TEREXLIFT

TEREXLIFT

WORKSHOP MANUAL

Code 57.4400.4200 - 4th Edition 05/2007

Handler with telescopic boom

GIROLIFT 3514 - 3518

3714 SX - 5022 - 4010 Perfora



English
Edition

INDEX

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Code 57.4400.4200 - 4th Edition 05/2007

Number: .....

Consigned to: .....

DECLARATION

I, the undersigned.....

declare that I have received the ***Workshop manual for TEREXLIFT lifts series Girolift 3514 - 3518 - 3714 SX - 5022 - 4010 Perfora.***

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Yours sincerely

date .....

For acceptance

The consignee

Company stamp
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LIST OF REVISED PAGES

Revision No.	Revision date	Revised pages	Notes	Issued by
1	12-2002		Publicated	
2	12-2003		Manual revision	
3	03-2007	Sect. C, Sect. P	Manual revision	
4	05-2007	Sect. C updated with wiring diagram 5022 stage 3	Manual revision	
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Sect. B SAFETY REGULATIONS

Sect. C TECHNICAL OPERATING DATA

Sect. D CHECKS AND ADJUSTMENTS

Sect. E DISMANTLING AND ASSEMBLY

Sect. F TROUBLESHOOTING

Sect. G DANA AXLE ASSEMBLY/DISASSEMBLY

Sect. H PERKINS ENGINE MAINTENANCE

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Sect. L REPAIR INSTRUCTIONS - REXROTH PUMP

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GENERAL INFORMATION

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A.01 INTRODUCTION

This manual has been prepared to provide information about the routine and extraordinary maintenance of the main units of the machine in a safe and proper way.

STRICTLY COMPLY WITH THE INSTRUCTIONS GIVEN IN THIS MANUAL!
READ AND UNDERSTAND THIS MANUAL BEFORE CARRYING OUT ANY INTERVENTION ON THE MACHINE.

If you are unsure about anything after the reading of this manual, address to TEREXLIFT Assistance Service: addresses, phone and fax numbers are printed in the cover and in the title-page of this manual.

Keep this manual in the workshop at all times and read it before carrying out any extraordinary maintenance job.

A.02 SYMBOLS USED IN THE MANUAL

In this manual, any important information starts with a **SPECIAL SYMBOL**.
Symbols are also used to direct the reader's attention to special technical information about the tools to use, the tightening torques, etc.
There are six safety symbols in this manual, always combined with keywords that class the situations according to their degree of dangerousness.
The symbols are always followed by a text explaining the situation taken into account, the attention to be paid to such situation, the method and the behaviour to be adopted. If necessary, it stresses prohibitions or provides instructions to prevent dangers.
Sometimes, it can be followed by illustrations.

The safety symbols are the following:

DANGER

Draws the attention to situations that involve your own as well as the others' safety and that can result in serious or lethal injury.

ELECTRICAL DANGER

Draws the attention to electrical risks that involve your own as well as the others' safety and that can result in serious injury or lethal injury.

CAUTION

Draws the attention either to situations that involve your own as well as the others' safety and that can result in minor or moderate injury; or to situations that affect the machine efficiency.

ATTENTION

Draws the attention either to situations that involve your own as well as the others' safety and that can result in minor or moderate injury; or to situations that affect the machine efficiency.

IMPORTANT

Draws the attention to important technical information or practical advice that allows for a safer and more efficient use of the machine.

PROTECT THE ENVIRONMENT

Draws the attention to important environment-related information.



Indicates the number of people needed for the job



Time expected to do the intervention (except in case of troubles)



Special tools needed for the job



Weight of the unit to be handled



Tightening torque of bolts and screws



Inspection needed

A.03 ABBREVIATIONS

Abbreviation	Definition
Tab.	Table
Pag.	Page
Sect.	Section
Dwg.	Drawing
Ref.	Reference
CLS	Concrete
Mach.	Machine
Fig.	Figure
Ph.	Photo
T.O.	Technical Office
T.A.S.	Technical Assistance Service

A.04 UNITS OF MEASURE

1 FORCE

The unit of measure of force is the Newton (N)

For the conversion:

1 N	=	0.1019 kg
1 kg	=	9.81 N

2 POWER

The unit of measure of power is the kilowatt (kW). Other units of measure used are:

CV	Horsepower
HP	Horsepower

For the conversion:

1 kW	=	1.36	CV
1 kW	=	1.34	HP
1 CV	=	0.736	kW
1 CV	=	0.986	HP
1 HP	=	0.746	kW
1 HP	=	1.014	CV

3 TORQUE

The unit of measure of power is the Newton metre (Nm).

For the conversion:

1 Nm	=	0.1019	kgm
1 kgm	=	9.81	Nm
1 kgm	***=***	***10***	***Nm***

NOTE:

For simplicity, the ***Nm*** unit is converted according to the ratio 10 Nm = 1 kgm

4 SPECIFIC CONSUMPTION

The specific consumption is expressed in g/kWh (grams per kilowatt-hour). Another unit of measure used is: g/HPh (grams per horsepower-hour)

For the conversion:

1 g/kWh	=	0.736	g/HPh
1 g/HPh	=	1.36	g/kWh

5 PRESSURE

The unit of measure of pressure is the kPa (kilopascal). Other units of measure used are:

kg/cm^2	kilogram per square centimetre
Atm	Technical atmosphere
psi	Pound per square inch

For the conversion:

1 kg/cm^2	=	1	Atm
1 kg/cm^2	=	98.1	kPa
1 kg/cm^2	=	0.981	bar
1 kg/cm^2	***=***	***1***	***bar***
1 kg/cm^2	=	14.22	psi
1 bar	=	100	kPa
1 bar	=	1.02	kg/cm^2
1 bar	=	14.51	psi
1 psi	=	6.9	kPa
1 psi	=	0.069	bar
1 psi	=	0.0703	kg/cm^2
1 kPa	=	0.145	psi
1 kPa	=	0.0102	kg/cm^2
1 kPa	=	0.01	bar

NOTE:

For simplicity, the ***bar*** unit is converted according to the ratio 1 bar = 1 kg/cm^2

6 CONVERSION OF SOME METRIC UNITS OF MEASURE INTO IMPERIAL UNITS OF MEASURE

0,1 mm	=	3,937	mils
1 mm	=	0,039	inch
1 m	=	3,281	ft
1 km	=	0,621	miles
1 cm^3	=	0,061	cu. in.
1 g	=	0,035	oz.
1 kg	=	2,205	lbs.
1 t	=	1,102	short ton
1 t	=	0,9842	long ton
1 l	=	0,2642	gal
0°C	=	32°F	

Note: in case of differences of temperature 1°C = 1.8°F

A.05 WORKSHOP EQUIPMENT

IMPORTANT

The list below indicates the minimum equipment necessary for servicing the vehicle.

Standard tools
- 6 to 41 mm box wrench set
- 6 to 41 mm socket wrench set
- 2 to 10 mm Allen wrench set
- External circlip pliers - ø 10÷60 mm
- Internal circlip pliers - ø 20÷200 mm
- Two-leg pullers - ø 25÷200 mm
- Three-leg pullers - ø 50÷400 mm
- American cutters
- Scissors
- Screwdriver set
- Hammer set
- Mallets with plastic plugs
- Combination pliers
- Wire nippers
- Nylon collar pliers
- Wire cutter
- Wire strippers
- Shears
- Cutting nippers
- Hand-saw
- Cutter
- Slotted screw driver set - ø 2.5 ÷ 10 mm
- Crosshead screw driver set - ø 2.5 ÷ 10 mm
- Adjustable self-locking pliers
- Ring nut spanner
- Wrench set for hydraulic cylinders
- Drift bolt set
- Chisel set
- Punch
- Funnel
- Funnel with flexible extension
- Calibrated measuring beaker
- Crowbar
- Fluid collecting tanks
- Pliers for internal cylinder seals

Fittings for plugging disconnected pipes
- 1/4" gas male plug
- 3/8" gas male plug
- 1/2" gas male plug
- 1" gas male plug
- 1" 1/4 gas male plug
- 1" 1/2 gas male plug
- 1/4" gas female plug
- 3/8" gas female plug
- 1/2" gas female plug
- 1" gas female plug
- 1" 1/4 gas female plug
- 1" 1/2 gas female plug

Sealing material
- Teflon tape
- Loctite sealant
- Loctite threadlocker

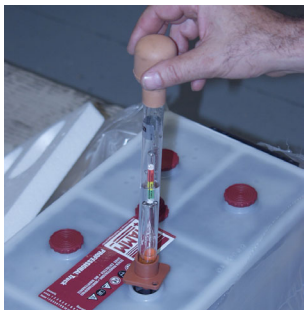
Equipment and instrumentation
- Measure instruments: metre, gauge, micrometres
- Compressor with compressed air system
- Hydraulic circuit test bench for pressures up to 400 bar
- Pressure gauges 0-60 bar / 0-240 bar / 0-600 bar
- Ammeter
- Digital tester
- Hourmeter
- Hydrometer for checking the battery charge
- Thermometer for oil temperature check
- Lamp/indicator for checking hydraulic circuit leaks
- Painting system
- Steam cleaner
- Forklift and/or pallet lift
- Stackable wooden planks and/or pallets
- Electric welding machine
- Cylinder and blowpipe
- Hoisting means with 5000 kg payload
- Textile bridles
- Two-/three-leg chains with hooks
- Pneumatic screwdriver
- Water level
- Bench drilling machine
- Portable electric drill
- Set of helical bits
- Set of screw taps and threaders
- Battery charger
- Adjustable stands

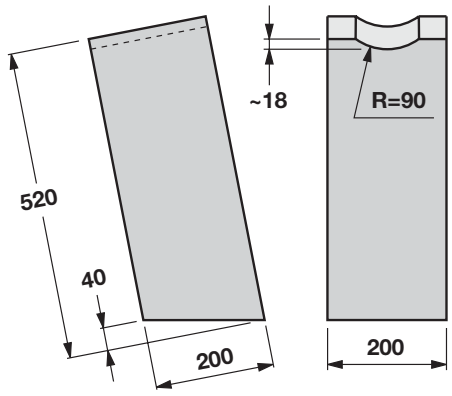
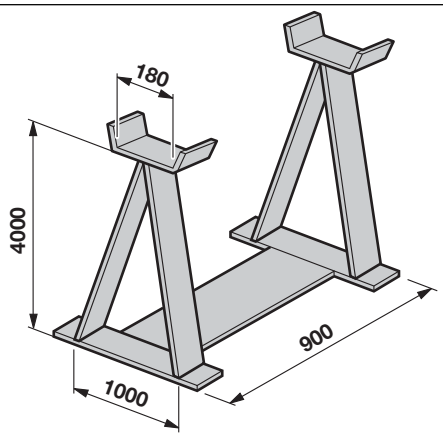
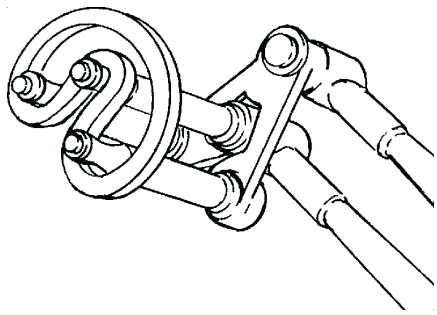
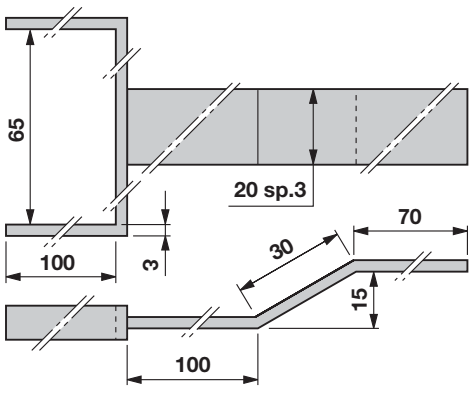
Consumable material
- Oils
- Greases
- Rags for cleaning

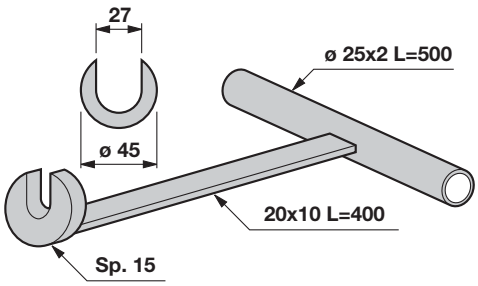
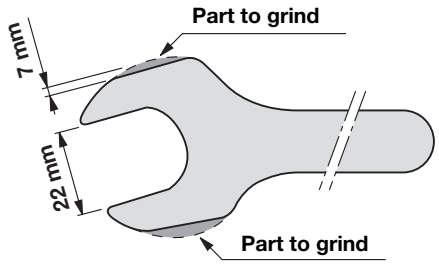
Personal protection equipment
- Goggles
- Gloves
- Ear-protectors
- Shoes
- Overall

A.06 SPECIAL EQUIPMENT

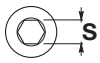
	PART#	DESCRIPTION
		Pressure gauge for checking the hydraulic oil low pressure - 0÷60 bar Pressure gauge for checking the hydraulic oil medium pressure 0÷240 bar Pressure gauge for checking the hydraulic oil high pressure 0÷600 bar
		Amperometric detector
		Electronic hourmeter
		Tester for electric values

	PART#	DESCRIPTION
		Clock / chronometer
		Hydrometer for battery charge
		Lamp/indicator for hydraulic circuit leaks
		Lamp/indicator for electric circuit
		Thermometer for checking the freezing point of the radiator coolant

	PART#	DESCRIPTION
	**Dwg.01**	Wooden block for supporting the lifting jack
	**Dwg.02**	Fixed supporting stands for boom
		Wrench for internal seals
	**Dwg.03**	Wrench for boom sliding blocks

	PART#	DESCRIPTION
		**Dwg.04** Wrench for assembling flexible hoses valve of the 3rd telescope extension c
		Tester -pressurizer for accumulators
		**Dwg.05** Wrench for Hydromatic pumps fixing enter the seat)

A.07 TIGHTENING TORQUES

Thread diameter	Pitch	Wrench measure mm				Tightening torques Material class					
						8.8		10.9		12.9	
			UNI	UNI	UNI	Normal	Galvanized	Normal	Galvanized	Normal	Galvanized
mmmm	5931/32		5933÷36	5923÷30	Nm	Nm	Nm	Nm	Nm	Nm	
4	0,7	7	3	2,5	2	3,2	2,8	4,4	3,9	5,3	4,8
5	0,8	8	4	3	2,5	6,1	5,5	8,7	7,8	10,3	9,3
6	1	10	5	4	3	10,6	9,5	14,8	13,3	17,8	16,0
8	1,25	13	6	5	4	25,1	22,5	35,4	31,8	42,5	30,2
	1	13	6	5	4	26,5	23,8	37,3	33,5	44,7	40,3
10	1,5	17	8	6	5	51,1	46,0	71,9	64,7	86,3	77,6
	1,25	17	8	6	5	53,4	48,1	75,1	67,5	90,2	81,1
12	1,75	19	10	8	6	86,5	77,8	121,4	109,2	145,9	131,3
	1,25	19	10	8	6	92,4	83,2	129,5	116,6	156,1	140,5
14	2	22	12	10	6	137,7	123,9	193,8	174,4	232,6	209,3
	1,5	22	12	10	6	145,9	131,3	206,1	185,5	246,9	222,0
16	2	24	14	10	8	209,1	188,2	293,8	264,4	353,0	317,7
	1,5	24	14	10	8	218,3	196,5	308,1	277,3	369,3	332,4
18	2,5	27	14	12	8	288,7	259,8	406,1	365,5	487,7	436,9
	1,5	27	14	12	8	314,2	282,8	442,8	398,5	530,6	477,5
20	2,5	30	17	12	10	408,1	367,3	573,4	516,1	687,7	618,9
	1,5	30	17	12	10	439,7	395,8	619,3	557,4	742,8	662,5
22	2,5	32	17	-	12	542,3	488,5	763,2	686,9	915,3	823,7
	1,5	32	17	-	12	582,6	524,3	819,3	737,4	983,6	885,3
24	3	36	19	-	12	705,1	634,5	990,8	891,7	1193,3	1074,4
	2	36	19	-	12	745,3	671,3	1051,0	945,9	1255,1	1129,5
27	3	41	19	-	-	1036,0	927,5	1448,9	1304,0	1734,6	1561,2
	2	41	19	-	-	1091,8	982,6	1530,6	1377,5	1836,7	1653,0
30	3,5	46	22	-	-	1307,9	1258,1	1989,3	1772,4	2357,1	2121,4
	2	46	22	-	-	1510,2	1359,1	2122,4	1910,2	2540,8	2286,7
33	3,5	50	24	-	-	2000,0	1800,0	2800,0	2520,0	3400,0	3060,0
	2	50	24	-	-	1610,0	1450,0	2300,0	2070,0	2690,0	2420,0
36	4	55	27	-	-	2600,0	2340,0	3700,0	3330,0	4300,0	3870,0
	3	55	27	-	-	2800,0	2520,0	3900,0	3510,0	4600,0	4140,0
39	4	60	27	-	-	3400,0	3060,0	4800,0	4320,0	5600,0	5040,0
	3	60	27	-	-	3600,0	3240,0	5100,0	4590,0	5900,0	5310,0

Thread diameter	Pitch	Standard nuts		Low nuts	
		5S Nm	8G Nm	5S Nm	8G Nm
4	0,7	5,5		3,5	
5	0,8	5,5		3,5	
6	1	9,5	13,0	6,0	8,0
8	1,25	23,0	32,0	14,0	20,0
	1	25,0	35,0	16,0	22,0
10	1,5	46,0	64,0	29,0	40,0
	1,25	49,0	68,0	31,0	42,0
12	1,75	80,0	110,0	50,0	69,0
	1,25	88,0	125,0	55,0	78,0
14	2	125,0	180,0	78,0	110,0
	1,5	140,0	195,0	88,0	120,0
16	2	195,0	275,0	120,0	170,0
	1,5	210,0	295,0	130,0	185,0
18	2,5	270,0	390,0	170,0	245,0
	1,5	305,0	425,0	190,0	265,0
20	2,5	305,0	540,0	190,0	340,0
	1,5	425,0	600,0	260,0	375,0
22	2,5	510,0	720,0	320,0	450,0
	1,5	570,0	800,0	360,0	500,0
24	3	660,0	930,0	410,0	580,0
	2	720,0	1000,0	450,0	630,0
27	3	980,0	1400,0	610,0	880,0
	2	1050,0	1500,0	660,0	940,0
30	3,5	1350,0	1850,0	850,0	1160,0
	2	1450,0	2050,0	910,0	1280,0
33	3,5	1650,0	2310,0	1050,0	1470,0
	2	1980,0	2770,0	1270,0	1780,0
36	4	2120,0	2970,0	1360,0	1900,0
	3	2550,0	3570,0	1630,0	2280,0
39	4	2730,0	3820,0	1750,0	2450,0
	3	3250,0	4550,0	2080,0	2910,0

A.08 DRILL DIAMETERS FOR THREADS

Thread x pitch	DRILL DIAMETER LIMITS max	min	DRILL BIT DIAMETER
M 4 x 0,7	3,42	3,24	3,30
x 0,5	3,60	3,46	3,50
M 5 x 0,8	4,33	4,13	4,20
x 0,5	4,60	4,46	4,50
M 6 x 1	5,15	4,92	5,00
x 0,75	5,38	5,19	5,20
M 8 x 1,25	6,91	6,65	6,80
x 1	7,15	6,92	7,00
M 10 x 1,5	8,87	8,38	8,50
x 1,25	9,38	9,19	9,20
M 12 x 1,75	10,44	10,10	10,20
x 1,5	10,68	10,38	10,50
M 14 x 2	12,21	11,83	12,00
x 1,5	12,68	12,38	12,50
M 16 x 2	14,21	13,84	14,00
x 1,5	14,68	14,38	14,50
M 18 x 2,5	15,74	15,29	15,50
x 1,5	16,68	16,38	16,50
M 20 x 2,5	17,74	17,29	17,50
x 1,5	18,68	18,38	18,50
M 22 x 2,5	19,74	19,29	19,50
x 1,5	20,68	20,38	20,50
M 24 x 3	21,25	20,75	21,00
x 2	22,21	21,83	22,00
M 27 x 3	24,25	23,75	24,00
x 2	25,21	24,83	25,00
M 30 x 3,5	26,77	26,21	26,50
x 3	27,25	26,75	27,00
M 33 x 3,5	27,77	29,21	29,50
x 2	31,21	30,83	31,00
M 36 x 4	32,27	31,65	32,00
x 3	33,25	32,75	33,00
M 39 x 4	35,27	34,67	35,00
x 3	36,25	35,75	36,00

A.09 STANDARD TIGHTENING TORQUES FOR FITTING SEALS

■ 60° CONICAL SEALS

Thread diameter		TIGHTENING TORQUES (0+10%)
inc.	mm	60° CONICAL SEALS Nm
G 1/8"		15
G 1/4"	M 10 x 1	20
9/16"-18		25
11/16"-16		40
13/16"-16		55
3/4"-16		62
1"-14		80
7/8"-14		80
1.1/16"-12		110
1.3/16"-12		115
1.5/16"-12		160
1.7/16"-12		130
1.11/16"-12		190
1.5/8"-12		225
1.7/8"-12		270
2"-12		245
2.1/4"-12		360

■ FRONT O-LOK (Parker) SEALS

Thread diameter		TIGHTENING TORQUES (0+10%)
inc.	mm	FRONT O-LOK (Parker) SEALS Nm
9/16"-18		25
11/16"-16		40
13/16"-16		55
1"-14		80
1.3/16"-12		115
1.7/16"-12		130
1.11/16"-12		190
2"-12		245

■ 37° COUNTER-SUNK CONICAL SEALS (JIC)

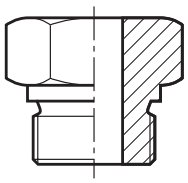
Thread diameter		TIGHTENING TORQUES (0+10%)
inc.	mm	37° CONICAL SEALS (JIC) Nm
7/16"-20	M10x1	15
1/2"-20	M12x1.5	20
9/16"-18	M14x1.5	28
	M16x1.5	62
3/4"-16	M18x1.5	62
7/8"-14	M22x1.5	80
1.1/16"-12	M27x2	110
1.3/16"-12		141
1.5/16"-12	M33x2	160
1.5/8"-12	M42x2	225
1.7/8"-12	M48x2	270
2.1/4"-12	M10x1	360

■ SEALS WITH GRIP-RING

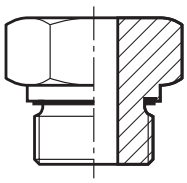
Thread diameter				TIGHTENING TORQUE (0+10%) SEALS WITH GRIP-RING
inc.	mm	Fitting Series	Pipe ø mm	Nm
G 1/8"	M10x1	LL	4	10
G 1/8"	M10x1	LL	6	10
G 1/8"	M10x1	L	6	25
G 1/4"	M12x1.5	L	8	50
G 1/4"	M14x1.5	L	10	50
G 1/8"	M20x1.5	L	12	130
G 1/8"	M20x1.5	L	15	190
G 1/8"	M20x1.5	L	18	245
G 1/8"	M20x1.5	L	22	130
G 1/8"	M20x1.5	L	28	190
G 1/8"	M20x1.5	L	35	245
G 1/8"	M20x1.5	L	42	245
G 1/4"	M12x1.5	S	6	50
G 1/4"	M14x1.5	S	8	50
G 3/8"	M16x1.5	S	10	80
G 3/8"	M18x1.5	S	12	80
G 1/2"	M22x1.5	S	16	105
G 3/4"	M27x2	S	20	220
G 1"	M33x2	S	25	370
G 1.1/4"	M42x2	S	30	500
G 1.1/2"	M48x2	S	38	600

■ FITTING ASSEMBLY

Thread diameter		TIGHTENING TORQUES (0+10%) JOINTS	
		A	B
inc.	mm	Nm	Nm
G 1/8"	M10x1	25	12
	M12x1.5	30	18
G 1/4"		40	18
	M14x1.5	50	20
	M16x1.5	60	35
	M18x1.5	80	50
G 3/8"		95	40
	M20x1.5	140	60
G 1/2"	M22x1.5	140	75
	M26x1.5	220	85
G 3/4"		250	110
	M27x2	250	100
G 1"		400	190
	M33x2	400	150
G 1.1/4"		600	240
	M42x2	600	260
G 1.1/2"		800	300
	M48x2	800	350



A



B

A Male face
Mechanical seal or copper washer

B Male face
Soft seal with O-ring

A.10 LOCKING MATERIALS

THREADLOCKERS

Product	*APPLICATION*	*Characteristics Temp. °C*	*Thread*	*Locking speed*	*Resistance*
Loctite 290	Thread locking	to 150°	M 12	Rapid	Medium
Loctite 222	Thread locking	to 150°	M 20	Moderate	Low
Loctite 243	Thread locking	to 150°	M 20	Rapid	Medium
Loctite 262	Thread locking	to 150°	M 20	Moderate	High
Loctite 270	Thread locking	to 150°	M 20	Moderate	Very high
Loctite 277	Thread locking	to 150°	M 36	Slow	High
Loctite 272	Thread locking	to 200°	M 36	Slow	High

THREAD SEALANT *For hermetic sealing. Non suitable for thermoplastic materials*

Product	*APPLICATION*	*Characteristics max °C*	*Thread max*	*type*	*Locking speed*	*Disassembly difficulty*
Loctite 511	Fitting sealant	150°	M80	Con./Cyl.	Rapid	Low
Loctite 542	Fitting sealant	150°	M36	Con./Cyl.	Rapid	Moderate
Loctite 545	Fitting sealant	150°	M36	Con./Con.	Moderate	Low
Loctite 565	Fitting sealant	150°	M80	Con./Cyl.	Instantaneous	Low
Loctite 572	Fitting sealant	150°	M80	Con./Cyl.	Moderate	Low
Loctite 577	Fitting sealant	150°	M80	Con./Cyl.	Rapid	Moderate

GASKETS *Total sealing in 24-72 hours*

Product	*APPLICATION*	*Characteristics max °C*	*Play max mm*	*Formation time*	*Resistance to fluids*
Loctite 518	Formed-in-place gasket	150°	0,5	Moderate	Excellent
Loctite 509	Formed-in-place gasket	150°	0,2	Moderate	Excellent
Loctite 573	Formed-in-place gasket	150°	0,2	Slow	Excellent
Loctite 574	Formed-in-place gasket	150°	0,5	Rapid	Excellent
Loctite 510	Formed-in-place gasket	200°	0,2	Moderate	Excellent
Loctite 5699	Formed-in-place gasket	200°	6,0	Rapid	Excellent
Loctite 5999	Formed-in-place gasket	200°	6,0	Instantaneous	Excellent
Loctite 5910	Formed-in-place gasket	200°	6,0	Rapid	Excellent
Loctite 5900	Formed-in-place gasket	200°	6,0	Instantaneous	Excellent
Loctite 5920	Formed-in-place gasket	250°	M 36	Slow	Good

A.11 HOISTING INSTRUCTIONS

DANGER

All parts weighing more than 25 kg MUST COMPULSORILY be handled with suitable hoisting means.
In the Disassembly and Assembly section there is a clear indication of the weight of the part to handle, while chapter A.12 contains a summary table with the weight of the single components.

Before removing parts of the machine, make sure that:
- all fixing bolts have been removed
- all hydraulic and electrical parts have been disconnected
- the part to be removed is not blocked.

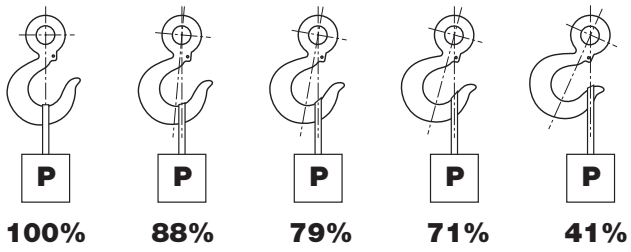
STRANDED ROPES

- Use ropes or other hoisting accessories suitable to the weight of the part to be handled. For ropes, refer to the following table:

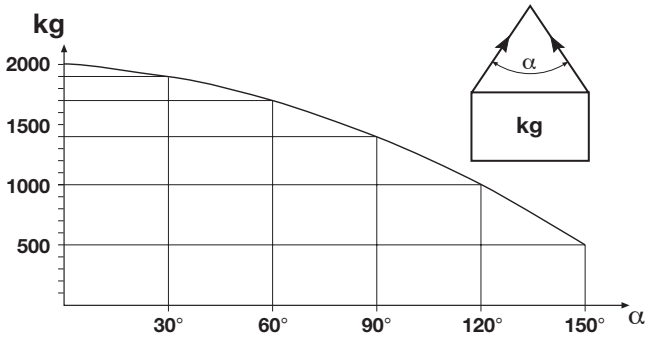
STRANDED ROPES	
Rope diameter mm	Max admissible load kg
10	1000
11.2	1400
12.5	1600
14	2200
16	2800
18	3600
20	4400
22.4	5600
30	10000
40	18000
50	28000
60	40000

The value of the admissible load has been considered as equal to 1/6 the rope breaking load.

- Attach the load to the natural seat of the hook. Attacching a load to an end can cause the load to fall down during raising and result in serious injury.



- Do not attach a heavy load to ropes forming a wide suspension angle. The total capacity of the ropes reduces proportionally to the amplitude of the angle as shown in the following chart.



A.12 WEIGHT LIST OF THE MAIN PARTS

Part	Weight kg Girolift 3514	Girolift 3518	Girolift 5022
❑ Complete cab	450	450	450
❑ Base frame without turret	1470	1470	2548
❑ Turret	1080	1080	2498
❑ 1st boom element	710	970	1420
❑ 2nd boom element	430	740	995
❑ 3rd boom element	490	480	655
❑ 4th boom element	-	500	740
❑ Complete boom	2300	3588	5600
❑ Oil-fuel tank	204	204	197
❑ Boom raising cylinder	278	283	398
❑ 2nd telescope extension cylinder	235	328	328
❑ 3rd telescope extension cylinder	146	-	-
❑ Fork balance cylinder	40	40	36
❑ Fork movement cylinderc	80	100	108
❑ Outrigger up/down cylinder	51,5	51,5	46
❑ Outrigger extension cylinder	-	-	32
❑ Front axle	700	700	694
❑ Rear axle	700	700	412
❑ Drive pump	63	63	80
❑ Service pump	35	35	45
❑ Perkins engine	550	550	600
❑ Distributor	30	30	30
❑ Gearbox	73	73	90
❑ Hydraulic joint	100	100	100
❑ Cooler	35	35	35
❑ Complete wheel (n° 1)	120	120	140
❑ Wheel rim (n° 1)	40	40	50
❑ Stabilising foot (n° 1)	50	50	18
❑ Turret rotation reduction gear	69	69	72
❑ Turret slewring	132	132	132

DANGER

All parts weighing more than 25 kg MUST COMPULSORILY be handled with suitable hoisting means.

A.13 ADVICE TO RENEW FLEXIBLE HOSES

PROTECT THE ENVIRONMENT

Before disconnecting the hydraulic piping, place containers of suitable size underneath to prevent oil spillage.

IMPORTANT

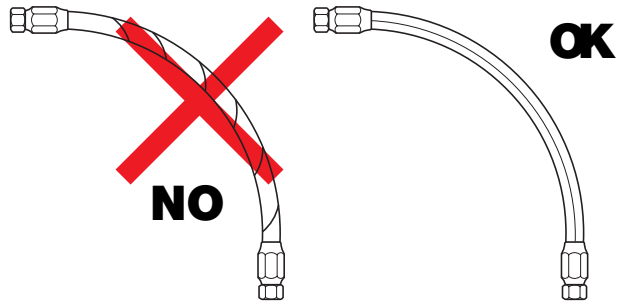
Plug all disconnected parts to prevent dust or impurities from entering the circuit. They can cause serious damage.

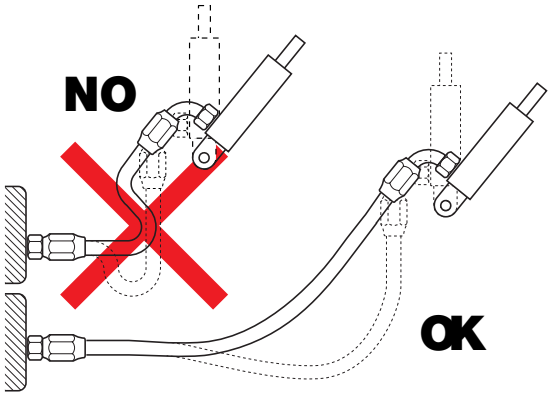
DANGER

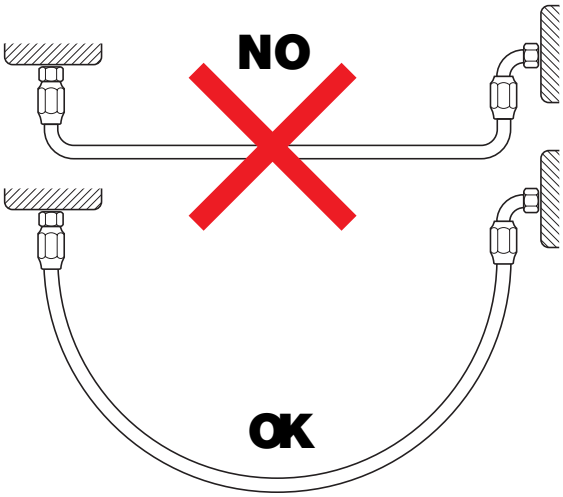
Before disconnecting the hydraulic piping, ensure there is no pressure in the line. In case, release the pressure by operating the control levers with the engine stopped.
In any case, disconnect the hydraulic piping with extreme caution and always wear suitable personal protection equipment -e.g. goggles, gloves, facial screen, etc.
Wrap up the end of the pipe to be disconnected with some rags and slowly loosen the pipe connector so that air comes out as slow as possible.

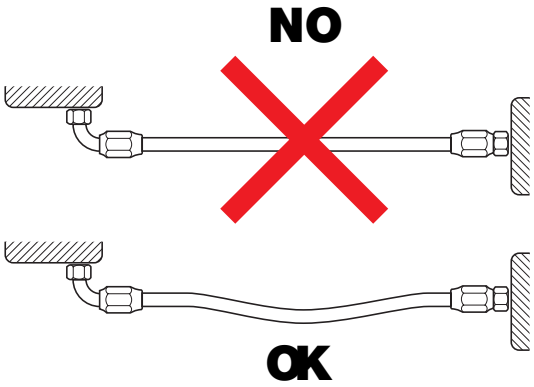
1. Before disconnecting or refitting a flexible hose, carefully clean the area all around.
2. Blow some compressed air to remove any impurity.
3. For an easier renewal of the hoses, whose run is not clearly visible, proceed as follows:
   - disconnect the hose to be replaced from both sides
   - tie a cord to one end of the hose
   - remove the hose pulling the cord until it comes out completely
   - untie the cord and tie it to the new hose
   - pull the cord from the other side to refit the hose until reaching the connecting point to the line.

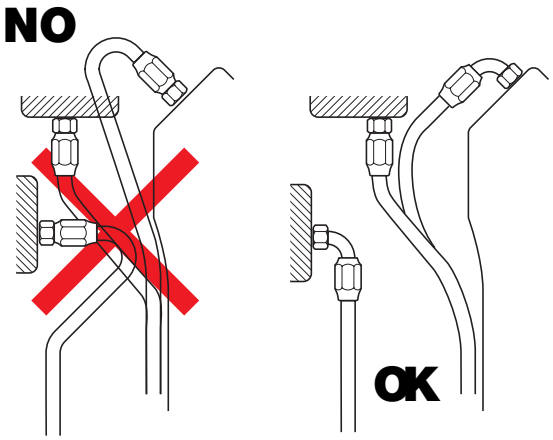
Useful advice for mounting flexible hoses:











A.14 REPAIR INTERVENTIONS WELDS AND WELD MATERIALS

ATTENTION

Before any weld on the machine, disconnect and isolate the battery cables and all the connections to positive and negative poles reaching the alternator. The ground cable of the machine must be directly connected to a metal part to be welded.

IMPORTANT

According to following specifications, repairable cracks are those with a maximum development of 100 mm which have not altered the normal deformability of the structure (crack edges open).

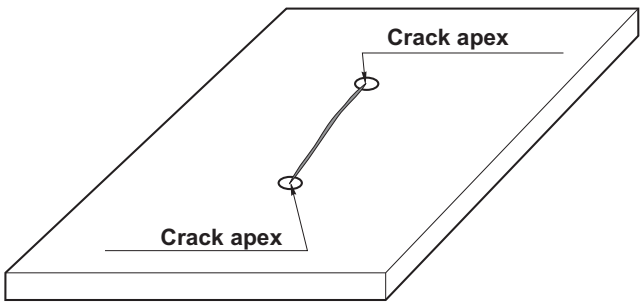
OPERATION PROCEDURE

1 Clean the area where the crack has been found thoroughly.

Remove paint, concrete or grease residues from the area.

To this end use traditional thinners.

2 Using a liquid penetrant (or another non-destructive method) inspect the areas to find the apices of the crack.



ATTENTION

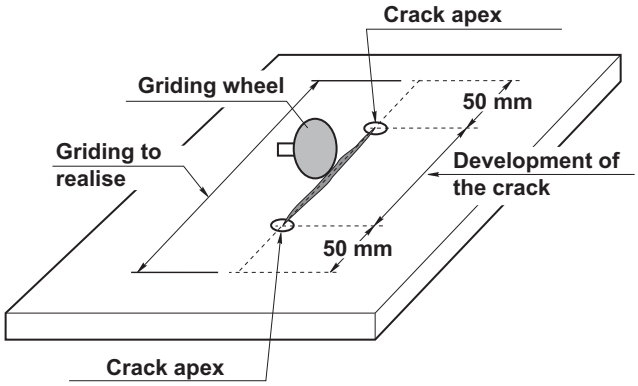
Warning: the visible apex of the crack is not the real apex. This is usually under the material skin and needs non-destructive methods to be found (liquid penetrants, magnetoscopy or ultrasounds).

IMPORTANT

It is also necessary that the operator charged of the checks is authorised to use the inspection instrumentation in accordance to UNI EN 473 standard or equivalent.

3 After inspection and once found the position of the two apices of the crack, grind the material for the entire development of the crack - see **2**.

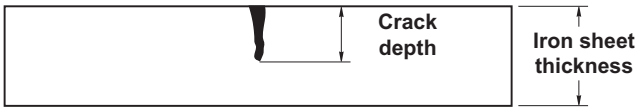
Grind 50 mm more than the development of the crack on both sides.



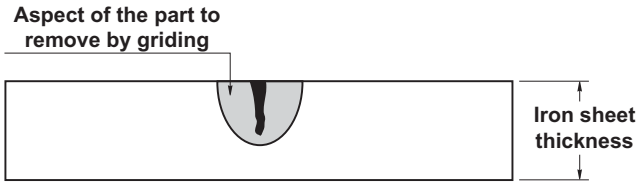
4 Check the ground area with a liquid penetrant - see **3**.

The result of this check can provide useful information on the depth of the crack:

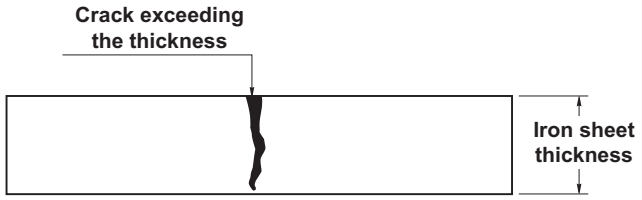
Type A *The crack does not exceed to the thickness of the iron sheet*



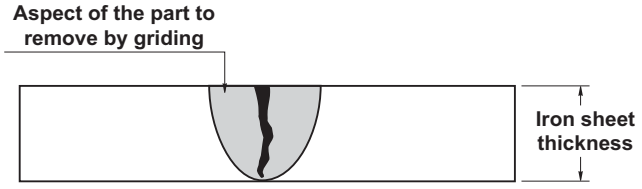
In this case, further grind the crack and check again with a liquid penetrant until the crack has been removed.



Type B *The crack exceeds the thickness of the iron sheet*



In this case grind in depth without removing too much material as this would complicate subsequent welding.



5 Grind as explained below:

a- Use electrodes compatible with the structure material.

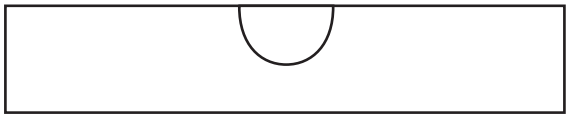
b- Create a seam with low voltage (V) and current (A) parameters so as not to alter the structure in the vicinity of the weld. The materials used for the structural elements of the machine have a fine grain structure which, if subject to high thermal loads, can result in a coarsening and, consequently, in a decay of the mechanical characteristics of the base material.

IMPORTANT

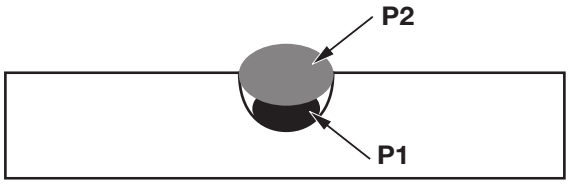
It is better to foresee an multi-pass welding with moderate parameters rather than a weld with less passes and high parameters.

Preparation after grinding

Crack not exceeding the thickness



WELDING PROCEDURE

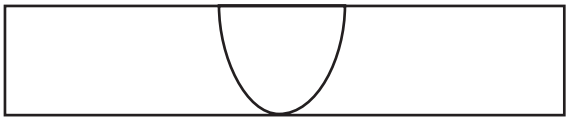


P1: Bottom pass

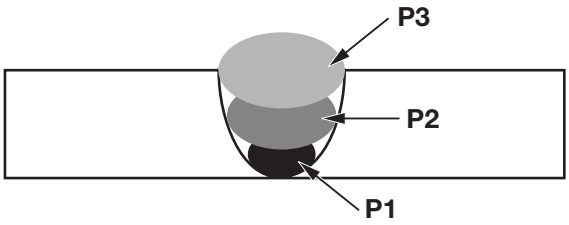
P2: Filling pass

PRE-HEAT AT 120°
BEFORE PASS P1

Preparation after grinding
Crack exceeding the thickness



WELDING PROCEDURE



P1: Pass at the root
P2: Intermediate pass
P3: Filling pass

PRE-HEAT AT 120°
BEFORE PASS P1

IMPORTANT

For reduced thickness values (3-5 mm) the operation can be carried out in two passes eliminated pass P2.

c- The welder must be qualified and use specific materials for the structural elements in accordance with UNI EN 287 or equivalent.

6 After cooling of the welded parts, do a final check with a liquid penetrant to be sure no surface cuts or cracks have been produced during welding.

Do a magnetoscopic or ultrasound inspection to be sure there are no internal defects in the material.

If, during this last check, defects in the seams or other defects such as burns or cuts are found:

a- Grind away the defect.
b- Check again to be sure the defect has been eliminated with a non-destructive test.
c- Re-weld the defective section as indicated in point **5**.

A.15 WELD MATERIAL

For material S690 (CNR 10029-87)

Wire ø 1.2
Class ER100S-G AWS A5.28-79
Protection gas
80% Argon mixture
20% CO_2

IMPORTANT

To weld couplings S690-S690 or S690 with other material, pre-heat:

- **Recommended**: for thickness up to 7.5 mm at 100-120°C
- **Compulsory**: for thickness from 8 mm and more at 150°C

For material S490 (CNR 10029-87)

Wire ø 1.2
Class DIN 8559-84 SG3
Protection gas
80% Argon mixture
20% CO_2

A.16 CHECKS WITH LIQUID PENETRANTS

Procedure to check welds or material cracks:

1. Thoroughly clean the part to be checked making sure there are no fluids or anything else which can prevent a good penetration of the fluid; to this end, use sand paper, grinding wheel, dry rags or paper.
2. Use a red liquid and let it dry for about 5 ÷ 8 minutes
3. Thoroughly clean with a rag and some water or a sponge, then dry with a clean and dry rag
4. Spray a white liquid (detector) onto the part to be checked and let dry for about 5 ÷ 6 minutes. If after this treatment the red colour comes to surface decidedly there is a crack. Pay extreme attention as, in presence of a deep but close crack, the red colour could hardly come to surface.
5. Pay attention to the area thermally altered by welding since cracks usually appear in this area and not in the middle of the weld.
6. This check can detect any surface crack.

A.17 CHECKS WITH MAGNETOSCOPE

Scope:

The checks with magnescope allow to find surface and sub-surface cracks down to 2 mm to guarantee the integrity of the structure

Equipment:

Magnetoscope



Detection method:

Black magnetic powder diluted in water. Spray the mixture onto the part to be checked during the magnetisation of the examined part.

Preparation of the surface:

The surface must be as regular as possible - e.g. absence of weld drops. The check can also be done on painted surfaces provided they are uniform.

Magnetisation mode:

The magnetisation of the area to be examined shall be done so that the lines of the magnetic field are perpendicular to the profile (course) of the defect.

Reading of the magnetoscopic image:

After magnetising the part and applied the detecting liquid, examine the area to find any indications. Indications of presence of a crack can be found on the edges and in the crack fissure with accumulation of magnetic particles.

IMPORTANT

Note all the defects with their position, length and type of indication on the drawing of the examined part to evaluate the damage.

A.18 REFILLING AND PRODUCT SPECIFICATIONS

Part	*Product*	*Girolift 3514 Girolift 3518 Capacity (litres)*	*Girolift 5022 Capacity (litres)*
Diesel engine	Shell Myrina D SAE 15W-40	10.5	13.5
Engine cooling system	Caltex Polar Antifreeze (ASTM D3306-74)	30	35
Fuel tank	Diesel fuel	125	125
Oil tank	Shell Tellus T46 DENISON HF-1	200	200
Gearbox	Shell Super Gear 90 LS SAE 90W	2.7	2.2
Differential gears	Shell Super Gear 90 LS SAE 90W	8.5	7 + 7
Wheel reduction gears	Shell Super Gear 90 LS SAE 90W	0.6 + 0.6	1.5 + 1.5
Turret rotation reduction gear	Shell Super Gear 90 LS SAE 90W	2.8	2.8

Section B
SAFETY INFORMATION

SECTION INDEX

B.01 General considerations ..... page 2
B.02 Requisites of the servicemen 2
B.02-1 Personal protective equipment 3
B.03 General safety precautions 3
B.03-1 Working area 3
B.03-2 Precautions during work 3

B.01 GENERAL CONSIDERATIONS

Most accidents occurring while working, servicing or maintaining operation machines, are caused by not complying with the basic safety precautions. Therefore, it is necessary to pay steady attention to the potential hazards and the effects that may come of operations carried out on the machine.

IMPORTANT

***If you recognise hazardous situations, you can prevent accidents*!**

For instance, this handbook makes use of special ***safety symbols*** to highlight potentially hazardous situations.

ATTENTION

The instructions given in this handbook are the ones established by TEREXLIFT. They do not exclude other safe and most convenient ways for the machine commissioning, operation and maintenance that take into account the available spaces and means.

If you decide to follow instructions other than those given in this manual, you must:

- be sure that the operations you are going to carry out are not explicitly forbidden;
- be sure that the methods are safe and in compliance with the indications given in this section;
- be sure that the methods cannot damage the machine directly or indirectly or make it unsafe;
- contact TEREXLIFT Assistance Service for any suggestion and the necessary written permission.

IMPORTANT

Do not hesitate to pose questions if you are in doubt! Contact TEREXLIFT: the assistance service is at your disposal. Addresses, phone and fax numbers are given in the cover and in the title-page of this manual.

B.02 REQUISITES OF THE SERVICEMEN

The operators who use the machine regularly or occasionally (e.g. for maintenance or transport) shall have the following requisites:

health:
before and during any operation, operators shall never take alcoholic beverages, medicines or other substances that may alter their psycho-physical conditions and, consequently, their working abilities.

physical:
good eyesight, acute hearing, good co-ordination and ability to carry out all required operations in a safe way, according to the instructions of this manual.

mental:
ability to understand and apply the rules, regulations and safety precautions. They shall be careful and sensible for their own as well as for the others' safety and shall desire to carry out the work correctly and in a responsible way.

emotional:
they shall keep calm and always be able to evaluate their own physical and mental conditions.

training:
they shall read and familiarise with this handbook, its enclosed graphs and diagrams, the identification and hazard warning plates. They shall be skilled and trained about the machine use.

IMPORTANT

It is recommended to take part in at least one technical training course organised by TEREXLIFT Assistance Office.

IMPORTANT

Ordinary and extraordinary maintenance of the machineare quite complex from a technical point of view and should be performed by an authoirsed service centre.

B.02-1 PERSONAL PROTECTIVE EQUIPMENT

During work, but especially when maintaining or repairing the machine, operators must wear suitable protective clothing and equipment:

- Overalls or any other comfortable garments. Operators should wear neither clothes with large sleeves nor objects that can get stuck in moving parts of the machine
- Protective helmet when working under or in the vicinity of suspended load
- Protective gloves
- Working shoes
- Breathing set (or dust mask)
- Ear-protectors or equivalent equipment
- Goggles or facial screen.

IMPORTANT

Use only type-approved protective equipment in good condition.

B.03 SAFETY PRECAUTIONS

DANGER

Read and understand the following safety instructions before servicing the machine.
The following list contains safety rules which must absolutely be obeyed to prevent accidents and injuries.

B.03-1 WORKING AREA

- Make sure the area all around the machine is safe. Always be aware of potential risks.
- During work, keep the working area in order. Never leave objects scattered: they could hinder the machine movements and represent a danger for personnel.

B.03-2 PRECAUTIONS DURING WORK

- Do not walk or stop under raised loads or machine parts supported by hydraulic cylinders or ropes only.
- Keep the machine handholds and access steps always clean from oil, grease or dirt to prevent falls or slips.
- When entering/leaving the cab or other raised parts, always face the machine; never turn the back.
- When carrying out operations at hazardous heights (over **3 meters** from the ground), always use type-approved safety belts or fall preventing devices.
- Do not enter/leave the machine when it is running.
- Before servicing the engine, let its parts cool down.
- Do not leave the driving place when the machine is running.
- Neither stop nor carry out interventions under or between the machine wheels when engine is running. When maintenance in this area is needed, stop the engine, engage the parking brake and chock the wheels to prevent accidental movements.
- Do not carry out maintenance or repair works without a sufficient lighting.
- When using the machine lights, the beam should be oriented in order not to blind the personnel at work.

- Before applying voltage to electric cables or components, ensure they are properly connected and efficient.
- Do not carry out interventions on electric components with voltage over 48V.
- Do not connect wet plugs or sockets.
- Signs and stickers shall never be removed, hidden or become unreadable.
- Except for maintenance purposes, do not remove safety devices, covers, guards,. Should their removal be necessary, stop the engine, remove them with the greatest care and always remember to refit them before starting the engine and using the machine again.
- Aleays stop the engine and disconnect the batteries before maintenance or service.
- Do not lubricate, clean or adjust moving parts.
- Do not carry out operations manually when specific tools are provided for this purpose.
- Absolutely avoid to use tools in bad conditions or in an improper way.
- Before carrying out operations on hydraulic lines under pressure (hydraulic oil, compressed air) and/or before disconnecting hydraulic components, ensure the relevant line has been previously depressurised and does not contain any hot fluid.

DANGER

Any intervention on the hydraulic or pneumatic circuit must be carried out by authorised personnel. Before any operation on lines under pressure, release any residual pressure from the circuit.
Do not use your fingers to check for pressure leaks. Fine jets of air, oil or fuel can injure you.

- Neither smoke nor use open flames if there is a risk of fire or close to fuel, oil or batteries.
- Do not leave fuel cans or bottles in unsuitable places.
- Do not empty catalytic mufflers or other vessels containing burning materials without taking the necessary precautions.
- Carefully handle all flammable or dangerous substances.
- After any maintenance or repair work, make sure that no tool, cloth or other object has been left within compartments with moving parts or in which suction and cooling air circulates.
- Never give orders to several people at a ime. Instructions and signs must be given by one person only.
- Always pay the due attention to the instructions given by the foreman.
- Never distract the operator during working phases or crucial manoeuvres.
- Do not call an operator suddenly, if unnecessary.
- Do not frighten an operator or throw objects by no means.
- After work, never leave the machine under potentially dangerous conditions.

PROTECT THE ENVIRONMENT

Treatment and disposal of used oils is subject to federal, national and local laws and regulations. Collect and deliver these wastes to authorised centres.

- Use the assistance of a second person to handle loads weighing 30 to 50 kg.
- For loads over 50 kg, the use of special hoisting equipment in good condition and equipped as per enforced regulations is mandatory.

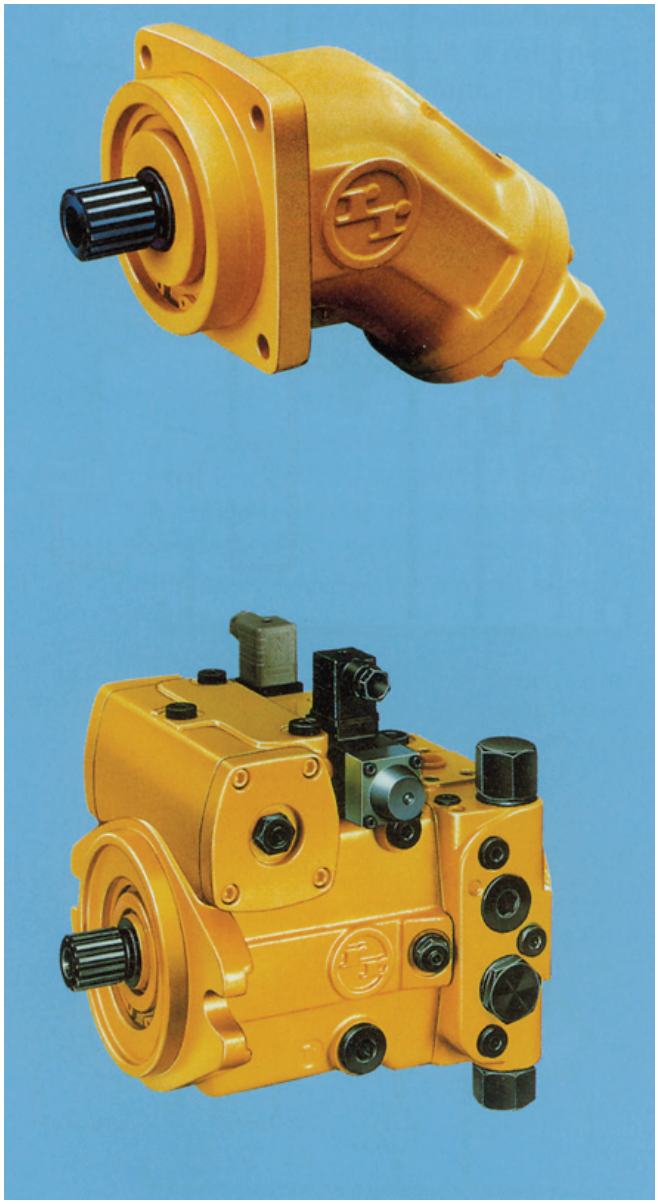
Section C
TECHNICAL OPERATING DATA

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Axial Piston Units



1 Basic Principles

1.1 Types of Hydraulic Circuit

1.1.1 Open circuit
1.1.2 Closed Circuit

2 Principles of Function

2.1 Bent-Axis

2.1.1 Bent-Axis Principle
2.1.2 Description of Function
2.1.3 Principles of Calculation
2.1.4 Rotary Group Forces
2.1.5 40°-Tapered Piston, Bent-Axis Rotary Group
2.1.6 Examples of Types
2.1.7 Symbols

2.2 Swashplate

2.2.1 Swashplate Principle
2.2.2 Description of Function
2.2.3 Principles of Calculation
2.2.4 Rotary Group Forces
2.2.5 Swashplate Rotary Group
2.2.6 Examples of Types
2.2.7 Symbols

3 Components

A Selection of Typical Models from the individual Product Groups

3.1 to 3.10 Standard Models of Bent-Axis and Swashplate Design

3.11 Summary of Control Devices

1 Basic Principles

1.1 Types of Hydraulic Circuit

For the hydraulic engineer, there are three basic types of circuit to consider:

open circuit
closed circuit
semi-closed circuit

In the following we look at open and closed circuits in some detai ls. The semi-closed circuit is a mixture of these two types of circuit and is used in applications where volume compensation via prefill valves is necessary (e.g. when using a single rod cylinder).

1.1.1 Open Circuit

Open circuit normally means the case where the pump suction line leads below a fluid level whose surface is **open** to atmospheric pressure. Maintenance of a pressure balance between the air in the hydraulic tank and the air in the atmosphere guarantees good pump suction characteristics. There must be no resistance in the inlet line which might cause pressure to drop below the so-called suction head/suction limit.

Axial piston units are self-priming; in certain special cases, however, a low pressure is applied to the suction side.

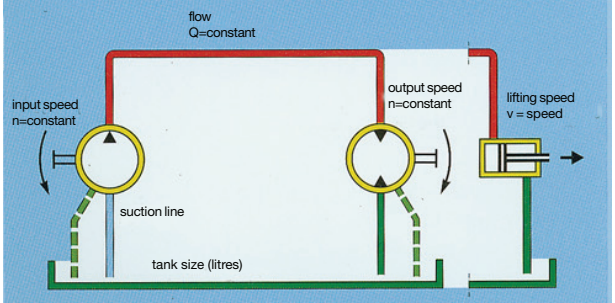
In **open** circuit hydraulic fluid is fed to the user via directional control valves and returned to the tank in the seme way.

Typical features of the **open** circuit are:

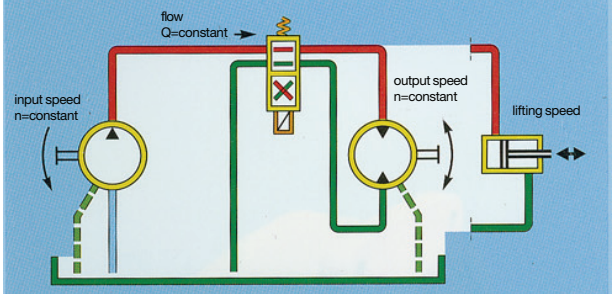
- suction lines - short length, large diameter
- directional control valves - flow-related sizes
- filter / cooler - flow-related sizes
- tank size - a multiple of the max. pump flow in litres
- pump arrangement - adjacent to or below the tank
- drive speeds - limited by the suction head
- load maintained in return by valves

The open circuit is standard in many industrial and mobile applications - from machine tools, through press drives to winches and mobile transmissions.

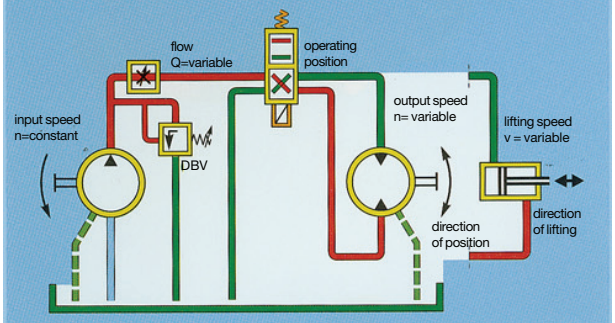
Open Circuit
The way to the complete hydraulic system:
(explanation of symbols, see page 3)



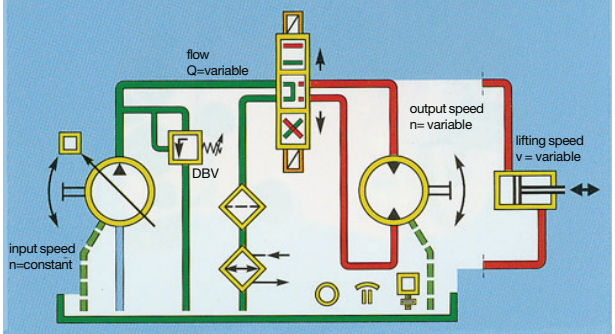
Basic system with hydraulic pump and hydraulic motor (or cylinder). **Single** direction of input, output and lift.



The directional control valve allows **reversal** of the direction of rotation or of movement at the user.



Variable output speed is achieved by installation of a flow controller for variable flow. the pressure relief valve (DBV) protects the system from overload.



Here, the fixed pump and flow controller have been replaced by a variable pump. Further valve functions have been added, e.g. free-whelling of the user. Filter, cooler and other accessories are also fitted.

1.1.2 Closed Circuit

A hydraulic system is described as **closed** when the hydraulic fluid is returned from the user direct to the pump.

There is a high pressure and a low pressure side, depending on the direction of load (take-off torque at the user).

The high pressure side is protected by pressure relief valves which unload to the low pressure side. The hydraulic fluid remains in the circuit.

Only the continuous leakage from pump and motor (dependent on operating data) must be replaced.

This fluid is normally replenished by an auxiliary pump flanged direct onto the main pump which delivers a continuous, adequate supply of fluid (boost fluid) from a small tank via a check valve into the low pressure side of the **closed** circuit. Any surplus flow of the boost pump, which operates in open circuit, is returned via a boost-pressure relief valve to the tank. The boosting of the low pressu re side en hances the pu m p-operati ng characteristics.

Typical features of the **closed** circuit for axial piston units are:

- directional control valves - small sizes for pilot operation
- filter/cooler - small sizes
- tank size - small, dimensioned to suit boost pump flow and volume of system
- speed - high limiting values through boost
- arrangement/mounting - position-flexible/optional
- drive - completely reversible through centre position
- load maintained - via the drive motor
- feedback of braking power

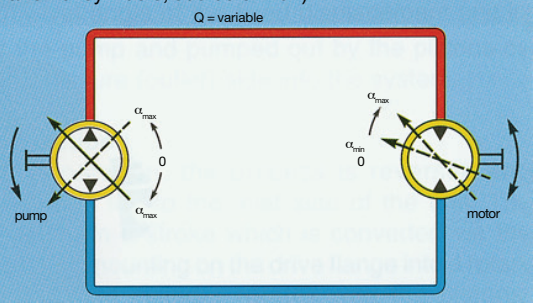
Explanation of Symbols / Colour Code for Open and Closed Circuits

red		(high) pressure line
blue		(low, boost) pressure line
blue		suction line
green		(low, boost) pressure line
blue		suction line
yellow		hydraulic components (pump, motor cylinder, valves accessories)
orange		control element (solenoids, springs)

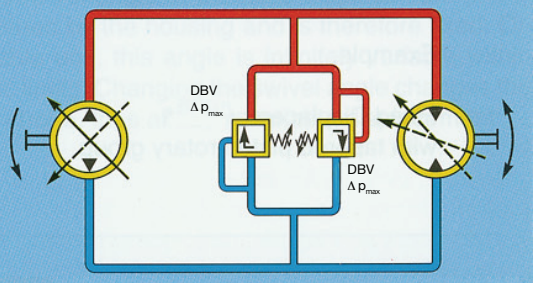
Closed Circuit

A step-by-step guide

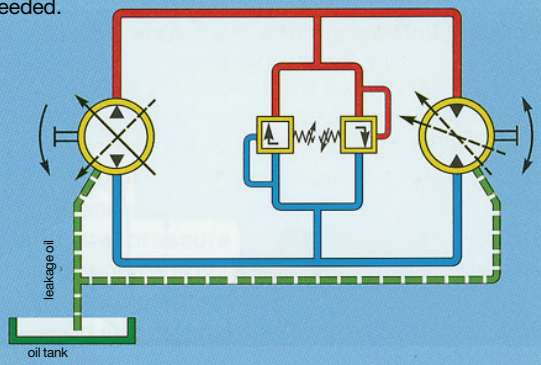
(explanation of symbols, see below left)



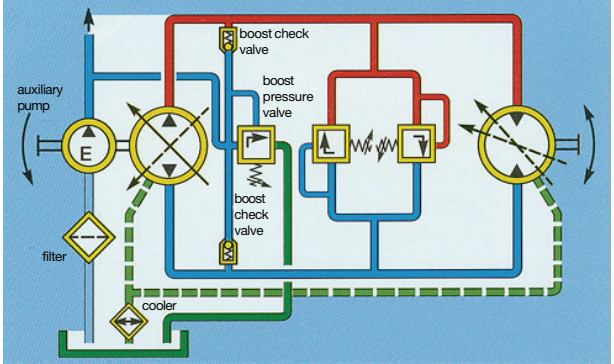
Basic system with variable pump and variable motor. Single pump input drive direction. Motor power take-off in both directions. The pump can be swivelled smoothly over centre, i.e. the direction of flow is reversible.



pressure relief valves , one each for the high and low pressure sides, prevent the maximum permissible pressure from being exceeded.



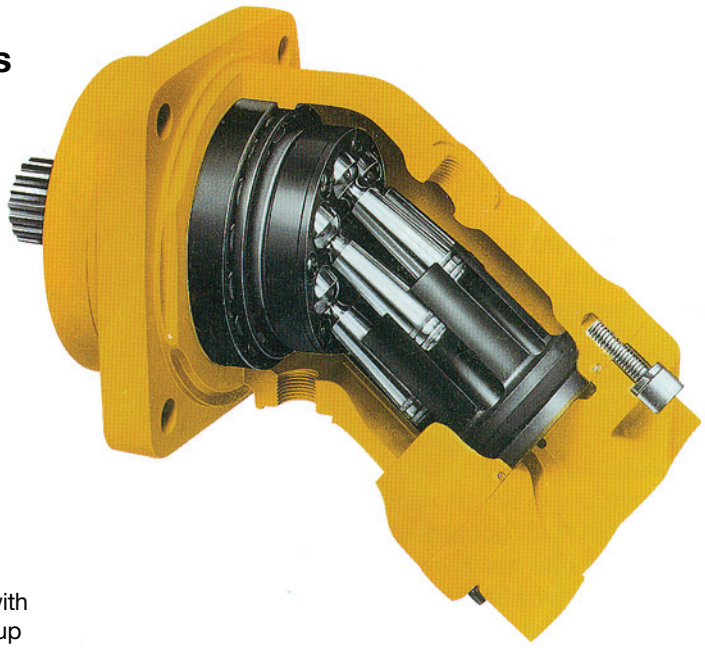
The leakage from pump and motor is led back to a small tank and must be replenished!



An auxiliary pump for replenishment of leakage oil and control of the pump. Boost check valve RV. Boost pressure relief valve DBV. Fitted filter, cooler and accessories.

2 Principles of Function

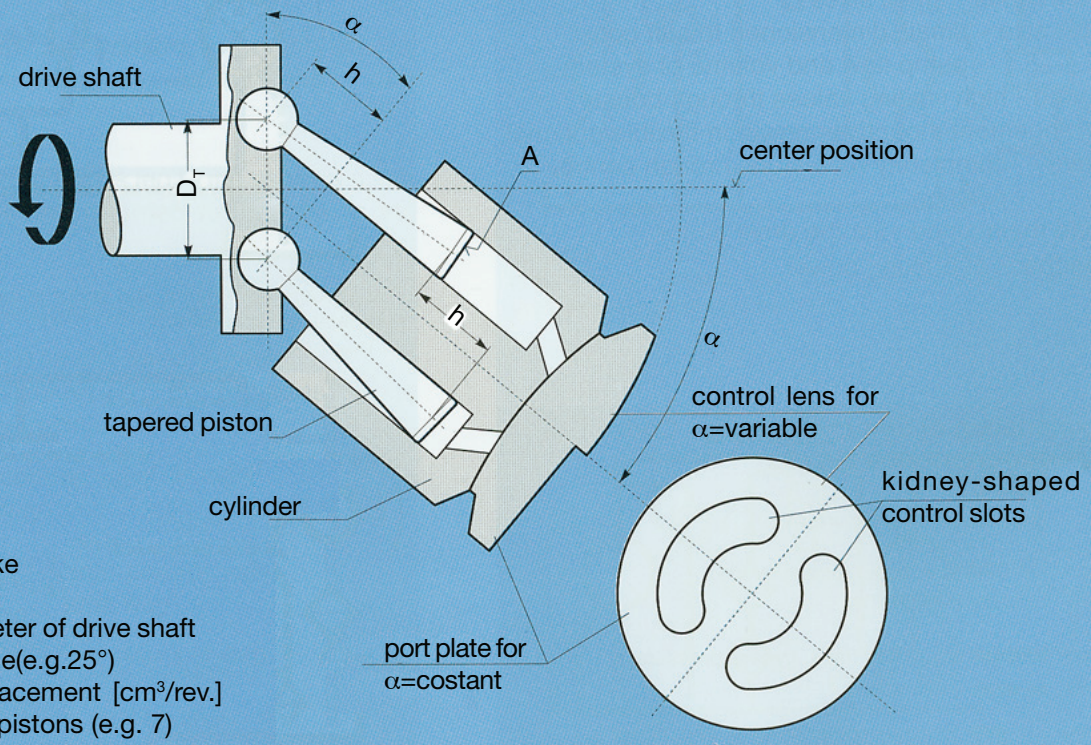
2.1 Bent Axis



Example:

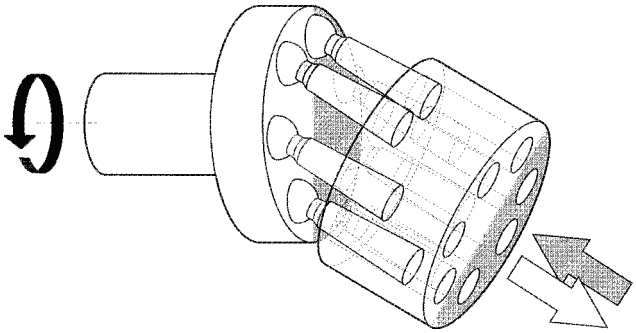
Fixed Displacement Unit with tapered piston rotary group

Schematic Diagram of a Bent-Axis Units
with fixed or variable swivel angle α



h = piston stroke
A = piston area
D_T = pitch diameter of drive shaft
α = swivel angle(e.g.25°)
V_g = geom.displacement [cm^3/rev.]
x = number of pistons (e.g. 7)
h = D_T • sin α
V_g = x•A•h
V_g = x•A•D_T•sin α

2.1.1 Bent-Axis Principle



The bent-axis rotary group is a displacement unit whose displacement pistone are arranged at an angle to the drive shaft.

Pump Function:
Through the flexible piston/piston rod arrangement, rotation of the drive shaft also causes the cylinder to rotate without the need for a Cardan coupling. The pistone execute a stroke within the cylinder bores dependent on the angle of inclination of the bent axis. The hydraulic medium is fed to the low pressure (inlet) side of the pump and pumped out by the pistone on the high pressure (outlet) side into the system.

Motor Function:

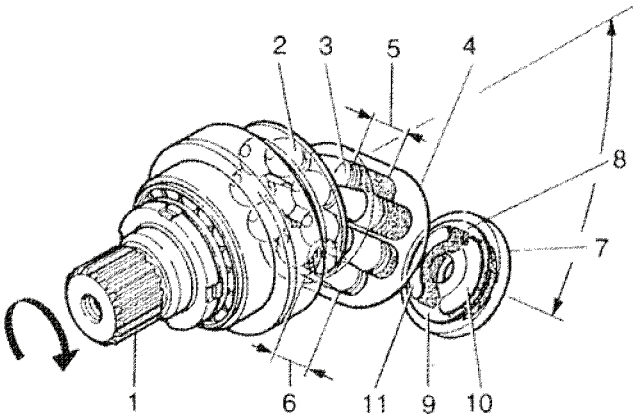
In motor operation, the process is reversed and pressure oil is fed to the inlet side of the unit. The pistone perform a stroke which is converted via the flexible piston mounting on the drive flange into a rotary movement. The cylinder rotates with the pistone, generating an output torque on the drive shaft. Oil exiting on the outlet side flows back into the system.

Swivel Angle:

The ti lt/swivel ang le of the fixed d isplacement u n it is determined by the housing and is therefore fixed. On a variable unit, this angle is infinitely variable within specific limite. Changing the swivel angle changes the piston stroke, thus allowing variable displacement.

2.1.2 Description of Function

Example: Fixed Displacement Unit



1 = drive shaft
2 = piston
3 = piston area
4 = cylinder
5 = pressure stroke
6 = suction stroke
7 = port piate
8 = upperdead pointOT
9 = lower dead point UT
10 =control slot, pressure side (for direction of rotation shown)
11 = control slot, suction side (for direction of rotation shown)

Description

The axial piston units of bent-axis design with fixed or variable displacement can operate as hydraulic pumps or hydraulic motore.

When used as a pump, the flow is proportional to the input speed and the swivel angle. If the unit is used as a motor, the output speed is proportional to the flow through the unit. The input (pump) or output (motor) torque increases with the pressure drop between the high and low pressure sides. In pump operation, mechanical energy is converted into hydrostatic power, while in motor operation, inversely, hydrostatic power is converted into mechanical energy. By adjusting the swivel angle of a variable pump or motor it is possible to vary the displacement and thus the flow.

Function
... as a pump in open circuit:

On rotation of the drive shaft, the cylinder is caused to rotate by seven pistone flexibly mounted in a circular arrangement on the drive shaft. The cylinder slides on the spherical port piate which has two kidney-shaped control slots. As the cylinder rotates, each of the seven pistone moves from the upper dead point OT to the lower dead point UT and back, thereby executing a stroke dependent on the swivel angle. The piston movement from the lower to the upper dead point in the cylinder bore produces the suction stroke, whereby a quantity of oil relative to the piston area and piston stroke is sucked in through the control slot on the suction side.

On further rotation of the drive shaft, as the pistone move from the upper to the lower dead point, oil is pushed out through the other control slot (pressure side). The pistone are held against the drive shaft by hydraulic pressure.

... as a motor:

The motor function is the reverse of the pump function. In this case, hydraulic oil is fed via the connection piate through a control slot to the cylinder bores. 3 or 4 cylinder bores are located over the pressure side control slot, 4 or 3 over the return-line side, with one bore possibly being covered by part of the port piate directly at the dead point. The force generated as a product of pressure and piston area acts on the drive shaft to produce the output torque.

Control Function: (with control devices fitted)
The swivel angle of the bent axis can be changed, for example, mechanically via an adjusting spinale or hydraulically via an adjusting piston. The hydraulic section of the rotary group cylinder complete with control lens (port piate) is swivelled out and, depending on the type of circuit and function, is held in the zero or starting position by either mechanical or hydraulic means. Increasing the swivel angle increases displacement and torque; decreasing the angle gives a corresponding reduction in these values. If the swivel angle is zero, the displacement is also zero.

Mechanical or hydraulic control devices are normally fitted, which can themselves be controlled and regulated by mechanical, hydraulic or electrical means. Well-known types of control are: handwheel contro!, electro-proportional contro!, constant horsepower contro!.

General
Because of the bent-axis design, in both pump and motor operation, the torque is generated direct at the drive shaft. The radiai loading of the pistone on the cylinder is very low, giving low wear, high efficiency and good starting torque. The spherical design of the port piate means a torque-free cylinder bearing since all forces acting on the cylinder pass through one point. Axial movement caused by elastic deformation does not increase the leakage losses between cylinder and port piate. When idling and during the start-tip process, the cylinder is held against the port piate by the builtin cup springs. As pressure increases, hydraulic forces balance the cylinder so that, even with high loading on the control face between cylinder and port piate, a permanent oil film is maintained and leakage is kept to a minimum. Mounted on the drive shaft is the bearing set which absorbs axial and radiai forces. External sealing of the rotary group is by means of radiai seal and O-rings. A retaining ring holds the complete rotary group in the housing.

2.1.3 Principles of Calculation

Calculating pump size

	Fixed displacement bent-axis pump	Variable displacement bent-axis pump
Flow	$Q=\frac{V_g \bullet n \bullet \eta_{vol}}{1000}$ (l/min)	$Q=\frac{V_g\ max \bullet n \bullet \sin\alpha \bullet \eta_{vol}}{1000 \bullet \sin\alpha_{max}}$ (l/min)
Drive speed	$n=\frac{Q \bullet 1000}{V_g \bullet \eta_{vol}}$ (rpm)	$n=\frac{Q \bullet 1000 \bullet \sin\alpha_{max}}{V_{g\ max} \bullet \eta_{vol} \bullet \sin\alpha}$ (rpm)
Drive torque	$M=\frac{V_g \bullet \Delta p}{20\pi \bullet \eta_{mh}} = \frac{1{,}59 \bullet V_g \bullet \Delta p}{100 \bullet \eta_{mh}}$ (Nm)	$M=\frac{V_{g\ max} \bullet \Delta p \bullet \sin\alpha}{20\pi \bullet \eta_{mh} \bullet \sin\alpha_{max}} = \frac{1{,}59 \bullet V_{g\ max} \bullet \Delta p \bullet \sin\alpha}{100 \bullet \eta_{mh} \bullet \sin\alpha_{max}}$ (Nm)
Drive power	$P=\frac{2\pi \bullet M \bullet n}{60000} = \frac{M \bullet n}{9549}$ (kW) $P=\frac{Q \bullet \Delta p}{600 \bullet \eta_{vol} \bullet \eta_{mh}} = \frac{Q \bullet \Delta p}{600 \bullet \eta_t}$ (kW)	$P=\frac{2\pi \bullet M \bullet n}{60000} = \frac{M \bullet n}{9549}$ (kW) $P=\frac{Q \bullet \Delta p}{600 \bullet \eta_{vol} \bullet \eta_{mh}} = \frac{Q \bullet \Delta p}{600 \bullet \eta_t}$ (kW)

Where:

Q	= flow	(l/min)	α_{max}	= max. swivel angle (varies according to design)
M	= drive torque	(Nm)	α	= set swivel angle (between 0 and α_{max})
P	= drive power	(kW)	η_{vol}	= volumetrie efficiency
V_g	= geometrie displacement per rev.	(cm3)	η_{mh}	= mechanical - hydraulic efficiency
$V_{g\ max}$	= max. geom. displacement per rev.	(cm3)	η_t	= overall efficiency ($\eta_t = \eta_{vol} \bullet \eta_{mh}$)
n	= speed	(rpm)	Δp	= differential pressure (bar)

Calculating motor size		
	Fixed displacement bent-axis pump	**Variable displacement bent-axis pump**
Consumption (Flow)	$Q=\frac{V_g \bullet n}{1000 \bullet \eta_{vol}}$ (l/min)	$Q=\frac{V_g\ max \bullet n \bullet \sin\alpha}{1000 \bullet \sin\alpha_{max} \bullet \eta_{vol}}$ (l/min)
Drive speed	$n=\frac{Q \bullet 1000 \bullet \eta_{vol}}{V_g}$ (rpm)	$n=\frac{Q \bullet 1000 \bullet \eta_{vol} \bullet \sin\alpha_{max}}{V_{g\ max} \bullet \sin\alpha}$ (rpm)
Drive torque	$M=\frac{V_g \bullet \Delta p \bullet \eta_{mh}}{20\pi}=\frac{1{,}59 \bullet V_g \bullet \Delta p \bullet \eta_{mh}}{100}$ (Nm)	$M=\frac{V_{g\ max} \bullet \Delta p \bullet \sin\alpha \bullet \eta_{mh}}{20\pi \bullet \sin\alpha_{max}}=\frac{1{,}59 \bullet V_{g\ max} \bullet \Delta p \bullet \sin\alpha \bullet \eta_{mh}}{100 \bullet \sin\alpha_{max}}$ (Nm)
Drive power	$P=\frac{2\pi \bullet M \bullet n}{60000}=\frac{M \bullet n}{9549}$ (kW) $P=\frac{Q \bullet \Delta p}{600} \bullet \eta_{vol} \bullet \eta_{mh}=\frac{Q \bullet \Delta p \bullet \eta_t}{600}$ (kW)	$P=\frac{2\pi \bullet M \bullet n}{60000}=\frac{M \bullet n}{9549}$ (kW) $P=\frac{Q \bullet \Delta p}{600} \bullet \eta_{vol} \bullet \eta_m=\frac{Q \bullet \Delta p \bullet \eta_t}{600}$ (kW)

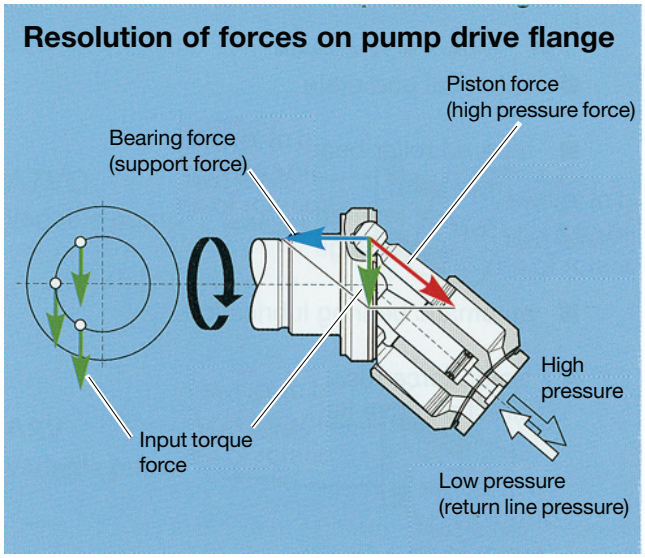
Where:

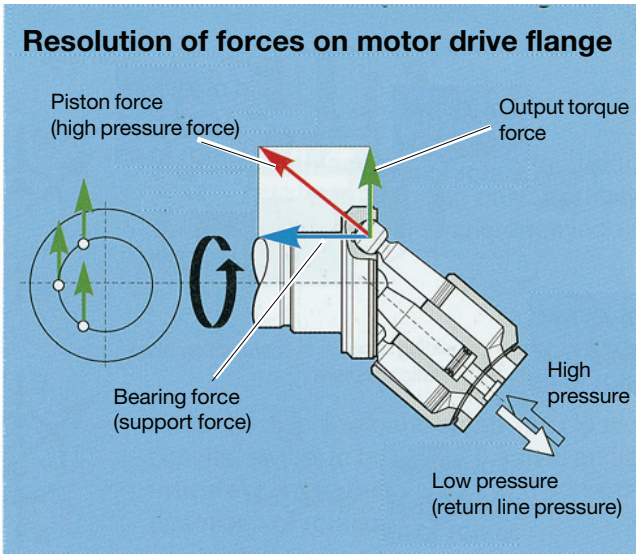
Q	=	consumption (flow) (l/min)	α_{max}	=	max. swivel angle (varies according to design)
M	=	output torque (Nm)	α	=	set swivel angle (between 0 and α_{max})
P	=	output power (kW)	η_{vol}	=	volumetrie efficiency
V_g	=	geometrie displacement per rev. (cm3)	η_{mh}	=	mechanical - hydraulic efficiency
$V_{g\ max}$	=	max. geom. displacement per rev. (cm3)	η_t	=	overall efficiency ($\eta_t = \eta_{vol} \bullet \eta_{mh}$)
n	=	speed (rpm)	Δp	=	differential pressure (bar)

2.1.4 Rotary Group Forces

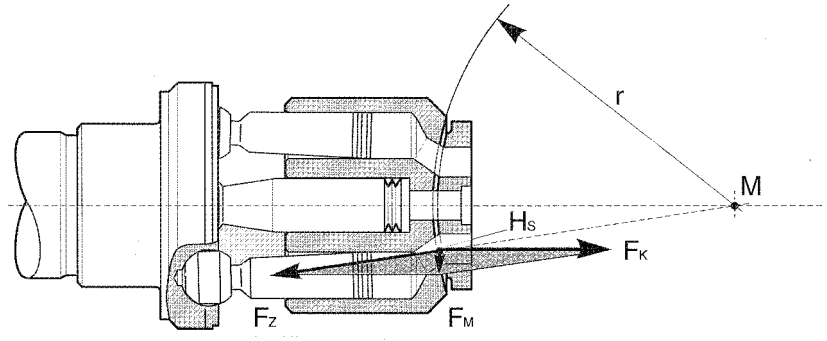
Parallelogram illustrating forces in a Fixed Displacement Unit.

The resolution of forces takes piace on the drive flange, ite. direct on the drive shaft. This conversion from torque into piston force in the pump, and in reverse in the motor, guarantees the best possible efficiency. A single resolution means a single efficiency loss!





Resolution of Forces on Port Plate with Spherical Control Face



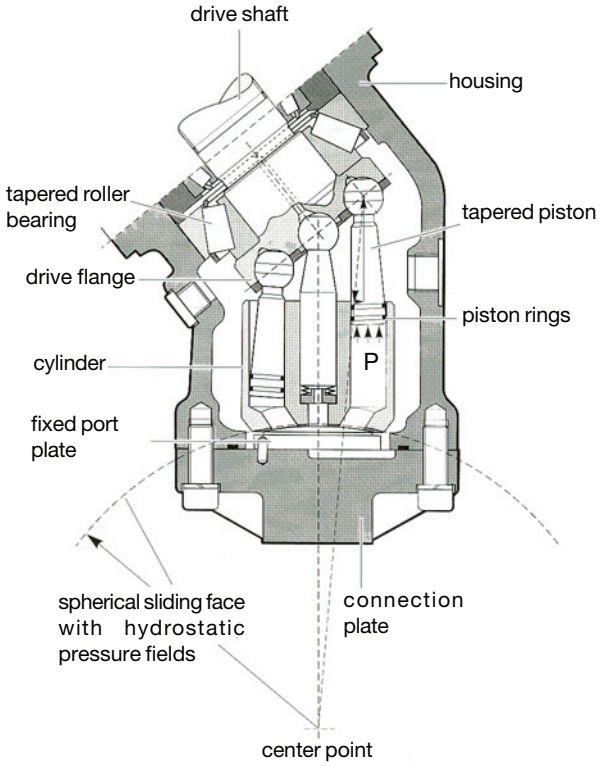
For this torque illustration, a segment of the hydraulic rotary group has been cut out and shown in simplified form in pure static condition with swivel angle 0°.

In practice, when the rotary group is swivelled out, dynamic loading is present since 3 or 4 of the piston areas are always under high pressure.

M	=	centre of assumed (theoretical) sphere
r	=	radius of this sphere
Hs	=	focal point of hydrostatic bearing pressure field
FK	=	sum of the force of 3 or 4 pistone
Fz	=	force of hydrostatic pressure field of cylinder
FM	=	resulting force on centre pin

2.1.5 40° Tapered Piston, Bent-Axis Rotary Group

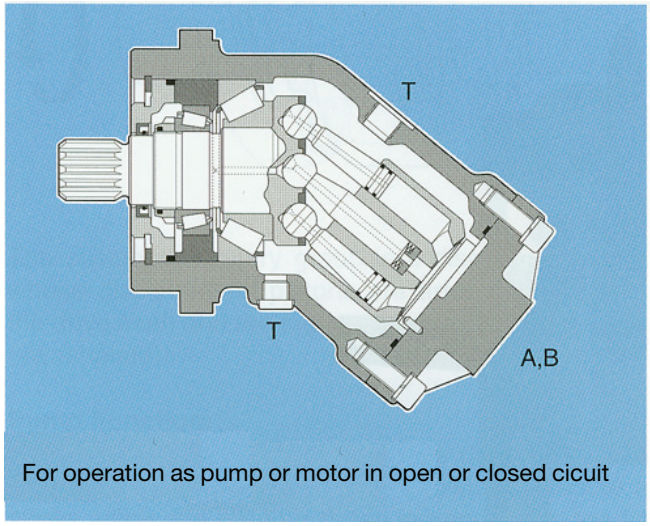
Shown here in housing with fixed swivel angle



- central swivel point
- cardanless cylinder drive
- torque-free cylinder bearing
- self-centring rotary group
- spherical port piate
- tapered roller bearings
- one-piece tapered piston with 2 piston rings
- automatic bearing lubrication
- piston-force resolution direct on drive flange

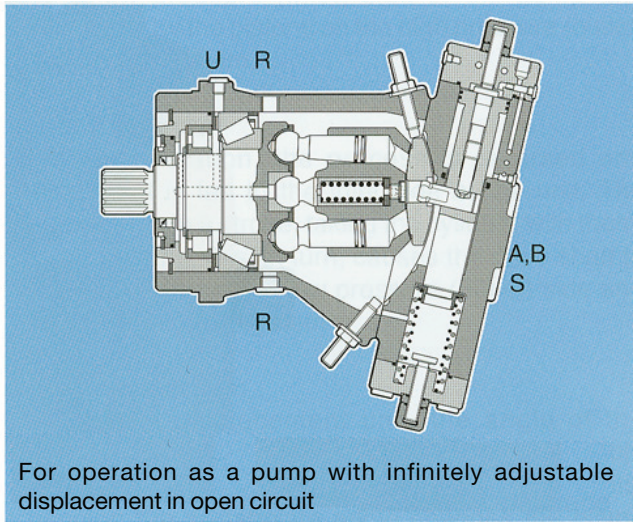
2.1.6 Examples of Types

Fixed Displacement Unit A2F (fixed swivel angle)



For operation as pump or motor in open or closed cicuit

Variable Displacement Unit A7VO (variable swivel angle)



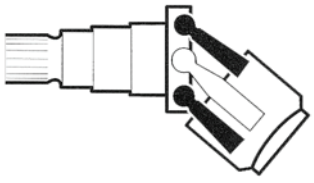
For operation as a pump with infinitely adjustable displacement in open circuit

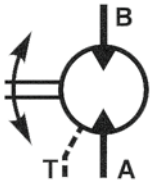
2.1.7 Symbols

Symbolic illustration of the best-known types

A,B Pressure ports
S Suction port
T,R Case drain ports
U Flushing port

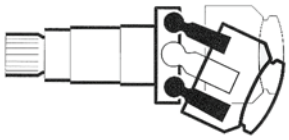
A2FM
Fixed motor





Fixed displacement motor for open or closed circuits; fixed swivel angle; both directions of rotation of power take-off.

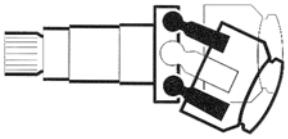
A6VM
Variable motor

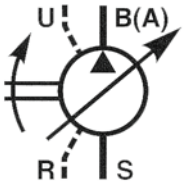




Variable displacement motor for open and closed circuits, swivel to one side only; infinitely variable swivel angle; both directions of rotation of power take-off.

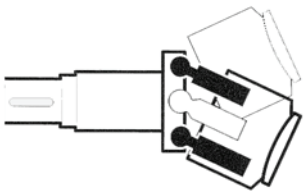
A7VO
Variable pump





Variable displacement pump for open circuits, swivel to one side only; infinitely variable swivel angle; single direction of rotation of drive.

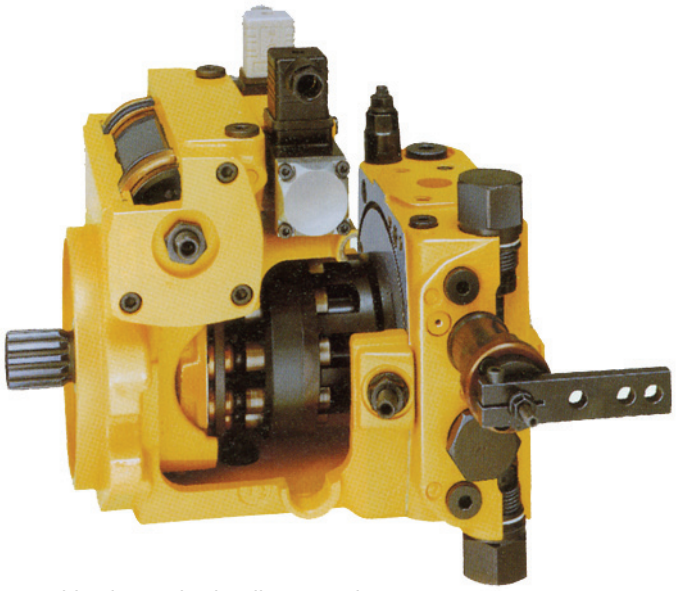
A2V
Variable pump





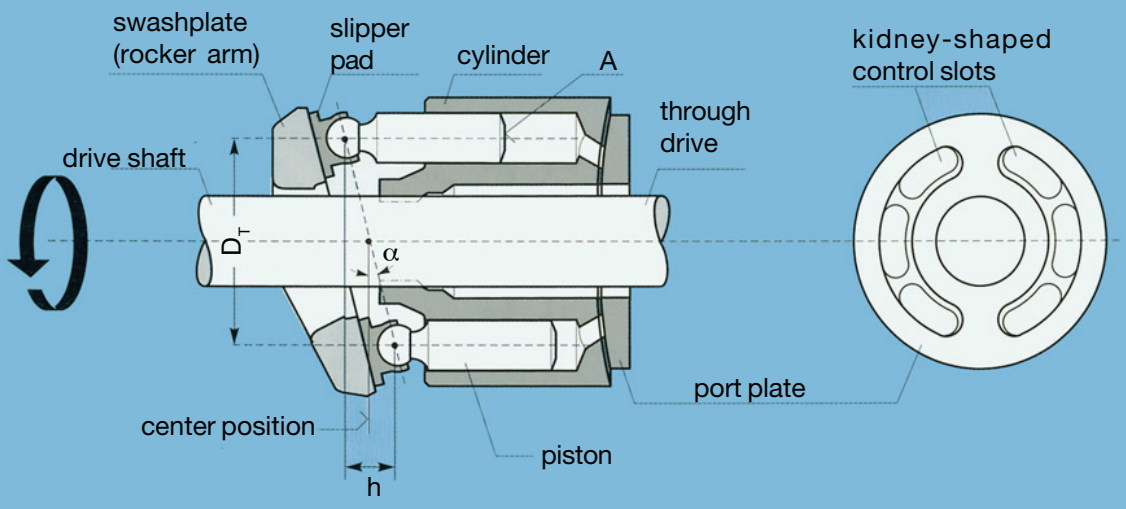
Variable displacement pump for closed circuits, swivel to both sides; swivel angle infinitely variable over centre; both directions of rotation of drive.

2.2 Swashplate



Example:
Variable Displacement Pump with electro-hydraulic control, speed-related closed loop control and built-on auxiliary pump

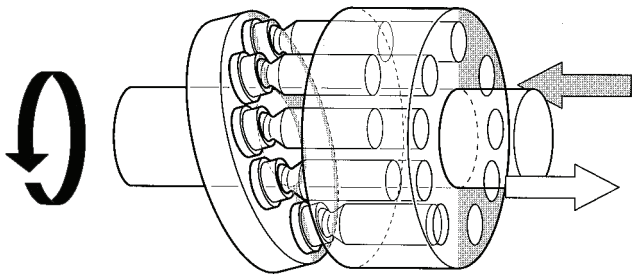
Schematic Diagram of a swashplate unit (with pistons parallel to axis)
with fixed or variable swivel angle α



h = piston stroke
A = piston area
D_T = pitch diameter when α=0
α = swivel angle (e.g. 20°)
V_g = geom.displacement [cm^3/rev.]

x = number of pistons (e.g. 9)
h = $D_T \bullet \tan \alpha$
V_g = $x \bullet A \bullet h$
V_g = $x \bullet A \bullet D_T \bullet \tan\alpha$

2.2.1 Swashplate Principle



The swashplate rotary group is a displacement unit whose displacement pistone are arranged axially to the drive shaft and are supported against a tilted piate (swashplate).

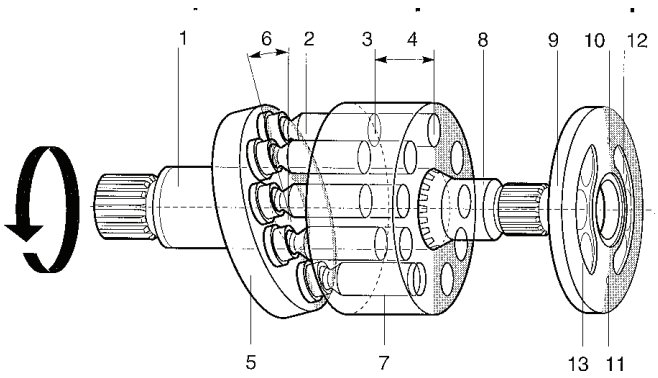
Pump Function:
Through the gearing, rotation of the drive shaft also causes the cylinder to rotate. The pistone execute a stroke within the cylinder bores dependent on the tilt angle of the swashplate. The hydraulic medium is fed to the low pressure (inlet) side of the pump and pumped out by the pistone on the high pressure (outlet) side into the system.

Motor Function:
In motor operation, the process is reversed and pressure oil is fed to the inlet side of the unit. The pistone perform a stroke, taking the cylinder with them. Via the gearing, this, in turn, causes the drive shaft to rotate. Oil exits on the low pressure (outlet) side and flows back into the system.

Swashplate Angle:
In the fixed displacement unit, the angle of the swashplate is fixed within the housing. In the variable unit, this angle is infinitely variable within specific limite. Changing the swashplate angle changes the piston stroke, thus varying the displacement.

2.2.2 Description of Function

Example: Variable Displacement Pump



1 = drive shaft
2 = piston
3 = piston area
4 = piston stroke
5 = swashplate
6 = angle of adjustment
7 = cylinder
8 = through drive
9 = port piate
10 = upper dead point OT
11 = lower dead point UT
12 = control slot,pressure side (for direction of rotation shown)
13 = control slot,suction side (for direction of rotation shown)

Description
The axial piston units of swashplate design, with fixeo or variable displacement, can operate as hydraulic pumps or motore.
When used as a pump, the flow is proportional to the input speed and the swashplate angle. If the unit is used as a motor, the output speed is proportional to the flow through the unit.
The input (pump) or output (motor) torque increases with the pressure drop between the high and low pressure sides.
In pump operation, mechanical energy is converted into hydrostatic power while in motor operation, inversely, hydrostatic power is converted into mechanical energy.

By adjusting the swashplate angle of a variable pump or motor it is possible to vary the displacement and thus the flow.

Function
.....as a pump:
Driven by the prime mover, (e.g. diesel or electric motor), the drive shaft rotates and, via the gearing, also causes the cylinder to rotate, taking with it the nine pistone. The pistone are held against the sliding surface of the swashplate by the slipper pads and carry out a stroke. The slipper pads are held against the sliding surface and guided by means of a return device. As the cylinder rotates, each piston moves through the lower or upper dead point and back to its starting position. A movement from one dead point to the other (where the direction of movement is reversed) constitutes one complete stroke during which a volume of hydraulic fluid, corresponding to the piston area and the stroke, is either sucked in or pumped out via the two control slots in the portplate.

During the suction stroke, the hydraulic fluid is sucked - in reality compressed - by atmospheric pressure in open circuits, and by the boost pressure in closed circuits, into the piston area as it increases in size. During the pressure stroke, fluid is pushed out through the piston bores on the opposite side into the hydraulic system.

.... as a motor:

The motor function is the reverse of the pump function. In this case, hydraulic fluid is fed from the system to the hydraulic motor. Oil flows via the connection piate through a control slot to the cylinder bores. 4 or 5 cylinder bores are located over the pressure side control slot. The remaining cylinder bores are located over the other control slot and are either connected with the return-line side, or may be closed when directly above the connecting strip between the two control slots. Application of pressure to the piston causes it to sfide down the swashplate, taking the cylinder with it. The cylinder and the nine connected pistone rotate with the drive shaft and the pistone carry out a stroke. Hydraulic pressure generates a torque at the cylinder and thus the rotation of the drive shaft. The output speed is determined by the volume of flow into the motor.

Control Function: (with control devices fitted)
The angle of the swashplate can be changed, for example, mechanically via a pivot pin or hydraulically via an adjusting piston. The swashplate/rocker arm is mounted on roller or plein bearings and the zero position is spring-centred. Increasing the swivel angle increases displacement and torque, decreasing the angle gives a corresponding reduction in these values. If the swivel angle is zero, the displacement is also zero. Mechanical or hydraulic control devices are normally fitted, which can themselves be controlled and regulated by mechanical, hydraulic or electrical means. Well-known types of control are: electroproportional contro!, constant pressure control (zero stroke contro!), constant horsepower contro!.

General
Swashplate-type pumps and motore are suitable for application in open and closed circuits. Because of their design, they are used predominantly as pumps in closed circuits. The possibility of mounting auxiliary or secondary pumps on the through drive and of making use of the integrated design of controls and valves offers a number of advantages. Through this compact and lightweight arrangement, longer service life may be expected since the slipper pads are mounted on hydrostatic bearings (plein bearings). The resolution of forces (piston forces/torque) takes piace on the swashplate via the slipper pad. Forces within the hydraulic section of the rotary group, ie. cylinder with pistone and port piate, are balanced. The drive shaft bearings allow external forces to be absorbed. The principle of the spherical control area, its lubrication, the pre-tensioning of the cylinder via cup springs, etc., ar'? Rimilar to that of the bent-axis rotary group.

2.2.3 Principles of Calculation

Calculating pump size

	Fixed displacement bent-axis pump	Variable displacement bent-axis pump
Flow	$Q=\frac{V_g \bullet n \bullet \eta_{vol}}{1000}$ (l/min)	$Q=\frac{V_{g\,max} \bullet n \bullet \tan\alpha \bullet \eta_{vol}}{1000 \bullet \tan\alpha_{max}}$ (l/min)
Drive speed	$n=\frac{Q \bullet 1000}{V_g \bullet \eta_{vol}}$ (rpm)	$n=\frac{Q \bullet 1000 \bullet \tan\alpha_{max}}{V_{g\,max} \bullet \eta_{vol} \bullet \tan\alpha}$ (rpm)
Drive torque	$M=\frac{V_g \bullet \Delta p}{20\pi \bullet \eta_{mh}} = \frac{1{,}59 \bullet V_g \bullet \Delta p}{100 \bullet \eta_{mh}}$ (Nm)	$M=\frac{V_{g\,max} \bullet \Delta p \bullet \tan\alpha}{20\pi \bullet \eta_{mh} \bullet \tan\alpha_{max}} = \frac{1{,}59 \bullet V_{g\,max} \bullet \Delta p \bullet \tan\alpha}{100 \bullet \eta_{mh} \bullet \tan\alpha_{max}}$ (Nm)
Drive power	$P=\frac{2\pi \bullet M \bullet n}{60000} = \frac{M \bullet n}{9549}$ (kW) $P=\frac{Q \bullet \Delta p}{600 \bullet \eta_{vol} \bullet \eta_{mh}} = \frac{Q \bullet \Delta p}{600 \bullet \eta_t}$ (kW)	$P=\frac{2\pi \bullet M \bullet n}{60000} = \frac{M \bullet n}{9549}$ (kW) $P=\frac{Q \bullet \Delta p}{600 \bullet \eta_{vol} \bullet \eta_{mh}} = \frac{Q \bullet \Delta p}{600 \bullet \eta_t}$ (kW)

Where:

Q	= flow	(l/min)	α_{max}	= max. swivel angle (varies according to design)
M	= drive torque	(Nm)	α	= set swivel angle (between 0 and α_{max})
P	= drive power	(kW)	η_{vol}	= volumetrie efficiency
V_g	= geometrie displacement per rev.	(cm3)	η_{mh}	= mechanical - hydraulic efficiency
$V_{g\,max}$	= max. geom. displacement per rev.	(cm3)	η_t	= overall efficiency ($\eta_t = \eta_{vol} \bullet \eta_{mh}$)
n	= speed	(rpm)	Δp	= differential pressure (bar)

Calculating motor size		
	Fixed displacement bent-axis pump	**Variable displacement bent-axis pump**
Consumption (Flow)	$Q=\frac{V_g \bullet n}{1000 \bullet \eta_{vol}}$ (l/min)	$Q=\frac{V_g\ max \bullet n \bullet \tan\alpha}{1000 \bullet \tan\alpha_{max} \bullet \eta_{vol}}$ (l/min)
Drive speed	$n=\frac{Q \bullet 1000 \bullet \eta_{vol}}{V_g}$ (rpm)	$n=\frac{Q \bullet 1000 \bullet \eta_{vol} \bullet \tan\alpha_{max}}{V_{g\ max} \bullet \tan\alpha}$ (rpm)
Drive torque	$M=\frac{V_g \bullet \Delta p \bullet \eta_{mh}}{20\pi}=\frac{1{,}59 \bullet V_g \bullet \Delta p \bullet \eta_{mh}}{100}$ (Nm)	$M=\frac{V_{g\ max} \bullet \Delta p \bullet \tan\alpha \bullet \eta_{mh}}{20\pi \bullet \tan\alpha_{max}}=\frac{1{,}59 \bullet V_{g\ max} \bullet \Delta p \bullet \tan\alpha \bullet \eta_{mh}}{100 \bullet \tan\alpha_{max}}$ (Nm)
Drive power	$P=\frac{2\pi \bullet M \bullet n}{60000}=\frac{M \bullet n}{9549}$ (kW) $P=\frac{Q \bullet \Delta p}{600} \bullet \eta_{vol} \bullet \eta_{mh}=\frac{Q \bullet \Delta p \bullet \eta_t}{600}$ (kW)	$P=\frac{2\pi \bullet M \bullet n}{60000}=\frac{M \bullet n}{9549}$ (kW) $P=\frac{Q \bullet \Delta p}{600} \bullet \eta_{vol} \bullet \eta_m=\frac{Q \bullet \Delta p \bullet \eta_t}{600}$ (kW)

Where:

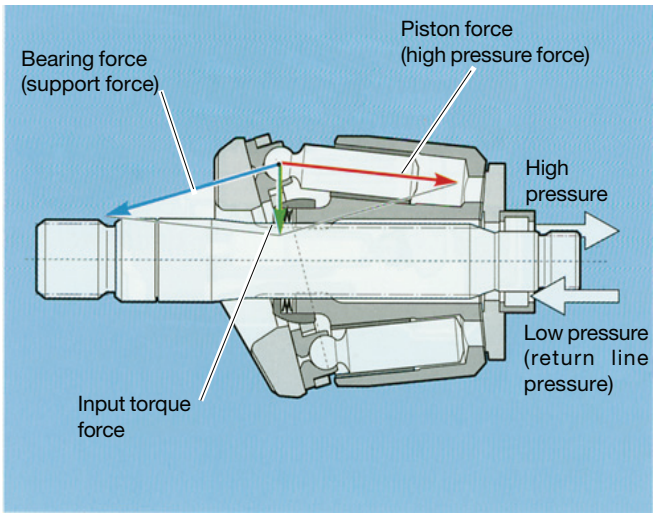
Q	=	consumption (flow) (l/min)	α_{max}	=	max. swivel angle (varies according to design)
M	=	output torque (Nm)	α	=	set swivel angle (between 0 and α_{max})
P	=	output power (kW)	η_{vol}	=	volumetrie efficiency
V_g	=	geometrie displacement per rev. (cm3)	η_{mh}	=	mechanical - hydraulic efficiency
$V_{g\ max}$	=	max. geom. displacement per rev. (cm3)	η_t	=	overall efficiency ($\eta_t = \eta_{vol} \bullet \eta_{mh}$)
n	=	speed (rpm)	Δp	=	differential pressure (bar)

2.2.4 Rotary Group Forces

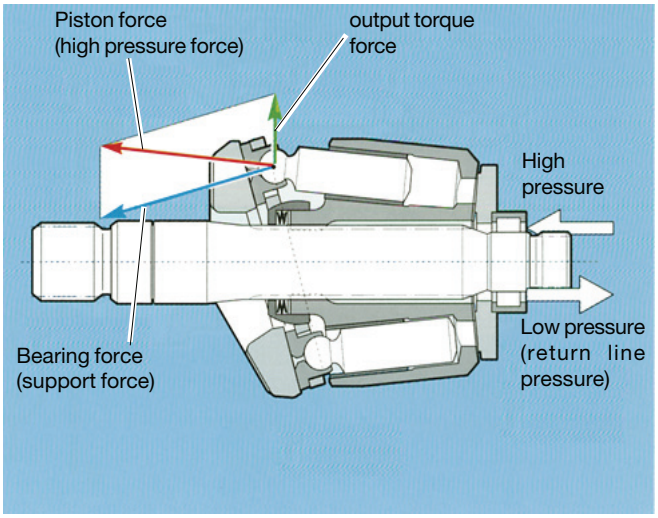
Parallelogram illustrating forces in a variable displacement unit, e.g. with piston angled inwards.

The resolution of forces takes piace on the swashplate in the slipper pads and the cylinder.
The piston slipper pads are on hydrostatic bearings, and guarantee long service life of the rotary groups.

Resolution of Forces on the Pump Swashplate



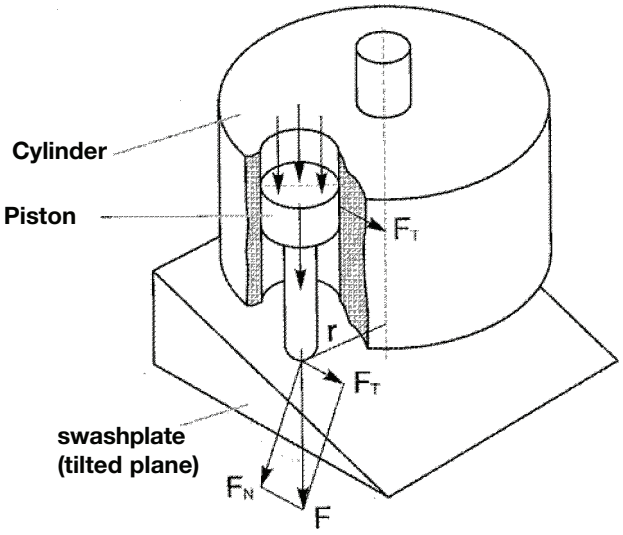
Resolution of Forces on the Motor Swashplate



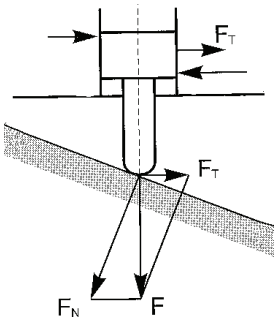
2.2.5 Swashplate Rotary Group

Simplified illustration

The basic componente of a swashplate rotary group are **cylinder**, **piston** and **swashplate**.



e.g. as a motor:
As explained in the Description of Function, the piston is pressurised by oil from the pump and pressed against the tilted piate.

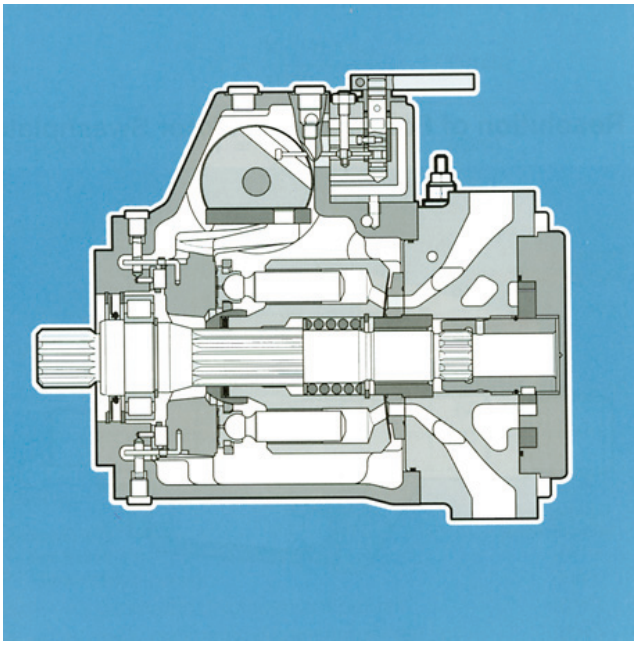


The resolution of the piston forces at the point of contact (plein bearing) with the tilted piate produces a bearing-force and a torque-force component (FN and FT). The piston slides down the tilted piate and carries out a stroke, taking with it the cylinder and drive shaft. However, because of the movement allowed by the piston tolerance within the cylinder bore, at the point of break-away (start-tip), a greater frictional resistance occurs (static friction) than during a normal stroke (sliding friction). This 2-fola resolution of forces is the reason for the slightly lower starting efficiency of the swashplate unit as compared to the single resolution of forces in the case of the bent-axis unit. In practice, this can be important in motor operation, but is of little significance in pump operation.

2.2.6 Examples of Types

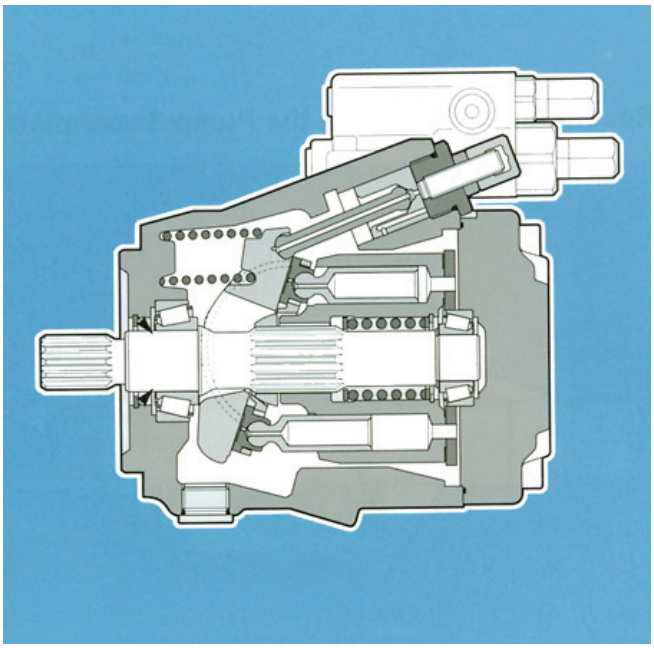
Variable Pump for Closed Circuits A4VG

High pressure range up to 450 bar



Variable Pump for Open Circuits A1 OVO

Medium pressure range up to 315 bar

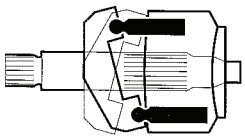


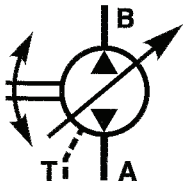
2.2.7 Symbols

Symbolic illustration of the best-known types

A,B	Pressure ports
S	Suction port
T,R,L	Case drain ports
U	Flushing port

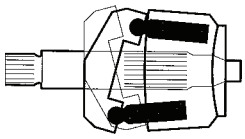
A4VG
Variable Pump

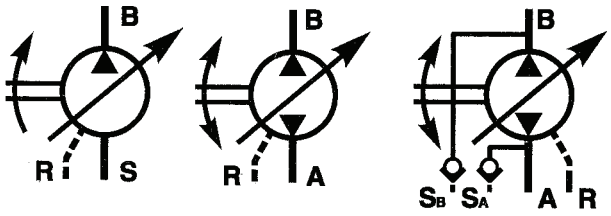




Variable displacement pump for closed circuits, swivel to both sides; swivel angle infinitely variable over centre; both directions of rotation of drive; tandem version possible by mounting additional pump at the through drive.

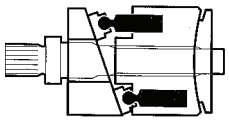
A4VSO/G/H
Variable Pump

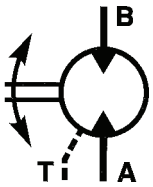




Variable displacement pump for open, closed or semi-closed circuits; swivel angle infinitely variable; single or both directions of rotation of drive and flow direction, depending on the type of circuit; auxiliary pump may be mounted at the through drive.

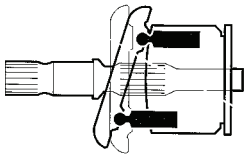
A4FM
Fixed Motor

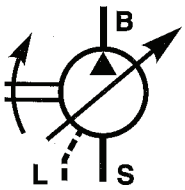




Fixed displacement motor for open or closed circuits; fixed swivel angle; both directions of rotation of power take-off; possibility of through drive for mounting brake.

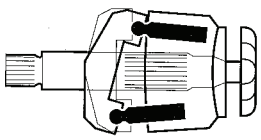
A1 OVO
Variable Pump

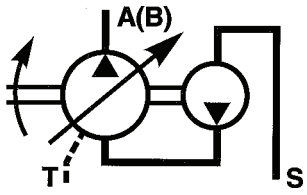




Variable displacement pump fo open circuits, swivel to one ~ only; infinitely variable swivel angle single direction of rotation of drive

A1 1 VLO
Variable Pump





Variable displacement pump for open circuits, swivel to one side only; infinitely variable swivel angle; single direction of rotation of drive; with built-on charging pump at through drive.

3 Components

3.1 Fixed displacement motore and pumps of bent axis design

With high performance, modem axial-tapered piston rotary groups, series 6

Important Features:

- Cardanless cylinder drive via
- tapered pistone tapered pistone with piston ring seals
- robust tapered roller bearings with long service life
- flange and shaft end to ISO or SAE standards
- two drain ports and flushing port for bearings as standard
- direct mounting of brake valve possible
- models available for special applications
- nominai pressure up to 400 bar, peak pressure up to 450 bar

3.1.1 Fixed Motor

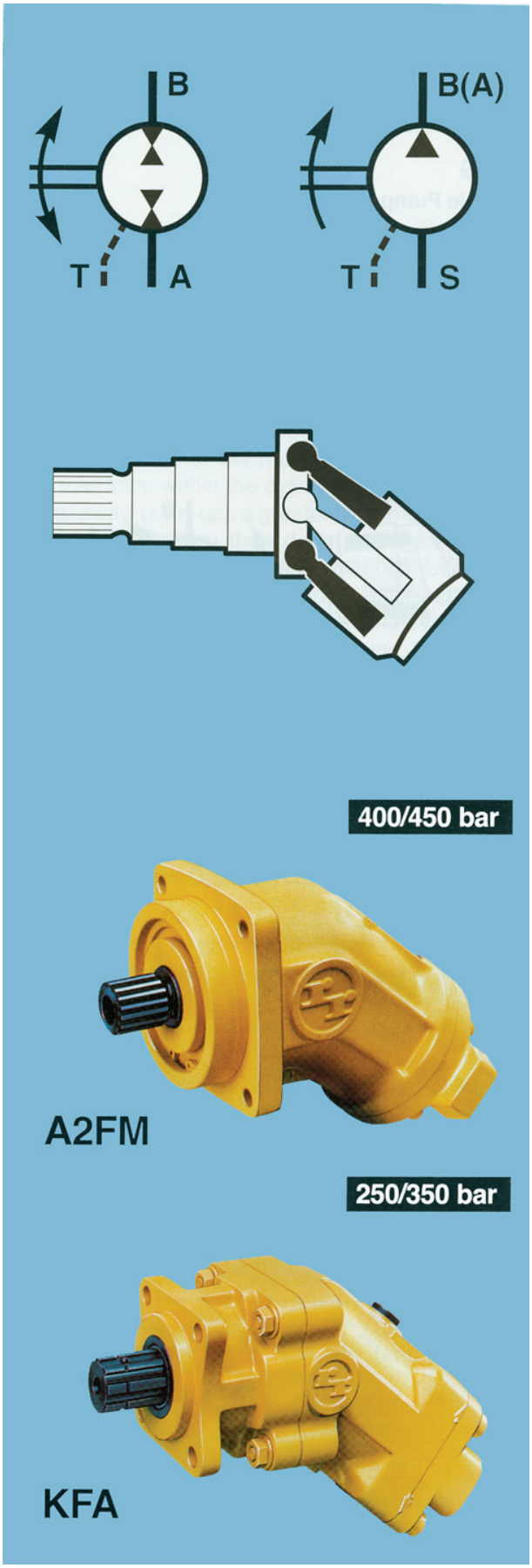
Operation as a motor in open and closed circuits; used in mobile and industrial applications, wherever a constant displacement is required for hydrostatic power transmission.

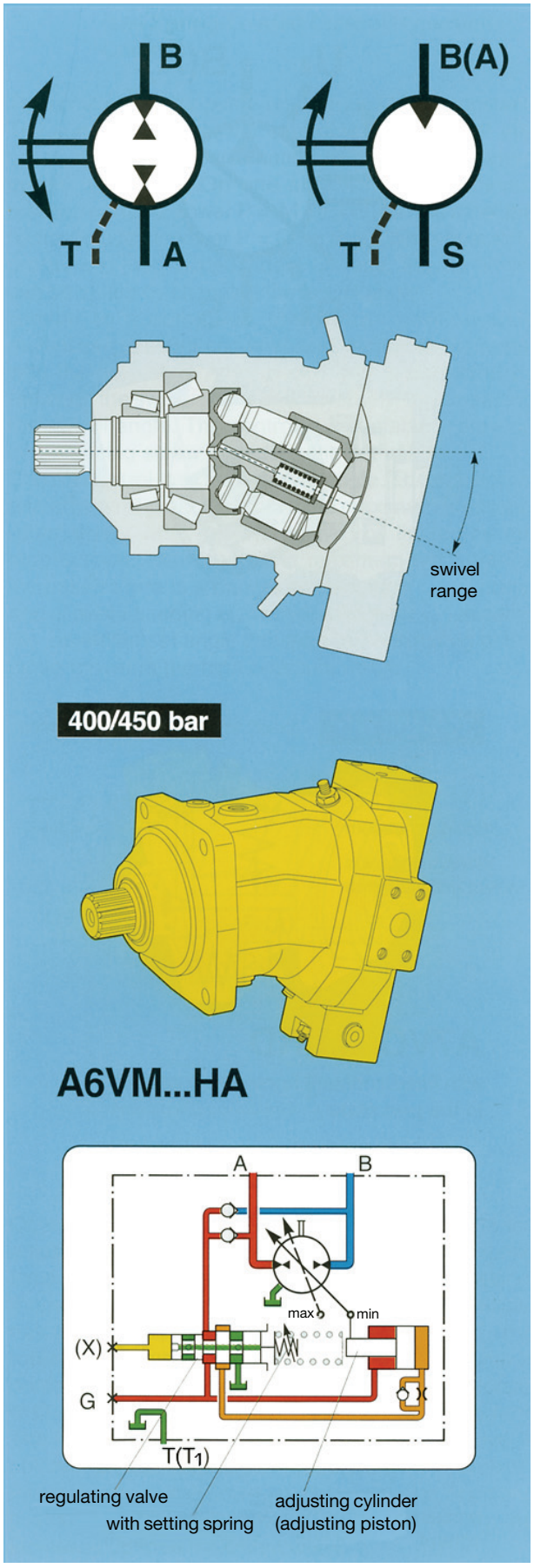
3.1.2 Fixed Pump

With a suitable connection piate fitted, the A2FM motor becomes the A2FO pump (not illustrated) which is suitable for open circuits and is noted for its robustness, reliability, long service life and quiet operation.

3.1.3 Fixed Pump for Trucks

Pump with special characteristics and dimensions for applications in mobile trucks; it is designed for a pressure range of 250/350 bar. If it is necessary to change the direction of rotation (e.g. with change of gearbox), this is simply carried out on the open-circuit pump by rotating the connection piate.





3.2 Variable Motor of Bent-Axis Design for Open and Closed Circuits

Important Features:

- gives greater control range for hydrostatic transmissions
- fulfils the requirement for high speed and high torque
- cost-saving through elimination of gearbox, and possibility of using smaller pu m ps
- low unit power
- good starting characteristics
- various control and regulating devices
- swivel to one side only
- nominai pressure 400 bar, peak pressure 450 bar

3.2.1 Automatic Control, High-Pressure-related

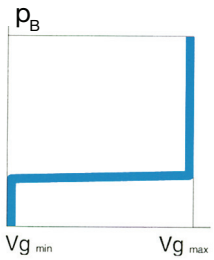
The A6VM variable motor has a bent-axis rotary group. The torque is therefore generated direct on the drive shaft and the cylinder is driven without a Cardan coupling directly by the tapered pistone. The swivel angle of the rotary group may be changed by moving the control lens along a spherical surface by means of the adjusting piston. Provided that the pump flow and high pressure remain constant, then

- reducing the angle gives higher speed and lower torque
- increasing the angle gives higher torque and lower speed.

The code ... HA refers to the high-pressure-related control of this motor. The displacement is set automatically dependent on operating pressure. When the operating pressure set with the regulating valve - measured internally via A or B - is reached, the motor is swivelled from $Vg_{m\sim n}$ to Vg_{max} Below this pressure, the motor remains at minimum swivel angle.

HA curve
Automatic control
high-pressure-related

P_B = operating pressure
V_g = displacement



3.3 Variable Pump of Bent-Axis Design, for Open Circuits

Important features:

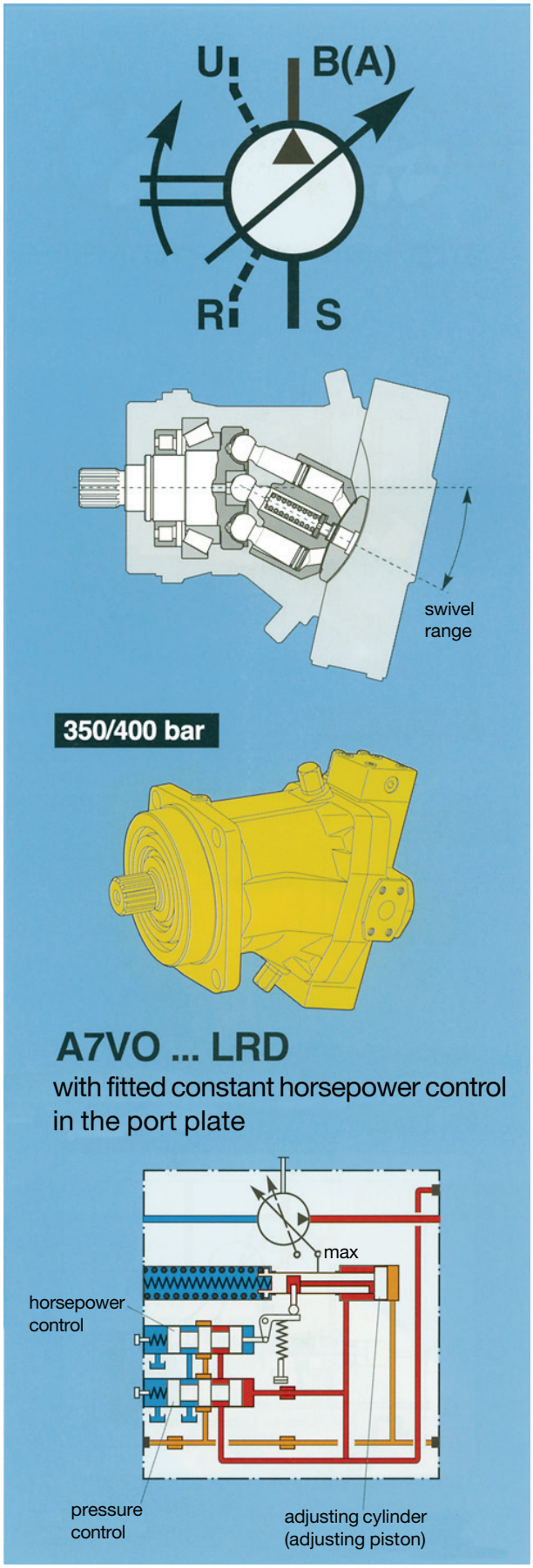
- axial-tapered piston rotary group
- Cardanless cylinder drive via tapered pistone
- robust bearings with long service life
- displacement variable between V9O and Vgmax
- constant horsepower control with exact hyperbolic curve
- constant pressure control, hydraulic and electric control devices, load-sensing operation possible
- high pressure range up to 350/400 bar
- for use in mobile and industrial applications

3.3.1 High Pressure Applications

The A7VO is a variable pump with internal drain for open hydraulic circuits. The bent-axis rotary group is characterised by its robustness and good self-priming properties. The drive shaft bearings also allow external forces to be absorbed. For particularly demanding requirements in terms of force absorption and running time, type A7VLO has a rotary group with specially strengthened bearings.

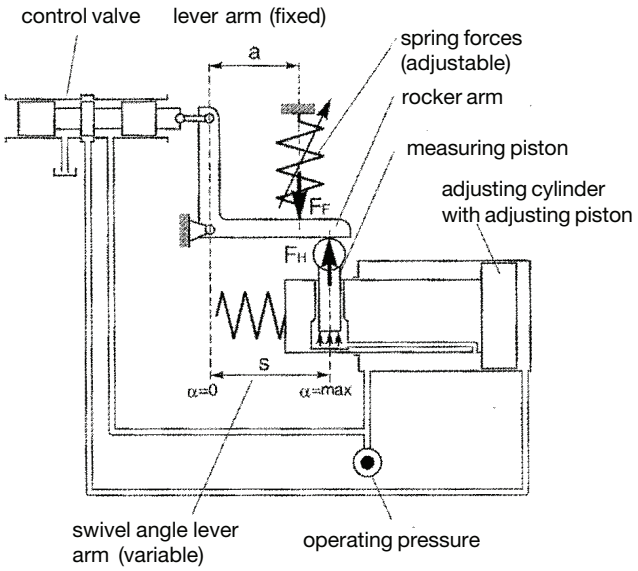
The swivel angle of the rotary group is changed by moving the control lens along a spherical surface by means of an adjusting piston. Increasing the angle increases the pump flow and the required drive torque.

Reducing the angle reduces the pump flow and the required drive torque. The maximum angle is e.g. 25• or 26,5•. The minimum 0•. The pump is controlled as a function of the operating pressure, and adjusted by means of external control signals. The necessary control pressure is taken from the pressure side via a check valve.



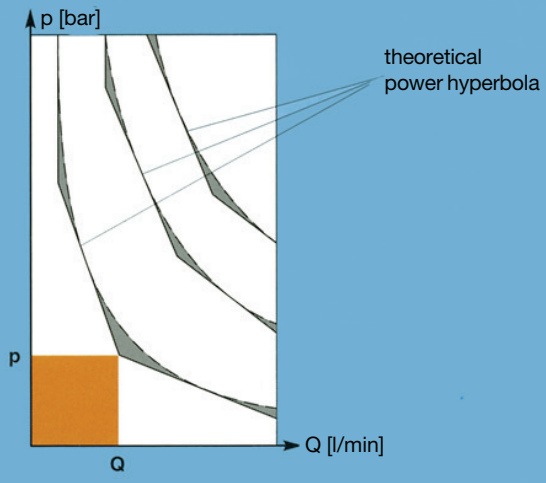
3.3.2 Constant Horsepower Control LR (see Spring-Loaded ControUHyperbolic Control)

The control holds the pump input torque M [Nm] constant. The constant horsepower control is a function of this constant torque in combination with a constant input speed n [1 /min]. On one side we trave the input mechanical drive power P = M n [kW], on the other the hydraulic output power P = Q p [kW]. While operating pressure p [bar] is dependent on load, flow Q [l/min] can be varied by changing the swivel angle.
Si m i lar to a computer, the control conti n uously multiplies pressure and flow, and compares the result with the set value. Any upward drift is corrected by reducing the swivel angle and, inversely, by increasing the swivel angle. The control is adjustable (screwing in the setting screw increases the set value).
Start of control is at max. swivel angle. The position at end of control is dependent on the maximum pressure. Alternatively, both end values can be limited by the stop screws. Warning: if the maximum set angle is increased there is a danger of cavitation in the pump and of over-speeding of the hydraulic motor! Increasing the minimum set angle can lead to overloading of the prime mover in the high pressure range.



Operating pressure acts via a measuring piston in the adjusting piston on a rocker arm. The opposed spring force, externally adjustable, determines the power setting. If operating pressure p exceeds the permissible value, calculated from the formula P = Q p [kW], the rocker arm actuates the control valve and the pump is destroked. The pump flow is reduced until the product of Q p once again corresponds to the available power. The ideai power hyperbola is achieved, the drive is not overloaded, because of the “constant HP contro!”. Inversely, the pump flow can, depending on operating pressure and supported by a return spring, be increased up to its maximum value.

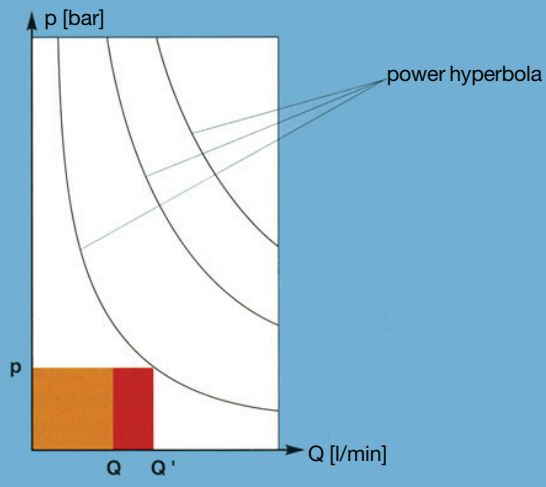
Spring-loaded Control with approximated curve



Hydraulic
Power formula:P = Q • p[kW] = constant

- power matching possible by changing the spring package
- power losses in the range shown by shaded section
- no zero swivel, i.e. residual flow against high pressure generates heat

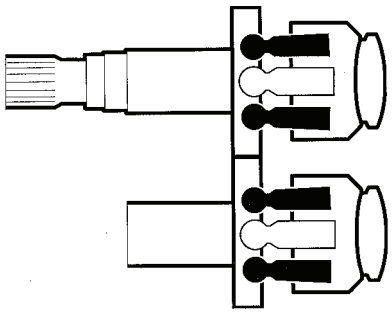
Hyperbolic Control with ideal hyperbolic curve



Hydraulic
Power formula:P = Q' • p[kW] = constant

- optimum power matching by infinitely variable spring force, settable externally
- zero swivel, i.e. no residual flow, generating less heat

3.3.3 Variable Double Pump with 2 parallel Bent Axis Rotary Groups



Two variable pumps - one drive. An advantageous combination of two individual pumps with integral distributor gear.

Models with secondary drive and/or auxiliary pump for the supply of additional hydraulic circuits are today standard7 particularly in mobile applications.

As an extension of the constant horsepower control for a single pump (A7VO..LR - see pages 18/19), the double pump A8VO..SR with summated horsepower control is used, for example, for two parallel hydraulic circuits where the total drive power is split between the two circuits proportional to the pressures in both circuits.

The high pressure signal is averaged in the summation valve and used as the reference value. The ideai hyperbolic power curve is achieved when the torque forces acting on the rocker arm of the constant horsepower control are in balance.

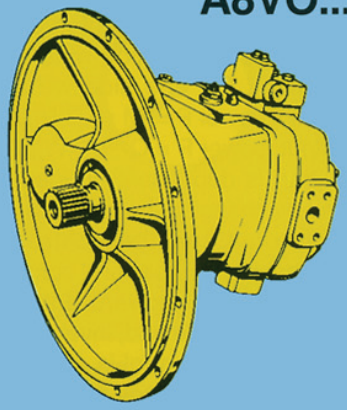
The max. hydraulic torque, which is the product of high pressure force FH and swivel stroke s, may not exceed the mechanical torque occurring as a product of the adjustable spring force FF and the fixed lever arm a.

Since the operating pressure p is predetermined by the hydraulic system and the pump can only change its flow Q, if the max. allowable power is exceeded, the pump is automatically swivelled back to a smaller angle. Swivel stroke s is reduced until the resulting hydraulic torque is once again equal to the given mechanical torque.

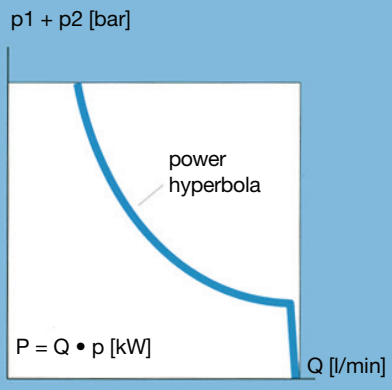
In practice, both individual or combined controls fina application. Common variations are load-limit contro!, three-circuit contro!, load sensing, etc.

350/400 bar

A8VO...SR



Hyperbolic control
Summated Hp control curve

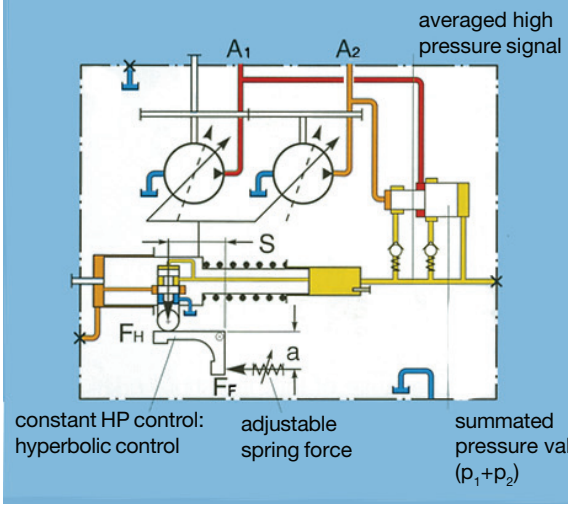


Q = flow

p_1= operating pressure 1 . pump at A_1

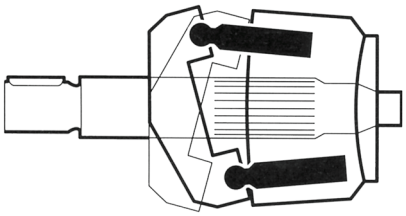
p_2= operating pressure 1 . pump at A_2

Double pump
with summated HP control



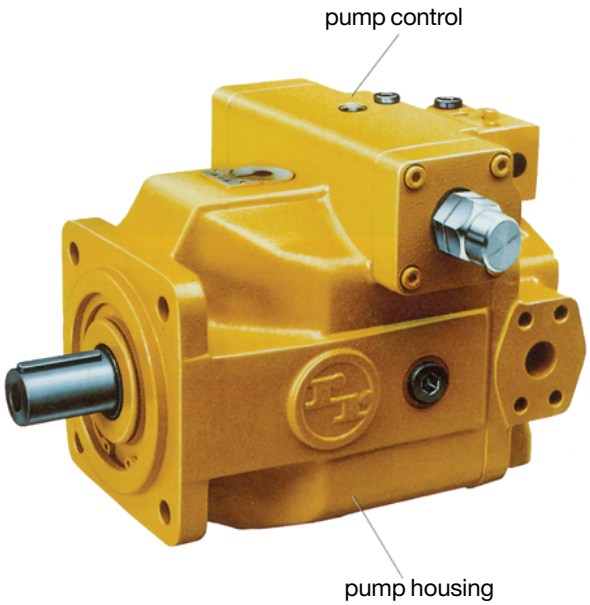
3.4 Variable Pump of Swashplate Design
for universa! industrial applications

O=open circuit
G=closed circuit
H=semi-closed circuit



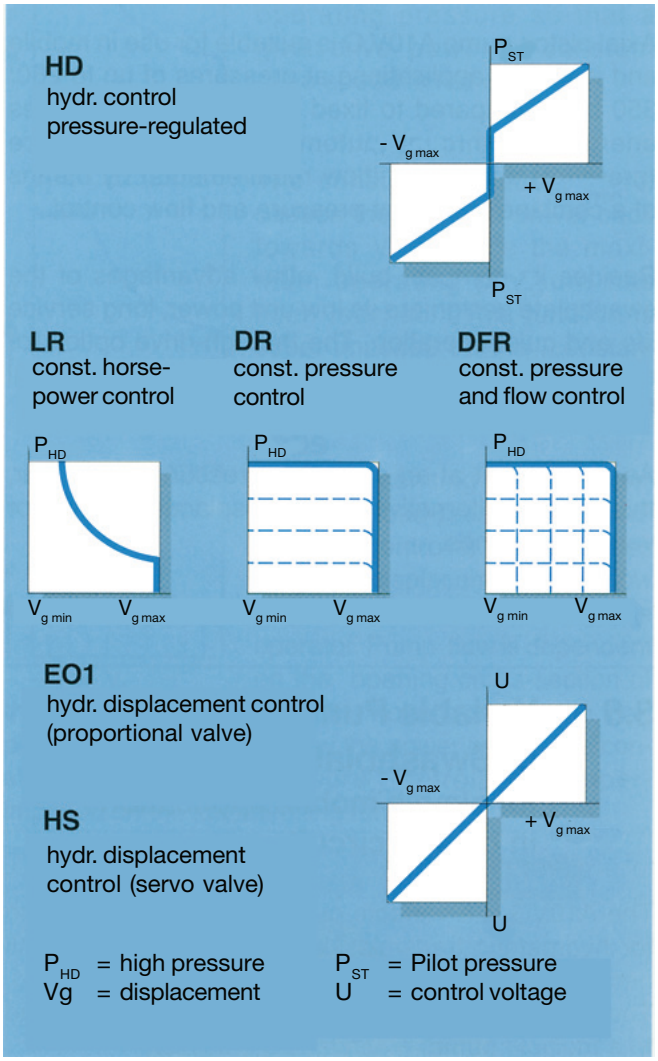
The A4VS.. variable pump is universally suitable for use in the various types of circuit (O-C-S). A wide range of controls and pump models are available. For industrial applications the A4VS..G pump e.g. (operating in closed circuit) can be extended by the addition of relevant adjusting devices and built-on valve block, auxiliary pumps at the through drive, tank and cooler to form a complete hydraulic drive unit. A semi-closed circuit **..H**.. may also be extended by the use of anti-cavitation check valves. This will compensate e.g. for differences in volume when operating single rod cylinders.

350/400 bar



A4VSO

3.4.1 Pump Control Devices
of modular design for a variety of control and regulating functions



In addition to the recognised advantages of swashplate design the A4VSO pump, developed specially for use in industrial applications, also offers an extremely long bearing service life. Load-sensing control and mooring operation, as well as secondary contro!, can be achieved with this pump.
The system of closed loop secondary speed contro!, in combination with a pressure-controlled pump and a secondary-controlled motor, guarantees high control dynamics, accurate speed contro!, minimal power loss and energy recuperation.
Speed control DS1 regulates the variable unit to produce the necessary torque for the required speed. This torque (in the power supply with impressed pressure) is proportional to the displacement and thus also proportional to the swivel ang le. The swivel ang le (adjusting distance) is recorded by means of an inductive positional transducer, and the speed is recorded by a tachogenerator.

3.5 Variable Pump of Swashplate Design for medium pressure range in open circuits

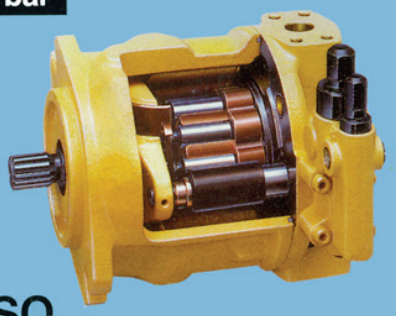
Axial piston pump A1 OV.O is suitable for use in mobile and industrial applications at pressures of up to 280/ 350 bar. Compared to fixed pump systems it saves energy, e.g. through automatic matching to force (pressure) and speed (flow requirements) by means of a combined constant pressure and flow contro!.

Besides its compact build, other advantages of the swashplate design are its low unit power, long service life and quiet operation. The through-drive option for mounting of additional pumps is a particularly useful feature.

As a fixed unit at an operating pressure of 280 bar, this is a real alternative to fixed displacement gear or vane type pumps.

Medium high pressure range

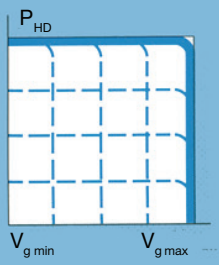
280/350 bar



A10VSO

DFR
constant pressure
and flow control

P_{HD} = operating pressure
Vg = flow



3.6 Variable Pump of Swashplate Design for simple mobile applications in closed circuit

The A10VG is a variable pump of swashplate design for hydrostatic transmissions in a closed circuit. Al1 necessary valves and an auxiliary pump are integrated. The pump design is such that it can easily be extended to a multiple pump.

The swivel angle of the rotary group is changed, e.g. directly by tuming the pivot pin manually.

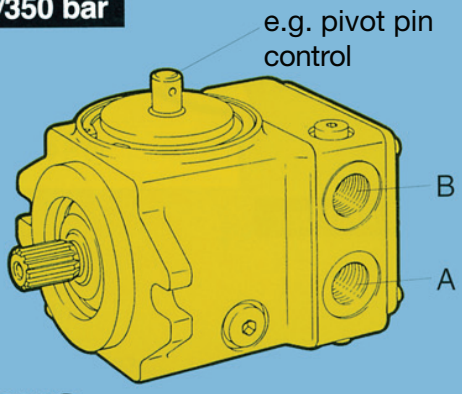
If the swivel angle is zero, the pump flow is also zero. Swivelling the pump over centre smoothly reverses the direction of flow.

With the manual pivot pin contro!, the pin is connected direct to the rocker arm of the rotary group. The angle of rotation of the pin corresponds to the pump swivel angle. The necessary adjustment torque, usually applied by hand or foot force, is influenced by the high pressure and the swivel angle. Limiting of the stroke, or angle of the stroke, or angle of the control mechanism, or possible zero-centring, must be carried out within the control mechanism itself.

In addition to the manual pivot-pin contro!, hydraulic controls can also be fitted to this pump.

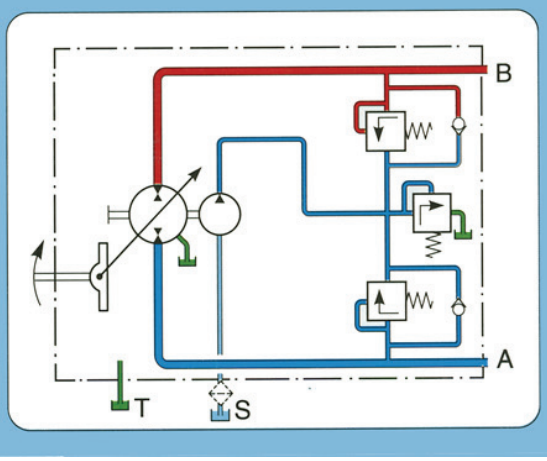
Medium high pressure range

300/350 bar



A10VG

A, B = service lines
T = tank, S = suction line

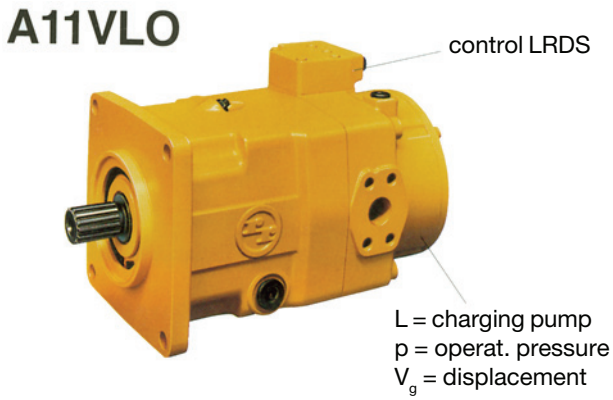


3.7 Variable Pump of Swashplate Design for mobile applications in open circuit with charging pump

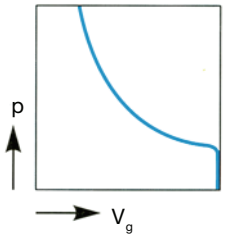
The control functions of the A11VLO illustrated h~ can be operated either super-imposed or as individ~ functions:

- constant horsepower control with hyperbolic curv~
- constant pressure control via sequence valve
- load-sensing control via Ap-control of load-pressure signa

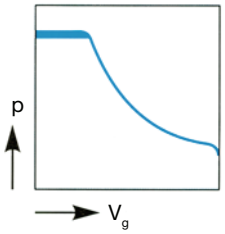
High Pressure Range 350/400 bar



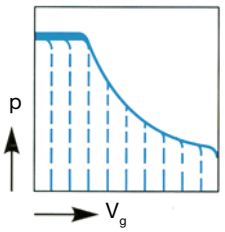
Load-Sensing control



LR
The constant horsepower control regulates the pump displacement in relation to the operating pressure so that a given drive power at constant drive speed is not exceeded.



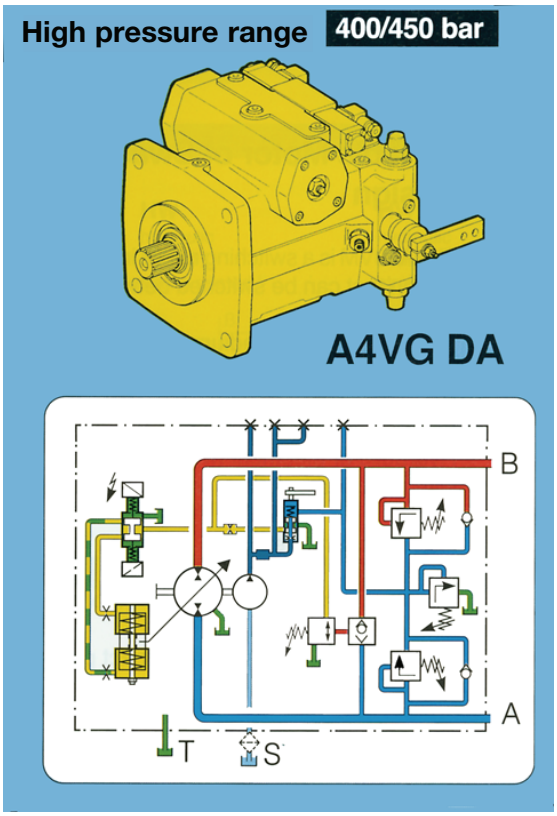
DR
The constant pressure control causes the pump to swivel back towards Vg=O, once the maximum operating pressure has been reached. This function is super-imposed on the constant horsepower contro!.



LRDS
The load-sensing control operates as a load-pressure dependent flow controller and matches the pump displacement to the flow requirement indicated by the operator. Pump flow is dependent on the opening cross-section of the directional valves, but is not affected by the load pressure in the range below the power curve. The constant power and pressu re controls are su perimposed on the load-sensing function.

3.8 Variable Pump of Swashplate Design high-pressure mobi-le transmissions in closed circuit

We trave here in the A4VG DA pump a power pack, complete with all componente for closed circuit operation, similar to that described in 3.6. Through hydraulic control with various control devices, we trave the typical “mobile pump”. This is combined with a fixed or variable motor to give the automatic “mobile transmission”.
Illustrated here is the “speed-related automotive contro”’. The pump is controlled by means of the drive speed , operati ng pressu re and , electrical ly, via 2 switching solenoide. The control energy is taken from the boost circuit. The pump control time is retarded by means of throttles.
The DA control is designed for mobile transmissions with combustion engines. It takes account of the fact that in combustion engines the torque increases with the speed, and that with loads around the max. torque limit a loss of speed occurs. The power capacity of a combustion engine can, therefore, more or less be equated with its current speed. Through corresponding adjustments on the hydraulic side, optimum automotive control is achieved.



3.9 Fixed Motor of Swashplate Design

The A4FM is of compact, space-saving design, offering the following technical advantages with:

Connection in series (summated pressure) Mounting of brake possible Insensitive to oscillations

This fixed motor for high pressures (350/ 400 bar) is suitable for connection in series. The axial pressure compensation of the hydrostatic bearing on the slipper pads ensures high loading capability and a long service life.



3.10 Variable Motor of Swashplate Design

The A1 OVM is a switching motor in swashplate design that can be switched between two positions. It operates in the medium pressure range (250/315 bar) in open or closed circuits.

Variable motor/switching motor Hydraulic or electrical two-point adjustment with mounted switching valve

Adjustment range 1: 2,5
Mechanical holding brake can be built on

Also available as a small compact plug-in motor



3.11 Summary of the most common control options on pumps and motore

The electronic componente (amplifiers), used to amplify the signals, are not listed here.

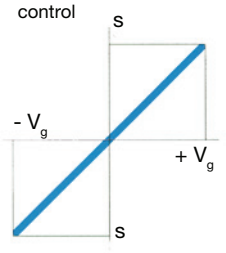
Different features of the controls are:

- type of circuit
- force transfer
- (hydraulic or mechanical)
- operation of control
- (direct or pilot operation)
- curve (position and adjustability)
- open loop control (without feedback)
  - mechanical/manual
  - mechanical/electrical
  - -hydraulic/mechanical
  - hydraulic/electrical
  - hydraulic/hydraulic
- closed loop control (with feedback)
  - hydraulic/mechanical
  - hydraulic/electrical

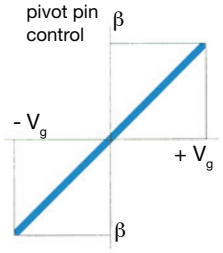
3.11.1 Pump Controls

- Mechanical - manual, proportional to:
  MA - control stroke s, or
  MD - control angle ß for pumps in reversible operation
- Mechanical/electrical, with
  EM - electric gear motor

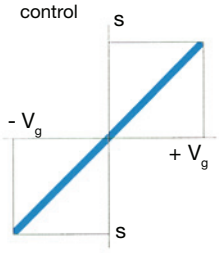
MA
manual control



MD
mechanical pivot pin control



EM
electric motor control

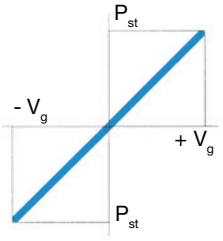


V_g = specific displacement s = control stroke β = control angle

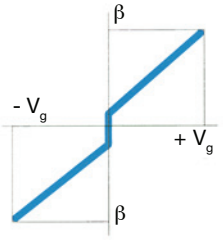
- Hydraulic - mechanical, proportional to:
  DG - pilot pressure p_{st}

  HW - control angle ß, or control stroke s for pumps in reversible operation

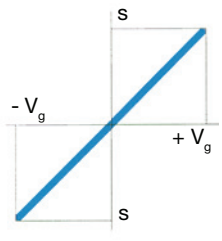
DG
direct operated hydraulic control pressure related



HW
hydraulic control stroke related [1)]



HW
hydraulic control stroke related

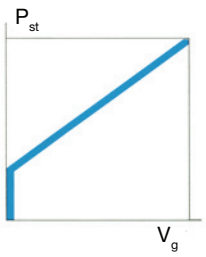


V_g = specific displacement p_{st} = pilot pressure [1)] = dead band in zero position

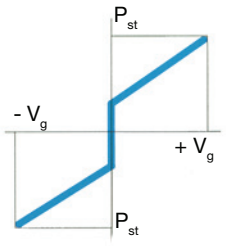
• Hydraulic - hydraulic:

HD - proportional to pilot pressure p_{st} for pumps in open circuit or reversible operation

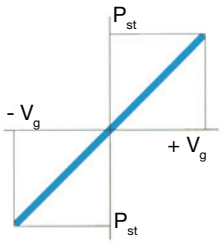
HD
hydr. control
pressure related



HD
hydr. control
pressure related"



HD
hydr. control
pressure related



V_g = specific displacement p_{st} = pilot pressure [1] = dead band in zero position

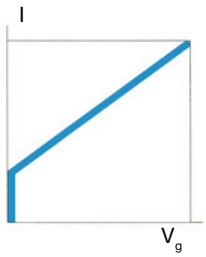
• Hydraulic - electrical:

EZ - with switching solenoids (not illust.)

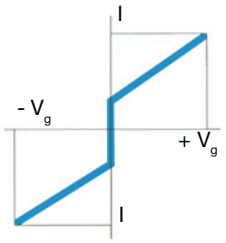
EP - with proportional solenoids, proportional to control current I in open or closed circuit

ES - with servo valve in closed circuit

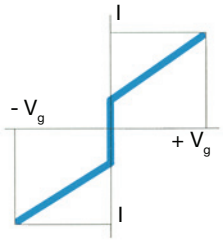
EP
electric control
with proportional
solenoid



EP
electric control
with proportional
solenoid



ES
electric control
with servo valve



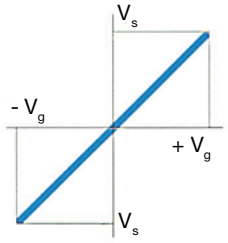
V_g = specific displacement I = control current

• Hydraulic, flow-related:

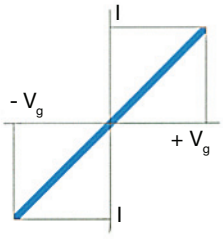
HM - proportional to pilot oil flow V_{st}, in reversible operation

HS - electrical/hydraulic with built-on servo valve, proportional to control current I

HM
hydr. control
flow-related



HS
hydr. control
with servo valve

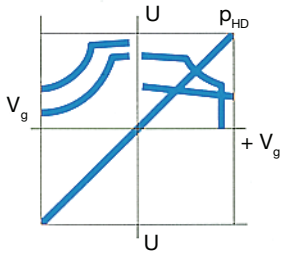


V_g = specific displacement V_s = pilot oil flow

• Hydraulic, flow-related:

EO - with built-on proportional valve in reversible operation; with electronic amplifier; closed loop control possible.

EO
eiectronic
controi



U = control voltage P_{HD} = high pressure

3.11.2 Closed-Loop Pump Controls

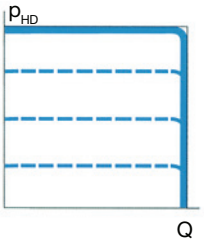
• Hydraulic:

DR - constant system pressure through suitable adjustment of pump flow

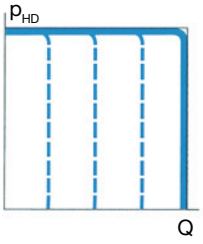
FR - constant pump flow with variable drive speed and/or flow variation to meet changing user requirement

DFR - a combination of both the above controls; the constant flow control is superimposed on a mechanically settable constant pressure control

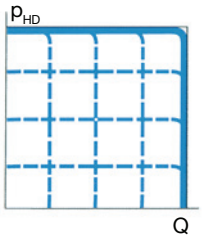
DR
constant
pressure control



FR
constant
flow control



DFR
const.
pressure and flow control



Q = flow p_{HD}= high presure

LR - constant drive torque control; power = torque x speed, P=Mxn=constant.

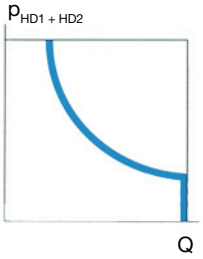
SR - for parallel operation of two pumps from one prime mover; automatic power distribution by summation of pressure

DFLR - combined constant pressure/flow control with super-imposed constant horsepower control

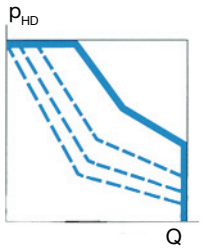
LR
constant
HP control



SR
summated
HP control



DFLR
const. pressure,
HP and flow
control



V_g = specific displacement Q = flow p_{HD}= high presure

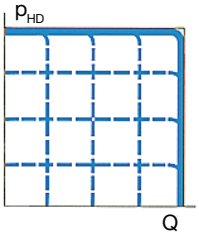
DRS - flow variation according to user requirement (load sensing) with super-imposed constant pressure control; pump is swivelled dependent on load pressure

LRDS - drive torque is limited on max. by addition of constant horsepower control; pump flow is varied according to user requirement

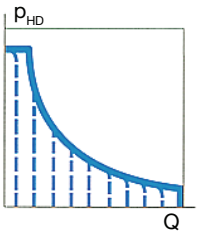
• Electronic:

DFE - alternative electronic version of combined control DFR.

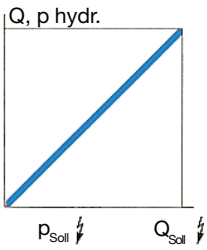
DRS
const. pressure
control with
load sensing



LRDS
const. HP control
with pressure cut-off
and load sensing



DFE
electronicconst.
pressure and
flow control



V_g = specific displacement p_{HD} = high pressure ϟ = eletric signal

3.11.3 Motor Controls

• Hydraulic- hydraulic:

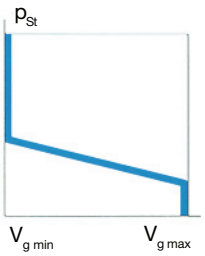
HD - proportional to pilot pressure PST.

HZ - hydraulic/hydraulic, two-point control

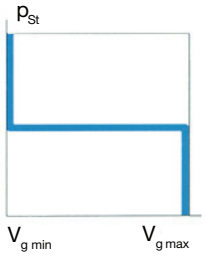
EP - hydraulic/electric, with proportional solenoid

EZ - with switching solenoid, two-point control.

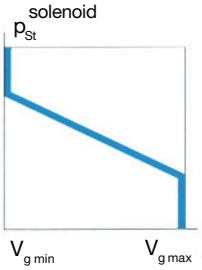
HD
hydr. control, pilot-pressure-related



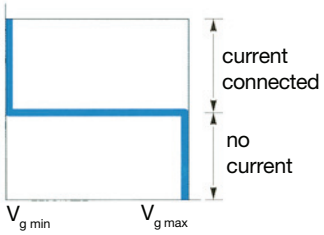
HZ
hydr. two-pointcontrol



EP
electrical control with proportional solenoid



EZ
electrical two-point control with switching solenoid



V_g = specific displacement p_{st} = pilot pressure I = control current

3.11.4 Closed-Loop Motor Controls

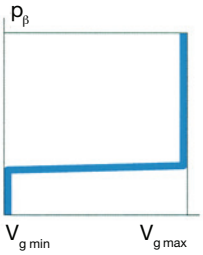
• Hydraulic:

HA - automatic high-pressure-related control; automatic adjustment to current torque requirement

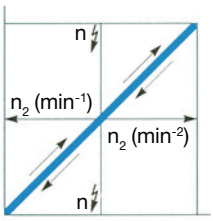
DS - pumps with DS control are used as motors for “secondary control"

DA - speed-related hydraulic control is the basis for “mobile transmission” with “automotive control”.

HA
automatic control high pressure related



DS
constant speed control, with secondary control



DA
hydr. control speed related

V_g = specific displacement p_β = operating pressure n = speed

C.02 HYDRAULIC SYMBOLS

MOTORS


Fixed motor with one direction of flow


Fixed motor with two directions of flow


Variable motor with two directions of flow


Reversible fixed motor with two directions of flow

PUMP

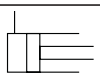

Fixed displacement pump with one direction of flow


Fixed displacement pump with two directions of flow


Variable displacement pump with one direction of flow

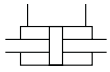

Variable displacement pump with flow regulator

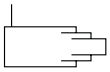
CYLINDERS


Single-acting cylinder


Single-acting cylinder with spring return


Double-acting cylinder


Double-acting cylinder with bilateral rod


Telescopic cylinder

COMMANDS AND CONTROLS


Shaft rotating in one direction


Shaft rotating in two directions


Hand-operated control


Hand-operated control with pushbutton


Hand-operated control with lever

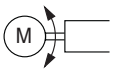

Hand-operated control with pedal


Mechanical control with pushbutton


Mechanical control with spring


Mechanical control with roller


Electro-magnetic control with winding (solendoid)



Control with electric motor


Direct pressure control


Indirect (piloted) pressure control


Control with electromagnet and piloted distributor

PIPES AND CONNECTIONS

Induction and return pipe

Piloting pipe

Blow-by pipe


Flexible hose

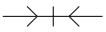

Connecting point

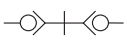

Pipe cross without connection


Breather


Closed pressure fitting


Pressure fitting with connected pipe


Quick fitting


Quick fitting with check valves

DISTRIBUTION - SETTING ELEMENTS


Non-return valve


Calibrated non-return valve

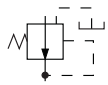

Unlockable non-return valve


Combined non-return and throttle valve


Switching valve


Pressure relief valve with direct control


Pressure relief valve with hydraulic control


Pressure reducing valve


Sequence valve


Adjustable throttle valve


Two-way flow regulator


Cut-out cock

POWER SOURCES



Electric motor


Thermal engine

OTHER EQUIPMENT


Accumulator


Water tank


Compressor


Filter


Cooler


Pressure gauge

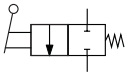

Thermometer

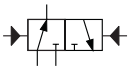

Flowmeter

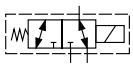

Pressure switch

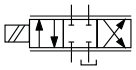

Drain to tank indication

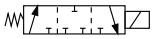
DISTRIBUTION - SETTING ELEMENTS

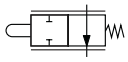

Two-position and two-way distributor, with manual lever control and spring return


Three-way and two-position distributor, with hydraulic control

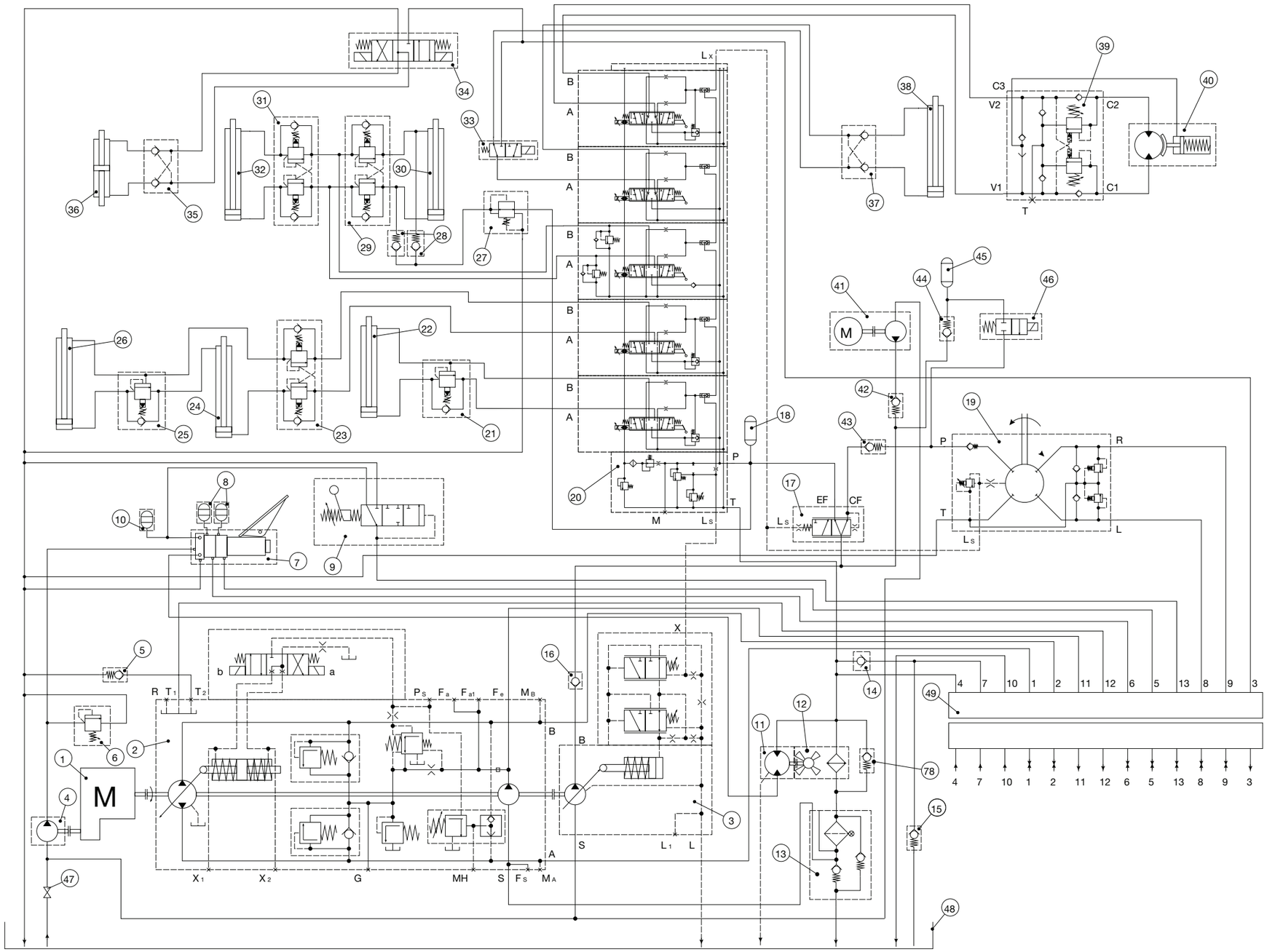

Two-position, three-way distributor, with electro-magnetic control and spring return


Distributor with mechanical control and span proportional to the action of the same control

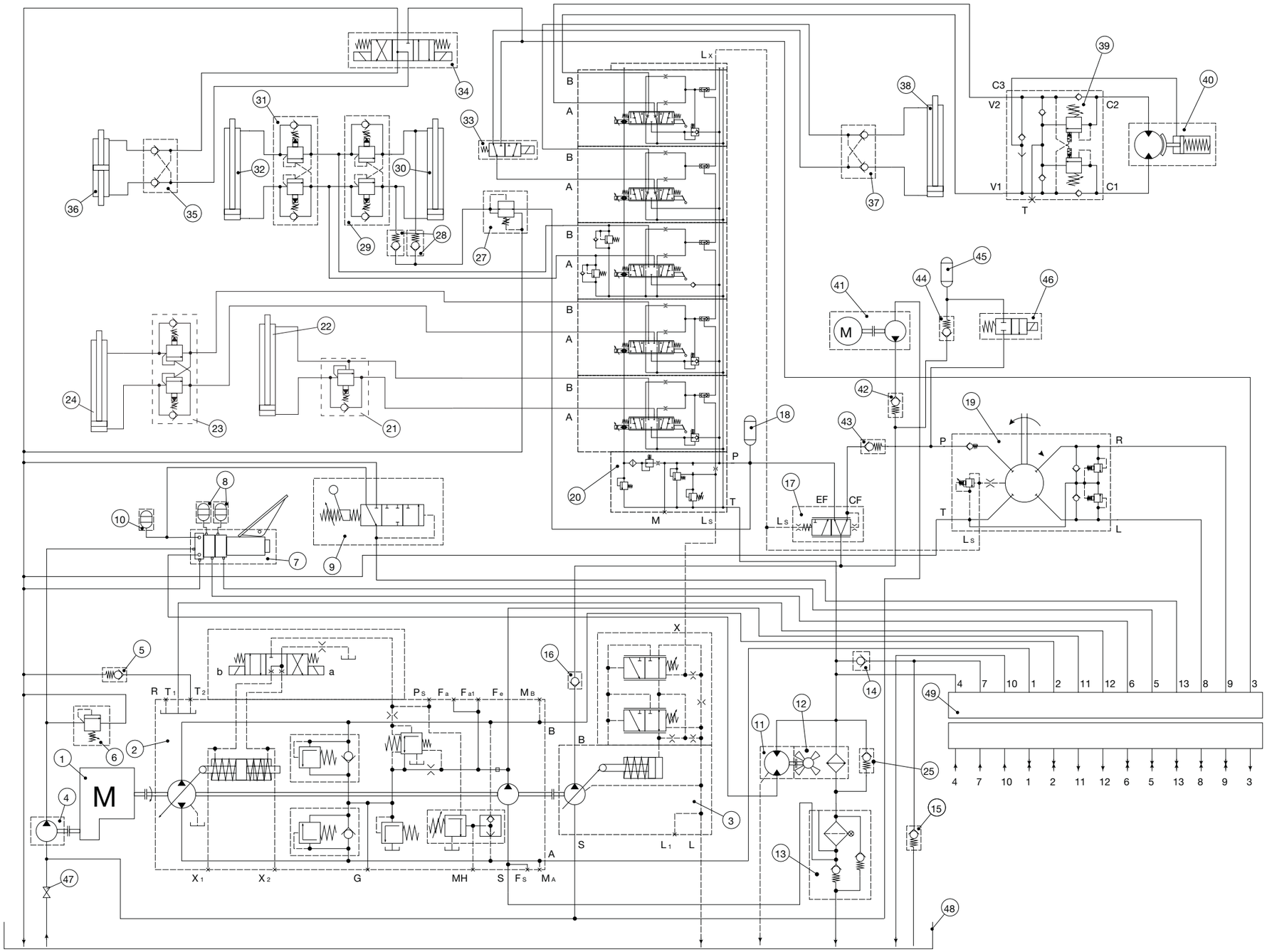

Two-position, three-way distributor, with representation of transient connection during passage phase


Electro-hydraulic single-acting servo valve

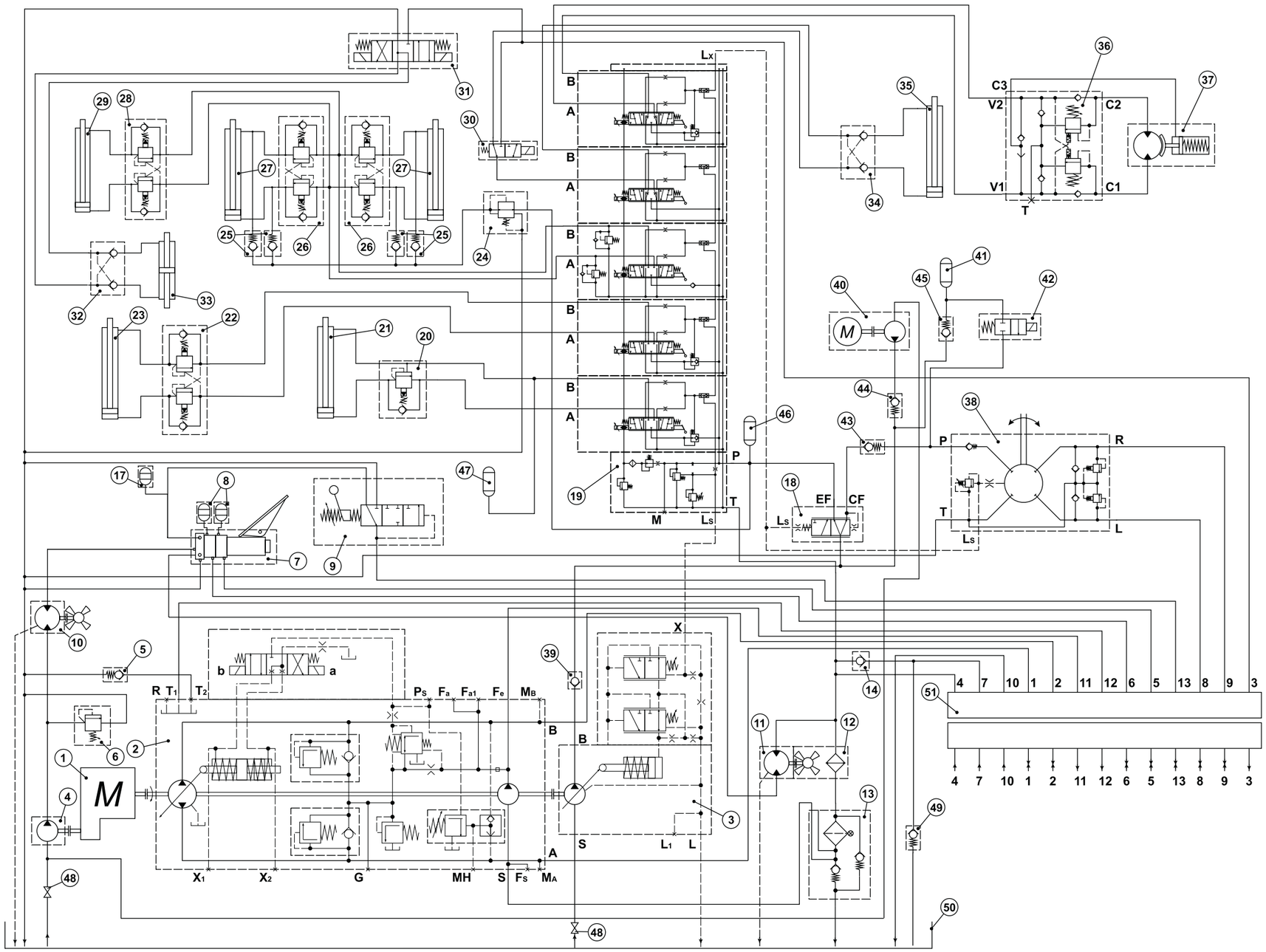
Operation: Hydraulic scheme Girolift 3514 (part 1 of 2)	*Table:* **C.03.01.01**



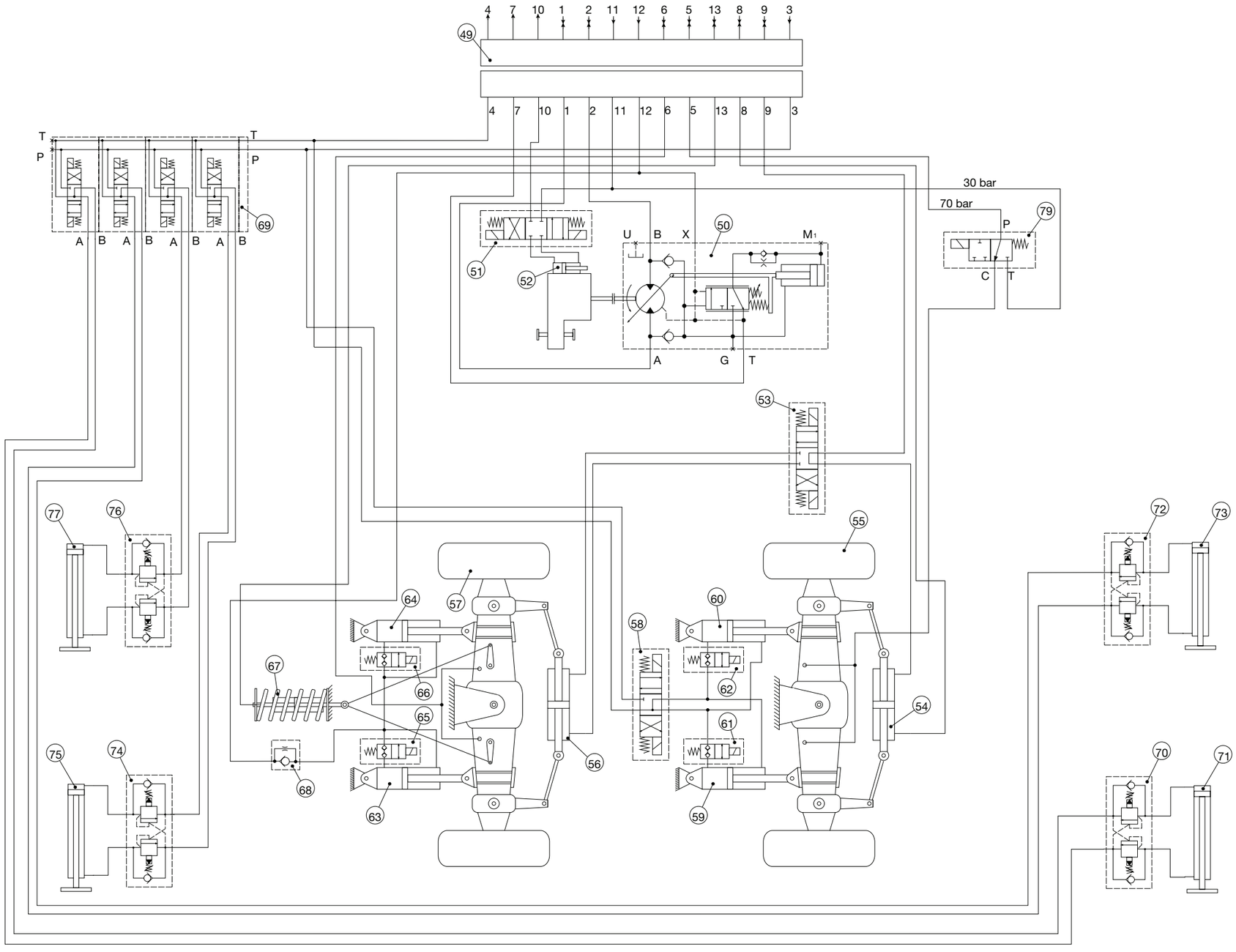
Operation: Hydraulic scheme Girolift 3518 (part 1 of 2)	*Table:* **C.03.01.02**



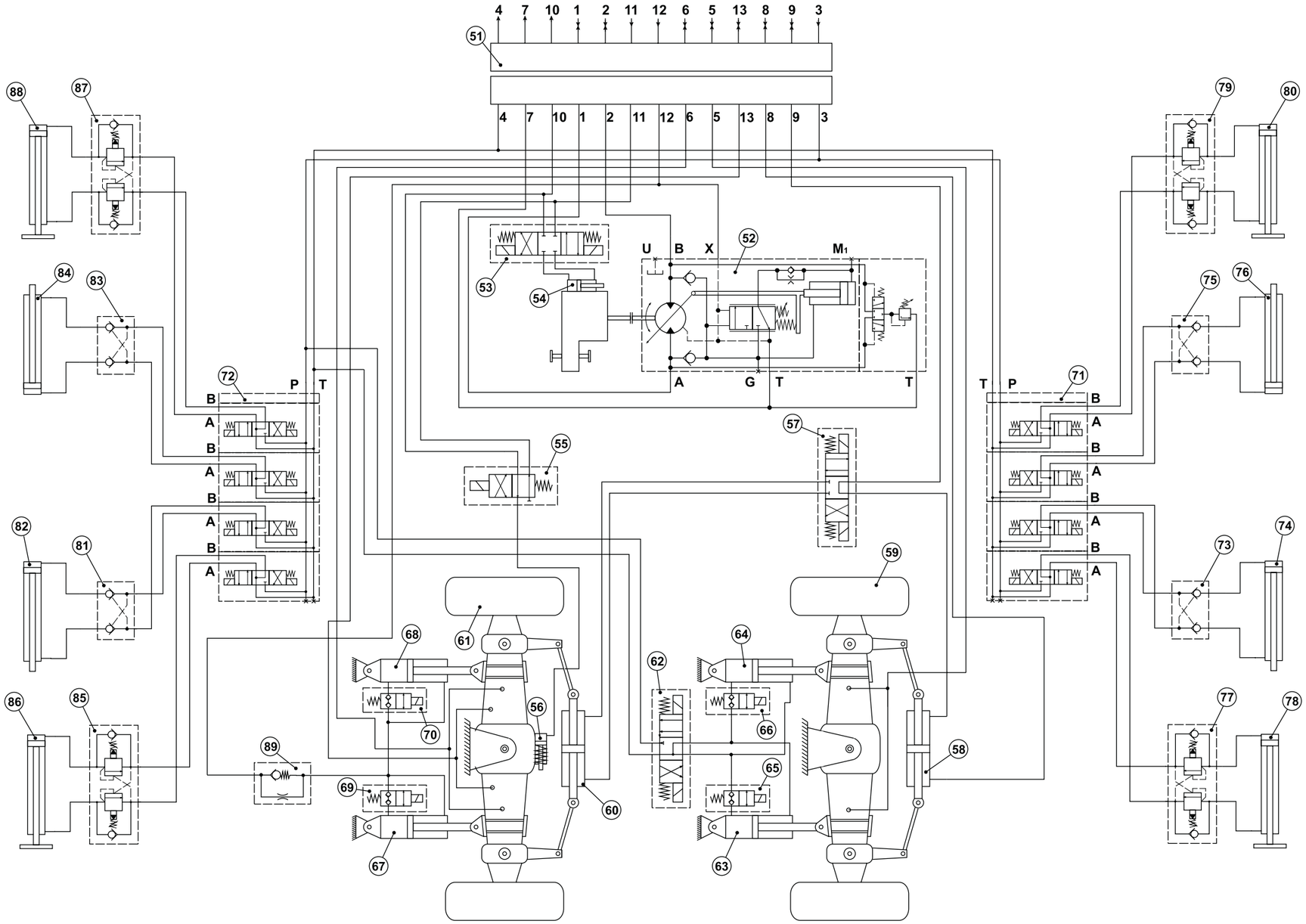
Operation: Hydraulic scheme Girolift 5022 (part 1 of 2)	*Table:* **C.03.01.03**



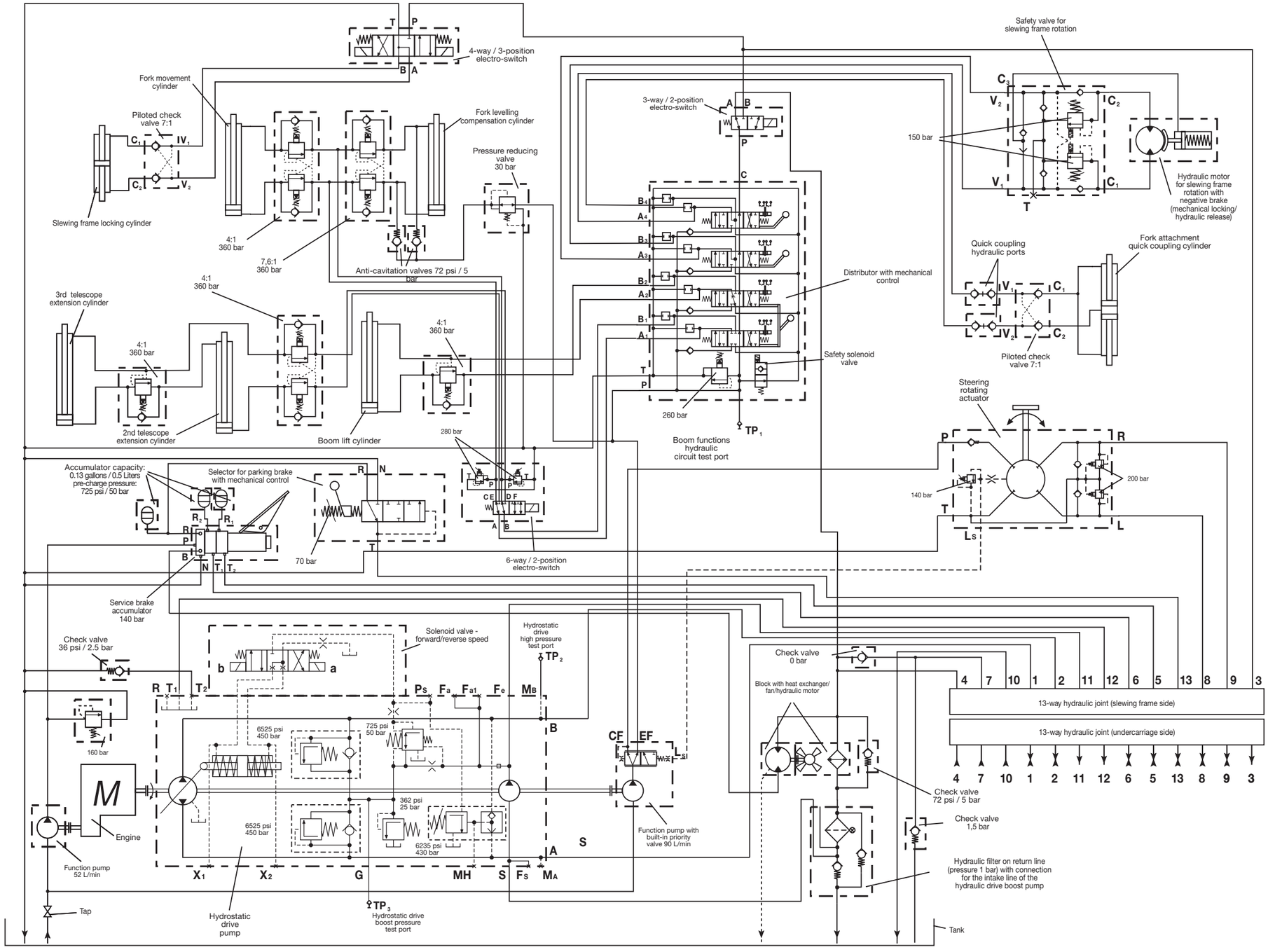
Operation: Hydraulic scheme Girolift 3514 - 3518 (part 2 of 2)	*Table:* **C.03.01.04**



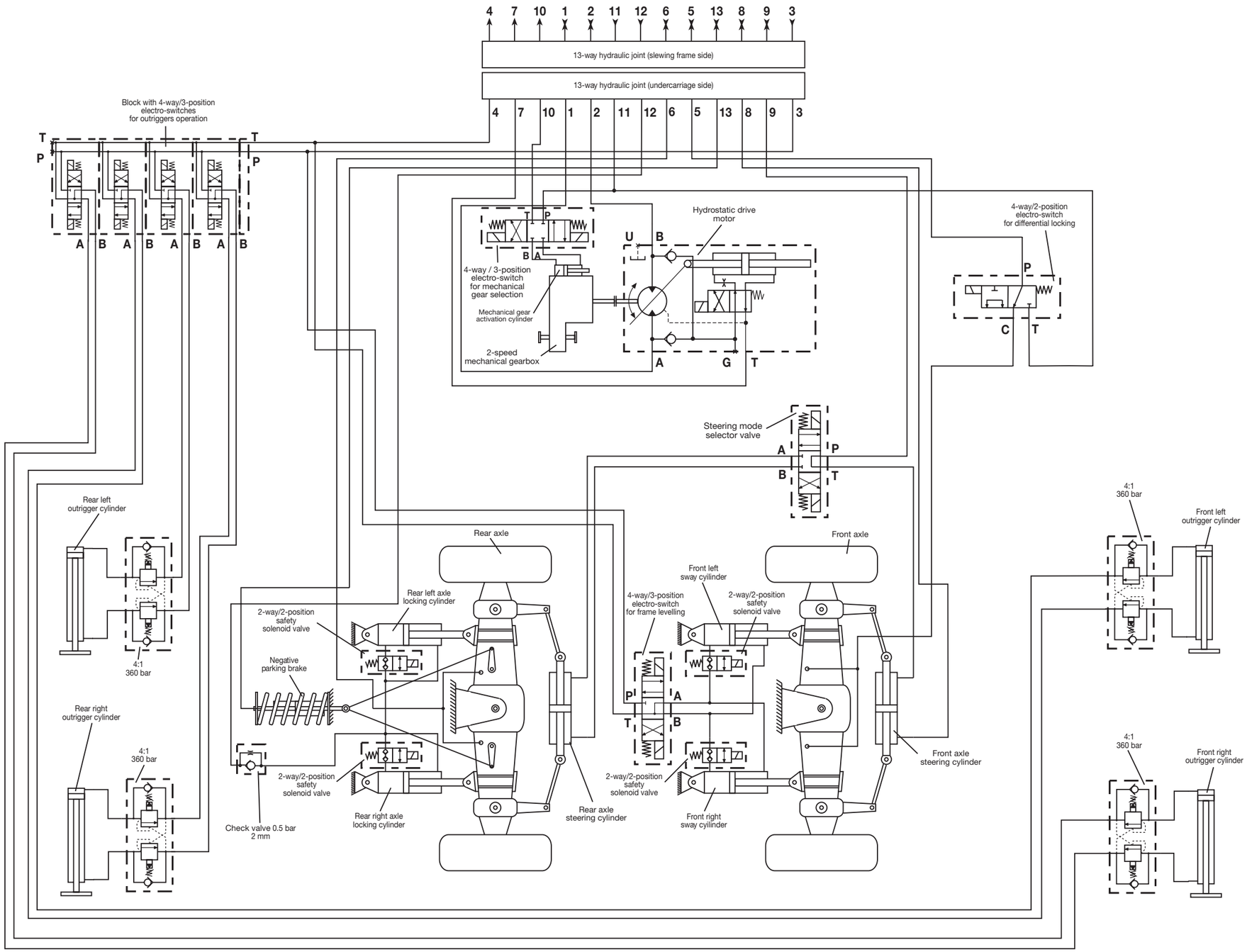
Operation: Hydraulic scheme Girolift 5022 (part 2 of 2)	*Table:* **C.03.01.05**



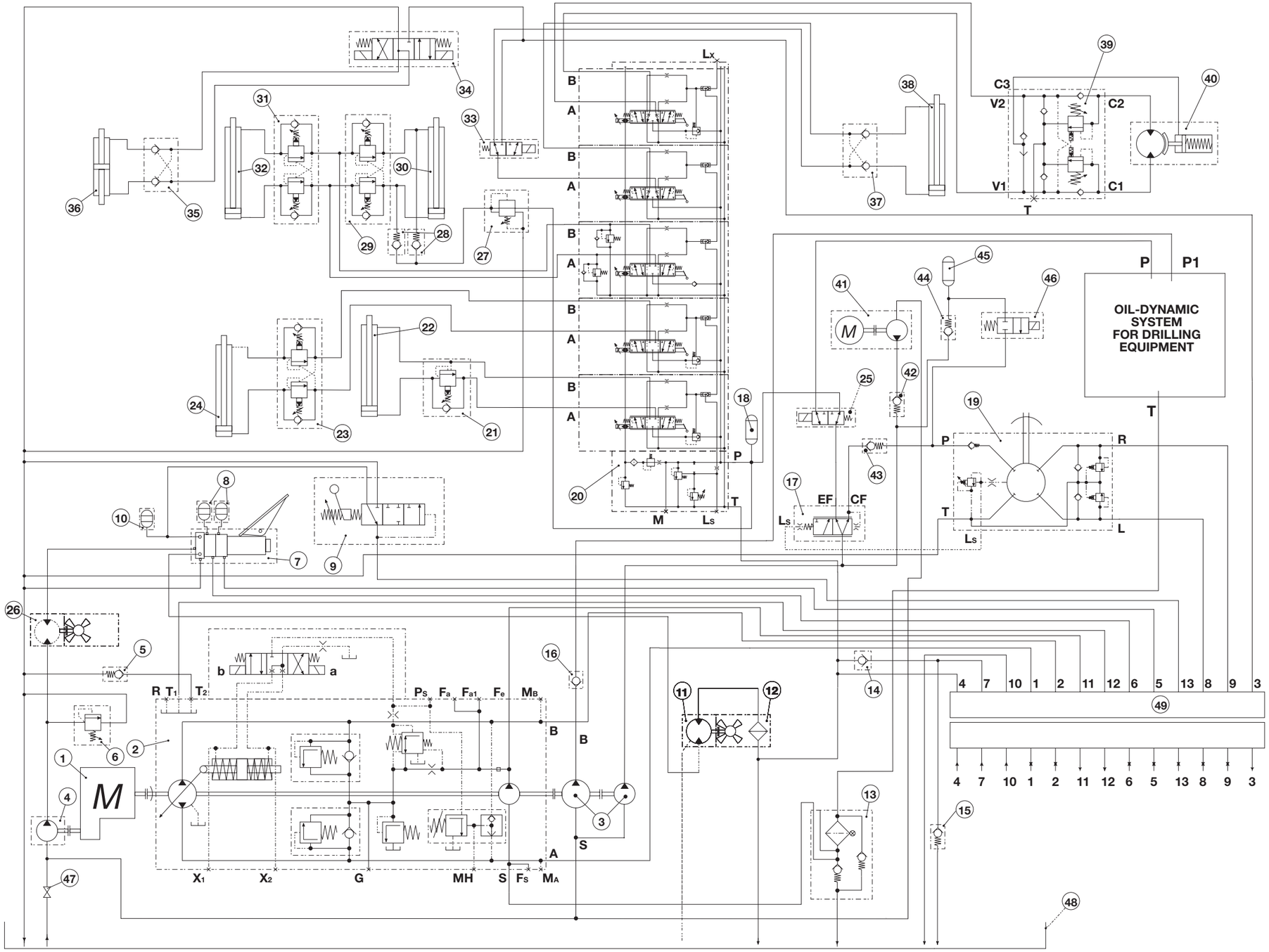
Operation: Hydraulic scheme Girolift 3714 SX (part 1 of 2)	*Table:* **C.03.01.06**



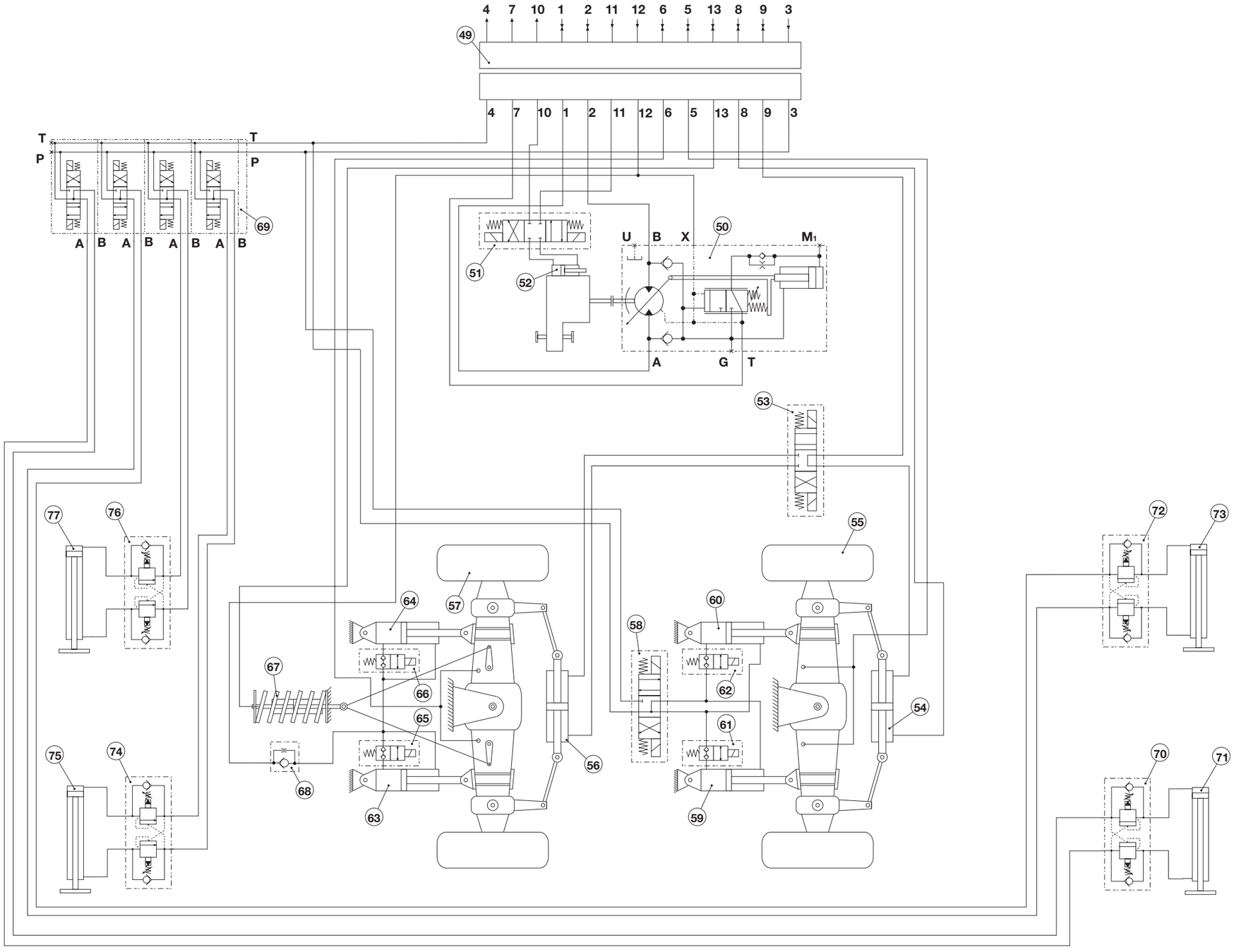
Operation: Hydraulic scheme Girolift 3714 SX (part 2 of 2)	*Table:* **C.03.01.07**



Operation: Hydraulic scheme 4010 Perfora (part 1 of 2)	*Table:* **C.03.01.08**



Operation: Hydraulic scheme 4010 Perfora (part 2 of 2)	*Table:* **C.03.01.09**



Operation: Description of the hydraulic components Girolift 3514	Table: C.03.01.10

1	DIESEL ENGINE
2	HYDRAULIC DRIVE PUMP
3	MAIN HYDRAULIC SERVICE PUMP
4	AUXILIARY HYDRAULIC SERVICE PUMP
5	ONE-WAY VALVE (2.5 bar)
6	PRESSURE REDUCING VALVE (160 bar)
7	SERVO-CONTROLLED BRAKE PUMP
8	SERVICE BRAKE ACCUMULATOR
9	MANUAL PARKING BRAKE CONTROL
10	PARKING BRAKE ACCUMULATOR
11	OIL EXCHANGER FAN MOTOR
12	OIL RADIATOR
13	OIL FILTER
14	ONE-WAY VALVE (0 bar)
15	ONE-WAY VALVE (1,5 bar)
16	ONE-WAY VALVE (0 bar)(*)
17	LOAD-SENSING VALVE
18	ACCUMULATOR
19	POWER STEERING
20	ELECTROPROPORTIONAL DISTRIBUTOR
21	LIFTING CYLINDER BLOCK VALVE
22	LIFTING CYLINDER
23	2nd SECTION EXT. CYLINDER BLOCK VALVE
24	2nd SECTION EXTENSION CYLINDER
25	3rd SECTION EXT. CYLINDER BLOCK VALVE
26	3rd SECTION EXTENSION CYLINDER
27	PRESSURE REDUCING VALVE (30 bar)
28	ONE-WAY VALVE (5 bar)
29	COMPENSATION CYLINDER BLOCK VALVE
30	COMPENSATION CYLINDER
31	FORK MOVEMENT CYLINDER BLOCK VALVE
32	FORK MOVEMENT CYLINDER
33	FLOW DIVIDER
34	TURRET LOCK CONTROL SOLENOID VALVE
35	TURRET LOCK CYLINDER BLOCK VALVE
36	TURRET LOCKING CYLINDER
37	ATTACHMENT COUPL. CYLINDER BLOCK VALVE
38	ATTACHMENT COUPLING CYLINDER
39	TURRET ROT. GEAR MOTOR BLOCK VALVE
40	TURRET ROTATION GEAR MOTOR
41	EMERGENCY PUMP (*)
42	ONE-WAY VALVE (0.5 bar)(*)
43	ONE-WAY VALVE (0.5 bar)(*)
44	ONE-WAY VALVE (0.5 bar)(*)
45	EMERGENCY STEERING ACCUMULATOR (**)
46	EMERGENCY STEERING SOLENOID VALVE (**)
47	PUMP INTAKE LINE GATE VALVE
48	HYDRAULIC OIL TANK
49	13-WAY HYDRAULIC JOINT
50	HYDRAULIC DRIVE MOTOR
51	MECHANICAL SPEED SELECTION SOL. VALVE
52	HYDRAULIC MECHANICAL SPEED ACTUATOR
53	STEERING SELECTION SOLENOID VALVE
54	FRONT AXLE STEERING CYLINDER
55	FRONT AXLE
56	REAR AXLE STEERING CYLINDER
57	REAR AXLE
58	SWAY CONTROL SOLENOID VALVE
59	FRONT RIGHT SWAY CYILINDER
60	FRONT LEFT SWAY CYILINDER
61	FRONT RIGHT SWAY CYILINDER BLOCK VALVE
62	FRONT LEFT SWAY CYILINDER BLOCK VALVE
63	REAR RIGHT AXLE LOCKING CYLINDER
64	REAR LEFT AXLE LOCKING CYLINDER
65	REAR RIGHT AXLE CYLINDER BLOCK VALVE
66	REAR LEFT AXLE CYLINDER BLOCK VALVE
67	NEGATIVE PARKING BRAKE
68	ONE-WAY VALVE WITH THROTTLE
69	OUTRIGGER SOLENOID VALVE BLOCK
70	FRONT RIGHT OUTRIGGER CYLINDER BLOCK VALVE
71	FRONT RIGHT OUTRIGGER CYLINDER
72	FRONT LEFT OUTRIGGER CYLINDER BLOCK VALVE
73	FRONT LEFT OUTRIGGER CYLINDER
74	REAR RIGHT OUTRIGGER CYLINDER BLOCK VALVE
75	REAR RIGHT OUTRIGGER CYLINDER
76	REAR LEFT OUTRIGGER CYLINDER BLOCK VALVE
77	REAR LEFT OUTRIGGER CYLINDER
78	ONE-WAY VALVE (5 bar)
79	DIFFERENTIAL LOCKING SOLENOID VALVE

(*) ONLY WITH MAN-PLATFORM

(**) ONLY FOR TÜV STANDARDS

Operation: Description of the hydraulic components Girolift 3518	*Table:* **C.03.01.11**

1	DIESEL ENGINE
2	HYDRAULIC DRIVE PUMP
3	MAIN HYDRAULIC SERVICE PUMP
4	AUXILIARY HYDRAULIC SERVICE PUMP
5	ONE-WAY VALVE (2.5 bar)
6	PRESSURE REDUCING VALVE (160 bar)
7	SERVO-CONTROLLED BRAKE PUMP
8	SERVICE BRAKE ACCUMULATOR
9	MANUAL PARKING BRAKE CONTROL
10	PARKING BRAKE ACCUMULATOR
11	OIL EXCHANGER FAN MOTOR
12	OIL RADIATOR
13	OIL FILTER
14	ONE-WAY VALVE (0 bar)
15	ONE-WAY VALVE (1,5 bar)
16	ONE-WAY VALVE (0 bar)(*)
17	LOAD-SENSING VALVE
18	ACCUMULATOR
19	POWER STEERING
20	ELECTROPROPORTIONAL DISTRIBUTOR
21	LIFTING CYLINDER BLOCK VALVE
22	LIFTING CYLINDER
23	2nd SECTION EXT. CYLINDER BLOCK VALVE
24	2nd SECTION EXTENSION CYLINDER
78	ONE-WAY VALVE (5 bar)
27	PRESSURE REDUCING VALVE (30 bar)
28	ONE-WAY VALVE (5 bar)
29	COMPENSATION CYLINDER BLOCK VALVE
30	COMPENSATION CYLINDER
31	FORK MOVEMENT CYLINDER BLOCK VALVE
32	FORK MOVEMENT CYLINDER
33	FLOW DIVIDER
34	TURRET LOCK CONTROL SOLENOID VALVE
35	TURRET LOCK CYLINDER BLOCK VALVE
36	TURRET LOCKING CYLINDER
37	ATTACHMENT COUPL. CYLINDER BLOCK VALVE
38	ATTACHMENT COUPLING CYLINDER
39	TURRET ROT. GEAR MOTOR BLOCK VALVE
40	TURRET ROTATION GEAR MOTOR
41	EMERGENCY PUMP (*)
42	ONE-WAY VALVE (0.5 bar)(*)

43	ONE-WAY VALVE (0.5 bar)(*)
44	ONE-WAY VALVE (0.5 bar)(*)
45	EMERGENCY STEERING ACCUMULATOR (**)
46	EMERGENCY STEERING SOLENOID VALVE (**)
47	PUMP INTAKE LINE GATE VALVE
48	HYDRAULIC OIL TANK
49	13-WAY HYDRAULIC JOINT
50	HYDRAULIC DRIVE MOTOR
51	MECHANICAL SPEED SELECTION SOL. VALVE
52	HYDRAULIC MECHANICAL SPEED ACTUATOR
53	STEERING SELECTION SOLENOID VALVE
54	FRONT AXLE STEERING CYLINDER
55	FRONT AXLE
56	REAR AXLE STEERING CYLINDER
57	REAR AXLE
58	SWAY CONTROL SOLENOID VALVE
59	FRONT RIGHT SWAY CYILINDER
60	FRONT LEFT SWAY CYILINDER
61	FRONT RIGHT SWAY CYILINDER BLOCK VALVE
62	FRONT LEFT SWAY CYILINDER BLOCK VALVE
63	REAR RIGHT AXLE LOCKING CYLINDER
64	REAR LEFT AXLE LOCKING CYLINDER
65	REAR RIGHT AXLE CYLINDER BLOCK VALVE
66	REAR LEFT AXLE CYLINDER BLOCK VALVE
67	NEGATIVE PARKING BRAKE
68	ONE-WAY VALVE WITH THROTTLE
69	OUTRIGGER SOLENOID VALVE BLOCK
70	FRONT RIGHT OUTRIGGER CYLINDER BLOCK VALVE
71	FRONT RIGHT OUTRIGGER CYLINDER
72	FRONT LEFT OUTRIGGER CYLINDER BLOCK VALVE
73	FRONT LEFT OUTRIGGER CYLINDER
74	REAR RIGHT OUTRIGGER CYLINDER BLOCK VALVE
75	REAR RIGHT OUTRIGGER CYLINDER
76	REAR LEFT OUTRIGGER CYLINDER BLOCK VALVE
77	REAR LEFT OUTRIGGER CYLINDER
78	ONE-WAY VALVE (5 bar)
79	DIFFERENTIAL LOCKING SOLENOID VALVE

(*) ONLY WITH MAN-PLATFORM

(**) ONLY FOR TÜV STANDARDS

Operation: Description of the hydraulic components Girolift 5022	Table: C.03.01.12

1	DIESEL ENGINE
2	HYDRAULIC DRIVE PUMP
3	MAIN HYDRAULIC SERVICE PUMP
4	AUXILIARY HYDRAULIC SERVICE PUMP
5	ONE-WAY VALVE (2.5 bar)
6	PRESSURE REDUCING VALVE (160 bar)
7	SERVO-CONTROLLED BRAKE PUMP
8	SERVICE BRAKE ACCUMULATOR
9	MANUAL PARKING BRAKE CONTROL
10	WATER EXCHANGER FAN MOTOR
11	OIL EXCHANGER FAN MOTOR
12	AIR-OIL EXCHANGER
13	OIL FILTER
14	ONE-WAY VALVE (0 bar)
15	
16	
17	PARKING BRAKE ACCUMULATOR
18	LOAD-SENSING VALVE
19	ELECTROPROPORTIONAL DISTRIBUTOR
20	LIFTING CYLINDER BLOCK VALVE
21	LIFTING CYLINDER
22	EXTENSION CYLINDER BLOCK VALVE
23	EXTENSION CYLINDER
24	PRESSURE REDUCING VALVE (30 bar)
25	ONE-WAY VALVE (5 bar)
26	COMPENSATION CYLINDER BLOCK VALVE
27	COMPENSATION CYLINDER
28	FORK MOVEMENT CYLINDER BLOCK VALVE
29	FORK MOVEMENT CYLINDER
30	FLOW DIVIDER
31	TURRET LOCK CONTROL SOLENOID VALVE
32	TURRET LOCK CYLINDER BLOCK VALVE
33	TURRET LOCKING CYLINDER
34	ATTACHMENT COUPL. CYLINDER BLOCK VALVE
35	ATTACHMENT COUPLING CYLINDER
36	TURRET ROT. GEAR MOTOR BLOCK VALVE
37	TURRET ROTATION GEAR MOTOR
38	POWER STEERING
39	ONE-WAY VALVE (0 bar) (*)
40	EMERGENCY PUMP (*)
41	EMERGENCY STEERING ACCUMULATOR (**)
42	EMERGENCY STEERING SOLENOID VALVE (**)
43	ONE-WAY VALVE (0.5 bar)(*)
44	ONE-WAY VALVE (0.5 bar)(*)
45	ONE-WAY VALVE (0.5 bar)(*)
46	PUMP ACCUMULATOR
47	EXTENSION CYLINDER ACCUMULATOR
48	PUMP INTAKE LINE VALVE
49	ONE-WAY VALVE (1,5 bar)
50	HYDRAULIC OIL TANK
51	13-WAY HYDRAULIC JOINT
52	HYDRAULIC DRIVE MOTOR
53	MECHANICAL SPEED SELECTION VALVE.
54	HYDRAULIC MECHANICAL SPEED ACTUATOR
55	DIFFERENTIAL LOCK SOLENOID VALVE
56	HYDRAULIC DIFFERENTIAL LOCK ACTUATOR
57	STEERING SELECTION SOLENOID VALVE
58	FRONT AXLE STEERING CYLINDER
59	FRONT AXLE
60	REAR AXLE STEERING CYLINDER
61	REAR AXLE
62	SWAY CONTROL SOLENOID VALVE
63	FRONT RIGHT SWAY CYILINDER
64	FRONT LEFT SWAY CYILINDER
65	FRONT RIGHT SWAY CYILINDER BLOCK VALVE
66	FRONT LEFT SWAY CYILINDER BLOCK VALVE
67	REAR RIGHT AXLE LOCKING CYLINDER
68	REAR LEFT AXLE LOCKING CYLINDER
69	REAR RIGHT AXLE CYLINDER BLOCK VALVE.
70	REAR LEFT AXLE CYLINDER BLOCK VALVE
71	FRONT OUTRIGGER SOLENOID VALVE BLOCK.
72	REAR OUTRIGGER SOLENOID VALVE BLOCK
73	FRONT RIGHT OUTR. ARM CYLIND. BLOCK VALVE
74	FRONT RIGHT OUTRIGGER ARM CYLINDER
75	FRONT LEFT OUTR. ARM CYLIND. BLOCK VALVE
76	FRONT LEFT OUTRIGGER ARM CYLINDER
77	FRONT RIGHT OUTR. FOOT CYL. BLOCK VALVE
78	FRONT RIGHT OUTRIGGER FOOT CYLINDER
79	FRONT LEFT OUTR. FOOT CYL. BLOCK VALVE
80	FRONT LEFT OUTRIGGER FOOT CYLINDER
81	REAR RIGHT OUTR. ARM CYLIND. BLOCK VALVE
82	REAR RIGHT OUTRIGGER ARM CYLINDER

Operation: Description of the hydraulic components Girolift 5022	Table: C.03.01.12

83	REAR LEFT OUTR. ARM CYLIND. BLOCK VALVE
84	REAR LEFT OUTRIGGER ARM CYLINDER
85	REAR RIGHT OUTR. FOOT CYL. BLOCK VALVE
86	REAR RIGHT OUTRIGGER FOOT CYLINDER
87	REAR LEFT OUTR. FOOT CYL. BLOCK VALVE
88	REAR LEFT OUTRIGGER FOOT CYLINDER
89	ONE-WAY VALVE WITH THROTTLE

(*) ONLY WITH MAN-PLATFORM

(**) ONLY FOR TÜV STANDARDS

Operation: Description of the hydraulic components 4010 Perfora	Table: C.03.01.13

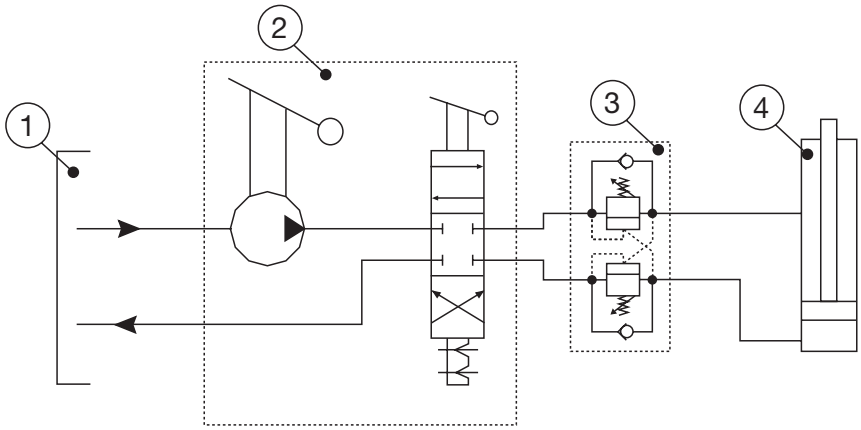
1	DIESEL ENGINE
2	HYDRAULIC DRIVE PUMP
3	HYDRAULIC SERVICE PUMPS
4	AUXILIARY HYDRAULIC SERVICE PUMP
5	ONE-WAY VALVE (2.5 bar)
6	PRESSURE REDUCING VALVE (160 bar)
7	SERVO-CONTROLLED BRAKE PUMP
8	SERVICE BRAKE ACCUMULATOR
9	MANUAL PARKING BRAKE CONTROL
10	PARKING BRAKE ACCUMULATOR
11	OIL EXCHANGER FAN MOTOR
12	AIR-OIL EXCHANGER
13	OIL FILTER
14	ONE-WAY VALVE (0 bar)
15	ONE-WAY VALVE (1,5 bar)
16	ONE-WAY VALVE (0 bar) (*)
17	LOAD-SENSING VALVE
18	PUMP ACCUMULATOR
19	POWER STEERING
20	ELECTROPROPORTIONAL DISTRIBUTOR
21	LIFTING CYLINDER BLOCK VALVE
22	LIFTING CYLINDER
23	2ND BOOM ELEMENT EXTENSION CYLINDER BLOCK VALVE
24	2ND BOOM ELEMENT EXTENSION CYLINDER
25	FLOW DIVIDER
26	WATER RADIATOR
27	PRESSURE REDUCING VALVE (30 bar)
28	ONE-WAY VALVE (5 bar)
29	COMPENSATION CYLINDER BLOCK VALVE
30	COMPENSATION CYLINDER
31	FORK MOVEMENT CYLINDER BLOCK VALVE
32	FORK MOVEMENT CYLINDER
33	FLOW DIVIDER
34	TURRET LOCK CONTROL SOLENOID VALVE
35	TURRET LOCK CYLINDER BLOCK VALVE
36	TURRET LOCKING CYLINDER
37	ATTACHMENT COUPL. CYLINDER BLOCK VALVE
38	ATTACHMENT COUPLING CYLINDER
39	TURRET ROT. GEAR MOTOR BLOCK VALVE
40	TURRET ROTATION GEAR MOTOR
41	EMERGENCY PUMP (*)
42	ONE-WAY VALVE (0,5 bar) (**)
43	ONE-WAY VALVE (0,5 bar) (**)
44	ONE-WAY VALVE (0,5 bar) (*)
45	EMERGENCY STEERING ACCUMULATOR (**)
46	EMERGENCY STEERING SOLENOID VALVE (**)
47	PUMP INTAKE LINE VALVE
48	HYDRAULIC OIL TANK
49	13-WAY HYDRAULIC JOINT
50	HYDRAULIC DRIVE MOTOR
51	MECHANICAL SPEED SELECTION VALVE.
52	HYDRAULIC MECHANICAL SPEED ACTUATOR
53	STEERING SELECTION SOLENOID VALVE
54	FRONT AXLE STEERING CYLINDER
55	FRONT AXLE
56	REAR AXLE STEERING CYLINDER
57	REAR AXLE
58	SWAY CONTROL SOLENOID VALVE
59	FRONT RIGHT SWAY CYILINDER
60	FRONT LEFT SWAY CYILINDER
61	FRONT RIGHT SWAY CYILINDER BLOCK VALVE
62	FRONT LEFT SWAY CYILINDER BLOCK VALVE
63	REAR RIGHT AXLE LOCKING CYLINDER
64	REAR LEFT AXLE LOCKING CYLINDER
65	REAR RIGHT AXLE CYLINDER BLOCK VALVE.
66	REAR LEFT AXLE CYLINDER BLOCK VALVE
67	NEGATIVE PARKING BRAKE
68	ONE-WAY VALVE WITH THROTTLE
69	OUTRIGGER SOLENOID VALVE BLOCK
70	FRONT OUTRIGGER CYLINDER BLOCK VALVE
71	FRONT LEFT OUTRIGGER CYLINDER
72	FRONT LEFT OUTRIGGER CYLINDER BLOCK VALVE
73	FRONT RIGHT OUTRIGGER CYLINDER
74	REAR RIGHT OUTRIGGER CYLINDER BLOCK VALVE
75	REAR RIGHT OUTRIGGER CYLINDER
76	REAR LEFT OUTRIGGER CYLINDER BLOCK VALVE
77	REAR LEFT OUTRIGGER CYLINDER

(*) ONLY WITH MAN-PLATFORM

(**) ONLY FOR TÜV STANDARDS

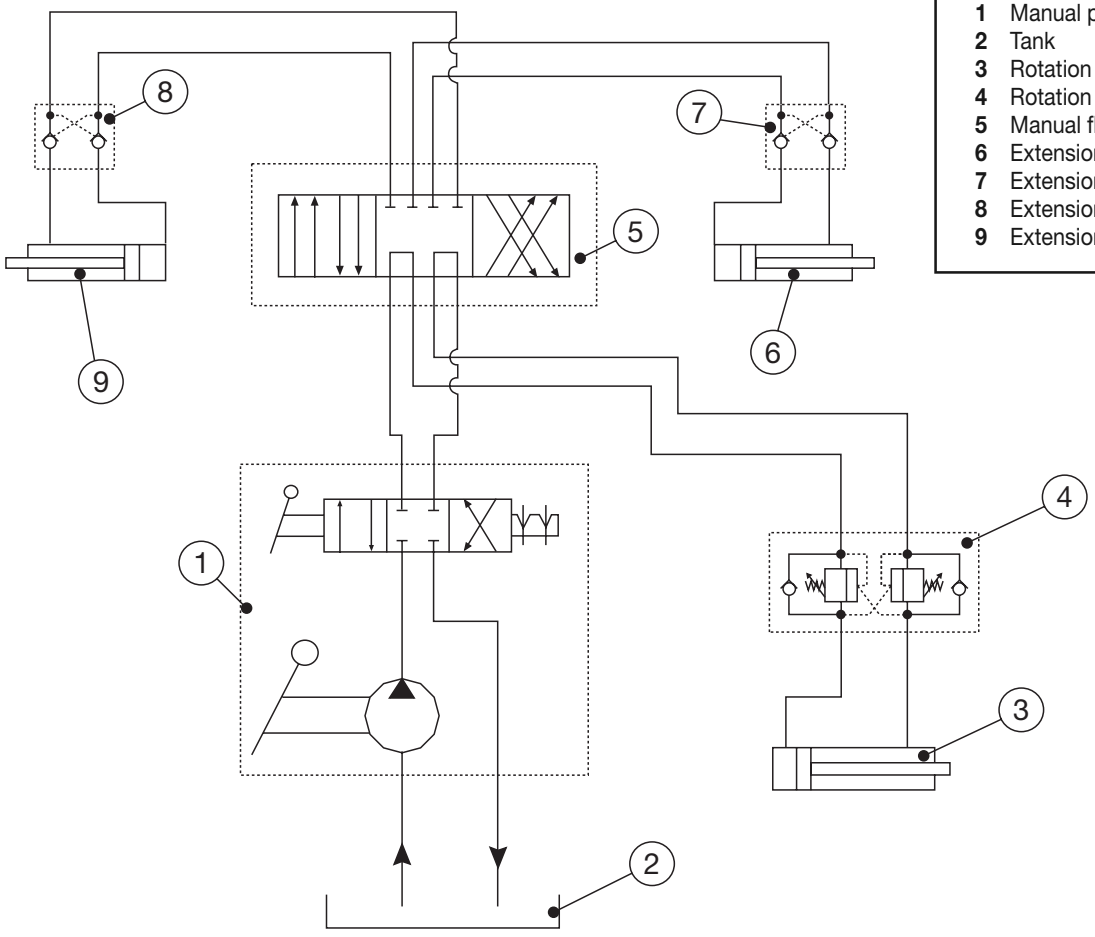
Operation: Aerial man-platform hydraulic schemes	Table: C.03.02

Aerial platform RNE - REM 4400



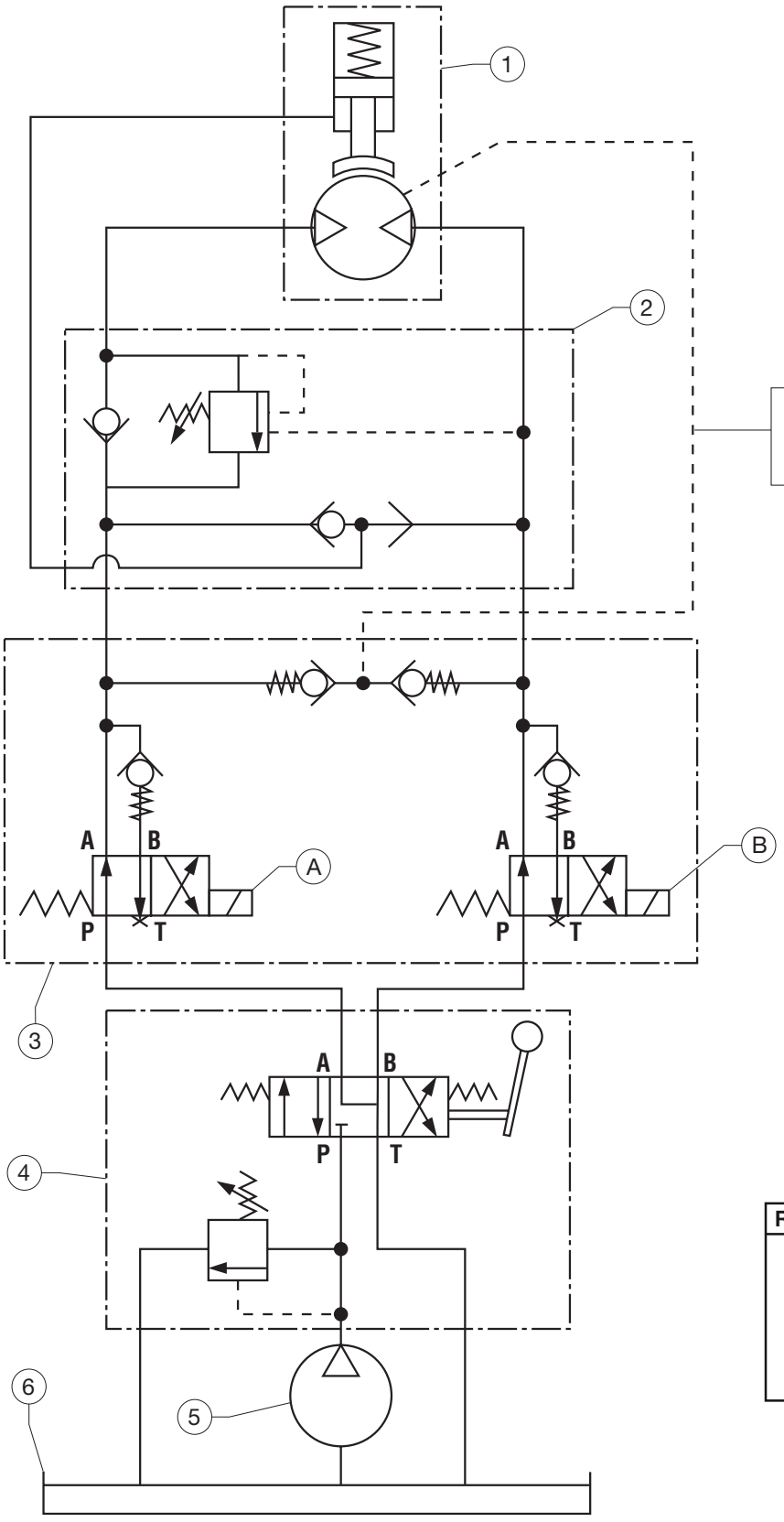
Ref.	Description
1	Tank
2	Manual pump
3	Block valve
4	Rotation cylinder

Aerial platform REM 5500



Ref.	Description
1	Manual pump
2	Tank
3	Rotation cylinder
4	Rotation cylinder block valve
5	Manual flow divider
6	Extension cylinder
7	Extension cylinder block valve
8	Extension cylinder block valve
9	Extension cylinder

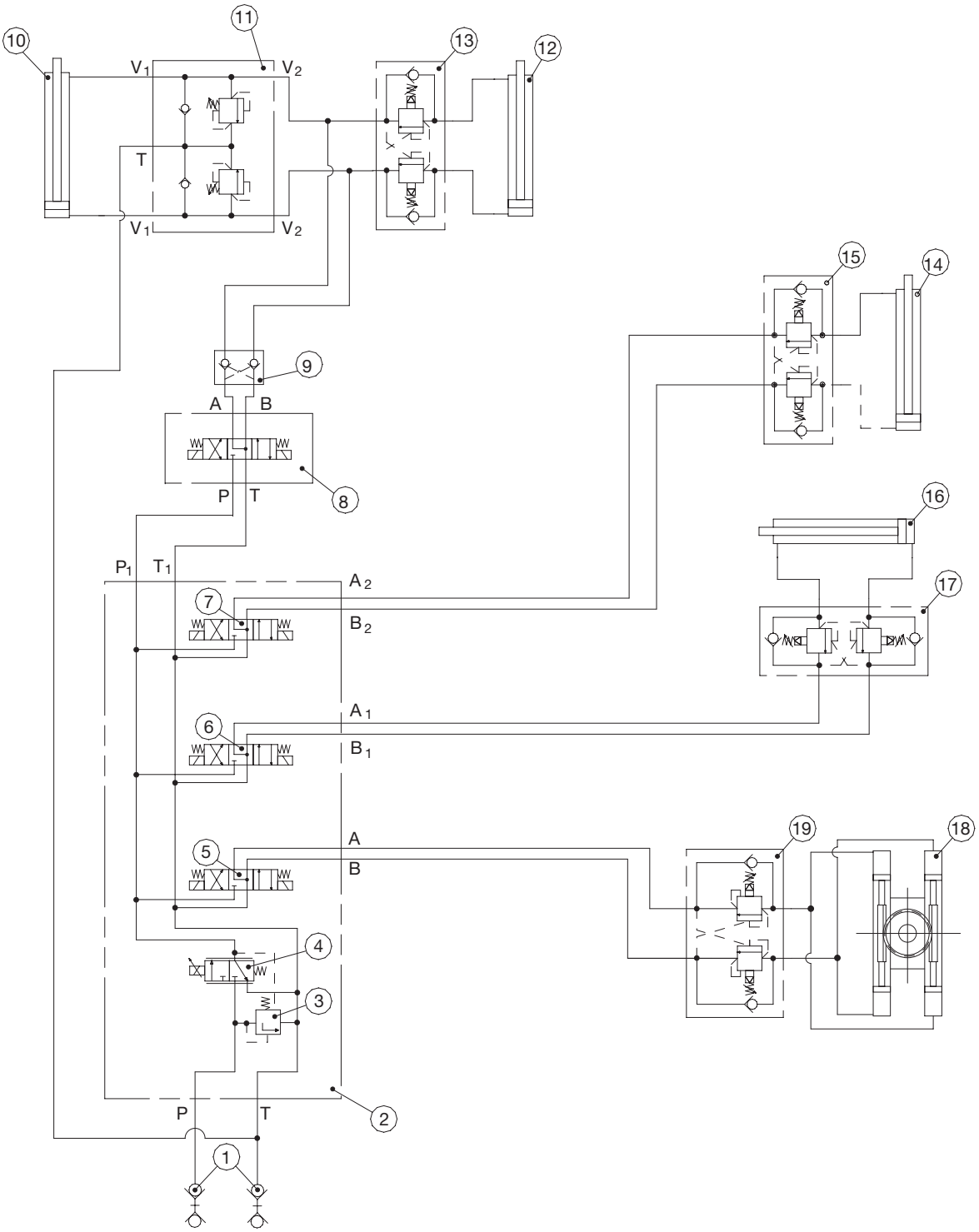
Operation: Winch hydraulic scheme	*Table:* **C.03.03**



Discharge line
External for S25 winches
Internal for P9 and P15 winches

Ref.	Description
1	Hydraulic motor
2	Valve
3	Cock
4	Control valve
5	Hydraulic pump
6	Oil tank

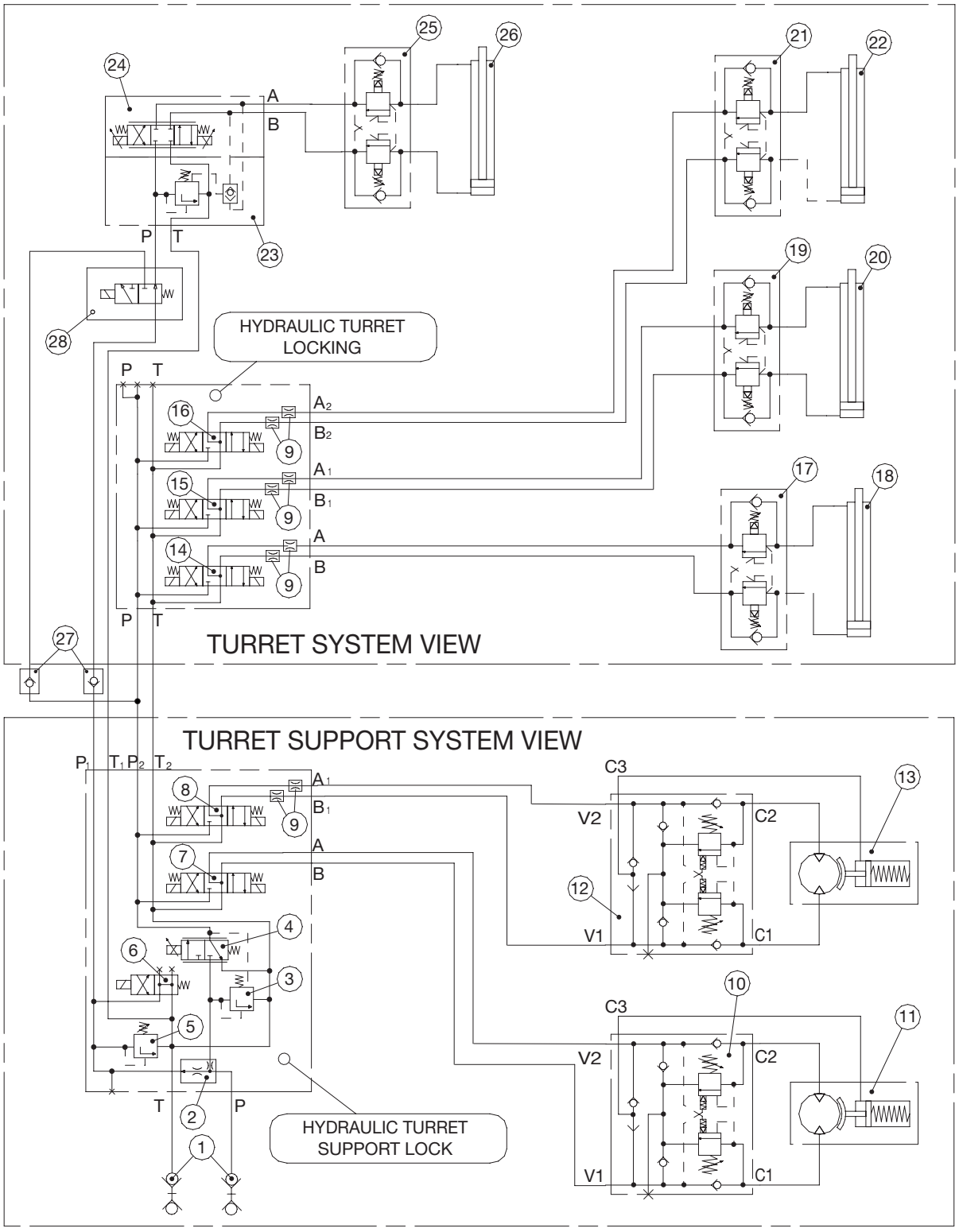
Operation: Robot 8000 hydraulic scheme	Table: C.03.04



Operation: Description of the hydraulic components robot 8000	*Table:* **C.03.04**

Réf.	Description
1	Quick connector
2	Hydraulic connection panel
3	Two-way compensator
4	3-way proportional valve
5	Turret rotation solenoid valve
6	Extension cylinder solenoid valve
7	Lifting cylinder solenoid valve
8	Solenoid valve for levelling the platform in manual mode
9	Double check valve
10	Levelling cylinder on turret
11	Double pressure relief valve
12	Platform levelling cylinder
13	Platform levelling cylinder block valve
14	Lifting cylinder
15	Lifting cylinder block valve
16	Extension cylinder
17	Extension cylinder block valve
18	Rotating operator
19	Rotating operator block valve

Operation: Robot 15000 hydraulic scheme	Table: C.03.05

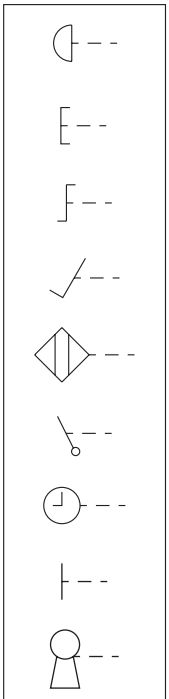


Operation: Description of the hydraulic components robot 15000	*Table:* **C.03.05**

Réf.	Description
1	Quick connector
2	Load sensing valve
3	2-way max pressure valve
4	Proportional valve
5	Pressure reducing valve
6	Unloading solenoid valve
7	Boom dumping slewring mot. solenoid
8	Turret rotation slewring gear mot. solenoid
9	Throttle
10	Boom dumping gear motor block valve
11	Boom dumping gear motor
12	Turret rotation gear motor block valve
13	Turret rotation gear motor
14	1st section extension cylinder solenoid valve
15	2nd section extension cylinder solenoid valve
16	3rd section extension cylinder solenoid valve
17	1st section motion cylinder block valve
18	1st section motion cylinder
19	2nd section motion cylinder block valve
20	2nd section motion cylinder
21	3rd section motion cylinder block valve
22	3rd section motion cylinder
23	2-way valve
24	Sway proportional valve
25	Sway cylinder block valve
26	Platform sway cylinder
27	1-way valve

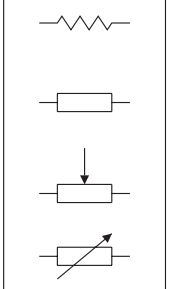
C.04 ELECTRICAL SYMBOLS

ACTUATORS



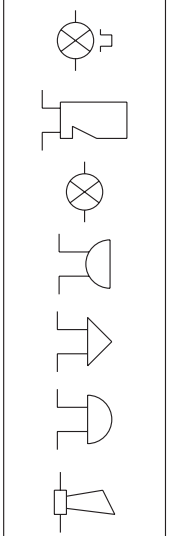
- Emergency controls
- Pushbutton control
- Rotary control
- Pedal control
- Proximity control
- Lever control
- Timed control
- Mechanical/manual control
- Key control

RESISTANCES



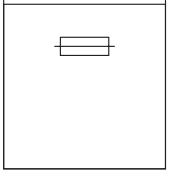
- Resistance
- Resistor
- Potentiometer
- Variable resistance

SIGNALS



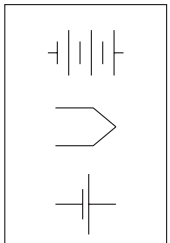
- Intermittent lamp
- Whistle
- Lamp
- Buzzer
- Siren
- Bell
- Horn

FUSES AND RELAYS



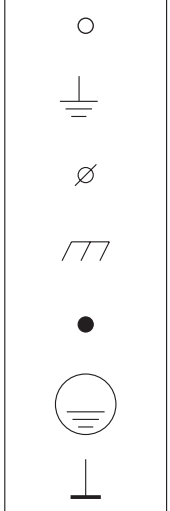
- Horizontal fuse
- Relay

ACCUMULATORS



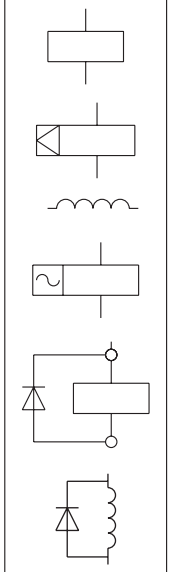
- Battery
- Thermocouple
- Element

TERMINALS AND GROUNDS



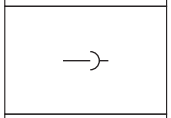
- Ring
- Ground
- Terminal
- Ground to frame
- Knot
- Protection ground
- Frame ground 2

COILS



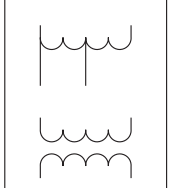
- Coil
- Mechanical coupling coil
- Winding
- A/C coil
- Coil with diode
- Winding with diode

CONNECTORS



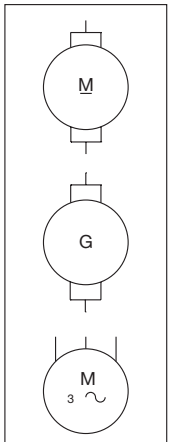
- Connector

STATIC APPLICATIONS



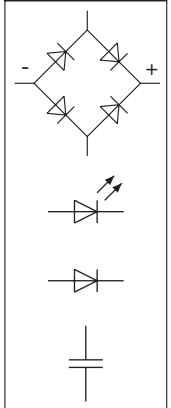
- Auto-transformer
- Transformer

DYNAMIC APPLICATIONS



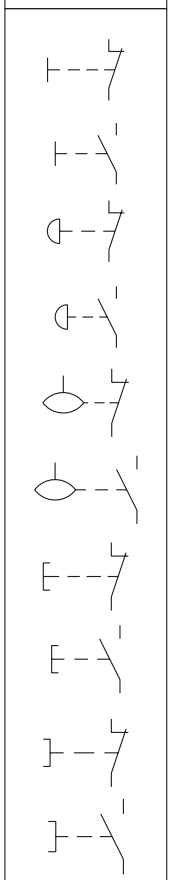
- Motor
- Generator
- As_3p_motor

ELECTRONIC PARTS



- Rectifier
- Light-emitting diode
- Diode
- Condenser

PUSHBUTTONS



- Manual NC contact
- Manual NO contact
- NC mushroom-head pushbutton
- NO mushroom-head pushbutton
- NC level
- NO level
- Pushbutton with NC return
- Pushbutton with NO return
- NC tie-rod
- NO tie-rod

CONTACTS


Thermal


Normally open (NO)


Normally closed (NC)


NO limit switch


NC limit switch


Contactor

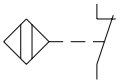

Magneto-thermal closure


Magneto-thermal opening


Thermal closure

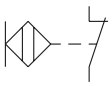

Thermal opening


Exchange


NC proximity


NO proximity

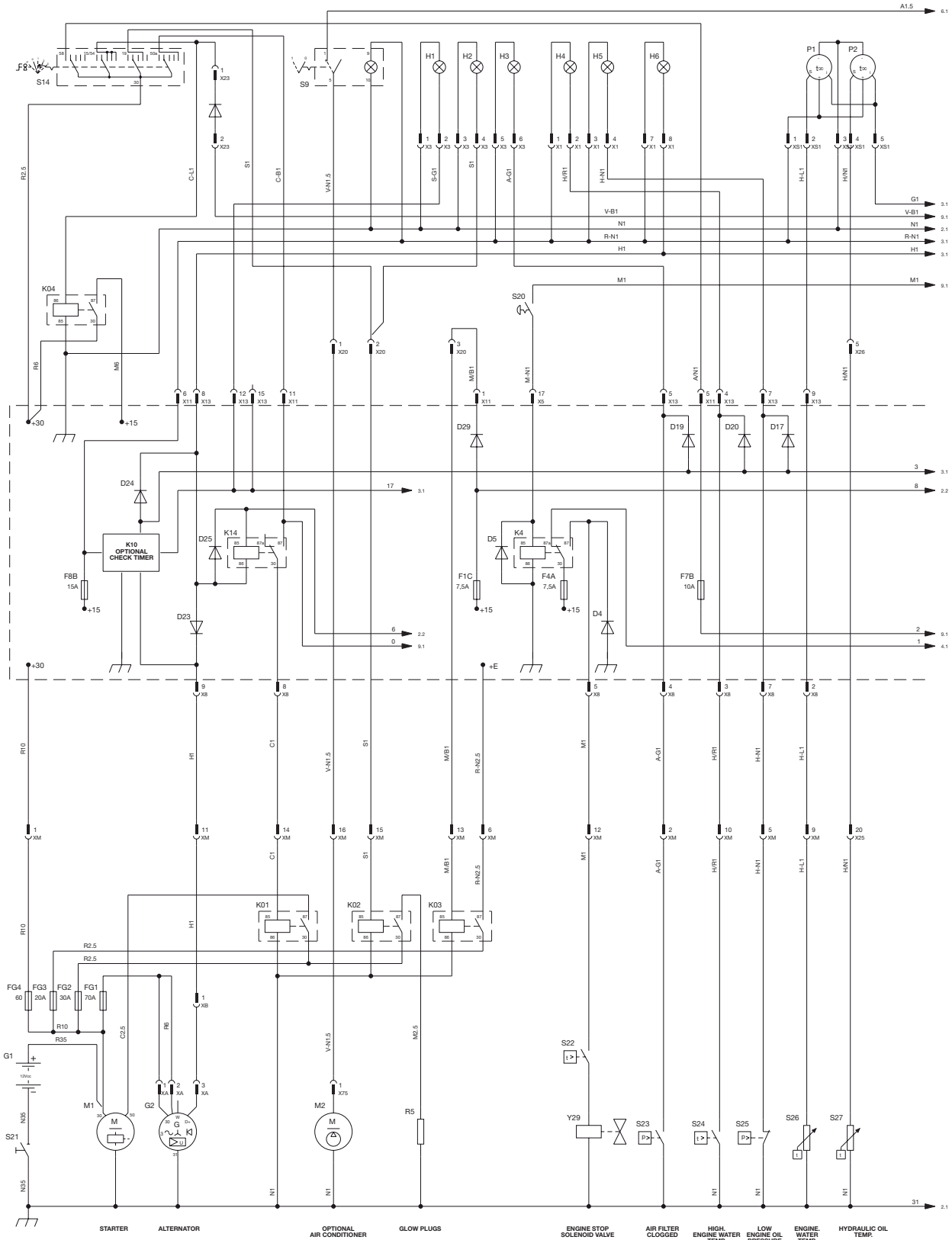

NO mechanical


NC mechanical

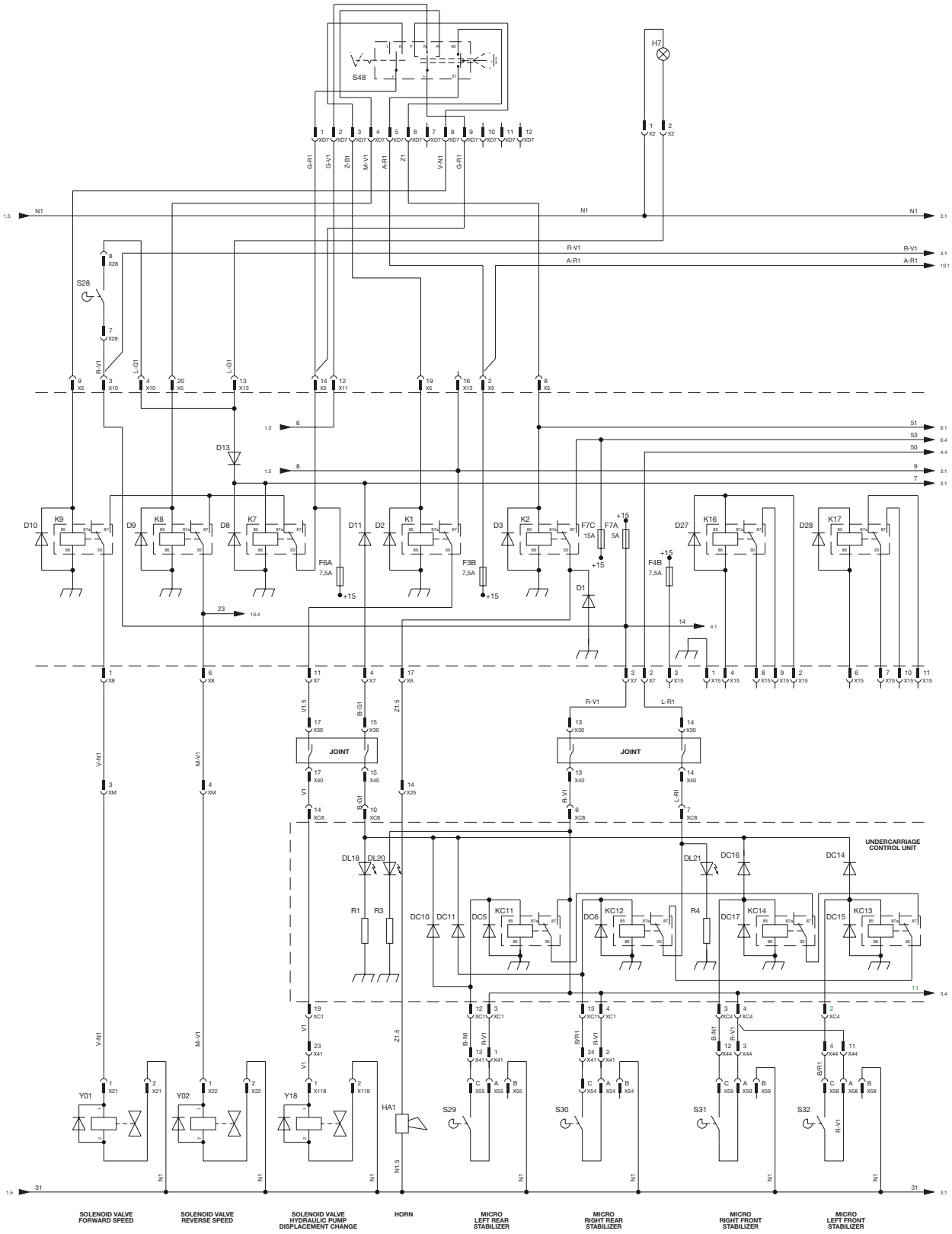

Selector


Selector2

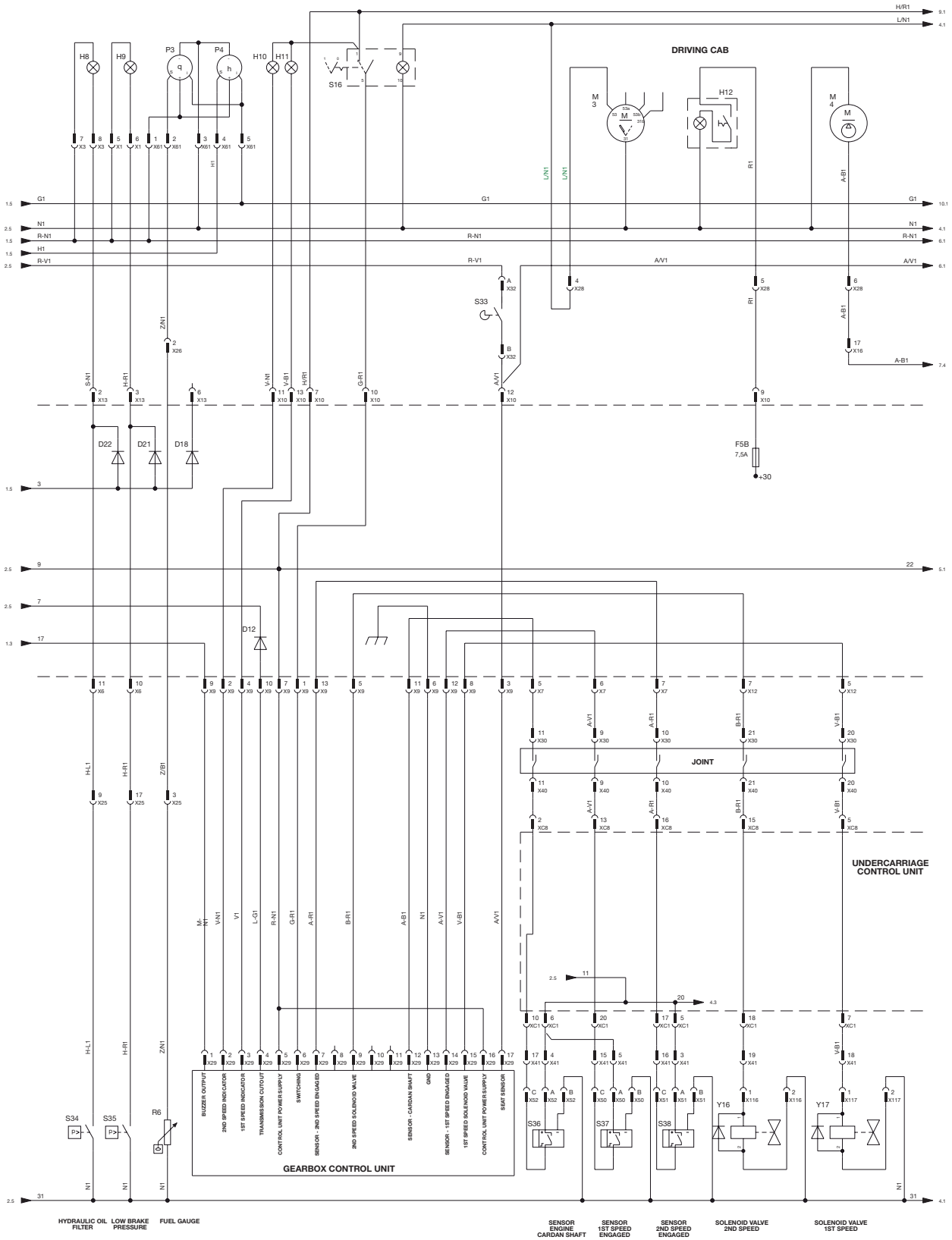
Operation:	Wiring diagram Girolift 3514-3518 (up to serial no. 9261) 5022 (up to serial no. 9410) - sheet 1 of 10	*Table:* **C.05.01**



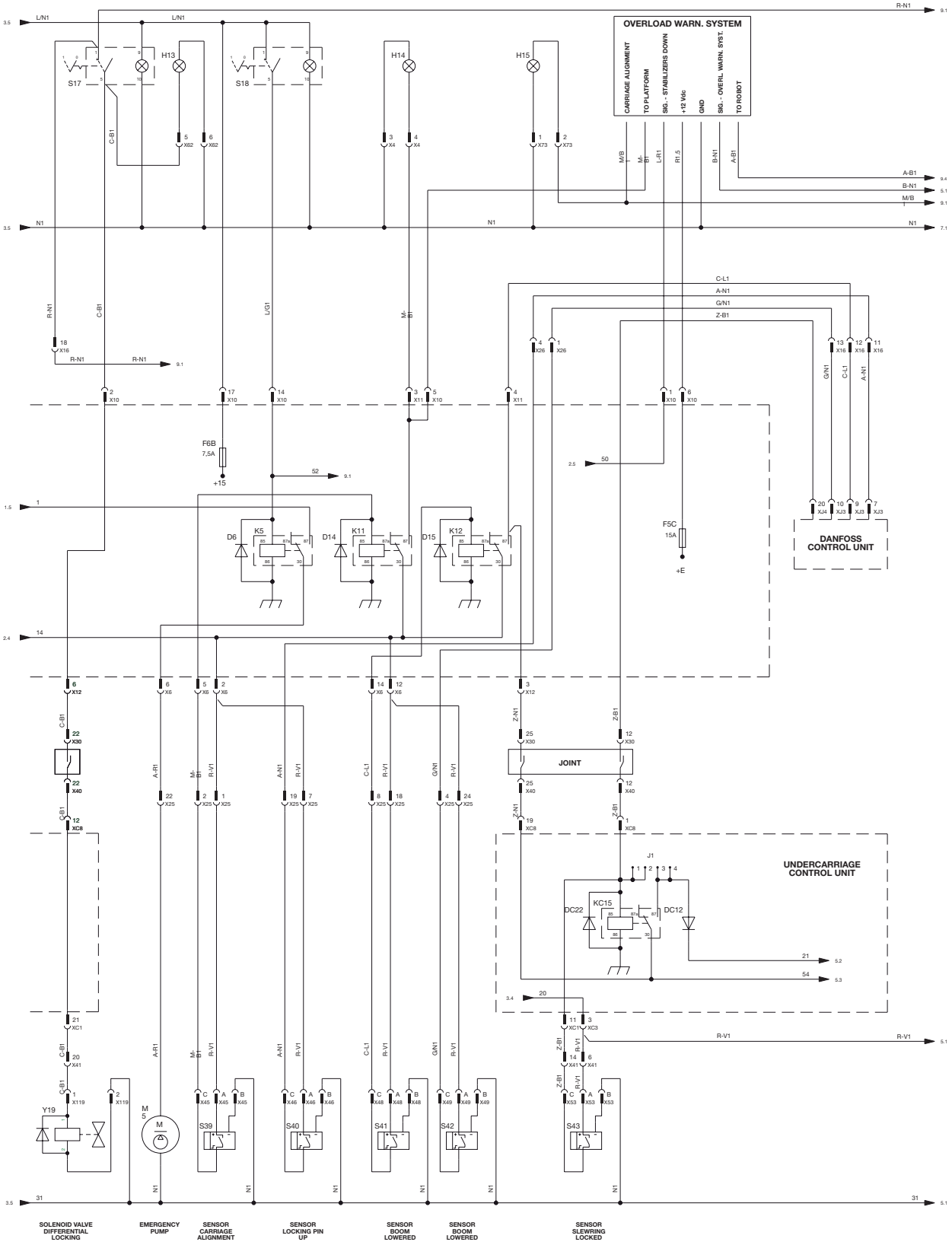
Operation:	Table:
Wiring diagram Girolift 3514-3518 (up to serial no. 9261) 5022 (up to serial no. 9410) - sheet 2 of 10	**C.05.01**



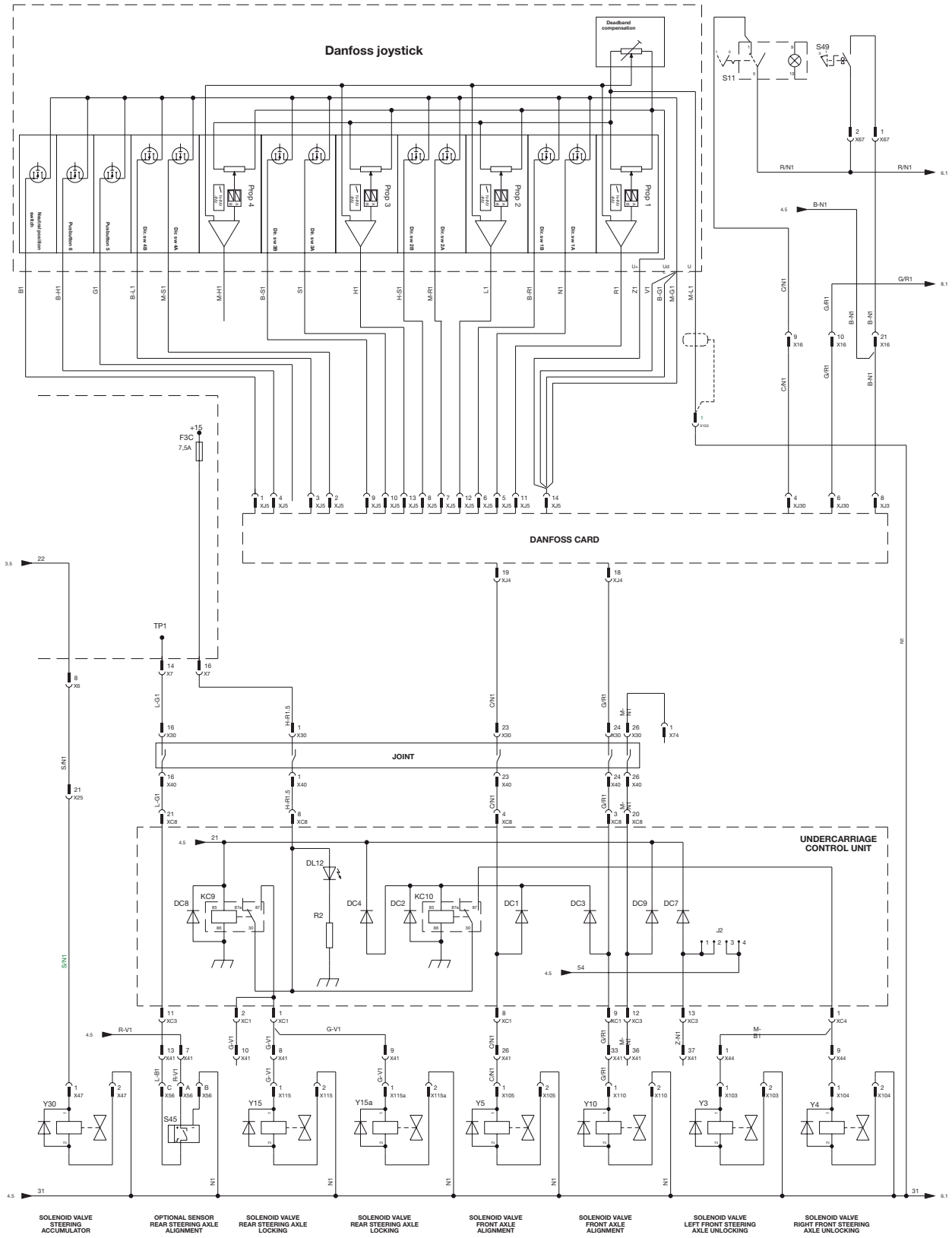
Operation:	Wiring diagram Girolift 3514-3518 (up to serial no. 9261) 5022 (up to serial no. 9410) - sheet 3 of 10	*Table:* **C.05.01**



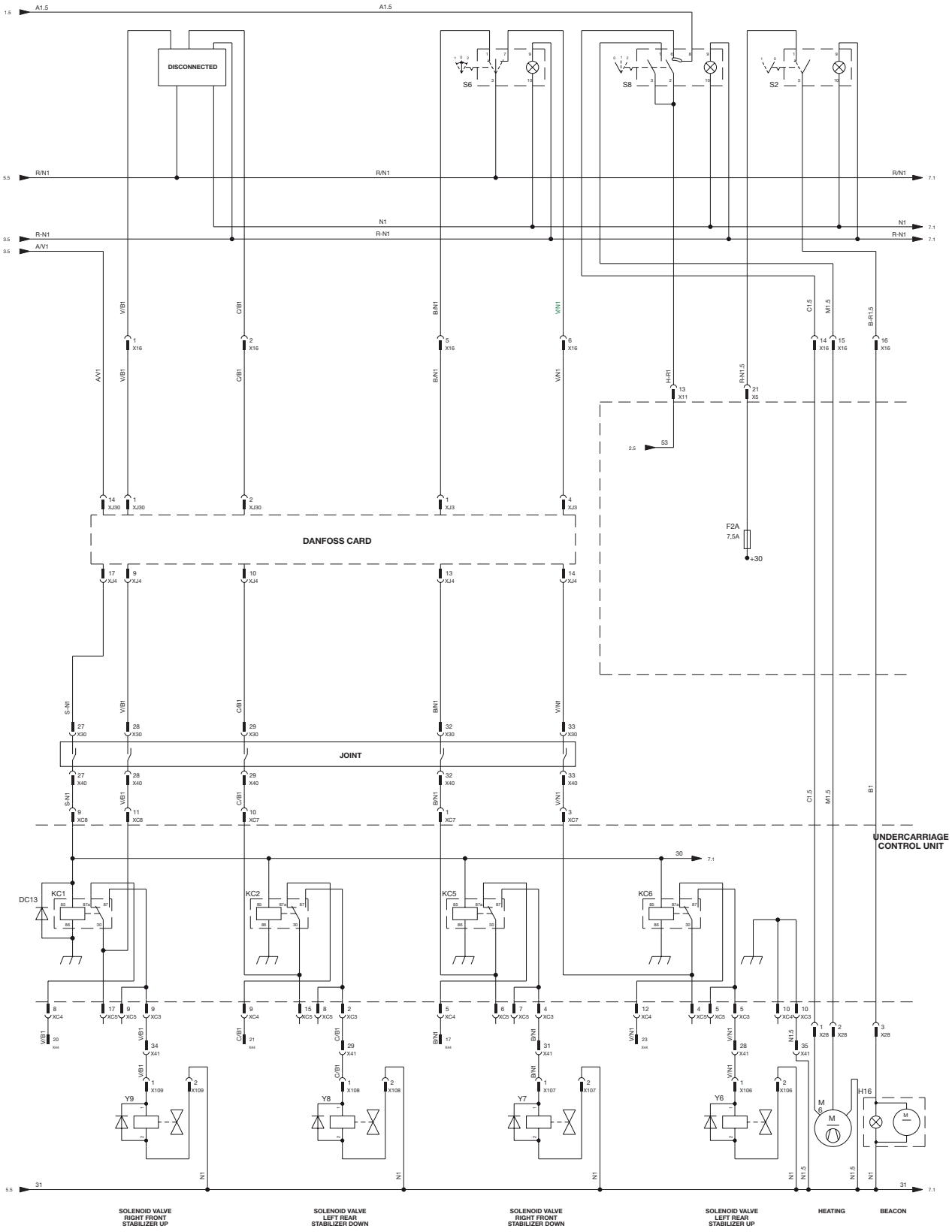
Operation:	Table:
Wiring diagram Girolift 3514-3518 (up to serial no. 9261) 5022 (up to serial no. 9410) - sheet 4 of 10	**C.05.01**



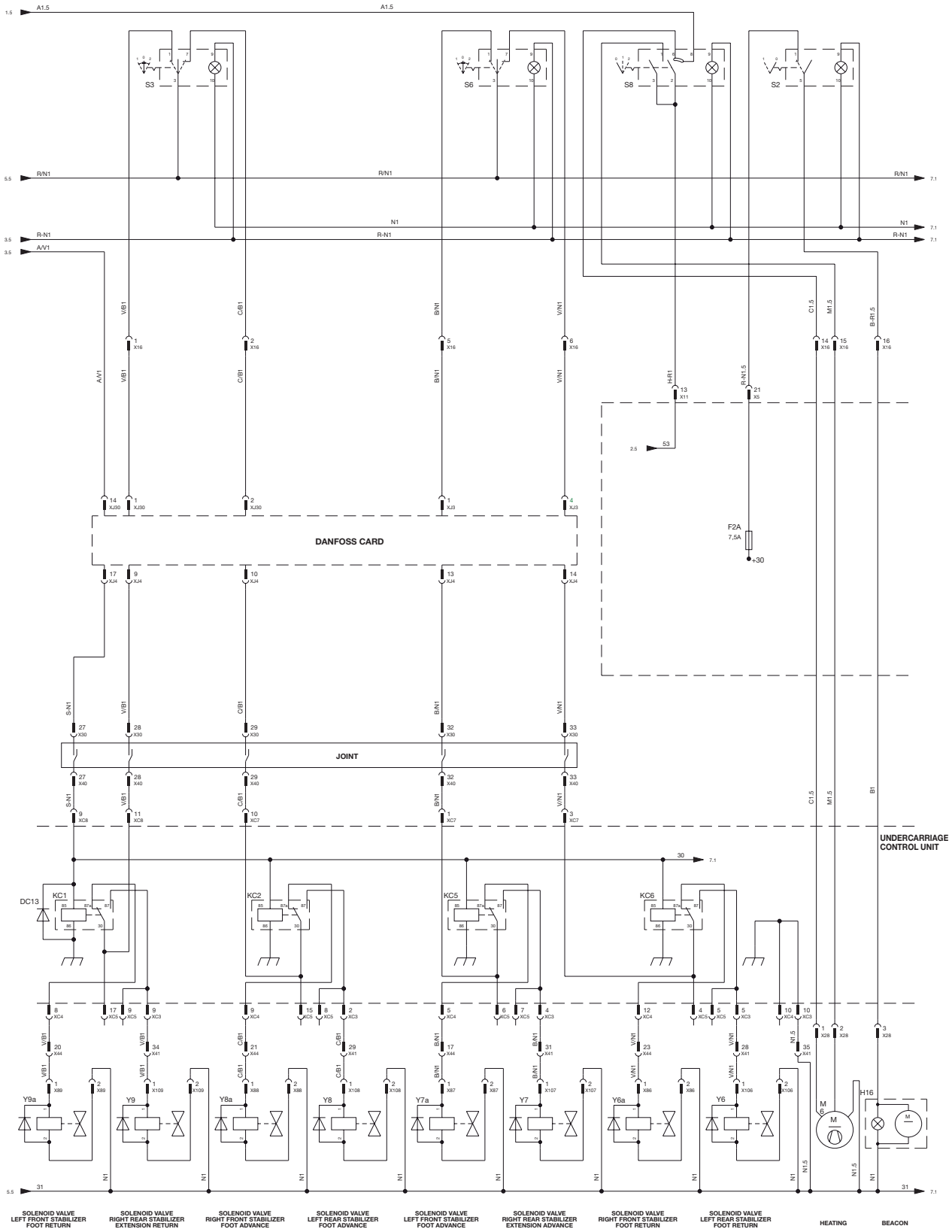
Operation:	Table:
Wiring diagram Girolift 3514-3518 (up to serial no. 9261) 5022 (up to serial no. 9410) - sheet 5 of 10	**C.05.01**



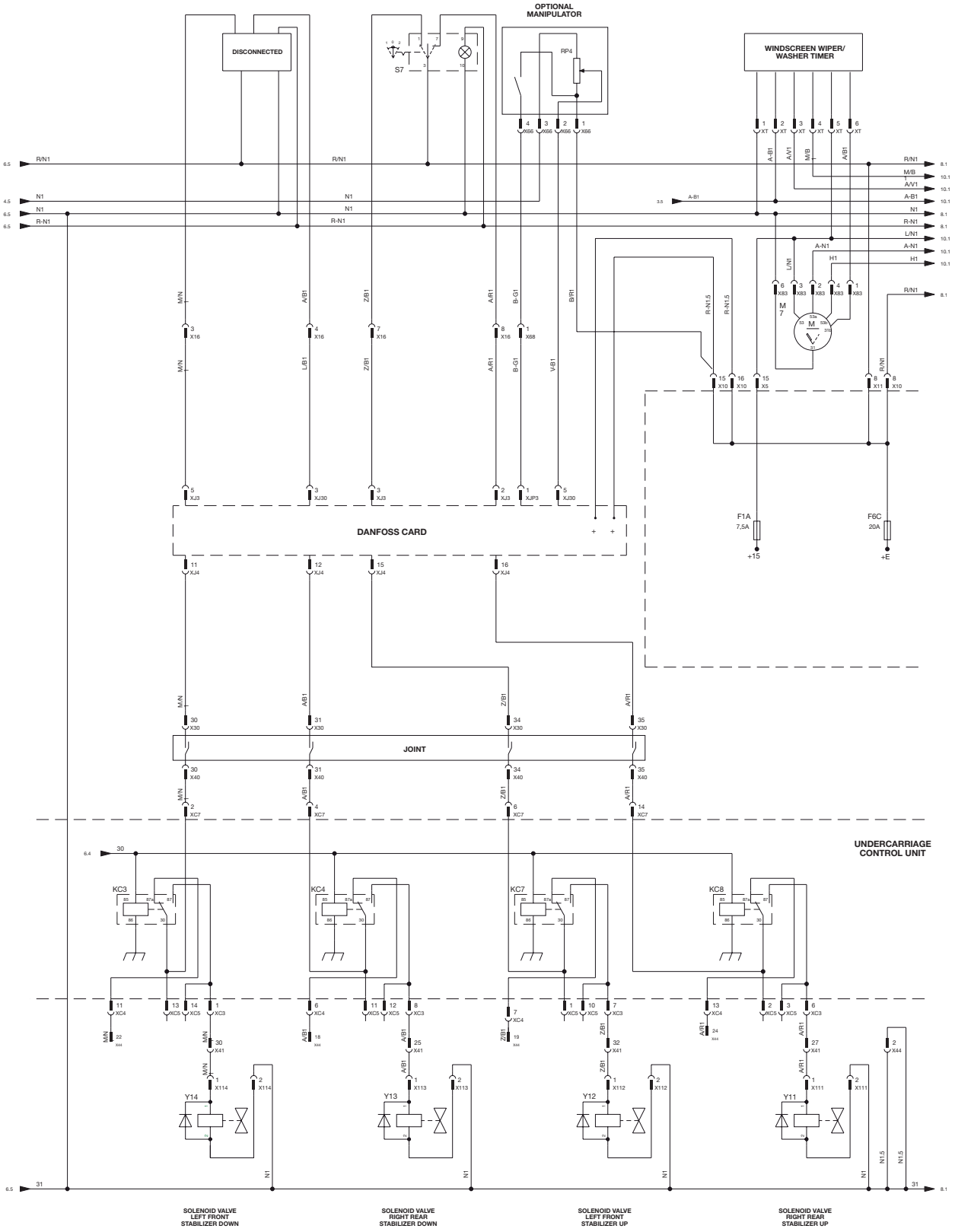
Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (up to serial no. 9261) - sheet 6 of 10	**C.05.01**



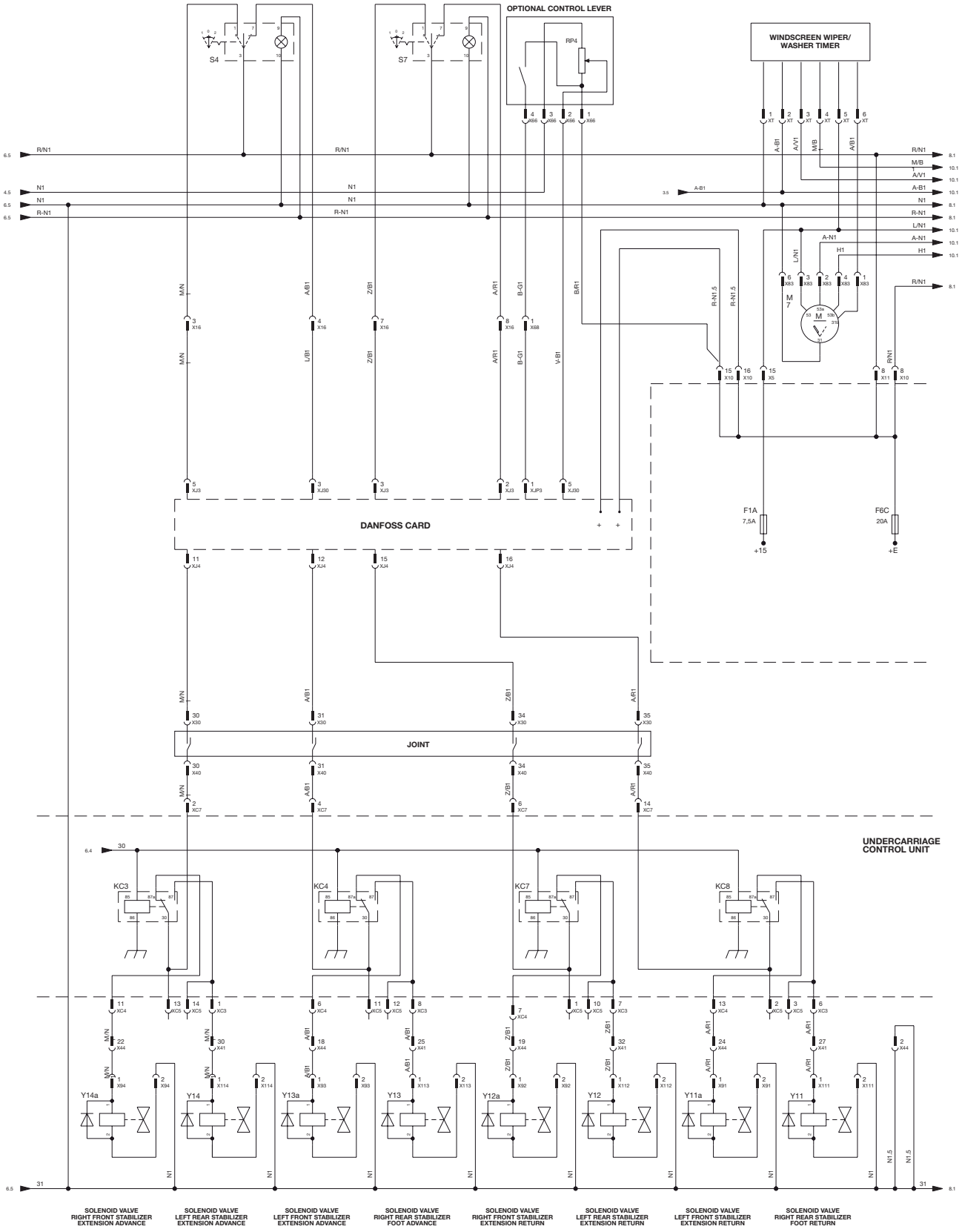
Operation: Wiring diagram Girolift 5022 (up to serial no. 9410) - sheet 6 of 10	*Table:* **C.05.01**



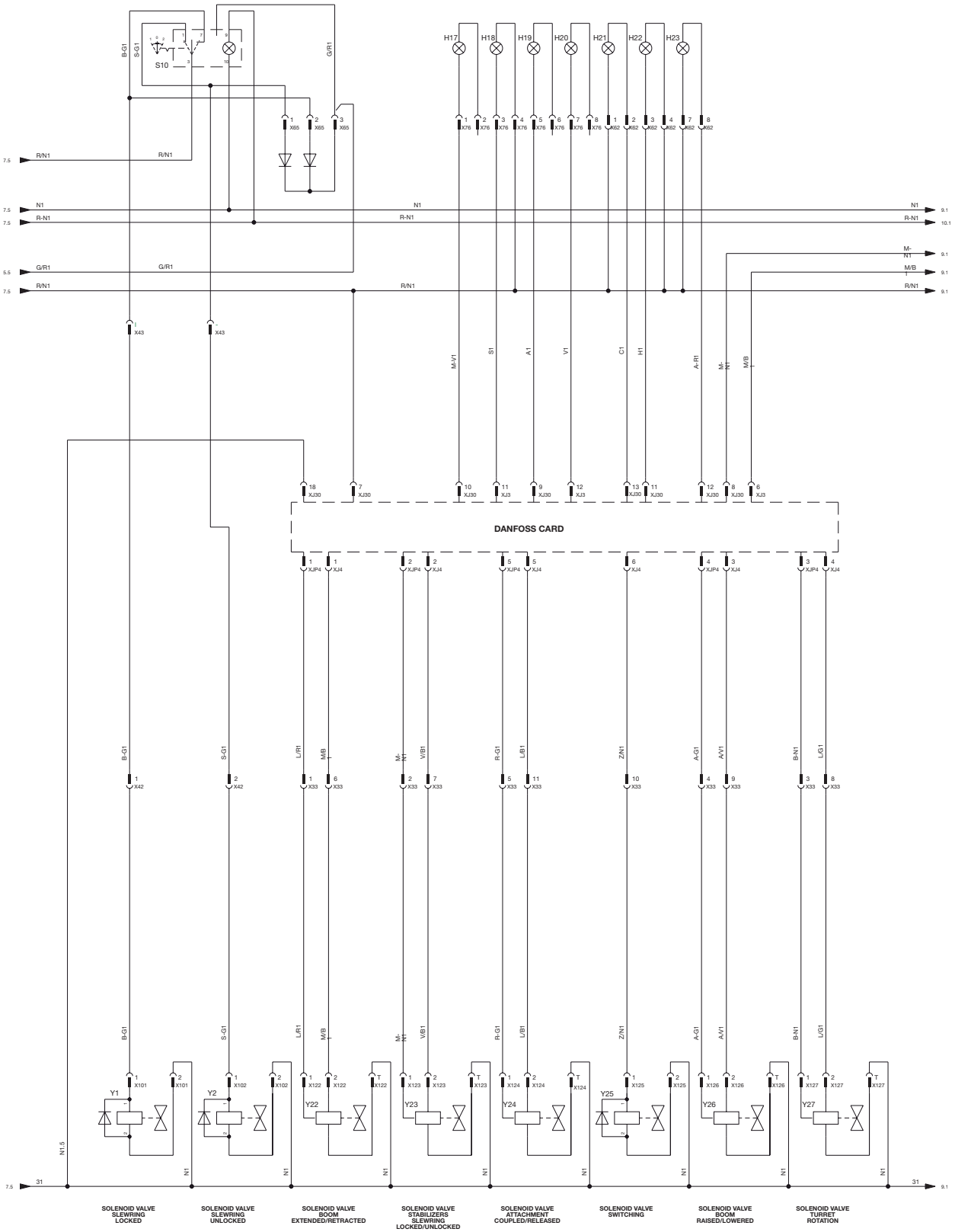
Operation:	Wiring diagram Girolift 3514-3518 (up to serial no. 9261) - sheet 7 of 10	*Table:* **C.05.01**



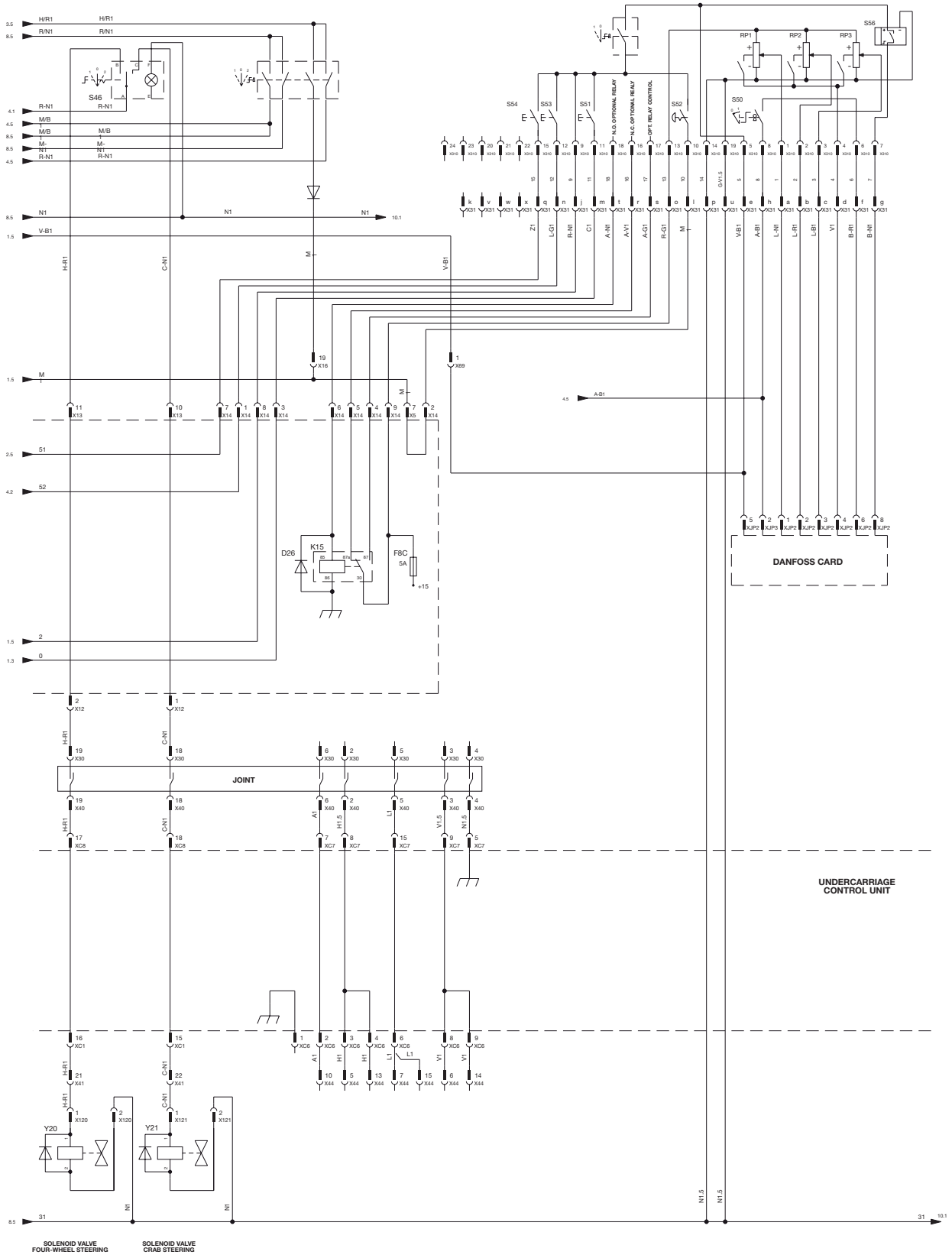
Operation:	Table:
Wiring diagram Girolift 5022 (up to serial no. 9410) - sheet 7 of 10	C.05.01



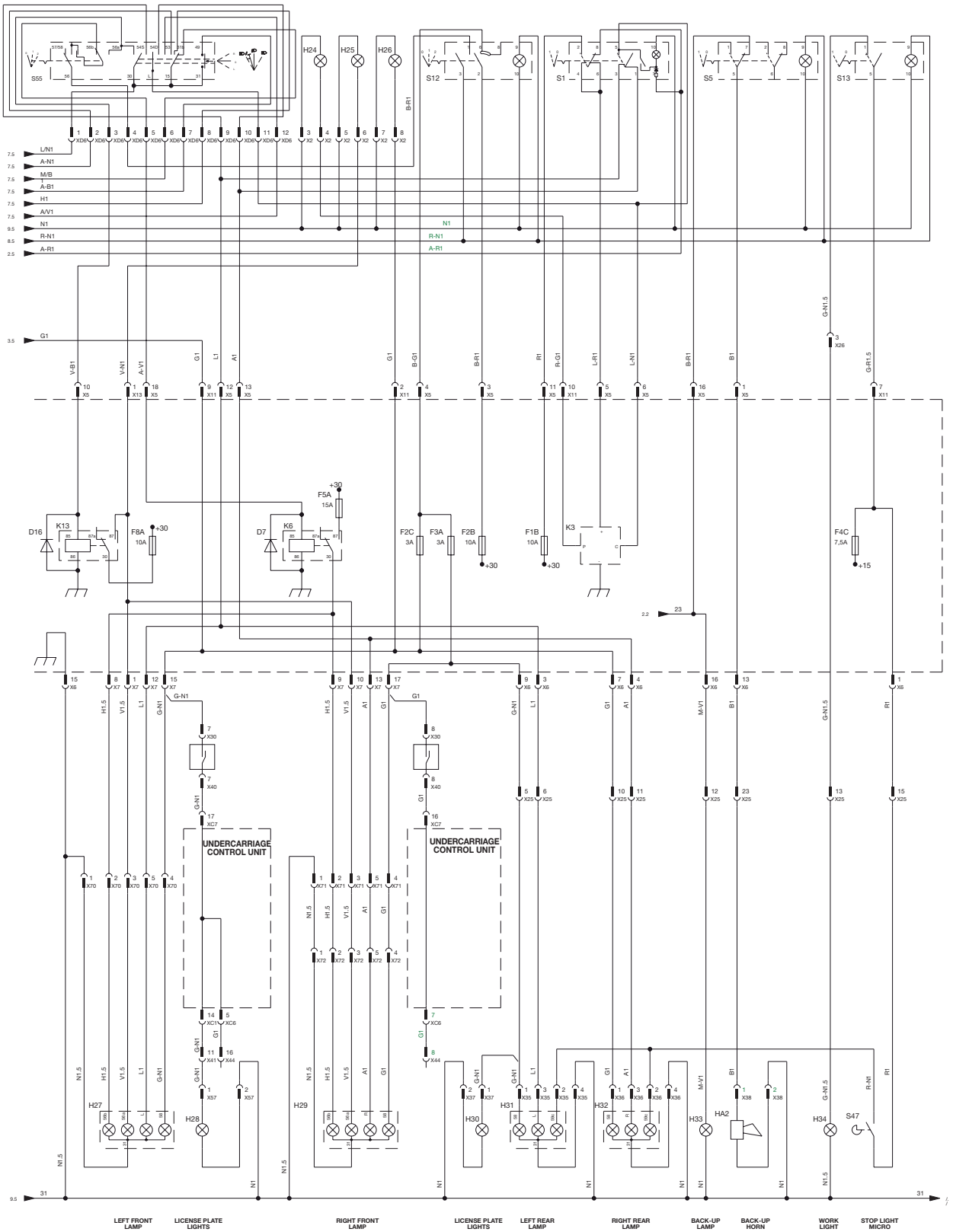
Operation:	Table:
Wiring diagram Girolift 3514-3518 (up to serial no. 9261) 5022 (up to serial no. 9410) - sheet 8 of 10	**C.05.01**



Operation:	Table:
Wiring diagram Girolift 3514-3518 (up to serial no. 9261) 5022 (up to serial no. 9410) - sheet 9 of 10	**C.05.01**



Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (up to serial no. 9261) 5022 (up to serial no. 9410) - sheet 10 of 10	**C.05.01**



Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (up to serial no. 9261) DANFOSS board	**C.05.01**

"JP2" CONNECTOR

(PLATFORM)

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	PROP. CONTROL - LIFTING/LOWERING	A N	IN
2	PROP. CONTROL - TURRET ROTATION	R L	IN
3	PROP. CONTROL - BOOM EXTENSION/RETRACT.	A B	IN
4	+12 JOYSTICK IN MOTION	V	IN
5	PLATFORM MOTION ON	B V	IN
6	+12 FOR ROBOT POWER SUPPLY	B R	OUT
7	DISCONNECTED		
8	SENSOR - FORKS COUPLED	B N	IN

"JP3" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	OPT. JOYSTICK SW IN NEUTRAL POSITION	B G	IN
2	TO ROBOT	A B	IN
3	OUT OPTIONAL 1		
4	OUT OPTIONAL 2		
5			
6			
7			
8			

"J4" CONNECTOR

(STABILIZERS AND BOOM)

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	PROP. CONTROL - LIFTING/RETRACTING Y22	M/B	OUT
2	PROP. CONTROL - FORKS ROTATION Y23	V/B	OUT
3	PROP. CONTROL - BOOM EXT./RETRACT. Y26	A/V	OUT
4	PROP. CONTROL - TURRET ROTATION Y27	L/G	OUT
5	PROP. CONTROL - COUPLING/RELEASE Y24	A/B	OUT
6	ELECTRIC CARRIAGE-DANFOSS SWITCHING Y25	Z/N	
7	DISCONNECTED		
8	DISCONNECTED		
9	Y9 RIGHT FRONT STAB. LIFTING SOLENOID	V/B	OUT
10	Y8 LEFT REAR STAB. LOWERING SOLENOID	C/B	OUT
11	Y14 LEFT FRONT STAB. LOWERING SOLENOID	M/N	OUT
12	Y13 RIGHT REAR STAB. LOWERING SOLENOID	A/B	OUT
13	Y7 RIGHT FRONT STAB. LOWERINGSOLENOID	B/N	OUT
14	Y6 LEFT REAR STAB. LIFTING SOLENOID	V/N	OUT
15	Y12 LEFT FRONT STAB. LIFTING SOLENOID	Z/B	OUT
16	Y11 RIGHT REAR STAB. LIFTING SOLENOID	A/R	OUT
17	STABILIZER RELAY COIL POWER SUPPLY	S/N	OUT
18	Y10 LEFT SWAY SOLENOID	G/R	OUT
19	Y5 RIGHT SWAY SOLENOID	C/N	OUT
20	SENSOR - LOCKING PIN FOR SLEWRING	Z B	IN

"XJ5" CONNECTOR

(JOYSTICK CAB FOR BOOM)

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	+12 JOYSTICK IN MOTION	M+B+MV	IN
2	YELLOW PUSHBUTTON	S/M	IN
3	RED PUSHBUTTON	B/A	IN
4	DEAD MAN	B/H	IN
5	JOYSTICK - DIR.1A FWD	N	IN
6	JOYSTICK - DIR.1B REVERSE	B/R	IN
7	JOYSTICK - DIR. 2A RIGHT	M/R	IN
8	JOYSTICK - DIR. 2B LEFT	M/S	IN
9	JOY. - DIR.3A BOOM RETRACTION	B/S	IN
10	JOY. - DIR.3B BOOM EXTENSION	S	IN
11	PROP. 1P LIFTING/LOWERING	R	IN
12	PROP. 2P ROTATION	L	IN
13	PROP. 3P EXT./RETRACTION	H	IN
14	+12 FOR JOYSTICK POTENTIOMETERS	GM+GB+V+Z	OUT

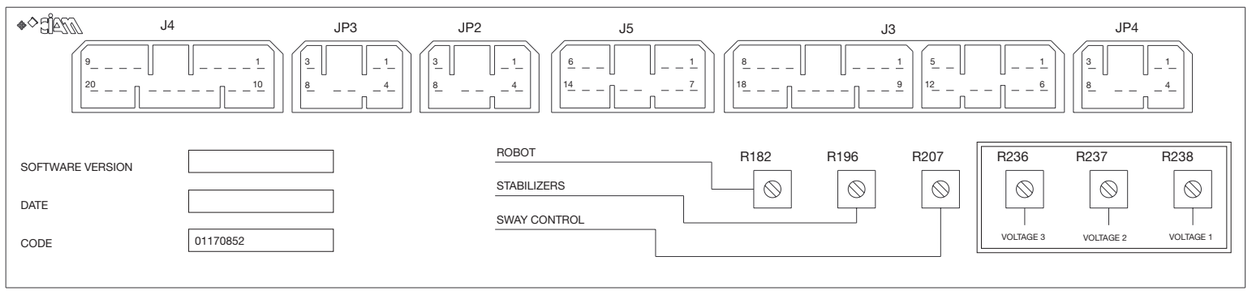
"JP4" CONNECTOR

(12V POWER SUPPLIED DANFOSS CONTROL VALVE)

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	EXTENSION/RETRACTION SOLENOID Y22 POWER SUPPLY	A/R	OUT
2	LIFTING/LOWERING SOLENOID Y26 POWER SUPPLY	A G	OUT
3	FORKS ROTATION SOLENOID Y23 POWER SUPPLY	M N	OUT
4	TURRET ROTATION SOLENOID Y27 POWER SUPPLY	B N	OUT
5	ATTACHMENT COUPLING/RELEASE SOLENOID Y24 POWER SUPPLY	R G	OUT
6	DISCONNECTED		
7	DISCONNECTED		
8	DISCONNECTED		

CONNECTOR REFERENCES IN WIRING DIAGRAM

JP2 CORRESPONDS TO XJP2
JP3 CORRESPONDS TO XJP3
JP4 CORRESPONDS TO XJP4
J3 CORRESPONDS TO XJ3 (12-WAY CONNECTOR)
AND TO XJ30 (18-WAY CONNECTOR)
J4 CORRESPONDS TO XJ4
J5 CORRESPONDS TO XJ5



"JP3" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	LEFT REAR STAB. PUSHBUTTON	B/N	IN
2	RIGHT FRONT STAB. PUSHBUTTON	A/R	IN
3	RIGHT REAR STAB. PUSHBUTTON	Z/B	IN
4	LEFT FRONT STAB. PUSHBUTTON	V/N	IN
5	DISCONNECTED	M/N	IN
6	KEY-SWITCH - ROAD/CABIN/PLATFORM	M/B	IN
7	SENSOR - LOCK. PIN UP (SLEWRING LOCKED)	A N	IN
8	SENSOR - OVERLOAD WARNING SYSTEM	B N	IN
9	SENSOR - BOOM DOWN	C L	IN
10	SENSOR - BOOM UP	G/N	IN
11	BOOM EXTENS./RETRACT. INDICATOR	S	IN
12	BOOM LIFTING/LOWER. INDICATOR	V	IN
1	DISCONNECTED		
2	DISCONNECTED		
3	DISCONNECTED		
4	SWAY CONTROL PUSHBUTTON	C/N	IN
5	OPTIONAL	B/V	IN
6	TURRET ROT. PIN LOCK./UNLOCKING PUSHBUTTON	G/R	IN
7	+12 LOCKED	R/N	IN
8	KEY SELECTOR	M N	IN
9	INDICATOR - FORK ROTATION	A	IN
10	INDICATOR - ATTACHMENT COUPLED/RELEASED	M V	IN
11	INDICATOR - TURRET ROTATION	H	IN
12	INDICATOR - SLEWRING LOCKED	L R	IN
13	INDICATOR - PARALLEL FORKS	C	IN
14	SEAT SENSOR	A/V	IN
15	DISCONNECTED		
16	DISCONNECTED		
17	DISCONNECTED		
18	GND	N	IN

Operation:	*Table:*
Wiring diagram Girolift 5022 (up to serial no. 9410) DANFOSS board	**C.05.01**

"JP2" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	PROP. CONTROL - LIFTING/LOWERING	A-N	IN
2	PROP. CONTROL - TURRET ROTATION	L-R	IN
3	PROP. CONTROL - BOOM EXTENSION/RETRACT.	L-B	IN
4	+12 JOYSTICK IN MOTION	V	IN
5	PLATFORM MOTION ON	V-B	IN
6	+12 FOR ROBOT POWER SUPPLY	B-R	OUT
7	DISCONNECTED		
8	SENSOR - FORKS COUPLED	B-N	IN

"JP3" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	OPT. JOYSTICK SW IN NEUTRAL POSITION	B-G	IN
2	TO ROBOT	A-B	IN
3	OUT OPTIONAL 1		
4	OUT OPTIONAL 2		
5			
6			
7			
8			

"J4" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	PROP. CONTROL - LIFTING/RETRACTING	M/B	OUT
2	PROP. CONTROL - FORKS ROTATION	V/B	OUT
3	PROP. CONTROL - BOOM EXT./RETRACT.	A/V	OUT
4	PROP. CONTROL - TURRET ROTATION	L/G	OUT
5	PROP. CONTROL - COUPLING/RELEASE	L/B	OUT
6	ELECTRIC CARRIAGE-DANFOSS SWITCHING	Z/N	
7	DISCONNECTED		
8	DISCONNECTED		
9	Y9-Y9a LEFT STAB. EXT. SOLENOID	V/B	OUT
10	Y8-Y8a LEFT STAB. RETRACT. SOLENOID	C/B	OUT
11	Y14-Y14a RIGHT STAB. EXT. SOLENOID	M/N	OUT
12	Y13-Y13a RIGHT STAB. RETRACT. SOLENOID	A/B	OUT
13	Y7-Y7a LEFT STAB. LIFTING SOLENOID	B/N	OUT
14	Y6-Y6a LEFT STAB. RETRACTING SOLENOID	V/N	OUT
15	Y12-Y12a RIGHT STAB. LIFTING SOLENOID	Z/B	OUT
16	Y11-Y11a RIGHT STAB. RETRACTING SOLENOID	A/R	OUT
17	STABILIZER RELAY COIL POWER SUPPLY	S-N	OUT
18	Y10 LEFT SWAY SOLENOID	G/R	OUT
19	Y5 RIGHT SWAY SOLENOID	C/N	OUT
20	SENSOR - LOCKING PIN FOR SLEWRING	Z-B	IN

"J5"/"J6" CONNECTORS

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	+12 JOYSTICK IN MOTION	M+B+M-V	IN
2	YELLOW PUSHBUTTON	S-N	IN
3	RED PUSHBUTTON	B-L	IN
4	DEAD MAN	B-H	IN
5	JOYSTICK - DIR.1A FWD	N	IN
6	JOYSTICK - DIR.1B REVERSE	B-R	IN
7	JOYSTICK - DIR. 2A RIGHT	M-R	IN
8	JOYSTICK - DIR. 2B LEFT	M-S	IN
9	JOY. - DIR.3A BOOM RETRACTION	B/S	IN
10	JOY. - DIR.3B BOOM EXTENSION	S	IN
11	PROP. 1P LIFTING/LOWERING	R	IN
12	PROP. 2P ROTATION	L	IN
13	PROP. 3P EXT./RETRACTION	H	IN
14	+12 FOR JOYSTICK POTENTIOMETERS	MG+BG+V+Z	IN

CONNECTOR REFERENCES IN WIRING DIAGRAM

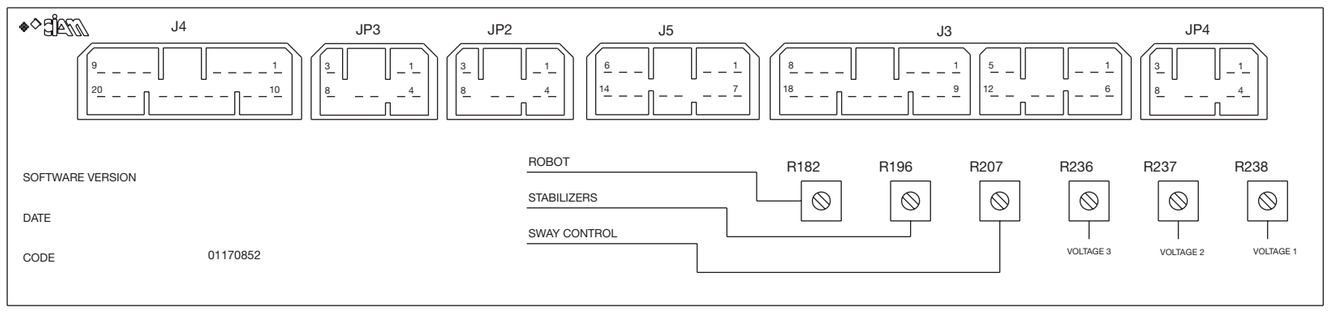
JP2 CORRESPONDS TO XJP2
JP3 CORRESPONDS TO XJP3
JP4 CORRESPONDS TO XJP4
J3 CORRESPONDS TO XJ3 (12-WAY CONNECTOR)
AND TO XJ30 (18-WAY CONNECTOR)
J4 CORRESPONDS TO XJ4
J5 CORRESPONDS TO XJ5

"JP4" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	EXTENSION/RETRACTION SOLENOID POWER SUPPLY	A/R	OUT
2	LIFTING/LOWERING SOLENOID POWER SUPPLY	M-N	OUT
3	FORKS ROTATION SOLENOID POWER SUPPLY	B-N	OUT
4	TURRET ROTATION SOLENOID POWER SUPPLY	A-G	OUT
5	ATTACHMENT COUPLING/RELEASE SOLENOID POWER SUPPLY	R-G	OUT
6	DISCONNECTED		
7	DISCONNECTED		
8	DISCONNECTED		

"JP3" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SEG.
1	RIGHT FRONT ARM PUSHBUTTON	B/N	IN
2	RIGHT FRONT FOOT PUSHBUTTON	A/R	IN
3	LEFT FRONT ARM PUSHBUTTON	Z/B	IN
4	LEFT FRONT FOOT PUSHBUTTON	V/N	IN
5	RIGHT REAR ARM PUSHBUTTON	M/N	IN
6	TO PLATFORM	M/B	IN
7	SENSOR - LOCKING PIN UP	A-N	IN
8	SENSOR - OVERLOAD WARNING SYSTEM	B-N	IN
9	SENSOR - BOOM LOWERED	C-L	IN
10	TO OPTIONAL JOYSTICK	G/N	IN
11	EXTENSION/RETRACTION INDICATOR	S	IN
12	LIFTING/LOWERING INDICATOR	V	IN
1	RIGHT REAR FOOT PUSHBUTTON	V/B	
2	LEFT REAR ARM PUSHBUTTON	C/B	
3	LEFT REAR FOOT PUSHBUTTON		
4	SWAY CONTROL PUSHBUTTON	C/N	IN
5	SENSOR - BOOM LIFTED	B/V	IN
6	TURRET ROT. PIN LOCK.UNLOCKING ENABLED	G/R	IN
7	V BATTERY	R/N	IN
8	TO CABIN	M-N	IN
9	INDICATOR - FORK ROTATION	A	IN
10	INDICATOR - ATTACHMENT COUPLING/RELEASE	M-V	IN
11	INDICATOR - TURRET LOCKED	H	IN
12	INDICATOR - TURRET ROTATION	L-R	IN
13	INDICATOR - PARALLEL FORKS	C	IN
14	SEAT SENSOR	A/V	IN
15	DISCONNECTED		
16	DISCONNECTED		
17	DISCONNECTED		
18	GND	N	IN



Operation: Wiring diagram Girolift 3514-3518 (up to serial no. 9261) - CONTROL UNIT board

Table: **C.05.01**

X5 - MARK 21

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	BACK-UP ALARM CUTOUT	B(1)	OUT
2	HAZARD PUSHBUTTON POWER SUPPLY	R A	IN
3	POSITION LIGHTS SW POWER SUPPLY	B R	OUT
4	POSITION LIGHTS	B61.5	IN
5	BLINKING POWER SUPPLY	L R	OUT
6	TURN SIGNALS POWER SUPPLY	2LN	OUT
7	EMERGENCY PUSHBUTTON POWER SUPPLY	2M	OUT
8	HORN POWER SUPPLY	Z	IN
9	GEAR SW POWER SUPPLY	V N	IN
10	HIGH BEAM POWER SUPPLY	B V	IN
11	HAZARD PUSHBUTTON POWER SUPPLY	R	OUT
12	LEFT TURN SIGNAL POWER SUPPLY	2 L	OUT
13	RIGHT TURN SIGNAL POWER SUPPLY	2 A	OUT
14	FWD/REVERSE AND DISPLAC. CHANGE POWER SUPPLY	2GR	OUT
15	WINDSCREEN WIPER AND TIMER POWER SUPPLY	2L/N	OUT
16	BACK-UP ALARM CUTOUT PUSHBUTTON POWER SUPPLY	B R	OUT
17	EMERGENCY PUSHBUTTON	M N	IN
18	FROM SW TO RELAY FOR LOW BEAM	A V	IN
19	FROM SW TO RELAY FOR DISPLACEMENT CHANGE	Z B	IN
20	REVERSE SPEED	M N	IN
21	BEACON PUSHBUTTON POWER SUPPLY	R N	OUT

X6 - MARK 17

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	BRAKE PUMP POWER SUPPLY FOR STOP	R	OUT
2	LOCKING PIN UP/CARRIAGE ALIGNMENT SENSOR POWER S.	2RV	OUT
3	LEFT TURN SIGNAL POWER SUPPLY	L	IN
4	RIGHT TURN SIGNAL POWER SUPPLY	A	IN
5	CARRIAGE ALIGNMENT SIGNAL	M B	IN
6	EMERGENCY PUMP COIL POWER SUPPLY	A R	IN
7	RIGHT REAR BEAM POWER SUPPLY	G	OUT
8	STEERING ACCUMULATOR SOLENOID VALVE	S/N	OUT
9	LEFT FRONT POSITION LIGHTS/LICENSE PLATE LIGHT PS.	G N	OUT
10	PRESSURE SW - LOW BRAKE PUMP PRESSURE	H R	IN
11	HYDRAULIC OIL FILTER CLOGGING	H L	IN
12	BOOM UP/DOWN SENSOR POWER SUPPLY	2RV	OUT
13	BACK-UP ALARM	B	OUT
14	SIGNAL - BOOM LOWERED SENSOR	C L	IN
15	GND	N	IN
16	BACK-UP LAMP	M V	OUT
17	HORN POWER SUPPLY	Z	OUT

X7 - MARK 17

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	LEFT HIGH BEAM POWER SUPPLY	V	OUT
2	SIGNAL - STABILIZERS FOR OVERLOAD SYSTEM	L R	IN
3	STABILIZER SENSOR POWER SUPPLY	R V	OUT
4	SIGNAL - STABILIZER FOR TRANSMISSION DISENGAGEMENT	B G	OUT
5	SIGNAL - CARDAN SHAFT SENSOR	A B	IN
6	SIGNAL - 2ND SPEED SENSOR	A V	IN
7	SIGNAL - 1ST SPEED SENSOR	A R	IN
8	LOW BEAM	H	OUT
9	LOW BEAM	H	OUT
10	RIGHT HIGH BEAM POWER SUPPLY	V	OUT
11	DISPLACEMENT CHANGE SOLENOID POWER SUPPLY	V	OUT
12	LEFT TURN SIGNAL	L	OUT
13	RIGHT TURN SIGNAL	A	OUT
14	OPTIONAL	L G	OUT
15	RIGHT REAR/LEFT FRONT POSITION LIGHTS	G N	OUT
16	KC9-KC10 RELAY 30 POWER SUPPLY - STEERING AXLE SWAY UNLOCKING	H R	OUT
17	RIGHT FRONT/LEFT REAR POSITION LIGHTS	2 G	OUT

X15 - MARK 13

POS.	FUNCTION DESCRIPTION
OPTIONAL FOR ALL MOTIONS	

X9 - MARK 13

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	+12 GEAR CHANGE	G R	OUT
2	SIGNAL - 1ST MECHANICAL GEAR INDICATOR	V N	IN
3	SEAT SENSOR	A/V	OUT
4	SIGNAL - 2ND MECHANICAL GEAR INDICATOR	V	OUT
5	2ND SPEED Y16 SOLENOID VALVE	B R	IN
6	GND	N	OUT
7	+12 CONTROL UNIT POWER SUPPLY FROM 1C 7.5A FUSE	R N	OUT
8	1ST MECHANICAL GEAR Y17 SOLENOID VALVE	V B	IN
9	BUZZER OUT	M N	OUT
10	TRANSMISSION DISENGAGED	L G	IN
11	SENSOR - CARDAN SHAFT IN MOTION	A B	OUT
12	SENSOR - 1ST SPEED ENGAGED	A V	OUT
13	SENSOR - 2ND SPEED ENGAGED	A R	OUT

X11 - MARK 13

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	85 ELECTRONIC RELAY POWER SUPPLY	M/B	OUT
2	POSITION LIGHTS INDICATOR	G	OUT
3	CARRIAGE ALIGNMENT INDICATOR	M B	OUT
4	+12 SENSOR - BOOM LOWERED	C A	IN
5	+12 FOR PLATFORM	L/N	IN
6	+12 FOR INSTRUMENTS INDICATORS	2RN	OUT
7	+12 WORK LIGHT	G R	OUT
8	+12 STABILIZERS PUSHBUTTON POWER SUPPLY	R/N	OUT
9	+12 DASHBOARD LIGHTING	2G	OUT
10	+12 TURN SIGNALS INDICATOR POWER SUPPLY	R G	OUT
11	+12 FROM 50 IGNITION KEY	C A	IN
12	+12 GEAR CHANGE SW POWER SUPPLY	G V	OUT
13	+12 HEATING SW	H R	OUT

X8 - MARK 9

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y01 FWD SPEED SOLENOID VALVE	V N	OUT
2	ENGINE WATER TEMPERATURE	H L	IN
3	HIGH ENGINE WATER TEMPERATURE	H/R	IN
4	AIR FILTER	A G	IN
5	Y29 ELECTROSTOP	M	OUT
6	Y02 REVERSE SPEED SOLENOID VALVE	M V	OUT
7	ENGINE OIL INDICATOR	H N	OUT
8	STARTER K01 RELAY COIL	C	OUT
9	+12 FROM ALTERNATOR	H	OUT

X14 - MARK 9

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	EMERGENCY PUMP RELAY POWER SUPPLY	L G	IN
2	ENGINE EMERGENCY STOP PUSHBUTTON POWER SUPPLY	M	OUT
3	+12 START DESDE BARQUILLA	C	IN
4	OPCIONAL	A G	OUT
5	OPCIONAL +12	A V	OUT
6	OPCIONAL	A N	IN
7	AVISADOR ACUSTICO	Z	IN
8	+12 PARA BARQUILLA	R N	OUT
9	AL. POTENT. JOYSTICK BARQUILLA	C R	OUT

X10 - MARK 17

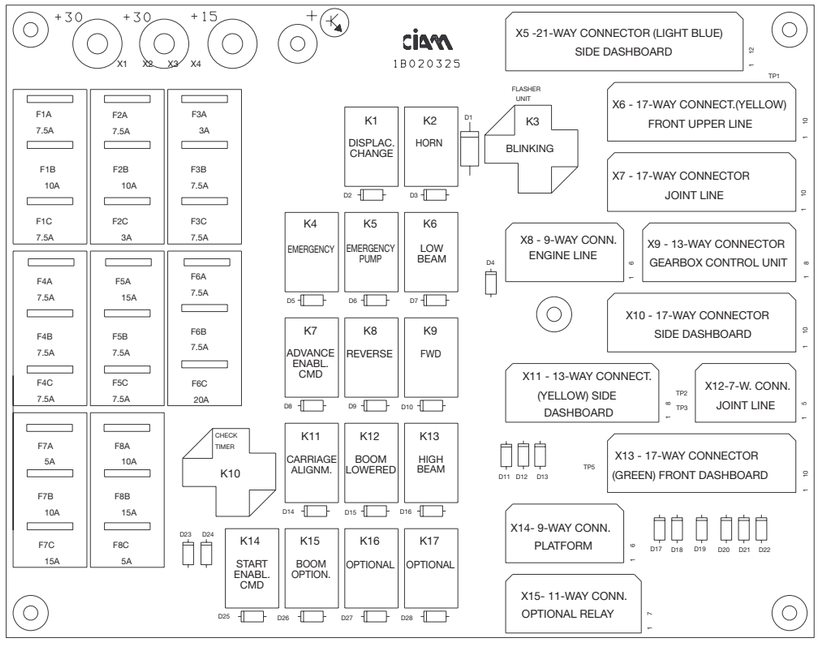
POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	SIGNAL - LOWERED STABILIZERS FOR OVERLOAD SYSTEM	L R	OUT
2	+12 DIFFERENTIAL LOCKING (GIRO 5022)	C B	IN
3	+12 SEAT MICRO AND PARKING BRAKE MICRO	2RV	OUT
4	SIGNAL - PARKING BRALE ENGAGED	L G	IN
5	CARRIAGE ALIGNMENT SENSOR	M B	OUT
6	OVERLOAD WARNING SYSTEM CENTRAL POWER SUPPLY	R	OUT
7	CHANGE PUSHBUTTON POWER SUPPLY	H/R	OUT
8	ROAD/CABIN/PLATFORM POWER SUPPLY	2R/N	OUT
9	INTERIOR LAMP POWER SUPPLY	R	OUT
10	1ST/2ND MECHANICAL SPEED CHANGE	G R	IN
11	1ST SPEED INDICATOR	V N	OUT
12	SEAT SENSOR	2AV	IN
13	2ND SPEED INDICATOR	B V	OUT
14	+12 SIGNAL FOR EMERGENCY PUMP	L/G	IN
15	DANFOSS CARD AND OPT. HAND CONTROL POWER SUPPLY	RBR	OUT
16	DANFOSS CARD POWER SUPPLY	R N	OUT
17	EMERGENCY PUMP POWER SUPPLY	L/N	OUT

X12 - MARK 9

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	4-WHEEL STEERING SOLENOID VALVE	C N	OUT
2	CRAB STEERING SOLENOID VALVE	H R	OUT
3	SIGNAL - BOOM LOWERED	Z N	OUT
4	OPTIONAL		
5	1ST MECHANICAL SPEED SOLENOID VALVE	B V	OUT
6	DIFFERENTIAL LOCKING SOLENOID (GIRO 5022)	A B	OUT
7	2ND MECHANICAL SPEED SOLENOID VALVE	B R	OUT

X13 - MARK 17

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	HIGH BEAM INDICATOR	V N	OUT
2	HYDRAULIC OIL INDICATOR POWER SUPPLY	S N	OUT
3	BRAKE INDICATOR	H R	OUT
4	MAX. WATER TEMPERATURE INDICATOR	H/R	OUT
5	AIR FILTER INDICATOR	A G	OUT
6	OPTIONAL		OUT
7	ENGINE OIL INDICATOR	H N	OUT
8	GEN-SET INDICATOR	2 H	OUT
9	ENGINE WATER TEMPERATURE	H L	OUT
10	4-WHEEL STEERING POWER SUPPLY	C N	OUT
11	CRAB STEERING POWER SUPPLY	H R	OUT
12	ALARM INDICATOR (BUZZER)	S G	OUT
13	PARKING BRAKE INDICATOR	L G	OUT
14	DISCONNECTED		
15	DISCONNECTED		
16	DISCONNECTED		
17	DISCONNECTED		



Operation: Wiring diagram Girolift 5022 (up to serial no. 9410) - CONTROL UNIT board	*Table:* **C.05.01**

X5 - MARK 21

POS.	FUNCTION DESCRIPTION
1	back-up alarm cutout
2	+15 hazard sw
3	+ position lights sw
4	position lights switch
5	+ blinking
6	49 selector sw
7	emergency pushbutton
8	horn
9	fwd speed
10	56/a selector sw
11	+30 hazard sw
12	left turn signal
13	right turn signal
14	+ speed selector sw
15	+ front windscreen wiper
16	back-up alarm
17	emergency pushbutton
18	56/b selector sw
19	displacement change wa
20	reverse speed
21	+ beacon sw

X6 - MARK 17

POS.	FUNCTION DESCRIPTION
1	+stop sw
2	+sensor - boom lowered
3	left turn signal
4	right turn signal
5	signal - carriage alignment
6	emergency pump
7	58 right
8	steering accumulator solenoid
9	58 left
10	brake pressure switch
11	hydraulic oil filter
12	+ carriage alignment sensor
13	back-up alarm
14	signal - lowered boom sensor
15	GND
16	back-up lamp
17	horn

X7 - MARK 17

POS.	FUNCTION DESCRIPTION
1	56/a
2	signal - stabilizers for overload warn. system
3	+ sensors
4	signal - stabilizers for transmission disengagm
5	sensor - Cardan shaft
6	sensor - 1st speed
7	sensor - 2nd speed
8	56/b
9	56/b
10	56/a
11	displacement change solenoid valve
12	left turn signal
13	right turn signal
14	optional
15	58 left
16	+12V levelling relay power supply
17	58 right

X8 - MARK 9

POS.	FUNCTION DESCRIPTION
1	fwd speed solenoid valve
2	Temp. H2o
3	max H2o
4	air filter
5	electrostop
6	reverse speed solenoid valve
7	engine oil
8	start (50)
9	battery charger (D+)

X9 - MARK 13

POS.	FUNCTION DESCRIPTION
1	speed change sw
2	signal - 2nd speed indicator
3	seat sensor
4	signal - 1st speed indicator
5	2nd speed solenoid valve
6	GND
7	+ control unit power supply
8	1st speed solenoid valve
9	out - optional buzzer
10	transmission disengagement
11	sensor - Cardan shaft
12	sensor - 1st speed
13	sensor - 2nd speed

X10 - MARK 17

POS.	FUNCTION DESCRIPTION
1	signal - stabilizers for overload warn. syst.
2	differential locking solenoid valve
3	+ seat sensor
4	parking brake signal
5	carriage alignment
6	+ overload warning system power supply
7	+ speed change/indicators sw
8	Danfoss sw/pushbutton
9	+ interior lamps
10	change sw
11	2nd speed indicator
12	seat sensor
13	1st speed indicator
14	emergency pump sw
15	+ Danfoss card
16	+ Danfoss card
17	+ optional upper windscreen wiper

X11 - MARK 13

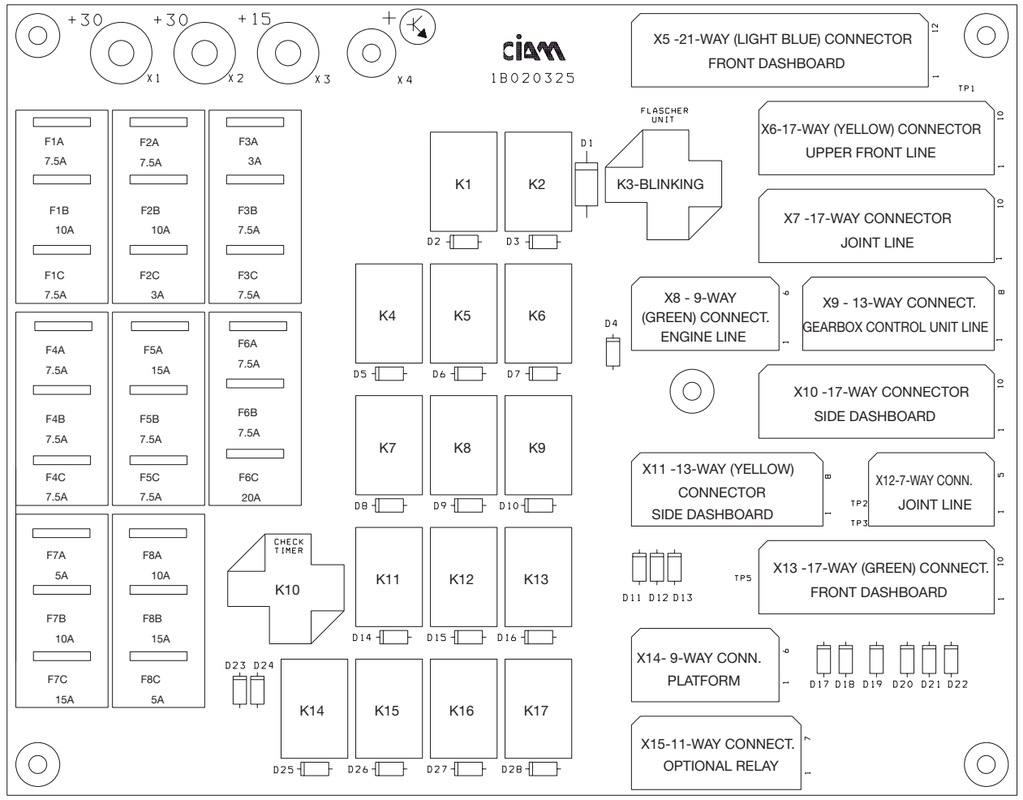
POS.	FUNCTION DESCRIPTION
1	electronic relay power supply enabl. command
2	lights indicator
3	signal - carriage alignment
4	lowered boom indicator
5	platform power supply
6	+ dashboard indicator
7	+ work light sw
8	+ stabilizers sw
9	dashboard lighting
10	turn signals indicator
11	start
12	sw neutral
13	+ heating sw

X12 - MARK 9

POS.	FUNCTION DESCRIPTION
1	crab steering solenoid valve
2	4-wheel steering solenoid valve
3	signal - boom lowered
4	optional
5	1st speed solenoid valve
6	differential locking solenoid valve
7	2nd speed solenoid valve

X13 - MARK 17

POS.	FUNCTION DESCRIPTION
1	indicator 56/a
2	oil filter
3	brake pressure indicator
4	max H2o
5	air filter
6	optional
7	engine oil
8	gen-set
9	signal - water temperature
10	crab steering sw
11	4-wheel steering sw
12	optional alarm main sw
13	parking brake indicator
14	optional
15	signal - optional buzzer
16	+ buzzer
17	disconnected - blank



X14 - MARK 9

POS.	FUNCTION DESCRIPTION
1	emergency pump sw
2	engine stop
3	starter
4	optional 2
5	optional 1
6	optional 3
7	horn
8	+ platform
9	platform motion potentiometer power supply

X15 - MARK 13

POS.	FUNCTION DESCRIPTION
1	optional
2	optional
3	optional
4	optional
5	optional
6	optional
7	optional
8	optional
9	optional
10	optional
11	optional

Operation: Wiring diagram Girolift 3514-3518 (up to serial no. 9261) - UNDERCARRIAGE board

Table: **C.05.01**

XC8 - MARK 21-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	SENSOR - SLEWRING LOCKING PIN	Z B	OUT
2	SENSOR - CARDAN SHAFT	A B	OUT
3	Y10 LEFT FRONT SWAY	G/R	IN
4	Y5 RIGHT FRONT SWAY	C/N	IN
5	Y17 1ST SPEED SOLENOID VALVE	B V	IN
6	SENSOR POWER SUPPLY	R V	IN
7	SIGNAL FOR OVERLOAD WARNING SYSTEM	L R	OUT
8	+12 FOR 30 RELAY KC9 KC10 STEERING AXLE SOLENOID VALVE RELEASE	H R	IN
9	STABILIZER RELAY COIL POWER SUPPLY	S N	IN
10	SIGNAL - STABILIZERS FOR TRANSMISSION DISENGAGEMENT	B G	OUT
11	Y9 RIGHT FRONT STAB. LIFT. - KC1 RELAY 30 POWER SUPPLY	B/V	IN
12	NOT USED IN GIROLIFT 3514	C B	
13	1ST MECHANICAL SPEED SENSOR	A/V	OUT
14	Y18 HYDRAULIC SPEED SOLENOID VALVE	V	IN
15	Y16 2ND SPEED SOLENOID VALVE	B R	IN
16	2ND MECHANICAL SPEED SENSOR	A R	OUT
17	Y20 CRAB STEERING	H R	IN
18	Y21 4-WHEEL STEERING	C N	IN
19	DISCONNECTED	Z N	
20	DISCONNECTED	M N	
21	OPTIONAL	L G	

XC6 - MARK 9-WAY

POS.	FUNCTION DESCRIPTION
NOT USED FOR GIROLIFT 3514	

XC5 - MARK 17-WAY

POS.	FUNCTION DESCRIPTION
NOT USED FOR GIROLIFT 3514	

XC4 - MARK 13-WAY

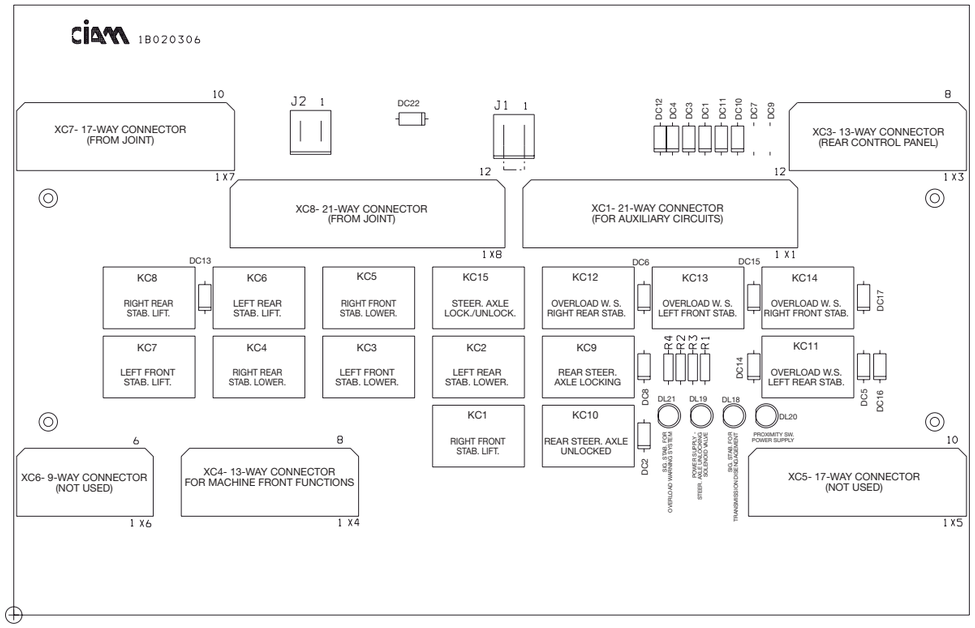
POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y3 /Y4 FRONT STEER. AXLE UNLOCK. SOLENOID	2MB	OUT
2	SENSOR - LEFT FRONT STABILIZER	B/R	IN
3	SENSOR - RIGHT FRONT STABILIZER	B N	IN
4	FRONT STAB. SENSOR POWER SUPPLY	2RV	IN
5	DISCONNECTED	B/N	
6	DISCONNECTED	A/B	
7	DISCONNECTED	Z/B	
8	DISCONNECTED	V/B	
9	DISCONNECTED	C/B	
10	GND	M	
11	DISCONNECTED	M/N	
12	DISCONNECTED	V/N	
13	DISCONNECTED	A/R	

XC3 - MARK 13-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y14 LEFT FRONT STAB. LOWERING	M/N	OUT
2	Y8 LEFT REAR STAB. LOWERING	C/B	OUT
3	SENSOR POWER SUPPLY	2RV	OUT
4	Y7 RIGHT FRONT STAB. LOWERING	B/N	OUT
5	Y6 LEFT REAR STAB. LIFTING	V/N	OUT
6	Y11 RIGHT REAR STAB. LIFTING	A/R	OUT
7	Y12 LEFT FRONT STAB. LIFTING	Z/B	OUT
8	Y13 RIGHT REAR STAB. LOWERING	A/B	OUT
9	Y9 RIGHT FRONT STAB. LIFTING	B/V	OUT
10	GND	N	
11	SENSOR - REAR WHEELS ALIGNMENT	A B	
12	DISCONNECTED	M N	
13	DISCONNECTED	Z N	

XC1 - MARK 21-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y15 REAR STEER. AXLE UNLOCK. SOLENOID	2GV	OUT
2	DISCONNECTED	G V	OUT
3	CARDAN SHAFT SENSOR POWER SUPPLY	R V	OUT
4	1ST SPEED SENSOR POWER SUPPLY	R V	OUT
5	2ND SPEED SENSOR POWER SUPPLY	R V	OUT
6	SLEWRING LOCKING PIN SENS. P.S.	2RV	OUT
7	Y17 1ST SPEED SOLENOID POWER SUPPLY	B V	OUT
8	Y5 RIGHT FRONT SWAY POWER SUPPLY	C/N	OUT
9	Y10 LEFT FRONT SWAY POWER SUPPLY	G/R	OUT
10	SIGNAL - CARDAN SHAFT SENSOR	A B	IN
11	SIG. - SLEWRING LOCKING PIN SENSOR	Z B	IN
12	LEFT REAR STAB. LIMIT SWITCH	B N	IN
13	RIGHT REAR STAB. LIMIT SWITCH	B/R	IN
14	DISCONNECTED	G N	
15	Y21 4-WHEEL STEERING SOLENOID VALVE	C N	OUT
16	Y20 CRAB STEERING SOLENOID VALVE	H R	OUT
17	2ND MECHANICAL SPEED SENSOR	A R	IN
18	Y16 2ND SPEED SOLENOID POWER SUPPLY	B R	OUT
19	Y18 DISPLACEMENT CHANGE SOLEN. P.S.	V	IN
20	1ST MECHANICAL SPEED SENSOR	A V	IN
21	DIFFERENTIAL LOCKING SOLENOID P.S.	C B	IN



XC7 - MARK 17-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y7 RIGHT FRONT STAB. LOWER. - kC5 RELAY 30 POWER S.	B/N	IN
2	Y14 LEFT FRONT STAB. LOWER. - KC3 RELAY 30 POWER S.	M/N	IN
3	Y6 LEFT REAR STAB. LIFT.- KC6 RELAY 30 POWER SUPPLY	V/N	IN
4	Y13 RIGHT REAR STAB. LOWER. - KC4 RELAY 30 POWER S.	A/B	IN
5	GND	N	IN
6	Y12 LEFT FRONT STAB. LIFT. - KC7 RELA7 30 POWER S.	Z/B	IN
7	DISCONNECTED		
8	DISCONNECTED		
9	DISCONNECTED		
10	Y8 LEFT REAR STAB. LOWER. - KC2 RELAY 30 POWER S.	C/B	IN
11	DISCONNECTED		
12	DISCONNECTED		
13	DISCONNECTED		
14	Y11 RIGHT REAR STAB. LIFT. - KC8 RELAY 30 POWER SUPPLY	A/R	IN
15	DISCONNECTED		
16	DISCONNECTED		
17	DISCONNECTED		

COLOUR LEGEND

SYMBOL	DESCRIPTION
A	light blue
B	white
C	orange
G	yellow
H	grey
L	blue
M	brown
N	black
R	red
S	pink
V	green
Z	purple

ABBREVIATION LEGEND

ANT.	FRONT	SAL.	LIFTING
POST.	REAR	DIS.	LOWERING
STAB.	STABILIZER	SENS.	SENSOR
EV	SOLENOID VALVE	CONN.	CONNECTOR
ALIM.	POWER SUPPLY	DIFFER.	DIFFERENTIAL
DX	RIGHT	SEG.	SIGNAL
SX	LEFT		
N.C.	DISCONNECTED		

Operation: Wiring diagram Girolift 5022 (up to serial no. 9410) - UNDERCARRIAGE board

Table: **C.05.01**

XC8 - MARK 21-WAY

POS.	FUNCTION DESCRIPTION
1	OUT- slewring locked sensor
2	OUT- Cardan shaft proximity sw sensor
3	Left front sway
4	Right front sway
5	1 speed
6	Micro power supply
7	Signal - overload proximity sw
8	+vc
9	front/rear switching SN
10	Signal - transmission disengagement
11	V/B Y9 Rpsx - Rsfdx
12	Differential locking
13	1st speed sensor
14	Displacement change
15	2nd speed solenoid vlave
16	OUT-2nd speed sensor
17	4-wheel steering
18	Crab steering
19	Disconnected
20	Disconnected
21	Optional rear alignm. sensor

XC6 - MARK 9-WAY

POS.	FUNCTION DESCRIPTION
1	GND
2	54 right
3	56/B
4	56/B
5	58 right
6	54 left
7	58 left
8	56/A
9	56/A

XC4 - MARK 13-WAY

POS.	FUNCTION DESCRIPTION
1	Front steering axle unlocking solenoid valve
2	Left front stabilizer limit switch
3	Right front stabilizer limit switch
4	+sensors
5	MV Y7 B/N
6	MV Y13 A/B
7	MV Y12 Z/B
8	MV Y9 V/B
9	MV Y8 C/B
10	GND
11	MV Y14 M/N
12	MV Y6 V/N
13	MV Y11 A/R

XC3 - MARK 13-WAY

POS.	FUNCTION DESCRIPTION
1	MV Y14 M/N
2	MV Y8 C/B
3	+sensors
4	MV Y7 B/N
5	MV Y6 V/N
6	MV Y11 A/R
7	MV Y12 Z/B
8	MV Y13 A/B
9	MV Y9 V/B
10	GND
11	Optional rear power supply sensor
12	Disconnected
13	Disconnected

XC5 - MARK 17-WAY

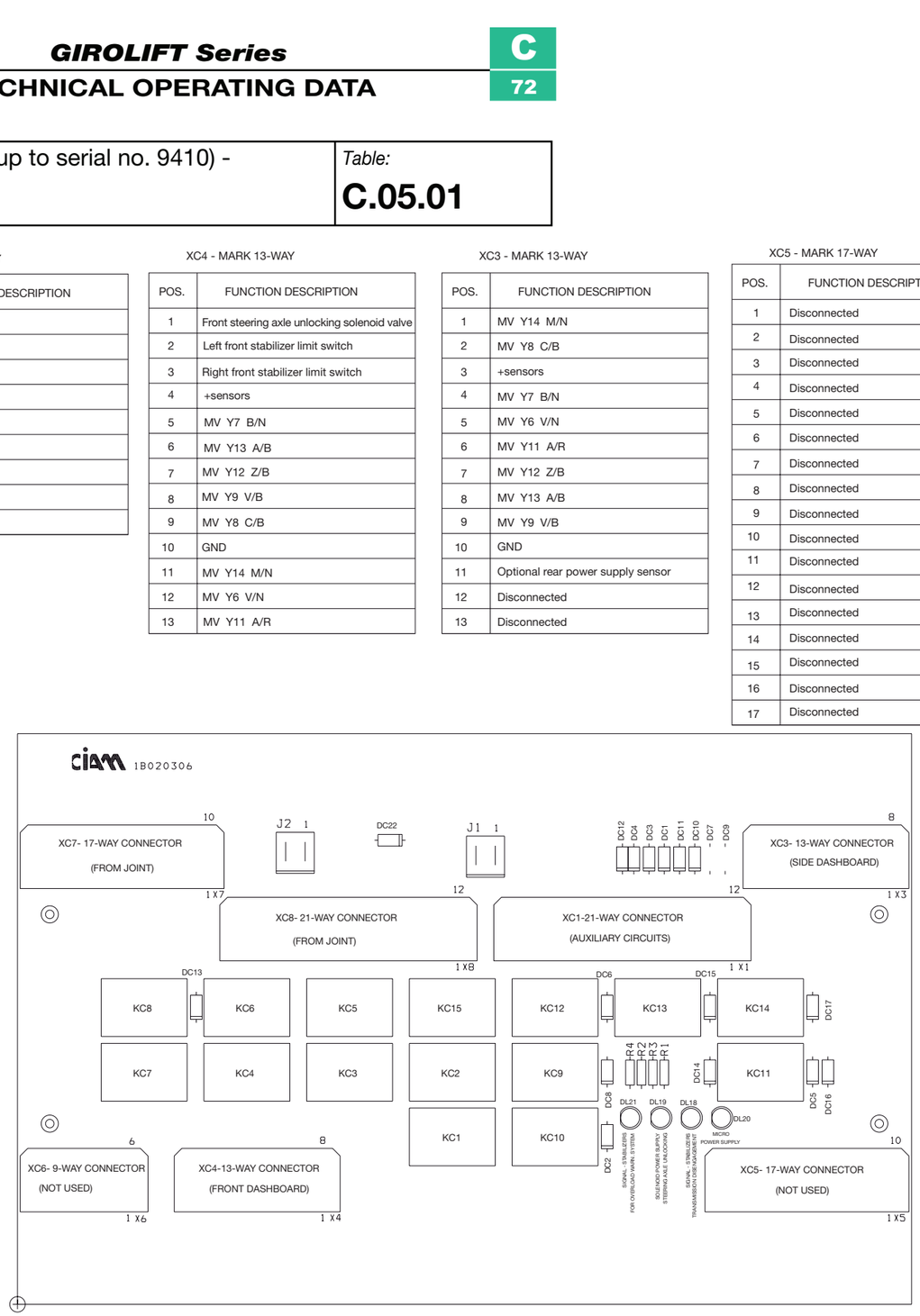
POS.	FUNCTION DESCRIPTION
1	Disconnected
2	Disconnected
3	Disconnected
4	Disconnected
5	Disconnected
6	Disconnected
7	Disconnected
8	Disconnected
9	Disconnected
10	Disconnected
11	Disconnected
12	Disconnected
13	Disconnected
14	Disconnected
15	Disconnected
16	Disconnected
17	Disconnected

XC1 - MARK 21-WAY

POS.	FUNCTION DESCRIPTION
1	Rear steering axle locking solenoid valve
2	Disconnected
3	+sensors
4	+sensors
5	+sensors
6	+sensors
7	OUT-1st speed solenoid valve
8	OUT-right sway solenoid valve
9	OUT-left sway solenoid valve
10	IN-Cardan shaft sensor
11	IN-locked slewring sensor
12	IN-left rear stab. limit switch
13	IN-right rear stab. limit switch
14	License plate lamps
15	OUT-crab steering solenoid valve
16	OUT-4-wheel steering solenoid valve
17	IN-2nd speed sensor
18	OUT-2nd speed solenoid valve
19	OUT-displacement change solenoid valve
20	IN-1st speed sensor
21	OUT-differential locking solenoid valve

XC7 - MARK 17-WAY

POS.	FUNCTION DESCRIPTION	TABLERO	
		FWD	Reverse
1	B/N Y7	Mpsx	Msfdx
2	M/N Y14	Msfdx	Msfsx
3	V/N Y6	Rpdx	Rpsx
4	A/B Y13	Msfsx	Mpdx
5	GND		
6	Z/B Y12	Rsfdx	Rsfsx
7	54 right		
8	56/B		
9	56/A		
10	C/B Y8	Mprdx	Mpsx
11	Disconnected		
12	Disconnected		
13	Disconnected		
14	A/R Y11	Rsfsx	Rpdx
15	54 left		
16	58 left		
17	58 right		



LEGEND

Symbol	Description
M	Advance
R	Return
p	Foot
sf	Extension
A	light blue
B	white
C	orange
G	yellow
H	grey
L	blue
M	brown
N	black
R	red
S	pink
V	green
Z	purple

Operation: Wiring diagram - components description	Table: C.05.01

Ref.	Description	Wir. diagr.
F1A	FUSE - WINDSCREEN WIPER/WASHER POWER SUPPLY SWITCH	7
F1B	FUSE - 10A HAZARD INDICATOR	10
F1C	FUSE - 7.5A HYDRAULIC PUMP DISPLACEMENT CHANGE SOLENOID, STEERING ACCUM. SOLENOID	1
F2A	FUSE - 7.5A BEACON POWER SUPPLY	6
F2B	FUSE - 10A LIGHTS SWITCH	10
F2C	FUSE - 3A LEFT FRONT/RIGHT REAR POSITION LIGHTS	10
F3A	FUSE - 3A RIGHT FRONT/LEFT REAR POSITION LIGHTS	10
F3B	FUSE - 7.5A HAZARD INDICATOR AND SPEED CHANGE SWITCH	2
F3C	FUSE - 7.5A FRONT/REAR STEERING AXLE LOCKING/UNLOCKING SOLENOID VALVES	5
F4A	FUSE - 7.5A EMERGENCY PUMP	1
F4B	OPTIONAL FUSE - 7.5A	2
F4C	FUSE - 7.5A STOP LIGHTS/WORK LIGHT MICRO	10
F5A	FUSE - 15A LOW BEAM	10
F5B	FUSE - 7.5A CAB LIGHTS	3
F5C	FUSE - 15A OVERLOAD WARNING SYSTEN	4
F6A	FUSE - 7.5A SPEED SWITCH POWER SUPPLY	2
F68	FUSE - 7.5A UPPER WINDSCREEN WIPER/WASHER POWER SUPPLY	4
F6C	FUSE - 20A SWITCHES, OPTIONAL CONTROL LEVER, DANFOSS CARD POWER SUPPLY	7
F7A	FUSE - STABILIZER LIMIT SWITCHES, PARKING BRAKE, CARRIAGE ALIGNM., BASKET POWER SUPPLY	2
F7B	FUSE - 10A BOOM POWER SUPPLY	1
F7C	FUSE - 15A HORN, HEATER	2
F8A	FUSE - 10A HIGH BEAM	10
F8B	FUSE - 15A TIMER, INSTRUMENT INDICATORS POWER SUPPLY	1
F8C	FUSE - 5A BOOM POWER SUPPLY	9
FG1	70A MAIN FUSE	1
FG2	30A MAIN FUSE	1
FG3	20A MAIN FUSE	1
FGI	60A MAIN FUSE	1
G1	BATTERY	1
G2	ALTERNATOR	1
H1	INDICATOR - ALARMS	1
HI0	INDICATOR - 2ND SPEED	3
H11	INDICATOR - 1ST SPEED	3
H12	CAB LIGHTING	3
H13	INDICATOR - DIFFERENTIAL LOCKING	4
H14	INDICATOR - CARRIAGE ALIGNMENT	4
H15	INDICATOR - BASKET	4
H16	BEACON	6
H17	INDICATOR - ATTACHMENT COUPLING/RELEASE	8
H18	INDICATOR - FORK ROTATION	8
H19	INDICATOR - BOOM OUT/IN	8
H2	INDICATOR - GLOW PLUGS	1
H20	INDICATOR - BOOM UP/DOWN	8
H21	INDICATOR - FORKS PARALLEL TO GROUND	8
H22	INDICATOR - TURRET ROTATION	8
H23	INDICATOR - TURRET ROTATION LOCKED	8
H24	INDICATOR - TURN SIGNALS	10
H25	INDICATOR - HIGH BEAM	10
H26	INDICATOR - POSITION LIGHTS	10
H27	LEFT FRONT LIGHT	10
H28	LICENCE PLATE LIGHT	10
H29	RIGHT FRONT LIGHT	10
H3	INDICATOR - AIR FILTER CLOGGED	1
H30	LICENCE PLATE LIGHT	10
H31	LEFT REAR LIGHT	10
H32	RIGHT REAR LIGHT	10
H33	BACK-UP LAMP	10
H34	WORK LIGHT	10
H4	INDICATOR - HIGH ENGINE WATER TEMPERATURE	1
H5	INDICATOR - LOW ENGINE OIL PRESSURE	1
H6	INDICATOR - GEN-SET	1
H7	INDICATOR - PARKING BRAKE	2
H8	INDICATOR - HYDRAULIC OIL FILTER CLOGGED	3
H9	INDICATOR - LOW BRAKE PRESSURE	3
HA1	HORN	2
HA2	BACK-UP HORN	10
K01	RELAY - STARTER	1
K02	RELAY - GLOW PLUGS	1
K03	RELAY - ELECTRONICS	1
K04	RELAY - POWER SUPPLY UNDER DASHBOARD	1
K1	RELAY - HYDRAULIC PUMP DISPLACEMENT CHANGE	2

Operation: Wiring diagram - components description	Table: C.05.01

K11	RELAY - CARRIAGE ALIGNMENT	4
KI2	RELAY - BOOM	4
KI3	RELAY - HIGH BEAM	10
KI4	RELAY - START ENABLING COMMAND	1
K15	OPTIONAL RELAY - BOOM	9
K16	OPTIONAL RELAY	2
K17	OPTIONAL RELAY	2
K2	RELAY - HORN	2
K3	BLINKING	10
K4	RELAY - EMERGENCY STOP	1
K5	RELAY - EMERGENCY PUMP	4
K6	RELAY - LOW BEAM	10
K7	RELAY - SPEED ENABLING COMMAND	2
K8	RELAY - REVERSE SPEED	2
K9	RELAY - FORWARD SPEED	2
KC1	RELAY - LEFT FRONT/REAR STABILIZER OUT	6
KC10	RELAY - FRONT AXLE UNLOCKING	5
KC11	RELAY - LEFT REAR STABILIZER OVERLOAD WARNING SYST.	2
KCI2	RELAY - RIGHT REAR STABILIZER OVERLOAD WARNING SYST.	2
KCI3	RELAY - LEFT FRONT STABILIZER OVERLOAD WARNING SYST.	2
KC14	RELAY - RIGHT FRONT STABILIZER OVERLOAD WARNING SYST.	2
KC15	RELAY - SLEWRING LOCKED	4
KC2	RELAY - LEFT FRONT/REAR STABILIZER IN	6
KC3	RELAY - RIGHT FRONT/REAR STABILIZER OUT	7
KC4	RELAY - RIGHT FRONT/REAR STABILIZER IN	7
KC5	RELAY - LEFT FRONT/REAR STABILIZER UP	6
KC6	RELAY - LEFT FRONT/REAR STABILIZER DOWN	6
KC7	RELAY - RIGHT FRONT/REAR STABILIZER UP	P7
KC8	RELAY - RIGHT FRONT/REAR STABILIZER DOWN	7
KC9	RELAY - REAR AXLE LOCKING	5
M1	STARTER	1
M2	OPTIONAL AIR CONDITIONER	1
M3	OPTIONAL UPPER WINDSCREEN WIPER/WASHER MOTOR	3
M4	WINDSCREEN WASHER PUMP	3
M5	EMERGENCY PUMP	4
M6	HEATING	6
M7	WINDSCREEN WIPER/WASHER MOTOR	7
P1	ENGINE WATER TEMPERATURE INDICATOR	1
P2	HYDRAULIC OIL TEMPERATURE INDICATOR	1
P3	FUEL GAUGE	3
P4	HOUR-METER	3
R1	1/4W RESISTANCE	2
R2	1/4W RESISTANCE	5
R3	1/4W RESISTANCE	2
R4	1/4W RESISTANCE	2
R5	GLOW PLUGS	1
R6	FUEL LEVEL TRANSDUCER	3
RP1	JOYSTICK 1 POTENTIOMETER	9
RP2	JOYSTICK 2 POTENTIOMETER	9
RP3	JOYSTICK 3 POTENTIOMETER	9
RP4	OPTIONAL CONTROL LEVER POTENTIOMETER	7
S1	SWITCH - HAZARD WARNING INDICATOR	10
S10	SWITCH - SLEWRING LOCKED/FREE	8
S11	SWITCH - AXLE LEVELLING	5
S12	SWITCH - LIGHTS	10
S13	SWITCH - WORK LIGHTS	10
S14	START-UP PANEL	1
S16	SWITCH - SPEED CHANGE	3
S17	SWITCH - DIFFERENTIAL LOCKING	4
S18	SWITCH - EMERGENCY PUMP	4
S2	SWITCH - BEACON	6
S20	MUSHROOM-HEAD BUTTON	1
S21	BATTERY CUTOUT SWITCH	1
S22	ENGINE THERMOSTAT	1
S23	PRESSURE SWITCH - AIR FILTER CLOGGED	1
S24	HIGH ENGINE WATER TEMPERATURE THERMOSTAT	1
S25	PRESSURE SWITCH - LOW ENGINE OIL PRESSURE	1
S26	ENGINE WATER TEMPERATURE TRANSDUCER	1
S27	HYDRAULIC OIL TEMPERATURE TRANSDUCER	1
S28	PARKING BRAKE MICRO	2
S29	LEFT REAR STABILIZER MICRO	2
S3	SWITCH - LEFT STABILIZER OUT/IN	6
S30	RIGHT REAR STABILIZER MICRO	2
S31	RIGHT FRONT STABILIZER MICRO	2
S32	LEFT FRONT STABILIZER MICRO	2
S33	SEAT MICRO	3
S34	PRESSURE SWITCH - HYDRAULIC OIL FILTER CLOGGED	3

Operation: Wiring diagram - components description	Table: C.05.01

S35	PRESSURE SWITCH - LOW BRAKE PRESSURE	3
S36	SENSOR - CARDAN SHAFT	3
S37	SENSOR - 1ST SPEED ENGAGED	3
S38	SENSOR - 2ND SPEED ENGAGED	3
S39	SENSOR - CARRIAGE ALIGNMENT	4
S4	SWITCH - RIGHT STABILIZERS OUT/IN	7
S40	SENSOR - LOCKING PIN UP	4
S41	SENSOR - BOOM DOWN	4
S42	SENSOR - BOOM UP	4
S43	SENSOR - SLEWRING LOCKED	4
S45	OPTIONAL SENSOR - REAR AXLE ALIGNMENT	5
S46	STEERING SWITCH	9
S47	STOP LIGHTS MICRO	10
S48	SPEED CHANGE SELECTOR SWITCH	2
S49	OVERLOAD WARNING SYSTEM CUTOUT	5
S5	BACK-UP HORN CUTOUT SWITCH	10
S50	ROBOT CONTROL	9
S51	START BUTTON	9
S52	ENGINE EMERGENCY STOP BUTTON	9
S53	EMERGENCY PUMP BUTTON	9
S54	HORN BUTTON	9
S55	LIGHTS/TURN SIGNALS SWITCH	10
S56	SENSOR - FORKS ENGAGED	9
S6	SWITCH - LEFT STABILIZERS UP/DOWN	6
S7	SWITCH - RIGHT STABILIZERS UP/DOWN	7
S8	SWITCH - HEATING	6
S9	SWITCH - OPTIONAL AIR CONDITIONER	1
Y01	SOLENOID VALVE - FWD SPEED	2
Y02	SOLENOID VALVE - REVERSE	2
Y1	SOLENOID VALVE - SLEWRING LOCKED	8
Y10	SOLENOID VALVE - FRONT AXLE LEVELLING	5
Y11	SOLENOID VALVE - RIGHT REAR STABILIZER UP	7
Y12	SOLENOID VALVE - LEFT FRONT STABILIZER UP	7
Y13	SOLENOID VALVE - RIGHT REAR STABILIZER DOWN	7
Y14	SOLENOID VALVE - LEFT FRONT STABILIZER DOWN	7
Y15	SOLENOID VALVE - REAR AXLE LOCKED	5
Y15a	SOLENOID VALVE - REAR AXLE LOCKED	5
Y16	SOLENOID VALVE - 2ND SPEED	3
Y17	SOLENOID VALVE - 1ST SPEED	3
Y18	SOLENOID VALVE - HYDRAULIC PUMP DISPLACEMENT CHANGE	4
Yl9	SOLENOID VALVE - FWD	8
Y2	SOLENOID VALVE - SLEWRING UNLOCKED	9
Y20	SOLENOID VALVE - FOUR-WHEEL STEERING	9
Y21	SOLENOID VALVE - CRAB STEERING	8
Y22	SOLENOID VALVE - BOOM EXTENSION/ RETRACTION	8
Y23	SOLENOID VALVE - STABILIZERS / SLEWRING LOCKED/UNLOCKED	8
Y24	SOLENOID VALVE - ATTACHMENT RELEASED/ COUPLED	8
Y25	SOLENOID VALVE - SWITCHING	8
Y26	SOLENOID VALVE - BOOM RAISED/LOWERED	8
Y27	SOLENOID VALVE - TURRET ROTATION	8
Y29	SOLENOID VALVE - ENGINE STOP	1
Y3	SOLENOID VALVE - LEFT FRONT AXLE UNLOCKED	5
Y30	SOLENOID VALVE - STEERING ACCUMULATOR	5
Y4	SOLENOID VALVE - RIGHT FRONT AXLE UNLOCKED	5
Y5	SOLENOID VALVE - FRONT AXLE LEVELLING	5
Y6	SOLENOID VALVE - LEFT REAR STABILIZER UP	6
Y7	SOLENOID VALVE - RIGHT FRONT STABILIZER DOWN	6
Y8	SOLENOID VALVE - LEFT REAR STABILIZER UP	6
Y9	SOLENOID VALVE - LEFT FRONT STABILIZER UP	6
X1	5-WAY CONNECTOR	
X10	17-WAY MARK CONNECTOR	
X101	2-WAY CONNECTOR	
X102	2-WAY CONNECTOR	
X103	2-WAY CONNECTOR	
X104	2-WAY CONNECTOR	
X105	2-WAY CONNECTOR	
X106	2-WAY CONNECTOR	
X107	2-WAY CONNECTOR	
X108	2-WAY CONNECTOR	
X109	2-WAY CONNECTOR	
X11	13-WAY MARK CONNECTOR	
X110	2-WAY CONNECTOR	
X111	2-WAY CONNECTOR	
X112	2-WAY CONNECTOR	
X113	2-WAY CONNECTOR	
X114	2-WAY CONNECTOR	
X115	2-WAY CONNECTOR	

Operation: Wiring diagram - components description	Table: C.05.01

X115a	2-WAY CONNECTOR
X11è	2-WAY CONNECTOR
X117	2-WAY CONNECTOR
X118	2-WAY CONNECTOR
X119	2-WAY CONNECTOR
X12	7-WAY MARK CONNECTOR
X120	2-WAY CONNECTOR
X121	2-WAY CONNECTOR
X122	4-POLE CONNECTOR
X123	4-POLE CONNECTOR
X124	4-POLE CONNECTOR
X125	2-WAY CONNECTOR
X126	4-POLE CONNECTOR
X127	4-POLE CONNECTOR
X13	17-WAY MARK CONNECTOR
X14	9-WAY MARK CONNECTOR
X15	11-WAY MARK CONNECTOR
X150	1-WAY CONNECTOR
X16	21-WAY MARK CONNECTOR
X2	8-WAY CONNECTOR
X20	3-WAY CONNECTOR
X21	2-WAY CONNECTOR
X22	2-WAY CONNECTOR
X23	2-WAY CONNECTOR
X25	24-WAY DEUTSCH CONNECTOR
X26	5-WAY MARK CONNECTOR
X28	8-WAY DEUTSCH CONNECTOR
X29	17-WAY MARK CONNECTOR
X3	8-WAY CONNECTOR
X30	40-WAY DEUTSCH CONNECTOR TYPE A
X31	23-WAY DEUTSCH CONNECTOR
X310	24-WAY DEUTSCH CONNECTOR
X32	3-WAY DEUTSCH CONNECTOR
X33	12-WAY DEUTSCH CONNECTOR
X35	4-WAY CONNECTOR
X36	4-WAY CONNECTOR
X37	2-WAY DEUTSCH CONNECTOR
X38	2-WAY DEUTSCH CONNECTOR
X4	8-WAY CONNECTOR
X40	40-WAY DEUTSCH CONNECTOR TYPE A
X41	40-WAY DEUTSCH CONNECTOR TYPE A
X42	2-WAY DEUTSCH CONNECTOR
X43	2-WAY 90° CONNECTOR
X44	24-WAY DEUTSCH CONNECTOR
X45	3-WAY DEUTSCH CONNECTOR
X46	3-WAY DEUTSCH CONNECTOR
X47	2-WAY CONNECTOR
X48	3-WAY DEUTSCH CONNECTOR
X49	3-WAY DEUTSCH CONNECTOR
X5	21-WAY MARK CONNECTOR
X50	3-WAY DEUTSCH CONNECTOR
X51	3-WAY DEUTSCH CONNECTOR
X52	3-WAY DEUTSCH CONNECTOR
X53	3-WAY DEUTSCH CONNECTOR
X54	3-WAY DEUTSCH CONNECTOR
X55	3-WAY DEUTSCH CONNECTOR
X56	3-WAY DEUTSCH CONNECTOR
X57	2-WAY DEUTSCH CONNECTOR
X58	3-WAY DEUTSCH CONNECTOR
X59	3-WAY DEUTSCH CONNECTOR
X6	17-WAY MARK CONNECTOR
X61	8-WAY CONNECTOR
X62	8-WAY CONNECTOR
X65	3-WAY CONNECTOR
X66	4-WAY DEUTSCH CONNECTOR
X67	2-WAY CONNECTOR
X68	1-WAY CONNECTOR
X69	1-WAY CONNECTOR
X7	17-WAY MARK CONNECTOR
X70	6-WAY DEUTSCH CONNECTOR
X71	6-WAY DEUTSCH CONNECTOR
X72	6-WAY DEUTSCH CONNECTOR
X73	2-WAY CONNECTOR
X74	1-WAY CONNECTOR
XT5	1-WAY CONNECTOR
XT6	8-WAY CONNECTOR
X8	9-WAY MARK CONNECTOR
X83	6-WAY CONNECTOR
X9	13-WAY MARK CONNECTOR
XA	3-WAY CONNECTOR
XB	1-WAY CONNECTOR
XC1	21-WAY MARK CONNECTOR
XC3	13-WAY MARK CONNECTOR
XC4	13-WAY MARK CONNECTOR
XC5	17-WAY MARK CONNECTOR
XC6	9-WAY MARK CONNECTOR
XC7	17-WAY MARK CONNECTOR
XC8	21-WAY MARK CONNECTOR
XD6	12-WAY DEUTSCH CONNECTOR
XD7	12-WAY DEUTSCH CONNECTOR

Operation: Wiring diagram - components description	Table: C.05.01

XJ3	12-WAY MIC 70 CONNECTOR
XJ30	18-WAY MIC 70 CONNECTOR
XJ4	20-WAY MIC 70 CONNECTOR
XJ5	14-WAY MIC 70 CONNECTOR
XJP2	8-WAY MIC 70 CONNECTOR
XJP3	8-WAY MIC 70 CONNECTOR
XJP4	8-WAY MIC 70 CONNECTOR
XM	18-WAY DEUTSCH CONNECTOR
XS1	5-WAY COMBINATI 1 CONNECTOR
XT	6-WAY CONNECTOR

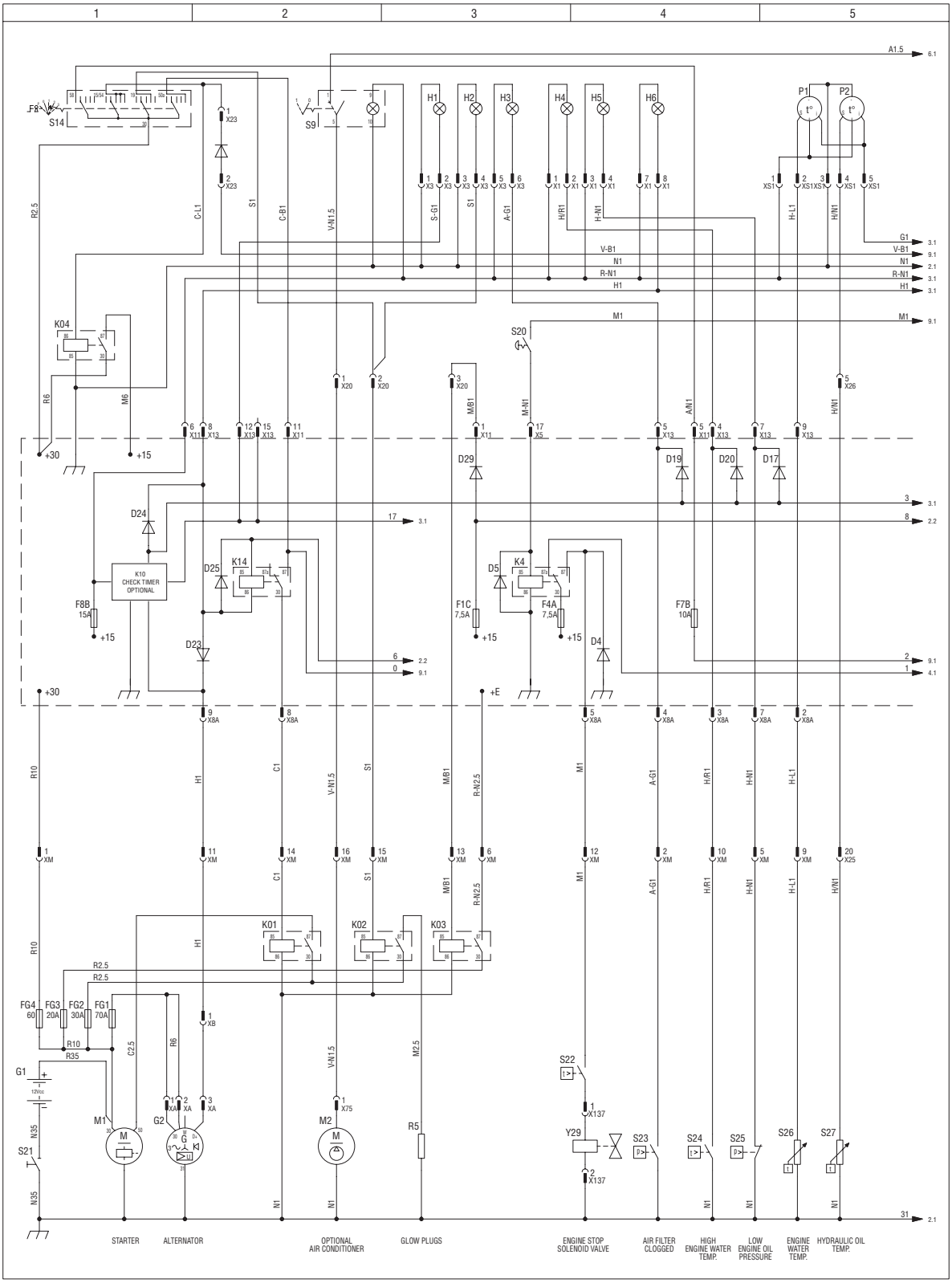
WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

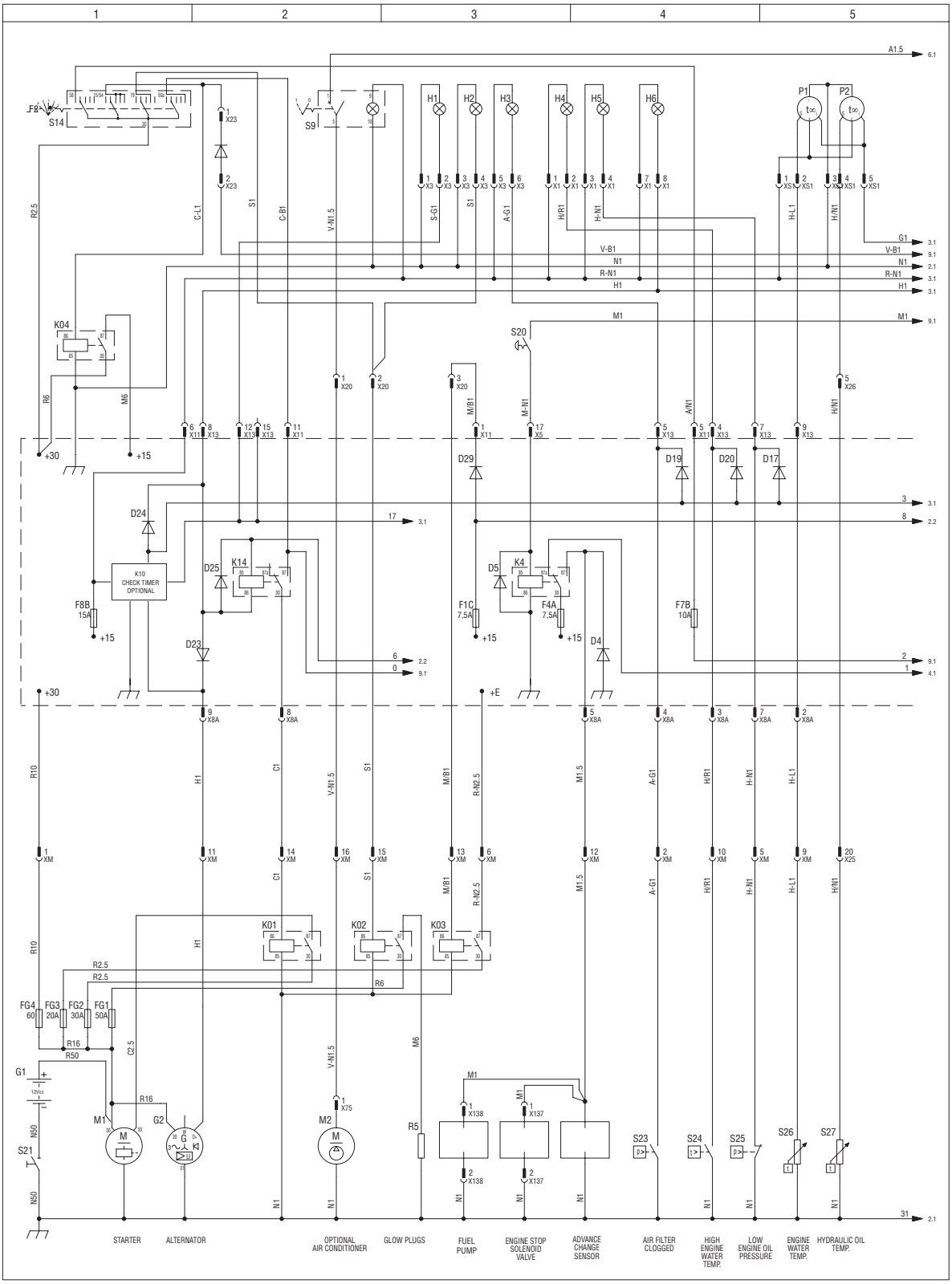
REMARK:
Two-colour wires are indicated through a combination of the aforesaid initials as follows:

G/V	YELLOW/GREEN (CROSSWISE COLOURING)
G-V	YELLOW-GREEN (LENGTHSWISE COLOURING)

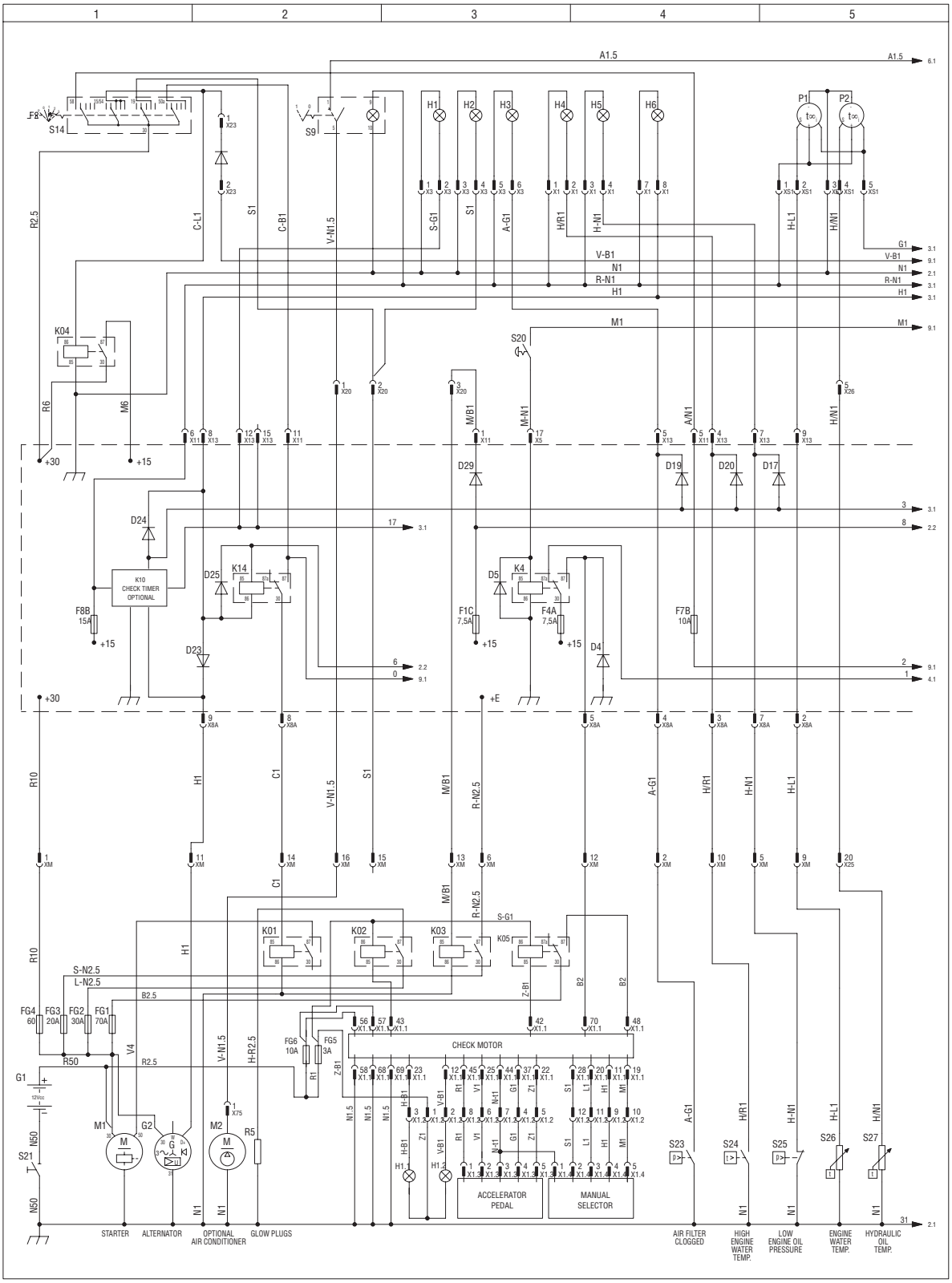
Operation:	Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 1 of 10	*Table:* **C.05.02**



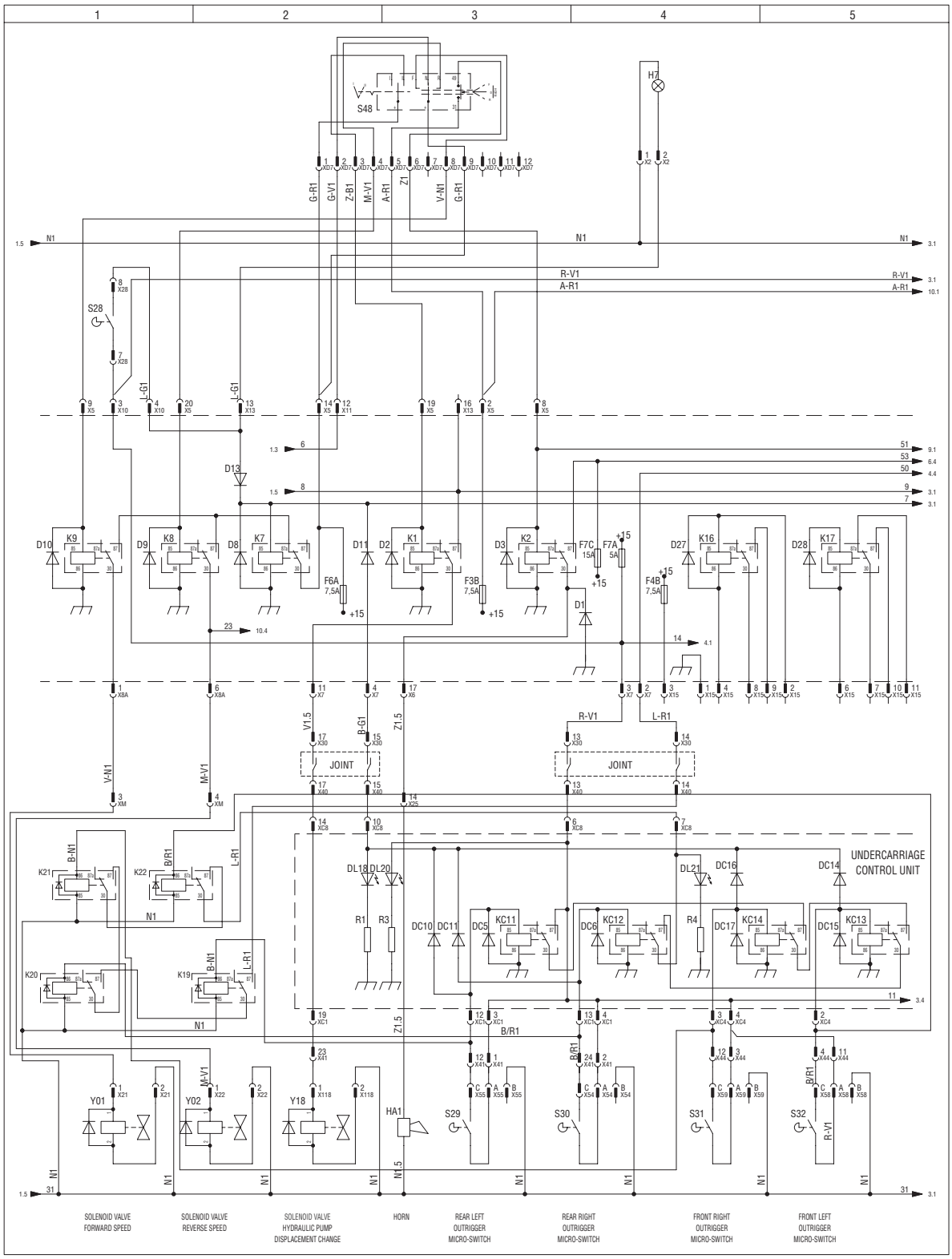
Operation:	Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) - sheet 1 of 10 • **STAGE 2 MOTOR**	*Table:* **C.05.02**



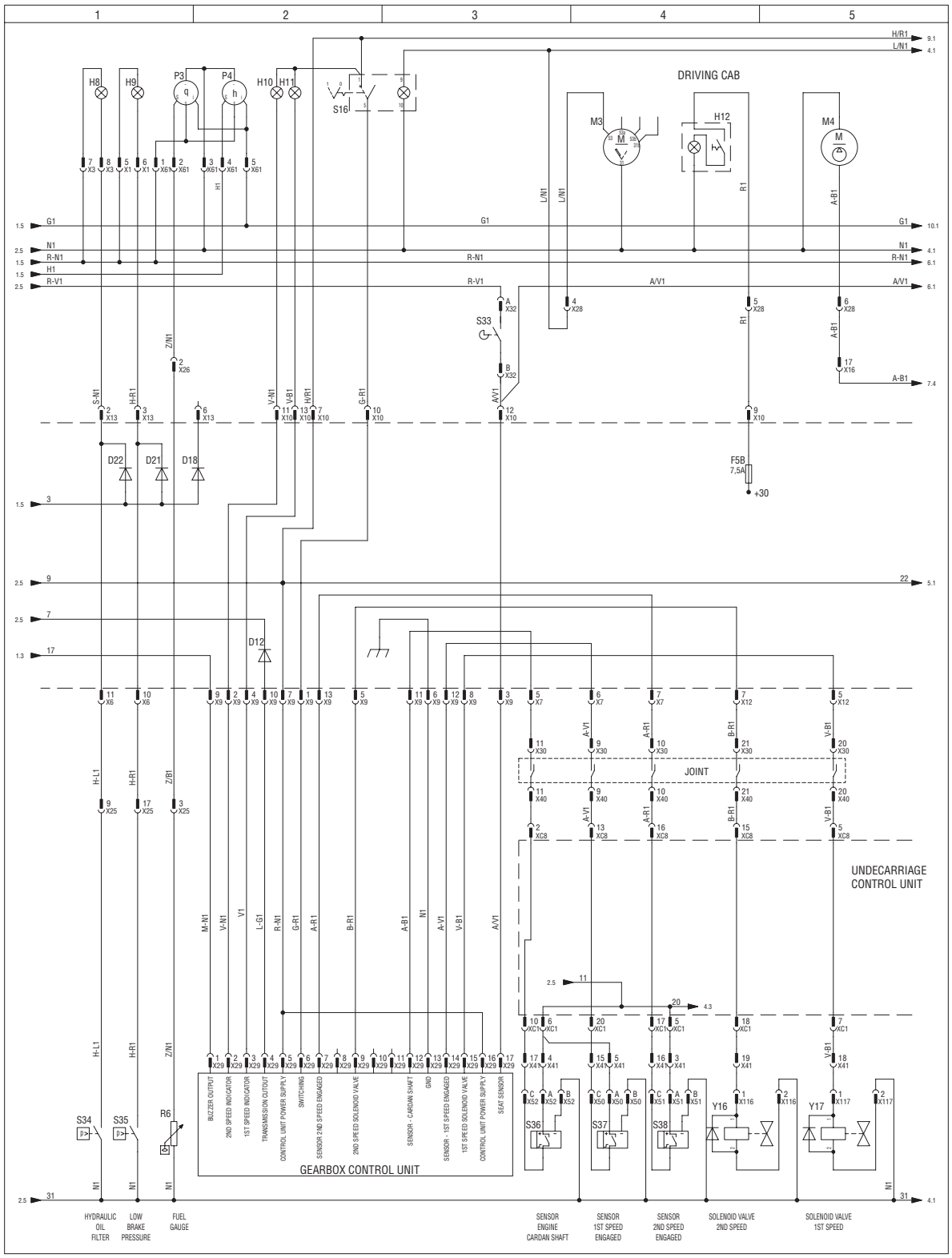
Operation:	*Table:*
Wiring diagram Girolift 5022 (from serial no. 09411 to serial no. 10078) - sheet 1 of 10 • **STAGE 2 MOTOR**	**C.05.02**



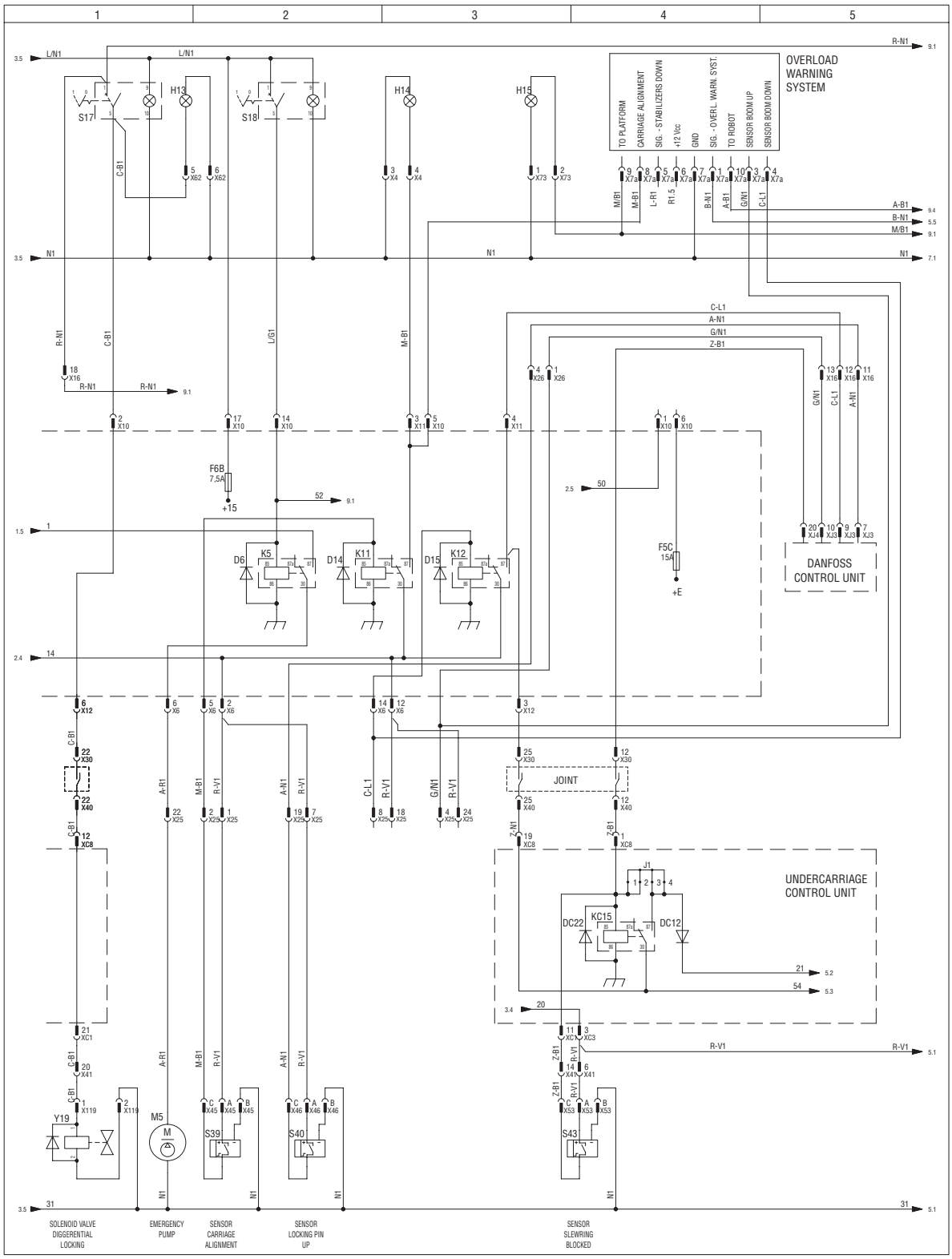
Operation:	Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 2 of 10	*Table:* **C.05.02**



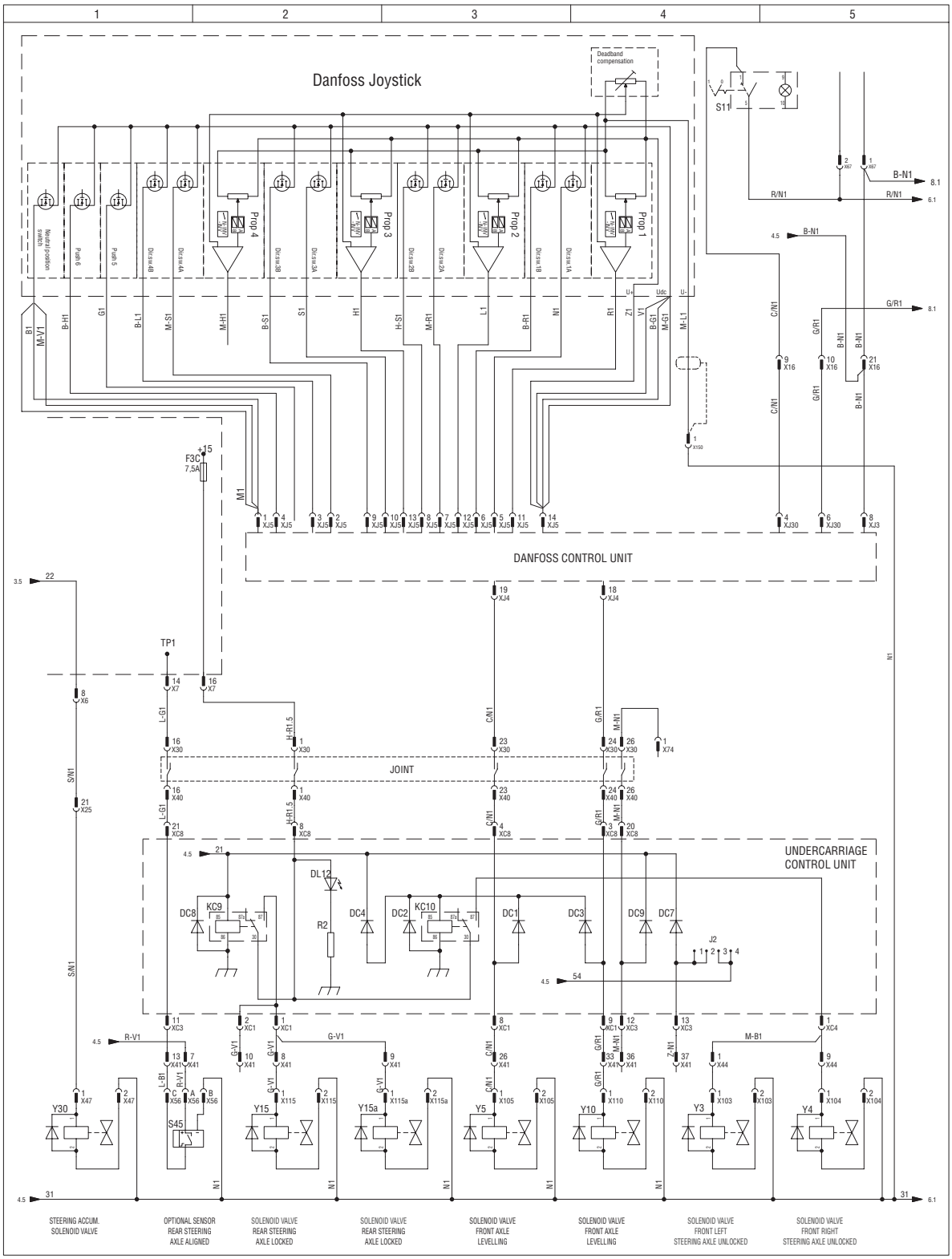
Operation:	Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 3 of 10	*Table:* **C.05.02**



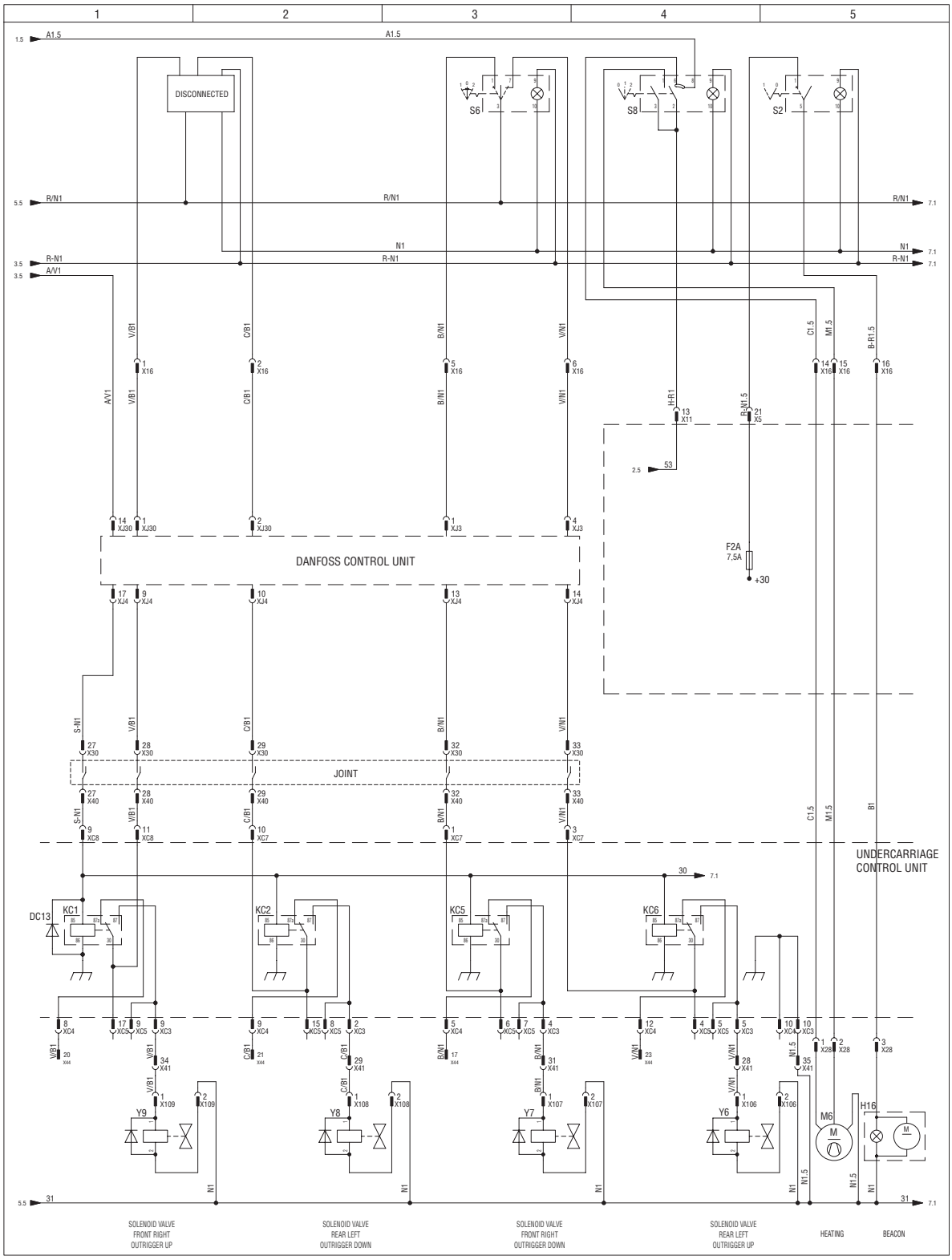
Operation:	Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 4 of 10	*Table:* **C.05.02**



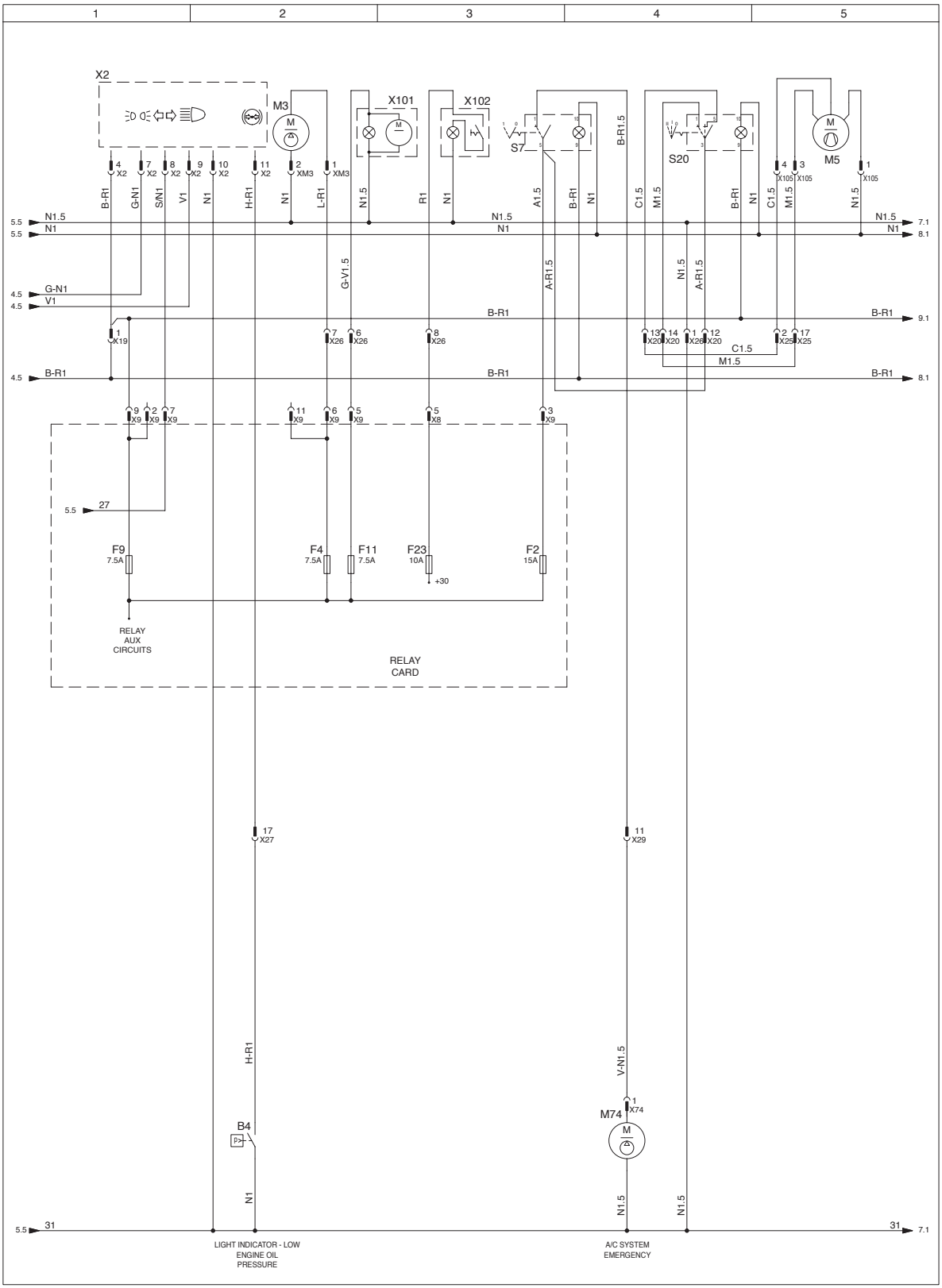
Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 5 of 10	**C.05.02**



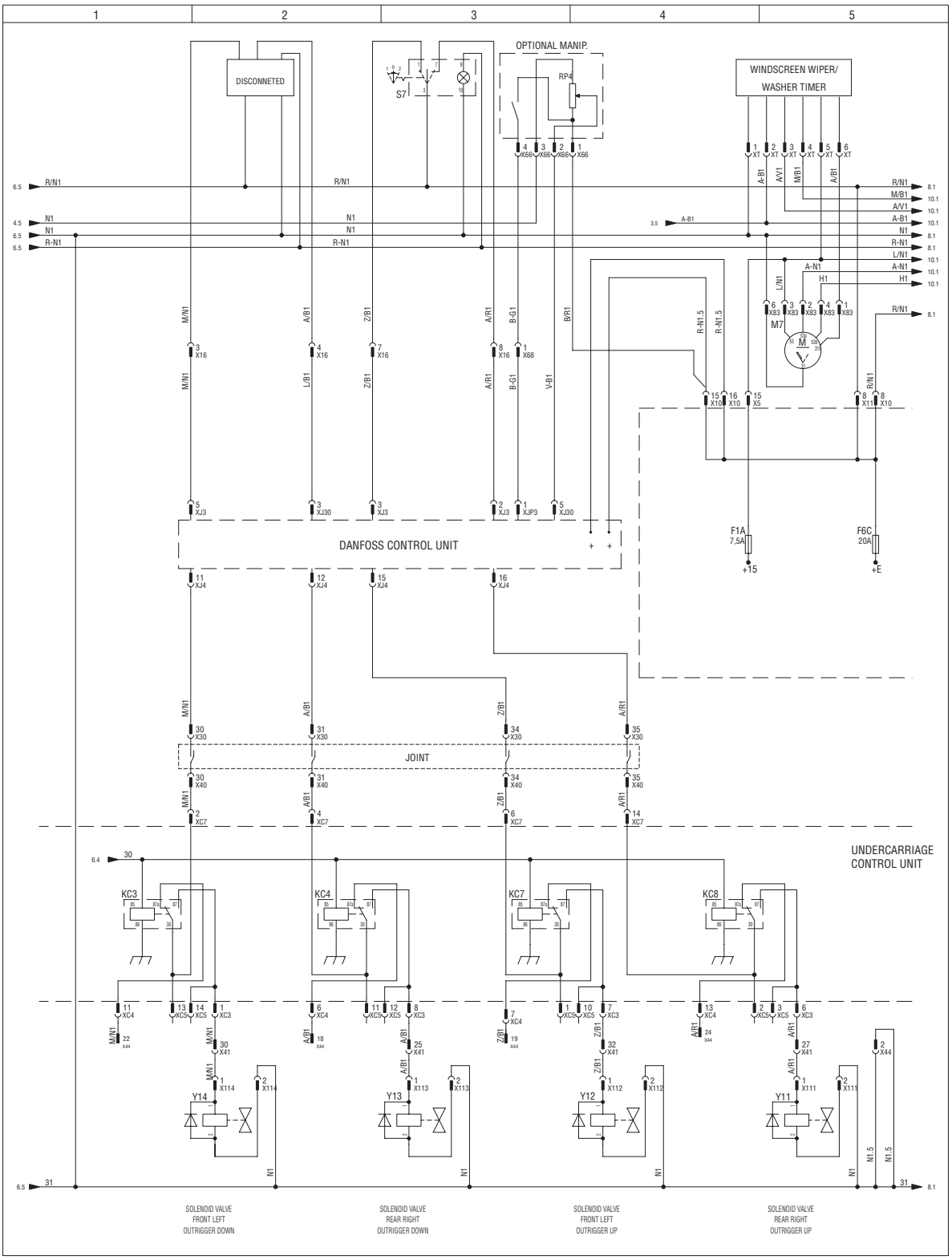
Operation:	Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) - sheet 6 of 10	*Table:* **C.05.02**



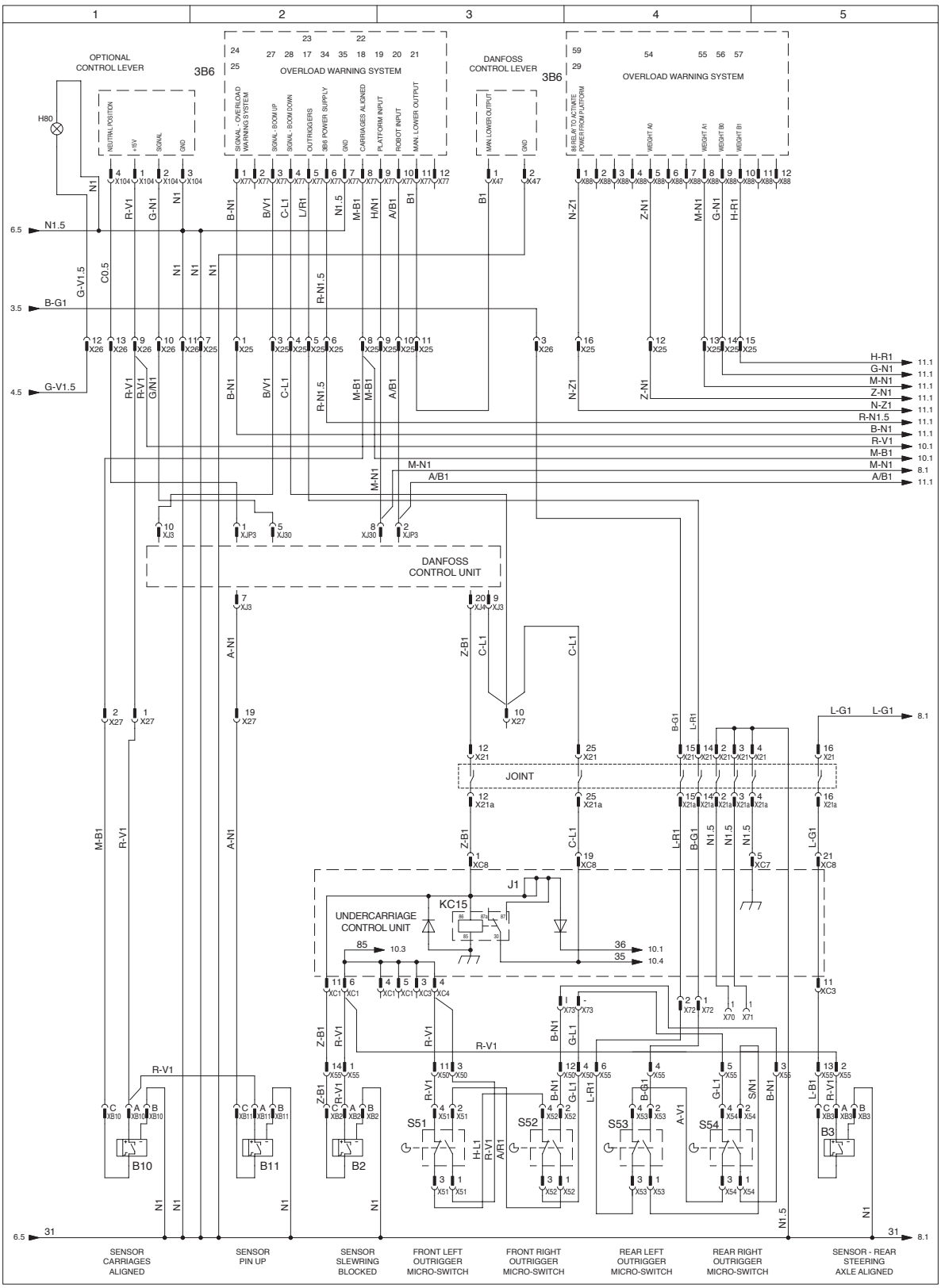
Operation:	Wiring diagram Girolift 5022 (from serial no. 09411 to serial no. 10078) - sheet 6 of 10	*Table:* **C.05.02**



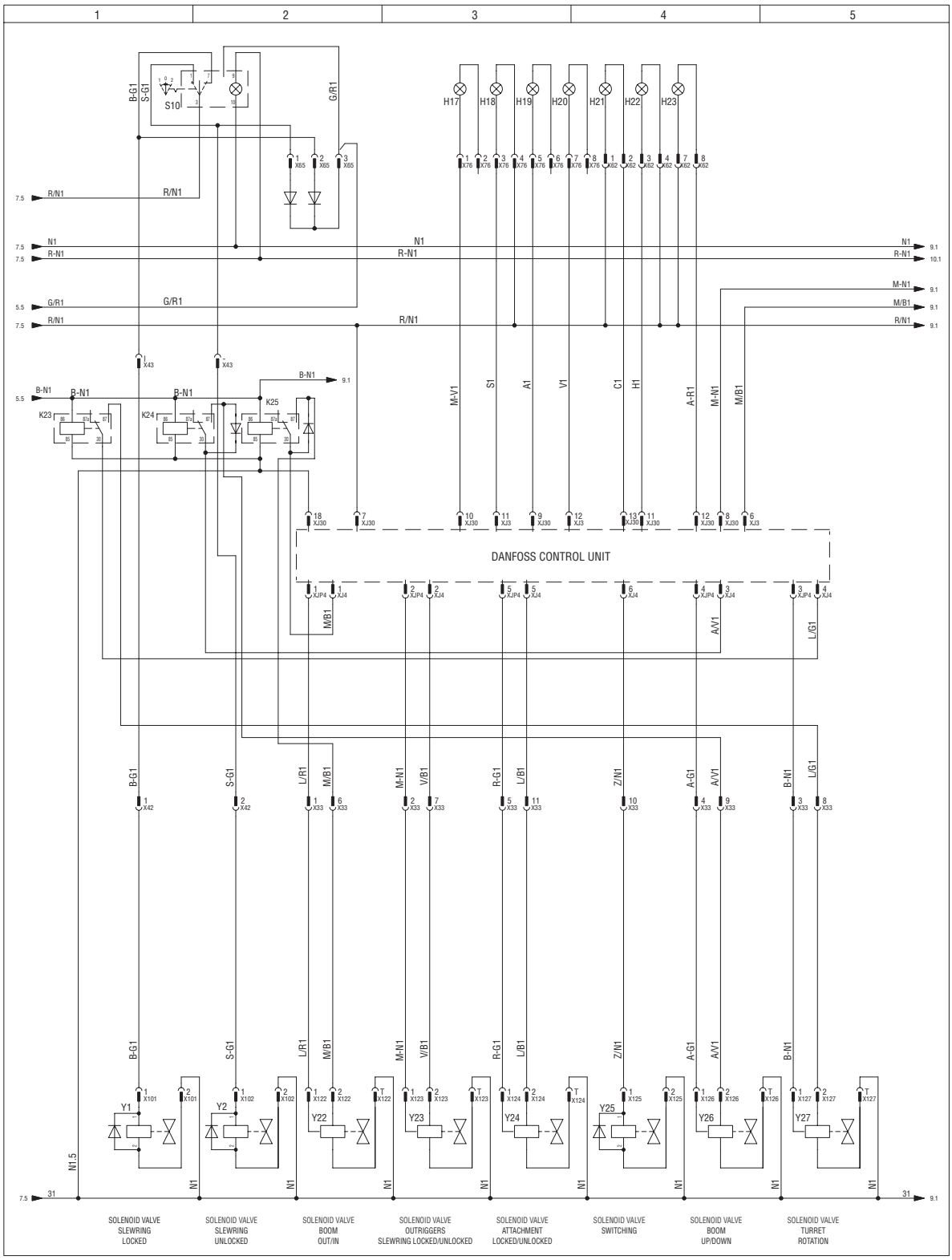
Operation:	Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) - sheet 7 of 10	*Table:* **C.05.02**



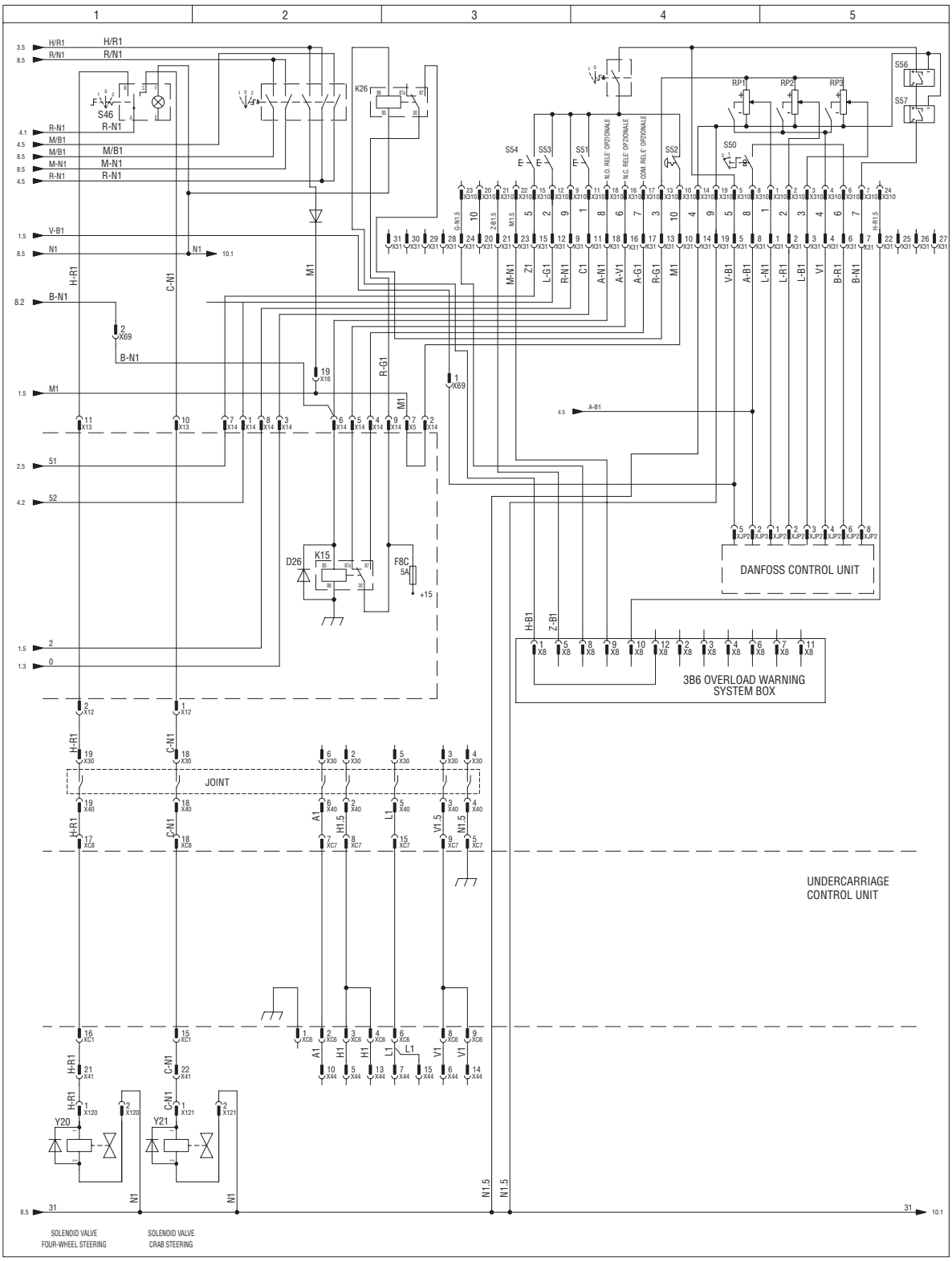
Operation:	*Table:*
Wiring diagram Girolift 5022 (from serial no. 09411 to serial no. 10078) - sheet 7 of 10	**C.05.02**



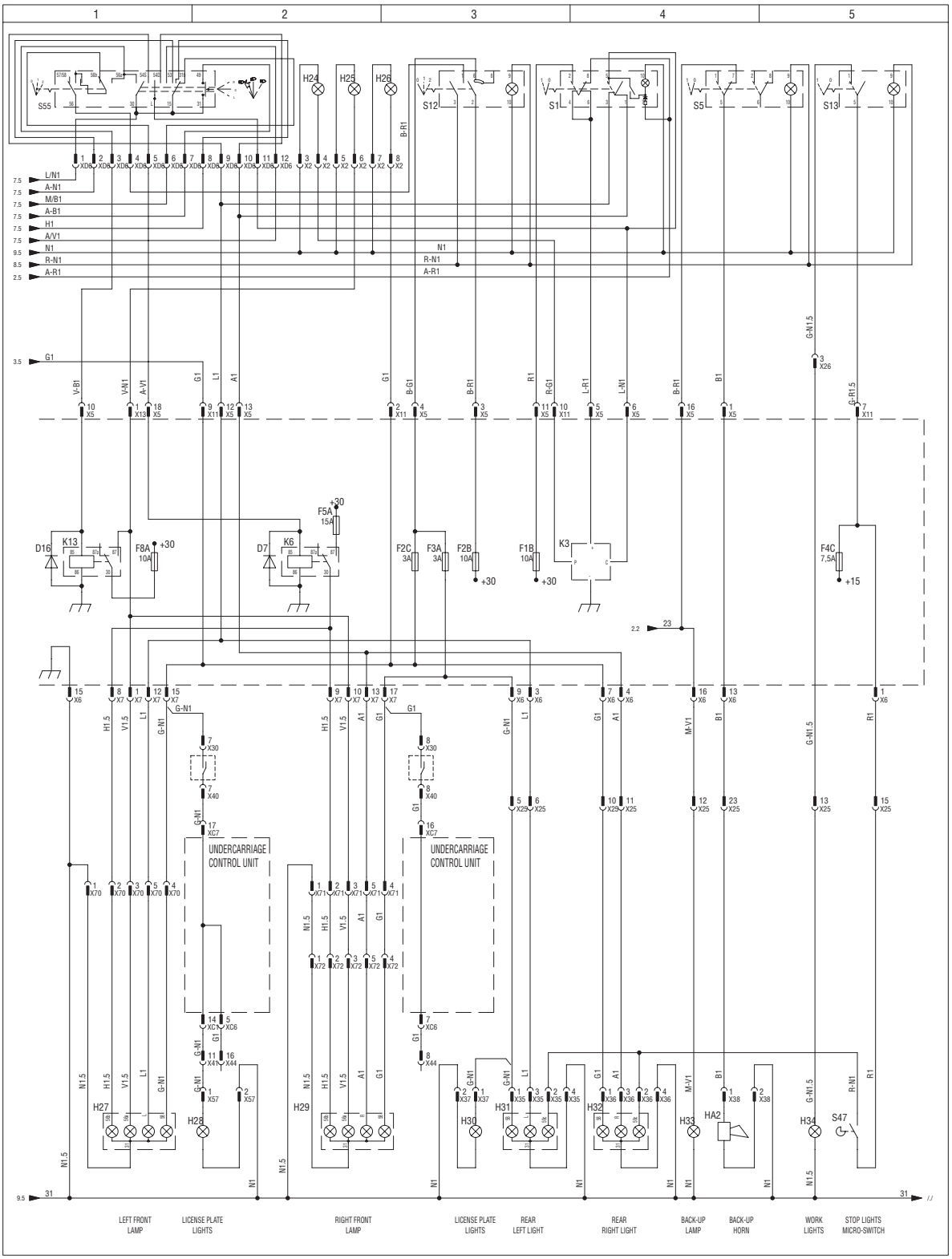
Operation:	Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 8 of 10	*Table:* **C.05.02**



Operation:	Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 9 of 10	*Table:* **C.05.02**



Operation:	Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 10 of 10	*Table:* **C.05.02**



Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • DANFOSS board	**C.05.02**

"JP2" CONNECTOR

(PLATFORM)

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	PROP. CONTROL - LIFTING/LOWERING	A N	IN
2	PROP. CONTROL - TURRET ROTATION	R L	IN
3	PROP. CONTROL - BOOM EXTENSION/RETRACT.	A B	IN
4	+12 JOYSTICK IN MOTION	V	IN
5	PLATFORM MOTION ON	B V	IN
6	+12 FOR ROBOT POWER SUPPLY	B R	OUT
7	DISCONNECTED		
8	SENSOR - FORKS COUPLED	B N	IN

"JP3" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	OPT. JOYSTICK SW IN NEUTRAL POSITION	B G	IN
2	TO ROBOT	A B	IN
3	OUT OPTIONAL 1		
4	OUT OPTIONAL 2		
5			
6			
7			
8			

"J4" CONNECTOR

(STABILIZERS AND BOOM)

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	PROP. CONTROL - LIFTING/RETRACTING Y22	M/B	OUT
2	PROP. CONTROL - FORKS ROTATION Y23	V/B	OUT
3	PROP. CONTROL - BOOM EXT./RETRACT. Y26	A/V	OUT
4	PROP. CONTROL - TURRET ROTATION Y27	L/G	OUT
5	PROP. CONTROL - COUPLING/RELEASE Y24	A/B	OUT
6	ELECTRIC CARRIAGE-DANFOSS SWITCHING Y25	Z/N	
7	DISCONNECTED		
8	DISCONNECTED		
9	Y9 RIGHT FRONT STAB. LIFTING SOLENOID	V/B	OUT
10	Y8 LEFT REAR STAB. LOWERING SOLENOID	C/B	OUT
11	Y14 LEFT FRONT STAB. LOWERING SOLENOID	M/N	OUT
12	Y13 RIGHT REAR STAB. LOWERING SOLENOID	A/B	OUT
13	Y7 RIGHT FRONT STAB. LOWERINGSOLENOID	B/N	OUT
14	Y6 LEFT REAR STAB. LIFTING SOLENOID	V/N	OUT
15	Y12 LEFT FRONT STAB. LIFTING SOLENOID	Z/B	OUT
16	Y11 RIGHT REAR STAB. LIFTING SOLENOID	A/R	OUT
17	STABILIZER RELAY COIL POWER SUPPLY	S/N	OUT
18	Y10 LEFT SWAY SOLENOID	G/R	OUT
19	Y5 RIGHT SWAY SOLENOID	C/N	OUT
20	SENSOR - LOCKING PIN FOR SLEWRING	Z B	IN

"XJ5" CONNECTOR

(JOYSTICK CAB FOR BOOM)

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	+12 JOYSTICK IN MOTION	M+B+MV	IN
2	YELLOW PUSHBUTTON	S/M	IN
3	RED PUSHBUTTON	B/A	IN
4	DEAD MAN	B/H	IN
5	JOYSTICK - DIR.1A FWD	N	IN
6	JOYSTICK - DIR.1B REVERSE	B/R	IN
7	JOYSTICK - DIR. 2A RIGHT	M/R	IN
8	JOYSTICK - DIR. 2B LEFT	M/S	IN
9	JOY. - DIR.3A BOOM RETRACTION	B/S	IN
10	JOY. - DIR.3B BOOM EXTENSION	S	IN
11	PROP. 1P LIFTING/LOWERING	R	IN
12	PROP. 2P ROTATION	L	IN
13	PROP. 3P EXT./RETRACTION	H	IN
14	+12 FOR JOYSTICK POTENTIOMETERS	GM+GB+V+Z	OUT

"JP4" CONNECTOR

(12V POWER SUPPLIED DANFOSS CONTROL VALVE)

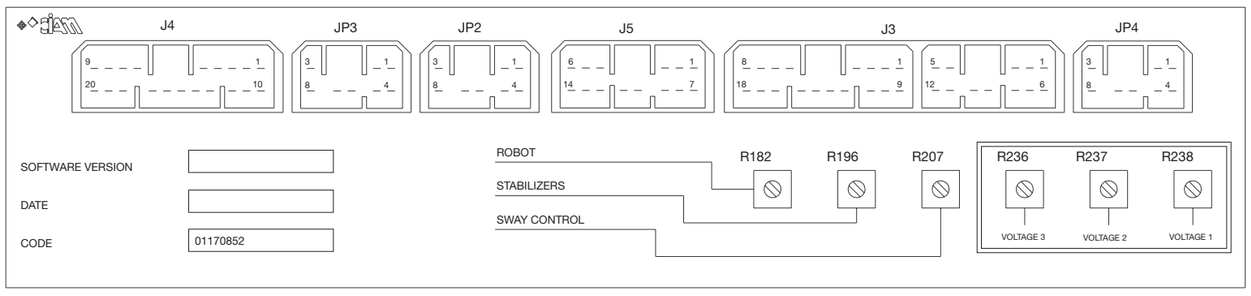
POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	EXTENSION/RETRACTION SOLENOID Y22 POWER SUPPLY	A/R	OUT
2	LIFTING/LOWERING SOLENOID Y26 POWER SUPPLY	A G	OUT
3	FORKS ROTATION SOLENOID Y23 POWER SUPPLY	M N	OUT
4	TURRET ROTATION SOLENOID Y27 POWER SUPPLY	B N	OUT
5	ATTACHMENT COUPLING/RELEASE SOLENOID Y24 POWER SUPPLY	R G	OUT
6	DISCONNECTED		
7	DISCONNECTED		
8	DISCONNECTED		

CONNECTOR REFERENCES IN WIRING DIAGRAM

JP2 CORRESPONDS TO XJP2
JP3 CORRESPONDS TO XJP3
JP4 CORRESPONDS TO XJP4
J3 CORRESPONDS TO XJ3 (12-WAY CONNECTOR)
AND TO XJ30 (18-WAY CONNECTOR)
J4 CORRESPONDS TO XJ4
J5 CORRESPONDS TO XJ5

"JP3" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	LEFT REAR STAB. PUSHBUTTON	B/N	IN
2	RIGHT FRONT STAB. PUSHBUTTON	A/R	IN
3	RIGHT REAR STAB. PUSHBUTTON	Z/B	IN
4	LEFT FRONT STAB. PUSHBUTTON	V/N	IN
5	DISCONNECTED	M/N	IN
6	KEY-SWITCH - ROAD/CABIN/PLATFORM	M/B	IN
7	SENSOR - LOCK. PIN UP (SLEWRING LOCKED)	A N	IN
8	SENSOR - OVERLOAD WARNING SYSTEM	B N	IN
9	SENSOR - BOOM DOWN	C L	IN
10	SENSOR - BOOM UP	G/N	IN
11	BOOM EXTENS./RETRACT. INDICATOR	S	IN
12	BOOM LIFTING/LOWER. INDICATOR	V	IN
1	DISCONNECTED		
2	DISCONNECTED		
3	DISCONNECTED		
4	SWAY CONTROL PUSHBUTTON	C/N	IN
5	OPTIONAL	B/V	IN
6	TURRET ROT. PIN LOCK./UNLOCKING PUSHBUTTON	G/R	IN
7	+12 LOCKED	R/N	IN
8	KEY SELECTOR	M N	IN
9	INDICATOR - FORK ROTATION	A	IN
10	INDICATOR - ATTACHMENT COUPLED/RELEASED	M V	IN
11	INDICATOR - TURRET ROTATION	H	IN
12	INDICATOR - SLEWRING LOCKED	L R	IN
13	INDICATOR - PARALLEL FORKS	C	IN
14	SEAT SENSOR	A/V	IN
15	DISCONNECTED		
16	DISCONNECTED		
17	DISCONNECTED		
18	GND	N	IN



Operation: Wiring diagram Girolift 5022 (from serial no. 09411 to serial no. 10078) • DANFOSS board	*Table:* **C.05.02**

"JP2" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	PROP. CONTROL - LIFTING/LOWERING	A-N	IN
2	PROP. CONTROL - TURRET ROTATION	L-R	IN
3	PROP. CONTROL - BOOM EXTENSION/RETRACT.	L-B	IN
4	+12 JOYSTICK IN MOTION	V	IN
5	PLATFORM MOTION ON	V-B	IN
6	+12 FOR ROBOT POWER SUPPLY	B-R	OUT
7	DISCONNECTED		
8	SENSOR - FORKS COUPLED	B-N	IN

"JP3" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	OPT. JOYSTICK SW IN NEUTRAL POSITION	B-G	IN
2	TO ROBOT	A-B	IN
3	OUT OPTIONAL 1		
4	OUT OPTIONAL 2		
5			
6			
7			
8			

"J4" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	PROP. CONTROL - LIFTING/RETRACTING	M/B	OUT
2	PROP. CONTROL - FORKS ROTATION	V/B	OUT
3	PROP. CONTROL - BOOM EXT./RETRACT.	A/V	OUT
4	PROP. CONTROL - TURRET ROTATION	L/G	OUT
5	PROP. CONTROL - COUPLING/RELEASE	L/B	OUT
6	ELECTRIC CARRIAGE-DANFOSS SWITCHING	Z/N	
7	DISCONNECTED		
8	DISCONNECTED		
9	Y9-Y9a LEFT STAB. EXT. SOLENOID	V/B	OUT
10	Y8-Y8a LEFT STAB. RETRACT. SOLENOID	C/B	OUT
11	Y14-Y14a RIGHT STAB. EXT. SOLENOID	M/N	OUT
12	Y13-Y13a RIGHT STAB. RETRACT. SOLENOID	A/B	OUT
13	Y7-Y7a LEFT STAB. LIFTING SOLENOID	B/N	OUT
14	Y6-Y6a LEFT STAB. RETRACTING SOLENOID	V/N	OUT
15	Y12-Y12a RIGHT STAB. LIFTING SOLENOID	Z/B	OUT
16	Y11-Y11a RIGHT STAB. RETRACTING SOLENOID	A/R	OUT
17	STABILIZER RELAY COIL POWER SUPPLY	S-N	OUT
18	Y10 LEFT SWAY SOLENOID	G/R	OUT
19	Y5 RIGHT SWAY SOLENOID	C/N	OUT
20	SENSOR - LOCKING PIN FOR SLEWRING	Z-B	IN

"J5"/"J6" CONNECTORS

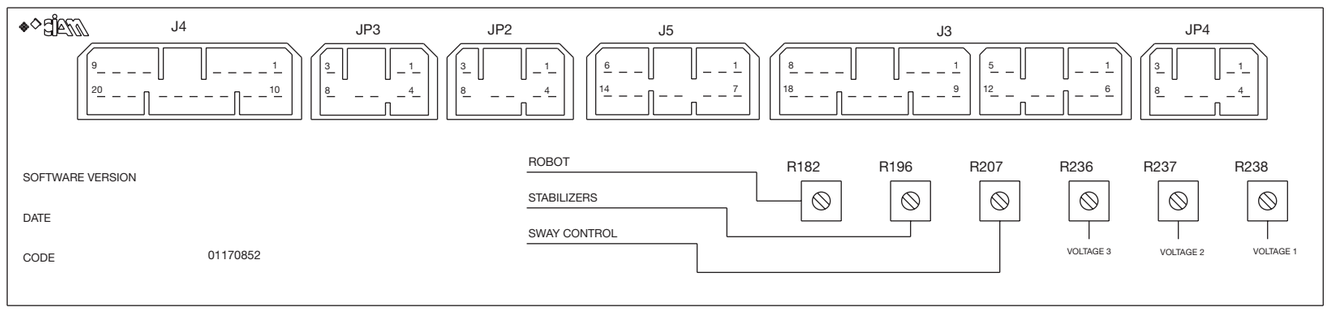
POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	+12 JOYSTICK IN MOTION	M+B+M-V	IN
2	YELLOW PUSHBUTTON	S-N	IN
3	RED PUSHBUTTON	B-L	IN
4	DEAD MAN	B-H	IN
5	JOYSTICK - DIR.1A FWD	N	IN
6	JOYSTICK - DIR.1B REVERSE	B-R	IN
7	JOYSTICK - DIR. 2A RIGHT	M-R	IN
8	JOYSTICK - DIR. 2B LEFT	M-S	IN
9	JOY. - DIR.3A BOOM RETRACTION	B/S	IN
10	JOY. - DIR.3B BOOM EXTENSION	S	IN
11	PROP. 1P LIFTING/LOWERING	R	IN
12	PROP. 2P ROTATION	L	IN
13	PROP. 3P EXT./RETRACTION	H	IN
14	+12 FOR JOYSTICK POTENTIOMETERS	MG+BG+V+Z	IN

CONNECTOR REFERENCES IN WIRING DIAGRAM

JP2 CORRESPONDS TO XJP2
JP3 CORRESPONDS TO XJP3
JP4 CORRESPONDS TO XJP4
J3 CORRESPONDS TO XJ3 (12-WAY CONNECTOR) AND TO XJ30 (18-WAY CONNECTOR)
J4 CORRESPONDS TO XJ4
J5 CORRESPONDS TO XJ5

"JP4" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	EXTENSION/RETRACTION SOLENOID POWER SUPPLY	A/R	OUT
2	LIFTING/LOWERING SOLENOID POWER SUPPLY	M-N	OUT
3	FORKS ROTATION SOLENOID POWER SUPPLY	B-N	OUT
4	TURRET ROTATION SOLENOID POWER SUPPLY	A-G	OUT
5	ATTACHMENT COUPLING/RELEASE SOLENOID POWER SUPPLY	R-G	OUT
6	DISCONNECTED		
7	DISCONNECTED		
8	DISCONNECTED		



"JP3" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SEG.
1	RIGHT FRONT ARM PUSHBUTTON	B/N	IN
2	RIGHT FRONT FOOT PUSHBUTTON	A/R	IN
3	LEFT FRONT ARM PUSHBUTTON	Z/B	IN
4	LEFT FRONT FOOT PUSHBUTTON	V/N	IN
5	RIGHT REAR ARM PUSHBUTTON	M/N	IN
6	TO PLATFORM	M/B	IN
7	SENSOR - LOCKING PIN UP	A-N	IN
8	SENSOR - OVERLOAD WARNING SYSTEM	B-N	IN
9	SENSOR - BOOM LOWERED	C-L	IN
10	TO OPTIONAL JOYSTICK	G/N	IN
11	EXTENSION/RETRACTION INDICATOR	S	IN
12	LIFTING/LOWERING INDICATOR	V	IN
1	RIGHT REAR FOOT PUSHBUTTON	V/B	
2	LEFT REAR ARM PUSHBUTTON	C/B	
3	LEFT REAR FOOT PUSHBUTTON		
4	SWAY CONTROL PUSHBUTTON	C/N	IN
5	SENSOR - BOOM LIFTED	B/V	IN
6	TURRET ROT. PIN LOCK.UNLOCKING ENABLED	G/R	IN
7	V BATTERY	R/N	IN
8	TO CABIN	M-N	IN
9	INDICATOR - FORK ROTATION	A	IN
10	INDICATOR - ATTACHMENT COUPLING/RELEASE	M-V	IN
11	INDICATOR - TURRET LOCKED	H	IN
12	INDICATOR - TURRET ROTATION	L-R	IN
13	INDICATOR - PARALLEL FORKS	C	IN
14	SEAT SENSOR	A/V	IN
15	DISCONNECTED		
16	DISCONNECTED		
17	DISCONNECTED		
18	GND	N	IN

Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • CONTROL UNIT board	**C.05.02**

X5 - MARK 21

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	BACK-UP ALARM CUTOUT	B	OUT
2	HAZARD PUSHBUTTON POWER SUPPLY	R-A	IN
3	POSITION LIGHTS SW POWER SUPPLY	B-R	OUT
4	POSITION LIGHTS	B-G	IN
5	BLINKING POWER SUPPLY	L-R	OUT
6	TURN SIGNALS POWER SUPPLY	2LN	OUT
7	EMERGENCY PUSHBUTTON POWER SUPPLY	2M	OUT
8	HORN POWER SUPPLY	Z	IN
9	GEAR SW POWER SUPPLY	V-N	IN
10	HIGH BEAM POWER SUPPLY	B-V	IN
11	HAZARD PUSHBUTTON POWER SUPPLY	R	OUT
12	LEFT TURN SIGNAL POWER SUPPLY	2 L	OUT
13	RIGHT TURN SIGNAL POWER SUPPLY	2 A	OUT
14	FWD/REVERSE AND DISPLAC. CHANGE POWER SUPPLY	2GR	OUT
15	WINDSCREEN WIPER AND TIMER POWER SUPPLY	2L/N	OUT
16	BACK-UP ALARM CUTOUT PUSHBUTTON POWER SUPPLY	B-R	OUT
17	EMERGENCY PUSHBUTTON	M-N	IN
18	FROM SW TO RELAY FOR LOW BEAM	A-V	IN
19	FROM SW TO RELAY FOR DISPLACEMENT CHANGE	Z-B	IN
20	REVERSE SPEED	M-N	IN
21	BEACON PUSHBUTTON POWER SUPPLY	R-N	OUT

X6 - MARK 17

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	BRAKE PUMP POWER SUPPLY FOR STOP	R	OUT
2	LOCKING PIN UP CARRIAGE ALIGNMENT SENSOR POWERS.	2RV	OUT
3	LEFT TURN SIGNAL POWER SUPPLY	L	IN
4	RIGHT TURN SIGNAL POWER SUPPLY	A	IN
5	CARRIAGE ALIGNMENT SIGNAL	M-B	IN
6	EMERGENCY PUMP COIL POWER SUPPLY	A-R	IN
7	RIGHT REAR BEAM POWER SUPPLY	G	OUT
8	STEERING ACCUMULATOR SOLENOID VALVE	S/N	OUT
9	LEFT FRONT POSITION LIGHTS/LICENSE PLATE LIGHT FRS.	G-N	OUT
10	PRESSURE SW - LOW BRAKE PUMP PRESSURE	H-R	IN
11	HYDRAULIC OIL FILTER CLOGGING	H-L	IN
12	BOOM UP/DOWN SENSOR POWER SUPPLY	2RV	OUT
13	BACK-UP ALARM	B	OUT
14	SIGNAL - BOOM LOWERED SENSOR	C-L	IN
15	GND	N	IN
16	BACK-UP LAMP	M-V	OUT
17	HORN POWER SUPPLY	Z	OUT

X7 - MARK 17

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	LEFT HIGH BEAM POWER SUPPLY	V	OUT
2	SIGNAL - STABILIZERS FOR OVERLOAD SYSTEM	L-R	IN
3	STABILIZER SENSOR POWER SUPPLY	R-V	OUT
4	SIGNAL - STABILIZER FOR TRANSMISSION DISENGAGEMENT	B-G	OUT
5	SENSOR - CARDAN SHAFT	A-B	IN
6	SENSOR - 1ST SPEED ENGAGED	A-V	IN
7	SENSOR - 2ND SPEED ENGAGED	A-R	IN
8	LOW BEAM	H	OUT
9	LOW BEAM	H	OUT
10	HIGH BEAM	V	OUT
11	DISPLACEMENT CHANGE SOLENOID POWER SUPPLY	V	OUT
12	LEFT TURN SIGNAL	L	OUT
13	RIGHT TURN SIGNAL	A	OUT
14	OPTIONAL	L-G	OUT
15	LEFT POSITION LIGHTS	G-N	OUT
16	KC9-KC10 RELAY 30 POWER SUPPLY - STEERING AXLE SWAY UNLOCKING	H-R	OUT
17	RIGHT POSITION LIGHTS	2 G	OUT

X9 - MARK 13

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	+12 GEAR CHANGE	G-R	OUT
2	SIGNAL - 2ND MECHANICAL GEAR INDICATOR	V-N	IN
3	SEAT SENSOR	A/V	OUT
4	SIGNAL - 1ST MECHANICAL GEAR INDICATOR	V	OUT
5	2ND SPEED Y16 SOLENOID VALVE	B-R	IN
6	GND	N	OUT
7	+12 CONTROL UNIT POWER SUPPLY FROM 1C 7.5A FUSE	R-N	OUT
8	1ST MECHANICAL GEAR Y17 SOLENOID VALVE	V-B	IN
9	BUZZER OUT (OPTIONAL)	M-N	OUT
10	TRANSMISSION DISENGAGED	L-G	IN
11	SENSOR - CARDAN SHAFT IN MOTION	A-B	OUT
12	SENSOR - 1ST SPEED ENGAGED	A-V	OUT
13	SENSOR - 2ND SPEED ENGAGED	A-R	OUT

X11 - MARK 13

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	85 ELECTRONIC RELAY POWER SUPPLY	M/B	OUT
2	POSITION LIGHTS INDICATOR	G	OUT
3	CARRIAGE ALIGNMENT INDICATOR	M-B	OUT
4	+12 SENSOR - BOOM LOWERED	C-L	IN
5	+12 FOR PLATFORM	L/N	IN
6	+12 FOR INSTRUMENTS INDICATORS	2RN	OUT
7	+12 WORK LIGHT	G-R	OUT
8	+12 STABILIZERS PUSHBUTTON POWER SUPPLY	R/N	OUT
9	+12 DASHBOARD LIGHTING	2G	OUT
10	+12 TURN SIGNALS INDICATOR POWER SUPPLY	R-G	OUT
11	+12 FROM 50 IGNITION KEY	C-B	IN
12	+12 GEAR CHANGE SW POWER SUPPLY	G-V	OUT
13	+12 HEATING SW	H-R	OUT

X8 - MARK 9

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y01 FWD SPEED SOLENOID VALVE	V-N	OUT
2	ENGINE WATER TEMPERATURE	H-L	IN
3	HIGH ENGINE WATER TEMPERATURE	H/R	IN
4	AIR FILTER	A-G	IN
5	Y29 ELECTROSTOP	M	OUT
6	Y02 REVERSE SPEED SOLENOID VALVE	M-V	OUT
7	ENGINE OIL INDICATOR	H-N	OUT
8	STARTER K01 RELAY COIL	C	OUT
9	+12 FROM ALTERNATOR	H	OUT

X14 - MARK 9

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	EMERGENCY PUMP RELAY POWER SUPPLY	L-G	IN
2	ENGINE EMERGENCY STOP PUSHBUTTON POWER SUPPLY	M	OUT
3	+12 START DESDE BARQUILLA	C	IN
4	OPTIONAL	A-G	OUT
5	OPTIONAL +12	A-V	OUT
6	OPTIONAL	A-N	IN
7	AVISADOR ACUSTICO	Z	IN
8	+12 FOR PLATFORM	R-N	OUT
9	AL. POTENT. JOYSTICK BARQUILLA	G-R	OUT

X12 - MARK 9

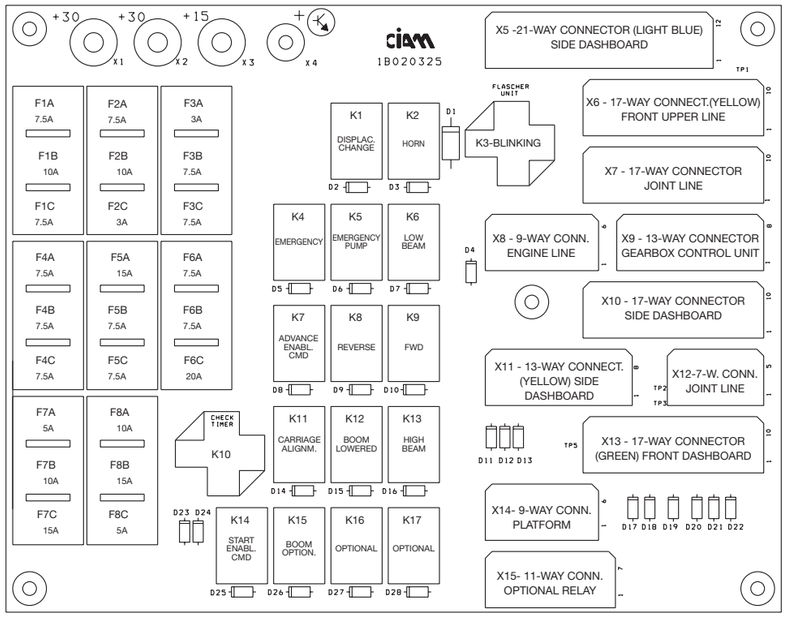
POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	4-WHEEL STEERING SOLENOID VALVE	C-N	OUT
2	CRAB STEERING SOLENOID VALVE	H-R	OUT
3	SIGNAL - BOOM LOWERED	Z-N	OUT
4	OPTIONAL		
5	SOLENOID VALVE - 1ST SPEED	B-V	OUT
6	DIFFERENTIAL LOCKING SOLENOID	A-B	OUT
7	SOLENOID VALVE - 2ND SPEED	B-R	OUT

X13 - MARK 17

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	HIGH BEAM INDICATOR	V-N	OUT
2	HYDRAULIC OIL INDICATOR POWER SUPPLY	S-N	OUT
3	BRAKE INDICATOR	H-R	OUT
4	MAX. WATER TEMPERATURE INDICATOR	H/R	OUT
5	AIR FILTER INDICATOR	A-G	OUT
6	OPTIONAL		OUT
7	ENGINE OIL INDICATOR	H-N	OUT
8	GEN-SET INDICATOR	2 H	OUT
9	SIGNAL - ENGINE WATER TEMPERATURE	H-L	OUT
10	4-WHEEL STEERING POWER SUPPLY	C-N	OUT
11	CRAB STEERING POWER SUPPLY	H-R	OUT
12	ALARM INDICATOR (BUZZER)	S-G	OUT
13	PARKING BRAKE INDICATOR	L-G	OUT
14	DISCONNECTED		
15	DISCONNECTED		
16	DISCONNECTED		
17	DISCONNECTED		

X15 - MARK 13

POS.	FUNCTION DESCRIPTION
OPTIONAL FOR ALL MOTIONS	



WIRE COLOURS

- **A** LIGHT BLUE
- **B** WHITE
- **C** ORANGE
- **G** YELLOW
- **H** GREY
- **L** BLUE
- **M** BROWN
- **N** BLACK
- **R** RED
- **S** PINK
- **V** GREEN
- **Z** PURPLE

REMARK: TWO-COLOUR WIRES ARE INDICATED INDICATEDTHROUGH A COMBINATION OF THE AFORESAID INITIALS AS FOLLOWS:

G/V -> YELLOW/GREEN (CROSSWISE COLOURING)
G-V -> YELLOW-GREEN (LENGTHSWISE COLOURING)

X10 - MARK 17

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	SIGNAL - LOWERED STABILIZERS FOR OVERLOAD SYSTEM	L-R	OUT
2	+12 SOLENOID VALVE - DIFFERENTIAL LOCKING	C-B	IN
3	+12 SEAT MICRO AND PARKING BRAKE MICRO	2RV	OUT
4	SIGNAL - PARKING BRALE ENGAGED	L-G	IN
5	CARRIAGE ALIGNMENT SENSOR	M-B	OUT
6	OVERLOAD WARNING SYSTEM CENTRAL POWER SUPPLY	R	OUT
7	CHANGE PUSHBUTTON POWER SUPPLY	H/R	OUT
8	ROAD/CABIN/PLATFORM POWER SUPPLY	2R/N	OUT
9	INTERIOR LAMP POWER SUPPLY	R	OUT
10	1ST/2ND MECHANICAL SPEED CHANGE	G-R	IN
11	2ND SPEED INDICATOR	V-N	OUT
12	SEAT SENSOR	2AV	IN
13	1ST SPEED INDICATOR	B-V	OUT
14	+12 SIGNAL FOR EMERGENCY PUMP	L/G	IN
15	DANFOSS CARD AND OPT. HAND CONTROL POWER SUPPLY	RBR	OUT
16	DANFOSS CARD POWER SUPPLY	R-N	OUT
17	EMERGENCY PUMP POWER SUPPLY	L/N	OUT

Operation:	*Table:*
Wiring diagram Girolift 5022 (from serial no. 09411 to serial no. 10078) • CONTROL UNIT board	**C.05.02**

X5 - MARK 21

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	BACK-UP ALARM CUTOUT	B	OUT
2	HAZARD PUSHBUTTON POWER SUPPLY	R-A	IN
3	POSITION LIGHTS SW POWER SUPPLY	B-R	OUT
4	POSITION LIGHTS	B-G	IN
5	BLINKING POWER SUPPLY	L-R	OUT
6	TURN SIGNALS POWER SUPPLY	2LN	OUT
7	EMERGENCY PUSHBUTTON POWER SUPPLY	2M	OUT
8	HORN POWER SUPPLY	Z	IN
9	GEAR SW POWER SUPPLY	V-N	IN
10	HIGH BEAM POWER SUPPLY	B-V	IN
11	HAZARD PUSHBUTTON POWER SUPPLY	R	OUT
12	LEFT TURN SIGNAL POWER SUPPLY	2 L	OUT
13	RIGHT TURN SIGNAL POWER SUPPLY	2 A	OUT
14	FWD/REVERSE AND DISPLAC. CHANGE POWER SUPPLY	2GR	OUT
15	WINDSCREEN WIPER AND TIMER POWER SUPPLY	2L/N	OUT
16	BACK-UP ALARM CUTOUT PUSHBUTTON POWER SUPPLY	B-R	OUT
17	EMERGENCY PUSHBUTTON	M-N	IN
18	FROM SW TO RELAY FOR LOW BEAM	A-V	IN
19	FROM SW TO RELAY FOR DISPLACEMENT CHANGE	Z-B	IN
20	REVERSE SPEED	M-N	IN
21	BEACON PUSHBUTTON POWER SUPPLY	R-N	OUT

X12 - MARK 9

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	4-WHEEL STEERING SOLENOID VALVE	C-N	OUT
2	CRAB STEERING SOLENOID VALVE	H-R	OUT
3	SIGNAL - BOOM LOWERED	Z-N	OUT
4	OPTIONAL		
5	SOLENOID VALVE - 1ST SPEED	B-V	OUT
6	DIFFERENTIAL LOCKING SOLENOID	A-B	OUT
7	SOLENOID VALVE - 2ND SPEED	B-R	OUT

X13 - MARK 17

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	HIGH BEAM INDICATOR	V-N	OUT
2	HYDRAULIC OIL INDICATOR POWER SUPPLY	S-N	OUT
3	BRAKE INDICATOR	H-R	OUT
4	MAX. WATER TEMPERATURE INDICATOR	H/R	OUT
5	AIR FILTER INDICATOR	A-G	OUT
6	OPTIONAL		OUT
7	ENGINE OIL INDICATOR	H-N	OUT
8	GEN-SET INDICATOR	2 H	OUT
9	ENGINE WATER TEMPERATURE	H-L	OUT
10	4-WHEEL STEERING POWER SUPPLY	C-N	OUT
11	CRAB STEERING POWER SUPPLY	H-R	OUT
12	ALARM INDICATOR (BUZZER)	S-G	OUT
13	PARKING BRAKE INDICATOR	L-G	OUT
14	DISCONNECTED		
15	DISCONNECTED		
16	DISCONNECTED		
17	DISCONNECTED		

X6 - MARK 17

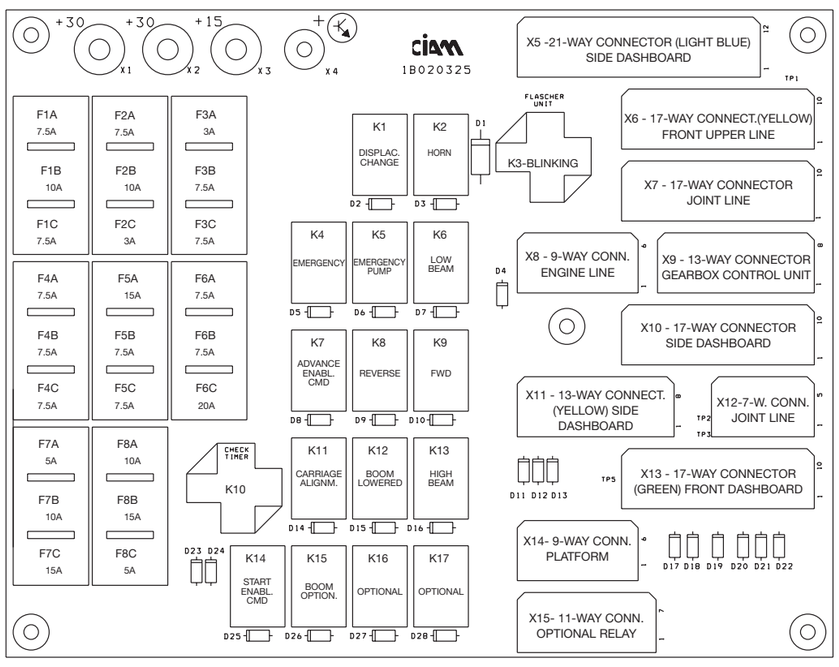
POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	BRAKE PUMP POWER SUPPLY FOR STOP	R	OUT
2	LOCKING PIN UP/CARRIAGE ALIGNMENT SENSOR POWER S.	2RV	OUT
3	LEFT TURN SIGNAL POWER SUPPLY	L	IN
4	RIGHT TURN SIGNAL POWER SUPPLY	A	IN
5	CARRIAGE ALIGNMENT SIGNAL	M-B	IN
6	EMERGENCY PUMP COIL POWER SUPPLY	A-R	IN
7	RIGHT REAR BEAM POWER SUPPLY	G	OUT
8	STEERING ACCUMULATOR SOLENOID VALVE	S/N	OUT
9	LEFT FRONT POSITION LIGHTS/LICENSE PLATE LIGHT PS.	G-N	OUT
10	PRESSURE SW - LOW BRAKE PUMP PRESSURE	H-R	IN
11	HYDRAULIC OIL FILTER CLOGGING	H-L	IN
12	BOOM UP/DOWN SENSOR POWER SUPPLY	2RV	OUT
13	BACK-UP ALARM	B	OUT
14	SIGNAL - BOOM LOWERED SENSOR	C-L	IN
15	GND	N	IN
16	BACK-UP LAMP	M-V	OUT
17	HORN POWER SUPPLY	Z	OUT

X7 - MARK 17

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	LEFT HIGH BEAM POWER SUPPLY	V	OUT
2	SIGNAL - STABILIZERS FOR OVERLOAD SYSTEM	L-R	IN
3	STABILIZER SENSOR POWER SUPPLY	R-V	OUT
4	SIGNAL - STABILIZER FOR TRANSMISSION DISENGAGEMENT	B-G	OUT
5	SENSOR - CARDAN SHAFT	A-B	IN
6	SENSOR - 1ST SPEED ENGAGED	A-V	IN
7	SENSOR - 2ND SPEED ENGAGED	A-R	IN
8	LOW BEAM	H	OUT
9	LOW BEAM	H	OUT
10	HIGH BEAM	V	OUT
11	DISPLACEMENT CHANGE SOLENOID POWER SUPPLY	V	OUT
12	LEFT TURN SIGNAL	L	OUT
13	RIGHT TURN SIGNAL	A	OUT
14	OPTIONAL	L-G	OUT
15	LEFT POSITION LIGHTS	G-N	OUT
16	KC9-KC10 RELAY 30 POWER SUPPLY - STEERING AXLE SWAY UNLOCKING	H-R	OUT
17	RIGHT POSITION LIGHTS	2 G	OUT

X15 - MARK 13

POS.	FUNCTION DESCRIPTION
	OPTIONAL FOR ALL MOTIONS



X9 - MARK 13

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	+12 GEAR CHANGE	G-R	OUT
2	SIGNAL - 2ND MECHANICAL GEAR INDICATOR	V-N	IN
3	SEAT SENSOR	A/V	OUT
4	SIGNAL - 1ST MECHANICAL GEAR INDICATOR	V	OUT
5	2ND SPEED Y16 SOLENOID VALVE	B-R	IN
6	GND	N	OUT
7	+12 CONTROL UNIT POWER SUPPLY FROM 1C 7.5A FUSE	R-N	OUT
8	1ST MECHANICAL GEAR Y17 SOLENOID VALVE	V-B	IN
9	BUZZER OUT (OPTIONAL)	M-N	OUT
10	TRANSMISSION DISENGAGED	L-G	IN
11	SENSOR - CARDAN SHAFT IN MOTION	A-B	OUT
12	SENSOR - 1ST SPEED ENGAGED	A-V	OUT
13	SENSOR - 2ND SPEED ENGAGED	A-R	OUT

X8 - MARK 9

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y01 FWD SPEED SOLENOID VALVE	V-N	OUT
2	ENGINE WATER TEMPERATURE	H-L	IN
3	HIGH ENGINE WATER TEMPERATURE	H/R	IN
4	AIR FILTER	A-G	IN
5	Y29 ELECTROSTOP	M	OUT
6	Y02 REVERSE SPEED SOLENOID VALVE	M-V	OUT
7	ENGINE OIL INDICATOR	H-N	OUT
8	STARTER K01 RELAY COIL	C	OUT
9	+12 FROM ALTERNATOR	H	OUT

WIRE COLOURS

- **A** LIGHT BLUE
- **B** WHITE
- **C** ORANGE
- **G** YELLOW
- **H** GREY
- **L** BLUE
- **M** BROWN
- **N** BLACK
- **R** RED
- **S** PINK
- **V** GREEN
- **Z** PURPLE

REMARK: TWO-COLOUR WIRES ARE INDICATED INDICATEDTHROUGH A COMBINATION OF THE AFORESAID INITIALS AS FOLLOWS:

G/V -> YELLOW/GREEN (CROSSWISE COLOURING)
G-V -> YELLOW-GREEN (LENGTHSWISE COLOURING)

X11 - MARK 13

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	85 ELECTRONIC RELAY POWER SUPPLY	M/B	OUT
2	POSITION LIGHTS INDICATOR	G	OUT
3	CARRIAGE ALIGNMENT INDICATOR	M-B	OUT
4	+12 SENSOR - BOOM LOWERED	C-L	IN
5	+12 FOR PLATFORM	L/N	IN
6	+12 FOR INSTRUMENTS INDICATORS	2RN	OUT
7	+12 WORK LIGHT	G-R	OUT
8	+12 STABILIZERS PUSHBUTTON POWER SUPPLY	R/N	OUT
9	+12 DASHBOARD LIGHTING	2G	OUT
10	+12 TURN SIGNALS INDICATOR POWER SUPPLY	R-G	OUT
11	+12 FROM 50 IGNITION KEY	C-B	IN
12	+12 GEAR CHANGE SW POWER SUPPLY	G-V	OUT
13	+12 HEATING SW	H-R	OUT

X14 - MARK 9

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	EMERGENCY PUMP RELAY POWER SUPPLY	L-G	IN
2	ENGINE EMERGENCY STOP PUSHBUTTON POWER SUPPLY	M	OUT
3	+12 START DESDE BARQUILLA	C	IN
4	OPTIONAL	A-G	OUT
5	OPTIONAL +12	A-V	OUT
6	OPTIONAL	A-N	IN
7	AVISADOR ACUSTICO	Z	IN
8	+12 FOR PLATFORM	R-N	OUT
9	AL. POTENT. JOYSTICK BARQUILLA	G-R	OUT

X10 - MARK 17

POS.	FUNCTION DESCRIPTION	COL	SEG
1	SIGNAL - LOWERED STABILIZERS FOR OVERLOAD SYSTEM	L-R	OUT
2	+12 SOLENOID VALVE - DIFFERENTIAL LOCKING	C-B	IN
3	+12 SEAT MICRO AND PARKING BRAKE MICRO	2RV	OUT
4	SIGNAL - PARKING BRALE ENGAGED	L-G	IN
5	CARRIAGE ALIGNMENT SENSOR	M-B	OUT
6	OVERLOAD WARNING SYSTEM CENTRAL POWER SUPPLY	R	OUT
7	CHANGE PUSHBUTTON POWER SUPPLY	H/R	OUT
8	ROAD/CABIN/PLATFORM POWER SUPPLY	2R/N	OUT
9	INTERIOR LAMP POWER SUPPLY	R	OUT
10	1ST/2ND MECHANICAL SPEED CHANGE	G-R	IN
11	2ND SPEED INDICATOR	V-N	OUT
12	SEAT SENSOR	2AV	IN
13	1ST SPEED INDICATOR	B-V	OUT
14	+12 SIGNAL FOR EMERGENCY PUMP	L/G	IN
15	DANFOSS CARD AND OPT HAND CONTROL POWER SUPPLY	RBR	OUT
16	DANFOSS CARD POWER SUPPLY	R-N	OUT
17	EMERGENCY PUMP POWER SUPPLY	L/N	OUT

Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • UNDERCARRIAGE board	**C.05.02**

XC8 - MARK 21-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	SENSOR - SLEWRING LOCKING PIN	Z-B	OUT
2	SENSOR - CARDAN SHAFT	A-B	OUT
3	Y-10 SOLENOID VALVE - LEFT FRONT AXLE LEVELLING	G/R	IN
4	Y5 - SOLENOID VALVE - RIGHT FRONT AXLE LEVELLING	C/N	IN
5	Y17 1ST SPEED SOLENOID VALVE	B-V	IN
6	SENSOR POWER SUPPLY	R-V	IN
7	SIGNAL FOR OVERLOAD WARNING SYSTEM	L-R	OUT
8	+12 FOR 30 RELAY KC9 KC10 STEERING AXLE SOLENOID VALVE RELEASE	H-R	IN
9	STABILIZER RELAY COIL POWER SUPPLY	S-N	IN
10	SIGNAL - STABILIZERS FOR TRANSMISSION DISENGAGEMENT	B-G	OUT
11	Y9 RIGHT FRONT STAB. LIFT. KC1 RELAY 30 POWER SUPPLY	B/V	IN
12	Y19 SOLENOID VALVE - DIFFERENTIAL LOCKING	C-B	IN
13	1ST MECHANICAL SPEED SENSOR	A/V	OUT
14	Y18 SOLENOID VALVE - HYDRAULIC DISPLACEMENT CHANGE	V	IN
15	Y16 2ND SPEED SOLENOID VALVE	B-R	IN
16	2ND MECHANICAL SPEED SENSOR	A-R	OUT
17	Y20 SOLENOID VALVE - FOUR-WHEEL STEER	H-R	IN
18	Y21 SOLENOID VALVE - CRAB STEER	C-N	IN
19	DISCONNECTED	Z-N	
20	DISCONNECTED	M-N	
21	OPTIONAL	L-G	

XC7 - MARK 17-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y7 RIGHT FRONT STAB. LOWER. kC5 RELAY 30 POWER S.	B/N	IN
2	Y14 LEFT FRONT STAB. LOWER. KC3 RELAY 30 POWER S.	M/N	IN
3	Y6 LEFT REAR STAB. LIFT. KC6 RELAY 30 POWER SUPPLY	V/N	IN
4	Y13 RIGHT REAR STAB. LOWER. KC4 RELAY 30 POWER S.	A/B	IN
5	GND	N	IN
6	Y12 LEFT FRONT STAB. LIFT. KC7 RELA7 30 POWER S.	Z/B	IN
7	DISCONNECTED		
8	DISCONNECTED		
9	DISCONNECTED		
10	Y8 LEFT REAR STAB. LOWER. KC2 RELAY 30 POWER S.	C/B	IN
11	DISCONNECTED		
12	DISCONNECTED		
13	DISCONNECTED		
14	Y11 RIGHT REAR STAB. LIFT. KC8 RELAY 30 POWER SUPPLY	A/R	IN
15	DISCONNECTED		
16	DISCONNECTED		
17	DISCONNECTED		

XC6 - MARK 9-WAY

POS.	FUNCTION DESCRIPTION
NOT USED FOR GIROLIFT 3514	

XC5 - MARK 17-WAY

POS.	FUNCTION DESCRIPTION
NOT USED FOR GIROLIFT 3514	

ABBREVIATION LEGEND

ANT.	FRONT	SAL.	LIFTING
POST.	REAR	DIS.	LOWERING
STAB.	STABILIZER	SENS.	SENSOR
EV	SOLENOID VALVE	CONN.	CONNECTOR
ALIM	POWER SUPPLY	DIFFER.	DIFFERENTIAL
SX	LEFT	SEG.	SIGNAL
DX	RIGHT		
N.C.	DISCONNECTED		

XC4 - MARK 13-WAY

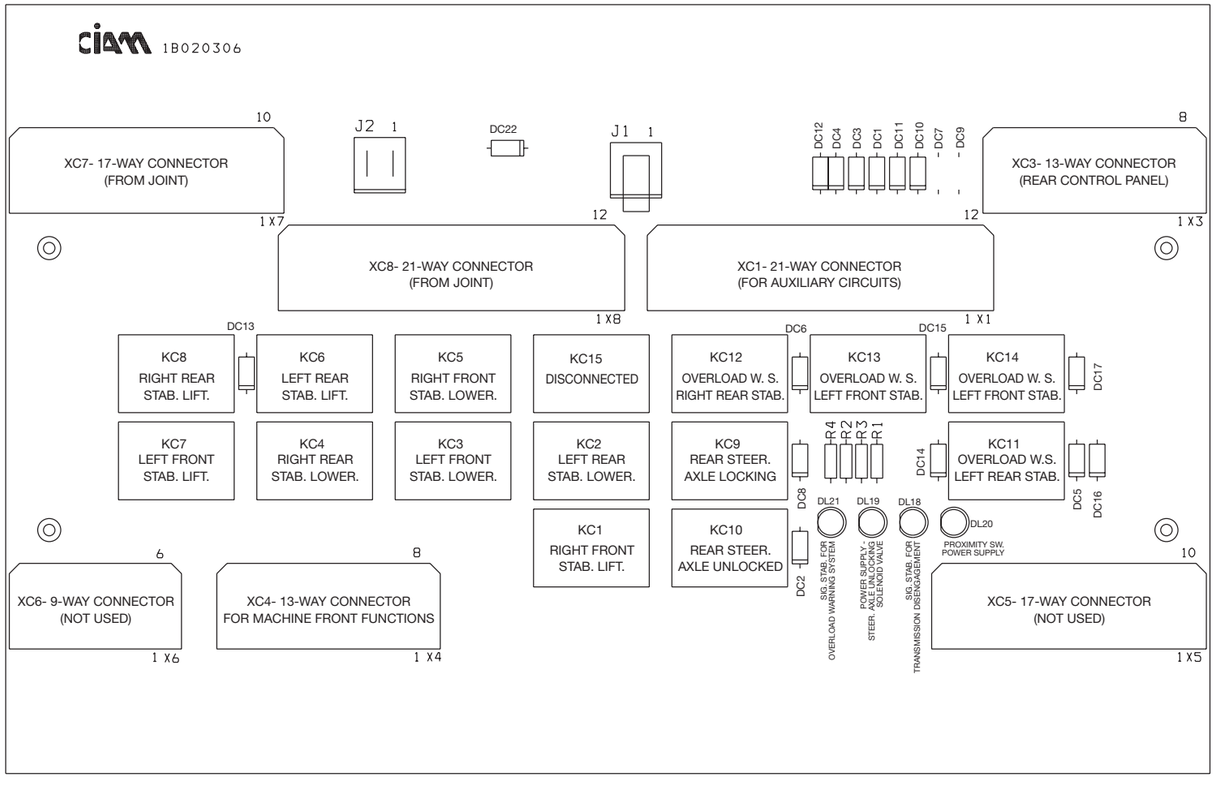
POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y3 /Y4 FRONT STEER. AXLE UNLOCK. SOLENOID	2MB	OUT
2	SENSOR - LEFT FRONT STABILIZER	B/R	IN
3	SENSOR - RIGHT FRONT STABILIZER	B-N	IN
4	FRONT STAB. SENSOR POWER SUPPLY	2RV	IN
5	DISCONNECTED		
6	DISCONNECTED		
7	DISCONNECTED		
8	DISCONNECTED		
9	DISCONNECTED		
10	GND		
11	DISCONNECTED		
12	DISCONNECTED		
13	DISCONNECTED		

XC3 - MARK 13-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y14 LEFT FRONT STAB. LOWERING	M/N	OUT
2	Y8 LEFT REAR STAB. LOWERING	C/B	OUT
3	SENSOR POWER SUPPLY	2RV	OUT
4	Y7 REAR RIGHT OUTRIGGER DOWN	B/N	OUT
5	Y6 REAR RIGHT OUTRIGGER UP	V/N	OUT
6	Y11 REAR RIGHT OUTRIGGER DOWN	A/R	OUT
7	Y12 LEFT FRONT STAB. LIFTING	Z/B	OUT
8	Y13 REAR RIGHT OUTRIGGER DOWN	A/B	OUT
9	Y9 RIGHT FRONT STAB. LIFTING	V/B	OUT
10	GND	N	
11	SENSOR - REAR WHEELS ALIGNMENT	A-B	
12	DISCONNECTED	M-N	
13	DISCONNECTED	Z-N	

XC1 - MARK 21-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y15 REAR STEER. AXLE UNLOCK. SOLENOID	2GV	OUT
2	DISCONNECTED	G-V	OUT
3	CARDAN SHAFT SENSOR POWER SUPPLY	R-V	OUT
4	1ST SPEED SENSOR POWER SUPPLY	R-V	OUT
5	2ND SPEED SENSOR POWER SUPPLY	R-V	OUT
6	SLEWRING LOCKING PIN SENS. P.S.	2RV	OUT
7	Y17 1ST SPEED SOLENOID POWER SUPPLY	B-V	OUT
8	Y5 RIGHT FRONT AXLE LEVELLING SOLENOID VALVE POWER SUPPLY	C/N	OUT
9	Y10 LEFT FRONT AXLE LEVELLING SOLENOID VALVE POWER SUPPLY	G/R	OUT
10	SIGNAL - CARDAN SHAFT SENSOR	A-B	IN
11	SENSOR - SLEWRING BLOCKED	Z-B	IN
12	LEFT REAR STAB. LIMIT SWITCH	B-N	IN
13	RIGHT REAR STAB. LIMIT SWITCH	B/R	IN
14	DISCONNECTED	G-N	
15	Y21 CRAB STEERING SOLENOID VALVE	C-N	OUT
16	Y20 4-WHEEL STEERING SOLENOID VALVE	H-R	OUT
17	2ND MECHANICAL SPEED SENSOR	A-R	IN
18	Y16 2ND SPEED SOLENOID POWER SUPPLY	B-R	OUT
19	Y18 DISPLACEMENT CHANGE SOLEN. P.S.	V	OUT
20	1ST MECHANICAL SPEED SENSOR	A-V	IN
21	DIFFERENTIAL LOCKING SOLENOID P.S.	C-B	OUT



WIRE COLOURS

- **A** LIGHT BLUE
- **B** WHITE
- **C** ORANGE
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G/V -> YELLOW/GREEN (CROSSWISE COLOURING)

G-V -> YELLOW-GREEN (LENGTHSWISE COLOURING)

Operation:	*Table:*
Wiring diagram Girolift 5022 (from serial no. 09411 to serial no. 10078) • UNDERCARRIAGE board	**C.05.02**

XC8 - MARK 21-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	SENSOR - SLEWRING LOCKING PIN	Z-B	OUT
2	SENSOR - CARDAN SHAFT	A-B	OUT
3	Y-10 SOLENOID VALVE - LEFT FRONT AXLE LEVELLING	G/R	IN
4	Y5 - SOLENOID VALVE - RIGHT FRONT AXLE LEVELLING	C/N	IN
5	Y17 1ST SPEED SOLENOID VALVE	B-V	IN
6	SENSOR POWER SUPPLY	R-V	IN
7	SIGNAL FOR OVERLOAD WARNING SYSTEM	L-R	OUT
8	+12 FOR 30 RELAY KC9 KC10 STEERING AXLE SOLENOID VALVE RELEASE	H-R	IN
9	STABILIZER RELAY COIL POWER SUPPLY	S-N	IN
10	SIGNAL - STABILIZERS FOR TRANSMISSION DISENGAGEMENT	B-G	OUT
11	Y9 RIGHT FRONT STAB. LIFT. KC1 RELAY 30 POWER SUPPLY	B/V	IN
12	Y19 SOLENOID VALVE - DIFFERENTIAL LOCKING	C-B	IN
13	1ST MECHANICAL SPEED SENSOR	A/V	OUT
14	Y18 SOLENOID VALVE - HYDRAULIC DISPLACEMENT CHANGE	V	IN
15	Y16 2ND SPEED SOLENOID VALVE	B-R	IN
16	2ND MECHANICAL SPEED SENSOR	A-R	OUT
17	Y20 SOLENOID VALVE - FOUR-WHEEL STEER	H-R	IN
18	Y21 SOLENOID VALVE - CRAB STEER	C-N	IN
19	DISCONNECTED	Z-N	
20	DISCONNECTED	M-N	
21	OPTIONAL	L-G	

XC6 - MARK 9-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	GND		
2	RIGHT TURN SIGNAL	A	
3	DISCONNECTED		
4	DISCONNECTED		
5	DISCONNECTED		
6	LEFT TURN SIGNAL	L	
7	DISCONNECTED		
8	DISCONNECTED		
9	DISCONNECTED		

ABBREVIATION LEGEND

ANT.	FRONT	SAL.	LIFTING
POST.	REAR	DIS.	LOWERING
STAB.	STABILIZER	SENS.	SENSOR
EV	SOLENOID VALVE	CONN.	CONNECTOR
ALIM	POWER SUPPLY	DIFFER.	DIFFERENTIAL
SX	LEFT	SEG.	SIGNAL
DX	RIGHT		
N.C.	DISCONNECTED		

XC4 - MARK 13-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y3 /Y4 FRONT STEER. AXLE UNLOCK. SOLENOID	2MB	OUT
2	SENSOR - LEFT FRONT STABILIZER	B/R	IN
3	SENSOR - RIGHT FRONT STABILIZER	B-N	IN
4	FRONT STAB. SENSOR POWER SUPPLY	2RV	IN
5	Y7A FRONT LEFT OUTRIGGER UP	B/N	OUT
6	Y13A FRONT RIGHT OUTRIGGER IN	A/B	OUT
7	Y12A FRONT RIGHT OUTRIGGER UP	Z/B	OUT
8	Y9A FRONT LEFT OUTRIGGER OUT	V/B	OUT
9	Y8A FRONT LEFT OUTRIGGER IN	C/B	OUT
10	GND		
11	Y14A FRONT RIGHT OUTRIGGER OUT	M/N	OUT
12	Y6A FRONT LEFT OUTRIGGER DOWN	V/N	OUT
13	Y11A FRONT RIGHT OUTRIGGER DOWN	A/R	OUT

XC3 - MARK 13-WAY

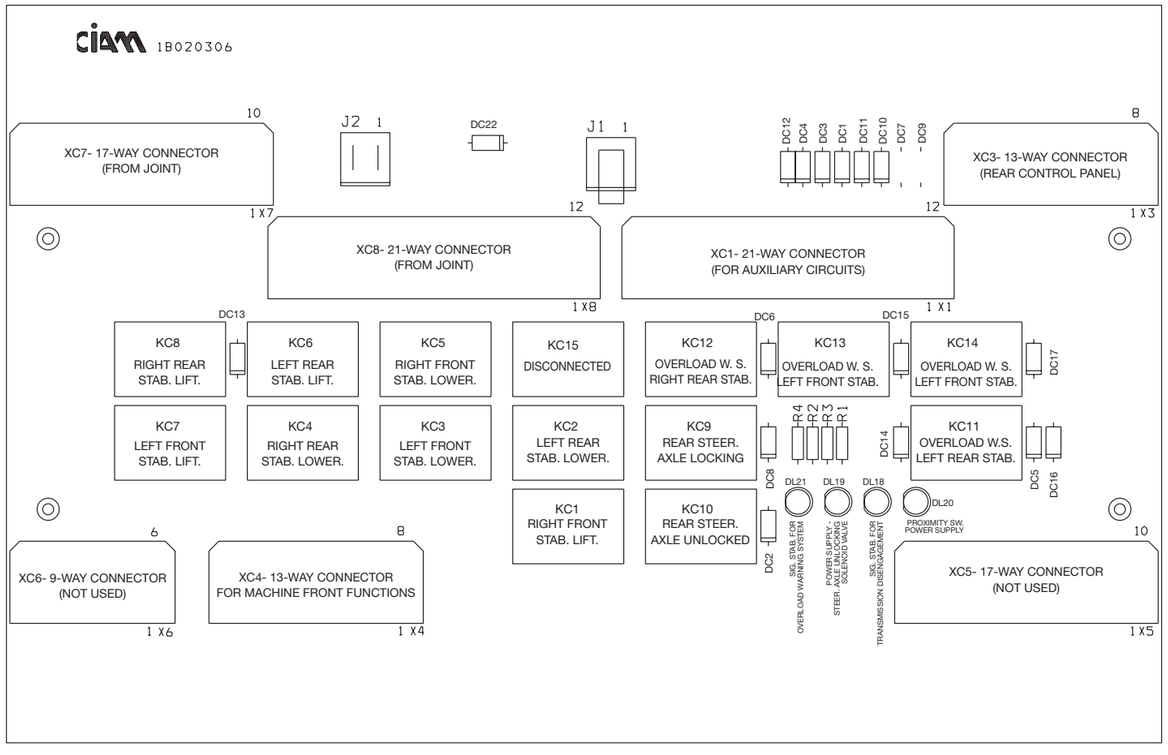
POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y14 REAR RIGHT OUTRIGGER OUT	M/N	OUT
2	Y8 REAR LEFT OUTRIGGER IN	C/B	OUT
3	SENSOR POWER SUPPLY	2RV	OUT
4	Y7 REAR LEFT OUTRIGGER UP	B/N	OUT
5	Y6 REAR LEFT OUTRIGGER DOWN	V/N	OUT
6	Y11 REAR RIGHT OUTRIGGER DOWN	A/R	OUT
7	Y12 REAR RIGHT OUTRIGGER UP	Z/B	OUT
8	Y13 REAR RIGHT OUTRIGGER IN	A/B	OUT
9	Y9 REAR LEFT OUTRIGGER OUT	V/B	OUT
10	GND	N	
11	SENSOR - REAR WHEELS ALIGNMENT	A-B	
12	DISCONNECTED	M-N	
13	DISCONNECTED	Z-N	

XC1 - MARK 21-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y15 REAR STEER. AXLE UNLOCK. SOLENOID	2GV	OUT
2	DISCONNECTED	G-V	OUT
3	CARDAN SHAFT SENSOR POWER SUPPLY	R-V	OUT
4	1ST SPEED SENSOR POWER SUPPLY	R-V	OUT
5	2ND SPEED SENSOR POWER SUPPLY	R-V	OUT
6	SLEWRING LOCKING PIN SENS. P.S.	2RV	OUT
7	Y17 1ST SPEED SOLENOID POWER SUPPLY	B-V	OUT
8	Y5 RIGHT FRONT AXLE LEVELLING SOLENOID VALVE POWER SUPPLY	C/N	OUT
9	Y10 LEFT FRONT AXLE LEVELLING SOLENOID VALVE POWER SUPPLY	G/R	OUT
10	SIGNAL - CARDAN SHAFT SENSOR	A-B	IN
11	SENSOR - SLEWRING BLOCKED	Z-B	IN
12	LEFT REAR STAB. LIMIT SWITCH	B-N	IN
13	RIGHT REAR STAB. LIMIT SWITCH	B/R	IN
14	DISCONNECTED	G-N	
15	Y21 CRAB STEERING SOLENOID VALVE	C-N	OUT
16	Y20 4-WHEEL STEERING SOLENOID VALVE	H-R	OUT
17	2ND MECHANICAL SPEED SENSOR	A-R	IN
18	Y16 2ND SPEED SOLENOID POWER SUPPLY	B-R	OUT
19	Y18 DISPLACEMENT CHANGE SOLEN. P.S.	V	IN
20	1ST MECHANICAL SPEED SENSOR	A-V	IN
21	DIFFERENTIAL LOCKING SOLENOID P.S.	C-B	IN

XC5 - MARK 17-WAY

POS.	FUNCTION DESCRIPTION
NOT USED	



XC7 - MARK 17-WAY

POS.	FUNCTION DESCRIPTION	COL.	SIG.
1	Y7-Y7A LEFT STAB. UP - KC5 RELAY 30 POWER S.	B/N	IN
2	Y14-Y14A RIGHT STAB. OUT - KC3 RELAY 30 POWER S.	M/N	IN
3	Y6-Y6A LEFT STAB. DOWN - KC6 RELAY 30 POWER S.	V/N	IN
4	Y13-Y13A RIGHT STAB. IN - KC4 RELAY 30 POWER S.	A/B	IN
5	GND	N	IN
6	Y12-Y12A RIGHT STAB. UP - KC7 RELAY 30 POWER S.	Z/B	IN
7	DISCONNECTED		
8	DISCONNECTED		
9	DISCONNECTED		
10	Y8-Y8A LEFT STAB. IN - KC2 RELAY 30 POWER S.	C/B	IN
11	DISCONNECTED		
12	DISCONNECTED		
13	DISCONNECTED		
14	Y11-Y11A RIGHT STAB. DOWN - KC8 RELAY 30 POWER S.	A/R	IN
15	DISCONNECTED		
16	DISCONNECTED		
17	DISCONNECTED		

WIRE COLOURS

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Operation: Wiring diagram - components description	Table: C.05.02

Ref.	Description	Sheet
F1A	FUSE - WINDSCREEN WIPER/WASHER POWER SUPPLY 7.5A	7
F1B	FUSE - HAZARD WARNING LIGHT 10A	10
F1C	FUSE - HYDRAULIC DISPLACEMENT CHANGE SOLENOID VALVE, STEERING ACCUM. SOLENOID VALVE 7.5A	1
F2A	FUSE - BEACON POWER SUPPLY 7,5A	6
F2B	FUSE - LIGHTS SWITCH 10A	10
F2C	FUSE - FRONT LEFT/REAR RIGHT POSITION LIGHTS 3A	10
F3A	FUSE - FRONT RIGHT/REAR LEFT POSITION LIGHTS 3A	10
F3B	FUSE - HAZARD WARNING LIGHT ANS SPEED SWICTH 7.5A	2
F3C	FUSE - FRONT/REAR STEERING AXLES LOCKING/UNLOCKING SOLENOID VALVE 7.5A	5
F4A	FUSE - EMERGENCY PUMP 7.5A	1
F4B	FUSE - OPTIONAL 7.5A	2
F4C	FUSE - STOP AND WORK LIGHTS MICRO SWITCH 7.5A	10
F5A	FUSE - LOW BEAM 15A	10
F5B	FUSE - CAB LIGHTS7.5A	3
F5C	FUSE - OVERLOAD WARNING SYSTEM 15A	4
F6A	FUSE - SPEED SWITCH POWER SUPPLY 7.5A	2
F6B	FUSE - UPPER WINDSCREEN WIPER/ WASHER POWER SUPPLY 7.5A	4
F6C	FUSE - SWITCHES, OPTIONAL CONTROL LEVER, DANFOSS CARD POWER SUPPLY 20A	7
F7A	FUSE - POWER SUPPLY: OUTRIGGERS LIMIT SWITCH, PARKING BRAKE, CARRIAGE ALIGNMENT, BASKET 5A	2
F7B	FUSE - BOOM POWER SUPPLY 10A	1
F7C	FUSE - HORN, HEATER 15A	2
F8A	FUSE - HIGH BEAM 10A	10
F8B	FUSE - TIMER, INSTRUMENTS LIGHTING POWER SUPPLY 15A	1
F8C	FUSE - BOOM POWER SUPPLY 5A	9
FG1	MAIN FUSE 70A	1
FG2	MAIN FUSE 30A	1
FG3	MAIN FUSE 20A	1
FG4	MAIN FUSE 60A	1
G1	BATTERY	1
G2	ALTERNATOR	1
H1	INDICATOR LIGHT - ALARMS	1
H10	INDICATOR LIGHT - 2ND SPEED	3
H11	INDICATOR LIGHT - 1ST SPEED	3
H12	CAB INTERIOR LIGHTS	3
H13	INDICATOR LIGHT - DIFFERENTIAL LOCKING	4
H14	INDICATOR LIGHT - CARRIAGE ALIGNMENT	4
H15	INDICATOR LIGHT - BASKET	4
H16	BEACON	6
H17	INDICATOR LIGHT - ATTACHMENT LOCKING/ UNLOCKING	8
H18	INDICATOR LIGHT - FORK ROTATION	8
H19	INDICATOR LIGHT - BOOM OUT/IN	8
H2	INDICATOR LIGHT - GLOW PLUGS	1
H20	INDICATOR LIGHT - BOOM UP/DOWN	8
H21	INDICATOR LIGHT - FORKS PARALLEL	8
H22	INDICATOR LIGHT - TURRET RROTATION	8
H23	INDICATOR LIGHT - TURRET LOCKED	8
H24	INDICATOR LIGHT - TURN SIGNALS	10
H25	INDICATOR LIGHT - HIGH BEAM	10
H26	INDICATOR LIGHT - POSITION LIGHTS	10
H27	FRONT LEFT LIGHT	10
H28	LICENCE PLATE LIGHT	10
H29	FRONT RIGHT LIGHT	10
H3	INDICATOR LIGHT - AIR FILTER CLOGGED	1
H30	LICECE PLATE LIGHT	10
H31	REAR LEFT LIGHT	10
H32	REAR RIGHT LIGHT	10
H33	BACK-UP LAMP	10
H34	WORK LIGHTS	10
H4	INDICATOR LIGHT - HIGH ENGINE WATER TEMPERATURE	1
H5	INDICATOR LIGHT - LOW ENGINE OIL PRESSURE	1
H6	INDICATOR LIGHT - GENERATOR	1
H7	INDICATOR LIGHT - PARKING BRAKE	2
H8	INDICATOR LIGHT - HYDRAULIC OIL FILTER CLOGGED	3
H9	INDICATOR LIGHT - LOW BRAKE PRESSURE	3
HA1	HORN	2
HA2	BACK-UP HORN	10
K01	RELAY - START-UP	1
K02	RELAY - PRE-HEATING	1
K03	RELAY - ELECTRONIC COMPONENTS	1
K04	RELAY - POWER SUPPLY UNDER DASHBOARD	1
K1	RELAY - HYDRAULIC DISPLACEMENT CHANGE	2
K11	RELAY - CARRIAGE ALIGNMENT	4
K12	RELAY - BOOM	4
K13	RELAY - HIGH BEAM	10
K14	RELAY - START-UP ENABLING COMMAND	1

Operation: Wiring diagram - components description	Table: C.05.02

K15	OPTIONAL RELAY - BOOM	9
K16	RELAY - OPTIONAL	2
K17	RELAY - OPTIONAL	2
K2	RELAY - HORN	2
K19	RELAY	2
K20	RELAY	2
K21	RELAY	2
K22	RELAY	2
K23	RELAY - TURRET ROTATION ENABLING COMMAND	8
K24	RELAY - BOOM UP/DOWN ENABLING COMMAND	8
K25	RELAY - BOOM IN/OUT ENABLING COMMAND	8
K26	RELAY - JOYSTICK POWER SUPPLY	9
K3	INTERMITTENCE	10
K4	RELAY - EMERGENCY	1
K5	RELAY - EMERGENCY PUMP	4
K6	RELAY - LOW BEAM	10
K7	RELAY - GEAR ENABLING COMMAND	2
K8	RELAY - REVERSE SPEED	2
K9	RELAY - FORWARD SPEED	2
KC1	RELAY - FRONT/REAR LEFT OUTRIGGER OUT	6
KC10	RELAY - FRONT STEERING AXLE UNLOCKING	5
KC11	RELAY - REAR LEFT OUTRIGGER OVERLOAD WARNING SYSTEM	2
KC12	RELAY - REAR RIGHT OUTRIGGER OVERLOAD WARNING SYSTEM	2
KC13	RELAY - FRONT LEFT OUTRIGGER OVERLOAD WARNING SYSTEM	2
KC14	RELAY - FRONT RIGHT OUTRIGGER OVERLOAD WARNING SYSTEM	2
KC15	RELAY - SLEWRING LOCKED	4
KC2	RELAY - FRONT/REAR LEFT OUTRIGGER IN	6
KC3	RELAY - FRONT/REAR RIGHT OUTRIGGER OUT	7
KC4	RELAY - FRONT/REAR RIGHT OUTRIGGER IN	7
KC5	RELAY - FRONT/REAR LEFT OUTRIGGER UP	6
KC6	RELAY - FRONT/REAR LEFT OUTRIGGER DOWN	6
KC7	RELAY - FRONT/REAR RIGHT OUTRIGGER UP	7
KC8	RELAY - FRONT/REAR RIGHT OUTRIGGER DOWN	7
KC9	RELAY - REAR STEERING AXLE LOCKED	5
M1	STARTING MOTOR	1
M2	OPTIONAL A/C SYSTEM	1
M3	UPPER WINDSCREEN WIPER/WASHER MOTOR - OPTIONAL	3
M4	WINDSCREEN WASHER PUMP	3
M5	EMERGENCY PUMP	4
M6	HEATING	6
M7	WINDSCREEN WIPER/WASHER MOTOR	7
P1	ENGINE WATER TEMPERATURE INDICATOR	1
P2	HYDRAULIC OIL TEMPERATURE INDICATOR	1
P3	FUEL GAUGE	3
P4	HOUR-METER	3
R1	1/4W RESISTANCE	2
R2	1/4W RESISTANCE	5
R3	1/4W RESISTANCE	2
R4	1/4W RESISTANCE	2
R5	GLOW PLUGS	1
R6	FUEL GAUGE TRANSDUCER	3
RP1	JOYSTICK 1 POTENTIOMETER	9
RP2	JOYSTICK 2 POTENTIOMETER	9
RP3	JOYSTICK 3 POTENTIOMETER	9
RP4	OPTIONAL CONTROL LEVER POTENTIOMETER	7
S1	SWITCH - HAZARD WARNING LIGHT	10
S10	SWITCH - SLEWRING LOCKED/UNLOCKED	8
S11	SWITCH - AXLE LEVELLING	5
S12	SWITCH - LIGHTS	10
S13	SWITCH - WORK LIGHTS	10
S14	START-UP PANEL	1
S16	SWITCH - SPEED CHANGE	3
S17	SWITCH - DIFFERENTIAL LOCKING	4
S18	SWITCH - EMERGENCY PUMP	4
S2	SWITCH - BEACON	6
S20	EMERGENCY MUSHROOM-HEAD PUSHBUTTON	1
S21	BATTERY CUTOFF	1
S22	ENGINE THERMOSTAT	1
S23	PRESSURE SWITCH - AIR FILTER CLOGGED	1
S24	THERMOSTAT - HIGH ENGINE WATER TEMPERATURE	1
S25	PRESSURE SWITCH - LOW ENGINE OIL PRESSURE	1
S26	TRANSDUCER - ENGINE WATER TEMPERATURE	1
S27	TRANSDUCER - HYDRAULIC OIL TEMPERATURE	1
S28	PARKING BRAKE MICRO-SWITCH	2
S29	REAR LEFT OUTRIGGER MICRO-SWITCH	2
S3	SWITCH - LEFT OUTRIGGER OUT/IN	6
S30	REAR RIGHT OUTRIGGER MICRO-SWITCH	2
S31	FRONT RIGHT OUTRIGGER MICRO-SWITCH	2

Operation: Wiring diagram - components description	Table: C.05.02

S32	FRONT LEFT OUTRIGGER MICRO-SWITCH	2
S33	SEAT MICRO-SWITCH	3
S34	PRESSURE SWITCH - HYDRAULIC OIL FILTER CLOGGED	3
S35	PRESSURE SWITCH - LOW BRAKE PRESSURE	3
S36	SENSOR - CARDAN SHAFT	3
S37	SENSOR - 1ST SPEED ENGAGED	3
S38	SENSOR - 2ND SPEED ENGAGED	3
S39	SENSOR - CARRIAGES ALIGNED	4
S4	SWITCH - RIGHT OUTRIGGER OUT/IN	7
S40	SENSOR - PIN HIGH	4
S43	SENSOR - SLEWRING BLOCKED	4
S45	OPTIONAL SENSOR - REAR STEERING AXLE ALIGNED	5
S46	STEERING SELECTOR	9
S47	STOP LIGHTS MICRO-SWITCH	10
S48	SPPED SWITCH	2
S5	BACK-UP HORN SWITCH	10
S50	ROBOT CONTROL	9
S51	START PUSHBUTTON	9
S52	ENGINE EMERGENCY STOP PUSHBUTTON	9
S53	EMERGENCY PUMP PUSHBUTTON	9
S54	HORN PUSHBUTTON	9
S55	LIGHTS - TURN SIGNALS SWITCCH	10
S56	SENSOR - FORKS ON	9
S56	SENSOR - FORKS ON	9
S6	SWITCH - LEFT OUTRIGGER UP/DOWN	6
S7	SWITCH - RIGHT OUTRIGGER UP/DOWN	7
S8	SWITCH - HEATER	6
S9	SWITCH - OPTIONAL A/C SYSTEM	1
Y01	SOLENOID VALVE - FORWARD SPEED	2
Y02	SOLENOID VALVE - REVERSE SPEED	2
Y1	SOLENOID VALVE - SLEWRING LOCKED	8
Y10	SOLENOID VALVE - FRONT AXLE LEVELLING	5
Y11	SOLENOID VALVE - REAR RIGHT OUTRIGGER UP	7
Y11a	SOLENOID VALVE - FRONT RIGHT OUTRIGGER DOWN	7
Y12	SOLENOID VALVE - FRONT LEFT OUTRIGGER UP	7
Y12a	SOLENOID VALVE - FRONT RIGHT OUTRIGGER UP	7
Y13	SOLENOID VALVE - REAR RIGHT OUTRIGGER DOWN	7
Y13a	SOLENOID VALVE - FRONT RIGHT OUTRIGGER IN	7
Y14	SOLENOID VALVE - FRONT LEFT OUTRIGGER DOWN	7
Y14a	SOLENOID VALVE - FRONT RIGHT OUTRIGGER OUT	7
Y15	SOLENOID VALVE - REAR STEERING AXLE LOCKED	5
Y15a	SOLENOID VALVE - REAR STEERING AXLE LOCKED	5
Y16	SOLENOID VALVE - 2ND SPEED	3
Y17	SOLENOID VALVE - 1ST SPEED	3
Y18	SOLENOID VALVE - HYDRAULIC DISPLACEMENT CHANGE	2
Y19	SOLENOID VALVE - DIFFERENTIAL LOCKING	4
Y2	SOLENOID VALVE - SLEWRING UNLOCKED	8
Y20	SOLENOID VALVE - FOUR-WHEEL STEER	9
Y21	SOLENOID VALVE - CRAB STEER	9
Y22	SOLENOID VALVE - BOOM OUT/IN	8
Y23	SOLENOID VALVE - OUTRIGGERS LOCKED/ SLEWRING UNLOCKED	8
Y24	SOLENOID VALVE - ATTACHMENT LOCKED/ UNLOCKED	8
Y25	SOLENOID VALVE - SWITCHING	8
Y26	SOLENOID VALVE - BOOM UP/DOWN	8
Y27	SOLENOID VALVE - TURRET ROTATION	8
Y29	SOLENOID VALVE - ENGINE STOP	1
Y3	SOLENOID VALVE - FRONT LEFT STEERING AXLE UNLOCKED	5
Y30	SOLENOID VALVE - STEERING ACCUM.	5
Y4	SOLENOID VALVE - FRONT RIGHT STEERING AXLE UNLOCKED	5
Y5	SOLENOID VALVE - FRONT AXLE LEVELLING	5
Y6	SOLENOID VALVE - REAR LEFT OUTRIGGER UP	6
Y6a	SOLENOID VALVE - FRONT LEFT OUTRIGGER DOWN	6
Y7	SOLENOID VALVE - FRONT RIGHT OUTRIGGER DOWN	6
Y7a	SOLENOID VALVE - FRONT LEFT OUTRIGGER UP	6
Y8	SOLENOID VALVE - REAR LEFT OUTRIGGER DOWN	6
Y8a	SOLENOID VALVE - FRONT LEFT OUTRIGGER IN	6
Y9	SOLENOID VALVE - FRONT LEFT OUTRIGGER UP6	
Y9a	SOLENOID VALVE - FRONT LEFT OUTRIGGER OUT	6

Operation: Wiring diagram - components description	*Table:* **C.05.02**

X1	8-WAY CONNECTOR
X10	17-WAY MARK CONNECTOR
X101	2-WAY CONNECTOR
X102	2-WAY CONNECTOR
X103	2-WAY CONNECTOR
X104	2-WAY CONNECTOR
X105	2-WAY CONNECTOR
X106	2-WAY CONNECTOR
X107	2-WAY CONNECTOR
X108	2-WAY CONNECTOR
X109	2-WAY CONNECTOR
X11	13-WAY MARK CONNECTOR
X110	2-WAY CONNECTOR
X111	2-WAY CONNECTOR
X112	2-WAY CONNECTOR
X113	2-WAY CONNECTOR
X114	2-WAY CONNECTOR
X115	2-WAY CONNECTOR
X115a	2-WAY CONNECTOR
X116	2-WAY CONNECTOR
X117	2-WAY CONNECTOR
X118	2-WAY CONNECTOR
X119	2-WAY CONNECTOR
X12	7-WAY MARK CONNECTOR
X120	2-WAY CONNECTOR
X121	2-WAY CONNECTOR
X122	4-PIN CONNECTOR
X123	4-PIN CONNECTOR
X124	4-PIN CONNECTOR
X125	2-WAY CONNECTOR
X126	4-PIN CONNECTOR
X127	4-PIN CONNECTOR
X13	17-WAY MARK CONNECTOR
X14	9-WAY MARK CONNECTOR
X15	11-WAY MARK CONNECTOR
X150	1-WAY CONNECTOR
X16	21-WAY MARK CONNECTOR
X2	8-WAY CONNECTOR
X20	3-WAY CONNECTOR
X21	2-WAY CONNECTOR
X22	2-WAY CONNECTOR
X23	2-WAY CONNECTOR
X25	24-WAY DEUTSCH CONNECTOR
X26	5-WAY MARK CONNECTOR
X28	8-WAY DEUTSCH CONNECTOR
X29	17-WAY MARK CONNECTOR
X3	8-WAY CONNECTOR
X30	40-WAY DEUTSCH CONNECTOR - TYPE A
X31	31-WAY DEUTSCH CONNECTOR
X310	24-WAY DEUTSCH CONNECTOR
X32	3-WAY DEUTSCH CONNECTOR
X33	12-WAY DEUTSCH CONNECTOR
X35	4-WAY CONNECTOR
X36	4-WAY CONNECTOR
X37	2-WAY DEUTSCH CONNECTOR
X38	2-WAY DEUTSCH CONNECTOR
X4	8-WAY CONNECTOR
X40	40-WAY DEUTSCH CONNECTOR - TYPE A
X41	40-WAY DEUTSCH CONNECTOR - TYPE A
X42	2-WAY DEUTSCH CONNECTOR
X43	2-WAY 90° CONNECTOR
X44	24-WAY DEUTSCH CONNECTOR
X45	3-WAY DEUTSCH CONNECTOR
X46	3-WAY DEUTSCH CONNECTOR
X47	2-WAY CONNECTOR
X48	3-WAY DEUTSCH CONNECTOR
X49	3-WAY DEUTSCH CONNECTOR
X5	21-WAY MARK CONNECTOR
X50	3-WAY DEUTSCH CONNECTOR
X51	3-WAY DEUTSCH CONNECTOR
X52	3-WAY DEUTSCH CONNECTOR
X53	3-WAY DEUTSCH CONNECTOR
X54	3-WAY DEUTSCH CONNECTOR
X55	3-WAY DEUTSCH CONNECTOR
X56	3-WAY DEUTSCH CONNECTOR
X57	3-WAY DEUTSCH CONNECTOR
X58	3-WAY DEUTSCH CONNECTOR
X59	3-WAY DEUTSCH CONNECTOR
X6	17-WAY MARK CONNECTOR
X61	8-WAY CONNECTOR
X62	8-WAY CONNECTOR
X65	3-WAY CONNECTOR
X66	4-WAY DEUTSCH CONNECTOR
X67	2-WAY CONNECTOR
X68	1-WAY CONNECTOR
X69	1-WAY CONNECTOR
X7	17-WAY MARK CONNECTOR
X7a	X7 ON THE 3B6 CONTROL UNIT 12-WAY DEUTSCH CONNECTOR
X70	6-WAY DEUTSCH CONNECTOR
X71	6-WAY DEUTSCH CONNECTOR
X72	6-WAY DEUTSCH CONNECTOR

Operation: Wiring diagram - components description	Table: C.05.02

X73	2-WAY CONNECTOR
X74	1-WAY CONNECTOR
X75	1-WAY CONNECTOR
X76	8-WAY CONNECTOR
X8A	9-WAY MARK CONNECTOR
X83	6-WAY CONNECTOR
X86	2-WAY CONNECTOR
X87	2-WAY CONNECTOR
X88	2-WAY CONNECTOR
X89	2-WAY CONNECTOR
X9	13-WAY MARK CONNECTOR
X91	2-WAY CONNECTOR
X92	2-WAY CONNECTOR
X93	2-WAY CONNECTOR
X94	2-WAY CONNECTOR
XA	3-WAY CONNECTOR
XB	1-WAY CONNECTOR
XC1	21-WAY MARK CONNECTOR
XC3	13-WAY MARK CONNECTOR
XC4	13-WAY MARK CONNECTOR
XC5	17-WAY MARK CONNECTOR
XC6	9-WAY MARK CONNECTOR
XC7	17-WAY MARK CONNECTOR
XC8	21-WAY MARK CONNECTOR
XD6	12-WAY DEUTSCH CONNECTOR
XD7	12-WAY DEUTSCH CONNECTOR
XJ3	12-WAY MIC 70 CONNECTOR
XJ30	18-WAY MIC 70 CONNECTOR
XJ4	20-WAY MIC 70 CONNECTOR
XJ5	14-WAY MIC 70 CONNECTOR
XJP2	8-WAY MIC 70 CONNECTOR
XJP3	8-WAY MIC 70 CONNECTOR
XJP4	8-WAY MIC 70 CONNECTOR
XM	18-WAY DEUTSCH CONNECTOR
XS1	5-WAY COMBINATI 1 CONNECTOR
XT	6-WAY CONNECTOR
X137	2-WAY CONNECTOR
X8	12-WAY DT CONNECTOR

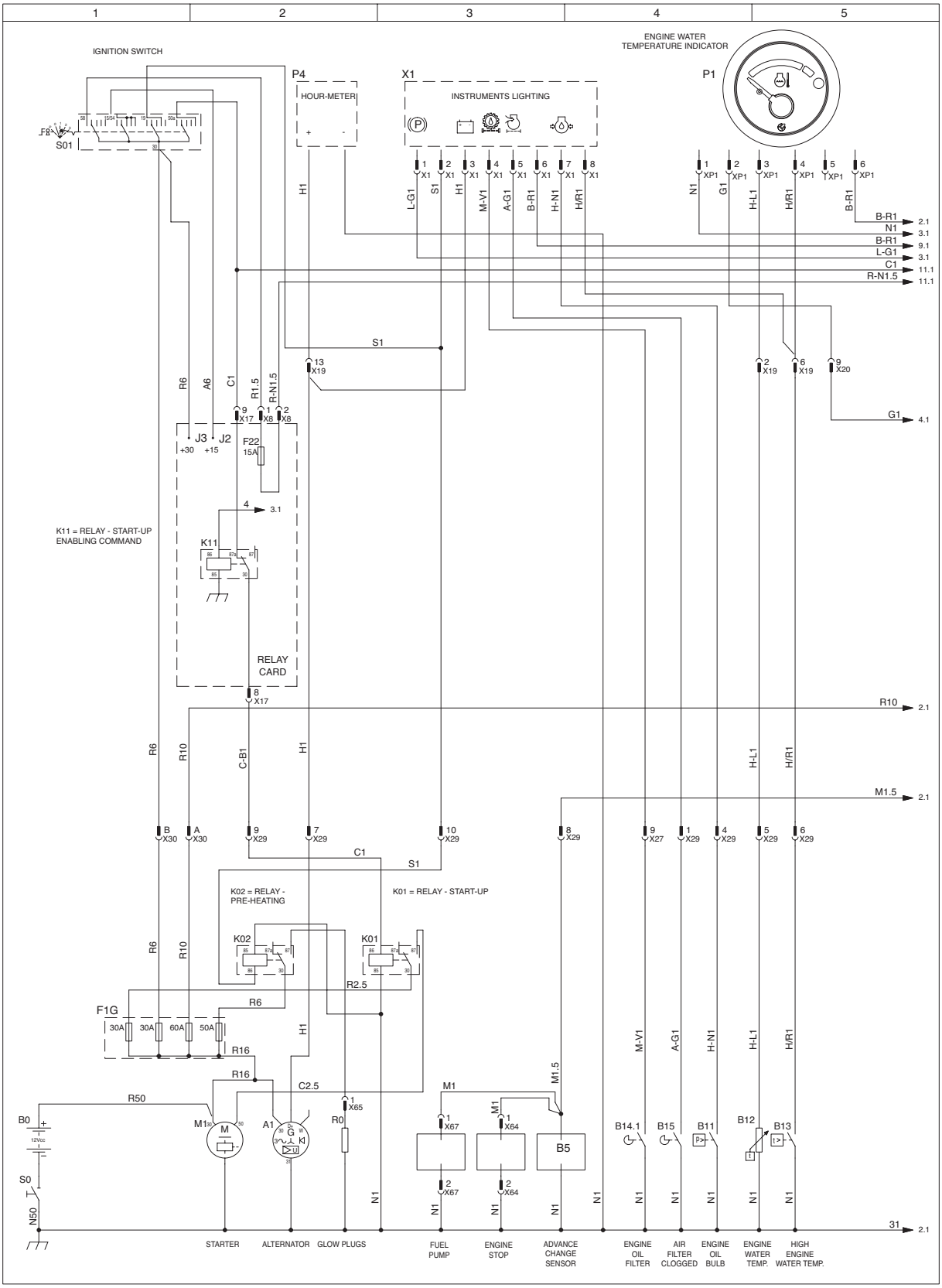
WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

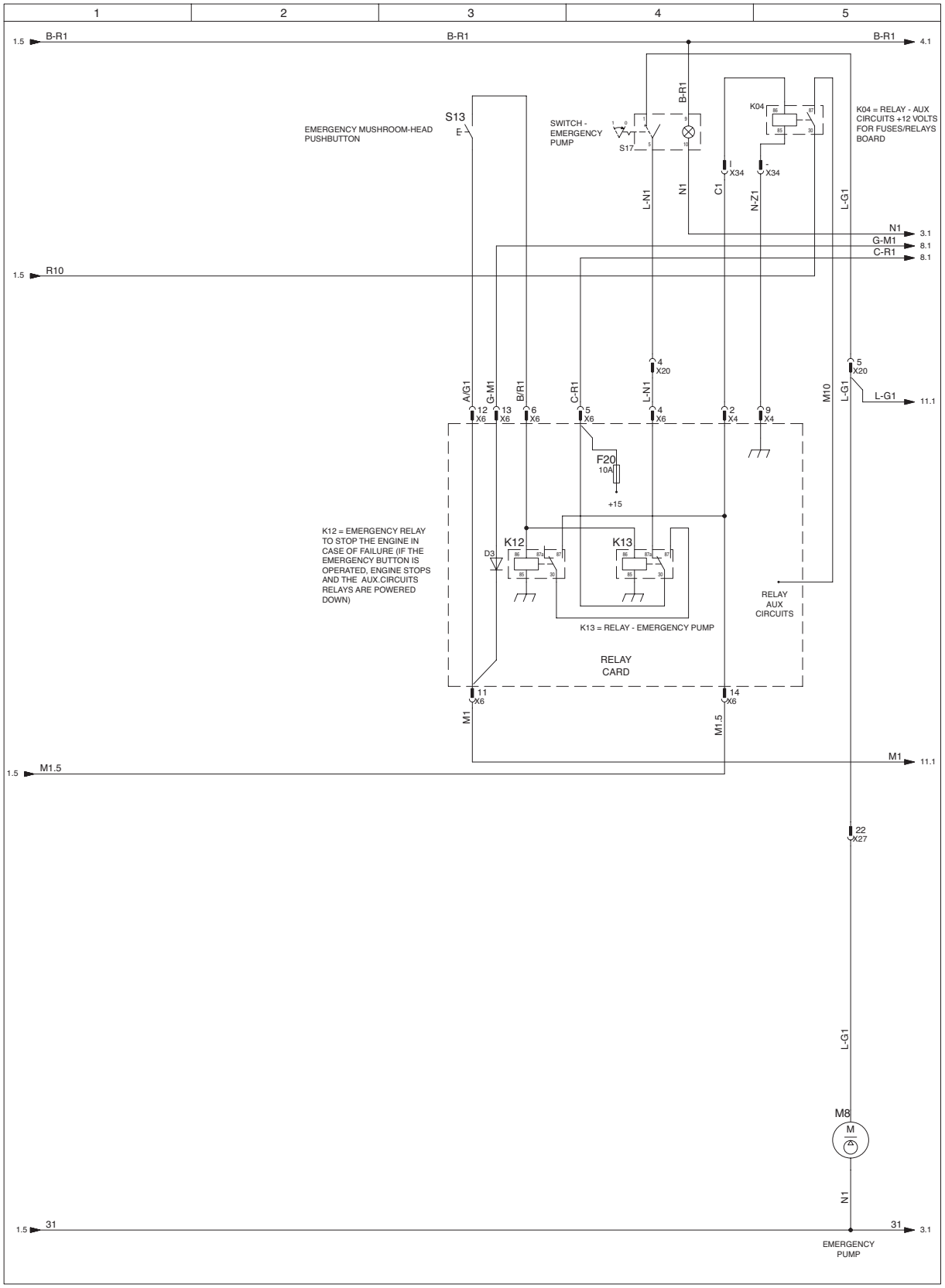
REMARK: Two-colour wires are indicated through a combination of the aforesaid initials as follows:

G/V = YELLOW/GREEN (Crosswise colouring)
G-V = YELLOW-GREEN (Lengthswise colouring)

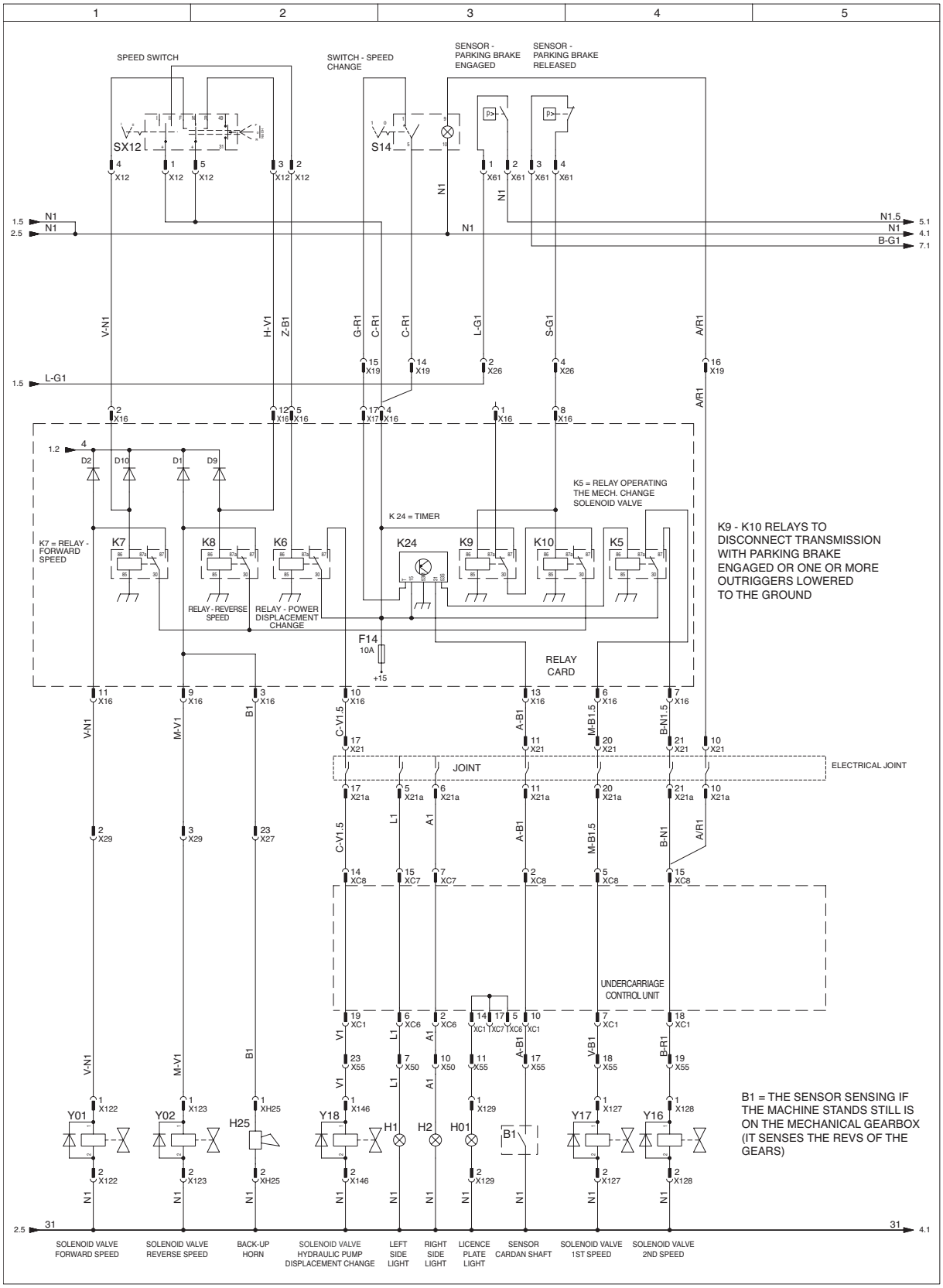
Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) - sheet 1 of 11	**C.05.03**



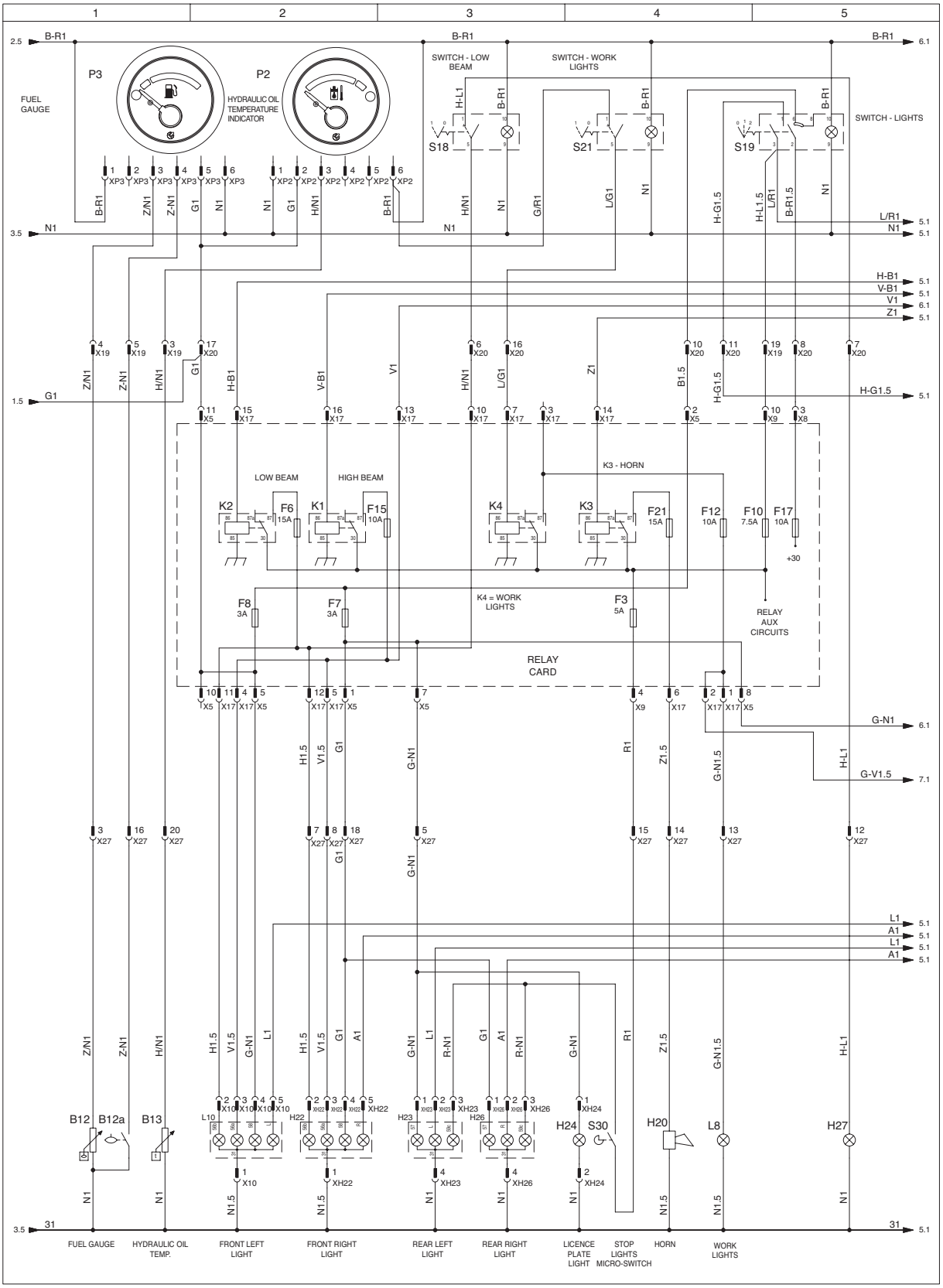
Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) - sheet 2 of 11	**C.05.03**



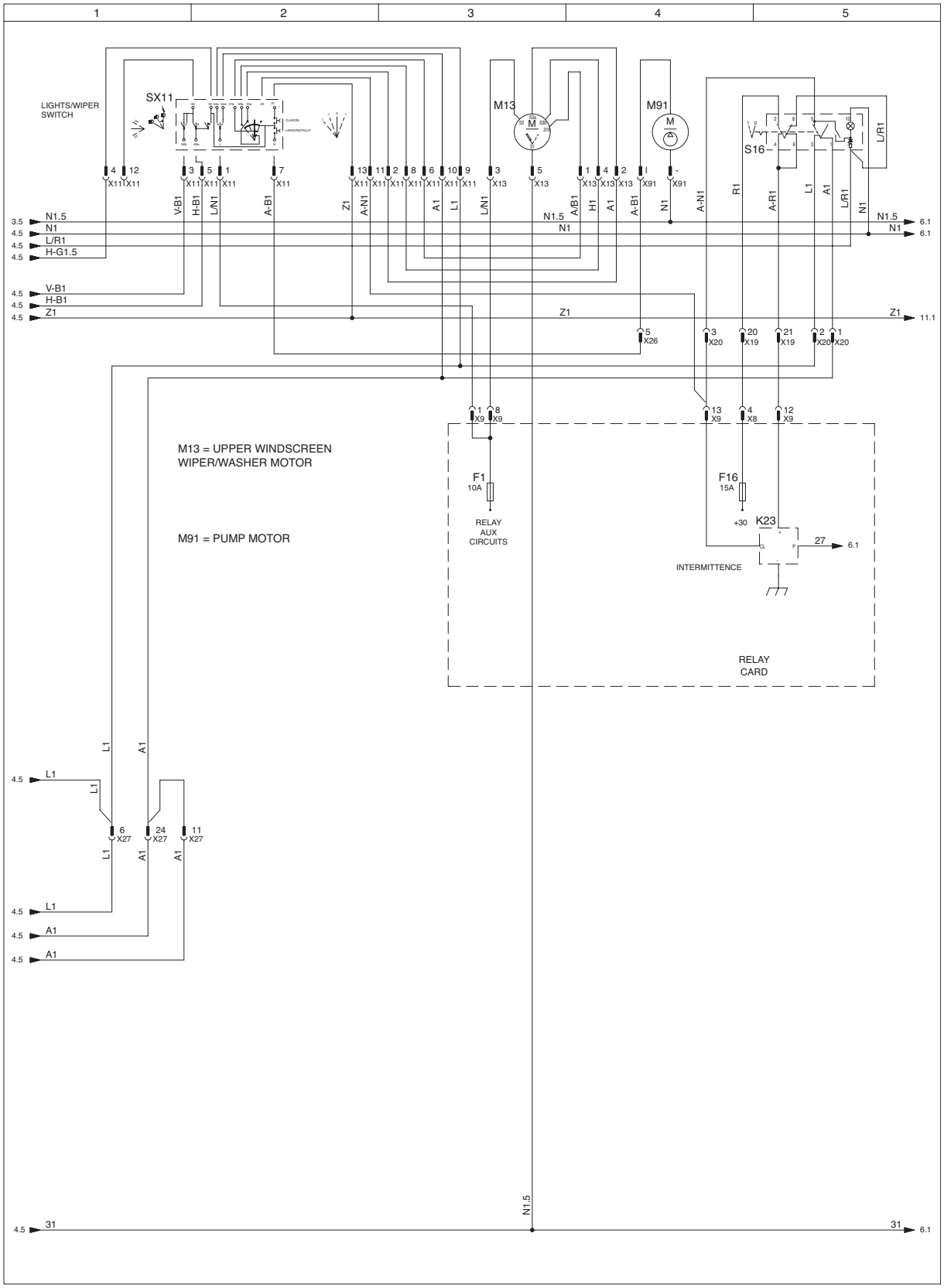
Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) - sheet 3 of 11	**C.05.03**



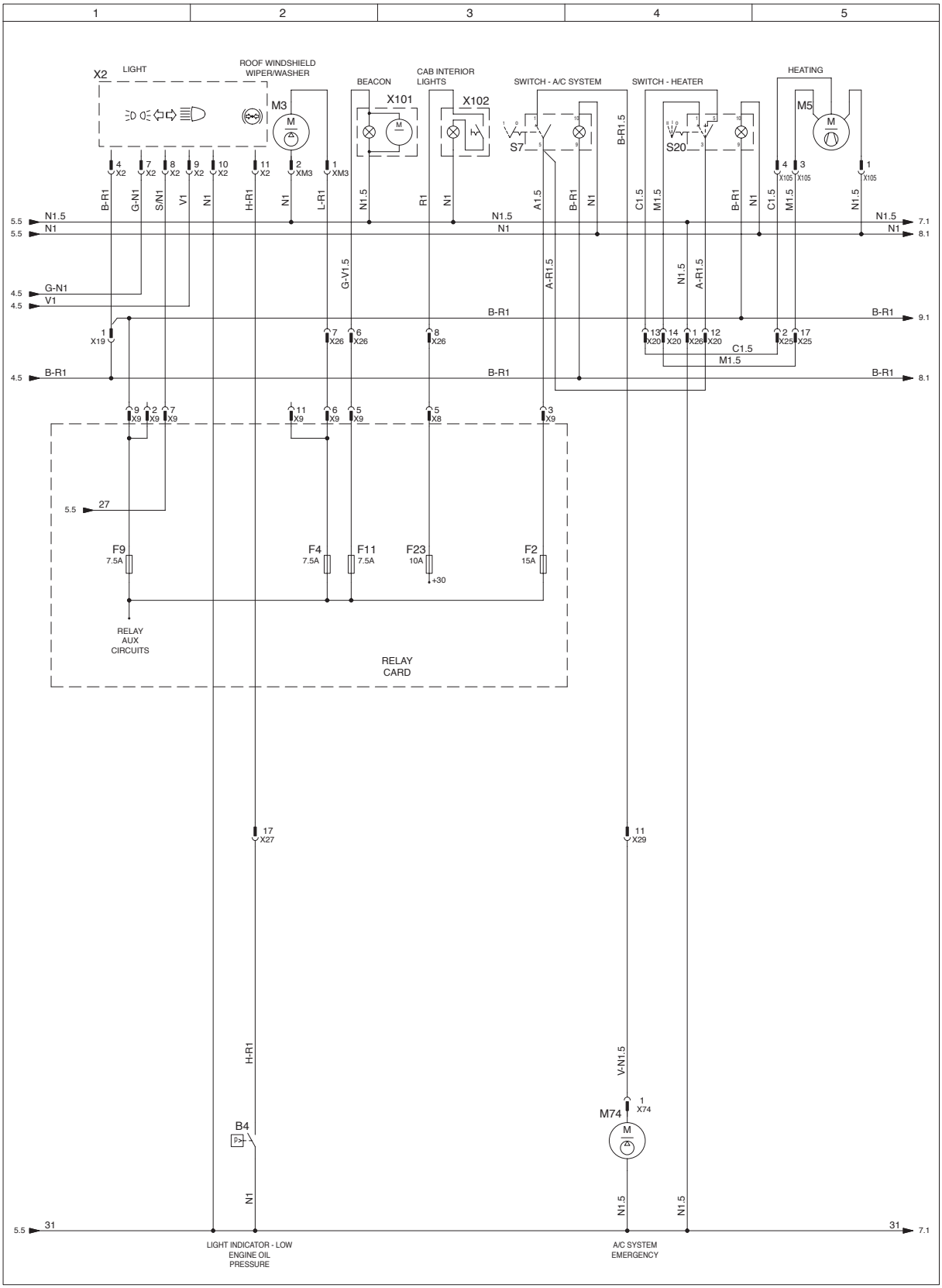
Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) - sheet 4 of 11	**C.05.03**



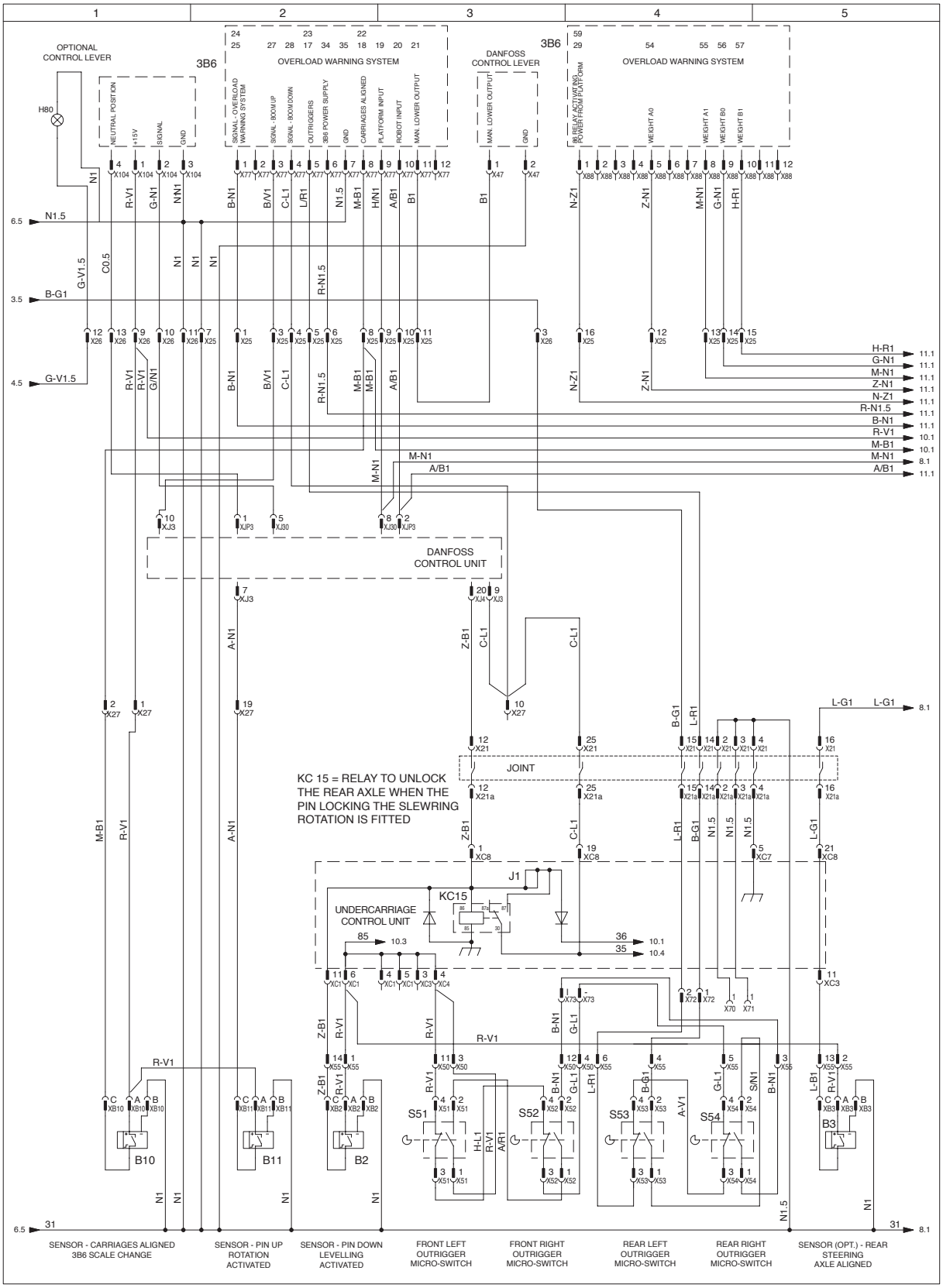
Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) - sheet 5 of 11	**C.05.03**



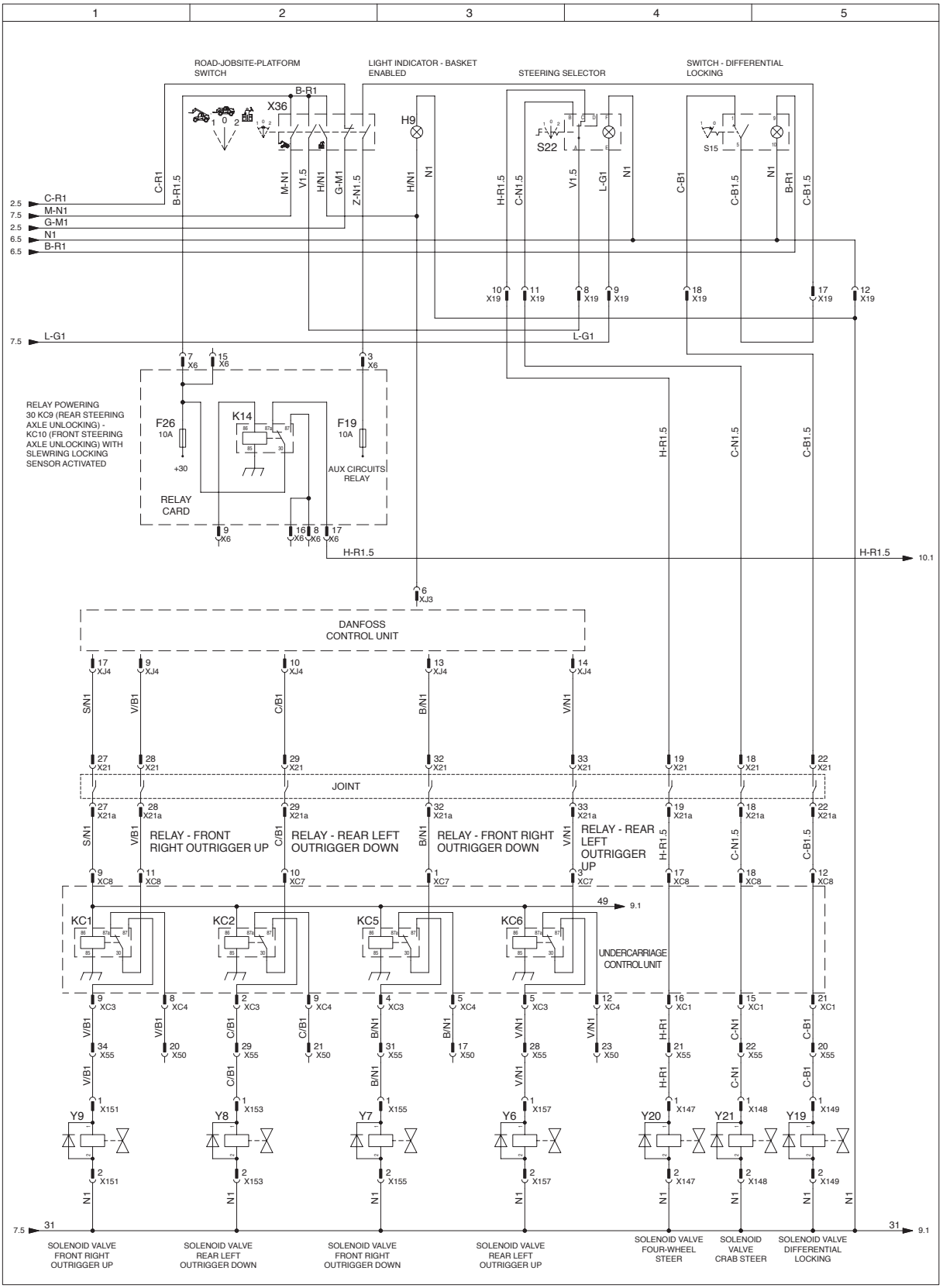
Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) - sheet 6 of 11	**C.05.03**



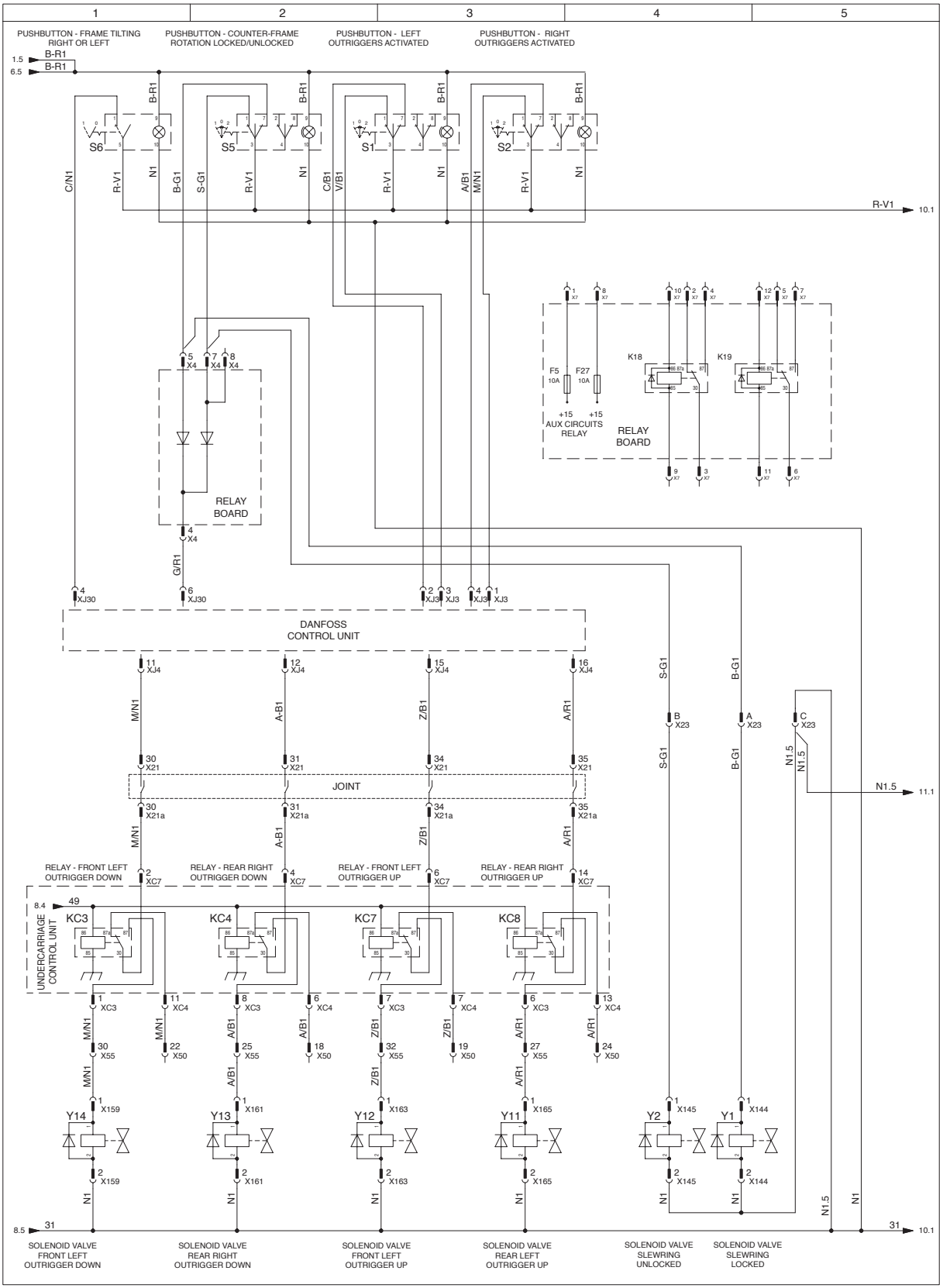
Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) - sheet 7 of 11	**C.05.03**



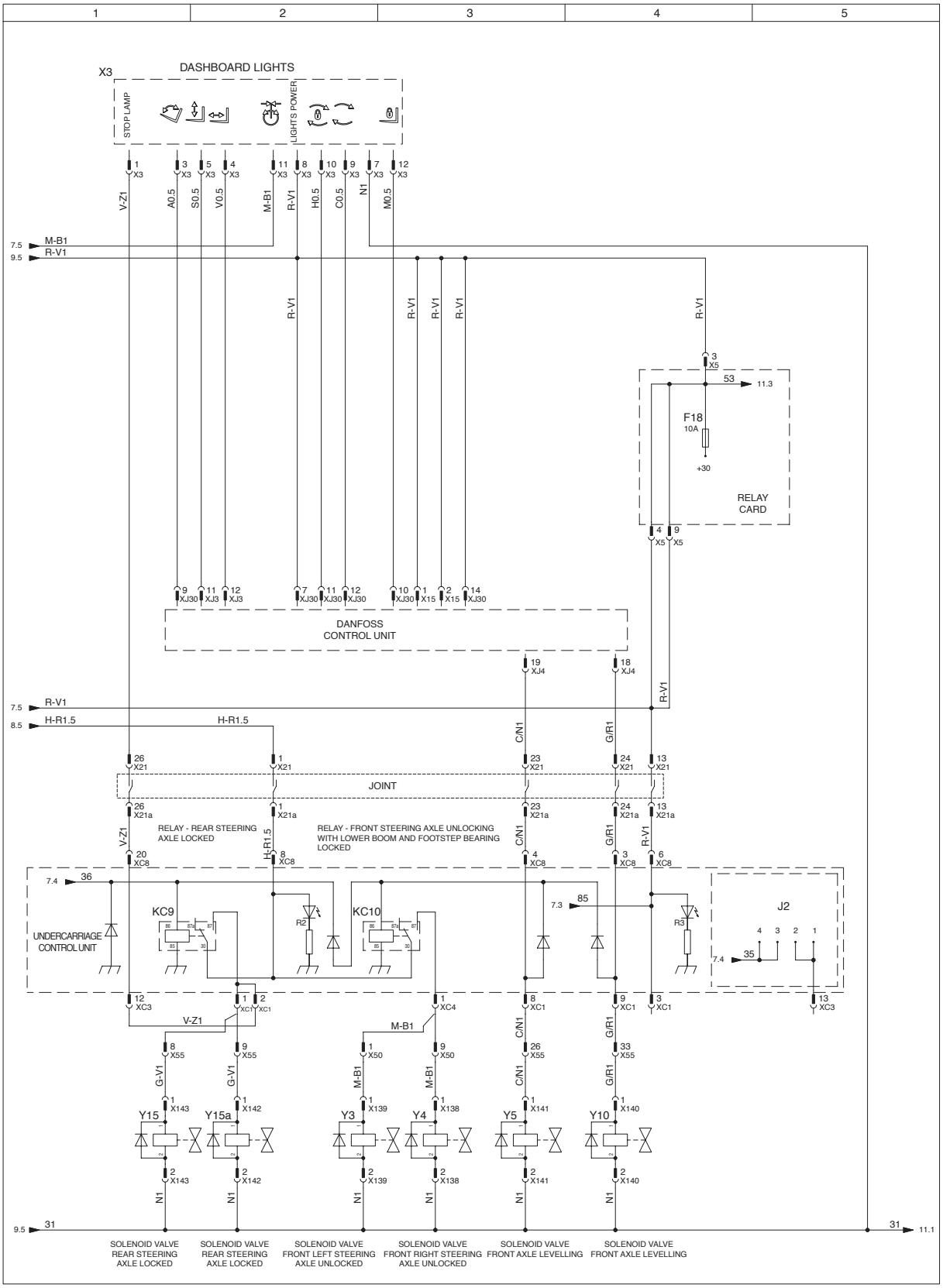
Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) - sheet 8 of 11	**C.05.03**



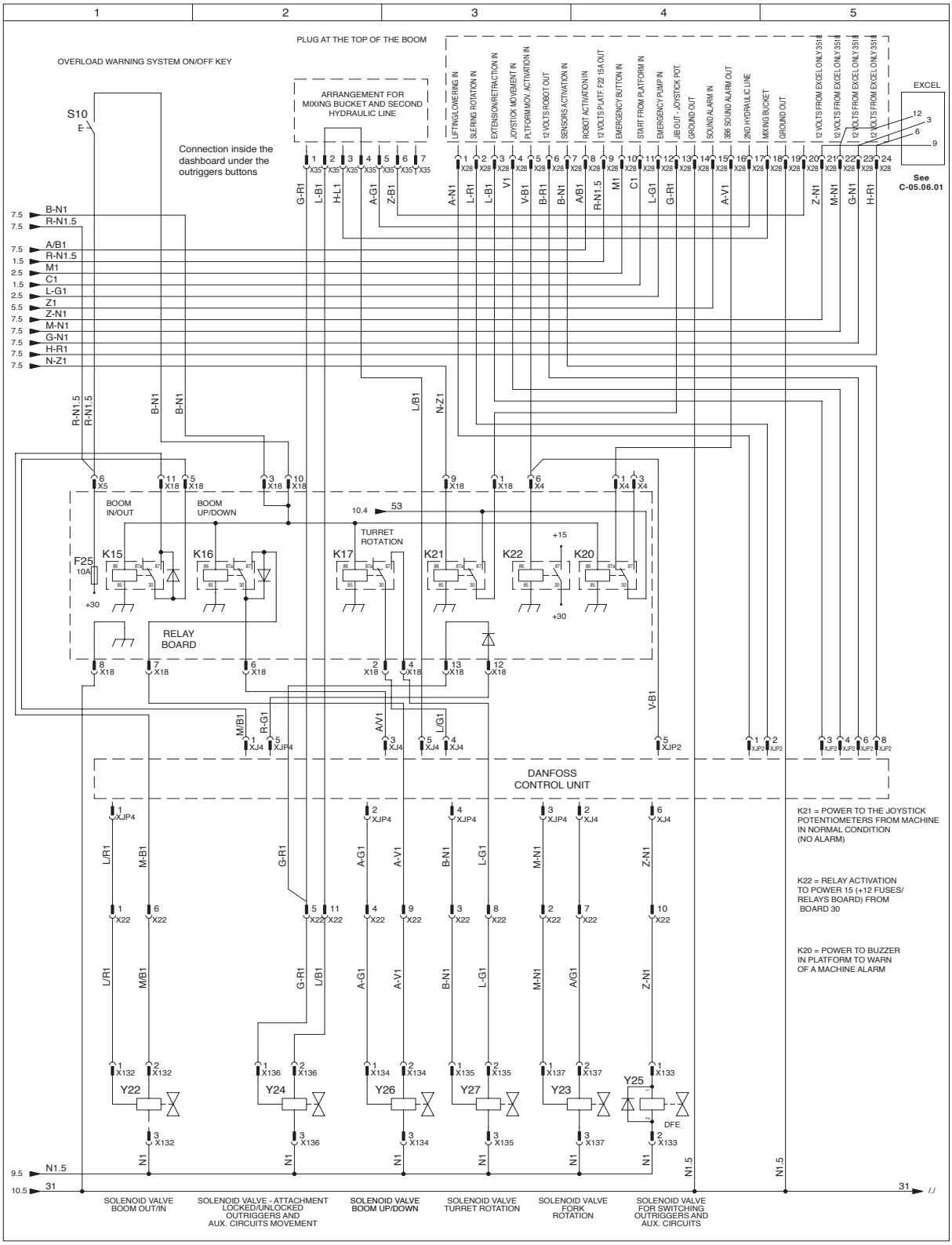
Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) - sheet 9 of 11	**C.05.03**



Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) - sheet 10 of 11	**C.05.03**



Operation:	Table:
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) - sheet 11 of 11	**C.05.03**



Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) • UNDERCARRIAGE board	**C.05.03**

XC8 - MARK 21-WAY

POS.	FUNCTION DESCRIPTION	COL.
1	SENSOR - SLEWRING LOCKING PIN	Z-B
2	SENSOR - CARDAN SHAFT	A-B
3	Y10 SOLENOID VALVE - AXLE LEVELLING	G/R
4	Y5 SOLENOID VALVE - AXLE LEVELLING	C/N
5	1ST SPEED SOLENOID VALVE	M-B
6	SENSOR POWER SUPPLY	R-V
7	DISCONNECTED	
8	SOLENOID VALVE - REAR STEERING AXLE LOCKED	H-R
9	OUTRIGGER RELAY SWITCHING	S/N
10	DISCONNECTED	
11	SOLENOID VALVE - LEFT OUTRIGGER OUT	V/B
12	SOLENOID VALVE - DIFFERENTIAL LOCKING	C-B
13	DISCONNECTED	
14	SOLENOID VALVE - DISPLACEMENT CHANGE	C-V
15	MECH. SPEED LIGHT POWER SUPPLY 2ND SPEED SOLENOID VALVE	A-R B-N
16	DISCONNECTED	
17	SOLENOID VALVE - FOUR-WHEEL STEER	H-R
18	SOLENOID VALVE - CRAB STEER	C-N
19	SIGNAL - BOOM DOWN	C-L
20	SIGNAL - AXLE BLOCKED	V-Z
21	SIGNAL - REAR ALIGNMENT	L-G

XC6 - MARK 9-WAY

POS.	FUNCTION DESCRIPTION	COL.
1	GND	
2	RIGHT TURN SIGNAL	A
3	DISCONNECTED	
4	DISCONNECTED	
5	DISCONNECTED	
6	LEFT TURN SIGNAL	L
7	DISCONNECTED	
8	DISCONNECTED	
9	DISCONNECTED	

XC5 - MARK 17-WAY

POS.	FUNCTION DESCRIPTION
NOT USED	

XC4 - MARK 13-WAY

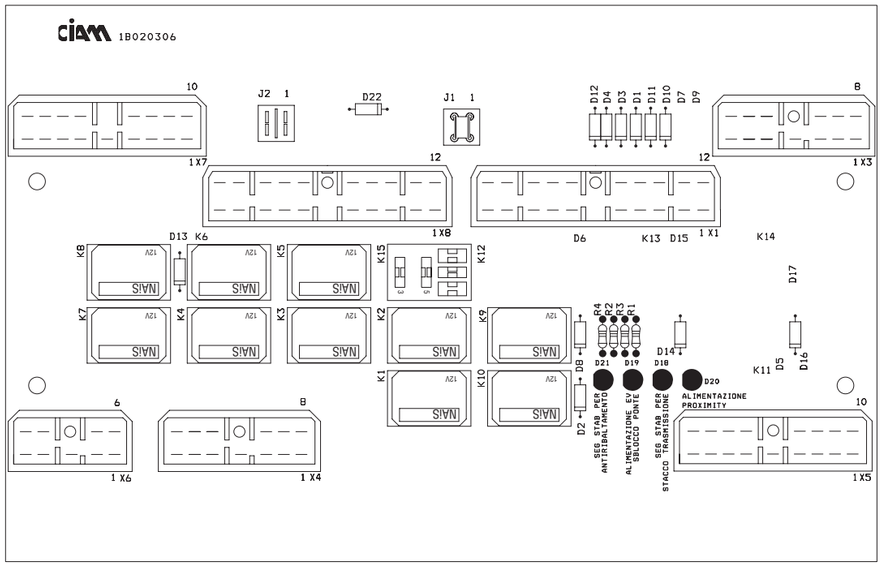
POS.	FUNCTION DESCRIPTION	COL.
1	FRONT LEFT STEER. AXLE UNLOCK. SOLENOID FRONT RIGHT STEER. AXLE UNLOCK. SOLENOID	2MB
2	DISCONNECTED	
3	DISCONNECTED	
4	FRONT LEFT OUTR. LIMIT SWITCH NC P.S. FRONT LEFT OUTR. LIMIT SWITCH NC P.S.	2RV
5	SOLENOID VALVE - FRONT LEFT OUTRIGGER UP	B/N
6	SOLENOID VALVE - FRONT RIGHT OUTRIGGER IN	A/B
7	SOLENOID VALVE - FRONT RIGHT OUTRIGGER UP	Z/B
8	SOLENOID VALVE - FRONT LEFT OUTRIGGER OUT	V/B
9	SOLENOID VALVE - FRONT LEFT OUTRIGGER IN	C/B
10	DISCONNECTED	
11	SOLENOID VALVE - FRONT LEFT OUTRIGGER UP	M/N
12	SOLENOID VALVE - FRONT LEFT OUTRIGGER DOWN	V/N
13	SOLENOID VALVE - FRONT RIGHT OUTRIGGER DOWN	A/R

XC3 - MARK 13-WAY

POS.	FUNCTION DESCRIPTION	COL.
1	SOLENOID VALVE - REAR RIGHT OUTRIGGER OUT	M/N
2	SOLENOID VALVE - REAR LEFT OUTRIGGER IN	C/B
3	DISCONNECTED	
4	SOLENOID VALVE - REAR LEFT OUTRIGGER UP	B/N
5	SOLENOID VALVE - REAR LEFT OUTRIGGER DOWN	V/N
6	SOLENOID VALVE - REAR RIGHT OUTRIGGER DOWN	A/R
7	SOLENOID VALVE - REAR RIGHT OUTRIGGER UP	Z/B
8	SOLENOID VALVE - REAR RIGHT OUTRIGGER IN	A/B
9	SOLENOID VALVE - REAR LEFT OUTRIGGER OUT	V/B
10	GND	N
11	SENSOR - REAR WHEELS ALIGNMENT	L-B
12	DISCONNECTED	M-N
13	DISCONNECTED	Z-N

XC1 - MARK 21-WAY

POS.	FUNCTION DESCRIPTION	COL.
1	SOLENOID VALVE - REAR STEER. AXLE UNLOCK.	2GV
2	DISCONNECTED	
3	DISCONNECTED	
4	DISCONNECTED	
5	DISCONNECTED	
6	SLEWRING BLOCKED SENS. P.S. REAR AXLE LEVELLING SENS. P.S.	2RV
7	SOLENOID VALVE - 1ST HYDR. SPEED	B-V
8	SOLENOID VALVE - REAR AXLE LEVELLING	C/N
9	SOLENOID VALVE - REAR AXLE LEVELLING	G/R
10	SIGNAL - CARDAN SHAFT SENSOR	A-B
11	SIGNAL - SLEWRING BLOCKED	Z-B
12	DISCONNECTED	
13	DISCONNECTED	
14	POWER SUPPLY - LICENCE PLATE LIGHT	G-N
15	CRAB STEERING SOLENOID VALVE	C-N
16	4-WHEEL STEERING SOLENOID VALVE	H-R
17		
18	SOLENOID VALVE - 2ND HYDR. SPEED	B-R
19	SOLENOID VALVE - DISPLACEMENT CHANGE	V
20	DISCONNECTED	
21	SOLENOID VALVE - DIFFERENTIAL LOCKING	C-B



XC7 - MARK 17-WAY

POS.	FUNCTION DESCRIPTION	COL.
1	SOLENOID VALVE - LEFT STAB. UP	B/N
2	SOLENOID VALVE - RIGHT STAB. OUT	M-N
3	SOLENOID VALVE - LEFT STAB. DOWN	V/N
4	SOLENOID VALVE - RIGHT STAB. IN	A-B
5	GND	N
6	SOLENOID VALVE - RIGHT STAB. UP	Z/B
7	LEFT TURN SIGNAL	A
8	DISCONNECTED	
9	DISCONNECTED	
10	SOLENOID VALVE - LEFT STAB. IN	C/B
11	DISCONNECTED	
12	DISCONNECTED	
13	DISCONNECTED	
14	SOLENOID VALVE - RIGHT STAB. DOWN	A/R
15	RIGHT TURN SIGNAL	L
16	DISCONNECTED	
17	DISCONNECTED	

ABBREVIATION LEGEND

ANT.	FRONT	SAL.	LIFTING
POST.	REAR	DIS.	LOWERING
STAB.	STABILIZER	SENS.	SENSOR
S.V.	SOLENOID VALVE	CONN.	CONNECTOR
P.S.	POWER SUPPLY	DIFFER.	DIFFERENTIAL
SX	LEFT	SIG.	SIGNAL
DX	RIGHT		
N.C.	DISCONNECTED		

WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

REMARK: TWO-COLOUR WIRES ARE INDICATED INDICATEDTHROUGH A COMBINATION OF THE AFORESAID INITIALS AS FOLLOWS:

G/V ->YELLOW/GREEN (CROSSWISE COLOURING)
G-V ->YELLOW-GREEN (LENGTHSWISE COLOURING)

D.R.C. 04.15.02 rev 00

Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) • DANFOSS board	**C.05.03**

1 2 3 4 5 6 7 8

A B C D E F

"XJP2" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	SIGNAL - LIFTING/LOWERING	A-N	IN
2	SIGNAL - TURRET ROTATION	L-R	IN
3	SIGNAL - BOOM EXTENSION/RETRACT.	L-B	IN
4	+12 JOYSTICK IN MOTION	V	IN
5	PLATFORM MOTION ON	V-B	IN
6	+12 FOR ROBOT POWER SUPPLY	B-R	OUT
7	DISCONNECTED		
8	SENSOR - FORKS COUPLED	B-N	IN

"XJP3" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	DISCONNECTED		
2	TO ROBOT	A/B	IN
3	DISCONNECTED		
4	DISCONNECTED		
5	DISCONNECTED		
6	DISCONNECTED		
7	DISCONNECTED		
8	DISCONNECTED		

"XJ4" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	Y22 SIGNAL - BOOM OUT/IN	M/B	OUT
2	FORK ROTATION PROP. SIGNAL Y23	V/B	OUT
3	Y26 SIGNAL - BOOM EXT./RETRACT.	A/V	OUT
4	TURRET ROTATION S.V. SIGNAL Y27	L/G	OUT
5	Y24 SIGNAL - COUPLING/RELEASE	L/B	OUT
6	Y25 SOLENOID VALVE - SWITCHING	Z-N	OUT
7	DISCONNECTED		
8	DISCONNECTED		
9	SOLENOID VALVE - LEFT OUTRIGGERS OUT	V/B	OUT
10	SOLENOID VALVE - LEFT OUTRIGGERS IN	C/B	OUT
11	SOLENOID VALVE - RIGHT OUTRIGGERS OUT	M-N	OUT
12	SOLENOID VALVE - RIGHT OUTRIGGERS IN	A-B	OUT
13	SOLENOID VALVE - LEFT OUTRIGGERS UP	B/N	OUT
14	SOLENOID VALVE - LEFT OUTRIGGERS DOWN	V/N	OUT
15	SOLENOID VALVE - RIGHT OUTRIGGERS UP	Z/B	OUT
16	SOLENOID VALVE - RIGHT OUTRIGGERS DOWN	A/R	OUT
17	OUTRIGGER RELAY COIL SWITCHING	S-N	OUT
18	Y10 SOLENOID VALVE - FRONT AXLE LEVELLING	G/R	OUT
19	Y5 SOLENOID VALVE - FRONT AXLE LEVELLING	C/N	OUT
20	SENSOR - LOCKING PIN FOR SLEWRING	Z-B	IN

"XJ5" CONNECTOR

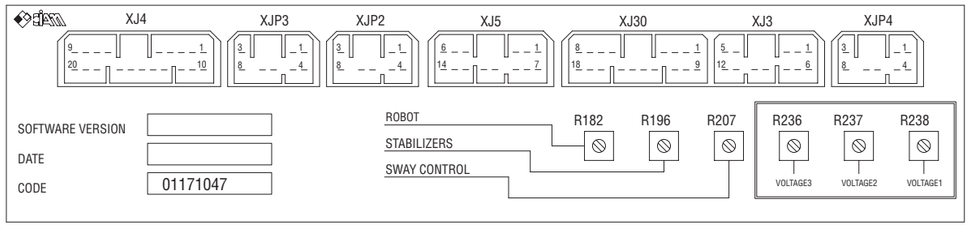
POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	+12 JOYSTICK IN MOTION	M+B+M-V	IN
2	YELLOW PUSHBUTTON	S-N	IN
3	RED PUSHBUTTON	B-L	IN
4	DEAD MAN	B-H	IN
5	JOYSTICK - DIR.1A FWD	N	IN
6	JOYSTICK - DIR.1B REVERSE	B-R	IN
7	JOYSTICK - DIR. 2A RIGHT	M-R	IN
8	JOYSTICK - DIR. 2B LEFT	M-S	IN
9	JOY. - DIR.3A BOOM RETRACTION	B/S	IN
10	JOY. - DIR.3B BOOM EXTENSION	S	IN
11	PROP. 1P LIFTING/LOWERING	R	IN
12	PROP. 2P ROTATION	L	IN
13	PROP. 3P EXT./RETRACTION	H	IN
14	+12 FOR JOYSTICK POTENTIOMETERS	MG+BG+V+Z	OUT

"XJ3-XJ30" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	RIGHT FRONT ARM PUSBUTTON	B	IN
2	RIGHT FRONT FOOT PUSBUTTON	A/R	IN
3	FRONT LEFT OUTRIGGER ARM PUSBUTTON	Z/B	IN
4	FRONT LEFT OUTRIGGER FOOT PUSBUTTON	V/N	IN
5	REAR RIGHT OUTRIGGER ARM PUSBUTTON	M/N	IN
6	TO PLATFORM (FROM ROAD/SITE/PLATF. SELECTOR)	H/N	IN
7	SENSOR - LOCK. PIN UP (SLEWRING LOCKED)	A-N	IN
8	OVERLOAD WARNING SYSTEM SENSOR FROM 386	B-N	IN
9	SENSOR - BOOM DOWN	C-L	IN
10	SENSOR - BOOM UP	B/V	IN
11	BOOM LIFTING/LOWER. INDICATOR	S	IN
12	BOOM EXTENS./RETRACT. INDICATOR	V	IN
1	RIGHT STAB. LEG/FOOT PUSHBUTTON	V/B	IN
2	LEFT STAB. FOOT PUSHBUTTON	C-B	IN
3	LEFT STAB. FOOT PUSHBUTTON	A/B	IN
4	SWAY CONTROL PUSHBUTTON	C/N	IN
5	IN OPTIONAL JOYSTICK	G/N	IN
6	SWITCH - SLEWRING LOCKED/UNLOCKED	G/R	IN
7	SEAT SENSOR	R-V	IN
8	TO CABIN (FROM ROAD/SITE/PLATF. SELECTOR)	M-N	IN
9	INDICATOR - FORK ROTATION	A	IN
10	INDICATOR - FORK COUPLED	M	IN
11	INDICATOR - ROTATION LOCKED	H	IN
12	INDICATOR - TURRET LOCKED	C	IN
13	DISCONNECTED		
14	SEAT SENSOR	R-V	IN
15	DISCONNECTED		
16	DISCONNECTED		
17	DISCONNECTED		
18	GND	N	IN

"XJP4" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	Y22 EXTENSION/RETRACTION SOLENOID POWER SUPPLY	L/R	OUT
2	Y26 BOOM LIFTING/LOWER. SOLENOID POWER SUPPLY	A-G1	OUT
3	Y23 FORKS ROTATION SOLENOID POWER SUPPLY	M-N	OUT
4	Y27 TURRET ROTATION SOLENOID POWER SUPPLY	B-N	OUT
5	Y24 ATTACHMENT COUPLING/RELEASE SOLENOID POWER SUPPLY	R-G	OUT
6	DISCONNECTED		
7	DISCONNECTED		
8	DISCONNECTED		



D.R.C. 04.15.03 rev 00

Operation:	*Table:*
Wiring diagram Girolift 3514-3518 (Girolift 3514: from serial no. 10189 to serial no. 14740 - Girolift 3518: from serial no. 10189 to serial no. 14749) • CONTROL UNIT board	**C.05.03**

X5 - MARK 11

POS.	FUNCTION DESCRIPTION	COL
1	Right pos. light Danfoss cont. unit power supply	2G
2	Pos. lights fuse power supply	B
3	DISCONNECTED	
4	Outriggers lowered sensor	R-V
5	Front left pos. light	G/N
6	3B6 control unit power supply	2R-N
7	Rear left pos. light	G/N
8	Position lights indicator	G/N
9	DISCONNECTED	
10	DISCONNECTED	
11	Instruments backlight	G

X6 - MARK 17

POS.	FUNCTION DESCRIPTION	COL
1	DISCONNECTED	
2	Walvoil control unit power supply	A
3	Work selector switch	Z-N
4	Emergency pump power supply	L-N
5	Basket emerg.button power supply	C-R
6	Cab emerg.button out	B/R
7		
8	Outrigger switch	2L/B
9	Outrigger switch	A-G
10	DISCONNECTED	
11	Electrostop	M
12	Cab emerg.button power supply	A/G
13	Electrostop from jobsite	G-M
14	Electrostop	M
15	DISCONNECTED	
16	DISCONNECTED	
17	DISCONNECTED	

X7 - MARK 17

POS.	FUNCTION DESCRIPTION	COL
1	Left high beam power supply steering axle locked	V
2	signal - stabilizers for overload system steering axle locked	L-R
3	stabilizer sensor power supply steering axle locked	R-V
4	Signal - stabilizer for transmission disengagement	B-G
5	sensor - cardan shaft	A-B
6	Sensor - 1st speed engaged	A-V
7	Sensor - 2nd speed engaged	A-R
8	Low beam	H
9	Low beam	H
10	High beam	V
11	displacement change solenoid power supply	V
12	Left turn signal	L
13	Right turn signal	A
14	optional	L-G
15	Left position lights	G-N
16	kc9-kc10 relay 30 power supply Steering axle sway unlocking	H-R
17	Right position lights	2 G

X9 - MARK 13

POS.	FUNCTION DESCRIPTION	COL
1	Lights switch power supply	L/N
2	DISCONNECTED	
3	A/C system switch power supply	A
4	Stop lights switch power supply	A-R
5	Beacon power supply	G-V
6	Rear wiper power supply	L-R
7	Turn signal - light indicator	S/N
8	Front wiper power supply	L/N
9	Switch lamp power supply Instruments power supply	2B-R
10	Warning light power supply	H-L
11	DISCONNECTED	
12	Blinking power supply	A-R
13	49	A-N

X18 - MARK 13

POS.	FUNCTION DESCRIPTION	COL
1	Solenoid valve - 17 m boom Solenoid valve - 17 m boom	V/N A-N
2	DISCONNECTED	
3	Signal - overload warning system	B-N
4	DISCONNECTED	
5	Solenoid valve - boom extension	H-L
6	Solenoid valve - boom down	L-R
7	Solenoid valve - boom down	L-N
8	GND	N
9	Sensor - 17 m boom	G-N
10	ARB forced signal	2B-N
11	Solenoid valve - boom extension	S-N
12	DISCONNECTED	
13	DISCONNECTED	

X17- MARK 17

POS.	FUNCTION DESCRIPTION	COL
1	DISCONNECTED	
2	DISCONNECTED	
3	DISCONNECTED	
4	56a SX FRONT	V
5	56a DX	V
6	Horn	Z
7	DISCONNECTED	
8	Start-up enabling command	C
9	Motor start 50 Start	2B-R
10	Power supply - Fog light switch	H/N
11	Left low beam	H
12	Right low beam	H
13	High beam Indicator	V
14	Horn Horn	2Z
15	High beam common switch	H-B
16	High beam common	V-B
17	Mechanical speed	G-R

X8 - MARK 5

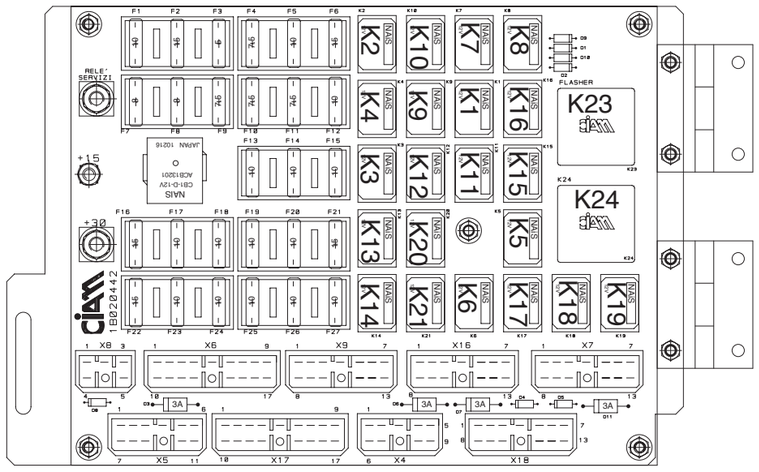
POS.	FUNCTION DESCRIPTION	COL
1	58 CONTROL BOARD	R
2	Basket power supply	H-R
3	Pos. light switch power supply	B-R
4	Warn. light switch power supply	R-G
5	Cab interior lights power supply	R

X4 - MARK 9

POS.	FUNCTION DESCRIPTION	COL
1	Moment alarm	V-B
2	86 Aux circuit relay	C
3	DISCONNECTED	
4	Jobsite function signal	S
5	Jobsite functions enabled	M-N
6	Platform relay power supply	L
7	Platform enabled	H/N
8	Platform enabling signal	C
9	85 Aux circuit relay	N-Z

X16 - MARK 13

POS.	FUNCTION DESCRIPTION	COL
1	DISCONNECTED	
2	Forward speed	V-N
3	Back-up horn	M-V
4	Speed/gearbox switch power s.	2C-R
5		
6	Solenoid valve - 1st mechanical speed	M-B
7	Solenoid valve - 2nd mechanical speed	2B-N
8	Transmission disconnected	S-G
9	Solenoid valve - reverse speed Back-up lamp	2M-V
10		
11	Solenoid valve - forward speed	V-N
12	Reverse speed	H-V
13	Movement signal	A-B



WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

REMARK: TWO-COLOUR WIRES ARE INDICATED INDICATEDTHROUGH A COMBINATION OF THE AFORESAID INITIALS AS FOLLOWS:

G/V ->YELLOW/GREEN (CROSSWISE COLOURING)
G-V ->YELLOW-GREEN (LENGTHSWISE COLOURING)

X7 - MARK 13

POS.	FUNCTION DESCRIPTION	COL
1	DISCONNECTED	
2	DISCONNECTED	
3	DISCONNECTED	
4	DISCONNECTED	
5	DISCONNECTED	
6	Platform relay power supply	H-R
7	+15 general Platform relay power supply	R-N L
8	DISCONNECTED	
9	DISCONNECTED	
10	DISCONNECTED	
11	BRIDGE	N
12	Forks block signal	B-N
13	BRIDGE	N

Operation: Wiring diagram - components description	Table: C.05.03

Ref.	Description	Sheet
F1G	MAIN FUSE 30A	1
F1G	MAIN FUSE 30A	1
F1G	MAIN FUSE 60A	1
F1G	MAIN FUSE 50A	1
A1	ALTERNATOR	1
B0	BATTERY	1
B10	SENSOR - CARRIAGES ALIGNED	7
B11	PRESSURE SWITCH - ENGINE OIL FILTER	1
B11	SENSOR - PIN HIGH	7
B12	FUEL GAUGE	4
B12	THERMOSTAT - HIGH ENGINE WATER TEMPERATURE	1
B12a	FUEL RESERVE	4
B13	HYDRAULIC OIL THERMOMETER - HIGH TEMPERATURE	4
B13	THERMOSTAT - HIGH ENGINE WATER TEMPERATURE	1
B14.1	MICRO-SWITCH - ENGINE OIL FILTER CLOGGED	1
B15	MICRO-SWITCH - AIR FILTER CLOGGED	1
B2	SENSOR - SLEWRING BLOCKED	7
B3	SENSOR - REAR STEERING AXLE ALIGNED	7
B4	PRESSURE SWITCH - LOW ENGINE OIL PRESSURE	6
B5	SENSOR - ADVANCE CHANGE	1
F1	FUSE - WINDSCREEN WIPER/WASHER 10A	5
F10	FUSE - EMERGENCY SWITCH 7.5A	4
F11	FUSE - BEACON 7,5A	6
F12	FUSE - WORK LIGHTS 10A	4
F14	FUSE - DRIVE SWITCH 10A	3
F15	FUSE - HIGH BEAM 10A	4
F16	FUSE - EMERGENCY LIGHT SWITCH 15A	5
F17	FUSE - LIGHTS AND FLASHING 10A	4
F18	FUSE - OUTRIGGERS LOWERED 10A	10
F19	FUSE - STEERING SELECTOR 10A	8
F2	FUSE - HEATING 15A	6
F20	FUSE - EMERGENCY MUSHROOM-HEAD PUSHBUTTON 10A	2
F21	FUSE - HORN 15A	4
F22	FUSE - PLATFORM ROTATION 15A	1
F23	FUSE - CAB LIGHTS 10A	6
F25	FUSE - 3B6 CONTROL UNIT 10A	11
F26	FUSE - OUTRIGGERS 10A	8
F3	FUSE - STOP SWITCH 5A	4
F4	FUSE - REAR WINDSCREEN WIPER 7.5A	6
F6	FUSE - LOW BEAM 15A	4
F7	FUSE - RIGHT POSITION LIGHTS SWITCH 3A	4
F8	FUSE - LEFT POSITION LIGHTS SWITCH 3A	4
F9	FUSE - INSTRUMENTS LIGHTING POWER SUPPLY 7,5A	6
H01	LICENCE PLATE LIGHT	3
H1	LEFT SIDE LIGHT	3
H2	RIGHT SIDE LIGHT	3
H20	HORN	4
H22	FRONT RIGHT LIGHT	4
H23	REAR LEFT LIGHT	4
H24	LICENCE PLATE LIGHT	4
H25	BACK-UP HORN	3
H26	REAR RIGHT LIGHT	4
H27	LIGHT	4
H9	LIGHT INDICATOR - BASKET ENABLED	8
K01	RELAY - START-UP	1
K02	RELAY - PRE-HEATING	1
K04	RELAY - AUX CIRCUITS	2
K1	RELAY - HIGH BEAM	4
K10	RELAY - TRANSMISSION DISCONNECTED	3
K11	RELAY - START-UP ENABLING COMMAND	1
K12	RELAY - AUX CIRCUITS	2
K13	RELAY - EMERGENCY PUMP	2
K14	RELAY - OUTRIGGERS	8
K15	RELAY	11
K16	RELAY - BOOM OUT/IN	11
K17	RELAY - BOOM UP/DOWN	11
K2	RELAY - HIGH BEAM	4
K20	RELAY	11
K21	RELAY - BOOM SENSOR	11
K22	RELAY	11
K23	INTERMITTENCE	5
K24	TIMER	3
K3	RELAY - HORN	4
K4	RELAY - WORK LIGHTS	4
K5	RELAY - 1st and 2nd MECHANICAL SPEED	3
K6	RELAY - POWER DISPLACEMENT CHANGE	3
K7	RELAY - FORWARD SPEED	3
K8	RELAY - REVERSE SPEED	3
K9	RELAY - TRANSMISSION DISCONNECTED	3
KC1	RELAY - FRONT/REAR LEFT OUTRIGGER OUT	8
KC10	RELAY - FRONT STEERING AXLE UNLOCKING	10
KC15	RELAY - SLEWRING LOCKED	7
KC2	RELAY - FRONT/REAR LEFT OUTRIGGER IN	8
KC3	RELAY - RELAY - FRONT/REAR RIGHT OUTRIGGER OUT	9

Operation: Wiring diagram - components description	Table: C.05.03

KC4	RELAY - FRONT/REAR RIGHT OUTRIGGER IN	9
KC5	RELAY - FRONT/REAR LEFT OUTRIGGER UP	8
KC6	RELAY - FRONT/REAR LEFT OUTRIGGER DOWN	8
KC7	RELAY - FRONT/REAR RIGHT OUTRIGGER UP	9
KC8	RELAY - FRONT/REAR RIGHT OUTRIGGER DOWN	9
KC9	RELAY - REAR STEERING AXLE LOCKED	10
L10	FRONT LEFT LIGHT	4
L8	LIGHT	4
M1	STARTING MOTOR	1
M13	UPPER WINDSCREEN WIPER/WASHER MOTOR	5
M3	ROOF WINDSHIELD WIPER/WASHER	6
M5	HEATING	6
M74	A/C SYSTEM	6
M8	EMERGENCY PUMP	2
M92	PUMP MOTOR	5
R0	GLOW PLUGS	1
P1	ENGINE WATER TEMPERATURE GAUGE	1
P2	FUEL LEVEL GAUGE	4
P3	FUEL GAUGE	4
P4	HOUR-METER	1
SX1	LIGHTS / WIPER SWITCH	5
S0	BATTERY CUTOFF	1
S01	START-UP PANEL	1
S1	RIGHT STABILISER LEG SWITCH	9
S10	OVERLOAD CUTOUT	11
S13	EMERGENCY MUSHROOM-HEAD PUSHBUTTON	2
S14	SWITCH - SPEED CHANGE	3
S15	SWITCH - DIFFERENTIAL LOCKING	8
S16	WARNING SWITCH	5
S17	SWITCH - EMERGENCY PUMP	2
S18	SWITCH - LIGHTS	4
S19	SWITCH - LIGHTS	4
S2	LEFT OUTR. LEG/FOOT SWITCH	9
S20	SWITCH - HEATER	6
SX12	SPEED SWICTH	3
S21	SWITCH - WORK LIGHTS	4
S22	STEERING SELECTOR	8
S30	STOP LIGHTS MICRO-SWITCH	4
S5	SWITCH - SLEWRING LOCKED/UNLOCKED	9
S51	FRONT LEFT OUTRIGGER MICRO-SWITCH	7
S52	FRONT RIGHT OUTRIGGER MICRO-SWITCH	7
S53	REAR LEFT OUTRIGGER MICRO-SWITCH	7
S54	REAR LEFT OUTRIGGER MICRO-SWITCH	7
S6	REAR RIGHT OUTRIGGER MICRO-SWITCH	7
S7	SWITCH - A/C SYSTEM	6
X101	BEACON	6
X102	CAB INTERIOR LIGHTS	6
Y01	SOLENOID VALVE - FORWARD SPEED	3
Y02	SOLENOID VALVE - REVERSE SPEED	3
Y1	SOLENOID VALVE - SLEWRING LOCKED	9
Y10	SOLENOID VALVE - FRONT AXLE LEVELLING	10
Y11	SOLENOID VALVE - REAR RIGHT OUTRIGGER DOWN	9
Y12	SOLENOID VALVE - REAR RIGHT OUTRIGGER UP	9
Y13	SOLENOID VALVE - REAR RIGHT OUTRIGGER IN	9
Y14	SOLENOID VALVE - REAR RIGHT OUTRIGGER OUT	9
Y15	SOLENOID VALVE - REAR STEERING AXLE LOCKED	10
Y15a	SOLENOID VALVE - REAR STEERING AXLE LOCKED	10
Y16	SOLENOID VALVE - 2ND SPEED	3
Y17	SOLENOID VALVE - 1ST SPEED	3
Y18	SOLENOID VALVE - DISPLACEMENT CHANGE	3
Y19	SOLENOID VALVE - DIFFERENTIAL LOCKING	8
Y2	SOLENOID VALVE - SLEWRING UNLOCKED	9
Y20	SOLENOID VALVE - FOUR-WHEEL STEER	8
Y21	SOLENOID VALVE - CRAB STEER	8
Y22	SOLENOID VALVE - BOOM OUT/IN	11
Y23	SOLENOID VALVE - FORKS/OUTRIGGERS	11
Y24	SOLENOID VALVE - ATTACHMENT LOCKED/ UNLOCKED	11
Y25	SOLENOID VALVE - SWITCHING	11
Y26	SOLENOID VALVE - BOOM UP/DOWN	11
Y27	SOLENOID VALVE - TURRET ROTATION	11
Y3	SOLENOID VALVE - FRONT LEFT STEERING AXLE UNLOCKED	10
Y4	SOLENOID VALVE - FRONT RIGHT STEERING AXLE UNLOCKED	10
Y5	SOLENOID VALVE - FRONT AXLE LEVELLING	10
Y6	SOLENOID VALVE - REAR LEFT OUTRIGGER DOWN	8
Y7	SOLENOID VALVE - REAR LEFT OUTRIGGER UP	8
Y8	SOLENOID VALVE - REAR LEFT OUTRIGGER IN	8
Y9	SOLENOID VALVE - REAR LEFT OUTRIGGER OUT	8
X1	8-WAY CONNECTOR - LIGHT INDICATORS	
X10	6-WAY CONNECTOR	
X104	3-WAY CONNECTOR	
X105	4-WAY CONNECTOR	
X11	13-WAY CONNECTOR	
X12	5-WAY CONNECTOR	
X122	2-WAY CONNECTOR	

Operation: Wiring diagram - components description	Table: C.05.03

X123	2-WAY CONNECTOR	
X127	2-WAY CONNECTOR	
X128	2-WAY CONNECTOR	
X129	2-WAY CONNECTOR	
X13	6-WAY CONNECTOR	
X132	3-WAY CONNECTOR	
X133	2-WAY CONNECTOR	
X134	3-WAY CONNECTOR	
X135	3-WAY CONNECTOR	
X136	3-WAY CONNECTOR	
X137	3-WAY CONNECTOR	
X138	2-WAY CONNECTOR	
X139	2-WAY CONNECTOR	
X140	2-WAY CONNECTOR	
X141	2-WAY CONNECTOR	
X142	2-WAY CONNECTOR	
X143	2-WAY CONNECTOR	
X144	2-WAY CONNECTOR	
X145	2-WAY CONNECTOR	
X146	2-WAY CONNECTOR	
X147	2-WAY CONNECTOR	
X148	2-WAY CONNECTOR	
X149	2-WAY CONNECTOR	
X15	2-WAY CONNECTOR	
X150	2-WAY CONNECTOR	
X151	2-WAY CONNECTOR	
X152	2-WAY CONNECTOR	
X153	2-WAY CONNECTOR	
X154	2-WAY CONNECTOR	
X155	2-WAY CONNECTOR	
X156	2-WAY CONNECTOR	
X157	2-WAY CONNECTOR	
X158	2-WAY CONNECTOR	
X159	2-WAY CONNECTOR	
X16	13-WAY CONNECTOR	
X160	2-WAY CONNECTOR	
X161	2-WAY CONNECTOR	
X162	2-WAY CONNECTOR	
X163	2-WAY CONNECTOR	
X164	2-WAY CONNECTOR	
X165	2-WAY CONNECTOR	
X17	17-WAY CONNECTOR	
X18	13-WAY CONNECTOR	
X19	21-WAY CONNECTOR	
X2	12-WAY CONNECTOR - LIGHT INDICATORS	6
X20	17-WAY CONNECTOR	
X21	40-WAY DEUTSCH CONNECTOR - TYPE B	
X21a	40-WAY DEUTSCH CONNECTOR - TYPE B	
X22	12-WAY CONNECTOR	
X23	3-WAY DEUTSCH CONNECTOR	
X25	17-WAY CONNECTOR	
X26	11-WAY CONNECTOR	
X27	24-WAY DEUTSCH CONNECTOR	
X28	24-WAY DEUTSCH CONNECTOR	
X29	24-WAY DEUTSCH CONNECTOR	10
X3	12-WAY CONNECTOR - LIGHT INDICATORS	
X30	2-WAY CONNECTOR	
X34	2-WAY 90° CONNECTOR	
X35	7-WAY CONNECTOR	
X4	9-WAY CONNECTOR	
X47	2-WAY 90° CONNECTOR	
X5	11-WAY CONNECTOR	
X50	24-WAY DEUTSCH CONNECTOR	
X51	4-WAY CONNECTOR	
X52	4-WAY CONNECTOR	
X53	4-WAY CONNECTOR	
X54	4-WAY CONNECTOR	
X55	40-WAY DEUTSCH CONNECTOR - TYPE B	
X6	17-WAY CONNECTOR	
X61	5-WAY CONNECTOR	
X63	1-WAY CONNECTOR	
X64	2-WAY CONNECTOR - ENGINE STOP	1
X67	2-WAY CONNECTOR - FUEL PUMP	1
X70	1-WAY CONNECTOR	
X71	1-WAY CONNECTOR	
X72	2-WAY CONNECTOR	
X73	2-WAY 90° CONNECTOR	
X77	12-WAY CONNECTOR	
X8	5-WAY CONNECTOR	
X88	12-WAY CONNECTOR	
X9	13-WAY CONNECTOR	
X91	2-WAY 90° CONNECTOR	
XB10	3-WAY DEUTSCH CONNECTOR	
XB11	3-WAY DEUTSCH CONNECTOR	
XB2	3-WAY DEUTSCH CONNECTOR	
XB3	3-WAY DEUTSCH CONNECTOR	
XC1	21-WAY CONNECTOR	
XC3	13-WAY CONNECTOR	
XC4	13-WAY CONNECTOR	
XC6	9-WAY CONNECTOR	
XC7	17-WAY CONNECTOR	
XC8	21-WAY CONNECTOR	

Operation: Wiring diagram - components description	*Table:* **C.05.03**

XH22	6-WAY CONNECTOR
XH23	4-WAY CONNECTOR
XH24	2-WAY CONNECTOR
XH25	2-WAY CONNECTOR
XH26	4-WAY CONNECTOR
XJ3	12-WAY CONNECTOR
XJ30	18-WAY CONNECTOR
XJ4	20-WAY CONNECTOR
XJP2	8-WAY CONNECTOR
XJP3	8-WAY CONNECTOR
XJP4	8-WAY CONNECTOR
XM3	2-WAY CONNECTOR
XP1	14-WAY CONNECTOR
XP2	6-WAY CONNECTOR
XP3	6-WAY CONNECTOR

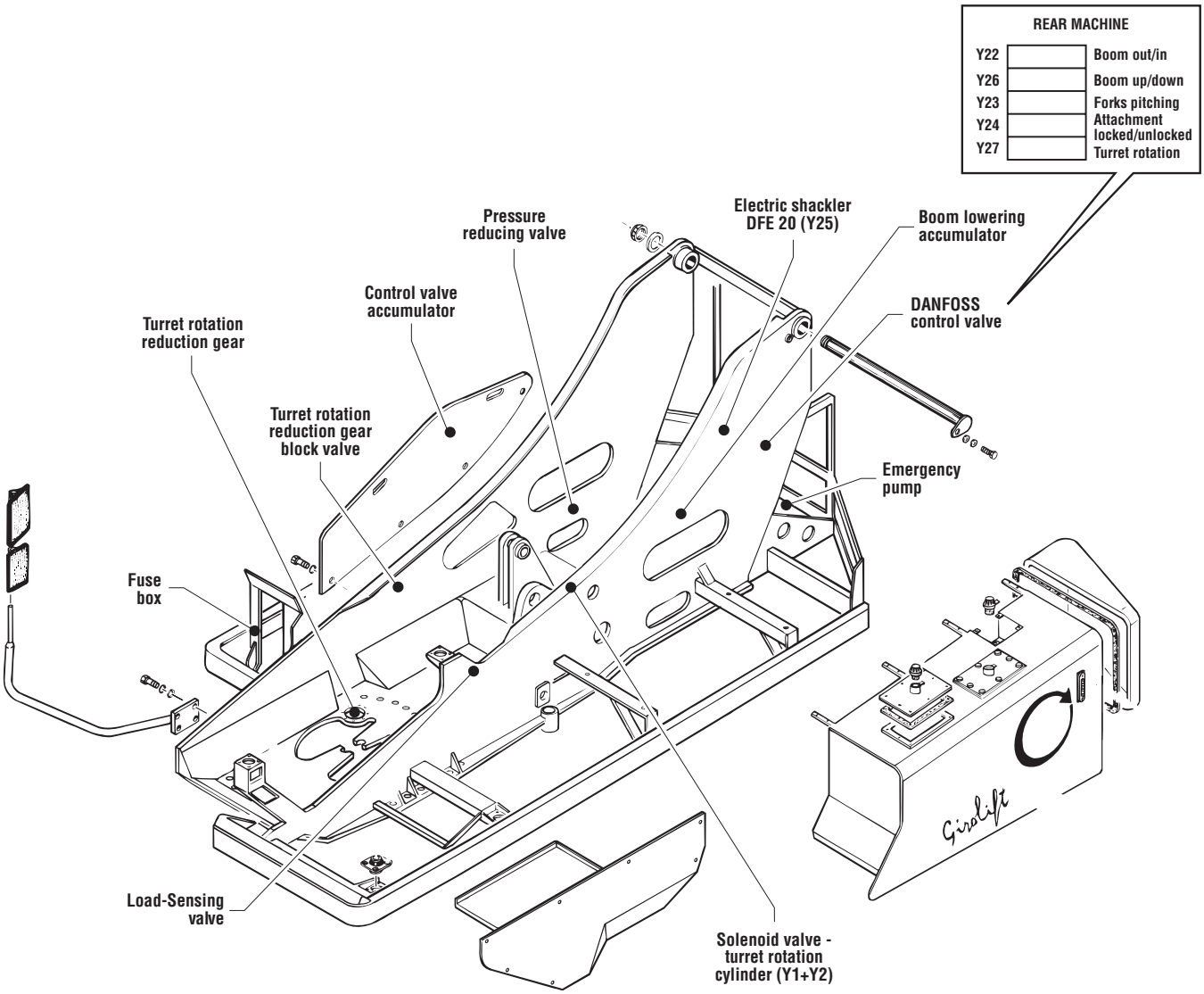
WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

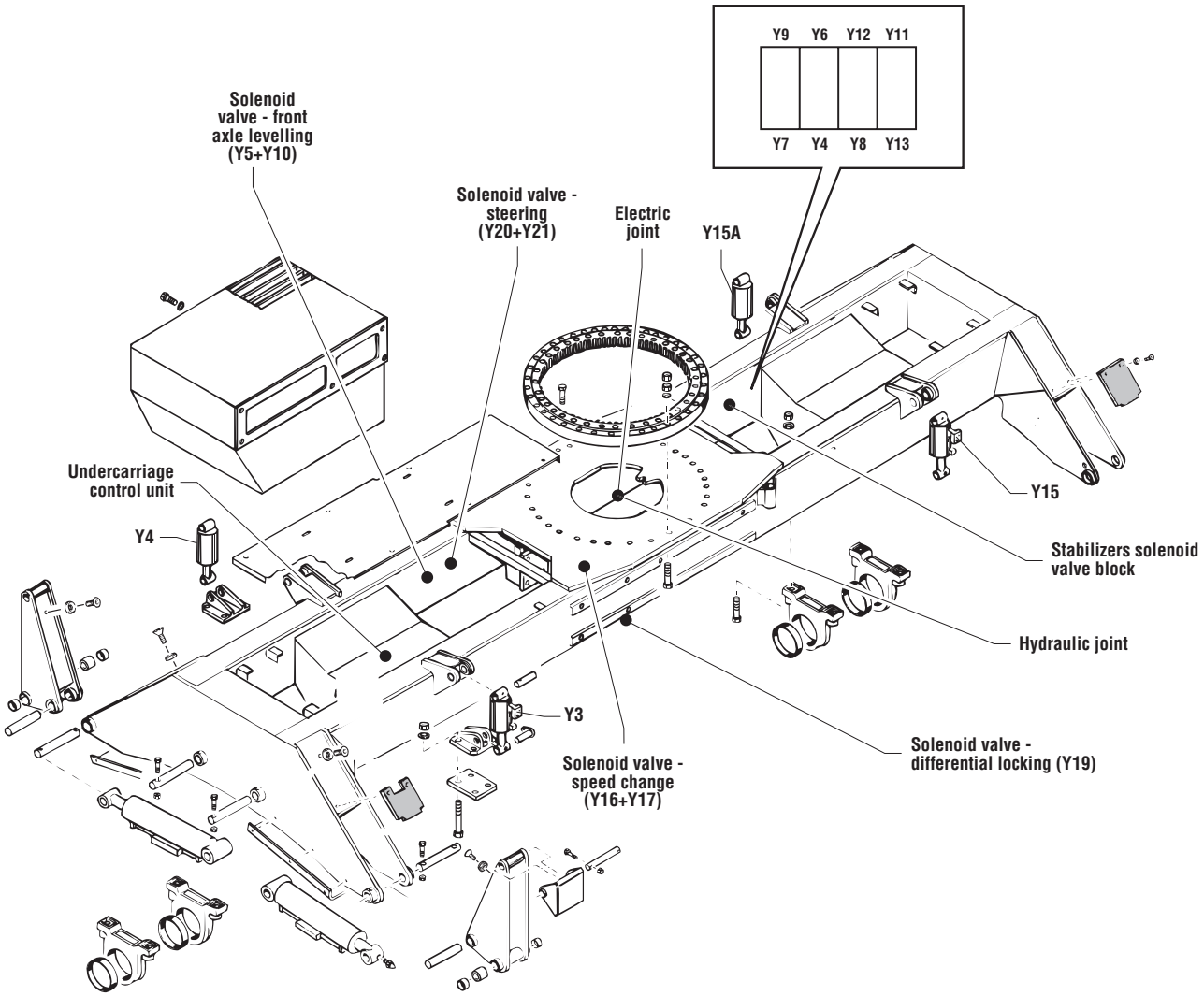
REMARK:Two-colour wires are indicated through a combination of the aforesaid initials as follows:

G/V = YELLOW/GREEN (crosswise colouring)
G-V = YELLOW-GREEN (lengthswise colouring)

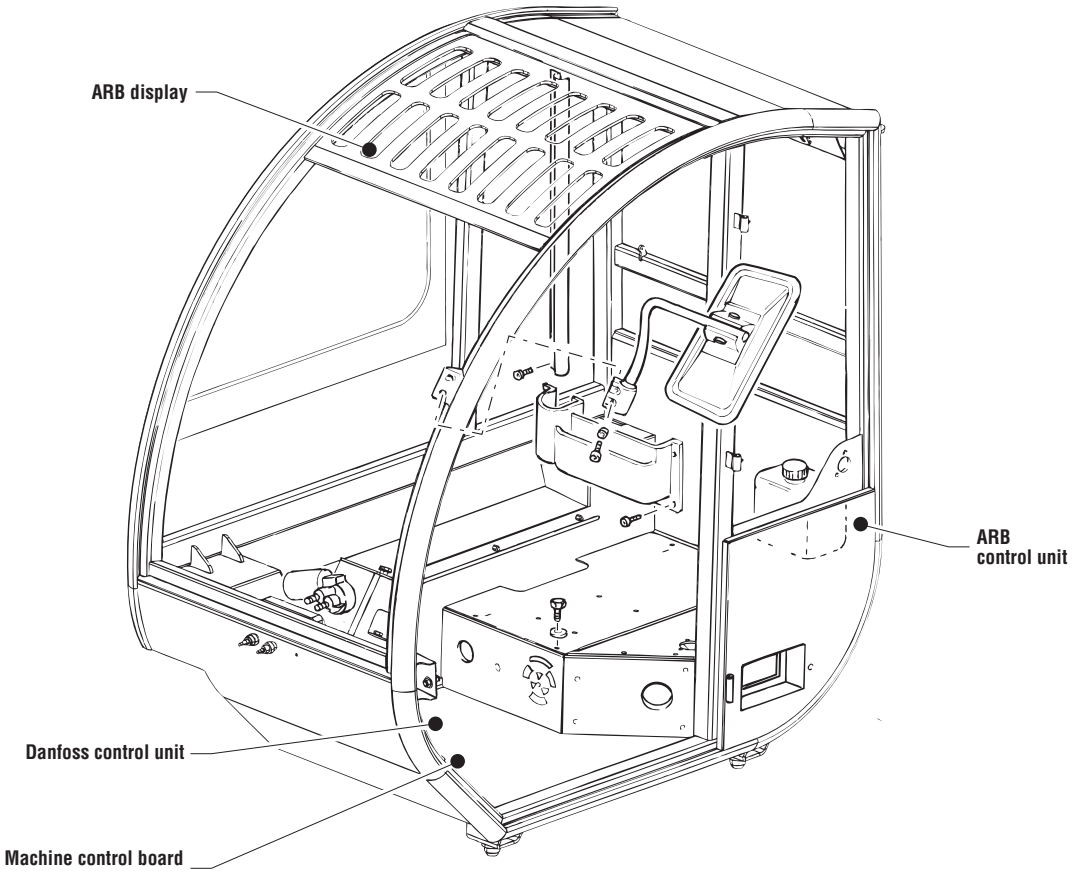
Operation:	Position of the electrical components on the machine - Girolift 3514-3518	Table: C.05.03



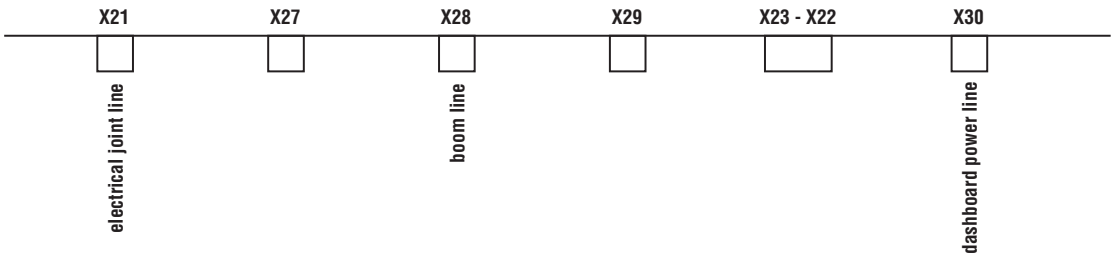
Operation:	Position of the electrical components on the machine - Girolift 3514-3518	*Table:* **C.05.03**



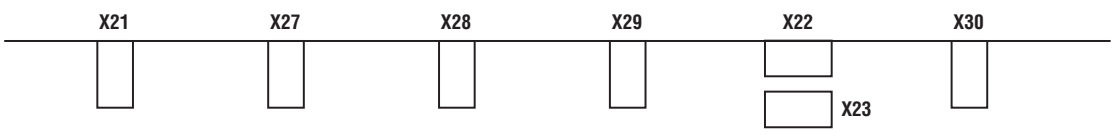
Operation:	Position of the electrical components on the machine - Girolift 3514-3518	*Table:* **C.05.03**



Cab plugs layout (boom side) - side view



Cab plugs layout (boom side) - view from below



Operation: Motor line tree-based scheme - Girolift 3514-3518

Table: **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
X29	DT CONN. 125453	Air filter sensor output		B1/	1	A-G	1	DF		F1/3	A	R	10	120188	+30 relay - aux circuits	2-WAY CONN.	X30
	To LH dashboard line	Power supply: forward speed solenoid valve		Y21/1	2	V-N	1	DF		F1/1	B	R	6	120119	+30 Start-up panel	To LH dashboard line	
	125453	Power supply: reverse speed solenoid valve		Y22/1	3	M-V	1	DF							Insulate the rear part of the terminal	125376	
		Engine oil sensor output		B2/	4	H-N	1	DF							with thermally insul. tube + 750162		
		H2O temp. sensor output		B3/	5	H-L	1	DF									
		Max H2O temp. sensor output		B4/1	6	H/R	1	DF		K21/87		C	2.5	ff C	Start-up enabling command		X66
		D+ alternator		X60/	7	H	1	DF								+50 Start	
		Advance change sensor		B5/	8	M	1.5	DF								000000	
		Start-up enabling command		K21/86	9	C-B	1	DF									
		Pre-heating relay power supply		K20/86	10	S	1	DF		K20/87	1	M	6	120138	Glow plugs power supply	1-WAY DT CONN.	X65
		Optional A/C		X63/1	11	V-N	1.5	DF								Glow plugs	
					12			150100								124014	
					13			150100									
					14			150100		X29/23		N	1.5	C/C10.101012	GND		gnd1
					15			150100		X29/24		N	1.5	-	GND	Ground point	
					16			150100		K21/85		N	1	-	GND	000000	
					17			150100		X64/2		N	1	-	GND	+ 900001	
					18			150100		B5/		N	1	-	GND		
					19			150100									
					20			150100		X61/2		N	1	C/C10.101012	GND		gnd1.2
					21			150100		B4/2		N	1	-	GND	Ground point	
					22			150100		Y22/2		N	1	-	GND	000000	
		GND		gnd1.1/	23	N	1.5	DF		Y21/2		N	1	-	GND	+ 900001	
		GND		gnd1.1/	24	N	1.5	DF		B1/		N	1	-	GND		
B1		Air filter sensor output		X29/1		A-G	1	ff C		gnd1.1/	85	N	1	ffda	GND	RELAY CONN. 125048	K21
	AIR FILTER	GND		gnd1.2/		N	1	ff C		K20/85		N	1	-	GND	Relay - start-up	
	000000									X29/9	86	C-B	1	ffda	Start-up enabling command	125048	
										F1/2	30	R	2.5	FFDAG	Start relay common power supply		
										X66/	87	C	2.5	FFDAG	Start-up enabling command	+ 157102	
Y21	S/V CONN. 125234	Power supply: forward speed solenoid valve		X29/2	1	V-N	1	101077			S						
	Solenoid valve - forward speed	GND		gnd1.2/	2	N	1	101077									
	125234									K21/	85	N	1	ffda	GND	RELAY CONN. 125048	K20
										X29/10	86	S	1	ffda	Pre-heating relay power supply	Relay - pre-heating	
										F1/4	30	R	6	FFDAG	Pre-heating relay common power supply	125048	
Y22	S/V CONN. 125234	Power supply: reverse speed solenoid valve		X29/3	1	M-V	1	101077		X65/1	87	M	6	FFDAG	Glow plugs power supply		
	Solenoid valve - reverse speed	GND		gnd1.2/	2	N	1	101077			S					+ 157102	
	125234																
											C					5-WAY FUSE HOLDER	F1
B2		Engine oil sensor output		X29/4		H-N	1	ff		X30/B	1	R	6	120119	+30 Start-up panel	Fuse box	
	Sensor - engine oil									K21/30	2	R	2.5	120119	Start relay common power supply	113823 113824	
	000000									X30/A	3	R	10	120188	+30 relay - aux circuits	113825 113825	
										K20/30	4	R	6	120119	Pre-heating relay common power supply		
	+ 128010															+ 1C020458 X2	
B3		H2O temp. sensor output		X29/5		H-L	1	ff		X29/8		M	1.5	FF C	Advance change sensor		B5
	Sensor - H2O temp.									X64/1		M	1	-	Engine stop	Advance change sensor	
	000000									X61/1		M	1	-	Fuel pump	000000	
	+ 128010									gnd1.1/		N	1	ff C	GND		
B4	2-WAY DT CONN.	Max H2O temp. sensor output		X29/6	1	H/R	1	DF		B5/	1	M	1	120198	Engine stop	2-WAY CONN.	X64
	Max H2O temp.	GND		gnd1.2/	2	N	1	DF		gnd1.1/	2	N	1	120198	GND	Engine stop	
	125402 125403															300004 300013	
																+ 118179 X2	
X60		D+ alternator		X29/7		H	1	C/C5.120011									
	D+ alternator																
	000000									X29/11	1	V-N	1.5	ffda	Optional A/C	1-WAY CONN.	X63
																Optional A/C	
	+ 128101															125005	
X61	2-WAY DT CONN.	Fuel pump		B5/	1	M	1	DF		V/		R	16	C/C10.101110	CONNECT TO STARTING		Z
	Fuel pump	GND		gnd1.2/	2	N	1	DF		X/		R	16	-	MOTOR	+30 STARTING MOTOR	
	125402 125403															000000	
																+ 900001	
V		CONNECT TO THE COMMON		Z/		R	16	C/C6.101055								+ 128100	
	+30 FUSE BOX	OF THE FUSE BOX															
	000000																
	+ 900001																
X		CONNECT TO ALTERNATOR		Z/		R	16	C/C6.101055									
	ALTERNATOR																
	000000																
	+ 128101																
	+ 900001																

0A006809

Operation: Upper line tree-based scheme - Girolift 3514-3518

Table: **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
X27	DT CONN. 125457	Sensor power supply		Sal1/	1	R-V	1	DF		X27/4		N	1.5	C/C6.120028	GND		gnd1.1
	To RH dashboard line	Signal - carriages aligned sensor		B10/C	2	M-B	1	DF		B4/		N	1	-	GND	Ground point	
	125457	Signal - fuel level from float		B12/	3	Z/N	1	DF		B10/B		N	1	-	GND	000000	
		GND		gnd1.1/	4	N	1.5	DF		B11/B		N	1	-	GND	+ 900001	
		Rear left position lights		H23/1	5	G-N	1	DF		B14/		N	1	-	GND		
		Rear left turn signal		H23/2	6	L	1	DF									
		Right low beam		H22/2	7	H	1.5	DF		H23/4		N	1	C/C6.120028	GND		gnd1.2
		Right high beam		H22/3	8	V	1.5	DF		M8/		N	1	-	GND	Ground point	
		Light indicator - hydraulic oil filter clogged		B14/	9	H-L	1	DF		H25/2		N	1	-	GND	000000	
					10			150100		H22/1		N	1.5	-	GND	+ 900001	
		Rear right turn signal		H26/2	11	A	1	DF									
		Fog lamp		H27/	12	M-V	1	DF		L8/		N	1.5	C/C6.120028	GND		gnd1.3
		Work ligth		L8/	13	G-N	1.5	DF		H20/		N	1.5	-	GND	Ground point	
		Horn		H20/	14	Z	1.5	DF		H26/4		N	1	-	GND	000000	
		+15 Stop lights switch		S30/	15	R	1	DF		B12/		N	1	-	GND	+ 900001	
		Signal - fuel from float reserve warning light		B12/	16	Z-N	1	DF									
		Light indicator - low engine oil pressure		B4/	17	H-R	1	DF		X27/13		G-N	1.5	ff C	Work ligth		L8
		Rear right position lights		H26/1	18	G	1	DF		gnd1.3/		N	1.5	ff C	GND	Work ligth	
		Signal - pin high		B11/C	19	A-N	1	DF								000000	
		Signal - hydraulic oil temperature		B13/	20	H/N	1	DF									
					21			150100		X27/14		Z	1.5	ff C	Horn		H20
		Emergency pump power supply		M8/	22	L-G	1	DF		gnd1.3/		N	1.5	ff C	GND	Horn	
		Back-up horn power supply		H27/	23	B	1	DF								000000	
		Front right turn signal		H22/5	24	A	1	DF									
										X27/15		R	1	ff C	+15 Stop lights switch		S30
Sal1		Sensor power supply		X27/1		R-V	1	-		H26/3		R-N	1	ff C	Right stop lights	Stop switch	
	Ground point	Sensor power supply		B10/A		R-V	1	-		H23/3		R-N	1	-	Left stop lights	000000	
	000000	Sensor power supply		B11/A		R-V	1	-									
		Ultrasound welding and cover with thermally insulated tube + 750161								X27/17		H-R	1	ff C	Light indicator - low engine oil pressure		B4
										gnd1.1/		N	1	ff C	GND	Pressure switch - low	
																000000	
B10	3-WAY DT CONN.	Sensor power supply		Sal1/	A	R-V	1	DF								engine oil pressure	
	Sensor - carriages aligned	GND		gnd1.1/	B	N	1	DF									
	125406 125407	Signal - carriages aligned sensor		X27/2	C	M-B	1	DF		X27/22		L-G	1	ff C	Emergency pump power supply		M8
										gnd1.2/		N	1	ff C	GND	Emergency pump	
																000000	
B11	3-WAY DT CONN.	Sensor power supply		Sal1/	A	R-V	1	DF									
	Sensor - pin high	GND		gnd1.1/	B	N	1	DF		H27/	1	B	1	DF	Back-up horn	2-WAY DT CONN.	H25
	125406 125407	Signal - pin high		X27/19	C	A-N	1	DF		gnd1.2/	2	N	1	DF	GND	Back-up horn	
																125402 125403	
H22	6-WAY DT CONN.	GND		gnd1.2/	1	N	1.5	DF								Join:	
	Front right light	Right low beam		X27/7	2	H	1.5	DF								+ 125400	
	125414 125415	Right high beam		X27/8	3	V	1.5	DF								+ 125401	
		Front right position lights		H26/1	4	G	1	DF								+ 120110 x2	
		Front right turn signal		X27/24	5	A	1	DF									
					6			150100		H22/4	1	G	1	ffda	Front right position lights	4-WAY CONN.	H26
										X27/18		G	1	-	Rear right position lights	Rear right light	
B12		Signal - fuel level from float		X27/3		Z/N	1	-		X27/11	2	A	1	ffda	Rear right turn signal	125011	
	Fuel gauge	Signal - fuel from float reserve warning light		X27/16		Z-N	1	-		S30/	3	R-N	1	ffda	Right stop lights	Join ring nut:	
	000000	GND		gnd1.3/		N	1	-		gnd1.3/	4	N	1	ffda	GND	+ 103011	
	MOUNT									X27/23		B	1	ff C	Back-up horn power supply		H27
	CONNECTOR KIT									H25/1		B	1	-	Back-up horn	Fog lamp	
	+ 125177 x3															000000	
H27		Fog lamp		X27/12		M-V	1	ff									
	Fog lamp																
	000000																
H23	4-WAY CONN.	Rear left position lights		X27/5	1	G-N	1	ffda									
	Rear left light	Licence plate light		H24/1		G-N	1	-									
	125011	Rear left turn signal		X27/6	2	L	1	ffda									
	Join ring nut:	Left stop lights		S30/	3	R-N	1	ffda									
	+ 103011	GND		gnd1.2/	4	N	1	ffda									
		GND		H24/2		N	1	-									
H24	2-WAY DT CONN.	Licence plate light		H23/1	1	G-N	1	DF									
	Licence plate light	GND		H23/4	2	N	1	DF									
	125402 125403																
B13		Signal - hydraulic oil temperature		X27/20		H/N	1	ff C									
	Sensor - hydraulic																
	000000																
	oil temperature																
	+ 128010																
B14		Light indicator - hydraulic oil filter clogged		X27/9		H-L	1	ff C									
	Signal - oil filter	GND		gnd1.1/		N	1	ff C									
	000000																
	clogged																
	+ 128018																

ATTENTION!!!!
DT CONNECTOR - TYPE 'C'

0A006801

Operation: Cab side line tree-based scheme - Girolift 3514-3518

Table: **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
X25	17-WAY MK CONN.	Signal - Overload warning system		X7/1	1	B-N	1	FFK		GND/	1	N	1.5	FFK	GND	13-WAY MK CONN.	X26
	To LH dashboard line	1st heating speed		X5/4	2	C	1.5	FFK		X61/1	2	L-G	1	FFK	Light indicator - parking brake	To LH ddashboard line	
	125214	Signal - boom up		X7/3	3	B/V	1	FFK		X61/3	3	B-G	1	FFK	+12 from outriggers	125213	
		Signal - boom down		X7/4	4	C-L	1	FFK		X61/4	4	S-G	1	FFK	Transmission disconnected		
		Signal - outriggers		X7/5	5	L/R	1	FFK		X9/l	5	A-B	1	FFK	Pump power supply		
		3B6 power supply		X7/6	6	R-N	1.5	FFK		X1/	6	G-V	1.5	FFK	+15 beacon		
		GND		GND/	7	N	1.5	FFK		X3/1	7	L-R	1	FFK	+15 rear windscreen wiper		
		Carriages aligned		X7/8	8	M-B	1	FFK		X2/	8	R	1	FFK	+30 cab lights		
		Platform input		X7/9	9	H/N	1	FFK		X4/1	9	R-V	1	FFK	+15 joystick		
		Robot input		X7/10	10	A/B	1	FFK		X4/2	10	G-N	1	FFK	Signal - joystick		
		Man. lower output		X7/11	11	B	1	FFK		X4/3	11	N	1	FFK	GND		
		Weight A0		X8/5	12	Z-N	1	FFK		GND/		N	1	-	GND		
		Weight A1		X8/8	13	M-N	1	FFK		X80/1	12	G-V	1.5	FFK	Work light		
		Weight B0		X8/9	14	G-N	1	FFK		X4/4	13	C	0.5	FFK	Neutral pos. manip op.		
		Weight B1		X8/10	15	H-R	1	FFK									
		86 relay - basket full		X8/1	16	N-Z	1	FFK		X26/12	1	G-V	1.5	ffda	Work light	2-WAY CONN.	X80
		2nd heating speed		X5/3	17	M	1.5	FFK		GND/	2	N	1.5	ffda	GND	Work light	
																125007	
X4	4-WAY DT CONN.	+15 joystick		X26/9	1	R-V	1	DF									
	Joystick	Signal - joystick		X26/10	2	G-N	1	DF		X26/7	1	L-R	1	ffda	+15 rear windscreen wiper	2-WAY CONN.	X3
	125410 125411	GND		X26/11	3	N	1	DF		GND/	2	N	1	ffda	GND	Roof windshield	
		Neutral pos. manip op.		X26/13	4	C	0.5	DF								125007	
																wiper/washer	
X9	2-WAY 90° CONN.	Pump power supply		X26/5	1	A-B	1	ffda		X26/8		R	1	ff C	+30 cab lights		X2
	Pump	GND		GND/	-	N	1	ffda		GND/		N	1	ff C	GND	Cab lights	
	125018															000000	
X61	5-WAY MK CONN.	Light indicator - parking brake		X26/2	1	L-G	1	FFK		X26/6		G-V	1.5	ff C	+15 beacon		X1
	Connect	GND		GND/	2	N	1	FFK		GND/		N	1.5	ff	GND	Beacon	
	125209	+12 from outriggers		X26/3	3	B-G	1	FFK								000000	
	X61a	Transmission disconnected		X26/4	4	S-G	1	FFK									
					5					X25/7		N	1.5	C/C6.120028	GND	Ground point	GND
										X26/1		N	1.5	-	GND		
X5	4-WAY CONN.	GND		GND/	1	N	1.5	ffda		X26/		N	1	-	GND	000000	
	Heater motor				2					X1/		N	1.5	-	GND		
	125011	2nd heating speed		X25/17	3	M	1.5	ffda									
		1st heating speed		X25/2	4	C	1.5	ffda		X2/		N	1	C/C6.120028	GND		
										X3/2		N	1	-	GND		
X8	12-WAY DT CONN.	86 relay - basket full		X25/16	1	N-Z	1	DF		X9/_		N	1	-	GND		
	3B6				2			150100		X61/2		N	1	-	GND		
	125422 125423				3			150100									
					4			150100		X5/1		N	1.5	C/C6.120028	GND		
		Weight A0		X25/12	5	Z-N	1	DF		X7/7		N	1.5	-	GND		
					6			150100		X80/2		N	1.5	-	GND		
					7			150100									
		Weight A1		X25/13	8	M-N	1	DF		X61a/1		L-G	1	ff C	Connect in pos. 4 NO		S6
		Weight B0		X25/14	9	G-N	1	DF		X61a/2		N	1	ff C	Connect in pos. 1 com.	Parking brake	
		Weight B1		X25/15	10	H-R	1	DF								000000	
					11			150100									
					12			150100									
										X61a/3		B-G	1	ff C	Connect in pos. 1 com.		S7
X7	12-WAY DT CONN.	Signal - overload warning system		X25/1	1	B-N	1	DF		X61a/4		S-G	1	ff C	Connect in pos. 2 NC	Parking brake	
	3B6				2			150100								000000	
	125422 125423	Signal - boom up		X25/3	3	B/V	1	DF									
		Signal - boom down		X25/4	4	C-L	1	DF									
		Signal - outriggers		X25/5	5	L/R	1	DF									
		3B6 power supply		X25/6	6	R-N	1.5	DF									
		GND		GND/	7	N	1.5	DF									
		Carriages aligned		X25/8	8	M-B	1	DF									
		Platform input		X25/9	9	H/N	1	DF									
		Robot input		X25/10	10	A/B	1	DF									
		Man. lower output		X25/11	11	B	1	DF									
					12			150100									
X61a	5-WAY MK CONN.	Connect in pos. 4 NO		S6/	1	L-G	1	FMK									
	Connect to	Connect in pos. 1 com.		S6/	2	N	1	FMK									
	125216	Connect in pos. 1 com.		S7/	3	B-G	1	FMK									
	X61	Connect in pos. 2 NC		S7/	4	S-G	1	FMK									
					5												

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Operation: Right dashboard tree-based scheme - Girolift 3514-3518
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Table: **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE NR.	N.	REF.	P.	COL.	SEC.	TERMIN.
X20	17-WAY MK CONN.	RIGHT TURN SIGNAL		S16/1	1	A	1	FFK
	FROM DRIV.PLACE LINE	LEFT TURN SIGNAL		S16/3	2	L	1	FFK
	125214	49		S16/5	3	A-N	1	FFK
		+SWITCH - EMERGENCY PUMP		S17/5	4	L-N	1	FFK
		EMERGENCY PUMP		S17/1	5	L-G	1	FFK
		+SWITCH - FOG LAMP		S18/5	6	H/N	1	FFK
		FOG LAMP		S18/1	7	H-L	1	FFK
		+ SWITCH - LIGHTS		S19/2	8	B-R	1.5	FFK
		INSTRUMENTS LIGHTING		P1/2	9	G	1	FFK
		POS. LIGHTS FUSE POWER SUPPLY		S19/6	10	B	1.5	FFK
		POWER SUPPLY: LIGHTS SWITCH		S19/1	11	H-G	1.5	FFK
		+SWITCH - HEATHER		S20/3	12	A-R	1.5	FFK
		1st SPEED		S20/5	13	C	1.5	FFK
		2nd SPEED		S20/1	14	M	1.5	FFK
					15			
		WORK LIGHTS RELAY ACTIV.		S21/1	16	L/G	1	FFK
		INSTRUMENTS LIGHTING		P2/2	17	G	1 ┐	FFK
		INSTRUMENTS LIGHTING		P3/5		G	1 ┘	-
P1	6-WAY CONN. - INSTRUMENTS	GND		P4/	1	N	1	120467
	ENGINE WATER TEMP. GAUGE	INSTRUMENTS LIGHTING		X20/9	2	G	1	120467
	124220	H2O temp. signal		X19/2	3	H-L	1	120467
		Light indicator - MAX H2O temp.		X19/6	4	H/R	1	120467
					5			
		+15 instruments		X19/1	6	B-R	1	120467
P2	6-WAY CONN. - INSTRUMENTS	GND		P4/	1	N	1	120467
	HYDRAULIC OIL TEMP.	INSTRUMENTS LIGHTING		X20/17	2	G	1	120467
	124220	HYDRAULIC OIL TEMPERATURE INDICATOR		X19/3	3	H/N	1	120467
					4			
					5			
		+15 LIGHT SWITCH		A/	6	B-R	1	120467
P3	6-WAY CONN. - INSTRUMENTS	+15 LIGHT SWITCH		A/	1	B-R	1	120467
	FUEL GAUGE				2			
	124220	Light indicator - Fuel reserve		X19/5	3	Z/N	1	120467
		Fuel gauge		X19/4	4	Z-N	1	120467
		INSTRUMENTS LIGHTING		X20/17	5	G	1	120467
		GND		S22/	6	N	1	120467
P4		D+ alternator		X19/13	+	H	1	ff C
	HOUR-METER	GND		X19/12	-	N	1 ┐	FF C
	000000	GND		P1/1		N	1 ┐	-
		GND		P2/1		N	1 ┘	-
S18	8-WAY CONN.	FOG LAMP		X20/7	1	H-L	1	ffda
	FOG LAMP SWITCH				2			
	125056				3			
					4			
		+SWITCH - FOG LAMP		X20/6	5	H/N	1	ffda
					6			
					7			
					8			
H18	2-WAY CONN.	GND		X19/	1	N	1 ┐	120272
	LIGHT INDICATOR - FOG LAMP	GND		H19/1		N	1 ┘	-
	125374	+15 LIGHT SWITCH		X19/	2	B-R	1 ┐	120272
		+15 LIGHT SWITCH		H19/2		B-R	1 ┘	-
S19	8-WAY CONN.	POWER SUPPLY: LIGHTS SWITCH		X20/11	1	H-G	1.5	ffda
	LIGHTS SWITCH	+ LIGHTS SWITCH		X20/8	2	B-R	1.5	ffda
	125056	POWER SUPPLY: FW/REV SEL.& WARNING		X19/19	3	H-L	1.5 ┐	ffda
		Emergency lights switch +15		S16/8		L/R	1 ┘	-
					4			
					5			
		POS. LIGHTS FUSE POWER SUPPLY		X20/10	6	B	1.5	ffda
					7			
					8			
H19	2-WAY CONN.	GND		H18/1	1	N	1 ┐	120272
	LIGHT INDICATOR - LIGHTS	GND		H20/1		N	1 ┘	-
	125374	+15 LIGHT SWITCH		H18/2	2	B-R	1 ┐	120272
		+15 LIGHT SWITCH		H20/2		B-R	1 ┘	-

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE NR.	CONNECTOR	UNIT
	P1/6	1	B-R	1 ┐	FFK	+15 INSTRUMENTS	21-WAY MK CONN.	X19
	H18/2		B-R	1 ┘	-	+15 LIGHT SWITCH	FROM DRIV.PLACE LINE	
	P1/3	2	H-L	1	FFK	H2O temp. signal	125215	
	P2/3	3	H/N	1	FFK	HYDRAULIC OIL TEMPERATURE INDICATOR		
	P3/4	4	Z-N	1	FFK	Fuel gauge		
	P3/3	5	Z/N	1	FFK	Light indicator - Fuel reserve		
	P1/4	6	H/R	1	FFK	Light indicator -MAX H2O temp.		
		7						
	S22/A	8	V	1.5	FFK	+15 Steering selector		
	S22/E	9	L-G	1	FFK	Light indicator - rear steering axle aligned		
	S22/C	10	H-R	1.5	FFK	Four-wheel steer		
	S22/B	11	C-N	1.5	FFK	Crab steer		
	P4/-	12	N	1 ┐	FFK	GND		
	H18/1		N	1 ┘	-	GND		
	P4/+	13	H	1	FFK	D+ alternator		
	S14/5	14	C-R	1	FFK	+15 Switch - speed change		
	S14/1	15	G-R	1	FFK	Mechanical speed output		
	H14/1	16	A/R	1	FFK	Light indicator - 2nd mechanical speed		
	S15/5	17	C-B	1.5	FFK	Differential switch +15		
	S15/1	18	C-B	1	FFK	Power supply: differential locking solenoid valve		
	S19/3	19	H-L	1.5	FFK	POWER SUPPLY: FW/REV. SELECTOR & WARNING		
	S16/2	20	R	1	FFK	+30 switch - light indicators		
	S16/4	21	A-R	1	FFK	FLASHING POWER SUPPLY		
	H17/		B-R	1 ┐	FFC	+15 LIGHT SWITCH		A
	P2/6		B-R	1 ├	-	+15 LIGHT SWITCH		
	P3/1		B-R	1 ├	-	+15 LIGHT SWITCH	000000	
	S21/5		G/R	1 ┘	-	+SWITCH - WORK LIGHT		
						WIRE INSERTION SIDE		
	X19/8	A	V	1.5	120272	+15 Steering selector	MERIT CONN.125128	S22
	X19/11	B	C-N	1.5	120272	Crab steer	STEERING SELECTOR	
	X19/10	C	H-R	1.5	120272	Four-wheel steer	125128	
		D						
	X19/9	E	L-G	1	120272	Light indicator - rear steering axle aligned		
	H17/1	F	N	1 ┐	120272	GND		
	P3/6		N	1 ┘	-	GND		
	X20/5	1	L-G	1	ffda	EMERGENCY PUMP	8-WAY CONN.	S17
		2					SWITCH - EMERGENCY PUMP	
		3					125056	
		4						
	X20/4	5	L-N	1	ffda	+SWITCH - EMERGENCY PUMP		
		6						
		7						
		8						
	H16/	1	N	1 ┐	120272	GND	2-WAY CONN.	H17
	S22/F		N	1 ┘	-	GND	LIGHT INDICATOR -	
	H15/2	2	B-R	1 ┐	120272	+15 SW LAMP	125374	
	A/		B-R	1 ┘	-	+15 SW LAMP	EMERGENCY PUMP	
	X20/1	1	A	1	ffda	RIGHT TURN SIGNAL	8-WAY CONN.	S16
	X19/20	2	R	1	ffda	Light indicators switch +30	SWITCH - LIGHT	
	X20/2	3	L	1	ffda	LEFT TURN SIGNAL	125056	
	X19/21	4	A-R	1 ┐	ffda	FLASHING POWER SUPPLY	INDICATORS	
	S16/6		A-R	1 ┘	-	FLASHING POWER SUPPLY		
	X20/3	5	A-N	1	ffda	49		
	S16/4	6	A-R	1	ffda	FLASHING POWER SUPPLY		
	S16/8	7	L/R	1	ffda	Light indicator bridge		
	S19/	8	L/R	1 ┐	ffda	Light indicators switch +15		
	S16/7		L/R	1 ┘	-	Light indicator bridge		
	H15/1		N	1 ┐	ff C	GND		H16
	H17/1		N	1 ┘	-	GND	LIGHT INDICATOR - WARNING LIGHTS	
							000000	

Operation:	Right dashboard tree-based scheme - Girolift 3514-3518 Page 2 of 2	*Table:* **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
(S20)	8-WAY CONN.	2nd SPEED		X20/14	1	M	1.5	ffda		X19/18	1	C-B	1	ffda	Power supply: differential locking solenoid valve	8-WAY CONN.	(S15)
	SWITCH - HEATER				2						2					SWITCH - DIFFERENTIAL LOCKING	
	125056	+SWITCH - HEATER		X20/12	3	A-R	1.5	ffda			3					125056	
					4						4						
		1st SPEED		X20/13	5	C	1.5	ffda		X19/17	5	C-B	1.5	ffda	+15 Switch differential		
					6						6						
					7						7						
					8						8						
(H20)	2-WAY CONN.	GND		H19/1	1	N	1	120272		H14/2	1	N	1	120272	GND	2-WAY CONN.	(H15)
	LIGHT INDICATOR - HEATER	GND		H21/1		N	1	-		H16/		N	1	-	GND	LIGHT INDICATOR -	
	125374	+15 LIGHT SWITCH		H19/2	2	B-R	1	120272		H21/2	2	B-R	1	120272	+15 LIGHT SWITCH	125374	
		+15 LIGHT SWITCH		H21/2		B-R	1	-		H17/2		B-R	1	-	+15 LIGHT SWITCH	DIFFERENTIAL LOCKING	
(S21)	8-WAY CONN.	WORK LIGHTS RELAY ACTIVATION		X20/16	1	L/G	1	ffda		X19/15	1	G-R	1	ffda	Mechanical gear ouput	8-WAY CONN.	(S14)
	SWITCH - WORK				2						2					SWITCH - SPEED CHANGE	
	125056				3						3					125056	
	LIGHTS (OPTIONAL)				4						4						
		+SWITCH - WORK LIGHTS		A/	5	G/R	1	ffda		X19/14	5	C-R	1	ffda	+15 Switch - speed change		
					6						6						
					7						7						
					8						8						
(H21)	2-WAY CONN.	GND		H20/1	1	N	1	120272		X19/16	1	A/R	1	120272	Light indicator - 2nd mechanical speed	2-WAY CONN.	(H14)
	LIGHT INDICATOR - WORK	GND		H14/2		N	1	-		H21/1	2	N	1	120272	GND	LIGHT INDICATOR -	
	125374	+15 LIGHT SWITCH		H20/2	2	B-R	1	120272		H15/1		N	1	-	GND	125374	
	LIGHTS (OPTIONAL)	+15 LIGHT SWITCH		H15/2		B-R	1	-								SPEED CHANGE	

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Operation: Left dashboard tree-based scheme - Girolift 3514-3518

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Table: **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
GND1	18-WAY JOINT CONN.	GND		X13/6	1	N	1.5	120171		X6/17	1	H-R	1.5	DM	SOLENOID VALVE - REAR STEERING AXLE LOCKED	40-WAY DT CONN.	X21
	GND	GND		X3/7	2	N	1	120171		GND1/7	2	N	1.5	DM	GND	JOINT LINE	
	125741 125742	GND		X2/10	3	N	1	120171		GND1/11	3	N	1.5	DM	GND	125481	
		GND		X19/12	4	N	1.5	120171		GND1/8	4	N	1.5	DM	GND		
		GND		X25/7	5	N	1.5	120171			5			150100			
		GND		X26/1	6	N	1.5	120171			6			150100			
		GND		X21/2	7	N	1.5	120097			7			150100			
		GND		X21/4	8	N	1.5	120097			8			150100			
		GND		X10/1	9	N	1.5	120097			9			150100			
		GND		XJ3B/18	10	N	1.5	120097		X19/16	10	A/R	1	DM	MECH. SPEED LIGHT INDICATOR		
		GND		X21/3	11	N	1.5	120171		X16/13	11	A-B	1	DM	SENSOR - CARDAN SHAFT		
		GND		X23/C	12	N	1.5	120171		XJ4/20	12	Z-B	1	DM	SENSOR - SLEWRING BLOCKED		
		GND		X28/14	13	N	1.5	120171		X5/	13	R-V	1	DM	+SENSOR		
		GND		X28/19	14	N	1.5	120171		X25/5	14	L/R	1	DM	Signal - outriggers		
		GND		X29/24	15	N	1.5	120171		X26/3	15	B-G	1	DM	+Stab. for declutch		
		GND		X29/23	16	N	1.5	120171		X19/9	16	L-G	1	DM	REAR STEERING AXLE ALIGNED		
					17					X16/10	17	C-V	1.5	DM	SOLENOID VALVE - POWER DISPLACEMENT CHANGE		
		GND		X26/11	18	N	1	120171		X19/11	18	C-N	1.5	DM	CRAB STEER		
										X19/10	19	H-R	1.5	DM	FOUR-WHEEL STEER		
GND2		GND		H7/		N	1	C/C8.120022		X16/6	20	M-B	1.5	DM	SOLENOID VALVE - 1ST MECHANICAL SPEED		
	GND	GND		X27/4		N	1.5	-		X16/7	21	B-N	1.5	DM	SOLENOID VALVE - 2ND MECHANICAL SPEED		
		GND		X18/8		N	1	C/C8.120022		X19/18	22	C-B	1.5	DM	SOLENOID VALVE - DIFFERENTIAL LOCKING		
		GND		H9/2		N	1	-		XJ4/19	23	C/N	1	DM	SOLENOID VALVE - SWAY Y5		
										XJ4/18	24	G/R	1	DM	SOLENOID VALVE - SWAY Y10		
X26	13-WAY MK CONN.	GND		GND1/6	1	N	1.5	FMK		Sal3/	25	C-L	1	DM	SIGNAL - BOOM DOWN		
	To side line	LIGHT INDICATOR - PARKING BRAKE		X1/1	2	L-G	1	FMK		X3/6	26	V-Z	1	DM	AXLE BLOCKED		
	125220	+Stab. for declutch		X21/15	3	B-G	1	FMK		XJ4/17	27	S/N	1	DM	OUTRIGGER RELAY SWITCHING		
		TRANSMISSION DISCONNECTED		X16/8	4	S-G	1	FMK		XJ4/9	28	V/B	1	DM	SOLENOID VALVE - LEFT OUTRIGGER OUT		
		PUMP		X11/7	5	A-B	1	FMK		XJ4/10	29	C/B	1	DM	SOLENOID VALVE - LEFT OUTRIGGER IN		
		+ BEACON		X9/5	6	G-V	1.5	FMK		XJ4/11	30	M-N	1	DM	SOLENOID VALVE - RIGHT OUTRIGGER OUT		
		+15 REAR WINDSCREEN WIPER		X9/6	7	L-R	1	FMK		XJ4/12	31	A-B	1	DM	SOLENOID VALVE - RIGHT OUTRIGGER IN		
		+12 CAB INTERIOR LIGHTS		X8/5	8	R	1	FMK		XJ4/13	32	B/N	1	DM	SOLENOID VALVE - LEFT OUTRIGGER UP		
		OPTIONAL MANIP. POWER SUPPLY		Sal6/	9	R-V	1	FMK		XJ4/14	33	V/N	1	DM	SOLENOID VALVE - LEFT OUTRIGGER DOWN		
		OPTIONAL MANIP. SIGNAL		XJ3B/5	10	G/N	1	FMK		XJ4/15	34	Z/B	1	DM	SOLENOID VALVE - RIGHT OUTRIGGER UP		
		GND		GND1/18	11	N	1	FMK		XJ4/16	35	A/R	1	DM	SOLENOID VALVE - RIGHT OUTRIGGER DOWN		
		WORK LIGHT POWER SUPPLY		X17/2	12	G-V	1.5	FMK			36			150100			
		Neutral pos. manip.		XJP3/1	13	C	0.5	FMK			37			150100			
											38			150100			
X25	7-WAY MK CONN.	SIGNAL - OVERLOAD WARNING SYSTEM		X18/10	1	B-N	1	FMK			39			150100			
	To cab line	1st HEATING SPEED		X20/13	2	C	1.5	FMK			40			150100			
	125221	SENSOR - BOOM UP		XJ3/10	3	B/V	1	FMK									
		SENSOR - BOOM DOWN		Sal3/	4	C-L	1	FMK		Sal6/	1	R-V	1	DM	SENSOR POWER SUPPLY	24-WAY DT CONN.	X27
		Signal - outriggers		X21/14	5	L/R	1	FMK		X25/	2	M-B	1	DM	CARRIAGES ALIGNED	Upper carriage line	
		3B6 POWER SUPPLY		X5/6	6	R-N	1.5	FMK		X19/4	3	Z/N	1	DM	COMB. LEVEL INSTRUMENT	125456	
		GND		GND1/5	7	N	1.5	FMK		GND2/	4	N	1.5	DM	GND		
		CARRIAGES ALIGNED		X3/11	8	M-B	1	FMK		X5/7	5	G-N	1	DM	REAR LEFT POSITION LIGHTS		
		CARRIAGES ALIGNED		X27/2		M-B	1	-		SALD4/	6	L	1	DM	LEFT TURN SIGNAL		
		Platform input		X36C/	9	M-N	1	FMK		X17/12	7	H	1.5	DM	RIGHT LOW BEAM		
		ROBOT		XJP3/2	10	A/B	1	FMK		X17/5	8	V	1.5	DM	RIGHT HIGH BEAM		
		ROBOT		X28/8		A/B	1	-		X1/4	9	H-L	1	DM	LIGHT INDICATOR - HYDRAULIC OIL FILTER		
		MAN. LOWER OUTPUT		X47/	11	B	1	FMK		Sal3/	10	C-L	1	DM	SENSOR - BOOM DOWN		
		WEIGHT A0		X28/21	12	Z-N	1	FMK		SALD5/	11	A	1	DM	RIGHT TURN SIGNAL		
		WEIGHT A1		X28/22	13	M-N	1	FMK		X20/7	12	H-L	1	DM	FOG LAMP		
		WEIGHT B0		X28/23	14	G-N	1	FMK		X17/1	13	G-N	1.5	DM	WORK LIGHT		
		WEIGHT B1		X28/24	15	H-R	1	FMK		X17/6	14	Z	1.5	DM	HORN		
		86 RELAY - BASKET FULL		X18/9	16	N-Z	1	FMK		X9/4	15	R	1	DM	+15 SWITCH - STOP LIGHT		
		2nd HEATING SPEED		X20/14	17	M	1.5	FMK		X19/5	16	Z-N	1	DM	LIGHT INDICATOR - RESERVE		
										X2/11	17	H-R	1	DM	LIGHT INDICATOR - BRAKE OIL PRESS.		
SALD4		LEFT TURN SIGNAL		X11/9		L	1	-		X5/1	18	G	1	DM	FRONT RIGHT POSITION LIGHTS		
	WELDING	LEFT TURN SIGNAL		X27/6		L	1	-		XJ3/7	19	A-N	1	DM	SENSOR - BOOM UP		
	+ 900001	LEFT TURN SIGNAL		X10/5		L	1	-		X19/3	20	H/N	1	DM	OIL TEMP. INSTRUMENT		
		LEFT TURN SIGNAL		X20/2		L	1	-		X6/2	21	S/N	1	DM	+12 STEER ACCUM. SOLENOID VALVE		
										X20/	22	L-G	1	DM	EMERGENCY PUMP		
SALD5		RIGHT TURN SIGNAL		X11/10		A	1	-		X16/3	23	B	1	DM	BACK-UP HORN		
	WELDING	RIGHT TURN SIGNAL		X27/11		A	1	-		SALD5/	24	A	1	DM	RIGHT TURN SIGNAL		
	+ 900001	RIGHT TURN SIGNAL		X27/24		A	1	-									
		RIGHT TURN SIGNAL		X20/1		A	1	-									

Operation: Left dashboard tree-based scheme - Girolift 3514-3518
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Table: **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.
X20	17-WAY MK CONN.	RIGHT TURN SIGNAL		SALD5/	1	A	1	FMK
	FRONT DASHBOARD	LEFT TURN SIGNAL		SALD4/	2	L	1	FMK
	125196	49 LIGHTS SWITCH		X11/11	3	A-N	1	FMK
		49		X9/13		A-N	1	-
		POWER SUPPLY: EMERGENCY PUMP SWITCH		X6/4	4	L-N	1	FMK
		+SWITCH EMERGENCY PUMP		X28/12	5	L-G	1	FMK
		EMERGENCY PUMP		X27/22		L-G	1	-
		+SWITCH - FOG LAMP		X17/10	6	H/N	1	FMK
		FOG LAMP		X27/12	7	H-L	1	FMK
		+SWITCH - POSITION LIGHTS		X8/3	8	B-R	1.5	FMK
		INSTRUMENTS LIGHT INDICATOR		X20/17	9	G	1	FMK
		POS. LIGHTS FUSE POWER SUPPLY		X5/2	10	B	1.5	FMK
		POWER SUPPLY: LIGHTS SWITCH		X11/4	11	H-G	1.5	FMK
		+15 SWITCH - HEATER		S7/	12	A-R	1.5	FMK
		1st HEATING SPEED		X25/2	13	C	1.5	FMK
		2nd HEATING SPEED		X25/17	14	M	1.5	FMK
					15			
		WORK LIGHTS SW OUPUT		X17/7	16	L/G	1	FMK
		INSTRUMENTS LIGHT INDICATOR		X5/11	17	G	1	FMK
		INSTRUMENTS LIGHT INDICATOR		X20/9		G	1	-
X19	21-WAY MK CONN.	LIGHT INDICATOR POWER SUPPLY		X2/4	1	B-R	1	FMK
	FRONT DASHBOARD	INSTRUMENTS POWER SUPPLY		X9/		B-R	1	-
	125197	WATER TEMP. INSTRUMENT		X29/5	2	H-L	1	FMK
		OIL TEMP. INSTRUMENT		X27/20	3	H/N	1	FMK
		COMB. LEVEL INSTRUMENT		X27/3	4	Z/N	1	FMK
		LIGHT INDIC. - RESERVE		X27/16	5	Z-N	1	FMK
		LIGHT INDIC. - MAX WATER TEMP.		X29/6	6	H/R	1	FMK
		LIGHT INDIC. - MAX WATER TEMP.		X1/8		H/R	1	-
					7			
		POWER SUPPLY: STEERING SELECTOR		X36B/	8	V	1.5	FMK
		REAR STEERING AXLE ALIGNED		X21/16	9	L-G	1	FMK
		FOUR-WHEEL STEER		X21/19	10	H-R	1.5	FMK
		CRAB STEER		X21/18	11	C-N	1.5	FMK
		GND		GND1/4	12	N	1.5	FMK
		LIGHT INDICATOR - GENERATOR		X1/3	13	H	1	FMK
		D+		X29/7		H	1	-
		+SW - GEARBOX		X16/	14	C-R	1	FMK
		MECHANICAL SPEED		X17/17	15	G-R	1	FMK
		MECHANICAL SPEED LIGHT INDICATOR		X21/10	16	A/R	1	FMK
		+SWITCH - DIFFERENTIAL LOCKING		X36E/	17	C-B	1.5	FMK
		SOLENOID VALVE - DIFFERENTIAL LOCKING		X21/22	18	C-B	1.5	FMK
		+15 SWITCH - WARNING LIGHTS		X9/10	19	H-L	1.5	FMK
		+30 SWITCH - WARNING LIGHTS		X8/4	20	R	1	FMK
		FLASHING POWER SUPPLY		X9/12	21	A-R	1	FMK
X1	8-WAY CONN.	INDICATOR LIGHT - PARKING BRAKE		X26/2	1	L-G	1	120171
	W.LIGHTS CONNECTOR	LIGHT INDICATOR - PRE-HEATING		S12/8	2	S	1	120171
	125678	LIGHT INDICATOR - GENERATOR		X19/13	3	H	1	120171
		LIGHT INDICATOR - HYDRAULIC OIL FILTER		X27/9	4	H-L	1	120171
		LIGHT INDICATOR - AIR FILTER		X29/1	5	A-G	1	120171
		LIGHT INDICATOR POWER SUPPLY		H7/	6	B-R	1	120171
		LIGHT INDICATOR - ENGINE OIL		X29/4	7	H-N	1	120171
		LIGHT INDIC. - MAX WATER TEMP.		X19/	8	H/R	1	120171
X2	12-WAY CONN.				1			
	W.LIGHTS CONNECTOR				2			
	125646				3			
		LIGHT INDICATOR POWER SUPPLY		X19/1	4	B-R	1	120171
					5			
					6			
		LIGHT INDICATOR - POSITION LIGHTS		X5/8	7	G-N	1	120171
		LIGHT INDICATOR - TURN SIGNAL		X9/7	8	S/N	1	120171
		LIGHT INDICATOR - HIGH BEAM		X17/13	9	V	1	120171
		GND		GND1/3	10	N	1	120171
		LIGHT INDICATOR - BRAKE OIL PRESS.		X27/17	11	H-R	1	120171
					12			
S11	MERIT CONN.125121	+30 START-UP PANEL		X30/B	1	R	6	FFDAG
	START-UP PANEL	+30 RELAY CARD		J3/	2	R	6	FFDAG
	125121				3			+120019
	+ 109045				4			+120019

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
	XJP2/1	1	A-N	1	DM	SIGNAL - BOOM UP/DOWN	DT CONN. 125454	X28
	XJP2/2	2	L-R	1	DM	SIGNAL - TURRET ROTATION	PLATFORM LINE	
	XJP2/3	3	L-B	1	DM	SIGNAL - BOOM OUT/IN	125454	
	XJP2/4	4	V	1	DM	+12 JOYSTICK IN MOTION		
	X4/6	5	V-B	1	DM	PLATFORM ENABLED		
	XJP2/6	6	B-R	1	DM	ROBOT POWER SUPPLY		
	XJP2/8	7	B-N	1	DM	SENSOR - FORKS COUPLED		
	X25/	8	A/B	1	DM	ROBOT		
	X8/2	9	R-N	1.5	DM	BASKET POWER SUPPLY		
	X6/11	10	M	1	DM	BASKET EMERG.BUTTON POWER SUPPLY		
	X17/9	11	C	1	DM	START FROM BASKET		
	X20/5	12	L-G	1	DM	+SWITCH EMERGENCY PUMP		
	X18/1	13	G-R	1	DM	PLATFORM POTENT. POWER SUPPLY		
	GND1/13	14	N	1.5	DM	GND		
	X17/14	15	Z	1	DM	HORN		
	X4/1	16	A-V	1	DM	+12 OVERLOAD WARN SYSTEM. INPUT		
	X35/5	17	A-G	1	DM	+12V MIXING BUCKET		
	X35/3	18	H-L	1	DM	MIXING BUCKET ACTIVATION		
	GND1/14	19	N	1.5	DM	GND		
	X35/6	20	Z-B	1	DM	+ AUX BUCKET		
	X25/12	21	Z-N	1	DM	WEIGHT A0		
	X25/13	22	M-N	1	DM	WEIGHT A1		
	X25/14	23	G-N	1	DM	WEIGHT B0		
	X25/15	24	H-R	1	DM	WEIGHT B1		
	X1/5	1	A-G	1	DM	LIGHT INDICATOR - AIR FILTER	DT CONN. 125452	X29
	X16/11	2	V-N	1	DM	SOLENOID VALVE - FORWARD SPEED	ENGINE LINE	
	X16/9	3	M-V	1	DM	SOLENOID VALVE - REVERSE SPEED	125452	
	X1/7	4	H-N	1	DM	LIGHT INDICATOR - ENGINE OIL		
	X19/2	5	H-L	1	DM	WATER TEMP. INSTRUMENT		
	X19/6	6	H/R	1	DM	LIGHT INDIC. - MAX WATER TEMP.		
	X19/	7	H	1	DM	D+		
	X6/14	8	M	1.5	DM	ELECTROSTOP		
	X17/8	9	C-B	1	DM	START-UP ENABLING COMMAND		
	S12/8	10	S	1	DM	19 PRE-HEATING		
	S7/1	11	B-R	1.5	DM	OPTIONAL A/C		
		12			150100			
		13			150100			
		14			150100			
		15			150100			
		16			150100			
		17			150100			
		18			150100			
		19			150100			
		20			150100			
		21			150100			
		22			150100			
	GND1/16	23	N	1.5	DM	GND		
	GND1/15	24	N	1.5	DM	GND		
	J1/	A	R	10	120221	30 RELAY - AUX CIRCUITS	2-WAY CONN.	X30
	S11/1	B	R	6	120221	+30 START-UP PANEL	DIRECT POWER SUPPLY	
						COVER THE CLAMPED PART OF THE	125377	
						TERMINALS WITH THERM.-INS. TUBE		
	S5/7	A	B-G	1	DM	SOLENOID VALVE - SLEWRING LOCKED Y2	3-WAY DT CONN.	X23
	S5/1	B	S-G	1	DM	SOLENOID VALVE - SLEWRING LOCKED Y2	DANFOSS LINE	
	GND1/12	C	N	1.5	DM	GND	125428 125405	
	XJP4/1	1	L/R	1	DM	+SOLENOID VALVE - BOOM OUT/IN	12-WAY DT CONN.	X22
	XJP4/3	2	M-N	1	DM	+SOLENOID VALVE - FORKS/OUTRIGGERS	DANFOSS LINE	
	XJP4/4	3	B-N	1	DM	+SOLENOID VALVE - TURRET ROTATION	125474 125421	
	XJP4/2	4	A-G	1	DM	+SOLENOID VALVE - BOOM UP/DOWN		
	X18/13	5	G-R	1	DM	SIGNAL - ATTACHMENT LOCKED/UNLOCKED		
	X18/11	6	M-B	1	DM	SIGNAL - BOOM OUT/IN		
	XJ4/2	7	A/G	1	DM	ATTACHMENT LOCKED/UNLOCKED		
	X18/4	8	L-G	1	DM	SIGNAL - TURRET ROTATION		
	X18/7	9	A-V	1	DM	SIGNAL - BOOM UP/DOWN		
	XJ4/6	10	Z-N	1	DM	+SOLENOID VALVE - SWITCHING		
	X35/2	11	L-B	1	DM	ATTACHMENT LOCKED/UNLOCKED		
		12			150100			

Operation: Left dashboard tree-based scheme - Girolift 3514-3518

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Table: **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.
S12	MERIT CONN.125122	+15 RELAY CARD		J2/	5	A	6	120272
	START-UP PANEL				6			+ 120272
	125122	50 START-UP PANEL		X17/	7	C	1	120272
		19 PRE-HEATING		X29/10	8	S	1	120272
		Light indicator - pre-heating		X1/2		S	1	-
					9			+ 120272
		58 START-UP PANEL		X8/1	10	R	1.5	120272
S10		SIGNAL - OVERLOAD WARNING SYSTEM		X18/3		B-N	1	101022
	Overload cutout	SIGNAL - OVERLOAD WARNING SYSTEM		XJ3/8		B-N	1	-
	000000	+OVERLOAD CUTOUT SWITCH		X5/		R-N	1	101047
	switch							
	+ 106278							
	+ 106269							
X12	5-WAY MK CONN.	+SPEED SWITCH		SALD2/	1	C-R	1	FFK
	SPEED SWITCH	2nd HYDRAULIC SPEED		X16/5	2	Z-B	1	FFK
	125209	REVERSE SPEED		X16/12	3	H-V	1	FFK
		FORWARD SPEED		X16/2	4	V/N	1	FFK
		+SPEED SWITCH		SALD2/	5	C-R	1	FFK
X11	13-WAY MK CONN.	+15 WIPER SWITCH		X9/1	1	L/N	1	FFK
	LIGHTS SWITCH	53 (1st SPEED)		X13/2	2	A	1	FFK
	125213	HIGH BEAM COMMON		X17/16	3	V-B	1	FFK
		POWER SUPPLY - LIGHTS SWITCH		X20/11	4	H-G	1.5	FFK
		LOW BEAM COMMON SWITCH		X17/15	5	H-B	1	FFK
		31/B ENGINE		X13/1	6	A/B	1	FFK
		PUMP		X26/5	7	A-B	1	FFK
		53/B (2nd SPEED)		X13/4	8	H	1	FFK
		LEFT TURN SIGNAL		SALD4/	9	L	1	FFK
		RIGHT TURN SIGNAL		SALD5/	10	A	1	FFK
		49 LIGHTS SWITCH		X20/3	11	A-N	1	FFK
					12			
		HORN		X17/14	13	Z	1	FFK
X13	6-WAY CONN.	31/B ENGINE		X11/6	1	A/B	1	ffda
	WIPER MOTOR	53 (1st SPEED)		X11/2	2	A	1	ffda
	125015	+15 FRONT WIPER		X9/8	3	L/N	1	ffda
		53/B (2nd SPEED)		X11/8	4	H	1	ffda
					5			
		GND		GND1/1	6	N	1.5	ffda
X10		GND		GND1/9	1	N	1.5	DF
	FRONT LEFT LIGHT	LEFT LOW BEAM		X17/11	2	H	1.5	DF
		LEFT HIGH BEAM		X17/4	3	V	1.5	DF
	join	LIGHT INDICATOR - FRONT LEFT POS. LIGHTS		X5/5	4	G-N	1	DF
		LEFT TURN SIGNAL		SALD4/	5	L	1	DF
	+ 125414				6			150100
	+ 125415							
X9	13-WAY MK CONN.	+15 WIPER SWITCH		X11/1	1	L/N	1	FFK
	CONTROL UNIT				2			
	125213R	+SWITCH A/C SYSTEM		S7/5	3	A	1.5	FFK
		+15 SWITCH - STOP LIGHTS		X27/15	4	R	1	FFK
		+ BEACON		X26/6	5	G-V	1.5	FFK
		+15 REAR WIPER		X26/7	6	L-R	1	FFK
		LIGHT INDICATOR - TURN SIGNAL		X2/8	7	S/N	1	FFK
		+15 FRONT WIPER		X13/3	8	L/N	1	FFK
		LIGHT SWITCH POWER SUPPLY		H1/1	9	B-R	1	FFK
		INSTRUMENTS POWER SUPPLY		X19/		B-R	1	-
		+15 SWITCH - WARNING LIGHTS		X19/19	10	H-L	1.5	FFK
					11			
		FLASHING POWER SUPPLY		X19/21	12	A-R	1	FFK
		49		X20/	13	A-N	1	FFK
X8	5-WAY MK CONN.	58 START-UP PANEL		S12/10	1	R	1.5	FFK
	CONTROL UNIT	BASKET POWER SUPPLY		X28/9	2	R-N	1.5	FFK
	125209	+SWITCH - POSITION LIGHTS		X20/8	3	B-R	1.5	FFK
		+30 SWITCH - WARNING LIGHTS		X19/20	4	R	1	FFK
		+12 CAB INTERIOR LIGHTS		X26/8	5	R	1	FFK

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
	X27/10		C-L	1	-	SENSOR - BOOM DOWN		Sal3
	XJ3/9		C-L	1	-	SENSOR - BOOM DOWN	Welding	
	X21/25		C-L	1	-	SIGNAL - BOOM DOWN	000000	
	X25/4		C-L	1	-	SENSOR - BOOM DOWN	+ 900001	
	X26/9		R-V	1	-	OPTIONAL MANIP. POWER SUPPLY		Sal6
	X27/1		R-V	1	-	SENSOR POWER SUPPLY	Welding	
	X5/4		R-V	1	-	POWER SUPPLY: DANFOSS CONTROL UNIT	000000	
	XJ3B/7		R-V	1	-	SEAT SENSOR	+ 900001	
	XJ3B/14		R-V	1	-	SEAT SENSOR		
		1					12-WAY CONN.	X3
		2					FUNCTION W.LIGHTS	
	XJ3B/9	3	A	0.5	120171	LIGHT INDICATOR - FORK ROTATION	125646	
	XJ3/12	4	V	0.5	120171	LIGHT INDICATOR - BOOM OUT/IN		
	XJ3/11	5	S	0.5	120171	LIGHT INDICATOR - BOOM UP/DOWN		
	X21/26	6	V-Z	1	120171	AXLE BLOCKED		
	GND1/2	7	N	1	120171	GND		
	X15/1	8	R-V	1	120171	LIGHT INDICATOR POWER SUPPLY		
	XJ3B/12	9	C	0.5	120171	LIGHT INDICATOR - TURRET ROTATION		
	XJ3B/11	10	H	0.5	120171	LIGHT INDICATOR - ROTATION LOCKED		
	X25/8	11	M-B	1	120171	CARRIAGES ALIGNED		
	XJ3B/10	12	M	0.5	120171	LIGHT INDICATOR - FORKS COUPLED		
	X6/12		A/G	1	101047	+ CAB EMERG. BUTTON		S13
	X6/6		B/R	1	101047	CAB EMERG. BUTTON OUT	EMERGENCY MUSHROOM-HEAD PUSH-BUTTON	
							+ 106252	
							+ 106250	
	X19/17		C-B	1.5	101047	+SWITCH - DIFFERENTIAL LOCKING	WORK SELECTOR SWITCH	X36E
	X6/3		Z-N	1.5	101047	+15 SWITCH - DIFFERENTIAL LOCKING	+ 106269	
	XJ3/6		H/N	1	101022	PLATFORM INPUT	WORK SELECTOR SWITCH	X36D
	H9/1		H/N	1	-	LIGHT INDICATOR - BASKET ENABLED	+ 106277	
	X6/7		B-R	1.5	101022	WORK SELECTOR SWITCH		
	X36B/		B-R	1	-	WORK SELECTOR SWITCH	+ 106256	
	X19/8		V	1.5	101047	POWER SUPPLY: STEERING SELECTOR	WORK SELECTOR SWITCH	X36B
	X36D/		B-R	1	101022	WORK SELECTOR SWITCH	+ 106256	
	X36C/		B-R	1	-	WORK SELECTOR SWITCH		
	XJ3B/8		M-N	1	101022	JOBSITE INPUT	WORK SELECTOR SWITCH	X36C
	X25/9		M-N	1	-	3B6 PLATFORM INPUT	+ 106256	
	X36B/		B-R	1	101047	WORK SELECTOR SWITCH		
	X36D/	1	H/N	1	ffda	LIGHT INDICATOR - BASKET ENABLED	2-WAY CONN.	H9
	GND2/	2	N	1	ffda	GND	BASKET ENABLED	
							125007	
	X6/13		G-M	1	101047	ELECTROSTOP FROM JOBSITE		X36A
	X6/5		C-R	1	101047	+BASKET EMERG.BUTTON		
							WORK SELECTOR SWITCH	
							+ 106255	
	X18/	1	G-R	1	FFK	SIGNAL - ATTACHMENT LOCKED/UNLOCKED	7-WAY MK CONN.	X35
	X22/11	2	L-B	1	FFK	ATTACHMENT LOCKED/UNLOCKED	OPTIONAL PLATFORM	
	X28/18	3	H-L	1	FFK	MIXING BUCKET ACTIVATION	125210	
	XJ4/5	4	L/B	1	FFK	SIGNAL - ATTACHMENT LOCKED/UNLOCKED		
	X28/17	5	A-G	1	FFK	+12V MIXING BUCKET		
	X28/20	6	Z-B	1	FFK	+ AUX BUCKET		
		7						
		1					7-WAY MK CONN.	X35a
	X35a/4	2	B	1	FMK	Bridge	COUNTER-SCHEME	
		3					125217	
	X35a/2	4	B	1	FMK	Bridge		
		5						
		6						
		7						

Operation: Left dashboard tree-based scheme - Girolift 3514-3518

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Table: **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
X6	17-WAY MK CONN.				1					X29/11	1	B-R	1.5	ffda	OPTIONAL A/C	8-WAY CONN.	S7
	CONTROL UNIT	+12 STEER ACCUM. SOLENOID VALVE		X27/21	2	S/N	1	FFK			2					OPTIONAL A/C	
	125214G	+15 SWITCH - DIFFERENTIAL LOCKING		X36E/	3	Z-N	1.5	FFK			3					125056	
		POWER SUPPLY: EMERGENCY PUMP SWITCH		X20/4	4	L-N	1	FFK			4						
		+ BASKET EMERG.BUTTON		X36A/	5	C-R	1	FFK		X9/3	5	A	1.5	ffda	+SWITCH - A/C SYSTEM		
		CAB EMERG. BUTTON OUT		S13/	6	B/R	1	FFK		X20/12		A-R	1.5	-	+15 SWITCH - HEATER		
		WORK SELECTOR SWITCH		X36D/	7	B-R	1.5	FFK			6						
					8						7						
					9						8						
					10												
		BASKET EMERG.BUTTON POWER SUPPLY		X28/10	11	M	1	FFK		H6/	1	B-R	1	120272	LIGHT SWITCH POWER SUPPLY	2-WAY CONN.	H7
		+ CAB EMERG. BUTTON		S13/	12	A/G	1	FFK		X1/6		B-R	1	-	LIGHT INDICATOR POWER SUPPLY	light indicator	
		ELECTROSTOP FROM JOBSITE		X36A/	13	G-M	1	FFK		H6/	2	N	1	120272	LIGHT SWITCH GND	125374	
		ELECTROSTOP		X29/8	14	M	1.5	FFK		GND2/		N	1	-	GND		
					15												
					16					XJ3B/4	1	C/N	1	ffda	SWAY CONTROL PUSHBUTTON	8-WAY CONN.	S6
		SOLENOID VALVE - REAR STEERING AXLE LOCKED		X21/1	17	H-R	1.5	FFK			2					LEVELLING ACTIV.	
											3					125056	
X5	11-WAY MK CONN.	FRONT RIGHT POSITION LIGHT		X27/18	1	G	1	FFK			4						
	CONTROL UNIT	POS. LIGHTS FUSE POWER SUPPLY		X20/10	2	B	1.5	FFK		S5/	5	R-V	1	ffda	+ SWITCH - OUTRIGGERS		
	125212	POWER SUPPLY: DANFOSS CONTROL UNIT		X15/1	3	R-V	1	FFK			6						
		POWER SUPPLY: DANFOSS CONTROL UNIT		X15/2		R-V	1	-			7						
		POWER SUPPLY: DANFOSS CONTROL UNIT		Sal6/	4	R-V	1	FFK			8						
		LIGHT INDICATOR - FRONT LEFT POSITION LIGHT		X10/4	5	G-N	1	FFK									
		POWER SUPPLY: 3B6 CONTROL UNIT		X25/6	6	R-N	1.5	FFK		H5/	1	B-R	1	120272	LIGHT SWITCH POWER SUPPLY	2-WAY CONN.	H6
		+ OVERLOAD CUTOUT SWITCH		S10/		R-N	1	-		H7/1		B-R	1	-	LIGHT SWITCH POWER SUPPLY	light indicator	
		REAR LEFT POSITION LIGHT		X27/5	7	G-N	1	FFK		H5/	2	N	1	120272	LIGHT SWITCH GND	125374	
		LIGHT INDICATOR - POSITION LIGHT		X2/7	8	G-N	1	FFK		H7/2		N	1	-	LIGHT SWITCH GND		
		+ SWITCH - OUTRIGGERS		S1/3	9	R-V	1	FFK									
		+ SENSOR		X21/13		R-V	1	-		X23/B	1	S-G	1	ffda	SOLENOID VALVE - SLEWRING LOCKED Y2	8-WAY CONN.	S5
					10					X4/7		S-G	1	-	SLEWRING LOCKED/UNLOCKED	SLEWRING LOCK/UNCLOK.ACTIV.	
		INSTRUMENTS LIGHT INDICATOR		X20/17	11	G	1	FFK			2					125056	
										S2/	3	R-V	1	ffda	+ SWITCH - OUTRIGGERS		
X34	2-WAY 90° CONN.	86 RELAY - AUX CIRCUITS		X4/2	I	C	1	fplok		S6/5		R-V	1	-	+ SWITCH - OUTRIGGERS		
	RELAY - AUX CIRCUITS	85 RELAY - AUX CIRCUITS		X4/9	-	N-Z	1	fplok			4						
	125310										5						
											6						
	+ 157115									X23/A	7	B-G	1	ffda	SOLENOID VALVE - SLEWRING LOCKED Y2		
										X4/5		B-G	1	-	TO DANFOSS CONTROL UNIT		
X4	9-WAY MK CONN.	+12 OVERLAOD WARN.SYST. INPUT		X28/16	1	A-V	1	FFK			8						
	CONTROL UNIT	86 RELAY - AUX CIRCUITS		X34/I	2	C	1	FFK									
	125211				3					H2/	1	B-R	1	120272	LIGHT SWITCH POWER SUPPLY	2-WAY CONN.	H5
		SWITCH - SLEWRING LOCKED/UNLOCKED		XJ3B/6	4	G/R	1	FFK		H6/1		B-R	1	-	LIGHT SWITCH POWER SUPPLY	light indicator	
		TO DANFOSS CONTROL UNIT		S5/7	5	B-G	1	FFK		H2/	2	N	1	120272	LIGHT SWITCH GND	125374	
		PLATFORM ENABLED		X28/5	6	V-B	1	FFK		H6/2		N	1	-	LIGHT SWITCH GND		
		PLATFORM ENABLED		XJP2/5		V-B	1	-									
		SLEWRING LOCKED/UNLOCKED		S5/1	7	S-G	1	FFK		XJ3/1	1	M/N	1	ffda	FRONT LH FOOT	8-WAY CONN.	S2
					8						2					LEFT OUTRIGGER	
		85 RELAY - AUX CIRCUITS		X34/_	9	N-Z	1	FFK		S1/3	3	R-V	1	ffda	+ SWITCH - OUTRIGGERS	125056	
										S5/3		R-V	1	-	+ SWITCH - OUTRIGGERS		
X18	13-WAY MK CONN.	PLATFORM POTENT. POWER SUPPLY		X28/13	1	G-R	1	FFK			4						
	CONTROL UNIT	SIGNAL - TURRET ROTATION SOLENOID VALVE		XJ4/4	2	L/G	1	FFK			5						
	125213A	SIGNAL - OVERLOAD WARNING SYSTEM		S10/	3	B-N	1	FFK			6						
		SIGNAL - TURRET ROTATION		X22/8	4	L-G	1	FFK		XJ3/4	7	C-B	1	ffda	REAR LH FOOT		
		SIGNAL - BOOM OUT/IN		XJ4/1	5	M/B	1	FFK			8						
		SIGNAL - BOOM UP/DOWN		XJ4/3	6	A/V	1	FFK									
		SIGNAL - BOOM UP/DOWN		X22/9	7	A-V	1	FFK		H1/	1	B-R	1	120272	LIGHT SWITCH POWER SUPPLY	2-WAY CONN.	H2
		GND		GND2/	8	N	1	FFK		H5/1		B-R	1	-	LIGHT SWITCH POWER SUPPLY	light indicator	
		86 RELAY - BASKET FULL		X25/16	9	N-Z	1	FFK		H1/2	2	N	1	120272	LIGHT SWITCH GND	125374	
		SIGNAL - OVERLOAD WARNING SYSTEM		X25/1	10	B-N	1	FFK		H5/2		N	1	-	LIGHT SWITCH GND		
		SIGNAL - BOOM OUT/IN		X22/6	11	M-B	1	FFK									
		SOLENOID VALVE - ATTACHMENT LOCKED/UNLOCKED		XJP4/5	12	R-G	1	FFK		XJ3/3	1	V/B	1	ffda	FRONT RH FOOT	8-WAY CONN.	S1
		SIGNAL - ATTACHMENT LOCKED/UNLOCKED		X22/5	13	G-R	1	FFK			2					RIGHT OUTRIGGER	
		SIGNAL - ATTACHMENT LOCKED/UNLOCKED		X35/1		G-R	1	-		X5/9	3	R-V	1	ffda	+ SWITCH - OUTRIGGERS	125056	
										S2/3		R-V	1	-	+ SWITCH - OUTRIGGERS		
											4						
											5						
											6						
										XJ3/2	7	A/B	1	ffda	REAR RH FOOT		
											8						

Operation: Left dashboard tree-based scheme - Girolift 3514-3518

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Table: **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.
X16	13-WAY MK CONN.				1			
	CONTROL UNIT	FORWARD SPEED		X12/4	2	V/N	1	FFK
	125213V	BACK-UP JORN		X27/23	3	B	1	FFK
		+SPEED SWITCH		SALD2/	4	C-R	1	FFK
		+SW - GEARBOX		X19/14		C-R	1	-
		2nd HYDRAULIC SPEED		X12/2	5	Z-B	1	FFK
		SOLENOID VALVE - 1st MECHANICAL SPEED		X21/20	6	M-B	1.5	FFK
		SOLENOID VALVE - 2nd MECHANICAL SPEED		X21/21	7	B-N	1.5	FFK
		TRANSMISSION DISCONNECTED		X26/4	8	S-G	1	FFK
		SOLENOID VALVE - REVERSE SPEED		X29/3	9	M-V	1	FFK
		SOLENOID VALVE - DISPLACEMENT CHANGE		X21/17	10	C-V	1.5	FFK
		SOLENOID VALVE - FORWARD SPEED		X29/2	11	V-N	1	FFK
		REVERSE SPEED		X12/3	12	H-V	1	FFK
		SENSOR - CARDAN SHAFT		X21/11	13	A-B	1	FFK
X17	17-WAY MK CONN.	WORK LIGHT		X27/13	1	G-N	1.5	FFK
	CONTROL UNIT	Work light power supply		X26/12	2	G-V	1.5	FFK
	125214				3			
		LEFT HIGH BEAM		X10/3	4	V	1.5	FFK
		RIGHT HIGH BEAM		X27/8	5	V	1.5	FFK
		HORN		X27/14	6	Z	1.5	FFK
		WORK LIGHTS SW OUTPUT		X20/16	7	L/G	1	FFK
		START-UP ENABLING COMMAND		X29/9	8	C-B	1	FFK
		START FROM BASKET		X28/11	9	C	1	FFK
		50 START-UP PANEL		S12/7		C	1	-
		+SWITCH - FOG LAMP		X20/6	10	H/N	1	FFK
		LEFT LOW BEAM		X10/2	11	H	1.5	FFK
		RIGHT LOW BEAM		X27/7	12	H	1.5	FFK
		LIGHT INDICATOR - HIGH BEAM		X2/9	13	V	1	FFK
		HORN		X28/15	14	Z	1	FFK
		HORN		X11/13		Z	1	-
		LOW BEAM COMMON SWITCH		X11/5	15	H-B	1	FFK
		HIGH BEAM COMMON		X11/3	16	V-B	1	FFK
		MECHANICAL SPEED		X19/15	17	G-R	1	FFK
SALD2		+SPEED SWITCH		X16/4		C-R	1	-
	WELDING	+SPEED SWITCH		X12/1		C-R	1	-
		+SPEED SWITCH		X12/5		C-R	1	-
	+ 900001							
A		AUX CIRCUITS RELAY OUTPUT		B/		M	10	C/C6.101083
	000000							
	+ 128101							

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
	X9/9	1	B-R	1	120272	LIGHT SW POWER SUPPLY	2-WAY CONN.	H1
	H2/1		B-R	1	-	LIGHT SW POWER SUPPLY	light indicator	
	H2/2	2	N	1	120272	LIGHT SW GND	125374	
	X47/I		N	1	-	GND		
	H1/2	I	N	1	ffda	GND	2-WAY 90° CONN.	X47
	X25/11	-	B	1	ffda	MAN. LOWER OUTPUT	TO SERIAL LINE	
							125018	
							CONTROL LEVER	
	X5/3	1	R-V	1	ffda	POWER SUPPLY: DANFOSS CONTROL UNIT	2-WAY CONN.	X15
	X3/8		R-V	1	-	LIGHT INDICATOR POWER SUPPLY	DANFOSS CONTROL UNIT	
	X5/3	2	R-V	1	ffda	POWER SUPPLY: DANFOSS CONTROL UNIT	125007	
	X22/1	1	L/R	1	120171	+SOLENOID VALVE - BOOM OUT/IN	8-WAY CONN. 125678	XJP4
	X22/4	2	A-G	1	120171	+SOLENOID VALVE - BOOM UP/DOWN	LIGHT INDICATORS	
	X22/2	3	M-N	1	120171	+SOLENOID VALVE - FORKS/OUTRIGGERS	125678	
	X22/3	4	B-N	1	120171	+SOLENOID VALVE - TURRET ROTATION		
	X18/12	5	R-G	1	120171	SOLENOID VALVE - ATTACHMENT LOCKED/UNLOCKED		
		6						
		7						
		8						
		1					18-WAY CONN. 125649	XJ3B
		2					DANFOSS CONTROL UNIT	
		3					125649	
	S6/1	4	C/N	1	120171	SWAY CONTROL PUSHBUTTON		
	X26/10	5	G/N	1	120171	SIGNAL - OPTIONAL MANIP.		
	X4/4	6	G/R	1	120171	SWITCH - SLEWING LOCKED/UNLOCKED		
	Sal6/	7	R-V	1	120171	SEAT SENSOR		
	X36C/	8	M-N	1	120171	JOBSITE INPUT		
	X3/3	9	A	0.5	120171	LIGHT INDICATOR - FORK ROTATION		
	X3/12	10	M	0.5	120171	LIGHT INDICATOR - FORKS COUPLED		
	X3/10	11	H	0.5	120171	LIGHT INDICATOR - ROTATION LOCKED		
	X3/9	12	C	0.5	120171	LIGHT INDICATOR - TURRET ROTATION		
		13						
	Sal6/	14	R-V	1	120171	SEAT SENSOR		
		15						
		16						
		17						
	GND1/10	18	N	1.5	120171	GND		
	S2/1	1	M/N	1	120171	FRONT LH FOOT	12-WAY CONN.	XJ3
	S1/7	2	A/B	1	120171	REAR RH FOOT	DANFOSS CONTROL UNIT	
	S1/1	3	V/B	1	120171	FROPNT RH FOOT	125646	
	S2/7	4	C-B	1	120171	REAR LH FOOT		
		5						
	X36D/	6	H/N	1	120171	PLATFORM INPUT		
	X27/19	7	A-N	1	120171	SENSOR - BUCKET UP		
	S10/	8	B-N	1	120171	SIGNAL - OVERLOAD WARNING SYSTEM		
	Sal3/	9	C-L	1	120171	SENSOR - BOOM DOWN		
	X25/3	10	B/V	1	120171	SENSOR - BOOM UP		
	X3/5	11	S	0.5	120171	LIGHT INDICATOR - BOOM UP/DOWN		
	X3/4	12	V	0.5	120171	LIGHT INDICATOR - BOOM OUT/IN		
	X28/1	1	A-N	1	120171	SIGNAL - BOOM UP/DOWN	8-WAY CONN. 125678	XJP2
	X28/2	2	L-R	1	120171	SIGNAL - TURRET ROTATION	DANFOSS CONTROL UNIT	
	X28/3	3	L-B	1	120171	SIGNAL - BOOM OUT/IN	125678	
	X28/4	4	V	1	120171	+12 JOYSTICK IN MOTION		
	X4/	5	V-B	1	120171	PLATFORM ENABLED		
	X28/6	6	B-R	1	120171	ROBOT POWER SUPPLY		
		7						
	X28/7	8	B-N	1	120171	SENSOR - FORKS COUPLED		
	X26/13	1	C	0.5	120171	Neutral pos. manip.	8-WAY CONN. 125678	XJP3
	X25/10	2	A/B	1	120171	ROBOT	DANFOSS CONTROL UNIT	
		3					125678	
		4						
		5						
		6						
		7						
		8						

Operation:	Table:
Left dashboard tree-based scheme - Girolift 3514-3518 Page 6 of 6	C.05.03

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
										X18/5	1	M/B	1	120171	SIGNAL - BOOM OUT/IN	20-WAY CONN. 125651	XJ4
										X22/7	2	A/G	1	120171	ATTACHMENT LOCKED/UNLOCKED	DANFOSS CONTROL UNIT	
										X18/6	3	A/V	1	120171	SIGNAL - BOOM UP/DOWN	125651	
										X18/2	4	L/G	1	120171	SIGNAL - TURRET ROTATION SOLENOID VALVE		
										X35/4	5	L/B	1	120171	SIGNAL - ATTACHMENT LOCKED/UNLOCKED		
										X22/10	6	Z-N	1	120171	+SOLENOID VALVE - SWITCHING		
											7						
											8						
										X21/26	9	V/B	1	120171	SOLENOID VALVE -LEFT OUTRIGGER OUT		
										X21/26	10	C/B	1	120171	SOLENOID VALVE -LEFT OUTRIGGER IN		
										X21/26	11	M-N	1	120171	SOLENOID VALVE -RIGHT OUTRIGGER OUT		
										X21/26	12	A-B	1	120171	SOLENOID VALVE -RIGHT OUTRIGGER IN		
										X21/26	13	B/N	1	120171	SOLENOID VALVE -LEFT OUTRIGGER UP		
										X21/26	14	V/N	1	120171	SOLENOID VALVE -LEFT OUTRIGGER DOWN		
										X21/26	15	Z/B	1	120171	SOLENOID VALVE -RIGHT OUTRIGGER UP		
										X21/26	16	A/R	1	120171	SOLENOID VALVE -RIGHT OUTRIGGER DOWN		
										X21/26	17	S/N	1	120171	OUTRIGGER RELAY SWITCHING		
										X21/24	18	G/R	1	120171	Y10 SOLENOID VALVE - AXLE LEVELLING		
										X21/23	19	C/N	1	120171	Y5 SOLENOID VALVE - AXLE LEVELLING		
										X21/12	20	Z-B	1	120171	SENSOR - SLEWRING BLOCKED		
										X30/A		R	10	C/C6.101083	30 RELAY - AUX CIRCUITS		J1
																Relay - aux circuits	
																000000	
																+ 128101	
										S11/2		R	6	C/C6.101083	+30 RELAY BOARD		J3
																+30 control unit	
																000000	
																+ 128101	
										S12/5		A	6	C/C6.101124	+15 RELAY BOARD		J2
																+15 control unit	
																000000	
																+ 128101	
										A/		M	10	C/C6.101083	AUX CIRCUITS RELAY OUTPUT		B
																000000	
																+ 128101	

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Operation: Danfoss line tree-based scheme - Girolift 3514-3518

Table: **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
(X22)	12-WAY DT CONN.	Power supply: boom out/in solenoid valve		Y22/1	1	L/R	1	DF		Y1/1	A	B-G	1	DF	Power supply: slewring locked solenoid valve	3-WAY DT CONN.	(X23)
	To LH dashboard line	Power supply: forks/outriggers solenoid valve		Y23/1	2	M-N	1	DF		Y2/1	B	S-G	1	DF	Power supply: slewring unlocked solenoid valve	To LH dashboard line	
	125422 125423	Power supply: turret rotation solenoid valve		Y27/1	3	B-N	1	DF		gnd1.1/	C	N	1.5	DF	GND	125406 125407	
		Power supply: boom up/down solenoid valve		Y26/1	4	A-G	1	DF									
		Power supply: attachment locked/unlocked solenoid valve		Y24/1	5	G-R	1	DF									
		Signal - boom out/in solenoid valve		Y22/2	6	M/B	1	DF		X23/A	1	B-G	1	101077	Power supply: slewring locked solenoid valve	S/V CONN. 125234	(Y1)
		Signal - forks/outriggers solenoid valve		Y23/2	7	A/G	1	DF	1A	gnd1.2/	2	N	1	101077	GND	Solenoid valve - slewring locked	
		Signal - turret rotation solenoid valve		Y27/2	8	L-G	1	DF								125234	
		Signal - boom up/down solenoid valve		Y26/2	9	A-V	1	DF									
		Power supply: switching solenoid valve		Y25/1	10	Z-N	1	DF									
		Signal - attachment locked/unlocked solenoid valve		Y24/2	11	L/B	1	DF		X23/B	1	S-G	1	101077	Power supply: slewring unlocked solenoid valve	S/V CONN. 125234	(Y2)
					12			150100	1A	gnd1.2/	2	N	1	101077	GND	Solenoid valve - slewring unlocked	
																125234	
(gnd1.1)		GND		X23/C		N	1.5	C/C8.120022									
	Ground point	GND		Y22/		N	1	-									
	000000	GND		Y23/		N	1	-		X22/4	1	A-G	1	101077	Power supply: boom up/down solenoid valve	S/V CONN. 125526	(Y26)
	+ 900001									X22/9	2	A-V	1	101077	Signal - boom up/down solenoid valve	Solenoid valve -	
(gnd1.2)		GND		Y25/2		N	1	C/C8.120022			3					125526 138017	
	Ground point	GND		Y1/2		N	1	-		gnd1.3/	⏚	N	1	101077	GND	boom up/down	
	000000	GND		Y2/2		N	1	-									
	+ 900001																
(gnd1.3)		GND		Y27/		N	1	C/C8.120022		X22/3	1	B-N	1	101077	Power supply: turret rotation solenoid valve	S/V CONN. 125526	(Y27)
	Ground point	GND		Y26/		N	1	-		X22/8	2	L-G	1	101077	Signal - turret rotation solenoid valve	Solenoid valve - turret rotation	
	000000	GND		Y24/		N	1	-			3					125526 138017	
	+ 900001									gnd1.3/	⏚	N	1	101077	GND		
(Y22)	S/V CONN. 125526	Power supply: boom out/in solenoid valve		X22/1	1	L/R	1	101077		X22/5	1	G-R	1	101077	Power supply: attachment locked/unlocked solenoid valve	S/V CONN. 125526	(Y24)
	Solenoid valve - boom out/in	Signal - boom out/in solenoid valve		X22/6	2	M/B	1	101077		X22/11	2	L/B	1	101077	Signal - attachment locked/unlocked solenoid valve	Solenoid valve - attachment	
	125526 138017				3						3					125526 138017	
		GND		gnd1.1/	⏚	N	1	101077		gnd1.3/	⏚	N	1	101077	GND	locked/unlocked	
(Y23)	S/V CONN. 125526	Power supply: forks/outriggers solenoid valve		X22/2	1	M-N	1	101077									
	Solenoid valve -	Signal - forks/outriggers solenoid valve		X22/7	2	A/G	1	101077									
	125526 138017				3												
	forks/outriggers	GND		gnd1.1/	⏚	N	1	101077									
(Y25)	S/V CONN. 125234	Power supply: switching solenoid valve	1A	X22/10	1	Z-N	1	101077									
	Solenoid valve - switching	GND		gnd1.2/	2	N	1	101077									
	125234																

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Operation: Front carriage line tree-based scheme - Girolift 3514-3518

Table: **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE NR.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE NR.	CONNECTOR	UNIT
(X50)	24-WAY DT CONN.	Solenoid valve power supply: rear left steering axle unlocked		Y3/1	1	M-B	1	DF	1A	X50/9	1	M-B	1	101077	Power supply: rear right steering axle unlocked solenoid valve	S/V CONN.125234	(Y4)
	To junction box	GND		GND/	2	N	1.5	DF		GND/	2	N	1	101077	GND	Solenoid valve - front right	
	125453	NC contact power supply: front LH stab. limit switch		X51/1	3	R-V	1	DF								125234	
		NO contact output: front RH stab. limit switch		X52/3	4	G-L	1	DF								steering axle unlocked	
					5			150100									
					6			150100									
		Left turn signal		H1/	7	L	1	DF		X51/2	1	B/R	1	DF	NC contact power supply from front LH stab.	4-WAY DT CONN.	(X52)
					8			150100		X50/12	2	B-N	1	DF	NC contact output: front RH stab. limit switch	Front right outrigger	
		Solenoid valve power supply: rear right steering axle unlocked		Y4/1	9	M-B	1	DF		X50/4	3	G-L	1	DF	NO contact output: front RH stab. limit switch	125410 125411	
		Right turn signal		H2/	10	A	1	DF		X51/3	4	H-L	1	DF	NO contact power supply from front LH stab.	micro-switch	
		NO contact power supply: front RH stab. limit switch		X51/4	11	R-V	1	DF									
		NC contact output: front RH stab. limit switch		X52/2	12	B-N	1	DF									
					13			150100		X50/10		A	1	ff C	Right turn signal		(H2)
					14			150100								Right turn signal	
					15			150100								000000	
					16			150100									
					17			150100									
					18			150100									
					19			150100									
					20			150100									
					21			150100									
					22			150100									
					23			150100									
					24			150100									
(Y3)	S/V CONN.125234	Solenoid valve power supply: rear left steering axle unlocked		X50/1	1	M-B	1	101077									
	Solenoid valve - front left	GND	1A	GND/	2	N	1	101077									
	125234																
	steering axle unlocked																
(X51)	4-WAY DT CONN.	NC contact power supply: front LH stab. limit switch		X50/3	1	R-V	1	DF									
	Front left outrigger	NC contact power supply from front LH stab		X52/1	2	B/R	1	DF									
	125410 125411	NO contact power supply from front LH stab		X52/4	3	H-L	1	DF									
	micro-switch	NO contact power supply: front LH stab. limit switch		X50/11	4	R-V	1	DF									
(H1)		Left turn signal		X50/7		L	1	ff C									
	Left turn signal																
	000000																
(GND)		GND		X50/2		N	1.5	C/C8.120022									
	Ground point	GND		Y4/2		N	1	-									
	000000	GND		Y3/2		N	1	-									

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Operation:	Undercarriage box tree-based scheme - Girolift 3514-3518 Page 1 of 2	*Table:* **C.05.03**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
X21	40-WAY DT CONN.	Solenoid valve - rear steering axle locked		X8/8	1	H-R	1.5	DM		X21/32	1	B/N	1	FFK	Solenoid valve - left outrigger up	17-WAY MK CONN.	X7
	To cab line	GND		X20/1	2	N	1.5	DM		X21/30	2	M-N	1	FFK	Solenoid valve - right outrigger out	To control unit	
	125481	GND		X21/1	3	N	1.5	DM		X21/33	3	V/N	1	FFK	Solenoid valve - left outrigger down	125214V	
		GND		X7/5	4	N	1.5	DM		X21/31	4	A-B	1	FFK	Solenoid valve - right outrigger in		
		Right turn signal		X7/15	5	L	1	DM		X21/4	5	N	1.5	FFK	GND		
		Left turn signal		X7/7	6	A	1	DM		X21/34	6	Z/B	1	FFK	Solenoid valve - right outrigger up		
					7			150100		X21/6	7	A	1	FFK	Left turn signal		
					8			150100			8						
					9			150100			9						
		Power supply: mech. speed light indicator		X8/15	10	A-R	1	DM		X21/29	10	C/B	1	FFK	Solenoid valve - left outrigger in		
		Sensor - cardan shaft		X8/2	11	A-B	1	DM			11						
		Sensor - slewring blocked		X8/1	12	Z-B	1	DM			12						
		Sensor power supply		X8/6	13	R-V	1	DM			13						
		Outrigger signal for transmission deactivation		X22/1	14	B-G	1	DM		X21/35	14	A/R	1	FFK	Solenoid valve - right outrigger down		
		Outrigger signal for 3B6		X22/2	15	L-R	1	DM		X21/5	15	L	1	FFK	Right turn signal		
		Signal - rear steering axle aligned		X8/21	16	L-G	1	DM			16						
		Solenoid valve - power displacement change		X8/14	17	C-V	1.5	DM			17						
		Solenoid valve - crab steer		X8/18	18	C-N	1.5	DM									
		Solenoid valve - four-wheel steer		X8/17	19	H-R	1.5	DM		X21/12	1	Z-B	1	FFK	Sensor - slewring blocked	21-WAY MK CONN.	X8
		Solenoid valve - 1st mechanical speed		X8/5	20	M-B	1.5	DM		X21/11	2	A-B	1	FFK	Sensor - cardan shaft	To control unit	
		Solenoid valve - 2nd mechanical speed		X8/15	21	B-N	1	DM		X21/24	3	G/R	1	FFK	Y10 solenoid valve - axle levelling	125215G	
		Solenoid valve - differential locking		X8/12	22	C-B	1.5	DM		X21/23	4	C/N	1	FFK	Y5 solenoid valve - axle levelling		
		Y5 solenoid valve - axle levelling		X8/4	23	C/N	1	DM		X21/20	5	M-B	1.5	FFK	Solenoid valve - 1st mechanical speed		
		Y10 solenoid valve - axle levelling		X8/3	24	G/R	1	DM		X21/13	6	R-V	1	FFK	Sensor power supply		
		Signal - boom down		X8/19	25	C-L	1	DM			7						
		Signal - axle blocked		X8/20	26	V-Z	1	DM		X21/1	8	H-R	1.5	FFK	Solenoid valve - rear steering axle locked		
		Outrigger relay switching		X8/9	27	S/N	1	DM		X21/27	9	S/N	1	FFK	Outrigger relay switching		
		Solenoid valve - left outrigger out		X8/11	28	V/B	1	DM			10						
		Solenoid valve - left outrigger in		X7/10	29	C/B	1	DM		X21/28	11	V/B	1	FFK	Solenoid valve - left outrigger out		
		Solenoid valve - right outrigger out		X7/2	30	M-N	1	DM		X21/22	12	C-B	1.5	FFK	Solenoid valve - differential locking		
		Solenoid valve - right outrigger in		X7/4	31	A-B	1	DM			13						
		Solenoid valve - left outrigger up		X7/1	32	B/N	1	DM		X21/17	14	C-V	1.5	FFK	Solenoid valve - power displacement change		
		Solenoid valve - left outrigger down		X7/3	33	V/N	1	DM		X21/10	15	A-R	1	FFK	Power supply: mech. speed light indicator		
		Solenoid valve - right outrigger up		X7/6	34	Z/B	1	DM		X21/21		B-N	1	-	Solenoid valve - 2nd mechanical speed		
		Solenoid valve - right outrigger down		X7/14	35	A/R	1	DM			16						
					36			150100		X21/19	17	H-R	1.5	FFK	Solenoid valve - four-wheel steer		
					37			150100		X21/18	18	C-N	1.5	FFK	Solenoid valve - crab steer		
					38			150100		X21/25	19	C-L	1	FFK	Signal - boom down		
					39			150100		X21/26	20	V-Z	1	FFK	Signal - axle blocked		
					40			150100		X21/16	21	L-G	1	FFK	Signal - rear steering axle aligned		
X50	DT CONN. 125452	Solenoid valve - front left steering axle unlocked		X4/1	1	M-B	1	DM		X21/2	1	N	1.5	ffda	GND	1-WAY CONN.	X20
	To front carriage line	GND		X20a/1	2	N	1.5	DM								GND	
	125452	NC contact power supply: front LH stab. limit switch		X4/4	3	R-V	1	DM								125005	
		NO contact output: front RH stab. limit switch		X23/	4	G-L	1	DM									
					5			150100		X21/3	1	N	1.5	ffda	GND	1-WAY CONN.	X21
					6			150100								GND	
		Left turn signal		X8/6	7	L	1	DM								125005	
					8												
		Solenoid valve - front right steering axle unlocked		X4/1	9	M-B	1	DM		X21/14	1	B-G	1	ffda	Outriggers signal for transmission deactivation	2-WAY CONN.	X22
		Right turn signal		X8/2	10	A	1	DM		X21/15	2	L-R	1	ffda	Outriggers signal for 3B6		
		NO contact power supply: front LH stab. limit switch		X4/4	11	R-V	1	DM								125007	
		NC contact output: front RH stab. limit switch		X23/	12	B-N	1	DM									
					13			150100		X50/1	1	M-B	1	FFK	Solenoid valve - front left steering axle unlocked	13-WAY MK CONN.	X4
					14			150100		X50/9		M-B	1	-	Solenoid valve - front right steering axle unlocked	To control unit	
					15			150100			2					125213	
					16			150100			3						
		Solenoid valve - front left outrigger up		X4/5	17	B/N	1	DM		X50/3	4	R-V	1	FFK	NC contact power supply: front LH stab. limit switch		
		Solenoid valve - front right outrigger in		X4/6	18	A/B	1	DM		X50/11		R-V	1	FFK	NO contact power supply: front LH stab. limit switch		
		Solenoid valve - front right outrigger up		X4/7	19	Z/B	1	DM		X50/17	5	B/N	1	FFK	Solenoid valve - front left outrigger up		
		Solenoid valve - front left outrigger out		X4/8	20	V/B	1	DM		X50/18	6	A/B	1	FFK	Solenoid valve - front right outrigger in		
		Solenoid valve - front left outrigger in		X4/9	21	C/B	1	DM		X50/19	7	Z/B	1	FFK	Solenoid valve - front right outrigger up		
		Solenoid valve - front right outrigger up		X4/11	22	M/N	1	DM		X50/20	8	V/B	1	FFK	Solenoid valve - front left outrigger out		
		Solenoid valve - front left outrigger down		X4/12	23	V/N	1	DM		X50/21	9	C/B	1	FFK	Solenoid valve - front left outrigger in		
		Solenoid valve - front right outrigger down		X4/13	24	A/R	1	DM			10						
										X50/22	11	M/N	1	FFK	Solenoid valve - front right outrigger up		
										X50/23	12	V/N	1	FFK	Solenoid valve - front left outrigger down		
										X50/24	13	A/R	1	FFK	Solenoid valve - front right outrigger down		

Connector - type 'A'

Connector - type 'A'

Operation: Undercarriage box tree-based scheme - Girolift 3514-3518

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Table: **C.05.03**

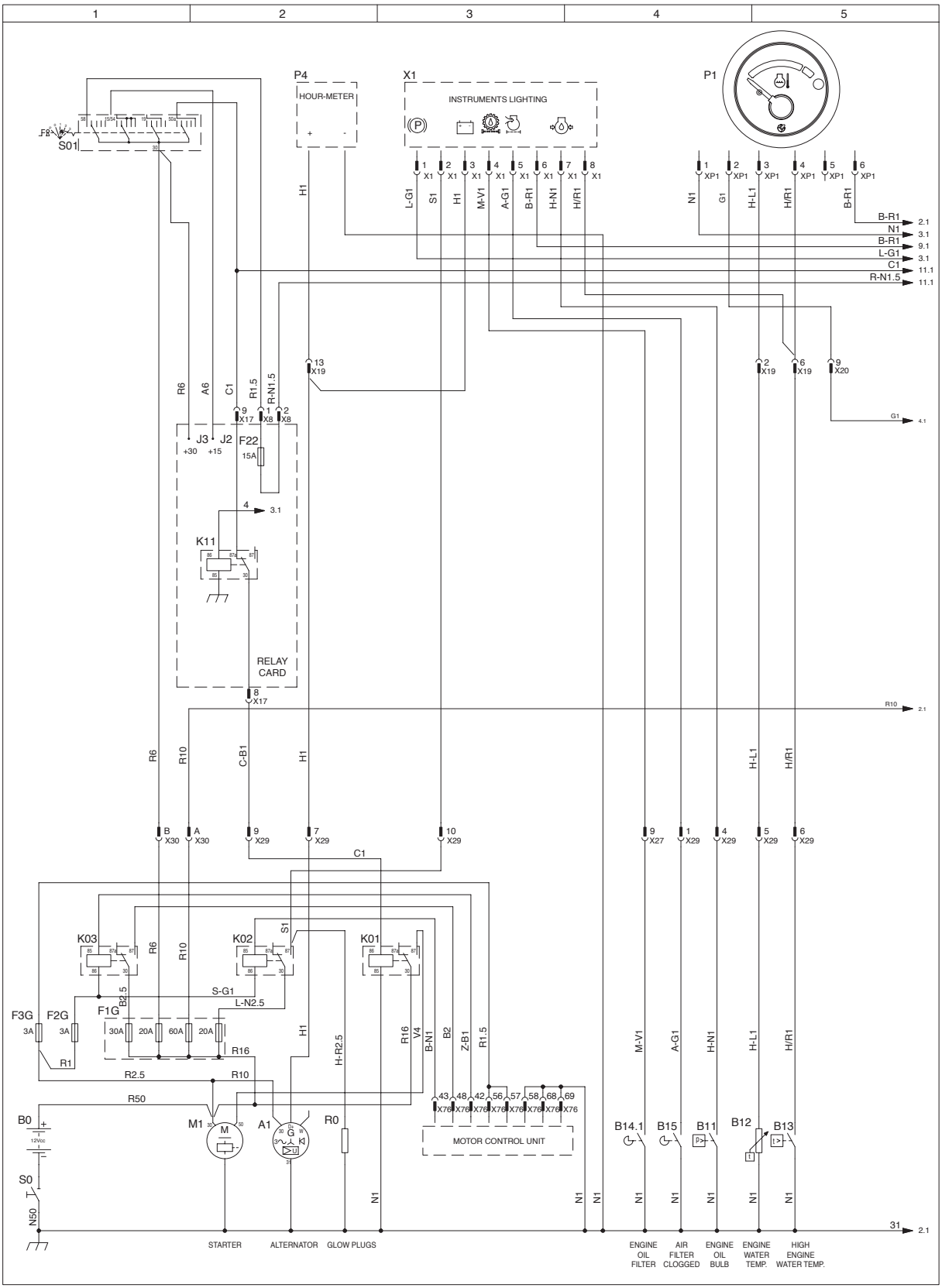
Connector - type 'B'

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.
X55	40-WAY DT CONN.	Slewring blocked sensor power supply		X1/6	1	R-V	1	DM
	To rear carriage	Rear axle levelling sensor power supply		X1/6	2	R-V	1	DM
	125482	NC contact input: rear RH stab. limit switch		X23a/1	3	B-N	1	DM
		NC contact output: rear LH stab. limit switch		X22a/1	4	B-G	1	DM
		NO contact input: rear RH stab. limit switch		X23a/	5	G-L	1	DM
		NO contact output: rear LH stab. limit switch		X22a/2	6	L-R	1	DM
					7			
		Solenoid valve - rear steering axle locked		X1/1	8	G-V	1	DM
		Solenoid valve - rear steering axle locked		X1/1	9	G-V	1	DM
					10			
		Power supply: licence plate light		X1/14	11	G-N	1	DM
					12			
		Signal - rear axle levelling sensor		X3/11	13	L-B	1	DM
		Signal - slewring blocked sensor		X1/11	14	Z-B	1	DM
					15			
					16			
		Signal - cardan shaft sensor		X1/10	17	A-B	1	DM
		Solenoid valve - 1st hydraulic speed		X1/7	18	V-B	1	DM
		Solenoid valve - 2nd hydraulic speed		X1/18	19	B-R	1	DM
		Solenoid valve - differential locking		X1/21	20	C-B	1	DM
		Solenoid valve - four-wheel steer		X1/16	21	H-R	1	DM
		Solenoid valve - crab steer		X1/15	22	C-N	1	DM
		Solenoid valve - displacement change		X1/19	23	V	1	DM
					24			
		Solenoid valve - rear right outrigger in		X3/8	25	A/B	1	DM
		Solenoid valve - rear axle levelling		X1/8	26	C/N	1	DM
		Solenoid valve - rear right outrigger down		X3/6	27	A/R	1	DM
		Solenoid valve - rear left outrigger down		X3/5	28	V/N	1	DM
		Solenoid valve - rear left outrigger in		X3/2	29	C/B	1	DM
		Solenoid valve - rear right outrigger out		X3/1	30	M/N	1	DM
		Solenoid valve - rear left outrigger up		X3/4	31	B/N	1	DM
		Solenoid valve - rear right outrigger up		X3/7	32	Z/B	1	DM
		Solenoid valve - rear axle levelling		X1/9	33	G/R	1	DM
		Solenoid valve - rear left outrigger out		X3/9	34	V/B	1	DM
		GND		X21a/1	35	N	1.5	DM
					36			
					37			
					38			
					39			
					40			

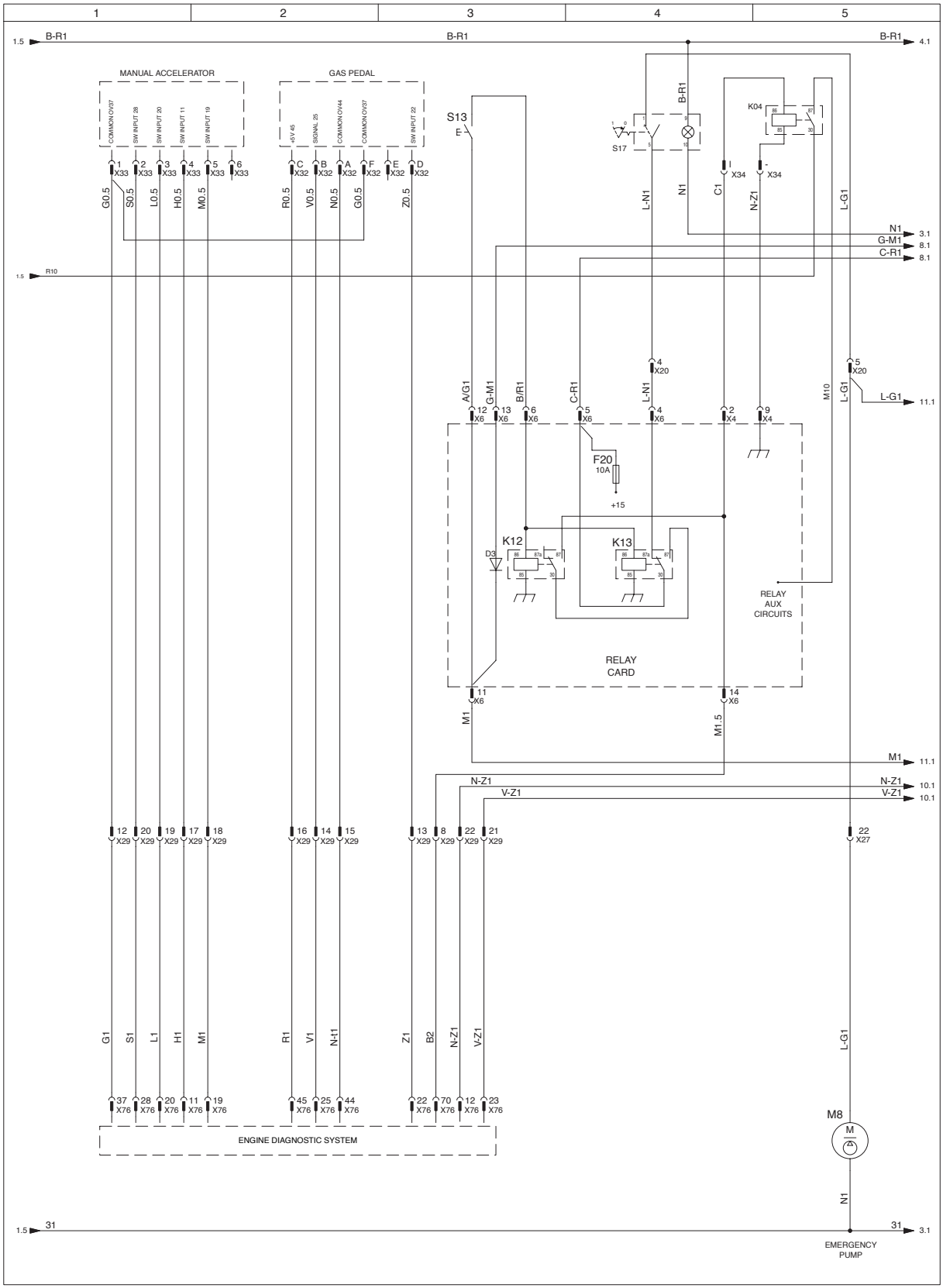
N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
		1					9-WAY MK CONN.	X6
	X50/10	2	A	1	FFK	Right turn signal	To control unit	
		3					125211	
		4						
		5						
	X50/7	6	L	1	FFK	Left turn signal		
		7						
		8						
		9						
	X50/2	1	N	1.5	fmda	GND	1-WAY CONN.	X20a
							GND	
							125006	
	X50/12		B-N	1	ffda	NC contact output: front RH stab. limit switch	2-WAY 90° CONN.	X23
	X50/4	-	G-L	1	ffda	NO contact output: front RH stab. limit switch		
							125018	
	X55/8	1	G-V	1	FFK	Solenoid valve - rear steering axle locked	21-WAY MK CONN.	X1
	X55/9		G-V	1	-	Solenoid valve - rear steering axle locked	To control unit	
	X3/12	2	V-Z	1	FFK	Bridge	125215	
		3						
		4						
		5						
	X55/1	6	R-V	1	FFK	Slewring blocked sensor power supply		
	X55/2		R-V	1	-	Rear axle levelling sensor power supply		
	X55/18	7	V-B	1	FFK	Solenoid valve - 1st hydraulic speed		
	X55/26	8	C/N	1	FFK	Solenoid valve - rear axle levelling		
	X55/33	9	G/R	1	FFK	Solenoid valve - rear axle levelling		
	X55/17	10	A-B	1	FFK	Signal - cardan shaft sensor		
	X55/14	11	Z-B	1	FFK	Signal - slewring blocked sensor		
		12						
		13						
	X55/11	14	G-N	1	FFK	Licence plate light power supply		
	X55/22	15	C-N	1	FFK	Solenoid valve - crab steer		
	X55/21	16	H-R	1	FFK	Solenoid valve - four-wheel steer		
		17						
	X55/19	18	B-R	1	FFK	Solenoid valve - 2nd hydraulic speed		
	X55/23	19	V	1	FFK	Solenoid valve - displacement change		
		20						
	X55/20	21	C-B	1	FFK	Solenoid valve - differential locking		
	X55/30	1	M/N	1	FFK	Solenoid valve - rear right outrigger out	13-WAY MK CONN.	X3
	X55/29	2	C/B	1	FFK	Solenoid valve - rear left outrigger in	To control unit	
		3					125213G	
	X55/31	4	B/N	1	FFK	Solenoid valve - rear left outrigger up		
	X55/28	5	V/N	1	FFK	Solenoid valve - rear left outrigger down		
	X55/27	6	A/R	1	FFK	Solenoid valve - rear right outrigger down		
	X55/32	7	Z/B	1	FFK	Solenoid valve - rear right outrigger up		
	X55/25	8	A/B	1	FFK	Solenoid valve - rear right outrigger in		
	X55/34	9	V/B	1	FFK	Solenoid valve - rear left outrigger out		
		10						
	X55/13	11	L-B	1	FFK	Signal - rear axle levelling sensor		
	X1/2	12	V-Z	1	FFK	Bridge		
		13						
	X55/35	1	N	1.5	fmda	GND	1-WAY CONN.	X21a
							GND	
							125006	
	X55/4	1	B-G	1	fmda	NC contact output: rear LH stab. limit switch	2-WAY CONN.	X22a
	X55/6	2	L-R	1	fmda	NO contact output: rear LH stab. limit switch		
							125008	
	X55/3		B-N	1	fmda	NC contact input: rear RH stab. limit switch	2-WAY 90° CONN.	X23a
	X55/5	-	G-L	1	fmda	NO contact input: rear RH stab. limit switch		
							125019	

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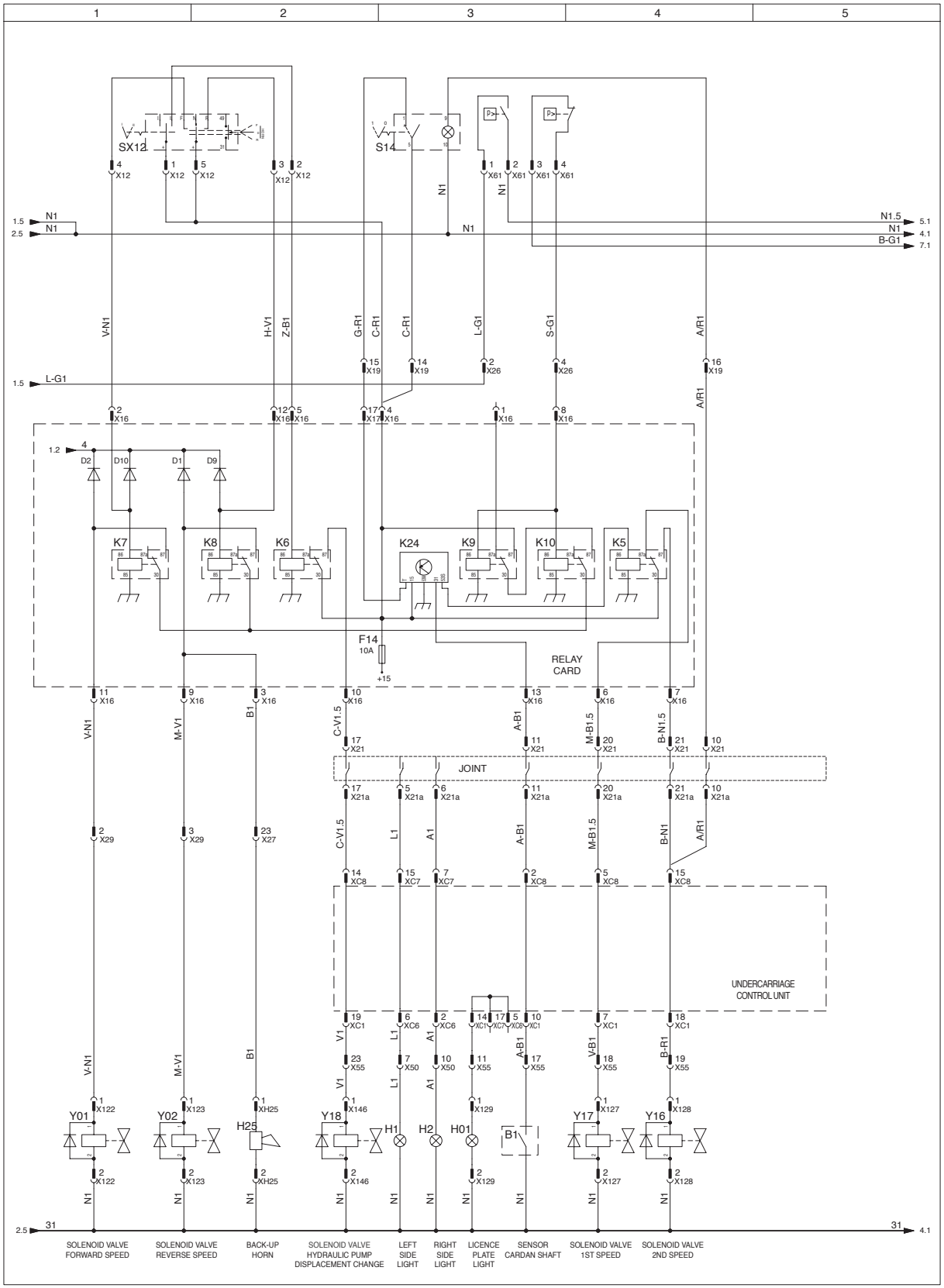
Operation:	Wiring diagram Girolift 5022 (from serial no. 10079 to serial no. 16757) - sheet 1 of 11	*Table:* **C.05.04**



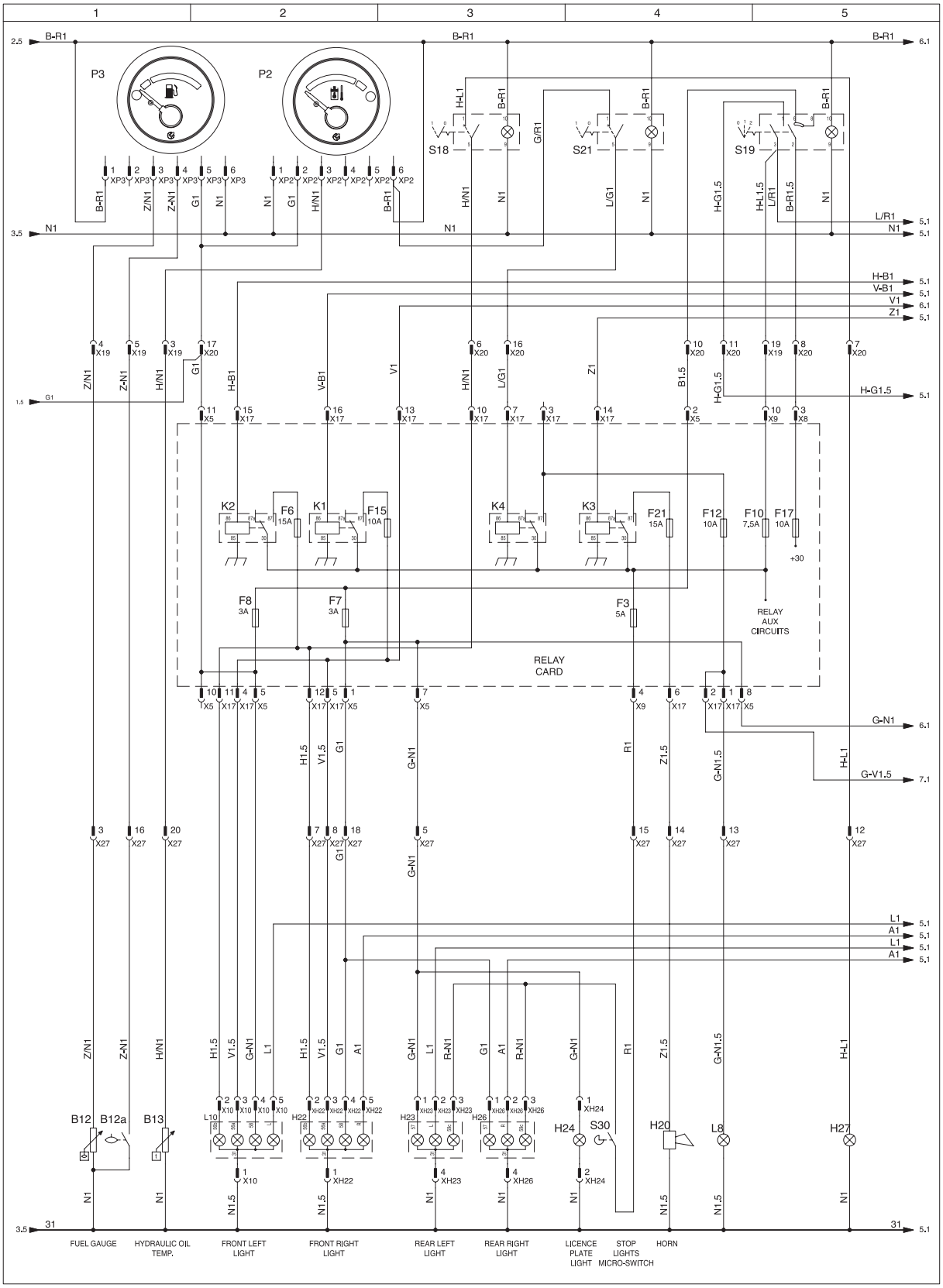
Operation:	Wiring diagram Girolift 5022 (from serial no. 10079 to serial no. 16757) - sheet 2 of 11	*Table:* **C.05.04**



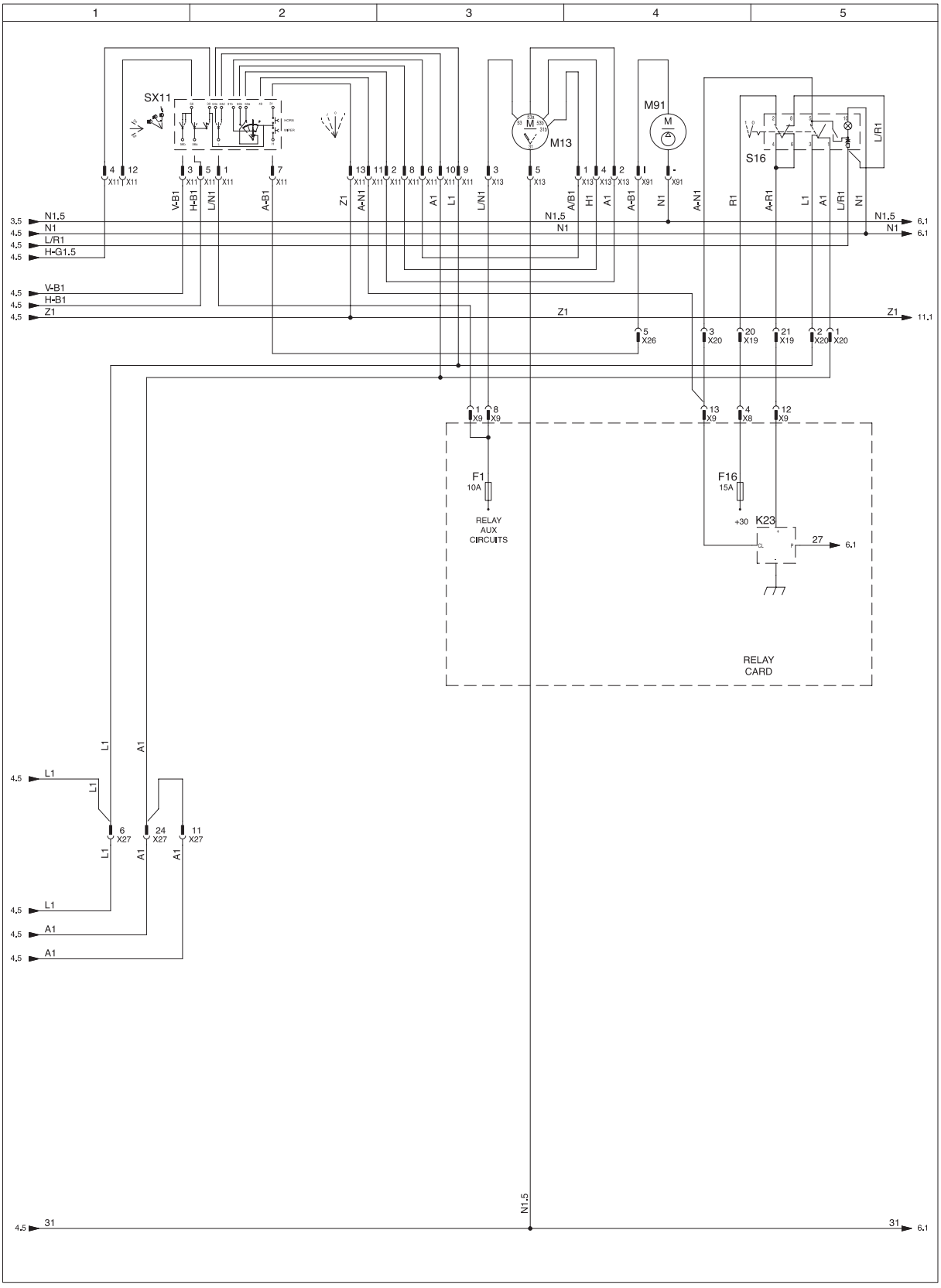
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Wiring diagram Girolift 5022 (from serial no. 10079 to serial no. 16757) - sheet 3 of 11	**C.05.04**



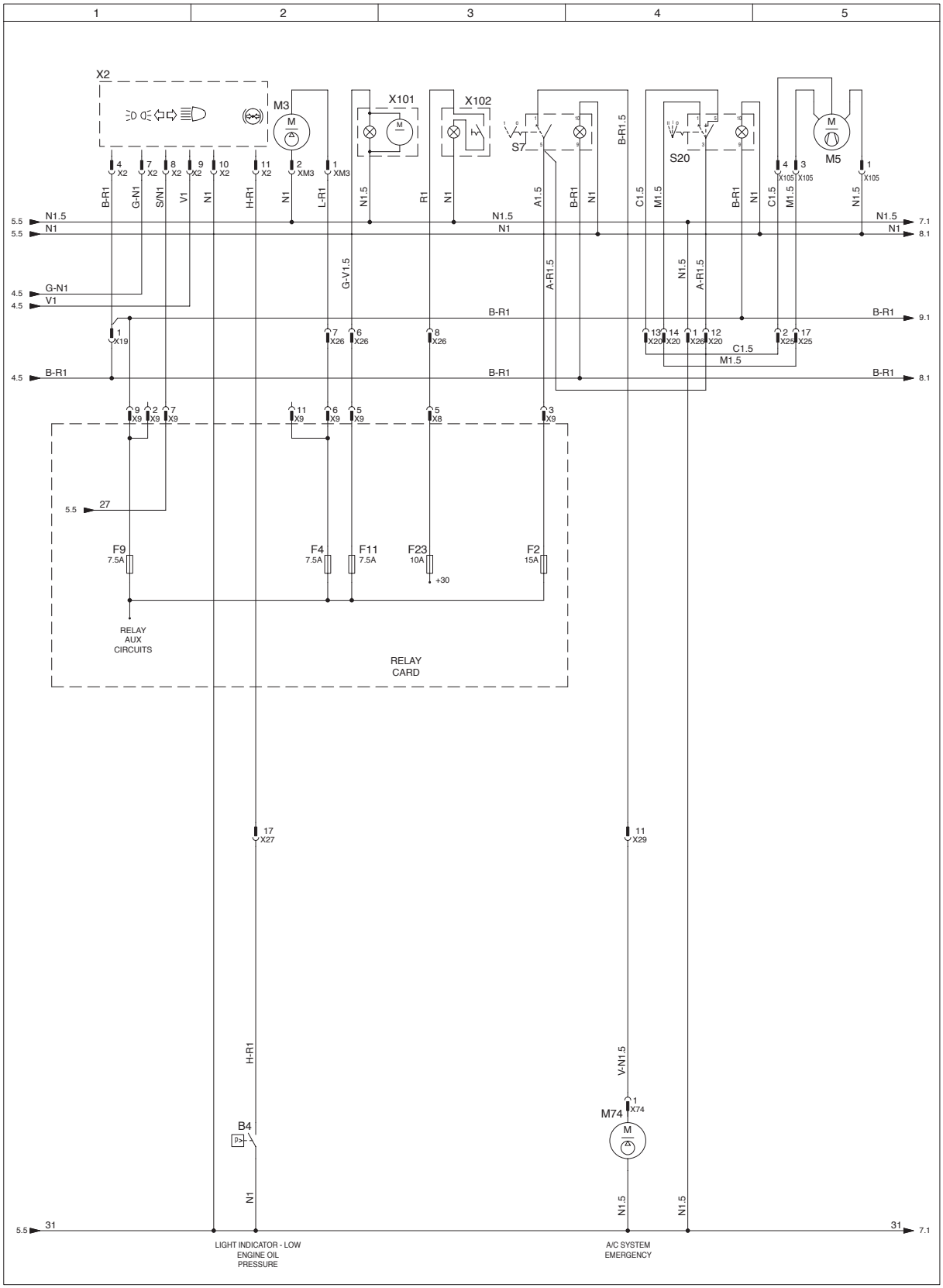
Operation:	*Table:*
Wiring diagram Girolift 5022 (from serial no. 10079 to serial no. 16757) - sheet 4 of 11	**C.05.04**



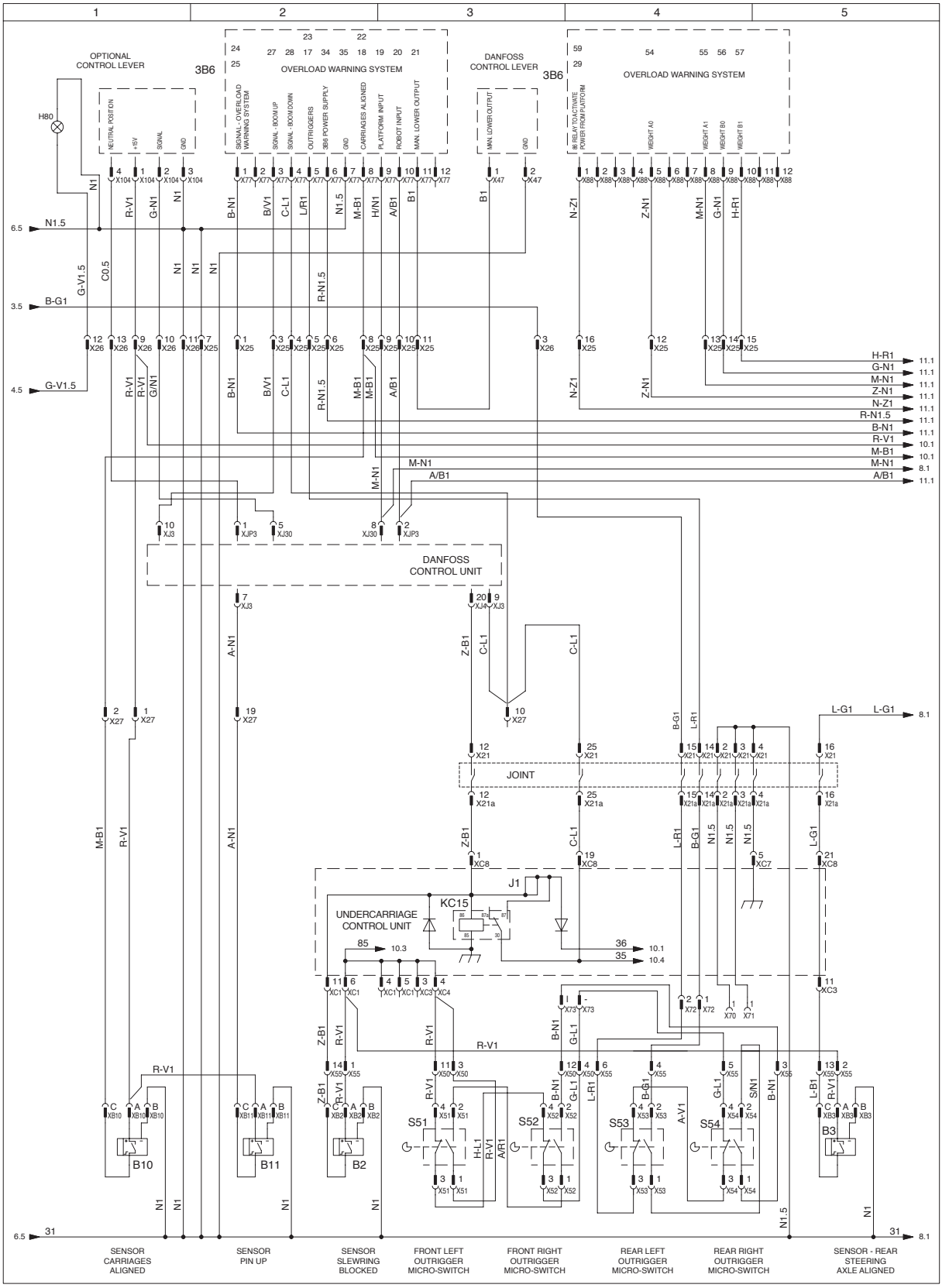
Operation:	Table:
Wiring diagram Girolift 5022 (from serial no. 10079 to serial no. 16757) - sheet 5 of 11	C.05.04



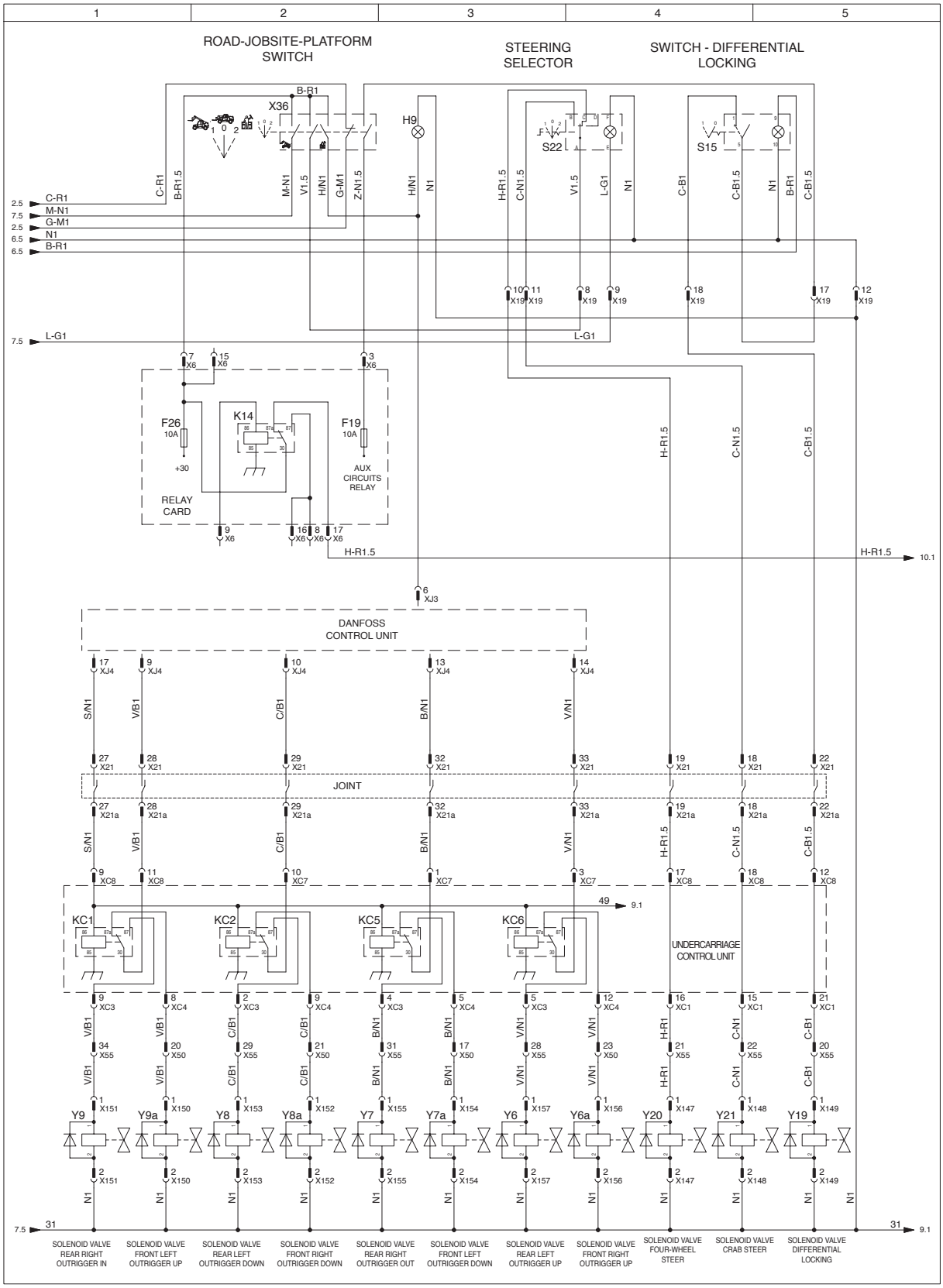
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Wiring diagram Girolift 5022 (from serial no. 10079 to serial no. 16757) - sheet 6 of 11	**C.05.04**



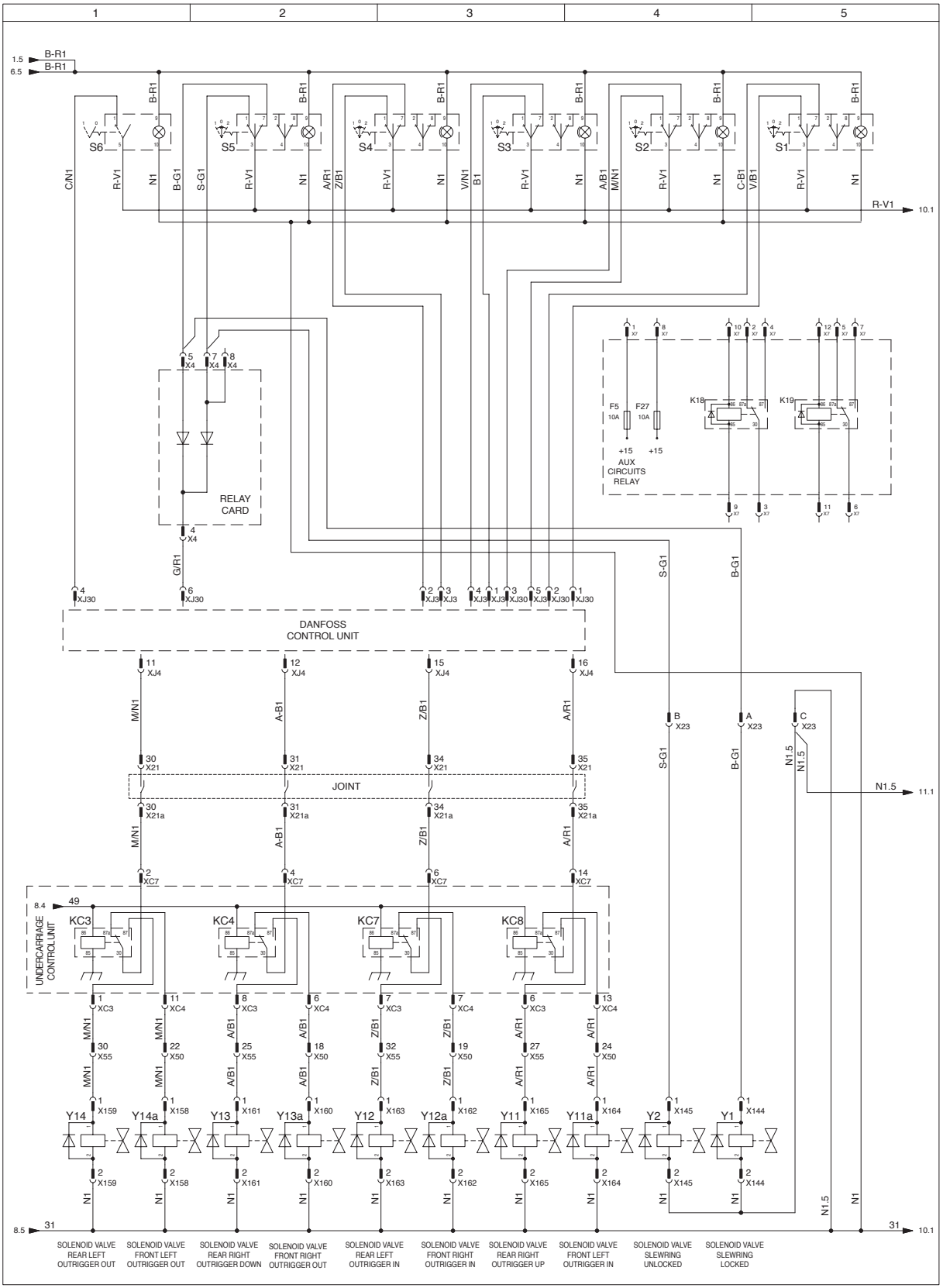
Operation:	Wiring diagram Girolift 5022 (from serial no. 10079 to serial no. 16757) - sheet 7 of 11	*Table:* **C.05.04**



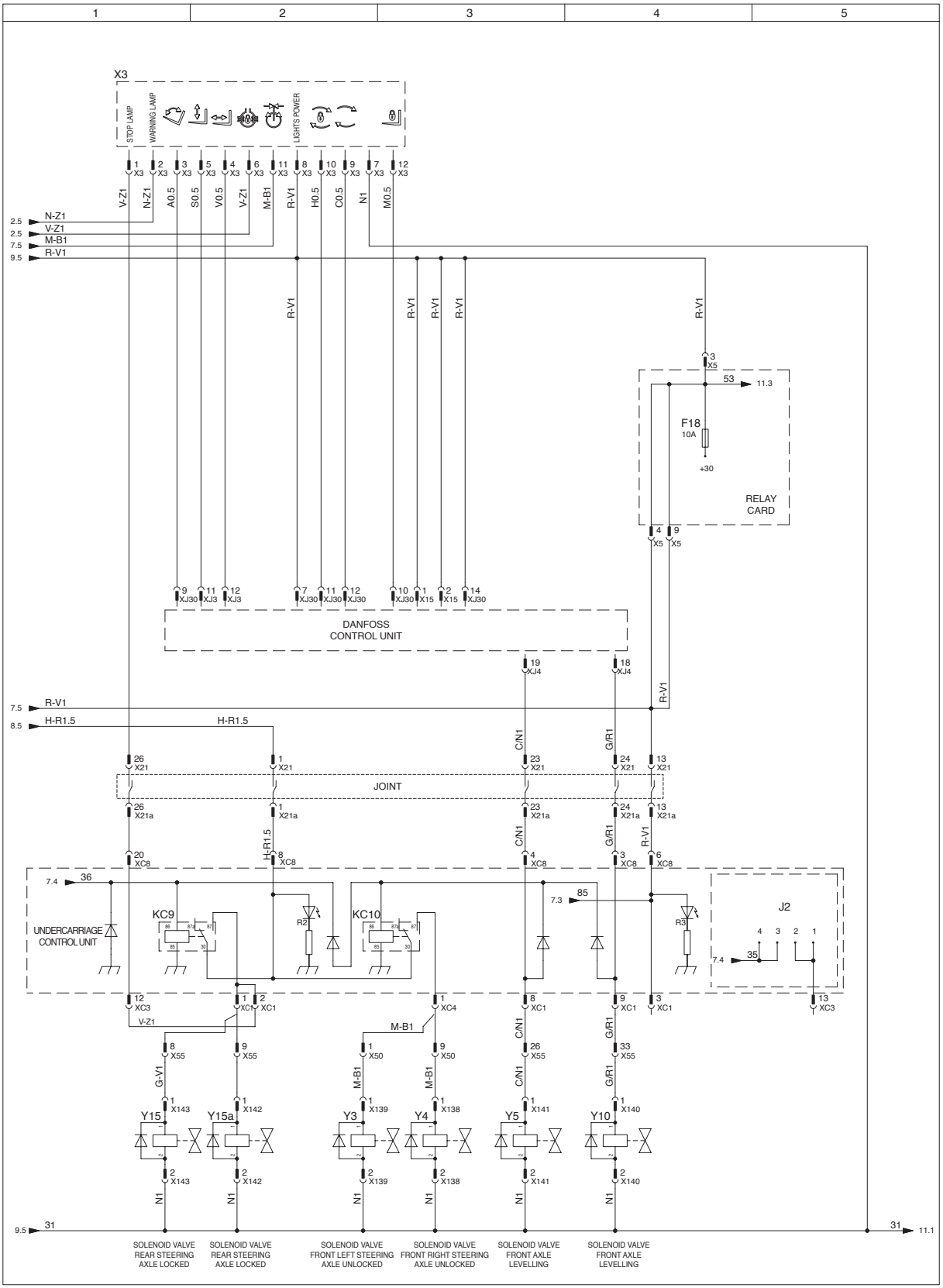
Operation:	*Table:*
Wiring diagram Girolift 5022 (from serial no. 10079 to serial no. 16757) - sheet 8 of 11	**C.05.04**



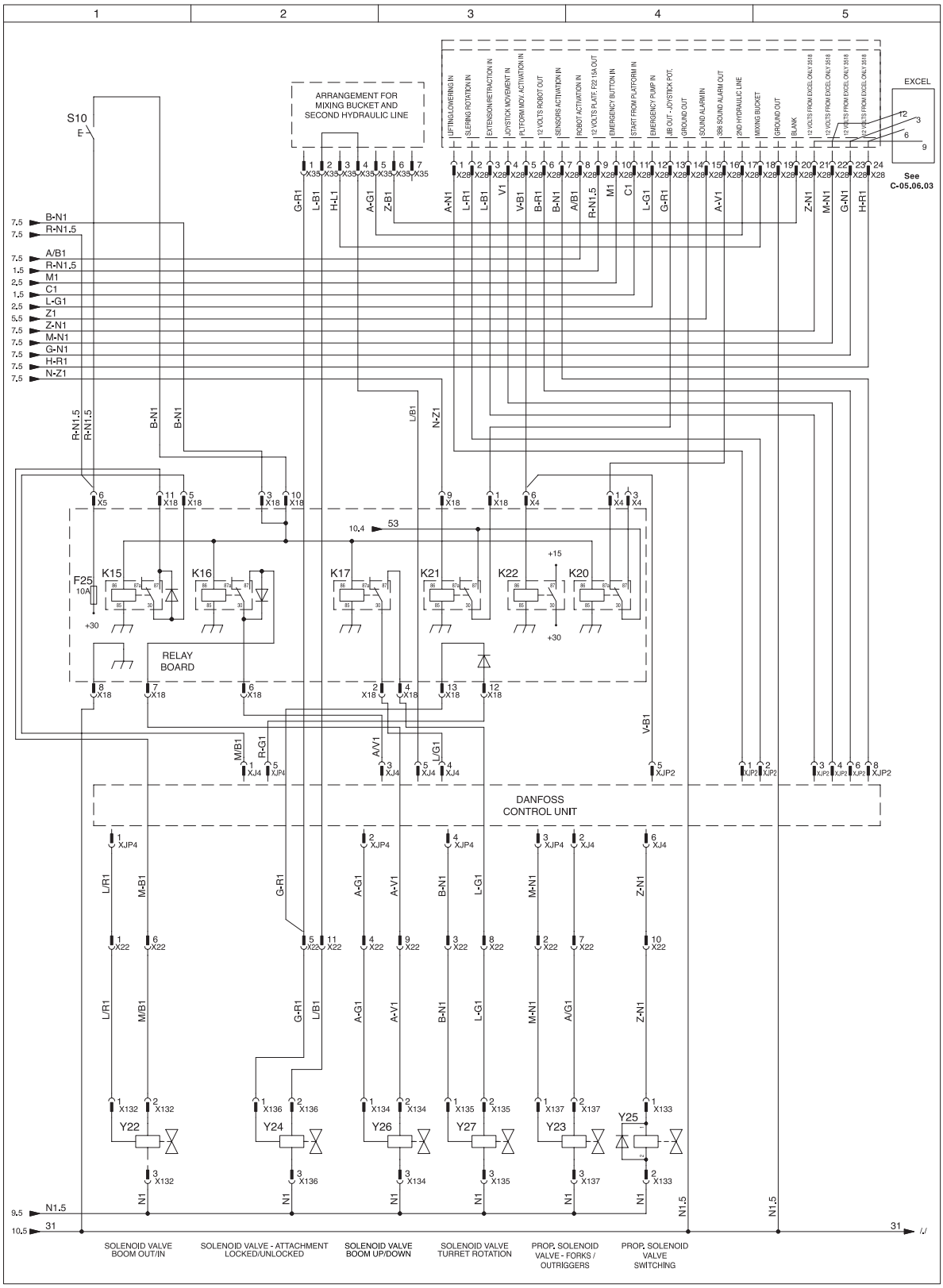
Operation:	Wiring diagram Girolift 5022 (from serial no. 10079 to serial no. 16757) - sheet 9 of 11	*Table:* **C.05.04**



Operation:	Table:
Wiring diagram Girolift 5022 (from serial no. 10079 to serial no. 16757) - sheet 10 of 11	C.05.04



Operation:	Wiring diagram Girolift 5022 (from serial no. 10079 to serial no. 16757) - sheet 11 of 11	Table: C.05.04



Operation:	*Table:*
Wiring diagram Girolift 5022 (from serial no. 10079) • UNDERCARRIAGE board	**C.05.04**

XC8 - MARK 21-WAY

POS.	FUNCTION DESCRIPTION	COL.
1	SENSOR - SLEWRING LOCKING PIN	Z-B
2	SENSOR - CARDAN SHAFT	A-B
3	Y10 SOLENOID VALVE - AXLE LEVELLING	G/R
4	Y5 SOLENOID VALVE - AXLE LEVELLING	C/N
5	1ST SPEED SOLENOID VALVE	M-B
6	SENSOR POWER SUPPLY	R-V
7	DISCONNECTED	
8	SOLENOID VALVE - REAR STEERING AXLE LOCKED	H-R
9	OUTRIGGER RELAY SWITCHING	S/N
10	DISCONNECTED	
11	SOLENOID VALVE - LEFT OUTRIGGER OUT	V/B
12	SOLENOID VALVE - DIFFERENTIAL LOCKING	C-B
13	DISCONNECTED	
14	SOLENOID VALVE - DISPLACEMENT CHANGE	C-V
15	MECH. SPEED LIGHT POWER SUPPLY 2ND SPEED SOLENOID VALVE	A-R B-N
16	DISCONNECTED	
17	SOLENOID VALVE - FOUR-WHEEL STEER	H-R
18	SOLENOID VALVE - CRAB STEER	C-N
19	SIGNAL - BOOM DOWN	C-L
20	SIGNAL - AXLE BLOCKED	V-Z
21	SIGNAL - REAR ALIGNMENT	L-G

XC6 - MARK 9-WAY

POS.	FUNCTION DESCRIPTION	COL.
1	GND	
2	RIGHT TURN SIGNAL	A
3	DISCONNECTED	
4	DISCONNECTED	
5	DISCONNECTED	
6	LEFT TURN SIGNAL	L
7	DISCONNECTED	
8	DISCONNECTED	
9	DISCONNECTED	

XC5 - MARK 17-WAY

POS.	FUNCTION DESCRIPTION
NOT USED	

XC4 - MARK 13-WAY

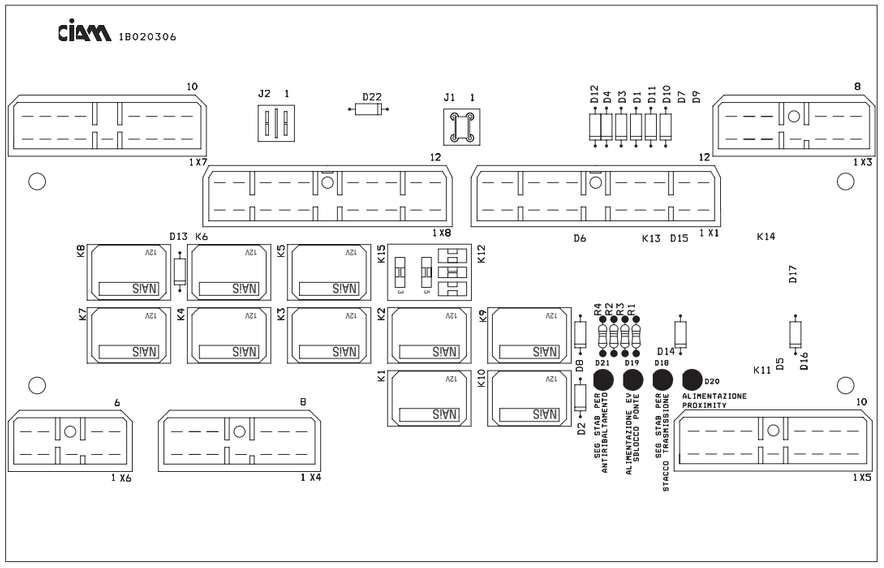
POS.	FUNCTION DESCRIPTION	COL.
1	FRONT LEFT STEER. AXLE UNLOCK. SOLENOID FRONT RIGHT STEER. AXLE UNLOCK. SOLENOID	2MB
2	DISCONNECTED	
3	DISCONNECTED	
4	FRONT LEFT OUTR. LIMIT SWITCH NC P.S. FRONT LEFT OUTR. LIMIT SWITCH NC P.S.	2RV
5	SOLENOID VALVE - FRONT LEFT OUTRIGGER UP	B/N
6	SOLENOID VALVE - FRONT RIGHT OUTRIGGER IN	A/B
7	SOLENOID VALVE - FRONT RIGHT OUTRIGGER UP	Z/B
8	SOLENOID VALVE - FRONT LEFT OUTRIGGER OUT	V/B
9	SOLENOID VALVE - FRONT LEFT OUTRIGGER IN	C/B
10	DISCONNECTED	
11	SOLENOID VALVE - FRONT LEFT OUTRIGGER UP	M/N
12	SOLENOID VALVE - FRONT LEFT OUTRIGGER DOWN	V/N
13	SOLENOID VALVE - FRONT RIGHT OUTRIGGER DOWN	A/R

XC3 - MARK 13-WAY

POS.	FUNCTION DESCRIPTION	COL.
1	SOLENOID VALVE - REAR RIGHT OUTRIGGER OUT	M/N
2	SOLENOID VALVE - REAR LEFT OUTRIGGER IN	C/B
3	DISCONNECTED	
4	SOLENOID VALVE - REAR LEFT OUTRIGGER UP	B/N
5	SOLENOID VALVE - REAR LEFT OUTRIGGER DOWN	V/N
6	SOLENOID VALVE - REAR RIGHT OUTRIGGER DOWN	A/R
7	SOLENOID VALVE - REAR RIGHT OUTRIGGER UP	Z/B
8	SOLENOID VALVE - REAR RIGHT OUTRIGGER IN	A/B
9	SOLENOID VALVE - REAR LEFT OUTRIGGER OUT	V/B
10	GND	N
11	SENSOR - REAR WHEELS ALIGNMENT	L-B
12	DISCONNECTED	M-N
13	DISCONNECTED	Z-N

XC1 - MARK 21-WAY

POS.	FUNCTION DESCRIPTION	COL.
1	SOLENOID VALVE - REAR STEER. AXLE UNLOCK.	2GV
2	DISCONNECTED	
3	DISCONNECTED	
4	DISCONNECTED	
5	DISCONNECTED	
6	SLEWRING BLOCKED SENS. P.S. REAR AXLE LEVELLING SENS. P.S.	2RV
7	SOLENOID VALVE - 1ST HYDR. SPEED	B-V
8	SOLENOID VALVE - REAR AXLE LEVELLING	C/N
9	SOLENOID VALVE - REAR AXLE LEVELLING	G/R
10	SIGNAL - CARDAN SHAFT SENSOR	A-B
11	SIGNAL - SLEWRING BLOCKED	Z-B
12	DISCONNECTED	
13	DISCONNECTED	
14	POWER SUPPLY - LICENCE PLATE LIGHT	G-N
15	CRAB STEERING SOLENOID VALVE	C-N
16	4-WHEEL STEERING SOLENOID VALVE	H-R
17		
18	SOLENOID VALVE - 2ND HYDR. SPEED	B-R
19	SOLENOID VALVE - DISPLACEMENT CHANGE	V
20	DISCONNECTED	
21	SOLENOID VALVE - DIFFERENTIAL LOCKING	C-B



ABBREVIATION LEGEND

ANT.	FRONT	SAL.	LIFTING
POST.	REAR	DIS.	LOWERING
STAB.	STABILIZER	SENS.	SENSOR
S.V.	SOLENOID VALVE	CONN.	CONNECTOR
P.S.	POWER SUPPLY	DIFFER.	DIFFERENTIAL
SX	LEFT	SIG.	SIGNAL
DX	RIGHT		
N.C.	DISCONNECTED		

XC7 - MARK 17-WAY

POS.	FUNCTION DESCRIPTION	COL.
1	SOLENOID VALVE - LEFT STAB. UP	B/N
2	SOLENOID VALVE - RIGHT STAB. OUT	M-N
3	SOLENOID VALVE - LEFT STAB. DOWN	V/N
4	SOLENOID VALVE - RIGHT STAB. IN	A-B
5	GND	N
6	SOLENOID VALVE - RIGHT STAB. UP	Z/B
7	LEFT TURN SIGNAL	A
8	DISCONNECTED	
9	DISCONNECTED	
10	SOLENOID VALVE - LEFT STAB. IN	C/B
11	DISCONNECTED	
12	DISCONNECTED	
13	DISCONNECTED	
14	SOLENOID VALVE - RIGHT STAB. DOWN	A/R
15	RIGHT TURN SIGNAL	L
16	DISCONNECTED	
17	DISCONNECTED	

WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

REMARK: TWO-COLOUR WIRES ARE INDICATED INDICATEDTHROUGH A COMBINATION OF THE AFORESAID INITIALS AS FOLLOWS:

G/V ->YELLOW/GREEN (CROSSWISE COLOURING)
G-V ->YELLOW-GREEN (LENGTHSWISE COLOURING)

D.R.C. 04.15.02 rev 00

Operation:	*Table:*
Wiring diagram Girolift 5022 (from serial no. 10079) • DANFOSS board	**C.05.04**

"XJP2" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	SIGNAL - LIFTING/LOWERING	A-N	IN
2	SIGNAL - TURRET ROTATION	L-R	IN
3	SIGNAL - BOOM EXTENSION/RETRACT.	L-B	IN
4	+12 JOYSTICK IN MOTION	V	IN
5	PLATFORM MOTION ON	V-B	IN
6	+12 FOR ROBOT POWER SUPPLY	B-R	OUT
7	DISCONNECTED		
8	SENSOR - FORKS COUPLED	B-N	IN

"XJP3" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	DISCONNECTED		
2	TO ROBOT	A/B	IN
3	DISCONNECTED		
4	DISCONNECTED		
5	DISCONNECTED		
6	DISCONNECTED		
7	DISCONNECTED		
8	DISCONNECTED		

"XJ4" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	Y22 SIGNAL - BOOM OUT/IN	M/B	OUT
2	FORK ROTATION PROP. SIGNAL Y23	V/B	OUT
3	Y26 SIGNAL - BOOM EXT./RETRACT.	A/V	OUT
4	TURRET ROTATION S.V. SIGNAL Y27	L/G	OUT
5	Y24 SIGNAL - COUPLING/RELEASE	L/B	OUT
6	Y25 SOLENOID VALVE - SWITCHING	Z-N	OUT
7	DISCONNECTED		
8	DISCONNECTED		
9	SOLENOID VALVE - LEFT OUTRIGGERS OUT	V/B	OUT
10	SOLENOID VALVE - LEFT OUTRIGGERS IN	C/B	OUT
11	SOLENOID VALVE - RIGHT OUTRIGGERS OUT	M-N	OUT
12	SOLENOID VALVE - RIGHT OUTRIGGERS IN	A-B	OUT
13	SOLENOID VALVE - LEFT OUTRIGGERS UP	B/N	OUT
14	SOLENOID VALVE - LEFT OUTRIGGERS DOWN	V/N	OUT
15	SOLENOID VALVE - RIGHT OUTRIGGERS UP	Z/B	OUT
16	SOLENOID VALVE - RIGHT OUTRIGGERS DOWN	A/R	OUT
17	OUTRIGGER RELAY COIL SWITCHING	S-N	OUT
18	Y10 SOLENOID VALVE - FRONT AXLE LEVELLING	G/R	OUT
19	Y5 SOLENOID VALVE - FRONT AXLE LEVELLING	C/N	OUT
20	SENSOR - LOCKING PIN FOR SLEWRING	Z-B	IN

"XJ5" CONNECTOR

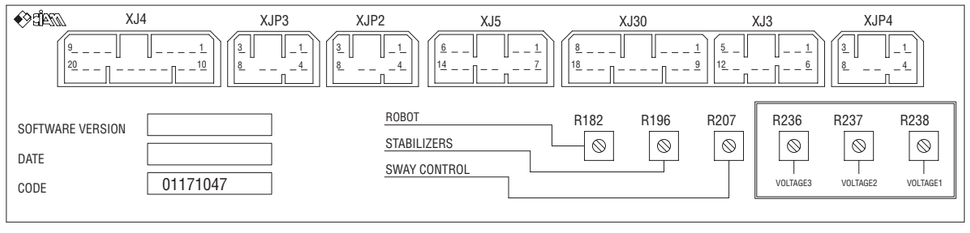
POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	+12 JOYSTICK IN MOTION	M+B+M-V	IN
2	YELLOW PUSHBUTTON	S-N	IN
3	RED PUSHBUTTON	B-L	IN
4	DEAD MAN	B-H	IN
5	JOYSTICK - DIR.1A FWD	N	IN
6	JOYSTICK - DIR.1B REVERSE	B-R	IN
7	JOYSTICK - DIR. 2A RIGHT	M-R	IN
8	JOYSTICK - DIR. 2B LEFT	M-S	IN
9	JOY. - DIR.3A BOOM RETRACTION	B/S	IN
10	JOY. - DIR.3B BOOM EXTENSION	S	IN
11	PROP. 1P LIFTING/LOWERING	R	IN
12	PROP. 2P ROTATION	L	IN
13	PROP. 3P EXT./RETRACTION	H	IN
14	+12 FOR JOYSTICK POTENTIOMETERS	MG+BG+V+Z	OUT

"XJ3-XJ30" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	RIGHT FRONT ARM PUSBUTTON	B	IN
2	RIGHT FRONT FOOT PUSBUTTON	A/R	IN
3	FRONT LEFT OUTRIGGER ARM PUSBUTTON	Z/B	IN
4	FRONT LEFT OUTRIGGER FOOT PUSBUTTON	V/N	IN
5	REAR RIGHT OUTRIGGER ARM PUSBUTTON	M/N	IN
6	TO PLATFORM (FROM ROAD/SITE/PLATF. SELECTOR)	H/N	IN
7	SENSOR - LOCK. PIN UP (SLEWRING LOCKED)	A-N	IN
8	OVERLOAD WARNING SYSTEM SENSOR FROM 3B6	B-N	IN
9	SENSOR - BOOM DOWN	C-L	IN
10	SENSOR - BOOM UP	B/V	IN
11	BOOM LIFTING/LOWER. INDICATOR	S	IN
12	BOOM EXTENS./RETRACT. INDICATOR	V	IN
1	RIGHT STAB. LEG/FOOT PUSHBUTTON	V/B	IN
2	LEFT STAB. FOOT PUSHBUTTON	C-B	IN
3	LEFT STAB. FOOT PUSHBUTTON	A/B	IN
4	SWAY CONTROL PUSHBUTTON	C/N	IN
5	IN OPTIONAL JOYSTICK	G/N	IN
6	SWITCH - SLEWRING LOCKED/UNLOCKED	G/R	IN
7	SEAT SENSOR	R-V	IN
8	TO CABIN (FROM ROAD/SITE/PLATF. SELECTOR)	M-N	IN
9	INDICATOR - FORK ROTATION	A	IN
10	INDICATOR - FORK COUPLED	M	IN
11	INDICATOR - ROTATION LOCKED	H	IN
12	INDICATOR - TURRET LOCKED	C	IN
13	DISCONNECTED		
14	SEAT SENSOR	R-V	IN
15	DISCONNECTED		
16	DISCONNECTED		
17	DISCONNECTED		
18	GND	N	IN

"XJP4" CONNECTOR

POS.	FUNCTION DESCRIPTION	COLOUR	SIG.
1	Y22 EXTENSION/RETRACTION SOLENOID POWER SUPPLY	L/R	OUT
2	Y26 BOOM LIFTING/LOWER. SOLENOID POWER SUPPLY	A-G1	OUT
3	Y23 FORKS ROTATION SOLENOID POWER SUPPLY	M-N	OUT
4	Y27 TURRET ROTATION SOLENOID POWER SUPPLY	B-N	OUT
5	Y24 ATTACHMENT COUPLING/RELEASE SOLENOID POWER SUPPLY	R-G	OUT
6	DISCONNECTED		
7	DISCONNECTED		
8	DISCONNECTED		



D.R.C. 04.15.03 rev 00

Operation: Wiring diagram Girolift 5022 (from serial no. 10079) • CONTROL UNIT board	*Table:* **C.05.04**

X5 - MARK 11

POS.	FUNCTION DESCRIPTION	COL
1	Right pos. light Danfoss cont. unit power supply	2G
2	Pos. lights fuse power supply	B
3	DISCONNECTED	
4	Outriggers lowered sensor	R-V
5	Front left pos. light	G/N
6	3B6 control unit power supply	2R-N
7	Rear left pos. light	G/N
8	Position lights indicator	G/N
9	DISCONNECTED	
10	DISCONNECTED	
11	Instruments backlight	G

X17- MARK 17

POS.	FUNCTION DESCRIPTION	COL
1	DISCONNECTED	
2	DISCONNECTED	
3	DISCONNECTED	
4	56a LEFT FRONT	V
5	56a RIGHT	V
6	Horn	Z
7	DISCONNECTED	
8	Start-up enabling command	C
9	Motor start 50 Start	2B-R
10	Power supply - Fog ligth switch	H/N
11	Left low beam	H
12	Right low beam	H
13	High beam Indicator	V
14	Horn Horn	2Z
15	High beam common switch	H-B
16	High beam common	V-B
17	Mechanical speed	G-R

X16 - MARK 13

POS.	FUNCTION DESCRIPTION	COL
1	DISCONNECTED	
2	Forward speed	V-N
3	Back-up horn	M-V
4	Speed/gearbox switch power s.	2C-R
5		
6	Solenoid valve - 1st mechanical speed	M-B
7	Solenoid valve - 2nd mechanical speed	2B-N
8	Transmission disconnected	S-G
9	Solenoid valve - reverse speed Back-up lamp	2M-V
10		
11	Solenoid valve - forward speed	V-N
12	Reverse speed	H-V
13	Movement signal	A-B

X6 - MARK 17

POS.	FUNCTION DESCRIPTION	COL
1	DISCONNECTED	
2	Walvoil control unit power supply	A
3	Work selector switch	Z-N
4	Emergency pump power supply	L-N
5	Basket emerg.button power supply	C-R
6	Cab emerg.button out	B/R
7		
8	Outrigger switch	2L/B
9	Outrigger switch	A-G
10	DISCONNECTED	
11	Electrostop	M
12	Cab emerg.button power supply	A/G
13	Electrostop from jobsite	G-M
14	Electrostop	M
15	DISCONNECTED	
16	DISCONNECTED	
17	DISCONNECTED	

X7 - MARK 17

POS.	FUNCTION DESCRIPTION	COL
1	Left high beam power supply steering axle locked	V
2	signal - stabilizers for overload system steering axle locked	L-R
3	stabilizer sensor power supply steering axle locked	R-V
4	Signal - stabilizer for transmission disengagement	B-G
5	sensor - cardan shaft	A-B
6	Sensor - 1st speed engaged	A-V
7	Sensor - 2nd speed engaged	A-R
8	Low beam	H
9	Low beam	H
10	High beam	V
11	displacement change solenoid power supply	V
12	Left turn signal	L
13	Right turn signal	A
14	optional	L-G
15	Left position lights	G-N
16	kc9-kc10 relay 30 power supply Steering axle sway unlocking	H-R
17	Right position lights	2 G

X9 - MARK 13

POS.	FUNCTION DESCRIPTION	COL
1	Lights switch power supply	L/N
2	DISCONNECTED	
3	A/c system switch power supply	A
4	Stop lights switch power supply	A-R
5	Beacon power supply	G-V
6	Rear wiper power supply	L-R
7	Turn signal - light indicator	S/N
8	Front wiper power supply	L/N
9	Switch lamp power supply Instruments power supply	2B-R
10	Warning light power supply	H-L
11	DISCONNECTED	
12	Blinking power supply	A-R
13	49	A-N

X8 - MARK 5

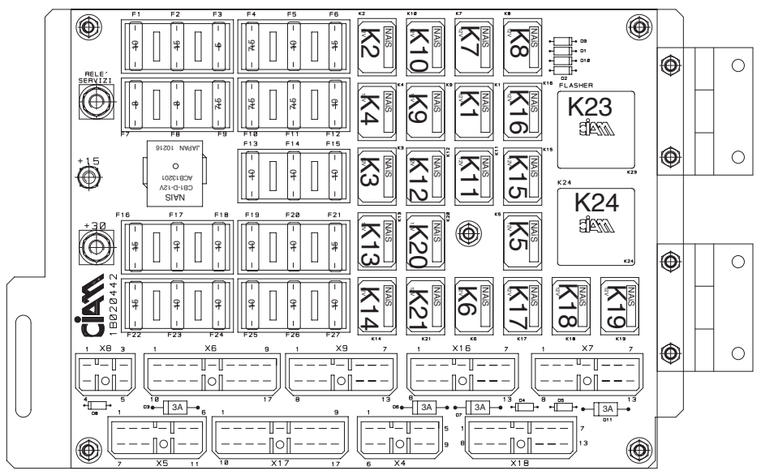
POS.	FUNCTION DESCRIPTION	COL
1	58 CONTROL BOARD	R
2	Basket power supply	H-R
3	Pos. light switch power supply	B-R
4	Warn. light switch power supply	R-G
5	Cab interior lights power supply	R

X18 - MARK 13

POS.	FUNCTION DESCRIPTION	COL
1	Solenoid valve - 17 m boom Solenoid valve - 17 m boom	V/N A-N
2	DISCONNECTED	
3	Signal - overload warning system	B-N
4	DISCONNECTED	
5	Solenoid valve - boom extension	H-L
6	Solenoid valve - boom down	L-R
7	Solenoid valve - boom down	L-N
8	GND	N
9	Sensor - 17 m boom	G-N
10	ARB forced signal Overload signal for Walvoil control unit	2B-N
11	Solenoid valve - boom extension	S-N
12	DISCONNECTED	
13	DISCONNECTED	

X4 - MARK 9

POS.	FUNCTION DESCRIPTION	COL
1	Moment alarm	V-B
2	86 Aux circuit relay	C
3	DISCONNECTED	
4	Jobsite function signal	S
5	Jobsite functions enabled	M-N
6	Platform relay power supply	L
7	Platform enabled	H/N
8	Platform enabling signal	C
9	85 Aux circuit relay	N-Z



WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

REMARK: TWO-COLOUR WIRES ARE INDICATED INDICATEDTHROUGH A COMBINATION OF THE AFORESAID INITIALS AS FOLLOWS:

G/V ->YELLOW/GREEN (CROSSWISE COLOURING)
G-V ->YELLOW-GREEN (LENGTHSWISE COLOURING)

X7 - MARK 13

POS.	FUNCTION DESCRIPTION	COL
1	DISCONNECTED	
2	DISCONNECTED	
3	DISCONNECTED	
4	DISCONNECTED	
5	DISCONNECTED	
6	Platform relay power supply	H-R
7	+15 general Platform relay power supply	R-N L
8	DISCONNECTED	
9	DISCONNECTED	
10	DISCONNECTED	
11	BRIDGE	N
12	Forks block signal	B-N
13	BRIDGE	N

Operation: Wiring diagram - components description	Table: C.05.04

Ref.	Description	Sheet
F1G	MAIN FUSE 20A	1
F1G	MAIN FUSE 30A	1
F1G	MAIN FUSE 60A	1
F1G	MAIN FUSE 20A	1
A1	ALTERNATOR	1
B0	BATTERY	1
B10	SENSOR - CARRIAGES ALIGNED	7
B11	PRESSURE SWITCH - ENGINE OIL FILTER	1
B11	SENSOR - PIN HIGH	7
B12	FUEL GAUGE	4
B12	THERMOSTAT - HIGH ENGINE WATER TEMPERATURE	1
B12a	FUEL RESERVE	4
B13	HYDRAULIC OIL THERMOMETER - HIGH TEMPERATURE	4
B13	THERMOSTAT - HIGH ENGINE WATER TEMPERATURE	1
B14.1	MICRO-SWITCH - ENGINE OIL FILTER CLOGGED	1
B15	MICRO-SWITCH - AIR FILTER CLOGGED	1
B2	SENSOR - SLEWRING BLOCKED	7
B3	SENSOR - REAR STEERING AXLE ALIGNED	7
B4	PRESSURE SWITCH - LOW ENGINE OIL PRESSURE	6
F1	FUSE - FRONT WIPER 10A	5
F10	FUSE - EMERGENCY SWITCH 7.5A	4
F11	FUSE - BEACON 7,5A	6
F12	FUSE - WORK LIGHTS 10A	4
F14	FUSE - DRIVE SWITCH 10A	3
F15	FUSE - HIGH BEAM 10A	4
F16	FUSE - EMERGENCY LIGHT SWITCH 15A	5
F17	FUSE - LIGHTS AND FLASHING 10A	4
F18	FUSE - OUTRIGGERS LOWERED 10A	10
F19	FUSE - STEERING SELECTOR 10A	8
F2	FUSE - HEATING 15A	6
F20	FUSE - EMERGENCY MUSHROOM-HEAD PUSHBUTTON 10A	2
F21	FUSE - HORN 15A	4
F22	FUSE - PLATFORM ROTATION 15A	1
F23	FUSE - CAB LIGHTS 10A	6
F25	FUSE - 3B6 CONTROL UNIT 10A	11
F26	FUSE - OUTRIGGERS 10A	8
F2G	MAIN FUSE 3A	1
F3	FUSE - STOP SWITCH 5A	4
F3G	MAIN FUSE 3A	1
F4	FUSE - REAR WINDSCREEN WIPER 7.5A	6
F6	FUSE - LOW BEAM 15A	4
F7	FUSE - RIGHT POSITION LIGHTS SWITCH 3A	4
F8	FUSE - LEFT POSITION LIGHTS SWITCH 3A	4
F9	FUSE - INSTRUMENTS LIGHTING POWER SUPPLY 7,5A	6
H01	LICENCE PLATE LIGHT	3
H1	LEFT SIDE LIGHT	3
H2	RIGHT SIDE LIGHT	3
H20	HORN	4
H22	FRONT RIGHT LIGHT	4
H23	REAR LEFT LIGHT	4
H24	LICENCE PLATE LIGHT	4
H25	BACK-UP HORN	3
H26	REAR RIGHT LIGHT	4
H27	LIGHT	4
H9	LIGHT INDICATOR - BASKET ENABLED	8
K01	RELAY - START-UP	1
K02	START AID RELAY	1
K03	INJECTION RELAY	1
K04	RELAY - AUX CIRCUITS	2
K1	RELAY - HIGH BEAM	4
K10	RELAY - TRANSMISSION DISCONNECTED	3
K11	RELAY - START-UP ENABLING COMMAND	1
K12	RELAY - AUX CIRCUITS	2
K13	RELAY - EMERGENCY PUMP	2
K14	RELAY - OUTRIGGERS	8
K15	RELAY - BOOM OUT/IN	11
K16	RELAY - BOOM UP/DOWN	11
K17	RELAY - TURRET ROTATION	11
K2	RELAY - HIGH BEAM	4
K20	RELAY - OVERLOAD ALARM ACTIVATION IN PLATFORM	11
K21	RELAY - POWER ACTIVATION FROM PLATFORM	11
K22	RELAY	11
K23	INTERMITTENCE	5
K24	TIMER	3
K3	RELAY - HORN	4
K4	RELAY - WORK LIGHTS	4
K5	RELAY - 1st and 2nd MECHANICAL SPEED	3
K6	RELAY - POWER DISPLACEMENT CHANGE	3
K7	RELAY - FORWARD SPEED	3
K8	RELAY - REVERSE SPEED	3
K9	RELAY - TRANSMISSION DISCONNECTED	3
KC1	RELAY - FRONT/REAR LEFT OUTRIGGER OUT	8
KC10	RELAY - FRONT STEERING AXLE UNLOCKING	10

Operation: Wiring diagram - components description	Table: C.05.04

KC15	RELAY - SLEWRING LOCKED	7
KC2	RELAY - FRONT/REAR LEFT OUTRIGGER IN	8
KC3	RELAY - FRONT/REAR RIGHT OUTRIGGER OUT	9
KC4	RELAY - FRONT/REAR RIGHT OUTRIGGER IN	9
KC5	RELAY - FRONT/REAR LEFT OUTRIGGER UP	8
KC6	RELAY - FRONT/REAR LEFT OUTRIGGER DOWN	8
KC7	RELAY - FRONT/REAR RIGHT OUTRIGGER UP	9
KC8	RELAY - FRONT/REAR RIGHT OUTRIGGER DOWN	9
KC9	RELAY - REAR STEERING AXLE LOCKED	10
L10	FRONT LEFT LIGHT	4
L8	LIGHT	4
M1	STARTING MOTOR	1
M13	UPPER WINDSCREEN WIPER/WASHER MOTOR	5
M3	ROOF WINDSHIELD WIPER/WASHER	6
M5	HEATING	6
M74	A/C SYSTEM	6
M8	EMERGENCY PUMP	2
M91	PUMP MOTOR	5
R0	GLOW PLUGS	1
P1	ENGINE WATER TEMPERATURE GAUGE	1
P2	FUEL LEVEL GAUGE	4
P3	FUEL GAUGE	4
P4	HOUR-METER	1
SX11	LIGHTS / WIPER SWITCH	5
S0	BATTERY CUTOFF	1
S01	START-UP PANEL	1
S1	RIGHT STABILIZER FOOT SWITCH	9
S10	OVERLOAD CUTOUT	11
S13	EMERGENCY MUSHROOM-HEAD PUSHBUTTON	2
S14	SWITCH - SPEED CHANGE	3
S15	SWITCH - DIFFERENTIAL LOCKING	8
S16	WARNING SWITCH	8
S17	SWITCH - EMERGENCY PUMP	2
S18	SWITCH - LIGHTS	4
S19	SWITCH - LIGHTS	4
S2	FRONT LEFT STABILIZER FOOT SWITCH	9
S20	SWITCH - HEATER	6
SX12	SPEED SWICTH	3
S21	SWITCH - WORK LIGHTS	4
S22	STEERING SELECTOR	8
S3	REAR LEFT STABILIZER FOOT SWITCH	9
S30	STOP LIGHTS MICRO-SWITCH	4
S4	REAR RIGHT STABILIZER FOOT SWITCH	9
S5	SWITCH - SLEWRING LOCKED/UNLOCKED	9
S51	FRONT LEFT OUTRIGGER MICRO-SWITCH	7
S52	FRONT RIGHT OUTRIGGER MICRO-SWITCH	7
S53	REAR LEFT OUTRIGGER MICRO-SWITCH	7
S54	REAR LEFT OUTRIGGER MICRO-SWITCH	7
S6	REAR RIGHT OUTRIGGER MICRO-SWITCH	7
S7	SWITCH - A/C SYSTEM	6
X101	BEACON	6
X102	CAB INTERIOR LIGHTS	6
Y01	SOLENOID VALVE - FORWARD SPEED	3
Y02	SOLENOID VALVE - REVERSE SPEED	3
Y1	SOLENOID VALVE - SLEWRING LOCKED	9
Y10	SOLENOID VALVE - FRONT AXLE LEVELLING	10
Y11	SOLENOID VALVE - REAR RIGHT OUTRIGGER DOWN	9
Y11a	SOLENOID VALVE - FRONT RIGHT OUTRIGGER DOWN	9
Y12	SOLENOID VALVE - REAR RIGHT OUTRIGGER UP	9
Y12a	SOLENOID VALVE - FRONT RIGHT OUTRIGGER UP	9
Y13	SOLENOID VALVE - REAR RIGHT OUTRIGGER IN	9
Y13a	SOLENOID VALVE - FRONT RIGHT OUTRIGGER IN	9
Y14	SOLENOID VALVE - REAR RIGHT OUTRIGGER OUT	9
Y14a	SOLENOID VALVE - FRONT RIGHT OUTRIGGER OUT	9
Y15	SOLENOID VALVE - REAR STEERING AXLE LOCKED	10
Y15a	SOLENOID VALVE - REAR STEERING AXLE LOCKED	10
Y16	SOLENOID VALVE - 2ND SPEED	3
Y17	SOLENOID VALVE - 1ST SPEED	3
Y18	SOLENOID VALVE - DISPLACEMENT CHANGE	3
Y19	SOLENOID VALVE - DIFFERENTIAL LOCKING	8
Y2	SOLENOID VALVE - SLEWRING UNLOCKED	9
Y20	SOLENOID VALVE - FOUR-WHEEL STEER	8
Y21	SOLENOID VALVE - CRAB STEER	8
Y22	SOLENOID VALVE - BOOM OUT/IN	11
Y23	SOLENOID VALVE - FORKS/OUTRIGGERS	11
Y24	SOLENOID VALVE - ATTACHMENT LOCKED/ UNLOCKED	11
Y25	SOLENOID VALVE - SWITCHING	11
Y26	SOLENOID VALVE - BOOM UP/DOWN	11
Y27	SOLENOID VALVE - TURRET ROTATION	11
Y3	SOLENOID VALVE - FRONT LEFT STEERING AXLE UNLOCKED	10
Y4	SOLENOID VALVE - FRONT RIGHT STEERING AXLE UNLOCKED	10
Y5	SOLENOID VALVE - FRONT AXLE LEVELLING	10

Operation: Wiring diagram - components description	Table: C.05.04

Y6	SOLENOID VALVE - REAR LEFT OUTRIGGER DOWN	8
Y6a	SOLENOID VALVE - FRONT LEFT OUTRIGGER DOWN	8
Y7	SOLENOID VALVE - REAR LEFT OUTRIGGER UP	8
Y7a	SOLENOID VALVE - FRONT LEFT OUTRIGGER UP	8
Y8	SOLENOID VALVE - REAR LEFT OUTRIGGER IN	8
Y8a	SOLENOID VALVE - FRONT LEFT OUTRIGGER IN	8
Y9	SOLENOID VALVE - REAR LEFT OUTRIGGER OUT	8
Y9a	SOLENOID VALVE - FRONT LEFT OUTRIGGER OUT	8
X1	8-WAY CONNECTOR - LIGHT INDICATORS	
X10	6-WAY CONNECTOR	
X104	3-WAY CONNECTOR	
X105	4-WAY CONNECTOR	
X11	13-WAY CONNECTOR	
X12	5-WAY CONNECTOR	
X122	2-WAY CONNECTOR	
X123	2-WAY CONNECTOR	
X127	2-WAY CONNECTOR	
X128	2-WAY CONNECTOR	
X129	2-WAY CONNECTOR	
X13	6-WAY CONNECTOR	
X132	3-WAY CONNECTOR	
X133	2-WAY CONNECTOR	
X134	3-WAY CONNECTOR	
X135	3-WAY CONNECTOR	
X136	3-WAY CONNECTOR	
X137	3-WAY CONNECTOR	
X138	2-WAY CONNECTOR	
X139	2-WAY CONNECTOR	
X140	2-WAY CONNECTOR	
X141	2-WAY CONNECTOR	
X142	2-WAY CONNECTOR	
X143	2-WAY CONNECTOR	
X144	2-WAY CONNECTOR	
X145	2-WAY CONNECTOR	
X146	2-WAY CONNECTOR	
X147	2-WAY CONNECTOR	
X148	2-WAY CONNECTOR	
X149	2-WAY CONNECTOR	
X15	2-WAY CONNECTOR	
X150	2-WAY CONNECTOR	
X151	2-WAY CONNECTOR	
X152	2-WAY CONNECTOR	
X153	2-WAY CONNECTOR	
X154	2-WAY CONNECTOR	
X155	2-WAY CONNECTOR	
X156	2-WAY CONNECTOR	
X157	2-WAY CONNECTOR	
X158	2-WAY CONNECTOR	
X159	2-WAY CONNECTOR	
X16	13-WAY CONNECTOR	
X160	2-WAY CONNECTOR	
X161	2-WAY CONNECTOR	
X162	2-WAY CONNECTOR	
X163	2-WAY CONNECTOR	
X164	2-WAY CONNECTOR	
X165	2-WAY CONNECTOR	
X17	17-WAY CONNECTOR	
X18	13-WAY CONNECTOR	
X19	21-WAY CONNECTOR	
X2	12-WAY CONNECTOR - LIGHT INDICATORS	6
X20	17-WAY CONNECTOR	
X21	40-WAY DEUTSCH CONNECTOR - TYPE B	
X21a	40-WAY DEUTSCH CONNECTOR - TYPE B	
X22	12-WAY CONNECTOR	
X23	3-WAY DEUTSCH CONNECTOR	
X25	17-WAY CONNECTOR	
X26	11-WAY CONNECTOR	
X27	24-WAY DEUTSCH CONNECTOR	
X28	24-WAY DEUTSCH CONNECTOR	
X29	24-WAY DEUTSCH CONNECTOR	10
X3	12-WAY CONNECTOR - LIGHT INDICATORS	
X30	2-WAY CONNECTOR	
X32	6-WAY CONNECTOR	
X33	6-WAY CONNECTOR	
X34	2-WAY 90° CONNECTOR	
X35	7-WAY CONNECTOR	
X4	9-WAY CONNECTOR	
X47	2-WAY 90° CONNECTOR	
X5	11-WAY CONNECTOR	
X50	24-WAY DEUTSCH CONNECTOR	
X51	4-WAY CONNECTOR	
X52	4-WAY CONNECTOR	
X53	4-WAY CONNECTOR	
X54	4-WAY CONNECTOR	
X55	40-WAY DEUTSCH CONNECTOR - TYPE B	
X6	17-WAY CONNECTOR	
X61	5-WAY CONNECTOR	
X70	1-WAY CONNECTOR	
X71	1-WAY CONNECTOR	
X72	2-WAY CONNECTOR	

Operation: Wiring diagram - components description	Table: C.05.04

X73	2-WAY 90° CONNECTOR	
X74	1-WAY CONNECTOR	
X76	70-WAY DEUTSCH CONNECTOR	
X77	12-WAY CONNECTOR	
X8	5-WAY CONNECTOR	
X88	12-WAY CONNECTOR	
X9	13-WAY CONNECTOR	
X91	2-WAY 90° CONNECTOR	
XB10	3-WAY DEUTSCH CONNECTOR	
XB11	3-WAY DEUTSCH CONNECTOR	
XB2	3-WAY DEUTSCH CONNECTOR	
XB3	3-WAY DEUTSCH CONNECTOR	
XC1	21-WAY CONNECTOR	
XC3	13-WAY CONNECTOR	
XC4	13-WAY CONNECTOR	
XC6	9-WAY CONNECTOR	
XC7	17-WAY CONNECTOR	
XC8	21-WAY CONNECTOR	
XH22	6-WAY CONNECTOR	
XH23	4-WAY CONNECTOR	
XH24	2-WAY CONNECTOR	
XH25	2-WAY CONNECTOR	
XH26	4-WAY CONNECTOR	
XJ3	12-WAY CONNECTOR	
XJ30	18-WAY CONNECTOR	
XJ4	20-WAY CONNECTOR	
XJP2	8-WAY CONNECTOR	
XJP3	8-WAY CONNECTOR	
XJP4	8-WAY CONNECTOR	
XM3	2-WAY CONNECTOR	
XP1	14-WAY CONNECTOR	
XP2	6-WAY CONNECTOR	
XP3	6-WAY CONNECTOR	
F5	FUSE - OPTIONAL	9
F27	FUSE - OPTIONAL	9
K18	RELAY - OPTIONAL	9
K19	RELAY - OPTIONAL	9
H80	WORK LIGHT	7
X7	13-WAY CONNECTOR	

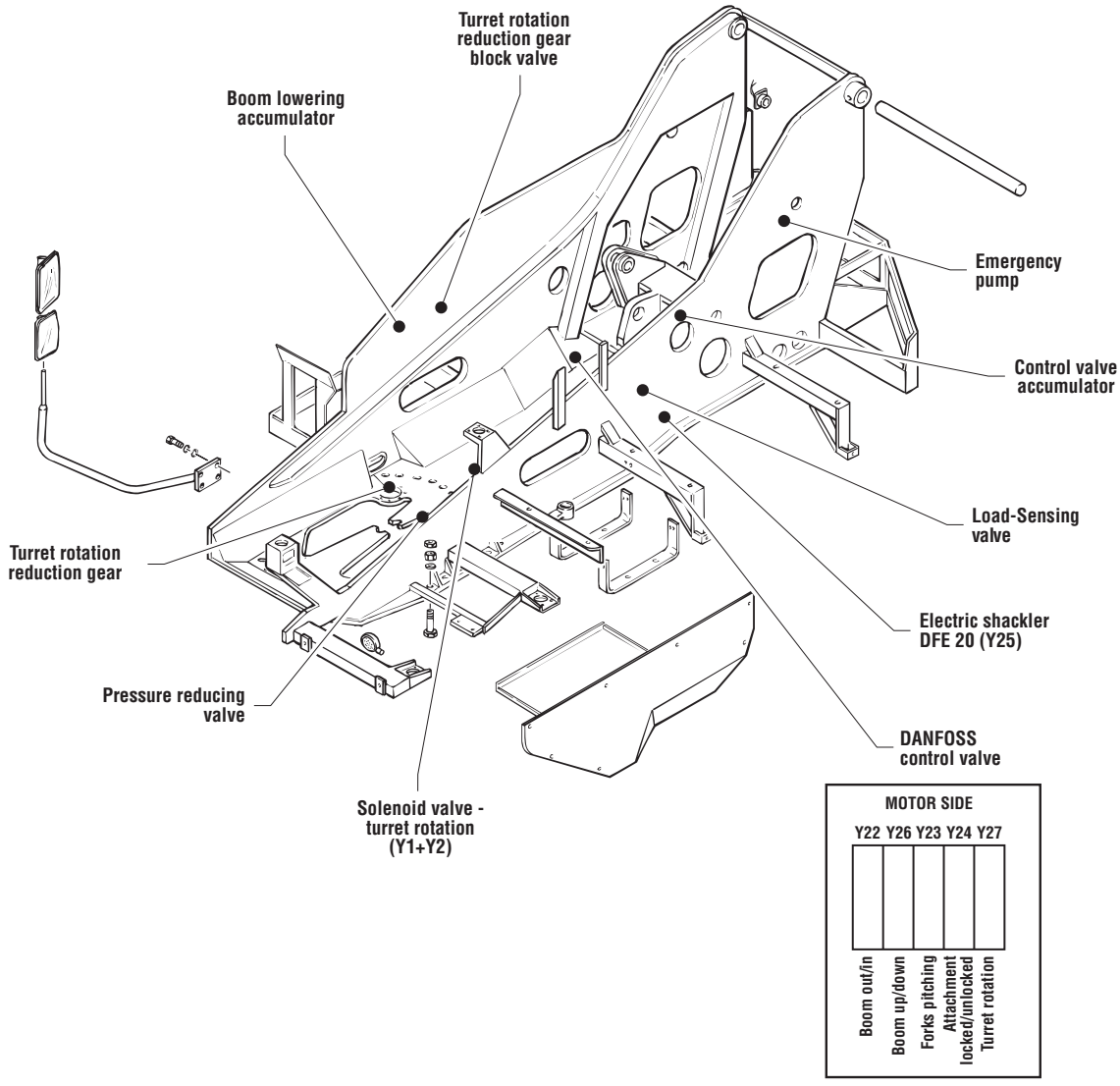
WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

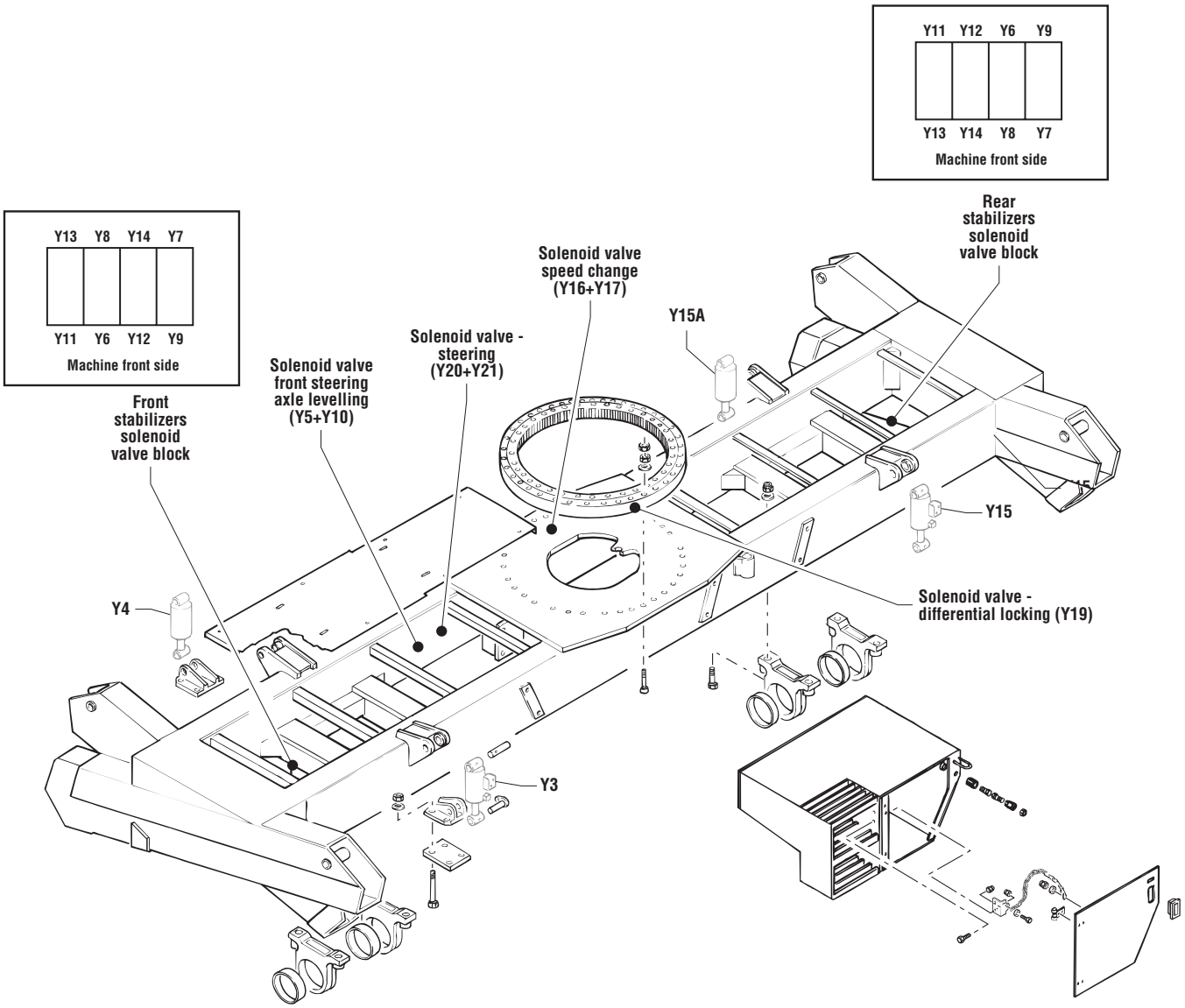
REMARK: Two-colour wires are indicated through a combination of the aforesaid initials as follows:

G/V = YELLOW/GREEN (Crosswise colouring)
G-V = YELLOW-GREEN (Lengthswise colouring)

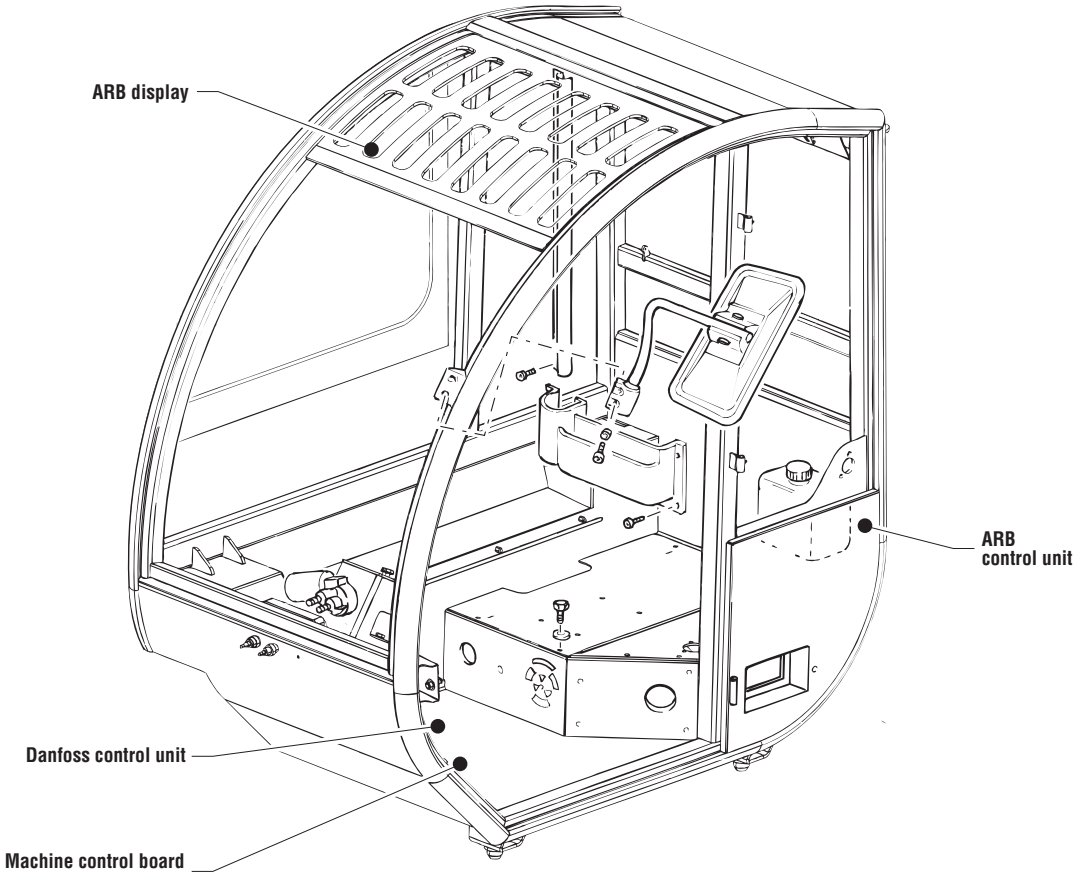
Operation:	Position of the electrical components on the machine - Girolift 5022	*Table:* **C.05.04**



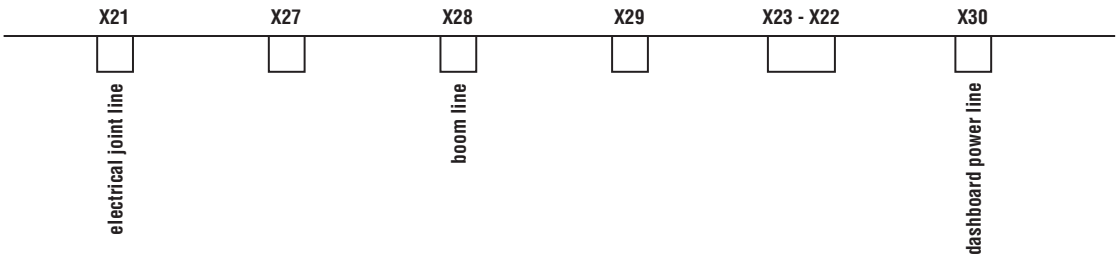
Operation:	Position of the electrical components on the machine - Girolift 5022	*Table:* **C.05.04**



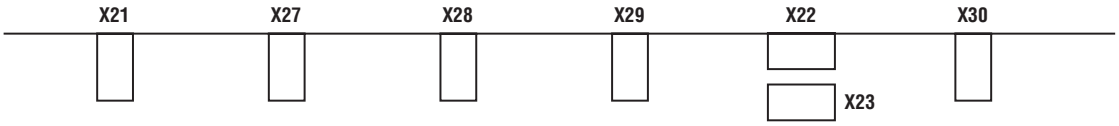
Operation:	Position of the electrical components on the machine - Girolift 5022	*Table:* **C.05.04**



Cab plugs layout (boom side) - side view



Cab plugs layout (boom side) - view from below



Operation: Motor line tree-based scheme - Girolift 5022

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Table: **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
X29	DT CONN. 125453	Sensor - air filter soiled		B14/	1	A-G	1	DF		F1/4	A	R	10	120119	+30 aux circuits	2-WAY CONN.	X30
	To cab line	S/V command - forward speed		Y1/1	2	V-N	1	DF		F1/2	B	R	6	120119	+30 start-up panel	To cab line	
	125453	S/V command - reverse speed		Y2/1	3	M-V	1	DF								125376	
		Engine oil bulb		B11/1	4	H-N	1	DF							COVER THE CLAMPED PART OF		
		H2O temperature sensor output		B12/	5	H-L	1	DF							TERMINALS WITH THERMALLY INS. TUBE		
		MAX H2O temperature sensor output		B13/	6	H/R	1	DF									
		D+ alternator		X7/	7	H	1	DF		GND/	85	N	1	ffda	GND	RELAY CONN. 125048	K1
		Electrostop		X76/	8	B	2	DF		X29/9	86	C	1	ffda	Start relay command	Relay - start up	
		Start relay command		K1/86	9	C	1	DF			30					125048	
		Light indicator - pre-heating		X2/	10	S	1	DF		X73/	87	V	4	FFDAG	Start-up enabling command	+ 157102	
		Optional A/C		X74/1	11	V-N	1.5	DF			S						
		COMMON 0 V 37		X76/	12	G	1	DF									
		SWITCH INPUT 22		X76/22	13	Z	1	DF		X76/	85	B-N	1	fplok	Start aid relay command	RELAY CONN. 125026	K2
		SIGNAL		X76/	14	V	1	DF		K3/	86	S-G	1	fplok	Start aid relay power supply	Start aid relay	
		COMMON 0 VOLT		X76/	15	N-t	1	DF		F1/1	30	L-N	2.5	fplok	Glow plug power supply from fuse	125026	
		+5 VOLTS		X76/	16	R	1	DF		X75/	87	H-R	2.5	FPLOK	Glow plugs power supply	+ 157104	
		SWITCH INPUT 11		X76/11	17	H	1	DF		X29/10		S	1	-	Light indicator - pre-heating		
		SWITCH INPUT 19		X76/19	18	M	1	DF			87a						
		SWITCH INPUT 20		X76/20	19	L	1	DF									
		SWITCH INPUT 28		X76/	20	S	1	DF			C					5-WAY FUSE HOLDER	F1
		STOP light command		X76/23	21	V-Z	1	DF		K2/30	1	L-N	2.5	120119	Glow plug power supply from fuse	Fuse Box	
		Warning light command		X76/12	22	N-Z	1	DF		X30/B	2	R	6	120119	+30 start-up panel	113623 113624	
		GND		GND/	23	N	1.5	DF		K3/30	3	B	2.5	120119	Injection relay common power supply	113625 113625	
		GND		GND/	24	N	1.5	DF		X30/A	4	R	10	120119	+30 aux circuits		
B14		Sensor - air filter soiled		X29/1		A-G	1	ff C		X76/	85	Z-B	1	fplok	Injection relay command	RELAY CONN. 125026	K3
	Air filter	GND		GND/		N	1	ff C		F2/2	86	S-G	1	fplok	Injection relay coil power supply	Injection relay	
	000000	GND		B13/		N	1	-		K2/86		S-G	1	-	Start aid relay power supply	125026	
										F1/3	30	B	2.5	fplok	Injection relay common power supply	+ 157104	
X76	70-WAY DT CONN.				1			150100		X76/	87	B	2	fplok	Injection relay power supply		
	Engine diagnostic system				2			150100			87a						
	125450				3			150100									
					4			150100		F3/	1	R	1	120142	+30 from battery	SMALL FUSE HOLDER	F2
					5			150100		K3/86	2	S-G	1	120142	Injection relay coil power supply	Fuse 3A	
					6			150100								125551	
					7			150100								+ 163010	
					8			150100									
					9			150100		X71/	1	R	2.5	120142	+30 from battery	SMALL FUSE HOLDER	F3
					10			150100		F2/1		R	1	-	+30 from battery	Fuse 10A	
		SWITCH INPUT 11		X29/17	11	H	1	DF		X76/	2	R	1.5	120142	+30 Engine diagnostic system	125551	
		Warning light command		X29/22	12	N-Z	1	DF		X76/		R	1.5	-	+30 Engine diagnostic system	+ 163007	
					13			150100									
					14			150100		K1/87		V	4	C/C6.120028	Start-up enabling command		X73
					15			150100								50 starting motor	
					16			150100								000000	
					17			150100									
					18			150100		K1/85		N	1	C/C10.101012	GND		GND
		SWITCH INPUT 19		X29/18	19	M	1	DF		Y1/2		N	1	-	GND	Ground point	
		SWITCH INPUT 20		X29/19	20	L	1	DF		Y2/2		N	1	-	GND	000000	
					21			150100		B14/		N	1	-	GND		
		SWITCH INPUT 22		X29/13	22	Z	1	DF		X29/23		N	1.5	-	GND	+ 900001	
		STOP light command		X29/21	23	V-Z	1	DF		X29/24		N	1.5	-	GND		
					24			150100									
		SIGNAL		X29/14	25	V	1	DF		X76/		N	1.5	C/C6.120022	GND		X70
					26			150100		X76/		N	1.5	-	GND	- battery	
					27			150100		X76/		N	1.5	-	GND	000000	
		SWITCH INPUT 28		X29/20	28	S	1	DF									
					29			150100		F3/1		R	2.5	C/C8.120022	+30 from battery		X71
					30			150100								+ battery	
					31			150100								000000	
					32			150100									
					33			150100		X29/11	1	V-N	1.5	ffda	Optional A/C	1-WAY CONN.	X74
					34			150100								Optional A/C	
					35			150100								125005	
					36			150100									
		COMMON 0 V 37		X29/12	37	G	1	DF		K2/87		H-R	2.5	FFG	Glow plugs power supply		X75
					38			150100								Glow plugs	
					39			150100								000000	
					40			150100									
					41			150100		AA/		R	16	C/C10.101089			BB
		Injection relay command		K3/85	42	Z-B	1	DF								Connect to	
		Start aid relay command		K2/85	43	B-N	1	DF								000000	
		COMMON 0 VOLT		X29/15	44	N-t	1	DF								starting motor	
		+5 VOLTS		X29/16	45	R	1	DF									
					46			150100								+ 900001	
					47			150100									
		Power supply: injection relay		K3/87	48	B	2	DF		AA/		R	4	FFDAG	Start relay common power supply		CC
					49			150100								Connect to 30	
					50			150100								000000	
					51			150100							Connect to 30 of the start relay	start relay	
					52			150100									
					53			150100		DD/		R	10	C/C6.101055			EE
					54			150100								Connect to	
					55			150100								000000	
		+30 Engine diagnostic system		F3/2	56	R	1.5	DF								alternator	
		+30 Engine diagnostic system		F3/	57	R	1.5	DF									
		GND		X70/	58	N	1.5	DF								+ 900001	
					59			150100									
					60			150100									
					61			150100									
					62			150100									
					63			150100									
					64			150100									
					65			150100									
					66			150100									
					67			150100									
		GND		X70/	68	N	1.5	DF									
		GND		X70/	69	N	1.5	DF									
		Electrostop		X29/8	70	B	2	DF									

Operation: Motor line tree-based scheme - Girolift 5022 Page 2 of 2	*Table:* **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
Y1	S/V CONN. 125234	S/V command - forward speed		X29/2	1	V-N	1	101077									
	Solenoid valve - forward speed	GND		GND/	2	N	1	101077									
	125234																
Y2	S/V CONN. 125234	S/V command - reverse speed		X29/3	1	M-V	1	101077									
	Solenoid valve - reverse speed	GND		GND/	2	N	1	101077									
	125234																
B11	CONN.125135	Engine oil bulb		X29/4	1	H-N	1	120069									
	Engine oil bulb																
	125135																
	+ 118201																
B12		H2O temperature sensor output		X29/5		H-L	1	ff C									
	Sensor - H2O temp.																
	000000																
	+ 128010																
X77		D+ alternator		X29/7		H	1	C/C5.120211									
	D+ alternator																
	000000																
B13		MAX H2O temperature sensor output		X29/6		H/R	1	ff C									
	Sensor - Max H2O temp.	GND		B14/		N	1	ff C									
	000000																
	+ 128018																
AA				BB/		R	16	C/C6.101115									
	Connect to common	Start relay common power supply		CC/		R	4	-									
	000000																
	fuse box																
	+ 900001																
DD				EE/		R	10	C/C10.101012									
	Connect to																
	000000																
	starting motor																
	+ 900001																

0A006802

Operation: Upper line tree-based scheme - Girolift 5022	*Table:* **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
X27	DT CONN. 125457	Sensor power supply		Sal1/	1	R-V	1	DF		X27/4		N	1.5 ┐	C/C6.120028	GND		gnd1.1
	To RH dashboard line	Signal - carriages aligned sensor		B10/C	2	M-B	1	DF		B4/		N	1 ┘	-	GND	Ground point	
	125457	Signal - fuel level from float		B12/	3	Z/N	1	DF		B10/B		N	1 ┐	-	GND	000000	
		GND		gnd1.1/	4	N	1.5	DF		B11/B		N	1 ┘	-	GND	+ 900001	
		Rear left position lights		H23/1	5	G-N	1	DF		B14/		N	1 ┘	-	GND		
		Rear left turn signal		H23/2	6	L	1	DF									
		Right low beam		H22/2	7	H	1.5	DF		H23/4		N	1 ┐	C/C6.120028	GND		gnd1.2
		Right high beam		H22/3	8	V	1.5	DF		M8/		N	1 ┐	-	GND	Ground point	
		Light indicator - hydraulic oil filter clogged		B14/	9	H-L	1	DF		H25/2		N	1 ┘	-	GND	000000	
					10			150100		H22/1		N	1.5 ┘	-	GND	+ 900001	
		Rear right turn signal		H26/2	11	A	1	DF									
		Fog lamp		H27/	12	M-V	1	DF		L8/		N	1.5 ┐	C/C6.120028	GND		gnd1.3
		Work ligth		L8/	13	G-N	1.5	DF		H20/		N	1.5 ┘	-	GND	Ground point	
		Horn		H20/	14	Z	1.5	DF		H26/4		N	1 ┐	-	GND	000000	
		+15 Stop lights switch		S30/	15	R	1	DF		B12/		N	1 ┘	-	GND	+ 900001	
		Signal - fuel from float reserve warning light		B12/	16	Z-N	1	DF									
		Light indicator - low engine oil pressure		B4/	17	H-R	1	DF		X27/13		G-N	1.5	ff C	Work ligth		L8
		Rear right position lights		H26/1	18	G	1	DF		gnd1.3/		N	1.5	ff C	GND	Work ligth	
		Signal - pin high		B11/C	19	A-N	1	DF								000000	
		Signal - hydraulic oil temperature		B13/	20	H/N	1	DF									
					21			150100		X27/14		Z	1.5	ff C	Horn		H20
		Emergency pump power supply		M8/	22	L-G	1	DF		gnd1.3/		N	1.5	ff C	GND	Horn	
		Back-up horn power supply		H27/	23	B	1	DF								000000	
		Front right turn signal		H22/5	24	A	1	DF									
										X27/15		R	1	ff C	+15 Stop lights switch		S30
Sal1		Sensor power supply		X27/1		R-V	1 ┐	-		H26/3		R-N	1 ┐	ff C	Right stop lights	Stop switch	
	Ground point	Sensor power supply		B10/A		R-V	1 ┤	-		H23/3		R-N	1 ┘	-	Left stop lights	000000	
	000000	Sensor power supply		B11/A		R-V	1 ┘	-									
		Ultrasound welding and cover with thermally insulated tube + 750161								X27/17		H-R	1	ff C	Light indicator - low engine oil pressure		B4
										gnd1.1/		N	1	ff C	GND	Pressure switch - low	
																000000	
B10	3-WAY DT CONN.	Sensor power supply		Sal1/	A	R-V	1	DF								engine oil pressure	
	Sensor - carriages aligned	GND		gnd1.1/	B	N	1	DF									
	125406 125407	Signal - carriages aligned sensor		X27/2	C	M-B	1	DF		X27/22		L-G	1	ff C	Emergency pump power supply		M8
										gnd1.2/		N	1	ff C	GND	Emergency pump	
																000000	
B11	3-WAY DT CONN.	Sensor power supply		Sal1/	A	R-V	1	DF									
	Sensor - pin high	GND		gnd1.1/	B	N	1	DF		H27/	1	B	1	DF	Back-up horn	2-WAY DT CONN.	H25
	125406 125407	Signal - pin high		X27/19	C	A-N	1	DF		gnd1.2/	2	N	1	DF	GND	Back-up horn	
																125402 125403	
H22	6-WAY DT CONN.	GND		gnd1.2/	1	N	1.5	DF								Join:	
	Front right light	Right low beam		X27/7	2	H	1.5	DF								+ 125400	
	125414 125415	Right high beam		X27/8	3	V	1.5	DF								+ 125401 + 120110 x2	
		Front right position lights		H26/1	4	G	1	DF									
		Front right turn signal		X27/24	5	A	1	DF									
					6			150100		H22/4	1	G	1 ┐	ffda	Front right position lights	4-WAY CONN.	H26
										X27/18		G	1 ┘	-	Rear right position lights	Rear right light	
B12		Signal - fuel level from float		X27/3		Z/N	1	-		X27/11	2	A	1	ffda	Rear right turn signal	125011	
	Fuel gauge	Signal - fuel from float reserve warning light		X27/16		Z-N	1	-		S30/	3	R-N	1	ffda	Right stop lights	Join ring nut:	
	000000	GND		gnd1.3/		N	1	-		gnd1.3/	4	N	1	ffda	GND	+ 103011	
	MOUNT									X27/23		B	1 ┐	ff C	Back-up horn power supply		H27
	CONNECTOR KIT									H25/1		B	1 ┘	-	Back-up horn	Fog lamp	
	+ 125177 x3															000000	
H27		Fog lamp		X27/12		M-V	1	ff									
	Fog lamp																
	000000																
H23	4-WAY CONN.	Rear left position lights		X27/5	1	G-N	1 ┐	ffda									
	Rear left light	Licence plate light		H24/1		G-N	1 ┘	-									
	125011	Rear left turn signal		X27/6	2	L	1	ffda									
	Join ring nut:	Left stop lights		S30/	3	R-N	1	ffda									
	+ 103011	GND		gnd1.2/	4	N	1 ┐	ffda									
		GND		H24/2		N	1 ┘	-									
H24	2-WAY DT CONN.	Licence plate light		H23/1	1	G-N	1	DF									
	Licence plate light	GND		H23/4	2	N	1	DF									
	125402 125403																
B13		Signal - hydraulic oil temperature		X27/20		H/N	1	ff C									
	Sensor - hydraulic																
	000000																
	oil temperature																
	+ 128010																
B14		Light indicator - hydraulic oil filter clogged		X27/9		H-L	1	ff C									
	Signal - oil filter	GND		gnd1.1/		N	1	ff C									
	000000																
	clogged																
	+ 128018																

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Operation: Cab side line tree-based scheme - Girolift 5022

Table: **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
X25	17-WAY MK CONN.	Signal - Overload warning system		X7/1	1	B-N	1	FFK		GND/	1	N	1.5	FFK	GND	13-WAY MK CONN.	X26
	To LH dashboard line	1st heating speed		X5/4	2	C	1.5	FFK		X61/1	2	L-G	1	FFK	Light indicator - parking brake	To LH ddashboard line	
	125214	Signal - boom up		X7/3	3	B/V	1	FFK		X61/3	3	B-G	1	FFK	+12 from outriggers	125213	
		Signal - boom down		X7/4	4	C-L	1	FFK		X61/4	4	S-G	1	FFK	Transmission disconnected		
		Signal - outriggers		X7/5	5	L/R	1	FFK		X9/l	5	A-B	1	FFK	Pump power supply		
		3B6 power supply		X7/6	6	R-N	1.5	FFK		X1/	6	G-V	1.5	FFK	+15 beacon		
		GND		GND/	7	N	1.5	FFK		X3/1	7	L-R	1	FFK	+15 rear windscreen wiper		
		Carriages aligned		X7/8	8	M-B	1	FFK		X2/	8	R	1	FFK	+30 cab lights		
		Platform input		X7/9	9	H/N	1	FFK		X4/1	9	R-V	1	FFK	+15 joystick		
		Robot input		X7/10	10	A/B	1	FFK		X4/2	10	G-N	1	FFK	Signal - joystick		
		Man. lower output		X7/11	11	B	1	FFK		X4/3	11	N	1	FFK	GND		
		Weight A0		X8/5	12	Z-N	1	FFK		GND/		N	1	-	GND		
		Weight A1		X8/8	13	M-N	1	FFK		X80/1	12	G-V	1.5	FFK	Work light		
		Weight B0		X8/9	14	G-N	1	FFK		X4/4	13	C	0.5	FFK	Neutral pos. manip op.		
		Weight B1		X8/10	15	H-R	1	FFK									
		86 relay - basket full		X8/1	16	N-Z	1	FFK		X26/12	1	G-V	1.5	ffda	Work light	2-WAY CONN.	X80
		2nd heating speed		X5/3	17	M	1.5	FFK		GND/	2	N	1.5	ffda	GND	Work light	
																125007	
X4	4-WAY DT CONN.	+15 joystick		X26/9	1	R-V	1	DF									
	Joystick	Signal - joystick		X26/10	2	G-N	1	DF		X26/7	1	L-R	1	ffda	+15 rear windscreen wiper	2-WAY CONN.	X3
	125410 125411	GND		X26/11	3	N	1	DF		GND/	2	N	1	ffda	GND	Roof windshield	
		Neutral pos. manip op.		X26/13	4	C	0.5	DF								125007	
																wiper/washer	
X9	2-WAY 90° CONN.	Pump power supply		X26/5	I	A-B	1	ffda		X26/8		R	1	ff C	+30 cab lights		X2
	Pump	GND		GND/	-	N	1	ffda		GND/		N	1	ff C	GND	Cab lights	
	125018															000000	
X61	5-WAY MK CONN.	Light indicator - parking brake		X26/2	1	L-G	1	FFK		X26/6		G-V	1.5	ff C	+15 beacon		X1
	Connect	GND		GND/	2	N	1	FFK		GND/		N	1.5	ff	GND	Beacon	
	125209	+12 from outriggers		X26/3	3	B-G	1	FFK								000000	
	X61a	Transmission disconnected		X26/4	4	S-G	1	FFK									
					5					X25/7		N	1.5	C/C6.120028	GND	Ground point	GND
										X26/1		N	1.5	-	GND		
X5	4-WAY CONN.	GND		GND/	1	N	1.5	ffda		X26/		N	1	-	GND	000000	
	Heater motor				2					X1/		N	1.5	-	GND		
	125011	2nd heating speed		X25/17	3	M	1.5	ffda									
		1st heating speed		X25/2	4	C	1.5	ffda		X2/		N	1	C/C6.120028	GND		
										X3/2		N	1	-	GND		
X8	12-WAY DT CONN.	86 relay - basket full		X25/16	1	N-Z	1	DF		X9/_		N	1	-	GND		
	3B6				2			150100		X61/2		N	1	-	GND		
	125422 125423				3			150100									
					4			150100		X5/1		N	1.5	C/C6.120028	GND		
		Weight A0		X25/12	5	Z-N	1	DF		X7/7		N	1.5	-	GND		
					6			150100		X80/2		N	1.5	-	GND		
					7			150100									
		Weight A1		X25/13	8	M-N	1	DF		X61a/1		L-G	1	ff C	Connect in pos. 4 NO		S6
		Weight B0		X25/14	9	G-N	1	DF		X61a/2		N	1	ff C	Connect in pos. 1 com.	Parking brake	
		Weight B1		X25/15	10	H-R	1	DF								000000	
					11			150100									
					12			150100									
										X61a/3		B-G	1	ff C	Connect in pos. 1 com.		S7
X7	12-WAY DT CONN.	Signal - overload warning system		X25/1	1	B-N	1	DF		X61a/4		S-G	1	ff C	Connect in pos. 2 NC	Parking brake	
	3B6				2			150100								000000	
	125422 125423	Signal - boom up		X25/3	3	B/V	1	DF									
		Signal - boom down		X25/4	4	C-L	1	DF									
		Signal - outriggers		X25/5	5	L/R	1	DF									
		3B6 power supply		X25/6	6	R-N	1.5	DF									
		GND		GND/	7	N	1.5	DF									
		Carriages aligned		X25/8	8	M-B	1	DF									
		Platform input		X25/9	9	H/N	1	DF									
		Robot input		X25/10	10	A/B	1	DF									
		Man. lower output		X25/11	11	B	1	DF									
					12			150100									
X61a	5-WAY MK CONN.	Connect in pos. 4 NO		S6/	1	L-G	1	FMK									
	Connect to	Connect in pos. 1 com.		S6/	2	N	1	FMK									
	125216	Connect in pos. 1 com.		S7/	3	B-G	1	FMK									
	X61	Connect in pos. 2 NC		S7/	4	S-G	1	FMK									
					5												

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Operation: Right dashboard tree-based scheme - Girolift 5022

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Table: **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE NR.	N.	REF.	P.	COL.	SEC.	TERMIN.
X20	17-WAY MK CONN.	RIGHT TURN SIGNAL		S16/1	1	A	1	FFK
	FROM DRIV.PLACE LINE	LEFT TURN SIGNAL		S16/3	2	L	1	FFK
	125214	49		S16/5	3	A-N	1	FFK
		+SWITCH - EMERGENCY PUMP		S17/5	4	L-N	1	FFK
		EMERGENCY PUMP		S17/1	5	L-G	1	FFK
		+SWITCH - FOG LAMP		S18/5	6	H/N	1	FFK
		FOG LAMP		S18/1	7	H-L	1	FFK
		+ SWITCH - LIGHTS		S19/2	8	B-R	1.5	FFK
		INSTRUMENTS LIGHTING		P1/2	9	G	1	FFK
		POS. LIGHTS FUSE POWER SUPPLY		S19/6	10	B	1.5	FFK
		POWER SUPPLY: LIGHTS SWITCH		S19/1	11	H-G	1.5	FFK
		+SWITCH - HEATHER		S20/3	12	A-R	1.5	FFK
		1st SPEED		S20/5	13	C	1.5	FFK
		2nd SPEED		S20/1	14	M	1.5	FFK
					15			
		WORK LIGHTS RELAY ACTIV.		S21/1	16	L/G	1	FFK
		INSTRUMENTS LIGHTING		P2/2	17	G	1	FFK
		INSTRUMENTS LIGHTING		P3/5		G	1	-
P1	6-WAY CONN - INSTRUMENTS	GND		P4/	1	N	1	120467
	ENGINE WATER TEMP. GAUGE	INSTRUMENTS LIGHTING		X20/9	2	G	1	120467
	124220	H2O temp. signal		X19/2	3	H-L	1	120467
		Light indicator - MAX H2O temp.		X19/6	4	H/R	1	120467
					5			
		+15 instruments		X19/1	6	B-R	1	120467
P2	6-WAY CONN - INSTRUMENTS	GND		P4/	1	N	1	120467
	HYDRAULIC OIL TEMP.	INSTRUMENTS LIGHTING		X20/17	2	G	1	120467
	124220	HYDRAULIC OIL TEMPERATURE INDICATOR		X19/3	3	H/N	1	120467
					4			
					5			
		+15 LIGHT SWITCH		A/	6	B-R	1	120467
P3	6-WAY CONN - INSTRUMENTS	+15 LIGHT SWITCH		A/	1	B-R	1	120467
	FUEL GAUGE				2			
	124220	Light indicator - Fuel reserve		X19/5	3	Z/N	1	120467
		Fuel gauge		X19/4	4	Z-N	1	120467
		INSTRUMENTS LIGHTING		X20/17	5	G	1	120467
		GND		S22/	6	N	1	120467
P4		D+ alternator		X19/13	+	H	1	ff C
	HOUR-METER	GND		X19/12	-	N	1	FF C
	000000	GND		P1/1		N	1	-
		GND		P2/1		N	1	-
S18	8-WAY CONN.	FOG LAMP		X20/7	1	H-L	1	ffda
	FOG LAMP SWITCH				2			
	125056				3			
					4			
		+SWITCH - FOG LAMP		X20/6	5	H/N	1	ffda
					6			
					7			
					8			
H18	2-WAY CONN.	GND		X19/	1	N	1	120272
	LIGHT INDICATOR - FOG LAMP	GND		H19/1		N	1	-
	125374	+15 LIGHT SWITCH		X19/	2	B-R	1	120272
		+15 LIGHT SWITCH		H19/2		B-R	1	-
S19	8-WAY CONN.	POWER SUPPLY: LIGHTS SWITCH		X20/11	1	H-G	1.5	ffda
	LIGHTS SWITCH	+ LIGHTS SWITCH		X20/8	2	B-R	1.5	ffda
	125056	POWER SUPPLY: FW/REV SEL.& WARNING		X19/19	3	H-L	1.5	ffda
		Emergency lights switch +15		S16/8		L/R	1	-
					4			
					5			
		POS. LIGHTS FUSE POWER SUPPLY		X20/10	6	B	1.5	ffda
					7			
					8			
H19	2-WAY CONN.	GND		H18/1	1	N	1	120272
	LIGHT INDICATOR - LIGHTS	GND		H20/1		N	1	-
	125374	+15 LIGHT SWITCH		H18/2	2	B-R	1	120272
		+15 LIGHT SWITCH		H20/2		B-R	1	-

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE NR.	CONNECTOR	UNIT
	P1/6	1	B-R	1	FFK	+15 INSTRUMENTS	21-WAY MK CONN.	X19
	H18/2		B-R	1	-	+15 LIGHT SWITCH	FROM DRIV.PLACE LINE	
	P1/3	2	H-L	1	FFK	H2O temp. signal	125215	
	P2/3	3	H/N	1	FFK	HYDRAULIC OIL TEMPERATURE INDICATOR		
	P3/4	4	Z-N	1	FFK	Fuel gauge		
	P3/3	5	Z/N	1	FFK	Light indicator - Fuel reserve		
	P1/4	6	H/R	1	FFK	Light indicator -MAX H2O temp.		
		7						
	S22/A	8	V	1.5	FFK	+15 Steering selector		
	S22/E	9	L-G	1	FFK	Light indicator - rear steering axle aligned		
	S22/C	10	H-R	1.5	FFK	Four-wheel steer		
	S22/B	11	C-N	1.5	FFK	Crab steer		
	P4/-	12	N	1	FFK	GND		
	H18/1		N	1	-	GND		
	P4/+	13	H	1	FFK	D+ alternator		
	S14/5	14	C-R	1	FFK	+15 Switch - speed change		
	S14/1	15	G-R	1	FFK	Mechanical speed output		
	H14/1	16	A/R	1	FFK	Light indicator - 2nd mechanical speed		
	S15/5	17	C-B	1.5	FFK	Differential switch +15		
	S15/1	18	C-B	1	FFK	Power supply: differential locking solenoid valve		
	S19/3	19	H-L	1.5	FFK	POWER SUPPLY: FW/REV. SELECTOR & WARNING		
	S16/2	20	R	1	FFK	+30 switch - light indicators		
	S16/4	21	A-R	1	FFK	FLASHING POWER SUPPLY		
	H17/		B-R	1	FFC	+15 LIGHT SWITCH		A
	P2/6		B-R	1	-	+15 LIGHT SWITCH		
	P3/1		B-R	1	-	+15 LIGHT SWITCH	000000	
	S21/5		G/R	1	-	+SWITCH - WORK LIGHT		
						WIRE INSERTION SIDE		
	X19/8	A	V	1.5	120272	+15 Steering selector	MERIT CONN.125128	S22
	X19/11	B	C-N	1.5	120272	Crab steer	STEERING SELECTOR	
	X19/10	C	H-R	1.5	120272	Four-wheel steer	125128	
		D						
	X19/9	E	L-G	1	120272	Light indicator - rear steering axle aligned		
	H17/1	F	N	1	120272	GND		
	P3/6		N	1	-	GND		
	X20/5	1	L-G	1	ffda	EMERGENCY PUMP	8-WAY CONN.	S17
		2					SWITCH - EMERGENCY PUMP	
		3					125056	
		4						
	X20/4	5	L-N	1	ffda	+SWITCH - EMERGENCY PUMP		
		6						
		7						
		8						
	H16/	1	N	1	120272	GND	2-WAY CONN.	H17
	S22/F		N	1	-	GND	LIGHT INDICATOR -	
	H15/2	2	B-R	1	120272	+15 SW LAMP	125374	
	A/		B-R	1	-	+15 SW LAMP	EMERGENCY PUMP	
	X20/1	1	A	1	ffda	RIGHT TURN SIGNAL	8-WAY CONN.	S16
	X19/20	2	R	1	ffda	Light indicators switch +30	SWITCH - LIGHT	
	X20/2	3	L	1	ffda	LEFT TURN SIGNAL	125056	
	X19/21	4	A-R	1	ffda	FLASHING POWER SUPPLY	INDICATORS	
	S16/6		A-R	1	-	FLASHING POWER SUPPLY		
	X20/3	5	A-N	1	ffda	49		
	S16/4	6	A-R	1	ffda	FLASHING POWER SUPPLY		
	S16/8	7	L/R	1	ffda	Light indicator bridge		
	S19/	8	L/R	1	ffda	Light indicators switch +15		
	S16/7		L/R	1	-	Light indicator bridge		
	H15/1		N	1	ff C	GND		H16
	H17/1		N	1	-	GND	LIGHT INDICATOR - WARNING LIGHTS	
							000000	

Operation:	Right dashboard tree-based scheme - Girolift 5022 Page 2 of 2	*Table:* **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
(S20)	8-WAY CONN.	2nd SPEED		X20/14	1	M	1.5	ffda		X19/18	1	C-B	1	ffda	Power supply: differential locking solenoid valve	8-WAY CONN.	(S15)
	SWITCH - HEATER				2						2					SWITCH - DIFFERENTIAL LOCKING	
	125056	+SWITCH - HEATER		X20/12	3	A-R	1.5	ffda			3					125056	
					4						4						
		1st SPEED		X20/13	5	C	1.5	ffda		X19/17	5	C-B	1.5	ffda	+15 Switch differential		
					6						6						
					7						7						
					8						8						
(H20)	2-WAY CONN.	GND		H19/1	1	N	1	120272		H14/2	1	N	1	120272	GND	2-WAY CONN.	(H15)
	LIGHT INDICATOR - HEATER	GND		H21/1		N	1	-		H16/		N	1	-	GND	LIGHT INDICATOR -	
	125374	+15 LIGHT SWITCH		H19/2	2	B-R	1	120272		H21/2	2	B-R	1	120272	+15 LIGHT SWITCH	125374	
		+15 LIGHT SWITCH		H21/2		B-R	1	-		H17/2		B-R	1	-	+15 LIGHT SWITCH	DIFFERENTIAL LOCKING	
(S21)	8-WAY CONN.	WORK LIGHTS RELAY ACTIVATION		X20/16	1	L/G	1	ffda		X19/15	1	G-R	1	ffda	Mechanical gear ouput	8-WAY CONN.	(S14)
	SWITCH - WORK				2						2					SWITCH - SPEED CHANGE	
	125056				3						3					125056	
	LIGHTS (OPTIONAL)				4						4						
		+SWITCH - WORK LIGHTS		A/	5	G/R	1	ffda		X19/14	5	C-R	1	ffda	+15 Switch - speed change		
					6						6						
					7						7						
					8						8						
(H21)	2-WAY CONN.	GND		H20/1	1	N	1	120272		X19/16	1	A/R	1	120272	Light indicator - 2nd mechanical speed	2-WAY CONN.	(H14)
	LIGHT INDICATOR - WORK	GND		H14/2		N	1	-		H21/1	2	N	1	120272	GND	LIGHT INDICATOR -	
	125374	+15 LIGHT SWITCH		H20/2	2	B-R	1	120272		H15/1		N	1	-	GND	125374	
	LIGHTS (OPTIONAL)	+15 LIGHT SWITCH		H15/2		B-R	1	-								SPEED CHANGE	

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Operation: Left dashboard tree-based scheme - Girolift 5022

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Table: **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.
(GND1)	18-WAY JOINT CONN.	GND		X13/6	1	N	1.5	120171
	GND	GND		X3/7	2	N	1	120171
	125741 125742	GND		X2/10	3	N	1	120171
		GND		X19/12	4	N	1.5	120171
		GND		X25/7	5	N	1.5	120171
		GND		X26/1	6	N	1.5	120171
		GND		X21/2	7	N	1.5	120097
		GND		X21/4	8	N	1.5	120097
		GND		X10/1	9	N	1.5	120097
		GND		XJ3B/18	10	N	1.5	120097
		GND		X21/3	11	N	1.5	120171
		GND		X23/C	12	N	1.5	120171
		GND		X28/14	13	N	1.5	120171
		GND		X28/19	14	N	1.5	120171
		GND		X29/24	15	N	1.5	120171
		GND		X29/23	16	N	1.5	120171
					17			
		GND		X26/11	18	N	1	120171
(GND2)		GND		H7/		N	1 ┐	C/C&120022
	GND	GND		X27/4		N	1.5 ┘	-
		GND		X18/8		N	1 ┐	C/C&120022
		GND		H9/2		N	1 ┘	-
(X33)	6-WAY DT CONN.	COMMON OV 37		Sal/	1	G	0.5	DF
	MANUAL ACCELERATOR	SW INPUT 28		X29/20	2	S	0.5	DF
	125414 125415	SW INPUT 20		X29/19	3	L	0.5	DF
		SW INPUT 11		X29/17	4	H	0.5	DF
		SW INPUT 19		X29/18	5	M	0.5	DF
					6			150100
(X32)	6-WAY CONN.	COMMON OV 44		X29/15	A	N	0.5	120074
	GAS PEDAL	SIGAL 25		X29/14	B	V	0.5	120074
	124218	+5VOLT 45		X29/16	C	R	0.5	120074
	+ 118216 x5	SW INPUT 22		X29/13	D	Z	0.5	120074
					E			+ 150102
		COMMON OV 37		Sal/	F	G	0.5	120074
(X26)	13-WAY MK CONN.	GND		GND1/6	1	N	1.5	FMK
	To side line	LIGHT INDICATOR - PARKING BRAKE		X1/1	2	L-G	1	FMK
	125220	+Stab. for declutch		X21/15	3	B-G	1	FMK
		TRANSMISSION DISCONNECTED		X16/8	4	S-G	1	FMK
		PUMP		X11/7	5	A-B	1	FMK
		+ BEACON		X9/5	6	G-V	1.5	FMK
		+15 REAR WINDSCREEN WIPER		X9/6	7	L-R	1	FMK
		+12 BEACON		X8/5	8	R	1	FMK
		OPTIONAL MANIP. POWER SUPPLY		Sal6/	9	R-V	1	FMK
		OPTIONAL MANIP. SIGNAL		XJ3B/5	10	G/N	1	FMK
		GND		GND1/18	11	N	1	FMK
		Work lights power supply		X17/2	12	G-V	1.5	FMK
		Neutral pos. manip.		XJP3/1	13	C	0.5	FMK
(X25)	17-WAY MK CONN.	SIGNAL - OVERLOAD WARNING SYSTEM		X18/10	1	B-N	1	FMK
	To cab line	1st HEATING SPEED		X20/13	2	C	1.5	FMK
	125221	SENSOR - BOOM UP		XJ3/10	3	B/V	1	FMK
		SENSOR - BOOM DOWN		Sal3/	4	C-L	1	FMK
		Stab. signal for 3B6		X21/14	5	L/R	1	FMK
		3B6 POWER SUPPLY		X5/6	6	R-N	1.5	FMK
		GND		GND1/5	7	N	1.5	FMK
		CARRIAGES ALIGNED		X3/11	8	M-B	1 ┐	FMK
		CARRIAGES ALIGNED		X27/2		M-B	1 ┘	-
		3B6 PLATFORM INPUT		X36C/	9	M-N	1	FMK
		ROBOT		XJP3/2	10	A/B	1 ┐	FMK
		ROBOT		X28/8		A/B	1 ┘	-
		MAN. LOWER OUTPUT		X47/	11	B	1	FMK
		WEIGHT A0		X28/21	12	Z-N	1	FMK
		WEIGHT A1		X28/22	13	M-N	1	FMK
		WEIGHT B0		X28/23	14	G-N	1	FMK
		WEIGHT B1		X28/24	15	H-R	1	FMK
		86 RELAY - BASKET FULL		X18/9	16	N-Z	1	FMK
		2nd HEATING SPEED		X20/14	17	M	1.5	FMK

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
	X6/17	1	H-R	1.5	DM	SOLENOID VALVE - REAR STEERING AXLE LOCKED	40-WAY DT CONN.	(X21)
	GND1/7	2	N	1.5	DM	GND	JOINT LINE	
	GND1/11	3	N	1.5	DM	GND	125481	
	GND1/8	4	N	1.5	DM	GND		
		5			150100			
		6			150100			
		7			150100			
		8			150100			
		9			150100			
	X19/16	10	A/R	1	DM	MECH. SPEED LIGHT INDICATOR		
	X16/13	11	A-B	1	DM	SENSOR - CARDAN SHAFT		
	XJ4/20	12	Z-B	1	DM	SENSOR - SLEWRING BLOCKED		
	X5/	13	R-V	1	DM	+SENSOR		
	X25/5	14	L/R	1	DM	Stab. signal for 3B6		
	X26/3	15	B-G	1	DM	+Stab. for declutch		
	X19/9	16	L-G	1	DM	REAR STEERING AXLE ALIGNED		
	X16/10	17	C-V	1.5	DM	SOLENOID VALVE - DISPLACEMENT CHANGE		
	X19/11	18	C-N	1.5	DM	CRAB STEER		
	X19/10	19	H-R	1.5	DM	FOUR-WHEEL STEER		
	X16/6	20	M-B	1.5	DM	SOLENOID VALVE - 1st MECHANICAL SPEED		
	X16/7	21	B-N	1.5	DM	SOLENOID VALVE - 2nd MECHANICAL SPEED		
	X19/18	22	C-B	1.5	DM	SOLENOID VALVE - DIFFERENTIAL LOCKING		
	XJ4/19	23	C/N	1	DM	Y5 SOLENOID VALVE - AXLE LEVELLING		
	XJ4/18	24	G/R	1	DM	Y10 SOLENOID VALVE - AXLE LEVELLING		
	Sal3/	25	C-L	1	DM	SENSOR - BOOM DOWN		
	X3/6	26	V-Z	1	DM	AXLE BLOCKED		
	XJ4/17	27	S/N	1	DM	OUTRIGGER RELAY SWITCHING		
	XJ4/9	28	V/B	1	DM	SOLENOID VALVE - LEFT OUTRIGGER OUT		
	XJ4/10	29	C/B	1	DM	SOLENOID VALVE - LEFT OUTRIGGER IN		
	XJ4/11	30	M-N	1	DM	SOLENOID VALVE - RIGHT OUTRIGGER OUT		
	XJ4/12	31	A-B	1	DM	SOLENOID VALVE - RIGHT OUTRIGGER IN		
	XJ4/13	32	B/N	1	DM	SOLENOID VALVE - LEFT OUTRIGGER UP		
	XJ4/14	33	V/N	1	DM	SOLENOID VALVE - LEFT OUTRIGGER DOWN		
	XJ4/15	34	Z/B	1	DM	SOLENOID VALVE - RIGHT OUTRIGGER UP		
	XJ4/16	35	A/R	1	DM	SOLENOID VALVE - RIGHT OUTRIGGER DOWN		
		36			150100			
		37			150100			
		38			150100			
		39			150100			
		40			150100			
	Sal6/	1	R-V	1	DM	SENSOR POWER SUPPLY	DT CONN. 125456	(X27)
	X25/	2	M-B	1	DM	CARRIAGES ALIGNED	Upper carriage line	
	X19/4	3	Z/N	1	DM	COMB. LEVEL INSTRUMENT	125456	
	GND2/	4	N	1.5	DM	GND		
	X5/7	5	G-N	1	DM	REAR LEFT POSITION LIGHT		
	SALD4/	6	L	1	DM	LEFT TURN SIGNAL		
	X17/12	7	H	1.5	DM	RIGHT LOW BEAM		
	X17/5	8	V	1.5	DM	RIGHT HIGH BEAM		
	X1/4	9	H-L	1	DM	LIGHT INDICATOR - HYDRAULIC OIL FILTER		
	Sal3/	10	C-L	1	DM	SENSOR - BOOM DOWN		
	SALD5/	11	A	1	DM	RIGHT TURN SIGNAL		
	X20/7	12	H-L	1	DM	FOG LAMP		
	X17/1	13	G-N	1.5	DM	WORK LIGHT		
	X17/6	14	Z	1.5	DM	HORN		
	X9/4	15	R	1	DM	+15 SWITCH - STOP LIGHTS		
	X19/5	16	Z-N	1	DM	RESERVE WARN LIGHT		
	X2/11	17	H-R	1	DM	BRAKE OIL PRESS. WARN. LIGHT		
	X5/1	18	G	1	DM	FRONT RIGHT POSITION LIGHT		
	XJ3/7	19	A-N	1	DM	SENSOR - BUCKET UP		
	X19/3	20	H/N	1	DM	OIL TEMP. INSTRUMENT		
	X6/2	21	S/N	1	DM	+12 STEER ACCUM. SOLENOID VALVE		
	X20/	22	L-G	1	DM	EMERGENCY PUMP		
	X16/3	23	B	1	DM	BACK-UP HORN		
	SALD5/	24	A	1	DM	RIGHT TURN SIGNAL		

Operation: Left dashboard tree-based scheme - Girolift 5022

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Table: **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.
(X20)	17-WAY MK CONN.	RIGHT TURN SIGNAL		SALD5/	1	A	1	FMK
	To RH dashboard line	LEFT TURN SIGNAL		SALD4/	2	L	1	FMK
	125221	49 LIGHTS SWITCH		X11/11	3	A-N	1	FMK
		49		X9/13		A-N	1	-
		POWER SUPPLY: EMERGENCY PUMP SWITCH		X6/4	4	L-N	1	FMK
		+SWITCH EMERGENCY PUMP		X28/12	5	L-G	1	FMK
		EMERGENCY PUMP		X27/22		L-G	1	-
		+SWITCH - FOG LAMP		X17/10	6	H/N	1	FMK
		FOG LAMP		X27/12	7	H-L	1	FMK
		+SWITCH - POSITION LIGHTS		X8/3	8	B-R	1.5	FMK
		INSTRUMENTS LIGHT INDICATOR		X20/17	9	G	1	FMK
		POS. LIGHTS FUSE POWER SUPPLY		X5/2	10	B	1.5	FMK
		POWER SUPPLY: LIGHTS SWITCH		X11/4	11	H-G	1.5	FMK
		+15 SWITCH - HEATER		S7/	12	A-R	1.5	FMK
		1st HEATING SPEED		X25/2	13	C	1.5	FMK
		2nd HEATING SPEED		X25/17	14	M	1.5	FMK
					15			
		WORK LIGHTS SWITCH OUTPUT		X17/7	16	L/G	1	FMK
		INSTRUMENTS LIGHT INDICATOR		X5/11	17	G	1	FMK
		INSTRUMENTS LIGHT INDICATOR		X20/9		G	1	-
(X19)	21-WAY MK CONN.	LIGHT INDICATOR POWER SUPPLY		X2/4	1	B-R	1	FMK
	To RH dashboard line	INSTRUMENTS POWER SUPPLY		X9/		B-R	1	-
	125222	WATER TEMP. INSTRUMENT		X29/5	2	H-L	1	FMK
		OIL TEMP. INSTRUMENT		X27/20	3	H/N	1	FMK
		CONMB. LEVEL INSTRUMENT		X27/3	4	Z/N	1	FMK
		RESERVE WARNING LIGHT		X27/16	5	Z-N	1	FMK
		MAX WATER TEMP. WARN. LIGHT		X29/6	6	H/R	1	FMK
		MAX WATER T. - SPARE		X1/8		H/R	1	-
					7			
		POWER SUPPLY: STEERING SELECTOR		X36B/	8	V	1.5	FMK
		REAR STEERING AXLE ALIGNED		X21/16	9	L-G	1	FMK
		FOUR-WHEEL STEER		X21/19	10	H-R	1.5	FMK
		CRAB STEER		X21/18	11	C-N	1.5	FMK
		GND		GND1/4	12	N	1.5	FMK
		GENERATOR WARN. LIGHT		X1/3	13	H	1	FMK
		D+		X29/7		H	1	-
		+SW - GEARBOX		X16/	14	C-R	1	FMK
		MECHANICAL SPEED		X17/17	15	G-R	1	FMK
		MECHANICAL SPEED LIGHT INDICATOR		X21/10	16	A/R	1	FMK
		+SWITCH - DIFFERENTIAL LOCKING		X36E/	17	C-B	1.5	FMK
		SOLENOID VALVE - DIFFERENTIAL LOCKING		X21/22	18	C-B	1.5	FMK
		+15 SWITCH - LIGHT INDICATORS		X9/10	19	H-L	1.5	FMK
		+30 SWITCH - INDICATOR LIGHTS		X8/4	20	R	1	FMK
		FLASHING POWER SUPPLY		X9/12	21	A-R	1	FMK
(X1)	8-WAY CONN. 125678	LIGHT INDICATOR - PARKING BRAKE		X26/2	1	L-G	1	120171
	W.LIGHT CONNECTOR	LIGHT INDICATOR - PRE-HEATING		X29/10	2	S	1	120171
	125678	GENERATOR WARN. LIGHT		X19/13	3	H	1	120171
		LIGHT INDICATOR - HYDRAULIC OIL FILTER		X27/9	4	H-L	1	120171
		LIGHT INDICATOR - AIR FILTER		X29/1	5	A-G	1	120171
		LIGHT INDICATOR POWER SUPPLY		H7/	6	B-R	1	120171
		LIGHT INDICATOR - ENGINE OIL		X29/4	7	H-N	1	120171
		MAX WATER TEMP. WARN. LIGHT		X19/	8	H/R	1	120171
(X2)	12-WAY CONN.				1			
	W.LIGHT CONNECTOR				2			
	125646				3			
		LIGHT INDICATOR POWER SUPPLY		X19/1	4	B-R	1	120171
					5			
					6			
		LIGHT INDICATOR - POSITION LIGHTS		X5/8	7	G-N	1	120171
		LIGHT INDICATOR - TURN SIGNAL		X9/7	8	S/N	1	120171
		LIGHT INDICATOR - HIGH BEAM		X17/13	9	V	1	120171
		GND		GND1/3	10	N	1	120171
		BRAKE OIL PRESSURE WARN. LIGHT		X27/17	11	H-R	1	120171
					12			

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
	XJP2/1	1	A-N	1	DM	SIGNAL - BOOM UP/DOWN	DT CONN. 125454	(X28)
	XJP2/2	2	L-R	1	DM	SIGNAL - TURRET ROTATION	PLATFORM LINE	
	XJP2/3	3	L-B	1	DM	SIGNAL - BOOM OUT/IN	125454	
	XJP2/4	4	V	1	DM	+12 JOYSTICK IN MOTION		
	X4/6	5	V-B	1	DM	PLATFORM ENABLED		
	XJP2/6	6	B-R	1	DM	ROBOT POWER SUPPLY		
	XJP2/8	7	B-N	1	DM	SENSOR - FORKS COUPLED		
	X25/	8	A/B	1	DM	ROBOT		
	X8/2	9	R-N	1.5	DM	BASKET POWER SUPPLY		
	X6/11	10	M	1	DM	BASKET EMERG. BUTTON POWER SUPPLY		
	X17/9	11	C	1	DM	START FROM BASKET		
	X20/5	12	L-G	1	DM	+SWITCH EMERGENCY PUMP		
	X18/1	13	G-R	1	DM	PLATFORM POTENT. POWER SUPPLY		
	GND1/13	14	N	1.5	DM	GND		
	X17/14	15	Z	1	DM	HORN		
	X4/1	16	A-V	1	DM	+12 OVERLOAD WARN. SYST. INPUT		
	X35/5	17	A-G	1	DM	+12V MIXING BUCKET		
	X35/3	18	H-L	1	DM	MIXING BUCKET ACTIVATION		
	GND1/14	19	N	1.5	DM	GND		
	X35/6	20	Z-B	1	DM	+ AUX BUCKET		
	X25/12	21	Z-N	1	DM	WEIGHT A0		
	X25/13	22	M-N	1	DM	WEIGHT A1		
	X25/14	23	G-N	1	DM	WEIGHT B0		
	X25/15	24	H-R	1	DM	WEIGHT B1		
	X1/5	1	A-G	1	DM	LIGHT INDICATOR - AIR FILTER	DT CONN. 125452	(X29)
	X16/11	2	V-N	1	DM	SOLENOID VALVE - FORWARD SPEED	ENGINE LINE	
	X16/9	3	M-V	1	DM	SOLENOID VALVE - REVERSE SPEED	125452	
	X1/7	4	H-N	1	DM	LIGHT INDICATOR - ENGINE OIL		
	X19/2	5	H-L	1	DM	WATER TEMP. INSTRUMENT		
	X19/6	6	H/R	1	DM	MAX WATER TEMP. WARN. LIGHT		
	X19/	7	H	1	DM	D+		
	X6/14	8	M	1.5	DM	ELECTROSTOP		
	X17/8	9	C-B	1	DM	START-UP ENABLING COMMAND		
	X1/2	10	S	1	DM	LIGHT INDICATOR - PRE-HEATING		
	S7/1	11	B-R	1.5	DM	OPTIONAL A/C		
	Sal/	12	G	0.5	DM	COMMON OV 37		
	X32/D	13	Z	0.5	DM	SW INPUT 22		
	X32/B	14	V	0.5	DM	SIGAL 25		
	X32/A	15	N	0.5	DM	COMMON OV 44		
	X32/C	16	R	0.5	DM	+5VOLT 45		
	X33/4	17	H	0.5	DM	SW INPUT 11		
	X33/5	18	M	0.5	DM	SW INPUT 19		
	X33/3	19	L	0.5	DM	SW INPUT 20		
	X33/2	20	S	0.5	DM	SW INPUT 28		
	X3/1	21	V-Z	1	DM	STOP LAMP		
	X3/2	22	N-Z	1	DM	WARNING LAMP		
	GND1/16	23	N	1.5	DM	GND		
	GND1/15	24	N	1.5	DM	GND		
	XJP4/1	1	L/R	1	DM	+SOLENOID VALVE - BOOM OUT/IN	12-WAY DT CONN.	(X22)
	XJP4/3	2	M-N	1	DM	+SOLENOID VALVE - FORKS/OUTRIGGERS	DANFOSS LINE	
	XJP4/4	3	B-N	1	DM	+SOLENOID VALVE - TURRET ROTATION	125474 125421	
	XJP4/2	4	A-G	1	DM	+SOLENOID VALVE - BOOM UP/DOWN		
	X18/13	5	G-R	1	DM	SIGNAL - ATTACHMENT LOCKED/UNLOCKED		
	X18/11	6	M-B	1	DM	SIGNAL - BOOM OUT/IN		
	XJ4/2	7	A/G	1	DM	ATTACHMENT LOCKED/UNLOCKED		
	X18/4	8	L-G	1	DM	SIGNAL - TURRET ROTATION		
	X18/7	9	A-V	1	DM	SIGNAL - BOOM UP/DOWN		
	XJ4/6	10	Z-N	1	DM	+SOLENOID VALVE - SWITCHING		
	X35/2	11	L-B	1	DM	ATTACHMENT LOCKED/UNLOCKED		
		12			150100			
	S5/7	A	B-G	1	DM	SOLENOID VALVE - SLEWRING LOCKED Y2	3-WAY DT CONN.	(X23)
	S5/1	B	S-G	1	DM	SOLENOID VALVE - SLEWRING LOCKED Y2	DANFOSS LINE	
	GND1/12	C	N	1.5	DM	GND	125428 125405	
	J1/	A	R	10	120221	30 RELAY - AUX CIRCUITS	2-WAY CONN.	(X30)
	S11/1	B	R	6	120221	+30 START-UP PANEL	DIRECT SUPPLY	
							125377	
						COVER THE CLAMPED PART OF THE		
						TERMINALS WITH THERM.-INS. TUBE		

Operation:	Left dashboard tree-based scheme - Girolift 5022 Page 3 of 6	*Table:* **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.
(S11)	MERIT CONN.125121	+30 START-UP PANEL		X30/B	1	R	6	FFDAG
	START-UP PANEL	+30 RELAY CARD		J3/	2	R	6	FFDAG
	125121				3			+ 120019
	+ 109045				4			+ 120019
(S12)	MERIT CONN.125122	+15 RELAY CARD		J2/	5	A	6	120272
	START-UP PANEL				6			+ 120272
	125122	50 START-UP PANEL		X17/	7	C	1	120272
					8			+ 120272
					9			+ 120272
		58 START-UP PANEL		X8/1	10	R	1.5	120272
(S10)		SIGNAL - OVERLOAD WARNING SYSTEM		X18/3		B-N	1	101022
	Overload cutout switch	SIGNAL - OVERLOAD WARNING SYSTEM		XJ3/8		B-N	1	-
	000000	+ OVERLOAD CUTOUT SWITCH		X5/		R-N	1	101047
	+ 106278							
	+ 106269							
(SALD4)		LEFT TURN SIGNAL		X11/9		L	1	-
	WELDING	LEFT TURN SIGNAL		X27/6		L	1	-
	+ 900001	LEFT TURN SIGNAL		X10/5		L	1	-
		LEFT TURN SIGNAL		X20/2		L	1	-
(SALD5)		RIGHT TURN SIGNAL		X11/10		A	1	-
	WELDING	RIGHT TURN SIGNAL		X27/11		A	1	-
	+ 900001	RIGHT TURN SIGNAL		X27/24		A	1	-
		RIGHT TURN SIGNAL		X20/1		A	1	-
(X12)	5-WAY MK CONN.	+SPEED SWITCH		SALD2/	1	C-R	1	FFK
	SPEED SWITCH	2nd HYDRAULIC SPEED		X16/5	2	Z-B	1	FFK
	125209	REVERSE SPEED		X16/12	3	H-V	1	FFK
		FORWARD SPEED		X16/2	4	V/N	1	FFK
		+SPEED SWITCH		SALD2/	5	C-R	1	FFK
(X11)	13-WAY MK CONN.	+15 WIPER SWITCH		X9/1	1	L/N	1	FFK
	LIGHTS SWITCH	53 (1st SPEED)		X13/2	2	A	1	FFK
	125213	HIGH BEAM COMMON		X17/16	3	V-B	1	FFK
		POWER SUPPLY: LIGHTS SWITCH		X20/11	4	H-G	1.5	FFK
		LOW BEAM COMMON SWITCH		X17/15	5	H-B	1	FFK
		31/B ENGINE		X13/1	6	A/B	1	FFK
		PUMP		X26/5	7	A-B	1	FFK
		53/B (2nd SPEED)		X13/4	8	H	1	FFK
		LEFT TURN SIGNAL		SALD4/	9	L	1	FFK
		RIGHT TURN SIGNAL		SALD5/	10	A	1	FFK
		49 LIGHTS SWITCH		X20/3	11	A-N	1	FFK
					12			
		HORN		X17/14	13	Z	1	FFK
(X13)	6-WAY CONN.	31/B ENGINE		X11/6	1	A/B	1	ffda
	WIPER MOTOR	53 (1st SPEED)		X11/2	2	A	1	ffda
	125015	+15 FRONT WIPER		X9/8	3	L/N	1	ffda
		53/B (2nd SPEED)		X11/8	4	H	1	ffda
					5			
		GND		GND1/1	6	N	1.5	ffda
(X10)		GND		GND1/9	1	N	1.5	DF
	FRONT LEFT LIGHT	LEFT LOW BEAM		X17/11	2	H	1.5	DF
		LEFT HIGH BEAM		X17/4	3	V	1.5	DF
	join	LIGHT INDICATOR - FRONT LEFT POSITION LIGHT		X5/5	4	G-N	1	DF
		LEFT TURN SIGNAL		SALD4/	5	L	1	DF
	+ 125414				6			150100
	+ 125415							

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
	X29/12		G	0.5	-	COMMON OV 37		(Sal)
	X32/F		G	0.5	-	COMMON OV 37	WELDING	
	X33/1		G	0.5	-	COMMON OV 37		
							+ 900001	
	X27/10		C-L	1	-	SENSOR - BOOM DOWN		(Sal3)
	XJ3/9		C-L	1	-	SENSOR - BOOM DOWN	Welding	
	X21/25		C-L	1	-	SIGNAL - BOOM DOWN	000000	
	X25/4		C-L	1	-	SENSOR - BOOM DOWN	+ 900001	
	X26/9		R-V	1	-	OPTIONAL MANIP. POWER SUPPLY		(Sal6)
	X27/1		R-V	1	-	SENSOR POWER SUPPLY	Welding	
	X5/4		R-V	1	-	POWER SUPPLY: DANFOSS CONTROL UNIT	000000	
	XJ3B/7		R-V	1	-	SEAT SENSOR	+ 900001	
	XJ3B/14		R-V	1	-	SEAT SENSOR		
	X29/21	1	V-Z	1	120171	STOP LAMP	12-WAY CONN.	(X3)
	X29/22	2	N-Z	1	120171	WARNING LAMP	FUNCTION W.LIGHTS	
	XJ3B/9	3	A	0.5	120171	LIGHT INDICATOR - FORK ROTATION	125646	
	XJ3/12	4	V	0.5	120171	LIGHT INDICATOR - BOOM OUT/IN		
	XJ3/11	5	S	0.5	120171	LIGHT INDICATOR - BOOM UP/DOWN		
	X21/26	6	V-Z	1	120171	AXLE BLOCKED		
	GND1/2	7	N	1	120171	GND		
	X15/1	8	R-V	1	120171	LIGHT INDICATOR POWER SUPPLY		
	XJ3B/12	9	C	0.5	120171	LIGHT INDICATOR - TURRET ROTATION		
	XJ3B/11	10	H	0.5	120171	LIGHT INDICATOR - ROTATION LOCKED		
	X25/8	11	M-B	1	120171	CARRIAGES ALIGNED		
	XJ3B/10	12	M	0.5	120171	LIGHT INDICATOR - FORKS COUPLED		
	X6/12		A/G	1	101047	+ CAB EMERG. BUTTON		(S13)
	X6/6		B/R	1	101047	CAB EMERG. BUTTON OUT	EMERGENCY MUSHROOM-HEAD PUSHBUTTON	
							+ 106252	
							+ 106250	
	X19/17		C-B	1.5	101047	+SWITCH - DIFFERENTIAL LOCKING	WORK SELECTOR SWITCH	(X36E)
	X6/3		Z-N	1.5	101047	+15 SWITCH - DIFFERENTIAL LOCKING	+ 106269	
	XJ3/6		H/N	1	101022	PLATFORM INPUT	WORK SELECTOR SWITCH	(X36D)
	H9/1		H/N	1	-	LIGHT INDICATOR - BASKET ENABLED	+ 106277	
	X6/7		B-R	1.5	101022	WORK SELECTOR SWITCH		
	X36B/		B-R	1	-	WORK SELECTOR SWITCH	+ 106256	
	X19/8		V	1.5	101047	POWER SUPPLY: STEERING SELECTOR	WORK SELECTOR SWITCH	(X36B)
	X36D/		B-R	1	101022	WORK SELECTOR SWITCH	+ 106256	
	X36C/		B-R	1	-	WORK SELECTOR SWITCH		
	XJ3B/8		M-N	1	101022	JOBSITE INPUT	WORK SELECTOR SWITCH	(X36C)
	X25/9		M-N	1	-	3B6 PLATFORM INPUT	+ 106256	
	X36B/		B-R	1	101047	WORK SELECTOR SWITCH		
	X36D/	1	H/N	1	ffda	LIGHT INDICATOR - BASKET ENABLED	2-WAY CONN.	(H9)
	GND2/	2	N	1	ffda	GND	BASKET ENABLED	
							125007	
	X6/13		G-M	1	101047	ELECTROSTOP FROM JOBSITE		(X36A)
	X6/5		C-R	1	101047	+BASKET EMERG. BUTTON		
							WORK SELECTOR SWITCH	
							+ 106255	
	X18/	1	G-R	1	FFK	SIGNAL - ATTACHMENT LOCKED/UNLOCKED	7-WAY MK CONN.	(X35)
	X22/11	2	L-B	1	FFK	ATTACHMENT LOCKED/UNLOCKED	OPT. PLATFORM	
	X28/18	3	H-L	1	FFK	MIXING BUCKET ACTIVATION	125210	
	XJ4/5	4	L/B	1	FFK	SIGNAL - ATTACHMENT LOCKED/UNLOCKED		
	X28/17	5	A-G	1	FFK	+12V MIXING BUCKET		
	X28/20	6	Z-B	1	FFK	+ AUX BUCKET		
		7						

Operation: Left dashboard tree-based scheme - Girolift 5022

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Table: **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.
X9	13-WAY MK CONN.	+15 WIPER SWITCH		X11/1	1	L/N	1	FFK
	CONTROL UNIT				2			
	125213R	+SWITCH - A/C SYSTEM		S7/5	3	A	1.5	FFK
		+15 SWITCH - STOP LIGHTS		X27/15	4	R	1	FFK
		+ BEACON		X26/6	5	G-V	1.5	FFK
		+15 REAR WINDSCREEN WIPER		X26/7	6	L-R	1	FFK
		LIGHT INDICATOR - TURN SIGNAL		X2/8	7	S/N	1	FFK
		+15 FRONT WIPER		X13/3	8	L/N	1	FFK
		LIGHT SW POWER SUPPLY		H1/1	9	B-R	1	FFK
		INSTRUMENTS POWER SUPPLY		X19/		B-R	1	-
		+15 SWITCH - LIGHT INDICATORS		X19/19	10	H-L	1.5	FFK
					11			
		FLASHING POWER SUPPLY		X19/21	12	A-R	1	FFK
		49		X20/	13	A-N	1	FFK
X8	5-WAY MK CONN.	58 START-UP PANEL		S12/10	1	R	1.5	FFK
	CONTROL UNIT	BASKET POWER SUPPLY		X28/9	2	R-N	1.5	FFK
	125209	+SWITCH - POSITION LIGHT		X20/8	3	B-R	1.5	FFK
		+30 SWITCH - LIGHT INDICATORS		X19/20	4	R	1	FFK
		+12 CAB INTERIOR LIGHTS		X26/8	5	R	1	FFK
X6	17-WAY MK CONN.				1			
	CONTROL UNIT	+12 STEER ACCUM. SOLENOID VALVE		X27/21	2	S/N	1	FFK
	125214G	+15 SWITCH - DIFFERENTIAL LOCKING		X36E/	3	Z-N	1.5	FFK
		POWER SUPPLY: EMERGENCY PUMP SWITCH		X20/4	4	L-N	1	FFK
		+BASKET EMERG. BUTTON		X36A/	5	C-R	1	FFK
		CAB EMERG. BUTTON OUT		S13/	6	B/R	1	FFK
		WORK SELECTOR SWITCH		X36D/	7	B-R	1.5	FFK
					8			
					9			
					10			
		BASKET EMERG. BUTTON POWER SUPPLY		X28/10	11	M	1	FFK
		+ CAB EMERG. BUTTON		S13/	12	A/G	1	FFK
		ELECTROSTOP FROM JOBSITE		X36A/	13	G-M	1	FFK
		ELECTROSTOP		X29/8	14	M	1.5	FFK
					15			
					16			
		SOLENOID VALVE - REAR STEERING AXLE LOCKED		X21/1	17	H-R	1.5	FFK
X5	11-WAY MK CONN.	FRONT RIGHT POSITION LIGHT		X27/18	1	G	1	FFK
	CONTROL UNIT	POS. LIGHTS FUSE POWER SUPPLY		X20/10	2	B	1.5	FFK
	125212	POWER SUPPLY: DANFOSS CONTROL UNIT		X15/1	3	R-V	1	FFK
		POWER SUPPLY: DANFOSS CONTROL UNIT		X15/2		R-V	1	-
		POWER SUPPLY: DANFOSS CONTROL UNIT		Sa6/	4	R-V	1	FFK
		LIGHT INDICATOR - FRONT LEFT POSITION LIGHT		X10/4	5	G-N	1	FFK
		POWER SUPPLY: 3B6 CONTROL UNIT		X25/6	6	R-N	1.5	FFK
		+OVERLOAD CUTOUT SWITCH		S10/		R-N	1	-
		REAR LEFT POSITION LIGHT		X27/5	7	G-N	1	FFK
		LIGHT INDICATOR - POSITION LIGHT		X2/7	8	G-N	1	FFK
		+ SWITCH - OUTRIGGERS		S1/3	9	R-V	1	FFK
		+SENSOR		X21/13		R-V	1	-
					10			
		INSTRUMENTS LIGHT INDICATOR		X20/17	11	G	1	FFK
X34	2-WAY 90° CONN.	86 RELAY - AUX CIRCUITS		X4/2		C	1	fplok
	Relay - aux circuits	85 RELAY - AUX CIRCUITS		X4/9		N-Z	1	fplok
	125310							
	+ 157115							
X4	9-WAY MK CONN.	+12 OVERLOAD WARN. SYST. INPUT		X28/16	1	A-V	1	FFK
	CONTROL UNIT	86 RELAY - AUX CIRCUITS		X34/I	2	C	1	FFK
	125211				3			
		SWITCH - SLEWRING LOCKED/UNLOCKED		XJ3B/6	4	G/R	1	FFK
		TO DANFOSS CONTROL UNIT		S5/7	5	B-G	1	FFK
		PLATFORM ENABLED		X28/5	6	V-B	1	FFK
		PLATFORM ENABLED		XJP2/5		V-B	1	-
		SLEWRING LOCKED/UNLOCKED		S5/1	7	S-G	1	FFK
					8			
		85 RELAY - AUX CIRCUITS		X34/	9	N-Z	1	FFK

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
		1					7-WAY MK CONN.	X35a
	X35a/4	2	B	1	FMK	Bridge	COUNTER-SCHEME	
		3					125217	
	X35a/2	4	B	1	FMK	Bridge		
		5						
		6						
		7						
	X29/11	1	B-R	1.5	ffda	OPTIONAL A/C	8-WAY CONN.	S7
		2					OPTIONAL A/C	
		3					125056	
		4						
	X9/3	5	A	1.5	ffda	+SWITCH - A/C SYSTEM		
	X20/12		A-R	1.5	-	+15 SWITCH - HEATER		
		6						
		7						
		8						
	H6/	1	B-R	1	120272	LIGHT SW POWER SUPPLY	2-WAY CONN.	H7
	X1/6		B-R	1	-	LIGHT INDICATOR POWER SUPPLY	light indicator	
	H6/	2	N	1	120272	LIGHT SW GND	125374	
	GND2/		N	1	-	GND		
	XJ3B/4	1	C/N	1	ffda	SWAY CONTROL PUSHBUTTON	8-WAY CONN.	S6
		2					LEVELLING ACTIV.	
		3					125056	
		4						
	S5/	5	R-V	1	ffda	+ SWITCH - OUTRIGGERS		
		6						
		7						
		8						
	H5/	1	B-R	1	120272	LIGHT SW POWER SUPPLY	2-WAY CONN.	H6
	H7/1		B-R	1	-	LIGHT SW POWER SUPPLY	light indicator	
	H5/	2	N	1	120272	LIGHT SW GND	125374	
	H7/2		N	1	-	LIGHT SW GND		
	X23/B	1	S-G	1	ffda	SOLENOID VALVE - SLEWRING LOCKED Y2	8-WAY CONN.	S5
	X4/7		S-G	1	-	SLEWRING LOCKED/UNLOCKED	SLEWRING LOCK/UNLOCK ACTIV.	
		2					125056	
	S4/3	3	R-V	1	ffda	+ SWITCH - OUTRIGGERS		
	S6/5		R-V	1	-	+ SWITCH - OUTRIGGERS		
		4						
		5						
		6						
	X23/A	7	B-G	1	ffda	SOLENOID VALVE - SLEWRING LOCKED Y2		
	X4/5		B-G	1	-	TO DANFOSS CONTROL UNIT		
		8						
	H4/	1	B-R	1	120272	LIGHT SW POWER SUPPLY	2-WAY CONN.	H5
	H6/1		B-R	1	-	LIGHT SW POWER SUPPLY	light indicator	
	H4/	2	N	1	120272	LIGHT SW GND	125374	
	H6/2		N	1	-	LIGHT SW GND		
	XJ3/3	1	Z/B	1	ffda	REAR RH ARM	8-WAY CONN.	S4
		2					RH FOOT ARM	
	S3/3	3	R-V	1	ffda	+ SWITCH - OUTRIGGERS	125056	
	S5/3		R-V	1	-	+ SWITCH - OUTRIGGERS	REAR	
		4						
		5						
		6						
	XJ3/2	7	A/R	1	ffda	REAR RH FOOT		
		8						
	H3/	1	B-R	1	120272	LIGHT SW POWER SUPPLY	2-WAY CONN.	H4
	H5/1		B-R	1	-	LIGHT SW POWER SUPPLY	light indicator	
	H3/	2	N	1	120272	LIGHT SW GND	125374	
	H5/2		N	1	-	LIGHT SW GND		

Operation:	Left dashboard tree-based scheme - Girolift 5022 Page 5 of 6	Table: **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
X18	13-WAY MK CONN.	PLATFORM POTENT. POWER SUPPLY		X28/13	1	G-R	1	FFK									
	CONTROL UNIT	SIGNAL - TURRET ROTATION SOLENOID VALVE		XJ4/4	2	L/G	1	FFK		XJ3/1	1	B	1	ffda	REAR LH ARM	8-WAY CONN.	S3
	125213A	SIGNAL - OVERLOAD WARNING SYSTEM		S10/	3	B-N	1	FFK			2					LH FOOT ARM	
		SIGNAL - TURRET ROTATION		X22/8	4	L-G	1	FFK		S2/3	3	R-V	1	ffda	+ SWITCH - OUTRIGGERS	125056	
		SIGNAL - BOOM OUT/IN		XJ4/1	5	M/B	1	FFK		S4/3		R-V	1	-	+ SWITCH - OUTRIGGERS	REAR	
		SIGNAL - BOOM UP/DOWN		XJ4/3	6	A/V	1	FFK			4						
		SIGNAL - BOOM UP/DOWN		X22/9	7	A-V	1	FFK			5						
		GND		GND2/	8	N	1	FFK			6						
		86 RELAY - BASKET FULL		X25/16	9	N-Z	1	FFK		XJ3/4	7	V/N	1	ffda	REAR LH FOOT		
		SIGNAL - OVERLOAD WARNING SYSTEM		X25/1	10	B-N	1	FFK			8						
		SIGNAL - BOOM OUT/IN		X22/6	11	M-B	1	FFK									
		SOLENOID VALVE - ATTACHMENT LOCKED/UNLOCKED		XJP4/5	12	R-G	1	FFK		H2/	1	B-R	1	120272	LIGHT SW POWER SUPPLY	2-WAY CONN.	H3
		SIGNAL - ATTACHMENT LOCKED/UNLOCKED		X22/5	13	G-R	1	FFK		H4/1		B-R	1	-	LIGHT SW POWER SUPPLY	light indicator	
		SIGNAL - ATTACHMENT LOCKED/UNLOCKED		X35/1		G-R	1	-		H2/	2	N	1	120272	LIGHT SWITCH GND	125374	
										H4/2		N	1	-	LIGHT SWITCH GND		
X16	13-WAY MK CONN.				1												
	CONTROL UNIT	FORWARD SPEED		X12/4	2	V/N	1	FFK		XJ3/5	1	M/N	1	ffda	FRONT RH ARM	8-WAY CONN.	S2
	125213V	BUCK-UP HORN		X27/23	3	B	1	FFK			2					RH FOOT ARM	
		+SPEED SWITCH		SALD2/	4	C-R	1	FFK		S1/3	3	R-V	1	ffda	+ SWITCH - OUTRIGGERS	125056	
		+SW - GEARBOX		X19/14		C-R	1	-		S3/3		R-V	1	-	+ SWITCH - OUTRIGGERS	FRONT	
		2nd HYDRAULIC SPEED		X12/2	5	Z-B	1	FFK			4						
		SOLENOID VALVE - 1st MECHANICAL SPEED		X21/20	6	M-B	1.5	FFK			5						
		SOLENOID VALVE - 2nd MECHANICAL SPEED		X21/21	7	B-N	1.5	FFK			6						
		TRANSMISSION DISCONNECTED		X26/4	8	S-G	1	FFK		XJ3B/3	7	A/B	1	ffda	FRONT RH FOOT		
		SOLENOID VALVE - REVERSE SPEED		X29/3	9	M-V	1	FFK			8						
		SOLENOID VALVE - DISPLACEMENT CHANGE		X21/17	10	C-V	1.5	FFK									
		SOLENOID VALVE - FORWARD SPEED		X29/2	11	V-N	1	FFK		H1/	1	B-R	1	120272	LIGHT SW POWER SUPPLY	2-WAY CONN.	H2
		REVERSE SPEED		X12/3	12	H-V	1	FFK		H3/1		B-R	1	-	LIGHT SW POWER SUPPLY	light indicator	
		SENSOR - CARDAN SHAFT		X21/11	13	A-B	1	FFK		H1/2	2	N	1	120272	LIGHT SWITCH GND	125374	
										H3/2		N	1	-	LIGHT SWITCH GND		
X17	17-WAY MK CONN.	WORK LIGHT		X27/13	1	G-N	1.5	FFK									
	CONTROL UNIT	WORK LIGHTS POWER SUPPLY		X26/12	2	G-V	1.5	FFK		XJ3B/1	1	V/B	1	ffda	FRONT LH ARM	8-WAY CONN.	S1
	125214				3						2					LH FOOT ARM	
		LEFT HIGH BEAM		X10/3	4	V	1.5	FFK		X5/9	3	R-V	1	ffda	+ SWITCH - OUTRIGGERS	125056	
		RIGHT HIGH BEAM		X27/8	5	V	1.5	FFK		S2/3		R-V	1	-	+ SWITCH - OUTRIGGERS	FRONT	
		HORN		X27/14	6	Z	1.5	FFK			4						
		WORK LIGHTS SWITCH OUTPUT		X20/16	7	L/G	1	FFK			5						
		START-UP ENABLING COMMAND		X29/9	8	C-B	1	FFK			6						
		START FROM BASKET		X28/11	9	C	1	FFK		XJ3B/2	7	C-B	1	ffda	FRONT LH FOOT		
		50 START-UP PANEL		S12/7		C	1	-			8						
		+SWITCH - FOG LAMP		X20/6	10	H/N	1	FFK									
		LEFT LOW BEAM		X10/2	11	H	1.5	FFK		X9/9	1	B-R	1	120272	LIGHT SW POWER SUPPLY	2-WAY CONN.	H1
		RIGHT LOW BEAM		X27/7	12	H	1.5	FFK		H2/1		B-R	1	-	LIGHT SW POWER SUPPLY	light indicator	
		LIGHT INDICATOR - HIGH BEAM		X2/9	13	V	1	FFK		H2/2	2	N	1	120272	LIGHT SWITCH GND	125374	
		HORN		X28/15	14	Z	1	FFK		X47/I		N	1	-	GND		
		HORN		X11/13		Z	1	-									
		LOW BEAM COMMON SWITCH		X11/5	15	H-B	1	FFK		H1/2	I	N	1	ffda	GND	2-WAY 90° CONN.	X47
		HIGH BEAM COMMON		X11/3	16	V-B	1	FFK		X25/11	-	B	1	ffda	MAN. LOWER OUTPUT	TO SERIAL LINE	
		MECHANICAL SPEED		X19/15	17	G-R	1	FFK								125018	
																CONTROL LEVER	
SALD2		+SPEED SWITCH		X16/4		C-R	1	-									
	WELDING	+SPEED SWITCH		X12/1		C-R	1	-		X5/3	1	R-V	1	ffda	POWER SUPPLY: DANFOSS CONTROL UNIT	2-WAY CONN.	X15
		+SPEED SWITCH		X12/5		C-R	1	-		X3/8		R-V	1	-	LIGHT INDICATOR POWER SUPPLY	DANFOSS CONTROL UNIT	
	+ 900001									X5/3	2	R-V	1	ffda	POWER SUPPLY: DANFOSS CONTROL UNIT	125007	
A		AUX CIRCUITS RELAY OUTPUT		B/		M	10	C/C6.101083		X22/1	1	L/R	1	120171	+SOLENOID VALVE - BOOM OUT/IN	8-WAY CONN. 125678	XJP4
										X22/4	2	A-G	1	120171	+SOLENOID VALVE - BOOM UP/DOWN	light indicators	
	000000									X22/2	3	M-N	1	120171	+SOLENOID VALVE - FORKS/OUTRIGGERS	125678	
										X22/3	4	B-N	1	120171	+SOLENOID VALVE - TURRET ROTATION		
	+ 128101									X18/12	5	R-G	1	120171	SOLENOID VALVE - ATTACHMENT LOCKED/UNLOCKED		
											6						
											7						
											8						

Operation: Left dashboard tree-based scheme - Girolift 5022
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Table: **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.
(J1)		30 RELAY - AUX CIRCUITS		X30/A		R	10	C/C6.101083
	Relay - aux circuits							
	000000							
	+ 128101							
(J3)		+30 RELAY BOARD		S11/2		R	6	C/C6.101083
	+30 control unit							
	000000							
	+ 128101							
(J2)		+15 RELAY BOARD		S12/5		A	6	C/C5.101124
	+15 control unit							
	000000							
	+ 128101							
(B)		AUX CIRCUITS RELAY OUTPUT		A/		M	10	C/C6.101083
	000000							
	+ 128101							

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
	S1/1	1	V/B	1	120171	FRONT LH ARM	18-WAY CONN. 125649	(XJ3B)
	S1/7	2	C-B	1	120171	FRONT LH FOOT	DANFOSS CONTROL UNIT	
	S2/7	3	A/B	1	120171	FRONT RH FOOT	125649	
	S6/1	4	C/N	1	120171	SWAY CONTROL PUSHBUTTON		
	X26/10	5	G/N	1	120171	SIGNAL - OPTIONAL MANIP.		
	X4/4	6	G/R	1	120171	SWITCH - SLEWRING LOCKED/UNLOCKED		
	Sal6/	7	R-V	1	120171	SEAT SENSOR		
	X36C/	8	M-N	1	120171	JOBSITE INPUT		
	X3/3	9	A	0.5	120171	LIGHT INDICATOR - FORK ROTATION		
	X3/12	10	M	0.5	120171	LIGHT INDICATOR - FORKS COUPLED		
	X3/10	11	H	0.5	120171	LIGHT INDICATOR - ROTATION LOCKED		
	X3/9	12	C	0.5	120171	LIGHT INDICATOR - TURRET ROTATION		
		13						
	Sal6/	14	R-V	1	120171	SEAT SENSOR		
		15						
		16						
		17						
	GND1/10	18	N	1.5	120171	GND		
	S3/1	1	B	1	120171	REAR LH ARM	12-WAY CONN.	(XJ3)
	S4/7	2	A/R	1	120171	REAR RH FOOT	DANFOSS CONTROL UNIT	
	S4/1	3	Z/B	1	120171	REAR RH ARM	125646	
	S3/7	4	V/N	1	120171	REAR LH FOOT		
	S2/1	5	M/N	1	120171	FRONT RH ARM		
	X36D/	6	H/N	1	120171	PLATFORM INPUT		
	X27/19	7	A-N	1	120171	SENSOR - BUCKET UP		
	S10/	8	B-N	1	120171	SIGNAL - OVERLOAD WARNING SYSTEM		
	Sal3/	9	C-L	1	120171	SENSOR - BOOM DOWN		
	X25/3	10	B/V	1	120171	SENSOR - BOOM UP		
	X3/5	11	S	0.5	120171	LIGHT INDICATOR - BOOM UP/DOWN		
	X3/4	12	V	0.5	120171	LIGHT INDICATOR - BOOM OUT/IN		
	X28/1	1	A-N	1	120171	SIGNAL - BOOM UP/DOWN	8-WAY CONN. 125678	(XJP2)
	X28/2	2	L-R	1	120171	SIGNAL - TURRET ROTATION	DANFOSS CONTROL UNIT	
	X28/3	3	L-B	1	120171	SIGNAL - BOOM OUT/IN	125678	
	X28/4	4	V	1	120171	+12 JOYSTICK IN MOTION		
	X4/	5	V-B	1	120171	PLATFORM ENABLED		
	X28/6	6	B-R	1	120171	ROBOT POWER SUPPLY		
		7						
	X28/7	8	B-N	1	120171	SENSOR - FORKS COUPLED		
	X26/13	1	C	0.5	120171	Neutral pos. manip.	8-WAY CONN. 125678	(XJP3)
	X25/10	2	A/B	1	120171	ROBOT	DANFOSS CONTROL UNIT	
		3					125678	
		4						
		5						
		6						
		7						
		8						
	X18/5	1	M/B	1	120171	SIGNAL - BOOM OUT/IN	20-WAY CONN. 125651	(XJ4)
	X22/7	2	A/G	1	120171	ATTACHMENT LOCKED/UNLOCKED	DANFOSS CONTROL UNIT	
	X18/6	3	A/V	1	120171	SIGNAL - BOOM UP/DOWN	125651	
	X18/2	4	L/G	1	120171	SIGNAL - TURRET ROTATION SOLENOID VALVE		
	X35/4	5	L/B	1	120171	SIGNAL - ATTACHMENT LOCKED/UNLOCKED		
	X22/10	6	Z-N	1	120171	+SOLENOID VALVE - SWITCHING		
		7						
		8						
	X21/28	9	V/B	1	120171	SOLENOID VALVE - LEFT OUTRIGGER OUT		
	X21/29	10	C/B	1	120171	SOLENOID VALVE - LEFT OUTRIGGER IN		
	X21/30	11	M-N	1	120171	SOLENOID VALVE - RIGHT OUTRIGGER OUT		
	X21/31	12	A-B	1	120171	SOLENOID VALVE - RIGHT OUTRIGGER IN		
	X21/32	13	B/N	1	120171	SOLENOID VALVE - LEFT OUTRIGGER UP		
	X21/33	14	V/N	1	120171	SOLENOID VALVE - LEFT OUTRIGGER DOWN		
	X21/34	15	Z/B	1	120171	SOLENOID VALVE - RIGHT OUTRIGGER UP		
	X21/	16	A/R	1	120171	SOLENOID VALVE - RIGHT OUTRIGGER DOWN		
	X21/27	17	S/N	1	120171	OUTRIGGER RELAY SWITCHING		
	X21/24	18	G/R	1	120171	Y10 SOLENOID VALVE - AXLE LEVELLING		
	X21/23	19	C/N	1	120171	Y5 SOLENOID VALVE - AXLE LEVELLING		
	X21/12	20	Z-B	1	120171	SENSOR - SLEWRING BLOCKED		

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Operation: Danfoss line tree-based scheme - Girolift 5022	*Table:* **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.
(X22)	12-WAY DT CONN.	Power supply: boom out/in solenoid valve		Y22/1	1	L/R	1	DF
	To LH dashboard line	Power supply: forks/outriggers solenoid valve		Y23/1	2	M-N	1	DF
	125422 125423	Power supply: turret rotation solenoid valve		Y27/1	3	B-N	1	DF
		Power supply: boom up/down solenoid valve		Y26/1	4	A-G	1	DF
		Power supply: attachment locked/unlocked solenoid valve		Y24/1	5	G-R	1	DF
		Signal - boom out/in solenoid valve		Y22/2	6	M/B	1	DF
		Signal - forks/outriggers solenoid valve		Y23/2	7	A/G	1	DF
		Signal - turret rotation solenoid valve		Y27/2	8	L-G	1	DF
		Signal - boom up/down solenoid valve		Y26/2	9	A-V	1	DF
		Power supply: switching solenoid valve		Y25/1	10	Z-N	1	DF
		Signal - attachment locked/unlocked solenoid valve		Y24/2	11	L/B	1	DF
					12			150100
(GND)		GND		X23/C		N	1.5	C/C8.120022
	Ground point	GND		Y22/		N	1	-
	000000	GND		Y23/		N	1	-
	+ 900001 X3	GND		Y25/2		N	1	C/C8.120022
		GND		Y1/2		N	1	-
		GND		Y2/2		N	1	-
		GND		Y27/		N	1	C/C8.120022
		GND		Y26/		N	1	-
		GND		Y24/		N	1	-
(Y22)	S/V CONN. 125526	Power supply: boom out/in solenoid valve		X22/1	1	L/R	1	101077
	Solenoid valve - boom out/in	Signal - boom out/in solenoid valve		X22/6	2	M/B	1	101077
	125526 138017				3			
		GND		GND/	⏚	N	1	101077
(Y23)	S/V CONN. 125526	Power supply: forks/outriggers solenoid valve		X22/2	1	M-N	1	101077
	Solenoid valve - forks/outriggers	Signal - forks/outriggers solenoid valve		X22/7	2	A/G	1	101077
	125526 138017				3			
		GND		GND/	⏚	N	1	101077

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
	Y1/1	A	B-G	1	DF	Power supply: slewring blocked solenoid valve	3-WAY DT CONN.	(X23)
	Y2/1	B	S-G	1	DF	Power supply: slewring unlocked solenoid valve	To LH dashboard line	
	GND/	C	N	1.5	DF	GND	125406 125407	
1A1	X23/A	1	B-G	1	101077	Power supply: slewring blocked solenoid valve	S/V CONN. 125234	(Y1)
	GND/	2	N	1	101077	GND	Solenoid valve - slewring 125234 blocked	
1A1	X23/B	1	S-G	1	101077	Power supply: slewring unlocked solenoid valve	S/V CONN. 125234	(Y2)
	GND/	2	N	1	101077	GND	Solenoid valve - slewring 125234 unlocked	
1A1	X22/10	1	Z-N	1	101077	Power supply: switching solenoid valve	S/V CONN. 125234	(Y25)
	GND/	2	N	1	101077	GND	Solenoid valve - switching 125234	
	X22/4	1	A-G	1	101077	Power supply: boom up/down solenoid valve	S/V CONN. 125234	(Y26)
	X22/9	2	A-V	1	101077	Signal - boom up/down solenoid valve	Solenoid valve - boom	
		3					125526 138017	
	GND/	⏚	N	1	101077	GND	up/down	
	X22/3	1	B-N	1	101077	Power supply: turret rotation solenoid valve	S/V CONN. 125234	(Y27)
	X22/8	2	L-G	1	101077	Signal - turret rotation solenoid valve	Solenoid valve - turret rotation	
		3					125526 138017	
	GND/	⏚	N	1	101077	GND		
	X22/5	1	G-R	1	101077	Power supply: attachment locked/unlocked solenoid valve	S/V CONN. 125234	(Y24)
	X22/11	2	L/B	1	101077	Signal - attachment locked/unlocked solenoid valve	Solenoid valve - attachment	
		3					125526 138017	
	GND/	⏚	N	1	101077	GND	locked/unlocked	

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Operation: Front carriage line tree-based scheme - Girolift 5022

Table: **C.05.04**

UNIT	CONNECTOR	FUNCTION # WIRE NR.	N.	REF.	P.	COL.	SEC.	TERMIN.
X50	DT CONN. 125453	Solenoid valve power supply: front left steering axle unlocked		Y3/1	1	M-B	1	DF
	To junction box	GND		GND1/	2	N	1.5	DF
	125453	NC contact power supply: front LH stab. limit switch		X51/1	3	R-V	1	DF
		NO contact output: front RH stab. limit switch		X52/3	4	G-L	1	DF
					5			150100
					6			150100
		Left turn signal		H1/	7	L	1	DF
					8			150100
		Solenoid valve power supply: front right steering axle unlocked		Y4/1	9	M-B	1	DF
		Right turn signal		H2/	10	A	1	DF
		NO contact power supply: front RH stab. limit switch		X51/4	11	R-V	1	DF
		NC contact output: front RH stab. limit switch		X52/2	12	B-N	1	DF
					13			150100
					14			150100
					15			150100
					16			150100
		Solenoid valve power supply: front left outrigger up		Y7/1	17	B/N	1	DF
		Solenoid valve power supply: front right outrigger in		Y13/1	18	A/B	1	DF
		Solenoid valve power supply:front right outrigger up		Y12/1	19	Z/B	1	DF
		Solenoid valve power supply:front left outrigger out		Y9/1	20	V/B	1	DF
		Solenoid valve power supply:front left outrigger in		Y8/1	21	C/B	1	DF
		Solenoid valve power supply: front left outrigger out		Y14/1	22	M/N	1	DF
		Solenoid valve power supply: front left outrigger down		Y6/1	23	V/N	1	DF
		Solenoid valve power supply: front left outrigger down		Y11/1	24	A/R	1	DF
Y3	S/V CONN. 125234	Solenoid valve power supply: front LH steering axle unlocked	1A	X50/1	1	M-B	1	101077
	Solenoid valve - front left	GND		GND1/	2	N	1	101077
	125234							
	steering axle unlocked							
X51	4-WAY DT CONN.	NC contact power supply: front LH stab. limit switch		X50/3	1	R-V	1	DF
	Micro-switch - front	NC contact power supply from front LH stab.		X52/1	2	B/R	1	DF
	125410 125411	NO contact power supply from front LH stab.		X52/4	3	H-L	1	DF
	left outrigger	NC contact power supply: front LH stab. limit switch		X50/11	4	R-V	1	DF
H1		Left turn signal		X50/7		L	1	ff C
	Left turn signal							
	000000							
GND1		GND		X50/2		N	1.5	C/C8.120022
	Ground point	GND		Y4/2		N	1	-
	000000	GND		Y3/2		N	1	-
		GND		GND/		N	1	-
	+ 900001							
Y9	S/V CONN. 125234	Solenoid valve power supply: front left outrigger out	2A	X50/20	1	V/B	1	101077
	Solenoid valve - front left	GND		GND/	2	N	1	101077
	125234							
	outrigger out							
Y8	S/V CONN. 125234	Solenoid valve power supply: front left outrigger in	2A	X50/21	1	C/B	1	101077
	Solenoid valve - front left	GND		GND/	2	N	1	101077
	125234							
	outrigger in							
Y7	S/V CONN. 125234	Solenoid valve power supply: front left outrigger up	2A	X50/17	1	B/N	1	101077
	Solenoid valve - front left	GND		GND/	2	N	1	101077
	125234							
	outrigger up							
Y6	S/V CONN. 125234	Solenoid valve power supply: front left outrigger down	2A	X50/23	1	V/N	1	101077
	Solenoid valve - front left	GND		GND/	2	N	1	101077
	125234							
	outrigger down							

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE NR.	CONNECTOR	UNIT
1A	X50/9	1	M-B	1	101077	Power supply: front right steering axle unlocked solenoid valve	S/V CONN. 125234	Y4
	GND1/	2	N	1	101077	GND	Solenoid valve - front right	
							125234	
							steering axle unlocked	
	X51/2	1	B/R	1	DF	NC contact power supply from front LH stab.	4-WAY DT CONN.	X52
	X50/12	2	B-N	1	DF	NC contact output: front RH stab. limit switch	Micro-switch - front right	
	X50/4	3	G-L	1	DF	NO contact output: front RH stab. limit switch	125410 125411	
	X51/3	4	H-L	1	DF	NO contact power supply from front LH stab.	outrigger	
	X50/10		A	1	ff C	Right turn signal		H2
							Right turn signal	
							000000	
1A	X50/22	1	M/N	1	101077	Solenoid valve power supply: front left outrigger out	S/V CONN. 125234	Y14
	GND/	2	N	1	101077	GND	Solenoid valve - front right	
							125234	
							outrigger out	
1A	X50/18	1	A/B	1	101077	Solenoid valve power supply: front right outrigger in	S/V CONN. 125234	Y13
	GND/	2	N	1	101077	GND	Solenoid valve - front right	
							125234	
							outrigger in	
1A	X50/19	1	Z/B	1	101077	Solenoid valve power supply: front right outrigger up	S/V CONN. 125234	Y12
	GND/	2	N	1	101077	GND	Solenoid valve - front right	
							125234	
							outrigger up	
1A	X50/24	1	A/R	1	101077	Solenoid valve power supply: front left outrigger down	S/V CONN. 125234	Y11
	GND/	2	N	1	101077	GND	Solenoid valve - front right	
							125234	
							outrigger down	
	GND1/		N	1	C/C8.101094	GND		GND
	Y11/2		N	1	-	GND	Ground point	
	Y12/2		N	1	-	GND	000000	
	Y13/2		N	1	-	GND		
	Y14/2		N	1	-	GND	+ 900001	
	Y9/2		N	1	-	GND		
	Y8/2		N	1	-	GND		
	Y7/2		N	1	-	GND		
	Y6/2		N	1	-	GND		

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Operation: Rear carriage line tree-based scheme - Girolift 5022

Table:

C.05.04

UNIT	CONNECTOR	FUNCTION # WIRE NR.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE NR.	CONNECTOR	UNIT
(X55)	40-WAY DT CONN.	Sensor power supply - slewring blocked		B2/A	1	R-V	1	DF		X55/35		N	1.5	C/C8.101040	GND		(GND)
	To junction box	Sensor power supply - rear axle levelling		B3/A	2	R-V	1	DF		GND1/		N	1.5	-	GND	Ground point	
	125484	NC contact input: rear RH limit switch		X54/1	3	B-N	1	DF		Y18/2		N	1	-	GND	000000	
		NC contact output: LH limit switch		X53/2	4	B-G	1	DF		Y21/2		N	1	-	GND		
		NO contact input: rear RH limit switch		X54/4	5	G-L	1	DF		Y20/2		N	1	-	GND	+ 900001 X2	
		NO contact output: LH limit switch		X53/3	6	L-R	1	DF		Y5/2		N	1	-	GND		
					7			150100		Y10/2		N	1	-	GND		
		Power supply - rear steering axle locked		Y15/1	8	G-V	1	DF		Y17/2		N	1	-	GND		
		Power supply - rear steering axle locked		Y15a/1	9	G-V	1	DF									
					10			150100		Y16/2		N	1	C/C8.101040	GND		
		Licence plate light power supply		H1/1	11	G-N	1	DF		Y19/2		N	1	-	GND		
					12			150100		B1/		N	1	-	GND		
		Signal - rear axle levelling sensor		B3/C	13	L-B	1	DF		B2/B		N	1	-	GND		
		Signal - slewring blocked sensor		B2/C	14	Z-B	1	DF		Y15/2		N	1	-	GND		
					15			150100		Y15a/2		N	1	-	GND		
					16			150100		B3/B		N	1	-	GND		
		Signal - cardan shaft sensor		B1/	17	A-B	1	DF		H1/2		N	1	-	GND		
		Power supply: 1st speed solenoid valve		Y17/1	18	V-B	1	DF									
		Power supply: 2nd speed solenoid valve		Y16/1	19	B-R	1	DF	1/A	X55/23	1	V	1	101077	Power supply: displacement change solenoid valve	S/V CONN. 125234	(Y18)
		Power supply: differential locking solenoid valve		Y19/1	20	C-B	1	DF		GND/	2	N	1	101077	GND	Displacement change solenoid valve	
		Power supply: four-wheel steer solenoid valve		Y20/1	21	H-R	1	DF								125234	
		Power supply: crab steer solenoid valve		Y21/1	22	C-N	1	DF									
		Power supply: displacement change solenoid valve		Y18/1	23	V	1	DF	1/A	X55/22	1	C-N	1	101077	Power supply: crab steer solenoid valve	S/V CONN. 125234	(Y21)
					24			150100		GND/	2	N	1	101077	GND	Crab steer solenoid valve	
		Power supply: rear right outrigger in solenoid valve		Y13/1	25	A/B	1	DF								125234	
		Power supply: front axle levelling solenoid valve		Y5/1	26	C/N	1	DF									
		Power supply: rear right outrigger down solenoid valve		Y11/1	27	A/R	1	DF									
		Power supply: rear left outrigger down solenoid valve		Y6/1	28	V/N	1	DF	1/A	X55/21	1	H-R	1	101077	Power supply: four-wheel steer solenoid valve	S/V CONN. 125234	(Y20)
		Power supply: rear left outrigger in solenoid valve		Y8/1	29	C/B	1	DF		GND/	2	N	1	101077	GND	Four-wheel steer	
		Power supply: rear right outrigger out solenoid valve		Y14/1	30	M/N	1	DF								125234	
		Power supply: rear left outrigger up solenoid valve		Y7/1	31	B/N	1	DF								solenoid valve	
		Power supply: rear right outrigger up solenoid valve		Y12/1	32	Z/B	1	DF									
		Power supply: front axle levelling solenoid valve		Y10/1	33	G/R	1	DF	1/A	X55/26	1	C/N	1	101077	Power supply: front axle levelling solenoid valve	S/V CONN. 125234	(Y5)
		Power supply: rear left outrigger out solenoid valve		Y9/1	34	V/B	1	DF		GND/	2	N	1	101077	GND	Solenoid valve - front	
		GND		GND/	35	N	1.5	DF								125234	
					36			150100								axle levelling	
					37			150100									
					38			150100	1/A	X55/33	1	G/R	1	101077	Power supply: front axle levelling solenoid valve	S/V CONN. 125234	(Y10)
					39			150100		GND/	2	N	1	101077	GND	Solenoid valve - front	
					40			150100								125234	
																axle levelling	
(B1)		GND		GND/		N	1	120062									
	Cardan shaft sensor	Signal - cardan shaft sensor		X55/17		A-B	1	120062	1/A	X55/18	1	V-B	1	101077	Power supply: 1st speed solenoid valve	S/V CONN. 125234	(Y17)
	000000									GND/	2	N	1	101077	GND	Solenoid valve - 1st speed	
	+ 104010 X2															125234	
(B2)	3-WAY DT CONN.	Slewring blocked sensor power supply		X55/1	A	R-V	1	DF	1/A	X55/19	1	B-R	1	101077	Power supply: 2nd speed solenoid valve	S/V CONN. 125234	(Y16)
	Slewring blocked sensor	GND		GND/	B	N	1	DF		GND/	2	N	1	101077	GND	Solenoid valve - 2nd speed	
	125406 125407	Signal - slewring blocked sensor		X55/14	C	Z-B	1	DF								125234	
(Y15)	S/V CONN. 125234	Rear steering axle locked power supply	1/A	X55/8	1	G-V	1	101077	1/A	X55/20	1	C-B	1	101077	Power supply: differential locking solenoid valve	S/V CONN. 125234	(Y19)
	Solenoid valve - rear	GND		GND/	2	N	1	101077		GND/	2	N	1	101077	GND	Solenoid valve - differential locking	
	125234															125234	
	steering axle locked																
										X55/11	1	G-N	1	DF	Licence plate light power supply	2-WAY DT CONN.	(H1)
(Y15a)	S/V CONN. 125234	Rear steering axle locked power supply	1/A	X55/9	1	G-V	1	101077		GND/	2	N	1	DF	GND	Licence plate light	
	Solenoid valve - rear	GND		GND/	2	N	1	101077								125402 125403	
	125234														Mount plugged scheme		
	steering axle locked															+ 125400	
																+ 125401	
(X53)	4-WAY DT CONN.	From RH limit switch to LH limit switch NC contact		X54/2	1	S/N	1	DF								+ 150100 X2	
	Rear left outrigger	NC contact output: LH limit switch		X55/4	2	B-G	1	DF									
	125410 125411	NO contact output: LH limit switch		X55/6	3	L-R	1	DF	1/A	X55/30	1	M/N	1	101077	Power supply: rear right outrigger out solenoid valve	S/V CONN. 125234	(Y14)
	micro-switch	From RH limit switch to LH limit switch NO contact		X54/3	4	A-V	1	DF		GND1/	2	N	1	101077	GND	Solenoid valve - rear right	
																125234	
(X54)	4-WAY DT CONN.	NC contact input: rear RH limit switch		X55/3	1	B-N	1	DF								outrigger out	
	Rear right outrigger	From RH limit switch to LH limit switch NC contact		X53/1	2	S/N	1	DF									
	125410 125411	From RH limit switch to LH limit switch NO contact		X53/4	3	A-V	1	DF	1/A	X55/25	1	A/B	1	101077	Power supply: rear right outrigger in solenoid valve	S/V CONN. 125234	(Y13)
	micro-switch	NO contact input: rear RH limit switch		X55/5	4	G-L	1	DF		GND1/	2	N	1	101077	GND	Solenoid valve - rear	
																125234	
(B3)	3-WAY DT CONN.	Rear axle levelling sensor power supply		X55/2	A	R-V	1	DF								right outrigger in	
	Sensor - rear axle	GND		GND/	B	N	1	DF	1/A	X55/02	1	Z/B	1	101077	Power supply: rear right outrigger up solenoid valve	S/V CONN. 125234	(Y12)
	125406 125407	Signal - rear axle levelling sensor		X55/13	C	L-B	1	DF		GND1/	2	N	1	101077	GND	Solenoid valve - rear right	
	levelling sensor															125234	
																outrigger up	
(Y9)	S/V CONN. 125234	Power supply: rear left outrigger out solenoid valve	1/A	X55/34	1	V/B	1	101077									
	Solenoid valve - rear left	GND		GND1/	2	N	1	101077	1/A	X55/27	1	A/R	1	101077	Power supply: rear right outrigger down solenoid valve	S/V CONN. 125234	(Y11)
	125234									GND1/	2	N	1	101077	GND	Solenoid valve - rear right	
	outrigger out															125234	
																outrigger down	
(Y8)	S/V CONN. 125234	Power supply: rear left outrigger in solenoid valve	1/A	X55/29	1	C/B	1	101077									
	Solenoid valve - rear	GND		GND1/	2	N	1	101077		GND/		N	1.5	C/C8.101013	GND		(GND1)
	125234									Y14/2		N	1	-	GND	Ground point	
	left outrigger in									Y13/2		N	1	-	GND	000000	
(Y7)	S/V CONN. 125234	Power supply: rear left outrigger up solenoid valve	1/A	X55/31	1	B/N	1	101077		Y12/2		N	1	C/C8.101094	GND	+ 900001 X2	
	Solenoid valve - rear left	GND		GND1/	2	N	1	101077		Y11/2		N	1	-	GND		
	125234									Y9/2		N	1	-	GND		
	outrigger up									Y7/2		N	1	-	GND		
										Y8/2		N	1	-	GND		
(Y6)	S/V CONN. 125234	Power supply: rear left outrigger down solenoid valve	1/A	X55/28	1	V/N	1	101077		Y9/2		N	1	-	GND		
	Solenoid valve - rear left	GND		GND1/	2	N	1	101077									
	125234																
	outrigger down																

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Operation: Undercarriage box tree-based scheme - Girolift 5022

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Table:

C.05.04

Connector - type 'A'

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.
(X21)	40-WAY DT CONN.	Solenoid valve - rear steering axle locked		X8/8	1	H-R	1.5	DM
	To cab line	GND		X20/1	2	N	1.5	DM
	125481	GND		X21/1	3	N	1.5	DM
		GND		X7/5	4	N	1.5	DM
		Right turn signal		X7/15	5	L	1	DM
		Left turn signal		X7/7	6	A	1	DM
					7			150100
					8			150100
					9			150100
		Power supply: mech. speed light indicator		X8/15	10	A-R	1	DM
		Sensor - cardan shaft		X8/2	11	A-B	1	DM
		Sensor - slewring blocked		X8/1	12	Z-B	1	DM
		Sensor power supply		X8/6	13	R-V	1	DM
		Outrigger signal for transmission deactivation		X22/1	14	B-G	1	DM
		Outrigger signal for 3B6		X22/2	15	L-R	1	DM
		Signal - rear steering axle aligned		X8/21	16	L-G	1	DM
		Solenoid valve - power displacement change		X8/14	17	C-V	1.5	DM
		Solenoid valve - crab steer		X8/18	18	C-N	1.5	DM
		Solenoid valve - four-wheel steer		X8/17	19	H-R	1.5	DM
		Solenoid valve - 1st mechanical speed		X8/5	20	M-B	1.5	DM
		Solenoid valve - 2nd mechanical speed		X8/15	21	B-N	1	DM
		Solenoid valve - differential locking		X8/12	22	C-B	1.5	DM
		Y5 solenoid valve - axle levelling		X8/4	23	C/N	1	DM
		Y10 solenoid valve - axle levelling		X8/3	24	G/R	1	DM
		Signal - boom down		X8/19	25	C-L	1	DM
		Signal - axle blocked		X8/20	26	V-Z	1	DM
		Outrigger relay switching		X8/9	27	S/N	1	DM
		Solenoid valve - left outrigger out		X8/11	28	V/B	1	DM
		Solenoid valve - left outrigger in		X7/10	29	C/B	1	DM
		Solenoid valve - right outrigger out		X7/2	30	M-N	1	DM
		Solenoid valve - right outrigger in		X7/4	31	A-B	1	DM
		Solenoid valve - left outrigger up		X7/1	32	B/N	1	DM
		Solenoid valve - left outrigger down		X7/3	33	V/N	1	DM
		Solenoid valve - right outrigger up		X7/6	34	Z/B	1	DM
		Solenoid valve - right outrigger down		X7/14	35	A/R	1	DM
					36			150100
					37			150100
					38			150100
					39			150100
					40			150100

Connector - type 'A'

UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.
(X50)	DT CONN. 125452	Solenoid valve - front left steering axle unlocked		X4/1	1	M-B	1	DM
	To front carriage line	GND		X20a/1	2	N	1.5	DM
	125452	NC contact power supply: front LH stab. limit switch		X4/4	3	R-V	1	DM
		NO contact output: front RH stab. limit switch		X23/	4	G-L	1	DM
					5			150100
					6			150100
		Left turn signal		X6/6	7	L	1	DM
					8			
		Solenoid valve - front right steering axle unlocked		X4/1	9	M-B	1	DM
		Right turn signal		X6/2	10	A	1	DM
		NO contact power supply: front LH stab. limit switch		X4/4	11	R-V	1	DM
		NC contact output: front RH stab. limit switch		X23/	12	B-N	1	DM
					13			150100
					14			150100
					15			150100
					16			150100
		Solenoid valve - front left outrigger up		X4/5	17	B/N	1	DM
		Solenoid valve - front right outrigger in		X4/6	18	A/B	1	DM
		Solenoid valve - front right outrigger up		X4/7	19	Z/B	1	DM
		Solenoid valve - front left outrigger out		X4/8	20	V/B	1	DM
		Solenoid valve - front left outrigger in		X4/9	21	C/B	1	DM
		Solenoid valve - front right outrigger up		X4/11	22	M/N	1	DM
		Solenoid valve - front left outrigger down		X4/12	23	V/N	1	DM
		Solenoid valve - front right outrigger down		X4/13	24	A/R	1	DM

N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
	X21/32	1	B/N	1	FFK	Solenoid valve - left outrigger up	17-WAY MK CONN.	(X7)
	X21/30	2	M-N	1	FFK	Solenoid valve - right outrigger out	To control unit	
	X21/33	3	V/N	1	FFK	Solenoid valve - left outrigger down	125214V	
	X21/31	4	A-B	1	FFK	Solenoid valve - right outrigger in		
	X21/4	5	N	1.5	FFK	GND		
	X21/34	6	Z/B	1	FFK	Solenoid valve - right outrigger up		
	X21/6	7	A	1	FFK	Left turn signal		
		8						
		9						
	X21/29	10	C/B	1	FFK	Solenoid valve - left outrigger in		
		11						
		12						
		13						
	X21/35	14	A/R	1	FFK	Solenoid valve - right outrigger down		
	X21/5	15	L	1	FFK	Right turn signal		
		16						
		17						
	X21/12	1	Z-B	1	FFK	Sensor - slewring blocked	21-WAY MK CONN.	(X8)
	X21/11	2	A-B	1	FFK	Sensor - cardan shaft	To control unit	
	X21/24	3	G/R	1	FFK	Y10 solenoid valve - axle levelling	125215G	
	X21/23	4	C/N	1	FFK	Y5 solenoid valve - axle levelling		
	X21/20	5	M-B	1.5	FFK	Solenoid valve - 1st mechanical speed		
	X21/13	6	R-V	1	FFK	Sensor power supply		
		7						
	X21/1	8	H-R	1.5	FFK	Solenoid valve - rear steering axle locked		
	X21/27	9	S/N	1	FFK	Outrigger relay switching		
		10						
	X21/28	11	V/B	1	FFK	Solenoid valve - left outrigger out		
	X21/22	12	C-B	1.5	FFK	Solenoid valve - differential locking		
		13						
	X21/17	14	C-V	1.5	FFK	Solenoid valve - power displacement change		
	X21/10	15	A-R	1	FFK	Power supply: mech. speed light indicator		
	X21/21		B-N	1	-	Solenoid valve - 2nd mechanical speed		
		16						
	X21/19	17	H-R	1.5	FFK	Solenoid valve - four-wheel steer		
	X21/18	18	C-N	1.5	FFK	Solenoid valve - crab steer		
	X21/25	19	C-L	1	FFK	Signal - boom down		
	X21/26	20	V-Z	1	FFK	Signal - axle blocked		
	X21/16	21	L-G	1	FFK	Signal - rear steering axle aligned		
	X21/2	1	N	1.5	ffda	GND	1-WAY CONN.	(X20)
							GND	
							125005	
	X21/3	1	N	1.5	ffda	GND	1-WAY CONN.	(X21)
							GND	
							125005	
	X21/14	1	B-G	1	ffda	Outriggers signal for transmission deactivation	2-WAY CONN.	(X22)
	X21/15	2	L-R	1	ffda	Outriggers signal for 3B6		
							125007	
	X50/1	1	M-B	1	FFK	Solenoid valve - front left steering axle unlocked	13-WAY MK CONN.	(X4)
	X50/9		M-B	1	-	Solenoid valve - front right steering axle unlocked	To control unit	
		2					125213	
		3						
	X50/3	4	R-V	1	FFK	NC contact power supply: front LH stab. limit switch		
	X50/11		R-V	1	FFK	NO contact power supply: front LH stab. limit switch		
	X50/17	5	B/N	1	FFK	Solenoid valve - front left outrigger up		
	X50/18	6	A/B	1	FFK	Solenoid valve - front right outrigger in		
	X50/19	7	Z/B	1	FFK	Solenoid valve - front right outrigger up		
	X50/20	8	V/B	1	FFK	Solenoid valve - front left outrigger out		
	X50/21	9	C/B	1	FFK	Solenoid valve - front left outrigger in		
		10						
	X50/22	11	M/N	1	FFK	Solenoid valve - front right outrigger up		
	X50/23	12	V/N	1	FFK	Solenoid valve - front left outrigger down		
	X50/24	13	A/R	1	FFK	Solenoid valve - front right outrigger down		

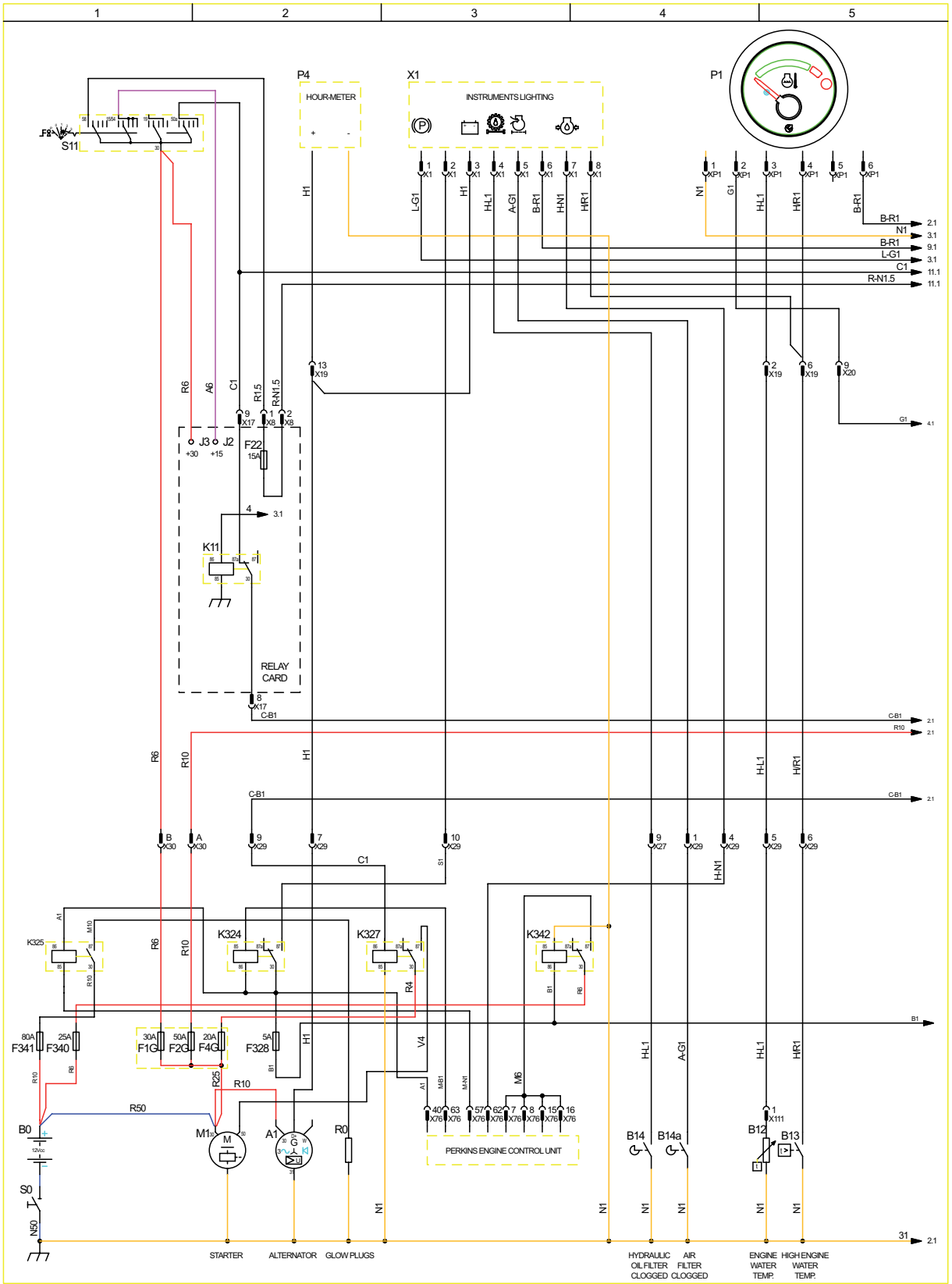
Operation:	Table:
Undercarriage box tree-based scheme - Girolift 5022 Page 2 of 2	**C.05.04**

Connector - type 'B'

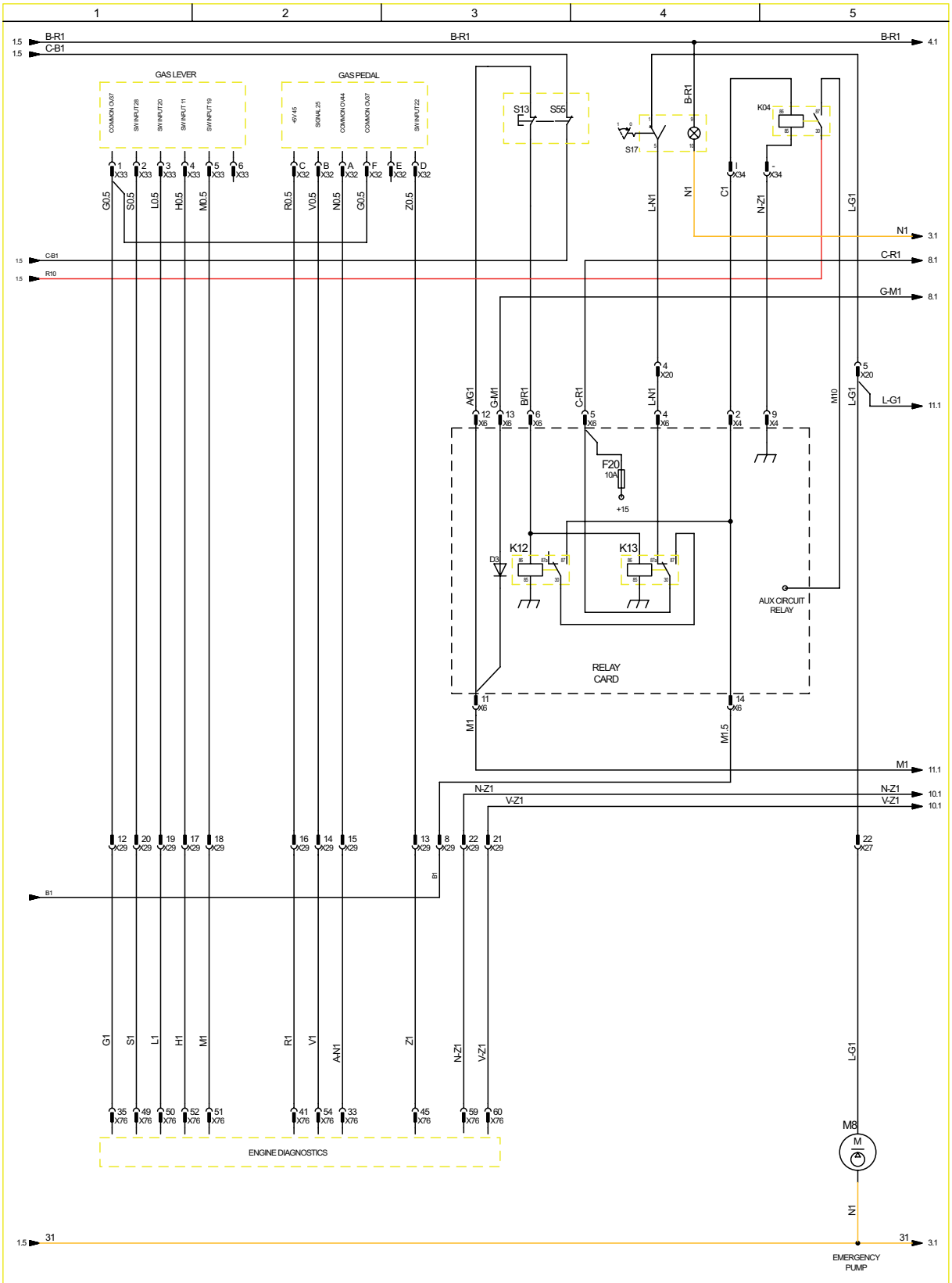
UNIT	CONNECTOR	FUNCTION # WIRE N.	N.	REF.	P.	COL.	SEC.	TERMIN.	N.	REF.	P.	COL.	SEC.	TERMIN.	FUNCTION # WIRE N.	CONNECTOR	UNIT
X55	40-WAY DT CONN.	Slewring blocked sensor power supply		X1/6	1	R-V	1	DM									
	To rear carriage	Rear axle levelling sensor power supply		X1/6	2	R-V	1	DM									
	125482	NC contact input: rear RH stab. limit switch		X23a/1	3	B-N	1	DM									
		NC contact output: rear LH stab. limit switch		X22a/1	4	B-G	1	DM			1					9-WAY MK CONN.	X6
		NO contact input: rear RH stab. limit switch		X23a/	5	G-L	1	DM		X50/10	2	A	1	FFK	Right turn signal	To control unit	
		NO contact output: rear LH stab. limit switch		X22a/2	6	L-R	1	DM			3					125211	
					7						4						
		Solenoid valve - rear steering axle locked		X1/1	8	G-V	1	DM			5						
		Solenoid valve - rear steering axle locked		X1/1	9	G-V	1	DM		X50/7	6	L	1	FFK	Left turn signal		
					10						7						
		Power supply: licence plate light		X1/14	11	G-N	1	DM			8						
					12						9						
		Signal - rear axle levelling sensor		X3/11	13	L-B	1	DM									
		Signal - slewring blocked sensor		X1/11	14	Z-B	1	DM		X50/2	1	N	1.5	fmda	GND	1-WAY CONN.	X20a
					15											GND	
					16											125006	
		Signal - cardan shaft sensor		X1/10	17	A-B	1	DM									
		Solenoid valve - 1st hydraulic speed		X1/7	18	V-B	1	DM		X50/12	I	B-N	1	ffda	NC contact output: front RH stab. limit switch	2-WAY 90° CONN.	X23
		Solenoid valve - 2nd hydraulic speed		X1/18	19	B-R	1	DM		X50/4	-	G-L	1	ffda	NO contact output: front RH stab. limit switch		
		Solenoid valve - differential locking		X1/21	20	C-B	1	DM								125018	
		Solenoid valve - four-wheel steer		X1/16	21	H-R	1	DM									
		Solenoid valve - crab steer		X1/15	22	C-N	1	DM		X55/8	1	G-V	1	FFK	Solenoid valve - rear steering axle locked	21-WAY MK CONN.	X1
		Solenoid valve - displacement change		X1/19	23	V	1	DM		X55/9		G-V	1	-	Solenoid valve - rear steering axle locked	To control unit	
					24					X3/12	2	V-Z	1	FFK	Bridge	125215	
		Solenoid valve - rear right outrigger in		X3/8	25	A/B	1	DM			3						
		Solenoid valve - rear axle levelling		X1/8	26	C/N	1	DM			4						
		Solenoid valve - rear right outrigger down		X3/6	27	A/R	1	DM			5						
		Solenoid valve - rear left outrigger down		X3/5	28	V/N	1	DM		X55/1	6	R-V	1	FFK	Slewring blocked sensor power supply		
		Solenoid valve - rear left outrigger in		X3/2	29	C/B	1	DM		X55/2		R-V	1	-	Rear axle levelling sensor power supply		
		Solenoid valve - rear right outrigger out		X3/1	30	M/N	1	DM		X55/18	7	V-B	1	FFK	Solenoid valve - 1st hydraulic speed		
		Solenoid valve - rear left outrigger up		X3/4	31	B/N	1	DM		X55/26	8	C/N	1	FFK	Solenoid valve - rear axle levelling		
		Solenoid valve - rear right outrigger up		X3/7	32	Z/B	1	DM		X55/33	9	G/R	1	FFK	Solenoid valve - rear axle levelling		
		Solenoid valve - rear axle levelling		X1/9	33	G/R	1	DM		X55/17	10	A-B	1	FFK	Signal - cardan shaft sensor		
		Solenoid valve - rear left outrigger out		X3/9	34	V/B	1	DM		X55/14	11	Z-B	1	FFK	Signal - slewring blocked sensor		
		GND		X21a/1	35	N	1.5	DM			12						
					36						13						
					37					X55/11	14	G-N	1	FFK	Licence plate light power supply		
					38					X55/22	15	C-N	1	FFK	Solenoid valve - crab steer		
					39					X55/21	16	H-R	1	FFK	Solenoid valve - four-wheel steer		
					40						17						
										X55/19	18	B-R	1	FFK	Solenoid valve - 2nd hydraulic speed		
										X55/23	19	V	1	FFK	Solenoid valve - displacement change		
											20						
										X55/20	21	C-B	1	FFK	Solenoid valve - differential locking		
										X55/30	1	M/N	1	FFK	Solenoid valve - rear right outrigger out	13-WAY MK CONN.	X3
										X55/29	2	C/B	1	FFK	Solenoid valve - rear left outrigger in	To control unit	
											3					125213G	
										X55/31	4	B/N	1	FFK	Solenoid valve - rear left outrigger up		
										X55/28	5	V/N	1	FFK	Solenoid valve - rear left outrigger down		
										X55/27	6	A/R	1	FFK	Solenoid valve - rear right outrigger down		
										X55/32	7	Z/B	1	FFK	Solenoid valve - rear right outrigger up		
										X55/25	8	A/B	1	FFK	Solenoid valve - rear right outrigger in		
										X55/34	9	V/B	1	FFK	Solenoid valve - rear left outrigger out		
											10						
										X55/13	11	L-B	1	FFK	Signal - rear axle levelling sensor		
										X1/2	12	V-Z	1	FFK	Bridge		
											13						
										X55/35	1	N	1.5	fmda	GND	1-WAY CONN.	X21a
																GND	
																125006	
										X55/4	1	B-G	1	fmda	NC contact output: rear LH stab. limit switch	2-WAY CONN.	X22a
										X55/6	2	L-R	1	fmda	NO contact output: rear LH stab. limit switch		
																125008	
										X55/3	I	B-N	1	fmda	NC contact input: rear RH stab. limit switch	2-WAY 90° CONN.	X23a
										X55/5	-	G-L	1	fmda	NO contact input: rear RH stab. limit switch		
																125019	

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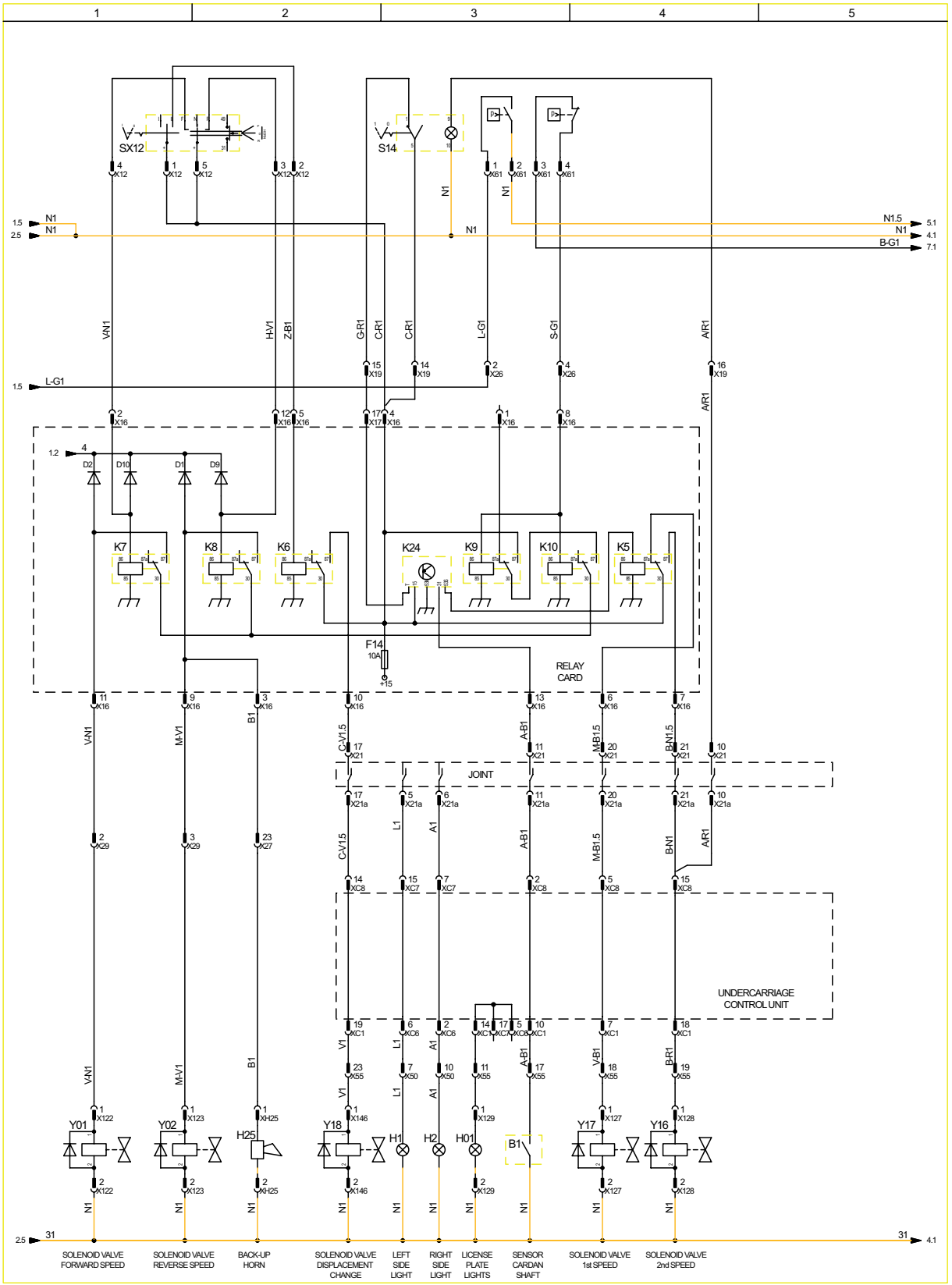
Operation:	Table:
Wiring diagram Girolift 5022 (from serial no. 16758) - sheet 1 of 11 • **STAGE 3 MOTOR**	**C.05.05**



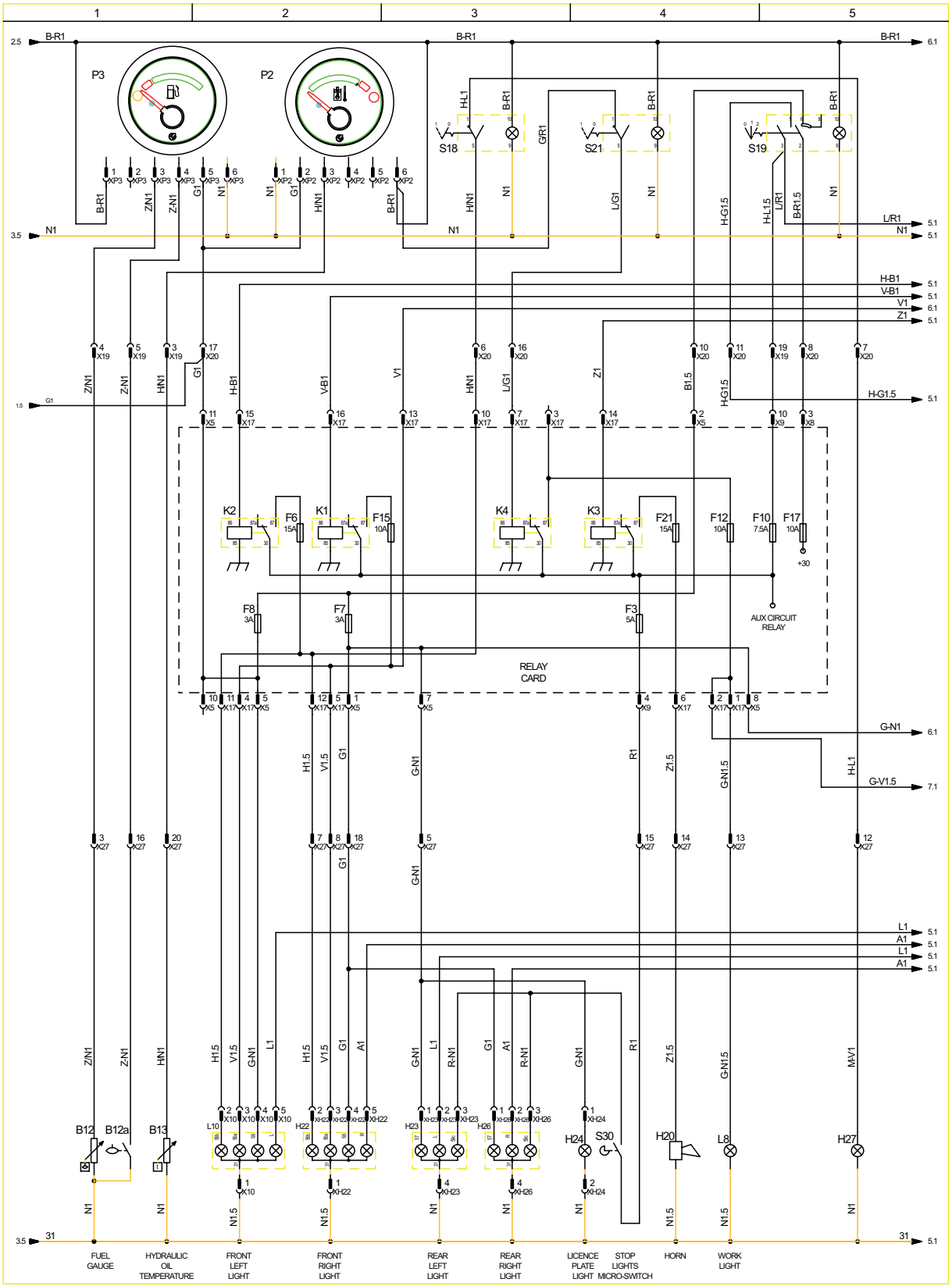
Operation:	Table:
Wiring diagram Girolift 5022 (from serial no. 16758) - sheet 2 of 11 • **STAGE 3 MOTOR**	**C.05.05**



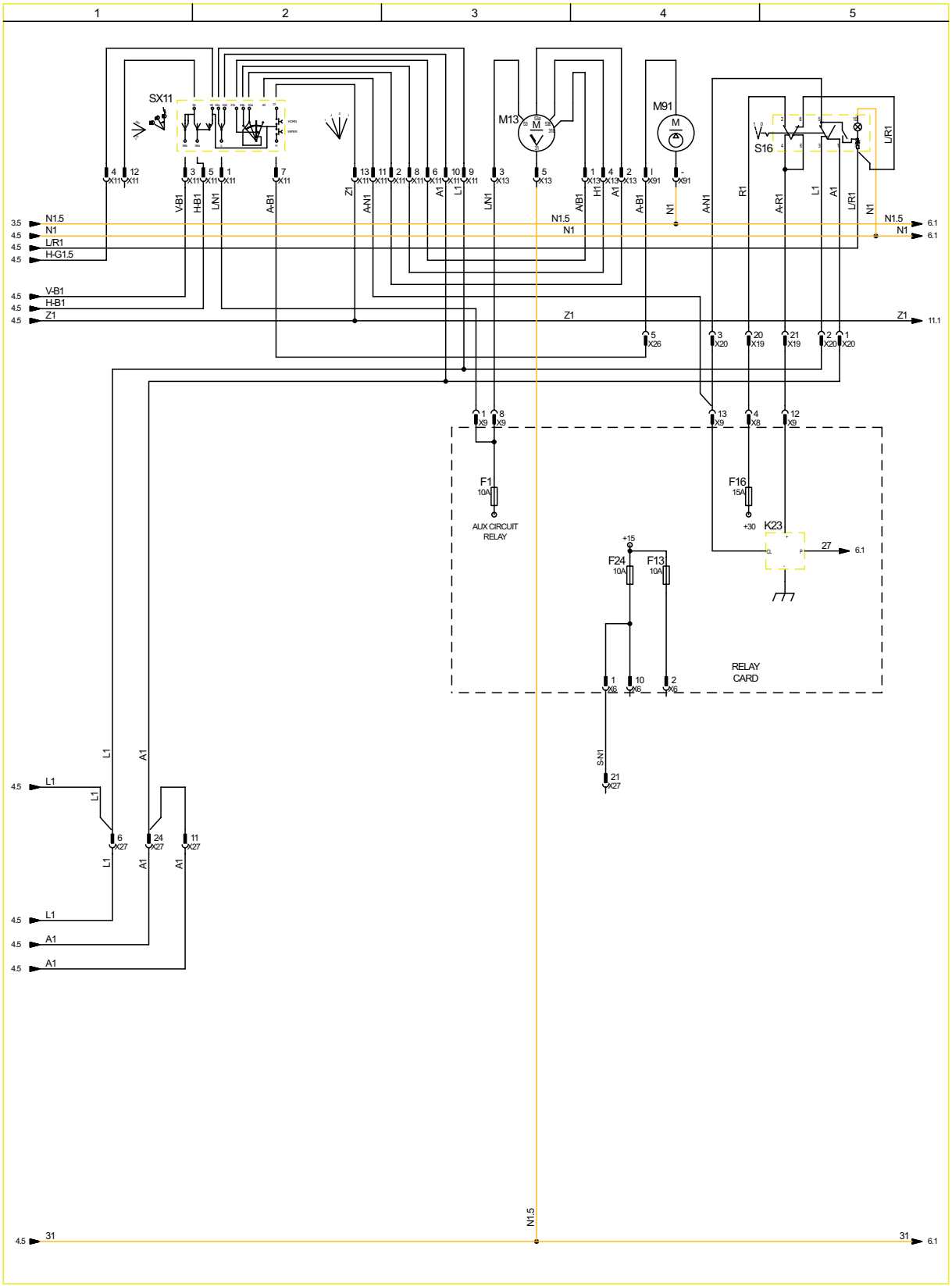
Operation:	Table:
Wiring diagram Girolift 5022 (from serial no. 16758) - sheet 3 of 11 • **STAGE 3 MOTOR**	**C.05.05**



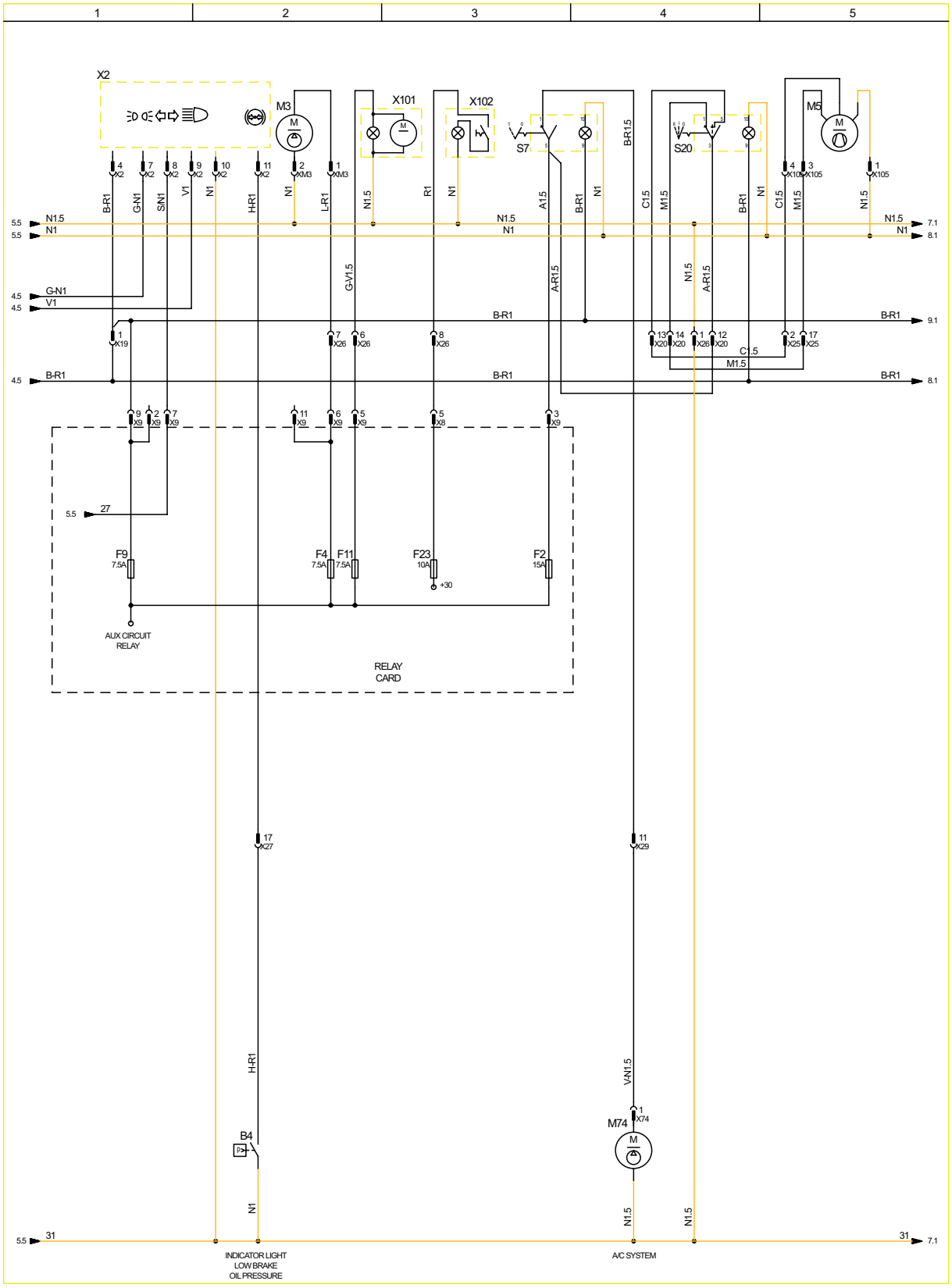
Operation:	Wiring diagram Girolift 5022 (from serial no. 16758) - sheet 4 of 11 • **STAGE 3 MOTOR**	*Table:* **C.05.05**



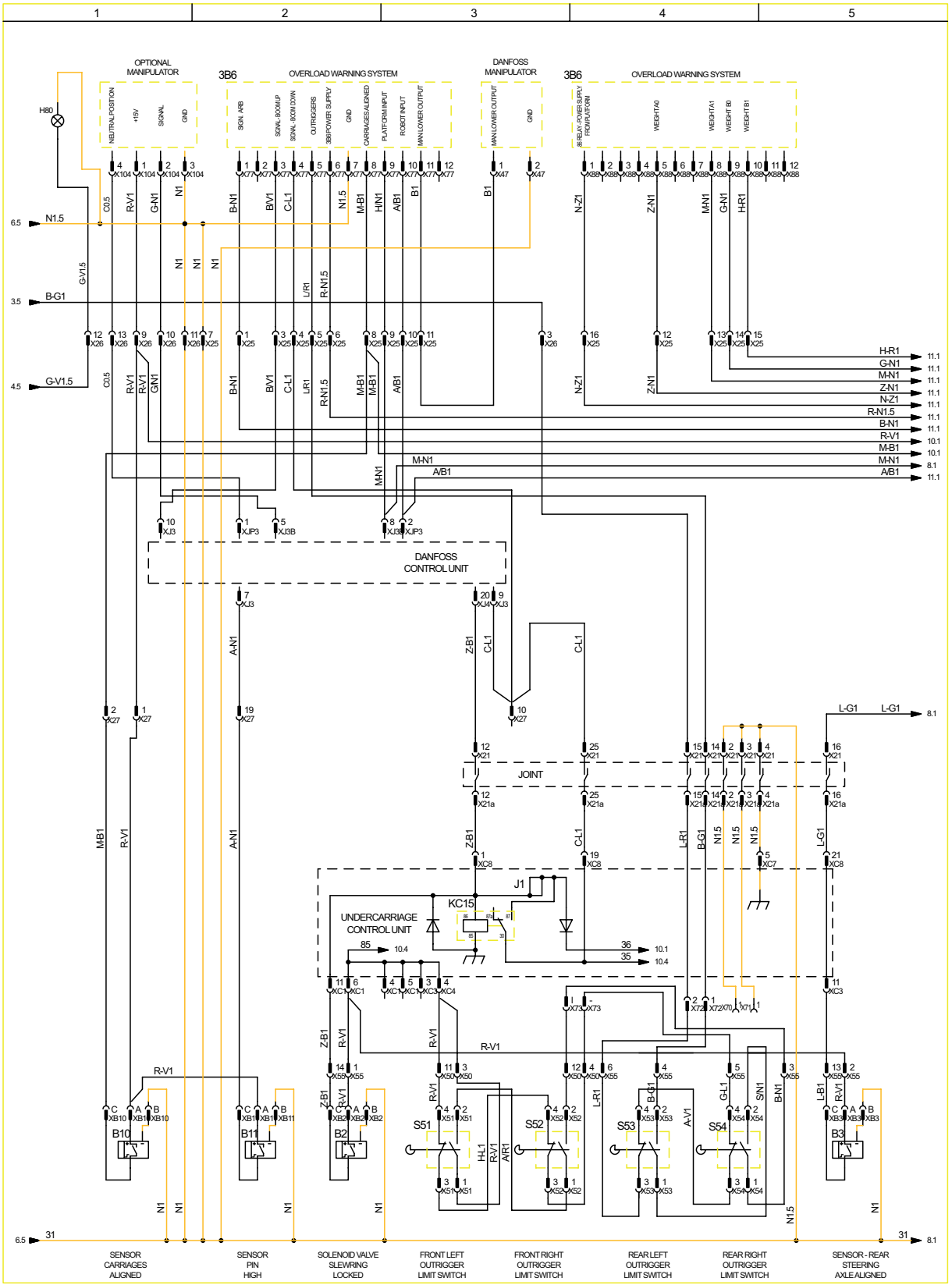
Operation:	Wiring diagram Girolift 5022 (from serial no. 16758) - sheet 5 of 11 • **STAGE 3 MOTOR**	Table: **C.05.05**



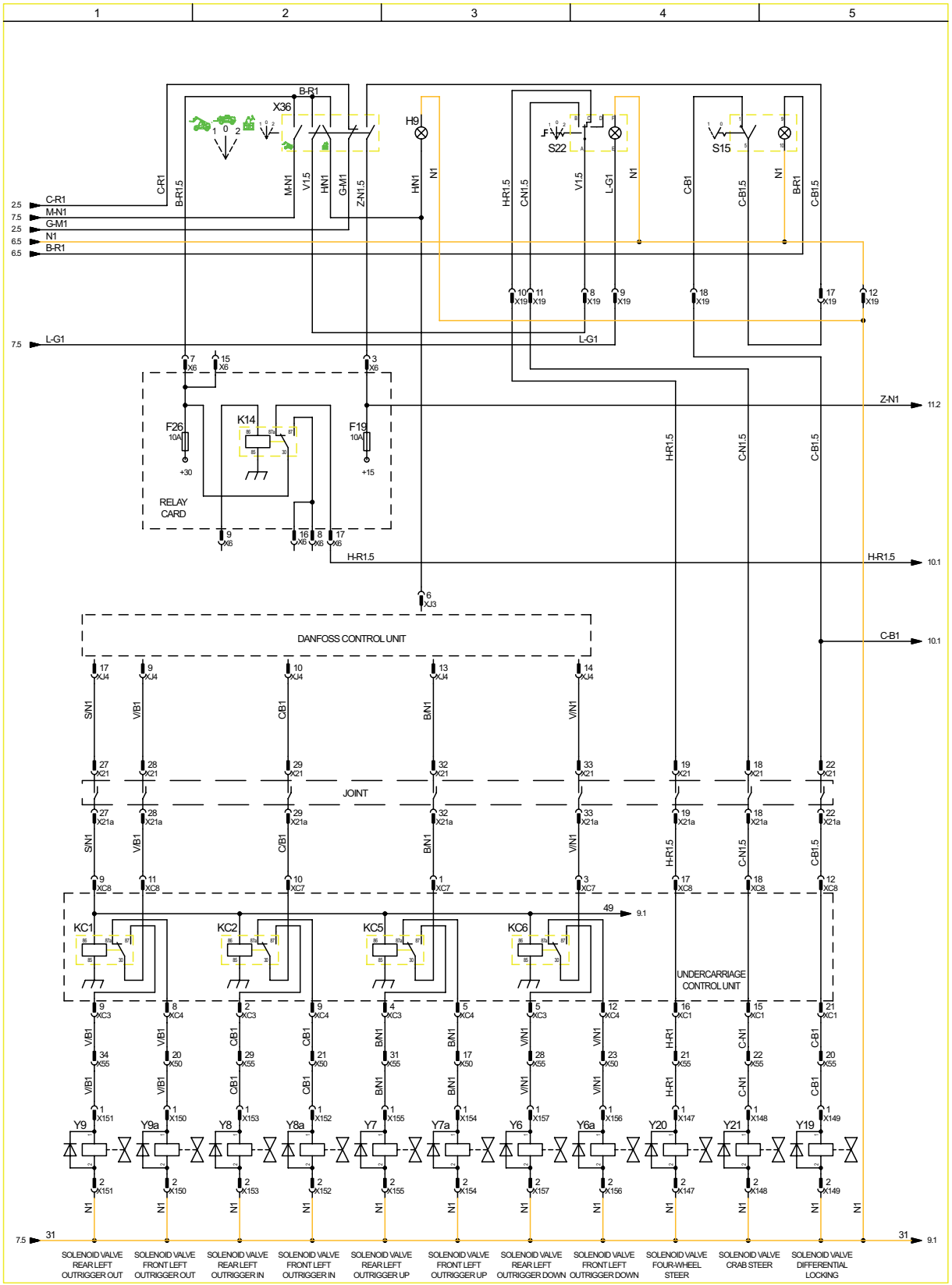
Operation:	Table:
Wiring diagram Girolift 5022 (from serial no. 16758) - sheet 6 of 11 • **STAGE 3 MOTOR**	**C.05.05**



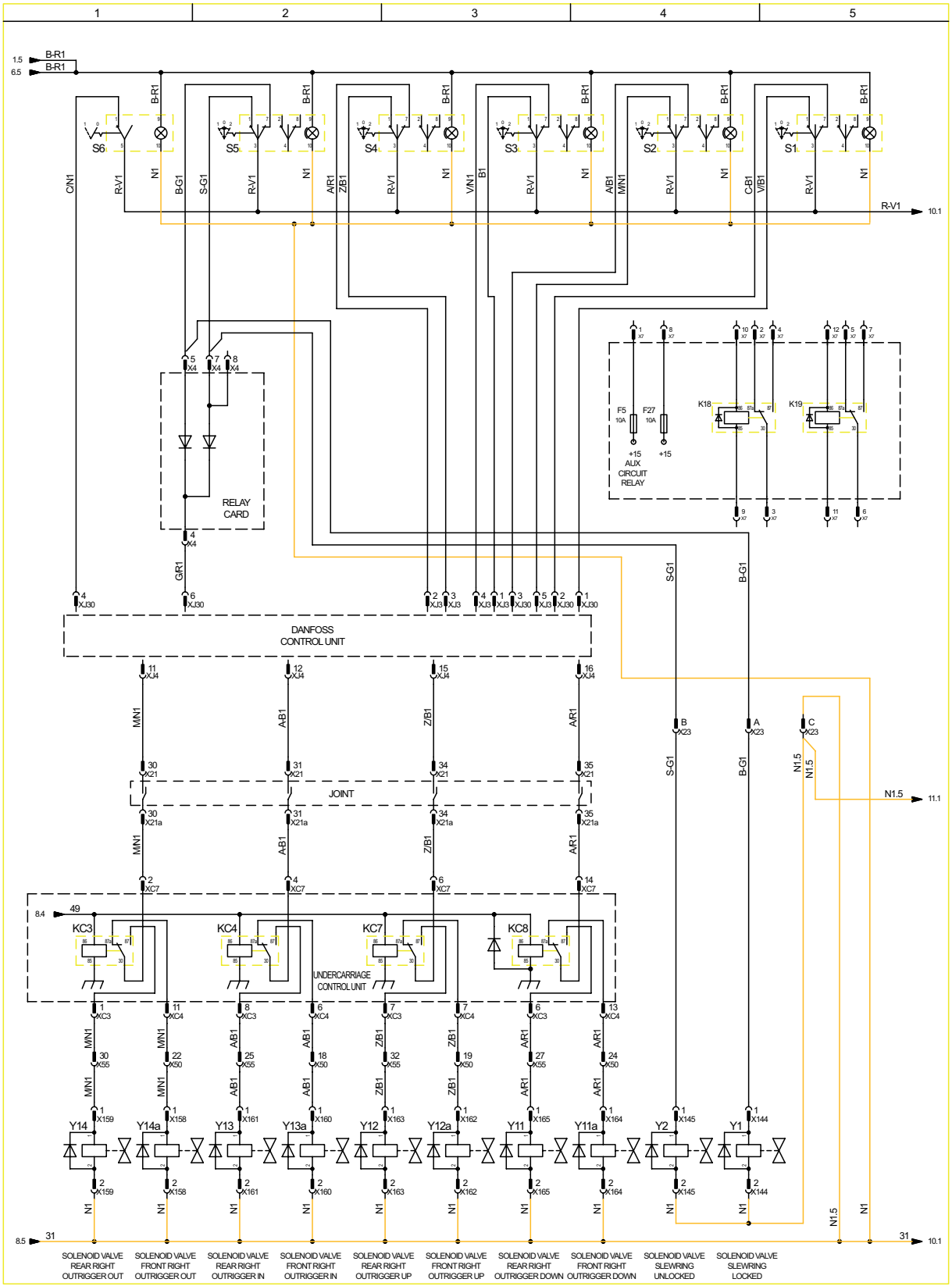
Operation:	Wiring diagram Girolift 5022 (from serial no. 16758) - sheet 7 of 11 • **STAGE 3 MOTOR**	Table: **C.05.05**



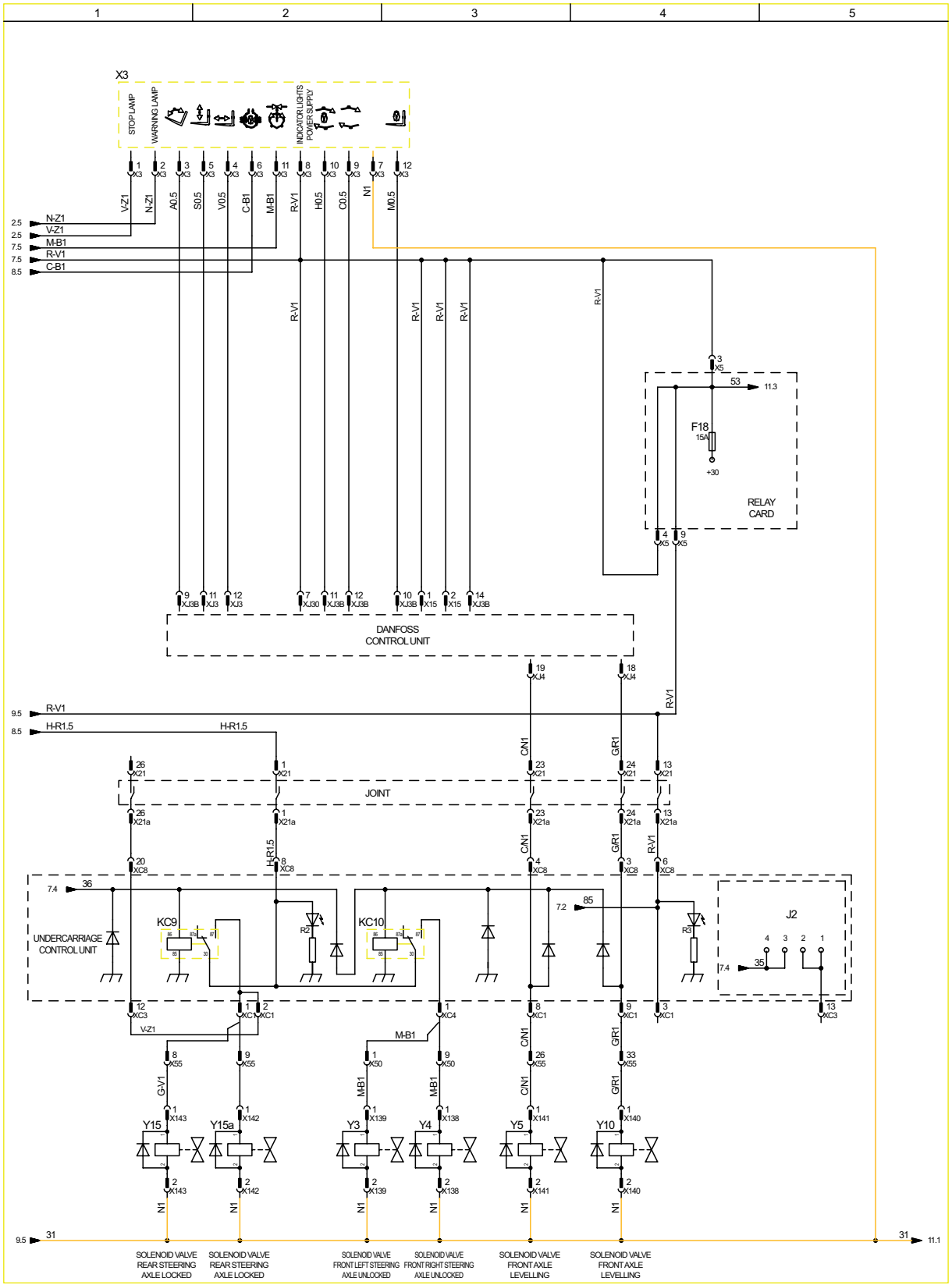
Operation:	Table:
Wiring diagram Girolift 5022 (from serial no. 16758) - sheet 8 of 11 • **STAGE 3 MOTOR**	**C.05.05**



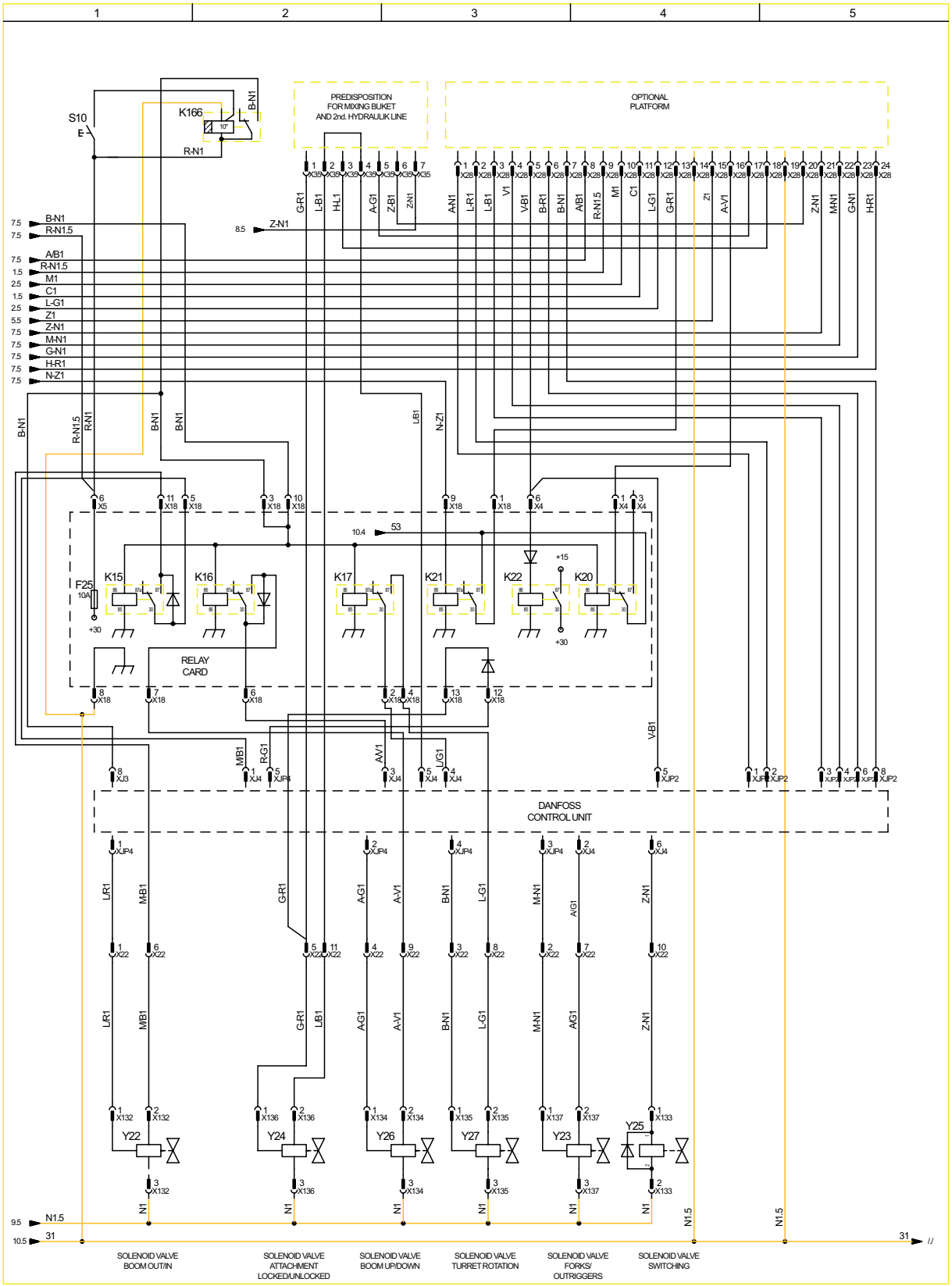
Operation:	Wiring diagram Girolift 5022 (from serial no. 16758) - sheet 9 of 11 • **STAGE 3 MOTOR**	*Table:* **C.05.05**



Operation:	Table:
Wiring diagram Girolift 5022 (from serial no. 16758) - sheet 10 of 11 • **STAGE 3 MOTOR**	**C.05.05**



Operation:	Table:
Wiring diagram Girolift 5022 (from serial no. 16758) - sheet 11 of 11 • **STAGE 3 MOTOR**	**C.05.05**



Operation: Wiring diagram - components description	Table: C.05.05

REF	DESCRIPTION	SHEET
A1	ALTERNATOR	1
B0	BATTERY	1
B10	SENSOR - CARRIAGES ALIGNED	7
B11	PRESSURE SWITCH - ENGINE OIL FILTER	1
B11	SENSOR - PIN HIGH	7
B12	FUEL GAUGE	4
B12	ENGINE WATER THERMOMETER - HIGH TEMPERATURE	1
B12a	FUEL RESERVE	4
B13	HYDRAULIC OIL THERMOMETER - HIGH TEMPERATURE	4
B13	THERMOSTAT - HIGH ENGINE WATER TEMPERATURE	1
B14	HYDRAULIC OIL FILTER CLOGGED	1
B15	MICRO-SWITCH - AIR FILTER CLOGGED	1
B2	SENSOR - SLEWRING BLOCKED	7
B3	SENSOR - REAR STEERING AXLE ALIGNED	7
B4	PRESSURE SWITCH - LOW BRAKE OIL PRESSURE	6
F1G	30A FUSE - START-UP PANEL	1
F2G	50A FUSE - CAB	1
F4G	20A FUSE - START-UP RELAY	1
F341	80A FUSE - GLOW PLUGS	1
F342	25A FUSE - PERKINS CONTROL UNIT POWER SUPPLY	1
F328	5A FUSE - PRE-HEATING	1
F1	FUSE - FRONT WINDSCREEN WIPER/WASHER 10A	5
F10	FUSE - EMERGENCY SWITCH 7,5A	4
F11	FUSE - BEACON 7,5A	6
F12	FUSE - WORK LIGHTS 10A	4
F13	BLANK - 10A	5
F14	FUSE - DRIVE SWITCH 10A	3
F15	FUSE - HIGH BEAM 10A	4
F16	FUSE - EMERGENCY LIGHT SWITCH 15A	5
F17	FUSE - LIGHTS AND FLASHING 10A	4
F18	FUSE - OUTRIGGERS LOWERED 10A	10
F19	FUSE - STEERING SELECTOR 10A	8
F2	FUSE - HEATING 15A	6
F20	FUSE - EMERGENCY MUSHROOM-HEAD PUSHBUTTON 10A	2
F21	FUSE - HORN 15A	4
F22	FUSE - PLATFORM ROTATION 15A	1
F23	FUSE - CAB LIGHTS 10A	6
F24	BLANK - 10A	5
F25	FUSE - 3B6 CONTROL UNIT 10A	11
F26	FUSE - OUTRIGGERS 10A	8
F27	FUSE - OPTIONAL	9
F3	FUSE - STOP SWITCH 5A	4
F4	FUSE - REAR WINDSCREEN WIPER 7,5A	6
F5	FUSE - OPTIONAL	9
F6	FUSE - LOW BEAM 15A	4
F7	FUSE - RIGHT POSITION LIGHTS SWITCH 3A	4
F8	FUSE - LEFT POSITION LIGHTS SWITCH 3A	4
F9	FUSE - INSTRUMENTS LIGHTING POWER SUPPLY 7,5A	6
H01	LICENCE PLATE LIGHT	3
H1	LEFT SIDE LIGHT	3
H2	RIGHT SIDE LIGHT	3
H20	HORN	4
H22	FRONT RIGHT LIGHT	4
H23	REAR LEFT LIGHT	4
H24	LICENCE PLATE LIGHT	4
H25	BACK-UP HORN	3
H26	REAR RIGHT LIGHT	4
H27	LIGHT	4
H9	LIGHT INDICATOR - BASKET ENABLED	8
H80	WORK LIGHT	7
K324	RELAY - PRE-HEATING INDICATOR LIGHT	1
K325	RELAY - GLOW PLUGS	1
K327	RELAY - START-UP	1
K342	RELAY - PERKINS CONTROL UNIT	1
K1	RELAY - HIGH BEAM	4
K10	RELAY - TRANSMISSION DISCONNECTED	3
K11	RELAY - START-UP ENABLING COMMAND	1
K12	RELAY - AUX CIRCUITS	2
K13	RELAY - EMERGENCY PUMP	2
K14	RELAY - OUTRIGGERS	8
K15	RELAY - BOOM OUT/IN	11
K16	RELAY - BOOM UP/DOWN	11
K17	RELAY - TURRET ROTATION	11
K18	RELAY - OPTIONAL	9
K19	RELAY - OPTIONAL	9
K116	ARB TIMER	11
K2	RELAY - HIGH BEAM	4
K20	RELAY - PLATFORM OVERLOAD WARNING SYSTEM ON	11
K21	RELAY - POWER SUPPLY FROM PLATFORM	11
K22	RELAY - PLATFORM	11
K23	INTERMITTENCE	5
K24	TIMER	3
K3	RELAY - HORN	4

Operation: Wiring diagram - components description	Table: C.05.05

K4	RELAY - WORK LIGHTS	4
K5	RELAY - 1st and 2nd MECHANICAL SPEED	3
K6	RELAY - POWER DISPLACEMENT CHANGE	3
K7	RELAY - FORWARD SPEED	3
K8	RELAY - REVERSE SPEED	3
K9	RELAY - TRANSMISSION DISCONNECTED	3
KC1	RELAY - FRONT/REAR LEFT OUTRIGGER	8
KC10	RELAY - FRONT STEERING AXLE UNLOCKING	10
KC15	RELAY - SLEWRING LOCKED	7
KC2	RELAY - FRONT/REAR LEFT OUTRIGGER IN	8
KC3	RELAY - FRONT/REAR RIGHT OUTRIGGER OUT	9
KC4	RELAY - FRONT/REAR RIGHT OUTRIGGER IN	9
KC5	RELAY - FRONT/REAR LEFT OUTRIGGER UP	8
KC6	RELAY - FRONT/REAR LEFT OUTRIGGER DOWN	8
KC7	RELAY - FRONT/REAR RIGHT OUTRIGGER UP	9
KC8	RELAY - FRONT/REAR RIGHT OUTRIGGER DOWN	9
KC9	RELAY - REAR STEERING AXLE LOCKED	10
L10	FRONT LEFT LIGHT	4
L8	WORK LIGHT	4
M1	STARTING MOTOR	1
M13	UPPER WINDSCREEN WIPER/WASHER MOTOR	5
M3	ROOF WINDSHIELD WIPER/WASHER	6
M5	HEATING	6
M74	A/C SYSTEM	6
M8	EMERGENCY PUMP	2
M91	PUMP MOTOR	5
R0	GLOW PLUGS	1
P1	ENGINE WATER TEMPERATURE GAUGE	1
P2	FUEL LEVEL GAUGE	4
P3	FUEL GAUGE	4
P4	HOUR-METER	1
S0	BATTERY CUTOFF	1
S1	FRONT RIGHT STABILISER LEG SWITCH	9
S10	OVERLOAD CUTOUT	11
S11	START-UP PANEL	1
S13	EMERGENCY MUSHROOM-HEAD PUSHBUTTON	2
S14	SWITCH - SPEED CHANGE	3
S15	SWITCH - DIFFERENTIAL LOCKING	8
S16	WARNING SWITCH	5
S17	SWITCH - EMERGENCY PUMP	2
S18	SWITCH - LIGHTS	4
S19	SWITCH - LIGHTS	4
S2	FRONT LEFT STABILISER LEG SWITCH	9
S20	SWITCH - HEATER	6
SX11	LIGHTS / WIPER SWITCH	5
SX12	SPEED SWICTH	3
S21	SWITCH - WORK LIGHTS	4
S22	STEERING SELECTOR	8
S3	REAR LEFT STABILIZER FOOT SWITCH	9
S30	STOP LIGHTS MICRO-SWITCH	4
S4	REAR RIGHT STABILIZER FOOT SWITCH	9
S5	SWITCH - SLEWRING LOCKED/UNLOCKED	9
S51	FRONT LEFT OUTRIGGER LIMIT SWITCH	7
S52	FRONT RIGHT OUTRIGGER LIMIT SWITCH	7
S53	REAR LEFT OUTRIGGER LIMIT SWITCH	7
S54	REAR LEFT OUTRIGGER LIMIT SWITCH	7
S6	REAR RIGHT OUTRIGGER LIMIT SWITCH	7
S7	SWITCH - A/C SYSTEM	6
X101	BEACON	6
X102	CAB INTERIOR LIGHTS	6
Y01	SOLENOID VALVE - FORWARD SPEED	3
Y02	SOLENOID VALVE - REVERSE SPEED	3
Y1	SOLENOID VALVE - SLEWRING LOCKED	9
Y10	SOLENOID VALVE - FRONT AXLE LEVELLING	10
Y11	SOLENOID VALVE - REAR RIGHT OUTRIGGER DOWN	9
Y11a	SOLENOID VALVE - FRONT RIGHT OUTRIGGER DOWN	9
Y12	SOLENOID VALVE - REAR RIGHT OUTRIGGER UP	9
Y12a	SOLENOID VALVE - FRONT RIGHT OUTRIGGER UP	9
Y13	SOLENOID VALVE - REAR RIGHT OUTRIGGER IN	9
Y13a	SOLENOID VALVE - FRONT RIGHT OUTRIGGER IN	9
Y14	SOLENOID VALVE - REAR RIGHT OUTRIGGER OUT	9
Y14a	SOLENOID VALVE - FRONT RIGHT OUTRIGGER OUT	9
Y15	SOLENOID VALVE - REAR STEERING AXLE LOCKED	10
Y15a	SOLENOID VALVE - REAR STEERING AXLE LOCKED	10
Y16	SOLENOID VALVE - 2ND SPEED	3
Y17	SOLENOID VALVE - 1ST SPEED	3
Y18	SOLENOID VALVE - DISPLACEMENT CHANGE	3
Y19	SOLENOID VALVE - DIFFERENTIAL LOCKING	8
Y2	SOLENOID VALVE - SLEWRING UNLOCKED	9
Y20	SOLENOID VALVE - FOUR-WHEEL STEER	8
Y21	SOLENOID VALVE - CRAB STEER	8
Y22	SOLENOID VALVE - BOOM OUT/IN	11
Y23	SOLENOID VALVE - FORKS/OUTRIGGERS	11
Y24	SOLENOID VALVE - ATTACHMENT LOCKED/ UNLOCKED	11

Operation: Wiring diagram - components description	Table: C.05.05

Y25	SOLENOID VALVE - SWITCHING	11
Y26	SOLENOID VALVE - BOOM UP/DOWN	11
Y27	SOLENOID VALVE - TURRET ROTATION	11
Y3	SOLENOID VALVE - FRONT LEFT STEERING AXLE UNLOCKED	10
Y4	SOLENOID VALVE - FRONT RIGHT STEERING AXLE UNLOCKED	10
Y5	SOLENOID VALVE - FRONT AXLE LEVELLING	10
Y6	SOLENOID VALVE - REAR LEFT OUTRIGGER DOWN	8
Y6a	SOLENOID VALVE - FRONT LEFT OUTRIGGER DOWN	8
Y7	SOLENOID VALVE - REAR LEFT OUTRIGGER UP	8
Y7a	SOLENOID VALVE - FRONT LEFT OUTRIGGER UP	8
Y8	SOLENOID VALVE - REAR LEFT OUTRIGGER IN	8
Y8a	SOLENOID VALVE - FRONT LEFT OUTRIGGER IN	8
Y9	SOLENOID VALVE - REAR LEFT OUTRIGGER OUT	8
Y9a	SOLENOID VALVE - FRONT LEFT OUTRIGGER OUT	8
X1	8-WAY CONNECTOR - LIGHT INDICATORS	1
X10	6-WAY CONNECTOR	
X104	3-WAY CONNECTOR	
X105	4-WAY CONNECTOR	
X11	13-WAY CONNECTOR	
X111	1-WAY CONNECTOR	
X12	5-WAY CONNECTOR	
X122	2-WAY CONNECTOR	
X123	2-WAY CONNECTOR	
X127	2-WAY CONNECTOR	
X128	2-WAY CONNECTOR	
X129	2-WAY CONNECTOR	
X13	6-WAY CONNECTOR	
X132	3-WAY CONNECTOR	
X133	2-WAY CONNECTOR	
X134	3-WAY CONNECTOR	
X135	3-WAY CONNECTOR	
X136	3-WAY CONNECTOR	
X137	3-WAY CONNECTOR	
X138	2-WAY CONNECTOR	
X139	2-WAY CONNECTOR	
X140	2-WAY CONNECTOR	
X141	2-WAY CONNECTOR	
X142	2-WAY CONNECTOR	
X143	2-WAY CONNECTOR	
X144	2-WAY CONNECTOR	
X145	2-WAY CONNECTOR	
X146	2-WAY CONNECTOR	
X147	2-WAY CONNECTOR	
X148	2-WAY CONNECTOR	
X149	2-WAY CONNECTOR	
X15	2-WAY CONNECTOR	
X150	2-WAY CONNECTOR	
X151	2-WAY CONNECTOR	
X152	2-WAY CONNECTOR	
X153	2-WAY CONNECTOR	
X154	2-WAY CONNECTOR	
X155	2-WAY CONNECTOR	
X156	2-WAY CONNECTOR	
X157	2-WAY CONNECTOR	
X158	2-WAY CONNECTOR	
X159	2-WAY CONNECTOR	
X16	13-WAY CONNECTOR	
X160	2-WAY CONNECTOR	
X161	2-WAY CONNECTOR	
X162	2-WAY CONNECTOR	
X163	2-WAY CONNECTOR	
X164	2-WAY CONNECTOR	
X165	2-WAY CONNECTOR	
X17	17-WAY CONNECTOR	
X18	13-WAY CONNECTOR	
X19	21-WAY CONNECTOR	
X2	12-WAY CONNECTOR - LIGHT INDICATORS	6
X20	17-WAY CONNECTOR	
X21	40-WAY DEUTSCH CONNECTOR - TYPE B	
X21a	40-WAY DEUTSCH CONNECTOR - TYPE B	
X22	12-WAY CONNECTOR	
X23	3-WAY DEUTSCH CONNECTOR	
X25	17-WAY CONNECTOR	
X26	13-WAY CONNECTOR	
X27	24-WAY DEUTSCH CONNECTOR	
X28	24-WAY DEUTSCH CONNECTOR	
X29	24-WAY DEUTSCH CONNECTOR	10
X3	12-WAY CONNECTOR - LIGHT INDICATORS	
X30	2-WAY CONNECTOR	
X32	6-WAY CONNECTOR	
X33	6-WAY CONNECTOR	
X34	2-WAY 90° CONNECTOR	
X35	7-WAY CONNECTOR	
X4	9-WAY CONNECTOR	
X47	2-WAY CONNECTOR	
X5	11-WAY CONNECTOR	
X50	24-WAY DEUTSCH CONNECTOR	
X51	4-WAY CONNECTOR	
X52	4-WAY CONNECTOR	

Operation: Wiring diagram - components description	Table: C.05.05

X53	4-WAY CONNECTOR
X54	4-WAY CONNECTOR
X55	40-WAY DEUTSCH CONNECTOR - TYPE B
X6	17-WAY CONNECTOR
X61	5-WAY CONNECTOR
X7	13-WAY CONNECTOR
X70	1-WAY CONNECTOR
X71	1-WAY CONNECTOR
X72	2-WAY CONNECTOR
X73	2-WAY 90° CONNECTOR
X74	1-WAY CONNECTOR
X76	70-WAY DEUTSCH CONNECTOR
X77	12-WAY CONNECTOR
X8	5-WAY CONNECTOR
X88	12-WAY CONNECTOR
X9	13-WAY CONNECTOR
X91	2-WAY 90° CONNECTOR
XB10	3-WAY DEUTSCH CONNECTOR
XB11	3-WAY DEUTSCH CONNECTOR
XB2	3-WAY DEUTSCH CONNECTOR
XB3	3-WAY DEUTSCH CONNECTOR
XC1	21-WAY CONNECTOR
XC3	13-WAY CONNECTOR
XC4	13-WAY CONNECTOR
XC6	9-WAY CONNECTOR
XC7	17-WAY CONNECTOR
XC8	21-WAY CONNECTOR
XH22	6-WAY CONNECTOR
XH23	4-WAY CONNECTOR
XH24	2-WAY CONNECTOR
XH25	2-WAY CONNECTOR
XH26	4-WAY CONNECTOR
XJ3	12-WAY CONNECTOR
XJ3B	18-WAY CONNECTOR
XJ4	20-WAY CONNECTOR
XJP2	8-WAY CONNECTOR
XJP3	8-WAY CONNECTOR
XJP4	8-WAY CONNECTOR
XM3	2-WAY CONNECTOR
XP1	14-WAY CONNECTOR
XP2	6-WAY CONNECTOR
XP3	6-WAY CONNECTOR

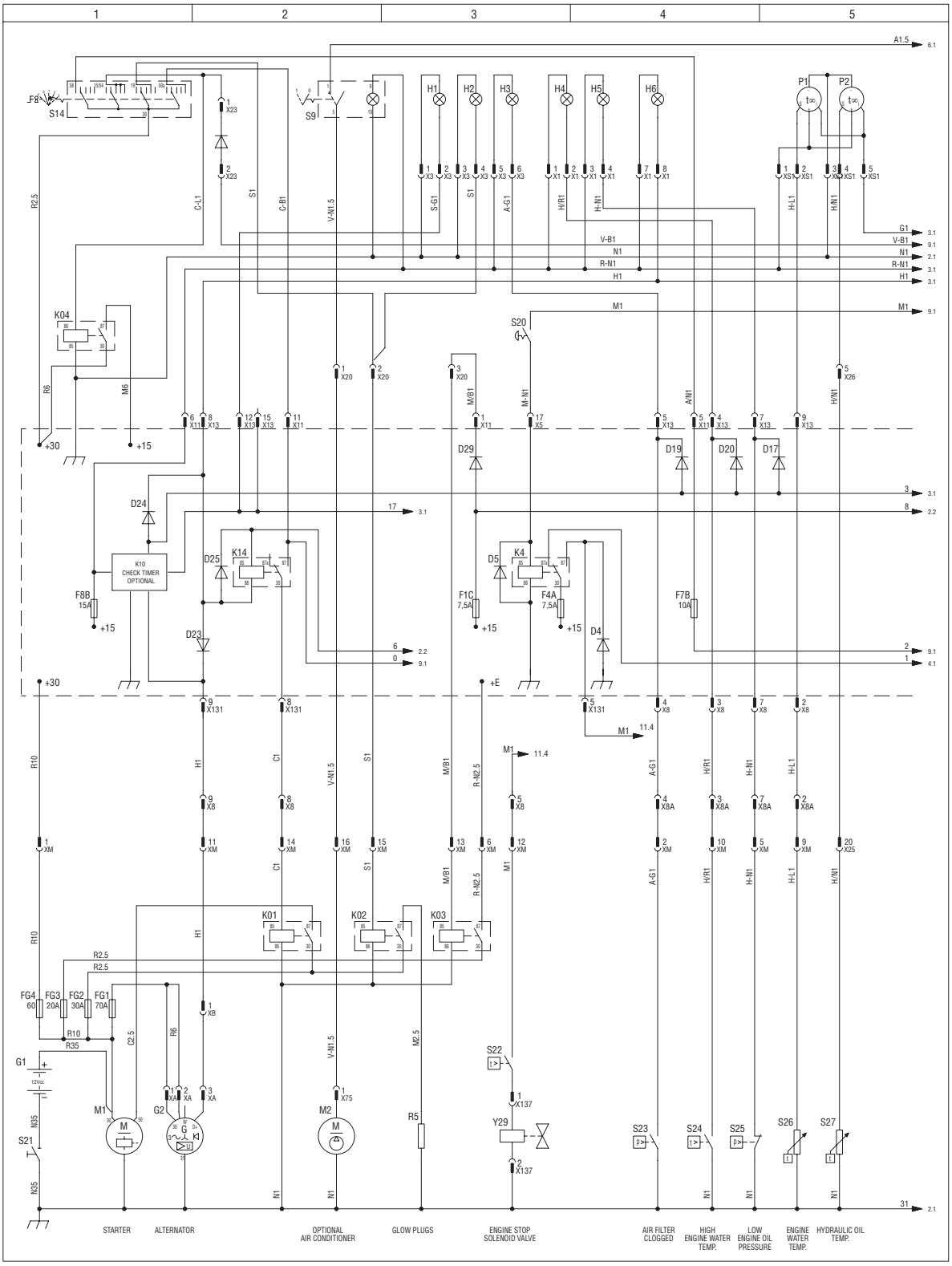
WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

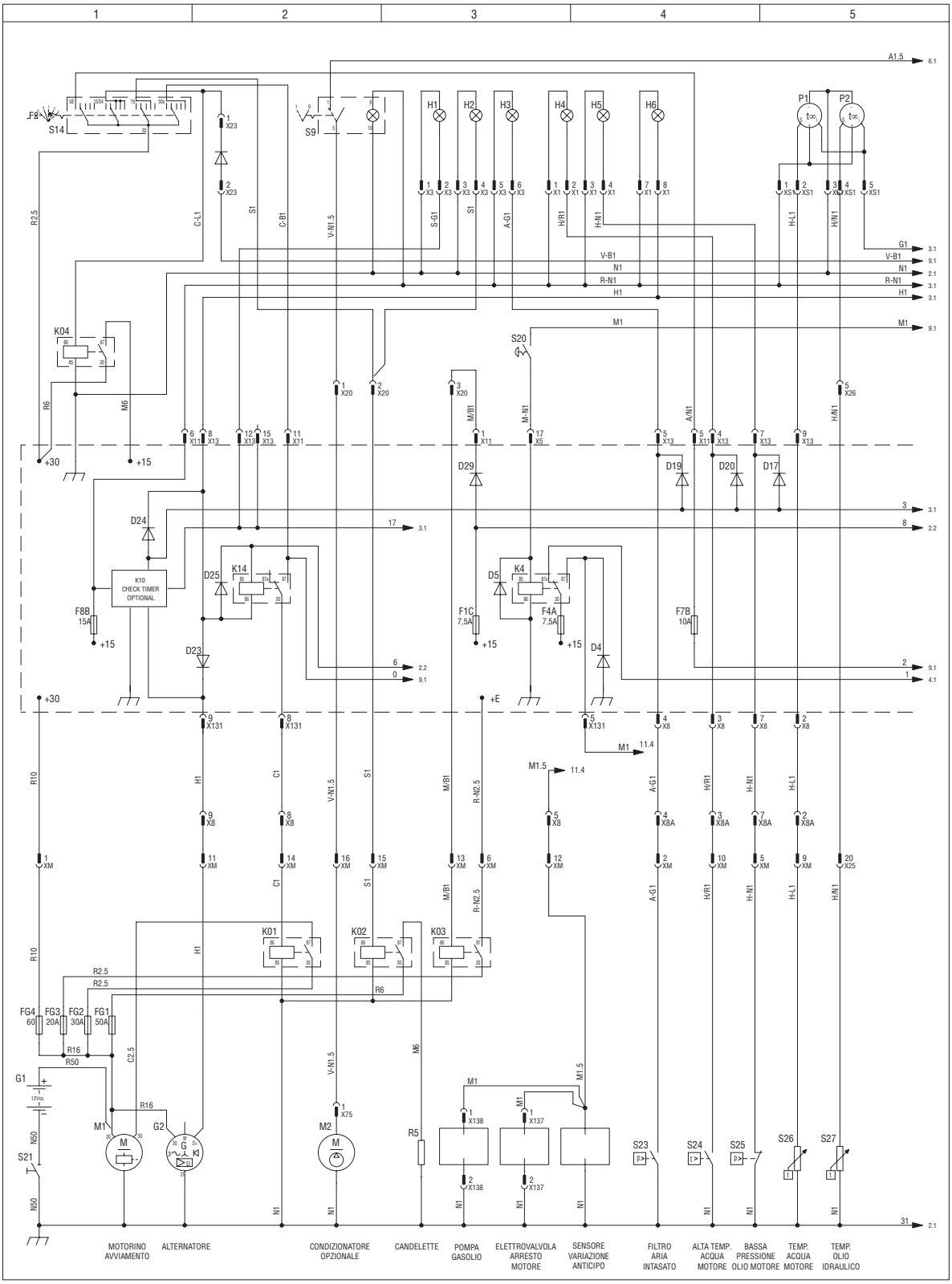
REMARK: Two-colour wires are indicated through a combination of the aforesaid initials as follows:

G/V = YELLOW/GREEN (Crosswise colouring)
G-V = YELLOW-GREEN (Lengthswise colouring)

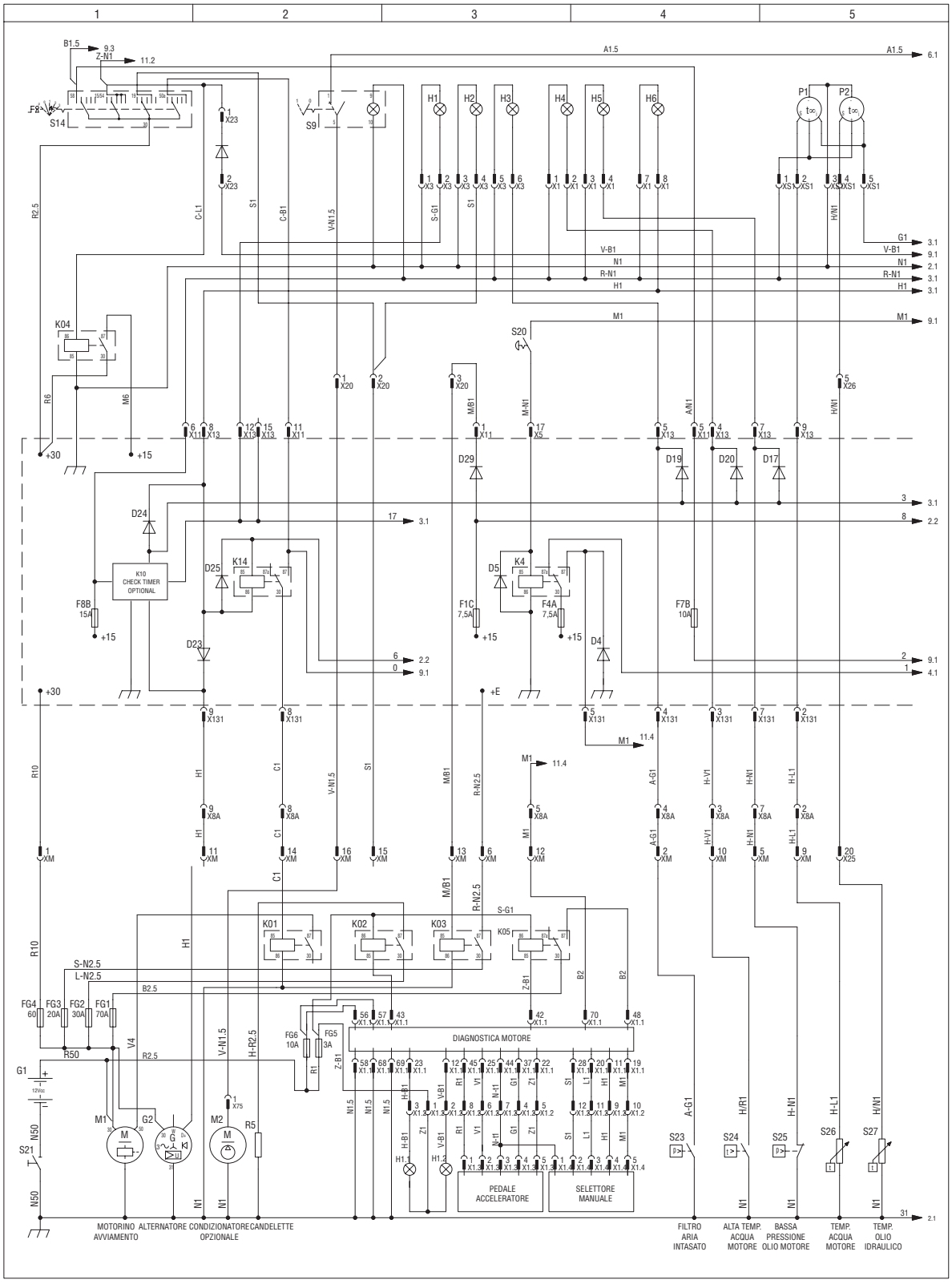
Operation:	*Table:*
RADIO wiring diagram - Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 1 of 11	**C.05.06**



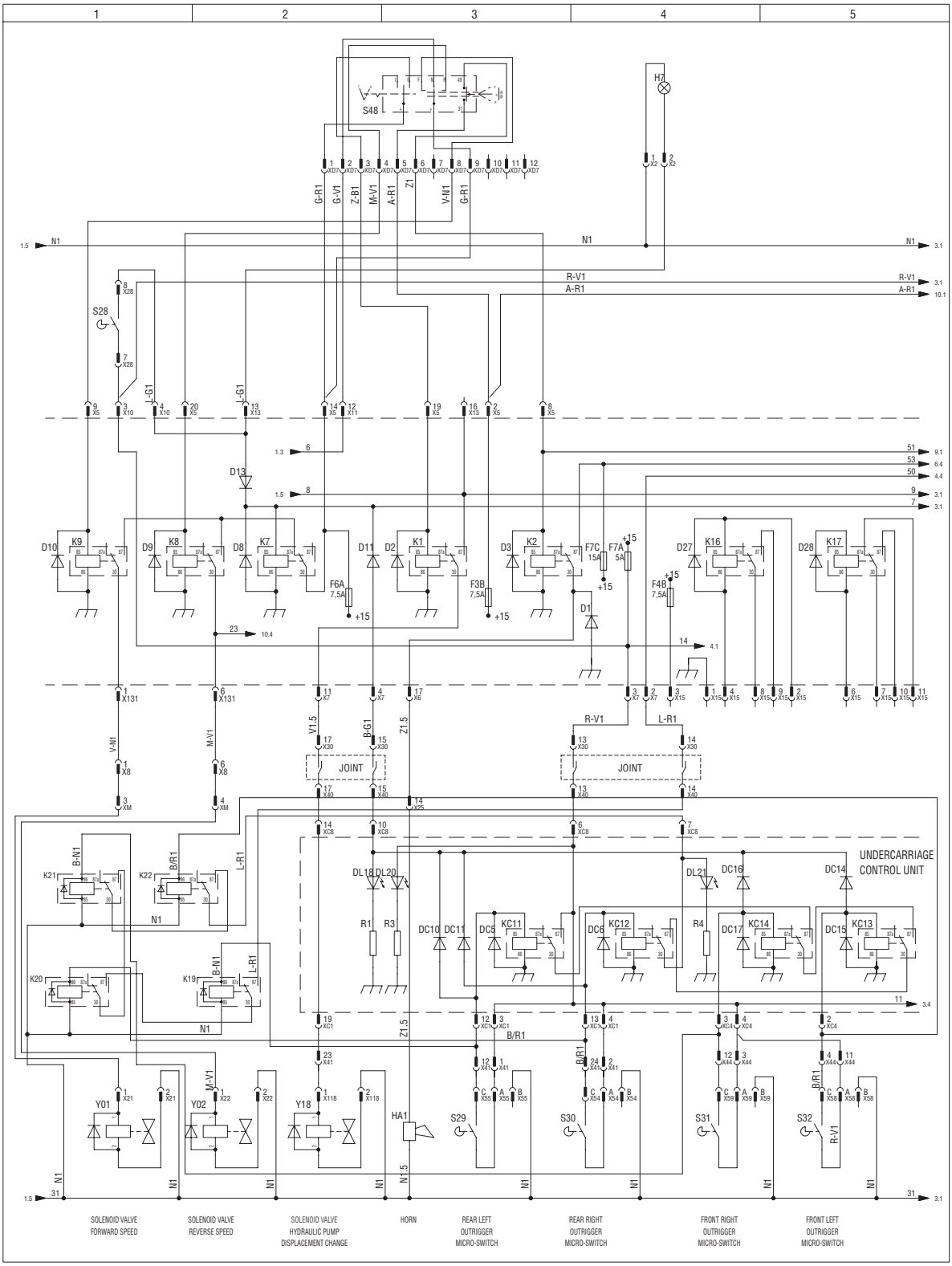
Operation:	RADIO wiring diagram - Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) - sheet 1 of 11 • **STAGE 2 MOTOR**	*Table:* **C.05.06**



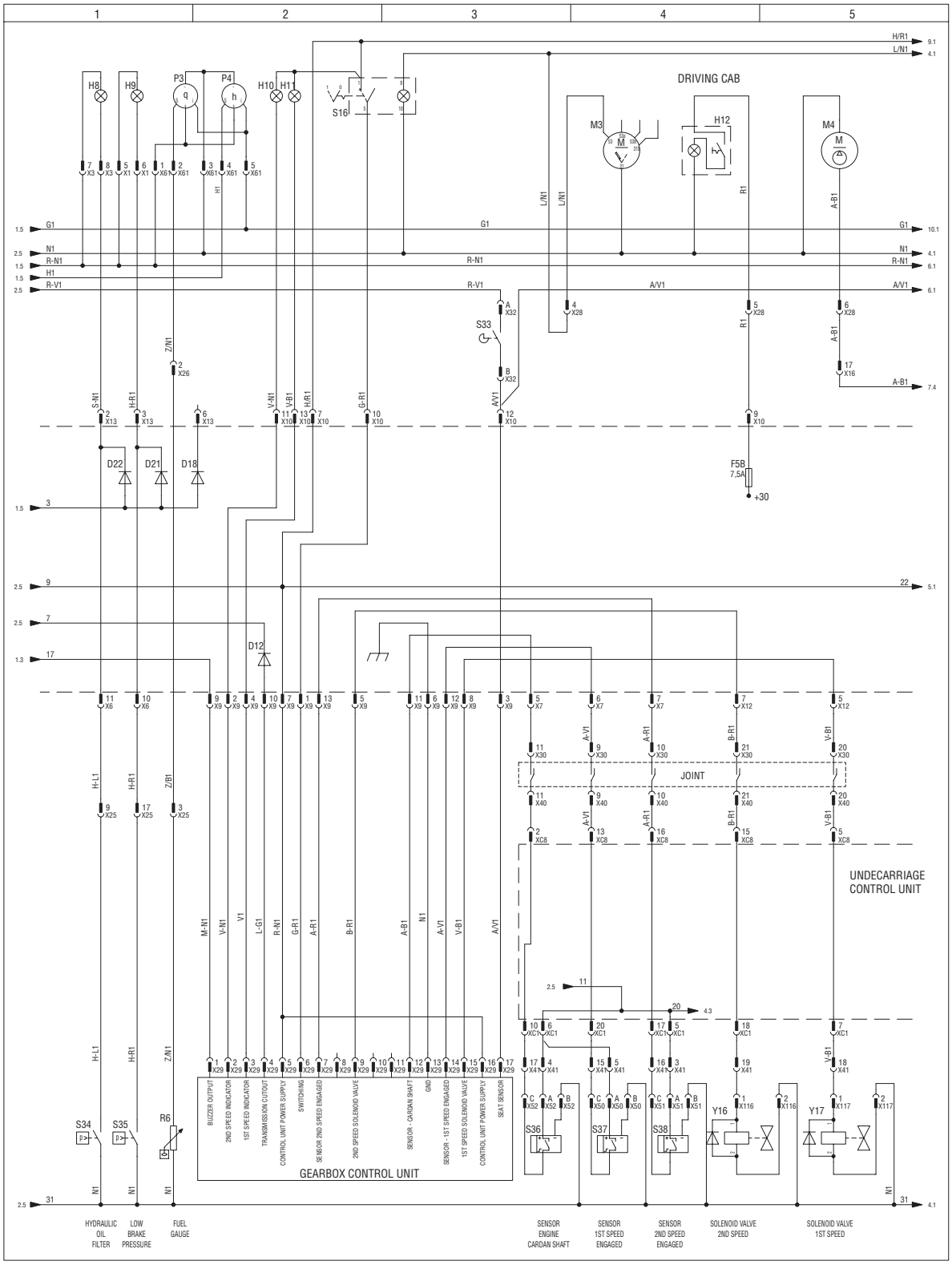
Operation:	RADIO wiring diagram - Girolift 5022 (from serial no. 09411 to serial no. 10078) - sheet 1 of 11 • **STAGE 2 MOTOR**	*Table:* **C.05.06**



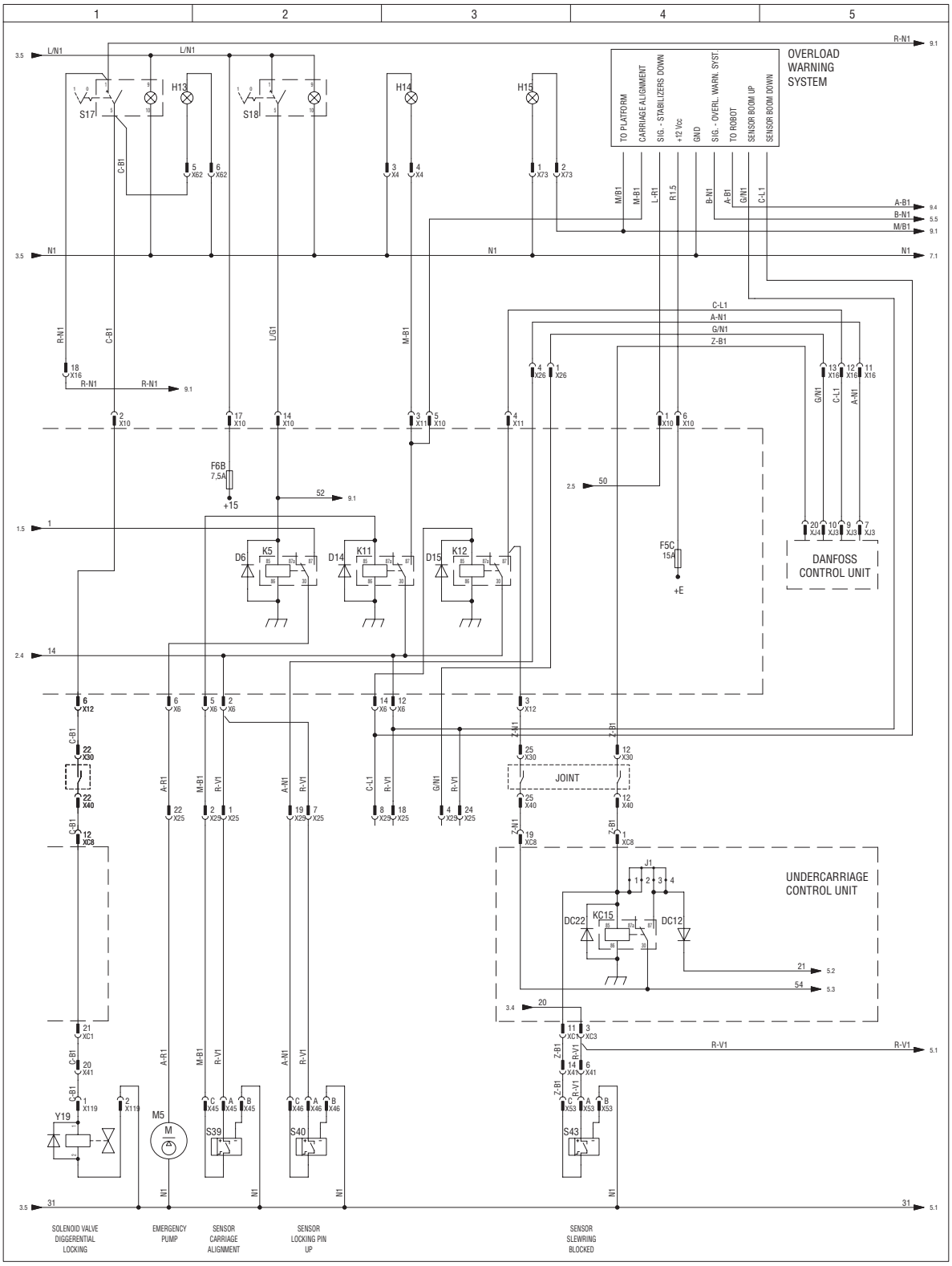
Operation:	*Table:*
RADIO wiring diagram - Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 2 of 11	**C.05.06**



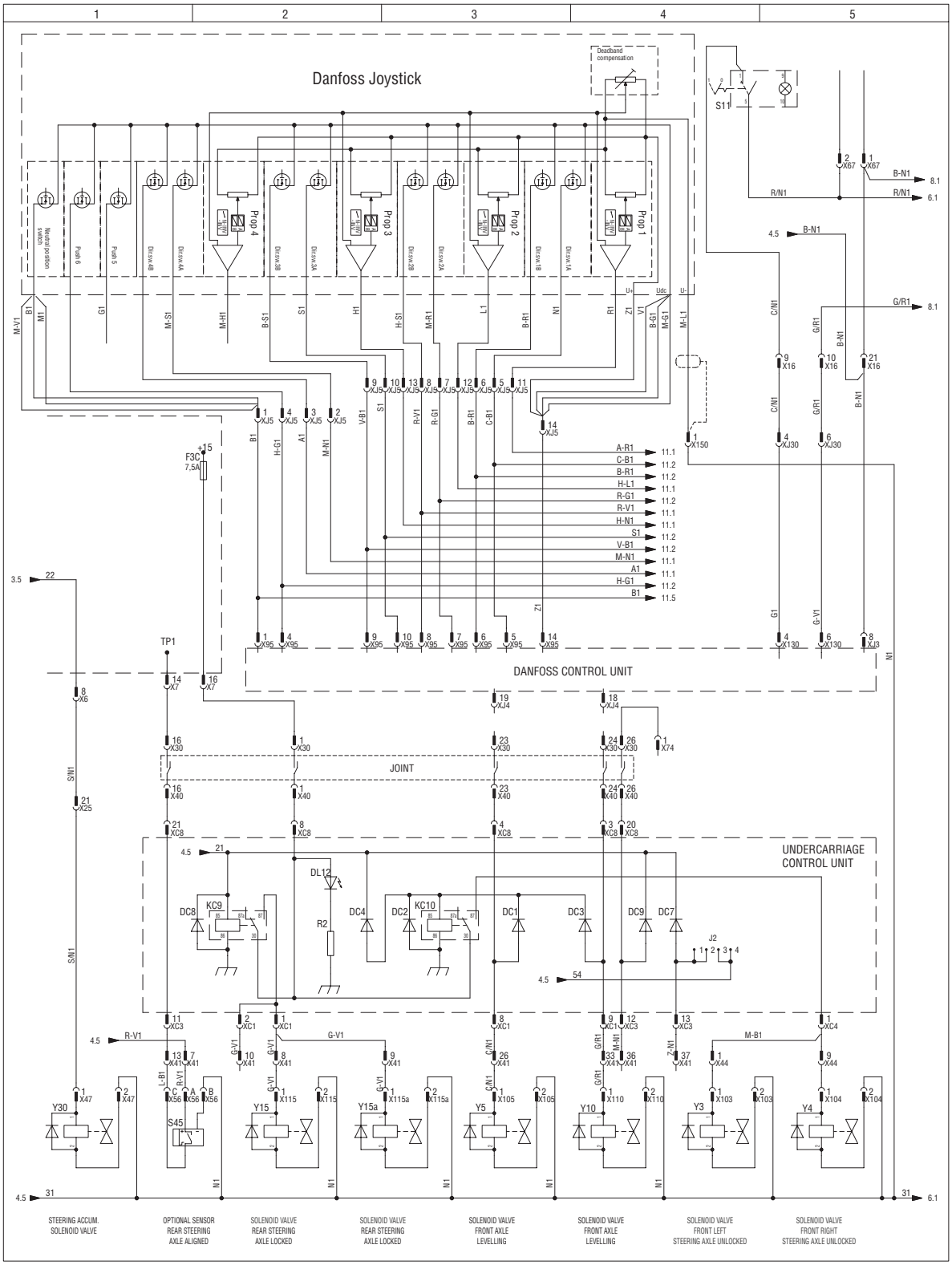
Operation:	*Table:*
RADIO wiring diagram - Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 3 of 11	**C.05.06**



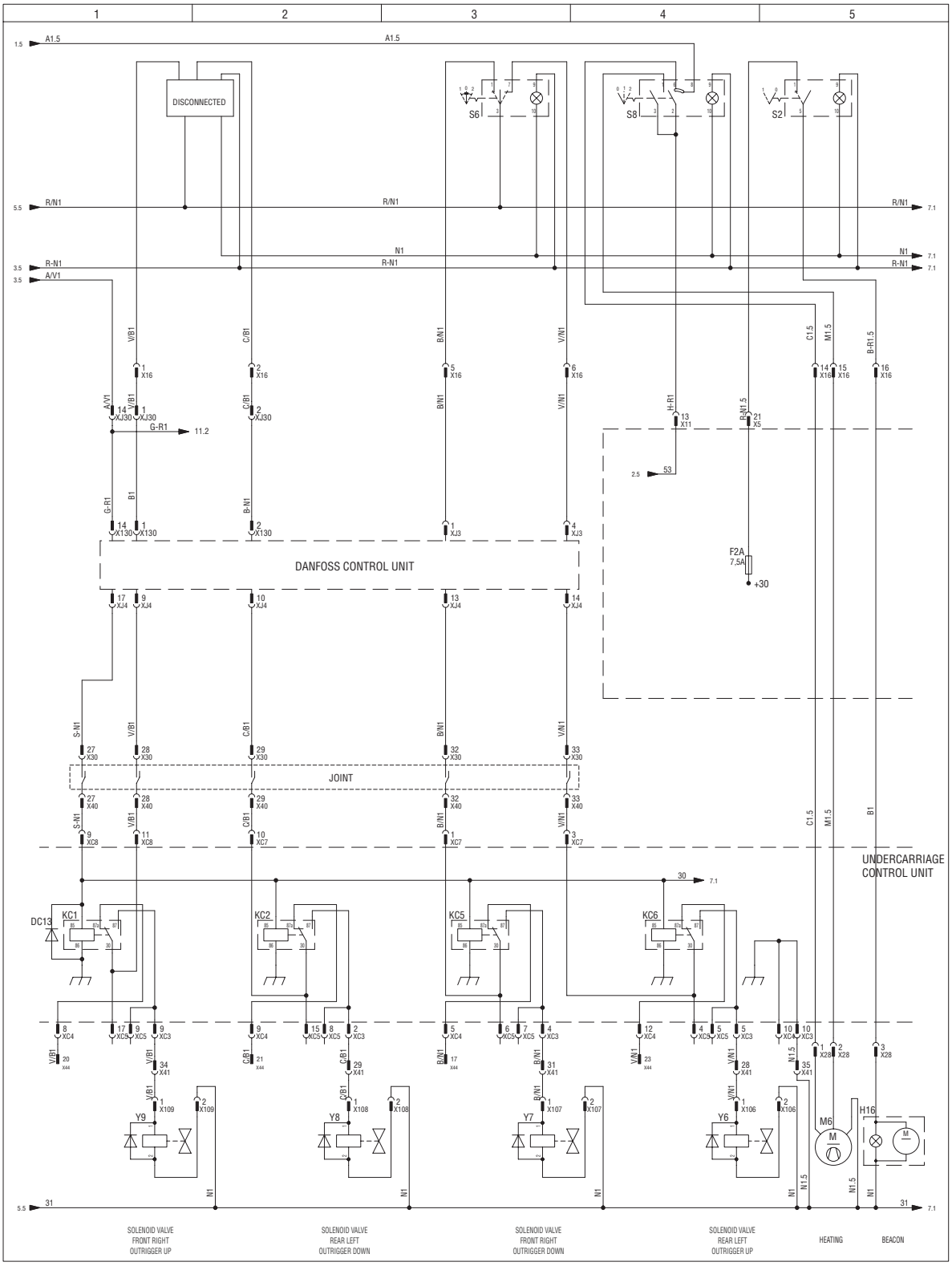
Operation:	Table:
RADIO wiring diagram - Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 4 of 11	**C.05.06**



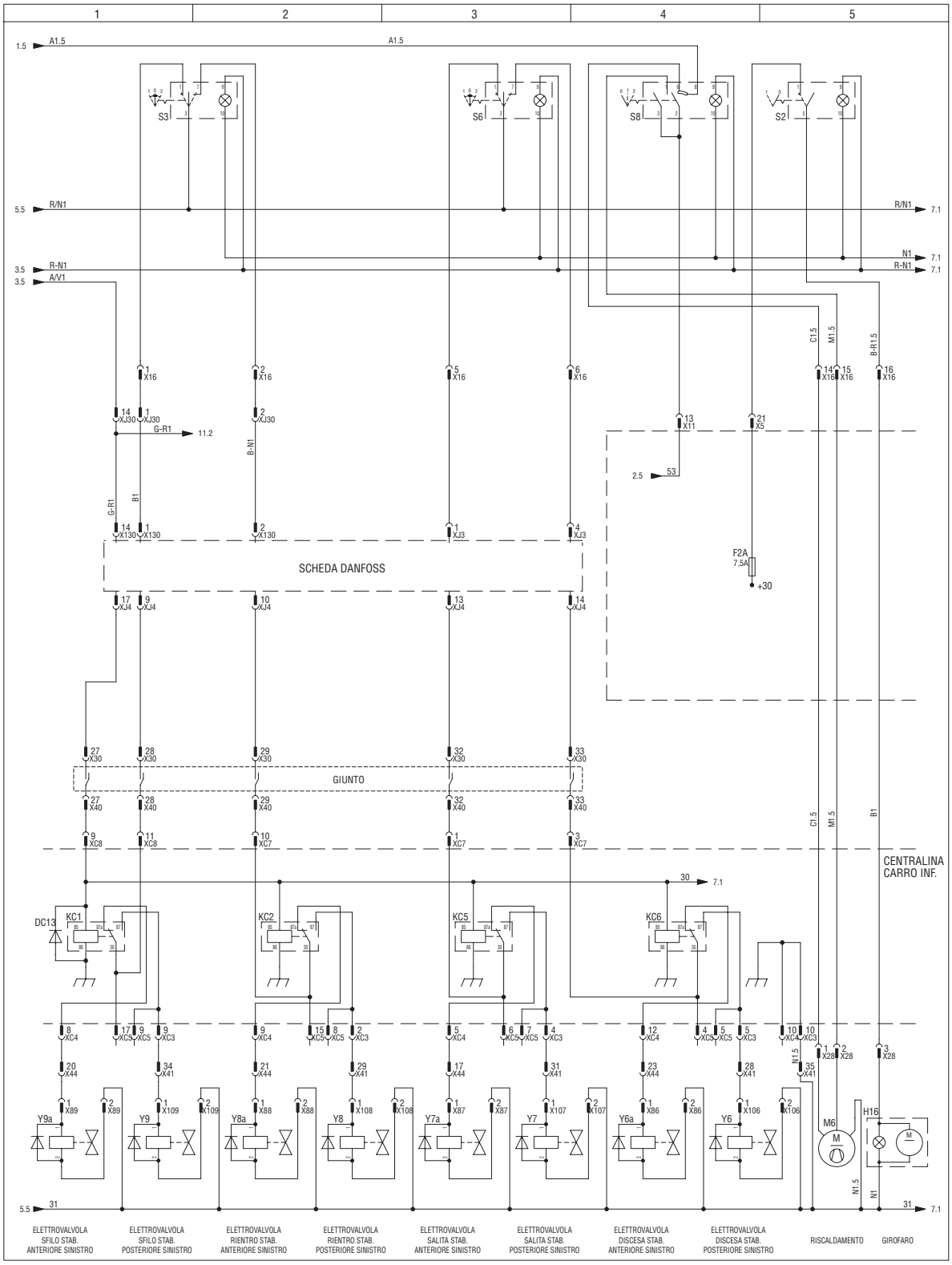
Operation:	Table:
RADIO wiring diagram - Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 5 of 11	**C.05.06**



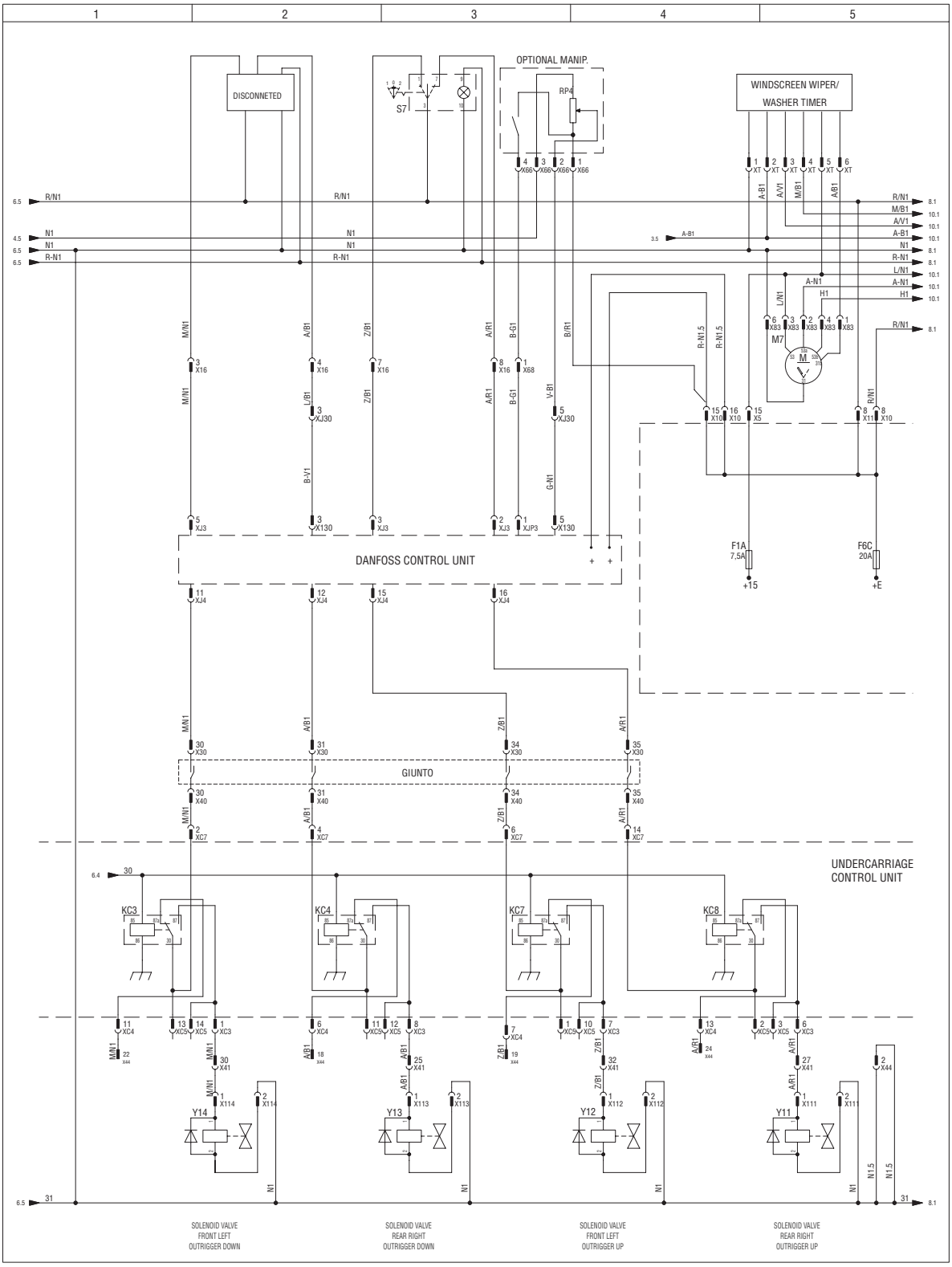
Operation:	RADIO wiring diagram - Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) - sheet 6 of 11	*Table:* **C.05.06**



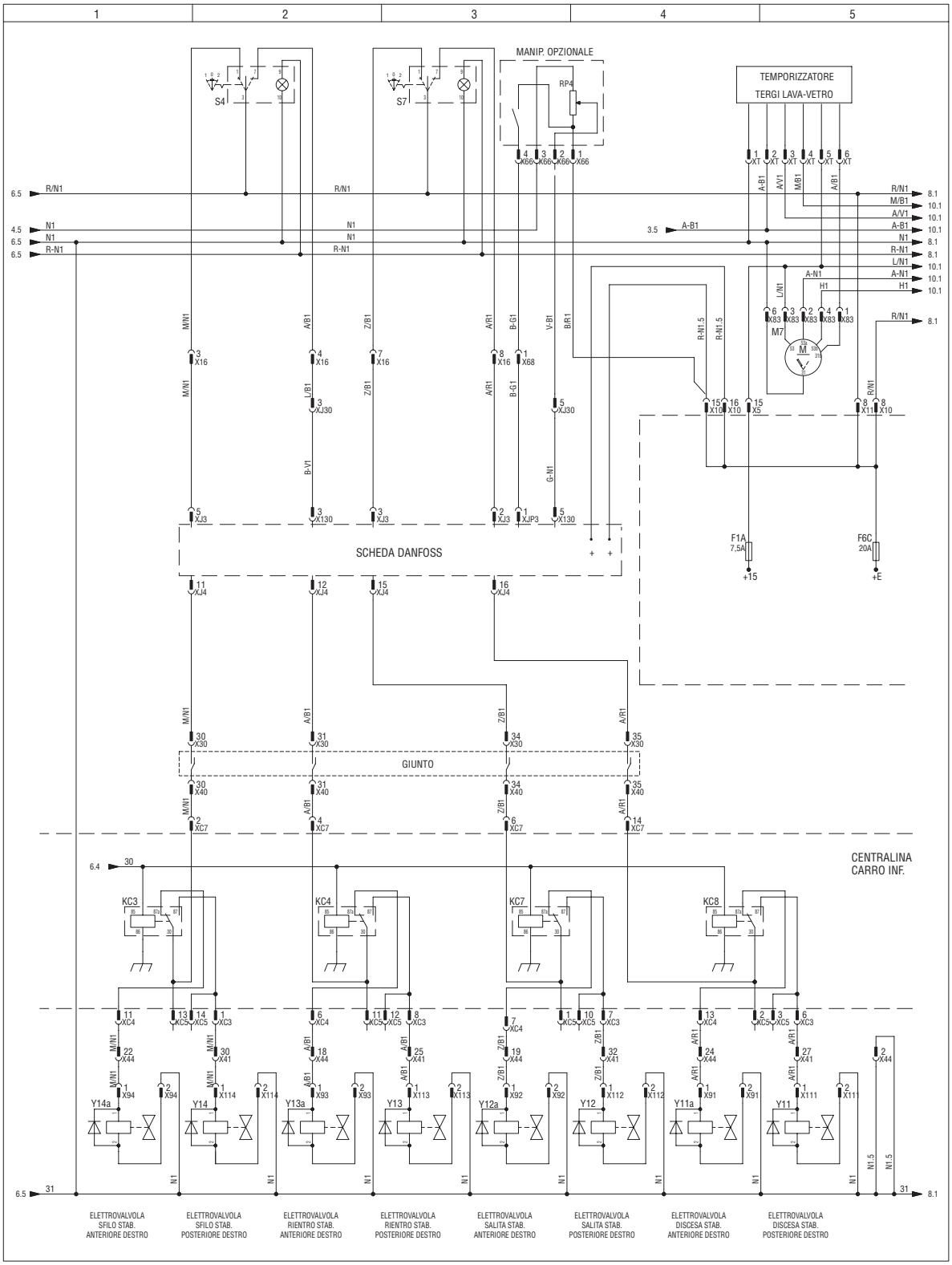
Operation:	Table:
RADIO wiring diagram - Girolift 5022 (from serial no. 09411 to serial no. 10078) - sheet 6 of 11	**C.05.06**



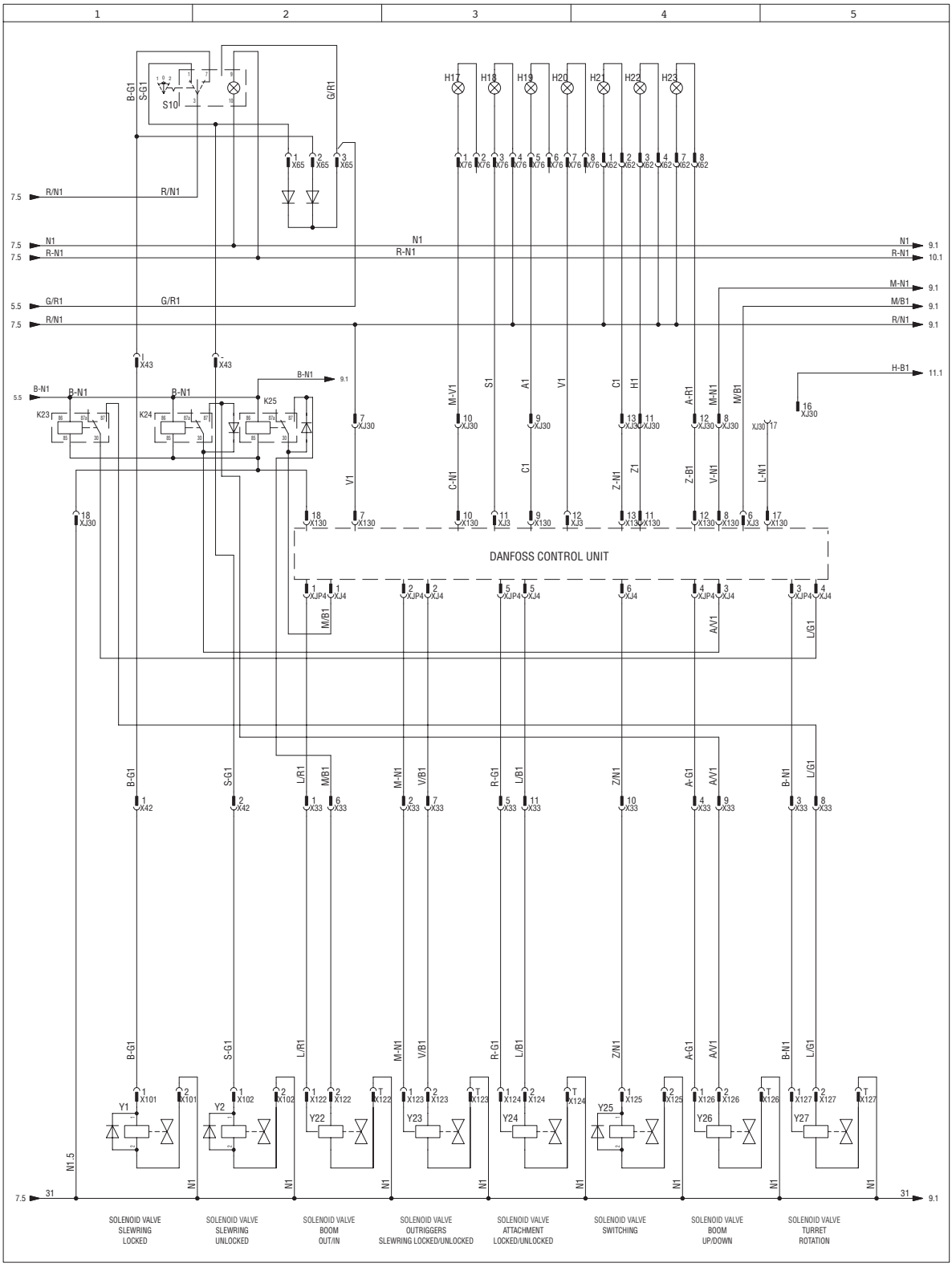
Operation:	RADIO wiring diagram - Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) - sheet 7 of 11	*Table:* **C.05.06**



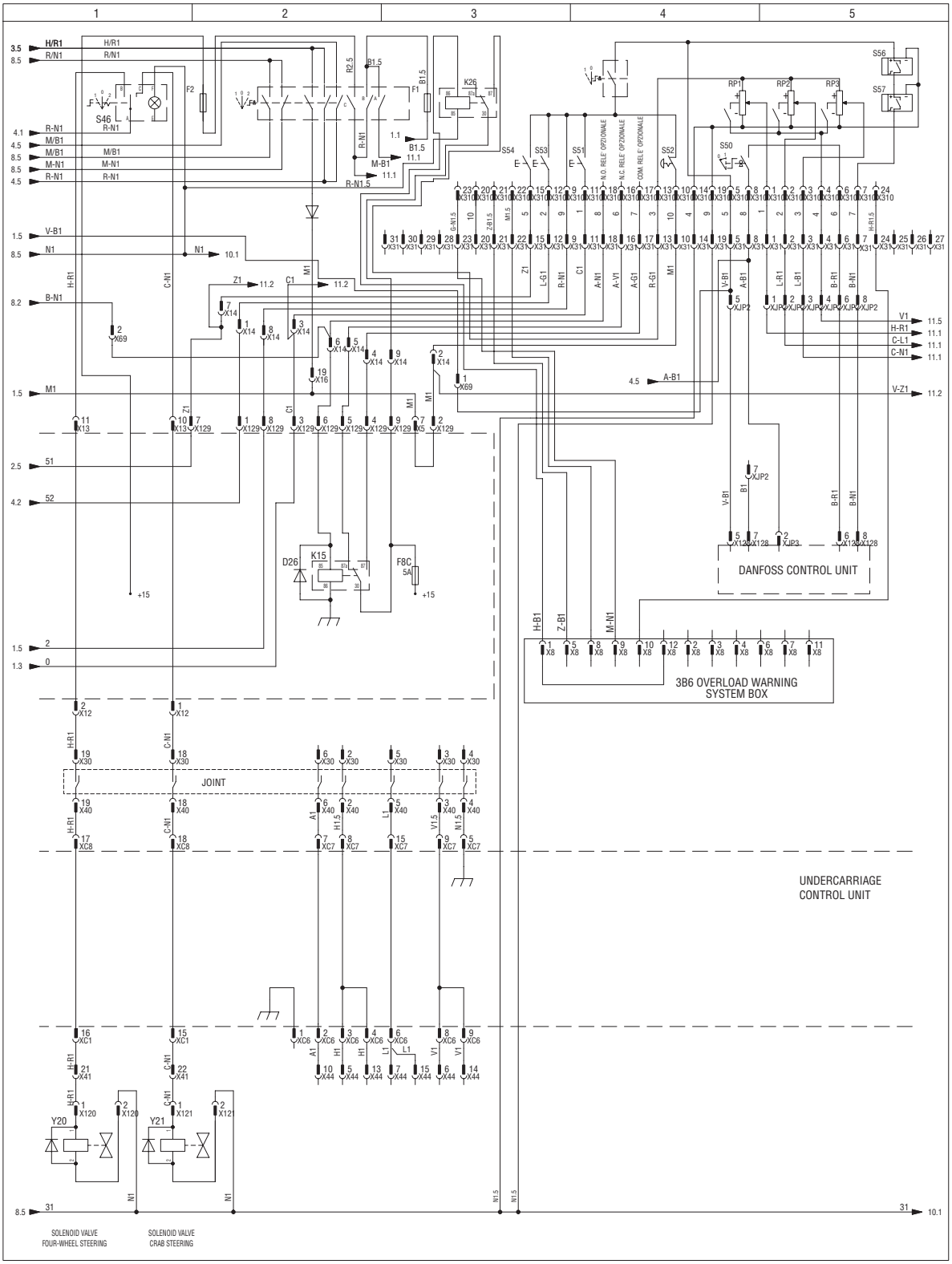
Operation:	*Table:*
RADIO wiring diagram - Girolift 5022 (from serial no. 09411 to serial no. 10078) - sheet 7 of 11	**C.05.06**



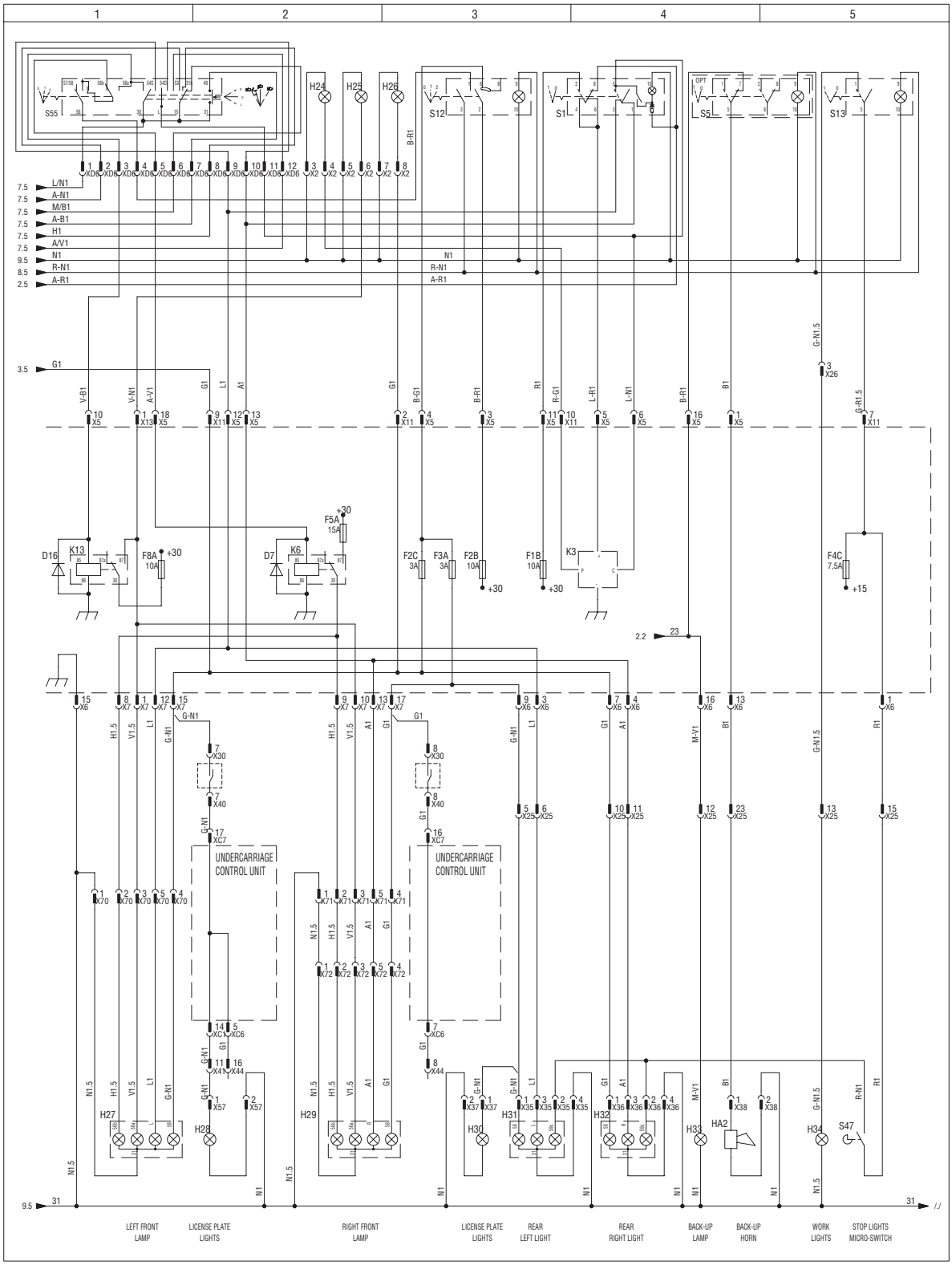
Operation:	Table:
RADIO wiring diagram - Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 8 of 11	**C.05.06**



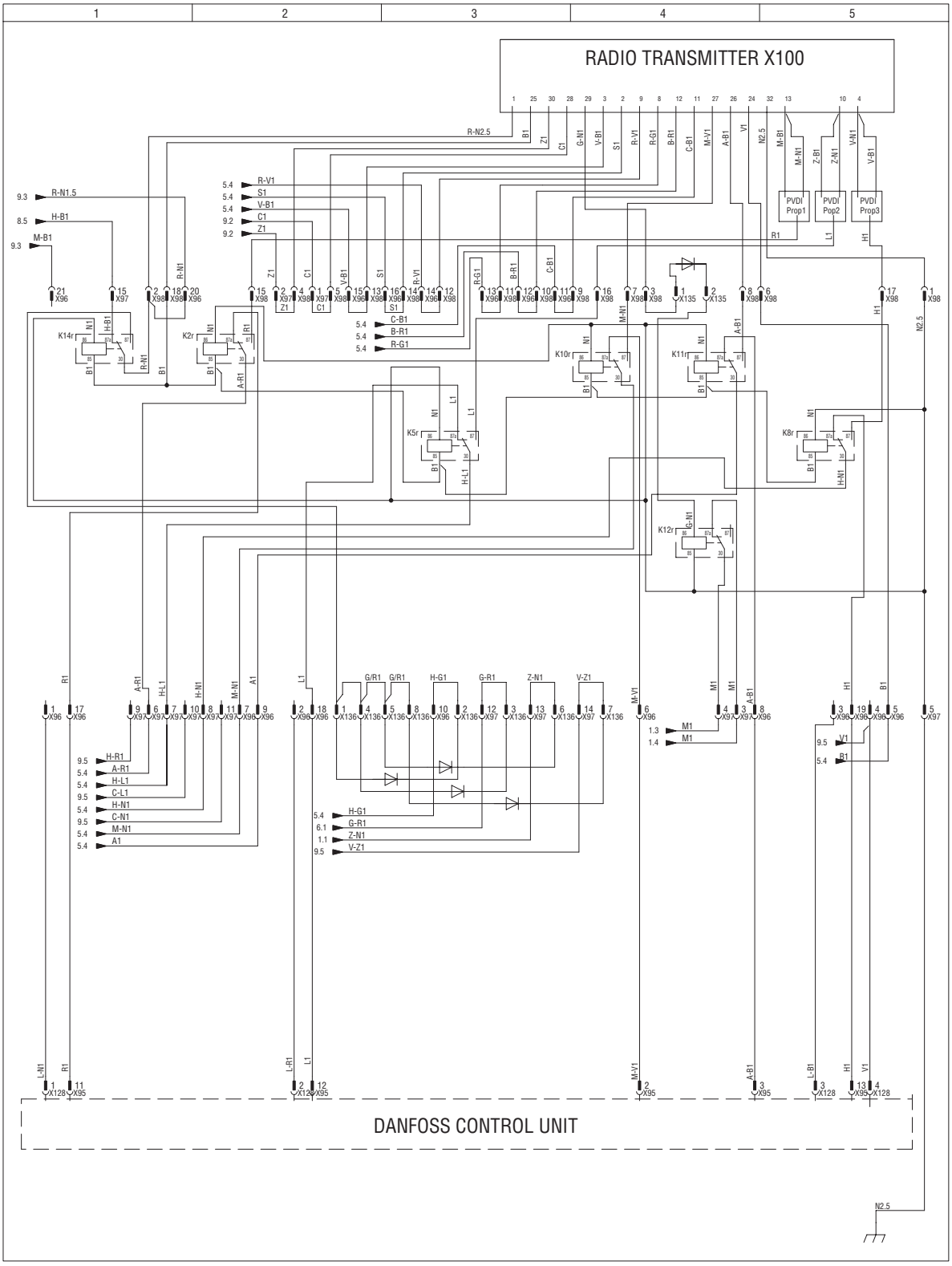
Operation:	RADIO wiring diagram - Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 9 of 11	*Table:* **C.05.06**



Operation:	*Table:*
RADIO wiring diagram - Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 10 of 11	**C.05.06**



Operation:	Table:
RADIO wiring diagram - Girolift 3514-3518 (from serial no. 09262 to serial no. 10188) • 5022 (from serial no. 09411 to serial no. 10078) - sheet 11 of 11	**C.05.06**



Operation: Legend: RADIO wiring diagram - Girolift 3514-3518-5022	Table: C.05.06

NAME	DESCRIPTION	TABLE
F1	REMOTE CONTROL FUSE	11
F2	REMOTE CONTROL FUSE	11
F1A	7.5A FUSE - WINDSCREEN WIPER/WASHER POWER SUPPLY	7
F1B	10A HAZARD LIGHT FUSE	10
F1C	7.5A FUSE - HYDR. DISPLAC. CHANGE SOLENOID, STEER. ACCUM. SOLENOID	1
F2A	7.5A FUSE - BEACON POWER SUPPLY	6
F2B	10A LIGHT SWITCH FUSE	10
F2C	3A FUSE - FRONT LEFT/REAR RIGHT POSITION LIGHTS	10
F3A	3A FUSE - FRONT RIGHT/REAR LEFT POSITION LIGHTS	10
F3B	7.5A HAZARD LIGHT AND SPEED SWITCH FUSE	2
F3C	7.5A FUSE - FRONT/REAR AXLE LOCKING/ UNLOCKING SOLENOID VALVES	5
F4A	7.5A EMERGENCY PUMP FUSE	1
F4B	7.5A OPTIONAL FUSE	2
F4C	7.5A FUSE - STOP MICRO-SWITCH, WORK LIGHT	10
F5A	15A LOW BEAM FUSE	10
F5B	7.5A CAB LIGHTING FUSE	3
F5C	15A OVERLOAD WARN. SYST. FUSE	4
F6A	7.5A FUSE - POWER SUPLLY. SPEED SWITCH	2
F6B	7.5A FUSE - POWER SUPPLY: UPPER WINDSCREEN WIPER/WASHER	4
F6C	20A FUSE - POWER SUPPLY SWITCHES, OPTIONAL HAND LEVER, DANFOSS CARD	7
F7A	5A FUSE - POWER SUPPLY: OUTRIGGER LIMIT SWITCH, PARKING BRAKE, CARRIAGE ALIGNMENT, BASKET	2
F7B	10A BOOM POWER SUPPLY FUSE	1
F7C	15A FUSE HORN - HEATER	2
F8A	10A HIGH BEAM FUSE	10
F8B	15A FUSE TIMER AND LIGHT INDICATORS AND INSTRUMENTS POWER SUPPLY	1
F8C	5A BOOM POWER SUPPLY FUSE	9
FG1	70A GENERAL FUSE	1
FG2	30A GENERAL FUSE	1
FG3	20A GENERAL FUSE	1
FG4	60A GENERAL FUSE	1
G1	BATTERY	1
G2	ALTERNATOR	1
H1	LIGHT INDIC. -ALARMS	1
H10	LIGHT INDIC. -2nd SPEED	3
H11	LIGHT INDIC. -1st SPEED	3
H12	CAB LIGHTING	3
H13	LIGHT INDIC. - DIFFERENTIAL LOCKING	4
H14	LIGHT INDIC. - CARRIAGE ALIGNMENT	4
H15	LIGHT INDIC. - BASKET	4
H16	BEACON	6
H17	LIGHT INDIC. - ATTACHMENT LOCKED/ UNLOCKED	8
H18	LIGHT INDIC. - FORK ROTATION	8
H19	LIGHT INDIC. - BOOM IN/OUT	8
H2	LIGHT INDIC. - GLOW PLUGS	1
H20	LIGHT INDIC. - BOOM UP/DOWN	8
H21	LIGHT INDIC. - PARALLEL FORKS	8
H22	LIGHT INDIC. - TURRET ROTATION	8
H23	LIGHT INDIC. - TURRET ROTATION LOCKED	8
H24	LIGHT INDIC. - TURN SIGNALS	10
H25	LIGHT INDIC. - HIGH BEAM	10
H26	LIGHT INDIC. - POSITION LIGHTS	10
H27	FRONT LEFT LIGHT	10
H28	LICENSE PLATE LIGHT	10
H29	FRONT RIGHT LIGHT	10
H3	LIGHT INDIC. - AIR FILTER CLOGGED	1
H30	LICENSE PLATE LIGHT	10
H31	REAR LEFT LIGHT	10
H32	REAR RIGHT LIGHT	10
H33	BACK-UP LIGHTS	10
H34	WORK LIGHT	10
H4	LIGHT INDIC. - HIGH ENGINE WATER TEMPERATURE	1
H5	LIGHT INDIC. - LOW ENGINE OIL PRESSURE	1
H6	LIGHT INDIC. - GEN-SET	1
H7	LIGHT INDIC. - PARKING BRAKE	2
H8	LIGHT INDIC. - HYDRAULIC OIL FILTER CLOGGED	3
H9	LIGHT INDIC. - LOW BRAKE PRESSURE	3
HA1	HORN	2
HA2	BACK-UP HORN	10
K01	RELAY - IGNITION	1
K02	RELAY - PRE-HEATING	1
K03	RELAY - ELECTRONIC COMPONENTS	1
K04	RELAY - POWER SUPPLY UNDER DASHBOARD	1
K1	HYDRAULIC DISPLACEMENT CHANGE RELAY	2
K11	CARRIAGE ALIGNMENT RELAY	4
K12	BOOM RELAY	4
K13	HIGH BEAM RELAY	10
K14	START ENABLING RELAY	1

Operation: Legend: RADIO wiring diagram - Girolift 3514-3518-5022	Table: C.05.06

K15	OPTIONAL RELAY - BOOM	9
K16	OPTIONAL RELAY	2
K17	OPTIONAL RELAY	2
K19	RELAY	2
K20	RELAY	2
K21	RELAY	2
K22	RELAY	2
K23	RELAY - TURRET ROTATION ACTIVATION	8
K24	RELAY - BOOM UP/DOWN ACTIVATION	8
K25	RELAY - BOOM IN/OUT ACTIVATION	8
K26	RELAY - JOYSTICK POWER SUPPLY	9
K3	FLASHING	10
K4	EMERGENCY RELAY	1
K5	EMERGENCY PUMP RELAY	4
K6	LOW BEAM RELAY	10
K7	SPEED ENABLING RELAY	2
K8	REVERSE SPEED RELAY	2
K9	FWD SPEED RELAY	2
KC1	FRONT/REAR LEFT OUTRIGGER EXTENSION RELAY	6
KC10	FRONT AXLE UNLOCKING RELAY	5
KC11	REAR LEFT OUTRIGGER ANTI-OVERTURNING RELAY	2
KC12	REAR RIGHT OUTRIGGER ANTI-OVERTURNING RELAY	2
KC13	FRONT LEFT OUTRIGGER ANTI-OVERTURNING RELAY	2
KC14	FRONT RIGHT OUTRIGGER ANTI-OVERTURNING RELAY	2
KC15	SLEWRING LOCKING RELAY	4
KC2	FRONT/REAR LEFT OUTRIGGER RETRACTION RELAY	6
KC3	FRONT/REAR RIGHT OUTRIGGER EXTENSION RELAY	7
KC4	FRONT/REAR RIGHT OUTRIGGER RETRACTION RELAY	7
KC5	FRONT/REAR LEFT OUTRIGGER UP-MOVEMENT RELAY	6
KC6	FRONT/REAR LEFT OUTRIGGER DOWN-MOVEMENT RELAY	6
KC7	FRONT/REAR RIGHT OUTRIGGER UP-MOVEMENT RELAY	7
KC8	FRONT/REAR RIGHT OUTRIGGER DOWN-MOVEMENT RELAY	7
KC9	REAR AXLE LOCKING RELAY	5
M1	STARTING MOTOR	1
M2	OPTIONAL A/C	1
M3	OPTIONAL UPPER WINDSCREEN WIPER/ WASHER MOTOR	3
M4	WINDSCREEN WASHER PUMP	3
M5	EMERGENCY PUMP	4
M6	HEATING	6
M7	WINDSCREEN WIPER/WASHER MOTOR	7
P1	ENGINE WATER TEMPERATURE INDICATOR	1
P2	HYDRAULIC OIL TEMPERATURE INDICATOR	1
P3	FUEL GAUGE	3
P4	HOUR-METER	3
R1	1/4W RESISTANCE	2
R2	1/4W RESISTANCE	5
R3	1/4W RESISTANCE	2
R4	1/4W RESISTANCE	2
R5	GLOW PLUIGS	1
R6	FUEL LEVEL TRANSDUCER	3
RP1	JOYSTICK 1 POTENTIOMETER	9
RP2	JOYSTICK 2 POTENTIOMETER	9
RP3	JOYSTICK 3 POTENTIOMETER	9
RP4	OPTIONAL HAND-LEVER POTENTIOMETER	7
S1	HAZARD LIGHTS SWITCH	10
S10	SLEWRING LOCKING/UNLOCKING SWITCH	8
S11	AXLE LEVELLING SWITCH	5
S12	LIGHTS SWITCH	10
S13	WORK LIGHT SWITCH	10
S14	IGNITION CONTROL PANEL	1
S16	SPEED SWITCH	3
S17	DIFFERENTIAL LOCKING SWITCH	4
S18	EMERGENCY PUMP SWITCH	4
S2	BEACON SWITCH	6
S20	EMERGENCY MUSHROOM	1
S21	BATTERY CUTOUT	1
S22	THERMOSTAT - ENGINE EMISSIONS	1
S23	PRESSURE SWITCH - AIR FILTER CLOGGED	1
S24	THERMOSTAT - HIGH ENGINE WATER TEMPERATURE	1
S25	PRESSURE SWITCH - LOW ENGINE OIL PRESSURE	1
S26	ENGINE WATER TEMPERATURE TRANSDUCER	1
S27	HYDRAULIC OIL TEMPERATURE TRANSDUCER	1
S28	HAND-BRAKE MICRO-SWITCH	2
S29	REAR LEFT OUTRIGGER MICRO-SWITCH	2
S30	REAR RIGHT OUTRIGGER MICRO-SWITCH	2
S31	FRONT RIGHT OUTRIGGER MICRO-SWITCH	2
S32	FRONT LEFT OUTRIGGER MICRO-SWITCH	2
S33	SEAT MICRO-SWITCH	3

Operation: Legend: RADIO wiring diagram - Girolift 3514-3518-5022	Table: C.05.06

S34	PRESSURE SWITCH - HYDRAULIC OIL FILTER CLOGGED	3
S35	PRESSURE SWITCH - LOW BRAKE PRESSURE	3
S36	SENSOR - CARDAN	3
S37	SENSOR - 1st SPEED ENGAGED	3
S38	SENSOR - 2nd SPEED ENGAGED	3
S39	SENSOR - CARRIAGE ALIGNMENT	4
S40	SENSOR - PIN HIGH	4
S41	SENSOR - BOOM DOWN	4
S45	OPTIONAL SENSOR - REAR AXLE ALIGNMENT	5
S46	STEERING SELECTOR	9
S47	STOP LIGHTS MICRO-SWITCH	10
S48	SPEED SWITCH	2
S5	BACK-UP HORN SWITCH	10
S50	ROBOT CONTROL	9
S51	START PUSHBUTTON	9
S52	ENGINE EMERGENCY STOP PUSHBUTTON	9
S53	EMERGENCY PUMP PUSHBUTTON	9
S54	HORN PUSHBUTTON	9
S55	LIGHTS - TURN SIGNALS SWITCH	10
S56	SENSOR - FORKS ENGAGED	9
S56	SENSOR - FORKS ENGAGED	9
S6	LEFT OUTRIGGER UP/DWON SWITCH	6
S7	RIGHT OUTRIGGER UP/DWON SWITCH	7
S8	HEATING SWITCH	6
S9	OPTIONAL A/C SWITCH	1
Y01	FWD SPEED SOLENOID VALVE	2
Y02	REVERSE SPEED SOLENOID VALVE	2
Y1	SLEWRING LOCKING SOLENOID VALVE	8
Y10	FRONT AXLE LEVELLING SOLENOID VALVE	5
Y11	REAR RIGHT OUTRIGGER DOWN-MOVEMENT SOLENOID VALVE	7
Y11a	FRONT RIGHT OUTRIGGER DOWN-MOVEMENT SOLENOID VALVE	7
Y12	REAR RIGHT OUTRIGGER UP-MOVEMENT SOLENOID VALVE	7
Y12a	FRONT RIGHT OUTRIGGER UP-MOVEMENT SOLENOID VALVE	7
Y13	REAR RIGHT OUTRIGGER RETRACTION SOLENOID VALVE	7
Y13a	FRONT RIGHT OUTRIGGER RETRACTION SOLENOID VALVE	7
Y14	REAR RIGHT OUTRIGGER EXTENSION SOLENOID VALVE	7
Y14a	FRONT RIGHT OUTRIGGER EXTENSION SOLENOID VALVE	7
Y15	REAR AXLE LOCKING SOLENOID VALVE	5
Y15a	REAR AXLE LOCKING SOLENOID VALVE	5
Y16	2nd SPEED SOLENOID VALVE	3
Y17	1st SPEED SOLENOID VALVE	3
Y18	HYDRAULIC DISPLACEMENT CHANGE SOLENOID VALVE	2
Y19	FWD SPEED SOLENOID VALVE	4
Y2	SLEWRING UNLOCKING SOLENOID VALVE	8
Y20	4-WHEEL STEER SOLENOID VALVE	9
Y21	CRAB STEER SOLENOID VALVE	9
Y22	BOOM EXTENSION/RETRACTION SOLENOID VALVE	8
Y23	SLEWRING LOCKING/UNLOCKING SOLENOID VALVE	8
Y24	ATTACHMENT LOCKING/UNLOCKING SOLENOID VALVE	8
Y25	SWITCHING SOLENOID VALVE	8
Y26	BOOM RAISING/LOWERING SOLENOID VALVE	8
Y27	TURRET ROTATION SOELNOID VALVE	8
Y29	ENGINE STOP SOLENOID VALVE	1
Y3	FRONT LEFT AXLE UNLOCKING SOLENOID VALVE	5
Y30	STEER. ACCUMULATOR SOLENOID VALVE	5
Y4	FRONT RIGHT AXLE UNLOCKING SOLENOID VALVE	5
Y5	FRONT AXLE LEVELLING SOLENOID VALVE	5
Y6	REAR LEFT OUTRIGGER UP-MOVEMENT SOLENOID VALVE (3514-3518)	6
Y6	REAR LEFT OUTRIGGER DOWN-MOVEMENT SOLENOID VALVE (5022)	6
Y6a	FRONT LEFT OUTRIGGER DOWN-MOVEMENT SOLENOID VALVE (5022)	6
Y7	FRONT RIGHT OUTRIGGER DOWN-MOVEMENT SOLENOID VALVE (3514-3518)	6
Y7	FRONT RIGHT OUTRIGGER UP-MOVEMENT SOLENOID VALVE (5022)	6
Y7a	REAR LEFT OUTRIGGER UP-MOVEMENT SOLENOID VALVE (5022)	6
Y8	REAR LEFT OUTRIGGER DOWN-MOVEMENT SOLENOID VALVE (3514-3518)	6
Y8	REAR LEFT OUTRIGGER RETRACTION SOLENOID VALVE (5022)	6
Y8a	FRONT LEFT OUTRIGGER RETRACTION SOLENOID VALVE (5022)	6
Y9	FRONT RIGHT OUTRIGGER UP-MOVEMENT SOLENOID VALVE (3514-3518)	6
Y9	REAR LEFT OUTRIGGER EXTENSION	

Operation: Legend: RADIO wiring diagram - Girolift 3514-3518-5022	Table: C.05.06

	SOLENOID VALVE (5022)	6
Y9a	FRONT LEFT OUTRIGGER EXTENSION SOLENOID VALVE(5022)	6
X1	8-WAY CONNECTOR	
X10	MARK 17-WAY CONNECTOR	
X101	2-WAY CONNECTOR	
X102	2-WAY CONNECTOR	
X103	2-WAY CONNECTOR	
X104	2-WAY CONNECTOR	
X105	2-WAY CONNECTOR	
X106	2-WAY CONNECTOR	
X107	2-WAY CONNECTOR	
X108	2-WAY CONNECTOR	
X109	2-WAY CONNECTOR	
X11	MARK 13-WAY CONNECTOR	
X110	2-WAY CONNECTOR	
X111	2-WAY CONNECTOR	
X112	2-WAY CONNECTOR	
X113	2-WAY CONNECTOR	
X114	2-WAY CONNECTOR	
X115	2-WAY CONNECTOR	
X115a	2-WAY CONNECTOR	
X116	2-WAY CONNECTOR	
X117	2-WAY CONNECTOR	
X118	2-WAY CONNECTOR	
X119	2-WAY CONNECTOR	
X12	MARK 7-WAY CONNECTOR	
X120	2-WAY CONNECTOR	
X121	2-WAY CONNECTOR	
X122	4-POLE CONNECTOR	
X123	4-POLE CONNECTOR	
X124	4-POLE CONNECTOR	
X125	2-WAY CONNECTOR	
X126	4-POLE CONNECTOR	
X127	4-POLE CONNECTOR	
X13	MARK 17-WAY CONNECTOR	
X14	MARK 9-WAY CONNECTOR	
X15	MARK 11-WAY CONNECTOR	
X150	1-WAY CONNECTOR	
X16	MARK 21-WAY CONNECTOR	
X2	8-WAY CONNECTOR	
X20	3-WAY CONNECTOR	
X21	2-WAY CONNECTOR	
X22	2-WAY CONNECTOR	
X23	2-WAY CONNECTOR	
X25	DEUTSCH 24-WAY CONNECTOR	
X26	MARK 5-WAY CONNECTOR	
X28	DEUTSCH 8-WAY CONNECTOR	
X29	MARK 17-WAY CONNECTOR	
X3	8-WAY CONNECTOR	
X30	DEUTSCH 40-WAY CONNECTOR - TYPE A	
X31	DEUTSCH 31-WAY CONNECTOR	
X310	DEUTSCH 24-WAY CONNECTOR	
X32	DEUTSCH 3-WAY CONNECTOR	
X33	DEUTSCH 12-WAY CONNECTOR	
X35	4-WAY CONNECTOR	
X36	4-WAY CONNECTOR	
X37	DEUTSCH 2-WAY CONNECTOR	
X38	DEUTSCH 2-WAY CONNECTOR	
X4	8-WAY CONNECTOR	
X40	DEUTSCH 40-WAY CONNECTOR - TYPE A	
X41	DEUTSCH 40-WAY CONNECTOR - TYPE A	
X42	DEUTSCH 2-WAY CONNECTOR	
X43	90°2-WAY CONNECTOR	
X44	DEUTSCH 24-WAY CONNECTOR	
X45	DEUTSCH 3-WAY CONNECTOR	
X46	DEUTSCH 3-WAY CONNECTOR	
X47	2-WAY CONNECTOR	
X48	DEUTSCH 3-WAY CONNECTOR	
X49	DEUTSCH 3-WAY CONNECTOR	
X5	MARK 21-WAY CONNECTOR	
X50	DEUTSCH 3-WAY CONNECTOR	
X51	DEUTSCH 3-WAY CONNECTOR	
X52	DEUTSCH 3-WAY CONNECTOR	
X53	DEUTSCH 3-WAY CONNECTOR	
X54	DEUTSCH 3-WAY CONNECTOR	
X55	DEUTSCH 3-WAY CONNECTOR	
X56	DEUTSCH 3-WAY CONNECTOR	
X57	DEUTSCH 2-WAY CONNECTOR	
X58	DEUTSCH 3-WAY CONNECTOR	
X59	DEUTSCH 3-WAY CONNECTOR	
X6	MARK 17-WAY CONNECTOR	
X61	8-WAY CONNECTOR	
X62	8-WAY CONNECTOR	
X65	3-WAY CONNECTOR	
X66	DEUTSCH 4-WAY CONNECTOR	
X67	2-WAY CONNECTOR	
X68	1-WAY CONNECTOR	
X69	2-WAY CONNECTOR	
X7	MARK 17-WAY CONNECTOR	
X7a	**X7 on the 3B6 control unit** - DEUTSCH 12-WAY CONNECTOR	

Operation: Legend: RADIO wiring diagram - Girolift 3514-3518-5022	Table: C.05.06

X70	DEUTSCH 6-WAY CONNECTOR	
X71	DEUTSCH 6-WAY CONNECTOR	
X72	DEUTSCH 6-WAY CONNECTOR	
X73	2-WAY CONNECTOR	
X74	1-WAY CONNECTOR	
X75	1-WAY CONNECTOR	
X76	8-WAY CONNECTOR	
X8	DEUTSCH 12-WAY CONNECTOR	
X8A	MARK 9-WAY CONNECTOR	
X83	6-WAY CONNECTOR	
X86	2-WAY CONNECTOR	
X87	2-WAY CONNECTOR	
X88	2-WAY CONNECTOR	
X89	2-WAY CONNECTOR	
X9	MARK 13-WAY CONNECTOR	
X91	2-WAY CONNECTOR	
X92	2-WAY CONNECTOR	
X93	2-WAY CONNECTOR	
X94	2-WAY CONNECTOR	
XA	3-WAY CONNECTOR	
XB	1-WAY CONNECTOR	
XC1	MARK 21-WAY CONNECTOR	
XC3	MARK 13-WAY CONNECTOR	
XC4	MARK 13-WAY CONNECTOR	
XC5	MARK 17-WAY CONNECTOR	
XC6	MARK 9-WAY CONNECTOR	
XC7	MARK 17-WAY CONNECTOR	
XC8	MARK 21-WAY CONNECTOR	
XD6	DEUTSCH 12-WAY CONNECTOR	
XD7	DEUTSCH 12-WAY CONNECTOR	
XJ3	MIC 70 12-WAY CONNECTOR	
XJ30	MIC 70 18-WAY CONNECTOR	
XJ4	MIC 70 20-WAY CONNECTOR	
XJ5	MIC 70 14-WAY CONNECTOR	
XJP2	MIC 70 8-WAY CONNECTOR	
XJP3	MIC 70 8-WAY CONNECTOR	
XJP4	MIC 70 8-WAY CONNECTOR	
XM	DEUTSCH 18-WAY CONNECTOR	
XS1	COMBINATI 1 5-WAY CONNECTOR	
XT	6-WAY CONNECTOR	
X137	ENGINE STOP 2-WAY CONNECTOR	
X95	MIC 70 14-WAY CONNECTOR	
X96	MARK 21-WAY CONNECTOR	
X97	MARK 17-WAY CONNECTOR	
X98	MARK 21-WAY CONNECTOR	
X128	MIC 70 8-WAY CONNECTOR	
X129	MARK 9-WAY CONNECTOR	
X130	MIC 70 14-WAY CONNECTOR	
X131	MARK 9-WAY CONNECTOR	
X132	COMBINATI 1 5-WAY CONNECTOR	
X133	6-WAY CONNECTOR	
X134	ENGINE STOP 2-WAY CONNECTOR	
X135	6-WAY CONNECTOR	
X136	ENGINE STOP 2-WAY CONNECTOR	
K2r	RADIO PROPORTIONAL RELAY	11
K5r	2 RADIO PROPORTIONAL RELAY	11
K8r	3 RADIO PROPORTIONAL RELAY	11
K10r	YELLOW REMOTE CONTROL BUTTON RELAY	11
K11r	RED REMOTE CONTROL BUTTON RELAY	11
K12r	ENGINE STOP RELAY	11
K14r	DIP SWITCH SIGN. RELAY	11

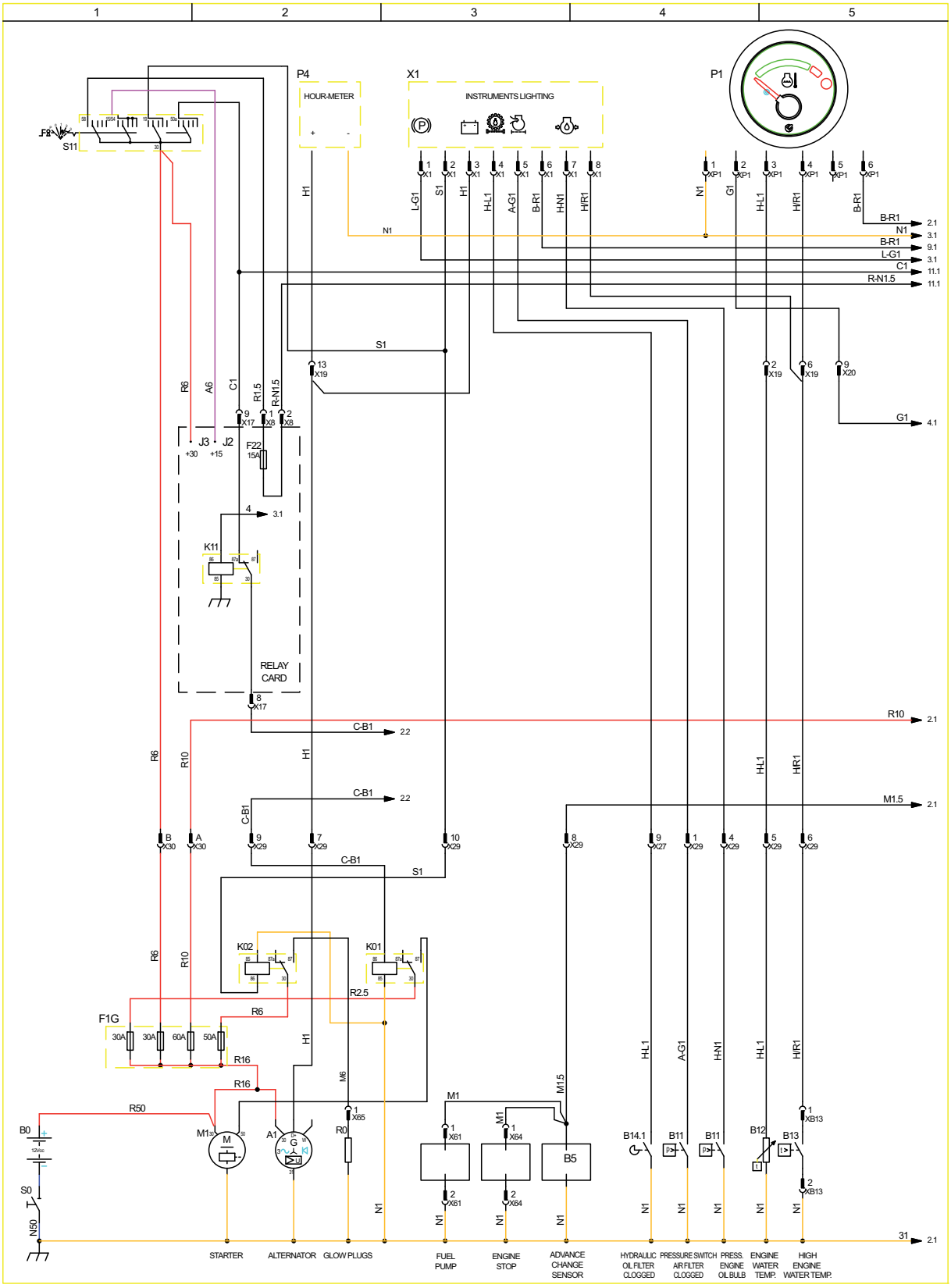
WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

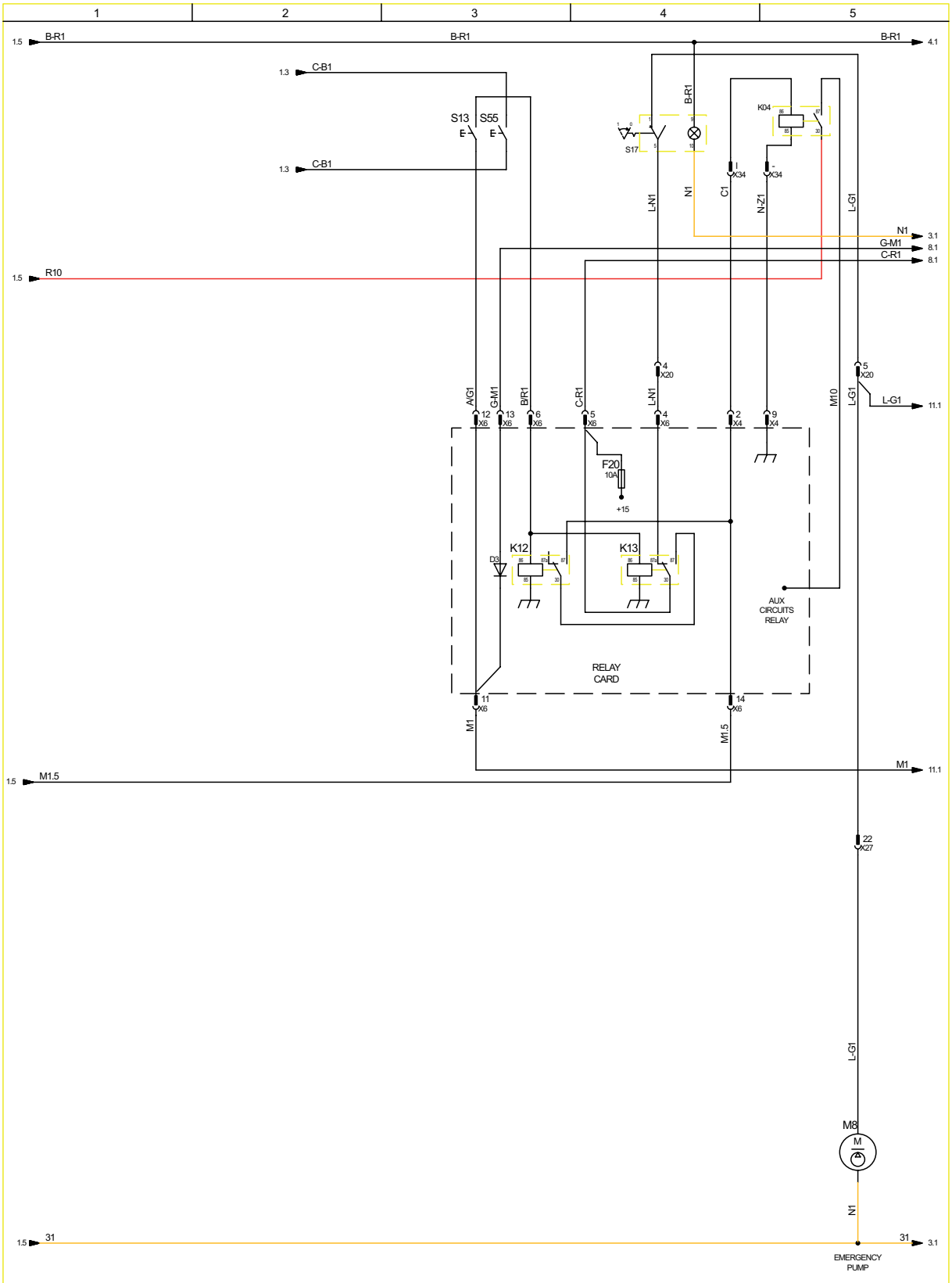
REMARK: Two-colour wires are indicated through a combination of the aforesaid initials as follows:

G/V = YELLOW/GREEN (Crosswise colouring)
G-V = YELLOW-GREEN (Lengthswise colouring)

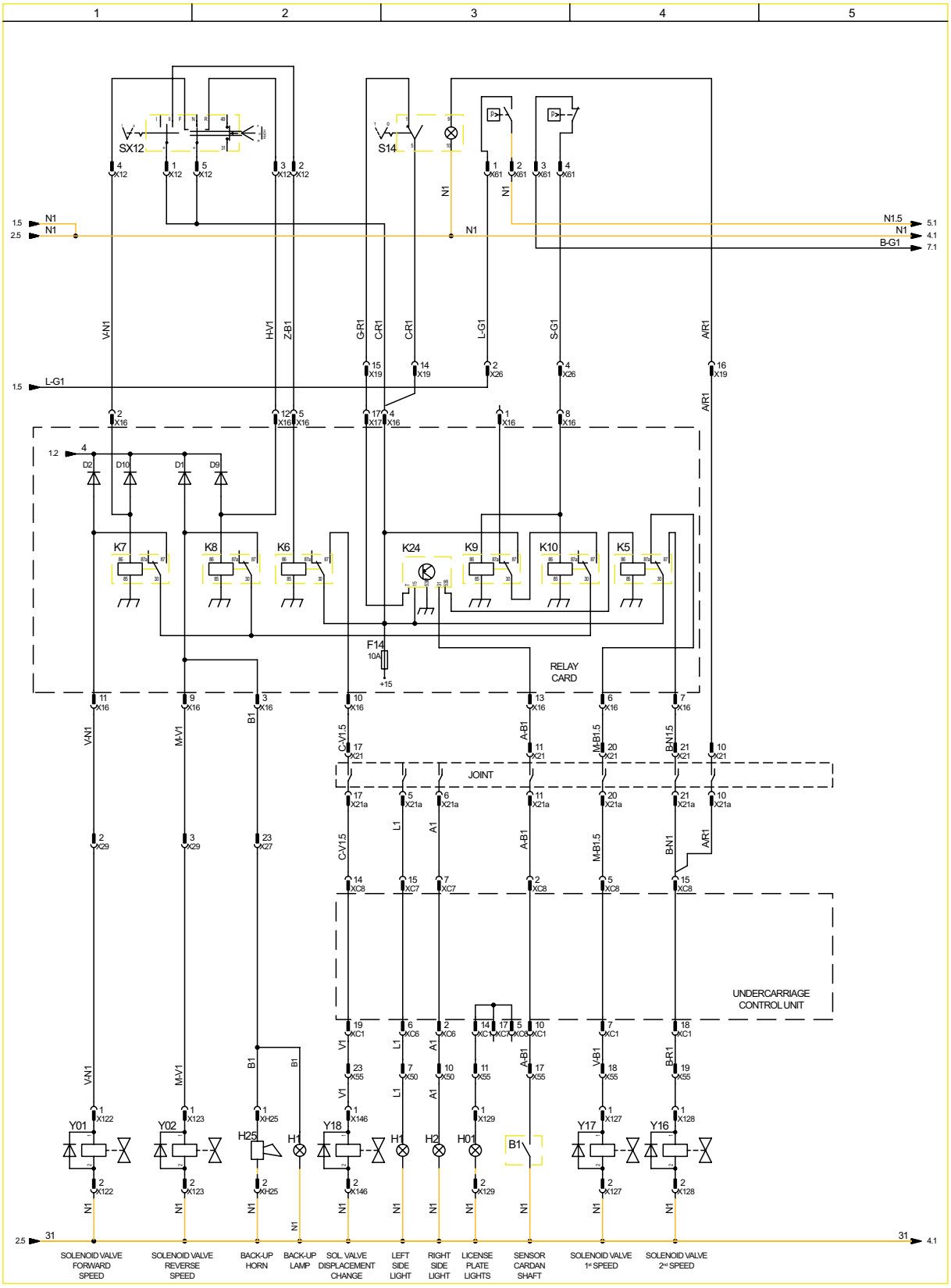
Operation:	Table:
Wiring diagrams 3514-3518 (Girolift 3514: from serial no. 14741 - Girolift 3518: from serial no. 14750) - sheet 1 of 11	**C.05.07**



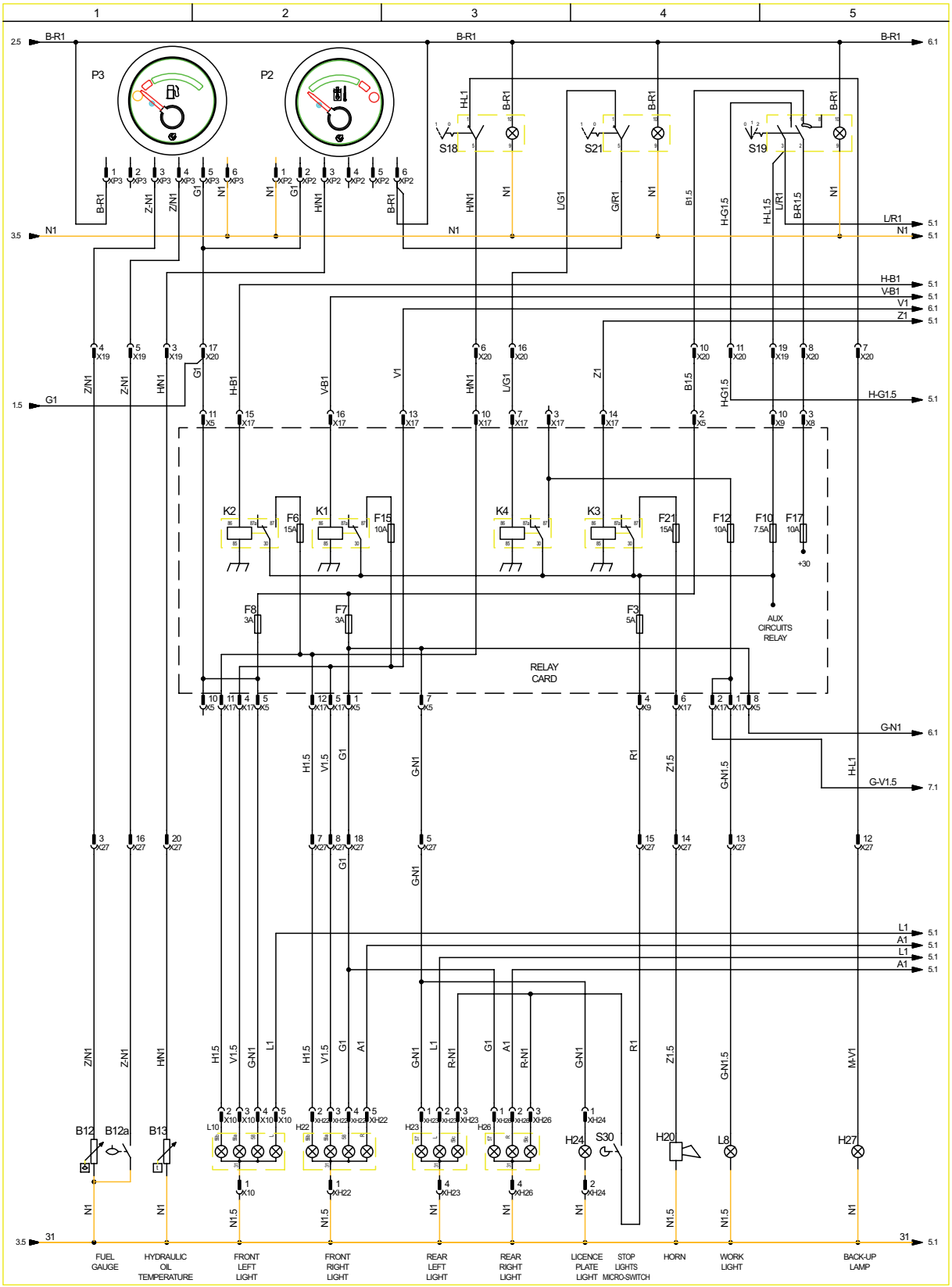
Operation:	*Table:*
Wiring diagrams 3514-3518 (Girolift 3514: from serial no. 14741 - Girolift 3518: from serial no. 14750) - sheet 2 of 11	**C.05.07**



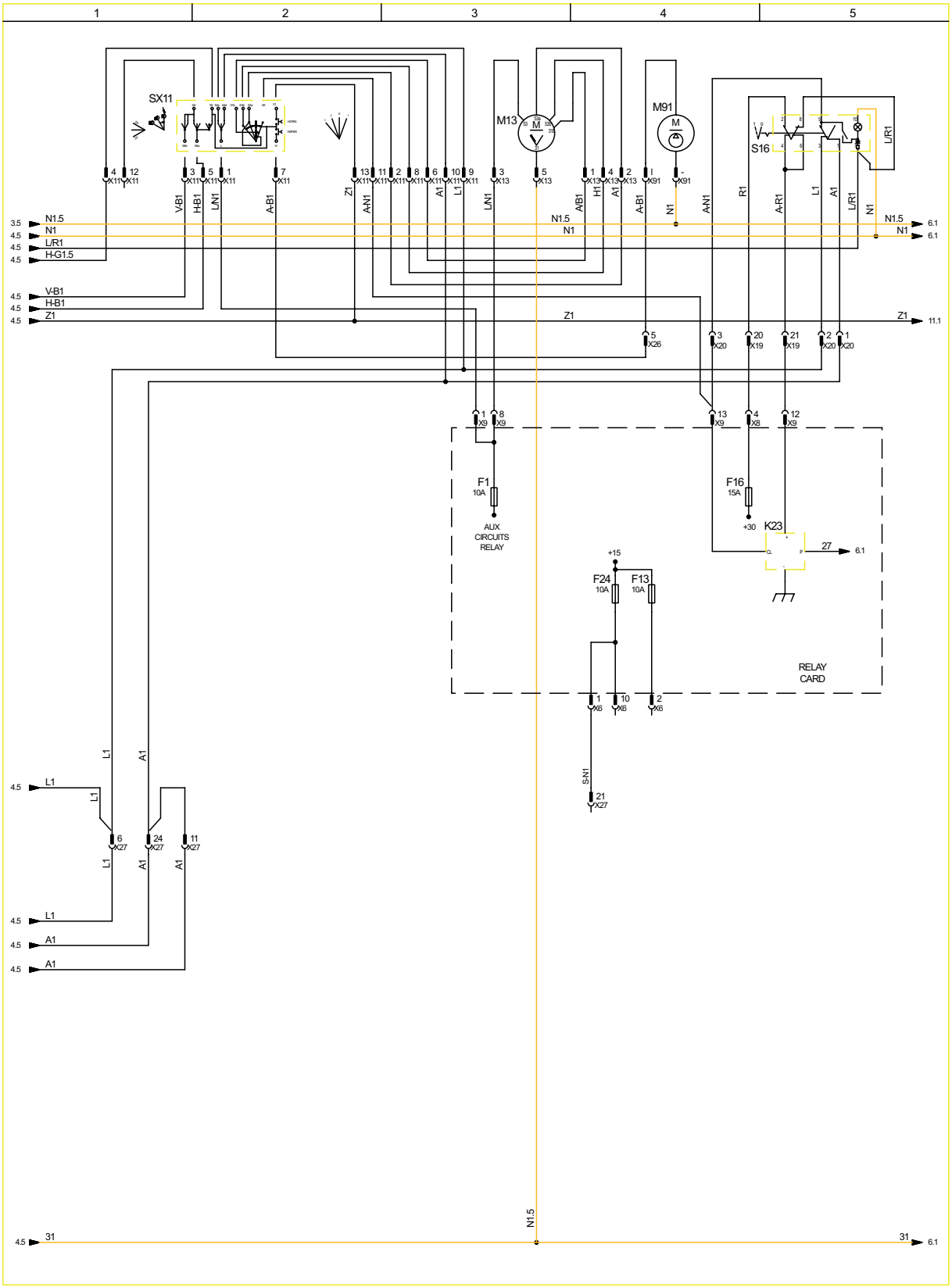
Operation:	Table:
Wiring diagrams 3514-3518 (Girolift 3514: from serial no. 14741 - Girolift 3518: from serial no. 14750) - sheet 3 of 11	**C.05.07**



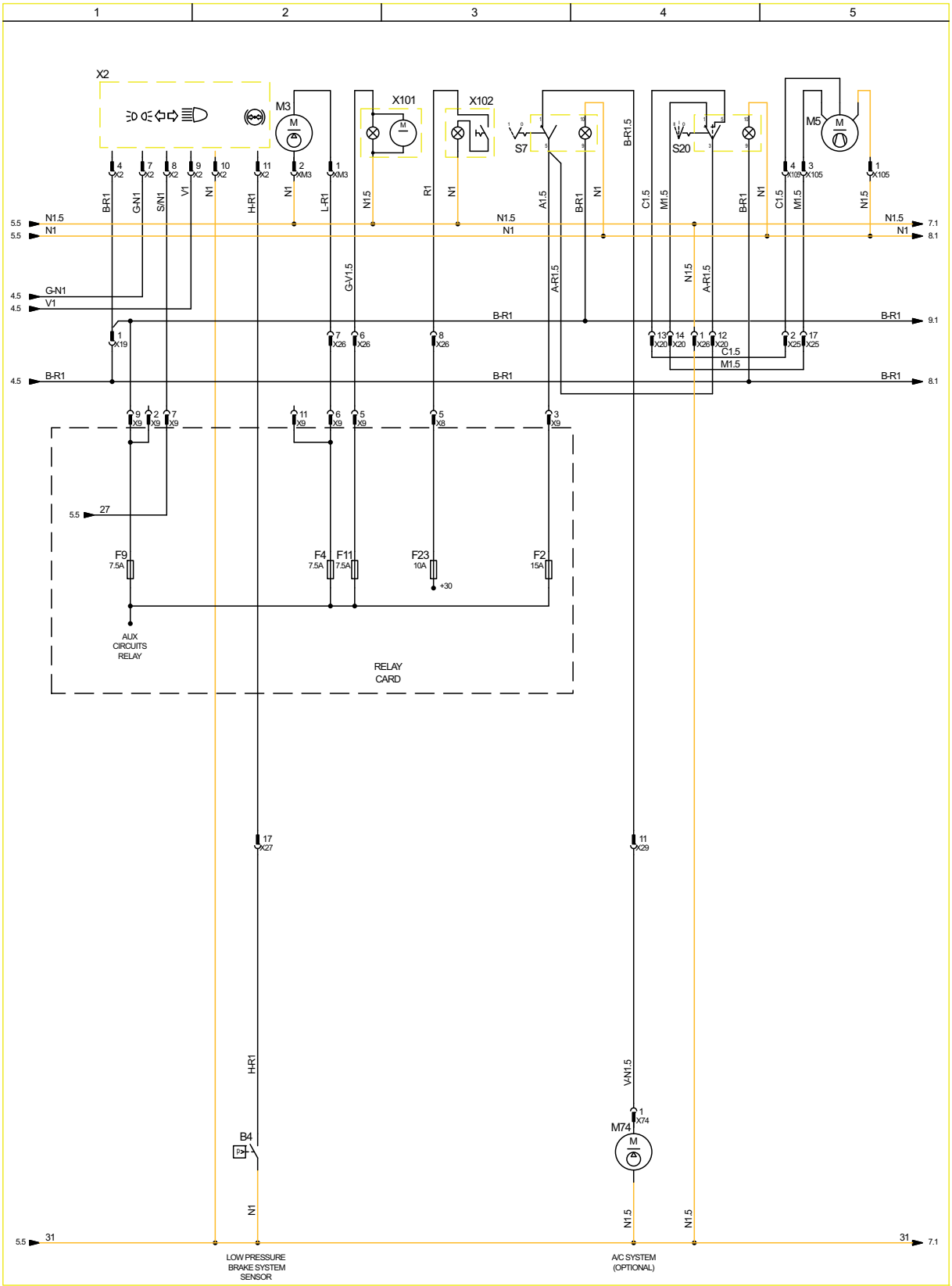
Operation:	*Table:*
Wiring diagrams 3514-3518 (Girolift 3514: from serial no. 14741 - Girolift 3518: from serial no. 14750) - sheet 4 of 11	**C.05.07**



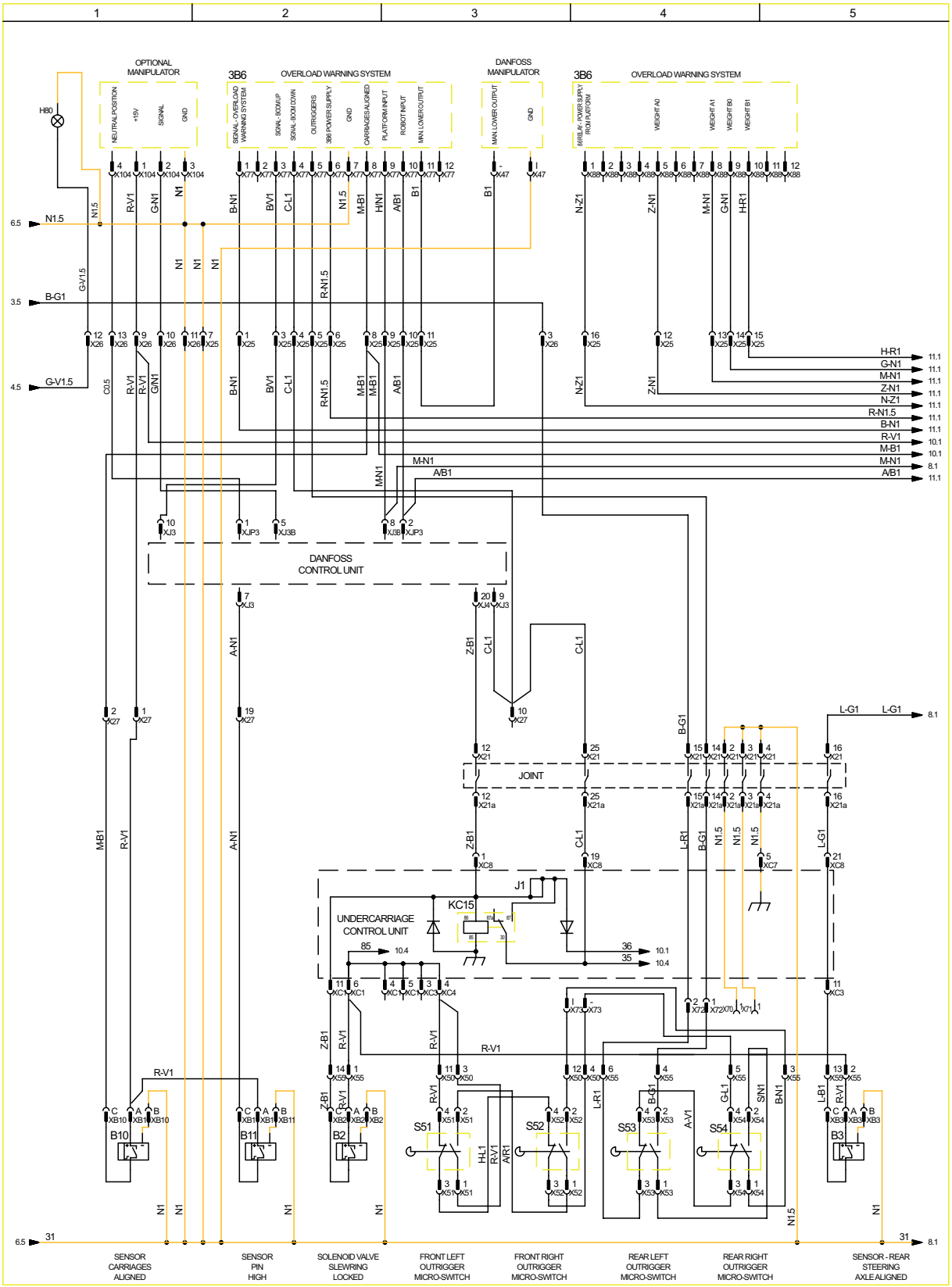
Operation:	Table:
Wiring diagrams 3514-3518 (Girolift 3514: from serial no. 14741 - Girolift 3518: from serial no. 14750) - sheet 5 of 11	C.05.07



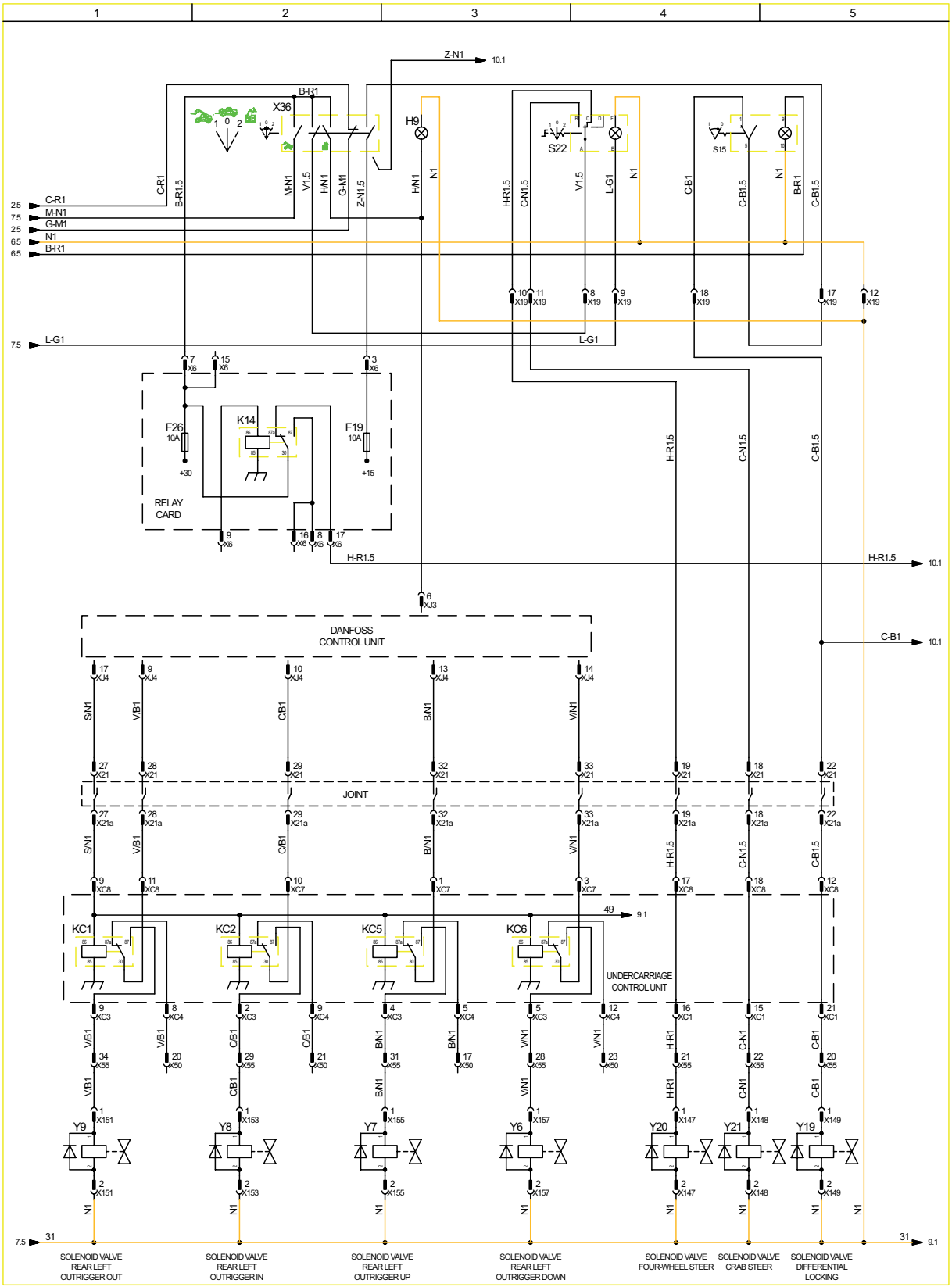
Operation:	Wiring diagrams 3514-3518 (Girolift 3514: from serial no. 14741 - Girolift 3518: from serial no. 14750) - sheet 6 of 11	*Table:* **C.05.07**



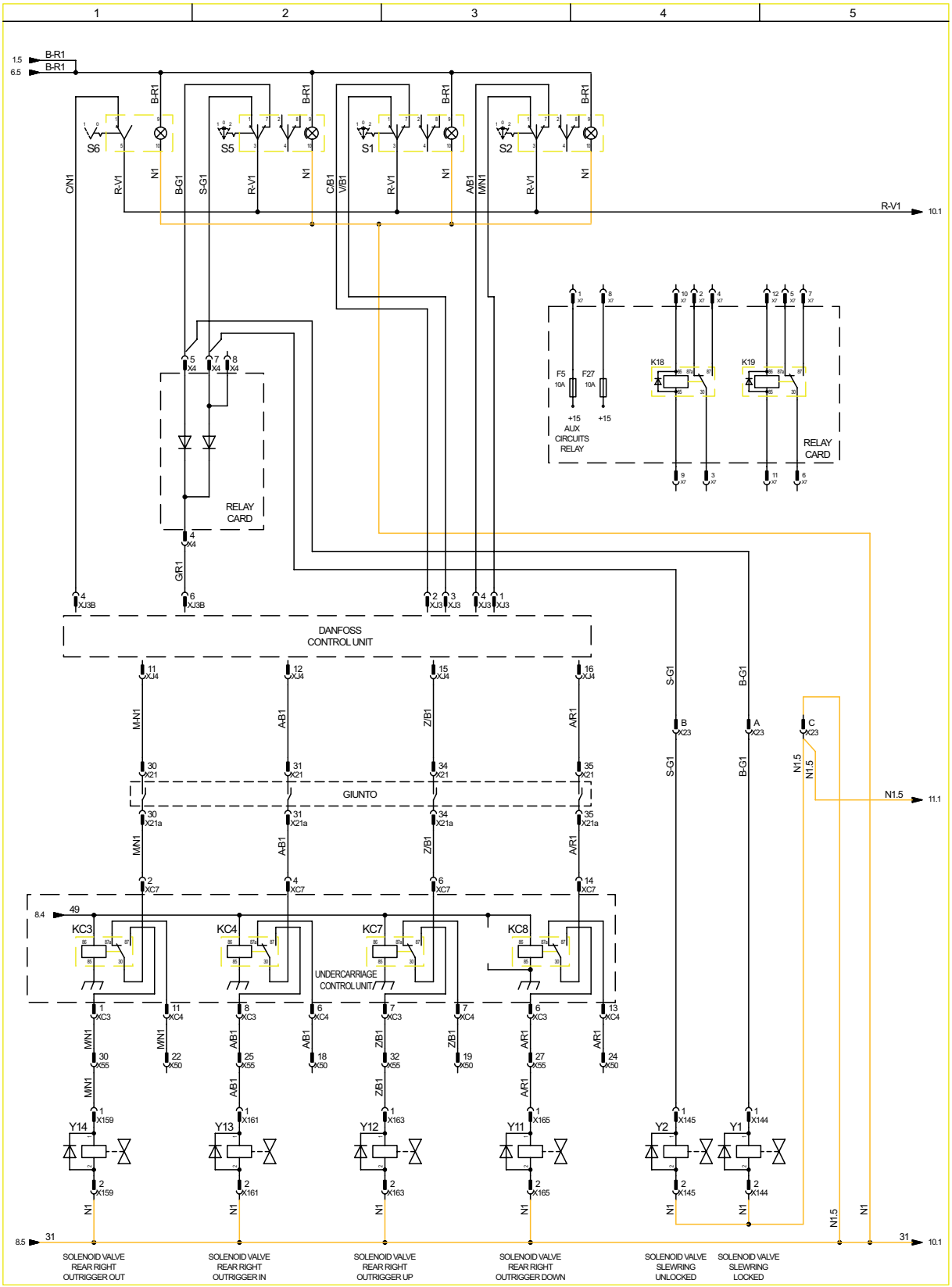
Operation:	Table:
Wiring diagrams 3514-3518 (Girolift 3514: from serial no. 14741 - Girolift 3518: from serial no. 14750) - sheet 7 of 11	**C.05.07**



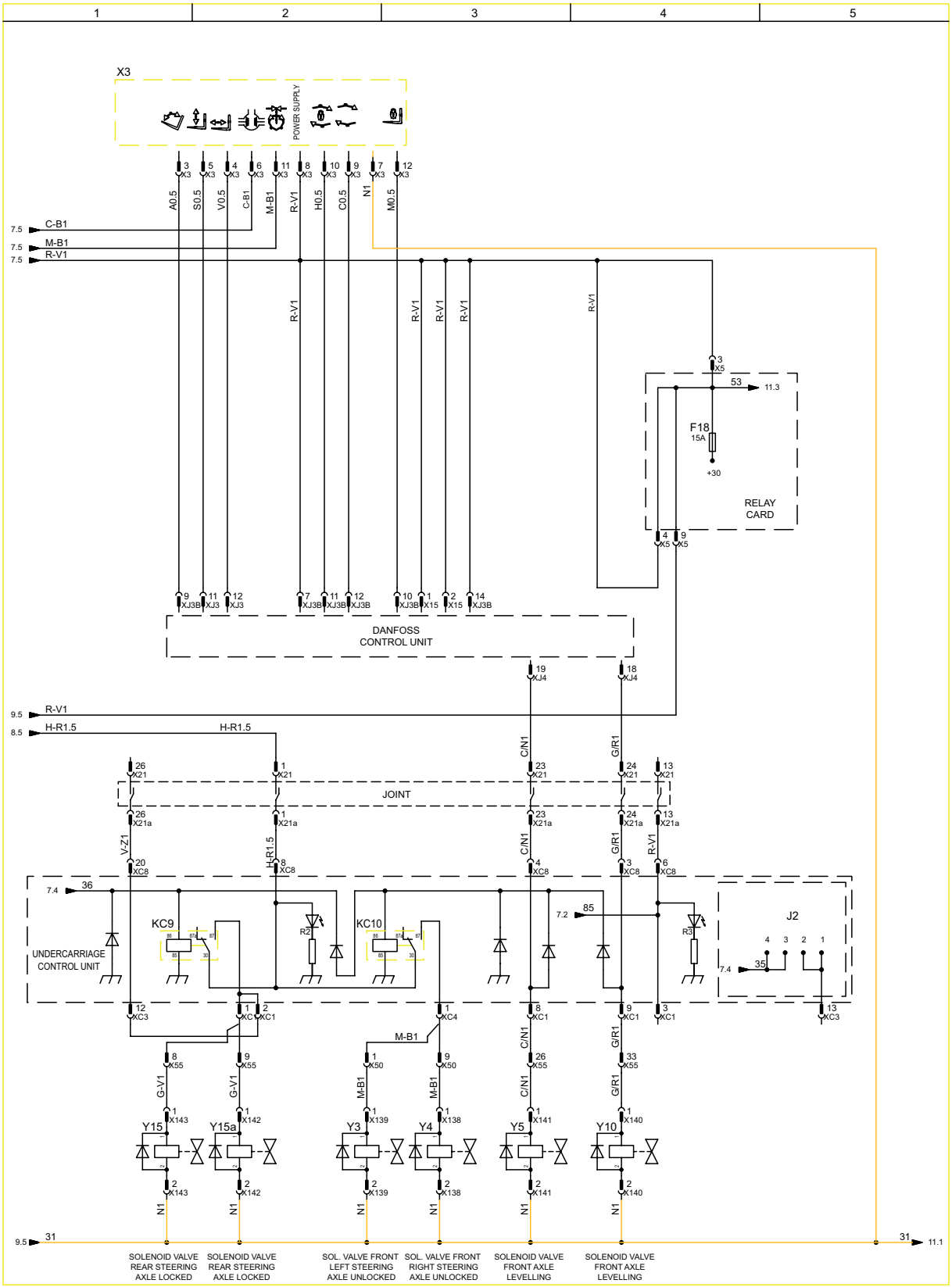
Operation:	Table:
Wiring diagrams 3514-3518 (Girolift 3514: from serial no. 14741 - Girolift 3518: from serial no. 14750) - sheet 8 of 11	**C.05.07**



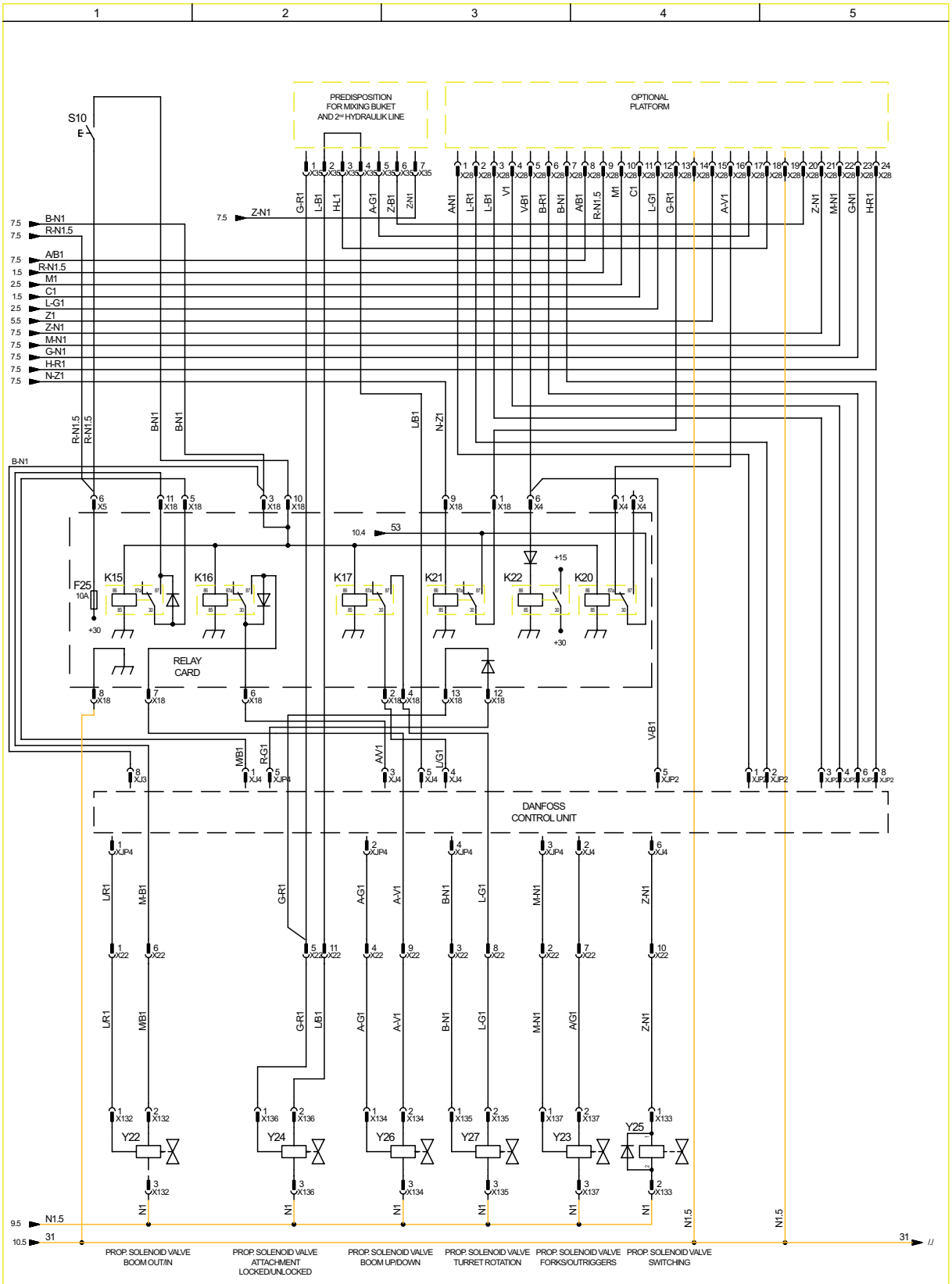
Operation:	Table:
Wiring diagrams 3514-3518 (Girolift 3514: from serial no. 14741 - Girolift 3518: from serial no. 14750) - sheet 9 of 11	**C.05.07**



Operation:	Table:
Wiring diagrams 3514-3518 (Girolift 3514: from serial no. 14741 - Girolift 3518: from serial no. 14750) - sheet 10 of 11	C.05.07



Operation:	Table:
Wiring diagrams 3514-3518 (Girolift 3514: from serial no. 14741 - Girolift 3518: from serial no. 14750) - sheet 11 of 11	**C.05.07**



Operation: Legend: wiring diagram - Girolift 3514-3518	Table: C.05.07

NAME	DESCRIPTION	TABLE
A1	ALTERNATOR	1
B0	BATTERY	1
B1	PRESSURE SWITCH - AIR FILTER CLOGGED	1
B2	SENSOR - SLEWRING BLOCKED	7
B3	SENSOR - REAR STEERING AXLE ALIGNED	7
B4	PRESSURE SWITCH - LOW BRAKE OIL PRESSURE	6
B5	SENSOR - ADVANCE CHANGE	1
B10	SENSOR - CARRIAGES ALIGNED	7
B11	PRESSURE SWITCH - ENGINE OIL FILTER	1
B11	SENSOR - PIN HIGH	7
B12	FUEL GAUGE	4
B12	THERMOSTAT - HIGH ENGINE WATER TEMPERATURE	1
B12a	FUEL RESERVE	4
B13	HYDRAULIC OIL THERMOMETER - HIGH TEMPERATURE	4
B13	THERMOSTAT - HIGH ENGINE WATER TEMPERATURE	1
B14.1	MICRO-SWITCH - HYDRAULIC OIL FILTER	1
F1G	MAIN FUSE 30A	1
F1G	MAIN FUSE 30A	1
F1G	MAIN FUSE 60A	1
F1G	MAIN FUSE 50A	1
F1	FUSE - FRONT WINDSCREEN WIPER/WASHER 10A	5
F2	FUSE - HEATING 15A	6
F3	FUSE - STOP SWITCH 5A	4
F4	FUSE - REAR WINDSCREEN WIPER 7.5A	6
F5	FUSE - OPTIONAL	9
F6	FUSE - LOW BEAM 15A	4
F7	FUSE - RIGHT POSITION LIGHTS SWITCH 3A	4
F8	FUSE - LEFT POSITION LIGHTS SWITCH 3A	4
F9	FUSE - INSTRUMENTS LIGHTING POWER SUPPLY 7,5A	6
F10	FUSE - EMERGENCY SWITCH 7.5A	4
F11	FUSE - BEACON 7,5A	6
F12	FUSE - WORK LIGHTS 10A	4
F13	FUSE - OPTIONAL 10A	5
F14	FUSE - DRIVE SWITCH 10A	3
F15	FUSE - HIGH BEAM 10A	4
F16	FUSE - EMERGENCY LIGHT SWITCH 15A	5
F17	FUSE - LIGHTS AND FLASHING 10A	4
F18	FUSE - OUTRIGGERS LOWERED 10A	10
F19	FUSE - STEERING SELECTOR 10A	8
F20	FUSE - EMERGENCY MUSHROOM-HEAD PUSHBUTTON 10A	2
F21	FUSE - HORN 15A	4
F22	FUSE - PLATFORM ROTATION 15A	1
F23	FUSE - CAB LIGHTS 10A	6
F24	FUSE - OPTIONAL 10A	5
F25	FUSE - 3B6 CONTROL UNIT 10A	11
F26	FUSE - OUTRIGGERS 10A	8
F27	FUSE - OPTIONAL	9
H01	LICENCE PLATE LIGHT	3
H1	LEFT SIDE LIGHT	3
H2	RIGHT SIDE LIGHT	3
H9	LIGHT INDICATOR - BASKET ENABLED	8
H20	HORN	4
H22	FRONT RIGHT LIGHT	4
H23	REAR LEFT LIGHT	4
H24	LICENCE PLATE LIGHT	4
H25	BACK-UP HORN	3
H26	REAR RIGHT LIGHT	4
H27	FOG LAMP	4
H28	BACK-UP LAMP	3
H80	WORK LIGHT	7
K01	RELAY - START-UP	1
K02	RELAY -PRE-HEATING	1
K04	RELAY - AUX CIRCUITS	2
K1	RELAY - HIGH BEAM	4
K2	RELAY - HIGH BEAM	4
K3	RELAY - HORN	4
K4	RELAY - WORK LIGHTS	4
K5	RELAY - 1st and 2nd MECHANICAL SPEED	3
K6	RELAY - POWER DISPLACEMENT CHANGE	3
K7	RELAY - FORWARD SPEED	3
K8	RELAY - REVERSE SPEED	3
K9	RELAY - TRANSMISSION DISCONNECTED	3
K10	RELAY - TRANSMISSION DISCONNECTED	3
K11	RELAY - START-UP ENABLING COMMAND	1
K12	RELAY - AUX CIRCUITS	2
K13	RELAY - EMERGENCY PUMP	2
K14	RELAY - OUTRIGGERS	8
K15	RELAY - BOOM OUT/IN	11
K16	RELAY - BOOM UP/DOWN	11
K17	RELAY - TURRET ROTATION	11
K18	RELAY - OPTIONAL	9
K19	RELAY - OPTIONAL	9
K20	RELAY - PLATFORM OVERLOAD WARNING SYSTEM ON	11

Operation: Legend: wiring diagram - Girolift 3514-3518	Table: C.05.07

K21	RELAY - POWER SUPPLY FROM PLATFORM	11
K22	RELAY - PLATFORM	11
K23	INTERMITTENCE	5
K24	TIMER	3
KC1	RELAY - FRONT/REAR LEFT OUTRIGGER	8
KC2	RELAY - FRONT/REAR LEFT OUTRIGGER IN	8
KC3	RELAY - FRONT/REAR RIGHT OUTRIGGER OUT	9
KC4	RELAY - FRONT/REAR RIGHT OUTRIGGER IN	9
KC5	RELAY - FRONT/REAR LEFT OUTRIGGER UP	8
KC6	RELAY - FRONT/REAR LEFT OUTRIGGER DOWN	8
KC7	RELAY - FRONT/REAR RIGHT OUTRIGGER UP	9
KC8	RELAY - FRONT/REAR RIGHT OUTRIGGER DOWN	9
KC9	RELAY - REAR STEERING AXLE LOCKED	10
KC10	RELAY - FRONT STEERING AXLE UNLOCKING	10
KC15	RELAY - SLEWRING LOCKED	7
L10	FRONT LEFT LIGHT	4
L8	WORK LIGHT	4
M1	STARTING MOTOR	1
M3	ROOF WINDSHIELD WIPER/WASHER	6
M5	HEATING	6
M8	EMERGENCY PUMP	2
M13	UPPER WINDSCREEN WIPER/WASHER MOTOR	5
M74	A/C SYSTEM (OPTIONAL)	6
M91	PUMP MOTOR	5
R0	GLOW PLUGS	1
P1	ENGINE WATER TEMPERATURE GAUGE	1
P2	FUEL LEVEL GAUGE	4
P3	FUEL GAUGE	4
P4	HOUR-METER	1
S0	BATTERY CUTOFF	1
S1	FRONT RIGHT OUTR. LEG/FOOT SWITCH	9
S2	FRONT LEFT OUTR. LEG/FOOT SWITCH	9
S5	SWITCH - PIN SLEWRING LOCKED/UNLOCKED	9
S6	REAR RIGHT OUTRIGGER LIMIT-SWITCH	7
S7	SWITCH - A/C SYSTEM	6
S10	OVERLOAD CUTOUT	11
S11	START-UP PANEL	1
S13	EMERGENCY MUSHROOM-HEAD PUSHBUTTON	2
S14	SWITCH - SPEED CHANGE	3
S15	SWITCH - DIFFERENTIAL LOCKING	8
S16	WARNING SWITCH	5
S17	SWITCH - EMERGENCY PUMP	2
S18	SWITCH - LIGHTS	4
S19	SWITCH - LIGHTS	4
S20	SWITCH - HEATER	6
S21	SWITCH - WORK LIGHTS	4
S22	STEERING SELECTOR	8
S30	STOP LIGHTS MICRO-SWITCH	4
S51	FRONT LEFT OUTRIGGER LIMIT-SWITCH	7
S52	FRONT RIGHT OUTRIGGER LIMIT-SWITCH	7
S53	REAR LEFT OUTRIGGER LIMIT-SWITCH	7
S54	REAR LEFT OUTRIGGER LIMIT-SWITCH	7
S55	MUSHROOM BUTTON	2
SX11	LIGHTS / WIPER SWITCH	5
SX12	SPEED SWICTH	3
X101	BEACON	6
X102	CAB INTERIOR LIGHTS	6
Y01	SOLENOID VALVE - FORWARD SPEED	3
Y02	SOLENOID VALVE - REVERSE SPEED	3
Y1	SOLENOID VALVE - SLEWRING LOCKED	9
Y2	SOLENOID VALVE - SLEWRING UNLOCKED	9
Y3	SOLENOID VALVE - FRONT LEFT STEERING AXLE UNLOCKED	10
Y4	SOLENOID VALVE - FRONT RIGHT STEERING AXLE UNLOCKED	10
Y5	SOLENOID VALVE - FRONT AXLE LEVELLING	10
Y6	SOLENOID VALVE - REAR LEFT OUTRIGGER DOWN	8
Y7	SOLENOID VALVE - REAR LEFT OUTRIGGER UP	8
Y8	SOLENOID VALVE - REAR LEFT OUTRIGGER IN	8
Y9	SOLENOID VALVE - REAR LEFT OUTRIGGER OUT	8
Y10	SOLENOID VALVE - FRONT AXLE LEVELLING	10
Y11	SOLENOID VALVE - REAR RIGHT OUTRIGGER DOWN	9
Y12	SOLENOID VALVE - REAR RIGHT OUTRIGGER UP	9
Y13	SOLENOID VALVE - REAR RIGHT OUTRIGGER IN	9
Y14	SOLENOID VALVE - REAR RIGHT OUTRIGGER OUT	9
Y15	SOLENOID VALVE - REAR STEERING AXLE LOCKED	10
Y15a	SOLENOID VALVE - REAR STEERING AXLE LOCKED	10
Y16	SOLENOID VALVE - 2ND SPEED	3

Operation:	Legend: wiring diagram - Girolift 3514-3518	Table: C.05.07

Y17	SOLENOID VALVE - 1ST SPEED	3
Y18	SOLENOID VALVE - DISPLACEMENT CHANGE	3
Y19	SOLENOID VALVE - DIFFERENTIAL LOCKING	8
Y20	SOLENOID VALVE - FOUR-WHEEL STEER	8
Y21	SOLENOID VALVE - CRAB STEER	8
Y22	SOLENOID VALVE - BOOM OUT/IN	11
Y23	SOLENOID VALVE - FORKS/OUTRIGGERS	11
Y24	SOLENOID VALVE - ATTACHMENT LOCKED/UNLOCKED	11
Y25	SOLENOID VALVE - SWITCHING	11
Y26	SOLENOID VALVE - BOOM UP/DOWN	11
Y27	SOLENOID VALVE - TURRET ROTATION	11
X1	8-WAY CONNECTOR - LIGHT INDICATORS	1
X2	12-WAY CONNECTOR - LIGHT INDICATORS	6
X3	12-WAY CONNECTOR - LIGHT INDICATORS	
X4	9-WAY CONNECTOR	
X5	11-WAY CONNECTOR	
X6	17-WAY CONNECTOR	
X7	13-WAY CONNECTOR	
X8	5-WAY CONNECTOR	
X9	13-WAY CONNECTOR	
X10	6-WAY CONNECTOR	
X11	13-WAY CONNECTOR	
X12	5-WAY CONNECTOR	
X13	6-WAY CONNECTOR	
X15	2-WAY CONNECTOR	
X16	13-WAY CONNECTOR	
X17	17-WAY CONNECTOR	
X18	13-WAY CONNECTOR	
X19	21-WAY CONNECTOR	
X20	17-WAY CONNECTOR	
X21	40-WAY DEUTSCH CONNECTOR - TYPE B	
X21a	40-WAY DEUTSCH CONNECTOR - TYPE B	
X22	12-WAY CONNECTOR	
X23	3-WAY DEUTSCH CONNECTOR	
X25	17-WAY CONNECTOR	
X26	11-WAY CONNECTOR	
X27	24-WAY DEUTSCH CONNECTOR	
X28	24-WAY DEUTSCH CONNECTOR	
X29	24-WAY DEUTSCH CONNECTOR	10
X30	2-WAY CONNECTOR	
X34	2-WAY 90° CONNECTOR	
X35	7-WAY CONNECTOR	
X47	2-WAY CONNECTOR	
X50	24-WAY DEUTSCH CONNECTOR	
X51	4-WAY CONNECTOR	
X52	4-WAY CONNECTOR	
X53	4-WAY CONNECTOR	
X54	4-WAY CONNECTOR	
X55	40-WAY DEUTSCH CONNECTOR - TYPE B	
X61	5-WAY CONNECTOR	
X63	1-WAY CONNECTOR	
X64	2-WAY CONNECTOR - ENGINE STOP	1
X67	2-WAY CONNECTOR - FUEL PUMP	1
X70	1-WAY CONNECTOR	
X71	1-WAY CONNECTOR	
X72	2-WAY CONNECTOR	
X73	2-WAY 90° CONNECTOR	
X77	12-WAY CONNECTOR	
X88	12-WAY CONNECTOR	
X91	2-WAY 90° CONNECTOR	
X104	3-WAY CONNECTOR	
X105	4-WAY CONNECTOR	
X122	2-WAY CONNECTOR	
X123	2-WAY CONNECTOR	
X127	2-WAY CONNECTOR	
X128	2-WAY CONNECTOR	
X129	2-WAY CONNECTOR	
X132	3-WAY CONNECTOR	
X133	2-WAY CONNECTOR	
X134	3-WAY CONNECTOR	
X135	3-WAY CONNECTOR	
X136	3-WAY CONNECTOR	
X137	3-WAY CONNECTOR	
X138	2-WAY CONNECTOR	
X139	2-WAY CONNECTOR	
X140	2-WAY CONNECTOR	
X141	2-WAY CONNECTOR	
X142	2-WAY CONNECTOR	
X143	2-WAY CONNECTOR	
X144	2-WAY CONNECTOR	
X145	2-WAY CONNECTOR	
X146	2-WAY CONNECTOR	
X147	2-WAY CONNECTOR	
X148	2-WAY CONNECTOR	
X149	2-WAY CONNECTOR	
X150	2-WAY CONNECTOR	
X151	2-WAY CONNECTOR	
X152	2-WAY CONNECTOR	
X153	2-WAY CONNECTOR	
X154	2-WAY CONNECTOR	
X155	2-WAY CONNECTOR	

Operation: Legend: wiring diagram - Girolift 3514-3518	Table: C.05.07

X156	2-WAY CONNECTOR
X157	2-WAY CONNECTOR
X158	2-WAY CONNECTOR
X159	2-WAY CONNECTOR
X160	2-WAY CONNECTOR
X161	2-WAY CONNECTOR
X162	2-WAY CONNECTOR
X163	2-WAY CONNECTOR
X164	2-WAY CONNECTOR
X165	2-WAY CONNECTOR
XB2	3-WAY DEUTSCH CONNECTOR
XB3	3-WAY DEUTSCH CONNECTOR
XB10	3-WAY DEUTSCH CONNECTOR
XB11	3-WAY DEUTSCH CONNECTOR
XC1	21-WAY CONNECTOR
XC3	13-WAY CONNECTOR
XC4	13-WAY CONNECTOR
XC6	9-WAY CONNECTOR
XC7	17-WAY CONNECTOR
XC8	21-WAY CONNECTOR
XH22	6-WAY CONNECTOR
XH23	4-WAY CONNECTOR
XH24	2-WAY CONNECTOR
XH25	2-WAY CONNECTOR
XH26	4-WAY CONNECTOR
XJ3	12-WAY CONNECTOR
XJ4	20-WAY CONNECTOR
XJ30	18-WAY CONNECTORE
XJP2	8-WAY CONNECTOR
XJP3	8-WAY CONNECTOR
XJP4	8-WAY CONNECTOR
XM3	2-WAY CONNECTOR
XP1	14-WAY CONNECTOR
XP2	6-WAY CONNECTOR
XP3	6-WAY CONNECTOR

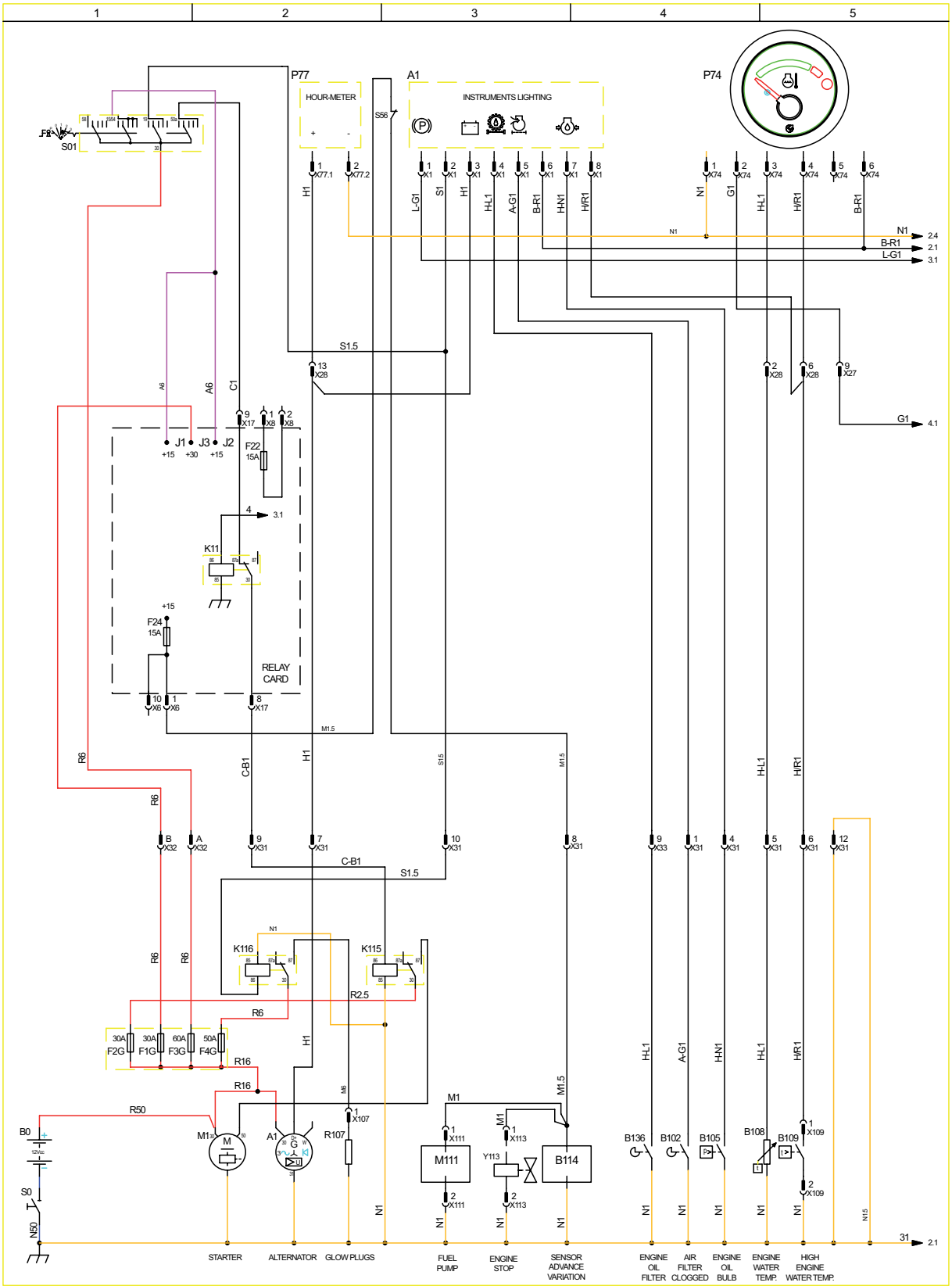
WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

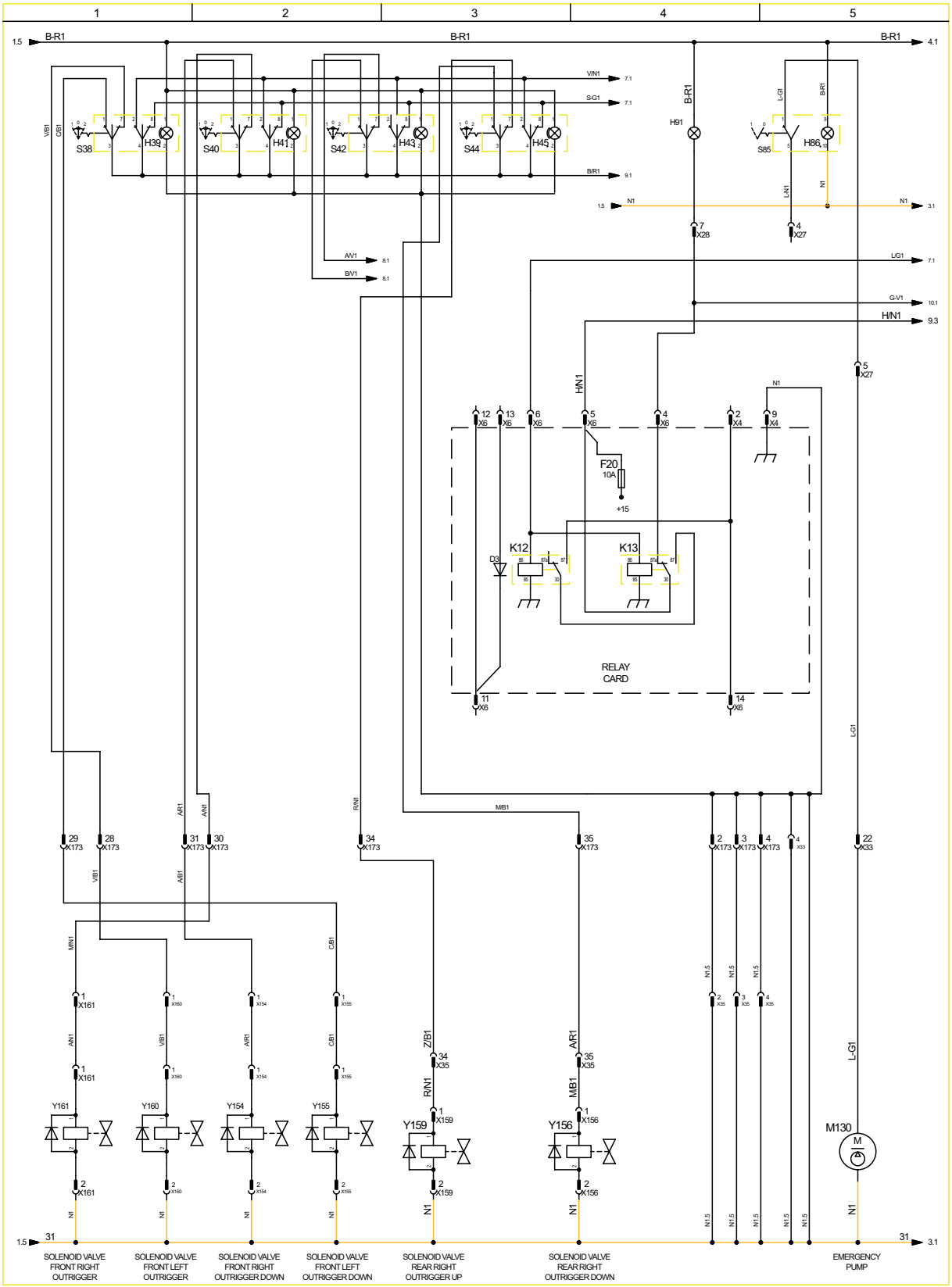
REMARK:Two-colour wires are indicated through a combination of the aforesaid initials as follows:

G/V = YELLOW/GREEN (crosswise colouring)
G-V = YELLOW-GREEN (lengthswise colouring)

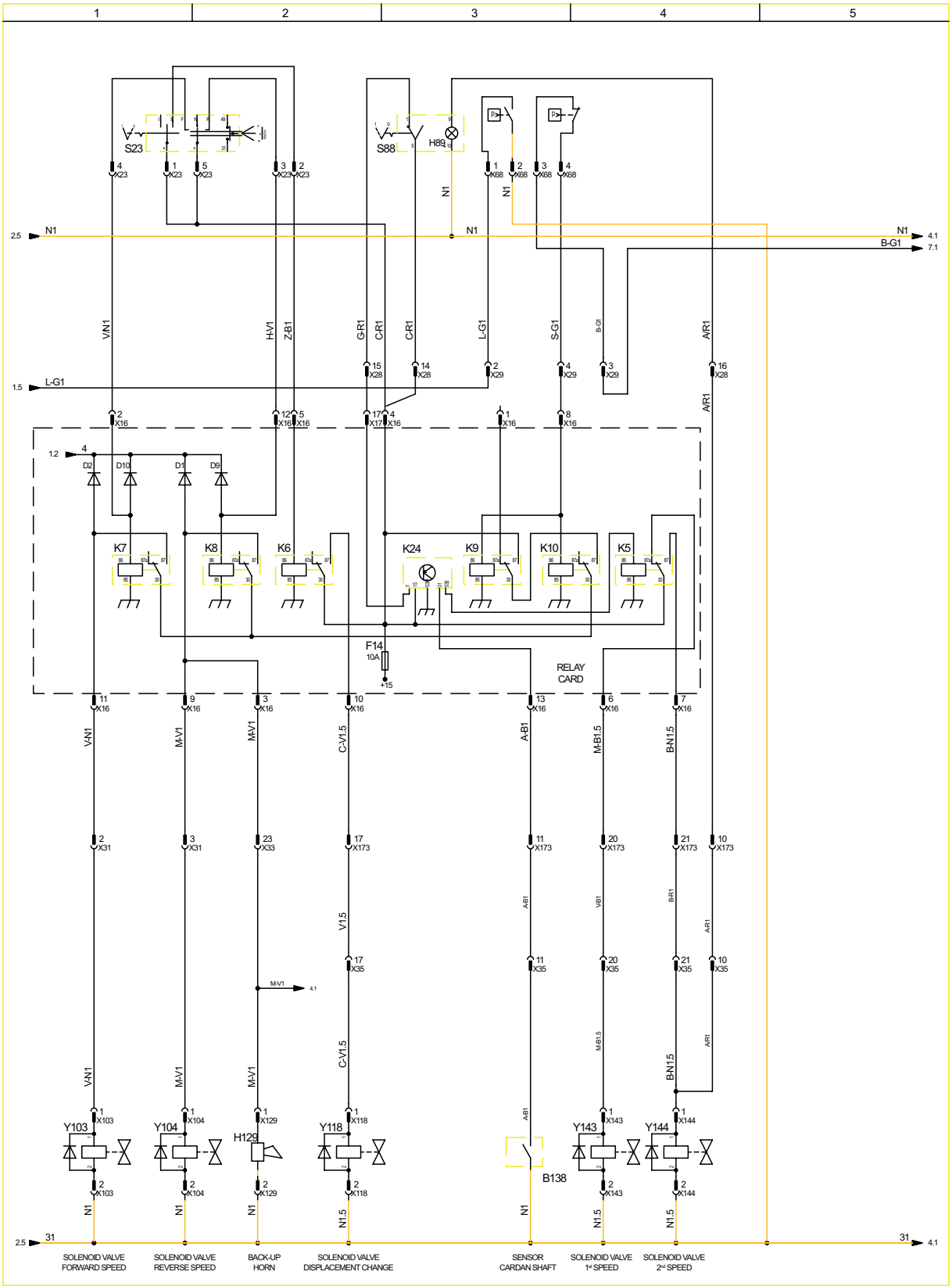
Operation: Wiring diagrams Girolift 3714 SX - sheet 1 of 11	Table: C.05.08



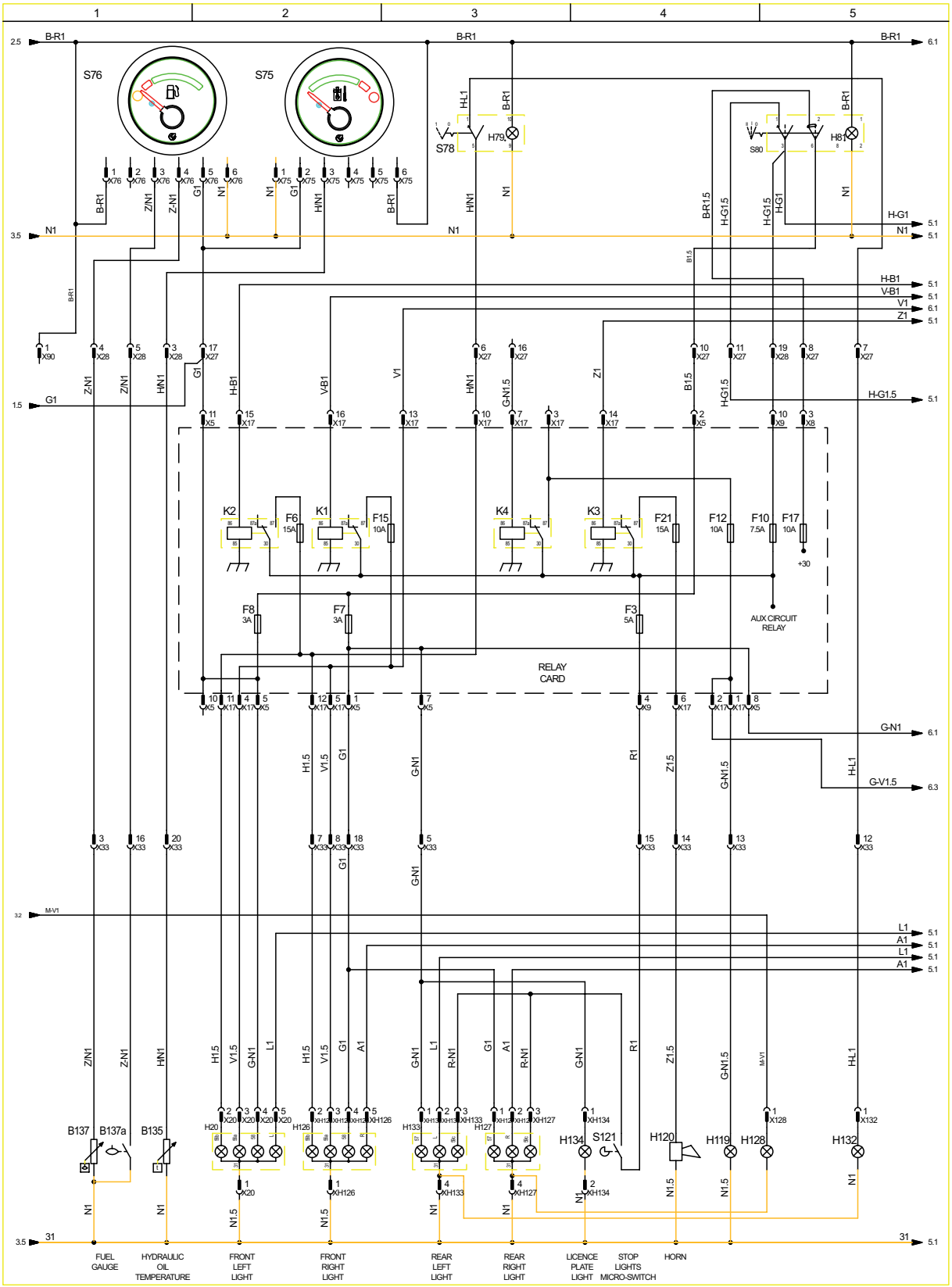
Operation: Wiring diagrams Girolift 3714 SX - sheet 2 of 11	*Table:* **C.05.08**



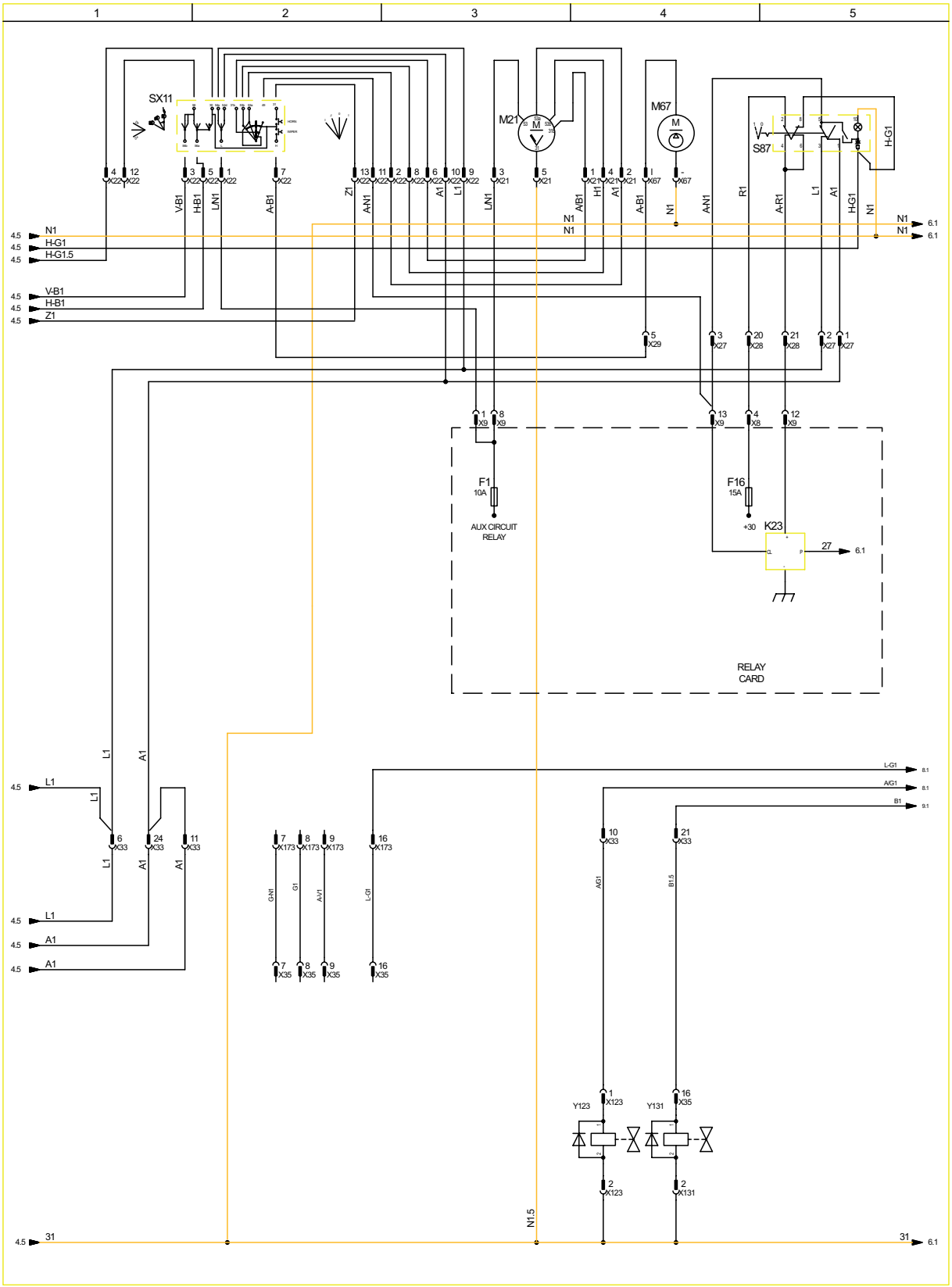
Operation: Wiring diagrams Girolift 3714 SX - sheet 3 of 11	Table: C.05.08



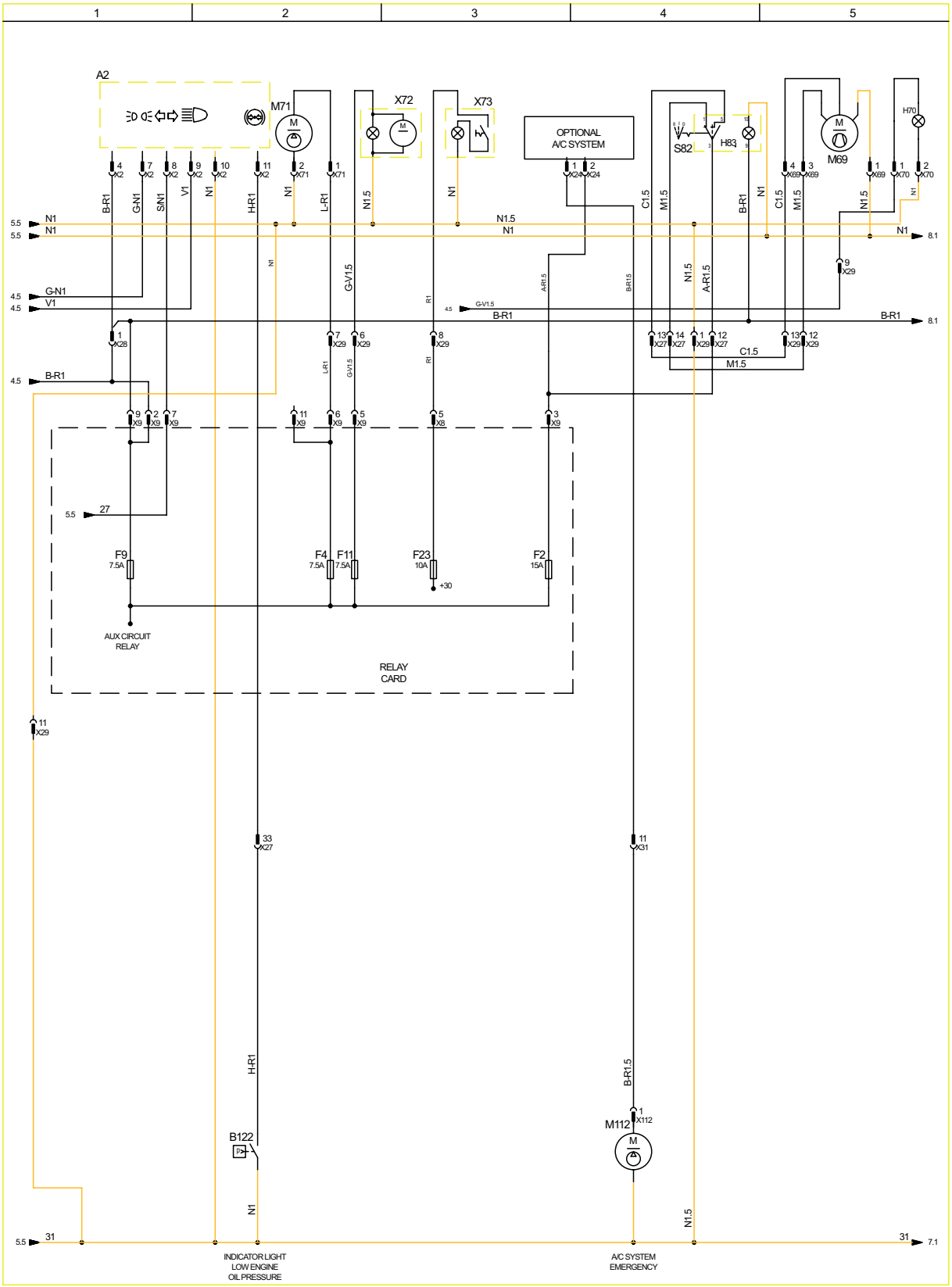
Operation: Wiring diagrams Girolift 3714 SX - sheet 4 of 11	*Table:* **C.05.08**



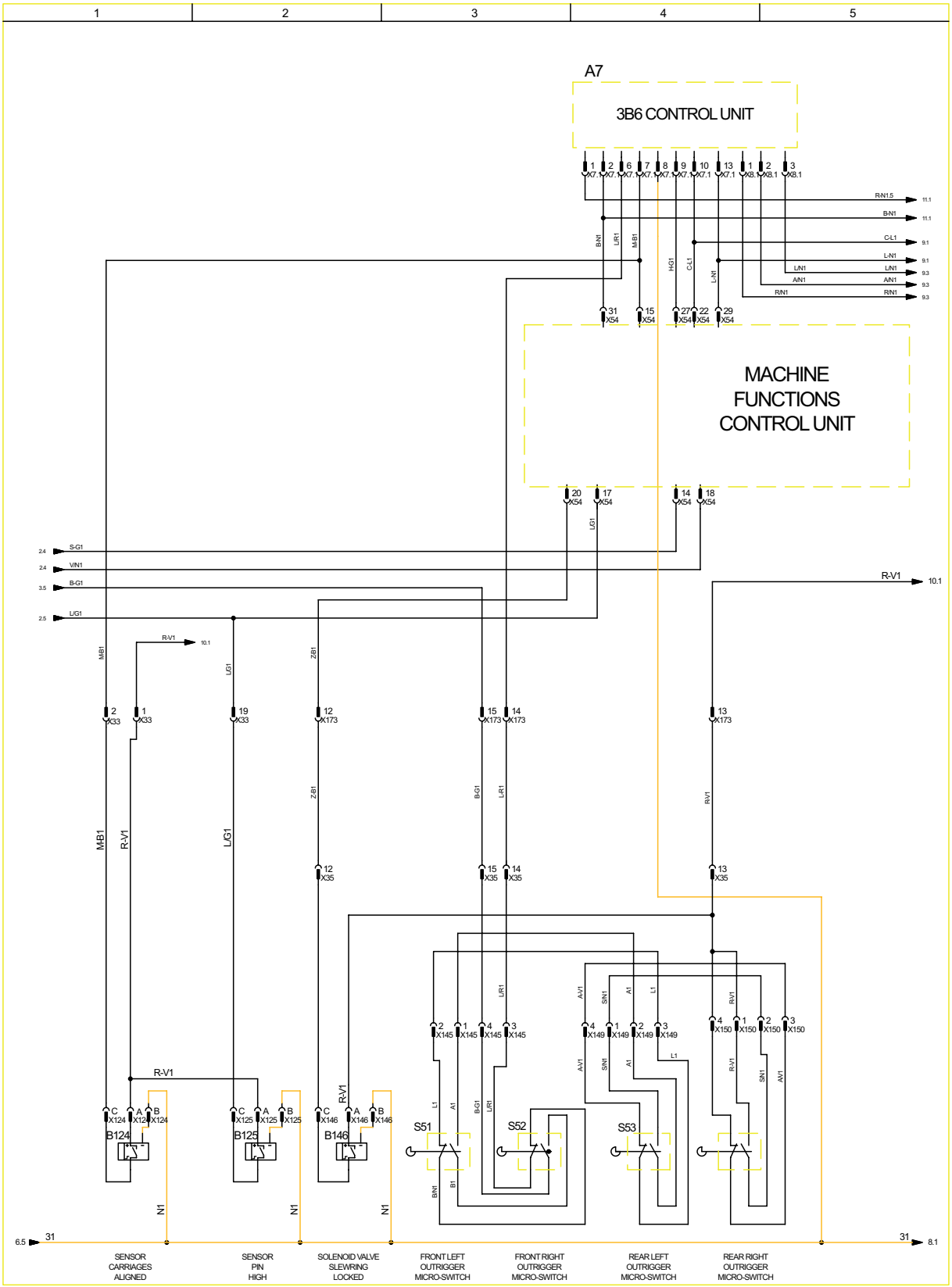
Operation: Wiring diagrams Girolift 3714 SX - sheet 5 of 11	Table: C.05.08



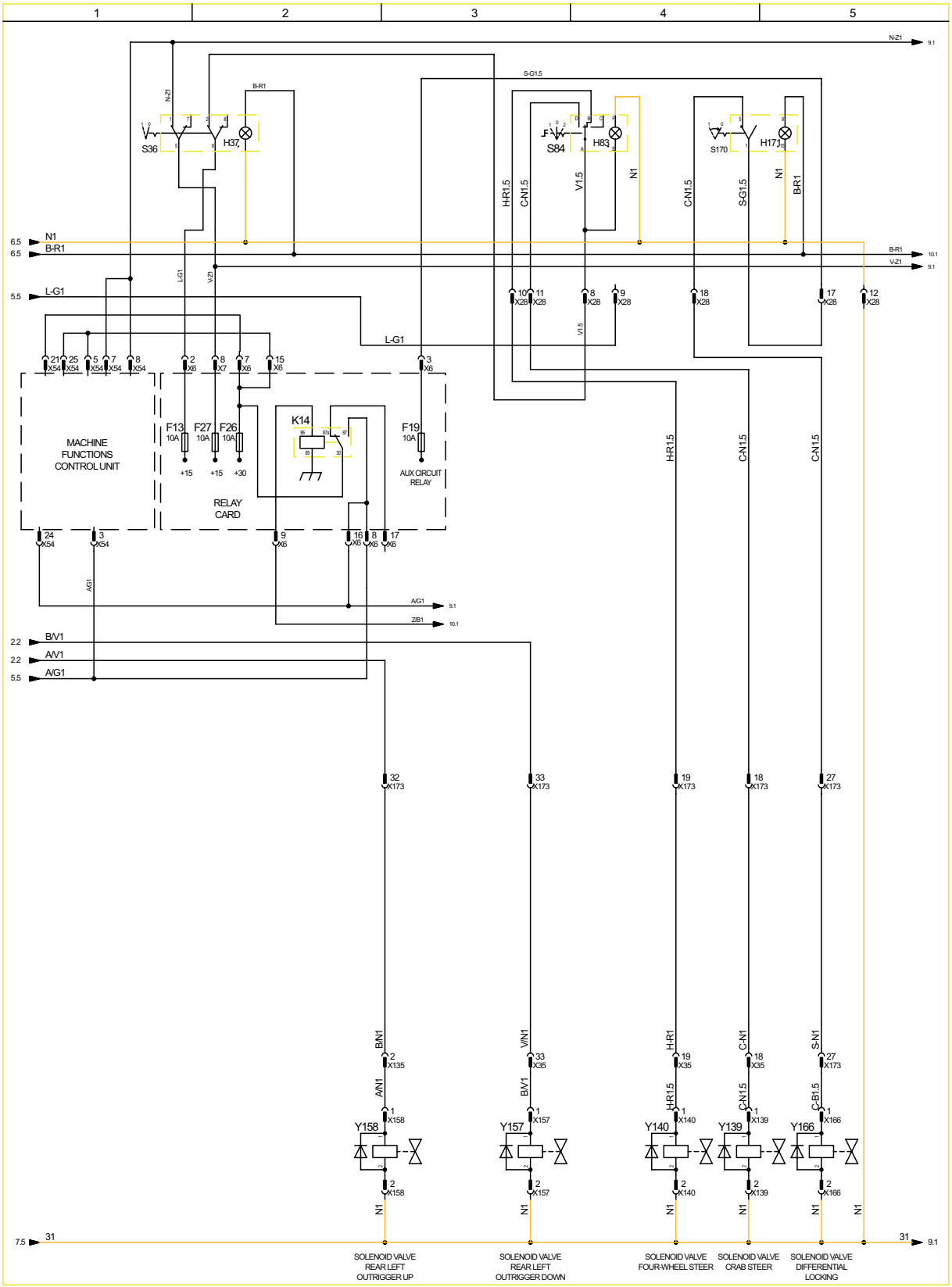
Operation: Wiring diagrams Girolift 3714 SX - sheet 6 of 11	Table: C.05.08



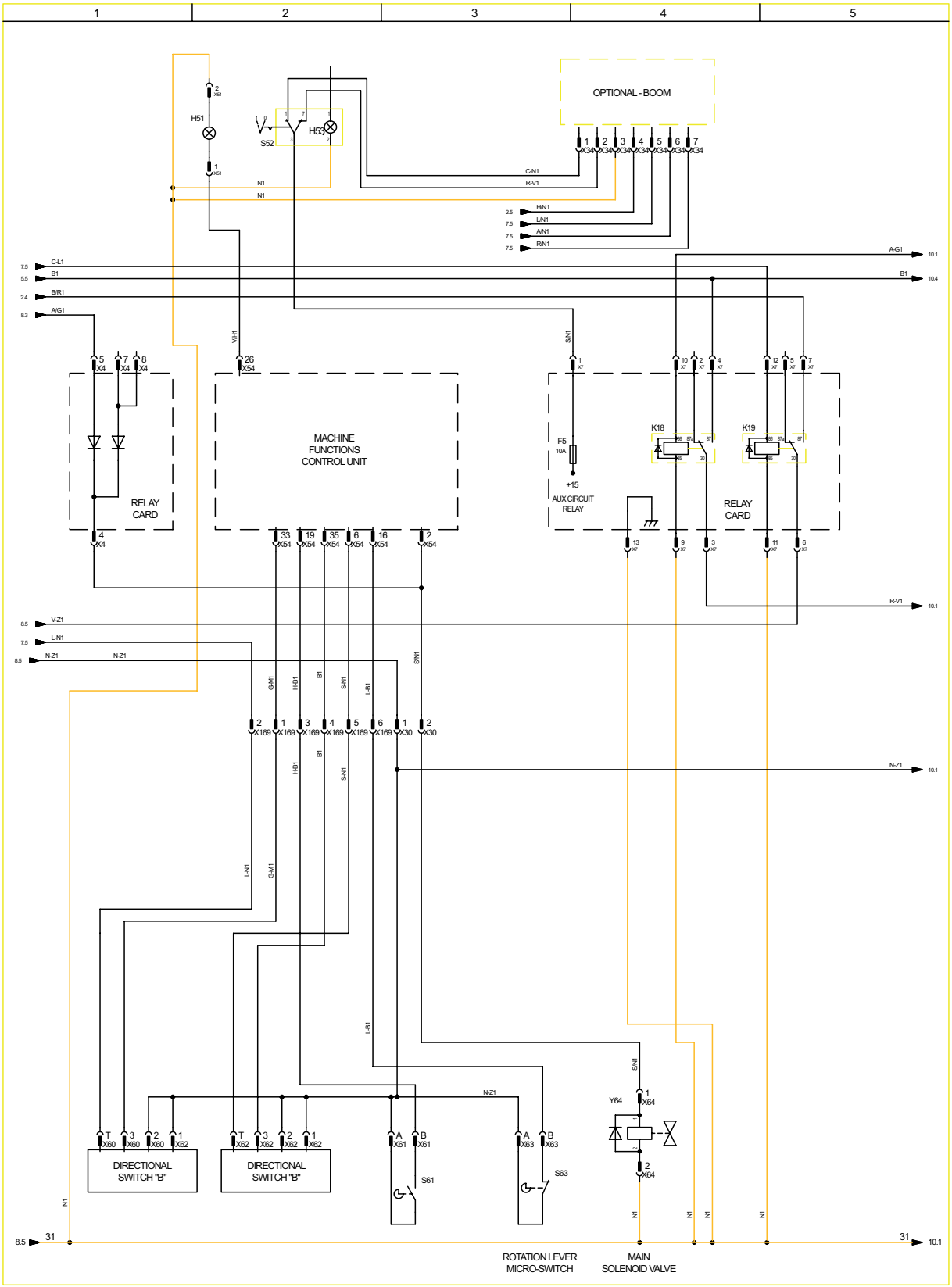
Operation:	Wiring diagrams Girolift 3714 SX - sheet 7 of 11	Table: C.05.08



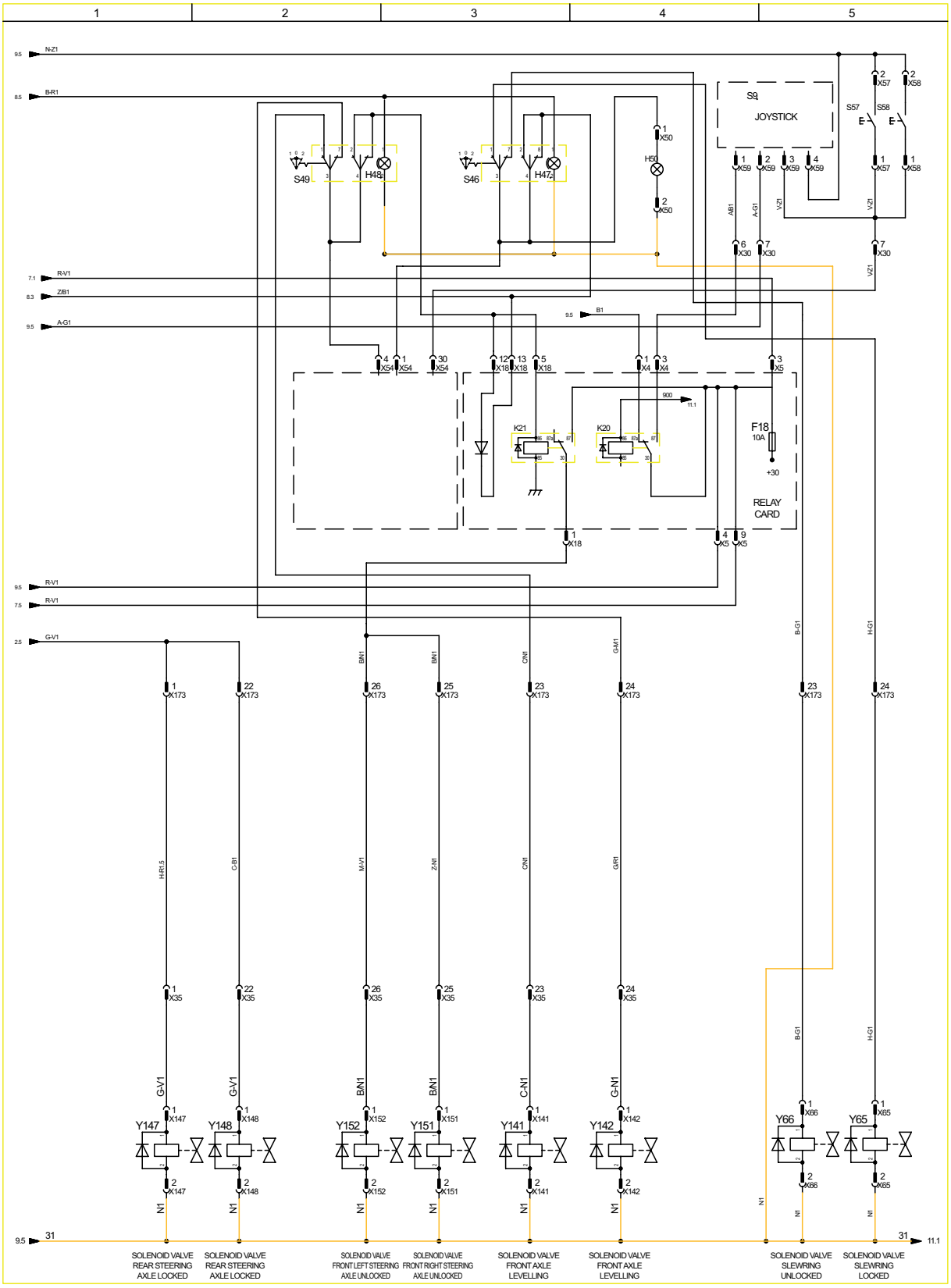
Operation: Wiring diagrams Girolift 3714 SX - sheet 8 of 11	Table: C.05.08



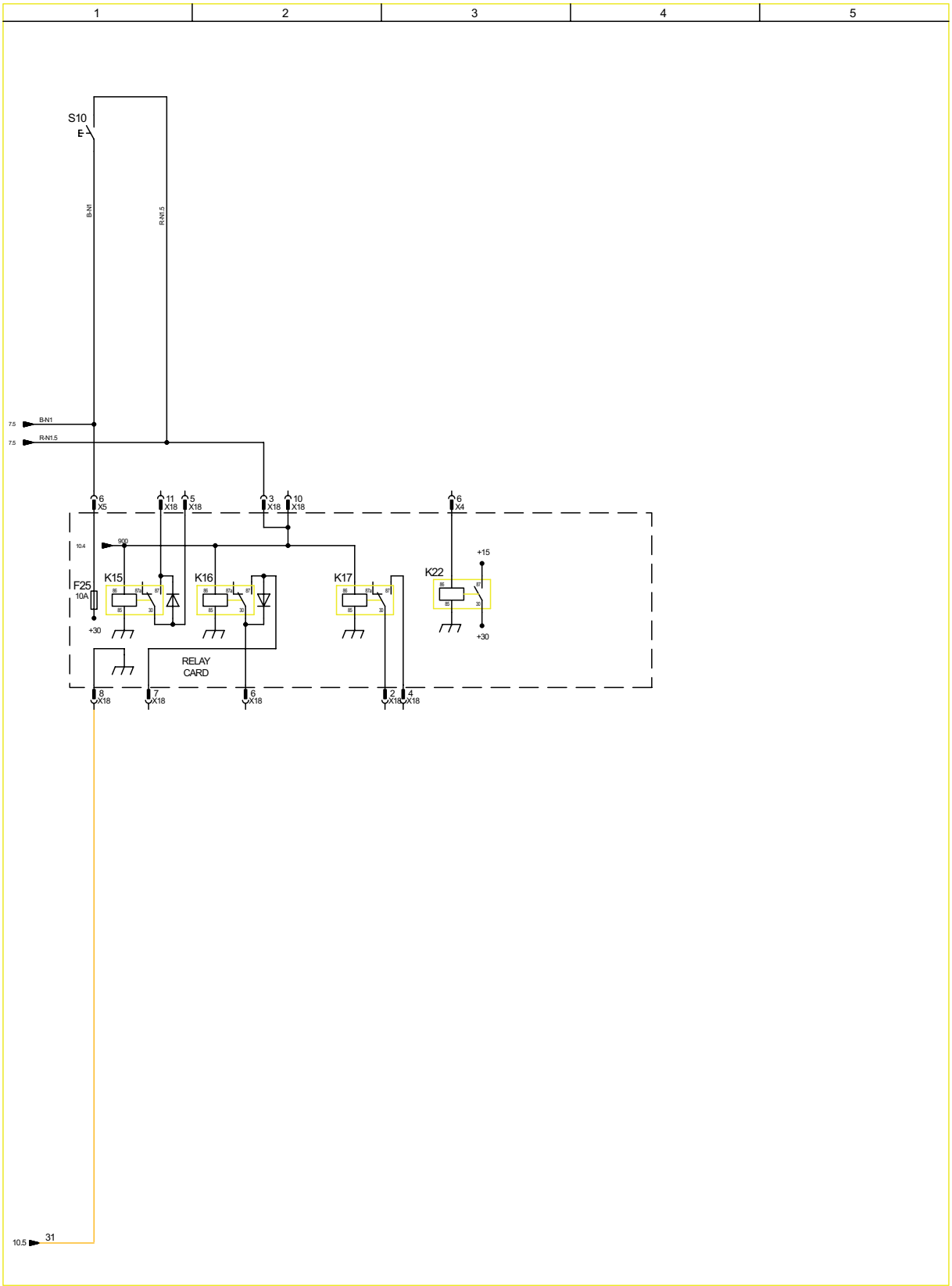
Operation: Wiring diagrams Girolift 3714 SX - sheet 9 of 11	Table: C.05.08



Operation: Wiring diagrams Girolift 3714 SX - sheet 10 of 11	*Table:* **C.05.08**



Operation: Wiring diagrams Girolift 3714 SX - sheet 11 of 11	Table: C.05.08



Operation: Legend: wiring diagram - Girolift 3714 SX	Table: C.05.08

NAME	DESCRIPTION	SHEET
A1	INDICATOR LIGHTS PANEL	1
A1	ALTERNATOR	1
A2	INDICATOR LIGHTS PANEL	6
A7	3B6 CONTROL UNIT	7
B0	BATTERY	1
B102	MICRO-SWITCH - AIR FILTER CLOGGED	1
B105	PRESSURE SWITCH - ENGINE OIL FILTER	1
B108	THERMOMETER - HIGH ENGINE WATER TEMPERATURE	1
B109	THERMOSTAT - HIGH ENGINE WATER TEMPERATURE	1
B122	PRESSURE SWITCH - LOW ENGINE OIL PRESSURE	6
B124	SENSOR - CARRIAGES ALIGNED	7
B125	SENSOR - PIN HIGH	7
B135	HYDRAULIC OIL THERMOMETER - HIGH TEMPERATURE	4
B136	MICRO-SWITCH - ENGINE OIL FILTER CLOGGED	1
B137	FUEL GAUGE	4
B137a	FUEL RESERVE	4
B146	SENSOR - SLEWRING BLOCKED	7
F1G	MAIN FUSE 30A	1
F2G	MAIN FUSE 30A	1
F3G	MAIN FUSE 60A	1
F4G	MAIN FUSE 50A	1
F1	FUSE - FRONT WIPER 10A	5
F2	FUSE - A/C SYSTEM 15A	6
F3	FUSE - STOP LIGHTS 5A	4
F4	FUSE - REAR WINDSCREEN WIPER 7.5A	6
F5	FUSE - OPT.	9
F6	FUSE - LOW BEAM 15A	4
F7	FUSE - LEFT POSITION LIGHTS SWITCH 3A	4
F8	FUSE - RIGHT POSITION LIGHTS SWITCH 3A	4
F9	FUSE - SWITCHES LIGHTS POWER SUPPLY 7.5A	6
F10	FUSE - EMERGENCY SWITCH 7.5A	4
F11	FUSE - BEACON 7.5A	6
F12	FUSE - WORK LIGHTS 10A	4
F13	FUSE - HIGH BOOM KIT 10A	3
F14	FUSE - RELAY POWER SUPPLY 10A	3
F15	FUSE - HIGH BEAM 10A	4
F16	FUSE - EMERGENCY LIGHT SWITCH 15A	5
F17	FUSE - TAIL LIGHTS AND FLASHING 10A	4
F18	FUSE - SENSORS 10A	10
F19	FUSE - OPT. 10A	8
F20	FUSE - POWER SUPPLY: K13 RELAY 10A	2
F21	FUSE - HORN 15A	4
F22	FUSE - OPT. 15A	1
F23	FUSE - CAB LIGHTS 10A	6
F24	FUSE - OPT. 15A	1
F25	FUSE - 3B6 CONTROL UNIT 10A	11
F26	FUSE - OUTRIGGERS 10A	8
F27	FUSE - HYDRAULIC ACTIVATION SWITCH	8
F27	FUSE - OPT. 10A	8
H20	FRONT LEFT LIGHT	4
H37	SWITCH INDICATOR LIGHT	8
H39	SWITCH INDICATOR LIGHT	2
H41	SWITCH INDICATOR LIGHT	2
H43	SWITCH INDICATOR LIGHT	2
H45	SWITCH INDICATOR LIGHT	2
H47	SWITCH INDICATOR LIGHT	10
H48	SWITCH INDICATOR LIGHT	10
H50	LIGHT INDICATOR - CARRIAGES ALIGNED	10
H51	INDIC. LIGHT -SLEWRING BLOCKED	9
H53	SWITCH INDICATOR LIGHT	9
H70	WORK LIGHT	6
H79	SWITCH INDICATOR LIGHT	4
H81	SWITCH INDICATOR LIGHT	4
H83	SWITCH INDICATOR LIGHT	8
H83	SWITCH INDICATOR LIGHT	6
H86	SWITCH INDICATOR LIGHT	2
H89	SWITCH INDICATOR LIGHT	3
H91	LIGHT INDICATOR - REAR STEERING AXLE LOCKED	2
H119	WORK LIGHT	4
H120	HORN	4
H124	LICENCE PLATE LIGHT	4
H126	FRONT RIGHT LIGHT	4
H127	REAR RIGHT LIGHT	4
H128	FOG LAMP	4
H129	BACK-UP HORN	3
H132	FOG LAMP	4
H133	REAR LEFT LIGHT	4
H171	SWITCH INDICATOR LIGHT	8
K1	RELAY - MECHANICAL SPEED	4
K2	RELAY - HIGH BEAM	4
K3	RELAY - HORN	4
K4	RELAY - WORK LIGHTS	4
K5	RELAY - 1st and 2nd MECHANICAL SPEED	3
K6	RELAY - 2ND HYDRAULIC SPEED	3
K7	RELAY - FORWARD SPEED	3
K8	RELAY - REVERSE SPEED	3

Operation: Legend: wiring diagram - Girolift 3714 SX	Table: C.05.08

K9	RELAY - TRANSMISSION DISCONNECTED	3
K10	RELAY - TRANSMISSION DISCONNECTED	3
K11	RELAY - START-UP ENABLING COMMAND	1
K12	RELAY - NOT USED	2
K13	RELAY - SLEWRING BLOCKED	2
K14	RELAY - EXCHANGE VALVE	8
K15	RELAY - NOT USED	11
K16	RELAY - NOT USED	11
K17	RELAY - NOT USED	11
K18	RELAY - EXCHANGE VALVE CONTROL	9
K19	RELAY - OUTRIGGERS	9
K20	RELAY - OVERLOAD WARNING SYSTEM	10
K21	RELAY - STEERING AXLE UNLOCKING	10
K22	RELAY - NOT USED	11
K23	INTERMITTENCE	5
K24	RELAY	3
K115	RELAY - START-UP	1
K116	RELAY - PREHEATING	1
M1	STARTING MOTOR	1
M21	FRONT WIPER	5
M67	PUMP MOTOR	5
M69	HEATING	6
M71	ROOF WINDSHIELD WIPER/WASHER	6
M112	A/C SYSTEM	6
M130	EMERGENCY PUMP	2
R107	GLOW PLUGS	1
S0	BATTERY CUTOFF	1
S01	START-UP PANEL	1
S10	OVERLOAD CUTOUT	11
S22	LIGHTS SWITCH	5
S23	DRIVE SWITCH	3
S36	SWITCH - HYDRAULIC ACTIVATION	8
S38	SWITCH - LH FRONT OUTRIGGER	2
S40	SWITCH - RH OUTRIGGER	2
S42	SWITCH - LH REAR OUTRIGGER	2
S44	SWITCH - RH REAR OUTRIGGER	2
S46	SWITCH - PIN LOCKING/UNLOCKING	10
S49	SWITCH - SWAY FUNCTION	10
S52	SWITCH - WINCH AND JIB	9
S56	EMERGENCY MUSHROOM-HEAD PUSHBUTTON	1
S57	DEADMAN BUTTON	10
S58	DEADMAN BUTTON	10
S59	JOYSTICK	10
S78	FOG LAMP SWITCH	4
S80	POSITION LIGHTS SWITCH	4
S82	SWITCH - HEATER	6
S84	STEERING SELECTOR	8
S85	SWITCH - EMERGENCY PUMP	2
S87	WARNING SWITCH	5
S88	SWITCH - SPEED CHANGE	3
S121	STOP LIGHTS MICRO-SWITCH	4
S170	SWITCH - DIFFERENTIAL LOCKING	8
Y64	MAIN SOLENOID VALVE	9
Y65	SOLENOID VALVE - SLEWRING LOCKED	10
Y66	SOLENOID VALVE - SLEWRING UNLOCKED	10
Y103	SOLENOID VALVE - FORWARD SPEED	3
Y104	SOLENOID VALVE - REVERSE SPEED	3
Y113	SOLENOID VALVE - ENGINE STOP	1
Y118	SOLENOID VALVE - DISPLACEMENT CHANGE	3
Y123	SOLENOID VALVE - EXCHANGE VALVE 1	5
Y131	SOLENOID VALVE - EXCHANGE VALVE 2	5
Y139	SOLENOID VALVE - CRAB STEER	8
Y140	SOLENOID VALVE - FOUR-WHEEL STEER	8
Y141	SOLENOID VALVE - FRONT AXLE LEVELLING	10
Y142	SOLENOID VALVE - FRONT AXLE LEVELLING	10
Y143	SOLENOID VALVE - 1st SPEED	3
Y144	SOLENOID VALVE - 2nd SPEED	3
Y147	SOLENOID VALVE - REAR STEERING AXLE LOCKED	10
Y148	SOLENOID VALVE - REAR STEERING AXLE LOCKED	10
Y151	SOLENOID VALVE - FRONT LEFT STEERING AXLE UNLOCKED	10
Y152	SOLENOID VALVE - FRONT LEFT STEERING AXLE UNLOCKED	10
Y154	SOLENOID VALVE - FRONT RIGHT OUTRIGGER DOWN	2
Y155	SOLENOID VALVE - FRONT LEFT OUTRIGGER DOWN	2
Y156	SOLENOID VALVE - REAR RIGHT OUTRIGGER DOWN	2
Y157	SOLENOID VALVE - REAR LEFT OUTRIGGER DOWN	8
Y158	SOLENOID VALVE - REAR LEFT OUTRIGGER UP	8
Y159	SOLENOID VALVE - REAR RIGHT OUTRIGGER UP	2
Y160	SOLENOID VALVE - FRONT LEFT OUTRIGGER UP	2
Y161	SOLENOID VALVE - FRONT RIGHT OUTRIGGER UP	2

Operation: Legend: wiring diagram - Girolift 3714 SX	Table: C.05.08

Y166	SOLENOID VALVE - DIFFERENTIAL LOCKING	8
X1	8-WAY MARK CONNECTOR	
X2	12-WAY MATE'N'LOCK CONNECTOR	
X4	9-WAY MARK CONNECTOR	
X5	11-WAY MARK CONNECTOR	
X6	17-WAY MARK CONNECTOR	
X7	13-WAY MARK CONNECTOR	
X7.1	13-WAY CONNECTOR	
X8	5-WAY CONNECTOR	
X8.1	3-WAY CONNECTOR	
X9	13-WAY MARK CONNECTOR	
X16	13-WAY MARK CONNECTOR	
X17	17-WAY MARK CONNECTOR	
X18	13-WAY MARK CONNECTOR	
X20	6-WAY CONNECTOR	
X21	6-WAY CONNECTOR	
X22	13-WAY MARK CONNECTOR	
X23	5-WAY MARK CONNECTOR	
X24	2-WAY CONNECTOR	
X27	17-WAY MARK CONNECTOR	
X28	21-WAY MARK CONNECTOR	
X29	13-WAY MARK CONNECTOR	
X30	17-WAY MARK CONNECTOR	
X31	12-WAY MARK CONNECTOR	
X32	2-WAY CONNECTOR	
X33	24-WAY DEUTSCH CONNECTOR	
X34	4-WAY CONNECTOR	
X35	40-WAY CONNECTOR	
X50	2-WAY CONNECTOR	
X51	2-WAY CONNECTOR	
X54	35-WAY CONNECTOR	
X57	2-WAY CONNECTOR	
X58	2-WAY CONNECTOR	
X59	4-WAY CONNECTOR	
X60	3-POLE + GND CONNECTOR GREY	
X61	2-WAY CONNECTOR	
X62	3-POLE + GND CONNECTOR GREY	
X63	2-WAY CONNECTOR	
X64	2-WAY CONNECTOR	
X65	2-WAY CONNECTOR	
X66	2-WAY CONNECTOR	
X67	2-WAY 90° CONNECTOR	
X68	4-WAY CONNECTOR	
X69	4-WAY CONNECTOR	
X70	2-WAY CONNECTOR	
X71	2-WAY CONNECTOR	
X72	BEACON	6
X73	CAB INTERIOR LIGHTS	6
X74	14-WAY MIC 70 CONNECTOR	
X75	6-WAY CONNECTOR	
X76	6-WAY CONNECTOR	
X77.1	1-WAY CONNECTOR	
X77.2	1-WAY CONNECTOR	
X90	1-WAY CONNECTOR	
X103	2-WAY CONNECTOR	
X104	2-WAY CONNECTOR	
X107	1-WAY CONNECTOR	
X109	2-WAY CONNECTOR	
X111	2-WAY CONNECTOR	
X112	1-WAY CONNECTOR	
X113	2-WAY CONNECTOR	
X118	2-WAY CONNECTOR	
X123	2-WAY CONNECTOR	
X124	3-WAY DEUTSCH CONNECTOR	
X125	3-WAY DEUTSCH CONNECTOR	
X128	1-WAY CONNECTOR	
X129	2-WAY CONNECTOR	
X131	2-WAY CONNECTOR	
X132	1-WAY CONNECTOR	
X135	2-WAY CONNECTOR	
X139	2-WAY CONNECTOR	
X140	2-WAY CONNECTOR	
X141	2-WAY CONNECTOR	
X142	2-WAY CONNECTOR	
X143	2-WAY CONNECTOR	
X144	2-WAY CONNECTOR	
X145	4-WAY DEUTSCH CONNECTOR	
X146	3-WAY DEUTSCH CONNECTOR	
X147	2-WAY CONNECTOR	
X148	2-WAY CONNECTOR	
X149	4-WAY DEUTSCH CONNECTOR	
X150	4-WAY DEUTSCH CONNECTOR	
X151	2-WAY CONNECTOR	
X152	2-WAY CONNECTOR	
X154	2-WAY CONNECTOR	
X155	2-WAY CONNECTOR	
X156	2-WAY CONNECTOR	
X157	2-WAY CONNECTOR	
X158	2-WAY CONNECTOR	
X159	2-WAY CONNECTOR	
X160	2-WAY CONNECTOR	
X161	2-WAY CONNECTOR	

Operation: Legend: wiring diagram - Girolift 3714 SX	Table: C.05.08

X166	2-WAY CONNECTOR
X169	40-WAY CONNECTOR
X173	40-WAY CONNECTOR
X1013	2-WAY CONNECTOR
XH126	6-WAY DEUTSCH CONNECTOR
XH127	4-WAY CONNECTOR
XH133	4-WAY CONNECTOR
XH134	2-WAY DEUTSCH CONNECTOR

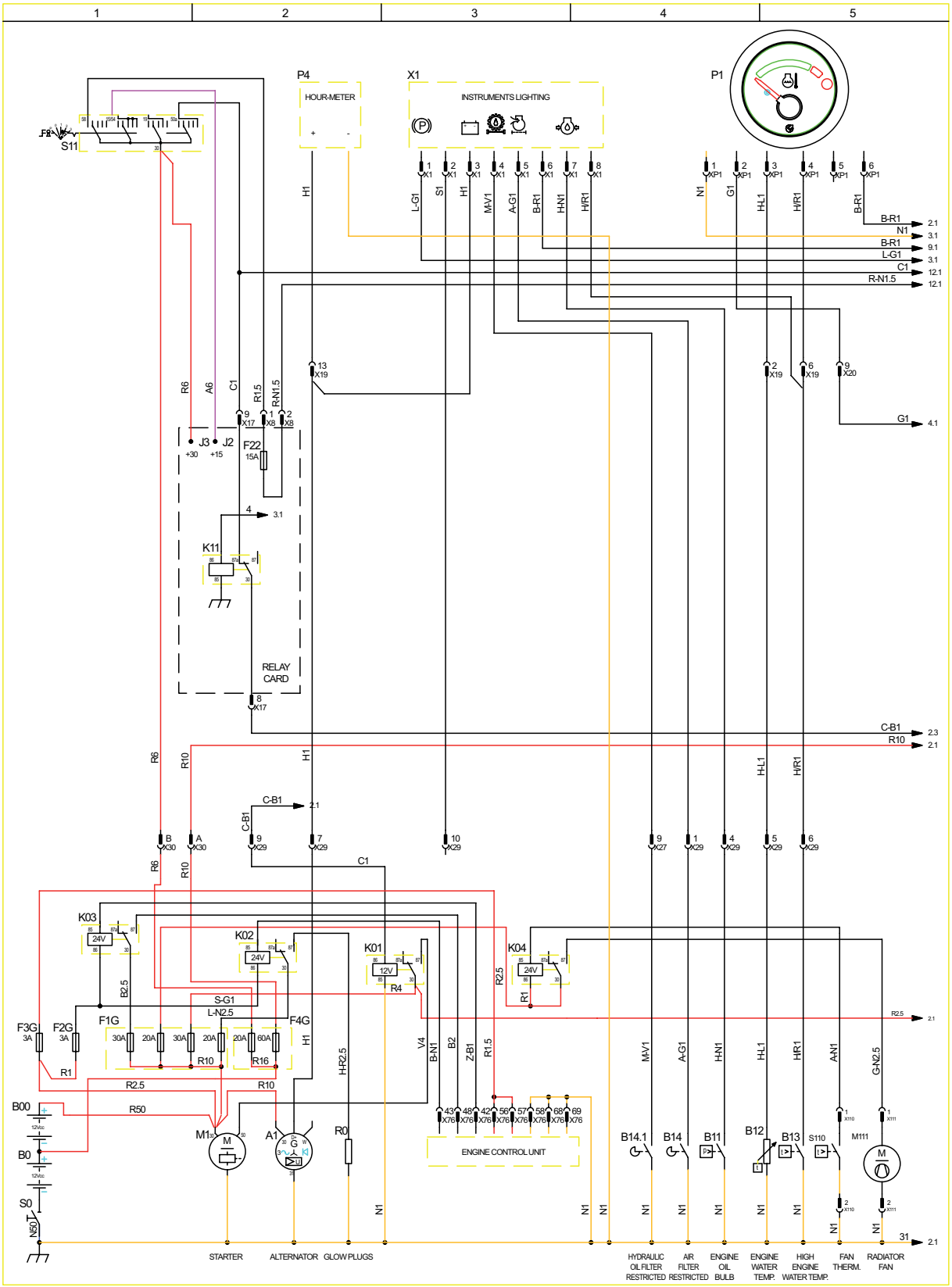
WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

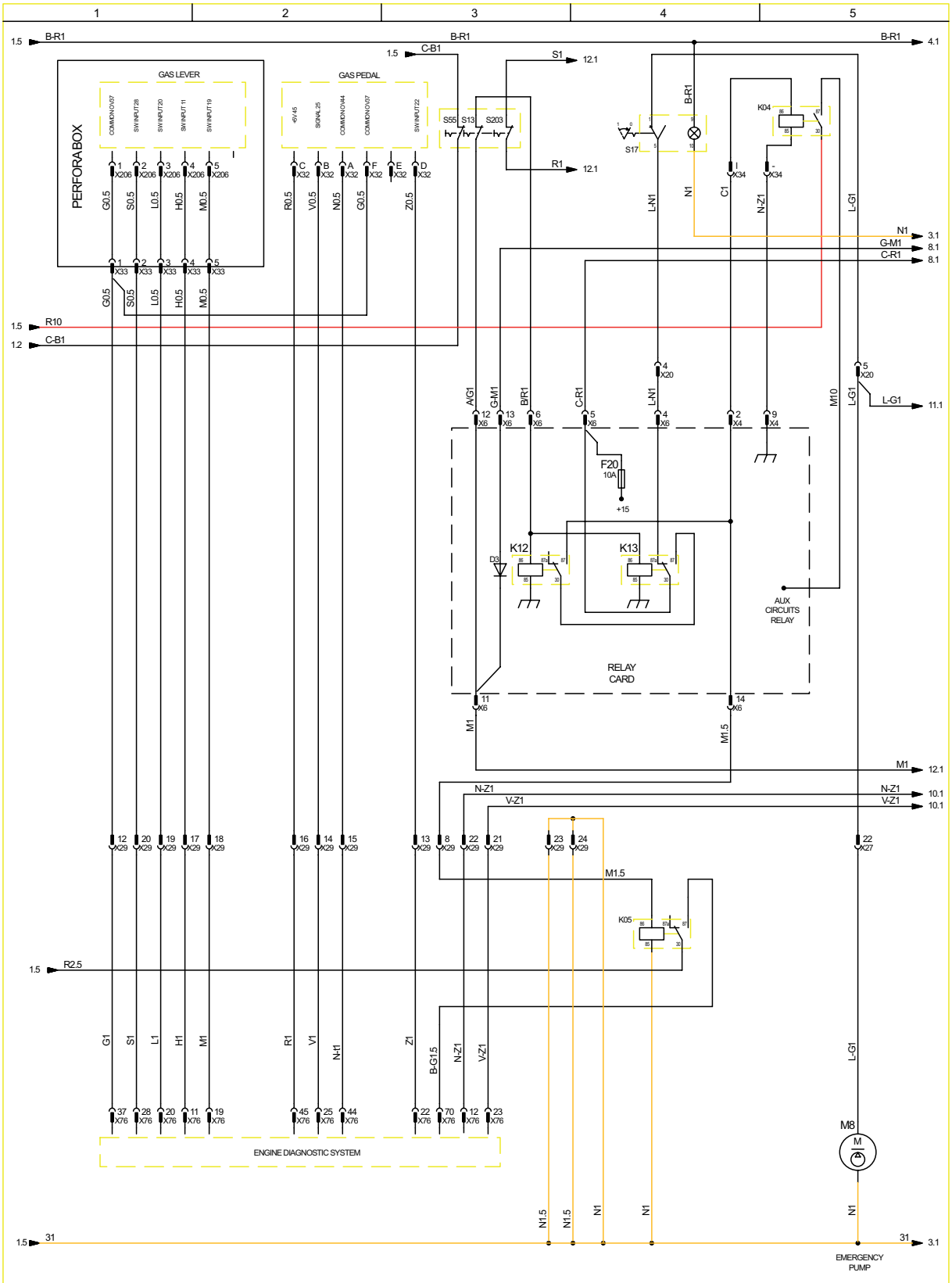
REMARK:Two-colour wires are indicated through a combination of the aforesaid initials as follows:

G/V = YELLOW/GREEN (crosswise colouring)
G-V = YELLOW-GREEN (lengthswise colouring)

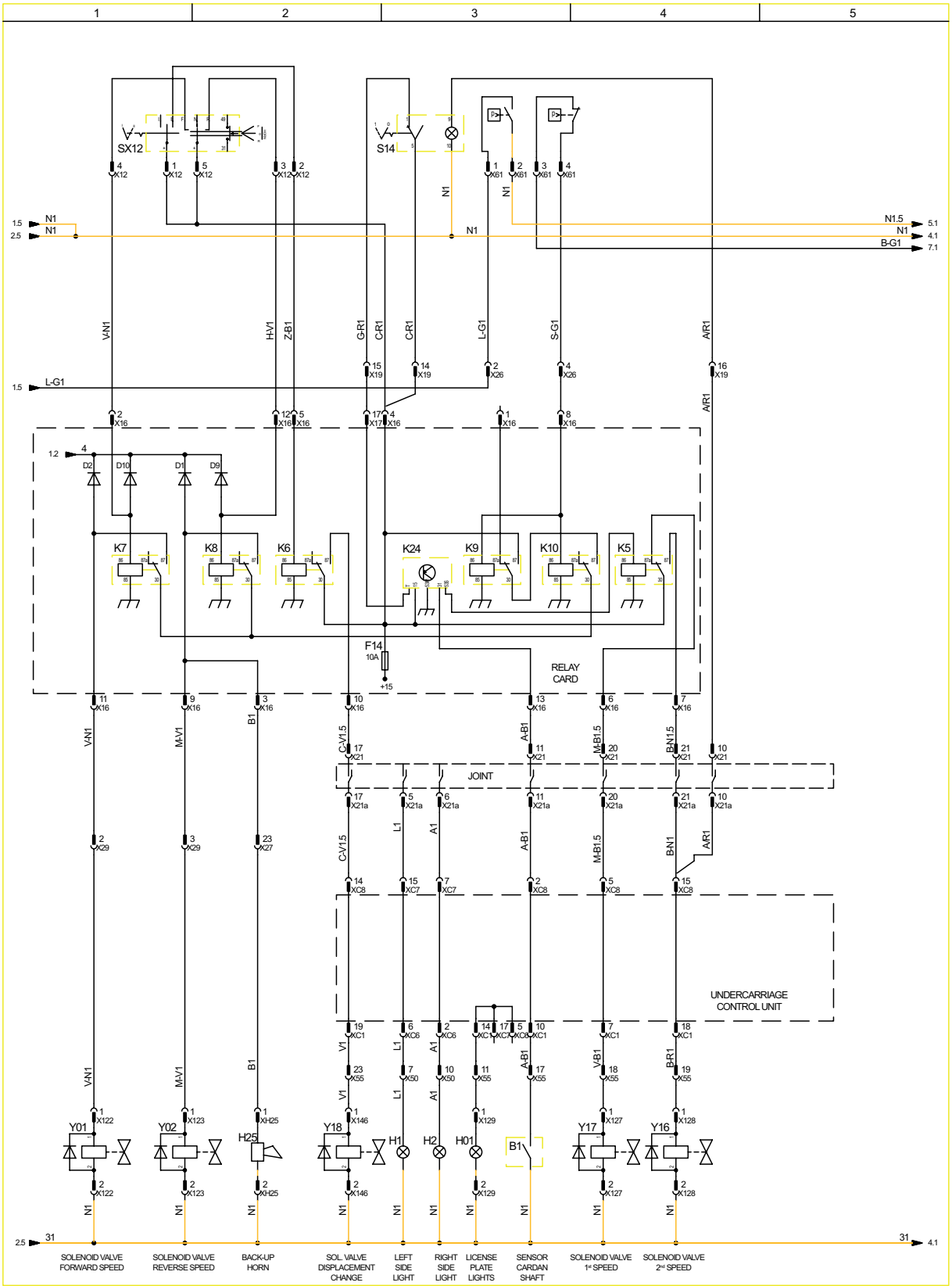
Operation: Girolift 4010 Perfora wiring diagram - sheet 1 of 12	Table: C.05.09



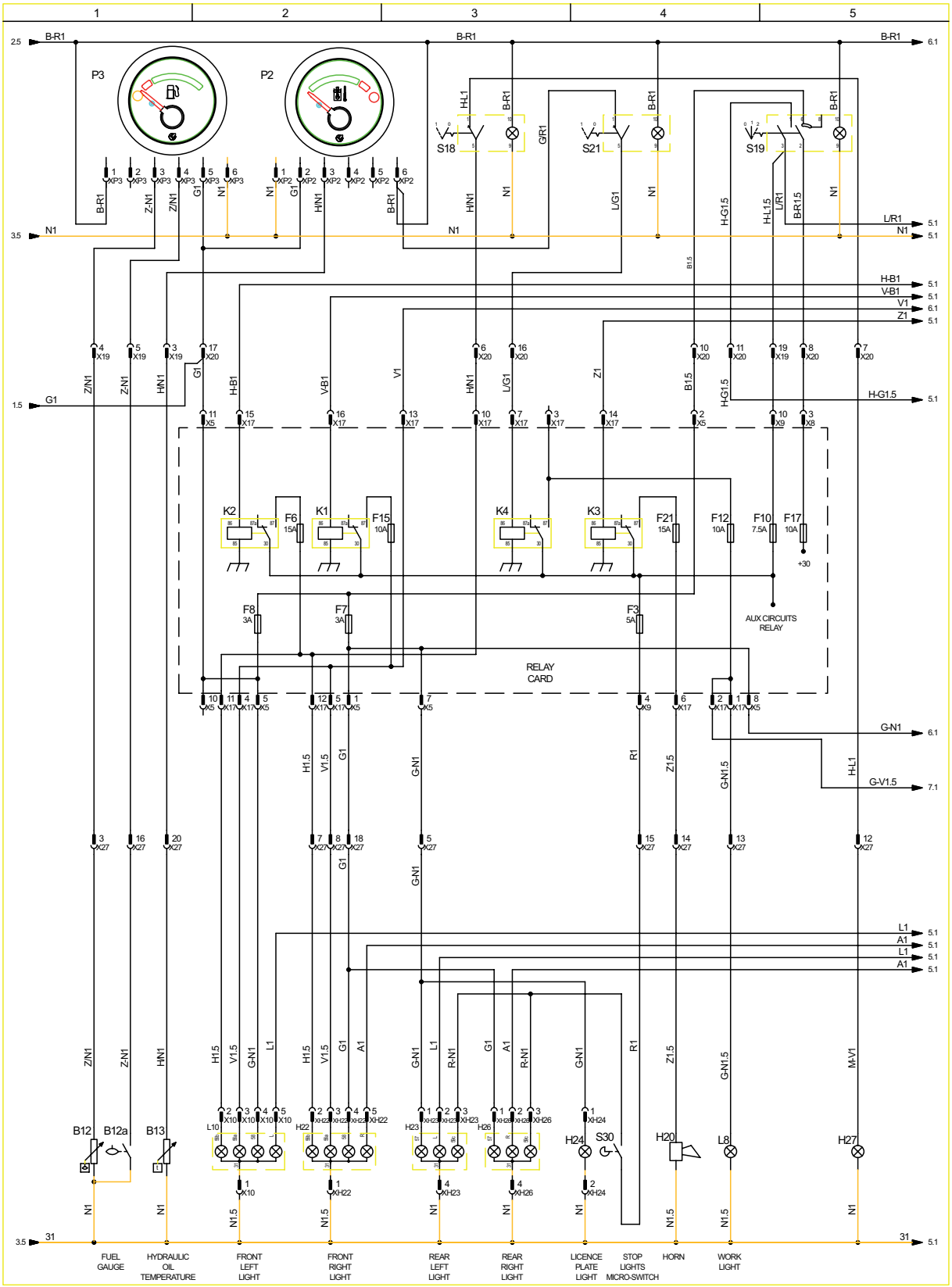
Operation: Girolift 4010 Perfora wiring diagram - sheet 2 of 12	*Table:* **C.05.09**



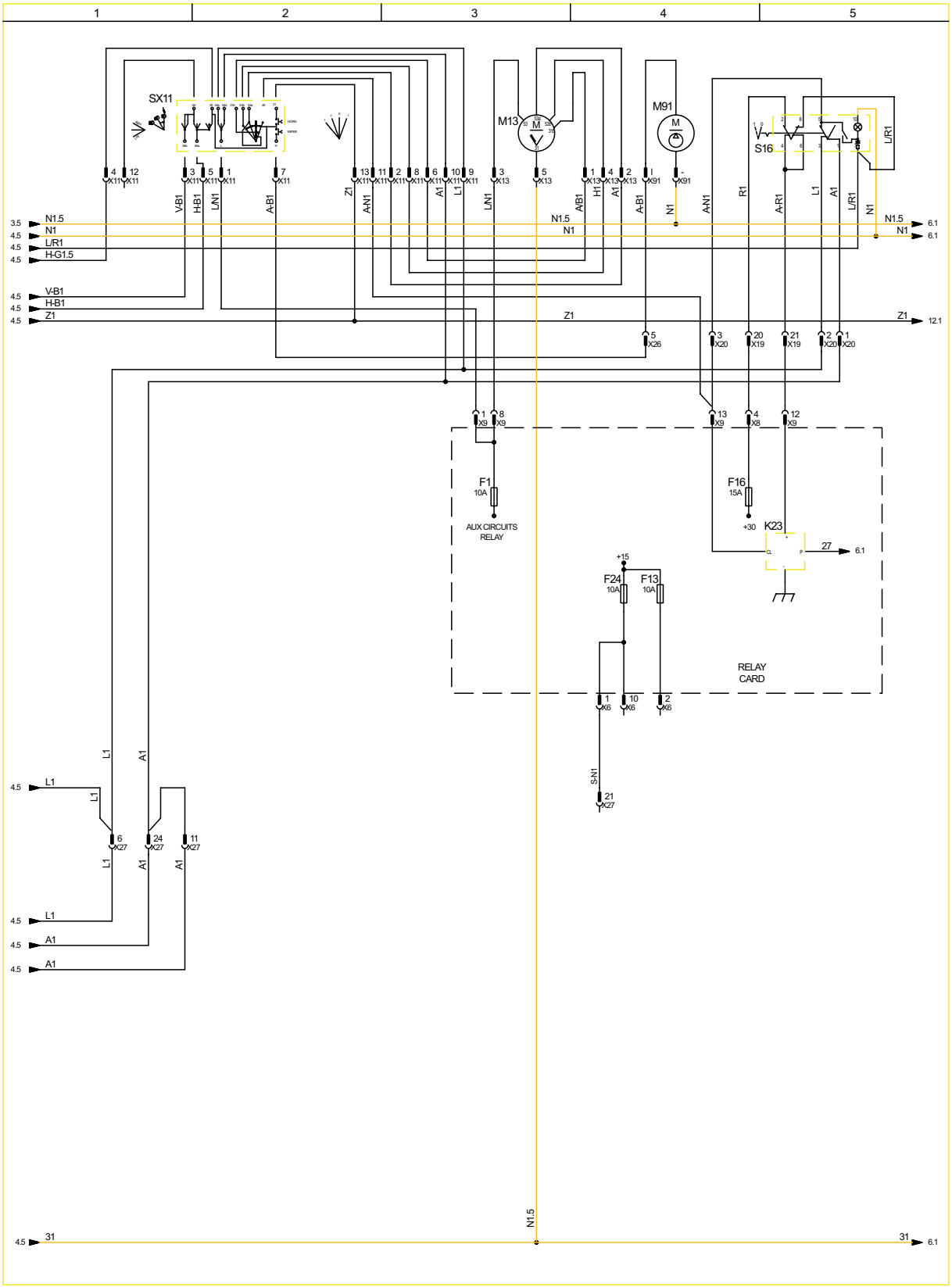
Operation: Girolift 4010 Perfora wiring diagram - sheet 3 of 12	Table: C.05.09



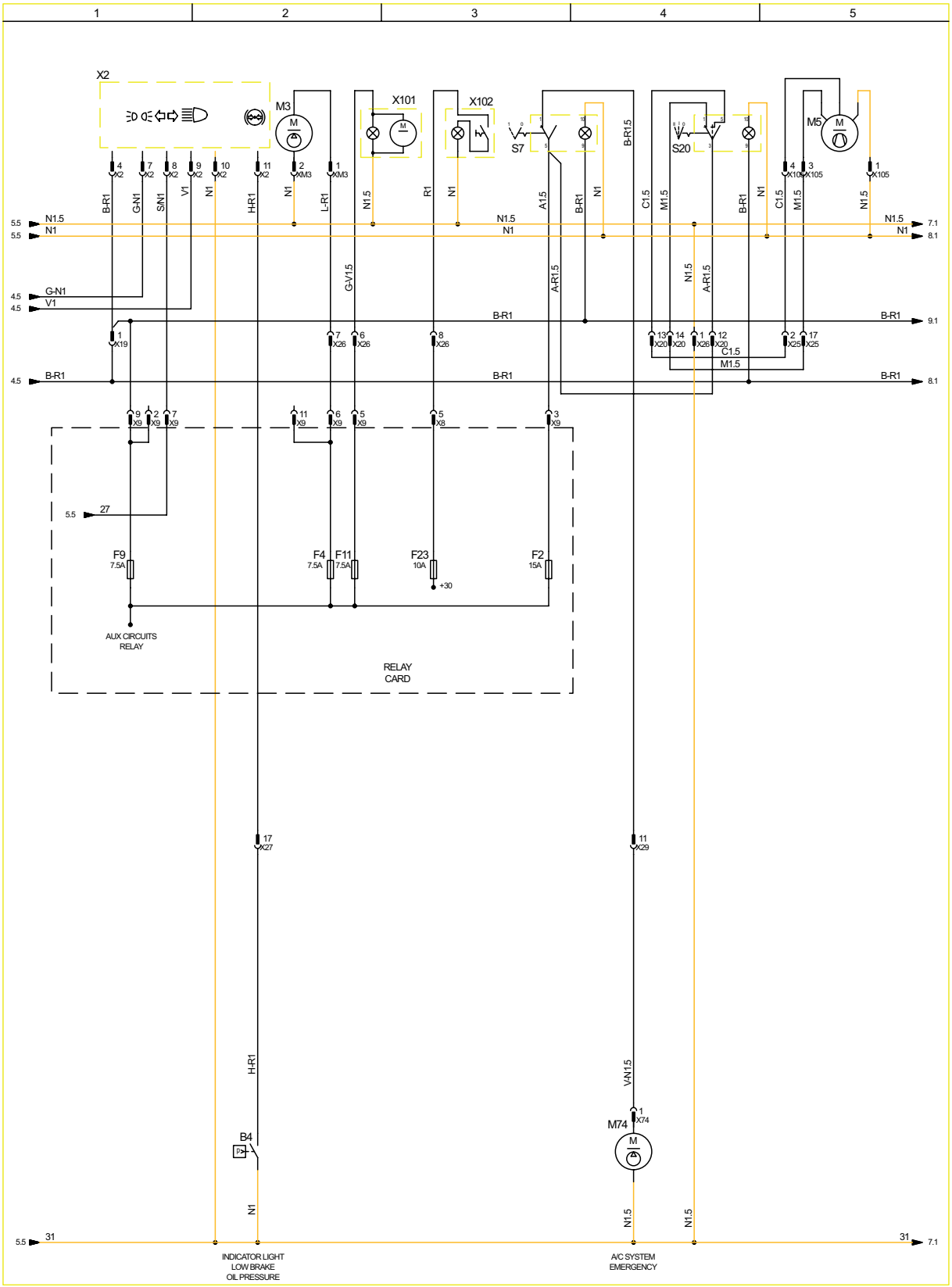
Operation: Girolift 4010 Perfora wiring diagram - sheet 4 of 12	*Table:* **C.05.09**



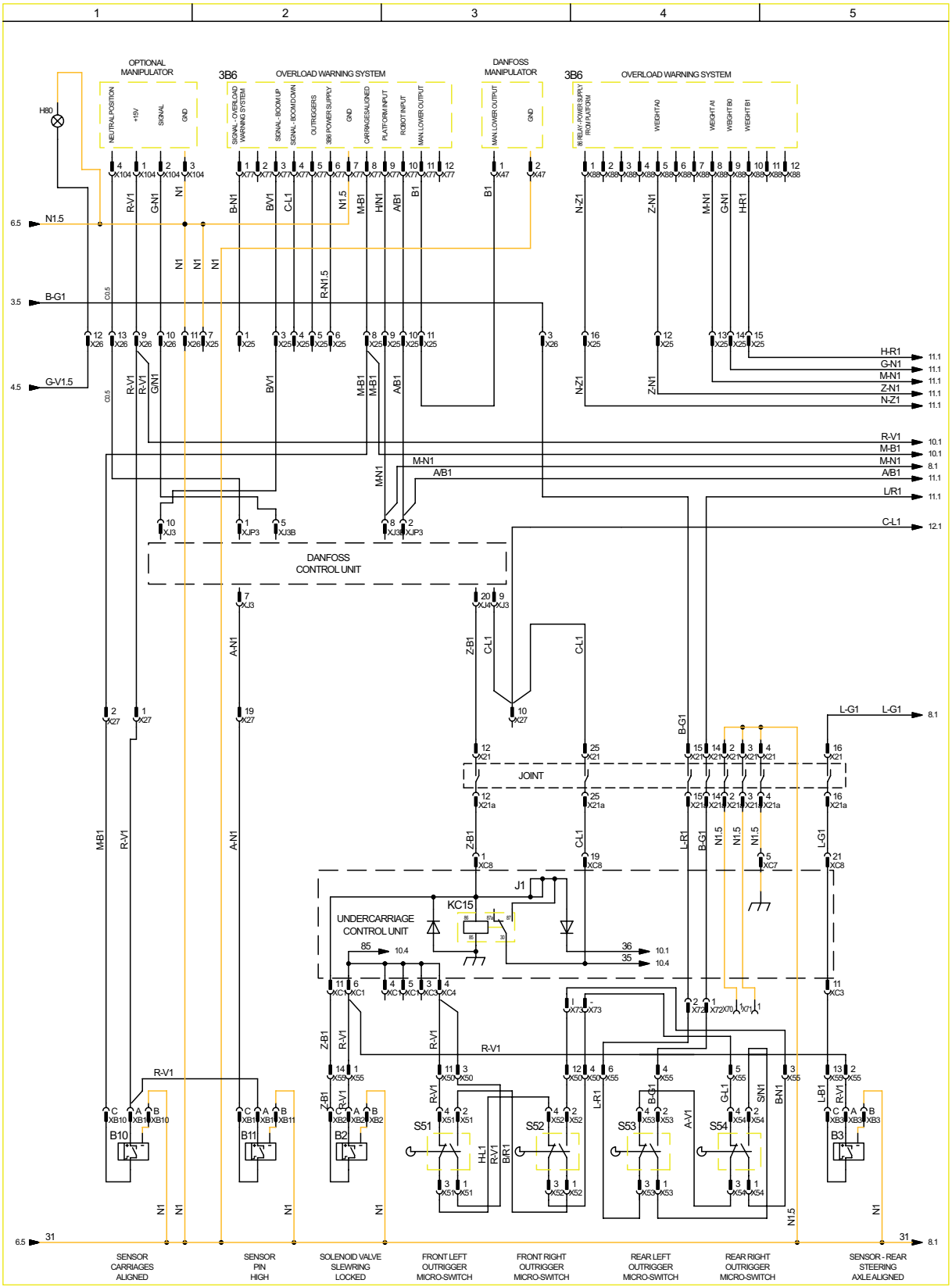
Operation:	Girolift 4010 Perfora wiring diagram - sheet 5 of 12	Table:
		C.05.09



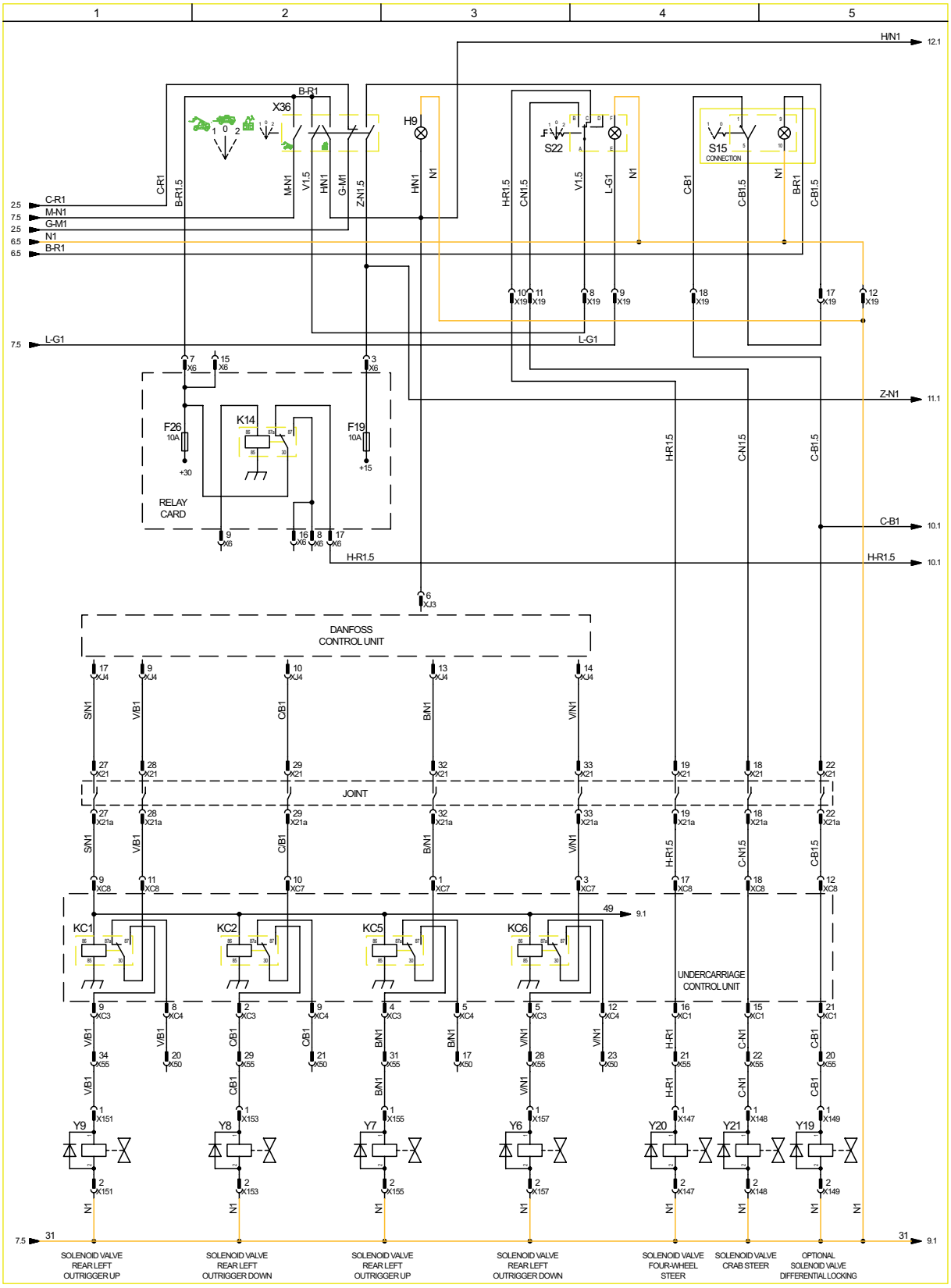
Operation:	Girolift 4010 Perfora wiring diagram - sheet 6 of 12	Table: C.05.09



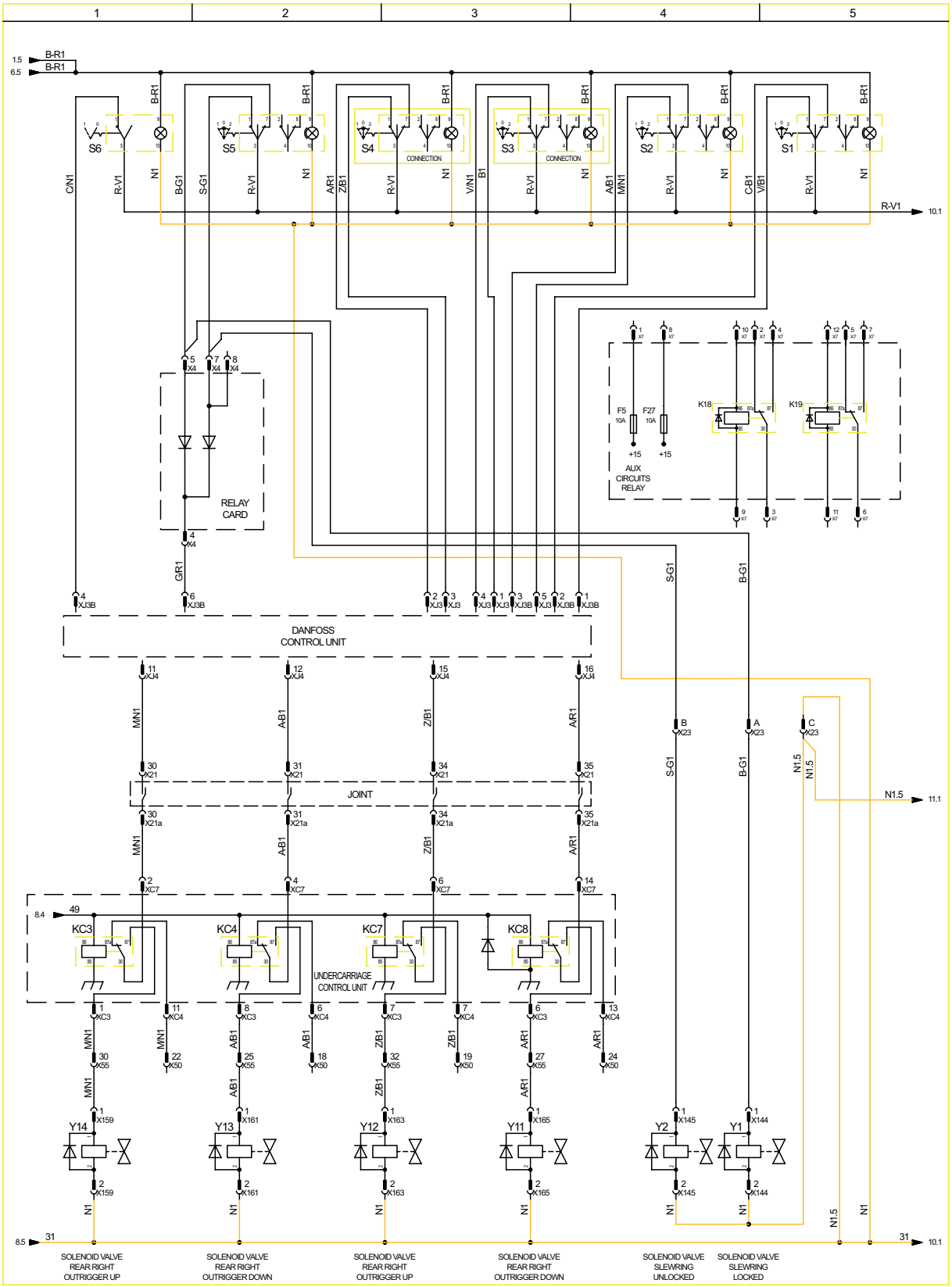
Operation: Girolift 4010 Perfora wiring diagram - sheet 7 of 12	*Table:* **C.05.09**



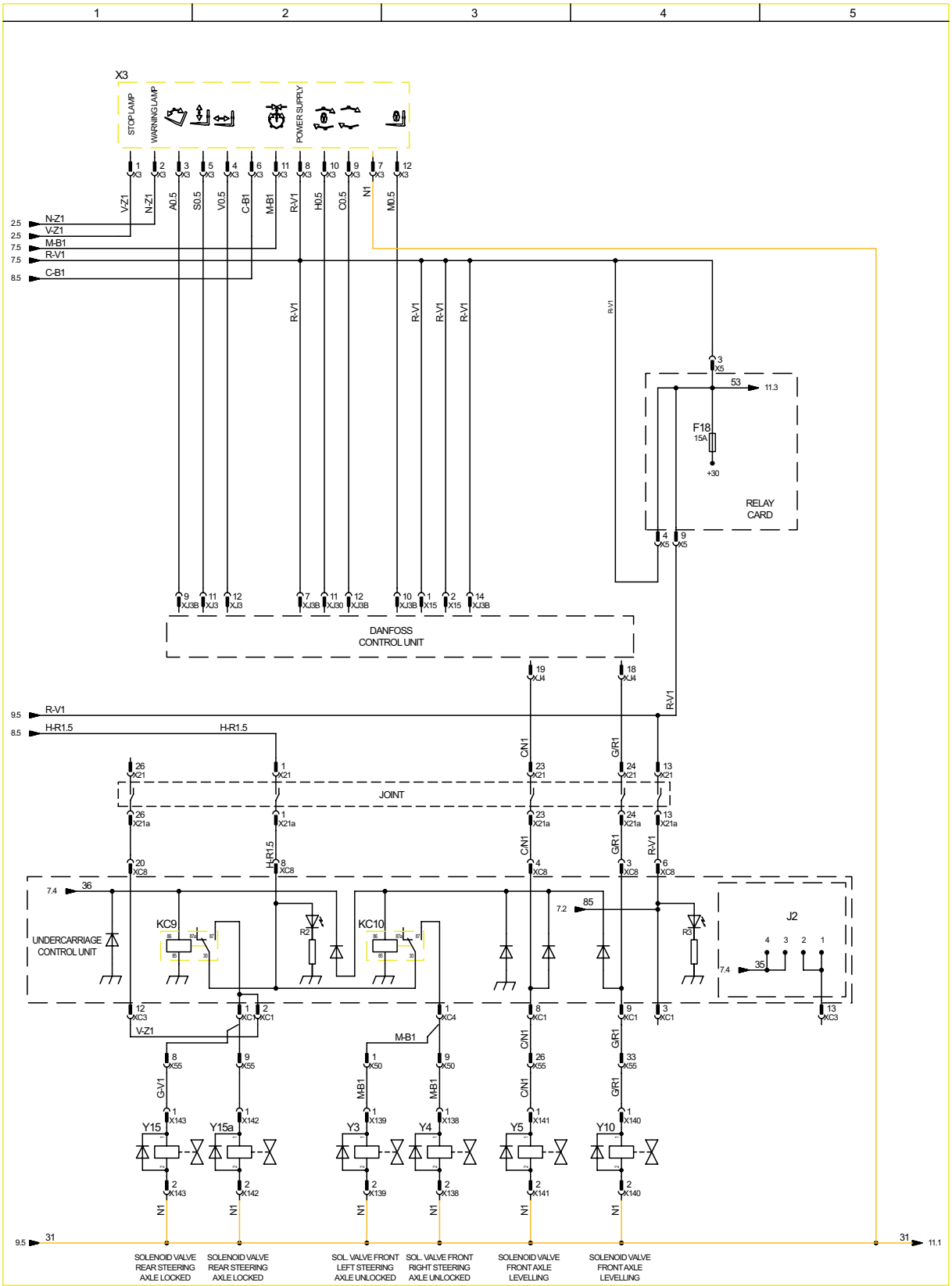
Operation:	Girolift 4010 Perfora wiring diagram - sheet 8 of 12	Table: C.05.09



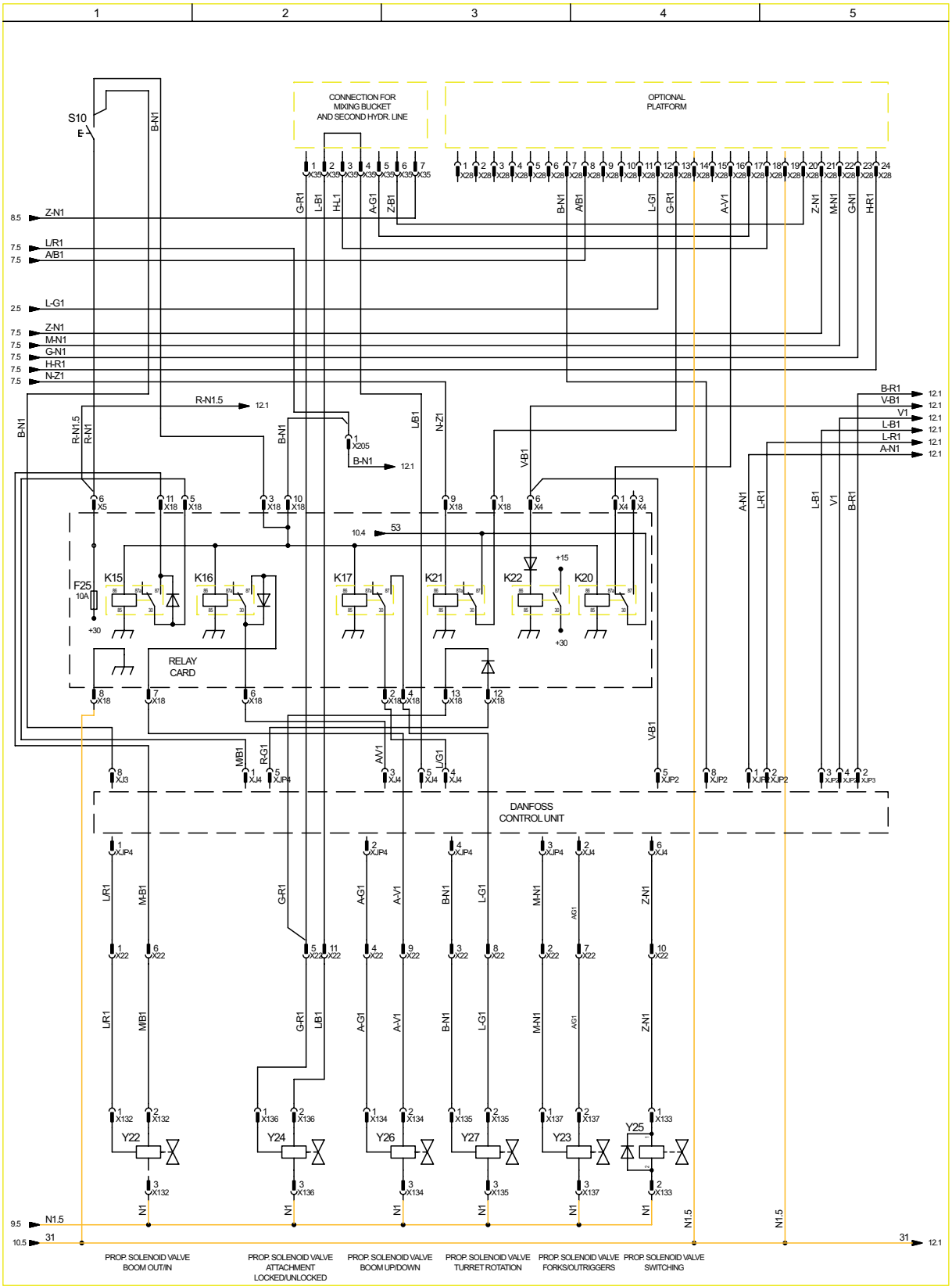
Operation:	Table:
Girolift 4010 Perfora wiring diagram - sheet 9 of 12	C.05.09



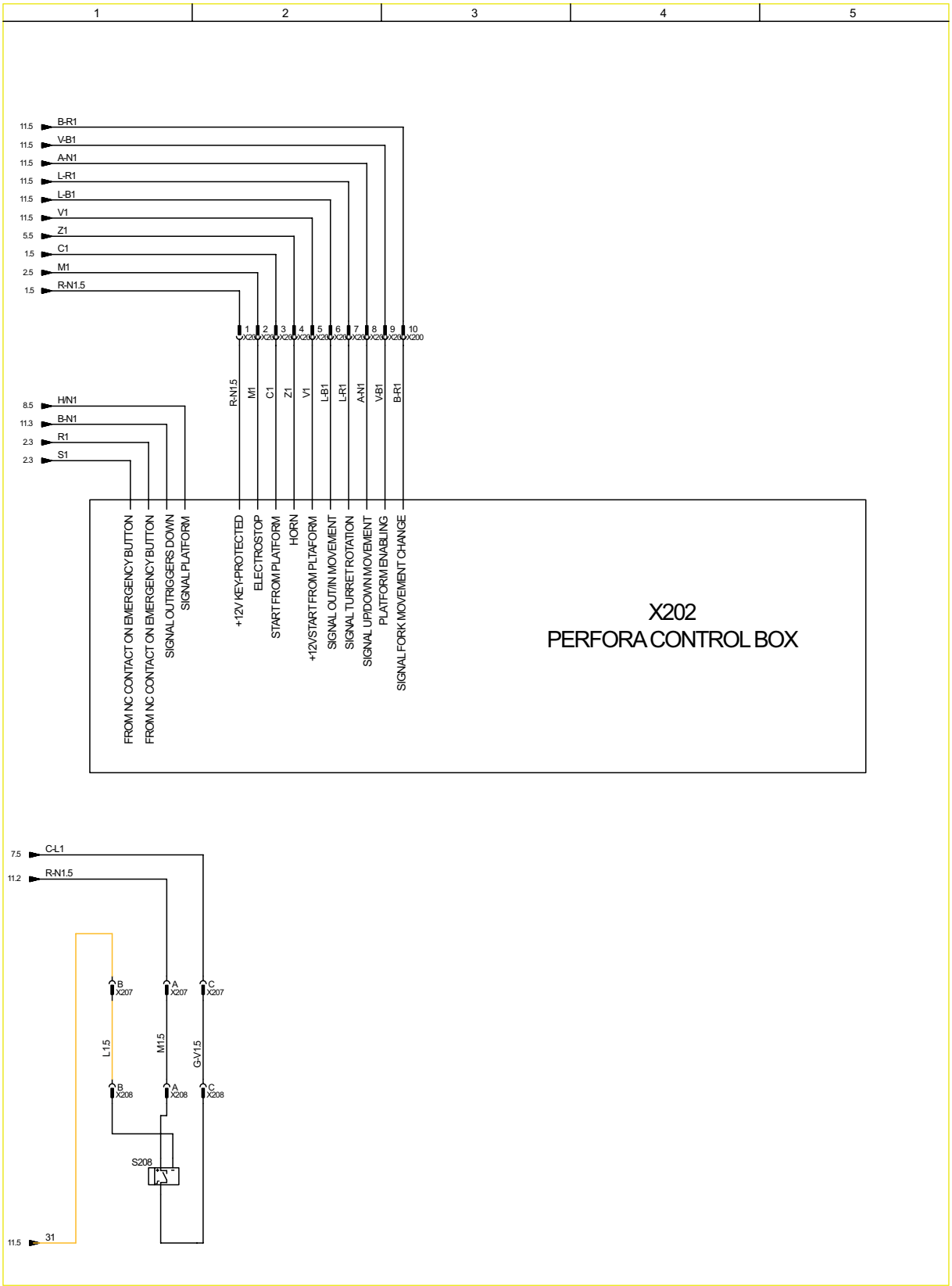
Operation:	Girolift 4010 Perfora wiring diagram - sheet 10 of 12	Table: C.05.09



Operation: Girolift 4010 Perfora wiring diagram - sheet 11 of 12	Table: C.05.09



Operation:	Girolift 4010 Perfora wiring diagram - sheet 12 of 12	Table: C.05.09



Operation: Legend: wiring diagram - Girolift 4010 Perfora	Table: C.05.09

NAME	DESCRIPTION	SHEET
F1G	MAIN FUSE 20A	1
F1G	MAIN FUSE 30A	1
F1G	MAIN FUSE 60A	1
F1G	MAIN FUSE 20A	1
A1	ALTERNATOR	1
B0	BATTERY	1
B10	SENSOR - CARRIAGES ALIGNED	7
B11	ENGINE OIL FILTER PRESSURE SWITCH	1
B11	SENSOR - PIN HIGH	7
B12	FUEL GAUGE	4
B12	TRANSDUCER - ENGINE WATER TEMPERATURE	1
B12a	FUEL RESERVE LEVEL GAUGE	4
B13	TRANSDUCER - HYDRAULIC OIL TEMPERATURE	4
B13	THERMOSTAT - HIGH ENGINE WATER TEMPERATURE	1
B14.1	MICRO-SWITCH - ENGINE OIL FILTER RESTRICTED	1
B14	MICRO-SWITCH - AIR FILTER RESTRICTED	1
B2	SENSOR - SLEWRING BLOCKED	7
B3	SENSOR - REAR STEERING AXLE ALIGNED	7
B4	PRESSURE SWITCH - LOW BRAKE OIL PRESSURE	6
F1	FUSE - FRONT WINDSCREEN WIPER/WASHER 10A	5
F10	FUSE - EMERGENCY PUSHBUTTON 7.5A	4
F11	FUSE - BEACON 7.5A	6
F12	FUSE - WORK LIGHTS 10A	4
F14	FUSE - SPEED SELECTOR 10A	3
F15	FUSE - HIGH BEAM 10A	4
F16	FUSE - HAZARD WARNING LIGHTS 15A	5
F17	FUSE - LIGHTS AND SIGNALLING 10A	4
F18	FUSE - OUTRIGGERS LOWERED 15A	10
F19	FUSE - STEER SELECTOR 10A	8
F2	FUSE - HEATER 15A	6
F20	FUSE - EMERGENCY BUTTON 10A	2
F21	FUSE - HORN 15A	4
F22	FUSE - TURRET ROTATION 15A	1
F23	FUSE - CEILING LIGHT 10A	6
F25	FUSE - 3B6 CONTROL UNIT 10A	11
F26	FUSE - OUTRIGGERS 10A	8
F2G	MAIN FUSE 3A	1
F3	FUSE - STOP SWITCH 5A	4
F3G	MAIN FUSE 3A	1
F4	FUSE - REAR WIPER 7.5A	6
F6	FUSE - LOW BEAM 15A	4
F7	FUSE - RIGHT POSITION LIGHTS SWITCH 3A	4
F8	FUSE - LEFT POSITION LIGHTS SWITCH 3A	4
F9	FUSE - INSTRUMENTS LIGHTING 7.5A	6
H01	LICENCE PLATE LIGHT	3
H1	LH SIDE LIGHT	3
H2	RH SIDE LIGHT	3
H20	HORN	4
H22	FRONT RIGHT LIGHT	4
H23	REAR LEFT LIGHT	4
H24	LICECE PLATE LIGHT	4
H25	BACK-UP HORN	3
H26	REAR RIGHT LIGHT	4
H27	LUCE	4
H9	INDICATOR LIGHT - BASKET	8
K01	RELAY - START-UP	1
K02	RELAY - START AID	1
K03	RELAY - INJECTION	1
K04	RELAY - AUX CIRCUITS	2
K05	RELAY - IGNITION INPUT SWITCH	2
K1	RELAY - HIGH BEAM	4
K10	RELAY - TRANSMISSION DISCONNECTED	3
K11	RELAY - START-UP ENABLING COMMAND	1
K12	RELAY - AUX CIRCUITS	2
K13	RELAY - EMERGENCY PUMP	2
K14	RELAY - OUTRIGGERS	8
K15	RELAY - BOOM OUT/IN-MOVEMENT	11
K16	RELAY - BOOM UP/DOWN-MOVEMENT	11
K17	RELAY - TURRET ROTATION	11
K2	RELAY - HIGH BEAM	4
K20	RELAY - PLATFORM OVERLOAD WARNING SYSTEM ON	11
K21	RELAY - POWER SUPPLY FROM PLATFORM	11
K22	RELAY	11
K23	INTERMITTENCE	5
K24	TIMER	3
K3	RELAY - HORN	4
K4	RELAY - WORK LIGHTS	4
K5	RELAY - 1ST AND 2ND MECHANICAL GEAR	3
K6	RELAY - HYDRAULIC DISPLACEMENT CHANGE	3
K7	RELAY - FORWARD SPEED	3
K8	RELAY - REVERSE SPEED	3
K9	RELAY - TRANSMISSION DISCONNECTED	3
KC1	RELAY - REAR LEFT OUTRIGGER UP	8
KC10	RELAY - FRONT STEERING AXLE UNLOCKING	10

Operation:	Legend: wiring diagram - Girolift 4010 Perfora	Table: C.05.09

KC15	RELAY - SLEWRING LOCKED	7
KC2	RELAY - REAR LEFT OUTRIGGER DOWN	8
KC3	RELAY - REAR RIGHT OUTRIGGER UP	9
KC4	RELAY - REAR RIGHT OUTRIGGER DOWN	9
KC5	RELAY - FRONT/REAR LEFT OUTRIGGER UP	8
KC6	RELAY - FRONT/REAR LEFT OUTRIGGER DOWN	8
KC7	RELAY - FRONT/REAR RIGHT OUTRIGGER UP	9
KC8	RELAY - FRONT/REAR RIGHT OUTRIGGER DOWN	9
KC9	RELAY - REAR STEERING AXLE LOCKED	10
L10	FRONT LEFT LIGHT	4
L8	WORK LIGHT	4
M1	STARTING MOTOR	1
M13	UPPER WINDSCREEN WIPER/WASHER MOTOR	5
M3	UPPER WINDSCREEN WIPER/WASHER	6
M5	HEATING FAN	6
M74	A/C SYSTEM	6
M8	EMERGENCY PUMP	2
M91	PUMP MOTOR	5
R0	GLOW PLUGS	1
P1	ENGINE WATER TEMPERATURE INDICATOR	1
P2	FUEL GAUGE	4
P3	FUEL GAUGE	4
P4	HOUR-METER	1
SX11	LIGHTS - WIPER SWITCH	5
S0	BATTERY CUTOFF	1
S11	IGNITION BOARD	1
S1	SWITCH - FRONT RH OUTRIGGER LEG	9
S10	OVERLOAD WARNING SYSTEM CUTOUT	11
S13	EMERGENCY MUSHROOM-HEAD PUSHBUTTON	2
S14	MECHANICAL GEARBOX SWITCH	3
S15	OPTIONAL SWITCH - DIFFERENTIAL LOCKING	8
S17	EMERGENCY PUMP PUSHBUTTON	2
S18	SWITCH - LIGHTS	4
S19	SWITCH - LIGHTS	4
S2	SWITCH - REAR LH OUTRIGGER LEG	9
S20	SWITCH - HEATER	6
SX12	SPEED SWITCH	3
S21	SWITCH - WORK LIGHTS	4
S16	SWITCH - HAZARD WARNING LIGHT	5
S22	STEERING SELECTOR	8
S3	CONNECTION FOR REAR LH OUTRIGGER LEG	9
S30	STOP LIGHTS MICRO-SWITCH	4
S4	CONNECTION FOR REAR RH OUTRIGGER LEG	9
S5	SWITCH - SLEWRING PIN LOCKING/UNLOCKING	9
S51	FRONT LEFT OUTRIGGER MICRO-SWITCH	7
S52	FRONT RIGHT OUTRIGGER MICRO-SWITCH	7
S53	REAR LEFT OUTRIGGER MICRO-SWITCH	7
S54	REAR LEFT OUTRIGGER MICRO-SWITCH	7
S6	REAR LEFT OUTRIGGER MICRO-SWITCH	7
S7	SWITCH - A/C SYSTEM	6
X101	BEACON	6
X102	CAB INTERIOR LIGHTS	6
Y01	SOLENOID VALVE - FORWARD SPEED	3
Y02	SOLENOID VALVE - REVERSE SPEED	3
Y1	SOLENOID VALVE - SLEWRING LOCKED	9
Y10	SOLENOID VALVE - FRONT AXLE LEVELLING	10
Y11	SOLENOID VALVE - REAR RIGHT OUTRIGGER DOWN	9
Y12	SOLENOID VALVE - REAR RIGHT OUTRIGGER UP	9
Y13	SOLENOID VALVE - REAR RIGHT OUTRIGGER DOWN	9
Y14	SOLENOID VALVE - REAR RIGHT OUTRIGGER UP	9
Y15	SOLENOID VALVE - REAR STEERING AXLE LOCKED	10
Y15A	SOLENOID VALVE - REAR STEERING AXLE LOCKED	10
Y16	SOLENOID VALVE - 2ND SPEED	3
Y17	SOLENOID VALVE - 1ST SPEED	3
Y18	SOLENOID VALVE - DISPLACEMENT CHANGE	3
Y19	OPTIONAL SOLENOID VALVE FOR DIFFERENTIAL LOCKING	8
Y2	SOLENOID VALVE - SLEWRING UNLOCKED	9
Y20	SOLENOID VALVE - FOUR-WHEEL STEER	8
Y21	SOLENOID VALVE - CRAB STEER	8
Y22	SOLENOID VALVE - BOOM OUT/IN	11
Y23	SOLENOID VALVE - FORKS/OUTRIGGERS	11
Y24	SOLENOID VALVE - ATTACHMENT LOCKED/UNLOCKED	11
Y25	SOLENOID VALVE - SWITCHING	11
Y26	SOLENOID VALVE - BOOM UP/DOWN	11
Y27	SOLENOID VALVE - TURRET ROTATION	11
Y3	SOLENOID VALVE - FRONT LEFT STEERING AXLE UNLOCKED	10
Y4	SOLENOID VALVE - FRONT RIGHT STEERING AXLE UNLOCKED	10
Y5	SOLENOID VALVE - FRONT AXLE LEVELLING	10

Operation: Legend: wiring diagram - Girolift 4010 Perfora	Table: C.05.09

Y6	SOLENOID VALVE - REAR LEFT OUTRIGGER DOWN	8
Y7	SOLENOID VALVE - REAR LEFT OUTRIGGER UP	8
Y8	SOLENOID VALVE - REAR LEFT OUTRIGGER DOWN	8
Y9	SOLENOID VALVE - REAR LEFT OUTRIGGER UP	8
X1	8-WAY CONNECTOR - WARNING LIGHTS	1
X10	6-WAY CONNECTOR	
X104	3-WAY CONNECTOR	
X105	4-WAY CONNECTOR	
X11	13-WAY CONNECTOR	
X12	5-WAY CONNECTOR	
X122	2-WAY CONNECTOR	
X123	2-WAY CONNECTOR	
X127	2-WAY CONNECTOR	
X128	2-WAY CONNECTOR	
X129	2-WAY CONNECTOR	
X13	6-WAY CONNECTOR	
X132	3-WAY CONNECTOR	
X133	2-WAY CONNECTOR	
X134	3-WAY CONNECTOR	
X135	3-WAY CONNECTOR	
X136	3-WAY CONNECTOR	
X137	3-WAY CONNECTOR	
X138	2-WAY CONNECTOR	
X139	2-WAY CONNECTOR	
X140	2-WAY CONNECTOR	
X141	2-WAY CONNECTOR	
X142	2-WAY CONNECTOR	
X143	2-WAY CONNECTOR	
X144	2-WAY CONNECTOR	
K04	RELAY - FAN	1
F4G	MAIN FUSE 60A	1
F4G	MAIN FUSE 20A	1
S110	FAN THERMISTORE	1
M111	RADIATOR FAN	1
S203	EMERGENCY PUSHBUTTON	2
S208	SENSOR - BOOM LOWERED	11
X202	PERFORA CONTROL BOX	11
S55	EMERGENCY PUSHBUTTON	2
X145	2-WAY CONNECTOR	
X146	2-WAY CONNECTOR	
X147	2-WAY CONNECTOR	
X148	2-WAY CONNECTOR	
X149	2-WAY CONNECTOR	
X15	2-WAY CONNECTOR	
X151	2-WAY CONNECTOR	
X153	2-WAY CONNECTOR	
X155	2-WAY CONNECTOR	
X157	2-WAY CONNECTOR	
X159	2-WAY CONNECTOR	
X16	13-WAY CONNECTOR	
X161	2-WAY CONNECTOR	
X163	2-WAY CONNECTOR	
X165	2-WAY CONNECTOR	
X17	17-WAY CONNECTOR	
X18	13-WAY CONNECTOR	
X19	21-WAY CONNECTOR	
X2	12-WAY CONNECTOR - WARNING LIGHTS	6
X20	17-WAY CONNECTOR	
X21	40-WAY DEUTSCH CONNECTOR - TYPE B	
X21a	40-WAY DEUTSCH CONNECTOR - TYPE B	
X22	12-WAY CONNECTOR	
X23	3-WAY DEUTSCH CONNECTOR	
X25	17-WAY CONNECTOR	
X26	13-WAY CONNECTOR	
X27	24-WAY DEUTSCH CONNECTOR	
X28	24-WAY DEUTSCH CONNECTOR	
X29	24-WAY DEUTSCH CONNECTOR	10
X3	12-WAY CONNECTOR - WARNING LIGHTS	
X30	2-WAY CONNECTOR	
X32	6-WAY CONNECTOR	
X33	6-WAY CONNECTOR	
X34	2-WAY CONNECTOR 90°	
X35	7-WAY CONNECTOR	
X4	9-WAY CONNECTOR	
X47	2-WAY CONNECTOR	
X5	11-WAY CONNECTOR	
X50	24-WAY DEUTSCH CONNECTOR	
X51	4-WAY CONNECTOR	
X52	4-WAY CONNECTOR	
X53	4-WAY CONNECTOR	
X54	4-WAY CONNECTOR	
X55	40-WAY DEUTSCH CONNECTOR - TYPE B	
X6	17-WAY CONNECTOR	
X61	5-WAY CONNECTOR	
X70	1-WAY CONNECTOR	
X71	1-WAY CONNECTOR	
X72	2-WAY CONNECTOR	
X73	2-WAY CONNECTOR 90°	
X74	1-WAY CONNECTOR	

Operation: Legend: wiring diagram - Girolift 4010 Perfora	Table: C.05.09

X76	70-WAY DEUTSCH CONNECTOR	
X77	12-WAY CONNECTOR	
X8	5-WAY CONNECTOR	
X88	12-WAY CONNECTOR	
X9	13-WAY CONNECTOR	
X91	2-WAY CONNECTOR 90°	
XB10	3-WAY DEUTSCH CONNECTOR	
XB11	3-WAY DEUTSCH CONNECTOR	
XB2	3-WAY DEUTSCH CONNECTOR	
XB3	3-WAY DEUTSCH CONNECTOR	
XC1	21-WAY CONNECTOR	
XC3	13-WAY CONNECTOR	
XC4	13-WAY CONNECTOR	
XC6	9-WAY CONNECTOR	
XC7	17-WAY CONNECTOR	
XC8	21-WAY CONNECTOR	
XH22	6-WAY CONNECTOR	
XH23	4-WAY CONNECTOR	
XH24	2-WAY CONNECTOR	
XH25	2-WAY CONNECTOR	
XH26	4-WAY CONNECTOR	
XJ3	12-WAY CONNECTOR	
XJ3B	18-WAY CONNECTOR	
XJ4	20-WAY CONNECTOR	
XJP2	8-WAY CONNECTOR	
XJP3	8-WAY CONNECTOR	
XJP4	8-WAY CONNECTOR	
XM3	2-WAY CONNECTOR	
XP1	14-WAY CONNECTOR	
XP2	6-WAY CONNECTOR	
XP3	6-WAY CONNECTOR	
X110	2-WAY CONNECTOR	
X111	2-WAY CONNECTOR	
X206	6-WAY CONNECTOR DT	
X205	1-WAY CONNECTOR	
X207	3-WAY CONNECTOR DT	
X208	3-WAY CONNECTOR DT	
X200	12-WAY CONNECTOR DT	
F5	FUSE - OPTIONAL	9
F27	FUSE - OPTIONAL	9
K18	OPTIONAL RELAY	9
K19	OPTIONAL RELAY	9
H80	WORK LIGHT	7
F24	FUSE - OPTIONAL	5
F13	FUSE - OPTIONAL	5
X7	13-WAY CONNECTOR	

WIRE COLOURS

A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GREY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	PURPLE

REMARK:Two-colour wires are indicated through a combination of the aforesaid initials as follows:

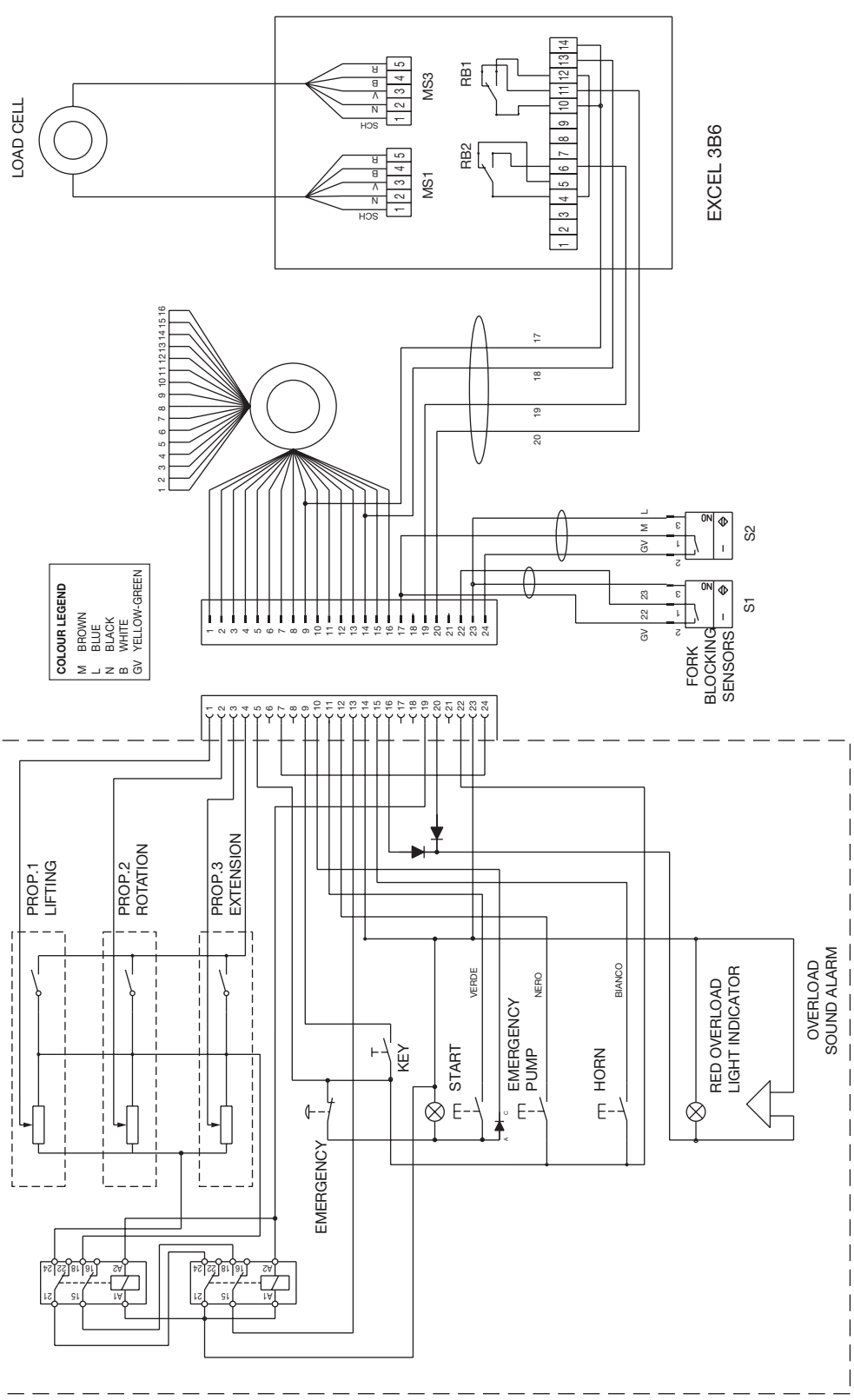
G/V = YELLOW/GREEN (crosswise colouring)
G-V = YELLOW-GREEN (lengthswise colouring)

Operation:	Table:
AERIAL PLATFORM wiring diagram - DANFOSS hand-lever wiring on Girolift 3514 with single reel	C.05.10.01

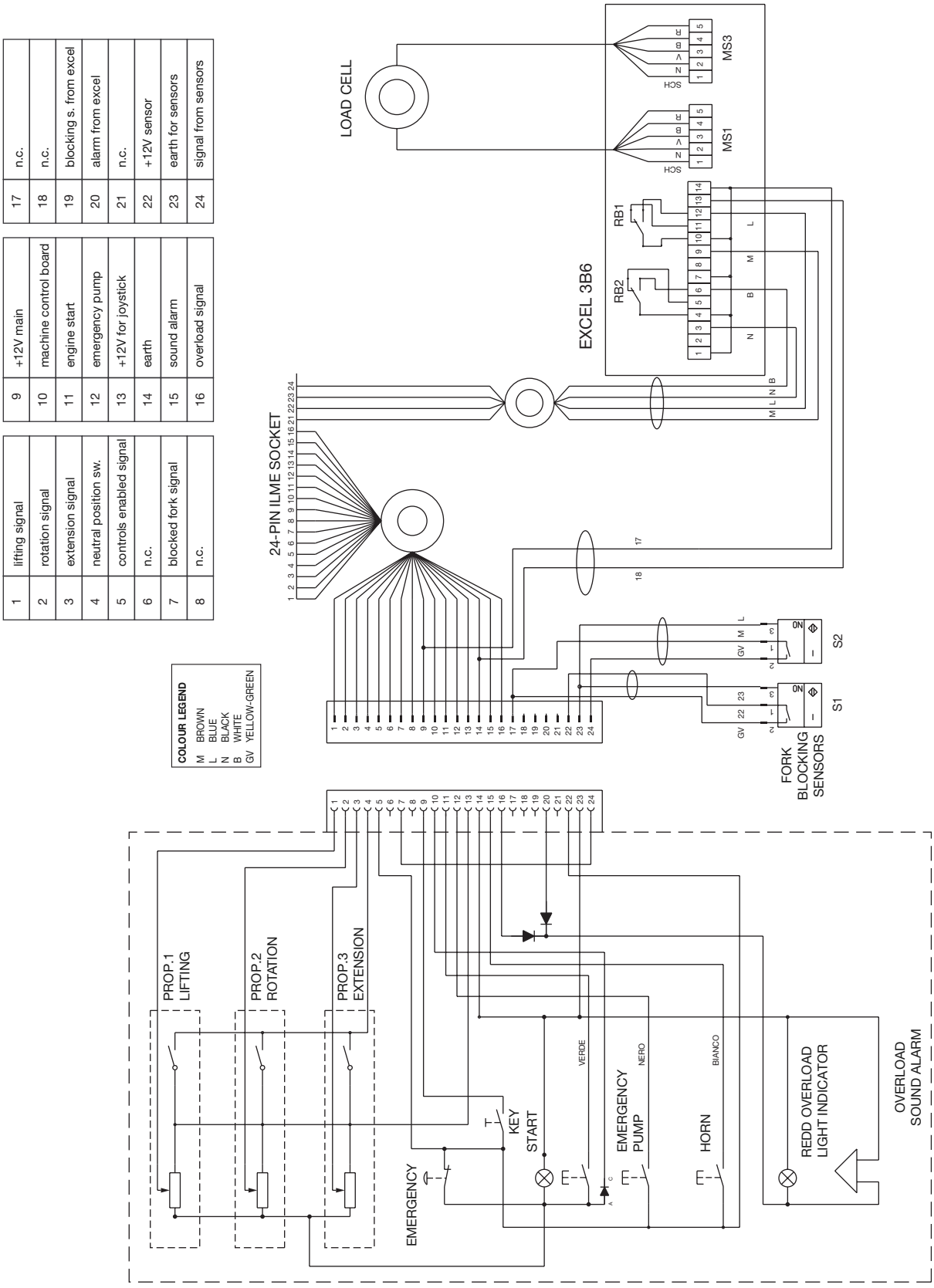
1	lift signal
2	rotation signal
3	extension signal
4	neutral position sw.
5	controls enabled
6	n.c.
7	blocked fork signal
8	n.c.

9	+12V main
10	machine control panel
11	engine start
12	emergency pump
13	+12V for joystick
14	earth
15	sound alarm
16	overload signal

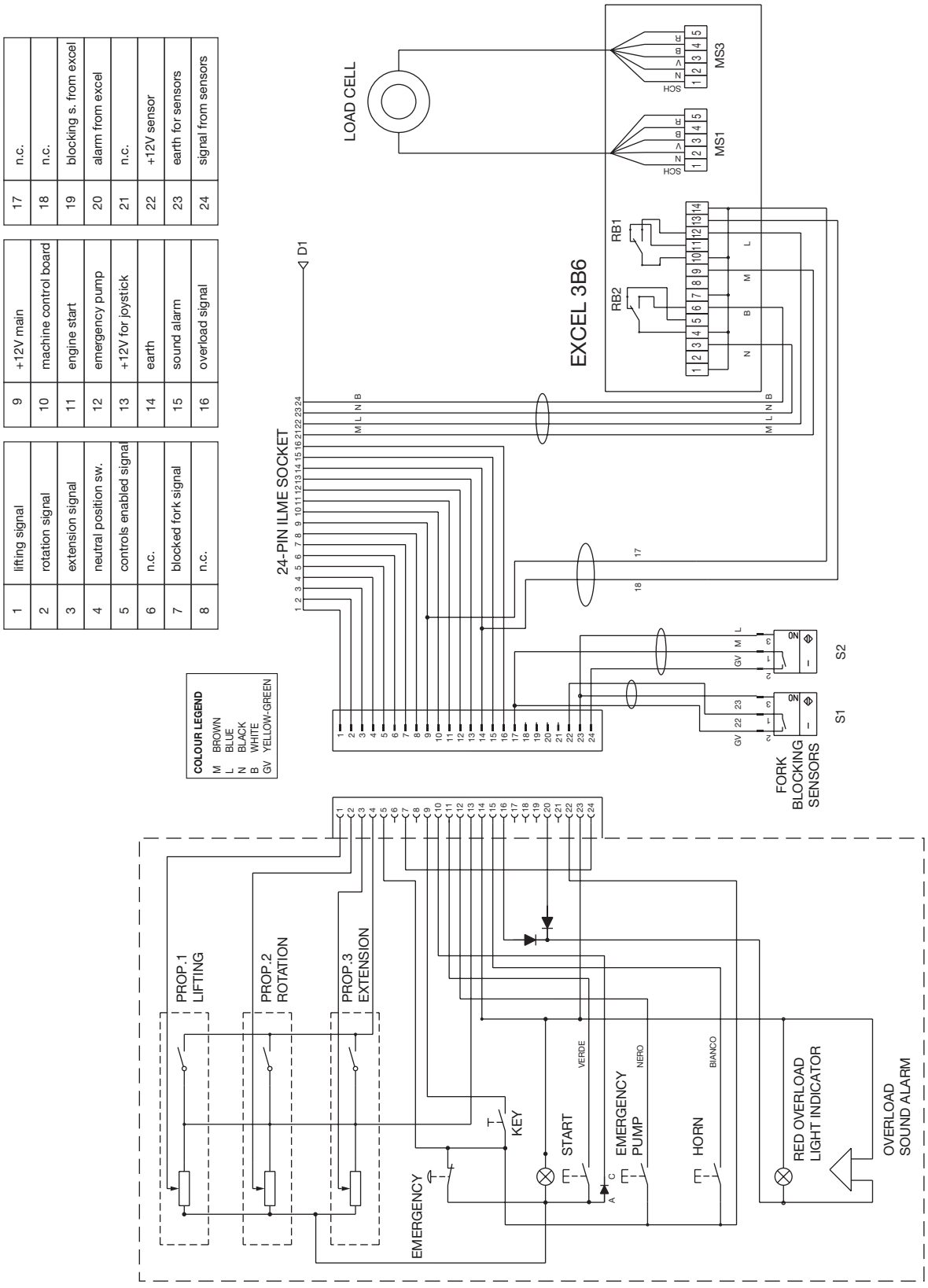
17	n.c.
18	n.c.
19	blocking s. from excel
20	alarm from excel
21	n.c.
22	+12V sensor
23	earth for sensors
24	sign. from sensors



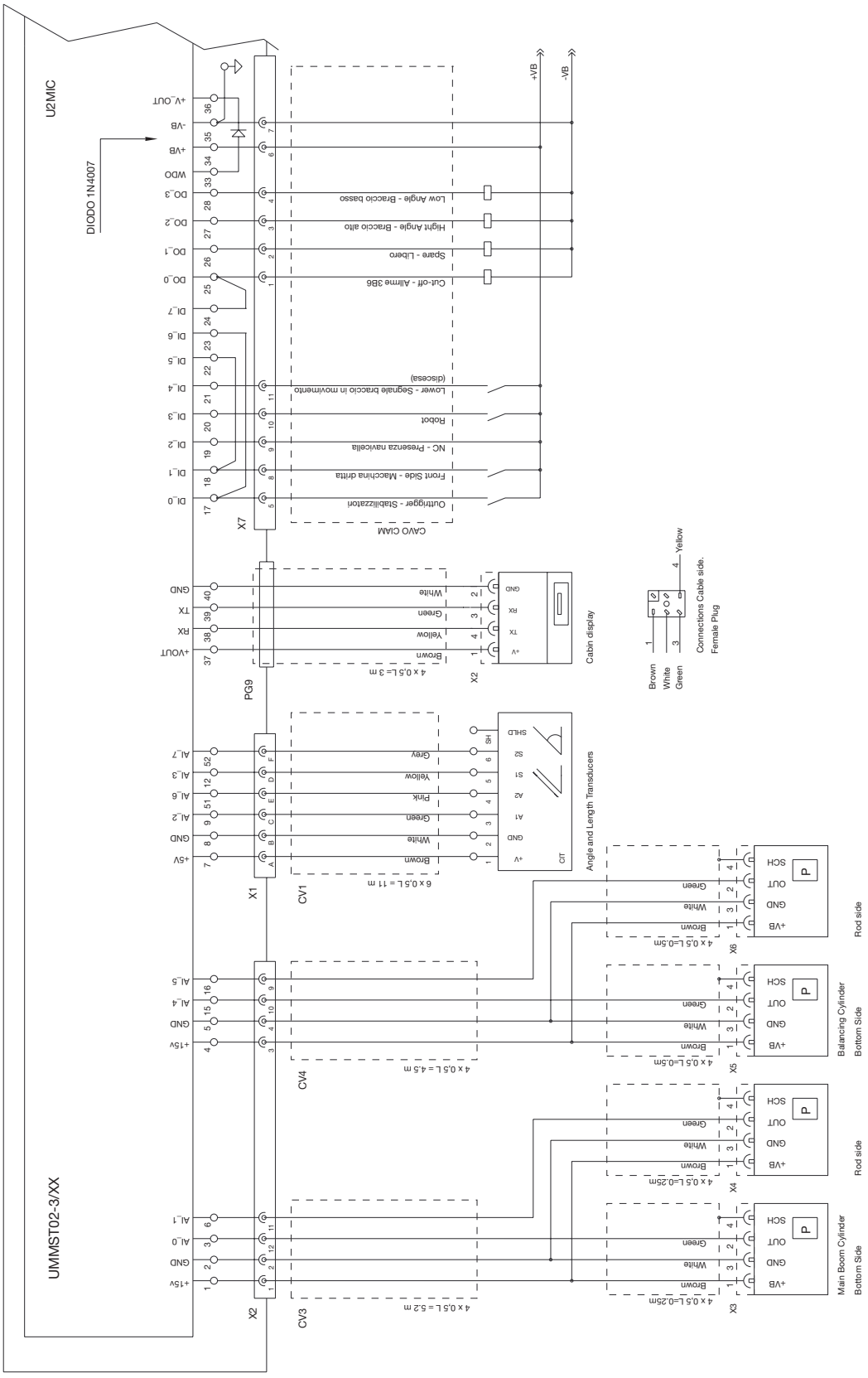
Operation:	Table:
AERIAL PLATFORM wiring diagram - DANFOSS hand-lever wiring on Girolift 3514 with double reel	**C.05.10.02**



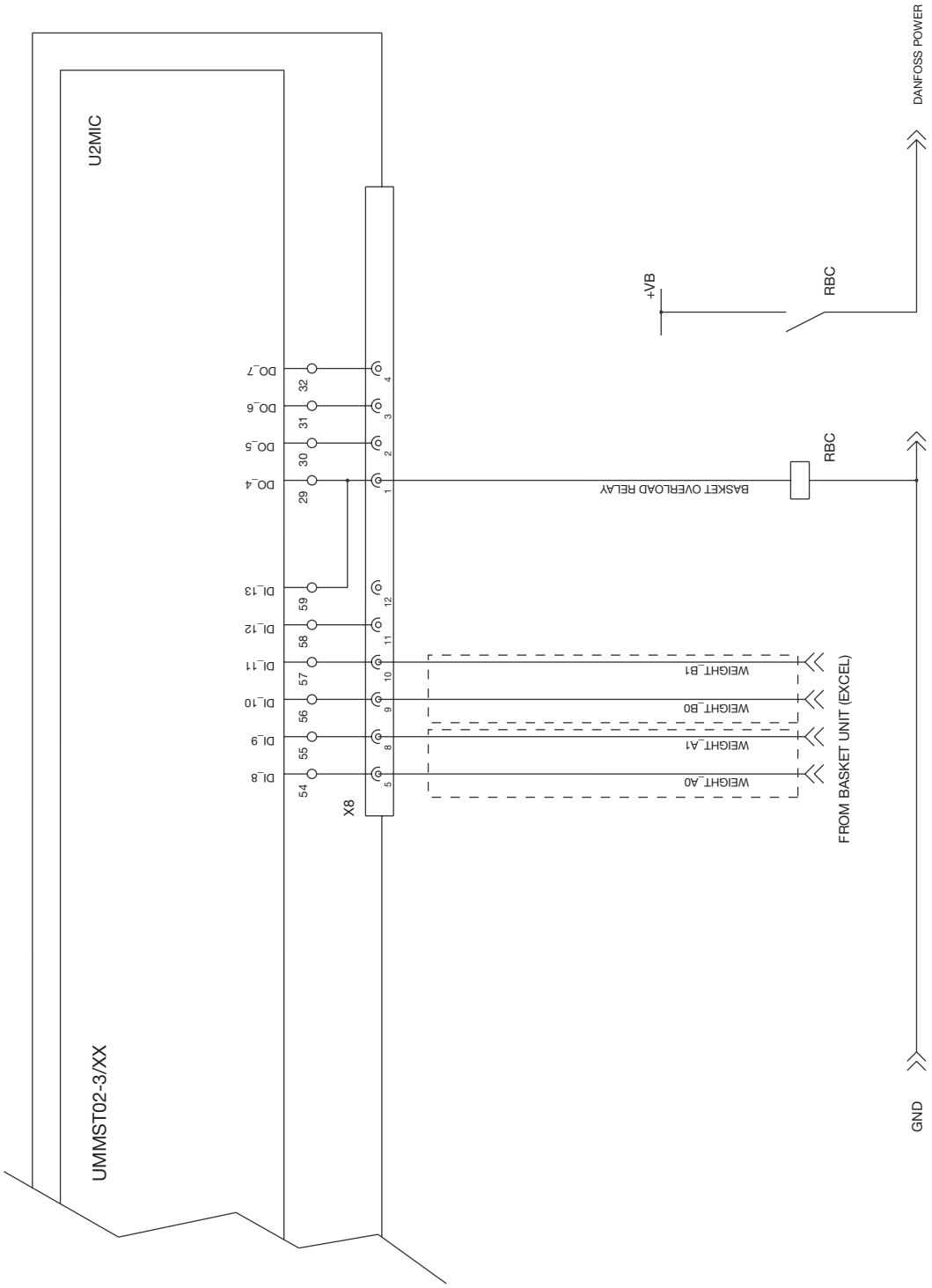
Operation:	Table:
AERIAL PLATFORM wiring diagram DANFOSS hand-lever wiring on Girolift 3518-5022	**C.05.10.03**



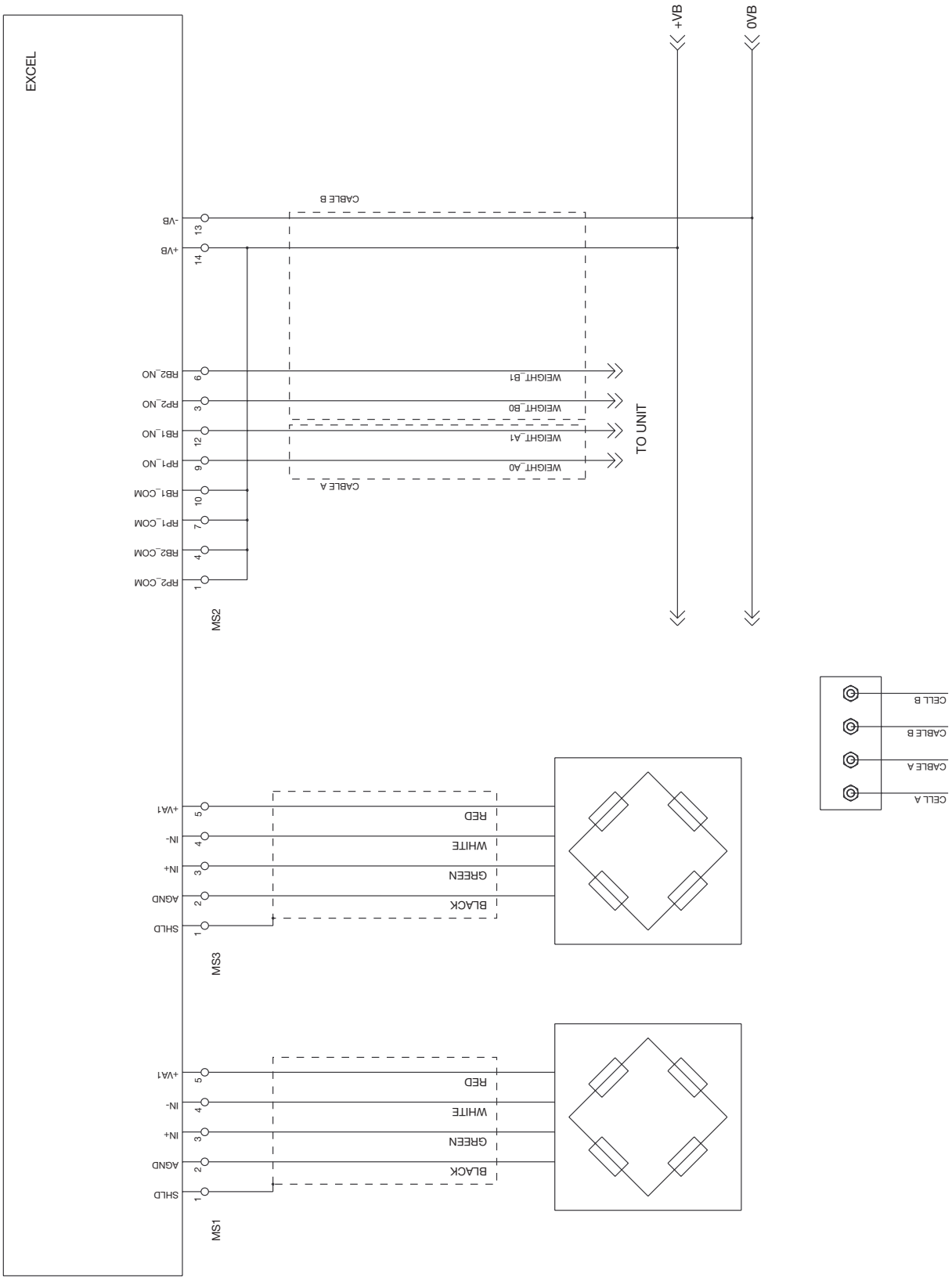
Operation: Wiring diagram - 3B6 “Excel” load limiter	*Table:* **C.05.11.01**



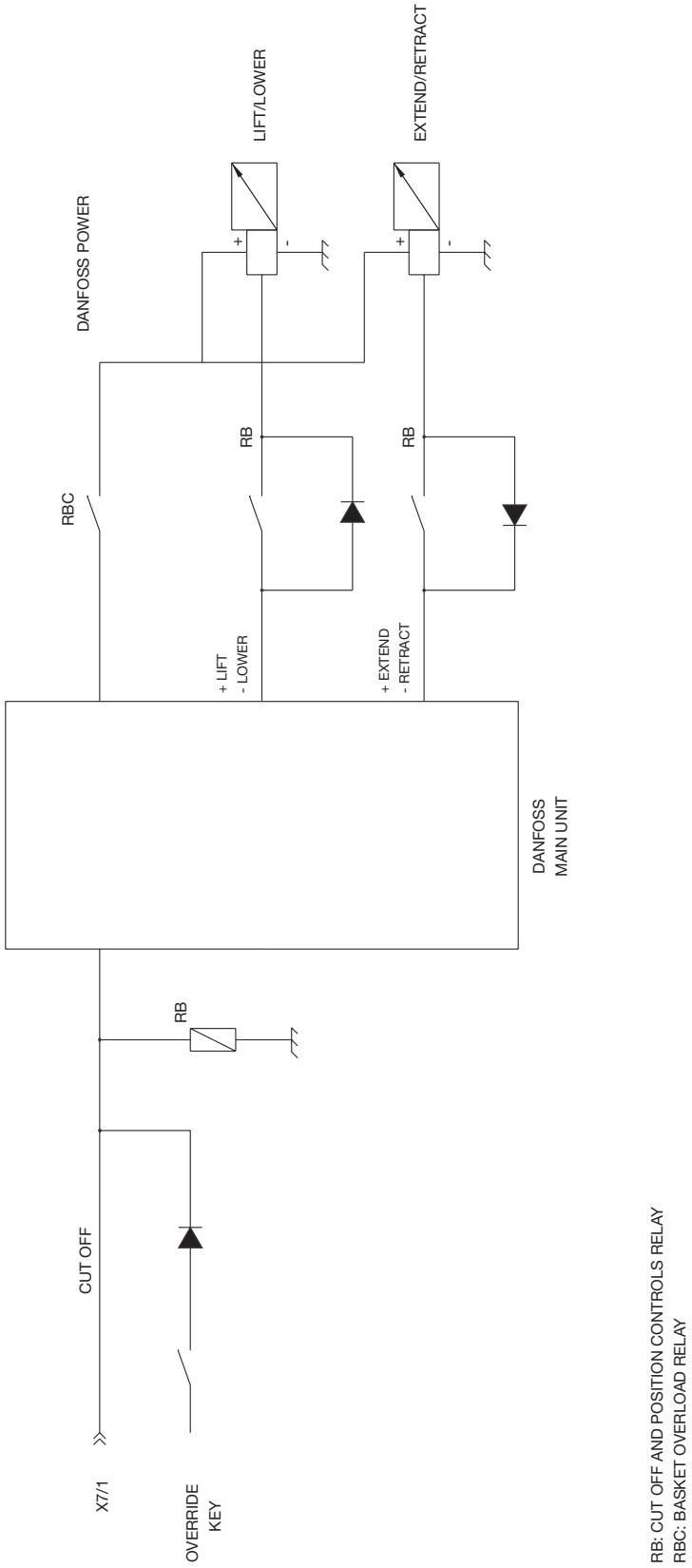
Operation: Wiring diagram - 3B6 “Excel” load limiter	Table: C.05.11.02



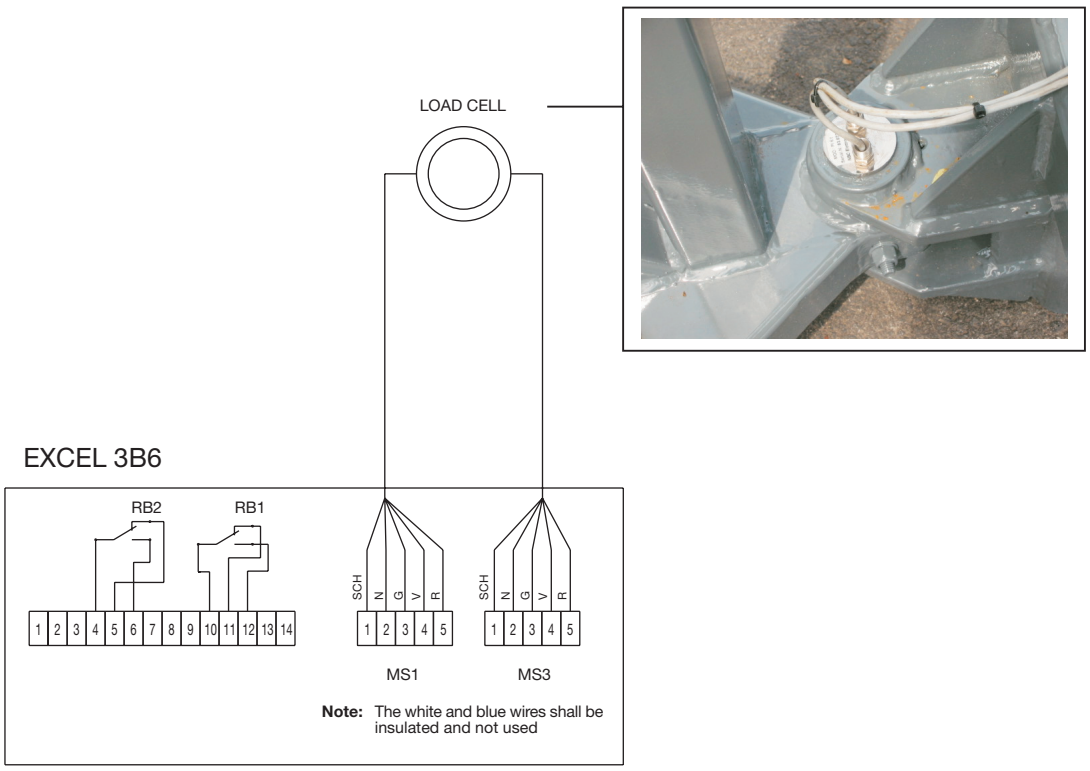
Operation: Wiring diagram - 3B6 “Excel” load limiter	*Table:* **C.05.11.03**



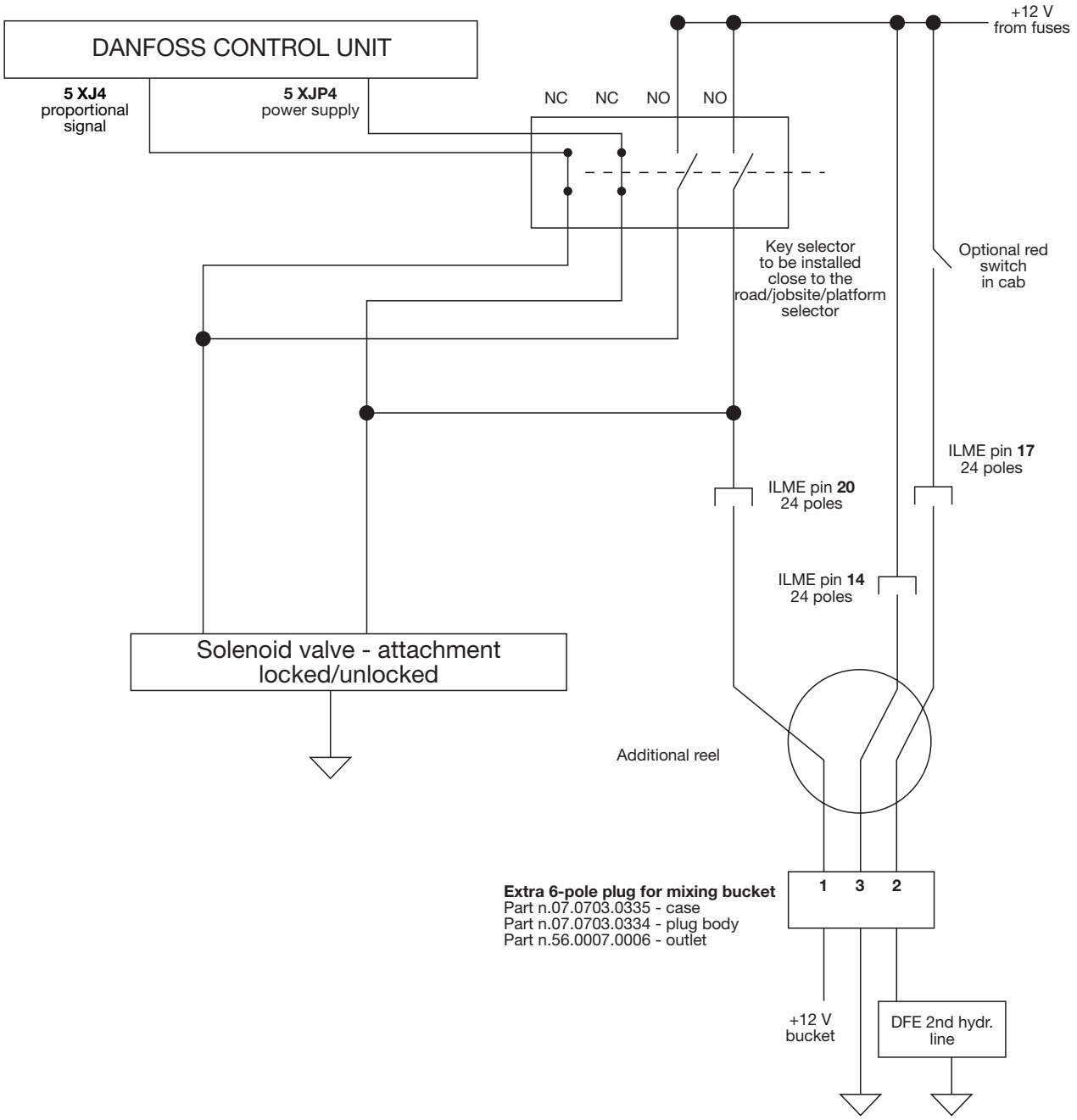
Operation: Wiring diagram - 3B6 “Excel” load limiter	*Table:* **C.05.11.04**



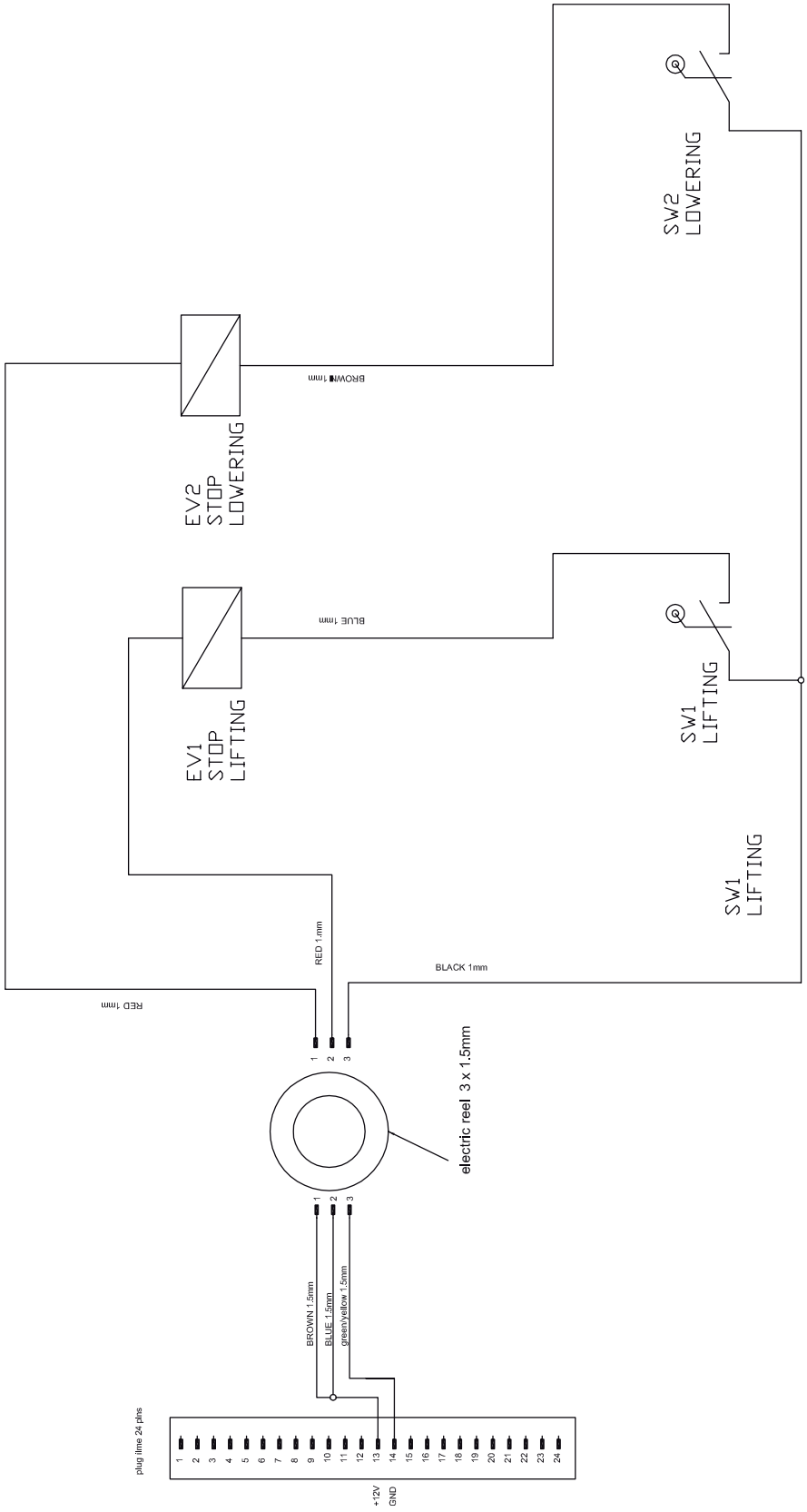
Operation:	Wiring diagram - Platform/boom connection - for **ROTARY** platforms **from serial no. 55116**	Table: **C.05.12**



Operation: Mixing buckets wiring diagram	*Table:* **C.05.13**



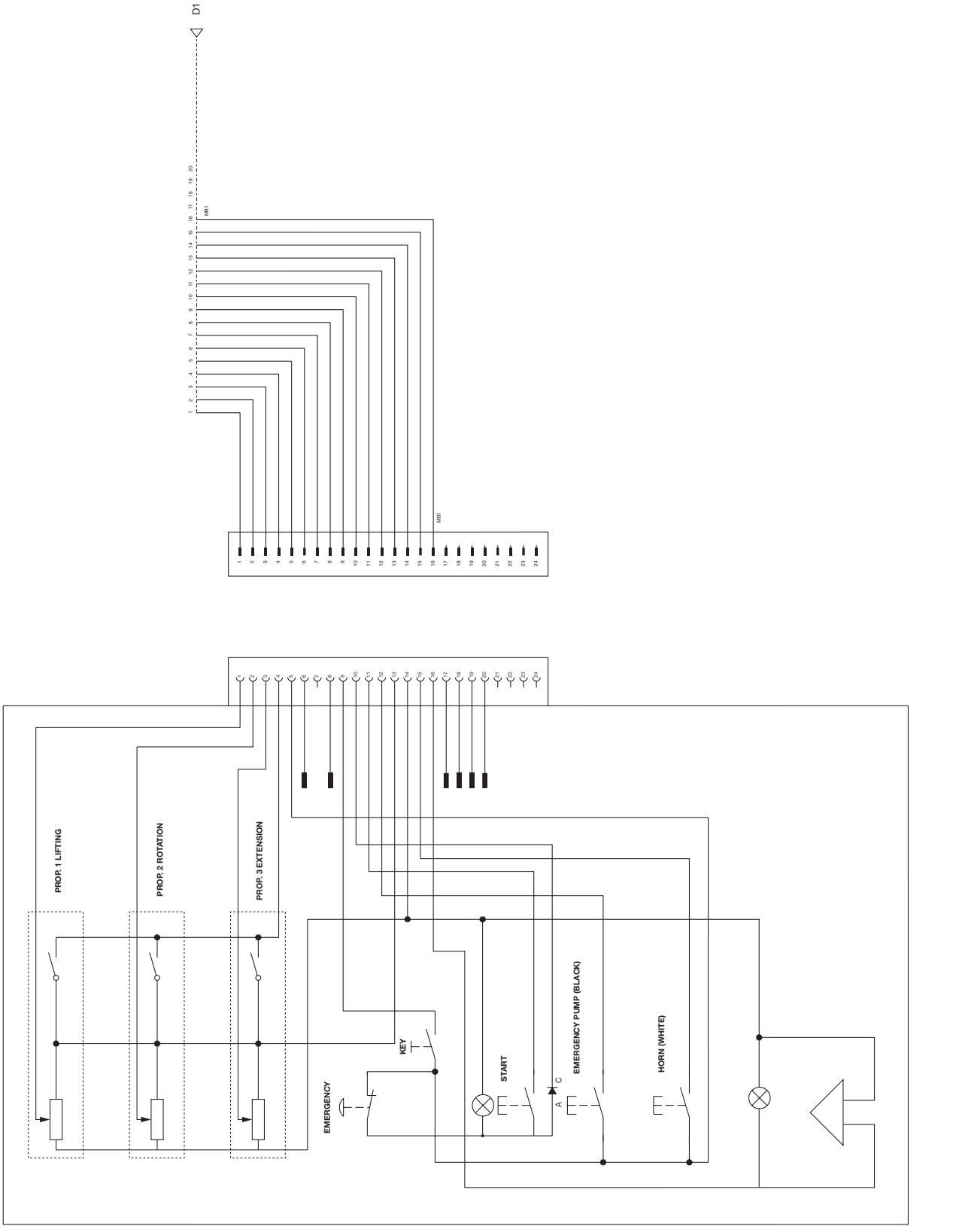
Operation: Wiring diagram - extension jibs and winches	Table: C.05.14



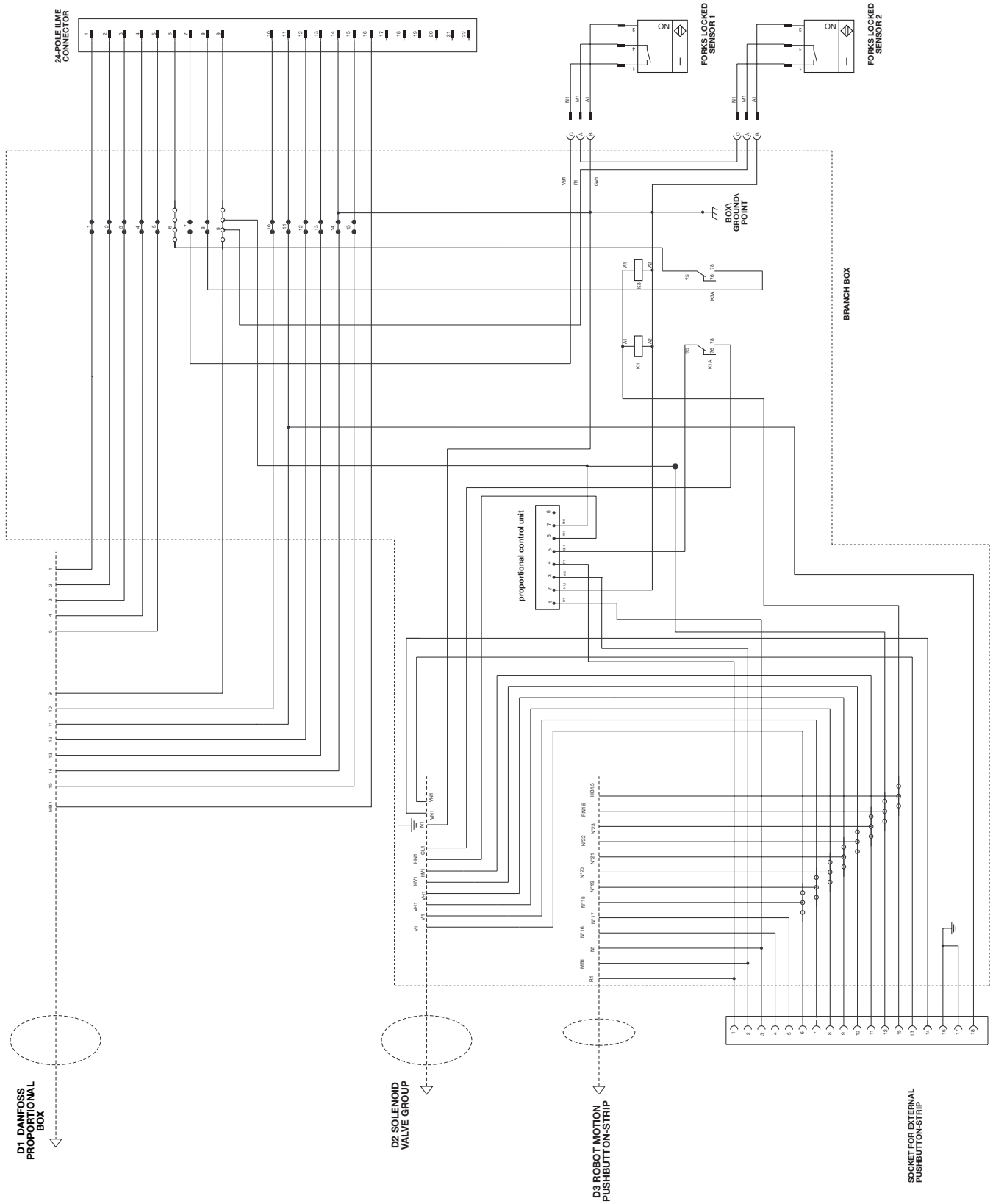
WIRE COLOURS

B WHITE
L BLUE
M BROWN
N BLACK
GV YELLOW-GREEN

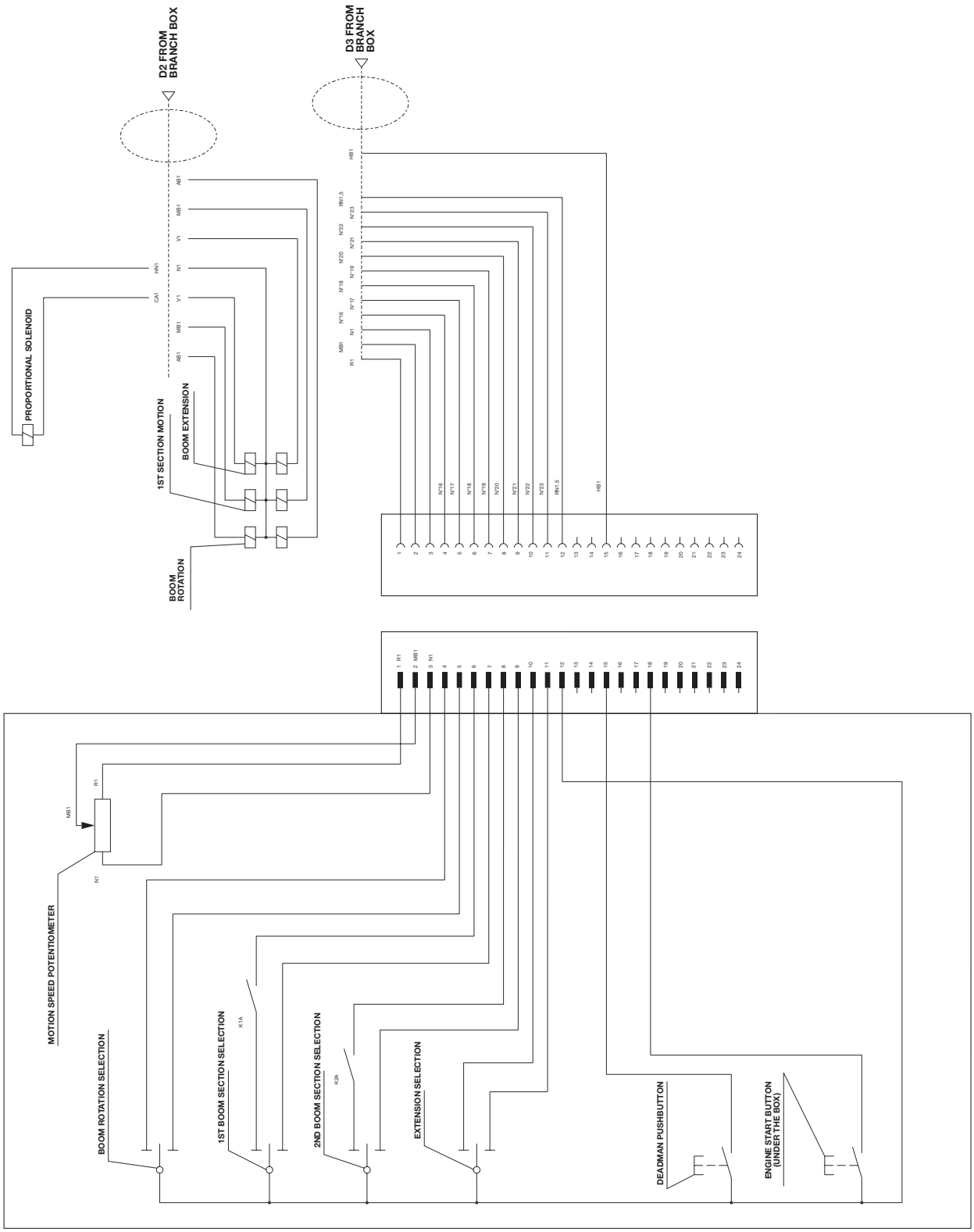
Operation: Wiring diagram - Robot 8000	Table: C.05.15.1.1



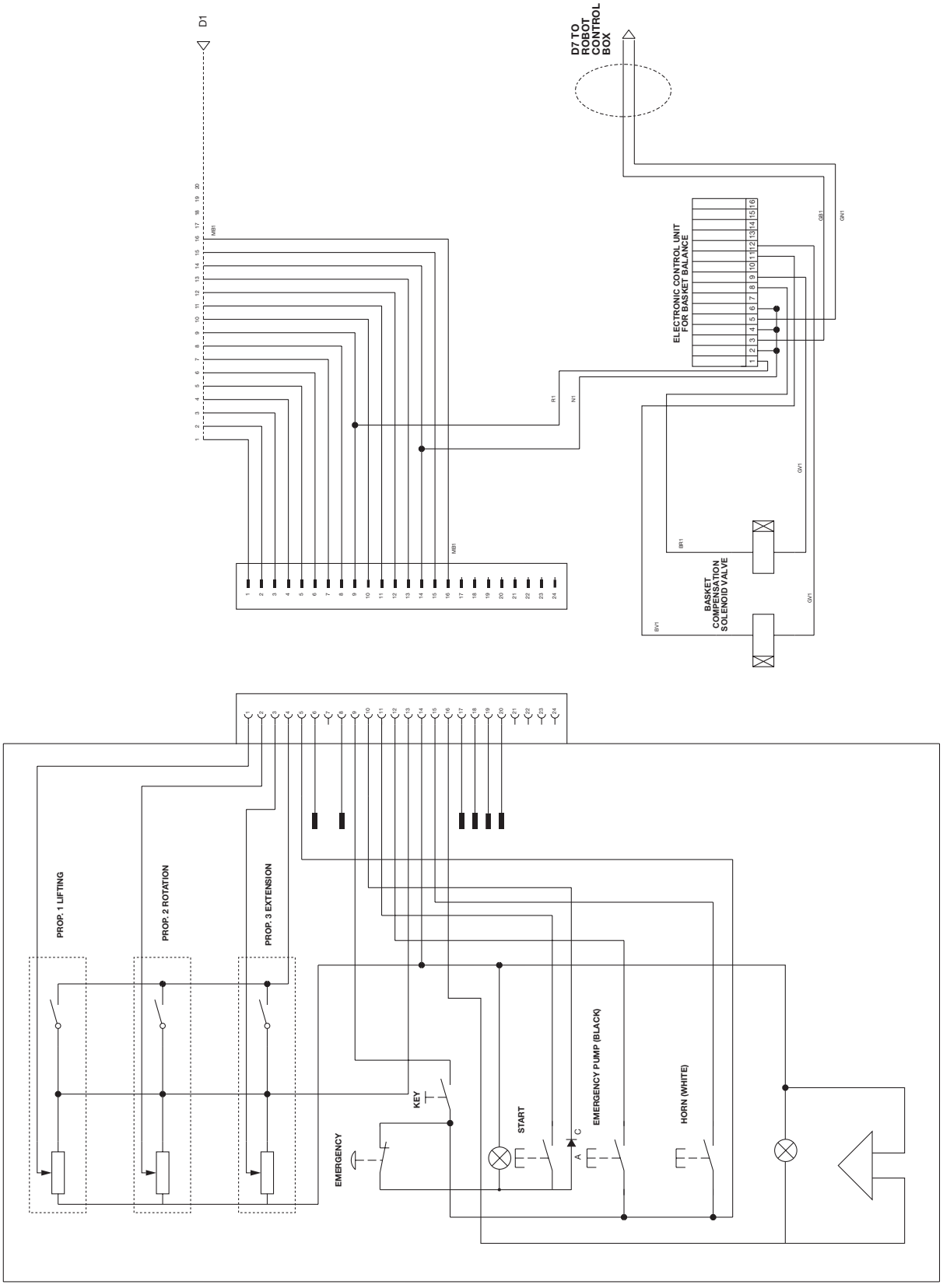
Operation: Wiring diagram - Robot 8000	Table: C.05.15.1.2



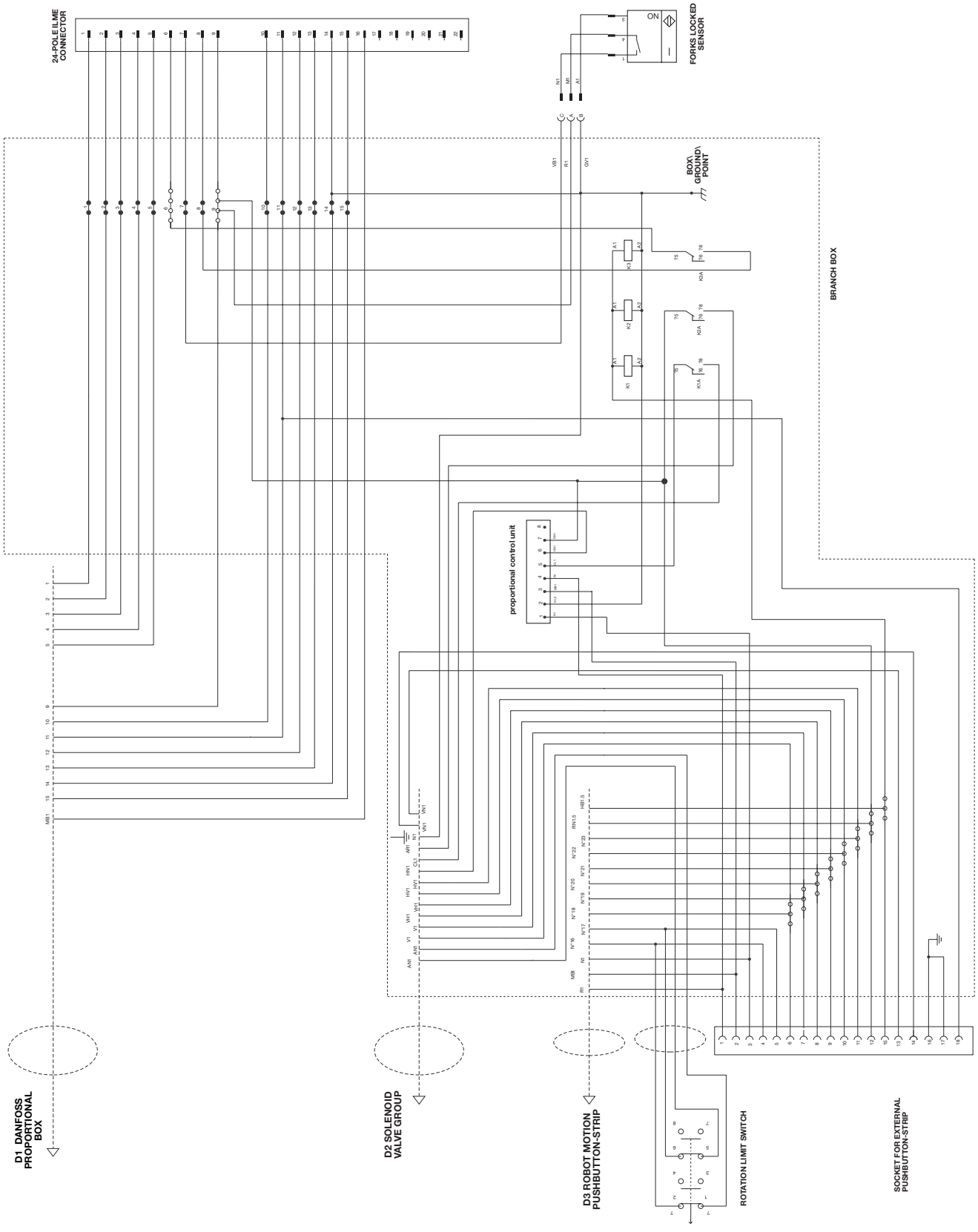
Operation: Wiring diagram - Robot 8000	Table: C.05.15.1.3



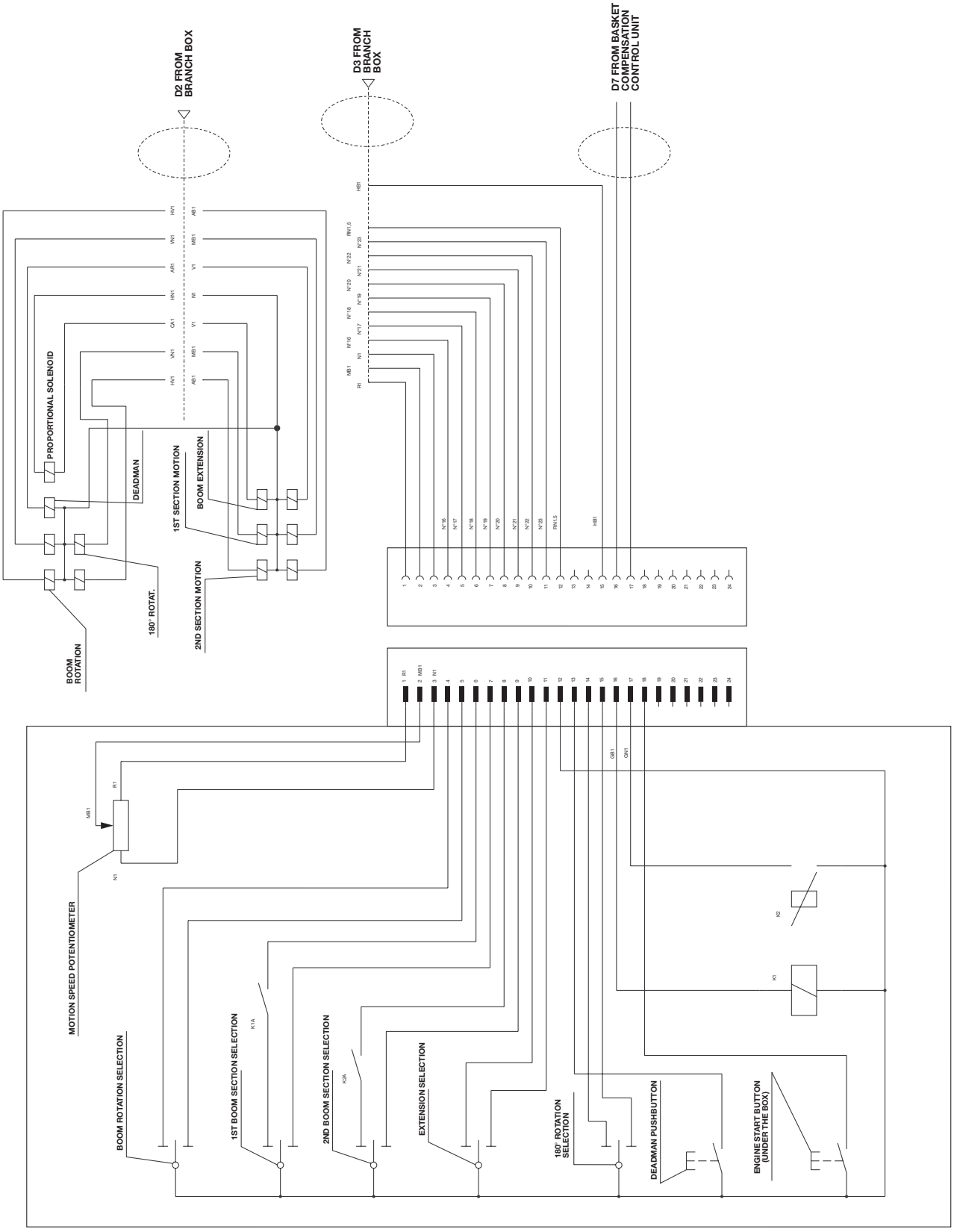
Operation: Wiring diagram - Robot 15000	Table: C.05.15.2.1



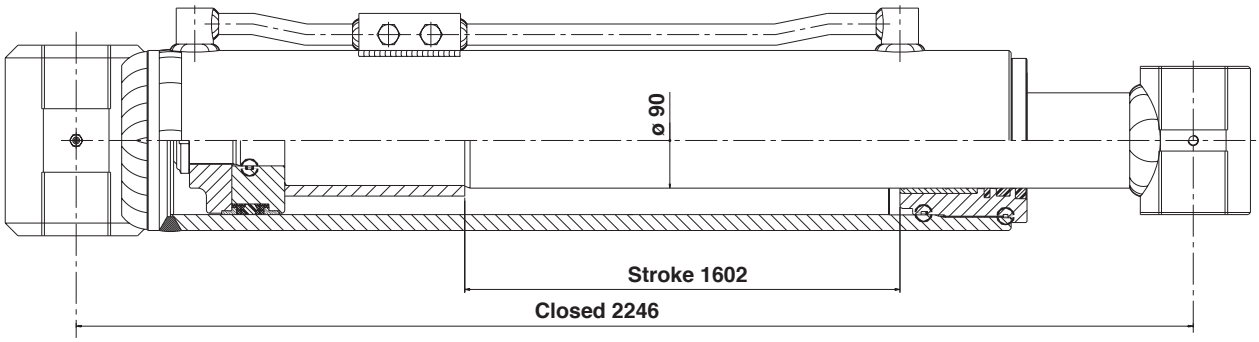
Operation: Wiring diagram - Robot 15000	Table: C.05.15.2.2

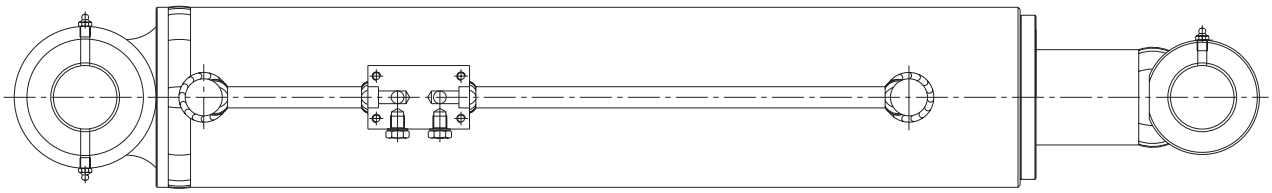


Operation: Wiring diagram - Robot 15000	*Table:* **C.05.15.2.3**



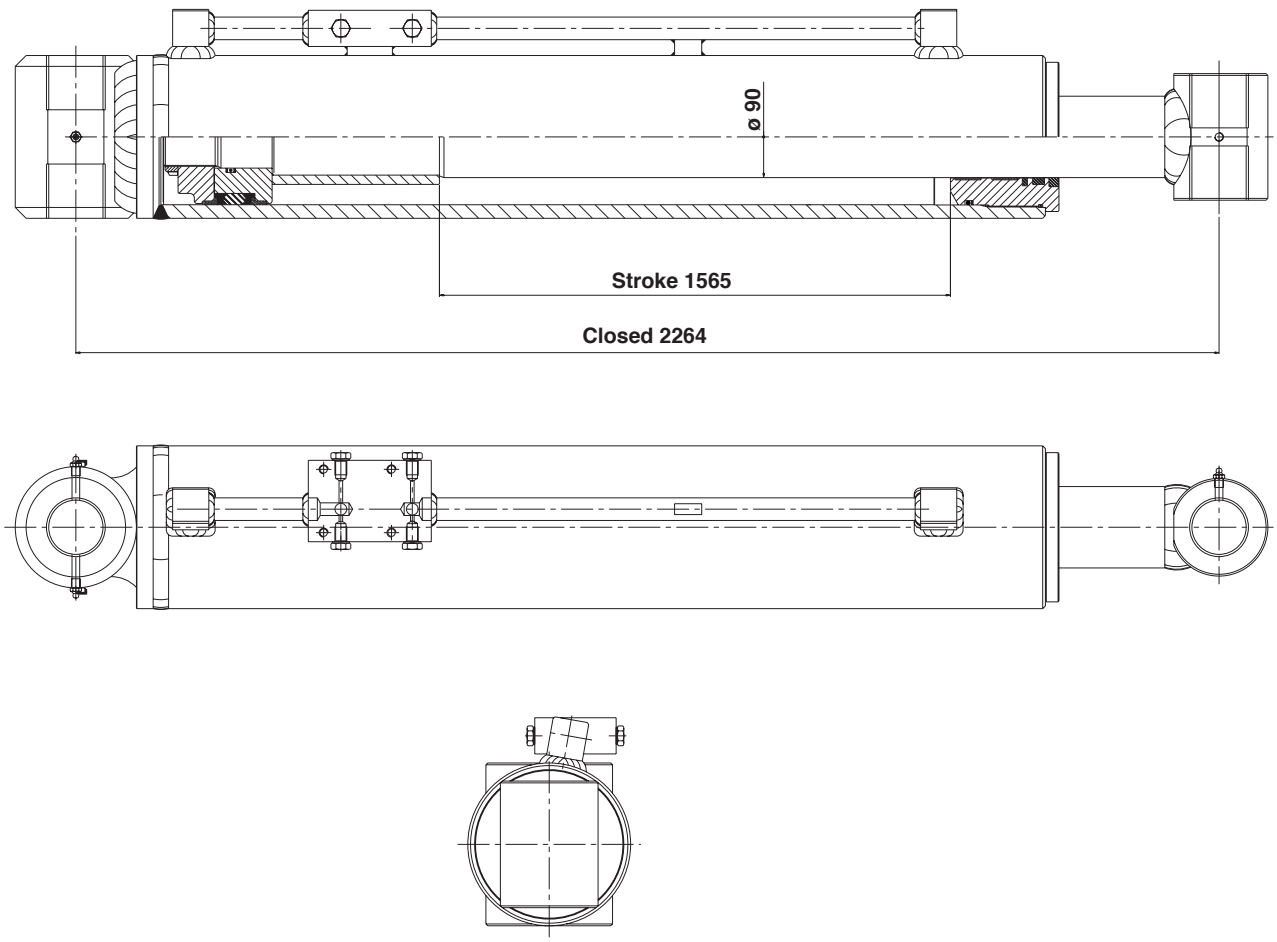
Operation: Boom raising cylinder - Girolift 3514	*Table:* **C.06.1.1**





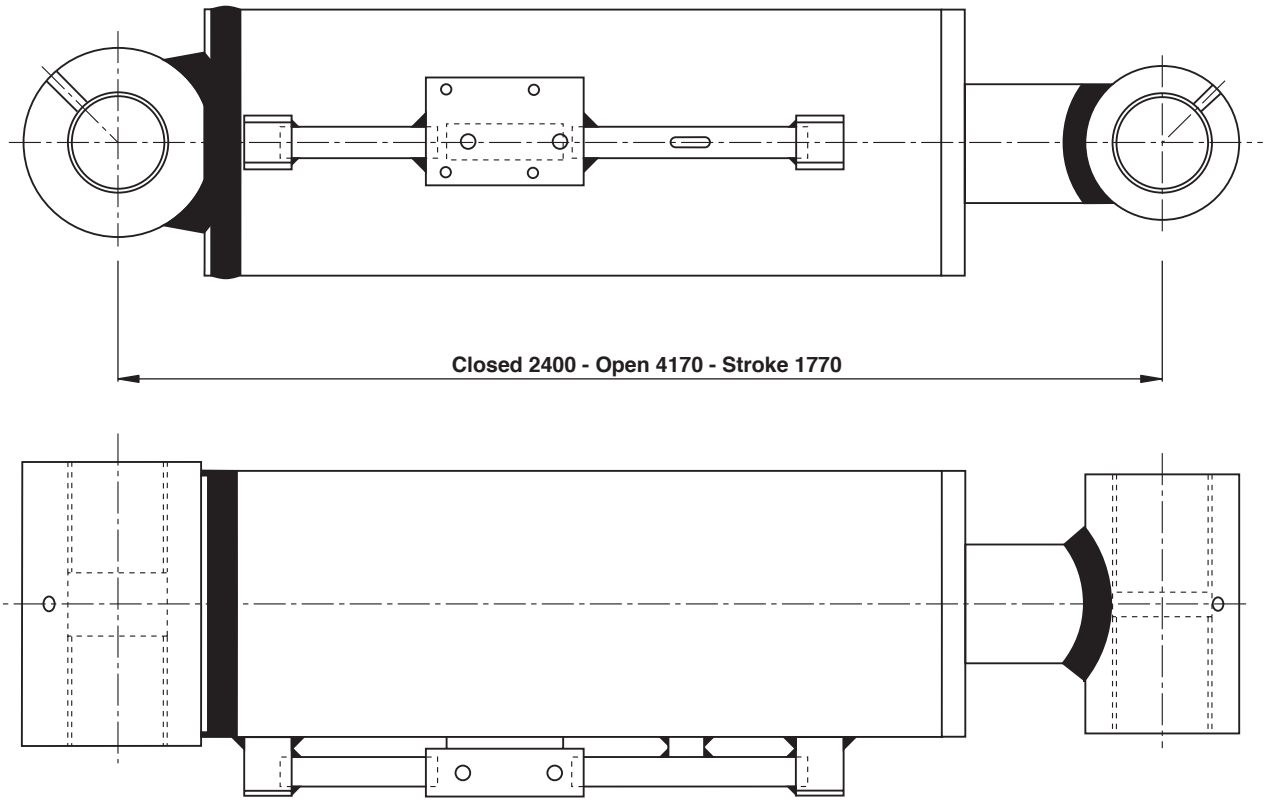
DESCRIPTION	**INDICATIVE CHARACTERISTICS**
Rod material	C45
Rod tolerance	f7
Rod roughness	Ra max 0.2 my
Chrome-plating thickness	25 (+5/-5) my
Chrome-plating hardness	900-1100 HV (Vichers 100 g)
Liner material	St 52.3
Liner tolerance	H8
Liner roughness	Ra max 0.2 my

Operation: Boom raising cylinder - Girolift 3518	Table: C.06.1.2



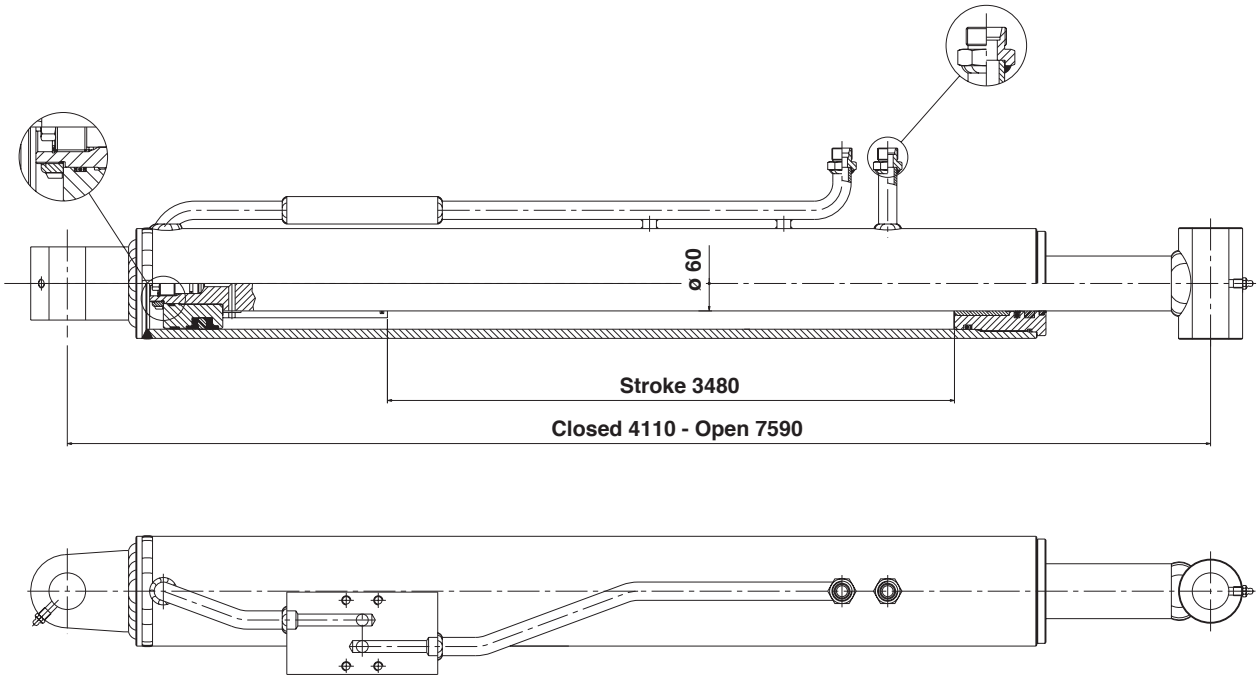
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	C45
Rod tolerance	f7
Rod roughness	Ra max 0.2 my
Chrome-plating thickness	25 (+5/-5) my
Chrome-plating hardness	900-1100 HV (Vichers 100 g)
Liner material	St 52.3
Liner tolerance	H8
Liner roughness	Ra max 0.2 my

Operation: Boom raising cylinder - Girolift 5022	*Table:* **C.06.1.3**



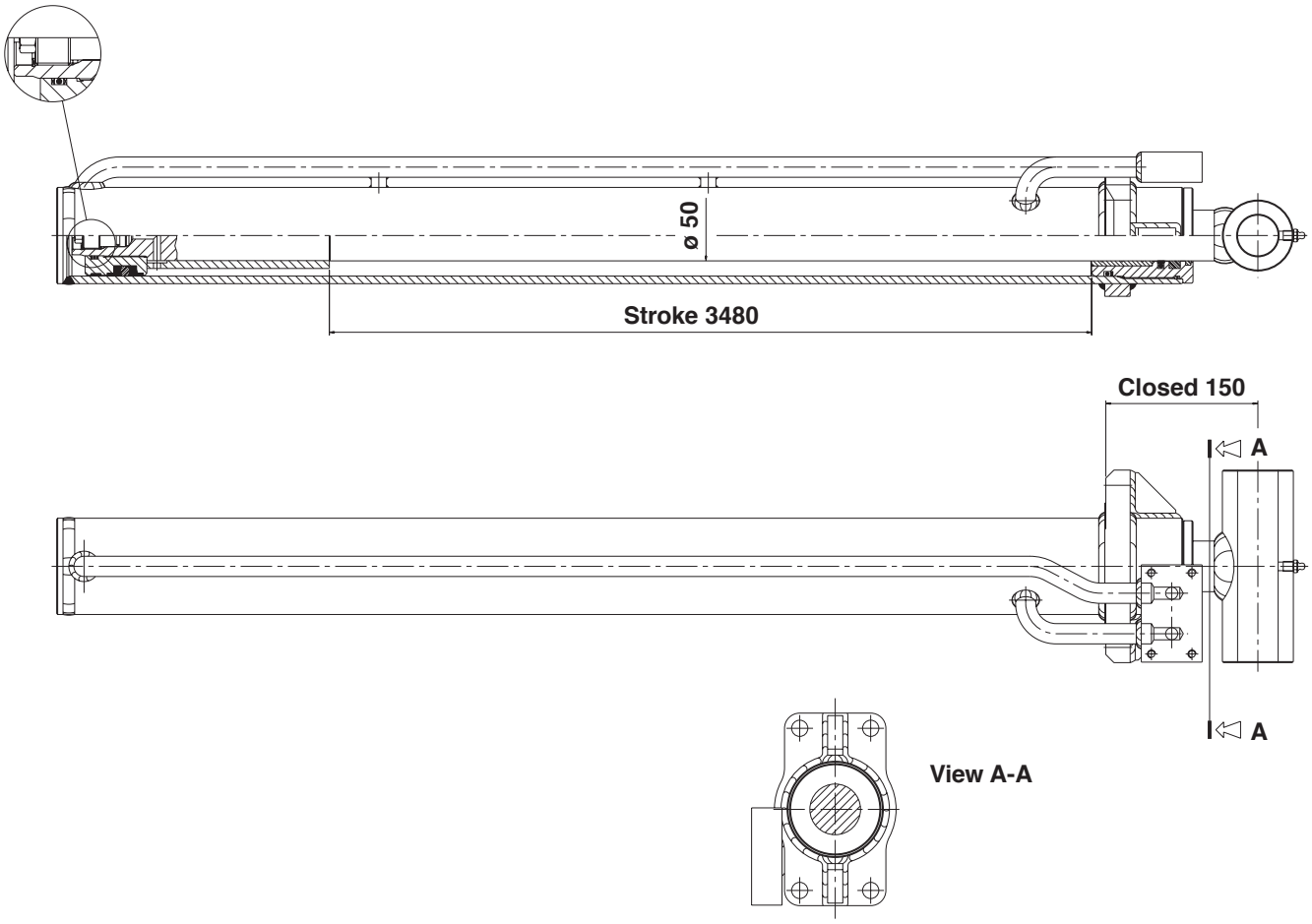
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	C40
Chrome-plating thickness	≥ 0,025 mm
Liner material	Fe 52

Operation:	2nd boom element extension cylinder - Girolift 3514	*Table:*
		C.06.2.1



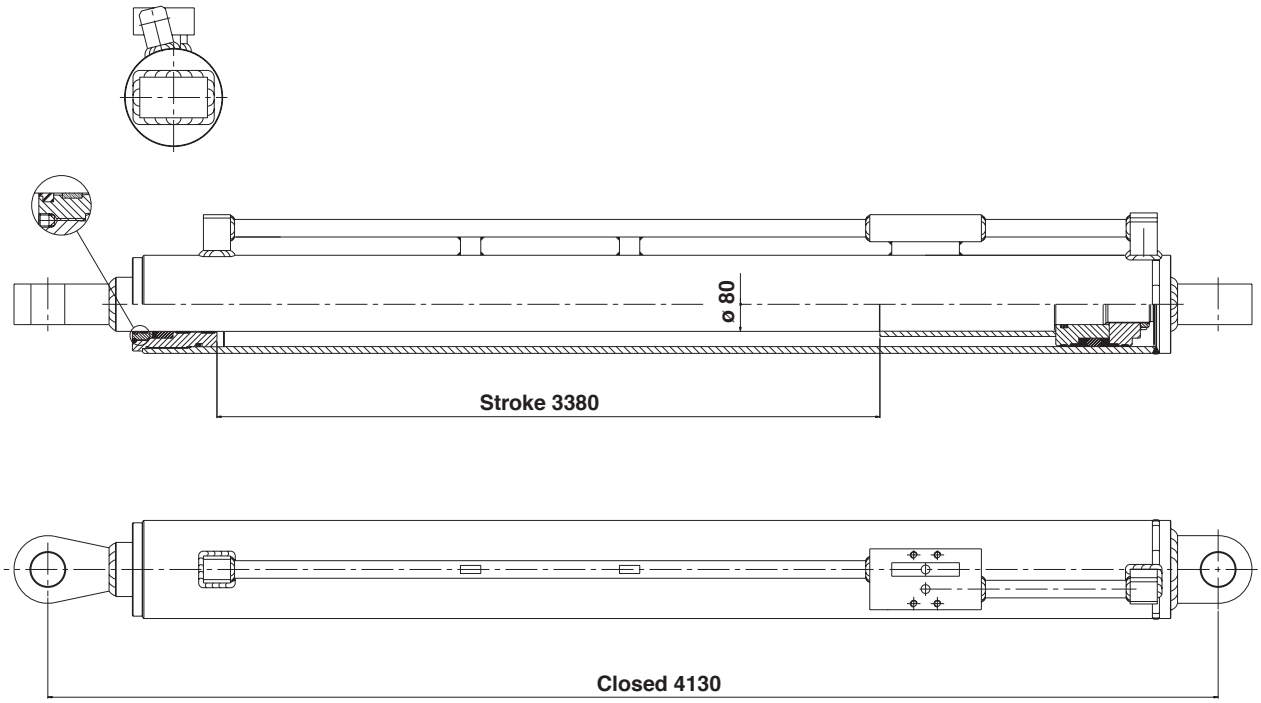
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	C45
Rod tolerance	f7
Rod roughness	Ra max 0.2 my
Chrome-plating thickness	25 (+5/-5) my
Chrome-plating hardness	900-1100 HV (Vichers 100 g)
Liner material	St 52.3
Liner tolerance	H8
Liner roughness	Ra max 0.2 my

Operation:	Table:
3rd boom element extension cylinder - Girolift 3514	C.06.2.2



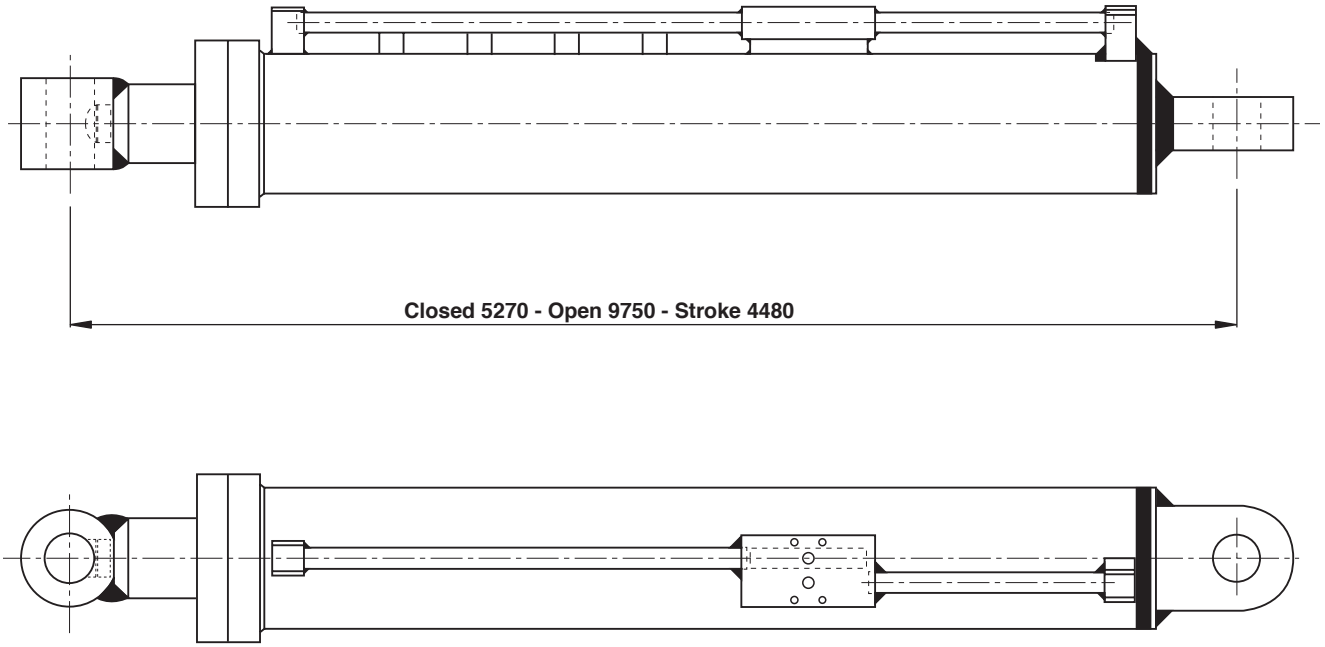
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	C45
Rod tolerance	f7
Rod roughness	Ra max 0.2 my
Chrome-plating thickness	25 (+5/-5) my
Chrome-plating hardness	900-1100 HV (Vichers 100 g)
Liner material	St 52.3
Liner tolerance	H8
Liner roughness	Ra max 0.2 my

Operation: Boom extension cylinder - Girolift 3518	*Table:* **C.06.2.3**



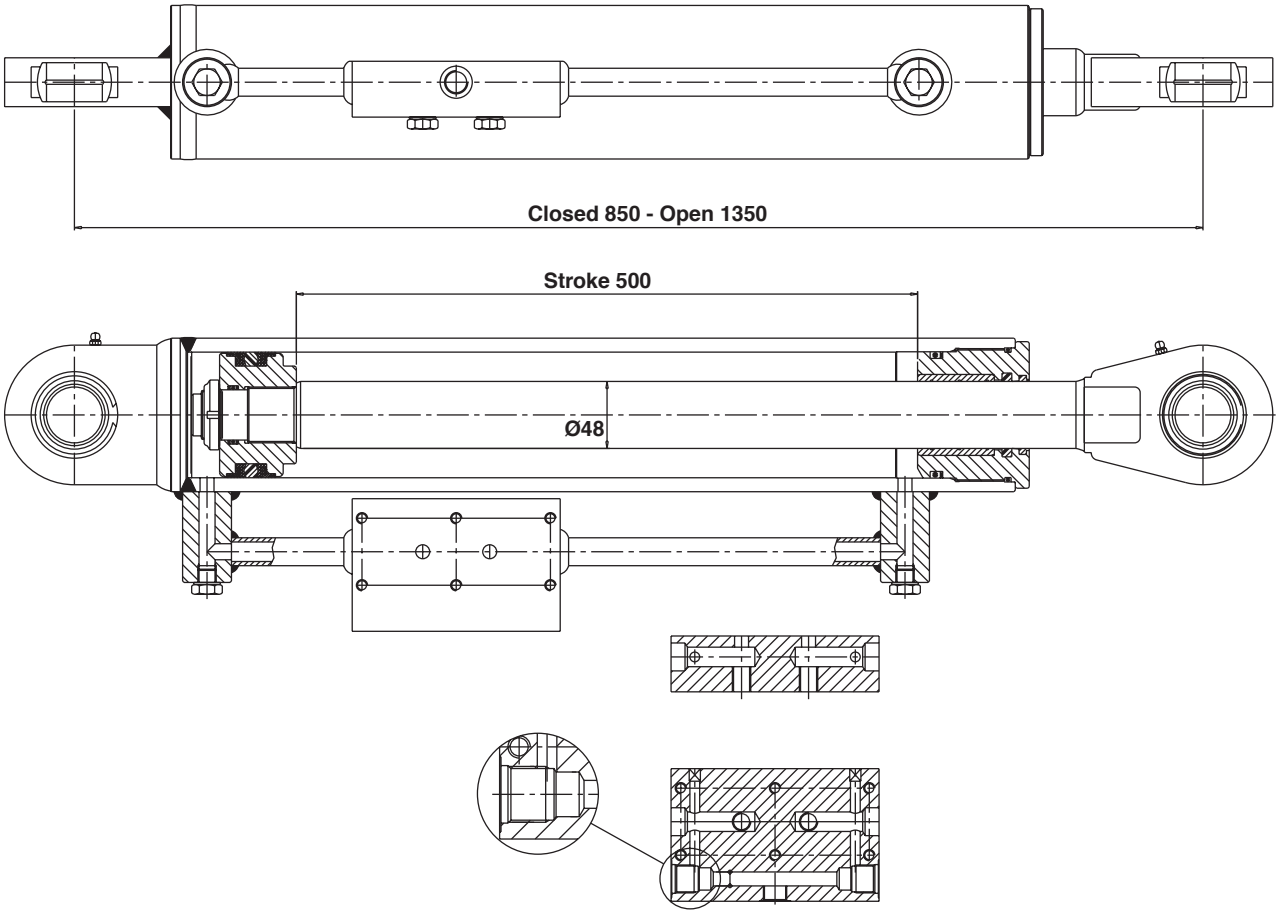
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	42 Cr Mo4
Rod tolerance	f7
Rod roughness	Ra max 0.2 my
Chrome-plating thickness	25 (+5/-5) my
Chrome-plating hardness	900-1100 HV (Vichers 100 g)
Liner material	St 52.3
Liner tolerance	H8
Liner roughness	Ra max 0.2 my

Operation: Boom extension cylinder - Girolift 5022	*Table:* **C.06.2.4**



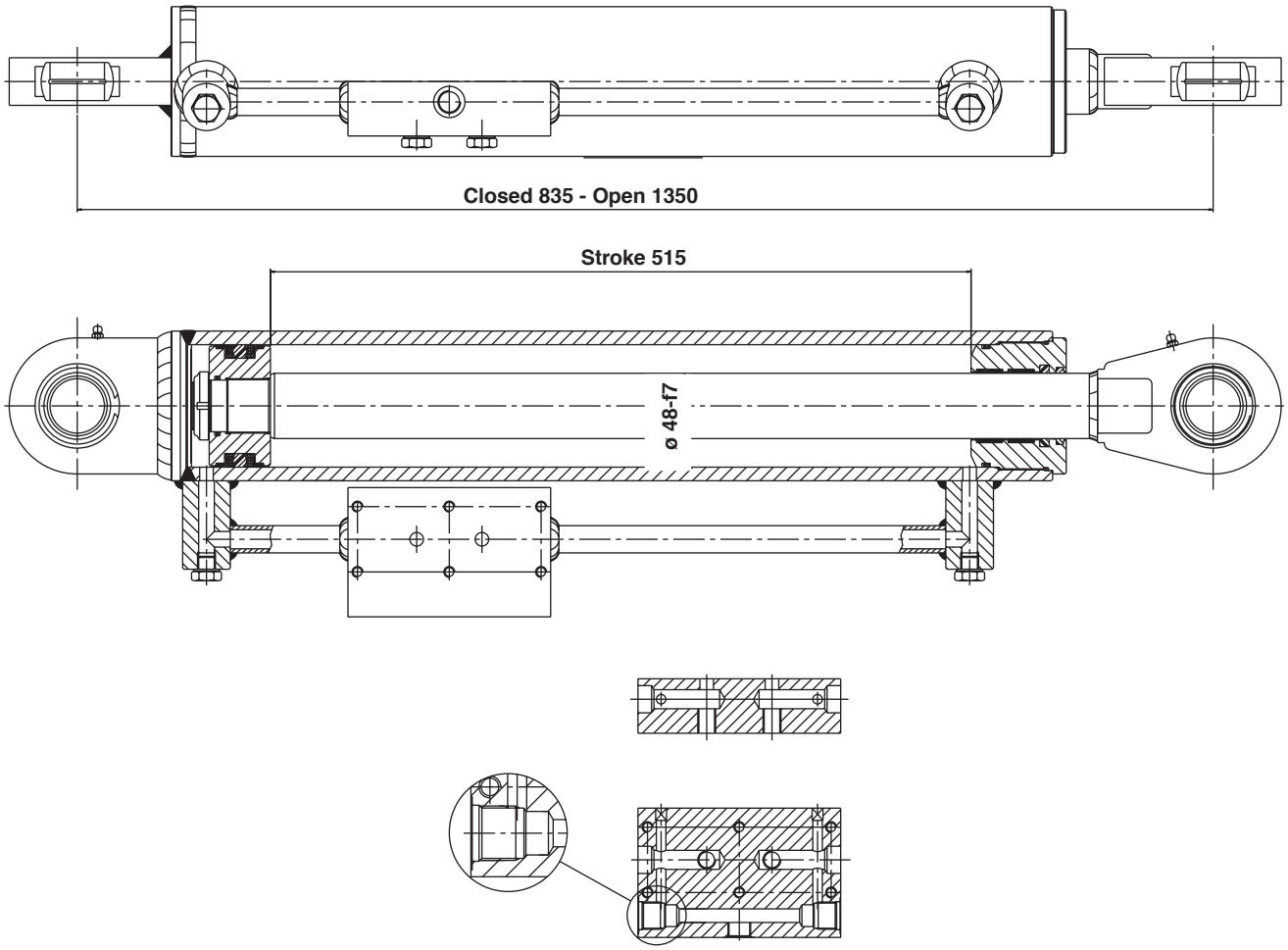
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	38NiCrMo4
Chrome-plating thickness	≥ 0,025 mm
Liner material	Fe 52

Operation:	Compensation cylinder - Girolift 3514	Table: C.06.3.1



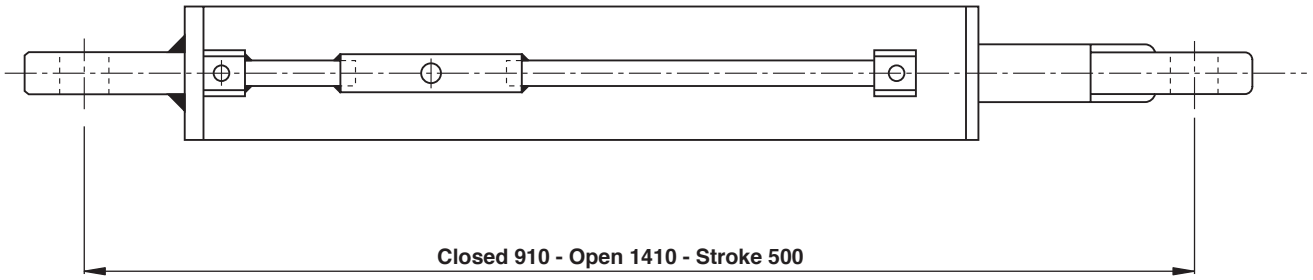
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	C45
Rod tolerance	f7
Rod roughness	Ra max 0.2 my
Chrome-plating thickness	25 (+5/-5) my
Chrome-plating hardness	900-1100 HV (Vichers 100 g)
Liner material	St 52.3
Liner tolerance	H8
Liner roughness	Ra max 0.2 my

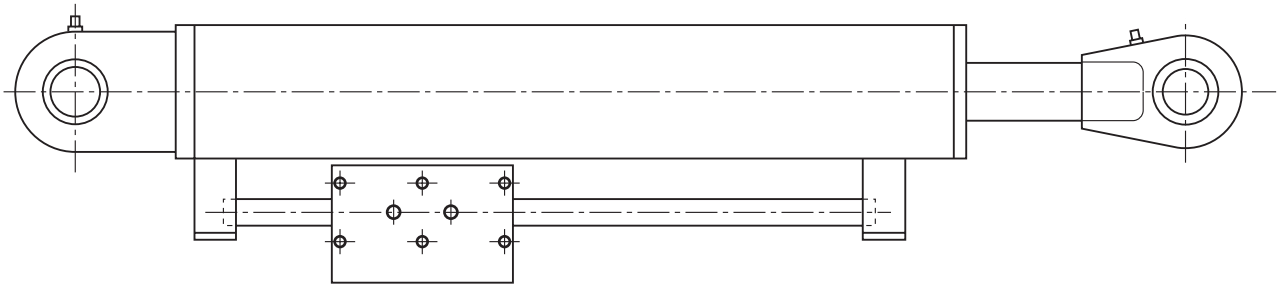
Operation: Compensation cylinder - Girolift 3518	*Table:* **C.06.3.2**



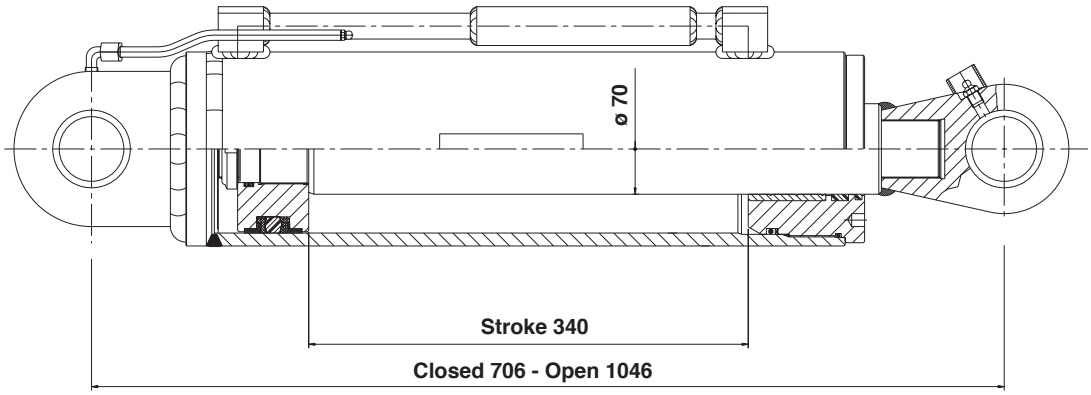
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	C45
Rod tolerance	f7
Rod roughness	Ra max 0.2 my
Chrome-plating thickness	25 (+5/-5) my
Chrome-plating hardness	900-1100 HV (Vichers 100 g)
Liner material	St 52.3
Liner tolerance	H8
Liner roughness	Ra max 0.2 my

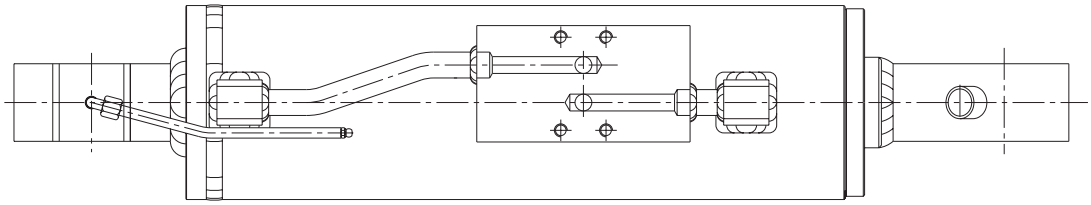
Operation: Compensation cylinder - Girolift 5022	*Table:* **C.06.3.3**





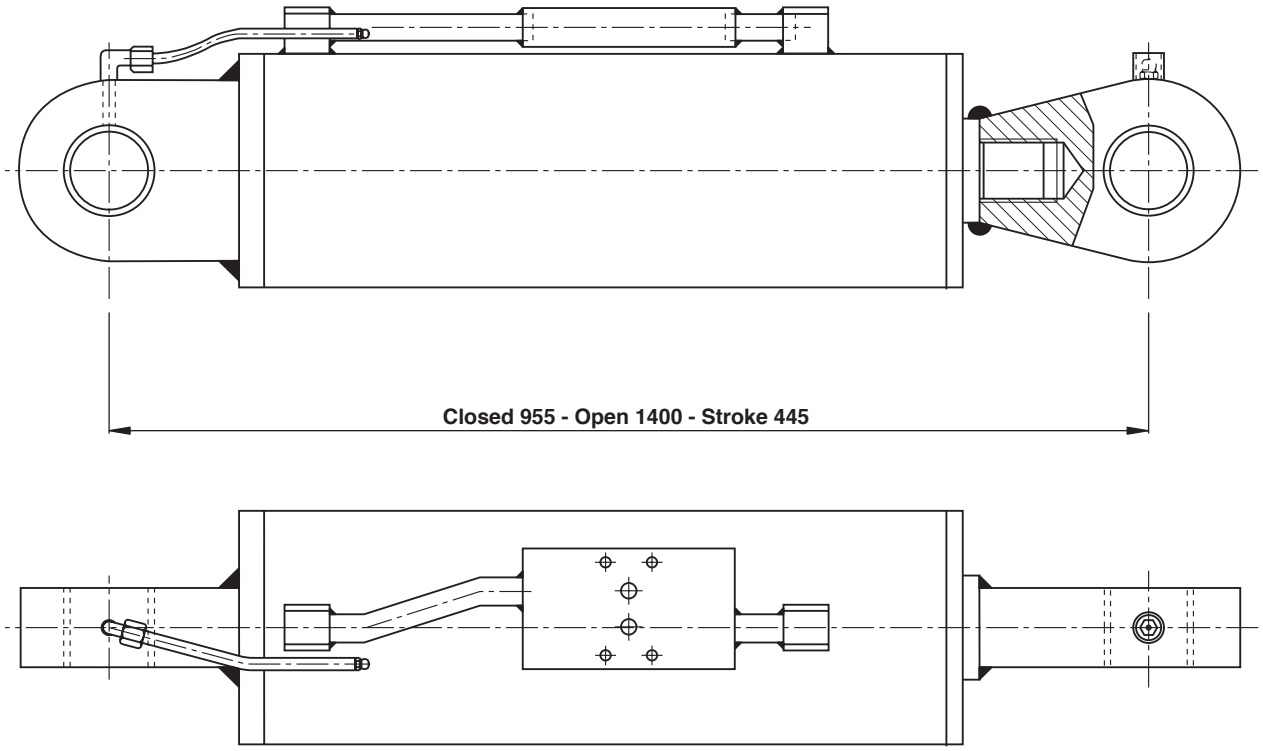
Operation: Fork movement cylinder - Girolift 3514 - 3518	*Table:* **C.06.4.1**





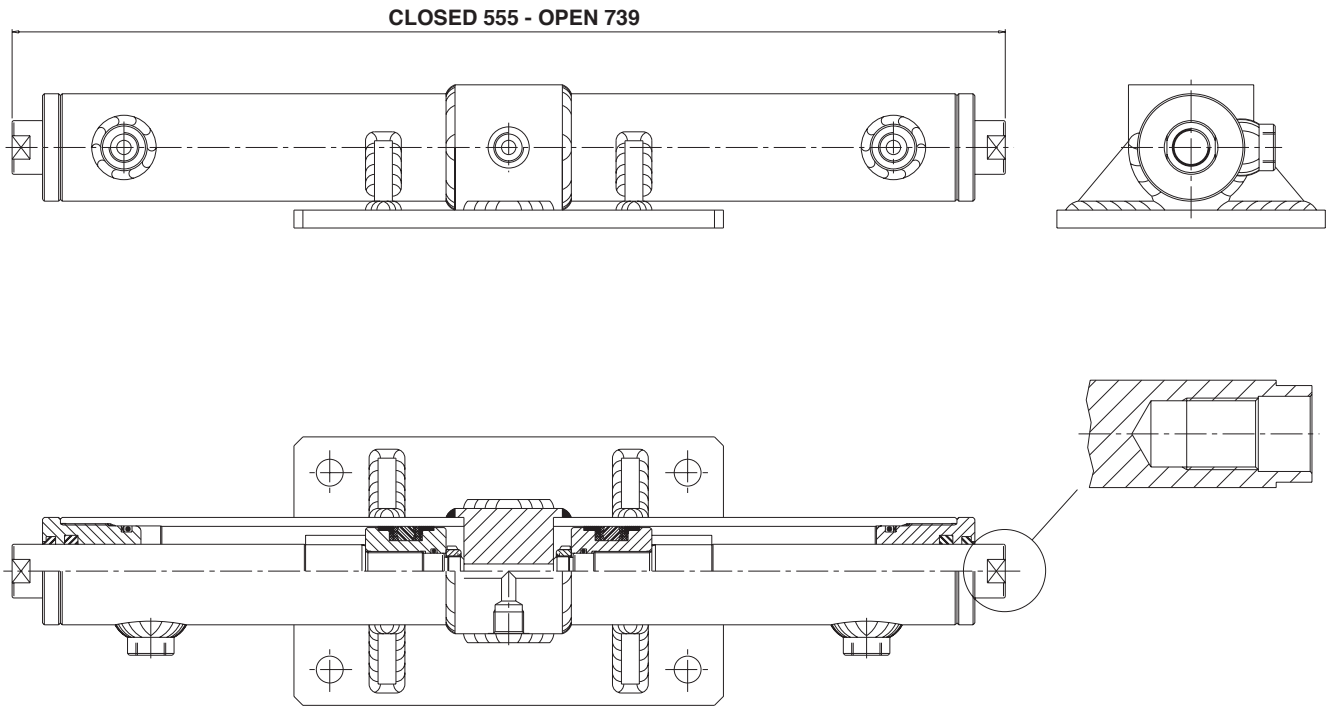
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	C45
Rod tolerance	f7
Rod roughness	Ra max 0.2 my
Chrome-plating thickness	25 (+5/-5) my
Chrome-plating hardness	900-1100 HV (Vichers 100 g)
Liner material	St 52.3
Liner tolerance	H8
Liner roughness	Ra max 0.2 my

Operation: Fork movement cylinder - Girolift 5022	Table: C.06.4.2



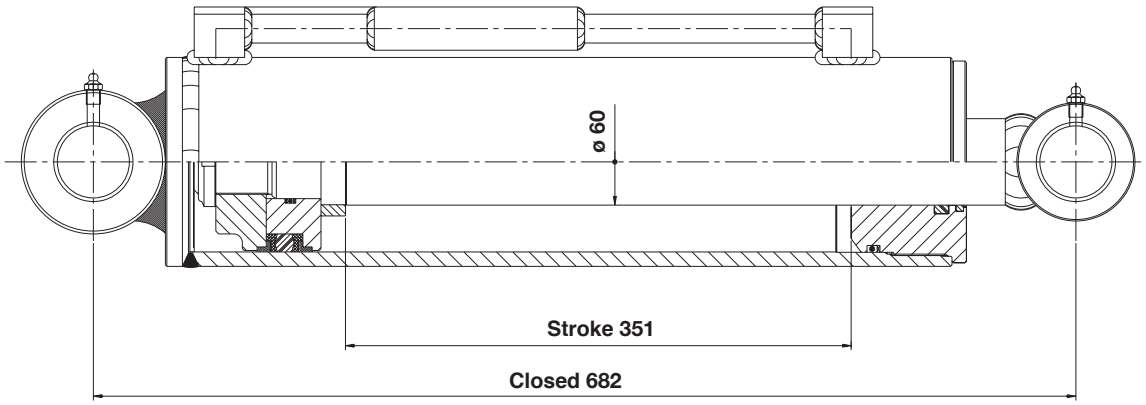
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	C40 tempered
Chrome-plating thickness	≥ 0,025 mm

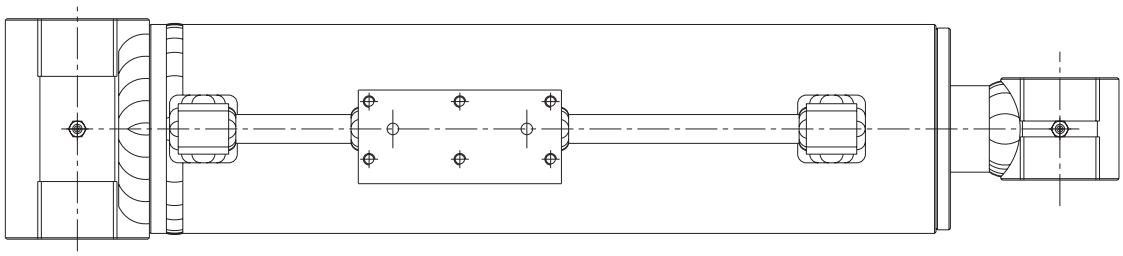
Operation: Attachment locking cylinder	*Table:* **C.06.5**



DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	C45
Rod tolerance	f7
Rod roughness	Ra max 0.2 my
Chrome-plating thickness	25 (+5/-5) my
Chrome-plating hardness	900-1100 HV (Vichers 100 g)
Liner material	St 52.3
Liner tolerance	H9
Liner roughness	Ra max 0.6 my

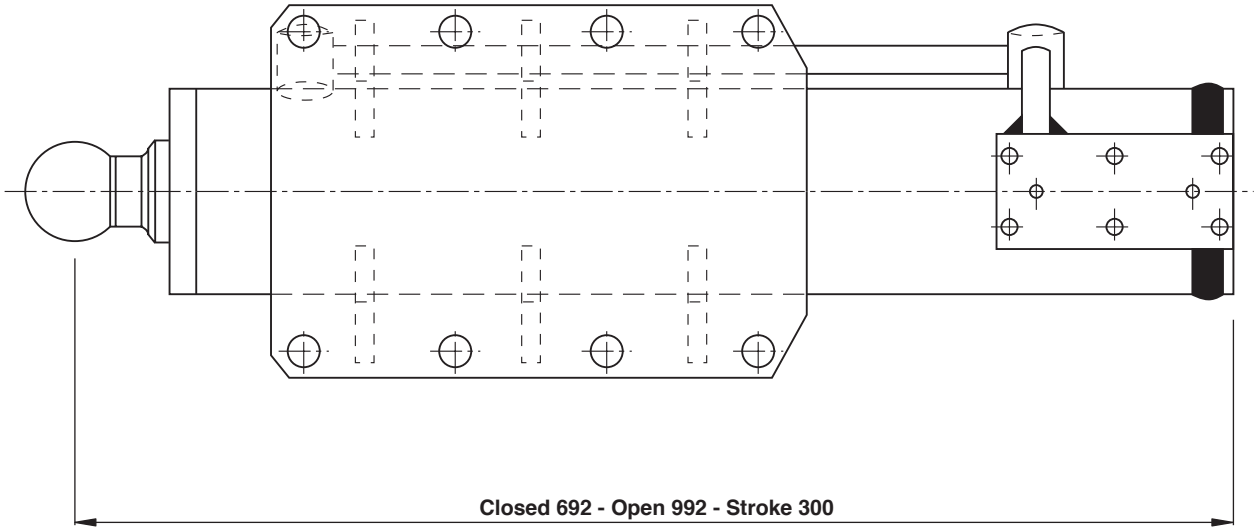
Operation: Stabilizer cylinder - Girolift 3514 - 3518	Table: C.06.6.1

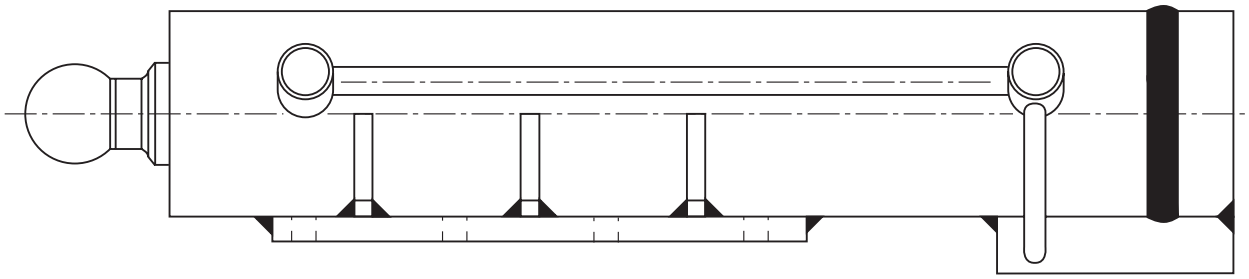




DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	C45
Rod tolerance	f7
Rod roughness	Ra max 0.2 my
Chrome-plating thickness	25 (+5/-5) my
Chrome-plating hardness	> 52 HRC
	(hardened layer depth: 1.8-2/7 mm)
Liner material	St 52.3
Liner tolerance	H8
Liner roughness	Ra max 0.2 my

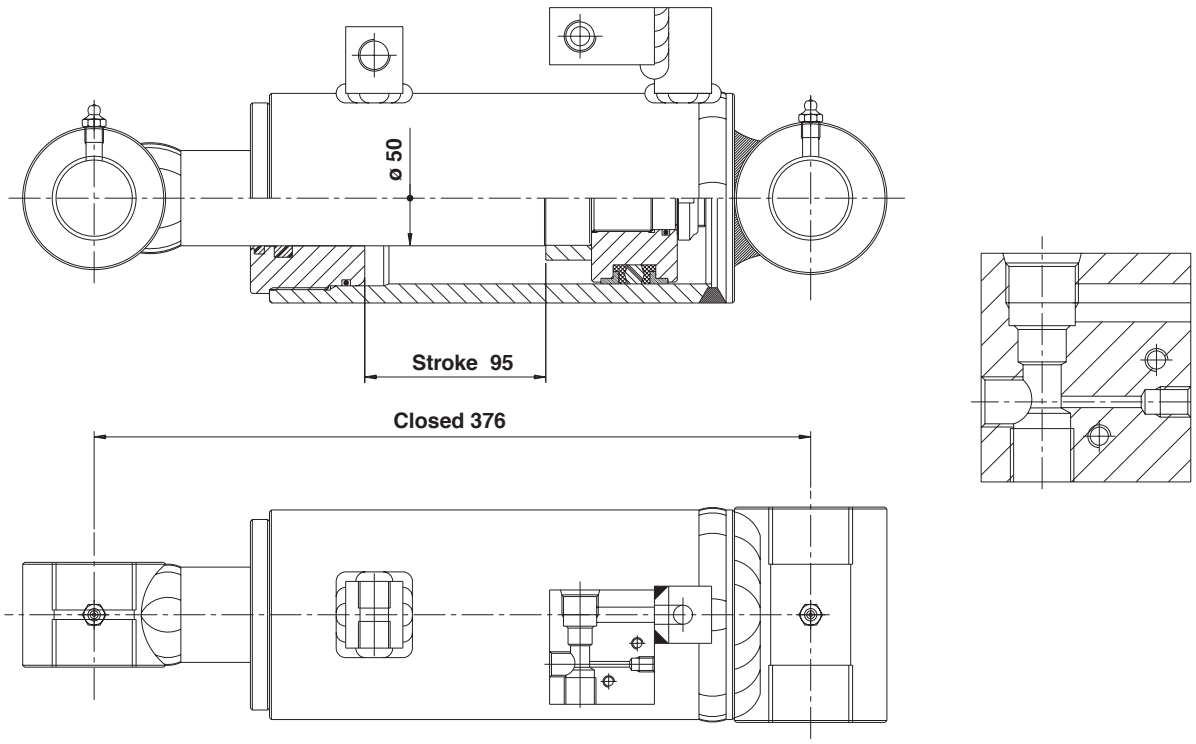
Operation: Stabilizer cylinder - Girolift 5022	*Table:* **C.06.6.2**





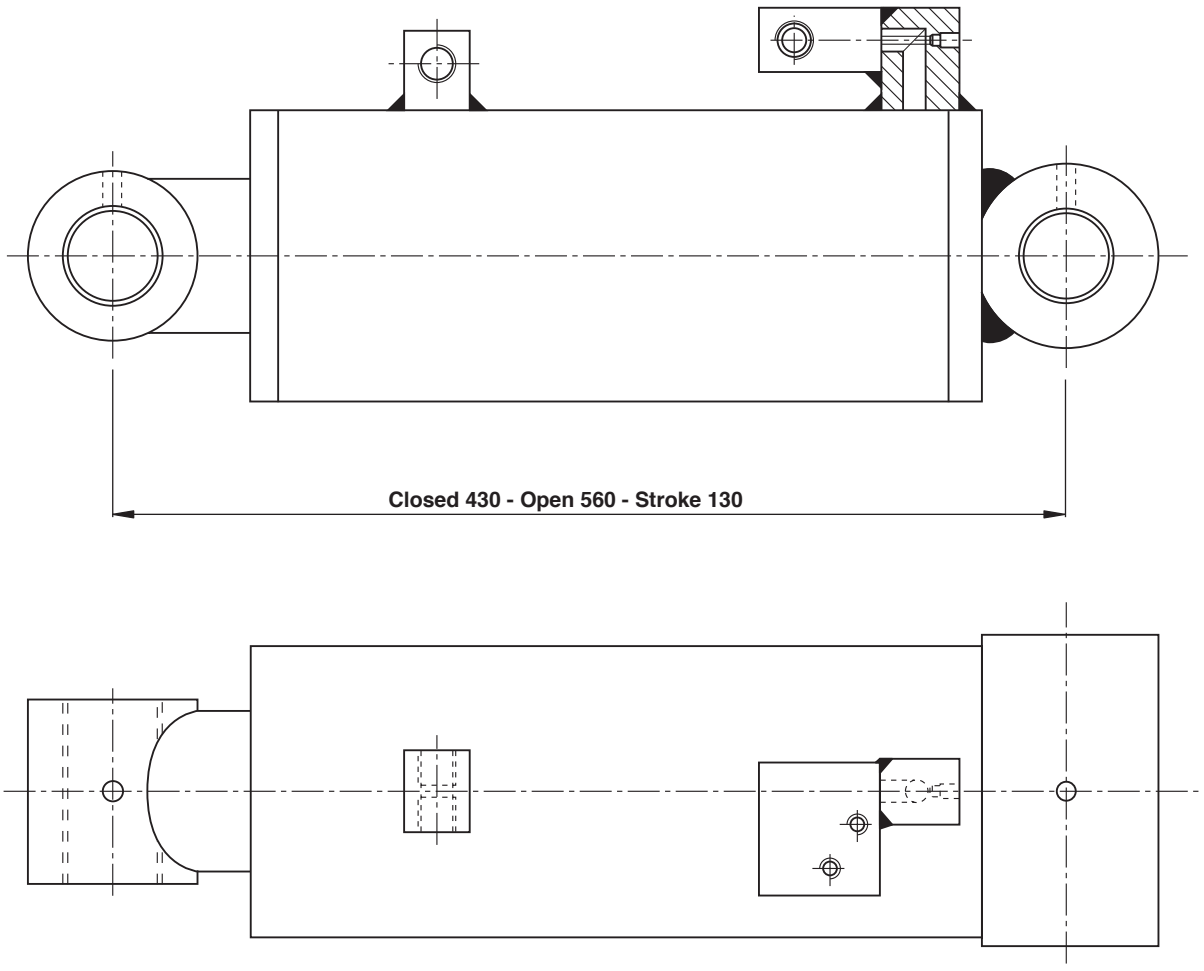
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	C40 tempered
Chrome-plating thickness	≥ 0,025 mm

Operation: Sway cylinder - Girolift 3514 - 3518	*Table:* **C.06.7.1**



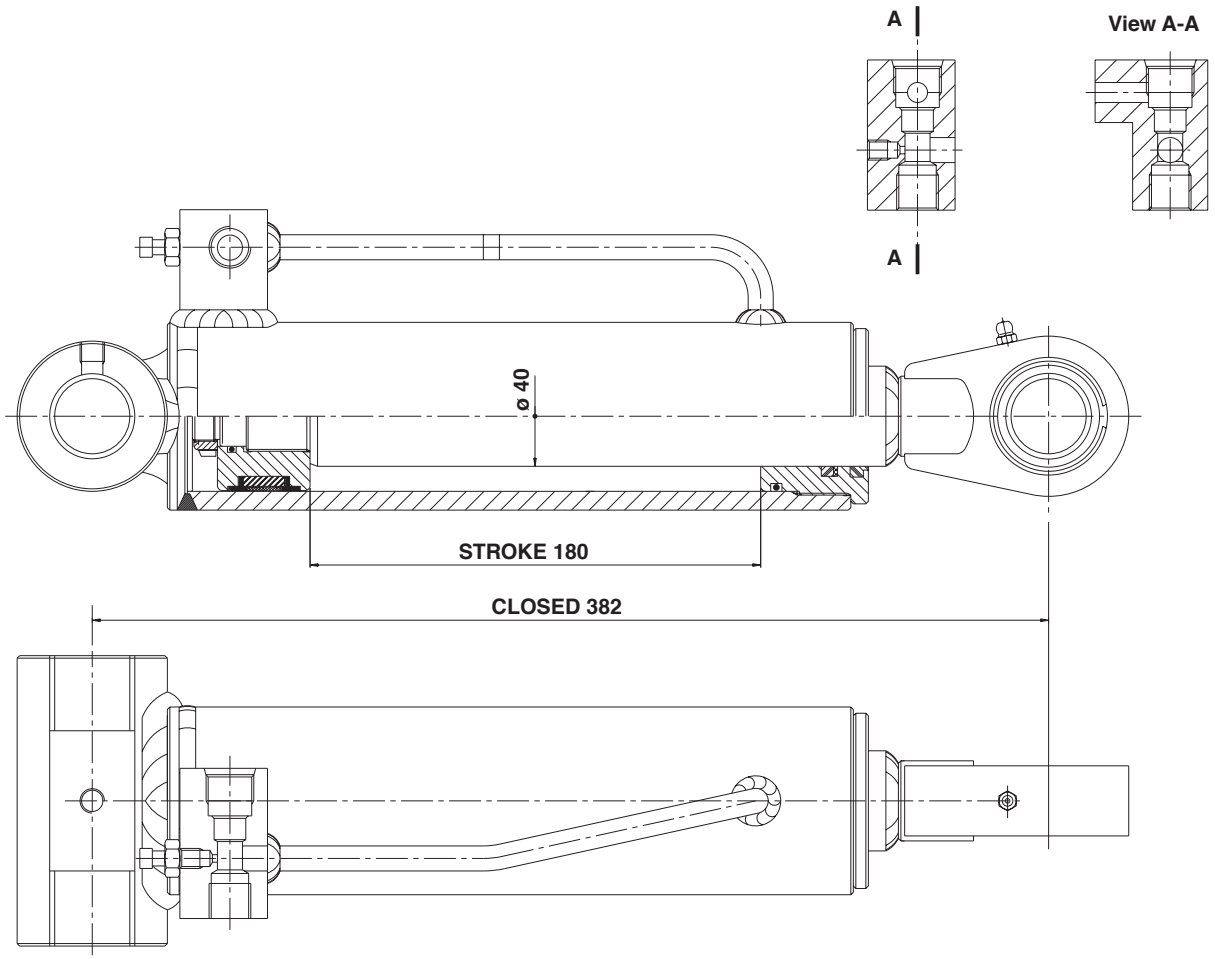
DESCRIPTION	**INDICATIVE CHARACTERISTICS**
Rod material	C45
Rod tolerance	f7
Rod roughness	Ra max 0.2 my
Chrome-plating thickness	25 (+5/-5) my
Chrome-plating hardness	900-1100 HV (Vichers 100 g)
Liner material	St 52.3
Liner tolerance	H8
Liner roughness	Ra max 0.2 my

Operation: Sway cylinder - Girolift 5022	*Table:* **C.06.7.2**



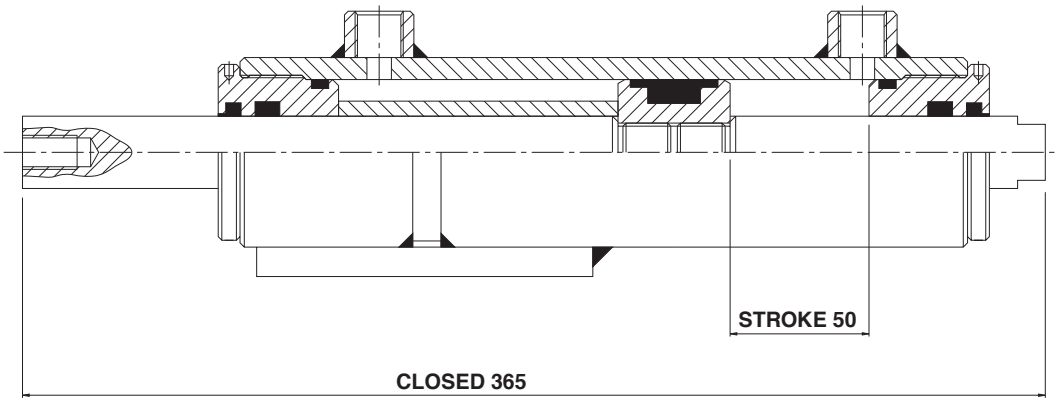
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	Fe 510B
Chrome-plating thickness	≥ 0,025 mm

Operation: Rear axle blocking cylinder - Girolift 3514	*Table:* **C.06.8**



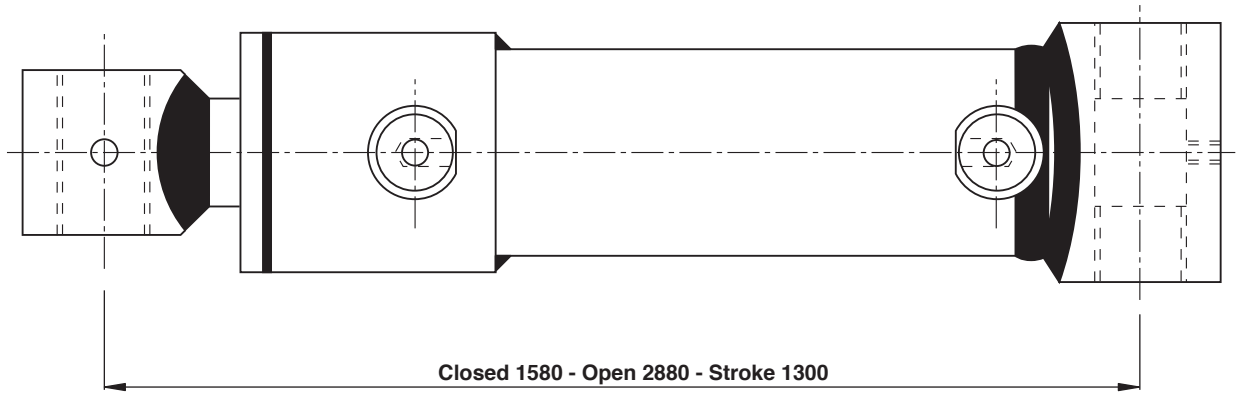
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material	C45
Rod tolerance	f7
Rod roughness	Ra max 0.2 my
Chrome-plating thickness	25 (+5/-5) my
Chrome-plating hardness	900-1100 HV (Vichers 100 g)
Liner material	St 52.3
Liner tolerance	H8
Liner roughness	Ra max 0.2 my

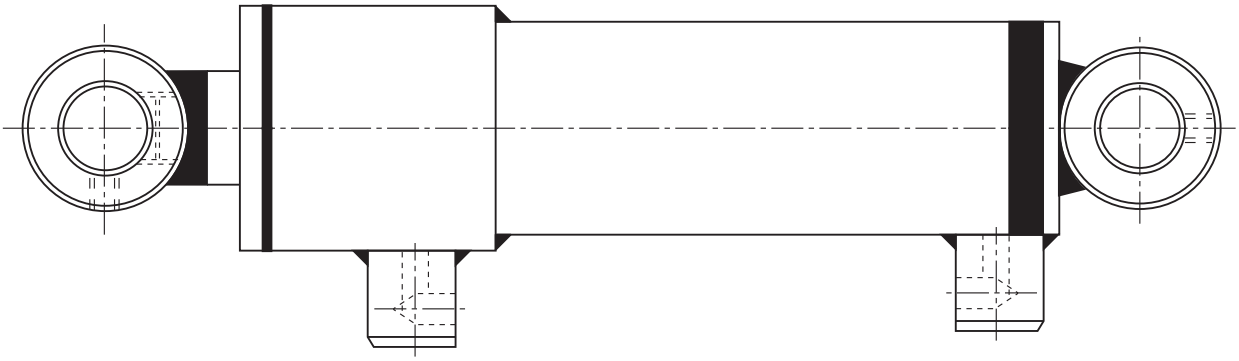
Operation: Turret rotation locking cylinder	*Table:* **C.06.9**



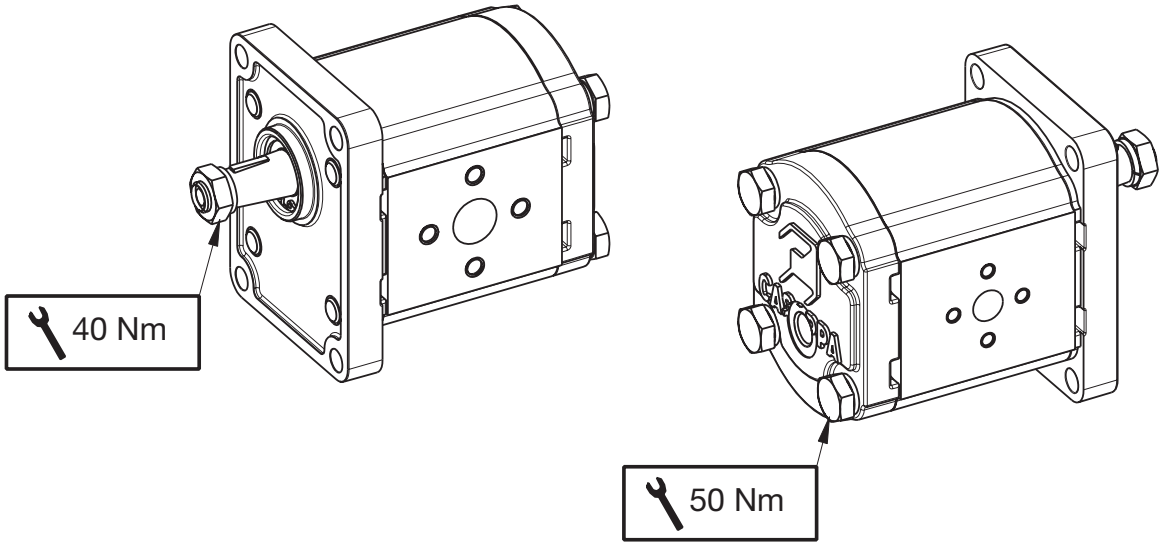
DESCRIPTION	INDICATIVE CHARACTERISTICS
Rod material.....	C40

Operation: Stabilizer extension cylinder - Girolift 5022	Table: C.06.10





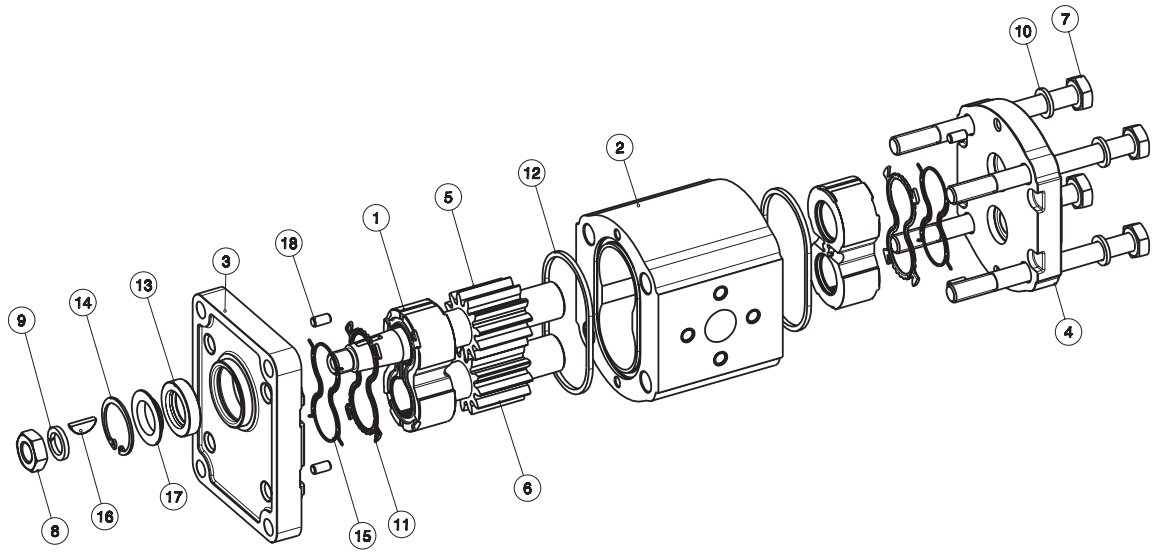
Operation: Radiator motor - technical features	Table: C.07.1.1



MOTOR DATA

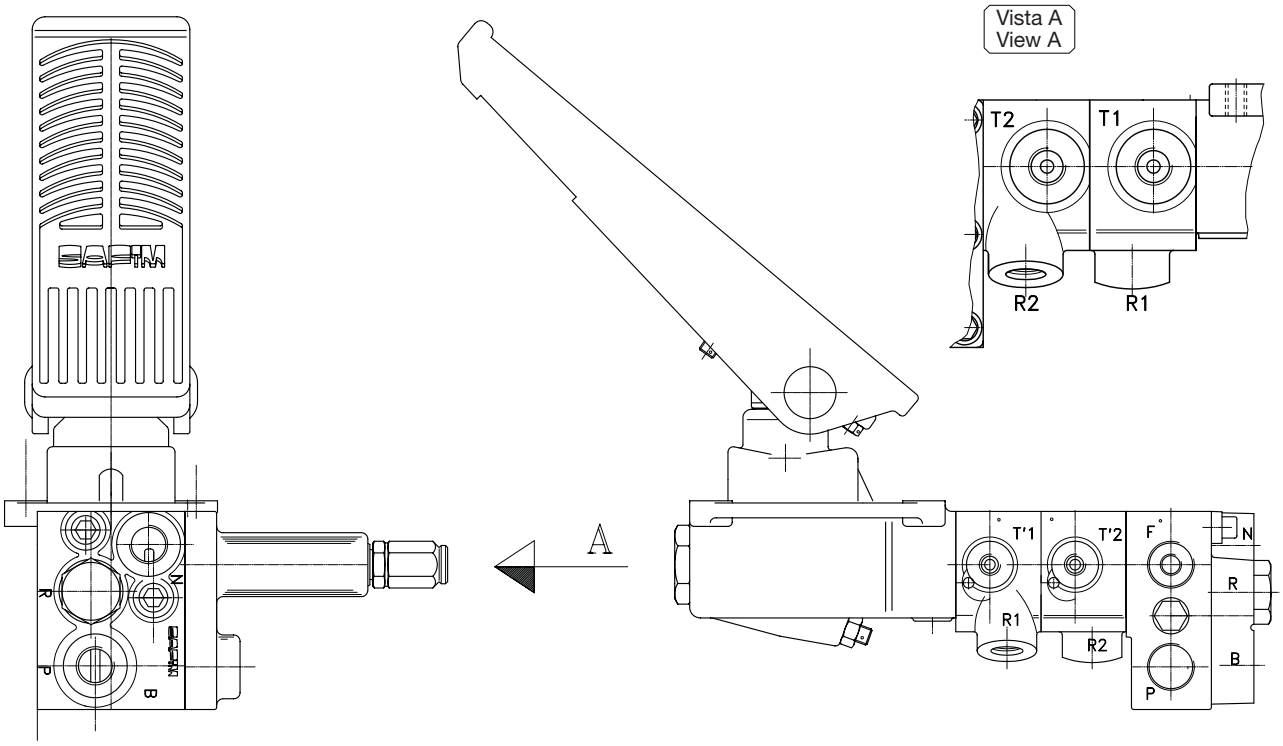
Direction of rotation (looking on drive shaft)		Reversible (R)
Displacement		21.139 [cm3/rev]
Max continuous pressure	P1	200 [bar]
Max intermittent pressure	P2	220 [bar]
Max peak pressure	P3	240 [bar]
Max back pressure for single rotation motors	P1 (cont)	- [bar]
	P2 (20 s)	- [bar]
	P3 (8 s)	- [bar]
Max drain line pressure on the reversible rotation motors		5 [bar]
Speed	min P1	500 [min^-1]
	max P1	3000 [min^-1]
Seals type		NBR
Operating temperature		-25 to + 80 [°C]
Viscosity range	recommended	12 to 100 mm^2/s (cSt)
	permitted	max 750 mm^2/s (cSt)
Contamination class	Δp > 200 bar	8 - Nas 1838
	ßx – 75-10 μm	19/17/14 - ISO 4406
	Δp < 200 bar	10 - Nas 1638
	ßx – 75-25 μm	21/19/16 - ISO 4406
Prototype code		-
Customer code		04.4235.00
Relief valve		[bar]
Stand-by pressure LS valve		[bar]
Weight		2.960 [kg]
Painting		
Special treatment		

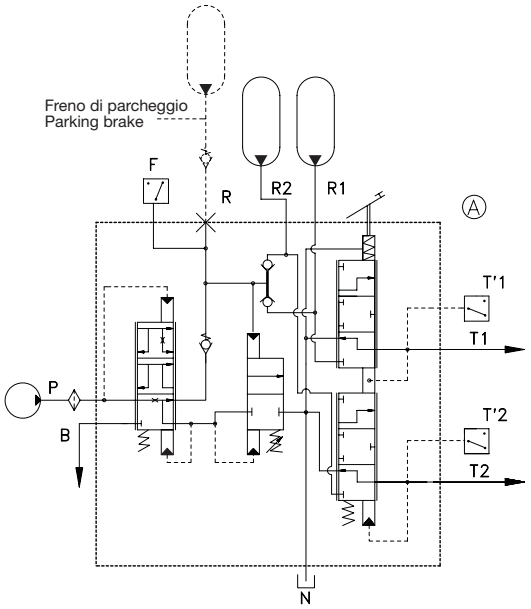
Operation: Radiator motor - components	Table: C.07.1.2



POS.	DESCRPTION
1	THRUST PLATE PL20 R Z (SIC)
2	BODY PL20.20-LEB/EA (H=76)
3	FRONT COVER PL20/AL
4	REAR COVER PL20R/AL TN
5	DRIVE SHAFT K-PL20.20-82
6	DRIVEN GEAR F-K-PL20.20
7	SCREW TE M 10X110 UNI 5737-10.9
8	NUT M 12X1,5 UNI 5589-A-6S-F-CD-8-II
9	WASHER 12 (12.2x18.3x2.5) DIN7980
10	WASHER 10 (10.5x16x2) HV200
11	SEAL PL20 R N T.N.
12	STANDARD SEAL PL 20 SQUARE SECTION
13	SHAFT SEAL BAU2 18X30X7
14	RING 30 UNI 7437
15	ANTIEXTRUSION Z PL20 R T.N.
16	KEY 3.16X6.6
17	BACK-UP WASHER GR.2
18	DOWEL PIN MM.5x10 UNI1707 H8

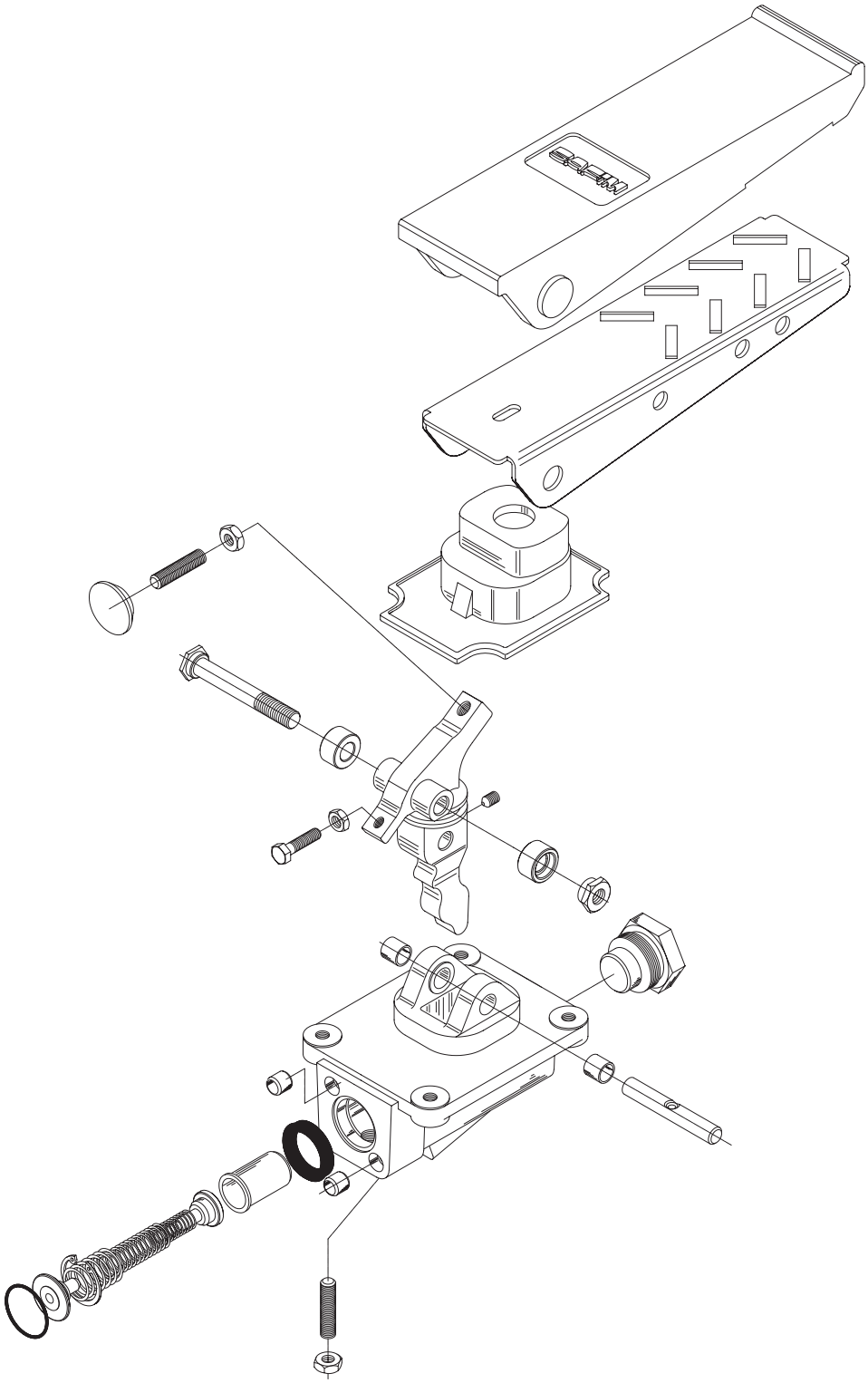
Operation: Brake pump - technical features	*Table:* **C.07.2.1**



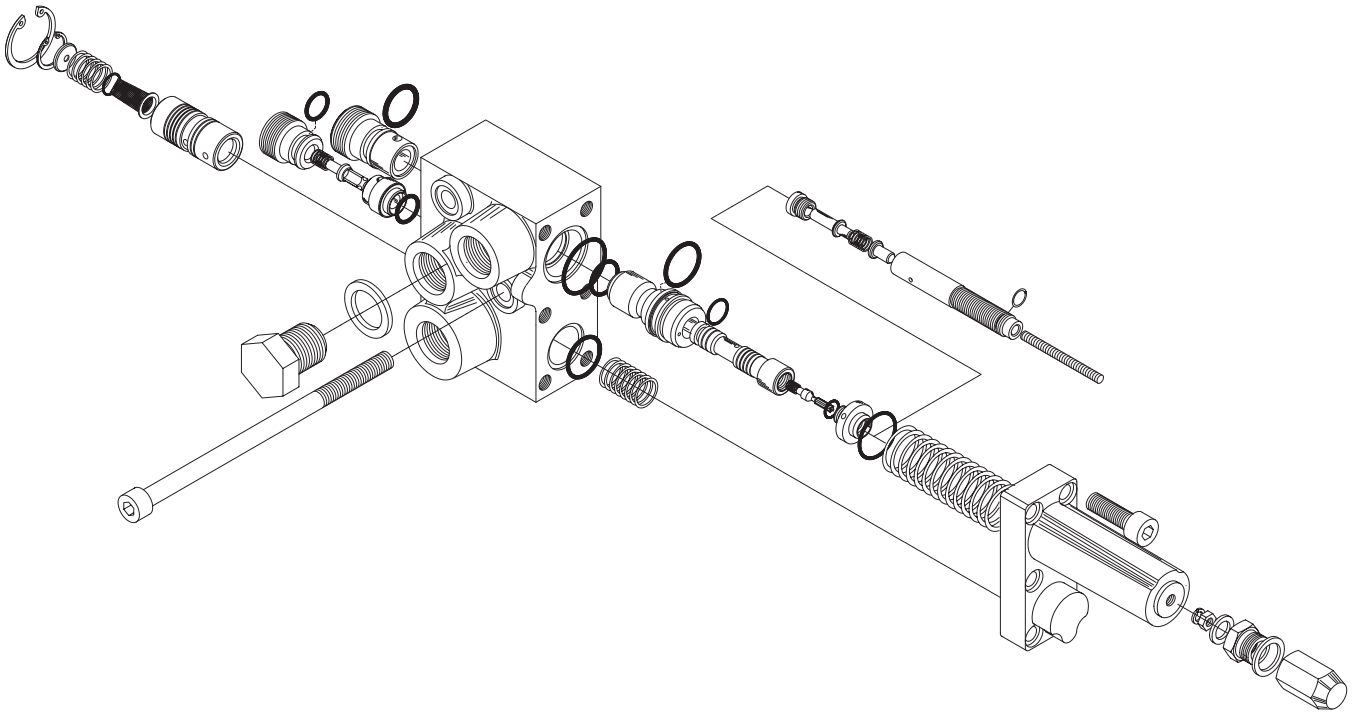


F	Accumulator pressure switch M10x1
R	Accumulator (Closed) M18x1.5
R1	Accumulator M14x1.5 ISO 6149
R2	Accumulator M14x1.5 ISO 6149
T1	Brake M14x1.5 ISO 6149
T'1	Brake pressure switch M10x1 ISO 6149
T2	Brake M14x1.5 ISO 6149
T'2	Brake pressure switch M10x1 ISO 6149
B	Other service or tank
P	Inlet
N	Tank M 18x 1.5

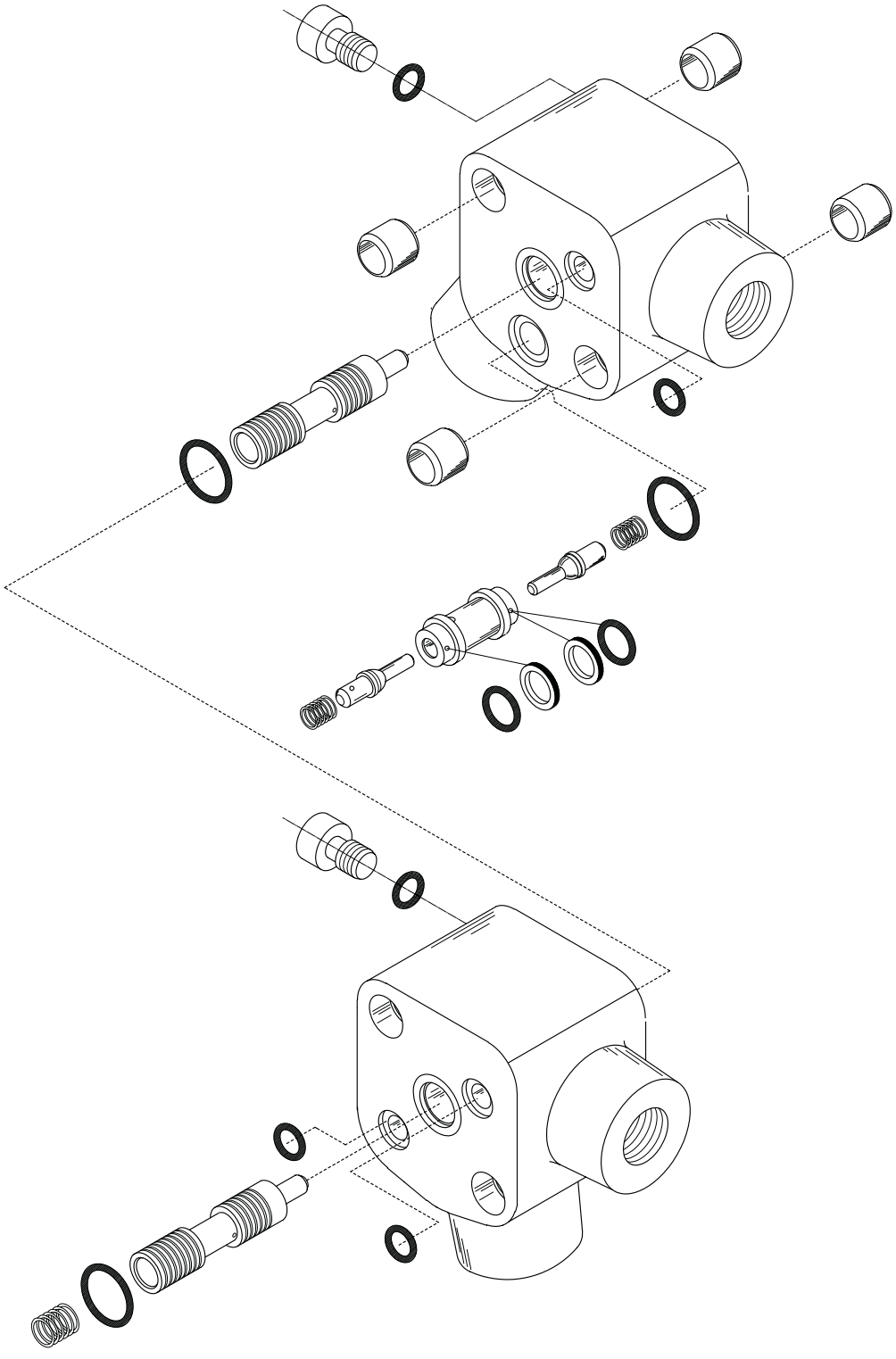
Operation: Brake pump - pedal support	Table: C.07.2.2



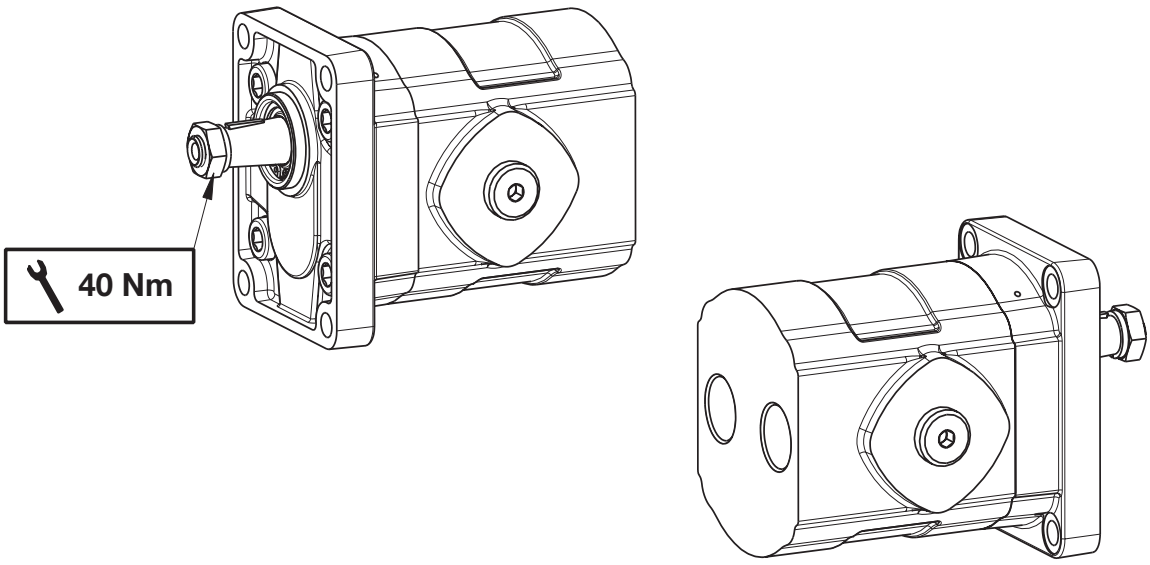
Operation: Brake pump - braking unit	*Table:* **C.07.2.3**



Operation: Brake pump - accumulators	*Table:* **C.07.2.4**



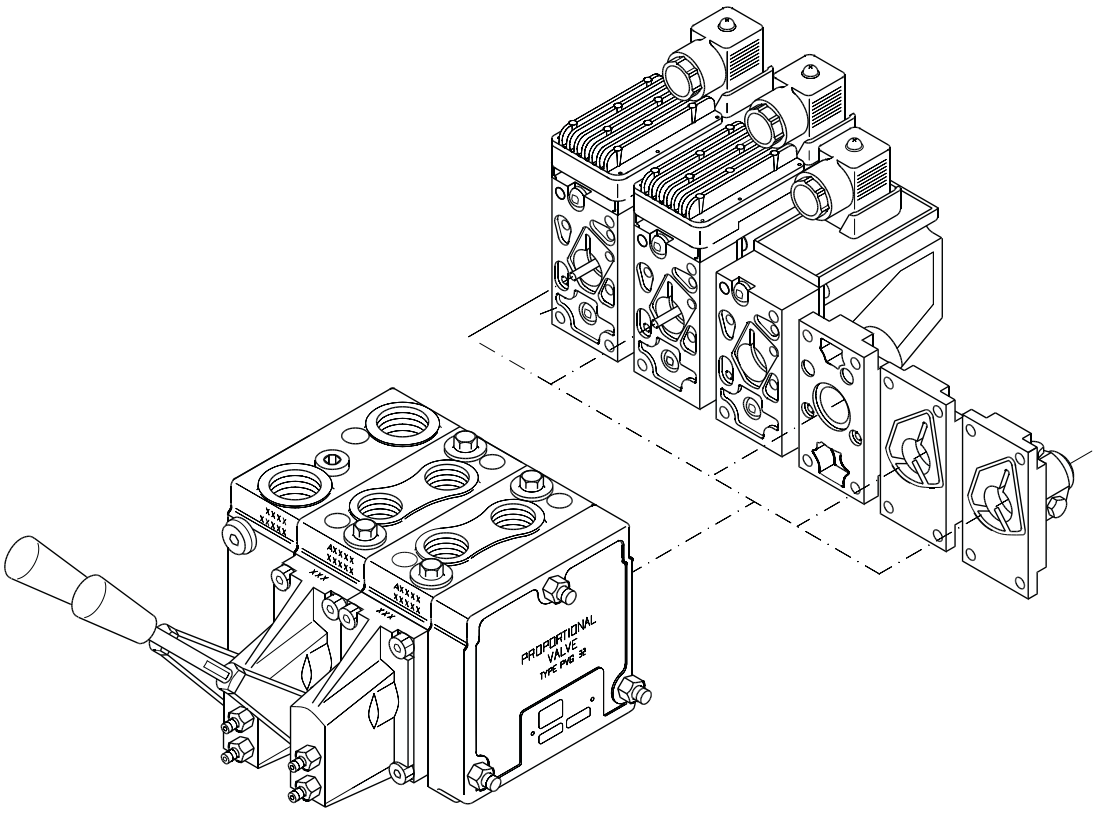
Operation: Transfer pump - technical features	Table: C.07.3



PUMP DATA

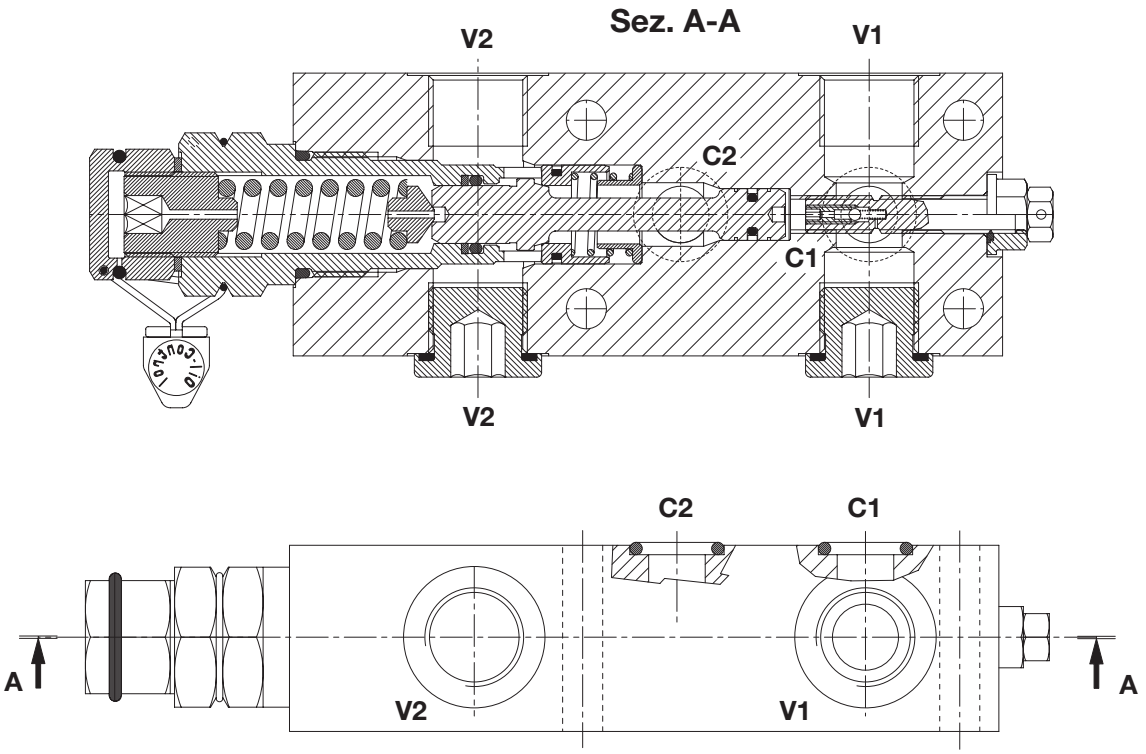
Direction of rotation (looking on drive shaft)		Clockwise (D)
Displacement		26.42 [cm3/rev]
Inlet pressure range for pump		0.7 - 3 [bu abs.]
Max continuous pressure	P1	180 [bar]
Max intermittent pressure	P2	200 [bar]
Max peak pressure	P3	220 [bar]
Speed	min P1	300 [min^-1]
	max P1	2500 [min^-1]
Seals type		NBR
Operating temperature		-25 to + 80 [°C]
Viscosity range	recommended	12 to 100 mm^2/s (cSt)
	Permitted	max 750 mm^2/s (cSt)
Contamination class	Δp > 200 bar	8 - Nas 1638
	ßx – 75-10 μm	19/17/14 - ISO 4406
	Δp > 200 bar	10 - Nas 1638
	ßx – 75-25 μm	21/19/16 - ISO 4406
Protoype code		-
Customer code		-
Relief valve		- [bar]
Stand-by pressure LS valve		- [bar]
Weight		5.710 [kg]
Painting		BLACK - RAL 9004
Special treatment		

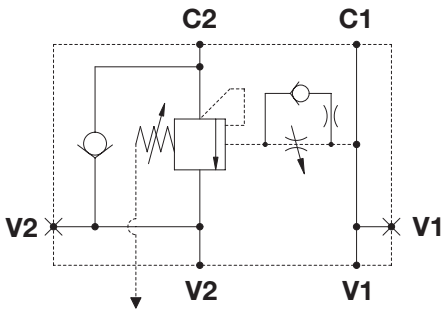
Operation: PVG 32 hydraulic distributor	Table: C.08



Technical data	
Max pressure	350 bar
Max input flow	140 l/min (CA)
Max input flow	150 l/min (CC)
Max input flow	230 l/min (CC with intermediate element)
Max flow on one element	130 l/min
Max number of bodies	10
Connections	P-T 3/4” G • A-B 1/2” G

Operation:	Boom raising cylinder block valve Girolift 3514	*Table:* **C.09.1.1**



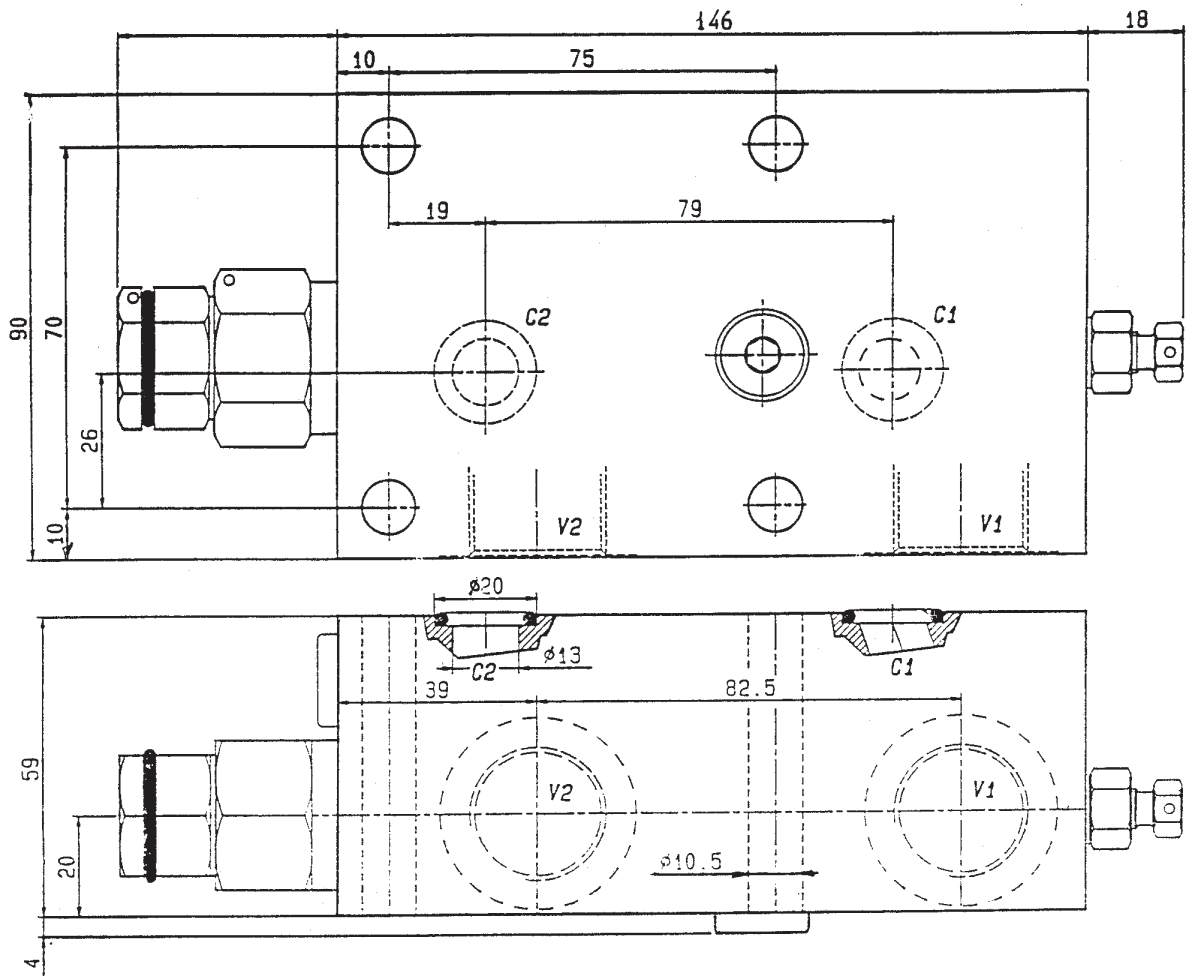


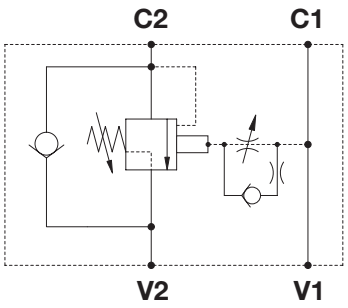
FITTINGS
V1-V2: G 1/2”
C1-C2: ø 12

TECHINCAL DATA

- Max working pressure .....350 bar
- Piloting ratio 4:1
- Valve setting .....1.3 times higher than the load induced pressure
- Manifold.....steel
- Weight .....2,5 kg

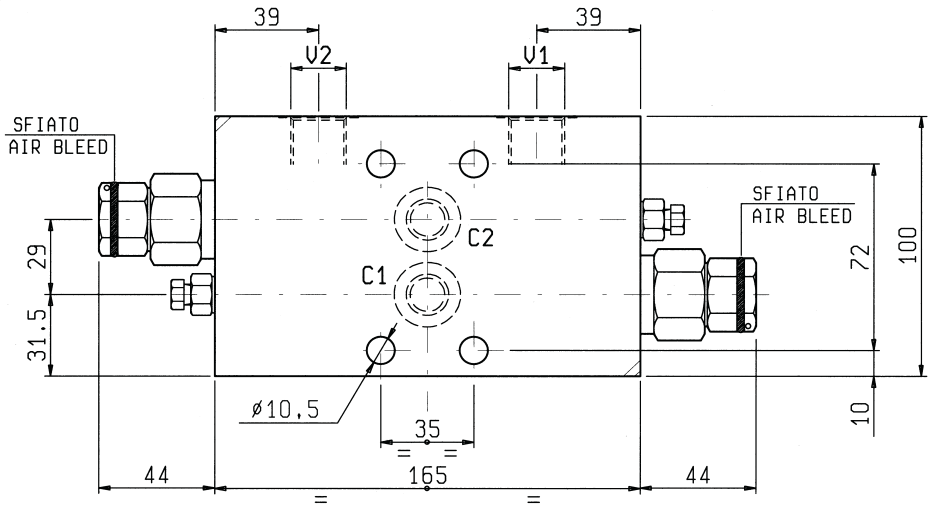
Operation:	Boom raising cylinder block valve Girolift 3518 - 5022	Table: **C.09.1.2**

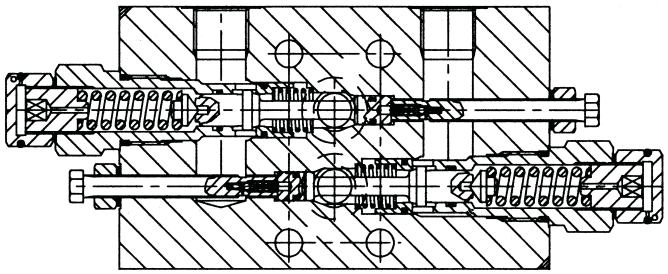


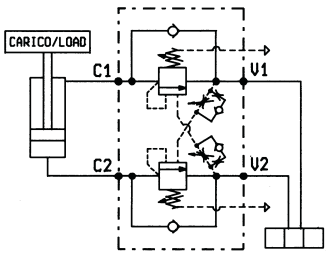


FITTINGS
V1-V2: G 3/4”
C1-C2: ø 13

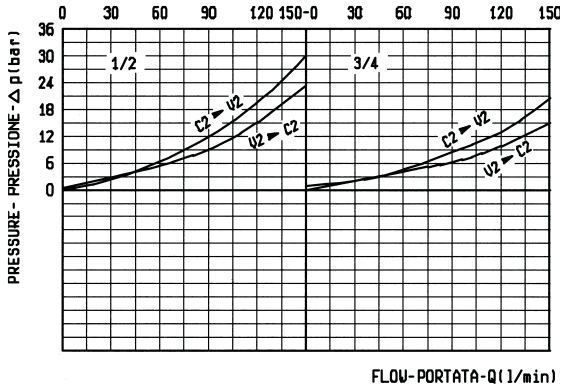
Operation:	Table:
2nd telescope extension cylinder block valve Girolift 3514	**C.09.2.1**







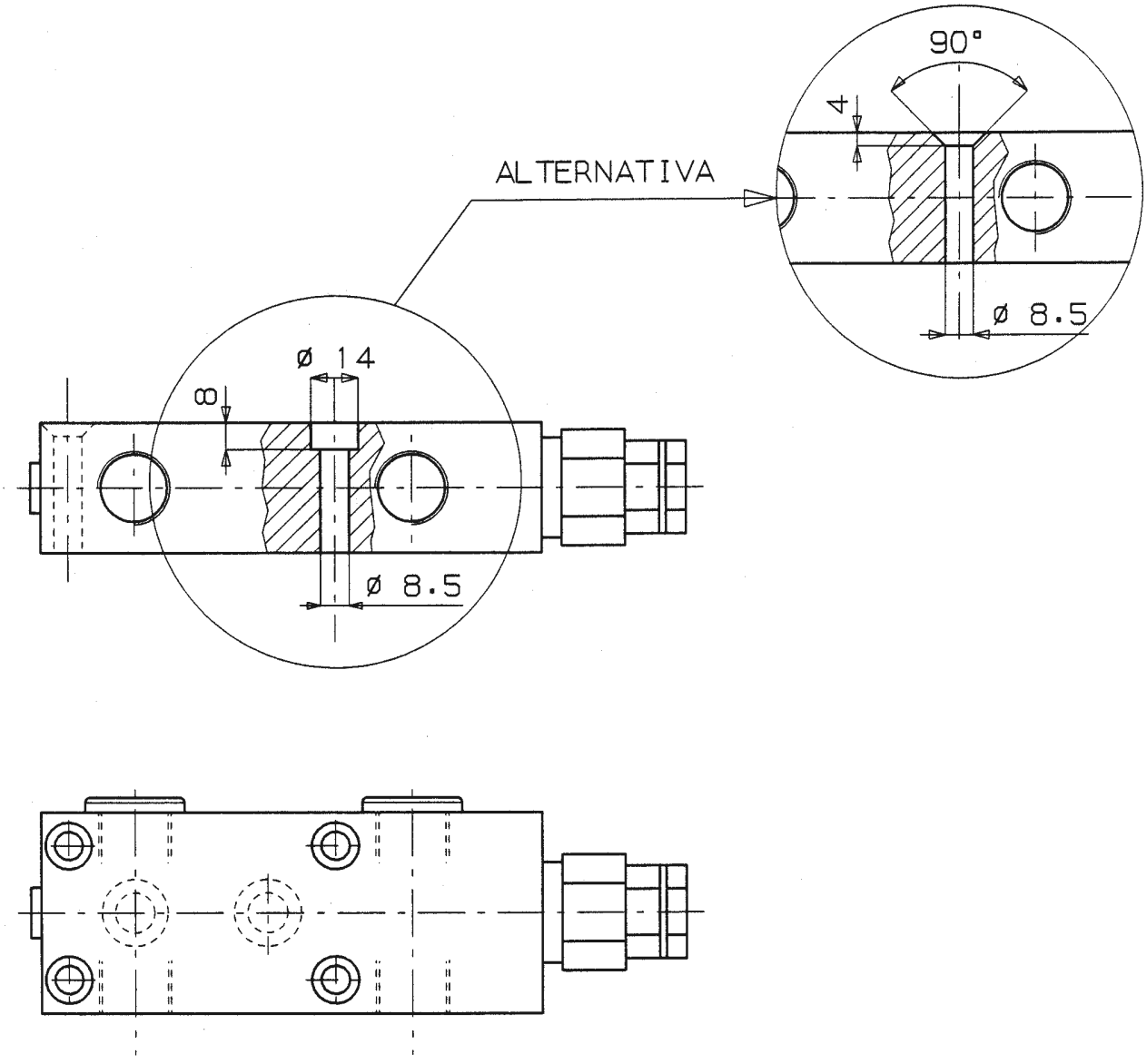
FITTINGS
V1-V2: G 1/2" • C1-C2: ø 13



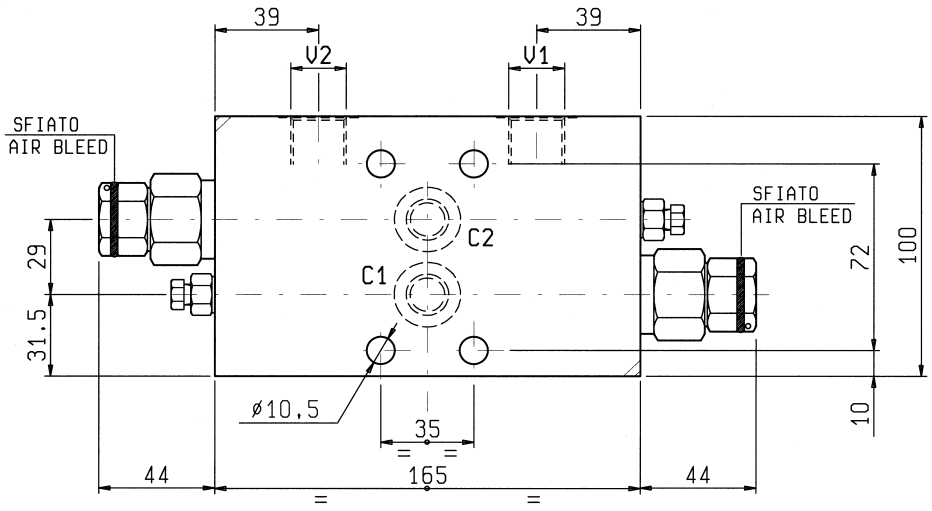
TECHINCAL DATA

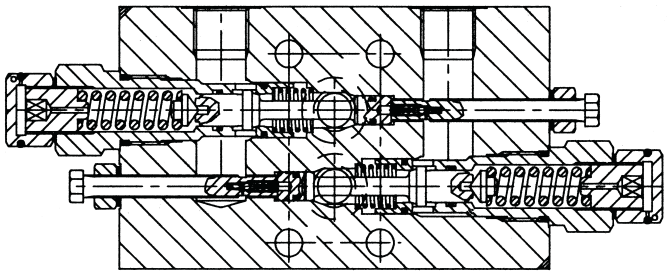
- Max working pressure .....350 bar
- Piloting ratio 4:1
- Max flow.....see diagram
- Valve setting .....1.3 times higher than the load induced pressure
- Spring setting .....100-350 min/max bar
- Weight .....2,8 kg

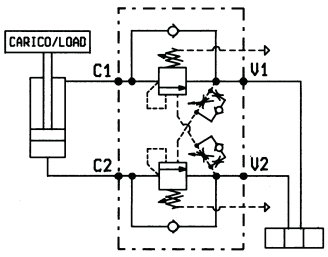
Operation:	3rd telescope extension cylinder block valve Girolift 3514	Table: **C.09.2.2**



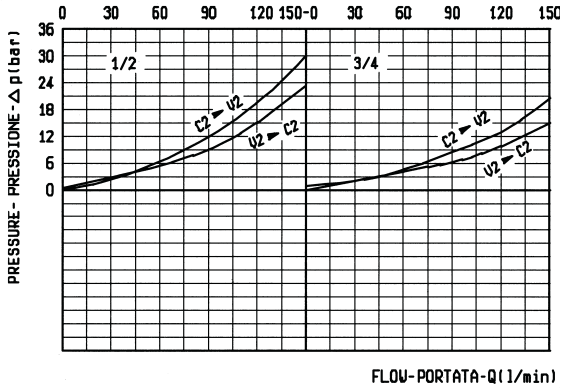
Operation:	Table:
Boom extension cylinder block valve Girolift 3518	**C.09.2.3**







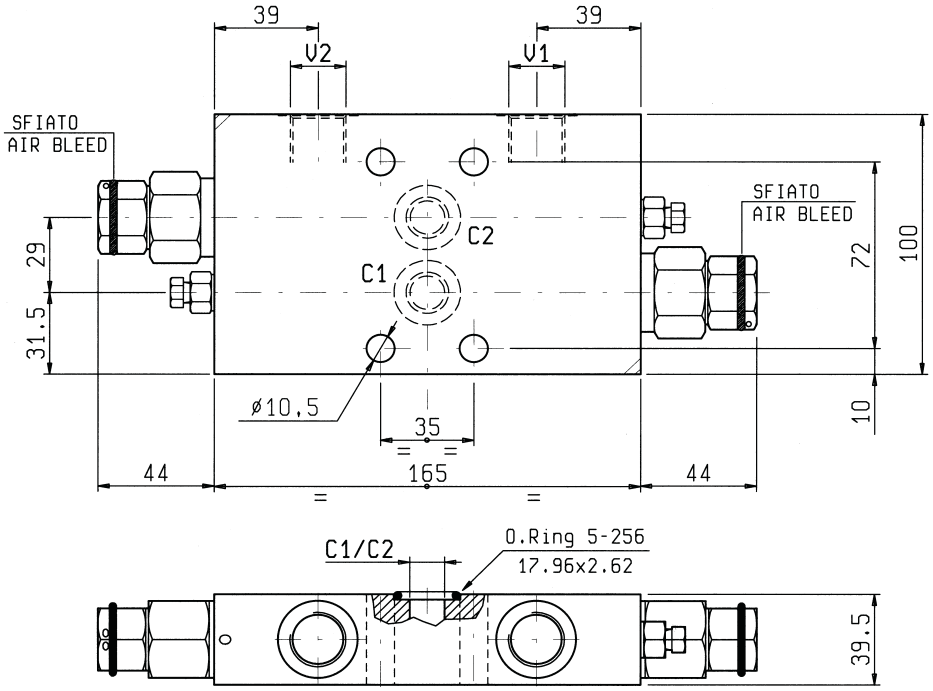
FITTINGS
V1-V2: G 1/2" • C1-C2: ø 13

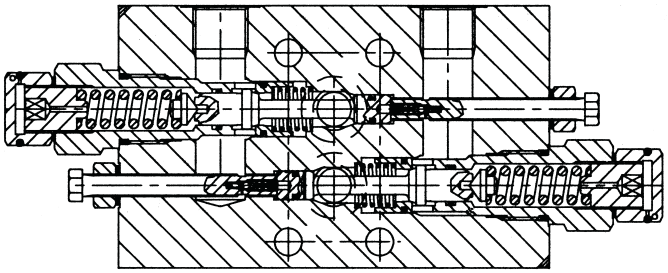


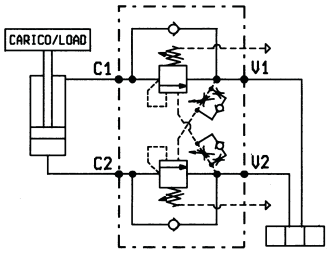
TECHINCAL DATA

- Max working pressure .....350 bar
- Piloting ratio 4:1
- Max flow.....see diagram
- Valve setting .....1.3 times higher than the load induced pressure
- Spring setting .....100-350 min/max bar
- Weight .....2,8 kg

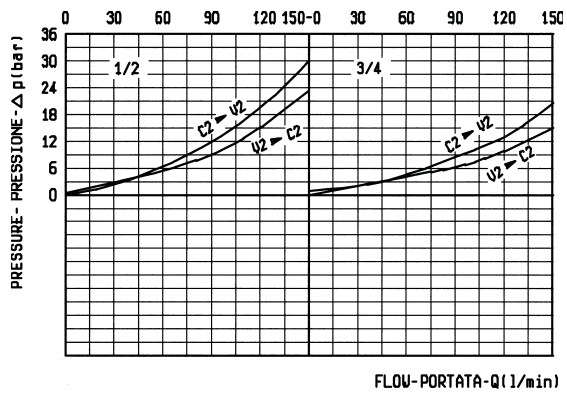
Operation:	Boom extension cylinder block valve Girolift 5022	*Table:* **C.09.2.4**







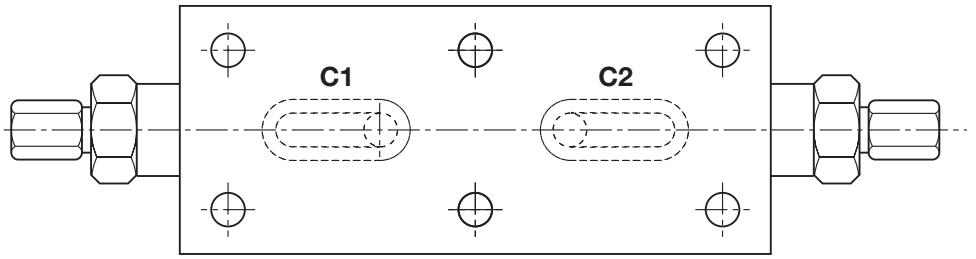
FITTINGS
V1-V2: G 1/2" • C1-C2: ø 13

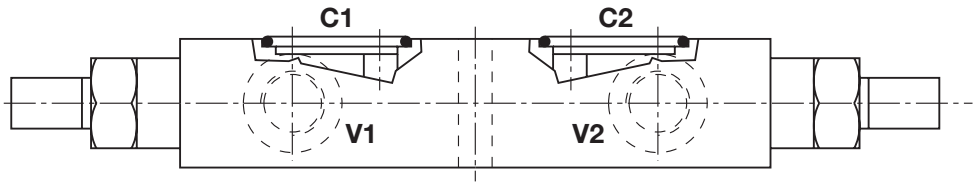


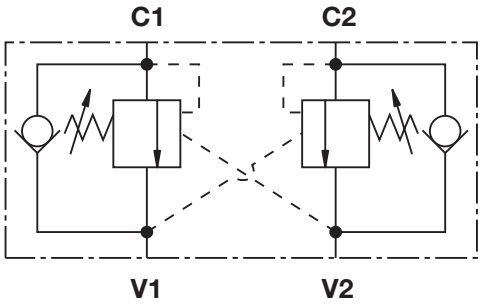
TECHINCAL DATA

- Max working pressure .....350 bar
- Piloting ratio 4:1
- Max flow .....see diagram
- Valve setting .....1.3 times higher than the load induced pressure
- Spring setting .....100-350 min/max bar
- Weight .....2,8 kg

Operation:	Outriggers cylinders and block valve Girolift 3514 - 3518 - 5022	Table: **C.09.3**





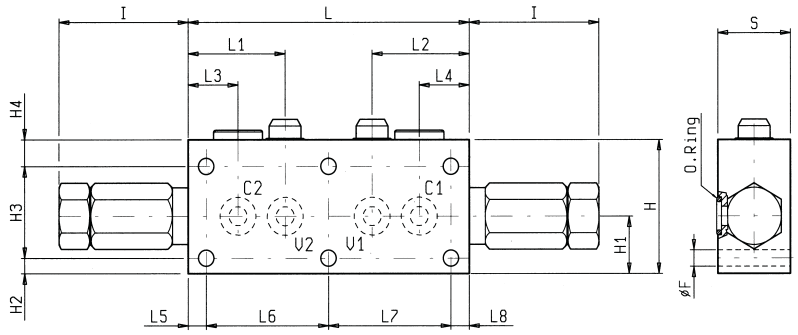


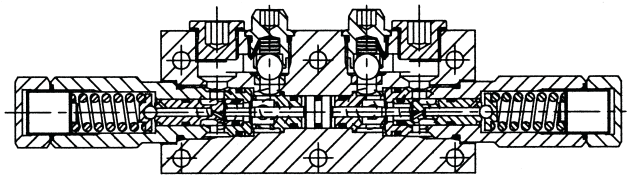
FITTINGS
V1-V2: 3/8” BSPP

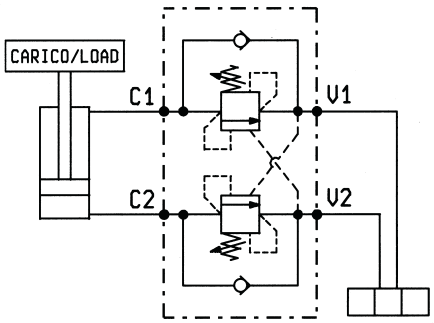
TECHINCAL DATA

- Piloting ratio 4,2:1
- Material.....zinc-coated steel

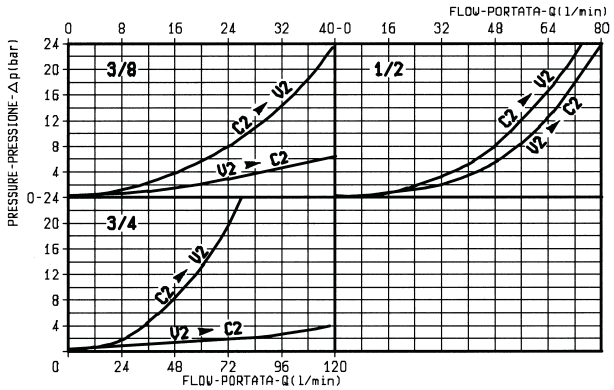
Operation:	Compensation cylinder block valve Girolift 3514 - 3518	*Table:* **C.09.4.1**







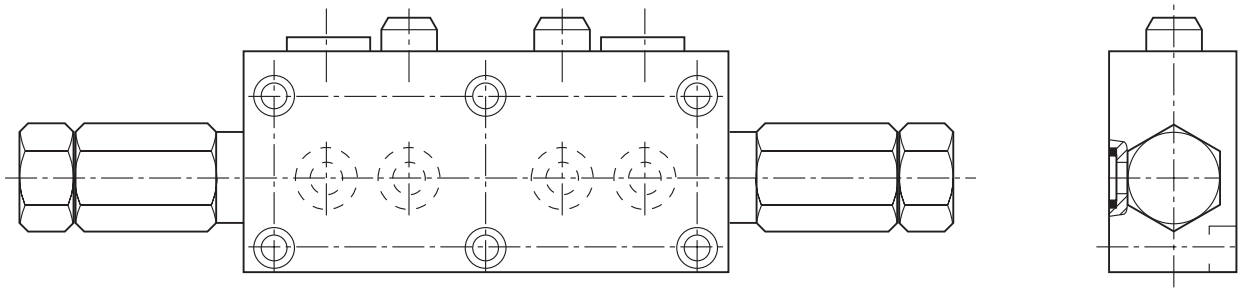
FITTINGS
V1-V2-C1-C2: 1/2”

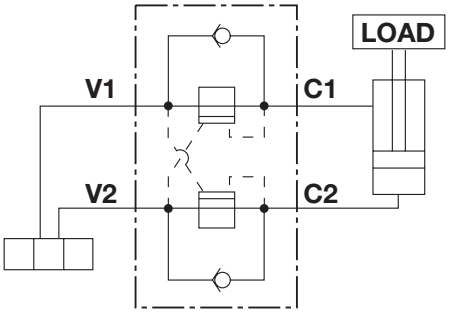


TECHINCAL DATA

- Max working pressure .....350 bar
- Piloting ratio 7,55:1
- Max flow .....see diagram
- Valve setting .....1.3 times higher than the load induced pressure
- Spring setting .....100-350 min/max bar
- Weight .....2,1 kg

Operation:	Compensation cylinder block valve Girolift 5022	*Table:* **C.09.4.2**



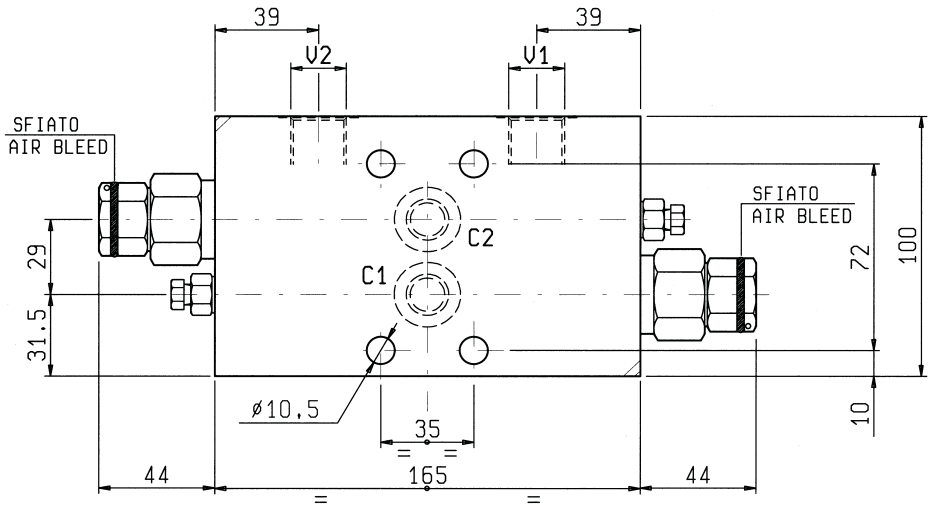


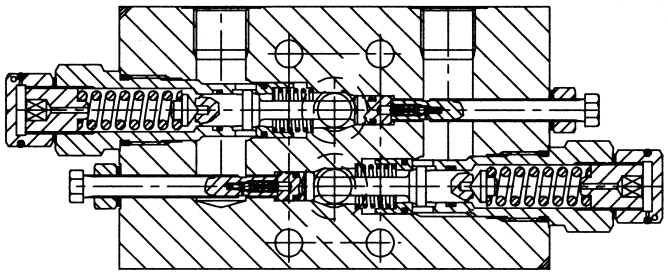
FITTINGS
V1-V2: G 1/2”
C1-C2: G 1/2”

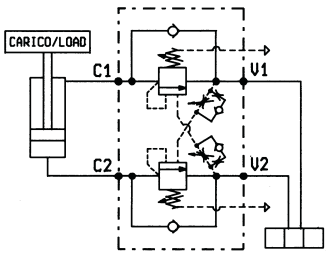
TECHINCAL DATA

- Max working pressure .....350 bar
- Piloting ratio 7,55:1
- Spring setting.....
  .....100 (min) - 350 (max) bar
- Bar increase / screw turn 105
- Std setting bar (Q=5 l/min).....350
- Weight .....2,1 kg

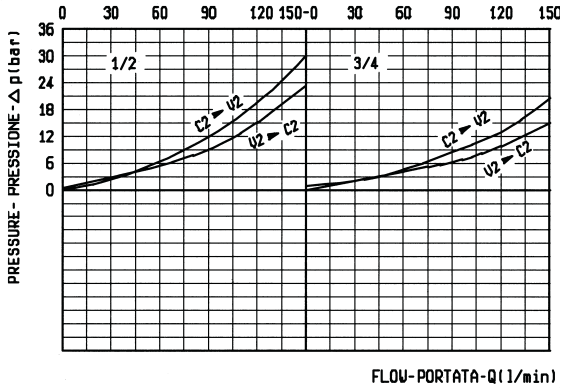
Operation:	Table:
Fork movement cylinder block valve Girolift 3514	**C.09.5.1**







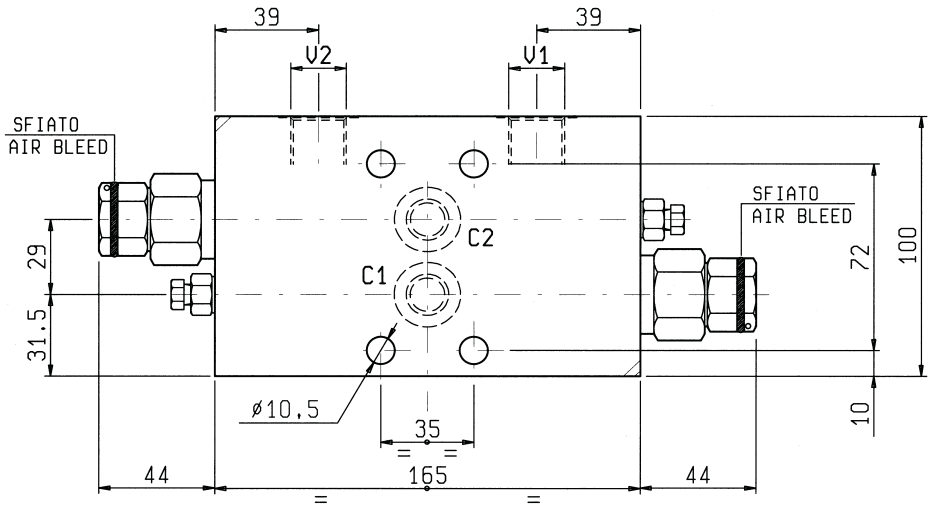
FITTINGS
V1-V2: G 1/2" • C1-C2: ø 13

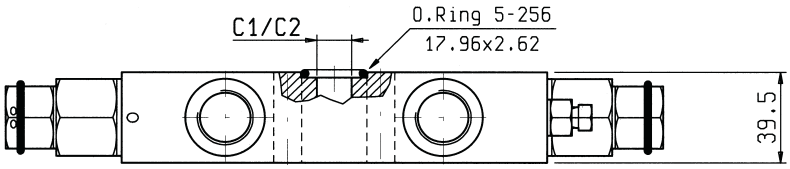


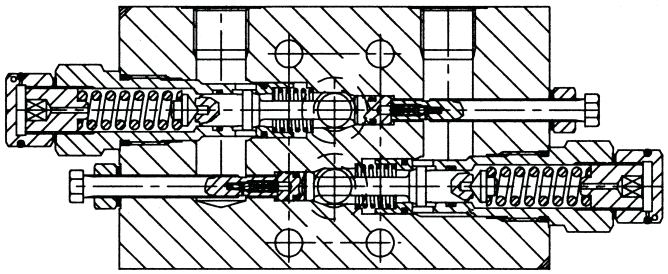
TECHINCAL DATA

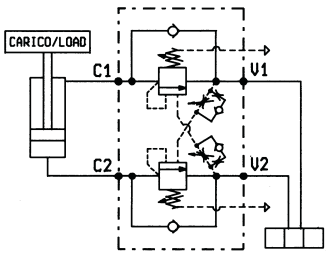
- Max working pressure .....350 bar
- Piloting ratio 4:1
- Max flow .....see diagram
- Valve setting .....1.3 times higher than the load induced pressure
- Spring setting .....100-350 min/max bar
- Weight .....2,8 kg

Operation:	Table:
Fork movement cylinder block valve Girolift 3518 - 5022	**C.09.5.2**

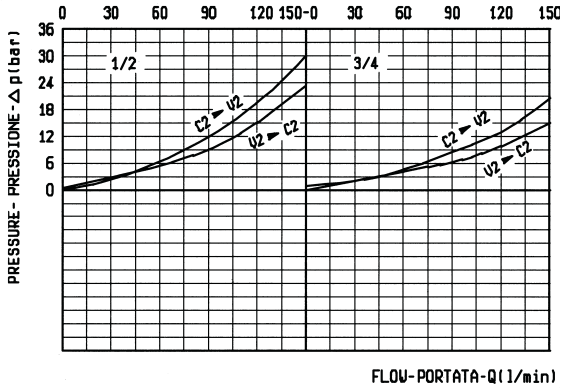








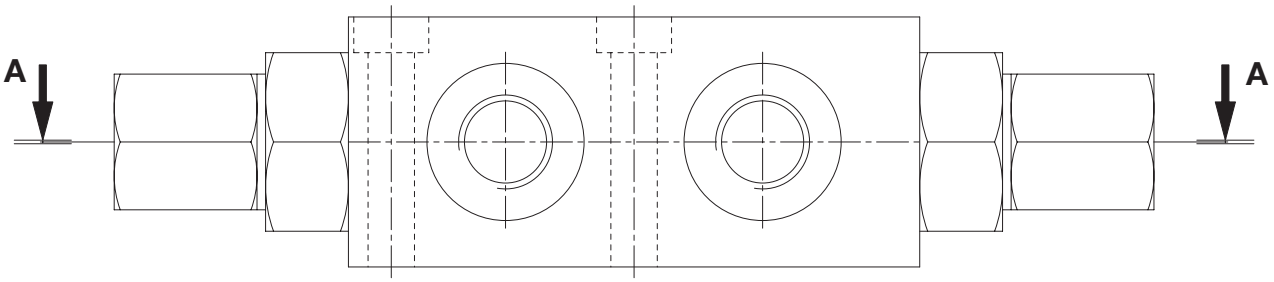
FITTINGS
V1-V2: G 1/2" • C1-C2: ø 13



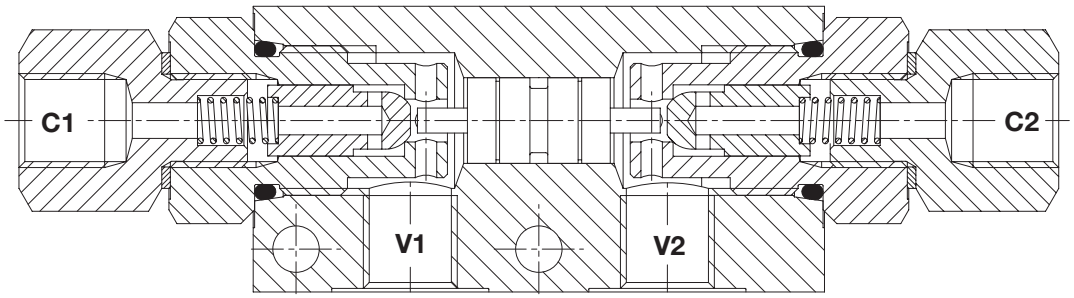
TECHINCAL DATA

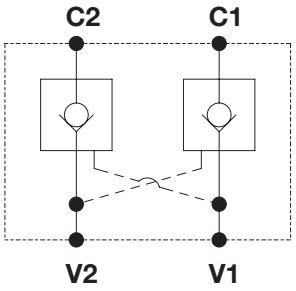
- Max working pressure .....350 bar
- Piloting ratio 4:1
- Max flow.....see diagram
- Valve setting .....1.3 times higher than the load induced pressure
- Spring setting .....100-350 min/max bar
- Weight .....2,8 kg

Operation:	Attachment cylinder block valve Girolift 3514 - 3518 - 5022	Table: **C.09.6**



Sez. A-A



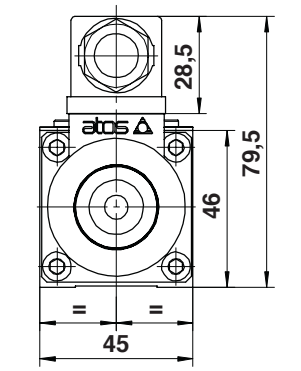


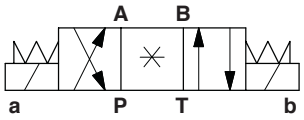
FITTINGS
V1-V2-C1-C2: G 1/4”

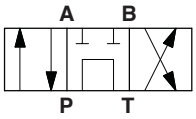
TECHINCAL DATA

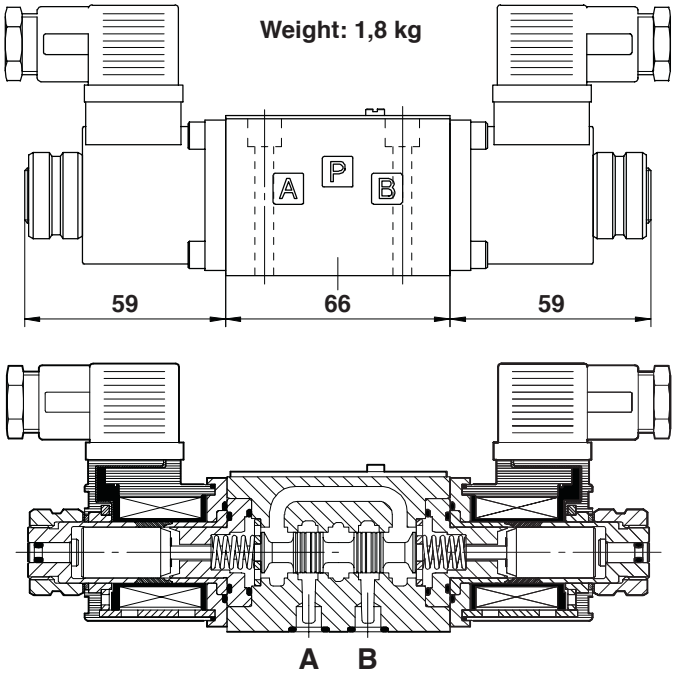
- Max working pressure .....350 bar
- Piloting ratio 4:1
- Weight .....0,7 kg

Operation: DHI solenoid valve	*Table:* **C.09.7**









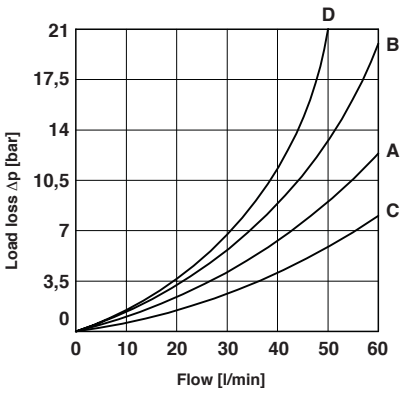
MAIN CHARACTERISTICS OF THE DHI SOLENOID VALVES

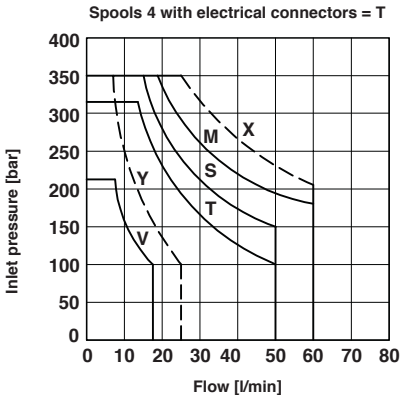
Installation position	Any
Coupling surface condition	Surface texture index $\sqrt{}^{0.4}$, flatness ratio 0.01/100 (ISO 1101)
Ambient temperature	-20 °C to +70 °C
Fluid	Hydraulic oil as per DIN 51524
Recommended viscosity	15÷100 mm²/s at 40 °C (ISO VG 15÷100)
Fluid contamination class	ISO 19/16, obtained through 25 μm and ß25≥ 75 line filters (recommended)
Fluid temperature	T ≤ 80 °C, if T ≤ 60 °C choose PE seals
Pressure limits	P, A, B ports: 350 bar – T port: 120 bar
Maximum flow	60 l/min for DI
Utilisation factor	100%
Voltage and power frequency	12 DC
Threshold tolerance	±10%

Q/Δp CHARTS

Port / Spool type	P-A	P-B	A-T	B-T	P-T
4	D	D	D	D	A

Tests done with fluid viscosity of 43 mm²/s at 40 °C





Section D
CHECKS AND ADJUSTMENTS

SECTION INDEX

D.01 Checking the cylinder speeds ..... page 2
D.02 Checking the absorption of the connectors 5
D.03 Checking and calibrating the circuit pressure 20
D.04 Calibrating the Excel board for aerial man-platforms 32
D.05 Calibrating the Robot 8000 - 15000 36
D.06 Calibrating the radio control 39
D.07 Description of the Perkins engine bulbs 42

Operation:	Checking the cylinder speeds Girolift 3514 - 3518	Table:
		D.01.01

IMPORTANT

The check of the movement times of the cylinders shall be done with the hydraulic oil at a temperature of 60°.

IMPORTANT

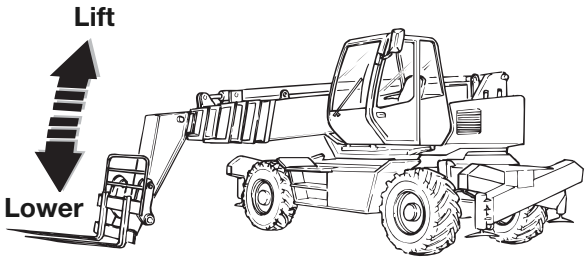
To check the engine speed, the area easy to reach is the external pulley of the output shaft.

BOOM LIFTING/LOWERING

Girolift 3514	Time (s)	
	up	down
Max engine speed	15”	10”
Min. engine speed	28”	18”

Girolift 3518	Time (s)	
	up	down
Max engine speed	15”	12”
Min. engine speed	30”	20”

Girolift 5022	Time (s)	
	up	down
Max engine speed	30”	20”
Min. engine speed	52”	40”

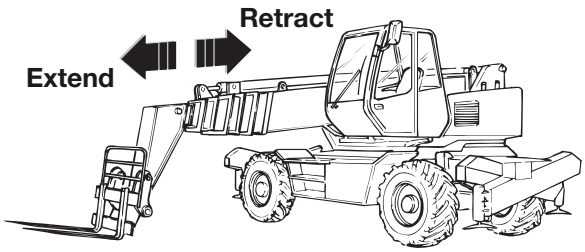


BOOM EXTENSION/RETRACTION

Girolift 3514	Time (s)	
	out	in
Max engine speed	17”	27”
Min. engine speed	23”	32”

Girolift 3518	Time (s)	
	out	in
Max engine speed	24”	15”
Min. engine speed	46”	32”

Girolift 5022	Time (s)	
	out	in
Max engine speed	43”	27”
Min. engine speed	90”	55”



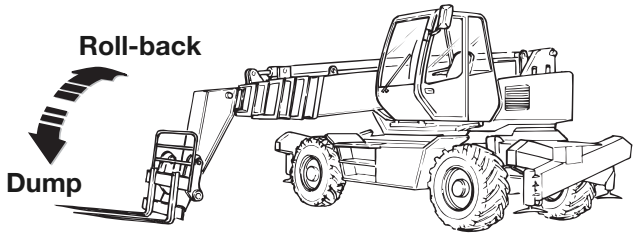
Operation: Checking the cylinder speeds Girolift 3514 - 3518	*Table:* **D.01.01**

ATTACHMENT DUMPING

Girolift 3514	Time (s)	
	roll-back	dump
Max engine speed	4”	4”
Min. engine speed	7”	6”

Girolift 3518	Time (s)	
	roll-back	dump
Max engine speed	5”	4”
Min. engine speed	7”	6”

Girolift 5022	Time (s)	
	roll-back	dump
Max engine speed	6”	6”
Min. engine speed	12”	11”

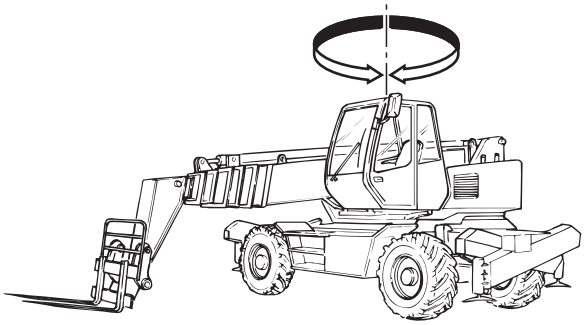


TURRET ROTATION (360°)

Girolift 3514	Time (s)
	rotation
Max engine speed	20”
Min. engine speed	26”

Girolift 3518	Time (s)
	rotation
Max engine speed	26”
Min. engine speed	30”

Girolift 5022	Time (s)
	rotation
Max engine speed	33”
Min. engine speed	35”



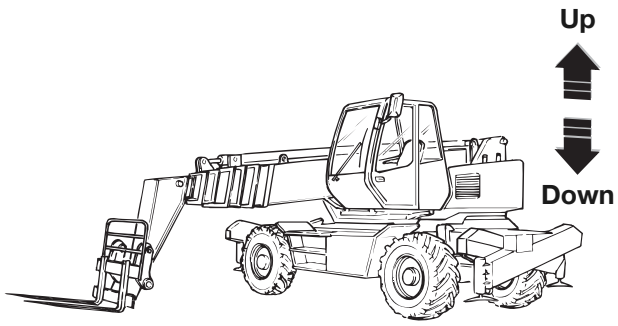
Operation:	Checking the cylinder speeds Girolift 3514 - 3518	*Table:* **D.01.01**

OUTRIGGER MOVEMENT

Girolift 3514	Time (s)	
	Up	Down
Max engine speed	5”	6”
Min. engine speed	6”	7”

Girolift 3518	Time (s)	
	Up	Down
Max engine speed	5”	5”
Min. engine speed	6”	6”

Girolift 5022	Time (s)	
	Up	Down
Max engine speed	3”	3”
Min. engine speed	4”	4”



OUTRIGGER ARM EXTENSION

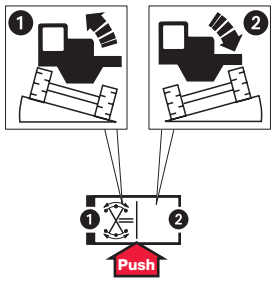
Girolift 5022	Time (s)	
	out	in
Max engine speed	4”	5”
Min. engine speed	5”	6”

MACHINE LEVELLING

Girolift 3514	Time (s)
	right-left levelling
Max engine speed	6”
Min. engine speed	8”

Girolift 3518	Time (s)
	right-left levelling
Max engine speed	6”
Min. engine speed	8”

Girolift 5022	Time (s)
	right-left levelling
Max engine speed	23”
Min. engine speed	25”



IMPORTANT

The maximum speed that can be reached on a level ground is 24 km/h in both directions (forward and reverse).

Operation:	Checking the electrical voltage of the connectors of the machine control boards	Table: D.02.01

DANFOSS BOARD

JP2 - 8 WAYS (from aerial man-platform)

Pos.	Function description	colour	Sig.	Measured current values
1	Up/down movement proportional	A-N	IN	Boom up/down movement, proportional signal, 6 V in neutral position, from 6 to 3 and from 6 to 9 with joystick moved.
2	Turret rotation proportional	R-L	IN	Turret rotation movement, proprtional signal, 6 V in neutral position, from 6 to 3 and from 6 to 9 with joystick moved.
3	Boom in/out proportional	A-B	IN	Boom in/out movement, proportional signal, 6 V in neutral position, from 6 to 3 and from 6 to 9 with joystick moved.
4	+12 Joystick moved	V	IN	12 V with joystick movement
5	Platform movements enabled	B-V	OUT	12 V with signal from sensor for platform locking to the machine
6	+12 V for robot power supply	B-R	OUT	12 V for robot power supply
7	NOT CONNECTED			
8	Forks coupled sensor signal	B-N	IN	12 V with platform locking sensor activated, say when the signal is sent to the board

JP3 - 2 WAYS (for aerial man-platform)

Pos.	Function description	colour	Sig.	Measured current values
1	+12 Joystick moved	B-G	IN	12 V with joystick movement
2	Robot selection	A-B	IN	12 V with key turned to «robot».

J4 - 20 WAYS

Pos.	Function description	colour	Sig.	Measured current values
1	Extension proportional	M/B	OUT	Neutral pos. 6 V; from 6 to 3 and from 6 to 9 with deadman button pressed and joystick wheel turned
2	Fork rotation proportional	V/B	OUT	Neutral pos. 6 V; from 6 to 3 and from 6 to 9 with deadman button pressed and joystick moved right or left
3	Up/down movement proportional	A/V	OUT	Neutral pos. 6 V; from 6 to 3 and from 6 to 9 with deadman button pressed and joystick moved forward or back
4	Turret rotation proportional	L/G	OUT	Neutral pos. 6 V; from 6 to 3 and from 6 to 9 with deadman button pressed, yellow rotation selection button activated and joystick moved right or left
5	Locking/unlocking proportional	A/B	OUT	Neutral pos. 6 V; from 6 to 3 and from 6 to 9 with deadman button pressed, red button activated and joystick moved right or left
6	Switching solenoid valve	Z/N	OUT	12 V with outrigger button pressed, sway and joystick operated.
7	NOT CONNECTED			

Operation:	Table:
Checking the electrical voltage of the connectors of the machine control boards	D.02.01

Pos.	Function description	colour	Sig.	Measured current values
8	NOT CONNECTED			
9	Front RT outr. UP sol. valve Y9	V/B	OUT	12 V with button pressed and joystick back with deadman button pressed
10	Rear LT outr. DOWN sol. valve Y8	C/B	OUT	12 V with button pressed and joystick forward with deadman button pressed
11	Front LT outr. DOWN sol. valve Y14	M/N	OUT	12 V with button pressed and joystick forward with deadman button pressed
12	Rear RT outr. DOWN sol. valve Y13	A/B	OUT	12 V with button pressed and joystick forward with deadman button pressed
13	Front RT outr. DOWN sol. valve Y7	B/N	OUT	12 V with button pressed and joystick forward with deadman button pressed
14	Rear LT outr. UP sol. valve Y6	V/N	OUT	12 V with button pressed and joystick back with deadman button pressed
15	Front LT outr. UP sol. valve Y12	Z/B	OUT	12 V with button pressed and joystick back with deadman button pressed
16	Rear RT outr. UP sol. valve Y11	A/R	OUT	12 V with button pressed and joystick back with deadman button pressed
17	Outriggers relay coils power supply	S-N	OUT	12 V with outriggers moved pressing the buttons and moving the joystick.
18	Left sway sol. valve Y10	G/R	OUT	12 V with button pressed and joystick left with deadman button pressed
19	Right sway sol. valve Y5	C/N	OUT	12 V with button pressed and joystick right with deadman button pressed
20	Slewring lock. pin sensor	Z-B	IN	12 V with rotation lock. pin down and sensor activated

***J5 or J6** - 14 WAYS (from joystick)*

Pos.	Function description	colour	Sig.	Measured current values
1	+12 joestick operated	M+B+MV	IN	12 V with joystick activated
2	Yellow button	S/M	IN	12 V with yellow button pressed
3	Red button	B/A	IN	12 V with red button pressed
4	Deadman	B/H	IN	12 V with deadman button pressed
5	Joystick - forward to 1A	N	IN	12 V with joystick forward and deadman pressed
6	Joystick - back to 1B	B/R	IN	12 V with joystick back and deadman pressed
7	Joystick - right to 2A	M/R	IN	12 V with joystick right and deadman pressed
8	Joystick - left to 2B	H/S	IN	12 V with joystick left and deadman pressed
9	Joystick - boom retracted to 3A	B/S	IN	12 V with joystick wheel back and deadman pressed
10	Joystick - boom extended to3B	S	IN	12 V with joystick wheel forward and deadman pressed
11	Boom UP/DOWN prop. (1P)	R	IN	Neutral pos. 6 V; from 6 to 3 and from 6 to 9 raising or lowering the boom with deadman button pressed

Operation: Checking the electrical voltage of the connectors of the machine control boards	*Table:* **D.02.01**

Pos.	Function description	colour	Sig.	Measured current values
12	Fork or turret rotation prop. (2P)	L	IN	Neutral pos. 6 V; from 6 to 3 and from 6 to 9 turning the turret right/left or pitching the forks forward/back with deadman button pressed
13	Boom IN/OUT prop. (3 P)	H	IN	Neutral pos. 6 V; from 6 to 3 and from 6 to 9 turning the wheel forward or back with deadman button pressed
14	+12 for joystick potentiometers	GM+GB+V+Z	OUT	12 V with dashboard on.

***JP4** - 8 WAYS (Danfoss distributor coils power supply - 12 V)*

Pos.	Function description	colour	Sig.	Measured current values
1	Power supply - IN/OUT sol. valve Y22	A/R	OUT	12 V with joystick operated
2	Power supply - UP/DOWN sol. valve Y26	A-G	OUT	12 V with joystick operated
3	Power supply - Fork rotation sol. valve Y23	M-N	OUT	12 V with joystick operated
4	Power supply - RT/LT turret rotation sol. valve Y27	B-N	OUT	12 V with joystick operated
5	Power supply - Attchment lock./unlock. sol. valve Y24	R-G	OUT	12 V with joystick operated
6	NOT CONNECTED			12 V with dashboard on
7	NOT CONNECTED			12 V with dashboard on
8	NOT CONNECTED			12 V with dashboard on

***J3** - 12 WAYS*

Pos.	Function description	colour	Sig.	Measured current values
1	Rear LT outrigger button	B/N	IN	12 V with outrigger selection button pressed
2	Front RT outrigger button	A/R	IN	12 V with outrigger selection button pressed
3	Rear RT outrigger button	Z/B	IN	12 V with outrigger selection button pressed
4	Front LT outrigger button	V/N	IN	12 V with outrigger selection button pressed
5	BLANK	M/N		
6	Road/site/platform selector	M/B	IN	12 V with selector to platform
7	High pin sensor signal	A-N	IN	12 V with sensor activated and counter-frame rotation enabled
8	Overload warn. syst. signal (3B6)	B-N	IN	12 V from overload warn. system when the machine is not in alarm; or when the machine is in alarm and the overload warn. system cutout key is turned inside dashboard
9	Low boom sensor signal	C L	IN	12 V with boom lowered, namely when forks are about 2 metres above the ground
10	High boom sensor signal	G/N	IN	12 V with boom fully raised
11	Boom out/in light ind.	S	IN	Negative for light indicator on dashboard - 12V wwith joy-stick wheel rotated

Operation:	Checking the electrical voltage of the connectors of the machine control boards	Table: D.02.01

12	Boom up/down light ind.	V	IN	Negative for light indicator on dashboard - 12 V with joystick moved forward or back

***J30** - 18 WAYS*

Pos.	Function description	colour	Sig.	Measured current values
1	NOT CONNECTED			
2	NOT CONNECTED			
3	NOT CONNECTED			
4	Compensation button	C/N	IN	12 V with compensation button pressed
5	OPTIONAL	B/V		
6	Slewring rot. cyl. lock./unlock. pushbutton	G/R	IN	12 V with button pressed
7	+12 under key	R/N	IN	12 V with dashboard on
8	Road/Platform/site key sel.	M-N	IN	12 V with key to site
9	Fork rotation light ind.	A	IN	Negative for light ind. 12 V with movement activated
10	Attachment lock./unlock. light ind.	M V	IN	Negative for light ind. 12 V with movement activated
11	Turret rotation light ind.	H	IN	Negative for light ind. 12 V with movement activated
12	Slewring locked light ind.	L R	IN	Negative for light ind. 12 V with movement activated
13	Parallel forks light ind.	C	IN	Negative for light ind. 12 V with movement activated
14	Seat sensor signal	A/V	IN	12 V with operator seated
15	NOT CONNECTED			
16	NOT CONNECTED			
17	NOT CONNECTED			
18	Earth	N	IN	Earth from frame

Operation:	Checking the electrical voltage of the connectors of the machine control boards	Table: D.02.01

FUSES - RELAYS X BOARD

X5 - 21 WAYS

Pos.	Function description	colour	Sig.	Measured current values
1	Back-up alarm off	B	OUT	12 V with back-up buzzer button pressed
2	Hazard button power supply	R-A	IN	12 V with dashboard on
3	Position light switch power supply	B-R	OUT	12 V
4	Position light switch output	B-G	IN	12 V with low and high beam on
5	Flashing power supply	L-R	OUT	12 V for turn signals flashing even if off
6	Turn signals power supply	2LN	OUT	12 V with dashboard on
7	Emerg. buttons power supply	2M	OUT	12 V with dashboard on
8	Horn power supply	Z	IN	12 V with horn on
9	Power supply from switch lever	V-N	IN	12 V with machine movement selection lever in forward speed possition
10	High beam power supply	B-V	IN	12 V with switch lever in low beam position
11	Hazard button power supply	R	OUT	12 V with dashboard on
12	Leftturn signal power supply	2L	OUT	12 V with left turn signal on
13	Right turn signal power supply	2A	OUT	12 V with right turn signal on
14	FWD/REV. and speed switch power supply	2G-R	OUT	12 V with dashboard on
15	Wiper motor and timer power supply	2L/N	OUT	12 V with dashboard on
16	Alarm off button power supply	B-R	OUT	12 V with dashboard on
17	Return from emerg. buttons	M-N	IN	12 V with dashboard on
18	From switch lever to low beam relay	A-V	IN	12 V with low beam on
19	From switch lever to displacement change relay	Z-B	IN	12 V with 2nd hydr. speed engaged from control lever
20	Reverse speed	M-V	IN	12 V with switch lever in reverse speed position
21	Beacon button power supply	R-N	OUT	12 V for beacon button

X6 - 17 WAYS

Pos.	Function description	colour	Sig.	Measured current values
1	Brake pump bulb power supply	R	OUT	12 V with dashboard on
2	Power supply - high pin and carriage alignment sensors	2RV	OUT	12 V with dashboard on
3	Left turn signal power supply	L	IN	12 V with turn signals lever forward
4	Right turn signal power supply	A	IN	12 V with turn signals lever back
5	Carriage alignment signal	MB	OUT	12 V when the sensor re-transmits the signal
6	Emerg. pump coil power supply	AR	IN	12 V with dashboard on and emergency button pressed
7	Rear RT light power supply	G	OUT	12 V with position lights on
8	Steer. accumulator sol. valve	S/N	OUT	12 V with dashboard on

Operation:	Checking the electrical voltage of the connectors of the machine control boards	Table: D.02.01

9	Front left light and license plate light power supply	GN	OUT	12 V with position lights on
10	Low brake pumpm pressure bulb return (negative for light ind. when pressure is low)	HR	IN	12 V with light indicator off
11	Hydr. oil filter clogging bulb return (negative for light ind. when the filter is clogged)	HL	IN	12 V with clean filter and light indicator off
12	High and low sensors power supply	2RV	OUT	12 V with dashboard on
13	Back-up horn	B	OUT	12 V with back-up horn on
14	Low boom signal return	CL	IN	12 V with boom down and sensor activated
15	Earth	N	IN	
16	Back-up light	MV	OUT	12 V with speed switch back
17	Horn power supply	Z	OUT	12 V with horn button pressed

***X7** - 17 WAYS*

Pos.	Function description	colour	Sig.	Measured current values
1	Left high beam power supply	V	OUT	12 V with high beam lever on
2	Signal from outrigger sensors for overload scale change	LR	IN	12 V with all outriggers lowered
3	Outrigger sensors power supply	RV	OUT	12 V with dashboard on
4	Signal from outrigger sensors for transmission disengagement	BG	OUT	12 V with one or more outriggers lowered
5	Signal from Cardan sensor	AB	IN	12 V with Cardan sensor activated
6	Signal from 2nd speed engaged sensor	AV	IN	12 V with 2nd speed engaged sensor activated
7	Signal from 1st speed engaged sensor	AR	IN	12 V with 1st speed engaged sensor activated
8	Low beam power supply	H	OUT	12 V with low beam on
9	Low beam power supply	H	OUT	12 V with low beam on
10	Right high beam power supply	V	OUT	12 V with high beam lever on
11	Displacement change sol. valve Y18 power supply	V	OUT	12 V with 2nd hydr speed engaged
12	Left turn signals power supply	L	OUT	12 V with left turn signal on
13	Right turn signals power supply	A	OUT	12 V with right turn signal on
14	OPTIONAL	LG	OUT	OPTIONAL.
15	Rear RT/front LT position lights	GN	OUT	12 V with position lights on
16	Power supply 30 relays KC9 - KC10 for axle sway unlocking Y15 - Y3 - Y4	HR	OUT	12 V with dashboard on
17	Front RT/rear LT position lights	2G	OUT	12 V with position lights on

Operation:	Checking the electrical voltage of the connectors of the machine control boards	Table: D.02.01

X8 - 9 WAYS

Pos.	Function description	colour	Sig.	Measured current values
1	Forward speed sol. valve Y1	VN	OUT	12 V with forward speed engaged
2	Engine water temperature	HL	IN	Signal for engine coolant tenperature thermometer
3	High eng. water temperature	H/R	IN	Signal switching on the water overheating light indic.
4	Air filter clogged	AG	IN	12 V in normal conditions, 0 V with filter clogged
5	Electrostop Y29	M	OUT	12 V in normal conditions, 0 V with emergency button pressed
6	Reverse speed sol. valve Y02	MV	OUT	12 V with reverse speed engaged
7	Engine oil light indic.	HN	OUT	Normal conditions 0 V, low pressure12 V
8	Starting motor relay coil K01	C	OUT	12 V with ignition key to output 50 for ignition
9	12 V from alternator	H	IN	12 V with engine started

X12 - 7 WAYS

Pos.	Function description	colour	Sig.	Measured current values
1	4-wheel steer sol. valve	C-N	OUT	12 V with steer selection button to «4-wheel» for sol. valve Y21
2	Crab steer sol. valve	H-R	OUT	12 V with steer selection button to «crab» for sol. valve Y20
3	Low boom sensor signal	Z-N	OUT	12 V with low boom sensor activated
4	OPTIONAL			
5	1st mech. speed engaged sol. valve	B-V	OUT	12 V with 1st mech. speed engaged
6	Differential lock. sol. valve Y19	A-B	OUT	12 V with differential lock. button pressed (**only Girlolift 5022**).
7	2nd mech. speed engaged sol. valve	B-R	OUT	12 V with 2nd mech. speed engaged

X13 - 17 WAYS

Pos.	Function description	colour	Sig.	Measured current values
1	High beam light indic.	V-N	OUT	12 V with high beam on
2	Hydr. oil bulb light indic. P.S.	S-N	OUT	12 V with dashboard on.
3	Brake bulb light indic.	H-R	OUT	12 V with accumulators under pressure
4	Max water temp light indic.	H/R	OUT	12 V with normal water temperature
5	Air filter light indic.	A-G	OUT	12 V with air filter clean
6	OPTIONAL (BLANK)			
7	Low eng. oil press. light indic.	H-N	OUT	12 V with engine started
8	Gen-set light indic.	2H	OUT	12 V with engine started
9	Engine water temperature	H-L	OUT	12 V with engine started
10	4-wheel steer power supply	C-N	IN	12 V with 4-wheel steer button pressed
11	Crab steer power supply	H-R	IN	12 V with crab steer button pressed
12	Alarm (buzzer) light indicator	S-G	IN	
13	Parking brake light indicator	L-G	OUT	12 V with parking brake engaged
14	BLANK			BLANK

Operation:	Checking the electrical voltage of the connectors of the machine control boards	Table: D.02.01

15	BLANK	BLANK
16	BLANK	BLANK
17	BLANK	BLANK

***X9** - 13 WAYS*

Pos.	Function description	colour	Sig.	Measured current values
1	12 V for speed change	G-R	OUT	12 V with 1st /2nd speed change button pressed
2	1st speed light indicator signal	V-N	IN	12 V with 1st speed engaged
3	Seat sensor	A/V	OUT	12 V with operator seated
4	2nd speed light indicator signal	V	OUT	12 V with 2nd speed engaged
5	2nd speed, sol. valve Y16	B-R	IN	12 V with 2nd speed engaged
6	EARTH	N	OUT	EARTH
7	Ctr. unit P.S. from fuse 1C (7.5 A)	R-N	OUT	12 V with dashboard on from fuse 1C (7,5 A)
8	1st speed engaged, sol. valve Y17	V-B	IN	12 V with 1st mechanical speed engaged
9	Buzzer OUT	M-N	OUT	OPTIONAL
10	Transmission disengaged	L-G	IN	12 V with operator seated, 0 V if he stands up with transmission disengament through coil of relay K7
11	Moving Cardan sensor	A-B	OUT	12 V with sensor activated
12	1st speed engaged sensor	A-V	OUT	12 V with 1st speed engaged sensor activated
13	2nd speed engaged sensor	A-R	OUT	12 V with 2nd speed engaged sensor activated

***X10** - 17 WAYS*

Pos.	Function description	colour	Sig.	Measured current values
1	Low outr. for overload syst. signal	LR-	OUT	12 V with outriggers down
2	Differential locking	C-B	IN	12 V with differential lock. button pressed (**only Girolift 5022**).
3	Seat/park. brake micro-switch P.S.	2RV	OUT	12 V with dashboard on from fuse 7A (5 A).
4	Parking brake engaged signal	L-G	IN	12 V with parking brake engaged
5	Straight machine sensor signal	MB	OUT	12 V for changing overload syst. scale when the straight machine sensor is activated
6	Overload syst. (3B6) power supply	R	OUT	12 V with dashboard on from fuse 5C (15 A).
7	Change button power supply	H/R	OUT	12 V with dashboard on from fuse 1C (7,5 A).
8	Road/site/platf key power supply	2RN	OUT	12 V with dashboard on
9	Cab lighting power supply	R	OUT	12 V with dashboard on
10	1st and 2nd mech. speed change	G-R	IN	12 V with mech. speed change button pressed
11	1st speed light indicator	V-N	OUT	12 V for powering 1st mechanical speed light indicator
12	Seat sensor signal return	2AV	IN	12 V with seated operator for use of Danfoss board and gearbox board
13	2nd speed light indicator	B-V	OUT	12 V for powering 2nd mechanical speed light indicator
14	Signal for emerg. pump	L/G	IN	12 V for emergency pump with button pressed, key operated and emergency mushroom pressed

Operation:	Checking the electrical voltage of the connectors of the machine control boards	Table: D.02.01

15	Danfoss board and opt. joystick P.S.	R-BR	OUT	12 V with dashboard on
16	Danfoss board power supply	R-N	OUT	12 V with dashboard on from fuse 6C (20 A)
17	Emergency pump power supply	2LN	OUT	12 V with dashboard on

***X11** - 13 WAYS*

Pos.	Function description	colour	Sig.	Measured current values
1	Electronics relay 85 P.S.	M/B	OUT	12 V with dashboard on
2	Position lights light ind.	G	OUT	12 V with position lights switch on
3	Carriage alignment light ind.	M-B	OUT	12 V with straight machine sensor activated
4	Low boom sensor	C-A	IN	12 V with sensor reading when boom is lowered
5	12 V for platform	L/N	IN	12 V with dashboard on for platform power supply
6	12 V for instrument light ind.	2RN	OUT	12 V with dashboard on for light indic. panel power supply
7	Work light power supply	G-R	OUT	12 V with dashboard on
8	Outriggers butt. power supply	R/N	OUT	12 V with dashboard on
9	Instruments lighting	2G	OUT	12 V with position lights button on
10	Turn sign. light ind. power supply	R-G	OUT	12 V with turn signals lever activated
11	12 V to 50 ignition board	C-A	IN	12 V with ignition board powered
12	Speed switch power supply	G-V	OUT	12 V with dashboard on
13	Heater power supply	H-R	OUT	12 V with dashboard on

***X14** - 9 WAYS*

Pos.	Function description	colour	Sig.	Measured current values
1	Emerg. pump relay P.S.	L-G	IN	12 V with emergency button pressed, dashboard on and emergency pump button pressed
2	Engine stop mushroom P.S.	M	OUT	12 V with dashboard on
3	Power supply for plaftorm start-up	C	IN	12 V for starting the aerial man-platform
4	OPTIONAL	A-G	OUT	OPTIONAL
5	OPTIONAL +12	A-V	OUT	OPTIONAL
6	OPTIONAL	A-N	IN	OPTIONAL
7	Horn	Z	IN	12 V with horn button pressed
8	Power supply for plaftorm	R-N	OUT	12 V with ignition key turned left and road/platform/site key turned to platform
9	Platform joystick potentiom. P.S.	C-R	OUT	12 V for platform with outriggers down and keys turned (see pos. 8).

Operation:	Table:
Checking the electrical voltage of the connectors of the machine control boards	**D.02.01**

UNDERCARRIAGE XC BOARD

***XC8** - 21 WAYS (from swivel joint)*

Pos.	Function description	colour	Sig.	Measured current values
1	Sensor - Rot. lock. pin down	Z-B	OUT	12 V with slewring lock. pin down and sensor LED on
2	Cardan sensor signal	A-B	OUT	12 V with sensor activated
3	Front LT sway sol. valve Y10	G/R	IN	12 V with sway button pressed, deadman button pressed and joystick left
4	Front RT sway sol. valve Y5	C/N	IN	12 V with sway button pressed, deadman button pressed and joystick right
5	1st speed sol. valve Y17	B-V	IN	12 V with 1st speed engaged
6	Sensors power supply	R-V	IN	12 V with dashboard on.
7	Overload scale change signal	L-R	OUT	12 V with outriggers lowered
8	P.S. 30 relays KC9 and KC10	H-R	IN	12 V with dashboard on (oscillating axle sol. valve unlock)
9	Outr. down/up relay coils power s.	S-N	IN	12 V with any outrigger button pressed and joystick activated to move up or down
10	Tramming lock. signal from outriggers	B-G	OUT	12 V when lowering an outrigger
11	Front RT outr. up, P.S. 30 relay KC1, sol. valve Y9	B/V	IN	12 V when raising the front right outrigger (**only 3514-3518**).
11	Front LT outr. up, rear RT arm retr., P.S. 30 relay KC1, sol. valve Y9	B/V	IN	12 V when raising the outrigger or retracting the arm (**only 5022**).
12	Not used in Giro 3514-3518			
12	Differential locking	C-B	IN	12 V with differential locking button pressed (**only 5022**).
13	Sensor sign.1st speed engaged	A-V	OUT	12 V with sensor activated
14	Hydr. speed engaged sol. valve Y18	V	IN	12 V with 2nd hydraulic speed engaged
15	2nd speed sol. valve Y16	B-R	IN	12 V with 2nd mechanical speed engaged
16	Sensor sign.2nd speed engaged	A-R	OUT	12 V with sensor activated
17	Crab steer sol. valve Y20	H-R	IN	12 V with selector on crab steer
18	4-wheel steer sol. valve Y21	C-N	IN	12 V with selector on 4-wheel steer
19	N.C.	Z-N		
20	N.C.	M-N		
21	OPTIONAL	L-G		

***XC7** - 17 WAYS (from swivel joint)*

Pos.	Function description	colour	Sig.	Measured current values
1	Front RT outr. down, P.S. 30 relay KC5, sol. valve Y7	B/N	IN	12 V during movement, with outrigger selection button pressed, joystick forward and deadman button pressed (**only 3514-3518**).

Operation: Checking the electrical voltage of the connectors of the machine control boards	*Table:* **D.02.01**

Pos.	Function description	colour	Sig.	Measured current values
1	Front LT outr. down, rear RT arm ext.,			
	P.S. 30 relay KC5, sol. valve Y7	B/N	IN	12 V during movement, with function selection button pressed, joystick operated and deadman button pressed (**only 5022**)
2	Front LT outr. down,			
	P.S. 30 relay KC3, sol. valve Y14	M/N	IN	12 V during movement, with outrigger selection button pressed, joystick forward and deadman button pressed (**only 3514-3518**)
2	Front RT/rear LT arm extension,			
	P.S. 30 relay KC3, sol. valve Y14	B/N	IN	12 V during movement, with function selection button pressed, joystick operated and deadman button pressed (**only 5022**)
3	Rear LT outr. up,			
	P.S. 30 relay KC6, sol. valve Y6	V/N	IN	12 V during movement, with outrigger selection button pressed, joystick back and deadman button pressed (**only 3514-3518**)
3	Front RT, rear LT outr. up,			
	P.S. 30 relay KC6, sol. valve Y6	V/N	IN	12 V during movement, with function selection button pressed, joystick operated and deadman button pressed (**only 5022**)
4	Rear RT outr. down,			
	P.S. 30 relay KC4, sol. valve Y13	A/B	IN	12 V during movement, with outrigger selection button pressed, joystick forward and deadman button pressed (**only 3514-3518**)
4	Front LT arm ext, rear RT outr. down,			
	P.S. 30 relay KC4, sol. valve Y13	A/B	IN	12 V during movement, with function selection button pressed, joystick operated and deadman button pressed (**only 5022**)
5	Earth	N	IN	Connected to frame
6	Front LT outr. up,			
	P.S. 30 relay KC7, sol. valve Y12	Z/B	IN	12 V during movement, with outrigger selection button pressed, joystick back and deadman button pressed(**only 3514-3518**)
6	Front RT/rear LT arm retr.,			
	P.S. 30 relay KC7, sol. valve Y12	Z/B	IN	12 V during movement, with function selection button pressed, joystick operated and deadman button pressed (**only 5022**)
7	NOT CONNECTED	A		
8	NOT CONNECTED	H		
9	NOT CONNECTED	V		
10	Rear LT outr. down,			
	P.S. 30 relay KC2, sol. valve Y8	C/B	IN	12 V during movement, with outrigger selection button pressed, joystick forward and deadman button pressed (**only 3514-3518**)

Operation:	Checking the electrical voltage of the connectors of the machine control boards	*Table:* **D.02.01**

Pos.	Function description	colour	Sig.	Measured current values
10	Front RT/Rear LT outr. down, P.S. 30 relay KC2, sol. valve Y8	C/B	IN	12 V during movement, with function selection button pressed, joystick operated and deadman button pressed (**only 5022**)
11	NOT CONNECTED			
12	NOT CONNECTED			
13	NOT CONNECTED			
14	Rear RT outr. up, P.S. 30 relay KC8, sol. valve Y11	A/R	IN	12 V during movement, with outrigger selection button pressed, joystick back and deadman button pressed (**only 3514-3518**)
14	Front LT arm retr., rear RT outr. up, P.S. 30 relay KC8, sol. valve Y11	A/R	IN	12 V during movement, with function selection button pressed, joystick operated and deadman button pressed (**only 5022**)
15	NOT CONNECTED	L		
16	NOT CONNECTED	G		
17	NOT CONNECTED	G-N		

XC4 *- 13 WAYS (front machine functions)*

Pos.	Function description	colour	Sig.	Measured current values
1	Power supply - front axle sway cylinders solenoid valves, Y3 - Y4	2MB	OUT	12 V during machine sway
2	Front LT outr. sensor signal	B/R	IN	12 V with front left outrigger down
3	Front RT outr. sensor signal	B-N	IN	12 V with front right outrigger down.
4	Front outr. sensors power supply	2RV	OUT	12 V with dashboard on
5	NOT CONNECTED	B/N		
5	Front LT outr. down sol. valve, Y7	B/N	OUT	12 V during movement (**only 5022**)
6	NOT CONNECTED	A/B		
6	Front LT arm ext. sol. valve, Y13	A/B	OUT	12 V during movement (**only 5022**)
7	NOT CONNECTED	Z/B		
7	Front RT arm retr. sol. valve, Y12	Z/B	OUT	12 V during movement (**only 5022**)
8	NOT CONNECTED	V/B		
8	Front LT outr. up sol. valve, Y9	V/B	OUT	12 V during movement (**only 5022**)
9	NOT CONNECTED	C/B		
9	Front RT outr. down sol. valve, Y8	C/B	OUT	12 V during movement (**only 5022**)
10	EARTH	M		
11	NOT CONNECTED	M/N		
11	Front RT arm ext. sol. valve, Y14	M/N	OUT	12 V during movement (**only 5022**)
12	NOT CONNECTED	V/N		
12	Front RT outr. up sol. valve, Y6	V/N	OUT	12 V during movement (**only 5022**)

Operation: Checking the electrical voltage of the connectors of the machine control boards	*Table:* **D.02.01**

Pos.	Function description	colour	Sig.	Measured current values
13	NOT CONNECTED	A/R		
13	Front LT arm retr. sol. valve,Y11	A/R	OUT	12 V during movement (**only 5022**)

XC3 - 13 WAYS (rear panel)

Pos.	Function description	colour	Sig.	Measured current values
1	Front LT outr. down sol. valve, Y14	M/N	OUT	12 V with outrigger selection button pressed, joystick operated and deadman button pressed (**only 3514-3518**)
1	Rear LT arm ext. sol. valve, Y14	M/N	OUT	12 V during movement (**only 5022**)
2	Rear LT outr. down sol. valve, Y8	C/B	OUT	12 V with outrigger selection button pressed, joystick operated and deadman button pressed
3	Sensors power supply	2RV	OUT	12 V with dashboard on
4	Front RT outr. down sol. valve, Y7	B/N	OUT	12 V with outrigger selection button pressed, joystick operated and deadman button pressed (**only 3514-3518**)
4	Rear RT arm ext. sol. valve, Y7	B/N	OUT	12 V during movement (**only 5022**)
5	Rear LT outr. up sol. valve, Y6	V/N	OUT	12 V with outrigger selection button pressed, joystick operated and deadman button pressed
6	Rear RT outr. up sol. valve, 11	A/R	OUT	12 V with outrigger selection button pressed, joystick operated and deadman button pressed
7	Front LT outr. up sol. valve, Y12	Z/B	OUT	12 V with outrigger selection button pressed, joystick operated and deadman button pressed (**only 3514-3518**)
7	Rear LT arm retract. sol. valve, Y12	Z/N	OUT	12 V during movement (**only 5022**)
8	Rear RT outr. down sol. valve,Y13	A/B	OUT	12 Vwith outrigger selection button pressed, joystick operated and deadman button pressed
9	Front RT outr. up sol. valve, Y9	B/V	OUT	12 V with outrigger selection button pressed, joystick operated and deadman button pressed (**only 3514-3518**)
9	Rear RT arm retract. sol. valve, Y19	B/V	OUT	12 V during movement (**only 5022**)
10	Earth	N	OUT	
11	Rear wheels align. sensor	A-B		OPTIONAL.
12	NOT CONNECTED	M-N		
13	NOT CONNECTED	Z-N		

XC1 - 21 WAYS (for aux. circuits)

Pos.	Function description	colour	Sig.	Measured current values
1	Rear axle unlock. sol. valve, Y15	2GV	OUT	12 V with counter-frame rotation unlock. pin down
2	NOT CONNECTED	G-V		
3	Power supply - Cardan sensor	R-V	OUT	12 V with dashboard on
4	Power supply - 1st speed sensor	R-V	OUT	12 V with dashboard on

Operation:	Checking the electrical voltage of the connectors of the machine control boards	*Table:* **D.02.01**

Pos.	Function description	colour	Sig.	Measured current values
5	Power supply - 2nd speed sensor	R-V	OUT	12 V with dashboard on
6	P.S. - slewring locking pin down sensor	2RV	OUT	12 V with dashboard on
7	P.S. - 1st speed solenoid, Y17	B-V	OUT	12 V with 1st mechanical speed engaged
8	P.S. - front RT sway solenoid, Y5	C/N	OUT	12 V with sway button activated, deadman button pressed and joystick operated
9	P.S. - front LT sway solenoid, Y10	G/R	OUT	12 V with sway button pressed, deadman button pressed and joystick operated
10	Cardan sensor signal	A-B	IN	12 V with Cardan rotation sensor activated
11	Slewring locking pin down sensor signal	Z-B	IN	12 V with slewring locking pin down and sensor activated
12	Sensor signal return - rear LT outrigger down	B-N	IN	12 V with outrigger up
13	Sensor signal return - rear RT outrigger down	B/R	IN	12 V with outrigger up
14	NOT CONNECTED	G-N		
15	4-wheel steer solenoid, Y21	C-N	OUT	12 V with selector on 4-wheel steer
16	Crab steer solenoid, Y20	H-R	OUT	12 V with selector on crab steer
17	Signal return 2nd speed engaged sensor	A-R	IN	12 V with 2nd mechanical speed engaged
18	Power supply - 2nd speed solenoid, Y16	B-R	OUT	12 V with 2nd mechanical speed engaged
19	Power supply - Hydromatik motor displac. change solenoid, Y18	V	OUT	12 V with 2nd mechanical speed engaged
20	Sensor signal return - 1st speed engaged	A-V	IN	12 V with 1st mechanical speed engaged
21	Differential locking power supply	C-B	OUT	Not present on Girolift **3514-3518** (disconnected), connected for Girolift **5022**

Operation:	Checking the electrical voltage of the connectors of the machine control boards	*Table:* **D.02.01**

GEARBOX CONTROL

Pos.	Function description	colour	Sig.	Measured current values
1	Buzzer	M-N		Optional
2	Light ind. - 2nd mech. speed	V-N	OUT	2 V when the light indicator „2nd mechanical speed engaged“ comes on
3	Light ind. - 1st mech. speed	V	OUT	12 V when the light indicator „1st mechanical speed engaged“ comes on
4	Drive disengagement (85 relay K 7)	L-G	OUT	12 V with seat cushion sensor non-activated (drive disengaged)
5	Power supply from 1C (7.5 A)	R-N	IN	12 V with dashboard on
6	Mech. speed change signal	G-R	IN	12 V with mech. speed ushbutton pressed down
7	Sensor - 1st speed engaged	A-R	IN	12 V with 1st speed sensor activated
8	NOT CONNECTED			
9	Solenoid - 1st speed	B-R	OUT	12 V with 1st speed engaged
10	NOT CONNECTED			
11	NOT CONNECTED			
12	Cardan sensor	A-B	IN	12 V with Cardan sensor activated
13	EARTH	N	IN	Earth to frame
14	Sensor - 2nd speed engaged	A-V	IN	12 V with 2nd speed sensor activated
15	Solenoid -2nd speed	V-B	OUT	12 V with 2nd speed engaged
16	Power supply bridged control unit with pos. 5	R-N	IN	12 V with dashboard on
17	Seat sensor	A/V	IN	12 V with the operated seated

Operation: Checking and calibrating the circuit pressure	Table: D.03.01

1. PRELIMINARY OPERATIONS

Warm up the hydraulic oil to 80°C by keeping one of the elements of the boom distributor to full stroke under pressure.
To reach this temperature in a faster way, cover the oil core of the radiator with a carton in the case of a water-oil combined cooler, or the oil radiator if the machine is equipped with a separate oil radiator.

2. SETTING THE BOOM DISTRIBUTOR

Find the manometer mini-socket **ref. 30** on the **Danfoss** distributor (see **annexes 1** and **2**).

2.1 STAND-BY SETTING

Connect a 0-60 bar manometer to the mini-socket **ref. 30**.
Set valve **ref. 33a** on the pump (see **annex 4**) to 20 bar. (**Note:** proceed with the engine running at idle speed and do not move any lever of the distributor).

2.2 SETTING THE DISTRIBUTOR PRESSURE CONTROL VALVE

- Remove the 0-60 bar manometer from the mini-socket **ref. 30** and connect a 0-400 bar manometer. Fully raise the boom to stroke end.
- Set the **PVP** valve (see **annex 5**) to 270 bar for models Girolift 3514 - 3518 - 5022.

  Note: If, during the distributor setting, it is not possible to reach a pressure of 270 bar, tighten valve **ref. 34** (see **annex 4**) of the Hydromatik variable displacement pump.
- After the distributor calibration, adjust valve **ref. 34** (see **annex 4**) of the Hydromatik variable displacement pump to a value of 260 bar.

The operations above must be done since the distributor valve acts as safety valve, while the pump valve acts as pressure control valve.

The two safety valves of the distributor, **LSA-LSB**, (see **annex 5**) must not be calibrated, since they are cartridge valves already set by Danfoss and used to release the pressure when the pressure in the forks line reaches a value of about 275-280 bar.

- Remove the manometer from the mini-socket and refit and tighten the protection cap.

3. SETTING THE BLOCK VALVES OF THE FORK BALANCE CYLINDER (see annexes 1 and 2)

- Loosen lock nuts **K** of the two valves **M** and tighten the two registers.
- Re-loosen of one turn and a half both valves and re-tighten the lock nuts.

  Note: In model 5022, there are two balance cylinders, while models 3514 ad 3518 have only one cylinder.

4. SETTING THE PRESSURE RELIEF VALVE

- Connect a 0-60 bar manometer to the mini-socket **ref. 33** (see **annexes 1** and **2**) positioned on valve **F** with the engine running at idle speed by moving any of the elements of the distributor to stroke end, then set valve **F** to 25 bar.
- Remove the manometer from the mini-socket and re-tighten the protection cap.

Operation: Checking and calibrating the circuit pressure	Table: D.03.01

5. SETTING THE HYDROMATIK PUMP HYDROSTATIC TRANSMISSION

Do the calibration of the hydrostatic transmission with the hydraulic oil at a temperature of 80°C.

- Connect a 0-60 bar manometer to the mini-socket **ref. G** (see **annex 6**) to read the low-pressure value.
- Connect a 0-600 bar manometer to the mini-socket **ref. H** to read the high-pressure value.

CAUTION

Do not fit the manometer to the application point corresponding to the reverse speed. This operation is extremely dangerous for the serviceman who is calibrating the transmission.

- Hold the selector to neutral position and make sure the maximum speed of the engine does not exceed 2500 rpm. The engine must run at a idle speed of 900 rpm. Otherwise, adjust the minimum speed.
- Measure the boost pressure and ensure it is about 26/28 bar with the engine running at idle speed. The boost pressure has not a fixed value but varies from pump to pump.
- Engage the 2nd mechanical speed.
- Pull the parking brake to stroke end and disconnect the relevant micro-switch or, with the assistance of a second operator, fully depress the foot brake.

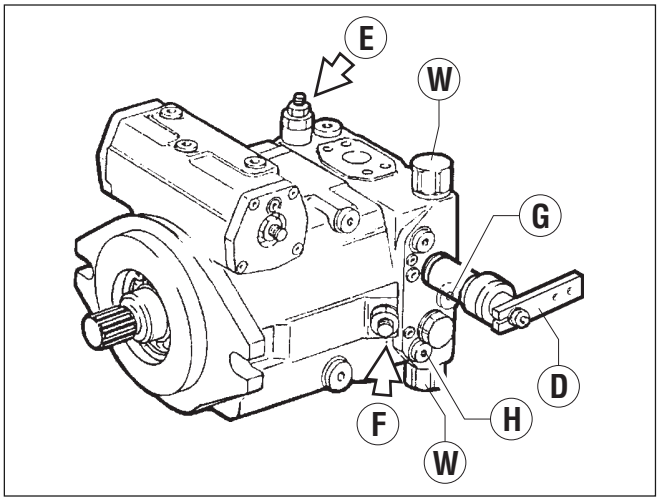
STARTING THE CALIBRATION

- Set the forward-neutral-reverse selector to the forward position.
- Run the engine at 1100 rpm. Check the value on the tachometer.
- Adjust the shutter **D** by means of the register until reading a value of 50 bar on the high-pressure manometer.

5.1 CALIBRATION OF THE "DA" CURVE

Do this operation with extreme caution. The proper functioning of pump and transmission depends on this calibration.

- Set the forward-neutral-reverse selector to the forward position.
- Run the engine at maximum speed and check the high-pressure value. If this value is less than 430 bar, increase the pressure to 425-430 bar by means of the pressure cut-off valve **E**.



- Gradually increase the engine rpm and steadily check the high-pressure manometer. As soon as the value of 400 bar is reached, hold the gas pedal fully depressed and attempt to keep the pressure on this value.
- If, with the engine running at 2000 rpm, the value of 400 bar is not reached, adjust the spark advance valve **F**.

ATTENTION

The spark advance screw must never be rotated beyond the vertical axis of the pump (observe the reference mark on the screw).

Operation: Checking and calibrating the circuit pressure	Table: D.03.01

Model	Pump pressure	Diesel engine rpm
GIROLIFT 3513	400 BAR	2100
GIROLIFT 4020	400 BAR	1600
GIROLIFT 5022	400 BAR	2000
GIROLIFT 3514	400 BAR	2000
GIROLIFT 3518	400 BAR	2000

5.2 CALIBRATION OF THE PRESSURE CUT-OFF VALVE

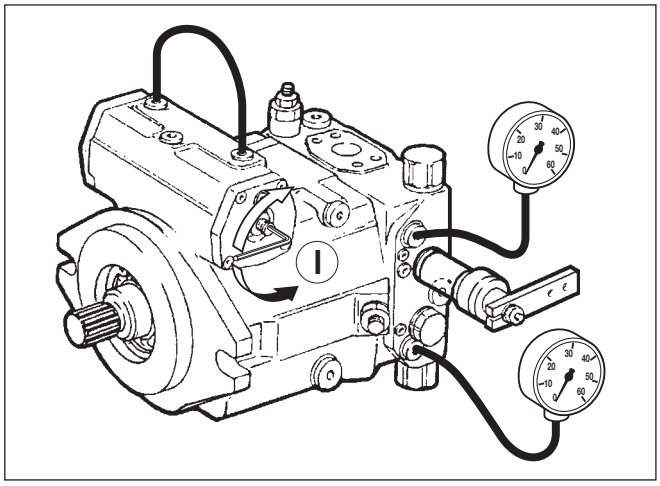
- With the engine running at maximum speed and the forward speed engaged, adjust the pressure cut-off valve **E** to 420 bar.

  The two pressure control valves **W** must not be calibrated since they are of cartridge type and already set to 450 bar by Rexroth.

5.3 CALIBRATION OF THE MECHANICAL ZERO

The calibration of the mechanical zero **I** is required if the machine is set to neutral position with the forward-reverse speed lever.

- Set the forward-neutral-reverse selector to neutral position.
- With the engine running at idle speed, adjust the mechanical zero screw by rotating it until the high-pressure manometer reads the same value measured by the boost pressure manometer.



6. SETTING THE BRAKING SYSTEM PRESSURE

- Connect a 0-250 bar manometer to position **R** (see **annex 7**).
- Depress the foot brake some times until the manometer starts increasing. When it stops, the value shown is the calibration value of valve **S** (see **annex 7**) which must be 140 bar. If the displayed value is inferior, loosen valve **S**; if the value is greater, tighten the valve.

  Note: To check the pressure, it is necessary to depress the foot brake some times until the manometer restarts increasing; when it stops in stable position, it shows the calibration value. Pay special attention while disconnecting the hose from the accumulator. Oil can splash all around. First of all, release any residual pressure from the accumulators.

Operation: Checking and calibrating the circuit pressure	*Table:* **D.03.01**

7. SETTING THE POWER STEERING

- Connect a 0-250 bar manometer to position **Z** (see **annex 4**).
- Select the front axle steering mode.
- Move the steering cylinder to stroke end and make sure the value of the power steering **A** is 140 bar. If the value is less, tighten valve **X**; if the value is greater, loosen the valve.

  Note: To gain access to valve **X**, remove the protection cap (see **annex 4**).

8. SETTING THE COUNTERFRAME ROTATION SAFETY VALVES

- Disconnect the two flexible hoses **H** (see **annex 3**) and connect two 0-250 bar manometers to both of them.
- Operate the turret rotation in one direction and check that the manometer reads a value of 140 bar.
- Operate the rotation in the opposite direction. The manometer must read again a pressure of 140 bar.
- To adjust the pressure, remove caps **T** and rotate the internal screws until reading the correct value on both manometers.

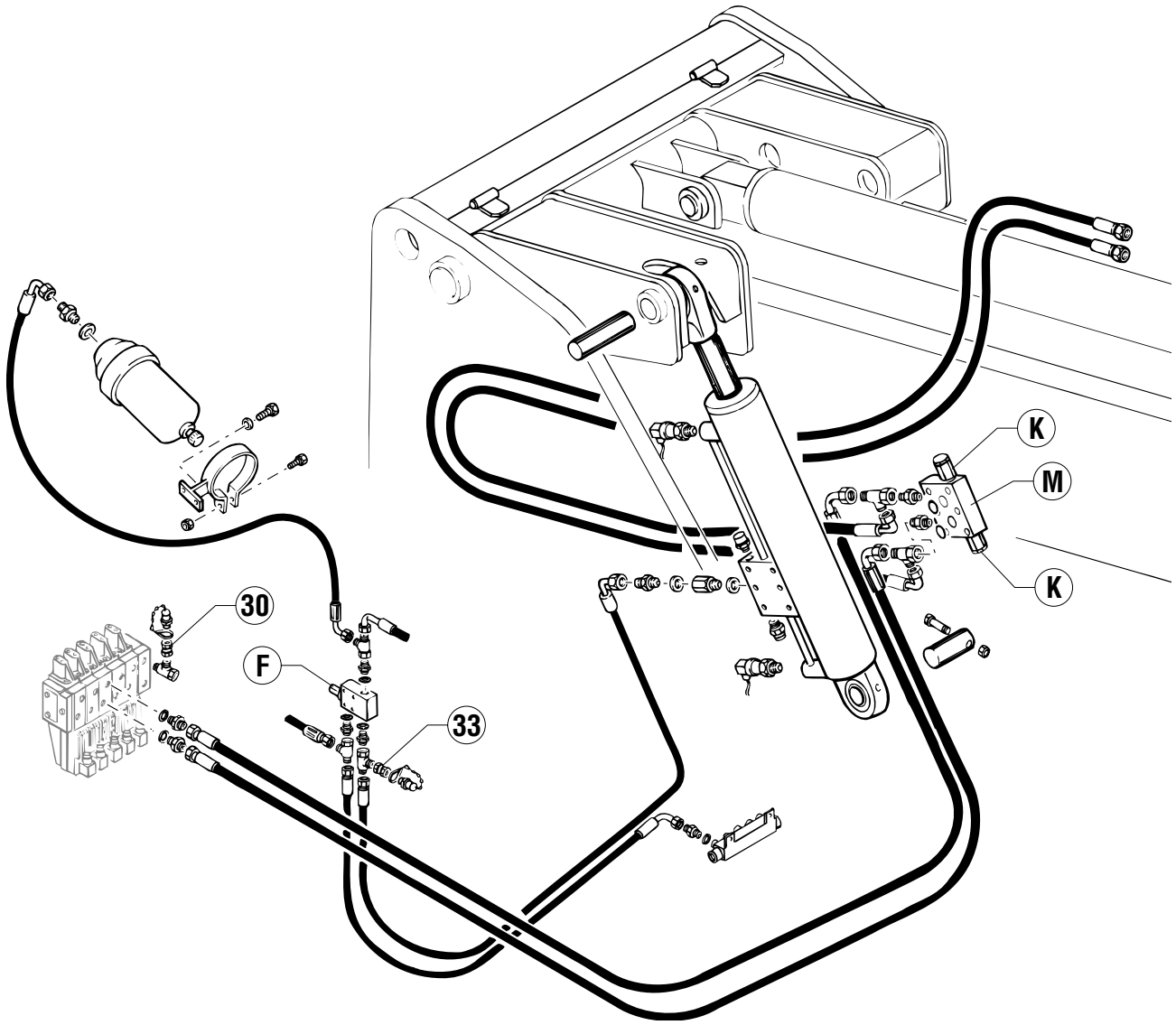
9. SETTING THE SAFETY VALVE OF THE RADIATOR FAN MOTOR

- Valve **9** (see **annex 8**) has been factory-set at **160 bar** and cannot be tampered with and/or adjusted by third parties.

Operation: Checking and calibrating the circuit pressure	*Table:* **D.03.01**

HYDRAULIC SYSTEM - FORK BALANCE (3514 - 3518)

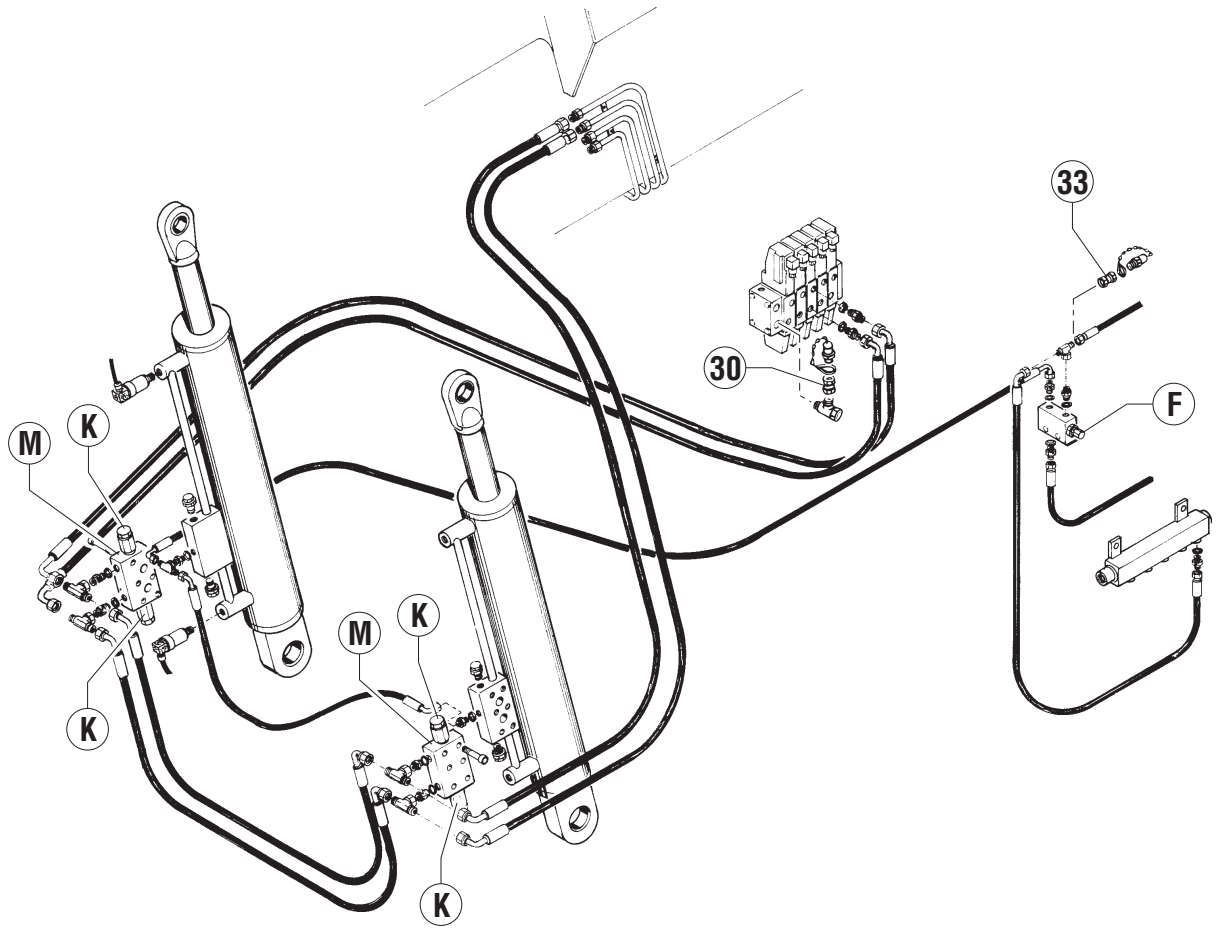
Annex 1



Operation: Checking and calibrating the circuit pressure	*Table:* **D.03.01**

HYDRAULIC SYSTEM - FORK BALANCE (5022)

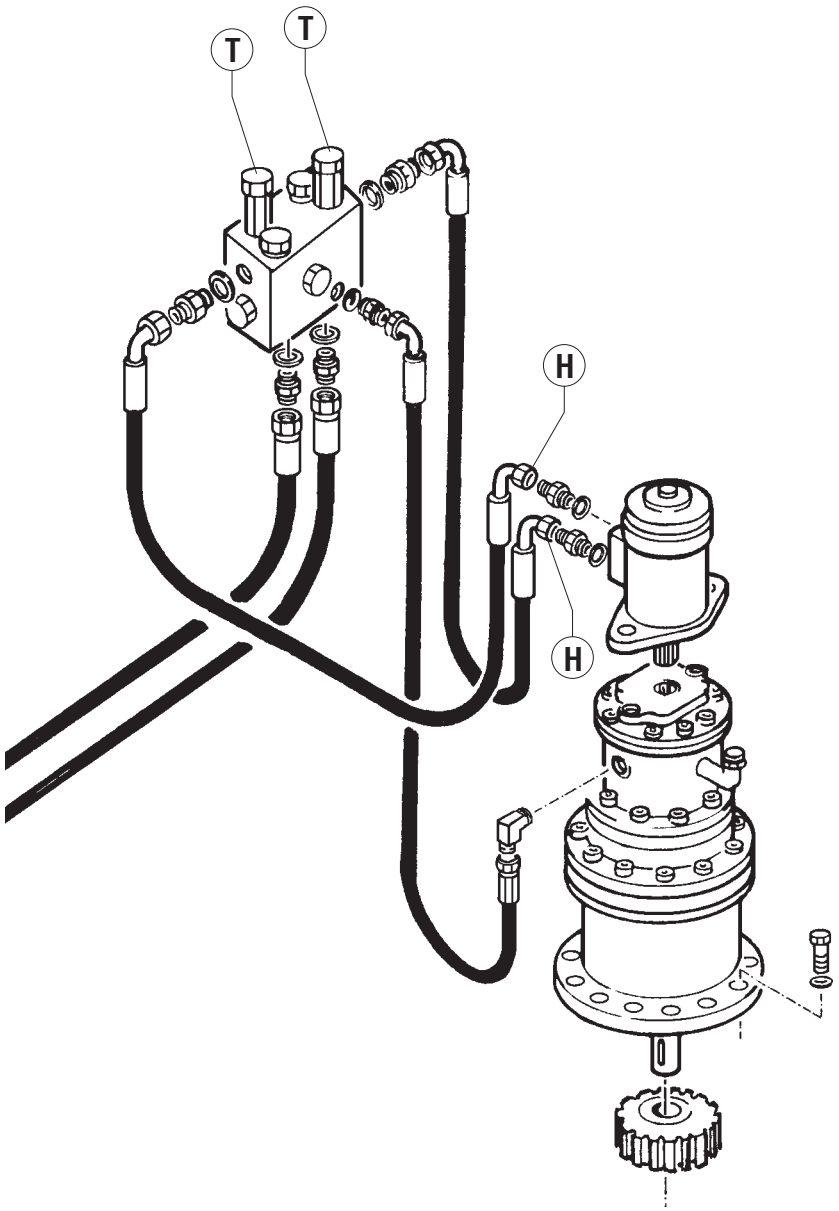
Annex 2



Operation:	Checking and calibrating the circuit pressure	Table: D.03.01

HYDRAULIC SYSTEM - TURRET ROTATION

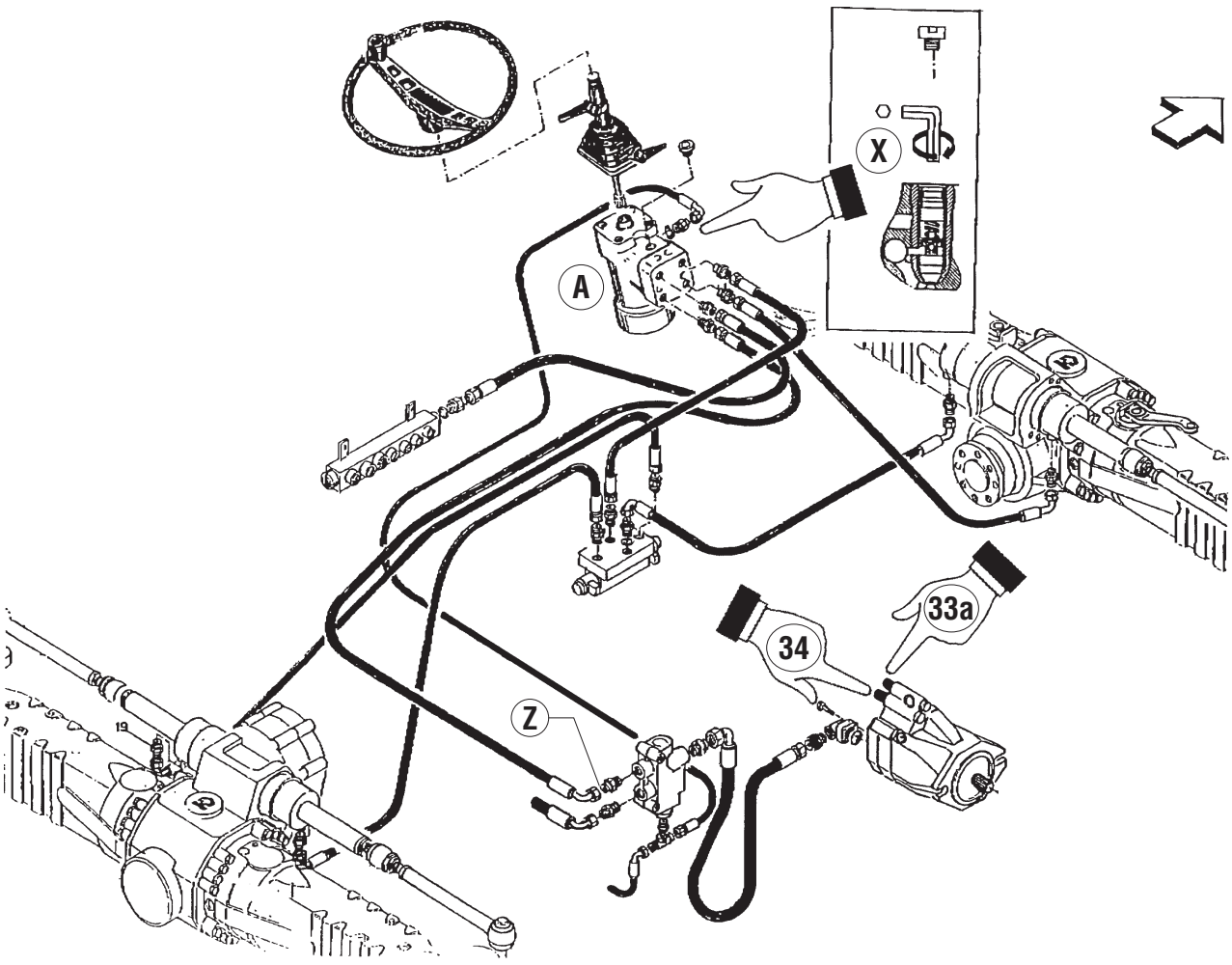
Annex 3



Operation: Checking and calibrating the circuit pressure	*Table:* **D.03.01**

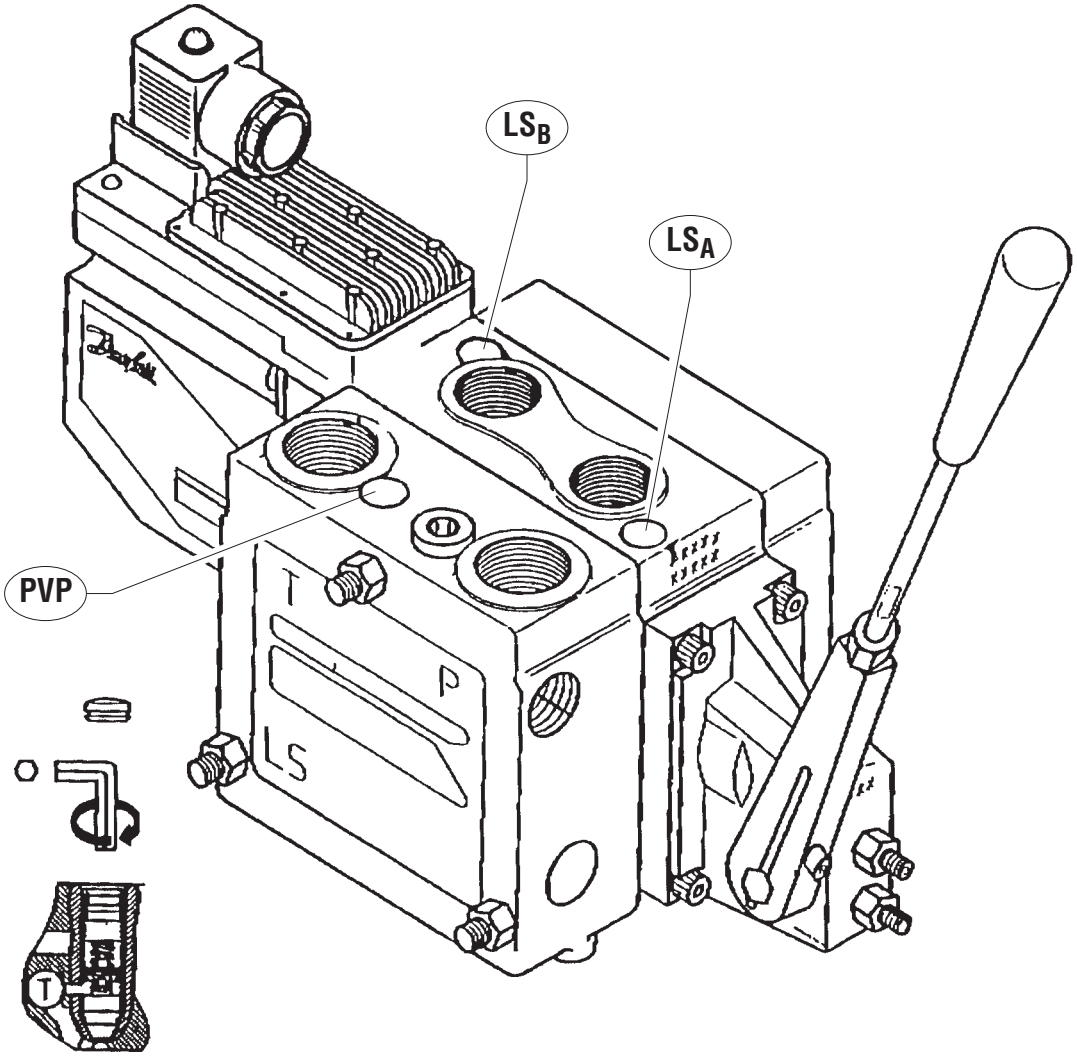
HYDRAULIC SYSTEM - HYDRAULIC STEERING

Annex 4



Operation: Checking and calibrating the circuit pressure	Table: D.03.01

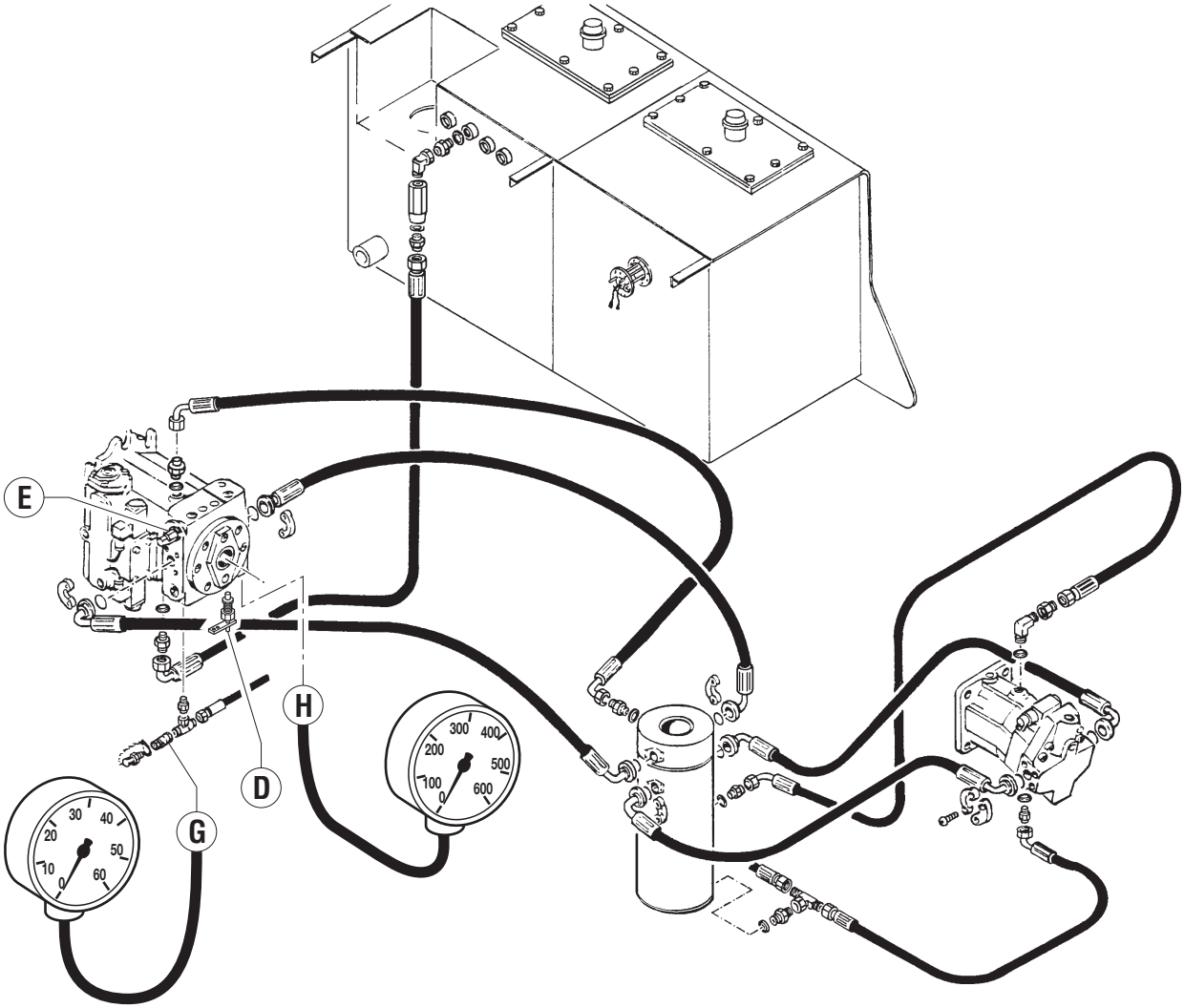
Annex 5



Operation: Checking and calibrating the circuit pressure	*Table:* **D.03.01**

HYDRAULIC SYSTEM - TRANSMISSION

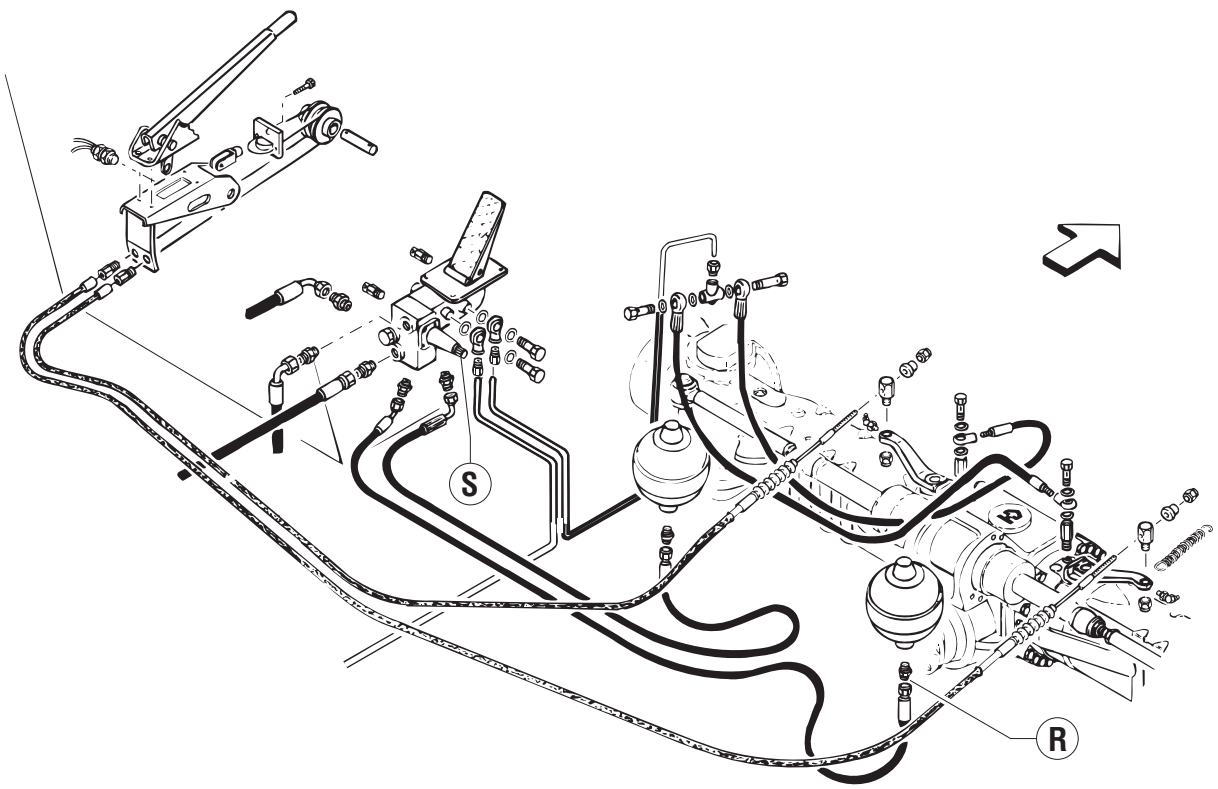
Annex 6



Operation: Checking and calibrating the circuit pressure	*Table:* **D.03.01**

HYDRAULIC SYSTEM - SERVICE AND PARKING BRAKES

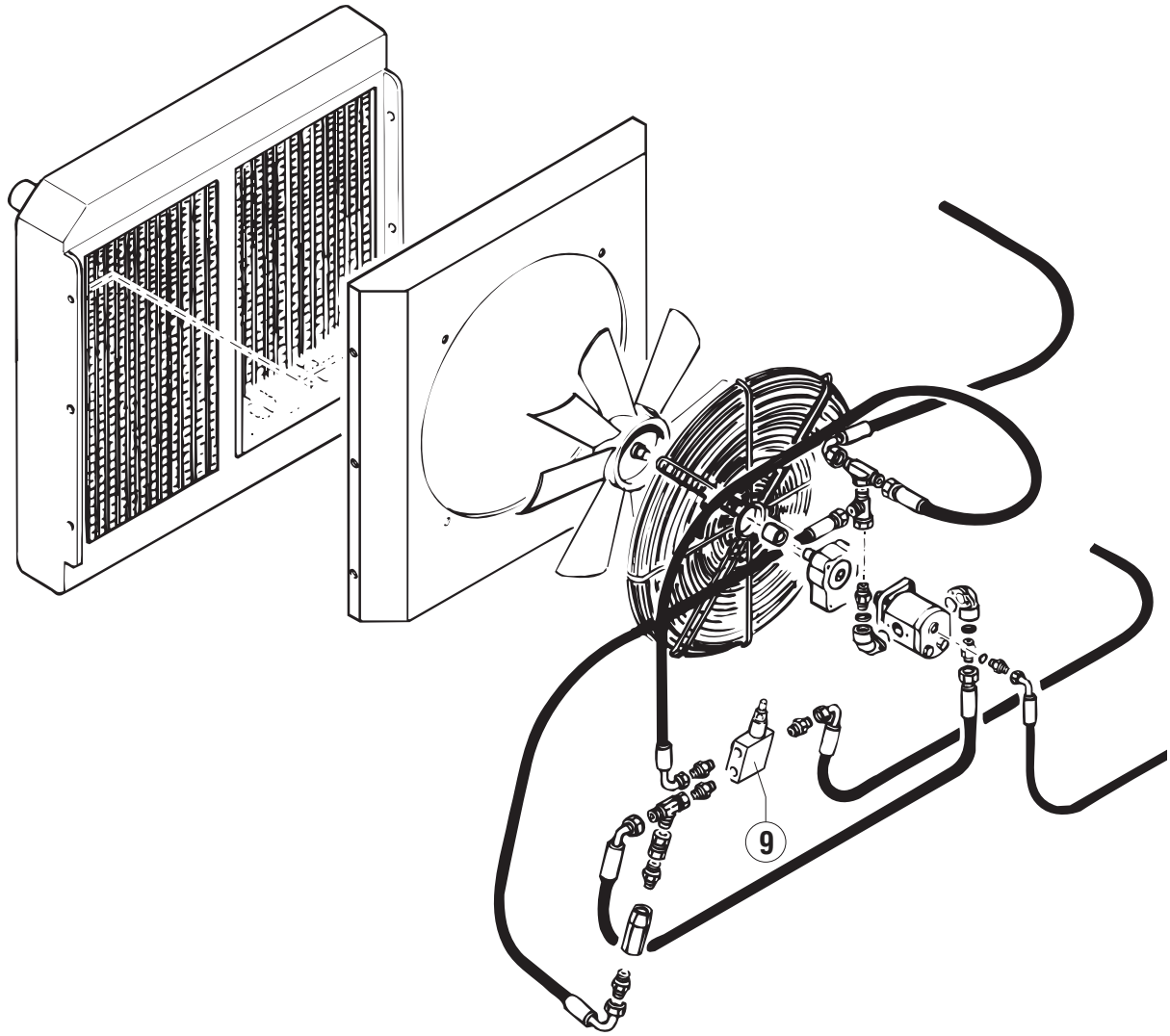
Annex 7



Operation: Checking and calibrating the circuit pressure	*Table:* **D.03.01**

HYDRAULIC SYSTEM - OIL COOLER

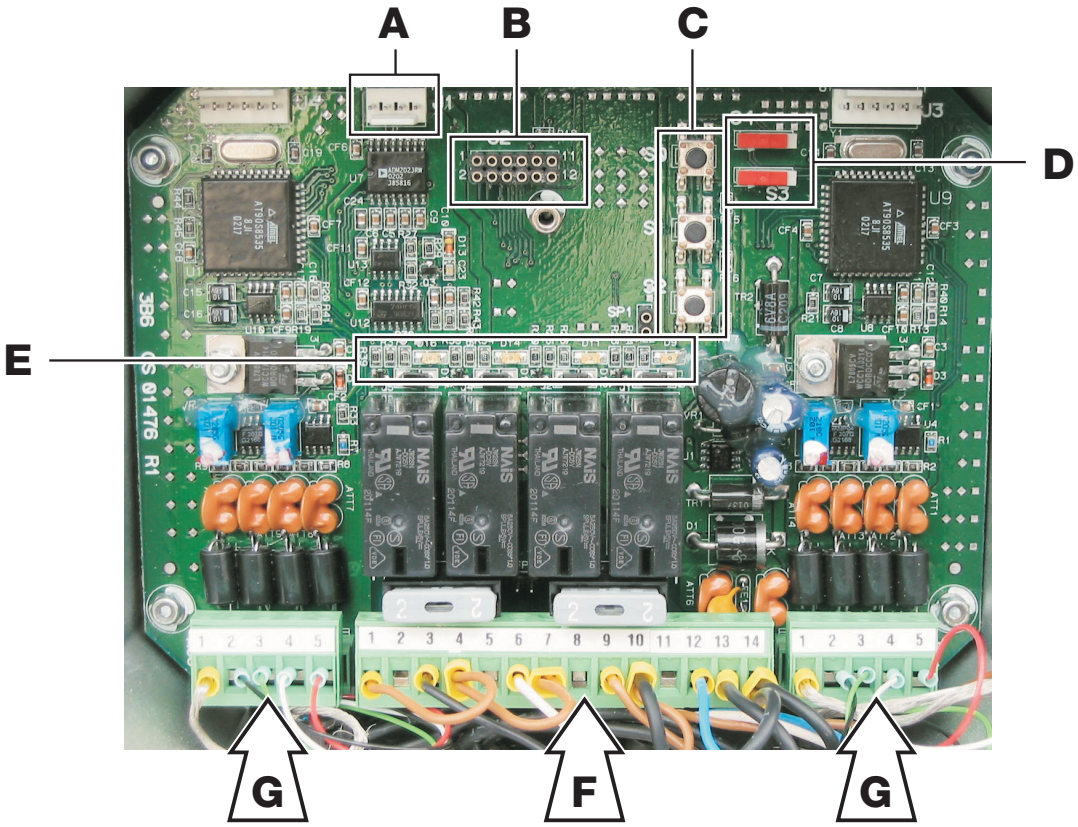
Annex 8



Operation:	Calibrating the Excel board for aerial man-platforms	Table: D.04.01

BOARD DESCRIPTION

The EXCEL board is installed in the man-platform, inside a protective box.
Removing the cover of the box, the board appears as follows:



The photo shows the parts involved in the calibration, as well as a view of the board.

- **J1** (ref. **A**): connector for the PC power cable
- **J2** (ref. **B**): monitor connector.
- Pushbuttons **S0**, **S1** and **S2** (ref. **C**): used for the quick calibration of the cell.
- Trimmers **S3** and **S4** (ref. **D**): used to view the parameters of one of the sensors of the load moment cell in the platform.

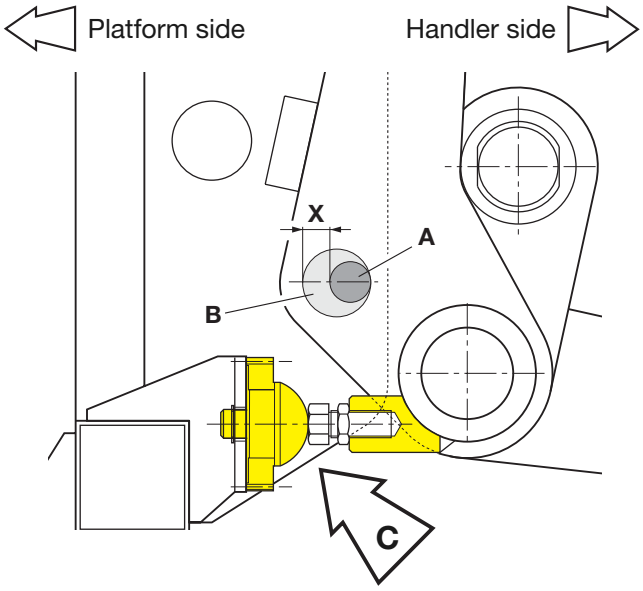
Operation: Calibrating the Excel board for aerial man-platforms	*Table:* **D.04.01**

- LEDs (ref. **E**): signal a pre-alarm or alarm condition.
  - During normal operation, the LED's are all lit when the laod in the platform is between 0% and 90% of the maximum admissible charge.
  - When the load is between 90% and 120% of the maximum admissible, the platform enters in pre-alarm and 2 of the 4 LED's are lit.
  - When the load is higher than 120%, all LEDS's are off and the alarm is activated.

- Connectors at the bottom of the board:
  - the arrow (ref. **F**) shows the power connector
  - the arrows (ref. **G**) show the connectors of the two sensors of the platform's load moment cell.

PLATFORM CALIBRATION

The nose of the boom shall be equipped with a small block where the screw which enters in contact with the semi-spherical bulb of the load cell must be screwed in. Couple the platform to the handler and with a 41mm hexagon wrench tighten or loosen the stop screw **C** fitted to the boom terminal so that the holes on the platform match those on the handler.
Ensure the aperture **X** between the locking pin **A** and the platform anchoring hole **B** is oriented towards the platform and at least **5 mm**.



IMPORTANT

This adjustment must not be done for the rotating platforms (from serial n.55116). It is enough to connect the platform to the machine as explained and follow the instructions below.



Stabilise the machine. Switch the controls to the platform by turning the Road-Jobsite-Platform key to Platform (ensure the green indicator close to the key comes on).

Check the type of platform coupled to the handler, then select it on the cab display.

Remove the he Road-Jobsite-Platform key, leave the driving cab and connect the electrical plug of the platform to the socket on the handler nose.

Operation: Calibrating the Excel board for aerial man-platforms	*Table:* **D.04.01**

Switch on the platform pushbutton pendant using the key removed from the driving cab and turning this key to **I - ON**.

Now you can start the calibration. Don't interrupt the calibration sequence: the machine would enter in alarm.

- Open the box cover removing the four screws and gain access to the EXCEL board.

ZERO SETTING

1 Make sure there is no load on the platform.

2 Power down by removing connector ref. **F**.

3 Reconnect the power connector, ensure all LED's come on and, using buttons ref. **C**, type in the following sequence:

GIROLIFT 3514 Series with single reel
S1 S0 S0 S1 S2

GIROLIFT Series
S1 S0 S1 S0 S2

Type in the code within 10 seconds after reconnecting the power connector.

IMPORTANT

Keep the code within reach before reconnecting the power connector.

IMPORTANT

When the zero has been set, ensure the procedure has been done correctly by checking that all LED's are off.

Operation: Calibrating the Excel board for aerial man-platforms	*Table:* **D.04.01**

MAXIMUM LOAD SETTING

1 Load the platform with the maximum admissible load (consider 100 kg per person).

2 Power down by removing connector ref. **F**.

3 Reconnect the power connector and, using buttons ref. **C**, type in the following sequence:

S1 S1 S0 S1 S2

Type in the code within 10 seconds after reconnecting the power connector.

IMPORTANT

Keep the code within reach before reconnecting the power connector.

IMPORTANT

When the maximum load has been set, ensure the procedure has been done correctly by checking that the second and fourth LED on the left come on. After removing the load, all LED's must go off.

Now the platform calibration procedure has ended.

ATTENTION

Before switching the controls back to the driving cab, disconnect the 24-pole ILME socket at the top of the boom.

SIGNALS ON DISPLAY WITH PC

Parameters:

15 **PercLevel1** load percent value corresponding to the first payload for load charts with 3 payloads.

16 **PercLevel2** load percent value corresponding to the second payload for load charts with 3 payloads.

17 **PercLevel3** load percent value corresponding to the third payload for load charts with 3 payloads or to the payload for one-payload load charts.

18 **Mode** this is 2 for rotating platforms and 1 for fixed platforms.

19 **Command** accepts values which are command codes.

20 **Cell_Adc1** this is the value of a calibration without load coming from the A/D converter of the displayed sensor.

21 **Cell_Known1** = 0.

22 **Cell_Adc2** this is the value of a calibration with maximum load coming from the A/D converter of the displayed sensor.

23 **Cell_Known2** =1000.

31 **CurPerc** ranges from 0 to 120; when 90 is displayed the system enters in pre-alarm.

32 **Cell_Actual** this is the value of the cell scale ranging from 0 to 1000.

33 **Cell_Adc** this is the value of the coming from the 12 bits A/D converter of the displayed sensor (therefore it ranges from 0 to 4096).

34 **SwVersion** = 300 for rotating platforms.

LED BEHAVIOUR DURING WORK

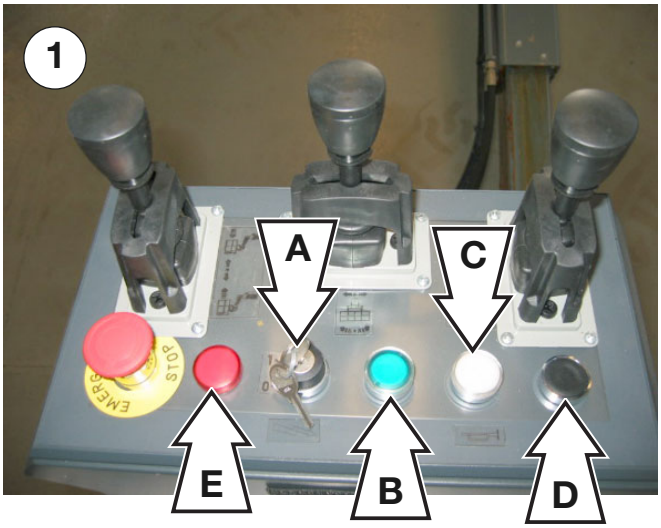
ALL LED'S ON: the loaded weight is within the accepted limits, **correct functioning**.

2 LED'S ON: the loaded weight is close the maximum admissible weight, **pre-alarm condition**.

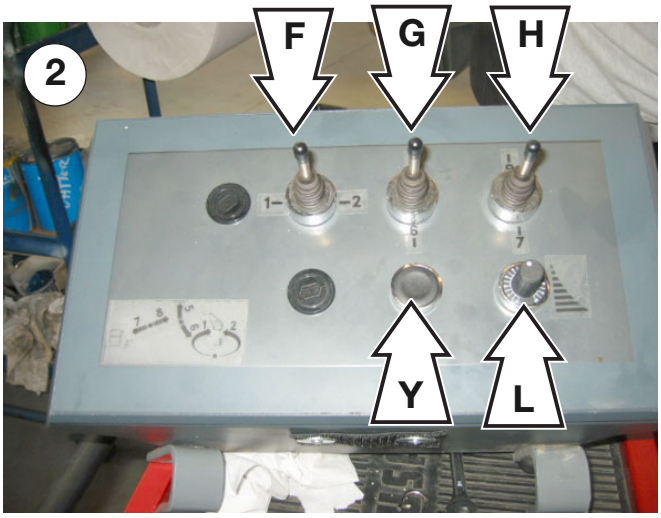
ALL LED'S OFF: machine in **alarm condition** and platform movements blocked.

Operation: Calibrating the Robot 8000 - 15000	Table: D.05.01

- Couple the Robot to the machine operating the attachment locking cylinder, then follow the instructions below:
  - disconnect the feeding pipes of the attachment locking cylinder and connect the feeding pipes of the robot;
  - sway the machine;
  - remove the pin locking the rotation of the counter-frame;
  - turn the Road/Jobsite/Platform key to “Platform”;
  - turn the dashboard key counter-clockwise;
  - engage the parking brake;
  - check that the forward/reverse selection lever is in the neutral position;
  - get out of the machine and connect the power plug to the power socket on the boom of the machine, then go to the platform of the Robot.



- Remove the pushbuttons panel (figure 2) used to operate the Robot controls, from the seat on the platform and reconnect it to the junction box at the base of the Robot arm using a suitable extension.

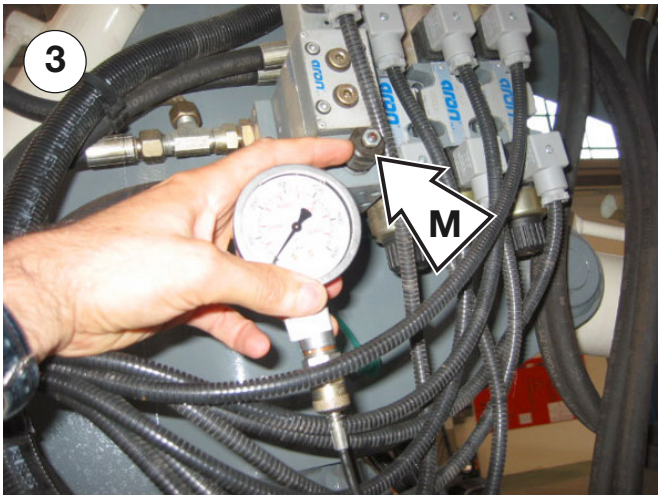


- Go to the other pushbuttons panel used to operate the handler boom movements, and turn the key ref. **A** (figure 1) to position **I**, then start the engine pressing on pushbutton ref. **B**.

- Get out of the platform, go back to the handler cab and using the **INDEX** key of the 3B6 display, select Robot 8000 or 15000; confirm the selection with **ENTER**.

- Go back to the robot pushbuttons panel and press the deadman button ref. **Y** (figure 2) to set the oil of the solenoid valves under pressure. At this moment, you can start the calibration.

- Connect a pressure gauge to the pressure socket; the pressure value must be 200 bar [this value can be adjusted with register ref. **M** (figure 3)].



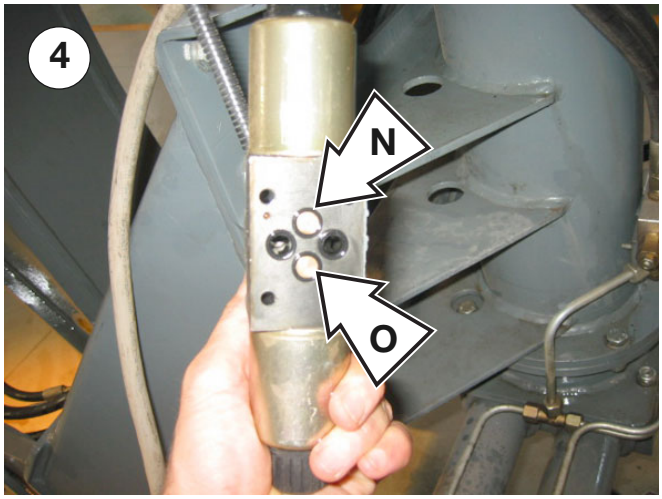
- Once you have checked that the pressure value is correct, proceed with checking the speed of the three movements of the robot arm.

- All movements can be adjusted using the potentiometer ref. **L** (figure 2). Usually the movement starts when the register is between digits 4.5 and 5 and increases proportionally till reaching the maximum speed which corresponds to digit 10 on the scale of the potentiometer.

Operation: Calibrating the Robot 8000 - 15000	Table: D.05.01

- To obtain different speeds for the three movements, check that in correspondence of ports **N** and **O** of the rotation solenoid, there are 0.8mm throttles and in correspondence of those which move the arm there are 1.5mm throttles.

- Test all the movements of the robot simulating any possible situation to be sure that it is in efficient working order.

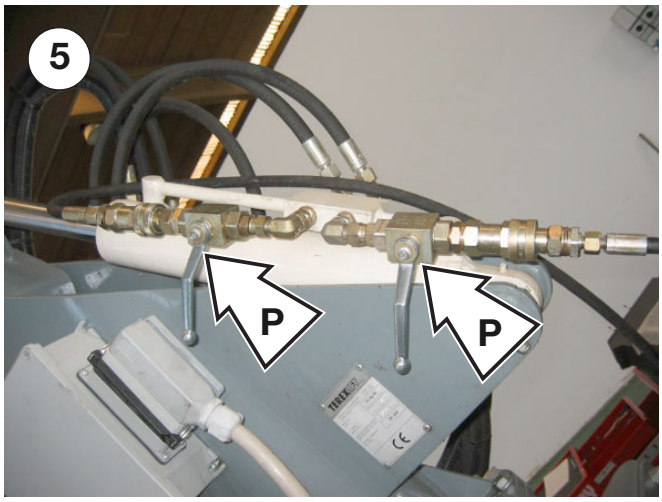


IMPORTANT

Inside the Danfoss box (located in the dashboard) there is a trimmer which adjusts the oil flow from the 4th element of the control block to the delivery line of the attachment locking function.
If this trimmer is maladjusted, the hydraulic oil will flow out of the wrong port of the control block and the robot won't work efficiently.

- During the first test, check that the delivery line connections are in order (a wrong connection results in unusual movements once the deadman button is pressed).

- Once the speed of the movements has been checked, make sure that the platform is in the horizontal position. Should that not be the case, disconnect the feeding pipes of the robot and connect the two pipes supplied to re-adjust the circuit.



IMPORTANT

This procedure must only be done for Robot 8000.

- Open the two cocks ref. **P** (fig. 5), get in the cab and place the fork holding frame at a 90° angle with respect to the ground, then press the red button ref. **Q** (fig. 6) to rotate the platform cylinder to end of stroke. Stop the movement when the platform is horizontal to the ground, close the two cocks ref. **P**, replace the pipes and repeat the test.
- If the platform isn't perfectly horizontal, repeat the adjustment.



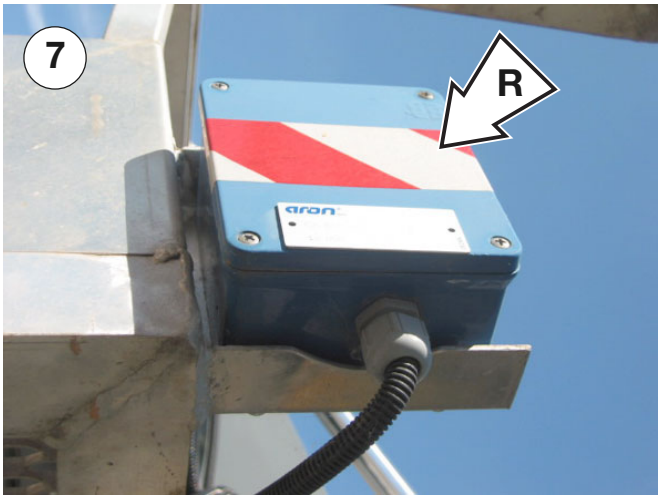
Operation: Calibrating the Robot 8000 - 15000	Table: D.05.01

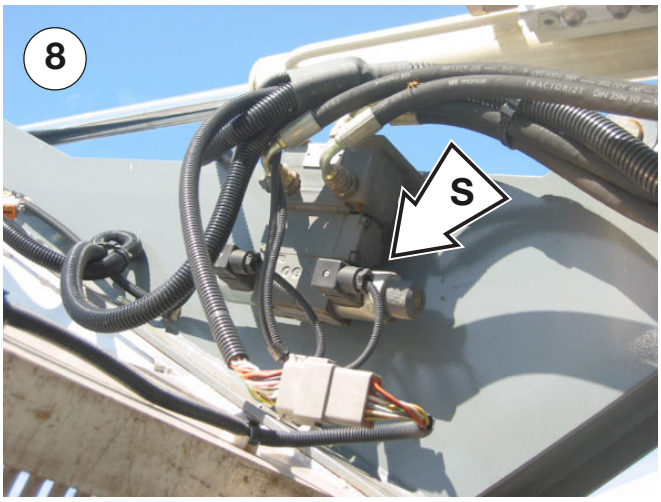
IMPORTANT

We recommend disconnecting the sway cylinder (rod side) and move it out completely to eliminate any air bubbles.

- On the leveling circuit, there is a valve whose setting is about 20 bar more than that of the pressure relief valve of the solenoids block which opens in presence of a sudden pressure rise.

- The platform levelling system of the Robot 15000 is operated by an electronic level ref. **R** (figure 7) which holds the platform in the horizontal position through the action of solenoid valve ref. **S** (figure 8).





Operation: Calibrating the proportional outputs of the radio control	Table: D.06.01

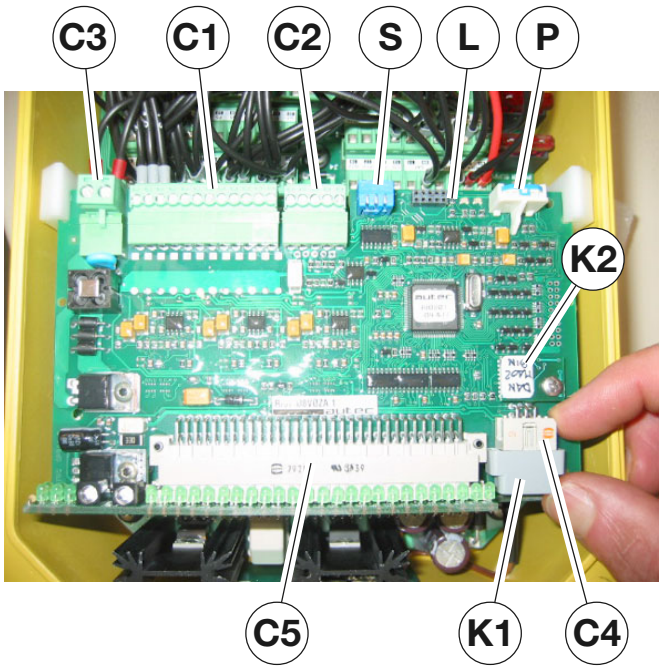
IMPORTANT

The calibration of the proportional outputs of the radio control must be done by expert personnel trained to do these operations.

Information on the RI97-08 module

The proportional outputs of the RI97-08 module are set to the values shown in the technical specifications. The code of the specifications of the radio control can be found on the label on the data memory (K2).

C1 proportional outputs connector
C2 aux proportional outputs connector
C3 voltage connector
C4 calibration key connector
C5 board connector
L green LED
K1 calibration key
K2 data memory
P reset button
S rotating selector



IMPORTANT

During the operation of the radio control, remove the calibration key K1. This key must only be used during calibration and, once it is inserted, it activates one proportional control at a time.

To reset the initial values of the proportional outputs (those on the specifications), insert the calibration key, press the reset button **P** and hold it down until the green LED **L** stops flashing and remains lit with a solid light.
If the module has to be replaced, install the data memory **K2** of the old module in the new one to maintain the same values of the proportional outputs.

Operation:	Calibrating the proportional outputs of the radio control	Table: D.06.01

Preparation to calibration

1 Check that the transmitter is OFF.
2 Turn off the receiver.
3 Open the receiver and insert the calibration key **K1** in connector **C4**.
4 Turn on the receiver.

IMPORTANT

From this moment on, do not touch the receiver so as not to loose the set parameters.

5 Go to the transmitter and turn the ignition key to position "**I**", then press **START**.

6. Turn the ignition key to  (REMOTE SET UP).

Calibration

7 Select the parameters to be set with the rotating selector **S** of the RI97-08 module. Start the calibration using selector **A** of the transmitter (turn to "+" to increase the value or to "-" to reduce the value).

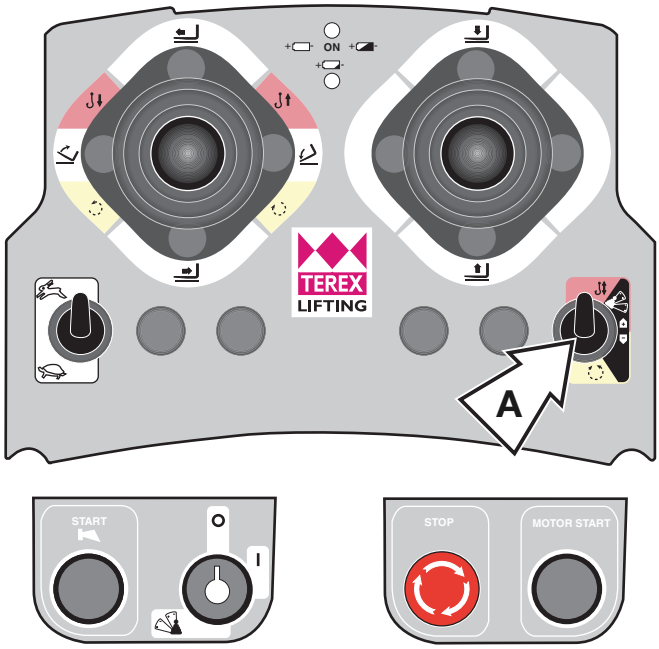
IMPORTANT

In the modules with voltage outputs, you can set positions 1, 2, 3, 4 and 5. In the modules with current outputs (PWM), you can set positions 0, 1, 3 and 4.

IMPORTANT

If, during calibration, you move the joystick out of the rest position, the horn/sound alarm sounds for about 0.5 seconds to warn that you're calibrating the minimum position.

VIEWS OF THE TRANSMITTER



Operation: Calibrating the proportional outputs of the radio control	Table: D.06.01

IMPORTANT

Calibration must be done for each single position of the speed selector of the transmitter.

Calibration of modules with voltage outputs

Position 1
With the rotating selector **S** in position **1** you can adjust the maximum and minimum voltage (or current) values of the two half-axes of each joystick. Follow the instructions below:
- To set the maximum value, move the joystick to end of stroke along the half-axis to be calibrated. Hold the position and act on selector **A** of the transmitter to set the value you wish.
- To set the minimum value, move the joystick just out of the rest position along the half-axis to be calibrated. Hold the position and act on selector **A** of the transmitter to set the value you wish.

Position 2
With the rotating selector **S** in position **2** you can adjust the voltage value corresponding to the rest position of the joystick. Usually this value doesn't need to be changed. Should that be necessary:
- move one of joysticks just out of the rest position
- hold the position and act on selector **A** of the transmitter to set the value you wish.

Positions 3-4
With the rotating selector **S** in position **3** and **4** you can set the minimum and maximum voltage values of the auxiliary outputs **Z8** and **Z9**. Proceed as follows:
- To set the maximum value, turn the knob (on the transmitter) of control **Z8** (or **Z9**) clockwise. Hold the position and act on selector **A** of the transmitter to set the value you wish.
- To set the minimum value, turn the knob (on the transmitter) of control **Z8** (or **Z9**) counter-clockwise. Hold the position and act on selector **A** of the transmitter to set the value you wish.

Position 5
With the rotating selector **S** in position **5** you can reverse the direction of the half-axes.
Proceed as follows:
- move the joystick of the axis to be reversed just out of the rest position
- hold the position and act on selector **A** of the transmitter moving it to position "+" to reverse the direction of the half-axes or to position "-" to reset the direction of the half-axes.

Saving the set parameters in the memory

8 Turn off the transmitter to save the new parameters.

9 Turn off the receiver.

10 Remove the calibration key K1.

11 Close the receiver and supply power.

Operation: Perkins engine bulbs - Description	*Table:* **D.07.01**

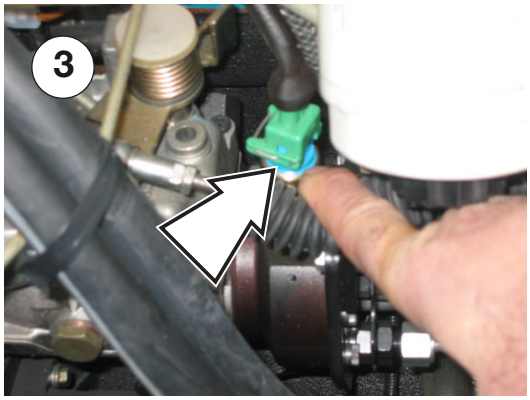
1 Absorption on positive (+) lead on the battery with ignition key turned to “1”.
Correct absorption: **~ 15 A**



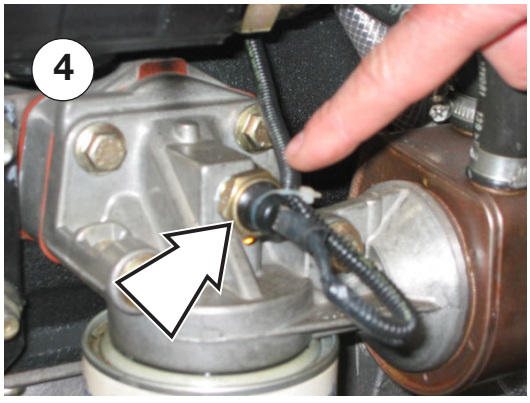
2 Absorption on positive (+) lead on the battery during the engine start-up.
Correct absorption: **max. ~ 700 A**



3 Injection pump power socket.
Correct absorption: **12 V**

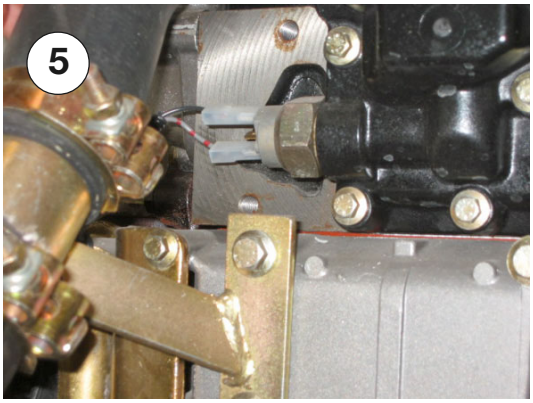


4 Engine oil pressure measuring bulb.

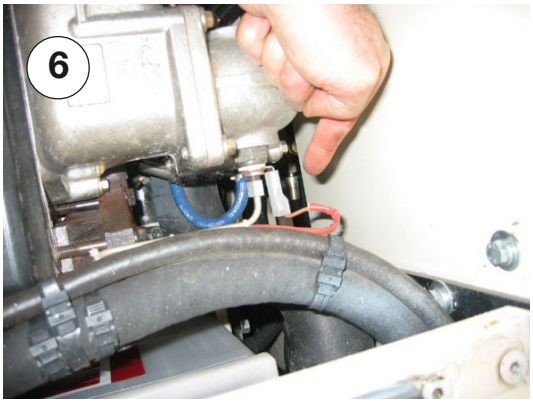


Operation: Perkins engine bulbs - Description	*Table:* **D.07.01**

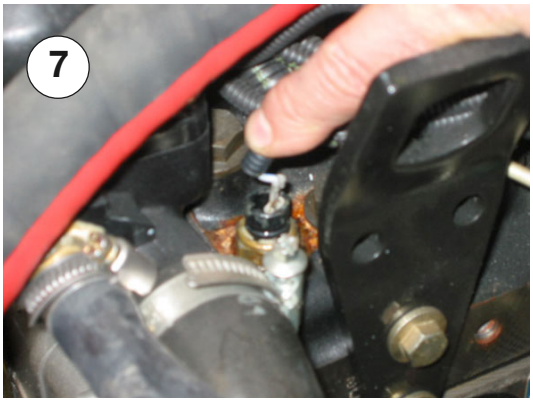
5 Water temperature measuring bulb (light indicator on dashboard).



6 Glow plug pre-heating bulb.
Absorption during pre-heating: **~ 13 A**



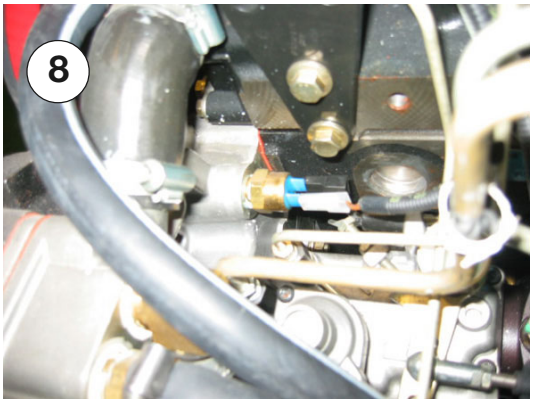
7 Water temperature measuring bulb (pressure gauge power supply on dashboard).



8 Cold advance adjustment bulb.

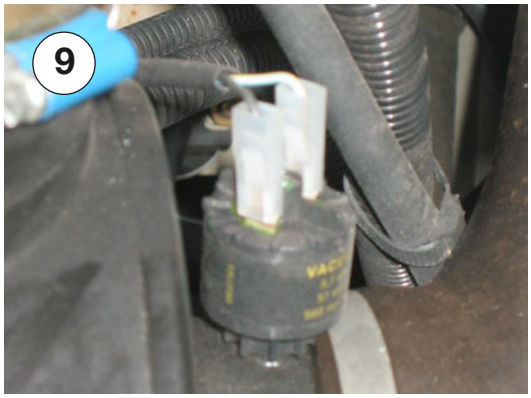
IMPORTANT

Do not, at any time, operate on this bulkb. Call in an expert technical engineer in case of troubles.

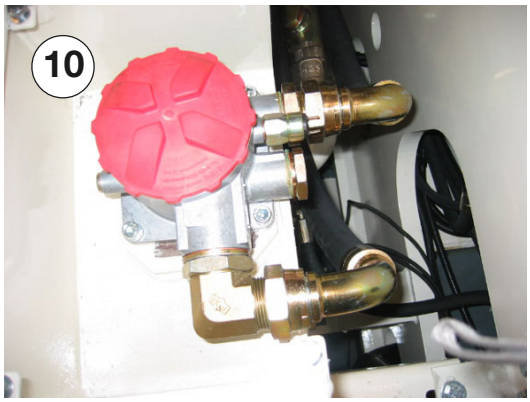


Operation: Perkins engine bulbs - Description	*Table:* **D.07.01**

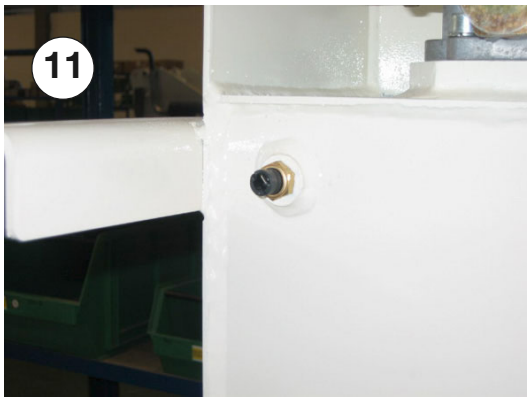
9 Air filter clogging sensing bulb.



10 Hydraulic oil filter clogging sensing bulb.



10 Hydraulic oil temperature measuring bulb.



Section E
DISMANTLING AND ASSEMBLY

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Service schedule

Job	Operators needed	Expected time (h)
Change starter key	1	1,00
Change gear switch lever	1	0,15
Change lights and horn switch lever	1	0,15
Change and adjust length transducer	1	2,00
Change and test pressure transducer	1	1,00
Change load moment indicator display	1	0,30
Complete recalibration of the 3B6 system	1	2,00
Change transmission control unit	1	1,50
Test efficiency of transmission control unit	1	1,00
Change joystick	1	1,30
Change deadman device	1	0,30
Change joystick movement switch pushbutton	1	0,30
Change Danfoss joystick yellow pushbutton	1	1,00
Change Danfoss joystick red pushbutton	1	1,00
Change boom extension wheel in Danfoss joystick	1	1,00
Change brake pump	1	1,00
Change 2 gearbox sensors	1	0,30
Change Cardan joint sensor	1	0,15
Change boom low sensor	1	0,15
Change boom high sensor	1	0,15
Change boom lifting cylinder	1	2,15
Change boom lifting cylinder kit (complete overhaul)	1	1,30
Change block valve of boom lifting cylinder	1	0,30
Change telescope cylinder	1	2,50
Change telescope cylinder kit	1	1,30
Change block valve of telescope cylinder	1	0,30
Change boom extension cylinder on boom	1	1,00
Change boom extension cylinder kit on boom	1	1,30
Change valve of boom extension cylinder on boom	1	0,30
Change cylinder re-sequencing valve inside boom	1	2,00
Change fork pitching cylinder	1	1,30
Change fork pitching cylinder kit	1	1,30
Change block valve of fork pitching cylinder	1	0,30

Job	Operators needed	Expected time (h)
Change fork locking cylinder	1	1,00
Change fork locking cylinder kit	1	1,15
Change block valve of fork locking cylinder	1	0,30
Change outrigger up/down mov. cylinder	1	1,30
Change outrigger up/down mov. cylinder kit	1	1,30
Change block valve of outrigger up/down mov. cylinder	1	0,30
Change fork compensation cylinder	1	2,00
Change fork compensation cylinder kit	1	1,30
Change block valve of the fork compensation cylinder	1	0,45
Check one-way valves in fork compensation cylinder	1	0,20
Change machine right/left sway cylinder	1	1,30
Change machine right/left sway cylinder kit	1	1,30
Change block valve of machine right/left sway cylinder	1	0,30
Change boom pipe for boom extension	1	1,00
Change boom pipe for fork back-pitching	1	1,30
Change boom pipe for fork locking	1	1,30
Complete renewal of boom pads	1	2,30
Check transmission pump pressures	2	0,20 cad.
Check pressure in boom main distributor	2	0,20 cad.
Check pressure in brake pump and power steering unit	1	0,15
Check pressure in pressure relief valves and safety valves	1	0,15
Change drive pump	1	2,00
Change drive motor	1	2,00
Changemotor. pump. transmission piping + tests	1	5,00
Change distributor drive pump	1	1,30
Replace distributor + calibration tests	1	2,00
Change pump on engine distribution	1	1,00
Change DFE valve	1	0,30
Change relays and fuses	1	0,10
Change wiper motor	1	1,00
Replace emergency pump coil+ test	1	0,30
Replace emergency pump	1	1,00
Change solenoid valves	1	0,20
Change gas pedal with cord	1	1,00
Change gas lever with cord	1	0,30
Change front axle	1	3,00
Change rear axle	1	3,00
Change complete gearbox	1	3,00

Job	Operators needed	Expected time (h)
Changie one Cardan joint	1	1,00
Change Cardan joints	1	2,00
Change axle hub	1	1,30
Change boom	2	5 cad.
Change pin anchoring boom to frame	2	1 cad.
Change pins in attachment locking cylinder	1	0,30
Change pin in stabiliser cylinder	1	0,20
Change power socket for man-platform at the top of the boom	1	0,20
Change electrical reel	1	2,00
Change platform joystick	1	0,20
Change pushbuttons in the cab	1	0,30
Change man-platform pushbuttons	1	0,10
Change pressure relief valve or distributor slider + test	1	0,30
Change distributor safety device + test	1	0,30
Changeone-way valve	1	0,20
Change hydraulic joint	2	2 cad.
Change electrical joint	1	2,00
Change Danfoss board	1	1,30
Change Danfoss board + troubleshooting	1	2,30
Change relays and fuses board	1	1,30
Change relays and fuses board + troubleshooting	1	2,30
Change undercarriage board	1	1,00
Change undercarriage board + troubleshooting	1	2,00
Replace maxi-fuses + troubleshooting	1	0,10
Bleed brake circuit	2	0,15 cad.
Renew hydraulic oil filter of transmission pump	1	0,20
Change power steering unit	1	1,30
Change beacon	1	0,20
Replace battery	1	0,10
Changesilencer	1	0,30
Change mudguard support	1	0,20
Change mudguards	1	0,10
Change hand-brake cord	1	0,30
Change steering wheel	1	0,10
Remove oil and fuel tanks	1	3,00

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Operation: **Dismantling the wheels**	Table: **G-001**			3514/18=**120** 5022=**140**
	3514 ✔	3518 ✔	5022 ✔	Hrs. - Min. **15**
Bridge crane, payload 500 kg (2000 lb) Lifting jack	Standard tools Adjustable stands Screwdriver, torque 300 Nm			**1**

Work procedure:

1 Using a 24mm socket wrench (Girolift 3514-3518) or a 27mm socket wrench (Girolift 5022) fitted to the pneumatic screwing machine loosen the 8 nuts without removing them from their seat.

1



2 Lower the outrigger near the wheel to be removed so that the wheel raises some centimetres above the ground.

2



3 Place a stand under the axle to prevent damage in case of an accidental collapse of the ourigger.

4 Remove the wheel rolling it on the ground.

DANGER

Every wheel weighs 120 kg (Girolift 3514-3518) or 140 kg (Girolift 5022). Use an adequate hoisting gear.



Operation: Re-assembling the wheels	Table: G-001

Operation:

5 Center the wheel with the axle and fit the 8 pins.

6 Raise the outrigger and tighten the nuts with the pneumatic screwing machine. Tighten alternately as shown in the figure.

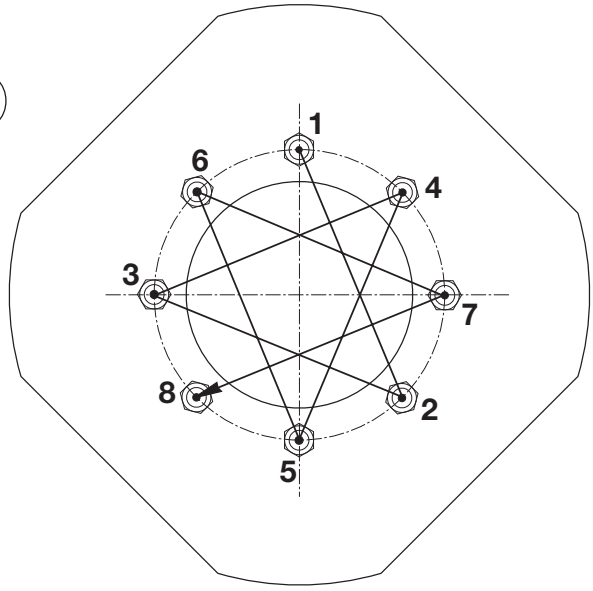
7 Lower the machine to the ground.

8 ***Re-tighten all nuts (torque 300 Nm).***

DANGER

Check the tightening of wheels one hour after the job. They might get loose until they do not stay correct.

6



Characteristics	*Girolift 3514*	*Girolift 3518*	*Girolift 5022*
Dimensions (front and rear)	18-19.5	18-19.5	18-22.5
Load index / Pr.	16	16	16
Rim	14 x 22.5	14 x 22.5	13 x 19.5
Wheel disc	8 holes DIN 70361	8 holes DIN 70361	8 holes DIN 70361
Pressure bar/Psi	5/72.5	5/72.5	5/72.5

Operation: **Dismantling the cylinders**	Table: **G-002**			kg	See table
	3514 ✔	*3518* ✔	*5022* ✔		
					Hrs. / **Min.**
Swing hoist, payload 500 kg (2000 lb)	See table				- / 30
					1

Cylinder	**Fork compensation Giro 3514**	**Fork compensation Giro 3518**	**Fork compensation Giro 5022**	**Attachment locking**	**2nd telescope extension Giro 3514**
Part	53.0300.0700	53.0300.0900	53.0300.0500	53.0500.0000	53.0100.0000
Weight kg / lb	40	43	36	11,4	235
ø Cylinder mm / in	110	110	110	60	120
ø Rod mm / in	48	48	48	30	60
Closed mm / in	850	835	910	555	4110
Stroke mm / in	500	515	500	92+92	3490
Pressure bar max	300	300	300	300	300
SEALS					
HEAD					
Type	OR ø79,77 + PBK 620	OR ø82,14 + PBK 236	OR 620	OR ø42,86 + PBK 826	OR ø89,69 + PBK 621
Type	B 236188	B 236188	B 236188	WRM 118149	I/GR 0600
Type	WRM 188220	WRM 188220	WRM 188220	B 157118	EU 6075
Type	OR ø88,5	OR ø88,57			OR ø98,02
Type					WRM 236267
PISTON					
Type	OR ø36,1 + PBK 221	OR ø37,69	OR 223	OR ø20,24	OR ø44,12 + PBK 132
Type	DBM 354275	DBM 354275	DBM 354275	DBM 196133	DBM 393295
Type					
Type					
Tools	USAG 282T SN/80-120 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/80-120 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/80-120 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/50-80 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/80-120 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")

Operation: **Dismantling the cylinders**	*Table:* **G-002**

Cylinder	3rd telescope extension Giro 3514	Extension Giro 3518	Extension Giro 5022	Attachment locking Giro 3514-3518	Outriggers Giro 3514-3518
Part	53.0200.0000	53.0100.0600	695887	53.0400.0000	53.0800.0200
Weight kg lb	146	328	328	80	74
ø Cylinder mm in	95	145	177,8	150	145
ø Rod mm in	50	80	100	70	60
Closed mm in	3849	4130	5270	706	682
Stroke mm in	3480	3380	4480	340	351
Pressure bar max	300	300	300	300	300
SEALS					
HEAD					
Type	OR ø69,2 + PBK 335	OR ø113,7 + PBK 349	-	OR ø120 + PBK 351	OR ø113,7 + PBK 349
Type	I/GR 0500	SM 393314/1AX	-	WRM 275307	WRM 236267
Type	EU 5065/1	OR ø123,7	-	EU 7080	B 283236
Type	OR ø78,97	WRM 314346	-	OR ø129,8	
Type	WRM 196228		-		
PISTON					
Type	OR ø39,69 + PBK 824	OR ø59,69 + PBK 332	-	OR ø52,39 + PBK 832	OR ø50,80 + PBK 831
Type	DBM 314236	DSM 492393/1A	-	DBM 511413	D11W 492393
Type					
Type					
Tools	USAG 282T SN/80-120 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/120-180 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/120-180 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/120-180 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/120-180 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")

Operation: **Dismantling the cylinders**	*Table:* **G-002**

Cylinder	**Outriggers Giro 5022**	**Lifting Giro 3514**	**Lifting Giro 3518**	**Lifting Giro 5022**	**Rear axle locking Giro 3514**
Part	53.0800.0100	53.0000.0600	53.0000.0900	53.0000.0500	53.0700.0000
Weight kg lb	46	278	283	398	10
ø Cylinder mm in	120	170	180	229	75
ø Rod mm in	75	90	90	100	40
Closed mm in	692	2246	2264	2400	382
Stroke mm in	300	1602	1565	1770	180
Pressure bar max	280	300	300	300	300
SEALS					
HEAD					
Type	-	OR ø132,9 + PBK 829	OR ø139,7 + PBK 867	-	OR 52,39
Type	-	BFR 90	BFR 90	-	WRM 157188
Type	-	EU 90105	TS 90 105 12/LA	-	B 188157
Type	-	SWP 90110	SWP 90110	-	
Type	-	OR ø139,3	OR ø148,8	-	
PISTON					
Type	-	OR ø47,63 + PBK 252	OR ø69,22 + PBK 335	-	OR ø23,81
Type	-	DSM 551472/1A	DSM 590492/1A	-	DPS 6048
Type					
Type					
Tools	USAG 282T SN/120-180 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/120-180 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/120-180 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/180-240 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/50-80 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")

Operation: **Dismantling the cylinders**	*Table:* **G-002**

Cylinder	**Turret rotation locking**	**Sway Giro 3514-3518**	**Sway Giro 5022**	**Outrigger extension Giro 5022**	**Attachment rotation Giro 5022**
Part	53.1000.0100	53.0600.0500	53.0600.0300	53.0400.0000	694909
Weight kg lb	9	40	36	32	108
ø Cylinder mm in	65	110	133	76	180
ø Rod mm in	25	50	70	40	80
Closed mm in	365	376	430	1580	955
Stroke mm in	50	95	130	1300	445
Pressure bar max	300	350	300	220	300
SEALS					
HEAD					
Type	OR 826 + BRS	OR ø85,32	-	-	-
Type	B 137098	B 244196/1/NEI	-	-	-
Type	WRM 098129	WRM 196228	-	-	-
Type					
Type					
PISTON					
Type	DBM 196133	OR ø32,93	-	-	-
Type		DBM 354275	-	-	-
Type					
Type					
Attrezzi	USAG 282T SN/50-80 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/80-120 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/120-180 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/50-80 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")	USAG 282T SN/120-180 pin ø 4,5 (3/16") USAG 281/215 pin ø 6 (1/4")

Operation: **Dismantling the cylinders**	Table: **G-002**

Operation:

■ **Opening the cylinder**

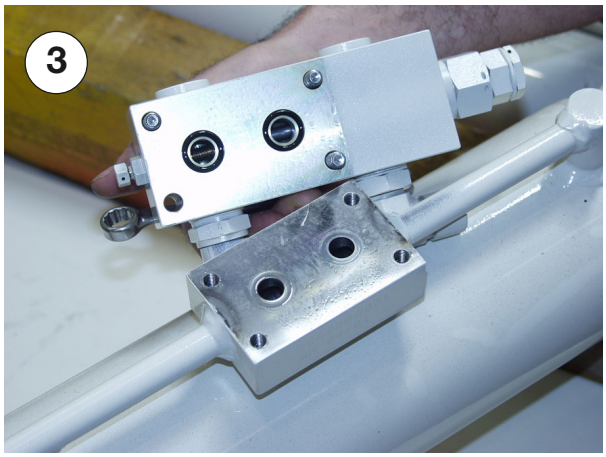
1 Clamp the cylinder in a vice with jaws of soft material (copper, aluminium, etc.).

2 Position a container of suitable size under the cylinder head to prevent oil spillage.



Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

3 Remove the blocking valve (if fitted). Oil will gush out. Use special personal protective equipment.

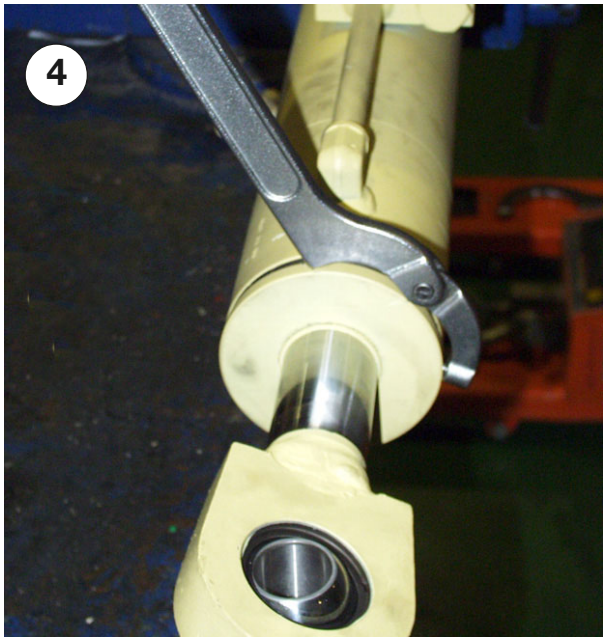


4 Loosen and remove the head from the cylinder with an adequate wrench (see table).

5 Pull out the cylinder rod with extreme caution. It might be full of oil.

6 Check the following parts for wear and/or damage:
- wear and/or scoring of chrome-plated rod
- wear and/or scoring of liner
- wear of seals
- wear of sliding runners

7 Remove the cylinder from the vice

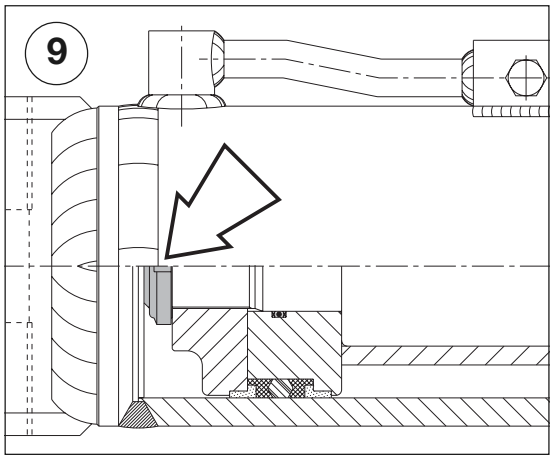


Operation: **Dismantling the cylinders**	*Table:* **G-002**

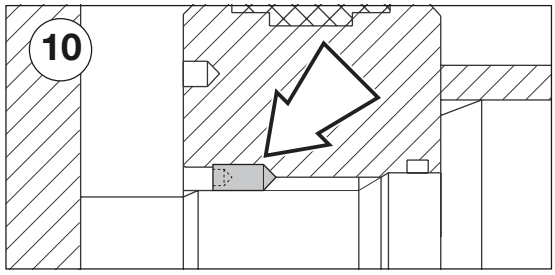
■ Dismantling piston and seals

8 Clamp the cylinder in a vice with jaws of soft material (copper, aluminium, etc.).

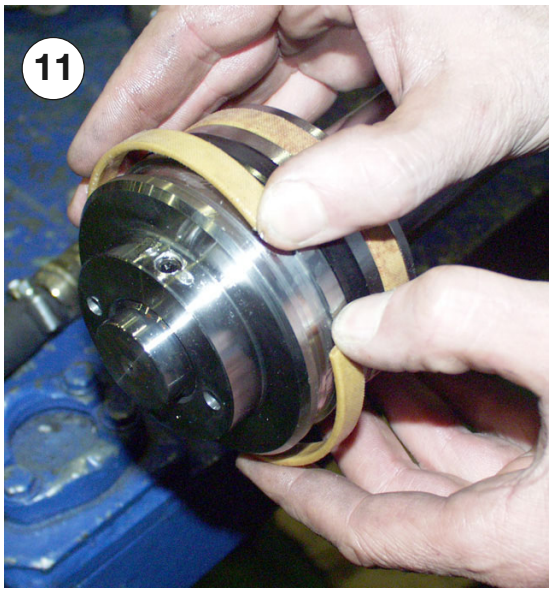
9 Unscrew the ring nut that blocks the cylinder piston



10 Remove the anti-rotation pin (if any) fitted axially to the rod with a 5mm hexagonal wrench.

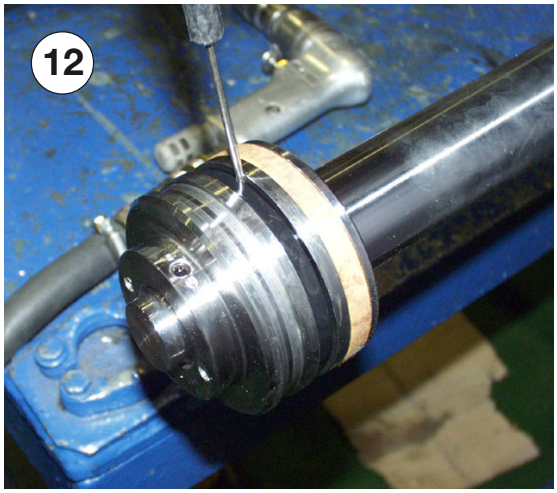


11 Press on the slotted edges to remove the two guide rings.



Operation:	Dismantling the cylinders	Table: G-002

12 With a hand-screwdriver, pry off the seal from the housing.



13 With the USAG 281C/215 wrench with ø 6mm pins, unscrew the piston completely.

14 With a small hand-screwdriver, pry off the O-ring between rod and piston.



■ Dismantling head and seals

15 With a small hand-screwdriver, pry off the O-ring and the relevant extrusion-proof ring from the head.

16 Pull out the head from the chrome-plated rod

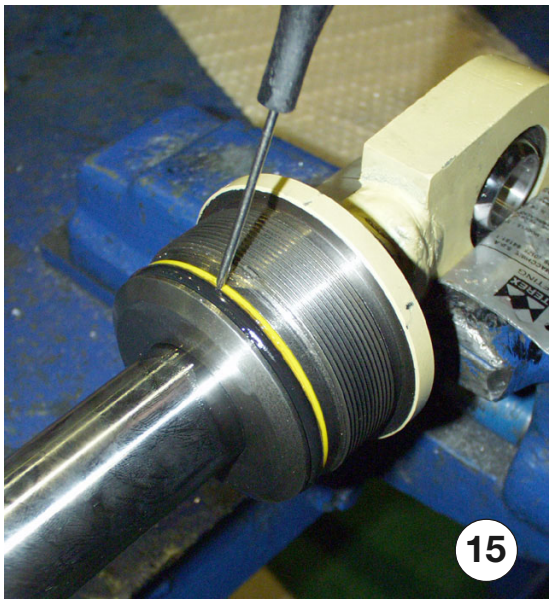
17 With a small hand-screwdriver, pry off the mud-scraper from its housing.

18 Using the same screwdriver, pry off the seal between head and rod.

19 Carefully clean the parts reassemble; renew any damaged parts.

IMPORTANT

Once removed, seals cannot be cleaned and refitted. They must be replaced.



Operation: Re-assembling the cylinders	Table: G-002

■ Re-assembling the cylinder

IMPORTANT

Before reassembling the parts, carefully clean them. Anoint seals, housings, threads and sliding parts.

20 Refit first internal and external seals to the head.

21 Also refit internal and external seals to piston and guide rings.

22 Pull the head into the chrome-plated rod. Do not slide the internal seals against the rod thread.

23 Re-tighten the piston to the rod. Do not slide the rod thread against the internal seal of the piston.

24 Re-tighten and lock the grub-screw of the cylinder paying attention not to dent its edge to prevent loosening.

25 Clamp the cylinder with the vice.

26 Carefully anoint pistons, seals and cylinder rod.

27 Pull the piston into the cylinder paying attention not to slide the seals against the cylinder thread.

28 Push the cylinder to stop.

IMPORTANT

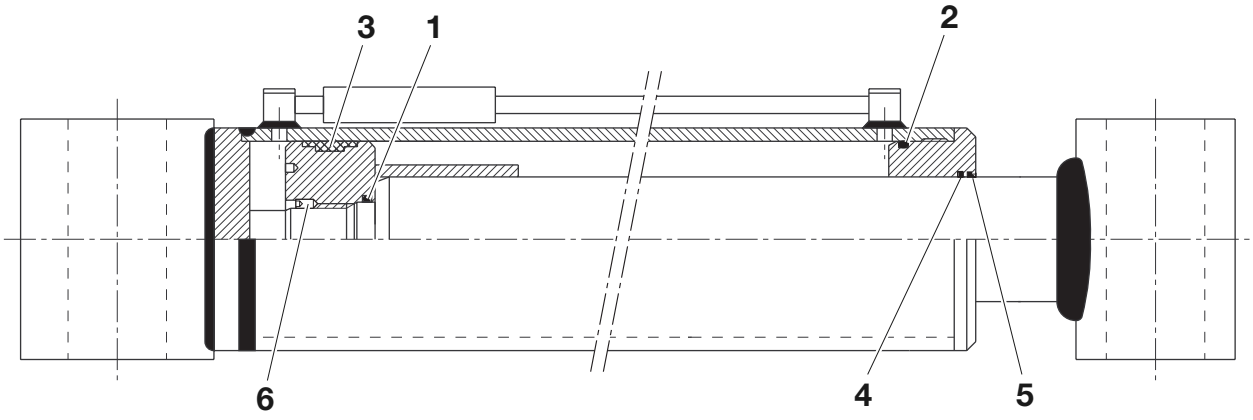
When the blocking valves are mounted, remove their canisters and eliminate the air.

29 Push the rod to stop into the cylinder, screw in and tighten the head. Check the hole of the grub-screw is aligned.

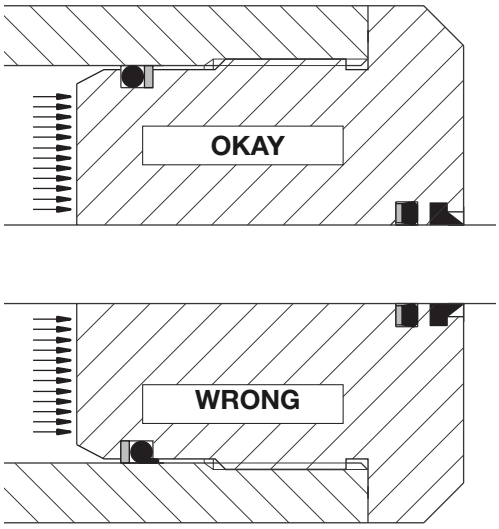
30 Fit the grub-screw and lock it in position with some Loctite.

31 Before refitting the blocking valve, check and, if necessary, renew any worn seal. Smear the seals with some grease to hold them in position during re-assembly.

Operation:	How to refit the cylinder seals	Table:
		G-002



1 *Seal between rod and piston*
It is usually an O-ring. This seal hardly wears out or get damaged since pressure is maintained by the mechanical coupling of piston and stem held in position by the grub-screw **6**. A probable damage can result from a worng installation.



2 *Seal between head and cylinder*
It is usually an O-ring. This seal wers out easily if fitted in a wrong way. The extrusion-proof ring shall be mounted so as to prevent oil leaks through the seal.

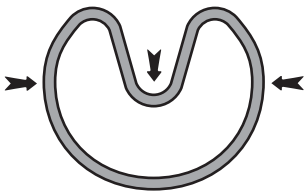
3 *Piston-cylinder seal*
This seal is subject to heavy wear. When the seal is worn, oil flows out between the two cylinder chambers and the movement is unstable and delayed. They are usually made of an elastic sealing element with a number of lips which guarantee sealing, a retaining ring of polyester resin with channels through which the fluid passes and lubricates the sealing lips, and guide ring of acetalic resin with an anti-extrusion function and a guiding function.

4 *Seal between rod and cylinder head*
This seal is subject to heavy wear. When the seal is worn, sweat and oil leaks can be noted on the head and the rod.

5 *Mud-scraper*
This seal is subject to heavy wear. The correct operation of this seal is an essential factor for the lifetime and efficiency of the rod seals.

Operation: How to refit the cylinder seals	Table: G-002

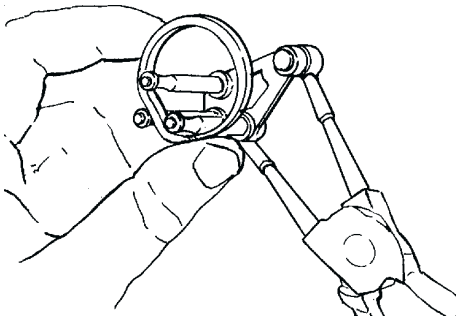
■ Refitting the seals into the internal housings

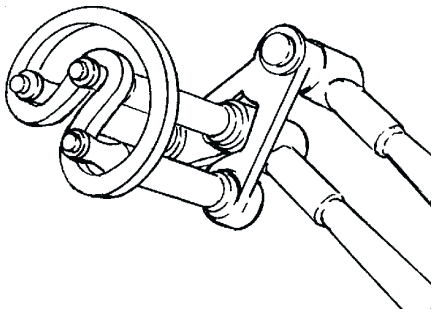


To refit a seal into its internal housing, bend it as shown to reduce its dimensions.
Once released, the seal will get back to its original shape.
To this end, use the special tool for seals (if available).

Before refitting a seal:

- Ensure all metal parts, the seal and the mounting tools are clean
- Oil the seal and the surfaces along which it has to slide with the same fluid of the system or an equivalent oil
- Make sure the seal enters the special notches and that there are no sharp edges
- Avoid a prolonged deformation of the seal during mounting.





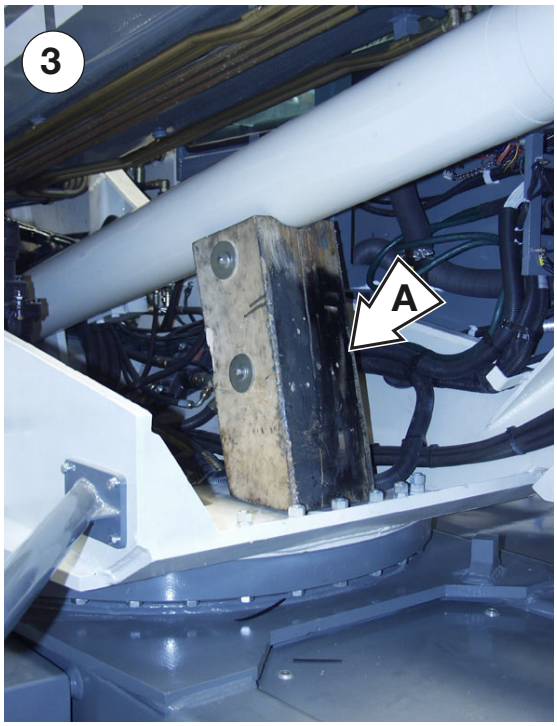
Operation:	Dismantling the cylinders Boom lifting cylinder	Table: G-003			3514/18=280 5022=398	
		3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
Bridge crane, payload 5000 kg (20000 lb) Textile bridles or chains with hooks	Standard tools Adjustable stands				2	15
					1	

Operation:

1 Release the attachment.

2 Remove the side casing of the cabin using a 5mm Allen wrench.

3 Raise the boom and put a supporting block **A** underneath (for the preparation see A.06 "Special equipment" - dwg.01); lower the boom onto the block.

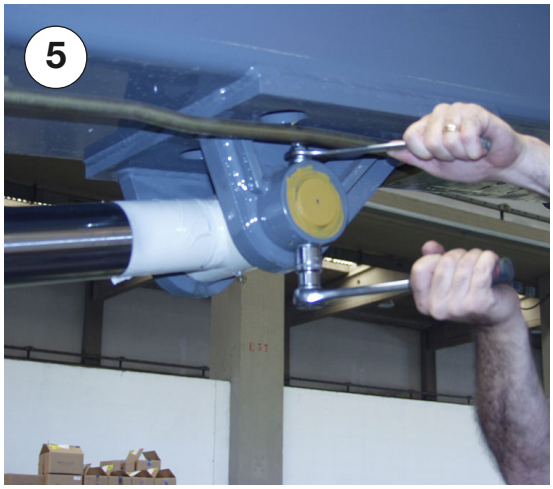


4 Secure the chains with hooks of the bridge crane to the special lugs. Pull the chains to support the boom.



Operation:	Dismantling the cylinders Boom lifting cylinder	Table: G-003

5 Remove the screw fixing the pin with two 24mm wrenches.

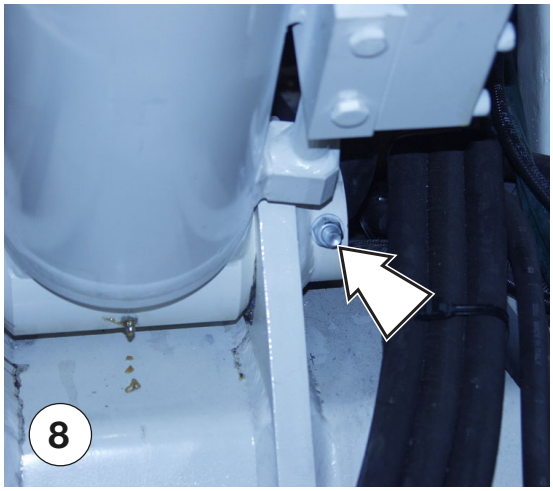


6 Knock out and extract the pin using a mallet of soft material (aluminium, copper, wood, etc.).

7 Using the bridge crane raise the boom and place a supporting stand (see A.06 “Special equipment” - dwg.02) under the attachment coupling beam to support the boom.



8 Remove the screw fixing the rear pin with two 19mm wrenches.



Operation:	Dismantling the cylinders Boom lifting cylinder	Table: G-003

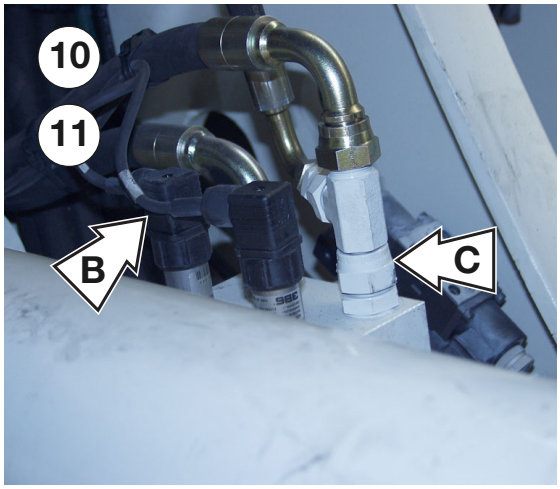
9 Place a container of suitable size under the hydraulic piping before disconnecting.

PROTECT THE ENVIRONMENT

Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

10 Disconnect the hydraulic pipes **C** from the block valve using a 27mm wrench. Plug to protect the circuit from dust and impurities.

11 Disconnect the couplings **B** from the pressure transducers.



ATTENTION

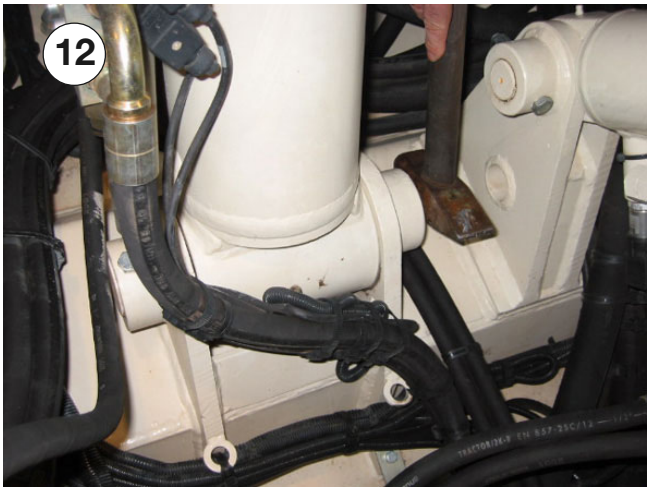
It is advisable to remove also the transducers to avoid that an accidental contact can damage them (transducers are very expensive).

CAUTION

Proceed with maximum attention when removing the transducers. Wrap them in a cloth to protect them from jets of oil at high pressure.

Operation:	Dismantling the cylinders Boom lifting cylinder	Table: G-003

12 Knock out and extract the rear pin using a mallet of soft material (aluminium, copper, wood, etc.).



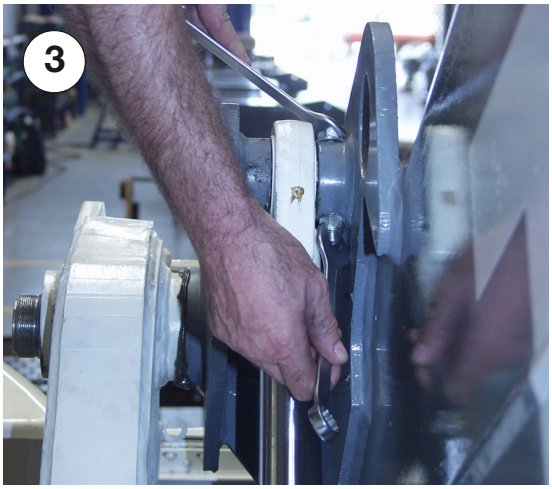
13 Tie a textile bridle around the cylinder and remove it from the machine using the bridge crane.

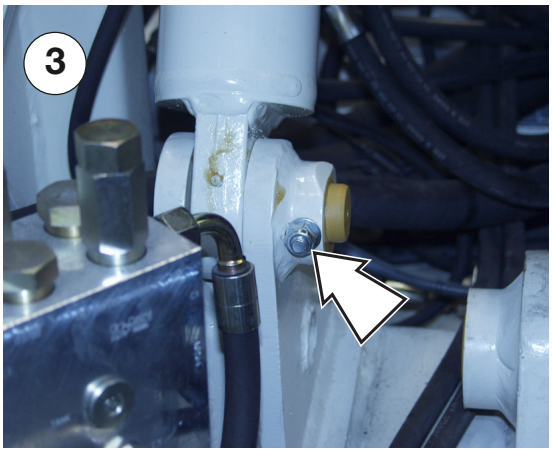
IMPORTANT

To reassemble the cylinder, repeat the steps above in reversed sequence. Remember to set the circuit under pressure before releasing the bridge crane.

Operation:	Dismantling the cylinders Fork compensation cylinder	Table: G-004			kg	40
		3514 ✔	3518 ✔	5022 ✔		Hrs. / Min.
Bridge crane, payload 5000 kg (20000 lb) Textile bridles or chains with hooks		Standard tools Adjustable stands				2 / -
						1

Operation:





ATTENTION

The Girolift 5022 is equipped with 2 compensation cylinders. Follow the procedure below to dismantle both cylinders.

1 Release the attachment.

2 Raise the boom and place a supporting stand (see A.06 “Special equipment” - dwg.02) under the attachment coupling beam to support the boom.

3 Remove the screws fixing the cylinder pins with two 19mm wrenches.

4 Place a container of suitable size under the hydraulic piping before disconnecting.

PROTECT THE ENVIRONMENT

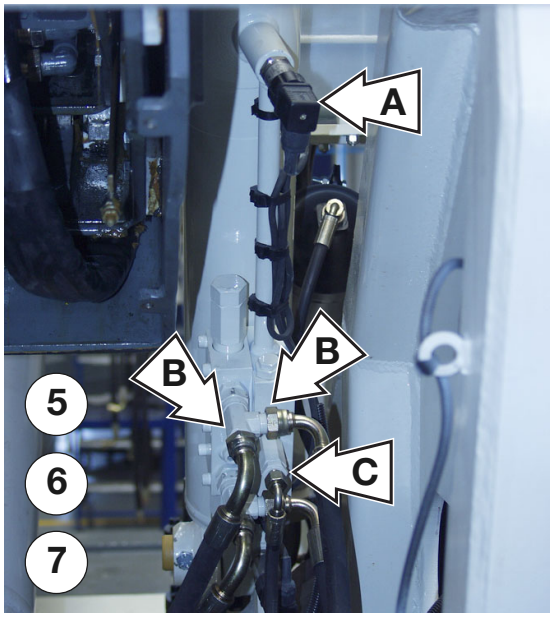
Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

Operation:	Dismantling the cylinders Fork compensation cylinder	Table: G-004

5 Disconnect the hydraulic pipes **B** from the block valve using a 27mm wrench. Plug to protect the circuit from dust and impurities.

6 Disconnect the flexible hose **C** (1/4") from the block valve using a 19mm wrench.

7 Disconnect the couplings **A** from the pressure transducers.

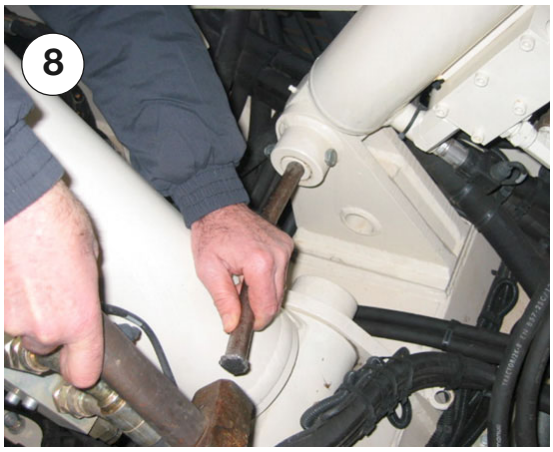


ATTENTION

It is advisable to remove also the transducers to avoid that an accidental contact can damage them (transducers are very expensive).

CAUTION

Proceed with maximum attention when removing the transducers. Wrap them in a cloth to protect them from jets of oil at high pressure.



8 Knock out and extract the pin using a mallet of soft material (aluminium, copper, wood, etc.).

9 Fix the cylinder with a textile bridle connected to the bridge crane to support its weight.

10 Remove the bottom pin.

11 Remove the cylinder from the machine using the bridge crane. Store the cylinder in a place where it does not hinder other operations.

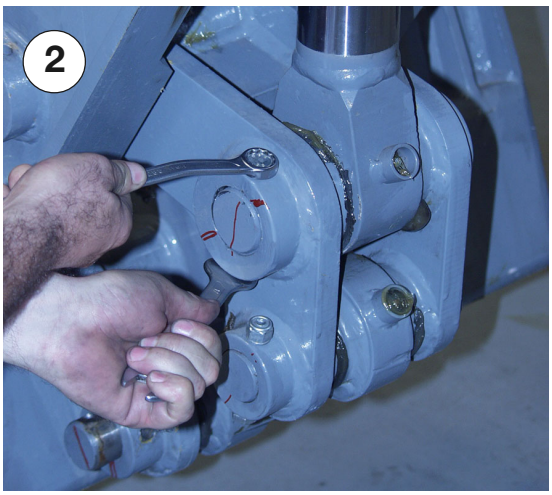
Operation:	Dismantling the cylinders Attachment rotation cylinder	Table: G-005		
		3514 ✔	3518 ✔	5022 ✔

Bridge crane, payload kg 500 (2000 lb) Textile bridles or chains with hooks	Standard tools Adjustable stands	kg	3514=80 3518=100 5022=108
			Hrs. 1 / Min. 30
			1

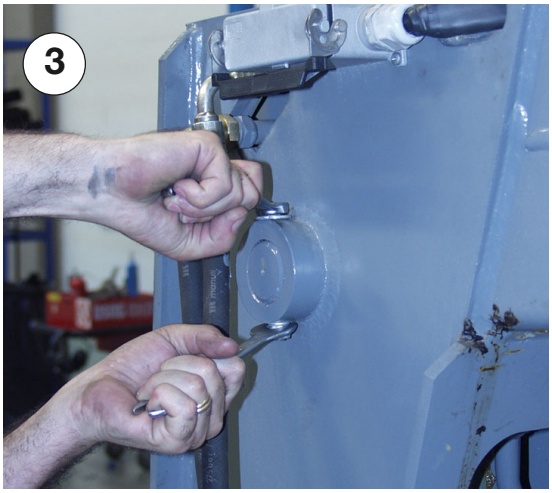
Operation:

1 Release the attachment

2 Remove the screw fixing the pin (rod side) with two 17mm wrenches



3 Remove the screw fixing the pin (bottom side) with two 17mm wrenches



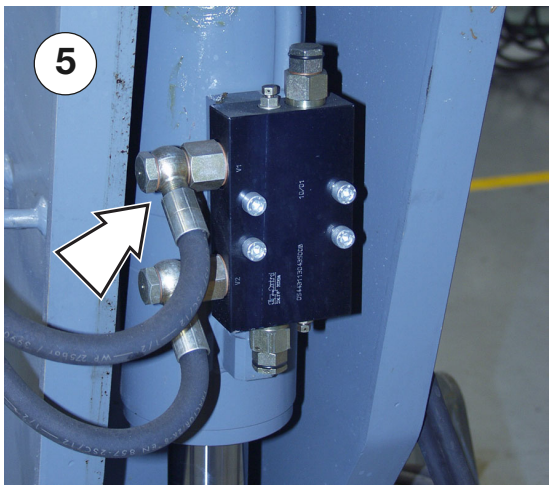
4 Place a container of suitable size under the hydraulic piping before disconnecting.

PROTECT THE ENVIRONMENT

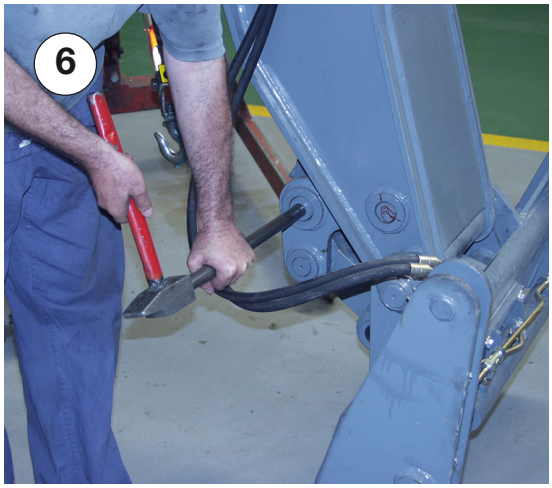
Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

Operation:	Dismantling the cylinders Attachment rotation cylinder	Table: G-005

5 Disconnect the two hydraulic pipes from the block valve. Plug to protect the circuit from dust and impurities.

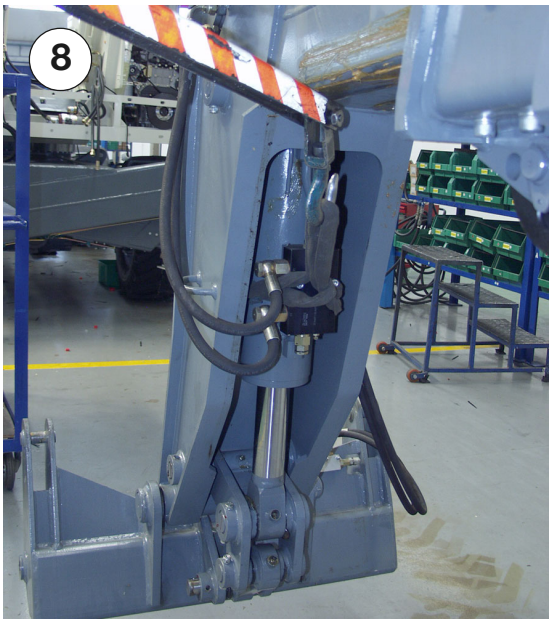


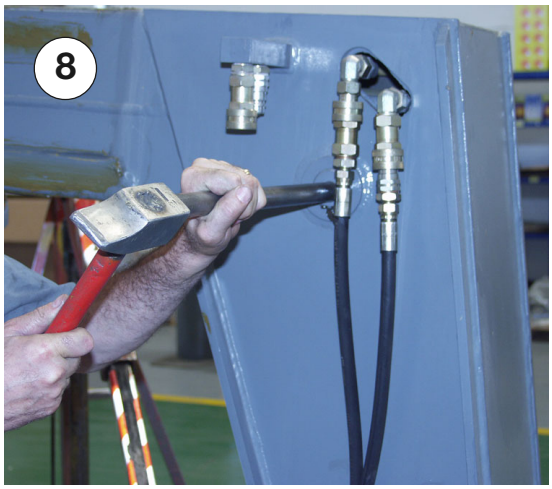
6 Knock out and extract the pin (rod side) using a mallet of soft material (aluminium, copper, wood, etc.).



7 Tie a textile bridle around the cylinder and secure the bridle to a hydraulic elevator which shall support the cylinder once the pin is removed.

8 Pull the bridle and extract the pin from the bottom side. Store the cylinder in a place where it does not hinder other operations.



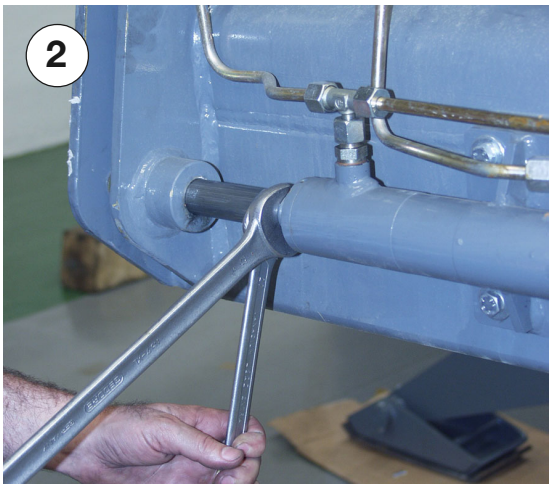


Operation:	Dismantling the cylinders Attachment locking cylinder (up to serial number 9261)	Table: G-006 3514 ✔ 3518 ✔ 5022 ☐	kg: 11,4
Bridge crane, payload 500 kg (2000 lb) Textile bridles or chains with hooks	Standard tools		Hrs. 1 Min. -
			1

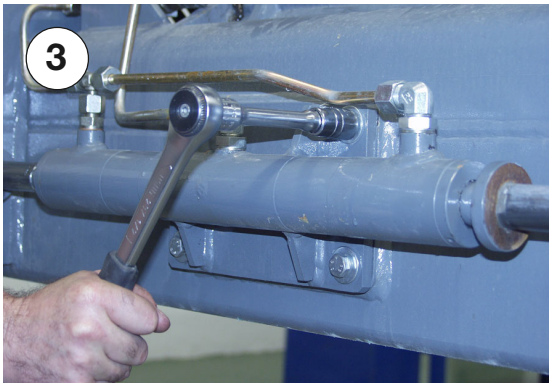
Operation:

1 Release the attachment

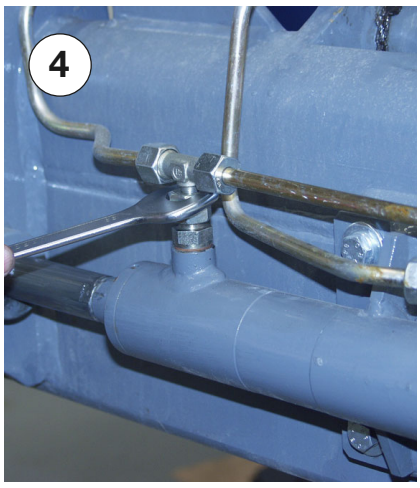
2 Unscrew the cylinder coupling terminals using two 27mm wrenches.

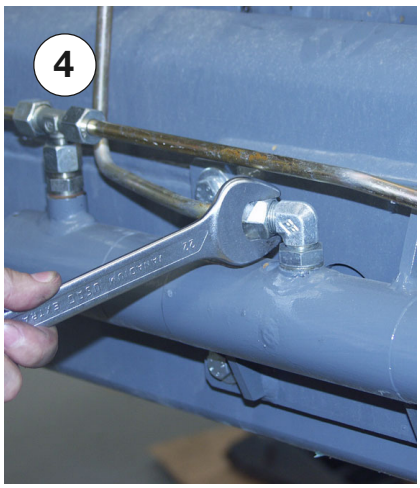


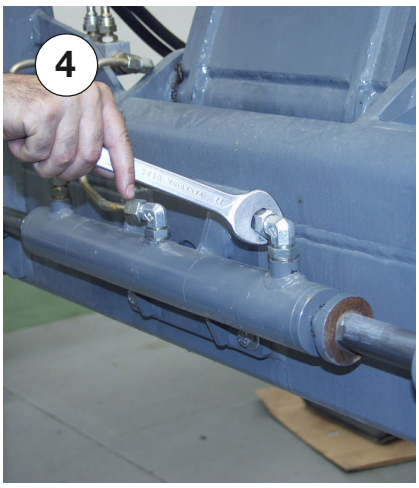
3 Loosen the 4 screws fixing the cylinder to the attachment holding frame with two 17mm wrenches.



4 Disconnect the iron pipes from the cylinder with a 22mm wrench.

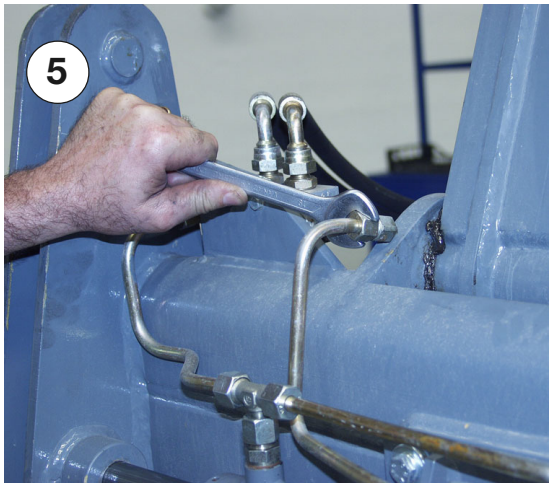






Operation:	Dismantling the cylinders Attachment locking cylinder (up to serial number 9261)	Table: G-006

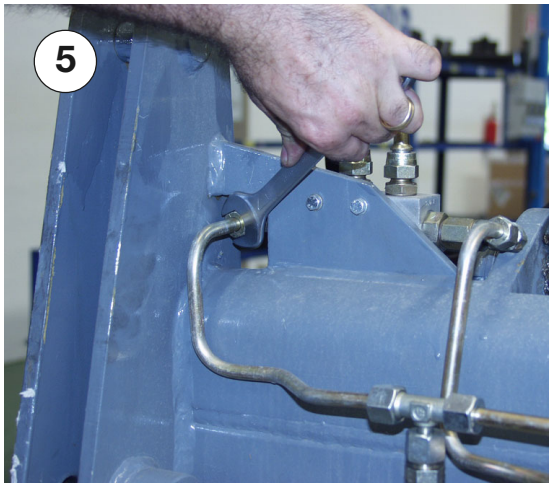
5 With a 19mm hexagonal wrench, loosen the iron pipes coming from the block valve.



CAUTION

Iron pipes are under pressure being upstream the block valve. Proceed with extreme caution.

6 Free the pipes, remove the screws fixing the cylinder to the attachment holding frame and remove the cylinder.



Reassembling the cylinder:

IMPORTANT

To reassemble the cylinder, repeat the steps above in reversed order considering the precautions below.

1 Block the terminal pins on the cylinder rods after smearing the threads with Loctite 245. Clean and use the amount indicated in the bottle.

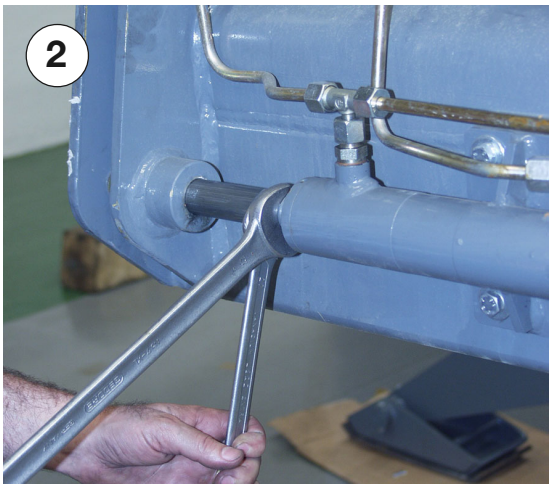
2 Lock the four fixing screws of the cylinder to the holding frame with the terminal pins completely driven into their housing but free to rotate (correct alignment of the pins with the holes).

Operation:	Table: G-006.1			
Dismantling the cylinder **Attachment locking cylinder (from serial number 9262)**	3514 ✔	3518 ✔	5022 ☐	kg: 11,4
				Hrs. 1 / Min. -
Bridge crane, payload 500 kg (2000 lb) Textile bridles or chains with hooks	Standard tools			1

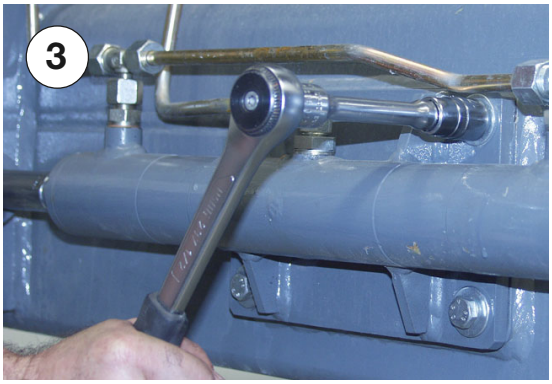
Operation:

1 Release the attachment

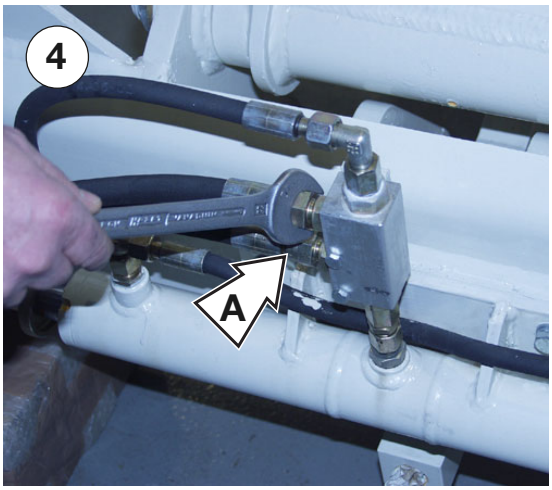
2 Unscrew the cylinder coupling terminals using two 27mm wrenches.



3 Loosen the 4 screws fixing the cylinder to the attachment holding frame with two 17mm wrenches.

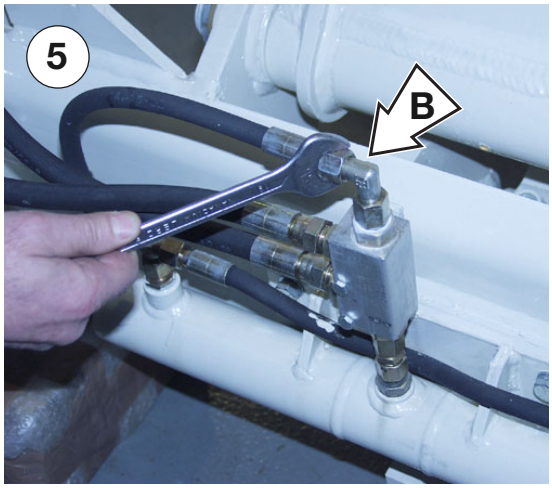


4 Disconnect the delivery hoses **A** coming from the boom using a 22mm wrench.



Operation:	Dismantling the cylinder Attachment locking cylinder (from serial number 9262)	Table: G-006.1

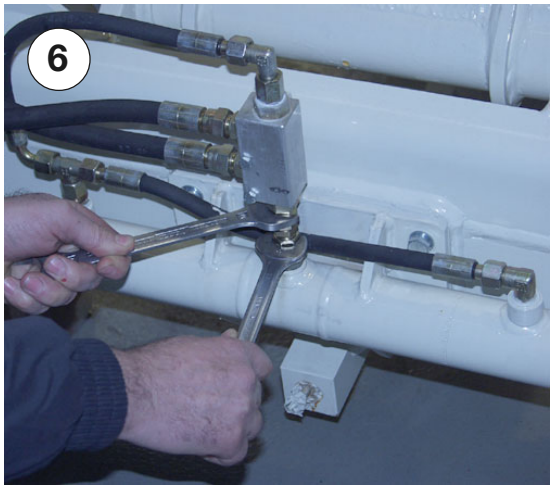
5 With a 19mm hexagonal wrench, loosen the flexible hose **B**.



CAUTION

Flexible hoses are under pressure being upstream the block valve. Proceed with extreme caution.

6 Using two 19mm wrenches, free the cylinder of the block valve.



Reassembling the cylinder:

IMPORTANT

To reassemble the cylinder, repeat the steps above in reversed order considering the precautions below:

1 Block the terminal pins on the cylinder rods after smearing the threads with Loctite 245. Clean and use the amount indicated in the bottle.

2 Lock the four fixing screws of the cylinder to the holding frame with the terminal pins completely driven into their housing but free to rotate (correct alignment of the pins with the holes).

Operation:	Dismantling the cylinders Turret rotation locking cylinder	Table: G-007 3514 ✔ 3518 ✔ 5022 ✔	kg 6,1
		Standard tools	Hrs. 1 Min. -
			1

Operation:

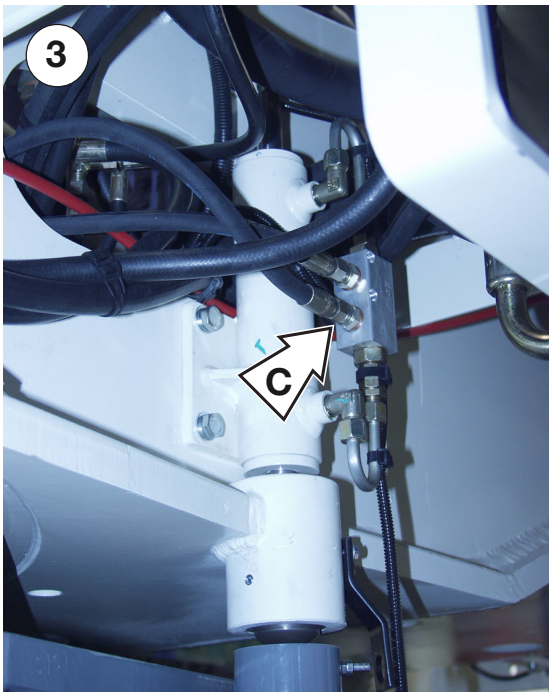
1 Before disconnecting the hydraulic hoses, place a container of suitable size underneath.

PROTECT THE ENVIRONMENT

Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

2 Retract the turret rotation locking cylinder.

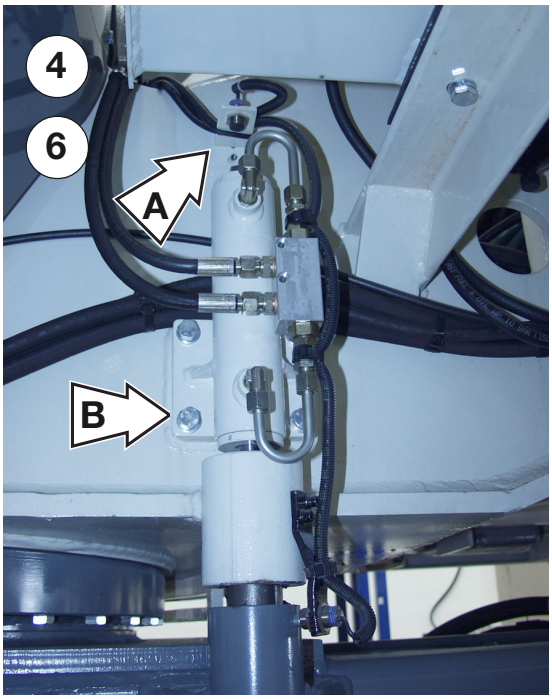
3 Using a 19mm wrench, disconnect the two hydraulic hoses **C** from the block valve. Plug to protect the circuit from dust and impurities.



4 Using a 19mm wrench, remove the bracket **A** supporting the top proximity switch.

5 Cut the fasteners of the electrical cables powering the proximity switches.

6 With a 19mm wrench, remove the 4 screws **B** fixing the cylinder and remove the cylinder from the top.



Operation:	Dismantling the cylinders Turret rotation locking cylinder	Table: G-007

Reassembling the cylinder:

6 Re-assemble following the steps on the previous page in reversed sequence.

ATTENTION

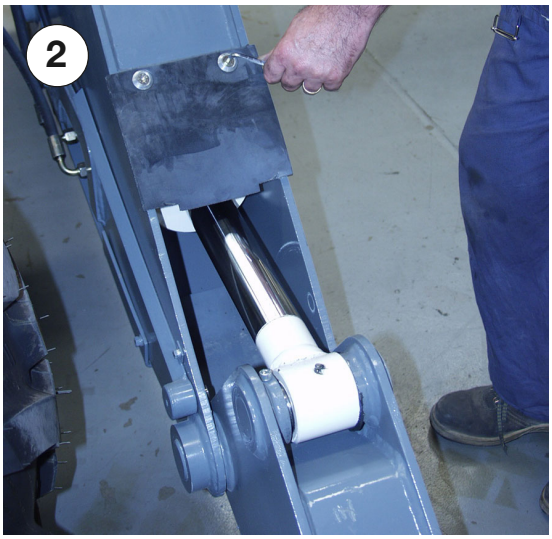
After remounting the cylinder, adjust the sensor distance (see card G-047).

Operation:	Table: G-008				
Dismantling the cylinders **Outrigger cylinders (4)**	3514 ✔	3518 ✔	5022 ☐	kg	51,5
				Hrs.	Min.
	Standard tools			1	30
				1	

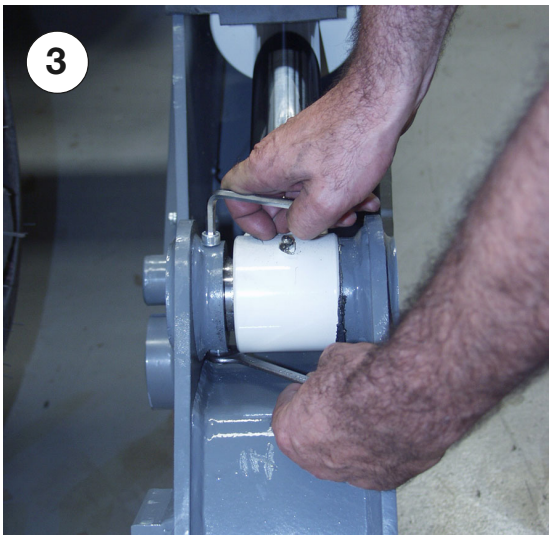
Dismantling procedure (referred to a single outrigger cylinder, but applicable to all of the 4 cylinders):

1 Lower the outrigger slightly above the ground.

2 Using a 6mm hexagonal wrench remove the screws fixing the rubber protection. Remove the protection.

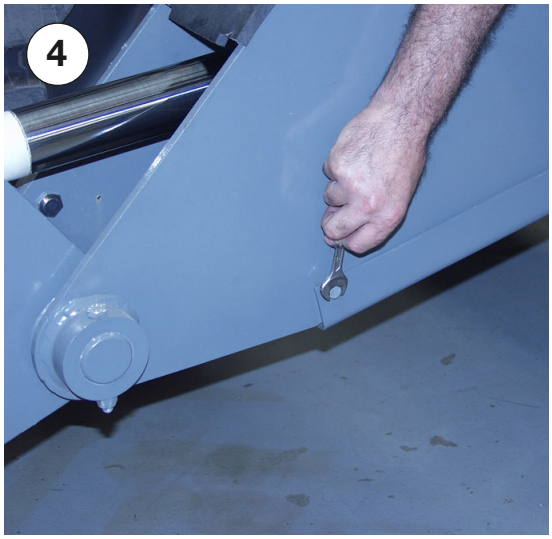


3 Remove the screw fixing the pin (outrigger side) using a 6mm hexagonal wrench and a 13mm fixed wrench.

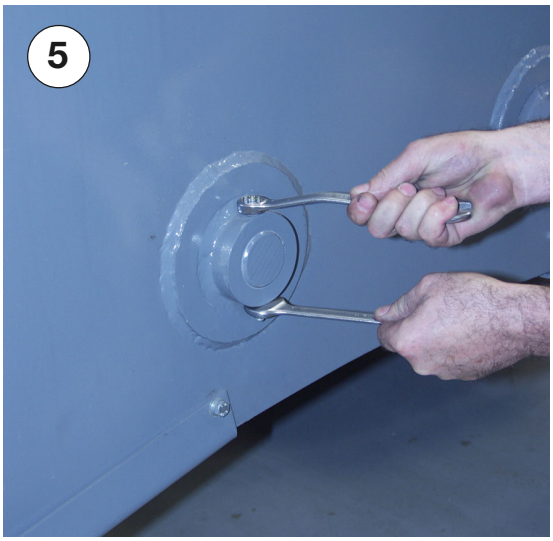


Operation:	Dismantling the cylinders Outrigger cylinders (4)	Table: G-008

4 Remove the bottom protection casing unscrewing the 4 fixing screws with a 13mm wrench.



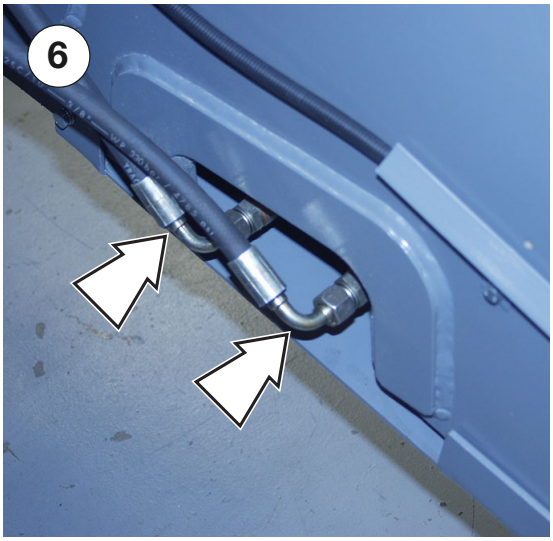
5 Remove the screw fixing the cylinder (frame side) using two 17mm wrenches.



PROTECT THE ENVIRONMENT

Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

6 Place a container for collecting the hydraulic oil under the hoses before disconnecting them with a 22mm wrench.

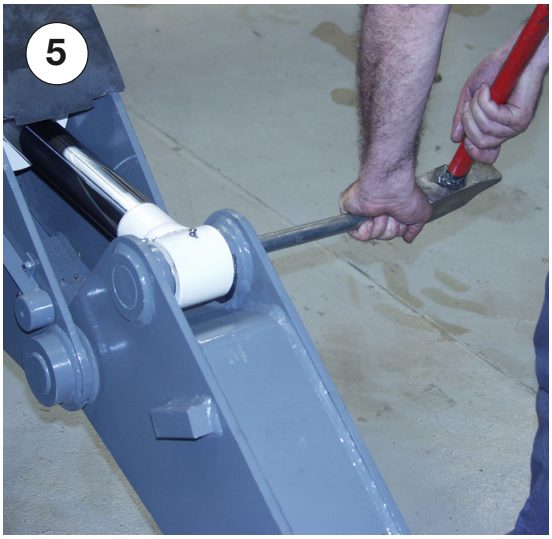


Operation:	Dismantling the cylinders Outrigger cylinders (4)	Table: G-008

7 Place a jack under the cylinder, then knock out and extract the pin (frame side) with a mallet of soft material (aluminium, copper, wood, etc.).



8 Place a wooden board under the outrigger cylinder; lower the cylinder to the board and pull out the pin (outrigger side).



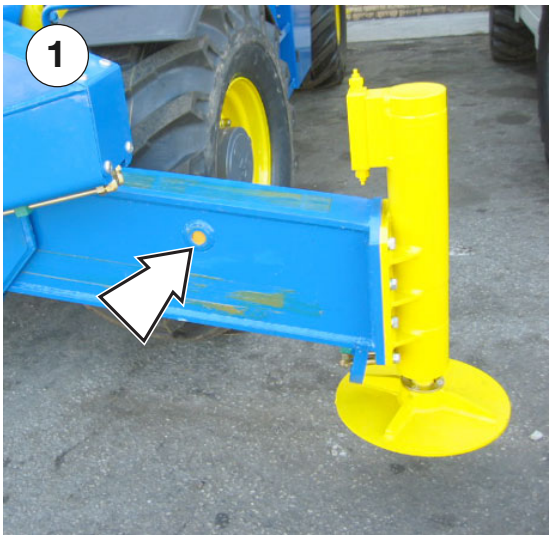
Operation:	Dismantling the cylinders Outrigger cylinders (4)	Table: G-008

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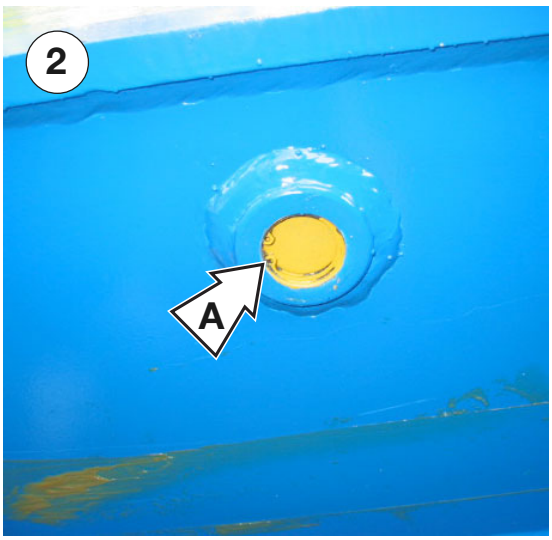
Operation:	Table: G-008.1				
Dismantling the cylinders **Outrigger cylinders (4)**	3514 ☐	3518 ☐	5022 ☑	kg	46
				Hrs.	Min.
	Standard tools			1	30
					1

Dismantling procedure (referred to a single outrigger cylinder, but applicable to all of the 4 cylinders):

1 Start the engine and lower the outrigger so that the pin that locks the cylinder (rod side) is accessible.



2 Remove the elastic ring A

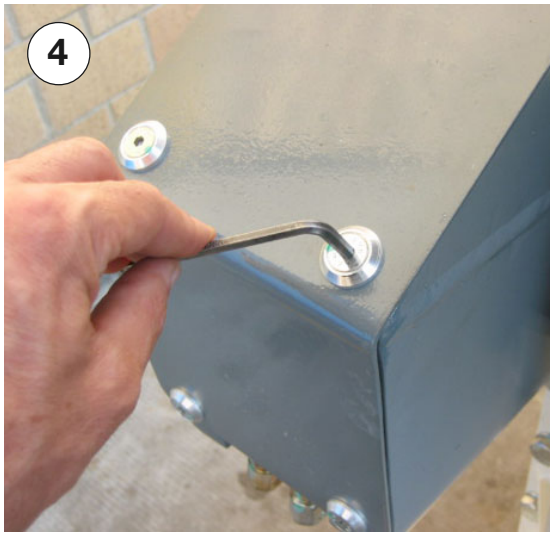


Operation:	Dismantling the cylinders Outrigger cylinders (4)	Table: G-008.1

3 Pull out the fixing pin. If the pin is hard to remove, knock it out using a plug of soft material (aluminium, copper, wood, etc.).



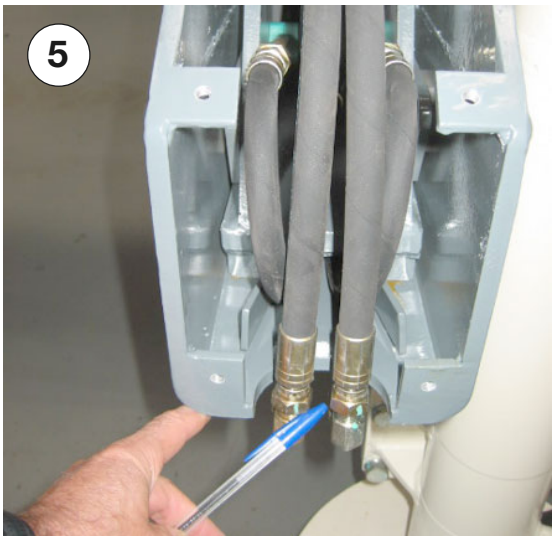
4 Remove the guard after having loosened the screws with a 5mm hexagon wrench.



PROTECT THE ENVIRONMENT

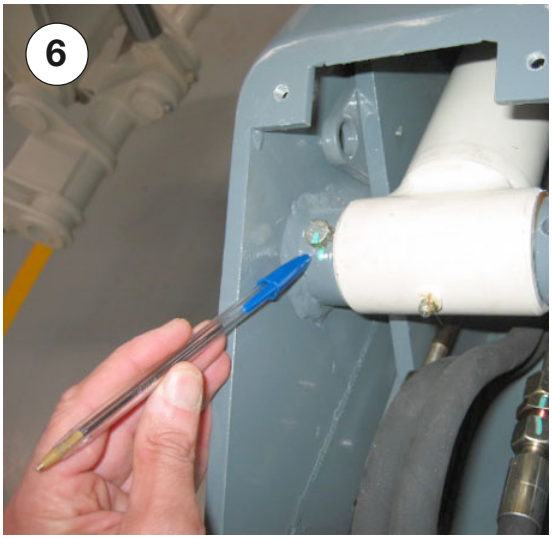
Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

5 Place a container for collecting the hydraulic oil under the hoses before disconnecting them with a 22mm wrench.



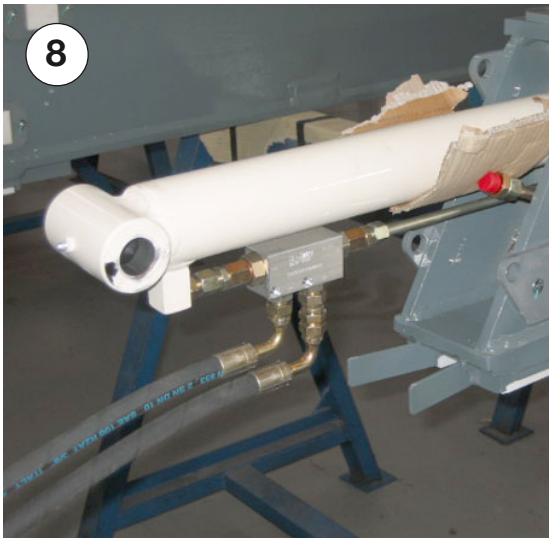
Operation:	Dismantling the cylinders Outrigger cylinders (4)	Table: G-008.1

6 With two 13mm spanners, remove the screw and the nut blocking the cylinder pin (bottom side)



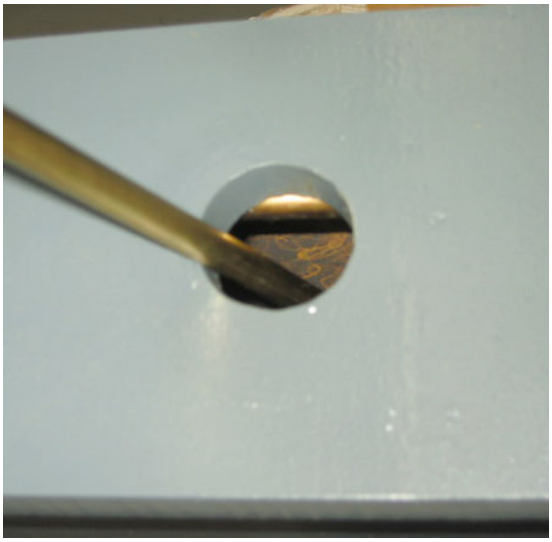
7 Pull out the fixing pin. If the pin is hard to remove, knock it out using a plug of soft material (aluminium, copper, wood, etc.).

8 Solidly sling the cylinder, pull it out and store it in a safe place making sure that it does not hinder other operations.



IMPORTANT

Reassemble following the above sequence in reverse order. With the help of a tackle, place the cylinder (rod side) into the hole of the outrigger arm, located at the bottom.



Operation:	Dismantling the cylinders Outrigger cylinders (4)	Table: G-008.1

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Operation:	Table: G-009				
Dismantling the cylinders **Sway cylinders (4)**	3514 ✔	3518 ✔	5022 ✔	kg	17,5
				Hrs.	Min.
				1	30
	Standard tools				1

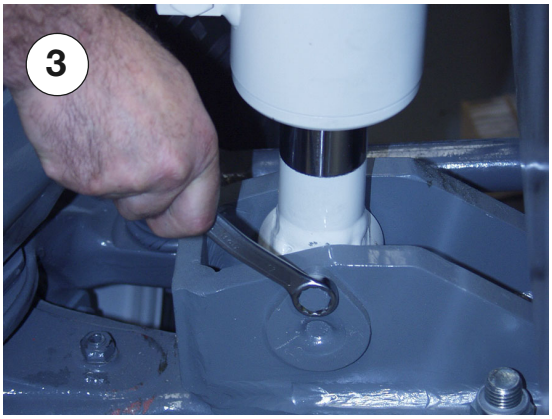
Disassembling procedure (referred to a single cylinder but applicable to all of the 4 cylinders):

1 Lower the 4 outriggers to stabilise the machine.

2 Using two 13mm wrenches, remove the screw fixing thetop pin.



3 Using a 17mm ring spanner remove the screw fixing the bottom pin.



PROTECT THE ENVIRONMENT

Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

4 Place a container for collecting the hydraulic oil under the hoses, then disconnect the hoses using a 22mm wrench.

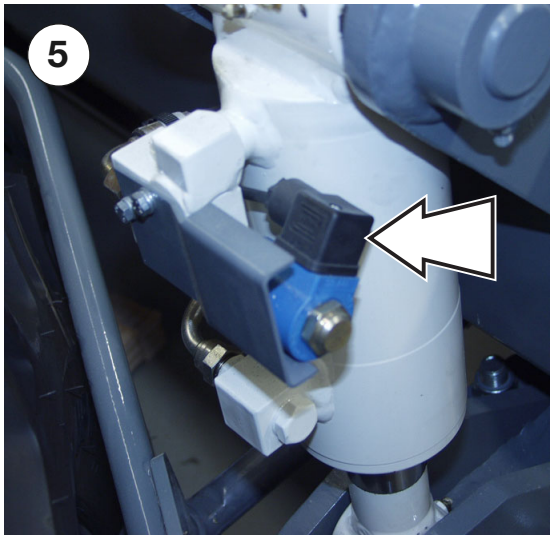


IMPORTANT

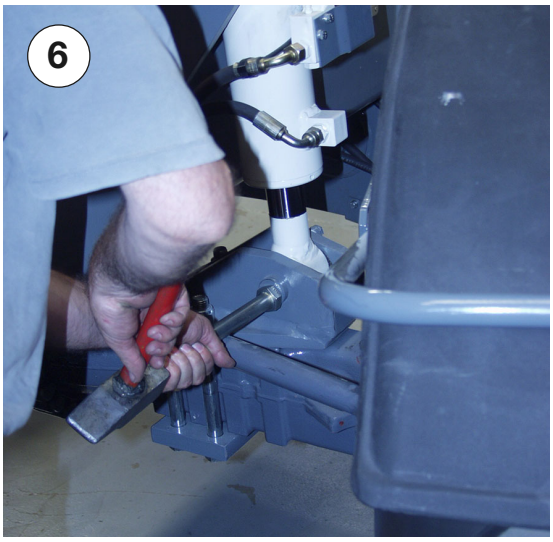
Before disconnecting the hoses, mark them with a different colour for an easy and correct re-assembly.

Operation:	Dismantling the cylinders Sway cylinders (4)	Table: G-009

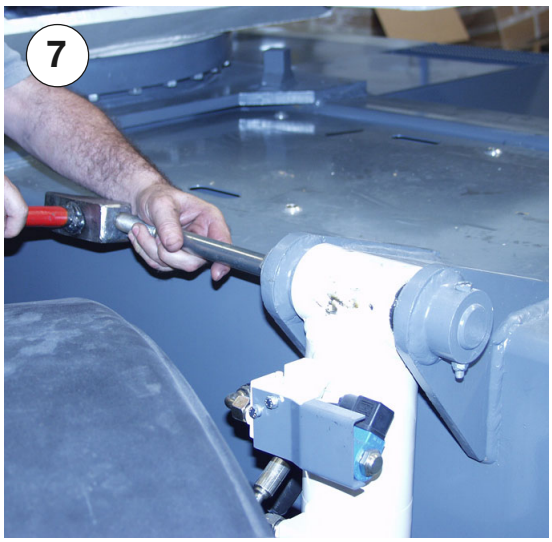
5 Disconnect the wire from the solenoid valve coil.



6 Knock out and extract the bottom pin using a mallet of soft material (aluminium, copper, wood, etc.).



7 Extract the top pin and place the cylinder in a place where it does not hinder other operations.



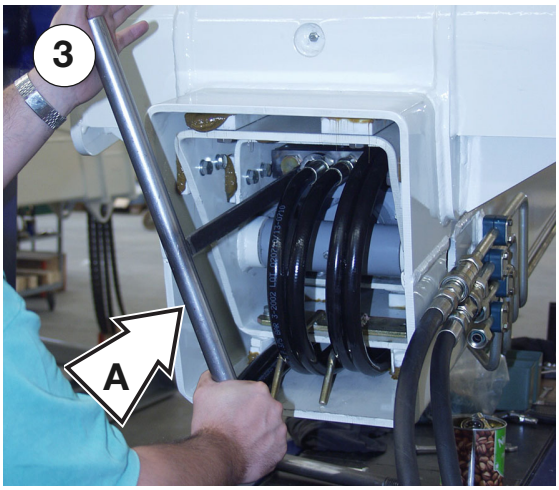
Operation:	Dismantling the cylinders 3rd telescope extension cylinder	Table: G-010 3514 ✔ 3518 ☐ 5022 ☐	kg 146
Bridge crane, payload 500 kg (2000 lb) Textile bridles or chains with hooks	Standard tools		Hrs. 2 Min. 30 1

Operation:

1 Set the boom to horizontal position

2 Remove the attachment holding frame from the boom nose.

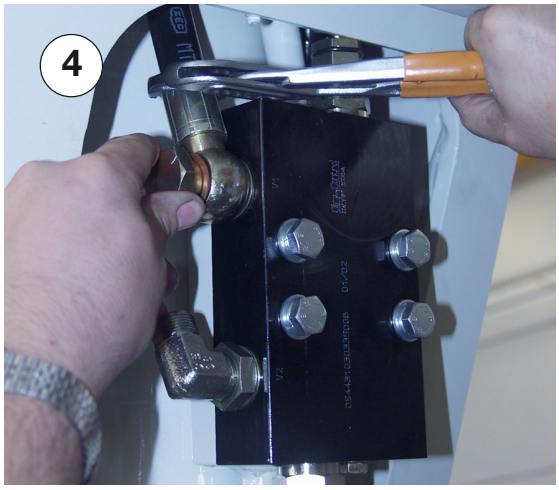
3 Disconnect the hydraulic lines from the block valve of the third telescope extension cylinder using the special wrench **A** (see A-06 dwg.04).



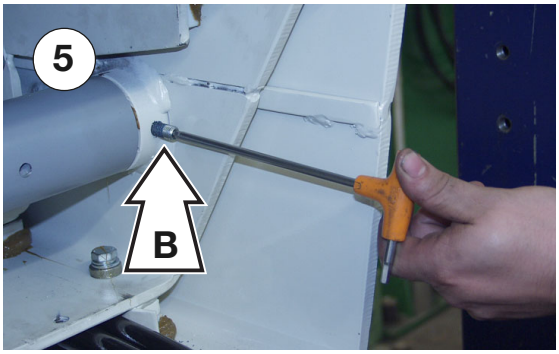
PROTECT THE ENVIRONMENT

Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

4 Disconnect and plug the hydraulic lines from both the block valve of the fork pitching cylinder and the hose-ring fitted to the boom nose. Tie a cord of suitable length around the lines for the subsequent remounting, then extract the hydraulic hoses from the back of the boom.

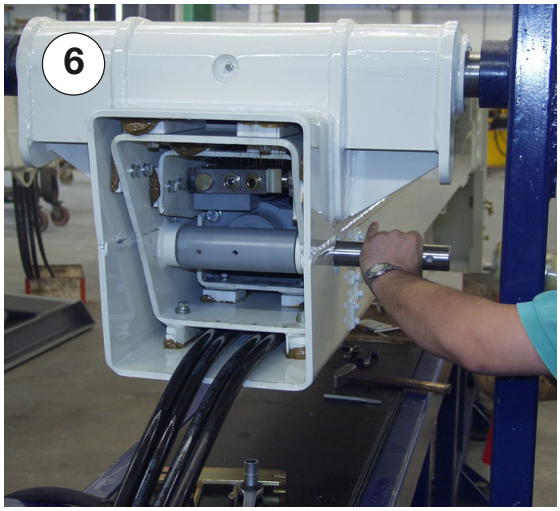


5 Extract the grubscrew **B** locking pin **C**.



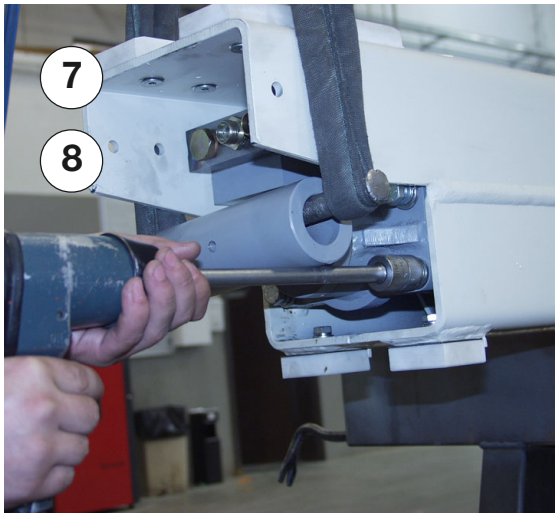
Operation:	Dismantling the cylinders 3rd telescope extension cylinder	Table: G-010

6 Extract pin **C** and free the extension cylinder.

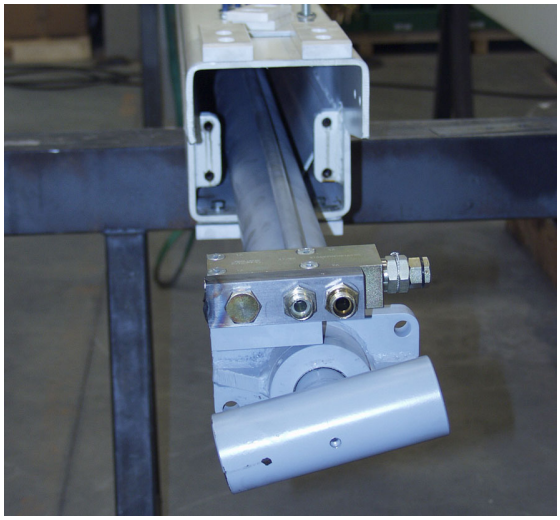


7 Using an unscrewing machine with extension and a 22mm wrench, remove the 4 screws fixing the cylinder to the boom telescope.

8 Tie a textile bridle connected to the bridge crane around the cylinder (see figure) and start pulling out the cylinder of the telescope.



9 Place the cylinder in an area where it does not hinder other operations.

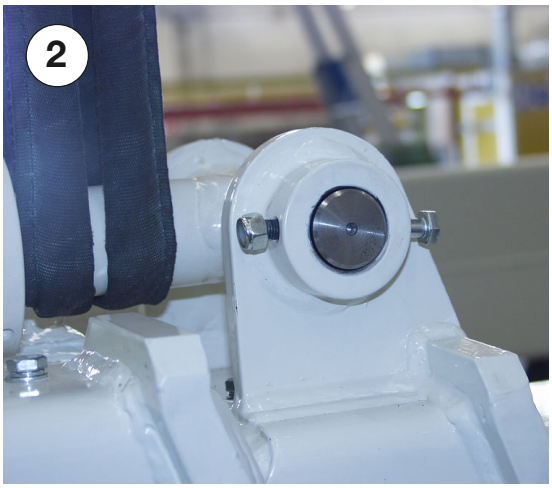


Operation:	Dismantling the cylinders 2nd telescope extension cylinder	Table: G-011 3514 ✔ / 3518 / 5022	kg: 235
Bridge crane, payload 500 kg (2000 lb) Textile bridles or chains with hooks	Standard tools		Hrs. 1 / Min. -
			1

Operation:

1 Set the boom to horizontal position

2 Remove the screw fixing the pin (rod side) using two 17mm wrenches.



3 Knock out and extract the pin with a mallet of soft material (aluminium, copper, wood, etc.).



4 Using a 27mm ring spanner, remove the cylinder guide U-bolt.



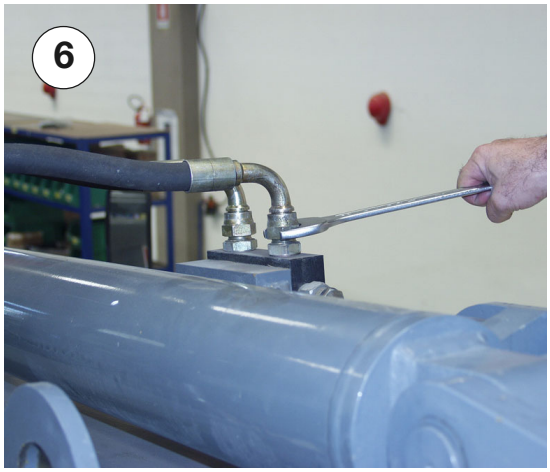
Operation:	Dismantling the cylinders 2nd telescope extension cylinder	Table: G-011

5 Using two 17mm wrenches, remove the screw fixing the pin (bottom side).



PROTECT THE ENVIRONMENT

Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.



6 With a 27mm wrench, disconnect the two hydraulic lines from the block valve. Plug the couplings to protect the circuit against dust and impurities.

7 Secure the cylinder with textile bridles. Slightly pull the bridles to remove the pin from the bottom side.

8 Remove and lower the cylinder to the ground.

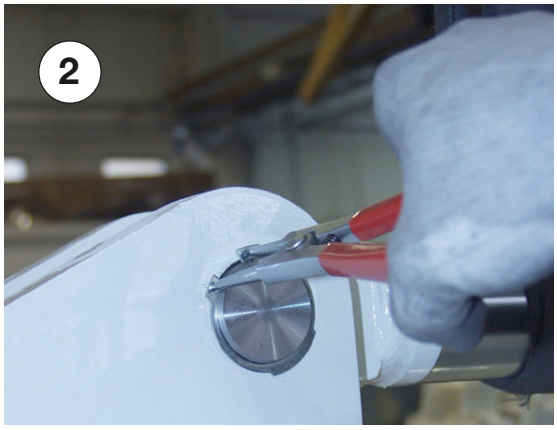


Operation:	Dismantling the cylinders 2nd telescope extension cylinder	Table: G-011.1			kg	328
		3514 ☐	3518 ✔	5022 ✔		Hrs. / Min.
Bridge crane, payload 500 kg (2000 lb) Textile bridles or chains with hooks		Standard tools				1 / -
						1

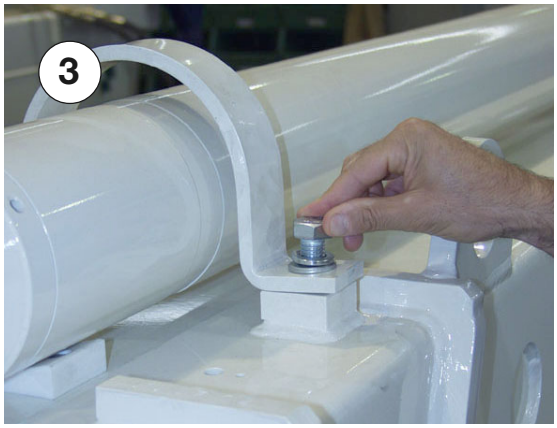
Dismantling procedure:

1 Lower the boom to the horizontal position and fully retract it.

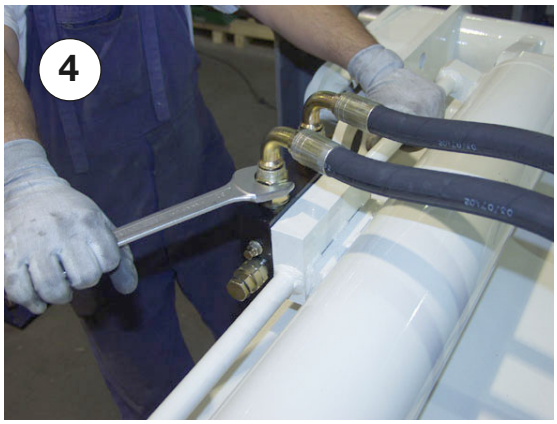
2 Remove the circlip ring locking the pin of the cylinder (rod side) with the pliers, then knock the pin out using a hammer of soft material.



3 With a 27mm spanner, remove the U-bracket locking the cylinder.



4 With a 32mm spanner, remove the two feeding pipes of the cylinder. Once dismantled, plug both the pipes and the valve to avoid that dust and other impurities may enter the circuit.

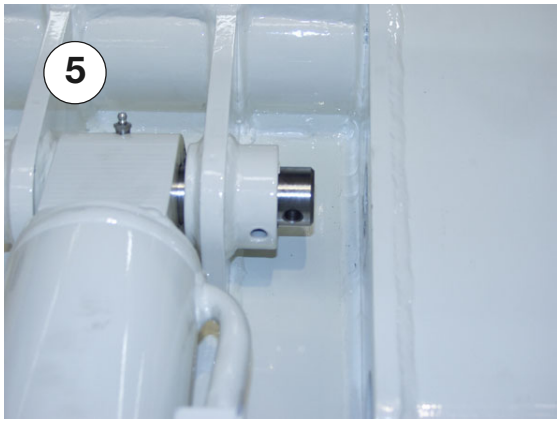


Operation:	Dismantling the cylinders 2nd telescope extension cylinder	Table: G-011.1

5 Remove the screw locking the pin of the cylinder (bottom side) and knock out the pin with a hammer of soft material.

6 Solidly sling the cylinder with a rope of adequate capacity attached to the bridge crane; lift out the cylinder, lower to the ground and store in a safe place.

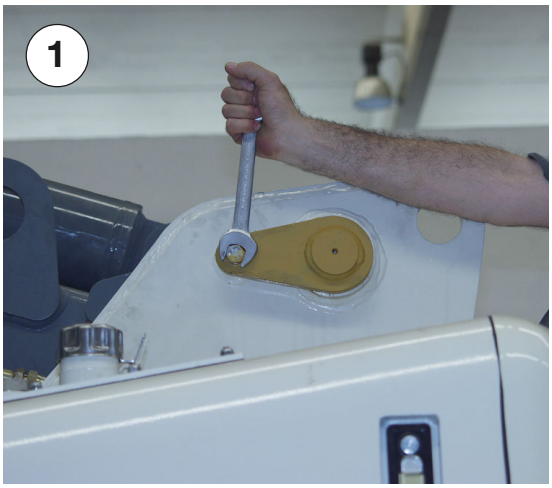
7 For the reassembly, follow the instructions above in reverse order.



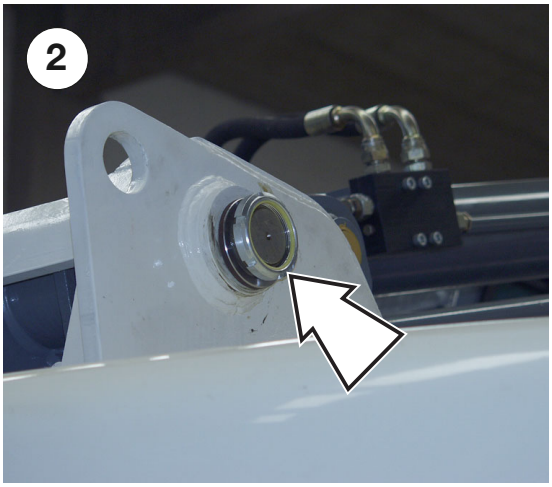
Operation: **Disassembling the boom assy**	Table: **G-012**			kg	2300
	3514 ☑	3518 ☐	5022 ☐	Hrs.	Min.
Bridge crane, payload 6000 kg Textile bridles or chains with hooks	Standard tools			5	-
				2	

Operation:

1 Remove the screw fixing the boom pin using a 19mm wrench.

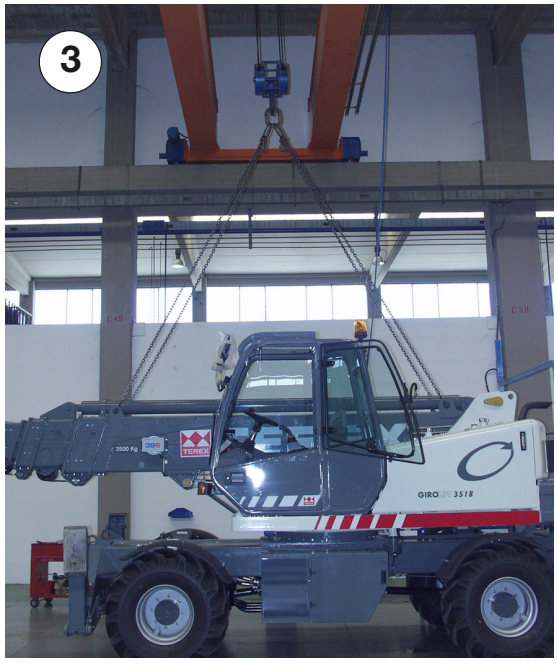


2 Remove the self-locking nut and relevant spacer.



Operation:	Disassembling the boom assy	Table:
		G-012

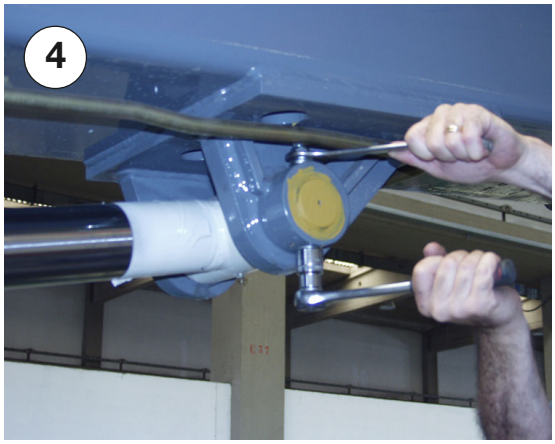
3 Secure the boom to a 4-leg chain of 3.5 metres and fix the chain to the special lugs. Pull the chain.



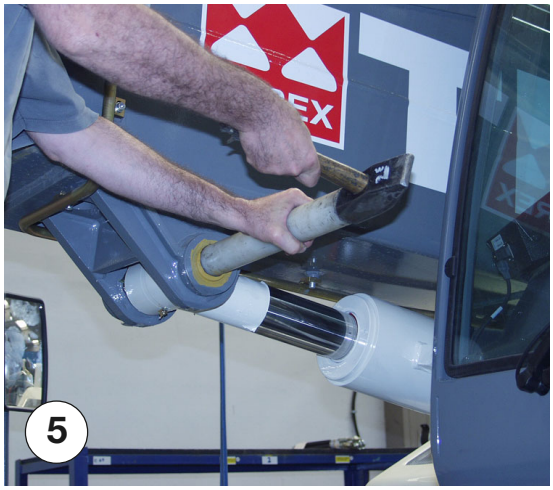
DANGER

Check that the chain has a minimum capacity of 6 tons.

4 Remove the screw fixing the pin of the raising cylinder using two 24mm wrenches.

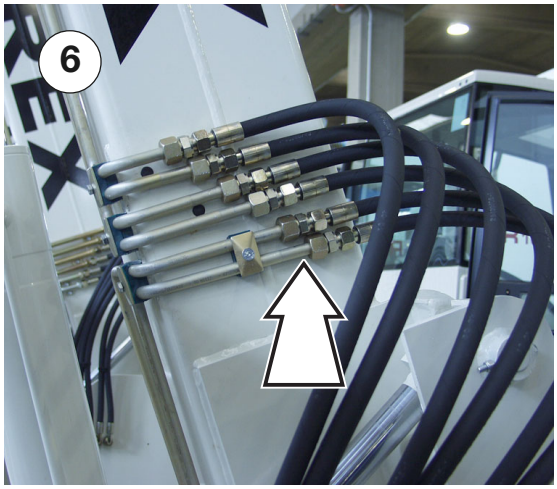


5 Fit a supporting block (see A.06 “Special equipment” - dwg.01), then knock out and extract the pin with a mallet of soft material (aluminium, copper, wood, etc.).

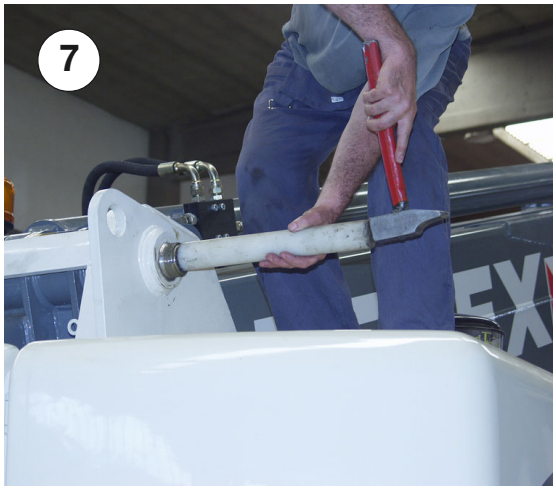


Operation:	Disassembling the boom assy	Table:
		G-012

6 Eliminate the residual pressure from the hydraulic system; then disconnect all the flexible hoses from the pipes using a 27mm wrench and a 30mm wrench for the counter nut.



7 Knock out and extract the swivel pin of the boom with a mallet of soft material (aluminium, copper, wood, etc.).



8 Raise and place the boom so that it does not hinder other operations.



Operation:	Disassembling the boom assy	Table:
		G-012

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Operation:	Dismantling the turret rotation gear motor	Table: G-013			kg	69
		3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
Bridge crane, payload 500 kg Textile bridles or chains with hooks		Standard tools			1	30
					1	

Operation:

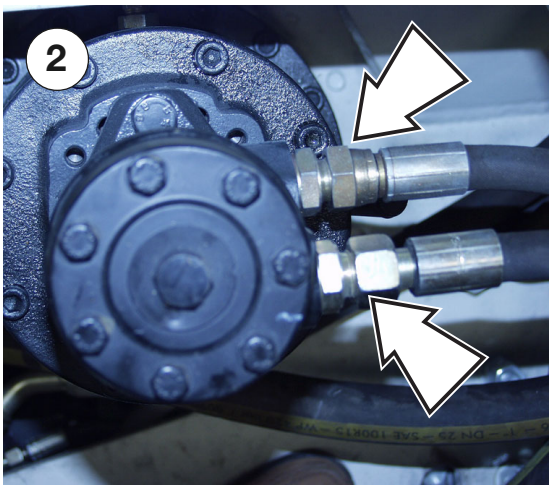
1 Raise the boom to access to the turret rotation gear motor.



ATTENTION

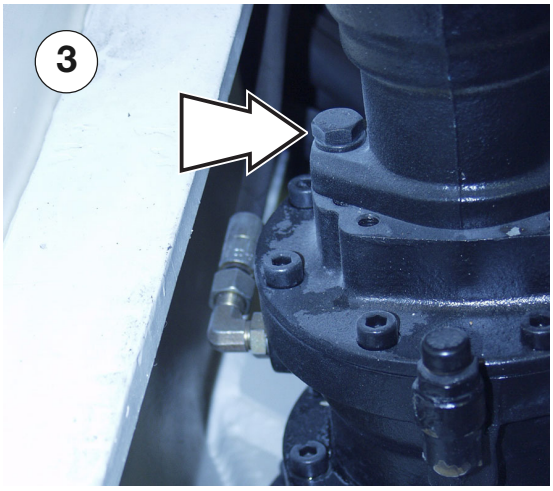
After raising the boom of the height necessary to access to the rotation motor, place a mechanical spacer to avoid an accidental lowering of the boom caused by a damaged block valve.

2 Disconnect the two flexible hoses of the orbital motor using a 27mm wrench.

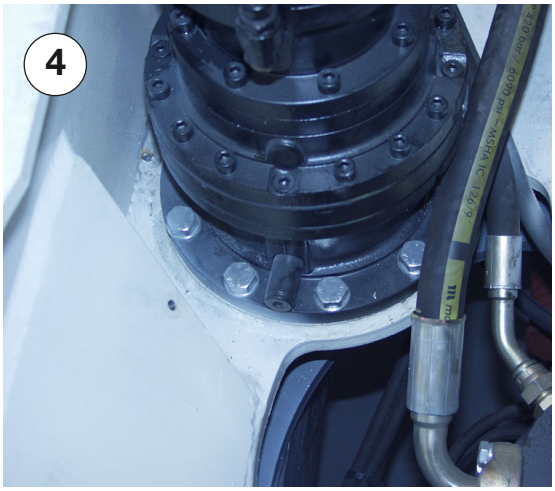


Operation: **Dismantling the turret rotation gear motor**	Table: **G-013**

3 Remove the fixing screws of the motor with a 19mm wrench.

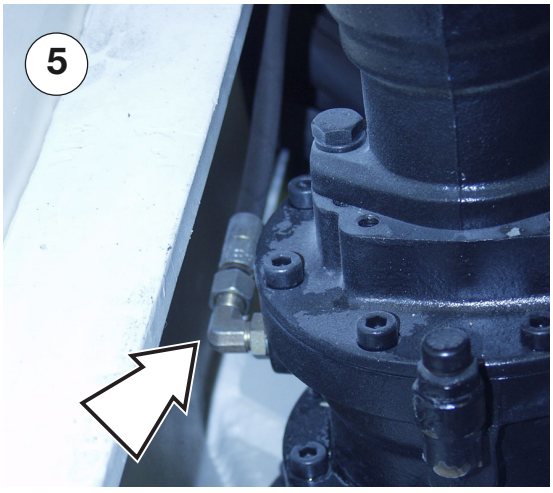


4 Remove the 10 screws fixing the reduction gear with a 24mm wrench.



5 Disconnect the brake tube using a 19mm wrench.

6 Extract the motor after securing it with a textle bridle connected to the bridge crane.



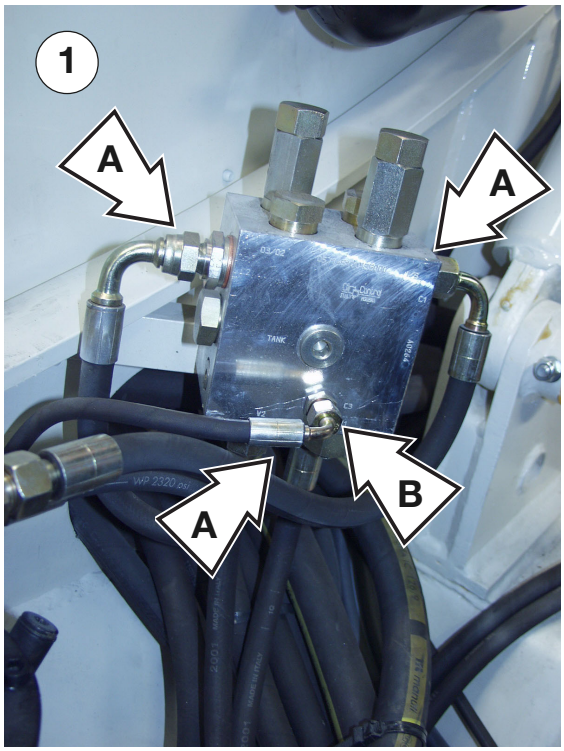
Operation:	Dismantling the block valve of the turret rotation gear motor	Table: G-013			kg	5,6
		3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
					-	45
						1

Disassembling the rotation motor block valve:

1 Using a 27mm wrench, disconnect the 4 flexible hoses **A**.

2 Using a 19mm wrench, disconnect the flexible hose **B.**

3 Using a 17mm wrench, free the valve removing the two fixing screws, placed in the rear side.



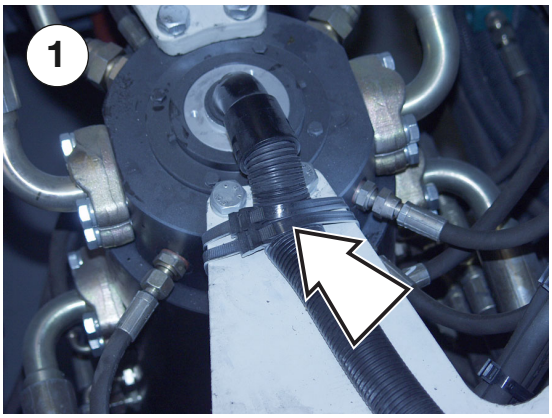
Operation:	Dismantling theblock valve of the turret rotation gear motor	Table: G-013

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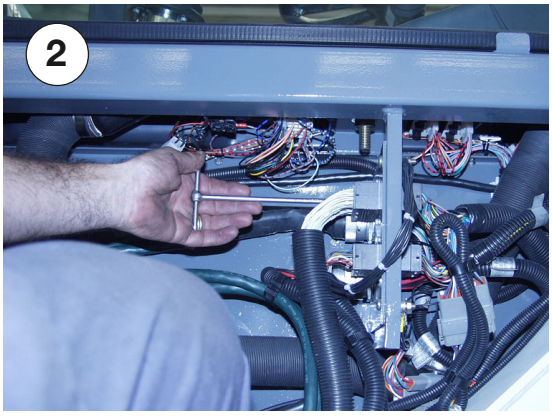
Operation: **Dismantling the electric joint**	Table: **G-014**			kg	8,5
	3514 ✔	3518 ✔	5022 ✔		Hrs. / Min.
Bridge crane, payload 500 kg Textile bridles or chains with hooks	Standard tools			2	-
					1

Procedure:

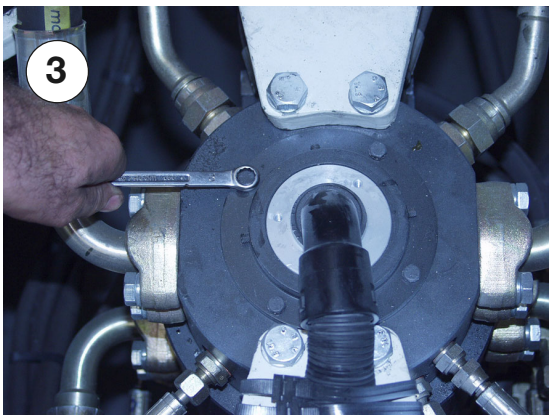
1 Disconnect the clamps fixing the corrugated sheath.



2 Remove the side cab casing, then remove the screw fixing the terminal strip with a 4mm hexagonal wrench.

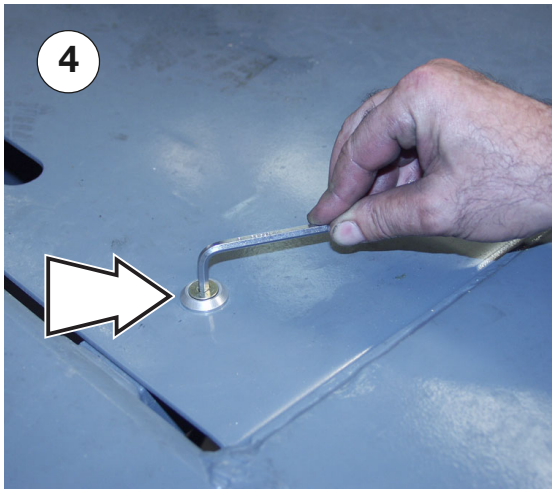


3 Remove the 4 fixing screws of the electric joint using a 10mm wrench.

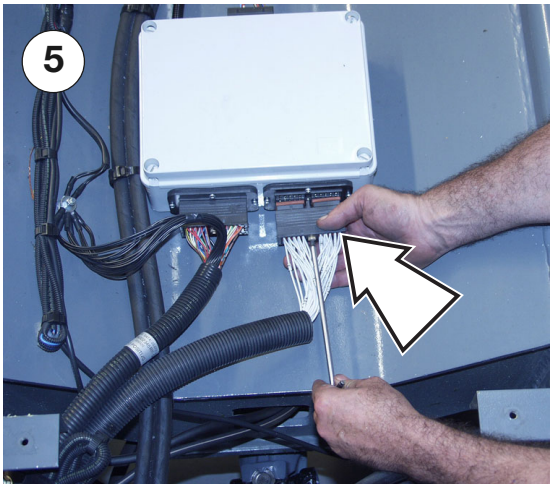


Operation:	Dismantling the electric joint	Table:
		G-014

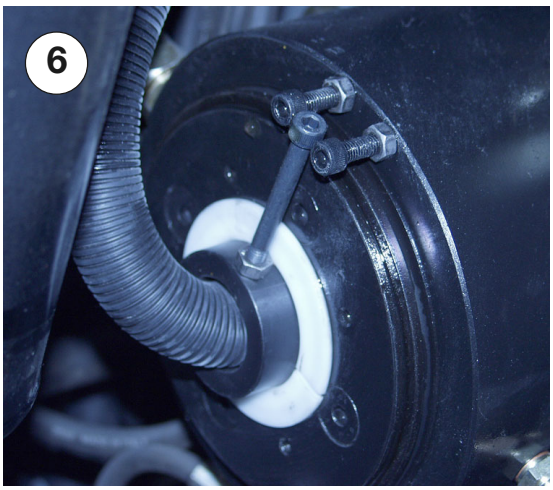
4 Remove the 8 screws fixing the top casing to the frame using a 5mm hexagonal wrench.



5 Disconnect the right terminal strip of the electrical box removing the fixing screw with a 4mm hexagonal wrench; then remove the plastic clamps from the corrugated sheath.



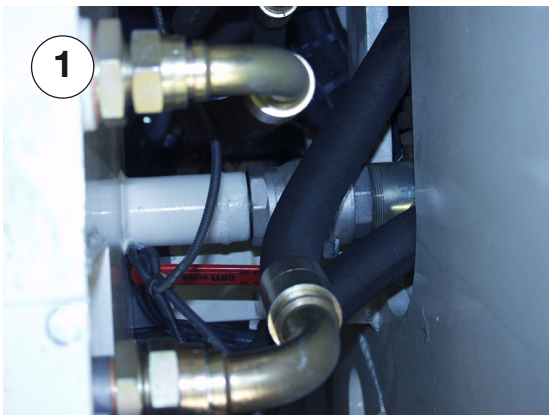
6 Remove the fixing screws placed at the bottom, then extract the complete joint from the top.



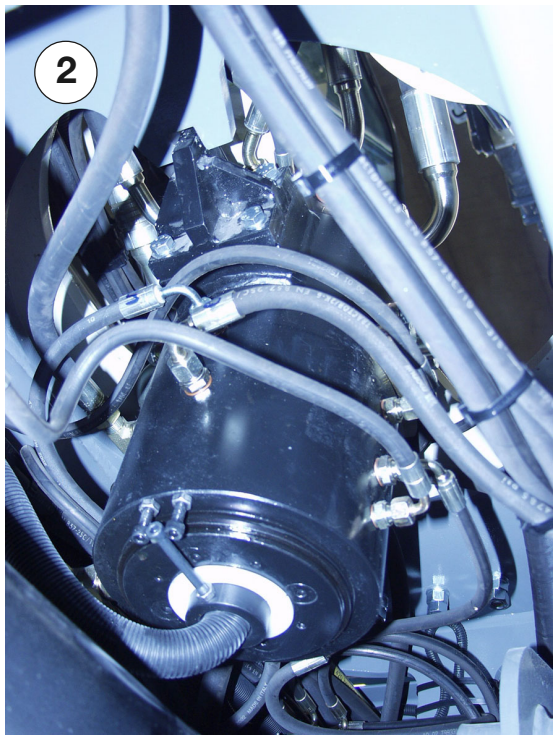
Operation: **Dismantling the electric joint**	Table: **G-014**			kg: 100
	3514 ✔	3518 ✔	5022 ✔	Hrs. 2 / Min. -
Bridge crane, payload 500 kg Textile bridles or chains with hooks	Standard tools			2

Operation:

1 Close the cocks of the hydraulic oil.



2 Disconnect and plug all hydraulic lines of the joint to protect them from dust and impurities.



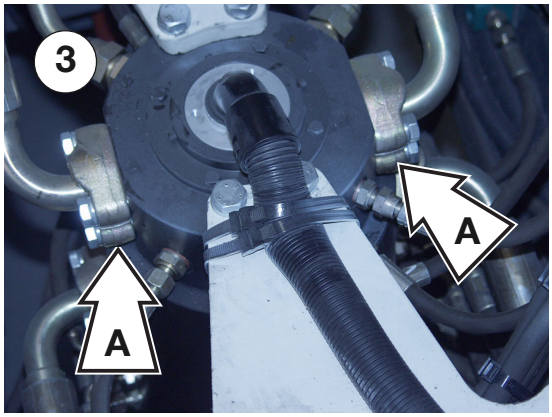
IMPORTANT

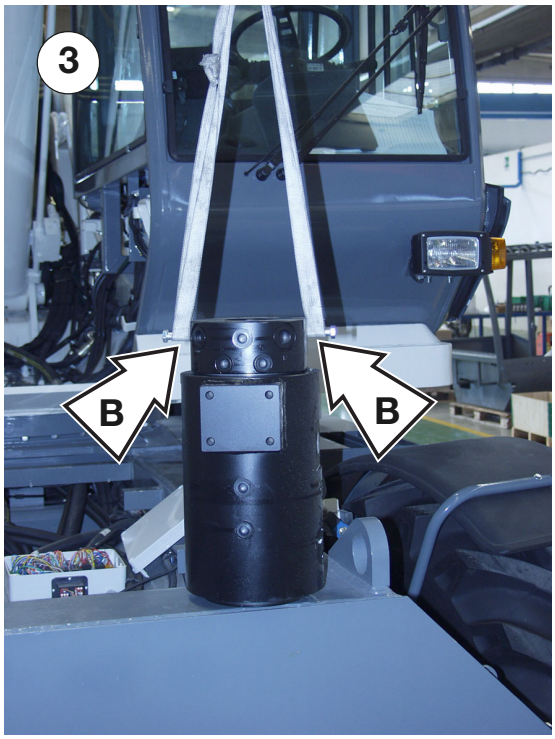
It is advisable to number every single line and secure it to the relevant outlet. In so doing, the re-assembly will be easier.

Operation: **Dismantling the hydraulic joint**	Table: **G-014**

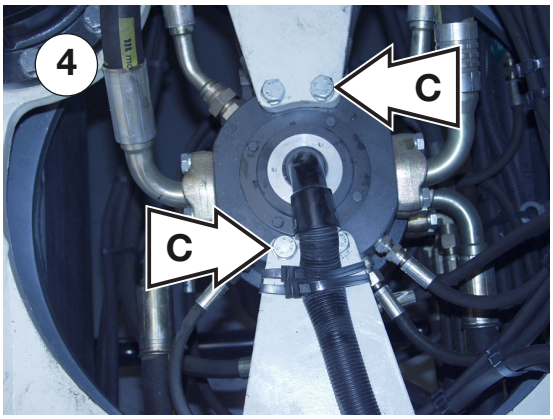
3 Fit 2 screws **B** in the holes of the fixing screws of the top flanges **A** so as to couple the joint with a textile bridle connected to the bridge crane.

Check the screws are tight, then slightly pull the bridle.





4 Remove the 4 top screws **C** fixing the hydraulic joint. Use a 22mm wrench.



Operation:	Dismantling the hydraulic joint	Table:
		G-014

5 Pull out the joint raising it with caution to avoid crashing against machine parts. Lower the joint to the ground in a site where it cannot hinder other operations.

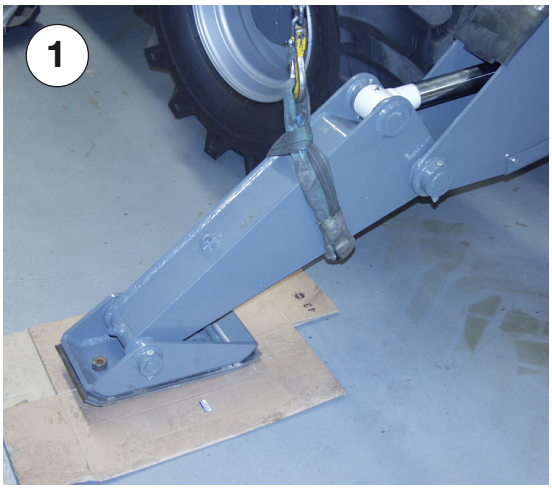
Operation:	Dismantling the hydraulic joint	Table:
		G-014

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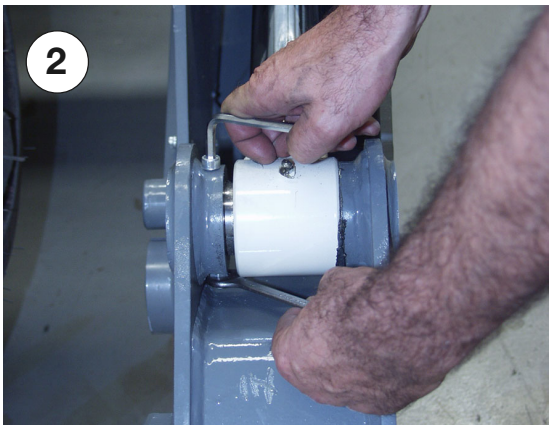
Operation: **Dismantling the outriggers**	Table: **G-015**			kg	50 cad.
	3514 ✔	3518 ✔	5022 ☐		
					Hrs. / Min.
Bridge crane, payload 500 kg Textile bridles or chains with hooks	Standard tools				1 / -
					1

Dismantling procedure (referred to a single outrigger but applicable to all of the 4 outriggers).

1 Secure the outrigger with a textile bridle connected to the bridge crane.



2 Remove the screw fixing the pin to the outrigger side using a 6mm hexagonal wrench and a 13mm fixed wrench.

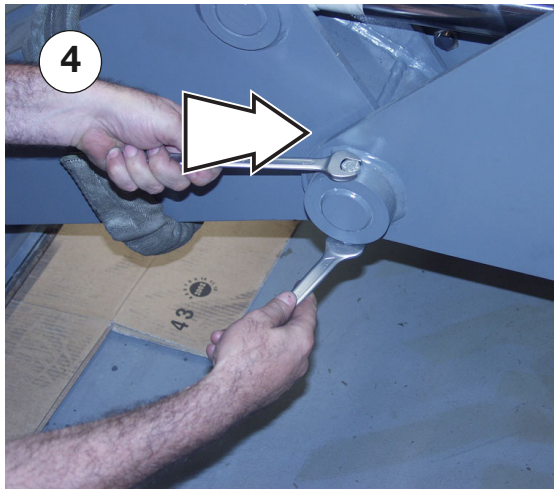


3 Knock out and extract the pin (outrigger side) with a hammer of soft material (aluminium, copper, wood, etc.).



Operation: **Dismantling the outriggers**	Table: **G-015**

4 Remove the screw fixing the pin to the frame side using a 17mm wrench.

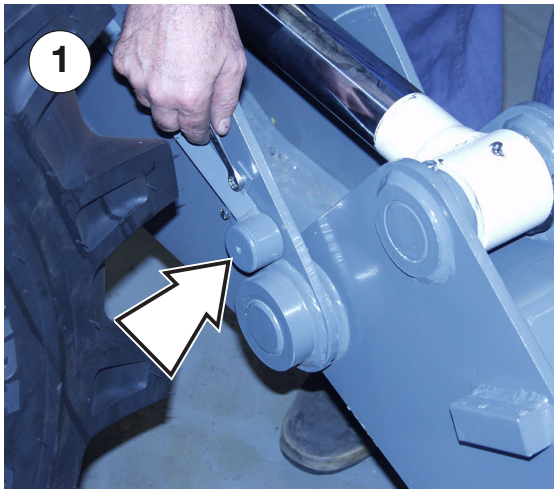


5 Knock out and extract the pin (frame side) with a hammer of soft material (aluminium, copper, wood, etc.).

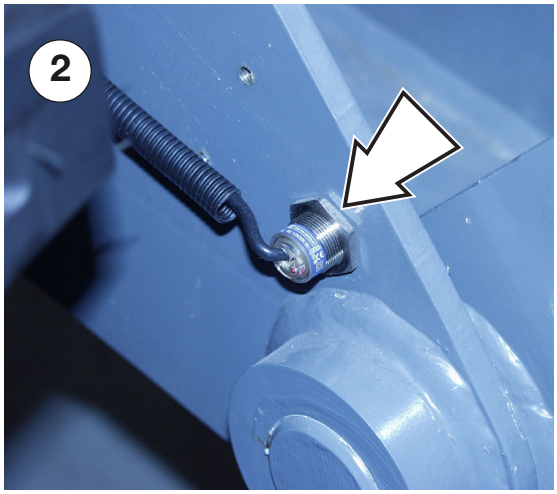


Operation:	Dismantling the outriggers	Table:
		G-015

Dismantling the outrigger sensor (up to serial number 8610):



1 Using a 10mm wrench, remove the 3 fixing screws of the sensor protection cover. Remove the sensor.



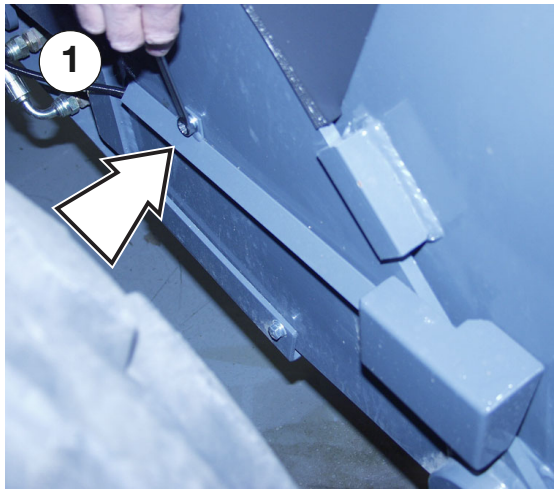
2 Replace or adjust the sensor using a 24mm wrench.

3 Adjust the distance of the sensor - see card G-047.

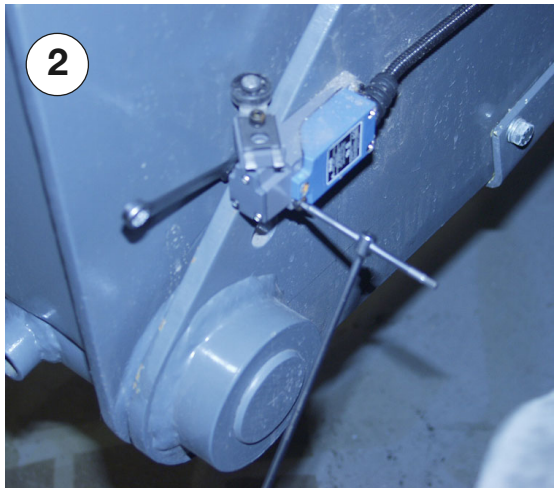
Operation: **Dismantling the outriggers**	*Table:* **G-015**

Dismantling the outrigger sensor (from serial number 8611):

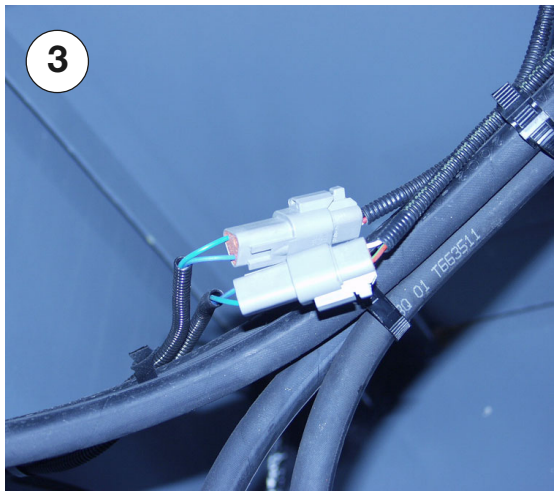
1 Using a 13mm wrench, remove the fixing screws of the sensor protection cover. Remove the sensor.



2 Using a 3mm hexagonal wrench and a 7mm wrench, remove the screws fixing the sensor.

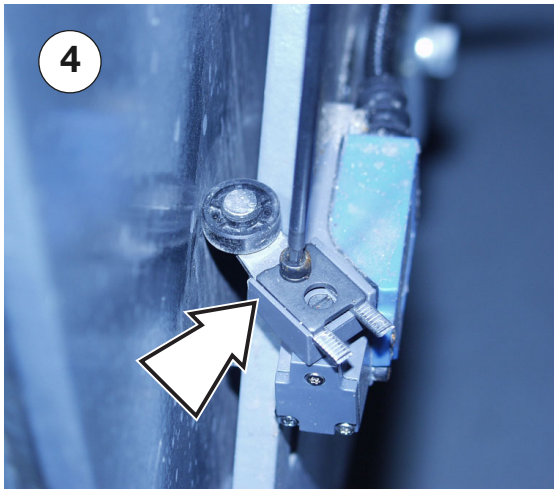


3 Disconnect the electrical wire and replace the sensor.

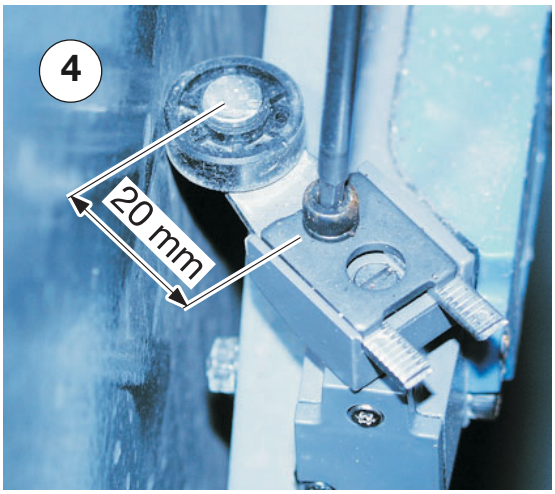


Operation: **Dismantling the outriggers**	Table: **G-015**

4 Using a 3mm hexagonal wrench, adjust the distance of the sensor arm to 20 mm roughly.



5 Attempt to raise and lower the outrigger checking that the sensor activates correctly.



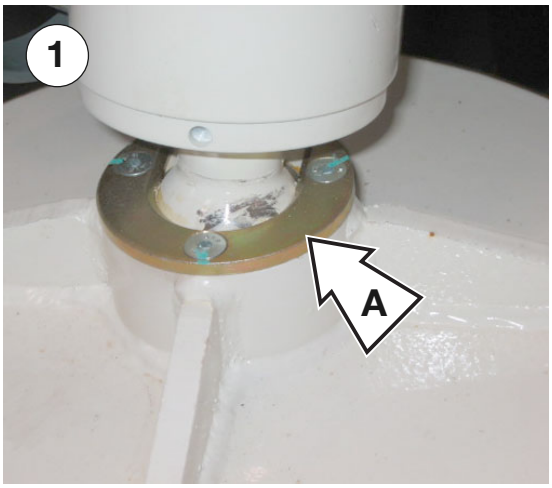
Operation:	Dismantling the outriggers	Table:
		G-015

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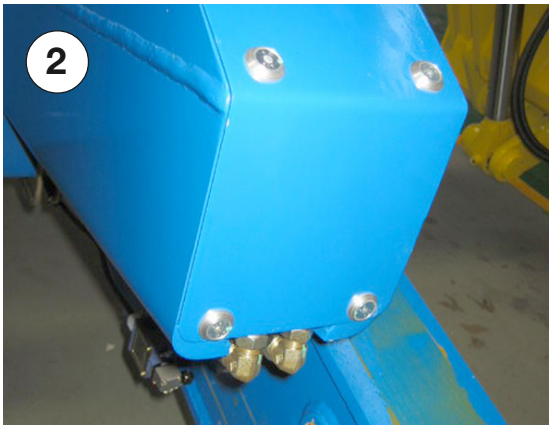
Operation: **Dismantling the outriggers**	Table: **G-015.1**			kg	18 cad.
	3514 ☐	3518 ☐	5022 ☑		Hrs. / Min.
Bridge crane, payload 500 kg Textile bridles or chains with hooks	Standard tools			1	1 -
					1

Dismantling procedure (referred to a single outrigger but applicable to all of the 4 outriggers).

1 Remove the footpad of the outrigger lifting cylinder. To this end, remove bracket **A** using a 5mm hexagon wrench.



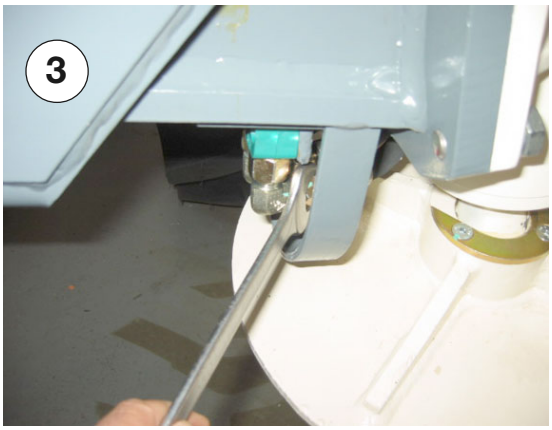
2 With a 5mm hexagon wrench, loosen the fixing screws of the guard, then remove the guard.



PROTECT THE ENVIRONMENT

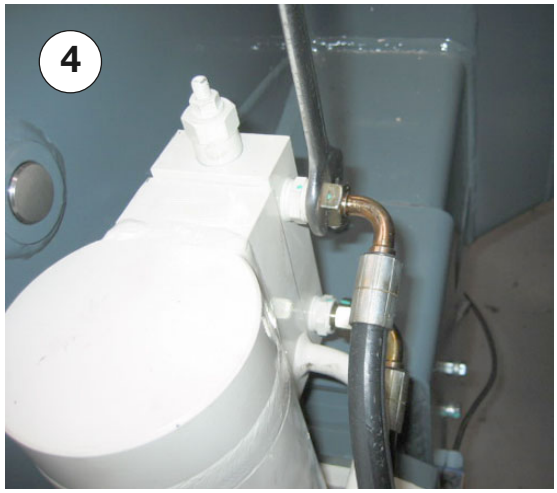
Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

3 Place a collecting tray underneath the hoses; with a 22mm spanner, disconnect the hoses from the internal metal pipes located at the bottom of the outrigger arm.



Operation: **Dismantling the outriggers**	*Table:* **G-015.1**

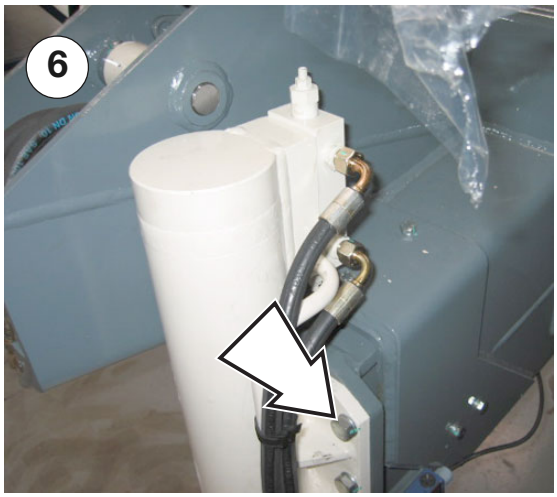
4 Loosen and disconnect the two feeding pipes of the cylinder valve lwith a 22mm spanner.



5 With a 6mm hexagon wrench, remove the block valve being very careful not to loosen the relevant seals.



6 Loosen the screws of the lifting cylinder with a 24mm spanner, then remove the cylinder.

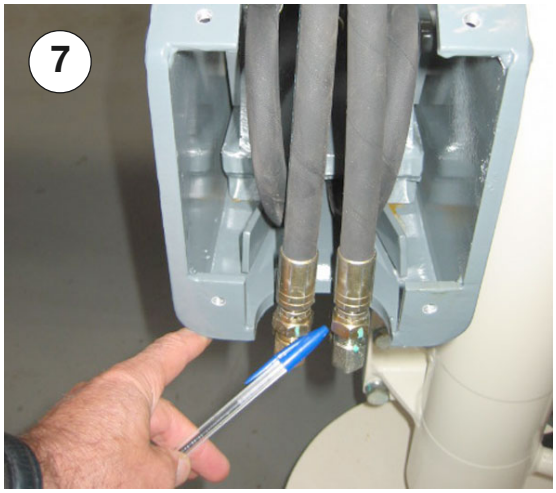


Operation:	Dismantling the outriggers	Table:
		G-015.1

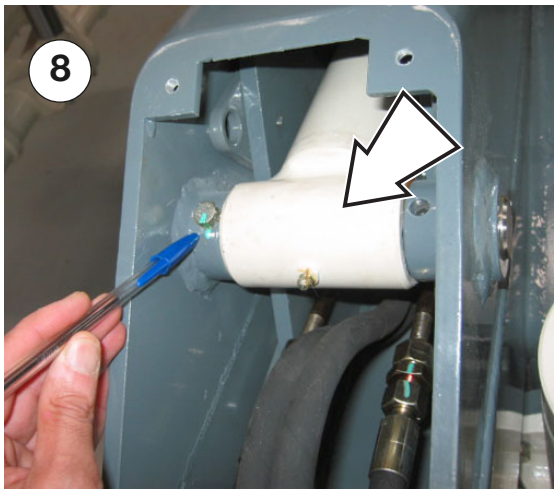
PROTECT THE ENVIRONMENT

Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

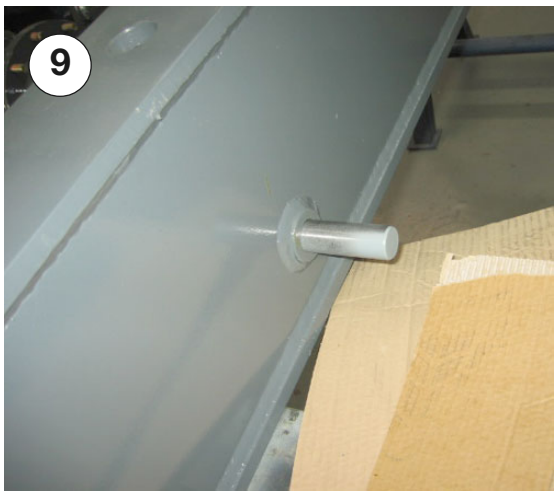
7 With a 22mm spanner, disconnect the boom in/out pipes from the tubes located at the bottom.



8 Loosen the screw and the fixing nut with two 13mm spanners, then remove the pin fixing the cylinder (rod side) to the machine.

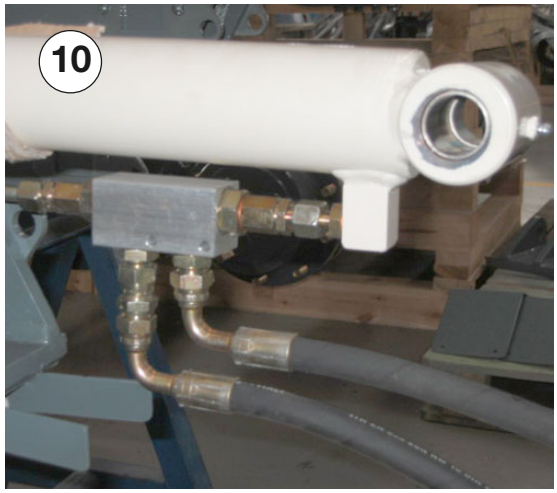


9 Remove the elastic rings, then pull out the cylinder pin (bottom side).



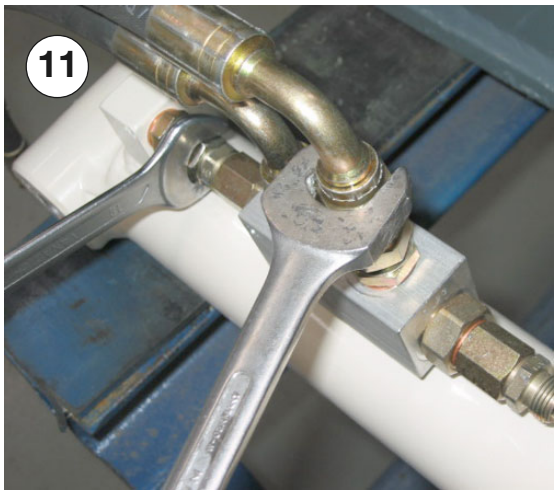
Operation: **Dismantling the outriggers**	*Table:* **G-015.1**

10 Sling the cylinder with a bridle connected to the bridge crane and pull it off the arm.



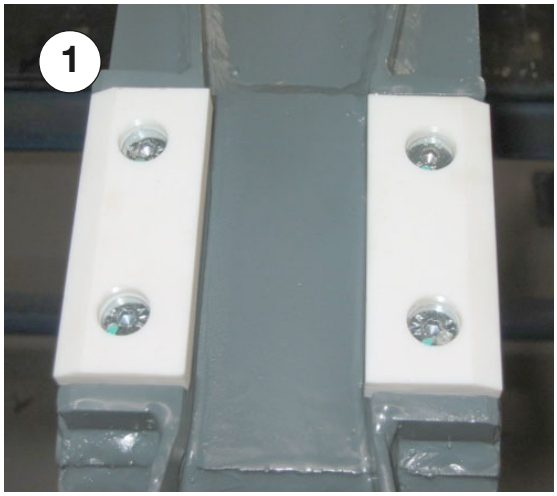
11 Disconnect the flexible hoses connected to the valve with a 22mm spanner.

12 Sling the outrigger arm with a bridle connected to the bridge crane, lift it out and store in a safe place so that it does not hinder other operations.



Operation:	Reassembling the outriggers	Table:
		G-015.1

Reassembly:



1 For the reassembly, follow the instructions on the previous pages in reverse order and check the condition of the sliding pads of the telescoping element.

2 If the pads have to be replaced, use a 5mm hexagon wrench to loosen the screws, fit new pads, retighten the screws and grease both the pads and the sliding elements.

Operation:	Reassembling the outriggers	Table:
		G-015.1

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Operation: **Dismantling the front axle**	Table: **G-016**			kg	700
	3514 ✔	3518 ✔	5022 ✔		Hrs. / Min.
Bridge crane, payload 1000 kg Textile bridles or chains with hooks	Standard tools			3	-
					1

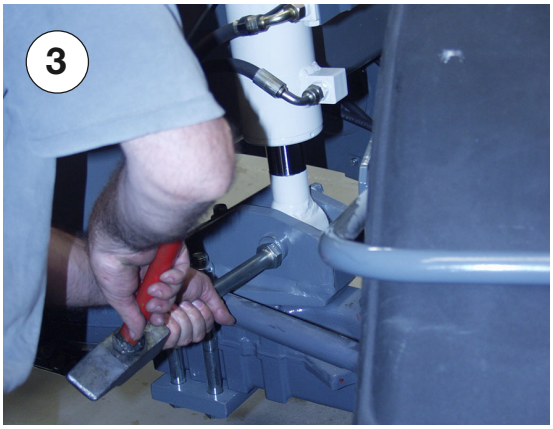
Operation:

1 Lower the 4 outriggers to the ground to raise the wheels slightly above the ground.

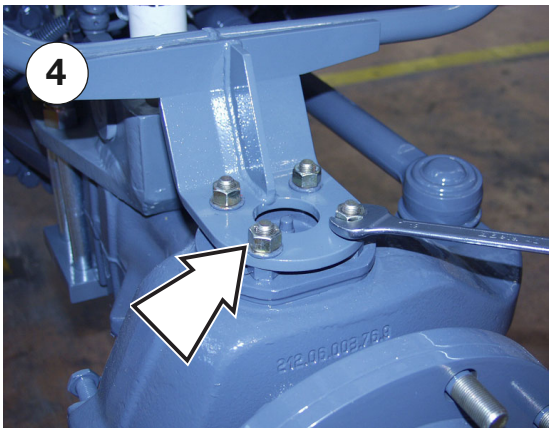
2 Remove the front wheels - see card G-001.



3 Pull out the pin (rod side) from both front axle levelling cylinders - see card G-009.

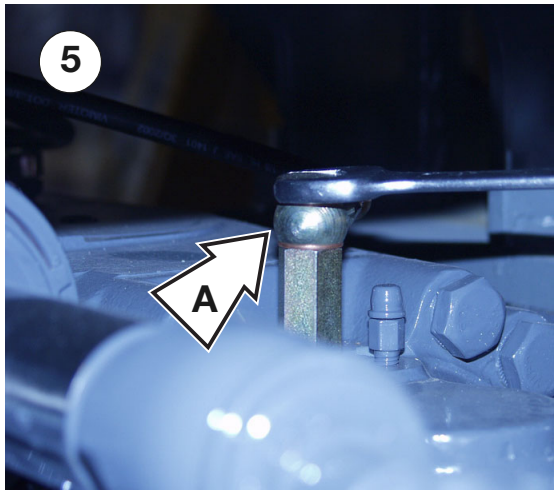


4 Remove the nuts fixing the front mud-guard using a 19mm wrench; remove the mud-guard.



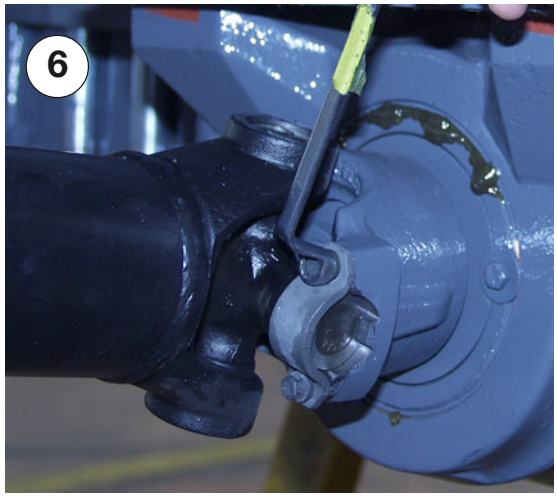
Operation: **Dismantling the front axle**	Table: **G-016**

5 Disconnect the two braking hoses **A** using a 19mm wrench, then plug the disconnected couplings to protect them from dust or impurities.

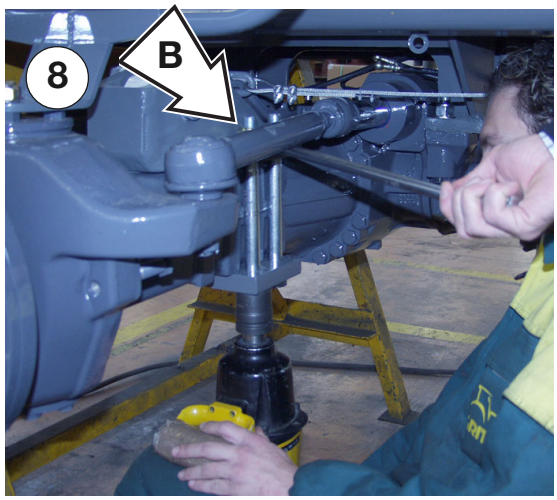


6 Using an 8mm wrench, remove the 4 fixing screws from the 2 spiders (front axle side).

7 Place a wheeled trolley of suitable dimensions under the rear axle and pull out the axle.

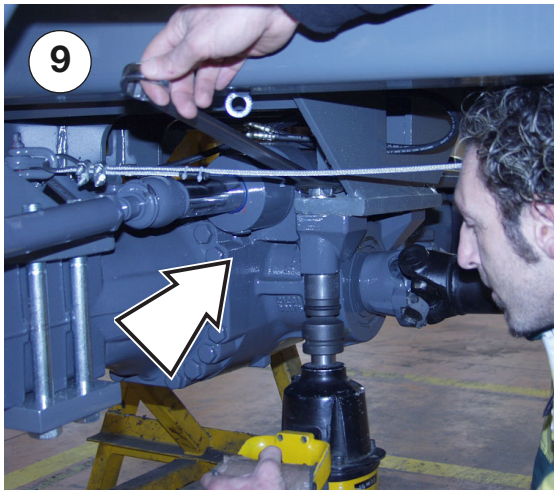


8 Remove the 8 M22x240 screws **B** fixing the axle and the relevant locknuts using an unscrewing machine with 32mm tube and a 32mm hexagonal wrench.



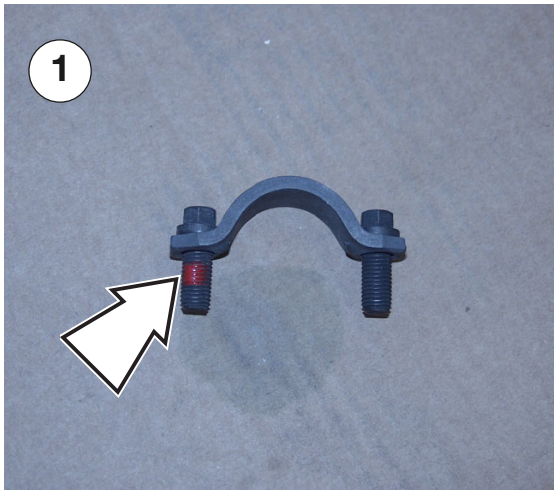
Operation: **Dismantling the front axle**	Table: **G-016**

9 Remove the 4 M20x130 screws **C** fixing the axle and the relevant locknuts using an unscrewing machine and a 30mm wrench.



Re-assembly:

1 To re-assemble the front axle, repeat the steps above in reversed sequence. Remember to smear the threads of the screws with some threadlocking liquid before refitting the Cardan shaft spiders.



Operation: **Dismantling the front axle**	Table: **G-016**

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Operation: **Dismantling the rear axle**	Table: **G-017**			kg	3514/18=**700** 5022=**412**
	3514 ✔	*3518* ✔	*5022* ✔		
					Hrs. **Min.**
Bridge crane, payload 1000 kg Textile bridles or chains with hooks	Standard tools				**3** **-**
					1

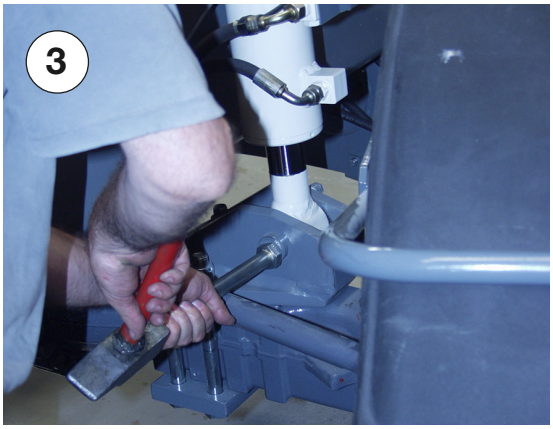
Operation:

1 Lower the 4 outriggers to the ground to raise the wheels slightly above the ground.

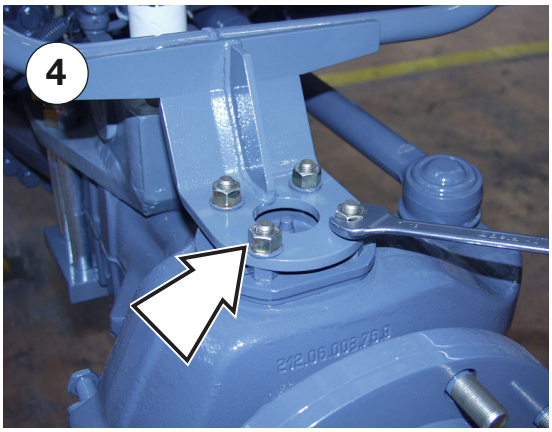


2 Remove the rear wheels - see card G-001.

3 Pull out the pin (rod side) from both rear axle levelling cylinders - see card G-009.

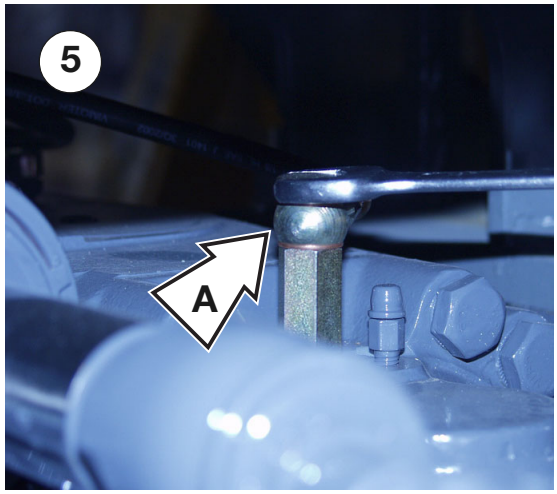


4 Remove the nuts fixing the rear mud-guard using a 19mm wrench; remove the mud-guard.

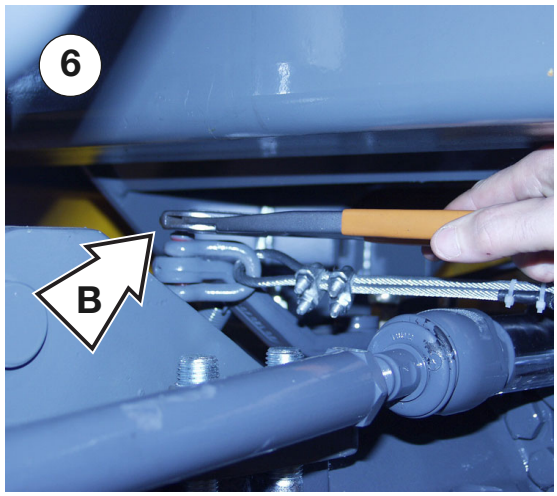


Operation: **Dismantling the rear axle**	Table: **G-017**

5 Disconnect the two braking hoses **A** using a 19mm wrench, then plug the disconnected couplings to protect them from dust or impurities.

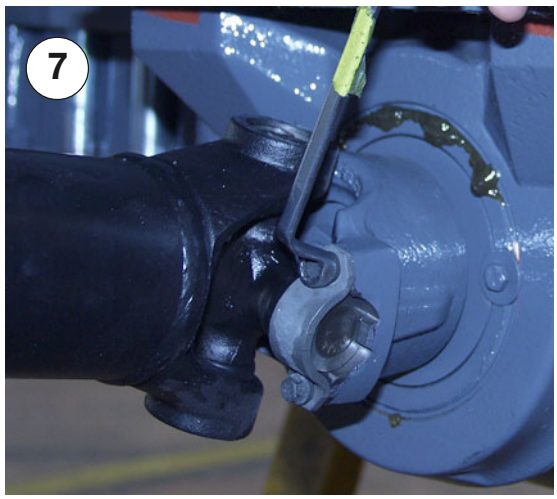


6 Using a gripper, remove pin **B** fixing the U-bolt of the brake cord. Do this operation on both sides of the rear axle.



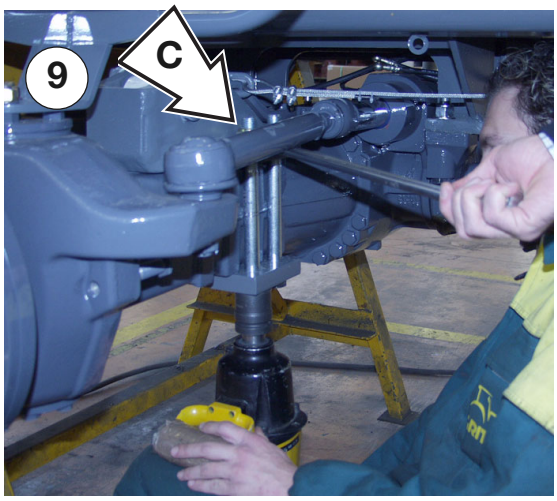
7 Using an 8mm wrench, remove the 4 fixing screws from the 2 spiders (rear axle side).

8 Place a wheeled trolley of suitable dimensions under the rear axle and pull out the axle.

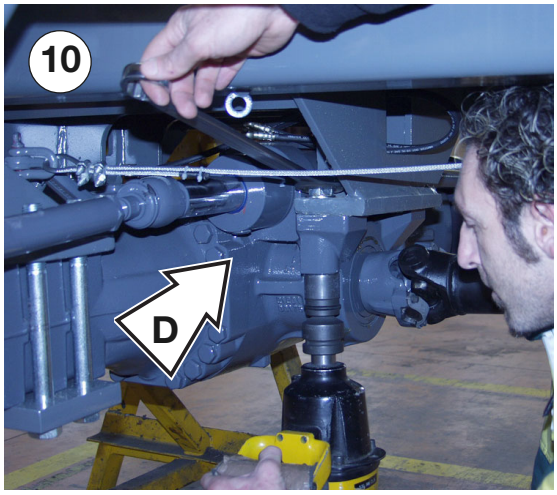


Operation: **Dismantling the rear axle**	Table: **G-017**

9 Remove the 8 M22x240 screws **C** fixing the axle and the relevant locknuts using an unscrewing machine and a 32mm wrench.

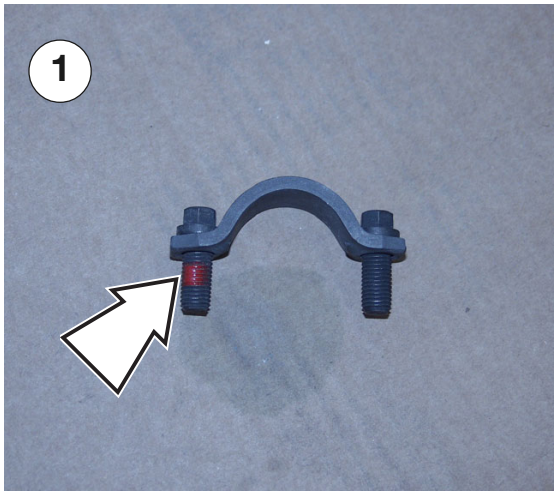


10 Remove the 4 M20x130 screws **D** fixing the axle and the relevant locknuts using an unscrewing machine and a 30mm wrench.



Re-assembly:

1 To re-assemble the rear axle, repeat the steps above in reversed sequence. Remember to smear the threads of the screws with some threadlocking liquid before refitting the Cardan shaft spiders.



Operation:	Dismantling the rear axle	Table:
		G-017

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Operation: **Dismantling the drive motor**	Table: **G-018**			3514/18=**35** 5022=**45**
	3514 ✔	3518 ✔	5022 ✔	
Bridge crane, payload 500 kg Textile bridles or chains with hooks	Standard tools			Hrs. **2** Min. **-** **1**

Operation:

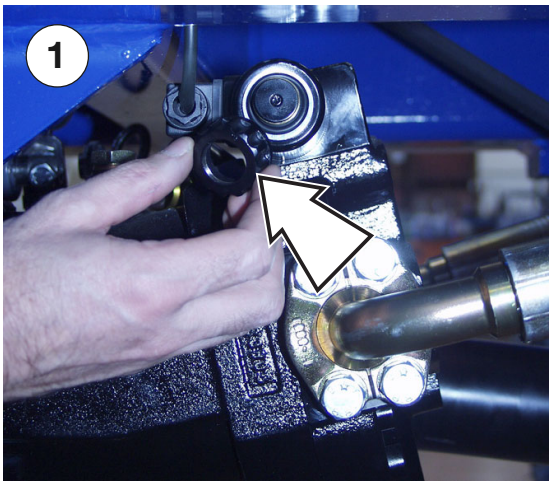
PROTECT THE ENVIRONMENT

Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

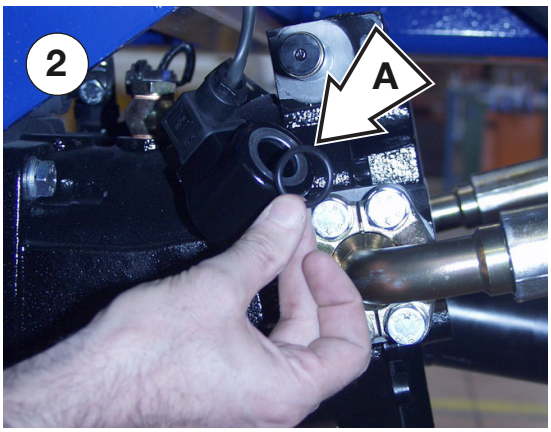
IMPORTANT

Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.

1 Remove the ring nut fixing the coil of the solenoid valve.

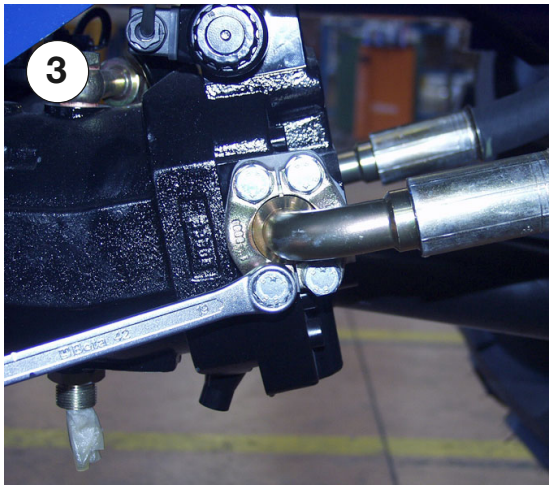


2 Pull out coil Y18 of the solenoid valve paying attention not to damage the seal **A**.

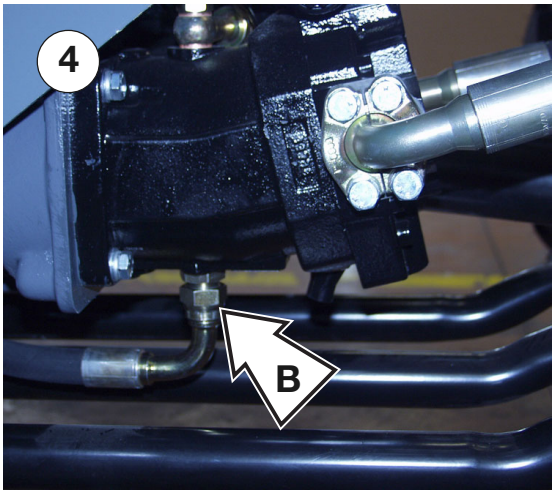


Operation: **Dismantling the drive motor**	Table: **G-018**

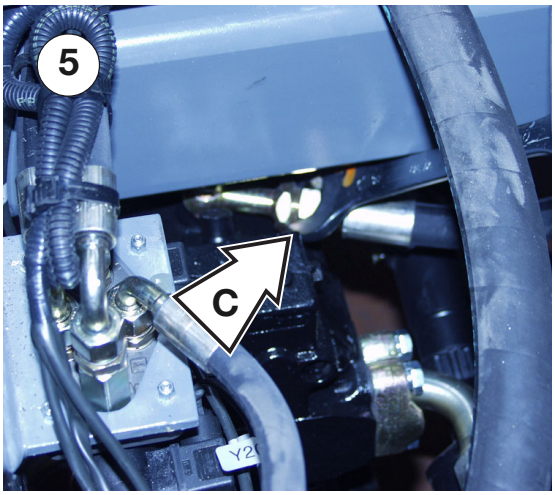
3 Disconnect the 2 high-pressure hoses (1 per side) removing the screws of the fixing flanges using a 19mm wrench.



4 Remove the lower draining duct **B** with a 32mm wrench.

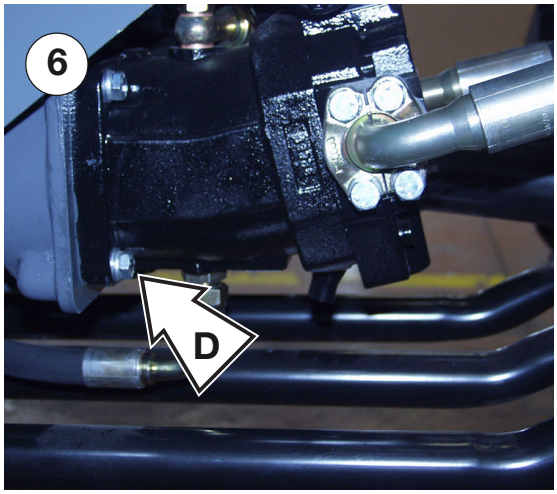


5 Disconnect the upper draining duct **C** with a 32mm wrench.



Operation: **Dismantling the drive motor**	Table: **G-018**

6 Remove the 4 screws **D** with flat and spring washers used to fix the motor using a 19mm wrench for the Girolift 3514-3518 or a 24mm wrench for the Girolift 5022.



7 Pull out the motor from the power divider coupled to gearbox placed in the central part of the machine. Hold the motor horizontal!

8 Protect the motor coupling point against impurities.

Operation:	Dismantling the drive motor	Table:
		G-018

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Operation: **Dismantling the gearbox**	Table: **G-019**			3514/18=**73** 5022=**90**	
	3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
Bridge crane, payload 500 kg Textile bridles or chains with hooks	Standard tools			**3**	**-**
				1	

Operation:

PROTECT THE ENVIRONMENT

Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

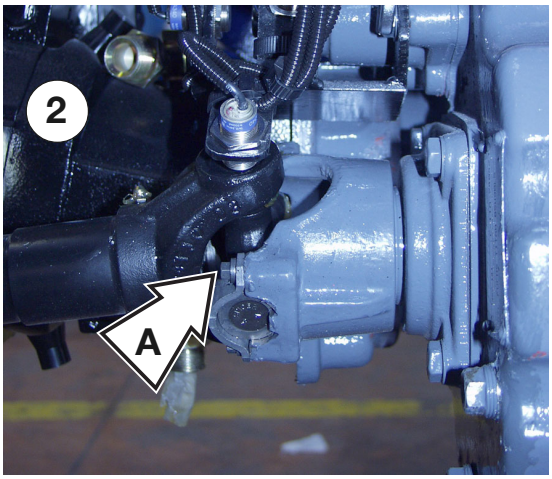
IMPORTANT

Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.

1 Disconnect the two flexible hoses of the gearbox with a 19mm wrench. Protect the ducts with two 1/4" plugs.

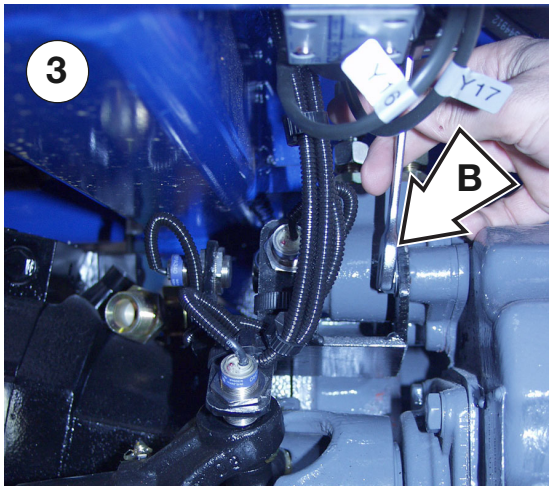


2 Using an 8mm wrench, remove the screws **A** from the spiders to free the gearbox from the Cardan shafts.

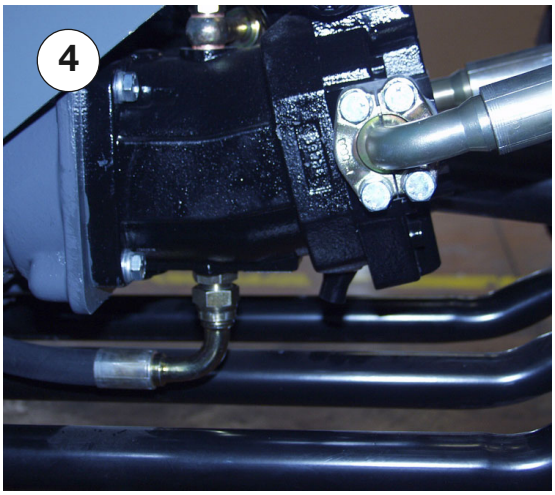


Operation: **Dismantling the gearbox**	Table: **G-019**

3 Remove the fixing screw **B** of the proximity switches support using a 17mm wrench.

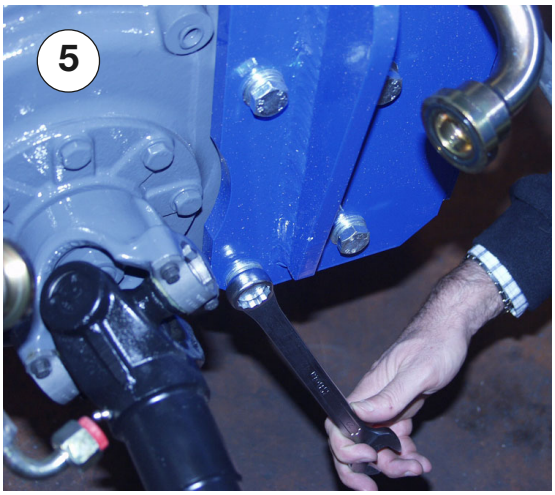


4 Remove the drive motor - see card G-018.



5 Remove the gearbox fixing screws and washers with a 22mm wrench.

6 Pull out the gearbox and place it so that it does not hinder other operations.



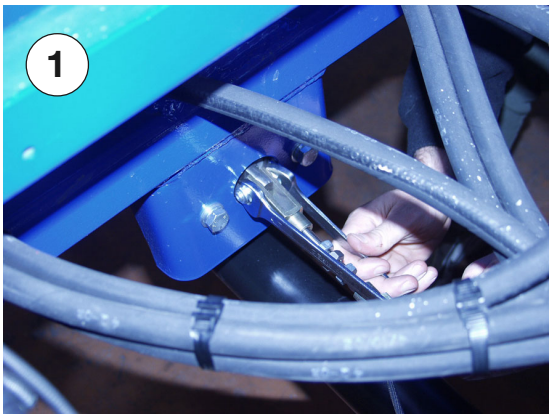
IMPORTANT

Before re-assembling the drive motor and the gearbox, smear the threads of the fixing screws with some threadlocking liquid.

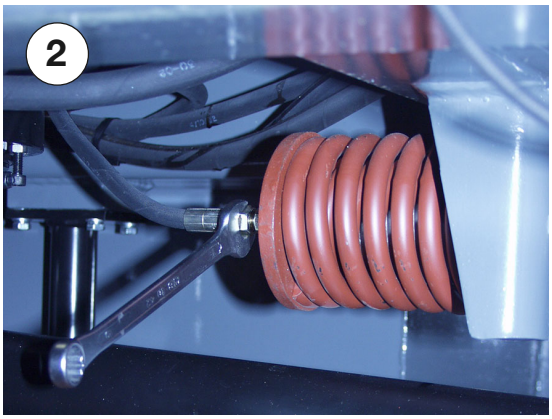
Operation: **Dismantling the parking brake cylinder**	Table : **G-020**			kg	9,5
	3514 ✔	3518 ✔	5022 ☐		Hrs. / Min.
	Standard tools				1 / 15
					1

Operation:

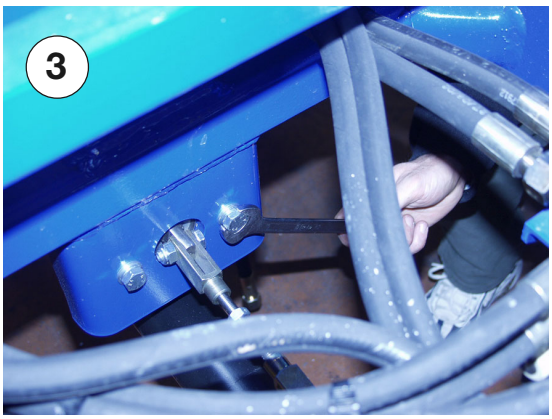
1 Using two 17mm wrenches, remove the screw fixing the fork to which the cord of the parking brake is connected.



2 Disconnect the flexible hose at the inlet of the swivel element using a 19mm wrench.



3 Remove the fixing screws with washers of the brake cylinder using a 19mm wrench.

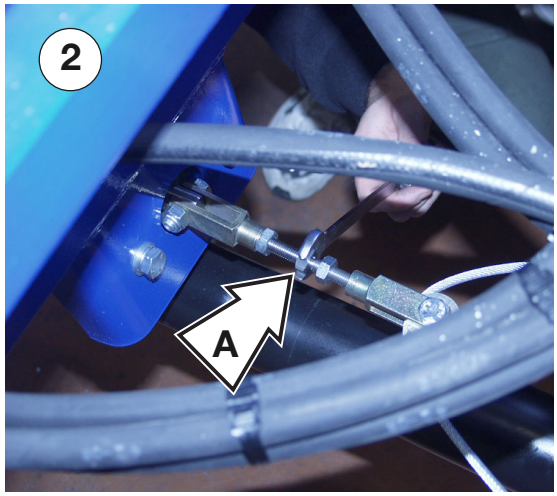


Operation:	Re-assembling the parking brake cylinder	Table:
		G-020

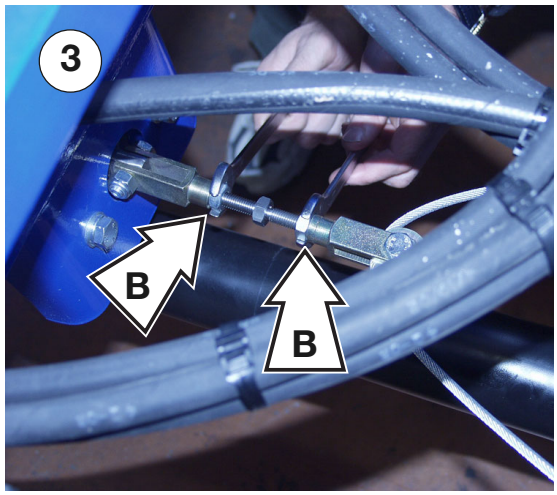
Re-assembling:

1 Replace the parking brake cylinder and refit it to the frame after having smeared the threads of the fixing screws with some threadlocking liquid.

2 Check that the parking brake is NOT engaged; adjust the tension of the cords turning the register **A** and checking that, in this state, the same cords are slightly slackened.



3 Tighten the counter nut **B** to fix in the obtained position using a 17mm wrench.



IMPORTANT

After adjusting the tension of the parking brake cord, drive the machine on a slope of 18% and with the parking brake engaged check that the machine does not move. Should that not be the case, re-adjust.

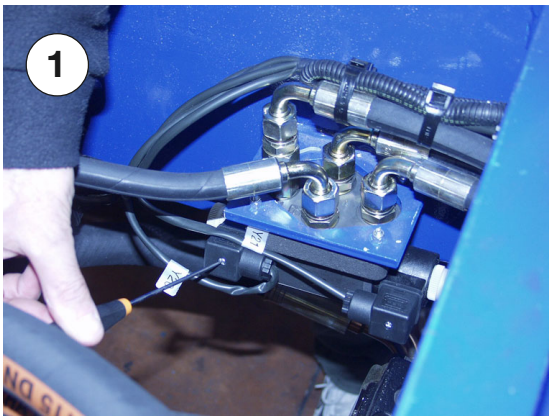
Operation: **Dismantling of solenoid valves**	Table : **G-021**			kg	1,4 cad.
	3514 ✔	3518 ✔	5022 ✔		Hrs. / Min.
	Standard tools				- / 20
					1

Operation:

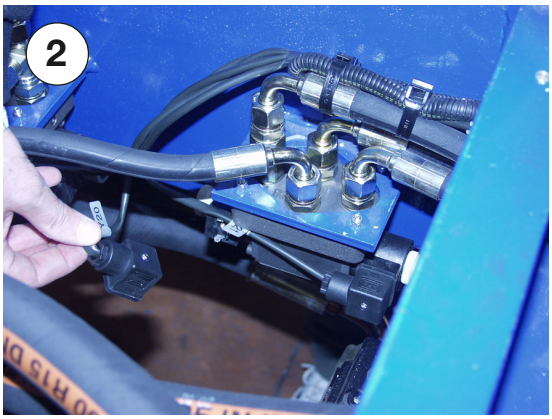
IMPORTANT

Before disassembling a solenoid valve, take note of the sequence of the "Y" references for a correct re-assembly.

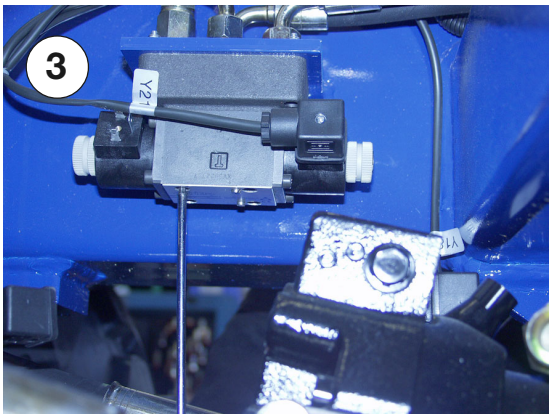
1 With a cross-tip remove the connector of the solenoid valve.



2 Pay attention not to loose the gasket on the connector.

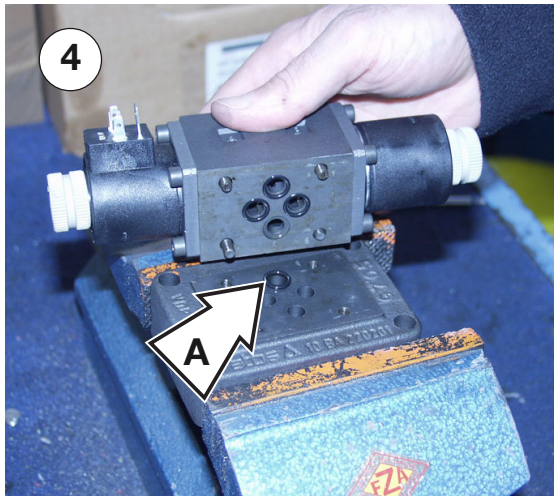


3 Using a 4mm hexagonal wrench, remove the 4 fixing screws of the solenoid valve.

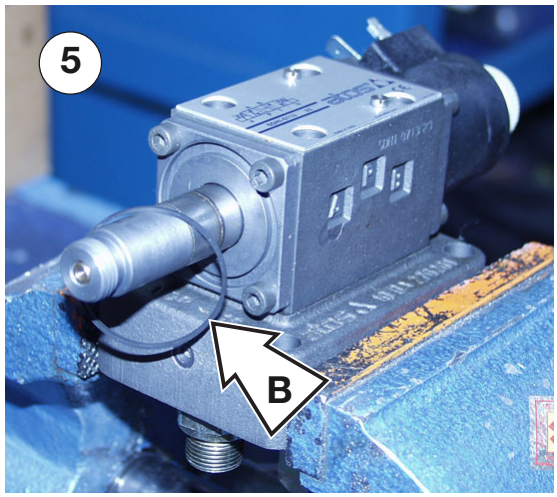


Operation:	Dismantling of solenoid valves	Table:
		G-021

4 Pay attention to the 4 gaskets **A** placed between the solenoid valve and the block. Check and replace them if damaged before re-assembly.



5 If also the coils of the solenoid valve shall be removed, pay attention to the seal **B**. Check and replace this seal if damaged.



Operation:	Dismantling the outrigger solenoid valves blocks	Table: G-022			kg	9
		3514 ✔	3518 ✔	5022 ✔		Hrs. / Min.
	Standard tools					2 / -
						1

Operation:

PROTECT THE ENVIRONMENT

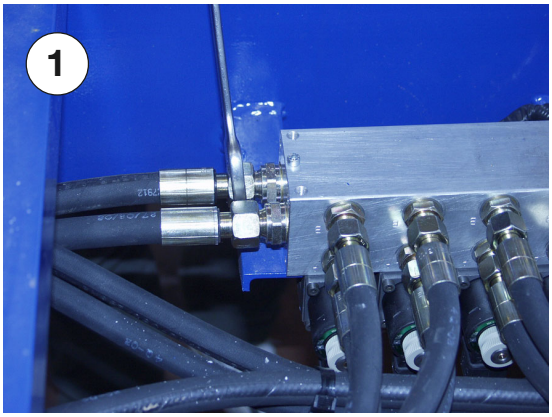
Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

IMPORTANT

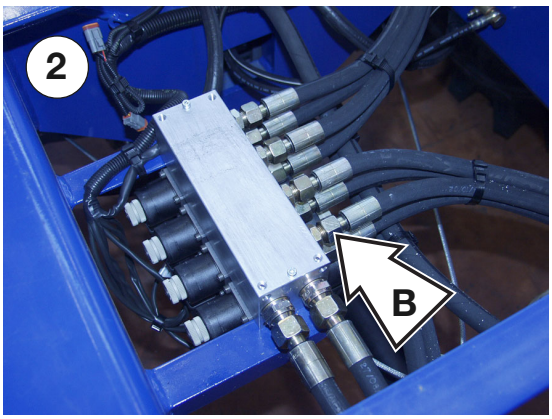
Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.

IMPORTANT

In the Girolift 5022 there are 2 blocks of outrigger solenoid valves.



1 Using a 27mm wrench, disconnect the pressure and drain flexible hoses.

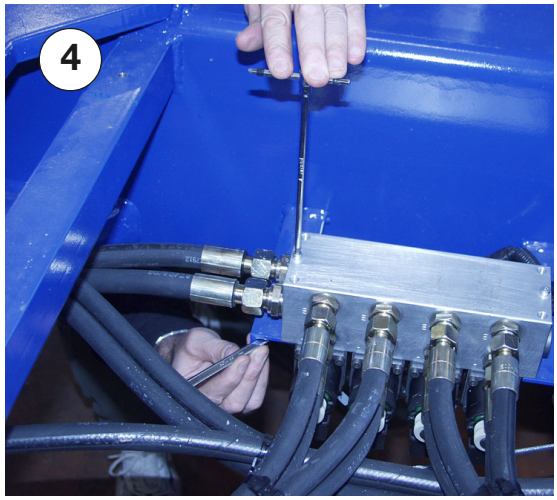


2 Using a 22mm wrench, disconnect the 8 outrigger feeding hoses.

Operation: **Dismantling the outrigger solenoid valves blocks**	*Table:* **G-022**

3 With a cross-tip screwdriver, disconnect the 8 connectors of the solenoid valves.

4 Using a 4mm hexagonal wrench, remove the 2 fixing screws of the soelnoid valves block while holding the base nut of same block blocked with an 8 mm wrench.

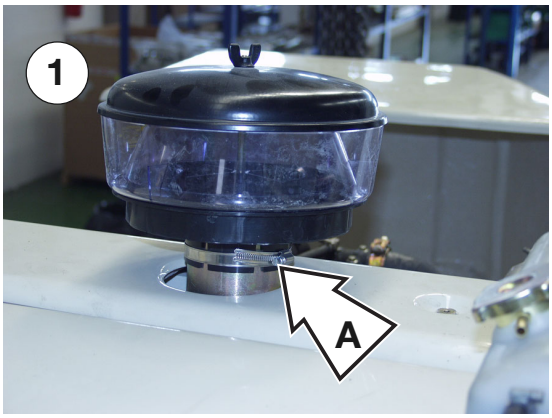


Operation: **Dismantling the battery**	Table: **G-023**			kg	3514/18=**45** 5022=**53**
	3514 ✔	3518 ✔	5022 ✔		
	Standard tools				Hrs. **-** Min. **30**
					1

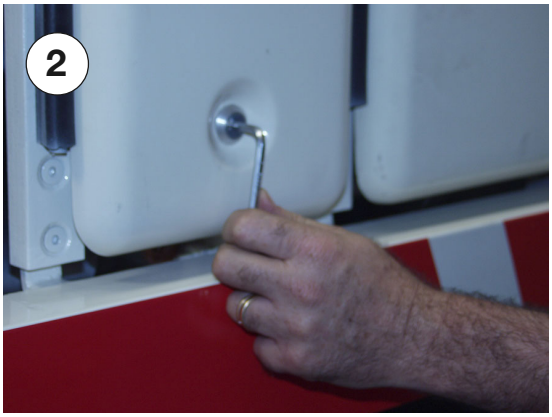
Operation:

PROTECT THE ENVIRONMENT

Never pour used batteries on the ground. Deliver the batteries to specialised collection and disposal centres.



1 With a screwdriver loosen clamp **A** of the cyclone pre-filter and remove the filter.



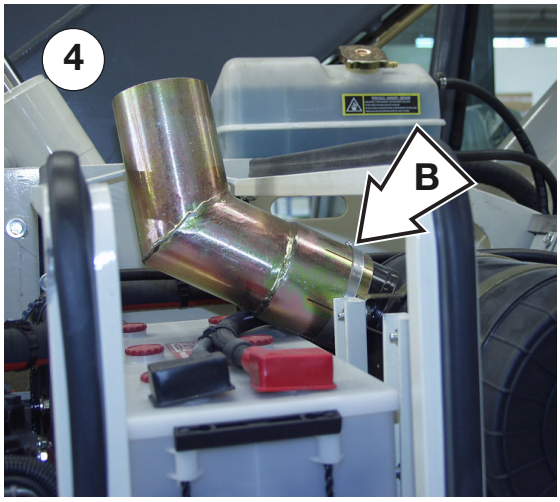
2 Remove the 2 fixing screws of the protection casing using a 5mm hexagonal wrench.

3 Remove the casing.

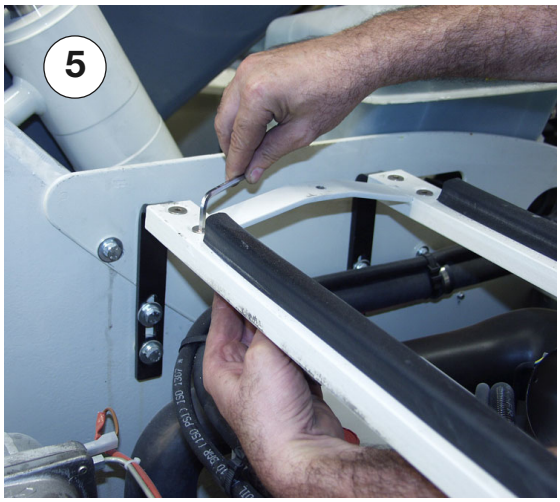


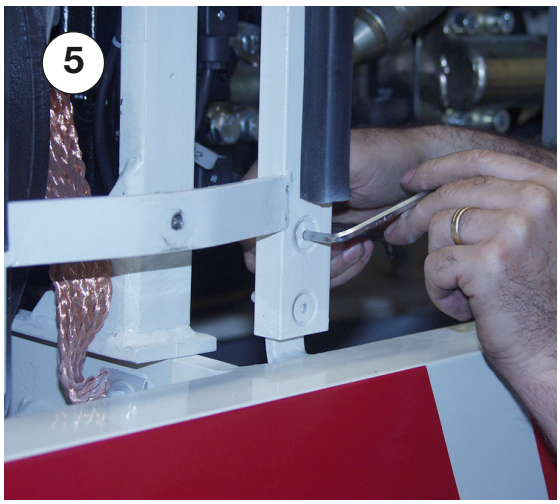
Operation: **Dismantling the battery**	Table: **G-023**

4 With a screwdriver, loosen clamp **B** and remove the manifold from the air filter; then place a cloth in the filter compartment to prevent impurities from entering the circuit.



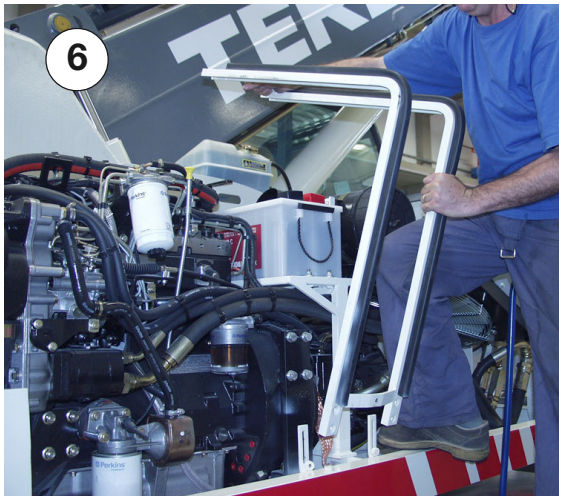
5 Remove the screws fixing the protection casing support using a 5mm hexagonal wrench and a 13mm wrench.



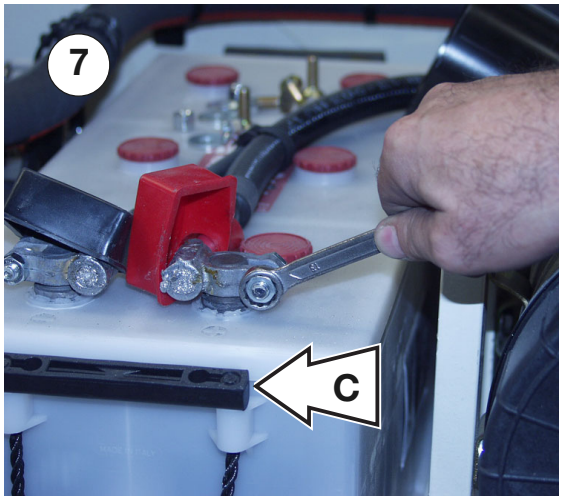


Operation: **Dismantling the battery**	Table: **G-023**

6 Remove the casing support.

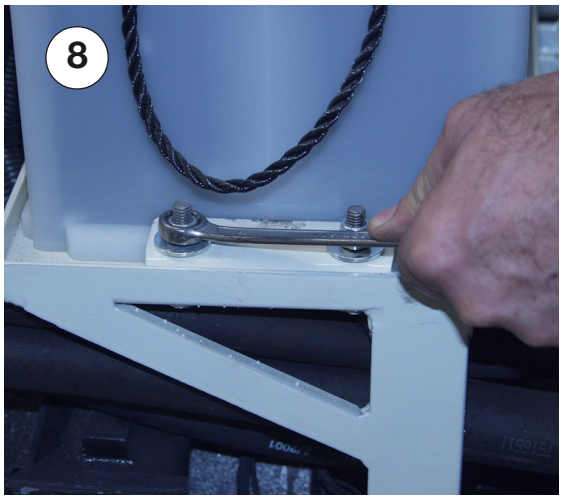


7 Using a 13mm wrench, disconnect the battery leads taking off first the negative "-" earth lead.



8 Remove the battery fixing bracket using a 13mm wrench.

9 Pull out the battery using the special handle **C**.



Operation: Dismantling the battery	Table: G-023

ATTENTION

Keep the battery away from sparks, flames or lit cigarettes.

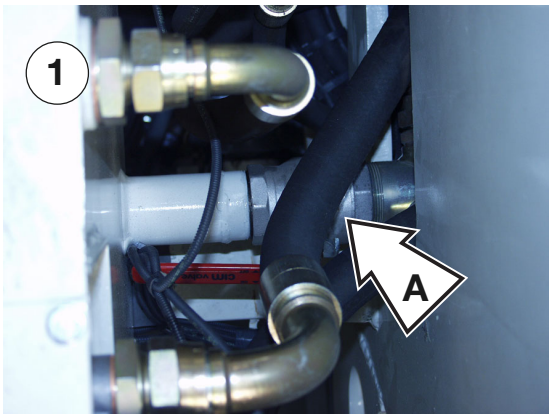
ATTENTION

When reconnecting, fit the positive (+) lead first.

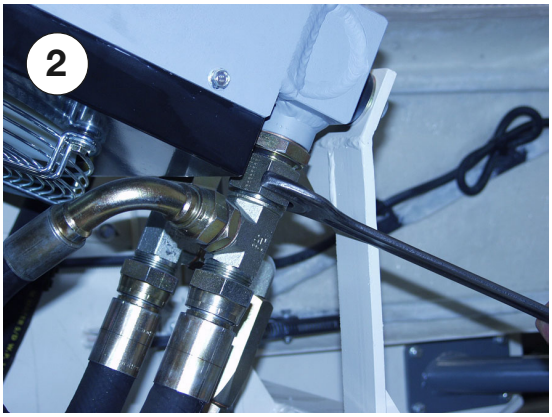
Operation: **Water-oil cooler disassembly**	Table: **G-024**			kg	35
	3514 ✔	3518 ✔	5022 ✔		Hrs. / Min.
Bridge crane, payload 500 kg Textile bridles or chains with hooks	Standard tools			1	1 / 30
				1	1

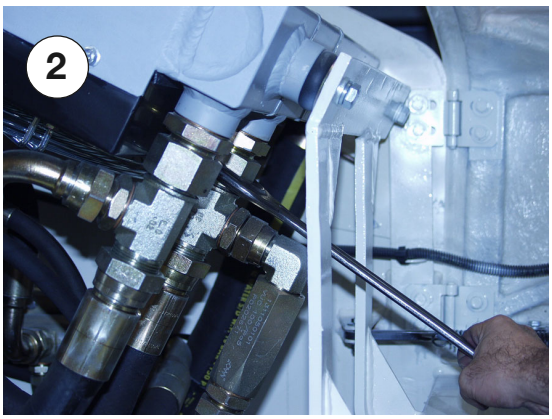
Operation:

1 Close cock **A** placed at the outlet of the hydraulic oil tank.



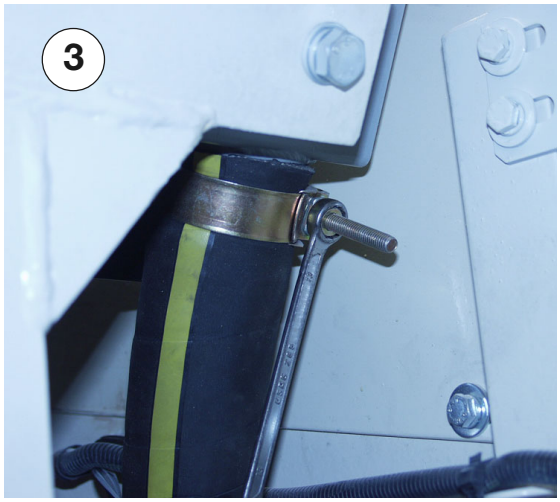
2 Using a 50mm wrench, disconnect the two fittings and close the radiator outlets with 1" 1/4 plugs.



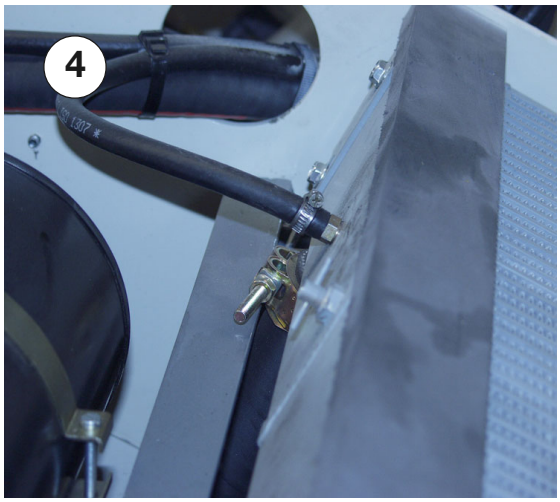


Operation: **Water-oil cooler disassembly**	*Table:* **G-024**

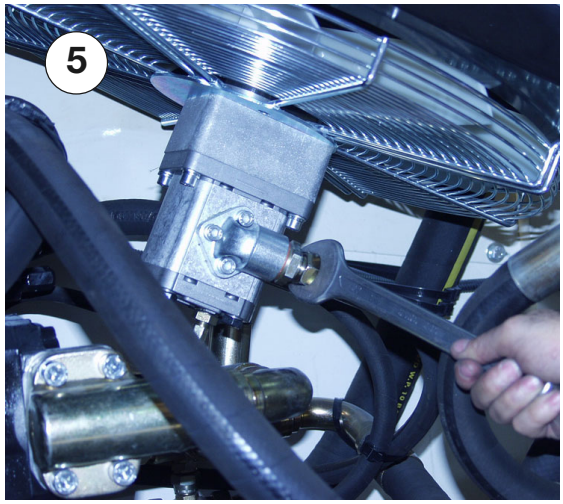
3 Using a 13mm wrench, disconnect the water hose clamps.



4 With a screwdriver remove the clamp and the tank filling tube.

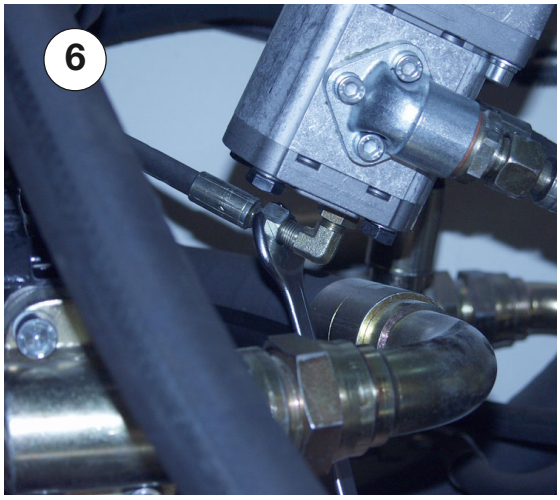


5 Using a 27mm wrench, disconnect the flexible hoses to the side of the engine.



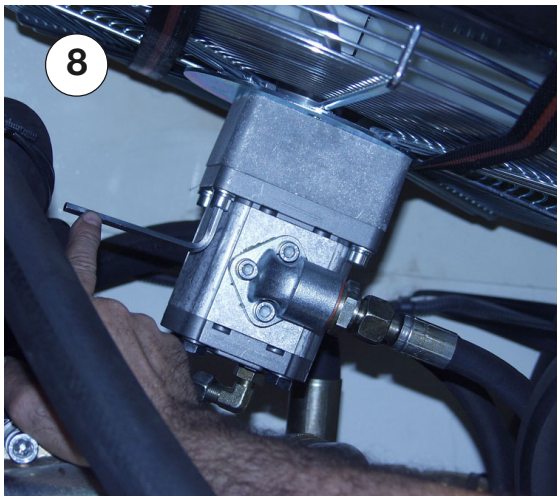
Operation: **Water-oil cooler disassembly**	Table: **G-024**

6 Disconnect the draining hose with a 19mm wrench.

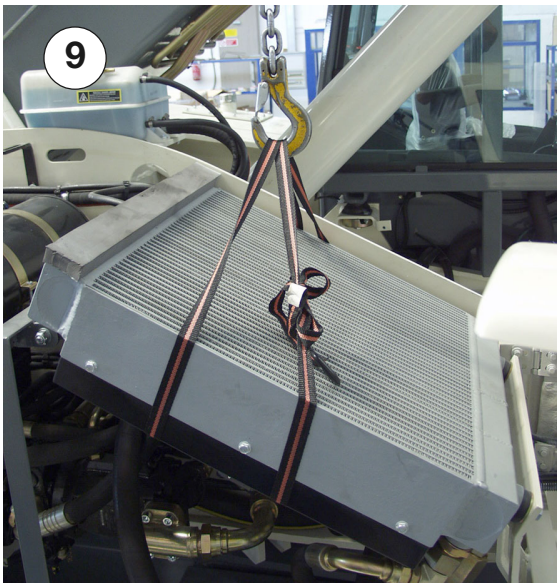


7 Plug the outlets on the engine with 1/2” and 1/4” male plugs.

8 Remove the fixing screws of the fan motor of the radiator using a 6mm hexagonal wrench.

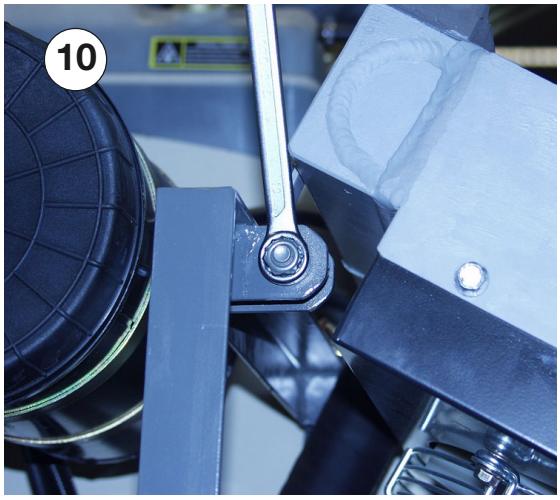


9 Secure the radiator with a textile bridle connected to the bridge crane. Slightly pull the bridle.

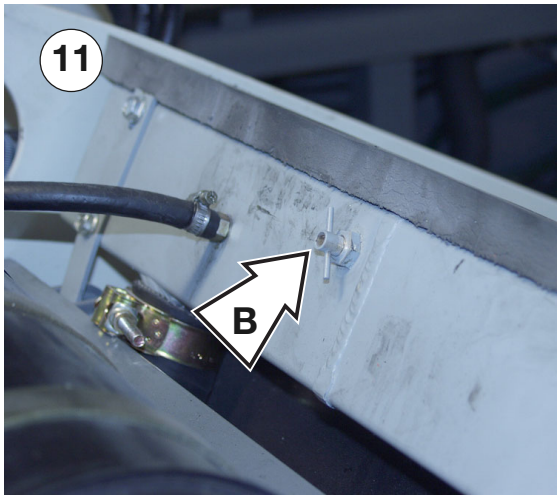


Operation:	Water-oil cooler disassembly	Table:
		G-024

10 Remove the 4 fixing screws of the radiator using a 19mm wrench.



11 When the radiator has been removed, check that there is no air in the circuit. Loosen cock **B** and check that water without air bubbles flows out.



Operation:	Dismantling the boom piston pump and the power steering unit	Table: G-025			kg	22
		3514 ✔	3518 ✔	5022 ✔		Hrs. / Min.
Bridge crane, payload 500 kg Textile bridles or chains with hooks		Standard tools				1 / 30
						1

Operation:

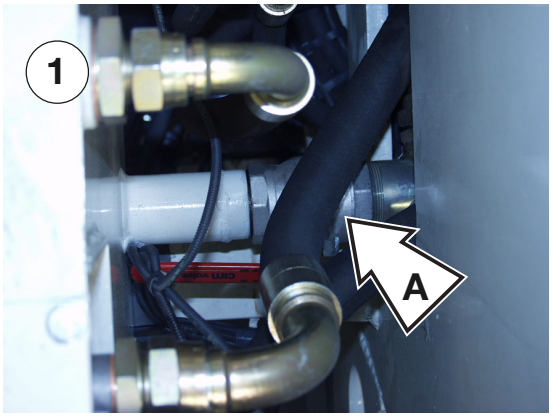
PROTECT THE ENVIRONMENT

Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

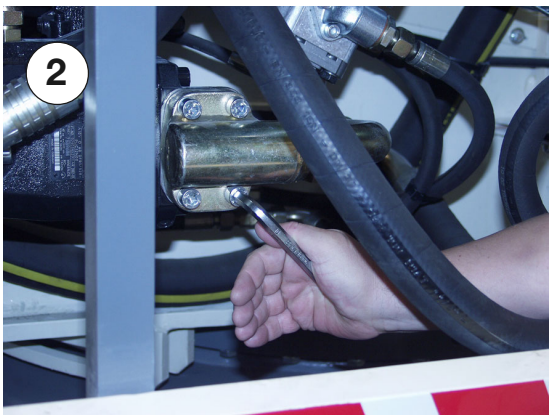
IMPORTANT

Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.

1 Close cock **A** placed at the outlet of the hydraulic oil tank.

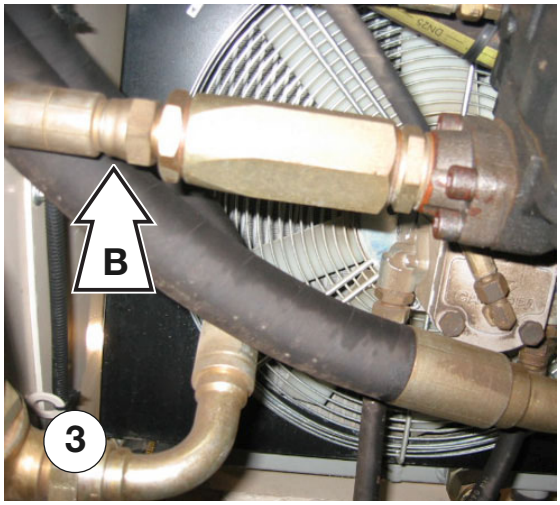


2 Using a 10mm hexagonal wrench, remove the flange fixing the intake hose.



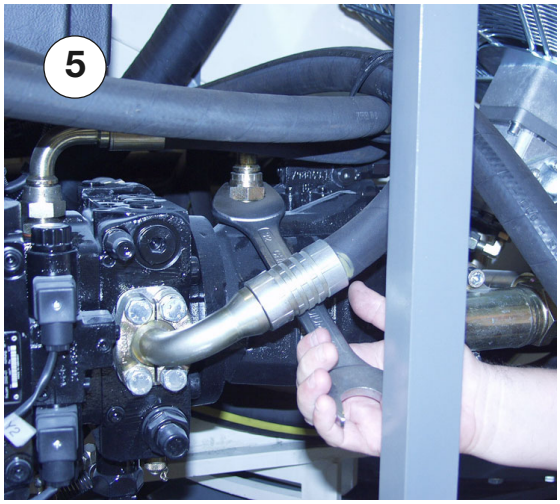
Operation:	Dismantling the boom piston pump and the power steering unit	Table: G-025

3 Using a 32mm wrench, disconnect the delivery hose **B** placed after the one-way valve.

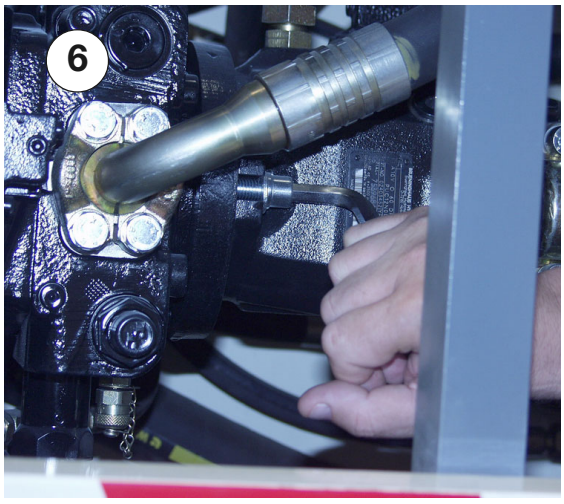


4 Using a 19mm wrench, disconnect the 1/4” load sensing hose

5 Using a 32mm wrench, disconnect the draining hose, the fit a 3/4” plug to the pump.



6 Dismantle the pump after removing the two fixing screws with a 10mm hexagonal wrench.



Operation:	Dismantling the boom piston pump and the power steering unit	Table: G-025

IMPORTANT

When re-assembling the boom pump, add hydraulic oil through the hole of the top plug. Plug with caution to prevent impurities from entering the pump, then re-assemble.

Operation:	Dismantling the boom piston pump and the power steering unit	Table: G-025

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Operation: **Dismantling the Hydromatic pump**	Table: **G-026**			kg	3514/18=**63** 5022=**80**
	3514 ✔	*3518* ✔	*5022* ✔		
Bridge crane, payload 500 kg Textile bridles or chains with hooks	Standard tools				**Hrs.** **Min.** **2** **-**
					1

Operation:

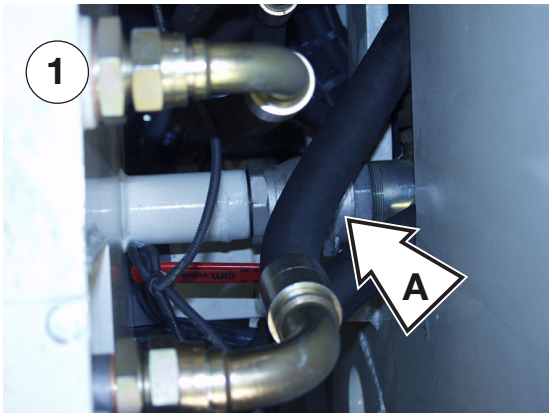
PROTECT THE ENVIRONMENT

Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

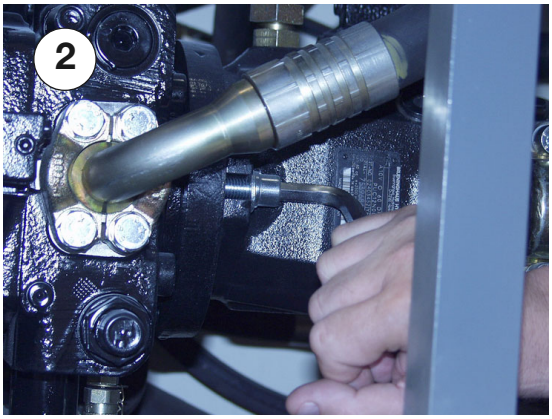
IMPORTANT

Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.

1 Close cock **A** placed at the outlet of the hydraulic oil tank.

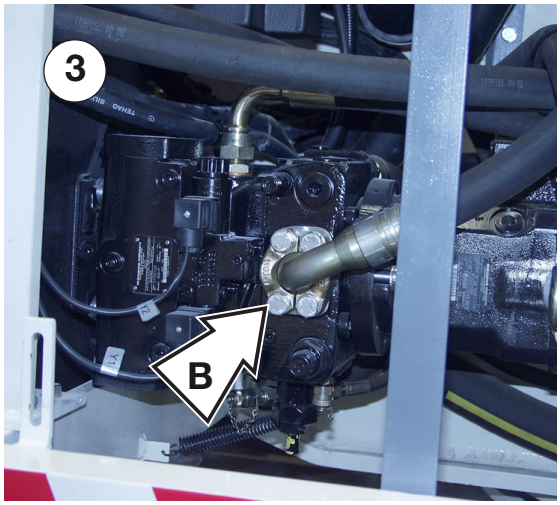


2 Remove the boom pump - see card G-025.

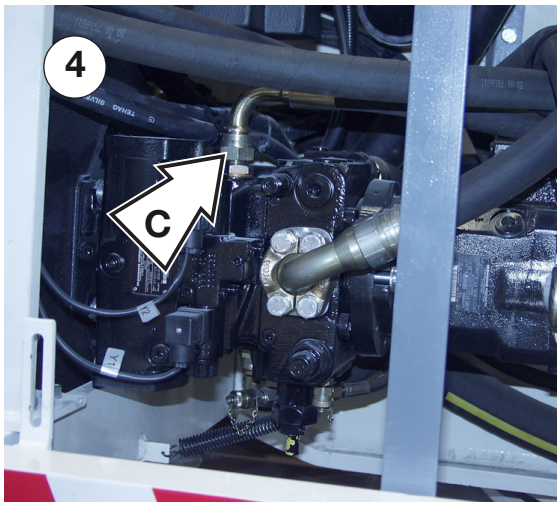


Operation:	Dismantling the Hydromatic pump	Table:
		G-026

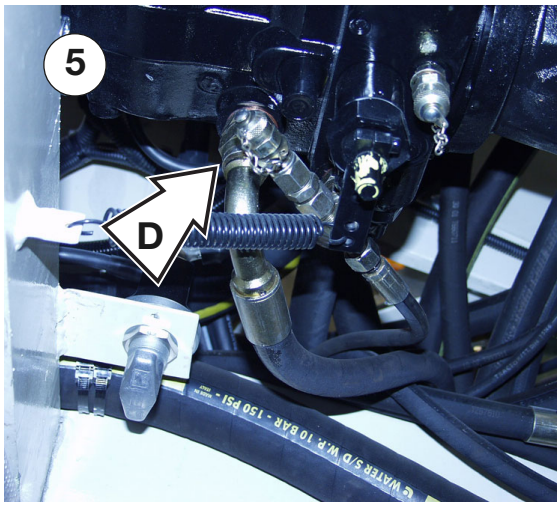
3 Disconnect the two HP hoses. Remove their flanges **B** on both sides of the pump using a 19mm wrench.



4 With a 32mm wrench, disconnect the top draining hose, then plug with a 3/4” plug.

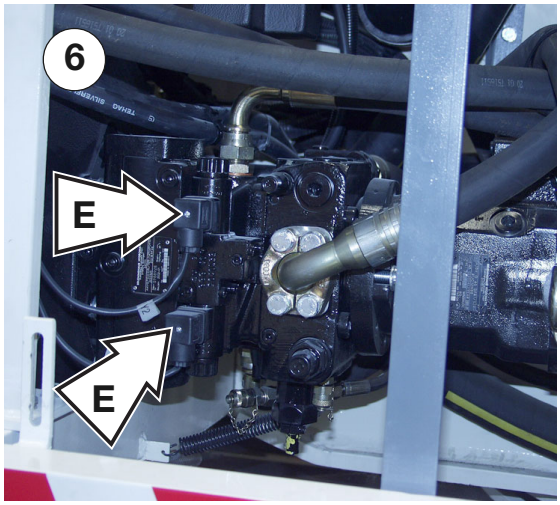


5 Using a 50mm wrench, disconnect the pump feeding hose.

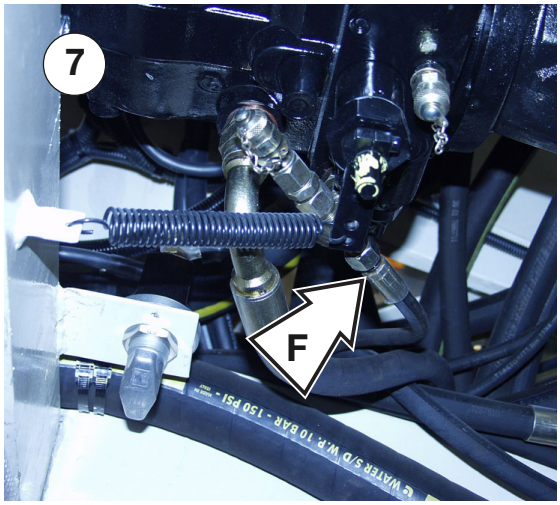


Operation:	Dismantling the Hydromatic pump	Table:
		G-026

6 With a cross-tip screwdriver remove the two wires of the solenoid valve.

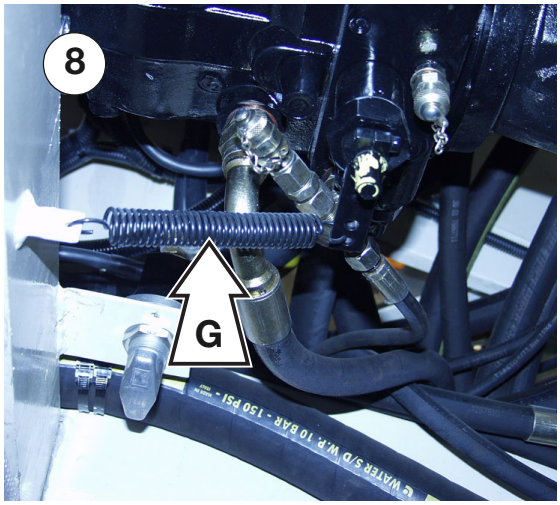


7 Using a 19mm wrench, disconnect the overfeeding hose **F**.



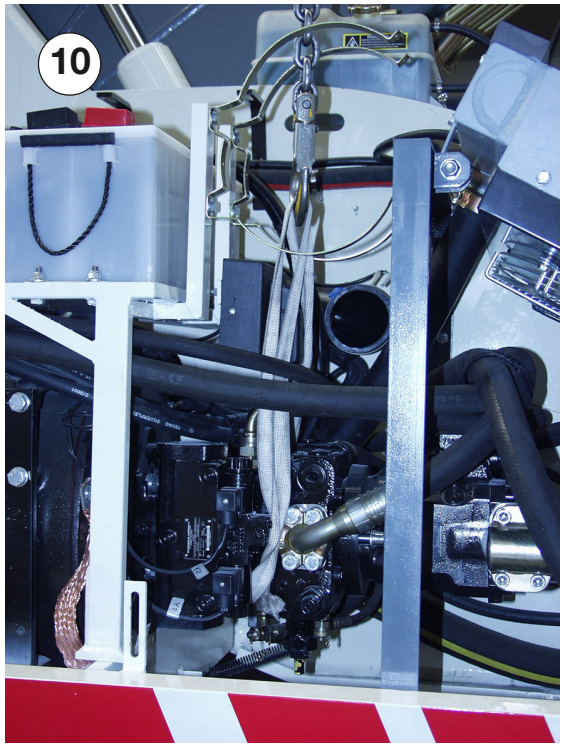
8 Release the Inching valve **G**

9 Remove the air filter - see card G-027



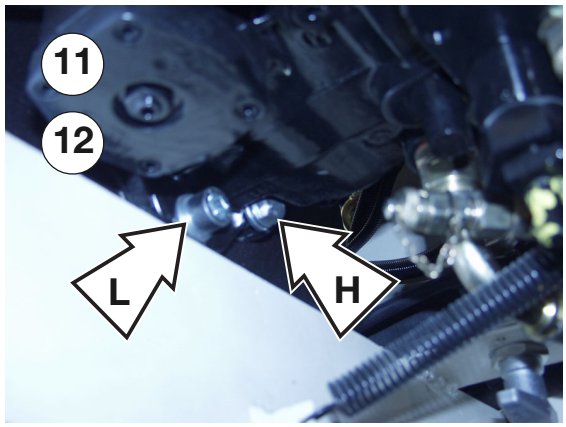
Operation: **Dismantling the Hydromatic pump**	Table: **G-026**

10 Secure the pump with a textile bridle connected to the bridge crane. Slightly pull the bridle.



11 Prepare a 22mm wrench for the Girolift 3514-3518 or a 30mm wrench for the Girolift 5022 grinding the external edge and reducing its thickness so that it can enter the screw seat (see A-06 dwg.05). Remove the 4 screws **H**.

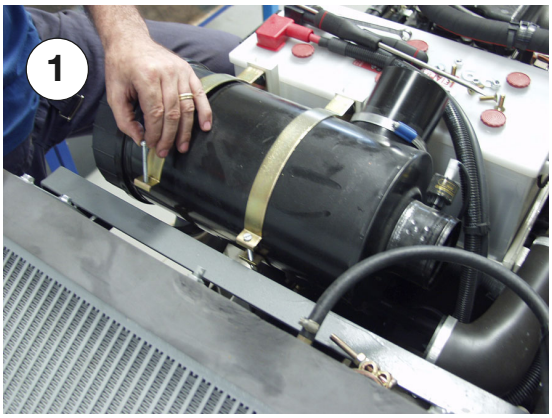
12 Using a 14mm hexagonal wrench, remove the two screws **L** fixing the pump. Pull out and raise the pump using the bridge crane.



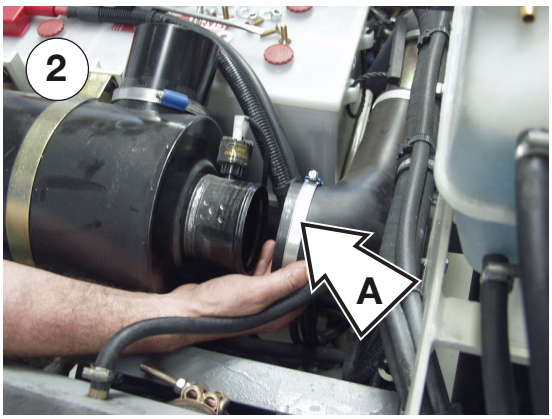
Operation: **Dismantling the air filter**	Table: **G-027**			kg: 8
	3514 ✔	3518 ✔	5022 ✔	Hrs.: - / Min.: 30
Standard tools				1

Operation:

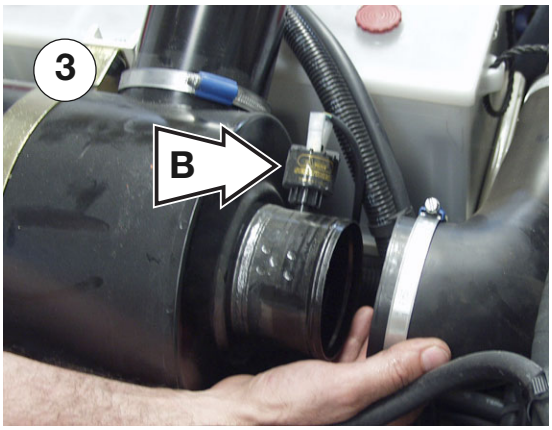
1 With a straight screwdriver, remove the 4 fixing screws of the air filter.



2 Loosen the clamp of the rubber hose using a straight screwdriver.



3 Disconnect the wire of the filter clogging indicator **B**.



Operation:	Dismantling the air filter	Table:
		G-027

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Operation:	Dismantling the feeding pump, brake pump and radiator motor	Table: G-028			kg	6,8
		3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
	Standard tools				1	-
					1	

Operation:

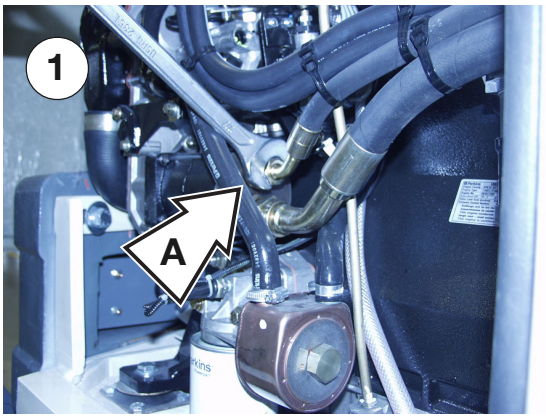
PROTECT THE ENVIRONMENT

Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

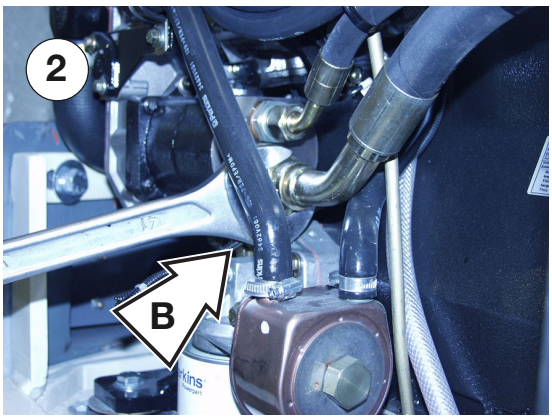
IMPORTANT

Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.

1 Using a 27mm wrench, disconnect the delivery hose **A**.

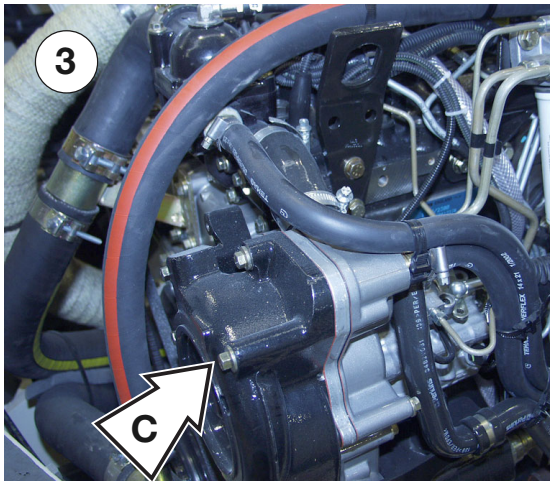


2 Using a 41mm wrench, disconnect the intake hose **B**.

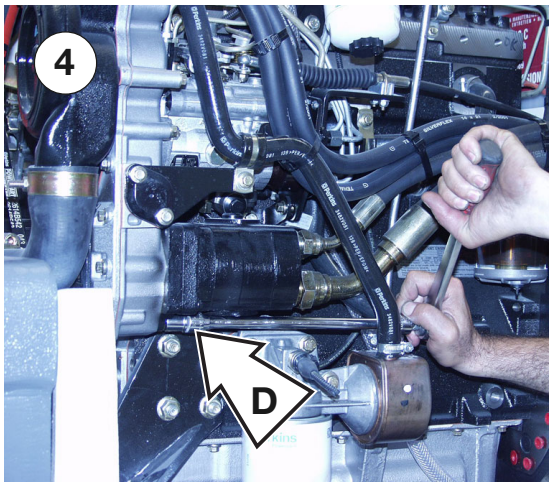


Operation:	Dismantling the feeding pump, brake pump and radiator motor	Table: G-028

3 With a 3/8” wrench, remove the front screw **C** aligned with the pump.



4 Using a 13mm socket wrench with extension, remove the 4 fixing nuts **D** of the pump.

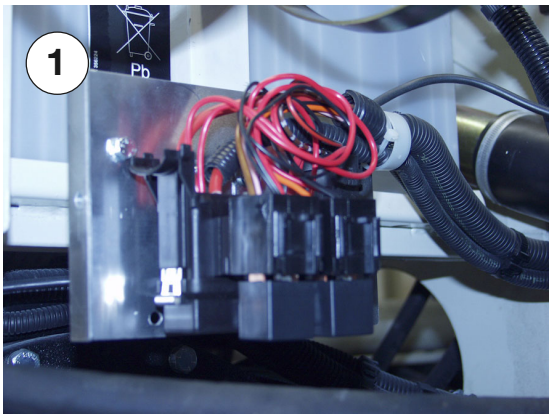


Operation: **Dismantling the Diesel engine**	Table: **G-029**			kg	3514/18=**550** 5022=**600**
	3514 ✔	3518 ✔	5022 ✔		
Bridge crane, payload 1000 kg (4000 lb) Textile bridles or chains with hooks	Standard tools				Hrs. 3 / Min. -
					2

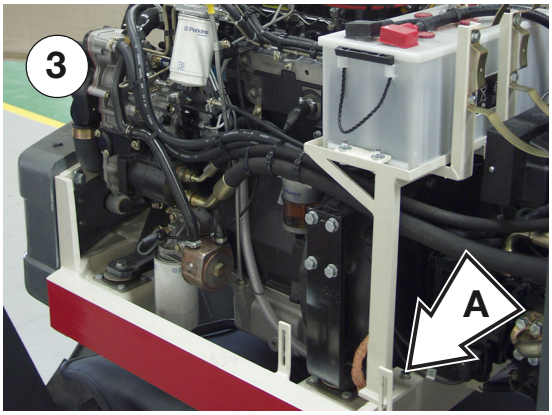
Operation:

1 Remove the central casing and the battery as illustrated in card G-023

2 Remove the fuse box using a 10mm wrench.



3 With a 17mm wrench loosen the fixing screw **A** and remove the battery support.



PROTECT THE ENVIRONMENT

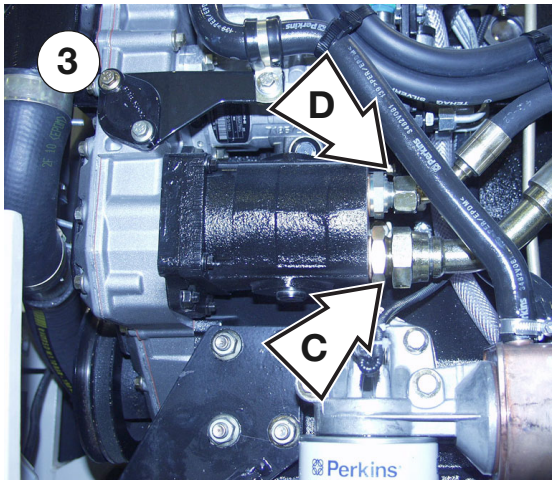
Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

IMPORTANT

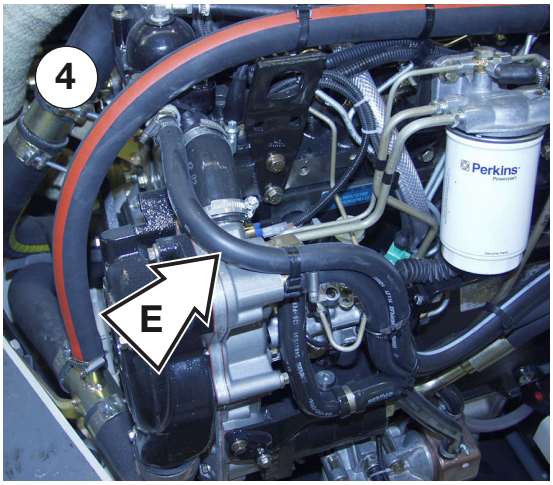
Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.

Operation: **Dismantling the Diesel engine**	Table: **G-029**

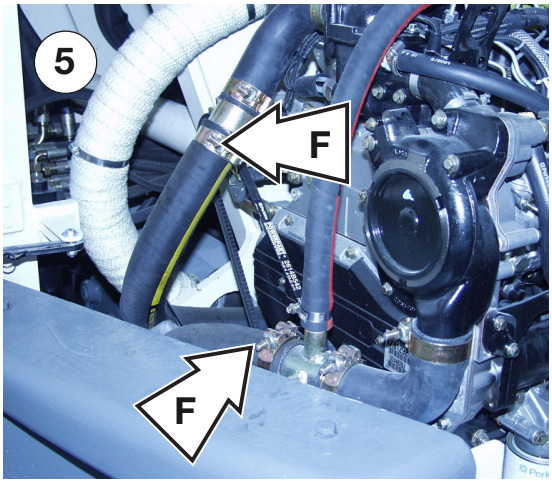
3 Disconnect the two hoses of the pump on the distribution line: disconnect the intake hose **C** with a 41mm wrench and the delivery hose **D** with a 27mm wrench.



4 Disconnect the heating hoses **E** removing the clamps with a cross-tip screwdriver.



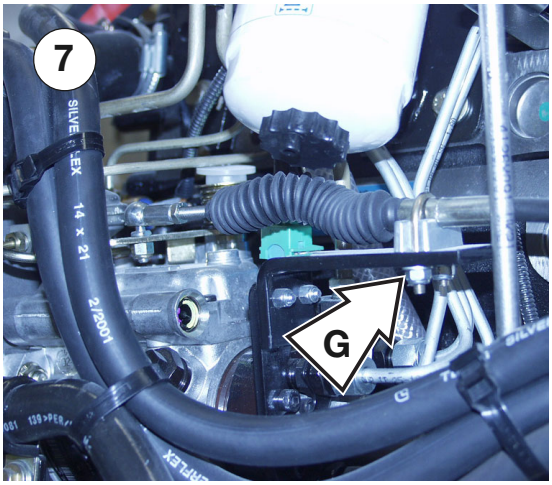
5 Using a 13mm wrench, remove clamps **F** which fix the hoses to the water pump after having drained off any water from the radiator by opening the special cock.



Operation: **Dismantling the Diesel engine**	Table: **G-029**

6 Cut all the plastic fasteners fixing the electrical cables and the rubber hoses to the engine.

7 Using a 10mm wrench remove the fixing screws, then pull out the U-bolt **G** which fixes the throttle cord. Remove the clip fixing the joint and free the throttle cord.



8 Disconnect the electrical cables of the alternator and the starting motor using a 13mm wrench.

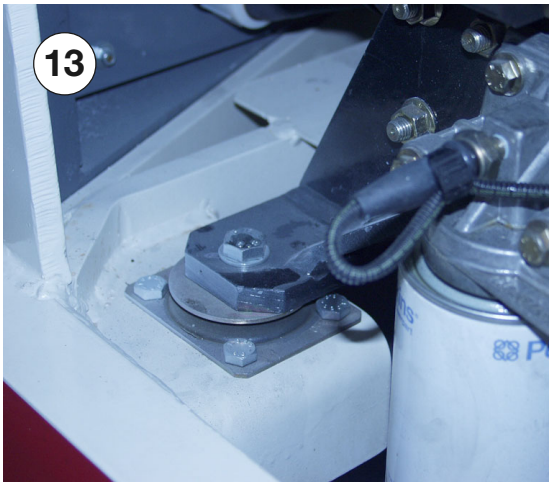
9 Disconnect the bulbs:
- pre-heating
- water temperature (n° 2)
- oil pressure

10 Disconnect the fuel solenoid valve.

11 Disconnect the fuel hoses from the filters.

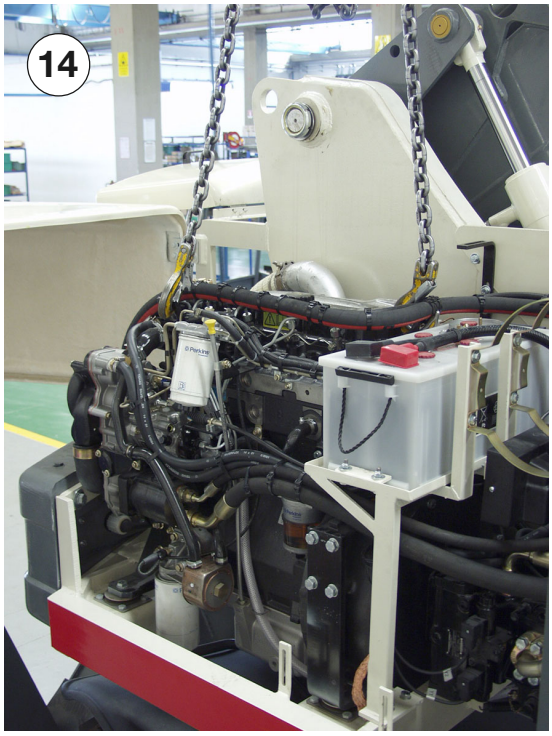
12 Remove the exhaust manifold.

13 Remove the 4 screws fixing the engine to the vibration devices using two 22mm wrenches.



Operation:	Dismantling the Diesel engine	Table:
		G-029

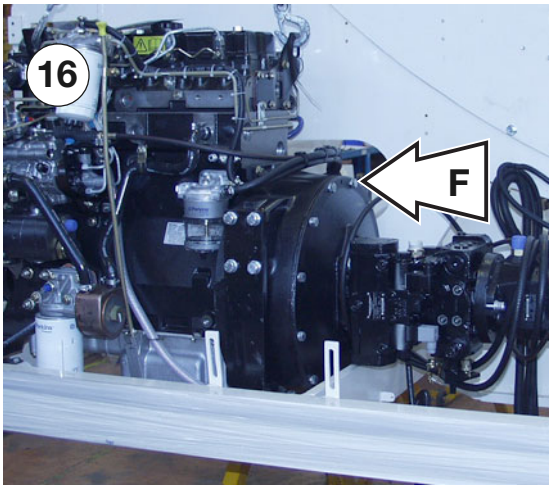
14 Couple the engine to the special hoisting brackets using a two-leg chain with hooks connected to the bridge crane. Slightly pull the chain.



15 Place two beams under the drive pumps or secure them firmly with a textile bridle to the radiator support.

16 Remove the 12 screws **F** of the engine housing using a 17mm wrench. Check that the pumps are jacked correctly.

17 Slowly pull out the engine with extreme caution and check that all the connections between engine and machine (e.g. hoses, electrical cables, etc.) have been disconnected. Place the engine on to a wooden pallet.

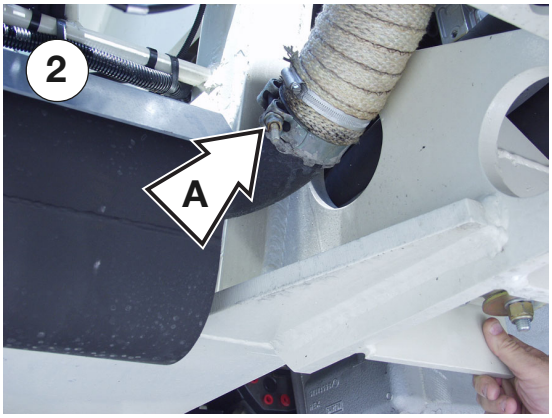


Operation: **Dismantling the exhaust pipe**	Table: **G-030**			kg	11
	3514 ✔	3518 ✔	5022 ✔		Hrs. / Min.
	Standard tools				- / 30
					1

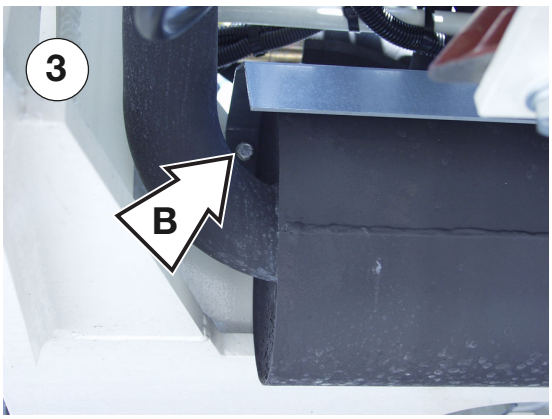
Operation:

1 Turn the machine 90° to access to the exhaust pipe, placed in the rear side at the bottom.

2 Using a 13mm wrench, disconnect the hose loosening clamp **A**.

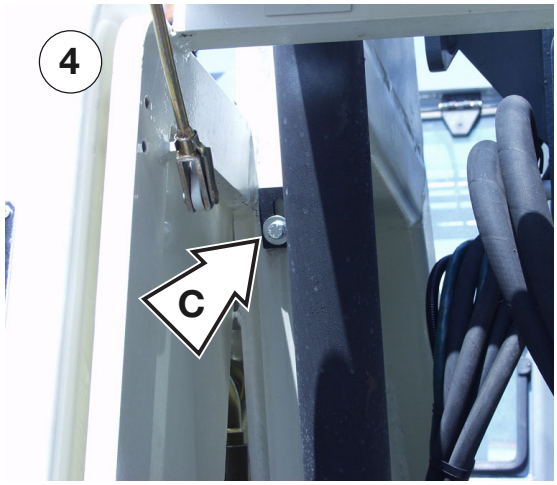


3 Remove the two screws **B** fixing the case with a 13mm wrench.



Operation: **Dismantling the exhaust pipe**	*Table:* **G-030**

4 Using a 13mm wrench and a 17mm wrench, remove screws **C** fixing the exhaust pipe.



Operation: **Distributor disassembly**	Table: **G-031** 3514 ✔ 3518 ✔ 5022 ✔	kg 30
Bridge crane, payload 500 kg Textile bridles or chains with hooks	Standard tools	Hrs. 2 Min. -
		1

Operation:

PROTECT THE ENVIRONMENT

Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

IMPORTANT

Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.

DANGER

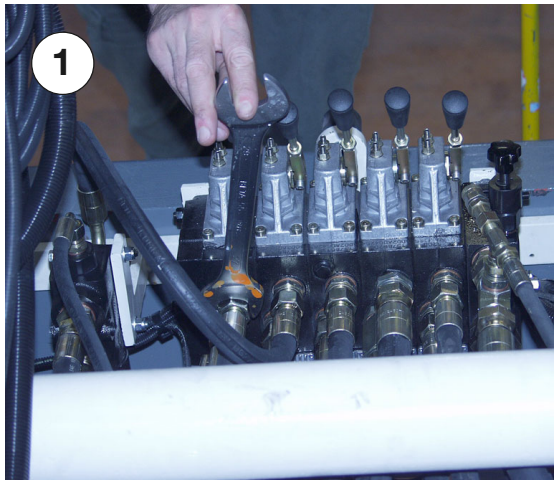
Before disconnecting the hydraulic lines, check that there is no pressure. Eliminate any residual pressure if necessary by operating the control levers with the engine stopped.
In any case, disconnect the hydraulic piping with extreme caution and always wear suitable personal protection equipment -e.g. goggles, gloves, facial screen, etc.
Wrap up the end of the pipe to be disconnected with some rags and slowly loosen the pipe connector so that air comes out as slow as possible.

Operation:	Distributor disassembly	Table:
		G-031

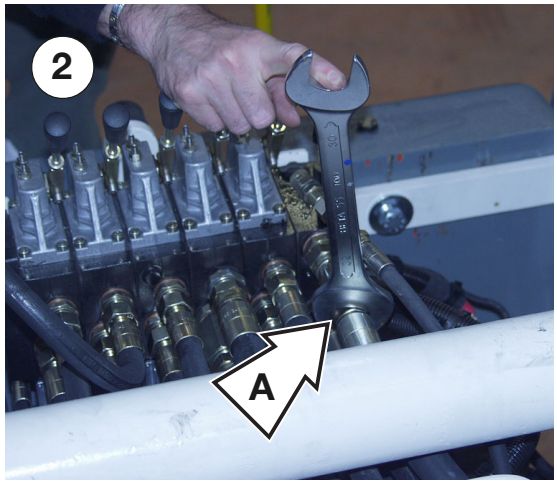
IMPORTANT

Before disconnecting any flexible hoses, label them for an easier re-assembly.

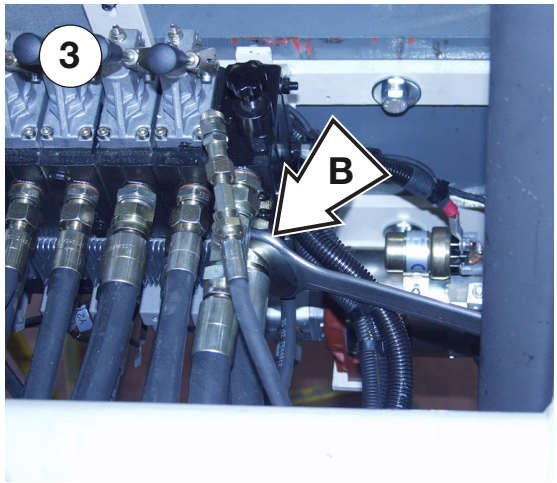
1 Using a 27mm wrench, disconnect the delivery hoses from the users.



2 Using a 32mm wrench, disconnect the delivery hose **A** of the distributor.

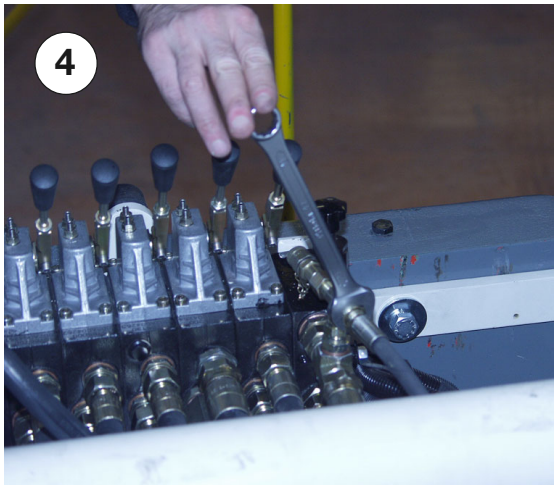


3 Using a 41mm wrench, disconnect the drain hose **A** returning to the tank.

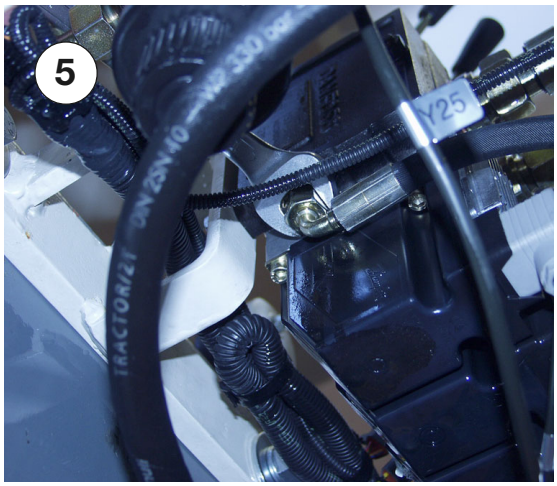


Operation: **Distributor disassembly**	Table: **G-031**

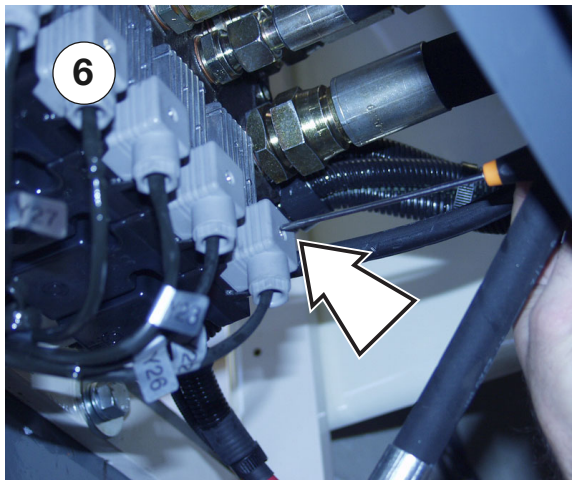
4 Using a 19mm wrench, disconnect the stand-by hose of the boom pump.



5 Using a 19mm wrench, disconnect the pilot hoses (1 to the right and 1 to the left of the distributor).

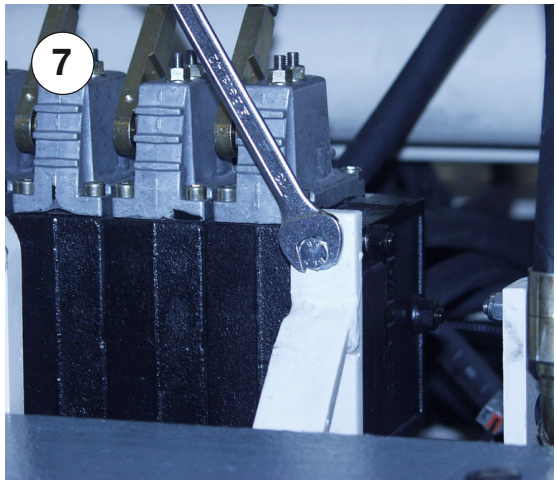


6 With a cross-tip screwdriver, disconnect the solenoid valve coils.



Operation:	Distributor disassembly	Table:
		G-031

7 Fix the distributor with a textile bridle connected to the bridge crane, slightly pull the bridle, then remove the fixing screws with washers using a 13mm wrench.



IMPORTANT

Before re-assembling the distributor, smear the thread of the fixing screws with some threadlocking liquid.

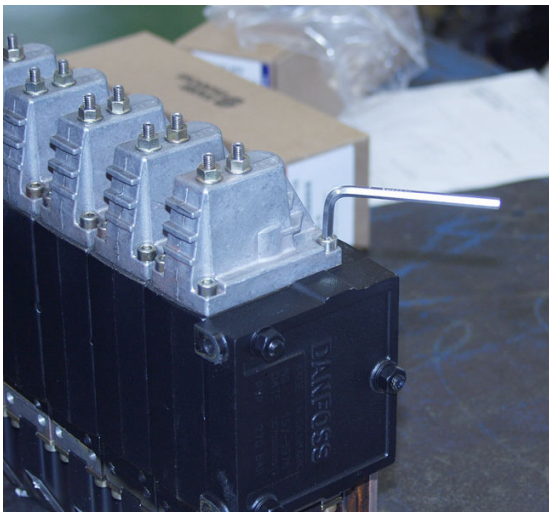
Operation:	Dismantling the distributor on bench (slider and valves)	Table: G-032			kg	-
		3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
	Standard tools				-	30
					1	

Operation:

❑ **Removing the slider**

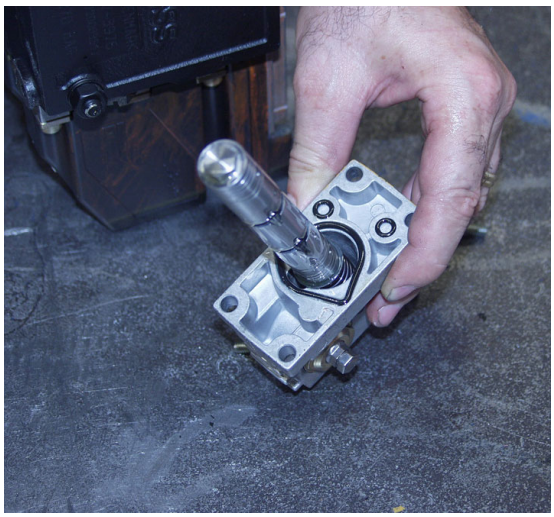
1 Remove the 4 screws fixing the cap using a 5mm hexagonal wrench.

1



2 Remove the cap and pull out the slider.

2



IMPORTANT

If the slider is scratched, it must be removed. Also check the seat of the slider with the help of a portable lamp. If the seat is scratched, remove the assy.

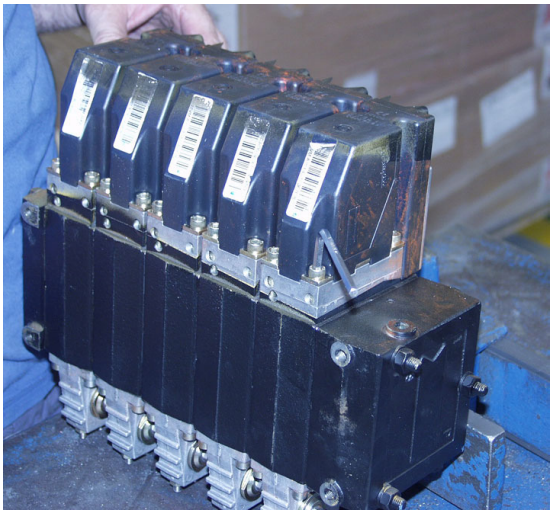
3 Clean thoroughly, check the seals and replace if necessary. Before re-assembling, anoint with some hydraulic oil.

Operation:	Dismantling the distributor on bench (slider and valves)	Table: G-032

❑ **Removing the solenoid**

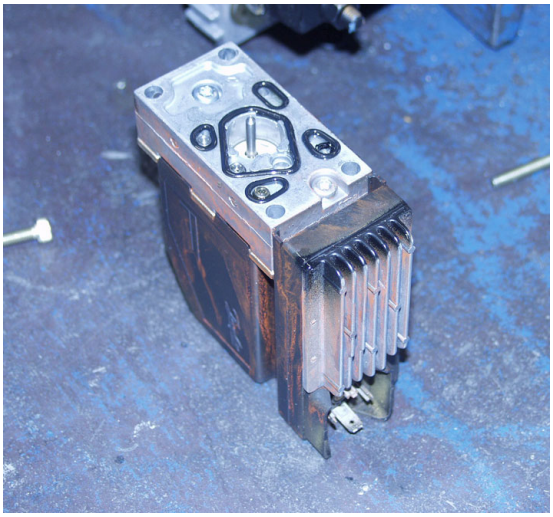
4 Using a 5mm hexagonal wrench, remove the fixing screws of the solenoid.

4



5 Check the seals for damage. Replace if necessary.

5



Operation: **Dismantling the emergency pump**	Table: **G-033** 3514 ✔ 3518 ✔ 5022 ✔	kg 10,2
		Hrs. 1 Min. 30
Standard tools		1

Operation:

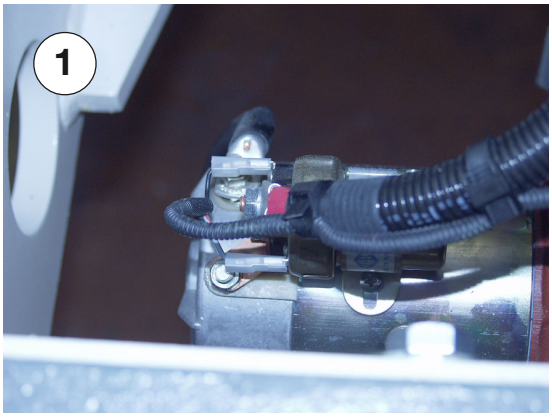
PROTECT THE ENVIRONMENT

Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

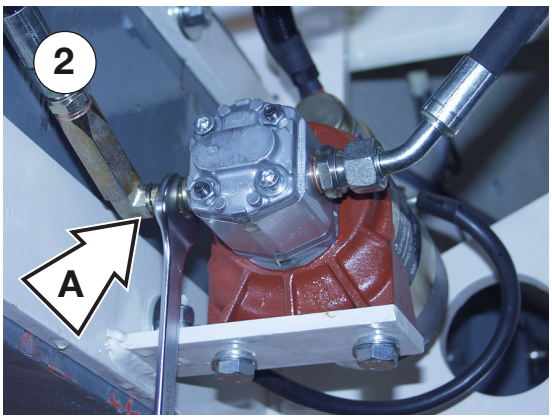
IMPORTANT

Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.

1 Disconnect the battery, then unplug all of the electrical connections of the pump.

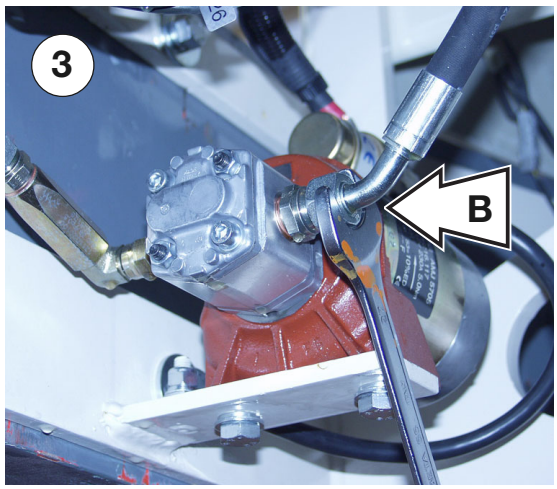


2 Using a 22mm wrench, disconnect the delivery hose **A** of the pump.

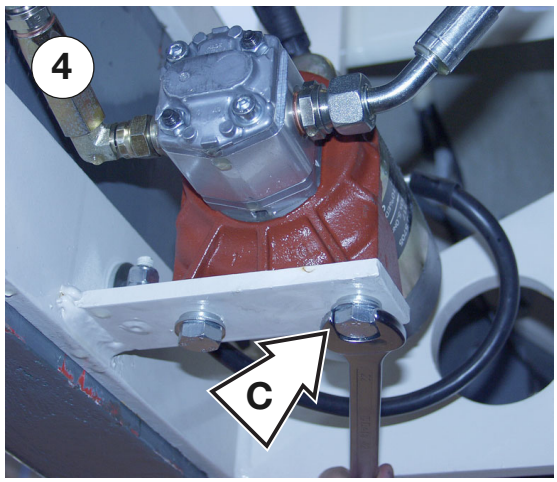


Operation:	Dismantling the emergency pump	Table:
		G-033

3 Using a 27mm wrench, disconnect the intake hose **B**.



4 Using a 22mm wrench, disconnect the screws **C** fixing the pump to the chassis.



IMPORTANT

Before re-assembling the emergency pump, smear the thread of the fixing screws with some threadlocking liquid.

Operation: **Dismantling the DFE valve**	Table: **G-034** 3514 ✔ 3518 ✔ 5022 ✔	kg: 4
		Hrs. - Min. 30
Standard tools		1

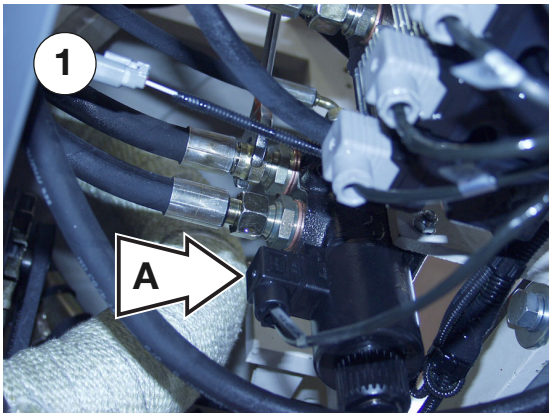
Operation:

PROTECT THE ENVIRONMENT

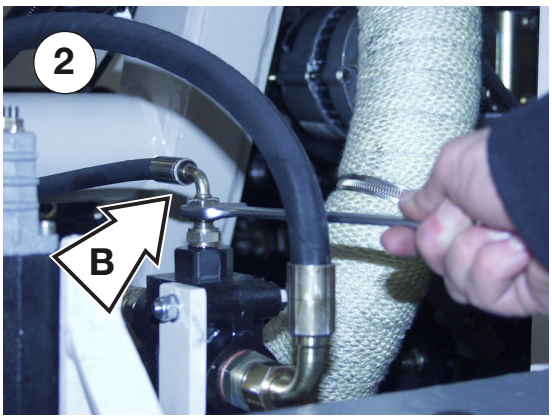
Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

IMPORTANT

Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.



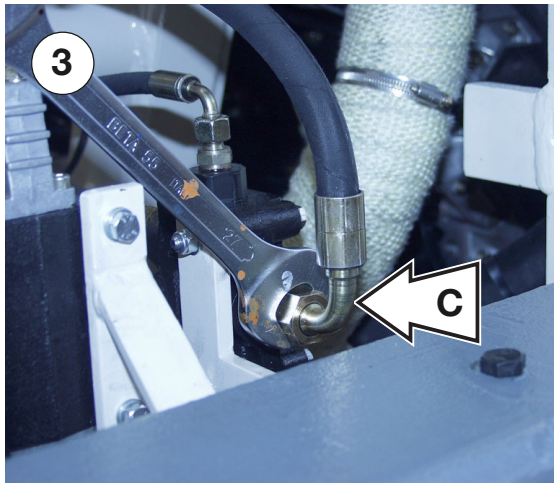
1 With a cross-tip screwdriver unplug the electrical wire **A**.

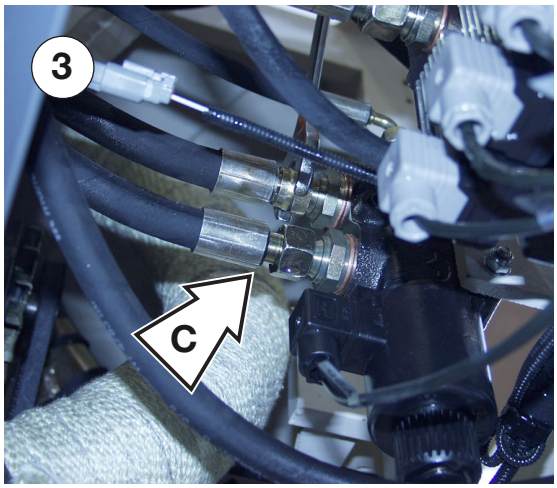


2 Using a 19mm wrench disconnect the draining hose **B** of the valve.

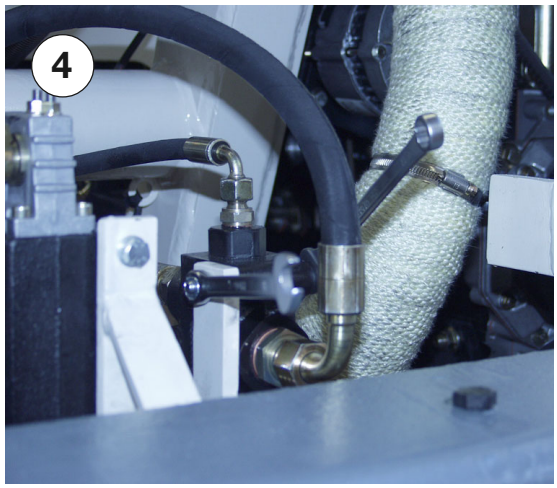
Operation:	Dismantling the DFE valve	Table:
		G-034

3 Using a 27mm wrench, disconnect the 3 flexibles hoses **C**.





4 Using two 13mm wrenches, remove the fixing screws with washers and the locknuts of the valve.



Operation: Dismantling the Load Sensing valve	Table: G-035			kg	4,5
	3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
	Standard tools			-	30
					1

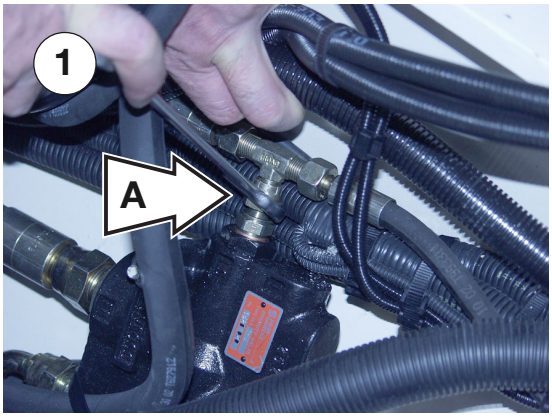
Operation:

PROTECT THE ENVIRONMENT

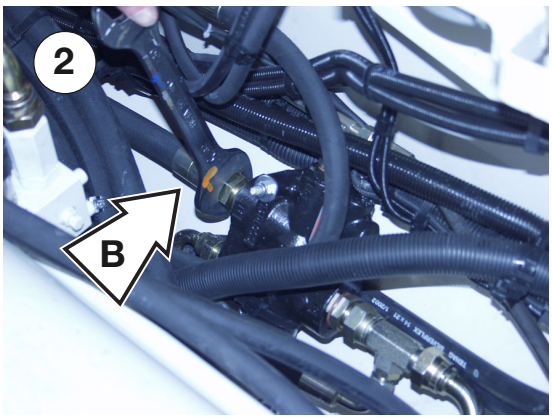
Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

IMPORTANT

Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.



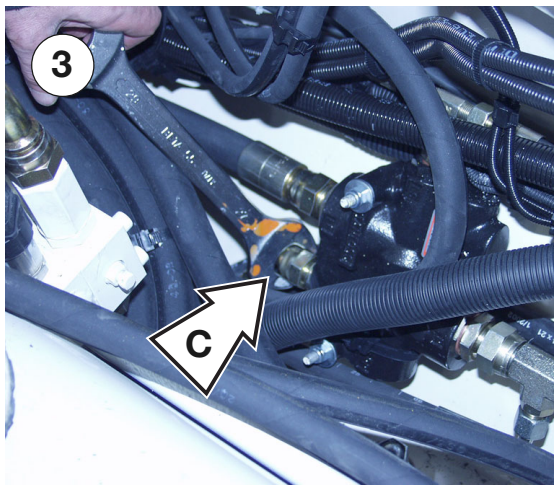
1 Using a 19mm wrench, disconnect the signal flexible hose **A** from the power steering unit.



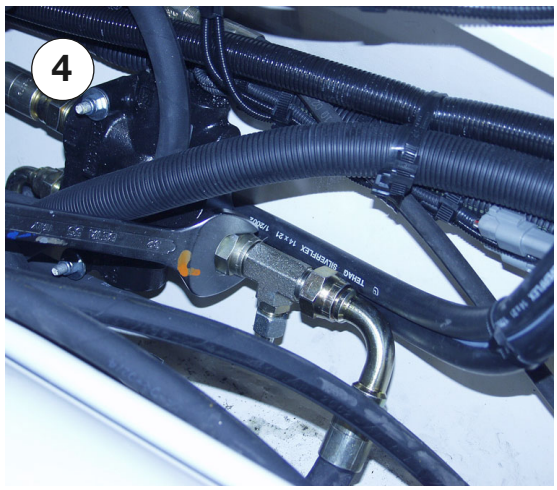
2 Using a 32mm wrench, disconnect the pressure flexible hose **B** from the power steering unit.

Operation: **Dismantling the Load Sensing valve**	Table: **G-035**

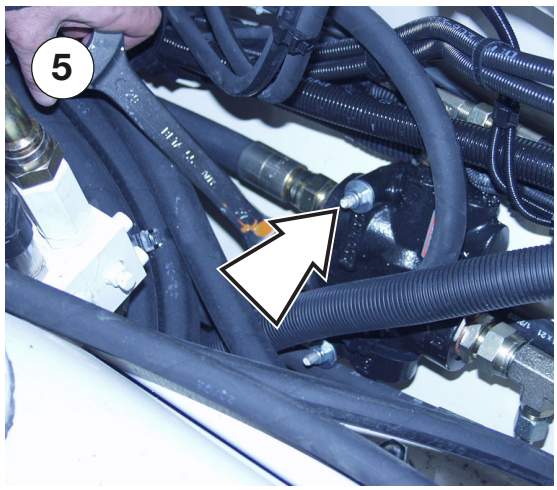
3 Using a 27mm wrench, disconnect the flexible hose **A** feeding the power steering unit.



4 Using a 32mnm wrench, disconnect the flexible hose **D** connecting the unit to the distributor.



5 Using a 13mm wrench, renove the locking nuts with washers from the valve.



Operation: **Accumulator disassembly**	Table: **G-036** 3514 ✔ 3518 ✔ 5022 ✔	kg: 7,2 (1,5 l) 4,1 (0,5 l)
		Hrs. - Min. 30
Standard tools		1

Operation:

■ **Distributor accumulator**

DANGER

Before dismantling and disconnecting the accumulator from the hydraulic line operate the distributor levers forward and back until they hardly move.

PROTECT THE ENVIRONMENT

Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

1 Place a container of suitable size under the feeding connector to prevent oil spillage.

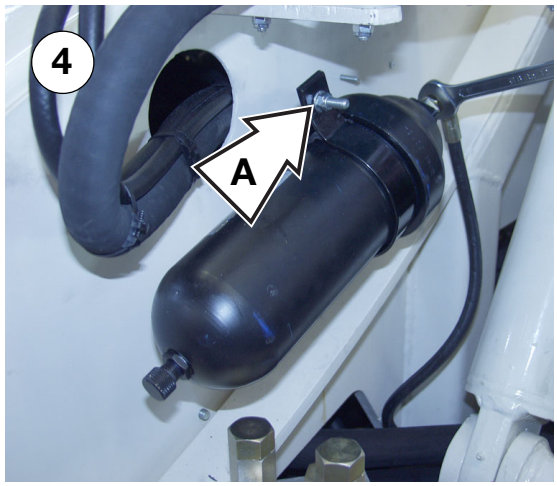
2 Disconnect the hydraulic connectors of the accumulator with extreme caution:
- protect your hands with gloves
- protect your face with a screen
- protect your eyes with goggles

3 Wrap up the accumulator in a cloth, then slowly loosen the feeding connector with a 19 mm wrench.



Operation: Accumulator disassembly	Table: G-036

4 Remove the screw **A** with two 13mm wrenches to open the accumulator clamp.



■ Boom lowering accumulator

DANGER

Before dismantling and disconnecting the accumulator from the hydraulic line operate the distributor levers forward and back until they hardly move.

PROTECT THE ENVIRONMENT

Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

1 Place a container of suitable size under the feeding connector to prevent oil spillage.

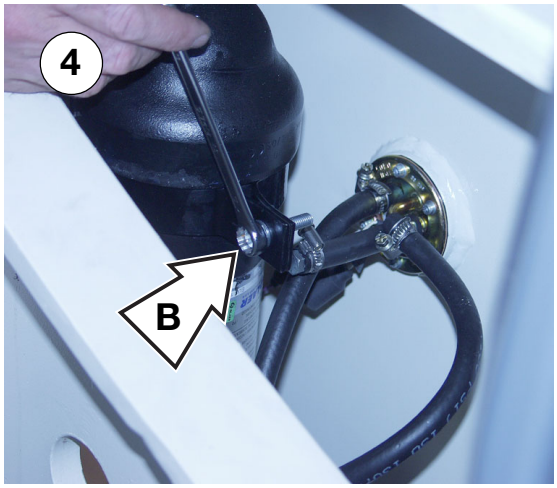
2 Disconnect the hydraulic connectors of the accumulator with extreme caution:
- protect your hands with gloves
- protect your face with a screen
- protect your eyes with goggles

3 Wrap up the accumulator in a cloth, then slowly loosen the feeding connector with a 27mm wrench.



Operation:	Accumulator disassembly	Table:
		G-036

4 Remove the screw **B** with two 13mm wrenches to open the accumulator clamp.



■ Service and parking brakes accumulators

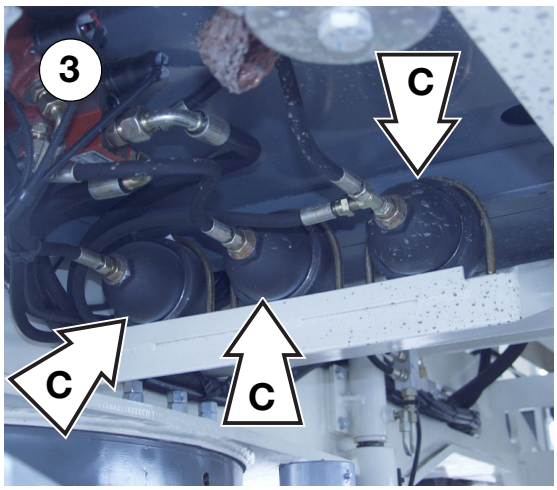
DANGER

With the engine shut down, the accumulator is not under pressure. In any case, pay the greatest attention when disconnecting the hydraulic line.

PROTECT THE ENVIRONMENT

Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

1 Place a container of suitable size under the feeding connector to prevent oil spillage.
2 Disconnect the hydraulic connectors of the accumulator with extreme caution:
   - protect your hands with gloves
   - protect your face with a screen
   - protect your eyes with goggles
3 Wrap up the accumulator **C** in a cloth, then slowly loosen the feeding connector with a 19mm wrench.



Operation: **Accumulator disassembly**	Table: **G-036**

4 Using two 13mm wrenches, remove the fixing screws of the accumulator clamp.

Operation: Checking the accumulator	Table: G-037			kg	-
	3514 ✔	3518 ✔	5022 ✔		Hrs. / Min.
	Standard tools				- / 30
					1

• GENERAL DESCRIPTION

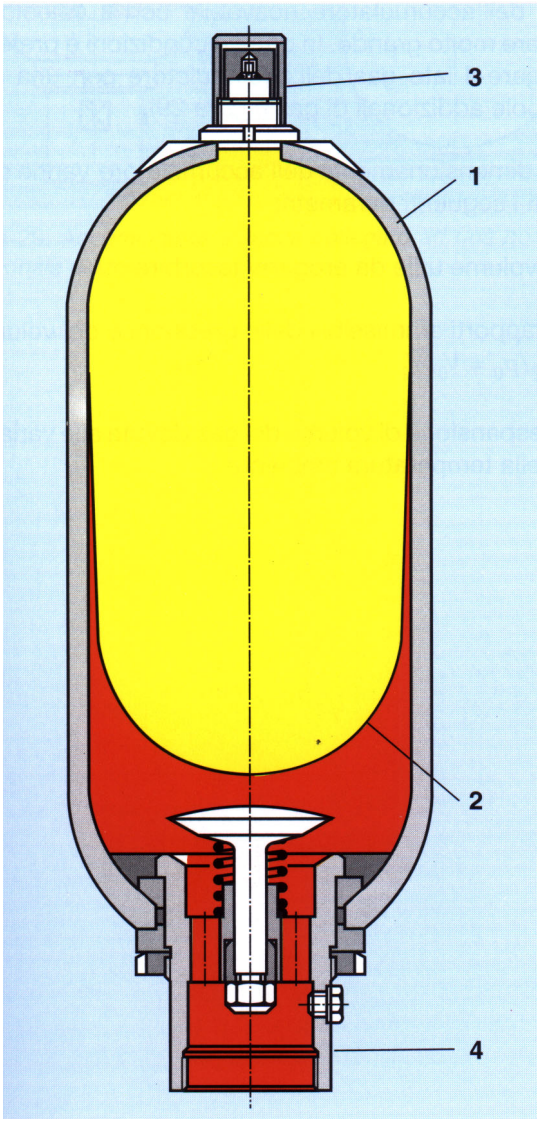
BLADDER ACCUMULATORS

In bladder accumulators, gas and liquid sides are separated by a flexible bladder. The liquid area is located in connection with the hydraulic circuit. As a result, when the hydraulic pressure rises fluid enters the accumulator and the gas is compressed. Vice versa, when the pressure sinks, the gas relaxes and displaces the liquid from the accumulator to the hydraulic circuit.

Bladder accumulators can be installed vertically (preferably) or horizontally or, in certain conditions, also inclined.

In the inclined or vertical positions, the liquid valve shall be turned downwards.

Bladder accumulators consist of a pressure vessel (**1**) in welded or forged execution, an elastic bladder, (**2**), gas connection (**3**) and oil connection (**4**).



Bladder accumulator

Operation:	Checking the accumulator	Table:
		G-037

DIAPHRAGM ACCUMULATORS

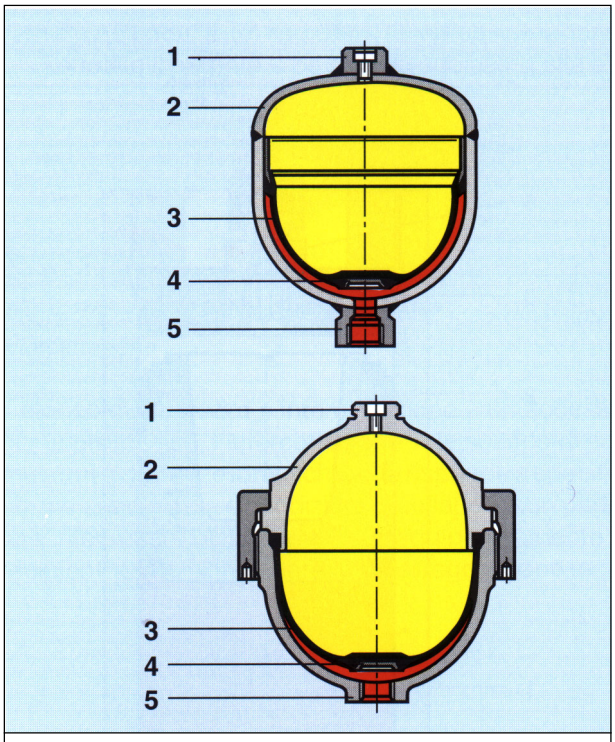
Diaphragm accumulators consist of a pressure resistant steel vessel, usually of spherical or cylindrical shape, with a diaphragm of flexible material used as a separation element.

The diaphragm accumulators are manufactured in two different executions:

- welded execution
- screwed-on execution

In the accumulators in welded execution, the diaphragm is pressed to the bottom before the weld of the two steel cups. In this way, thanks to special proceedings (e.g. electronic welding) and a special arrangement of the diaphragm, damages can be avoided.

In the screwed-on execution, the diaphragm is fastened with a ring nut placed between the two cups of the shell.



1 gas valve
2 vessel
3 diaphragm
4 plate valve
5 liquid side fitting

Diaphragm accumulators; (top) welded execution; (bottom) screwed-on execution.

Operation:	Checking the accumulator	Table: G-037

• SAFETY PRECAUTIONS

Accumulators can only be repaired by the manufacturer. Welding, soldering or mechanical working of the shell are prohibited.

The compressed gas inside the accumulator is highly dangerous due to the accumulated energy. Strictly observe the manufacturer's instructions on installation and maintenance.

The most important routine job is the check of the precharge pressure.

Accumulators shall be installed in easily accessible areas and fastened with strong supports to withstand rebounds in case the tubing breaks.

A check valve shall be installed between pump and accumulator to avoid dynamic reactions on the tubes.

Every accumulator, being a pressure vessel, shall be equipped with a gauge able to indicate the instantenous operating pressure. On the gauge, the maximum admissible pressure shall be clearly visible.

The accumulator shall also be equipped with a safety valve and protected against tampering.

The safety valve shall be designed so as not to block the discharge of the accumulator. Easily accessible on-off devices shall be mounted on the tube connecting the accumulator to the hydraulic circuit and as close to the accumulator as possible.

In Germany, accumuators shall fulfil the "Rules on pressure vessels". Installation and operation are regulated by the "Technical rules for pressure vessels (TRB)".

The pressure vessel forming the accumulator body is classed in relation to the admissible pressure ***p*** (bar), the capacity ***l*** (litres) and the operating pressure per capacity ***p x l***.

The following table lists the checks to be done in relation to the groups.

For the accumulators installed outside Germany, the testing documents valid in the destination country shall be issued as the testing of TÜV (German Technical Inspectorate) is not accepted all over the world. In this case, the admissible operating pressure can differ from the nominal pressure.

Group	Factory-checks pior to placing in service	Checks by the users	Routine checks
II $p > 25$ bar and $p \times l \quad 200$	Pressure check. With the "HP" mark, or a certificate, the manufacturer declares the conformity of the product and the testing of the pressure check.	Efficiency check (equipment and installation) done by inspectors.	The time intervals of the routine checks shall be defined by the user on the basis of his experience and the type of liquid used.
III $p > 1$ bar $p \times l > 200$ and $p \times l \quad 1000$	Preventive check by TÜV inspectors and manufacture and pressure check. Certificate issued by the Manufacturer (prototype identification) or by TÜV inspectors.	Check done by inspectors (TÜV).	See group II.
IV $p > 1$ bar and $p \times l > 1000$	See group III.	See group III.	Internal check: every 10 years when non-corrosive fluids are used; or every 5 years. Pressure check: every 10 years by inspectors (TÜV).

Operation: Checking the accumulator	Table: G-037

• PLACING IN SERVICE

CONDITION ON DELIVERY

The accumulators are delivered:

- either pre-charged with nitrogen to a storage pressure of more than 3 bar,
- or charged with nitrogen to a pressure corresponding to the one calculated according to its working characteristics.

PRESSURIZING WITH NITROGEN

- Use the OLAER charging and gauge assembly to check the charging pressure with respect to the calculated pressure; adjust if necessary. The charging pressure must be less than:

  - the calculated pressure (**S**) stamped on the sheel. If the charging pressure read on the gauge is less than 1.5 bar, follow the bladder recharging procedure (see re-assembly point **U** and following).
- Check the charging valve for leaks (using soapy water for example).
- Tighten the protective cap manually.
- Periodically check the inflation pressure:

  - Use the tester and pressurizer to check the inflation pressure on start-up.

  Repeat this operation during the first week of operation, and then every six months in case of normal operating conditions or every month in case of intensive use.

IMPORTANT

It is essential to use dry nitrogen from a bottle equipped with a pressure reducing valve. The use of an air compressor and of oxygen is strictly forbidden.

INSTALLATION

For maximum efficiency, the accumulator should be placed as close as possible to the system on which it is used. Leave a free space of 200mm around the charging valve to install the OLAER charging and gauge assembly (see accessories guide).

The hydropneumatic accumulators may be installed in any position from horizontal to vertical (charging valve at the top). The name plate must be visible and the vent screw accessible.

The accumulators are connected by means of the tapped fitting or may be equipped with a reducer fitting, a flange or a counter-flange (see guide for specific model).

FIXING

See sheet of each accumulator.

HYDRAULIC PRESSURIZING

Vent the pipework of any air that it might contain carefully loosening the vent screw according to the model until the liquid begins to flow, then re-close the vent.

Operation: Checking the accumulator	Table: G-037

• CHARGING AND TESTING DEVICE

GENERAL DESCRIPTION

Nitrogen leaks from accumulators are usually negligible. However, to avoid that the piston rests on the head or the bladder/diaphragm due an excessive loss in pressure, it is recommended to check the gas precharge pressure regulalry.

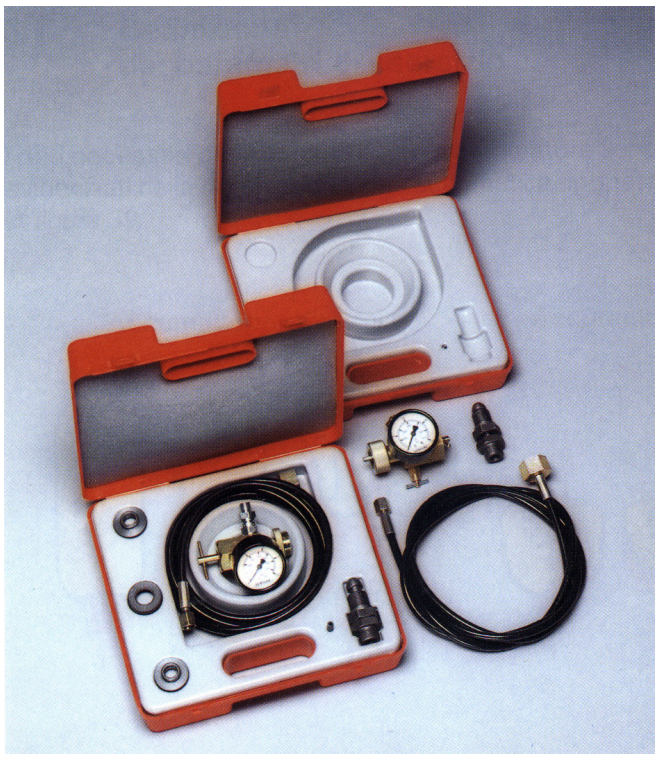
A single charging and testing device allows precharging the accumulator with nitrogen and to check and, if necessary, adjust the gas pressure.

To precharge the accumulator, the device is screwed onto the gas valve of the accumulator and connected to the nitrogen bottle by means of a flexible hose. The nitrogen bottle is not necessary to check or reduce the precharge pressure.

The precharge value stamped on the accumulator data plate shall be verified and, if necessary, restored before putting in service the accumulator or after a repair work. After the accumulator has been put in service, the precharge pressure should be checked at least once in the first week.

If this check reveals no loss in pressure, the precharge should be checked after 4 months and subsequently every year.

The charging and testing device is an indispensable instrument for checking inflation up to a max pressure of 550 bar and for checking the nitrogen loss from all OLAER accumulators.

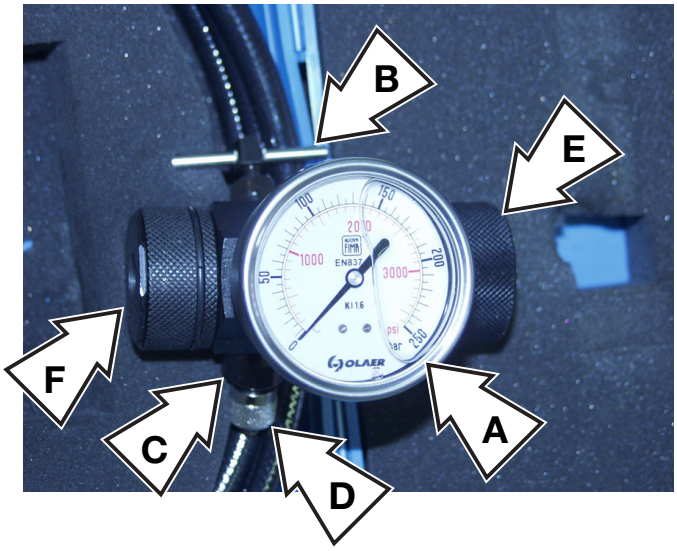


The instrument consists of 3 different parts:

- VG3 inflator tester
- Flexible hose cut to fit the nitrogen bottle fitting
- Case.

Operation:	Checking the accumulator	Table:
		G-037

GENERAL TECHNICAL CHARACTERISTICS



- Pressure gauge (pos. **A**) with standardised scale: 6, 10, 25, 100, 250, 400, 600 bar.
- Venting key (pos. **B**).
- Inflation fitting with check valve for connecting the 60°1/4" BSP male hose (Pos. **C**).
- Knurled plug (pos. **D**).
- Regulator (pos. **E**).
- 3 fittings (screwed on coupling **F**) to connect the accumulator-pressurizer tester:
  - SAE 7/8" 14 NF2;
  - SAE 5/8" 18 NF2;
  - 0,305"-32 NFT (for Schraeder valve).
- Flexible hose:
  - standard TS2 - max working pressure: 400 bar;
  - standard TS6 - max working pressure: 550 bar.

  Length: 2 m roughly. The hose has one female coupling to each end:
  - 60°1/4" BSP coupling for connection to the inflation fitting (pos. **C**);
  - ø 21.7x1.814 Sl fitting with seal for connection to a pressure source (nitrogen bottle, portable nitrogen source, inflation unit. etc.).

CODES

VG3	250	TS2
type	pressure gauge	flexible hose
	6 bar	
	10 bar	
	25 bar	
	100 bar	
	250 bar	
	400 bar	
	600 bar	

Flexible hose
TS2: max working pressure: 400 bar
TS3: max working pressure: 550 bar

INSTALLATION AND USE

To inflate with a nitrogen bottle, commonly sold on the market, it is advisable to fit a pressure reduciong valve between flexible hose and bottle.

Operation: Checking the accumulator	Table: G-037

CHECKS

Check that the accumulator has been disconnected from the circuit and that it discharges and returns to the liquid side.

- Loosen the plugs of the inflation valve (pos. **F**).
- Unscrew the regulator (pos. **E**).
- Open the vent (pos. **B**).
- Hand-tighten the tester on the inflation valve.
- Hand-lock the fitting and position the pressure gauge.
- Lock the vent key (pos. **B**).
- Screw down the regulator (pos. **E**) and start checking the needle. Screw down when the needle moves from position 0 (1/2 turn is enough; do not tighten).
- Read the inflation pressure on the pressure gauge.
- To reduce the pressure, open the vent key slowly until reaching the pressure you wish.
- To increase the inflation pressure:
  - remove the knurled plug (pos. D);
  - connect the fitting (pos. **C**) to one end of the 60° 1/4" BSP flexible hose;
  - connect the other end of the hose to the nitrogen source and set under pressure.

Compulsorily wait for the stabilisation of the thermal exchange caused by the movement of the pressures before any check or pre-charge. For safety reasons, cut out the nitrogen source during stabilisation.

DISMANTLING

Repeat the check phase in reversed sequence. After removing the pressurizer tester, check the tightness of the inflation valve.

Re-tighten the plug/s of the inflation valve.

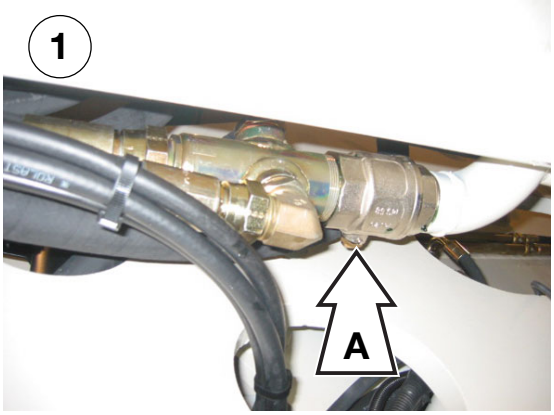
Operation:	Checking the accumulator	Table:
		G-037

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Operation: **Dismantling the hydraulic oil tank and the fuel tanks**	Table: **G-038** 3514 ✔ 3518 ✔ 5022 ✔	kg 204
		Hrs. 3 Min. -
Bridge crane, payload 500 kg Textile bridles or chains with hooks	Standard tools	1

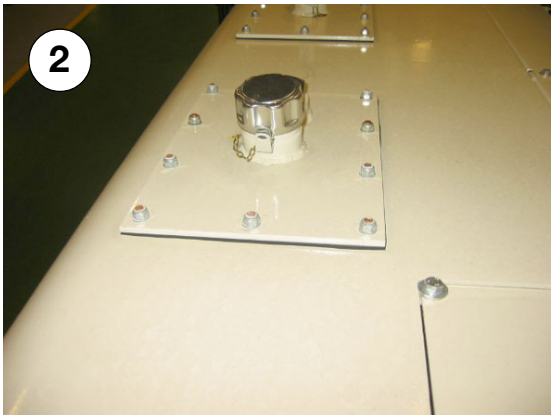
Operation:

1 Move to the back of the machine, close the hydraulic oil intake valve **A** using the lever provided.

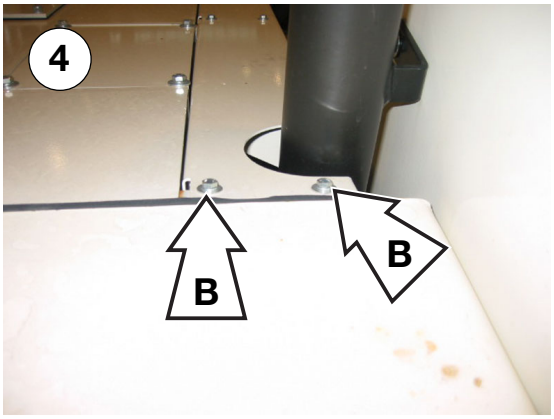


2 Climb on the tanks and open the top hatch using a 10mm wrench.

3 Empty both tanks (oil and fuel).

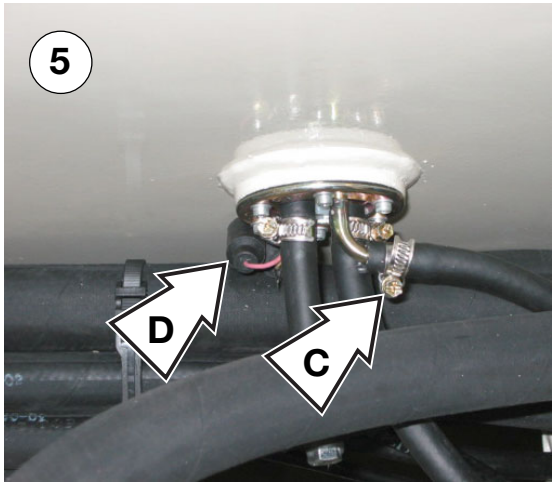


4 Remove screws **B** using a 10mm wrench. Remove the case placed between the two tanks and the side of the turret.

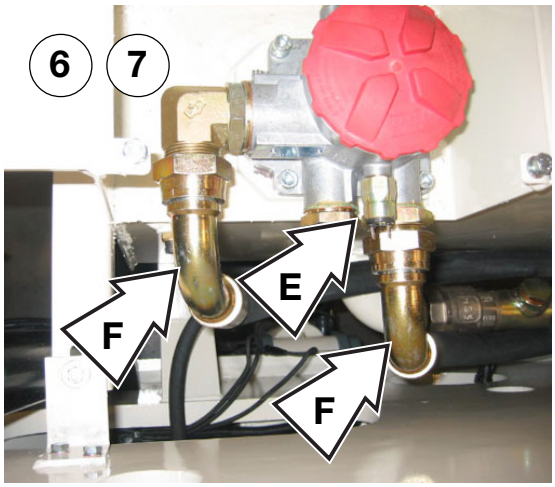


Operation:	Dismantling the hydraulic oil tank and the fuel tanks	Table: G-038

5 Using a cross-tip screwdriver loosen clamps **C** and pull out the hoses.
Disconnect the electrical wire **D**.

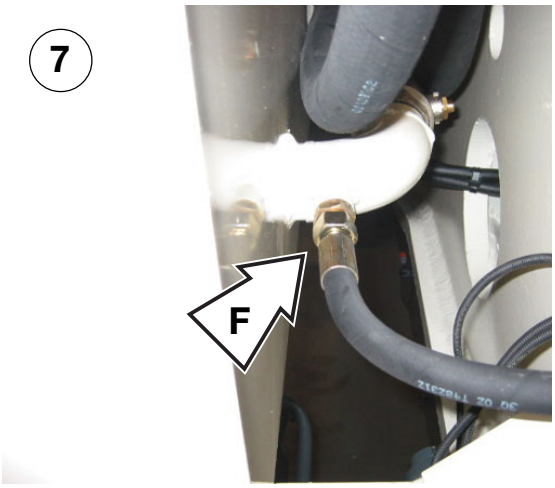


6 Remove the electrical wire **E** from the bulb on the hydraulic filter.



PROTECT THE ENVIRONMENT

Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

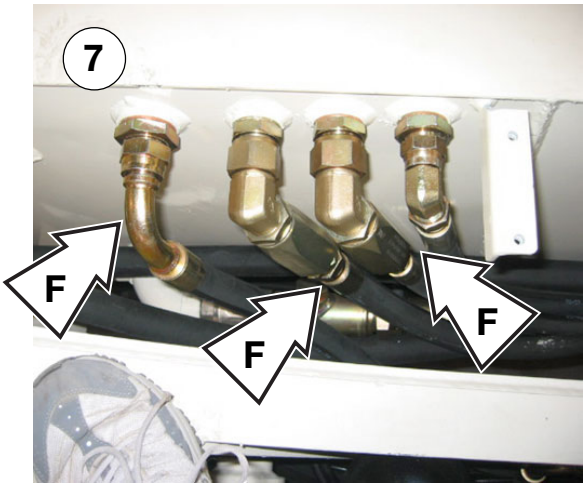


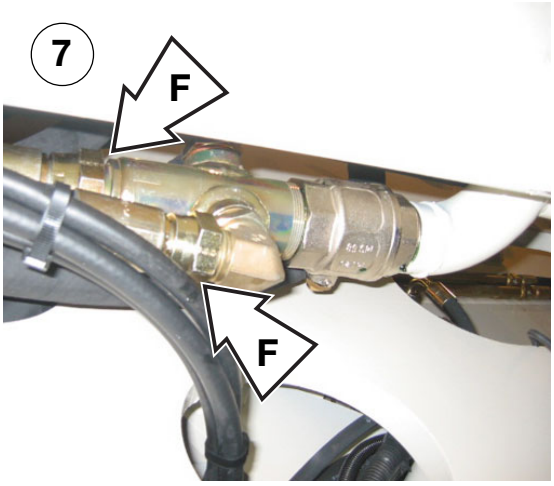
Operation:	Dismantling the hydraulic oil tank and the fuel tanks	Table: G-038

IMPORTANT

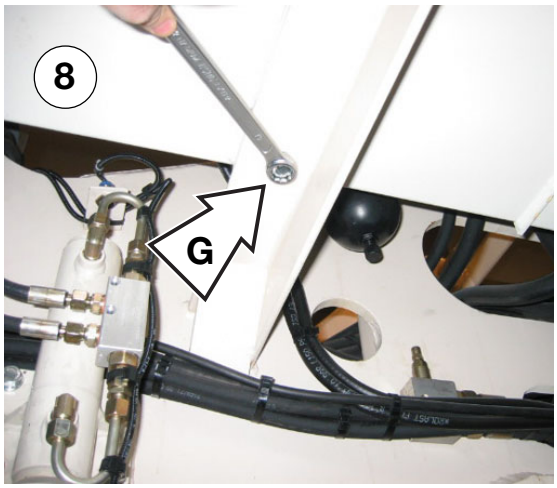
Carefully clean the area around the lines to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.

7 Disconnect all flexible hoses **F** using hexagonal wrenches (41 mm, 50 mm, 46 mm, 38 mm, 32 mm, 27 mm, 55 mm).



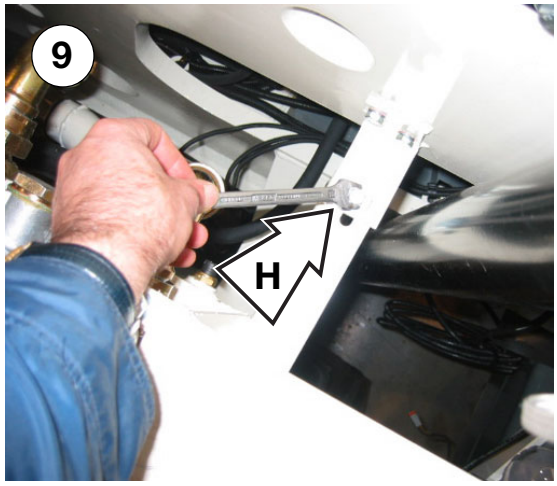


8 Using a 19mm wrench, remove the 4 screws **G** fixing the tanks assy to the turret of the machine.



Operation:	Dismantling the hydraulic oil tank and the fuel tanks	Table: G-038

9 Using two 13mm wrenches, remove the 2 rear screws **H** fixing the tanks assy.



10 Using two 10mm wrenches, remove the fiberglass case on which the machine data plate is applied.

11 Fix the tanks assy firmly using some textile bridles connected to the bridge crane, check that all parts have been loosened, then raise and lower the assy to the ground in a site where it cannot hinder other operations.

Operation: **Power steering disassembly**	Table: **G-039** 3514 ✔ 3518 ✔ 5022 ✔	kg	6,2
			Hrs. 1 / Min. 30
Standard tools			1

Operation:

1 Remove the proetction case underneath the steering wheel using a cross-tip screwing machine to access to the power steering unit.

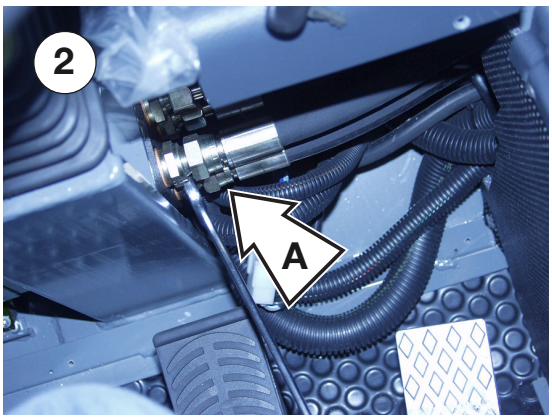
PROTECT THE ENVIRONMENT

Before disconnecting the hydraulic piping, place containers of suitable size underneath to prevent oil spillage.

IMPORTANT

Plug all disconnected parts to prevent dust or impurities from entering the circuit. They can cause serious damage.

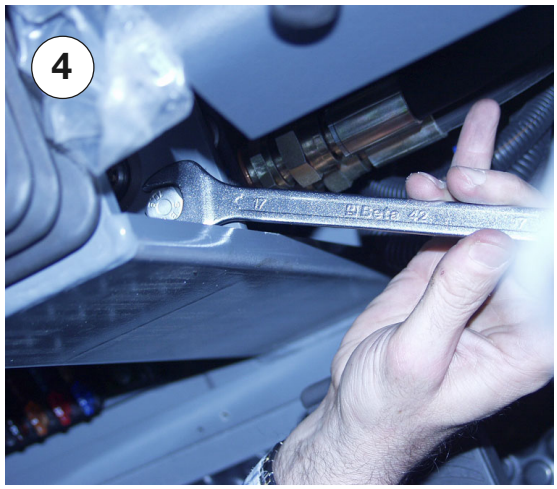
2 With a 27mm hexagonal wrench disconnect the four side pipelines **A**.



Operation: **Power steering disassembly**	*Table:* **G-039**

3 Using a 19mm wrench, disconnect the front flexible hose.

4 With a 17mm hexagonal wrench, remove the four screws fixing the power steering unit to the steering column.

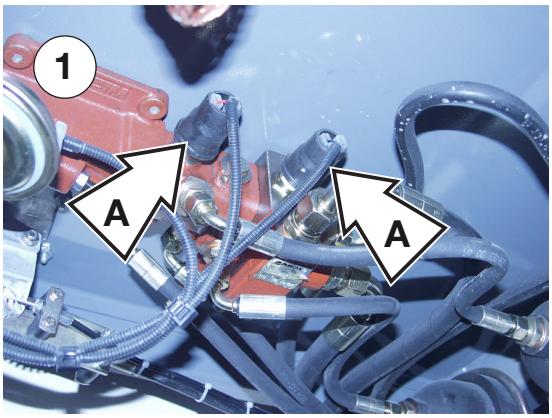


5 Drive out the power steering unit from the bottom.

Operation: **Dismantling the brake pump**	Table: **G-040** 3514 ✔ 3518 ✔ 5022 ✔	kg: 5
		Hrs. 1 / Min. -
Standard tools		1

Operation

1 Move to the base of the cabin and access to the brake pump. Disconnect the two electrical wires **A**.

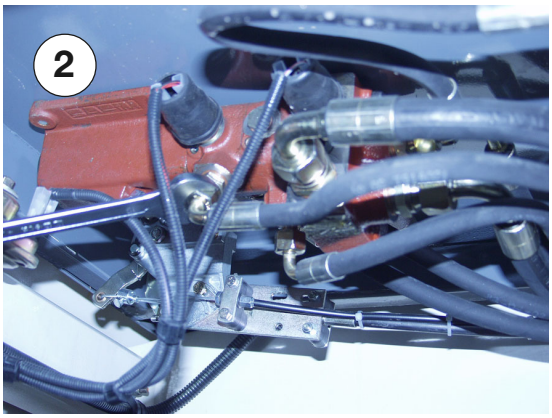


PROTECT THE ENVIRONMENT

Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

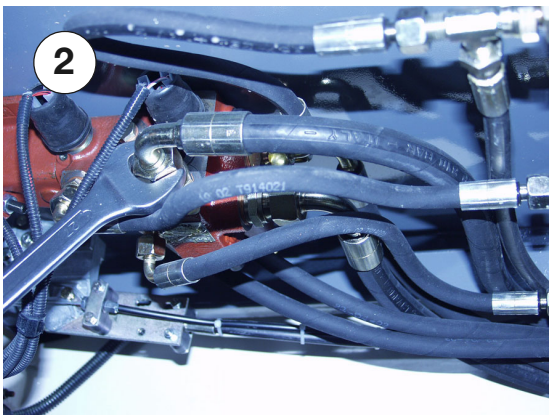
IMPORTANT

Plug all disconnected parts to prevent dust or impurities from entering the circuit. They can cause serious damage.



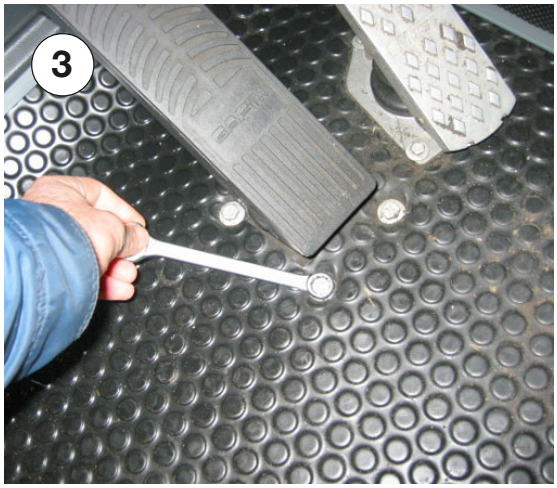
2 Disconnect the flexible hoses:

- n°5 using a 19mm wrench
- n°1 using a 22mm wrench
- n°1 using a 27mm wrench



Operation: **Dismantling the brake pump**	*Table:* **G-040**

3 Remove the 4 fixing screws of the brake pedal using a 13mm wrench. Remove the pedal-brake pump assy.

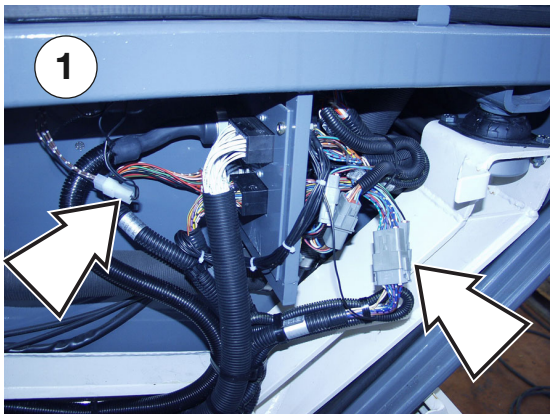


Operation: **Dismantling the cabin assy**	Table: **G-041** 3514 ✔ 3518 ✔ 5022 ✔	kg 450
Bridge crane, payload 5000 kg Textile bridles or chains with hooks	Standard tools	Hrs. 2 Min. 30
		2

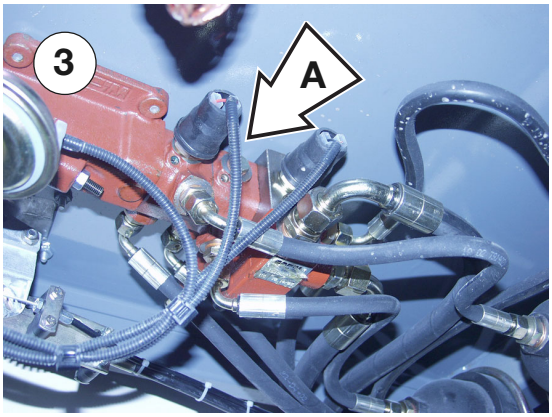
Operation:

1 Cut the plastic fasteners fixing the electrical cables, then disconnect all of the electrical wires.

2 Disconnect the hydraulic lines of the power steering unit (see card G-039) and of the heater (see card G-045).

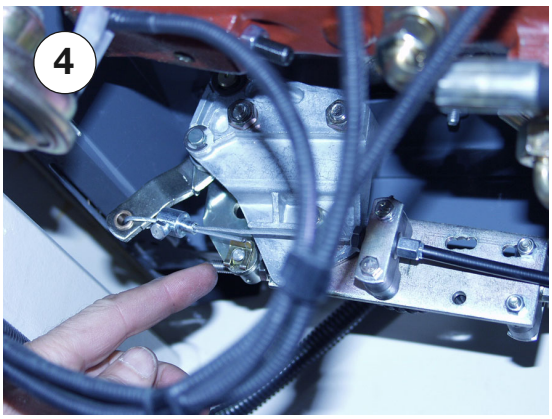


3 Disconnect the electrical and hydraulic connections of the brake pump **A** as per instructions in card G-040.



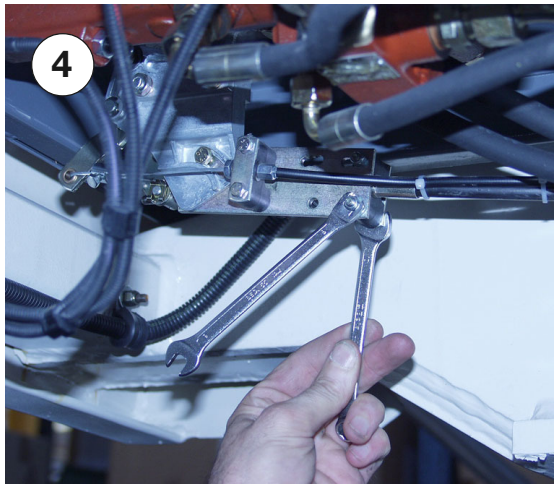
4 Disconnect the wire of the throttle pedal:

- Remove the locking clip



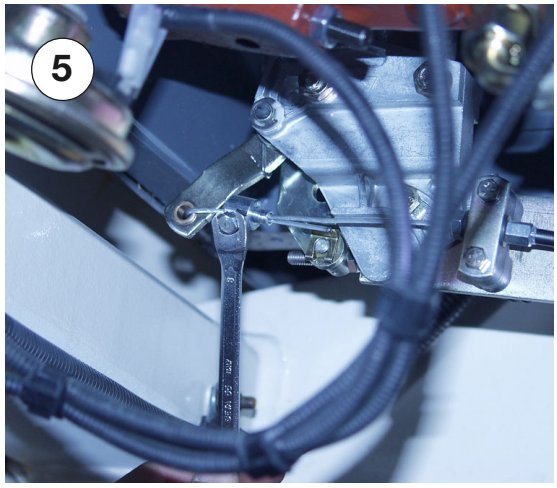
Operation: **Dismantling the cabin assy**	Table: **G-041**

- With two 8mm wrenches remove the screws fixing the throttle cord.

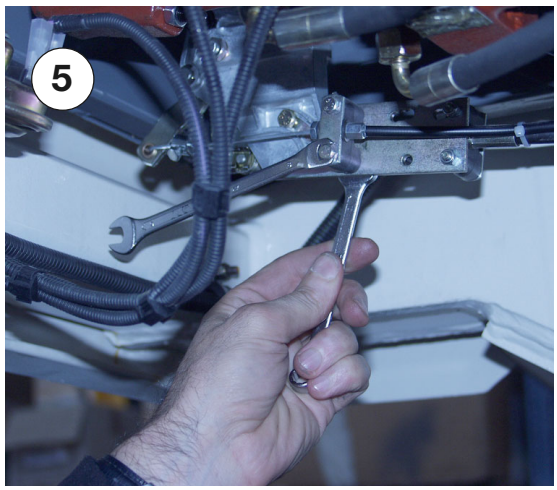


5 Disconnect the wire of the manual throttle:

- With an 8mm wrench disconnect the wire of the manual throttle.

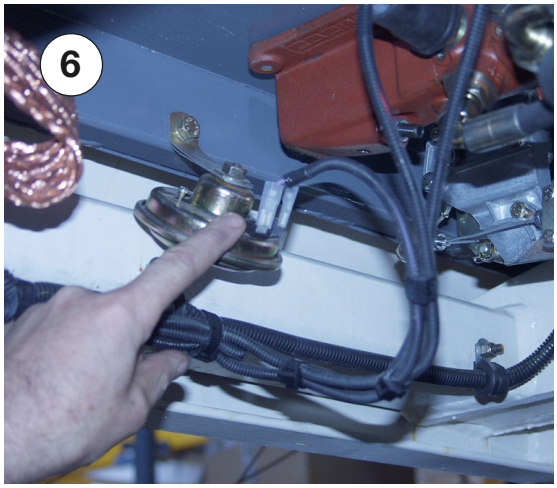


- With two 8mm wrenches remove the screws fixing the throttle bracket.

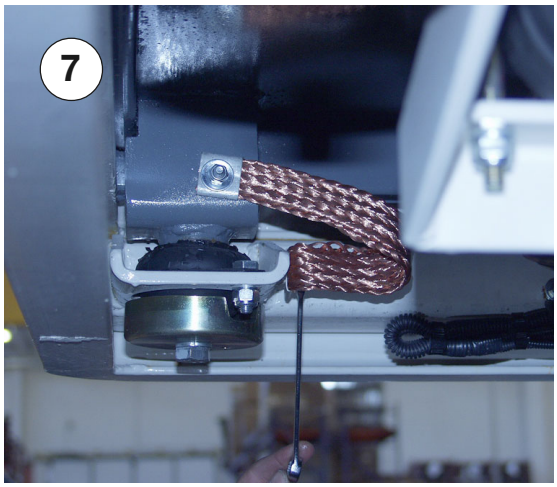


Operation: **Dismantling the cabin assy**	Table: **G-041**

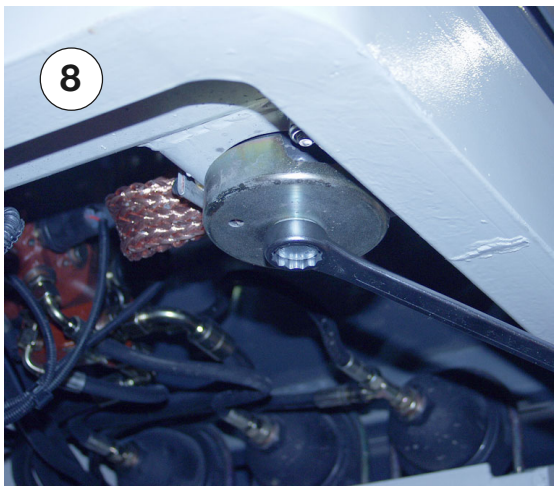
6 Hand-disconnect the power cables of the horn.



7 Using a 13mm wrench, disconnect the earth wire.

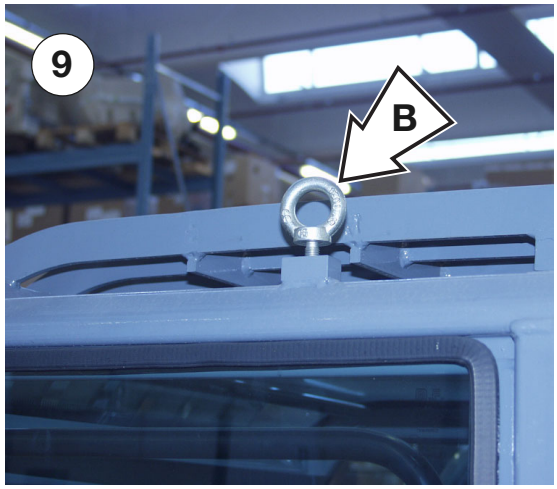


8 Remove the 4 fixing screws of the cabin using a 24mm wrench.



Operation:	Dismantling the cabin assy	Table:
		G-041

9 Fit and screw down two eyebolts **B** to the top of the cabin in the special seats.

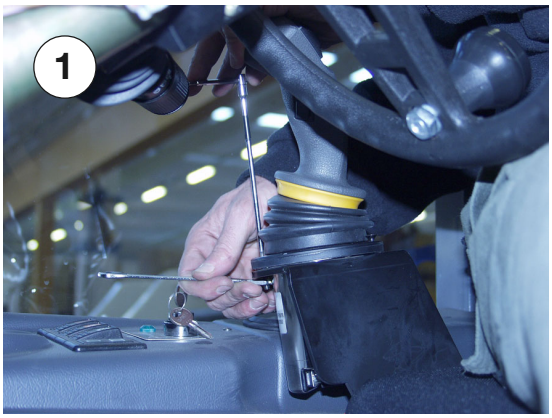


10 Fix a two-leg chain connected to the bridge crane, to the cabin. Raise slowly after having checked that all electrical and hydraulic connections have been disconnected. Avoid crashing against parts of the machine. Lower the cabin to the ground in a site where it cannot hinder other maintenance operations.

Operation: **Dismantling the hand lever (Danfoss)**	Table: **G-042** 3514 ✔ 3518 ✔ 5022 ✔	kg: 1
		Hrs. 1 Min. 30
Standard tools		1

Operation:

1 With a 3mm hexagonal wrench and an 8mm wrench drive out the 4 screws fixing the hand lever to the support.



2 Loosen the screws fixing the outlet on the hand lever using a flat screwdriver.



IMPORTANT

If the boom motions are reversed with respect to the indications in the instruction manual for use and maintenance, move the switches at the bottom of the hand lever.
Move the first switch at the top and check that the manoeuvre is correct. Should that not be the case, move the first switch back to the original position, move the second switch and re-check.



Operation:	Dismantling the hand lever	Table:
		G-042

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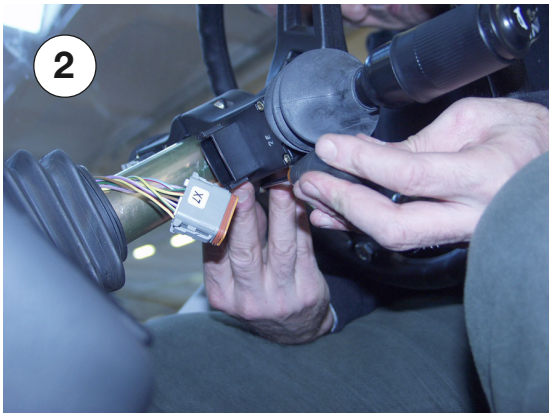
Operation:	Table: G-043				
Dismantling the control levers on the steering wheel	3514 ✔	3518 ✔	5022 ✔	kg	0,5 cad.
					Hrs. / Min.
	Standard tools				- / 15
					1

Operation:

1 Access to the driving place and disconnect the electrical wire before removing the lever.



2 With a star screwdriver, drive out the screw fixing the two parts of the control lever.



3 Separate the two parts and replace the damaged one.

4 Re-assemble checking that the plug on the right switch matches the hole on the steering column. Re-connect the electrical wire.



Operation:	Dismantling the control levers on the steering wheel	Table: G-043

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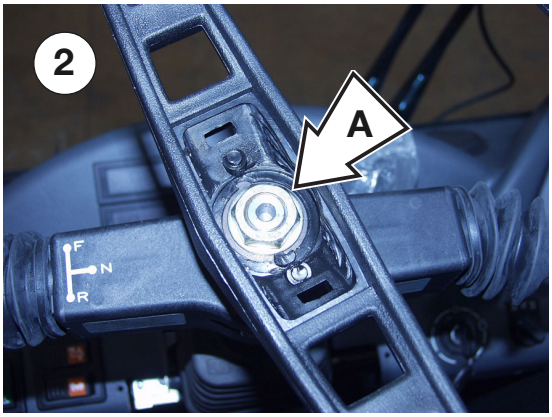
Operation: **Dismantling the steering wheel**	Table: **G-044** 3514 ✔ 3518 ✔ 5022 ✔	kg 1,8
		Hrs. - Min. 10
Standard tools		2

Operation:

1 Access to the driving place and remove the protection cover placed at the top of the steering wheel.



2 With a 27mm socket wrench, remove the ring nut locking the steering wheel **A**.





Operation: **Dismantling the steering wheel**	*Table:* **G-044**

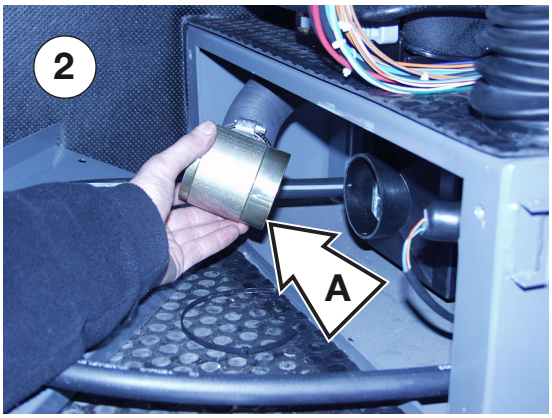
3 Pull the steering wheel while knocking out the terminal on the shaft with a rubber hammer until disconnecting the conical coupling.

Operation: **Dismantling the cab heater**	Table: **G-045** 3514 ✔ 3518 ✔ 5022 ✔	kg: 3
		Hrs. 1 Min. -
Standard tools		1

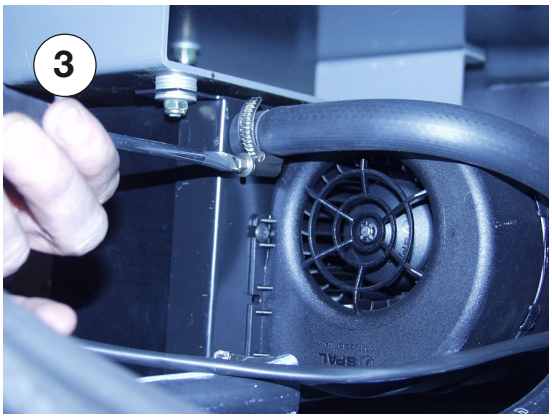
Operation:

1 Remove the panel covering the heater driving out the fixing screws.

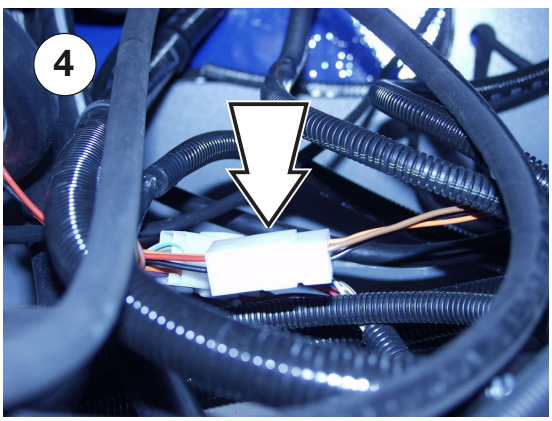
2 Pull out the hot air sleeve **A**.



3 With a straight screwdriver, remove the clamps fixing the water tubes.

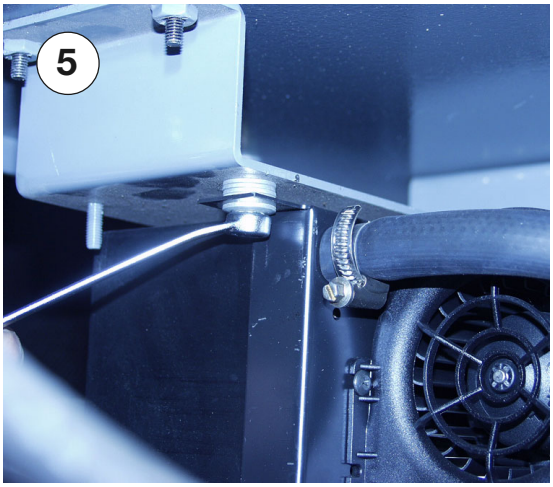


4 Disconnect the electrical wire powering the heater.



Operation: **Dismantling the cab heater**	Table: **G-045**

5 Remove the heater nuts with a 10mm wrench.

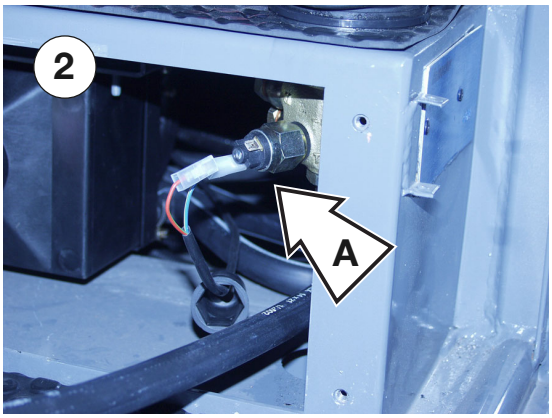


Operation: **Dismantling the parking brake lever**	Table: **G-046** 3514 ✔ 3518 ✔ 5022 ✔	kg 2
		Hrs. - Min. -
Standard tools		1

Operation:

1 Remove the panel under the seat driving out the fixing screws.

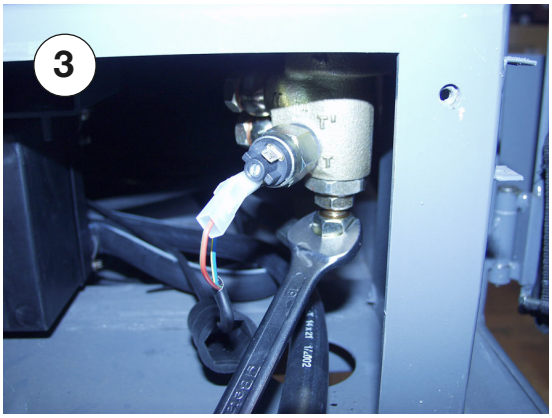
2 Pull out the protection sheathing, then disconnect the electrical wires.



DANGER

Before disconnecting the hydraulic lines, operate the brake lever some 10 times to eliminate any residual pressure from the accumulator.

3 With a 19mm wrench, disconnect the hydraulic lines.

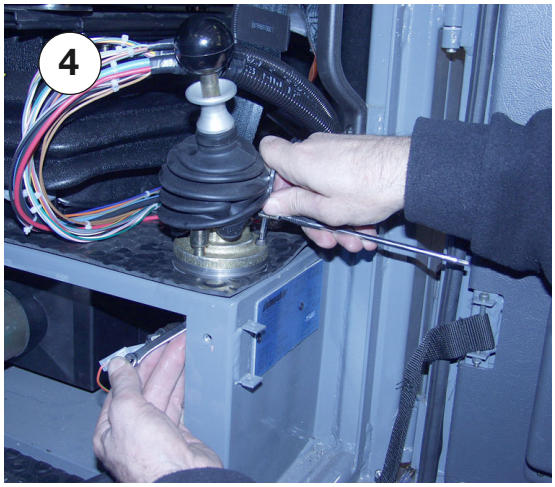


PROTECT THE ENVIRONMENT

Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

Operation:	Dismantling the parking brake lever	Table:
		G-046

4 With a 5mm wrench and a 10mm wrench, remove the 3 fixing screws of the parking brake lever.



IMPORTANT

During re-assembly, fit, together with the front screw, also the lever end-of-stroke spacer.

Operation:	Adjusting the distance of the proximity switches	Table: G-047			kg	-
		3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
	Standard tools				-	15
					1	

Operation:

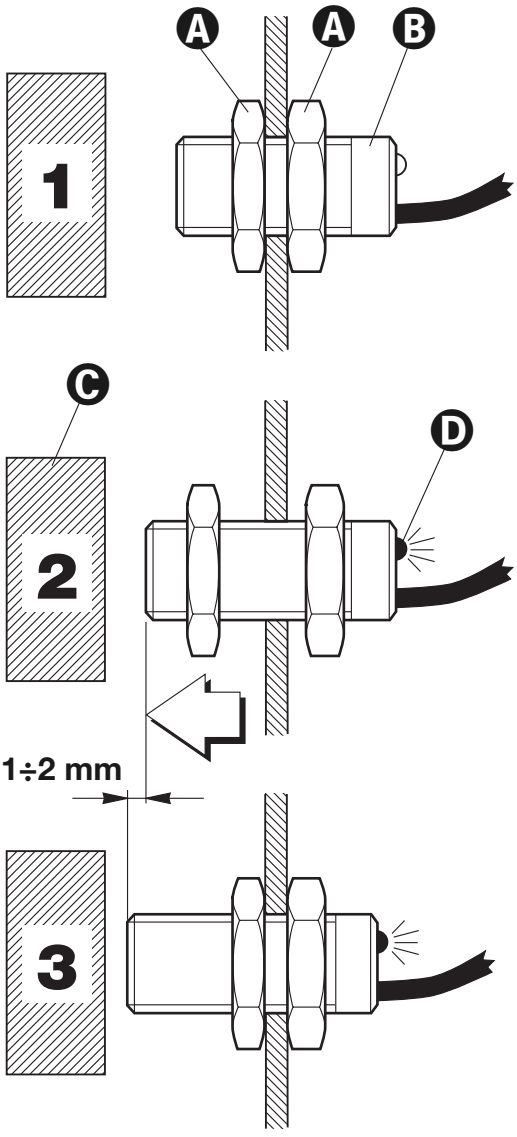
In case of a failure or complete malfunctioning of the proximity switches due to a loosening of their ring nuts, re-adjust as follows:

1 Loosen nuts **A** fixing the proximity switch **B**.

2 Near the mobile part **C** of the machine, controlled by the proximity switch.
Near the proximity switch to the component until the LED indicator **D** will come on.

3 Near the proximity switch another 1÷2 mm. Smoothly tighten the proximity switch fixing nut and the relevant lock nut.

The machine is equipped with a proximity switch on the parking brake. This switch prevents the machine start-up when the parking brake is not engaged.



ATTENTION

Tighten the nuts of the proximity switch to 15 Nm.

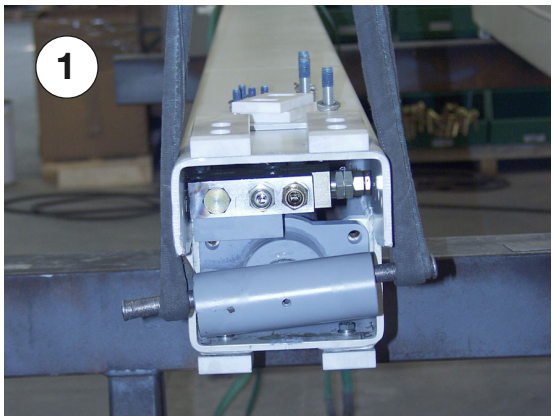
Operation:	Adjusting the distance of the proximity switches	Table: G-047

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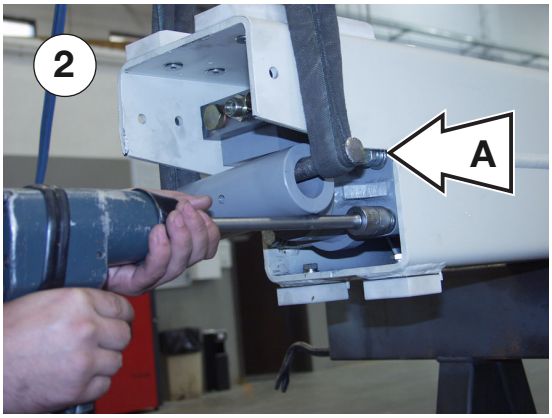
Operation: **Installing the boom assy**	Table: **G-048**			kg	2300
	3514 ✔	3518 ☐	5022 ☐		Hrs. / Min.
Bridge crane, payload 5000 kg (20000 lb) Textile bridles or chains with hooks Forklift	Standard tools Special wrenches (see A-06)			12	-
				1+1	

Operation:

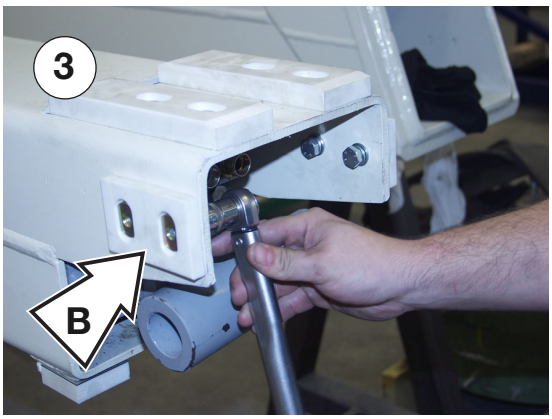
1 Sling the extension cylinder firmly and fit it into the third telescope.



2 Fit the screws **A** with the relevant washers, smear them with some threadlocking liquid and screw down without tightening using a screwing tool and a 22mm wrench with extension.
With a dynamometric wrench, tighten to a torque of 150 Nm.

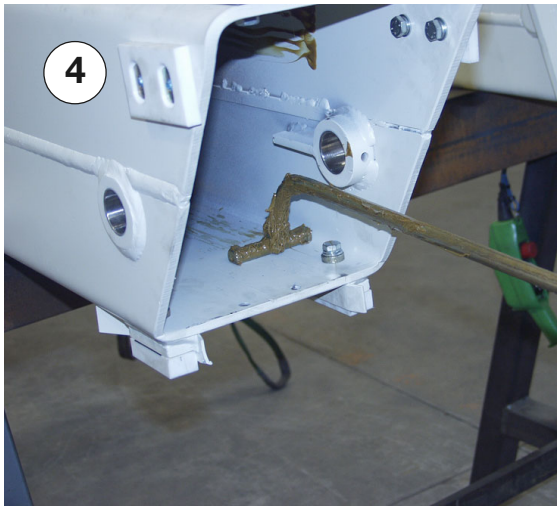


3 Fit to both sides of the telescope the sliding blocks **B** and tighten the screws to a torque of 30 Nmwith a 17mm dynamometric wrench.

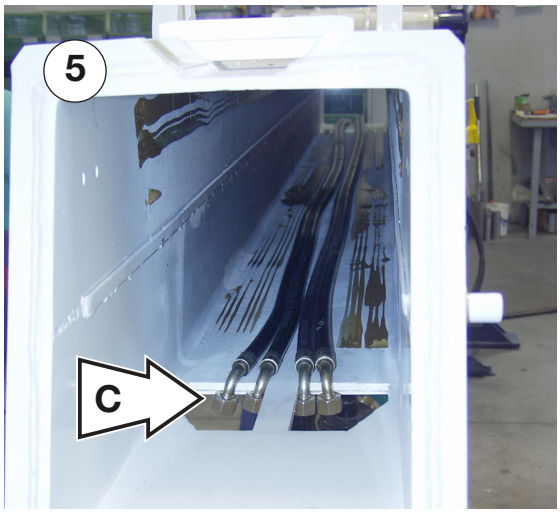


Operation: **Installing the boom assy**	Table: **G-048**

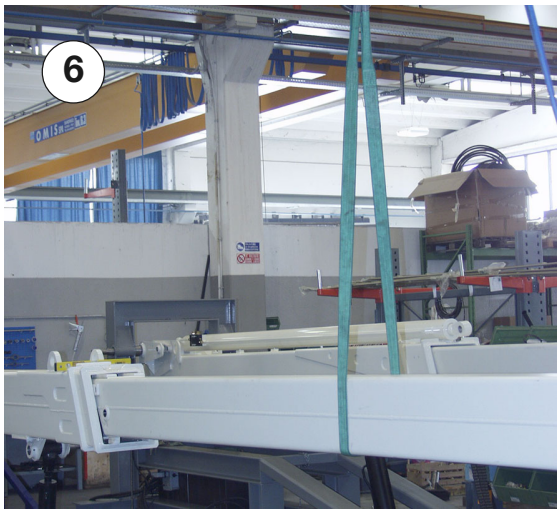
4 Smear the first telescope with some Interflon LS grease in the vicinity of the sliding areas of the blocks.



5 Position the hydraulic hoses **C** inside the first telescope.

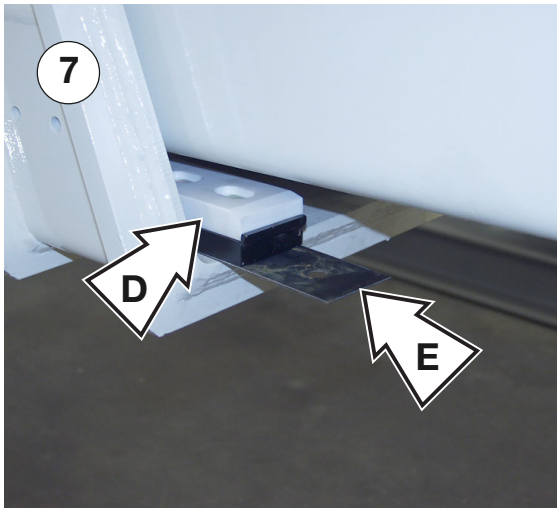


6 Fix the second boom telescope with a textile bridle connected to the bridge crane and fit the second telescope into the first one.

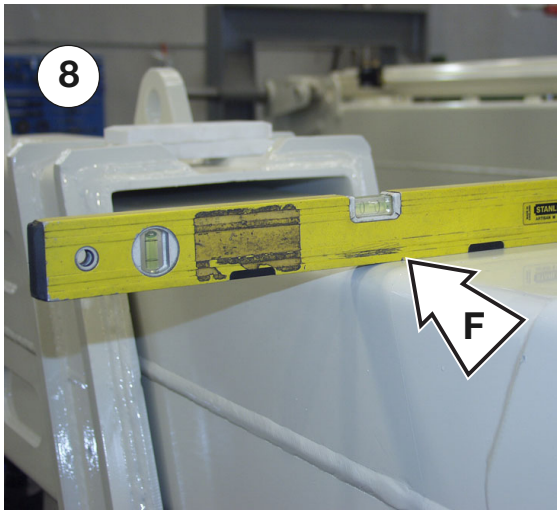


Operation:	Installing the boom assy	Table:
		G-048

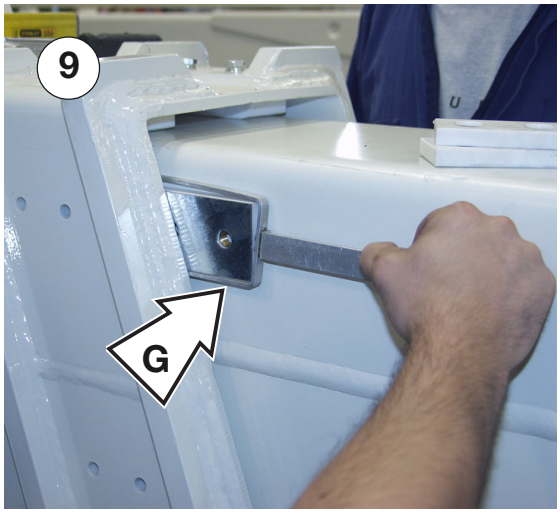
7 Hold the second telescope slightly raised with a rope connected to the bridge crane; fit the bottom blocks **D** with shims **E** in-between and tighten the screws of the blocks to 30 Nm with a dynamometric wrench.



8 With a water level **F** check that the second telescope is level.



9 Fit the side blocks to the first telescope (2 per side) using the special wrench **G** (see A-06 dwg.03).



Operation: **Installing the boom assy**	Table: **G-048**

10 Slowly move the second telescope into the first one using a forklift. Pay attention not to damge the hoses already fitted inside.

11 Fix the third boom telescope with a textile bridle connected to the bridge crane, and fit the third telescope into the second one.



12 Drive in the bottom pin fixing the attachment holding frame to the nose and, with a water level, check that the pin is level.

13 Fit if necessary, shims to the sliding blocks of the third telescope until reaching a clearance of at least 1 mm.

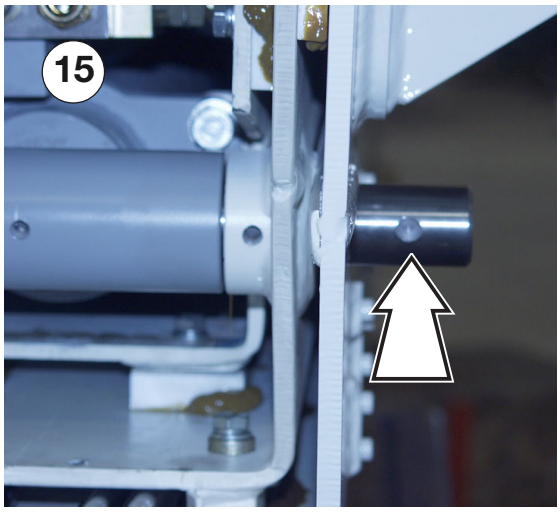
14 Fully drive the third telescope in the second one.



15 Fit the fixing pin of the third telescope cylinder on the rod side.

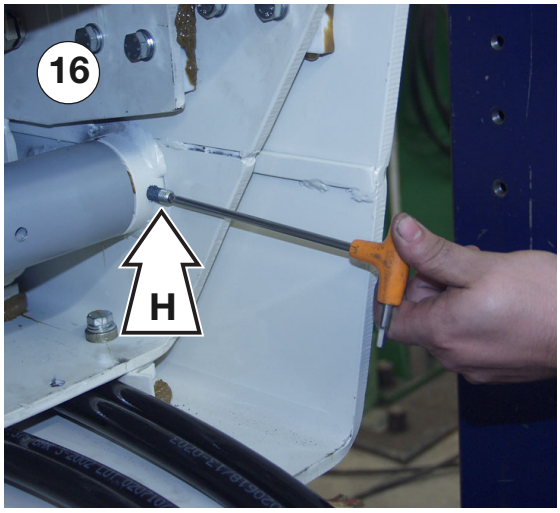
IMPORTANT

Check that the blind hole on the pin matches the hole on the bushing for the subsequent introduction of the grubscrew.



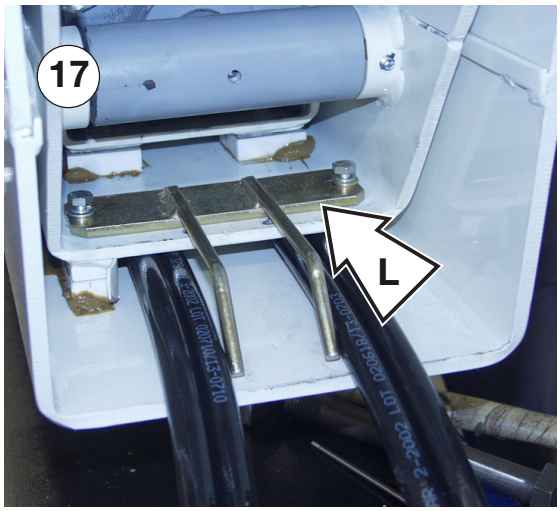
Operation:	Installing the boom assy	Table:
		G-048

16 Tighten the grubscrew **H** with a 5mm hexagonal wrench after smearing the screw with some drops of the threadlocking liquid.

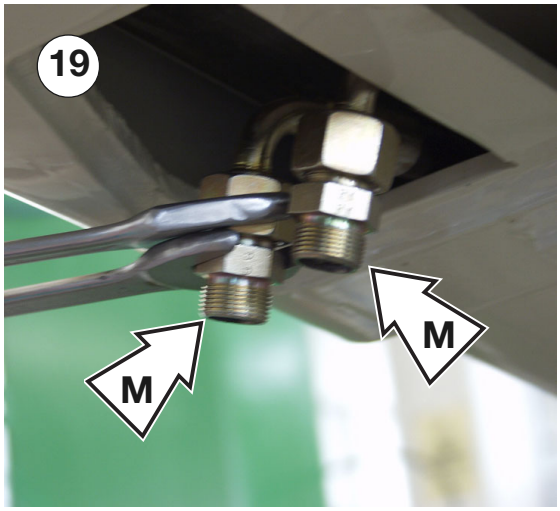


17 Fit the flexible hose bracket **L** and fix it with a 17mm wrench.

18 Mount the extension cylinder of the second telescope following the procedure opposite to the one indicated in card G-011.

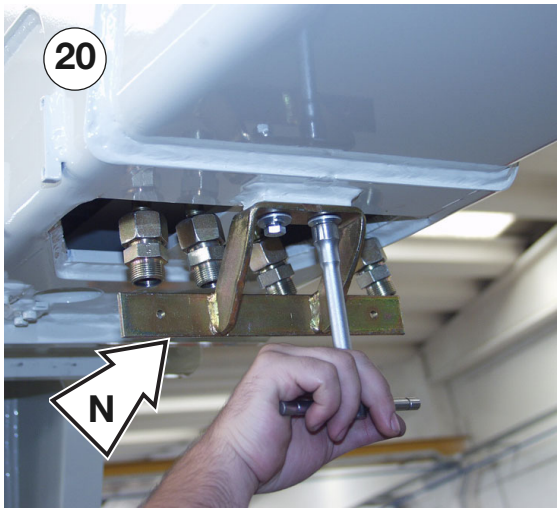


19 Fit couplings **M** to the flexible hoses inside the boom and tighten with a 27mm wrench and a 30mm wrench.

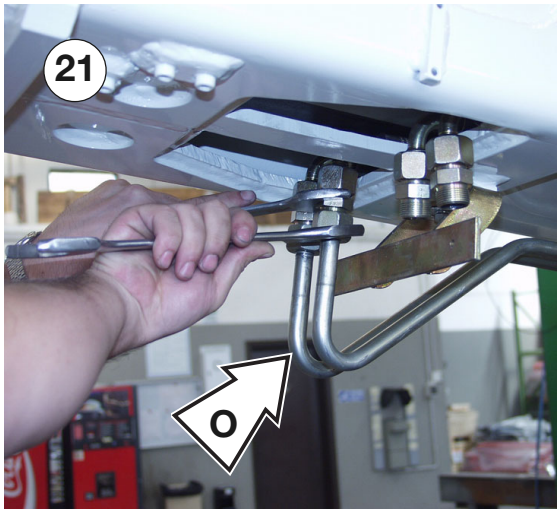


Operation: **Installing the boom assy**	Table: **G-048**

20 Fit the pipe bracket **N** and tighten with a 13mm wrench.



21 Fit pipes **O** using a 30mm wrench to tighten the nuts and a 27mm wrench for the couplings.

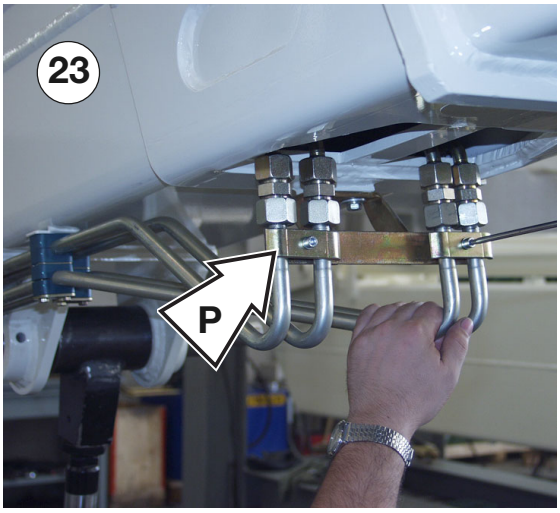


22 Fit the clamps where necessary and tighten their screws with a 10mm wrench. The screws of the special clamps fixing two tubes at a time shall be tightened with an 11 mm wrench.

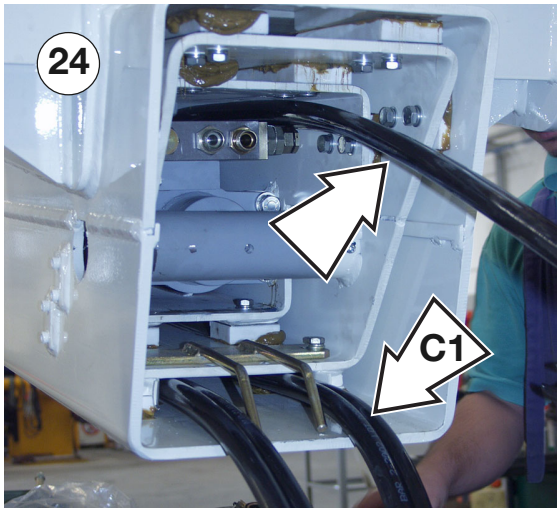


Operation: **Installing the boom assy**	Table: **G-048**

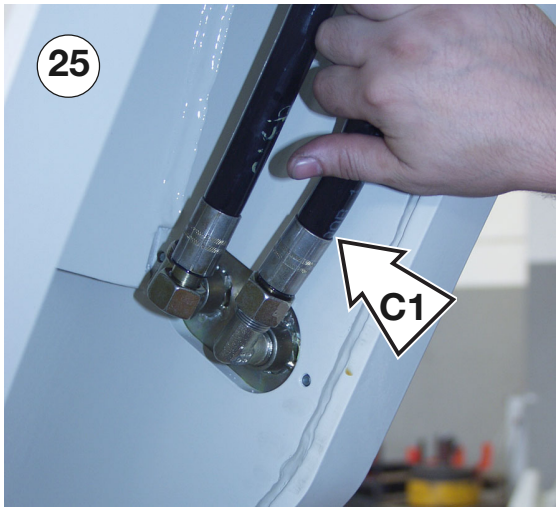
23 Fit the iron plates **P** to the pipe bracket using a 5mm hexagonal wrench.



24 Fit the flexible hoses inside the third telescope. Check their correct position and that they come out of the internal part of the nose.

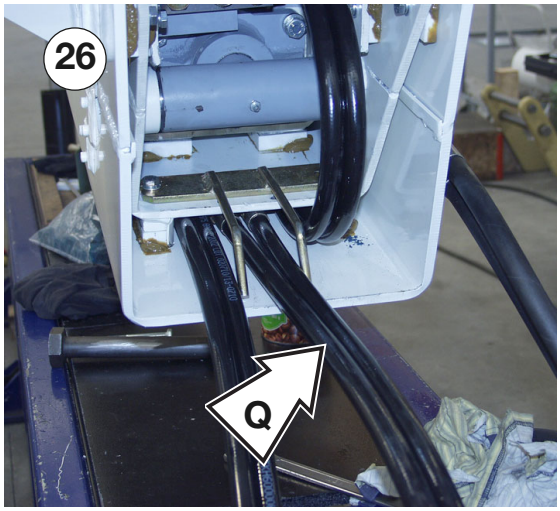


25 With a 27mm wrench, tighten hoses **C1** to the grommet after placing the internal hose to the external coupling (machine side). Set the line under pressure until the hoses stay correctly, then tighten the hose clamps.

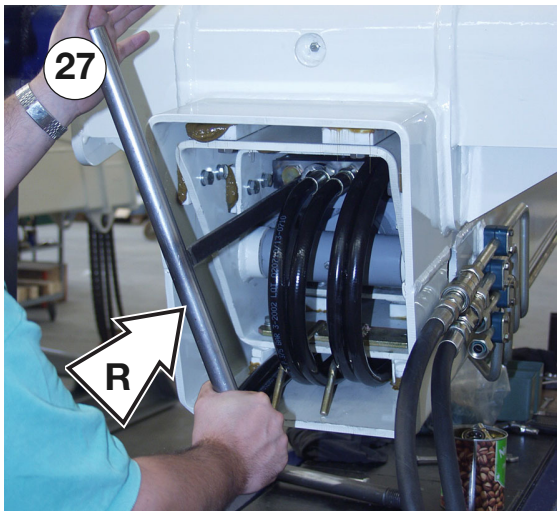


Operation: **Installing the boom assy**	Table: **G-048**

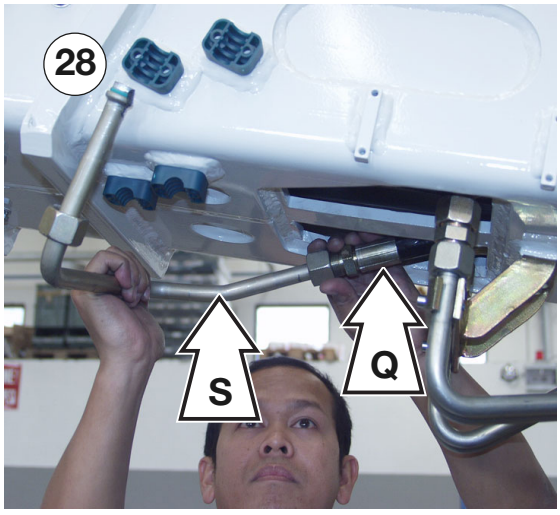
26 Fit the double line **Q** feeding the extension cylinder to the central part of the bracket.



27 With the special wrench **R** connect the double line to the block valve of the third telescope extension cylinder. For the preparation of the wrench **R** see A-06 dwg.04

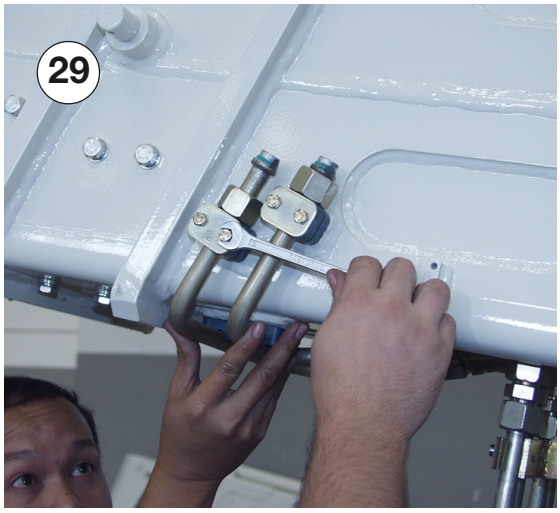


28 Connect the outputs of the double line **Q** on the nose side to pipes **S** using a 27mm wrench and a 30mm wrench.

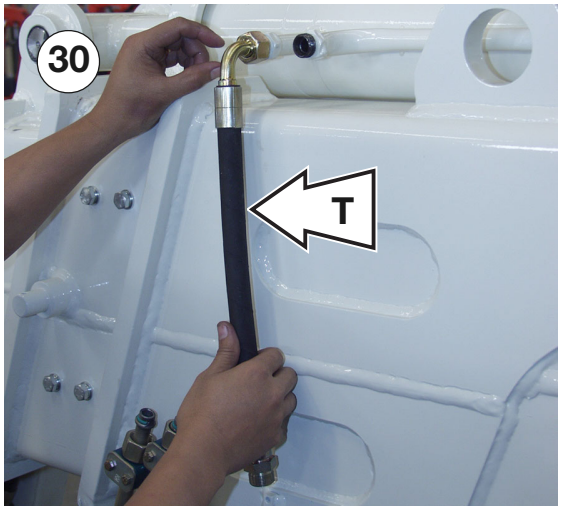


Operation:	Installing the boom assy	Table:
		G-048

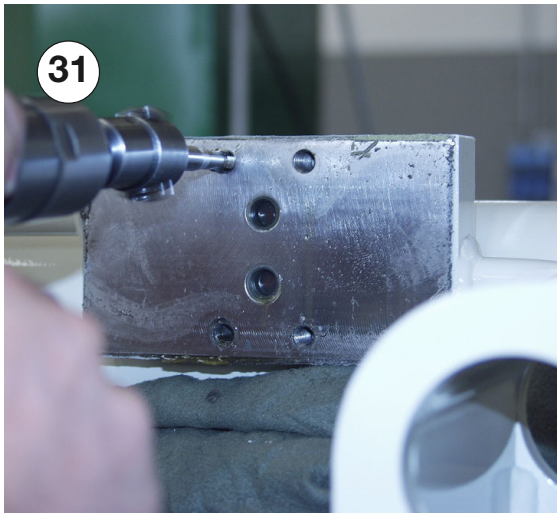
29 Place and tighten the hose clamps with a 10mm wrench.



30 Connect the outputs of the extension cylinder to pipes **S** placing hoses **T** in-between. For the assembly, use a 27mm wrench and 30mm wrench.

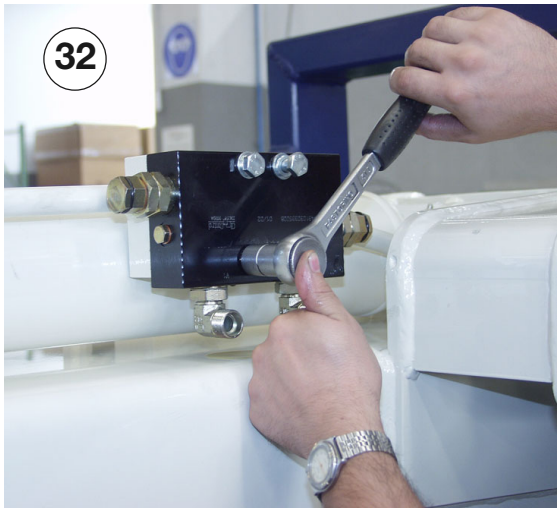


31 Re-thread M10 the threaded holes of the plate of the second telescope extension cylinder. Remove all the impurities with some compressed air.



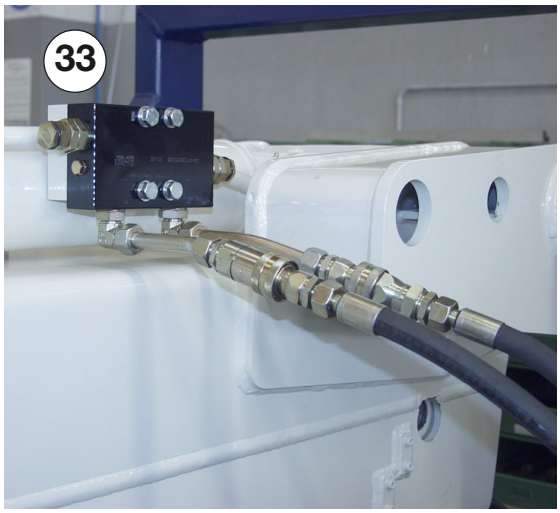
Operation: **Installing the boom assy**	*Table:* **G-048**

32 Fit the block valve with the couplings placed downwards. Fix the valve with a 17mm wrench.

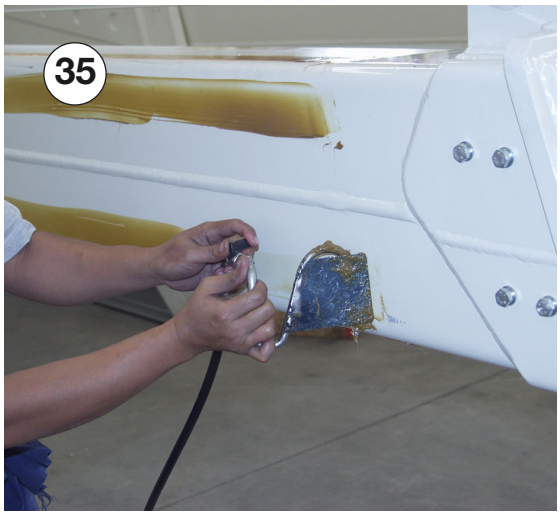


33 Connect the flexible hoses with a quick coupling as shown.

34 Set the circuit under pressure and extend the boom of some 10 cm. Fully retract the boom and hold the retract system over relief to eliminate the air.

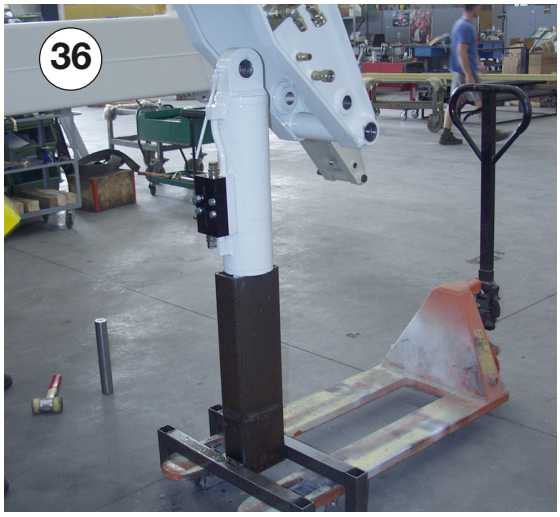


35 Fully extend the boom and smear the sliding areas with blocks with some Interflon LS2 grease.



Operation:	Installing the boom assy	Table:
		G-048

36 Move the fork pitching cylinder near the boom and let the hole on the cylinder match the one on the nose.

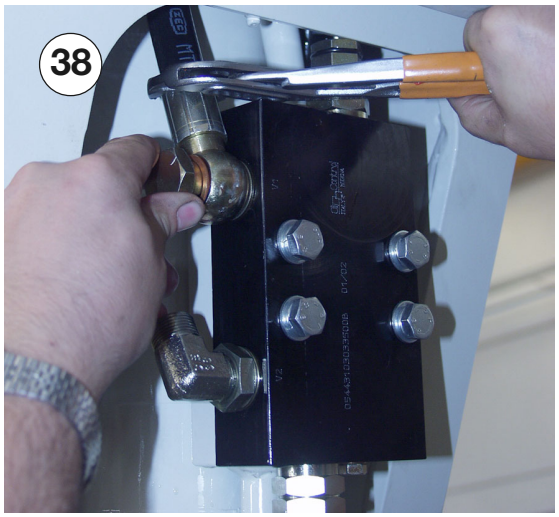


37 Fit the fixing pin and lock it with a screw and a nut using two 19mm wrenches.



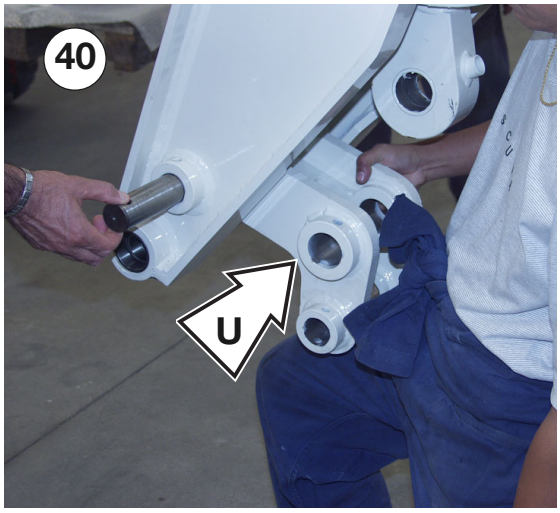
38 Connect the line with eye terminal to the block valve while slightly pulling the other line with a Polygrip wrench (Beta 1048-240). In so doing, the hose with eye terminal will form a slight curve and rest on the cylinder. Tighten the drilled pin with a 27mm wrench.

39 Connect the line with straight terminal to the 90° coupling fitted to the block valve using a 27mm wrench.

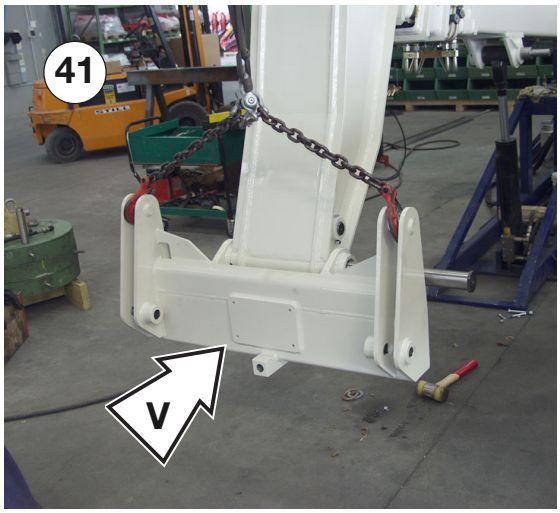


Operation:	Installing the boom assy	Table:
		G-048

40 Fit the connecting rod **U** to the nose, drive in the special pin and fix with a screw and a nut using a 17mm wrench.



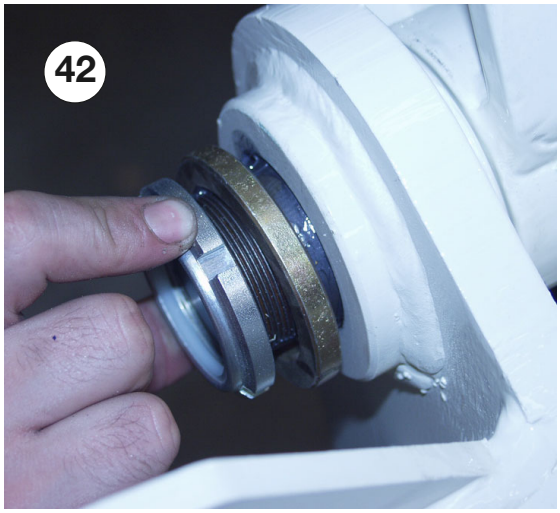
41 Raise the attachment holding frame **V** with a two-leg chain connected to the bridge crane and place it near the fixing hole of the nose.



42 Drive in the fixing pin of the attachment holding frame and lock in position with the special ring nut placing the shim provided in-between. Tighten the locknut with a USAG 282 SN 50-80 wrench.

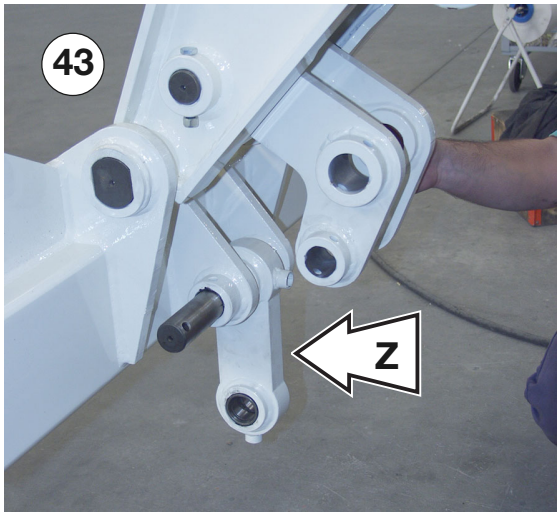
IMPORTANT

Thoroughly grease the seats of the pins to drive them in easier.

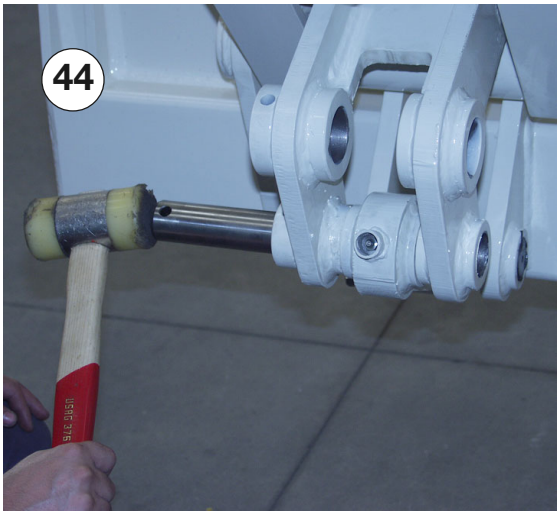


Operation: **Installing the boom assy**	Table: **G-048**

43 Fit the straight connecting rod **Z** as shown. Fit the locking pint and tighten the locknut to the screw with a 17mm wrench.



44 Fit the pin connecting the connecting rods and knock it lightly home with a rubber hammer. Fit a screw and a nut and lock with a 17mm wrench.



45 Connect the connecting rod **U** to the fork pitching cylinder driving in the relevant pin. Fit a screw and a locknut and lock with a 19mm wrench.

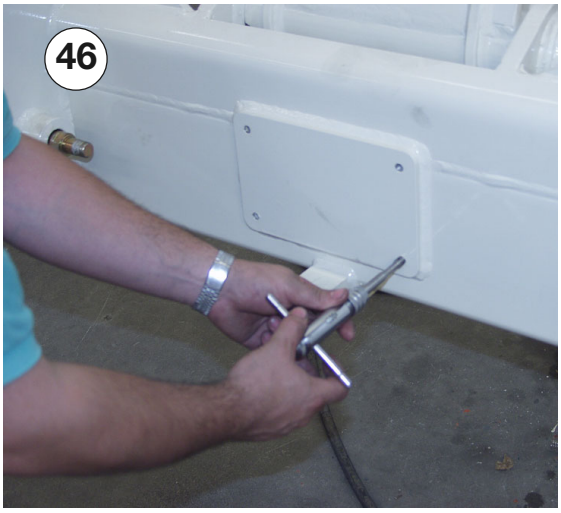


IMPORTANT

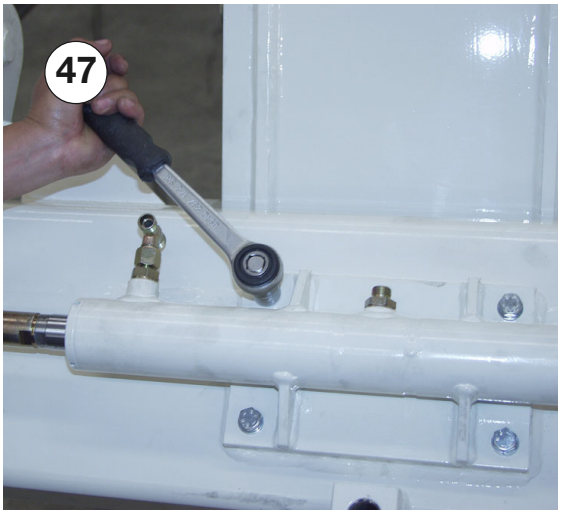
After the connections, lubricate the pins fitting a greasing gun into the greasing nipples. Check the good result of the operation.

Operation: **Installing the boom assy**	Table: **G-048**

46 Thread M10 the 4 holes on the plate of the attachment locking cylinder.



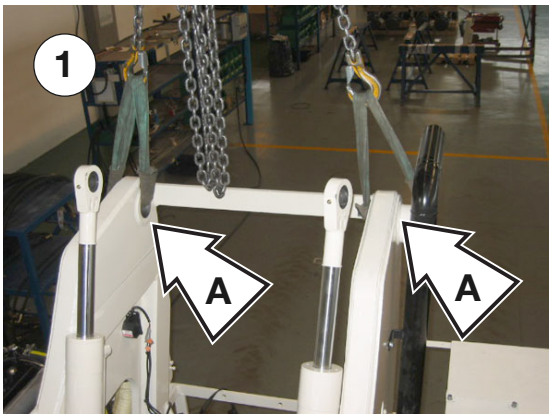
47 Fit the attachment locking cylinder following the procedure opposite to the one indicated in card G-006.

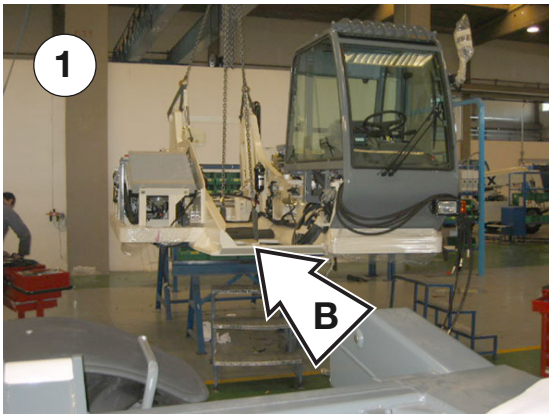


Operation: **Turret installation**	Table: **G-049**			kg	3514/18=**1080** 5022=**2498**
	3514 ✔	3518 ✔	5022 ✔		
Bridge crane, payload 5000 kg (20000 lb) Textile bridles or chains with hooks Forklift	Standard tools				Hrs. **-** Min. **30** **1**

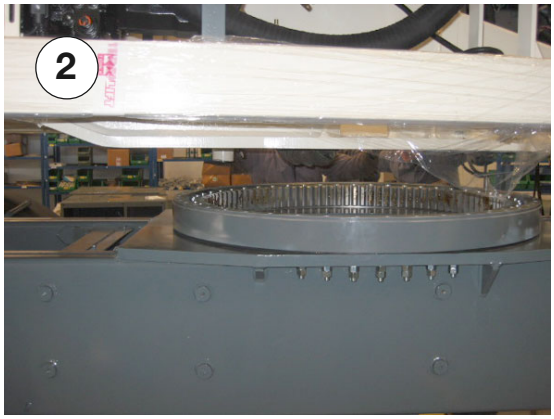
Operation:

1 Fix the turret firmly securing some textile bridles connected to the bridge crane, to the fixing points **A** of the boom and to holes **B** of the seat of the rotation reduction gear and the electro-hydraulic swivel joint.



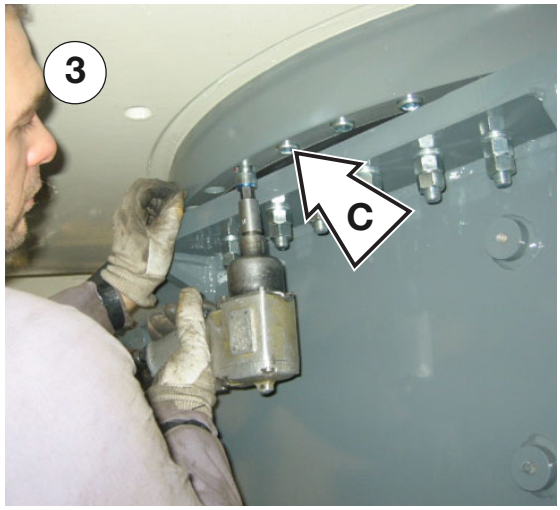


2 Slowly move the turret toward the undercarriage and avoid any contact between the two parts. Move the part of the turret where the fixing holes are present near the slewring.
Lower the turret and check it is level.



Operation: Turret installation	Table: G-049

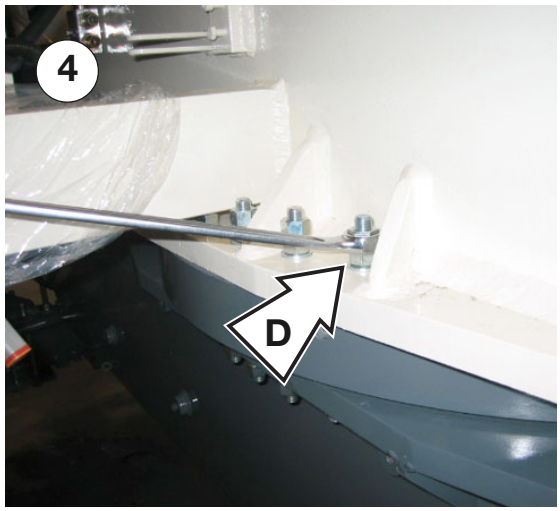
3 Move under the slewring and fit 20 screws M16x100 ref. **C**. Smear the screws with some threadlocking liquid before. Use a screwing tool with a 14mm hexagon wrench.



ATTENTION

To refit all of the screws, turn the turret by means of a bridge crane. Check that nobody is under the turret during this operation.

4 Fit the 28 stay-bolts **D** using the relevant washers and two fixing nuts per bolt. For this operation, use a screwing tool with a 14mm hexagonal wrench and a 24mm wrench for tightening the nuts.



IMPORTANT

In the Girolift 3514 - 3518 models the fixing screws of the turret on the slewring are of class 10.9 and shall be tightened with a dynamometric wrench to a torque of 293.8 Nm.
In the Girolift 5022 models, the screws are of class 12.9 and shall be tightened to a torque of 353 Nm.

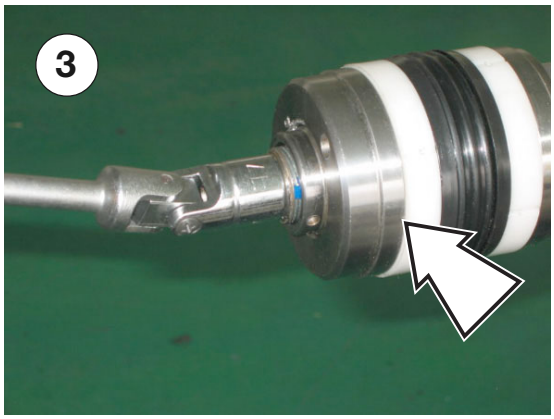
Operation: **Dismantling the re-sequencing valve**	Table: **G-050** 3514 ✔ 3518 ☐ 5022 ☐	kg: 2
Bridge crane, payload 500 kg (2000 lb) Textile bridles or chains with hooks Forklift	Standard tools	Hrs.: 2 — Min.: -
		1

Operation:

1 Remove the extension cylinder on which you shall intervene as per instructions contained in card G-010 or G-011

2 Extend the cylinder to free the rod as indicated in card G-002

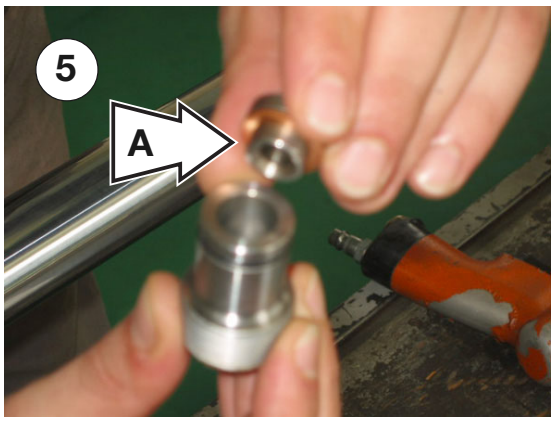
3 With a 17mm socket spanner loosen the rod re-sequencing valve



4 Remove the valve out of its seat and close the seat to impurities from entering inside.

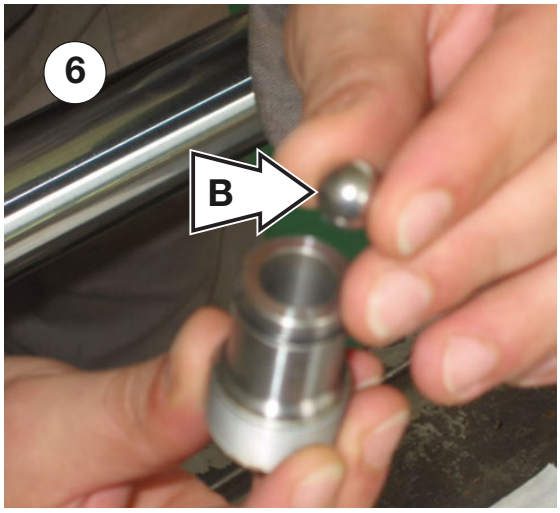


5 Disconnect the valve removing cap **A**

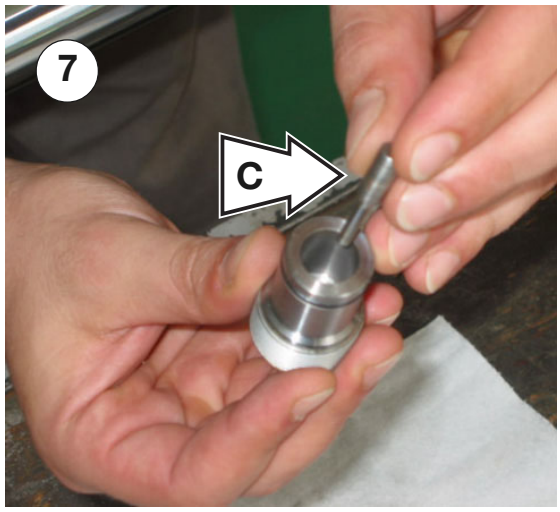


Operation:	Dismantling the re-sequencing valve	Table:
		G-050

6 Remove the ball **B**



7 Pull out the slider **C**



8 Clean all of the removed components thoroughly, then re-assemble the valve repeating the steps above in reversed sequence

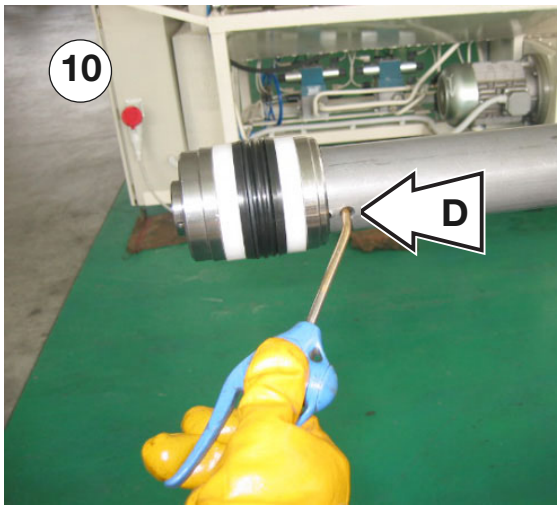


Operation:	Dismantling the re-sequencing valve	Table:
		G-050

9 Smear the valve with some threadlocking liquid before refitting the valve to the seat on the rod

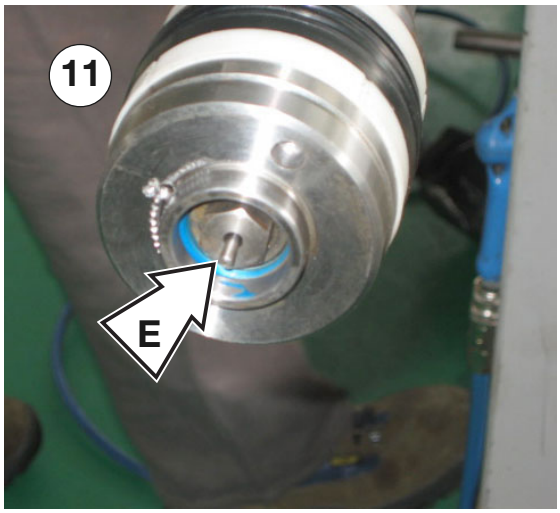


10 Check the efficiency of the valve as follows. Fit the nozzle of a compressed air gun into hole **D** on the rod, immediately after the seal pack, then blow some air



11 If the valve is efficient, the small piston **E** moves outwards avoiding air from coming out

12 Re-assemble and refit the cylinder to the machine



Operation:	Dismantling the re-sequencing valve	Table: G-050

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Operation: **Assembling the boom chain**	Table: **G-051** 3514 ☐ 3518 ☑ 5022 ☑	kg: see table
Bridge crane, payload 5000 kg (20000 lb) Textile bridles or chains with hooks	Standard tools	Hrs. 10 / Min. -
		2

Weights:

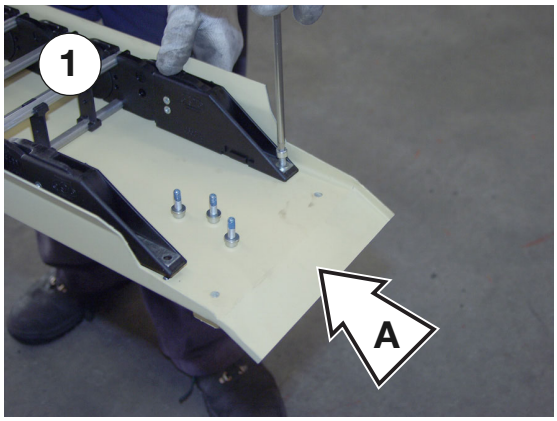
Chain ..... 25 kg
Iron chain cover ..... 22 kg
Chain c/w cable and lines ..... 80 kg
Complete chain and chain cover ..... 126 kg

Procedure to assemble chain and chain cover:

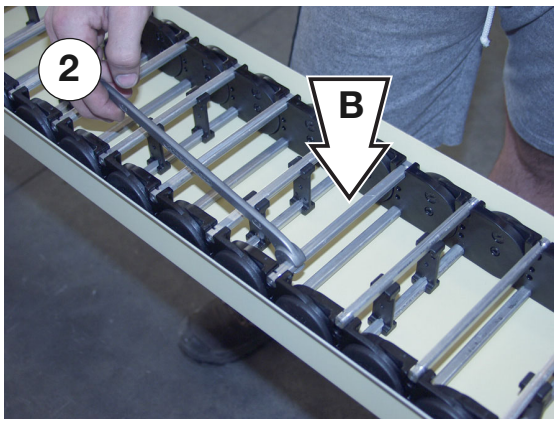
1 Place the plastic chain on cover **A** and, with a 5mm hexagonal wrench, fit and tighten the fixing screw after having checked that the two parts are parallel.

IMPORTANT

Before assembly smear the chain screws with some threadlocker.

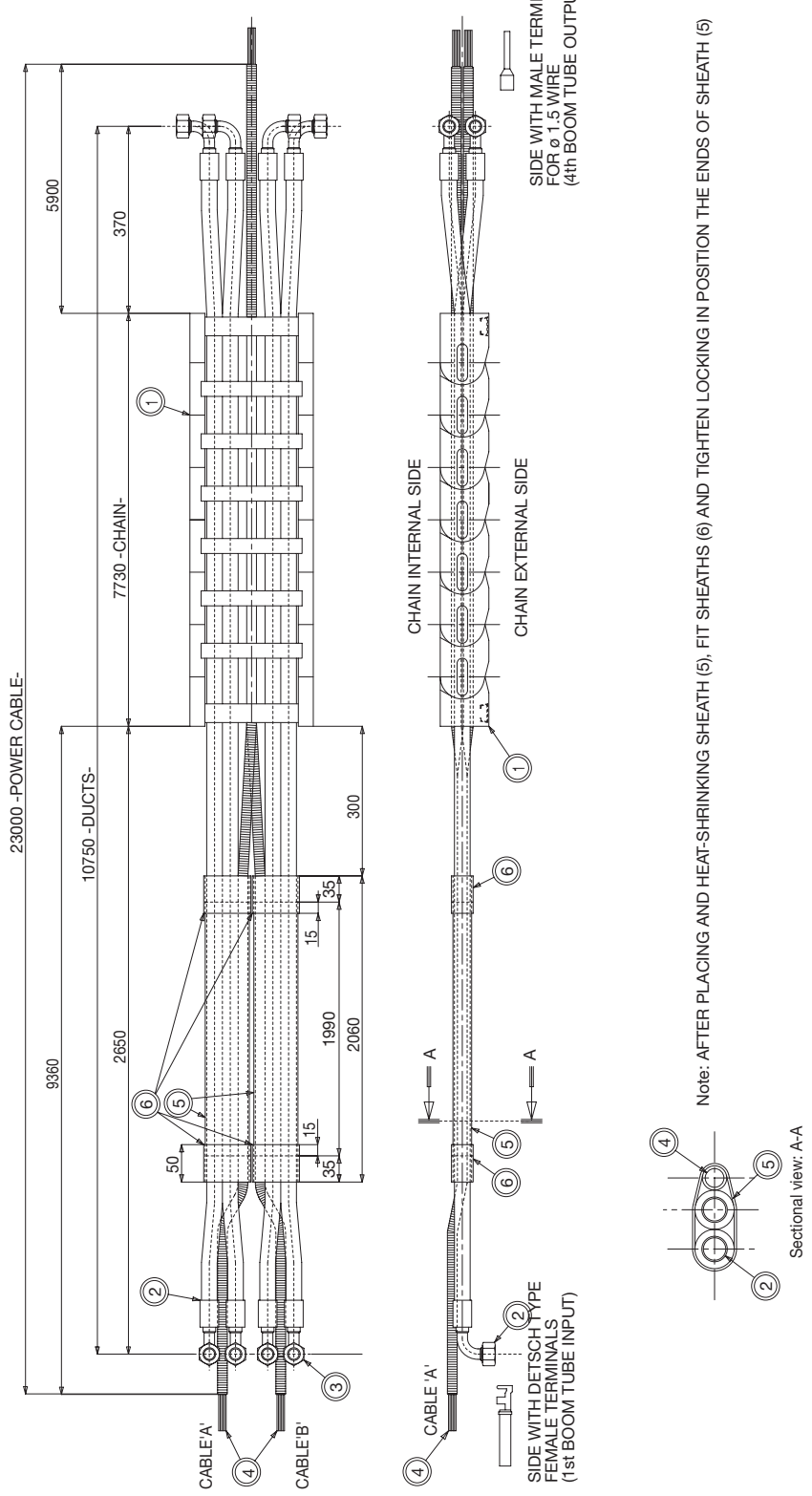


2 Remove all carriers **B** of the chain using the special wrench (see paragraph A.06).



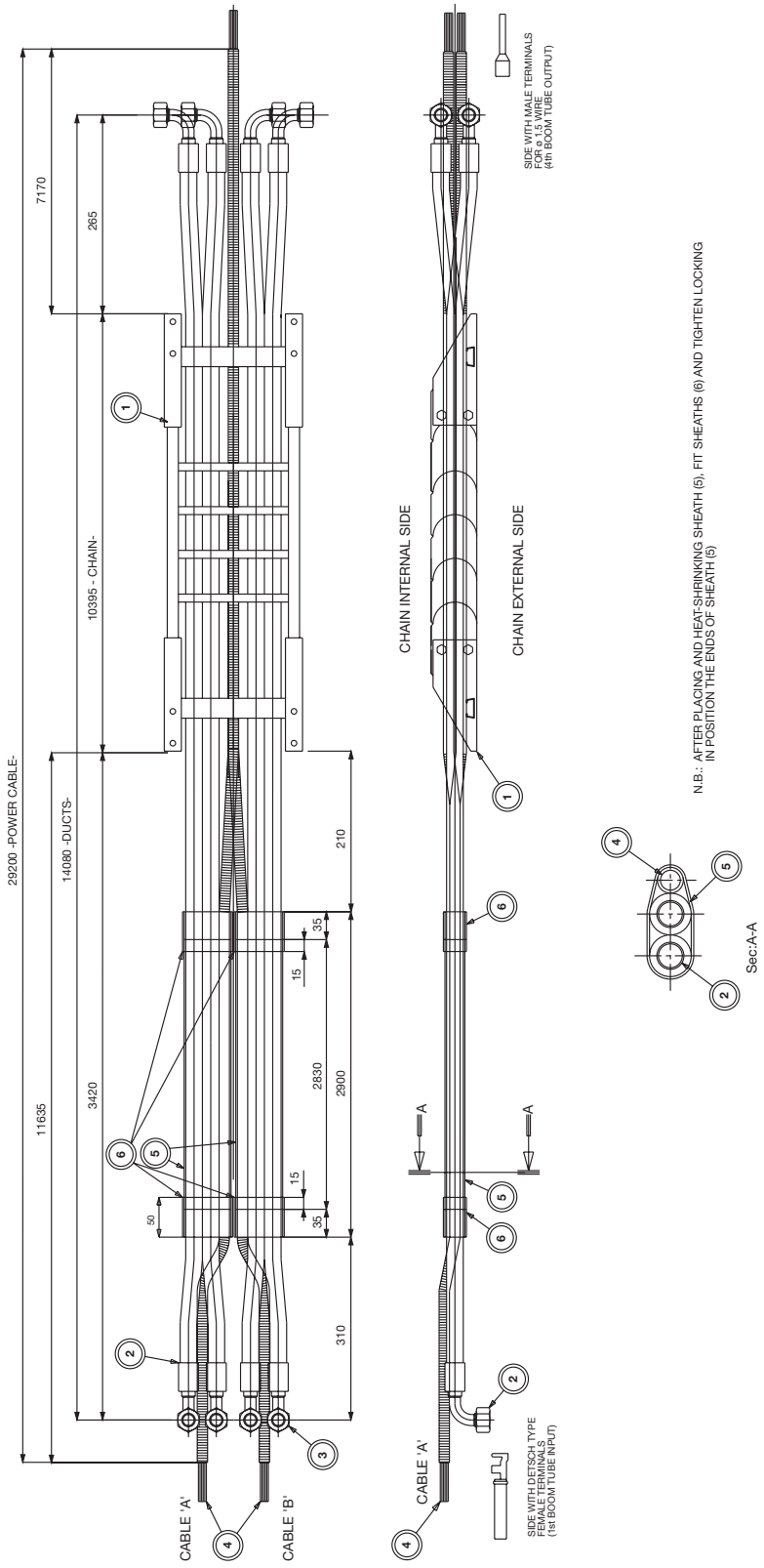
Operation:	Assembling the boom chain	Table:
		G-051

GIROLIFT 3518



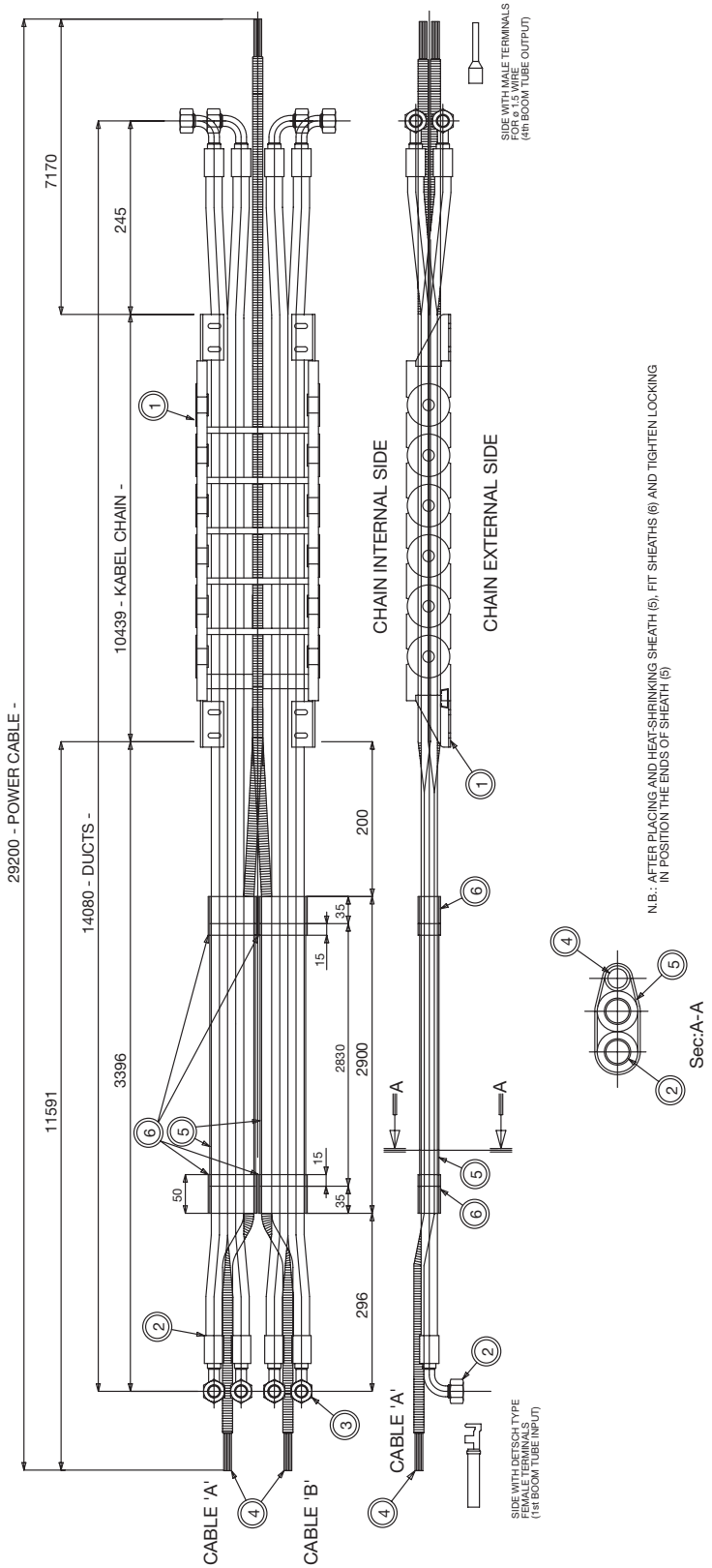
Operation:	Assembling the boom chain	Table:
		G-051

GIROLIFT 5022



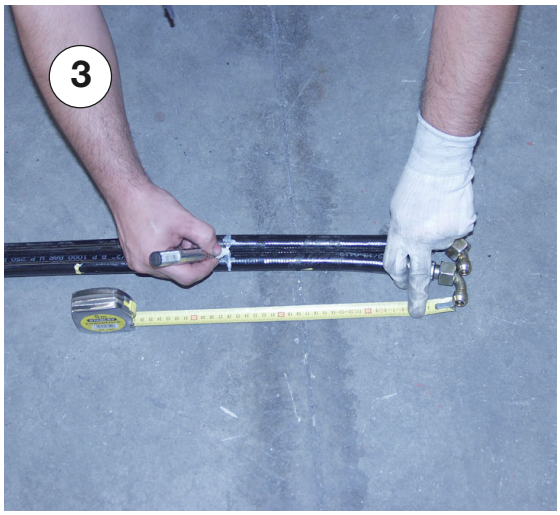
Operation:	Assembling the boom chain	Table:
		G-051

GIROLIFT 5022 with spring tensioning



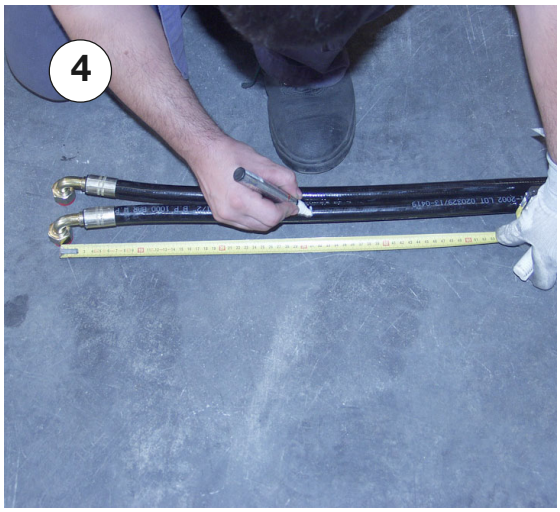
Operation: **Assembling the boom chain**	Table: **G-051**

3 Using the schemes on the previous pages, find the measure corresponding to the distance between the flexible hose connection (4th boom tube side) and the plate (**1**) and mark such measure on the hoses.

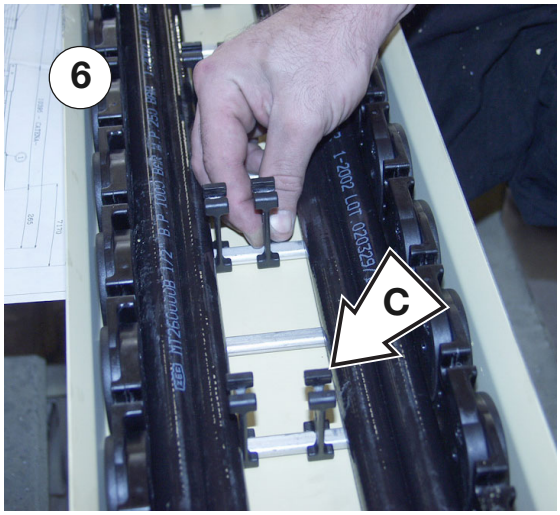


4 Find and mark the distance between connection and sheathing (**6**) on the opposite side of the flexible hoses (1st boom tube side).

5 Fit the assembled flexible hoses in the chain.

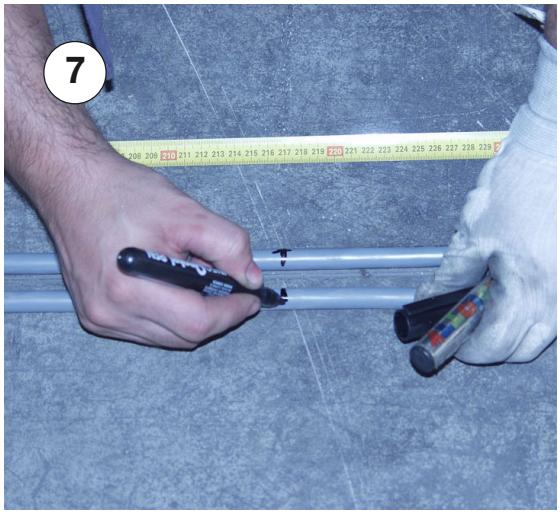


6 Space the internal spacers **C** and place the power cables of the chain right in the middle.



Operation:	Assembling the boom chain	Table:
		G-051

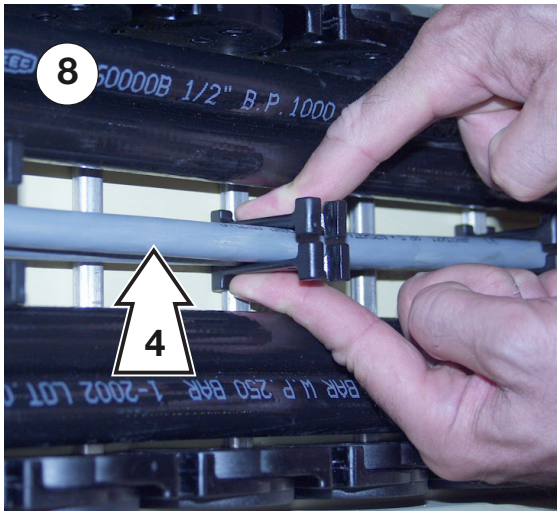
7 Mark the correct length on the power cables.



8 Fit the power cables (**4**) in the plastic chain one above the other; tighten spacers **C**.

IMPORTANT

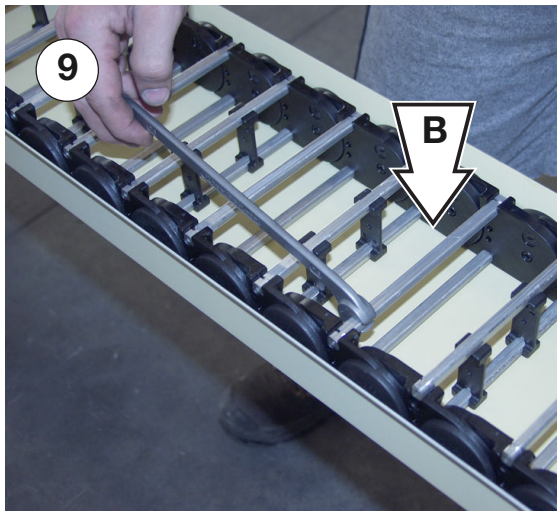
Place cable B above cable A and check that the male terminals to be connected to the ILME socket at the top of the boom and the female terminals to be connected to the power outlet under the cab are oriented correctly.



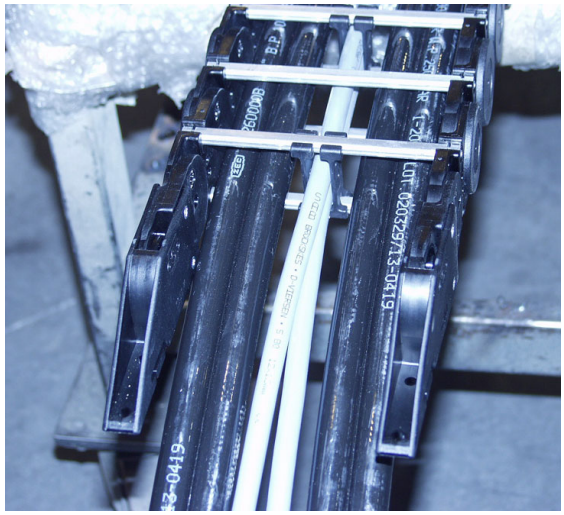
9 Refit all carriers **B** previously removed in the special housing using the wrench indicated in paragraph A.06, and turn 90°.

IMPORTANT

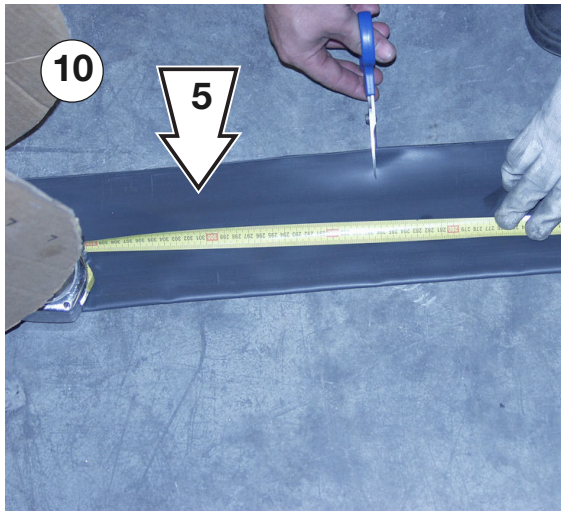
Fit the carriers with extreme caution as they play a fundamental role for the life of the chain.



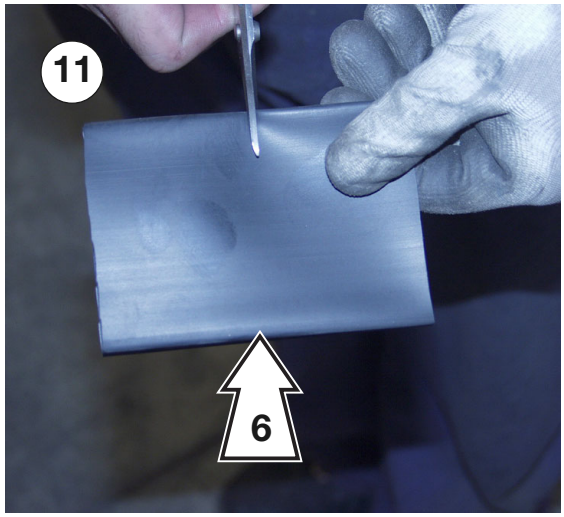
Operation: **Assembling the boom chain**	Table: **G-051**



10 Cut to size two lengths of the large heat-shrinking sheathing (**5**, see drawing above).

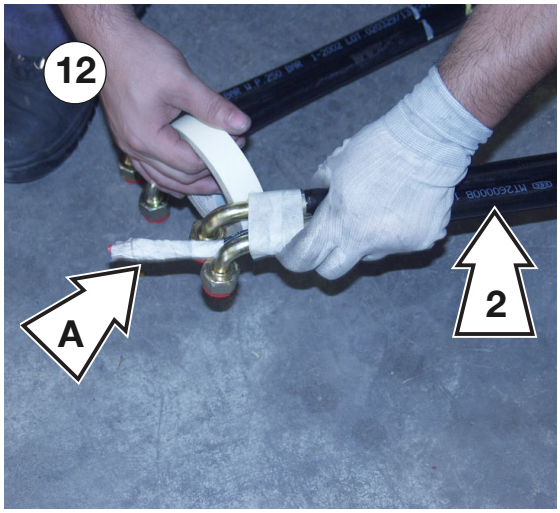


11 Cut to size four lengths of the small heat-shrinking sheathing (**6**, see drawing above).

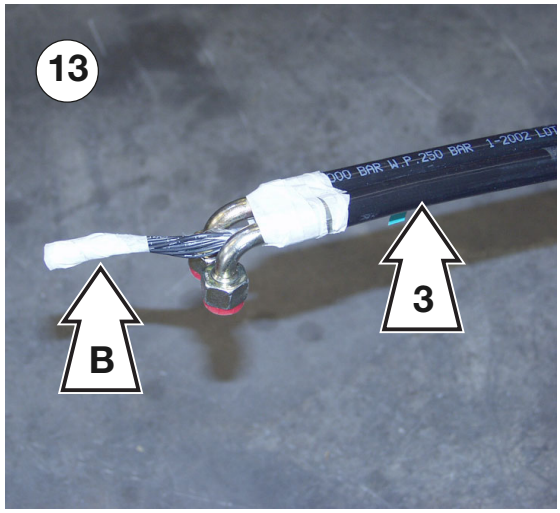


Operation: **Assembling the boom chain**	Table: **G-051**

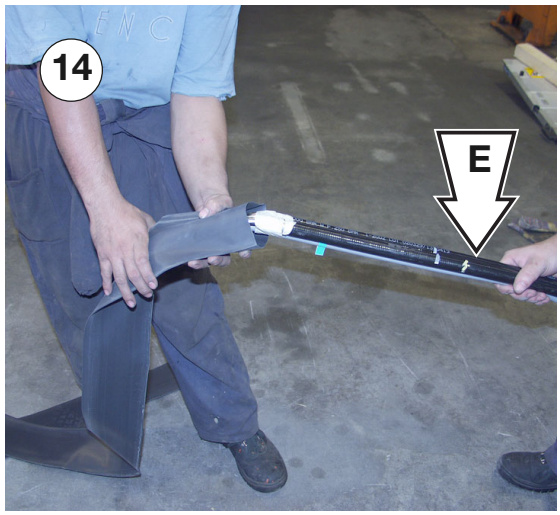
12 Join the top power cable (**A**) to the assembled flexible hose (**2**) with some adhesive tape.



13 Join the bottom power cable (**B**) to the assembled flexible hose (**3**).

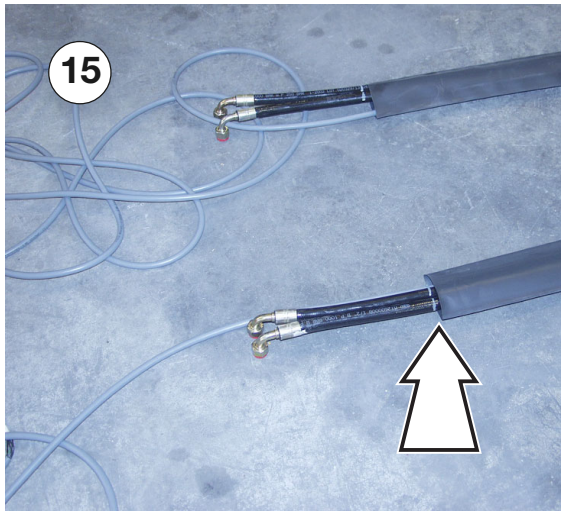


14 Fit the flexible hoses and power cables into the large sheathing previously prepared.



Operation: **Assembling the boom chain**	Table: **G-051**

15 Extend the flexible hoses and make sure that the power cables are placed in the internal part. Line up the sheathing (**5**) with the marks previously traced on the flexible hoses.



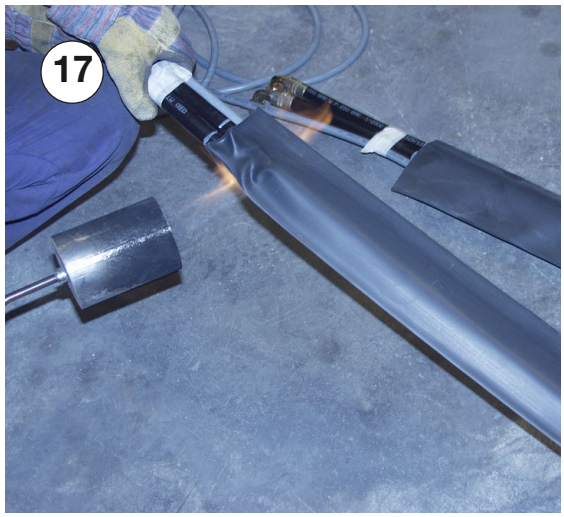
16 Prepare a bottle to machine the heat-shrinked sheathing.

DANGER

Before starting machining the sheathing, wear protective clothes and a facial screen to protect the eyes.
Proceed with extreme caution.

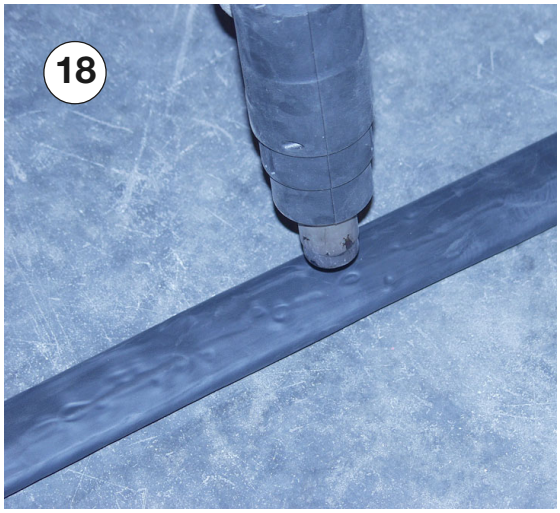


17 Start heating the sheathing paying attention not to burn it. Regularly check the correct position of the hoses.

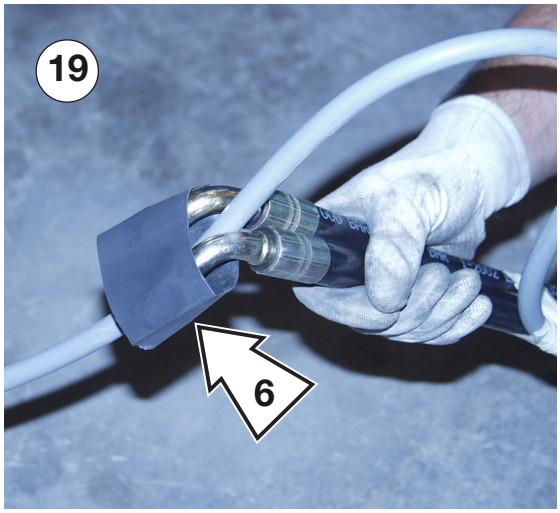


Operation: **Assembling the boom chain**	Table: **G-051**

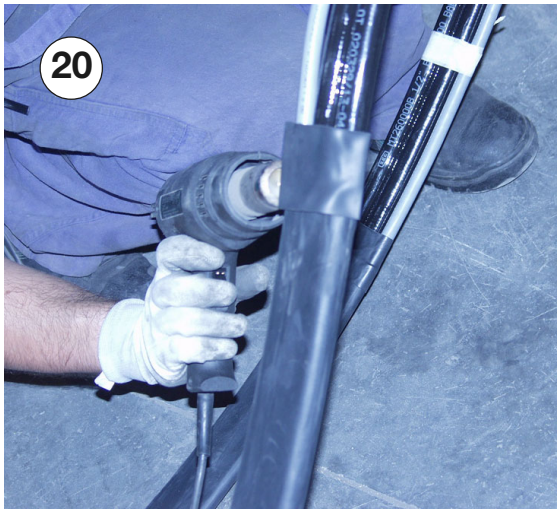
18 With an electrical heater, rectify all points of the sheathing with air bubbles or imperfections until obtaining a uniform surface.



19 Place the two lengths of the small sheathing (**6**) to the sides of the large sheathing (**5**).



20 Again with the electrical heater, join the sheaths.

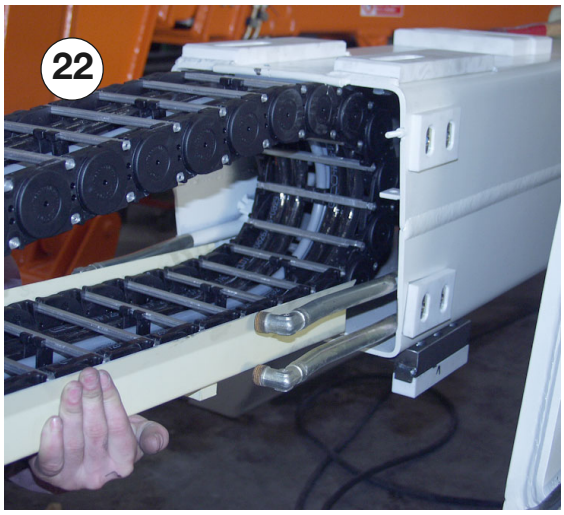


Operation: **Assembling the boom chain**	Table: **G-051**

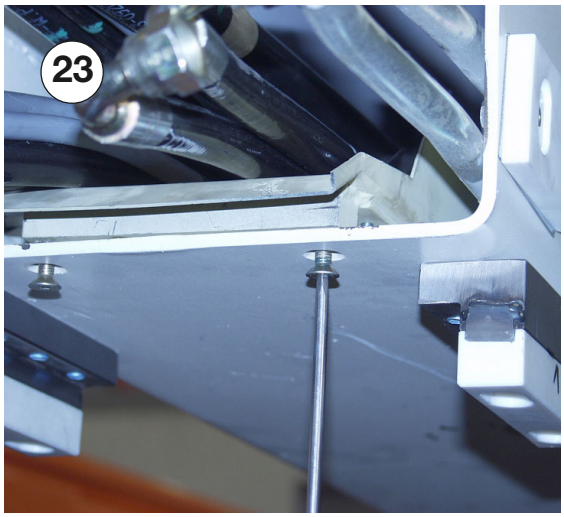
21 Bend the chain and prepare it for the assembly on the machine boom.



22 Position the chain cover and the chain into the 4th boom tube.



23 With a 5mm allen wrench, fix the chain cover to the rear side of the boom.

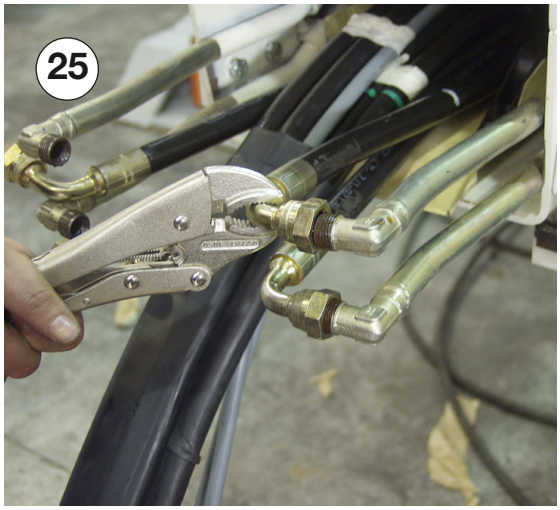


Operation: **Assembling the boom chain**	Table: **G-051**

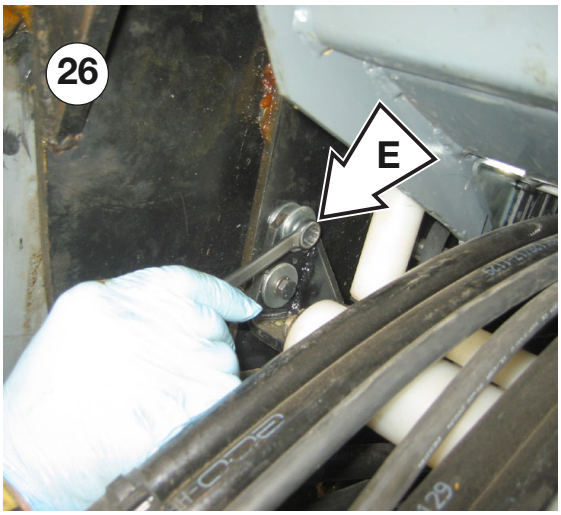
24 Using a 27mm box spanner, fix the chain bracket **D** to the top of the 2nd boom tube.



25 Move to the rear side of the machine and connect the flexible hoses to the tubes using a 27mm wrench.

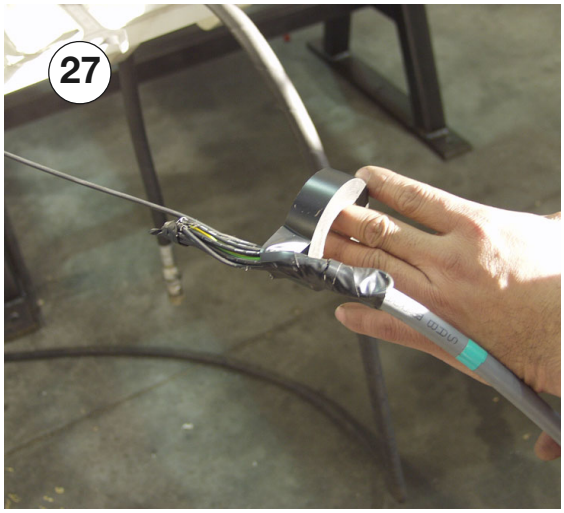


26 Place the slide rolls on the 3rd boom tube using two 13mm wrenches to tighten screws **E**.

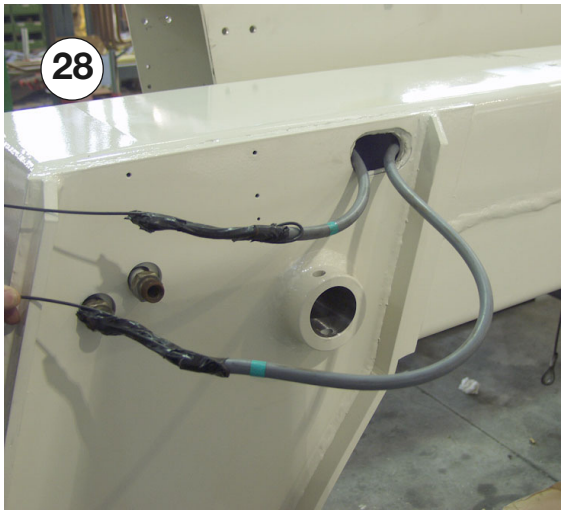


Operation: **Assembling the boom chain**	Table: **G-051**

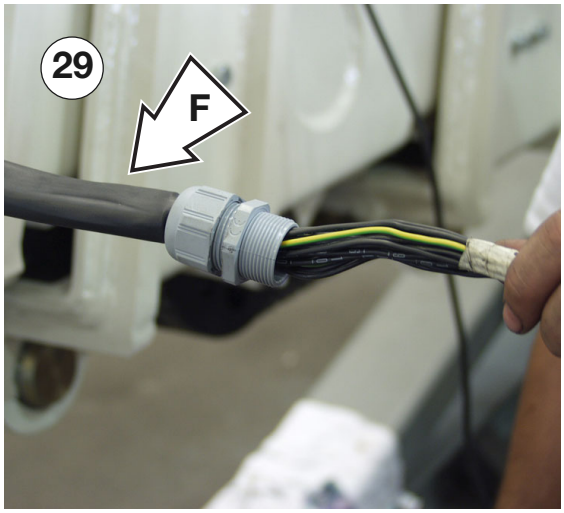
27 With some tape, join the new power cables with the ones present in the 4th boom tube (previously connected to the old power cables).



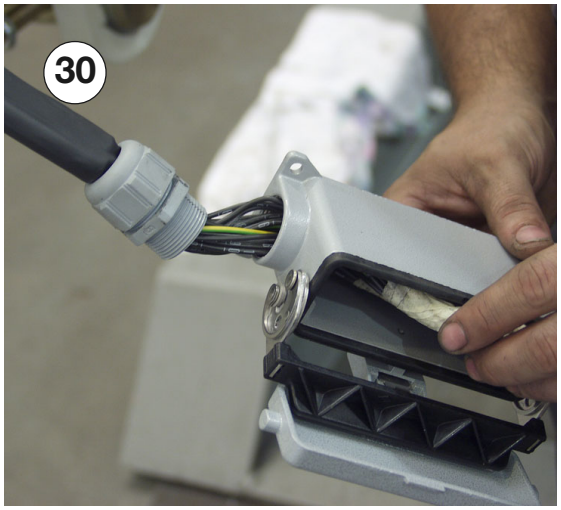
28 Pull the guide cables to extract the new power cables out of the hole on the boom nose.



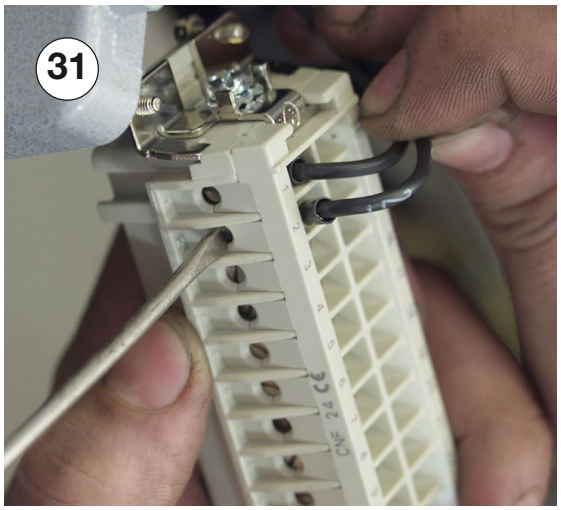
29 Cut the power cable sheathing, fit sheathing **F** and fix it with the electrical heater, then fit the mouths of the ILME socket.



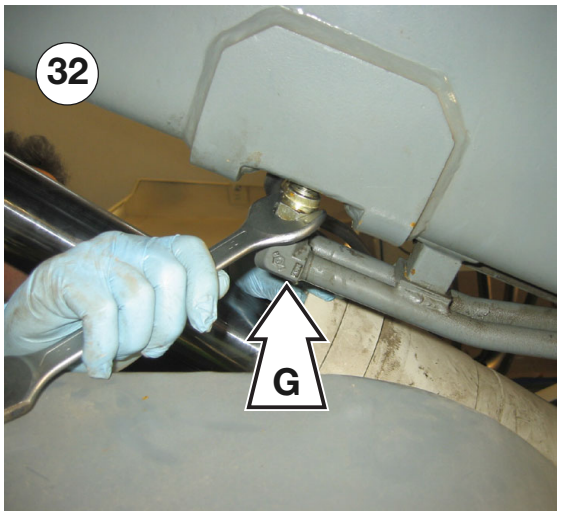
Operation: **Assembling the boom chain**	Table: **G-051**



30 Fit the cables into the socket.

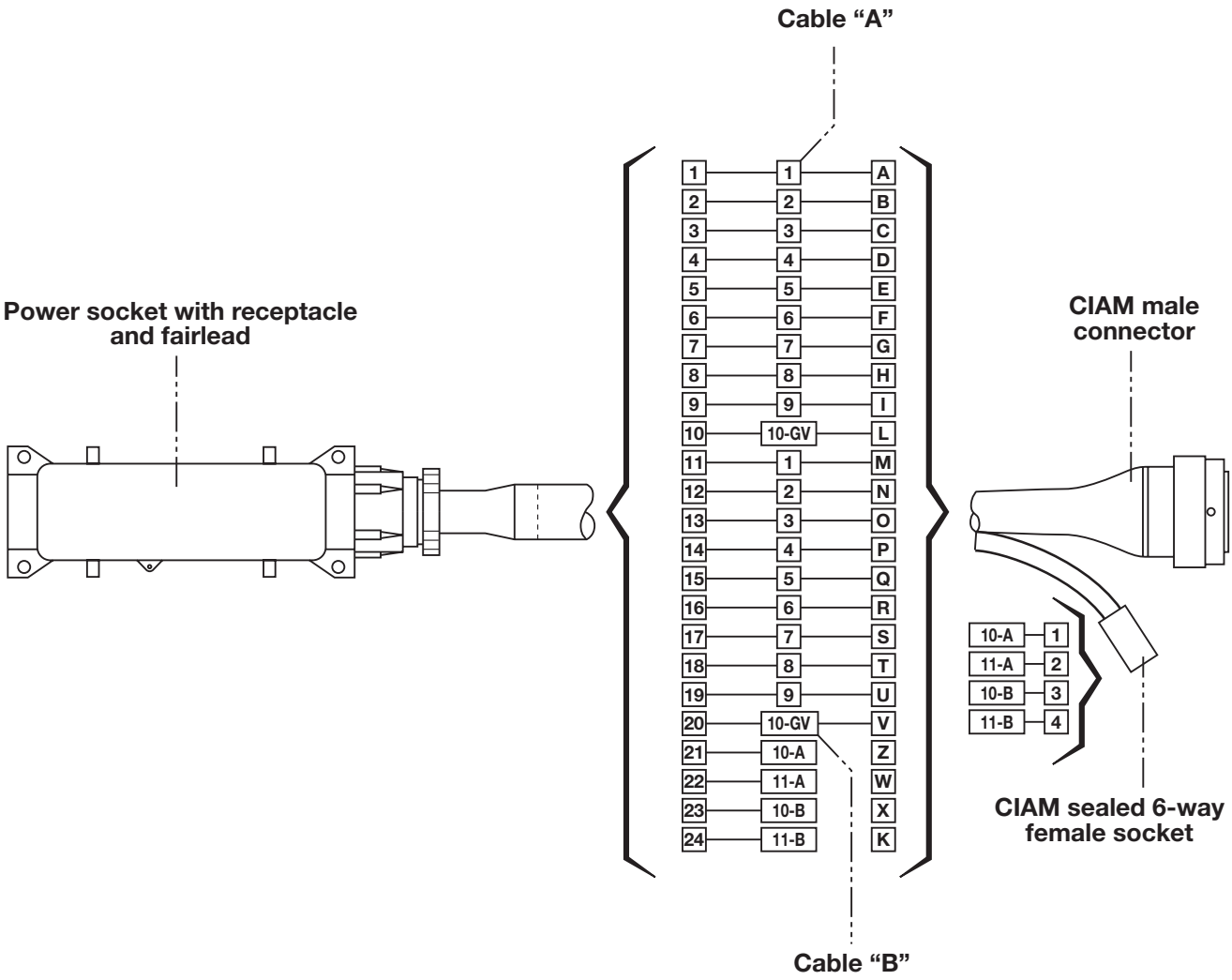


31 Consult the wiring diagram on next page to connect the cables to the socket receptacle, then re-assemble.



32 With a 27mm wrench, connect the tubes **G** with the flexible hoses inside the boom.

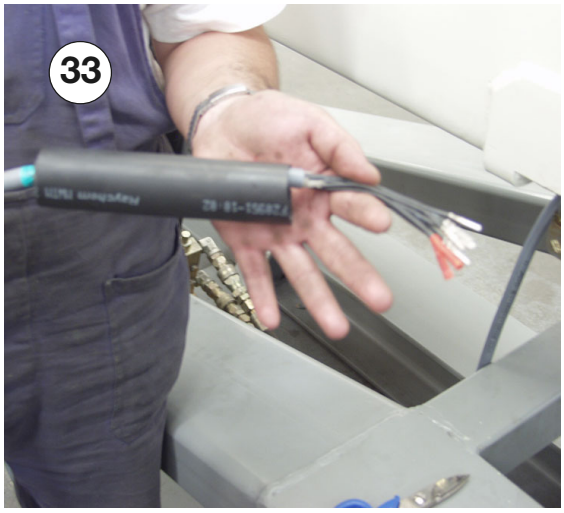
Operation:	Assembling the boom chain	Table:
		G-051



Note: Wire pos. 10 is yellow-green

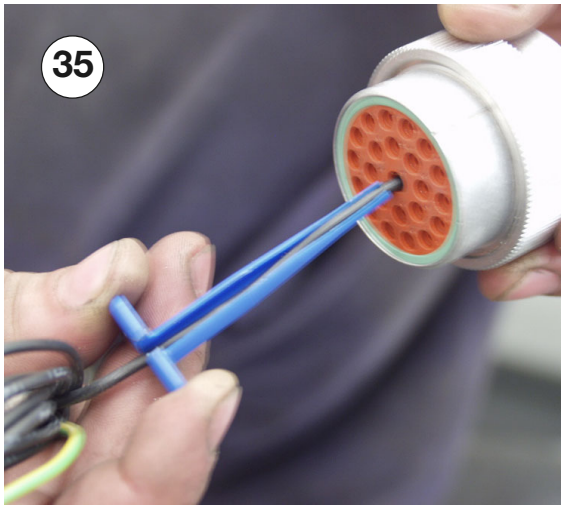
Operation: **Assembling the boom chain**	*Table:* **G-051**

33 Fit and weld the sheathing to the opposite side of the power cables.



34 Move the power cables close to the connection in the internal side of the cab and place some plastic binders to the tubes passing under the boom.

35 Consult the wiring diagram on the previous page and fit the terminals to the connectors.



36 Fit the connector to the special power outlet and extend the boom.

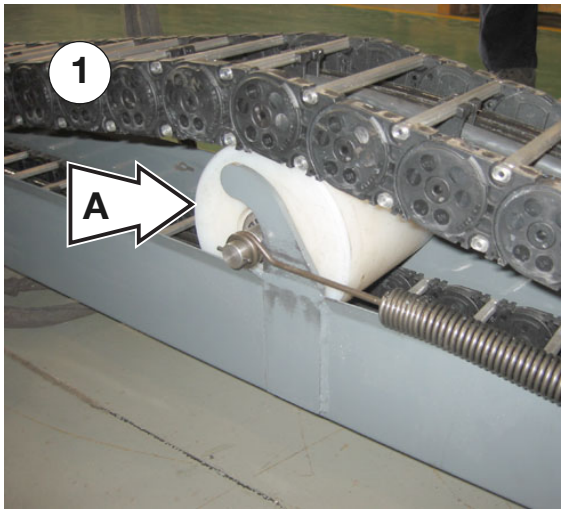
37 With a 5mm hexagonal wrench, tighten the chain cover with screws **H**.



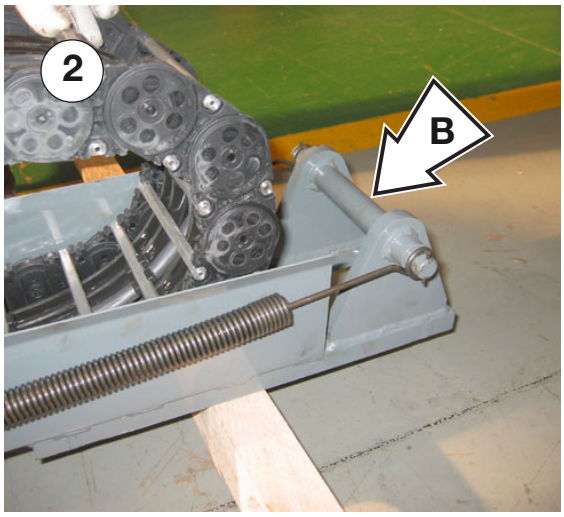
38 Attempt to extend the boom and check that the manoeuvre is correct.

Operation:	Assembling the boom chain	Table:
		G-051

Procedure for fitting the chain with spring tensioning (only for GIROLIFT 5022):



1 Place the Teflon roll **A** and the relevant fixing pin into the housing located almost in the middle of the chain cover.



2 Fit the two (right and left) springs to the pin of the Teflon roll and to pin **B** located to the end of the chain cover. Lock in position with the stop pins.

IMPORTANT

To assemble the chain cover with spring tensioning, it is necessary to space the hoses inside the fourth boom tube as follows:

- ***Warm up the hoses with an oxy-hydrogen flame.***
- ***Gently bend the hoses to the required width.***

Operation:	Assembling the boom chain	Table:
		G-051

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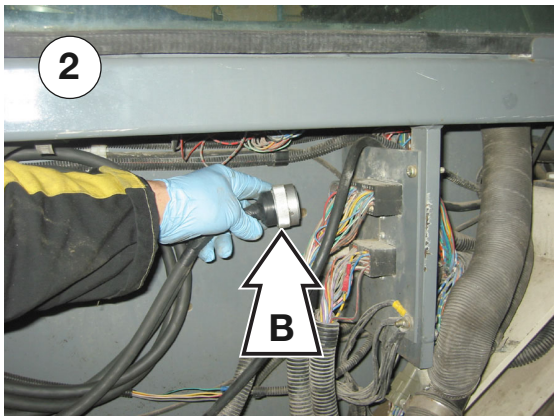
Operation: **Dismantling the boom chain**	Table: **G-052**			kg	126
	3514	3518	5022		Hrs. / Min.
	☐	☑	☑		8 / -
Bridge crane, payload 5000 kg (20000 lb) Textile bridles or chains with hooks	Standard tools				2

Procedure to dismantle chain and cover:

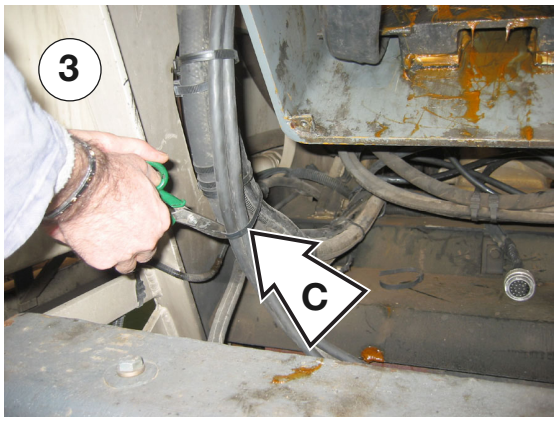
1 Lift the boom, with a 5mm wrench, unscrew all fixing screws and remove cover **A**.



2 Unplug the power plugs **B** powering the boom line.

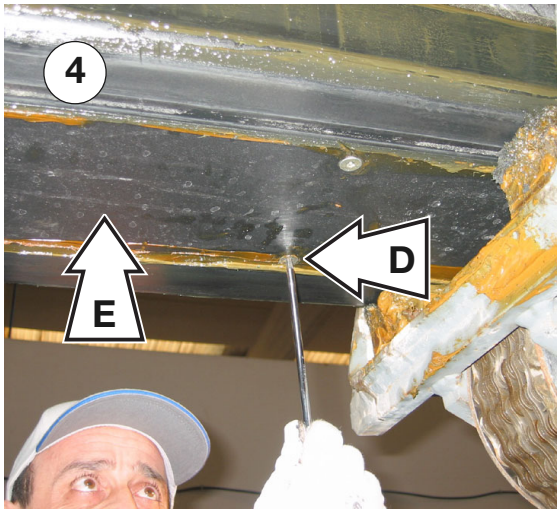


3 Cut all binders **C** fixing the power cable from the cab to the boom rear side.

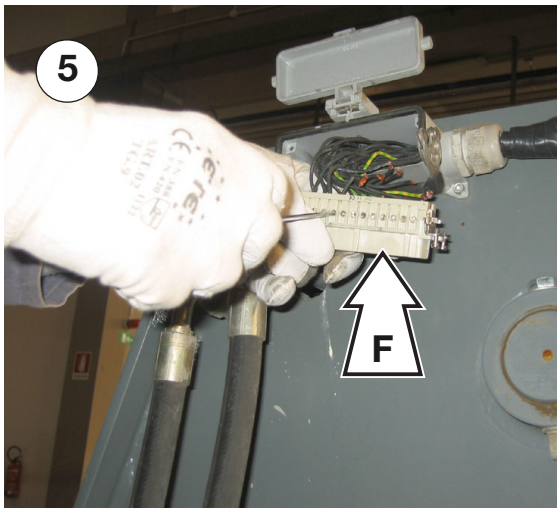


Operation: **Dismantling the boom chain**	Table: **G-052**

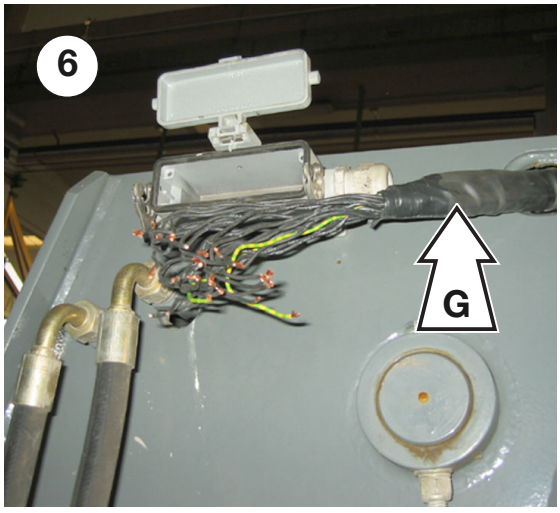
4 Lower and extend the boom (if necessary) and, with a 5mm hexagonal wrench, remove the screws **D** fixing the chain cover **E** on the 4th telescope; move in the boom telescopes.



5 Using a crosstip screwdriver remove the fixing screws and pull out the receptacle **F** of the ILME socket placed on the boom nose.
With a flat screwdriver, free all electrical wires, loosen the socket mouth and remove the wires.

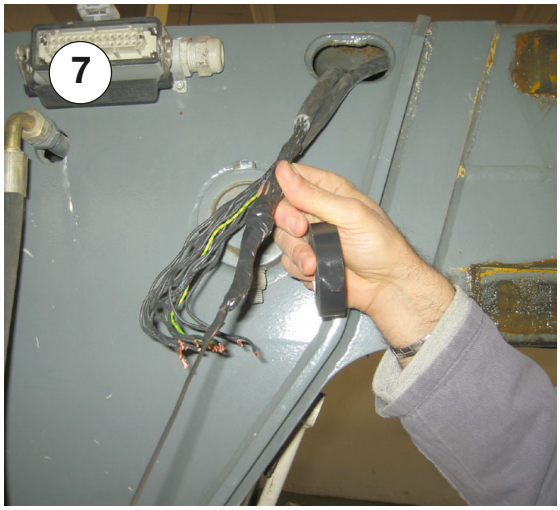


6 Cut the sheathing **G** which keeps the two power cables joined.



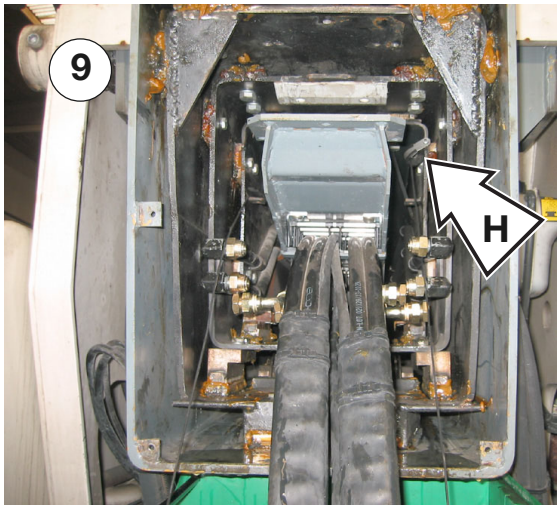
Operation: **Dismantling the boom chain**	Table: **G-052**

7 With some tape, fix a 15m cable to the end of each power cable; this will let you replace the cables in the boom easily.



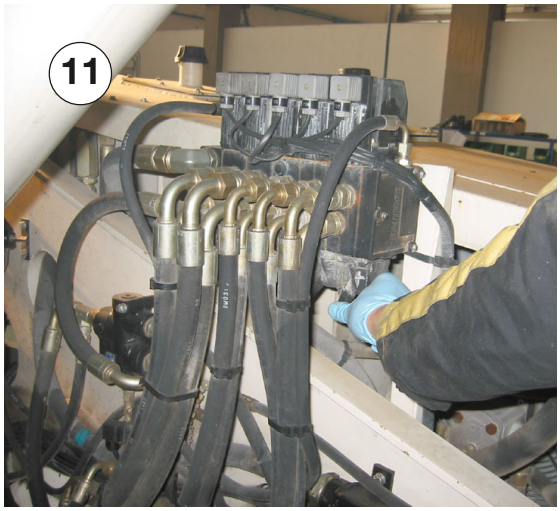
8 Move to the rear side of the machine and pull out the cable connecting the boom to the cab; extract all electrical terminals from the connector using the special tool (see paragraph A.06).

9 Remove the clamps **H** placed on the 4th telescope using a 10mm hexagonal wrench; extract the power cables (the ones previously removed from the ILME socket).



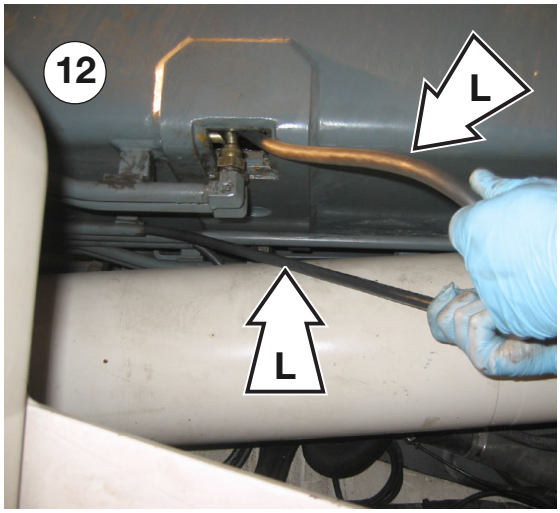
10 Raise again the boom to easily access to the couplings of the internal flexible hoses.

11 Stop the engine and eliminate any residual pressure from the hydraulic circuit operating the levers of the actuator up and down alternately for at least 5 seconds.

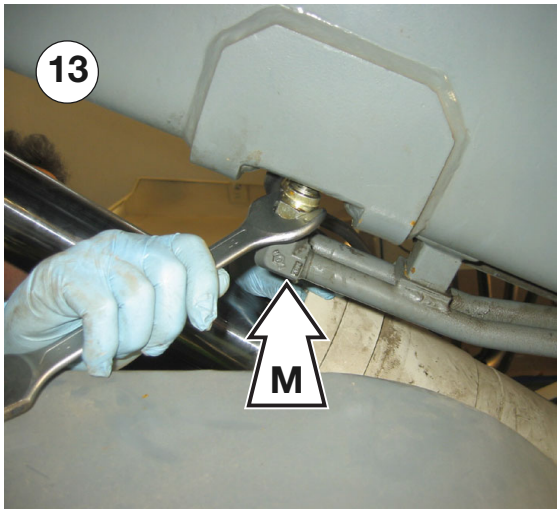


Operation:	Dismantling the boom chain	Table:
		G-052

12 Pull out both power cables **L** of the rigid protection tubes.



13 With a 27mm wrench loosen the couplings **M** of the hydraulic lines, place them in the boom and remove them from the rear side.



PROTECT THE ENVIRONMENT

Before disconnecting the hydraulic lines, place containers of suitable size underneath to prevent oil spillage.

14 Plug the 4 couplings of the tubes to avoid oil spillage when the machine will be started.

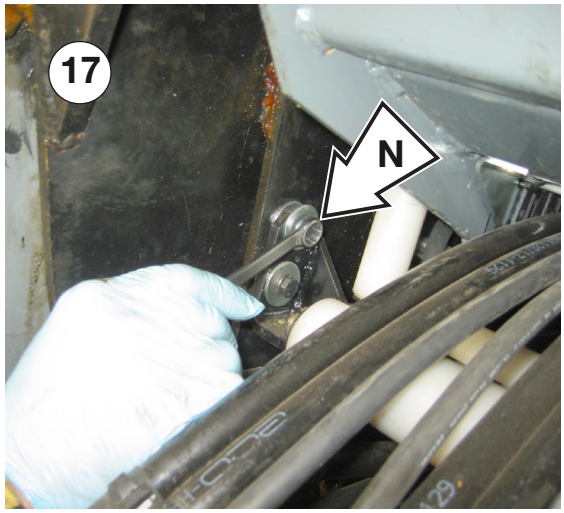
15 Start the engine and lower the boom to horizontal position.

16 Move to the rear side of the machine and, with a 27mm wrench, extract the lines previously disconnected after plugging them.



Operation:	Dismantling the boom chain	Table:
		G-052

17 With a 13mm wrench remove the screws **N** and the rear slide roll fitted to the 3rd telescope.

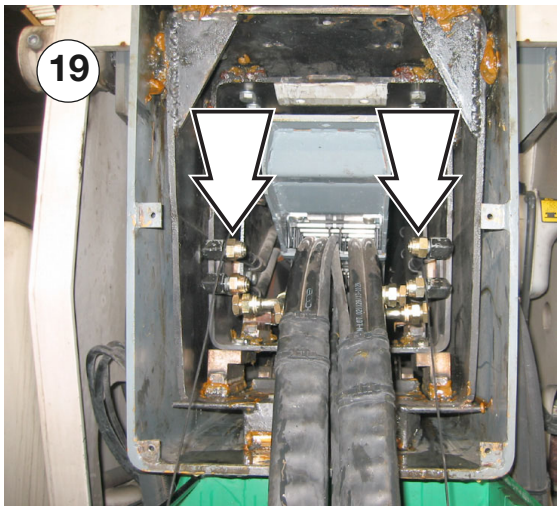


18 Remove also the second slide roll using two 13mm wrenches.

IMPORTANT

Note the position of the rolls before removing them so as to replace them correctly during reassembly.

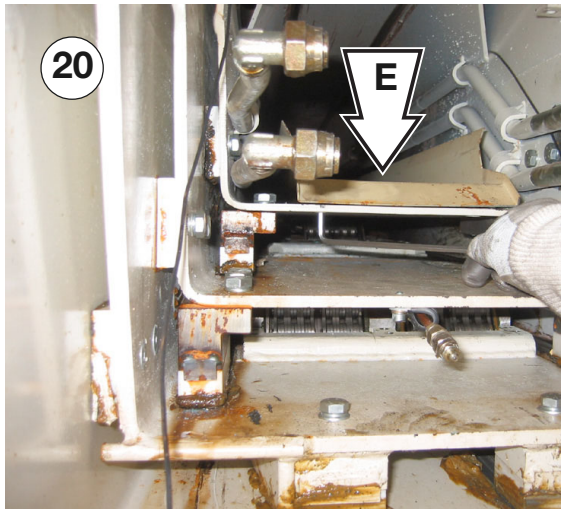
19 Disconnect the flexible hoses from the tubes. Plug to avoid that dust and impurities may enter the circuit.



IMPORTANT

Before disconnecting the flexible hoses, mark their position for an easy reassembly.

20 With a 5mm Allen wrench remove the two rear screws fixing the chain cover **E**.



Operation: **Dismantling the boom chain**	Table: **G-052**

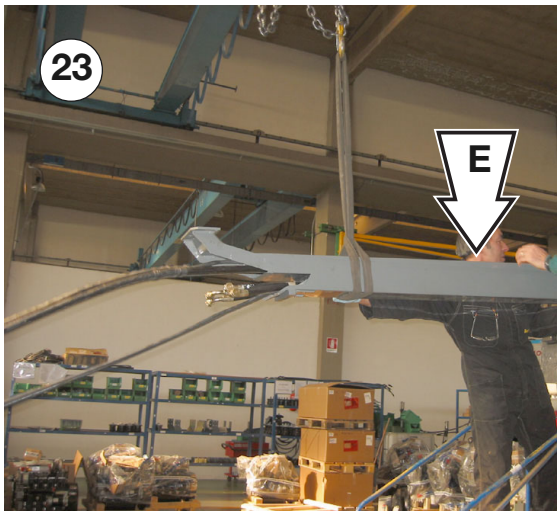
21 With a 17mm socket spanner remove the screws **O** fixing the chain supporting bracket.



22 Clamp the ends of the hydraulic lines and pull outwards to extract the chain cover complete with chain and hydraulic lines.



23 Sling the chain cover **E** with a textile bridle connected to the bridge crane, able to support it once pulled out completely of the boom.

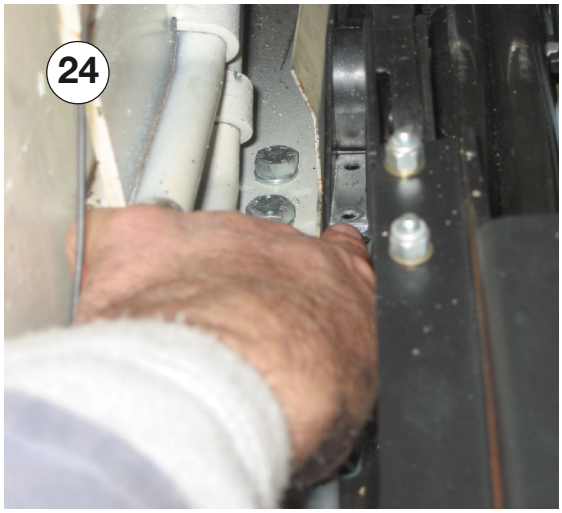


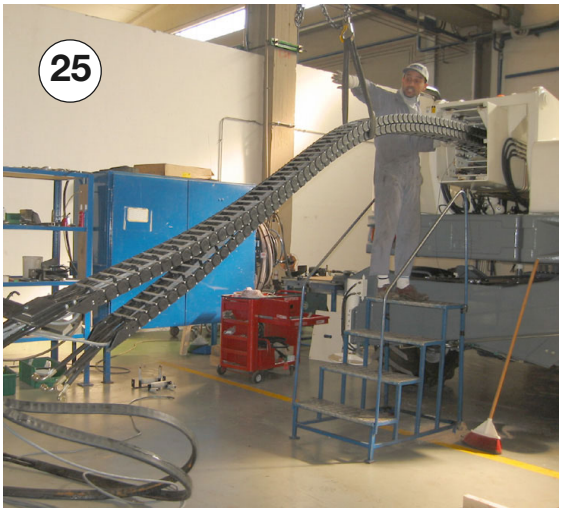
Operation:	Dismantling the boom chain	Table:
		G-052

Procedure for dismantling the chain:

24 If you shall remove only the chain without cover:

- proceed as explained in steps **1** to **22,** except for steps **4** and **21**.
- using a 5mm allen wrench, remove the screws fixing the bottom terminal of the plastic chain to the chain cover
- pull out the chain of the boom and sling with some textile bridles connected to the bridge crane to avoid that the chain can bend and break.







Operation:	Dismantling the boom chain	Table:
		G-052

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Operation: **Assembling the boom**	Table: **G-053**				
	3514	3518	5022	kg	see table
				Hrs.	Min.
Bridge crane, payload 10000 (40000 lb) Textile bridles or chains with hooks				16	-
Standard tools				1+1	

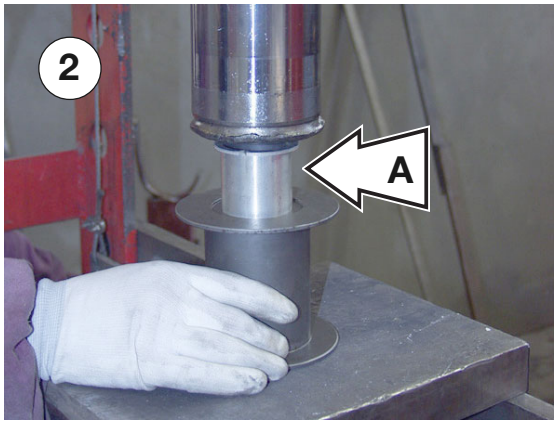
Procedure:

Weight	Girolift 3518	Girolift 5022
1st boom tube	970	1420
2nd boom tube	740	995
3rd boom tube	480	655
4th boom tube	500	740
total weight	**3588**	**5600**

The assembly order of the different boom parts is the following: 4th boom tube into 3rd boom tube; 4th+3rd boom tubes into 2nd boom tube; 4th+3rd+2nd boom tubes into 1st boom tube.



Prepare the four boom tubes and proceed as follows:

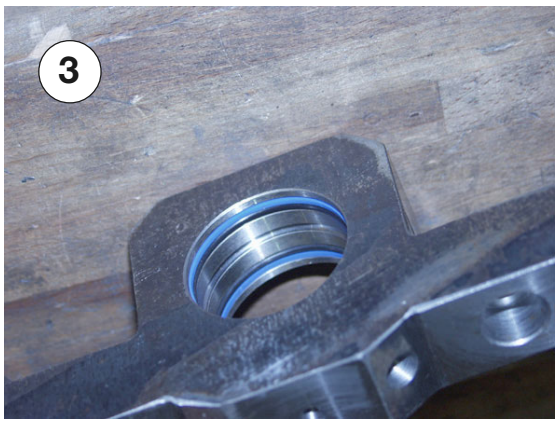


1 Remove the paper protecting the mechanical slide part of the pads; clean with a grinding wheel until the surfaces are perfectly smooth.

2 Fit bushings **A** (EKF 4550) into the sheaves where the boom extension chains slide.

IMPORTANT

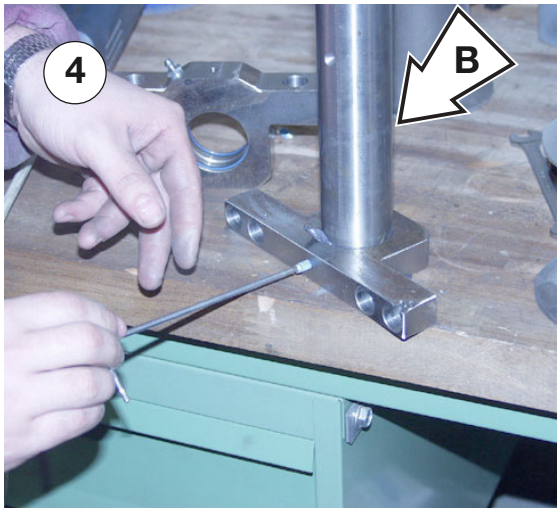
Do this operation with a press.



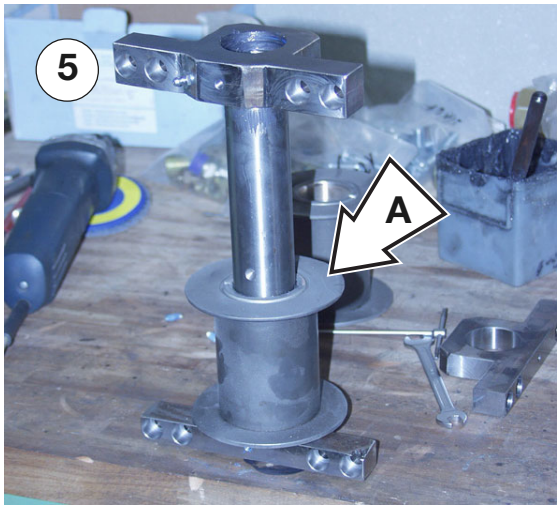
3 Fit the O-rings into the outer grooves of the pad locking supports.

Operation: **Assembling the boom**	Table: **G-053**

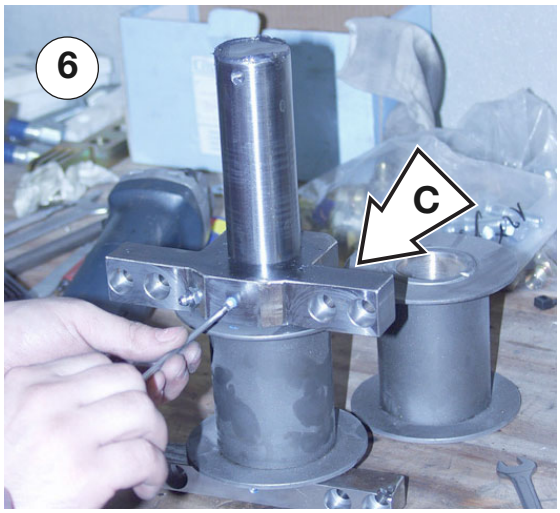
4 Mount the fixing bracket to the boom and line up the hole of pin **B** with the hole on the bracket; lock the two parts with a grubscrew using a 3mm hexagonal wrench.



5 Fit the sheave to the pin.

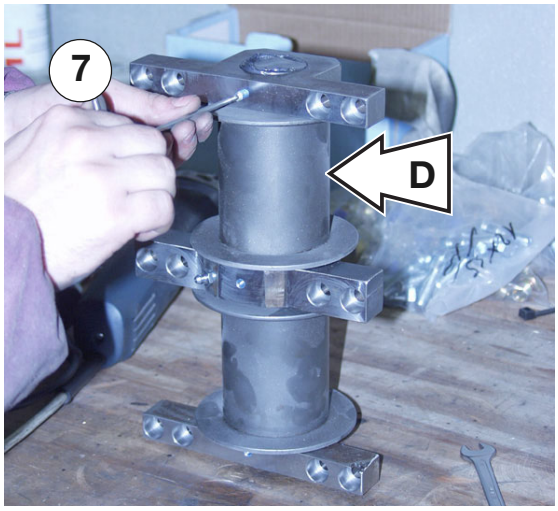


6 Fit the second bracket **C** and check that the hole is aligned with the blind hole on the pin; lock the two parts with a grubscrew using a 3mm hexagonal wrench.

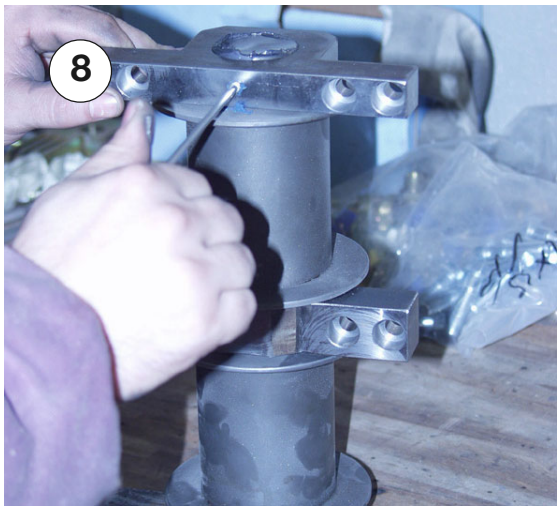


Operation: **Assembling the boom**	Table: **G-053**

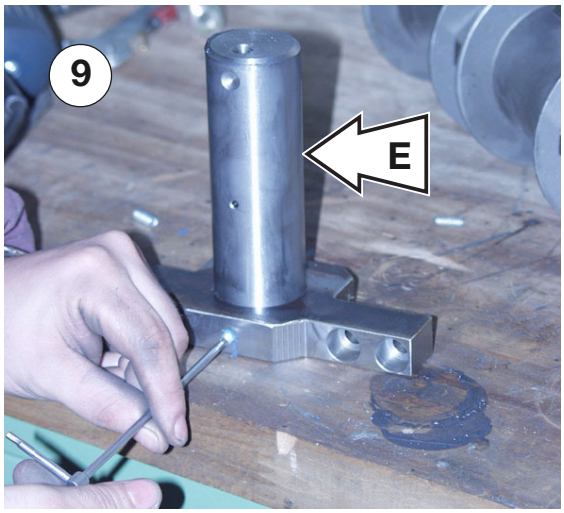
7 Mount the second sheave **D**.



8 Mount the third bracket and lock with the grubscrew provided.

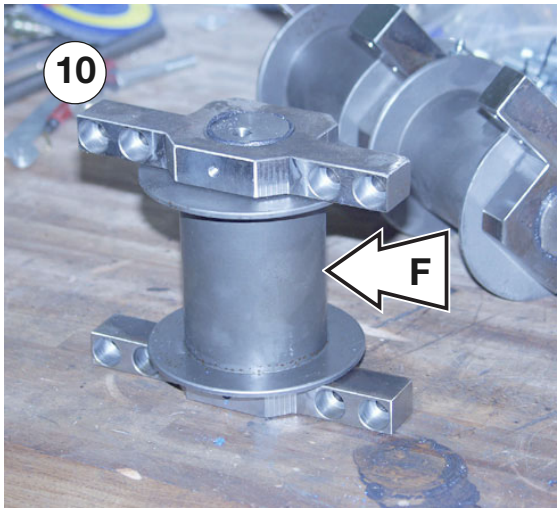


9 Mount the lower bracket on pin **E** and check that the holes are aligned; lock with the grubscrew provided.

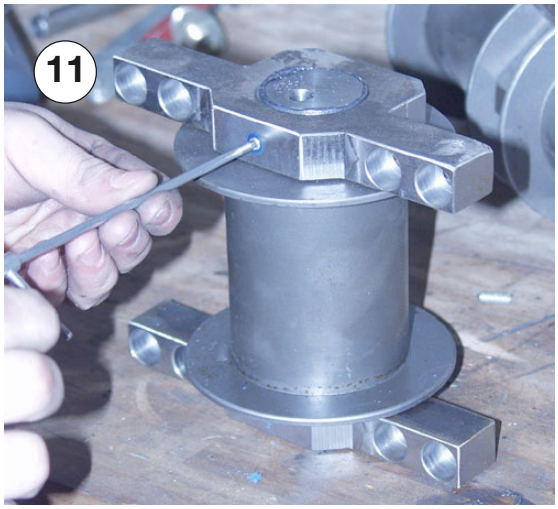


Operation: **Assembling the boom**	Table: **G-053**

10 Mount the single sheave **F** on the pin after smearing with some grease.



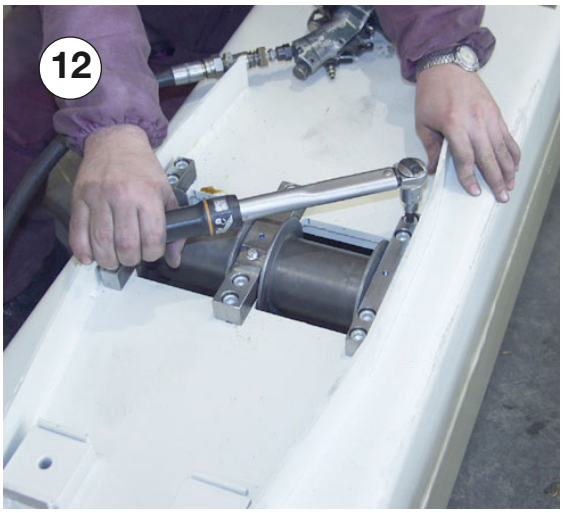
11 Mount the end bracket after smearing it with grease; lock with a grubscrew M6.



IMPORTANT

The greasing nipple of the rolls is placed outside. Oil reaches the pin centre through a hole.

12 The double sheave shall be fitted at the bottom rear side of the second boom tube and fixed with 12 screws (10.9) M10x40. Smear the screws with some threadlocker and tighten with a 8mm hexagonal dynamometric wrench to a torque of 7 Kgm.

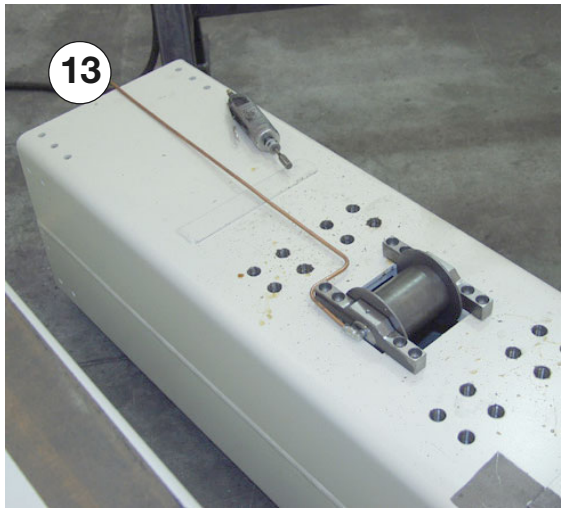


IMPORTANT

Cross-tighten all screws for a perfect locking of the bracket.

Operation: **Assembling the boom**	Table: **G-053**

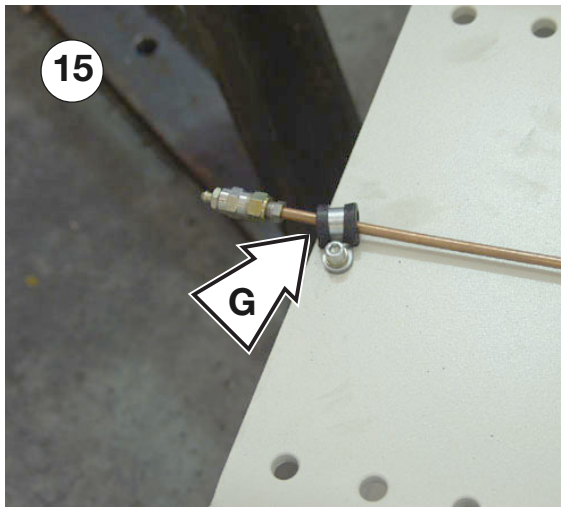
13 Fit the greasing nipple and check it is oriented toward the rear side of the boom.



14 Mount the single sheave to the bottom of third boom tube. Cross-tighten the screws with a 8mm hexagonal dynamometric wrench to a torque of 7 Kgm.

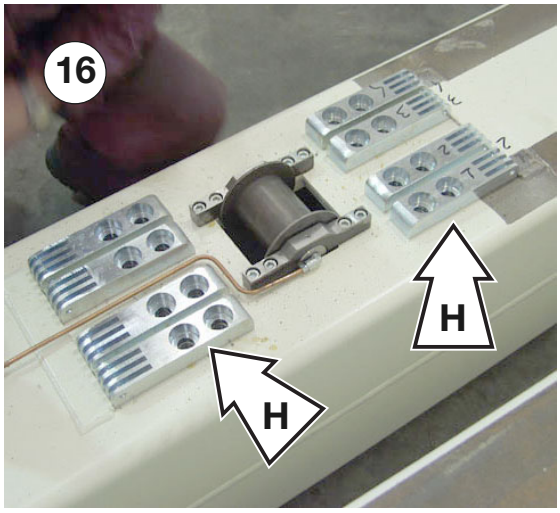


15 Fit a 90° connector after smearing the sheave pins with some threadlocker; fit a copper tube and place it toward the rear side of the boom. Fix with a clamp **G** at the end of the boom tube.



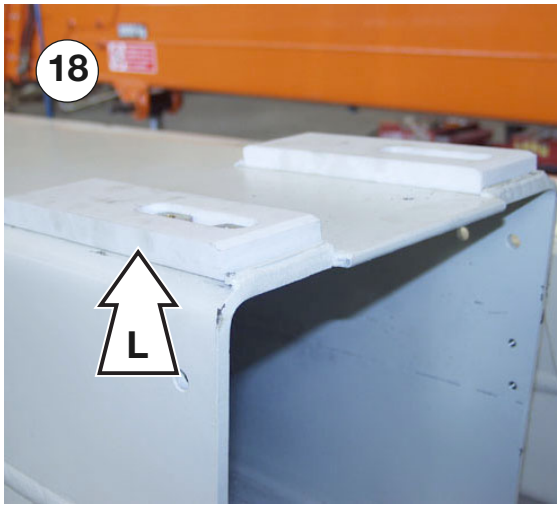
Operation: **Assembling the boom**	*Table:* **G-053**

16 Mount the supports **H** to fix the metal chains.



17 Mount the greasing nipples for the top rear pads of the second, third and fourth boom tubes.

18 Place the four boom tubes on to stands and fit the top pads **L** of the second boom section with two screws M14x40 each and third boom sections with two screws M14x25 each; tighten with a 22mm wrench.

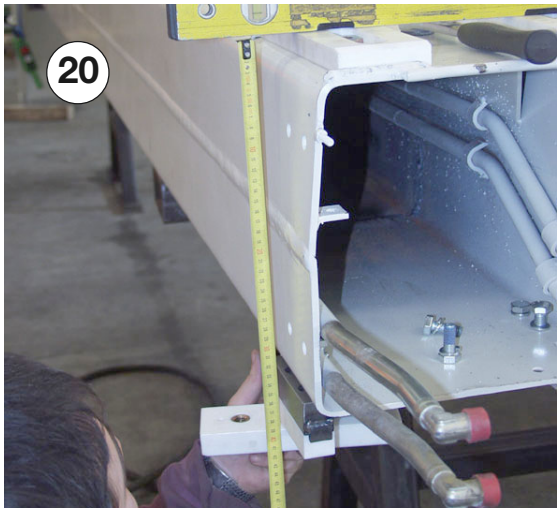


19 The top pads of the fourth boom tube shall be blocked with two screws M14x20 each and tightened to a torque of 5 Kgm; the bottom pads shall be blocked with three screws M12x30 each and tightened to 7 Kgm.



Operation: **Assembling the boom**	Table: **G-053**

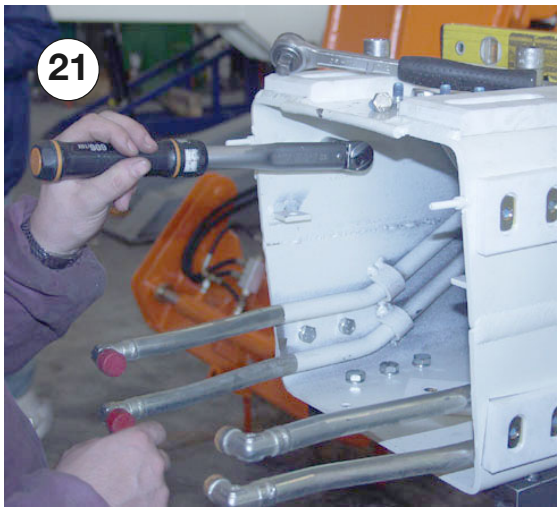
20 The width tolerance of the boom tubes shall be min. 0.5 mm - max. 1 mm.





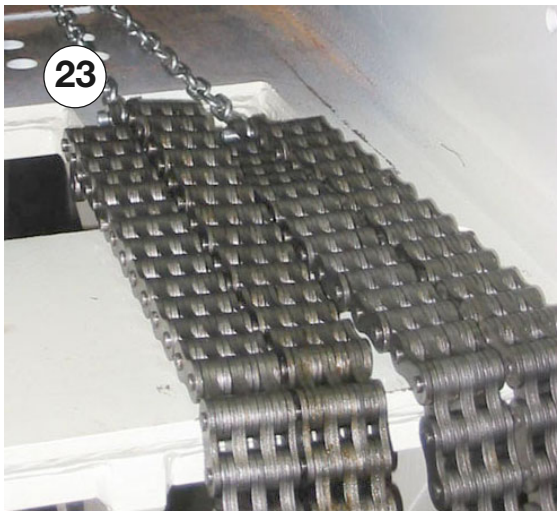
21 Tighten the side pads to a torque of 3 Kgm with a dynamometric wrench.

22 Fit the rear pads of the third boom tube.

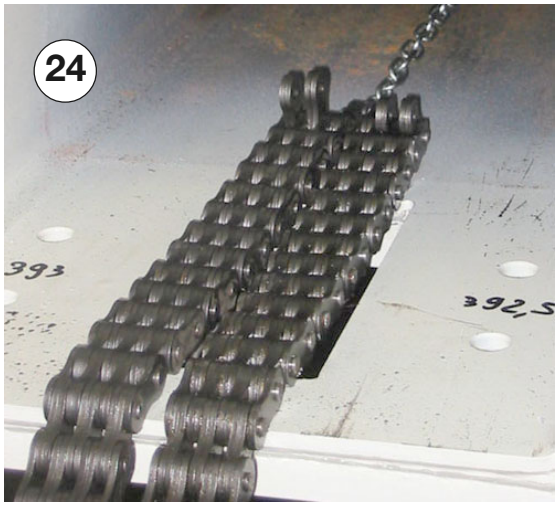


Operation: **Assembling the boom**	Table: **G-053**

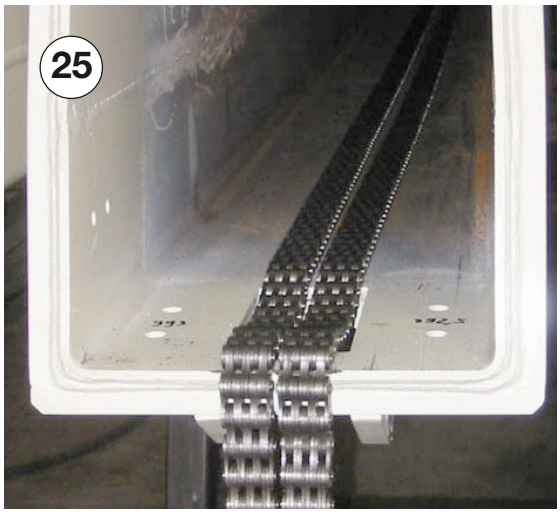
23 Place the slide chain in the second boom tube.



24 Place the slide chain in the third boom tube.

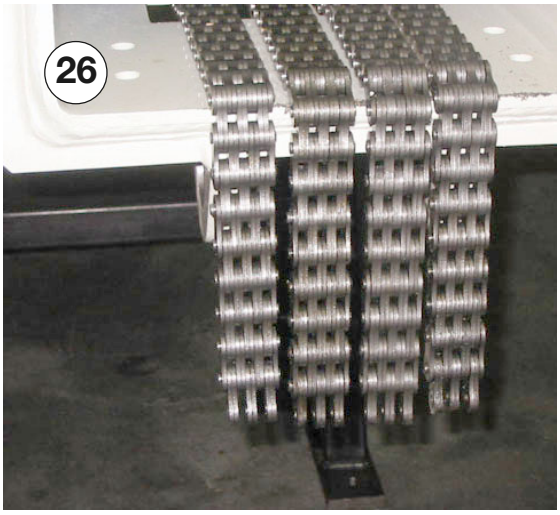


25 Leave a length of chain out of the front part of the third boom section.

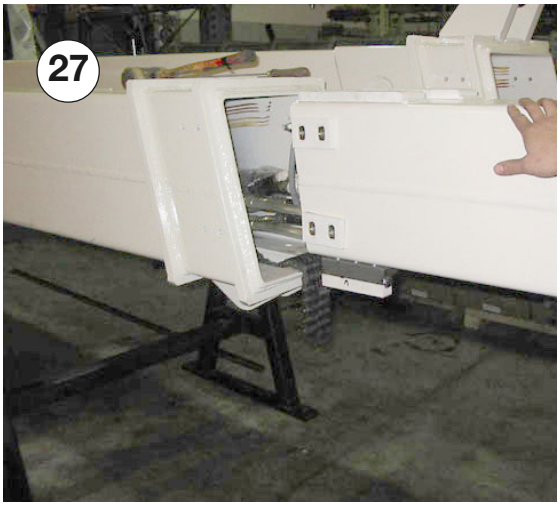


Operation: **Assembling the boom**	Table: **G-053**

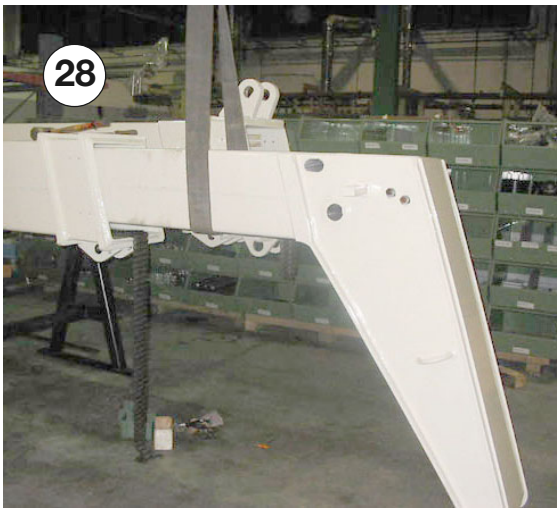
26 Leave a length of chain out of the front part of the second boom section.



27 After placing the plastic chain cover as indicated in G-051, fit the fourth boom tube into the third one using a textile bridle of suitable capacity connected to a bridge crane.



28 Let the fourth boom tube slide into the third.



Operation: **Assembling the boom**	Table: **G-053**

29 With a textile bridle connected to the bridge crane, sling the third and fourth boom tubes and place them into the second one.

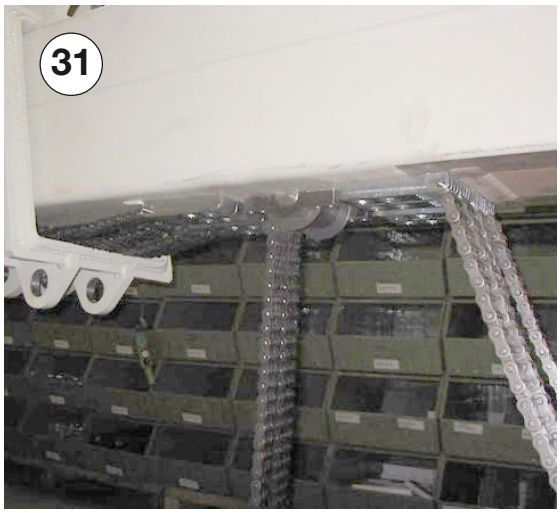


30 Block the chain under the fourth boom tube.



31 Fix the chain to the third boom tube.

32 Place second, third and fourth boom tubes into the first one.



Operation: **Assembling the boom**	Table: **G-053**

33 Sling the boom extension cylinder and raise it with the bridge crane.



34 Place the cylinder on the boom and fit the locking pin after smearing the relevant hole. Check that holes are aligned and fit the fixing screw.

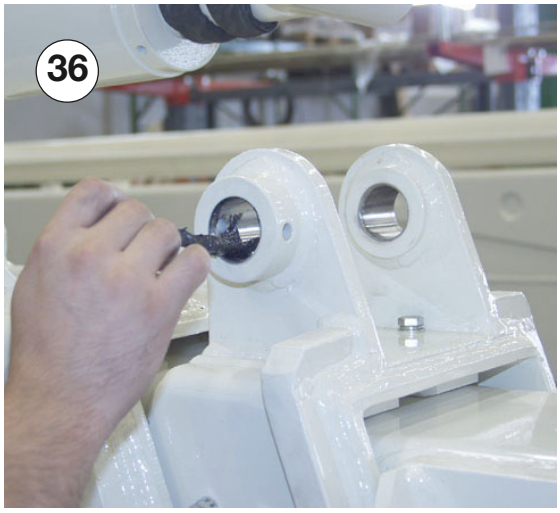


35 Insert the fixing screw and tighten the nut with two 17mm wrenches.

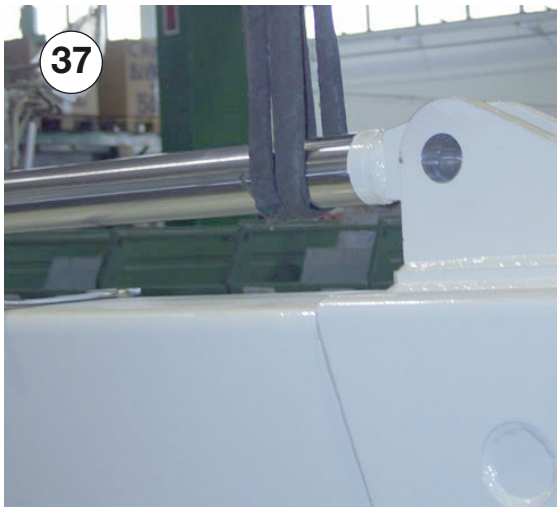


Operation: **Assembling the boom**	Table: **G-053**

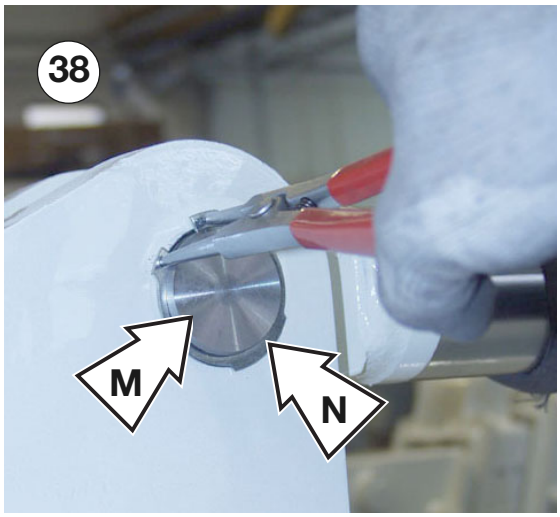
36 Thoroughly grease the bushings of the front connection of the second boom tube.



37 Lower the cylinder and align the hole with the one on the boom.

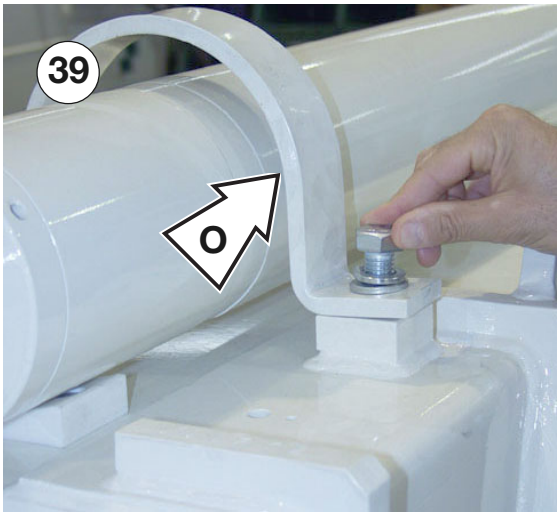


38 Fit pin **M** and lock it with 2 retaining rings **N**. Use a USAG 128 40-100 wrench.

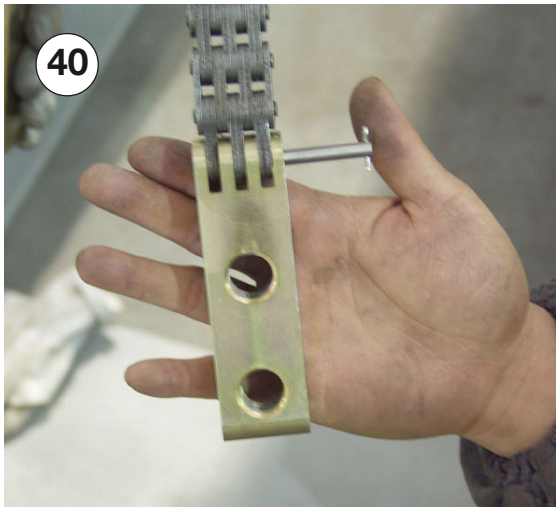


Operation: **Assembling the boom**	Table: **G-053**

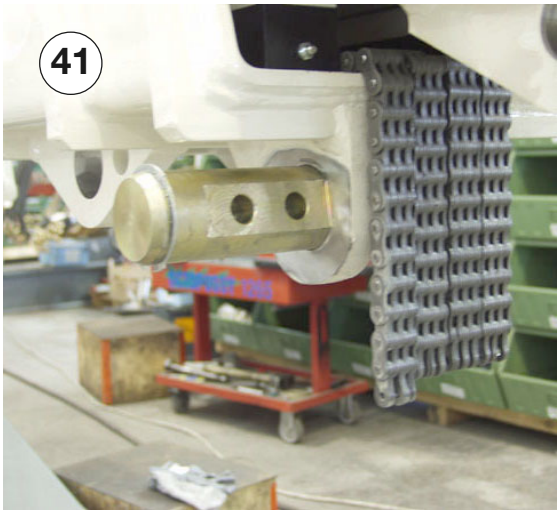
39 Mount the fixing bracket **O** of the extension cylinder and lock with the special screws using a 27mm wrench.



40 Fit the terminals to the boom slide chains, fix with the special splint pins and leave them out of the boom before fixing them to the bottom of the boom tube.

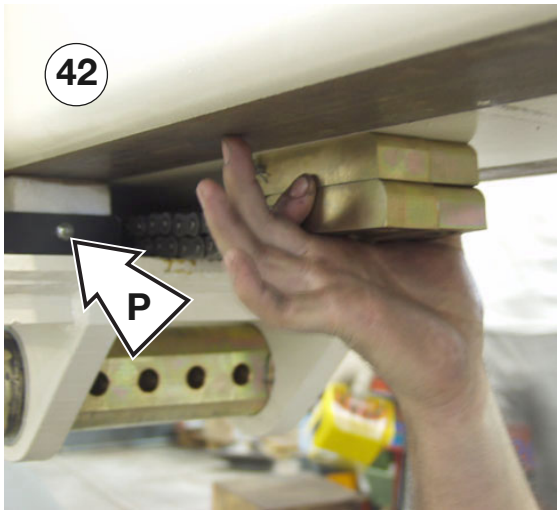


41 Use the second end of the chain to fit the tie-rods.

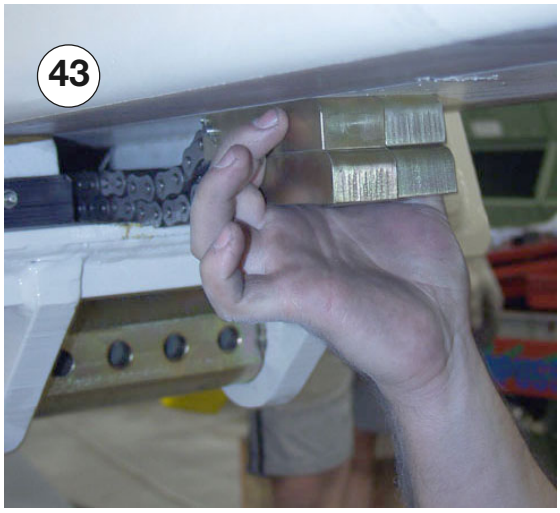


Operation: **Assembling the boom**	*Table:* **G-053**

42 Mount all bottom pads of the boom tubes (in the pad housing there is a greasing nipple **P** which, through a hole, releases oil into the bushing seat of the slide pad).



43 Mount the fixed brackets and fix the chain to the boom tubes. Position the brackets with a screwdriver.



44 Smear the screws with some Loctite, fit and tighten with a 17mm hexagonal wrench.



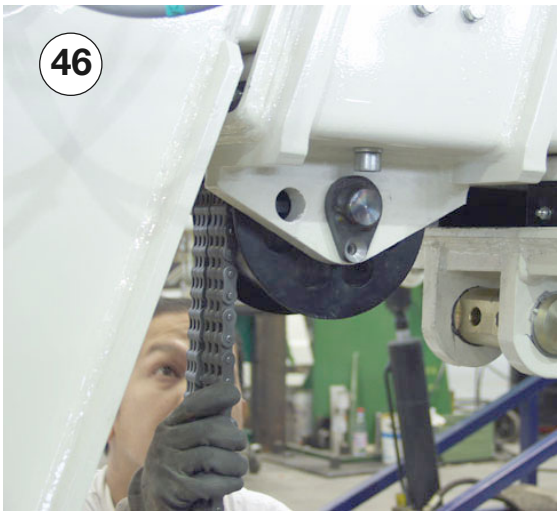
Operation: **Assembling the boom**	Table: **G-053**

45 Using a dynamometric wrench, tighten the screws to 500 Nm.



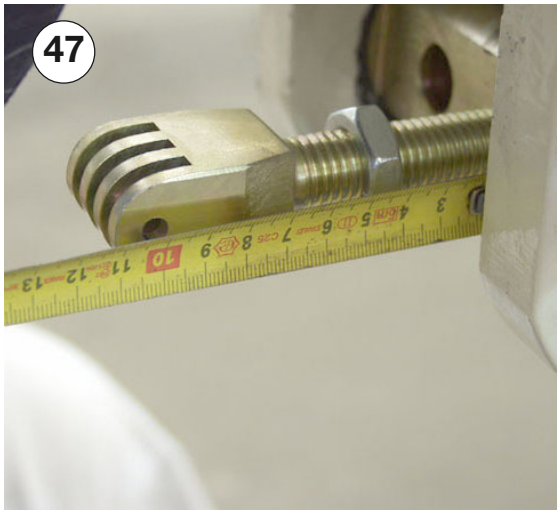
46 Fit the pin into the hole of the sheave of the second boom section. First let the 4 chains slide and the fixing plate rest on the boom surface. Tighten the screw with a 5mm hexagonal wrench.





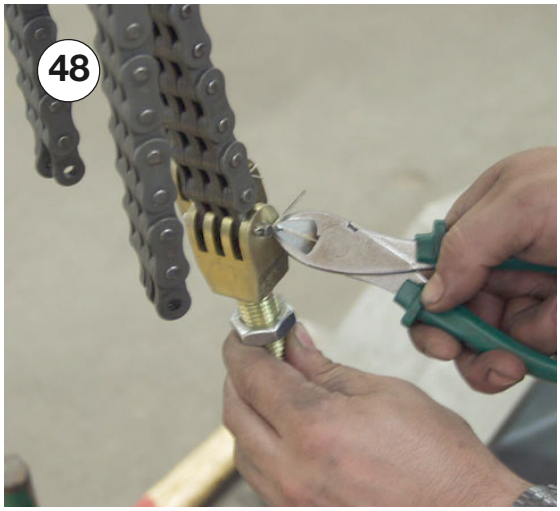
Operation: **Assembling the boom**	*Table:* **G-053**

47 Place the chain tensioners leaving a minimum distance of 100 mm between the face of the boom locking pin and the centre of the chain fixing hole.

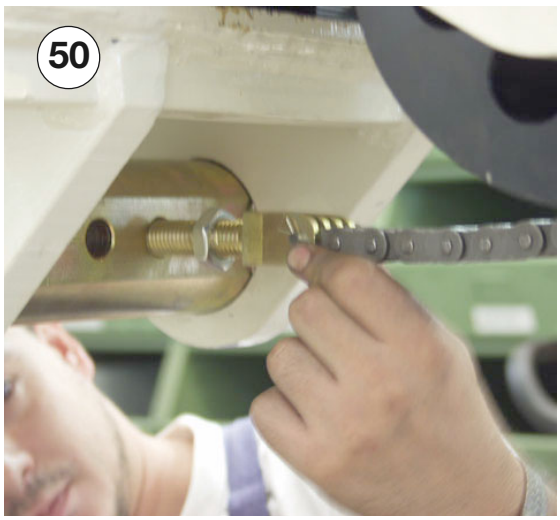


48 Mount the threaded tie-rods to the chains.

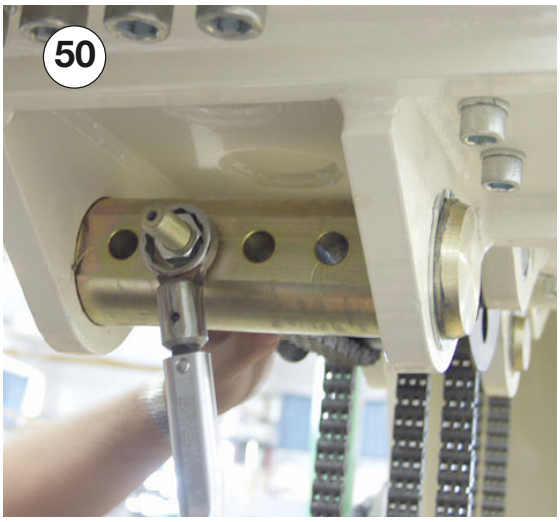
49 Fix the pin with 2 splint pins.



50 Fit the tie-rod to the chain locking pin and tighten nuts and counter-nuts with a 27mm hexagonal wrench. Tighten to 25 Nm with a dynamometric wrench.



Operation: **Assembling the boom**	Table: **G-053**

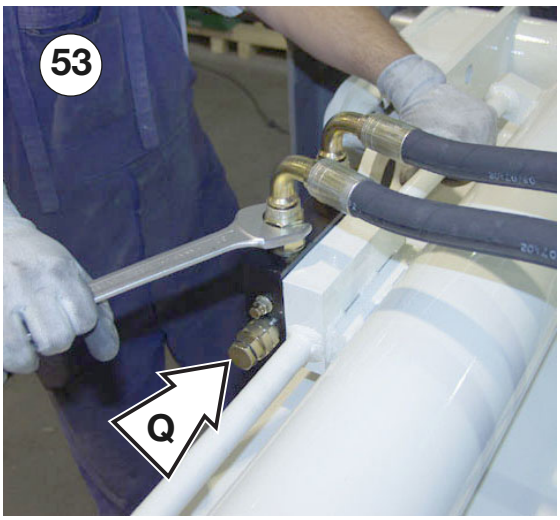


51 While tensioning the chains, tighten them with an adjustable wrench to avoid any rotation.

52 Check that the pads and the mechanical parts stay correctly before proceeding with the hydraulic connections.

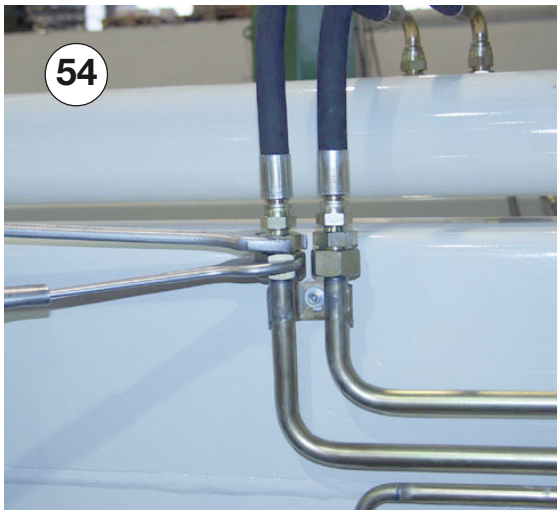


53 Mount the block valve **Q** of the boom extension cylinder and the relevant flexible hoses with a 32mm wrench.

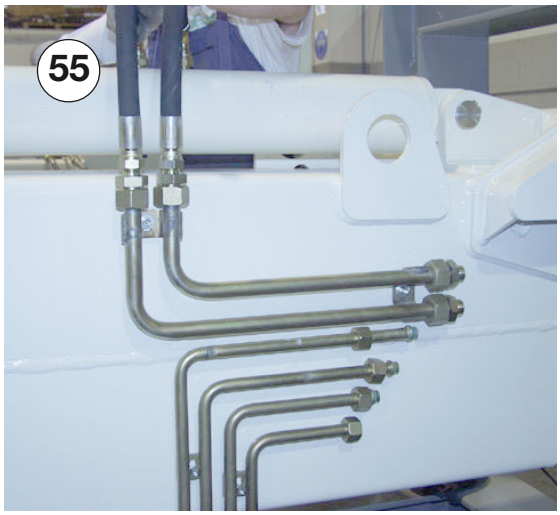


Operation: **Assembling the boom**	Table: **G-053**

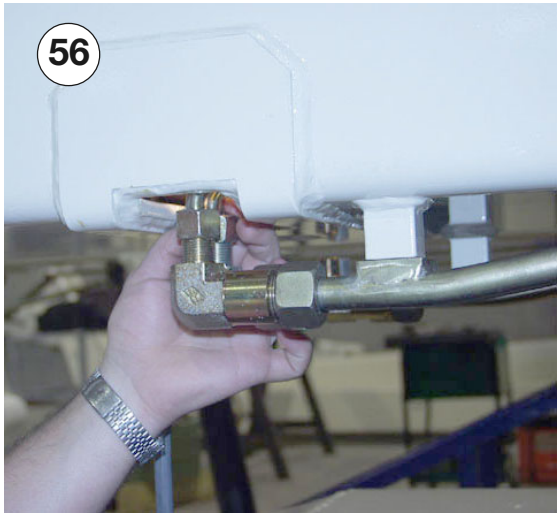
54 Fit a connector to the metal tubes sited to the left of the boom and tighten with two wrenches (46 and 41 mm).



55 Tighten the tube nut with two wrenches (41 and 32 mm), then fix the tubes to the side of the boom with a 6mm hexagonal wrench.

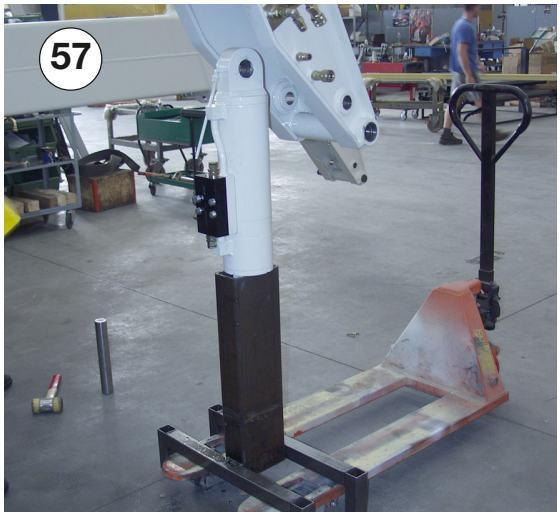


56 Connect the tubes to the bottom of the boom with a 27mm wrench.



Operation: **Assembling the boom**	Table: **G-053**

57 Near the fork pitching cylinder and align the hole on the cylinder with the one on the boom nose.

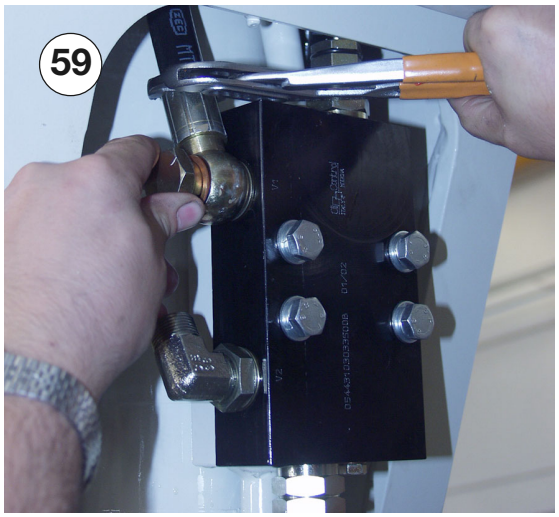


58 Fit the fixing pin and lock it in position with a screw and a nut using two 19mm wrenches.



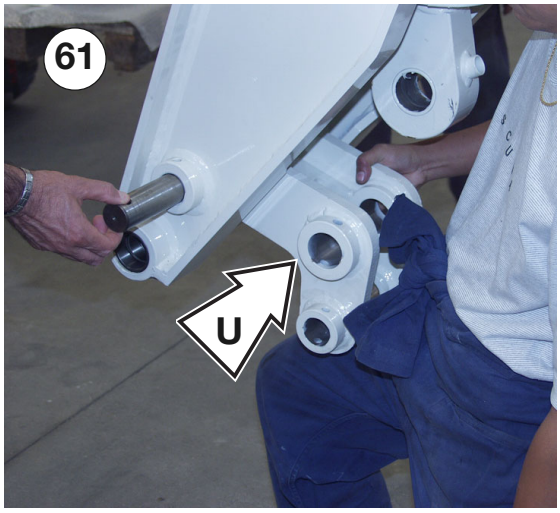
59 Connect the line with eye-terminal to the block valve pulling slightly the other line with a Polygrip (Beta 1048-240), so that the hose with eye-terminal forms a slight curve and rests on the cylinder. Tighten the hollow pin with a 27mm wrench.

60 Connect the line with straight terminal to the 90° connector on the block valve using a 27mm wrench.

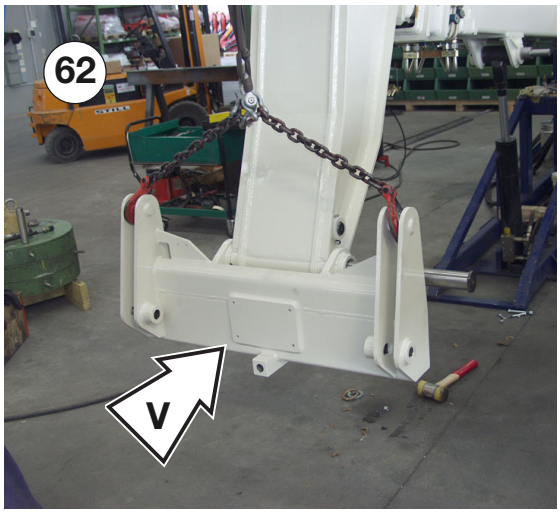


Operation: **Assembling the boom**	Table: **G-053**

61 Mount the connecting rod **U** to the boom nose fitting the relevant pin. Lock in position with a screw and a nut and tighten with a 17mm wrench.



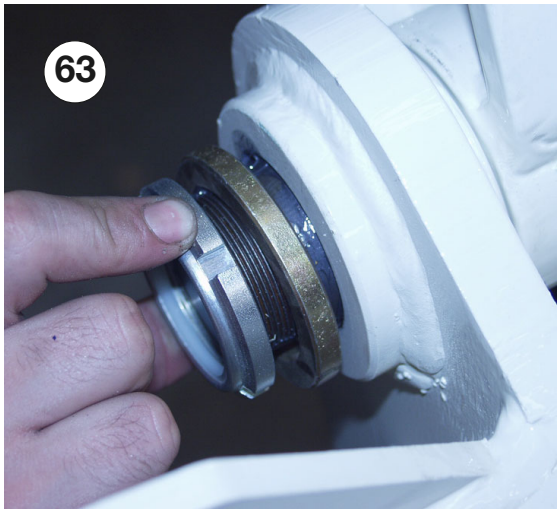
62 Raise the holding plate **V** using a two-leg chain connected to the bridge crane. Place the plate close to the fixing hole on the nose.



63 Fit the pin of the holding plate and lock it with the special ring nut placing in-between the shim supplied. Use a USAG 282 SN 50-80 spanner to tighten the ring nut.

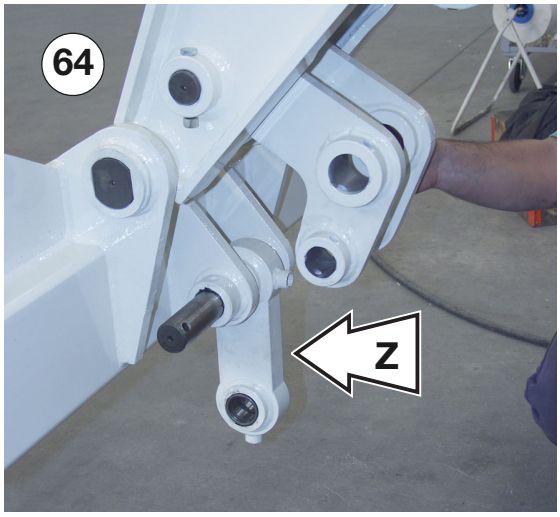
IMPORTANT

Thoroughly grease the housings of the pins to fit them home easier.

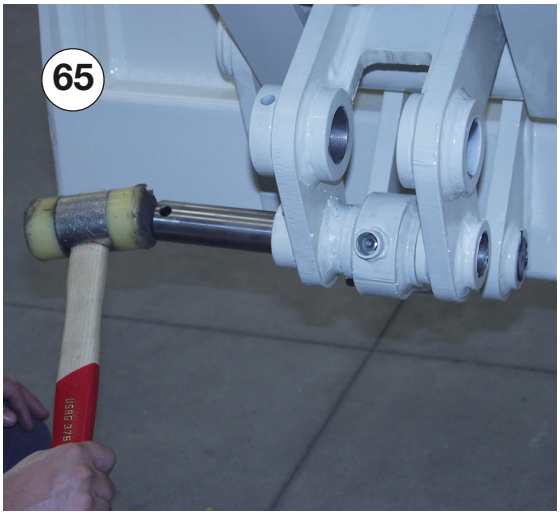


Operation: **Assembling the boom**	Table: **G-053**

64 Mount the straight connecting rod **Z** as shown. Fit the locking pin and tighten the locknut on the screw with a 17mm wrench.



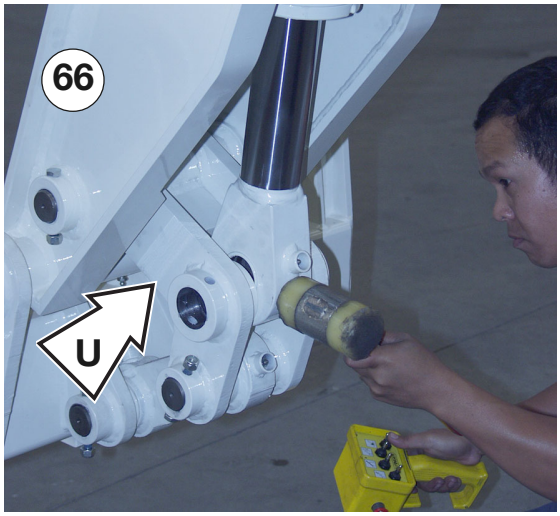
65 Fit the pin of the connecting rod and knock it lightly home with a rubber hammer. Fit the screw and the nut and tighten all parts with a 17mm wrench.



66 Connect the connecting rod **U** with the fork pitching cylinder fitting the special pin and locking all the parts with the screw and locknut using a 19mm wrench.

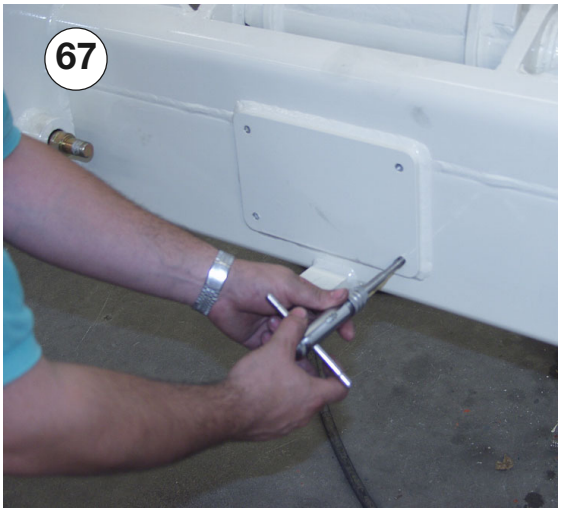
IMPORTANT

Once all connections have been made, lubricate all pins injecting grease with a greasing gun into the greasing nipples and check they are in efficient working order.

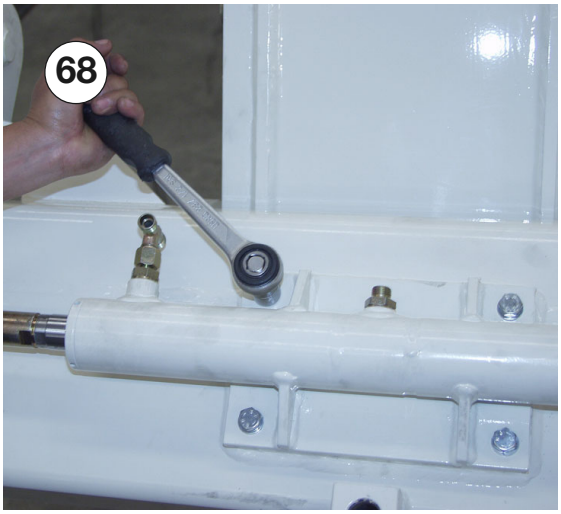


Operation: **Assembling the boom**	Table: **G-053**

67 Thread M10 the 4 holes on the plate used to connect the attachment locking cylinder.



68 Fit the attachment locking cylinder following the instructions in G-006 in reversed order.



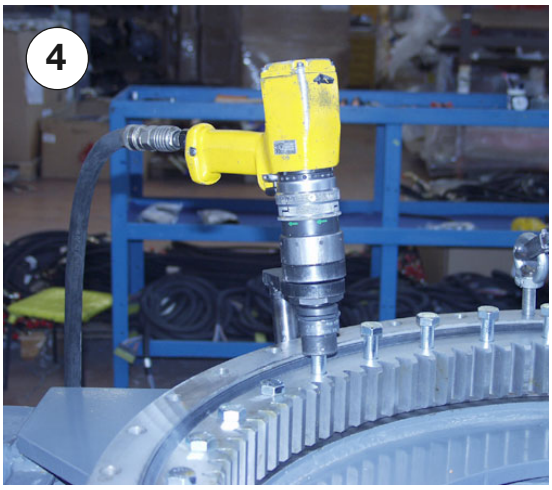
Operation: **Dismantling the turret slewring**	Table: **G-054**			kg	132
	3514 ✔	3518 ✔	5022 ✔		
					Hrs. / Min.
Bridge crane, payload 10000 kg (40000 lb) Textile bridles or chains with hooks	Standard tools				24 / -
					2

Dismantling procedure

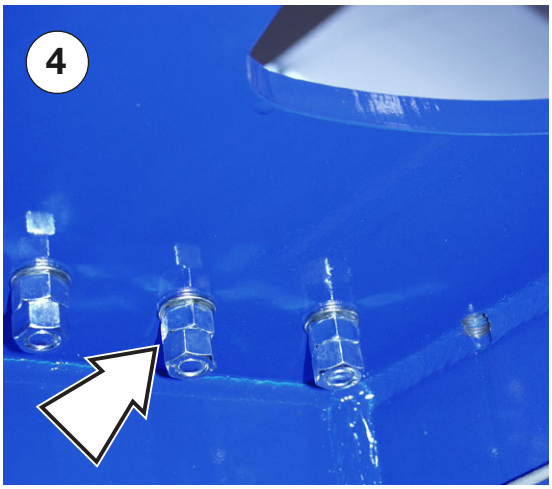
1 Remove the boom as explained in G-012 “Dismantling the boom”

2 Remove the electrical joint as explained in G-014 “Dismantling the electrical and hydraulic joint”

3 Remove the turret following the instructions in G-049 “Assembling the turret” in reverse order

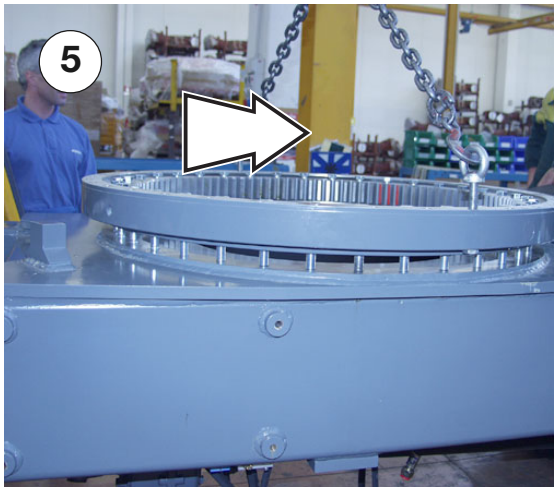


4 Remove the screws which fix the slewring to the undercarriage using a pneumatic screwdriver and, if necessary, an hexagon wrench to hold the locknut and the nut in position while unscrewing.

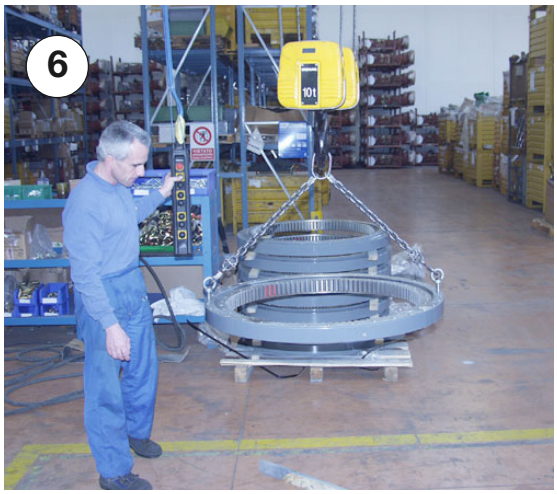


Operation:	Dismantling the turret slewring	Table:
		G-054

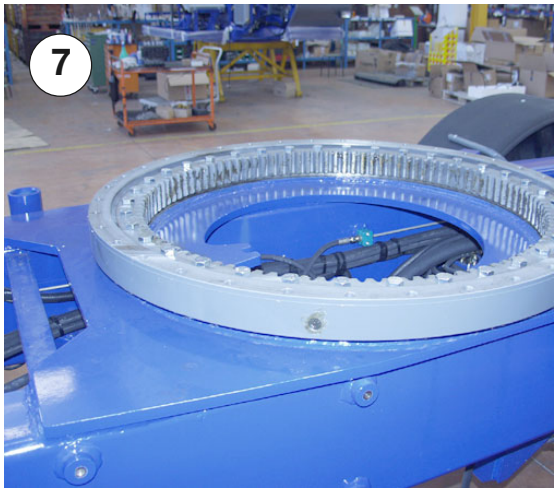
5 Fit two eyebolts in two opposite points of the slewring. Attach the chains of the bridge crane to these eyebolts and lift the slewring.



6 Lower the slewring to the ground onto a wooden pallet making sure that it does not hinder other operations.



7 For the reassembly, proceed in reverse order being very careful to tighten the fixing screws to the recommended tightening torque. Use the instructions G-049 “Assembling the turret” as a reference.



Operation: **Replacing the ignition key block**	Table: **G-055**			kg	-
	3514 ✔	*3518* ✔	*5022* ✔	Hrs.	Min.
	Standard tools			-	15
				1	

Procedure to replace the ignition key:

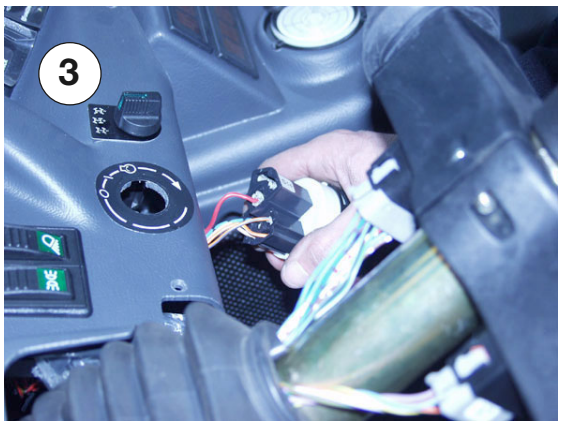
1 With a crosstip screwdriver pry off the dashboard cover.



2 Loosen the nut fixing the block to the dashboard using a 30mm wrench.



3 Disconnect all wires from the block. Re-connect them in the same position during reassembly.



Operation:	Replacing the ignition key block	Table:
		G-055

4 Change the ignition key block and re-connect all the terminals correctly.

Operation: **Dismantling the steering selector**	Table: **G-056**			kg	-
	3514 ✔	3518 ✔	5022 ✔		Hrs. / Min.
	Standard tools				- / 15
					1

Procedure:

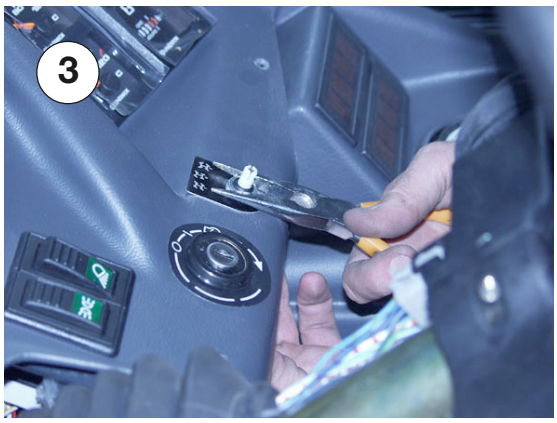
1 With a crosstip screwdriver pry off the dashboard cover.



2 Lift out the plastic cap.

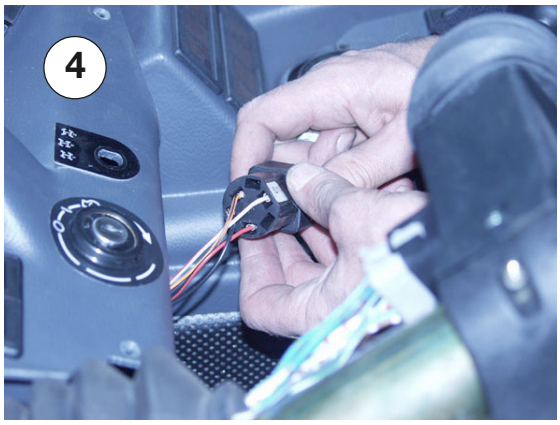


3 Loosen the nut locking the selector to the dashboard with pliers. Push out the selector.



Operation: **Dismantling the steering selector**	Table: **G-056**

4 Disconnect the wires and re-connect them to the new selector in the same position.



Operation: **Changing the rocker switches**	Table: **G-057**			kg	-
	3514 ✔	3518 ✔	5022 ✔		Hrs. / Min.
	Standard tools				- / 15
					1

Procedure:

1 With a crosstip screwdriver pry off the dashboard cover.



2 Push out the pushbutton.



3 With a flat screwdriver, pry off the pushbutton tabs.



Operation: **Changing the rocker switches**	Table: **G-057**

4 Lift out the pushbutton base.



5 Disconnect the terminals powering the pushbutton warning light.

6 Fit a new pushbutton and reconnect.



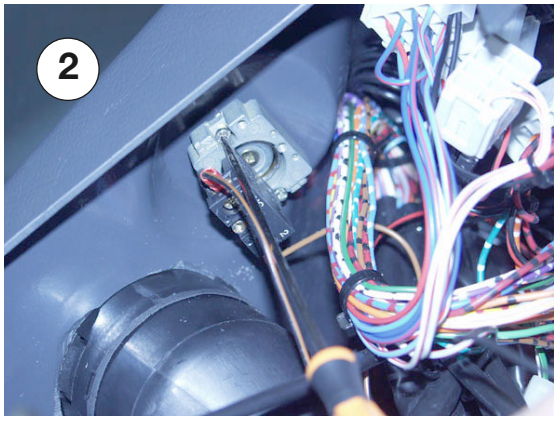
Operation: **Changing the emergency pushbutton**	Table: **G-058**			kg	-
	3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
	Standard tools			-	15
				1	

Procedure:

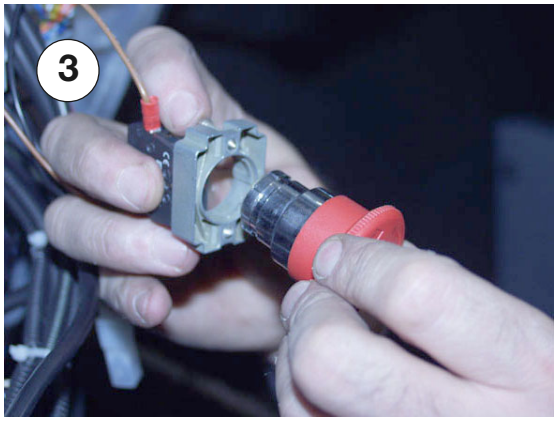
1 With a crosstip screwdriver, pry off the dashboard cover.



2 Using a screwdriver, unscrew and remove the screws fixing the base of the mushroom to the dashboard.



3 Pull out the top of the mushroom and, if necessary, replace the pushbutton. Refit all parts disassembled.



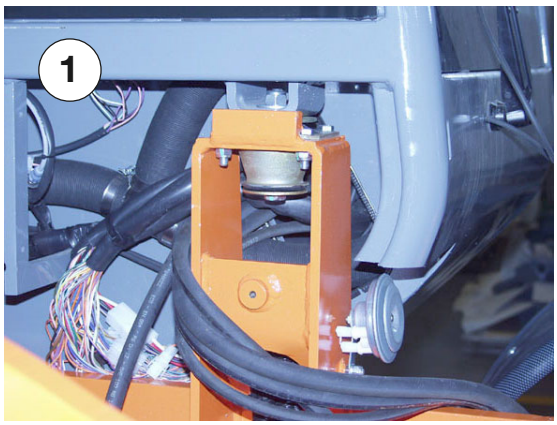
Operation:	Changing the emergency pushbutton	Table: G-058

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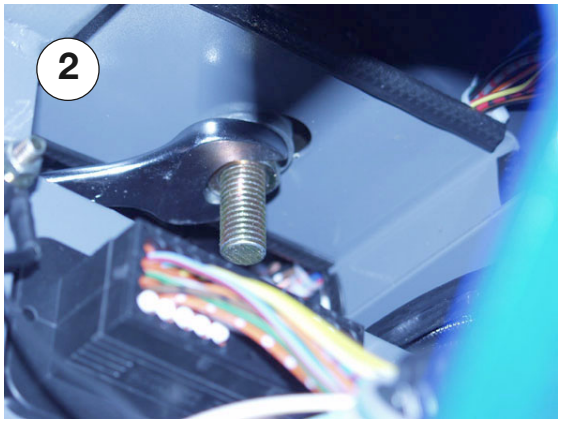
Operation: **Changing the water level**	Table: **G-059**			kg	-
	3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
	Standard tools			-	30
				1	

Procedure:

1 Remove the cover from the lifting cylinder side and access to the dashboard bottom.



2 With a 22mm wrench loosen the nut locking the water level to the dashboard and lift out.



3 Fit a new water level. Then move the machine to a flat surface and with a 3mm Allen wrench adjust the water level so that the air bubble is right in the middle when the machine is perfectly level.



Operation:	Changing the water level	Table:
		G-059

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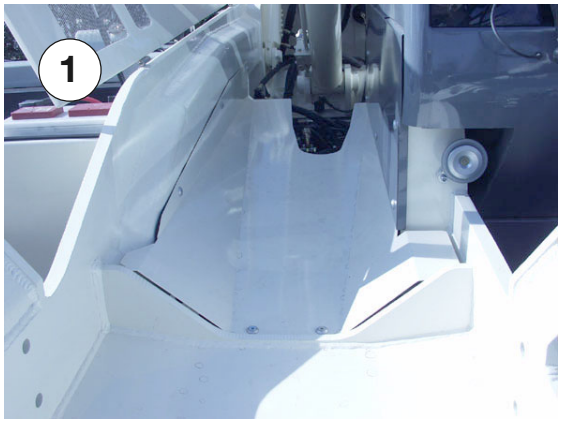
Operation:	Changing the road/jobsite/platform switch	Table: G-060		
		3514 ✔	3518 ✔	5022 ✔

kg	-	
	Hrs.	Min.
	-	30
	1	

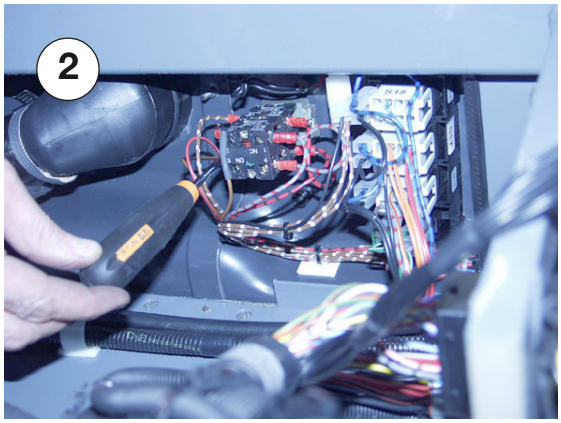
Standard tools

Procedure:

1 Remove the cover from the lifting cylinder side using a 5mm hexagonal wrench.



2 With a crosstip screwdriver, free the bottom part housing the contacts and extract the contacts.



3 Lift out the cap of the selector and fit a new selector proceeding in reversed order.



Operation:	Changing the road/jobsite/platform switch	Table: G-060

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Operation:	Changing the warning lights' blocks on the dashboard	Table: G-061			kg	-
		3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
	Standard tools				-	15
					1	

Procedure:

1 Pry off the dashboard cover with a crosstip screwdriver.



2 Push out the block to replace.



3 Disconnect the electrical wires and replace the block with a new one.Fit the new block.

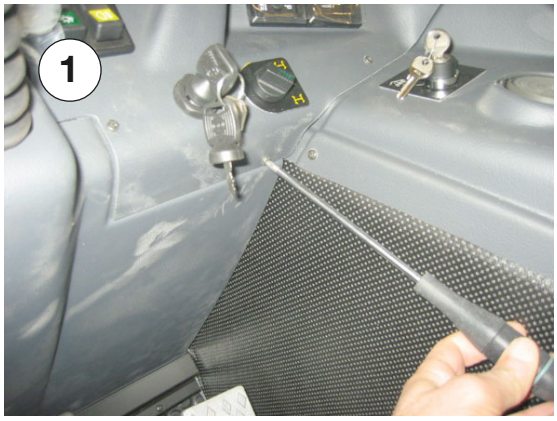
Operation:	Changing the warning lights' blocks on the dashboard	Table: G-061

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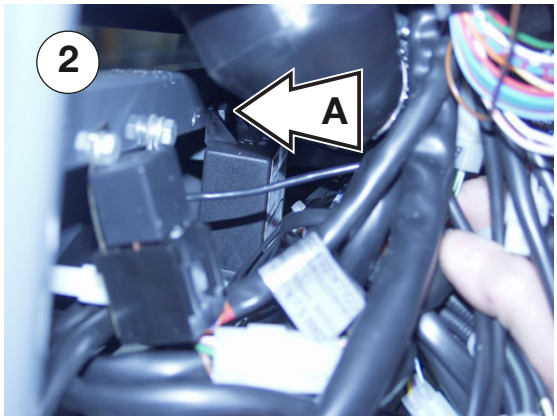
Operation: **Changing the SCT box**	Table: **G-062**			kg	-
	3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
	Standard tools			1	30
				1	

Procedure:

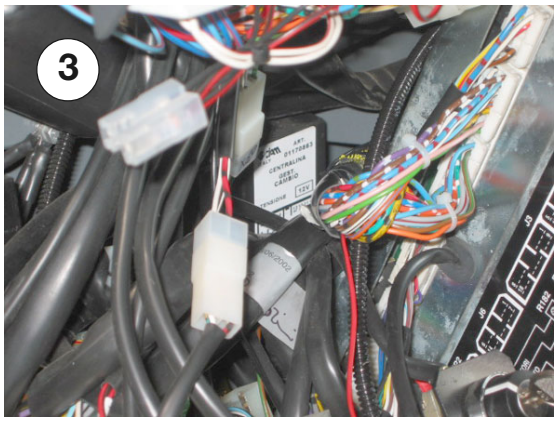
1 With a cross-slotted screwdriver, undo and remove all fixing screws of the top and bottom guards of the dashboard; remove the guards.



2 With a 10mm socket spanner, remove screw **A** which fixes the SCT box to the cab standard



3 Disconnect the wires from the box, then remove the old box and fit a new one.



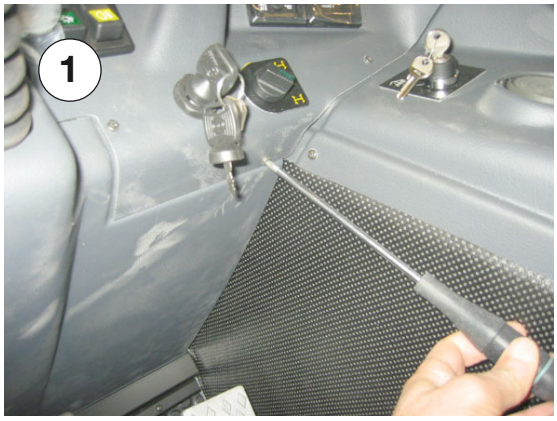
Operation:	Changing the SCT box	Table:
		G-062

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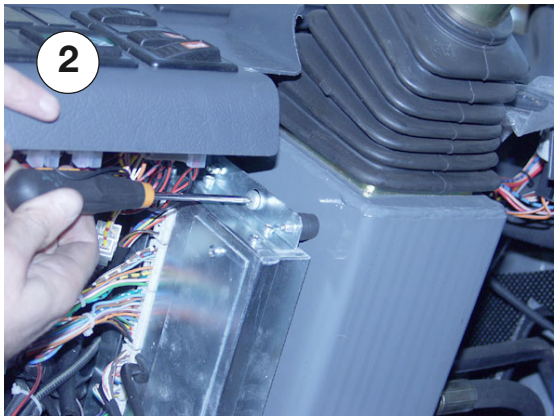
Operation: **Changing the Danfoss board**	Table: **G-063**			kg	-
	3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
	Standard tools			1	30
					1

Replacement procedure:

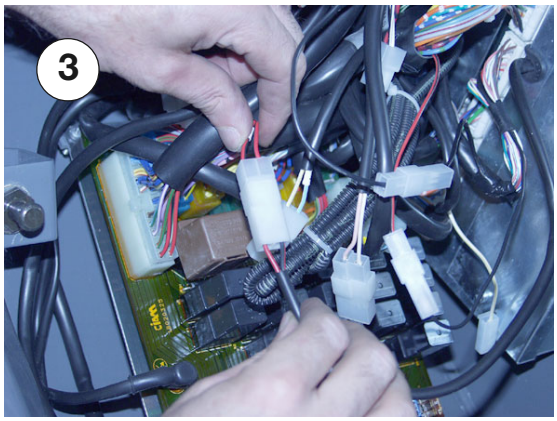
1 With a cross-slotted screwdriver, undo and remove all fixing screws of the top and bottom guards of the dashboard; remove the guards.



2 With another cross-slotted screwdriver, undo and remove the screws fixing the board to the steering column

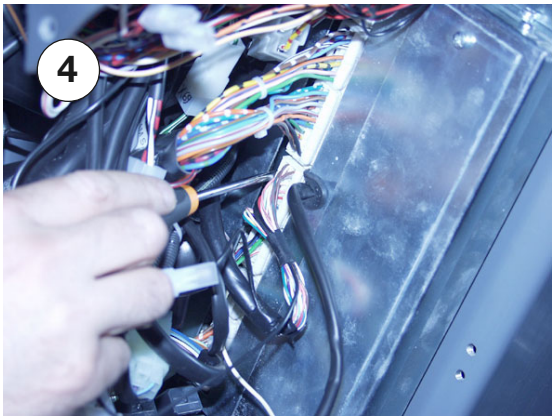


3 Disconnect the board wires



Operation: **Changing the Danfoss board**	*Table:* **G-063**

4 Unplug all the connecting plugs of the board using, if necessary, a small flat screwdriver to prize the tongues off.

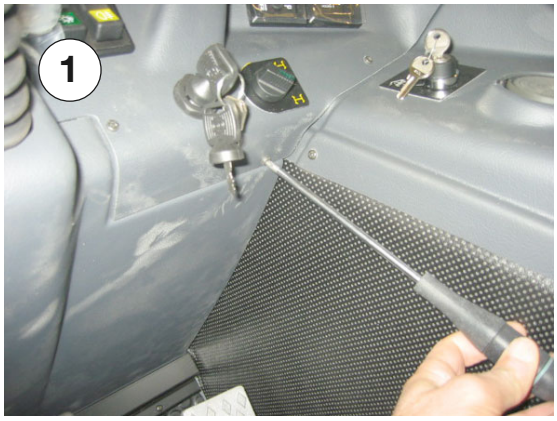


5 Fit a new board and reconnect it.

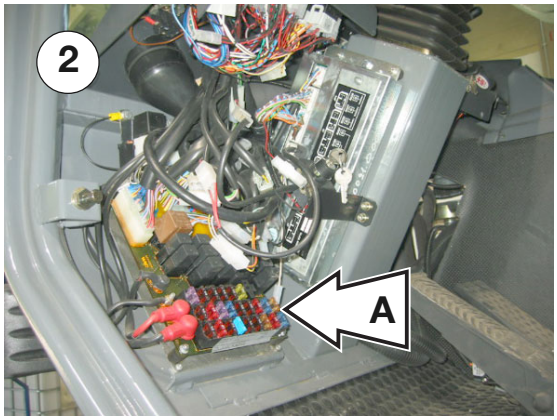
Operation: **Changing the fuses and relays board**	Table: **G-064**			kg	-
	3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
	Standard tools			1	30
					1

Replacement procedure:

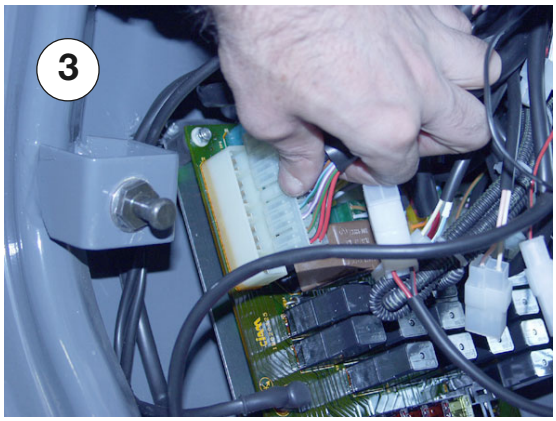
1 With a cross-slotted screwdriver, undo and remove all fixing screws of the top and bottom guards of the dashboard; remove the guards.



2 Reach the fuses and relays board **A**

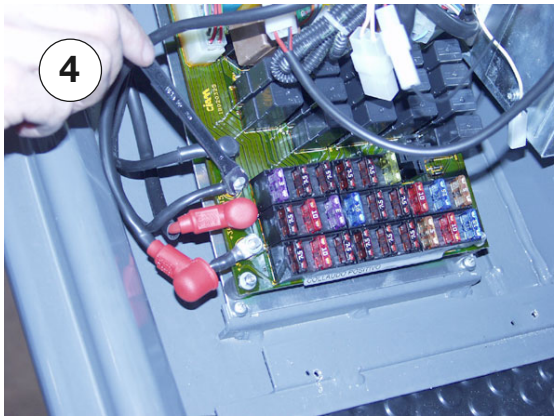


3 Unplug all connecting plugs of the board after having noted their position to make their reconnection easier



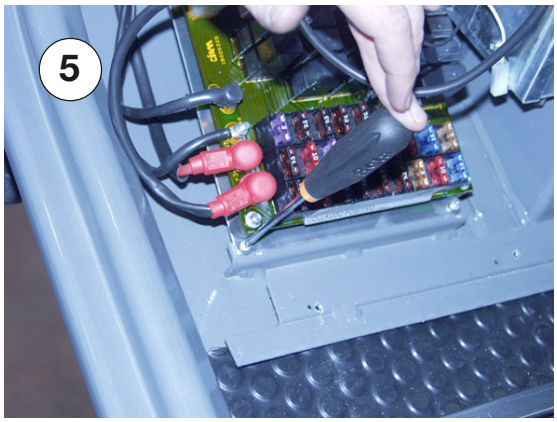
Operation:	Changing the fuses and relays board	Table:
		G-064

4 With an 8mm hexagon spanner, loosen the fixing nuts of the power wires after noting their position.



5 With a cross-slotted screwdriver, remove the screws fixing the board to the cab frame.

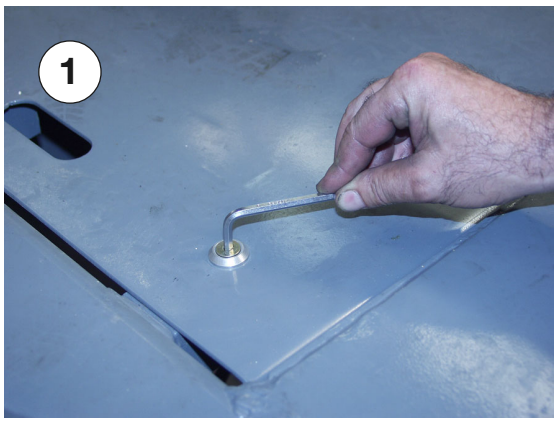
6 Replace and reconnect the board.



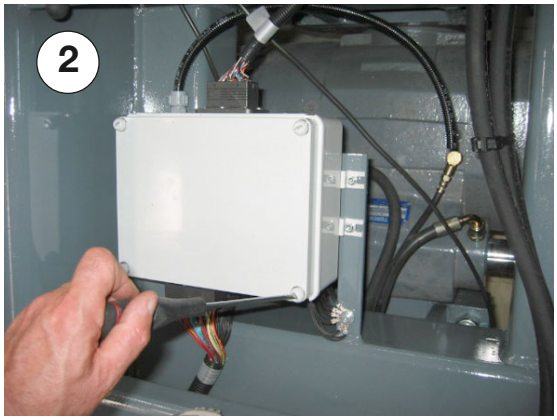
Operation: **Changing the undercarriage board**	Table: **G-065**			kg	-
	3514 ✔	*3518* ✔	*5022* ✔	Hrs.	Min.
Standard tools				1	-
				1	

Replacement procedure:

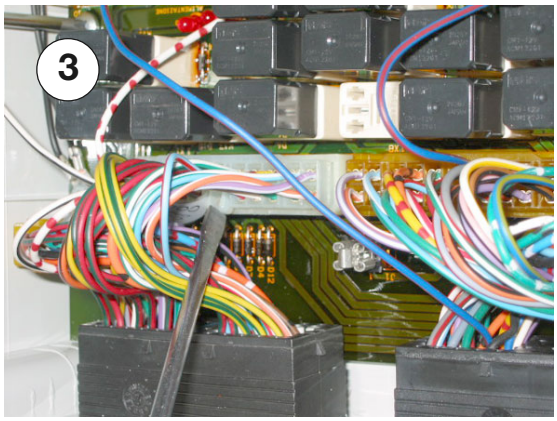
1 Using a 5mm hexagon screwdriver, undo and remove all fixing screws of the front axle guard; remove the guard.



2 Undo and remove the screws fixing the box cover using a flat screwdriver

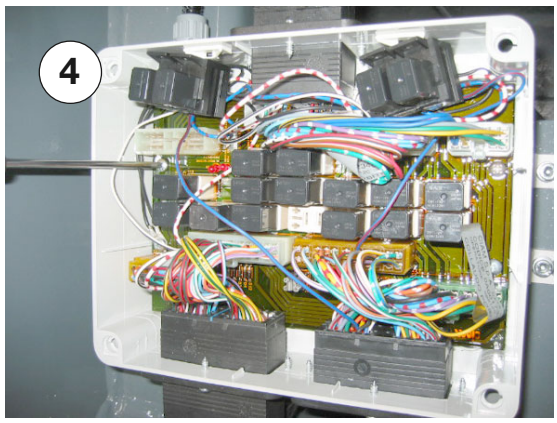


3 Unplug all connecting plugs of the board after having noted their position to make their reconnection easier



Operation:	Changing the undercarriage board	Table:
		G-065

4 With a cross-slotted screwdriver, remove the screws fixing the board and replace it.



Operation:	Changing the instruments board (3514-3518 from serial n. 10189) (5022 from serial n. 10079)	Table: G-066		
		3514 ✔	3518 ✔	5022 ✔

kg	-	
	Hrs.	Min.
	1	-
	1	

Standard tools

Replacement procedure:

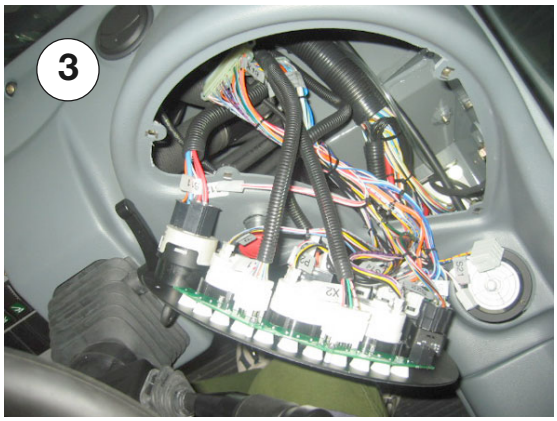
1 With a 2.5mm hexagon wrench, remove all screws fixing the instruments panel to the dashboard of the machine.



2 Remove the panel from its seat being very careful not to damage it.



3 Turn the panel to check the connections.



Operation: **Changing the instruments board**	Table: **G-066**

4 Once you have checked and, in case, replaced defective parts, refit the panel following the instructions in reverse order.

Operation:	Changing the boards (3514-3518 from serial n. 10189) (5022 from serial n. 10079)	Table: G-067		
		3514 ✔	3518 ✔	5022 ✔

kg	-	
	Hrs.	Min.
	1	-
	1	

Standard tools

Replacement procedure:

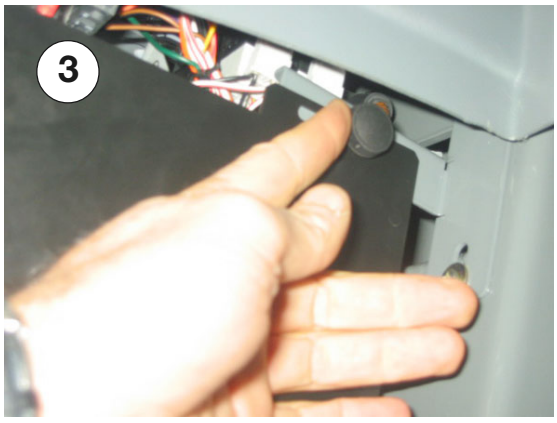
1 With a cross-slotted screwdriver, undo and remove all screws fixing the protection cover at the bottom.



2 Unscrew the knob which fixes the protection cover at the top of the dashboard.



3 Unscrew the top plastic knob which holds the fuses/relays board in position



Operation: **Changing the boards**	Table: **G-067**

4 Turn the fuses/relays board towards the cab interior.

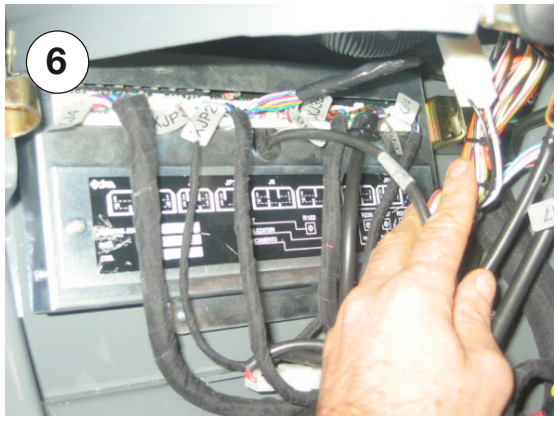


5 Lower it to the cab floor and check the electrical plugs, the fuses and the relays.



6 Also the Danfoss board is in a position which lets you check and do replacements easily.

7 Reassemble all the parts following the instructions in reverse order.

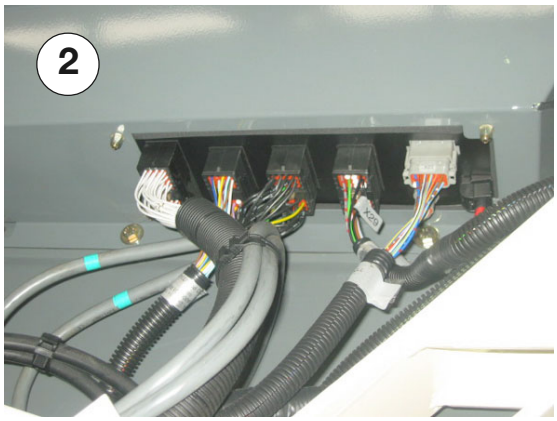


Operation:	Changing the cab-frame connections (3514-3518 from serial n. 10189) (5022 from serial n. 10079)	Table: G-068			kg	-
		3514 ✔	3518 ✔	5022 ✔	Hrs.	Min.
	Standard tools				1	-
					1	

Replacement procedure:

1 With a 6mm hexagon wrench, undo and remove all screws fixing the external guard of the cab (lifting cylinder side); remove the guard.

2 In so doing, you can check the connections between the cab electrical system and the machine frame.



3 Check and, in case, replace any defective parts, then reassemble following the instructions above in reverse order.

Operation:	Changing the cab-frame connections	Table: G-068

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Section F
TROUBLESHOOTING

SECTION INDEX

Hydraulic faults ..... page 2
Electrical faults 9
Brake pump problems 30
Danfoss pilot distributor problems 32

DANGER

Any service, maintenance or troubleshooting must be carried out with the machine stopped, the boom in rest position lowered to the ground, and the transportation locking devices fitted.

For the troubleshooting, use a $3^{1}/_{2}$ - digit tester or the device indicated on page A7-A8 of this manual.

Use the wiring diagrams enclosed for finding solenoid valves (EV), fuses (F), relays (E) or other electrical components in an easier way - see ***chapter C - Technical data*** of this manual.

Trouble	Cause	Solution
The machine does not move	• Drive pump maladjusted • DA valve damaged	• Recalibrate - see manual enclosed • Check and replace if necessary
Overfeeding insufficient	• Overfeeding pump defective • Hydraulic swivel joint damaged • Intake filter clogged • Hydraulic motor damaged	• Change the pump • Renew the internal seals or change the joint • Renew the filter • Replace the motor
The machine drive is not enough	• Hydraulic oil filter clogged • Low hydraulic oil level • The hydraulic oil is contaminated • Pump and motor worn (excessive leakage)	• Renew the oil filter • Top up • Clean tank and pipes, empty the pumps and change the oil • Change pump and motor
No shifting between 1st and 2nd mechanical speed	• Low overfeeding pressure • Hydraulic swivel joint damaged • Leaks from the hydraulic joint seals • Mechanical speed selection solenoid valve ref.**51** damaged • Mechanical speed hydraulic operator ref. **52** damaged	• Check the overfeeding pressure • Check line 11 crossing the swivel joint ref. **49** (see C.03 - Hydraulic schemes) • Check the seals of the swivel joint • Check the mechanical movement of the solenoid pin and the coil • Check the efficiency of the operator

Trouble	Cause	Solution
	• Gearbox gears damaged	• Check the gears; replace if necessary
No selection of the steering mode	• Steer selection solenoid valve ref. **53** damaged	• Check the sliding of the internal pin of the solenoid and the coil
Low parking brake action	• Insufficient cable tensioning • Negative parking brake ref. **67** damaged • Hydraulic swivel joint damaged • Parking brake lever damaged	• Re-tension the cable and check the clamps (see card G-020). • Check the brake efficiency; replace if necessary • Check line 13 of the hydraulic joint (ref.**49**) • Check the efficiency of the lever
No sway function	• Sway cylinders ref. **59** - **60** damaged • Block valves ref.**61** - **62** of the sway cylinders damaged • Sway control solenoid ref. **58** damaged • Hydraulic swivel joint ref.**49** damaged • Electric flow divider ref.**33** damaged	• Check the cylinder seals • Check the sliding of the sliders and the coils of the solenoids • Check the sliding of the sliders and the coils of the solenoid • Check lines 3 and 4 and the seals of the hydraulic swivel joint • Check the sliding of the EFD slider
The outriggers do not work	• Outrigger cylinders ref. **71** - **73** - **75** - **77** • Outrigger cylinder block valves ref. **70** - **72** - **74** - **76** damaged • Outrigger solenoid block damaged • Hydraulic swivel joint ref.**49** damaged • Electric flow divider ref.**33** damaged • Danfoss distributor damaged	• Check the efficiency and the internal seals of the cylinders • Check the efficiency of the valves and the correct sliding of the internal pistons • Check the efficiency of solenoid valves of the block (ref. **69**) • Check lines 3 and 4 and the seals of the hydraulic swivel joint • Check the sliding of the EFD slider • Check the element of the Danfoss distributor

Trouble	Cause	Solution
The machine does not steer	• Main pump ref. **3** damaged • Load-sensing priority valve ref. **17** damaged • Power steering unit damaged • Hydraulic swivel joint ref.**49** damaged • Steer cylinders ref. **54** - **56** damaged • Steer selection solenoid ref. **53** damaged	• Check the stand-by pressure of the pump (see D.03.01) • The priority valve does not select the hydraulic oil to the power steering unit. Replace the valve • Check the efficiency of the power steering unit. Also check if the pilot activates the valve ref. **17** • Check lines 8 and 9 of the hydraulic joint for internal pressure losses • Check the efficiency of the internal seals of the cylinders • Check the efficiency of the internal piston of the solenoid and the coil
The boom does not move	• Main pump ref. **3** damaged • Load-sensing priority valve ref. **17** damaged • Electro-proportional distributor ref. **20** damaged	• The pump does not deliver oil. Check the stand-by pressure (20 bar without operating any element of the distributor) • The priority valve is clogged or damaged. Remove, check the seals • Check that the distributor works correctly and discharges the stand-by pressure (20 bar) to the pump ref. **3**
Stepping down on the brake pedal, the machine does not brake	• Auxiliary pump ref. **4** damaged • Pressure reducing valve ref. **6** damaged • Brake pump ref. **7** damaged • Hydraulic swivel joint ref.**49** damaged • Brakes damaged or worn • Accumulator damaged	• Check the pump thoroughly • Check efficiency and setting of the valve (see D.03.01) • Check the efficiency of the pump thoroughly • Check lines 5 and 6 of the hydraulic joint for internal pressure losses • Check the efficiency of the discs (see sect. G) • Check and replace if necessary (see G-036)

Trouble	Cause	Solution
The counter-frame cannot be rotated	• Rotation gear motor ref. **40** damaged • Internal brake defective • Rotation gear motor block valves ref. **39** maladjusted • Gear motor sprocket-wheel teeth damaged • Gear motor slewring teeth damaged	• Check the efficiency; replace the motor if necessary • Check and replace the internal seals if necessary • Recalibrate the valves • Change the gear motor sprocket-wheel • Change the slewring
The attachment locking cylinder does not function	• Attachment locking cylinder ref. **38** damaged • Quick couplings damaged • Hydraulic quick couplings-distributor line defective	• Check the efficiency and replace the internal seals if necessary • Check and replace if necessary • Check and replace the damaged or clogged lines if necessary
The counter-frame rotation cylinder does not function	• Internal seals worn • Turret rotation locking solenoid ref. **34** damaged • Electric flow divider ref. **33** damaged	• Check the tightness of the seals and replace if necessary • Check the internal cleaning of the solenoid valve; replace if necessary • Check the mechanical efficiency; if necessary, replace the seals or the divider
The fork pitching does not function perfectly	• Fork movement cylinder ref. **32** damaged • Block valve ref. **31** damaged • Hydraulic block valve-distributor line defective • Safety valves maladjusted or damaged	• Change the seals and check the tightness of the cylinder. • Check and clean the valve; replace if necessary • Check the damaged or clogged lines; replace if necessary • Check the efficiency of the safety valves fitted to ports A and B of the distributor; recalibrate or change

Trouble	Cause	Solution
The boom extension does not function	• Extension cylinder inside the boom ref. **26** damaged	• Check the tightness of the cylinder seals, the rod and the re-sequencing valve fitted to the top of the rod. repair or replace the cylinder
	• Extension cylinder outside the boom ref. **24** damaged	• Check the tightness of the cylinder seals, the rod and the re-sequencing valve fitted to the top of the rod. repair or replace the cylinder
	• Distributor maladjusted	• Check the maximum pressure
	• Mechanical blockage	• Inspect the boom and check for mechanical blockages. Rectify
	• Block valve ref. **25** damaged	• Remove and clean the valve, check the seals; or replace if necessary
	• Block valve ref. **23** damaged	• Remove and clean the valve, check the seals; or replace if necessary
	• Hydraulic boom feeding line defective	• Check the damaged or clogged lines; replace if necessary
The boom lifting does not function	• Lifting cylinder ref. **22** damaged	• Replace the seals and check the tightness of the cylinder
	• Block valve ref. **21** damaged	• Remove and clean the valve, check the seals; or replace if necessary
	• Distributor maladjusted	• Check the maximum pressure
The boom jerks when moving down	• Accumulator damaged	• Check the accumulator thoroughly (1.5 litres); if necessary replace the internal diaphragm and re-pressurise (35 bar) - see G-037
	• Low hydraulic oil level	• Check and replenish, if necessary
The boom extension goes out of sequence frequently	• Extension cylinder seals damaged	• Replace the seals and check the tightness of the cylinder.
	• Re-sequencing valves damaged	• Remove and clean the valves, check the seals; or replace if necessary
	• Air in the circuit	• Bleed (see Operator Handbook)

Trouble	Cause	Solution
When the boom is moved up or down, forks do not level	• Compensation cylinder ref. **30** damaged • Distributor safety valves damaged • One-way valve ref. **28** damaged • Pressure reducing valve ref. **27** damaged • Block valves ref. **29** and **31** damaged • Hydraulic line defective	• Check the efficiency and the internal seals of the cylinders. • Check the efficiency of the safety valves fitted to ports A and B of the distributor; recalibrate or change • Remove and clean the valve, check the seals; or replace if necessary • Remove and clean the valve, check the seals; or replace if necessary • Remove and clean the valves, check the seals; or replace if necessary • Check the damaged or clogged lines; replace if necessary
The boom jerks when extended	• Sliding pads worn • Boom is badly greased • Paint or abrasion on the pad rail • Low hydraulic oil level	• Check the pads for wear; replace if necessary • Smear the sliding area of the boom on the pad with some grease • Grind out any signs of abrasion on the boom and polish the sliding area of the pad, then smear with grease • Check and replenish, if necessary
Boom hardly retracts when it is fully extended and horizontal	• Pads worn • Distributor maladjusted	• Check the pads thoroughly placed in the front and rear part of the boom; lubricate with special grease • Check the maximum pressure
The machine stops when boom is retracted and the engine runs at idle	• During the retraction of the boom, the load sensing pump ref. **3** reaches its maximum pressure and flow. if the engine is at idle, it cannot tolerate the demand and tends to stop.	• Accelerate the diesel engine before starting retracting the boom very slowly. When the movement starts, you can accelerate the manoeuvre. **Note:** do this operation with the engine running at max speed and use the joystick

Trouble	Cause	Solution
The radiator fan does not work	• Bushing between motor and radiator damaged • Fan motor ref. **11** damaged • Pressure reducing valve ref. **6** maladjusted • The reduction between motor ref. **11** and radiator fan ref. **12** is damaged	• Check the bushing; replace if necessary • Check the efficiency of the motor; replace if necessary • Recalibrate (see D.03.01) • Check the efficiency of the reduction gear; replace if necessary

Trouble	Cause	Solution
No power to dashboard with the key inserted	• Battery down	• Check the battery; replace if necessary
	• Battery cutout switch	• Check and restore the cutout switch
	• Earth	• Check the efficiency of the earth connection to the frame
	• Maxifuse **FG4** (60 A) blown	• Replace the fuse
	• Fuses and relays board damaged	• Check the board input with the 10mm red wire and the output with the 2.5mm red wire. If necessary, change the board and check the connections
	• Ignition key block	• Check the input ref. 30 of the key and the output with yellow-blue wire. If necessary, change the ignition block
	• Relay **K04** damaged	• Change the relay
The machine cannot be started with the cab controls	• Ignition key	• Check that 12V are supplied from ref. 50 of the key when the machine is started
	• Fuses and relays board	• Socket X11 pos. 11: 12 V with the machine powered up (see D.02.01)
	• Relay **K14** (coil feeding) damaged	• Replace
	• Speed switch **S48**	• Check the speed switch; if necessary replace
	• Fuse **F6A** blown	• Change the fuse
	• Fuse board socket **X8**	• Socket X8 pos. 8: 12 V (see D.02.01).
	• Problem on the line connecting the dashboard to the black box close to the engine	• Check the continuity of the orange wire from pos. **8** of connection **X8** to ref. **85** of relay **KO1**.
	• Relay **K01** damaged	• Replace
	• Check relays inputs/outputs **K01**	• Check the earth ref. **86**, check the power supply from maxifuse **FG2** (30 A) and check the output ref. **87** of the starting motor coil relay
	• Starting motor relay damaged	• Replace

Trouble	Cause	Solution
	• Starting motor damaged	• Check and replace if necessary
	• Check the earth efficiency	• Check and if necessary reconnect the earth to the frame
	• Maxifuse **FG2** (30 A) blown	• Change the fuse
The machine cannot be started with the platform controls	• Ignition key	• Check that 12V are supplied from ref. 50 of the key when the machine is started
	• Fuses board input	• Check socket **X11** in pos. **5** (12 V at the input - see D.02.01)
	• Fuse **F7B** (10 A) blown	• Change the fuse
	• Fuses board output	• Check socket **X14** in pos. **8** (12 V at the output - see D.02.01). In case, change the board
	• Socket **X31** placed under the joystick (boom side)	• Check terminal **J** of the socket (see D.02.01)
		• Check the current continuity in position **L** (fuel solenoid feeding), the current in position **M** (relay **K14** feeding)
	• Boom line broken	• Check the continuity of wire ref. **9** (R-N from 1) and the 24-pole socket (socket X310 at the top of the boom)
	• Platform reel damaged	• Check the internal continuity of the reel; if necessary, replace
	• Control pushbuttons on platform damaged	• Check the enabling key and the emergency mushroom-head pushbutton; in case, replace
		Check terminals 10 (12 V for relay coil K4, fuel solenoid Y29) and 11 (12 V for feeding 87 relay K14)
	• Fuses and relays board	• Check socket **X14** pos. 2 (input from boom line) **X5** pos. 7 (output from board to emergency button S20, board return to socket **X5** pos. 17)

Trouble	Cause	Solution
	• Fuse **F4A** (7.5 A) blown • Output from board **X8** pos. **5** • Solenoid **Y29** and bulb **S22** damaged • Relays board for ignition line	• Change the fuse • Check the efficiency of the board; if necessary, replace • Check and replace if necessary • Check input to board **X14** pos. **3**, up to 87 of relay **K14**. In case, replace the board
The engine runs but does not start	• No fuel • Fuse **F4A** blown • Line from pos. **5** socket **X8** to pos. **1** socket **X137** • Temperature bulb **S22** and solenoid **Y29** damaged • Engine A/C pump	• Refuel • Change the fuse • Check the continuity of the wires; replace if necessary • Check and replace if necessary • Check and replace
The battery charge gets down easily	• Break of internal parts • The alternator does not recharge	• Change the battery • Check the alternator; if necessary replace
The machine does not move	• Speed switch **S48** damaged • Fuse **F6A** (7,5 A) blown • Relays **K8** and **K9** damaged • Relays board damaged • Relay **K7** damaged • Parking brake inefficient • Outriggers micro-switches damaged • Gearbox sensors damaged	• Check the speed switch; replace if necessary • Change the fuse • Change the relays • Check the efficiency of output to the switch (socket **X14** pos. **5**), input from switch to board (socket **X5** pos. **9** and **20**), output from board to solenoids **Y01** and **Y02** placed on the drive pump. In case of troubles, change the parts • Change the relay • When excited, the bulb of the parking brake **S28**, disconnects relay **K7** through socket **X10** pos. **4**. Check and replace if necessary • Checks micro-switches **S29**, **S30**, **S31**, **S32** and replace • Check and replace

Trouble	Cause	Solution
	• Electrical swivel joint damaged	• Check path ref. **15** inside the electrical joint and replace if necessary. (Also check the sensors power line through wire ref. **13** inside the electrical joint)
	• Fuses board damaged	• Check socket **X7** in pos. **4**. If necessary, replace the board
	• Gearbox control unit damaged	• Check the output to connector **X29** in pos. 4 (with 12V, the machine does not move)
	• Fuses board damaged	• Check the input pos. **10** socket **X9**
No shifting between 1st and 2nd mechanical speed	• Fuse **F1C** blown	• Change the fuse
	• Mechanical gearbox pushbutton **S16** damaged.	• Check the efficiency; if necessary, replace
	• Fuses board damaged	• Check the power output **X10** pos. **7** (speed pushbutton output), check **X10** pos. **10** (speed pushbutton input), check **X9** pos. **1** output from board for powering the "gearbox control unit"
	• Gearbox control unit damaged	• Check the +12V input from the fuses board on socket **X29** pos. **6**, check the power wires and fit a new connection. Check the 1st speed output (**X29** pos. **15**) and the 2nd speed output (**X29** pos. **9**). If necessary, replace the SCT control unit
	• Relays board damaged	• Check the 1st speed input (**X9** pos. **8**) and the 2nd speed input (**X9** pos. **5**), the outputs from the 2nd speed board (**X12** pos. **7**) and the 1st speed board (**X12** pos. **5**); in case of troubles, change the relays control unit
	• Electrical swivel joint damaged	• Check the electrical joint input and output sockets, the wires pos. **20** (1st speed) and **21** (2nd speed). Replace the joint if necessary

Trouble	Cause	Solution
	• Undercarriage control unit damaged	• Check the inputs on socket **XC8** pos. **15** (2nd speed) and pos. **5** (1st speed); check the outputs on socket **XC1** pos. **18** (2nd speed) and pos. **7** (1st speed). If necessary change the board
	• Gearbox solenoid damaged	• Check the coil efficiency of solenoids **Y16** (2nd speed) and **Y17** (1st speed). Replace if damaged
	• 1st-2nd speed sensors damaged	• Check and replace
The boom does not move (IDENTIFICATION A)	• Fuse **F6C** (20 A) blown	• Change the fuse
	• Fuses board damaged	• Check output on socket **X10** pos. **8** (12 V) with board activated; replace if necessary
	• Road/site/platform selector on platform defective	• Check the efficiency; replace if necessary
	• Electrical line damaged	• Check and repair
	• Danfoss board inputs	• Check the connection input on **J30** 18-ways pos. **8** (12 V with key to site)
	• Danfoss board outputs	• Check connector **J5** or **J6** pos. **14** (12 V). Change the board, if necessary
	• Danfoss board inputs from joystick (deadman)	• Check if there are 12V on socket **J5** or **J6** when the deadman button is pressed. If not, change the deadman button
The boom cannot be raised or lowered	• See **IDENTIFICATION A**	• See **IDENTIFICATION A**
	• Joystick damaged	• Check if there are 12V on socket **J5** or **J6** pos. **1** when the joystick is operated, 12V in pos. **4** with the deadman button pressed, 12V in pos. **5** 12 V with the joystick forward, 12V in pos. **6** with the joystick back, 6 to 9 V or 6 to 3 V in pos. **11** depending on the manoeuvre to be carried. If not, change the joystick

Trouble	Cause	Solution
	• Danfoss board input from 3B6 board	• With a tester check if there are 12V on socket **J3** (12 ways) pos. **8**; if not, check the line from 3B6 board
	• Danfoss board (signals output)	• Connector **JP4** pos. **2**,12 V when boom is raised or lowered, pos. **3** 6 to 9 V or 6 to 3 V depending on the manoeuvre. In case, change the Danfoss board
	• Danfoss distributor coil damaged	• Measure 12 V on coil with joystick operated. If power fails check wires or replace the coil
The boom cannot be extended or retracted vimento delle forche	• See **IDENTIFICATION A** • Joystick damaged	• See **IDENTIFICATION A** • Measure 12V on socket **J5** or **J6** pos. **1** with the joystick operated, 12V in pos. **4** with the deadman button pressed, 12V in pos. **9** with the joystick wheel forward, 12V in pos. **10** with the joystick wheel back, 6 to 9 or 6 to 3 V in pos. **13** depending on the manoeuvre to be carried. If not, change the joystick
	• Danfoss board input from 3B6 board	• With a tester check if there are 12V on socket **J3** (12 ways) pos. **8**; if not, check the line from 3B6 board
	• Danfoss board (signals output)	• Connector **JP4** pos. **1**,12 V when boom is extended or retracted, **J4** pos. **1** 6 to 9 V or 6 to 3 V depending on the manoeuvre. In case, change the Danfoss board
	• Danfoss distributor coil damaged	• Measure 12 V on coil with joystick operated. If power fails check wires or replace the coil

Trouble	Cause	Solution
The boom does not move the forks	• See **IDENTIFICATION A** • Joystick damaged	• See **IDENTIFICATION A** • Measure 12V on socket **J5** or **J6** pos. **1** with the joystick operated, 12V in pos. **4** with the deadman button pressed, 12V in pos. **7** with joystick to the RH, 12V in pos. **8** 12 V with joystick to the LH, 6 to 9 V or 6 to 3 V in pos. **12** depending on the manoeuvre to be carried. If not, change the joystick
	• Danfoss board input from 3B6 board	• With a tester check if there are 12V on socket **J3** (12 ways) pos. **8**; if not, check the line from 3B6 board
	• Danfoss board (signals output)	• Connector **JP4** pos. **3**,12 V with fork pitching forward/ back, **J4** pos. **2** 6 to 9 V or 6 to 3 V depending on the manoeuvre. In case, change the Danfoss board
	• Danfoss distributor coil damaged	• Measure 12 V on coil with joystick operated. If power fails check wires or replace the coil
The counter-frame does not rotate	• See **IDENTIFICATION A** • Joystick damaged	• See **IDENTIFICATION A** • Measure 12V on socket **J5** or **J6** pos. **1** with the joystick operated, 12V in pos. **2** with yellow pushbutton pressed, 12V in pos. **4** with the deadman button pressed, 12V in pos. **7** with joystick to the RH, 12V in pos. **8** with joystick to the LH, 6 to 9 V or 6 to 3 V pos. **12** depending on the manoeuvre to be carried. If not, change the joystick
	• Danfoss board input from 3B6 board or from turret rotation unlocking sensor	• With a tester check if there are 12V on socket **J3** (12 ways) pos. **8**; if not, check the line from 3B6 board

Trouble	Cause	Solution
		Measure 12V on socket **J3** pos. **7** (enabling command from sensor on rotation locking cylinder)
	• Danfoss board (signals output)	• Connector **JP4** pos. **4**,12 V with turret rotation, **J4** pos. **4** 6 to 9 V or 6 to 3 V depending on the manoeuvre. In case, change the Danfoss board.
	• Danfoss distributor coil damaged	• Measure 12 V on coil with joystick operated. If power fails check wires or replace the coil
The attachment locking/ unlocking cylinder does not work	• See **IDENTIFICATION A** • Joystick damaged	• See **IDENTIFICATION A** • Measure 12V on socket **J5** or **J6** pos. **1** with the joystick operated, 12V in pos. **3** with the red button pressed, 12V in pos. **4** with the deadman button pressed, 12V in pos. **7** with joystick to the RH, 12V in pos. **8** with joystick to the LH, 6 to 9 V or 6 to 3 V pos. **12** depending on the manoeuvre to be carried. If not, change the joystick
	• Danfoss board input from 3B6 board	• With a tester check if there are 12V on socket **J3** (12 ways) pos. **8**; if not, check the line from 3B6 board Measure 12V on socket **J3** pos. **7** (enabling command from sensor on counter-frame rotation locking cylinder)
	• Danfoss board (signals output)	• Connector **JP4** pos. **5**, 12 V when the cylinder is opened/ closed, **J4** pos. **5** 6 to 9 V or 6 to 3 V depending on the manoeuvre. In case, change the Danfoss board
	• Flow regulating valve (FRV) damaged	• Check the efficiency. If necessary replace

Trouble	Cause	Solution
	• Danfoss distributor coil damaged	• Measure 12 V on coil with joystick operated. If power fails check wires or replace the coil
General functions for oil delivery to outriggers solenoids block	• See **IDENTIFICATION A** • Joystick damaged	• See **IDENTIFICATION A** • Measure 12V on socket **J5** or **J6** pos. **1** with the joystick operated, 12V in pos. **4** 12V in pos. **4** with the deadman button pressed, 12V in pos. **5** with the joystick forward, 12V in pos. **6** with the joystick back, 6 to 9 V or 6 to 3 V pos. **11** depending on the manoeuvre to be carried. If not, change the joystick
	• Fuse **F7A**, low boom sensor power supply, blown	• Change the fuse
	• Fuses and relays board damaged	• Socket **X6** pos. **12**: 12 V. If necessary, change the board. Check the line from pos. **14** of connection **X6**. Socket **X11** pos. **4**: 12 V
	• Low boom sensor **S41** defective • 3B6 control unit board	• Check and replace if necessary • Check there is an output of 12V on the internal terminal strip, pos. **28**, when the boom is below 10°
	• External socket on 3B6 box (behind the seat)	• Measure12 V on socket **X7** pos. **4**, if there is no check device controlling the line from the socket to the internal terminal board
	• X fuses and relays board damaged	• Check the 12V input with boom below 10° on socket **X6** pos. **14**. If voltage is not 12V, check the line and restore
	• Relay **K12** damaged	• Check and if necessary replace
	• Danfoss board damaged	• Check the input of the low boom signal (12 V) on socket **XJ3** pos. **9**

Trouble	Cause	Solution
	• Outriggers buttons damaged	• Check the efficiency of the pushbuttons; if necessary, replace
	• Danfoss board inputs	• With the tester measure 12V on socket **J3** (12 ways) pos. **1**, **2**, **3**, **4** (outriggers mov.). If not, check the line
	• Danfoss board outputs	• Connector **JP4** pos. **5**, 12 V, **J4** pos. **3** and **6**, 12 V
	• Danfoss board connection **J4**, output for solenoids (check with light indicator)	• Pos. **9**, 12 V for powering the solenoid **Y9** (front RH outrigger up-movement) • Pos. **10**, 12 V for powering the solenoid **Y8** (rear LH outrigger down-movement) • Pos. **11**, 12 V for powering the solenoid**Y14** (front LH outrigger down-movement) • Pos. **12**, 12 V for powering the solenoid **Y13** (rear RH outrigger down-movement) • Pos. **13**, 12 V for powering the solenoid **Y7** (front RH outrigger down-movement)) • Pos. **14**, 12 V for powering the solenoid **Y6** (rear LH outrigger up-movement) • Pos. **15**, 12 V for powering the solenoid **Y12** (front LH outrigger up-movement) • Pos. **16**, 12 V for powering the solenoid **Y11** (rear RH outrigger up-movement) • Pos. **17**, 12 V for powering the relay coils **KC1/2/3/4/5/6/7/8** on the undercarriage board
	• Electrical swivel joint defective	• Check the wires of the electrical swivel joint from socket **X30** connected to the cab under the joystick to socket **X40** connected to the XC undercarriage box Check if there is a voltage of 12V in the numbered wires ref. **27-28-29-30-31-32-33-34-35**. If necessary, replace the electrical joint

Trouble	Cause	Solution
	• Undercarriage board relays damaged • XC undercarriage board defective	• Check the efficiency of relays **KC1/2/3/4/5/6/7/8** • Inputs to board arrive from socket **XC8**: pos. **9** power to coils of all relays; pos. **11** power to 30 relay KC1 (front RH outrigger up-mov.); output to **XC3** pos. **9** • And from socket **XC7**: pos. **10** power for 30 relays **XC2** (rear LH outrigger down-mov.), output to **XC3** pos. **2**.; pos. **1** power for 30 relays **XC5** (front RH outrigger down-mov.) output to **XC3** pos. **4**; pos. **3** power for 30 relays **XC6** (rear LH outrigger up-mov.) output to **XC3** pos. **5**; pos. **2** power for 30 relays **XC3** (front LH outrigger down-mov.) output to **XC3** pos. **1**; pos. **4** power for 30 relays **XC3** (rear LH outrigger up-mov.) output to **XC3** pos. **8**; pos. **6** power for 30 relays **XC7** (front LH outrigger up-mov.) output to **XC3** pos. **7**; pos. **14** power for 30 relays **XC7** (rear RH outrigger up-mov.) output to **XC3** pos. **6**
	• Solenoids **Y9-Y8-Y7-Y6-Y14-Y13-Y12-Y11** damaged	• Check the efficiency of coils and the continuity of wires. If necessary, change the solenoid valves
No sway function	• See **IDENTIFICATION A** • Joystick damaged	• See **IDENTIFICATION A** • Measure 12V on **J5** or **J6** pos. **1** with joystick operated, 12V in pos. **3** with red button pressed, 12V in pos. **7** with joystick to the right, 12V in pos. **8** with joystick to the left, 6 to 9 V or 6 to 3 V in pos. **12** depending on the manoeuvre to be carried. If not, change the joystick

Trouble	Cause	Solution
	• Slewring locking sensor defective	• Check and replace if necessary
	• Fuse **F7A**, low boom sensor power supply, blown	• Change the fuse
	• Fuses and relays board damaged	• Socket **X6** pos. **12**: 12 V. If necessary change the board. Check the line from pos. **14** of connection **X6**. Socket **X11** pos. **4**: 12 V
	• Low boom sensor **S41** defective	• Check and replace if necessary
	• Relay **K12** damaged	• Check and replace if necessary
	• Danfoss board damaged	• Check the input of the low boom sensor (12 V) on **XJ3** pos. **9**
	• Sway pushbuttons damaged	• Check and replace if necessary
	• Danfoss board inputs	• With the tester measure 12V on socket **J3** (12 ways) pos. **4** (machine sway). If not, check the line
	• Danfoss board outputs	• Connector **JP4** pos. **5**, 12 V, **J4** pos. **4** and **6**, 12 V
	• Danfoss board connection **J4**, output for solenoids (check with light indicator)	• Pos. **18**, 12 V power to solenoid **Y10** (front axle sway) • Pos. **19**, 12 V power to solenoid **Y5** (front axle sway)
	• Electrical swivel joint defective	• Check the wires of the electrical swivel joint from socket **X30** connected to the cab under the joystick to socket **X40** connected to the XC undercarriage box. Check if there is a voltage of 12V in the numbered wires ref. **24** powering **Y10** and ref. **26** powering **Y5**. If necessary, replace the electrical joint
	• XC undercarriage board inputs defective	• Inputs to board arrive from **XC8**: pos. **3** and **20** powering the solenoids **Y5** and **Y10**
	• XC undercarriage board outputs defective	• Check the output on connection **XC1** pos. **8** and **9** for the sway solenoid control. If necessary change the board

Trouble	Cause	Solution
	• Solenoids **Y5** and **Y10** damaged	• Check the efficiency of coils and the continuity of wires. If necessary, change the solenoid valves
	• Fuse **F3C** (7,5 A) blown	• Change the fuse
	• Fuses and relays board damaged	• Socket **X7** pos. **14**: 12 V powering relays **KC9** and **KC10**
	• Electrical swivel joint defective	• Check wire ref. **1** powering fuse **F3C** to relay coils **KC9** and **KC10**
	• XC undercarriage board inputs defective	• Check **XC8**: pos. **8** power input from **F3C**
	• Relays **KC9** and **KC10** damaged	• Check the efficiency and replace if necessary
	• XC undercarriage board outputs defective	• Check the output on connection **XC4** pos. **1** and **4** for the power supply to the sway and rear axle unlocking solenoids
	• Sway solenoids damaged	• Check the efficiency of coils and the continuity of wires. If necessary, change the solenoid valves
Rear axle locked	• Fuse **F7A** - power supply to slewring locking sensor	• Check the efficiency and replace if necessary
	• XC undercarriage board outputs defective	• Check the output on connection **X7** pos. **3**
	• Electrical swivel joint defective	• Check wire ref. **13**
	• XC undercarriage board inputs defective	• Measure 12V on **XC8** pos. **6**
	• XC undercarriage board outputs defective	• Measure 12V on **XC3** pos. **3**
	• Slewring locking sensor **S43** damaged	• Check and replace if necessary
	• XC undercarriage board inputs defective	• Measure 12V on **XC1** pos. **11**
	• XC board jumper **J1** defective	• Check and replace if necessary
	• Relay **KC9** damaged	• Check the efficiency and replace if necessary
	• XC undercarriage board outputs defective	• Check the output on connection **XC1** pos. **1**
	• Solenoids **Y15** and **Y15a** damaged	• Check the efficiency of coils and the continuity of wires. If necessary, change the solenoid valves

Trouble	Cause	Solution
No displacement change of the drive motor	• Fuse **F6A** (7,5 A) blown • Fuses and relays board damaged • Speed switch defective • XC undercarriage board inputs defective • Relay **K1** damaged • Fuse **F1C** (7.5 A) blown • XC undercarriage board outputs defective • Electrical swivel joint defective, socket **X30** • Electrical swivel joint defective, socket **X40** • XC undercarriage board defective • Solenoid **Y18** damaged	• Change the fuse • Socket **X5** pos. **14**: 12 V. In case, change the board • Check the 12V input on connection **X07** pos. **1** (under the switch • Check the 12V output on connection **X07** pos. **3** • Measure 12V on **X5** pos. **19** • Check the efficiency of the relay, replace if necessary • Change the fuse • Measure 12V on **X7** pos. **11** • Measure 122V on **X30** pos. **17** • Measure 12V on **X40** pos. **17** • Inputs to board arrive from socket **XC8** pos. **14**, output to **XC1** pos. **19**. Ensure there is voltage; if not, change the board • Check the efficiency of coil and the continuity of wires. If necessary, change the solenoid valves
The 3B6 system does not change scale when the machine outriggers are lowered	• Fuse **F7A** (7.5 A) blown • Fuses and relays board damaged • Electrical swivel joint defective • XC undercarriage board defective • XC undercarriage board, power supply 87 relay **KC11** • Outriggers micro-switches **S29-S30-S31-S32** damaged	• Change the fuse • Socket **X7** pos. **3**: 12 V. In case, replace the board. • Measure 12V on **X30** and **X40** pos. **13** • Inputs to board arrive from socket **XC8** pos. **6**, output to **XC1** pos. **3** - **4** and **XC4** pos. **4**. Ensure there is voltage; if not, change the board • Check if there is voltage to socket **XC8** pos. **6**; replace the board if necessary • Check the wires of the micro-switches and their efficiency; if necessary replace

Trouble	Cause	Solution
	• Signal inputs on board **XC1** pos. **12-13** and **XC4** pos. **2-3**	• Measure 12 V for powering the coils of relays **KC11-12-13-14** and additional relays **KC19-20-21-22**
	• Relays **KC11-12-13-14** and additional relays **KC19-20-21-22** damaged	• Check the efficiency of the relays. Replace if necessary
	• XC undercarriage board outputs defective	• Measure 12V on **XC8** pos. **7**
	• Electrical swivel joint defective	• Check wire ref. **14** powering the dashboard through socket **X30-X40**
	• X board inputs (inside dashboard) defective	• Measure 12V on **X7** pos. **2**
	• X board outputs (outside dashboard) defective	• Measure 12V on **X10** pos. **1**
	• 3B6 overload warning system behind the seat defective	• Measure 12V on **X7** pos. **5**. If necessary, change the board • Check the 12V voltage on the terminal strip pos. **17** connected to pos. **23**
No shifting between first and second mechanical gear even if the machine is moving	• Fuse **F7A** (7.5 A) blown	• Change the fuse
	• Fuses and relays board damaged	• Socket **X7** pos. **3**: 12 V. In case, change the board
	• Electrical swivel joint defective	• Measure 12V on **X30** and **X40** pos. **13** c
	• XC undercarriage board input defective	• Measure 12V on **XC8** pos. **6**
	• XC undercarriage board output defective	• Measure 12V on **XC1** pos. **6**
	• Sensor **S36** damaged	• Check the sensor; if necessary, replace
	• XC undercarriage board input defective	• Measure 12V on **XC1** pos. **10**
	• XC undercarriage board output defective	• Measure 12V on **XC8** pos. **2**
	• Electrical swivel joint defective	• Measure 12V on **X30** and **X40** pos. **11**
	• X board (inside dashboard) defective	• Measure 12V on **X7** pos. **5** (input) • Measure 12V on **X9** pos. **11** (output)
	• Gearbox control unit input	• Measure 12V on **X29** pos. **12**. If there is no voltage, restore line X (if any) or change the control unit

Trouble	Cause	Solution
No shifting between front to side work mode	• Fuse **F7A** (7,5 A) blown • Fuses and relays board damaged • Carriage alignment sensor • Fuses and relays board (X) input defective • Relay **K11** damaged • Fuses and relays board (X) outputs defective • 3B6 box damaged • Connection on 3B6 box internal terminal strip	• Change the fuse • Socket **X6** pos. **2**: 12 V. In case, change the board • Check the efficiency; replace if necessary • Measure 12V on **X6** pos. **5** • Check the efficiency; replace if necessary • Measure 12V on **X11** pos. **3** (aligned machine light indicator power supply) and on **X10** pos. **5** (3B6 board power supply) • Measure 12V on **X7** pos. **8** • Check the 12V voltage on the terminal strip pos. **18** connected to pos. **22**
No selection of the steering mode (only two-wheel steer, crab-steer or four-wheel steer)	• Fuse **F1C** (7.5 A) blown • Fuses and relays board damaged • Road/site/platform selector input defective • Road/site/platform selector output voltage • Steering selector **S46** defective • Fuses and relays board (X) inputs defective • Fuses and relays board (X) outputs defective • Electrical swivel joint defective • XC undercarriage board inputs defective • XC undercarriage board outputs defective • Solenoids **Y20** and **Y21** damaged	• Change the fuse • Socket **X10** pos. **7**: 12 V. In case, change the board • Check the 12V input powering the key. if necessary, change the key block • Check the output voltage • Check the efficiency and replace if necessary • Measure 12V on **X13** pos. **11** and pos. **10** • Measure 12V on **X12** pos. **2** (four-wheel steer solenoid) and pos. **1** (crab-steer solenoid) • Measure 12V on wires pos. **19** and **18** • Measure 12V on **XC8** pos. **17** and pos. **18** • Measure 12V on **XC1** pos. **16** and pos. **15**. Check and replace the XC board • Check and replace if necessary

Trouble	Cause	Solution
The differential cannot be blocked	• Fuse **F1C** (7.5 A) blown	• Change the fuse
	• Fuses and relays board (X) output defective	• Measure 12V on **X10** pos. **7**
	• Road/site/platform selector input defective	• Check the 12V input powering the key. if necessary, change the key block
	• Road/site/platform selector output voltage	• Check the output voltage
	• Differential locking pushbutton **S17** defective	• Check the efficiency and replace if necessary
	• Fuses and relays board (X) input defective	• Measure 12V on **X10** pos. **2**
	• Fuses and relays board (X) output defective	• Measure 12V on **X12** pos. **6**
	• Electrical swivel joint defective	• Measure 12V on **X30** e **X40** pos. **22**
	• XC undercarriage board defective	• Inputs to board arrive from **XC8** pos. **12**, output to **XC1** pos. **21**. Ensure there is voltage; replace the board if necessary
	• Differential locking solenoids **Y19** damaged	• Check and replace if necessary
The horn does not work	• Fuse **F7C** (15 A) for relay **K2** power supply blown	• Change the fuse
	• Fuse **F3B** (7.5 A) for power line of switch pushbutton blown	• Change the fuse
	• Relay **K2** damaged	• Check the efficiency and replace if necessary
	• Horn pushbutton on switch	• Check power from X board to **X5** pos. **2** and pos. **8**. If there is no voltage, check the wires and, in case, change the switch (horn side)
	• Fuses and relays board (X) output defective	• Measure 12V on **X6** pos. **17**
	• Horn **HA1**	• Check the efficiency and replace if necessary

Trouble	Cause	Solution
The beacon does not work	• Fuse **F2A** (7.5 A) blown • Fuses and relays board (X) output defective • Beacon pushbutton **S2** damaged • Beacon **H16** damaged	• Change the fuse • Measure 12V on **X5** pos. **21** • Check the efficiency and replace if necessary • Check the efficiency and replace if necessary
The emergency pump does not work	• Pushbutton **S20** damaged • Fuses and relays board (X) input defective • Relay **K4** damaged • Fuse **F4A** (7.5 A) for relay **K4** power supply blown • Relay **K5** damaged • Fuse **F6B** (7.5 A) blown • Emergency pump pushbutton **S18** damaged • Fuses and relays board (X) input defective • Fuses and relays board (X) output defective • Emergency pump solenoid coil defective • Emergency pump defective	• Check the efficiency and replace if necessary • Measure 12V on **X5** pos. **17** • Check the efficiency and replace if necessary • Change the fuse • Check the efficiency and replace if necessary • Change the fuse • Check the efficiency and replace if necessary • Measure 12V on **X10** pos. **14** • Measure 12V on **X6** pos. **6** • Check the efficiency and replace if necessary • Check the efficiency and replace if necessary
The heating fan does not work	• Fuse **F7C** (15 A) blown • Fuses and relays board (X) output defective • Fan setting pushbutton **S8** • Heating motor **M6**	• Change the fuse • Measure 12V on **X11** pos. **13** • Check the efficiency and replace if necessary • Check the efficiency and replace if necessary
The boom locking device at max height does not work (machines equipped with high boom sensor)	• Fuse **F7A** (7.5 A) blown • Fuses and relays board (X) output defective • High boom sensor **S42** damaged • Danfoss board damaged	• Change the fuse • Measure 12V on **X6** pos. **12** • Check the efficiency and replace if necessary • Measure 12V at the input on **XJ3** pos. **10** with the boom high

Trouble	Cause	Solution
The boom locking device at max height does not work (machines NOT equipped with high boom sensor, with signal coming from the 3B6 control unit)	• 3B6 internal board • 3B6 box external socket (behind the seat) • Danfoss board damaged	• With a tester measure 12V on the terminal strip pos. **27**; if not, check the line from the angle meter • Measure12 V on **X7** pos. **3**; if not, check the line between socket and internal terminal strip • Measure 12 V at the input on **XJ3** pos. **10** with the boom high
The air filter clogging light indicator does not work	• Fuse **F8B** (15 A) blown • Dashboard light indicator **H3** • Air filter clogging pressure switch **S23** damaged	• Change the fuse • Check the light indicator power supply or replace • Check the efficiency and replace if necessary.
The high engine water temperature light indicator does not work	• Fuse **F8B** (15 A) blown • Dashboard light indicator **H4** • High engine water thermostat damaged • XC undercarriage board defective	• Change the fuse • Check the light indicator power supply or replace • Check the efficiency and replace if necessary • Inputs to board arrive from **X8** pos. **3**, output to **X13** pos. **4**. Ensure there is voltage; or change the board
The low engine pressure light indicator does not work	• Fuse **F8B** (15 A) blown • Dashboard light indicator **H5** • Low engine oil pressure switch damaged • Fuses and relays board (X) defective	• Change the fuse • Check the light indicator power supply or replace • Check the efficiency and replace if necessary • Inputs to board arrive from **X8** pos. **7**, output to **X13** pos. **7**. Ensure there is voltage; or change the board

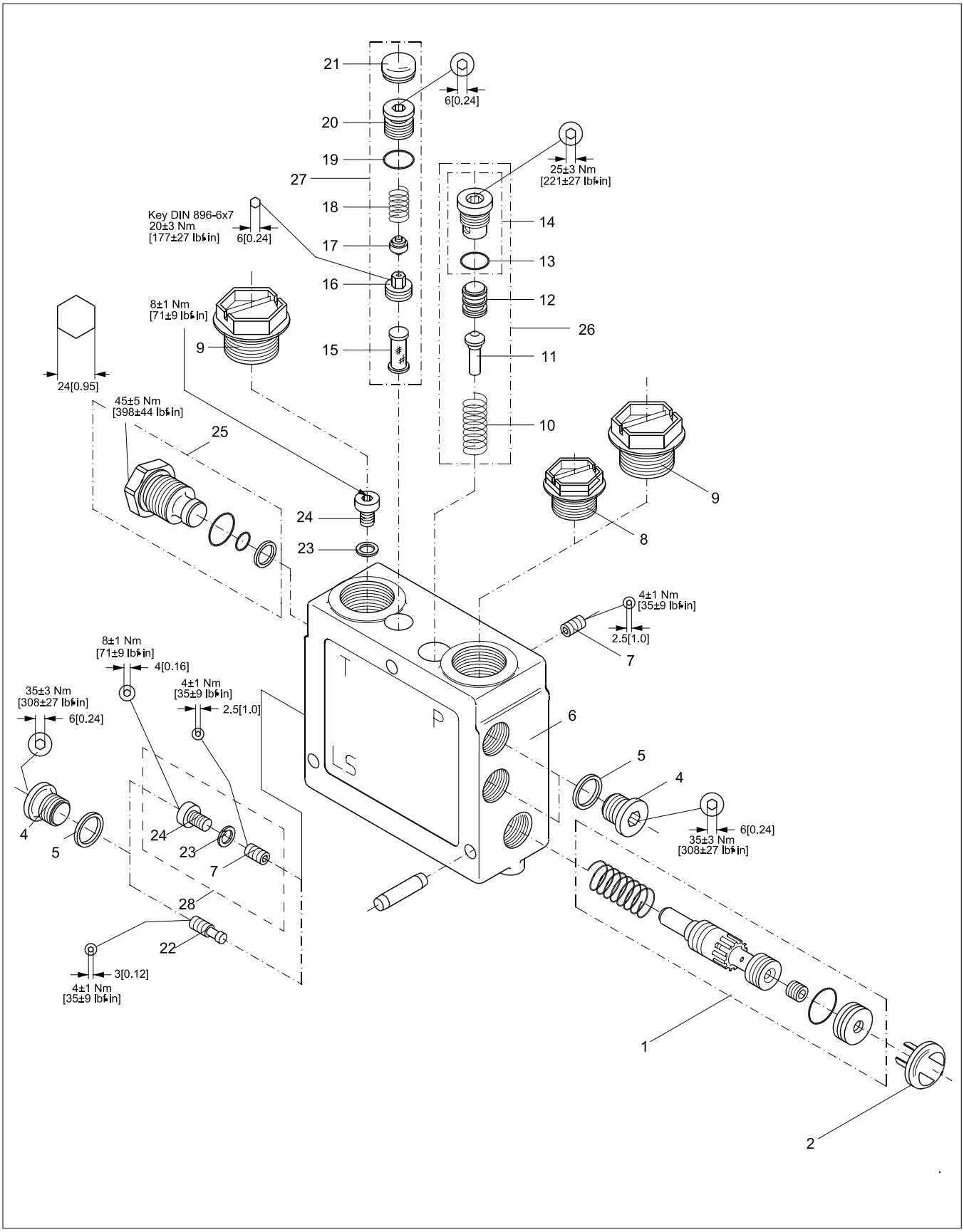
Trouble	Cause	Solution
The engine water thermometer does not work	• Fuse **F8B** (15 A) blown • Dashboard thermometer **P1** • Engine water temperature transducer damaged • Fuses and relays board (X) defective	• Change the fuse • Check the thermometer power supply or replace • Check the efficiency and replace if necessary • Inputs to board arrive from **X8** pos. **2**, output to **X13** pos. **9**. Ensure there is voltage; or change the board
The hydraulic oil thermometer does not work	• Fuse **F8B** (15 A) blown • Dashboard thermometer **P2** • Hydraulic oil temperature transducer damaged	• Change the fuse • Check the thermometer power supply or replace • Check the efficiency and replace if necessary
The hydraulic oil filter clogging light indicator does not work	• Fuse **F8B** (15 A) blown • Dashboard light indicator **H8** damaged • Oil filter clogging pressure switch **S34** damaged • Fuses and relays board (X) defective	• Change the fuse • Check the light indicator power supply or replace • Check the efficiency and replace if necessary • Inputs to board arrive from **X6** pos. **11**, output to **X13** pos. **2**. Ensure there is voltage; or change the board
The low brake pressure light indicator does not work	• Fuse **F8B** (15 A) blown • Dashboard light indicator **H9** damaged • Low brake pressure switch **S35** damaged • Fuses and relays board (X) defective	• Change the fuse • Check the light indicator power supply or replace • Check the efficiency and replace if necessary • Inputs to board arrive from **X6** pos. **10**, output to **X13** pos. **3**. Ensure there is voltage; or change the board
The fuel gauge does not work	• Fuse **F8B** (15 A) blown • Dashboard fuel gauge **P3** damaged • Fuel level transducer **R6** damaged	• Change the fuse • Check the light indicator power supply or replace • Check the efficiency and replace if necessary
The hour-meter does not work	• Fuse **F8B** (15 A) blown • Hour-meter**P4** damaged • Alternator **G2** damaged	• Change the fuse • Check the hour-meter power supply or replace • Check the efficiency and replace if necessary

Trouble	Cause	Solution
	• Fuses and relays board (X) defective	• Inputs to board arrive from **X3** pos. **9**, output to **X13** pos. **8**. Ensure there is voltage; or change the board
The lights of the dashboard light indicators do not work	• Fuse **F2B** (30 A) blown • Fuses and relays board (X) defective • Lights switch **S12** damaged • Fuses and relays board (X) defective • Dashboard pressure gauge lights power supply	• Change the fuse • Check the output to **X5** pos. **3**. Ensure there is voltage; or change the board • Check the switch power supply or replace • Inputs to board arrive from **X5** pos. **4**, output to **X11** pos. **9**. Ensure there is voltage; or change the board • Check the 12 V inputs on hydraulic oil temperature indicator **P2**, radiator water indicator **P1**, fuel gauge **P3** and hour-meter **P4**. Change any defective parts; replace the internal lamps or the indicators

Trouble	Cause	Solution
Abrupt braking	• Wrong pressure calibration	• Reduce the pressure acting on the register under the pedal; check the pressure value on the pressure gauge.
Low braking effect	• Wrong pressure calibration	• Reduce the pressure acting on the register under the pedal; check the pressure value on the pressure gauge, being very careful not to exceed the max admissible brake pressures.
Delayed braking and brake release	• Too slow feeding and discharge speed • The viscosity of the hydraulic fluid is too high	• Check that the diameter of the braking system tubes is not too small with respect to their length and the oil flow. • Empty the circuit and add a fluid with a correct viscosity index.
The braking pressure is not constant	• The minimum pressure of the accumulator is less than the braking pressure	• Check that the accumulator pressure is correctly calibrated. If necessary, act on the register at the cylindrical end of the filling valve.
Continuous recharge of the accumulators	• The nitrogen precharge of the accumulators is too low or too high • High brake capacity in relation to the volume of the accumulators	• Drain the oil off the accumulators and check the nitrogen pressure with the special instrument, then recharge at the correct pressure. • Redimension the accumulators and/or check the brake adjustment.
The feeding pump is always at pressure	• The pump is damaged • The valve is dirty	• Check and, if necessary, replace the pump. • Check the valve carefully: correct sliding of the parts, perfect integrity of the seal seats and connections.

Trouble	Cause	Solution
The accumulators cannot be recharged	• A foreign body blocks the sliding of the priority valve	• Check that all parts slide correctly, especially the input valve. • Check the hydraulic connection. • Once the accumulator filling valve has been overhauled, check that the stop ring of the piston, located in front of the feeding fitting, is in the correct position.
Brakes remain braked	• The discharge of the S6 system isn't correct • No return of the brake	• The discharge of the system is blocked and the pressure affects the brake operation. • Check that the pedal stop register is set to leave a slight play between return and operating pistons. • In the horizontal system, eliminate any blockages from the chamber underneath the pedal using the front cap to access to this chamber.
The dashboard light does not come on or remains always lit	• Check the calibration of the pressure switch	• Adjust the pressure switch of the filling valve to a value below the minimum pressure of the accumulator, yet sufficient to guarantee 3-4 brakings from the switching of the light.
Strokes on the pedal	• Abrupt pressure changes on the discharge	• High discharge flow of the brakes; increase the diameter of the discharge pipe or add an independent discharge on the pedal.

PVP pilot distributor - side module



If there is no pressure

Find the defective body of the pilot distributor.

- Activate one element of the distributor without LSA/B valves or shock-proof valve to stroke end.

- If all the elements have a safety valve, activate the element with the highest calibration value.

IMPORTANT

If no one of the elements reaches the calibration value, search for the defect on the input body as follows:

1 adjust the pressure relief valve **pos. 20** located under the plastic cap **pos. 21**. If the pressure value does not change, remove shutter **pos. 17** and the valve seat **pos. 18** and check that the surfaces are not damaged or there are impurities trapped somewhere

2 reassemble and test; if the problem persists, check compensator **pos. 1**

3 remove the tie-rods and dismantle the head of the distributor:
- remove the plastic pressure cap **pos. 2**
- pull bush **pos. 1** off the seat of the tie-rod
- pull the aluminium cap off the M5 threaded hole
- by removing this cap, the slider is pushed off by the spring. Check that the slider and its seat are not damaged. If these parts are worn, you must change the complete input body as the compensator is not supplied as a separate spare part.

If the electrical contacts are worn

- Make sure that the problem is not of mechanical nature by activating the element using the relevant lever.

- Check that the defect is not due to the control system (control lever or other parts). Operate the defective element with the control lever of another function after changing the position of the electrical connector.

- Measure the voltage between pin 1 and the negative on the electrical connector of the involved element, then measure the variable signal between pin 2 and the negative.

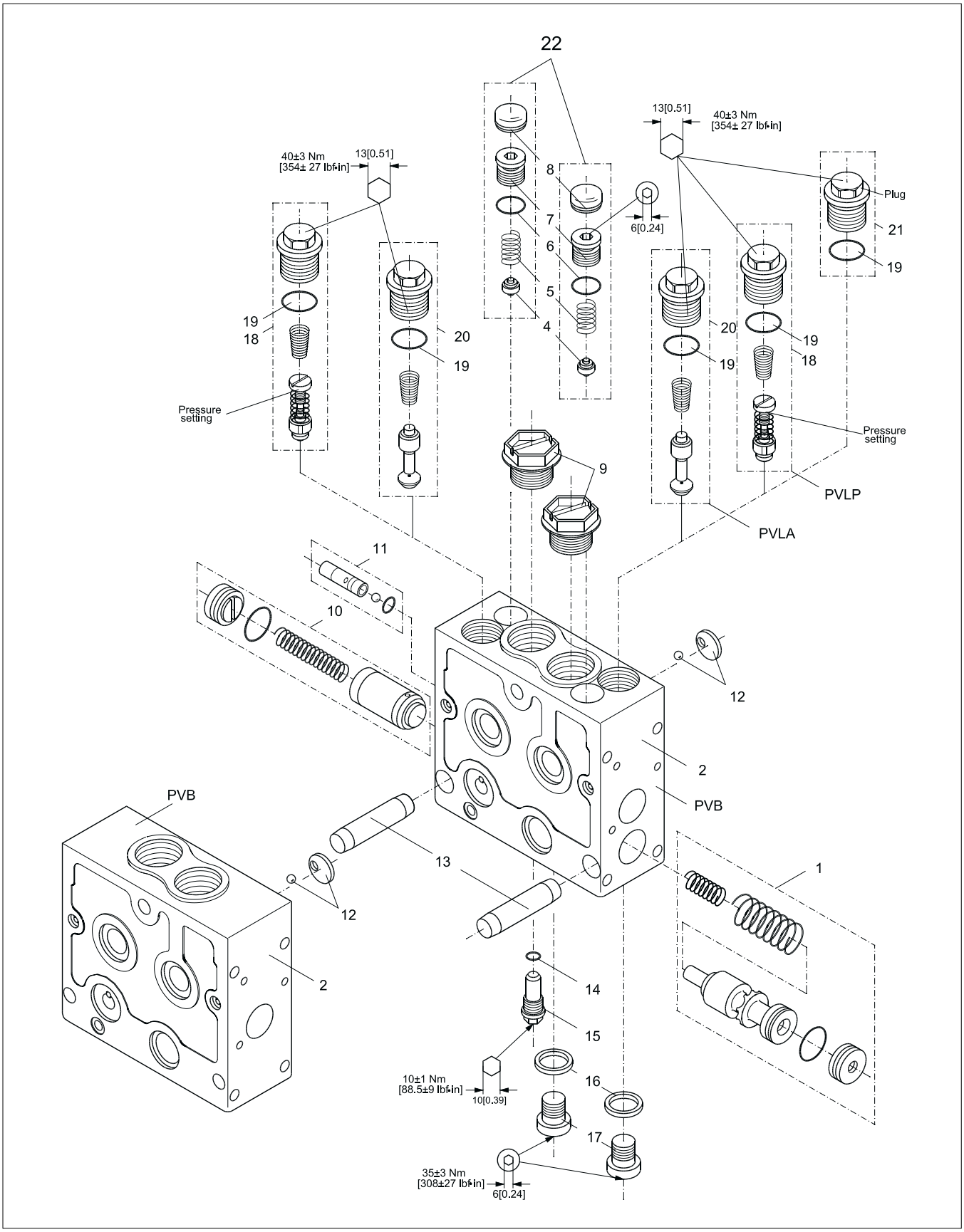
  a) The voltage must be between 11V and 15V

  b) The variable signal must be between 25% and 75% of the voltage.

- If all electrical elements are faulty, check that the pressure reducing valve **pos. 26** of the PVP input body is mounted correctly and the seats of slider **pos. 12** and shutter **pos. 11** are not damaged or blocked by impurities.

- If only one electrical element is faulty, change the electrical command with another one of the pilot distributor having the same code.

PVP pilot distributor - basic module



No pressure in the PVB element (without valves)

- Check that the mechanical lever is in efficient order. If necessary, remove the lever support, check the slider and clean the LS pipes with some compressed air.

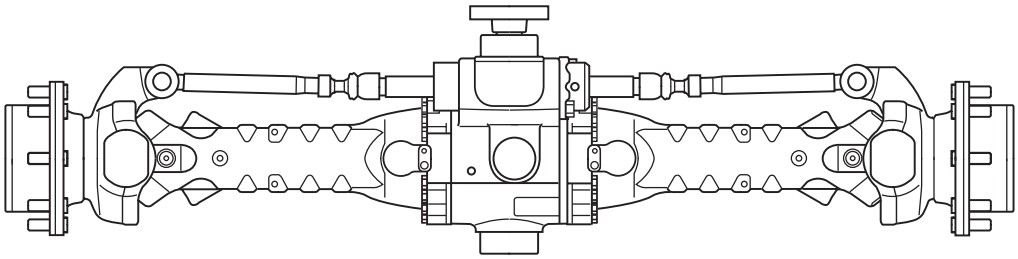
- Check the shock-proof and anti-cavitation valves **pos. 20**, as well as valves **LSA/B pos. 22** as follows:

  - act on regulator **pos. 7**. If the pressure remains unchanged, remove shutter **pos. 4** and seat **pos. 3** and check that the surfaces are not damaged and there are no impurities trapped somewhere. Check that the selection valve **pos. 11** is not damaged. If this valve must be dismantled, use the M4 threaded hole.

- If the problem persists, remove the element and check that the seat of the ball of the selection valve **pos. 12** of this element and of the previous one is not damaged and that the disk is perfectly flat.

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Section G
DANA AXLE
ASSEMBLY - DISASSEMBLY



SECTION INDEX

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INTRODUCTION

The efficiency and continued operation of mechanical units depend on constant, correct maintenance and also on efficient repair work, should there be a break-down or malfunction.
The instructions contained in thismanual have been based on a complete overhaul of the unit.
However, it is up to the mechanic to decide whether or not it is necessary to assemble only individual components, when partial repair work is needed. The manual provides a quick and sure guide which, with the use of photographs and diagrams illustrating the various phases of the operations, allows accurate work to be performed.
All the information needed for correct disassembly, checks and assembly of each individual component is set out below .
All the information needed for correct disassembly, checks and assembly of each individual component is set in the Chapter **E - Disassembly and Reassembly**.
In describing the following operations it is presumed that the unit has already been removed from the vehicle.

IMPORTANT

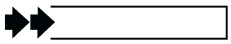
In order to facilitate work and protect both working surfaces and operators, it is advisable to use proper equipment such as: trestles or supporting benches, plastic or copper hammers, appropriate levers, extractors and specific spanners or wrenches.
Before going on to disassemble the parts and drain the oil, it is best to thoroughly clean the unit, removing any encrusted or accumulated grease.

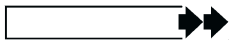
Introductory remarks

All the disassembled mechanical units should be thoroughly cleaned with appropriate products and restored or replaced if damage, wear, cracking or seizing have occurred.
In particular, thoroughly check the condition of all moving parts (bearings, gears, crown wheel and pinion, shafts) and sealing parts (O-rings, oil shields) which are subject to major stress and wear. In any case, it is advisable to replace the seals every time a component is overhauled or repaired. During assembly, the sealing rings must be lubricated on the sealing edge. In the case of the crown wheel and pinion, replacement of one component requires the replacement of the other one. During assembly , the prescribed pre-loading, backlash and torque of parts must be maintained.

Classification

This manual classifies units according to part numbers. For a correct interpretation, classification is indicated as follows:


= up to the part number


= from the part number on

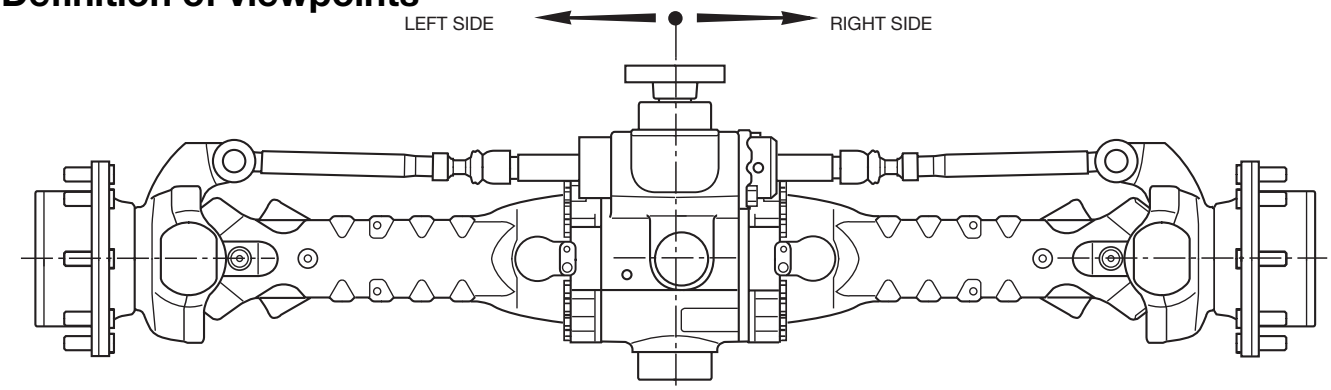
When no classification is given, disassembly and assembly operations are the same for all versions.

Specific equipment and spare parts

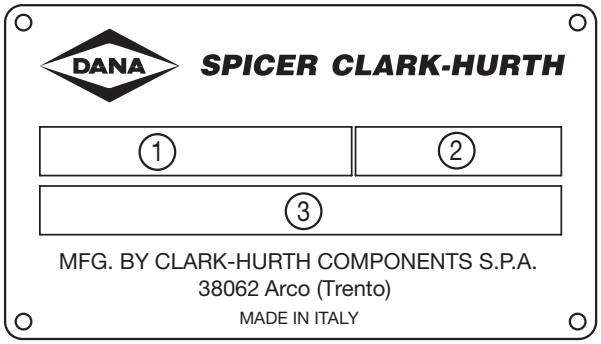
The drawings of all specific tools required for maintenance and repair work can be found at the end of this manual ; spare parts may be ordered either from the vehicle manufacturer or directly from the Service Centers or Authorised Distributors of SPICER CLARK-HURTH.

MAINTENANCE AND LUBRICANT

Definition of viewpoints

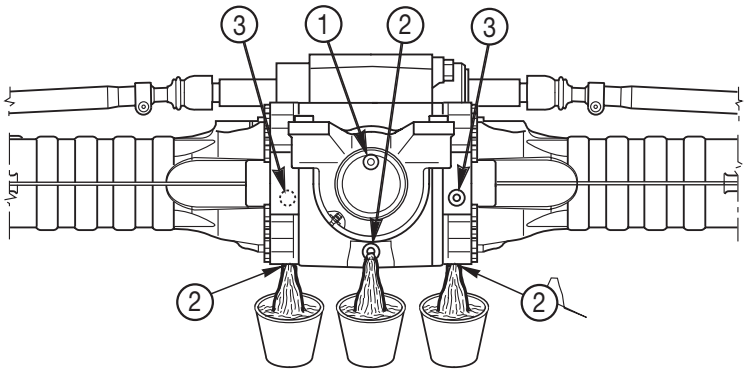


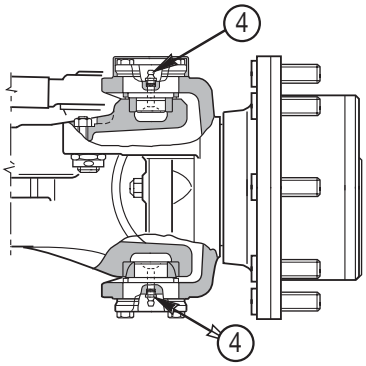
Data plate

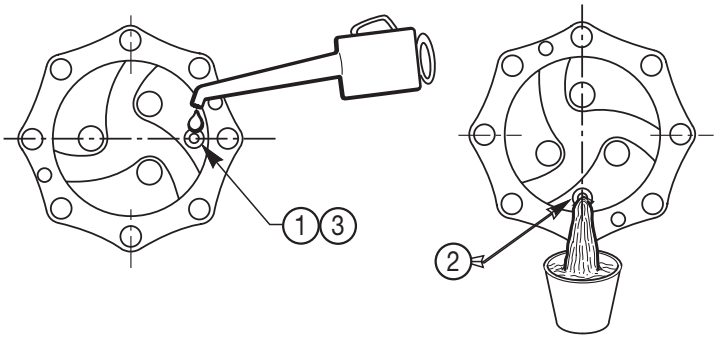


1. Type and model unit - modification index
2. Serial number
3. Lubrificant

Maintenance points







1. Oil filling plug
2. Oil draining plug
3. Check level plug
4. Grease nipples

Maintenance points

OPERATION		FREQUENCY	LUBRICANTS
• Check levels:	Differential	monthly	**SAE85W90 (API GL4 - MIL L-2105)** With additives for oil-bath brakes
	Riduzione epicicloidale	ogni 200 ore	
• Oil change:	Differential	every 800 hours (*)	**SAE85W90 (API GL5 - MIL 2105-B)** With additives for oil-bath brakes, for units presenting hypoid crown wheel and pinion and /or self-locking differential gear.
	Planetary reduction	every 1000 hours	
	Self-locking differential gear	every 700 hours (*) (§)	

(*) Initially after 100 working hours

(§) When it starts sounding noisy

OPERATION	MEMBER	CONDITIONS	FREQUENCY	LUBRICANTS
Greasing	Articulations	Normal work	monthly	MOLIKOTE
		Awkward work	Weekly	MOLIKOTE

Adjustment and checks

UNIT	OPERATION	FREQUENCY	SERVICE BRAKE CIRCUIT
Negative brake	Adjustment	every 1000 hours (*)	Only for mineral oil use e.g. ATF Dexron II. Make sure that master cylinder seals are suitable for mineral oil.
Service brake	Adjustment	every 500 hours	
Wheel nuts	Tightening	every 200 hours	

(*) Initially after 100 working hours

CONVERSION TABLES

Units of pressure: 1 Atm = 1 bar = 10^5 PA = 14.4 PSi

Units of weight

	N	daN	kN	kg	lbs
1N	1	0,1	0,001	0,102	0,225
1daN	10	1	0,01	1,02	2,25
1kN	1000	100	1	102	225
1kg	9,81	0,981	0,00981	1	2,205

Units of torque

	Nm	daNm	kNm	kgm	lb-in
1Nm	1	0,1	0,001	0,102	8,854
1daNm	10	1	0,01	1,02	88,54
1kNm	1000	100	1	102	8854
1kgm	9,81	0,981	0,00981	1	86,8
1lb-in	0,1129	0,01129	0,0001129	0,01152	1

Tightening torques

Unit: Nm

SIZE OF BOLT		TYPE OF BOLT					
		8.8		10.9		12.9	
		Normali + Loctite 242	Normali + Loctite 270	Normali + Loctite 242	Normali + Loctite 270	Normali + Loctite 242	Normali + Loctite 270
COARSE PITCH	M6x1	9,5-10,5	10,5-11,5	14,3-15,7	15,2-16,8	16,2-17,8	18,1-20,0
	M8x1,25	23,8-26,2	25,6-28,4	34,2-37,8	36,7-40,5	39,0-43,0	43,7-48,3
	M10x1,5	48-53	52-58	68-75	73-81	80-88	88-97
	M12x1,75	82-91	90-100	116-128	126-139	139-153	152-168
	M14x2	129-143	143-158	182-202	200-221	221-244	238-263
	M16x2	200-221	219-242	283-312	309-341	337-373	371-410
	M18x2,5	276-305	299-331	390-431	428-473	466-515	509-562
	M20x2,5	390-431	428-473	553-611	603-667	660-730	722-798
	M22x2,5	523-578	575-635	746-824	817-903	893-987	974-1076
	M24x3	675-746	732-809	950-1050	1040-1150	1140-1260	1240-1370
	M27x3	998-1103	1088-1202	1411-1559	1539-1701	1710-1890	1838-2032
	M30x3,5	1378-1523	1473-1628	1914-2115	2085-2305	2280-2520	2494-2757
FINE PITCH	M8x1	25,7-28,3	27,5-30,5	36,2-39,8	40,0-44,0	42,8-47,2	47,5-52,5
	M10x1,25	49,4-54,6	55,2-61,0	71,5-78,5	78,0-86,0	86,0-94,0	93,0-103,0
	M12x1,25	90-100	98-109	128-142	139-154	152-168	166-184
	M12x1,5	86-95	94-104	120-132	133-147	143-158	159-175
	M14x1,5	143-158	157-173	200-222	219-242	238-263	261-289
	M16x1,5	214-236	233-257	302-334	333-368	361-399	394-436
	M18x1,5	312-345	342-378	442-489	485-536	527-583	580-641
	M20x1,5	437-483	475-525	613-677	674-745	736-814	808-893
	M22x1,5	581-642	637-704	822-908	903-998	998-1103	1078-1191
	M24x2	741-819	808-893	1045-1155	1140-1260	1235-1365	1363-1507
	M27x2	1083-1197	1178-1302	1520-1680	1672-1848	1834-2027	2000-2210
	M30x2	1511-1670	1648-1822	2138-2363	2332-2577	2565-2835	2788-3082

Screw-locking, sealing and lubricating materials

- Locking, sealing and lubricating materials referred to in this manual are the same used in the shop-floor.

- The table below gives an account of the typical applications of each single material, in order to facilitate replacement with similar products marketed by different brand names with different trade marks.

DENOMINATION	APPLICATION
Loctite 242	Anaerobic product apt to prevent the loosening of screws, nuts and plugs. Used for medium-strength locking. Before using it, completely remove any lubricant by using the specific activator.
Loctite 243	The oleocompatible alternative to 242. Does not require the activation of lubricated surfaces.
Loctite 270	Anaerobic product for very-high strength locking of screws and nuts. Before using it, completely remove any lubricant by using the specific activator. To remove parts, it may be necessary to heat them at 80°C approx.
Loctite 275	Anaerobic product suitable for high-strength locking and sealing of large threaded parts, bolts and stud bolts, for pipe sealing and for protecting parts against tampering; suitable for sealing coupling surfaces with a max. diametrical clearance of 0,25 mm.
Loctite 510	Anaerobic product for the hermetic sealing of flanged units and screw holes communicating with fluids. Can seal clearances between flanges up to 0,2 mm.
Loctite 577	Quick anaerobic sealant for sealing threaded portions of conical or cylindrical unions up to M80. Before using it, remove any lubricant with the specific activator. After polymerisation, disassembly may result rather difficult, so heating may be necessary for larger diameters.
Loctite 638	Anaerobic adhesive for fast and high-strength gluing of cylindrical metal joints (hub on shaft). Can glue together parts with clearance ranging between 0,1 and 0,25 mm.
Loctite 648	Anaerobic adhesive for fast and medium-strength gluing of cylindrical metal joints (hub on shaft). Can glue together parts with radial clearance below 0,1 mm.
(AREXONS) Repositionable jointing compound for seals	Solvent-based sealing compound for elastic seals, drying through evaporation. Used for sealing the outer diameter of sealing rings for rotating shafts with outer metal reinforcement.

DENOMINATION	APPLICATION
Silicone	Semi-fluid adhesive material used for sealing and filling and to protect components from environmental and physical elements. Polymerises with non-corrosive dampness.
(TECNO LUPE/101) Silicone-based grease	Highly adhesive synthetic grease, with silicone compounds added. Applied to adjustment screws with hole communicating with oil-type fluids. Used when frequent adjusting is required.
Molikote	Lubricating compound containing molybdenum disulphide, used to lubricate articulation pins and to prevent sticking and oxidation of parts that are not lubricated on a regular basis.
(Lithium-based) Grease	Applied to bearings, sliding parts and used to lubricate seals or parts during assembly.

NOTES ON SAFETY PRECAUTIONS

1 - During all operations described in this manual, the axle should be fastened onto a trestle, while the other parts mentioned should rest on supporting benches.

2 - When removing one of the arms, an anti-tilting safety trestle should be placed under the other arm.

3 - When working on an arm that is fitted on the machine, make sure that the supporting trestles are correctly positioned and that the machine is locked lengthways.

4 - Do not admit any other person inside the work area; mark off the area, hang warning signs and remove the ignition key from the machine.

5 - Use only clean, quality tools; discard all worn, damaged, lowquality or improvised wrenches and tools. Ensure that all dynamometric wrenches have been checked and calibrated.

6 - Always wear gloves and non-slip rubber shoes when performing repair work.

7 - Should you stain a surface with oil, remove marks straight away.

8 - Dispose of all lubricants, seals, rags and solvents once work has been completed. Treat them as special waste and dispose of them according to the relative law provisions obtaining in the country where the axles are being overhauled.

9 - Make sure that only weak solvents are used for cleaning purposes; avoid using turpentine, dilutants and toluol-, xylolbased or similar solvents; use light solvents such as Kerosene, mineral spirits or water-based, environment friendly solvents.

10- For the sake of clarity, the parts that do not normally need to be removed have not been reproduced in some of the diagrams.

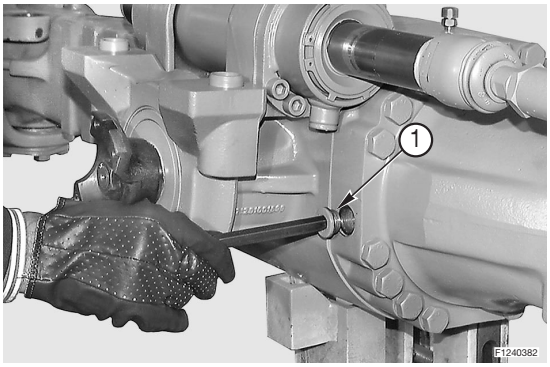
11- The terms RIGHT and LEFT in this manual refer to the position of the operator facing the axle from the side opposite the drive.

12- After repair work has been completed, accurately touch up any coated part that may have been damaged.

Symbols

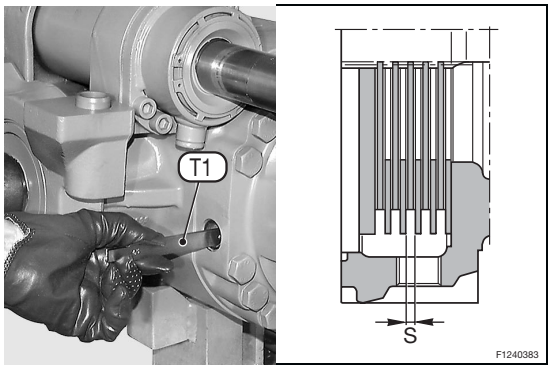
	Disassembly of assembly groups
	Reassemble to from assembly groups
	Remove obstruction parts
	Reinstall-remount parts which had obstructed disassembly
	Attention ! Important notice
	Check - adjust e.g. torque, dimensions, pressures, etc.
	T=Special tool P=Page
	Note direction of installation
	Visual inspection
	Possibly still serviceable, renew if necessary
	Renew at each reassembly
	Unlock - lock e.g. split pin, locking plate, etc.
	Lock-adhere (liquid sealant)
	Guard against material damage, damage to parts
	Mark before disassembly, observe marks when reassembly
	Caricare - riempire (olio - lubrificante)
	Drain off oil, lubricant
	Tighten
	Apply pressure into hydraulic circuit
	To clean
	Lubricate - grease

CHECKING WEAR AND REPLACING THE BRAKING DISKS



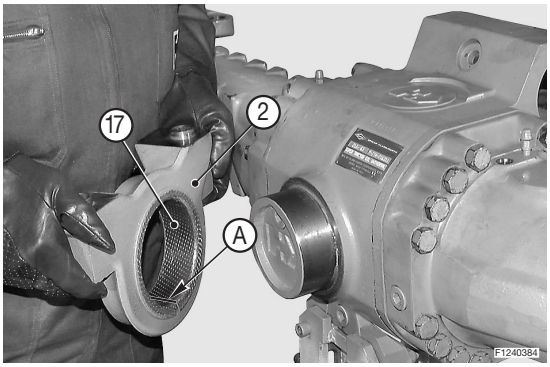
GB a

CAUTION! Perform all operations on both arms.
Remove the oil-level plug (1).



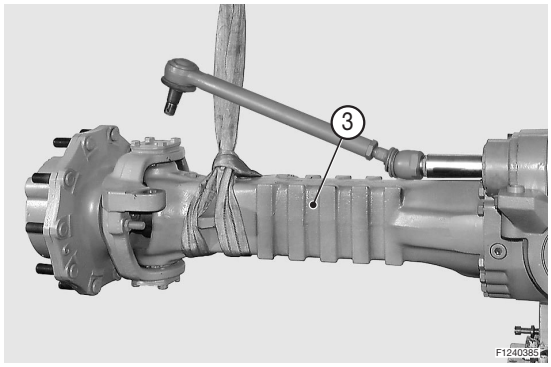
bar GB b

Apply the brakes and, keeping them under pressure, check the linings “S” between the disks using tool T1. Minimum “S”: 4.5 mm.
CAUTION! Replace the braking disks and the intermediate disks on both sides if necessary.



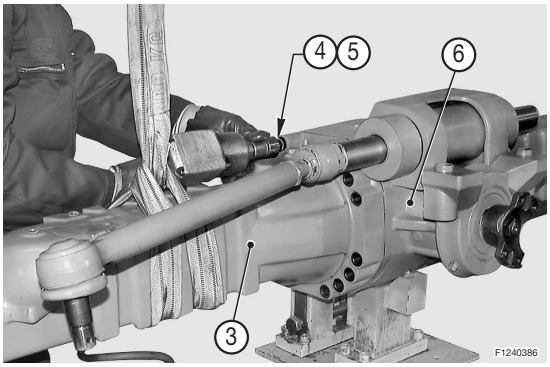
GB c

Remove the swinging support (2) on the side opposite the drive.
NOTE. If the bushing (17) is worn and needs replacing, note down the assembly side of the connection notch “A”.



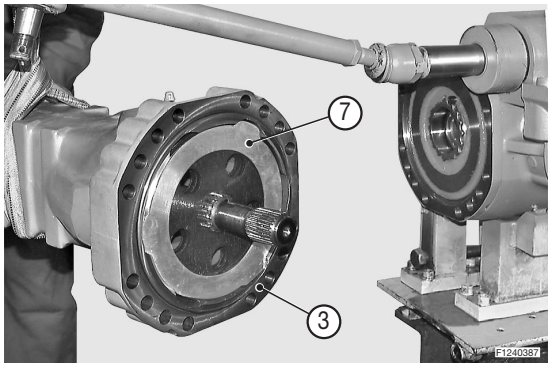
GB d

Disconnect the pins of the steering bars from the steering case (See "HOW TO REMOVE THE STEERING CYLINDER").
Sling the arm (3) to be removed and put the rod under slight tension.



GB e

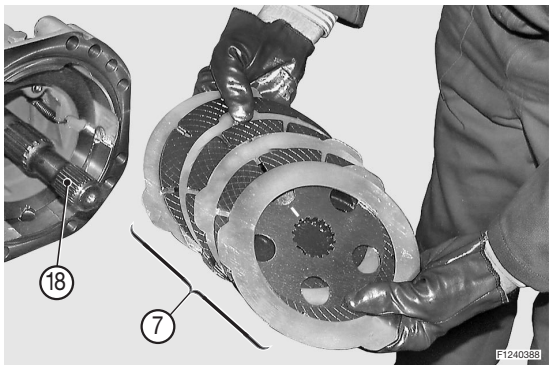
Unloose and remove the screws (4) and the washers (5) that fix the arm (3) to the central body (6).



GB f

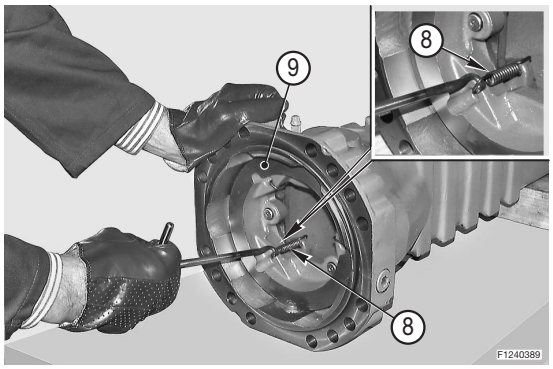
Remove the arm (3) together with the pack of the braking disks (7).
Place the arm on a bench.

Disassembly the braking units



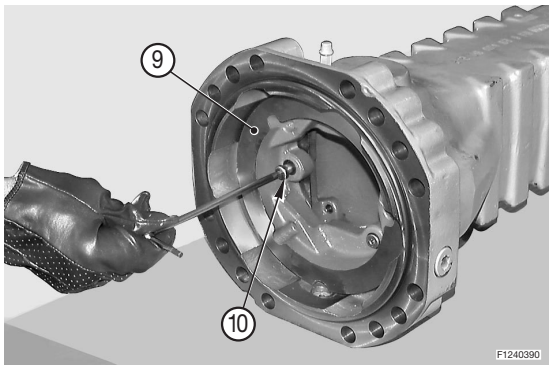
GB a

Remove the braking disks (7) and note down their order of assembly.
NOTE. 1 - If the disks do not need replacing, avoid switching their position.
2 - Extract the u-joint (18).



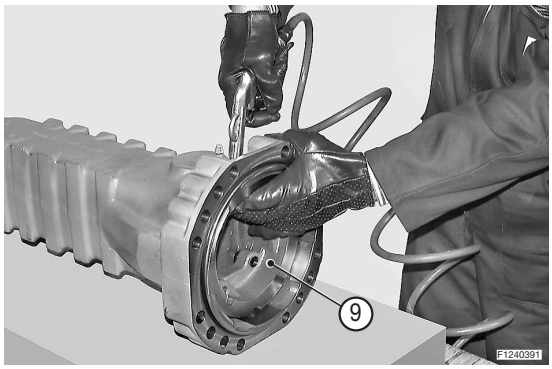
GB b

Remove the reversal springs (8) from the piston (9).
NOTE. If the springs (8) are weak or deformed they must be replaced.



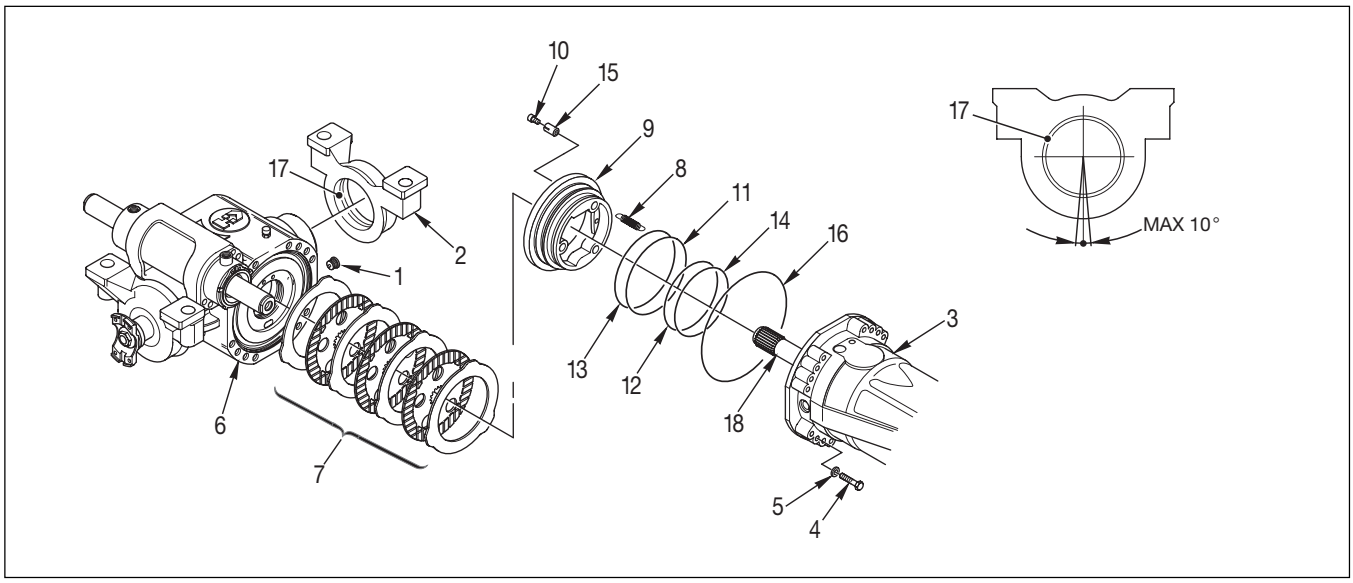
GB c

Remove the pin screws (10) guiding the piston (9).
CAUTION! If the screws are to be replaced, note down the different colours for the different brake gap.
(See "HOW TO ASSEMBLE THE BRAKING UNITS")

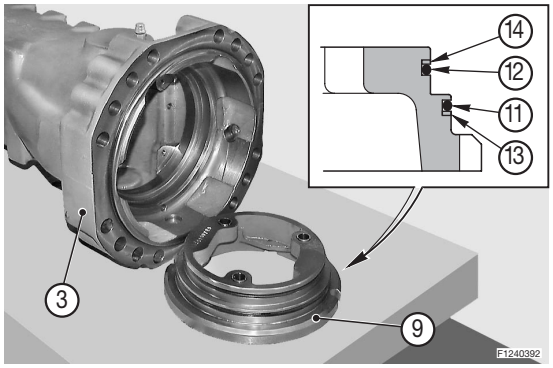


GB d

Slowly introduce compressed air through the connection of the braking circuit in order to extract the entire piston.
CAUTION! Hold on to the piston as it may be suddenly ejected and damaged.

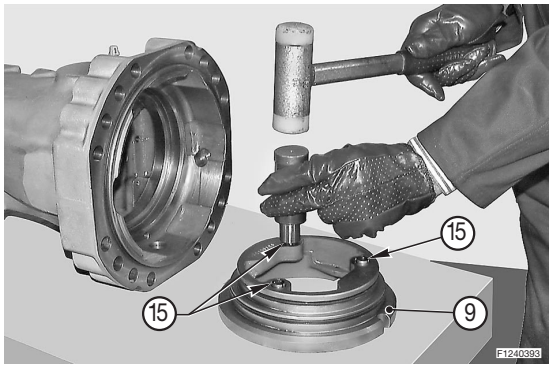


Assembly the braking units



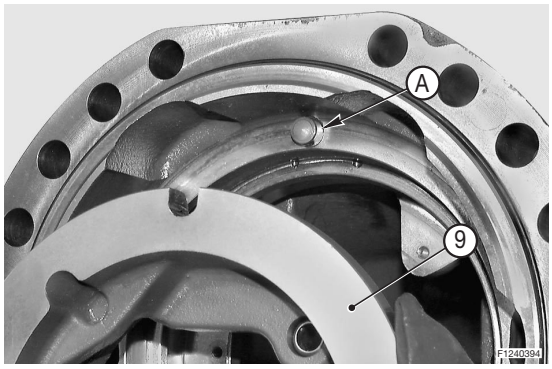
GB a

Accurately clean the piston (9) and the seats of slide and seal. Replace the O-rings (11) and (12) and the anti-extrusion rings (13) and (14); make sure that the assembly side is correct.
CAUTION! Accurately check the positioning of the anti-extrusion rings (13) and (14).



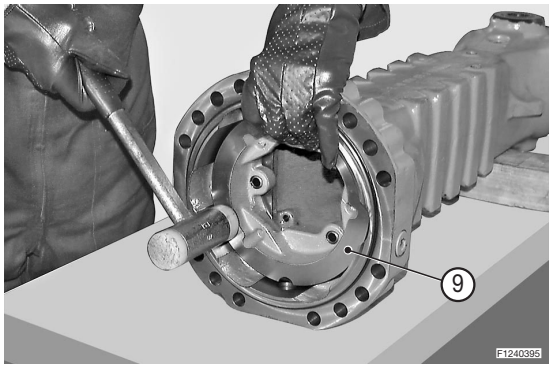
GB b

Insert the stroke automatic regulation springs (15); place them in line with the piston (9).



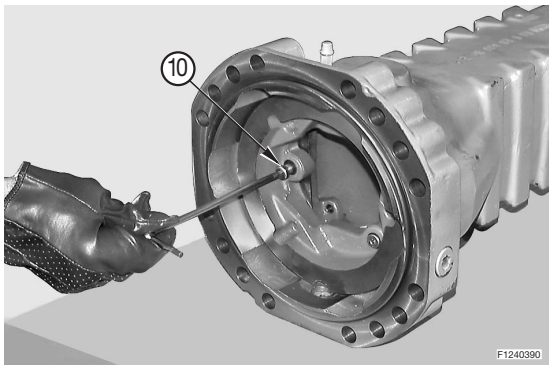
GB c

Lubricate the seals (11) and (12) and fit the piston (9) into the arm (3).
CAUTION! Make sure that the piston seat fits into the stop pin (A) inside the arm.



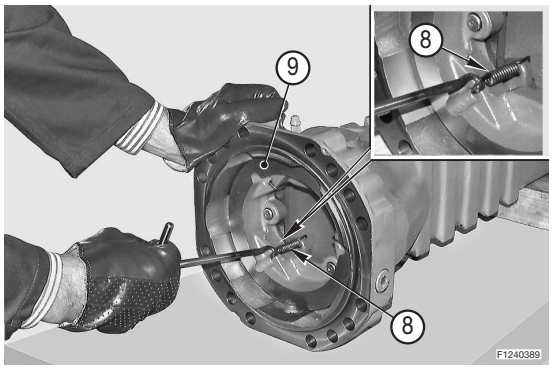
GB d

Assist the insertion of the piston (9) by lightly hammering around the edge with a plastic hammer.



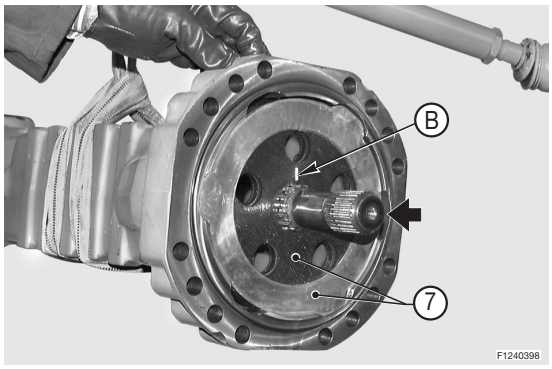
GB e

Fit the pin screws (10) making sure that they are all of the same colour. White: 1 mm gap, Yellow: 0,75 mm gap, Blue: 0,5 mm gap. Apply Loctite 270 to the thread.
Torque wrench setting: 5÷7 Nm.



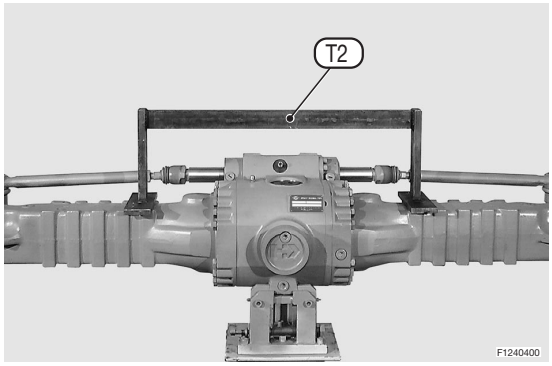
GB f

Fit the reversal springs (8) on the piston (9).
CAUTION! Pay due attention not to deform the connections of the springs.



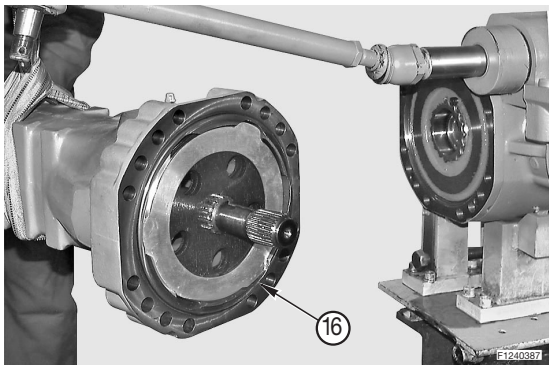
GB a

Slightly lubricate the braking disks (7) and fit them in the arm following the correct sequence; orient them so that the oil circulation holes and the marks “B” are perfectly lined up.
NOTE. When installing the steel discs, the slot corresponding to the oil level cap should always be kept free.



GB c

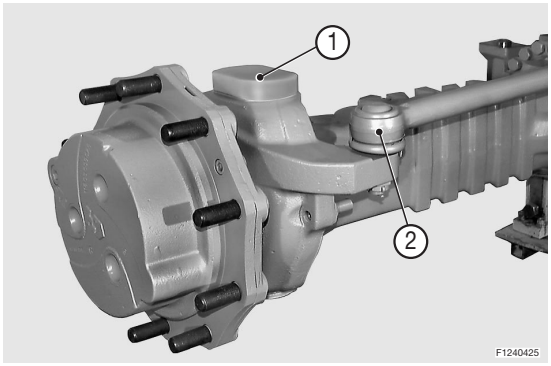
Check the flatness of the arms using tool T2 and finally lock the arms with the screws (4) and the washer (5) using the crosstightening method.
Torque wrench setting: 298 Nm



GB b

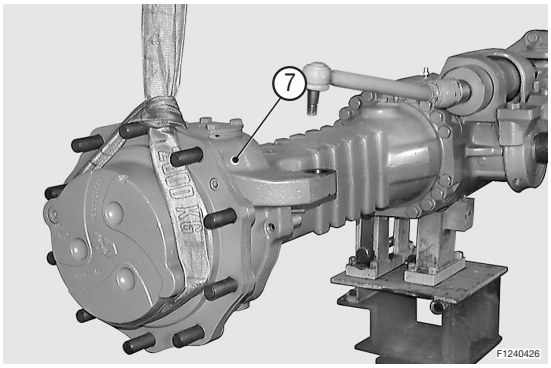
Check that the positioning of the sealing ring (16) on the arm is intact; install the complete arm. Lock it into position using two facing screws (4) and washers (5).

STEERING CASE - Removal and disassembly



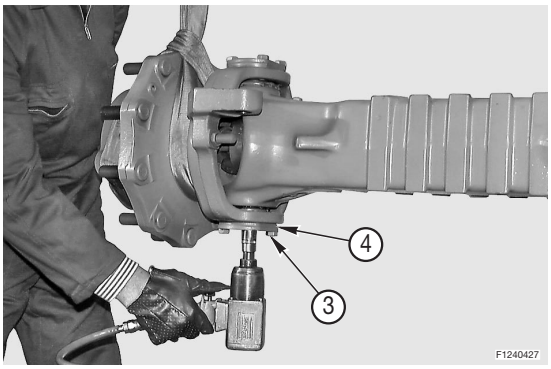
GB a

Remove the guard (1) and disconnect the articulation pin (2) (See "HOW TO REMOVE THE STEERING CYLINDER").



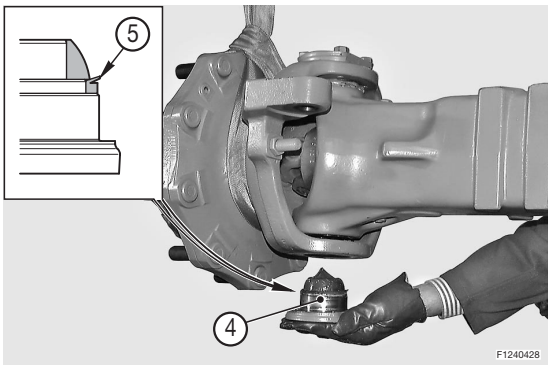
GB b

Sling the entire unit (7) and connect it to the hoist, putting the rod under light tension.



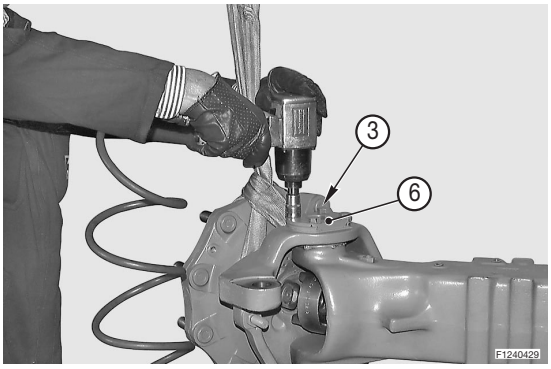
GB c

Unloose and remove the fittin screws (3) from the bottom articulation pin (4).
NOTE. Screws cannot be re-used.



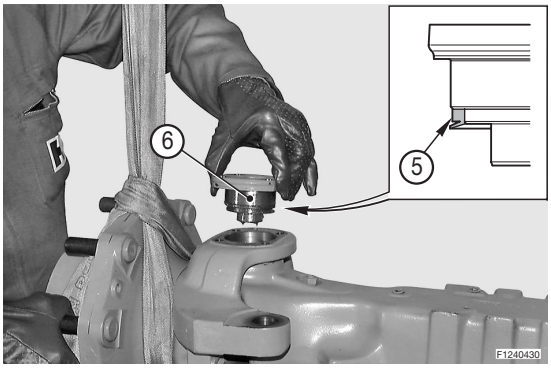
GB d

Remove the bottom articulation pin (4) complete with front sealing ring (5).



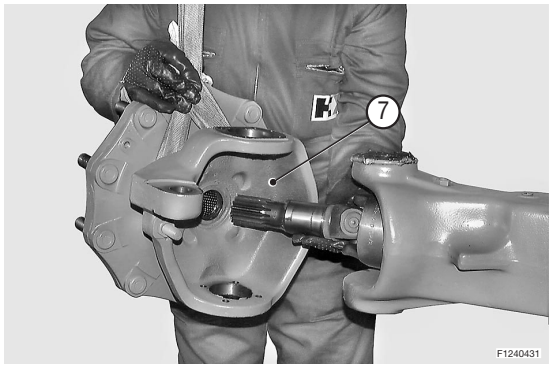
GB e

Unloose and remove the fittin screws (3) from the top articulation pin (6).



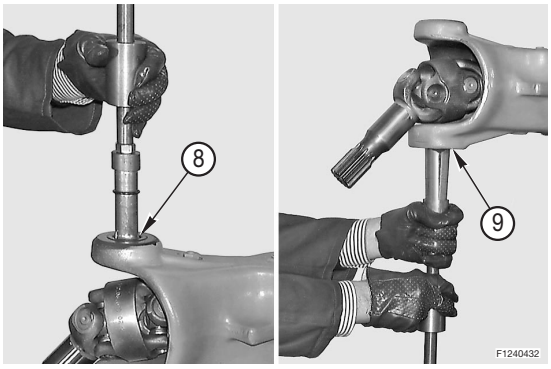
GB f

Using two levers, remove the top articulation pin (6) complete with front seal (5).
Pay attention not to damage the surfaces.



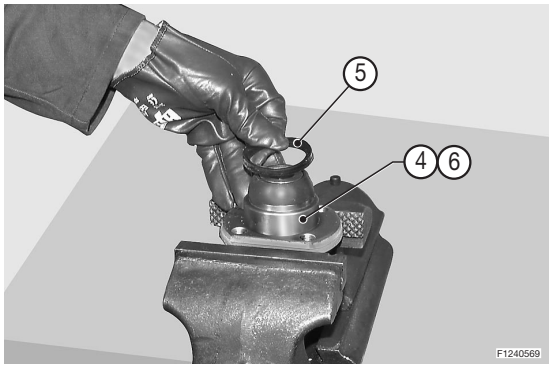
GB a

Remove the complete steering case (7).



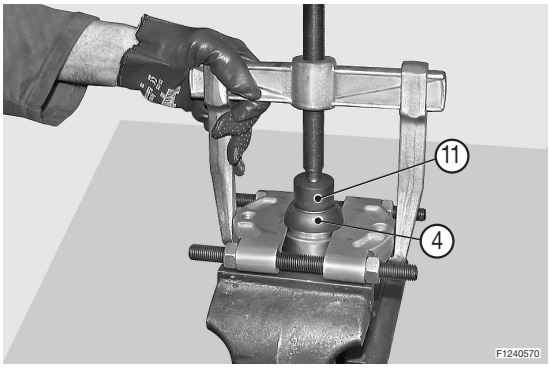
GB b

Using a puller for inner parts, remove the top bush (8) and the bottom ball-bush (9).



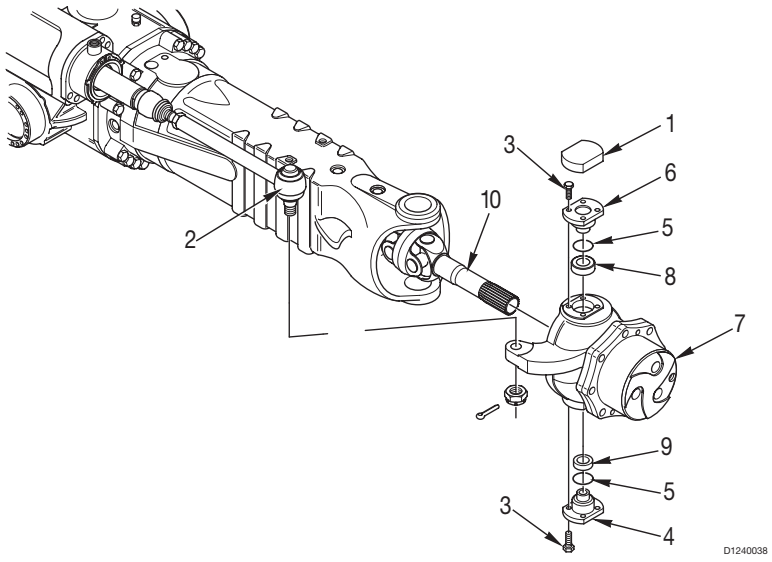
GB c

Remove the articulation pins (4) and (6) and the front sealing rings (5).
NOTE. Note down the side for assembly.

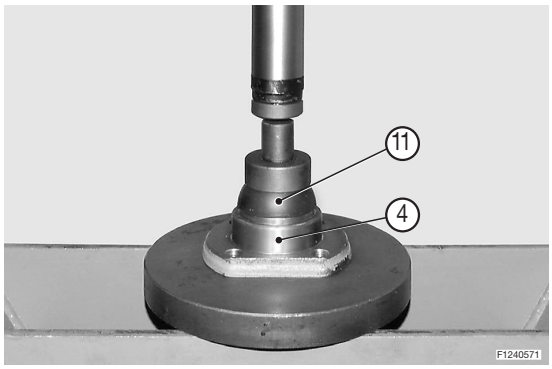


GB d

If the ball cover (11) needs replacing, remove it from the bottom articulation pin (4).

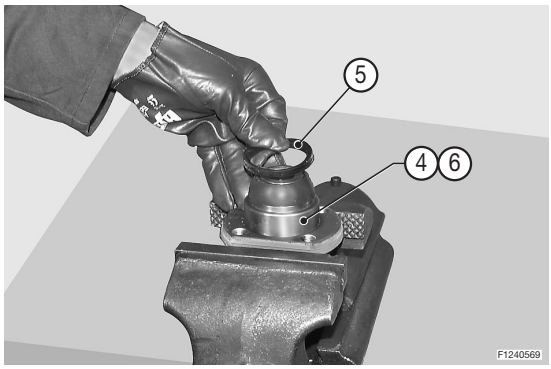


Assembly and installation



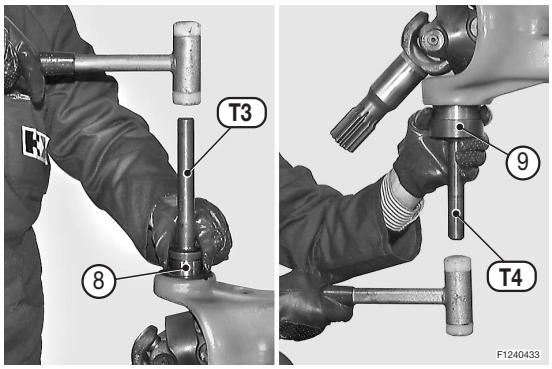
GB a

If the bottom articulation pin (4) has been extracted, position the pin under a press and fit the ball cover (11).



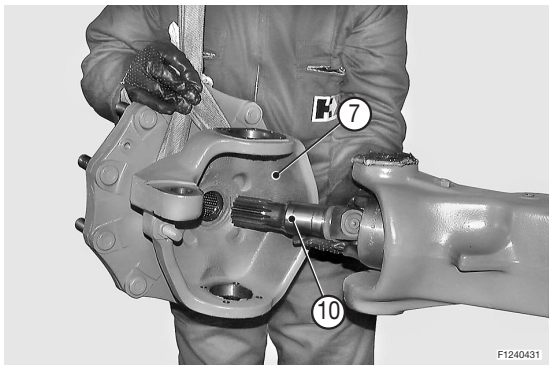
GB b

Fit the front sealing rings (5) onto the articulation pins (4) and (6).
NOTE. Carefully check that the rings are properly oriented (5).



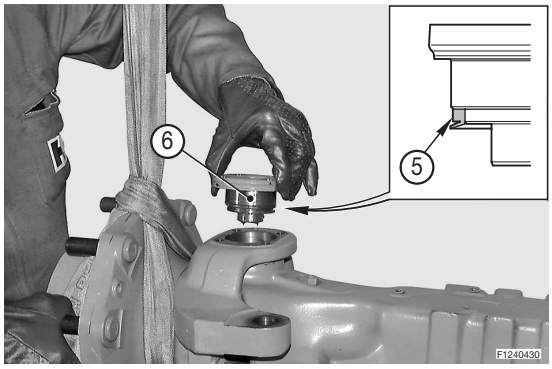
GB c

Lubricate the top bush (8) or the bottom ball bush (9) and fit them into the fulcrum holes of the arm.
Use tools T3 and T4.



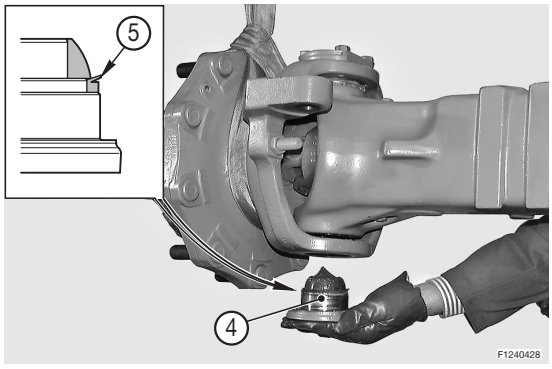
GB d

Lubricate the terminal of the u-joint (10) and install the steering case (7).
Pay due attention not to damage the dust cover rings and the sealing rings.



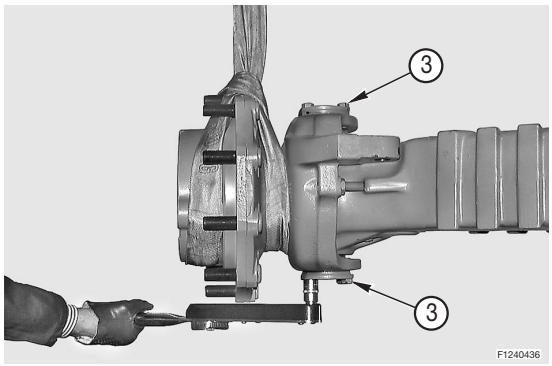
GB e

Fit a new seal (5) onto the top articulation pin (6). Lubricate and install the unit in the steering case. Position the screws (3) and lightly tighten.
Check the correct assembly side of the seal (5).



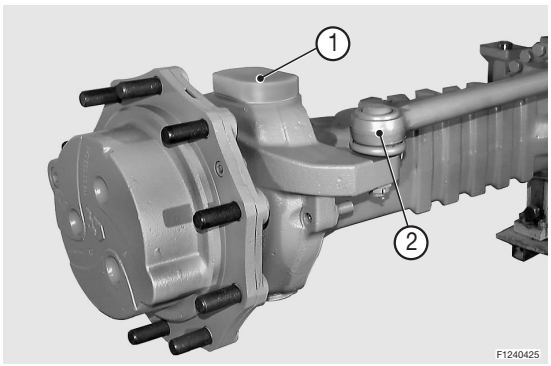
GB f

Fit a new seal (5) onto the bottom articulation pin (4). Lubricate and fit the unit in the sterring case. Position the screws (3) and lightly tighten.
Check for the correct assembly side of the seal (5).



GB a

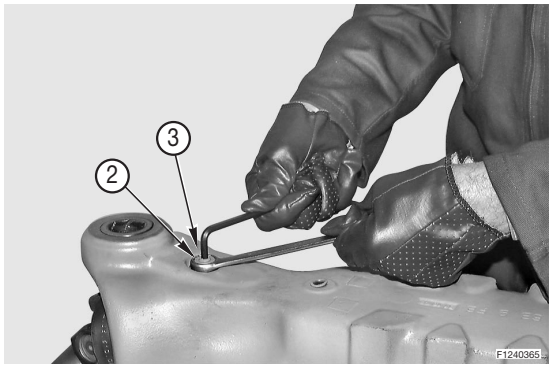
Tighten the new fittin screws (3) of top and bottom articulation pins in sequence using the cross tightening method.
Torque wrench setting: 128÷142 Nm



GB b

Connect the articulation pin (2) (See "HOW TO INSTALL THE STEERING CYLINDER").
Lubricate articulations with Molikote and fit the dust cover (1).

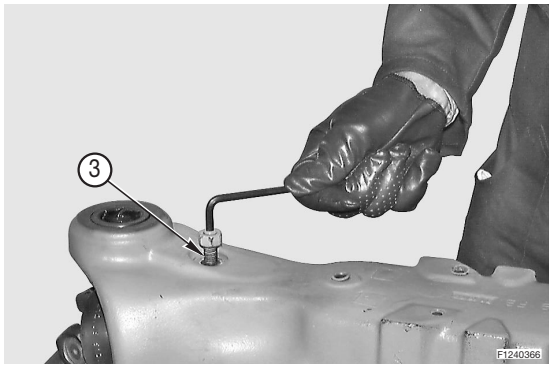
U-JOINT - Removal and disassembly



G
B

a

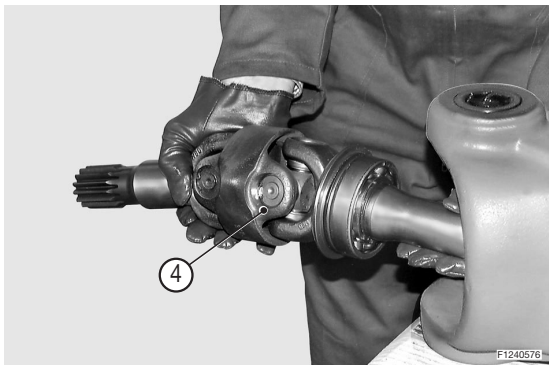
Unloose and remove the top and bottom check nuts (2) from the dowels (3).



GB

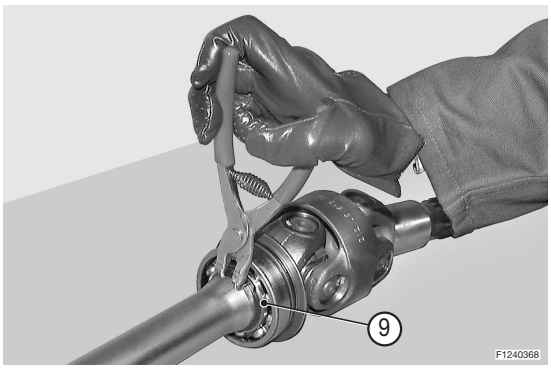
b

Remove top and bottom check dowels (3) from the flange (5) or bush (13).



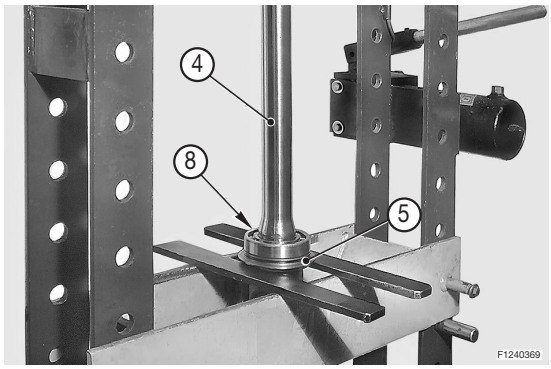
GB a

Remove the u-joint (4).
NOTE. To remove the u-joint use, if necessary, a plastic hammer or a lever.



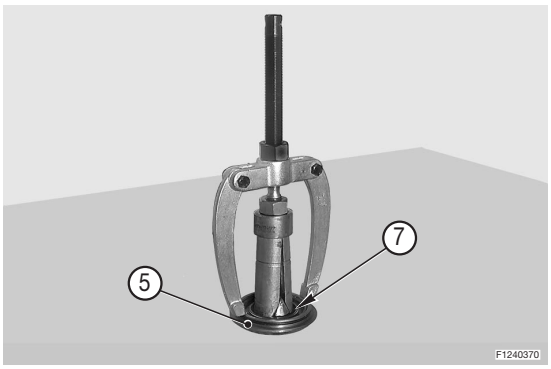
GB b

Remove the snap ring (9) from the bearing as well as the packing ring (5).



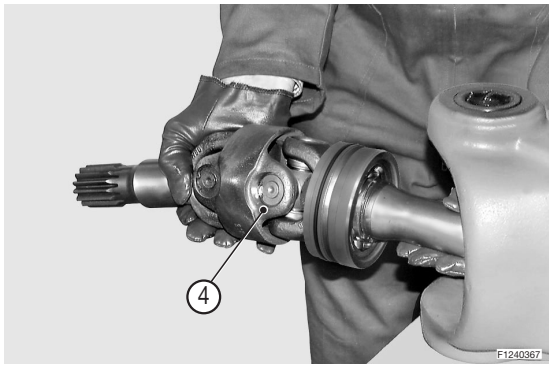
GB c

Position the entire u-joint (4) under a press and remove the bearing (8) and the ring (5) simultaneously.



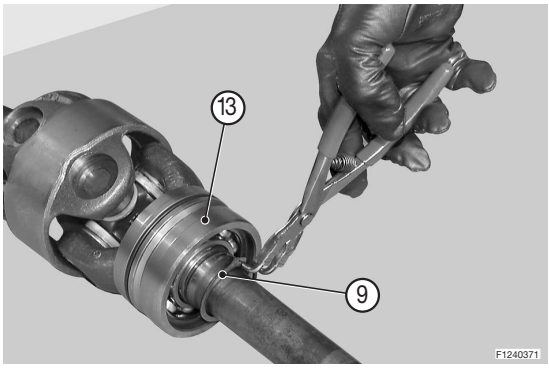
GB d

Extract the sealing ring of the shaft from the flange (5).
NOTE. Note down the assembly side of the ring.



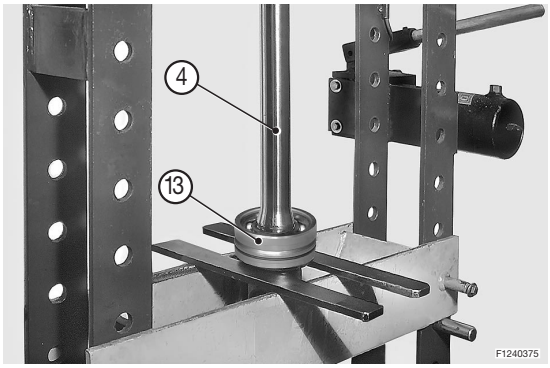
GB e

Remove the entire u-joint (4).
NOTE. To remove the u-joint use, if necessary, a plastic hammer or a lever.



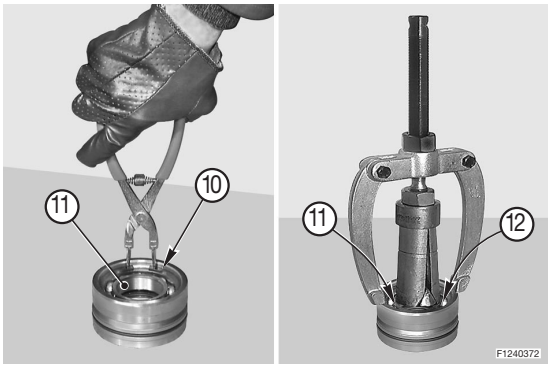
GB f

Remove the snap ring (9) from the bushing unit (13).



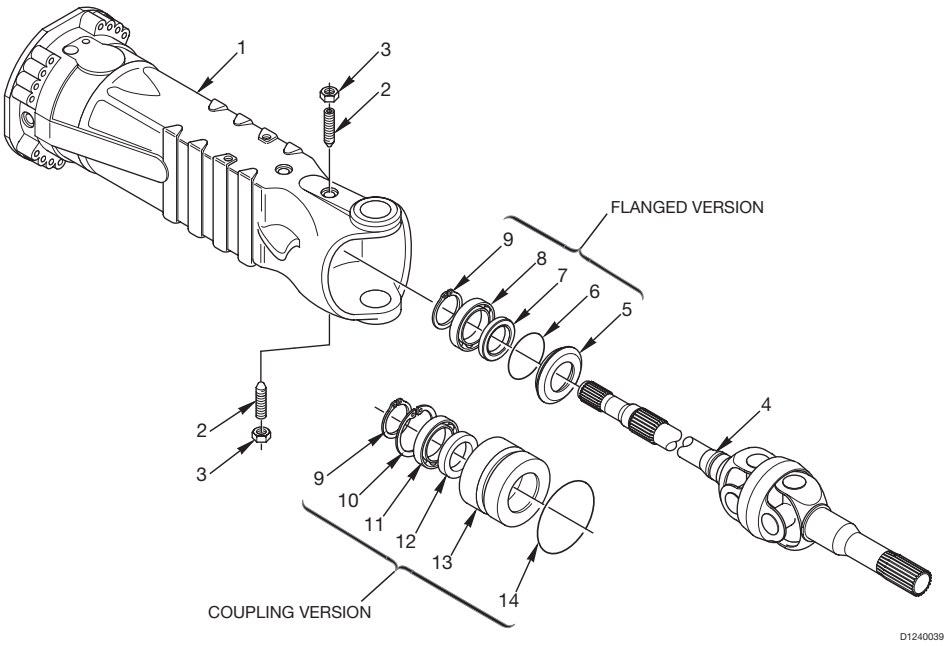
GB a

Position the entire u-joint (4) under a press and remove the complete bush (13).

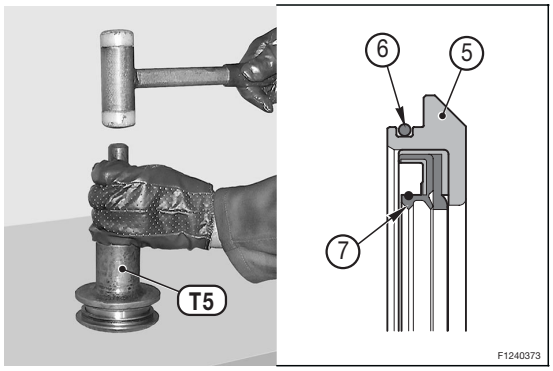


GB b

Remove the snap ring (10) from the bearing (11). Use a puller to remove the bearing (11), the sealing ring (12) and the O-ring (14).
NOTE. Note down the assembly side of the ring (12).

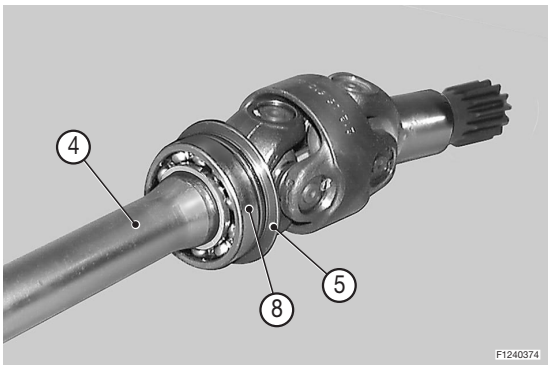


Assembly and installation



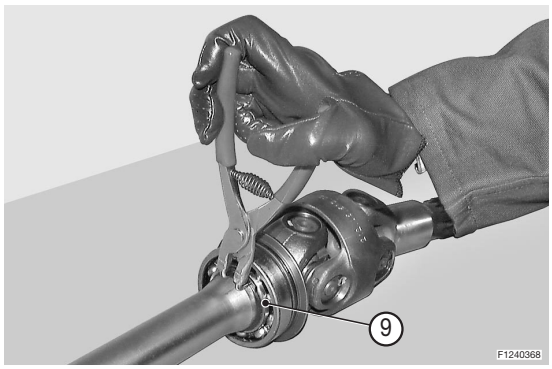
GB a

Insert the sealing ring (7) of the shaft in the flange (5), using tool T5.
NOTE. Carefully check the assembly side. Also replace the outer O-ring (6).



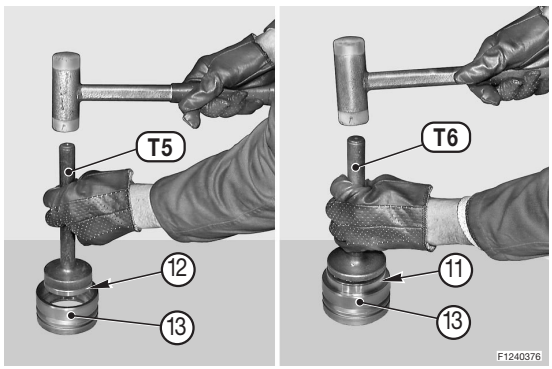
GB b

Fit the flange (5) onto the u-joint (4).
Heat the bearing (8) at an approx. temperature of 100° C, fit it on the u-joint and fasten.



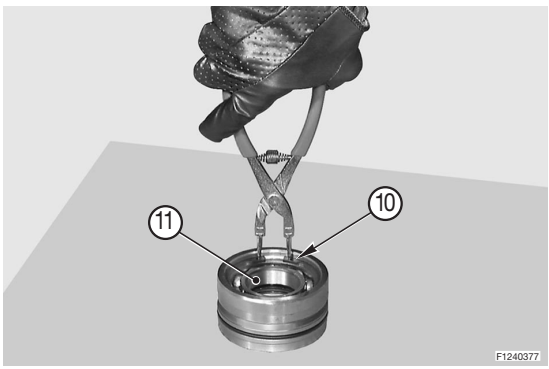
GB c

Fit the snap ring (9) on the bearing (8).



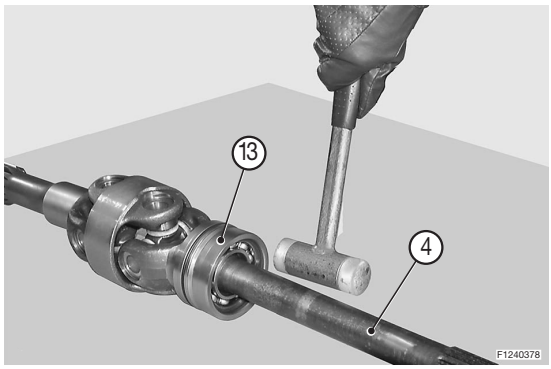
GB e

Using tools T5 and T6, insert the sealing ring (12) and the bearing (11) in the bush (13).
NOTE. Carefully check the assembly side of the seal (12).



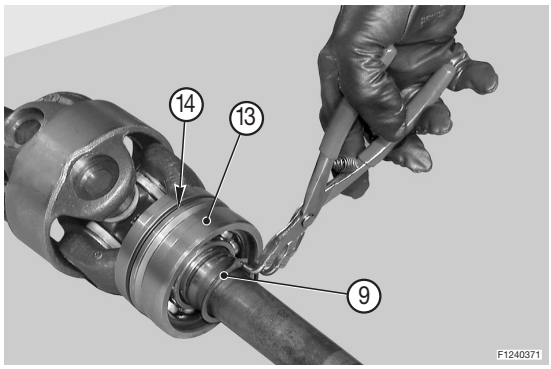
GB f

Fit the snap ring (10) on the bearing (11).



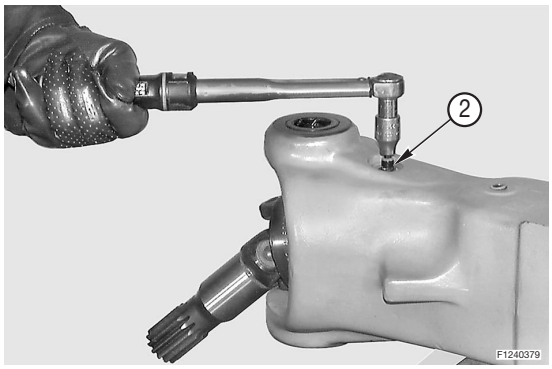
GB a

Heat the bearing in oil at an approx. temperature of 100°C and fit the entire bush (13) on the u-joint (4).



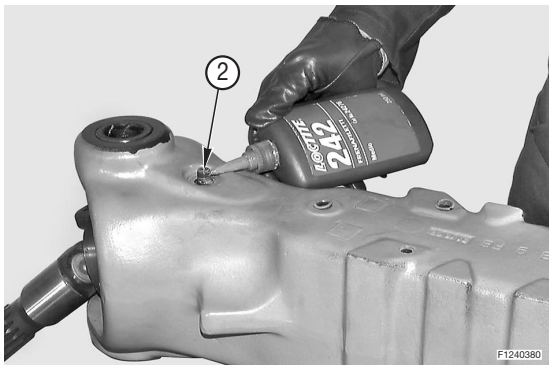
GB b

Fit the check ring (9) on the bushing unit (13); also put the O-ring (14) into position.



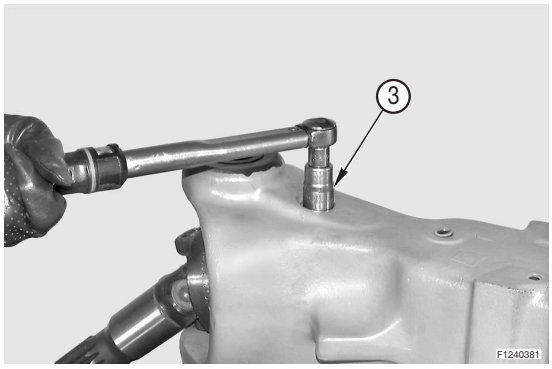
GB c

Insert the u-joint and tighten the top and bottom dowels (2).
Torque wrench setting: Max. 15 Nm.
NOTE. For u-joint coming with a bush, centre the point of the check dowels in the slot.



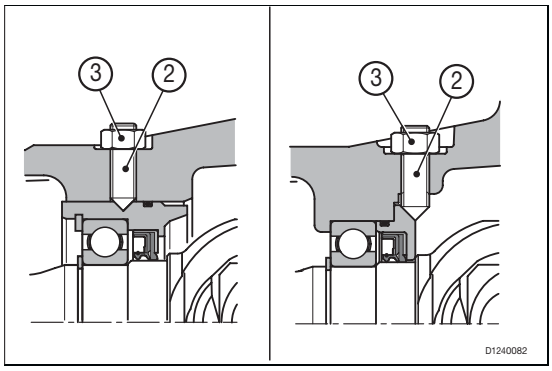
GB d

Apply Loctite 242 to the jutting parts of the dowels (2).

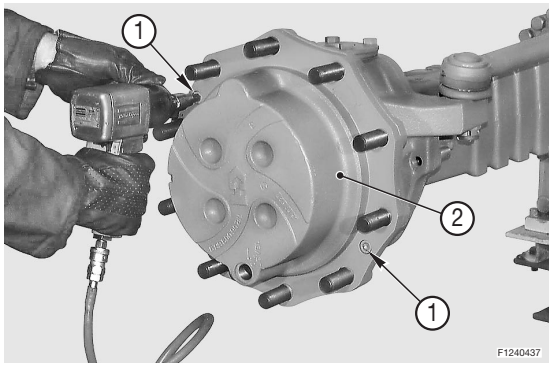


GB e

Screw the check nuts (3) of the dowels (2) and lock them using a dynamometric wrench.
Torque wrench setting: 122 Nm

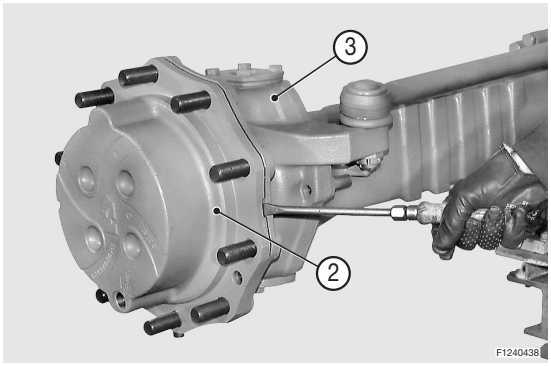


PLANETARY REDUCTION - Disassemble



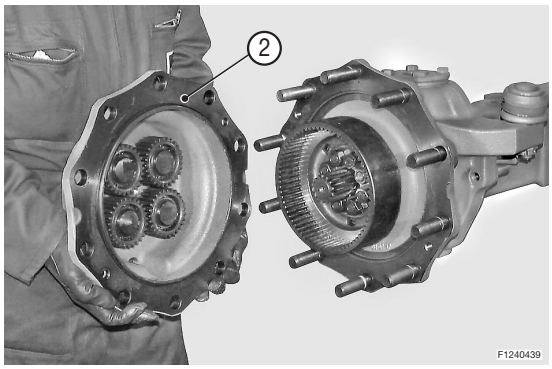
GB a

Disconnect the steering bars from the steering case (3).
For details, see "HOW TO REMOVE THE COMPLETE STEERING CASE".
Remove the securing screws (1) from the planetary carrier cover (2).



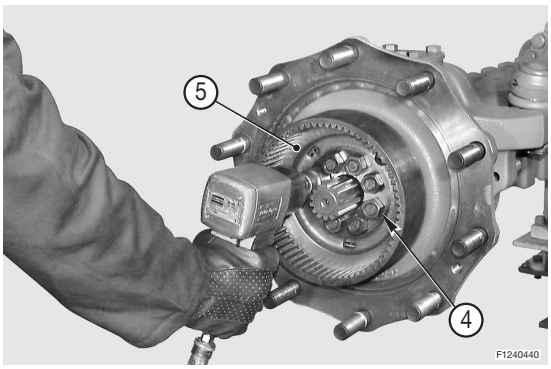
GB b

Disjoint the planetary carrier cover (2) from the steering case (3) by alternatively forcing a screwdriver into the appropriate slots.



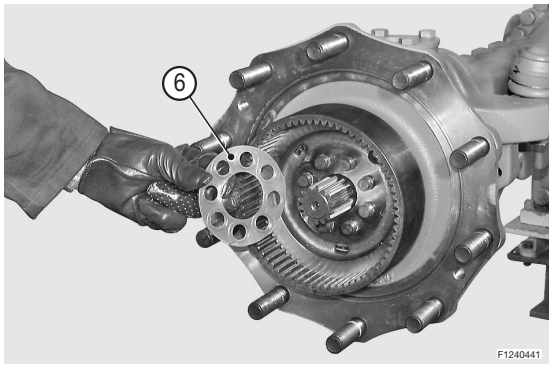
GB c

Remove the complete planetary carrier cover (2).



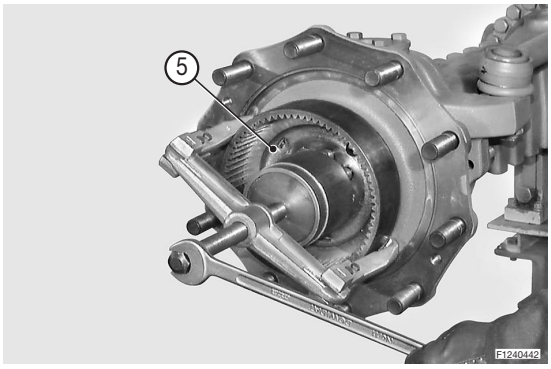
GB d

Unloose and remove the tightening nuts (4) from the crown flange (5).



GB e

Remove the safety flange (6).



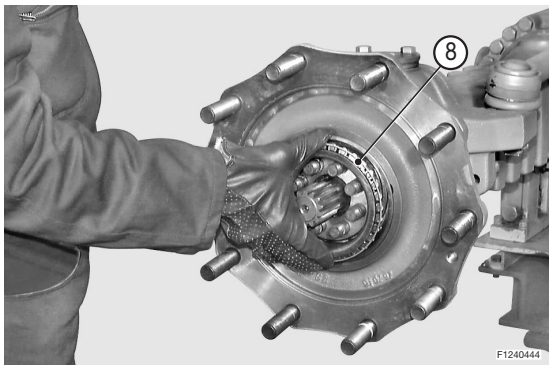
GB f

Using a puller, remove the complete crown flange (5) by acting onthe stud bolts.



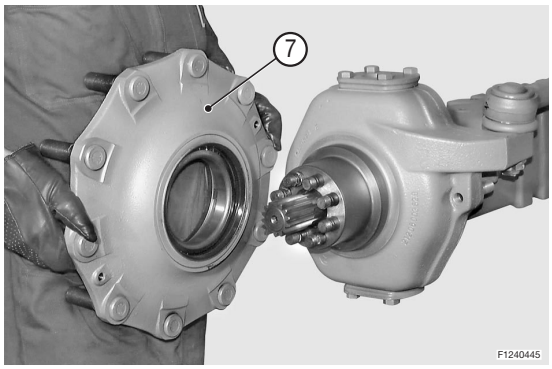
GB a

Partially extract the hub (7) using a plastic hammer.
NOTE. Alternately hammer on several equidistant points.



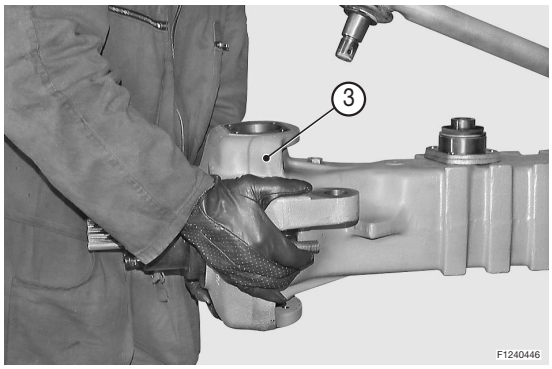
GB b

Remove the external bearing (8).



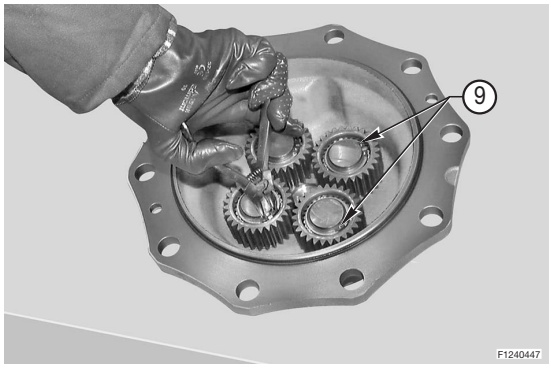
GB c

By hand remove the complete hub (7).



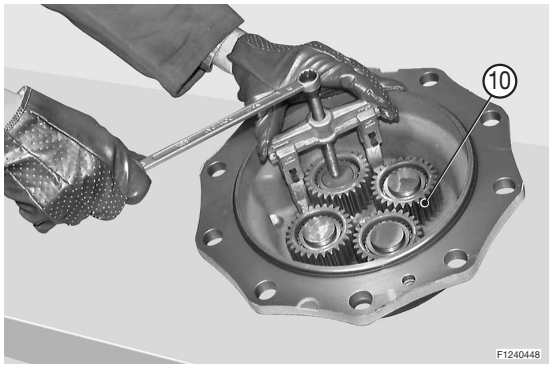
GB d

Remove the pins and remove the steering case (3).
For details, see "HOW TO REMOVE THE COMPLETE STEERING CASE".



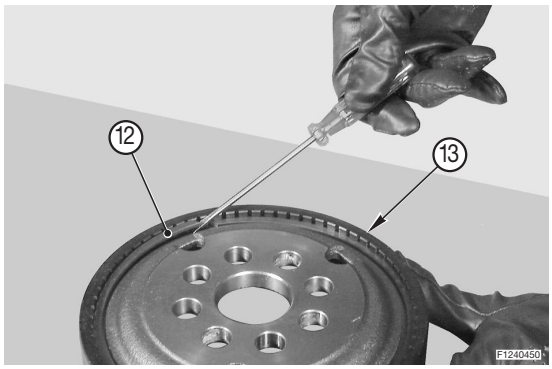
GB e

Remove the snap rings (9).



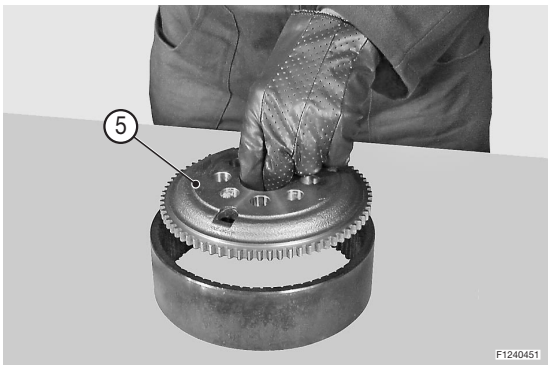
GB f

With the help of a puller, remove the planet wheel gears (10).
NOTE. Note down the assembly side of planet wheels.



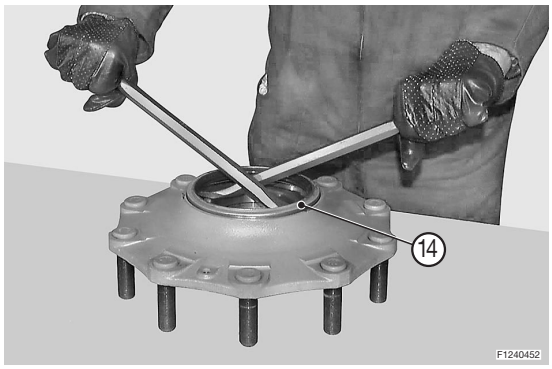
GB a

Remove the snap ring (12) from the crown (13).



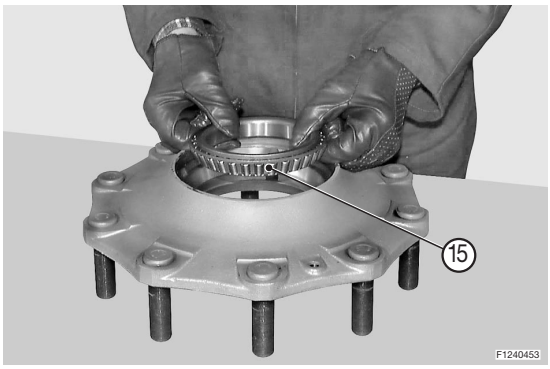
GB b

Remove the crown flange (5).



GB c

Remove the sealing ring from the hub (14).



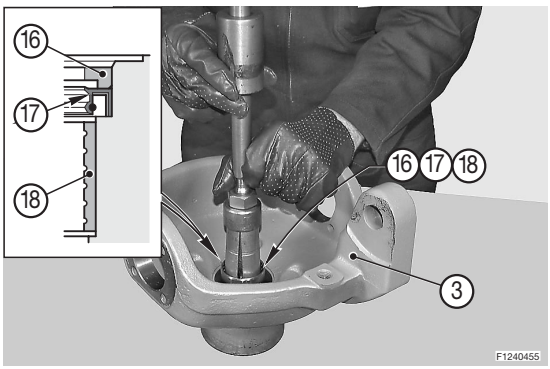
GB d

Remove the internal bearing (15).



GB e

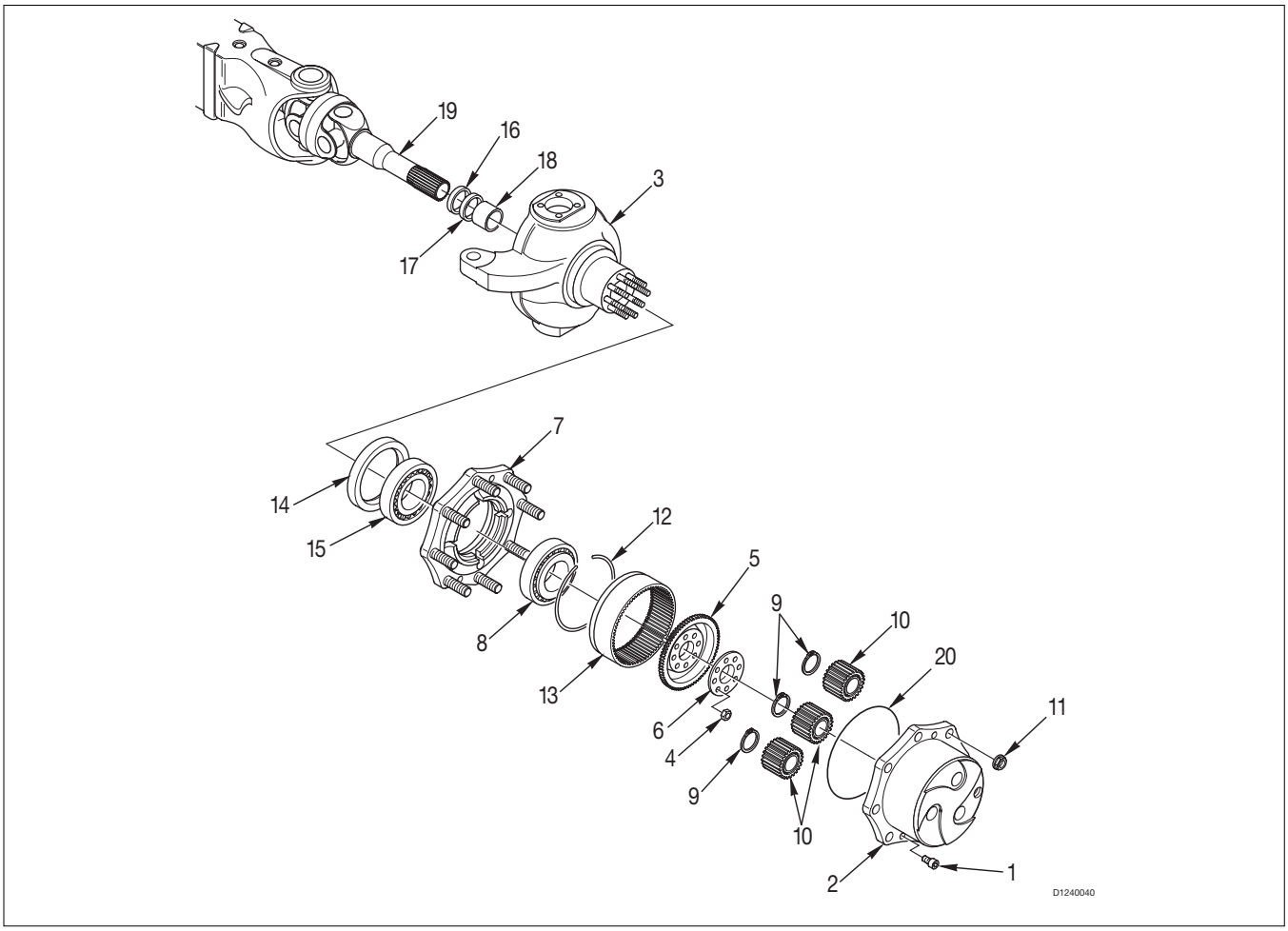
Remove the external thrust blocks from the bearings (8) and (15) forcing a pin-driver into the appropriate slots on the hub (7).
NOTE. Hammer in an alternate way so as to avoid crawling or deformation of the thrust blocks.



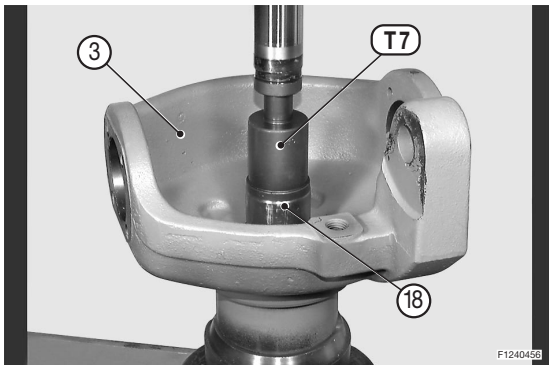
GB f

Use a puller to remove the centring ring (16), the sealing ring (17) and the bearing (18) from the steering case (3).
NOTE. Note down the orientation of both centring ring (16) and sealing ring (17).

AXLE ASSEMBLY - DISASSEMBLY

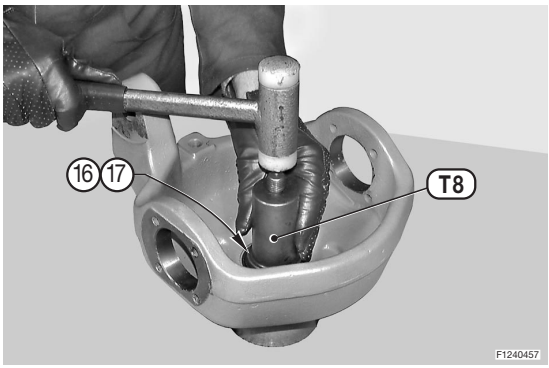


Assembly



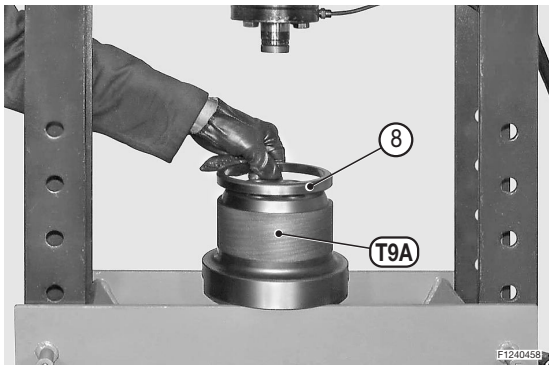
GB a

Lubricate the bushing (18) and the seat of the steering case (3).
Install the bushing (18), using tool T7.



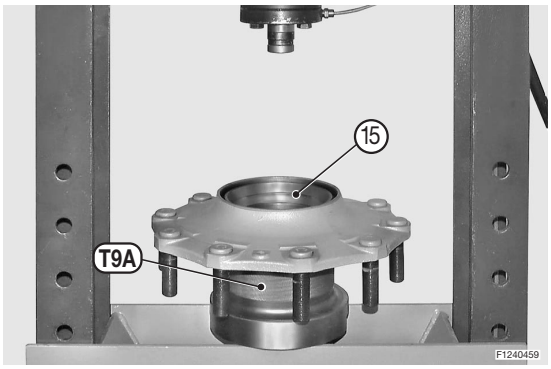
GB b

Lubricate the outer surface of the sealing ring (17) and centring ring (16); fit them into their seat using tool T8.



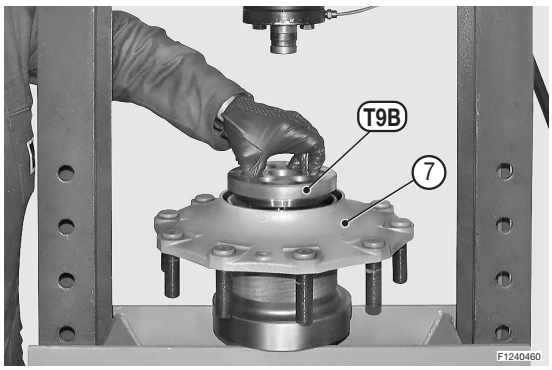
GB c

Position the lower part of tool T9A and the thrust block of the external bearing (8) under the press.



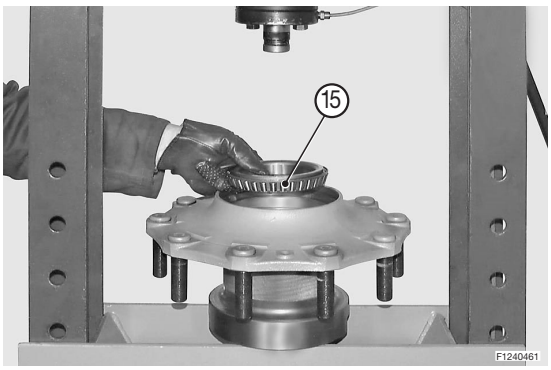
GB d

Lubricate the seats of the bearings and position the hub (7) on tool T9A; position the thrust block of the internal bearing (15).
NOTE. Check that the thrust block is correctly oriented.



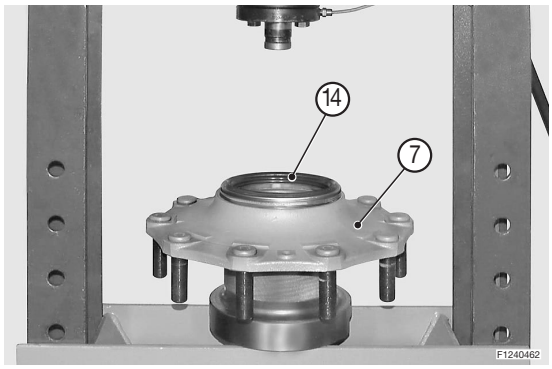
GB e

Position the upper part of tool T9B and press the thrust blocks into the hub (7) all the way down.



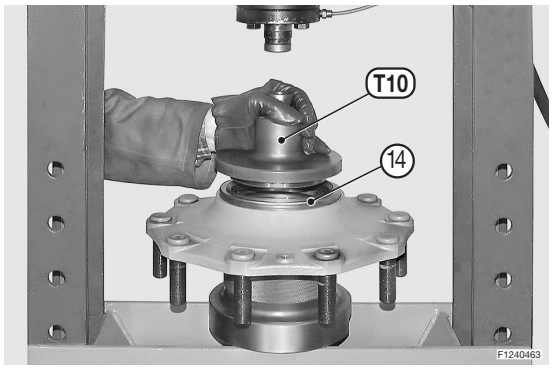
GB f

Fit the bearing (15) into the internal thrust block.



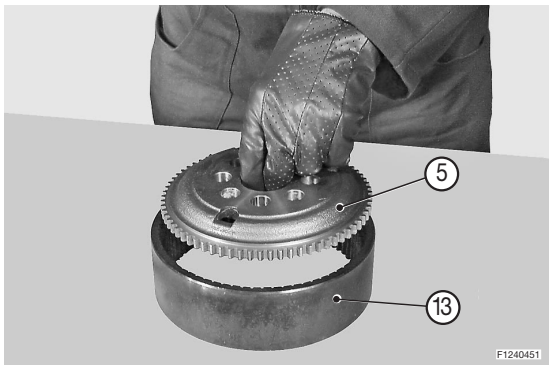
GB a

Apply a repositionable jointing compound for seals to the outer surface of the sealing ring (14). Position the sealing ring (14) in the hub (7).
NOTE. Check that the ring (14) is correctly oriented.



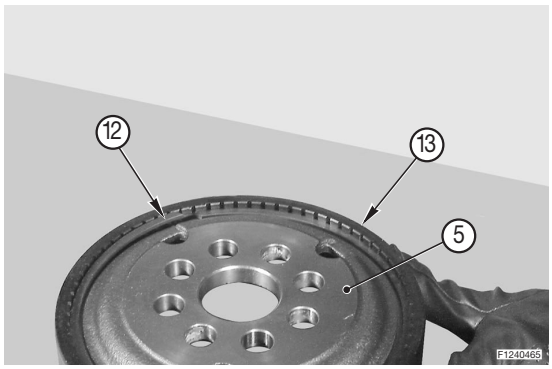
GB b

Position tool T10 and press the sealing ring (14) into its seat.



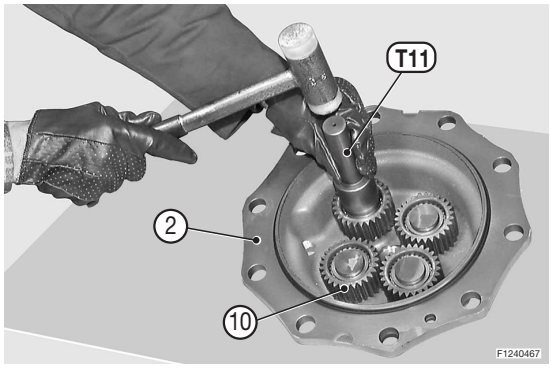
GB c

Insert the flange (5) in the crown (13).



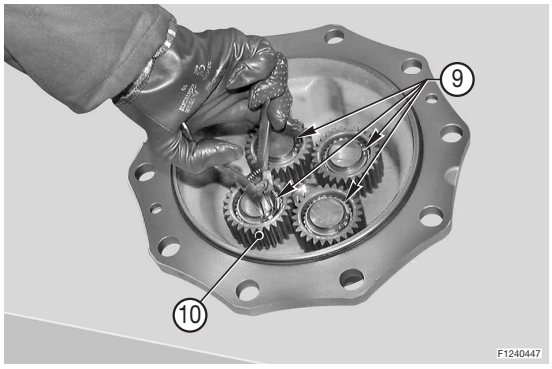
GB d

Insert the snap ring (12) in order to fix the flange (5) in the crown (13).
NOTE. Carefully check that ring (12) is properly inserted in the slot of the crown (13).



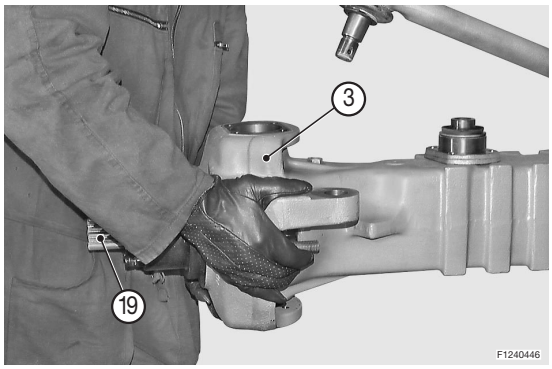
GB e

With the help of tool T11, insert the planet wheel gears (10) into the cover (2).
Accurately check the orientation.



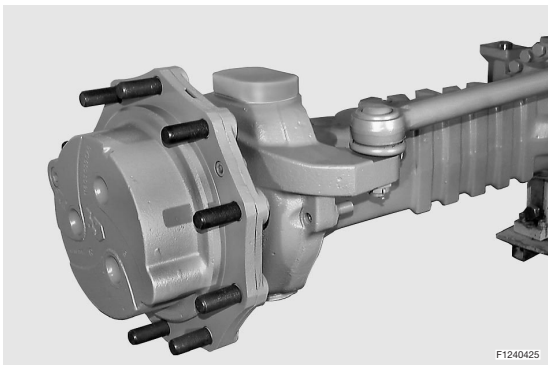
GB f

Lock the gears (10) into position by fitting the snap rings (9).



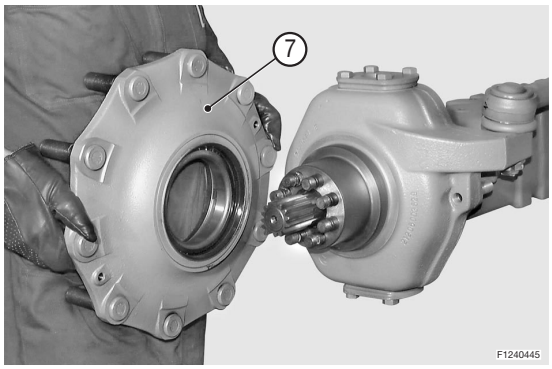
GB a

Fit the steering case (3) onto the U-joint (19) and install the articulation pins.
For pin assembly details, see "HOW TO ASSEMBLE THE COMPLETE STEERING CASE".



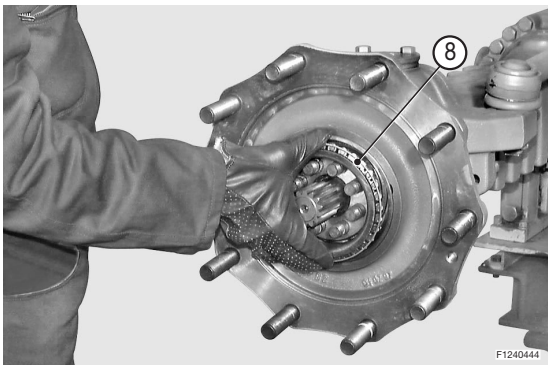
GB b

Connect the steering bars.
For details, see "HOW TO INSTALL THE COMPLETE STEERING CASE".



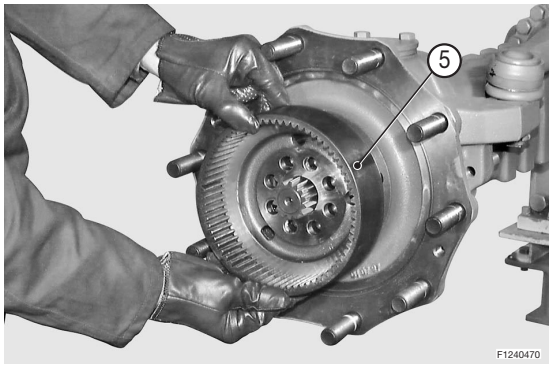
GB c

Install the hub (7).



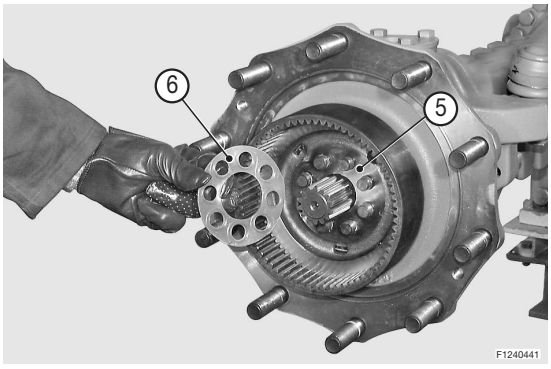
GB d

Install the external bearing (8).
NOTE. Using a plastic hammer, drive the bearing to the limit stop by lightly hammering around the edge.



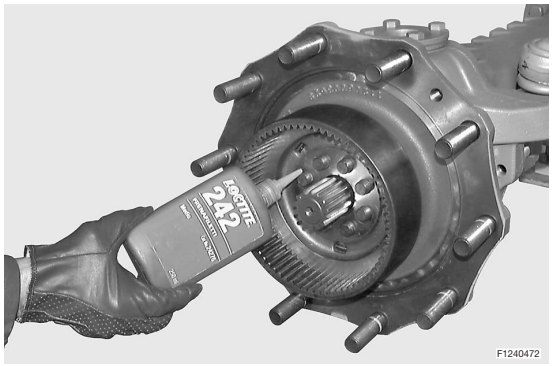
GB e

Fit the complete crown flange (5).
NOTE. In order to fasten the flange (5), use a plastic hammer and alternately hammer on several equidistant points.



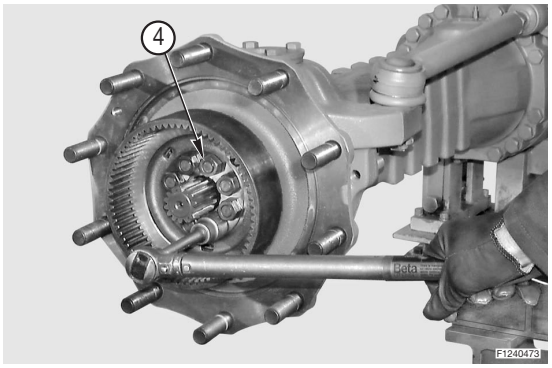
GB f

Apply Tecnolube Seal 101 grease to the surface of the safety flange (6) which touches the crown flange (5).
Fit the safety flange (6).



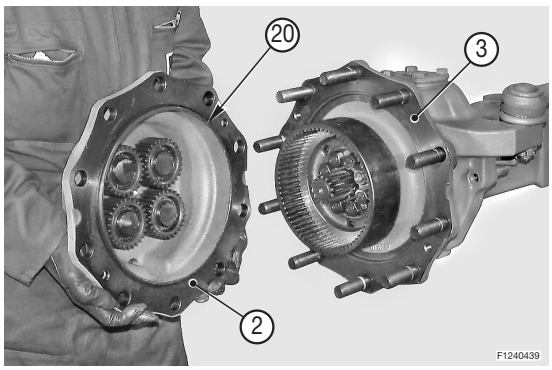
GB a

Apply Loctite 242 to the studs and fit in the nuts (4).



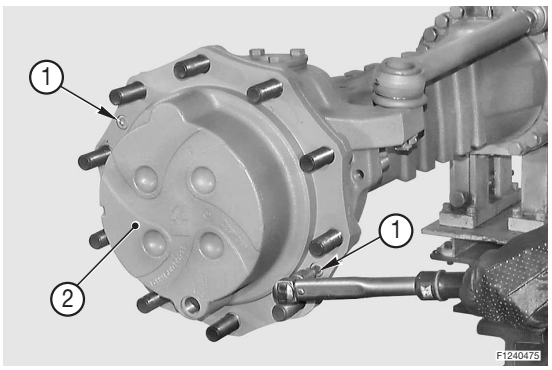
GB b

Cross tighten the nuts (4) in two stages.
Initial torque wrench setting: 120 Nm
Final torque wrench setting: 255÷285 Nm



GB c

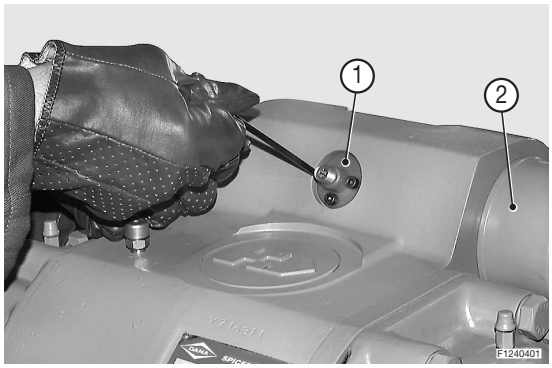
Fit the planetary carrier cover (2) onto the hub (3).
CAUTION! Check that the O-ring (20) is in good condition and in position.



GB d

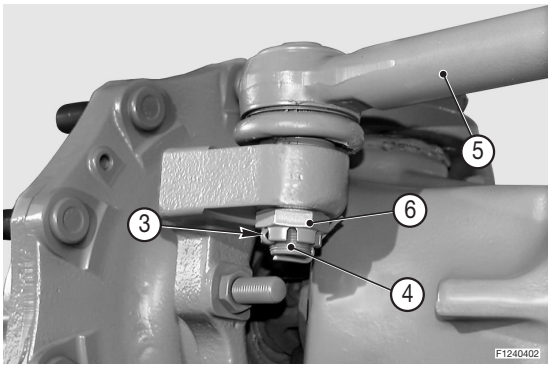
Lock the planetary carrier cover (2) by tightening the screws (1).
Torque wrench setting for screws: 40÷50 Nm

STEERING CYLINDER - Removal



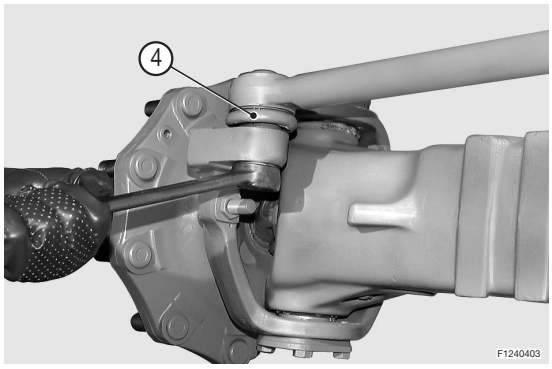
GB a

Remove the centring sensor (1) of the steering piston (2), if supplied.



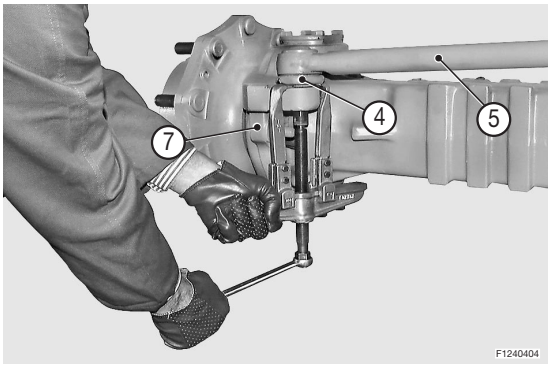
GB b

Remove the safety cotter pins (3) from the articulation pins (4) of the steering bars (5).
CAUTION! Dispose of used cotter pins.



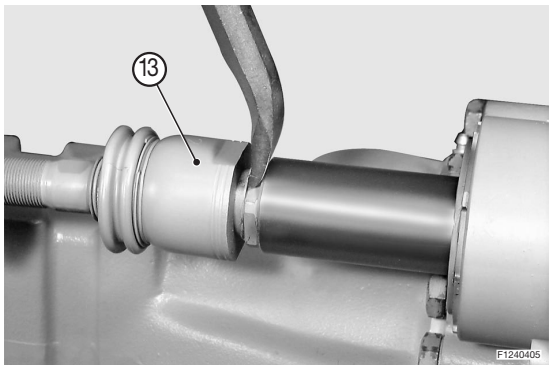
GB c

Remove the castellated nuts (6) that lock the articulation pins (4).



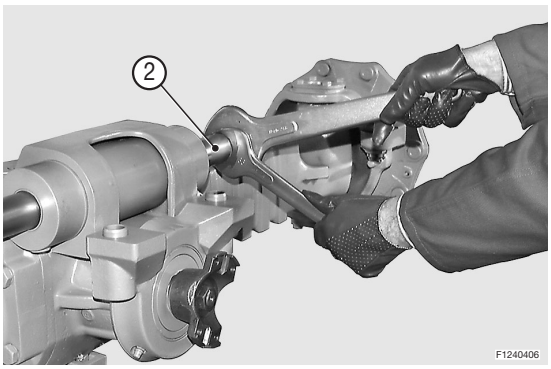
GB d

Disconnect the tapered pins of the articulation (4) from the steering case (7) by means of a puller.



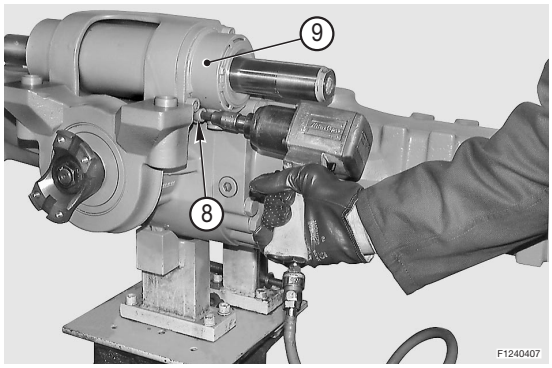
GB e

If the connection of the steering bars includes a safety collar (13), raise the border.



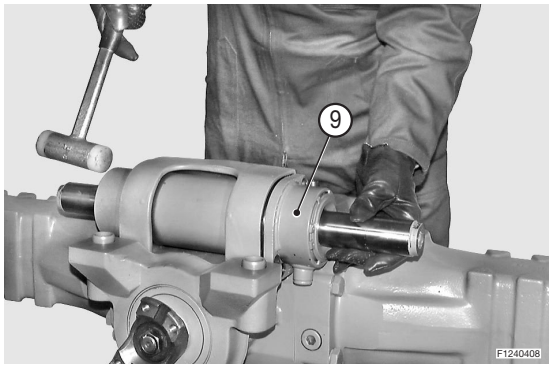
GB f

Disconnect left and right steering bars (5) from the piston (2).



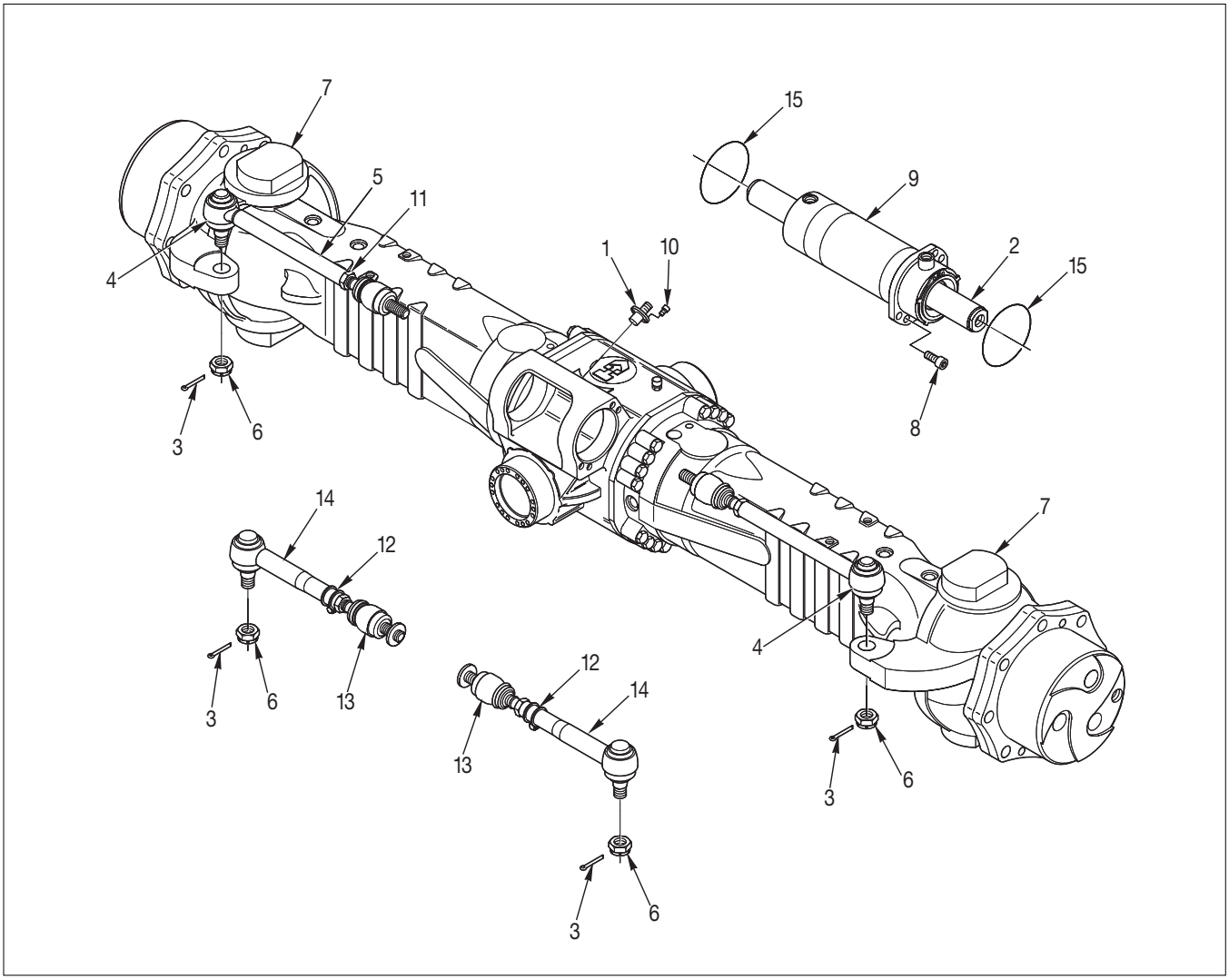
GB a

Remove the securing screws (8) from the steering cylinder (9).

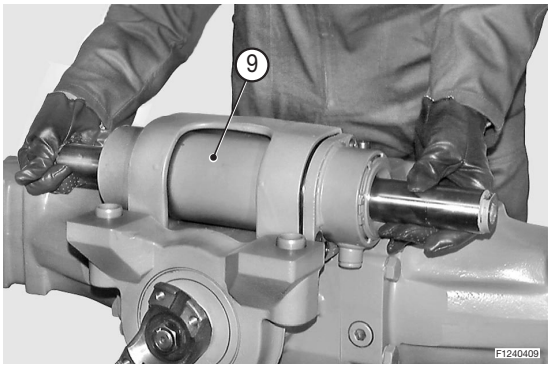


GB b

Extract the cylinder (9) using a plastic hammer.
NOTE. For cylinder disassembly, refer to "HOW TO DISASSEMBLE THE STEERING CYLINDER".

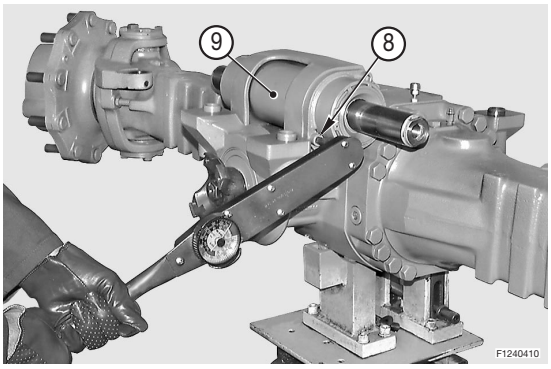


Installation



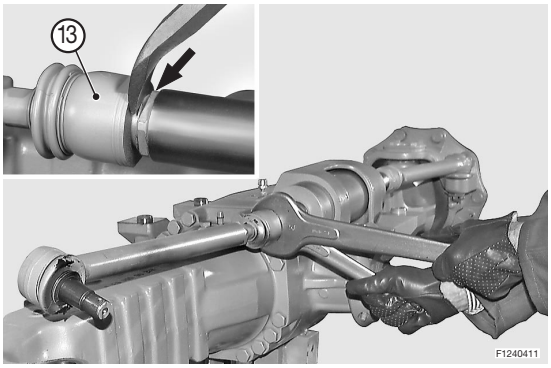
GB a

Check that the O-rings (15) of the axle unit are in good condition; lubricate the seats of the seals (15) and fit the steering cylinder (9) into its seat.
Lock the cylinder by cross- tightening the screws (8).
Torque wrench setting: 116÷128 Nm



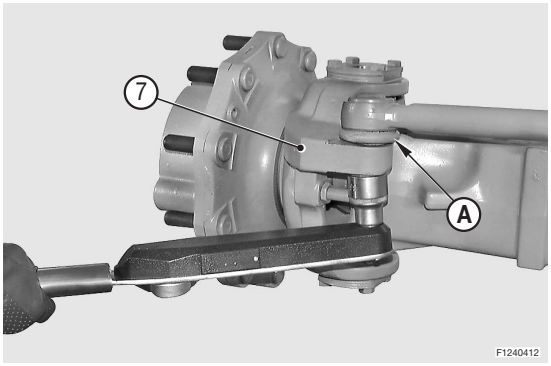
GB b

Apply Loctite 242 to the thread and connect the steering bars by screwing the terminals onto the piston stem.
Torque wrench setting: 240÷270 Nm
NOTE. Versions with coupling require that the rim of the articulation (13) is riveted onto the surfaces of the piston stem.



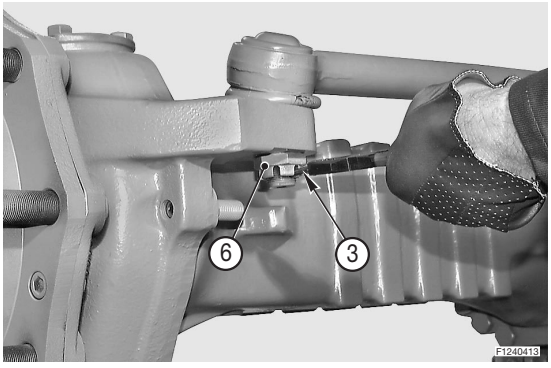
GB c

Insert the pins (4) in the steering case (7) and lock into position using a torque wrench setting of 260÷290 Nm.



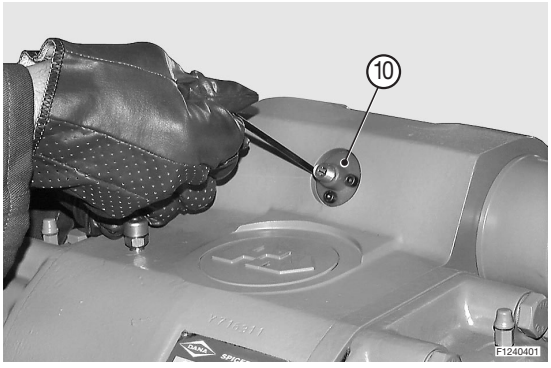
GB d

Find the position of the notching in relation to the hole of the cotter pins and tighten the nut (6) further.
CAUTION! Check that rubber guards (A) are intact.



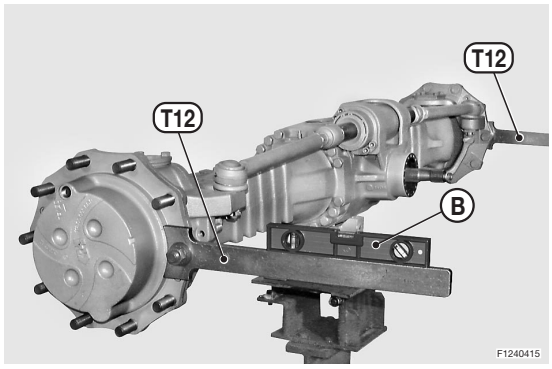
GB e

Insert the cotter pins (3) and bend the safety stems.
CAUTION! Use new cotter pins.



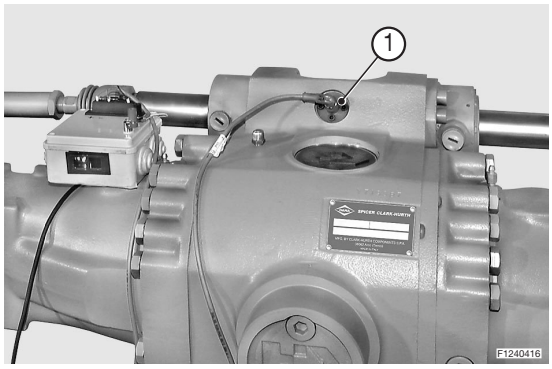
GB f

Install the proximity (1) for checking piston centring - if applicable - and tighten the screws (10).
Torque wrench setting: 5÷6 Nm



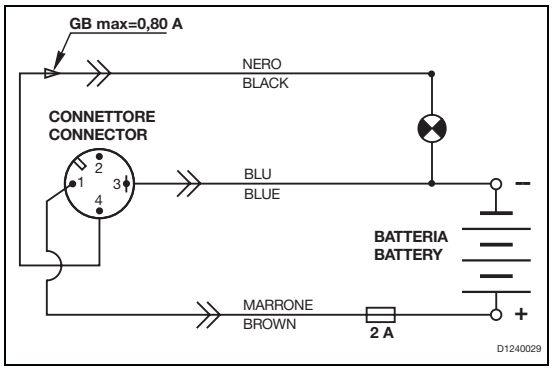
GB a

CAUTION. Eliminate the action of the negative brake, if fitted.
Apply tools T12 to the hubs and lock them.
Using a level “B”, check that tools are perfectly flat and parallel to each other.



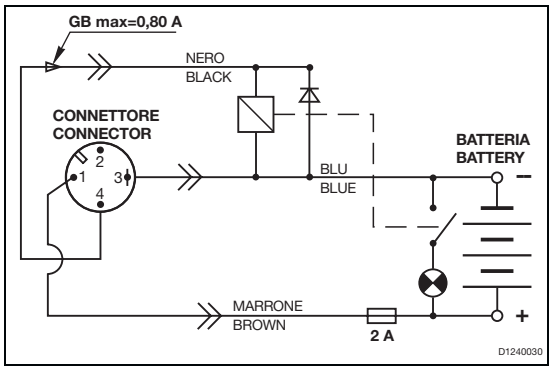
GB b

Connect the sensor (1) to the inspection device according to either diagram.



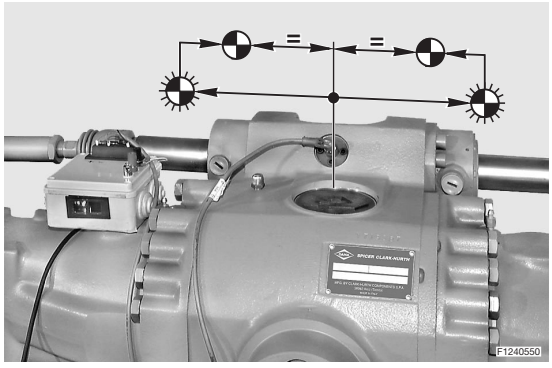
GB c

Sensor connection card, STANDARD version.



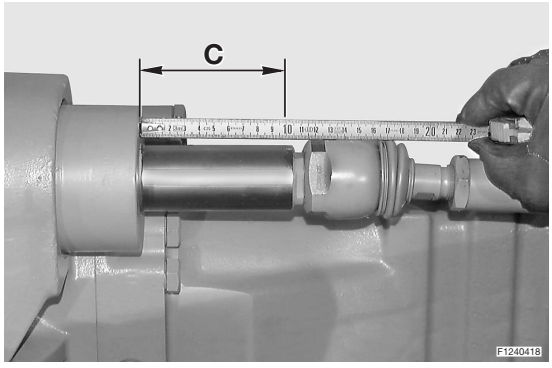
GB d

Sensor connection card, OPTIONAL version.



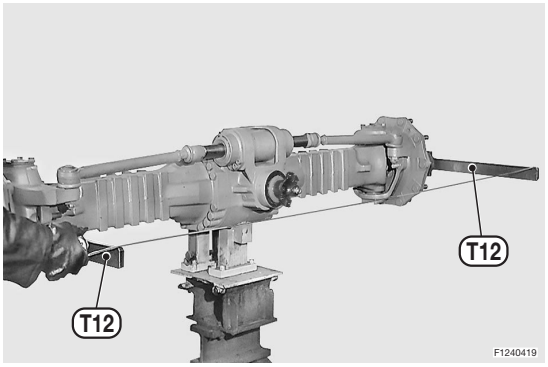
GB e

Centre the piston by slowly moving it first in one direction then in the other and position it half way on the stroke, which is determined by the switching on and off of the signal lamp of the inspection device in the reversal stage.



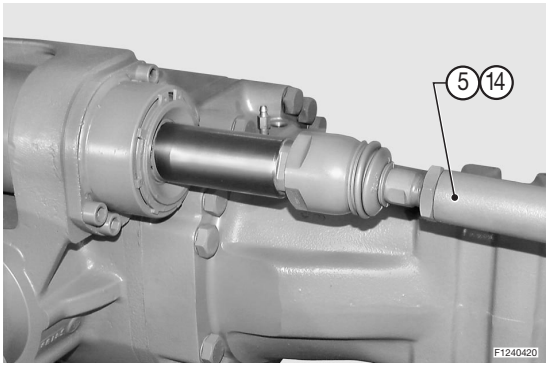
GB f

Inspect jut “C” on one side of the piston and note down the size for checking later adjustments.
NOTE. If cylinders come without a sensor, the centring of the piston must be carried out on the basis of the maximum stroke.



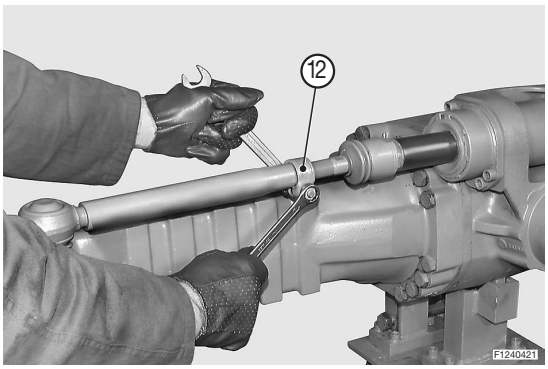
GB a

Without moving the piston, check front and rear size at the edge of tools T12.
Max. difference: 0.6÷0.7 mm
NOTE. In order to check the rear size, rotate the bevel pinion and check that tools T12 are flat.



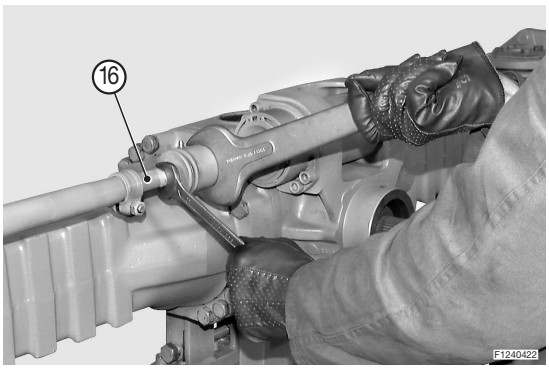
GB b

If necessary, adjust convergency without moving the centring of the piston and adjust the length of the steering bars (5) or (14).
NOTE. With a half turn of screw, the front size is reduced by about 3 mm, whereas the rear one is increased by about 3 mm.



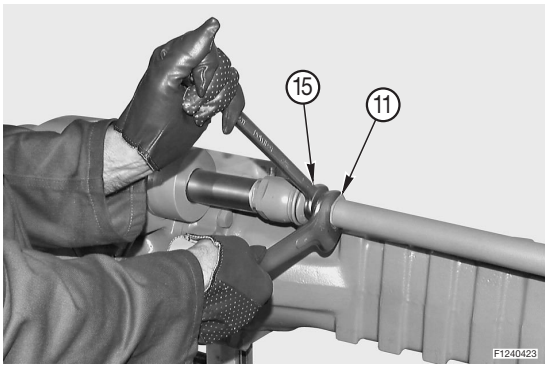
GB c

CONVERGENCY ADJUSTMENT ON UNITS WITH COLLAR
Unloose the nuts on the collars (12).



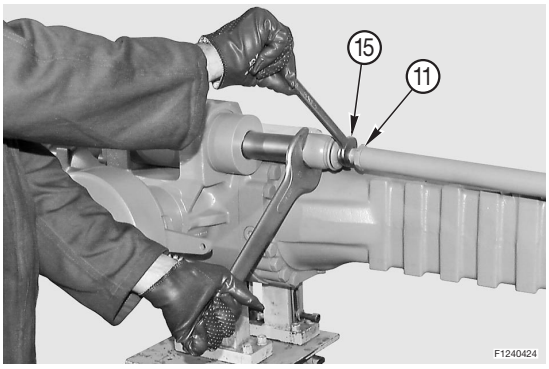
GB d

Rotate the ball-and-socket joints (16) until convergency has been obtained.
Check that articulations move easily and lock the collars (12).
Torque wrench setting for nuts: 42÷52 Nm



GB e

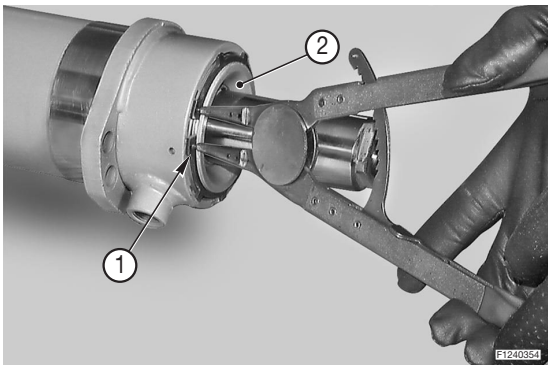
CONVERGENCY ADJUSTMENT ON ALTERNATIVE VERSIONS
Unloose the nuts (11) and screw them onto the ball-and-socket joints (15).



GB f

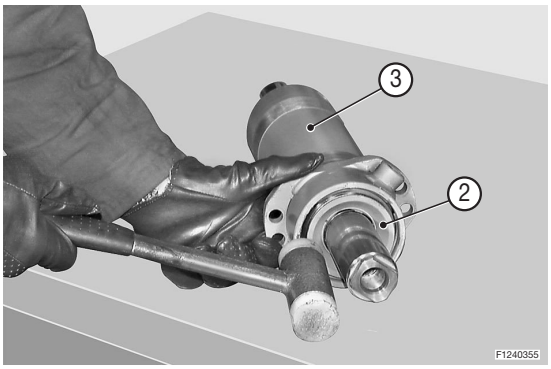
Hold the articulations still and rotate the ball-and-socket joints (15).
Once the convergency has been adjusted, lock the nuts (11).
Torque wrench setting for nuts: 298÷328 Nm

Disassembly



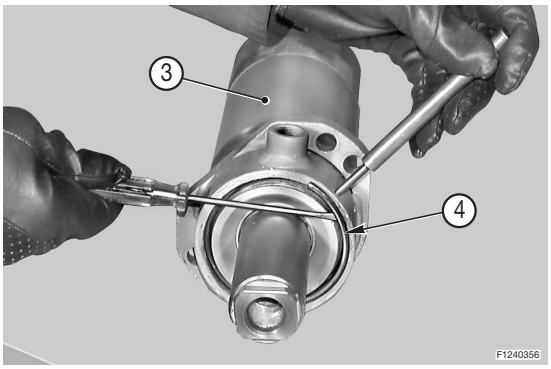
GB a

Remove the snap ring (1) from the cylinder head (2).



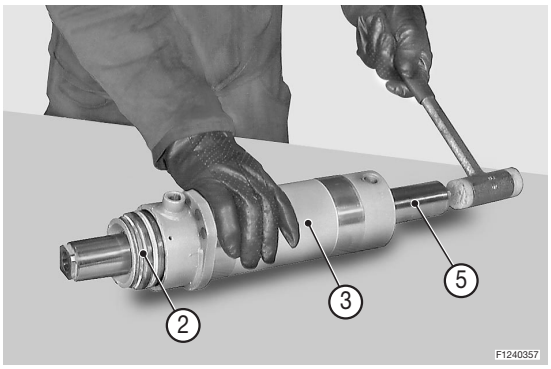
GB b

With the help of a plastic hammer, push the head (2) inside the cylinder (3).
NOTE. The head should line up with the edge of the cylinder.



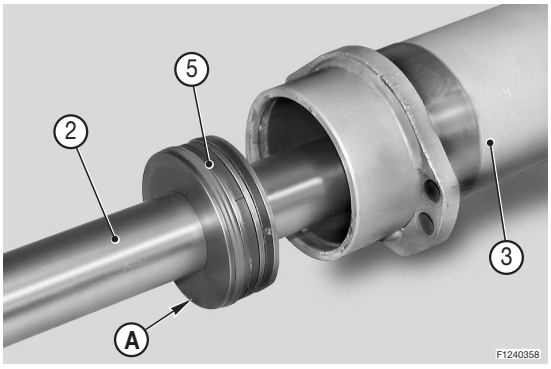
GB c

With the help of a drift, apply pressure to the stop ring (4) that is placed inside the cylinder (3) and extract the ring using a screwdriver.



GB d

Hammer the piston (5) on the rear of the head (2) using a plastic hammer.
Continue hammering until the head (2) is ejected from the cylinder (3).



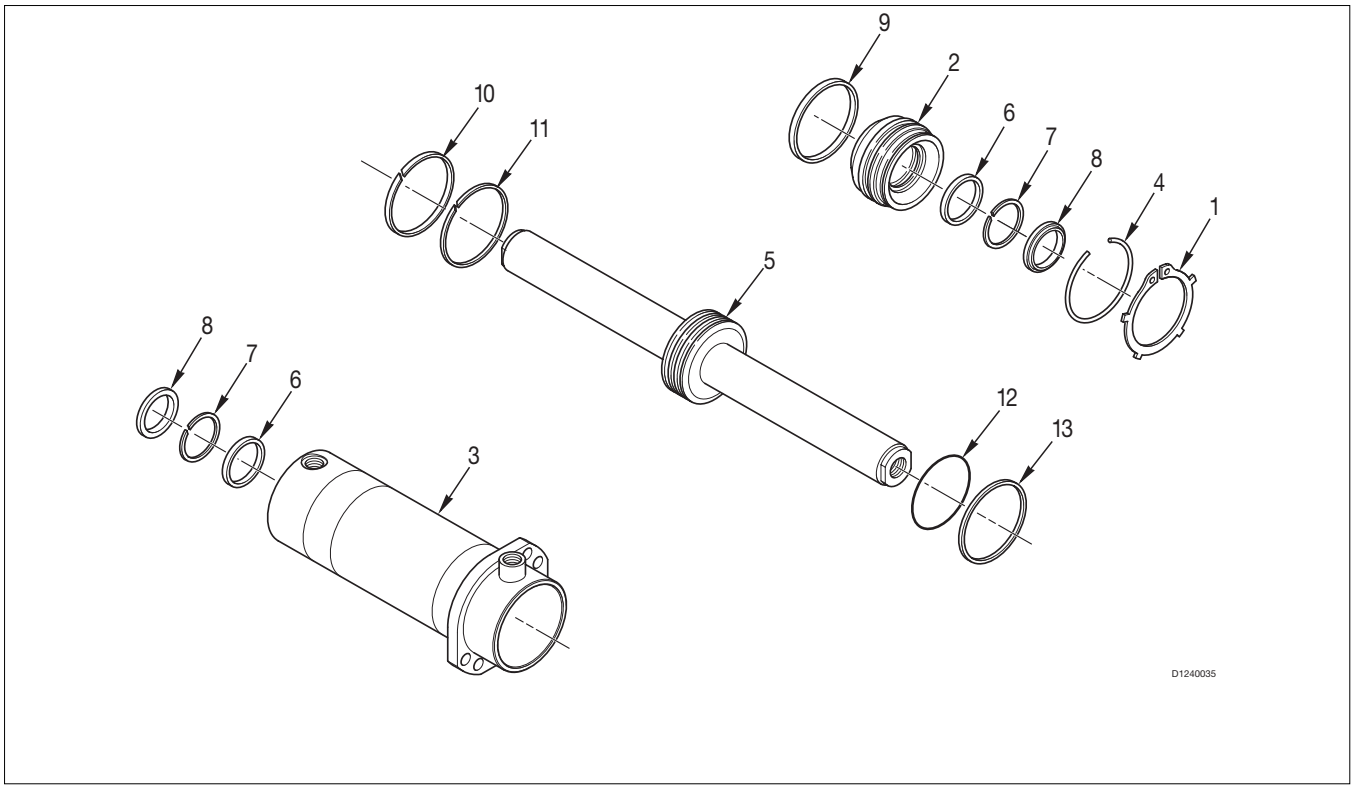
GB e

Disassemble the cylinder unit (3) by extracting first the head (2), then the piston (5).
CAUTION! Note down the assembly side of the piston (5). The bevelled part "A" of the piston is oriented towards the head (2).

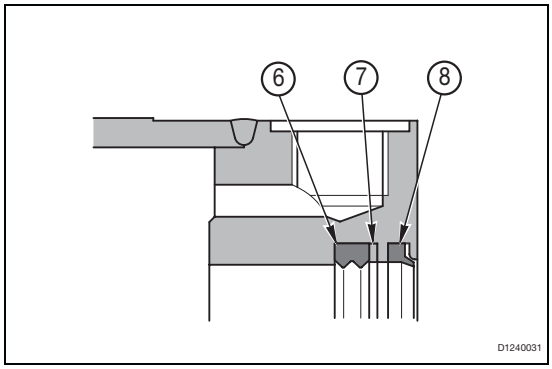
GB f

Remove all seals, anti-extrusion rings and scraper rings from head (2), cylinder (3) and piston (5).
NOTE. 1 - All seals must be replaced every time the unit is disassembled. 2 - Particular attention must be paid not to damage the seats of both seals and piston slide

AXLE ASSEMBLY - DISASSEMBLY

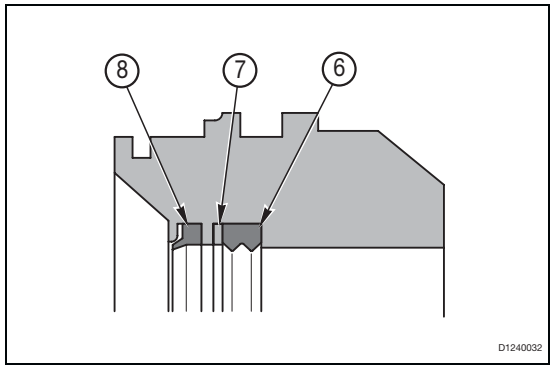


Assembly



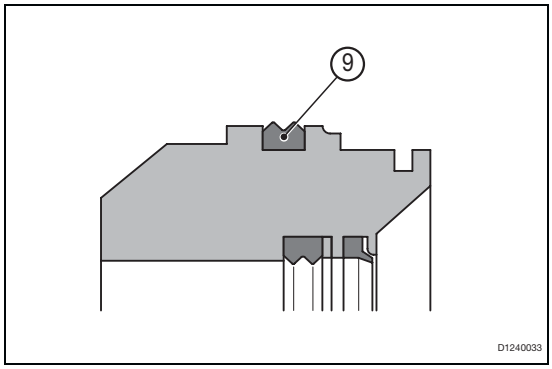
GB a

After applying grease, install the sealing ring (6) of the shaft, the anti-extrusion ring (7) and the scraper ring (8) inside the cylinder (3).
CAUTION! Thoroughly check that positioning of the anti-extrusion ring (7) is correct.



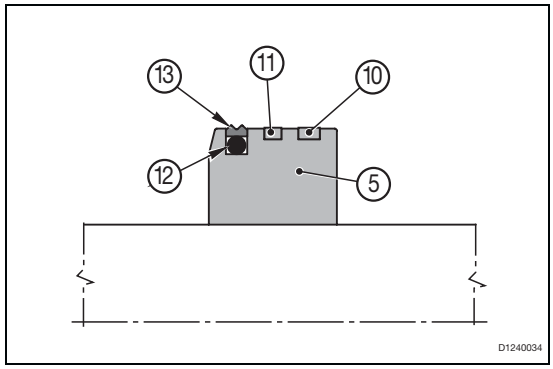
GB b

After applying grease, install the sealing ring (6) of the shaft, the anti-extrusion ring (7) and the scraper ring (8) in the head (2).
CAUTION! Thoroughly check that positioning of the anti-extrusion (7) ring is correct.



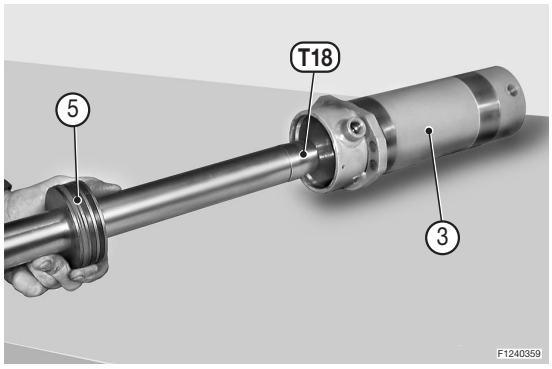
GB c

Fit the seal (9) onto the outside of the head (2).
CAUTION!
1 - In order to facilitate assembly, apply grease to the outer surface of the piston.
2 - Do not roll the seal (9) up.



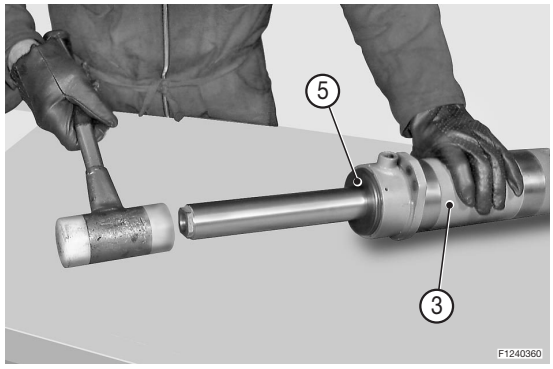
GB d

Prepare the piston (5) by fitting it with the guide ring (10), the magnetic ring (11), the O-ring (12) and the seal (13).
CAUTION! 1 - In order to facilitate assembly, apply grease.
2 - If a centring sensor is not fitted, then the magnetic ring (11) should be replaced by another guide ring (10).



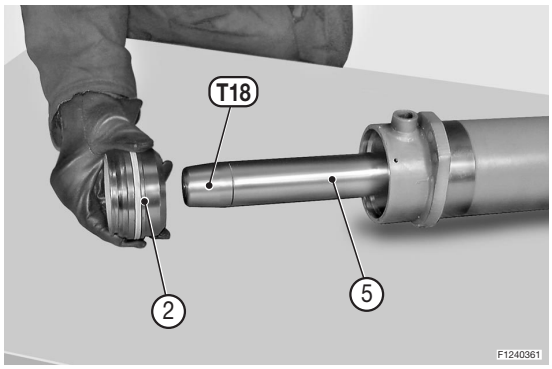
GB e

Apply tool T18 to the shaft on the opposite side of the head (2) and centre it on the cylinder (3) so that it fits into the piston (5).
NOTE. Apply a little grease to seals and cylinder.



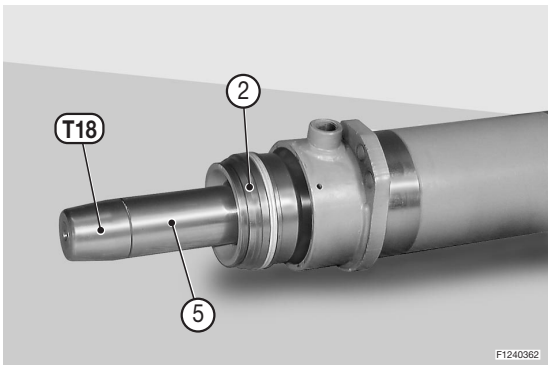
GB f

Push the piston (5) into the cylinder for 100 mm using a plastic hammer.



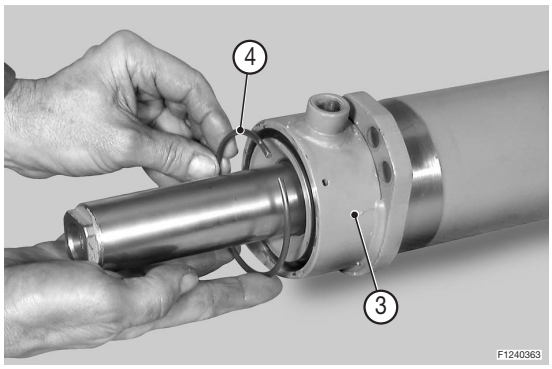
GB a

Remove tool T18 and apply it to the opposite side of the piston (5).



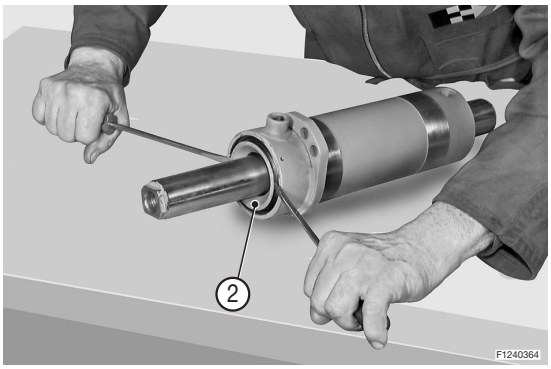
GB b

Apply grease to head (2) seals, fit the head onto the piston and push it into the cylinder (3) using a plastic hammer.
NOTE. Insert the head as to line it up with the edge of the cylinder.



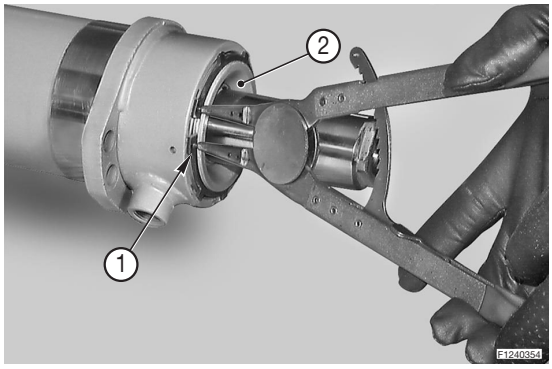
GB c

Insert the stop ring (4) ensuring that it fits into the seat of the cylinder (3).



GB d

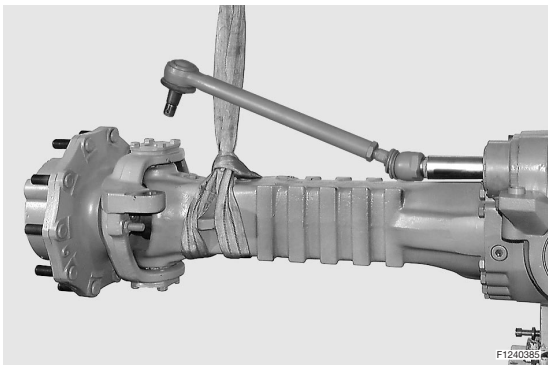
Apply pressure to the head using two screwdrivers or levers until the head is fastened onto the stop ring (4).



GB e

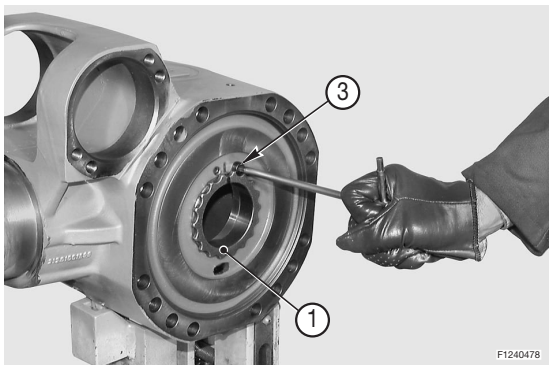
Fit the snap ring (1) on the head (2).
CAUTION! Make sure that the snap ring (1) is securely fastened in its seat.
If necessary, force it into its seat using a drift and a hammer.

DIFFERENTIAL UNIT - Removal and disassembly



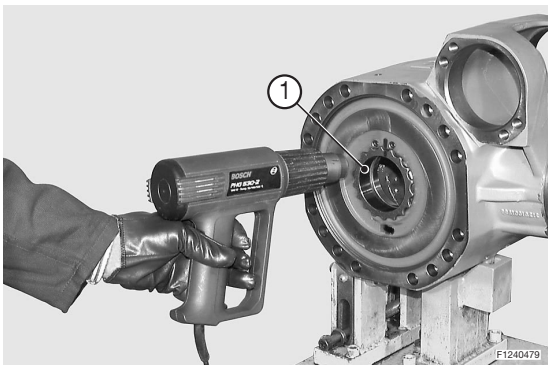
GB a

Remove the complete arms.
For details, see "CHECKING WEAR AND REPLACING THE BRAKING DISKS".



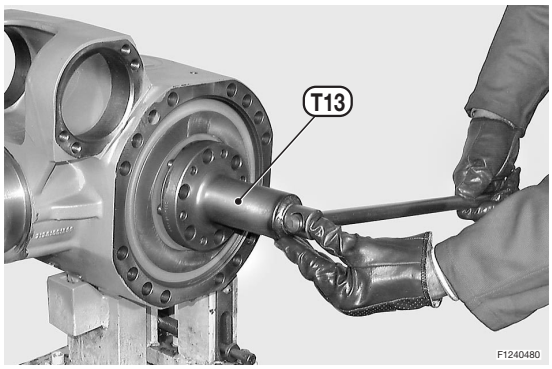
GB b

Mark the position of the ring nuts (1).
Remove the fittin screws (3) from the ring nuts (1).



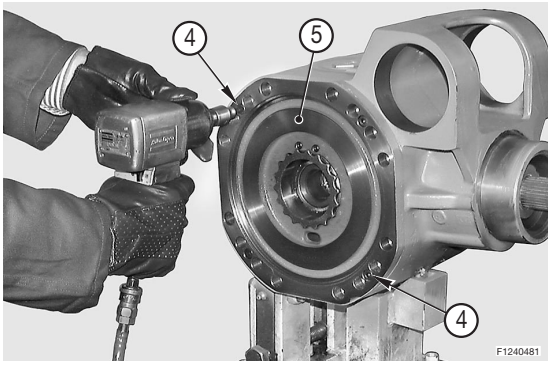
GB c

Uniformly heat the ring nuts (1) up to a temperature of 80° C.



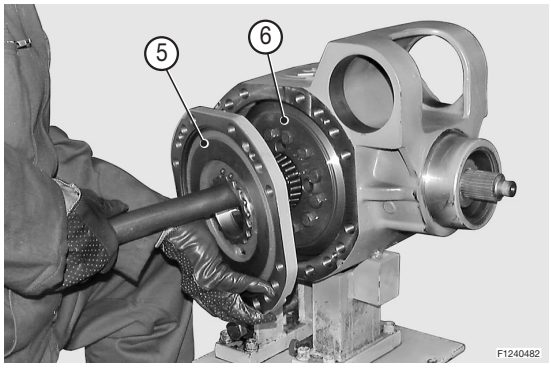
GB d

Apply tool T13 and remove the ring nuts.
NOTE. Accurately clean the threaded portions on ring nuts of body and cover.



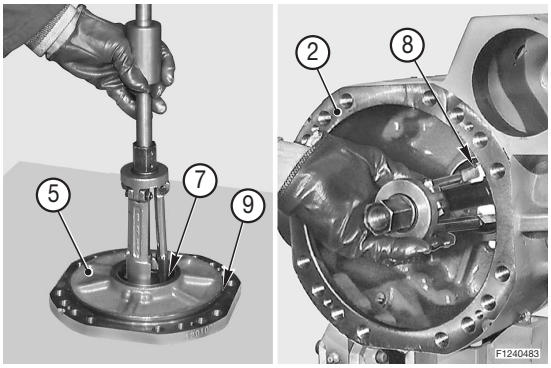
GB e

Remove the fittin screws (4) from the middle cover (5).



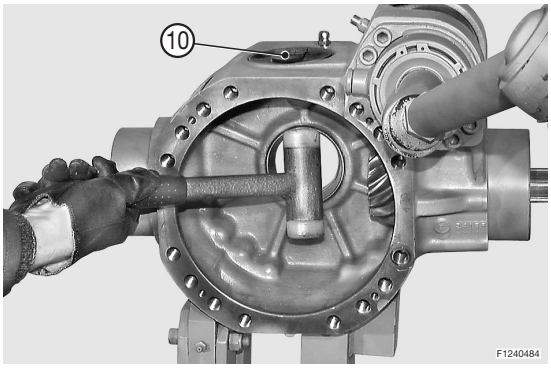
GB f

Insert a screw-driver in the opposing slots then force and remove the middle cover (5) and the complete differential unit (6).
NOTE. Support the pieces using a rod.



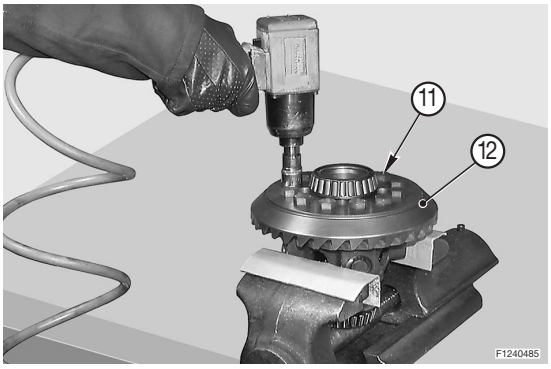
GB a

If the bearings need replacing, extract the external thrust blocks of the bearings (7) and (8) from middle cover (5) and central body (2).
NOTE. Accurately check the O-ring (9).



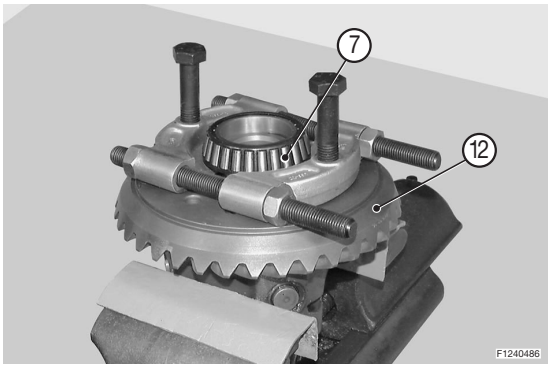
GB b

Remove the top plug (10).



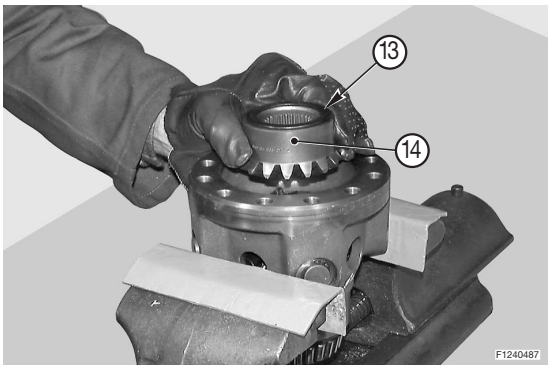
GB c

Remove the fittin screws (11) from the crown (12).



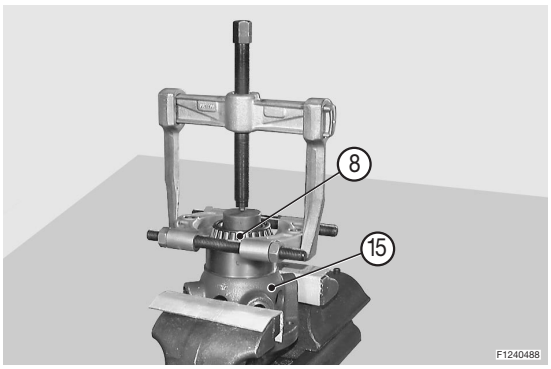
GB d

If the bearing need replacing, extract the bearing (7) and remove the crown (12).



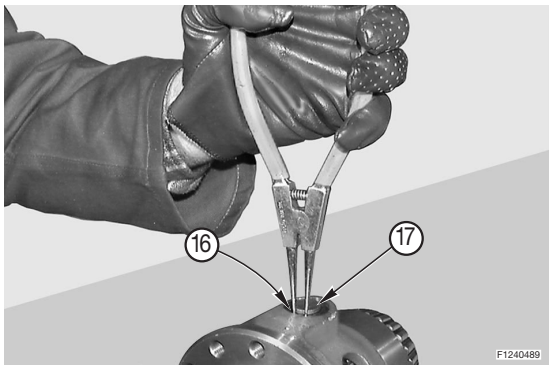
GB e

Remove the shim washer (13) and the planetary gear (14).



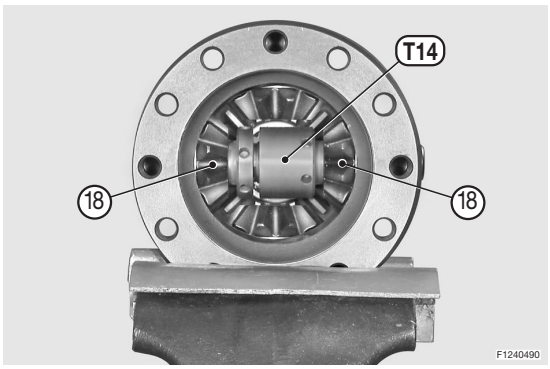
GB f

If the bearing need replacing, extract the bearing (8) from the differential carrier (15).



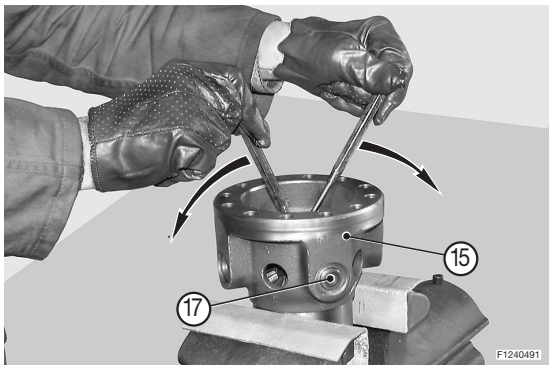
GB a

Remove the snap rings (16) from the two pins (17) of the planet wheel gears (18).



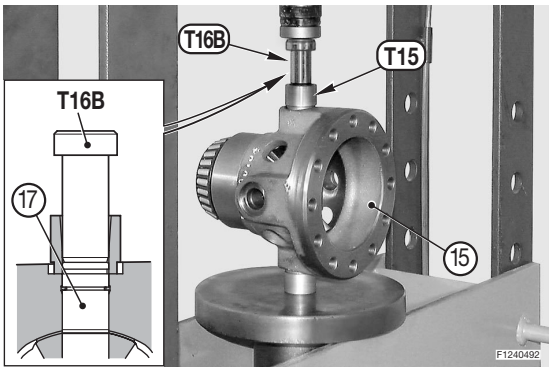
GB b

Insert tool T14 between the planet wheel gears (18).



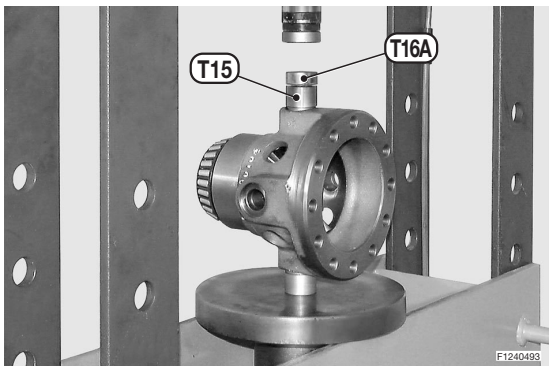
GB c

Force tool T14 in-between the planet wheel gears (18) using two pin-drivers.
CAUTION! Make sure that tool T14 is perfectly lined up with the pins (17) when locked.



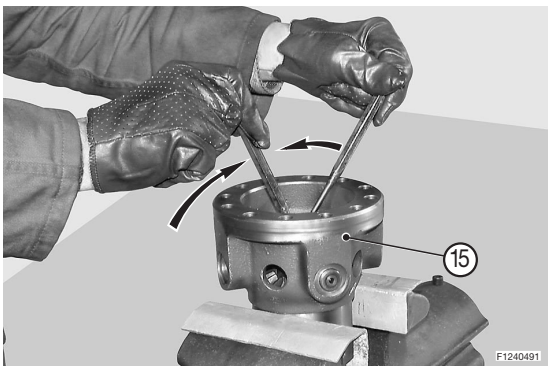
GB d

Place the differential carrier (15) under a press, position bush T15 and insert gudgeon T16A. Press T16A pin to limit position.



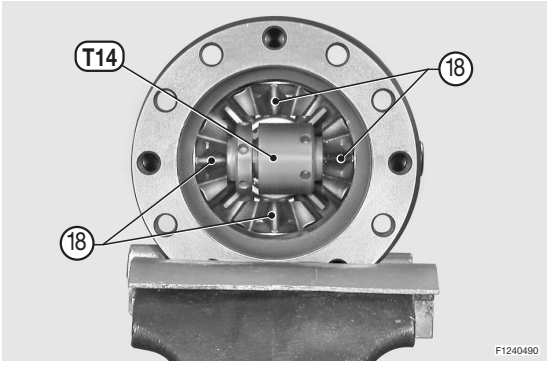
GB e

Remove gudgeon T16A and bush T15.
NOTE. In this condition the tool T14 contains pin (17).



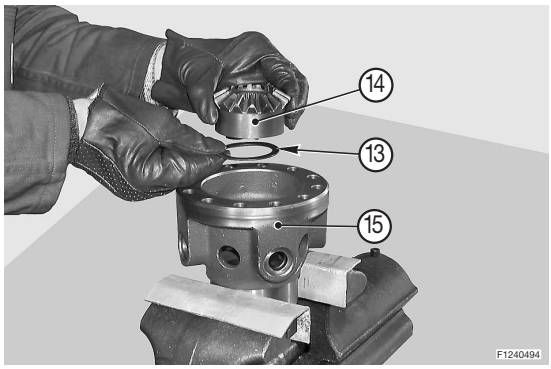
GB f

Remove tool T14 together with the pin (17) of the planet wheel.



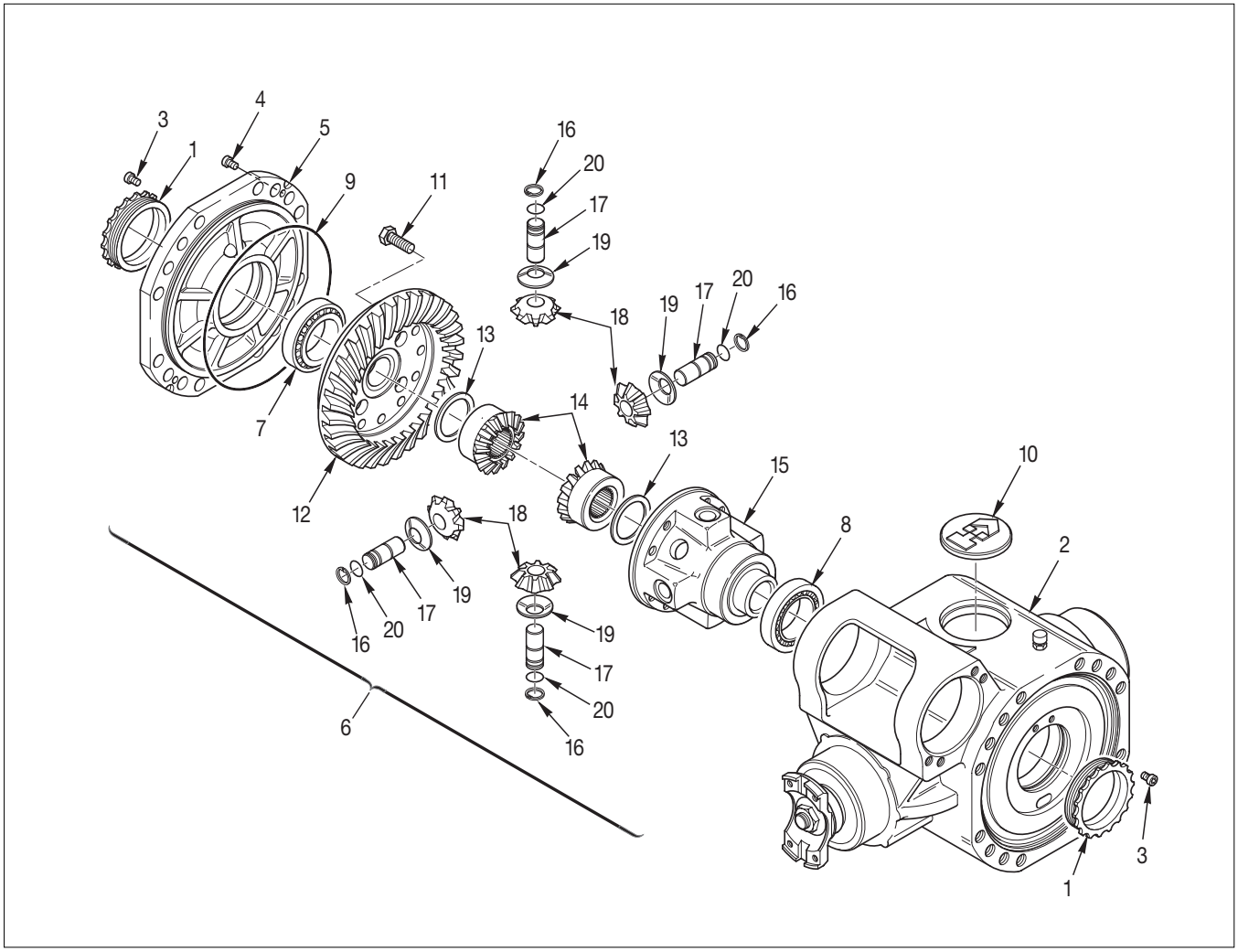
GB a

Leave the released planetary gear in position and again lock tool T14.
Repeat the operations for the extraction of the pin of the 2nd planet wheel (17).
Repeat the operations for all other pins.

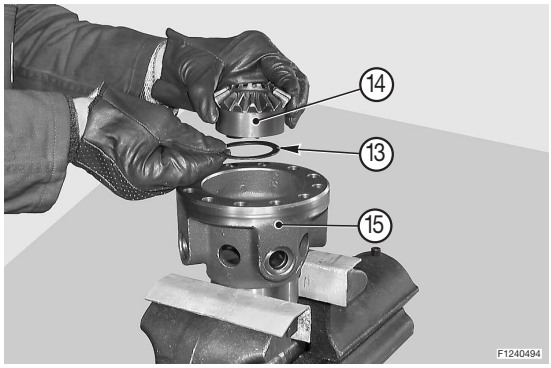


GB b

Remove tool T14 and remove the last two planet wheel gears (18), the 2nd differential unit gear (14) and the relative shim washer (13) from the differential carrier.

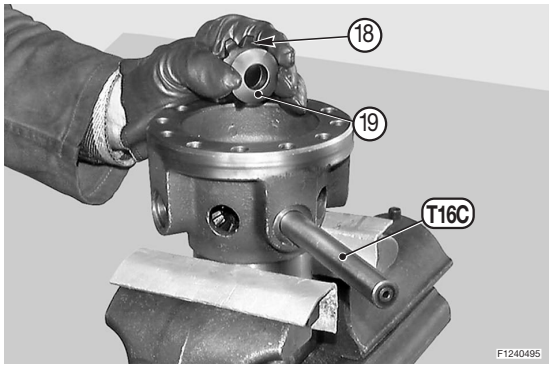


Assembly, adjusting and installation



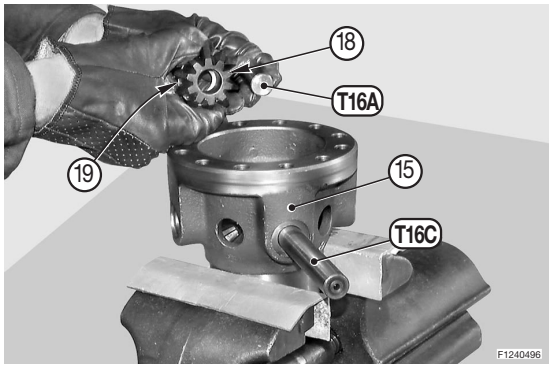
GB a

Insert the shim washer (13) and the planetary gear (14) in the differential carrier (15).



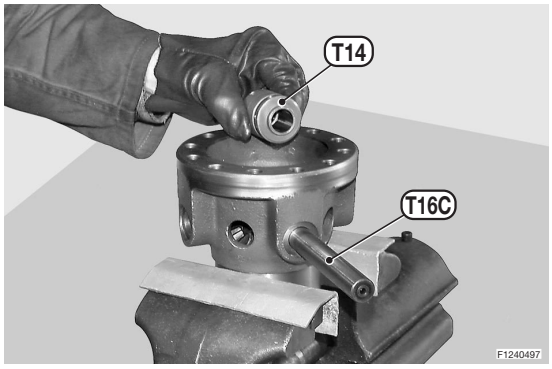
GB b

Position the shim washer (19) and the first planet wheel gear (18).
Hold them in position using bar T16C.



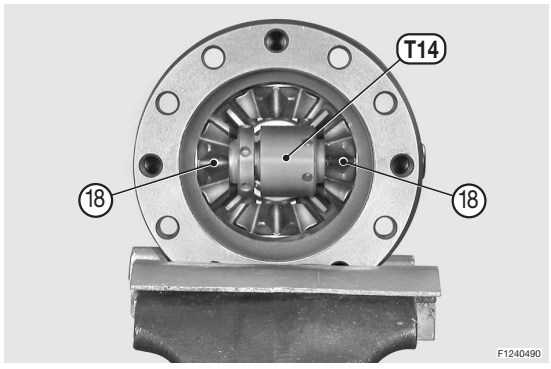
GB c

With the help of gudgeon T16A, position the second planet wheel gear (18) and the relative shim washer (19).



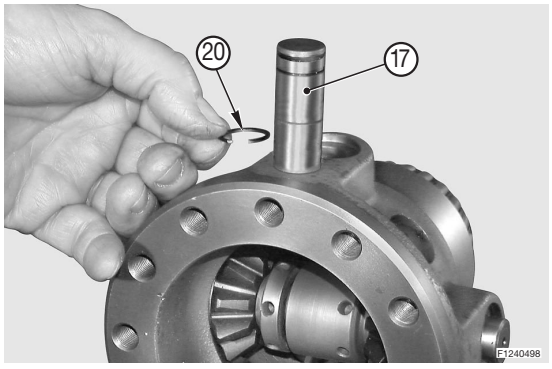
GB d

Insert tool T14 between the two planetary gears (18). Line up the entire unit by pushing bar T16C all the way down until gudgeon T16A is ejected.



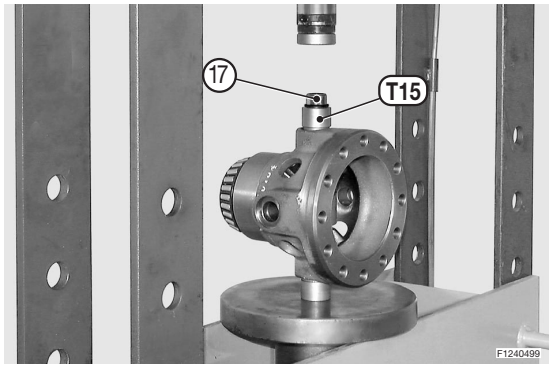
GB e

Lock tool T14 behind the planet wheel gears (18).
After locking, remove bar T16C.



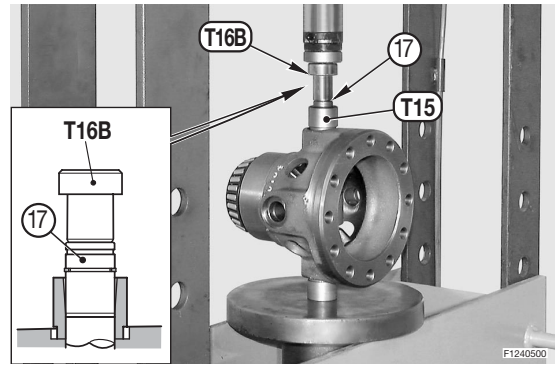
GB f

Fit the snap rings (20) onto the pins (17).



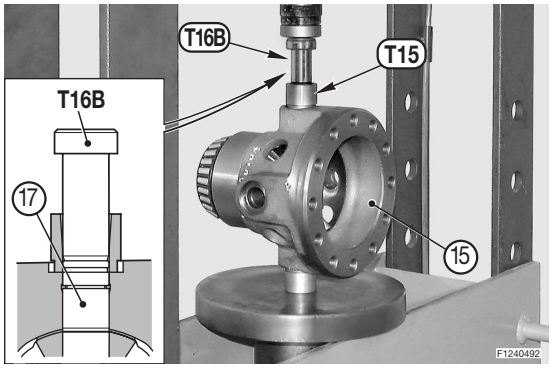
GB a

Place the differential carrier (15) under the press, position bush T15 and insert the planet wheel pin (17).



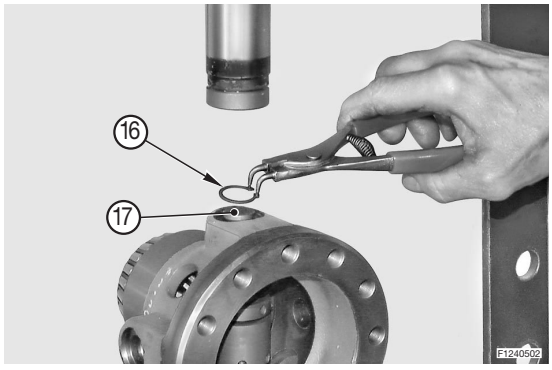
GB b

Put gudgeon T16B on top of the planet wheel pin (17).



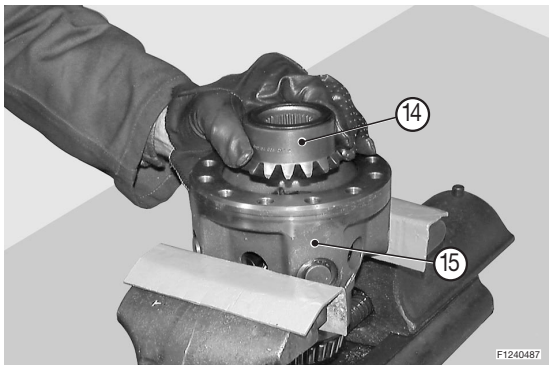
GB c

Press T16B pin all the way down.



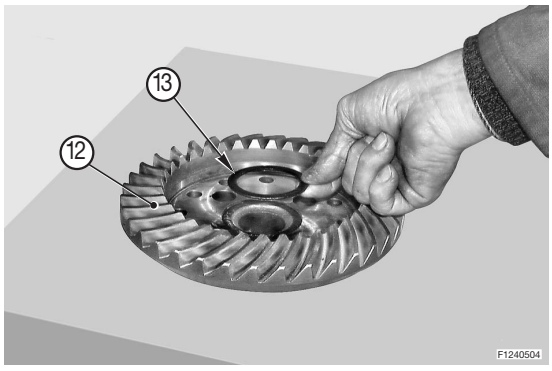
GB d

Remove gudgeon T16B, bush T15 and fit the snap ring (16) on the pin (17).
CAUTION! Make sure that the snap ring centres the seat and that it rests on the surface of the differential carrier. Repeat the operations on the other planet wheel pin or planet wheel axle.



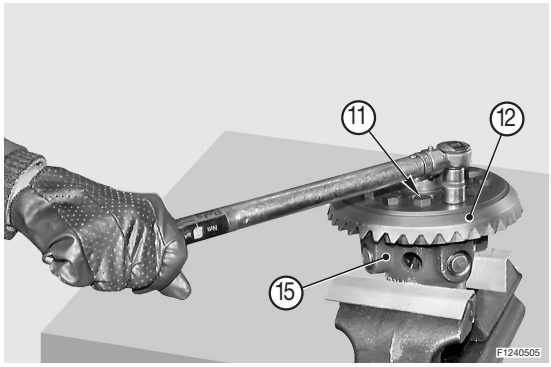
GB e

Position the second planetary gear (14) in the differential carrier (15).



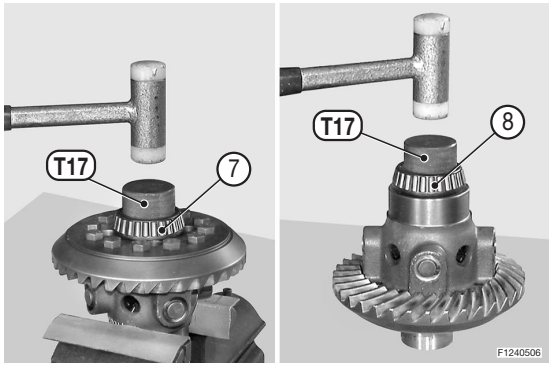
GB f

Position the shim washer (13) on the crown (12).
NOTE. In order to hold the shim washer (13) in position, apply grease to it.



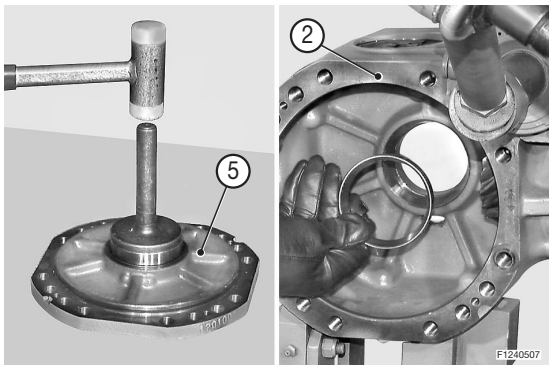
GB a

Position the crown (12) on the differential carrier (15) and lock it with screws (11) applied with Loctite 242.
Torque wrench setting for screws: 128÷142 Nm
NOTE. Secure the screws using the cross-tightening method.



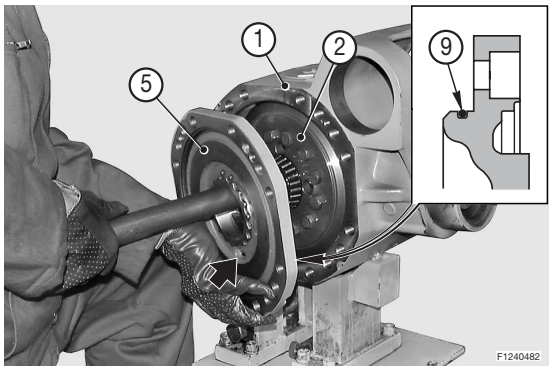
GB b

Install the bearings (7) and (8) using tool T17.



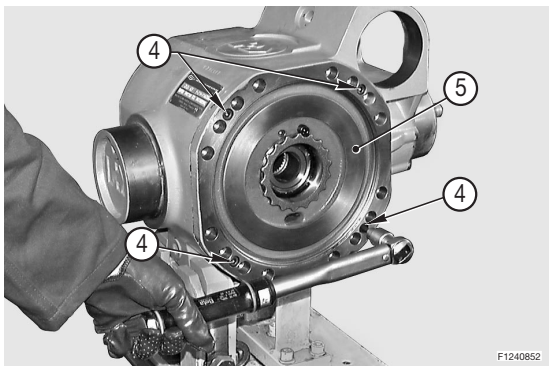
GB c

If the bearings are replaced, insert the external thrust blocks in the middle cover (5) and in the central body (2).



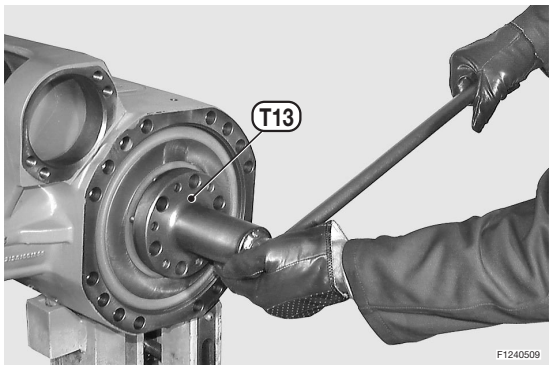
GB e

Position the differential unit (6) in the central body (2) with the help of a bar and fit the middle cover (5).
NOTE. Thoroughly check the state of the O-ring (9) and make sure that the cover is fitted with the oil discharge in the lower position.



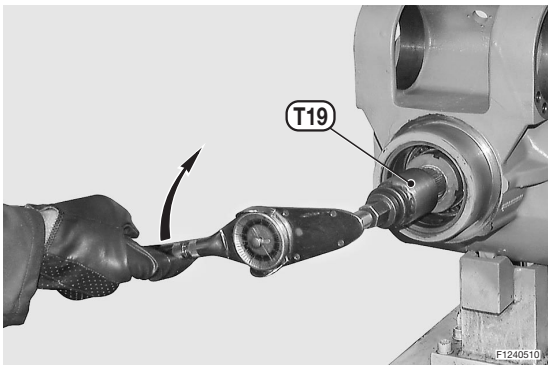
GB f

Lock the middle cover (5) with screws (4).
Torque wrench setting for screw: 23.8÷26.2 Nm



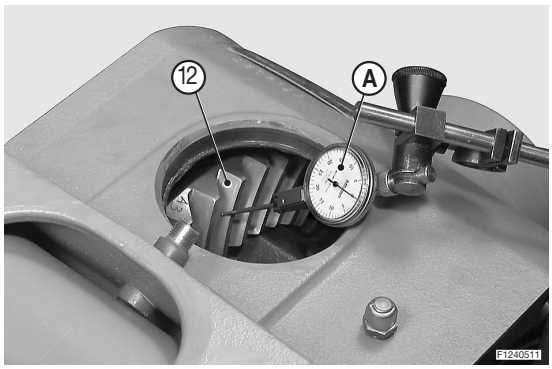
GB a

NOTE. If the ring nuts (1) are removed, spread them with Loctite 242.
Tighten ring nuts on the crown side until clearance between pinion and crown is zero, then lock the crown; go back 1/4÷1/2 turn.



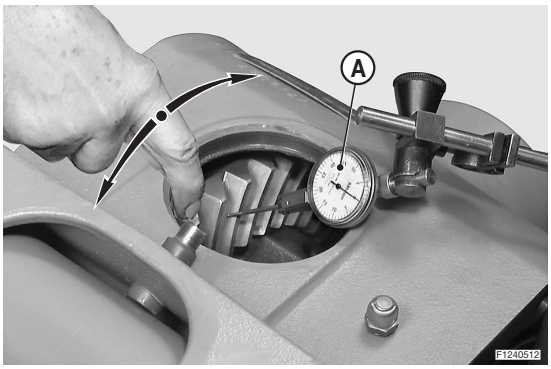
GB b

Pre-set the bearings by means of the ring nut situated on the opposite side of the crown, so as to increase pinion torque up to 140÷210 Ncm.
CAUTION! If bearings are not new, check the static torque; if bearings are new, check the continuous torque.



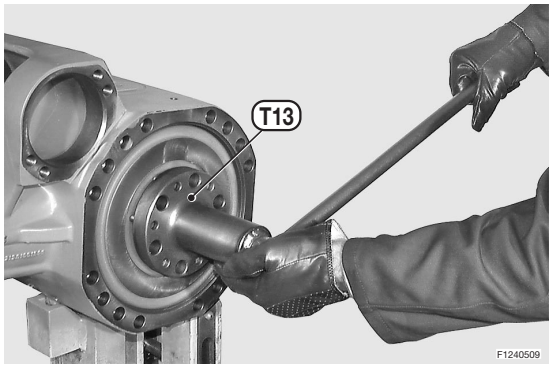
GB c

Introduce a comparator with rotary key “A” through the top plug hole (10). Position the comparator on the centre of one of the teeth of the crown (12), pre-set it to 1mm and reset it.



GB d

Manually move the crown (12) in both directions in order to check the existing backlash between the pinion and the crown.

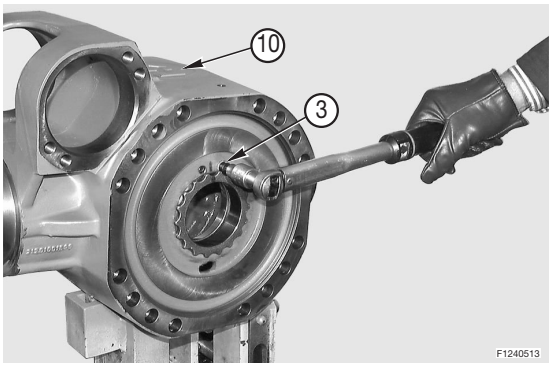


GB e

Adjust the backlash between the pinion and the crown by unloosing one of the ring nuts (1) and tightening the opposite to compensate.
Normal backlash: see table.

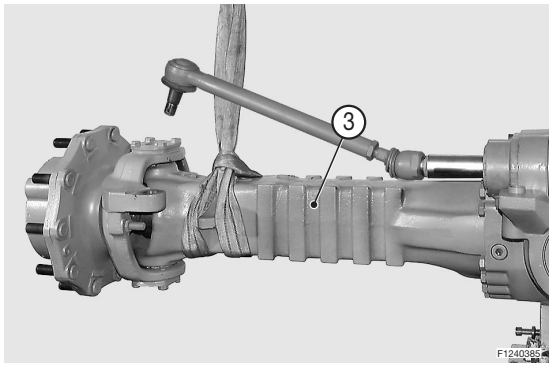
RATIO	CLEARANCE	
	MIN.	MAX.
9÷34	0,18	0,23
9÷35	0,13	0,18
11÷31	0,20	0,28
11÷35	0,13	0,18
12÷35	0,13	0,18
12÷41	0,15	0,20
14÷32	0,18	0,23
14÷36	0,15	0,20
14÷41	0,15	0,20
15÷32	0,18	0,23
15÷47	0,13	0,18

Difference between MIN and MAX clearance for whole circumference should not exceed 0,09 mm.



GB a

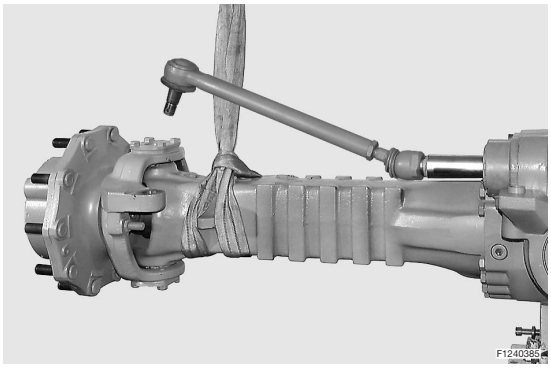
Apply Loctite 242 to the screws (3), fit them into one of the two holes and tighten.
Torque wrench setting: 23.8÷26.2 Nm
Fit the top plug (10) after applying repositionable jointing compound for seals to the rims.



GB b

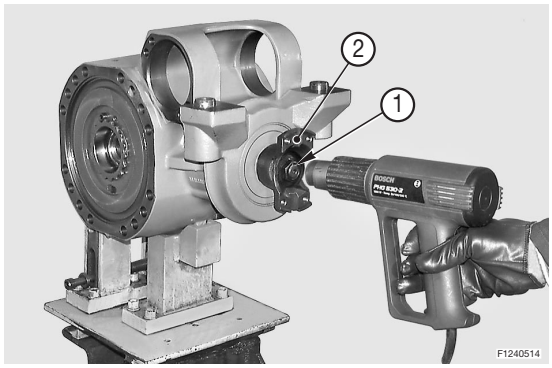
Re-install the complete arms.
For details, see "CHECKING WEAR AND REPLACING THE BRAKING DISKS".

BEVEL PINION - Removal



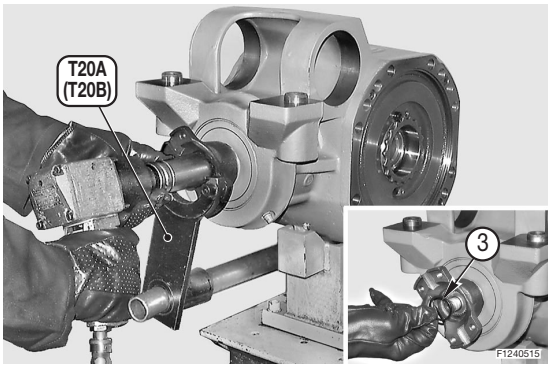
GB a

Remove the complete arms and the differential unit.
For details, see "CHECKING WEAR AND REPLACING THE BRAKING DISKS" and "REMOVING THE DIFFERENTIAL UNIT".



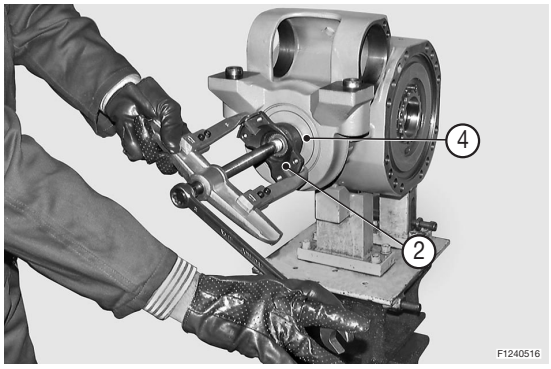
GB b

If disassembly is awkward, heat the check nut (1) of the flange (2) at 80°C.
NOTE. Heating is meant to unloose the setting of Loctite on the nut (1).



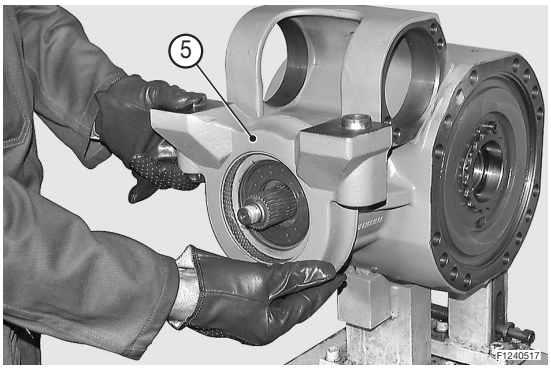
GB c

Position tool T20A (or T20B), so as to avoid pinion rotation.
Unloose and remove the nut (1); also remove the O-ring (3).



GB d

Remove the flange (2) complete with guard (4) by means of a puller.



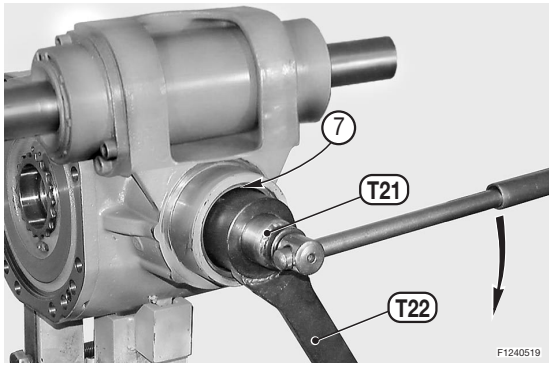
GB e

Remove the swinging support (5).



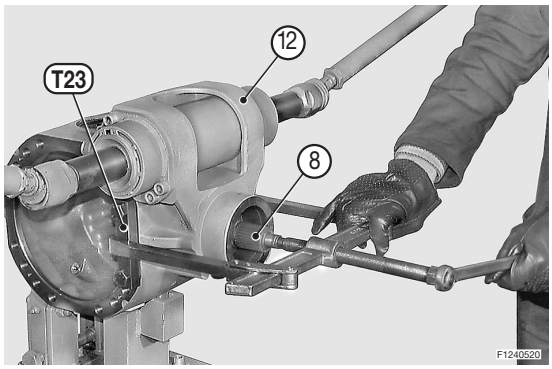
GB f

Remove the sealing ring (6).



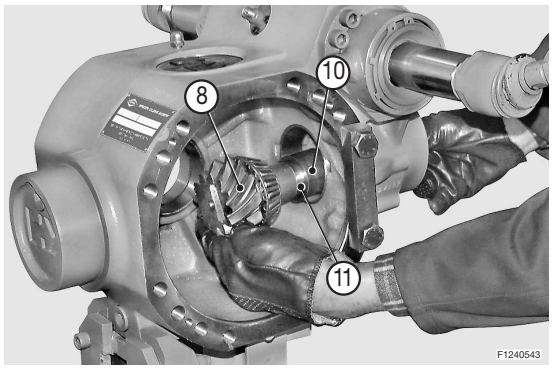
GB a

Position wrench T22 onto the ring nut (7) and apply bar hold T21 to the pinion (8). Stop wrench T22 and rotate the pinion so as to release and remove the ring nut (7).
NOTE. If disassembly proves awkward, weld the ring nut at approx. 80°C.



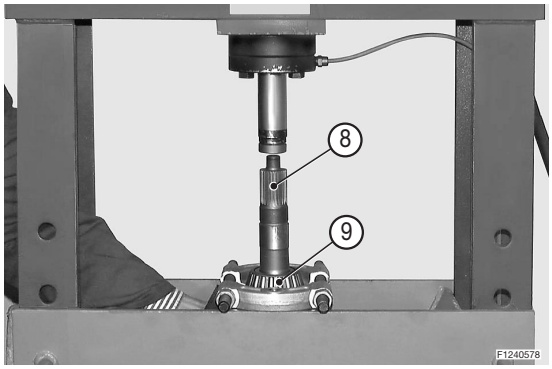
GB b

Apply blocks T23 and, with the help of a puller, extract the pinion (8) complete with the internal bearing (9), the distance piece (10) and shims (11).
NOTE. The thrust blocks of the bearings remain in the central body (12).



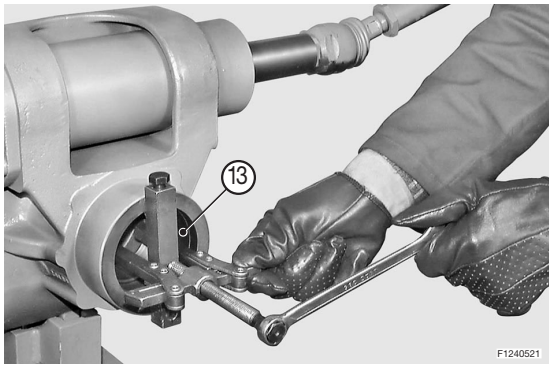
GB c

Remove the pinion (8), shims (11) and distance piece (10).



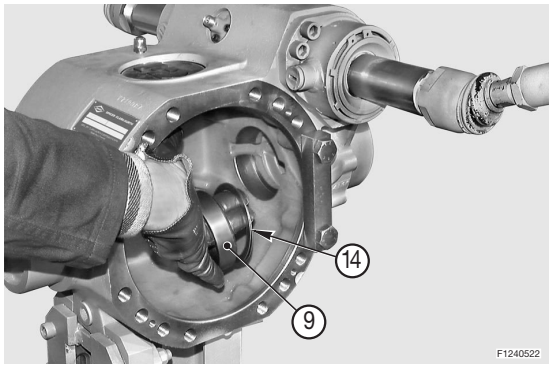
GB d

Using a puller and a press, remove the inner bearing (9) from the pinion (8).



GB e

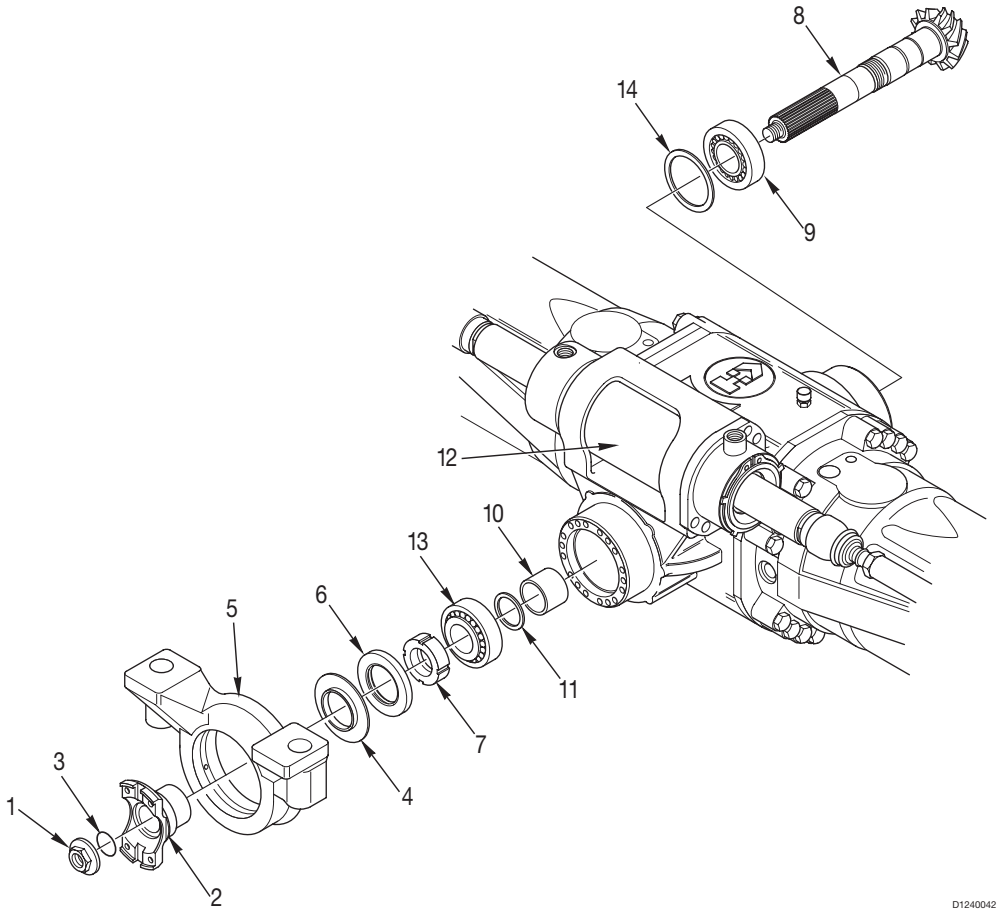
Remove the thrust block of the external bearing (13).



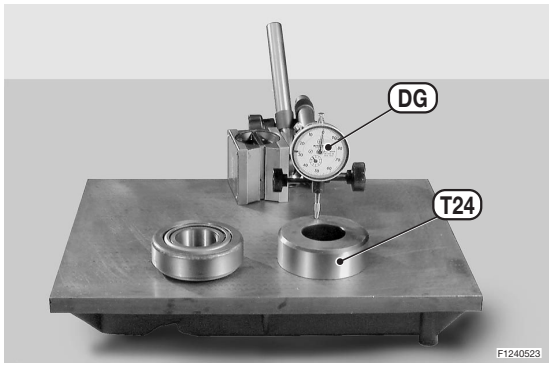
GB f

Insert a drift in the appropriate holes and remove the thrust block of the internal bearing (9) as well as the shim washers (14).

AXLE ASSEMBLY - DISASSEMBLY

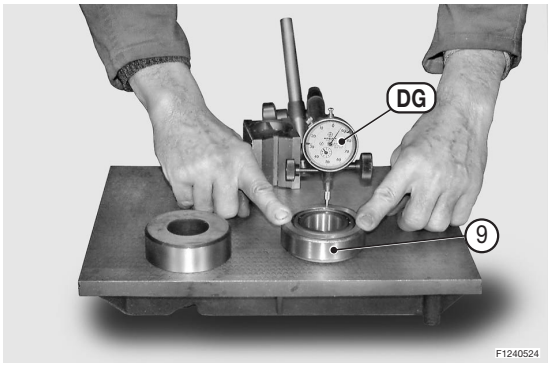


Adjusting and installation



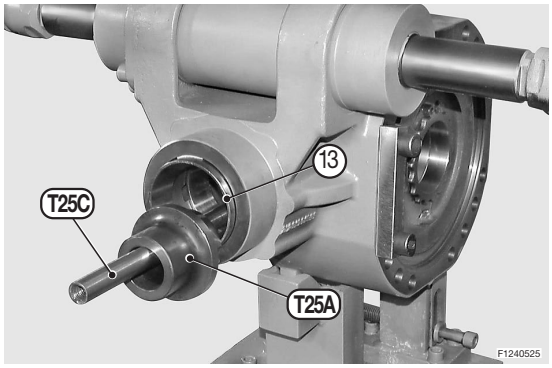
GB a

Using a surface plate, reset a centesimal comparator “DG” and place it on the measurement ring T24 (with a thickness of 30,2 mm).
Preset the comparator to approx. 2 mm.



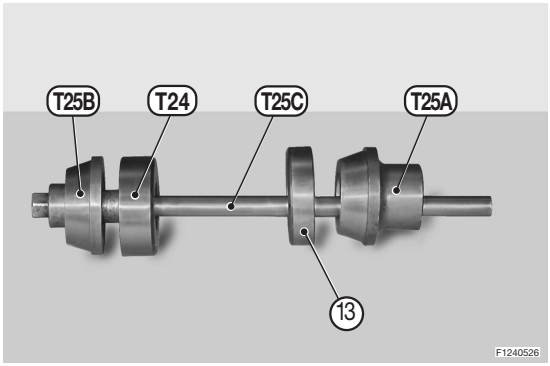
GB b

Bring the internal bearing (9), complete with its thrust block, under the comparator “DG”. Determine overall thickness “D” of the bearing checking the discrepancy between this size and the size of the measurement ring.
CAUTION! Press the thrust block in the centre and take several measurements while rotating the thrust block.



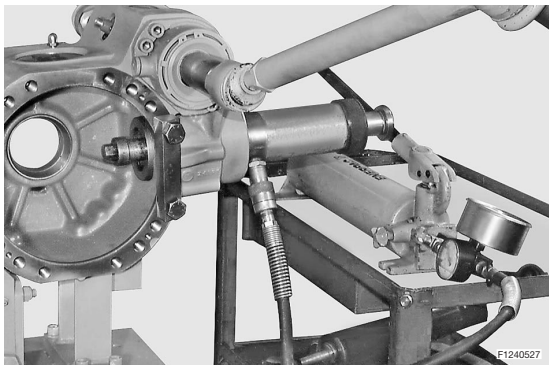
GB c

Partially insert the thrust block of the external bearing (13).



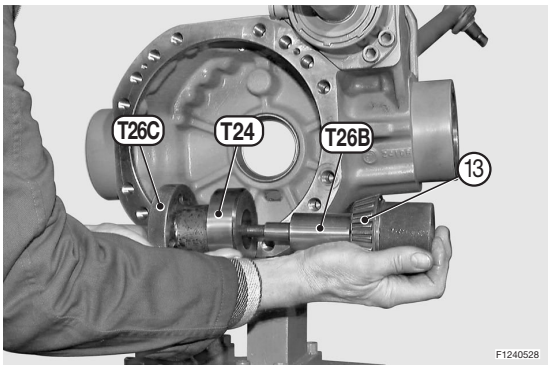
GB d

Install tension rod T25C, measurement ring T24 and front guide tool T25A on the thrust block of the external bearing (13).



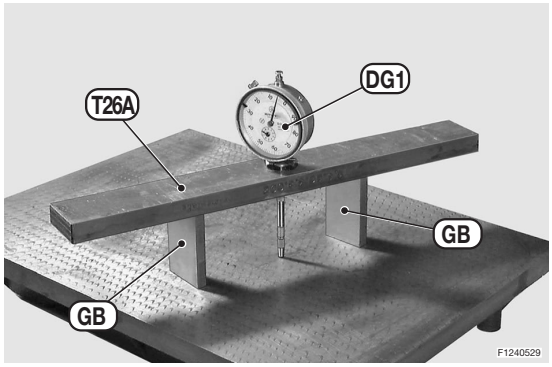
GB e

Connect the tension rod to the press and move the thrust block of the external bearing (13) into its seat. Disconnect the press and remove the tension rod.
NOTE. Before starting the next stage, make sure that the thrust block has been completely inserted into its seat.



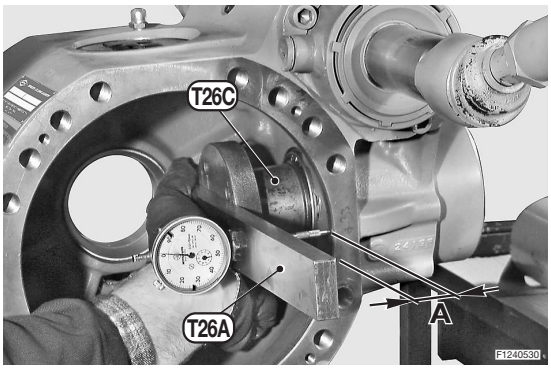
GB f

Insert tool T26B complete with external bearing (13), measurement ring T24 and gauged ring nut T26C.
Manually tighten.



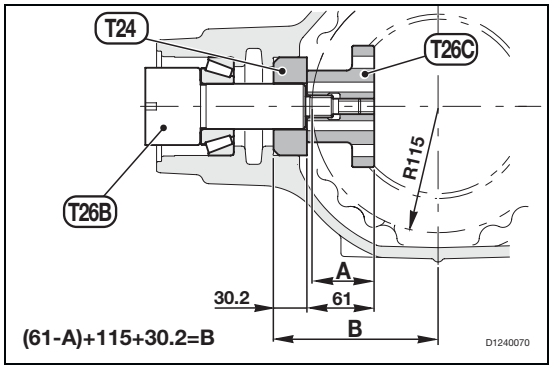
GB a

Fit a centesimal comparator “DG1” with long stem into bar T26A; when the bar rests on two size- blocks “GB” of 57 mm, reset the comparator.
Preset the comparator to approx. 2 mm and reset.



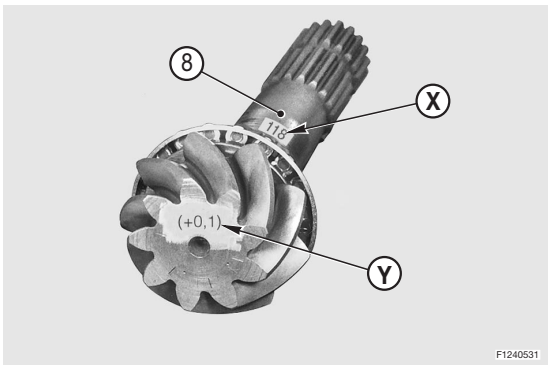
GB b

Lay bar T26A on gauged nut T26C and take the size “A” at about 57 mm corresponding to the maximum diameter of arms centring.



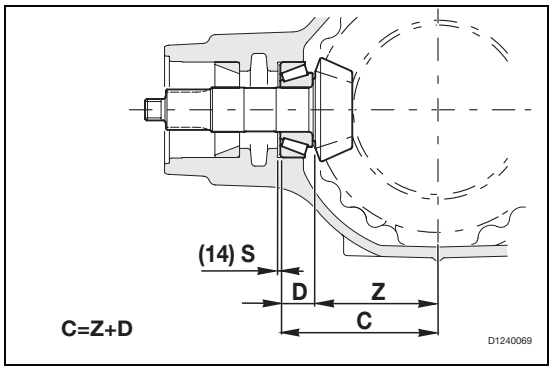
GB c

Calculate size “B” which will be the first useful value for calculating the size of the shims (14) that are to be inserted under the thrust block of the internal bearing (9).



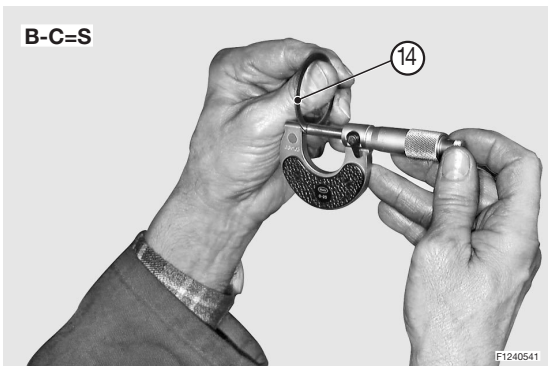
GB d

Check the nominal size (X) marked on the pinion and add or subtract the indicated variation (Y) so as to obtain size “Z”.
e.g.: Z= 118 + 0.1 = 118,1
Z= 118 ÷ 0,2 = 117,8



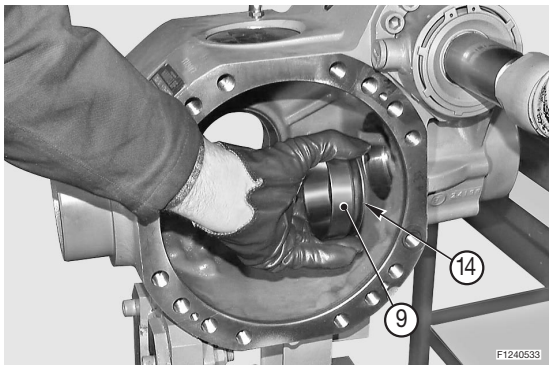
GB e

Calculate size “C” which represents the second value for calculating the size of the shims “S” that are to be placed under the thrust block of the internal bearing (9).



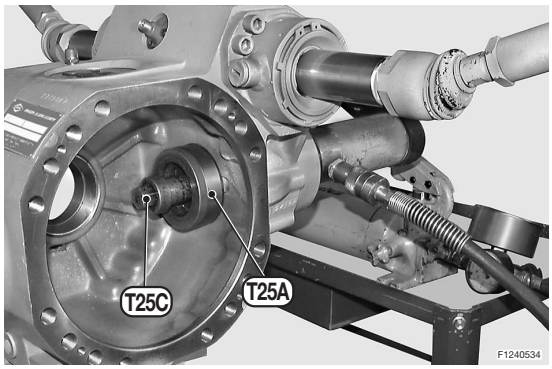
GB f

Calculate the difference between sizes “B” and “C” so as to obtain the size “S” of the shim (14) that will go under the thrust block of the internal bearing (9).



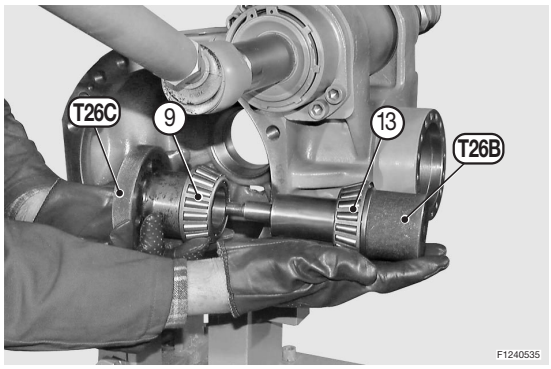
GB a

Insert shim “S” (14) and the thrust block of the internal bearing (9) in the central body.
NOTE. To hold shim “S” (14) in position, apply grease.



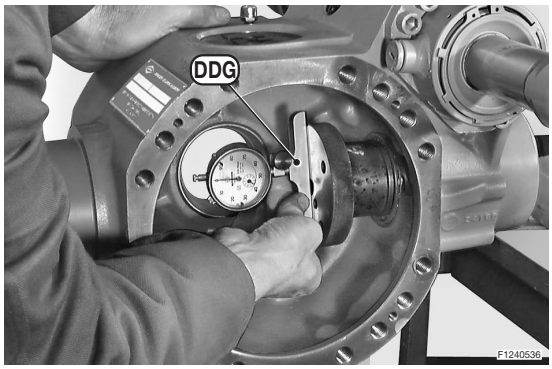
GB b

Position tool T25A and tension rod T25C.
Connect the tension rod to the press, fasten the thrust block and then remove the tools.
NOTE. Before going on to the next stage, make sure that the thrust block has been completely inserted.



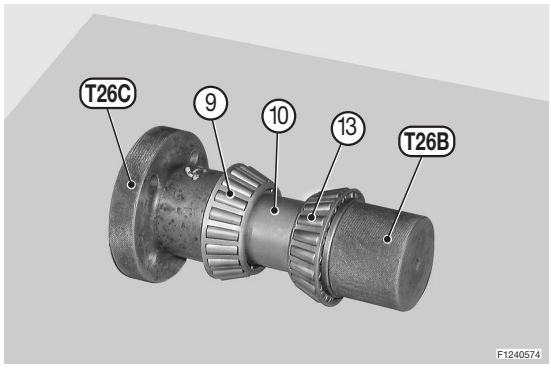
GB c

Position tools T26C and T26B complete with tapered bearings (9) and (13); manually tighten until a rolling torque has been obtained.



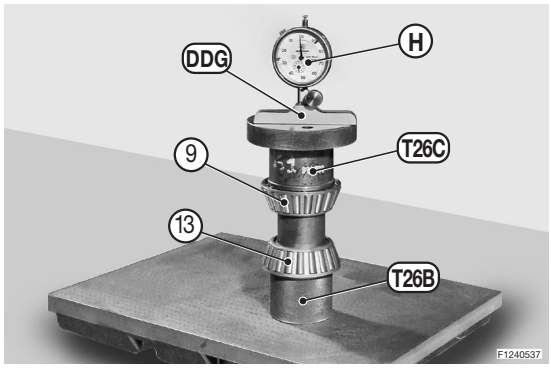
GB d

Insert the stem of a depth comparator “DDG” in either side hole of tool T26C; reset the comparator with a presetting of approx. 3 mm.



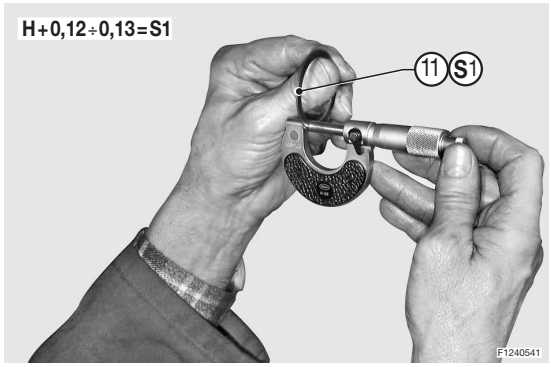
GB e

Remove the comparator and release tools and bearings from the central body.
Re-install all and insert the distance piece (10) between bearings (9) and (13); manually tighten the whole pack.



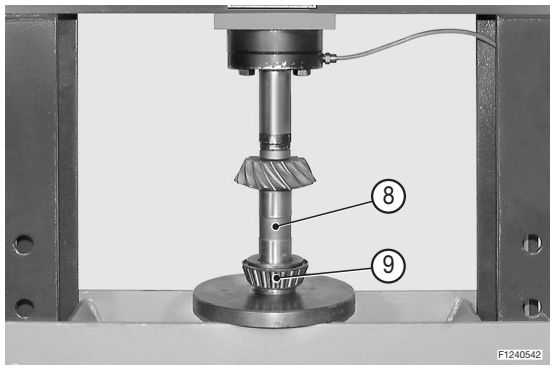
GB f

Insert depth comparator “DDG” into tool T26B-T26C and measure variation “H” in relation to the zero setting performed back at point.



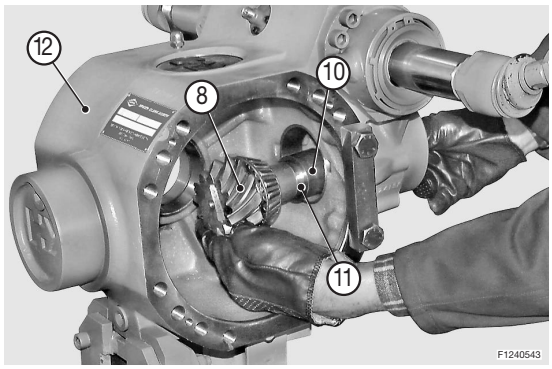
GB a

The variation is to be added to a set value of 0.12÷0.13 mm., so as to obtain the size of shim “S1” (11) which will be inserted between the external bearing (13) and the distance piece (10) and subsequently, to determine the preload for the bearings.



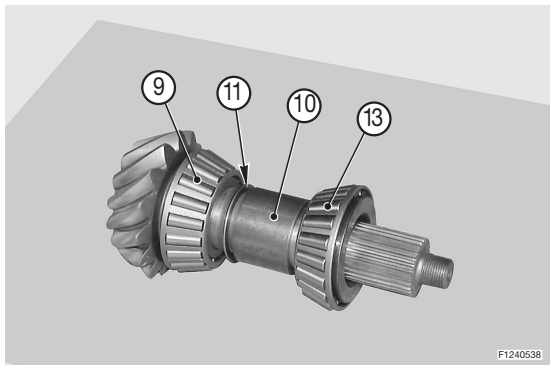
GB b

Position the internal bearing (9) and the pinion (8) under a press; force the bearing onto the pinion.



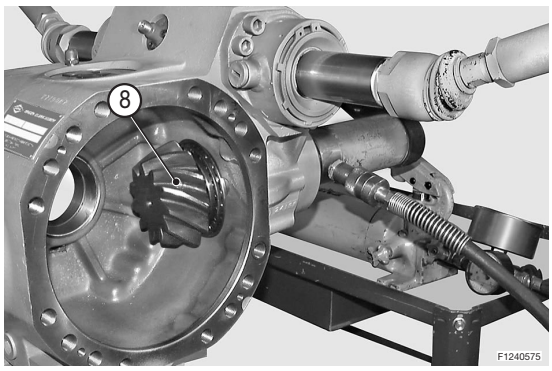
GB c

Fit the pinion (8), shim “S1” (11) and distance piece (10) in the main body (12).
NOTE. The finer shims must be placed in- between the thicker ones



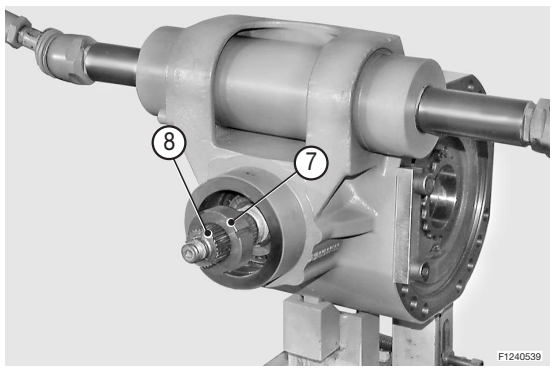
GB d

Insert the external bearing (13) in the central body in order to complete the pack arranged as in the figure.



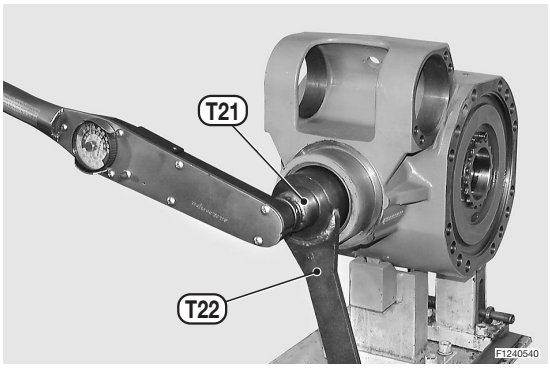
GB e

Connect the pinion (8) to the tie rod T28A and T28B; connect the tie rod T28C (see special tools) to the press and block.



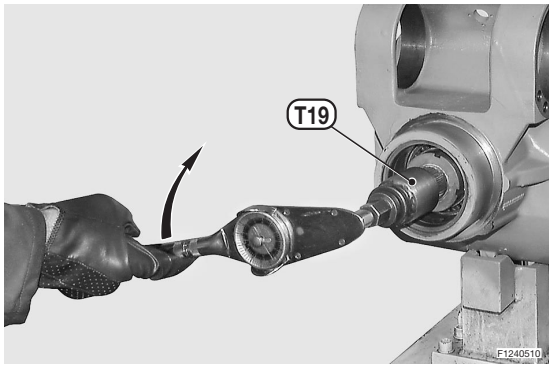
GB f

Apply Loctite 242 to the thread of the ring nut (7) and screw the nut onto the pinion (8).



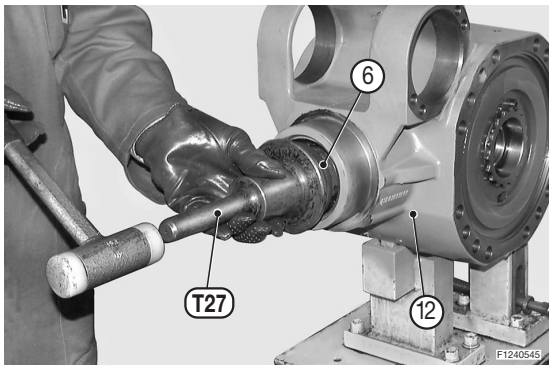
GB a

Apply special wrench T22 to the ring nut (7) and bar-hold T21 to the pinion (8).
Lock the wrench T22 and rotate the pinion using a dynamometric wrench, up to a minimum required torque setting of 500 Nm.



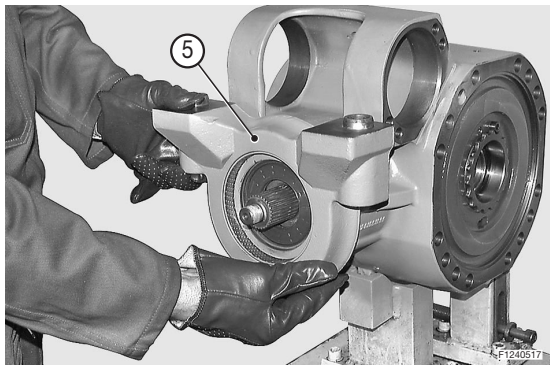
GB b

Apply onto the pinion (8) the bar-hold and with the help of a torque
metre, check the torque of the pinion (8).
Torque: 120÷170 Ncm
CAUTION! If torque exceeds the maximum value, then the size of shim “S1” (11) between the bearing (13) and the distance piece (10) needs to be increased.
If torque does not reach the set value, increase the torque setting of the ring nut (7) in different stages to obtain a maximum value of 570 Nm.
CAUTION! If torque does not reach the minimum value, then the size of shim “S1” (11) needs to be reduced.
CAUTION! When calculating the increase or decrease in size of shim “S1”, bear in mind that a variation of shim (11) of 0.01 mm corresponds to a variation of 60 Ncm in the torque of the pinion (8).



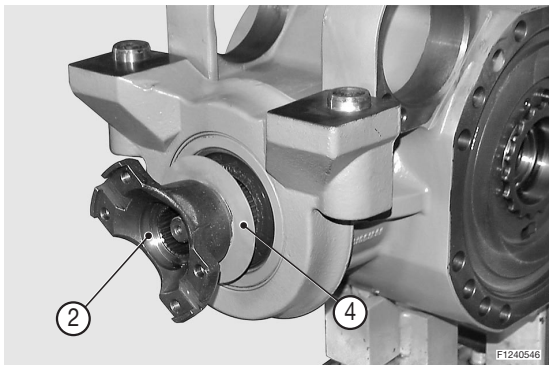
GB a

Lubricate the outer surface of the new sealing ring (6) and fit it onto the central body (12) using tool T27.



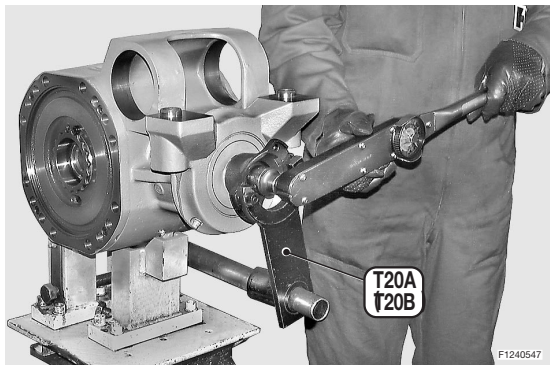
GB b

Install the swinging support (5).
NOTE. Check that it is properly oriented.



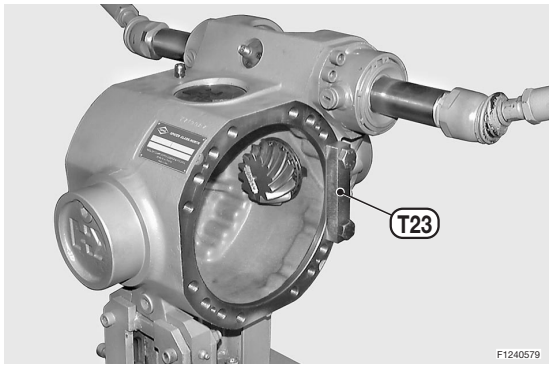
GB c

Fit the flange (2) complete with the guard (4) and fasten it.
For keying the flange (2), use a plastic hammer if necessary.
NOTE. Make sure that the guard (4) is securely fastened onto the flange and that it is not deformed.



GB d

Apply Loctite 242 to the threaded part of the pinion (8).
Position tool T20A (or T20B) and fasten it in order to avoid rotation.
Insert O-ring (3) the nut (1) and tighten it using a dynamometric wrench.
Torque wrench setting: 280÷310 Nm

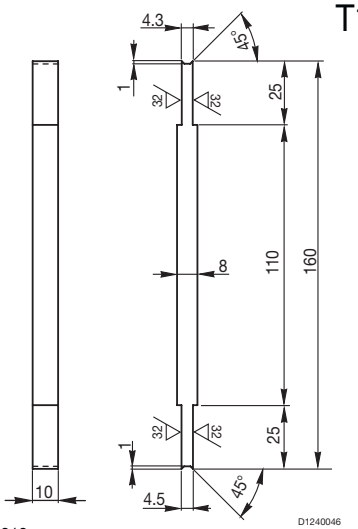


GB e

Remove blocks T23 (used for extracting the pinion) and re-install the arms.
For details, see "CHECKING WEAR AND REPLACING THE BRAKING DISKS".

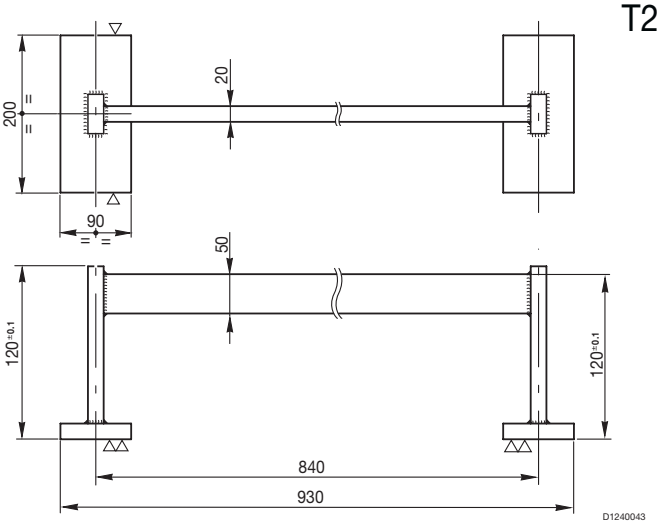
SPECIAL TOOLS

T1



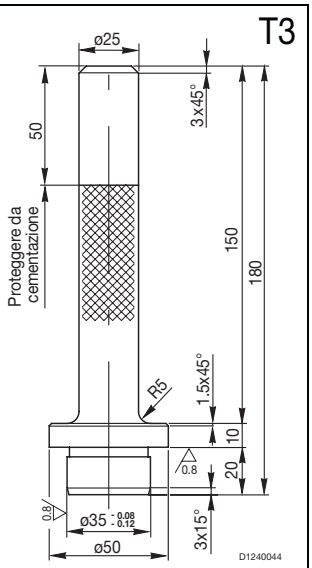
2313

T2



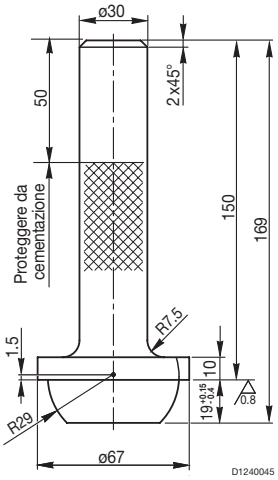
2305

T3



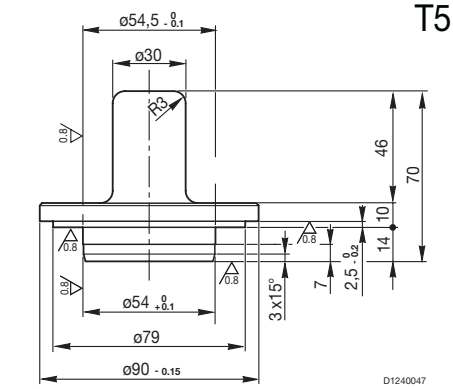
3364

T4



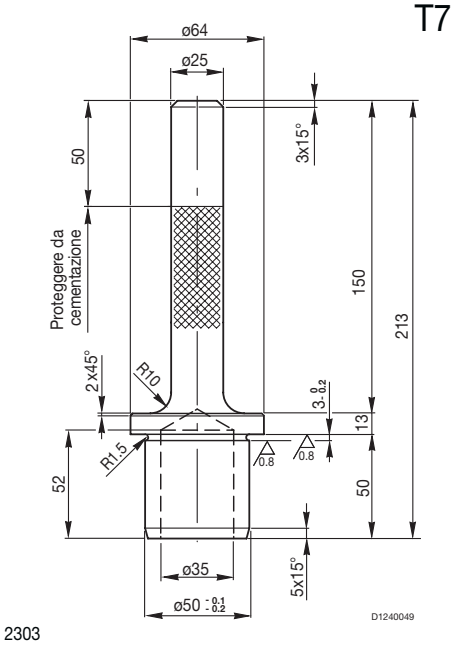
2302

T5



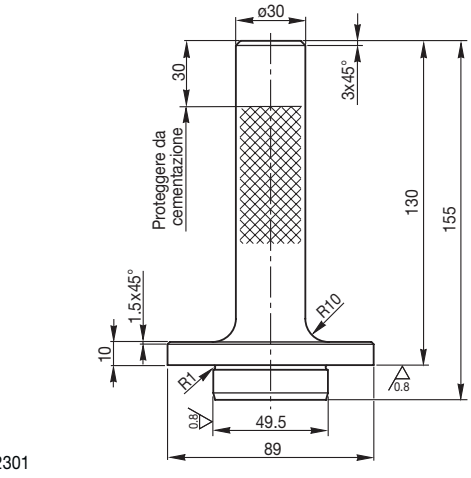
3342

T7

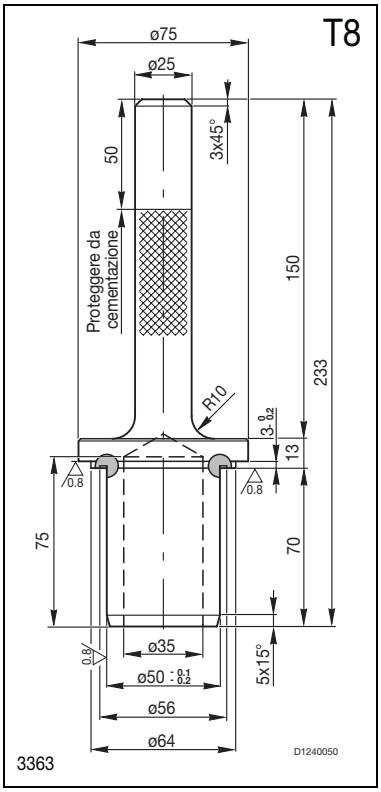


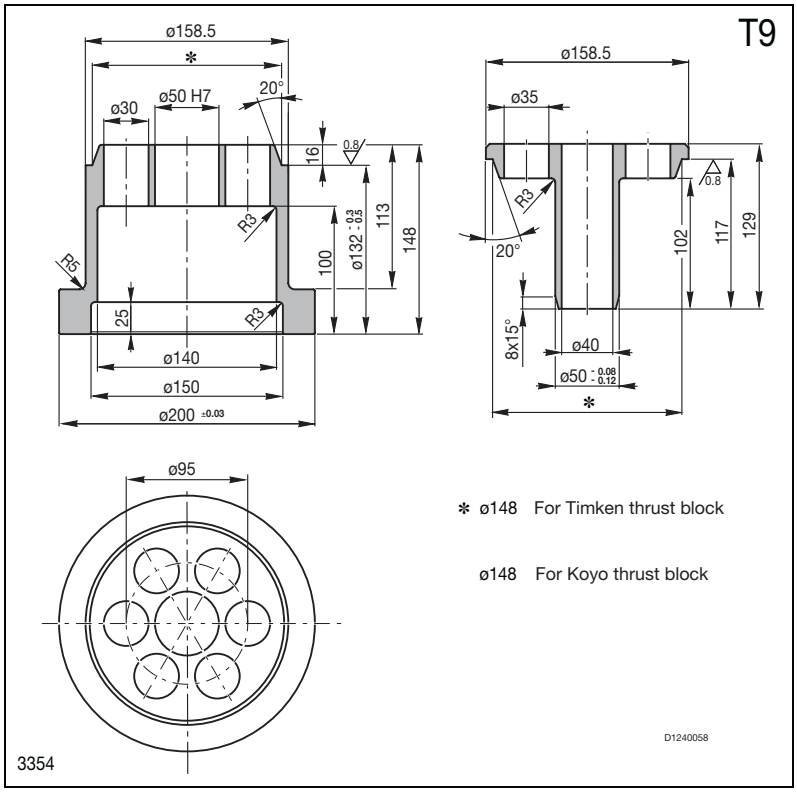
2303

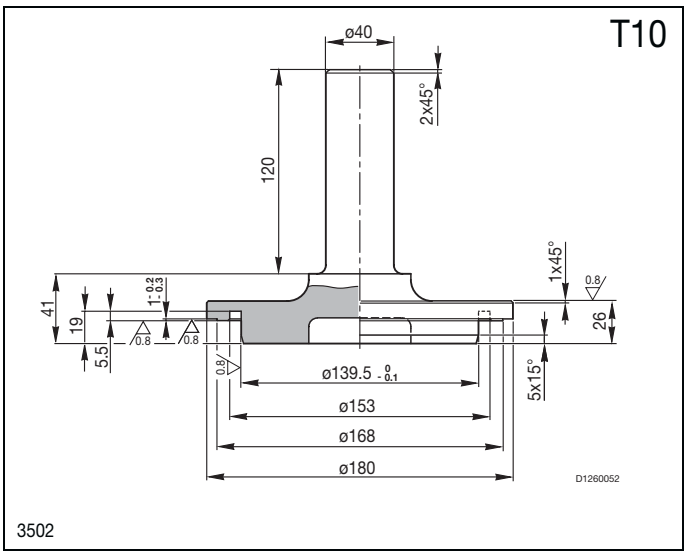
T6

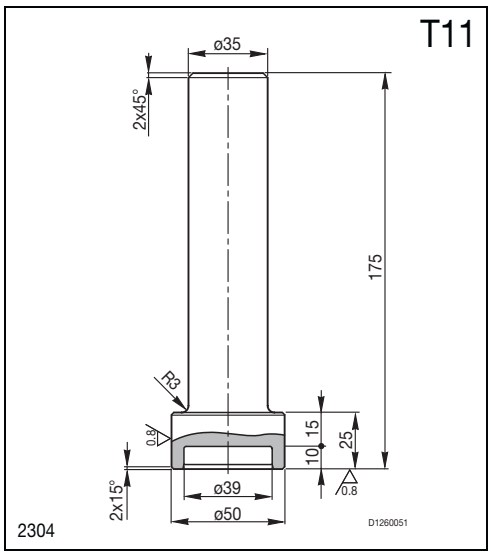


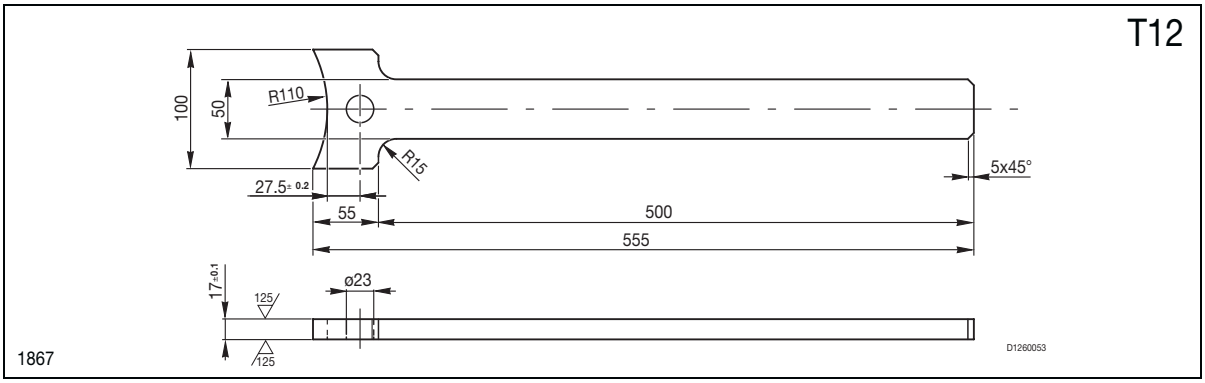
2301


T8
ø75
ø25
50
3x45°
Proteggere da cementazione
150
233
R10
3 +0.2 0
13
70
75
0.8
ø35
ø50 +0.1 +0.2
ø56
ø64
5x15°
D1240050
3363

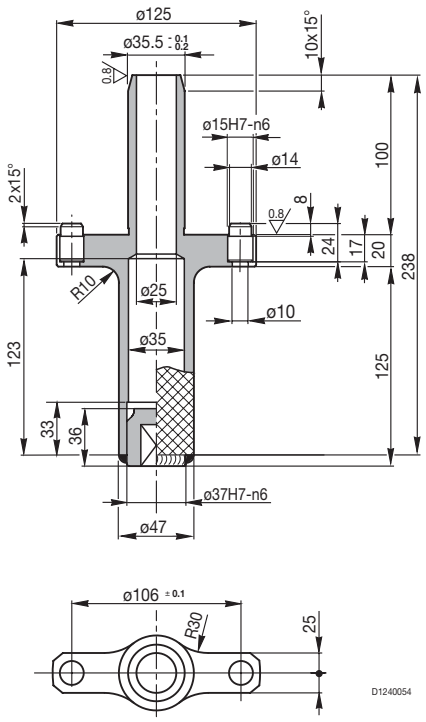

T9
ø158.5
*
ø30
ø50 H7
20°
16
0.8
R3
R5
100
ø132 +0.3 +0.5
113
148
25
ø140
ø150
ø200 ±0.03
ø95
ø158.5
ø35
R3
20°
0.8
102
117
129
8x15°
ø40
ø50 +0.08 +0.12
* ø148 For Timken thrust block
ø148 For Koyo thrust block
D1240058
3354


T10
ø40
2x45°
120
1x45°
0.8
41
19
1 +0.2 +0.3
0.8
5.5
26
5x15°
ø139.5 +0 -0.1
ø153
ø168
ø180
D1260052
3502


T11
ø35
2x45°
175
R3
0.8
10
15
25
2x15°
ø39
ø50
0.8
D1260051
2304

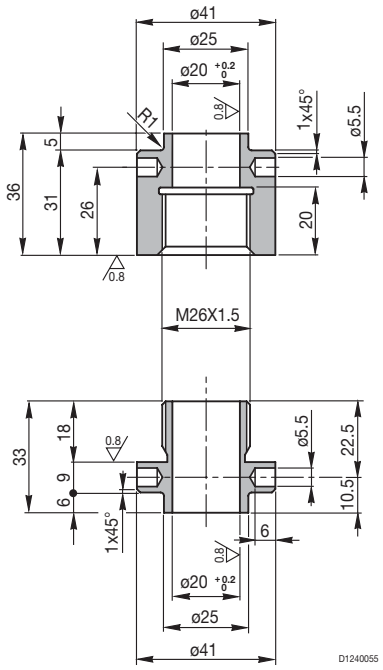

T12
100
50
R110
R15
5x45°
27.5 ± 0.2
55
500
555
17 ±0.1
ø23
125
125
D1260053
1867

T13



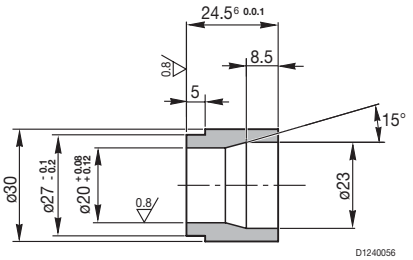
3333

T14



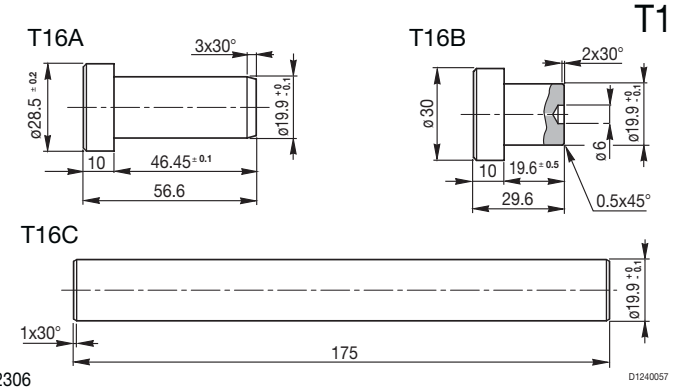
3708

T15



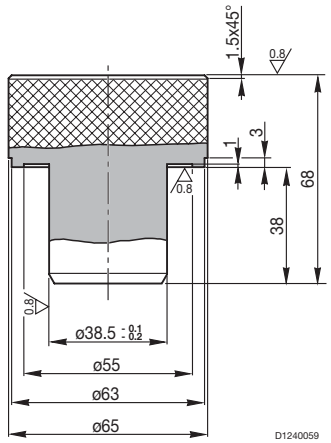
3424

T16



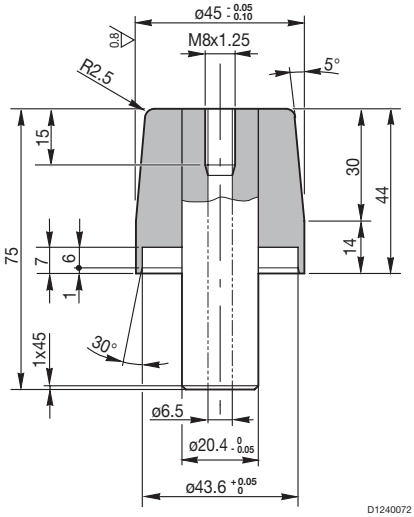
2306

T17



3332

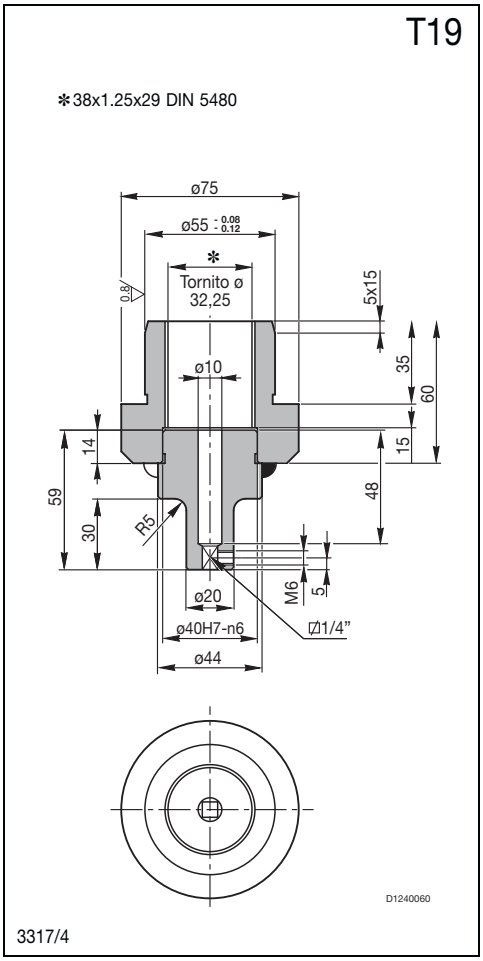
T18



2724

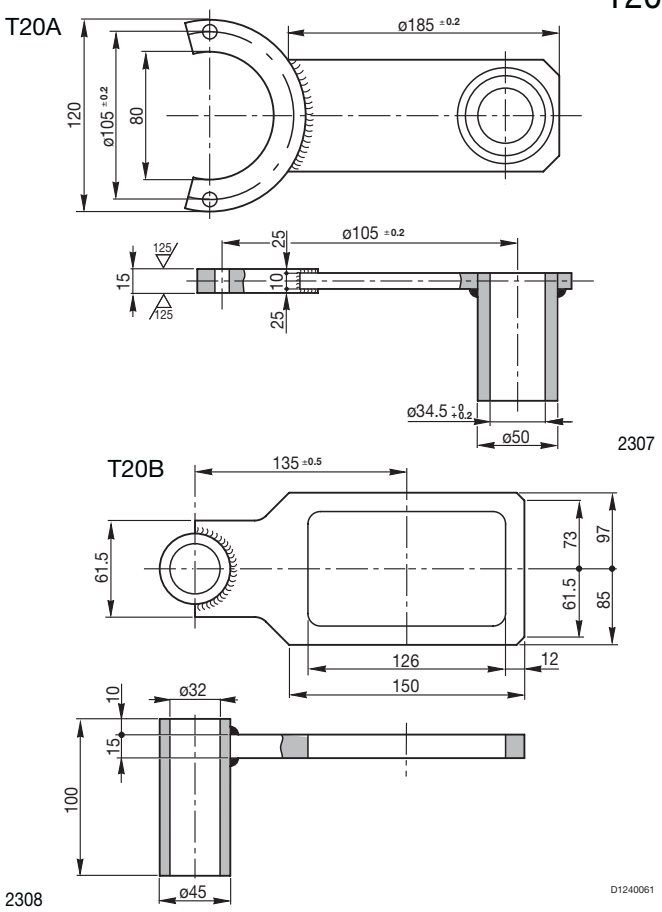
AXLE ASSEMBLY - DISASSEMBLY

T19



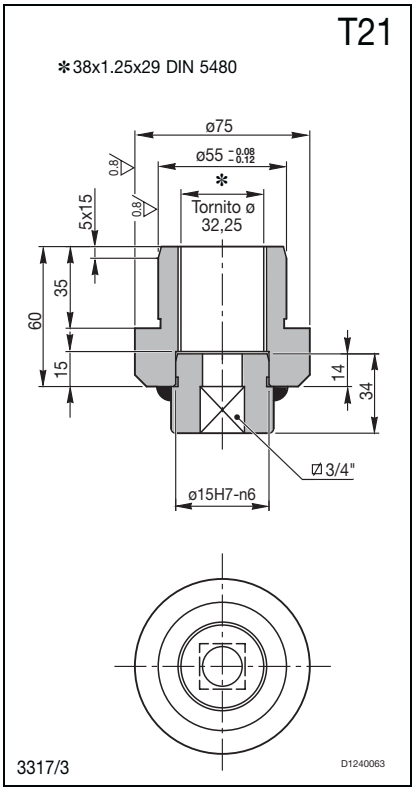
3317/4

T20



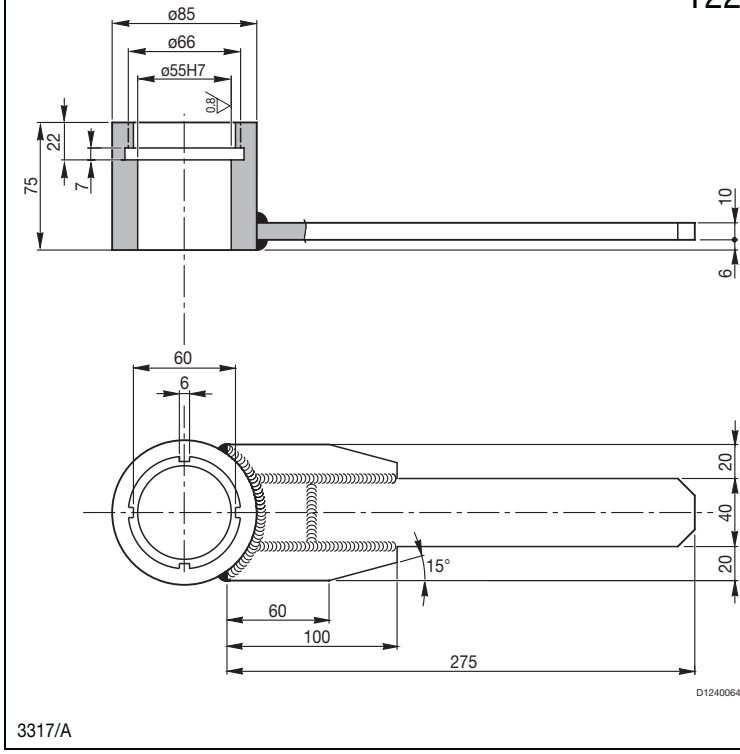
2308

T21



3317/3

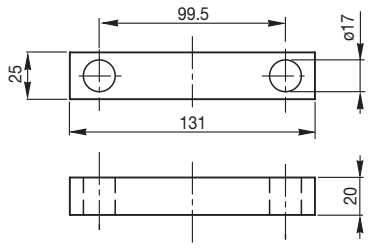
T22



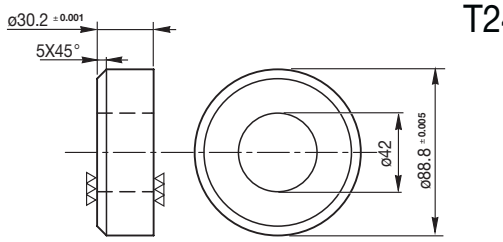
3317/A

AXLE ASSEMBLY - DISASSEMBLY

T23

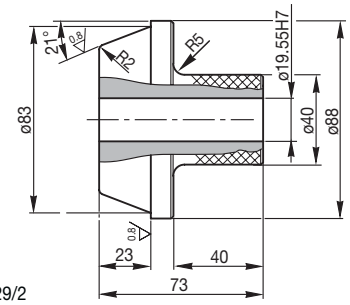


T24

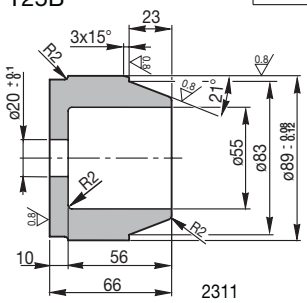


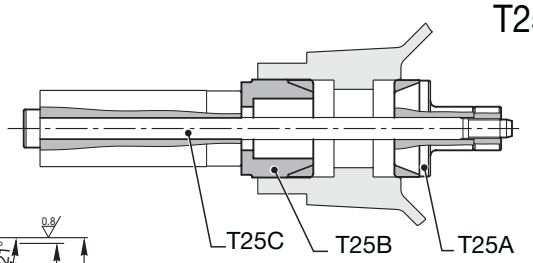
T25

T25A

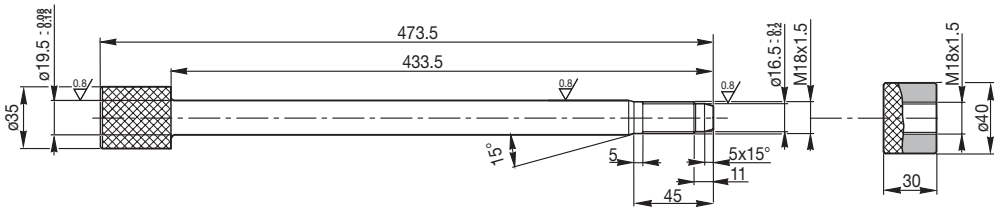


T25B



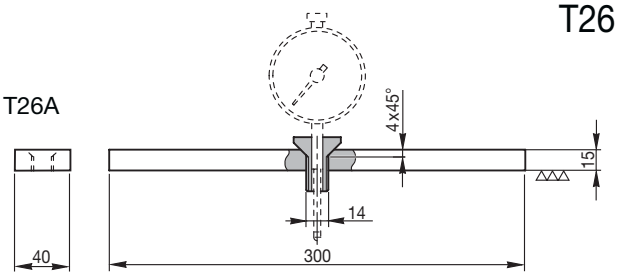


T25C

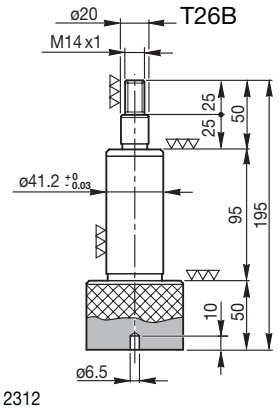


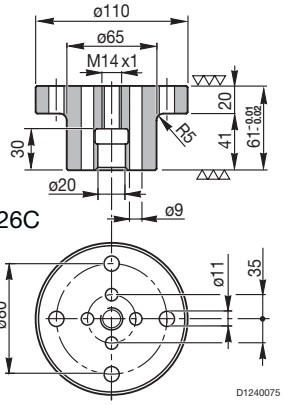
T26

T26A



T26B

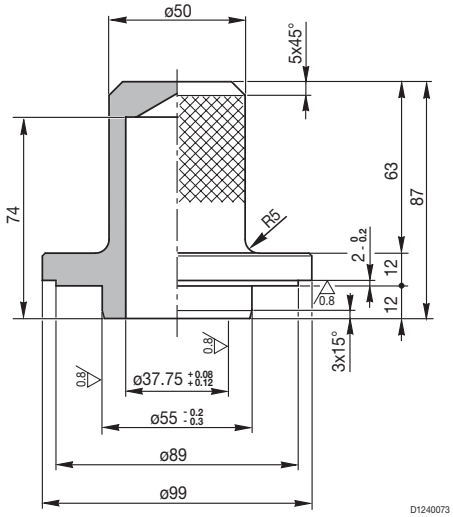




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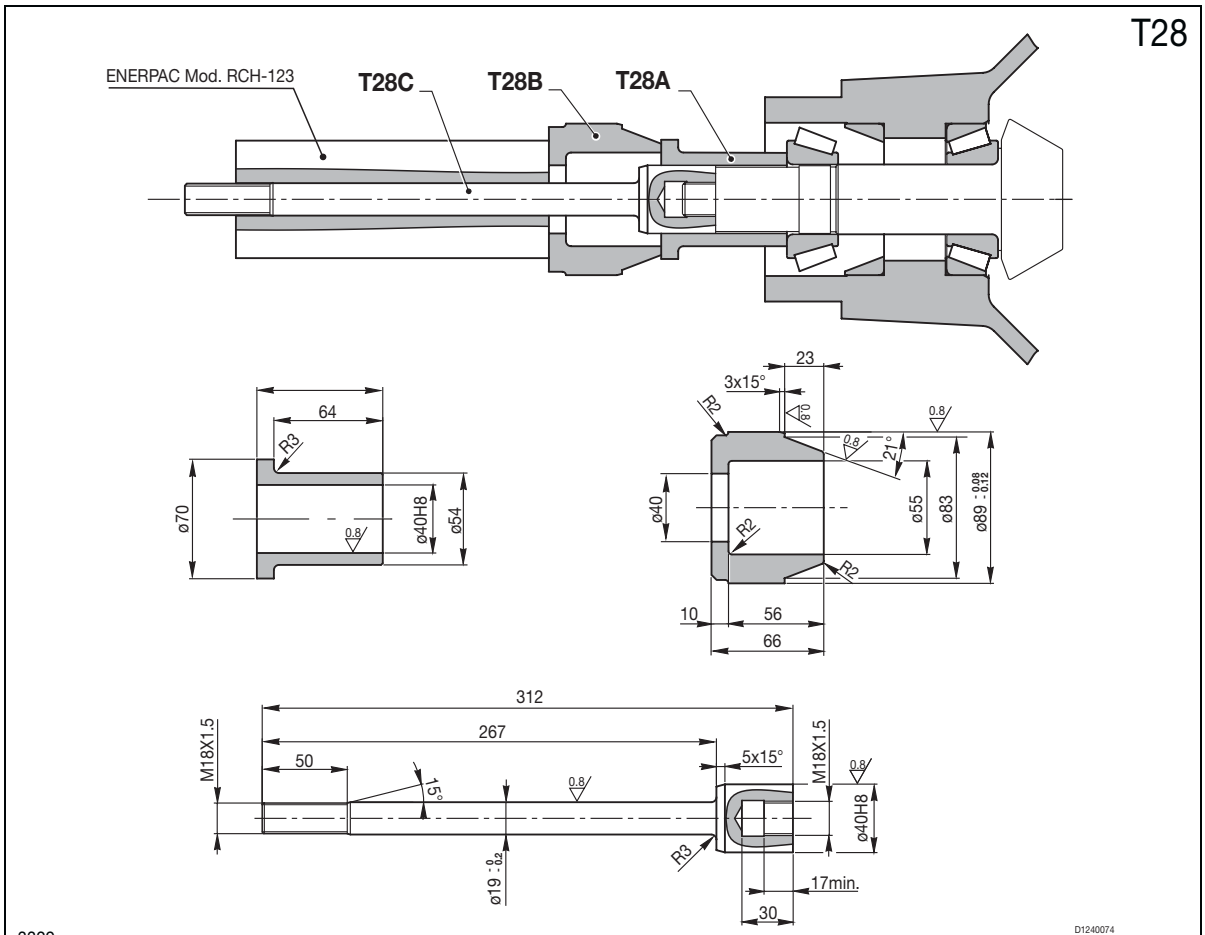
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T27



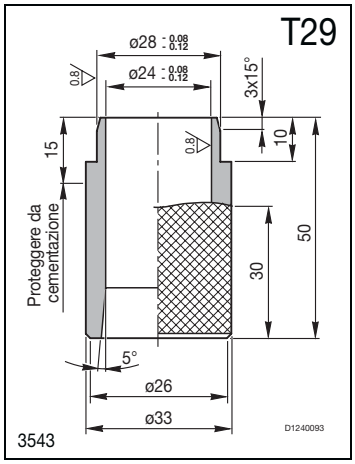
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T28



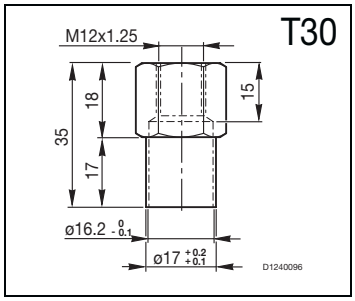
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T29

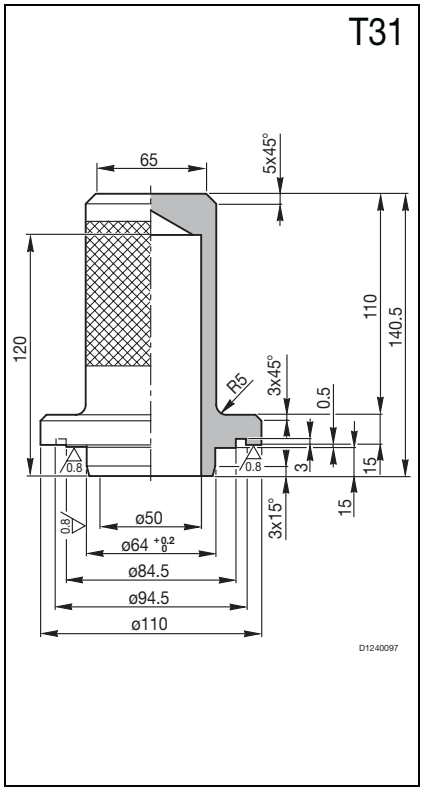


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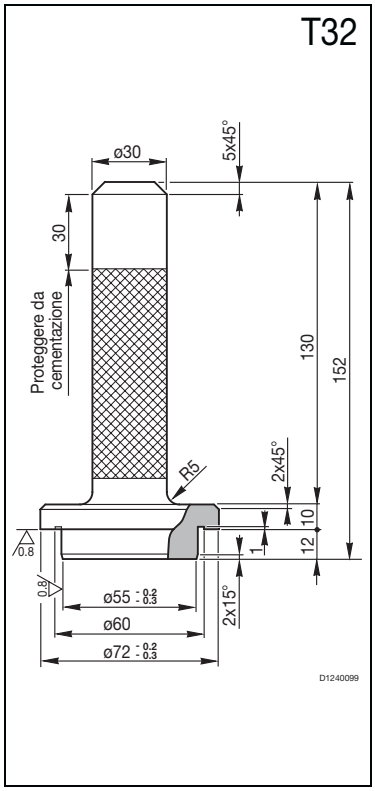
T30



T31



T32



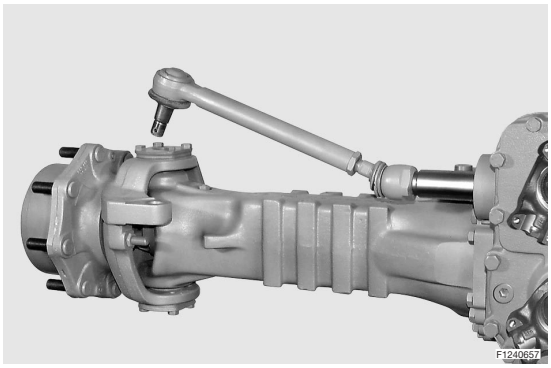
TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Insufficient braking	1. Incorrect adjustment	Inspect disc thickness and if discs are usable readjust brakes to the specifications in the vehicle's manual.
	2. Brake discs worn out	Inspect disc thickness and replace if necessary.
	3. Incorrect brake fluid	Replace all seals in axle and master cylinder that have made contact with the incorrect fluid and all brake hoses. If incorrect fluid leaked into axle oil, seals and o-rings in axle must be replaced.
	4. Loss of brake fluid	Inspect for and repair any leaks in outside circuit or master cylinder. If caused by incorrect brake fluid see correction N. 3. If leak is to the outside replace the o-rings between the center and intermediate housings. If leak is to the inside replace above o-rings and brake piston o-rings.
	5. Overheated axle causing brake fluid to vaporize. (Brake return when axle cools)	See "overheating" problem.
Soft brake pedal	6. Air in brake circuit	Bleed brakes as described in the vehicle's service manual.
Ineffective safety brake	7. Incorrect adjustment	See correction N. 1.
	8. Brake disc worn out	See correction N. 2.
Overheating	9. Oil level wrong	Drain, flush and refill oil to proper level.
	10. Too small of a brake gap	Readjust brakes to the specifications in the vehicle's service manual.
	11. Park brake dragging	Unlock the brake and adjust the correct gap.
	12. Incorrect brake fluid in system	See correction N. 3.
	13. No free-pedal at master cylinder	Readjust brake pedal as described in the vehicle's service manual.
	14. Restriction in brake lines	Inspect for and replace damage lines.
	15. Restriction in return line of brake Servo system	Inspect for and replace damaged return line. Inspect for and remove any filter, tee'd in line or any other source of back pressure from the return line.
	16. Incorrect lubricant	Change the retaining rings of the brake circuit and brake pump.

PROBLEM	CAUSE	CORRECTION
Diff-lock inoperative	17. If manual control, loose or misadjusted linkage	Inspect and correct linkage and readjust as indicated in vehicle's service manual.
	18. If hydraulic control, problems in the hydraulic or electrical circuits of the vehicle	Refer to the servi ce manual for the vehicle.
	19. If hydraulic control: problems in actuating cylinder (noteable through loss of hydraulic oil or increase of the oillevel in axle)	Rebuilt cylinder.
	20. If with lim. slip differential, worn discs	Replace discs.
Oil coming out of breather	21. Leak in internal brake system	See correction N. 2 and 3.
	22. Leak in diff-lock actuating cylinder	See correction N. 19.
NoSpin indexing noise when driving straight **CAUTION! With NoSpin, fatigue damage can occur on the side with the larger tire.**	23. Unequal tire pressure left anal right	Inflate tires to the recommended pressure in the service manual, or until the rolling radius is equal.
	24. Different style, size or brand of tires between left and right hand side	Change tires to make the rolling radius equal. Vary the tire pressure within the specifications until the rolling radius is equal.
Noise during coast and under power the same	25. Wheel bearings damaged	Replace and adjust.
Noise under power greater than during coast	26. Low oil level	Refill oil to proper level.
	27. Incorrect lubricant	See correction N. 16.
	28. Ring and pinion worn	Controllare attraverso il coperchio superiore. Sostituire la coppia conica.
	29. Worn ring and pinion bearings	Inspect through top cover. Replace and adjust.
	30. Worn planetary gears or bearings	Replace.
Noise during coast greater than under power	31. Loose pinion nut	Inspect ring, pinion and pinion bearings. If undamaged, retighten nut.
	32. Only pinion bearing damaged	See correction N. 29.
Noise during turn (without NoSpin)	33. Worn spider and/or side gears	Replace.
A "Stick slip" noise when going from forward to reverse	34. Worn or damaged cardanshaft	Inspect and replace as described in vehicle's service manual.

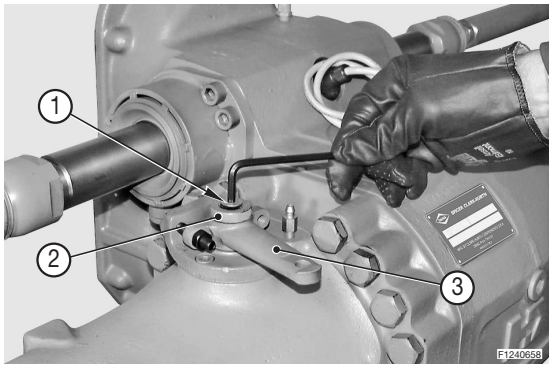
PROBLEM	CAUSE	CORRECTION
A "Stick slip" noise when going from forward to reverse	35. Loose wheel	Inspect for wheel and wheel stud damage. Replace if needed and retorque lugnuts.
	36. Articulation box joint and achsel shaft damaged	Inspect and replace.
	37. Spider pins loose in diff-carrier	Inspect through top cover. Replace.
	38. Damaged or missing spider and/or side gear washers	See correction N. 33.

OPTIONALS - HOW TO DISASSEMBLE THE MECHANIC PARKING BRAKE UNIT



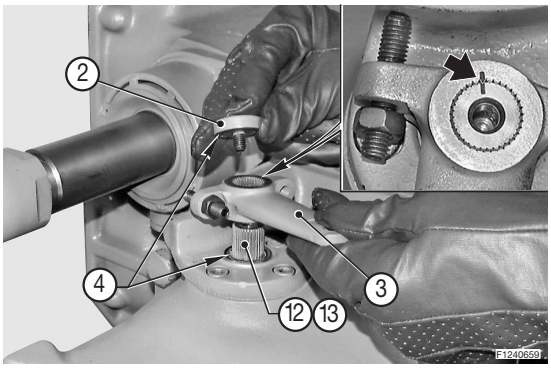
GB a

NOTE. The same disassembly procedure applies to both arms and may only be carried out when levers (3) are released.
Disconnect the tension bar from the steering case. For details, see "HOW TO REMOVE THE STEERING CYLINDER".



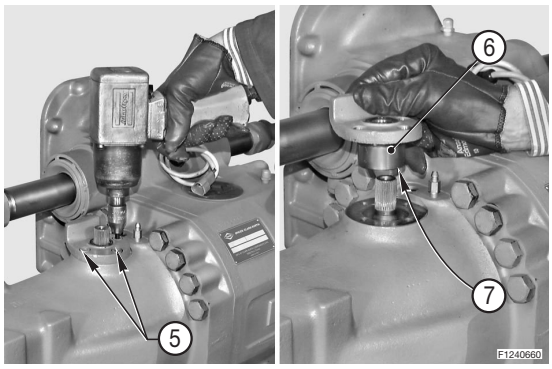
GB b

Draw out the screw (1) locking the washer (2) that stops the lever (3).



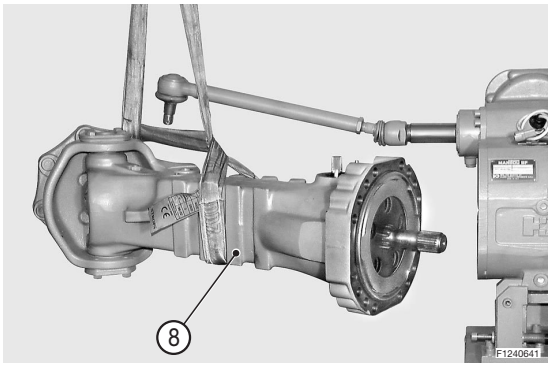
GB c

Remove washer (2), lever (3) and O-rings (4).
Mark the positions of levers (3) in relation to the thrust levers (12) and (13).



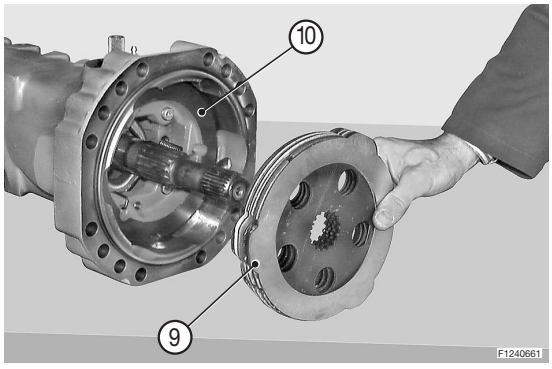
GB d

Draw out the screws (5) and remove bush (6) along with O-ring (7).



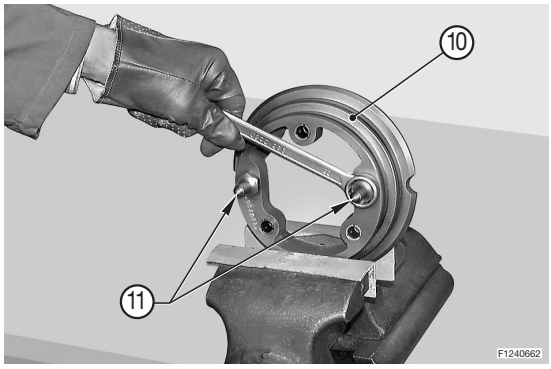
GB e

Connect the whole arm (8) to the hoist and put the rod under light tension.
Remove the whole arm; for details, see "CHECKING AND REPLACING THE BRAKING DISKS"



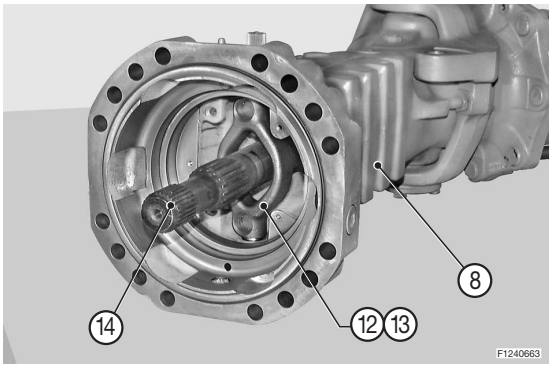
GB f

Remove the braking disks (9) and the whole piston (10).
For details, see "CHECKING AND REPLACING THE BRAKING DISKS".



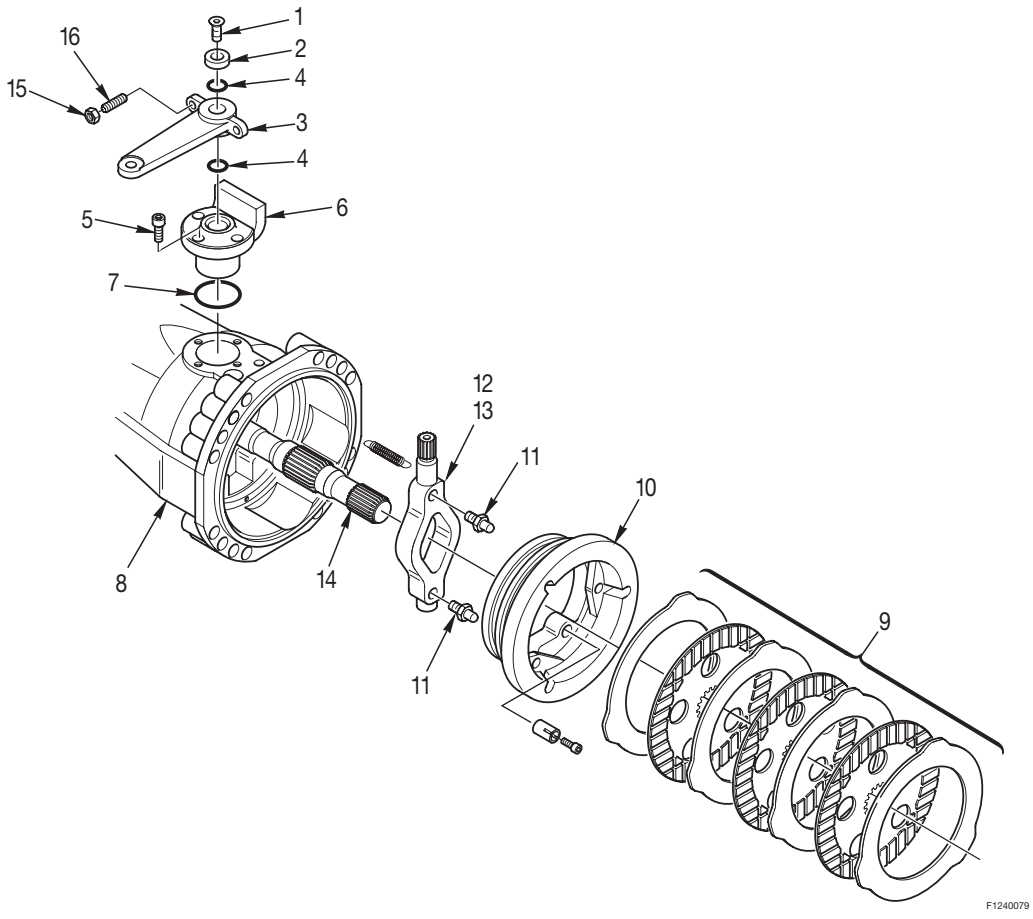
GB a

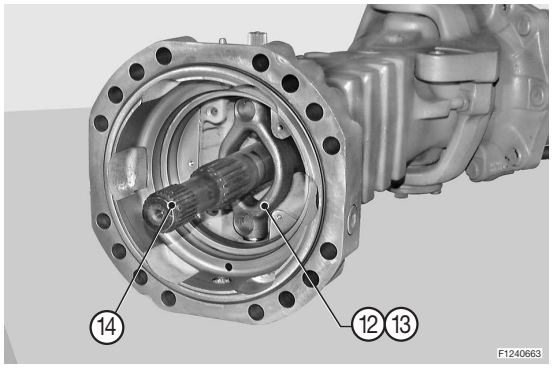
If pins (11) need replacing, block the piston (10) into a vice whose
jaws are covered in smooth material and remove the pins.



GB b

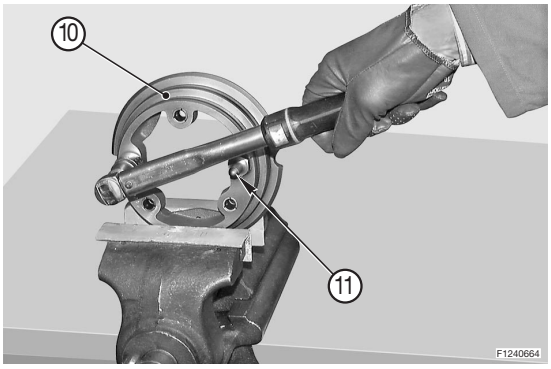
If thrust levers (12) and (13) need replacing, remove the U-joint (14)
before removing the arms (8).
For details, see "HOW TO REMOVE THE U-JOINT".





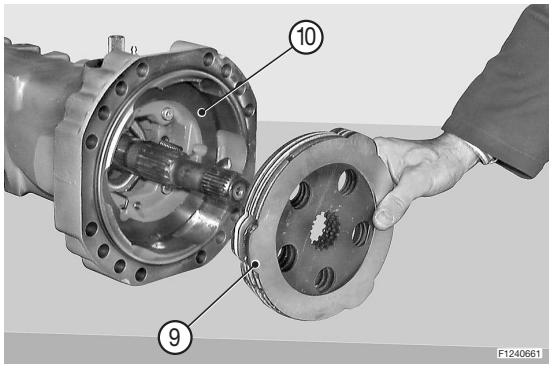
GB a

Install thrust levers (12) and (13), then install the U-joint (14). For details, see "HOW TO INSTALL THE U-JOINT".



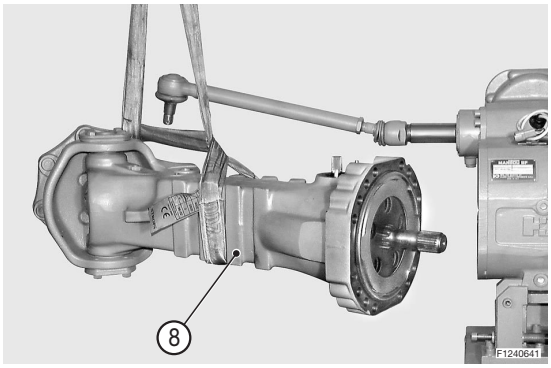
GB b

Apply Loctite 270 to the threaded portion of the pins (11) and fit them onto the piston (10).
Block them: torque wrench setting 30 ÷ 35 Nm.



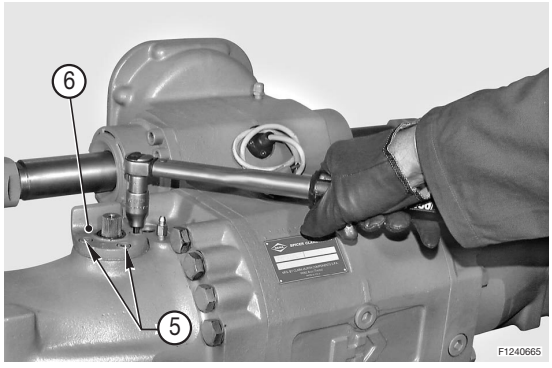
GB c

Re-install the piston (10) and the braking disks (9). For details, see "HOW TO ASSEMBLE THE BRAKING UNITS".



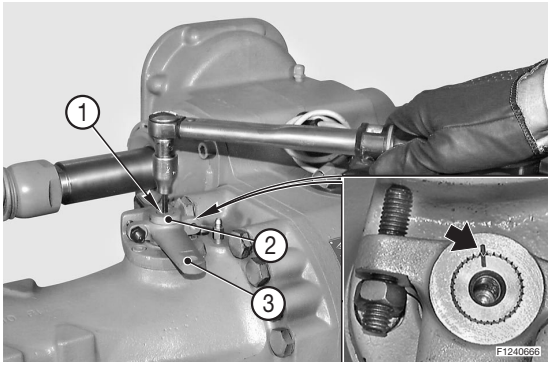
GB d

Install the arms (8) into the main body; check flatness and block arms following the appropriate procedures illustrated in section "HOW TO ASSEMBLE THE BRAKING UNITS".



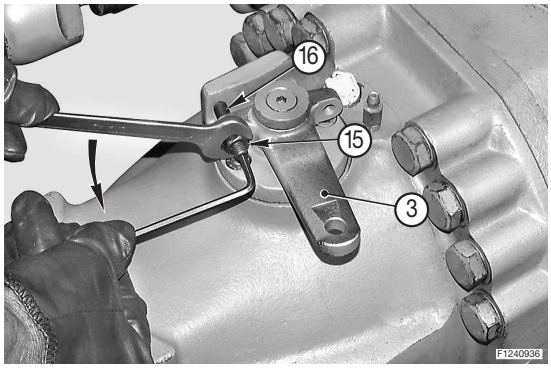
GB e

Install the bush (6) complete with O-ring (7) and block it with screws (5). Tighten screws with a torque wrench setting of 23.8 ÷ 26.2 Nm.



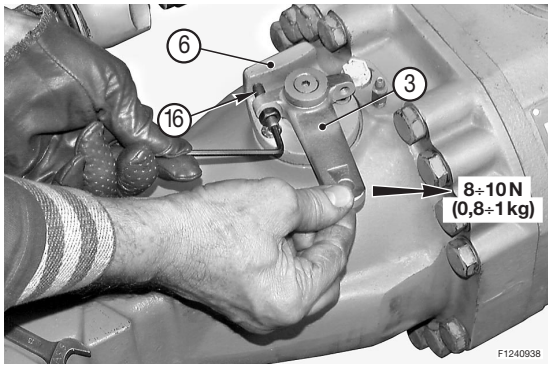
GB f

Install in sequence the lower O-ring (4), the lever (3) and the washer (2) with the relative O-ring (4). Block with screw (1) and tighten using a torque wrench setting of 23.8 ÷ 26.2 Nm.
CAUTION! Refer and keep to the positions marked during disassembly.



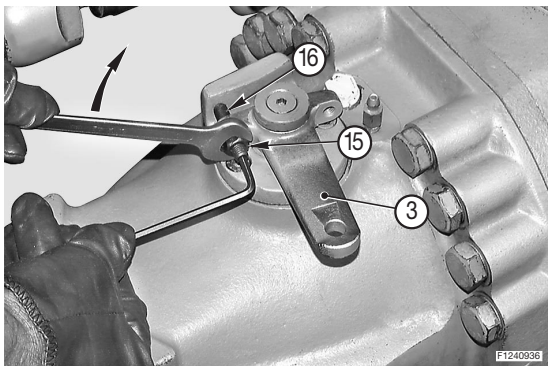
GB a

Connect the braking circuit and apply maximum working pressure to set the disks.
Release the pressure, loosen nut (15) and unscrew dowel (16) by a few turns.



GB b

Apply a force of 8 ÷ 10 N (0.8 ÷ 1 kg) to lever (3). Direct the force towards the braking direction in order to eliminate the idle stroke.
While the force is being applied, tighten dowel (16) until it is caused to rest onto bush (6).



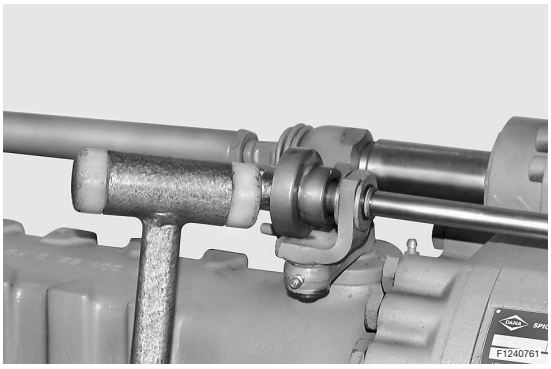
GB c

Lock dowel (16) in this position with nut (15).
Torque wrench setting: 20 ÷ 25 Nm.
CAUTION! The idle stroke should be eliminated without preloading thrust levers (12) and (13).

GB d

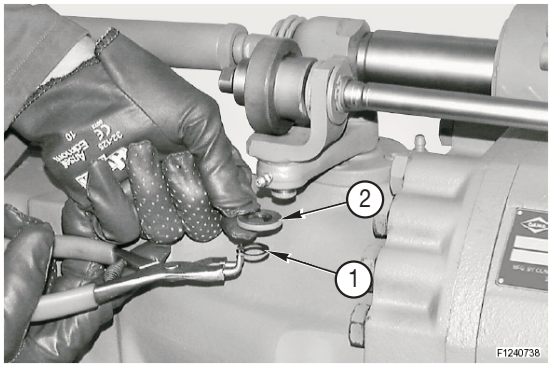
CAUTION! After connecting the control cable, check that when brakes are released both dowels (16) do lean against bush (6).

EXTERNAL HYDRAULIC NEGATIVE BRAKE WITH QUICK RELEASE



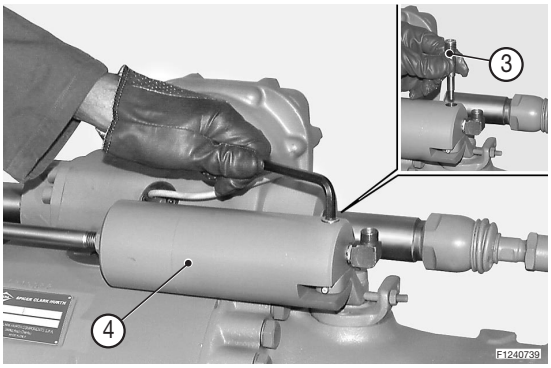
GB a

CAUTION! Before starting any operation on the assembly, disable the cylinder by giving a light hammer blow to the external ring of the check unit.



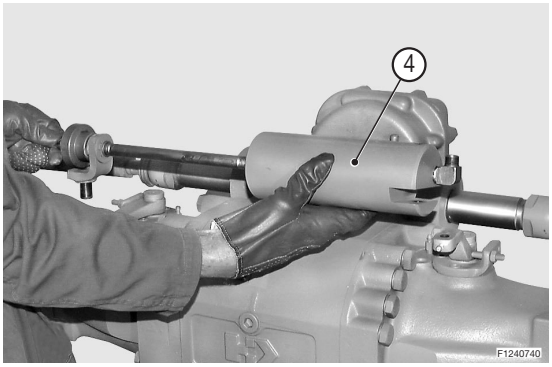
GB b

Remove snap ring (1) and extract distance piece (2).



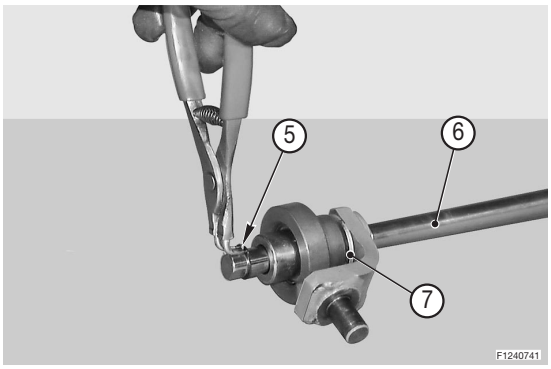
GB c

Remove the fulcrum pin (3) from the cylinder (4).



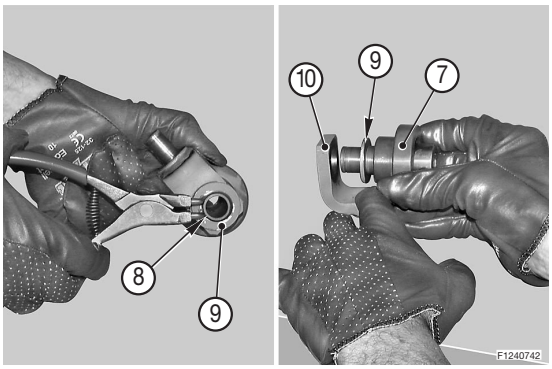
GB d

Remove the complete cylinder set (4).



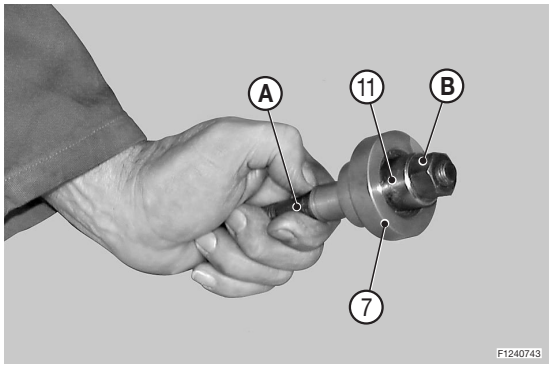
GB e

Remove snap ring (5) from stem (6) and extract the check unit (7).



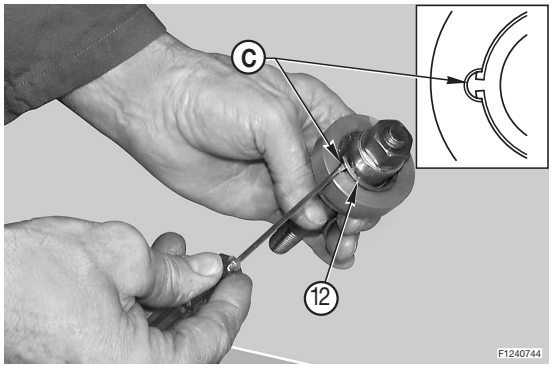
GB f

Remove snap ring (8) and washer (9) and separate support (10) and second washer (9) from the check unit (7).



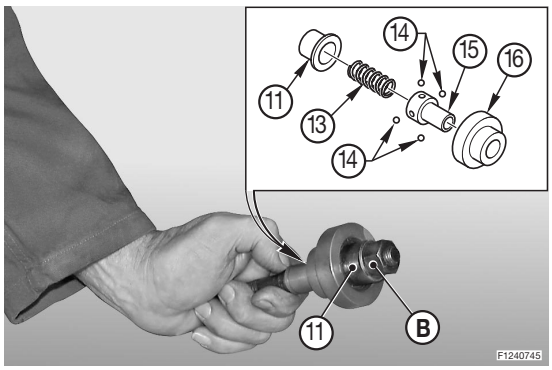
GB a

Introduce an M14x100 screw “A” into the hole of the check unit (7) and screw a nut “B” until the spring seat (11) is moved to the end of stroke.
NOTE. Use a T.C.E.I. screw.



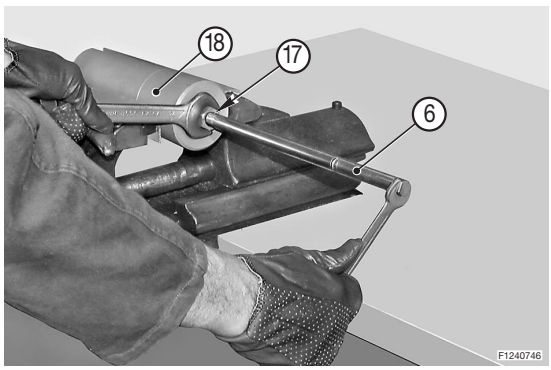
GB b

Rotate snap ring (12) until ring ends match slot “C”. Remove snap ring (12).



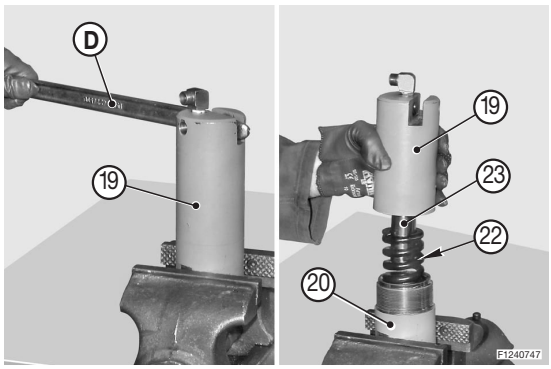
GB c

Slowly release nut “B” and disassemble the check unit.



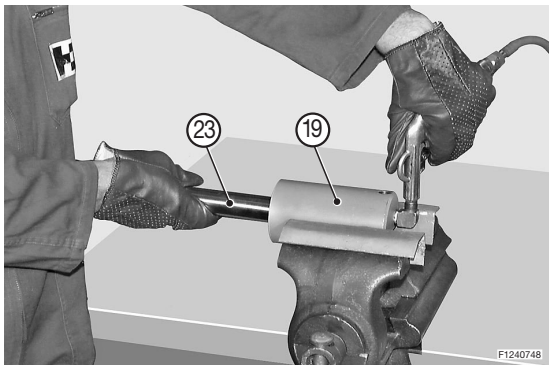
GB d

Loosen nut (17) and remove stem (6) from the cylinder (18).



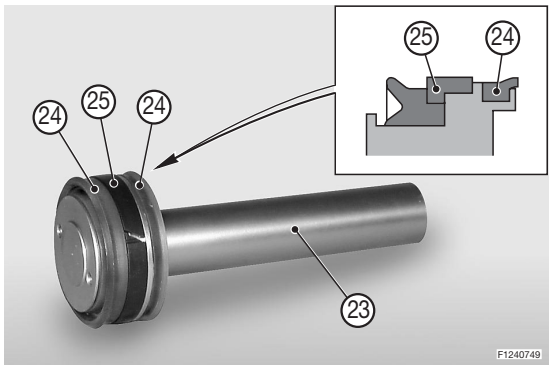
GB e

Place the cylinder in a vice with the spring seat (20) side engaged in it and, using a bar “D”, loosen and remove the cylinder unit (19) complete with piston (23) and spring (22).



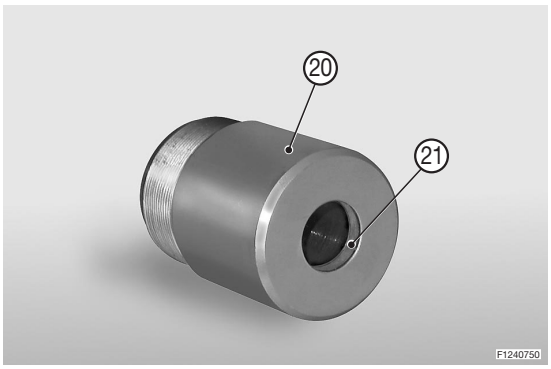
GB bar f

Slowly introduce air through the union piece of the cylinder unit (19) to expel the piston (23).
CAUTION! Hold the piston as it may be rapidly ejected and damaged.



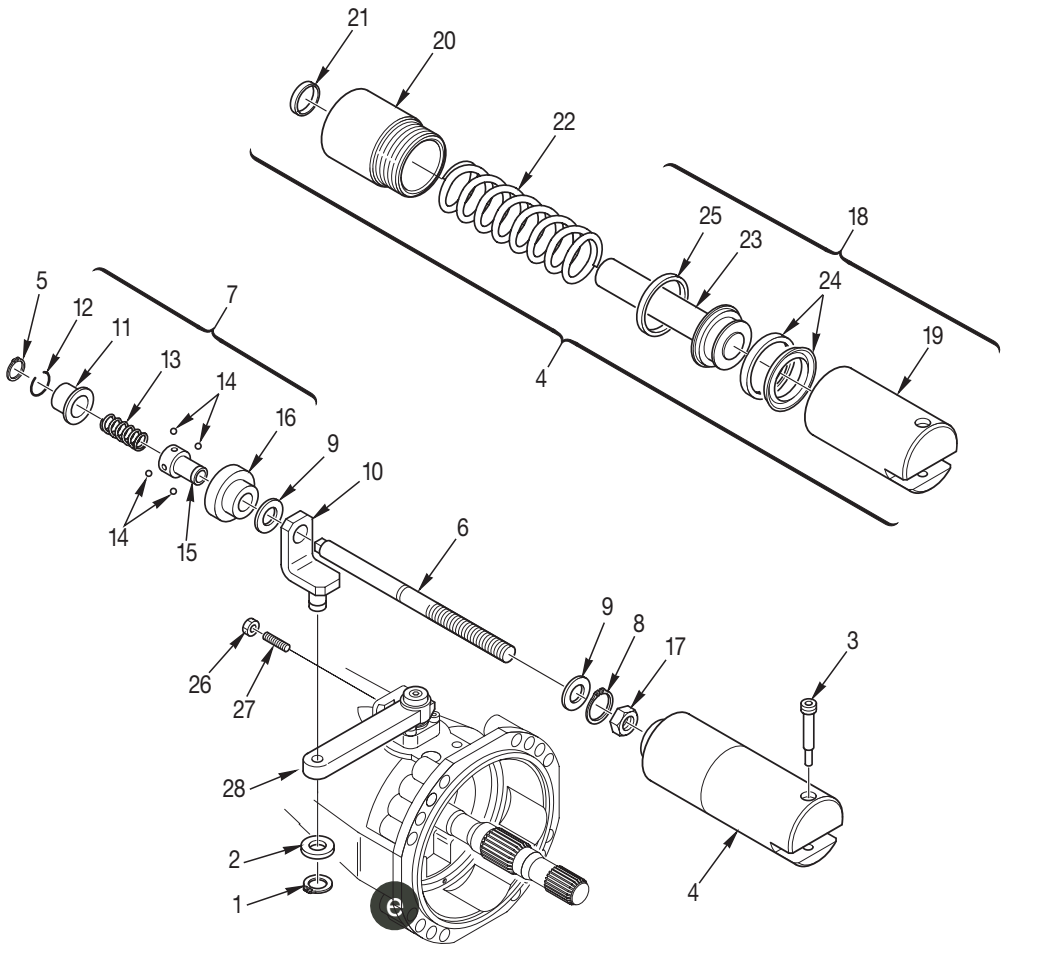
GB a

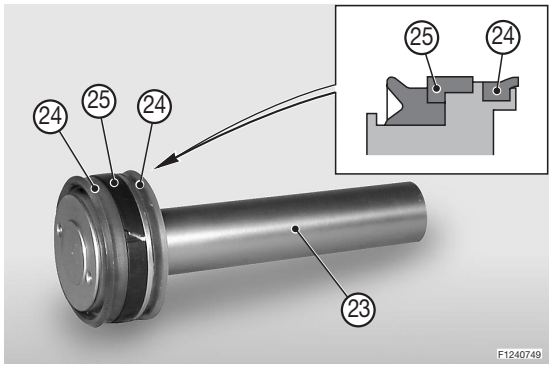
Remove seals (24) and guide ring (25) from the piston (23).
NOTE. Note down seals installation direction.



GB b

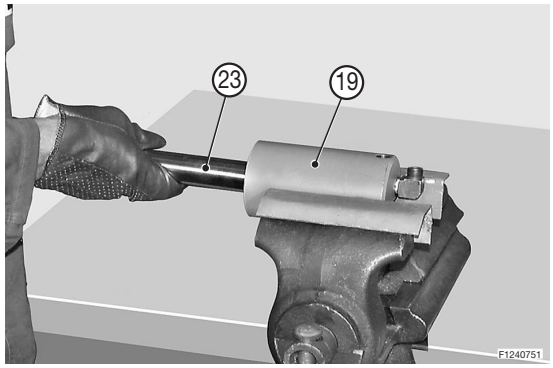
ONLY IF NECESSARY
Remove guide ring (21) from spring seat (20).
CAUTION! If guide ring (21) is taken out, it must be replaced.





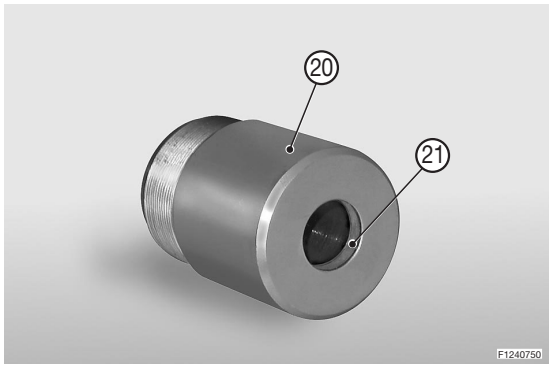
GB a

Fit guide ring (25) and seals (24) onto the piston (23).
CAUTION! Carefully check seals installation direction.



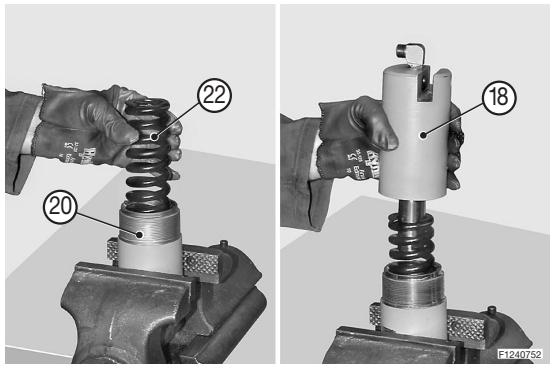
GB b

Lubricate seals (24) and the inside part of the cylinder (19); introduce the whole piston and move it to end of stroke.



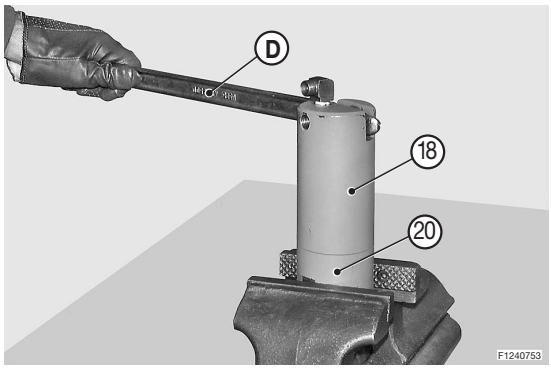
GB c

It the guide ring has been taken out, fit a new one (21) into the spring seat (20).
Lubricate the guide ring.



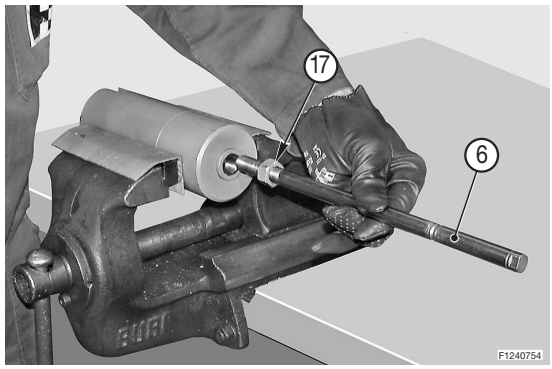
GB d

Position the spring seat (20) in a vice and insert spring (22).
Lubricate the thread. Install the whole cylinder (18).



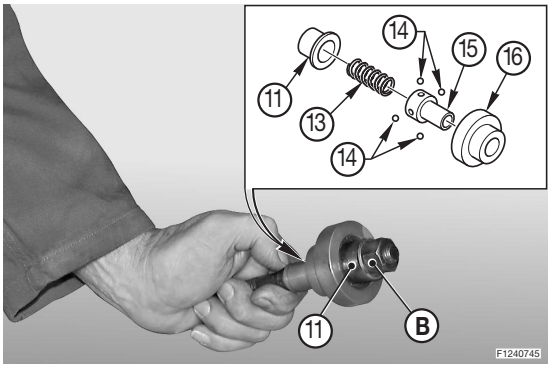
GB e

Screw the cylinder (18) into the spring seat (20) and lock it using a bar “D”.



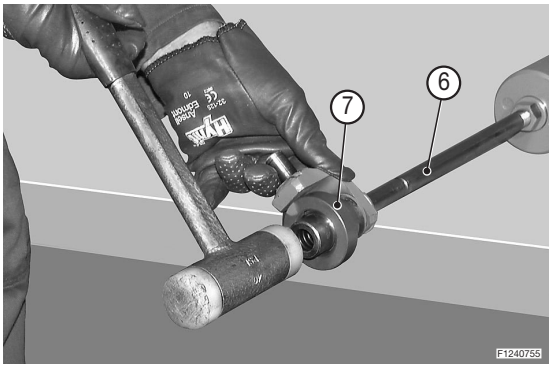
GB f

Screw stem (6) into the piston without locking the nut (17).



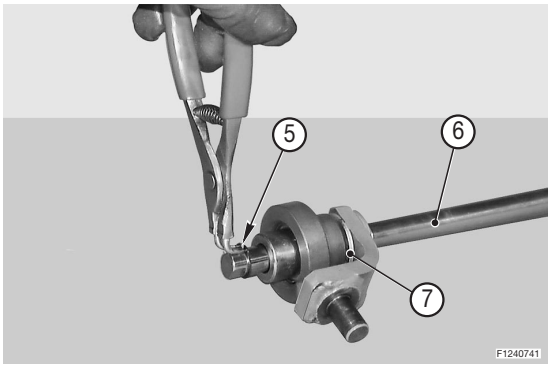
GB a

Assemble the check unit (7) by inverting the steps followed in the disassembly procedure.



GB b

Using a plastic hammer, install the check unit (7) onto the stem (6).

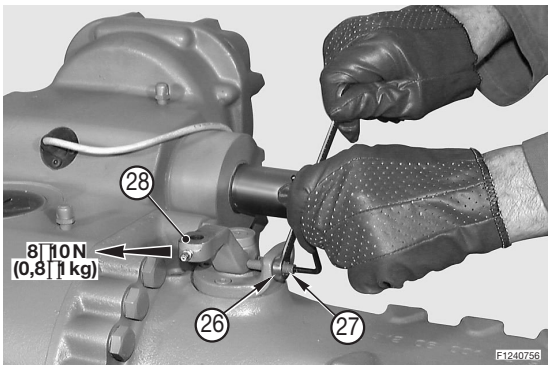


GB c

Fit the safety snap ring (5) onto the stem (6).

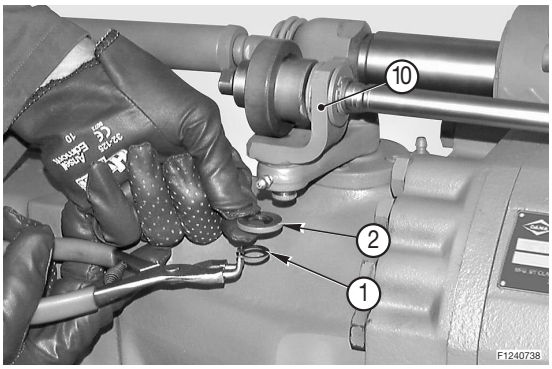
GB d

CAUTION! In case the braking disks have been replaced or if brake pistons have been removed: before adjusting the negative braking unit, apply the brakes several times at maximum pressure in order to set clearances.



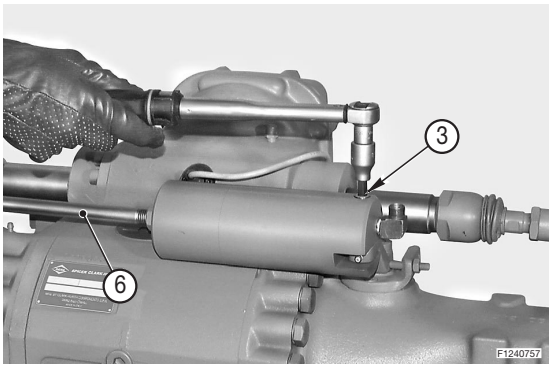
GB e

Loosen nuts (26) and apply a force of 8 ÷ 10 N (0.8 ÷ 1 kg) to levers (28). Direct the force towards the braking direction to eliminate the
clearances by using dowels (27); lock nuts (26) to a torque wrench setting of 20 ÷ 25 Nm.
CAUTION! The idle stroke should be eliminated without causing any preloading.



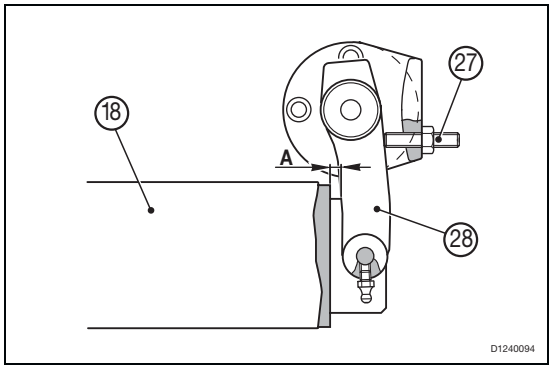
GB f

Fit the distance piece (2) and insert the pin of support (10) in the right-hand braking lever. Fit the snap ring (1).



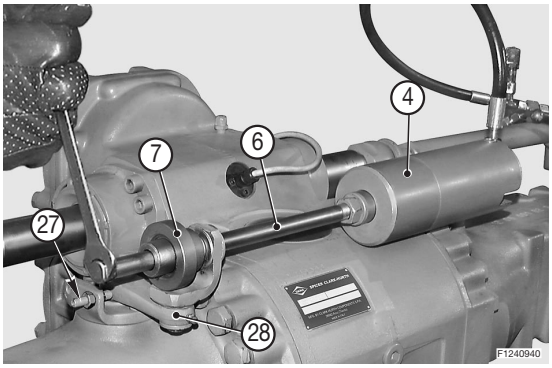
GB a

Rotate stem (6) to centre the hole of the fulcrum pin (3).
Apply Loctite 242 to the thread of the fulcrum pin (3), screw and tighten pin with a dynamometric wrench set to 25 ÷ 30 Nm.



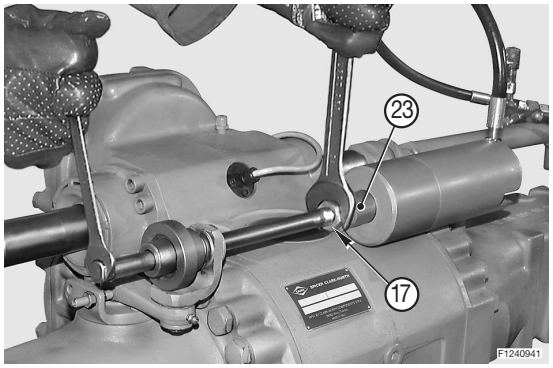
GB b

Check that a clearance “A” is left between the lever (28) on the cylinder side (resting against the adjustment dowel) and cylinder (18). If necessary, remove the lever, turn it by one tooth in relation to the spline and repeat idle stroke elimination procedure.



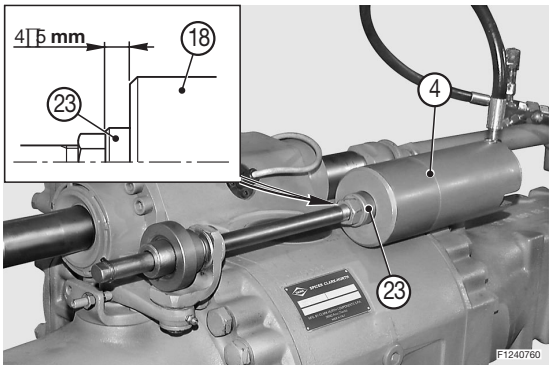
bar GB c

Introduce pressure into the cylinder (4) and, with the levers (28) resting against the adjustment dowels (27), screw rod (6) to engage the quick release (7) in the slot.



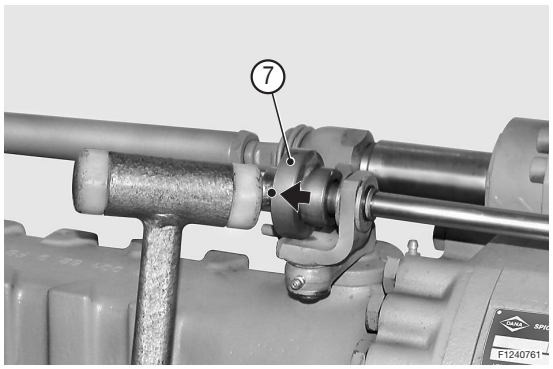
GB d

Lock nut (17) in position against the stem of the piston (23).
Torque wrench setting for the nut: max. 40 Nm.



GB e

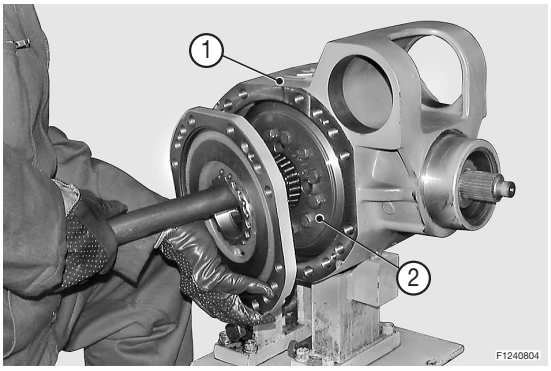
Release the pressure and check that piston (23) returns and stops in a position where it projects out from the cylinder head (4) by 4 ÷ 5 mm.



bar GB f

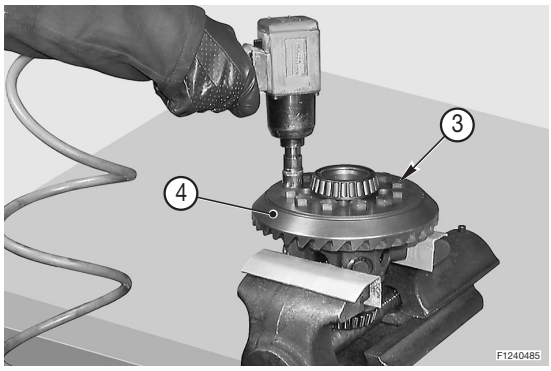
Release the check unit (7) by giving a hammer blow to the external ring.
Introduce pressure again and check that at the end of piston stroke, the check unit (7) is actually engaged onto the rod (6).

DISASSEMBLY LIMITED SLIP DIFFERENTIAL UNIT (25% AND 45%)



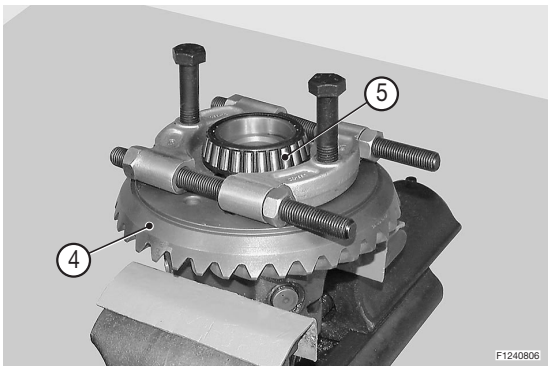
GB a

Remove the whole differential unit (2) from the central axle unit (1).
For details, see "REMOVING THE DIFFERENTIAL UNIT".



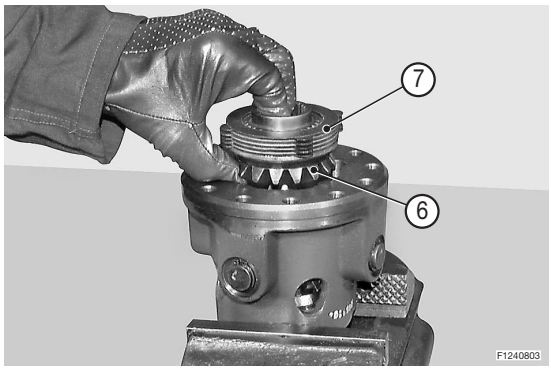
GB b

Remove the check screws (3) of the crown (4).
NOTE. Note down the position of the niches of the central hole in relation to the protrusions of the friction unit steel discs.



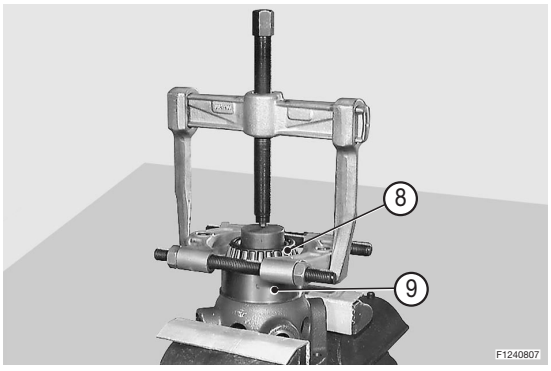
GB c

If bearing (5) needs replacing, remove it; remove crown (4).



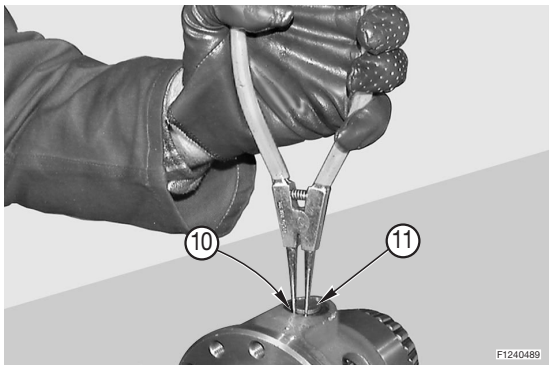
GB d

Remove the planetary gear (6) and the whole friction unit (7).



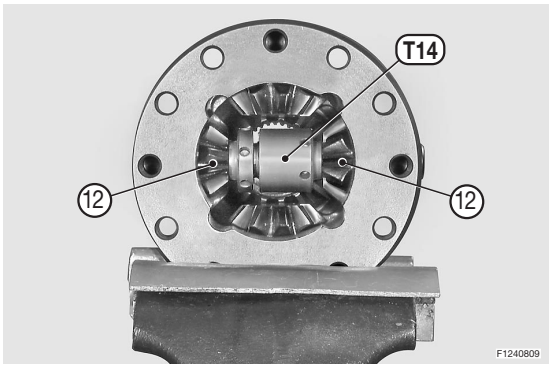
GB e

If bearing (8) needs replacing, extract it from the differential unit (9).



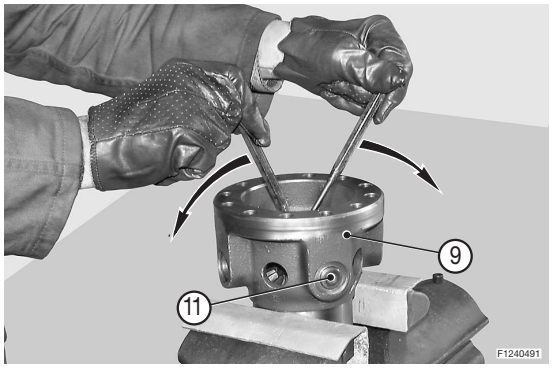
GB f

Remove the snap rings (10) from the pins (11) of the planet gears



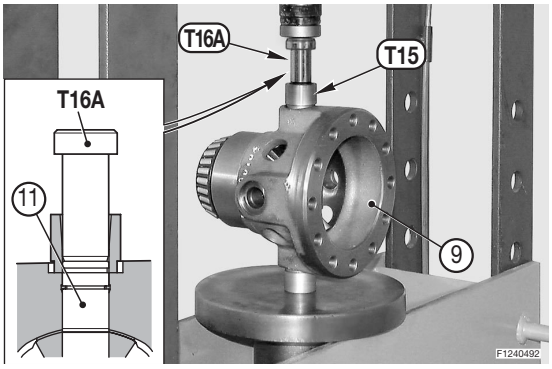
GB a

Introduce tool T14 in-between the planet gears (12).



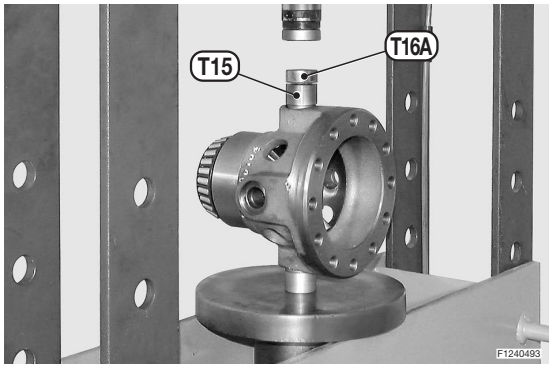
GB b

Using two pin-drivers, engage tool T14 in between the planet gears (12).
CAUTION! Carefully check that tool T14 keeps in an aligned position with the pins (11) when locked.



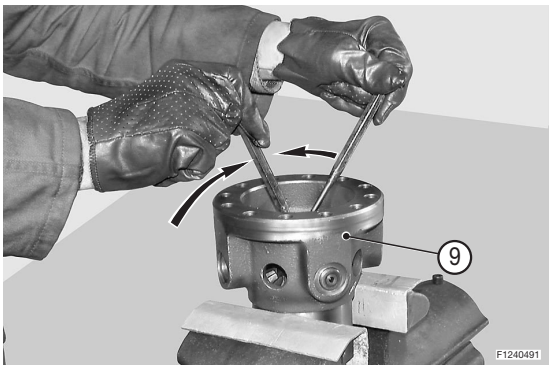
GB c

Place the differential unit (9) under a press, position bush T15 and insert gudgeon T16A. Press gudgeon T16A to end of stroke.



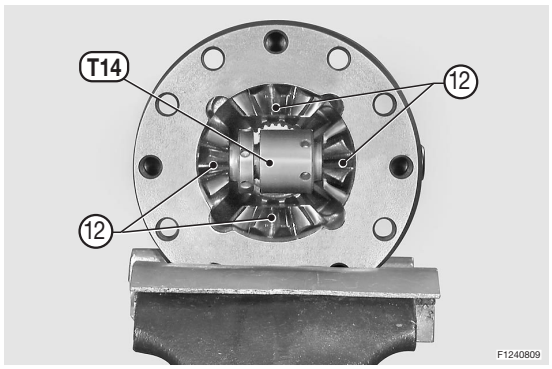
GB d

Remove gudgeon T16A and bush T15.
NOTE. In this state, the pin (11) is contained within tool T14.



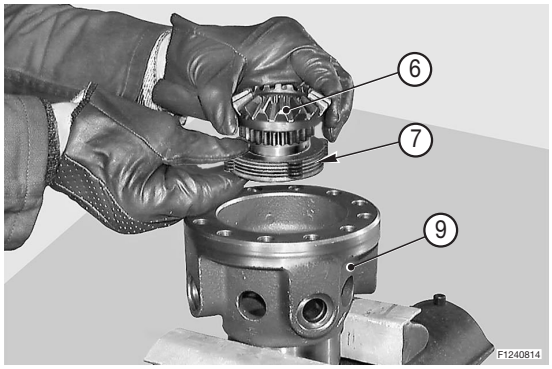
GB e

Remove tool T14 and planet pin (11) with it.



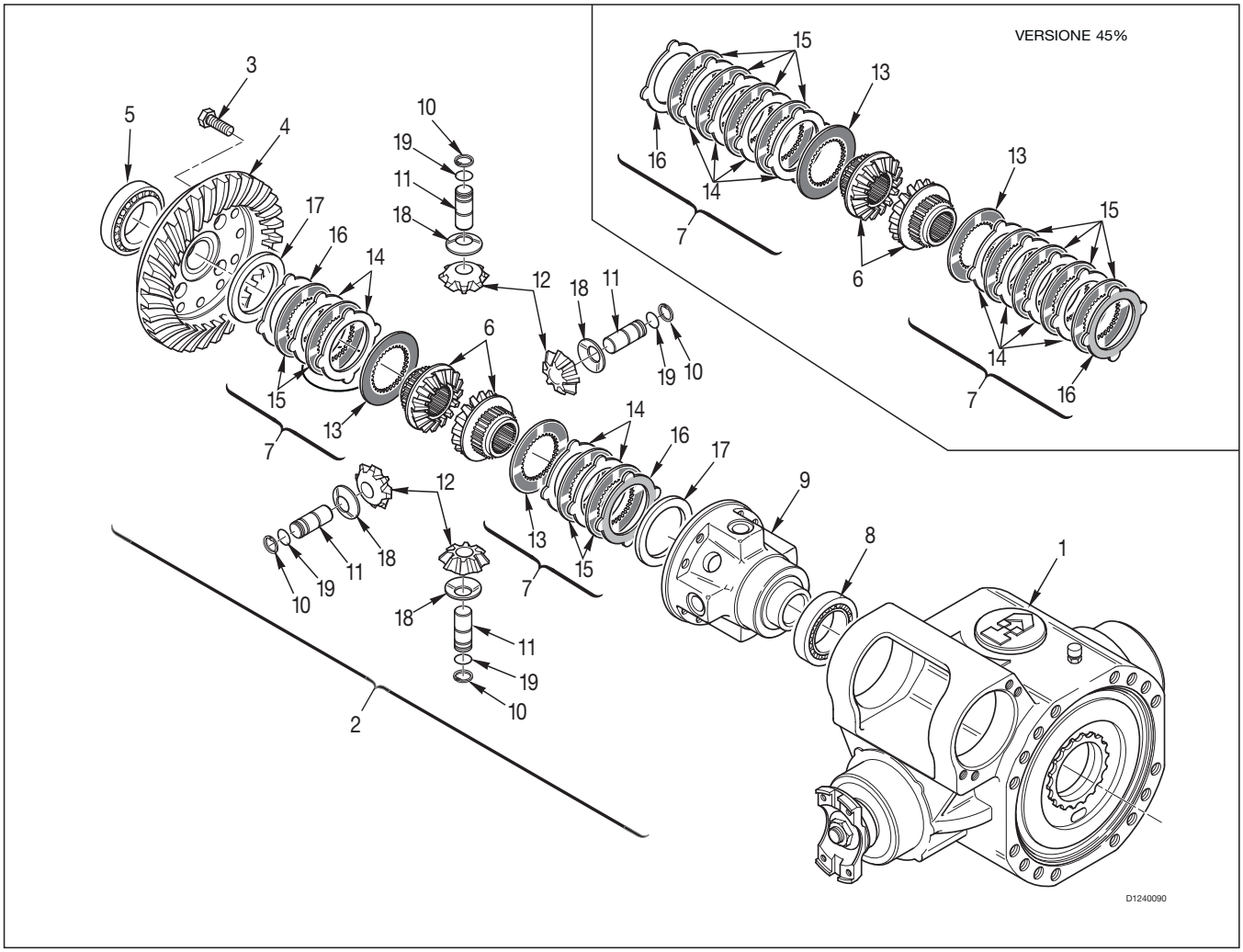
GB f

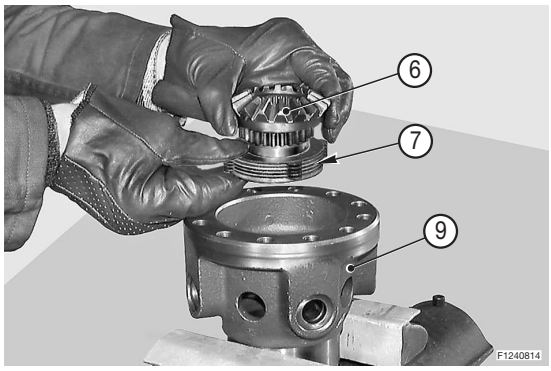
Leaving the released planet in its position, lock again tool T14.
Repeat pin extraction operation on the second planet pin (11).
Repeat the same operations on the remaining pins.



GB a

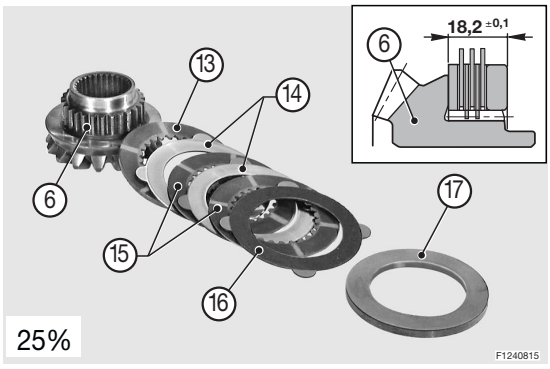
Remove tool T14 and extract from the differential unit (9) the two final planet gears (12), the 2nd planet gear (6) and the whole friction assembly concerned (7).





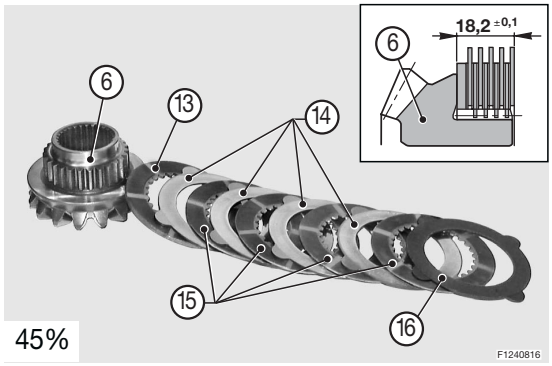
GB a

Place a friction unit (7) - suitable for the specific type of slipping - and planetary gear (6) into the differential unit (9).
The composition of the unit is illustrated in the points below.



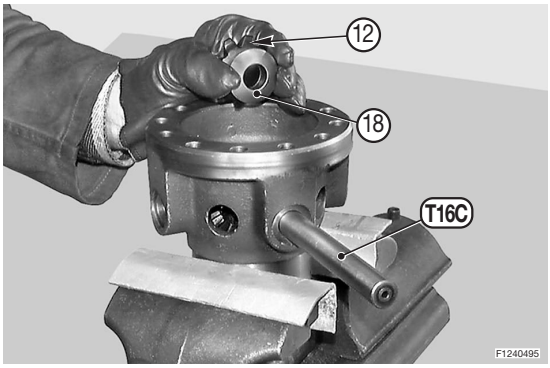
GB b

25% FRICTION UNIT COMPOSITION
Friction ring with increased shim (13), steel rings (14) and friction rings (15) alternated, end ring (16) and distance piece (17).
CAUTION! As to rings (13) and (16), the side without notches must face outwards.



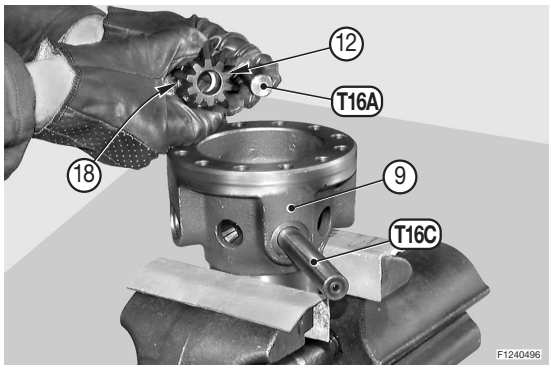
GB c

45% FRICTION UNIT COMPOSITION
Friction ring with increased shim (13), steel rings (14) and friction rings (15) alternated, end ring (16) and distance piece (17).
CAUTION! As to rings (13) and (16), the side without notches must face outwards.



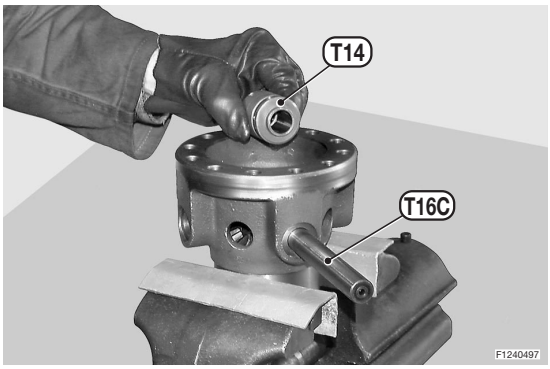
GB d

Position shim washer (18) and the first planet gear (12). Hold them in position with bar T16C.



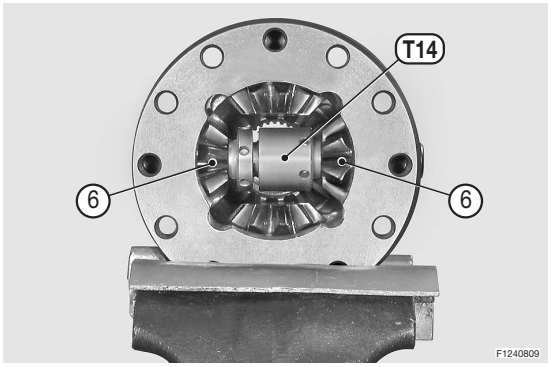
GB e

Using gudgeon T16A, position the second planet gear (12) and relative shim washer (18).



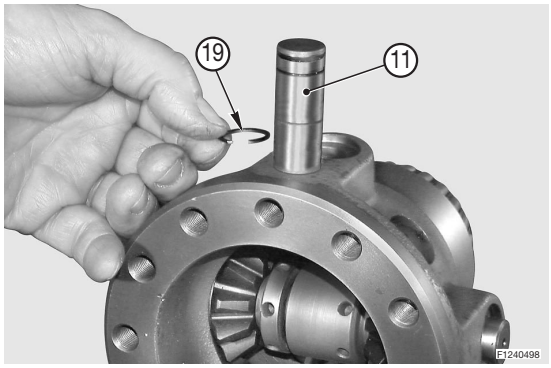
GB f

Insert tool T14 in-between the two planet gears (12). Align the whole unit, pushing bar T16C in as far as it will go, until gudgeon T16A is expelled.



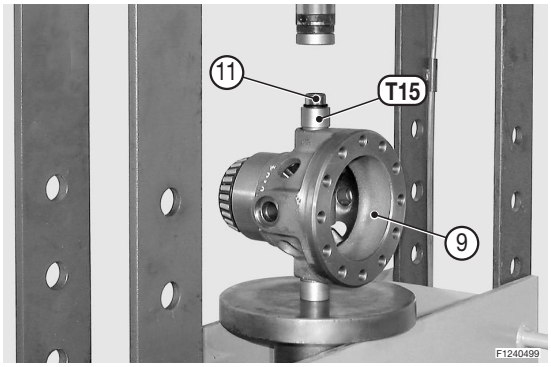
GB a

Lock tool T14 behind the planet gears (12).
After locking the tool, remove bar T16C.



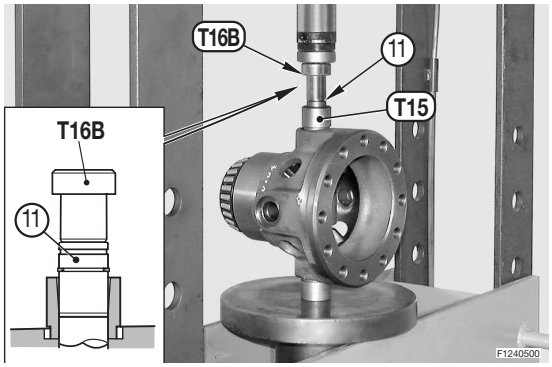
GB b

Fit snap rings (19) onto the pins (11).



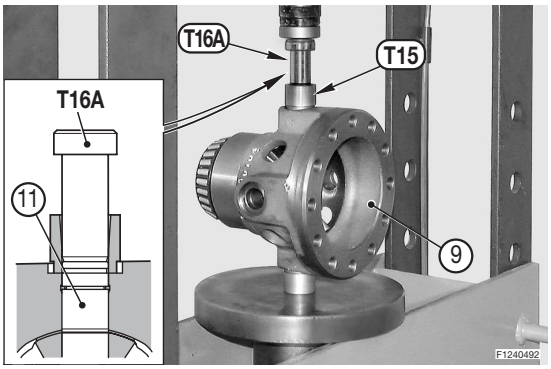
bar GB c

Position the differential unit (9) under the press, position bush T15 and insert the planet pin (11).



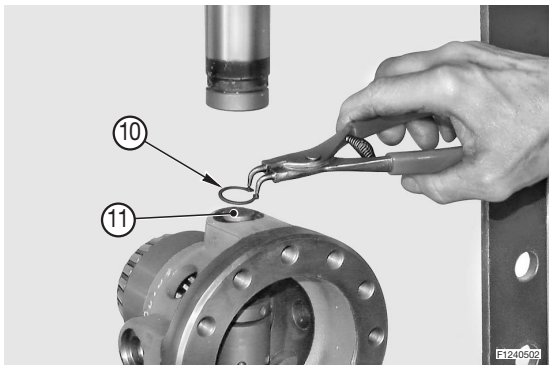
GB d

Place gudgeon T16B on top of the planet pin (11).



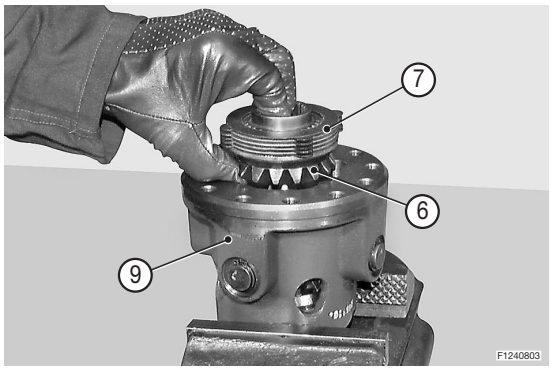
bar GB e

Press gudgeon T16B as far down as it will go.



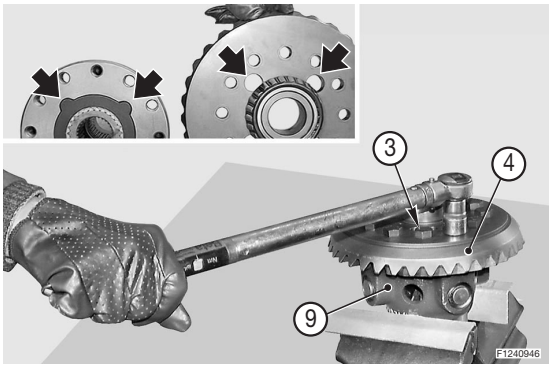
GB f

Remove gudgeon T16B, bush T15, and fit the snap ring (10) onto the pin (11).
CAUTION! Make sure that the snap ring centers the seat and positions itself on the differential unit face.
Repeat the operations on the other planet pin and on the other planet unit.



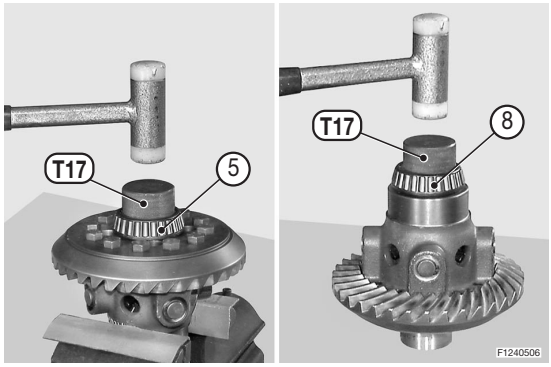
GB a

Check that planets have a light clearance in relation to the first planet gear.
Position the second planetary gear (6) and the second friction unit (7) into the differential unit (9).



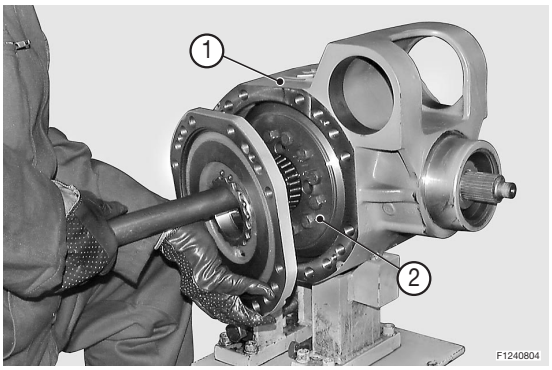
GB b

Line the lubrication holes up with the slots in the differential carrier.
Orient the holes of the crown (4) towards the protrusions of the braking unit. Position the crown (4) on the differential unit (9) and lock it with the screws (3) previously coated with Loctite 242.
Torque wrench setting for screws: 128 ÷ 142 Nm.
NOTE. Tighten screws using the criss-cross method.



GB c

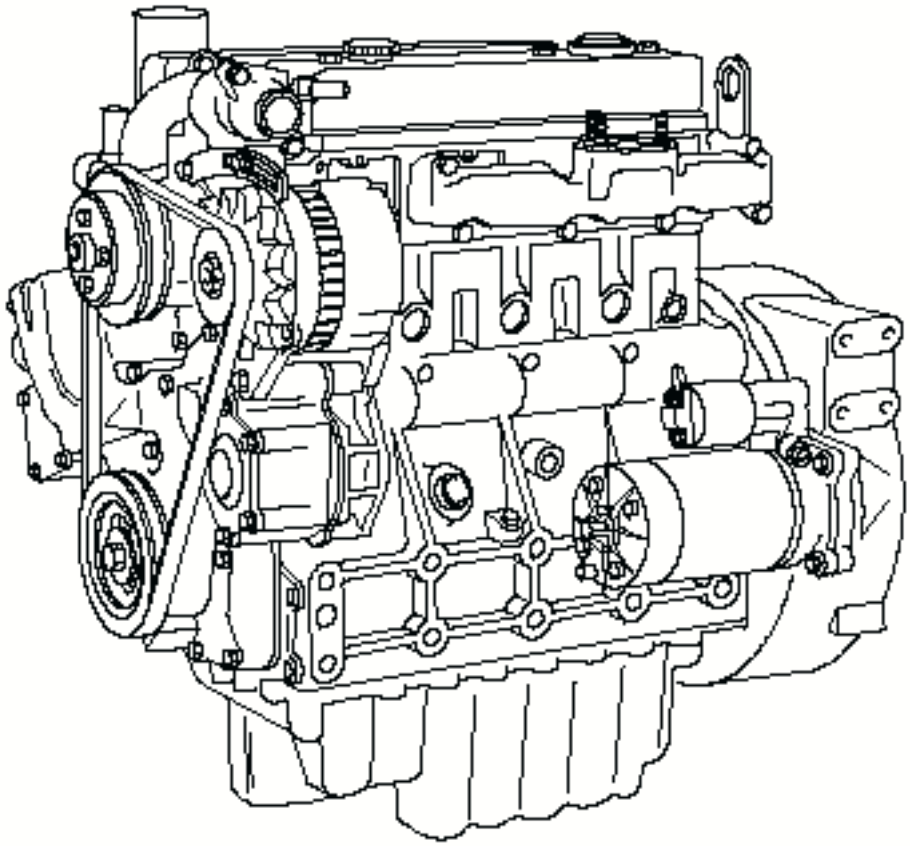
If bearings (5) and (8) have been removed, install them using tool T17.



GB d

Install the whole differential assembly (2) into the central body (1).
For details, see "INSTALLING THE DIFFERENTIAL UNIT".

Section H
PERKINS ENGINE MAINTENANCE



SECTION INDEX

PREVENTIVE MAINTENANCE 2
ENGINE FLUIDE 28
FAULT DIAGNOSIS 31
ENGINE PRESERVATION 33

PREVENTIVE MAINTENANCE

PREVENTIVE MAINTENANCE PERIODS

These preventive maintenance periods apply to average conditions of operation. Check the periods given by the manufacturer of the equipment in which the engine is installed. If necessary, use shorter periods. When the operation of the engine must conform to the local regulations these periods and procedures may need to be adapted to ensure correct operation of the engine.

It is good preventive maintenance to check for leakage and loose fasteners at each service.

These maintenance periods apply only to engines that are operated with fuel, lubricating oil and coolant which conform to the specifications given in this handbook.

Use the procedures in this chapter to maintain your engine in accordance with the preventive maintenance schedule.

Preventive maintenance schedules

The schedules which follow must be applied at the interval (hours or months) which occur first.

Note: For atomisers refer to “Atomiser maintenance” on page 15.

A First service at 20/40 hours
B Every day or every 8 hours
C Every 250 hours or 6 months
D Every 500 hours or 12 months
E Every 1000 hours
F Every 2000 hours
G Every 8000 hours

A	B	C	D	E	F	G	Operation
•	•						Check the amount of coolant in the header tank
	•						Check the engine for leakage of oil and coolant
			•				Check the specific gravity of the coolant (5) (1)
•		•					Check the tension and condition of the drive belt(s)
			•				Clean the sediment chamber and the strainer of the fuel lift pump
		•					Check for water in the pre-filter bowl (or earlier if your fuel supply is contaminated)
			•				Renew the element(s) of the fuel filter(s)
•							Ensure that the idle speed is checked and adjusted, if it is necessary (1)
	•						Check the amount of lubricating oil in the sump
	•						Check the lubricating oil pressure at the gauge
•			•				Renew the engine lubricating oil (2)
•			•				Renew the canister(s) of the lubricating oil filter (2)
					•		Clean the gauze element of the engine open breather system
						•	Renew the open/closed breather assembly (3)
							Empty the dust bowl of the air filter
•	•						- extremely dusty conditions
		•					- normal conditions
			•				Clean or renew the air filter element, if it has not been indicated earlier
					•		Ensure that the turbocharger impeller and turbocharger compressor casing are cleaned (1)
		•					Check all hoses and connections
		•					Clean the compressor air filter
					•		Ensure that the exhauster or compressor is checked (1)
•		•					Check all electrical cables and connections (4)
•				•			Ensure that the valve tip clearances of the engine are checked and, if necessary, adjusted (1)
					•		Ensure that the alternator and the starter motor are checked (1)

(1) By a person who has had the correct training.
(2) The oil service interval will change with the amount of sulphur in the fuel (see the table and the fuel specification - page 28). The interval to change the canister of the lubricating oil filter is not affected.
(3) Or at every complete engine overhaul.
(4) ***Caution:*** *Damage to the engine will occur if there is a failure in the electrical circuit for the cold start advance. The engine will run continuously with the timing fully advanced.*
5) Renew the antifreeze every 2 years. If a coolant inhibitor is used instead of antifreeze, it should be renewed every 6 months. If combustion gases are released into the cooling system, the coolant must be renewed.

Lubricating oil and oil filter canister service interval by application

Note: The service interval for the lubricating oil and oil filter canister is normally 500 hours. This may be reduced to 250 hours ***for applications which have engines operating at high load conditions***. Refer to your equipment supplier's handbook for the application, or the table above for guidance. If further advice is necessary, refer to your nearest Perkins distributor.

250 Hours	*500 Hours*	*500 Hours*
Agricultural	**Agricultural**	**Material handling**
Tractors over 120 bhp and all four wheel drives	Tractors under 120 bhp, not drive	Fork-lift trucks
Logging machinery	Ride-on mowers	Rough terrain fork-lift trucks
Combine harvesters	Woodchippers	Baggage handlers
All other agricultural applications except those listed under 500 hours	**Construction**	Straddle carriers
Construction	Wheeled shovel loaders	Mobile handling equipment
Road making plant	Telescopic handlers	Stationary material handling equipment
Rock crushing equipment	Road rollers, Backhoe loaders	**Vehicle**
Bulldozers, Trenchers	Skid steer loaders	Cars, vans and mini cars
Graders, Dumpers	Excavators, Cranes	Buses, Ambulances
Scrapers, Concrete mixers	**Industrial**	Fire appliances
Crawler tractors	Combined heat and power generating sets	Refuse collectors
All other construction applications except those listed under 500 hours	Mine personnel carriers	
Generating sets	Mine dumpers	
Base and prime power generating sets	Underground drill equipment	
Industrial	Welding sets	
Locomotives and rail equipment	Sweepers	
Compressors, Loaders	Aircraft towing tractor	
Pumping equipment	Refrigeration equipment	
Mine loaders	**Generating sets**	
Road sweepers (auxiliary engines)	Aircraft ground power units	
All other industrial applications except those listed under 500 hours	Stand-by generating sets	
Vehicle	Lighting towers	
All other vehicle applications except those listed under 500 hours		

How to fill the cooling system

Warning! *Refer to your equipment supplier's handbook for the application to fill the cooling system. If coolant is to be added to the system during service, allow the engine to cool before the coolant is added. Remove the filler cap slowly as dangerous coolant could be discharged if the coolant is still hot and the system under pressure.*

Caution: *If coolant is added to the system during service, it must consist of the same original mixture as used to fill the system. See "Coolant specification on page 30 for details of the correct coolant to be used in the system.*

For engines fitted with intercoolers:

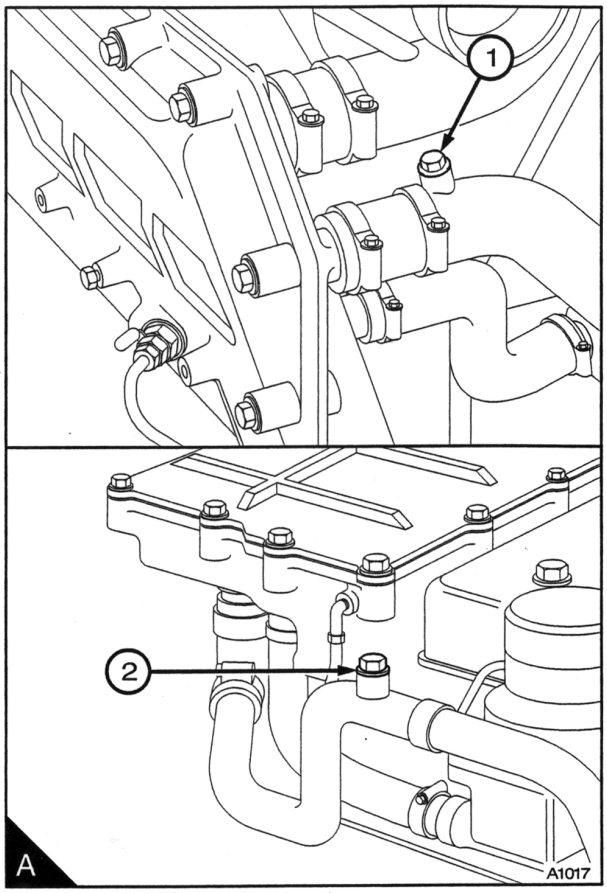
Caution: *When the cooling system is filled it is important to eliminate air from the intercooler to prevent an overheated engine.*

1 Ensure that the top and bottom hose connections are fitted correctly.

2 Fill the cooling system with coolant of the correct specification. Refer to "Coolant specification" on page 30.

3 Open the vent screw (A1 or A2) on the top pipe of the intercooler until coolant free of air flows from the screw. Then tighten the vent screw.

4 Continue to slowly fill the cooling system to the correct level in the radiator, refer to the user's handbook for the application.



How to drain the cooling system

Warning! *Do not drain the coolant while the engine is still hot and the system is under pressure because dangerous hot coolant can be discharged.*

1 Ensure that the vehicle or machine is on level ground.

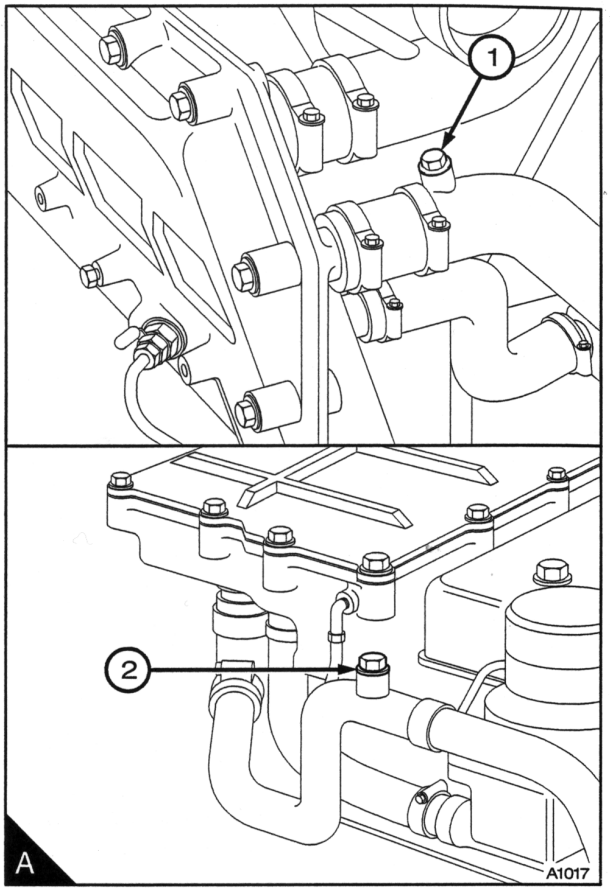
2 Remove the filler cap of the coolant system.

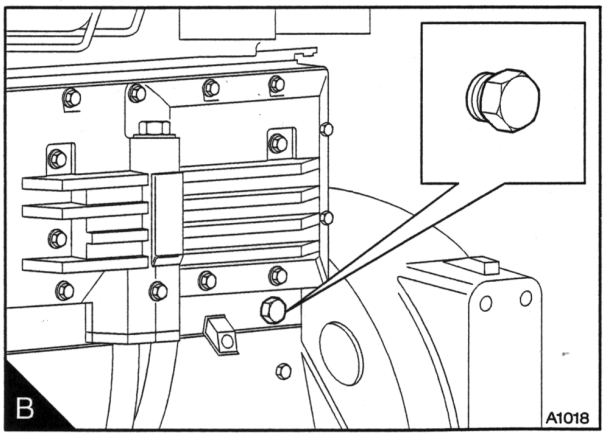
Caution: *To prevent frost damage, ensure that all of the coolant is removed from the engine. This is important if the system is drained after it has been flushed with water, or if an antifreeze solution too weak to protect the system from frost has been used.*

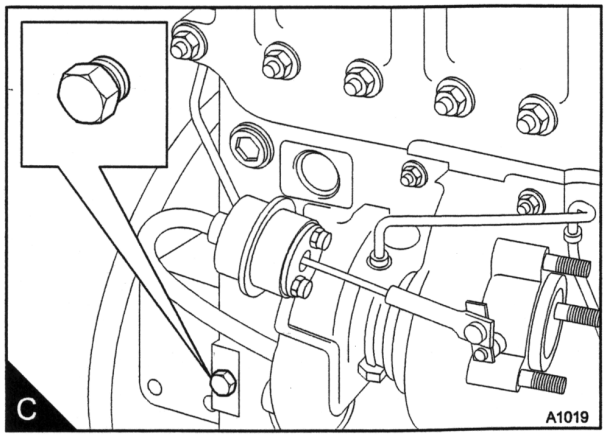
3 For engines fitted with intercoolers: Open the vent screw (A1) for vertical intercoolers or (A2) for horizontal intercoolers. This will ensure that all of the coolant is drained from the intercooler.

4 Remove the drain plug (B or C) from the side of the cylinder block in order to drain the engine. Ensure that the drain hole is not restricted.

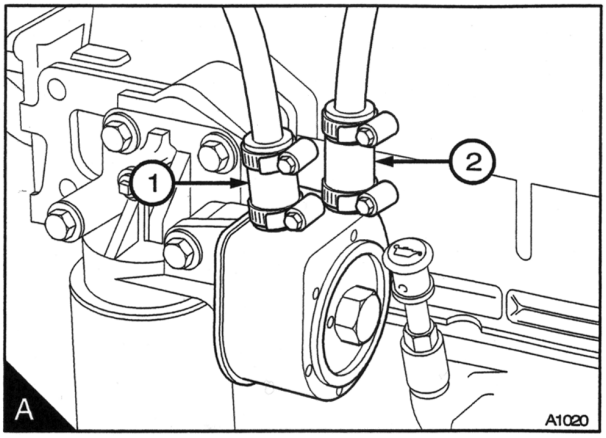
5 Open the tap or remove the drain plug at the bottom of the radiator in order to drain the radiator. If the radiator does not have a tap or drain plug, disconnect the hose at the bottom of the radiator.







6 If a lubricating oil cooler is fitted to the filter head instead of the cylinder block, then this must also be drained and flushed. To do this, disconnect the hoses (A1 and A2) at the top of the cooler and flush the oil cooler through the outlet connection (E1) until clean water flows from the inlet (A2).



Caution: *If the cooling system is to remain empty temporarily after it is flushed with clean water, drain the oil cooler and fill it with 165 ml (~/3 pint) of antifreeze. This will protect the oil cooler against frost if any clean water drains down from the water jacket when the vehicle is moved.*

7 Flush the coolant system with clean water.

8 Fit the hoses to the top of the cooler and tighten the clips.

9 Fit the drain plugs and the filler cap. Close the radiator tap or connect the radiator hose.

How to check the specific gravity of the coolant

For mixtures which contain inhibited ethylene glycol:

1 Ensure that the machine is on level ground.

2 Operate the engine until it is warm enough to open the thermostat. Continue to run the engine until the coolant has circulated the cooling system.

3 Stop the engine.

4 Allow the engine to cool until the temperature of the coolant is below 60°C (140°F).

Warning! *Do not drain the coolant while the engine is still hot and the system is under pressure because dangerous hot coolant can be discharged.*

5 Remove the filler cap of the cooling system.

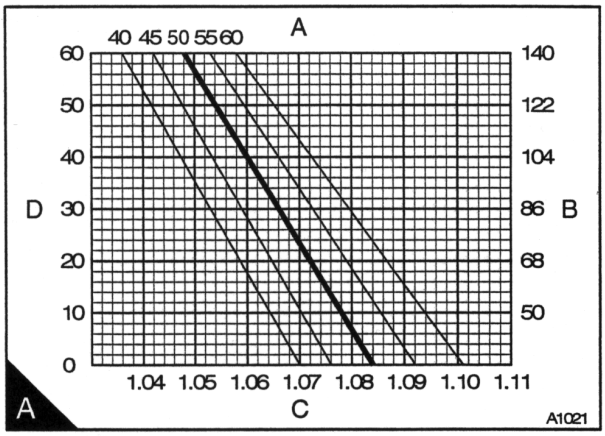
6 Drain some coolant from the cooling system into a suitable container.

7 Use a special coolant hydrometer that will check the temperature and the specific gravity of the coolant, follow the manufacturer's instructions.

Note: If a special coolant hydrometer is not available, put a hydrometer and a separate thermometer into the antifreeze mixture and check the readings on both instruments. Compare the readings with the chart (A).

8 Adjust the strength of the mixture as necessary.

Note: If it is necessary to fill or replenish the cooling system in service, mix the coolant to the correct strength before it is added to the cooling system. Perkins POWERPART antifreeze with a concentration of 50% will give protection against frost to a temperature of –35°C (-31°F). It will also give protection against corrosion. This is especially important when there are aluminium components in the cooling system.



Specific gravity chart

A = Percentage antifreeze by volume
B = Mixture temperature in °F
C = Specific gravity
D = Mixture temperature in °C

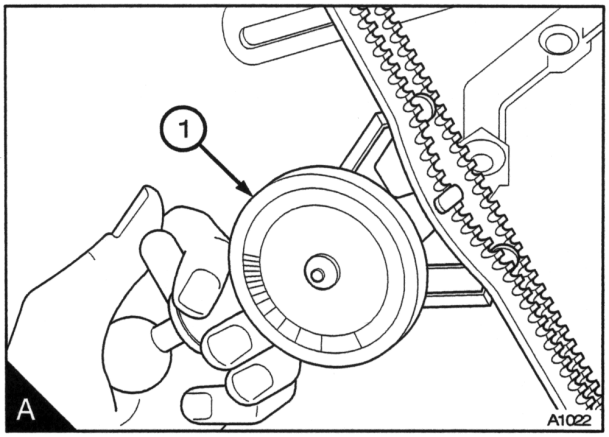
How to check the drive belt(s)

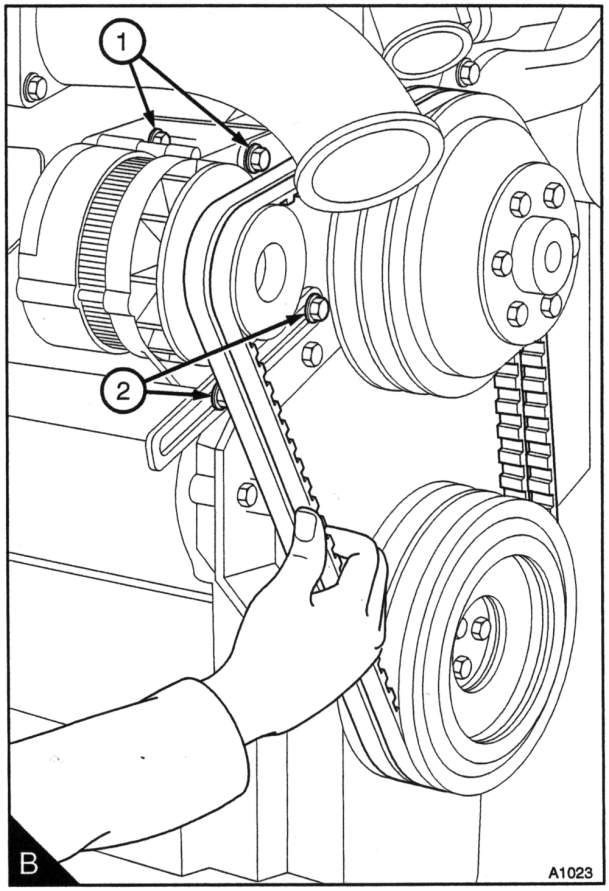
Renew a belt if it is worn or damaged. If twin belts are fitted, they must be renewed together.

To ensure maximum belt life, it is recommended that a belt tensioner gauge is used to check the belt tension. Fit the gauge (A1) at the centre of the longest free length and check the tension. If a “Burroughs” gauge is used, the correct tension is 355 N (80 lbf) 36 kgf. If the tension is 220 N (50 lbf) 22 kgf or below, adjust it to 355 N (80 lbf) 36 kgf as indicated below:

If a gauge is not available, press down the belt with the thumb at the centre of the longest free length and check the deflection (B). With moderate thumb pressure - 45N (10 lbf) 4,5 kgf - the correct deflection of the belt is 10mm(3/8in).

If twin belts are fitted, check/adjust the tension on the tighter belt.





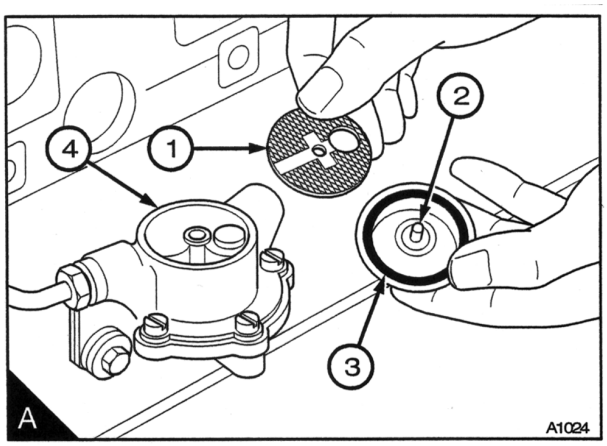
How to adjust the belt tension

1 Loosen the pivot fasteners (B1) of the alternator and the adjustment link fasteners (B2).

2 Change the position of the alternator to give the correct tension. Tighten the pivot fasteners of the alternator and the adjustment link fasteners.

3 Check the belt tension again to ensure that it is still correct. If a new belt is fitted, the belt tension must be checked again after the first 20 hours of operation.

How to clean the gauze strainer of the fuel lift pump



1 Release the fastener (A2) and remove the cover and the joint (A3) from the top of the fuel lift pump (A4). Remove the gauze strainer (A1). On some turbocharged engines, it will be necessary to remove the small heat shield which is fitted above the pump.

2 Wash carefully all of the sediment from the lift pump body.

3 Clean the gauze strainer, the joint and the cover.

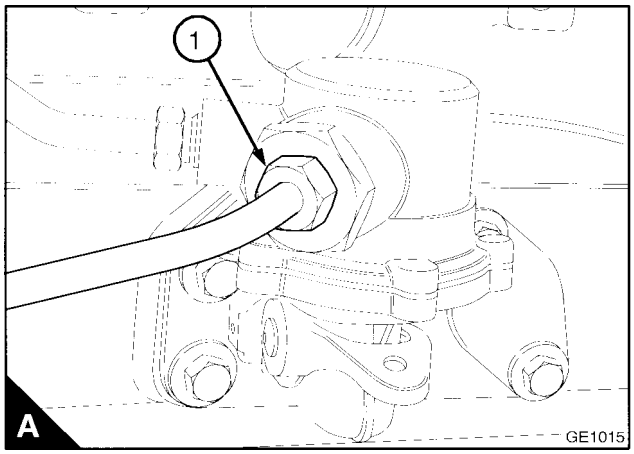
4 Assemble the lift pump. Use a good joint and ensure that the lift pump body and the cover are fitted together correctly because leakage at this point will let air into the fuel system. Fit the heat shield, if one is fitted.

5 Eliminate the air from the fuel system through the filter vent point, refer to “How to eliminate air from the fuel system” on page 18.

New fuel lift pump

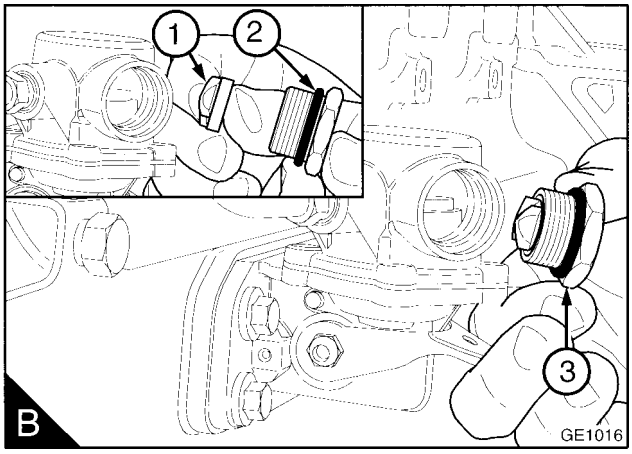
A new fuel lift pump (A) has been introduced for use on four cylinder New 1000 Series. The new pump is a one-piece assembly and should not be dismantled. A strainer (B1) is fitted inside the fuel inlet connection (B3). This strainer is cleaned at the same service interval as the strainer fitted to other fuel lift pumps. The procedure to remove and to fit this fuel lift pump is as the earlier fuel lift pumps.

A kit, is available that provides a fuel lift pump and a joint.



To clean the strainer

1 Turn off the fuel supply.
2 Release the union nut (A1) and remove the pipe from the fuel inlet.
3 Release the hexagonal fuel inlet connection (B3).
4 Remove the strainer (B1) together with the 'O' ring (B2) from the fuel inlet connection.
5 Clean the strainer in clean diesel fuel and dry it with low pressure compressed air. A kit, is available, which provides a strainer and an 'O' ring.
6 Fit the strainer into the fuel inlet connection and fit a new 'O' ring, if necessary.
7 Fit and tighten the fuel inlet connection to 20 Nm (15 lbf ft) 2,0 kgf m.



Caution: *Ensure that the olive on the fuel inlet pipe is in good condition. If it is not, renew the olive or the pipe. If there is not a good seal, air will enter the fuel system when the engine is run.*

8 Fit the pipe to the fuel inlet connection and tighten the union nut.
9 Turn on the fuel supply and check for fuel leakage. Correct any leakage. Eliminate air from the fuel system see "How to eliminate air from the fuel system" on page 18.

Fuel pre-filter

A pre-filter, if fitted, is installed between the fuel tank and the engine. Check the pre-filter bowl for water at regular intervals and drain as necessary, refer to "Preventive maintenance schedules" on page 3.

How to renew the fuel filter

Warning! *Discard the used canister and fuel oil in a safe place and in accordance with local regulations.*

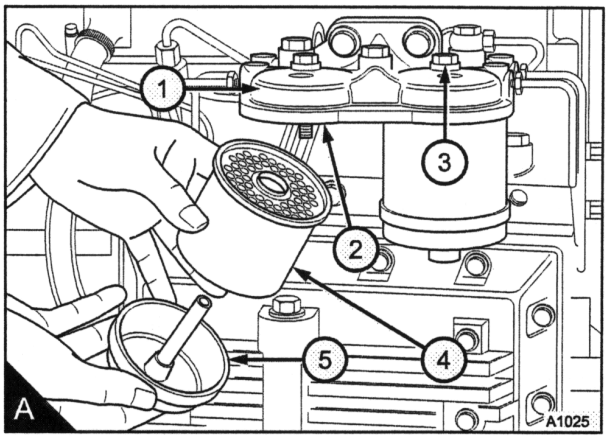
Cautions:

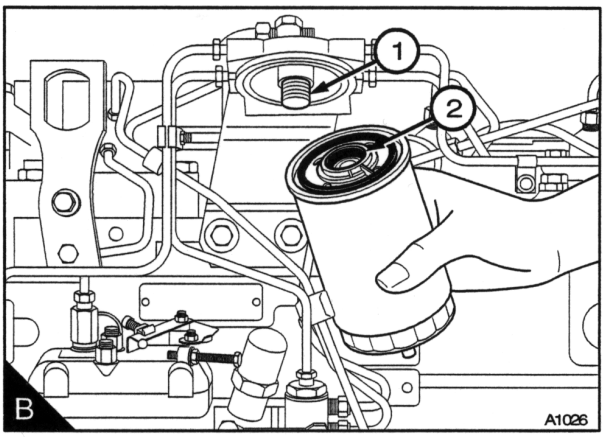
- *It is important that only the genuine Perkins parts are used. damage the fuel injection pump*
- *The pre-filter and main filter canisters must be renewed at the same time*
- *Do not allow dirt to enter the fuel system. Before a connection is disconnected, clean thoroughly the area around the connection. After a component has been disconnected, fit a suitable cover to all open connections.*

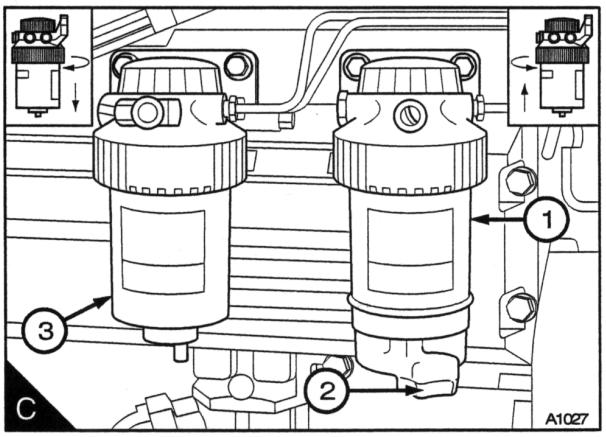
There are three types of fuel filter element in use: The separate element type where the filter element (A4) is held between the filter head and the bottom cover. The filter can have two elements (A).

The canister type where the filter element has an internal thread (B2) at the top and is fastened to a threaded adaptor in the filter head (B1).

A fuel filter with a quick release canister (C). The filter can have two canisters. Some engines are fitted with a pre-filter (C1) of the same type. This filter is fitted next to the main filter (C3), but connected in the fuel system before the fuel lift pump.







How to renew the element(s) of the separate element type

1. Clean the outside surfaces of the fuel filter assembly. If a drain tap (C2) is fitted to the bottom of the filter bowl, drain the fuel from the filter.
2. Hold the bottom cover of the filter element and release the set screw (A3) which is fitted through the filter head (A1) above the centre of the element.
3. Lower the bottom cover of the filter.
4. Remove the element (A4) and discard it.
5. Clean the inside surfaces of the filter head and of the cover.
6. Renew the seals (A2) and (A5) and lightly lubricate them with clean fuel.
7. Put the bottom cover under the new element and hold the element squarely to the filter head. Ensure that the element is fitted in the centre against the joint in the filter head. With the assembly in this position, engage and tighten the set screw.
8. Eliminate the air from the fuel filter, refer to “How to eliminate air from the fuel system” on page H18.

How to renew the filter canister of the canister type

Caution: *It is important that only the genuine Perkins fuel filter canister is used. The use of a wrong canister can cause damage to the fuel injection pump.*

1 Thoroughly clean the outside surfaces of the fuel filter assembly.

2 Loosen the drain device (A1) at the bottom of the filter and allow the water/fuel to drain into a suitable container.

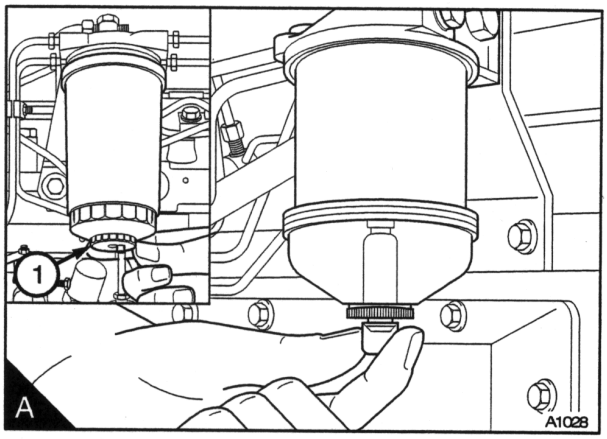
3 Use a strap wrench or similar tool to loosen the filter canister and remove the canister.

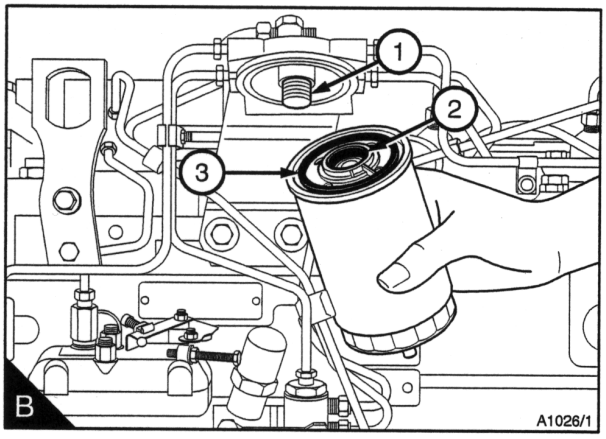
4 Ensure that the threaded adaptor (B1) is secure in the filter head and that the inside of the head is clean.

Caution: *Some of the fuel filter canisters fitted in the factory have a special sealant applied to the threads of the adaptor. Filter canisters supplied in service have an inner seal assembly (B2) instead. The seal is held in position by a plastic clip. Damage to the fuel injection pump may occur if the canister seals are not fitted correctly.*

5 Lubricate lightly the two top seals (B2) and (B3) of the new canister with clean fuel. Fit the new canister to the filter head and tighten, by hand only.

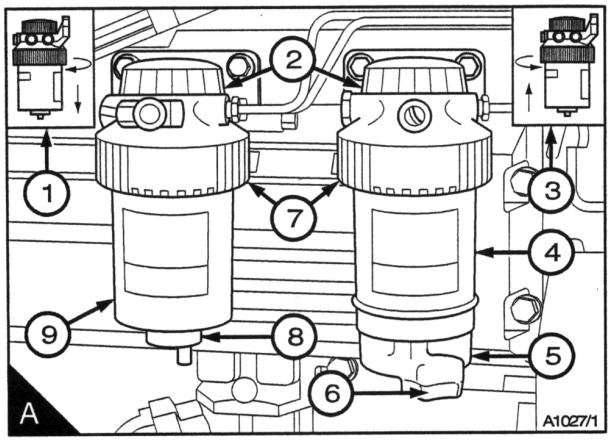
6 Eliminate the air from the fuel filter, refer to “How to eliminate air from the fuel system” on page 18.





How to renew the canister of the quick release canister type

Caution: *Discard used fuel filters and any spilt fuel in a safe place and in accordance with local regulations.*



1 Thoroughly clean the outside surfaces of the filter assembly.

2 Loosen the drain device (A8), or (A6) if a pre-filter is fitted, at the bottom of the canister or sediment bowl (A5) and allow the water or fuel to drain into a suitable container.

Note: If the filter does not have a drain device fitted release the cap (A2) on top of the filter head. Remove the nylon insert to lower the level of the fuel in the filter canister. This will prevent fuel spill when the clamp ring (A7) is released.

3 Support the filter canister(s) (A4) and (A9) and rotate the clamp ring to the left (A1) and remove the clamp ring.

4 Remove the canister from the filter head by a direct pull downwards (A1), and discard the old canister.

5 If a sediment bowl is fitted, remove the bowl and thoroughly clean the cover of the bowl.

6 Check the two ‘O’ ring seals of the sediment bowl for damage and renew them if necessary.

7 Clean the threads of the sediment bowl and fit the bowl to the canister and tighten by hand only.

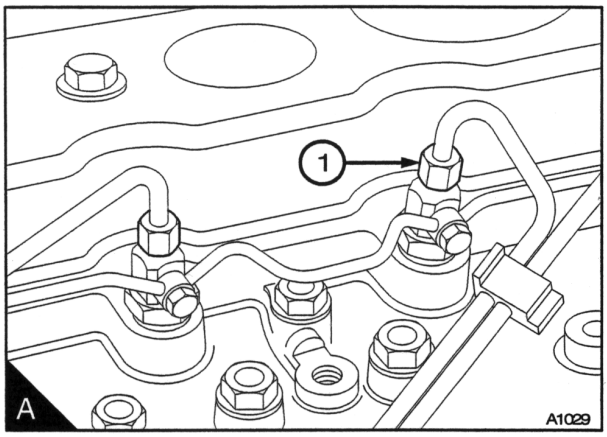
8 Ensure the filter head is clean. Push the new canister fully into the filter head (A3).

9 Support the canister, fit the clamp ring and rotate it to the right (A3) to fasten the canister to the filter head.

10 If the nylon insert was removed to lower the fuel level in the filter, ensure that it is fitted correctly and fit the cap.

11 Eliminate the air from the fuel filter, refer to “How to eliminate air from the fuel system” on page 18.

Atomiser maintenance



Caution: *A faulty atomiser must be renewed by a person who has had the correct training.*

Regular maintenance of the atomisers is not necessary. The atomiser nozzles should be renewed and not cleaned, and renewed only if an atomiser fault occurs. Some of the problems that may indicate that new nozzles are needed are listed below:

Engine will not start or is difficult to start

Not enough power

Engine misfires or runs erratically

High fuel consumption

Black exhaust smoke

Engine knocks or vibration

Excessive engine temperature

Atomiser fault

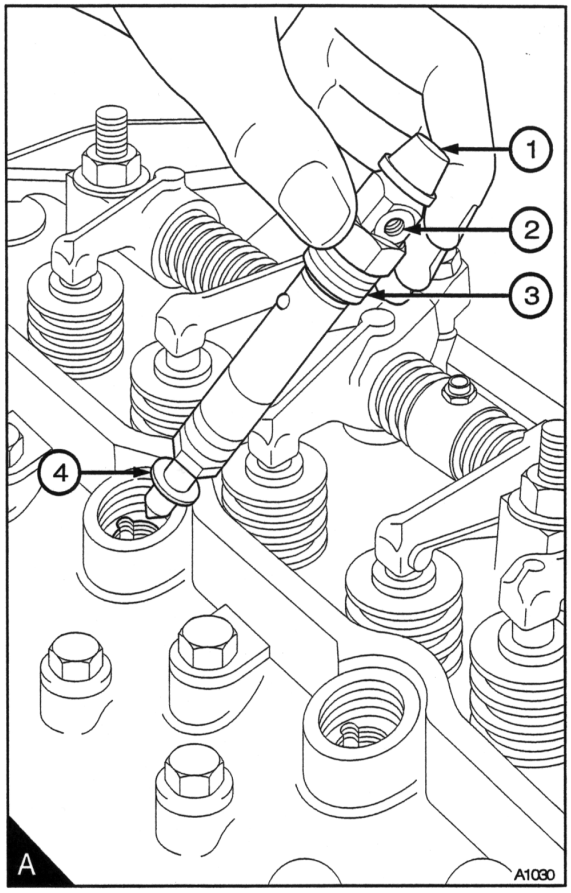
Warnings!

- *If your skin comes into contact with high-pressure fuel, obtain medical assistance immediately.*

- *Keep away from moving parts during engine operation. Some moving parts cannot be seen clearly while the engine runs.*

In order to find which atomiser is defective, operate the engine at a fast idle speed. Loosen and tighten the union nut (A1) of the high-pressure fuel pipe at each atomiser. Do not loosen the union nut more than half a turn. When the union nut of the defective atomiser is loosened, it has little or no effect on the engine speed.

How to remove an atomiser



Cautions:

- *Atomisers must be removed and fitted by a person with the correct training*
- *Do not allow dirt to enter the fuel system. Before a connection is disconnected, clean thoroughly the area around the connection. After a component has been disconnected, fit a suitable cover to all open connections.*

1 Remove the fuel leak-off pipe from the connection (A2).

2 SRemove the union nuts of the high-pressure pipe from the atomiser and from the fuel injection pump. Do not bend the pipe. If necessary, remove the pipe clamps. Fit a plastic cap (A1) to cover the fuel inlet connection.

Caution: *Remove and discard the seat washer (A4). If the original seat washer remains in the recess for the atomiser, the nozzle protrusion will be incorrect when a new seat washer is added.*

3 Release the clamp nut (A3) and remove the atomiser and its seat washer from the recess in the cylinder head.

How to fit an atomiser

Special requirements

Consumable products	
Description	**Part number**
POWERPART Universal jointing compound	21825474

Cautions:

- *Atomisers must be removed and fitted by a person with the correct training*
- *Do not allow dirt to enter the fuel system. Before a connection is disconnected, clean thoroughly the area around the connection. After a component has been disconnected, fit a suitable cover to all open connections.*

1 Thoroughly clean the threads of the clamp nut and the cylinder head.

Caution: *Do not allow any thread sealant to get below the clamp nut threads.*

2 Ensure that the wire clip (A1) is in position. Put a 6 mm (0.24 in) long, 1 mm (0.04 in) wide bead of POWERPART Universal jointing compound, part number 1861117, around the first two threads of the atomiser clamp nut.

3 Put the new seat washer (A3) into the seat recess in the cylinder head.

4 Put the atomiser in position, ensure that the location ball (A4) is fitted in the groove (A2) correctly. Carefully engage the threads of the clamp nut with the threads in the cylinder head.

Caution: *Do not move the clamp nut after it has been tightened, the seal that is made when torque has been applied will be broken and leakage past the atomiser seat may occur.*

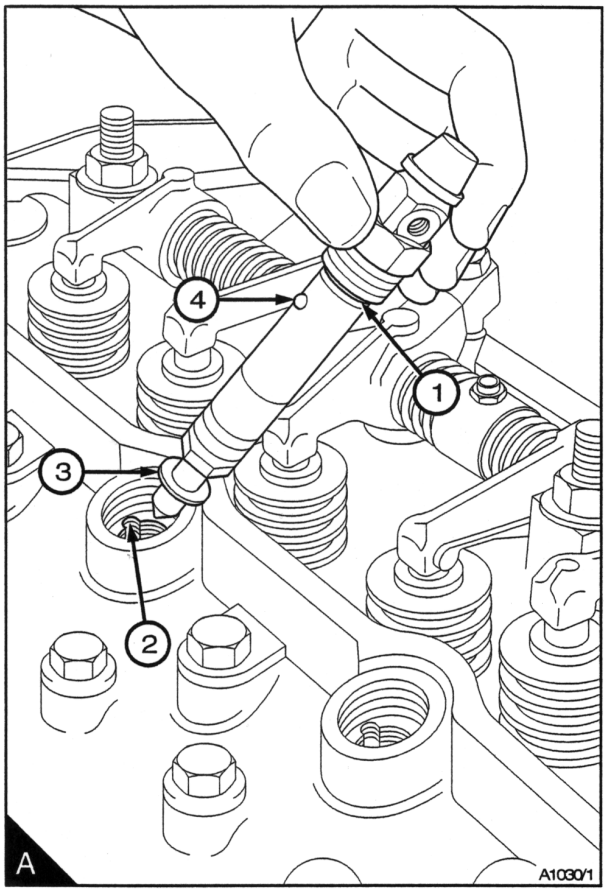
5 Ensure that the clamp nut is not cross threaded and tighten the nut **gradually and evenly** to 40 Nm (29 lbf ft) 4,1 kgf m. As the nut is tightened the atomiser will rotate clockwise as the bali moves in the slot. Remove any excess thread sealant.

Caution: *Do not tighten the union nuts of the high-pressure pipes more than the recommended torque tension. If there is a leakage from the union nut, ensure that the pipe is correctly aligned with the atomiser inlet. Do not tighten the atomiser union nut more, as this can cause a restriction at the end of the pipe. This can affect the fuel delivery.*

6 Remove the plastic cap and fit the high-pressure fuel pipe and tighten the union nuts to 27 Nm (20 lbf ft) 2,8 kgf m. If necessary, fit the pipe clamps.

7 Renew the sealing washers and fit the leak-off pipe. Tighten the M6 banjo bolt to 3,0 Nm (26.5 lbf in) 30,6 kgf cm.

8 Operate the engine and check for leakage of fuel and air.



How to eliminate air from the fuel system

Warning! *If your skin comes into contact with high-pressure fuel, obtain medical assistance immediately.*

If air enters the fuel system, it must be removed before the engine can be started. Air can enter the system if:

- The fuel tank is drained during normal operation
- The low-pressure fuel pipes are disconnected
- A part of the low-pressure fuel system leaks during engine operation.

In order to eliminate air from the fuel system, proceed as follows: Vent screws are not fitted to the fuel injection pump. Air will usually be removed from the fuel pump automatically.

Caution: *If the fuel system is empty or if the canister(s) of the fuel filter have been renewed, it will be necessary to eliminate air from the fuel system, especially the fuel injection pump.*

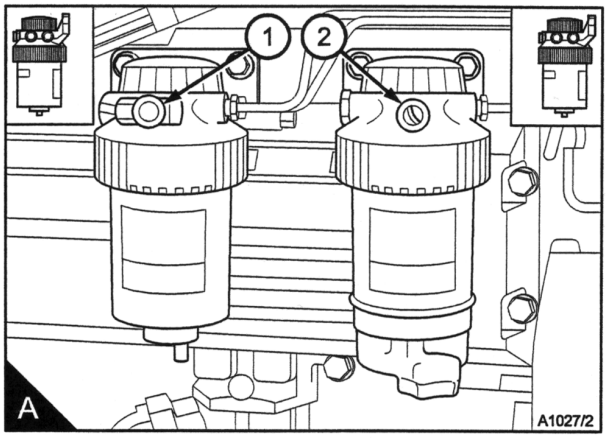
1 Loosen the vent plug on the filter head of the pre-filter (A2). Operate the priming lever of the fuel lift pump (B) until fuel, free of air, comes from the vent plug. Tighten the vent plug.

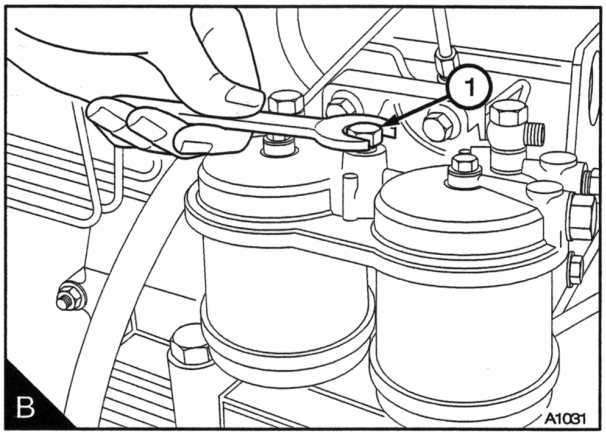
Note: If the drive cam of the fuel lift pump is at the point of maximum lift, it will not be possible to operate the priming lever. In this situation, the crankshaft must be rotated one revolution.

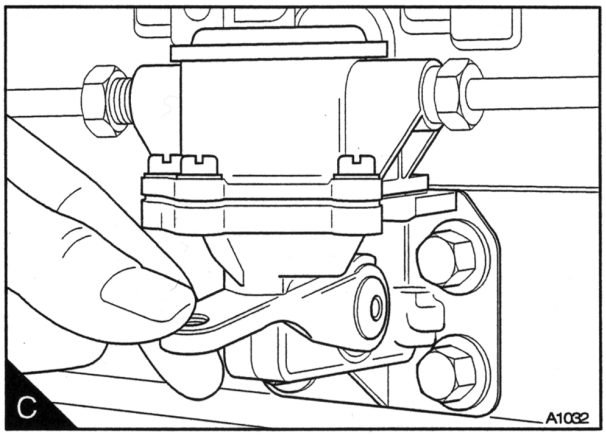
Loosen the vent screw (A1) on the main filter. Operate the priming lever of the fuel lift pump until fuel, free of air, comes from the banjo bolt. Tighten the vent screw.

For filters with a separate element: Loosen the vent plug (B1) or banjo bolt on the top of the filter head.

2 Operate the priming lever of the fuel lift pump (C) until fuel, free of air, comes from the banjo bolt or vent plug. Tighten the banjo bolt or vent plug.







Caution: *Use a spanner to prevent movement of the fuelled starting aid (A1) when the union nut (A2) is loosened or tightened.*

3 Loosen the union nut (A2) at the fuelled starting aid and operate the priming lever of the fuel lift pump until fuel, free of air, comes from the connection. Tighten the union nut at the starting aid.

Note: For Delphi fuel injection pumps: Loosen the union nut at the outlet connection of the low pressure fuel leak off pipe which is on top of the governor housing of the fuel injection pump. Operate the priming lever of the fuel lift pump until fuel, free of air, comes from the connection. Tighten the union nut.

Caution: *Do not tighten the union nuts of the high-pressure pipes more than the recommended torque tension. If there is a leakage from the union nut, ensure that the pipe is correctly aligned with the atomiser inlet. Do not tighten the atomiser union nut more, as this can cause a restriction at the end of the pipe. This can affect the fuel delivery.*

4 Loosen the high-pressure connections at two of the atomisers (B1).

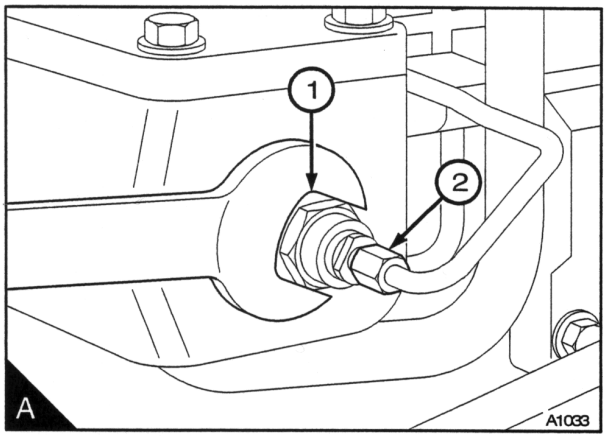
Caution: *Damage to the fuel injection pump, battery and starter motor can occur if the starter motor is used excessively to eliminate air from the fuel system.*

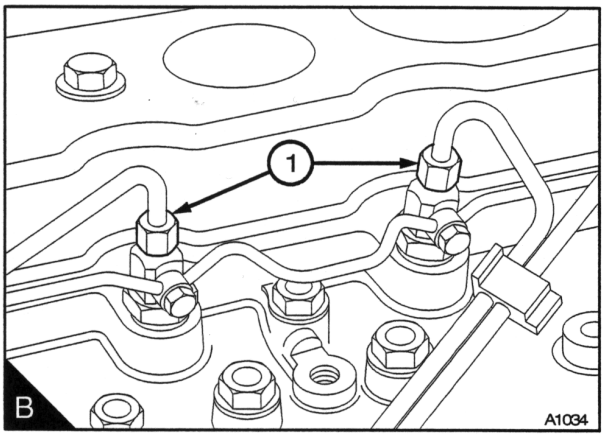
5 Put the electrical system switch to the “On” position. Ensure that the manual stop control, if one is fitted, is in the “Rue” position. Operate the starter motor until fuel, free from air, comes from the pipe connections. Tighten the high-pressure pipe connections to 27 Nm (20 lbf ft) 2,8 kgf m. Return the switch to the “Off” position.

6 The engine is now ready to star

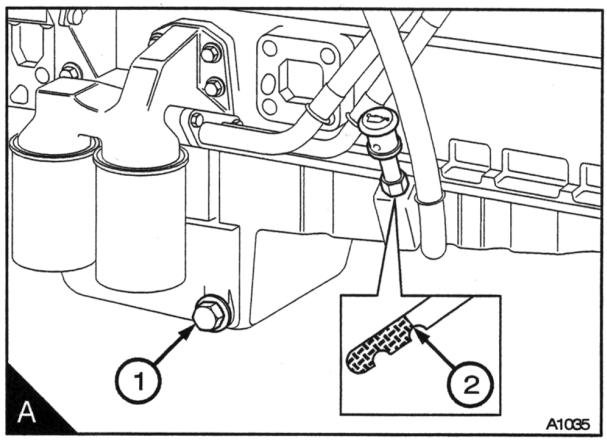
Caution: *Operate the engine at low idle speed for a minimum of two minutes immediately after air has been removed from the fuel system. This will ensure that the pump is free of air and prevent any damage to the pumps internal parts by metal to metal contact.*

If the engine runs correctly for a short time and then stops or runs roughly, check for air in the fuel system. If there is air in the fuel system, there is probably a leakage in the low pressure system.





How to renew the lubricating oil of the engine



Warning! *Do not exceed the correct level of lubricating oil in the sump especially if a closed circuit breather is fitted to the engine. If there is too much lubricating oil, the excess must be drained to the correct level. An excess of lubricating oil could enter the breather valve. This could cause the engine speed to increase rapidly without control.*

Cautions:

- *Discard the used lubricating oil in a safe place and in accordance with local regulations*
- *Ensure that the application is on a level surface to ensure an accurate reading on the dipstick.*

1 Operate the engine until it is warm.

2 Stop the engine, remove the sump drain plug (A1) and its “O” ring and drain the lubricating oil from the sump. Ensure that the “O” ring is not damaged. Fit the drain plug and its “O” ring and tighten the plug to 34 Nm (25 lbf ft) 3,5 kgf m.

3 Fill the sump to the mark (A2) on the dipstick with new and clean lubricating oil of an approved grade, refer to “Lubricating oil specification” on page 29.

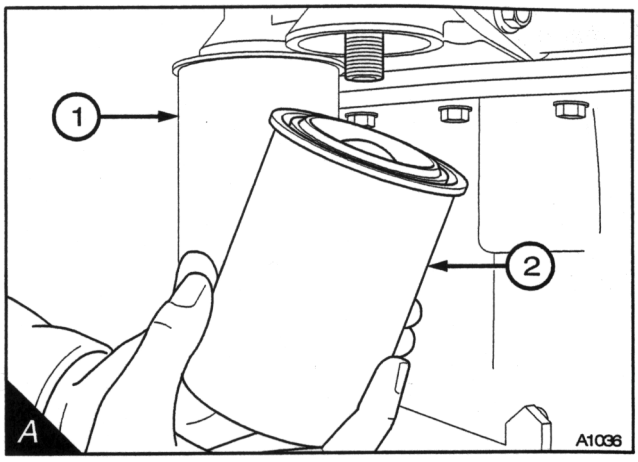
How to renew the canister of the lubricating oil filter

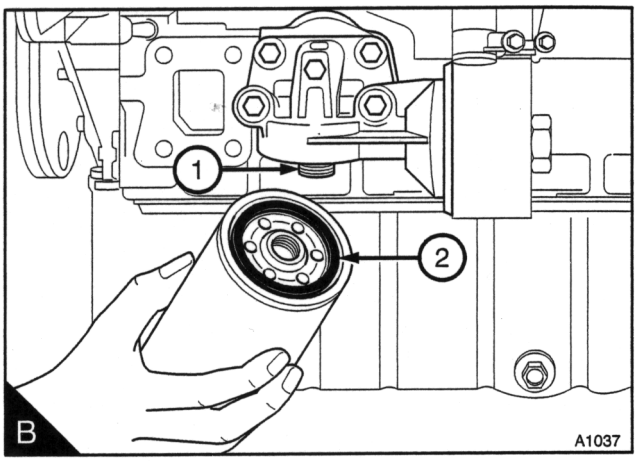
Warning! *Discard the used canister and lubricating oil in a safe place and in accordance with local regulations.*

Cautions:

- *The canister contains a valve and special tube to ensure that lubricating oil does not drain from the filter. Therefore, ensure that the correct Perkins POWERPART canister is used*
- *Ensure that the application is on a level surface to ensure an accurate reading on the dipstick.*

The filter can have one or two canisters. When two canisters (A1) and (A2) are fitted, both must be renewed at the same time.





1 Put a tray under the filter to retain spilt lubricating oil.

2 Remove the filter canister with a strap wrench or similar tool. Ensure that the adaptor (B1) is secure in the filter head. Discard the canister.

3 Clean the filter head.

4 Add clean engine lubricating oil to the new canister. Allow the oil enough time to pass through the filter element.

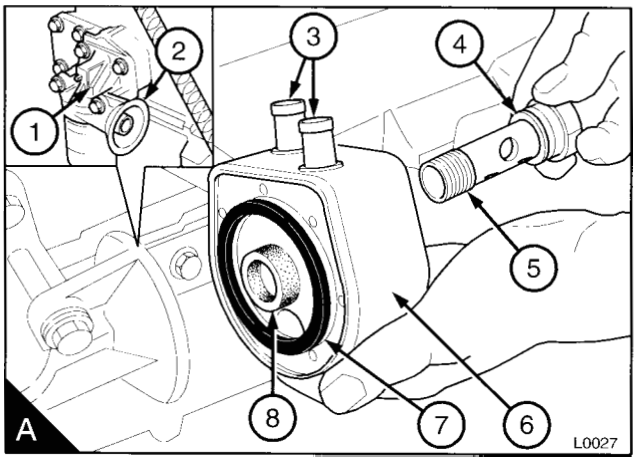
5 Lubricate the top of the canister seal (B2) with clean engine lubricating oil.

6 Fit the new canister and tighten it by hand only. Do not use a strap wrench.
Ensure that there is lubricating oil in the sump. On turbocharged engines ensure that the engine will not start and operate the starter motor until oil pressure is obtained. To ensure that the engine will not start, either put the manual stop control in the “Stop” position or disconnect the electrical stop control of the fuel injection pump. Oil pressure is indicated when the warning light is extinguished or by a reading on the gauge.

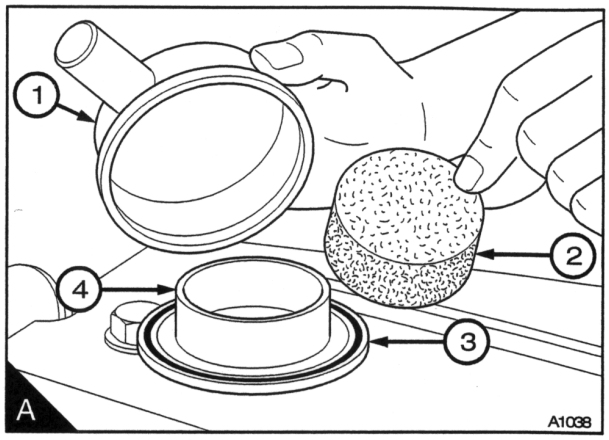
7 Operate the engine and check for leakage from the filter. When the engine has cooled, check the oil level on the dipstick and put more oil into the sump, if necessary.

To service the canister type lubricating oil cooler

1 Remove the lubricating oil cooler from the ergine.
2 Clean thoroughly the outside of the cooler plates with a proprietary clearing fluid. Clean thoroughly the inside of the cooler plates with clean water.
3 Fit the oil cooler to the engine.



How to maintain the engine open breather system



Caution: *The material used for the cover, fitted to the engine breathers has been changed to a harder plastic. As a result, the maintenance procedure and the maintenance period have changed. Also the part number has changed from 4133J005 to 4133J008. The part number is marked on the top of the cover of the latest oil separator. Do not try to remove the cover of the oil separator as it will break. The whole oil separator should be renewed at every engine overhaul or 8000 hours.*

Some engines are fitted with an open breather which has a steel gauze (A2) to separate the oil from the crankcase gases before they leave the engine.

Note: It is not necessary to remove the body of the breather from the rocker cover to obtain access to the gauze.

1 Release the hose clip from the breather cover (A1).

2 Use a suitable lever between the outlet nozzle and the rocker cover to remove the breather cover from the body of the breather (A4). Ensure that the breather cover and the rocker cover are not damaged.

3 Use a cloth made damp with a proprietary clearing fluid to clean the body of the breather.

4 Renew the “O” ring seal (A3).

5 Check that the inside of the breather pipe is clean. If the pipe is not clean, release the setscrews and remove the pipe. Wash the pipe with kerosene and dry it with low-pressure air.

6 Wash the steel gauze (A2) with kerosene and dry it with low-pressure air.

7 Fit the cover to the breather body, ensure that it is securely fitted.

8 Fit the breather pipe and tighten the hose clips.

How to maintain the engine closed circuit breather system

Caution: *It is very important that closed circuit breather systems are fitted correctly to the engine. Incorrect installation can cause extreme damage to the engine.*

Below is a series of safety precautions that must be applied at all times.

- Do not operate the engine if any of the breather valve or the induction hoses are loose or disconnected as this could allow dirt into the engine and damage to the engine could occur.
- Do not operate the engine if any of the breather valve or the induction hoses are bent such as to cause a restriction to the gases that flow through them. This can cause lubricating oil to enter the cylinders through the breather valve.
- Do not alter the design or any settings for the closed breather system.
- Ensure that the vent hole (A1) is not restricted during service. The closed circuit breather used on the New 1000 Series engine comprises a body (A4) and a valve assembly (A5). The whole assembly must be renewed every complete overhaul of the engine or 8000 hours.

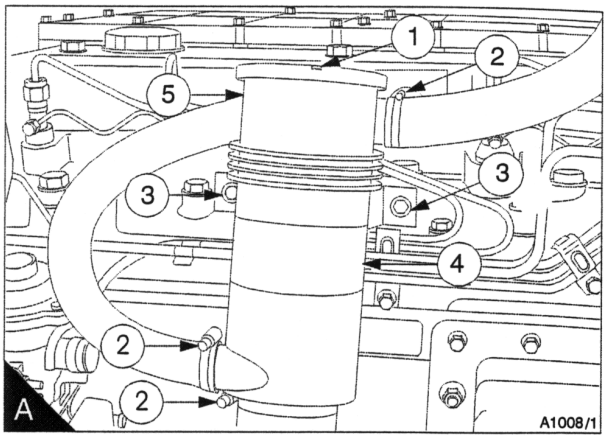
To renew the engine breather assembly

1 Release the three hose clips (A2) and remove the hoses.

2 Release the two setscrews (A3) and remove the breather assembly.

3 Clean the inside of the pipes with a proprietary clearing fluid and dry them.

4 Fit a new breather assembly. Fit and tighten the two setscrews. Fit the three hoses in their correct positions on the breather and tighten the three hose clips.



Air filter

Caution: *Do not operate the engine if there is a blockage in the air filter or the induction hose. This can cause lubricating oil to enter the cylinders through the breather valve.*

Environmental conditions have an important effect on the frequency at which the air filter needs service.

Certain air filters have a separate dust bowl (A1) which must be cleaned at intervals. The amount of dust in the bowl shows if it has been removed at the correct time for the conditions of operation. Do not let dust completely fill the bowl, because this will reduce the life of the filter element (A2).

Certain air filters have automatic dust valves (B1) through which dust is expelled from the filter. The rubber dust valve must be kept clean. Ensure that the sides of the valves close completely together and that they can separate freely.

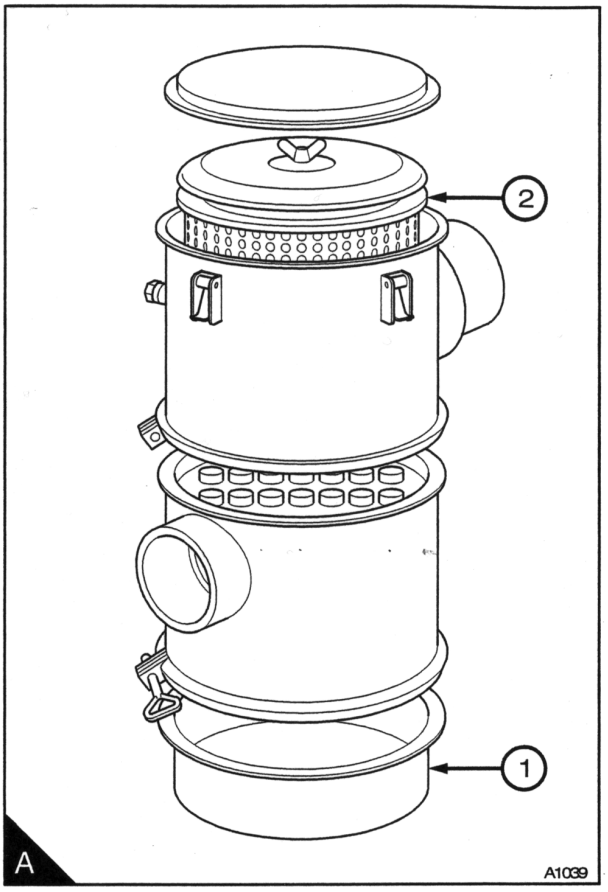
If a restriction indicator is fitted, see “Restriction indicator” on page 45, it will indicate precisely when the air filter element needs service. This prevents the premature removal of the filter element which causes extra cost or late removal of the element which can cause loss of engine power. The filter element must be cleaned or renewed according to the manufacturers recommendations.

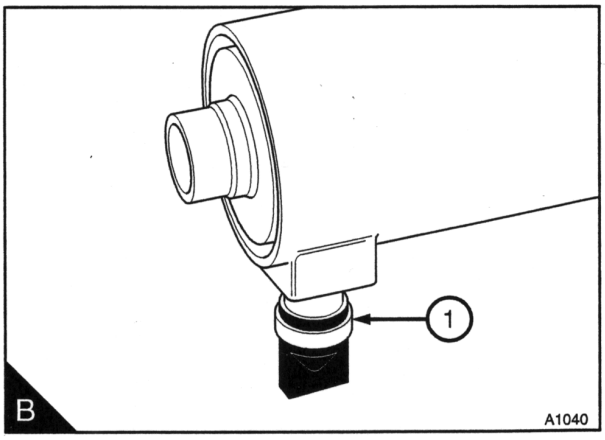
Restriction indicator

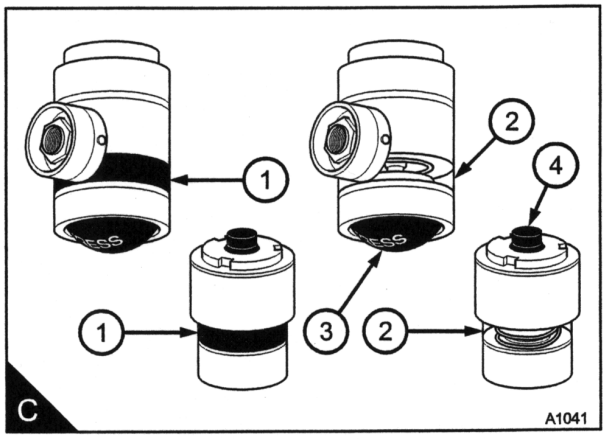
The restriction indicator is fitted on the air filter outlet or between the air filter and the induction manifold.

When the red warning indicator (C1) is seen through the clear panel (C2) after the engine has stopped, the air filter element must be removed for service.

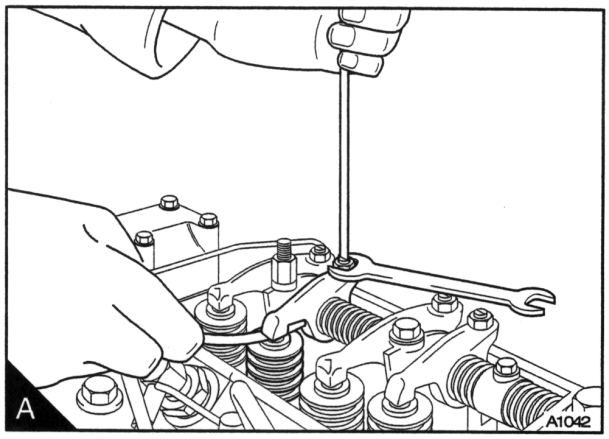
After a clean element has been fitted, press the rubber bottom (C3) or the button (C4) of the restriction indicator to reset the red warning indicator.

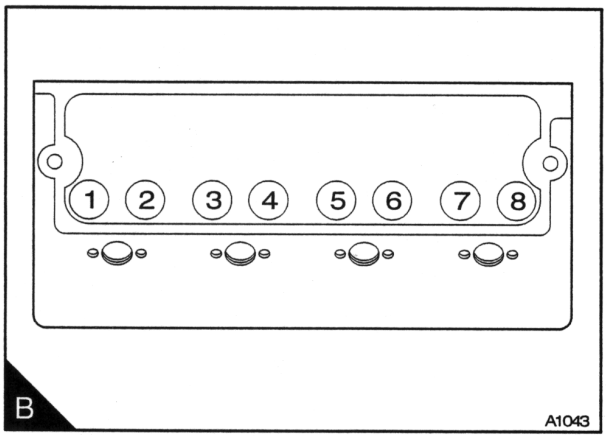






How to check the valve tip clearances - four cylinder engines





These are checked between the top of the valve stem and the rocker lever (A), with the engine hot or cold. The correct clearance for inlet valves is 0,20 mm (0.008 in) and 0,45 mm (0.018 in) for exhaust valves. The valve positions are shown at (B).

The sequence of valves from number 1 cylinder is shown in the table below.

Note: Number 1 cylinder is at the front of the engine.

1 Rotate the crankshaft in the normal direction of rotation until the inlet valve (B7) of number 4 cylinder has just opened and the exhaust valve (B8) of the same cylinder has not closed completely. Check the clearances of the valves (B1 and B2) of number 1 cylinder and adjust them, if necessary.

2 Set the valves (B3 and B4) of number 2 cylinder as indicated above for number 4 cylinder. Then check / adjust the clearances of the valves (B5 and B6) of number 3 cylinder.

3 Set the valves (B1 and B2) of number 1 cylinder. Then check / adjust the clearances of the valves (B7 and B8) of number 4 cylinder.

4 Set the valves (B5 and B6) of number 3 cylinder. Then check / adjust the clearances of the valves (B3 and B4) of number 2 cylinder.

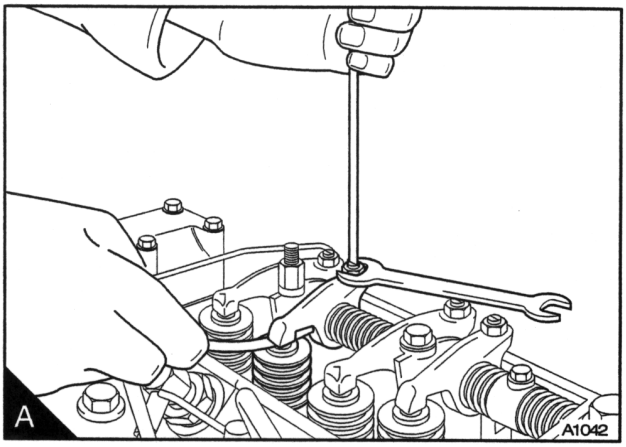
Cylinder and valve number	**1**		**2**		**3**		**4**	
	1	2	3	4	5	6	7	8
Valve **I = Inlet** **E = Exhaust**	I	E	I	E	I	E	I	E

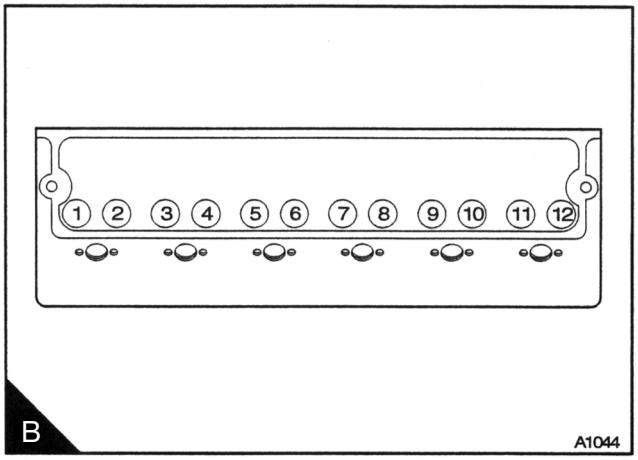
How to check the valve tip clearances -six cylinder engines

These are checked between the top of the valve stem and the rocker lever (A), with the engine hot or cold. The correct clearance for inlet valves is 0,20 mm (0.008 in) and 0,45 mm (0.018 in) for exhaust valves. The valve positions are shown at (B).

The sequence of valves from number 1 cylinder is shown in the table below.

Note: Number 1 cylinder is at the front of the engine.





1 Rotate the crankshaft in the normal direction of rotation until the inlet valve (B11) of number 6 cylinder has just opened and the exhaust valve (B12) of the same cylinder has not closed completely. Check the clearances of the valves (B1 and B2) of number 1 cylinder and adjust them, if necessary.

2 Set the valves (B3 and B4) of number 2 cylinder as indicated above for number 6 cylinder. Then check / adjust the clearances of the valves (B9 and B10) of number 5 cylinder.

3 Set the valves (B7 and B8) of number 4 cylinder. Then check / adjust the clearances of the valves (B5 and B6) of number 3 cylinder.

4 Set the valves (B1 and B2) of number 1 cylinder. Then check / adjust the clearances of the valves (B11 and B12) of number 6 cylinder.

5 Set the valves (B9 and B10) of number 5 cylinder. Then check / adjust the clearances of the valves (B3 and B4) of number 2 cylinder.

6 Set the valves (B5 and B6) of number 3 cylinder. Then check / adjust the clearances of the valves (B7 and B8) of number 4 cylinder.

Cylinder and valve number	**1**		**2**		**3**		**4**		**5**		**6**	
	1	2	3	4	5	6	7	8	9	10	11	12
Valve I = Inlet E = Exhaust	I	E	I	E	I	E	I	E	I	E	I	E

ENGINE FLUIDE

Fuel specification

To get the correct power and performance from your engine, use good quality fuel. The recommended fuel specification for Perkins engines is indicated below:

Cetane number: 45 minimum
Viscosity: 2.0/4.5 centistokes at 40° C
Density: 0,835/0,860 kg/litre at 15° C
Sulphur: 0.20% of mass, maximum
Distillation: 85% at 350° C

Cetane number indicates ignition performance. A fuel with a low cetane number can cause cold start problems and affect combustion.

Viscosity is the resistance to flow and engine performance can be affected if it is outside the limits.

Density: A lower density reduces engine power, a higher density increases engine power and exhaust smoke.

Sulphur: A high amount of sulphur (not normally found in Europe, North America or Australasia) can cause engine wear.

Percentage of sulphur in the fuel (%)	**Oil change interval**
< 0,5	Normal
0,5 to 1,0	0,75 of normal
> 1,0	0,50 of normal

Distillation: This is an indication of the mixture of different hydrocarbons in the fuel. A high ratio of light-weight hydrocarbons can affect the combustion characteristics.

Low temperature fuels

Special winter fuels may be available for engine operation at temperatures below 0°C. These fuels have a lower viscosity and also limit the wax formation in the fuel at low temperatures. If wax formation occurs, this could stop the fuel flow through the filter.

If you need advice on adjustments to an engine setting or to the lubricating oil change periods which may be necessary because of the standard of the available fuel, consult your nearest Perkins distributor.

Aviation kerosene fuels

Warning! *Aviation kerosene fuels are more flammable than diesel fuel and need careful storage. Ensure that the relevant safety precautions are conformed to*

These fuels can be used but they can affect engine performance. It is recommended that you consult the Perkins Technical Service Department at Peterborough.

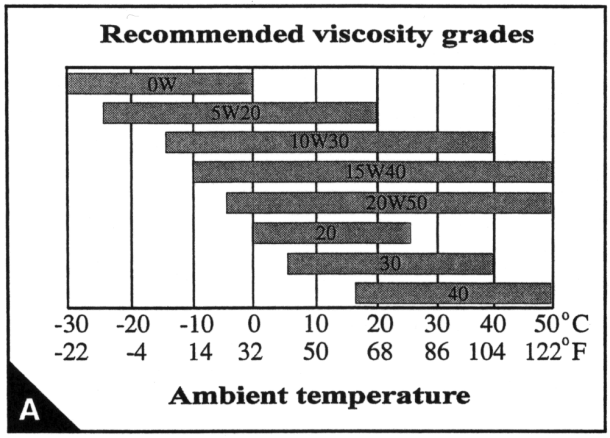
Lubricating oil specification

If you need advice on adjustments to an engine setting or to the lubricating oil change periods which may be necessary because of the standard of available fuel, consult your nearest Perkins distributor or the Technical Service Department.

Use only a good quality lubricating oil to the relevant specification as shown in the table below.

Caution: *The type of lubricating oil to be used may be affected by the quality of the fuel which is available. For further details see "Fuel specification" on page 28 and the "Preventive maintenance schedules" on page 3.*

Always ensure that the correct viscosity grade of lubricating oil is used for the ambient temperature range in which the engine will run as shown in the chart (A) and the table below:



Engine type	Specifications	
	API CF4 o ACEA E2	API CG4 o ACEA E3
Naturally aspirated	•	•(1)
Turbocharged	•	•(1)

(1) Recommended for applications which have engines that operate at high load conditions. Refer to your equipment supplier's handbook for the application or the table on page 4 for guidance. If further advice is necessary, refer to your nearest Perkins distributor.

Coolant specification

The quality of the coolant which is used can have a great effect on the efficiency and life of the cooling system. The recommendations indicated below can help to maintain a good cooling system and to protect it against frost and/or corrosion.

If the correct procedures are not used, Perkins cannot be held responsible for damage caused by frost or corrosion.

Caution:

- *An antifreeze which contains the correct inhibitor must be used at all times to prevent damage to the engine by corrosion, because of the use of aluminium in the cooling system*

- *If frost protection is not necessary, it is stili extremely important to use an approved antifreeze mixture because this gives a protection against corrosion and also raises the boiling point of the coolant*

- *If the approved antifreeze mixture is not available, add a correct mixture of corrosion inhibitor to the water. If the correct inhibitor is not used, the engine will be damaged by corrosion. If there is doubt about the corrosion inhibitor to be used, It is recommended that you consult the Perkins Service Department, Peterborough.*

Note: If combustion gases are released into the cooling system, the coolant must be renewed after repair of the fault.

The antifreeze which is recommended for this engine is the latest POWERPART Antifreeze, refer to “POWERPART recommended consumable products” on page 6. This antifreeze contains the correct corrosion inhibitor which is especially suitable for this engine.

If it is possible, use clean soft water in the coolant.

The quality of the antifreeze coolant must be checked at least once a year, for example, at the beginning of the cold period. The coolant must be renewed every two years.

The antifreeze mixture must consist of equal quantities of antifreeze and water. The corrosion inhibitor in the antifreeze will be diluted if a concentration of less than 50% of antifreeze is used. Concentrations of more than 50% of antifreeze may have an adverse effect on the performance of the coolant.

FAULT DIAGNOSIS

Problems and possible causes

Problem	Possible causes	
	Checks by the user	Checks by the workshop personnel
The starter motor turns the engine too slowly	1, 2, 3, 4	
The engine does not start	5, 6, 7, 8, 9, 10, 12, 14, 15, 17	13, 34, 35, 36, 37, 38, 40, 42, 43, 44
The engine is difficult to start	5, 7, 8, 9, 10, 11, 12, 14,15,16, 17,19	13, 34, 36, 37, 38, 40, 42, 43, 44
Not enough power	8, 9, 10, 11, 12, 16, 17, 18, 19, 20, 21	13, 34, 36, 37, 38, 39, 42, 43, 44, 61, 63, 64
Misfire	8, 9, 10, 12, 15, 20, 22	13, 34, 36, 37, 38, 39, 40, 41, 43
High fuel consumption	11,15,17,18,19, 21, 22	13, 34, 36, 37, 38, 39, 40, 42, 43, 44, 63
Black exhaust smoke	11, 15,17,19, 21, 22	13, 34, 36, 37, 38, 39, 40, 42, 43, 44, 61, 63
Blue or white exhaust smoke	4, 15, 21, 23	36, 37, 38, 39, 42, 44, 45, 52, 58, 62
The pressure of the lubricating oil is too low	4, 24, 25, 26	46, 47, 48, 50, 51, 59
The engine knocks	9,15, 17, 20, 22, 23	13, 36, 37, 40, 42, 44, 46, 52, 53, 60
The engine runs erratically	7, 8, 9,10,11,12,15, 16, 18, 20, 22, 23	13, 34, 38, 40, 41, 44, 52, 60
Vibration	18, 20, 27, 28	13, 34, 38, 39, 40, 41, 44, 52, 54
The pressure of the lubricating oil is too high	4, 25	49
The engine temperature is too high	11,15,19, 27, 29, 30, 32	13, 34, 36, 37, 39, 52, 55, 56, 57, 64
Basamento sotto pressione	31, 33	39, 42, 44, 45, 52
Crankcase pressure	11, 22	37, 39, 40, 42, 43, 44, 45, 53, 60
The engine starts and stops	10,11, 12	

List of possible causes

1 Battery capacity low.
2 Bad electrical connections.
3 Fault in starter motor.
4 Wrong grade of lubricating oil.
5 Starter motor turns engine too slowly.
6 Fuel tank empty.
7 Fault in stop control.
8 Restriction in a fuel pipe.
9 Fault in fuel lift pump.
10 Dirty fuel filter element.
11 Restriction in filter/cleaner or air induction system.
12 Air in fuel system.
13 Fault in atomisers or atomisers of an incorrect type.
14 Cold start system used incorrectly.
15 Fault in cold start system.
16 Restriction in fuel tank vent.
17 Wrong type or grade of fuel used.
18 Restricted movement of engine speed control.
19 Restriction in exhaust pipe.
20 Engine temperature is too high.
21 Engine temperature is too low.
22 Valve tip clearances are incorrect.
23 To much oil or oil of wrong specification used in wet type oil cleaner.
24 Not enough lubricating oil in sump.
25 Defective gauge.
26 Dirty lubricating oil filter element.
27 Fan damaged.
28 Fault in engine mounting or flywheel housing.
29 Too much lubricating oil in sump.
30 Restriction in air or water passages of radiator.
31 Restriction in breather pipe.
32 Insufficient coolant in system.
33 Vacuum pipe leaks or fault in the exhauster.
34 Fault in fuel injection pump.
35 Broken drive on fuel injection pump.
36 Timing of fuel injection pump is incorrect.
37 Valve timing is incorrect.
38 Bad compression.
39 Cylinder head gasket leaks.
40 Valves are not free.
41 Wrong high-pressure pipes.
42 Worn cylinder bores.
43 Leakage between valves and seats.
44 Piston rings are not free or they are worn or broken.
45 Valve stems and/or guides are worn.
46 Crankshaft bearings are worn or damaged.
47 Lubricating oil pump is worn.
48 Relief valve does not closet
49 Relief valve does not open.
50 Relief valve spring is broken.
51 Fault in suction pipe of lubricating oil pump.
52 Piston is damaged.
53 Piston height is incorrect.
54 Flywheel housing or flywheel is not aligned correctly.
55 Fault in thermostat or thermostat is of an incorrect type.
56 Restriction in coolant passages.
57 Fault in water pump.
58 Valve stem seal is damaged (if there is one fitted).
59 Restriction in sump strainer.
60 Valve spring is broken.
61 Turbocharger impeller is damaged or dirty.
62 Lubricating oil seal of turbocharger leaks.
63 Induction system leaks (turbocharged engines).
64 Turbocharger waste-gate does not work correctly (if there is one fitted).

ENGINE PRESERVATION

Introduction

The recommendations indicated below are designed to prevent damage to the engine when it is withdrawn from service for a prolonged period. Use these procedures after the engine is withdrawn from service. The instructions for the use of POWERPART products are given on the outside of each container.

Procedure

1 Completely clean the outside of the ergine.

2 When a preservative fuel is to be used, drain the fuel system and fill it with the preservative fuel. POWERPART Lay-Up 1 (Protective liquid 1) can be added to the normal fuel to change it to a preservative fuel. If preservative fuel is not used, the system can be kept full with normal fuel but the fuel must be drained and discarded at the end of the storage period together with the fuel filter element(s).

3 Operate the engine until it is warm. Then correct leakages of fuel, lubricating oil or air. Stop the engine and drain the lubricating oil from the sump.

4 Renew the canister(s) of the lubricating oil filter.

5 Fill the sump to the full mark on the dipstick with new and clean lubricating oil and add POWERPART Lay-Up 2 (Protective liquid 2) to the oil to protect the engine against corrosion. If POWERPART Lay-Up 2 is not available, use a correct preservative fluid instead of the lubricating oil. If a preservative fluid is used, this must be drained and the lubricating oil sump must be filled to the correct level with normal lubricating oil at the end of the storage period.

6 Drain the cooling system, see page 21. In order to protect the cooling system against corrosion, fill it with an approved antifreeze mixture because this gives protection against corrosion. If an approved antifreeze mixture is not available, add a correct mixture of corrosion inhibitor to the water - see page 43.

Attention: *Certain corrosion inhibitor mixtures could cause damage to some engine componente. Consult the Perkins Service Department, Peterborough if a corrosion inhibitor is to be used.*

7 Operate the engine for a short period in order to circulate the lubricating oil and the coolant in the ergine.

8 Disconnect the battery. Then put the battery into safe storage in a fully charged condition. Before the battery is put into storage, protect its terminals against corrosion. POWERPART Lay-Up 3 (Protective liquid 3) can be used on the terminals.

9 Clean the engine breather pipe (if one is fitted) and seal the end of the pipe.

10 Remove the atomisers and spray POWERPART Lay-Up 2 for one to two seconde into each cylinder bore with the piston at BDC.

11 Slowly turn the crankshaft one revolution and then fit the atomisers with new seat washers and new dust seals - see page 16.

12 Remove the air filter. Then, if necessary, remove the pipe(s) installed between the air filter and induction manifold or turbocharger. Spray POWERPART Lay-Up 2 into the induction manifold or turbocharger. It is recommended that the spray time for the turbocharger is 50% longer than the spray time for the manifold, which is indicated on the container label. Seal the manifold or the turbocharger with waterproof tape.

13 Remove the exhaust pipe. Spray POWERPART Lay-Up 2 into the exhaust manifold or the turbocharger. It is recommended that the spray time for the turbocharger is 50% longer than the spray time for the manifold, which is indicated on the container label. Seal the manifold or the turbocharger with waterproof tape.

14 If the lubricating oil filler is fitted onto the rocker cover, remove the filler cap. If the lubricating oil filler is not fitted onto the rocker cover, remove the rocker cover. Spray POWERPART Lay-Up 2 around the rocker shaft assembly. Fit the filler cap or rocker cover.

15 Seal the vent pipe of the fuel tank or the fuel filler cap with waterproof tape.

16 Remove the drive belts and put them into storage.

17 In order to prevent corrosion, spray the engine with POWERPART Lay-Up 3. Do not spray the area inside the alternator cooling fan.

Attention: *After a period in storage, but before the engine is started, operate the starter motor with the engine stop control (A page 14) in the "stop" position until oil pressure is indicated. Oil pressure can be indicated either by a gauge or when a low pressure warning light is extinguished. If a solenoid stop control is used on the fuel injection pump, it must be disconnected for this operation.*

If the engine protection is done correctly according to the above recommendations, no corrosion damage will normally occur. Perkins are not responsible for damage which may occur when an engine is in storage after a period in service.

PROCEDURE FOR FILLING THE COOLING CIRCUIT

A special attention must be paid when filling and bleeding the cooling circuit of the Perkins engines, 1000 series, and of engines in general to avoid potential damage due to an abrupt reduction of the liquid flow in the cooling circuit or a stall of the pump impeller.

Filling the engine and radiator circuit

Before starting filling, it is necessary to check that the heating circuit in the cabin or any other remote radiator is closed when filling the first time.

The filling velocity values recommended are:

- Max filling velocity 7 l/min
- Recommended filling velocity 5 l/min

At these filling velocities, with a continuous and uniform water flow, the air is eliminated from the circuit in an efficient way.

If such conditions do not exist, because of a particular arrangement of the circuit, it is possible to fill at 10 l/min. after having checked that the system is conform to the requisites of a correct installation. In any case, it may occur that some air remains inside the circuit. This air can be eliminated letting the engine run for 30 seconds at 50% speed than the maximum speed. The air in the circuit is normally eliminated through the vent point on the thermostatic valve. Bleeding does not occur if a thermostat is placed horizontally. Sometimes it may be necessary to repeat the procedure described to be sure that all the air has been eliminated from the circuit.

Filling and bleeding the heating circuit in the cab or other accessories

It is fundamental that the air of these circuits does not reach the pump body. This can be obtained with a vent hole in the highest point of the auxiliary circuit or in other ways that allow to eliminate the air in the circuit through the expansion cup.
The guarantee of a complete filling can only be given by a vacuum pump or a pressure equipment or if the entire auxiliary heating system in the cab is under the top tank of the radiator and an adequate vent point is accessible.

In most applications, this is not the case and it is necessary to intervene so that the return line of the auxiliary heating system does not allow to convey air into the pump body. In these cases, the connection at the pump inlet shall not be used in order to prevent cavitation. Air would remain inside the pump body until the opening of the thermostat and the application of a load to the engine, as it occurs during testing, could cause serious damage.
In this case, we suggest some adequate connection points:

- Bottom tank of the radiator
- Return pipe from the radiator to the pump, only if it is possible to prepare an air vent point in the radiator body or if there is a tube from the expansion tank between the circuit connection and the pump.

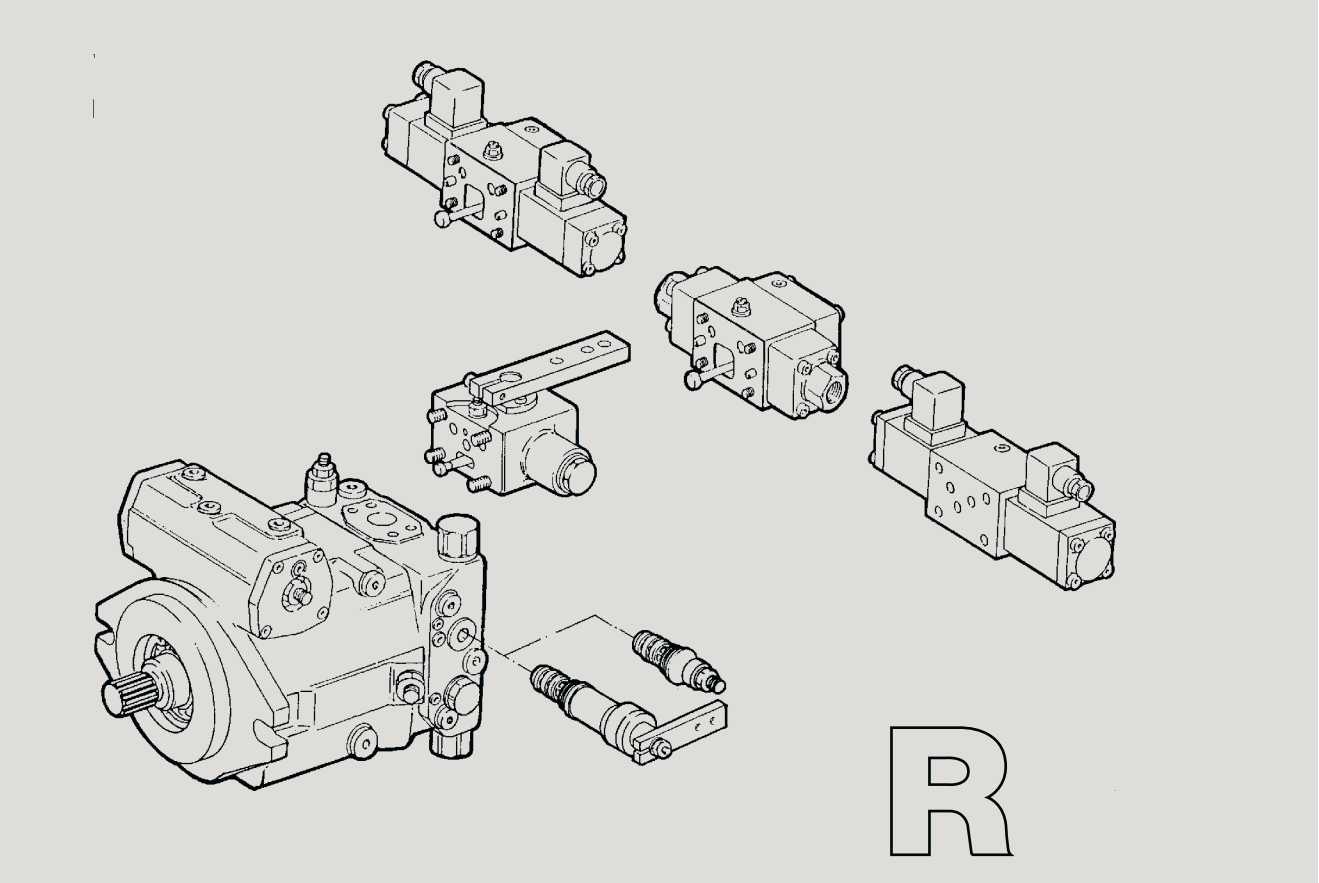
If these solutions cannot be realised, the installation cannot be considered safe. In this case, special filling and bleeding procedures shall be developed and adopted for any single application. The realisation can however be quite difficult; for instance, the return circuit from the heating shall be blocked with special restrictions (e.g. shut-off valves) and the engine shall be run loadless until all the air has been eliminated from the circuit, then the separate filling of the auxiliary circuit shall be done before opening the circuit and checking the efficiency.

In any case, this kind of solutions require a precise verification and can be affected by a number of variables, not necessarily depending on the engine, but on single production processes.

A more accurate check of the real efficiency of the filling of the cooling system can be done during the installation tests measuring the pressure in the circuit using the connection already fitted to the body of the thermostat seat for the temperature bulb. In this point, the pressure increases due to the increase in volume of the water. An

increase of about 40 kPa (0.4 bar) can be noted if the engine is run gradually from idle to about 2000 rev./min. If no variations are recorded, it is likely that some air has remained in the pump body and there are stall conditions.

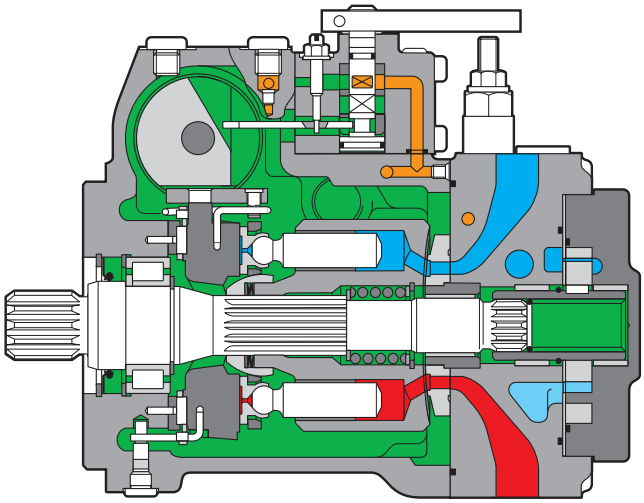
Section I
REPAIR INSTRUCTIONS REXROTH PUMP



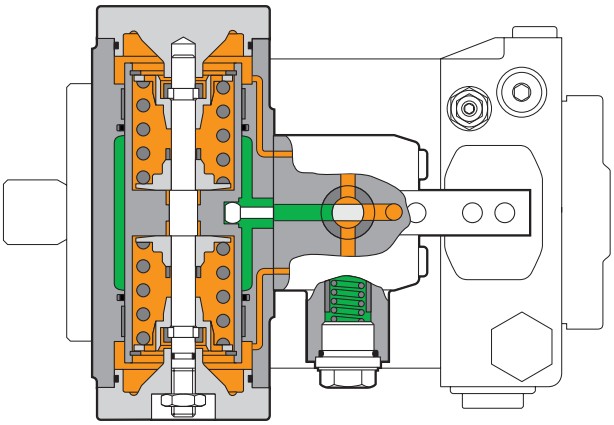
Repair instructions
Mod. A4VG

NOTICE

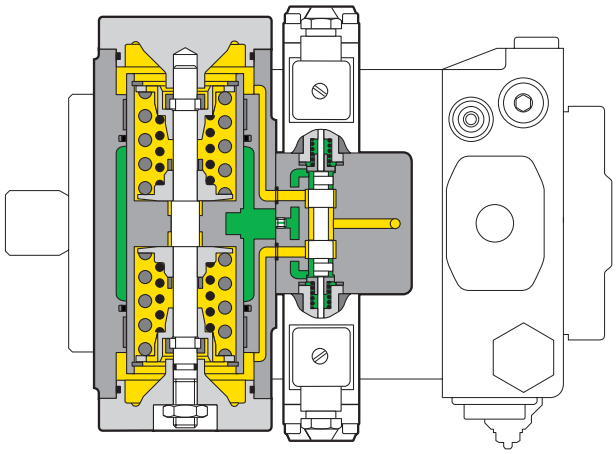
Specifications, descriptions and illustrative material shown herein were as accurate as known at the time this publication was approved for printing.
BRUENINGHAUS HYDROMATIK reserves the right to discontinue models or options at any time or to change specifications, materials, or design without notice and without incurring obligation.
Optional equipment and accessories may add cost to the basic unit, and some options are available only in combination with certain models or other options.
For the available combinations refer to the relevant data sheet for the basic unit and the desired option.
Adjustment and tests have to be carried out on the test bench under operating temperatures.
Protection of personnel and property has to be guaranteed by appropriate measures.
Expert knowledge, the precondition of any service work, can be obtained in our training courses.



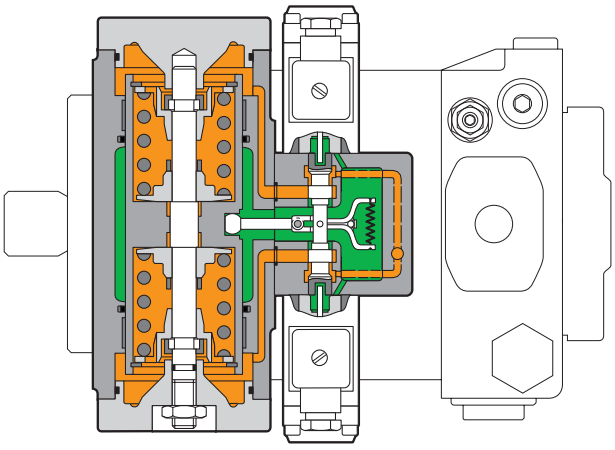
HWD



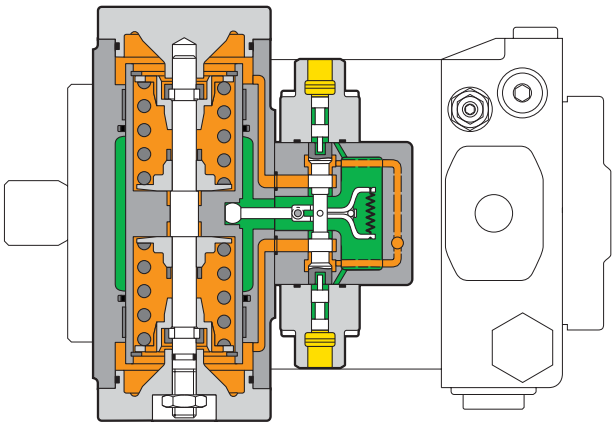
DAD



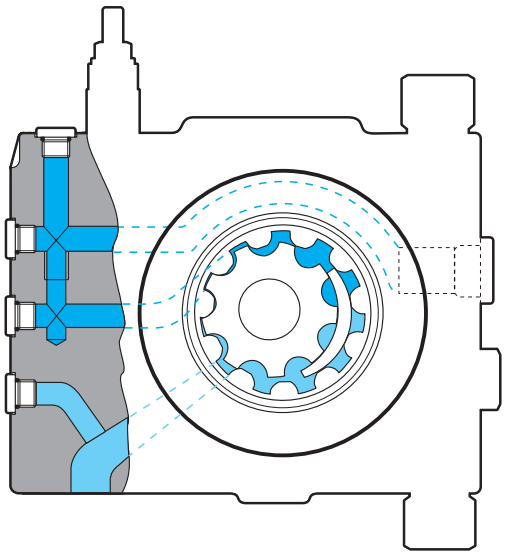
EPD

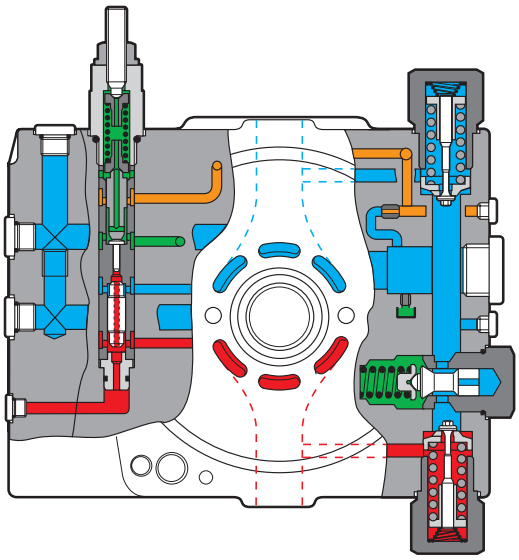


HDD

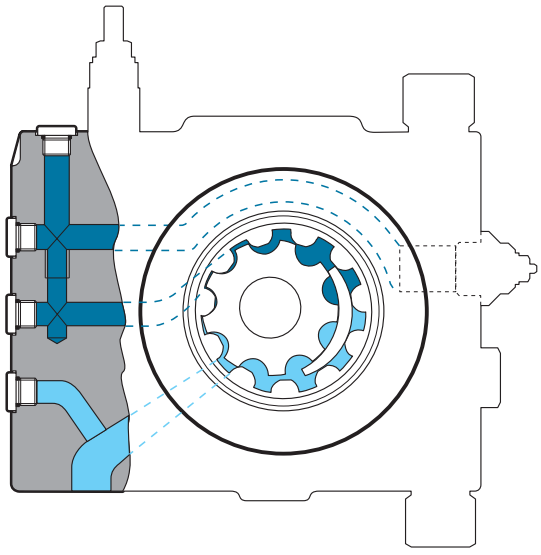


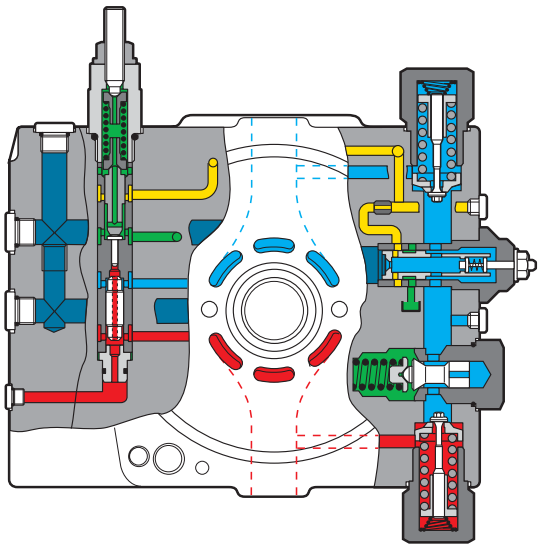
HWD / EPD / HDD

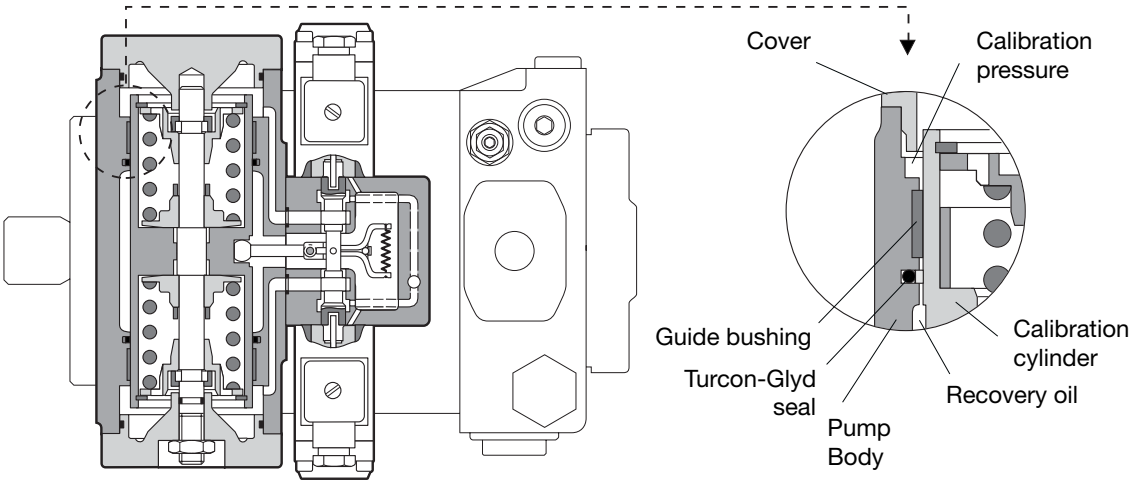




DAD



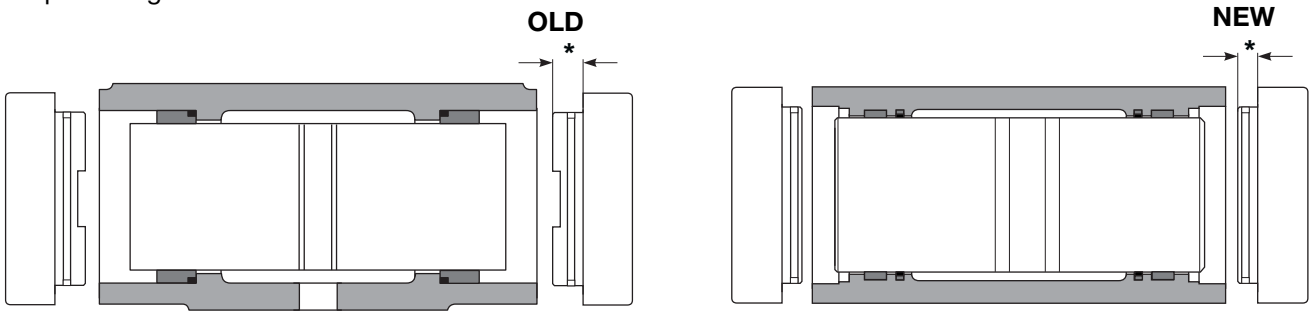




At present the change of the control into Turcon seal is made for A4VG.
The parts list of the complete unit will receive a new identification number.
Type reference and outside dimensions remain unchanged (pump housing will change at the area of the positioning piston. Positioning piston will change into chamfering design).

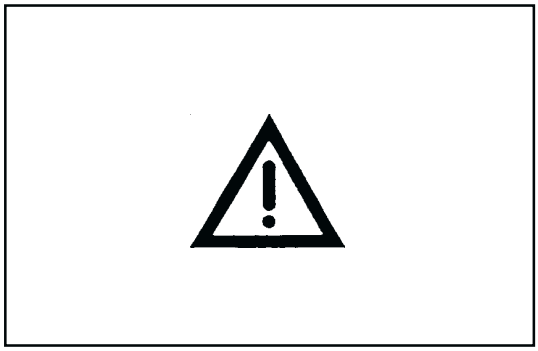
⚠ Do not use old positioning piston with Turcon seal (sharp edged - seal will be damaged)

Pump housing with Turcon seal

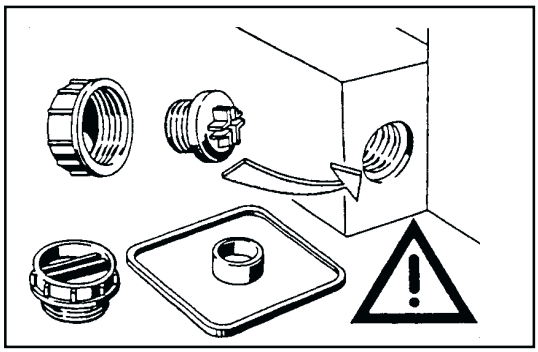


⚠ The change of the control into Turcon seal design improves in general the function (DA-behaviour, lower temperature-influence on control times).

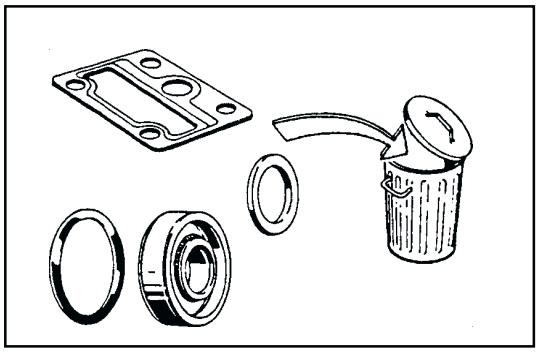
⚠ The control times will slightly change with the same throttle sections. Therefore our customers have to be informed about this change.



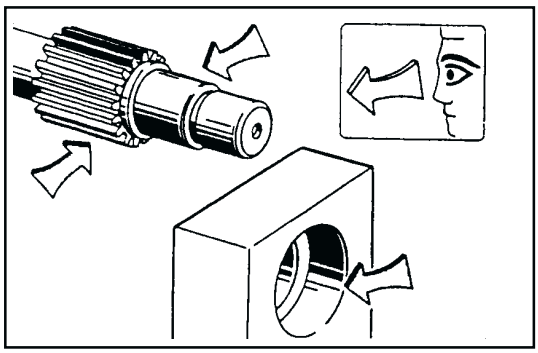
Attention!
Observe the following notices when carrying out repair work at hydraulic aggregates!



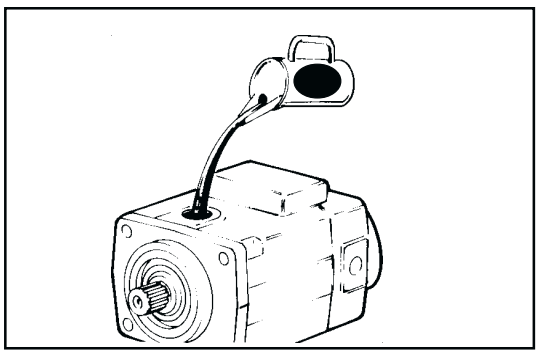
Close all ports of the hydraulic aggregates.



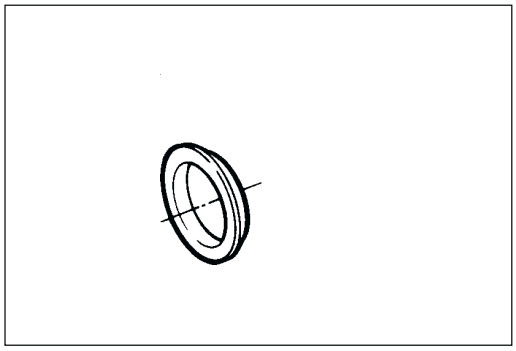
Replace all seals.
Use only original BRUENINGHAUS HYDROMATIK spare parts.



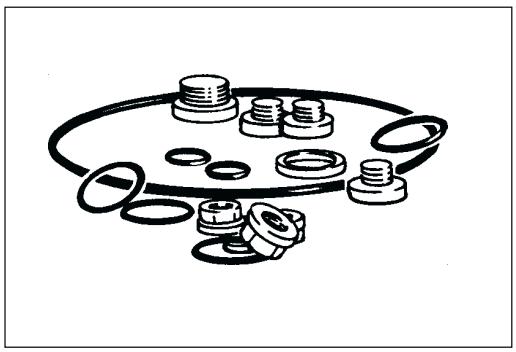
Check all seal and sliding surfaces for wear.
Attention: Rework of sealing area f. ex. with abrasive paper can damage surface.



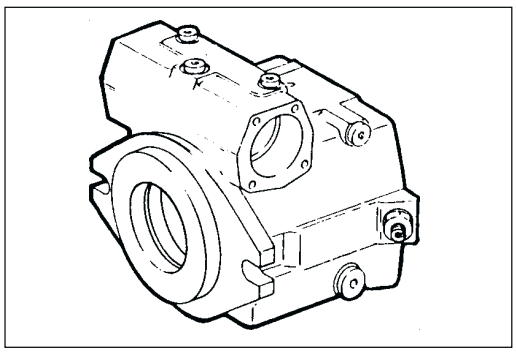
Fill up hydraulic aggregates with medium before start-up.



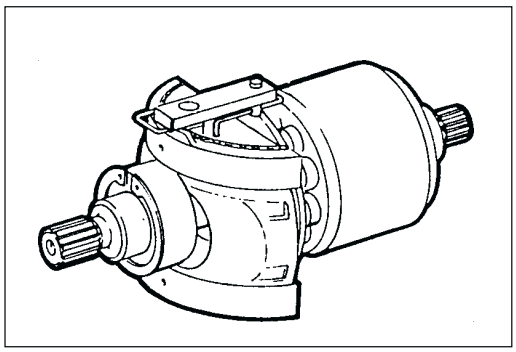
1 Seal kit for drive shaft.



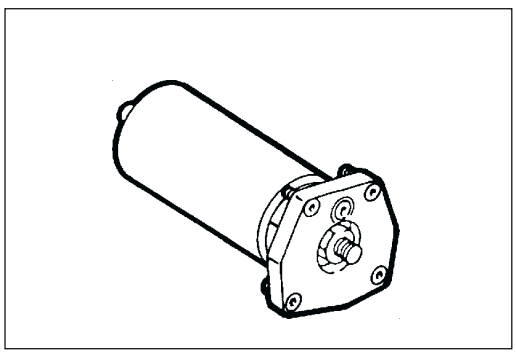
2 External seal kit.



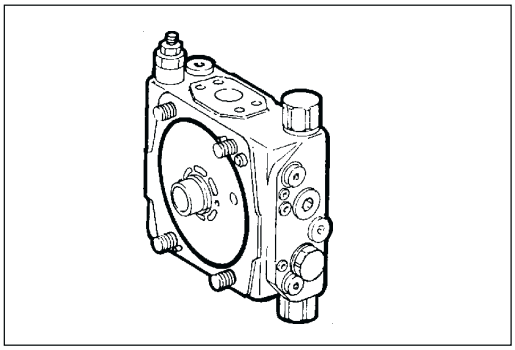
3 Housing.



4 Complete rotary group.

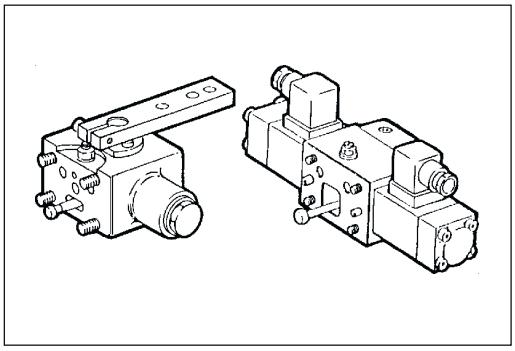


5 Positioning piston.



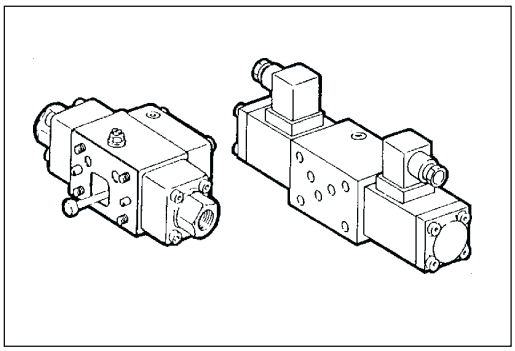
6

Port block.



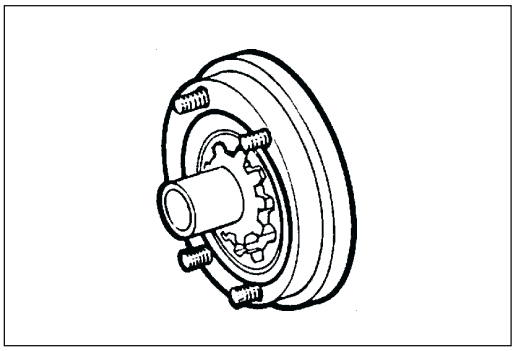
7

Control moduls **HW - EP.**



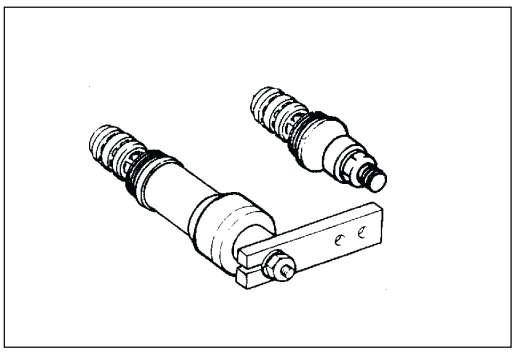
8

Control moduls **HD - DA.**



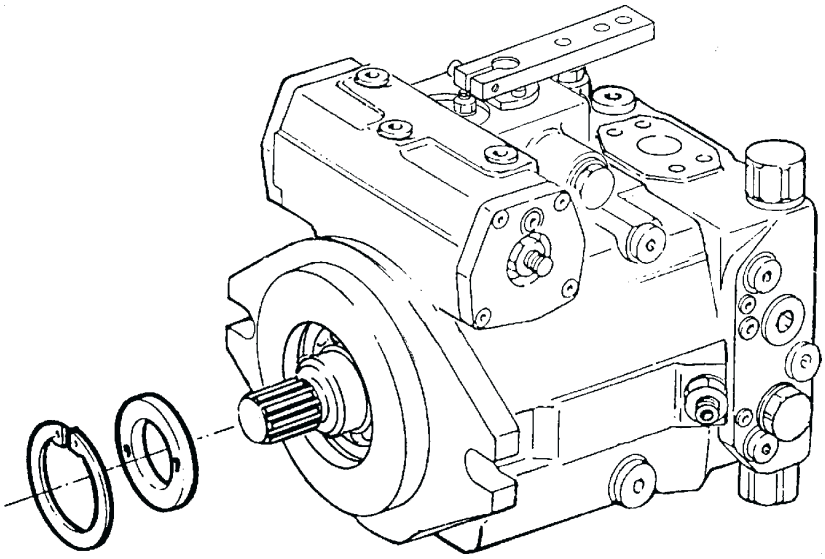
9

Boost pump.

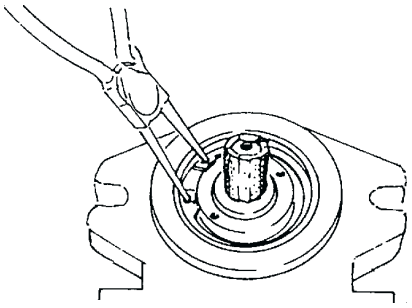


10

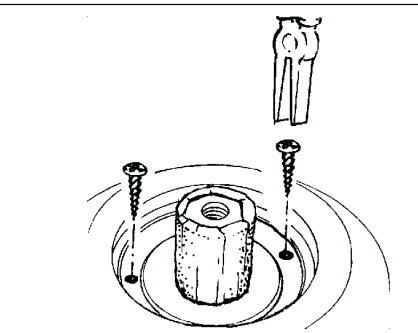
Control valve.



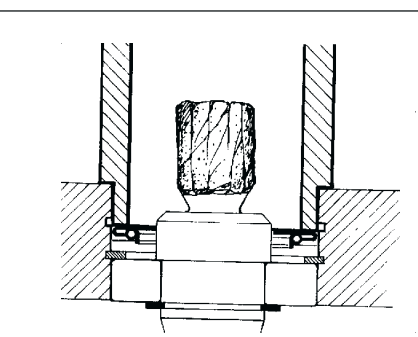
11



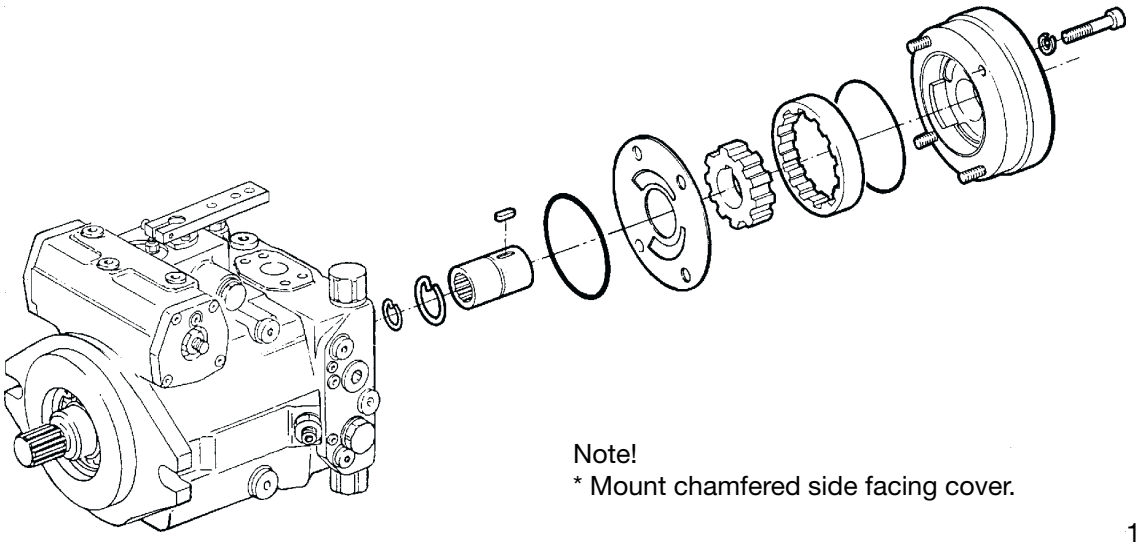
12 Protecting the drive shaft.
Remove retaining ring.



13 Screw in sheet metal screw into the holes fitted with rubber.
Pull out shaft seal with pliers.

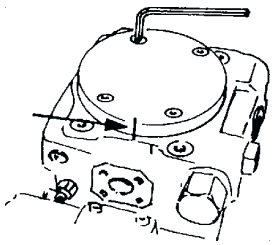


14 Press-in shaft seal with bush to stop.

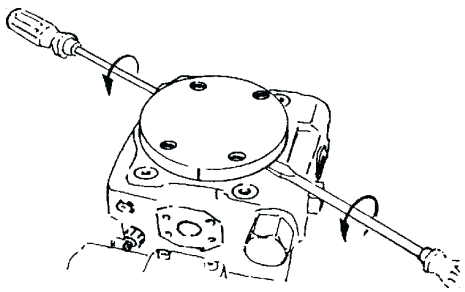


Note!
* Mount chamfered side facing cover.

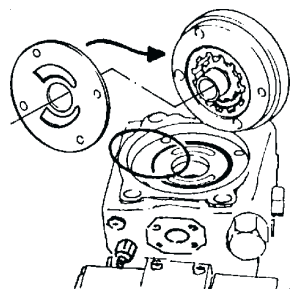
15



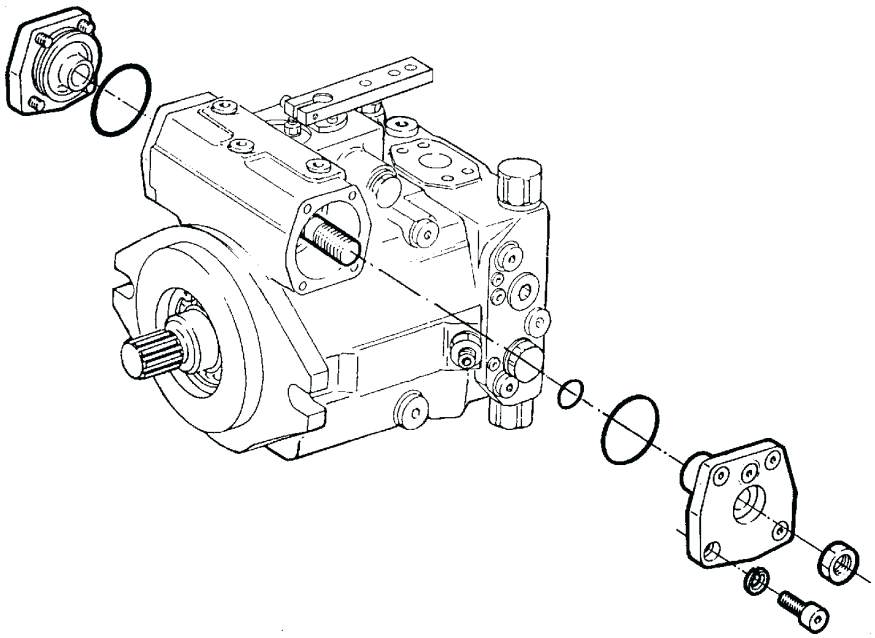
16 Mark position, remove fixing screws.



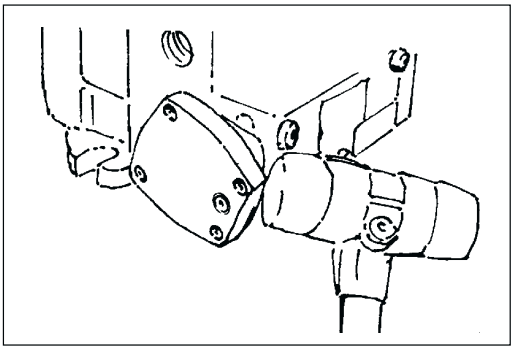
17 Pry-off cover.



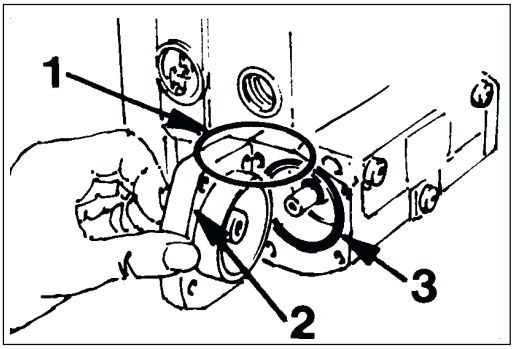
18 Inspect the parts of the boost pump and wear parts.
Boost pump can only be interchanged completely.



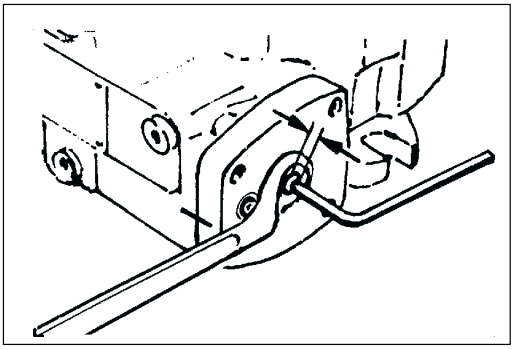
19



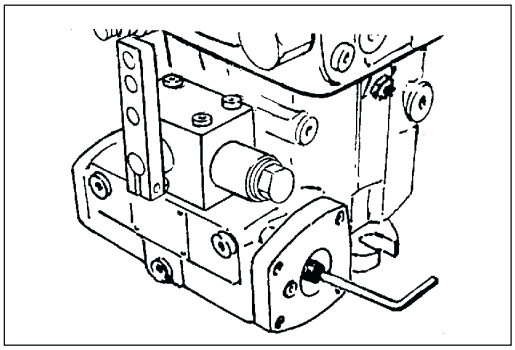
20 Loosen mounting screws.
Rotate cover and release by tapping gently with hammer.



21 Check!
O-ring (1), groove (2), housing (3).

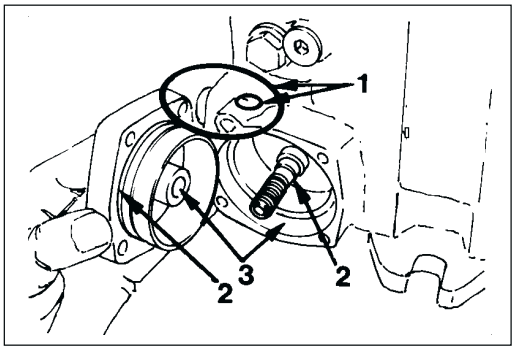


22 Remove locknut whilst holding setting screw.
Mark cover. Must be fixed, loosen counter nut.



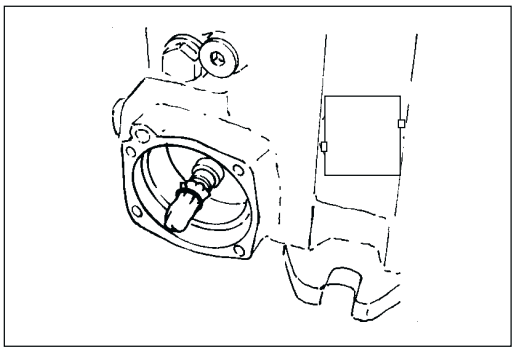
23

Pull cover off using zero position adjustment screw.



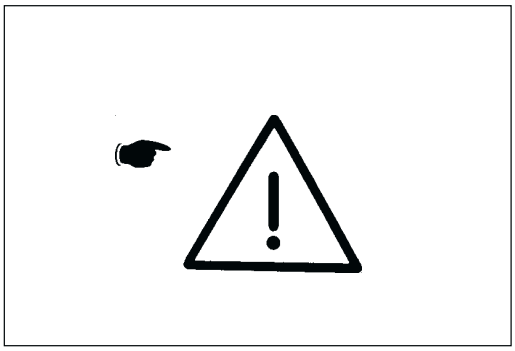
24

Check!
O-ring (19), groove (2), housing (3).



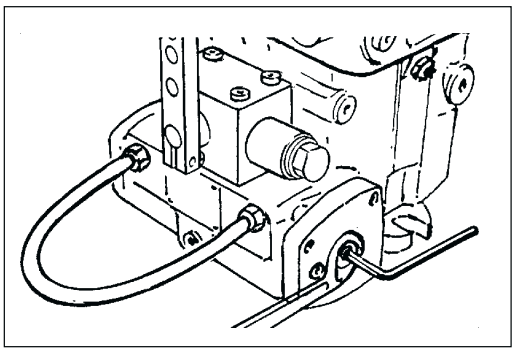
25

Cover threads, push on small O-ring.
Assemble in reversed order.



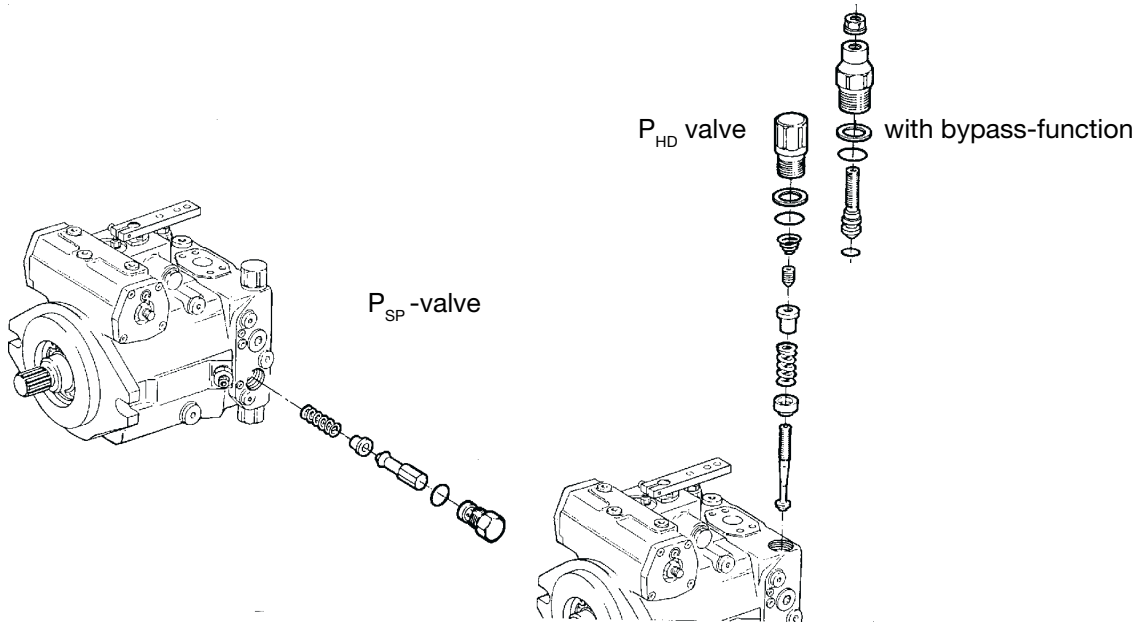
26

Attention!
Adjustment of the correct zero position to be carried out after installation into the machine or on the test bench.

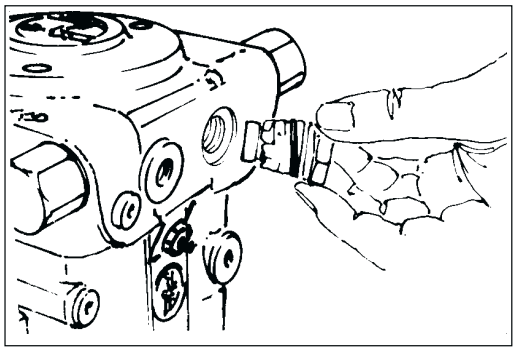


27

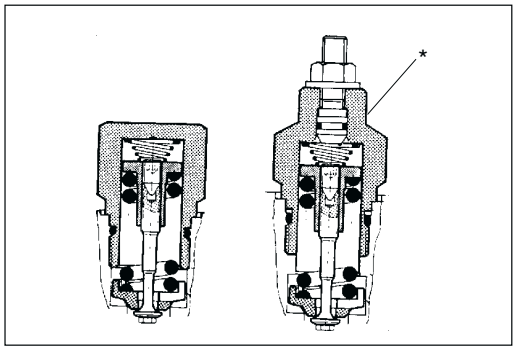
Reset mechanical zero position. To do this, connect X_1 to X_2 (size > 6).



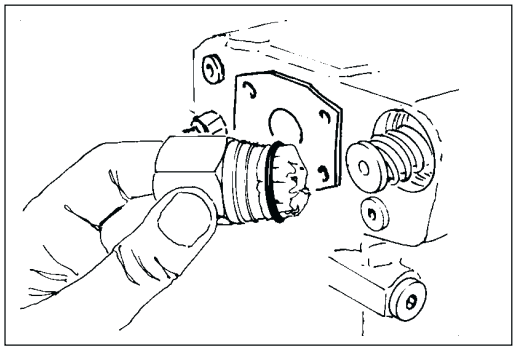
28



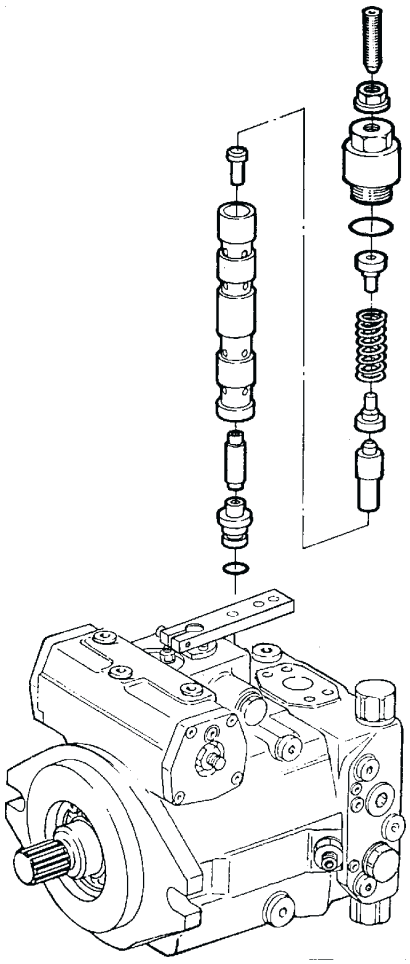
29 Cover threads before fitting new O-rings.
(Damage protection).



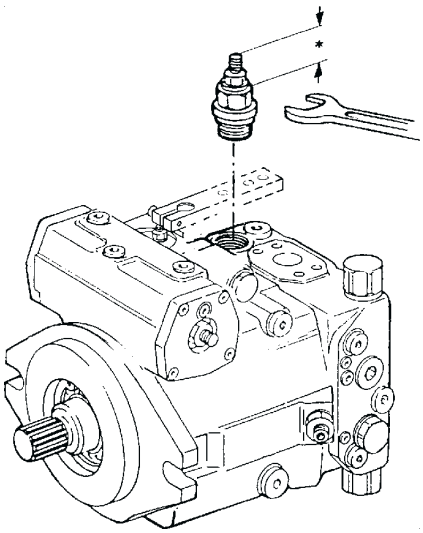
30 Remove valve poppet with spring.
* with bypass-function



31 Cover threads before fitting new O-rings.
(Damage protection).



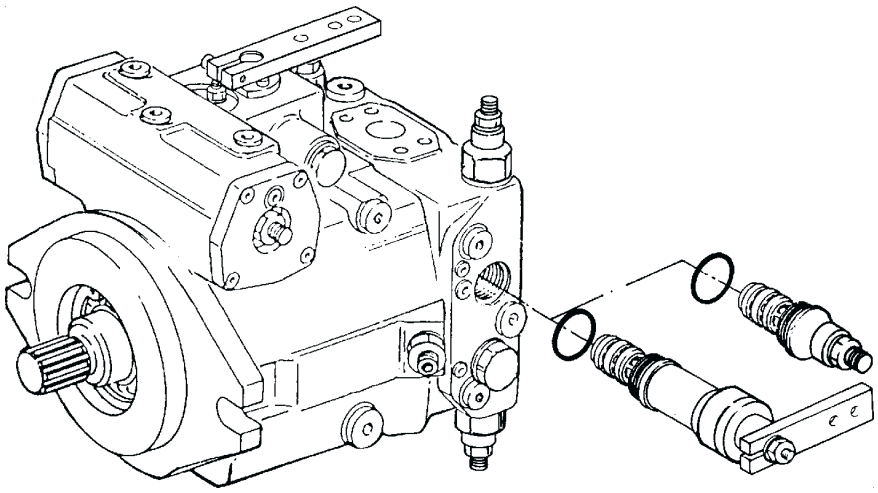
32



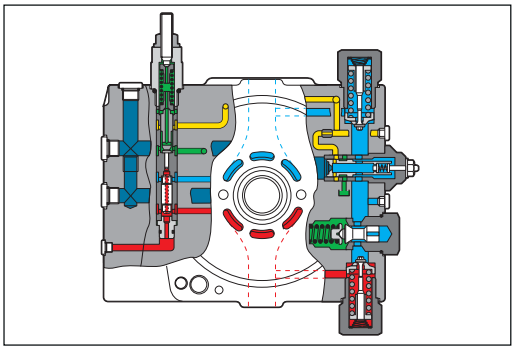
33

Change of the sealing nut.
Note setting measure (*).

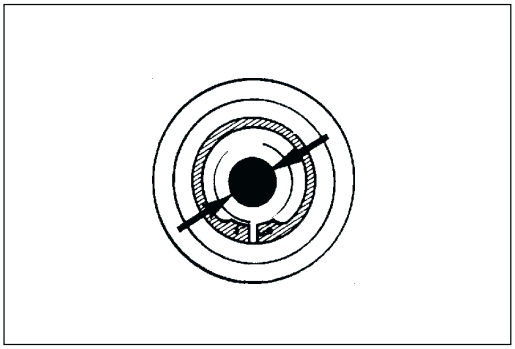
Attention!
After assembly check “valve setting”.



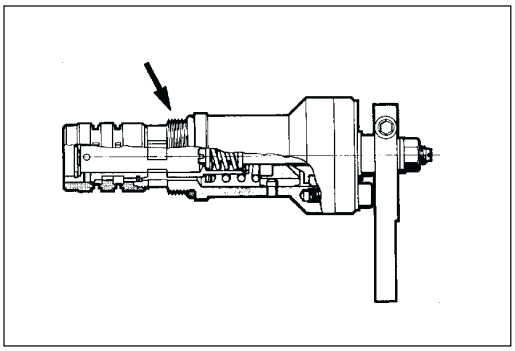
34



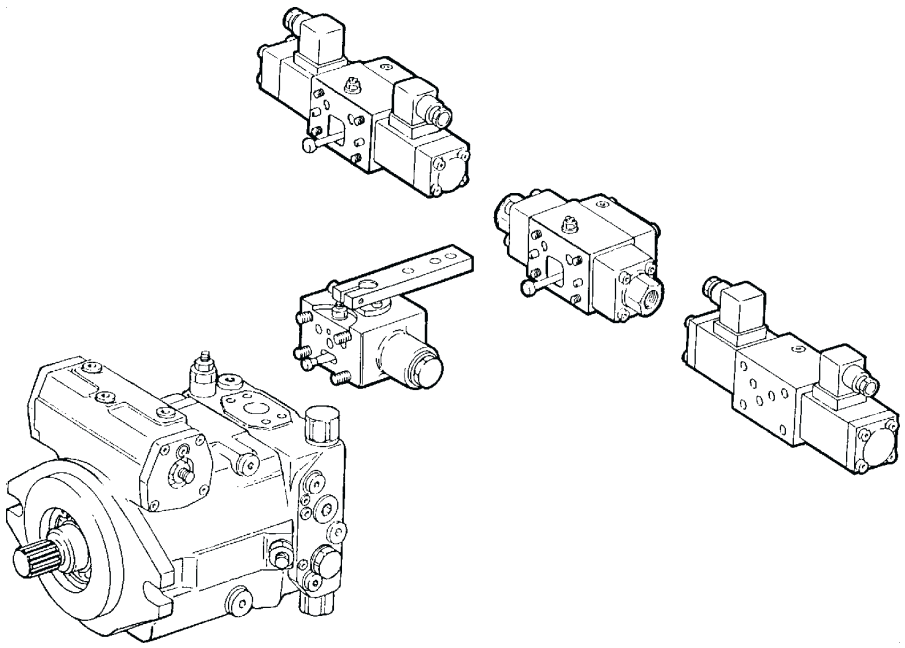
35 Remove control valve.



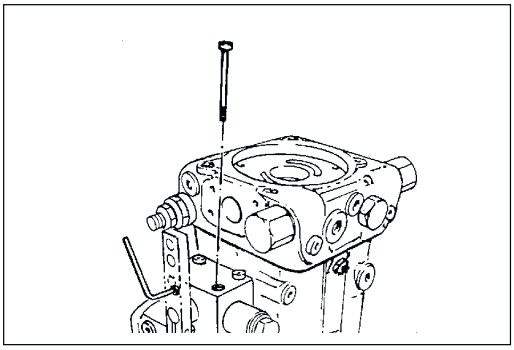
36 Do not damage throttle diameter.



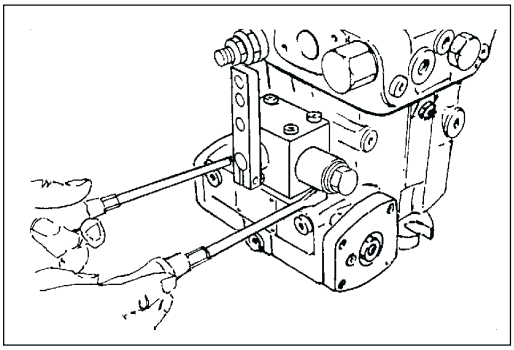
37 Before installing the new O-ring, tape the threads.



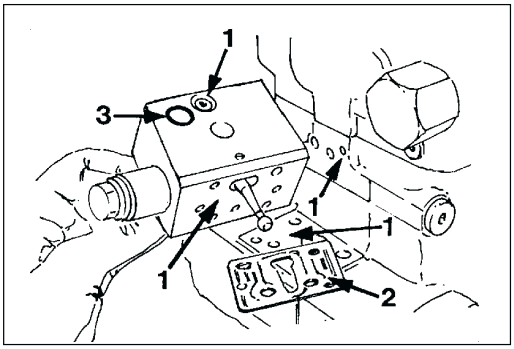
38



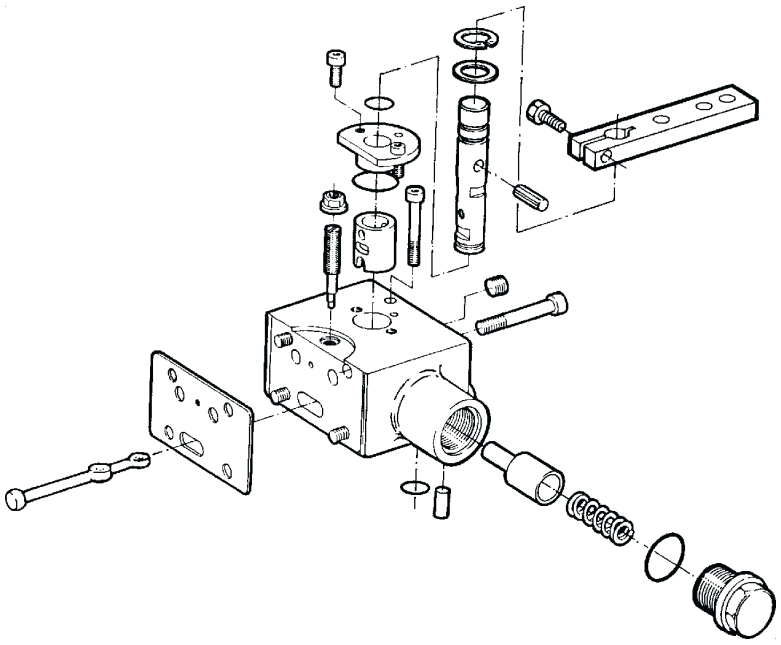
39 Remove fixing screws.



40 Pry-off the control module.

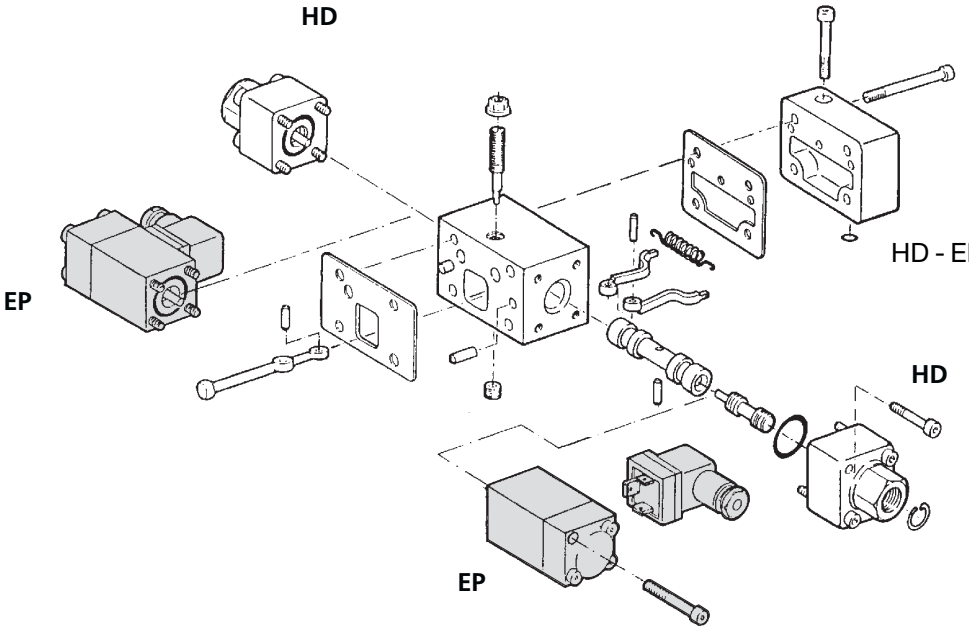


41 Check
Sealing surface (1), gasket (2), o-rings (3).



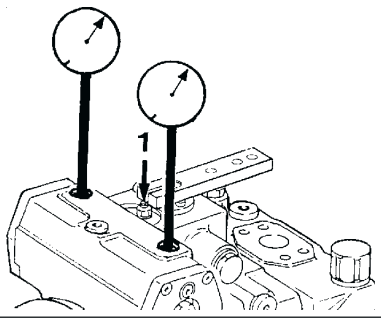
HW control module

42



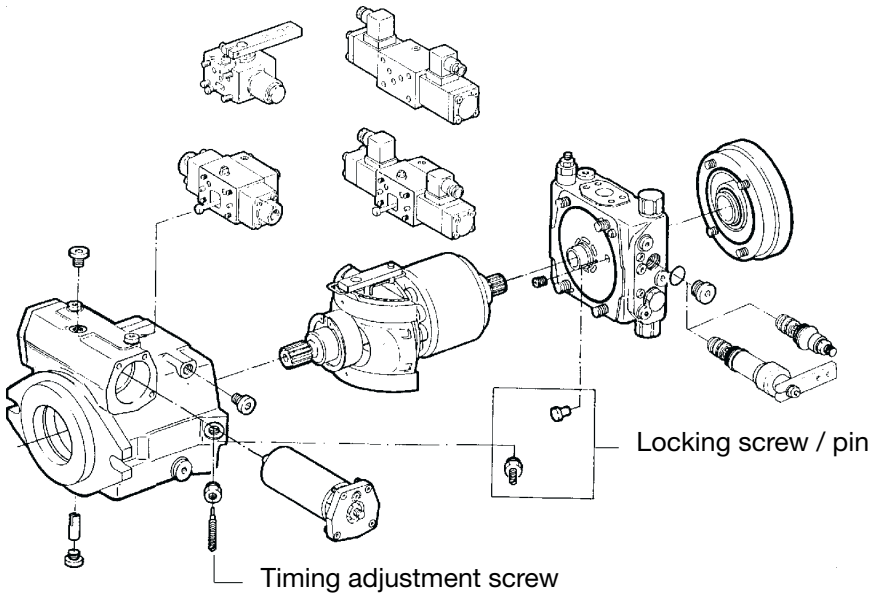
HD - EP control module

43

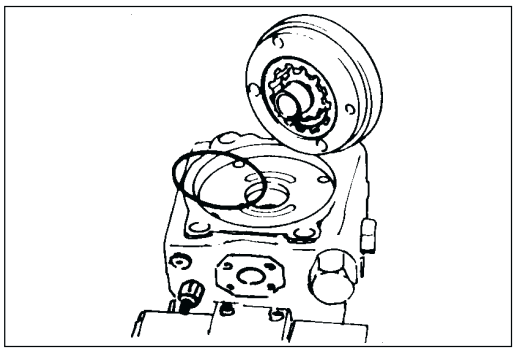


44

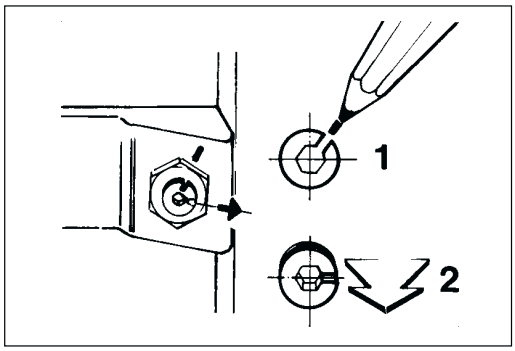
Reset hydraulic zero position (1).
Both gauges must indicate the same pressure.



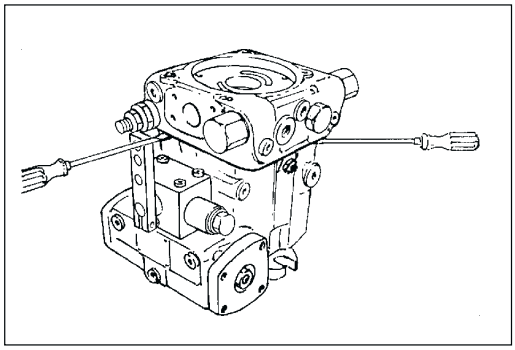
45



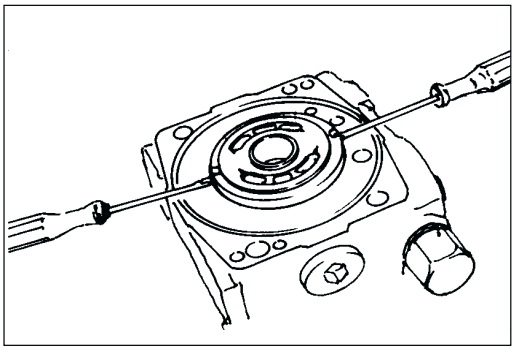
46 Mark position of the boost pump and the port plate.
Remove the boost pump.



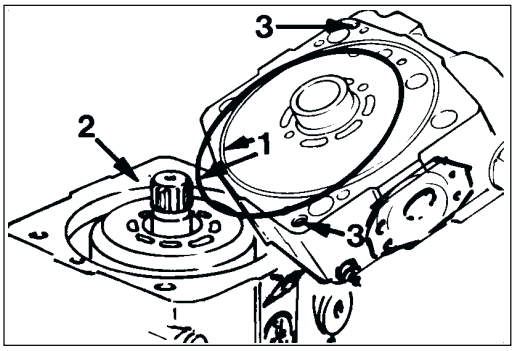
47 Mark the position of the indexing screw (1).
Set the indexing screw to disassembly position (2).



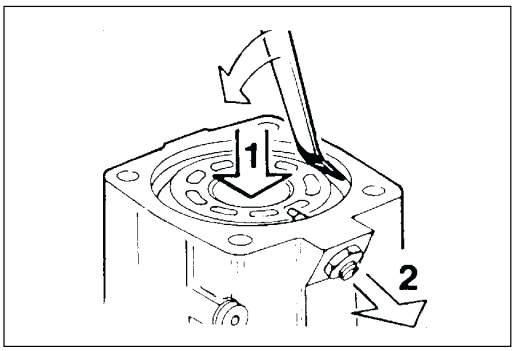
48 Release port plate fitting.
Take off port plate. If necessary, use screwdriver.
Attention! Sealing surface.



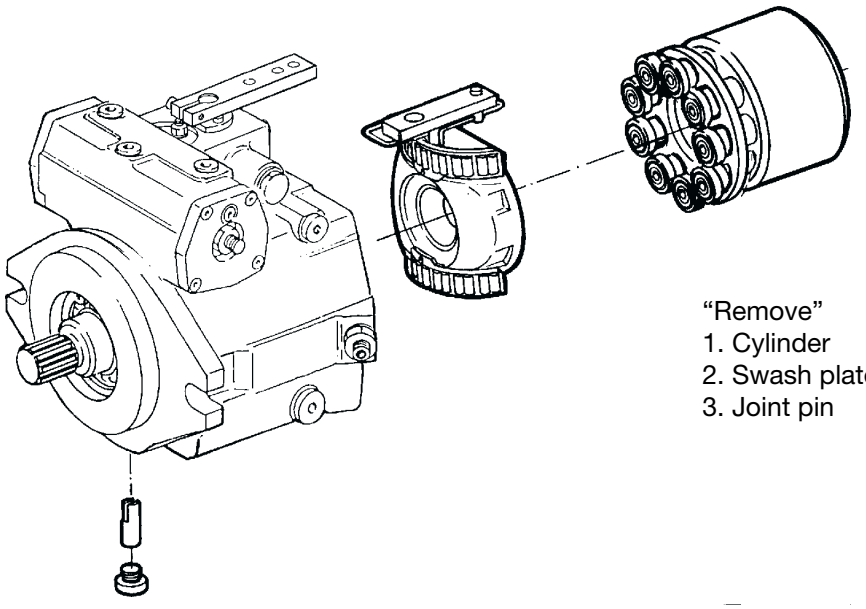
49 Lift off control plate.
Note position.



50 Check!
O-ring and groove (1), housing (2), Quad-ring and groove (3).

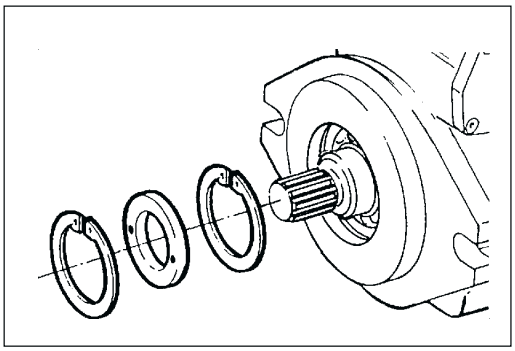


51 Press the cylinder to the bottom (1).
Remove fiming indexing screw (2).
Lift out rotary group (3).

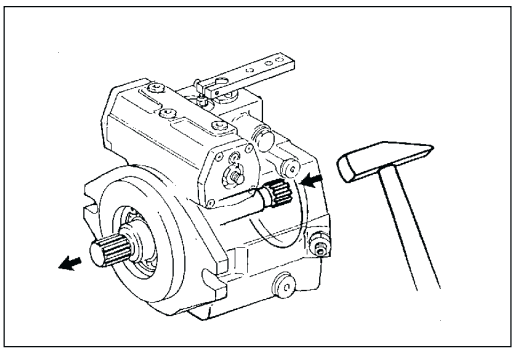


"Remove"
1. Cylinder
2. Swash plate
3. Joint pin

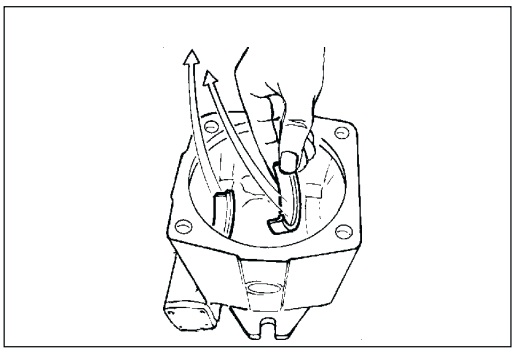
52



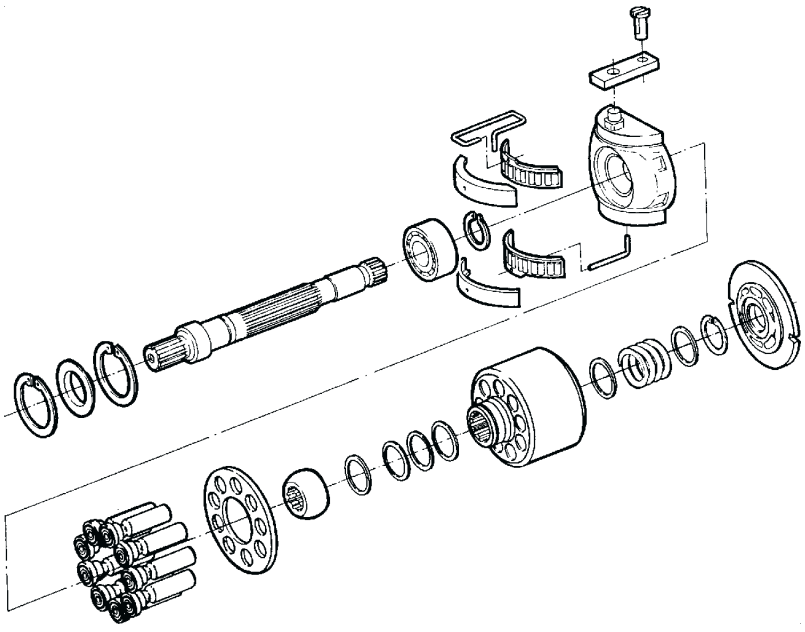
53 Remove retaining ring, radial seal ring.



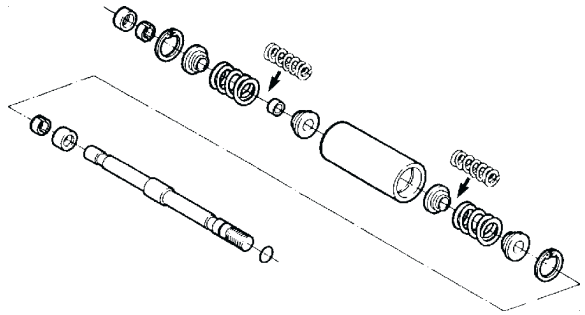
54 Remove drive shaft with slight hammer strokes.



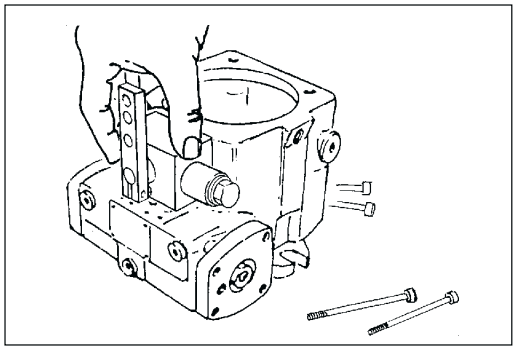
55 Remove bearing cups.



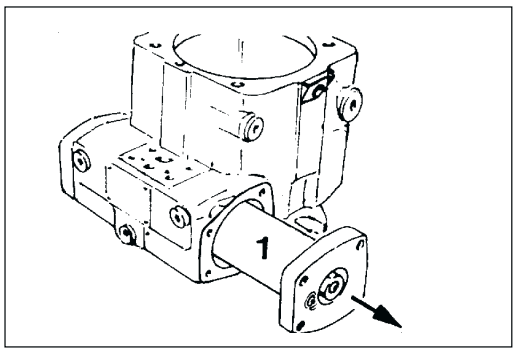
56



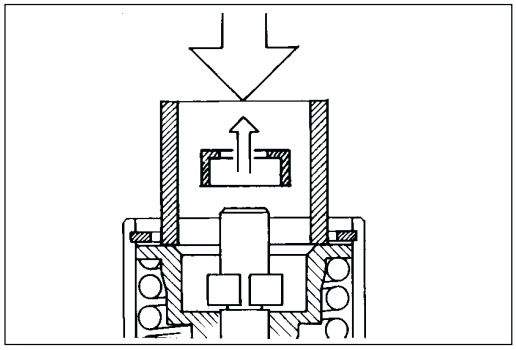
57



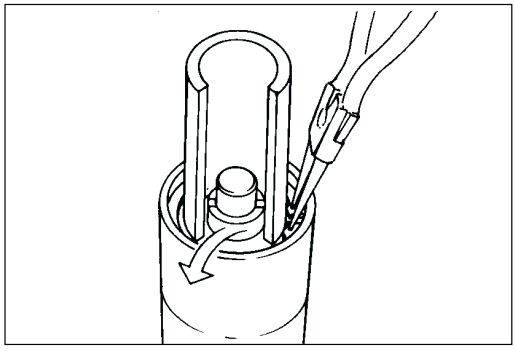
58 Remove control module.



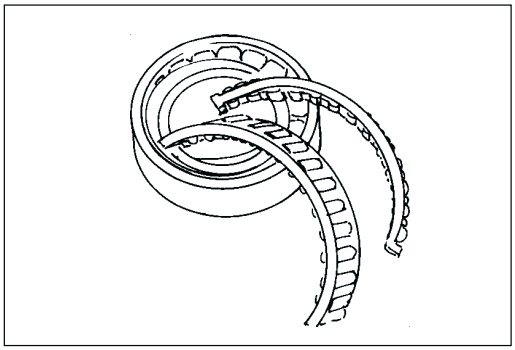
59 Pull out control piston (1).



60 Mount fixture and tension spring.
Remove receiving ring.

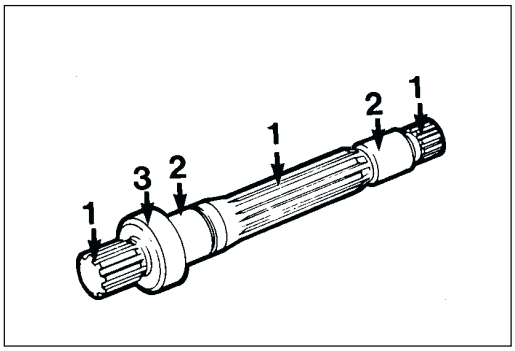


61 Take out rings.
Remove retaining ring.
Note! Parts are spring loaded.



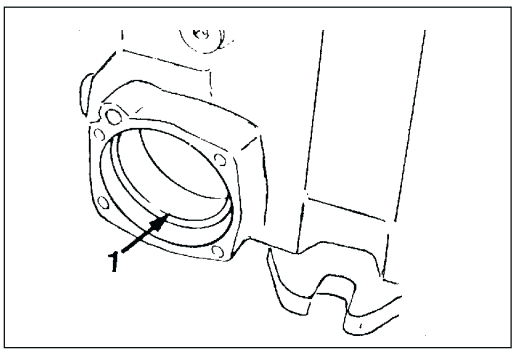
62

Replace all bearings.



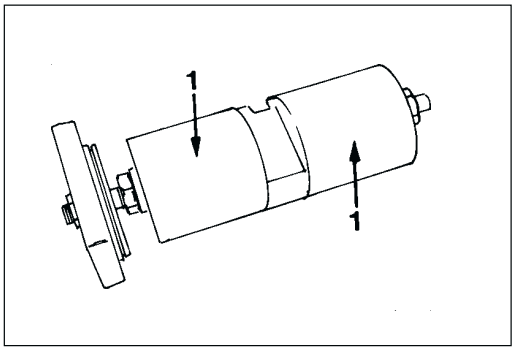
63

Check!
1. Splines for damage or fretting.
2. Running surfaces.
3. Groove cut by shaft seal.



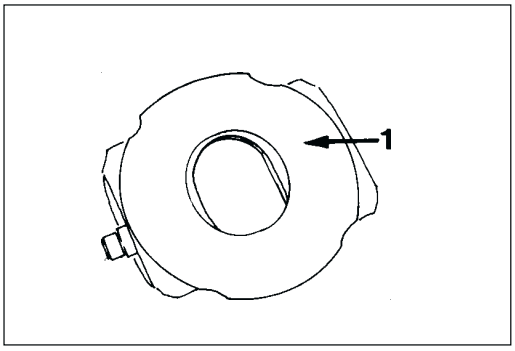
64

Check that the control piston guide bush (1) is free of grooves and has not worn out.



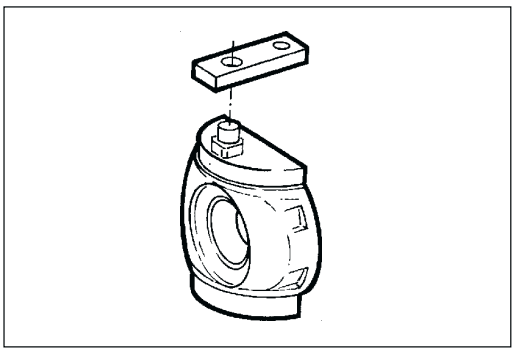
65

Check!
Control piston (1) is not scored.



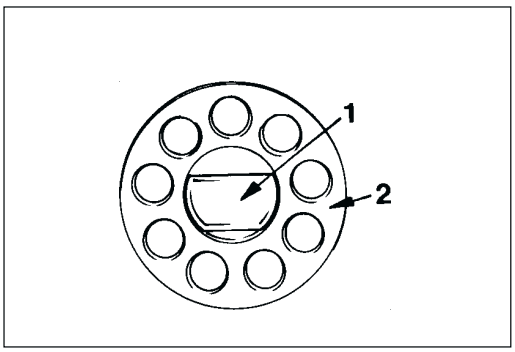
66

Check!
Sliding surface free of grooves.



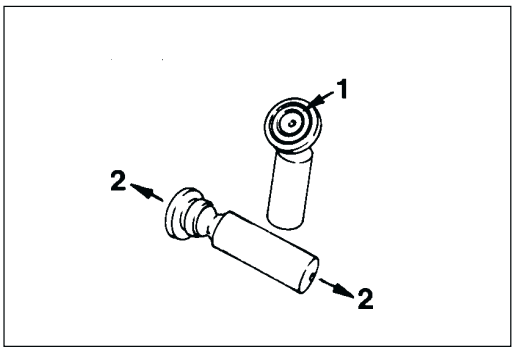
67

Check!
Make sure sliding ring/swivel pin are free of play.



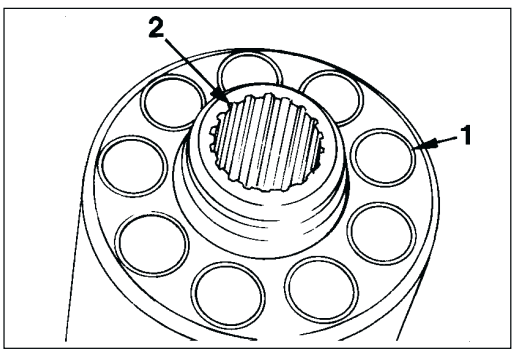
68

Check!
Check that return device is free of grooves (1) no wear in slipper pad area.



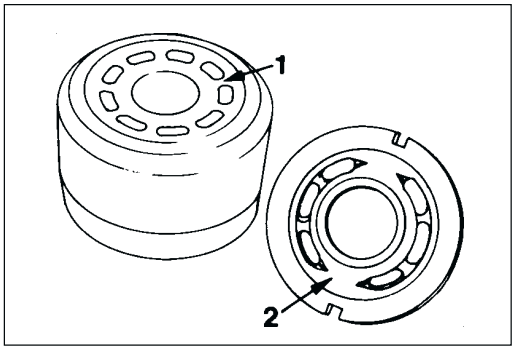
69

Check!
Check that there are no scratches or metal deposits on sliding surface (1), and there is no axial play (2), (otherwise: pistons must be replaced in sets).

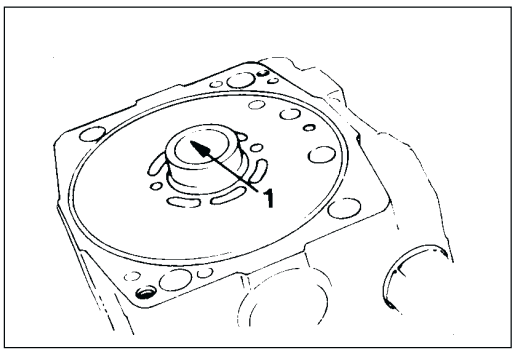


70

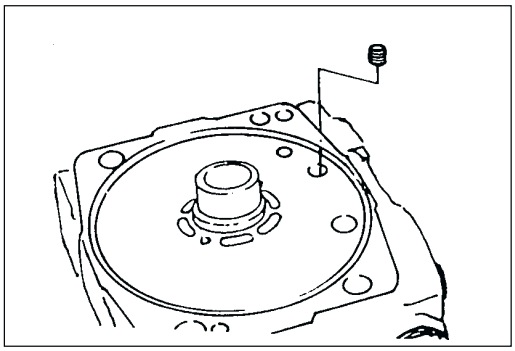
Check!
Cylinder bores (1), splines (2).



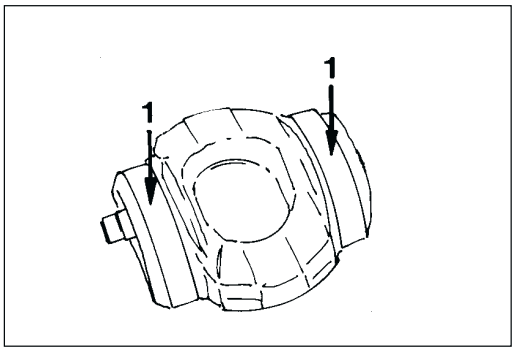
71 Check!
Cylinder gilding surface (1) free of scratches, no traces of wear and no embedded foreign particles. No scratches on the valve plate (2). (Replace ONLY in sets).



72 Check!
DU-bearing bush (1) is not worn out.



73 Information:
Boring for DA-control open.
Without DA-control closed.



74 Check!
Bearing surfaces (1).

Assemble housing - Turcon-Glyd-ring

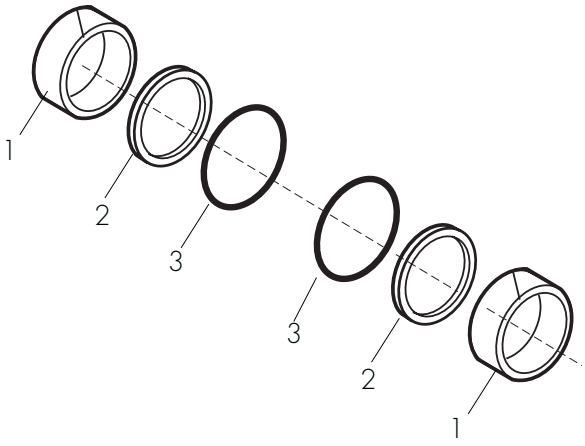
Auxiliary tools:

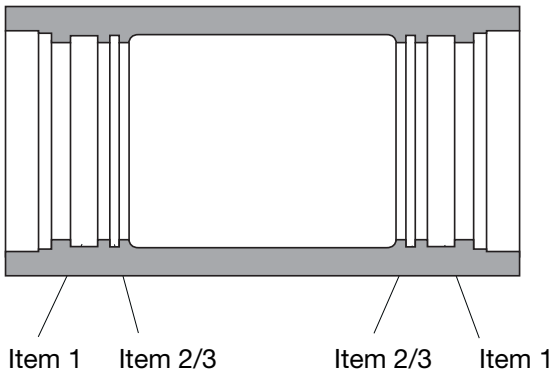
Assembly pliers: B+S x M22

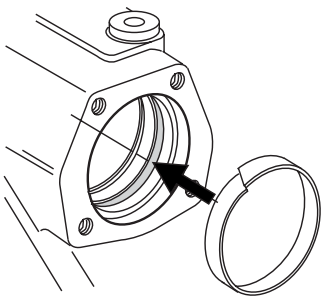
Guide thorn:

A4VG28	I: 277 4 347
A4VG40	I: 277 4 049
A4VG56	I: 277 4 050
A4VG71	I: 277 4 051
A4VG90	I: 277 4 052
A4VG125	I: 277 4 053
A4VG180	I: 277 4 054
A4VG250	I: 277 4 072

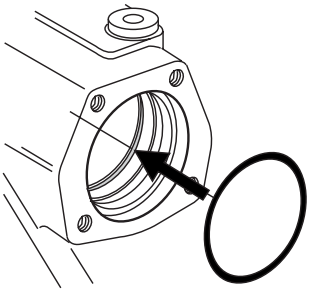
Assembly A4VG





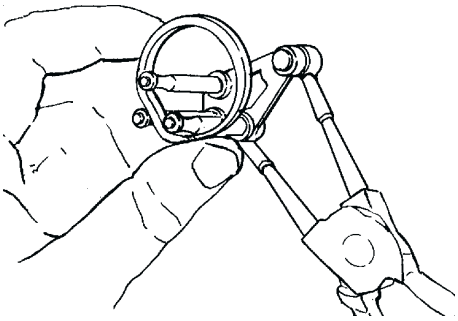


Item 1: Install barguide ring.

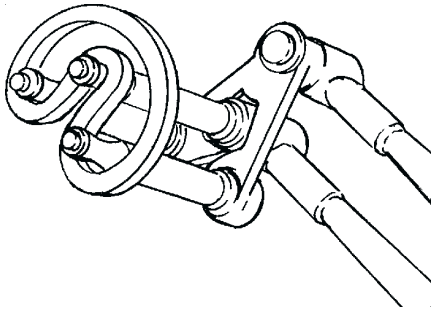


Item 3: Install O-ring.

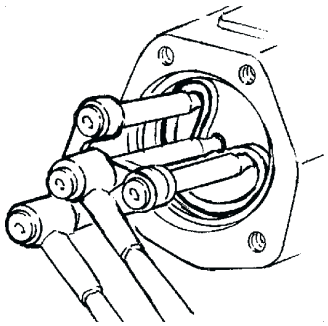
Assemble housing - Turcon-Glyd-ring



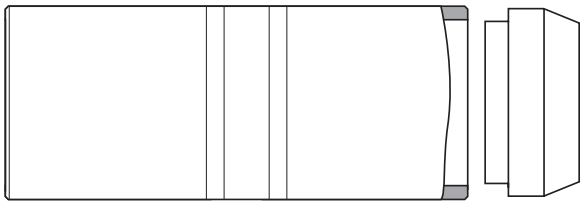
Fit the seal ring (Item 2) into the assembly tool.



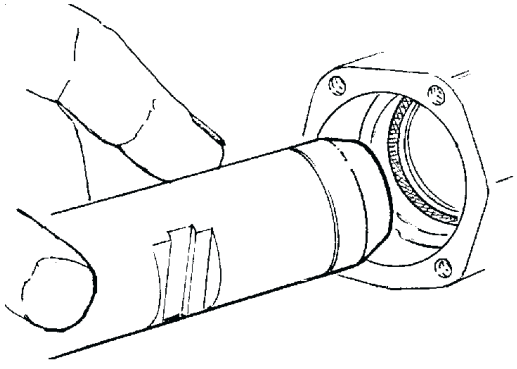
Press the seal ring into the kidney shape using the assembly tool. The deformation of the Turcon seal has to be done with care so as not to damage the sealing edges.



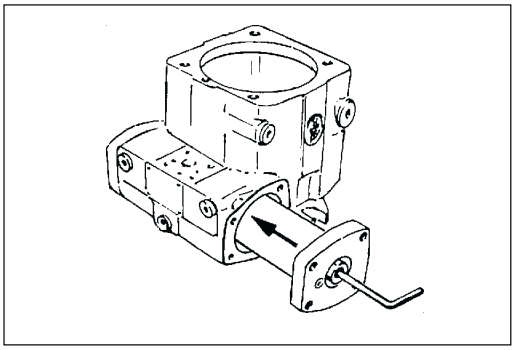
Position the seal ring into the housing and place it into the groove. Release the tension and withdraw the assembly tool. Check the position of the seal ring if necessary straighten using a finger.



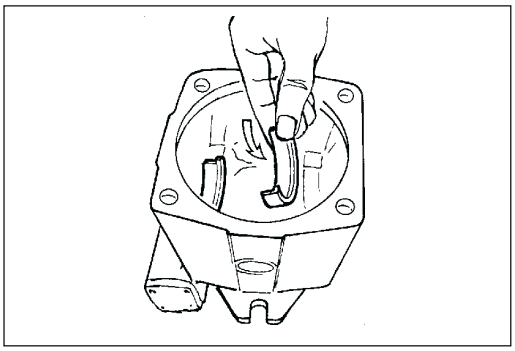
Insert guide thorn into the positioning piston.



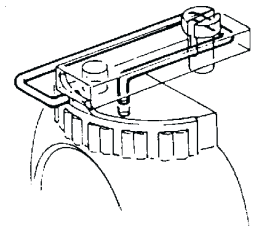
Grease slightly guide thorn.
Install positioning piston with guide thorn.

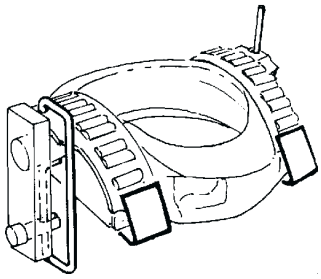


75 Insert positioning piston into the housing.
Instruction:
Oil positioning piston before assembly.

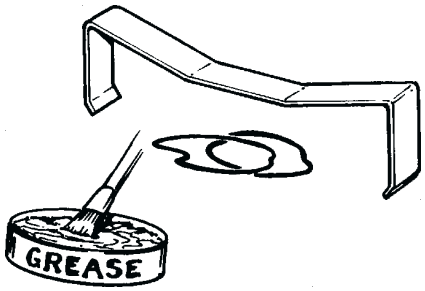


76 Insert bearing cup set.

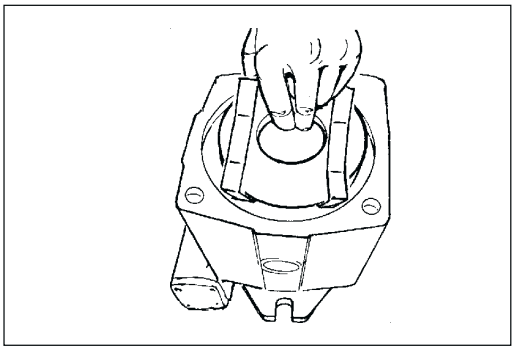




Assemble bearing, wire, gliding stone and articulating pin.
Assistance: Devices e.g. - Clamp / rubber rings / grease

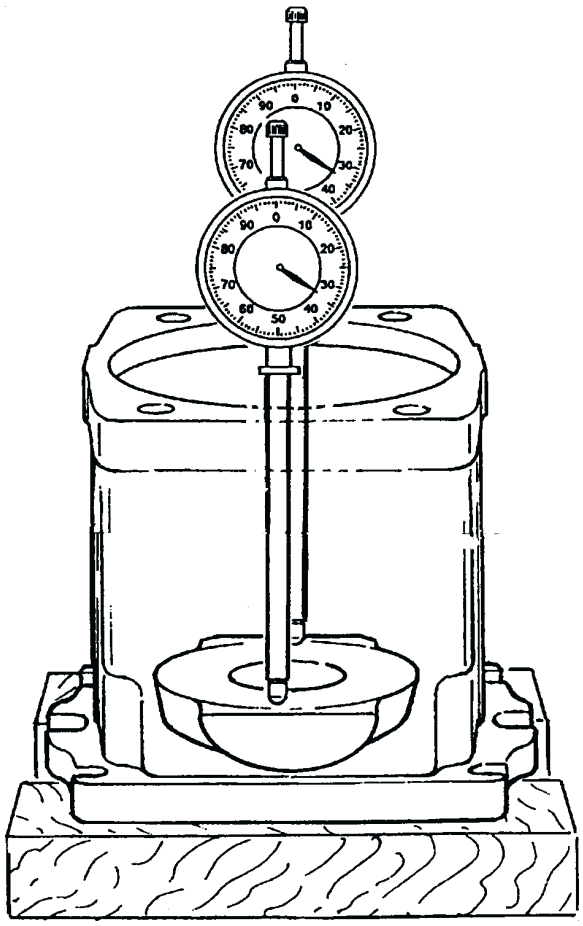


77



78 Insert completely swivel cradle into the housing.
Pay attention for correct seat of the swivel cradle in the housing.

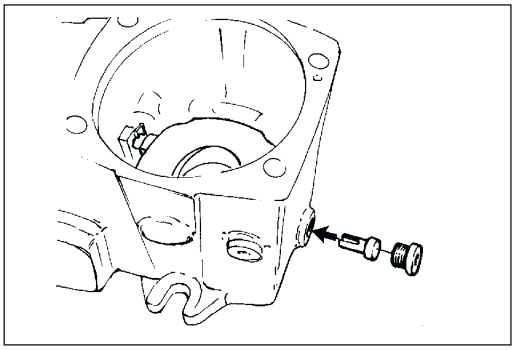
⚠ Remove auxiliary device.



⚠ Check: Location of the swivel-bearing in the bearing.

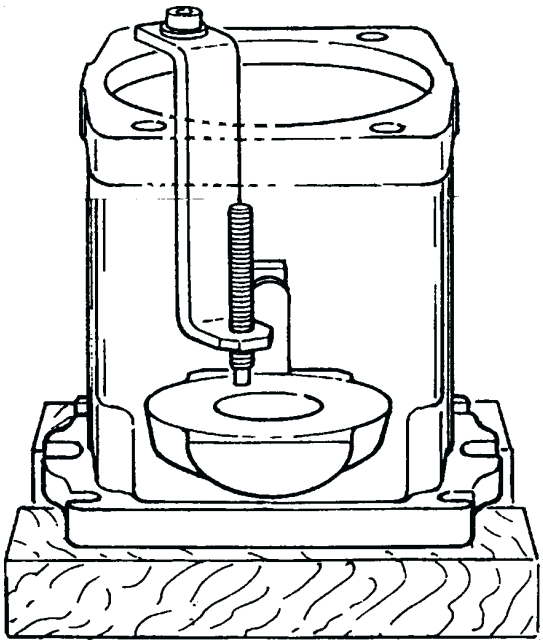
Swivel the swivel bearing by using the control piston “it should move easily”.
Centralise by using a measuring device (dial gauge or depth measurement).
Check points 1 and 2 - they should have the same dimension.

79



80

Fit joint pin.

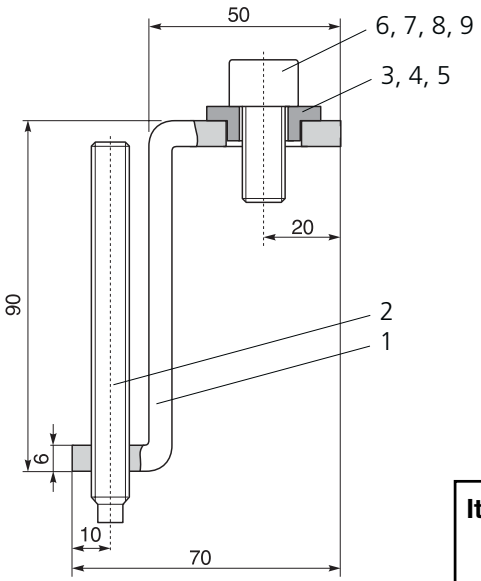


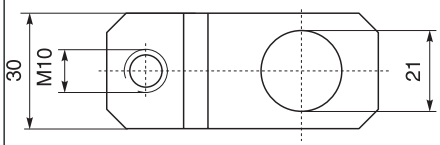
Fit holding device.
Hold swash plate in position utilising the set screw.

⚠ Do not use force.

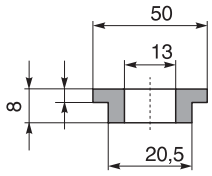
81

Holding device “swivel cradle” A4V

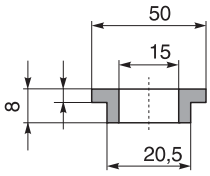




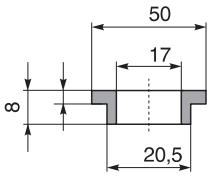
Part 3



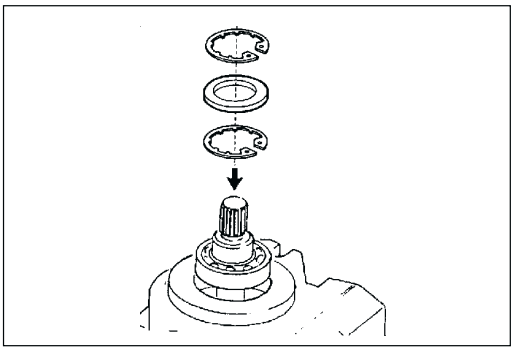
Part 4



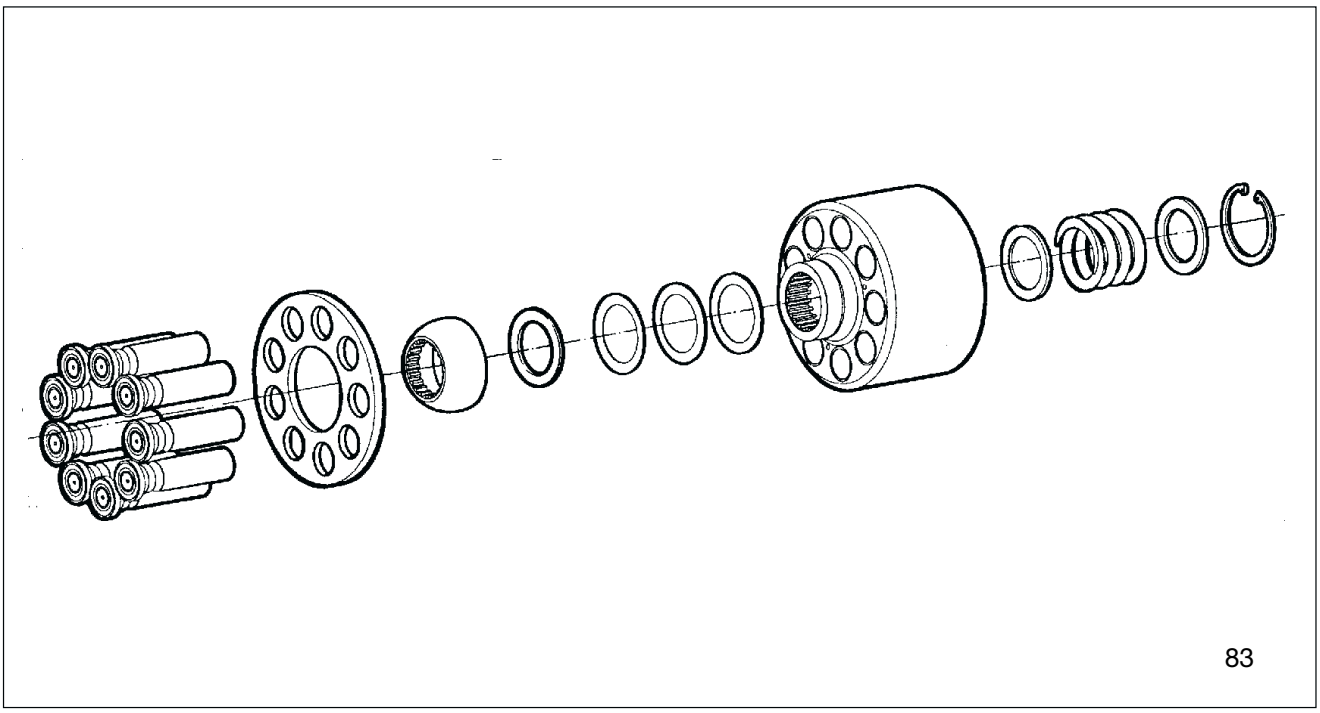
Part 5



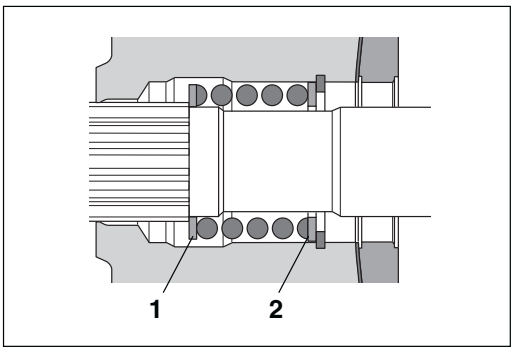
Item	Designation	Qty.
1	Angle	2
2	Threaded pin	2
3	Shim	2
4	Shim	2
5	Shim	2
6	Cyl. screw M12 x 25 DIN 912	2
7	Cyl. screw M14 x 25 DIN 912	2
8	Cyl. screw M16 x 30 DIN 912	2
9	Cyl. screw M20 x 35 DIN 912	2



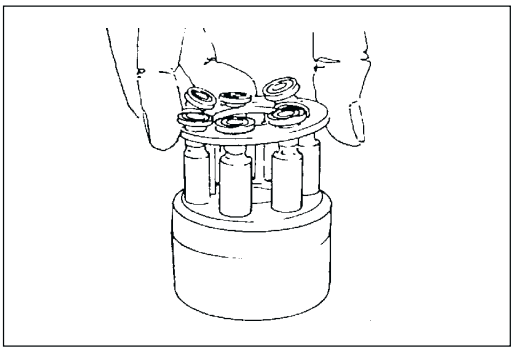
82 Assemble drive shaft with bearings and radial seal rings.



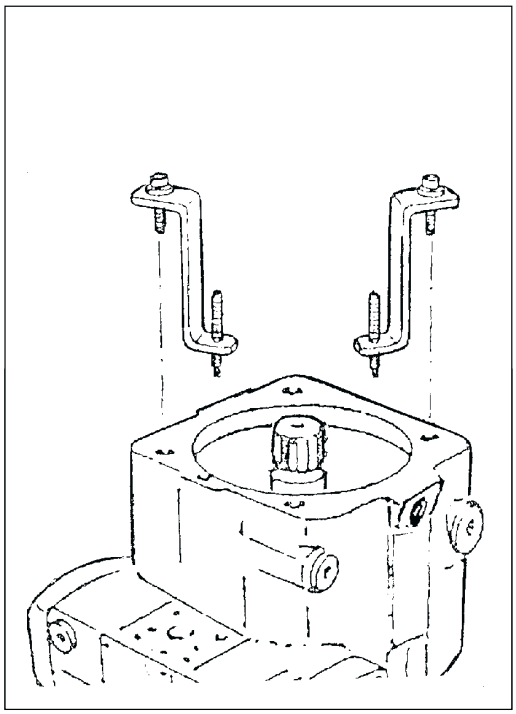
83



84 Disc 1, 2.

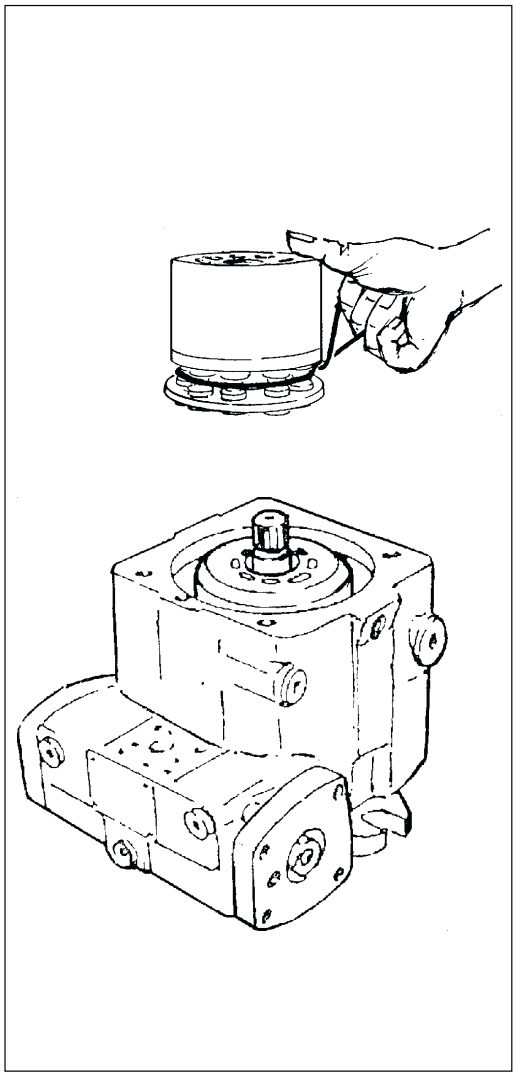


85 Assemble piston with retaining plate.
Note:
Oil piston and piston pad.



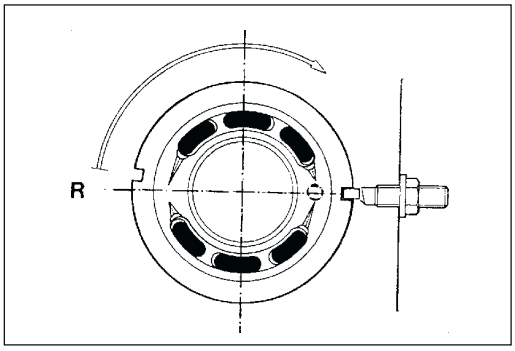
86

Remove holding device.
Fit cylinder complete with pistons and retaining device.



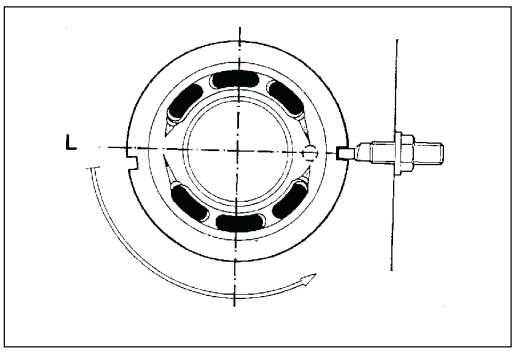
87

Assembly aid:
Hold the pistons by using an O-ring.



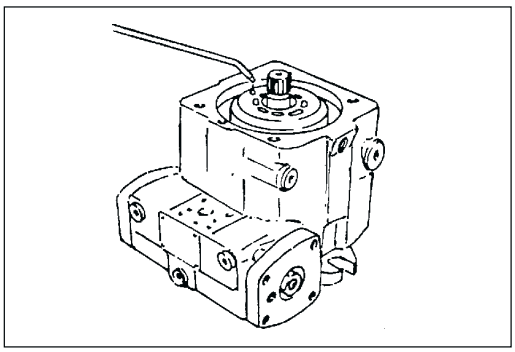
89

Control plate clockwise rotation - indexed in the direction of rotation.
Note! Noise grooves are machined - in based on direction of rotation.



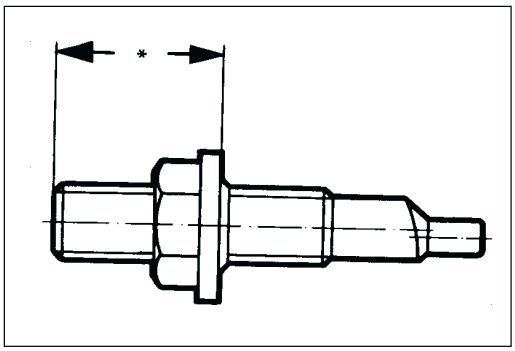
90

Control plate counter clockwise rotation - indexed in the direction of rotation.
Note! Noise grooves are machined - in based on direction of rotation.



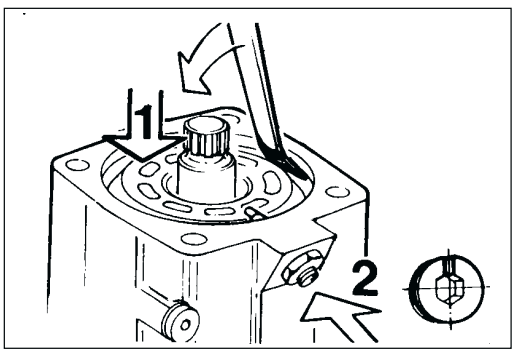
91

Oil the running surfaces of the cylinder barrel and the DU- bearing. Grease the O-rings and insert in grooves.



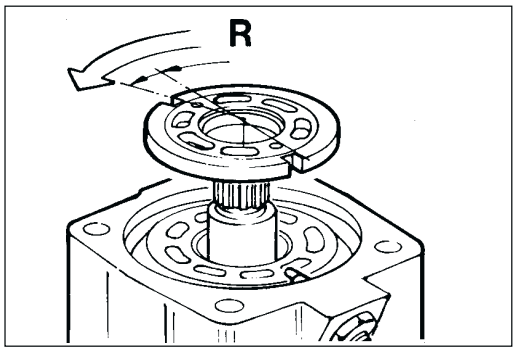
92

Basic setting - indexing screw
A4VG...40 * = 24 ± 0,75 mm.
A4VG...56 * = 21 ± 0,75 mm.

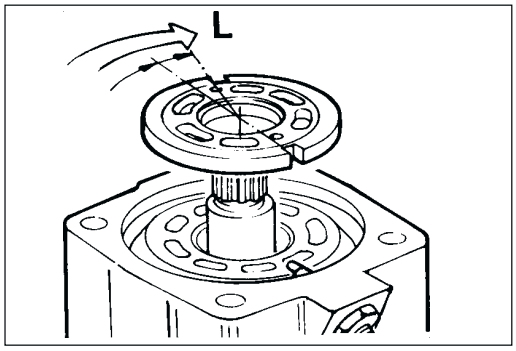


93

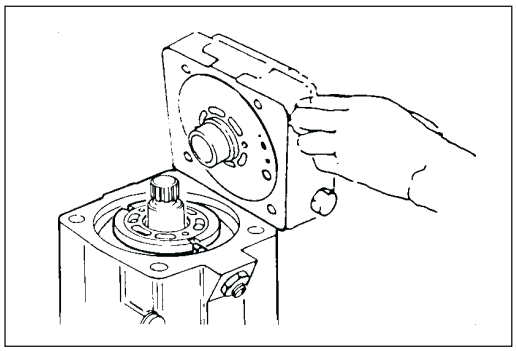
Press the cylinder to the bottom (1).
Screw in the indexing screw (2).
Groove in mounting position.



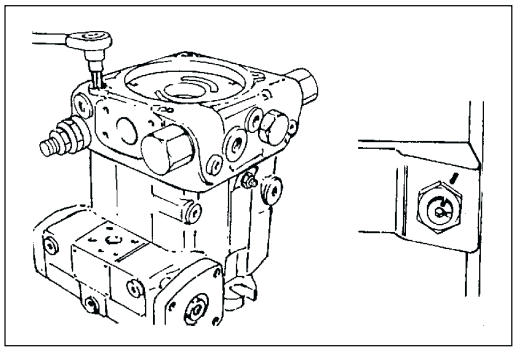
94 Insert the control plate - clockwise rotation.



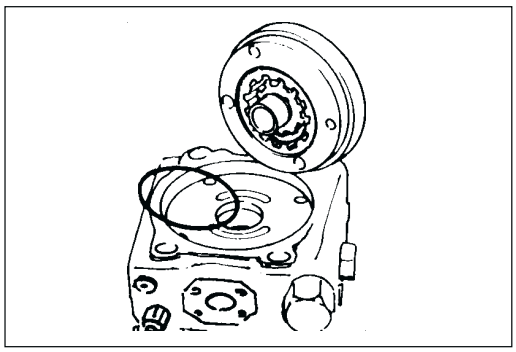
95 Insert the control plate - Counter- clockwise rotation.



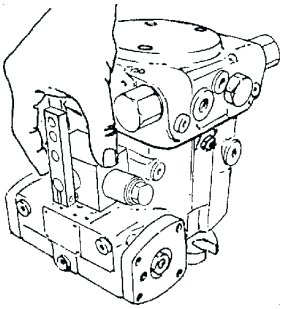
96 Place in correct position.
Note:
HW, HD, EP - Put control plate with greas to the port block.



97 Tighten screws (Cross-corner).
Turn the indexing screw to marking.

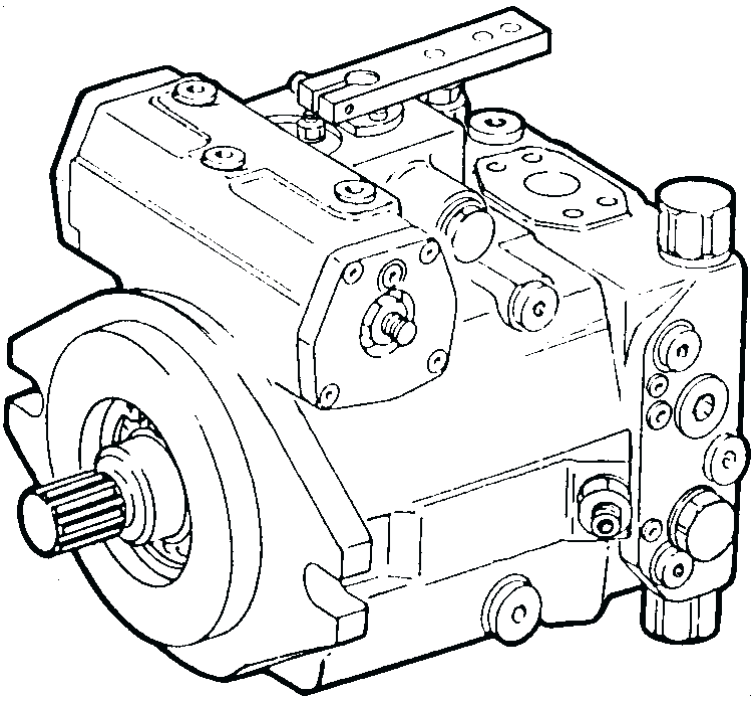


98 Assemble boost pump.



99

Mount control module.



100

Tightening torques for shaft bolts (Metric ISO Standard Thread)

The values for tightening torques shown in the table are valid only for shaft bolts with metric ISO- standard threads and head support surface dimensions in accordance with DIN 912, DIN 931 and DIN 933. These values are also valid only for light or unoiled, untreated surface as well as for use only with torque-indicating wrenches and force limiting tools.

Thread size	Strength Classes 8.8	10.9	12.9
	Tightening Torque (lb.ft)		
M 3	1,3	2,0	2,3
M 4	3,1	4,5	5,3
M 5	6,1	8,9	10,4
M 6	10,4	15,5	18.0
M 8	25	37	43
M10	51	75	87
M12	87	130	150
M14	140	205	240
M16	215	310	370
M18	300	430	510
M 20	430	620	720
M 22	580	830	970
M 24	740	1060	1240
M 27	1100	1550	1850
M 30	1500	2100	2500

Tightening torques for locking screws VSTI (Metric ISO fine thread)

Thread size	Designation	Tightening torques(lb.ft)
M 8 x 1	VSTI 8 x 1 -ED/SA	= 4
M 10 x 1	VSTI 10 x1 -ED	= 7
M 12 x 1,5	VSTI 12 x 1,5 -ED	= 15
M 14 x 1,5	VSTI 14 x 1,5 -ED	= 22
M 16 x 1,5	VSTI 16 x 1,5 -ED/SA	= 22
M 18 x 1,5	VSTI 18 x 1,5 -ED/SA	= 29
M 20 x 1,5	VSTI 20 x 1,5 -ED/SA	= 37
M 22 x 1,5	VSTI 22 x 1,5 -ED	= 44
M 26 x 1,5	VSTI 16 x 1,5 -ED/SA	= 51
M 27 x 2	VSTI 27 x 2 -ED	= 66
M 30 x 1 ,5	VSTI 30 x 1,5 -ED/SA	= 74
M 33 x 2	VSTI 33 x 2 -ED/SA	= 88
M 42 x 2	VSTI 42 x 2 -ED/SA	= 147
M 48 x 2	VSTI 48 x 2 -ED	= 220

Tightening torques for seal-lock nuts (Metric ISO-Standard Thread)

The values for tightening torques shown in the table are valid only for seal-lock nuts of the strength class 8.8 and with metric ISO-standard thread.

Thread size	Strength Classes 8.8	10.9	12.9
	Tightening torque (lb.ft)		
M 6	7,4	-	-
M 8	16,2	-	-
M10	29,5	-	-
M12	50,9	-	-
M14	81,1	-	-
M16	125,3	-	-

Tightening torques for cross-slotted lens head screws DIN 7985 (Metric ISO-Standard Thread)

The values for tightening torques shown in the table are valid only for cross-slotted lens head screws DIN 7985 of the strength class 8.8 and with metric ISO-standard thread.

Thread size	Strength Classes 8.8	10.9	12.9
	Tightening torques (lb.ft)		
M 3	0,8	-	-
M 4	2,1	-	-
M 5	4,4	-	-
M 6	7,4	-	-
M 8	18,4	-	-
M10	36,1	-	-

General advice

- Make yourself familiar with the equipment of the machine.
- Only operate the machine if your are completely familiar with the operating and control elements as well as the functioning of the machine.
- Use your safety equipment like helmet, safety shoes and hearing protection.
- Make yourself familiar with your working field.
- Only operate the machine for its intended purpose.

Please observe the guidelines of the Professional Association and the machine manufacturer.



Before starting

- Observe the operating instructions before starting.
- Check the machine for obvious faults.
- Do not operate the machine with defective instruments, warning lights or control elements.
- All safety devices must be in a secure position.

- Do not carry with you movable objects or secure them to the machine.
- Keep oily and inflammable material away from the machine.
- Before entering thc driver's cabin, check if persons or obstacles are beside or beneath the machine.

- Be careful when entering the driver's cabin, use stairs and handles.

- Adjust your seat before starting.

Start

- When starting all operating levers must be in “neutral position”.
- Only start the machine from the driver’s seat
- Check the indicating instruments after start to assure that all functions are in order.
- Do not leave the machine unobserved when the motor is running.
- When starting with battery connection cables connect plus with plus and minus with minus.
  Always connect negative (-) cable last and disconnect negative cable first.

Attention

- Exhaust gas is dangerous. Assure sufficient fresh air when starting in closed rooms!

Hydraulic equipment

1. Hydraulic equipment is standing under high pressure.

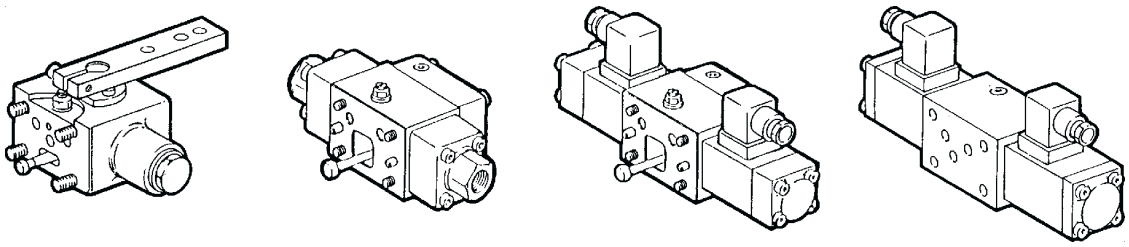
⚠ High pressure fluids (fuel, hydraulic oil) which escape under high pressure can penetrate the skin and cause heavy injuries.
Therefore immediately consult a doctor as otherwise heavy infections can be caused.

2. When searching leakages use appropriate auxiliary devices because of the danger of accidents.
3. Before working at the hydraulic equipment, lower pressure to zero and lower working arms of the rnachine.
4. When working at the hydraulic equipment, absolutely stop motor and secure machine against rolling away (parking brake, shim)!

5. When connecting hydraulic cylinders and motor pay attention to correct connection of hydraulic flexible hoses.
6. In case of exchanging the ports, the tunctions are vice versa (f. ex. lift-up/lower) - danger of accidents!

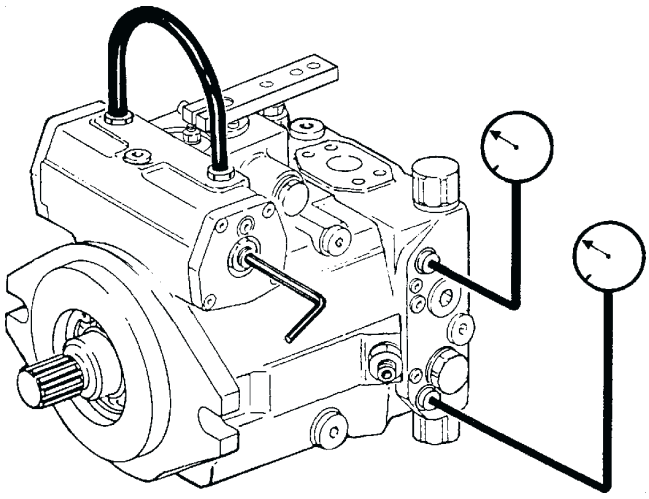
7. Check hydraulic flexible hoses regularly and replace them in case of dammage or wear! The new hose pipes must comply with the technical requirements of the machine manufacturer!

⚠ Orderly disposal or recycling of oil, fuel and filters!



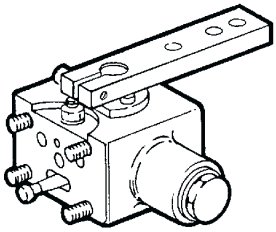
HW HD EP DA

101

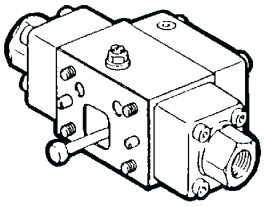


Attention!
Observe safety regulations!
Connect both control chambers with hose NW6.
Avoidance of rest signal from hydraulic zero position.
Connect manometer to M_A and M_B.
Adjust zero position so that at blocked drive both manometer indicate the same pressure valve.
Note:
Adjust death line of zero position.

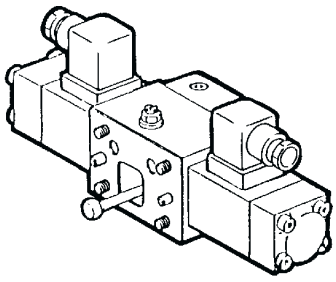
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HW



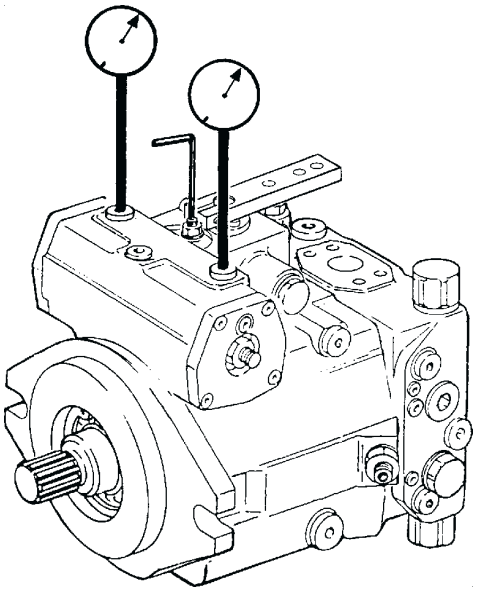
HD



EP

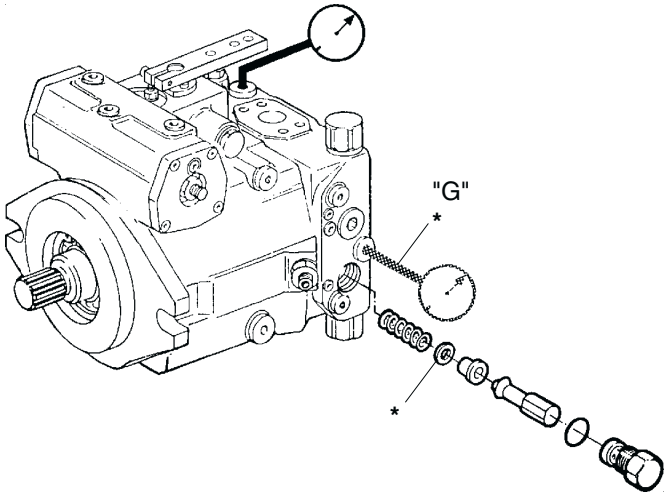
Attention!
Observe safety regulations!

103



Connect manometer to X_1 and X_2.
Adjust zero position so that at blocked drive both manometer indicate the same pressure value.
Note:
Eccentric adjusting
- Do not turn over ±90°.

104



105

Attention!
Observe safety regulations!

Note:
Readjusting only at operating temperature.

Connect manometer to “G”.

Attention!
* Boost pressure setting!
Nominal pressure p_H- 18 bar
Peak pressure p_H- 40 bar
at max. speed.

Note:
Adjusting data according to order.

Attention!
Observe safety regulations.

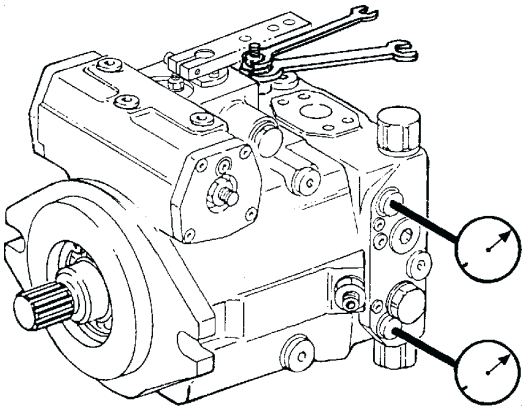
HP valve without bypass-function

1. HP valves are always adjusted 10% higher than the pressure cut-off.
   If one setting value is changed, always check both values.
2. Readjusting only at operating temperature.

Connect manometer M_A and M_B.
Pressure cut-off: Note measure X setting screw! Turn setting screw on block.
HP valves: Operate valves with small pump flow volume.
Check setting value. (“temperature“ only for a short time).
Change “setting value“ - check.

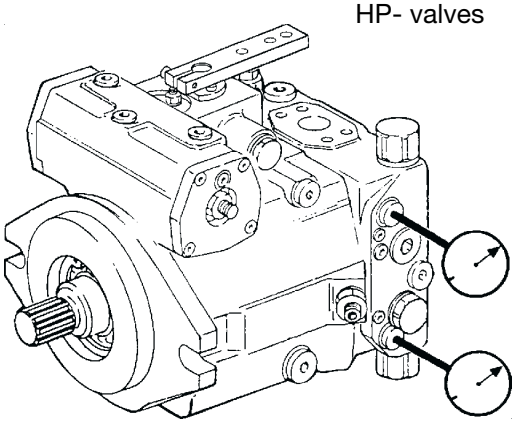
Pressure cut-off:
Turn back setting screw to measure (*).
Check pressure value and readjust.
Attention! Observe 10% pressure difference HP valves and pressure cut-off!

Pressure cut-off

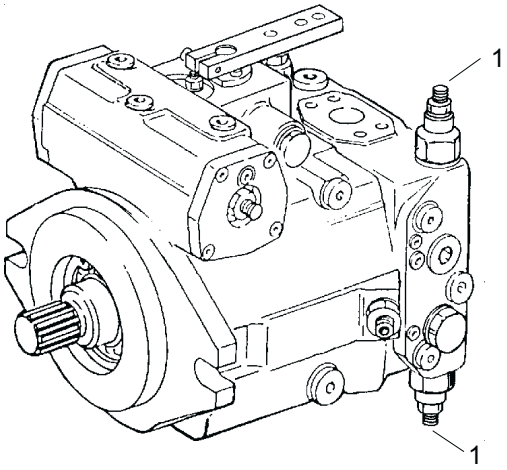


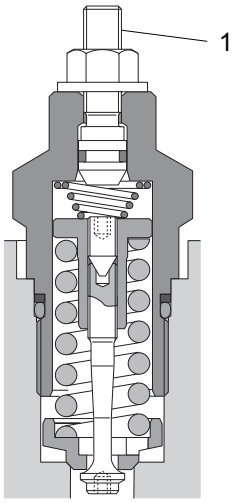
106

HP- valves



107





108

Vehicle with hydrostatic transmission and gear shift without idling setting position (free wheeling).

Hydrostatic transmission / Bypass-switching

In this case the travel transmission is switched on to free wheeling. For this purpose the variable displacement pump has incorporated high pressure relief valves with bypass function.
The screw (item 1) is unscrewed to such an extent, that the valve cartridge is released and free oil circulation is possible.

⚠ Bypass: Screw in item1 up to planeness with nut. Screw up nut again.

Towing speed

The max. towing speed of 2 km/h should not be exceeded.
- Higher admissible towing speeds depend on the available hydr. motor speed and engaged gear shift.

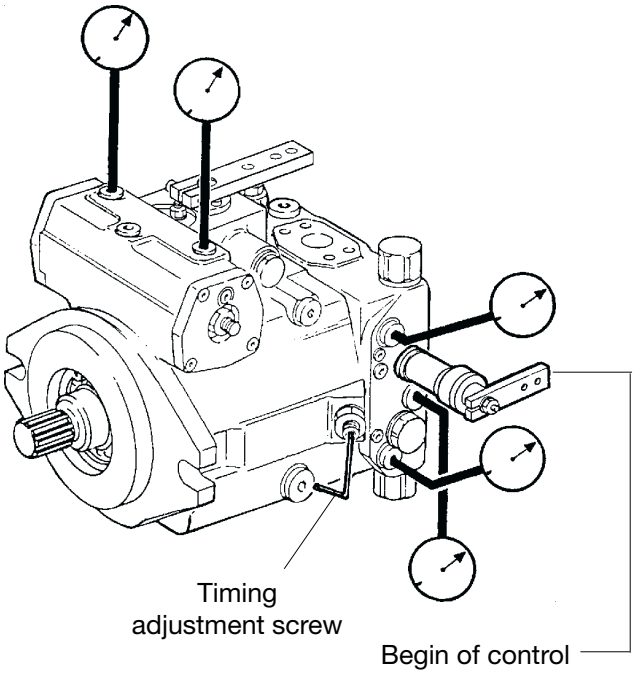
Towing distance

The towing distance should not exceed 1 km.
- If there is a lack of oil boosting, the hydraulic circuit will get empty.
  Take care of the heat development in the hydr. motor-rotary group.

Towing operation terminated

After termination of the towing operation turn item 1 back. The original pressure value setting of the high pressure relief valves will be avaiable again.

⚠ Valve function: Screw back item 1 up to stop. Screw up the nut.



111

Attention!
Observe safety regulations!

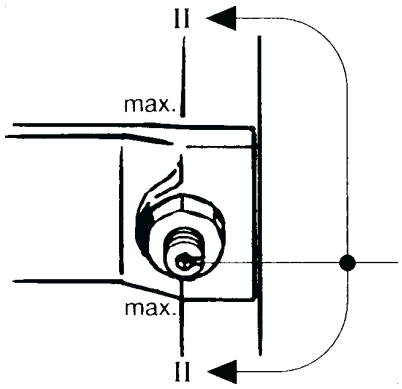
Check setting data.
Operating temperature should be kept largely constant during the check procedure.
Start prime mover, idle speed.

Block position
Drive direction switch - **"0"**.
Slowly increase motor speed up to the max. motor speed and thereby observe measuring instruments.

Boost pressure:
Idle speed of prime mover
Psp = approx. 15-20 bar
max. motor speed
Psp = ... bar*

Block position
Drive direction switch - **forward**
(Road gear and fully applied brake)

Check setting data pump A4VIDA
Begin of control:
HD 40-50 bar
Motor speed . . . . . rpm* Psp . . . . . bar*
HD . . . . . bar*
Readjusting - control start screw



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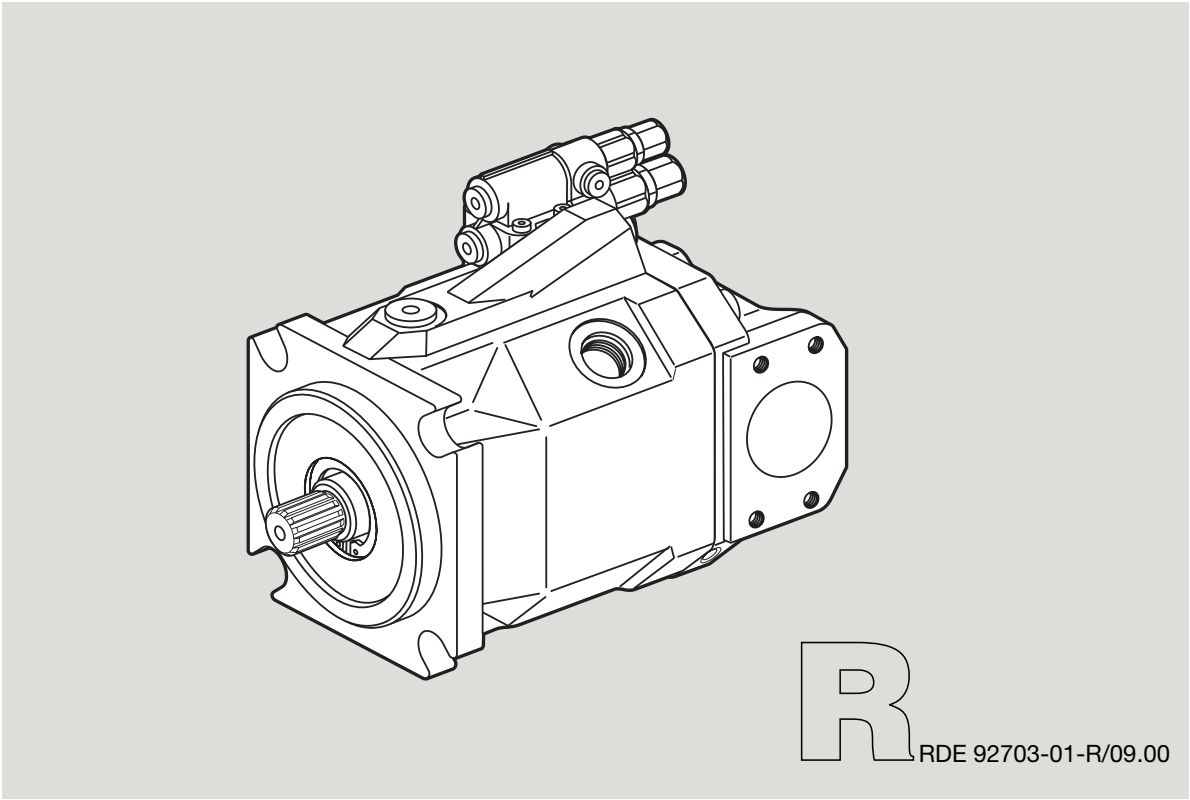
End of control
HD . . . . . bar
Motor speed . . . . . rpm* Psp . . . . . bar*
Readjusting timing adjustment screw

Note:
Eccentric adjusting - observe direction of rotation

* Setting data according to order!

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Section L
REPAIR INSTRUCTIONS REXROTH PUMP



Repair instructions
Mod. A10VO 28-85 DFR
Series 52

NOTICE

Specifications, descriptions and illustrative material shown herein were as accurate as known at the time this publication was approved for printing.

For repair, please use only original spare parts.

Optional equipment and accessories may add cost to the basic unit, and some options are available only in combination with certain models or other options.

For the available combinations refer to the relevant data sheet for the basic unit and the desired option.

Adjustment and tests have to be carried out on the test bench under operating temperatures.

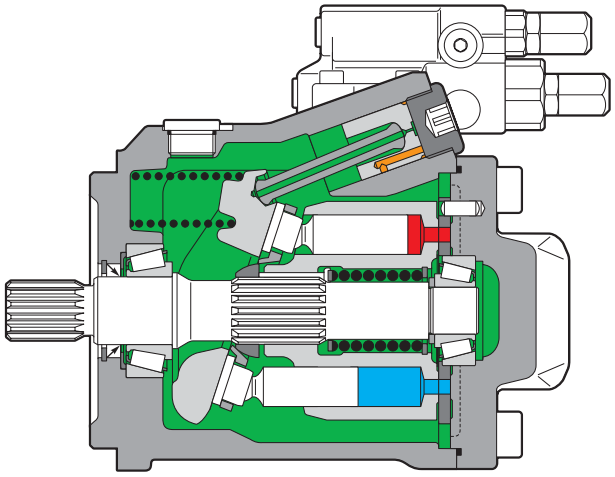
Protection of personnel and property has to be guaranteed by appropriate measures.

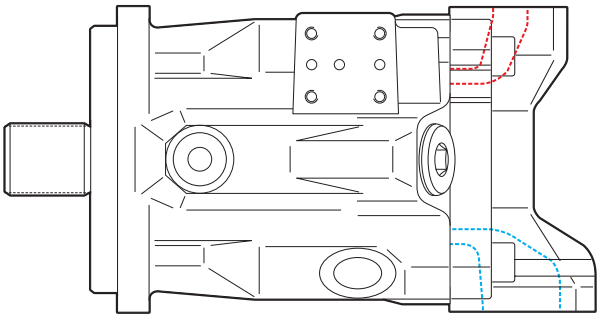
Expert knowledge, the precondition of any service work, can be obtained in our training courses.

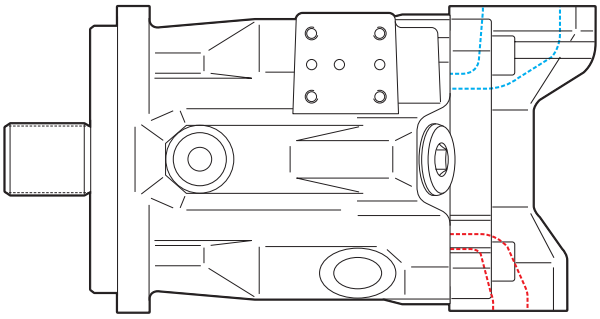
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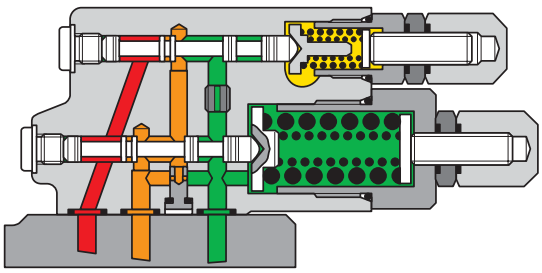
A10VO

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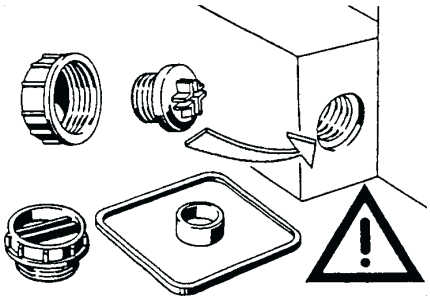




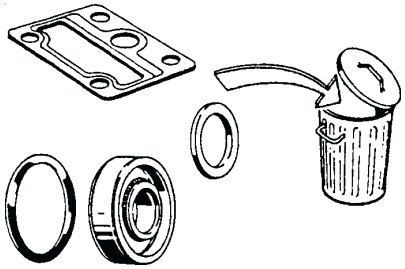




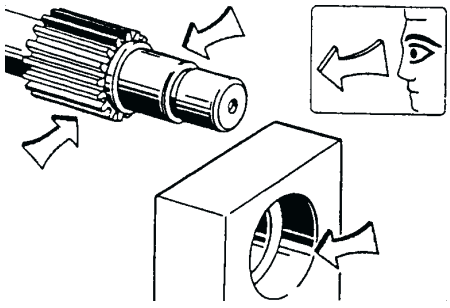
Attention!
Observe the following guidelines when carrying out repairs on hydraulic units!



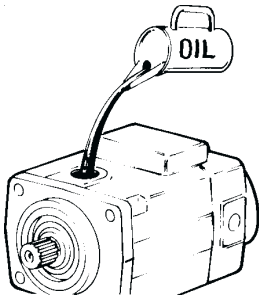
Close off all openings of the hydraulic unit.



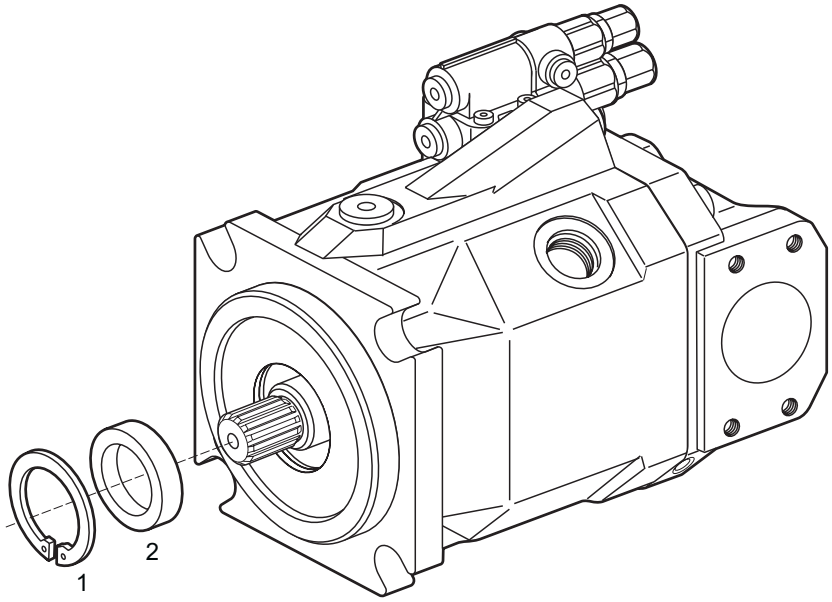
Replace all of the seals.
Use only original BRUENINGHAUS HYDROMATIK spare parts.

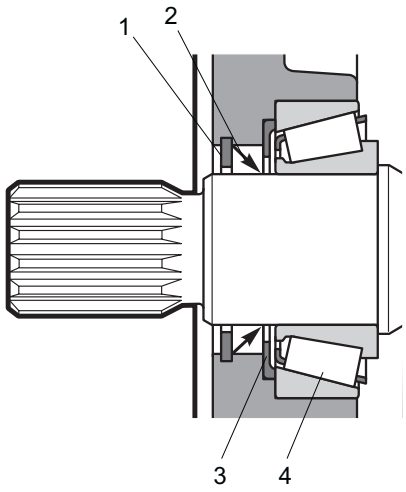


Check all sealing and sliding surfaces for wear.
Attention: Re-work of the sliding surfaces by using, for example abrasive paper, can damage the surface.

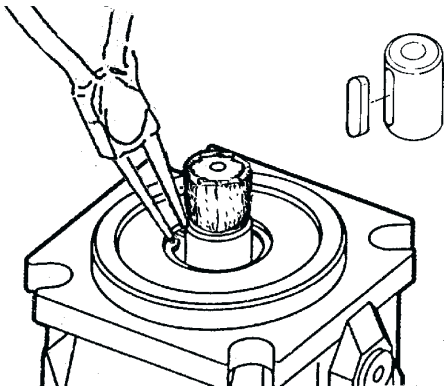


Fill the hydraulic unit with hydraulic oil before commissioning.

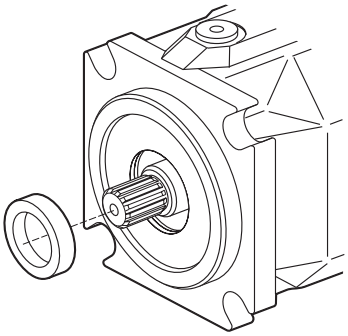




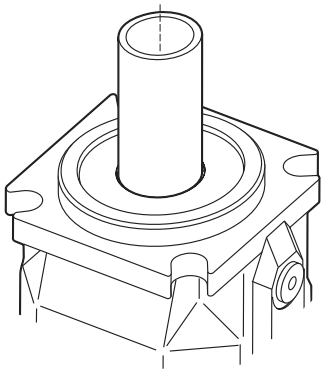
1. Circlip
2. Shaft seal
3. Ring
4. Bearing



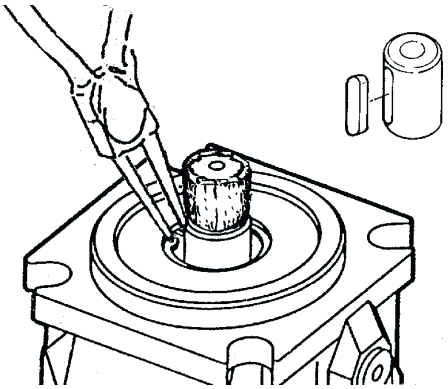
(Remove key, version with keyway)
Protect the drive shaft.
Remove the circlip.
Remove shaft seal to front.



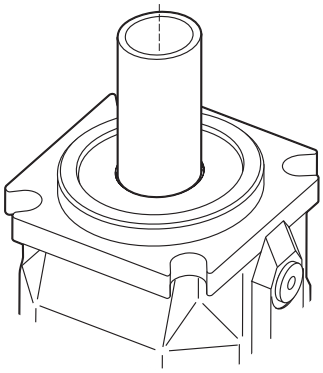
⚠ Change the shaft seal and check its sliding surface (drive shaft) and housing, grease the sealing ring. Visual check shaft seal and housing.



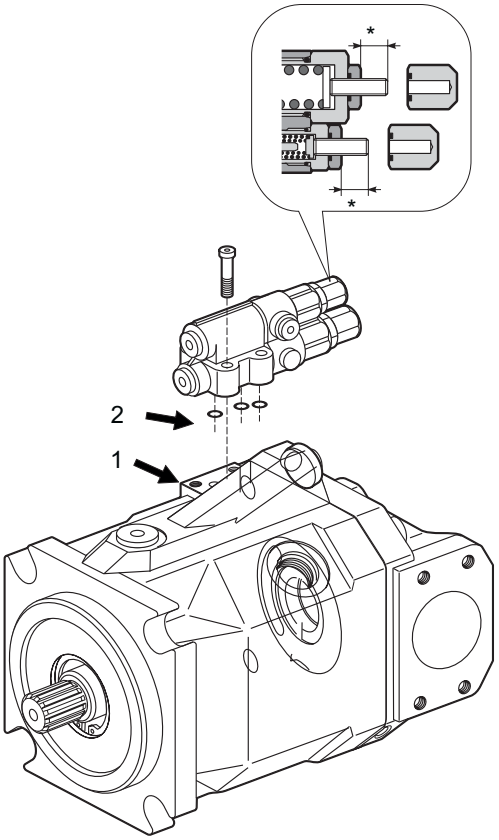
Assembling of the sealing ring carefully down to the distance ring.



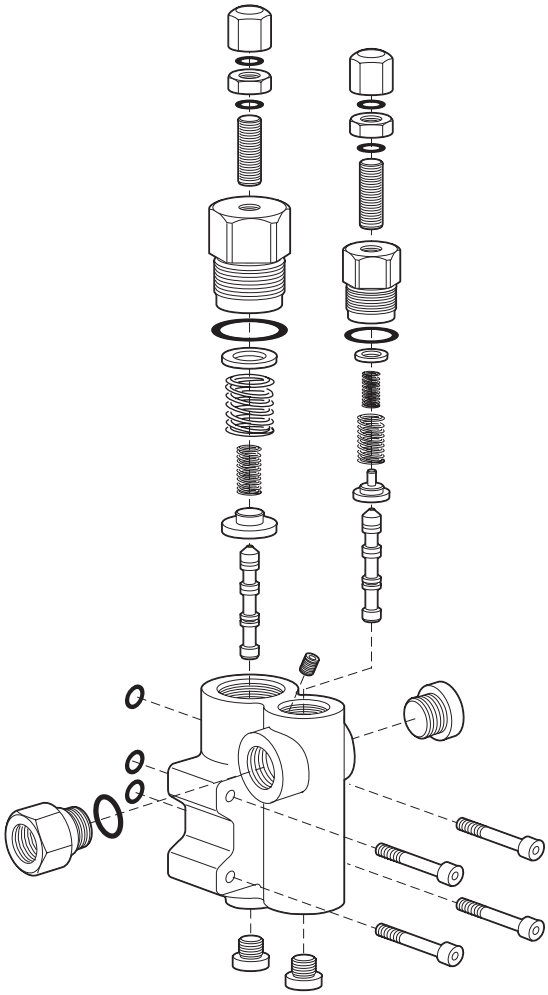
Assemble the snap ring.
(Assemble key version with keyway).



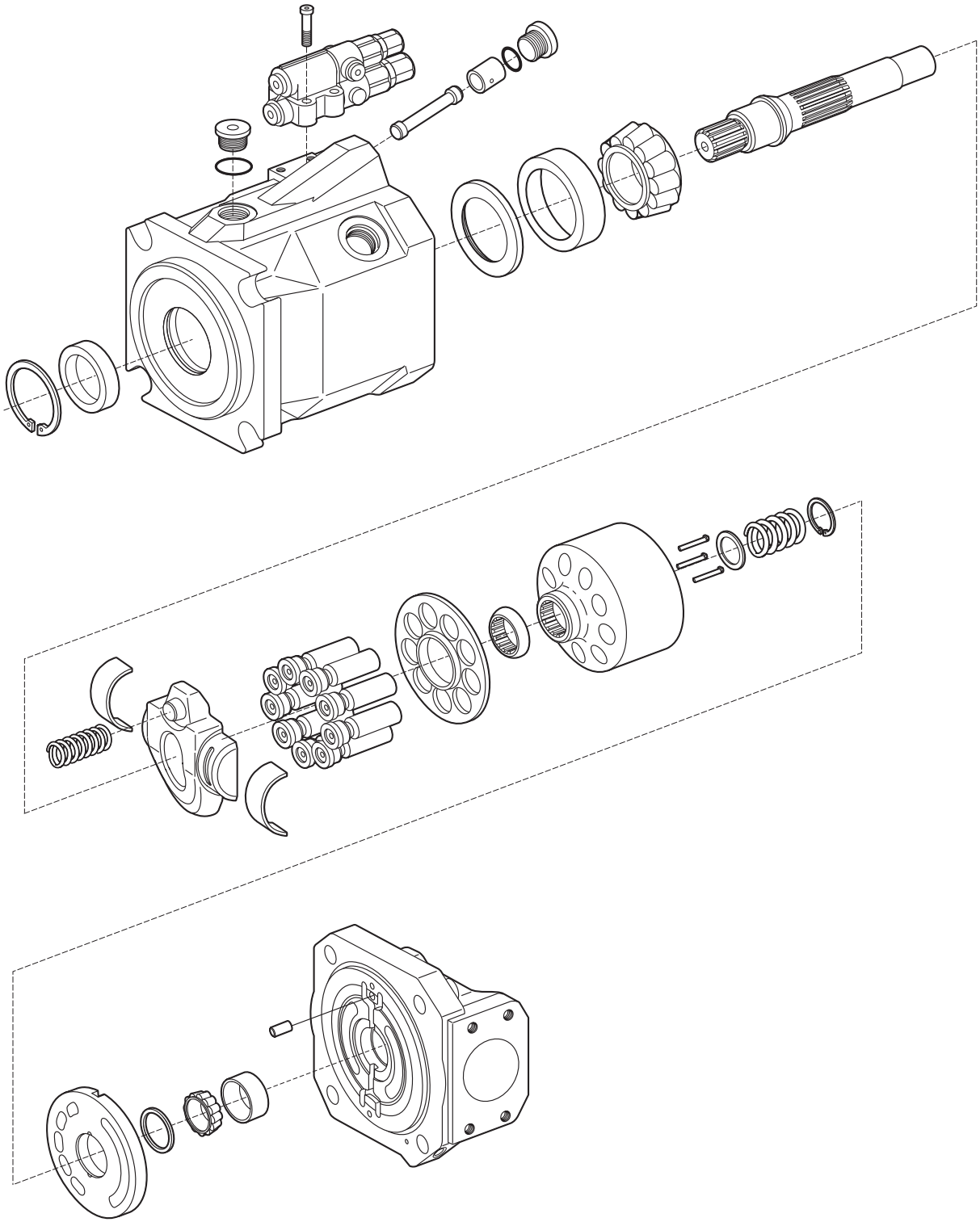
⚠ Visual check to ensure that the circlip is correctly located in the groove.

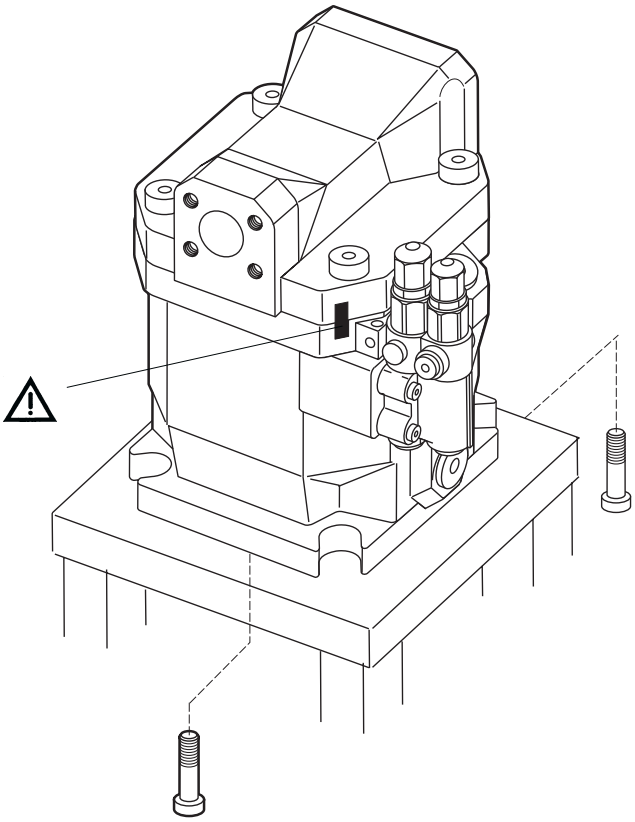


⚠ Remove the control valve
Measure dimension * and note down!
Check sealing surface (1).
Check O-rings (2).



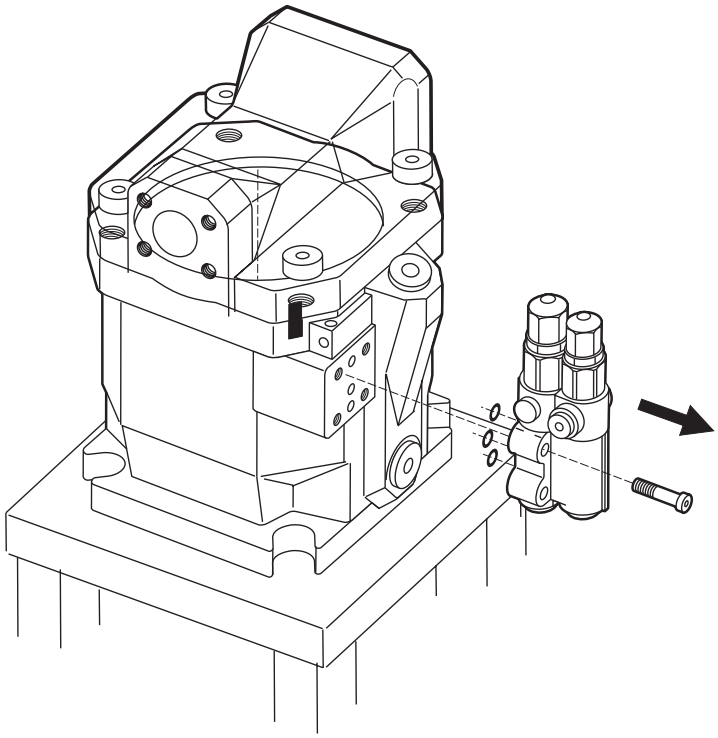
Overview

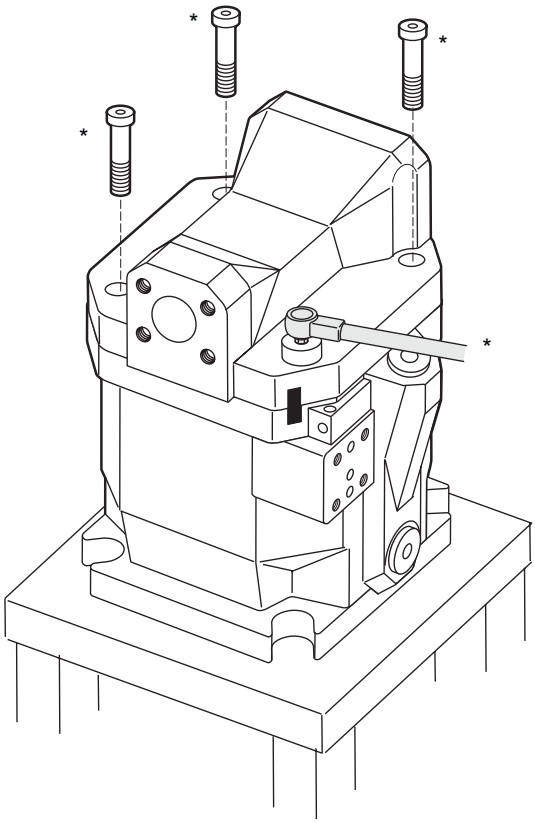




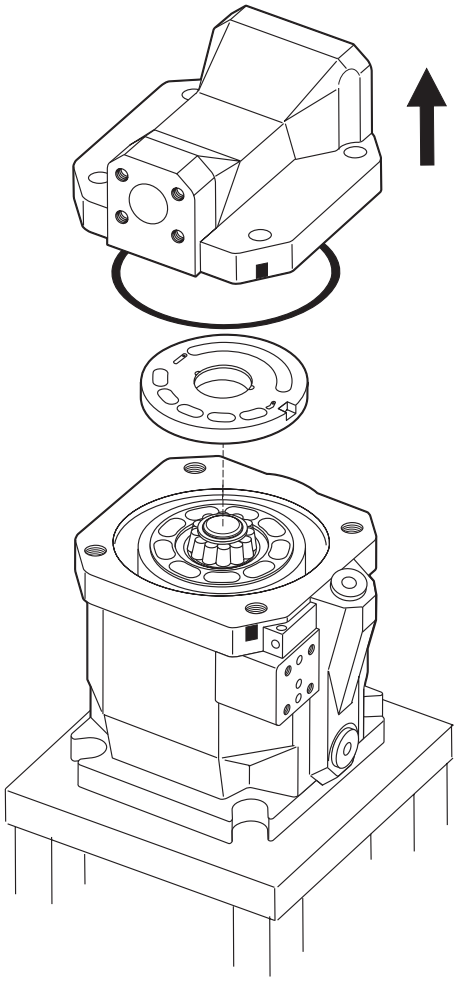
⚠ Disassembly position
Mark the location of the connection plate on the housing of pump.

Remove the control valve.



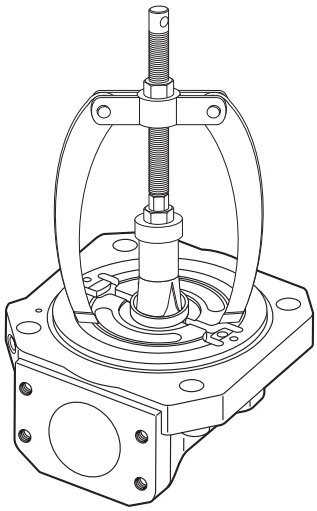


Remove the 4 socket screws *.



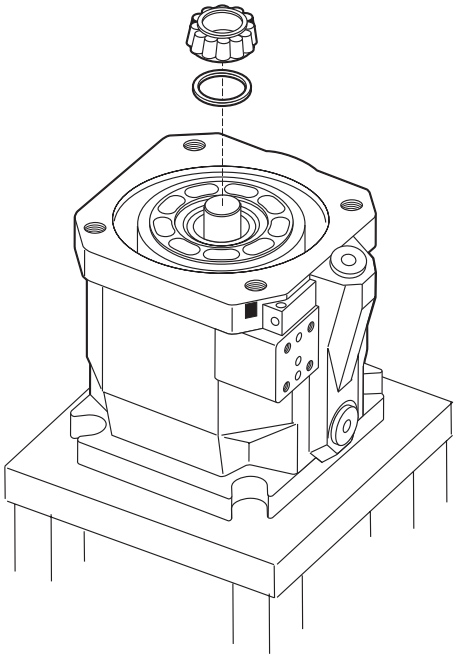
Remove connection plate and store down.

⚠ Control plate can drop down - keep tight while removing connection plate.



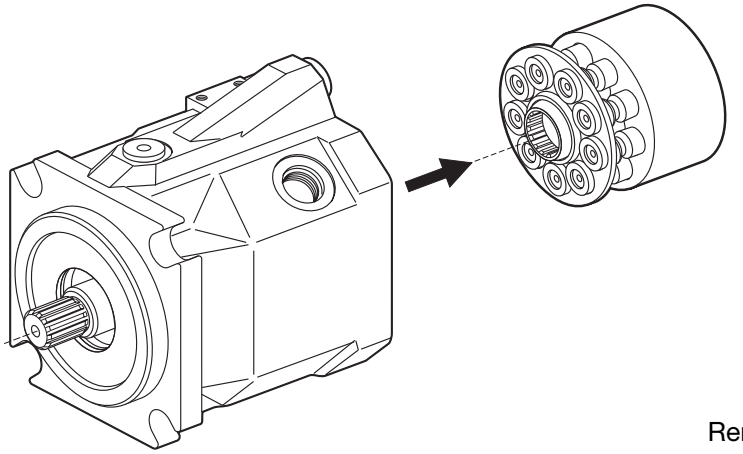
Pull bearing of the connection plate out using a bearing puller.

⚠ Do not damage the sealing surface.

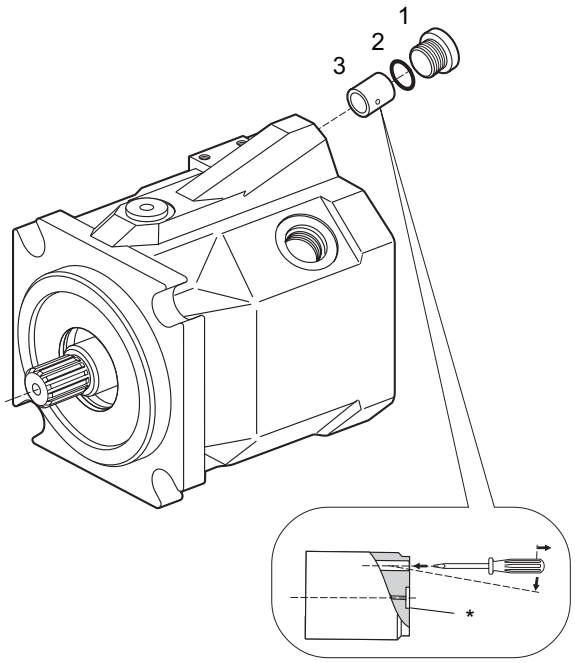


Remove bearing and shim.

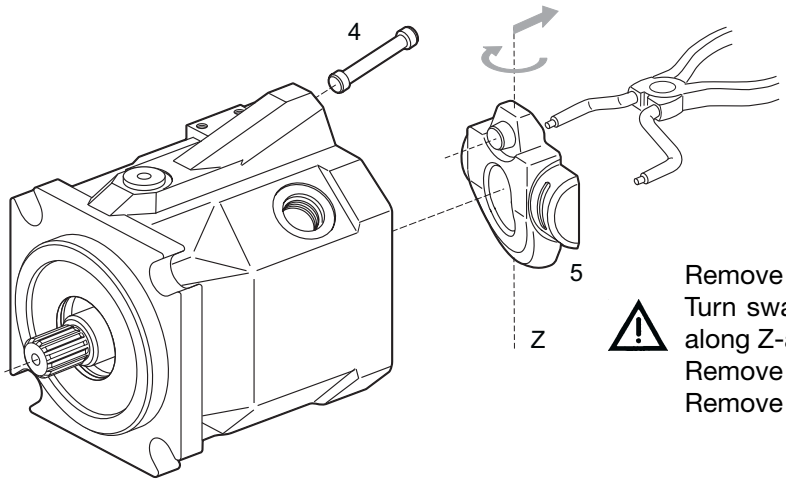
⚠ Do not damage the sealing surface.



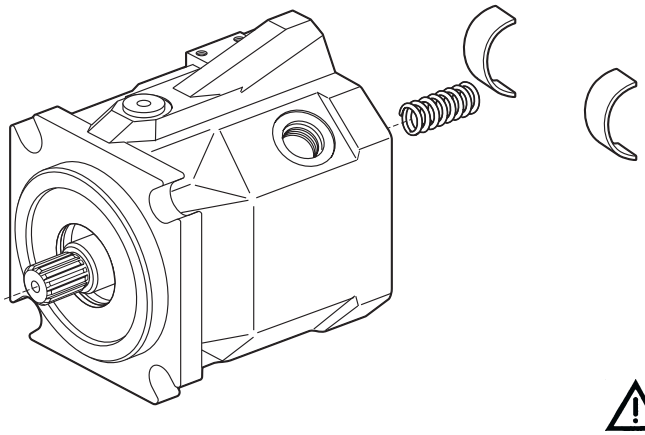
Remove the rotary group in a horizontal position.



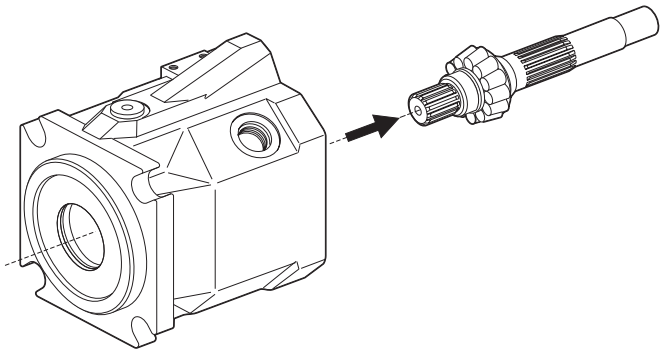
Remove plug (1) with seal (2).
Pull out control piston (3)
(-flat surface*-) with tool.



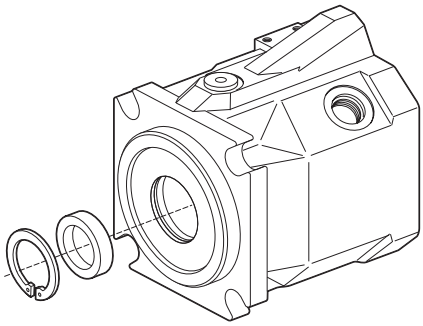
⚠ Remove piston rod and swash plate.
Turn swash plate (5) inside of the housing slightly along Z-axis with tool.
Remove piston rod (4).
Remove swash plate (5).



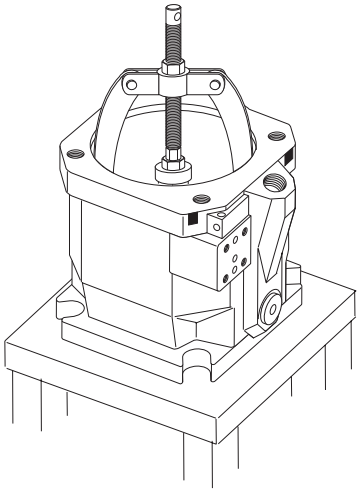
⚠ Remove bearing shells and bearing.
Attention for position!



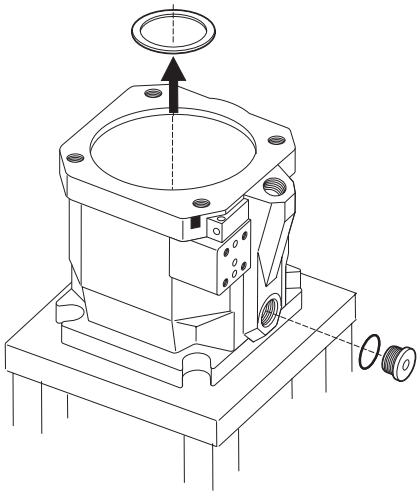
Remove drive shaft with bearing.



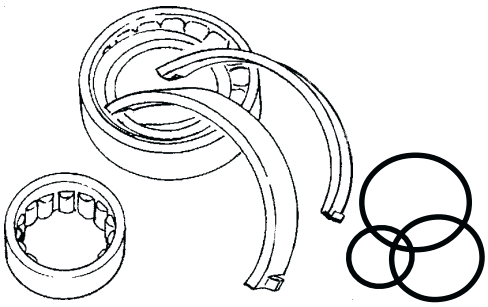
Remove circlip and shaft seal.



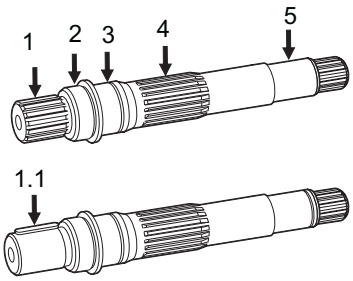
Pull out outer race of tapered bearing out of housing press seat.
Use bearing puller.



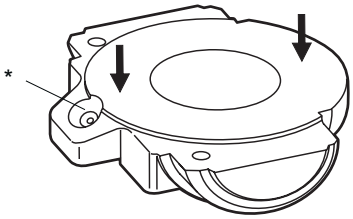
Remove shim.
Remove all plugs.
(Size 28 just one plug)



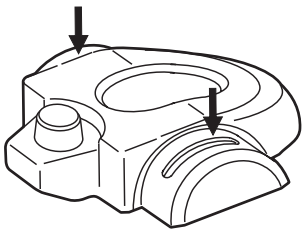
Renew all bearings and seals.



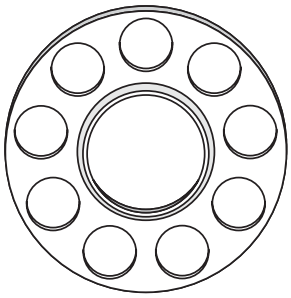
Check:
1. Wear on slines, fretting
1.1 Key set
2. Drive shaft seal wear grooves
3. Bearing seat
4. Splines for cylinder drive
5. Bearing seat



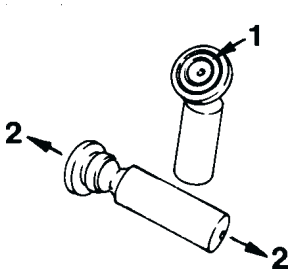
Check:
Sliding surface free of grooves.
* Check for freedom of piston rod movement



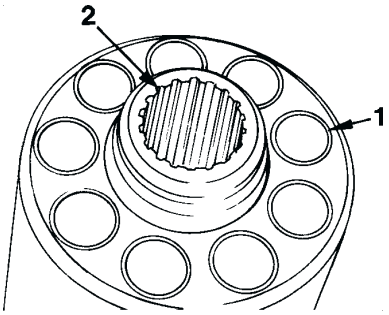
Check:
Bearing surfaces



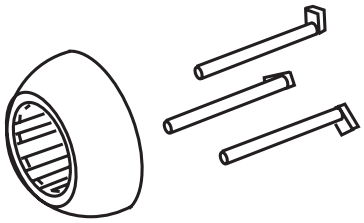
Check!
That the retaining plate is free of grooves and that there is no wear in the slipper pad area.



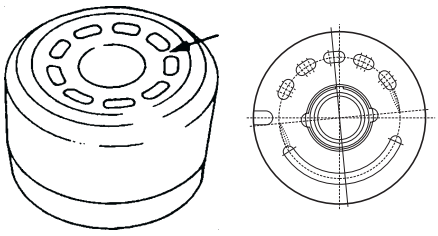
Check!
Check to see that there are no scratches or metal deposits on the sliding surface (1), and that there is no axial play (2), (pistons must only be replaced as a set).



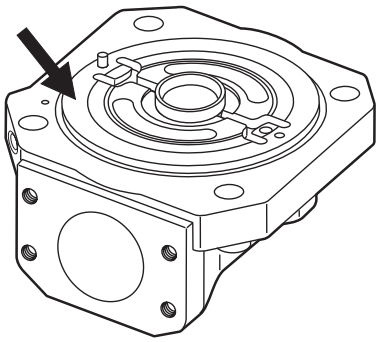
Check!
Cylinder bores (1), splines (2).



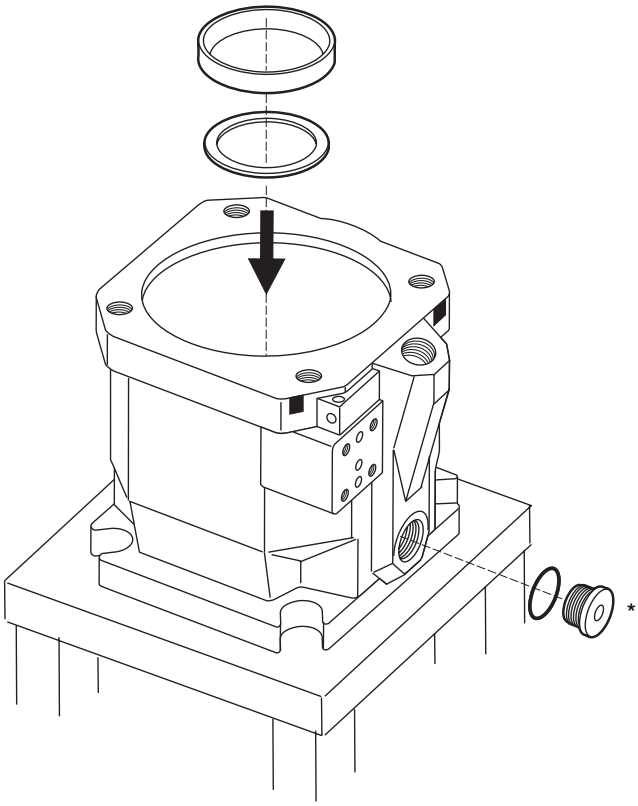
Free of grooves, no signs of wear.



Check!
Cylinder sliding surface free of grooves, no wear, no embedded foreign particles. That there are no scratches on the control plate. (Only replace them as a set).



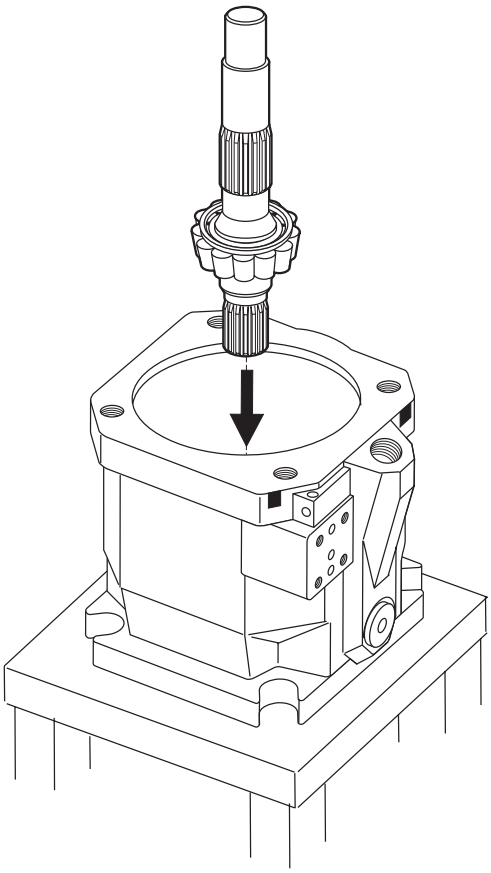
Check!
Mounting surface - control plate undamaged.



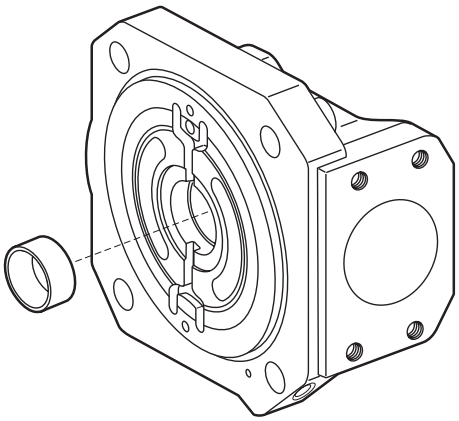
Press-in distance ring and outer racer with tool.

⚠ Pull plug* tight.

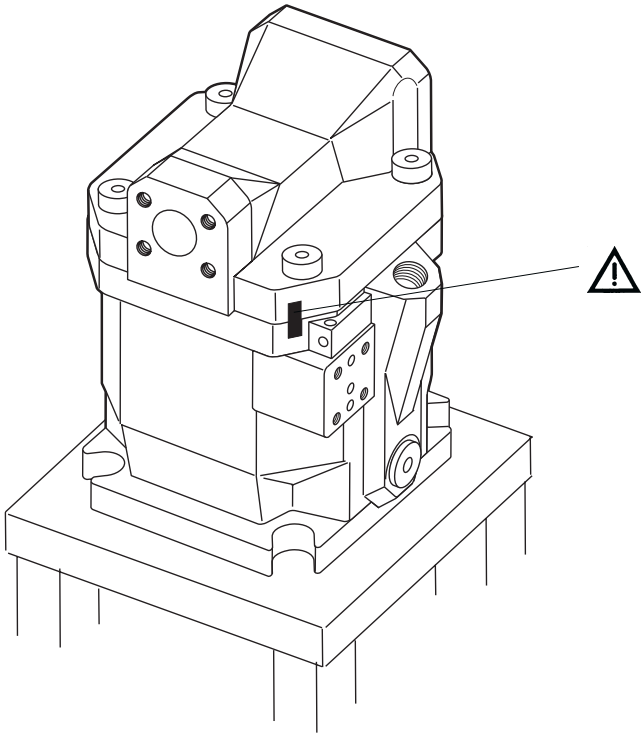
NG / Size	a_1	MA [Nm]
28	3/4 - 16 UNF-2B	72
45, 60	7/8 - 14 UNF-2B	127
85	1 1/16 - 12 UN	147



⚠ Assemble shaft in correct position.
Do not cut shaft seal!



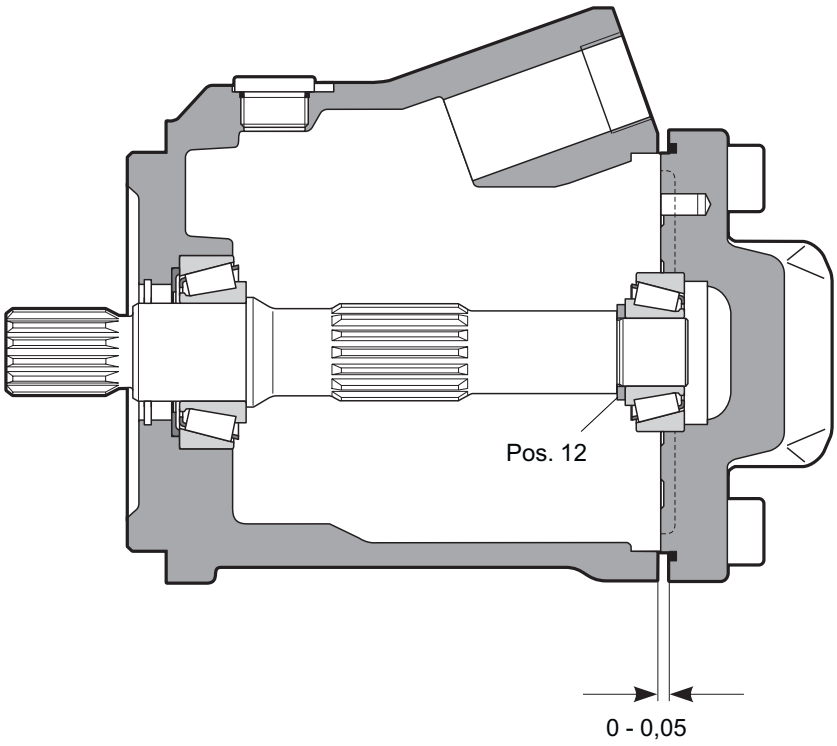
Press-in outer racer of rear bearing into connection plate.



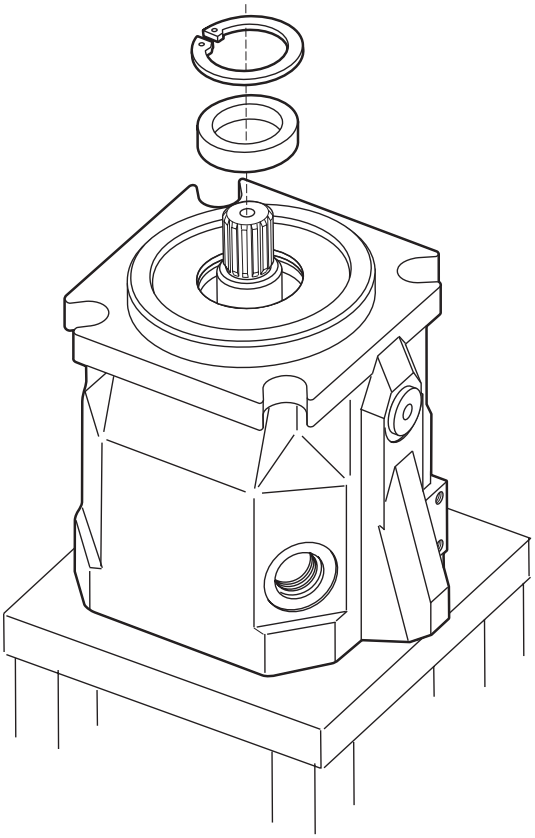
Assemble connection plate to pump acc. sign.
Pull 4 socket screws tight.

Adjustment of taper roller bearing set see attachment page 20.
Disassemble connection plate.

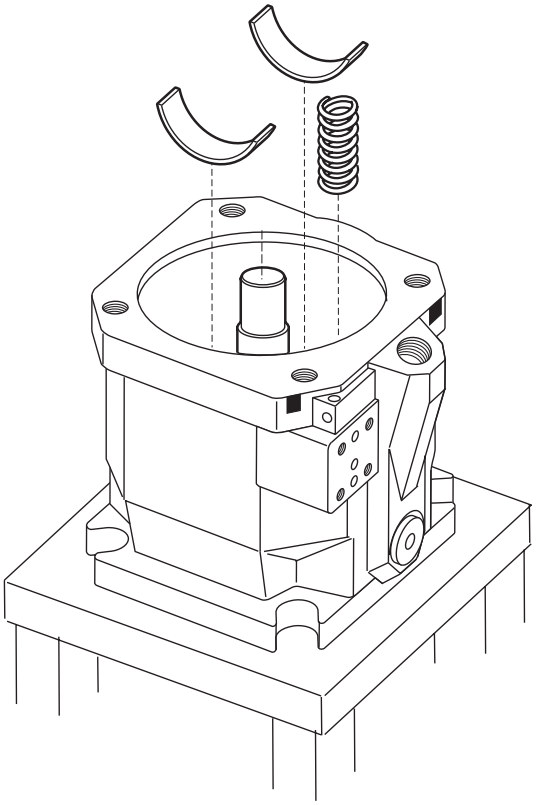
Taper roller bearing initial tension



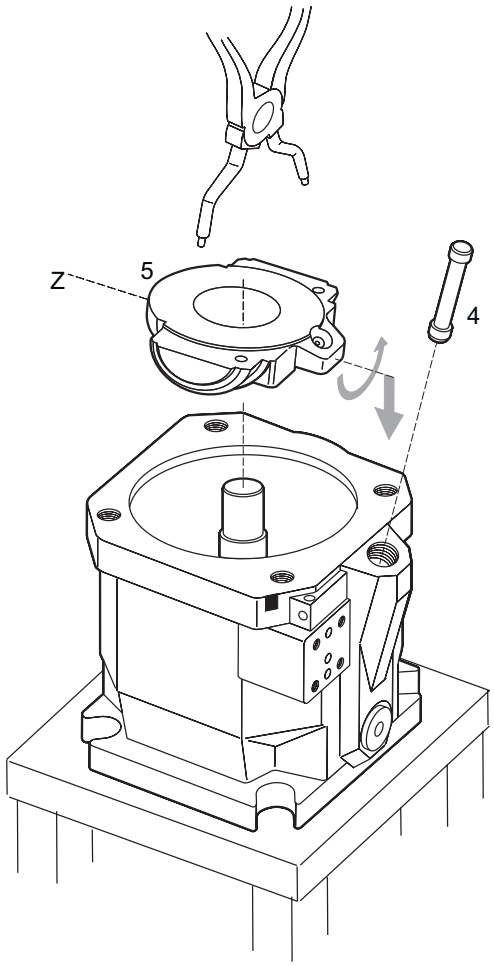
Adjustment of taper roller bearing set
Cast iron housing must have initial tension of the bearings: 0 ..... 0,05 mm, grind Pos. 12 if necessary.



Assembly instruction shaft seal see page 6.



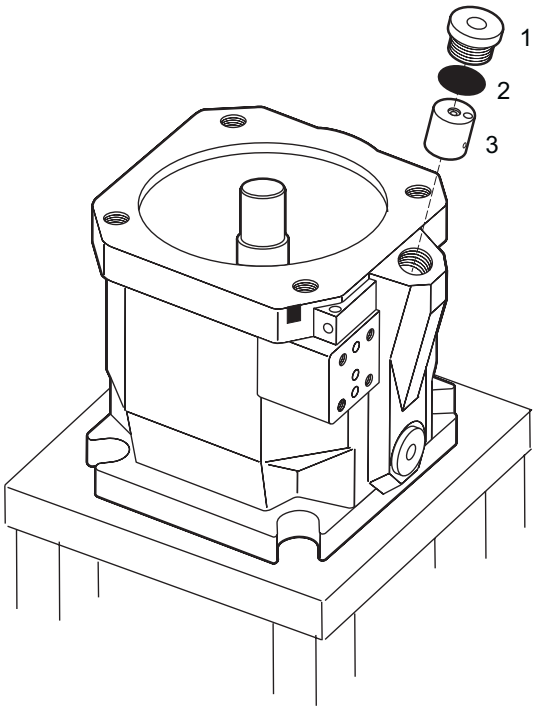
⚠ Fit in bearing shells and spring.
Fix with grease.



⚠ Assemble swash plate (5) and piston rod (4) into pump.

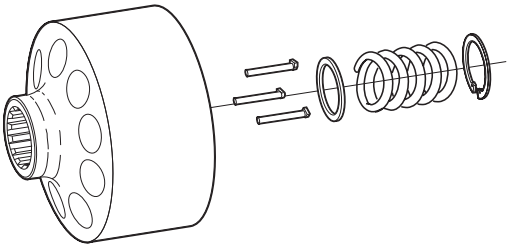
⚠ Spring guide pin in correct position.

Check correct position of the spring.

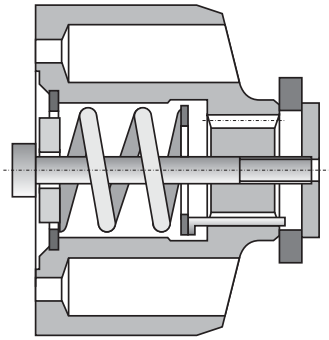


Assemble piston rod (4), control piston (3), seal (2), and plug (1).

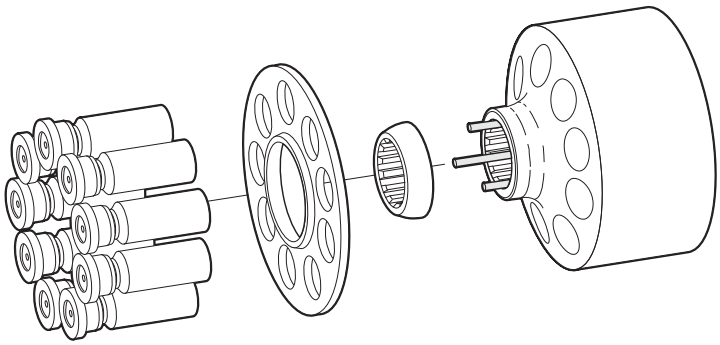
⚠ Pull plug tight.
Size 28, 45, 60 MA =190 Nm + 20 Nm
Size 85 MA = 320 Nm + 20 Nm
Secure with Loctite 242.

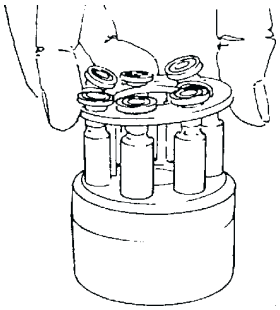


Fit pressure pins using an assembly aid.



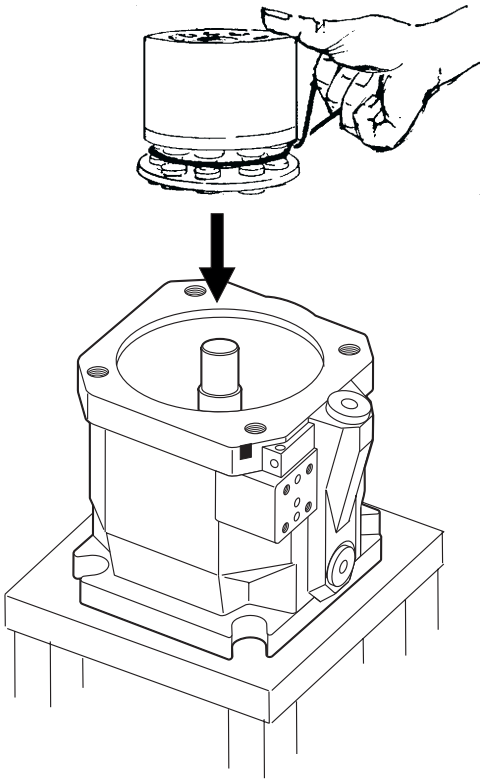
Pre-tension the spring using a suitable device.





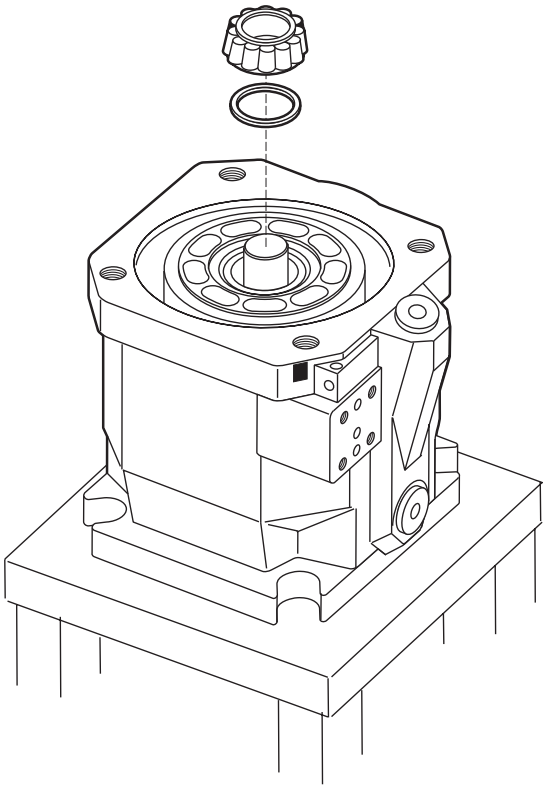
Assemble piston with retaining plate.

Note: Oil piston and slipper pad.

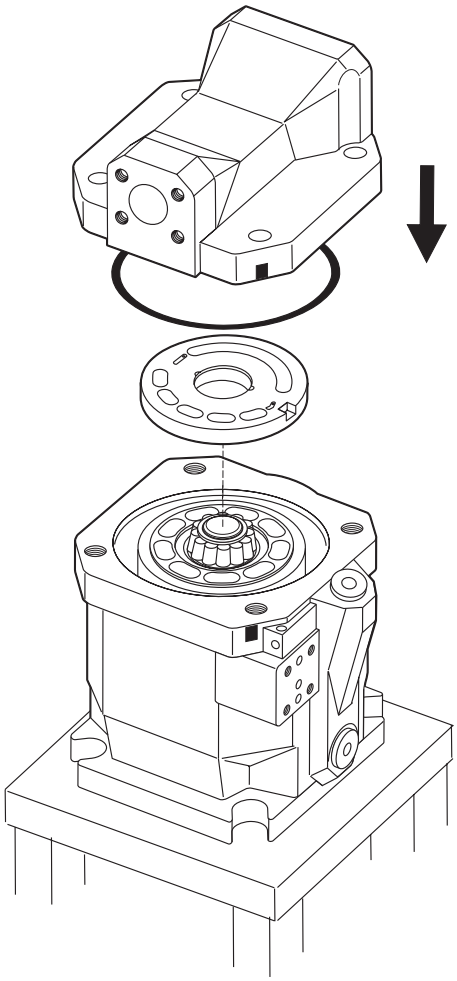


Fit rotary group!

⚠ Assembly aid:
Hold the pistons by using an O-ring.



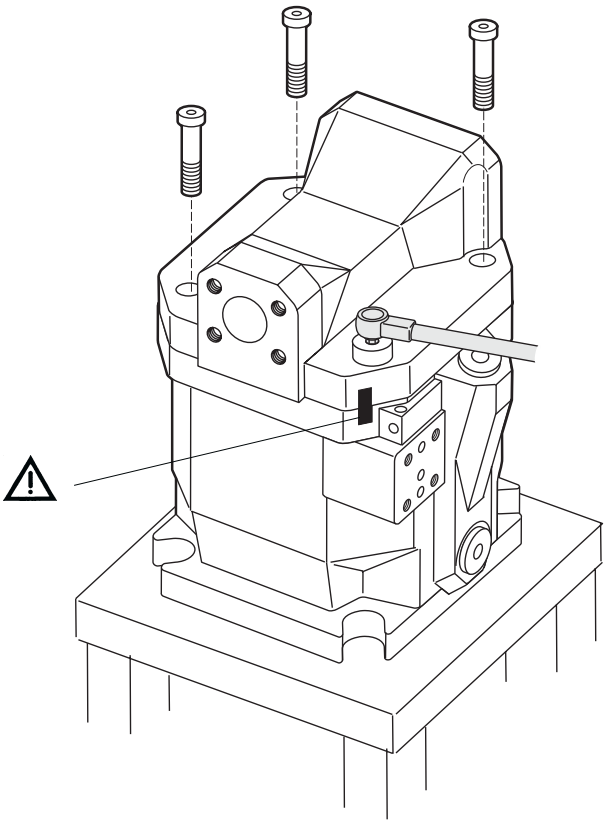
Assemble bearing and adjustment shim to shaft.



⚠ Fit the O-ring to the port plate.
Smear with some grease.
Fit the drive plate to the port plate.

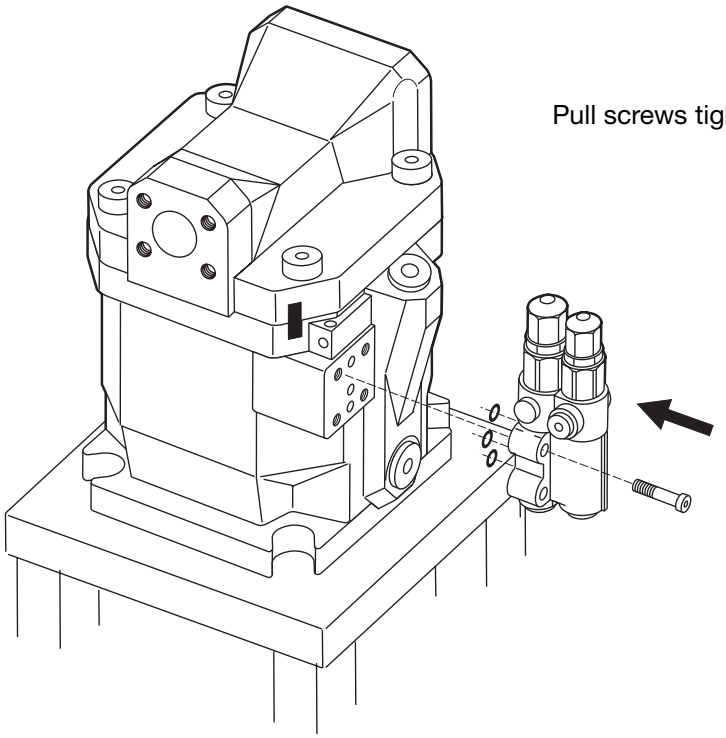
⚠ Smear with grease.

⚠ Pay maximum attention to the correct position of the fixing pin.

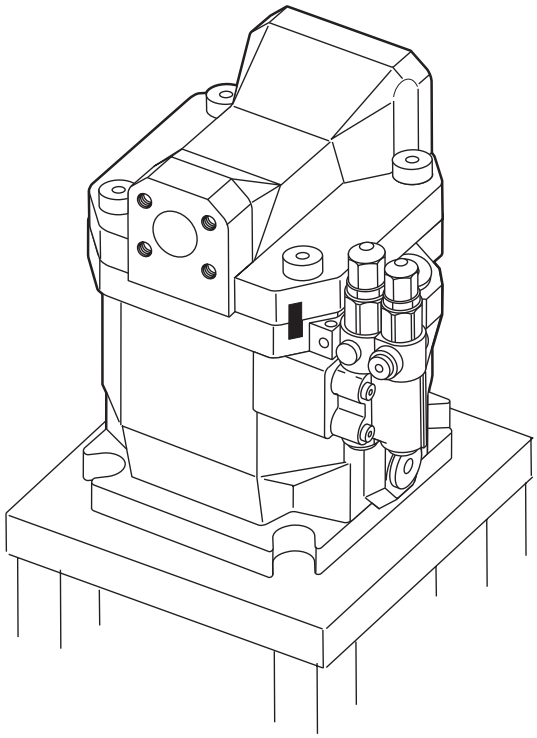


⚠ Assemble connection plate.
Check the correct position to housing.

⚠ Sign.



Pull screws tight acc. list page 26.

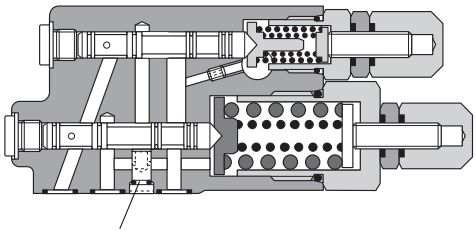


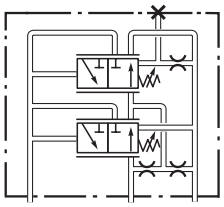
Assemble control valve.
Final pump assembly

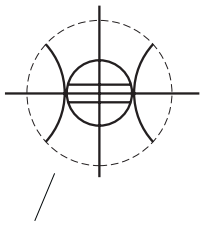
Double check of the housing signs.

All of the valves shown on this page have the orifice shown in its open condition (see sketches - installation location)

DR control valve

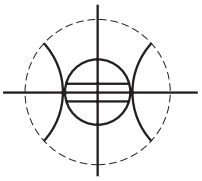


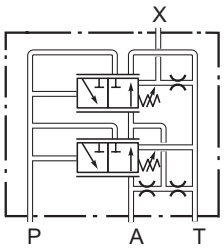




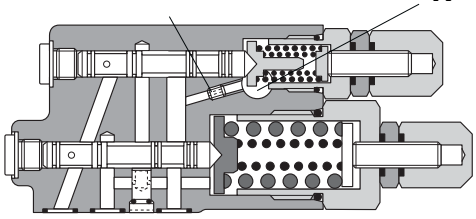
Both X-ports are plugged

Flow controller is blocked
Orifice 0,6 mm
Position of the orifice Æ 0,6



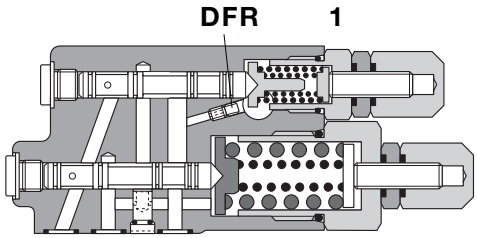


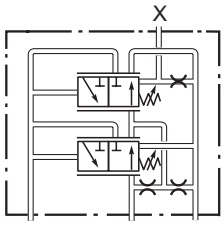
DFR control valve **X**

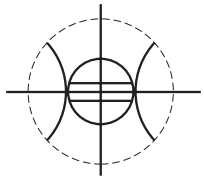


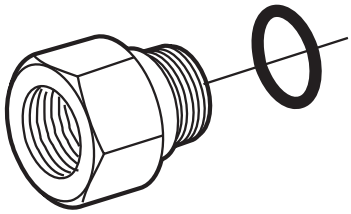
One X-port is plugged

Decompression-orifice

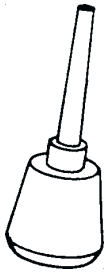




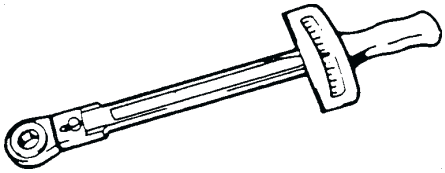




control valve
One X-port is plugged



Bypass orifice X-T is closed using a plug
Plug
Adapter on the DFR control valve for metric piping of the pilot connection X (without orifice).
Loctite types used:



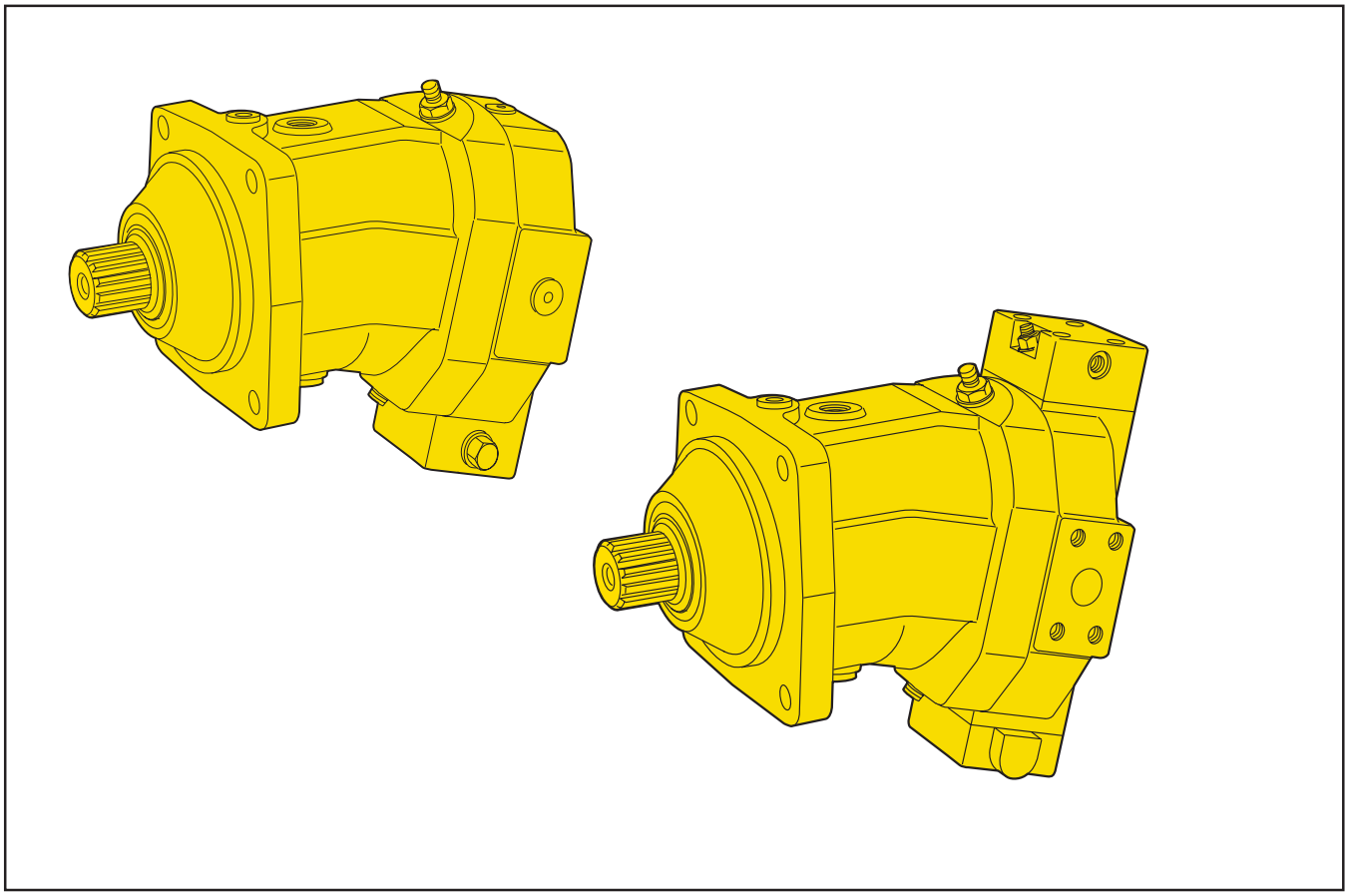
For all break-off plugs	No. 601
For all other parts	No. 242

Tightening torques

Bolt tensile strength grade:		8,8; 10,9; 12,9											
		M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M24	M30
	8,8	2,3	5,0	8,5	21	41	72	115	176	240	350	600	1220
M_A	0,9	3,2	7,2	12	29	58	100	165	250	350	490	840	1670
	12,9	4,1	8,5	14,5	35	70	121	195	300	410	590	990	2000

M_A (Nm) = max. tightening torque (lubricated screws m = 0,125)

Section M
REPAIR INSTRUCTIONS
REXROTH MOTOR



Repair instructions
Mod. A6VM

REPAIR INSTRUCTIONS - REXROTH MOTOR

Type code A6V M _ _ / 6 3 W

Axial piston unit
Bent axis design, variable displacement — A6V

Mode of operation
Motor — M

Size
≙ Displacement $V_{g\,max}$ in cm³ — 28 55 80 107 140 160 200
Size 250 - 1000 see RE 91603

Control and regulating device					28	55	80	107	140	160	200	
Hydraulische Verstellung, steuerdruckabhängig	HD	1			●	●	●	●	●	●	●	HD1
	HD		2		●	●	●	●	●	●	●	HD2
	HD	1		D	●	●	●	●	●	●	●	HD1D
	HD		2	D	●	●	●	●	●	●	●	HD2D
Hydraulic two-position control	HZ1				●	-	-	-	●	●	●	HZ1
	HZ3				-	●	●	●	-	-	-	HZ2
Electrical control, with proportional solenoid	EP	1			●	●	●	●	●	●	●	EP1
	EP		2		●	●	●	●	●	●	●	EP2
	EP	1		D	●	●	●	●	●	●	●	EP1D
	EP		2	D	●	●	●	●	●	●	●	EP2D
Electr. two-position control, w. switching solenoid	EZ	1			●	-	-	-	●	●	●	EZ1
	EZ		2		●	-	-	-	●	●	●	EZ2
	EZ	3			-	●	●	●	-	-	-	EP3
	EZ		4		-	●	●	●	-	-	-	EP4
Automatic control, high pressure related	HA	1			●	❍	❍	❍	●	●	●	HA1
	HA		2		●	●	●	●	●	●	●	HA2
	HA	3			-	●	●	●	-	-	-	HA3
Hydraulic control, speed related												
p_{ST}/p_{HD}=5/100, hydraulic valve for travel direction					●	●	●	●	●	●	●	DA1
el. valve for travel direction (12 V) + el. Q_{max} switch (12 V)					●	●	●	●	●	●	●	DA2
el. valve for travel direction (24 V) + el. Q_{max} switch (24 V)					●	●	●	●	●	●	●	DA3
p_{ST}/p_{HD}=8/100, hydraulic valve for travel direction					●	●	●	●	●	●	●	DA4
el. valve for travel direction (12 V) + el. Q_{max} switch (12 V)					●	●	●	●	●	●	●	DA5
el. valve for travel direction (24 V) + el. Q_{max} switch (24 V)					●	●	●	●	●	●	●	DA6

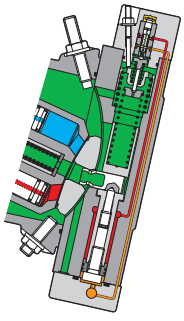
Pilot pressure increase Δ p = 10 bar
Pilot pressure increase Δ p = 25 bar
with constant pressure control

Control voltage 12 V
Control voltage 24 V
with constant pressure control

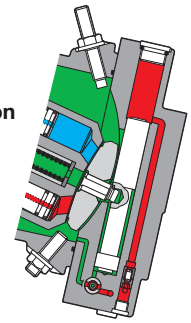
Model without pressure increase
Model with pressure increase Δ p = 100 bar

Override	HA1	HA2	HA3	
without override (no code)	●	●	●	
hydraulic override	●	●	●	T
electrical override, 12 V	●	●	●	U1
electrical override, 24 V	●	●	●	U2
el. override + el. valve for travel direction, 12 V	❍	❍	-	R1
el. override + el. valve for travel direction, 24 V	❍	❍	-	R2

Synchronizing piston



Differential piston

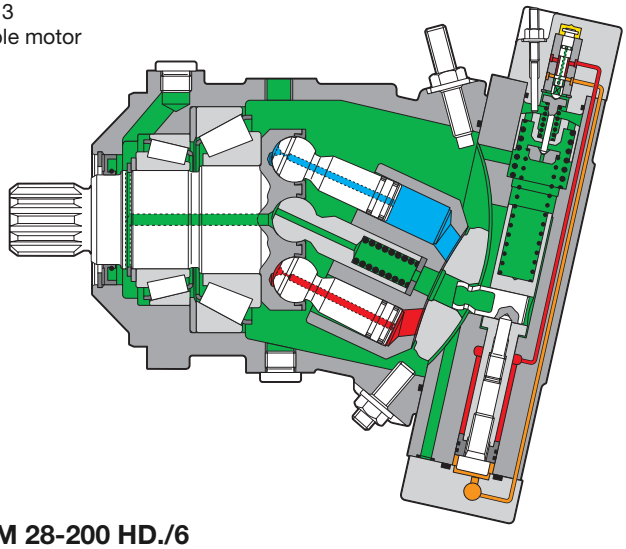


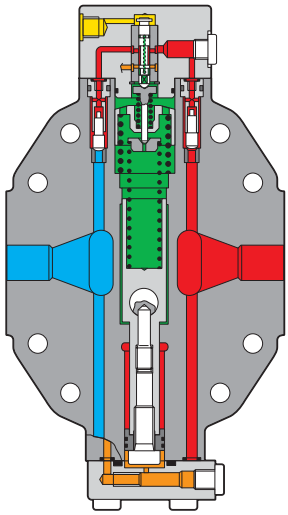
NOTICE

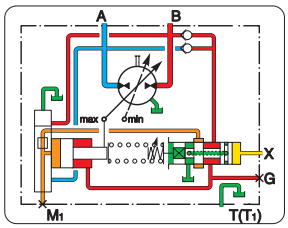
Specifications, descriptions and illustrative material shown herein were as accurate as known at the time this publication was approved for printing.
BRUENINGHAUS HYDROMATIK reserves the right to discontinue models or options at any time or to change specifications, materials, or design without notice and without incurring obligation.
Optional equipment and accessories may add cost to the basic unit, and some options are available only in combination with certain models or other options.
For the available combinations refer to the relevant data sheet for the basic unit and the desired option.
Adjustment and tests have to be carried out on the test bench under operating temperatures.
Protection of personnel and property has to be guaranteed by appropriate measures.
Expert knowledge, the precondition of any service work, can be obtained in our training courses.

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Index 3
Variable motor

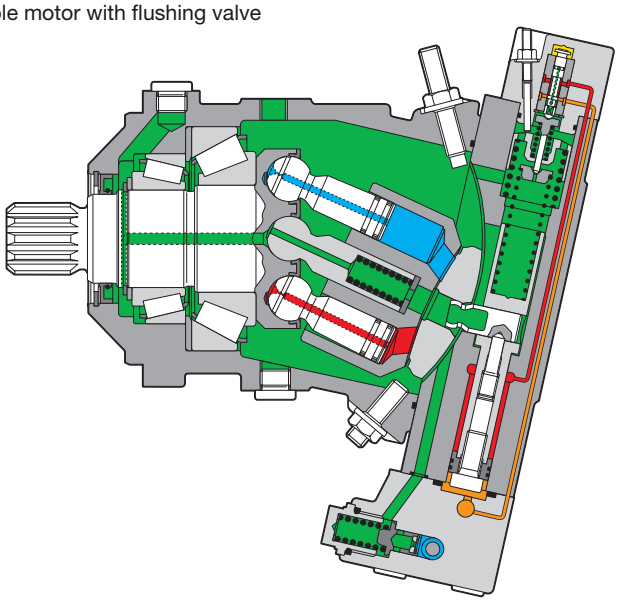


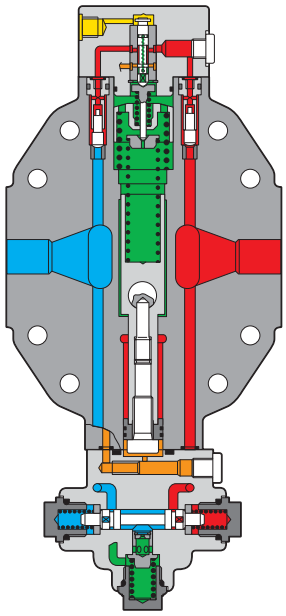


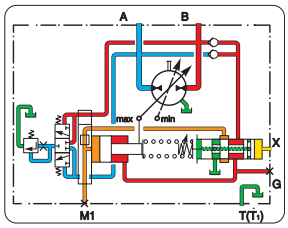


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Index 3
Variable motor with flushing valve

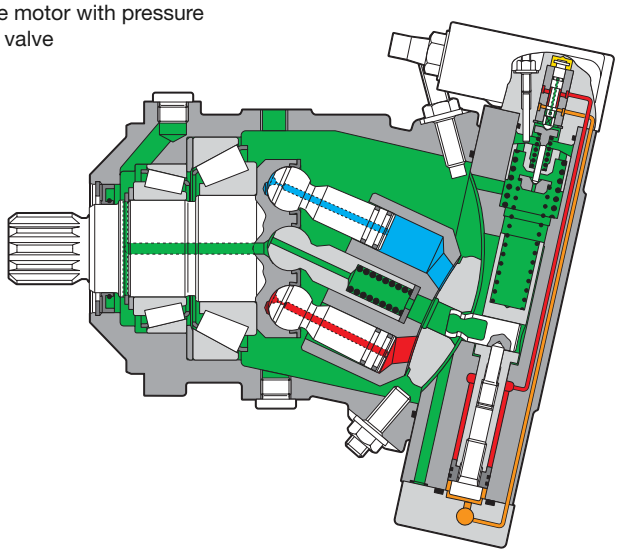


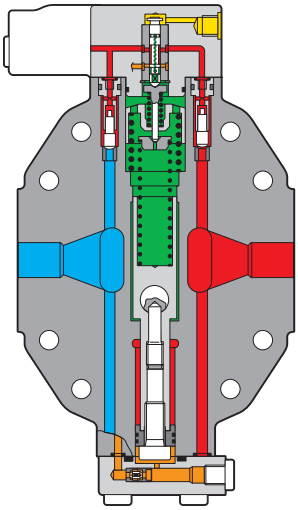


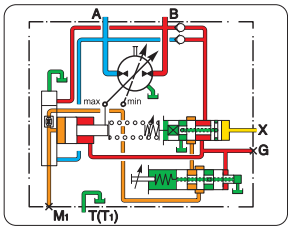


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Index 3
Variable motor with pressure control valve

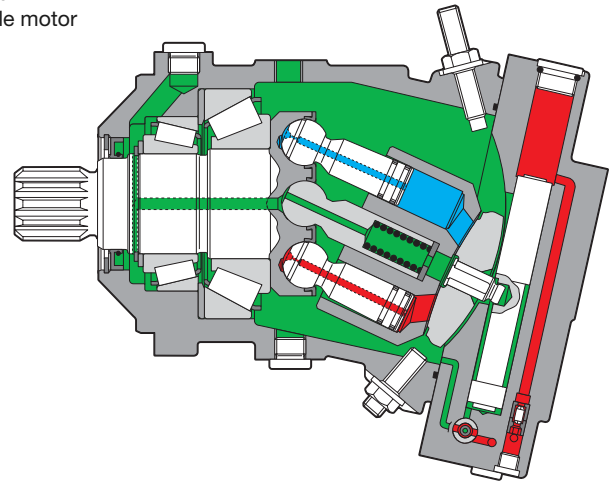


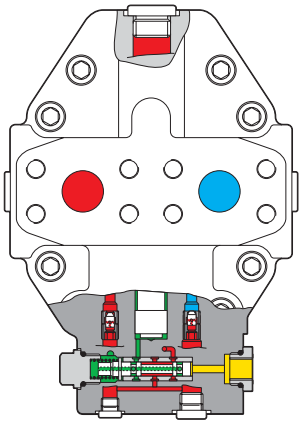


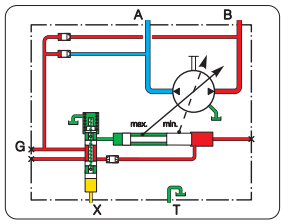


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Variable motor

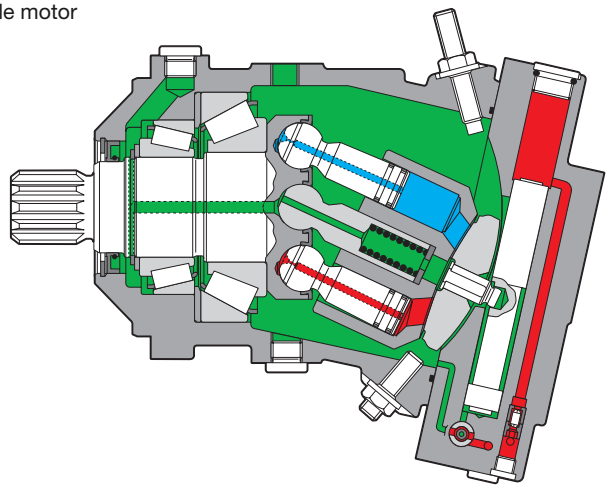


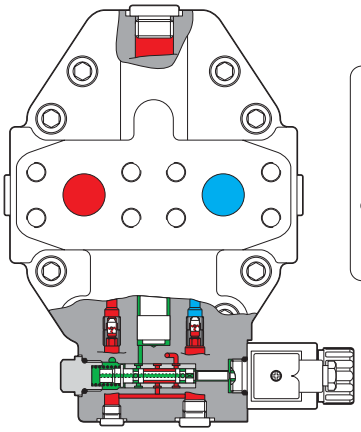


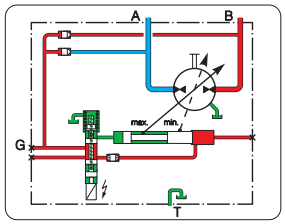


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Index 3
Variable motor

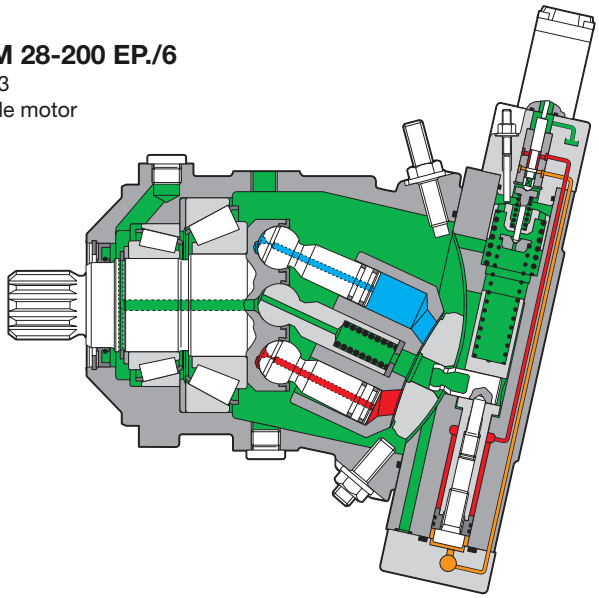


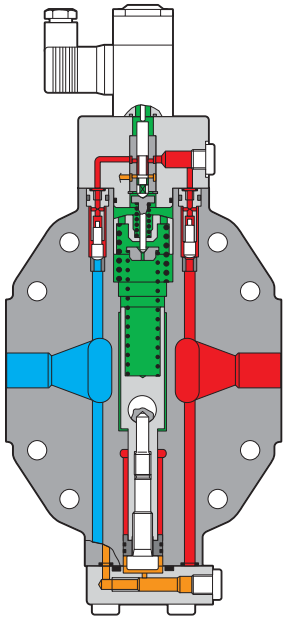


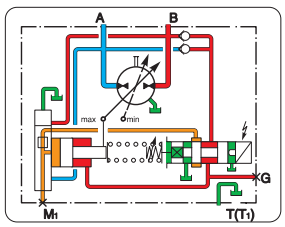


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Variable motor

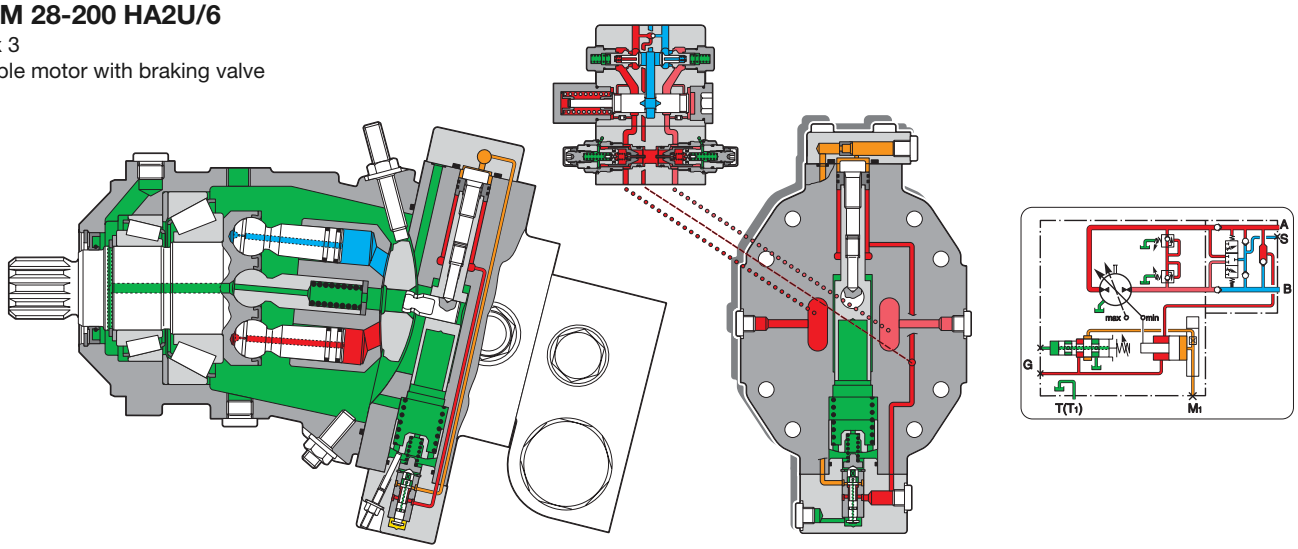






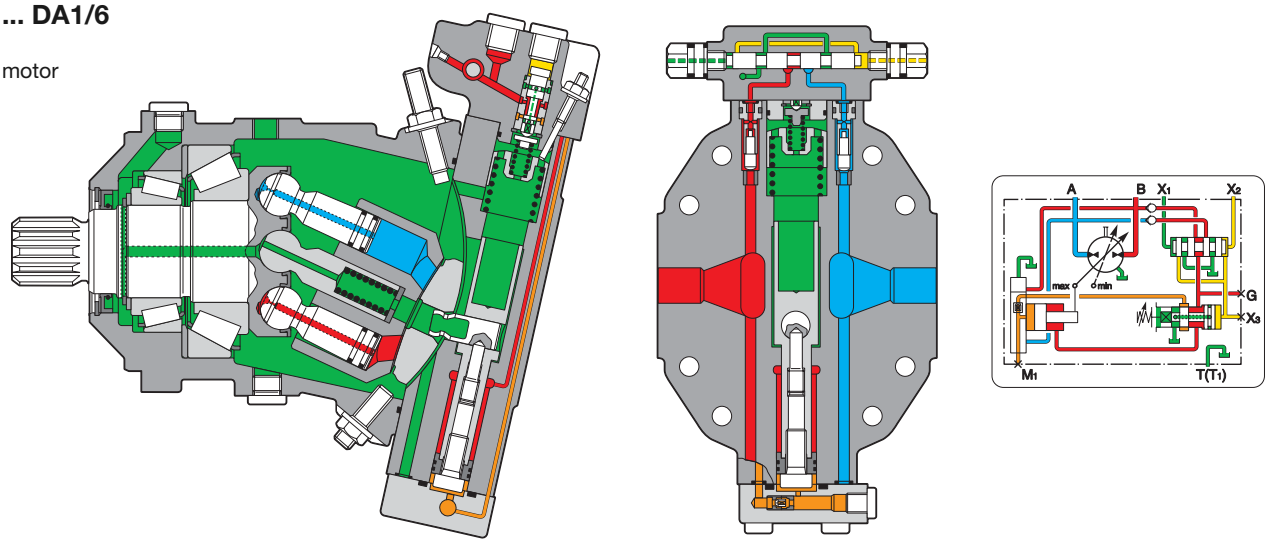
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Variable motor with braking valve



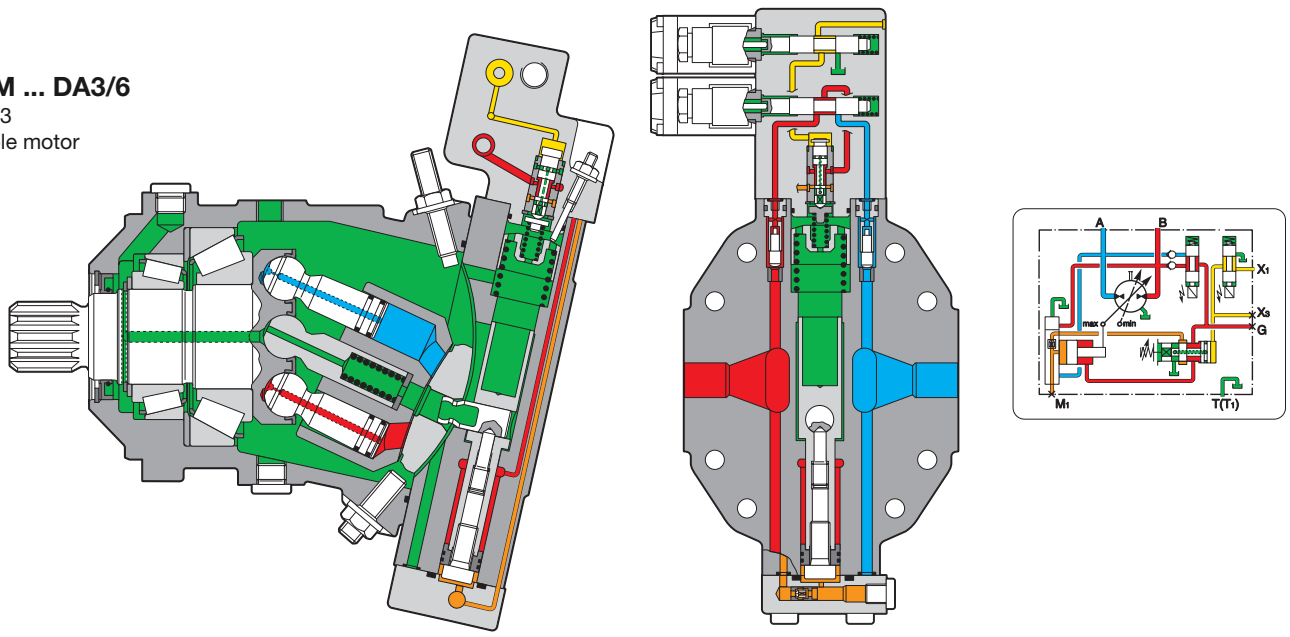
A6VM ... DA1/6

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Variable motor



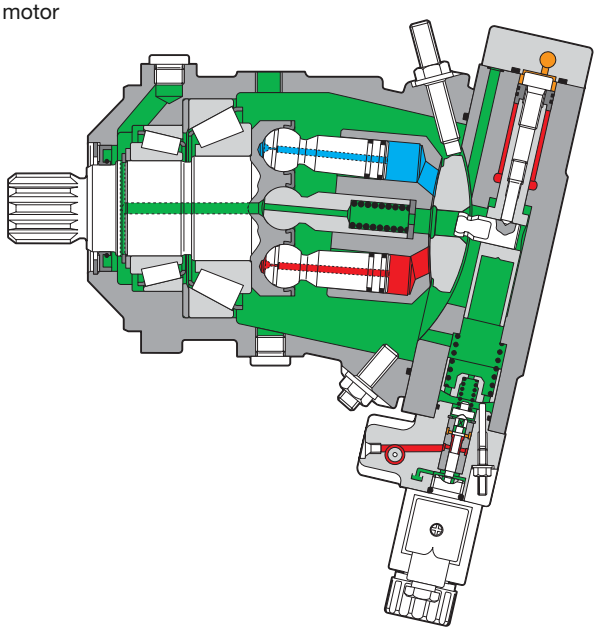
A6VM ... DA3/6

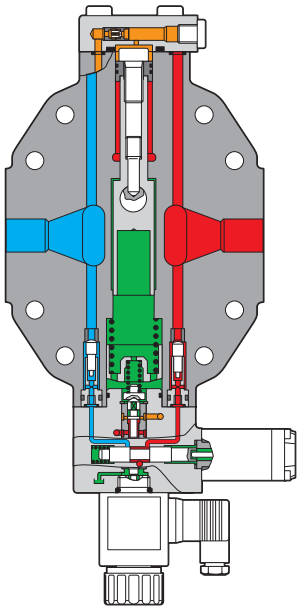
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Variable motor

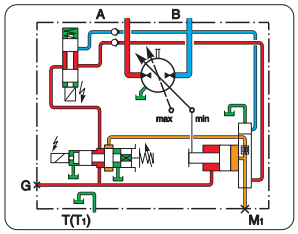


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Variable motor

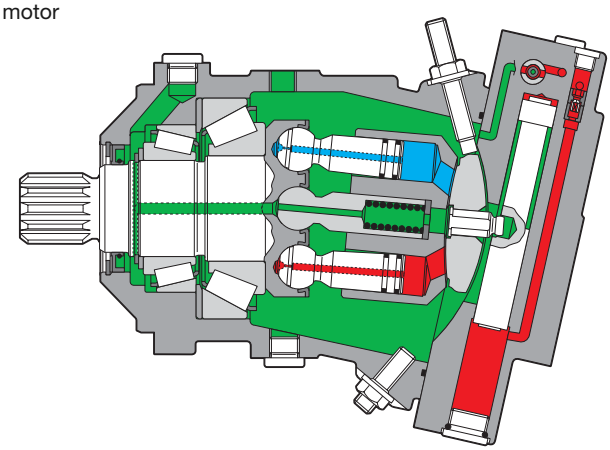


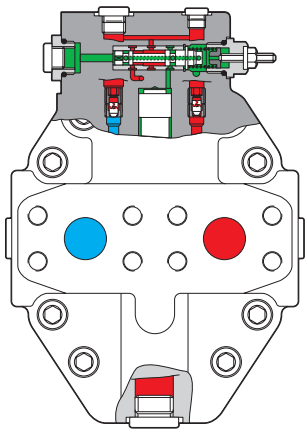


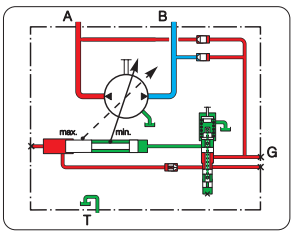


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Index 3
Variable motor

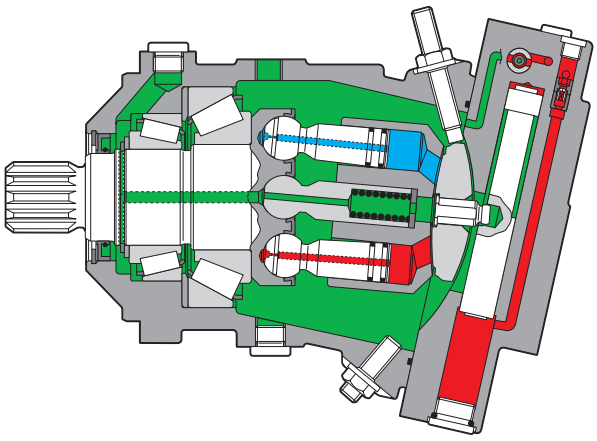


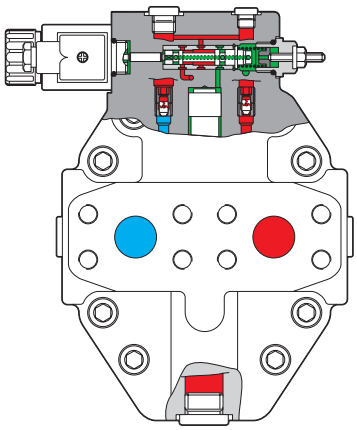


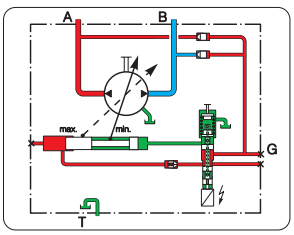


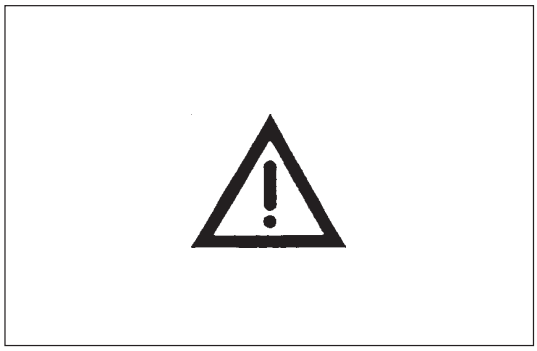
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Index 3
Variable motor

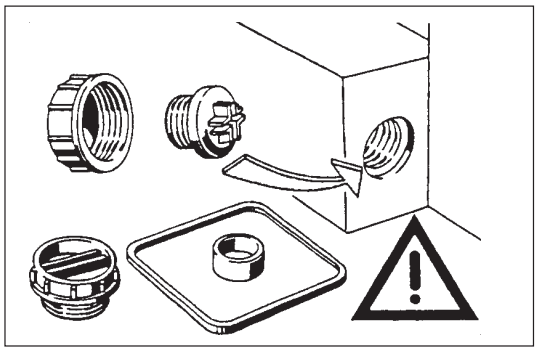




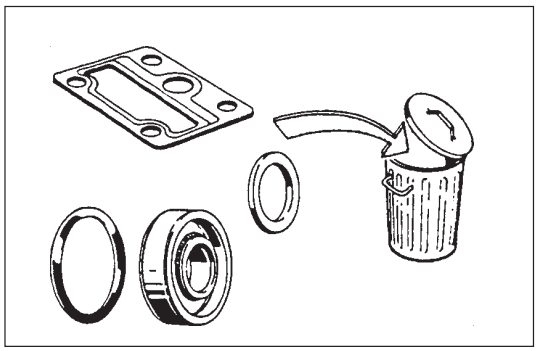




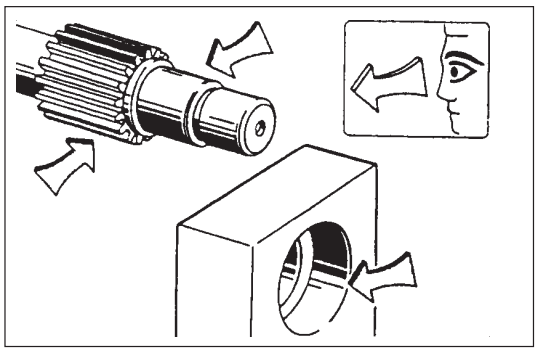
Attention!
Observe the following notices when carrying out repair work at hydraulic aggregates!



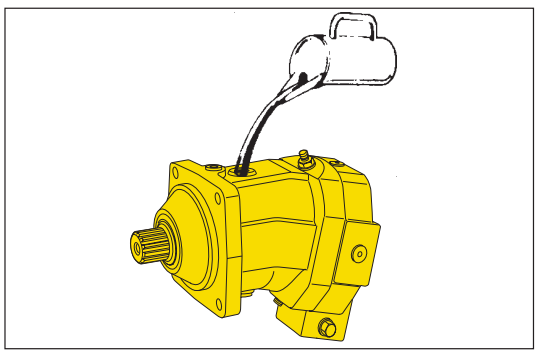
Close all ports of the hydraulic aggregates.



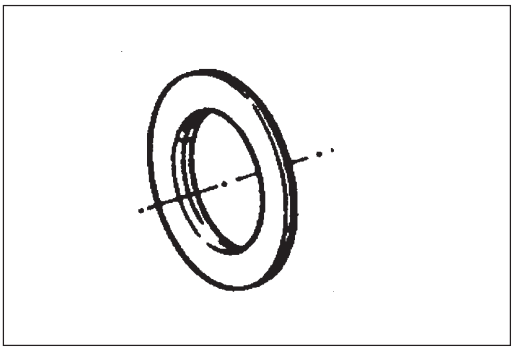
Replace all seals.
Use only original HYDROMATIK spare parts.



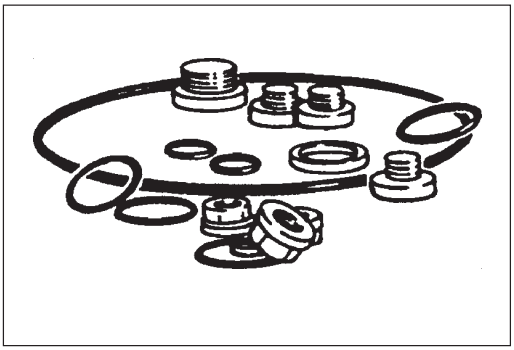
Check all seal and sliding surfaces for wear.
Attention: Rework of sealing area f. ex. with abrasive paper can damage surface.



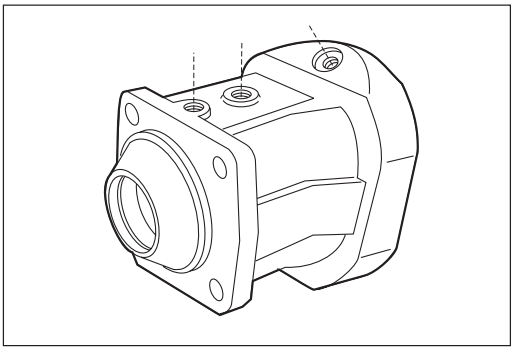
Fill up hydraulic aggregates with medium before start-up.



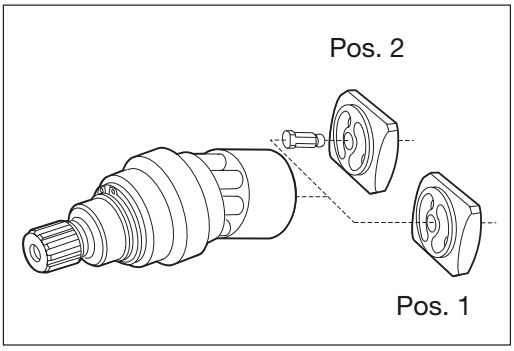
1 Seal kit for drive shaft.



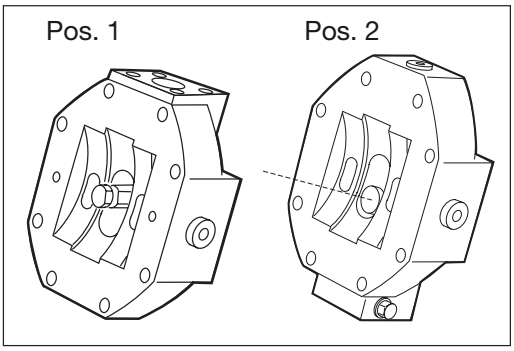
2 External seal kit.



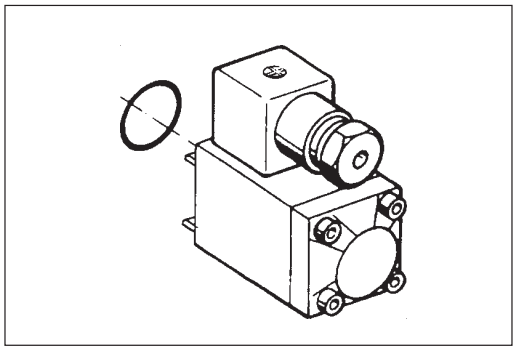
3 Housing.



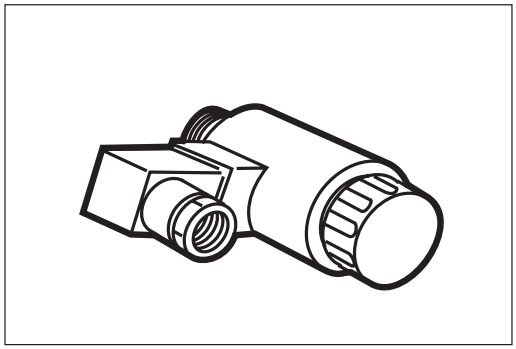
4 Complete rotary group
Note:
Pos. 1 - For port plate with differential piston
Pos. 2 - For port plate with synchronizing piston



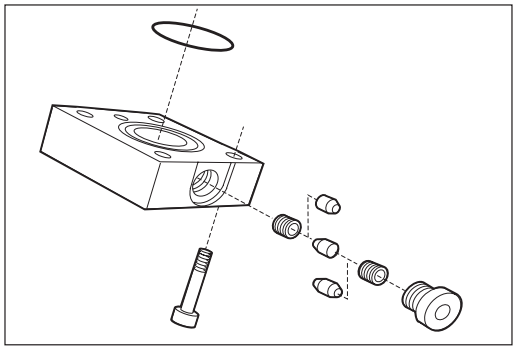
5 Port plate with control piston
Note:
Pos. 1 - For port plate with differential piston
Pos. 2 - For port plate with synchronizing piston



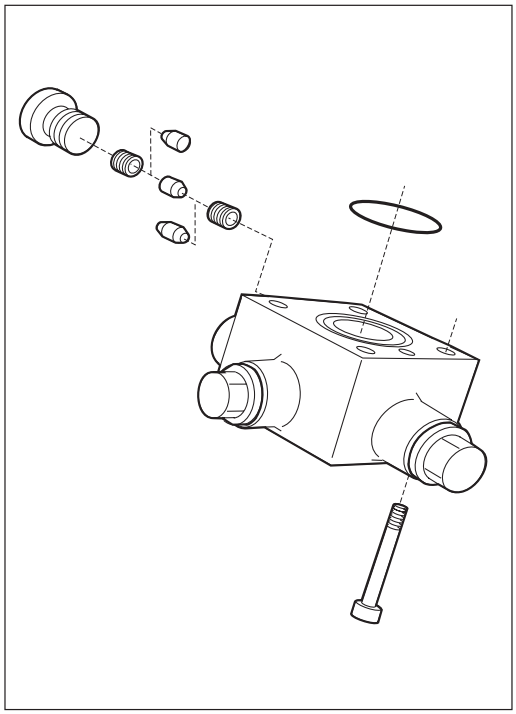
6 Proportional solenoid (EP).



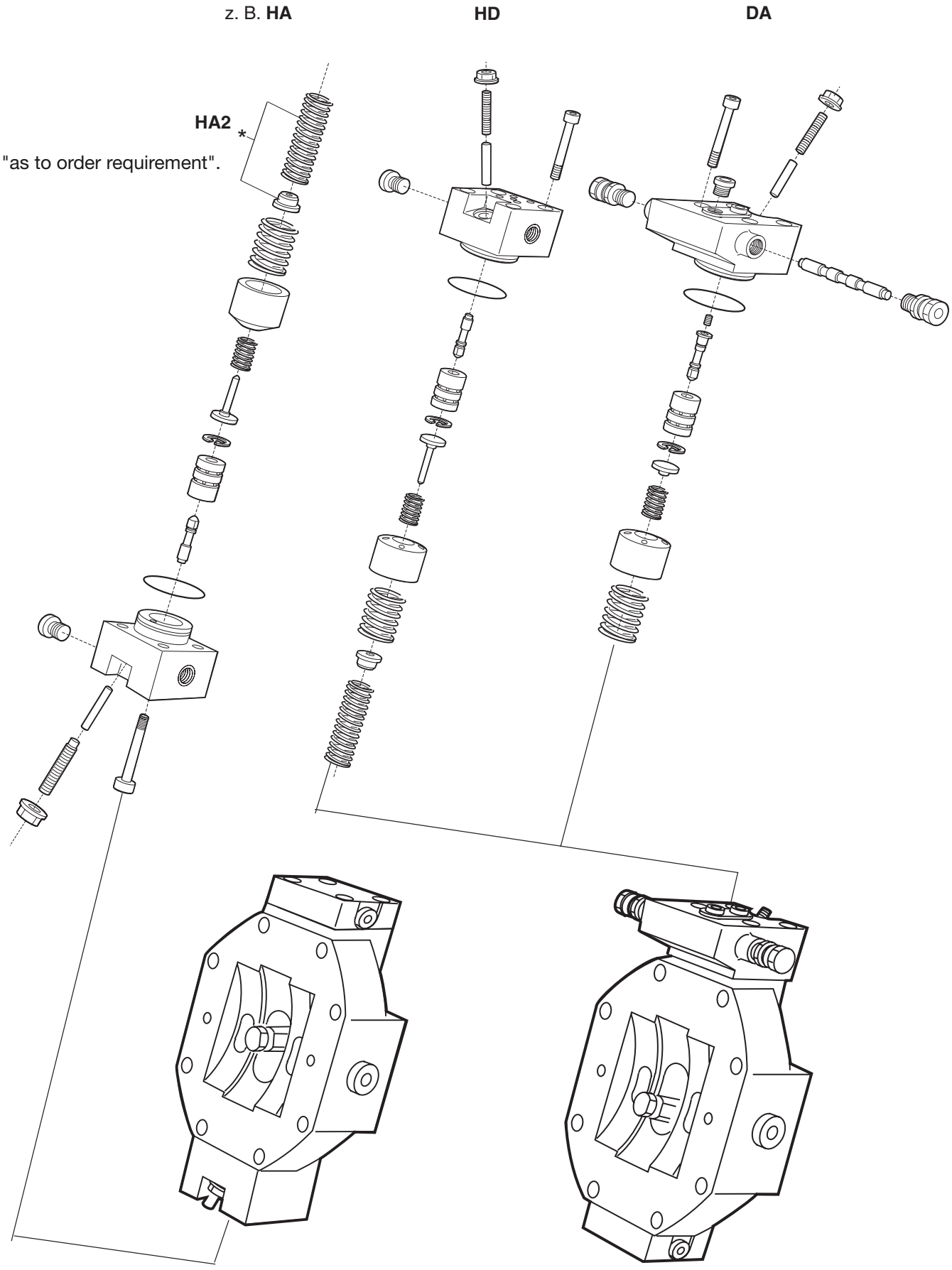
7 Solenoid.



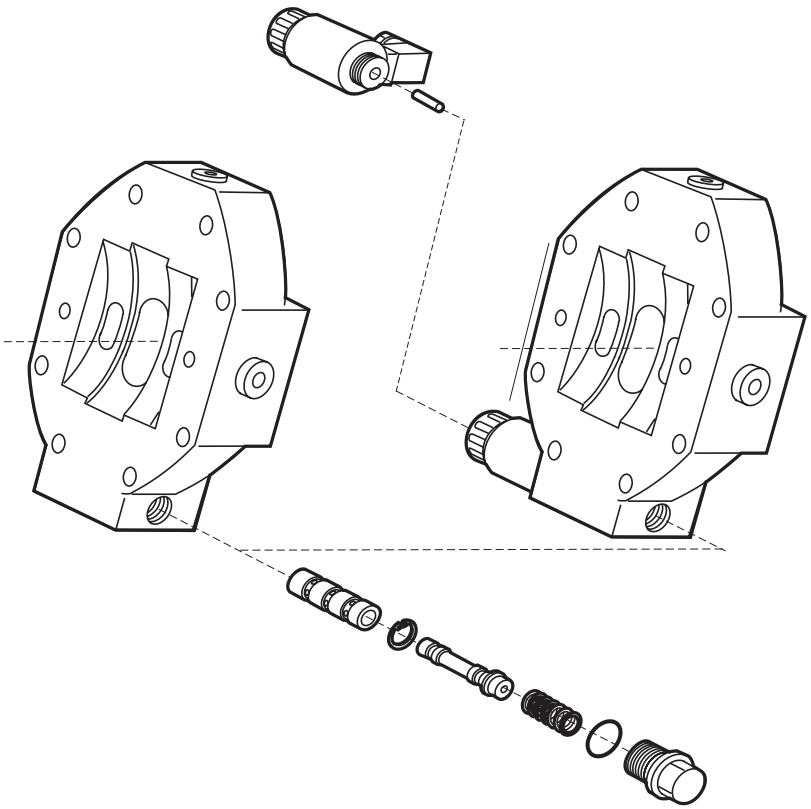
8 Cover with * throttle pin.
* Throttle pin “as to order requirement”.



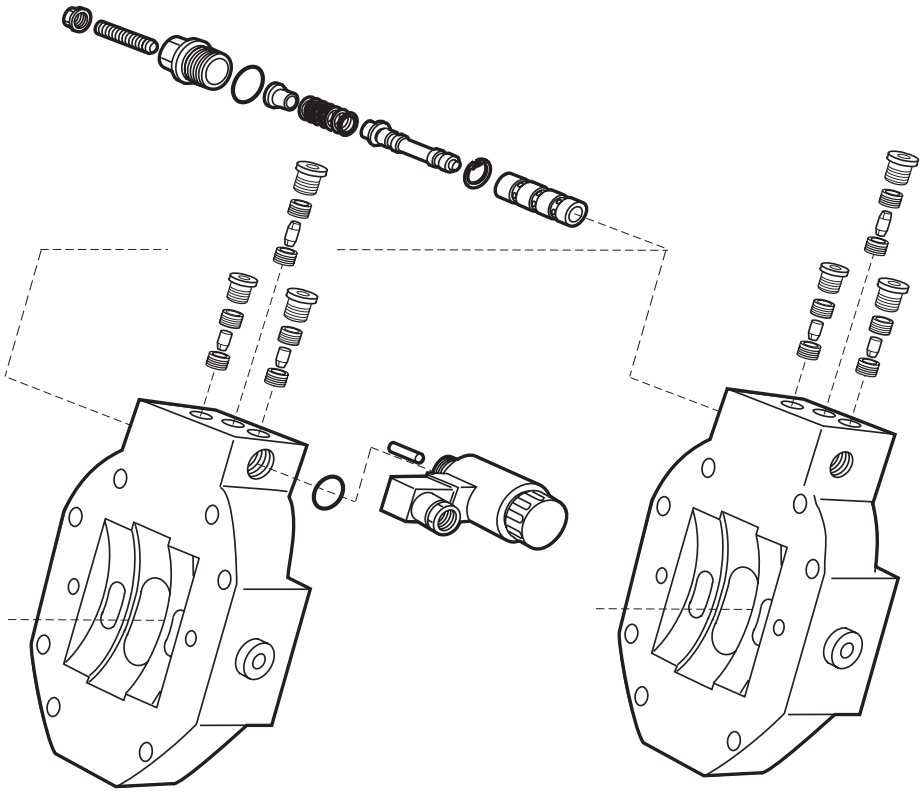
9 Cover with flushing and boost pressure valve and
* throttle pin.
* Throttle pin “as to order requirement”.

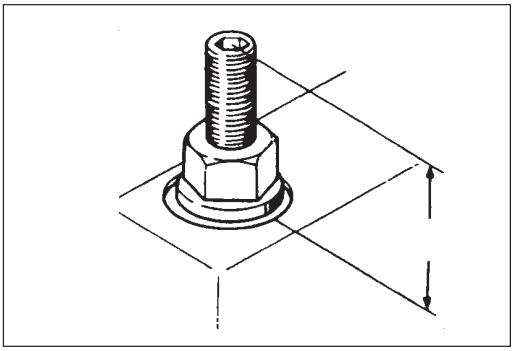

z. B. HA
HD
DA
HA2 *
"as to order requirement".

z. B. **HZ3 / EZ3**

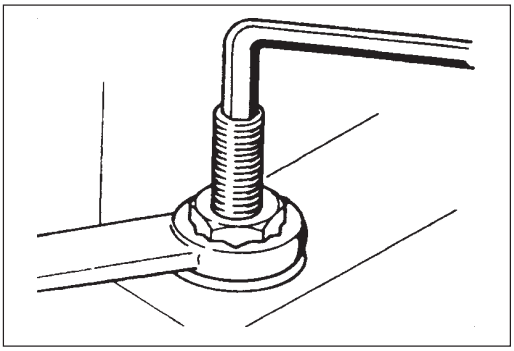


HA3 / HA3U

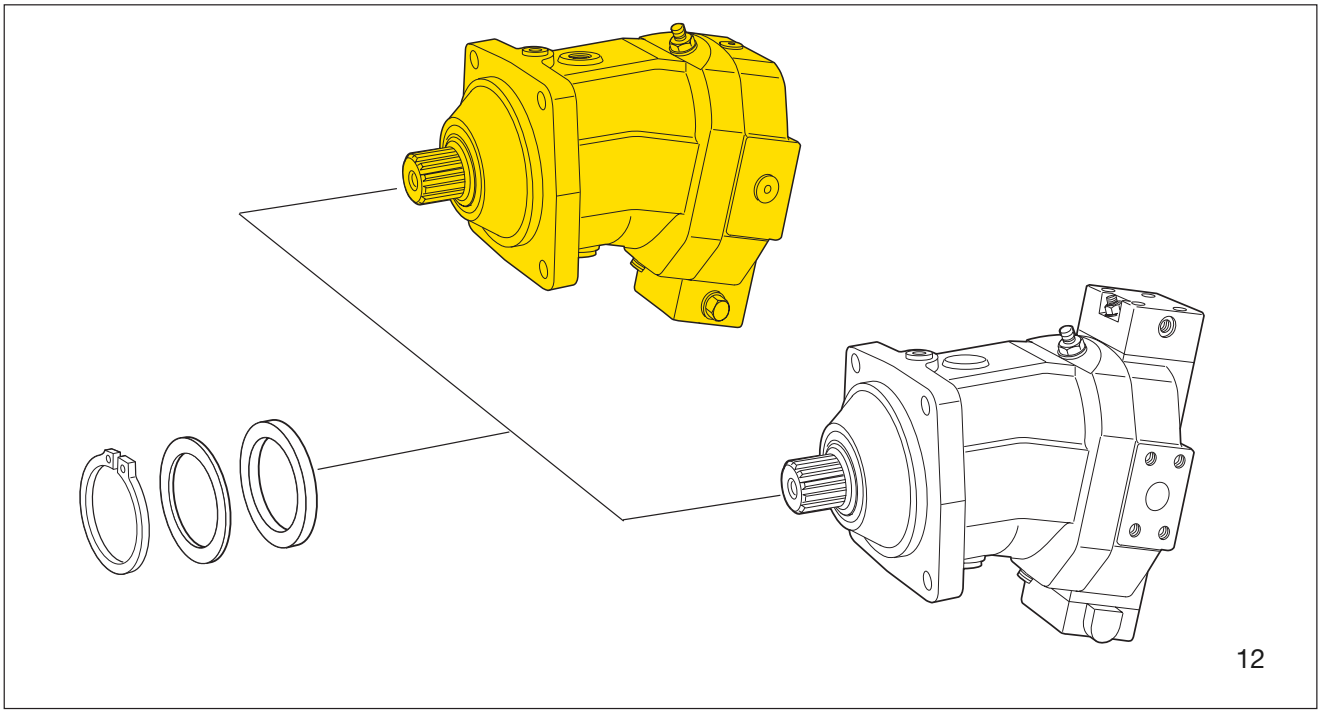




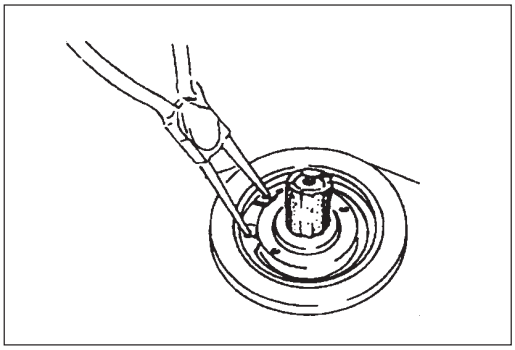
10 Replace seal nut.
First measure and record setting height.



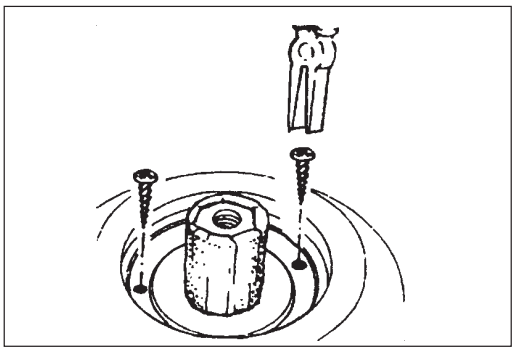
11 When tightening, counterhold setting screw, then check setting height.



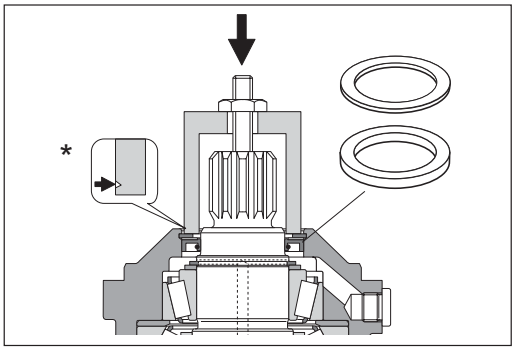
12



13 Protecting the drive shaft.
Remove retaining ring and shim.

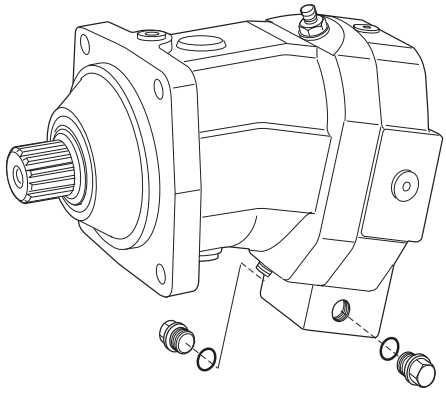


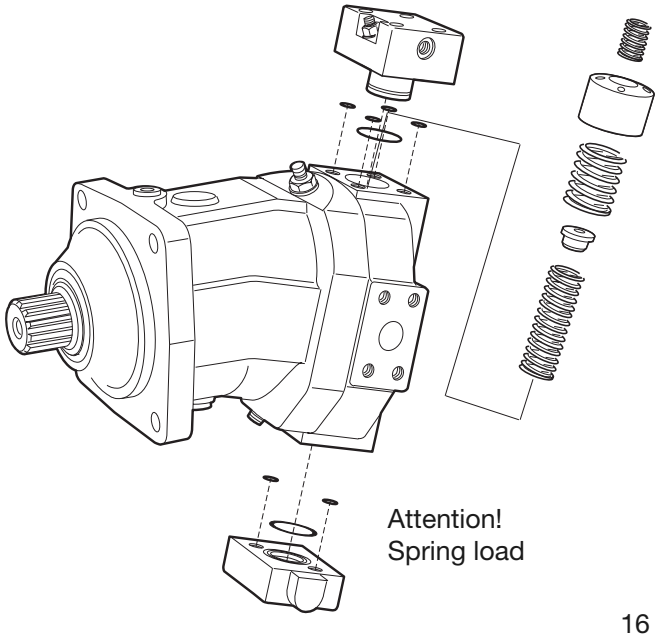
14 Screw in sheet metal screw into the holes fitted with rubber.
Pull out seal with pliers.



15 Press in shaft seal ring and shim with bush to stop.

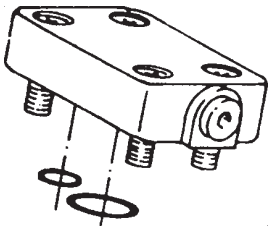
⚠ Take note of press-in depth!
Install mark for press-in depth of safety ring.





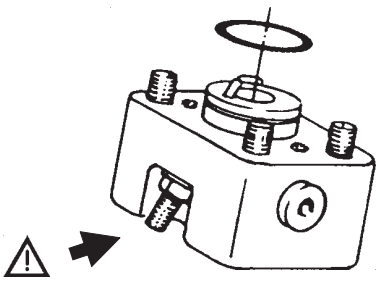
Attention!
Spring load

16



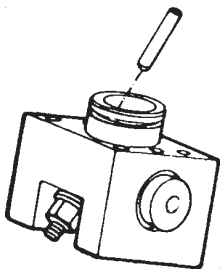
17

Inspect
Drilling in housing, O-ring, groove.



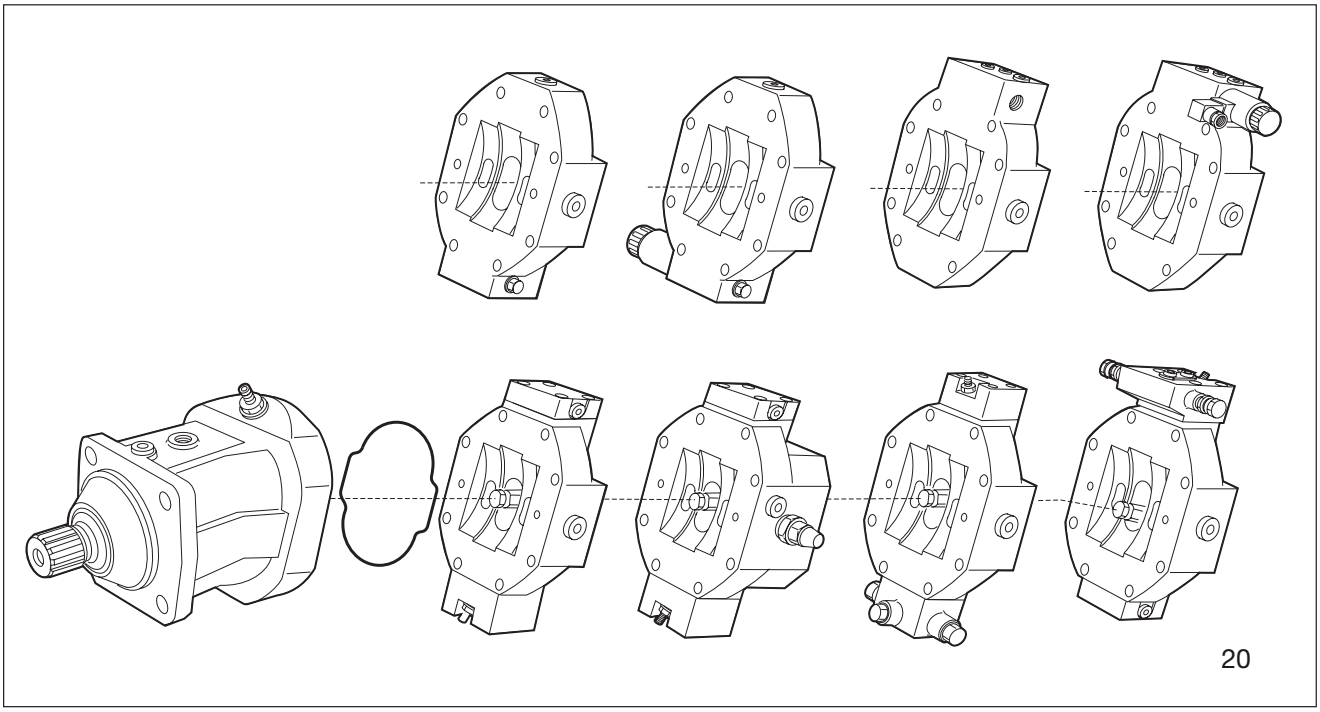
18

⚠ Do not remove adjustment screw.
Inspect
O-ring, O-ring groove, housing.

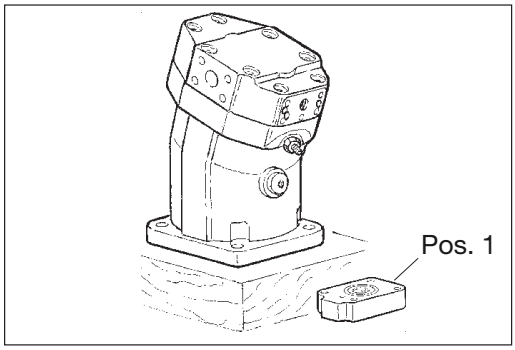


19

Assembly aid
Insert pin with grease.

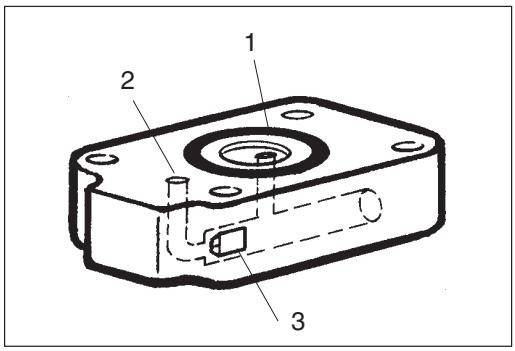


20



21

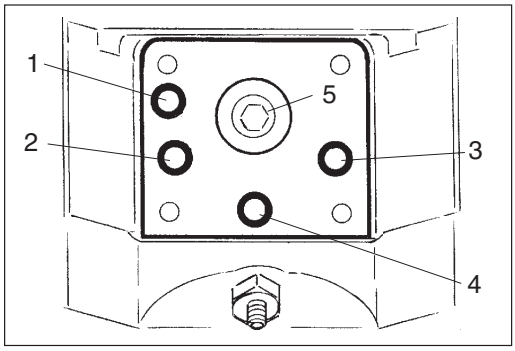
Example: A6VM ... HD control
Disassembly position:
Remove cover pos. 1



22

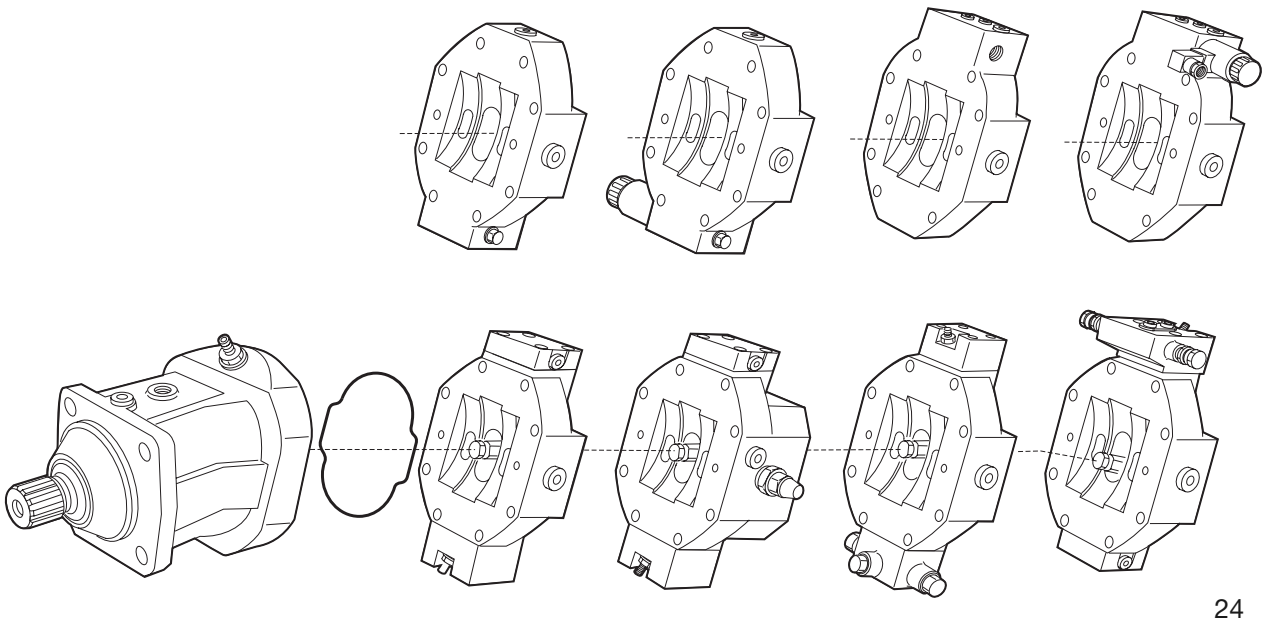
1. O-ring
2. Input flow of oil control
3. Throttle pin

⚠ Installation position differs according to the control components

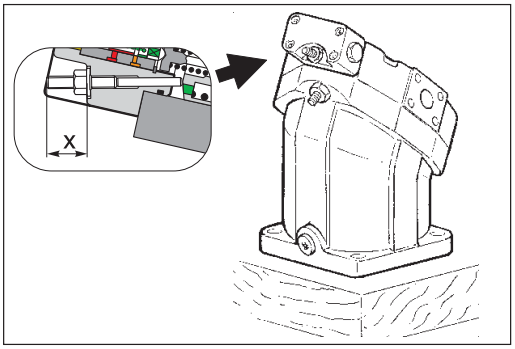


23

1. Input flow of oil control
2. High pressure/ low pressure
3. High pressure/ low pressure
4. Leckage oil
5. Control piston



24

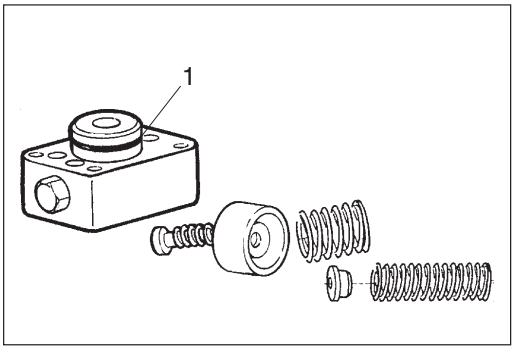


25

Example: A6VM... control - **differential piston**
Disassembly position: Remove cover pos. 2.

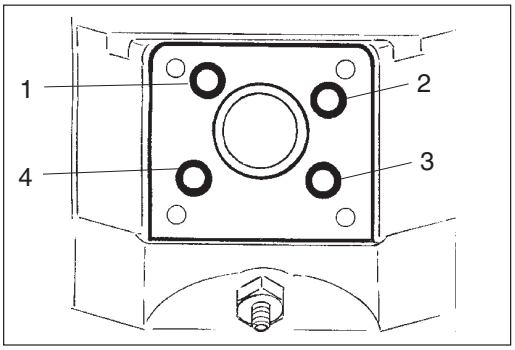
⚠ Attention! Spring load.

Dimension x: Note dimension (begin of regulation).



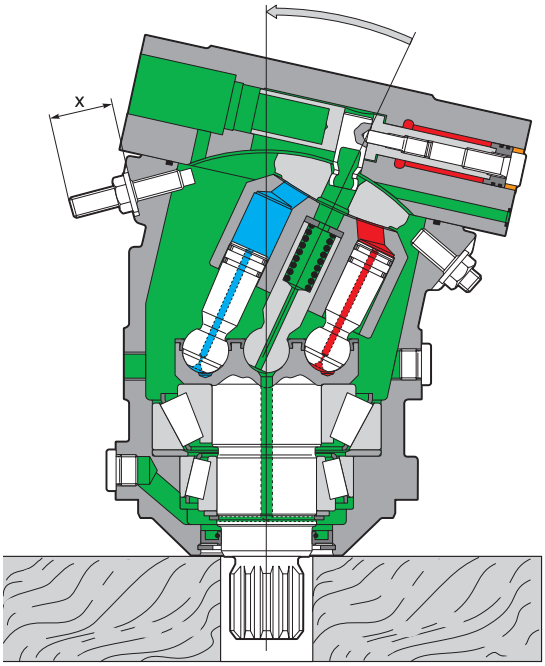
26

1. Check of O-ring



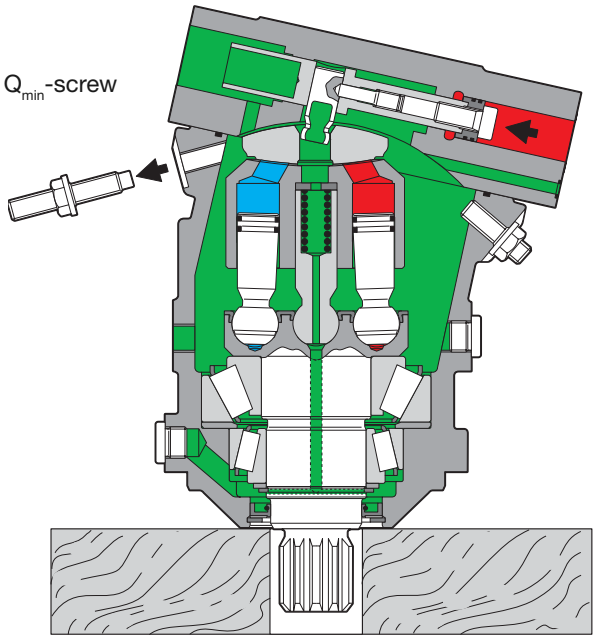
27

1. High pressure - small control piston side
2. Control pressure
3. High pressure - check valve
4. High pressure - check valve

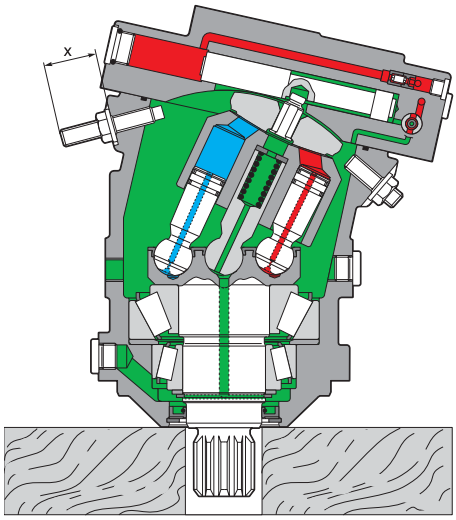


Diferential piston:
Note dimension x

⚠
For disassembly of the port plate, swivel always rotary group to zero position.
Piston rings to hang out of the cylinder boring.

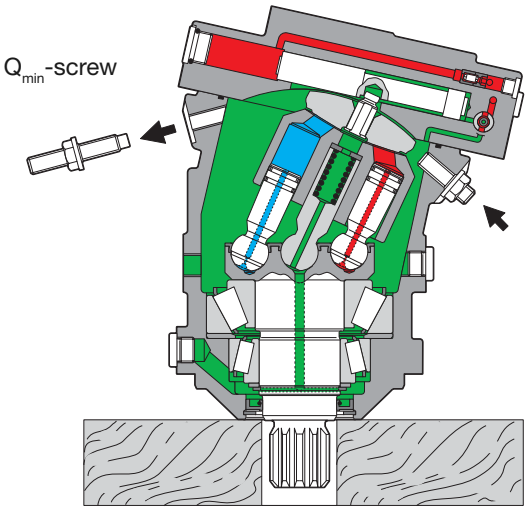


Remove Q_{min}-screw.
Swivel rotary group to 0°.

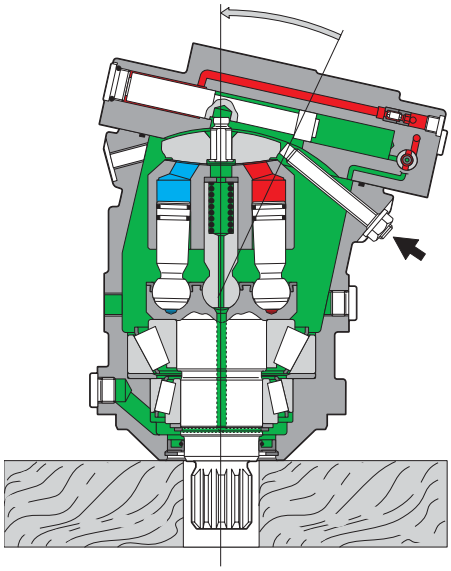


Synchronizing piston:
Note dimension x.

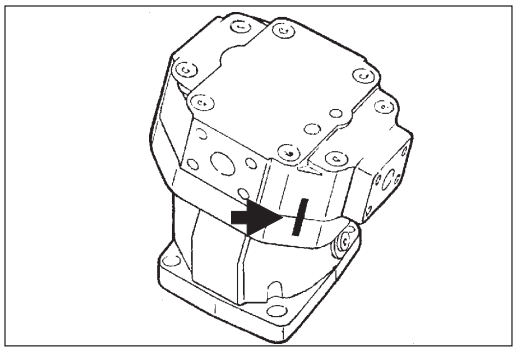
⚠
For disassembly of the port plate, swivel always rotary group to zero position.
Piston rings to hang out of the cylinder boring.



Remove Q_{min}-screw and plug.

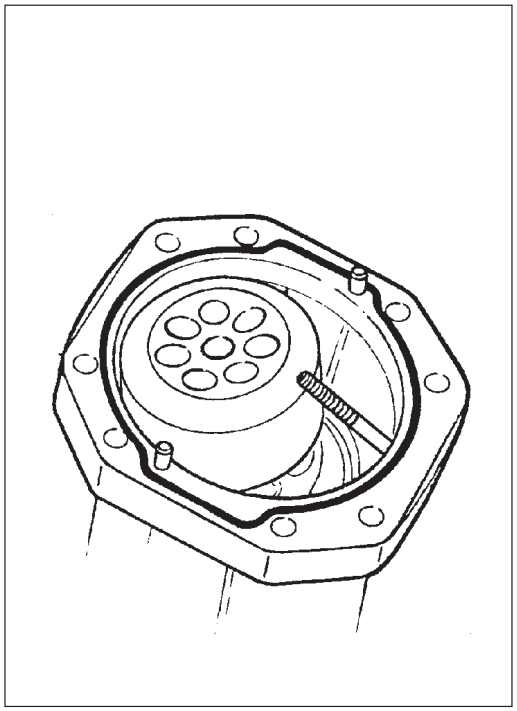


Swivel rotary group to zero position with screw Q_{min}.



28

Port plate
Mark position. Loosen screws.
Removal

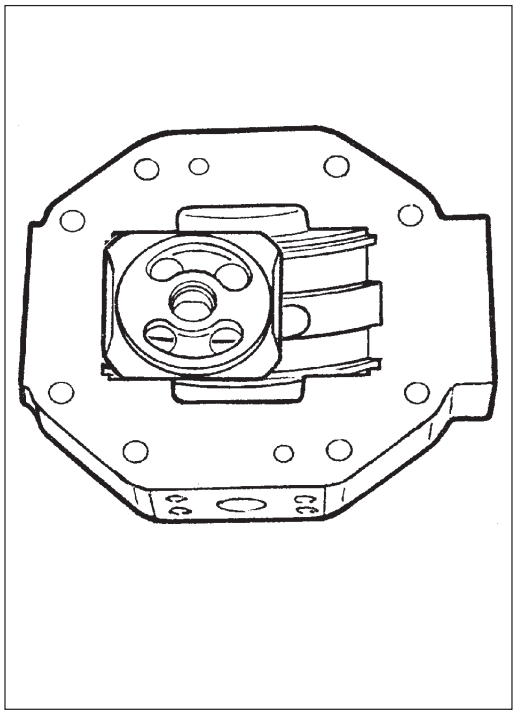


29

Check O-ring.

⚠ Stick new O-ring with some grease.

Do not swivel rotary group.
Piston rings to hang out from the cylinder boring.



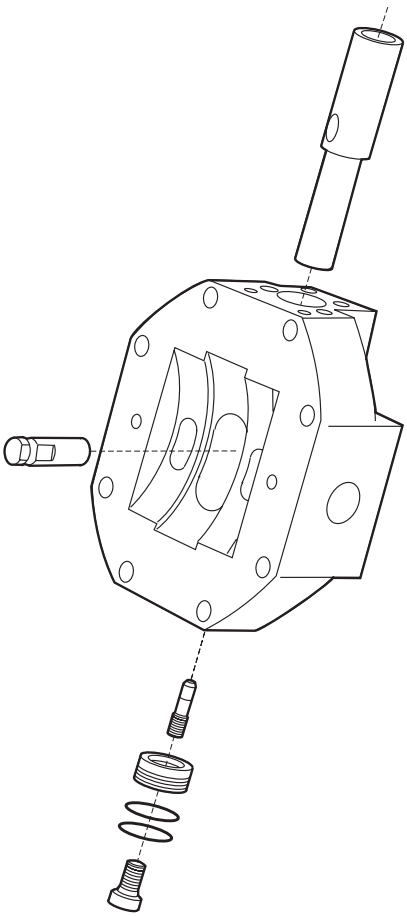
30

⚠ Stick control lens in sliding surface with grease.

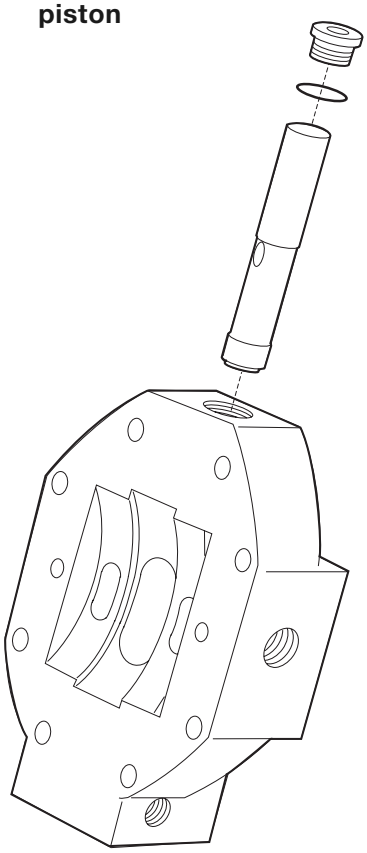
Assembly in reversal order.
Mount port plate.

⚠ Rotary group vertical.

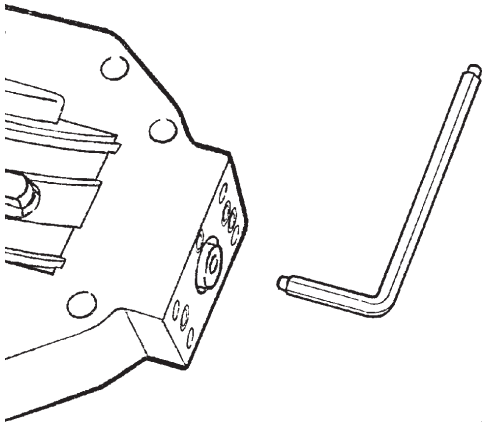
Differential piston



Synchronizing piston

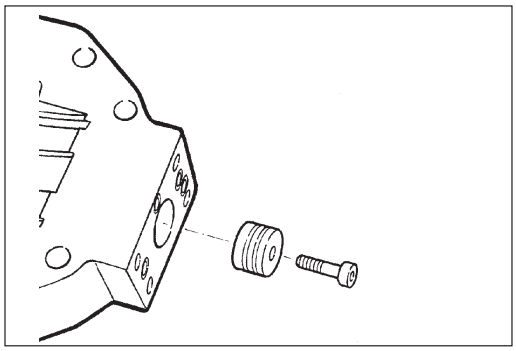


31



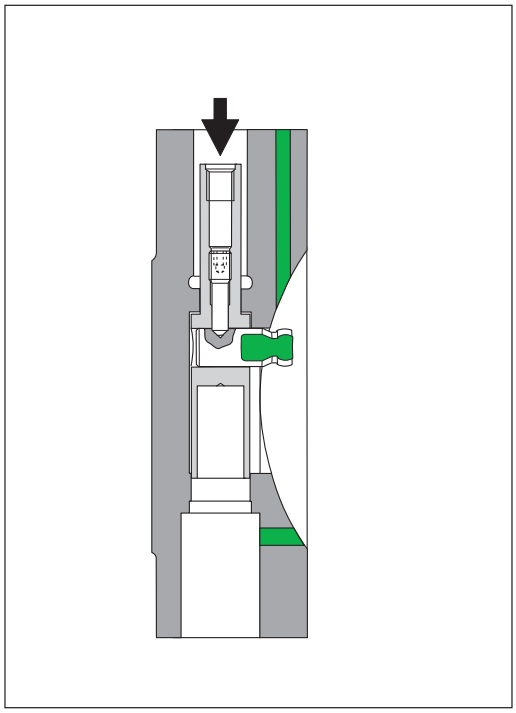
32

Loosen fixing screw.
Use only socket wrench.



33

Remove piston with piston ring.



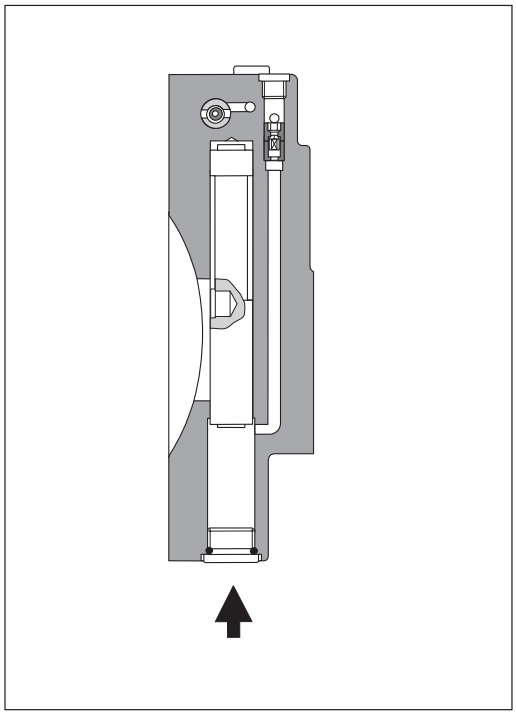
34

Differential piston

Warm up fixation screw for positioning plug via boring (screw glued - to turn out).

⚠ Use new screw.

Precote coating.
Note tightening torque!

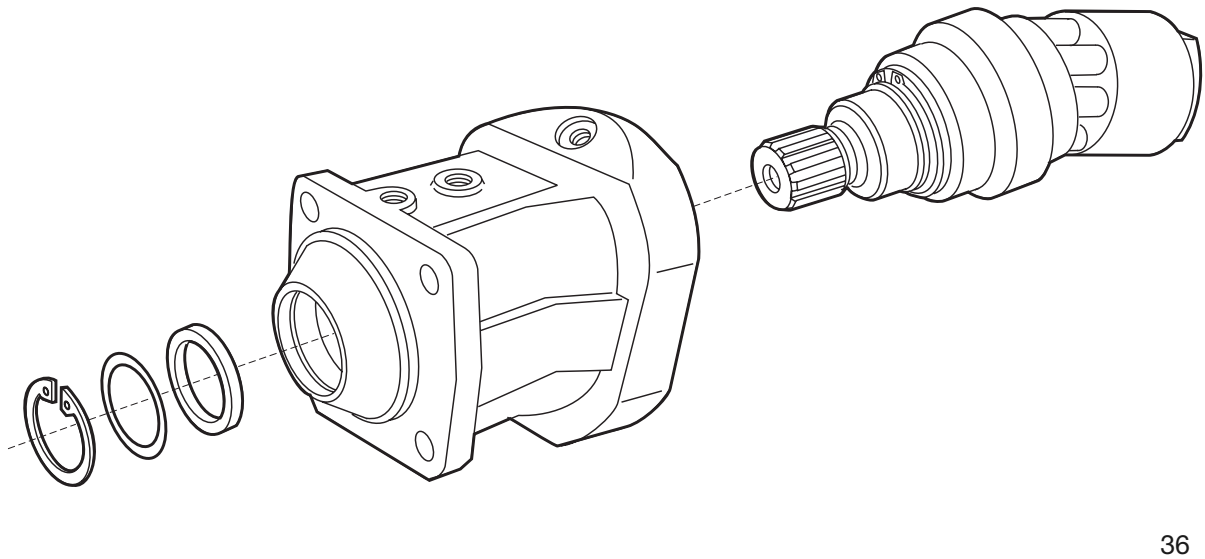


35

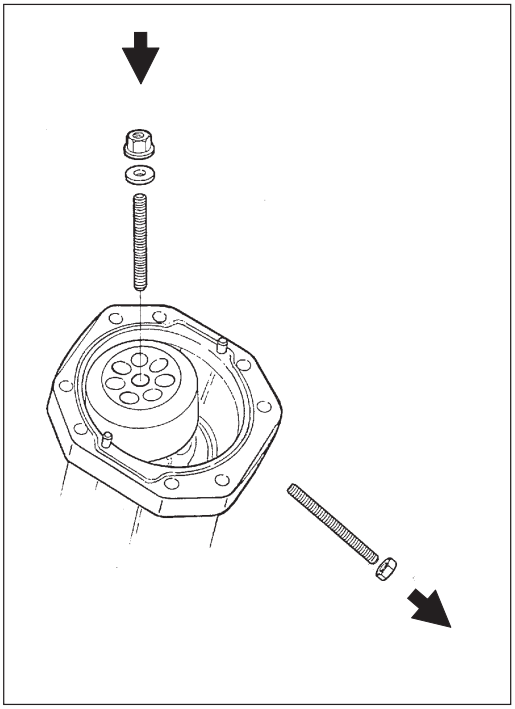
Synchronizing piston

Remove screw.
Remove piston.

⚠ Note installation position.



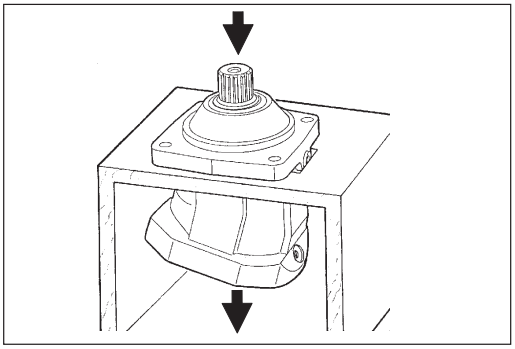
36



37

Screw in threaded pin into center pin.
Fix the cylinder with disc and locknut.
Remove Q_{max}-stop screw.

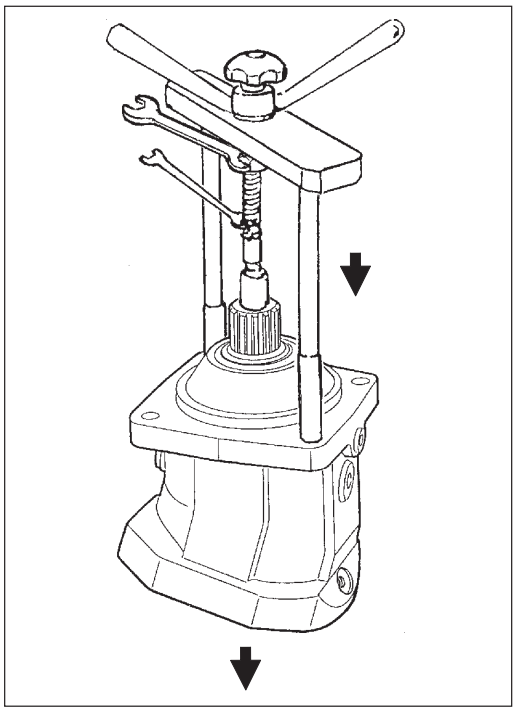
Size	
	28: M4 x 58 mm
	55: M5 x 71 mm
	80: M6 x 82 mm
	107: M6 x 92 mm
	140: M8 x 105 mm
	160: M8 x 105 mm
	200: M8 x 109 mm



38

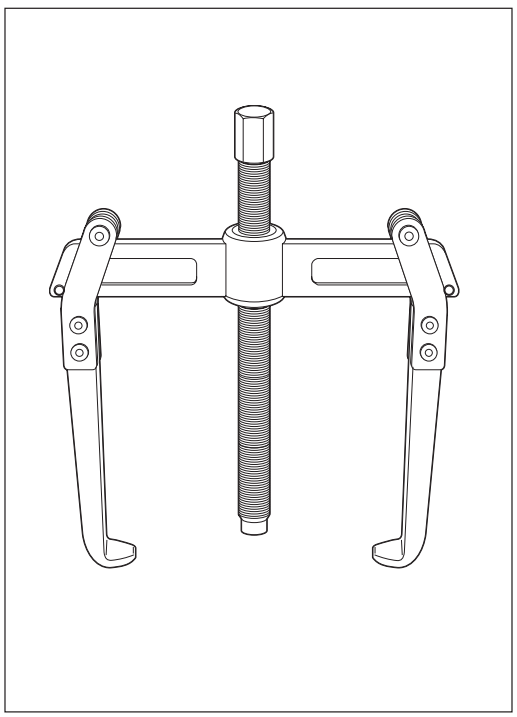
Press out rotary group!

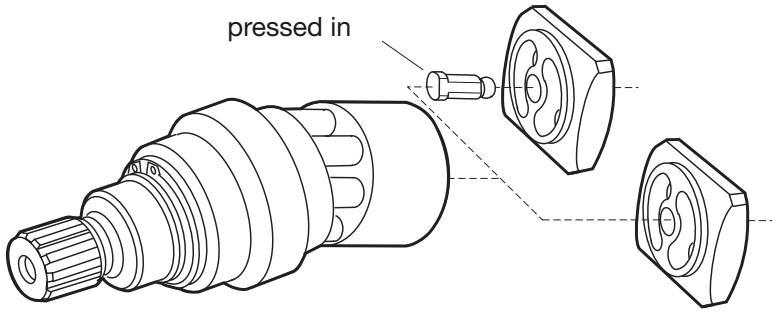
⚠ If the bearings are used again do not hit on the drive shaft.



39

Or press-out with extraction device.

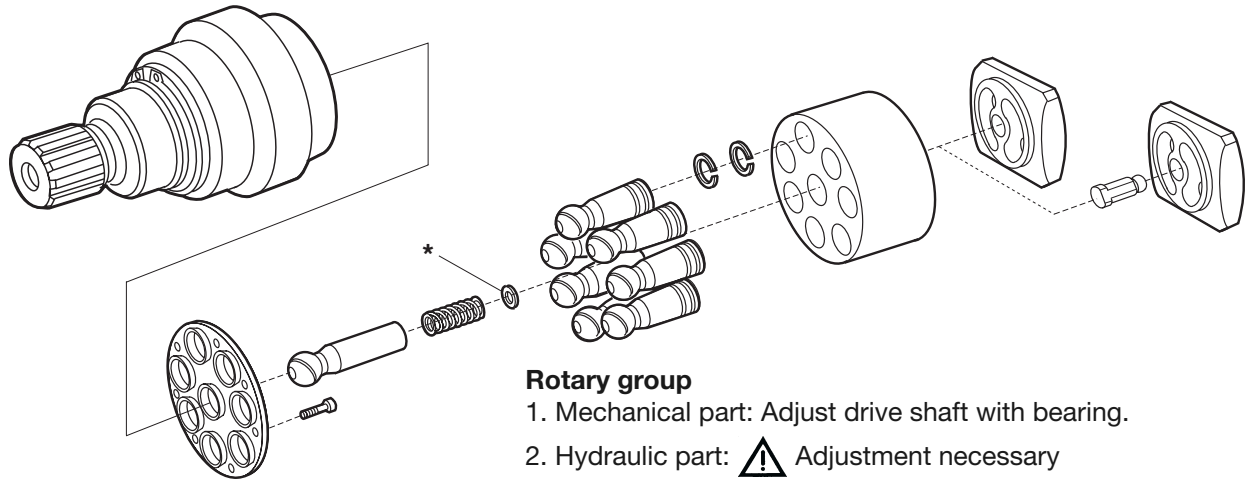




Complete rotary group

⚠ Setting of hydraulic part necessary.

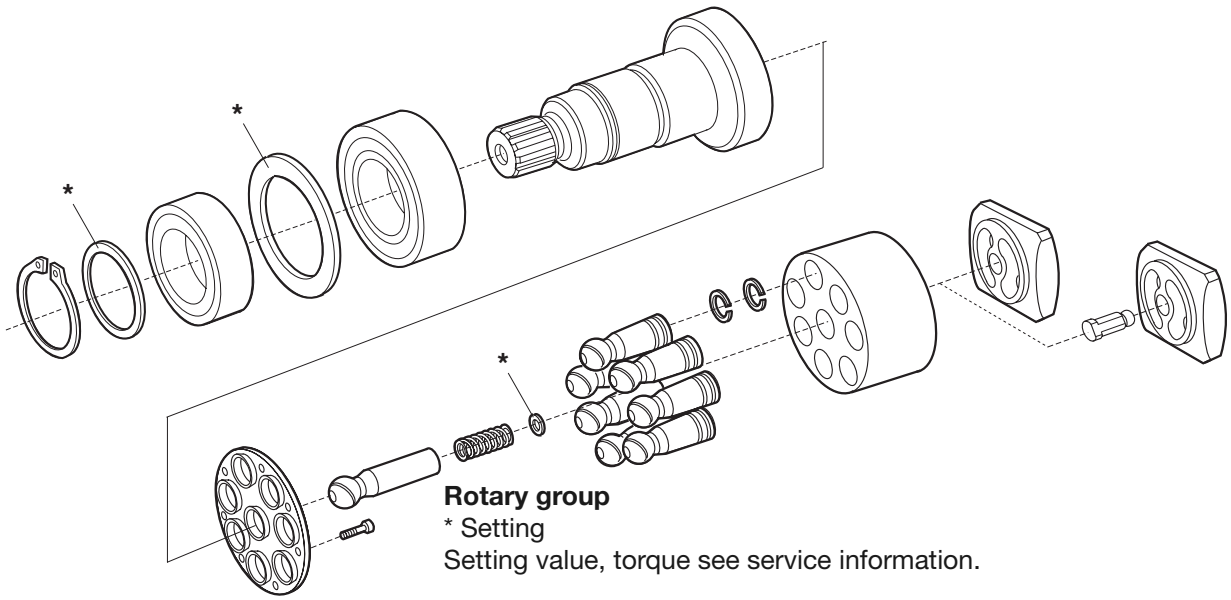
40



Rotary group

1. Mechanical part: Adjust drive shaft with bearing.
2. Hydraulic part: ⚠ Adjustment necessary

41

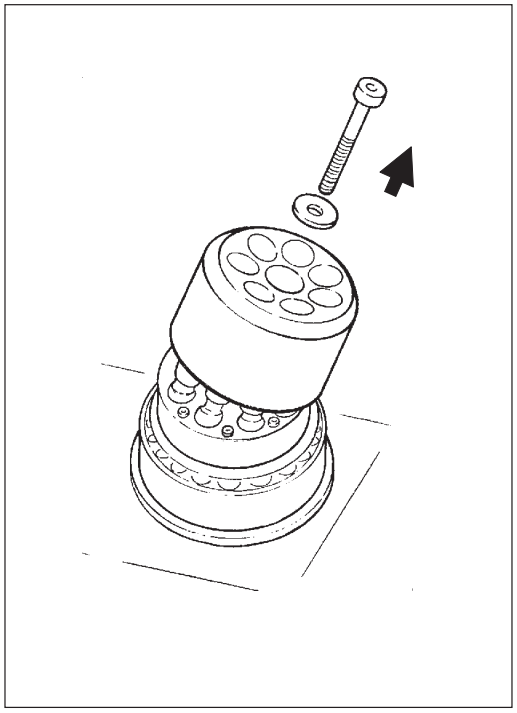


Rotary group

* Setting

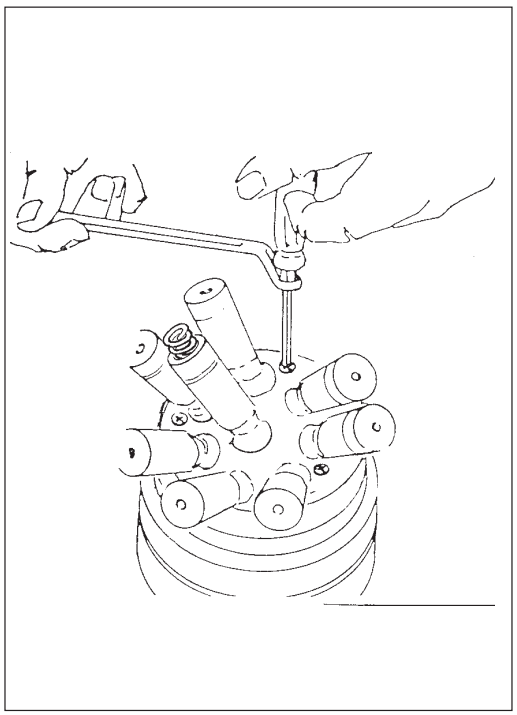
Setting value, torque see service information.

42



43

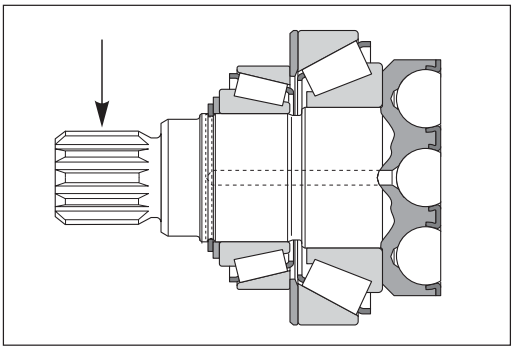
Remove fixing screw (cylinder).
Remove cylinder.



44

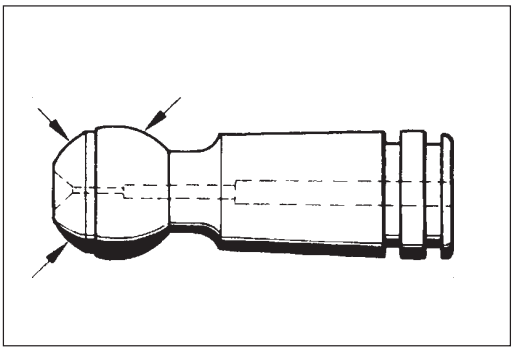
Disassemble retaining plate.

⚠ Screws are glued.
Use Torx-tools.



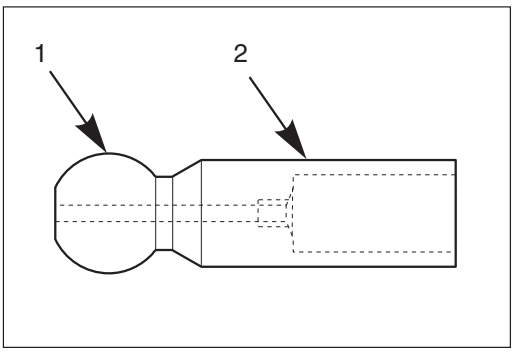
45

Free of corrosion, erosion or fretting; no damage to splines or keyways.



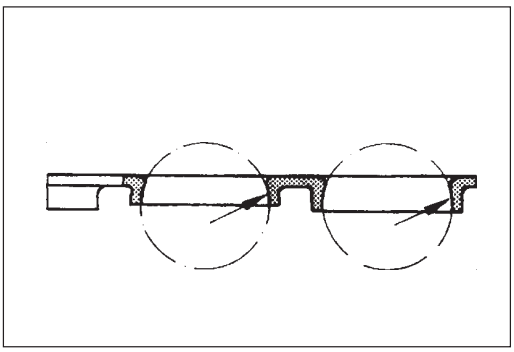
46

Pistons
No scoring and no pittings.



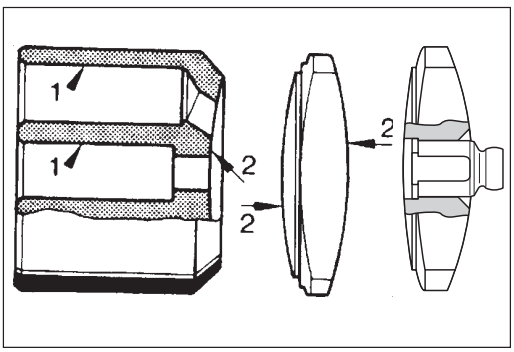
47

Center pin
No scoring and no pittings.



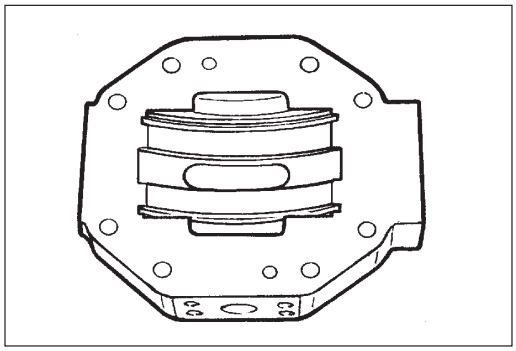
48

Retaining plate
No scoring and no evidence of wear



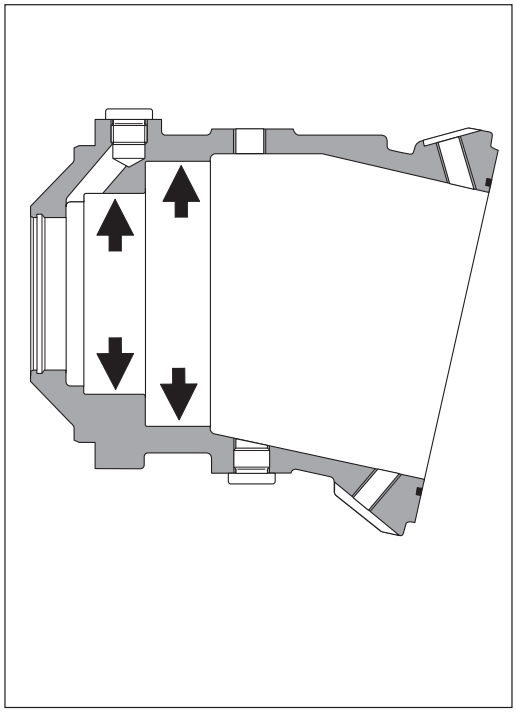
49

Cylinder block / control lens
1 Bores free of scoring, no evidence of wear.
2 Faces smooth and even, free of cracks and scoring.



50

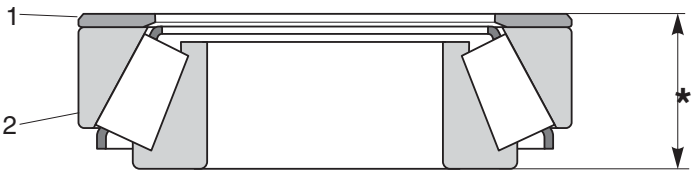
Control housing
Sliding surface and side guides free of scoring and no wear.



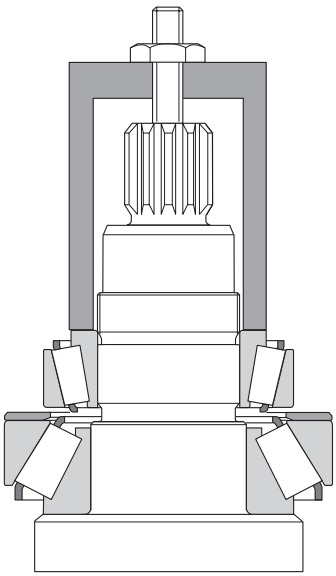
51

Visual check:
Bearing areas free of scoring and no evidence of wear.

Rotary group: mechanical part

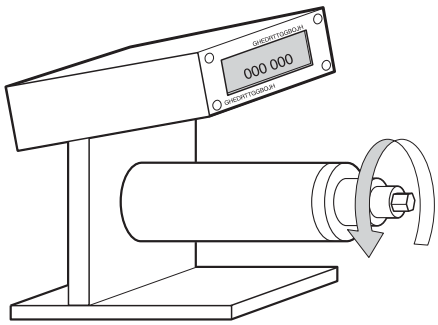


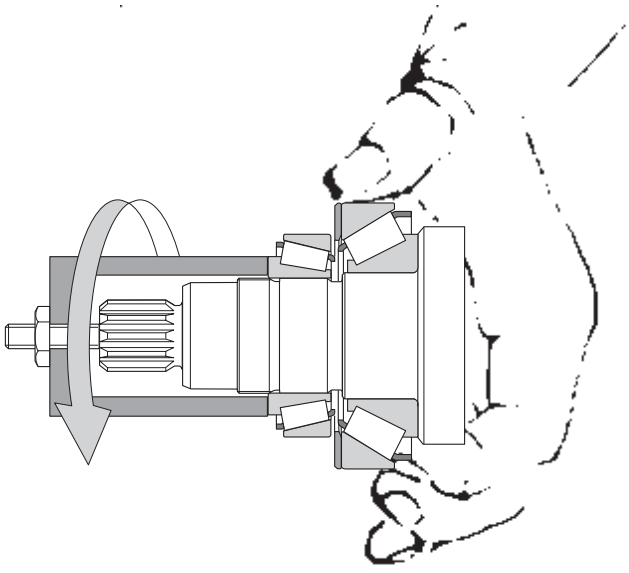
Adjustment dimension * and bearing torque see service information.



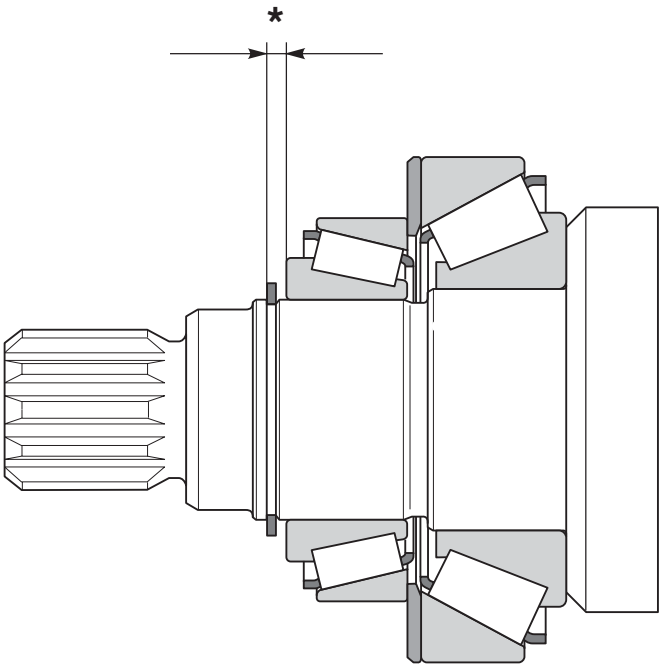
Press on bearing.
Do not exeed bearing torque during press-on.

Preload bearing with assembly sleeve and steady control of torque.

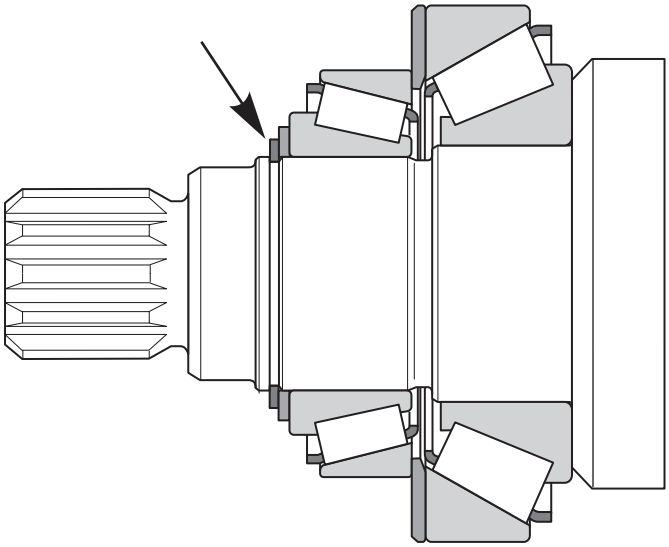




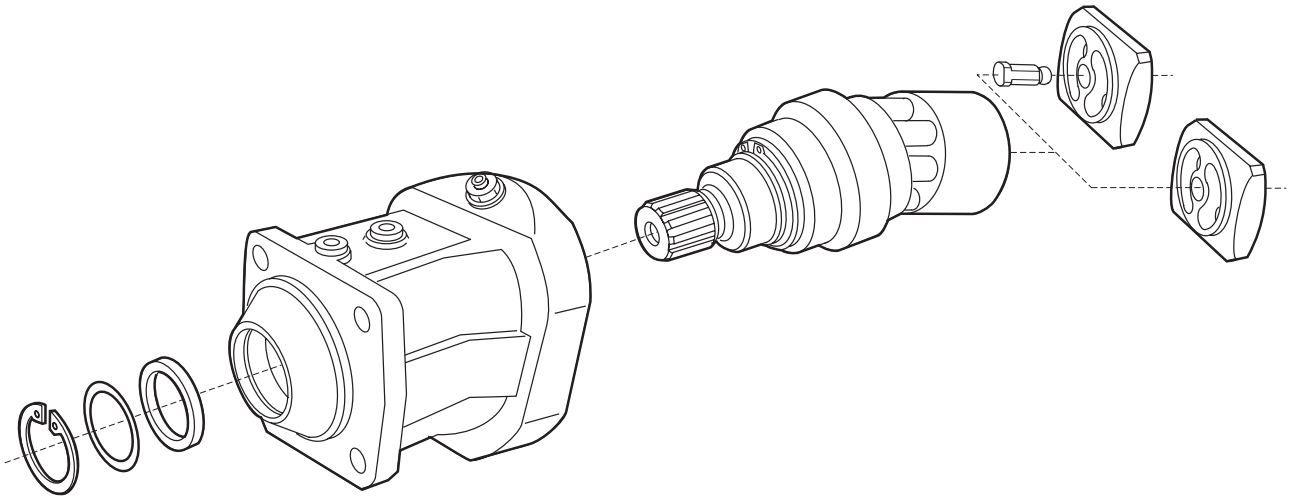
Rotary group: mechanical part



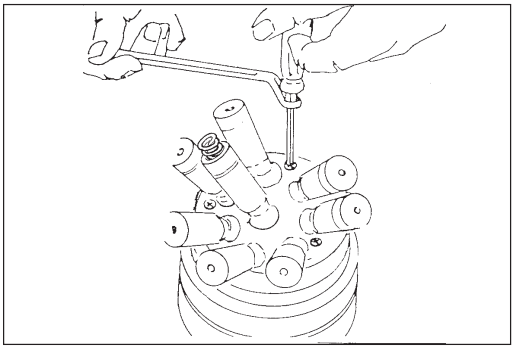
Assemble safety ring.
Determine dimension for adjustment disc with final dimensions (crossover).



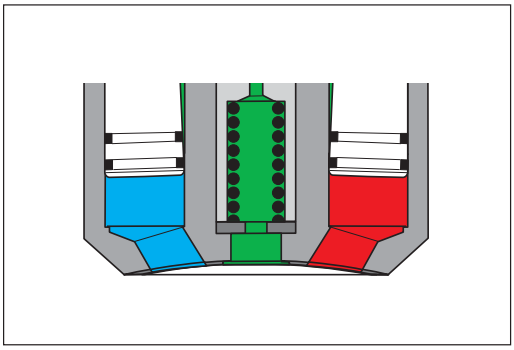
Install adjustment disc.
Assemble safety ring.
Drive shaft ready for assembly.



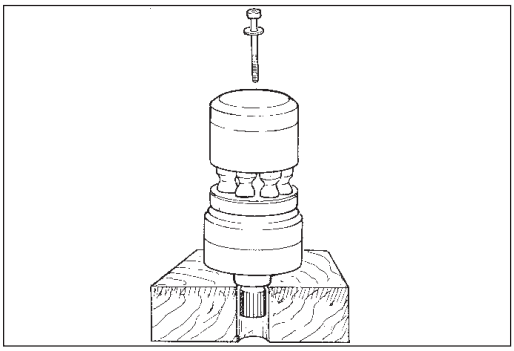
52



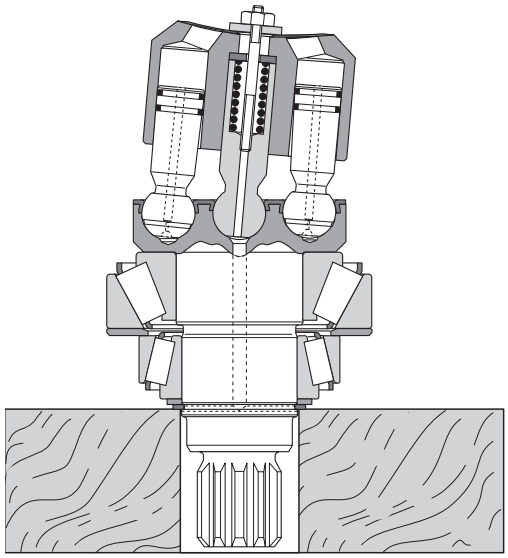
53 Insert retaining plate with piston and center pin.
Use screw with Precote-coating.



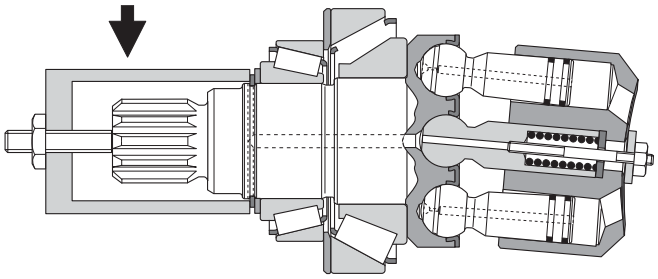
54 Make sure all parts are fitted in correctly.



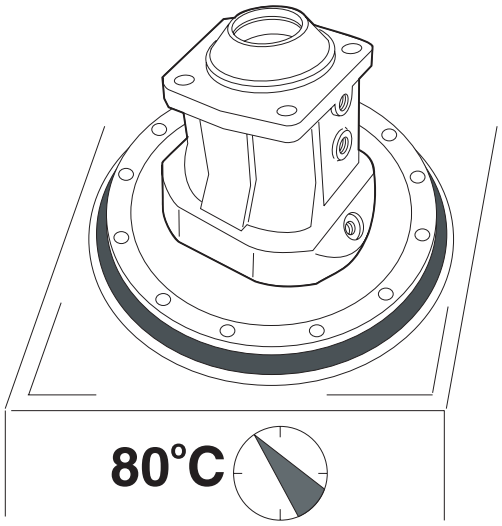
55 Swivel cylinder block to max. and fix the cylinder.



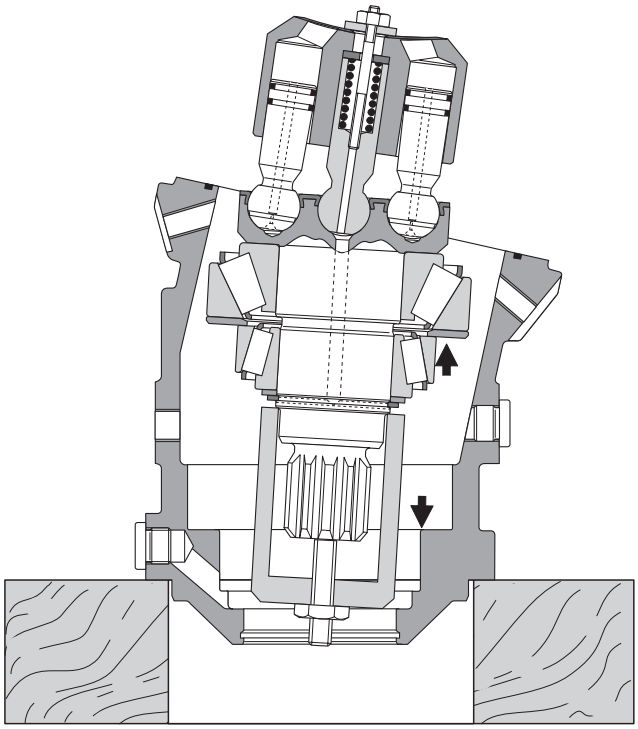
Rotary group completely assembled ready for assembly.



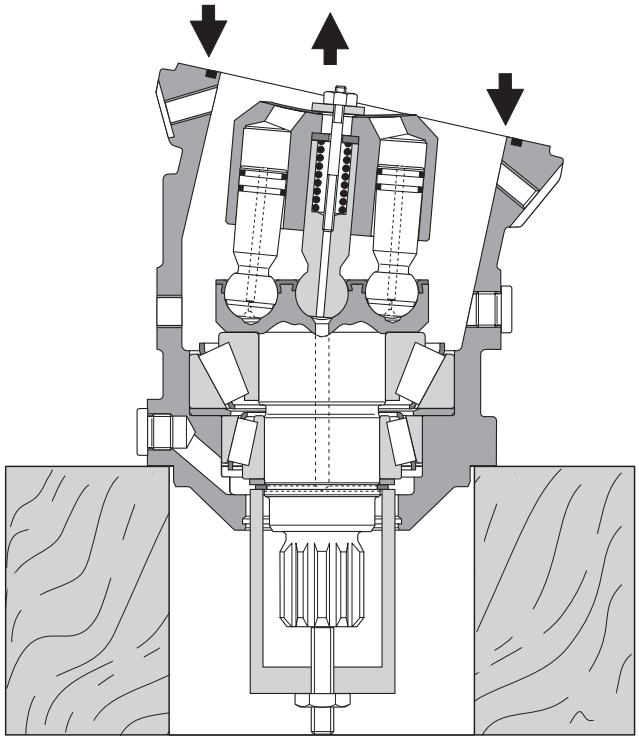
Place assembly sleeve.



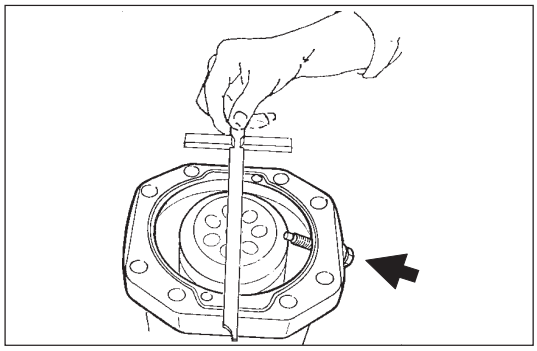
Warm up housing to 80°C.



Insert rotary group into housing to seat position.

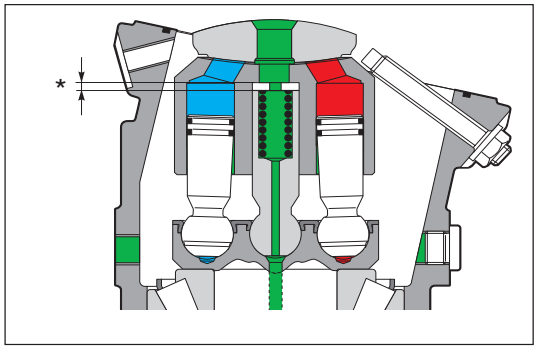


Fix zero position of cylinder with Q_{max}-screw.
1. Disassemble cylinder fixing screw.
2. Insert O-ring.



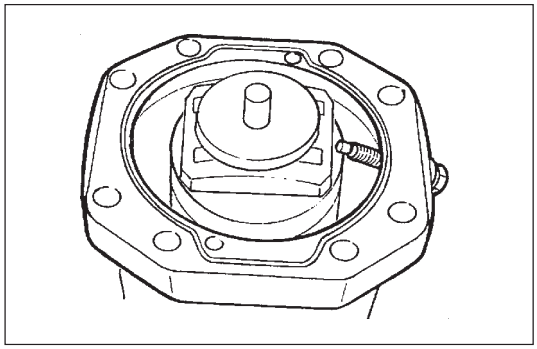
56

Determine cylinder swivel range to max. angle with screw.



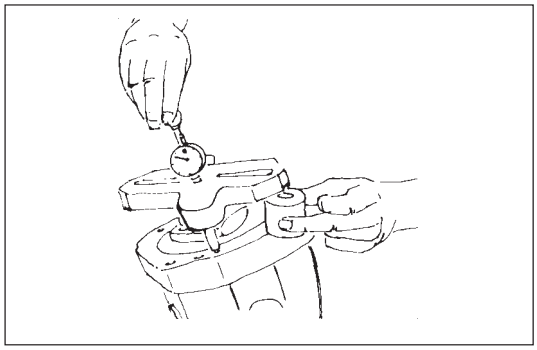
57

* Disc



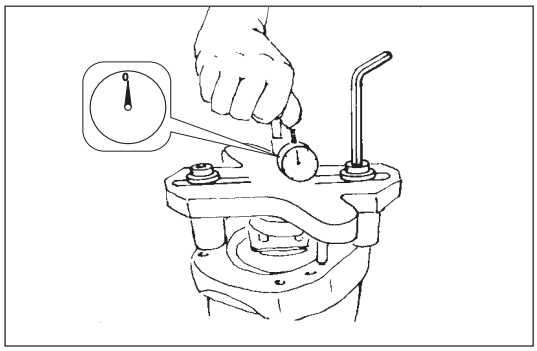
58

Place centering disc.



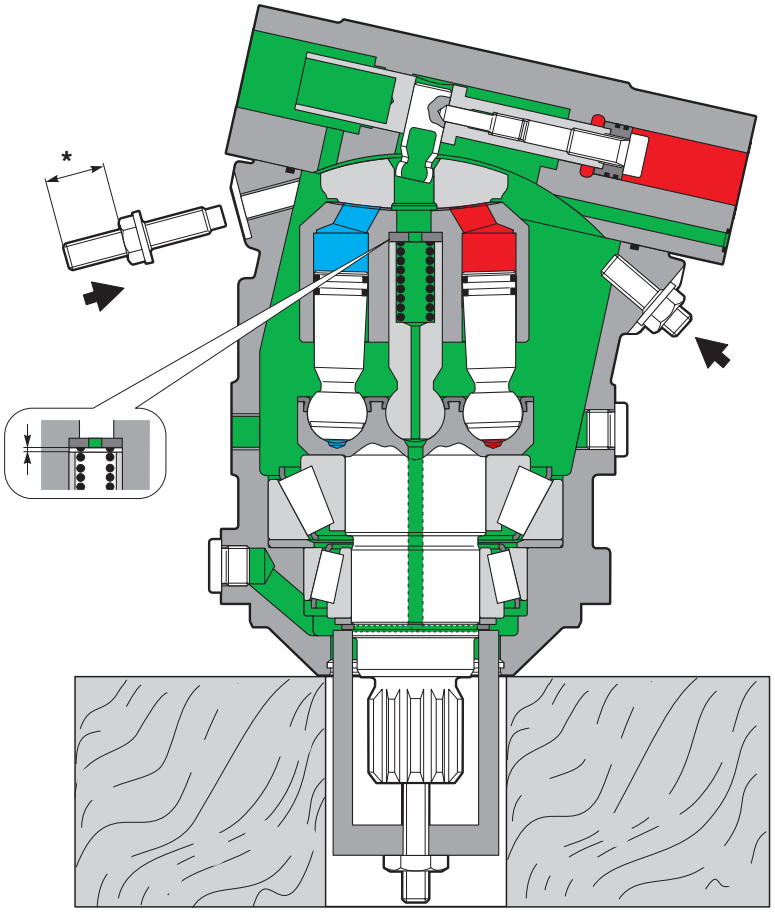
59

Mount measuring device.



60

Check dimension X.



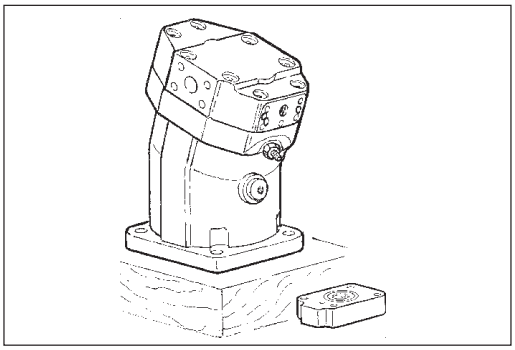
1. Assemble port plate with differential piston.

⚠ Take care of assembly design!

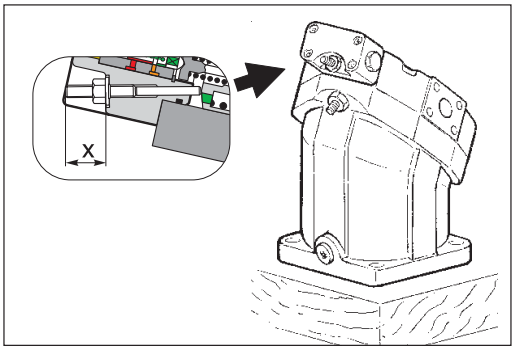
⚠ Tighten fixing screws with torque.

2. Swivel rotary group to “starting position”.
3. Set Q_{min}-screw to dimension*.
4. Assemble plug.
5. Remove assembly sleeve.

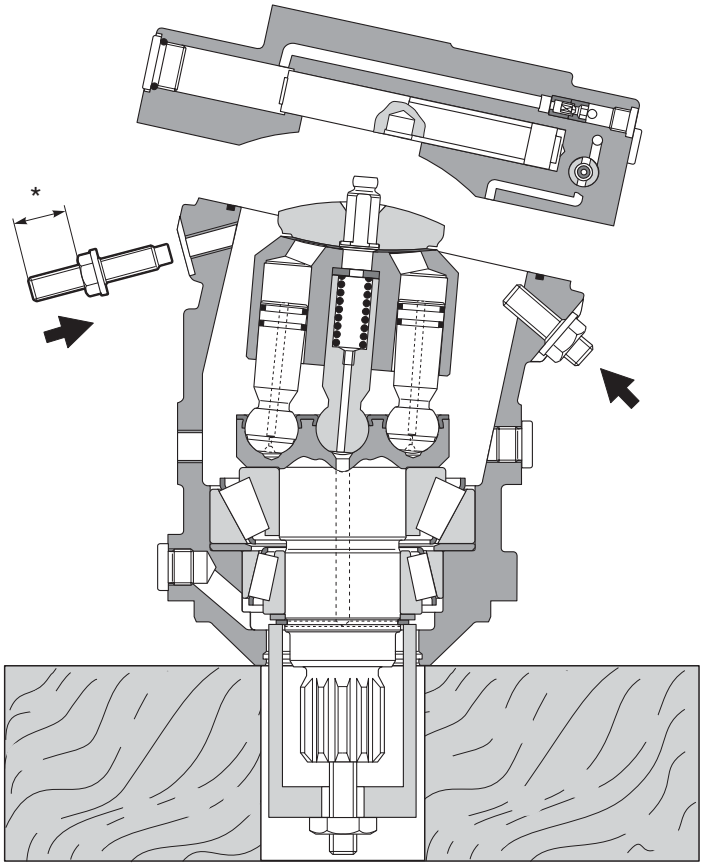
61



62 Assemble cover.



63 Assemble control components.



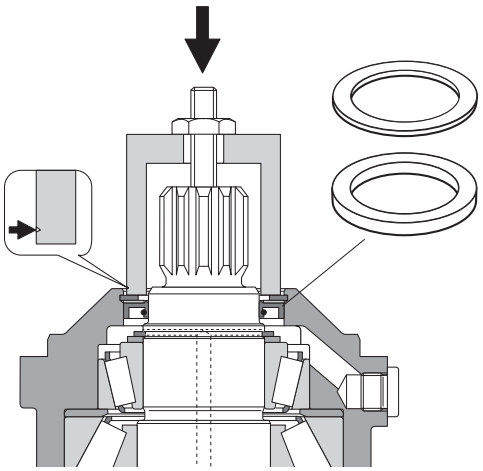
1. Assemble port plate with synchronizing piston.

⚠ Take care of assembly design!

⚠ Tighten fixing screws with torque.

2. Swivel rotary group to “starting position”.
3. Set Q_{min}-screw to dimension*.
4. Assemble plug.
5. Remove assembly sleeve.

64



65

Assemble shaft seal, disc and safety ring.
Press-in with assembly sleeve.

⚠ Take care of press-in depth.

Tightening torques for shaft bolts (Metric ISO Standard Thread)

The values for tightening torques shown in the table are valid only for shaft bolts with metric ISO-standard threads and head support surface dimensions in accordance with DIN 912, DIN 931 and DIN 933. These values are also valid only for light or unoiled, untreated surface as well as for use only with torque-indicating wrenches and force limiting tools.

Thread size	Strength Classes 8.8	10.9	12.9
	Tightening Torque (lb.ft)		
M 3	1,1	1,6	1,9
M 4	2,9	4,1	4,9
M 5	6	8,5	10
M 6	10	14	17
M 8	25	36	41
M10	49	69	83
M12	86	120	145
M14	135	190	230
M16	210	295	355
M18	290	405	485
M 20	410	580	690
M 22	550	780	930
M 24	710	1000	1200
M 27	1050	1500	1800
M 30	1450	2000	2400

Tightening torques for locking screws VSTI (Metric ISO fine thread)

Thread size	Designation	Tightening torques(lb.ft)
M 8 x 1	VSTI 8 x 1 -ED/SA	= 5
M 10 x 1	VSTI 10 x1 -ED	= 10
M 12 x 1,5	VSTI 12 x 1,5 -ED	= 20
M 14 x 1,5	VSTI 14 x 1,5 -ED	= 30
M 16 x 1,5	VSTI 16 x 1,5 -ED/SA	= 30
M 18 x 1,5	VSTI 18 x 1,5 -ED/SA	= 40
M 20 x 1,5	VSTI 20 x 1,5 -ED/SA	= 50
M 22 x 1,5	VSTI 22 x 1,5 -ED	= 60
M 26 x 1,5	VSTI 16 x 1,5 -ED/SA	= 70
M 27 x 2	VSTI 27 x 2 -ED	= 90
M 30 x 1 ,5	VSTI 30 x 1,5 -ED/SA	= 100
M 33 x 2	VSTI 33 x 2 -ED/SA	= 120
M 42 x 2	VSTI 42 x 2 -ED/SA	= 200
M 48 x 2	VSTI 48 x 2 -ED	= 300

Tightening torques for seal-lock nuts (Metric ISO-Standard Thread)

The values for tightening torques shown in the table are valid only for seal-lock nuts of the strength class 8.8 and with metric ISO-standard thread.

Thread size	Strength Classes 8.8	10.9	12.9
	Tightening Torque (lb.ft)		
M 6	10	-	-
M 8	22	-	-
M10	40	-	-
M12	69	-	-
M14	110	-	-
M16	170	-	-

Tightening torques for cross-slotted lens head screws DIN 7985 (Metric ISO-Standard Thread)

The values for tightening torques shown in the table are valid only for cross-slotted lens head screws DIN 7985 of the strength class 8.8 and with metric ISO-standard thread.

Thread size	Strength Classes 8.8	10.9	12.9
	Tightening Torque (lb.ft)		
M 3	1,1	-	-
M 4	2,9	-	-
M 5	6	-	-
M 6	10	-	-
M 8	25	-	-
M10	49	-	-

General advice

- Make yourself familiar with the equipment of the machine.
- Only operate the machine if your are completely familiar with the operating and control elements as well as the functioning of the machine.
- Use your safety equipment like helmet, safety shoes and hearing protection.
- Make yourself familiar with your working field.
- Only operate the machine for its intended purpose.

Please observe the guidelines of the Professional Association and the machine manufacturer.



Before starting

- Observe the operating instructions before starting.
- Check the machine for obvious faults.
- Do not operate the machine with defective instruments, warning lights or control elements.
- All safety devices must be in a secure position.

- Do not carry with you movable objects or secure them to the machine.
- Keep oily and inflammable material away from the machine.
- Before entering thc driver's cabin, check if persons or obstacles are beside or beneath the machine.

- Be careful when entering the driver's cabin, use stairs and handles.

- Adjust your seat before starting.

Start

- When starting all operating levers must be in “neutral position”.
- Only start the machine from the driver’s seat
- Check the indicating instruments after start to assure that all functions are in order.
- Do not leave the machine unobserved when the motor is running.
- When starting with battery connection cables connect plus with plus and minus with minus.
  Always connect mass cable (minus) at last and cut off at first.

Attention

- Exhaust gas is dangerous. Assure sufficient fresh air when starting in closed rooms!

Hydraulic equipment

1. Hydraulic equipment is standing under high pressure.

⚠ High pressure fluids (fuel, hydraulic oil) which escape under high pressure can penetrate the skin and cause heavy injuries.
Therefore immediately consult a doctor as otherwise heavy infections can be caused.

2. When searching leakages use appropriate auxiliary devices because of the danger of accidents.
3. Before working at the hydraulic equipment, lower pressure to zero and lower working arms of the machine.
4. When working at the hydraulic equipment, absolutely stop motor and secure machine against rolling away (parking brake, shim)!

5. When connecting hydraulic cylinders and motor pay attention to correct connection of hydraulic flexible hoses.
6. In case of exchanging the ports, the tunctions are vice versa (f. ex. lift-up/lower) - danger of accidents!

7. Check hydraulic flexible hoses regularly and replace them in case of dammage or wear! The new hose pipes must comply with the technical requirements of the machine manufacturer!

⚠ Orderly disposal or recycling of oil, fuel and filters!

Note!
In order to supply proper spare parts, please provide following specifications when ordering spares:

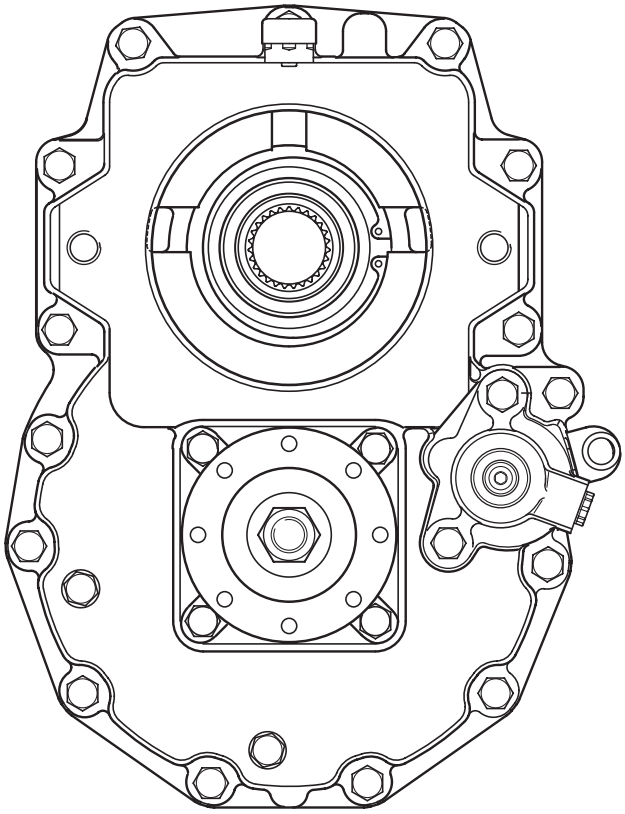
Type Code
Type Number
Serial Number
Assembly Group
Item
Designation

In repairing the unit, we recommend the use of pre-assembled partially tested assembly groups.

HYDROMATIK GmbH

Glockeraustraße 2
D-89275 Elchingen
Postanschrift: Postfach 22 60, D-89012 Ulm
Telefon (0 73 08) 8 20
Telex 712538
Telefax (0 73 08) 72 74, 72 73

Section N
DANA GEARBOX
ASSEMBLY - DISASSEMBLY



SECTION INDEX

INTRODUCTION 2
MAINTENANCE AND LUBRICANT 3
CONVERSION TABLES 4
TIGHTENING TORQUES 4
DIAGRAMS OF REDUCTION UNIT AND EXPLODED VIEWS 5
DISASSEMBLY OF DIRECTLY FLANGED REDUCTION GEAR 357 8
REMOVAL OF HYDRAULIC GEAR CONTROL 9
ASSEMBLY OF DIRECTLY FLANGED REDUCTION GEAR 357 17
INSTALLATION OF HYDRAULIC GEAR CONTROL 25

INTRODUCTION

The efficiency and continued operation of mechanical units depend on constant, correct maintenance and also on efficient repair work, should there be a break-down or malfunction.
The instructions contained in thismanual have been based on a complete overhaul of the unit. However, it is up to the mechanic to decide whether or not it is necessary to assemble only individual components, when partial repair work is needed. The manual provides a quick and sure guide which, with the use of photographs and diagrams illustrating the various phases of the operations, allows accurate work to be performed.
All the information needed for correct disassembly, checks and assembly of each individual component is set out below.
All the information needed for correct disassembly, checks and assembly of each individual component is set in the Chapter **E - Disassembly and Reassembly**.
In describing the following operations it is presumed that the unit has already been removed from the vehicle.

IMPORTANT

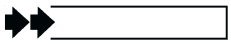
In order to facilitate work and protect both working surfaces and operators, it is advisable to use proper equipment such as: trestles or supporting benches, plastic or copper hammers, appropriate levers, extractors and specific spanners or wrenches.
Before going on to disassemble the parts and drain the oil, it is best to thoroughly clean the unit, removing any encrusted or accumulated grease.

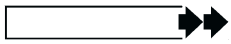
Introductory remarks

All the disassembled mechanical units should be thoroughly cleaned with appropriate products and restored or replaced if damage, wear, cracking or seizing have occurred.
In particular, thoroughly check the condition of all moving parts (bearings, gears, crown wheel and pinion, shafts) and sealing parts (O-rings, oil shields) which are subject to major stress and wear. In any case, it is advisable to replace the seals every time a component is overhauled or repaired. During assembly, the sealing rings must be lubricated on the sealing edge. In the case of the crown wheel and pinion, replacement of one component requires the replacement of the other one. During assembly, the prescribed pre-loading, backlash and torque of parts must be maintained.

Classification

This manual classifies units according to part numbers. For a correct interpretation, classification is indicated as follows:


= up to the part number

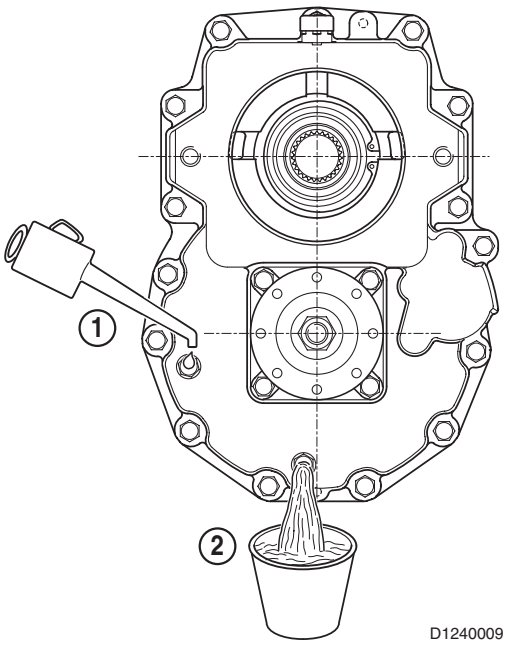

= from the part number on

When no classification is given, disassembly and assembly operations are the same for all versions.

Specific equipment and spare parts

The drawings of all specific tools required for maintenance and repair work can be found at the end of this manual ; spare parts may be ordered either from the vehicle manufacturer or directly from the Service Centers or Authorised Distributors of SPICER CLARK-HURTH.

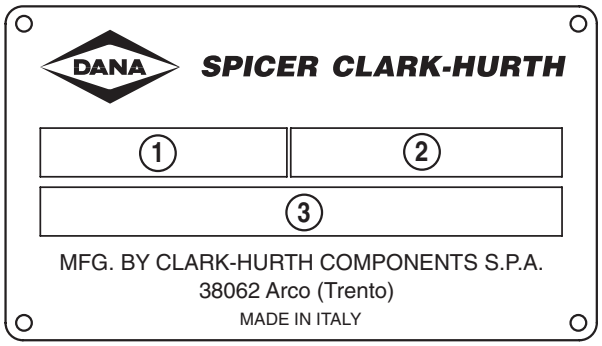
MAINTENANCE AND LUBRICANT



1 Oil fill and level plug

2 Oil drain plug

Data plate



1 Type and model unit

2 Serial number

3 Lubrificant

Maintenance points

OPERATION	FREQUENCY	LUBRICANTS
• Check levels:	monthly	**SAE85W90 API GL3**
• Oil change:	every 1000 hours (*)	

(*) Initially after 100 working hours

CONVERSION TABLES

Units of pressure: 1 Atm = 1 bar = 10^5 PA = 14.4 PSi

Units of weight

	N	daN	kN	kg	lbs
1N	1	0,1	0,001	0,102	0,225
1daN	10	1	0,01	1,02	2,25
1kN	1000	100	1	102	225
1kg	9,81	0,981	0,00981	1	2,205

Units of torque

	Nm	daNm	kNm	kgm	lb-in
1Nm	1	0,1	0,001	0,102	8,854
1daNm	10	1	0,01	1,02	88,54
1kNm	1000	100	1	102	8854
1kgm	9,81	0,981	0,00981	1	86,8
1lb-in	0,1129	0,01129	0,0001129	0,01152	1

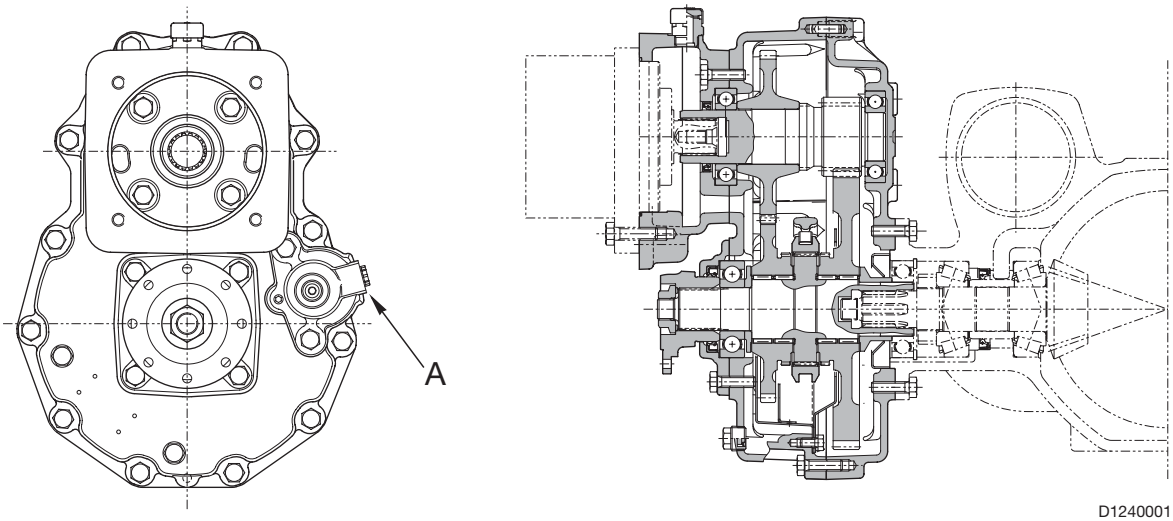
Tightening torques

Unit: Nm

SIZE OF BOLT	TYPE OF BOLT		
	8G/8.8 Nm	10k/10.9 Nm	12k/12.9 Nm
M4	2,9	4,1	-
M6	10,0	14,0	-
M8	25,0	35,0	-
M10	49,0	69,0	-
M10x1,25	52,0	73,0	88,0
M12	86,0	120,0	-
M14	135,0	190,0	-
M14x1,5	150,0	210,0	250,0
M16	210,0	295,0	-
M18x1,5	325,0	460,0	550,0
A22	550		

DIAGRAMS OF REDUCTION UNIT AND EXPLODED VIEWS

DIAGRAM

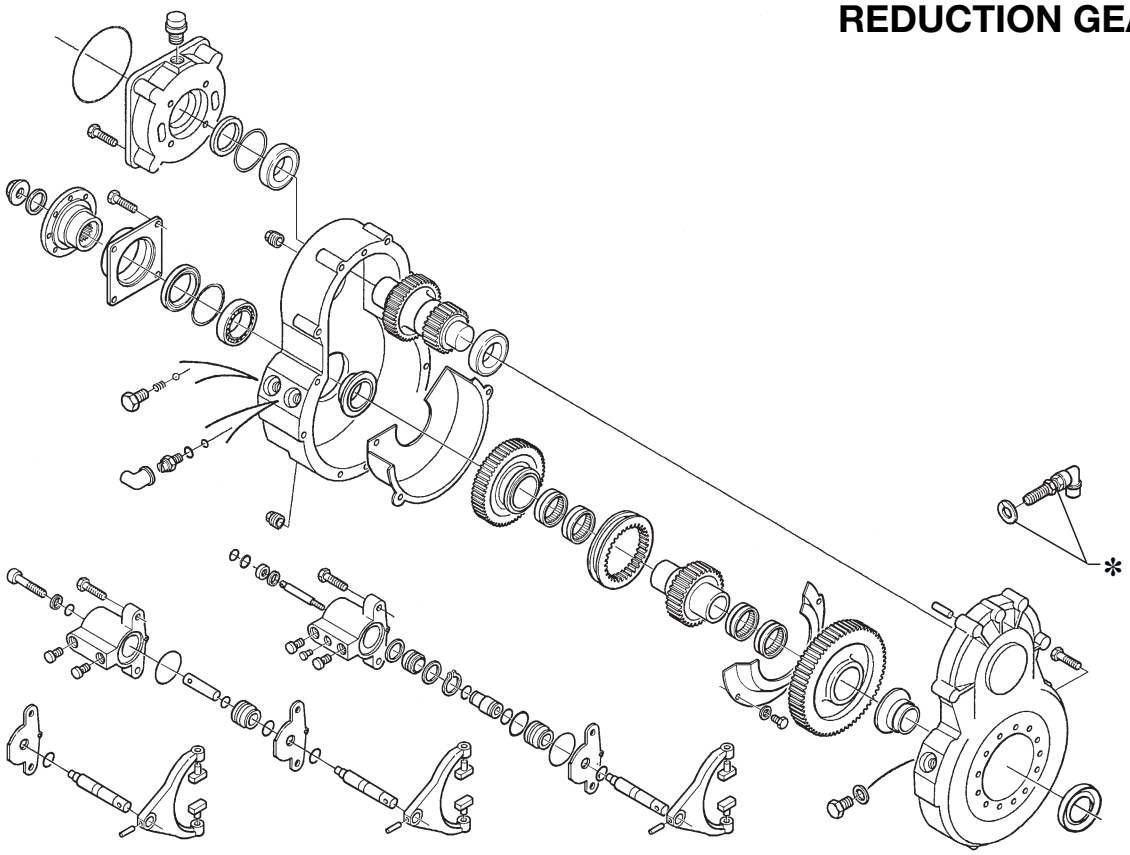


D1240001

TECHNICAL DATA

A - Connector for hydraulic gear control - Pressure required 15÷30 bar

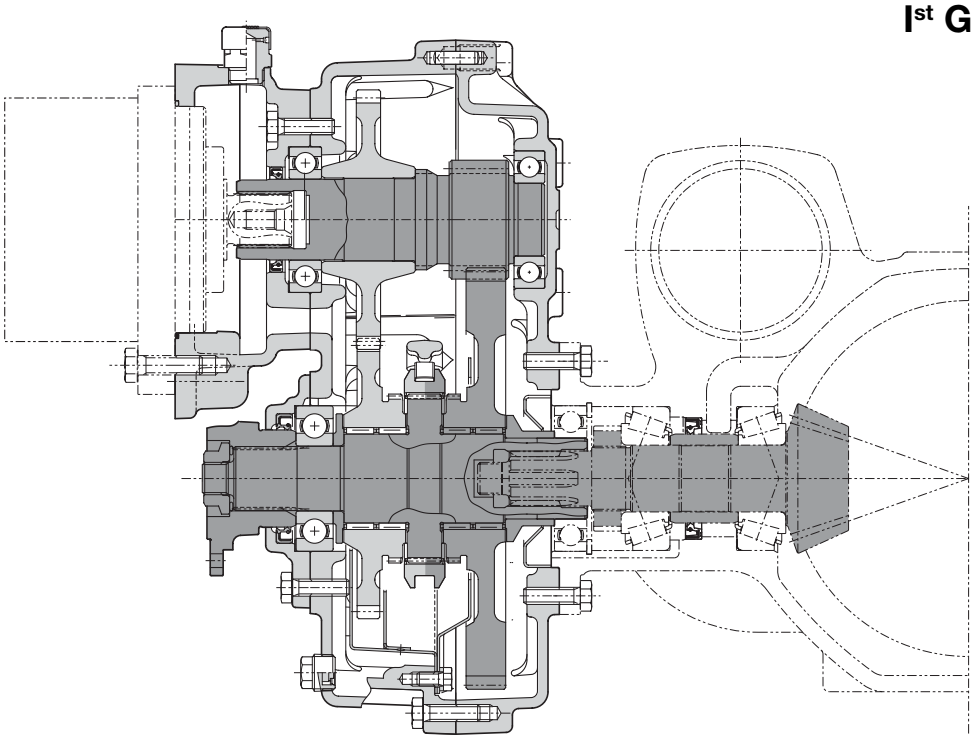
REDUCTION GEAR



*** OPTIONAL**

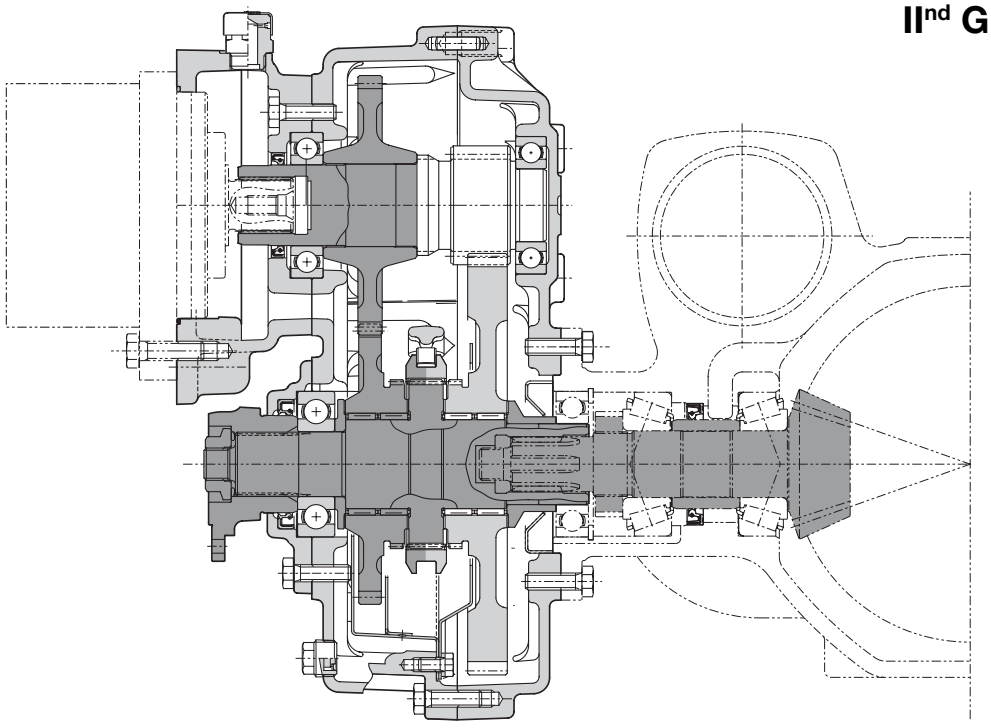
D1240012

Ist GEAR



D1240002

IInd GEAR

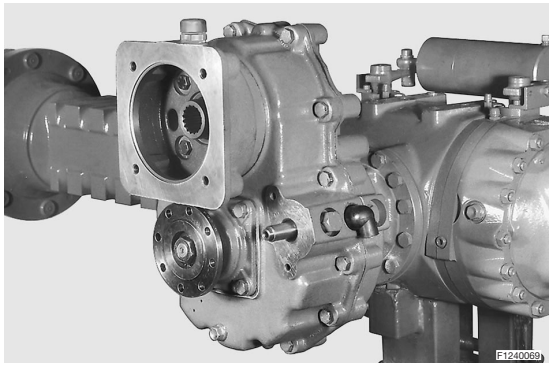


D1240003

Symbols

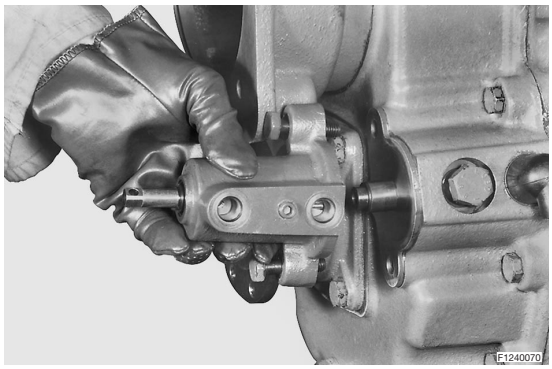
	Disassembly of assembly groups
	Reassemble to from assembly groups
	Remove obstruction parts
	Reinstall-remount parts which had obstructed disassembly
	Attention ! Important notice
	Check - adjust e.g. torque, dimensions, pressures, etc.
	T=Special tool P=Page
	Note direction of installation
	Visual inspection
	Possibly still serviceable, renew if necessary
	Renew at each reassembly
	Unlock - lock e.g. split pin, locking plate, etc.
	Lock-adhere (liquid sealant)
	Guard against material damage, damage to parts
	Mark before disassembly, observe marks when reassembly
	Caricare - riempire (olio - lubrificante)
	Drain off oil, lubricant
	Tighten
	Apply pressure into hydraulic circuit
	To clean
	Lubricate - grease

DISASSEMBLY OF DIRECTLY FLANGED REDUCTION GEAR 357



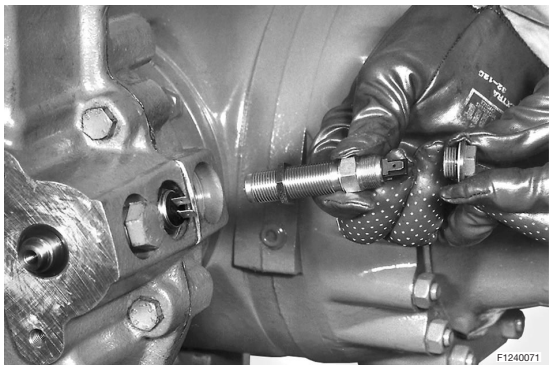
GB a

Reduction gear directly flanged on the axle with mechanic gear control.



GB b

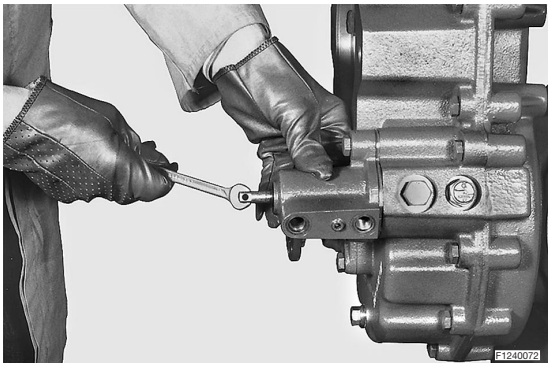
Reduction gear directly flanged on the axle with hydraulic gear control.



GB c

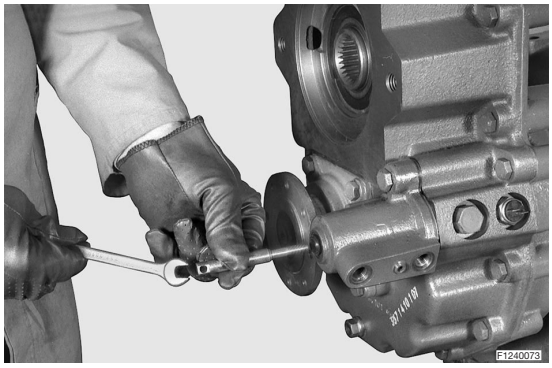
Reduction gear directly flanged on the axle with or without revolution indicator.

REMOVAL OF HYDRAULIC GEAR CONTROL



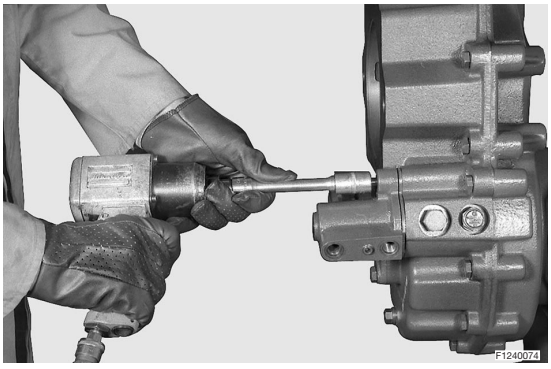
GB a

Remove the gear control rod.



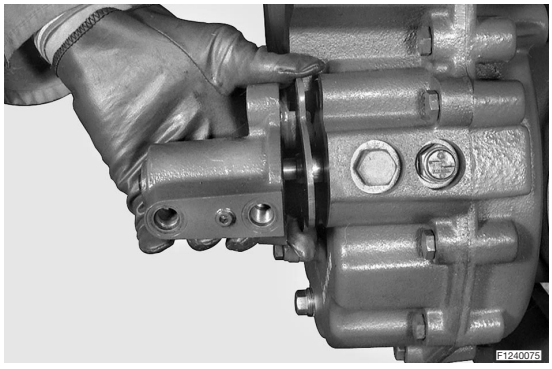
GB b

Pull out the control rod.



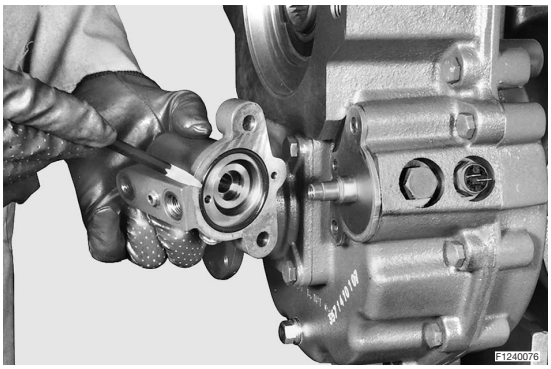
GB c

Remove screws on the gear control cylinder.



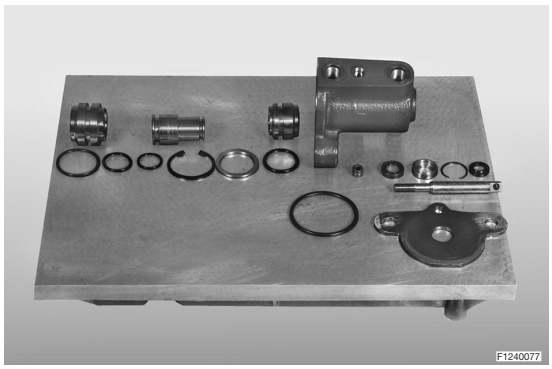
GB d

Remove the gear control cylinder.



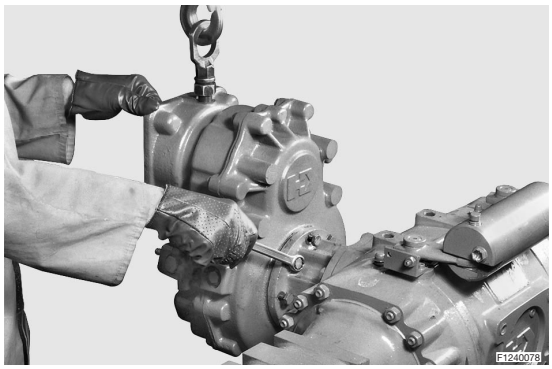
GB e

Pull out the gear control cylinder.
Pay attention to the position of the O-rings.
Remove the protection plate.



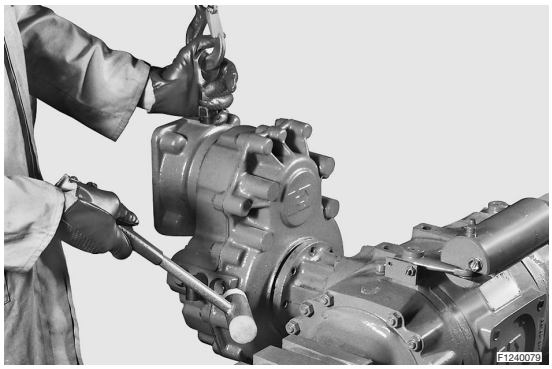
GB f

Re-assembly arrangement of gear control cylinder parts.



GB a

Remove fastening screws from the reduction unit.



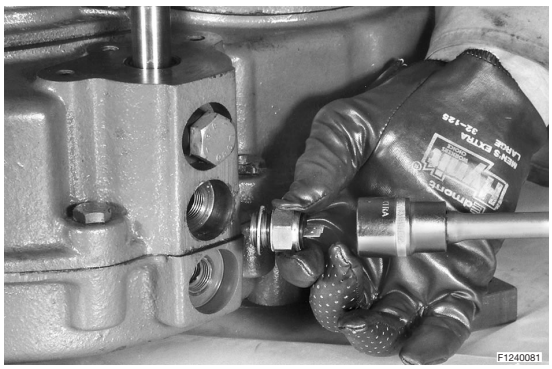
GB b

Disjoin the entire reduction unit from the axle and place it on a bench.



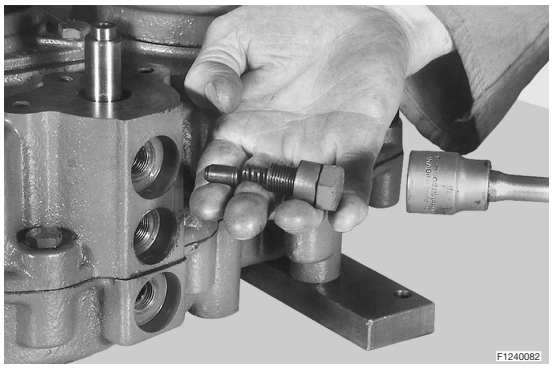
GB c

Remove the sealing cover with the relative washer or the revolution indicator.



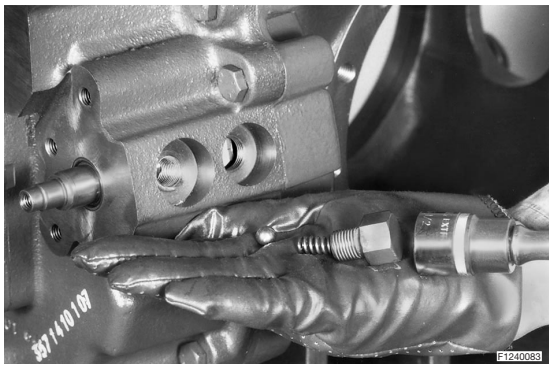
GB d

Remove gear-in position switch, O-ring and washer.



GB e

Remove screw, spring, together with gear-and-neutral position spindle (mechanical version).



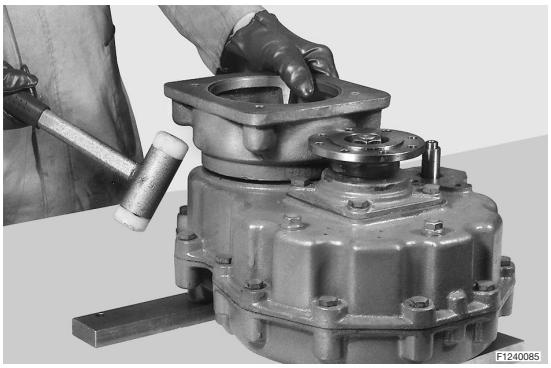
GB f

Remove screw, spring and neutral position ball (hydraulic version).



GB a

Remove screws from the motion input cover.



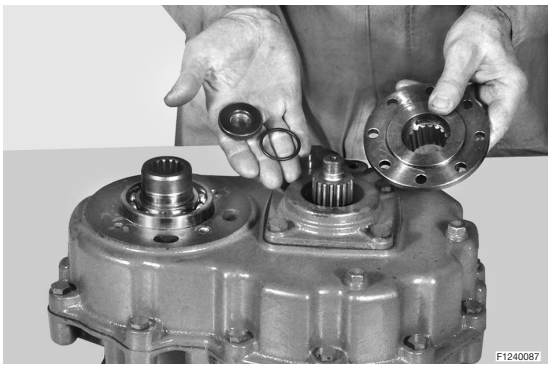
GB b

Disjoin the motion entrance cover.



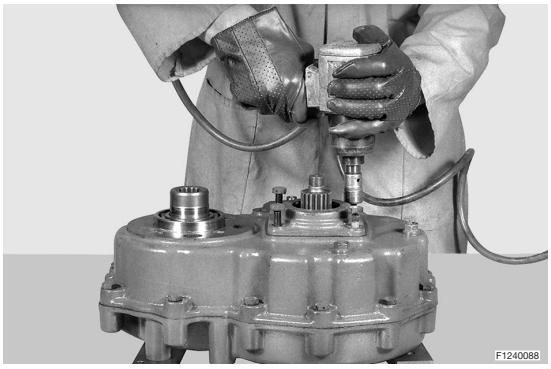
GB c

Remove the nut from the flange.



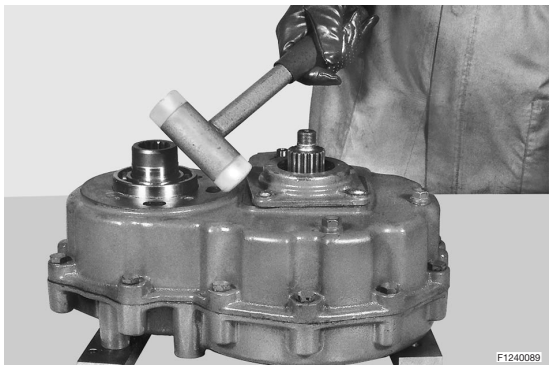
GB d

Remove the O-ring and pull out the flange.



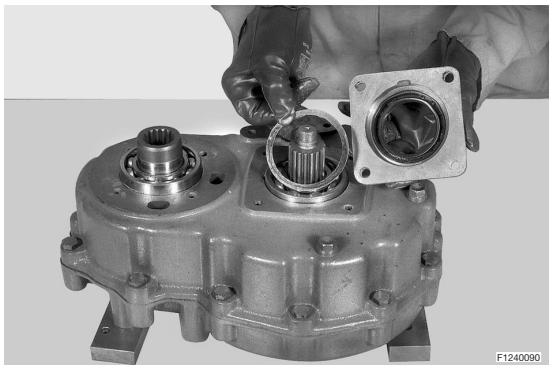
GB e

Remove screws from the cover.



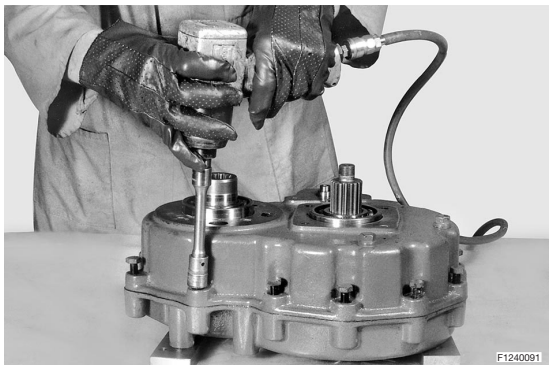
GB a

Disjoin the cover.



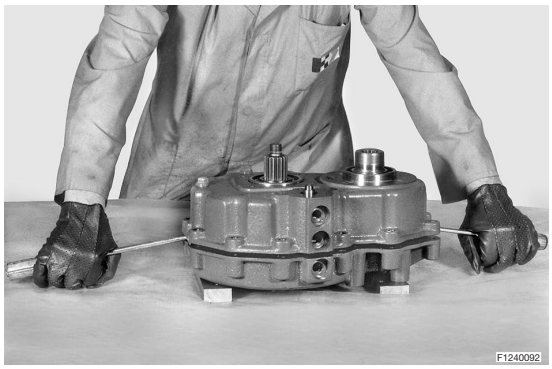
GB b

Remove the cover by fixing the distance washers onto the cover itself.
Caution: the niche must be facing upwards.



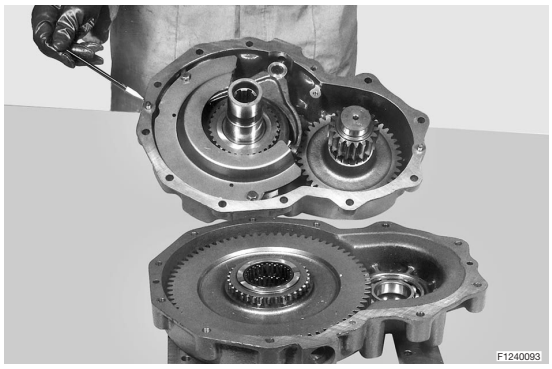
GB c

Remove screws.



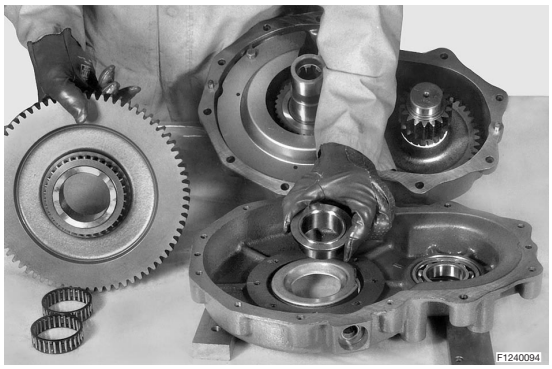
GB d

Remove the cover.
Take care not to damage planes.



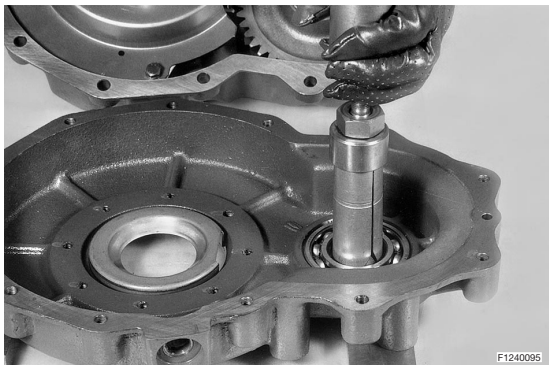
GB e

Take away the cover.
Pay attention to the position of the pins.



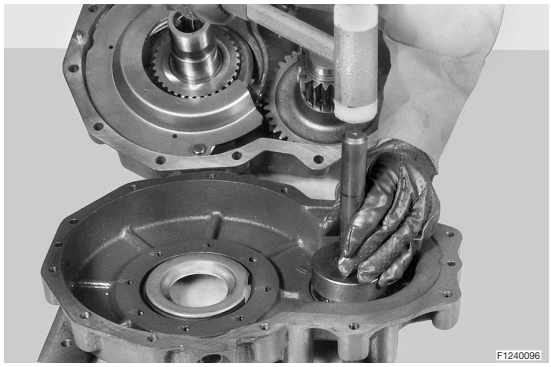
GB a

Pull out gear, needle bearings and distance piece form the box.



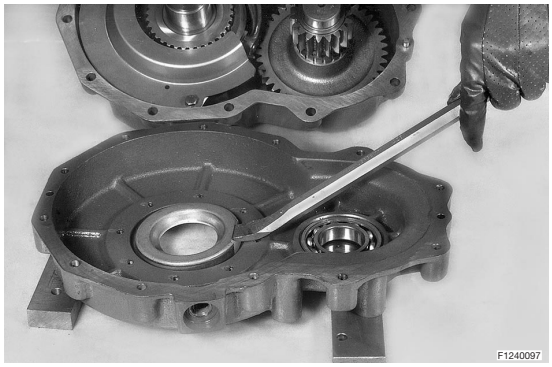
GB b

Remove the bearing if it needs replacing.



GB c

Re-introduce the bearing into the box.



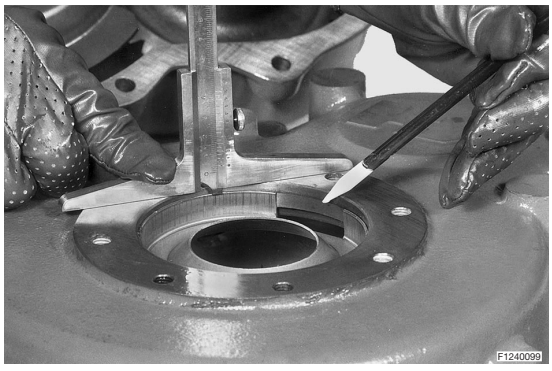
GB d

Remove the oil shield plate only if necessary.
Caution: the oil inlet must face upwards.



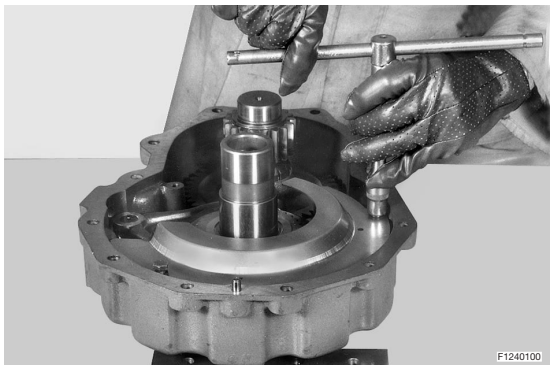
GB e

Re-introduce the oil shield plate with oil inlet facing upwards.
Apply LOCTITE 510 on the outside.



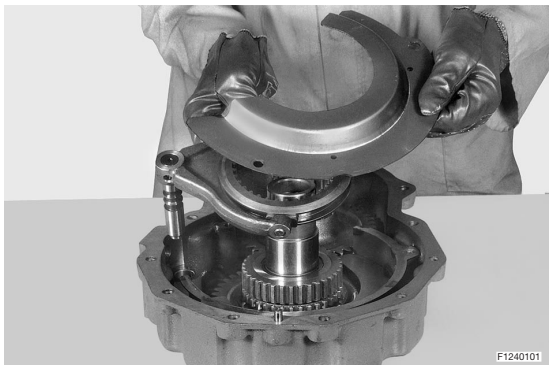
GB f

Fit the oil shield plate into position 5÷5.5 mm from box plane.



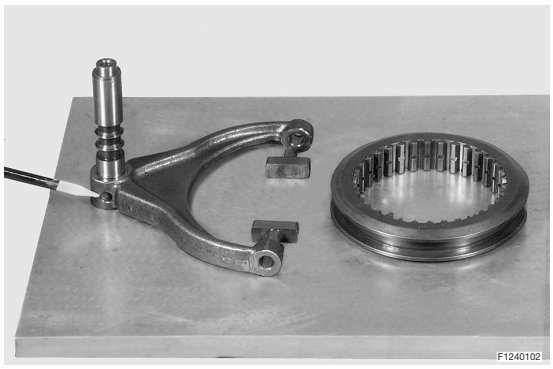
GB a

Remove the check screws from the flow regulator plate.



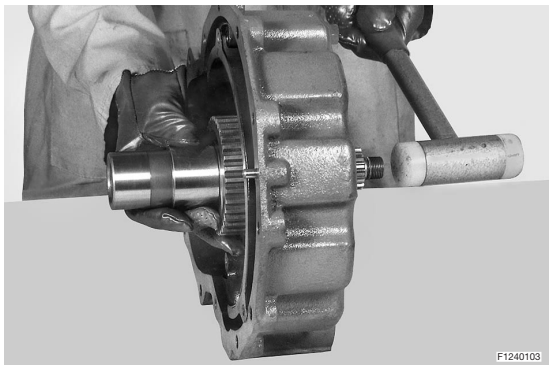
GB b

Remove the plate and pull out coupling and fork at the same time.



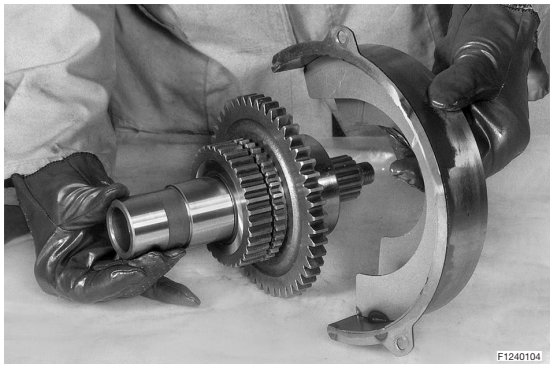
GB c

Check: sliding blocks, pin, and sliding coupling. Replace if worn.



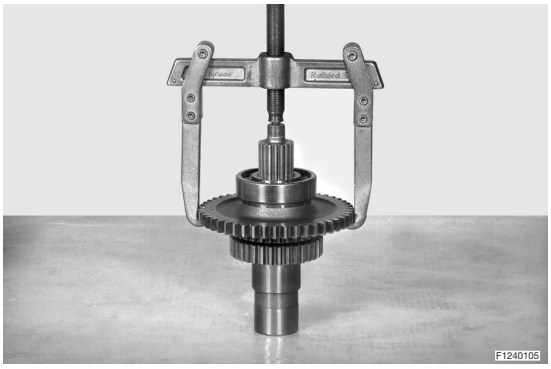
GB d

Remove the lower shaft.



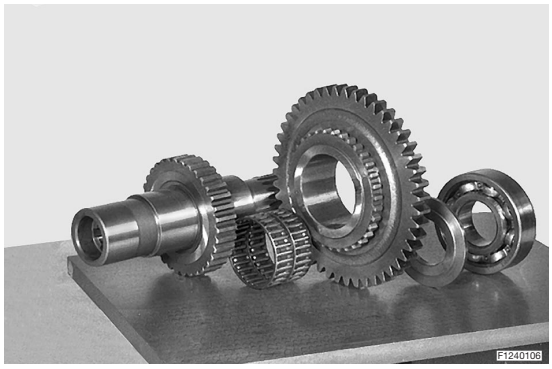
GB e

Remove the entire shaft and the flow regulator plate.



GB a

Disassembly of the entire lower shaft.



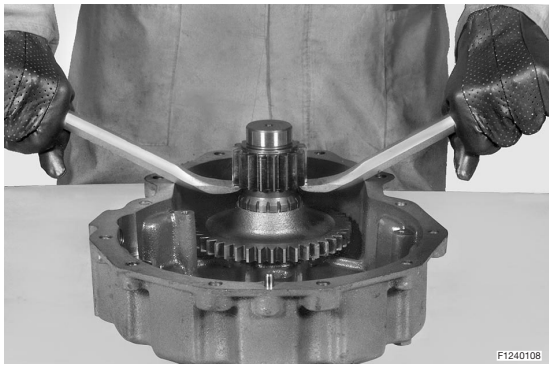
GB b

Progressive arrangement of parts fitted onto the lower shaft.



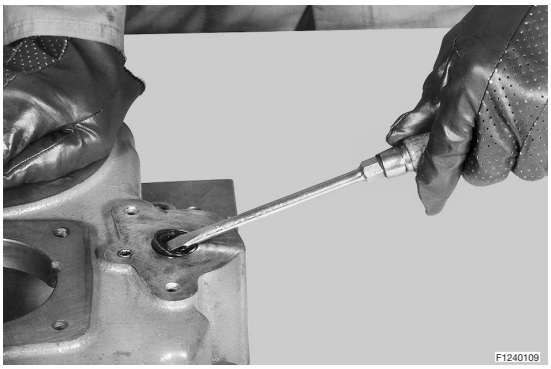
GB c

Assembly of lower shaft.



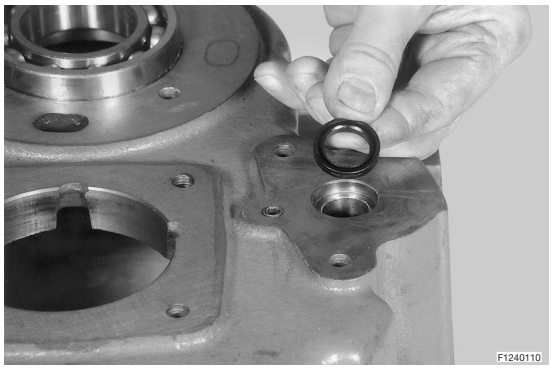
GB d

Removal of upper shaft.
(In case of replacement, the shaft is supplied already assembled).



GB e

Pull out the sealing ring.



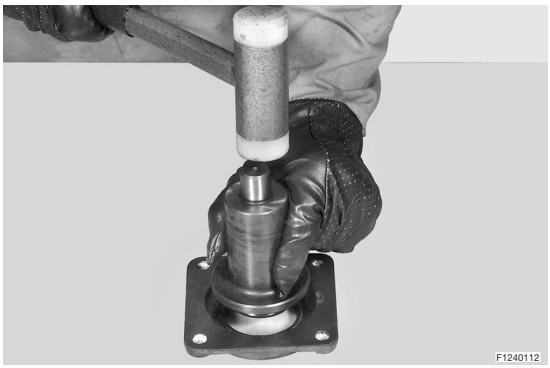
GB f

Re-insert a new sealing ring.



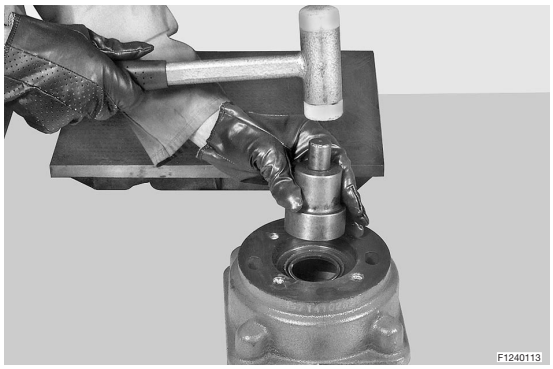
GB a

Pull out the sealing ring of the cover.



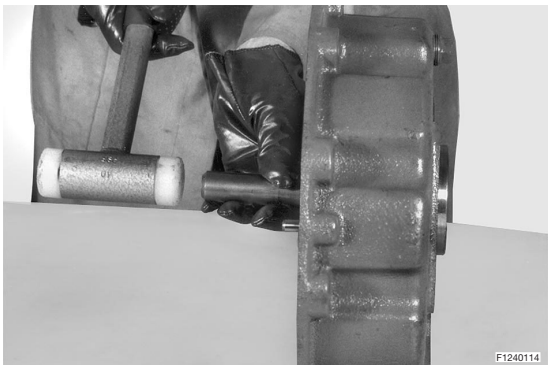
GB b

Re-insert a new sealing ring.



GB c

Pull out the sealing ring from the motion input cover.



GB d

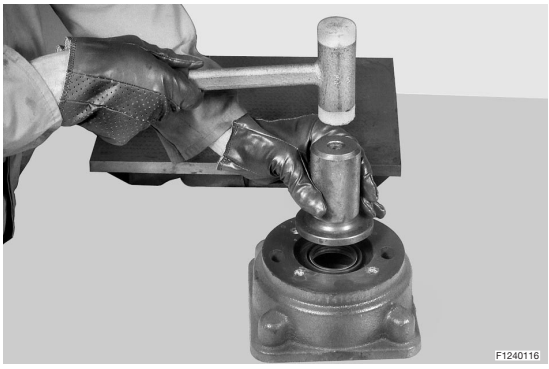
Remove the bearing from the cover of the reduction unit.

ASSEMBLY OF DIRECTLY FLANGED REDUCTION GEAR 357



GB a

Re-fit the bearing in the cover of the reduction unit using ordinary tools.



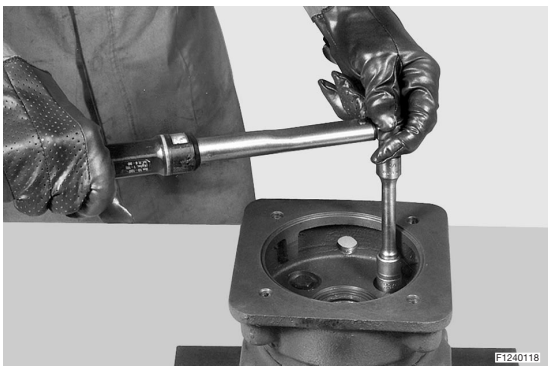
GB b

Re-insert the new sealing ring in the motion input cover.



GB c

Re-assemble the cover, spreading LOCTITE 510 on planes and screws.



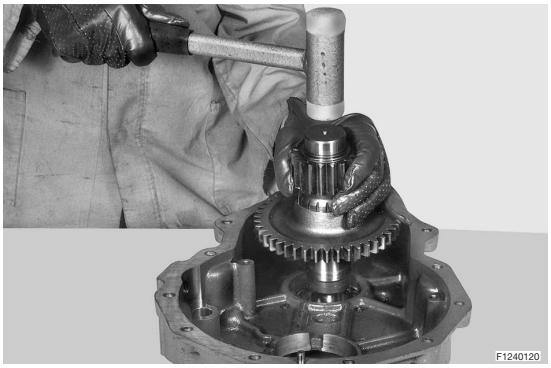
GB d

Tighten screws using a torque wrench setting of 49÷51 Nm.



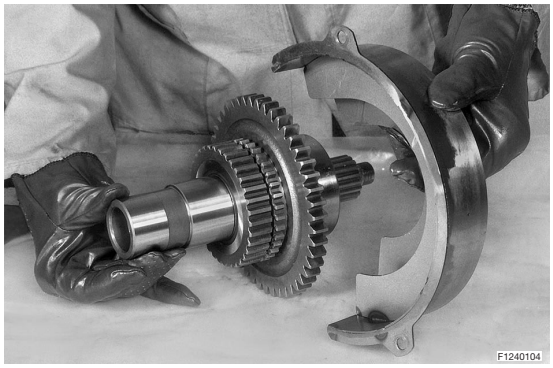
GB e

Lubricate the lip of the sealing ring with grease.



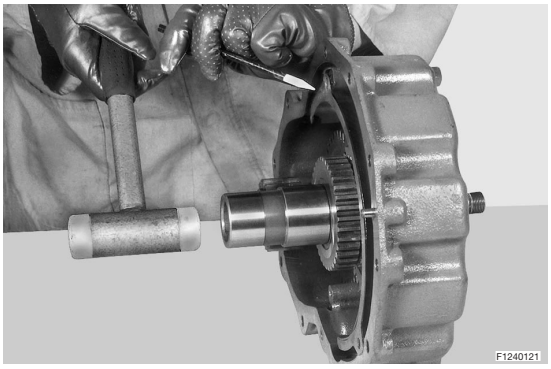
GB a

Re-assemble the motion upper shaft.



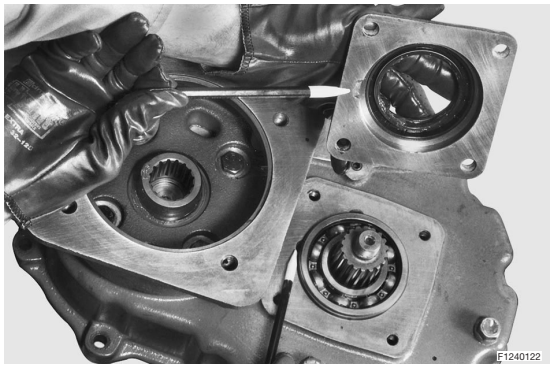
GB b

Re-assemble the full lower shaft and the flow regulator plate.



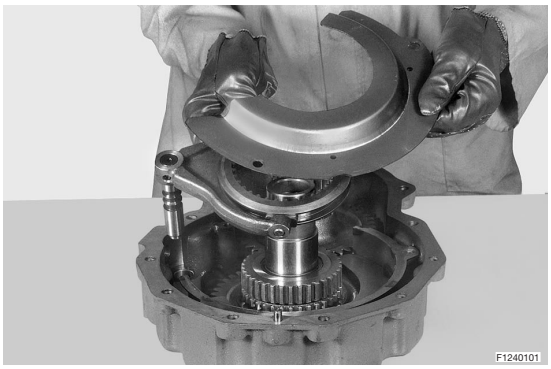
GB c

Position the shaft so that the bearing juts out approximately 5 mm from the cover of the reduction unit.



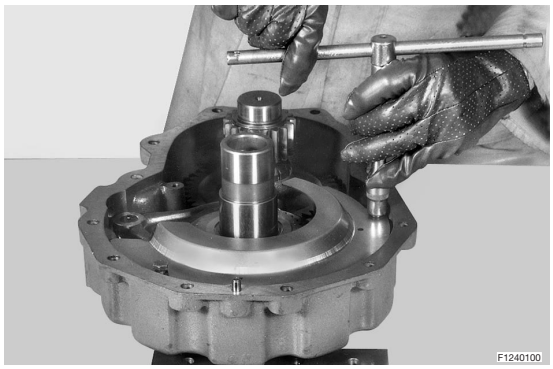
GB d

Temporarily re-assemble the cover with screws. (Be sure that the niche faces upwards).



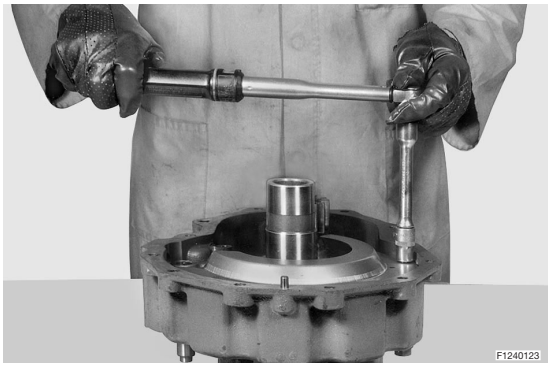
GB e

Simultaneously insert: fork and sliding blocks, coupling and flow regulator plate.



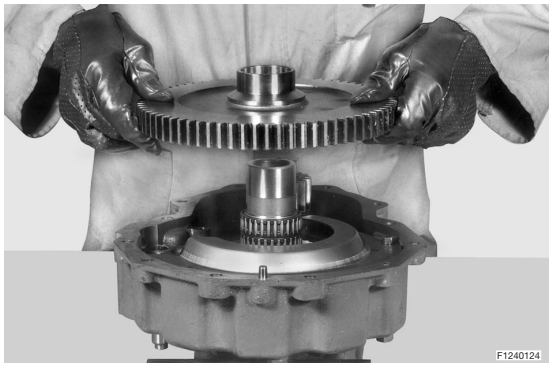
GB f

Re-insert screws and tighten.



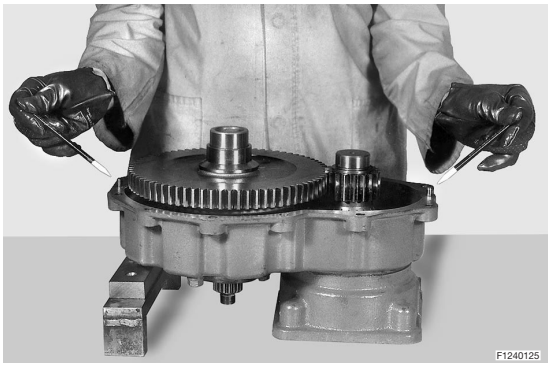
GB a

Tighten screws using a torque wrench setting of 25÷26 Nm.



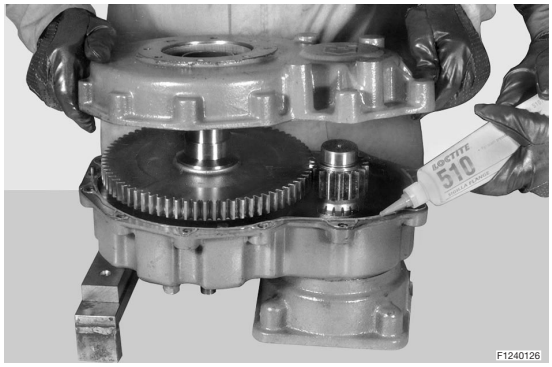
GB b

Re-assemble needle bearings, gear and distance piece.



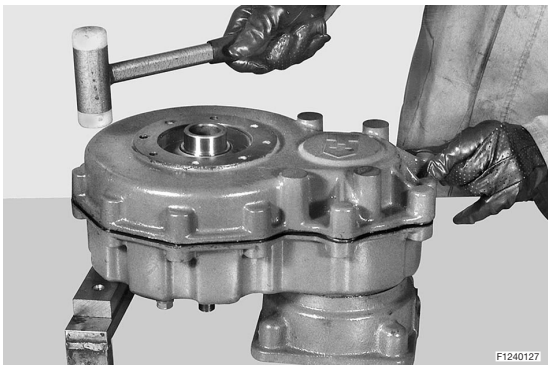
GB c

Check the insertion of pins.



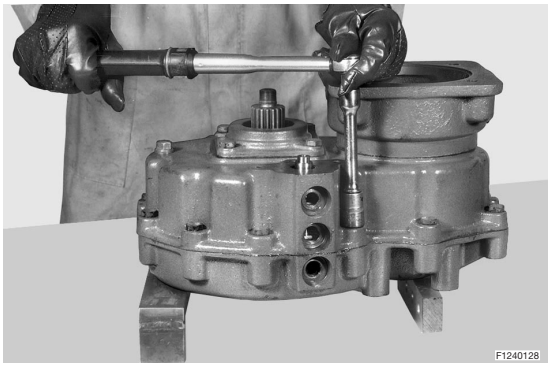
GB d

Spread LOCTITE 510 on the surface and assemble the cover.



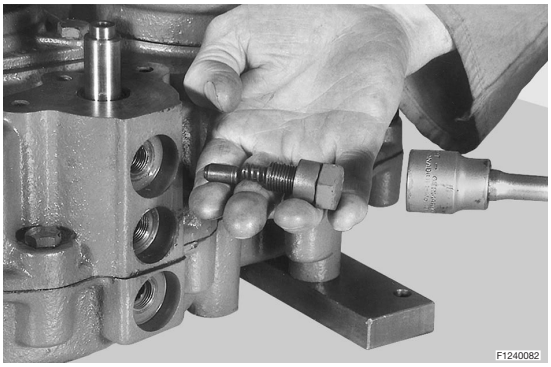
GB e

Fasten the cover.



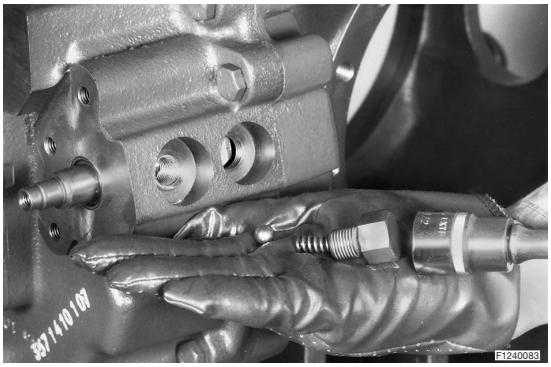
GB a

Tighten screws using a torque wrench setting of 49÷51 Nm.
Caution: tighten using the crossed method.



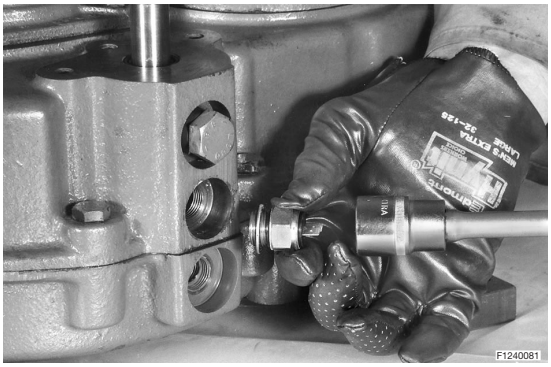
GB b

Grease components and re-introduce spindle, spring and screw (mechanical version).
Tighten using a max. torque wrench setting of 80÷100 Nm.



GB c

Grease components and re-introduce ball, spring and screw (hydraulic version).
Tighten using a max. torque wrench setting of 80÷100 Nm.



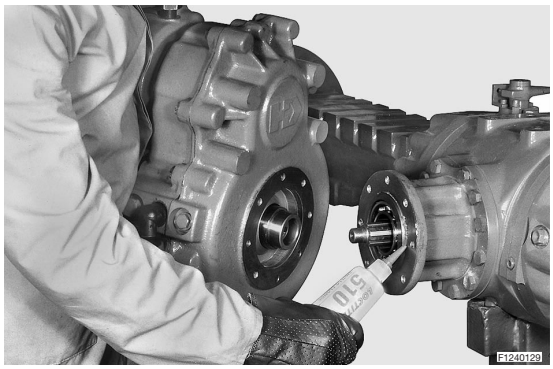
GB d

Fix the gear-in position switch with washer and O-ring.
Tighten with torque wrench setting of max. 54,2 Nm.



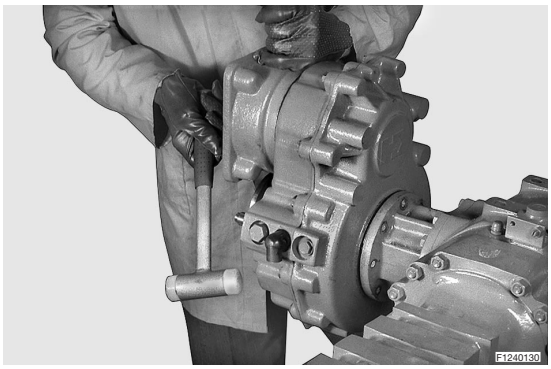
GB e

Assemble the sealing cover with washer and revolution indicator.
Tighten using a torque wrench setting of max. 25 Nm.



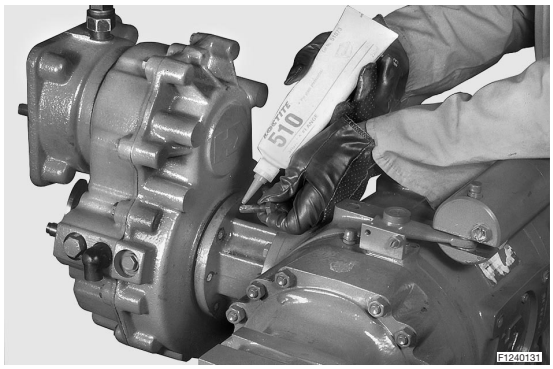
GB a

Re-fit the reduction unit onto the axle by spreading LOCTITE 510 on the planes.



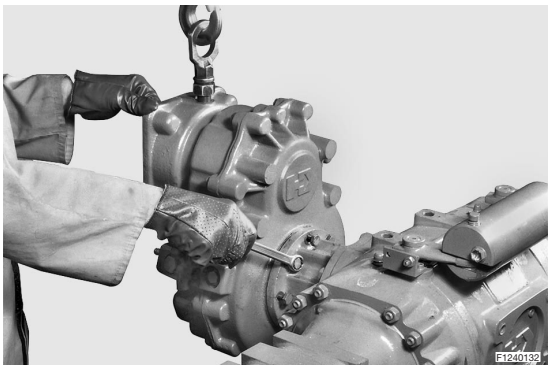
GB b

Fasten the support planes (turn flange to assist assembly).



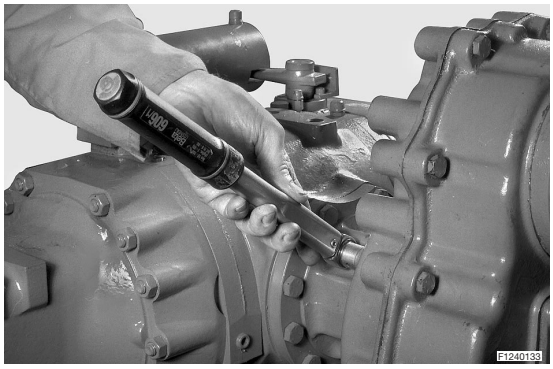
GB c

Insert screws by applying LOCTITE 510.



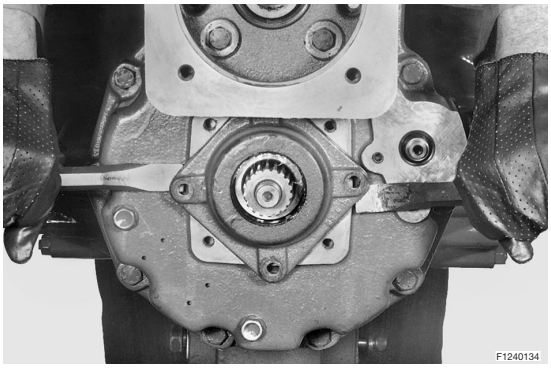
GB d

Screw down by placing the reduction unit in a vertical position in relation to the axis.



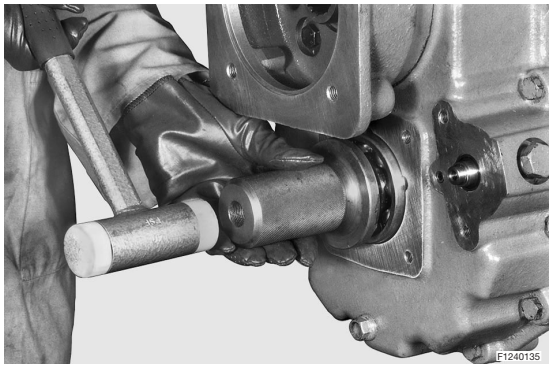
GB e

Tighten screws using a torque wrench setting of 49÷51 Nm.



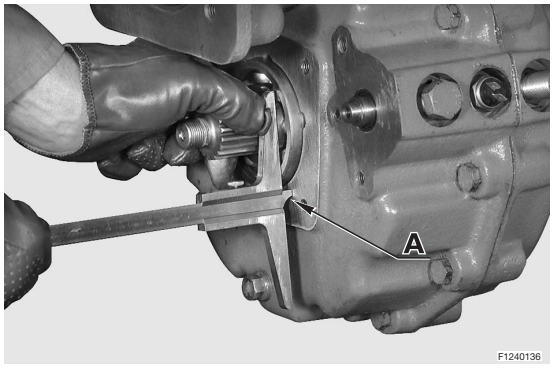
GB f

Extract screws and remove the temporarily assembled cover.



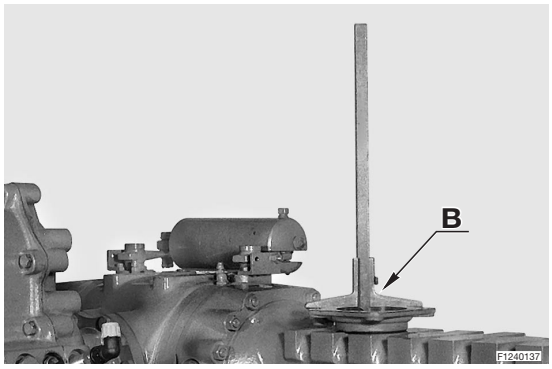
GB a

Fasten the bearing by using a standard tool.



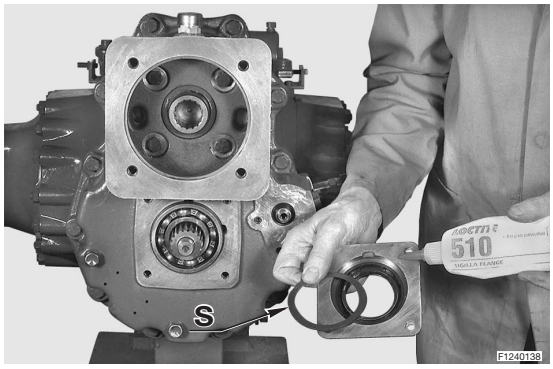
GB b

Measure dimension “A” between the bearing and the box plane using an ordinary depth gauge.
(if parts are not replaced, use disassembled distance washers).



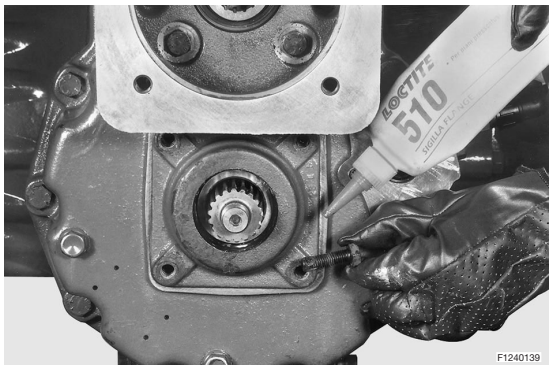
GB c

Measure dimension "B" on the cover, between the bearing plane and bearing support. Calculate the dimension of the distance washers required: S=Dimension B±Dimension A
Es: B=5,2±A=4,6 mm ± Backlash 0,2÷0,3= Distance washer required= 0,4÷0,3



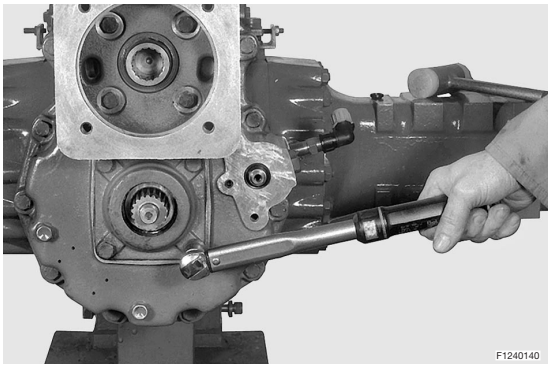
GB d

Apply LOCTITE 510 on the surface, lubricate the sealing ring, insert the distance washers and re-assemble the cover with niche facing upwards.



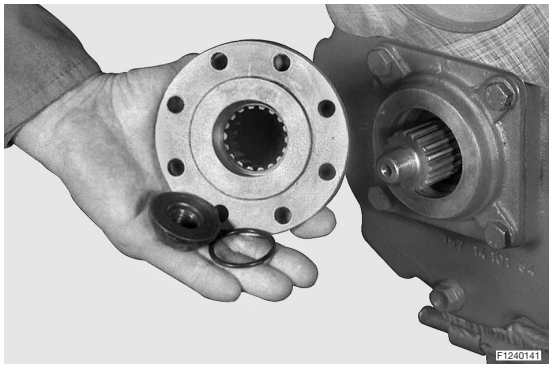
GB e

Fit screws after applying LOCTITE 510.



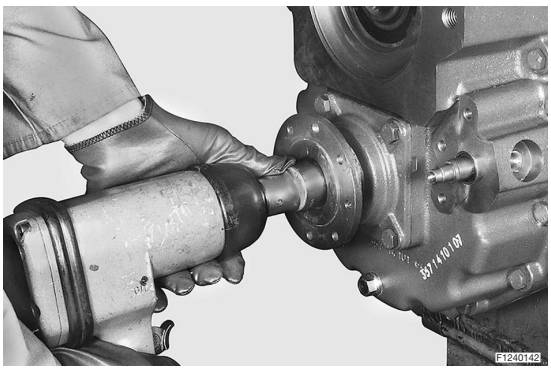
GB a

Tighten screws using a torque wrench setting of 49÷51 Nm.



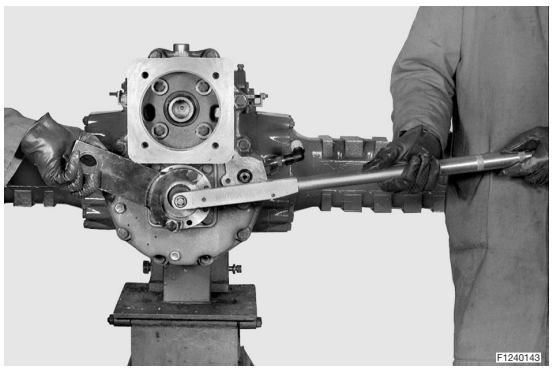
GB b

Assemble flange, O-ring and nut using LOCTITE 242.



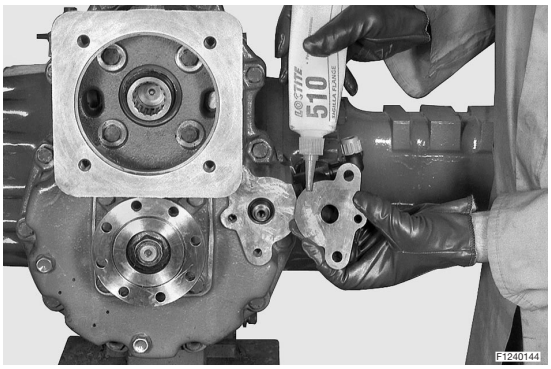
GB c

Screw down the nut of the flange.



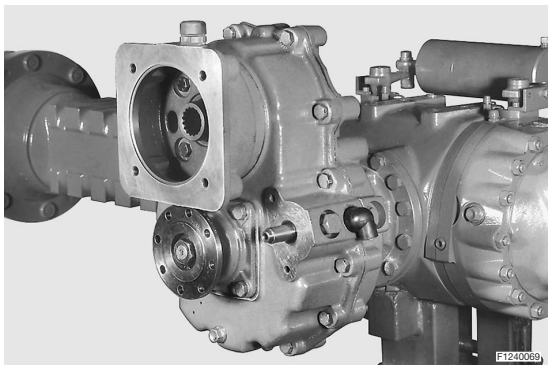
GB d

Tighten the nut using a torque wrench setting of 260÷280 Nm.



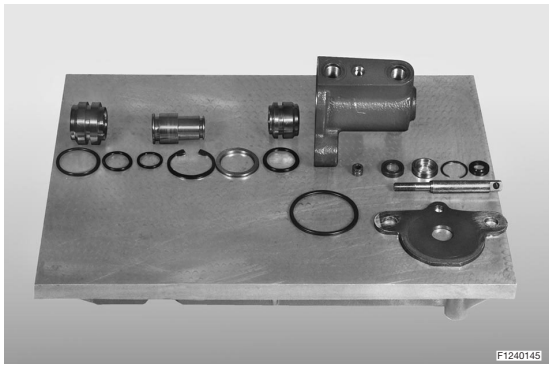
GB e

Re-fix the protection plate after applying LOCTITE 510.



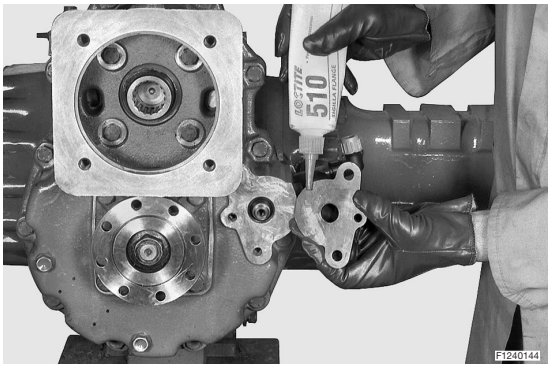
GB f

Complete flanged reduction gear 357 with mechanical gear control.



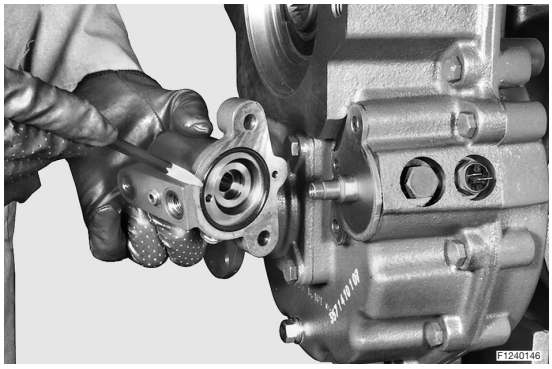
GB a

Re-assemble all the parts of the gear control cylinder, according to their arrangement.



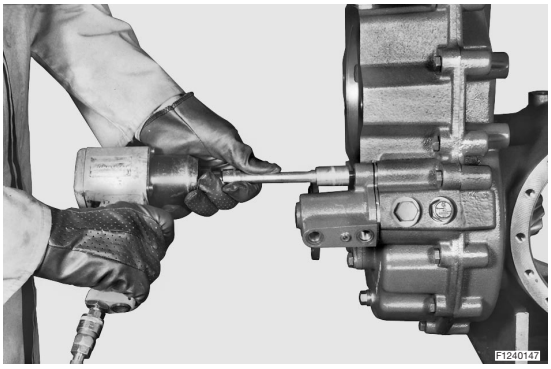
GB b

Re-fix the protection plate after applying LOCTITE 510 on it.



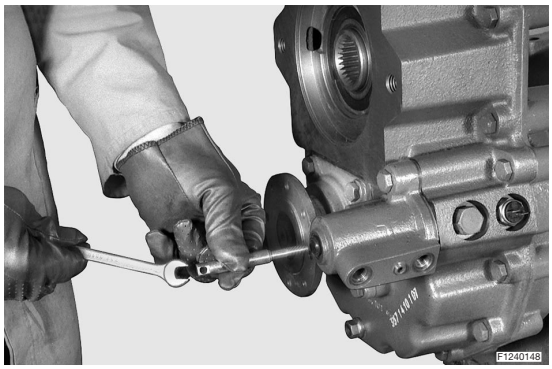
GB c

Re-fit the gear control cylinder into place with its O-ring.



GB d

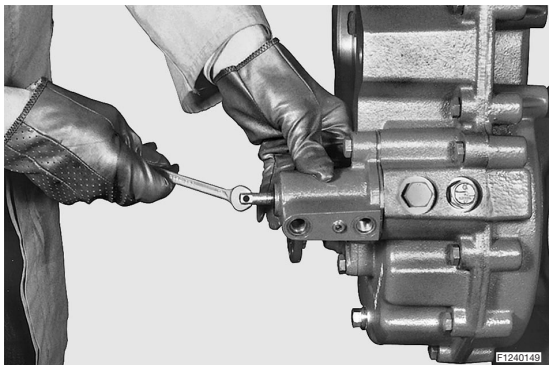
Re-fit screws and screw down.



GB e

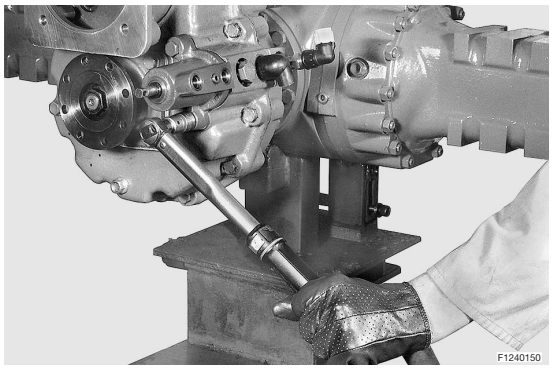
Re-introduce the gear control rod after applying LOCTITE 242 on it.

INSTALLATION OF HYDRAULIC GEAR CONTROL



GB a

Tighten the gear control rod using a torque wrench setting of 25÷26 Nm.



GB b

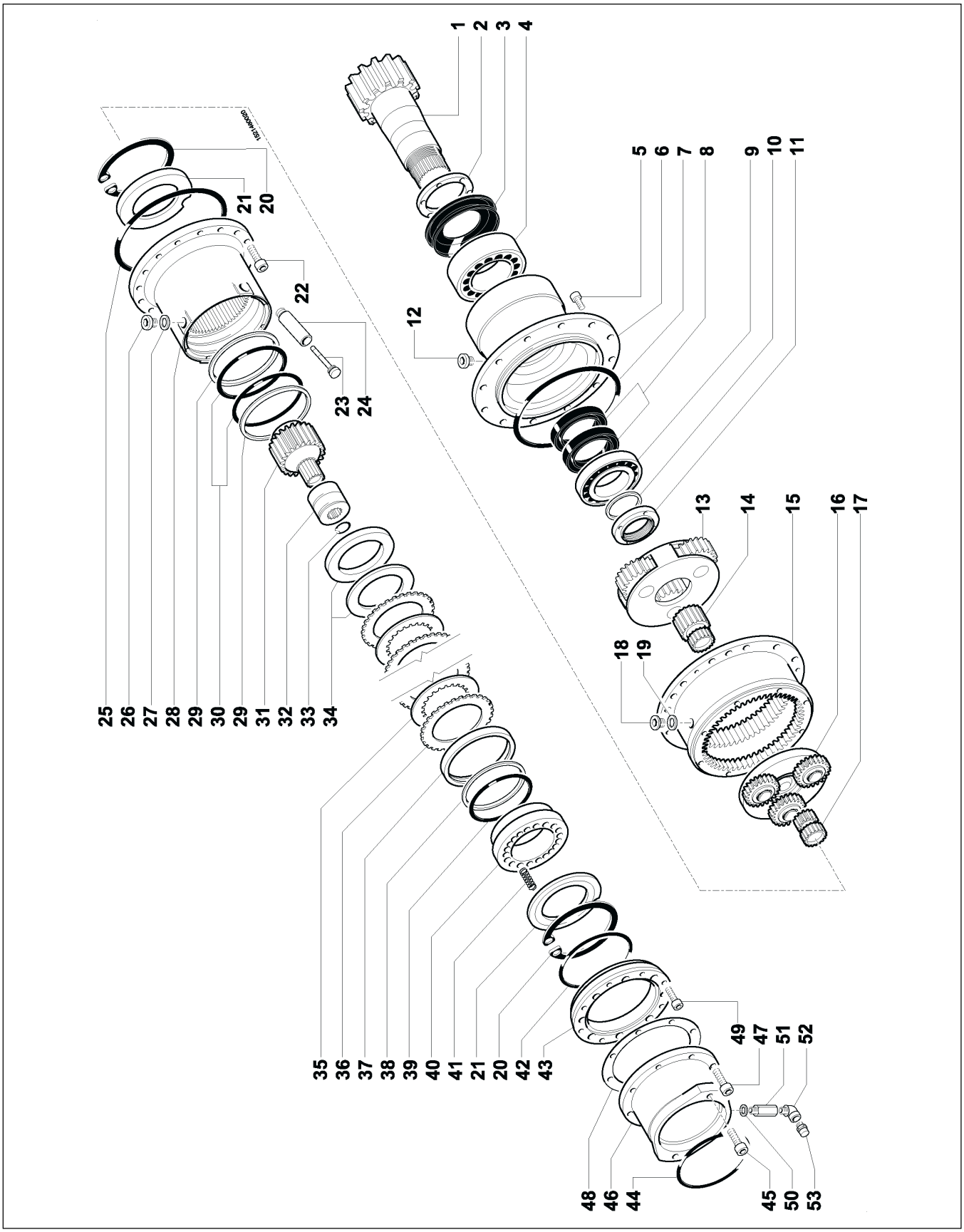
Tighten gear control cylinder screws using a torque wrench setting of 49÷51 Nm.

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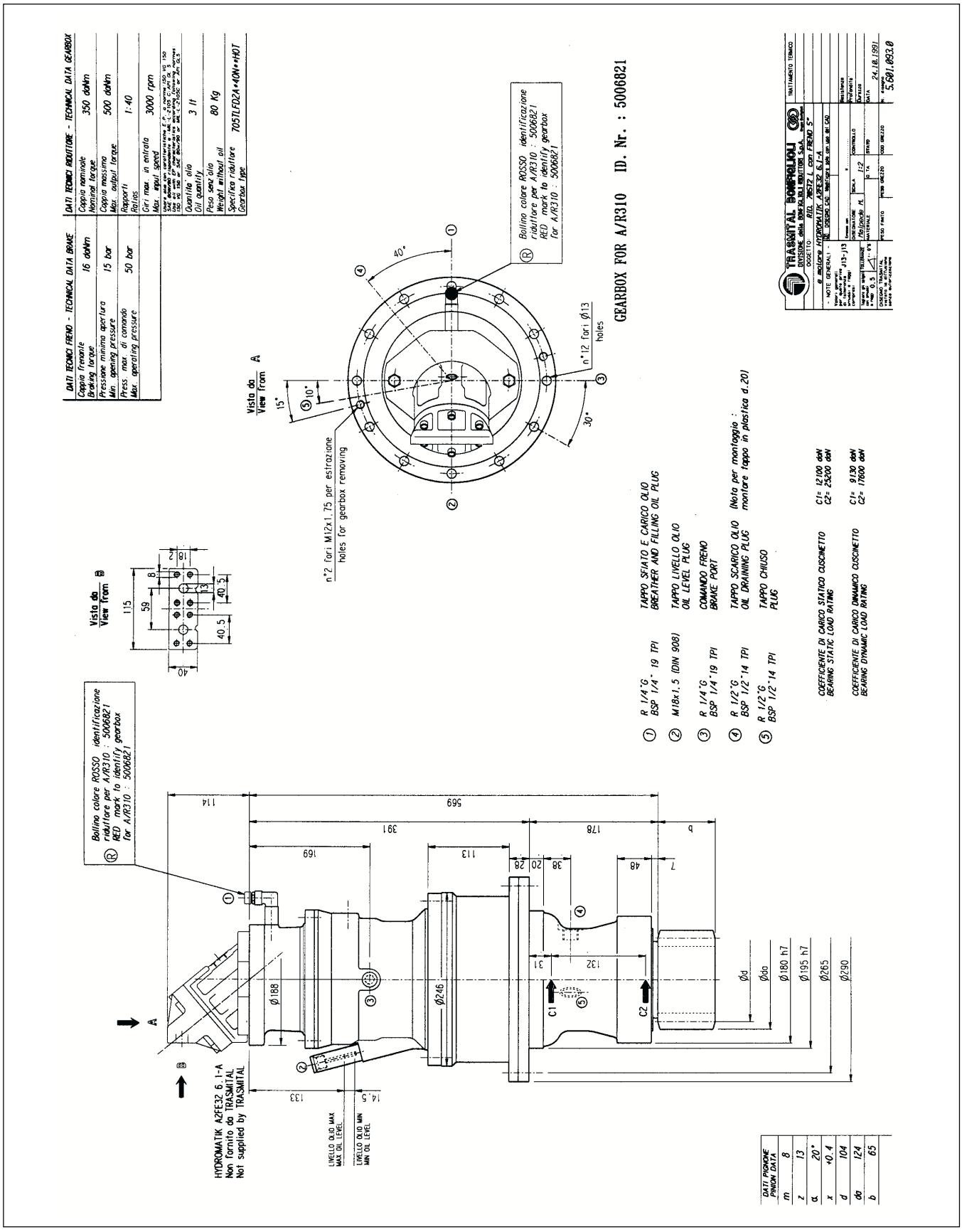
Section O
INSTALLATION, USE AND MAINTENANCE ROTATION GEAR MOTOR

SECTION INDEX

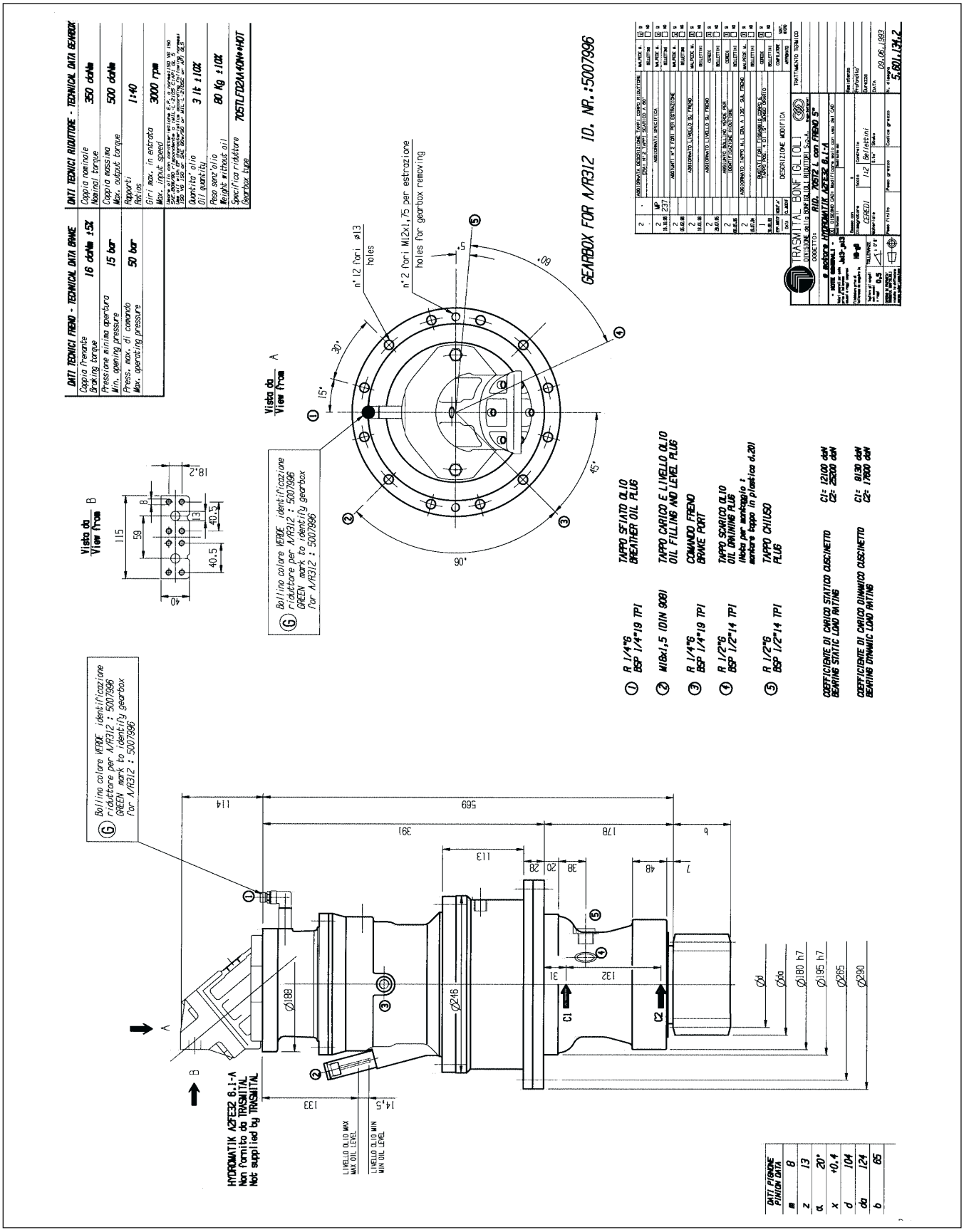
DATA PLATE 5
NOTES 6
INSTALLATION 7
LUBRICATION 9
PLACING IN SERVICE 11
MAINTENANCE 11



Dwg.1 - Exploded view of the gear motor

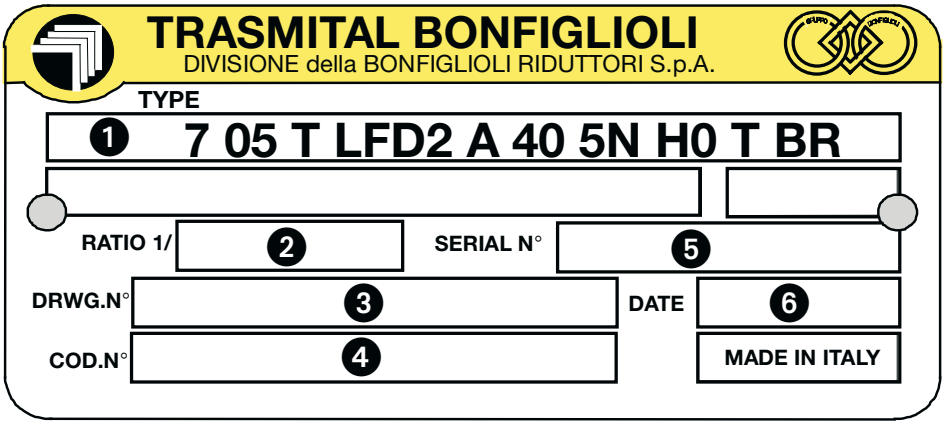


Dwg.2a - Gear motor installation drawing



Dwg.2b - Gear motor installation drawing

DATA PLATE



Ref.	Data	Description	Notes
1	**TYPE**	Gear motor description	**7 05 T LFD2 A 40 5N H0 T**
2	**RATIO 1:**	Reduction ratio	**1:40**
3	**DRWG.N°**	Installation drawing	**5.601.093.0**
4	**COD.N°**	Product code	**2T260100542**
5	**SERIAL N°**	Product serial number	
6	**DATE**	Year of manufacture	

Attention: The data plates must always be kept readable in all elements in which they are contained.
Always use the identification data (at least the serial number) when contacting the manufacturer for spare parts, information and assistance.

Note: The complete and constant observance of the instructions contained in this technical manual guarantees the best operating conditions and a longer lifetime to the gear motor.
Photos and drawings are given as an example to describe the operations to be carried out on the gear motor.
Also if the gear motor you have purchased is not the one shown in the illustrations of this technical manual, the characteristics and the sequence of the operations described are the same.

NOTES

SUPPLY CONDITIONS

TRASMITAL BONFIGLIOLI supplies its gear motors in the following standard conditions:

- Already prepared to be installed in the mounting position specified in the order
- **Without lubricating oil** and anointed inside with a thin coat of oil used during the final testing of the reduction gear and compatible with the recommended oils (Tab.1)
- Painted with a grey (**RAL 7035**) anti-oxidation primer coat to be finished as you like.

Coupling surfaces are not painted.

The final painting shall be done by the customer.

- Tested
- Packed in special boxes.

TRANSPORTATION

During transportation, it is advisable to handle the reduction gears as fragile items to avoid damage.
During internal transportation of unpacked reduction gears avoid crashes so as not to damage delicate internal parts.

STORAGE

For a correct storage of the product, follow these precautions:

- Do not store the product outside or in areas exposed to bad weather conditions or excessive humidity
- Always place a wooden surface or the like between the floor and the product to avoid any direct contact with the ground
- If the expected storage period is longer than 60 days, the coupling surfaces such as flanges, shafts and joints shall be protected with a suitable anti-oxidation product **(SHELL ENSIS FLUID SDC or the like)**.

In case of storage periods longer than 6 months, do the following preliminary operations:

- Smear the external machined parts and the coupling parts with some grease to prevent oxidation
- Place the reduction gears with the vent plug in the highest position and fill with oil.

Before any use, fill the reduction gears with the correct amount of recommended oil.

INSTALLATION

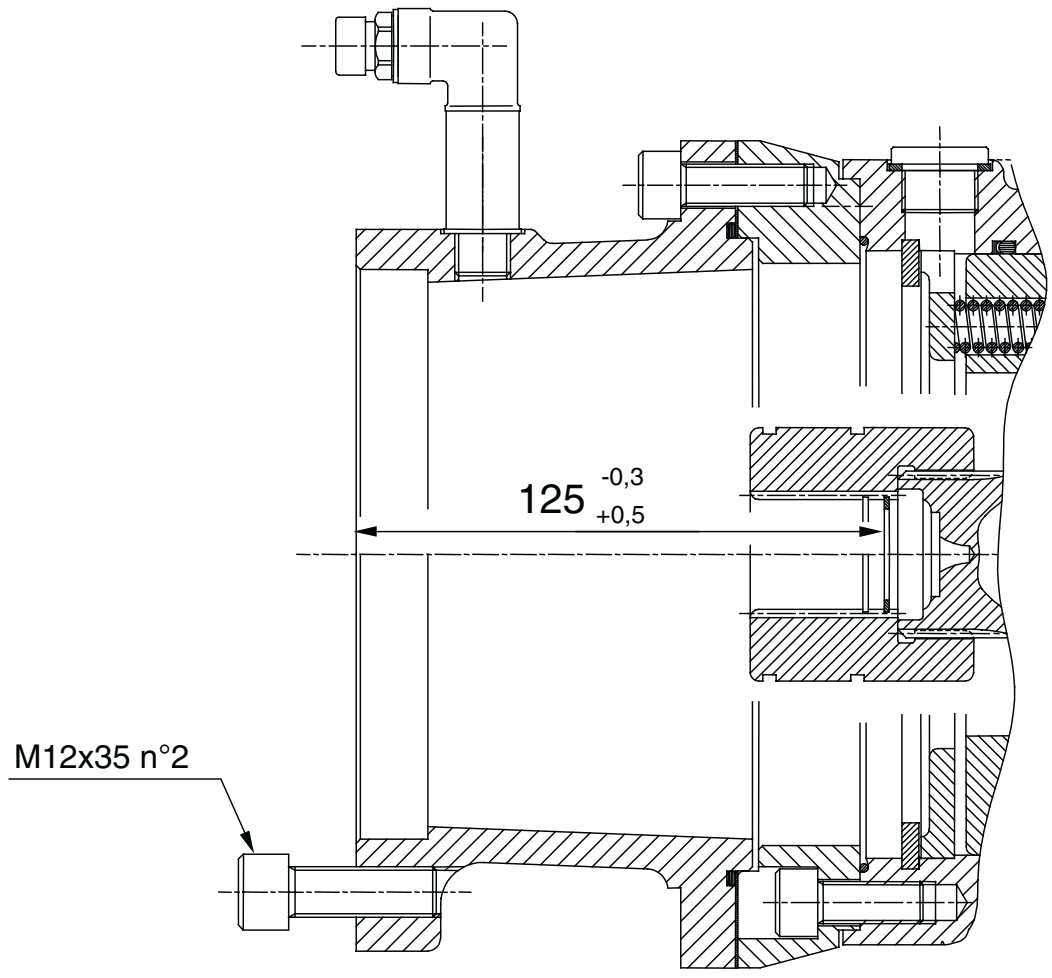
INSTALLING THE HYDRAULIC MOTOR

Check that the coupling surfaces and the seat where the hydraulic motor shall be installed are clean and without burrs.
Before mounting the hydraulic motor, check the axial length of the reduction gear from the stop of the motor flange (46) to the stop of the snap ring (33) placed in the motor joint (32) with a gauge:

Axial length = 124.7-125.5 mm.

Fit the O-ring (44), supplied with the reduction gear, to the special seat in the hydraulic motor and assemble the motor to the reduction gear paying special attention to the seal already mounted.
Using a dynamometric wrench, tighten the 2 hexagon socket screws M12x35, resistance class 8.8 (45), to 86 Nm.

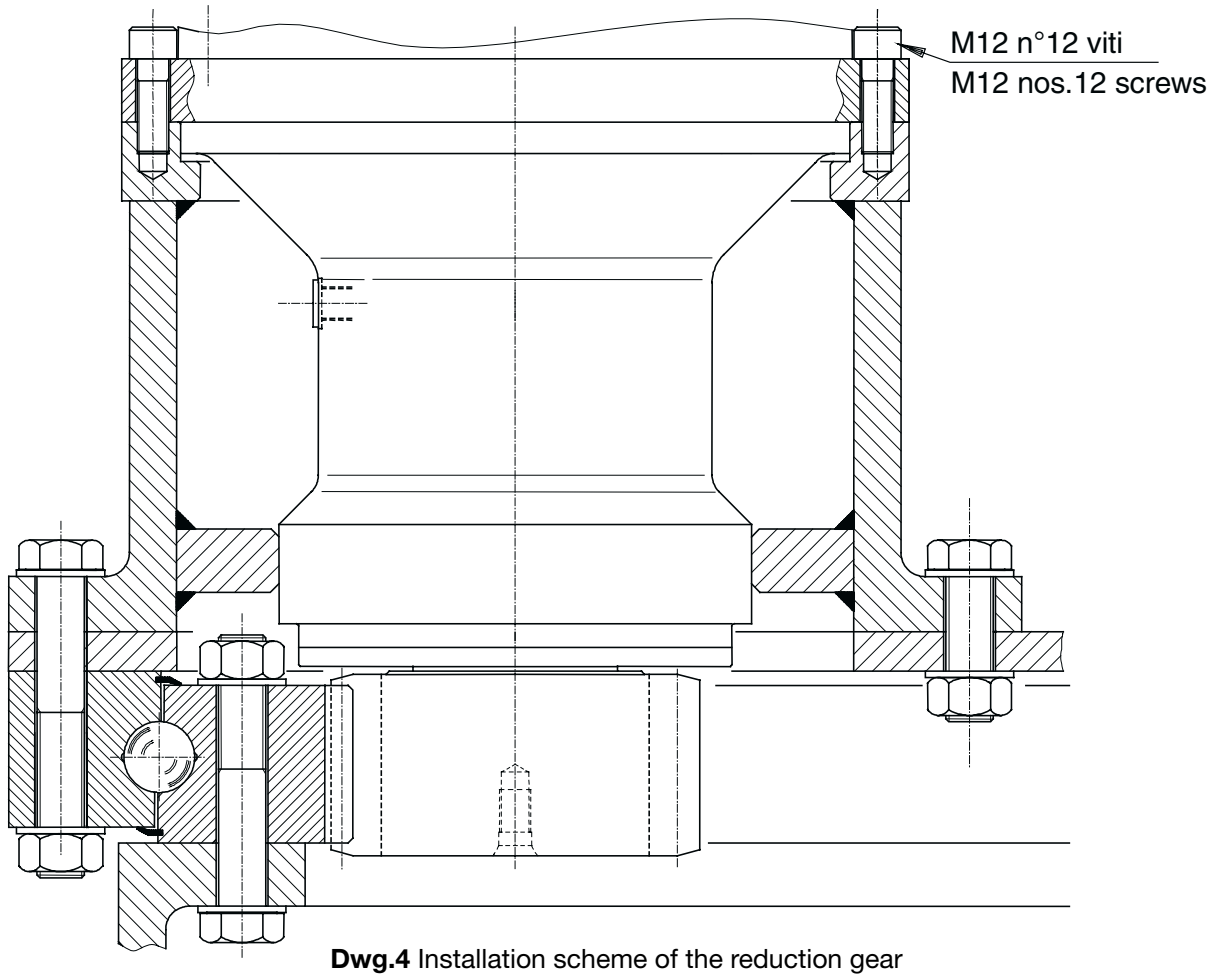
Attention: *Do not remove the plastic plugs from the hydraulic motor until the connection of the flexible hoses.*



Dwg.3 Check of the axial length

INSTALLING THE REDUCTION GEAR ON THE MACHINE

a) Clean the coupling areas removing any protective coats or paints and install the reduction gear on the machine.
b) Fix the reduction gear to the frame with 12 screws M12 with minimum resistance class 8.8, tightened to 86 Nm with a dynamometric wrench.



Dwg.4 Installation scheme of the reduction gear

CONNECTING THE BRAKE

The reduction gear is equipped with a safety negative multidisc brake with hydraulic release (parking brake). For the opening of the brake, connect the control pipe to the threaded hole on the brake body (thread 1/4"G - BSP 19 threads per inch - dwg.2a-2b)

BRAKE TECHNICAL DATA		
Steel discs	*[qty]*	**2**
Sintered discs	*[qty]*	**3**
Springs	*[qty]*	**12**
Minimum pressure for complete opening	*(bar)*	**15±10%**
Maximum brake control pressure	*(bar)*	**50**
Braking moment	*(Nm)*	**160±10%**

LUBRICATION

REDUCTION GEAR LUBRICATION

The lubrication of motor and reduction gear is separated.
The lubrication of the reduction gear is of splash type in an oil bath.
We recommend to use an oil for gear transmissions with **SAE 80W/90** viscosity and **EP** characteristics fulfilling the **MIL-L-2105 C & API GL 5** standards.
During operation and for very short periods the oil can reach, but never exceed, an intermittent temperature of 85-90°C.

List of recommended oils conform to SAE 80W/90 & SAE 85W/140 standards with API GL5 characteristics		
Ambient temperature	**-10°C / +30°C (SAE 80W/90)**	**+20°C / +45°C (SAE 85W/140)**
Producers	**Oil type**	
SHELL	**SPIRAX HD**	**SPIRAX HD**
AGIP	ROTRA MP	ROTRA MP
ARAL	GETRIEBEOL HYP	GETRIEBEOL HYP
BP-MACH	HYPOGEAR EP	HYPOGEAR EP
CASTROL	HYPOY	HYPOY
CHEVRON	UNIVERSAL GEAR LUBRICANTE	UNIVERSAL GEAR LUBRICANTE
ELF	TRANSELF8	TRANSELF8
ESSO	GEAR OIL GX PONTONIC MP	GEAR OIL GX PONTONIC MP
I.P.	PONTIAX HD	PONTIAX HD
MOBIL	MOBILUBE HD	MOBILUBE HD
TOTAL	TRASMISSION TM	TRASMISSION TM

Tab.1 List of recommended oils

FILLING WITH OIL

Attention! The reduction gear is supplied without oil but already prepared with filler, drain and level plugs. Before placing the reduction gear in service, proceed with the filling. *Unscrew the oil filler with M18x1.5 dipstick (dwg.2a 2b) and add new oil through the special hole till reaching the level between the min and max marks.*
Tighten the oil filler and start the reduction gear. Wait for a few seconds and check the oil level. Add new oil if necessary.

Indicative oil quantity = 3 litres ±10%.

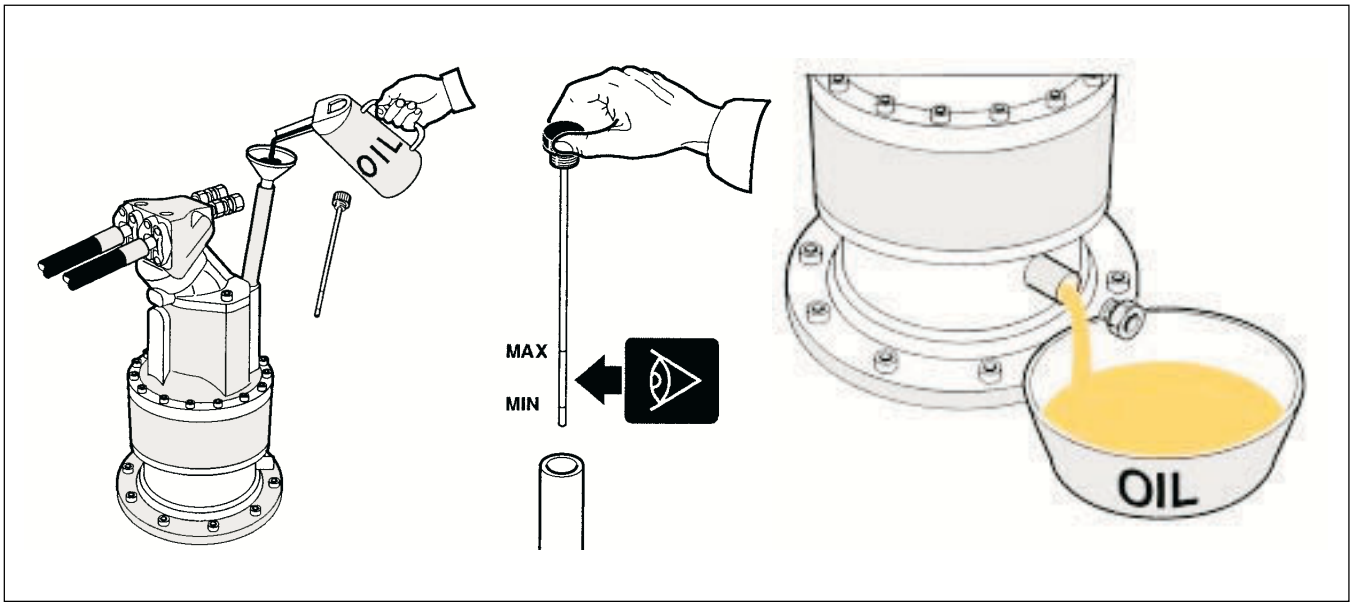
DRAINING THE OIL

Loosen the R1/2"G drain plug (dwg.2a-2b) and drain off the oil. Do this operation when the oil is warm.

Note: If the structure of the machine does not allow to access to the drain plug easily, prepare an extension from the drain plug to the outside of the machine when installing the reduction gear.

Attention! It is recommended not to mix mineral oils with synthetic oils and vice versa.

Dwg.5 Oil filling, level and drain scheme



PLACING IN SERVICE

Run the gear motor after having filled the motor body with hydraulic oil. Eliminate any residual air from the hydraulic circuit opening the vent valves and letting the oil flow out. Stop when oil without foam starts flowing out. Add new oil if necessary.
The presence of residual air in the hydraulic circuit is indicated by the presence of foam in the tank. Air causes motor jerks and an excessive noise of motor and valves.
Run the gear motor at a slow speed, check its correct functioning and the absence of noise and vibrations; after that, start increasing the speed gradually.
Do not reach the maximum pressure before all particles and impurities have been filtered.

During the first operating phases check that:

- the revolution number and the rotation direction are correct
- the motor runs regularly and there are no noise and vibrations
- the oil temperature does not reach too high values.

During normal operation, check that:

- there are no oil leaks
- the lubricating oil level is correct
- there are no problems.

MAINTENANCE

In case of normal running, the gear motor does not need any maintenance, except for the check and change of the oil. Maintenance is only necessary in case of anomalous running.
Do the following checks and jobs at the times scheduled below:

Screw tightening	After the first 50 hours of work of the gear motor
Oil level	Every 100 hours of work of the gear motor
First oil change	After the first 150 hours of work of the gear motor
Subsequent oil changes	Every 1000 hours of work of the gear motor or once a year

If an important and complex maintenance is necessary, refer to the EXPLODED VIEWS and the SPARES LISTS supplied upon request and the instructions contained in this technical manual.
If other instructions are required or in case of special problems, do not hesitate to contact your nearest dealer or our technical department.

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Sect. P
3B6
OVERLOAD WARNING SYSTEM

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ACCESS PROCEDURES TO μMACXxx LOAD MONITORING SYSTEM (LMI)

This system has been conceived and developed to offer two different levels of functionality of access to internal data, according to the actions to be done.

The basic access level (Operator) does not require any password; this one, in fact, is only supplied to TEREX Technical Service Personnel for possible interventions (troubleshooting and repair).

1st LEVEL - OPERATOR:

Without needing PASSWORD (also see the operator Manual) any working information of the machine is available through several monitoring given by the display panel.
Starting from basic working data: lifted load, max admitted load, outreach, working conditions, tilting percentage.
Pressing the ENTER key it is possible to display other machine working data: boom angle and length.
Pressing ENTER again it will be possible to show the hydraulic pressure values at their 4 measuring points, (two on the main cylinder, and two on the compensation cylinder).
The subsequent pressure of the ENTER key gives more information about the transducers signals converted into digital values, and about ON/OFF Inputs and Outputs from/towards outside status.
The aim is to give the Operator the possibility of entering these readings, communicating them to the Technical Assistance Department, giving relevant data, possibly avoiding a direct Service on site.
The Operator can also find some information to solve easy troubles in his Operator Manual.

2nd LEVEL: (PASSWORD) - SENSOR REPLACEMENT

ONLY TECHNICAL ASSISTANCE DEPT. AND AUTHORIZED DEALERS

The second level corresponds to the information contained in this Technical Assistance Manual explaining all details referred to system components (Main Unit, Transducers, Display Panel), troubleshooting codes introduction, and the useful information to resolve the problems without specific tools (except a voltmeter).
To this end a **PASSWORD** is given, allowing to enter all diagnostic functions and transducer calibration (angle and length) in case of their replacement, without needing any PC or programming tool.
As far as Pressure Transducers are concerned, please note that they do not need any calibration, as they are totally interchangeable.

FINE CALIBRATION. -SELECTION OF PRESET ATTACHMENTS, DOWNLOAD OF NEW LOAD CHARTS SENT VIA E-MAIL BY THE MANUFACTURER:

ONLY TECHNICAL ASSISTANCE DEPT.

This means the complete machine calibration, that is done at the first start-up of the machine.
To this end, a **PASSWORD** is given, allowing to enter the functions of the program, as the fine calibration of geometrical data and lifted load, and to perform their on-site calibration.
These calibrations do not need the use of a PC.

"SAVE" PROGRAM – CALIBRATION DATA SAVING FROM LMI TO PC AND DATA DOWNLOAD FROM PC TO LMI (PC REQUIRED)

The PASSWORD gives you access to this program to save machine calibration data.
Through the RS232 serial connection, which links the 3B6 load moment indicator to the PC (LMI to PC), and this software, it is possible to save all original calibration data of the machine on the PC or a floppy-disk (PC to FLOPPY DISK), to be able, afterwards, to re-load them into the LMI - see page 75.

3rd LEVEL: LOAD CHARTS LOADING AND ORIGINAL PARAMETERS PROGRAMMING

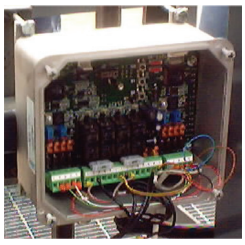
ONLY TEREX TECHNICAL ASSISTANCE DEPT.

On account of the responsability related to programming, this level in not available even to TEREX TECHNICAL ASSISTANCE PERSONNEL.

LOAD MOMENT INDICATOR COMPONENTS LOCATION ON THE MACHINE



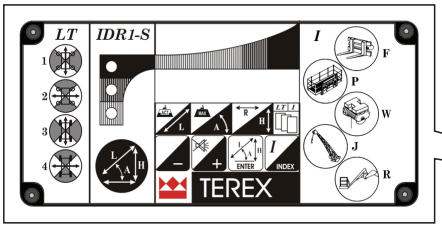
Load cell



EXCEL unit:
in the basket



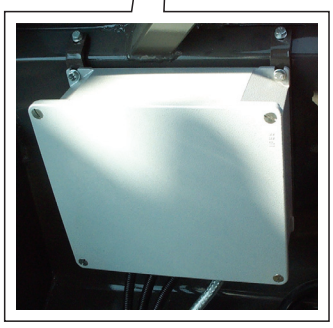
Angle and Length sensor: left side of the boom



Control panel: in the cabin



4 pressure transducers:
on lifting and
compensation cylinders



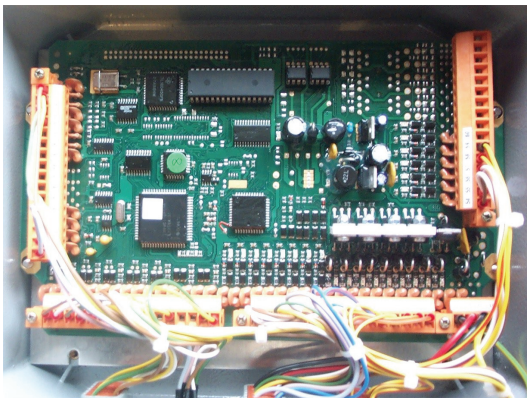
Main Unit
in the cabin

MAIN CONTROL UNIT
CODE: UMMST02-3/XX

The UMMST02-1/XX Main Control Unit is equipped with memories for Data and program storage; either not erasable EPROM type or erasable EEPROM type for calibration parameters storage.
Input/Output circuits are self-protected against overloads and short circuits.



Power supply internal circuits are designed to operate at low voltage and are provided with all protections for hard environment.
The UMMST02-1/XX Main Control Unit is provided with all EMC necessary components.



GENERAL CHARACTERISTICS

POWER SUPPLY

• DC	10-28 V
• Current absorbed without load	0,35A

INPUTS / OUTPUTS

- **14 digital inputs**
- **8 digital outputs**
- **6 (+2) analog inputs**
- Watch Dog Dynamic Output

• ON/OFF inputs voltage working range:	10-28 VCC
• Static outputs current:	2A
• Proportional analog inputs voltage:	0- 5V

- Serial RS232 and CAN BUS (option)
- Clock and Buffer battery (option)
- Circuits epoxy resin coating
- 8 KB E2PROM for Data Recording (32Kb Option)

MECHANICAL CHARACTERISTICS

MECHANICAL DIMENSIONS

• Case:	253 x 217 x 91 mm
• Fixing holes:	226 x196 mm

VIBRATIONS

• Continuous	5g from 20 to 400Hz over 3 axes
• Shock:	10g

ENVIRONMENTAL

• Salt spray resistance	over 48 Hours

TEMPERATURE

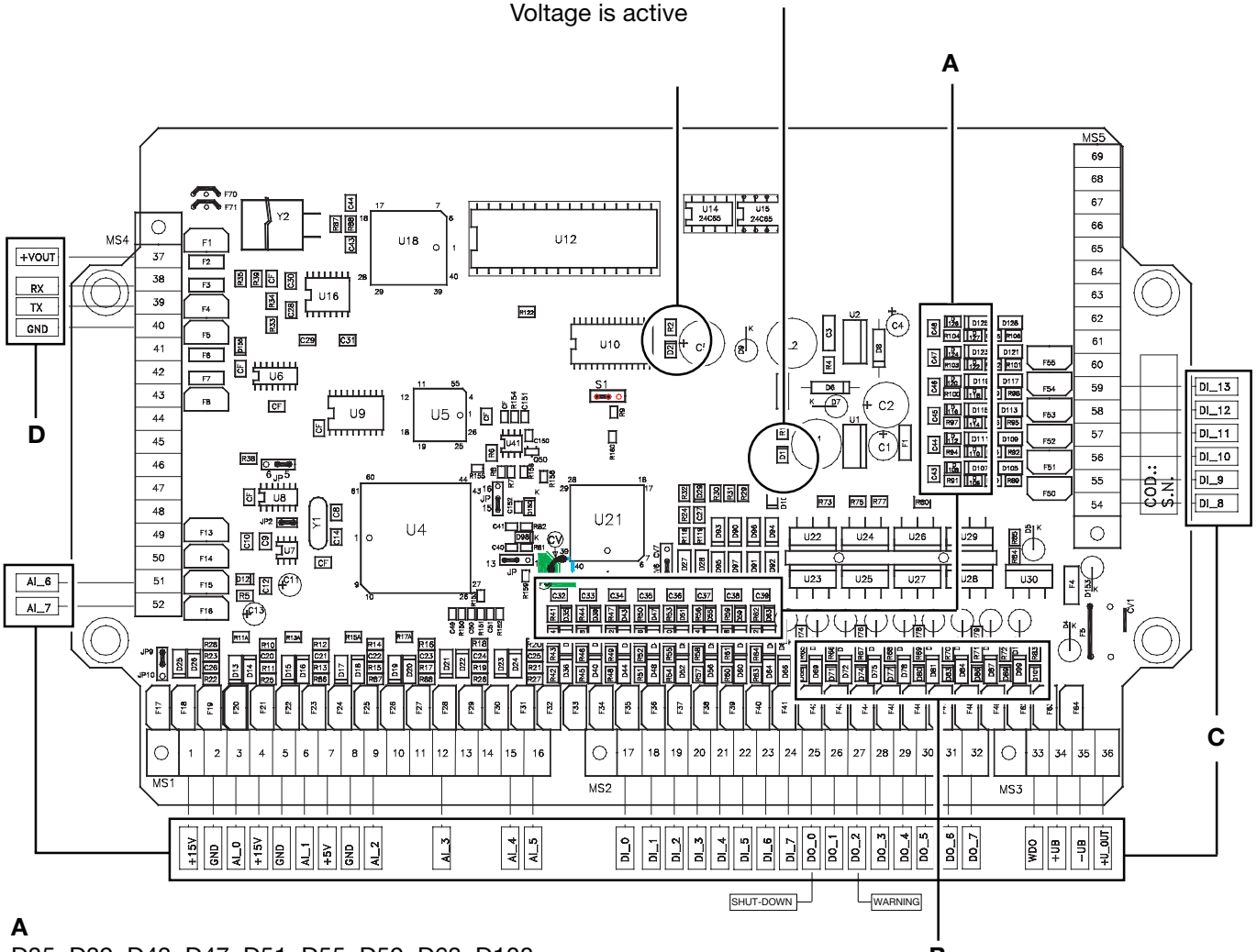
• Working range:	-30 -+70°C
• Srorage range:	-45 - +85°C

MAIN CONTROL UNIT - CONNECTIONS AND SIGNALS

D1 = RED LED
When lit means that +5V Voltage is active
Note:
D1 and D2 shall always be lit when the system is ON

D2 = RED LED
When lit means that +15V Voltage is active

LENGTH AND ERROR



A
D35, D39, D43, D47, D51, D55, D59, D63, D108, D112, D116 , D120, D124, D126 =RED LED's
They show the INPUT status
ON = ACTIVE INPUT

B
D68, D71, D74, D77, D80, D83, D86, D89 = RED LED's
They show the OUTPUT status
ON = ACTIVE OUTPUT

C
EXTERNAL WIRING
See page 75

D
PC (LAPTOP) CONNECTIONS

NOTES:

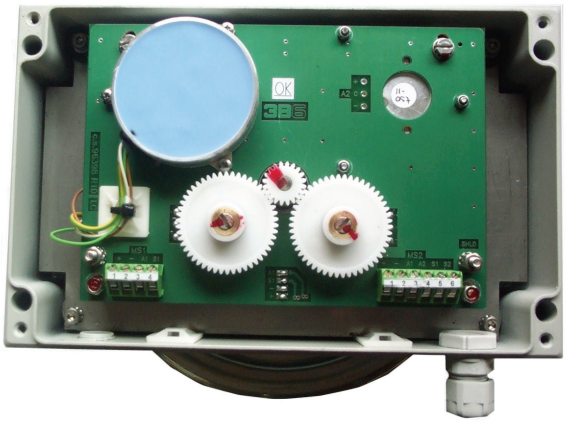
CODE	DIODE	PIN	FUNCTION
INPUT0	D35	17	OUTRIGGERS
INPUT1	D39	18	FRONT
INPUT2	D43	19	BASKET
INPUT3	D47	20	ROBOT
INPUT4	D51	21	LOWER
OUTPUT0	D68	25	CUT-OFF
OUTPUT2	D74	27	HIGH ANGLE
OUTPUT3	D77	28	LOW ANGLE

LENGTH AND ANGLE TRANSDUCERS CODE: CIT-2PAS-C3/XX

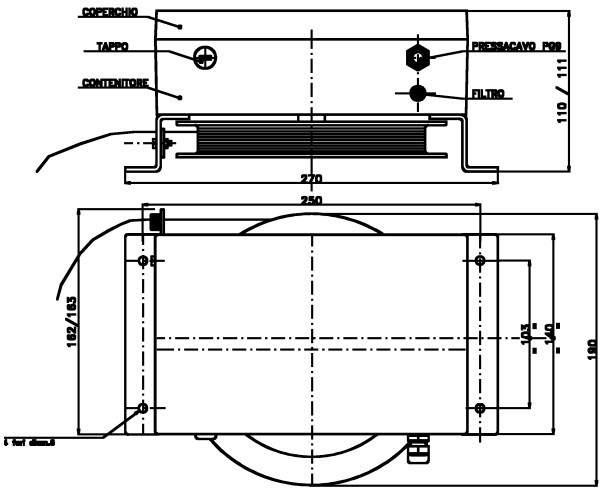
The boom length transducers are formed by a cable reel on which a cable is wound; the free side of the cable is attached to the boom head (or another intermediate elements).
Extending the boom, the cable unwinds thanks to a potentiometric sensor measuring the extension length.
While using the machine, it is always necessary to carefully check the cable unwinding along the boom, because it can be subject to accidental break if collided.
The replacement of this element has to be done by Qualified Personnel only.

The angle sensor (inside the cable reel) detects the absolute angle of the boom thanks to a potentiometric sensor.
Analog signals from above potentiometers are used by the LMI to compute the boom geometrical data.
The replacement of this element has to be done by Qualified Personnel only.

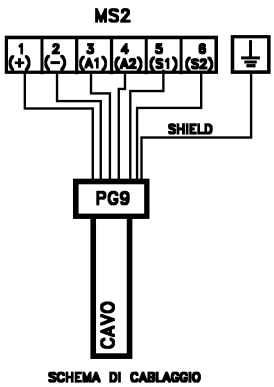




OVERALL DIMENSIONS



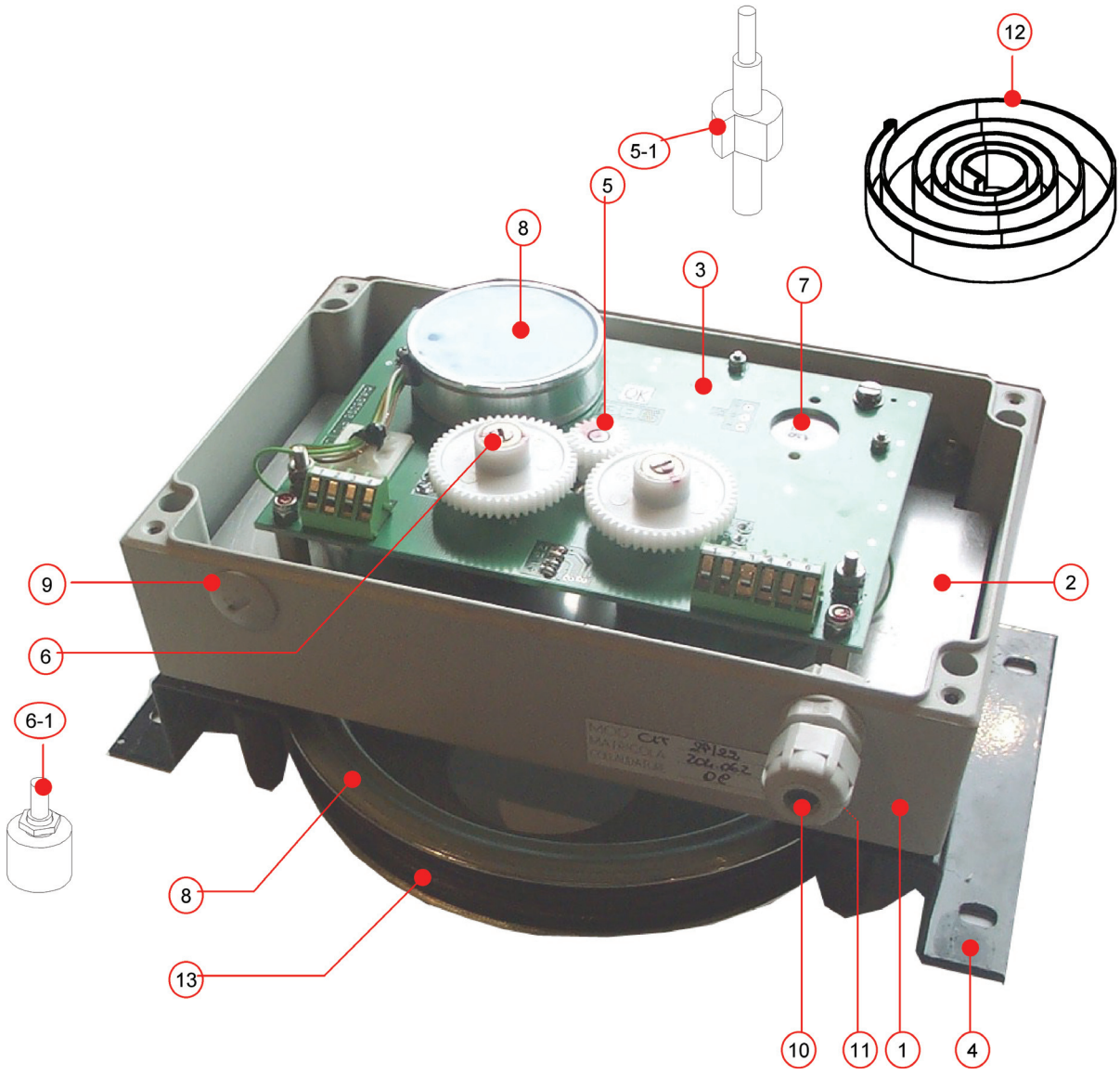
WIRING DIAGRAM



SCHEMA DI CABLAGGIO

MORSETTIERA MS2

MORSETTO	SEGNALE	
1 (+)	+V	ALIMENTAZIONE
2 (–)	–V	
3 (A1)	ANGOLO1	
4 (A2)	ANGOLO2	
5 (S1)	SFILO 1	
6 (S2)	SFILO2	



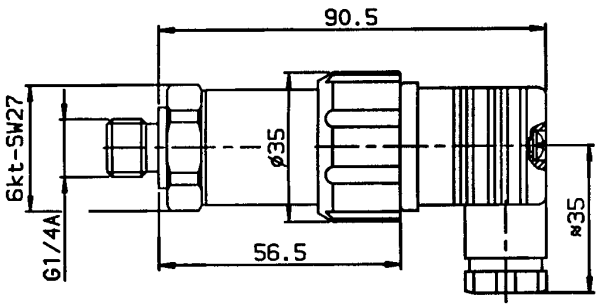
Description

1 Case
2 Base
3 Printed circuit
4 Z-bracket
5 Pinion
5-1 Shaft
6 Clutch
6-1 Potentiometer
7 Angle 1 sensor
8 Angle 2 sensor
9 Cap
10 Nylon cable ring
11 Filter
12 Spring
13 Cable

PRESSURE TRANSDUCERS
CODE : Y11 4745-350

The Pressure transducers detect the pressure into the lifting and lowering chambers; typically 2 sensors are required for measuring the differential pressure inside cylinders. By these values, weight computing is taken by the Main Control Unit.
These sensing devices detect the pressure by means of a sensor, which transforms the measured pressure into a direct voltage proportional to the pressure itself.
An on-board amplifier is included in the transducer itself.
Any possible replacement of these elements is very easy because of their are complete compatibility and must be done by Qualified Personnel.

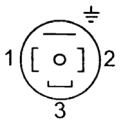




MECHANICAL DIMENSIONS

TECHNICAL CHARACTERISTICS

PIN CONNECTIONS



PIN	Three wires
1	+UB
2	Output signal 0.5 .. 5.5 V
3	0V

INPUT DATA

• Measuring range	350 bar
• Overload range	800 bar
• Overload pressure	2000 bar
• Parts in contact with oil	Stainless steel ; Viton seals

OUTPUT DATA

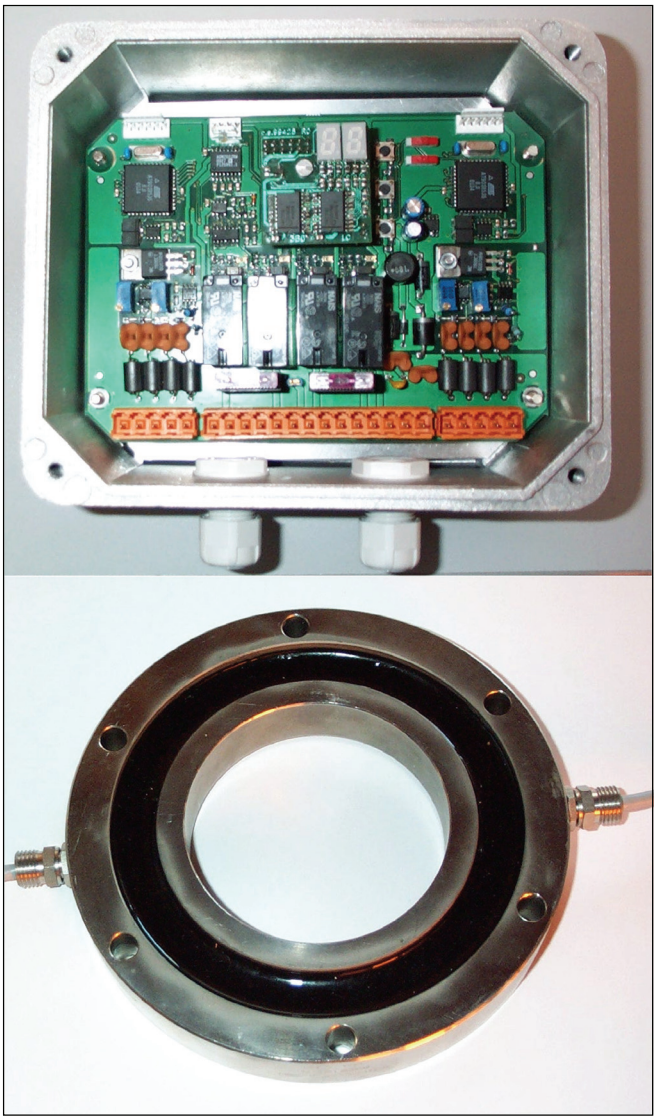
• Signal	0.5 ... 5.5V
• Thermal compensation	Max ≤ 0.15%/10K Typ. ≤ 0.08%/10K
• Linearity	Max ≤ 0.3%FS Typ. ≤ 0.1%FS
• Hysteresis	Max ≤ 0.1%FS Typ. ≤ 0.05%FS
• Repeatibility	≤ 0.05%FS

ENVIRONMENTAL CONDITIONS

• Nominal temperature range	-25 ...+85°C

EXCEL
CODE : EXCEL-X/XX

The EXCEL system is used as a load moment indicator on aerial man-platforms and it activates when the limits indicated by the manufacturer are exceeded.
The system has two channels (with double strain gauge and double electronic controls) as required by the directive.



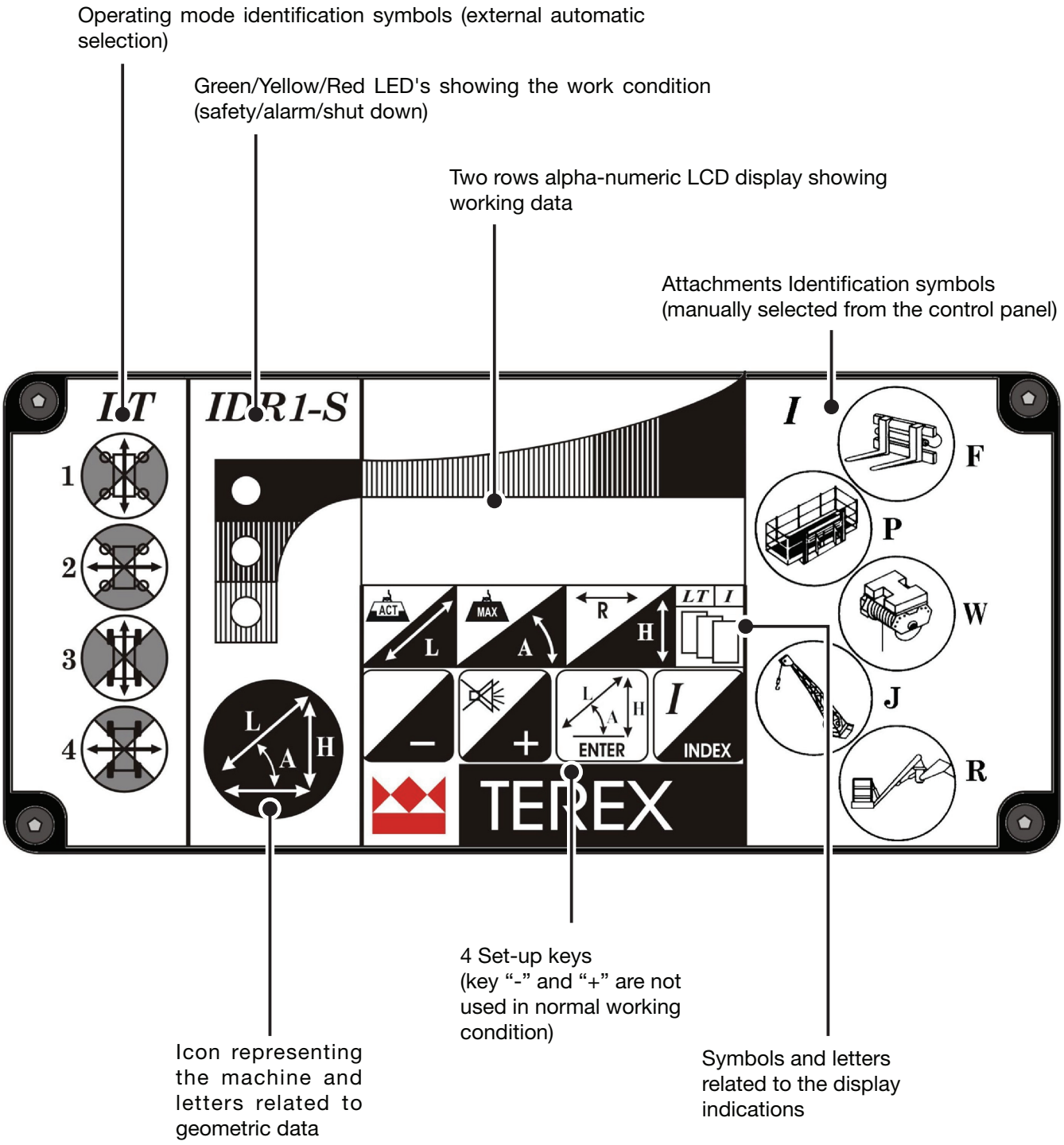
Technical data
General characteristics

- RISC microcontroller with integrated Flash and EEprom memory-chips
- Protection against power polarity inversion
- Block alarm outputs through 8A relays. Exchange contact available.
- Pre-alarm outputs through 8A relays. Exchange contact available.
- Load cell integrity check.
- Relay functioning check.
- Digitally settable intervention thresholds.
- Relay command enabled by dynamic separated Watchdog circuit.

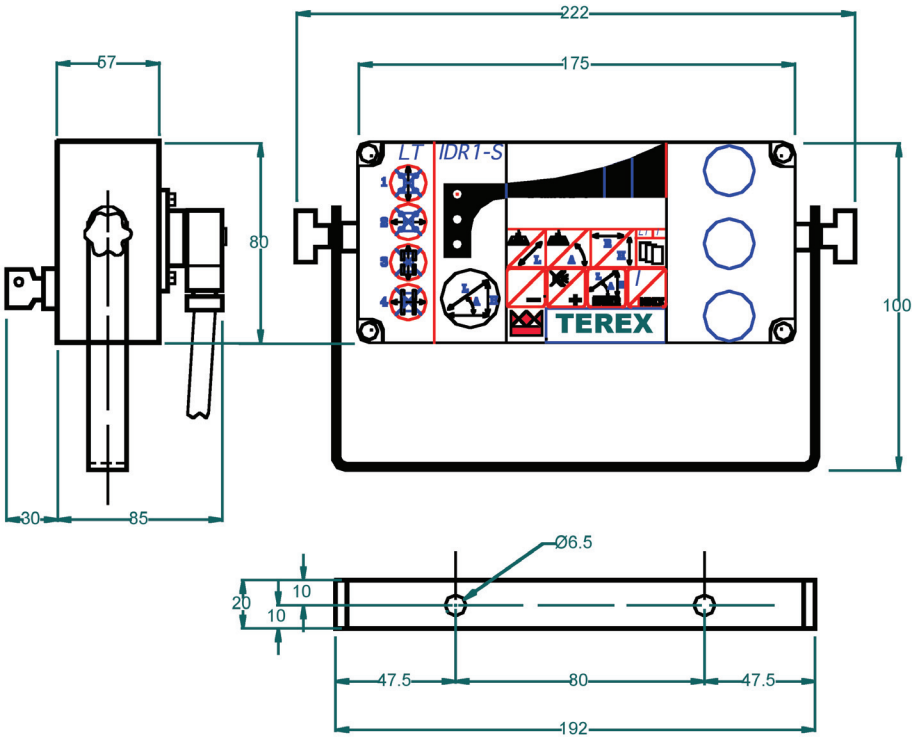
Mechanical and environmental characteristics

- Conform to EMC standard
- CE-marking
- Operating temperature ranges: -20 °C to +70 °C
- IP65 sealing protection
- Small-size box: 167 x 142 x 81 mm
- Signal access through fairleads and terminal strip.

CONTROL PANEL
CODE: IDR1S07-1M/xx



CONTROL PANEL: dimensions, characteristics

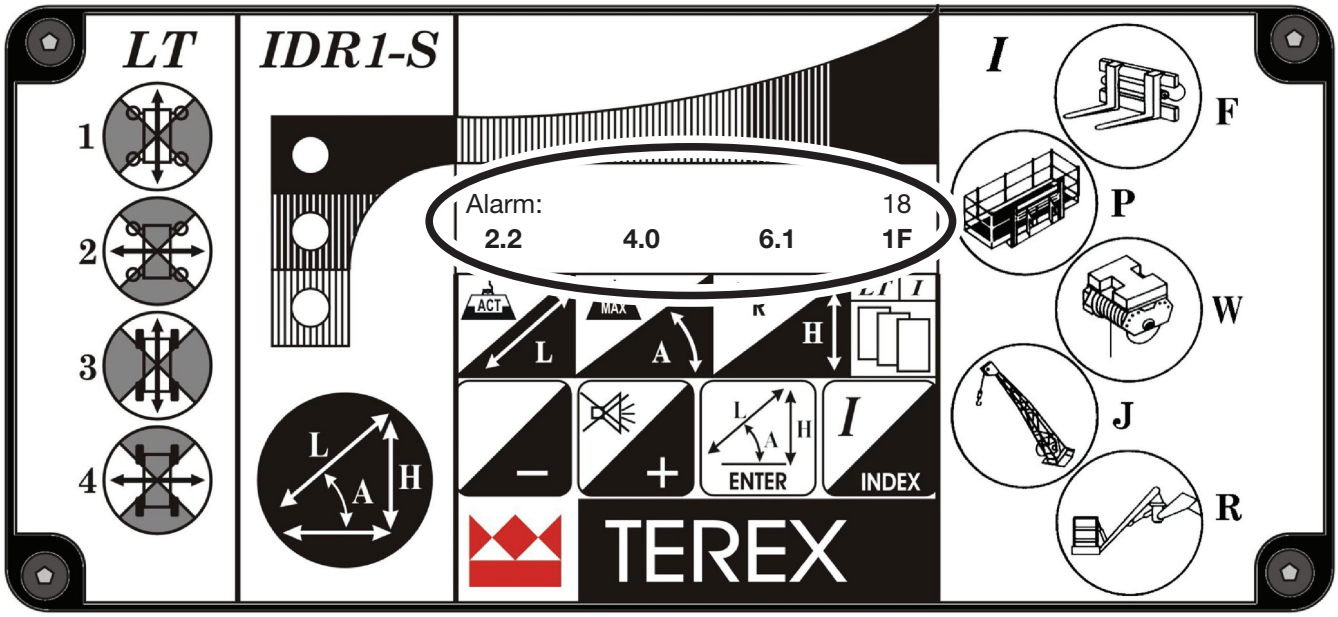


TECHNICAL DATA

• Power supply	8 - 24 V
• Working temperature range	- 20° +70°
• Microcontroller structure	16 bit
• Typical load precision	3,5%
• Working range precision	1%
• Connection to main unit	RS-232/C

TROUBLESHOOTING

The first thing to do during troubleshooting is to find the trouble signalled by the machine user.
Thanks to the powerful auto-diagnostic system of the load moment indicator which detects the troubles of the transducers, the break of cables and internal failures of electronic components we can identify the source of the problem.
When a trouble is detected, the LMI sets to safety conditions blocking the dangerous manoeuvres and, at the time, the control display shows an alarm message in the line at top instead of the % bar.
Thanks to the alarm code, we can identify the kind of trouble.



The alarm codes are listed on the following pages with their relevant causes and some hints to restore a correct operation.

ALARM CODES AND ACTIONS TO BE TAKEN

Alarm code	Description	What to do
1	Memory data not reliable	• Switch the system off and on. If the alarm persists, contact TEREX Technical Assistance to: • Verify that E2PROM chip is fitted properly in its socket. • Re-enter data and save them again • Replace the E2PROM chip and recalibrate the machine
2	Angle 1 sensor reading lower than the minimum value	• Verify that the wiring and the connectors are not in short circuit If the alarm persists, contact TEREX Technical Assistance to: • Verify the angle transducer integrity
3	Angle 1 sensor reading higher than the max value	• Verify that the cable or the connector wiring is not open If the alarm persists, contact TEREX Technical Assistance to: • Verify the angle transducer integrity
4	Reading of boom length 1 transducer lower than the minimum value	• Verify that the wiring and the connectors are not in short circuit If the alarm persists, contact TEREX Technical Assistance to: • Verify the length transducer integrity
5	Reading of boom length 1 transducer higher than the max value	• Verify that the cable or the connector wiring is not open If the alarm persists, contact TEREX Technical Assistance to: • Verify the length transducer integrity
6	Extension 1 below set value	• Verify that the cable or the connector wiring is not open If the alarm persists, contact TEREX Technical Assistance to: • Verify the length transducer integrity.
7	Extension 2 below set value	• Verify that the cable or the connector wiring is not open If the alarm persists, contact TEREX Technical Assistance to: • Verify the length transducer integrity.
8	Reading pressure of the main cylinder (bottom side) lower than the minimum	• Verify that the wiring and the connectors are not in short circuit If the alarm persists, contact TEREX Technical Assistance to: • Verify the pressure transducer integrity
9	Reading pressure of the main cylinder (bottom side) higher than the maximum	• Verify that the cable or the connector wiring is not open If the alarm persists, contact TEREX Technical Assistance to: • Verify the pressure transducer integrity
10	Reading pressure of the main cylinder (rod side) lower than the minimum	• Verify that the wiring and the connectors are not in short circuit If the alarm persists, contact TEREX Technical Assistance to: • Verify the pressure transducer integrity
11	Reading pressure of the main cylinder (rod side) higher than the maximum	• Verify that the cable or the connector wiring is not open If the alarm persists, contact TEREX Technical Assistance to: • Verify the pressure transducer integrity
12-13 14-15	Not Used	
16	Block output not verified	• Turn the disconnect key of the overload warning system back to position "0"
17	Control on plaftorm lock relay not verified	• Verify the wiring on the machine board

Alarm code	Description	What to do
18	Reading pressure of the compensation cylinder (bottom side) lower than the minimum.	• Verify that the wiring and the connectors are not in short circuit If the alarm persists, contact TEREX Technical Assistance to: • Verify the pressure transducer integrity
19	Reading pressure of the compensation cylinder (bottom side) higher than the maximum.	• Verify that the cable or the connector wiring is not open If the alarm persists, contact TEREX Technical Assistance to: • Verify the pressure transducer integrity
20	Reading pressure of the compensation cylinder (rod side) lower than the minimum.	• Verify that the wiring and the connectors are not in short circuit If the alarm persists, contact TEREX Technical Assistance to: • Verify the pressure transducer integrity
21	Reading pressure of the compensation cylinder (rod side) higher than the maximum.	• Verify that the cable or the connector wiring is not open If the alarm persists, contact TEREX Technical Assistance to: • Verify the pressure transducer integrity
22	Not used	
23	Redundance not verified (only with double board)	
24	Cell reading by EXCEL not congruent	• Verify the platform wiring and the proper mounting of the load cell on the platform
25 26-27 28-29	Not used	
30	End of stroke matching alarm with outriggers out	Verify the inputs, verify the board connections, verify the single transducers
31	End of stroke matching alarm with outriggers outriggers 50% out	Verify the inputs, verify the board connections
32	Angle matching alarm	Verify the values
33	Length matching alarm	Verify the values
34	Angle 2 sensor reading lower than the minimum value	• Verify that the wiring and the connectors are not in short circuit If the alarm persists, contact TEREX Technical Assistance to: • Verify the angle transducer integrity
35	Angle 2 sensor reading higher than the maximum value	• Verify that the cable or the connector wiring is not open If the alarm persists, contact TEREX Technical Assistance to: • Verify the angle transducer integrity
36	Reading of boom length 2 transducer lower than the minimum value	• Verify that the wiring and the connectors are not in short circuit If the alarm persists, contact TEREX Technical Assistance to: • Verify the length transducer integrity
37	Reading of boom length 2 transducer higher than the maximum value	• Verify that the cable or the connector wiring is not open If the alarm persists, contact TEREX Technical Assistance to: • Verify the length transducer integrity

Alarm code	Description	What to do
38-39	Not used	
40	CRC error in EPROM page 0	• Contact TEREX Technical Assistance
41	CRC error in EPROM page 1	• Contact TEREX Technical Assistance
42	CRC error in EPROM page 2	• Contact TEREX Technical Assistance
43	CRC error in EPROM page 3	• Contact TEREX Technical Assistance
44	CRC error in EPROM page 4	• Contact TEREX Technical Assistance
45	CRC error in EPROM page 5	• Contact TEREX Technical Assistance
46	CRC error in EPROM page 6	• Contact TEREX Technical Assistance
47	CRC error in EPROM page 7	• Contact TEREX Technical Assistance
48-49	Not Used	
50	Error in Memory Area Load Charts	• Contact TEREX Technical Assistance
51	Error in Memory Area Loadless Moments	• Contact TEREX Technical Assistance
52	Error in Memory Area Parameters 1	• Contact TEREX Technical Assistance
53	Error in Memory Area Parameters 2	• Contact TEREX Technical Assistance
54-55 56-57 58-59 60	Not Used	
61	No Check on Block=0, WDO=0	• Verify the card connections
62	No Check on Block=0,	• Verify the card connections
	WDO=1	
63	Not Used	
64	No Check on Block=1,WDO=0	• Verify the card connections
65-66	Not Used	
67	Block Check Input - Failure in 1	• Verify the card connections
68	No Check on Block=1, WDO=1	• Verify the card connections
69-70 71-72 73-74 75-76 77-78 79	Not used	
80-81	Alarms from EXCEL card	• Verify EXCEL • Verify the Platform connections

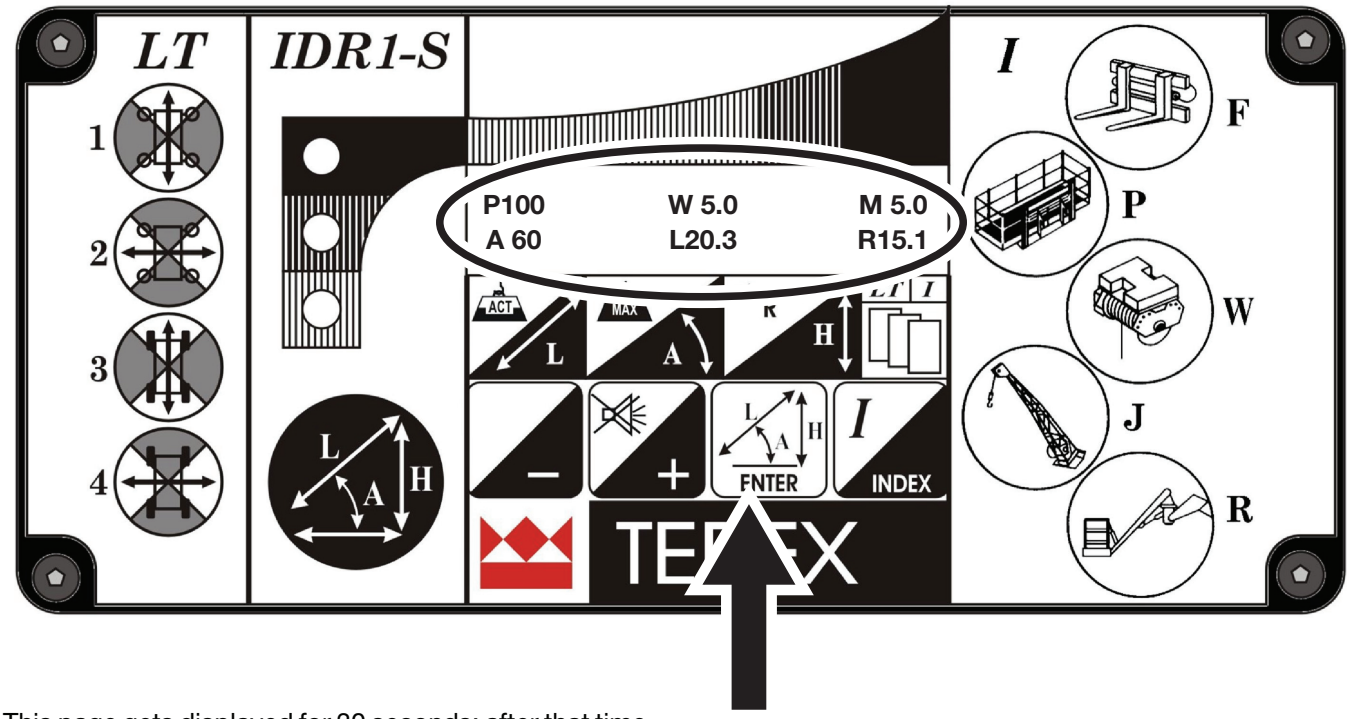
Alarm code	Description	What to do
82-83 84-85 86-87 88-89 90-91 92-93 94-95 96-97 98-99	Alarms from EXCEL card	• Verify EXCEL • Verify the Platform connections
100	Alarms from Platform Control	
101	No check on Load Block	• Verify the connections
	Platform=0, WDO=0	
102	No check on Load Block	
	Platform=0, WDO=1	• Verify the connections
103	Not Used	
104	No check on Load Block Basket =1, WDO=0	• Verify the connections
105-106	Not Used	
107	Platform Load Block Check Input defective in 1	• Verify the connections
108	No check on Bock=1, WDO=1	• Verify the connections

And to make things easier, the internal operating conditions can be viewed directly on the display as follows.

AUTO DIAGNOSTIC- System internal working conditions monitoring

Geometric data and load data

These readings show on some pages the internal status of the system which becomes very useful when a fault occurs.
Starting from the main working data page press twice the ENTER button:
The display will show the **first** control page with **geometric data and main cylinder differential pressure summary**.



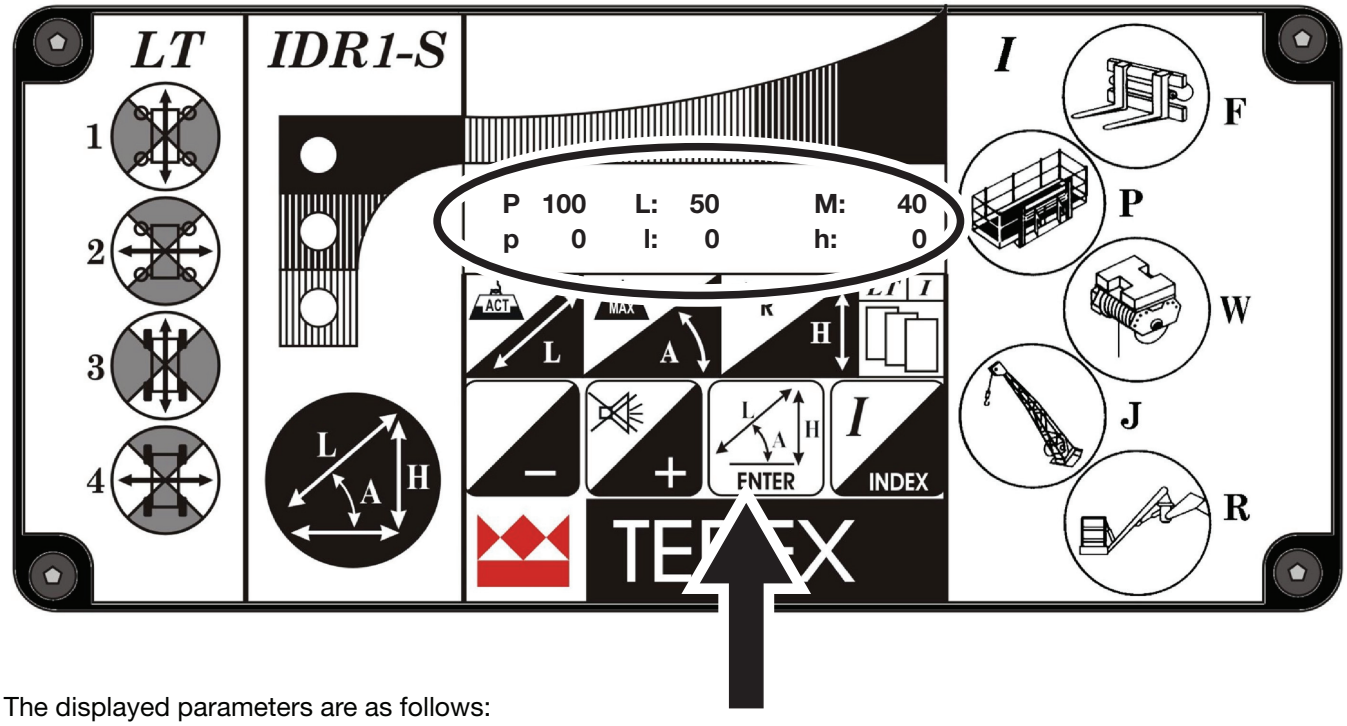
This page gets displayed for 30 seconds; after that time, it gets back to the normal working condition page.

The displayed parameters are as follows:

- P: Main cylinder differential pressure in Bar;
- W: Lifted load weight in Tons (Pounds/1000 if Imperial Measures System is used);
- M: Maximum admitted load in present position in Tons (Pounds/1000 if Imperial Measures System is used)
- A: Actual angle in Degrees:
- L: Actual boom length in Meters (in Feet if Imperial Measures System is used);
- R: Radius from turret rotation centre in Meters (in Feet if Imperial Measures System is used)

Hydraulic Pessure data

Pressing again the ENTER button the display will show the **second** page showing **individual hydraulic pressures summary**
This page gets displayed for 30 seconds; after that, it gets back to the normal working condition page.



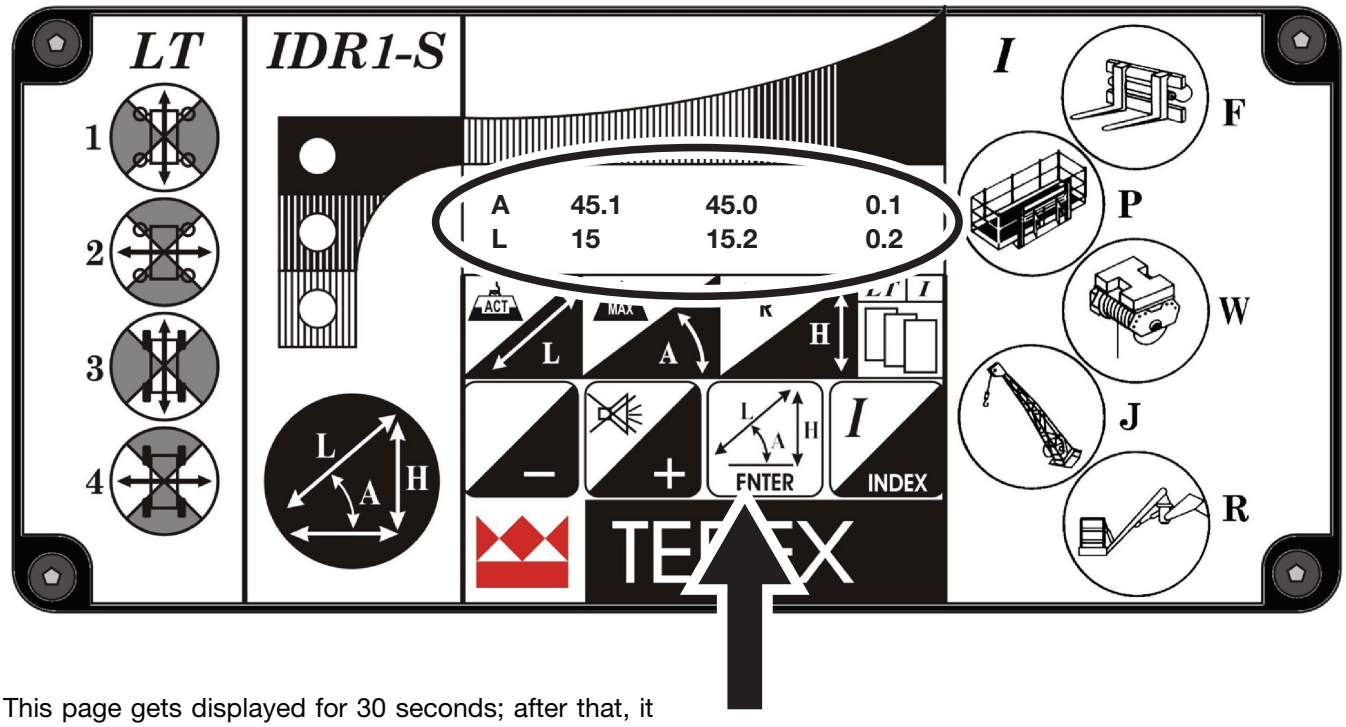
The displayed parameters are as follows:
Upper row
- P: Main cylinder differential pressure in Bar;
- L: Main cylinder bottom side pressure in Bar
- H: Main cylinder rod side pressure in Bar;

Lower row
- p: Compensation cylinder differential pressure in Bar;
- l: Compensation cylinder bottom side pressure in Bar;
- h: Compensation cylinder rod side pressure in Bar;

Hydraulic displayed pressures shall have correct values, coherent to the use of the machine.
The effectiveness of these values can be evaluated only on the base of the Technical Engineer experience and to his knowledge of the actual corresponding pressures into the cylinders.

Angle and Length data

Pressing once again the ENTER button the display will show the **third** page with the values of **angle 1, angle 2 and their difference and the values of length 1, length 2 and their difference**.



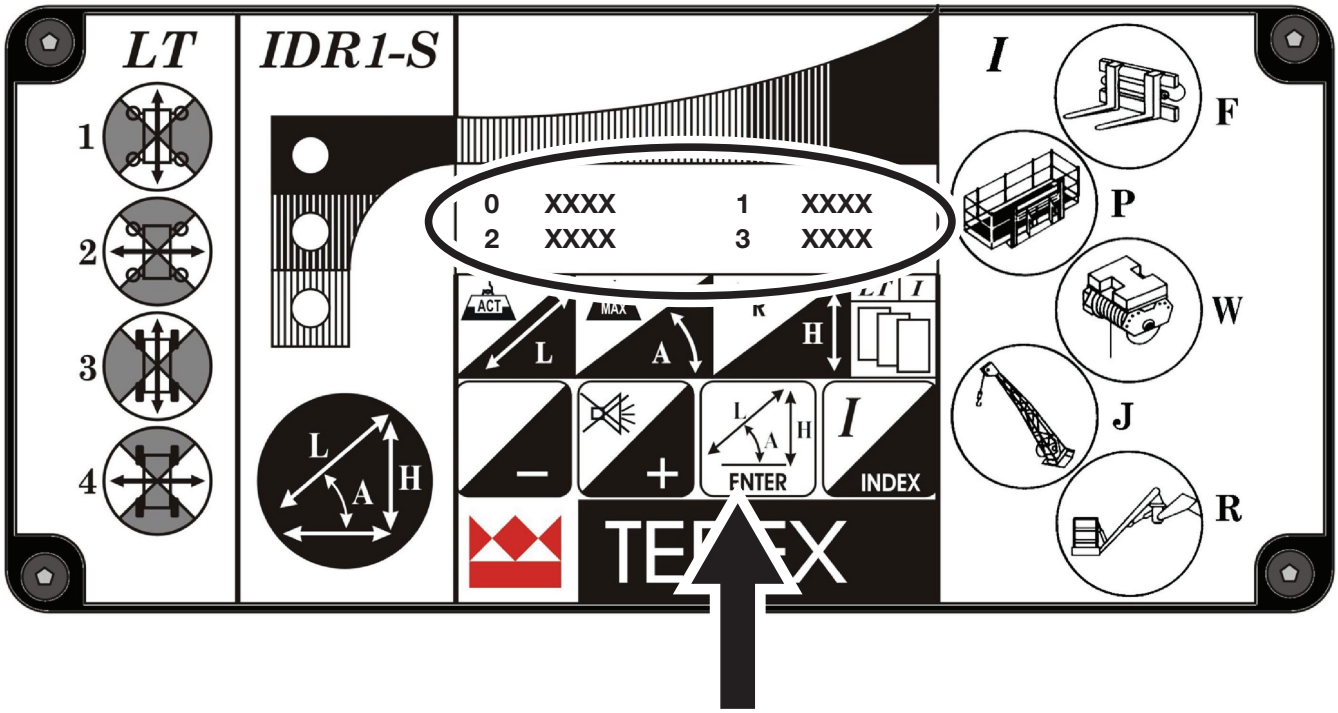
This page gets displayed for 30 seconds; after that, it gets back to the normal working condition page.
The displayed parameters are as follows:

Upper row in sequence:
- A: Angle 1;
- Angle 2;
- Difference between angle 1 and angle 2;

Lower row in sequence::
L: Length 1;
Length 2;
Difference between Length 1 and Length 2;

Sensors Digital Signals data

Pressing once again the ENTER button the display will show the **fourth** page giving the **digital signals corresponding to the actual measurements of pressure transducers and length/angle sensors**.
This page gets displayed for 30 seconds; after that ,it gets back to the normal working condition page.



The displayed parameters are as follows:

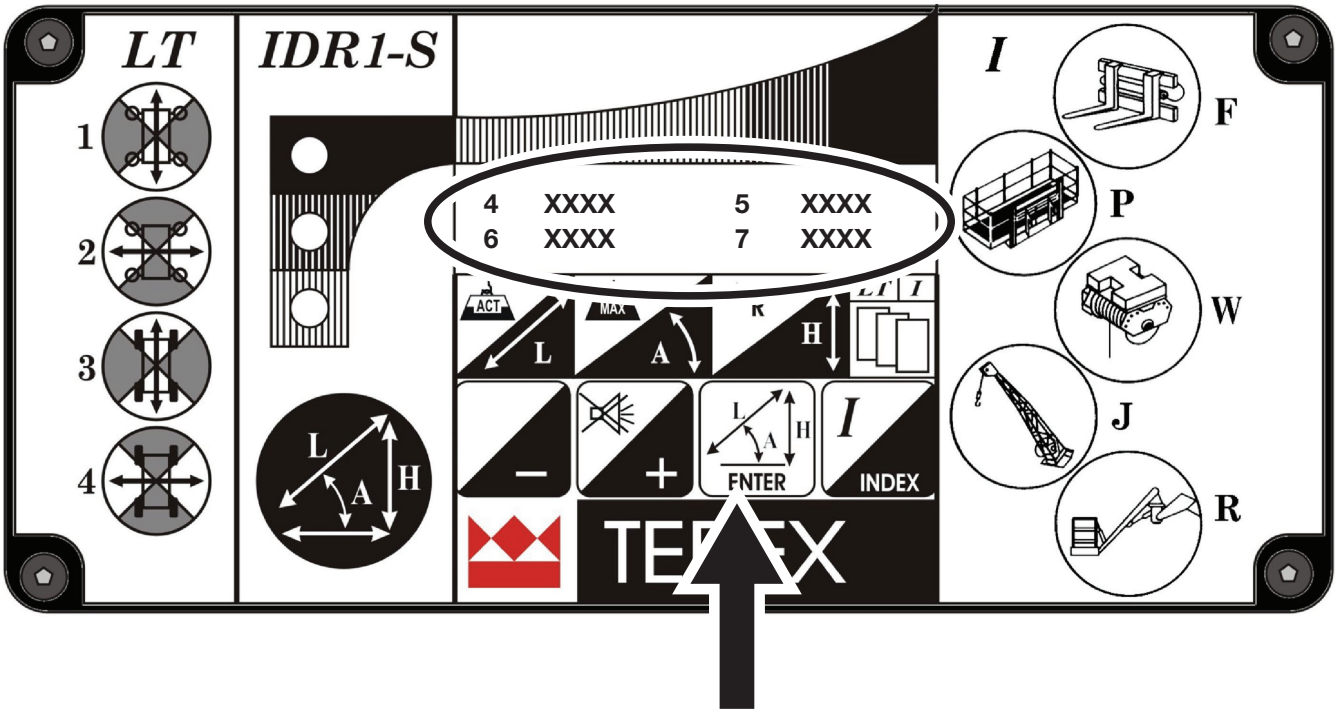
- 0 XXXX: Main cylinder bottom side pressure value in Bits; between 0 and 1023 (*)
- 1 XXXX: Main cylinder rod side pressure value in Bits; between 0 and 1023 (*)
- 2 XXXX: Angle 1 value in Bits; between 0 and 1023 (*)
- 3 XXXX: Boom Length 1 value in Bits; between 0 and 1023 (*)

Note: These numerical readings follow the course of the transducers voltage.
Minimum and maximum limits exist and they have not to be exceeded, otherwise the relevant signal is taken wrong by the system: THE MINIMUM VALUE IS 10, THE MAXIMUM VALUE IS 1010.

(*) = 10bits A/D Converter

Sensors Digital Signals data

Pressing once again the ENTER button the display will show the **fifth** page giving the **digital signals corresponding to the actual measurements of pressure transducers and length/angle sensors**.
This page gets displayed for 30 seconds; after that ,it gets back to the normal working condition page.



The displayed parameters are as follows:

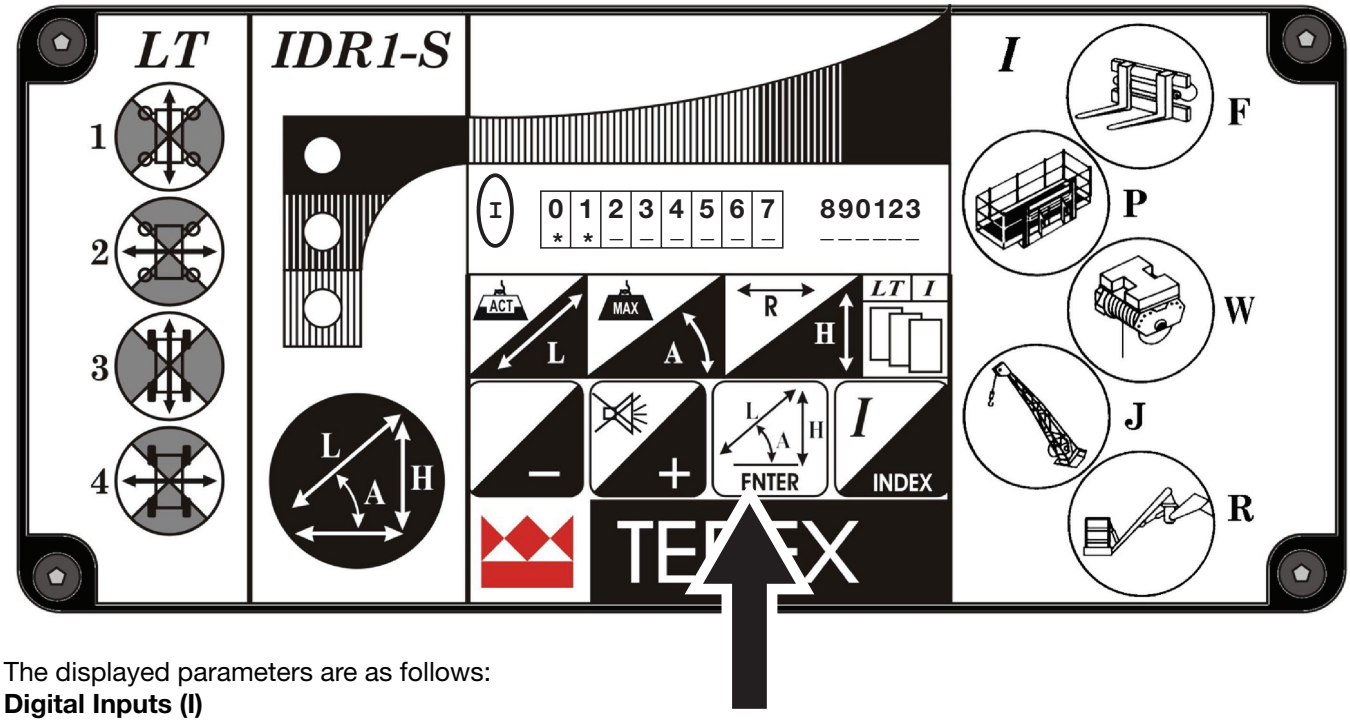
- 4 XXXX: Compensation cylinder bottom side pressure value in Bits; between 0 and 1023 (*)
- 5 XXXX: Compensation cylinder rod side pressure value in Bits; between 0 and 1023 (*)
- 6 XXXX: Angle 2 value in Bits; between 0 and 1023 (*)
- 7 XXXX: Boom Length 2 value in Bits; between 0 and 1023 (*)

Note: These numerical readings follow the course of the transducers voltage.
Minimum and maximum limits exist and they have not to be exceeded, otherwise the relevant signal is taken wrong by the system: THE MINIMUM VALUE IS 10, THE MAXIMUM VALUE IS 1010.

(*) = 10bits A/D Converter

Status of On/Off Inputs from Outside

Pressing the ENTER button again, the display will show the **sixth** page giving the **Status summary of the Inputs given by the micro-switches (LT Operating Mode)**. This page gets displayed for 30 seconds; after that, it gets back to the normal working condition page.



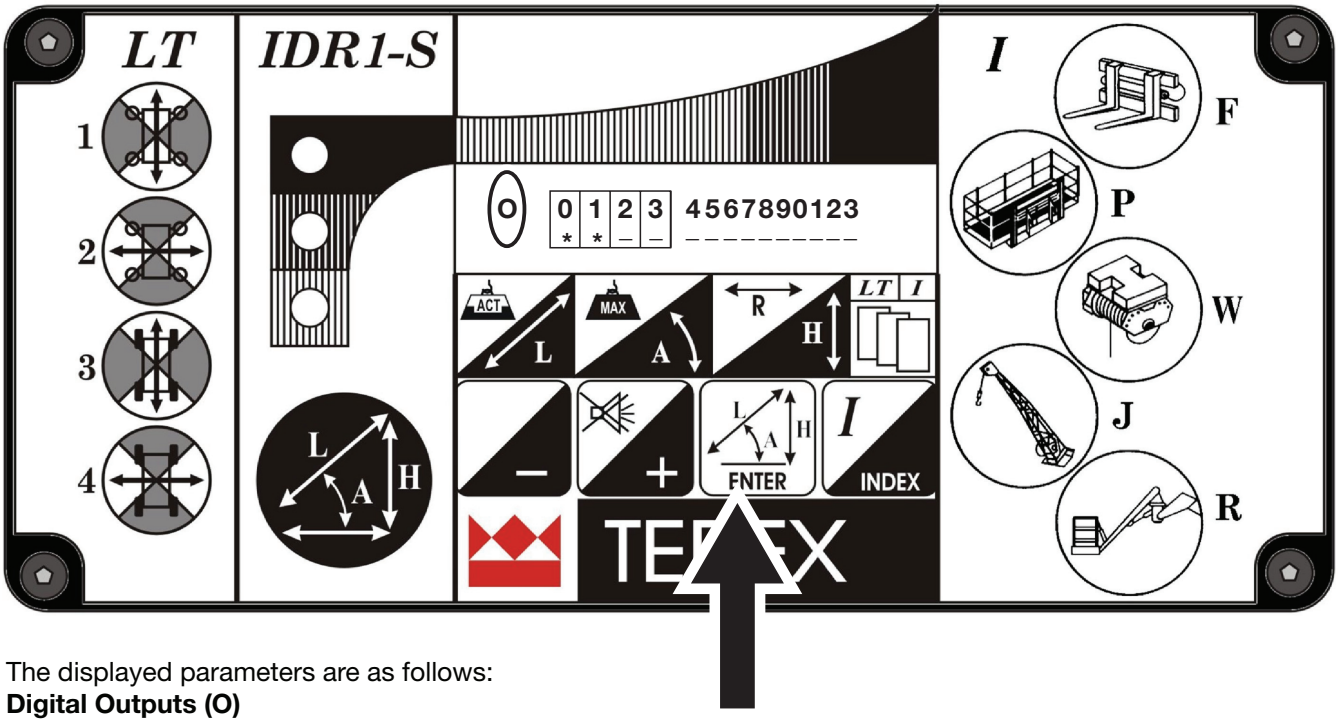
The displayed parameters are as follows:
Digital Inputs (I)
The upper row indicates the Input number, while the lower row indicates its status.
The symbol "*" means **active Input**, the symbol "-" means **non active Input**.

- 0 & 6: Outriggers: "*" When they are on ground completely extended
- 1 & 5: Turret rotation: "*" When in front position.
- 2: Basket: "*" When Basket is not present.
- 3: Robot (not used)
- 4: Lower: "*" When Boom is lowering.
- 7: Block Relay Check: "*" When Relay is not blocked

NOTE: The combination of the Inputs status automatically selects the proper LT Operating Mode and the corresponding load chart, depending on the machine model.
IMPORTANT: *This page has the aim to check the proper Inputs status from outside (micro-switches) in specific Machine positions.*
See also page 4 : LED's on main unit card

Status of On/Off Outputs to Outside

Pressing the ENTER button again, the display will show the **seventh** page giving the **Status summary of the Outputs of the system (automatic signals)**.
This page gets displayed for 30 seconds; after that, it gets back to the normal working condition page.



The displayed parameters are as follows:
Digital Outputs (O)
The upper row indicates the Output number, while the lower row indicates its status.
The symbol "*" means **active Output**, the symbol "-" means **non active Output**.

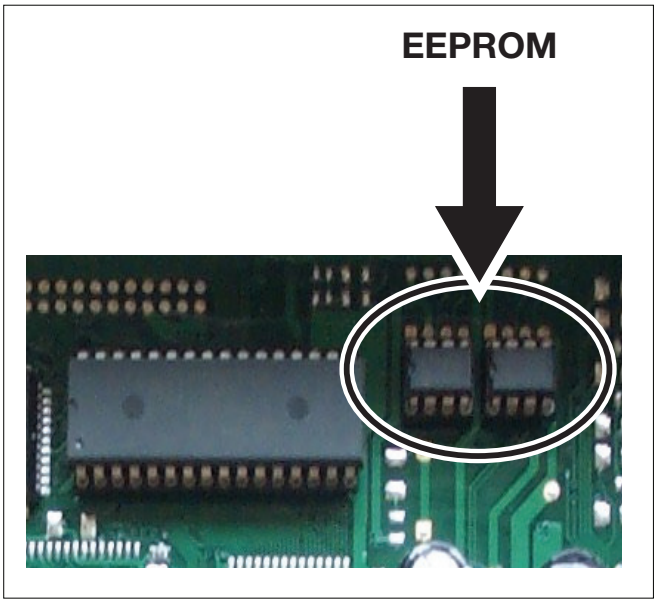
- 0: Shut-down — "*" When the machine is working in safe or alarm conditions. "-" When the machine gets in to a shut-down condition(100%)
- 1: Not used
- 2: High angle: — "*" when the boom is higher than 75°
- 3: Low Angle: — "*" when the boom is lower than 10°

IMPORTANT: *This page has the aim to check the proper Outputs status to outside when an ALARM or a SHUT-DOWN occurs.*
See also 4: LED on main control unit

ALARM CODE 1: MEMORY DATA NOT RELIABLE

CAUSE:
All the calibration data are stored in the two memories EEPROM 24C65.
Through the "Check-sum" equation, the software checks continuously the result to the original memorised value. When a difference is detected, the display will show the following message:
ALARM 1 = memory data not reliable.

ACTION TO TAKE:
1) Switch the system off and on.
2) Verify that the EEPROM chips are fitted properly in its socket.
3) Re-enter data and save again, switch off and on again.
   (To load data from the PC, please refer to the "DOWNLOADING DATA FROM PC TO LMI").
4) If the problem persists, replace the PC board making sure that software/parameters installed are corresponding to the machine characteristics.



ALARM CODE 2: ANGLE 1 TRANSDUCER READING LOWER THAN THE MINIMUM VALUE (*)

CAUSE:
The signal from the angle transducer to the main PC board is lower than the minimum programmed value.
This can be produced by a short-circuit in the electrical wiring, between the Main Unit and Sensor or the sensor itself is in interdiction.

ACTION TO TAKE:
Verify cable reel PC board proper power supply (refer to "CABLE REEL POWER SUPPLY VERIFYING" - page 36).
Verify angle potentiometer (refer to "ANGLE 1 POTENTIOMETER VERIFYING" - page 37).

ALARM CODE 3: ANGLE 1 TRANSDUCER READING HIGHER THAN THE MAXIMUM VALUE (*)

CAUSE:
The signal from the angle transducer to the main PC board is higher than the maximum programmed value.
This can be produced by a break in the electrical wiring, between the Main Unit and Sensor or the sensor itself is in saturation.

ACTION TO TAKE:
Verify cable reel PC board proper power supply (refer to

"CABLE REEL POWER SUPPLY VERIFYING" - page 36).
Verify angle potentiometer (refer to "ANGLE 1 POTENTIOMETER VERIFYING" - page 37).

ALARM CODE 4: BOOM LENGTH 1 TRANSDUCER READING LOWER THAN THE MINIMUM VALUE (*)

CAUSE:
The signal from the boom length transducer to the main PC board is lower than the minimum programmed value. This can be produced by a short-circuit in the electrical wiring, between the Main Unit and Sensor or the sensor itself is in interdiction.

ACTION TO TAKE:
Verify cable reel PC board proper power supply (refer to "CABLE REEL POWER SUPPLY VERIFYING" - page 36).
Verify length potentiometer (refer to "LENGTH 1 POTENTIOMETER VERIFYING" - page 38)

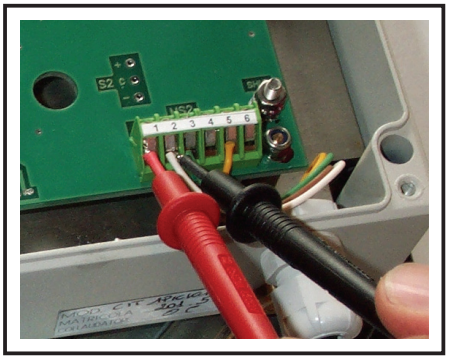
ALARM CODE 5: BOOM LENGTH 1 TRANSDUCER READING HIGHER THAN THE MAXIMUM VALUE (*)

CAUSE:
The signal from the boom length transducer to the main PC board is higher than the maximum programmed value. This can be produced by a short-circuit in the electrical wiring, between the Main Unit and Sensor or the sensor itself is in saturation.

ACTION TO TAKE:
Verify cable reel PC board proper power supply (refer to "CABLE REEL POWER SUPPLY VERIFYING" - page 36).
Verify length potentiometer (refer to "LENGTH 1 POTENTIOMETER VERIFYING" - page 38)

(*) : Main Unit Processor identifies below and over the signal range a minimum zone and a maximum zone in order to check the transducer.

CHECK OF THE CABLE REEL CARD POWER SUPPLY



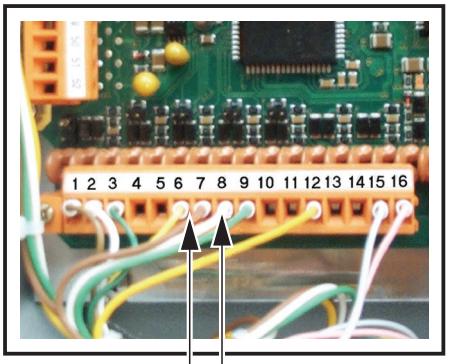
Verify 5Volts between 1(+) and 2(GND) on cable reel board

True

False

Verify the Potentiometers (**)

Verify on the U2MIC board 5Volts between 7(+) and 8(GND)



True

False

Cable brake down. Check the cable-reel cable

Disconnect wires 7 and 8 from the U2MIC board and Check for 5VCC

True

False

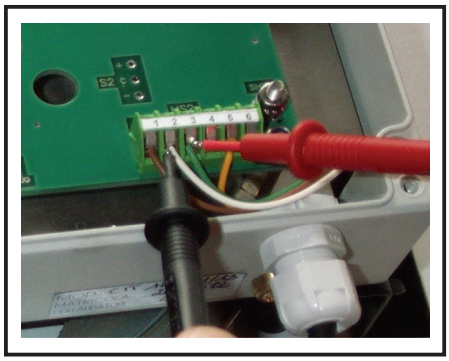
Probably the cable is in short circuit. Check cable

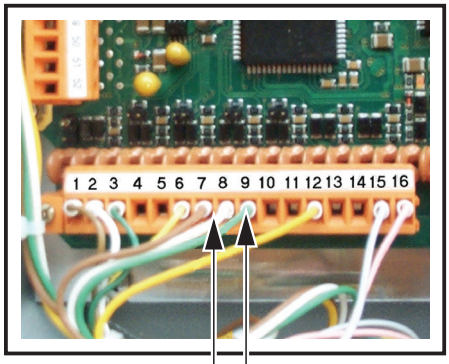
U2MIC board Is faulty. Replace it with a new one (*)

(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41
(**) Refer to pages 27 and 28

ANGLE 1 POTENTIOMETER CHECK

Move the machine Boom to 0° (horizontal).





Verify between 2(GND) and 3 (+) +2,5Vcc +/- 5%

False

True

Angle potentiometer broken (**)

Raise the boom slowly.

Verify with a voltmeter that the signal increases in a linear and continous way.

Losses of Signal

The variation is continous and linear

Angle potentiometer broken (**)

Verify on the U2MIC board the potentiometer signal on 8(GND) and 9(AI_2)

The signal is not correct

The signal is not correct

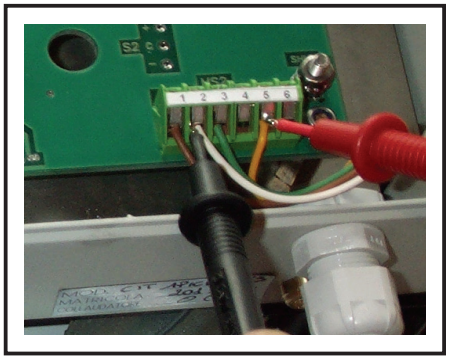
Problems on the Connection Cable. Probably short circuited. Check the cable

The U2MIC board is faulty. Proceed with the replacement (*)

(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41
(**) Also refer to POTENTIOMETER ALIGNMENT - page 42

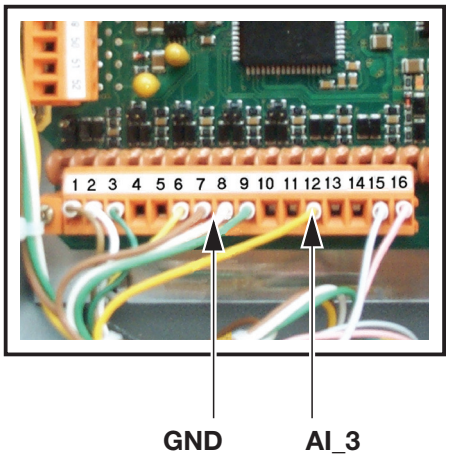
LENGTH 1 POTENTIOMETER CHECK

The machine Boom must be completely retracted.



Verify between 2(GND) and 5 (+) a voltage of roughly 4,5V toll.+/-0,5mV

- False → Boom Length Potentiometer broken (**)
- True → Perform a Boom extension → Verify with a voltmeter that the signal increases in a linear and continous way
  - Losses of Signal → Boom Length potentiometer broken (**)
  - The variation is continous and linear → Verify on the U2MIC board the potentiometer signal on 8(GND) and 12(AI_3)
    - The signal is not correct → Problems on the Connection Cable. Probably short circuited. Check the cable
    - The signal is not correct → The U2MIC board is faulty. Proceed with the replacement (*)
- Voltage higher or at 5V → Boom Length Potentiometer broken (**)

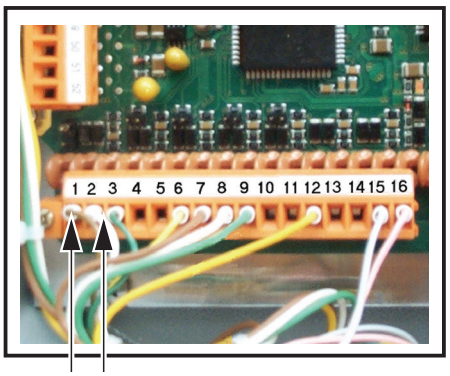


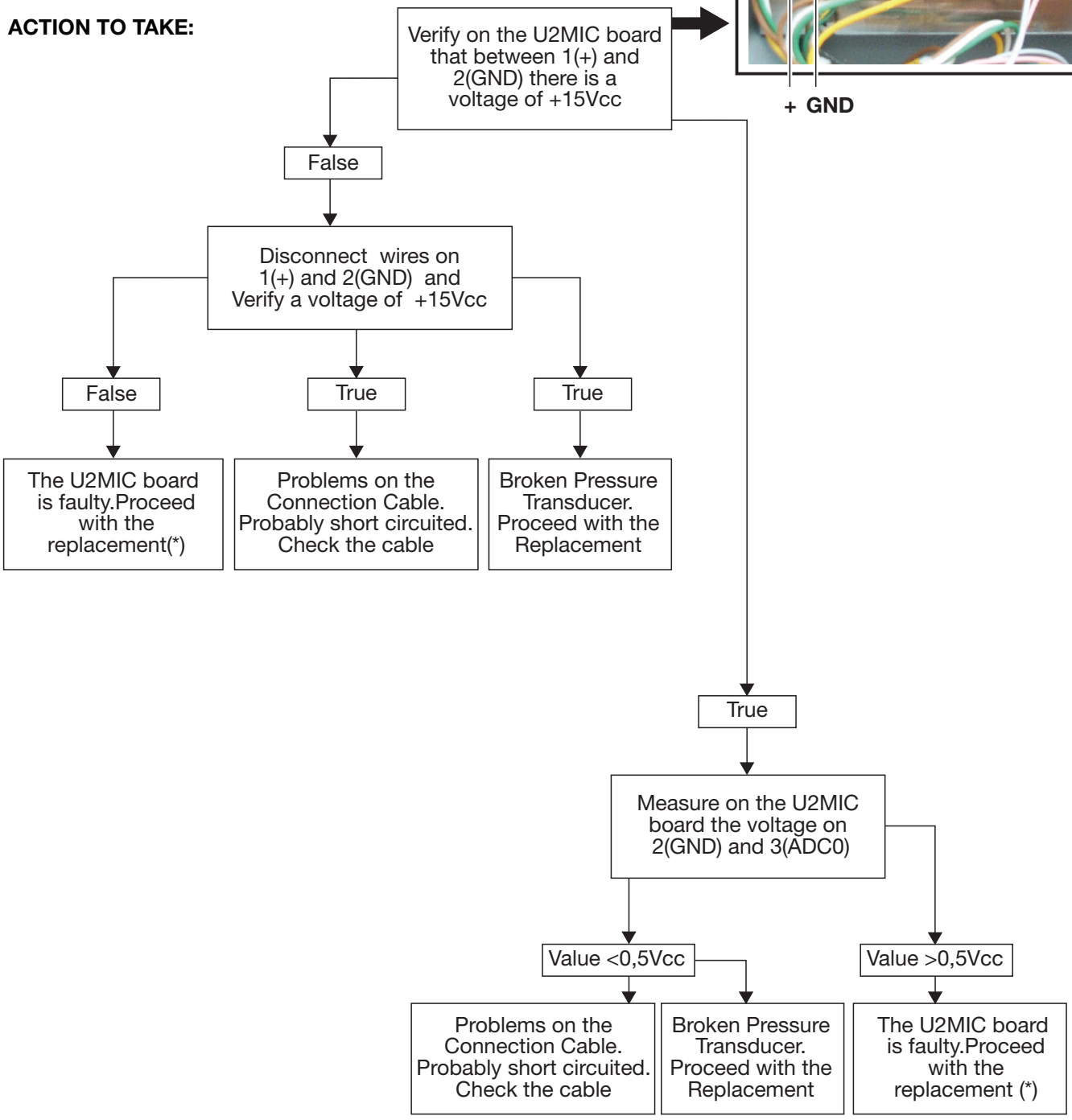
(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41
(**) Also refer to POTENTIOMETER ALIGNMENT - page 42

ALARM CODE 8 : MAIN CYLINDER (BOTTOM SIDE) READING LOWER THAN THE MINIMUM VALUE

CAUSE:
The value of the cylinder chamber pressure transducer (bottom side) is lower than the minimum value.

ACTION TO TAKE:



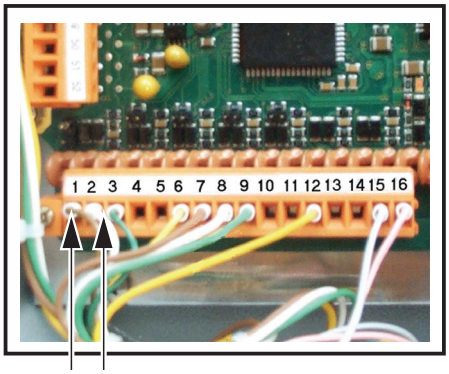


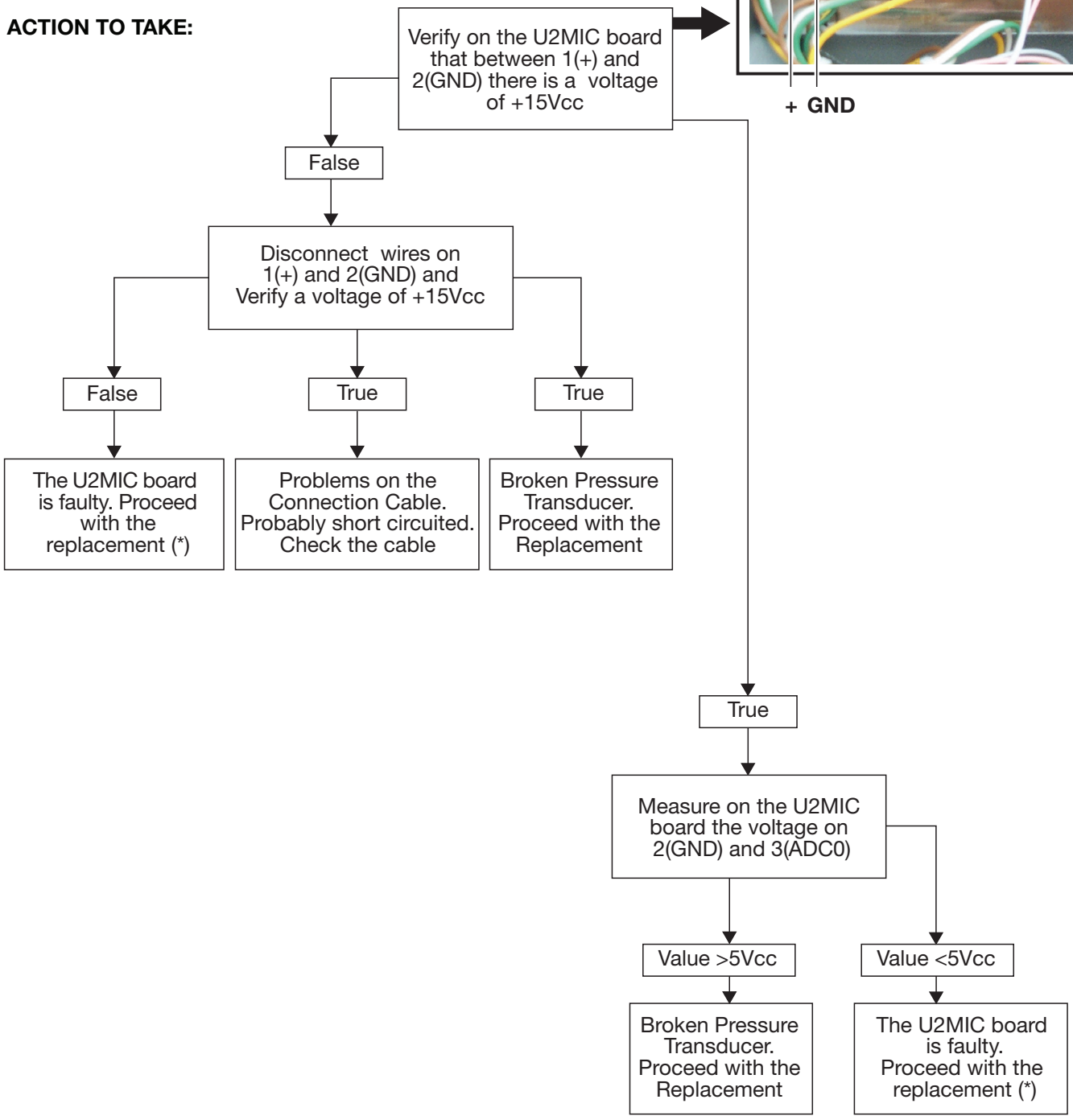
(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41

ALARM CODE 9 : MAIN CYLINDER (BOTTOM SIDE) READING HIGHER THAN THE MAXIMUM VALUE

CAUSE:
The value of the cylinder chamber pressure transducer (bottom side) is higher than the maximum value.

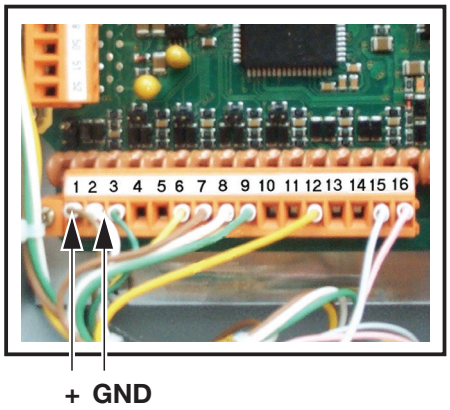
ACTION TO TAKE:





(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41

ALARM CODE 10 : MAIN CYLINDER (ROD SIDE) READING LOWER THAN THE MINIMUM VALUE



CAUSE:
The value of the cylinder chamber pressure transducer (rod side) is lower than the minimum value.

ACTION TO TAKE:

Verify on the U2MIC board that between 1(+) and 2(GND) there is a voltage of +15Vcc

False

Disconnect wires on 1(+) e 2(GND) and Verify a voltage of +15Vcc

False

The U2MIC board is faulty. Proceed with the replacement (*)

True

Problems on the Connection Cable. Probably short circuited. Check the cable

True

Broken Pressure Transducer. Proceed with the Replacement

True

Measure on the U2MIC board the voltage on 2(GND) and 6(ADC1)

Value <0,5Vcc

Problems on the Connection Cable. Probably short circuited. Check the cable

Broken Pressure Transducer. Proceed with the Replacement

Value >0,5Vcc

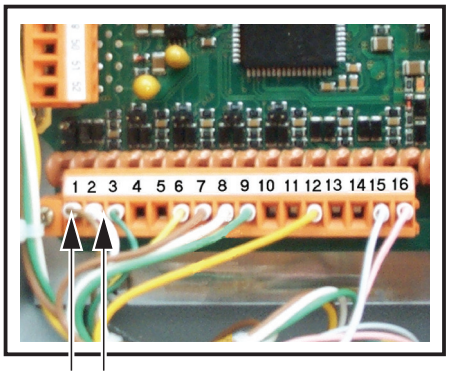
The U2MIC board is faulty. Proceed with the replacement (*)

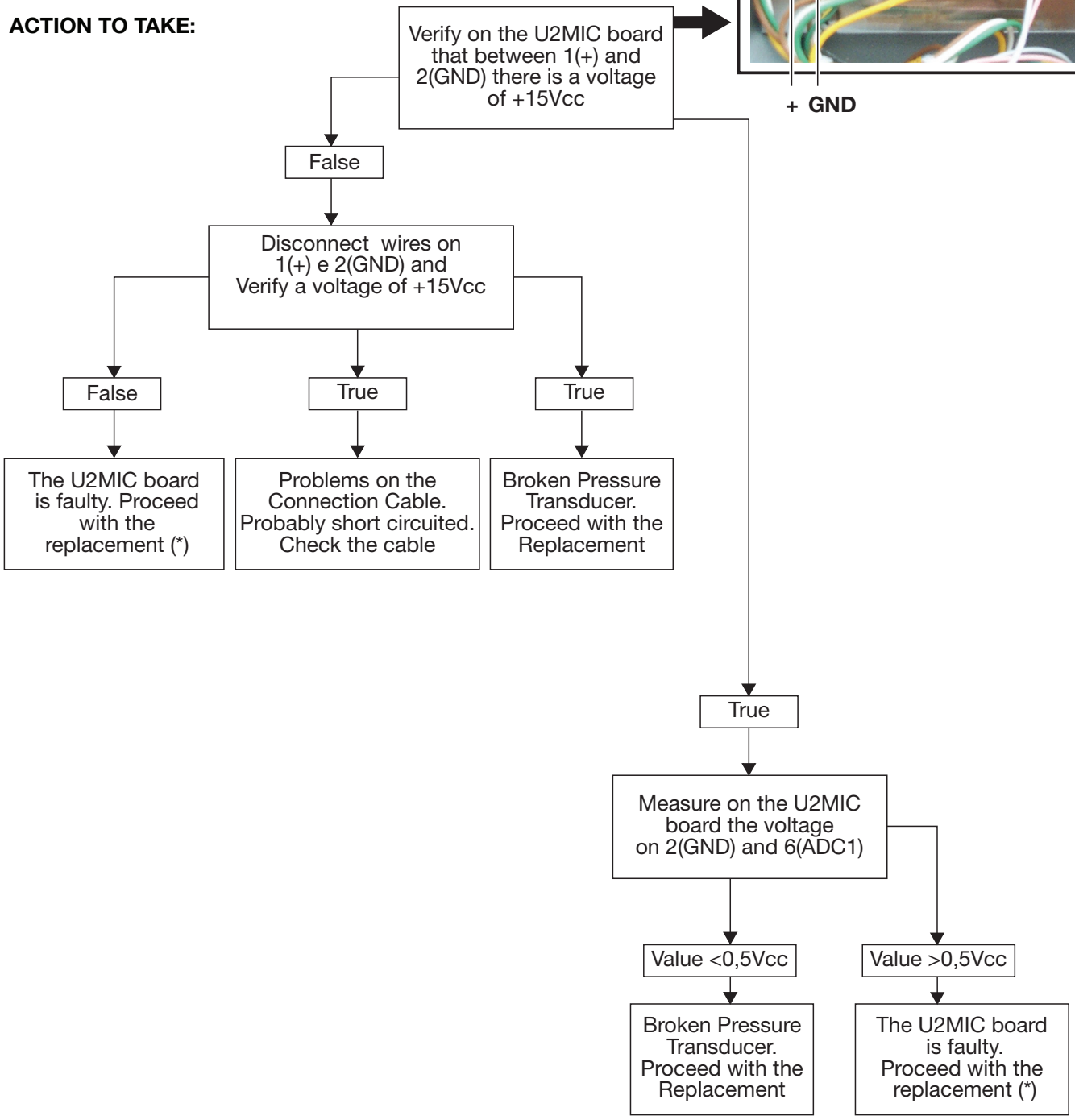
(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41

ALARM CODE 11 : MAIN CYLINDER (ROD SIDE) READING HIGHER THAN THE MAXIMUM VALUE

CAUSE:
The value of the cylinder chamber pressure transducer (rod side) is higher than the maximum value.

ACTION TO TAKE:



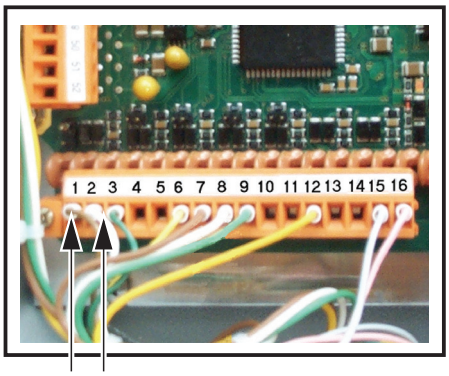


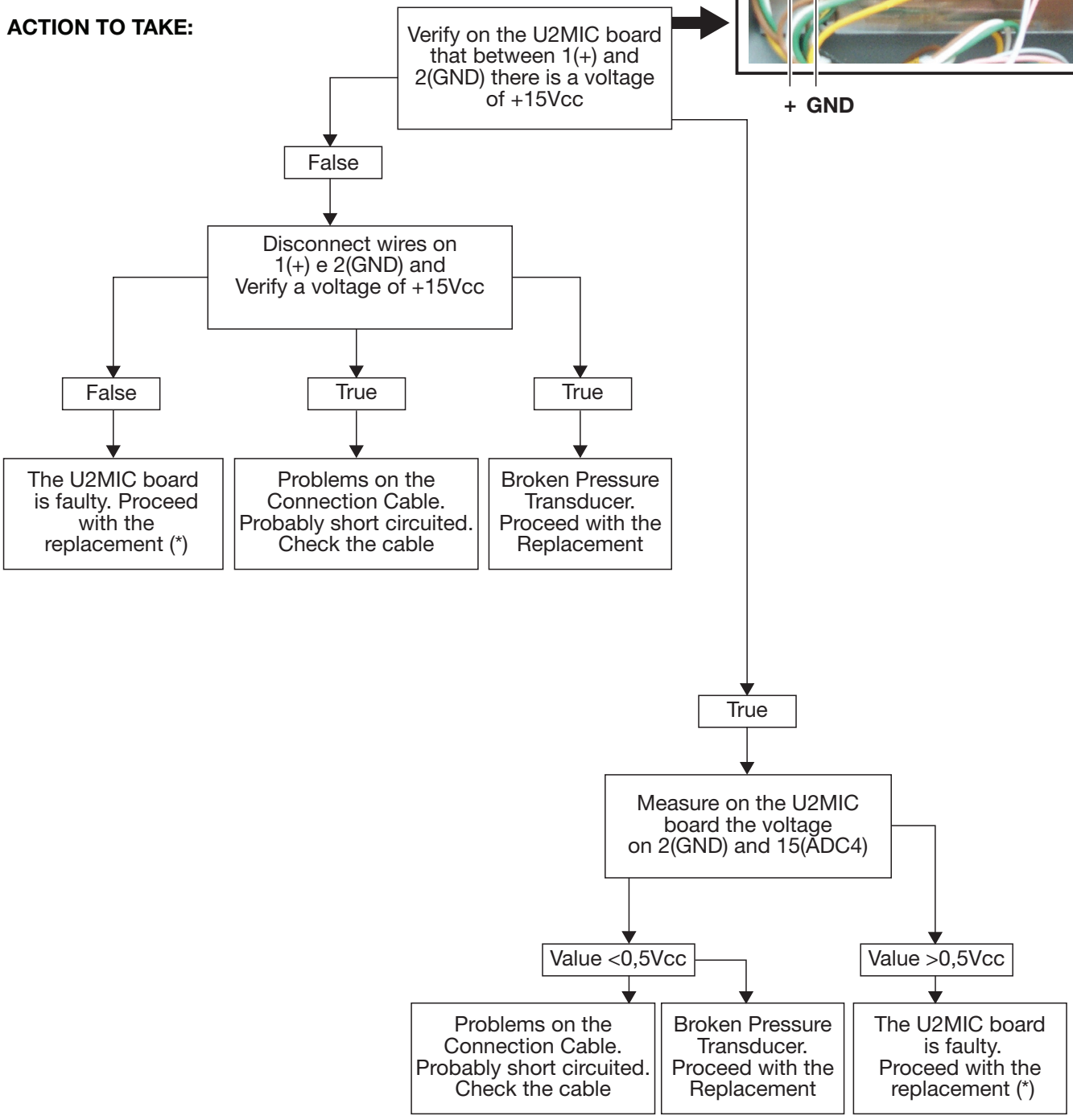
(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41

ALARM CODE 18 : COMPENSATION CYLINDER (BOTTOM SIDE) READING LOWER THAN THE MINIMUM VALUE

CAUSE:
The value of the cylinder chamber pressure transducer (bottom side) is lower than the minimum value.

ACTION TO TAKE:



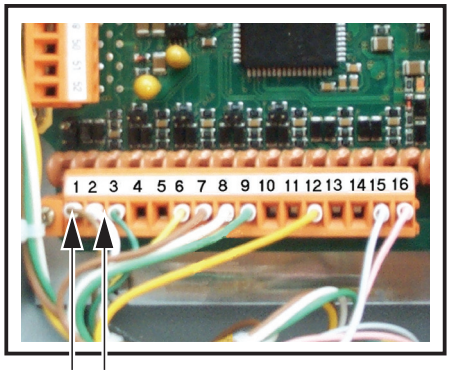


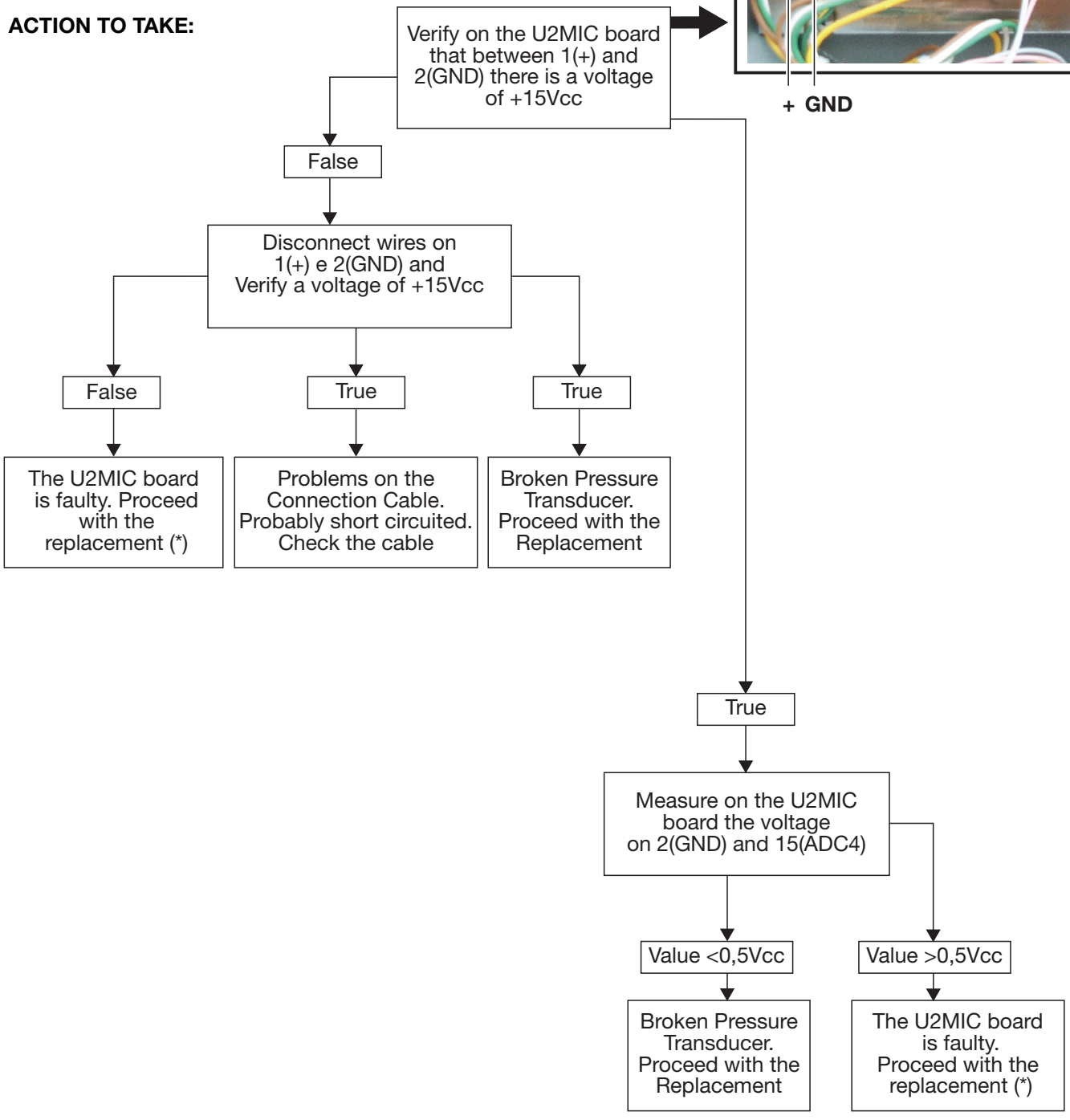
(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41

ALARM CODE 19 : COMPENSATION CYLINDER (BOTTOM SIDE) READING HIGHER THAN THE MAXIMUM VALUE

CAUSE:
The value of the cylinder chamber pressure transducer ((bottom side) is higher than the maximum value.

ACTION TO TAKE:



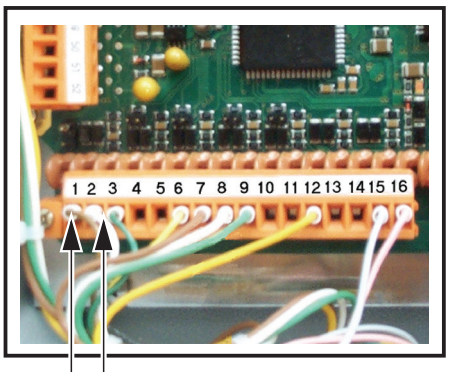


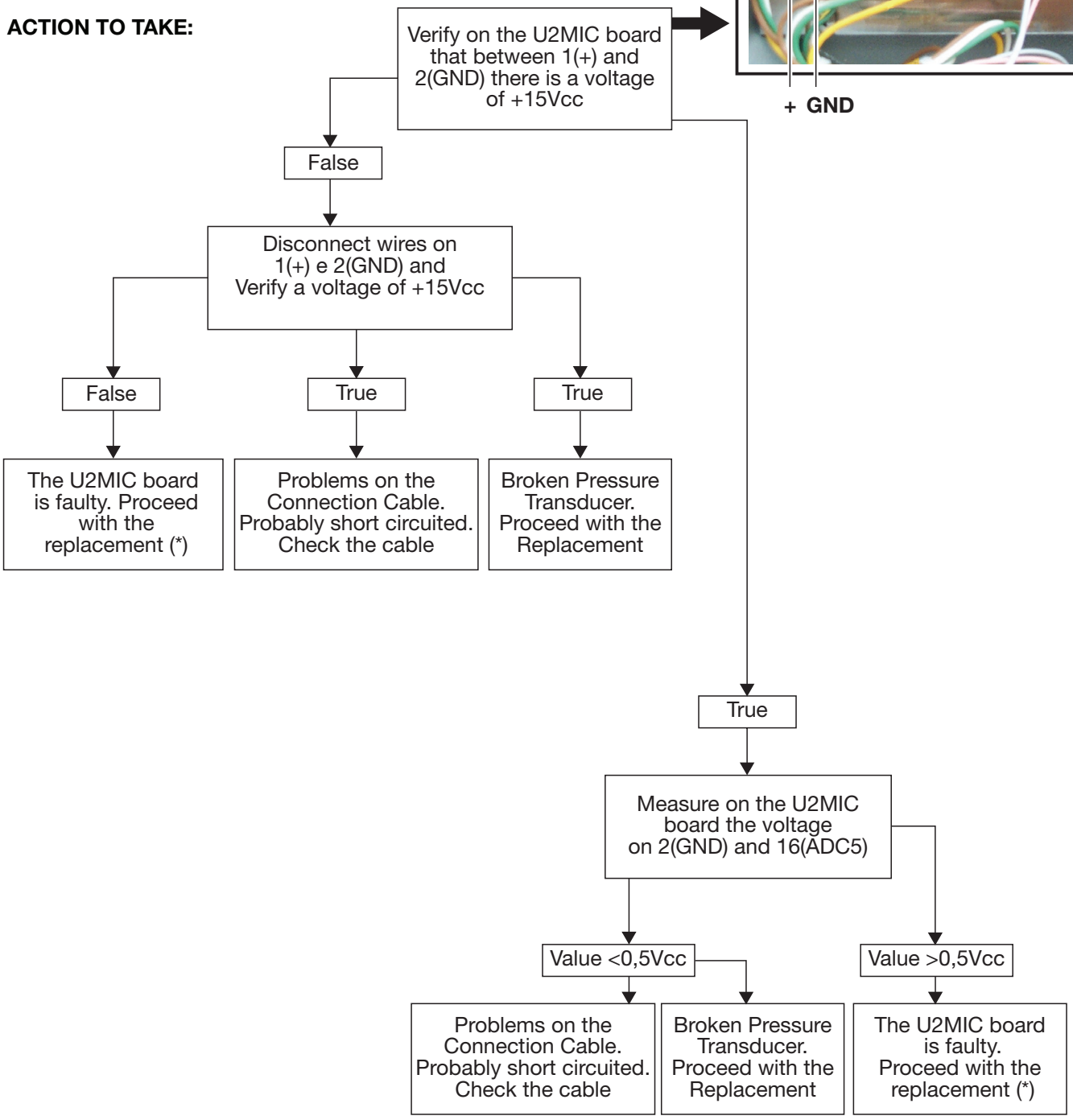
(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41

ALARM CODE 20 : COMPENSATION CYLINDER (ROD SIDE) READING LOWER THAN THE MINIMUM VALUE

CAUSE:
The value of the cylinder chamber pressure transducer (rod side) is lower than the minimum value.

ACTION TO TAKE:



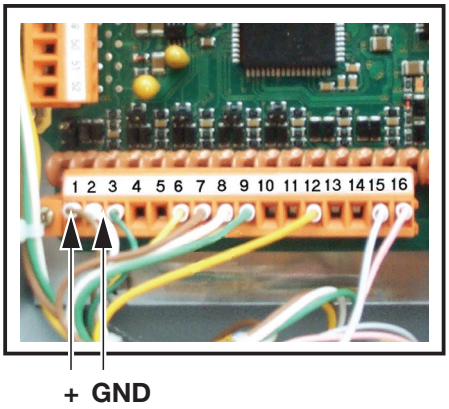


(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41

ALARM CODE 21 : COMPENSATION CYLINDER (ROD SIDE) READING HIGHER THAN THE MAXIMUM VALUE

CAUSE:
The value of the cylinder chamber pressure transducer (rod side) is higher than the maximum value.

ACTION TO TAKE:



Verify on the U2MIC board that between 1(+) and 2(GND) there is a voltage of +15Vcc

- False
  - Disconnect wires on 1(+) e 2(GND) and Verify a voltage of +15Vcc
    - False → The U2MIC board is faulty. Proceed with the replacement (*)
    - True → Problems on the Connection Cable. Probably short circuited. Check the cable
    - True → Broken Pressure Transducer. Proceed with the Replacement
- True
  - Measure on the U2MIC board the voltage on 2(GND) and 16(ADC5)
    - Value <0,5Vcc → Broken Pressure Transducer. Proceed with the Replacement
    - Value >0,5Vcc → The U2MIC board is faulty. Proceed with the replacement (*)

(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41

ALARM CODE 34: ANGLE 2 TRANSDUCER READING LOWER THAN THE MINIMUM VALUE (*)

CAUSE:
The signal from the angle transducer to the main PC board is lower than the minimum programmed value.
This can be produced by a short-circuit in the electrical wiring, between the Main Unit and Sensor or the sensor itself is in interdiction.

ACTION TO TAKE:
Verify cable reel PC board proper power supply (refer to "CABLE REEL POWER SUPPLY VERIFYING" - page 36).
Verify angle potentiometer (refer to "ANGLE 2 POTENTIOMETER VERIFYING" - page 38).

ALARM CODE 35: ANGLE 2 TRANSDUCER READING HIGHER THAN THE MAXIMUM VALUE (*)

CAUSE:
The signal from the angle transducer to the main PC board is higher than the maximum programmed value.
This can be produced by a break in the electrical wiring, between the Main Unit and Sensor or the sensor itself is in saturation.

ACTION TO TAKE:
Verify cable reel PC board proper power supply (refer to "CABLE REEL POWER SUPPLY VERIFYING" - page 36).
Verify angle potentiometer (refer to "ANGLE 2 POTENTIOMETER VERIFYING" - page 38).

ALARM CODE 36: BOOM LENGTH 2 TRANSDUCER READING LOWER THAN THE MINIMUM VALUE (*)

CAUSE:
The signal from the boom length transducer to the main PC board is lower than the minimum programmed value.
This can be produced by a short-circuit in the electrical wiring, between the Main Unit and Sensor or the sensor itself is in interdiction.

ACTION TO TAKE:
Verify cable reel PC board proper power supply (refer to "CABLE REEL POWER SUPPLY VERIFYING" - page 36).
Verify length potentiometer (refer to "LENGTH 2 POTENTIOMETER VERIFYING" - page 39)

ALARM CODE 37: BOOM LENGTH 2 TRANSDUCER READING HIGHER THAN THE MAXIMUM VALUE (*)

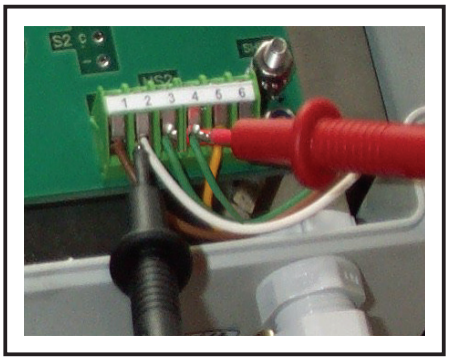
CAUSE:
The signal from the boom length transducer to the main PC board is higher than the maximum programmed value. This can be produced by a short-circuit in the electrical wiring, between the Main Unit and Sensor or the sensor itself is in saturation.

ACTION TO TAKE:
Verify cable reel PC board proper power supply (refer to “CABLE REEL POWER SUPPLY VERIFYING” - page 36).
Verify length potentiometer (refer to “LENGTH 2 POTENTIOMETER VERIFYING” - page 39)

(*) : Main Unit Processor identifies below and over the signal range a minimum zone and a maximum zone in order to check the transducer.

ANGLE 2 POTENTIOMETER CHECK

Move the machine Boom to 0° (horizontal).



Verify between 2(GND) and 4 (+) a voltage of roughly 2,8V toll.+/-1mV

False

True

Angle Potentiometer broken (**)

Perform a Boom extension

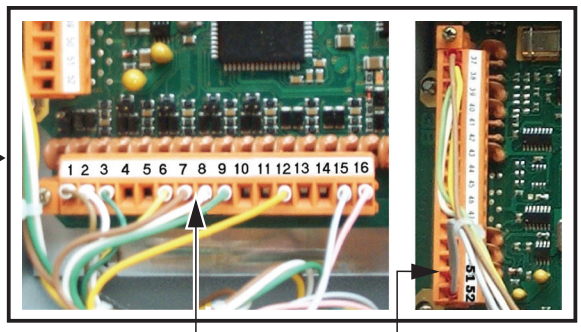
Verify with a voltmeter that the signal increases in a linear and continous way

Losses of Signal

The variation is continous and linear

Angle potentiometer broken (**)

Verify on the U2MIC board the potentiometer signal on 8(GND) and 51(AI_6)



The signal is not correct

The signal is not correct

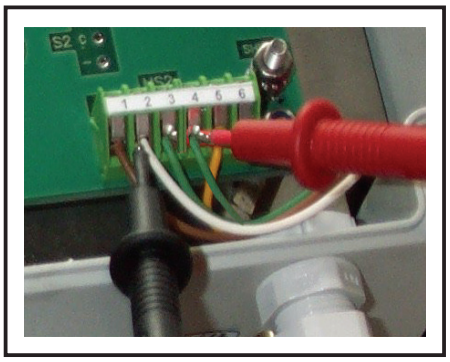
Problems on the Connection Cable. Probably short circuited. Check the cable

The U2MIC board is faulty. Proceed with the replacement (*)

(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41
(**) Also refer to POTENTIOMETER ALIGNMENT - page 42

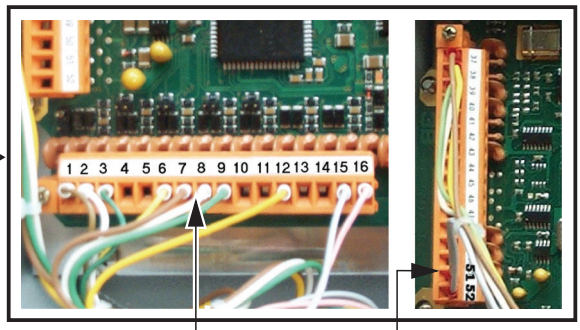
LENGTH 2 POTENTIOMETER CHECK

The machine Boom must be completely retracted.



Verify between 2(GND) and 6 (+) a voltage of roughly 0,25V toll.+/-0,5mV

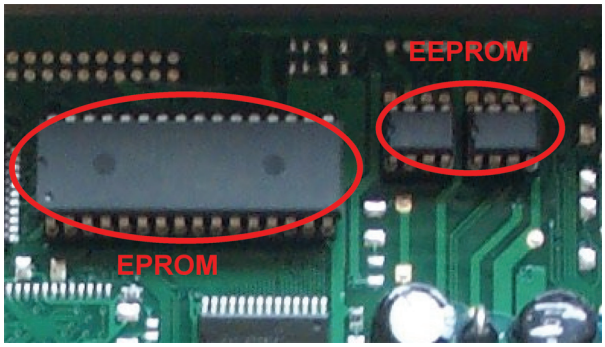
- False → Boom Length Potentiometer broken (**)
- True → Perform a Boom extension → Verify with a voltmeter that the signal increases in a linear and continous way
  - Losses of Signal → Boom Length potentiometer broken (**)
  - The variation is continous and linear → Verify on the U2MIC board the potentiometer signal on 8(GND) and 52(AI_7)
    - The signal is not correct → Problems on the Connection Cable. Probably short circuited. Check the cable
    - The signal is not correct → The U2MIC board is faulty. Proceed with the replacement (*)
- Voltage higher or at 5V → Boom Length Potentiometer broken (**)



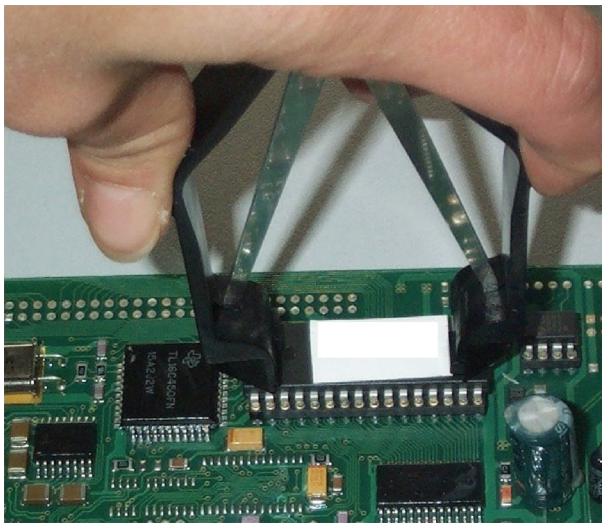
(*) Also refer to EPROM and EEPROM MEMORIES REPLACEMENT - page 41
(**) Also refer to POTENTIOMETER ALIGNMENT - page 42

EPROM and EEPROM REPLACEMENT(*)

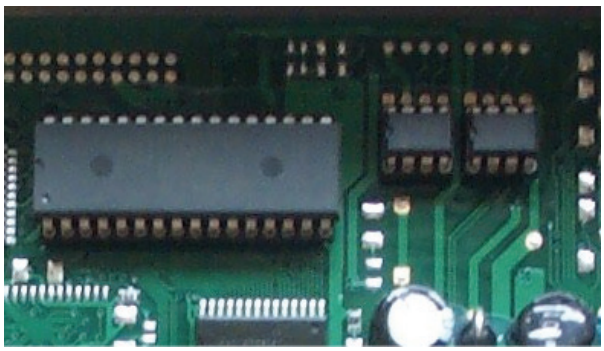
The picture shows the EPROM (LMI software) and the EEPROM (calibration data), that have to be removed from the old PC board and fitted to the new one.



Remove the EPROM and EEPROM carefully out of their sockets using an adequate tool.



Correctly insert the EPROM and EEPROM in their sockets on the new PC Board (see figure) taking care not to damage their pin.



(*) **NOTE:** Replacement of memories is required in case of failure of the Main Control Unit that must be replaced, avoiding any re-programming and re-calibration of the system.

POTENTIOMETER ALIGNMENT

Mechanical alignment of angle and extension sensors

Following the replacement of a potentiometer, even if this has been done carefully, it is advisable to check its alignment.

The following procedure, if properly done, allows the total restoring of the machine behaviour without any calibration operation.

Switch on the machine and wait for a few seconds. The home page will be displayed. →	* * * * 0.0 00.0 6.8 **1F**
ANGLE CHECK	
Press ENTER some times to display the page showing the transducers readings. As far as **the angle** is concerned, check, with the boom in the horizontal position, that: • the reading of transducer “A1XX” is between 300 and 320 and gets reduced when the boom is raised. • the reading of transducer “A2XX” is between 500 and 520 and increases when the boom is raised.	0 XXXX 1 XXXX **2 A1XX** 3 L1XX 4 XXXX 5 XXXX **6 A2XX** 7 L2XX

LENGTH CHECK	
After replacing the potentiometer, it is necessary to reset. With the machine boom fully retracted, turn the body of the potentiometer until reading: • 950 on “L1XX” • 130 on “L2XX”. In case of replacement of the reel cable, it is necessary to pre-tension approximately 1 m of cable fixing the opposite end at the top of the boom. Turn the potentiometer body until reading 950 on “L1XX” 950 and 130 on “L2XX”. Check, after removing the cable, that “L1XX” gets reduced and “L2XX” increases.	0 XXXX 1 XXXX 2 A1XX **3 L1XX** 4 XXXX 5 XXXX 6 A2XX **7 L2XX**

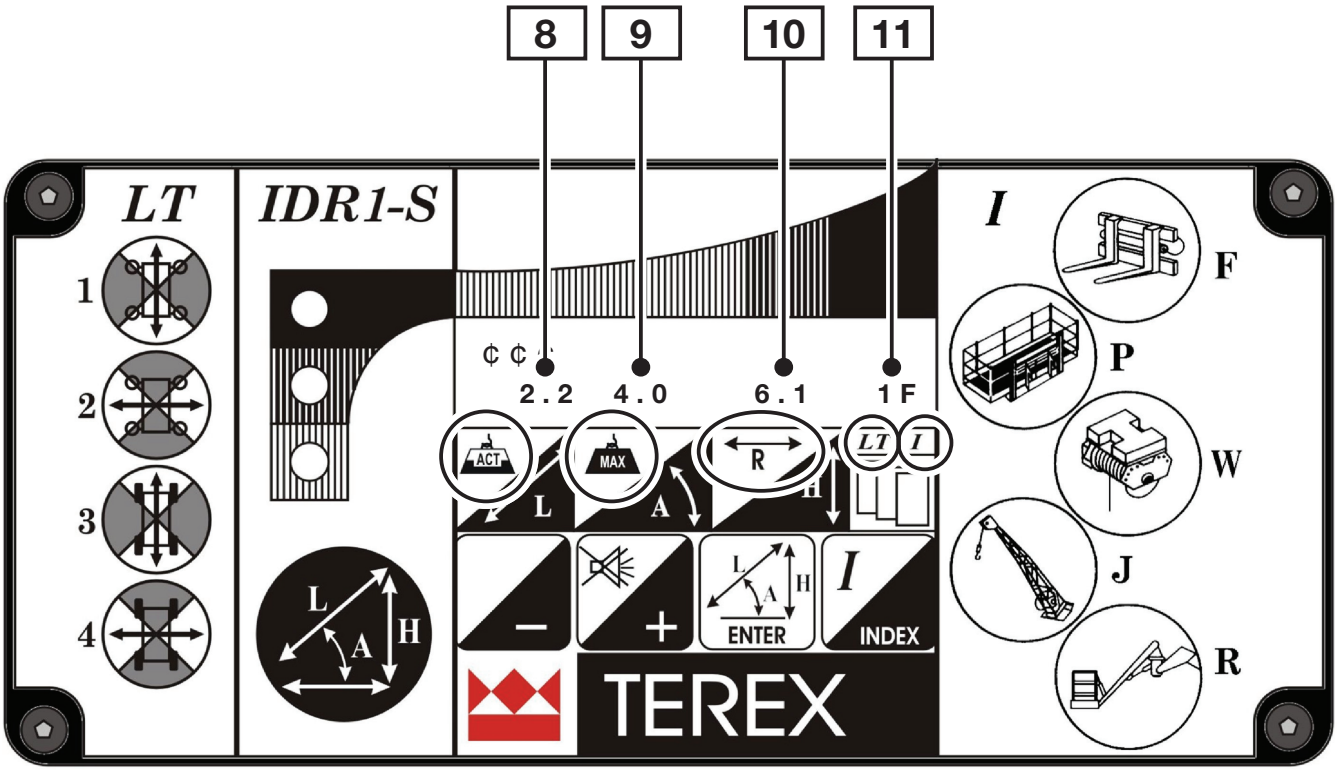
After the replacement of the potentiometer it is recommended to verify the correspondence of the angle and length values shown on the display in two known positions of the boom.

Example: boom IN and boom OUT at 0° and at maximum angle.

These displayed values must correspond to the values given by the Manufacturer for this specific model of the machine.

MESSAGES ON CONTROL PANEL

- Reading of main working data on the alphanumerical display



8 LIFTED LOAD WEIGHT: It shows up when the forks are selected with the boom completely in (as an option it is available also when winch and basket are used, regardless the boom extension).

Graphic Symbol : **ATC** Reading in "Tons", with a decimal point

9 MAXIMUM ADMITTED LOAD: in present machine configuration.

Graphic Symbol : **MAX** Reading in "Tons", with a decimal point

10 WORKING RADIUS: (distance from the centre of turret slewring to applied load).

Graphic Symbol : **R** Reading in "Metres", with a decimal point

11 WORKING CONFIGURATION:

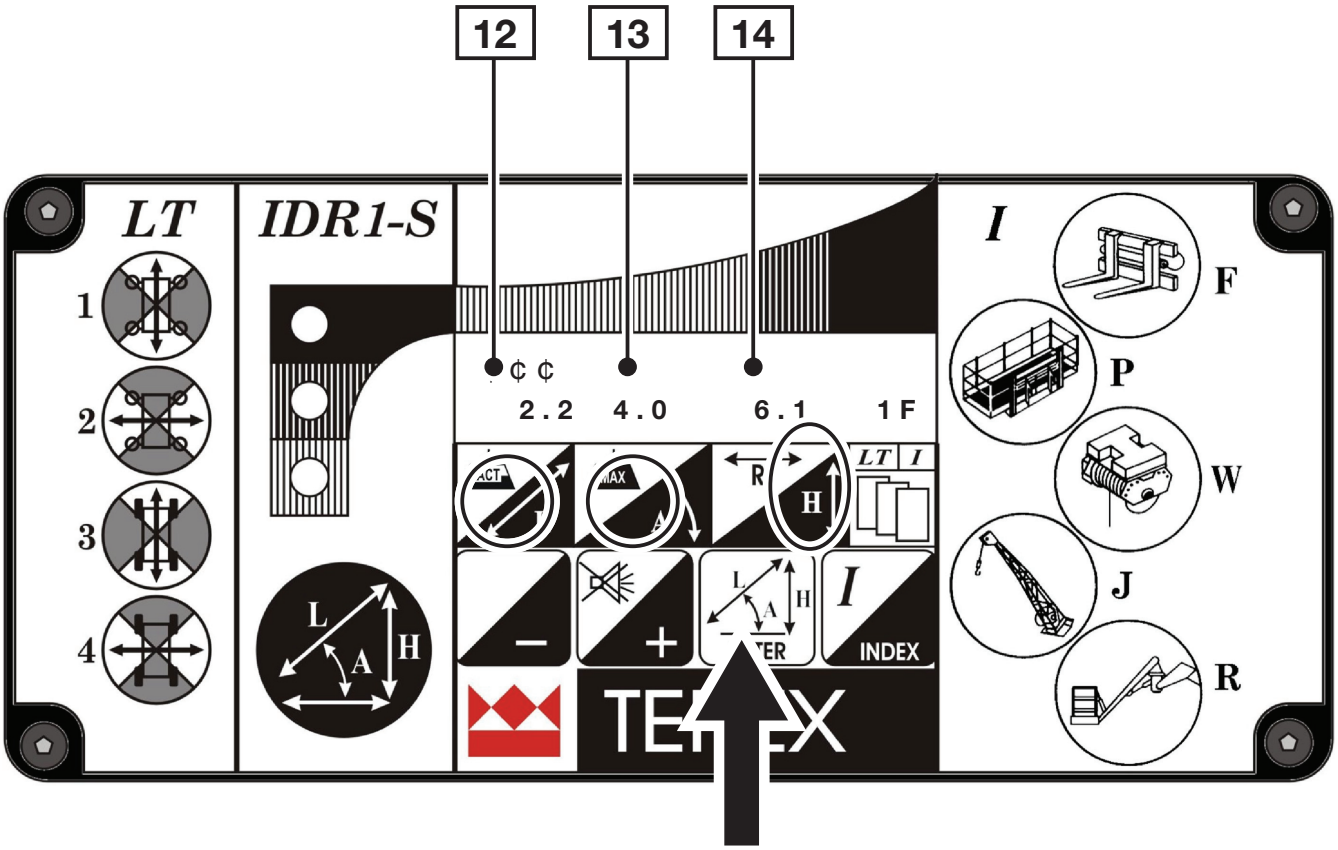
The first figure refers to the Operating Mode Graphic Symbol : **LT**

The second figure refers to the attachment used Graphic Symbol : **I**

NOTE: In case of Imperial Measure System, the weight will be displayed in "Pounds/1000" and the geometric data in "Feet".

Reading of complementary working data on the display

Pressing the ENTER pushbutton the display will show as follows :



For a few seconds, the complementary data values of L, A, H are displayed.
After that, the display gets back to its main reading of ACT, MAX, R.

12 BOOM LENGTH

Graphic Symbol : **L** Reading in “Metres”, with a decimal point.

13 BOOM ANGLE

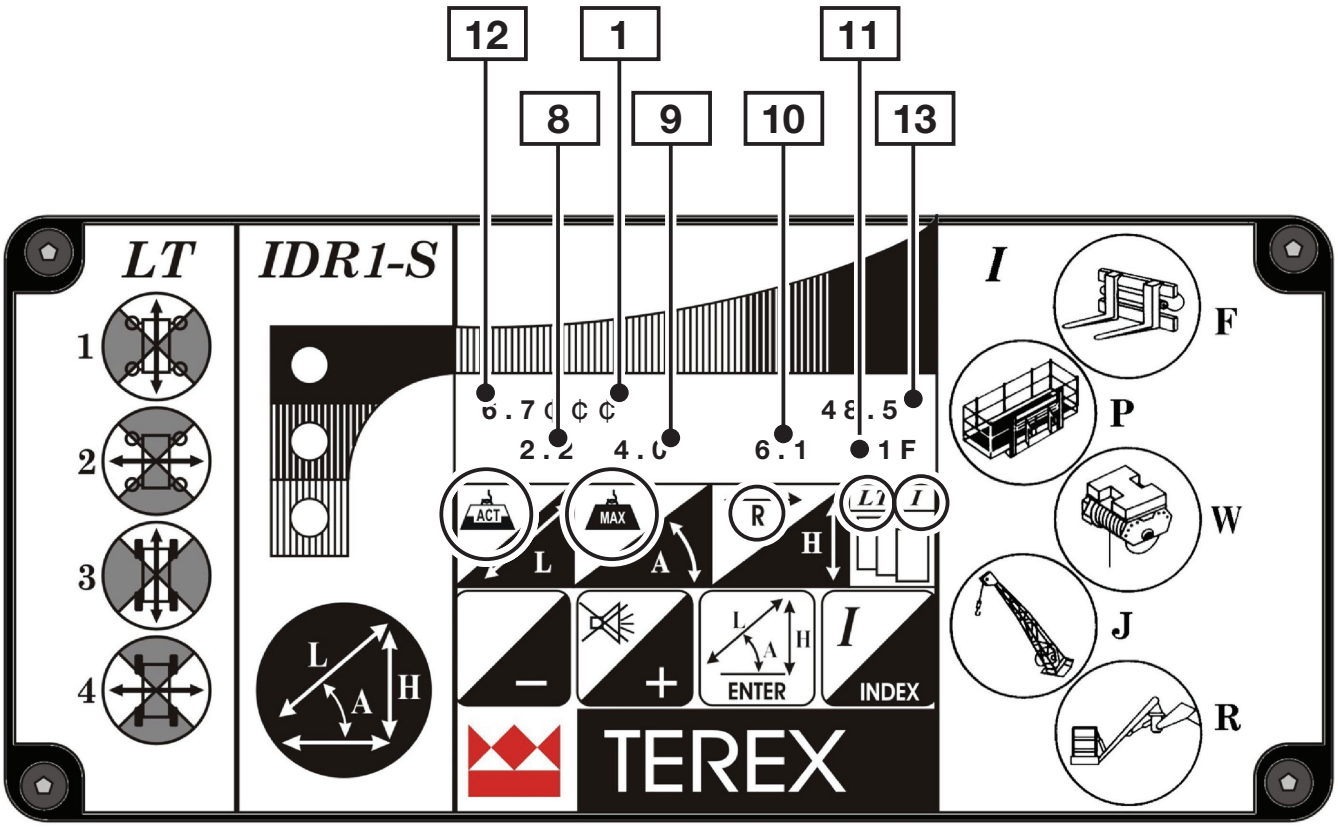
Graphic Symbol : **A** Reading in “Degrees”, with a decimal point.

14 HEIGHT FROM GROUND

Graphic Symbol : **H** Reading in “Metres”, with a decimal point.

NOTE: In case of Imperial Measure System, the weight will be displayed in “Pounds/1000” and the geometric data in “Feet”.

Simultaneous reading of all working data on alphanumerical display (optional)(*)



1 LCD percent bar.
8 LIFTED LOAD WEIGHT **ACT (**)**
9 MAXIMUM ADMITTED LOAD **MAX**
10 WORKING RADIUS **R**
11 WORKING CONFIGURATION **LT, I**
12 BOOM LENGTH
13 BOOM ANGLE

To read the HEIGHT FROM GROUND **H**, press ENTER.

NOTE: for the GRAPHIC SYMBOLS and the METRIC/IMPERIAL UNITS OF MEASURE, see the notes on the previous pages.

THE DISPLAY ALSO ENABLES THE USER TO VIEW OTHER MESSAGES CONCERNING THE SYSTEM OPERATION; SEE NEXT PAGES: **AUTO-DIAGNOSTIC**.

(*) To be set by TEREX according to the customer's specifications or the country of destination.

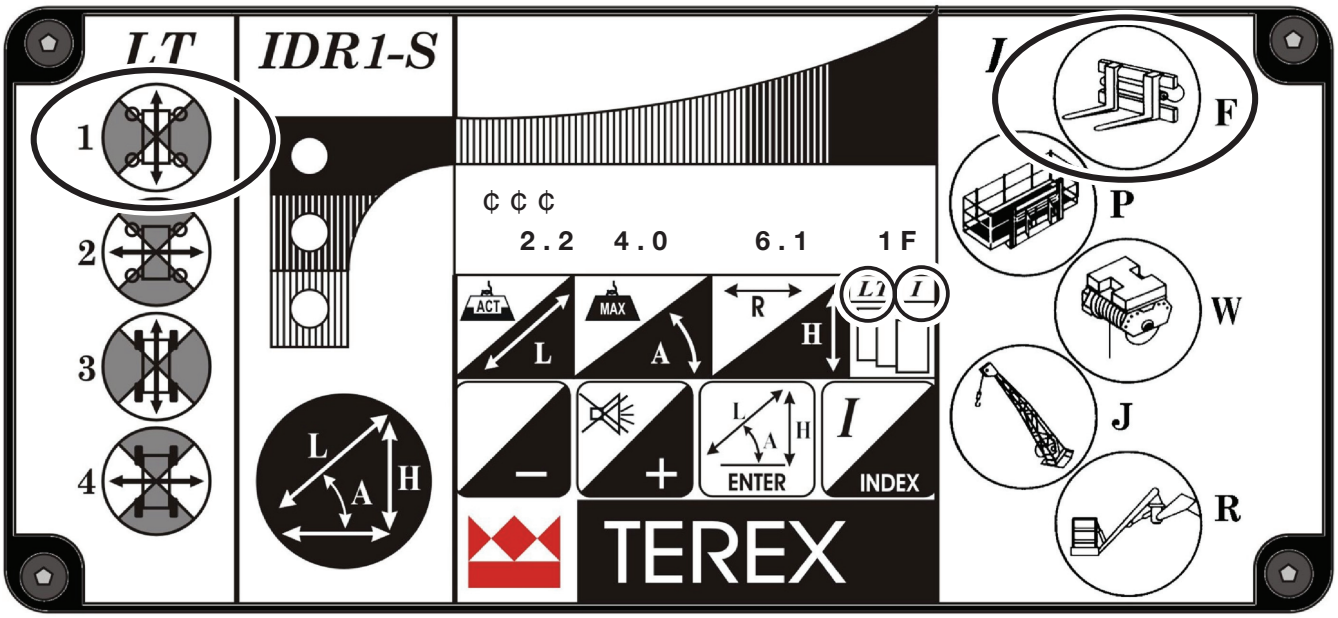
(**) To be set by TEREX according to the customer's specifications or the country of destination. In the basic version, the weight reading is only possible when the boom is fully retracted.

SELECTION OF ATTACHMENT AND OPERATING MODE

Basic messages

Every time that an attachments need to be replaced, i.e. forks get removed and the jib gets fitted, this setting must be done manually on the control panel, selecting the proper related Table (**I**).
The selection of the Operating Mode (**LT**) is automatic because of the external micro-switches.
In the main page, basically displayed, the selected attachment Table **I,** and the machine Operating Mode **LT**, are displayed in the area shown below, by numbers.

Following example of working conditions shows :
LT = **1** Front on Outriggers **I** = **1** Forks.



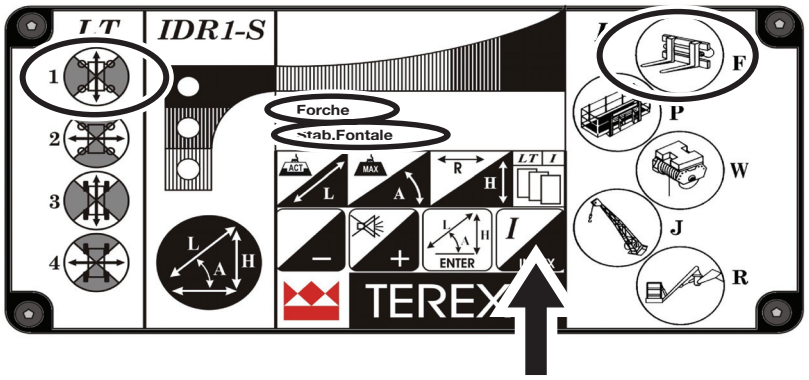
As far as the panel symbols are concerned, possible selections are the following:

Main **LT** (Automatic)
1 = Front on Outriggers
2 = Side on Outriggers
3 = Front on Wheels
4 = Side on Wheels

I (Manual) Selectable from the control panel:
F = Forks
P = Platform
W =Winch
J = Jib
R = Robot

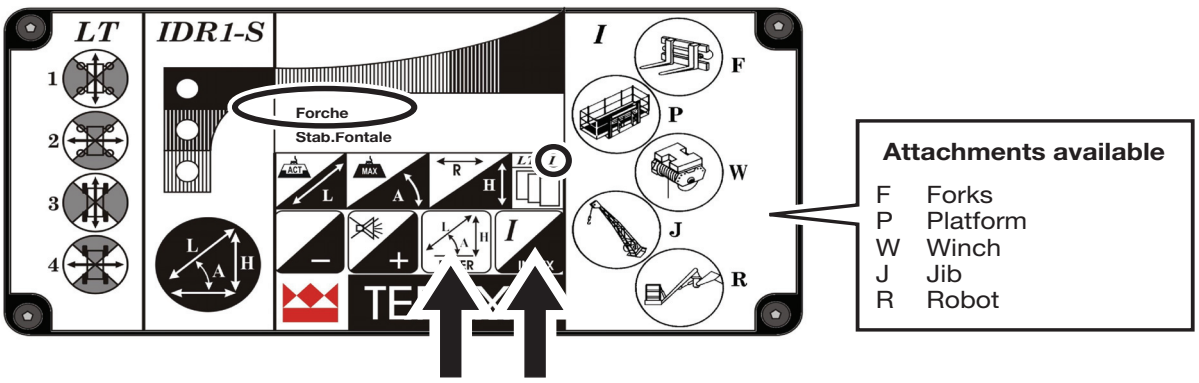
Visualisation as a plain text

For a better comprehension, the working conditions, say the Operating Mode (**LT**) and the Table (**I**) can be displayed as a plain text.
Pressing the INDEX key, the display shows the current Operating Mode and Table of the selected attachment on a clear background.
This reading is displayed for 3 seconds; after that, the display gets back to the main reading.



Setting the table

Starting from the main reading, press INDEX to go to the text page with Operating Mode (**LT**) and attachment Table (**I**).
Now, press INDEX several times to select the Table for the attachment to be used. Every pressure of the key corresponds to the selection of one of the available attachments.
During this phase, the system shuts down automatically.
Once the Table has been selected, press ENTER to **confirm** and activate the command.
Now the machine can be started.
The Table will remain selected even if the system is switched off and on until next manual selection.



CALIBRATION PROCEDURES

This chapter describes the calibration procedures of a machine whose load charts and loadless moments are known and have been saved in the Eprom.
Calibration is done directly on the machine control panel.
The sequence of the calibration phases is as follows:
Initial checks
Mechanical alignment of angle and length transducers
Board initialisation
Client's configuration setting
Transducers calibration
Weight corrections with empty machine
Weight correction with laden machine

INITIAL CHECKS

Before switching the LMI on, check all connections with special attention to power supply cables, transducers and shut-down relays. Check that the Eprom is fitted correctly and that everything is in efficient working order. After that, turn on the machine and proceed with the mechanical alignments of the angle and length sensors.

	Notes	Status
Check of the fixing cable	Cable shall be aligned with the pulley of the cable reel to avoid it can "run out" of the pulley itself	
Check of the fixing cable on the boom head	Cable shall be tightened with a special clamp. To avoid it can come out, use a double fixing with clamp and slot.	
Check of the transducer reading with boom in	Reading shall be approx.100 bit. In special case, when the stroke of the reel is close to the boom length, it can be reduced to max. 30 bit. The transducer alarm is triggered at 10 bit.	
Fixing of pressure transducers	Connectors shall be tight. When using screw-connectors check that there is a seal and the screws are tight.	
Cable harness	Moving cables shall be wrapped correctly to work efficiently in all of the boom positions. In moving parts, the cable shall be wrapped with a sheathing to be free to slide.	

	Notes	Status
Connections in main board	All terminals shall be tightened. Screens shall be isolated and connected to the earth screw. Check that there are residues of peeling or cable in the box or on the board. ***Attention:*** *They can cause a short-circuit even after a certain time.*	
Eprom	The Eprom with the program shall be fitted correctly. Check that all Pins are inserted into the socket. The Eprom shall bear the label with the relevant code.	
Check the software version and the machine type	Tale note of the software version and machine model displayed when the system is switched on. Check that the machine model corresponds to the one currently used. Sw ..... Model:	

ENTERING THE PASSWORD

Three password levels are envisaged.
The first password, with a limited access possibility, is reserved to Technical Assistance Personnel and gives access to replace the transducers.
The second password gives access to a higher level and is reserved to expert TEREX personnel for Calibration or Fine Calibration procedures.
The third password is reserved to TEREX personnel charged of programming.

Switch on the machine and wait for a few second. The following page will be displayed (see beside). Rapidly press the ENTER key once.	**UM101_3 gg-mm-aa** ITM5022
The password setting page should be displayed (see beside). If another page is displayed, you have hold ENTER pressed too much or too little. In this case, you shall switch off and on again and restart.	* Code: 4477
Press the “index” key more times to move the asterisk to the digit you wish and change the value with the “+” and “-” keys. Confirm with Enter. The password will be saved in the Eprom with the other data of the machine. Usually the password is disclosed only to the corporate personnel.	* Code: XXXX
Now the display shows the main page. If the board is new, an alarm "1" can appear on the screen. This is quite normal if the machine has still to be calibrated (it disappears when the data are saved the first time). If, on the contrary, other alarm codes are displayed, it is necessary to find and rectify the faults before going on.	* * * * 0 . 0 0 0 . 0 6 . 8 **1 1**
Press the "**+**" key to enter the "**INITIALIZE**" page. Press "**ENTER**" until displaying "**INIT ALL**". Press "**ENTER**" again to display "**INDEX TO CONFIRM**". Wait for the end of the initialisation then proceed as follows.	

DATA DOWNLOADING ON E2PROM

Every time a parameter is changed or a calibration is done, data must be saved as follows.
If data are not saved, they will get lost in case of power failure.

With the “+” and “-“ keys, display the “01 Save” page.	OPTIONS 01 Save
Press “ENTER” to activate the command. A message will inform that the saving procedure is in progress.	Save In Progress
After that, the message indicated here will be shown. Press INDEX to go back to the main page.	DONE!

CLIENT'S CONFIGURATION SETTING

It enables you to set some configuration parameters of the machine like the display mode, the second level password, etc.

With the “+” and “-” keys, scroll through the menus until displaying the page shown. Press Enter to access to the configuration.	CONFIGURATION 32 Config.
Set the reading language. The Eprom with the tables also stores the operator's messages in 4 different languages. During the machine calibration and depending on the country of the end user, it is possible to select one of the 4 languages available (set the parameter from 0 to 3). To change the parameter, it is enough to enter the maintenance password.	CONFIGURATION Language 0
If readings in Imperial measure system are required, it is necessary to display the page and set the “Eng Unit” parameter. If this parameter is set to “1”, readings will be in pounds per 1000 and feet; otherwise readings will be in tons and metres. The default value is “0” corresponding to the metric units. Remember that the values displayed in Imperial units are only for the operator. The calibrations (for which a password is required) are all in metric units.	CONFIGURATION Eng.Unit 0
Maintenance password. Enables to enter the assistance password. Active only with the calibration password.	CONFIGURATION PW2 1

ACTIVATION OF ACCESSORIES

Enables the user to activate the attachments which have been saved in the Eprom together with the load charts and the data. When placing the machine in service, it is necessary to activate only the attachments which have been supplied together with the machine setting them to "1". All unavailable accessories shall be set to "0".
These parameters can be changed after entering the assistance password.
When the board is initialised, some attachments are de-activated and shall be activated by hand.

With the “+” and “-” keys, scroll through the menus until displaying the page beside. Press Enter to access to the attachments configuration.	CONFIGURATION 33 Tools
The attachments whose tables are saved in the Eprom are displayed in the row at the bottom (in the selected language). If the table in the Eprom is blank, no message will be displayed.	TOOLS Cesto 0
To activate an attachment, -e.g. JIB PT1000”, scroll through the page with the “+” and “-” keys. Press Enter to set the value.	TOOLS PT1000 0
With the INDEX key, move the asterisk to the numerical datum and change it with “+” or “-”. Confirm with Enter. Remember to save the set values.	TOOLS * PT1000 1

CALIBRATING THE ANGLE AND LENGTH TRANSDUCERS

(GEOMETRICAL AUTO-CALIBRATION OF THE LMI)
This operation corresponds to an auto-calibration of the angle and length sensors with the boom OUT/IN and UP/DOWN.

Transducers calibration with Boom In	
Place the machine with the boom fully retracted and the boom at zero degree. With the “+” and “-” keys, scroll through the menu until displaying the page beside. Press ENTER and INDEX to confirm the "BOOM IN" calibration. Check that the angle and length values displayed are correct, then proceed with the calibration in "BOOM OUT" condition.	A00 S 6.8 W.0 12 Transd. Min
Transducers calibration with Boom Out	
Raise and fully extend the boom and check that all of the lifting and extension cylinders are at end of stroke. In this condition, the angle and length measures should correspond to those stored in memory. With the “+” and “-” keys, scroll through the menu until displaying the page beside and press ENTER and INDEX to confirm the "BOOM OUT" calibration.	A78 S20.3 W .0 13 Transd. Max
Check that the angle and length values displayed are correct; in case, retract the boom and check that the angle and length readings are correct for the entire working range. If everything is okay, save the settings (see page 12 - Data downloading on E2PROM).	A78 S20.3 W .0

INITIALISATION OF THE CALIBRATION PROCEDURES

Using the load chart of the attachment to use, check that the weight read on the display matches some known weights.
If a 10% error occurs, it is advisable to proceed with a fine calibration starting from the “Initialisation”.

With the “+” and “-” keys, scroll through the menu until displaying the page beside. Press ENTER to access to the menu.	A00 S 6.8 W.0 26 INIT WEIGHT
Press INDEX to confirm the initialisation procedure = erasing of any previous calibrations	A00 S 6.8 W.0 Index to Confirm

WEIGHT CALIBRATION IN EMPTY CONDITIONS

It is advisable to verify the weight in unladen conditions.
If the value is out of range, proceed with a "fine calibration".

Couple the attachment and with the outriggers lowered to the ground and the turret centred, select the relevant table on the main page.	Forche Stab. Frontale
Confirm with ENTER	**** 0.0 0.0 6.8 1F
Calibration with Boom In	
Place the machine with the boom retracted and completely lowered, then search the calibration page for unladen conditions. Press ENTER to begin the calibration.	A00 S 6.8 W.0 20 Empty
The figure beside shows that the unit is waiting to start the calibration.Press the "+" key to begin the weight correction.	P100 W 5.0 M 5.0 A 60 L20.3 R15.1
The display will appear as follows: W: current weight A: Angle L: Boom length Z: Correction in empty conditions S: Correction in laden conditions Slowly raise the boom to acquire the correct tare weight automatically. The buzzer will emit a short sound to warn of the correction in the selected calibration points. At the end of the calibration, the weight value should be "0". Errors of 100, 200 kg can be tolerated. After that, say when the boom is fully raised, press INDEX to stop the saving procedure and go back to the main page.	Lft W .0 z **XX** A-5 L 6.8 s 0
ATTENTION: *if, despite this calibration, a higher precision in a special boom position is necessary, it is possible to proceed with a LOCAL STATIC CALIBRATION as follows:*	
Place the boom to the **Ac** angle close to the position to be changed ➔ Press ENTER to start the automatic calibration procedure.	P100 W .0 M 5.0 Ac60 L 5.0 R3.1 Lft W .0 z **XX** **Ac**60 L 5.0 s 0

Calibration with boom at half stroke	
Place the machine with the boom 50% extended and completely lowered, then repeat the procedure pressing "+". ***ATTENTION:*** *To improve the precision in a specific position, see previous step.*	P100 W 5.0 M 5.0 A 60 L12.3 R15.1 Lft W .0 z **XX** A-5 L 12.0 s 0
Calibration with boom out	
Place the machine with the boom fully extended and lowered, then repeat the procedure. ***ATTENTION:*** *To improve the precision in a specific position, repeat the local static calibration procedure.*	P100 W 5.0 M 5.0 A 60 L19.4 R15.1 Lft W .0 z **XX** A-5 L 14.0 s 0
After the corrections in empty conditions, save the settings. Display "01: Save" and confirm with ENTER (page 12).	A00 S 6.8 W.0 01 Save

ATTENTION: *Only 5 static corrections are possible as, for each of them, a specific load chart is necessary. When the 5 load charts have been programmed, the system does not accept other corrections.*

WEIGHT CALIBRATION IN LADEN CONDITIONS

Now you can go on with the calibration of the weight in laden conditions. Two sample weights are necessary, one close to the maximum value (e.g. 4 tons) and another weight that the boom can handle when it is almost fully extended (e.g. 1 ton).

SETTING A KNOWN WEIGHT	
Display “21 Laden Act” and set the value of the known weight.	A00 S 6.8 W 3.8 21 LadenAct 4.00
To enter the value, press ENTER to view the asterisk, then with the INDEX key move the asterisk to the value and change with “+” and “-”. Confirm with **ENTER**.	* 21 LadenAct 4.00
SETTING IN LADEN CONDITIONS WITH BOOM IN	
Display “22 Laden” and activate the procedure pressing ENTER.	A00 S 6.8 W 3.8 22 Laden
Place the machine with the boom retracted and completely lowered. Raise the sample weight and start the procedure pressing “+”.	P100 W 4.0 M 5.0 A 60 L 6.8 R15.1
As explained before, slowly raise till the maximum angle and check that the read weight matches the set known weight automatically.	Lft W 4.0 z XX A-5 L 12.0 s **0**
ATTENTION: *if, despite this calibration, a higher precision in a special boom position is necessary, it is possible to proceed with a LOCAL STATIC CALIBRATION as follows:*	
Place the boom to the **Ac** angle close to the position to be changed. Press ENTER to start the automatic calibration procedure →	P100 W .0 M 5.0 Ac60 L 5.0 R3.1 Lft W .0 z **XX** **Ac**60 L 5.0 s 0

CALIBRATION OF A 1-TON KNOWN WEIGHT

Now proceed with the weight calibration with the boom extended. Display “21 Laden Act” and the value of the known weight (1 ton)	A00 S 6.8 W 3.8 21 LadenAct 1.00
Go on with “22 Laden ”	A00 S 6.8 W 0.9 22 Laden
Raise the 1-ton weight and extend the boom as far as possible. Amend the value during raising and check that the displayed value corresponds to the known weight set. ***ATTENTION:*** *To improve the precision in a specific position, repeat the local static calibration procedure.*	P100 W 1.0 M 5.0 A 60 L12.8 R15.1 Lft **W 1.0** z 21 A-5 L 6.8 s 122
Check the shut-down in different angle and length positions and always save the settings - “01 SAVE” Page 12	

ATTENTION: *Only 5 static corrections are possible as, for each of them, a specific load chart is necessary. When the 5 load charts have been programmed, the system does not accept other corrections.*

THE "FINE CALIBRATION" HAS ENDED.

If the weight calibration is not sufficiently precise, it is possible to do some "corrections" to force the data on the display using specific coefficients which affect the data processing.

Dynamic corrections in empty conditions

Some weight corrections are possible during lifting and lowering to compensate the increase or reduction, respectively, of the weight in dynamic conditions.

Display this page and press ENTER	`A 0 L 6.8 W0.0` `23 Empty Dynamic`
For the correction during lifting select the page shown and enable the correction pressing ENTER	`A XX W XX.X` `Lifting XXX`
W = current weight A = current angle “u” = (Up) lifting in progress “d” = (Down) lowering in progress “c” = (Centred) angle fixed point (*) XXX = current correction * = digit to change Attempt to increase or reduce the value till reaching a good compromise, then confirm with ENTER. The "up" correction value can range from -40 to -100. Press ENTER to save the datum.	`AuXX WXX.X *` `Lifting XXX`
Go on with the correction during lowering (“+” and “-“ keys) Display the page beside and press ENTER	`A XX W XX.X` `Lowering XXX`
W = current weight A = current angle “u” = (Up) lifting in progress “d” = (Down) lowering in progress “c” = (Centred) angle fixed point (*) XXX = current correction * = digit to change As explained above, increase or reduce the value till reaching a reasonable compromise. Values can range from 200 to 500.	`A XX WXX.X *` `Lowering XXX`

(*) “c” identifies some specific positions to which the system refers for the correction acquisition.

Dynamic corrections in laden conditions

With the boom retracted, raise a high weight and proceed with the following procedure which is similar to the previous one.

Display this page and press ENTER	`A 0 L 6.8  W 0.0` `24 Laden Dynamic`
For the correction during lifting select the page shown and enable the correction pressing ENTER	`A XX W XX.X` `Lifting  XXX`
W = current weight A = current angle “u” = (Up) lifting in progress “d” = (Down) lowering in progress “c” = (Centred) angle fixed point (*) XXX = current correction * = digit to change Attempt to increase or reduce the value till reaching a good compromise, then confirm with ENTER. Press ENTER to save the datum.	`AuXX WXX.X *` `Lifting  XXX`
Go on with the correction during lowering (“+” and “-“ keys) Display the page beside and press ENTER	`A XX W XX.X` `Lowering  XXX`
W = current weight A = current angle “u” = (Up) lifting in progress “d” = (Down) lowering in progress “c” = (Centred) angle fixed point (*) XXX = current correction * = digit to change As explained above, increase or reduce the value till reaching a reasonable compromise. Don't forget to save (“01 SAVE” – Page 12)	`A XX WXX.X  *` `Lowering  XXX`

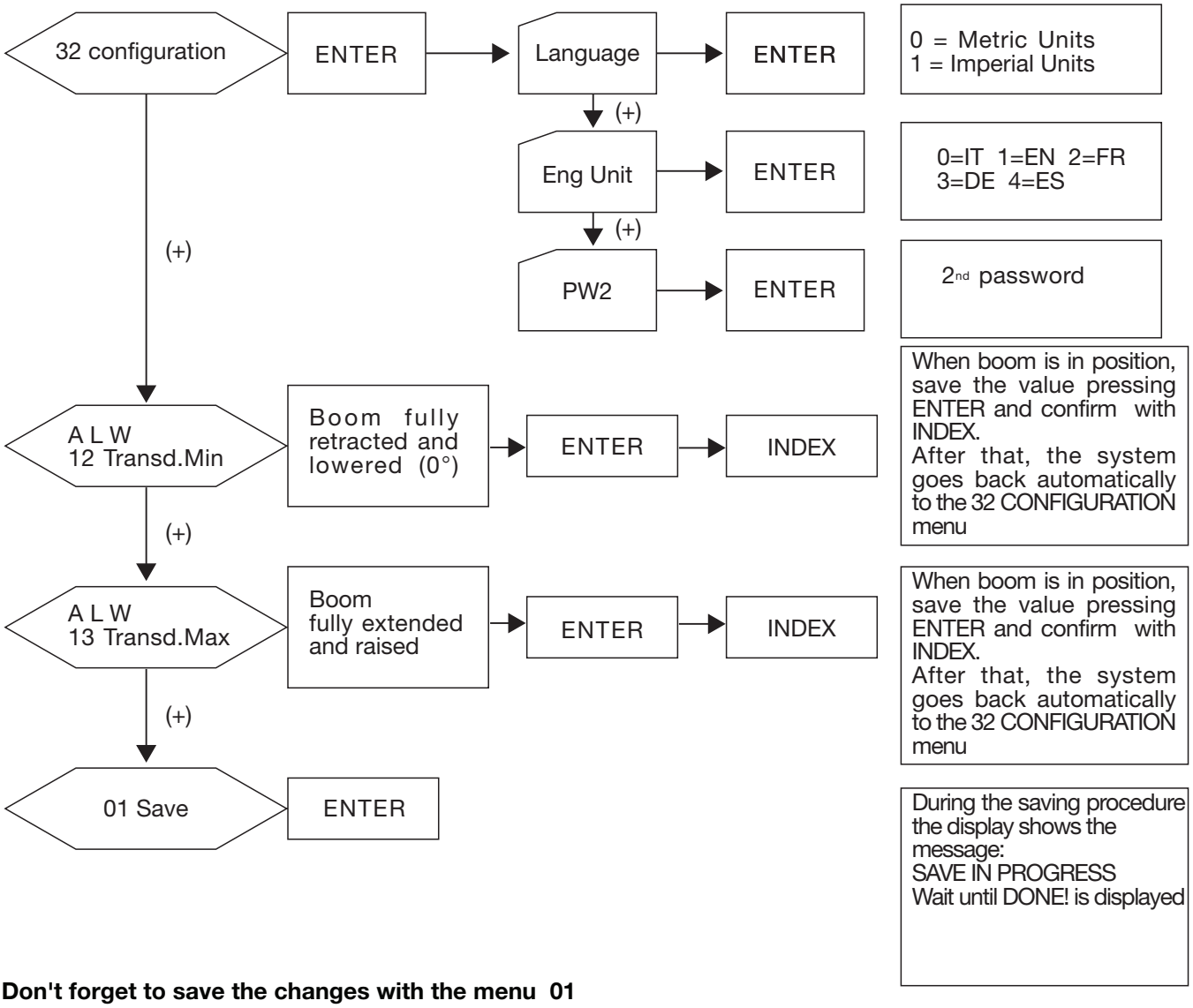
(*) “c” identifies some specific positions to which the system refers for the correction acquisition..

SUMMARY - ACCESS TO MENUS AND RELATED FUNCTIONS

1 When the machine is turned on, the display shows the software version. Press ENTER.

2 Type in the first password moving the asterisk with the INDEX key to the required digit and changing its values with (+) and (-).
Press ENTER to confirm the password.

3 When the first password is entered, the standard readings are displayed.
To gain access to the menus, press ENTER. To scroll through the menus, use the (+) key.

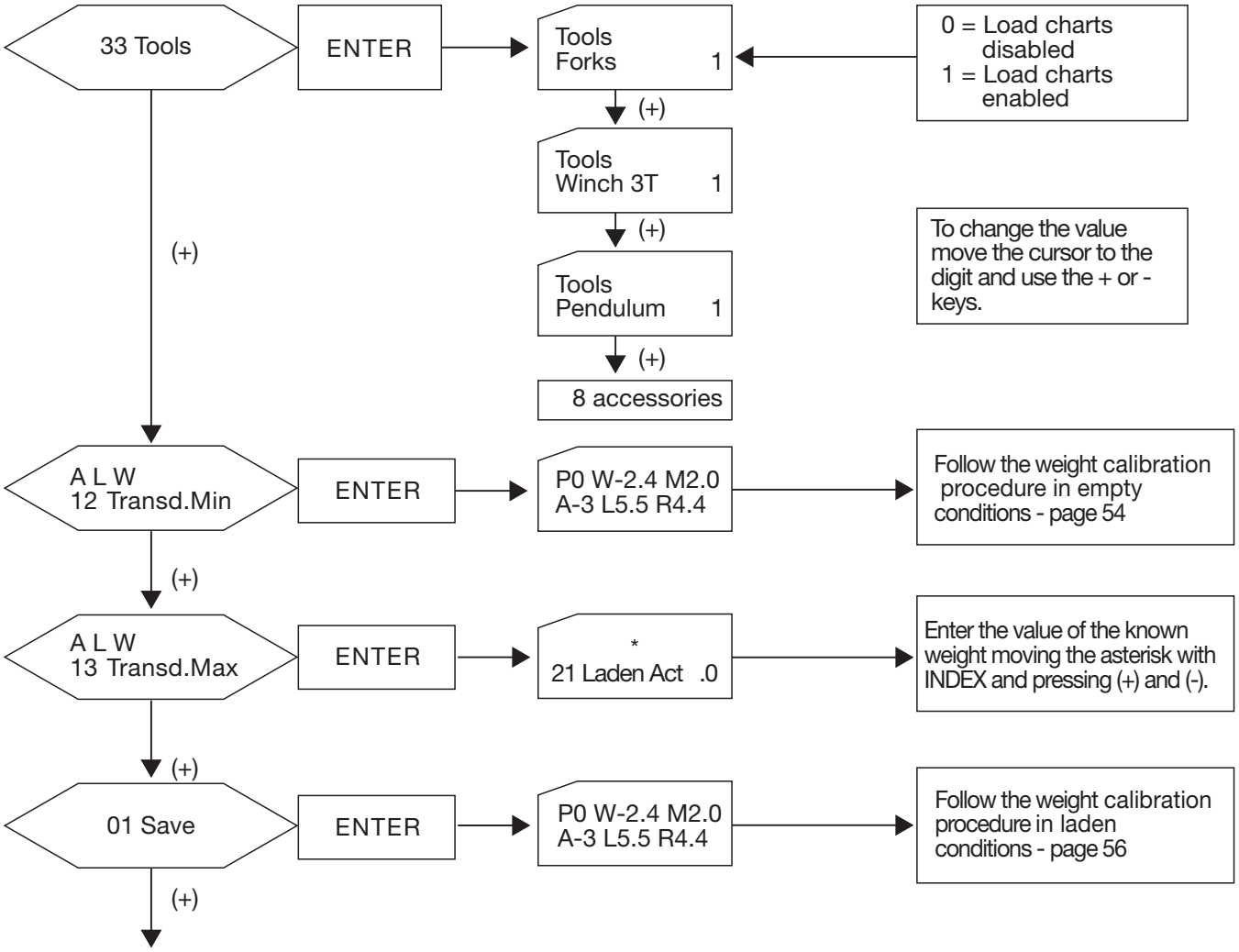


Don't forget to save the changes with the menu 01 SAVE.
Wait for the message DONE! before turning the machine off.

4 To access to the other Menus, it is necessary to type in the 2nd password.
Proceed as follows: with the INDEX key move the asterisk to the digits and with (+) and (-) change the value; press ENTER to confirm.

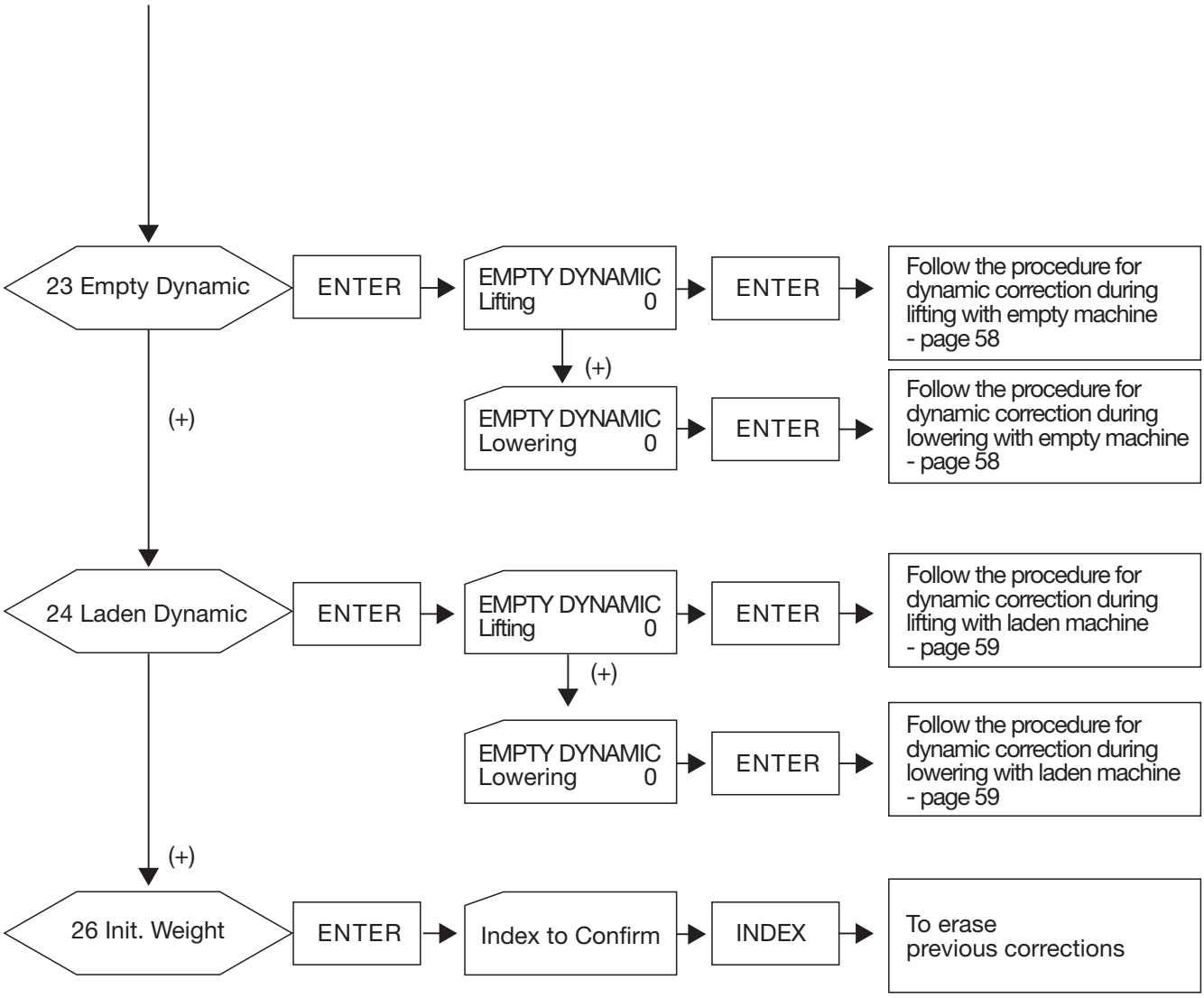
5 To access to any menu press ENTER.
To scroll through the menus, use the (+) and (-) keys.

6 The 2nd password gives access also to menus 12, 13, 32 and 01.



Don't forget to save the changes with the menu 01 SAVE.
Wait for the message DONE! before turning the machine off.

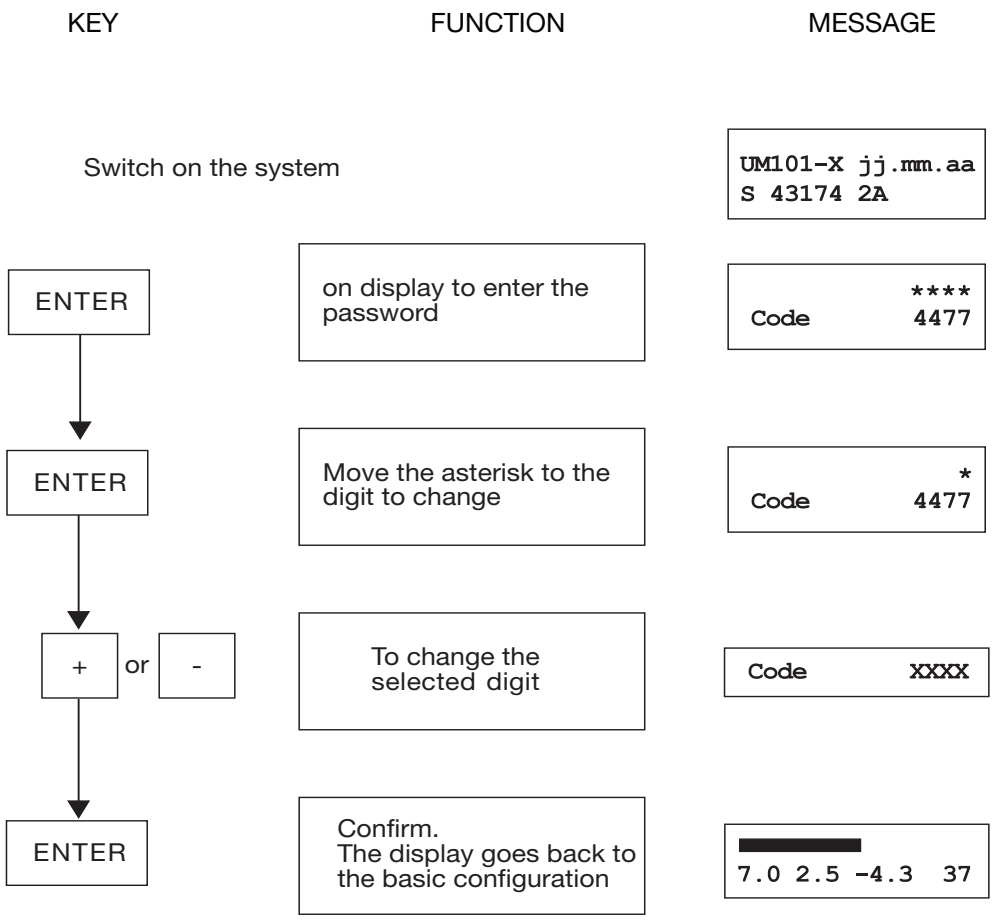
3B6 OVERLOAD WARNING SYSTEM



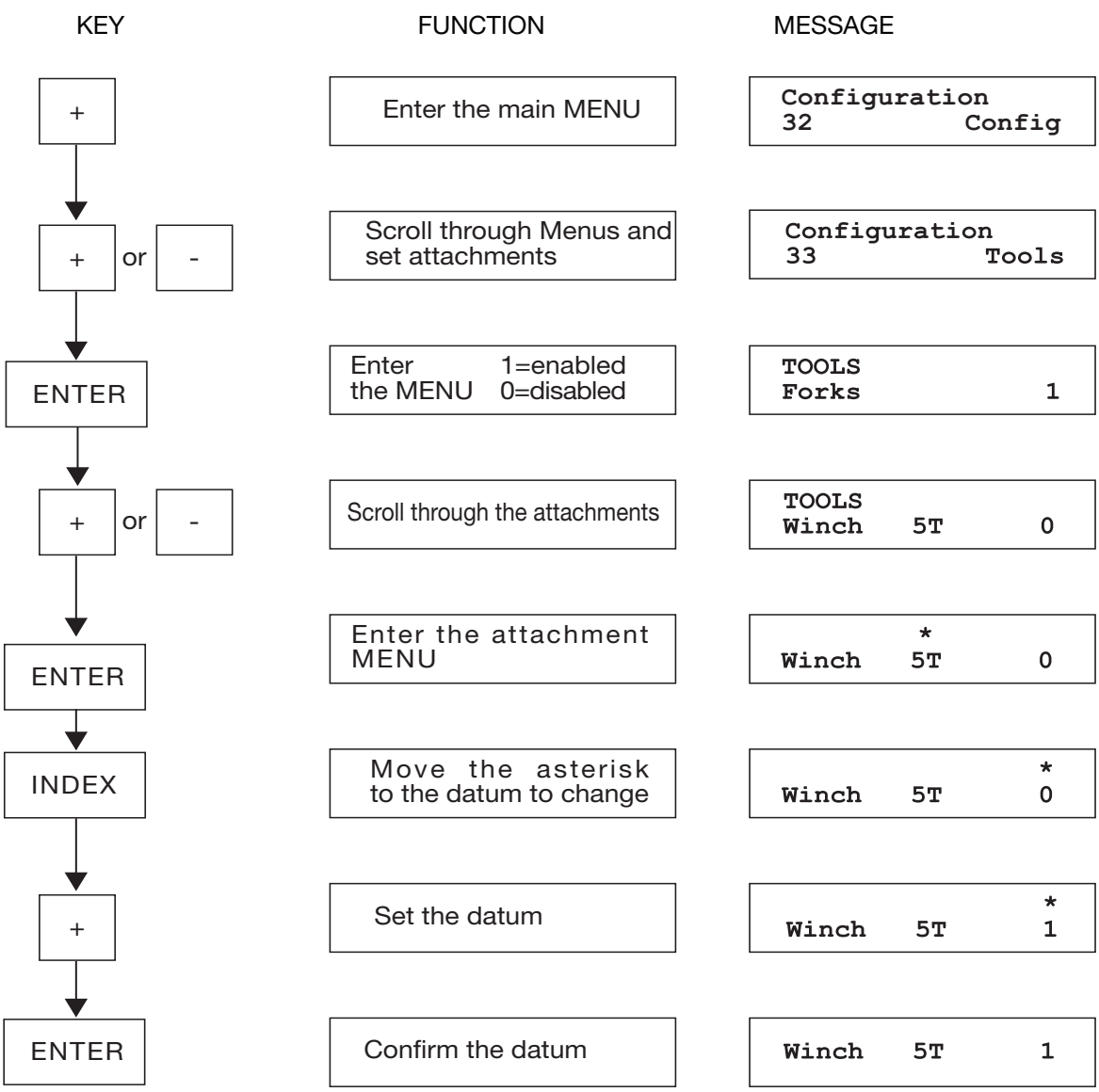
Don't forget to save the changes with the menu 01 SAVE.
Wait for the message DONE! before turning the machine off.

SUMMARY - PROGRAMMING PROCEDURES ON DISPLAY

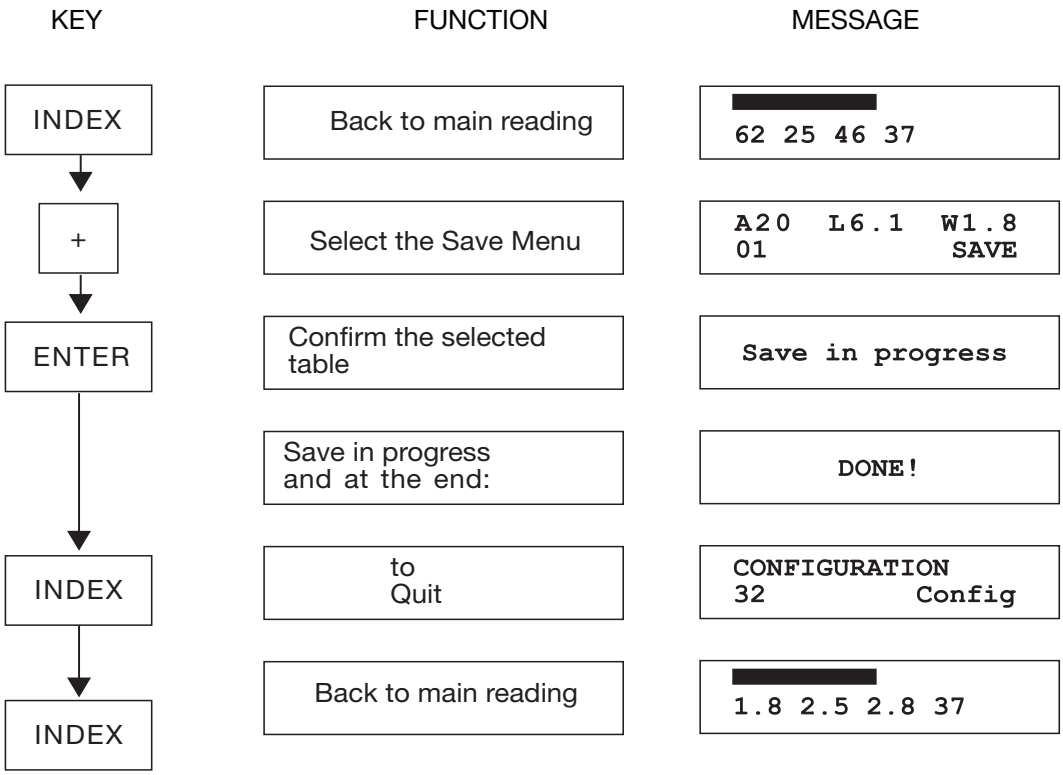
1 - FIRST PASSWORD



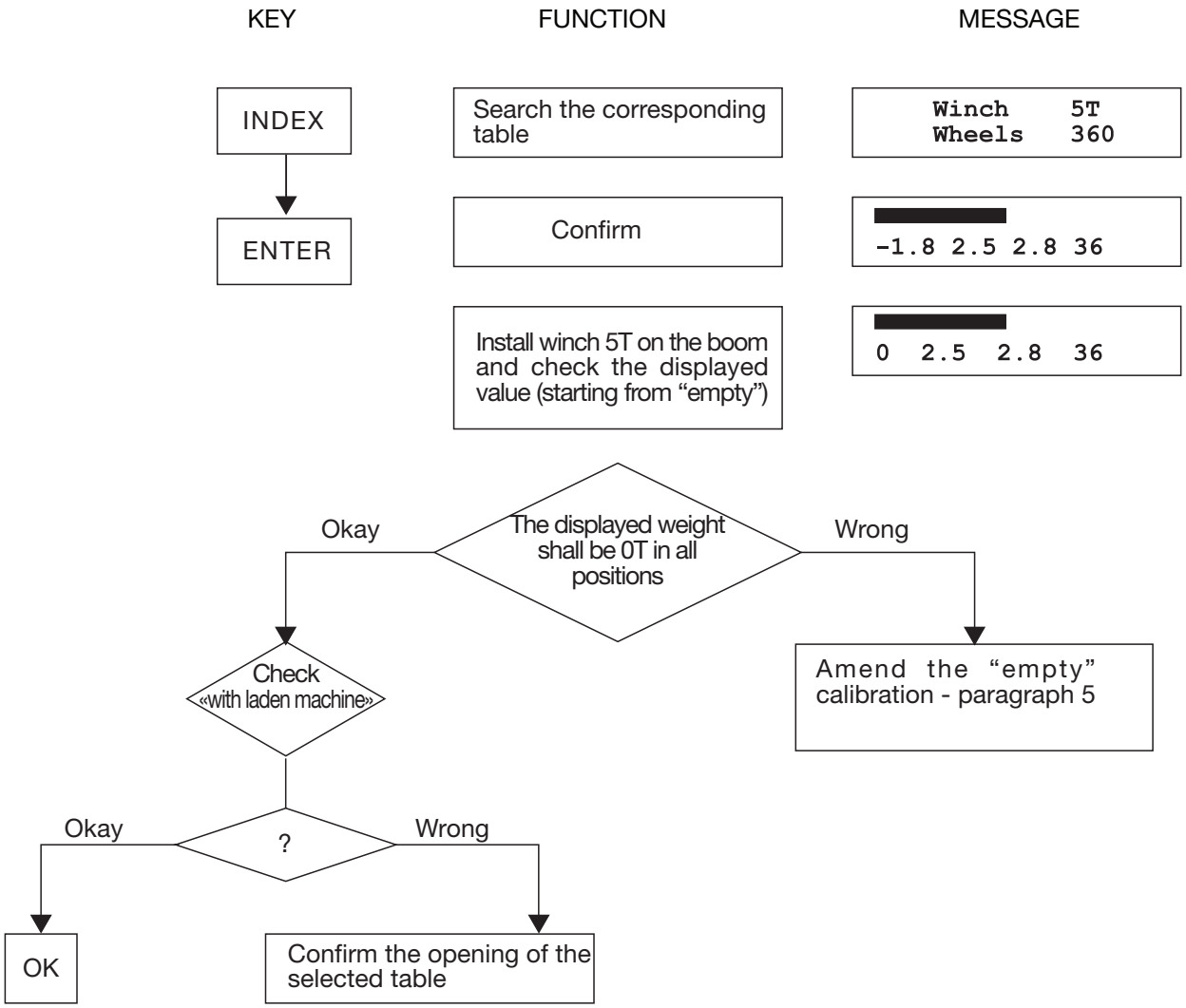
2 - Attachment selection (saved load charts)



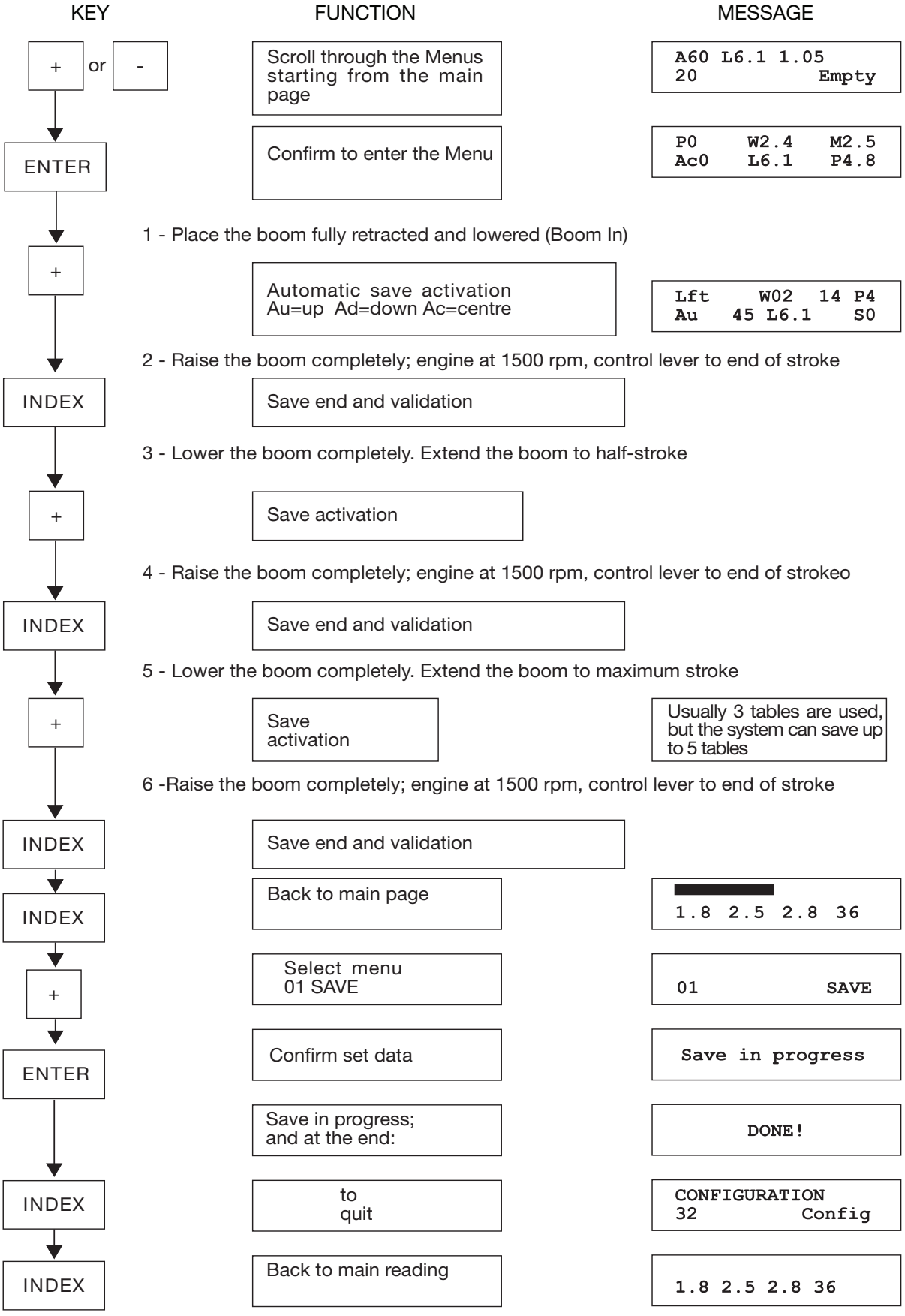
3 - Saving the selected load charts



4 - Selection of the attachment to calibrate



5 - «Empty» calibration correction (on wheels)



6 - «Laden» calibration correction (on wheels)

After the "empty" calibration correction, check if the "laden" calibration is correct (use two known weights).
1 close to the maximum weight (e.g. 4.3 tons)
1 close to the minimum weight (e.g. 0.6 tons)

6 - A Entering the value of the load weight

KEY	FUNCTION	MESSAGE
+	Select the related menu	A60 L6.1 W-1.8 21 Ladenact .0
ENTER	Confirm and access to the menu	* 21 Ladenact .0
INDEX	Move the asterisk to the datum to change	* 21 Ladenact .0
+ or -	Set the correct value: this is the weight of the load to handle (precision ± 10Kg) = 4.3 T	* 21 Ladenact 4.30

This value is required for the calibration correction with maximum value Boom retracted (see also 6B)

ENTER	Confirm	A60 L6.1 W-1.8 21 Ladenact 4.30

6 - B Calibration correction (5 charts available)

KEY	FUNCTION	MESSAGE
+	Select the related menu	A65 L6.1 W -1.7 22 Laden
ENTER	Confirm and access to the menu	P10 W2.2 M 2.5 A-2 L 6.1 R 4.6

Boom in (fully retracted and lowered). Apply the 4.3 ton load.

+	Save activation	Lft W4.9 20 Au 57 L.6.1 R4.6

Raise the boom; engine at 1500 rpm, control lever to end of stroke: automatic save procedure

INDEX	Save stop	P192 w 4.4 M 2.5 A 58 L 6.1 R 2.9

Remove the weight and apply the 0.6 ton weight. Extend the boom and repeat the steps above to amend the calibration with the boom extended.
ATTENTION: *Don't forget to enter the value of the weight shown in 6A: Entering the value of the load weight*

At the end confirm the corrections:

INDEX	Back to main menu	01 SAVE
+	Select the SAVE menu	SAVE in progress
ENTER	Confirm	DONE!
		32 Config.
INDEX	Back to main menu	
INDEX	Back to basic reading	

7 - Dynamic «empty» correction

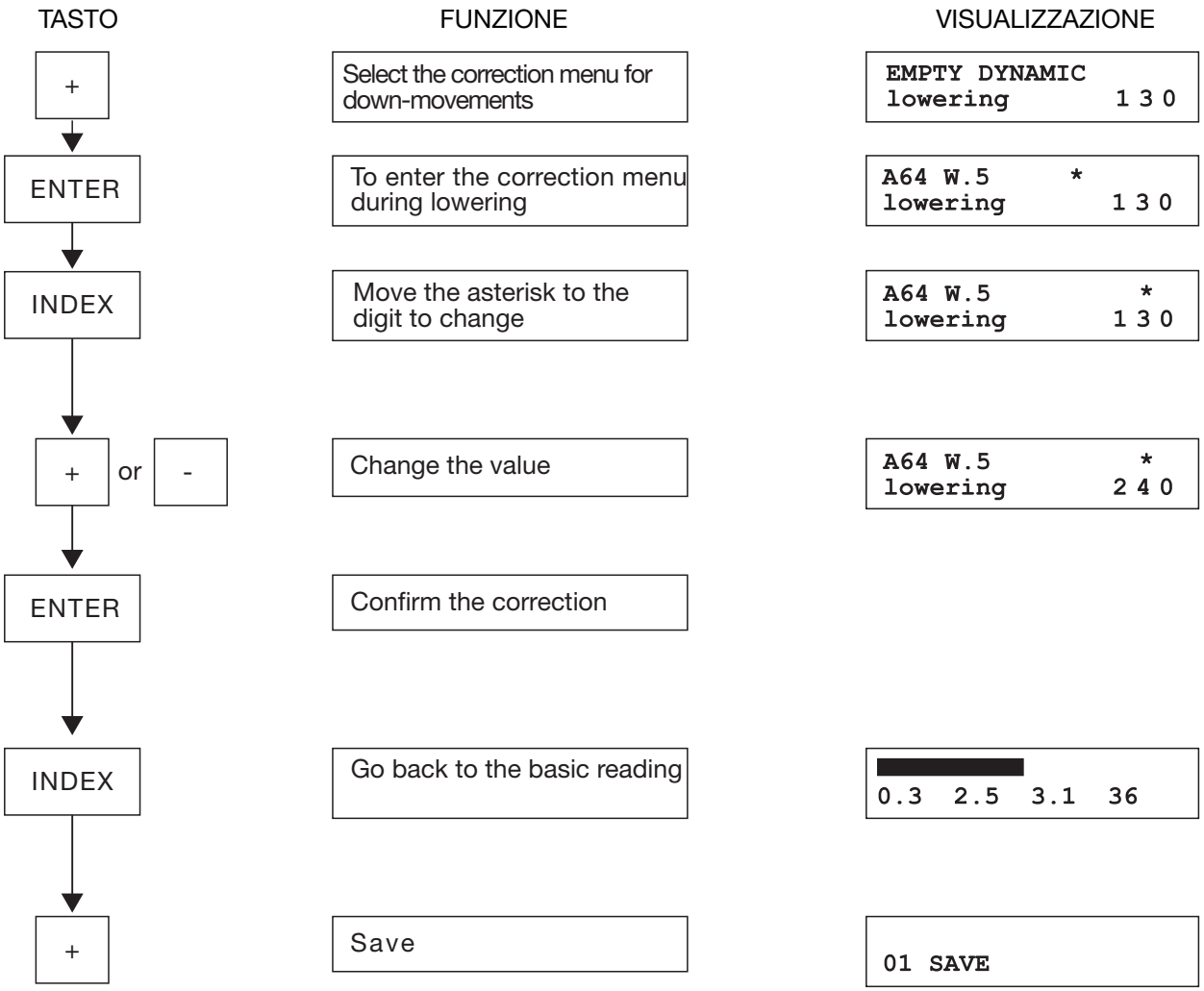
7 - A Correction during lifting

KEY	FUNCTION	MESSAGE
+	From the basic reading, scroll through the menus up to 23.	A64 L5.5 W0.5 23 Empty Dynamic
ENTER	Confirm and enter the menu (-150 = correction coefficient)	EMPTY DYNAMIC Lifting -150
ENTER	To enter the «correction»	A64 W.5 * Lifting -150
INDEX	Move the asterisk to the digit to change (–500 to +500)	A64 W.5 * Lifting -150
+ or -	Change the value Value coeff. sign - increases decreases + increases decreases	A64 W.5 * Lifting -250

W is the weight and must be «0» because no weight is applied.
W is the calculation result. The value to change is a coefficient which intervenes in the processing so as to obtain a calculation reading of 0 kg. This is an operation to fine-calibrate the weight. This operation only applies to up-movements.

ENTER	Confirm the «empty» correction: empty/dynamically/lifting	EMPTY DYNAMIC Lifting -250

7 - B Correction during lowering

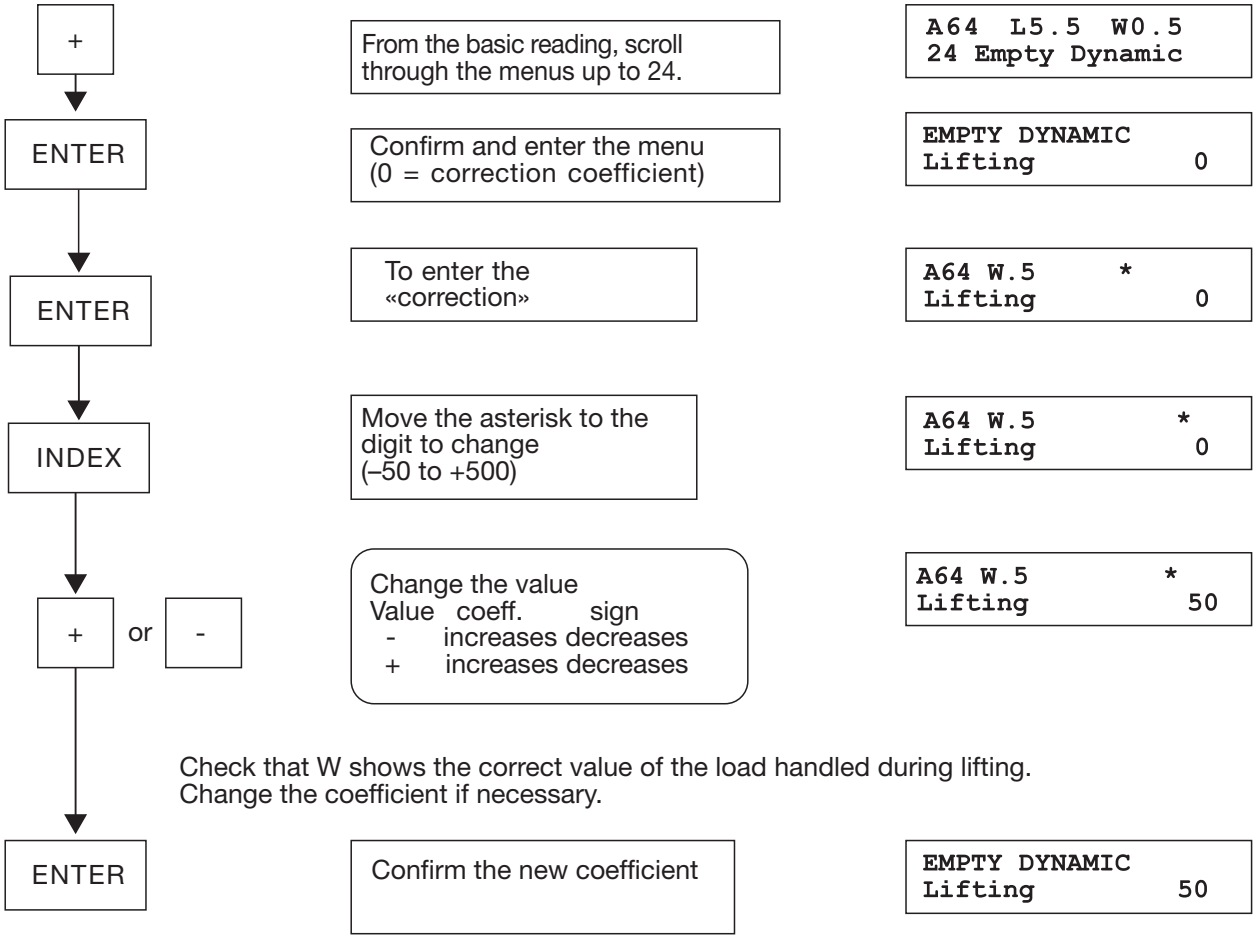


W is the weight and must be «0» because no weight is applied.
W is the calculation result. The value to change is a coefficient which intervenes in the processing so as to obtain a calculation reading of 0 kg. This is an operation to fine-calibrate the weight.
This operation only applies to down-movements.

8 - Dynamic «laden» correction (*)

8 - A Correction during lifting

Apply a weight equal to about _ the maximum admissible load.



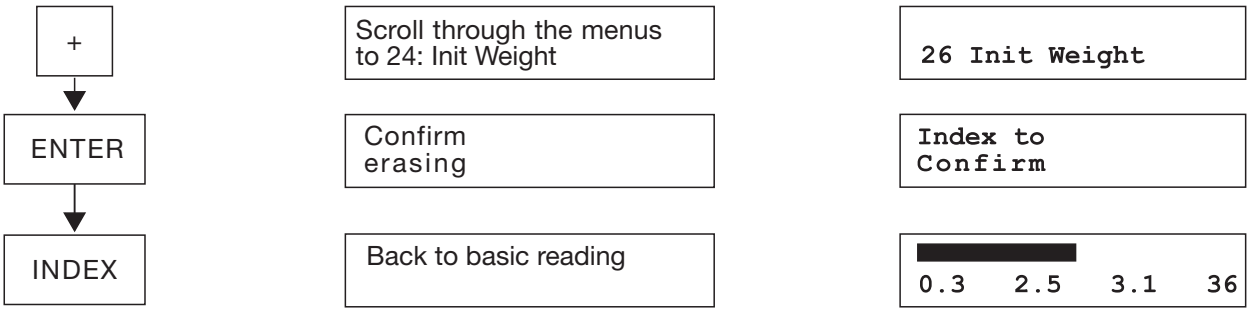
8 - B Correction during lowering

Repeat the procedures of paragraph 7 - B, but «with load» equal to about 1/2 the maximum admissible load.

(*) TIP:
With load almost equal to _ the maximum load to be handled by the machine.

9 - Erasing the calibration/attachments tables with or without load

Select the attachment to re-calibrate (erasing)



After that, proceed with calibrations 5 + 6
(«empty» and «laden» calibration procedures)

DATA DOWNLOAD FROM PC TO LMI (*)

Following procedure is required when data memorised into the PC must be downloaded into the LMI memories.
Connect the cable (supplied by 3B6) to the RS232 port of PC, and the MS4 terminal strip inside the U2MIC main control unit (see page 8).
Select prompt MSD on PC.
To start the program type in SAVE on the keyboard, and press ENTER.
The display will show:

```
1 : SAVE DATA FROM TRUCK TO COMPUTER
2 : LOAD DATA FROM COMPUTER TO TRUCK
5 : PREPARE DISKETTE
6 : SHOW DATA
0 : EXIT
```

Selecting 2, the list of all the programs saved in the PC will be displayed.
Example:

```
PROGRAMS LIST
00 5022.E14      dd/mm/yy hh:mm am
01 3514.E14      dd/mm/yy hh:mm am 00
___
```

Select the index corresponding to the model of the required machine (00, 01, 02…) and press ENTER.
The display will show:

```
Page xxx of 512
```

This counter will increase from 0 to 512; after that all data will be downloaded.
Press any key to continue.

(*) IThe saved data are the ones stored during the factory programming of the machine and saved on a Floppy-Disk. Data can also be e-mailed, by MCI directly to the PC.

DATA DOWNLOAD FROM LMI TO PC AND FROM PC TO FLOPPY-DISK

Some other uploading/downloading functions from PC to LMI exist:

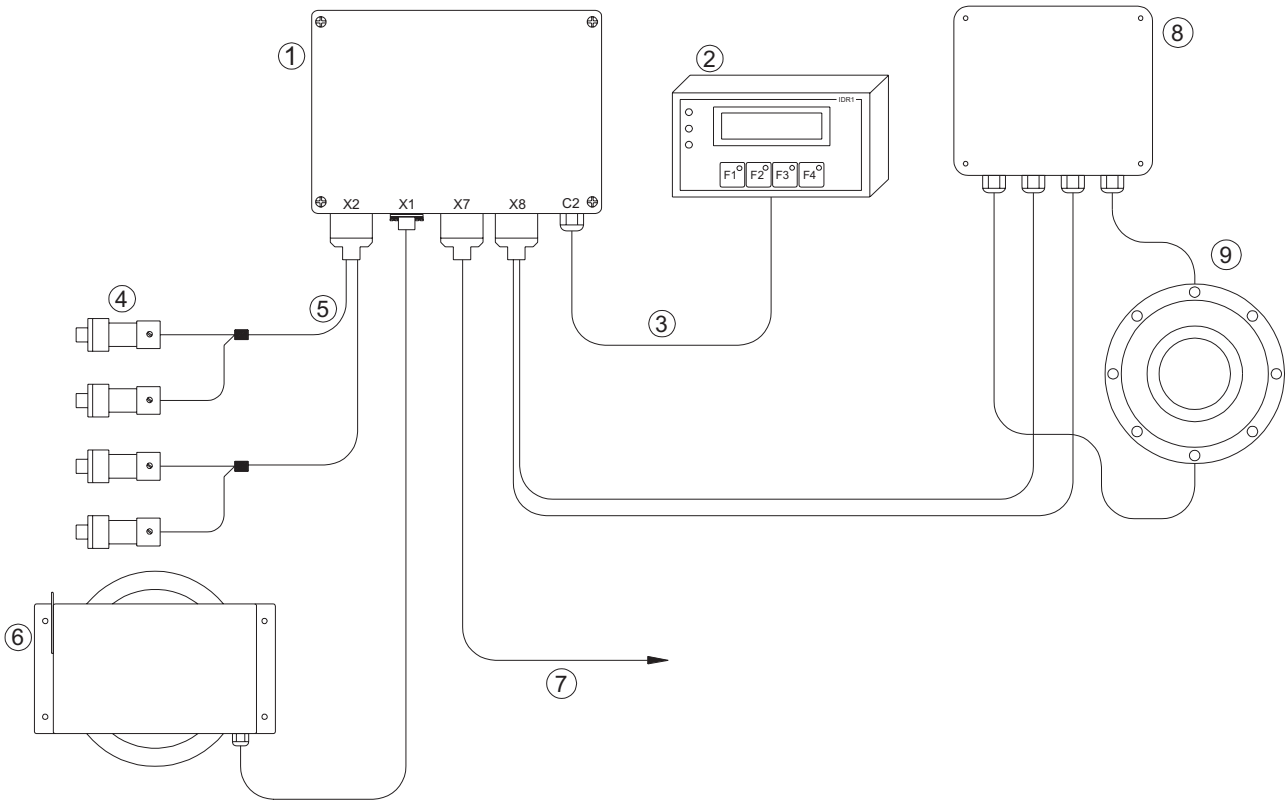
SELECTION 1 — This function is needed to save data from LMI to PC.
When PC requires it, enter the name of the File that must be saved (8 figures maximum). After that press ENTER.

SELECTION 5 — This function is needed to download data from PC to a Floppy-Disk.
Insert a Floppy-Disk into the driver and press ENTER.
Type in the name of the File to be saved and press ENTER.

SELECTION 6 — This function is needed to display the data of the saved files directly on the PC screen

SELECTION 0 — This function is needed to exit the program.

SYSTEM LAYOUT AND CONNECTIONS



1	Main Unit
2	Control Panel
3	Panel Cable
4	Pressure Transducers (4)

5	Pressure Transducers Cable
6	Angle/Length Sensor
7	Power and In/Out Cable
8	EXCEL unit (2 channels)
9	Load Cell