve from the side cover.



Heating switch

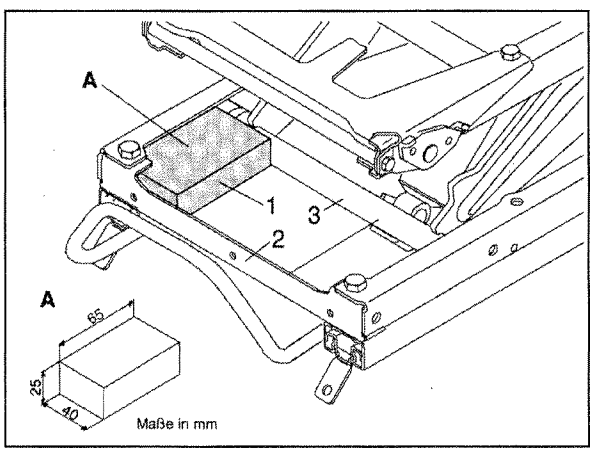
- Remove the side cover on the control side **(see page B4)**
- Disconnect the connector **(1)** and unclip the heating switch **(2)** from the side cover.



Making the seat safe against any accidental lowering

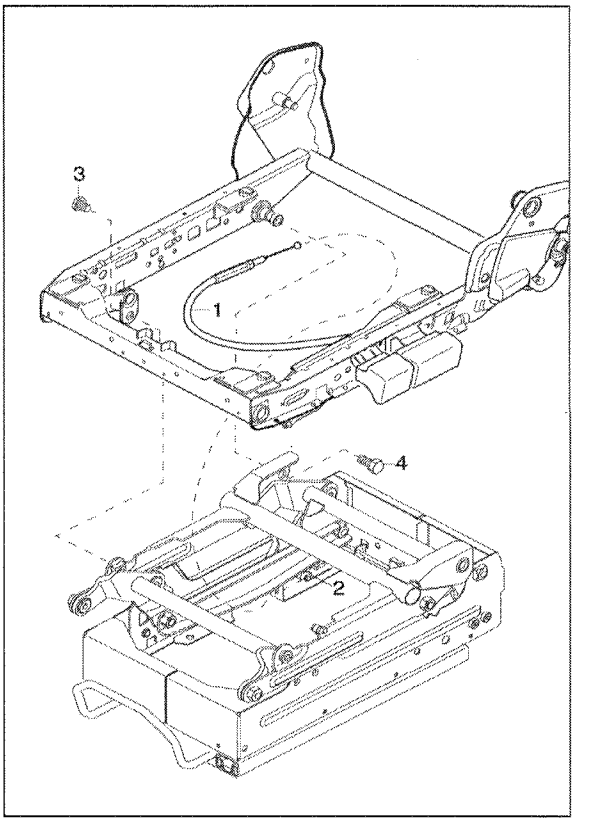
- In order to avoid any accidental lowering of the suspension during repair work, place a a block **(1)** between the lower frame **(2)** and the lower transverse tube of the cross-brace **(3).**

  Dimensions in mm.



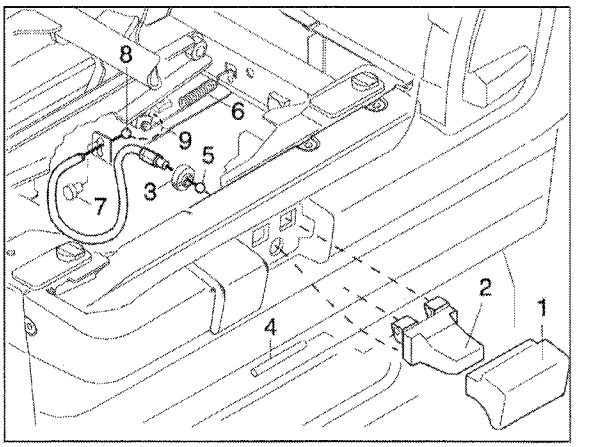
Seat frame

- Remove the bottom of the seat **(see page B1)**.
- Remove the backrest **(see page B1)**.
- Remove the adjusting cable **(1)** from the lever **(2)** **(see page B4)**.
- Adjust the seat angle to the maximum height and unscrew the two screws **(3)** as well as the two screws **(4)**.



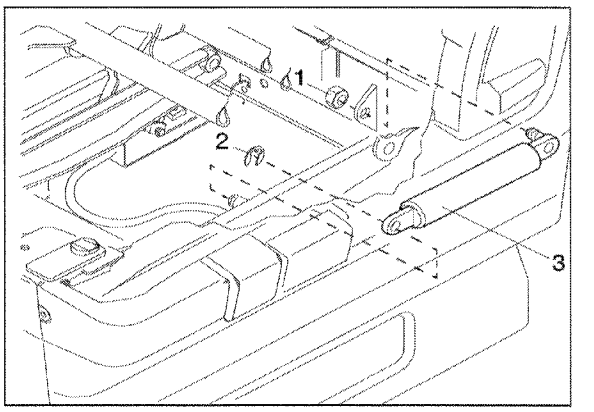
Height adjustment handle / cable

- Remove the seat cushion **(see page B1)**.
- Remove the handle **(1)** from the lever **(2)**.
- Take the stop **(3)** off the adjusting cable.
- Remove the pin **(4)**.
- Remove the end cap of the adjusting cable from the lever **(2)**
- Unhook the spring **(6)**.
- Remove the plug **(7)** and remove the end cap of the adjusting cable **(8)** from the lever **(9)**.



Gas cylinder

- Remove the seat cushion **(see page B1)**.
- Remove the nut **(1)** and the clip **(2)**.
- Remove the gas cylinder **(3)**.

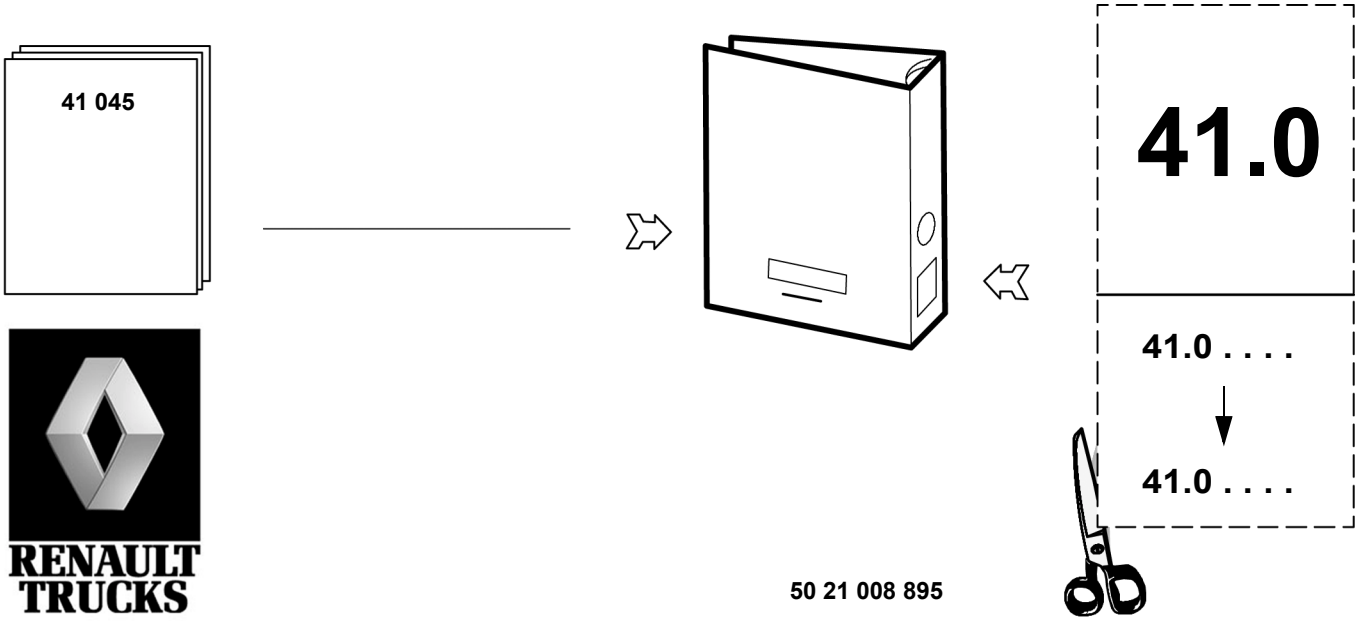


41 045 - GB - 04/2003

STEERING

RANGE	FAMILY	VARIANT
MIDLUM	-	-
MIDLUM 4x4		

The above information may change in the course of time. Only the "Consult" section of the workshop manuals repertory in standard N° 10320 serves as reference.



50 21 008 895

CONTENTS

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— Specific tightening torques . . . . . B2-1 → 5

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GENERALITIES

Warnings

In this document, safety instructions are symbolized as follows:

DANGER! NON-OBSERVANCE OF THE PROCEDURE DESCRIBED OR LACK OF CARE OR ATTENTION RISK CAUSING SERIOUS INJURY OR EVEN DEATH.

WARNING! Any different or inappropriate working method risks causing damage to the product.

NOTE! Draws attention to particular or important points of the method.

Environment

Comply with the regulations in force relative to the recovery and treatment of used parts and waste.

Conventional symbols

Fitting

	Tighten to torque (Nm) (left-hand thread)		Tighten by indicated value
	Tighten to torque (Nm) (right-hand thread)		Loosen by indicated value
	Tightening torque with lubricated threaded hardware		

Dimensioning

	Tightening		... Greater than or equal to ...
	Equal to		Wear limit
	... Less than ...		Machining limit or dimension
	... Greater than ...		Maximum out-of-true
	... Less than or equal to ...		Maximum parallelism error

Repair

	Force to be exerted in the direction shown (hammer - press)		Smear or coat (see "Consumables" table)
	Heat or cool: Temperature in degrees Celsius (e.g. + 80 °C)		Fill to level (see "Technical Data" and "Consumables" table)
	Weld bead		Grease or oil (see "Consumables" table)
	Repair time - Heating time		Mark - Assemble according to marking

Adjustment

	Rotating friction torque		Turn anti-clockwise
	Turn in alternate directions		Turn anti-clockwise (the figure shows the number of turns)
	Turn clockwise		Turn clockwise (the figure shows the number of turns)
	Place in contact		Move in the direction shown
	Dimension to be assured (mm)		

Various information

	Exhaust - Outlet		Operation with a sequence
	Intake - Inlet		Involves
	Weight in kg (example: 275 kg)		Return to numbered operation - Connected with numbered operation
	Depending on versions or options		Withdraw - Delete
	Wrong		Direction of disassembly (the arrow shows the direction)
	Correct		Direction of assembly (the arrow shows the direction)
	Injection		... to ...
	Repair dimension		Inspect - Check condition of part
	Part to be replaced		Danger for persons, vehicle or equipment

TECHNICAL DATA

Standard tightening torques

Definitions

There are several types of tightening:
- Tightening to torque (in **Nm**)
- Tightening to angle (en °)
- Tightening to torque-angle (en **Nm + °**)

Torques given in **Nm.** are nominal torques (average value calculated on the basis of the minimum torque and the maximum torque).
The tightening precision class defines the tolerance of this torque in percent as a function of the nominal torque applied.

Tightening precision classes:
- **Class I**: Special threaded hardware (tolerances ± 10% of the final torque).
- **Class II**: Reserved for precise tightening (tolerance ± 10% of the nominal torque).
- **Class III**: Reserved for normal standard tightening (tolerance ± 20% of the nominal torque)

For standard threaded hardware indicated in the table below, use tightening class **III**).
For other torques, see the following page(s).

"FIH" type (Nylstop) locknuts must be replaced whenever removed. "DRH" type (oval) locknuts can be re-used. If locknuts (DRH, FIH or other) are re-used, make absolutely certain that the screw-thread of the bolt protrudes least two threads above the top edge of the nut.

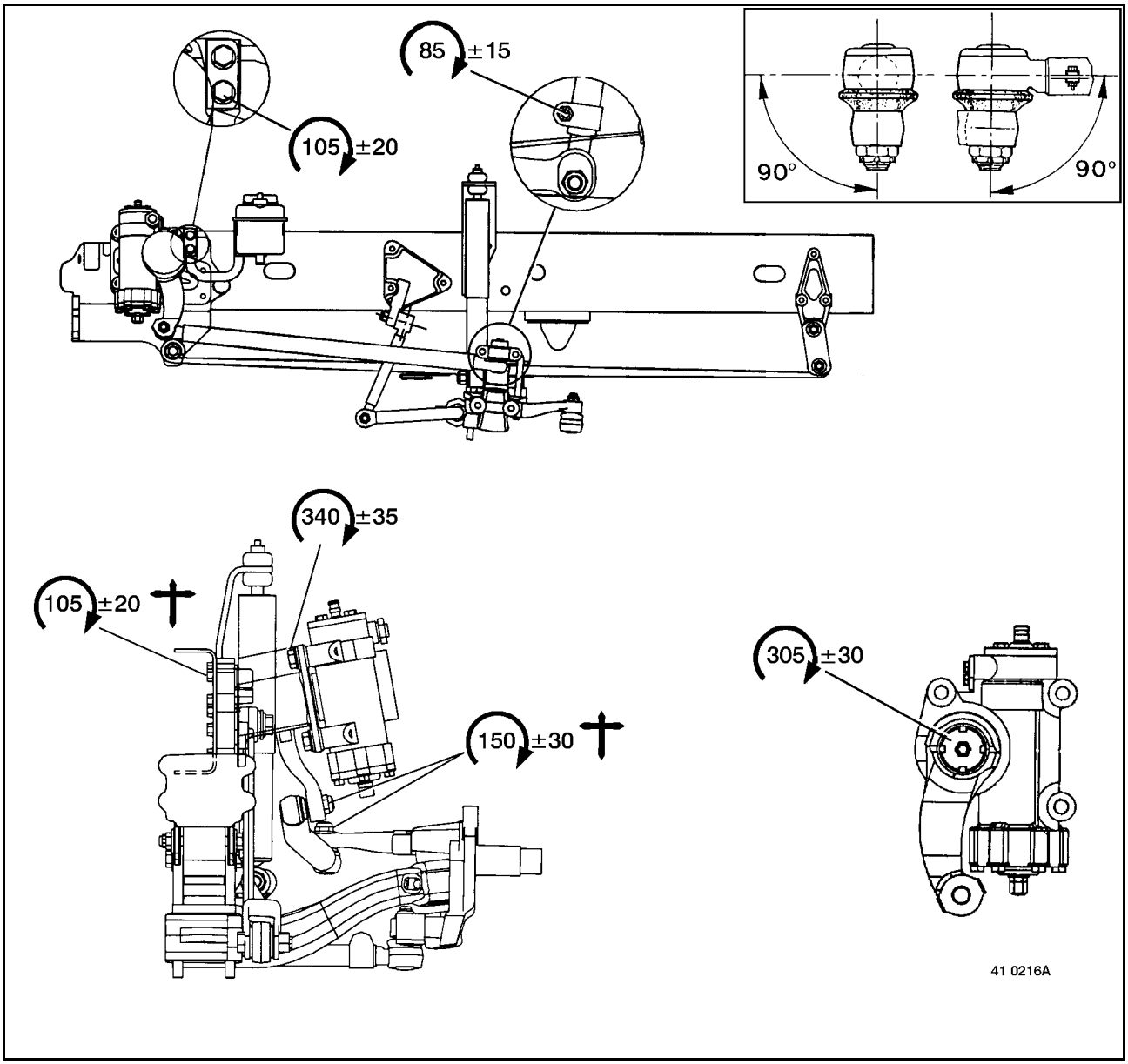
Standard tightening torques table

The tightening torque values given in the table are based on standard 01.50.4002 and apply to new nuts and bolts fitted dry and re-used nuts and bolts with oil applied to the screw-threads. If any nuts and bolts are replaced, ***it is absolutely essential to use nuts and bolts recommended by the RENAULT TRUCKS Spare Parts Department (coefficient of friction in compliance with standard 01.50.4002).***

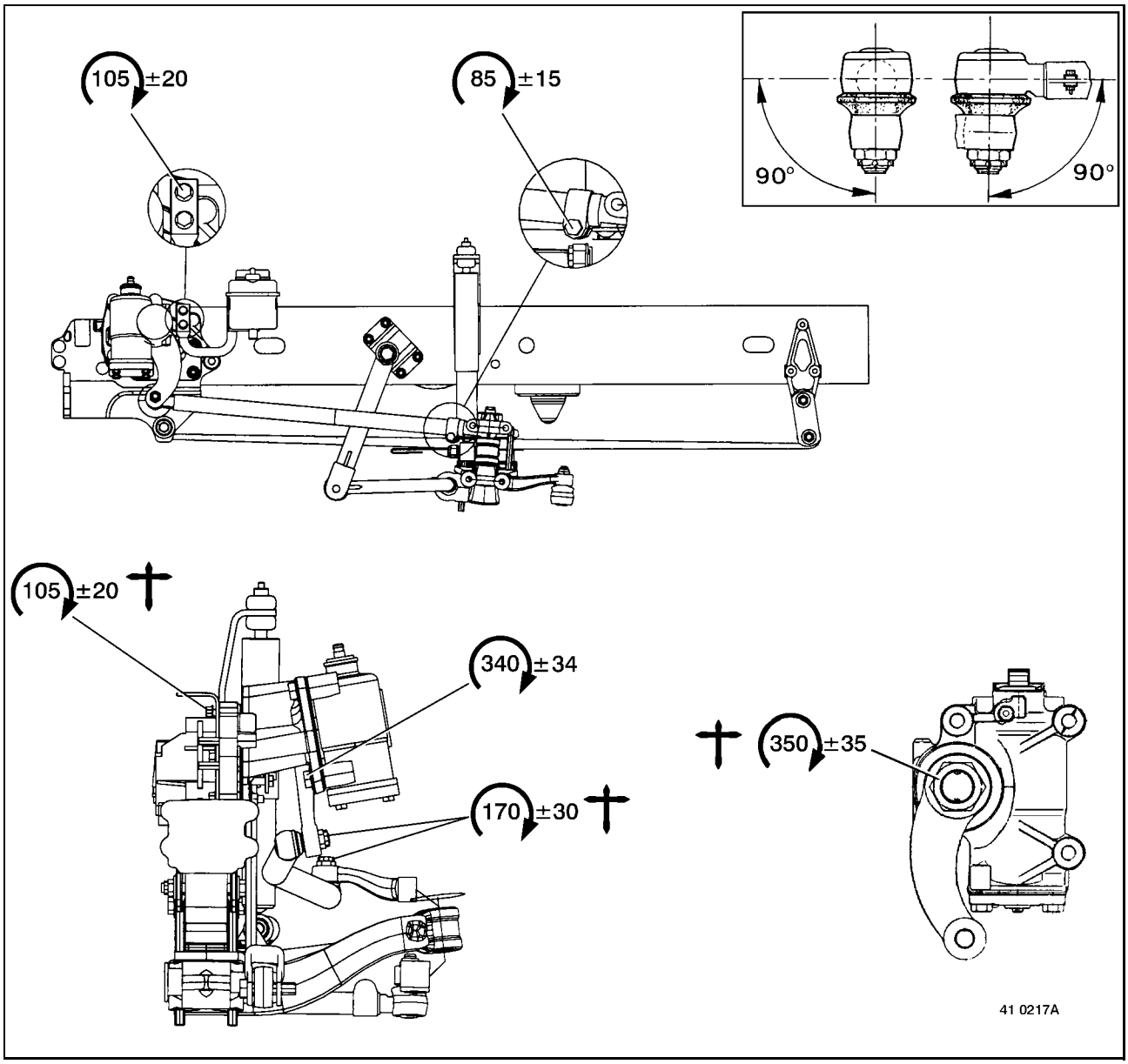
Tightening torque values in Nm for conventional "metric system" threaded hardwarebased on standard 01.50.4002 (H: normal and HE: with flange)		
dia. and pitch of nuts and bolts	**Quality class 8.8**	**Quality class 10.9**
	Tightening class III (± 20 %)	**Tightening class III (± 20 %)**
6 x 1.00	10	10
7 x 1.00	15	20
8 x 1.00	20	30
8 x 1.25	20	25
10 x 1.00	40	60
10 x 1.25	35	60
10 x 1.50	40	50
12 x 1.25	65	105
12 x 1.50	65	95
12 x 1.75	60	90
14 x 1.50	105	165
14 x 2.00	100	145
16 x 1.50	160	230
16 x 2.00	150	220
18 x 1.50	235	340
18 x 2.50	210	310
20 x 1.50	330	450
20 x 2.50	295	435
22 x 1.50	445	650
22 x 2.50	405	595

Specific tightening torques

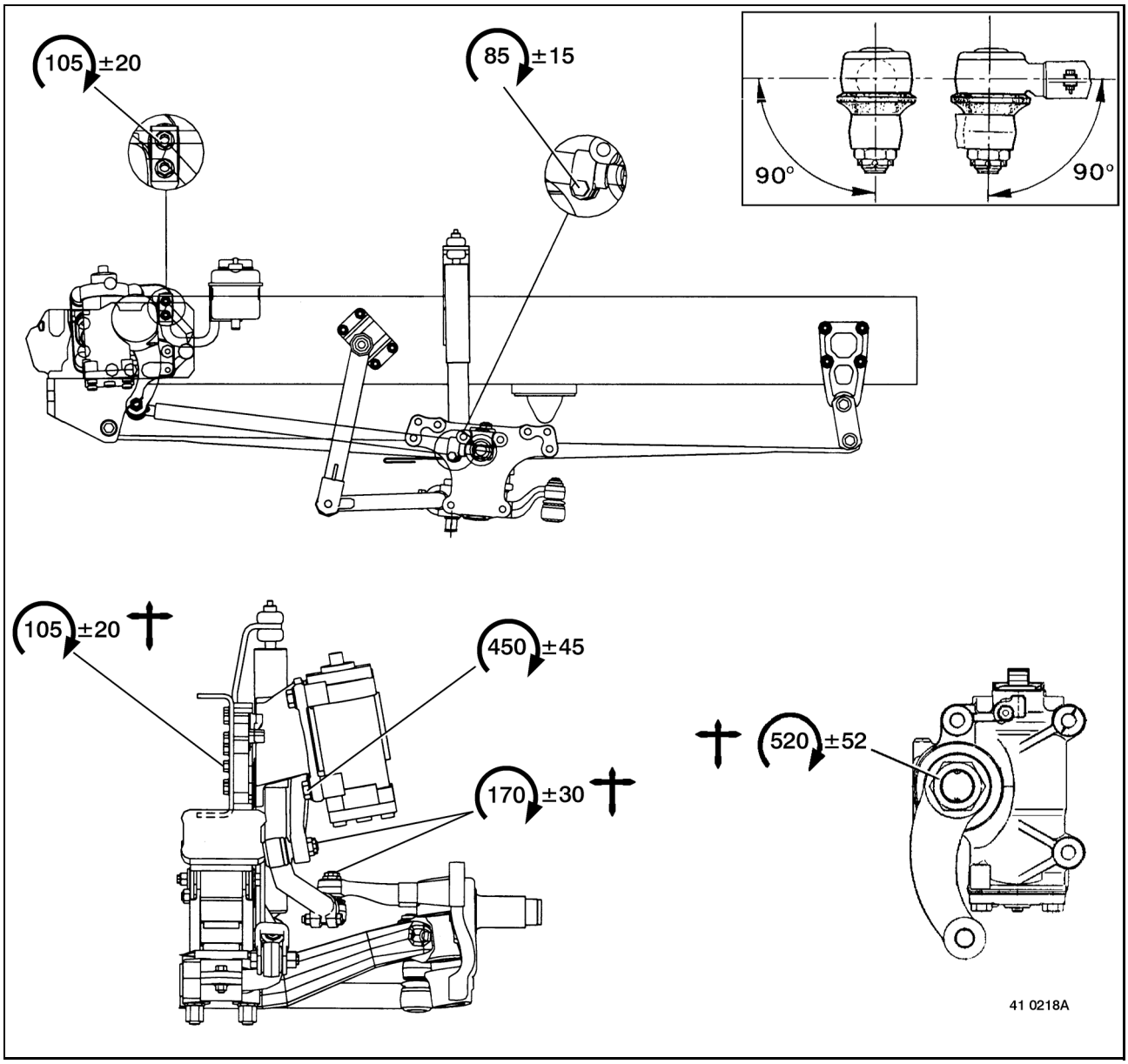
Steering box SHEPPARD M83



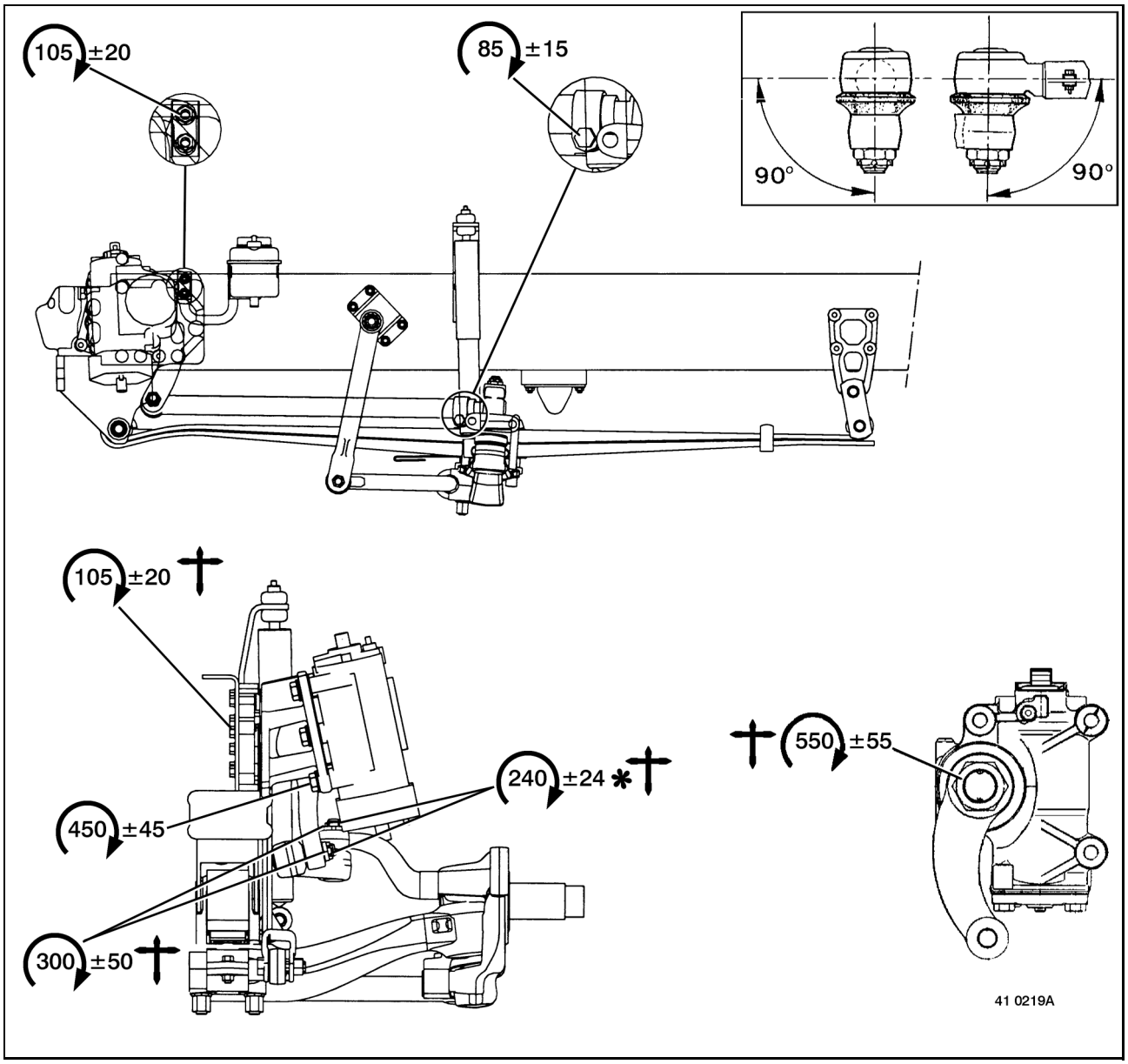
Steering box ZF 8090



Steering box ZF 8095

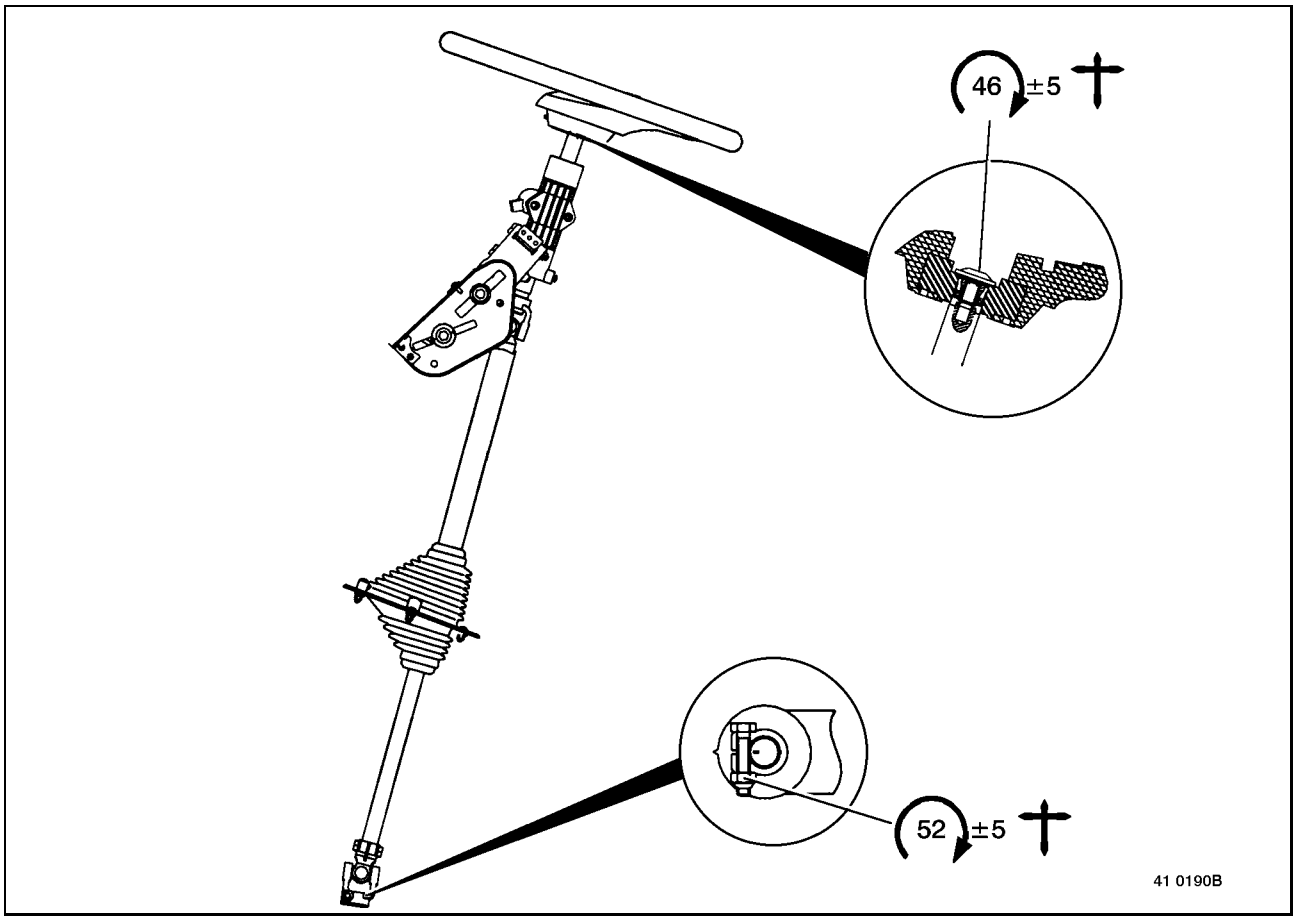


Steering box ZF 8098



* Assembly with washer

Steering wheel



TOOLS

Generalities

RENAULT TRUCKS divide tools into three categories:

- **General-purpose tools**: proprietary tools.
  - **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department).
  - **4-figure reference number** (tools classified by RENAULT TRUCKS but available from the supplier).

- **Special tools**: specifically created tools distributed by the RENAULT TRUCKS Spare Parts Department.

- **Locally manufactured tools**: these tools are classified differently according to their degree of sophistication:
  - **4-figure reference number** (represented by a drawing): tools that are simple to make without need for special qualification.
  - **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department): a certain amount of skill is needed to make these tools.

Three levels (or echelons) determine their assignment:
- **Level 1**: tools for servicing, maintenance and minor tasks.

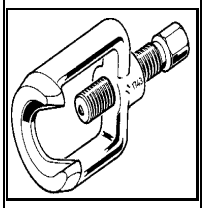
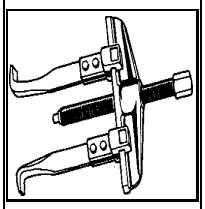
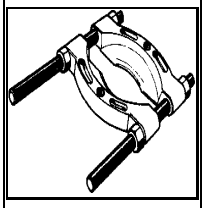
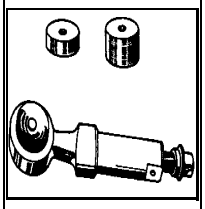
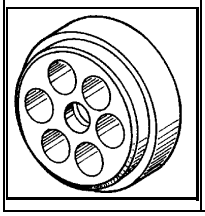
- **Level 2**: tools for major repairs.

- **Level 3**: tools for refurbishment.

Proprietary tools mentioned in this manual do not appear in the tools list.
These tools are identified in the standard tools manual (MO) by a 4-figure number.

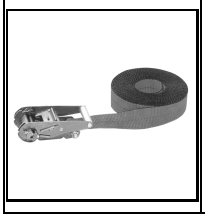
LIST OF TOOLS

General-purpose tools

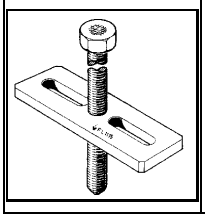
Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer code	Level	Qty
	**5000261743**	BALL-JOINT PULLER			1	1
	**5000260857**	PULLER			1	1
	5000269366	RAM		BB	1	1
	**5000260819**	UNSTICKER			1	1
	**5000260816**	RAM			1	1
	**5000262363**	SET OF PUSHERS			1	1

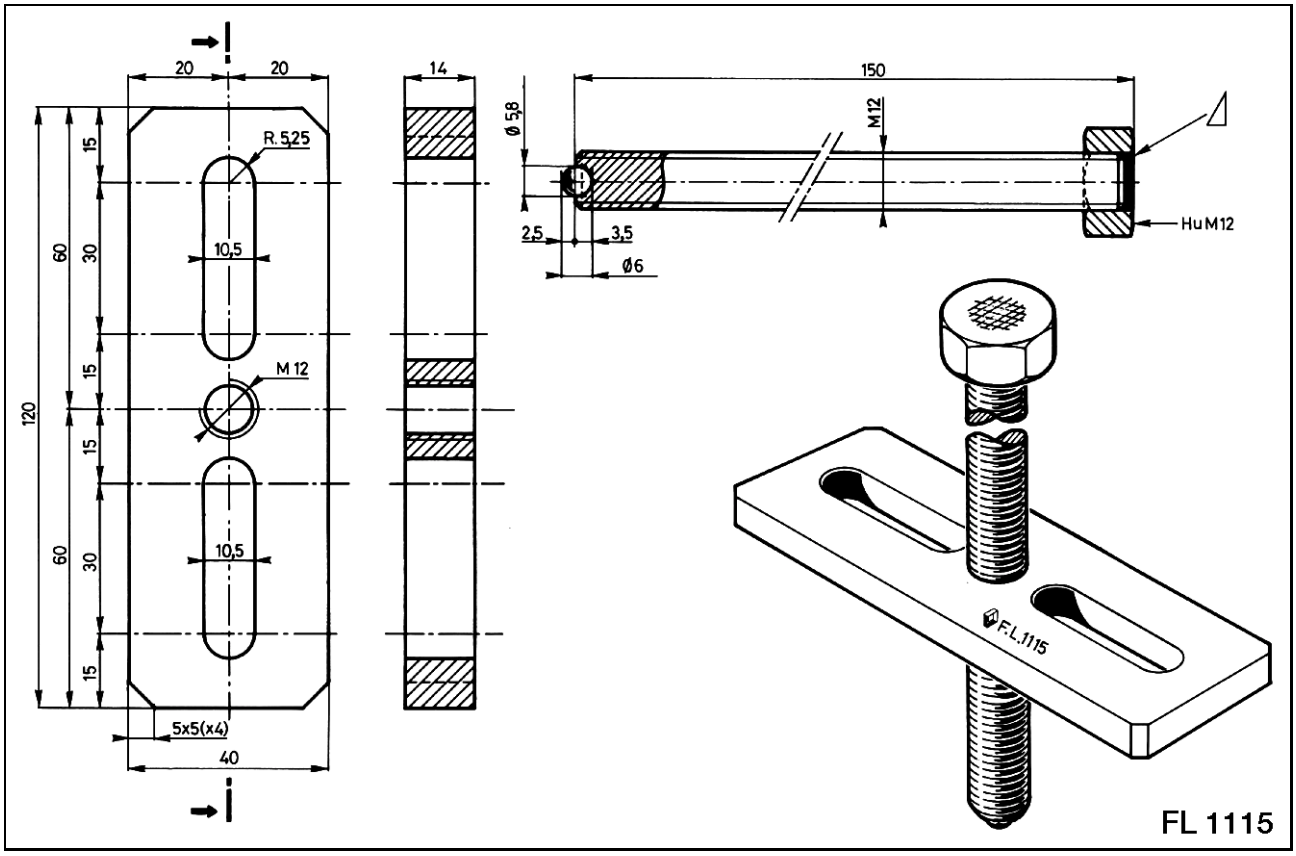
BB	**SEFAC S.A.**			
		1 rue André Compain BP 101		
		08800 MONTHERME		FRANCE
		03.24.53.01.82	03.24.53.29.18	

Special Tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer Code	Level	Qty
	**5000269804**	STRAP			1	1

Locally manufactured tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer Reference	Manufacturer Code	Level	Qty
	**1115**	FLANGE			1	1



Proprietary tools

Illustration	RENAULT TRUCKS Ref.	Designation	Manufacturer reference	Manufacturer code	Level	Qty
	9364	2-AXIS SWIVELLING HEAD		BB	1	1

BB	**SEFAC S.A.**			
	1 rue André Compain BP 101			
	08800 MONTHERME			FRANCE
	03.24.53.01.82	03.24.53.29.18		

REMOVAL / FITTING

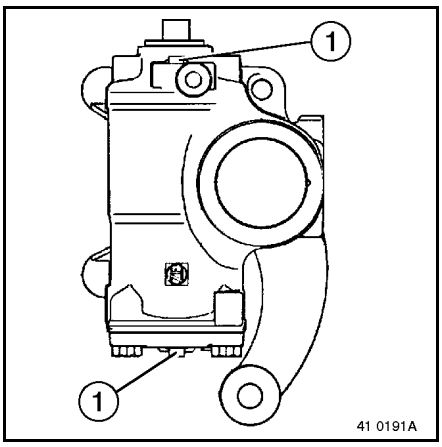
Steering box ZF 8090/8095/8098

Removal

IF THE VEHICLE IS EQUIPPED WITH AN AIRBAG SYSTEM, DISCONNECT THE BATTERY AND WAIT FOR 5 MINUTES BEFORE CARRYING OUT ANY WORK ON THE VEHICLE.

Remove the front bumper.
(see CMR **60 024**)
Tilt the cab.
Place the vehicle on a lift hoist.
Put safety trestles under the axles.
Clean the pipes.
Blank off the ports.

Steering box with automatic adjustment hydraulic lock-over limitation stops: before operating the steering arm, mark and remove the hydraulic lock stops (1).



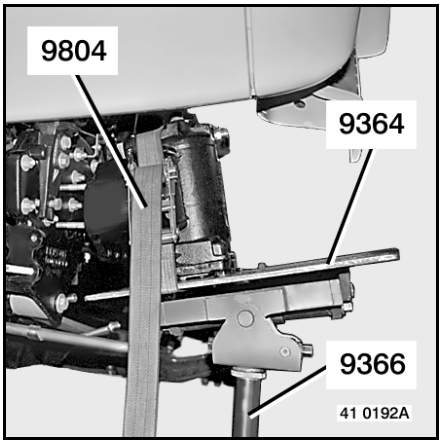
The item numbers indicated in the drawing on page D-1-3 correspond to the **sequence of disassembly**.

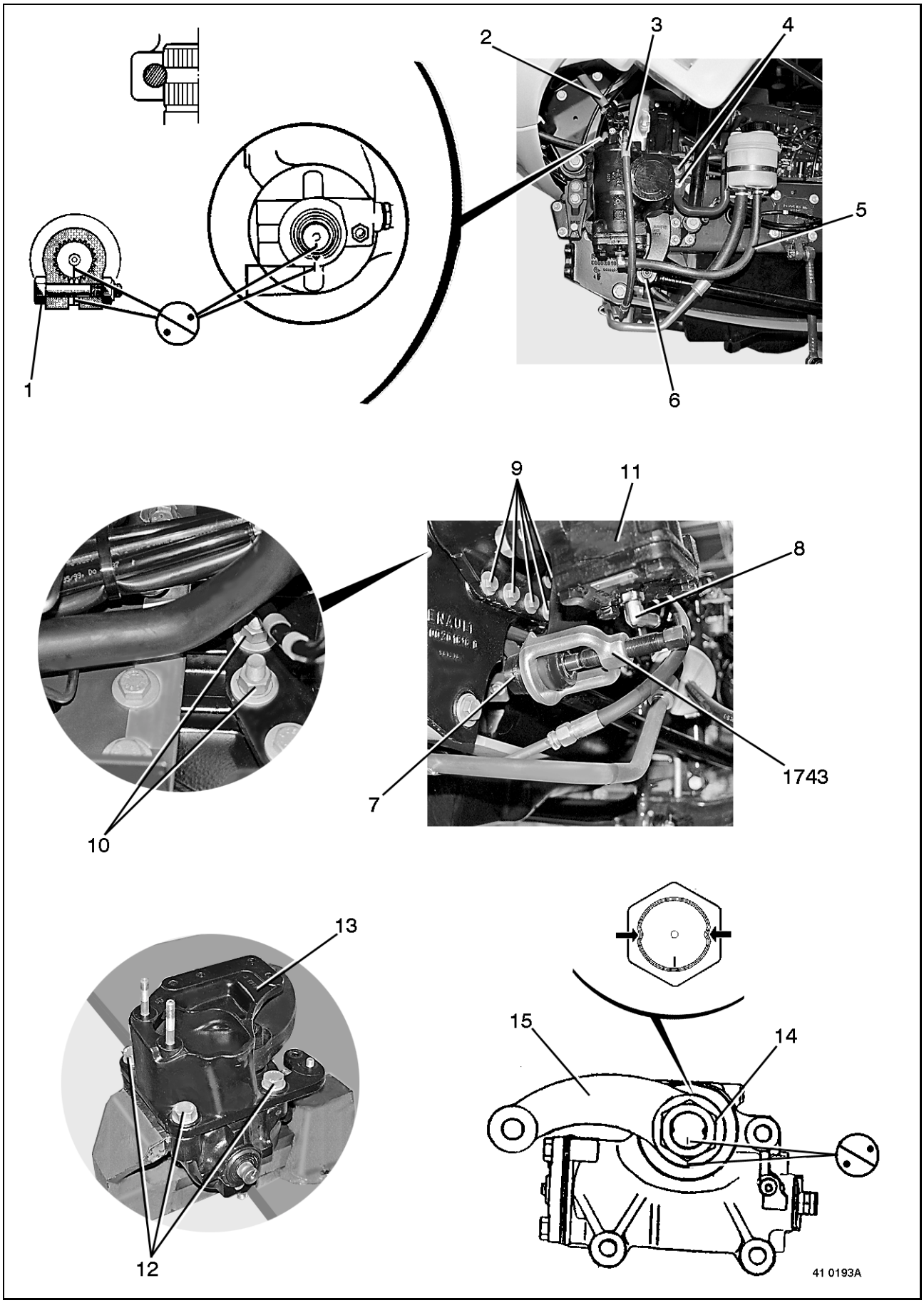
IF THE VEHICLE IS EQUIPPED WITH AN AIRBAG SYSTEM, REMOVE STEERING COLUMN (2) AND IMMOBILIZE THE STEERING WHEEL TO KEEP THE MID-POINT POSITION OF THE ROTARY SWITCH. FOR FURTHER DETAILS, REFER TO THE AIRBAG REPAIR MANUAL.

The table indicates the designation and the reference number of tools necessary for assembly / disassembly of the itemized parts.

Item	Tool designation	Reference	Assembly	Disassembly
7	Puller	**1743**		**x**
15	Puller	**0857**		**x**

Install tool **9804** + **9366** + **9364**.
Remove steering box **(11)** complete with bracket **(13)**.




1
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1743
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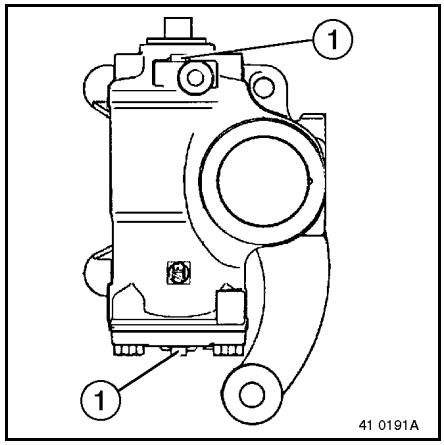
41 0193A

Fitting



Steering box with automatic adjustment hydraulic lock-over limitation stops: before operating the steering arm, mark and remove the hydraulic lock stops (1).

The item numbers indicated in the text refer to the drawing on page D-1-3.
Position drop arm **(15)**.
Screw up nut **(14)**.
Tighten to torque.
Lock **(14)**.
Retighten to lock properly. Never loosen.
Fit bracket **(13)**.
Tighten to torque.
Fasten bracket **(13)** to the chassis.
Tighten to torque.
Bring the steering box to the "mid-point" position (marks aligned).
Couple up steering universal joint **(2)**.
Ensure the position
Vehicle equipped with airbag system: line up the marks to fit the steering column to the steering box, in order to keep the mid-point of the rotary switch. For further details, refer to the airbag repair manual.
Fit nut and bolt **(1)**.
Tighten to torque.
Couple up drag link **(7)**.
See page(s) E-2.
Fit automatic adjustment hydraulic lockover limitation stops **(1)**.
Check their adjustment.
See page(s) E-3.
Fill the steering hydraulic system and bleed the air from the circuit.
For hydraulic system filling, circuit bleeding and filter replacement operations
(See Driving and Servicing Handbook).

Steering box SHEPPARD M83

Removal

IF THE VEHICLE IS EQUIPPED WITH AN AIRBAG SYSTEM, DISCONNECT THE BATTERY AND WAIT FOR 5 MINUTES BEFORE CARRYING OUT ANY WORK ON THE VEHICLE.

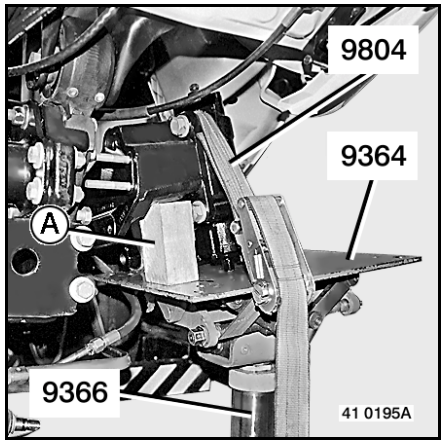
Remove the front bumper.
(see CMR **60 024**)
Tilt the cab.
Place the vehicle on a lift hoist.
Put safety trestles under the axles.
Clean the pipes.
Blank off the ports.
The item numbers indicated in the drawing on page D-2-2 correspond to the **sequence of disassembly**.

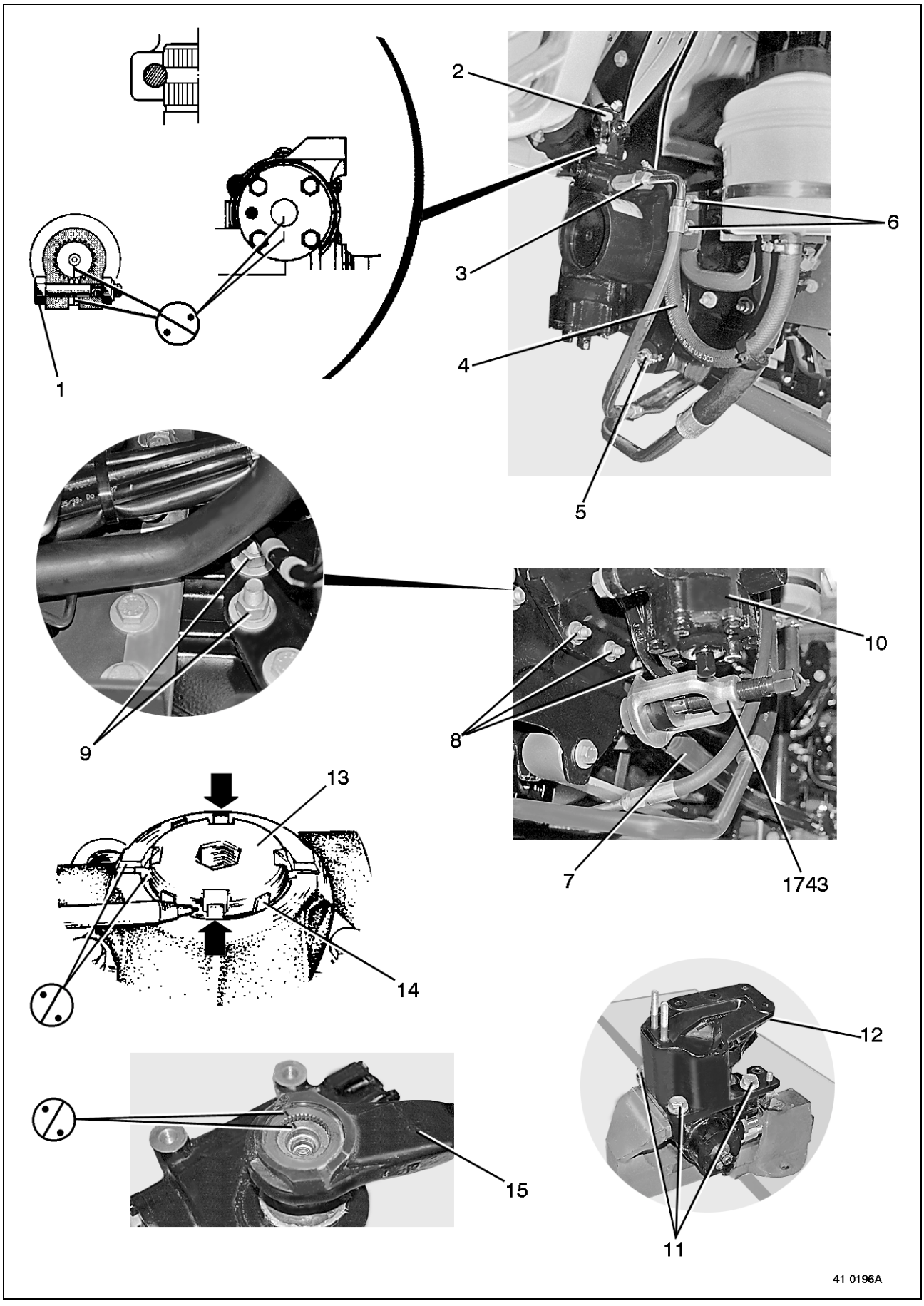
IF THE VEHICLE IS EQUIPPED WITH AN AIRBAG SYSTEM, REMOVE STEERING COLUMN (2) AND IMMOBILIZE THE STEERING WHEEL TO KEEP THE MID-POINT POSITION OF THE ROTARY SWITCH. FOR FURTHER DETAILS, REFER TO THE AIRBAG REPAIR MANUAL.

The table indicates the designation and the reference number of tools necessary for assembly / disassembly of the itemized parts.

Item	Tool designation	Reference	Assembly	Disassembly
7	Puller	**1743**		**x**
15	Puller	**0857**		**x**
15	Dislodger	**0819**		**x**
15	Ram	**0816**		**x**
15	Pusher set	**2363**		**x**

Position the wooden block **A** / tool **9804** + **9366** + **9364** assembly.




2
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8
7
1743
13
14
12
15
11
41 0196A

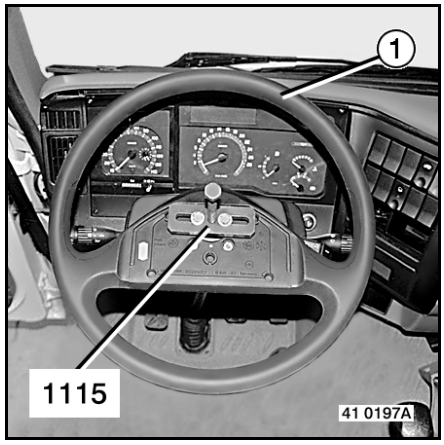
The item numbers indicated in the text refer to the drawing on page D-2-2.
Position drop arm **(15)**.
Apply grease to and install lock washer **(14)**.
Tighten bolt **(13)**.
Tighten to torque.
Lock **(14)**.
Retighten to lock properly. Never loosen.
Lock **(13)**.
Fit bracket **(12)**.
Tighten to torque.
Fasten bracket **(12)** to the chassis.
Tighten to torque.
Bring the steering box to the "mid-point" position (marks aligned).
Couple up steering universal joint **(2)**.
Ensure the position
Vehicle equipped with airbag system: line up the marks to fit the steering column to the steering box, in order to keep the mid-point of the rotary switch. For further details, refer to the airbag repair manual.
Fit nut and bolt **(1)**.
Tighten to torque.
Couple up drag link **(7)**.
See page(s) E-2.
Fill the steering hydraulic system and bleed the air from the circuit.
For hydraulic system filling, circuit bleeding and filter replacement operations
(See Driving and Servicing Handbook).
Check the hydraulic lockover limitation.
See page(s) E-3.

Steering wheel

Removal

If the vehicle is equipped with an airbag system, refer to the airbag repair manual.

Remove nut.
Remove steering wheel **(1)**.
Use tool **1115**.



Fitting

If the vehicle is equipped with an airbag system, refer to the airbag repair manual.

For fitting, proceed in the reverse sequence to removal.
Tighten to torque.

TESTING/ADJUSTMENT

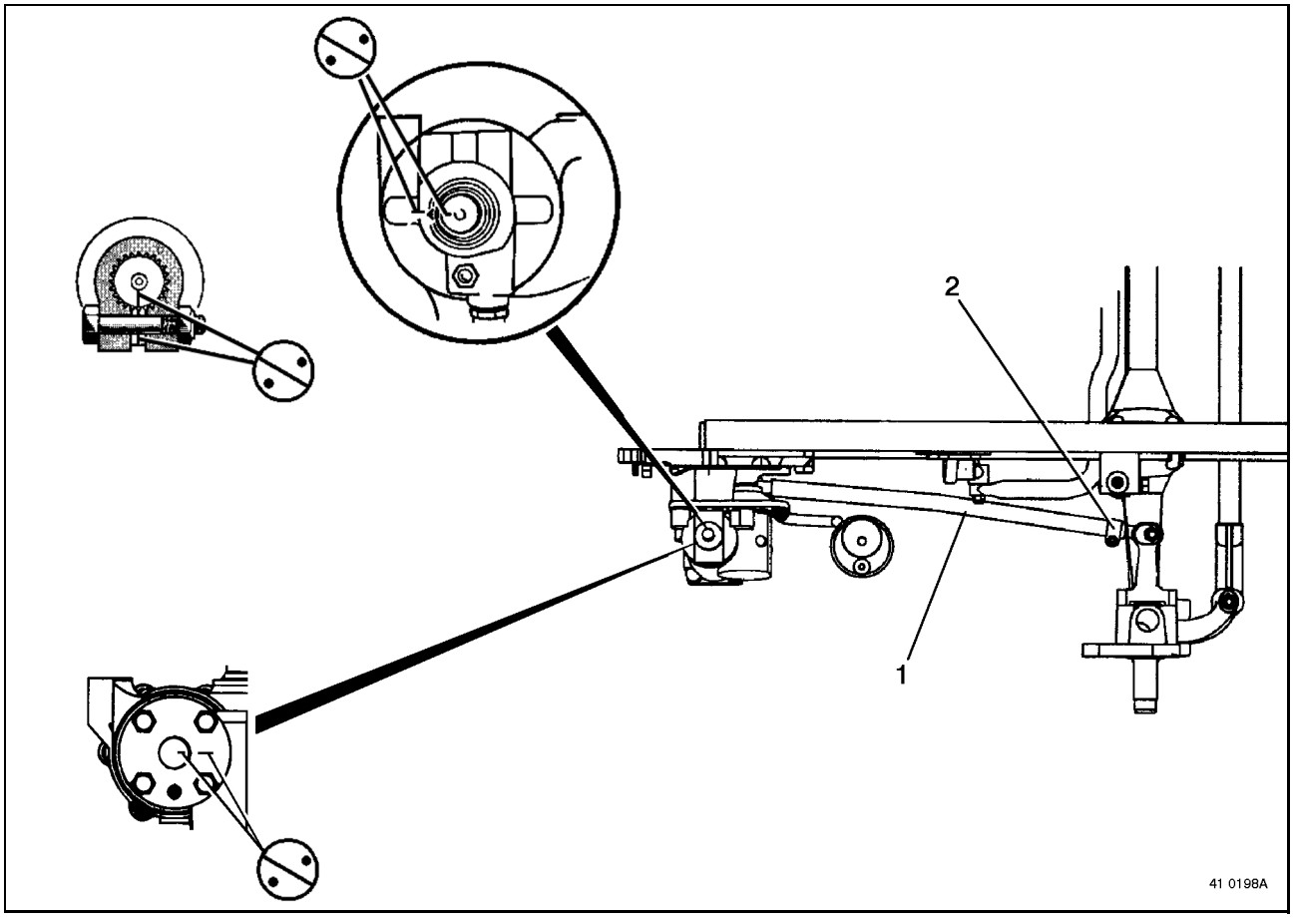
Preliminary checks

Before carrying out any work, proceed with the following checks:
- Condition and pressure of tyres.
- Condition and height of suspension.
- Efficiency of shock dampers.
- Play of front axle wheel hub bearings, swivel pins and joints.

With the front wheels in the "straight ahead" position, check the wheel alignment.
Check that the steering is in the "mid-point" position. For power-assisted steering systems, make sure there is no hydraulic pressure when the steering is in the "mid-point" position.
Carry out a road test after making adjustments found to be necessary during the above checks.If necessary, check the axle geometry angles.

Inspection conditions:
- Vehicle unladen and in running order.
- Cab in "road" position (for vehicles with tilt cab).
- Vehicle on flat ground, steering axle wheels on pivoting plates.
- Vehicle equipped with lift-up axle: the axle must be lowered.
- Luminous projector.

Adjustment of mid-point



Park the vehicle on flat ground, steering axle wheels on pivoting plates.
Set the front axle roadwheels to the straight-ahead position, wheel alignment already adjusted. Use a front axle tester.
Uncouple drag link **(1)**.
Set the steering box to the mid-point position (marks aligned).
Adjust the drag link to the necessary length (ball-joints perpendicular to the track rod).
Tighten drag link clamp bolt **(2)**.
Tighten to torque.

Adjustment of steering lock angles

For steering lock angles, see MR **42 052**.

Steering box SHEPPARD M83
With the wheel alignment adjusted, screw the steering lock stops fully home.
Turn the steering wheel to the right until the required steering lock angle is obtained.
Unscrew the lock stop in question until contact is made with the axle.
Turn the steering wheel to the left and adjust the other lock stop in the same way.
Check that the tyres do not enter into contact with the chassis mechanical components.

Steering box ZF 8090/8095/8098
With the wheel alignment adjusted, screw the mechanical steering lock stops fully home.
Turn the steering wheel carefully to the right until the required steering lock angle is obtained, without exceeding the angle so as not to maladjust the hydraulic lockover limitation stops on the steering box.
Unscrew the mechanical steering lock stop in question until contact is made with the axle.
Turn the steering wheel to the left and adjust the other steering lock stop in the same way.
Check that the tyres do not enter into contact with the chassis mechanical components.

Adjustment of hydraulic pressure limitation stops

Steering box ZF 8090/8095/8098
(To be carried out after adjusting the steering lock angles).
- Park the vehicle on flat ground, steering axle wheels on pivoting plates, or with the front roadwheels raised, with hydraulic power assistance.
- Turn the steering to the left until the lock stop makes contact with the axle (without forcing) .

The hydraulic steering lockover limitation stops are adjusted automatically.

*Correction is possible if the steering lock angle is increased (repeat the operations described above). If the steering lock angle is decreased, replace the hydraulic steering lockover limitation stops (see CMR **41 623**).*

Check the hydraulic lockover limitation.
(see MR **41 050**).

Steering box SHEPPARD M83
Adjustment of hydraulic pressure limitation stops (see MR 41 627).
Check the hydraulic lockover limitation.
(see MR **41 050**).

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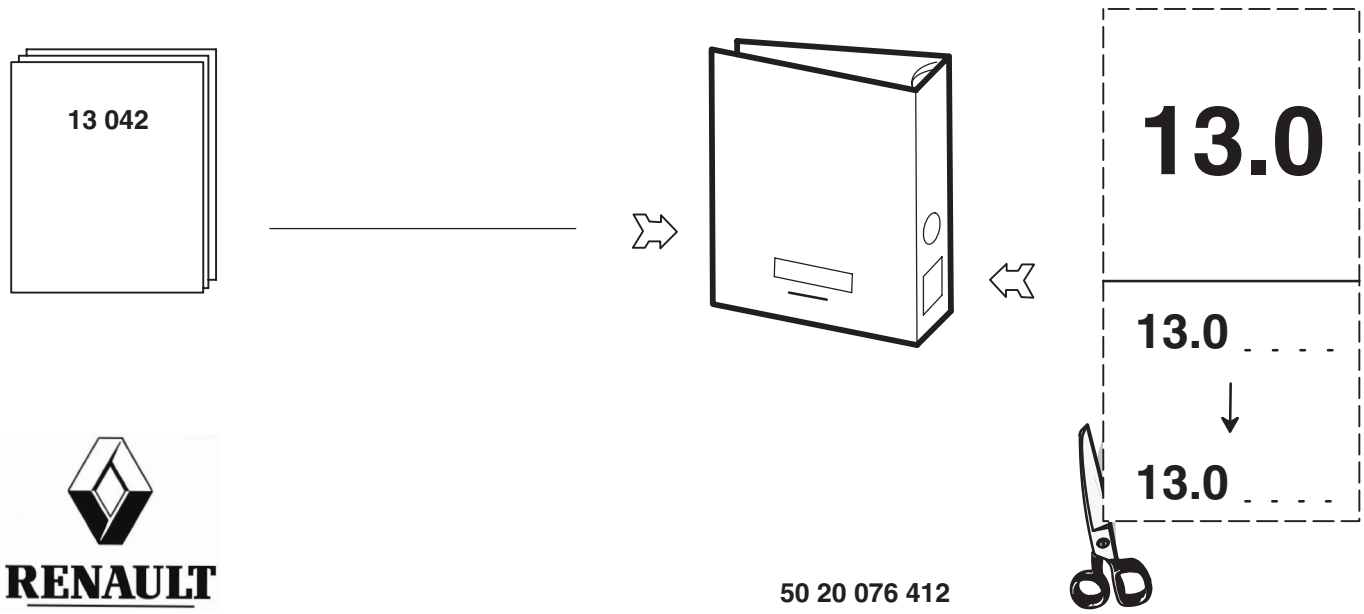
SUSPENSION

AIR SUSPENSION	VEHICLE
SWIVEL BRACKET REAR SUSPENSION	ALL RANGES

NOTE
The above information may change in the course of time.
Only the “Consult” section of the workshop manuals repertory in standard N° 10320 serves as reference.

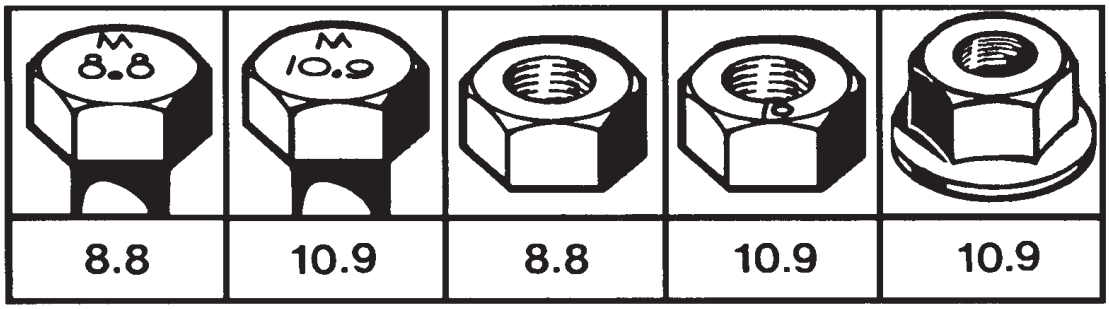


RENAULT

CONTENTS

VOLUME	DESCRIPTION	PAGES
A	Technical data	A1 → A6
	Conventional Symbols	A3
B	Rear suspension	B1 → B3
C	Swivel bracket	C1 → C7
D	Tools	D1

TECHNICAL DATA



21 0122

Tightening torques
There are several types of tightening:
- Tightening to torque (in **Nm.**)
- Tightening to angle (in °)
- Tightening to torque–angle (in **Nm. +** °)

Torques given in **Nm.** are nominal torques (average value calculated on the basis of the minimum torque and the maximum torque).
The tightening accuracy class defines the tolerance of this torque in percent as a function of the nominal torque applied.

Tightening accuracy classes:
- **Classe I**: Special threaded hardware (tolerances variable depending on assembly).
- **Classe II**: Reserved for precise tightening (tolerance ± 10% of the nominal torque).
- **Classe III**: Reserved for normal standard tightening (tolerance ± 20% of the nominal torque).

For standard threaded hardware indicated in the table below, use tightening class **III**.

For other torques, see page A4 → A6.

Tightening torques for conventional nut and bolt hardware to "METRIC system" standard 01.50.4002		
Dia. and pitch of nuts and bolts (in mm)	**Quality class 8.8**	**Quality class 10.9**
	Tightening class III (± 20 %)	**Tightening class III (± 20 %)**
6 x 1.00	7.4	10.8
7 x 1.00	12.1	17.8
8 x 1.00	19.2	28.2
8 x 1.25	17.9	26.3
10 x 1.00	39.4	58
10 x 1.25	37.4	55
10 x 1.50	35.4	52
12 x 1.25	67	98
12 x 1.50	64	94
12 x 1.75	61	90
14 x 1.50	105	155
14 x 2.00	98	143
16 x 1.50	161	237
16 x 2.00	151	222
18 x 1.50	235	346
18 x 2.50	210	308
20 x 1.50	328	481
20 x 2.50	296	435
22 x 1.50	444	652
22 x 2.50	406	596

Consumables

Capacities (Refer to Servicing Handbook)

Fastening, locking and sealing products	
Industrial reference	**Automotive reference**
Loctite 542	LT 542 Oléoétanch
Loctite 549	LT 549 Autoform
Loctite 270	LT 270 Freinfilet fort
Terostat 4 000	Terostat 4 000 mastic

Grease

Symbol	**Renault Trucks Oils**	**Standards**
	..... Superol EP2	NLGI 2 grease lithium soap calcium EP additive lead–free

Preparation prior to assembly :
Carefully clean and inspect all the parts.
Seals and lock–plates must always be discarded and new ones fitted.
Always oil parts prior to force fitting.
The inside of the lips of seal rings must be smeared with grease.
Shrink fitted parts must be heated with a hot air blower or in an oven, etc... Flame heating is strictly forbidden.

NOTE
When using a torque multiplier, calibrate the torque wrench–torque multiplier assembly to the desired torque.

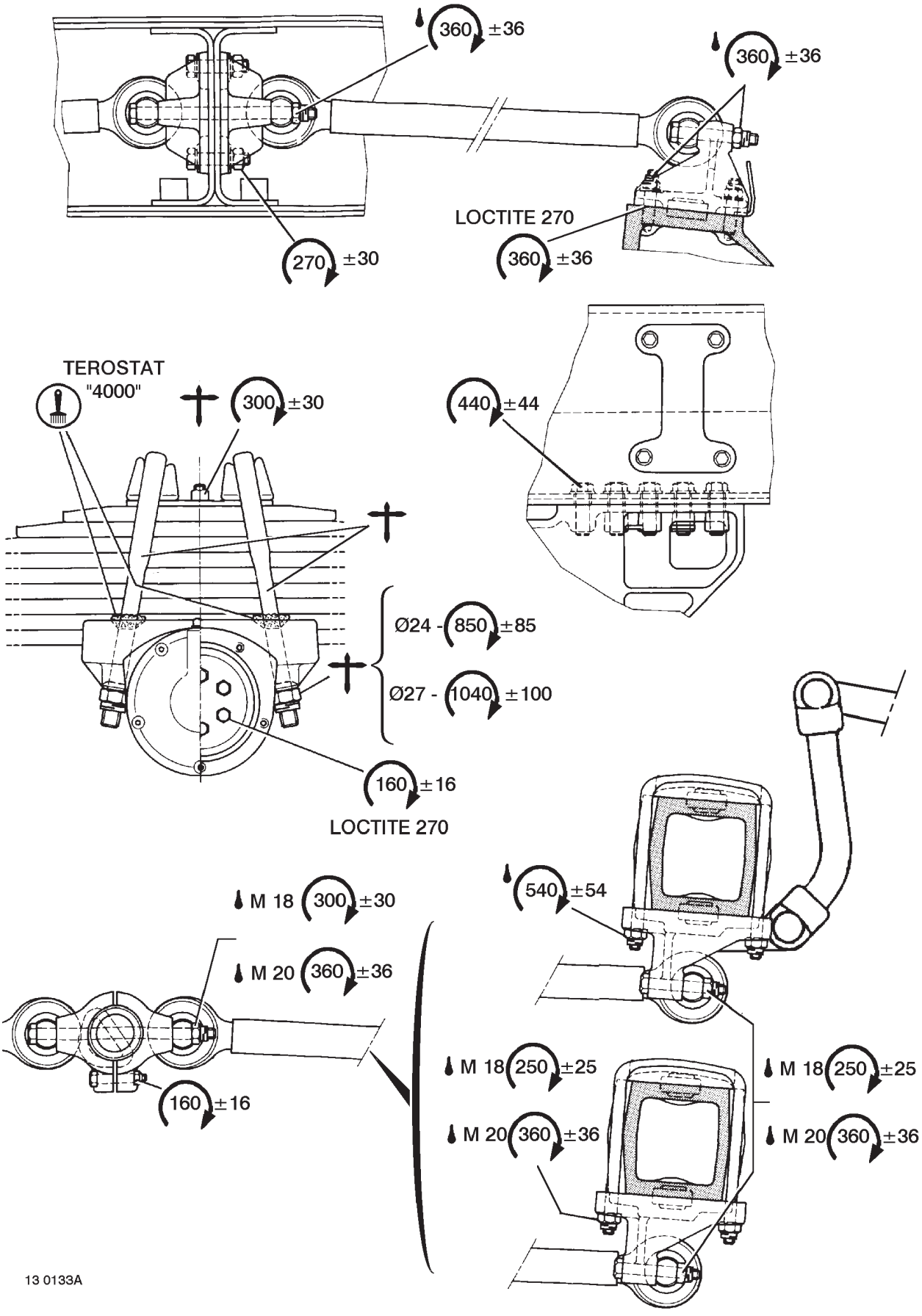
CONVENTIONAL SYMBOLS

Tighten at indicated torque (Nm) (right–hand thread)

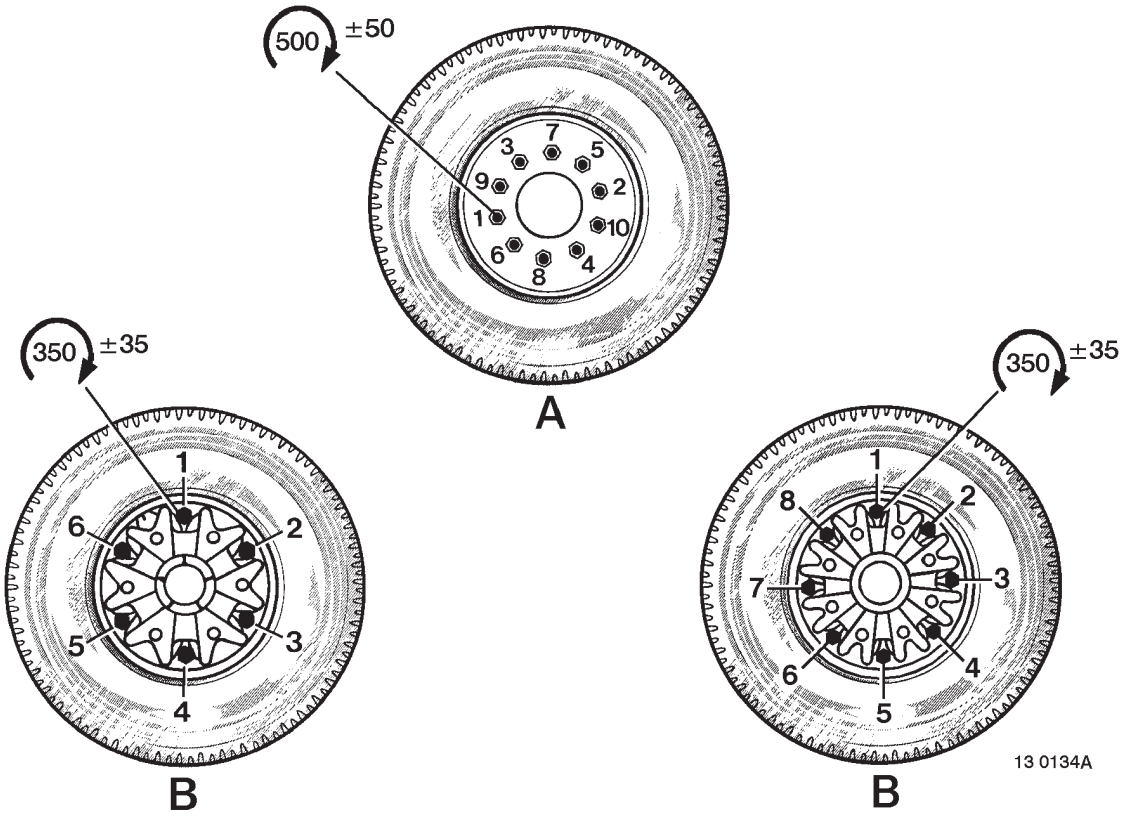
Smear (see “Consumables” table)

Part to be replaced

Mark – Assemble as per marking



Tightening torque with lubricated threaded hardware

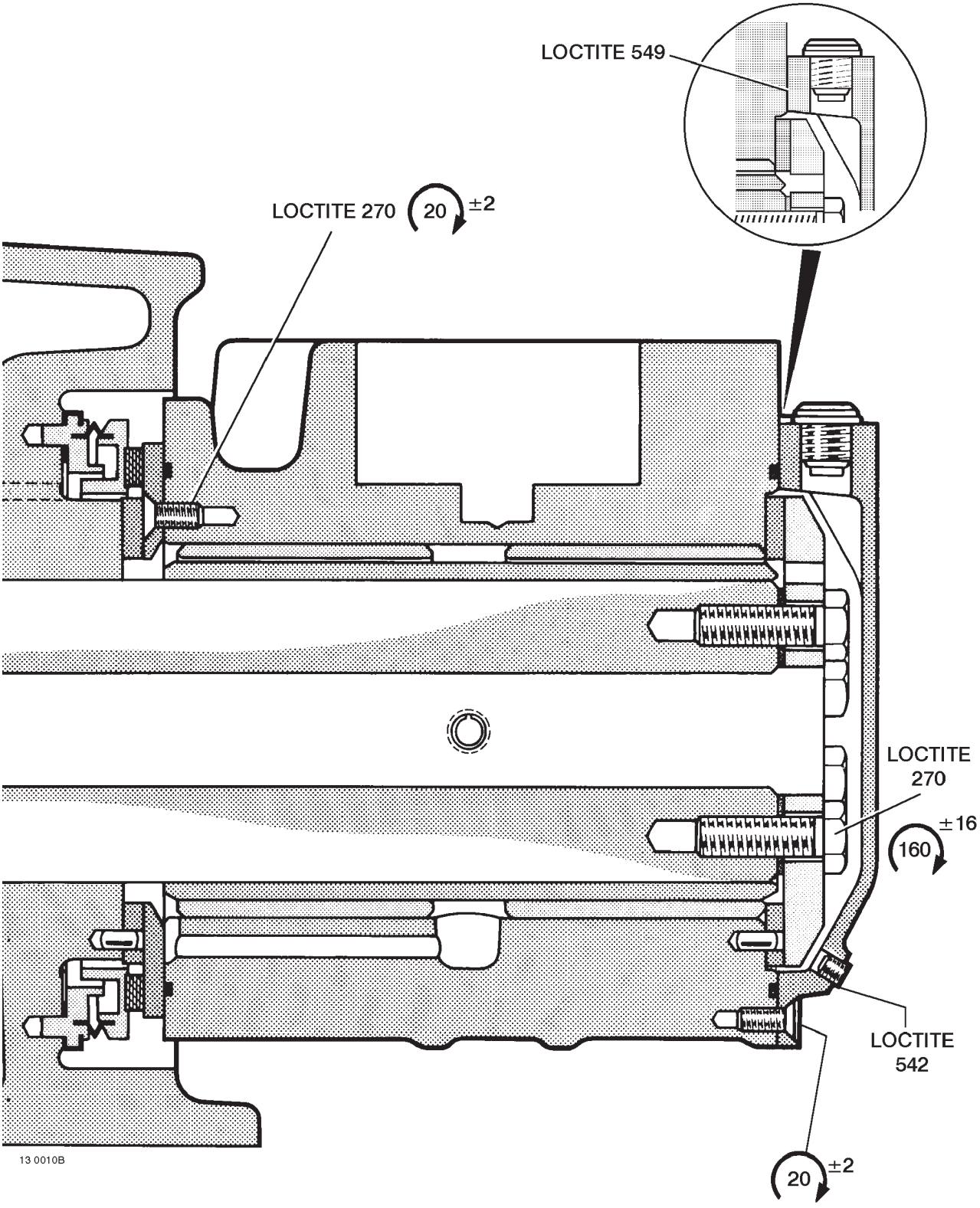


Depending on the assembly.

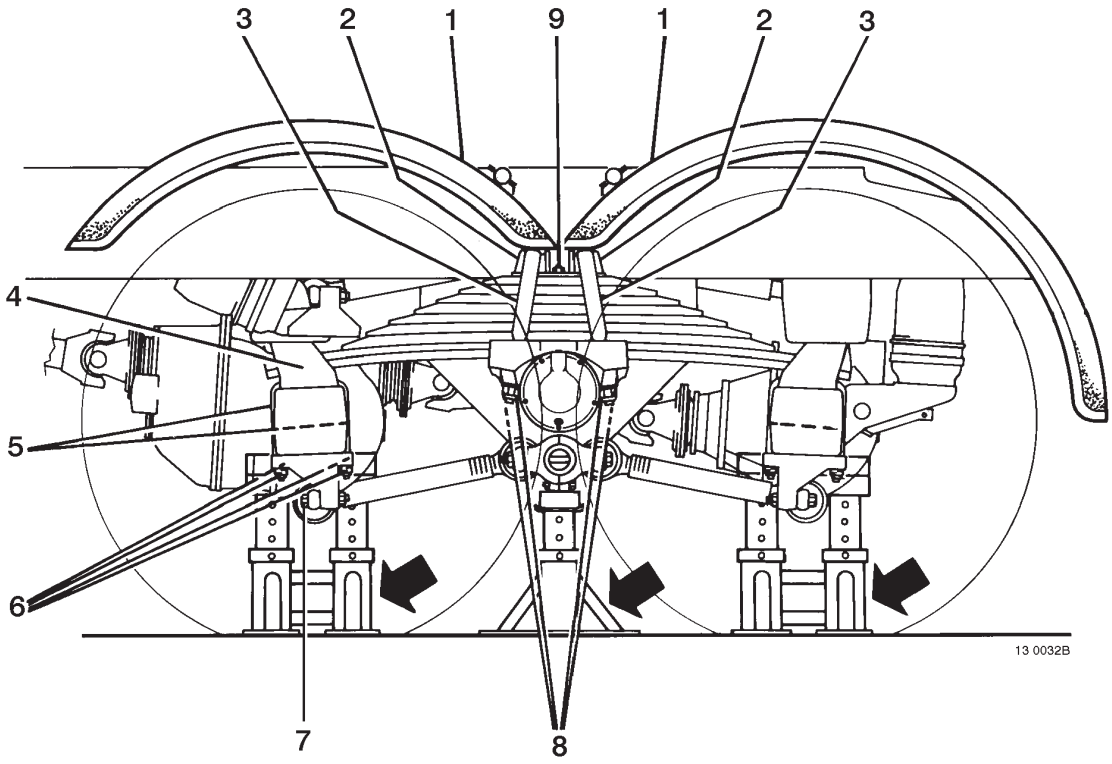
Wheel nut tightening torques and sequence

A : Disc rim wheels (steel / light alloy)

B : “Trilex” wheels


LOCTITE 549
LOCTITE 270
20
±2
LOCTITE
270
±16
160
LOCTITE
542
20
±2
13 0010B

REAR SPRING

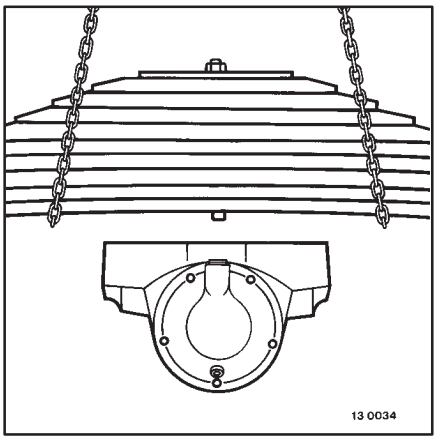


Removal

The item numbers indicated in the text refer to the figure on page **B2**.

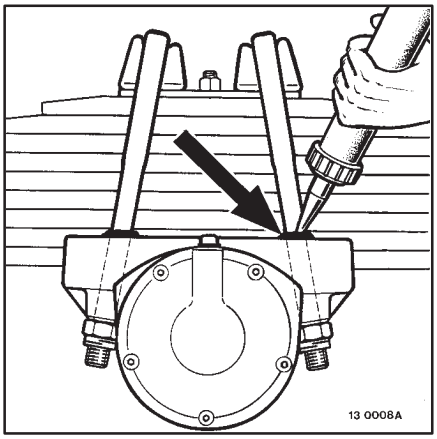
Withdraw the wings **(1)**.
Put axle stands under the vehicle.
Remove the wheels.
Remove the nuts **(8)**.
Remove the U–bolts **(3)**.
Withdraw the guides **(2)**.

Remove the bolts **(7)**.
Remove the nuts **(6)**.
Remove the U–bolts **(5)**.
Remove the retainers **(4)**.
Remove the spring.



Fitting

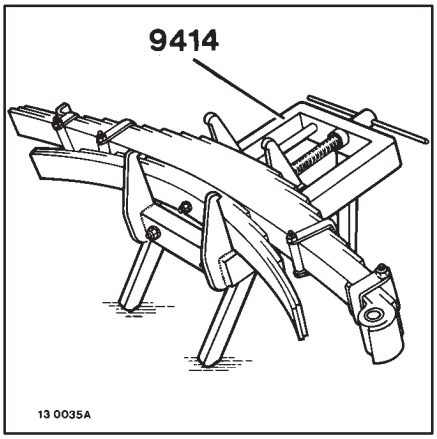
To fit, proceed in the reverse sequence to removal.
Tighten at the recommended torque.
Use a sealing compound " **Terostat 4000**".



Disassembly

Rear spring

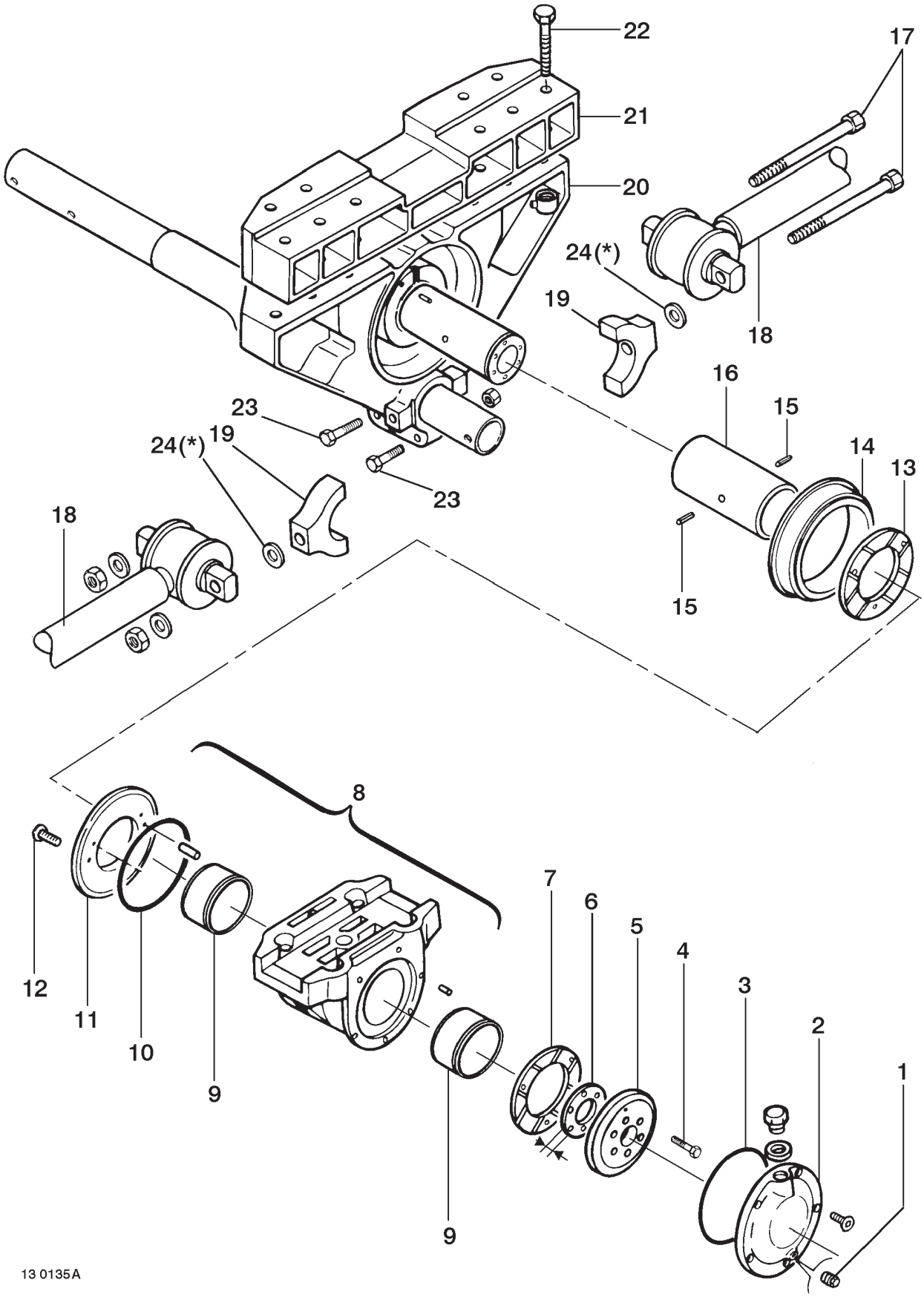
Clamp the spring.
Use tool(s) N° **9414**.
Remove steady pin **(9)**.
Free the spring leaves.



Assembly

Use tool(s) N° **9414**.
To assemble, proceed in the reverse sequence to disassembly.
Burr the nut using a centre–punch to lock the steady pin **(9)**.

SWIVEL BRACKET



(*) PMR 3041 – PMR 3045

The item numbers indicated in the text refer to the figure on page **C2**.

Removal

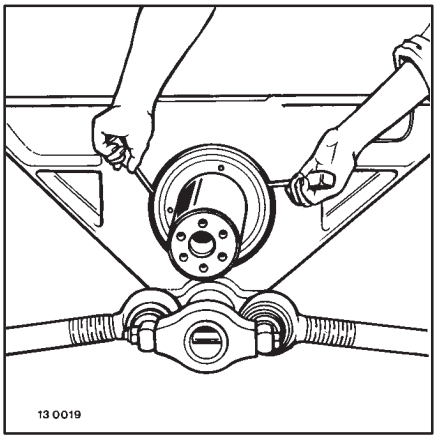
Remove the spring.
(See chapter : **B**).

Drain the oil through plug port **(1)**.
Remove the cap **(2)**.

Depending on the assembly.
Withdraw the O–ring **(3)**.

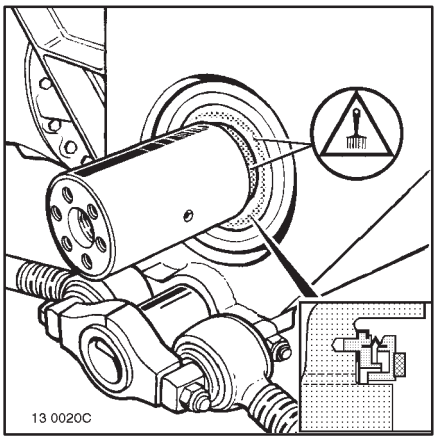
Remove the screws **(4)**.
Remove the stop plate **(5)**.
Save the shim **(6)**.
Remove the friction washer **(7)**.
Remove the assembly **(8)**.
Remove the friction washer **(13)**.

Save seal **(14)**.

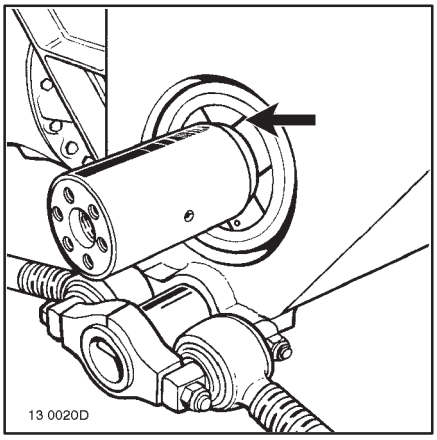


Fitting

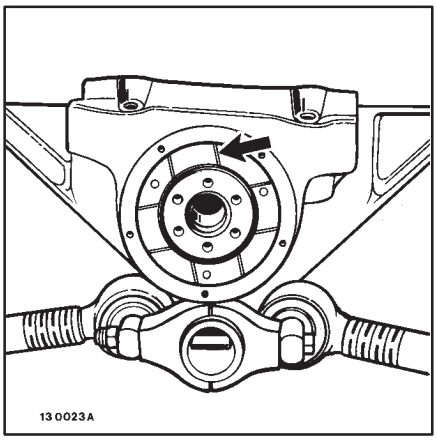
Grease.
Fit seal **(14)**.
Oil the cork bearing surface of seal **(14)**.



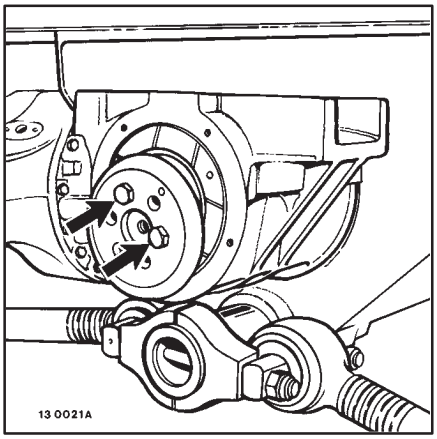
Fit the friction washer **(13)**.
Respect the direction of assembly.



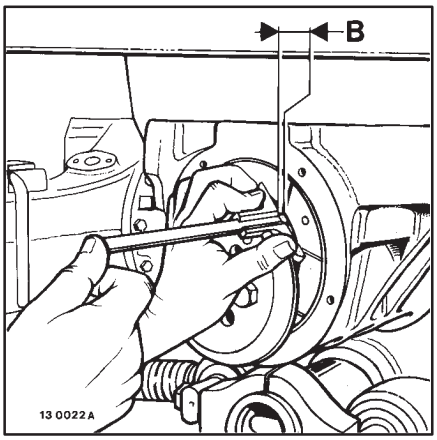
Fit the assembly **(8)**.
Fit the friction washer **(7)**.
Respect the direction of assembly.



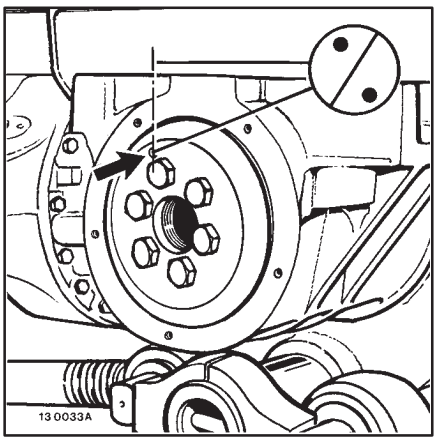
Position the stop ring **(5)**.
Tighten the screws moderately.



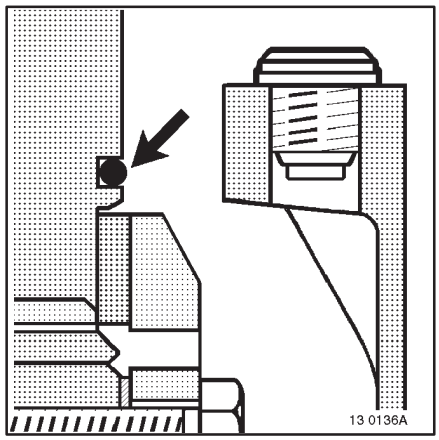
Measure the dimension **(B)**.
Calculate the thickness **(A)** of the shim **(6)**
A = B + 0.05 mm
+ 0.
Select the appropriate spacer **(6)**.
(Spare Part value: **3 – 1 – 0.5 – 0.1 mm**).



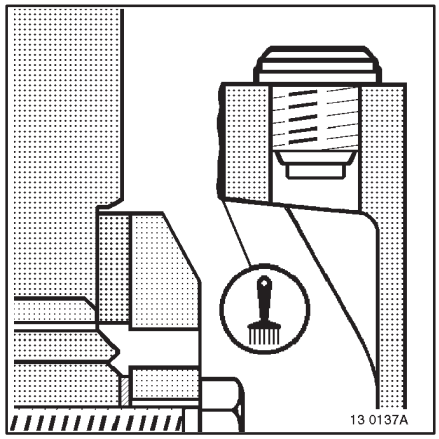
Fit the shim **(6)**.
Position the stop ring **(5)**.
Respect the orientation.
Fit the screws **(4)**.
Use a securing product such as "**LT 270**".
Tighten at the recommended torque.



Depending on the assembly.
Install the O–ring **(3)**.
Fit the cap **(2)**.



Depending on the assembly.
Use a sealing product “**LT 549**”.
Fit the cap **(2)**.

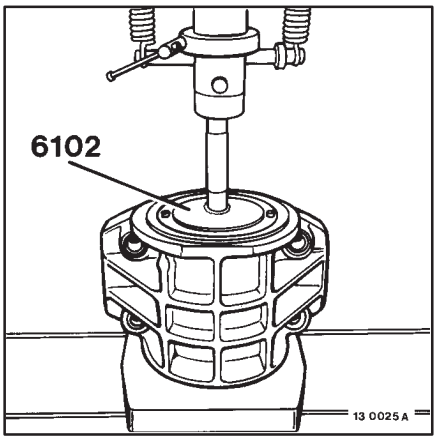


Fit the plug **(1)**.
Use a sealing product “**LT 542**”.
Fill with oil.
(Refer to Servicing Handbook).

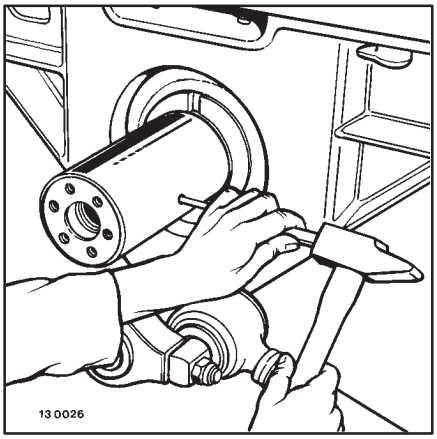
Disassembly

Remove the assembly **(8)**.
See page(s) **C2**.

Remove the screws **(12)**.
Remove the washer **(11)**.
Withdraw the O–ring **(10)**.
Remove the bushes **(9)**.
Use tool(s) **6102**.



For replacement only.
Remove the pins **(15)**.

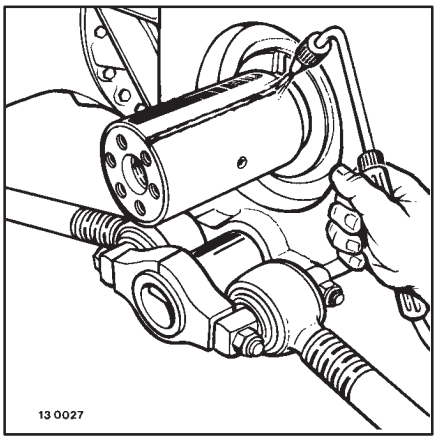


Remove the collar **(16)**.

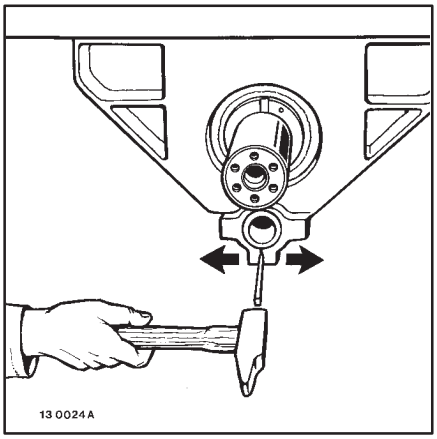
Withdraw the nuts and bolts **(17)**.
Uncouple the link rods **(18)**.
Withdraw the spacers **(19)**.

Depending on the assembly.
Withdraw the spacers **(24)**.

Withdraw the nuts and bolts **(22)**.
Depending on the assembly.
Save the shim **(21)**.

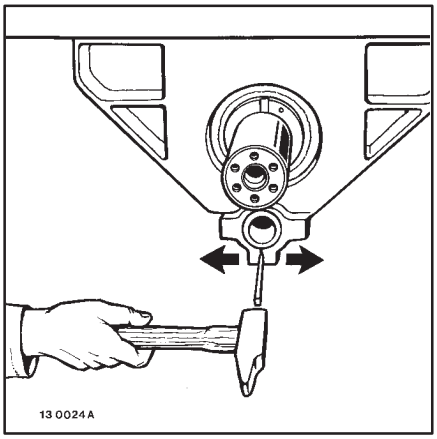


Withdraw the nuts and bolts **(23)**.
Separate the jaws.
Remove fitting **(20)**.



Assembly

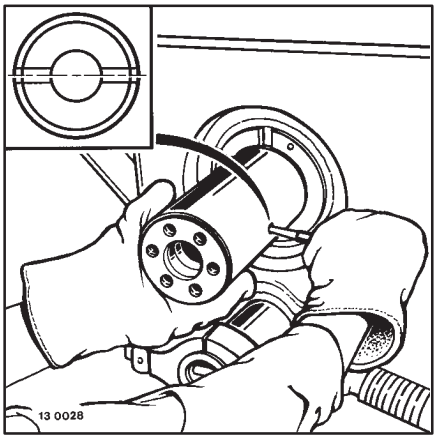
Separate the jaws.
Fit the fitting **(20)**.



Depending on the assembly.
Install the shim **(21)**.
Tighten the nuts and bolts **(22–23)**.
Tighten at the recommended torque.
Fit the spacers **(19)**.
Depending on the assembly.
Fit the spacers **(24)**.

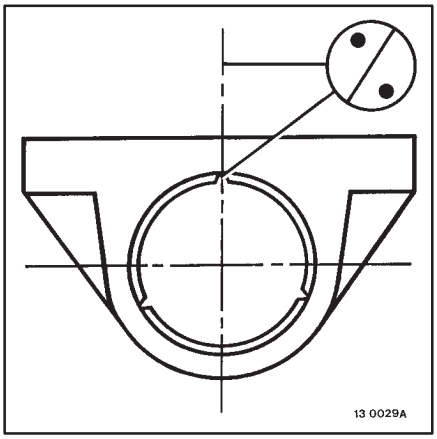
Couple up the link rods **(18)**.
Tighten the nuts and bolts **(17)**.
Tighten at the recommended torque.

Mount the collar **(16)**.
Heat part **(16)** to **120** °C.
Align the pin holes.
Install the pins **(15)**.



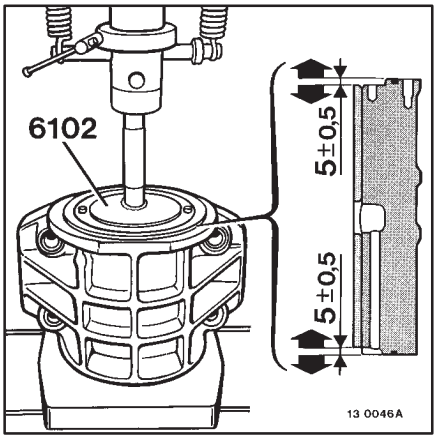
NOTE
This operation requires special attention.

Fit the bushes **(9)**.
Respect the orientation.



Use tool(s) **6102**.
Use a press.
Respect the position

Install the O–ring **(10)**.
Fit the washer **(11)**.
Fit the screws **(12)**.
Use a securing product such as “**LT 270**”.
Tighten at the recommended torque.



TOOLS

RENAULT TRUCKS divide tools into 3 categories:

– **General–purpose tools:** Commercially available tools.
  . **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department).
  . **4–figure reference number** (tools with RENAULT TRUCKS reference number, but available from the supplier).

– **Special tools:** Specially created tools, distributed by the RENAULT TRUCKS spare parts division.

– **Locally manufactured tools:** these tools are classified differently according to their degree of sophistication:

  . **4–figure reference number** (represented by a drawing): tools that are simple to make without need for special qualification.

  . **50 00 26 .... reference number** (possibility of purchasing through the RENAULT TRUCKS Spare Parts department): a certain skill is needed to make these tools.

Three levels (or echelons) determine their assignment:

– **LEVEL 1:** Tools for servicing and minor tasks.

– **LEVEL 2:** Tools for major repairs.

– **LEVEL 3:** Tools for refurbishment.

Specific tools				
RENAULT TRUCKS Ref. N°	**Designation**	**Level**	**Quantity**	**Pages**
50 00 26 **6102**	Pusher	1	1	C6