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FRONT AXLE

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GENERAL FEATURES

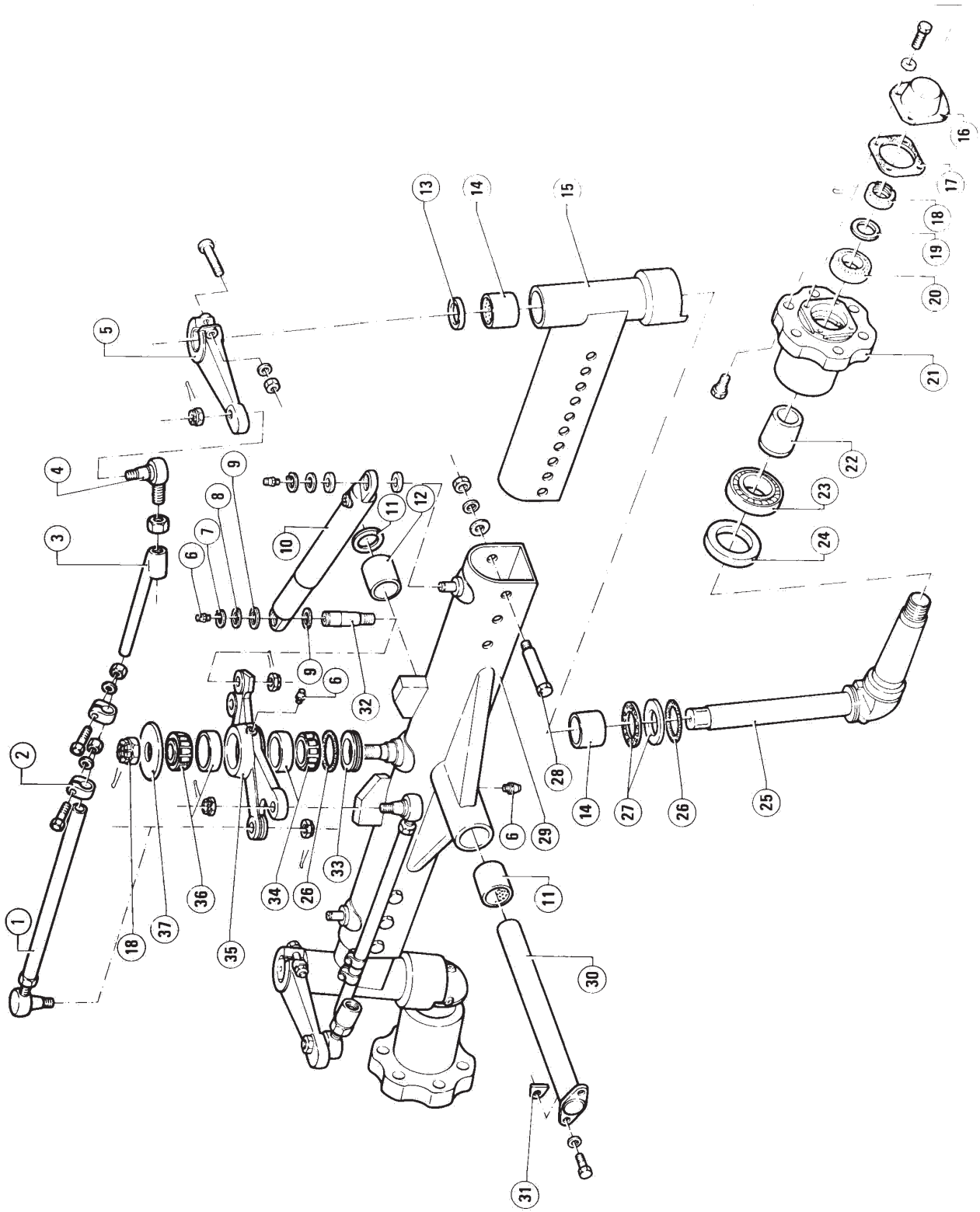
The group of telescopic type, substitutes the driving axle in the two-wheel drive models, although maintaining the same robustness and solidity. It is composed of a central axle which is secured to the front mounting through a pin, and two side axles. It permits the track to be adjusted according with the use requirements.
In addition to the shafts and wheel hubs, the side axles, also hold the steering tie rods through levers.
The steering movement is obtained through two power steering and transmission levers placed in central position.

FRONT AXLE ASSEMBLY

1 - Steering tie rod
2 - Clamp
3 - Sleeve
4 - Ball joint
5 - Steering central lever
6 - Grease nipple
7 - Seeger ring
8 - Fifth wheel
9 - Gasket
10 - Power steering
11 - Shovel ring
13 - Gasket
14 - Bush
15 - LH side axle
16 - Cover'
17 - Gasket
18 - Castle nut
19 - Shoulder ring
20 - Outer bearing
21 - Wheel hub
22 - Spacer
23 - Inner bearing
24 - Seal ring
25 - Wheel shaft
26 - O-ring
27 - Thrust bearing
28 - Pin
29 - Central axle
30 - Pin securing axle
31 - Shim
32 - Pin
33 - Disk
34 - Lower tapered roller bearing
35 - Steering central lever
36 - Upper tapered roller bearing
37 - Cover

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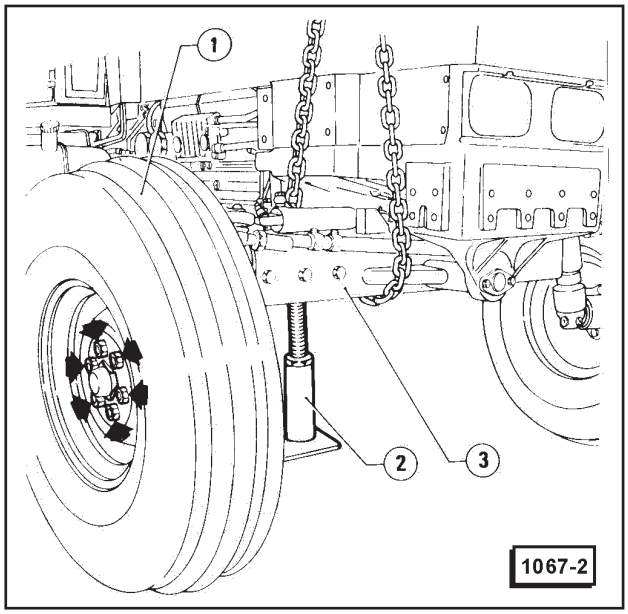


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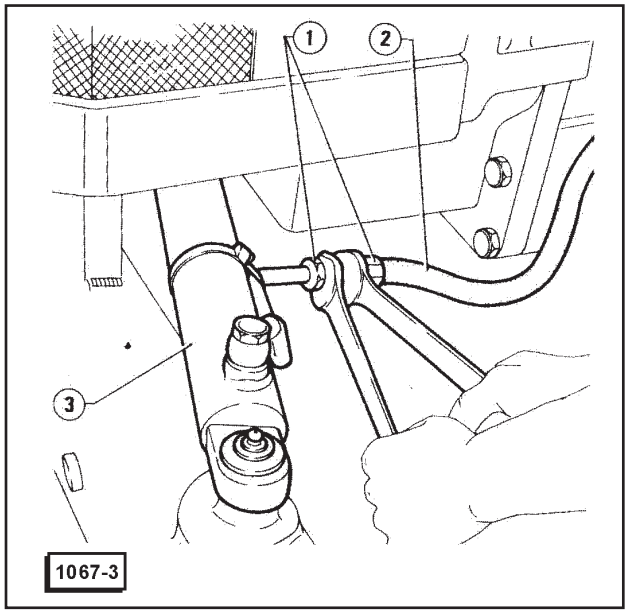
REMOVAL

1. Leave the vehicle on a level surface, operate the parking brake, and position a safety stand **2** under the engine oil sump, interposing a wooden block to prevent metal parts coming into contact.
2. Unscrew the six nuts securing wheels **1**.
3. Sling front axle **3** with a chain, and lift the vehicle.
4. Remove the wheels, then lower the vehicle resting it on safety **2**.



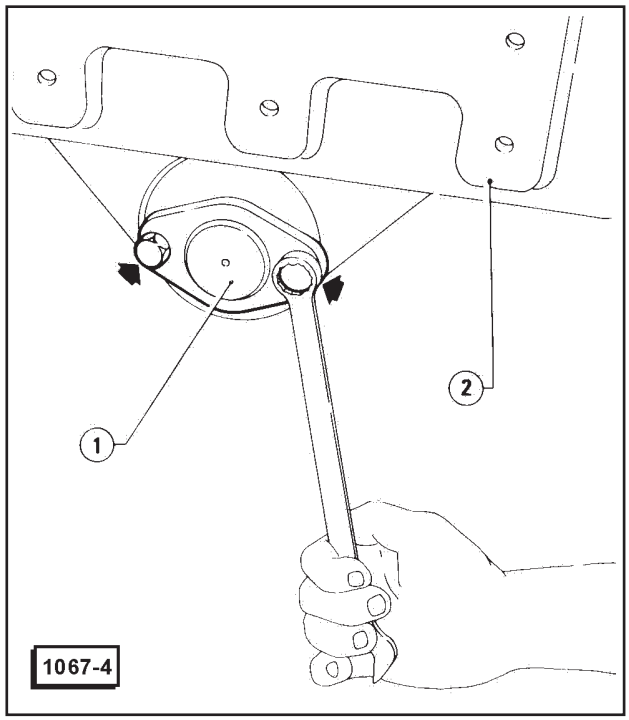
1 - Wheels
2 - Safety stand
3 - Front axle

5. Place appropriate containers under the power steering; unscrew unions **1** of power steering **3** from hoses **2** side.



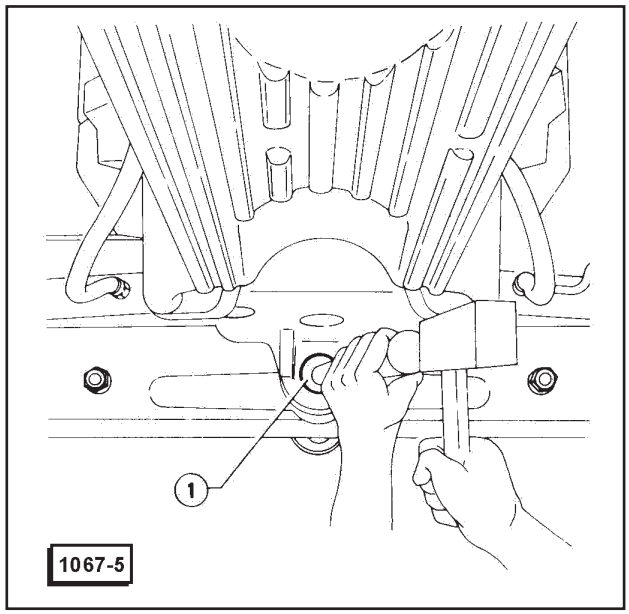
1 - Unions
2 - Hoses
3 - Power steering

6. Unscrew the two screws securing pin **1** to axle mounting **2**.



1 - Pin
2 - Axle support

7. Use a light alloy hammer and punch to tap on rear end of pin **1**.



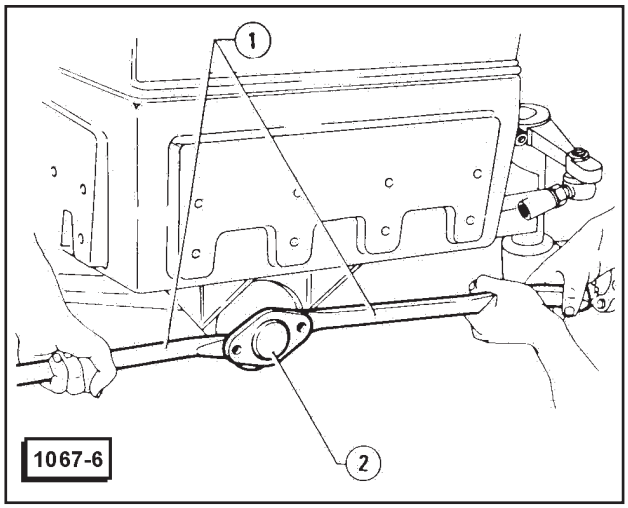
1 - Pin

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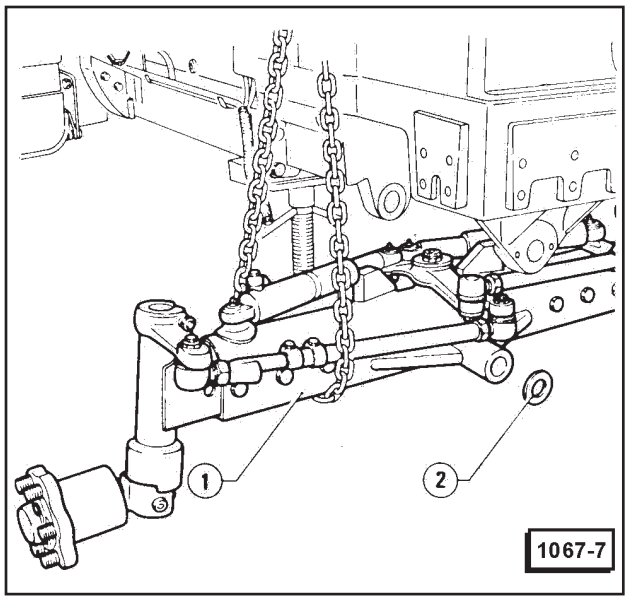
8. By means of two levers **1,** withdraw pin **2** forwards, and recover the shims interposed between flange and front mounting.

CAUTION
Keep the two shim packages separated so that the correct positioning can be maintained on reassembly.



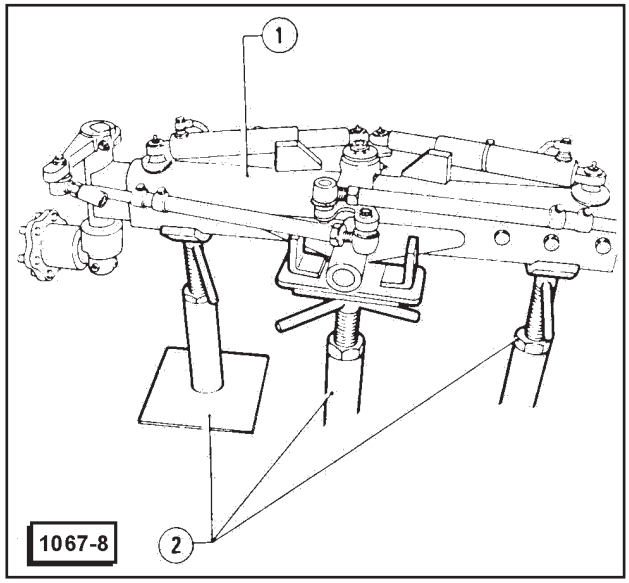
1 - Levers
2 - Pin

9. Remove the axle from front mounting by slightly tapping on central axle with a hammer.
10. Lower axle **1** very slowly, ensuring that operation is not hindered, then remove shovel rings **2**.



1 - Front driving axle
2 - Shovel rings

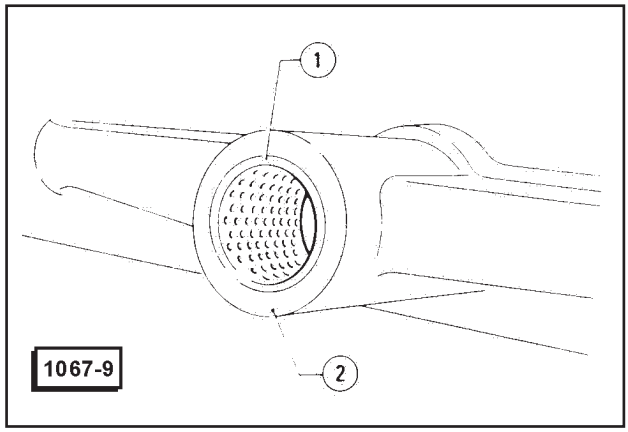
11. Position axle **1** on three stands **2**, ensuring that it rests safely.



1 - Front axle Assembly
2 - Stands

CHECKS AND VERIFICATIONS

1. Verify that bushes **1** of central axle are not worn, checking that indentations are still present. If required, remove the bushes using a hammer and a punch.



1 - Bush
2 - Central axle

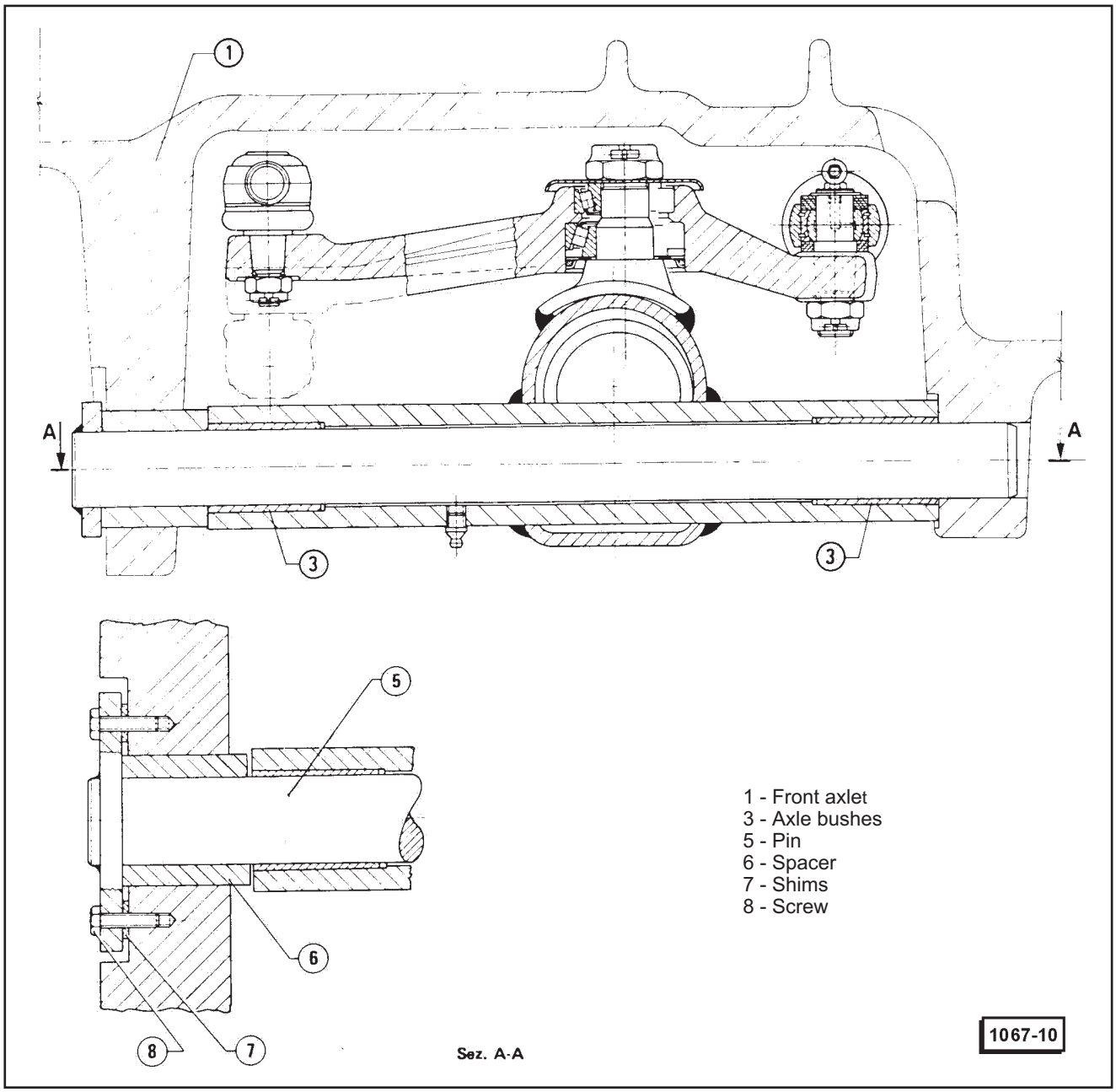
2. Verify that pin surface is free from cracks, deformations, or splinters. Replace the pin if required.

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INSTALLATION

Carry out installation by proceeding as follows.
1. Use very fine abrasive paper to eliminate any signs of oxidation from the pin and front mounting.
2. Grease the bushes and the pin using the grease prescribed.
3. Lay a coat of grease on the shovel rings of front mounting to facilitate the positioning.
4. By means of a light alloy hammer and punch, tap on spacer **6**, moving it forwards.
5. Insert pin **5** into the spacer.
6. Lift the axle and insert the pin into bush **3**.
7. Push the pin almost fully home.
8. Position shims **7**, and screws **7** securing the pin to front axle.



9. Complete the installation by reversing the order of removal, complying with the following.
— Check the end-float, and adjust it if necessary (refer to: End - Float Adjustment).
— Restore the oil level in the hydrostatic steering system and bleed it (refer to: Hydrostatic Steering - Hydraulic System Assembly - Bleeding).

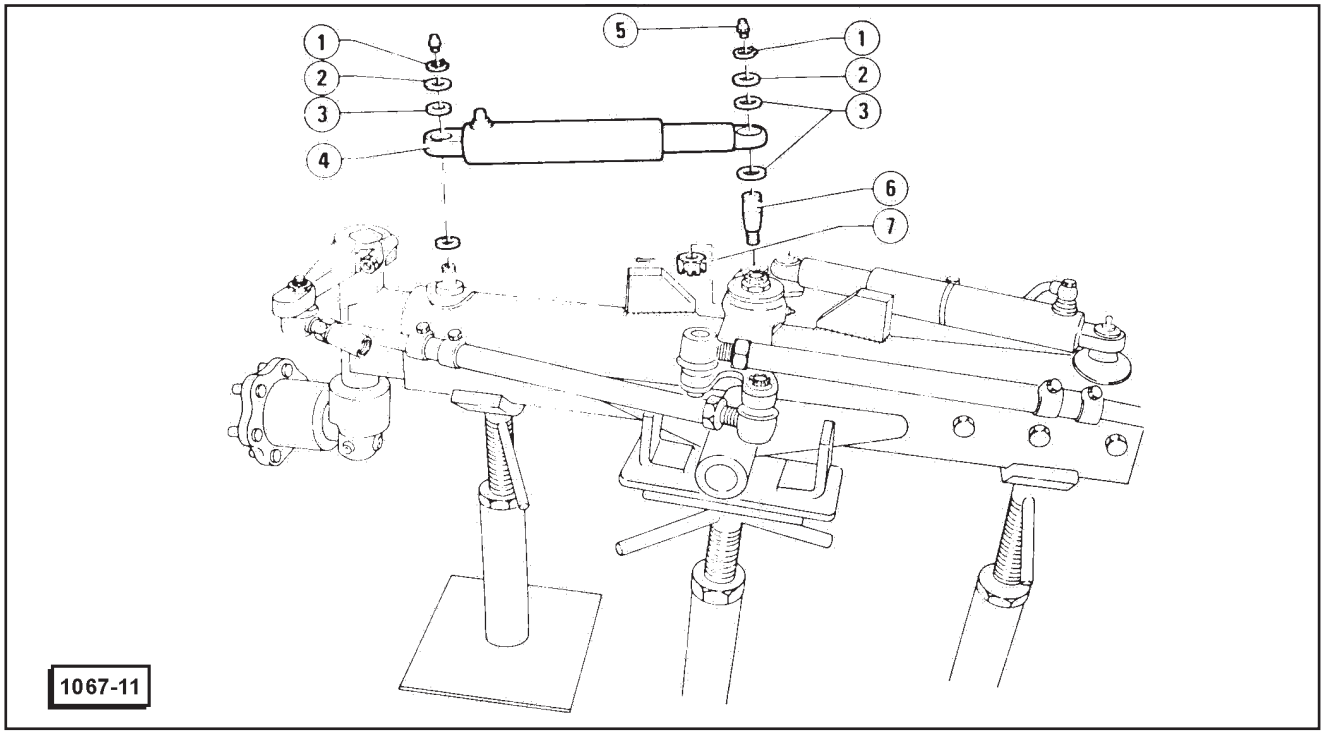
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POWER STEERING

REMOVAL

1. Remove the front axle from vehicle (refer to: Front Axle Assembly - Removal).
2. Remove Seeger ring **1**, fifth wheel **2**, and gasket **3**, on the outer connection point, wheel hub side.
3. Repeat the same operations on the connection point with the central lever.
4. Unscrew grease nipple **5** on pin **6**.
5. Use a lever to facilitate removal of power steering **4** from the two securing pins, and recover the two gaskets **3** underneath. Should the power steering be blocked by pin **6**, remove it by operating as follows.
(1) Withdraw the split pin, and unscrew castle nut **7**.
(2) By means of a light alloy hammer, tap upwards on pin **6** until extracting it from the steering centre lever, and remove the power steering together with the pin.



1 - Seeger ring
2 - Fifth wheel
3 - Gasket
4 - Power steering
5 - Grease ripple
6 - Pin
7 - Casti e nut

DISASSEMBLY, CHECKS AND VERIFICATIONS, REASSEMBLY

Proceed to install the power steering by operating as described in “Hydrostatic Steering - Power Steering Housing”.

INSTALLATION

Install the power steering housing by reversing the order of removal, complying with the following.
— Thoroughly grease the pins securing power steering housing using the grease prescribed.
— Tighten the castle nuts of the pins securing the jacks to the prescribed torque.

Tightening torque
Castle nuts securing power steering housing
157 N-m
(16 Kgm; 115.68 ft lb)

— Verify that the nut slot coincides with the split pin hole obtained on the pin; if the slot and the hole do not coincide, tighten the nut further until they coincide. Use a new split pin.

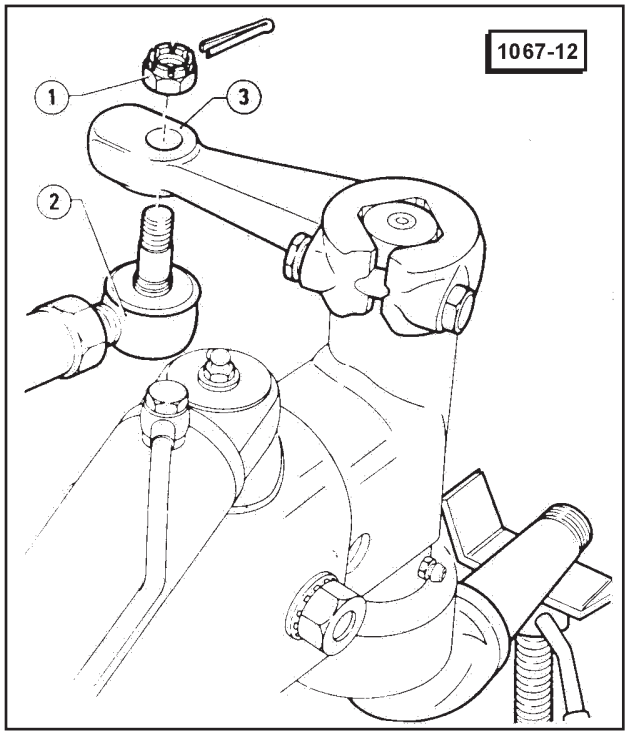
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STEERING TIE RODS

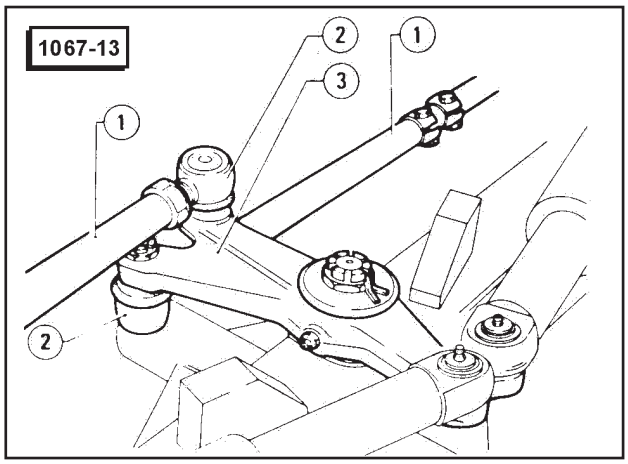
REMOVAL

1. Remove the front axle from the vehicle (refer to: Front Axle Assembly - Removal).
2. Extract the split pin securing castle nut **1**.
3. Unscrew the castle nut securing ball joint **2** to external lever **3**.



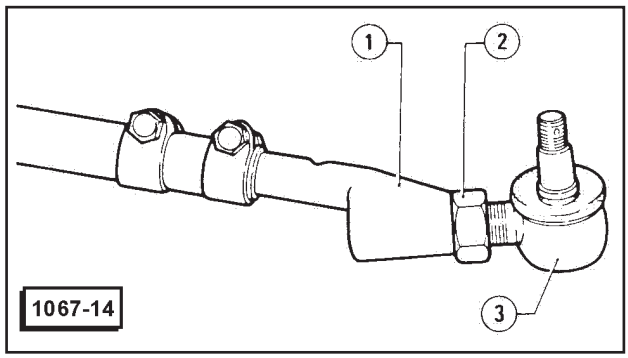
1 - Castle nut
2 - Ball joint
3 - Steering external lever

4. Repeat the same operations as for the two ball joints **2** secured to control lever **3**.
5. Withdraw the pins of ball joints **2**, and remove tie rods **1**.



1 - Steering tie rods
2 - Ball joints
3 - Steering central lever

6. If required, remove the ball joints at the end of tie rods, by operating as follows.
(1) Secure tie rod **1** on a vice fitted with protective jaws.
(2) Loosen locknut **2**, then unscrew ball joint **3**, taking care to count the number of turns necessary to remove it.



1 - Tie rod
2 - Locknut
3 - Ball joint

CHECKS AND VERIFICATIONS

1. Check that ball joints of the steering tie rods, are not worn or damaged, and verify that they rotate without seizing or remarkable backlash in their seat. If not so, replace them.
2. Check for good conditions of ball joints rubber protection; if not so, replace the joints.
3. Check for damage or deformations of the tie rods.

INSTALLATION

Install the steering tie rods by reversing the order of removal, complying with the following.
— If previously removed, install the ball joints taking care to screw the joint by the same number of turns counted when unscrewing.
— Carefully lubricate the pins securing the ball joints with the grease prescribed.
— Tighten the ball joint castle nuts to the prescribed torque given in the following table, according with the threading features.

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Tightening torques
Ball joint castle nuts

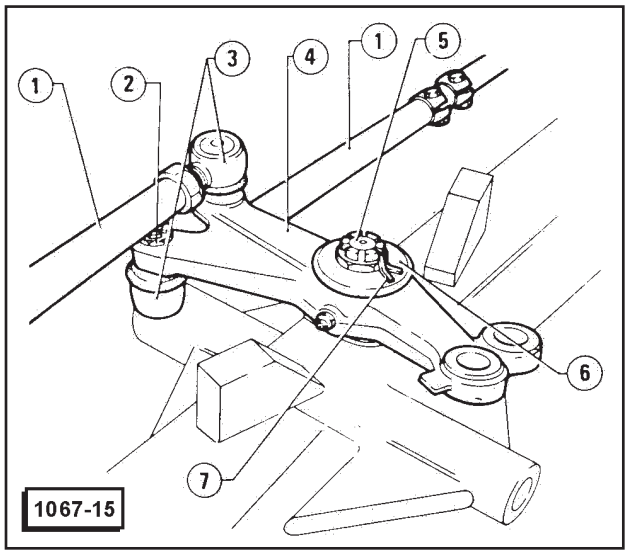
Threading meas. unit	Tightening torque Nm	Tightening torque kgm
M14x1,5	73,6	7,5
M12x1,5	49,1	5
M10x1	34,3	3,5
M20x1,5	157	16
M18x1,5	132,5	13,5
M15x1,5	118	12,0
M18x1,5	157	16

— Verify that the nut slot coincides with the split pin hole obtained on the pin; if not so, tighten the nut further until they coincide. Use a new split pin.

STEERING CENTRE LEVER

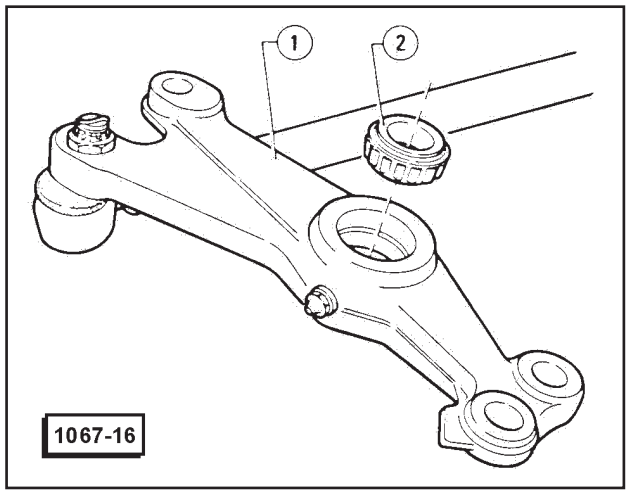
REMOVAL AND INSTALLATION

1. Remove the front axle from the driving axle, and remove the power steering housing **2** (refer to: Power Steering Housing - Removal).
2. Detach the steering tie rods from the central lever by operating as follows.
(1) Extract the split pin securing nuts **2**, and unscrew them.
(2) Withdraw the pins of ball joints **3**, and disconnect tie rods **1** from lever **4**.
3. Extract split pin **7** unscrew castle nut **5** securing steering wheel central lever **4**, and remove cover **6**.



1 - Steering tie rods
2 - Castle nut
3 - Ball joint
4 - Steering centre lever .
5 - Castle nut
6 - Cover
7 - Split pin

4. By means of a universal puller, remove centre lever **1** together with bearing **2**.

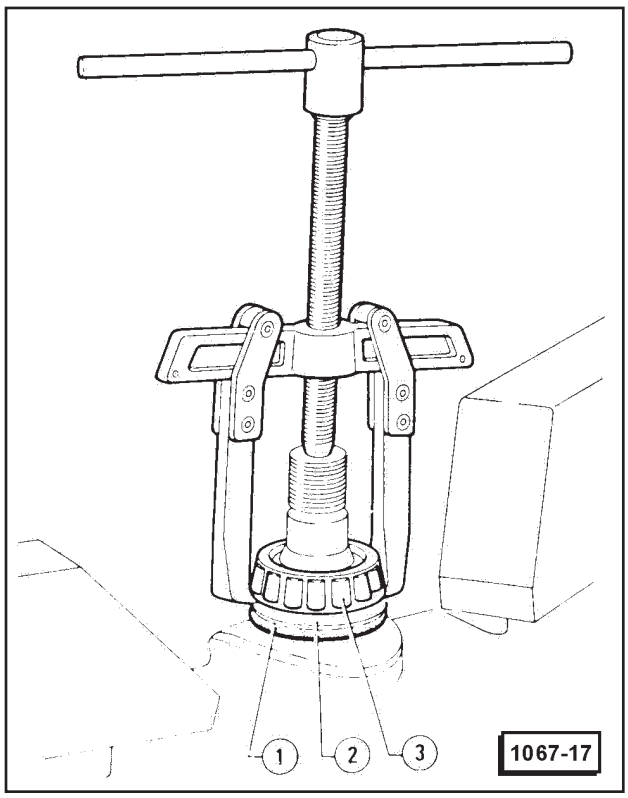


1 - Steering central lever
2 - Upper tapered roller bearing

5. By means of a universal puller, remove bearing **3**, then remove disk **2** with related O-ring **1**.

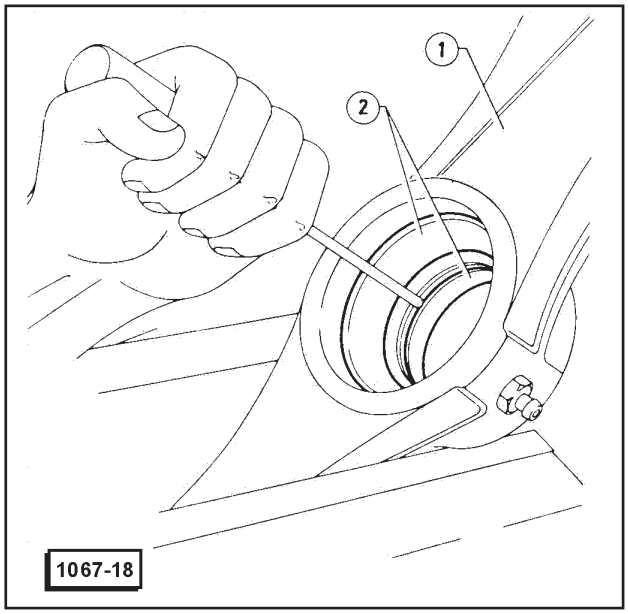
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1 - O-ring
2 - Disk
3 - Lower tapered roller bearing

6. If required, secure central lever **1** on a vice and, by means of a hammer and punch, remove outer races **2** of tapered bearing, housed in the central hole, taking care to extract first the upper race having smaller diameter, by tapping outwards.



1 - Steering centre lever
2 - Bearing outer races

7. Install the centre lever by reversing the order of removal, complying with the following.
— Before reassembly, lubricate thoroughly the tapered roller 'bearings and related races with the grease prescribed.
— Before mounting the lower bearing on the axle, fit a new disk, and a new O-ring.
— Comply with the following when fitting the castle nut.
  • Tighten fully the nut to set the bearings.
  • Loosen the nut and retighten it until the backlash is eliminated, then insert a new shakeproof split pin. Should the pin hole not coincide with the nut slot, tighten the nut further, until a new split pin can be inserted.
— At the end of reassembly, grease the pin and the bearings with the grease prescribed through the grease nipple housed on the lever..

CHECKS AND VERIFICATIONS

1. Check that the lever is not deformed or damaged. If not so, replace it.
2. Carefully examine the bearings by letting them rotate slowly, checking for vibrations, noisy or slight seizing.
3. Examine the conditions of both rolling elements and races surfaces checking for scratches, prints, grinding signs due to scoring generated by foreign matter. Replace the damaged components.

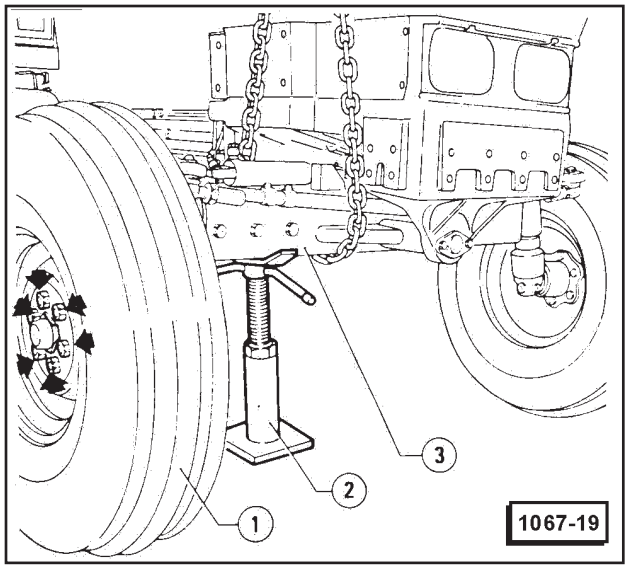
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WHEEL HUB

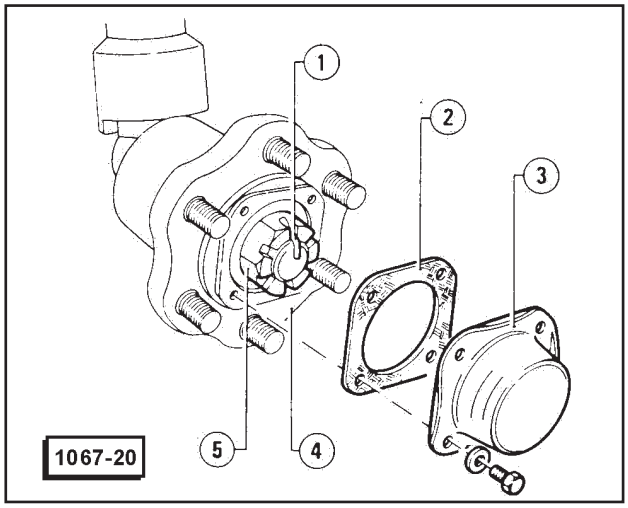
DISASSEMBLY AND REASSEMBLY

1. Place the tractor on a level surface, operate the parking brake, and position a safety stand **2** under the axle.
2. Unscrew the six nuts securing wheels **1**.
3. Sling front axle **3** with a chain, and lift the vehicle.
4. Remove the wheel, then lower the tractor resting it on safety stand **2**.



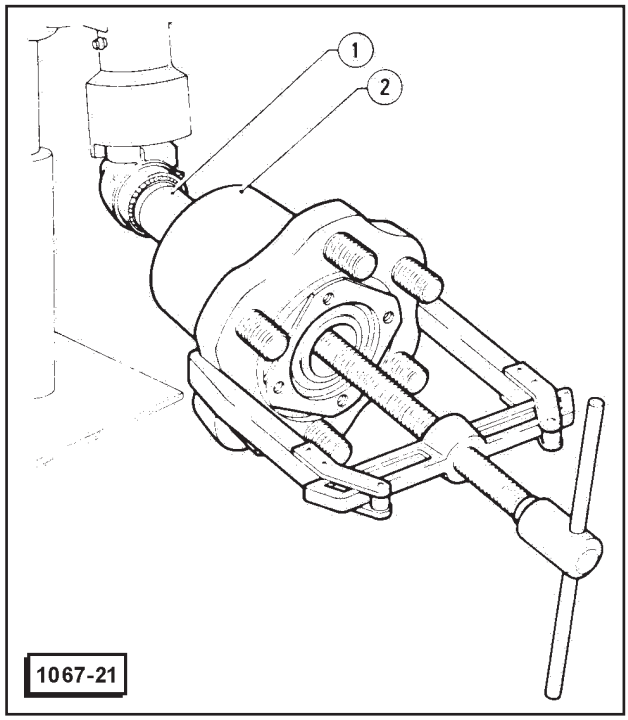
1 - Wheels
2 - Safety stand
3 - Front axle

5. Unscrew the four screws securing cover **3**; remove the cover and gasket **2** underneath.
6. Remove split pin **1**, and unscrew nut **5** securing hub **4** bearings, and remove the shoulder ring underneath.



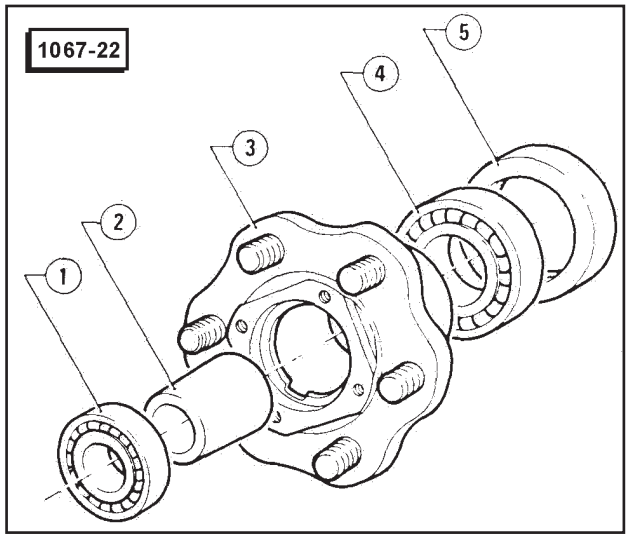
1 - Split pin
2 - Gasket
3 - Cover
4 - Hub
5 - Nut

7. Use a universal puller to withdraw hub assembly **2** from pin **1**.



1 - Wheel hub pin
2 - Hub assembly

8. By means of the appropriate puller, remove front ball bearing **1**, and withdraw spacer **2**.
9. By levering, extract seal ring **5**, then remove rear ball bearing **4** with the appropriate puller.



1 - Front ball bearing
2 - Spacer
3 - Wheel hub
4 - Rear ball bearing
5 - Seal ring

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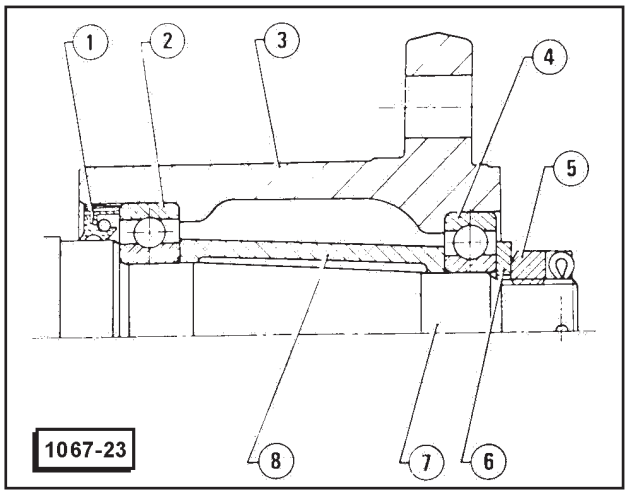
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10. Reassemble the hub by reversing the order of disassembly, complying with the following.
— Before reassembly, lubricate the internal bearing **2** and **4** and the new seal ring **1** with the grease prescribed.
— Carefully insert the seal ring **1** by means of a light alloy hammer and punch.
— Mount the hub **3** on the pin **7** by slightly tapping with a hammer.
— Tighten the castle nut **5** to the prescribed torque.

Tightening torque
Castle nut securing hub

See: GENERAL
Method of tightening nuts

— Verify that the nut slot coincides with the split pin hole obtained on pin; if not so, tighten the nut further until they coincide. Use a new split pin.
— Check that the hub **3** has an axle play of **0.12 to 0.48 mm** (0.0047 to 0.0188 in) with respect to the wheel shaft pivot **7**.



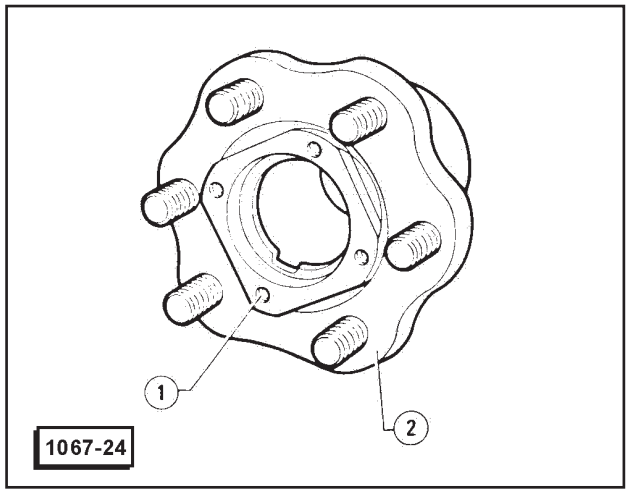
1 - Real ring
2 - Internal ball bearing
3 - Wheel hub
4 - Outside ball bearing
5 - Castle nut
6 - Shovel ring
7 - Wheel shaft pin
8 - Spacer

CHECKS AND VERIFICATIONS

Thoroughly clean the bearings and the other components, and dry them with compressed air.
1. Examine the bearings carefully by letting them rotate slowly checking for vibrations, noisy, or slight seizing.
2. Examine the conditions of both races and rolling elements surfaces checking for scratches, prints, grinding signs due to scoring generated by foreign matter. If so, replace the bearing.

CAUTION
If a bearing can no longer be used, replace both inner and outer ones.

3. Check that the wheel shaft is not damaged, and that the threading is in good condition; replace it if required (refer to: Wheel Shaft - Disassembly and Reassembly).
4. Verify that through hole, **1** securing outer cover is not obstructed by foreign matter; if so, remove the obstacle to permit the hub to be lubricated.



1 - Through hole
2 - Wheel hub

WHEEL SHAFT

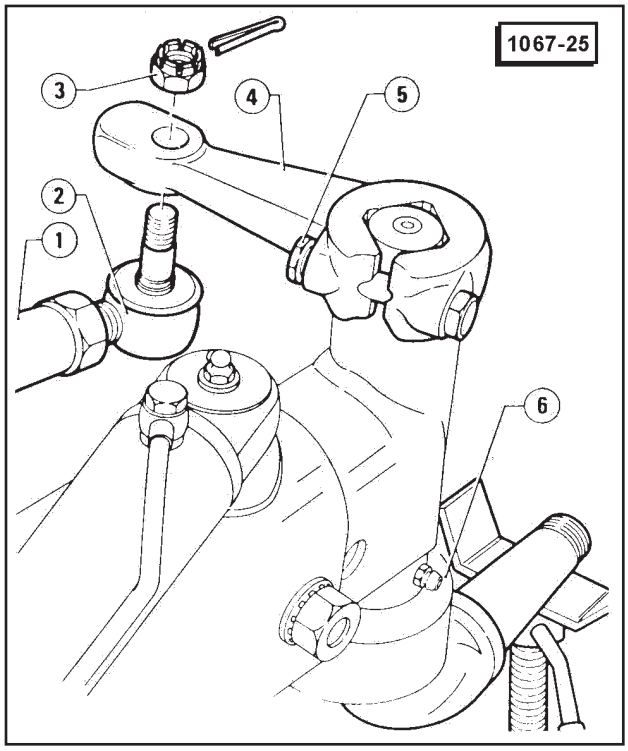
DISASSEMBLY AND REASSEMBLY

1. Remove the wheel hub (refer to: Wheel Hub - Disassembly and Reassembly).
2. Extract the split pin, and unscrew nut **3.**
3. Withdraw the ball joint **2** pin from lever **4**.
4. Unscrew and remove bolt **5** securing lever **4** to wheel shaft **6**.

CAUTION
Support the wheel shaft suitably to prevent it from dropping accidentally.

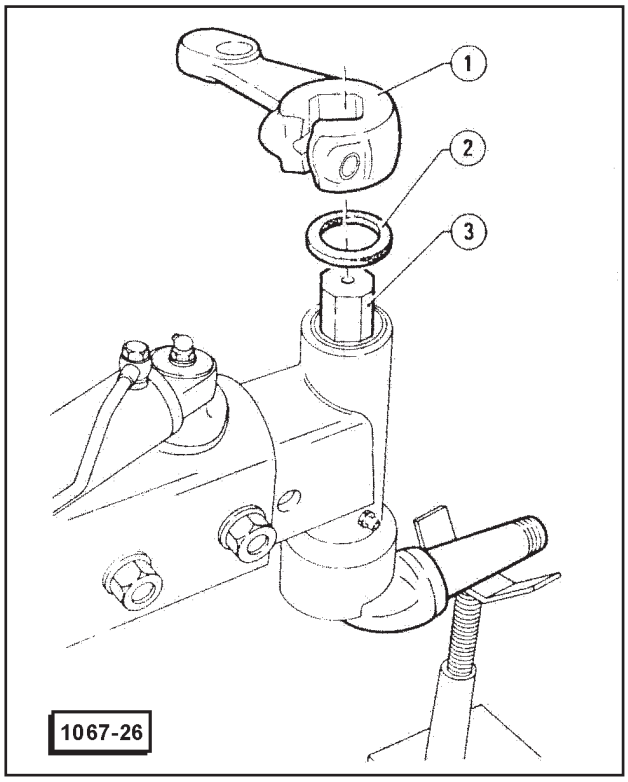
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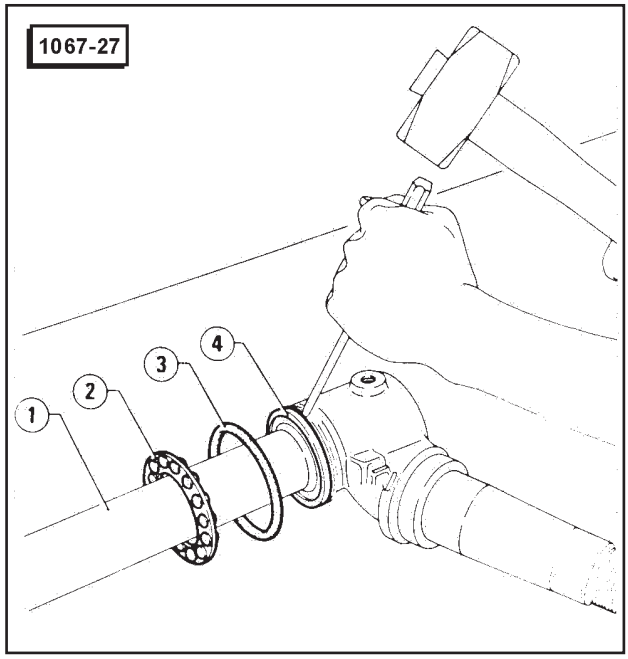
1 - Steering tie rod
2 - Ball joint
3 - Castle nut
4 - Steering outer lever
5 - Bolt
6 - Wheel shaft

5. Support wheel shaft **3**, remove lever **1** and gasket **2** underneath; withdraw wheel shaft.



1 - Steering outer lever
2 - Gasket
3 - Wheel shaft

6. Remove thrust bearing **2** and O-ring **3** by withdrawing them from shaft **1**.
7. If required, remove race **4** of thrust bearing using a light alloy hammer and punch.



1 - Wheel shaft
2 - Thrust bearing
3 - O-ring
4 - Thrust bearing race

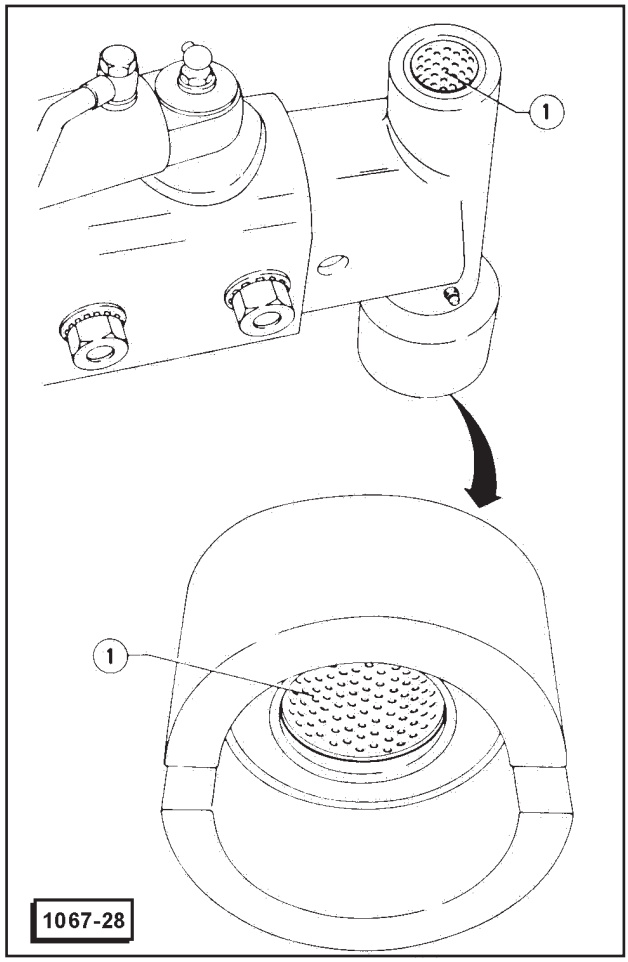
8. If required, remove the bushes inside the side axle, using a light alloy hammer and punch.
9. Reassemble the wheel shaft by reversing the order of disassembly, complying with the following.
— Fit a new O-ring on the shaft seat, and lubricate the O-ring seat.
— Lubricate the bushes of outer axle on which the shaft rotates.
— When reassembling, keep the wheel shaft forced upwards.
— Fit the bolt securing the steering outer lever to wheel shaft, with the nut pointing forwards.
— At the end of reassembly, grease the unit using the grease nipple located on the side axle.

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CHECKS AND VERIFICATIONS

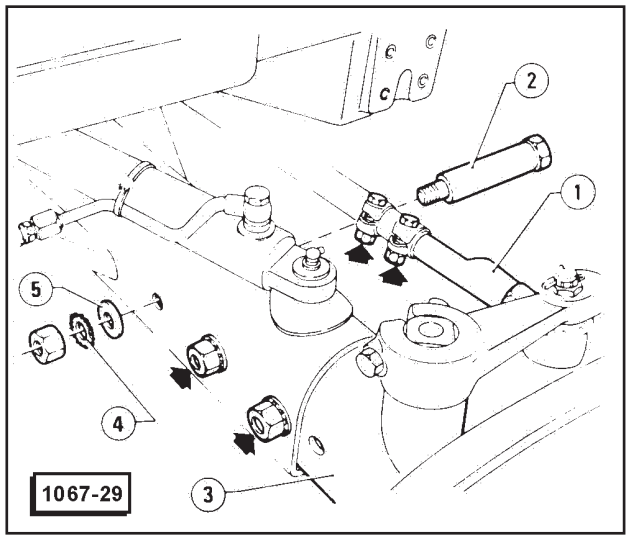
Wash the components thoroughly, and dry them with compressed air.
1. Check for signs of oxidations on wheel shaft; if so remove them using very fine abrasive paper.
2. Check that the wheel shaft is not deformed or damaged; if so, replace it.
3. Carefully check the thrust bearing for signs of grinding, scratches, or prints on the rolling elements or the races; if so, replace the worn components.
4. Check that both upper and lower bushes 1 of side axle are not worn, ensuring that indentations are still present; if not so, replace them.



1 - Bushes

TRACK VARIATION

1. Unscrew the nuts securing pins **2** for positioning side axles **3**. Remove pins **2** and shake proof washers **4** and **5**.
2. Unscrew the bolts of tie rods **1**, and remove them.
3. Lift the vehicle by means of lift, and extract both side axle and steering tie rod by the quantity required by tapping, if necessary, with a light alloy hammer.
4. Insert pins **2**, fit washers **4** and **5**, and the nut.

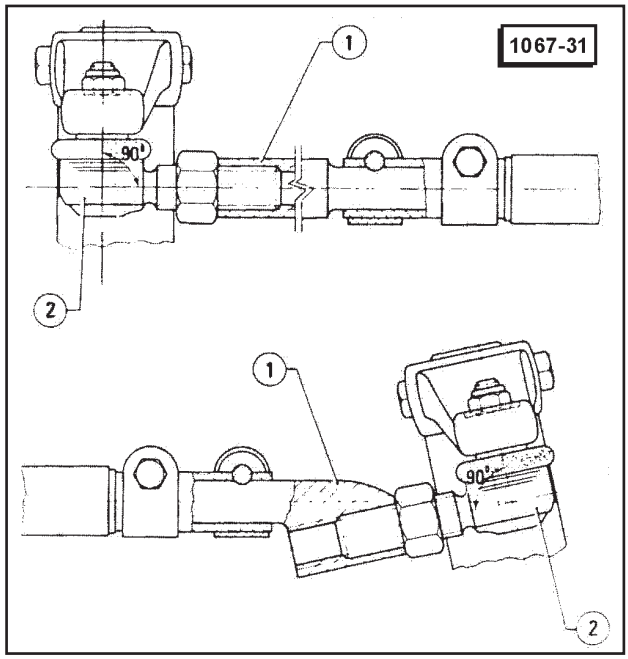


1 - Steering tie rod
2 - Pin
3 - Side axle
4 - Washer
5 - Washer

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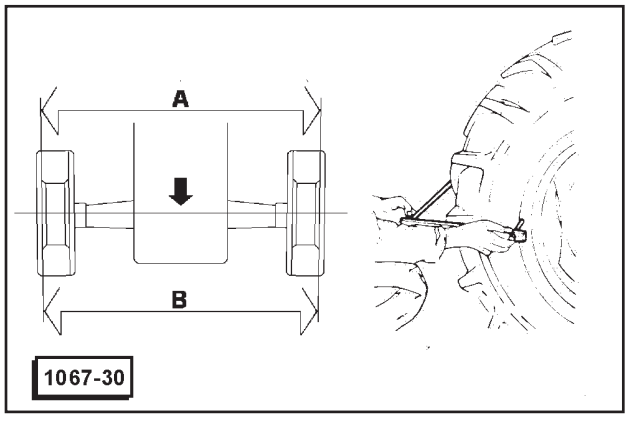
5. Rotate sleeve **1** around its axis so that joint **2** is in the position shown in the figure (i.e verify that joint working angle is 90°), then insert and tighten the two bolts securing the sleeve.



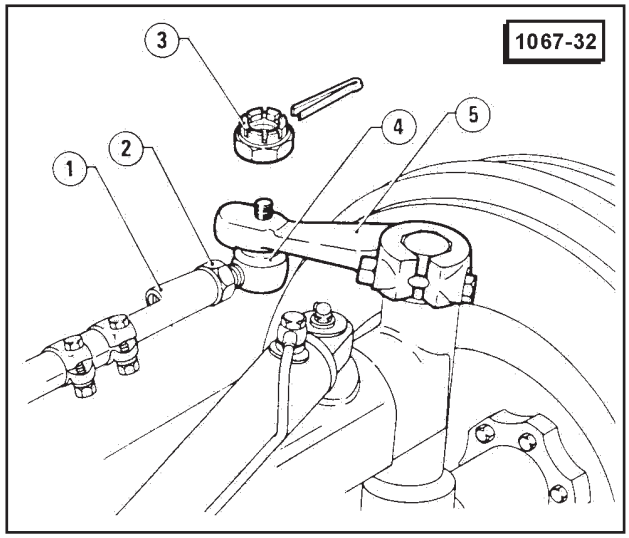
1 - Sleeve
2 - Ball joint

TOE-IN CHECK

1. Place the vehicle on a level surface with the steering wheel in central position and, by means of a suitable caliper, measure distances A and B on a horizontal plane passing through the wheel axes always in the same point of the rim.



2. Rotate the wheel by half turn, and repeat the previous operations to take note of any rim deformations.
3. If the difference A-B between the two measures is not within the values given in the table “Axle Assembly” (refer to: Technical Data and Specifications - Checks and Adjustments) for the model of tractor in object, carry out the adjustment by proceeding as follows.
(1) Remove the split pin, and unscrew nut **3**, then disconnect the pin of ball joint **4**.
(2) Repeat the same operations on the other tie rod.
(3) Loosen locknuts **2** and screw or unscrew both ball joints **4** by the same number of turns in order to lengthen or shorten the two steering tie rods by the same quantity, so as to restore the correct toe in valve.
(4) Tighten locknuts **2**, and install tie rods **1** be reversing the order of removal.



1 - Tie rod
2 - Locknut
3 - Castle nut
4 - Ball joint
5 - Steering outer lever

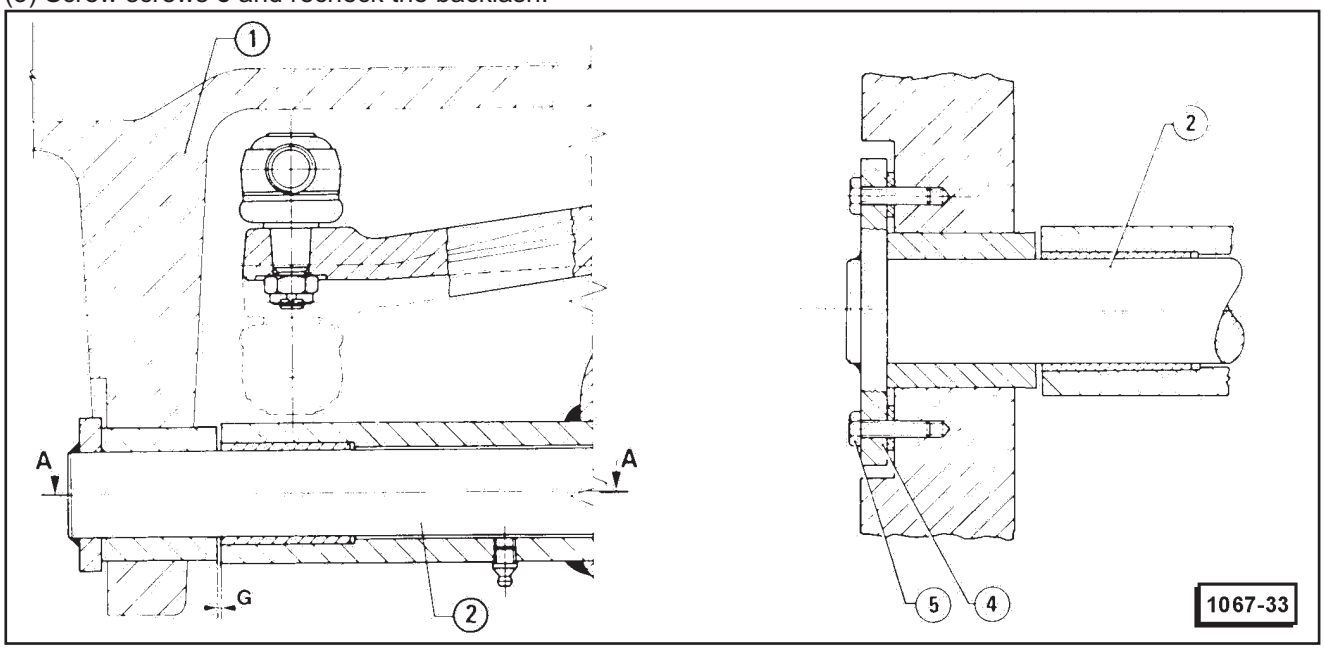
(5) Repeat the operations described until obtaining the correct toe-in valve.

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END-FLOAT ADJUSTMENT

1. Push the axle towards the rear side, and by means of a feeler gauge, verify that the max backlash "G" does not exceed 0.4 mm (0.02 in).
2. If the measured value exceeds the value prescribed, operate as follows.
(1) Unscrew screws **5** securing pin **2** to front mounting **1**.
(2) Slightly move the pin and remove such a number of shims **4** from underneath the flange to restore the correct backlash.
(3) Screw screws **5** and recheck the backlash.



1 - Front mounting
2 - Pin
4 - Shims
5 - Screw

TECHNICAL DATA AND SPECIFICATIONS

TECHNICAL DATES

Complete axle

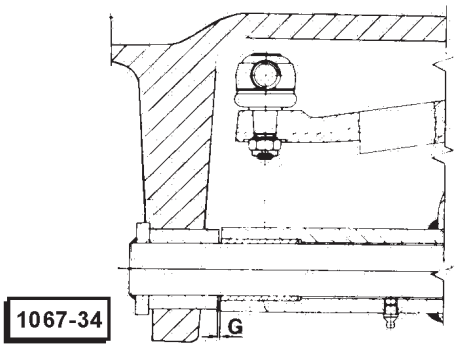
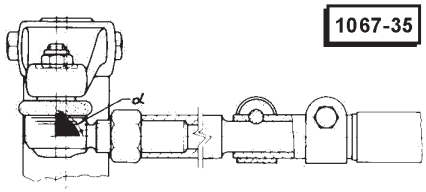
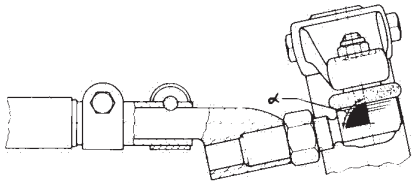
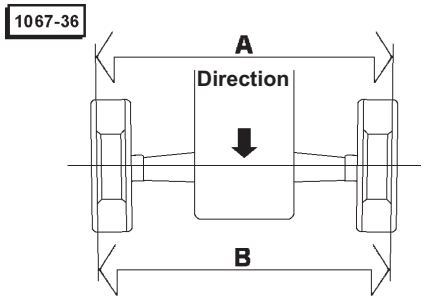
Type			Model 110
Toe - in	wheels up to 20"	mm	2 ÷ 6
	wheels from 20" to 30"	mm	3 ÷ 9
Axle swing			12°
Camber			30
Tyre air pressure		kg/cm^2 (bar)	2,40 (2,35)
Steering angle	Right		70°
	Left		50°

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CHECKS AND ADJUSTMENTS

Complete axle

Type of control		Model 110
Max. axle play “G” between front bearing and axle		0,4 mm
Angle “a” of work of steering rod ball joint	 **Left side (front view)**  **Right side (front view)**	90°
Toe-in “A- B”		2 ÷ 4 mm

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TIGHTENING TORQUES

Unit of measure: Nm (kgm)

Particulars		Model 110
Retaining nuts for steering jack pins (1)		157 (16)
	M14x1,5	73,6 (7,5)
	M12x1,5	49,1 (5)
	M10x1	34,3 (3,5)
Retaining nuts for ball joint pins (1)	M20x1,5	157 (16)
	M18x1,5	132,5 (13,5)
	M15x1,5	118 (12)
	M18x1,5	157 (16)

(1) If after tightening, the nut slot does not coincide with the split pin hole tighten further until they do coincide.

GENERAL SPECIFICATIONS

Fluids and Lubricants

Application	Type	Denomination	Model	Q.ty
Bushes and holding shaft pin	Grease	AGIP Grease 30 - (Grease 30)	110 - 130 - 150	-
Front bearing spacer				-
Steering jack retaining pins				-
Ball joint retaining pins				-
Central drive lever roller bearing				-
Hub bearing and holding link				-
Bush and wheel shaft				-

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TROUBLESHOOTING AND CORRECTIONS

Trouble	Probable cause	Corrective action
Noisy when running	No grease in the hubs and/or steering pins and/or in the axle rocking bushes	Disassemble the components, check for good conditions, then grease as prescribed
	Axle and/or hub bearings worn	Replace
Noisy during pick up	Excessive end - float of axle	Restore correct backlash
	Nuts of the pins securing side axle loose	Tighten the nuts
Wheels oscillates	Tyres too worn	Replace if required
	Steering ball joints worn	Replace if required

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FRONT DRIVING AXLE

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GENERAL FEATURES

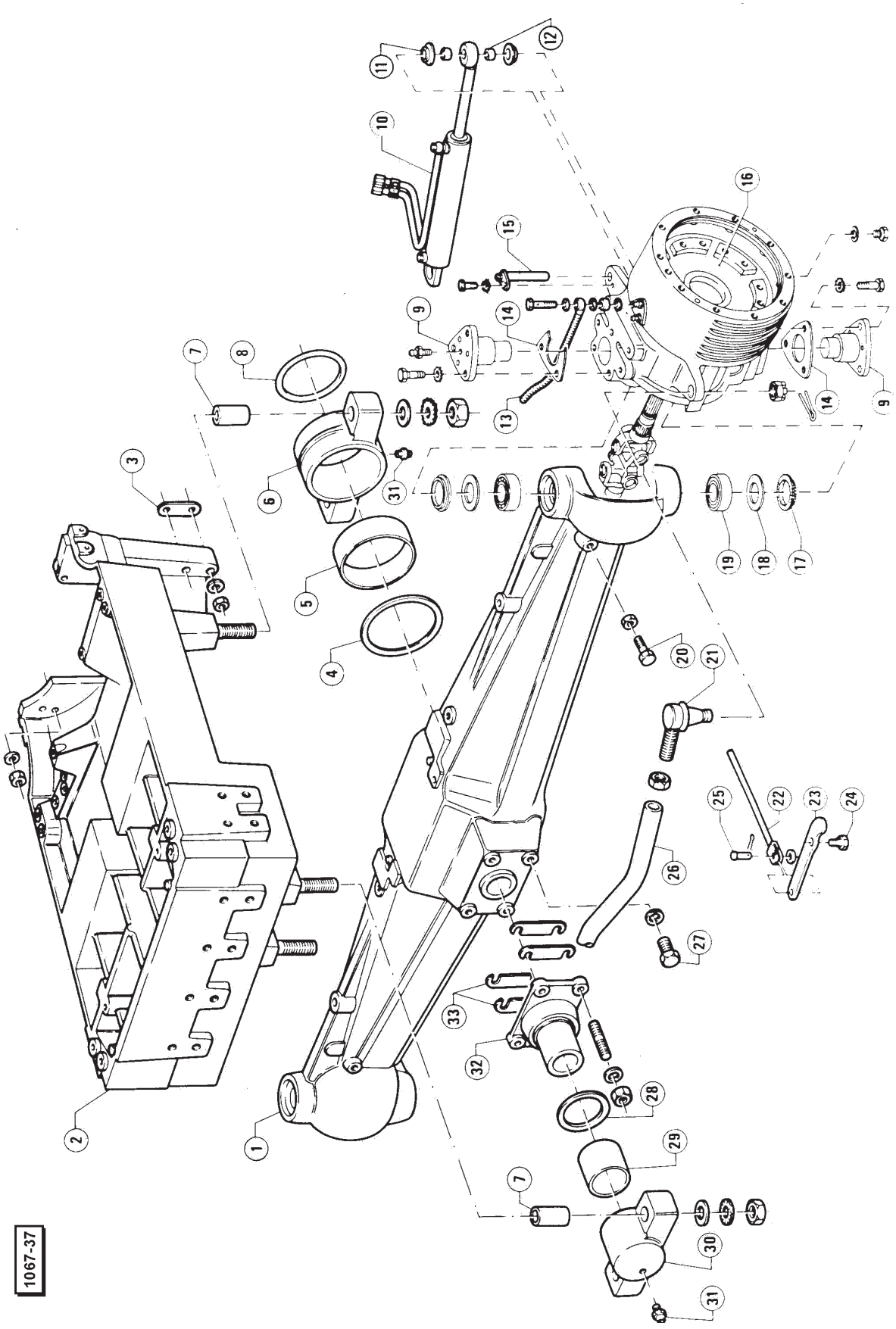
The peculiarity that distinguishes the front wheel drive, consists in the fact that the propeller shaft rotation centre coincides with the centre of front axle.
The propeller shaft is without universal joints. It transmits motion to the two front drive wheels through a differential and two final epicyclic reduction gears inserted into the hubs.
Two anchor pins permit the axle to perform a wide oscillation which, besides making the tractor very agile also on very steep terrains, also permits the axle to be easily disconnected from the front support in the event of any repair operations, thus requiring only the end-float check to be performed on reassembly.
Two pins, inserted into tapered bearings, connect the side hubs to the central part of axle, thus permitting the friction generated by hub rotation when steering to be reduced.

FRONT DRIVING AXLE ASSEMBLY

1 - Axle body
2 - Front support
3 - Shim
4 - Shoulder ring
5 - Bush
6 - Rear floating mounting
7 - Spacer
8 - Seal ring
9 - Pin
10 - Hydrostatic steering jack
11 - Dust cover
12 - Spacer
13 - Front brakes control hose
14 - Shim
15 - Pin
16 - Fork
17 - Dust cover
18 - Shoulder ring
19 - Roller bearing
20 - Steering angle adjusting screw
21 - Ball joint
22 - Front differential control tie rod
23 - Differential lock control lever
24 - Threaded pin
25 - Pin
26 - Tie rod
27 - Oil drain plug
28 - Shoulder ring
29 - Bush
30 - Front floating mounting
31 - Grease nipple
32 - Front flange
33 - Shims

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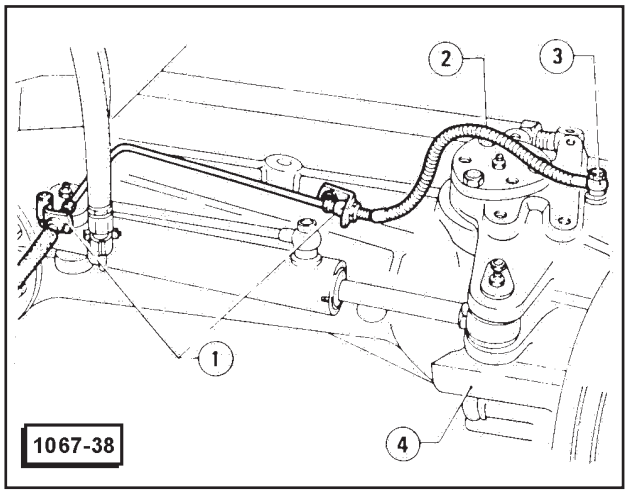
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REMOVAL AND INSTALLATION

CAUTION
Always use a light allow hammer or a punch when tapping on cast iron components.

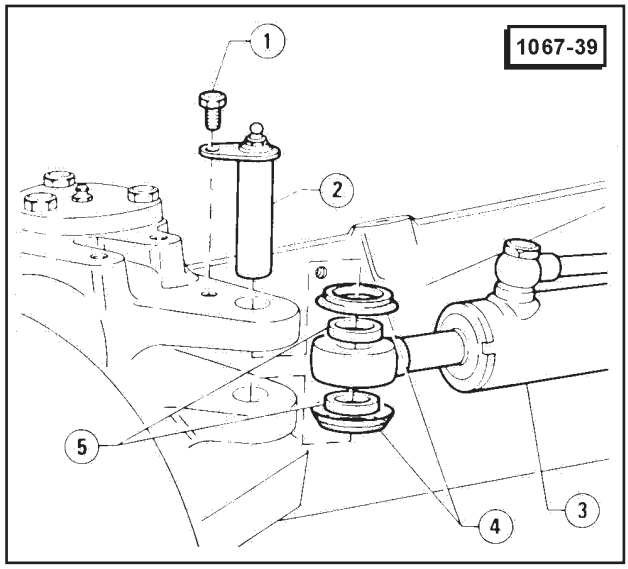
1. Remove the propeller shaft protection and remove the driving shaft (refer to: Engine - Engine Removal Preliminary Operations).
2. Unscrew the screws securing the two brackets **1** supporting hose **2**.
3. Place a suitable container for collecting the braking system oil, under fork **4**.
4. Unscrew union **3** on fork **4**, and disconnect hose **2** plugging it suitably.



1 - Brackets
2 - Braking system oil hose
3 - Union
4 - Fork

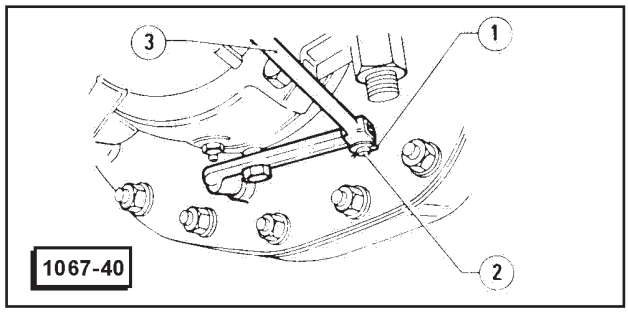
5. Unscrew screw **1** securing pin **2** to fork, and extract the pin by removing it with a lever.
6. Repeat the same operations for the other three pins, detach Rower steering housing **3**, and recover dust covers **4**, and spacers **5**. Support the power steering housing by securing them temporarily to the vehicle.

CAUTION
Do not disconnect the related supply piping from the power steering housing.



1 - Screw securing pin
2 - Pin securing jack
3 - Hydrostatic steering housing
4 - Dust cover
5 - Spacers

7. Extract split pin **1**, withdraw pin **2**, and disconnect tie rod **3.**



1 - Split pin
2 - Pin
3 - Differential lock control tie rod

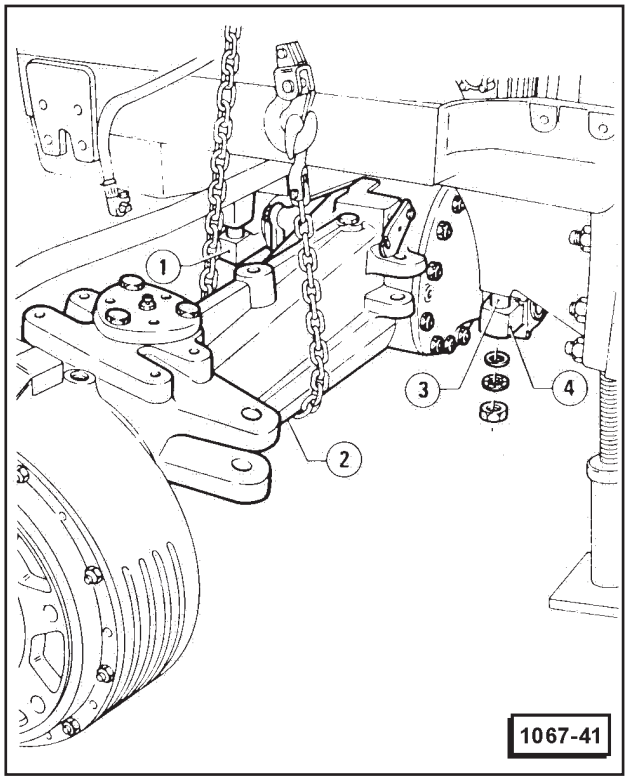
8. Position a support stand under the engine taking care to interpose a wooden wedge to prevent metal components coming into contact.
9. Loosen the screws securing the front wheels, lift the vehicle by means of an hydraulic jack, and remove the wheels; lower the vehicle.

CAUTION
Ensure that vehicle is safely positioned on the support

10. Sling the front axle suitably and keep sling taut.
11. Unscrew the four nuts securing rocking mountings 1, and remove the nuts and washers.
12. Lower axle **2** and with the aid of the levers, withdraw supports **4** and spacers **3** from studs; remove the axle from the front side, and position it on a suitable support.

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1 - Rocking mountings
2 - Front axle
3 - Spacers
4 - Rocking mounting

13. Proceed to install the front axle by reversing the order of removal, complying with the following.
— Tighten the nuts securing the rocking mountings to the prescribed torque.

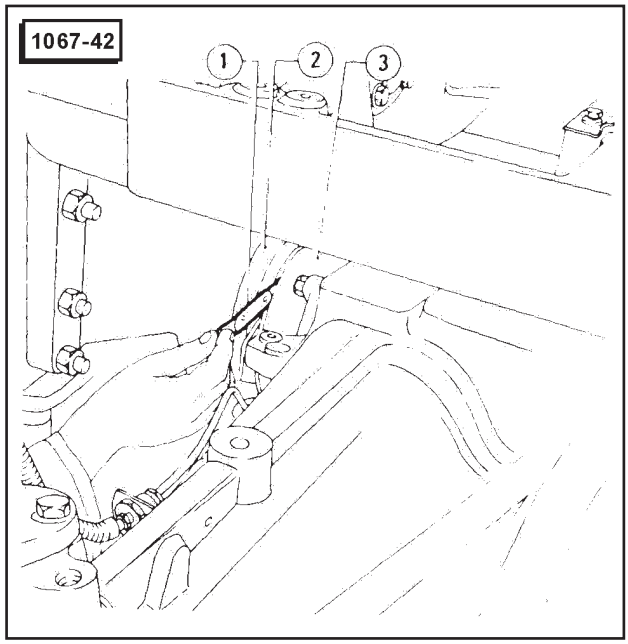
Tightening torque
Nuts securing rocking mounting

Front	**142 Nm (14,5 kgm;104.84 ft lb)**
Rear	**89 Nm (9,1 kgm; 65.79 ft lb)**

— Proceed to check (and adjust if required) the end-float by operating as follows.

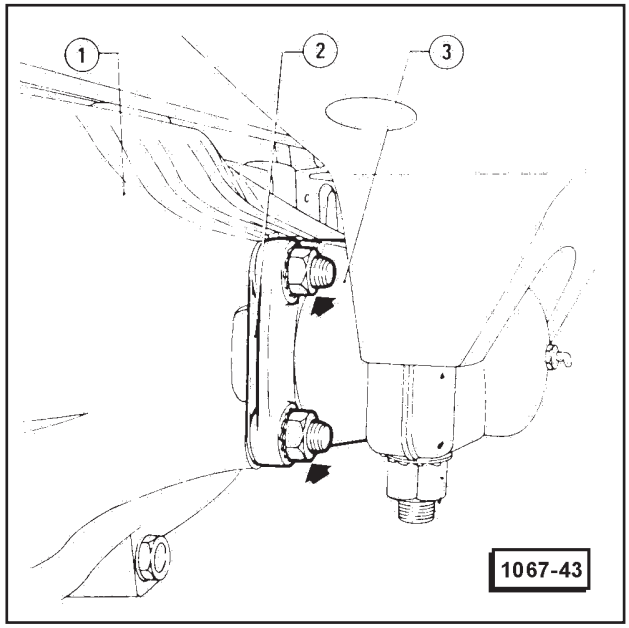
(1) Move axle forwards by tapping with a non-cast iron hammer.

(2) By means of feeler gauge **1** check that the end-float between shoulder ring **2** and differential casing **3** is within the values given in the table “Driving Axle Assembly” (refer to: Technical Data and Specifications - Checks and Adjustments).



1 - Feeder gauge
2 - Shoulder ring
3 - Differential casing

(3) If the backlash value is not correct, loosen the four nuts securing front rocking mounting **3** to axle **1**, and add or remove shim**s 2** accordingly, until obtaining the correct backlash.



1 - Front axle
2 - Shims
3 - Front rocking mounting

— Bleed the braking system (refer to: Brakes - Braking System Bleeding).
— Proceed to check the toe-in (refer to: Toe-in Check) and if required, adjust the differential lock control tie rod. (Refer to: Differential Lock System - Reassembly and Adjustments - Step 11.).

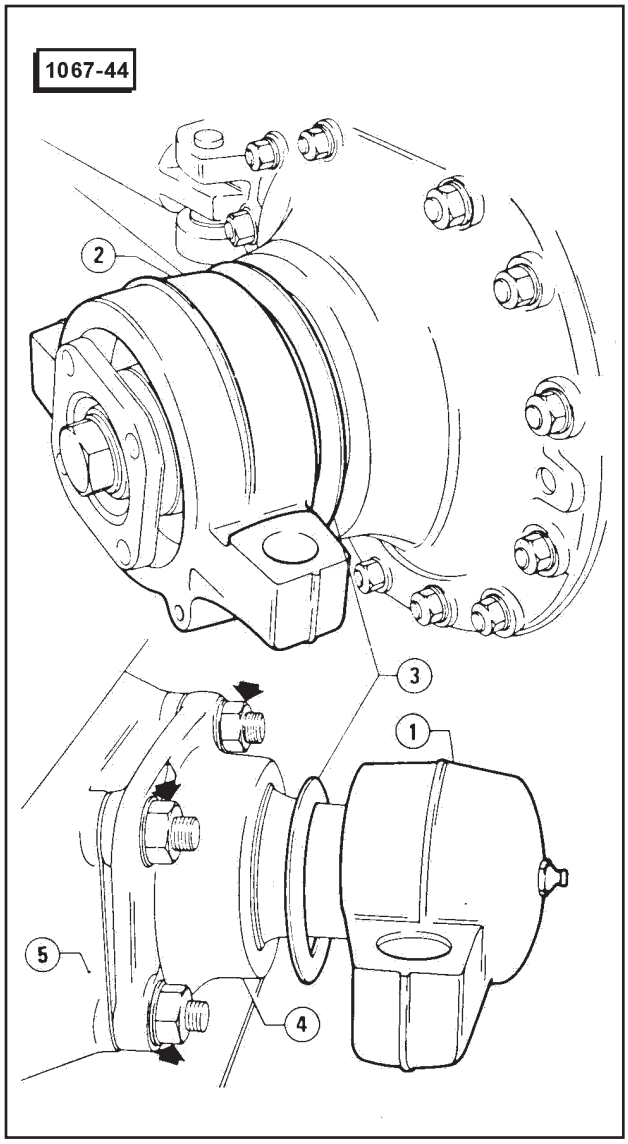
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ROCKING MOUNTINGS

REMOVAL AND INSTALLATION

1. Proceed to remove the front axle as indicated in “Complete Front Driving Axle - Removal and Installation”.
2. Remove both front **1** and rear **2** rocking mountings together with shoulder rings **3.**
3. Only if required, unscrew the four nuts securing front flange **4** to axle body **5**, and remove it together with the shims underneath.



1 - Front rocking mounting
2 - Rear rocking mounting
3 - Shoulder rings
4 - Front flange
5 - Axle body

4. Only if required, remove the bushes housed inside the rocking mountings securing these last into a vice, and using a hammer and a punch for the rear support, and a suitable puller for the front one, respectively.
5. Carry out installation by reversing the order of removal, complying with the following.
— If previously removed, install the front flange taking care to fit underneath the shims removed during removal.
— By means of the appropriate grease nipples, grease the two mountings before using the vehicle.
— Proceed to check (and adjust if required) the axle end-float by operating as indicated in “Complete Front Driving Axle - Removal and Installation”.
— Bleed the braking system (refer to: Brakes - Braking System Bleeding).
— Proceed to check the toe-in (refer to: Toe-in Check).

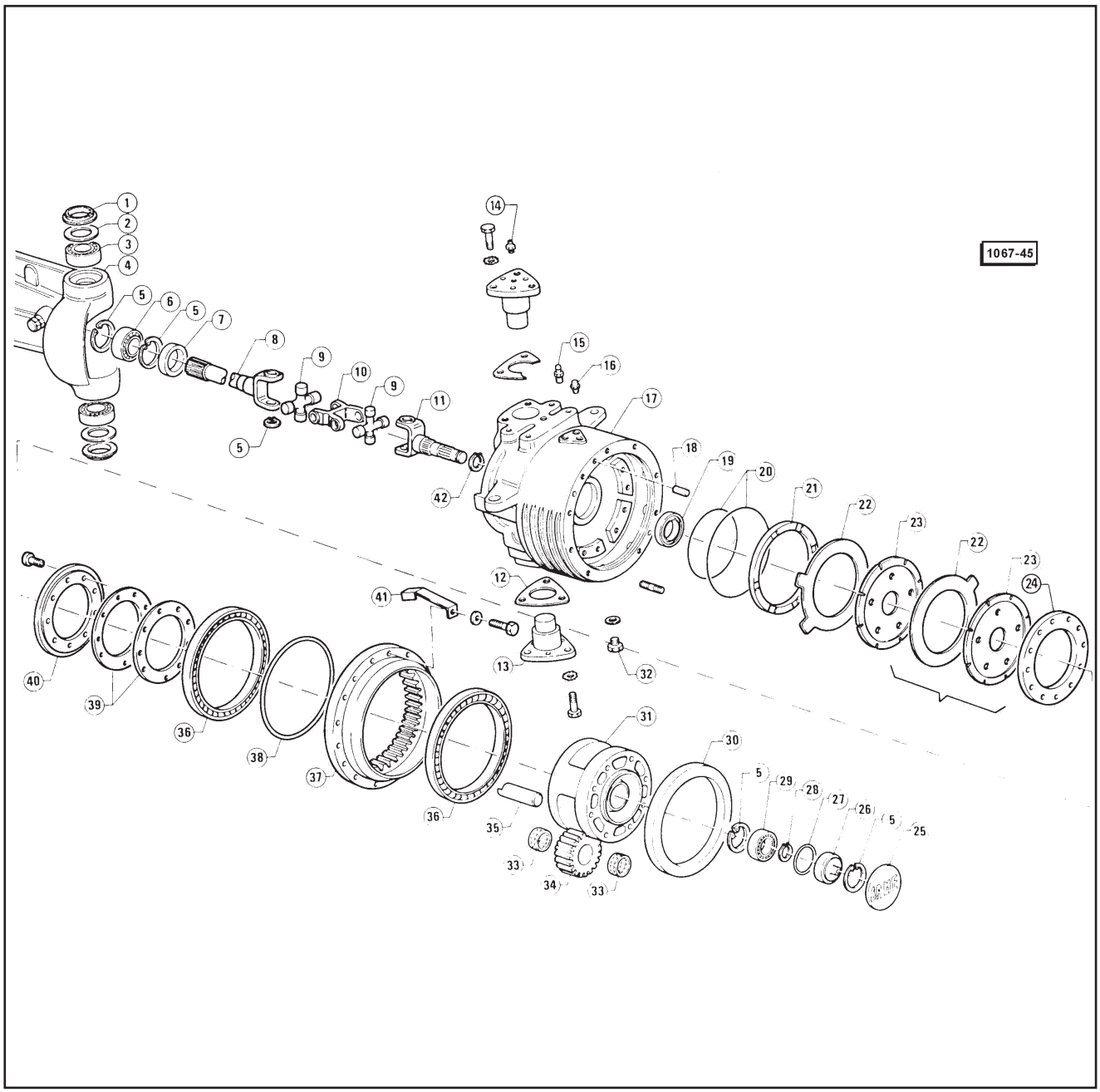
CHECKS AND VERIFICATIONS

1. Visually check that the bushes housed inside the rocking mountings are free from signs of excessive wear, seizing or deformation. Verify also that the bush bore is within the values given in the table “Rocking Mountings” (refer to: Technical Data and Specifications Checks and Adjustments). If not so, replace them.
2. Visually check that the mating surface of pins with the mountings are free from signs of seizing, deformation or excessive wear: if not, replace the damaged components.
3. Visually check that mounting outer surfaces are free from cracks, deformation, or any type of damage that could compromise the correct functioning. If not, replace the mounting.

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HUB



1 - Dust cover
2 - Shoulder ring
3 - Roller bearing
4 - Axle body
5 - Seeger ring - internal
6 - Bearing
7 - Seal ring
8 - Axle shaft
9 - Cross journal
10 - Constant velocity joint
11 - Wheel shaft
12 - Shim
13 - Pin
14 - Grease nipple
15 - Bleeder screw
16 - Valve
17 - Fork
18 - Dowel pin
19 - Seal ring
20 - O-ring
21 - Brake piston
22 - Counter disk and intermediate disk
23 - Brake disks
24 - Flange
25 - Cover
26 - Spacer
27 - O-ring
28 - Seeger ring
29 - Bearing
30 - Seal ring
31 - Differential carrier
32 - Oil drain plug
33 - Roller bearing
34 - Side pinion
35 - Pin
36 - Bearing
37 - Internal gear
38 - O-ring
39 - Adjusting shims
40 - Flange
41 - Protection
42 - Seeger ring

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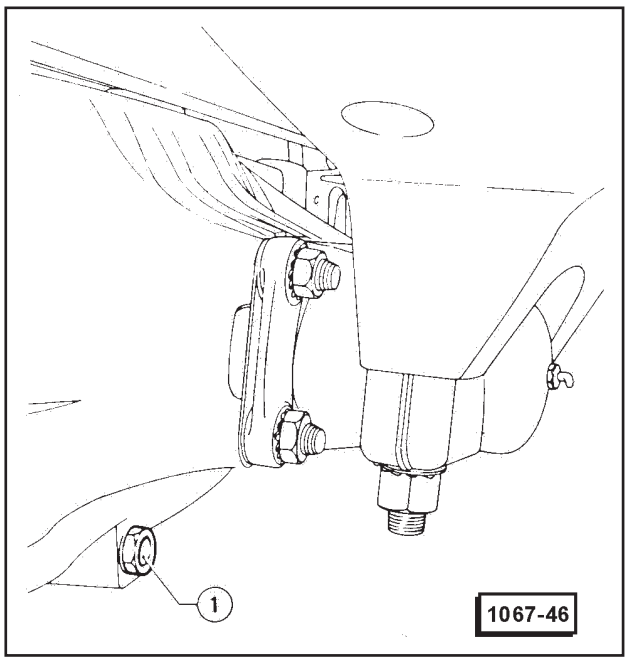
DISASSEMBLY

CAUTION
Always use a light alloy hammer or punch when tapping on cast iron components.

1. Position a support stand with wooden wedge interposed, under the engine to prevent metal components from coming into contact.
2. Loosen the screws securing the front wheels, lift the vehicle with an hydraulic jack, and remove the wheels; lower the vehicle.

CAUTION
Ensure that vehicle is safely positioned on supports.

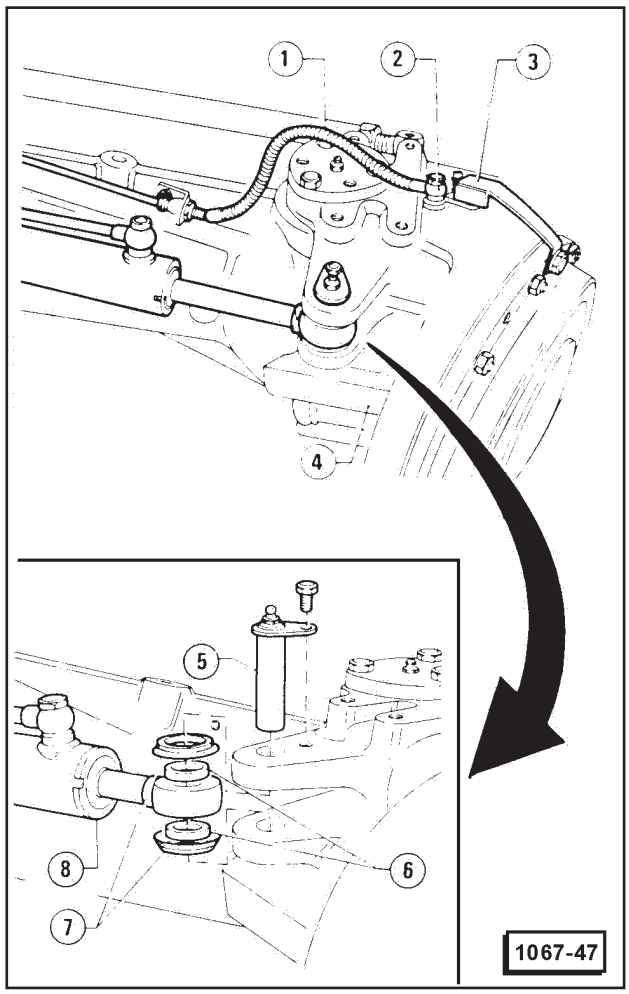
3. Place appropriate containers underneath – forks, unscrew the two plugs located in the lower side of forks, and plug **1** located underneath the front rocking mounting, and drain the oil.



1 - Front axle oil drain plug

4. Position a suitable container to collect the braking system oil under fork **4**. Unscrew union **2** on fork **4**, and disconnect hose **1** plugging it suitably.

5. Unscrew the screw securing pin **6** to fork; extract the pin using a lever, and recover dust covers **7** and spacers **5**.
6. Unscrew the securing screw, and remove valve protection **3**.

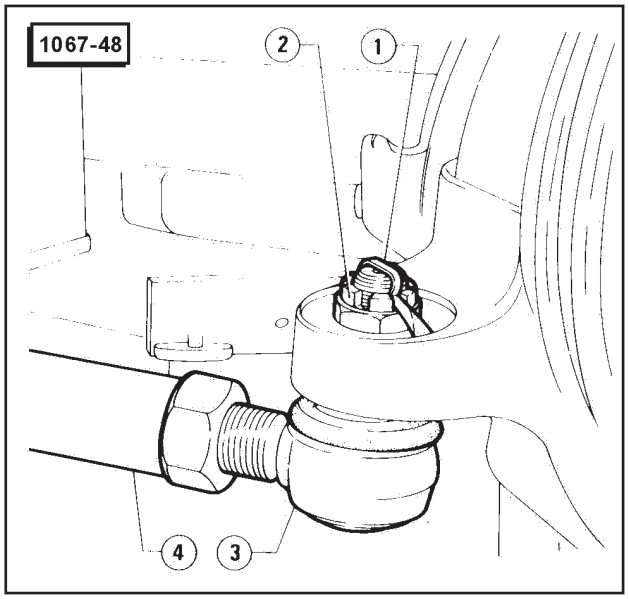


1 - Braking system oil hose
2 - Union
3 - Valve protection
4 - Fork
5 - Spacers
6 - Pin securing jack
7 - Dust cover
8 - Hydrostatic steering jack

7. Withdraw split pin **1,** and unscrew nut **2** securing kingpin **3** to fork.
8. Use the appropriate puller to remove from its seat kingpin **3** of tie rod **4** between the two forks. Repeat the same operation for the other kingpin, and remove the tie rod.

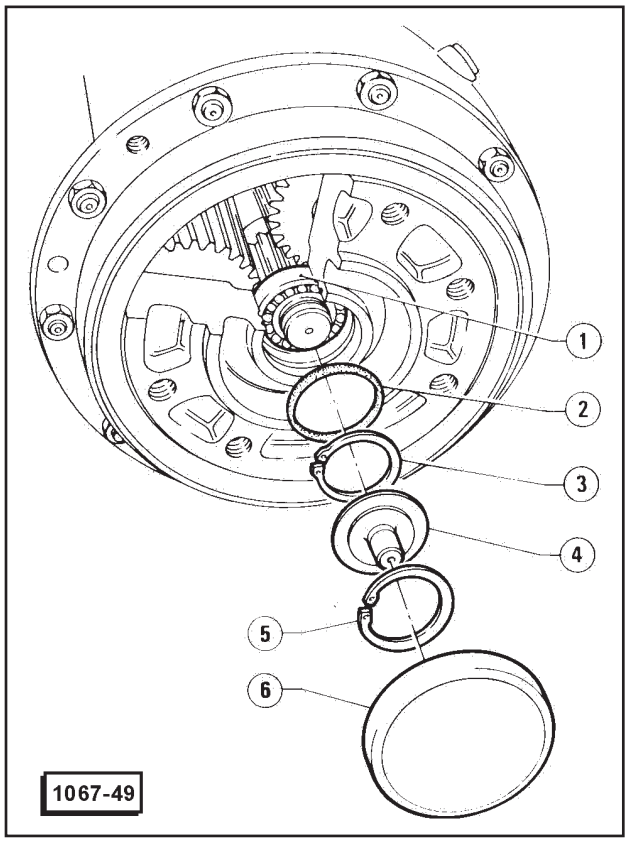
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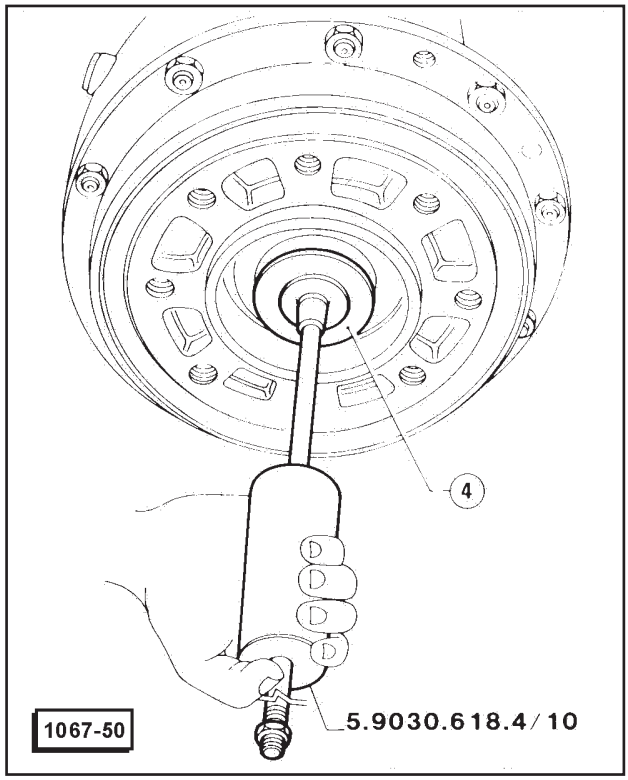
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1 - Split pin
2 - Nut
3 - Kingpin
4 - Tie rod

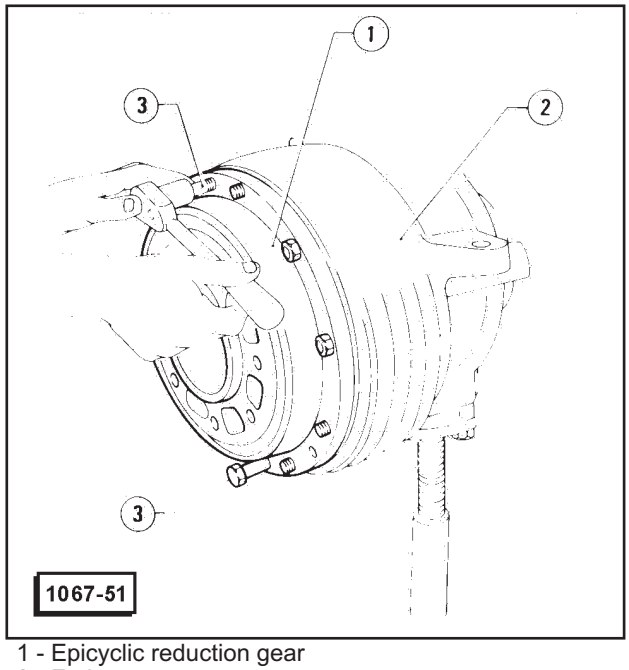
9. Unscrew cover **6** placed at the centre of hub, and remove it.
10. Extract seeger ring **5** located in front of spacer **4**; use tool 5.9030.618.4/10 with appropriate union to remove the spacer.
11. Remove seal ring **2**, and seeger ring **3**.





1 - Seeger ring
2 - Seal ring
3 - Seeger ring
4 - Spacer
5 - Seeger ring
6 - Bearing

12. Unscrew the ten nuts securing epicyclic reduction gear **1** to fork **2**.
13. Screw the two longest screws **3** into the holes without studs, by tightening them fully home onto fork; remove reduction gear 1 and the O-ring underneath.

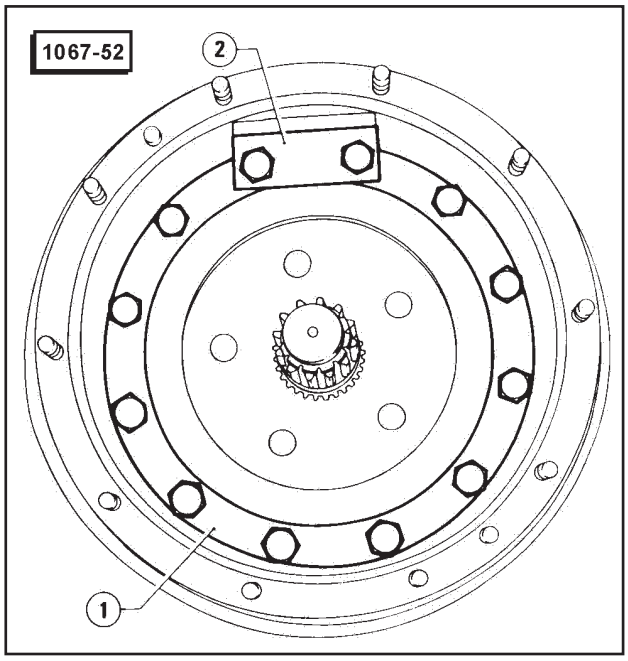


1 - Epicyclic reduction gear
2 - Fork
3 - Screws

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14. Unscrew the twelve self locking screws securing brake unit flange **1**, and remove it together with the oil deflector sheet steel **2**.

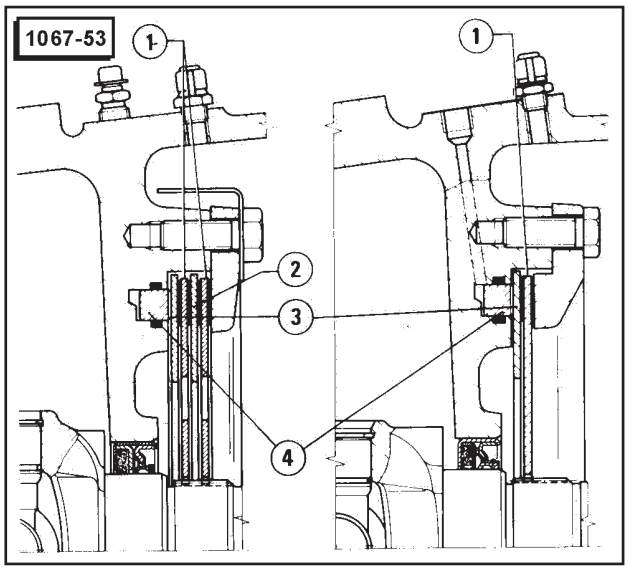


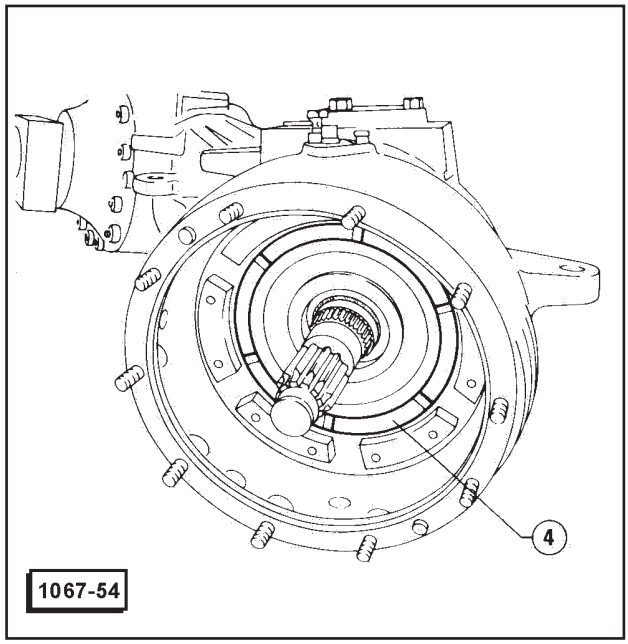
1 - Brake unit flange
2 - Oil deflector sheet plate

15. Extract brake discs 1, intermediate disc 2, and counter disk 3, then let compressed air into the brake oil union, and remove brake control piston 4.

CAUTION
For the models where it is present, countermark the mounting position of both counter disk and intermediate disk.

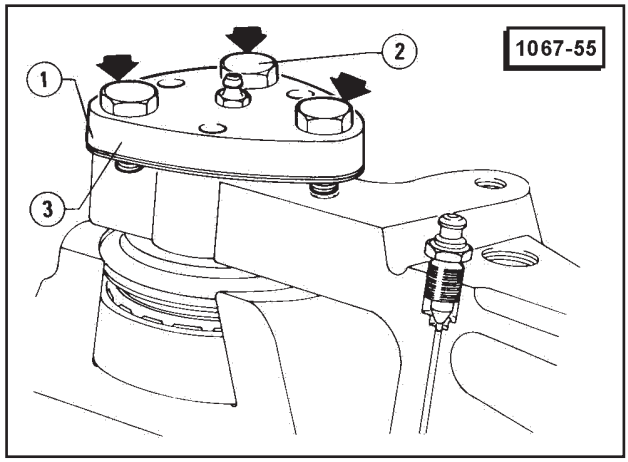
NOTE
Models 110 have one disk only, and are without intermediate disk.





1 - Brake disks
2 - Intermediate disk
3 - Counter disk
4 - Brake control piston

16. Sling the fork and support it with the aid of a suitable lift.
17. Unscrew the three screws securing upper pin **1**. Tighten partially screws **2** into the three threaded holes normally not used. Repeat the same operations for the lower pin.



1 - Upper pin securing fork
2 - Screws
3 - Shim

18. Tighten thoroughly the six screws previously positioned, and extract the two pins **10,** and shims **9,** then remove fork **1**. Recover dust covers and shoulder rings **3**.

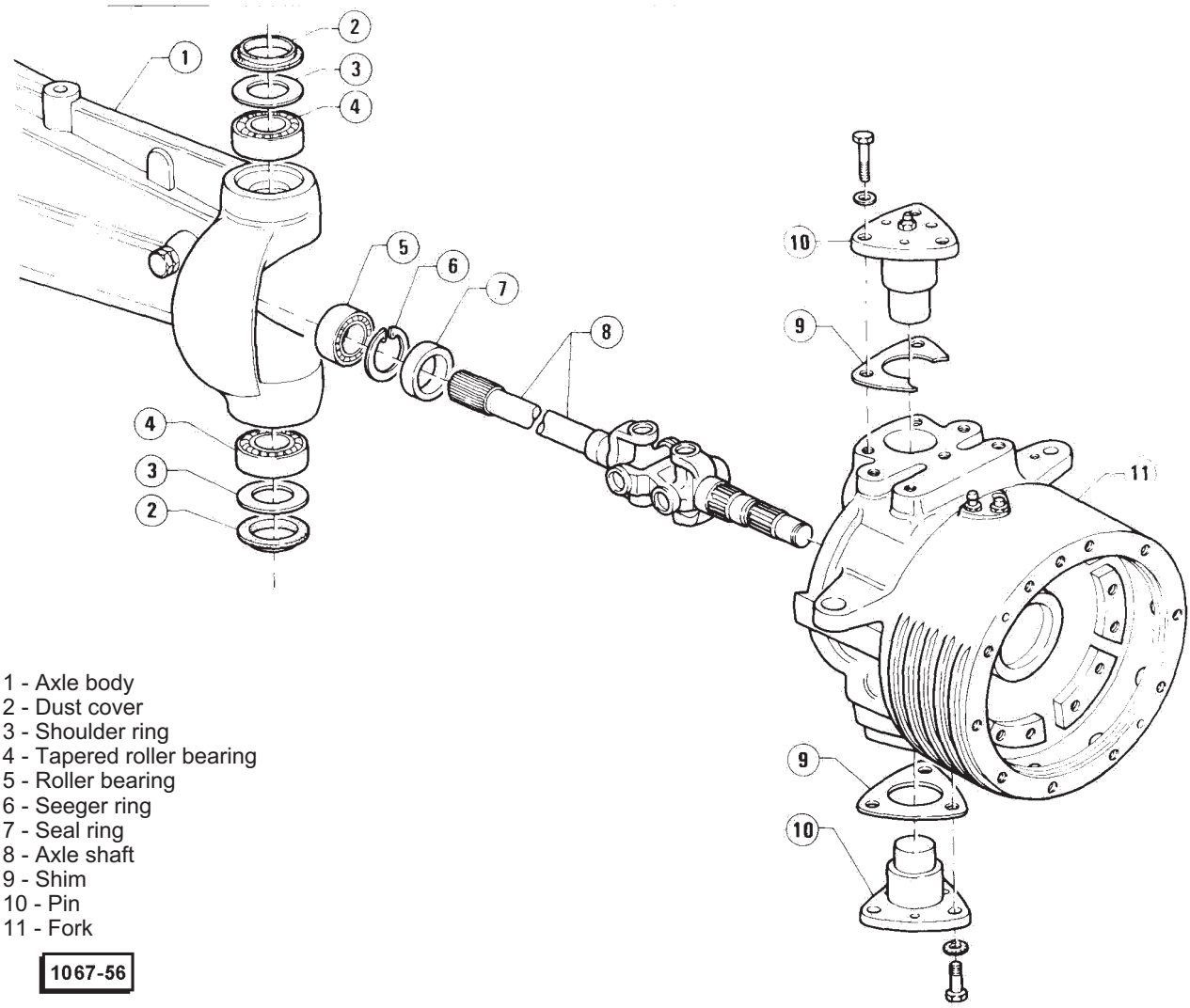
CAUTION
Take care not to drop the lower tapered roller bearing 4.

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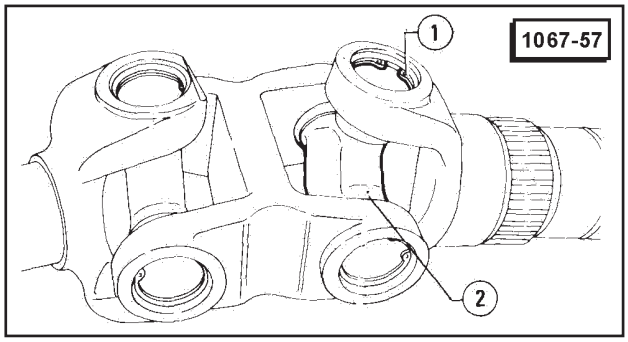
NOTE
If required, remove the outer race of tapered roller bearing **4**, by heating uniformly the fork in correspondence with the race.

19. Withdraw axle shaft **8** complete with constant velocity joint and wheel shaft, by pulling it outwards.
20. If required, remove seal ring **7**, and seeger ring **6** from axle **1** then, by means of the appropriate puller, extract bearing **5**.



1 - Axle body
2 - Dust cover
3 - Shoulder ring
4 - Tapered roller bearing
5 - Roller bearing
6 - Seeger ring
7 - Seal ring
8 - Axle shaft
9 - Shim
10 - Pin
11 - Fork

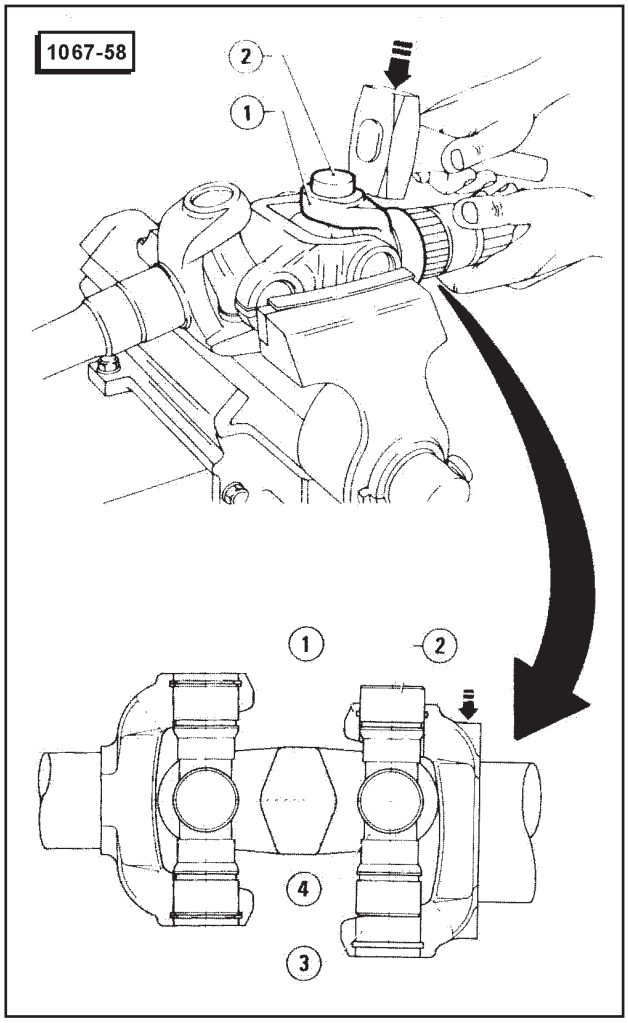
21. If required, disassemble the constant velocity joints by operating as follows.
(1) Extract the two seeger rings 1 of one pin of cross journals **2** by tapping, if required, with a non-cast iron hammer and punch.
(2) Secure the constant velocity joint fork on a vice fitted with protective jaws.
(3) Lightly tap with a hammer on the fork of wheel shaft **1** so that bearing can be withdraw upwards from its seat on fork **1**. Separate cross journal **4** from fork **1**.



1 - Seeger ring
2 - Constant velocity joint cross journal

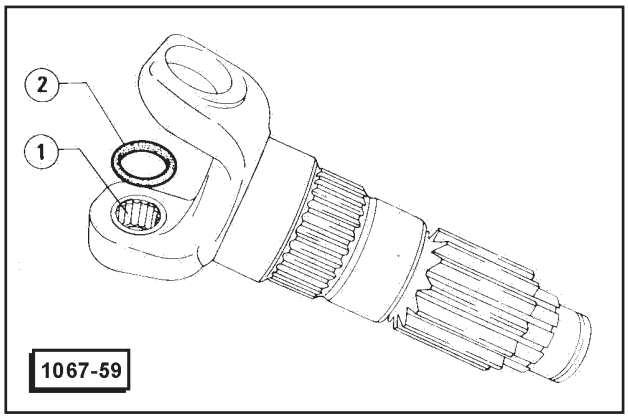
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1 - Wheel shaft fork
2 - Roller bearing
3 - Roller bearing
4 - Cross journal

(4) Following the same procedure, separate the cross journal from the constant velocity joint fork and axle shaft fork.
(5) Recover bearing rollers **1,** and the related dust cover rings **2**.



1 - Rollers
2 - Dust cover rings

CHECKS AND VERIFICATIONS

Before examining the components, wash them thoroughly with appropriate solvents, and dry them immediately after with compressed air.
Check brake conditions (refer to: Brakes - Front Brakes - Checks and Verifications).
Verify the epicyclic reduction gear (refer to: Epicyclic Reduction Gear - Checks and Verifications).

PINS

Check that the pin surfaces are not damaged or worn; if the damage is slight, smooth the surfaces with very fine abrasive paper. If not replace the pins. Proceed likewise for the pin seats on forks.

BEARINGS

1. Carefully examine the bearings by letting them rotate slowly: check for vibrations, noise or slight seizing.
2. Examine the conditions of ring surfaces and rolling elements checking for scratches, prints, grinding signs due to scoring generated by foreign matter. Replace the damaged components.

FORK AND AXLE BODY

Visually inspect that forks and axle body are free from damage, scratches or dents that could someway affect the efficiency and safety of functioning. If not, replace the damaged components.

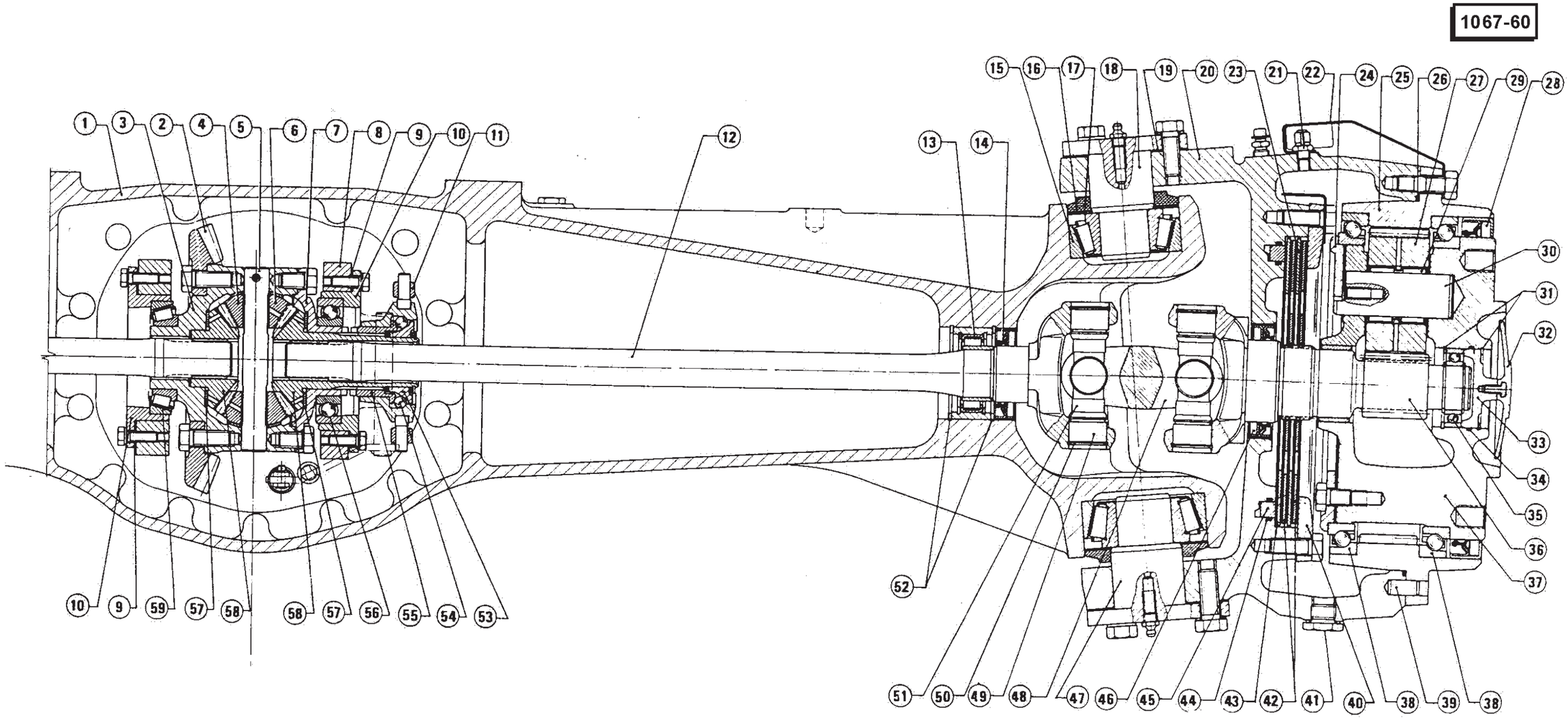
AXLE SHAFTS

1. Check that teeth on axle shafts are not worn or damaged. In presence of scratched elements, check that the gears meshing with the defective tooth are not damaged.
2. Verify that the rolling surfaces are very smooth and free from cracks. If required, proceed to smooth them with a very fine abrasive paper.
3. In presence of seizing, or if movement is difficult or noisy, verify the wear degree of needle bearings and races on constant speed joints cross journals.
Verify also good conditions of bearing dust covers. In presence of damaged components, replace the whole cross journal.

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REASSEMBLY (For 130 - 150)



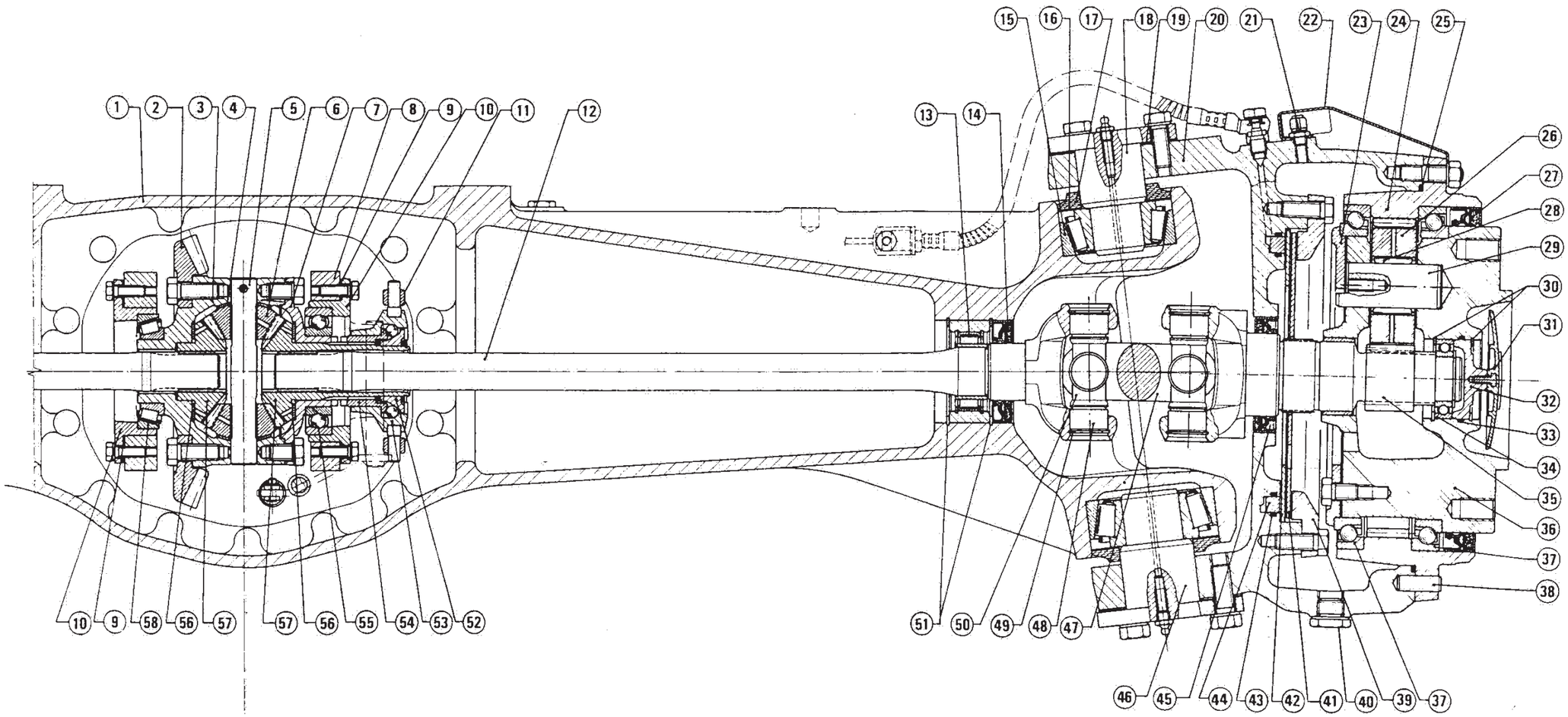
1 - Axle body
2 - Crown wheel
3 - Differential half casing
4 - Shoulder ring
5 - Spider pin
6 - Side pinion
7 - Differential flange casing
8 - Flange supporting differential
9 - Adjusting shims
10 - Differential flange casing
11 - Differential lock control lever
12 - Axle shaft
13 - Roller bearing
14 - Seal ring
15 - Tapered roller bearing
16 - Shoulder ring
17 - Dust cover
18 - Upper pin
19 - Adjusting shims
20 - Fork
21 - Valve
22 - Cover
23 - Intermediate disc
24 - Flange
25 - Epicyclic reduction gear
26 - O-ring
27 - Side pinion
28 - Seal ring
29 - Roller bearing
30 - Pin
31 - Seeger ring
32 - Cap
33 - Spacer
34 - O-ring
35 - Ball bearing
36 - Wheel shaft
37 - Spider pin casing
38 - Ball bearing
39 - Dowel pin
40 - Flange
41 - Oil drain cap
42 - Brake discs
43 - Counter disc
44 - O-ring
45 - Brake piston
46 - Support link
47 - Lower pin
48 - Constant velocity joint
49 - Roller bearings
50 - Seeger ring
51 - Cross velocity joint
52 - Seeger ring
53 - Spacer
54 - Coupling
55 - Contrate Coupling
56 - Ball bearing
57 - Shoulder ring
58 - Crown wheel
59 - Tapered roller bearing

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For 110

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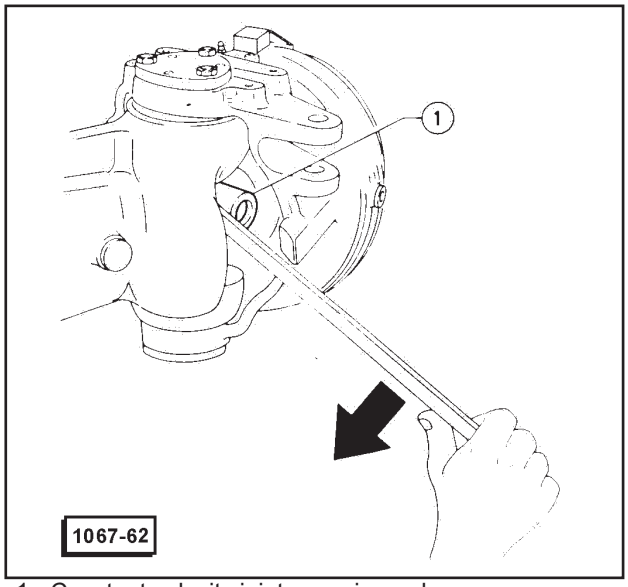
1 - Axle body
2 - Crown wheel
3 - Differential half casing
4 - Shoulder ring
5 - Spider pin
6 - Side pinion
7 - Differential flange casing
8 - Flange supporting differential
9 - Adjusting shims
10 - Differential flange casing
11 - Differential lock control lever
12 - Axle shaft
13 - Roller bearing
14 - Seal ring
15 - Roller bearing
16 - Shoulder ring
17 - Dust cover
18 - Upper pin
19 - Adjusting shims
20 - Fork
21 - Valve
22 - Cover
23 - Flange
24 - Epicyclic reduction gear
25 - O-ring
26 - Side pinion
27 - Seal ring
28 - Roller bearing
29 - Pin
30 - Seeger ring
31 - Cap
32 - Spacer
33 - O-ring
34 - Ball bearing
35 - Wheel shaft
36 - Spider pin casing
37 - Ball bearing
38 - Dowel pin
39 - Flange.
40 - Oil drain cap
41 - Brake discs
42 - Counter disc
43 - O-ring
44 - Brake piston
45 - Support link
46 - Lower pin
47 - Constant velocity joint
48 - Roller bearings
49 - Seeger ring
50 - Cross velocity joint
51 - Seeger ring
52 - Spacer
53 - Coupling
54 - Coupling
55 - Contrate coupling
55 - Ball bearing
56 - Shoulder ring
57 - Crown wheel
58 - Tapered roller bearing

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Refer to cross section on page 173 for models 150 and 130 (page 174 for models 110) and reassemble the hub by reversing the order of disassembly, complying with the following.

— If previously disassembled, proceed to assemble the constant velocity joint. To facilitate the positioning of the needles of bearing **49** (48), it is good practice to lay a coat of the grease prescribed on the bush containing them.
— Use the grease prescribed to lubricate tapered roller bearings **15** of fork **20**, and position shoulder rings **16** and dust cover **17**.
— When inserting axle shaft **22**, take care not to damage roller bearing **13** and seal ring **14**. Enclencher correctement l'éxtremité du demi-axe **12** sur les planétaires **57** (58) différentiel. - Insert the end of axle shaft **12** correctly onto crown wheels **57** (58). Verify that the axle shaft rotates freely.
— After having installed the bearings and dust cover, fit fork **20** set a shim (**0.5 mm; 0.0196 in** thick) underneath lower pin **47** (46) and by means of a hammer insert the pin. Tighten the screws.
— Insert under the upper pin **18** a shim package greater than that removed. Insert the pin and tighten the screws.
— Replace O-rings **44** (43) of brake control piston **45** (44) and refit piston into its seat with the oil slots pointing outwards.
— Install counter disk **43** (42) disks **42** (41) and, only for 150 - 130), intermediate disk **23**, coupling with the marks made on disassembly.
— Mount the epicyclic reduction gear **25** (24) holding axle shaft as shown in the following figure, levering outwards with cross journal 1 to prevent axle shaft moving inwards.



1 - Constant velocity joint cross journal

FORK BEARINGS PRELOAD ADJUSTMENT

After having assembled the various components as de, scribed in "Reassembly" proceed to measure the fork end-float by strictly following the procedure below.

NOTE
When using shim package, pack several shims into one: e.g. it is better to use a shim **0.2 mm** (0.0078 in) thick instead of two **0.1 mm** (0.0039 in) thick.

1. Apply the magnetic base support N. 5.9030.267.0 with centesimal comparator N. 5.9030.272.0 on the axle, and place the related probe perpendicularly with respect to lower pin, in proximity to the centre, and reset it.
2. By means of lever **1**, move the fork completely upwards (as shown in the figure), and read the backlash value on the comparator.
3. Unscrew screws **2,** and remove the shims from package **3** so as to remove the backlash without preloading the bearings.

CAUTION
Gradually reduce the backlash by repeating the reading with comparator each time, so as not to preload the bearings.

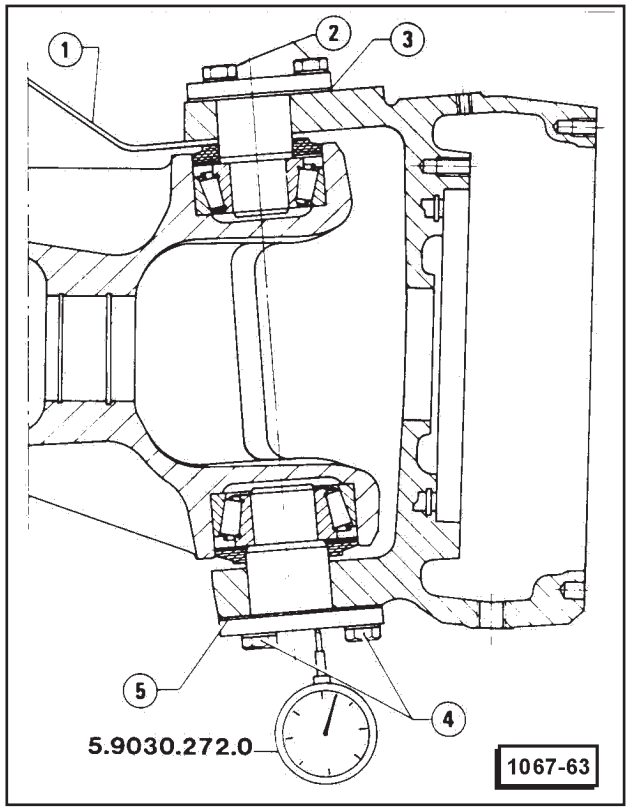
4. Once the backlash has been removed, remove the shim package **0.10 to 0.15 mm** (0.0039 to 0.0059) thickness, so that the correct bearing preload can be obtained.
5. Tighten screws **2** and **4** to the prescribed torque.

Tightening torque
Screw securing fork pin

Refer to: GENERAL
Instructions for tightening

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1 - Lever
2 - Screws
3 - Shim package
4 - Screws
5 - 0.5 mm (0.0196 in) shim

6. After having correctly performed the adjustment, check that the tapered bearings of shaft rotate freely into their seats although a slight preload can be sensed.

EPICYCLIC REDUCTION GEAR

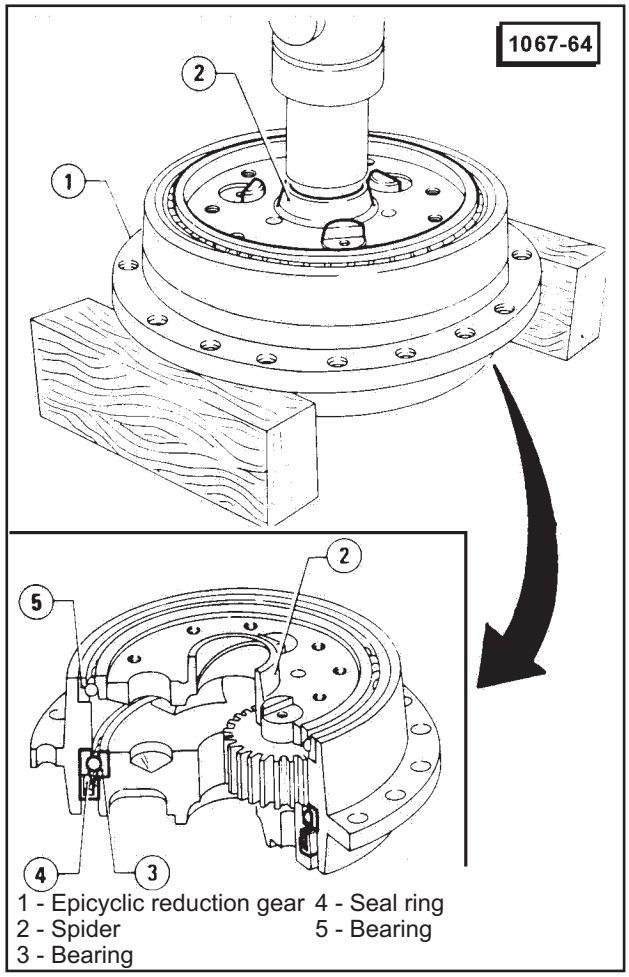
DISASSEMBLY

CAUTION
Always use a light alloy hammer or punch when tapping on cast iron components.

1. Remove the epicyclic reduction gear from front axle (refer to: Hub - Disassembly).
2. Referring to Diagrams on pages 173 and 174, unscrew the nine screws securing the flange **24** (23) of the reduction gear, and remove the flange itself, and shims underneath.
3. Rest epicyclic reduction gear **1** on two wooden blocks as shown in the diagram and by means of a press and a punch act on the centre of spider by pointing outwards until withdrawing spider **2**, bearing **3**, and seal ring **4** downwards.

NOTE
Should leaks occur through seal ring **4**, this can be removed by withdrawing it from its seat, without extracting spider. Replace seal ring **4** each time it is removed, since this operation damages it seriously.

4. If required, replace bearings **3** and **5**, and tap on them with a hammer and punch until they are removed.

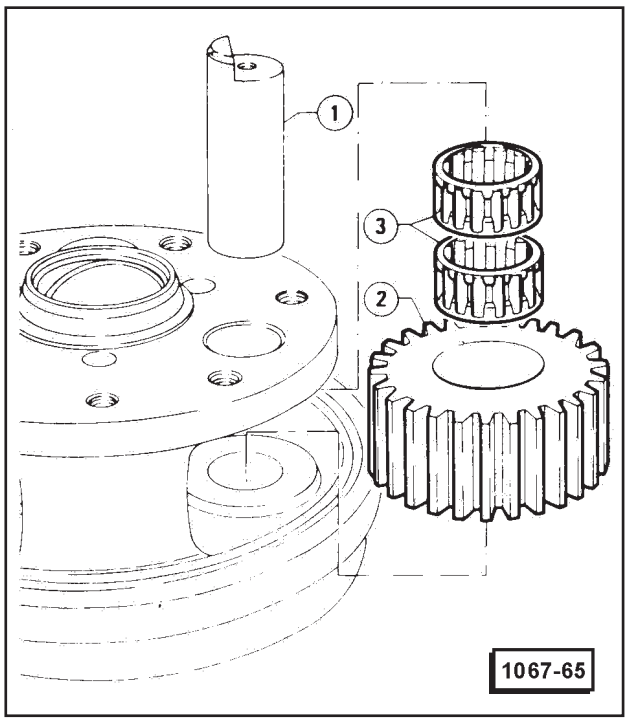


1 - Epicyclic reduction gear
2 - Spider
3 - Bearing
4 - Seal ring
5 - Bearing

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5. Withdraw pins **1** securing side pinions **2**; remove side pinions and needle bearings **3.**



1 - Pins
2 - Side pinions
3 - Needle bearings

CHECKS AND VERIFICATIONS

Before examining the components, thoroughly wash them with appropriate solvents, and dry them immediately after with compressed air.

PINS AND GEARS

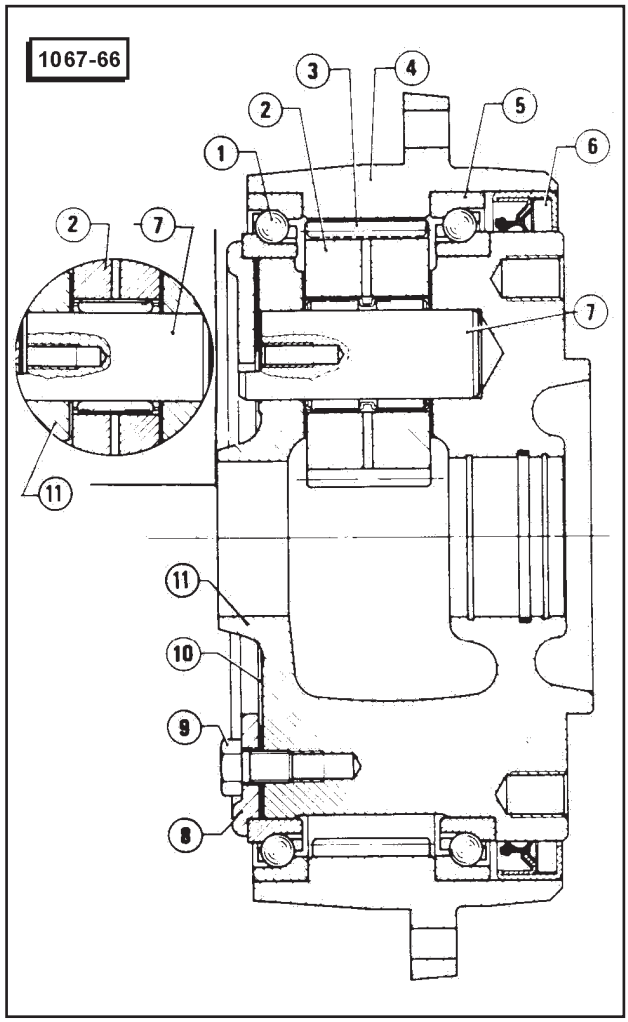
1. Check for damages of spider pin surfaces and their seats on epicyclic reduction gears. If slightly damaged, smooth the surfaces using a very fine abrasive paper. In presence of serious damage, replace the pins.
2. Verify that all teeth are not worn or damaged, and that all teeth work along the whole surface; if not so, replace the worn components.
3. In the event of gears with splintered teeth, replace them, and check that the gears they mesh with are not damaged.

BEARINGS

1. Examine the bearings carefully by letting them rotate slowly; check for vibration, noise or slight seizing.

2. Examine the conditions of ring surfaces and rolling elements checking for scratches, prints, grinding signs due to scoring generated by foreign matter. Replace the damaged components.
3. Use a very fine abrasive paper to smooth the outer surface of the internal gear on which the O-ring mates; clean with compressed air.

REASSEMBLY



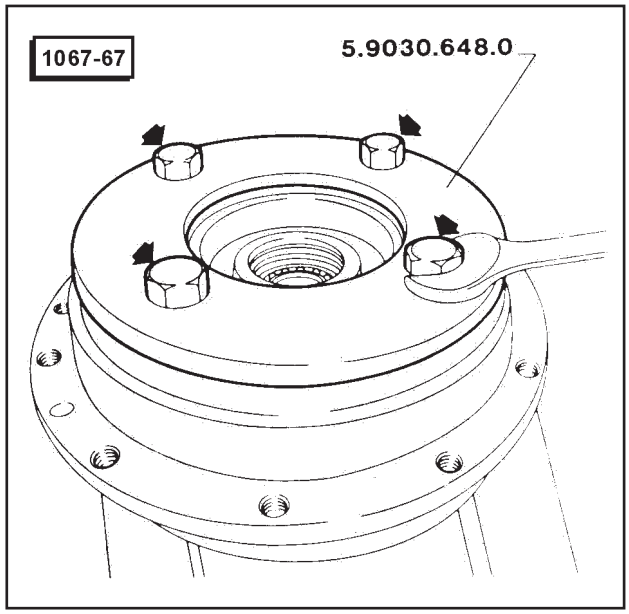
1 - Internal ball bearing
2 - Side pinion
3 - Needles
4 - Epicyclic reduction gear casing
5 - Outer ball bearing
6 - Seal ring
7 - Pin securing side pinions
8 - Flange
9 - Screws securing flange
10 - Shims
11 - Spider

Refer to the cross section and reassemble the epicyclic reduction gear by reversing the order of disassembly, complying with the following.

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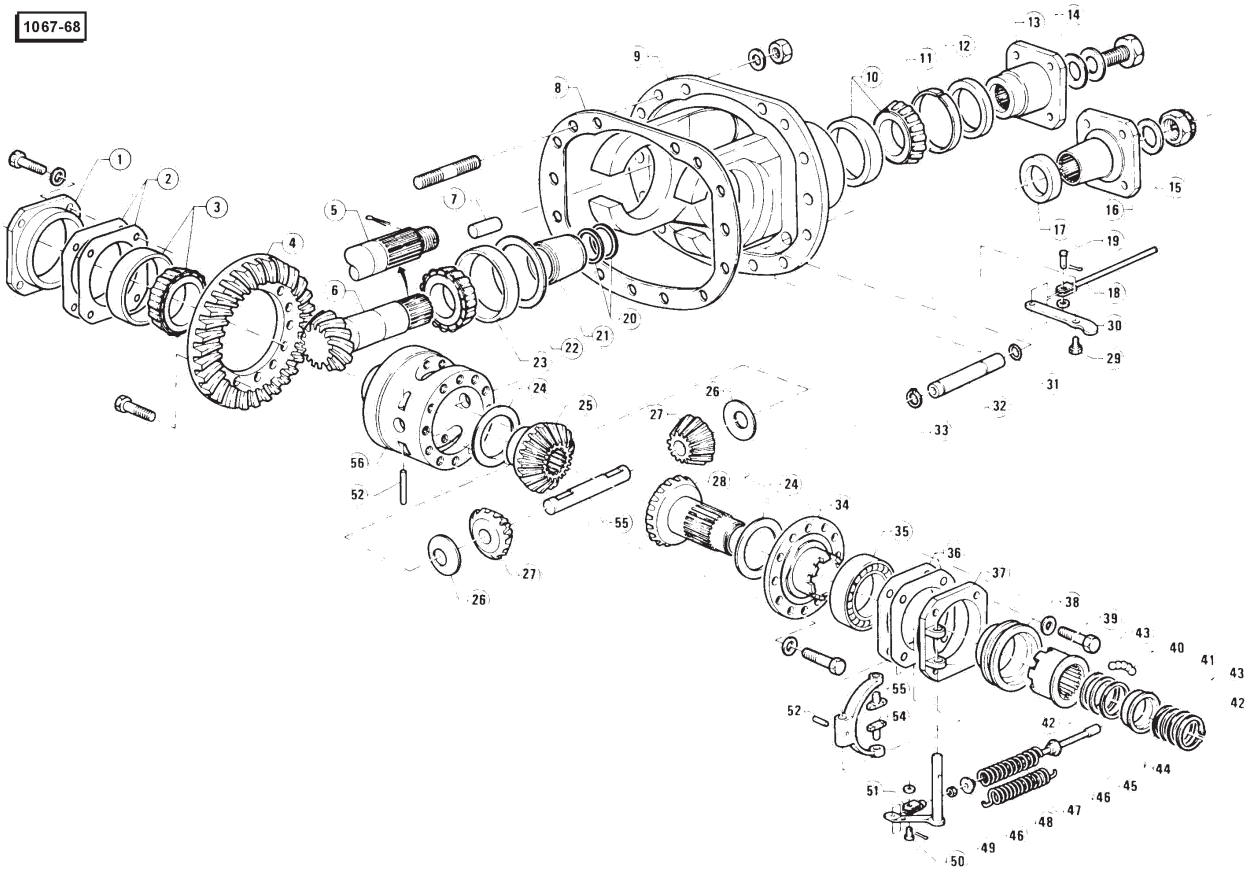
— If previously removed, install bearing **4** on spider **11**, taking care to position it in the correct mounting direction.
— Install side pinions **2** complete with bearings **3** into spider, directing the cylindrical part of pins **7** towards hub centre.
— Let the side pinion and internal gear teeth coincide without damaging them when inserting spider into epicyclic reduction gear casing **4**.
— If previously removed, install bearing **1** using a hammer and a punch by tapping slightly and uniformly on outer race.
— Fit a new seal ring **6** using tool N. 5.9030.638.0, as shown in the following figure.
— Ensure that hub rotates without sticking, although a slight preload can be sensed. If hub rotates too loose, remove flange **8** and a few shims **10**.



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COUPLE CONIQUE



1 - Flange
2 - Adjusting shims
3 - Tapered roller bearing
4 - Crown wheel
5 - Pinion**
6 - Pinion*
7 - Dowel pin
8 - Gasket
9 - Flange supporting differential
10 - Tapered roller bearing
11 - Spacer
12 - Seal ring
13 - Flange connecting propeller shaft*
14 - Shim*
15 - Shim**
16 - Flange connecting propeller shaft**
17 - Spacer
18 - Front differential lock control tie rod
19 - Pin
20 - Adjusting shims
21 - Spacer
22 - Adjusting shim
23 - Tapered roller bearing
24 - Shoulder ring
25 - Crown wheel
26 - Shoulder ring
27 - Side pinion
28 - Crown wheel
29 - Threaded pin
30 - Differential lock control lever
31 - O-ring
32 - Pushrod
33 - Seeger ring
34 - Differential casing flange
35 - Bearing
36 - Adjusting shims
37 - Differential flange
38 - Differential lock sleeve
39 - Contrate coupling
40 - Balls
41 - Spacer
42 - Seeger ring
43 - Shoulder ring
44 - Adjusting shims
45 - Rod
46 - Cup
47 - Thrust spring
48 - Return spring
49 - Transmission lever
50 - Pin
51 - Fork
52 - Dowel
53 - Differential lock control fork
54 - Pad
55 - Spider pin
56 - Differential half-casing

*** Only for 130, 150**
**** Only for 110**

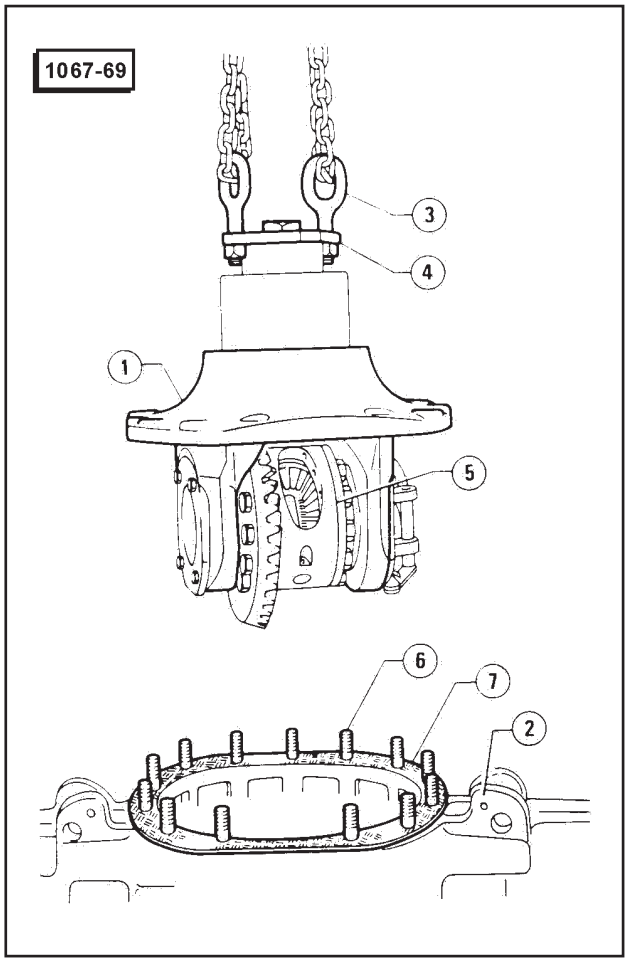
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DISASSEMBLY

CAUTION
Always use a light alloy hammer or punch when tapping n cast iron components.

1. Remove the front axle (refer to: Front Driving Axle Removal and Installation).
2. 2 Rotate the axle body **90** so as to bring the flange supporting rear differential in vertical position.
3. Unscrew the nuts securing flange supporting differential **1** to axle body **2**, and move the flange by tapping with a hammer.
4. Screw two eyebolts **3** on flange **4**, and lift the complete assembly; to facilitate the operation, use of a lever to withdraw the assembly from stud**s 6** and dowel pins; remove gasket **7**.

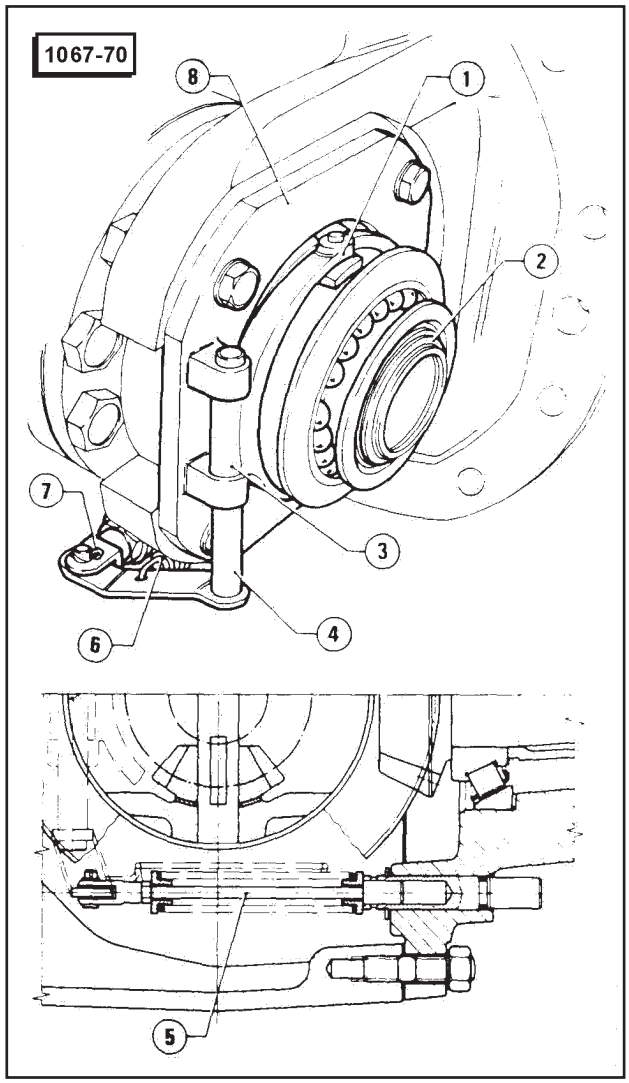


1 - Flange supporting differential
2 - Axle body
3 - Eyebolts
4 - Flange connecting propeller shaft
5 - Differential
6 - Studs
7 - Gasket

5. Release spring **6** from lever **4** and remove.
6. Withdraw split pin and extract pin **7**.
7. Extract dowel **3** securing lever **4** to fork **1**; withdraw lever **4**, and remove the fork together with the two pads.
8. Extract Seeger ring **2**, recover the shims underneath, and remove the complete differential unit.

CAUTION
Take care, not to drop the balls located inside the differential lock control sleeve.

9. Withdraw rod **5**.
10. Unscrew the four screws securing flange **8**, and remove it together with the shims underneath by slightly tapping with a hammer.

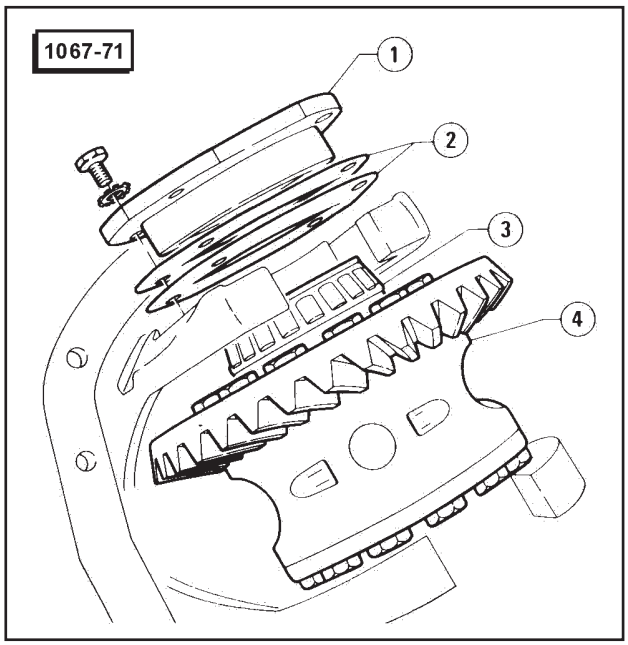


1 - Differential lock control fork
2 - Seeger ring
3 - Dowel
4 - Transmission lever
5 - Rod
6 - Return spring
7 - Pin
8 - Flange

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11. Repeat the operation of the previous step for flange **1**, and remove shims **2**.
12. Using a suitable puller, extract tapered roller bearing **3**, then extract differential casing **4**.



1 - Flange
2 - Shims
3 - Tapered roller bearing
4 - Differential casing

13. Remove the flange connecting the propeller shaft by operating as follows.

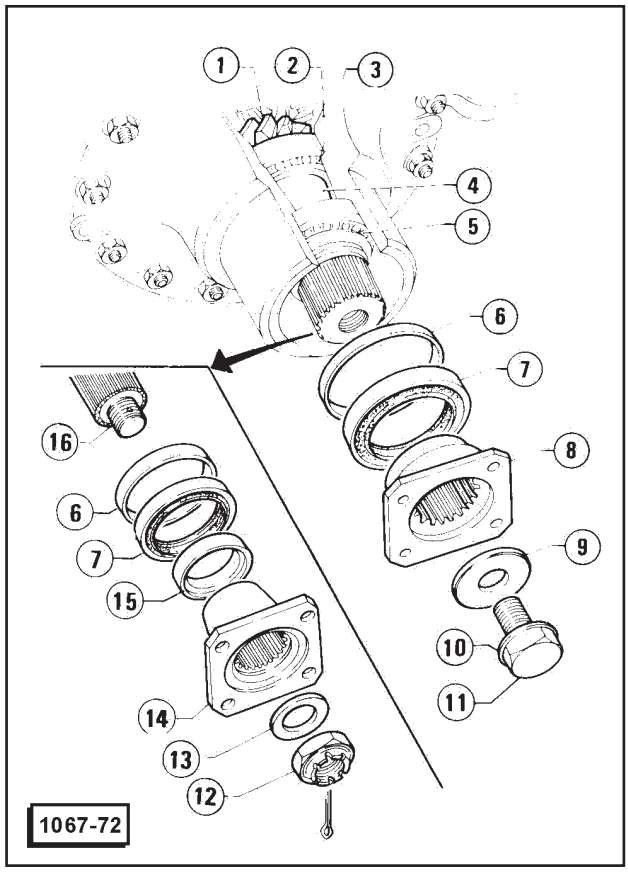
— **Only for 150-130**

(1) Secure flange **8** on a vice, unscrew screw **11**, and withdraw washer **10** and shoulder ring **9**.
(2) Remove the flange from the vice, and withdraw it from tang of pinion **1** by tapping with a hammer.
(3) Use a wooden mallet to tap on tang of pinion **1**, and extract the pinion together with inner race of bearing **3**, spacer **4**, and shim rings.
(4) Remove seal ring **7,** spacer **6** and inner rage of bearing **5** from flange supporting differential **2**.
(5) If required, remove the outer races of bearings **3** and **5** by tapping on races themselves with a light alloy hammer and punch.

NOTE
Behind the outer race of bearing **3**, are located the shims for adjusting the pinion-crown wheel position.

— **Only for 110**

Secure flange **4** on a vice; remove split pin, and unscrew nut **12** with shoulder ring **13**, then carry out disassembly as described for the models 150-130 taking into account that in the models 110 a spacer **15** is also present.

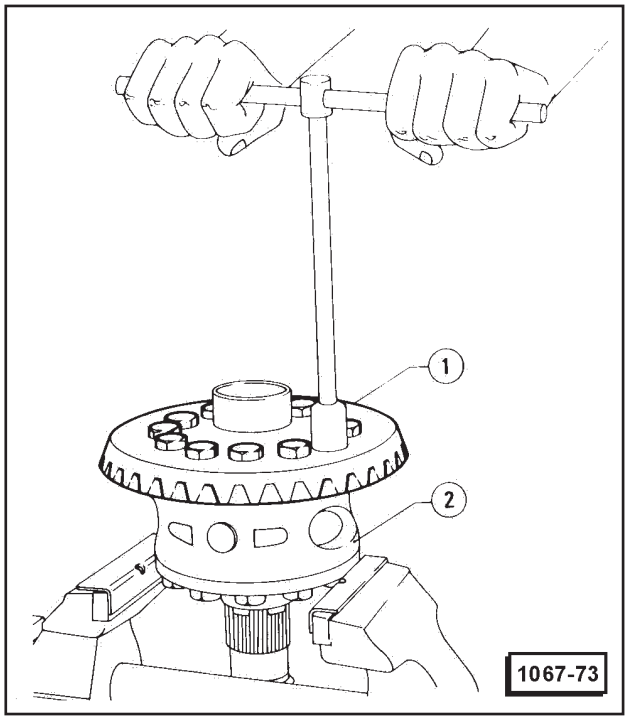


1 - Pinion
2 - Flange supporting differential
3 - Tapered roller bearing
4 - Spacer
5 - Tapered roller bearing
6 - Spacer
7 - Seal ring
8 - Flange connecting propeller shaft
9 - Shoulder ring
10 - Washer
11 - Screw
12 - Castle nut
13 - Shoulder ring
14 - Flange connecting propeller shaft
15 - Spacer
16 - Pinion tang

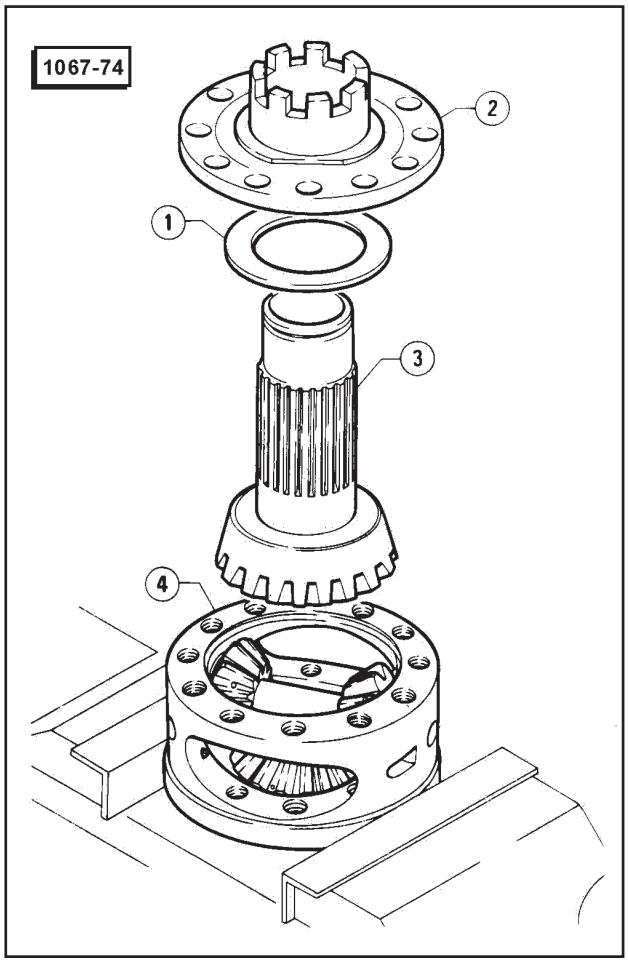
14. Secure the differential casing on a vice fitted with protective jaws, unscrew the twelve screws securing crown wheel **1** to differential casing **3**, and remove the crown wheel.

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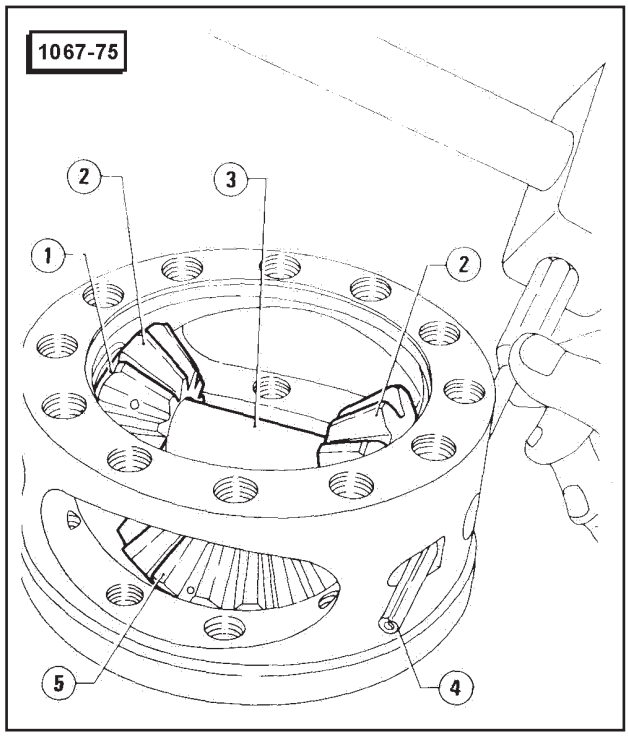


1 - Crown wheel
2 - Differential casing



1 - Shoulder ring
2 - Differential casing flange
3 - Crown wheel
4 - Half-casing

15. Unscrew the twelve screws securing flange **2** to half-casing **4**; remove flange **2** with crown wheel **3** and shoulder ring **1**.
16. Use a hammer and a punch to remove lock pin **4** securing pin **3** of the side pinions; tap on pin and withdraw it, then remove side pinions **2**, and shoulder rings **1**.
17. Withdraw crown wheel **5**, and the shoulder ring underneath.



1 - Shoulder ring
2 - Side pinions
3 - Spider pin
4 - Lock pin

CHECKS AND VERIFICATIONS

Before examining the components, provide to wash them thoroughly with the appropriate solvents, and dry them immediately after with compressed air. In particular, remove any traces of sealant or previous gaskets; then visually check for any damage to the surface.

FLANGE SUPPORTING DIFFERENTIAL

1. Verify that the support flange is free from cracks or splinters.
2. In particular, check for good condition of outer rings of both pinion shaft and differential casing tapered bearings.
3. Check that the threads of securing holes are not damaged.

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CROWN WHEEL AND PINION

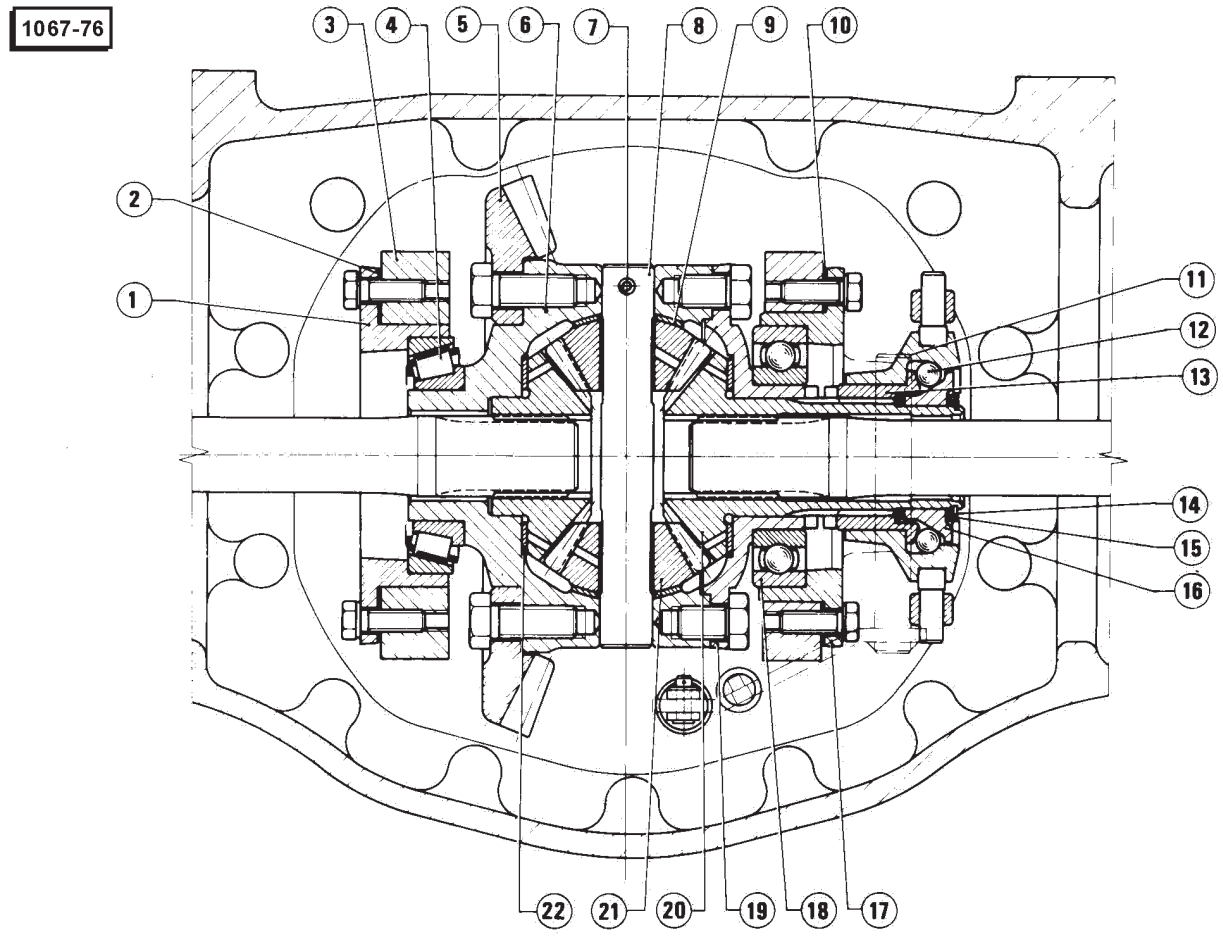
1. Check for noise or seizing signs in the pinion shaft bearings by letting them rotate freely. If in order there should be no noise.
2. Verify that both teeth are free from dents, seizing, or excessive wear. In presence of broken teeth, replace the crown wheel and pinion.
3. Verify that the teeth of bevel pinion works uniformly on the whole surface.

NOTE
Since the spare crown wheel and pinion assembly is supplied in pairs, replacement of one component only is not possible. Check that the crown wheel and pinion assembly to be installed has the same coupling reference designations marked on crown wheel and pinion respectively.

DIFFERENTIAL CASING

1. Check for noise or seizing signs of bearings by letting them rotate slowly.
2. Visually check that the teeth of gears, side pinions, and crown wheels are free from signs of seizing, and that they work uniformly, noiselessly and without excessive backlash on the whole surface. If required, replace the differential casing taking care, in this case, to replace also the tapered bearings.
3. Check for good condition of both rings and rolling element surfaces making sure that they are free from signs of irregular wear, grinding, due to scoring, seizing, or overheating. Replace the damaged components taking into account that the bearings must be replaced in pairs.

REASSEMBLY



1 - Flange
2 - Shims
3 - Flange supporting differential
4 - Tapered roller bearing
5 - Crown wheel
6 - Differential half-casing
7 - Dowel
8 - Spider pin
9 - Shoulder ring
10 - Shims
11 - Differential lock control sleeve
12 - Ball
13 - Differential lock coupling sleeve
14 - Seeger ring
15 - Adjusting shims
16 - Spacer
17 - Flange
18 - Ball bearing
19 - Differential casing flange
20 - Crown wheel
21 - Side pinion
22 - Shoulder ring

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Reassemble the differential casing by reversing the order of disassembly, complying with the following.

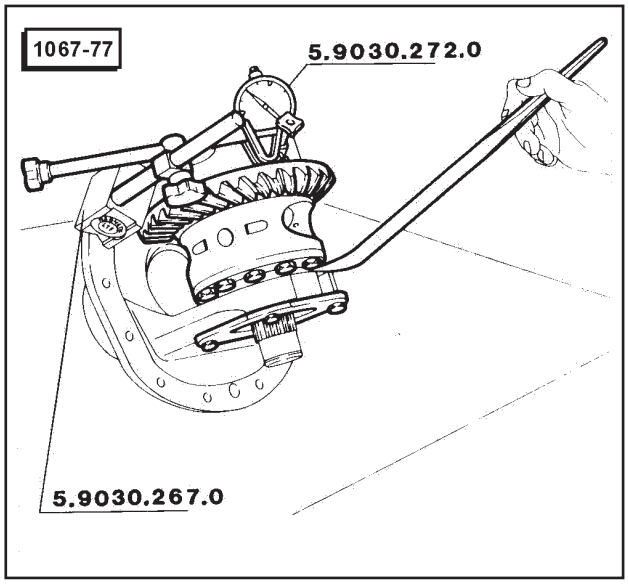
— Before reassembling the components, lubricate them with the grease prescribed.
— Replace all gaskets, seal rings, and O-rings.
— Tighten the following screws to the prescribed torque.

Tightening torque
Screws securing flange to differential half-casing
118 Nm
(12 Kgm; 86.76 ft lb)

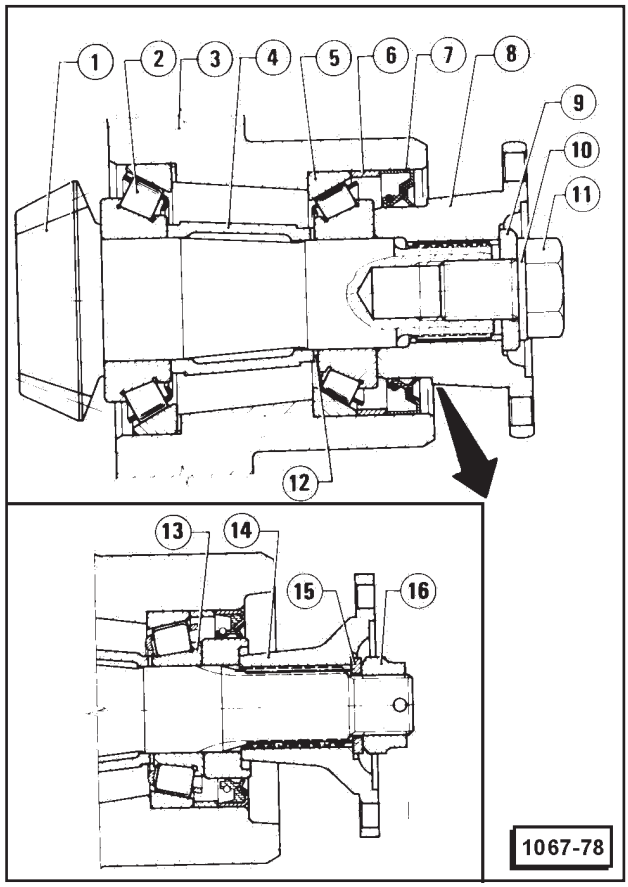
Screws securing crown wheel to differential casing
11,3 ÷ 11,8 Nm
(11,5 ÷ 12 Kgm; 83.15 to 86.76 ft lb)

— Refer to the cross section, and carry out reassembly taking care, when reassembling the differential casing on support flange **3**, to house roller bearing **4** on the side of crown wheel **5**, and ball bearing **18** on the opposite side.
— Proceed to adjust the differential casing bearings by operating as follows.

(1) Together with flanges 1 and 17, position a number of shims greater than that measured on disassembly.
(2) Refer to the following diagram and position magnetic base No. 5.9030.267.0 on the flange supporting the differential with the probe of the comparator 5.9030.272.0 on the outer surface of the crown wheel.
(3) Reset the comparator, and with the aid of a lever, move the differential casing measuring the backlash.



(4) Remove shims accordingly, from one side or the other of the flange supporting bearings, until obtaining a backlash value of **0.03 to 0.04 mm** (0.0011 to 0.0015 in). Repeat the measurement until the correct value is obtained.
— Remove the differential casing from the flange supporting differential, and mount the pinion assembly complete, with all components, taking care to position the same shim package **12** removed on disassembly. Verify manually that the pinion rotates freely without backlash. If required, change the number of shims **12**; if pinion rotates too loose, remove shims, add shims in the opposite case.



1 - Pinion
2 - Tapered roller bearing
3 - Flange supporting differential
4 - Spacer
5 - Tapered bearing
6 - Spacer
7 - Seal ring
8 - Flange connecting propeller shaft
9 - Shoulder ring
10 - Washer
11 - Screw
12 - Adjusting shims
13 - Spacer
14 - Flange connecting propeller shaft
15 - Shoulder ring
16 - Castle nut

— Proceed to adjust the pinion-crown wheel position (refer to: Pinion-Crown Wheel Position Adjustment).

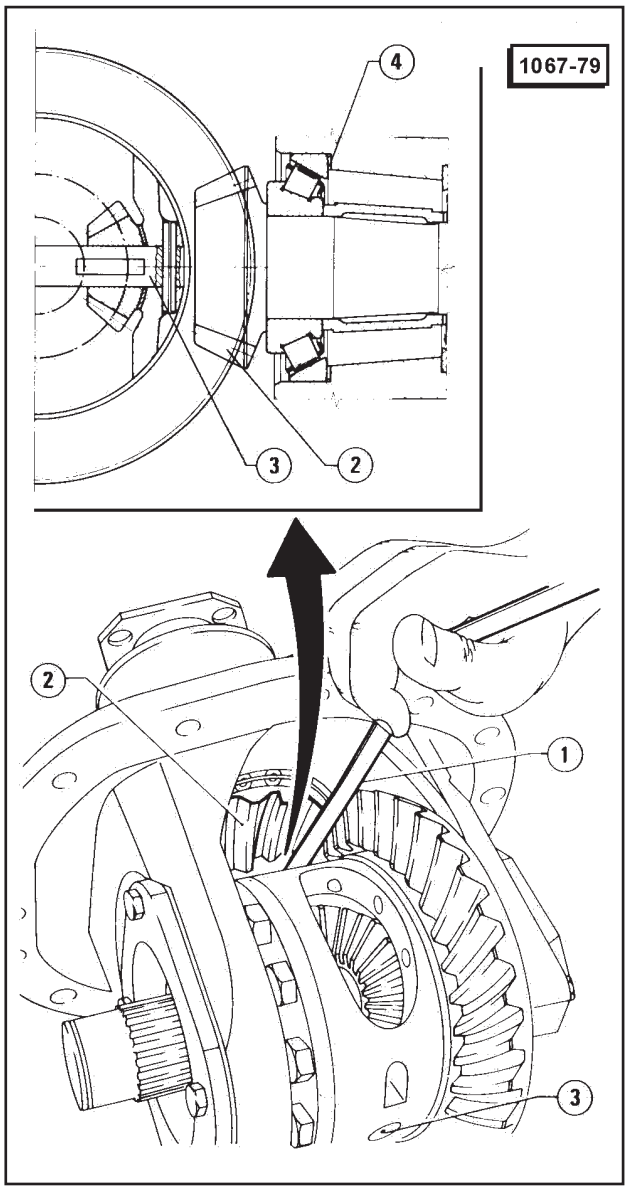
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PINION-CROWN WHEEL POSITION ADJUSTMENT

CAUTION
Adjustment is to be performed only if the pinion or the bearings have been replaced, by operating as per the following procedure. On the contrary, use the same shim package, if the original components are being reassembled.

1. Use feeler gauge **1** to measure the distance D between pinion head **2** and spider pin on differential casing **3**.



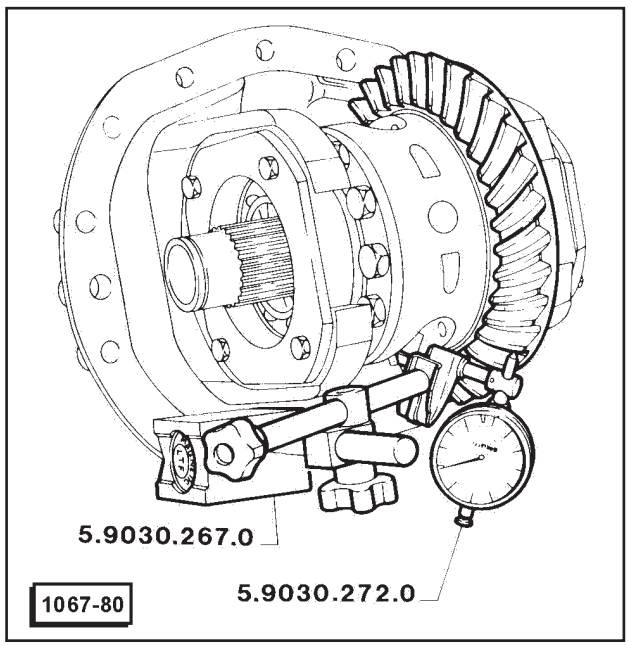
1 - Feeler gauge
2 - Pinion head
3 - Spider pin
4 - Shims

2. According to the sign, add or subtract the value marked on the contour of pinion tooth, up to the value given in the table “Pin-ion - Crown Wheel” (refer to: Technical Data Specifications - Checks and Adjustments).

Example

Value read in the table	5 mm
Value read on contour of pinion tooth	0,10 mm
Correct adjustment value	4,9 mm

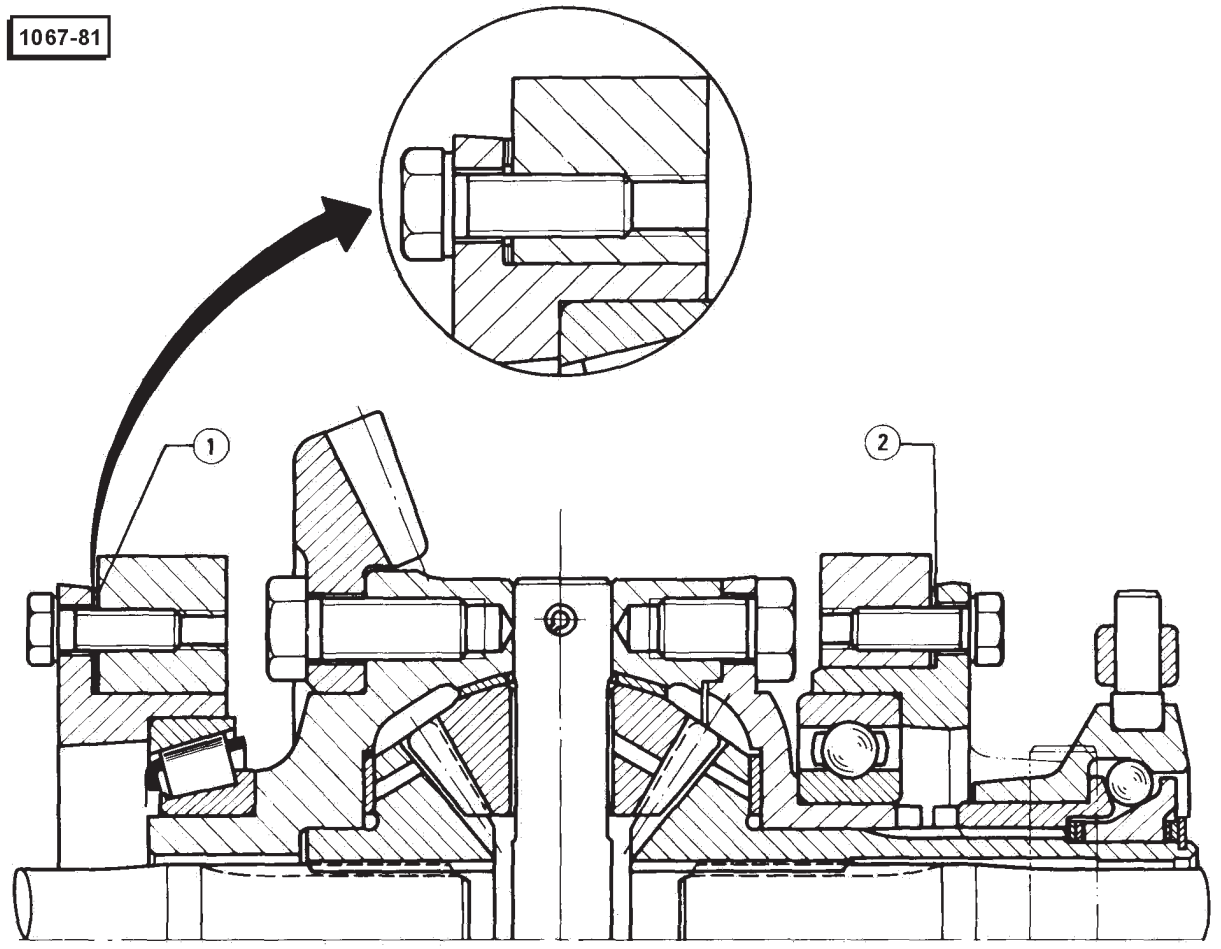
3. Compare the value thus calculated with those calculated with feeler gauge: if the measured value is greater, increase shim package **4** and viceversa. Repeat the measurement until obtaining the correct value.
4. Mount the magnetic base support N. 5.9030267.0 with centesimal comparator N. 5.9030.272.0 onto differential casing, and place the probe perpendicularly with respect to one tooth of crown wheel.



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5. Block pinion rotation, and rotate the crown wheel reading on comparator the backlash value between pinion teeth and those of crown wheel
6. Verify that the measure value is within the values given in the table “Pinion-Crown Wheel” (refer to: Technical Data and Specifications" - Checks and Adjustments") for the model of tractor in Question.
7. If the backlash is greater, move the shims from package **1** to package **2**, and viceversa. Repeat the measurement until the correct value is obtained.



1 - Shim package
2 - Shim package

DIFFERENTIAL LOCK SYSTEM

GENERAL FEATURES

The differential lock system is composed of a sliding sleeve, operated through a fork that is controlled by levers on the axle. The sleeve, due to a front claw coupling, makes the two axle shafts into a single unit which discharges the power on the wheel that grips, thus facilitating tractor motion on mud or friable terrains.
This system is very simple, and can be adjusted through two shim packages. It is made into a single unit with the differential assembly through a splined sleeve and a Seeger ring. The control to the outer levers is given by a tie rod that can be operated from the cab, which permits both front and rear drive differentials to be blocked simultaneously.

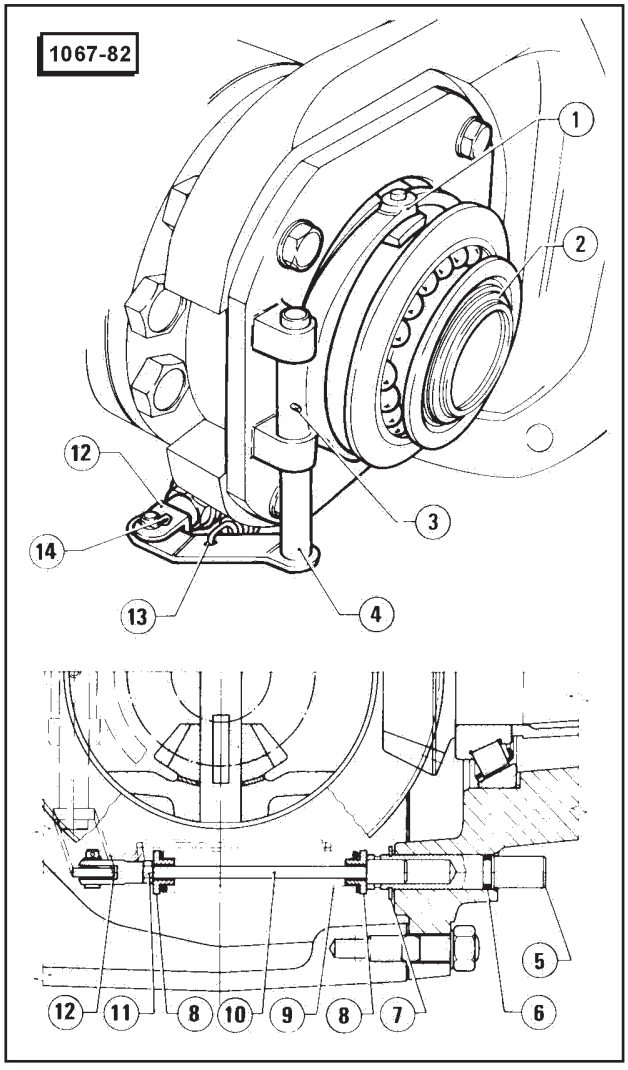
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DISASSEMBLY

1. Remove the differential assembly from the axle body (refer to: Crown Wheel and Pinion - steps **1**. to **4**.).
2. Release spring **13** from lever **4** and remove it.
3. Withdraw the split pin and extract pin **14**.
4. Extract dowel **3** securing lever **4** to fork **1**; withdraw lever **4**, and remove the fork together with the two pads.
5. Extract Seeger ring **2** recovering the shims underneath, and remove the differential lock system assembly.

CAUTION
Take care not to drop the balls located inside the differential lock control sleeve.



1 - Differential lock cont. fork
2 - Seeger ring
3 - Dowel
4 - Transmission lever
5 - Pushrod
6 - O-ring
7 - Seeger ring
8 - Cup
9 - Thrust spring
10 - Rod
11 - Locknut
12 - Fork
13 - Return spring
14 - Pin

6. Withdraw rod **10**, and if required, disassemble the unit, by unscrewing fork **12** and locknut **11**, then recover cups **8** and spring.
7. Remove Seeger ring **7**, and withdraw pushrod **5** outwards, recovering O-ring **6**.

CHECKS AND VERIFICATIONS

Thoroughly clean the components using the appropriate solvent, and check the rolling surfaces and splined section toothing. Should cracks, deformations, or excessive wear be present, replace the damaged components.
Verify also that all control system components, and in particular the spring and rod, are in good condition.

REASSEMBLY AND ADJUSTMENT

1. If previously disassembled, assemble the differential lock unit, positioning balls **3** between sleeve **2** and coupling **1**.

NOTE
The number of balls, changes according to the models, as shown in the following table.

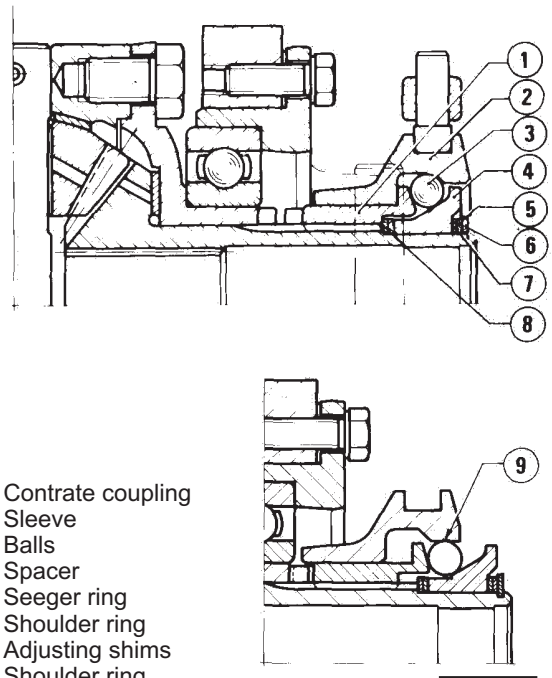
Model	150	110, 130
Ball number	19	18

2. Position shoulder ring **8**, and fit spacer **4**, then mount all shims **7**, and shoulder ring **6** on Seeger ring **5** side; refit this last.
3. By means of a feeler gauge, verify that, the backlash of spacer **4** is within **0 to 0.05 mm** (0 to 0.0019 in).
4. Move sleeve **2** and visually verify that the sleeve flat surface **9** is in contact with balls **3**.
5. If not remove Seeger ring **5**, shoulder ring **6**, and move the **0.02 mm** (0.0007 in) shim package from its initial position and place them in front of spacer **4.**
6. Reinstall the components, and repeat the verification described at step **4**. Repeat operation of step **5**. until obtaining the correct position of sleeve **2**.

CAUTION
Sleeve 2 must always slide freely both in the coupling and decoupling phases.

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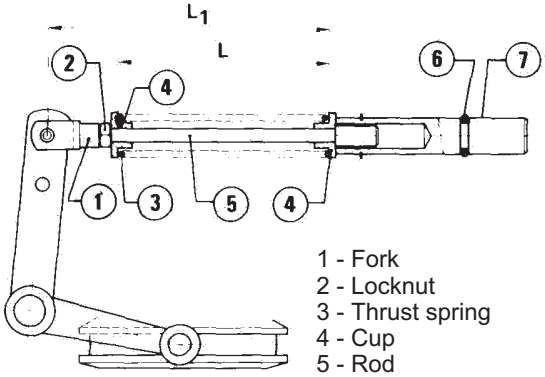
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1 - Contrate coupling
2 - Sleeve
3 - Balls
4 - Spacer
5 - Seeger ring
6 - Shoulder ring
7 - Adjusting shims
8 - Shoulder ring
9 - Flat mating surface

1067-83

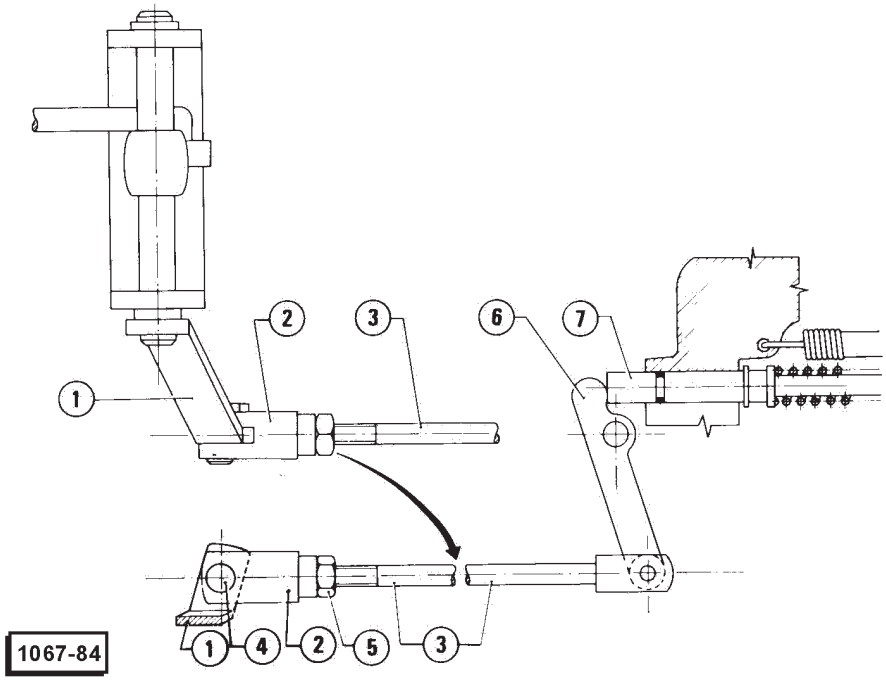
7. If previously disassembled, reassemble rod **5** with cups **4** and spring **3** then screw locknut **2** and fork **1**, until obtaining dimension L = 96 mm (3.78 in) as shown in the figure.
8. Verify that the distance “L1" between the axis of the pin on fork **1** and the resting plane of spring **3** is 128 ± 0.5 mm (5.04 ± 0.0196 in).
9. Refit pushrod **7** with a new O-ring **6**, then insert pushrod **5**.



1 - Fork
2 - Locknut
3 - Thrust spring
4 - Cup
5 - Rod
6 - O-ring
7 - Pushrod

1067-85

10. Complete reassembly by reversing the order of disassembly.
11. After having reconnected the front axle to vehicle, proceed to adjust the differential lock control by operating as follows.
(1) Ensure that the rear differential lock control is correctly adjusted (refer to: Gears - P.T.O. and Differential Unit - Differential Lock System).
(2) Withdraw the split pin and remove pin **4**.
(3) Bring lever **6** in contact with pushrod **7**.
(4) Centre the hole of fork **2** onto lever **1**, eliminating the backlash between tie rod **3** and lever **6**, and between fork **2** and hole of lever **1**.
(5) Once these operations have been carried out screw further fork **2** by one turn so as to preload the inner spring of the device; then tighten locknut **5**, and refit pin **4**.



1 - Transmission lever
2 - Fork
3 - Tie rod
4 - Pin
5 - Locknut
6 - Lever
7 - Pushrod

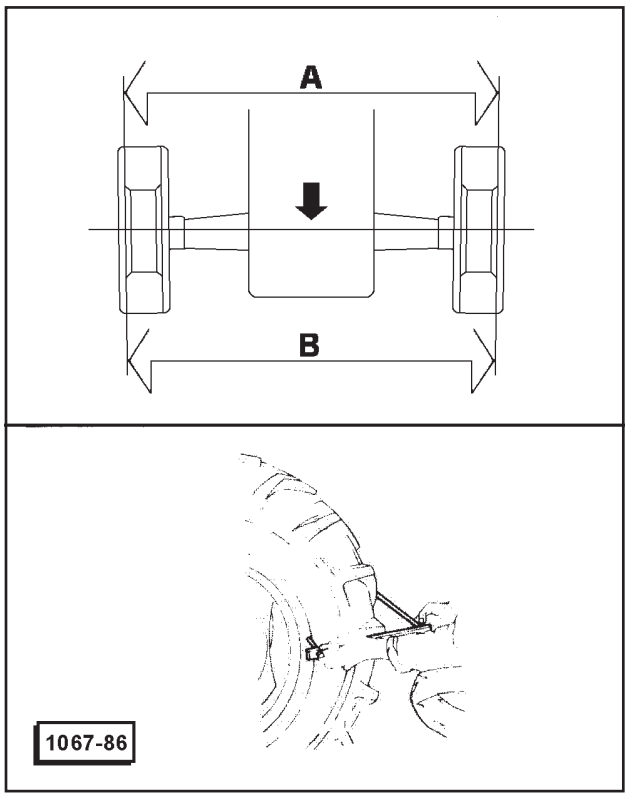
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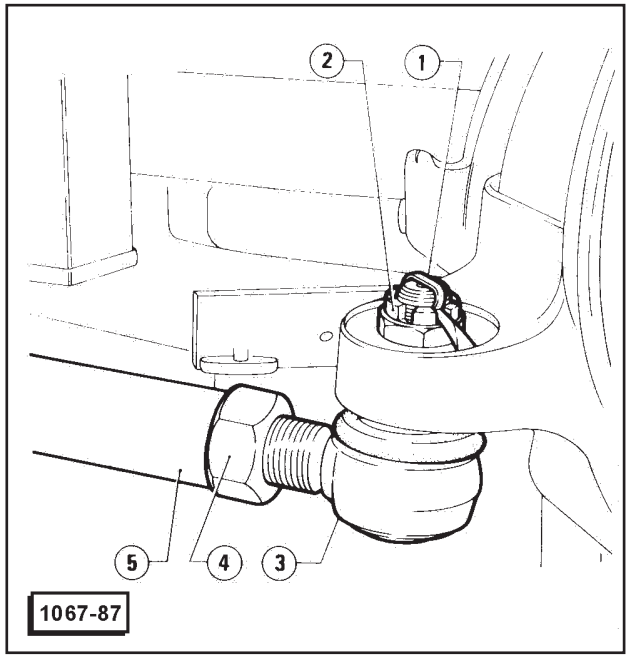
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TOE-IN CHECK

1. Place the vehicle on a level surface with the steering wheel in central position, and using a suitable caliper, measure the distances A and B on a horizontal plane passing through the wheel axes in the same point of wheel rim.



2. 2. Rotate the wheel by a half turn and repeat the previous operations to ensure that wheel rim is not deformed.
3. If the difference A-B between the two measures is not within the values given in the table “Driving Axle Assembly” (refer to: Technical Data and Specifications Checks and Adjustments) for the model of tractor in question, carry out the adjustment by operating as follows.
(1) Remove split pin **1**, unscrew nut **2** and by means of the appropriate puller, disconnect the pin of ball joint **3**.
(2) Repeat the same operations on the other side of tie rod, and remove tie rod **5**.
(3) Loosen locknuts **4** and screw or unscrew both ball joints **3** by the same number of turns, in order to shorten or lengthen the distance between the centres of pins and ball joints by such a quantity to restore the correct toe-in value.
(4) Tighten locknuts **4** and install tie rod **5** by reversing the order of removal.



1 - Split pin
2 - Castle nut
3 - Ball joint
4 - Locknut
5 - Tie rod

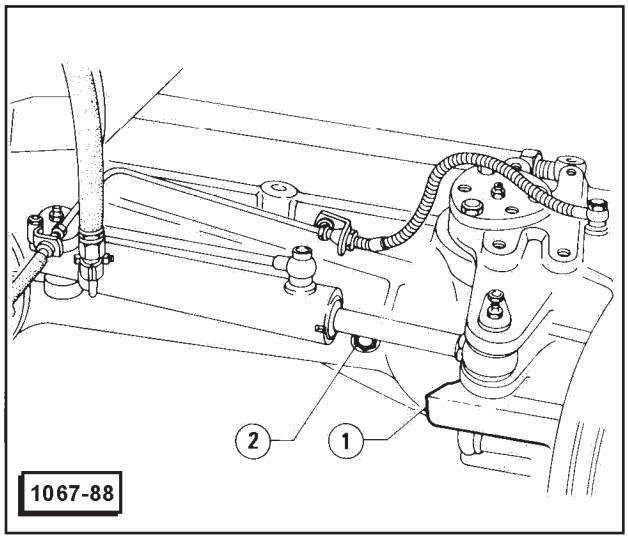
(5) Repeat the operations described until obtaining the correct toe-in value.

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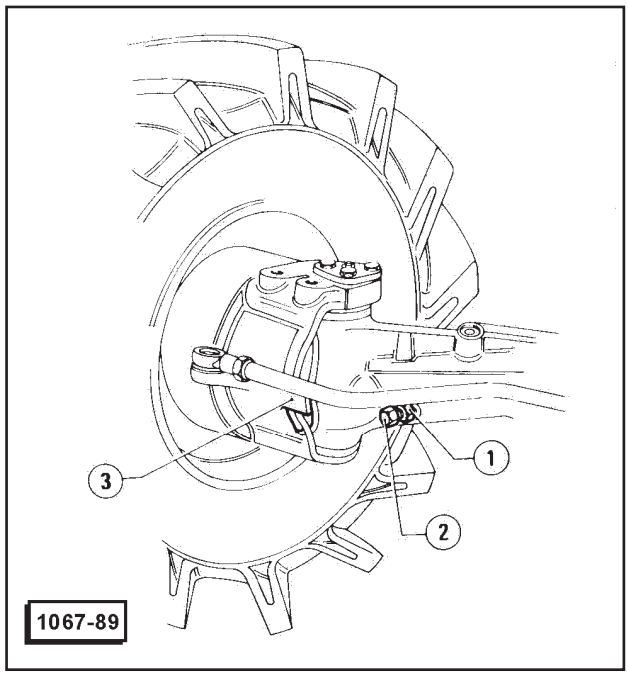
STEERING ANGLE ADJUSTMENT

1. Place the vehicle on a level surface with the wheels straight, then switch on the engine and turn the wheels to the right or to the left until the rear projection of inner fork, with respect to the steering direction, is in contact with the axle or, for the models 150-130-110 with spacer **2** (where present according with the wheel types), on the rear side of axle.



1 - Rear projection clampling fork
2 - Spacer

2. Acting on the outer wheel with respect to steering direction, loosen locknut 1, and position adjusting screw 2 in contact with fork front projection 3; tighten the locknut.



1 - Locknut
2 - Adjusting screw
3 - Front projection clamping fork

3. Steer the wheels to the opposite direction, and repeat the operations described at steps 1. and 2.

NOTE
For the models 150-130-110,a few spacers having different thickness (in relation to the tyre dimensional can be mounted in order to prevent tyre colliding against the engine side lids when the axle oscillates when the wheels are completely steered. For the spacer thickness, refer to “Technical Data and Specifications - Steering Convergence and Range”.

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TECHNICAL DATA AND SPECIFICATIONS

TECHNICAL DATA

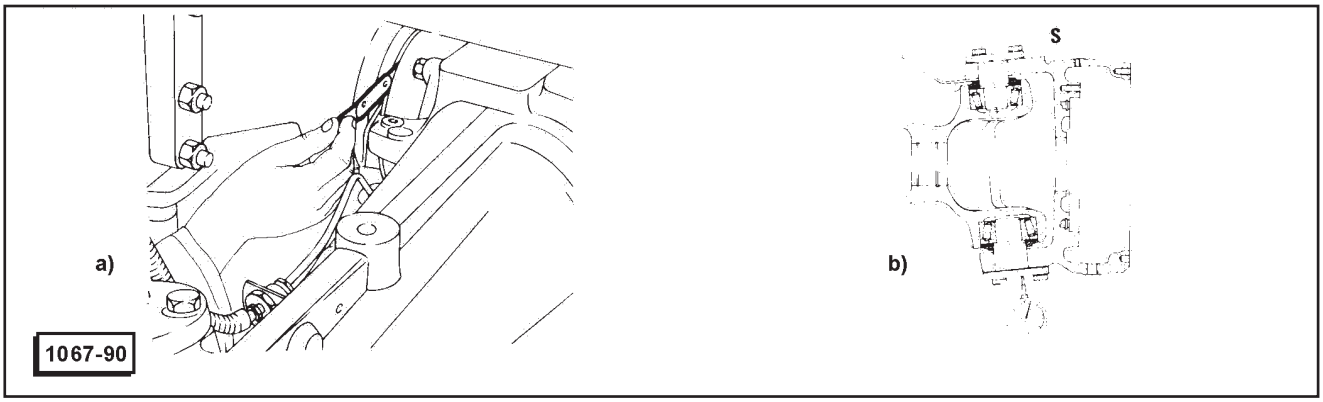
Features			Model		
			110	130	150
Front axle	Reduction gear - front drive	25 km/h 115.53 mi/h)	35/50=1/1,4286	34/51=1/1,5000	
		30 km/h 118.63 mi/h)	39/46=1/1,790	37/47=1/1,2703	
	Side epicyclic reduction gear		(12/12+ 69) = 1/6,7500		
	Bevel gear	25 km/h 115.53 mi/h)	13/34=1/2,6154	13/35=1/2,6927	
		30 km/h 118.63 mi/h)			
	Total reduction	25 km/h 115.53 mi/h)	1/25,2204	1/27,2595	
		30 km/h 118.63 mi/h)	1/20,8228	1/23,0852	
Mechanical ratio (No. front wheel turns/back wheel turns)		25 km/h 115.53 mi/h)	1,2824	1,2738	1,2375
		30 km/h 118.63 mi/h)	1,2887	1,2725	1,2255
No. of ball bearing mounted on the control sleeve			18	19	
Degree of axle swing			10°		
Steering angle		Inside wheel	50°		
		Outside wheel	37° 30’		
Radial clearance angle			7°		
Angle of tilt			1°		

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CHECKS AND ADJUSTMENTS

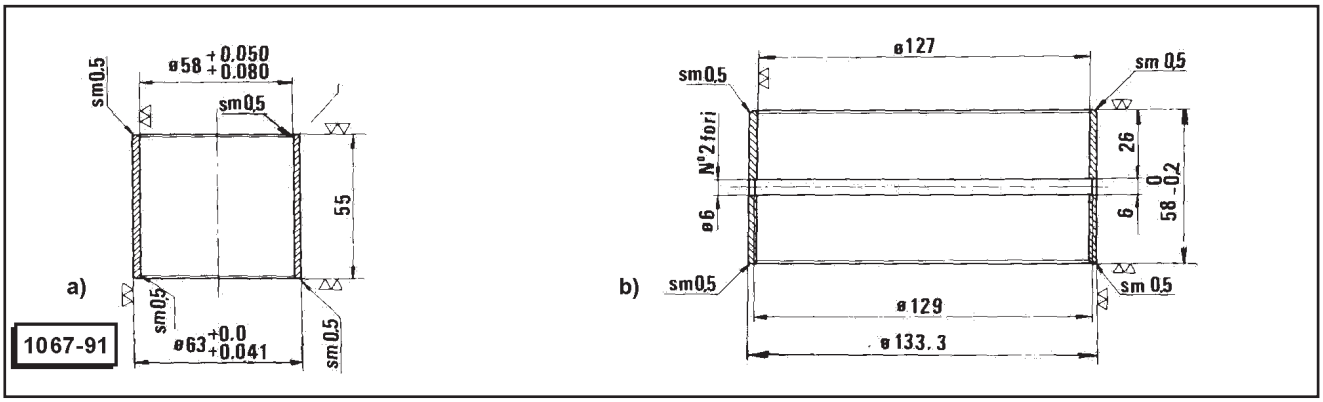
Complete axle



Unit: mm (in)

Type of check	Model		
	110	130	150
a) Axle play between the shoulder ring and differential box	0.1 to 0.4 (0.0039 to 0.01571		
b) Fork bearing thrust shims “s” to be removed when play on gauge is nil	0.10 to 0.15 (0.0039 to 0.00591		

Floating bearings

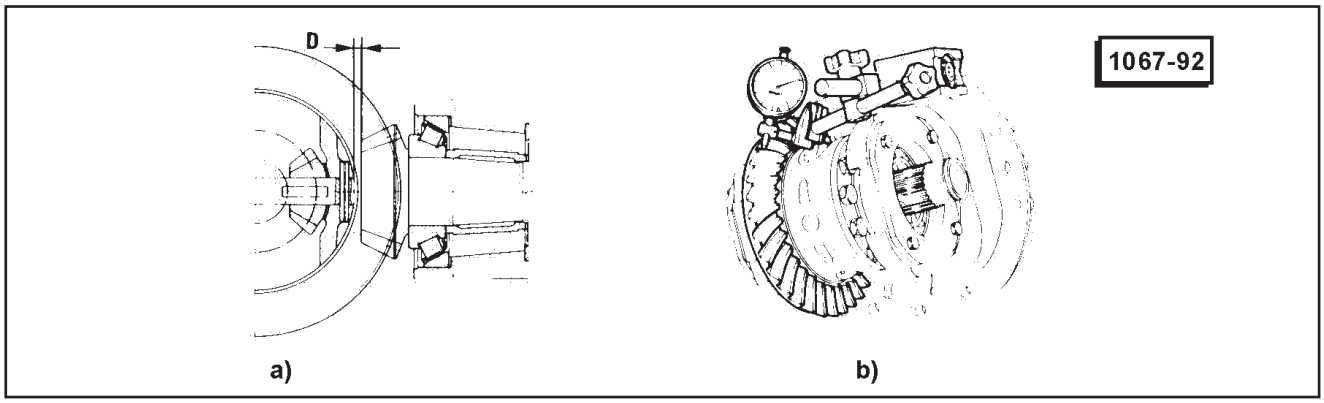


Type of check	Model		
	110	130	150
Amount of work tolerance	See Fig. a) and b)		

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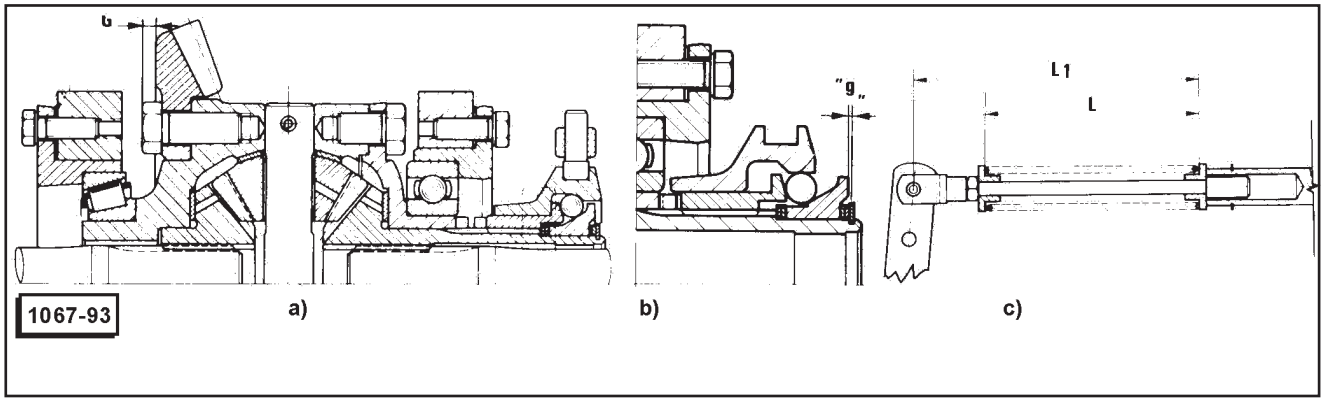
Pinion - Crown gear



Unit: mm (in)

Type of check	Model		
	110	130	150
a) Pinion position adjustment - crown gear: - distance “D” between pinion head and differential box	5 (0.20)		
b) Coupling play between teeth of the crown gear and the pinion	0,18 ÷ 0,24	0,17 ÷ 0,23	0,18 ÷ 0,24

Differential



Unit: mm (in)

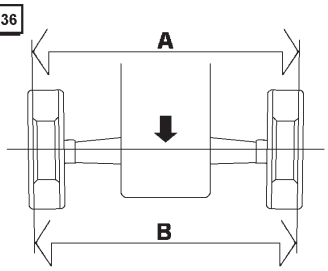
Type of check	Model		
	110	130	150
a) Play “G’ between differential box & relative support flange	0.03 to 0.04 (0.0011 to 0.0015)		
b) Differential lock device - axle play “g” of spacer	0 to 0.05 (0 to 0.00191		
c) Steering rod device of differential lock: - “L” distance between faces of spring	96 (3.781		
- “L1” distance between face of spring and pin axis on fork	128 ÷ 0,5 (5.04 to 0.0196)		

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Toe in and steering angle

Unit: mm (in)

Type of check			Model		
			110	130	150
1067-36 		Toe in check:	0±3		
		Difference ”A-B”			
Steering limit spacer thickness	Tyres	14.9/13-28	12	-	
		14.9/13-30	7	7	
		16.9/13-30	-	7	
		16.9/14-24	5	-	

TIGHTENING TORQUES

Unit: Nm (Kgm)

Particulars		Model		
		110	130	150
Differential - bevel gear clamping screws		113÷118 (11,5 ÷ 12)		
Bevel pinion clamping nut		225 (23)		
Flange screw stock fixing screws		29 (3)		
Flange clamping screws for fork		88 (9)	88 (9)	68 ÷ 78 (7 ÷ 8)
Pin clamp screws floating axle	- front pin	89 (9,1)		
	- rear pin	142 (14,5)		
Front engine bearing clamp screws		275 (28)		
Hydraulic jack clamp pin		157 (16)		
Ball bearing crown nuts		132 (13,5)		
Flange propeller shaft clamp screws (1)		49 (5)		
Differential half casing clamping screws		113 ÷ 118 (11,5 ÷ 12)		

NOTE: before tightening all screws must be cleaned and greased
(1) Add a small amount of Loctite 242 to the nut

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GENERAL PRESCRIPTIONS

Fluids and Lubricants

Application	Type	Make	Model	Q.ty
Front epicyclic reduction gear	Oil	AGIP ROTRA THT (API - GL3)	110 - 130 - 150	-
Front differential	Oil	AGIP ROTRA THT (API - GL3)		-
Bearings and various grease points	Grease	AGIP Grease 30		-

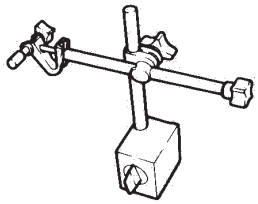
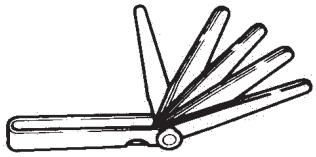
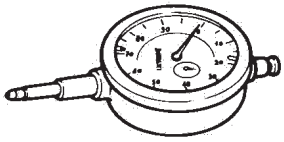
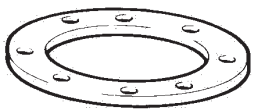
Sealants and fixatives

Application	Type	Make	Model	Q.ty
Transmission shaft clamp screws	Fixative	LOCTITE 242	110 - 130 - 150	-

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SPECIAL TOOLS

Tool Number	Name		Page No.
5.9030.267.0	Magnetic base	 1067-94	
5.9030.270.0	Thickness gauge	 1067-95	
5.9030.272.0	Comparator	 1067-96	
5.9030.618.4/10	Puller	 1067-97	
5.9030.648.0	Seal ring rubber	 1067-98	

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TROUBLESHOOTING AND CORRECTIONS

Trouble	Probable cause	Corrective action
Noisy running	Excessive wear of universal joints	Replace worn universal joints
	Front axle overloaded	Only use original front loads ballasting rear of vehicle as well
	Too little oil in the differential unit	Top up and check there are no leaks
	Pinion - crown - coupling incorrect	Change the bevel gear and overhaul the differential unit
	Bevel gear teeth damaged	Change the bevel gear and overhaul the differential unit
	Differential bearing housing worn	Change bearings
Noisy pick up	Over play between side pinion and crown wheel	Change shoulder rings, if necessary change complete differential box
Loss of oil	Seal ring worn	Replace worn seal ring
	Oil valve blocked	Clean oil valve
Wheel swing	Tyres excessively worn	Change if necessary
	Steering rod ball bearings worn	Replace if necessary

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BACK AXLE

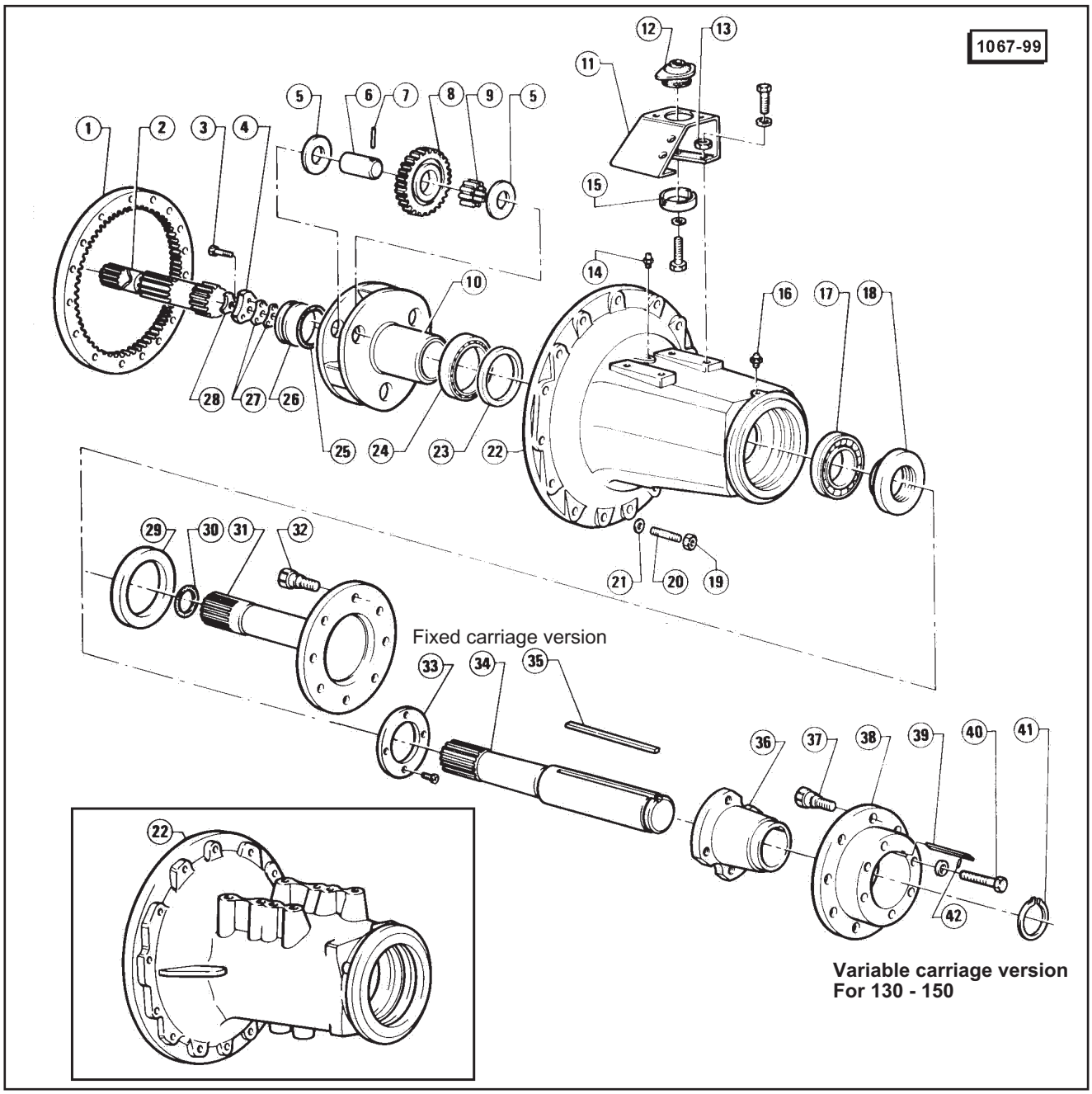
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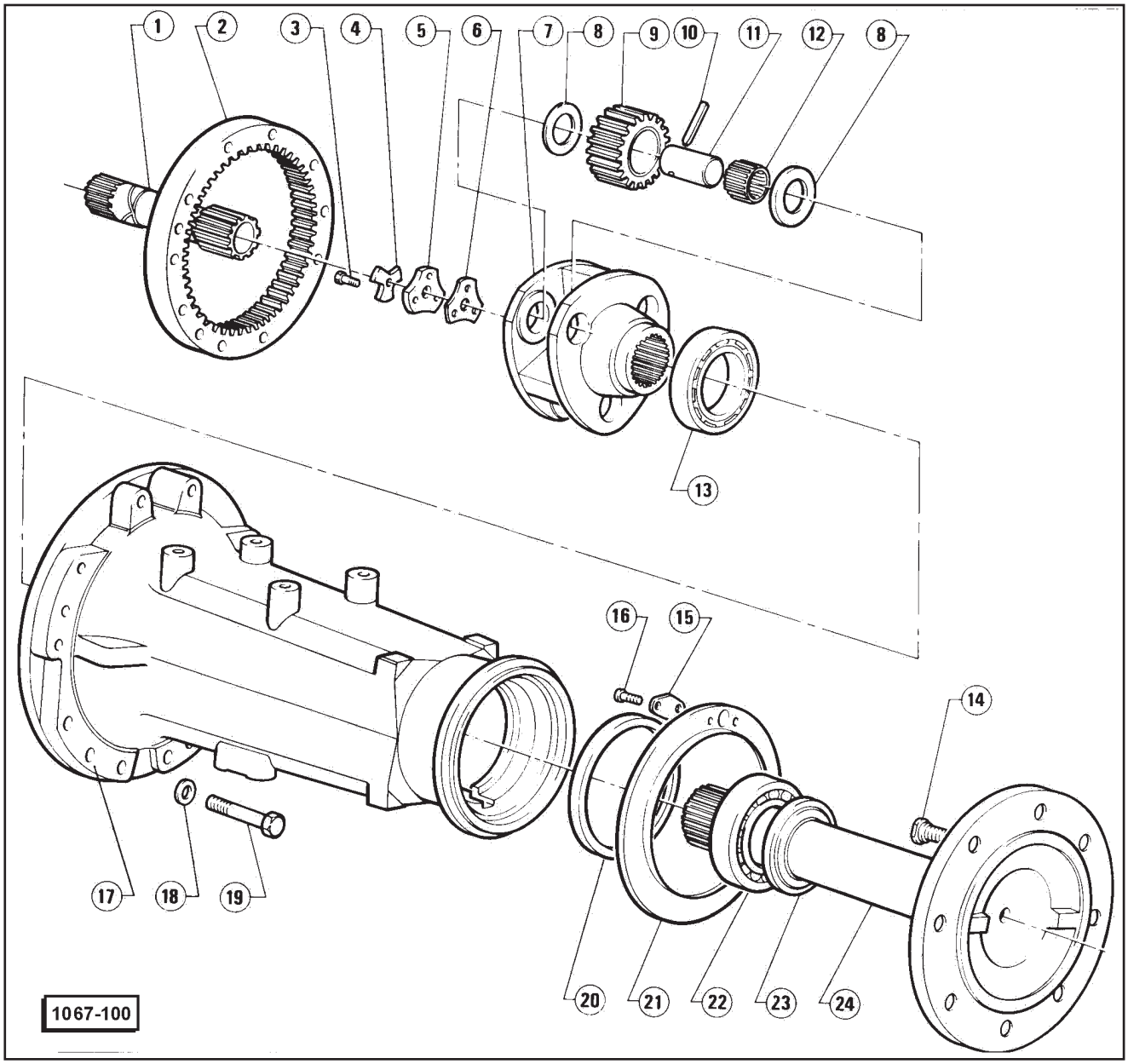
GENERAL FEATURES



1 - Reduction gear crown wheel
2 - Final reduction gear shaft
3 - Reduction gear and axle shaft clamping screws
4 - Flange
5 - Shoulder ring
6 - Spider pin
7 - Pin
8 - Side pinion
9 - Retainer
10 - Final reduction gear and spider pin housing
11 - Cabin holding arm
12 - Silent block holding arm
13 - Nut
14 - Air breather valve
15 - Bush
16 - Grease nipple
17 - Tapered roller bearing
18 - Spacer
19 - Ball clamp screw
20 - Studs
21 - Washer
22 - Bell supporting axle shaft
23 - Dust cover gasket
24 - Internal tapered roller bearing
25 - O-ring
26 - Flange
27 - Shims
28 - Screw lock spacer
29 - Timing case protection
30 - O-ring
31 - Axle shafts
32 - Wheel fixing column
33 - Spacer ring
34 - Continual cycle axle shaft
35 - Spanner
36 - Tapered sleeve
37 - Wheel fixing column
38 - Wheel hub boss
39 - Spanner
40 - Clamp screw for tapered sleeve of wheel hub boss
41 - Seeger ring
42 - Spanner lock pin

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1 - Final reduction gear
2 - Reduction crown nut
3 - Axle shaft reduction clamp screw
4 - Screw lock spanner
5 - Flange
6 - Shim
7 - Final reduction side pinion housing
8 - Shoulder ring
9 - Side pinion
10 - Spider pin clamp pin
11 - Spider pin
12 - Retainer
13 - Inside ball bearings
14 - Wheel column fastening
15 - Column substitution cap
16 - Cap fixing screw
17 - Axle shaft support bell
18 - Washer
19 - Bell fixing screw to brake housing
20 - Support link
21 - Protection timing case
22 - Outside ball bearing
23 - Spacer
24 - Axle shaft

The back axle has been designed with particular attention to strength, in order to stand up to the toughest conditions.
Two epicycle reduction gears have been mounted on the inside of the axle shaft bell supports which allow the engine to brilliantly perform the pick up phase. The presence of the reduction gears also allows a notable reduction of stress on the transmission.
For specific jobs models 150 and 130 are available, on request, with a continual axle shaft track.
These axle shafts allow the back track to be constantly changed quickly and accurately within the field.

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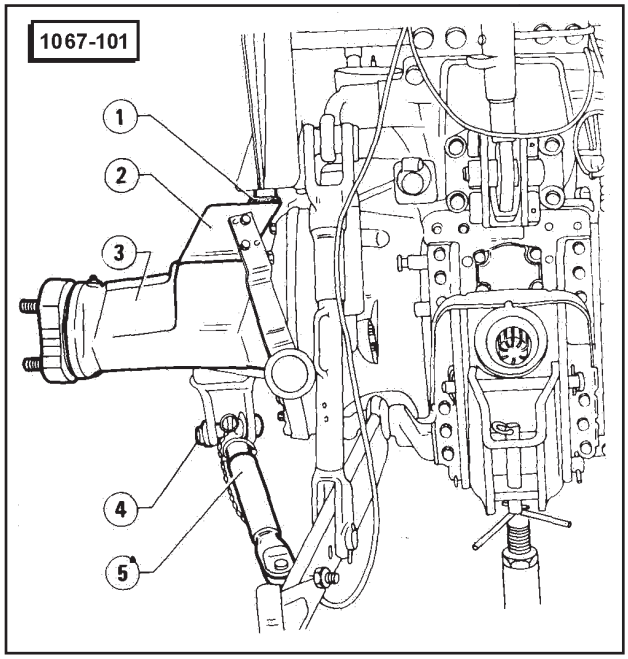
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REMOVAL

1. Park the vehicle on the flat and disengage gears.
2. Remove the back wheel as follows.

WARNING
To remove the wheels you need two people.

(1) Loosen the eight clamp screws of the wheel.
(2) Position a lever jack under the back axle, and with a wedge of wood lift the tractor.
(3) Remove the wheel from the hub with caution.
(4) Place the safety gentry under the brake housing and lower the tractor.
3. Put a bowl under the brake housing, unscrew the cap and drain the brake lubricating oil.
4. Loosen silent block **1** cabin fixing nuts.
5. Loosen screws fixing the cabin support bracket **2** to the bell **3**.
6. Lift the cabin in a sling sufficiently to be able to remove the support.
7. Remove the split pin and slip off the pin **4** fixing the stabilizer **5** to the bell **3.**

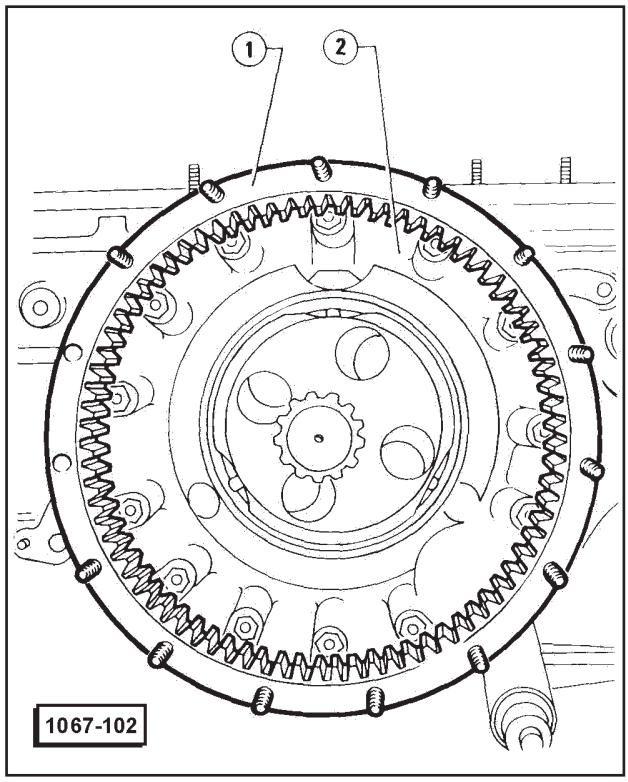


1 - Silent block
2 - Cabin support brake
3 - Axle shaft bell support
4 - Pin
5 - Stabilizer

8. Position a safety gantry under the tank and loosen the thirteen nuts and the two bolts fixing the axle shaft support bells to the differential.
9. Use an adequate means to keep the bell lifted during the removal of the brake housing.

WARNING
Accurately control that the tractor and the bell are balanced in order to avoid oscillation during the removal operation.

10. Remove the bell taking care to sling it properly.
11. If necessary, use light taps with a hammer to remove the crown wheel **1** from the brake housing **2.**



1 - Crown wheel
2 - Brake housing

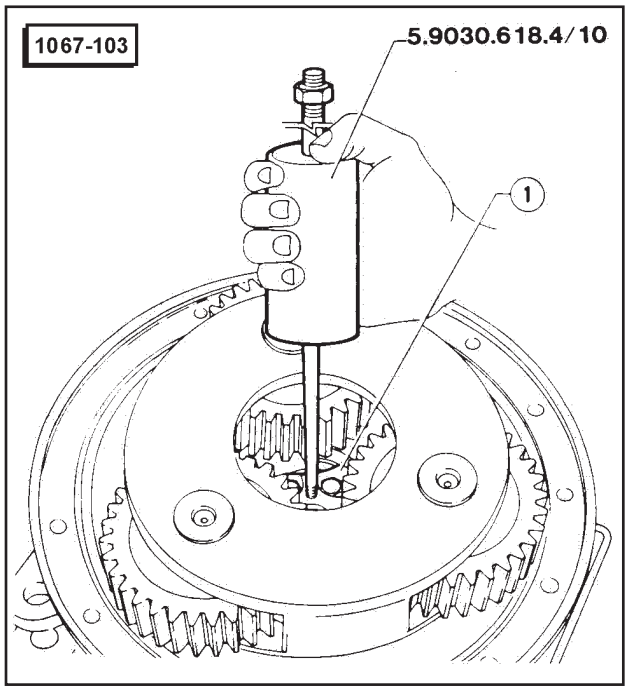
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DISMOUNTING

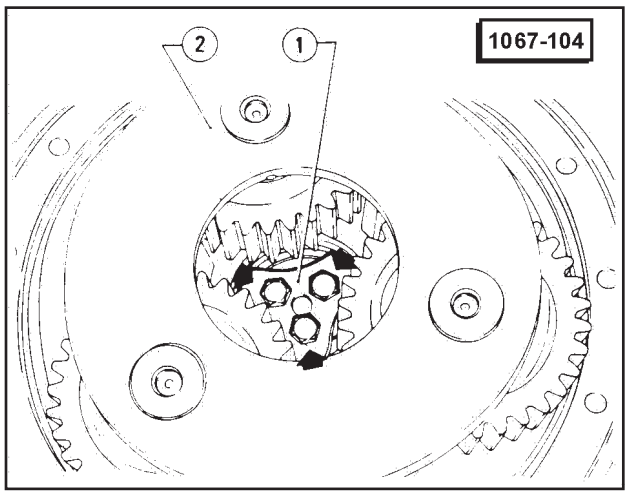
CAUTION
Always use a soft metal hammer and punch when it is necessary to tap iron parts.

1. Screw extractor 5.9030.618.4/10 onto the locking spacer **1** with the help of a reduction gear if necessary, and remove the spacer.



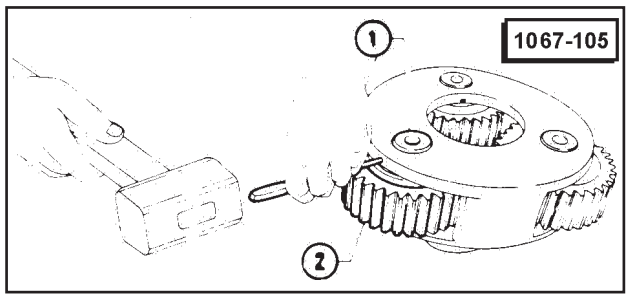
1 - Locking spacer

2. Loosen the screws fixing the spider pin casing **2** to the axle shaft. Remove the flange **1** and take out the shim package under it.



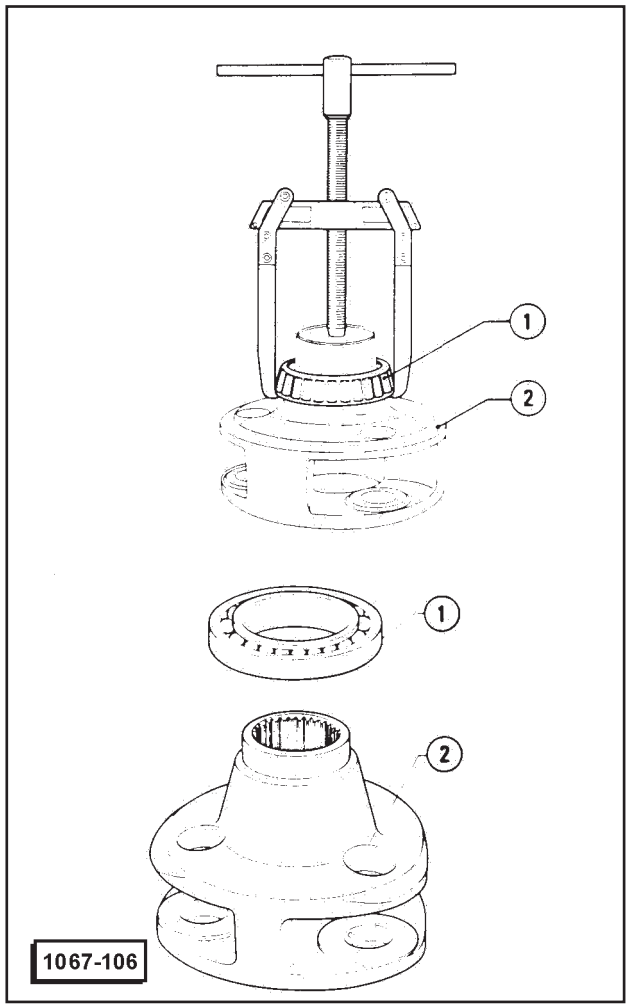
1 - Flange
2 - Reductor spider pin case

3. Remove the epicycle reduction gear and take apart as follows:
(1) Using a hammer and a punch remove the fixing pin pivot **1** of the side pinion **2.**



1 - Pivot
2 - Side pinion

(2) Slip off the pin and remove the side pinion complete with the retainer and the two shoulder rings.
(3) Remove the tapered bearing for model 150 and 130 and the ball bearing for model 110,using the correct extractor.

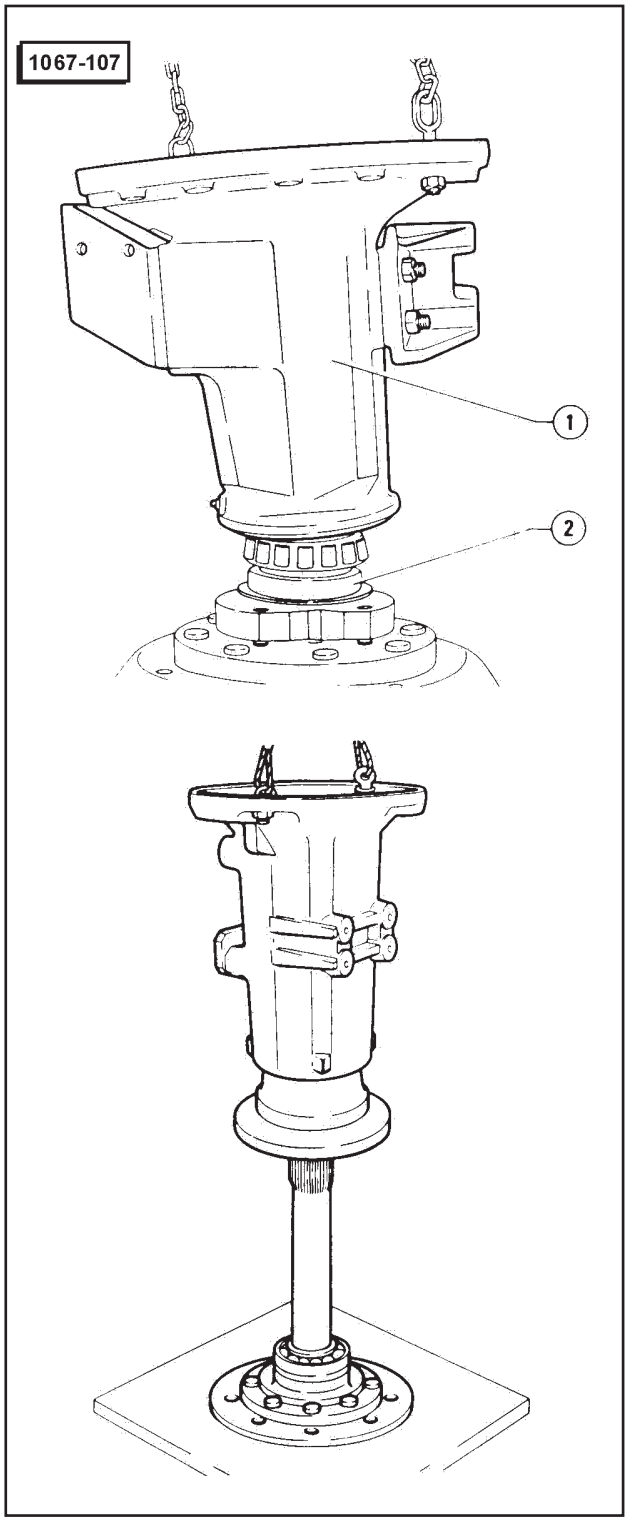


1 - Bearing
2 - Carriage loader

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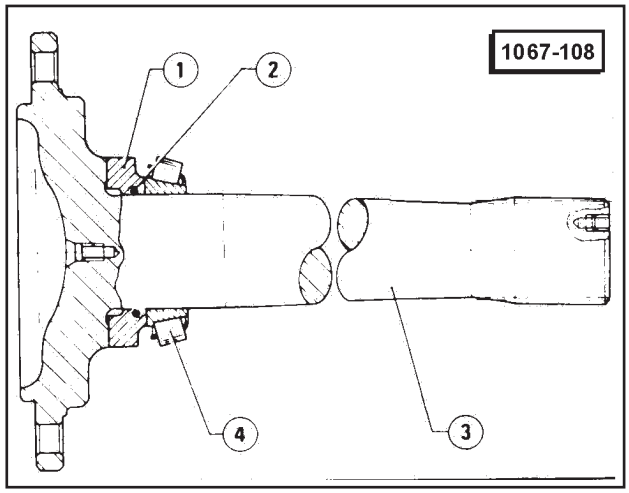
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4. Using a hoist, lift the bell **1** and remove the axle shaft **2**.



1 - Axle shaft support bell
2 - Axle shaft

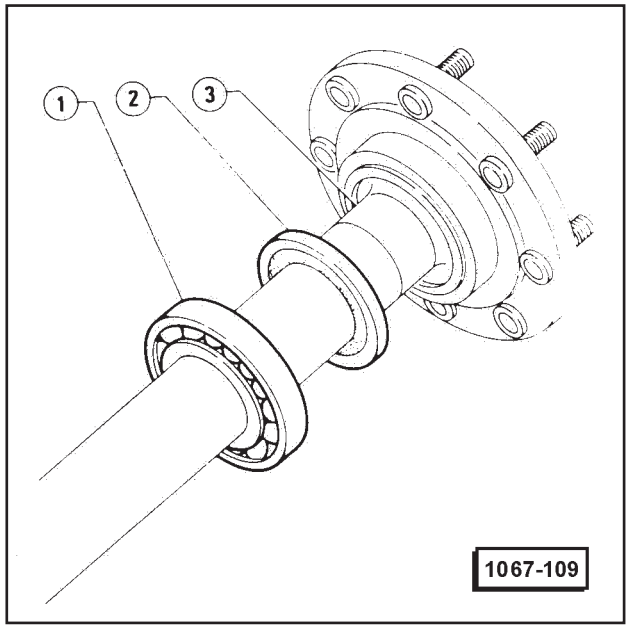
5. Using the correct extractor, remove the axle shaft bearings **4**, and if necessary, the spacer **1** with its relative O-ring **2**.



1 - Spacer
2 - O-ring
3 - Axle shaft
4 - External tapered roller bearing

Only for model 110

If necessary, remove the bearing **1** and the axle shaft **3** and spacer **2**.



1 - Outside ball bearing
2 - Spacer
3 - Axle shaft

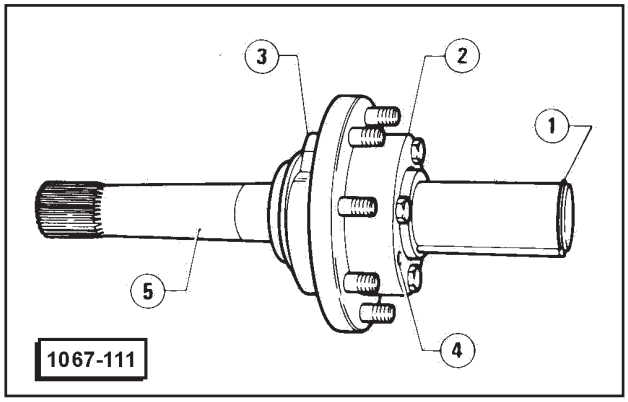
6. Only for models 130 - 150
If necessary remove the outside tracks of the tapered bearings and the dust cover washers mounted on the bell.

Only for model 110
If necessary remove the support link **1** found on the tip of the bell.

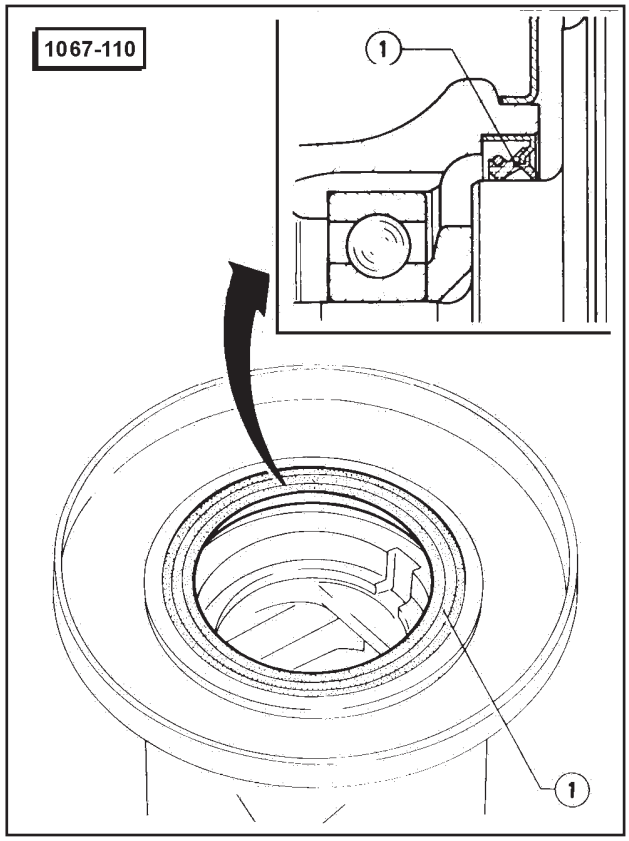
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7. Only for models 130 - 150
If present disassemble the steeples change axle shaft from the track working as follows.
(1) Remove the Seeger ring 1.
(2) Loosen the four screws fixing the hub 2to the tapered sleeve 3.
(3) Unscrew the two screws in the holes 4 until the hub comes away from the tapered sleeve.
(4) Remove the hub and the axle shaft jack 5.



1 - Seeger ring
2 - Wheel hub
3 - Tapered sleeve
4 - Holes
5 - Axle shaft



1 - Support link

CHECKS AND VERIFICATIONS

NOTE
Accurately clean all components and visually check for worn or damaged parts.

GEAR TEETH AND GROOVES

1. Check that the gear teeth and serrated shaft teeth on all edges are in order. If the teeth are irregular or broken they must be changed. The same check must be made for both parts.
2. Verify that all the teeth are without cracks, chips or excessive wear. Change any parts that are damaged.

BEARINGS

1. Examine bearings careful turning them slowly. If the bearings are in good condition they should run smoothly and not make noise or vibrate.

2. Examine the condition of the surface of all turning rings and see that they are not scratched, marked or have rubbed by foreign bodies. Change all parts that are worn.

CAUTION
Only for models 130 and 150
If the tapered roller bearing can no longer be used, change both of them.

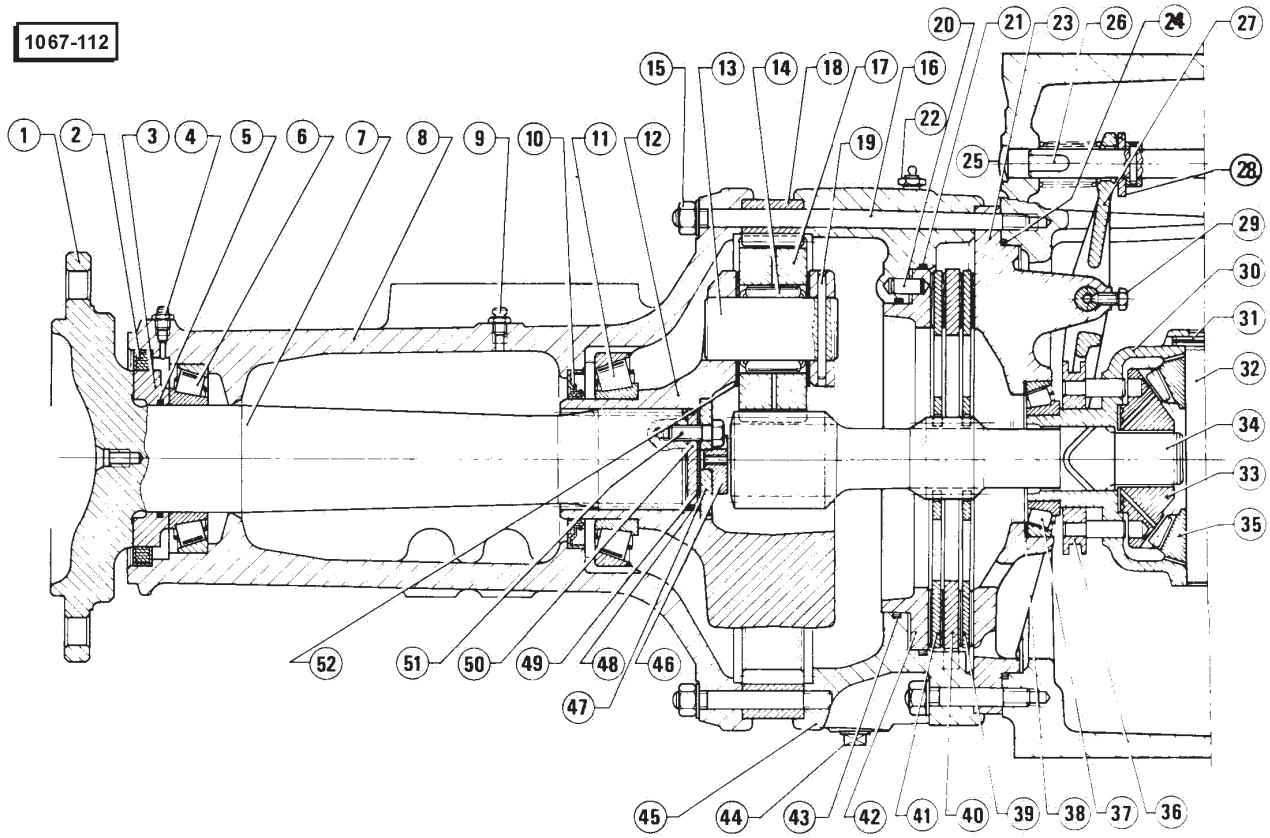
BELL AXLE SHAFT SUPPORT

1. Check that the bell is free from cracks and that the seats of the bearings are not worn or damaged.
2. Verify that the mating surface of the brake housing is not damaged because of insufficient fixative.
3. Having eliminated these faults, remove any eventual dents with a file. If there is excessive wear replace the damaged parts.

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REASSEMBLY

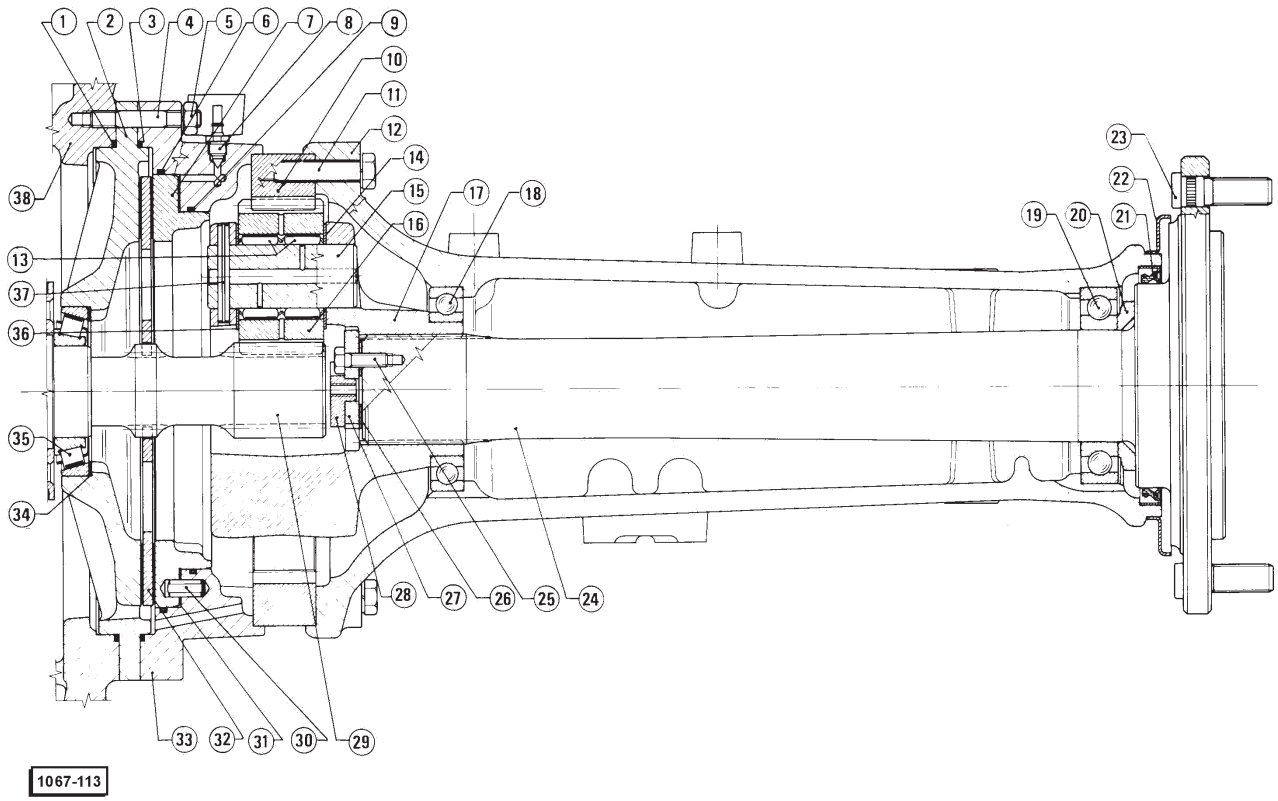


For 130 - 150

1 - Wheel attachment flange
2 - Dust cover washer
3 - Spacer
4 - Grease nipple
5 - O-ring
6 - Outside tapered roller bearing
7 - Axle shaft
8 - Axle shaft support bell
9 - Air breather valve
10 - Support link
11 - Inside tapered roller bearing
12 - Final reduction spider pin casing
13 - Spider pin
14 - Retainer
15 - Nut fixing bell to brake housing
16 - Studs
17 - Side pinion
18 - Crown wheel
19 - Spider pin fixing pin
20 - Locating pin
21 - O-ring
22 - Brake fluid bleeding valve
23 - Flange
24 - O-ring
25 - Differential block rod seat cap
26 - Differential block rod
27 - Differential block fork
28 - Spacer
29 - Differential block fork pin tightening nut
30 - Differential box
31 - Spider pin fixing pin
32 - Spider pin
33 - Portable crown wheel
34 - Final reduction shaft
35 - Side pinion
36 - Differential block crown wheel
37 - Differential tapered roller bearing
38 - Shims
39 - Brake disc
40 - Middle disc
41 - Brake disc
42 - Brake piston
43 - O-ring
44 - Oil drain plug
45 - Brake drum
46 - Lock washer
47 - Flange
48 - O-ring
49 - Shim
50 - Spacer
51 - Axle shaft reduction clamp screws
52 - Fifth wheel

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For 110

1 - O-ring
2 - Flange
3 - O-ring
4 - Studs
5 - Screw fixing brake housing to gearbox
6 - O-ring
7 - Brake piston
8 - Brake union
9 - O-ring
10 - Crown wheel
11 - Screw
12 - Axle shaft support bell
13 - Retainer
14 - Fifth wheel
15 - Spider pin
16 - Side pinion
17 - Final reduction spider pin housing
18 - Internal ball bearing
19 - External ball bearing
20 - Spacer
21 - Support link
22 - Protection sump
23 - Wheel bar
24 - Axle shaft
25 - Reduction fixing screw
26 - Shims
27 - Flange
28 - Spacer lock
29 - Final reduction shaft
30 - Locating pin
31 - Shim
32 - Brake disc
33 - Brake housing
34 - Shims
35 - Differential tapered roller bearing
36 - Fifth wheel
37 - Lock pin
38 - Rear gearbox

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NOTE
— Accurately wash the bell with solvant and dry with compressed air.
— On reassembly, replace all support links, the washers and O-ring lubricating with prescribed grease.
— Lubricate with a thin laver of prescribed grease, all parts before assembling.
— To make re-assembly easier, it is advisable to apply a thin layer of prescribed grease to the parts in order to hold them in place.
— Refer to the diagram in question for the correct reassembly order.

Reassemble the axle shaft working in the reverse order to the disassembly as follows:

Only for models 130 and 150

If necessary, change the felt seal **2** mounted on the bell.

Only for model 110

If necessary change the support link **21**.
— If previously removed reassemble the external bearing on the axle shaft.

Only for models 130 and 150

CAUTION
To make reassembly of internal and external rings and tapered roller bearings easier on models and, it is advisable to heat them to a temperature of not more than 100°C (212°F).

— Reassemble the epicyclic controls on the axle shaft taking care that the holes on the shaft are placed properly to enable the three fixing screws to enter.
— **Only for models 130 and 150**
Proceed with the adjustment of the tapered bearings **6** and **11**.
— **Only for model 110**
Proceed with the adjustment of the ball bearings **18** and **19**.
— **Only for models 130 and 150**
Mount a new O-ring **48** on the spacer **50** then spread the part of the spacer **50** which comes in contact with the axle shaft **7** with prescribed sealer.
— Tighten to the prescribed torque the screws fixing the epicyclic reduction gear to the axle shaft.

Tightening torque
— **Screws fixing epicyclic reduction gear to axle shaft**
96 ÷ 106 Nm (9,8 ÷ 10,8 kgm; 70.85 to 78.08 ft lb)
59 ÷ 63 Nm (6 ÷ 6,5 kgm; 43.38 to 47 ft lb)

INSTALLATION

Remount the support bell on the tractor working in the reverse order to that of dismounting keeping in mind the following.

— Spread the two faces on the crown wheel with prescribed sealer and mount.
— Tighten to the prescribed torque the screws fixing the bell to the brake housing.

Tightening torque
Screw fixing axle shaft support bell to the brake housing
130 Nm (13 kgm; 93.99 ft-lb)
88 Nm (9 kgm; 65.07 ft-lb)

Top up the differential oil to the correct level using the prescribed oil.

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SPRING LOAD ADJUSTMENT OF TAPERED ROLLER BEARING

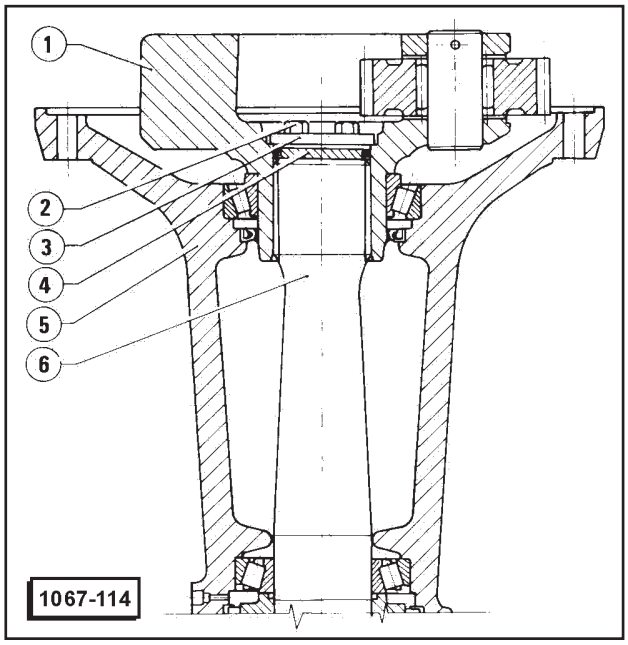
For 130 - 150

Before final mounting of the spacers with the sealant carry out the loading of the bearings scrupulously following the instructions given below:

NOTE
For 130 and 150 of the support bearing are of the tapered roller type.

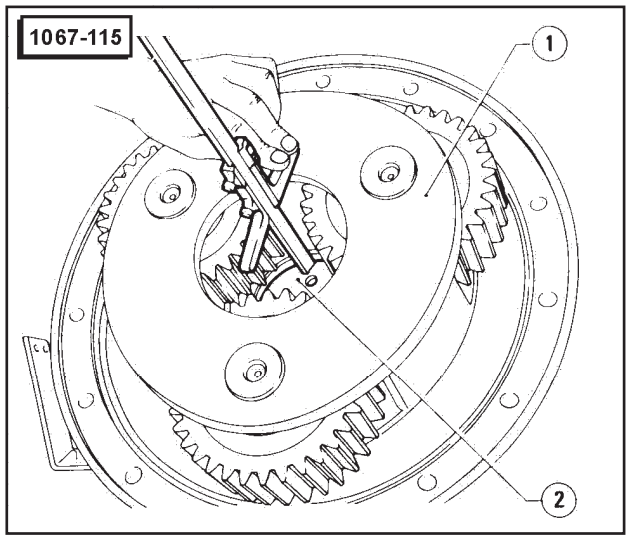
It is always better to use a larger shim package a smaller one for the adjustment. E.G. One shim of **0.2 mm** (0.0078 in) is better than two of **0.1 mm** (0.0039 in).

1. Fix the axle shaft **6** in a vertical position and block the rotation with the correct tool. Fix the support **5**, the reduction group **1** and the spacer **4** complete with O-ring on the axle shaft **6.** Apply Hylomar or similar sealant between the axle shaft and the spaces. Mount the flange **3** and tighten the screws **2** fixing the epicyclic reduction gear to the axle shaft to the torque of 5 Nm (0.5 kgm; 3.615 ft lb).
2. Turn the support about ten turns then check that the tightening torque is still 5 Nm. Should the screws have loosened re-tighten.



1 - Reduction group
2 - Screws fixing epicycle reduction gear to axle shaft
3 - Flange
4 - Spacer
5 - Support
6 - Axle shaft

3. Remove the screws and the flange **1** underneath and measure with an internal gauge, the existing distance “X” between the flat of the spacer **2** and that of the flange **1**.



1 - Flange
2 - Spacer

4. Position a shim package to the same value as “X” previously spread with prescribed sealant on the side that comes into contact with the axle shaft, then remount the flange and the three screws tightening to the prescribed torque.

Tightening torque
Screws fixing epicyclic reduction gear to the axle shaft (The screws must be greased with engine oil)
For 130 - 150
(96 ÷ 106 Nm)
(9,8 ÷ 10,8 Kgm; 70.85 to 78.08 ft-lb)

5. After having done the adjustment check that the bearings of the axle shaft turn freely in their seats.
6. If necessary, repeat the adjustment until you obtain the correct registration.

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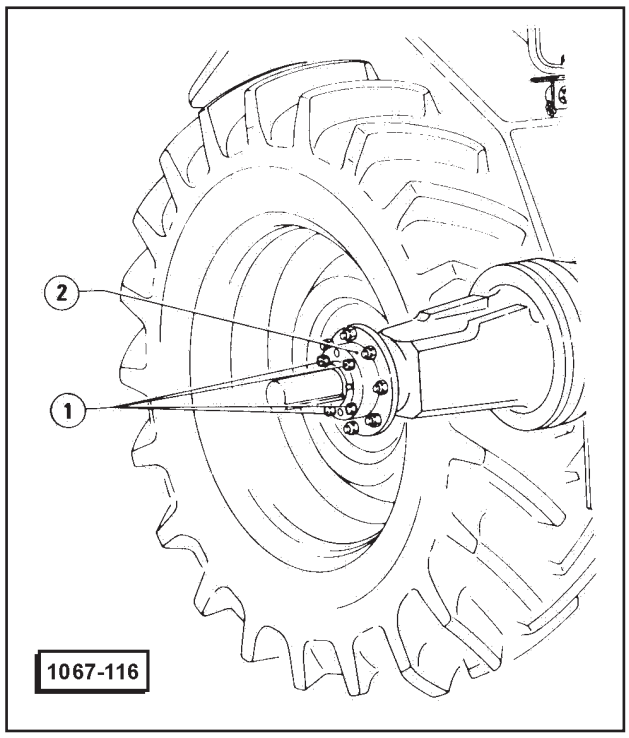
ADJUSTMENT OF THE AXLE SHAFT BALL BEARING POSITIONS

Follow the same procedure as laid down in “Preload adjustment for tapered roller bearings 130 and 150. The adjustment serves, in this case, to cancel the axle play on the shaft and guarantees the better working conditions and the correct positioning of the ball bearings which support it. On completion of the registration, tighten all screws of the axle shaft spider pin to the prescribed torque.

Tightening torque for screws fixing spider pin to axle shaft
58 ÷ 63Nm
(6 ÷ 6,5 Kgm; 43.38 to 47 ft-lb)

TRACK VARIATION

Models 130 and 150 can be equipped with a final axle shaft with step less change tracks which permit the back track to be quickly and precisely adapted for various jobs. Carry out the variation with the help of another operator working as follows:
1. Park the tractor on the flat. Engage the hand brake to the maximum. Lift one of the wheels with a jack and use a stand to keep the vehicle steady.
2. Loosen the four screws **1** fixing the wheel hub **2** to the tapered sleeve under it, then unblock the hub from the sleeve working on the wheel so as to move the hub to the necessary position. Fully tighten the screws **1** in a crosswise order.
3. Repeat the operation on the other side of the tractor.



1 - Screws fixing tapered sleeve to the hub
2 - Wheel hub

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TECHNICAL DATA AND SPECIFICATIONS

TECHNICAL DETAILS

Details	Model		
	110	130	150
Final epicycle reduction gear reading	$\frac{12}{12+57} = \frac{1}{5,75}$	$\frac{12}{12+63} = \frac{1}{6,25}$	$\frac{10}{10+59} = \frac{1}{6,9}$

TIGHTENING TORQUES

Unit: Nm (Kgm)

Details	Model		
	110	130	150
Screws fixing spider pin to back axle shaft	59 ÷ 63 (6 ÷ 6,5)	96 ÷ 106 (9,8 ÷ 10,8)	
Screws fixing axle shaft support to the brake housing	88 (9)	130 (13)	

GENERAL PRESCRIPTIONS

Fluids and Lubricants

Application	Type	Make	Model	Q.ty
Differential group	Oil	AGIP ROTRA THT (API - GL3)	110	-
Bearing grease nipples	Grease	AGIP GREASE 30 (Grease 30)	130 - 150	

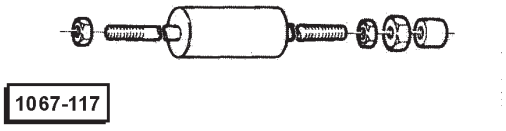
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Fixatives

Application	Type	Model
Mating surfaces between axle shaft bell and brake housing	HYLOMAR	110 - 130 - 150
Mating surfaces between brake housing and differential box	HYLOMAR	
Crown wheel surfaces	HYLOMAR	
Mating surfaces axle shaft - spacers	HYLOMAR	130 - 150

SPECIAL TOOLS

Tool Number	Name	Page No.
5.9030.618.4/10	Extractor  1067-117	

TROUBLE SHOOTING AND CORRECTIVE ACTION

Trouble	Probable cause	Corrective action
Pulls and banging if sudden change in torque loading	Lack of grease in bearings 130 - 150	Grease the bearings
	Bearing lubrication insufficient 110	Top up oil level
Axle shaft losing oil	Gearbox oil vapour breather valve blocked 130 - 150	Clean or change valve
	Support link worn 110	Change the support link
	Axle play on bearings excessive 110	Adjust bearings
Loss of oil from the joint with the brake housing	Insufficient sealant	Re-apply sealant

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BRAKES

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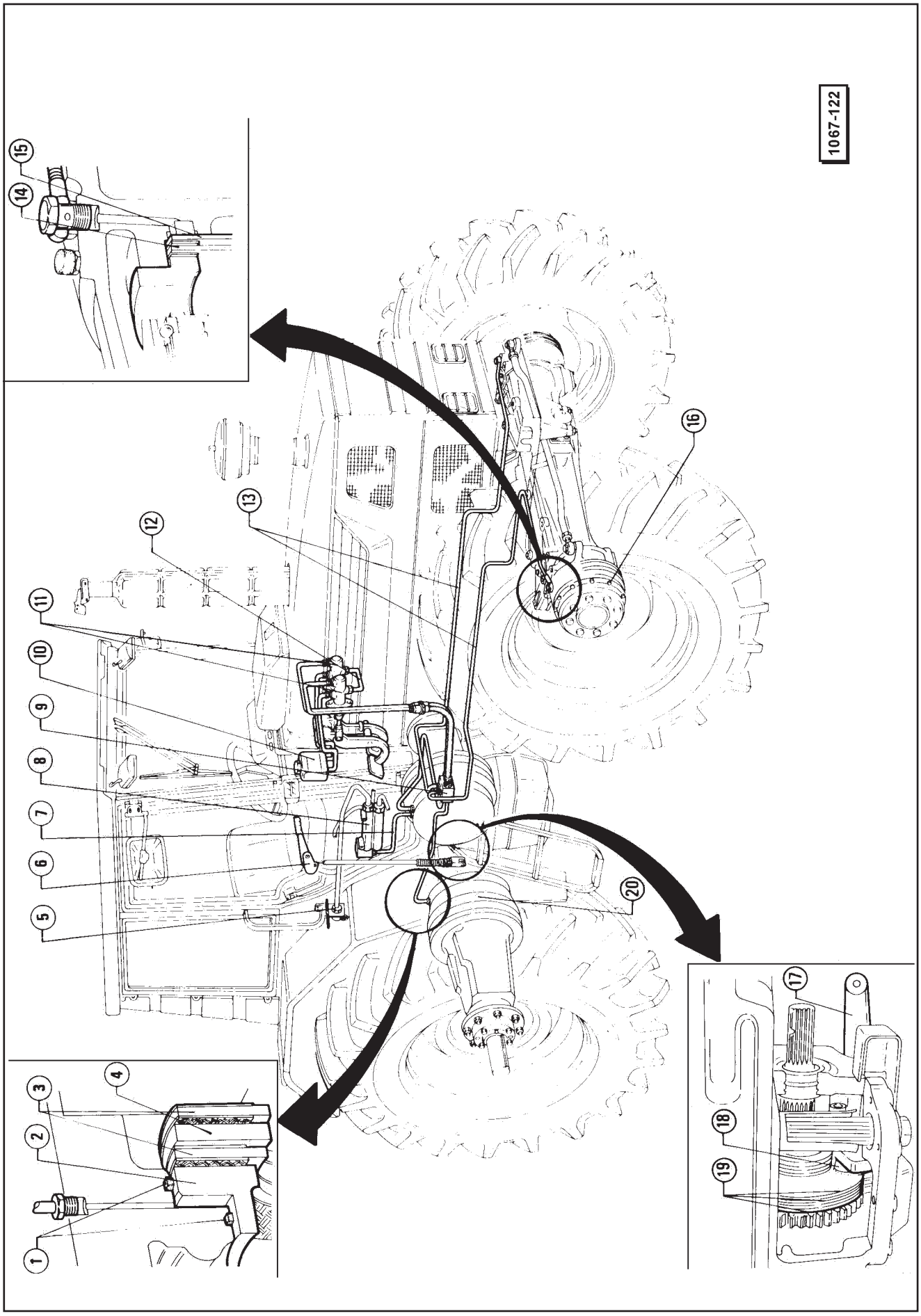
GENERAL FEATURES

The braking system is of hydraulic type; it is composed of two circuits which are equal and separate: one acts on the front and rear right-hand wheels, and the other on the left ones. The front brakes are provided only for the models of tractor fitted with front wheel drive.
This system permits the brakes to be used independently so as to reduce the turning radius and, consequently, the possible overheating of brakes discs.
The rear service brakes **20**, are located between the differential casing and the final reduction gears; the front service brakes **16** are located between differential and epicyclic reduction gear. This arrangement guarantees an accurate and safe braking.
The pedal control, independent for each circuit, acts on master cylinder which sends oil under pressure to the two pistons, one for the front brake, and the other for the rear one, which pack the brake discs together.
When the two pedals, previously connected with the special latch, are operated at the same time, a duct opens **12**, this connects the two hydraulic circuits to balance the braking pressure on both circuits.
The clutch and brake oil tank **10** is subdivided into three separate sections so as to prevent a leak in one of the two circuits from affecting the other two.
The discs of front **14** and rear **3** brakes are made of sintered material, and operate in oil; their wear is extremely limited.
Parking brake is of mechanical type and acts, through a lever **6** control housed in the cab, on a lever that causes a series of pads **18** to be packed together on discs **19** fitted on the front drive direct drive shaft. Furthermore, an hydraulic **8** system for the braking of trailer is also supplied as, an optional, or standard, according with each Market.

1 - O-ring
2 - Rear brake piston
3 - Rear brake disk
4 - Intermediate disk
5 - Plug far trailer hydraulic braking
6 - Parking brake
7 - Rear brake control pipe
8 - Auxiliary distributor braking
9 - Braking distribution
10 - Hydraulic brake oil tank
11 - Master cylinder brake
12 - Master cylinder brake coupling fitting
13 - Front brake control pipes
14 - Front brake disk
15 - Shoulder ring
16 - Intermediate disk
17 - Parking brake operation lever
18 - Parking brake pad
19 - Parking brake disks
20 - Rear brake

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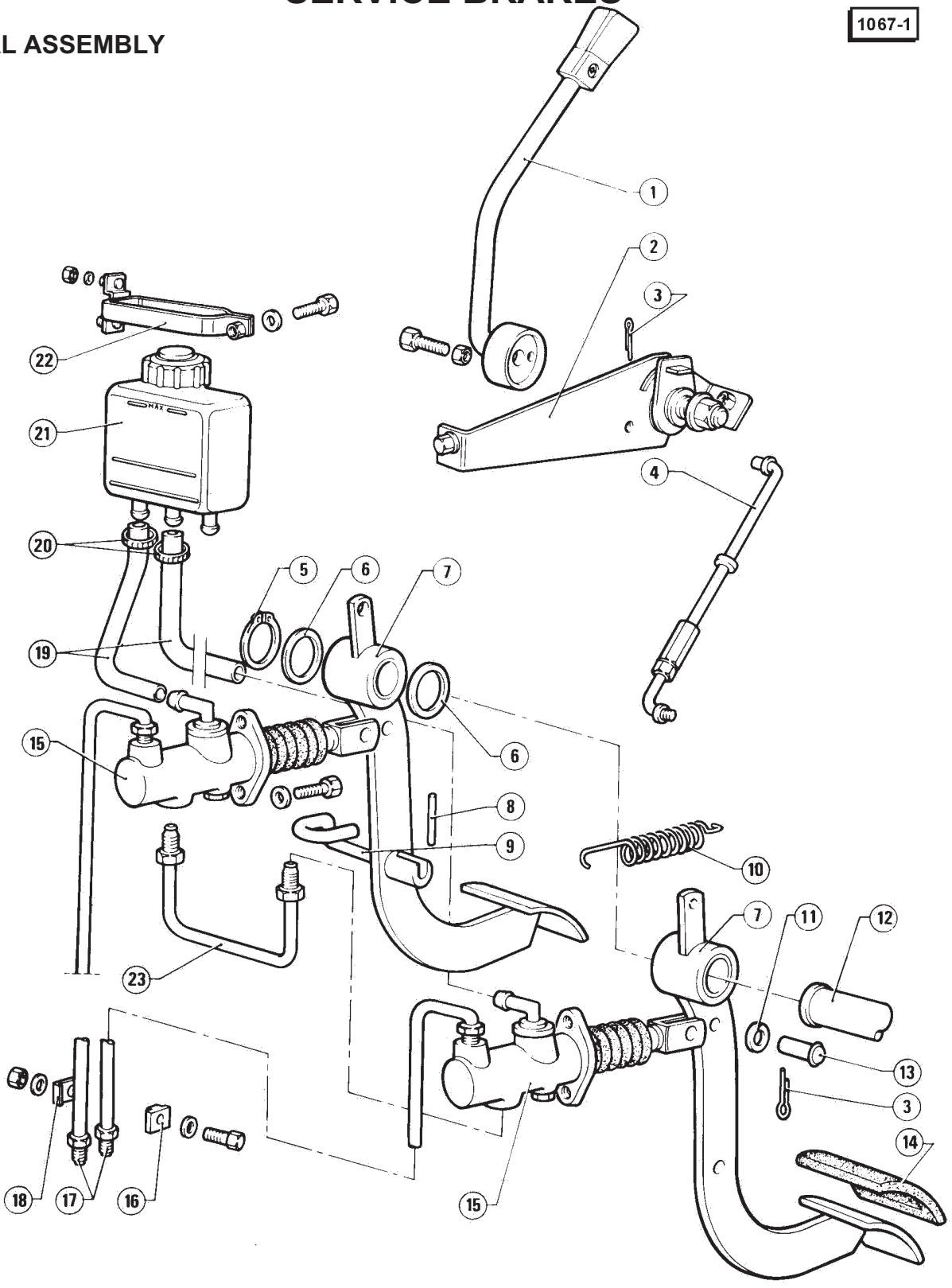
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SERVICE BRAKES

PEDAL ASSEMBLY

1067-1



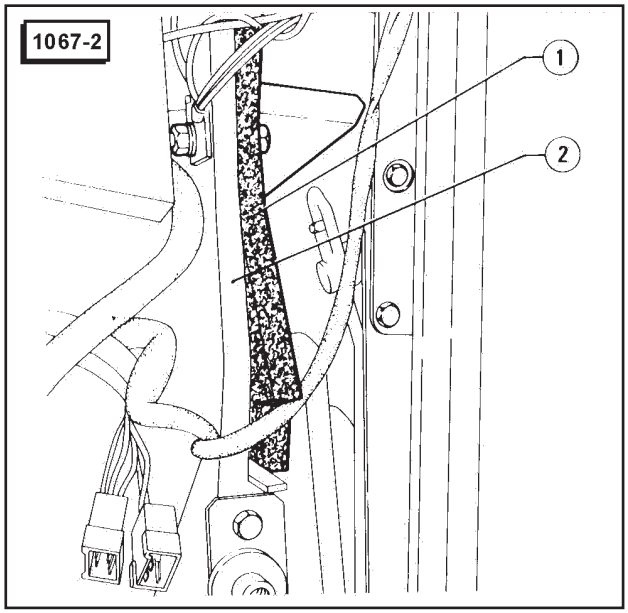
1 - Manual accelerator lever
2 - Bracket
3 - Split pin
4 - Manual accelerator transmission rod
5 - Seeger ring
6 - Washer
7 - Brake pedal
8 - Pin
9 - Pedal connection latch
10 - Spring
11 - Washer
12 - Pedal support
13 - Pin
14 - Rubber anti-slip protection
15 - Brake master cylinder
16 - Plate
17 - Oil delivery pipe
18 - Securing plate
19 - Master cylinder supply pipe
20 - Clamp
21 - Tank
22 - Support
23 - Pipe connecting master cylinder

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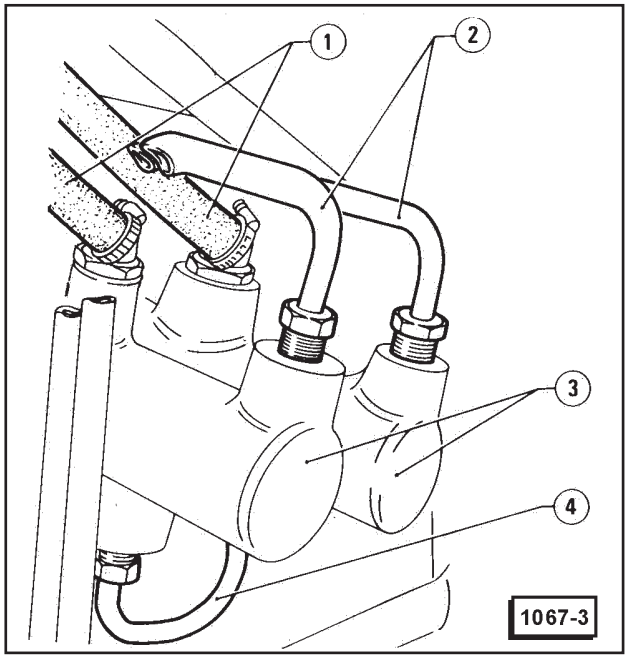
REMOVAL

1. Remove the tractor side engine lids, and unscrew the two bolts securing heat shield **1** to rear bulkhead **2**.



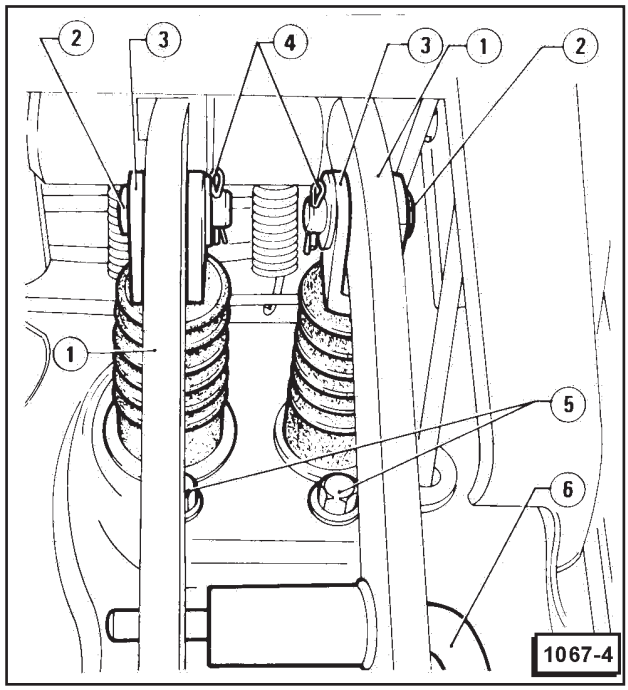
1 - Heat shield
2 - Rear bulkhead

2. Use a screwdriver to extract unions **1** of master cylinders **3** supply piping, plugging them suitably.
3. Unscrew unions **2** and disconnect the delivery piping from master cylinders.
4. Unscrew the unions securing pipe **4** connecting master cylinders, and remove it.



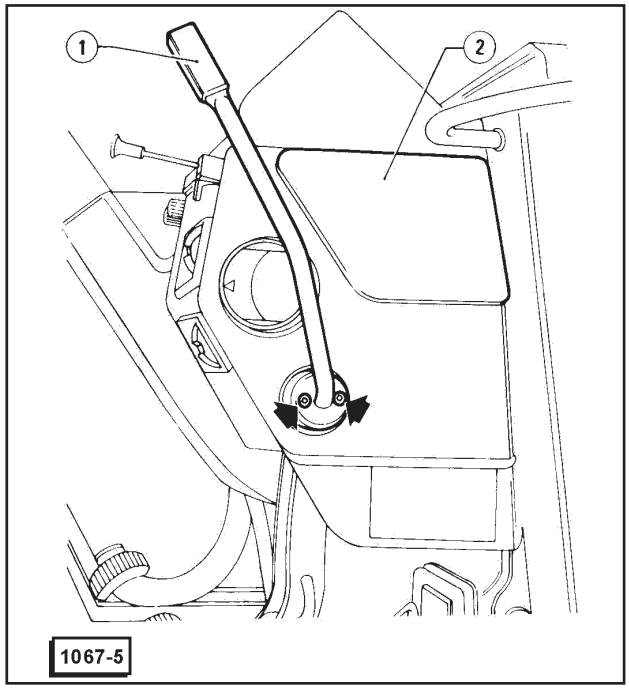
1 - Unions for master cylinder supply piping
2 - Unions for delivery piping from master cylinders
3 - Brake master cylinders
4 - Pipe connecting master cylinders

5. Operating from the passenger compartment, remove split pins **4**, and withdraw pins **2** securing master cylinder forks **3** to pedals **1**. Withdraw latch **6**.
6. Unscrew the four screws **5** securing master cylinder to dashboard sheet panel. Remove the two master cylinders from the engine compartment.



1 - Brake pedals
2 - Pins
3 - Forks
4 - Split pins
5 - Screws
6 - Latch

7. Unscrew the two screws securing manual accelerator level **1**. Remove the lever.
8. Remove lid **2** which has been pushed into place.

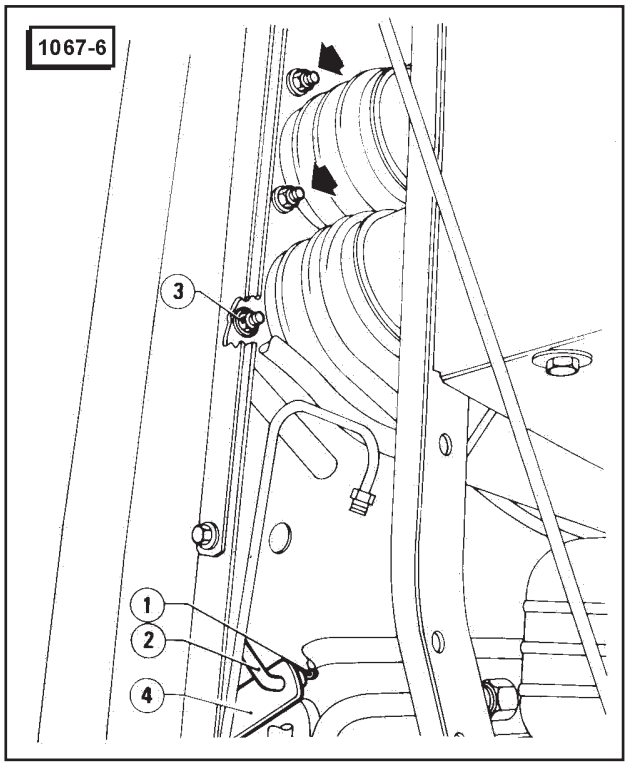


1 - Manual accelerator lever
2 - Engine lid

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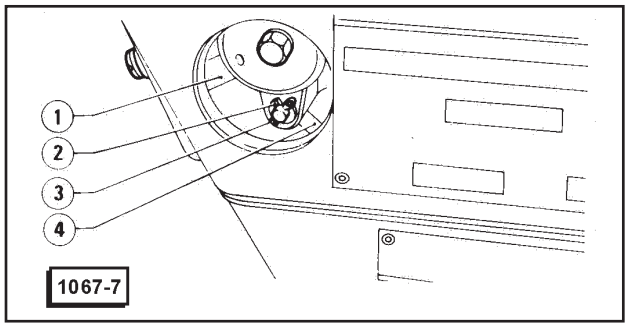
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9. Operating from the engine compartment, unscrew the two nuts securing the brake-clutch liquid tank support bracket.
10. Withdraw split pin **1** and the washer underneath. Disconnect rod **2** from accelerator control transmission lever **4**.
11. Unscrew screw **3** securing the manual accelerator support bracket.



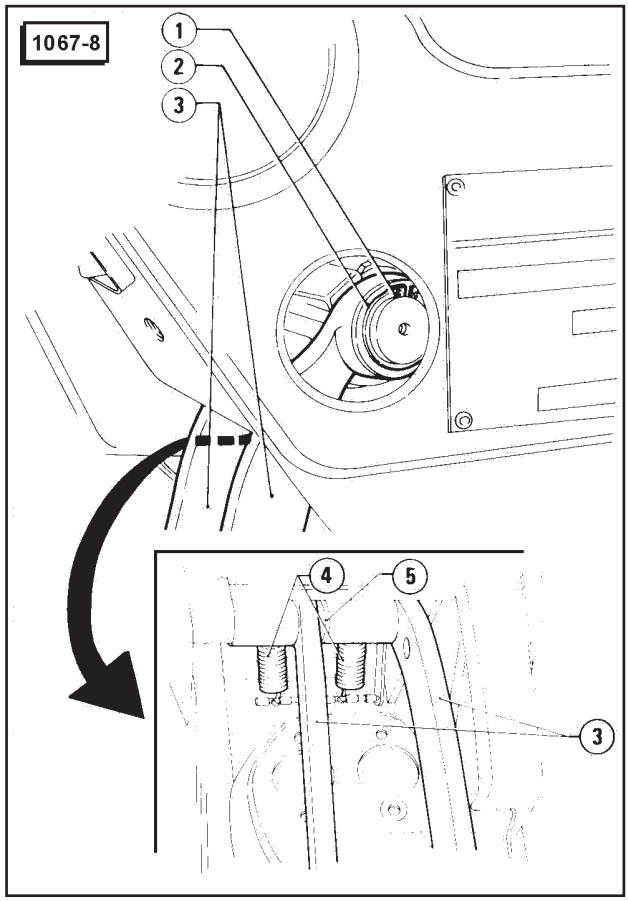
1 - Split pin
2 - Manual accelerator transmission rod
3 - Screw
4 - Manual accelerator transmission lever

12. Operating from the passenger compartment, partially extract the brake-clutch oil tank from the dashboard.
13. Withdraw split pin **3**, washer **2**, and remove rod **4**.
14. Unscrew the two screws securing bracket **1** to dashboard and remove it from below.



1 - Manual accelerator support bracket
2 - Washer
3 - Split pin
4 - Manual accelerator transmission rod

15. Release return springs **4** of pedals **3**.
16. Remove seeger ring **1**, withdraw washer **2**, and remove pedals **3** with interposed washer **5**.



1 - Seeger ring
2 - Washer
3 - Pedals
4 - Springs
5 - Washer

CHECKS AND VERIFICATIONS

Visually inspect all the disassembled components; replace those that are worn or damaged, verifying in particular the following.
1. Verify that pedals and the related pads are not deformed or damaged.
2. Check that pins and related seats are not too worn or seized.
3. Verify that springs are not damaged or strained.
4. Check that the rubber protections of pedal pads are not worn.

INSTALLATION

Install the brake pedals by reversing the order of removal, complying with the following.
— Refer to the enlarged view and lubricate the bushes **13** of pedals, pins **12**, and latch **9** with the prescribed grease.
— Replace all split pins.
— After having reassembled the pedals and master cylinders, proceed to adjust them by operating as follows.
(1) Lift the pedals completely.

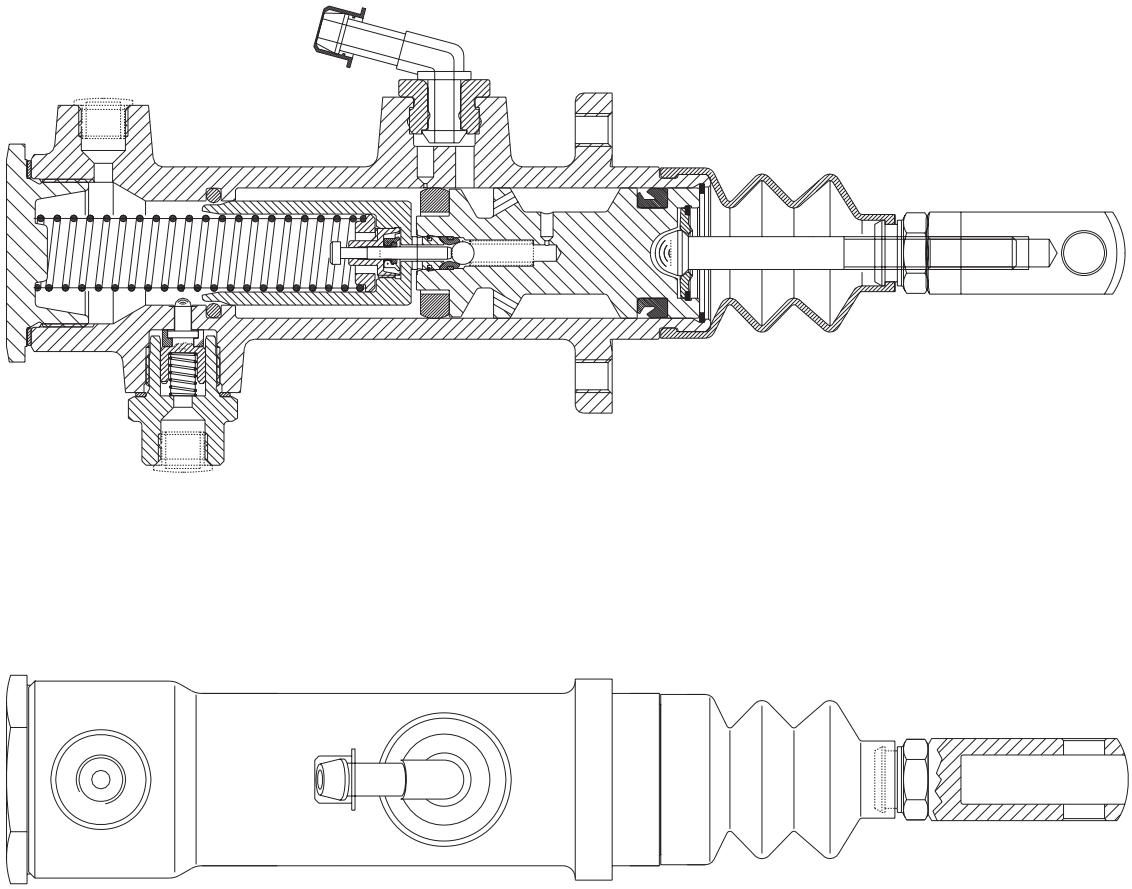
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(2) Pull the master cylinder forks completely, keeping them taut to take up the backlash, and verify that the fork holes are perfectly aligned with those in the pedals.
(3) If required, loosen the locknut and unscrew or screw the master cylinder rod accordingly until the holes are perfectly aligned.
(4) Block the rod with the locknut, and secure the forks to pedals by means of pins and new split pins.
— Proceed to adjust the accelerator control (refer to: Fuel Supply - Accelerator Control Adjustment).
— Proceed to bleed the braking system (refer to: Hydraulic System Bleeding).

BRAKE MASTER CYLINDER

For 150



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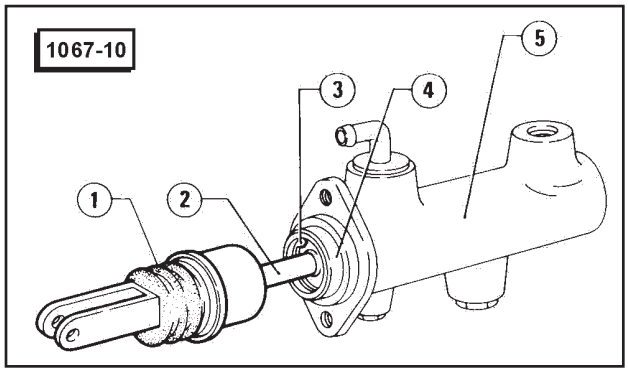
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REMOVAL

Disconnect the brake master cylinder (refer to: Pedal Assembly - Removal - steps 1. to 6.).

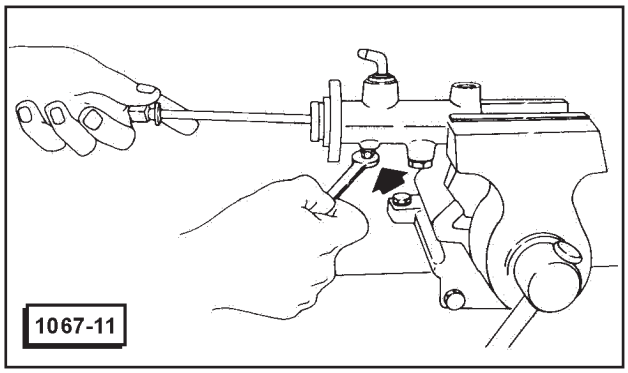
DISASSEMBLY

1. Withdraw boot **1,** remove Seeger ring **3,** and withdraw rod **2** together with collar **4**.



1 - Boot
2 - Rod
3 - Seeger ring
4 - Collar
5 - Master cylinder

2. Place the master cylinder on a vice fitted with protective jaws then, partially pushing the pistons towards master cylinder inside as shown in the figure, unscrew the screw securing the pistons and remove them together with the spring underneath.



3. Refer to the enlarged view and unscrew the two pistons; separate them recovering spring **11**.
4. Remove retaining rings **12** and **15** and washer **13** from piston **14**.
5. Remove Seeger ring **7**, and withdraw spacers **8**, and seal rings **9** from piston **10.**

CHECKS AND VERIFICATIONS

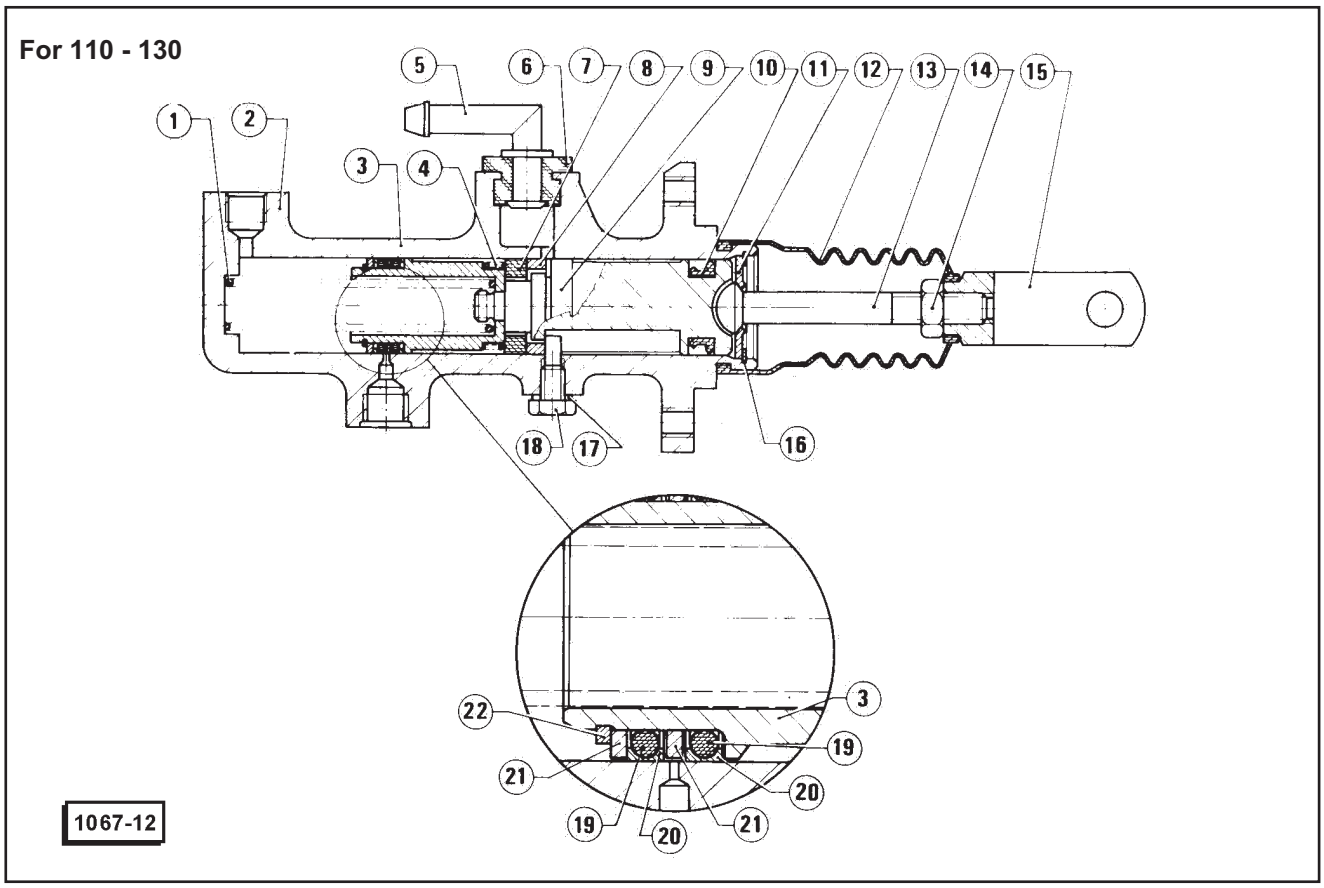
CAUTION
To clean and wash the master cylinder components use only the brake fluid prescribed. Do not use petrol, kerosene or other mineral oils to prevent damaging the rubber components.

1. Check for scratches and rust inside cylinder and on pistons. Replace them if required.
2. Check the wear degree of cylinder and pistons. In the event of excessive backlash, replace the cylinder assembly or piston assembly.
3. Verify the conditions of retaining rings and dust cover, replace the faulty components.
4. Check all compartments, openings, and master cylinder internal passages, and verify that they are clean and free from foreign matters.
5. Verify that springs are not strained or deformed. Replace them if required.

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REASSEMBLY



1 - Spring
2 - Master cylinder
3 - Intermediate piston
4 - Spring
5 - Fitting
6 - Gasket
7 - Seal ring
8 - Washer
9 - Piston
10 - Seal ring
11 - Disk support
12 - Boot
13 - Rod
14 - Nut
15 - Fork
16 - Seeger ring
17 - Gasket
18 - Setscrew
19 - Seal ring
20 - Seal ring
21 - Spacer
22 - Seeger ring

Reassemble the master cylinder by reversing the order of disassembly, complying with the following.
— Lubricate the relative motion sliding surfaces with the prescribed grease.
— Tighten thoroughly the two pistons **3** and **9** so that a certain backlash is present between them.
— When inserting the pistons into cylinder verify that the slot present on the external piston **9**, is correctly aligned with the setscrew seat **18**.
— Verify the master cylinder correct functioning, making sure that the pistons perform the whole travel freely.

INSTALLATION

Install the master cylinder on tractor (refer to: Pedal Assembly - Installation).

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BRAKES HYDRAULIC SYSTEM PIPING

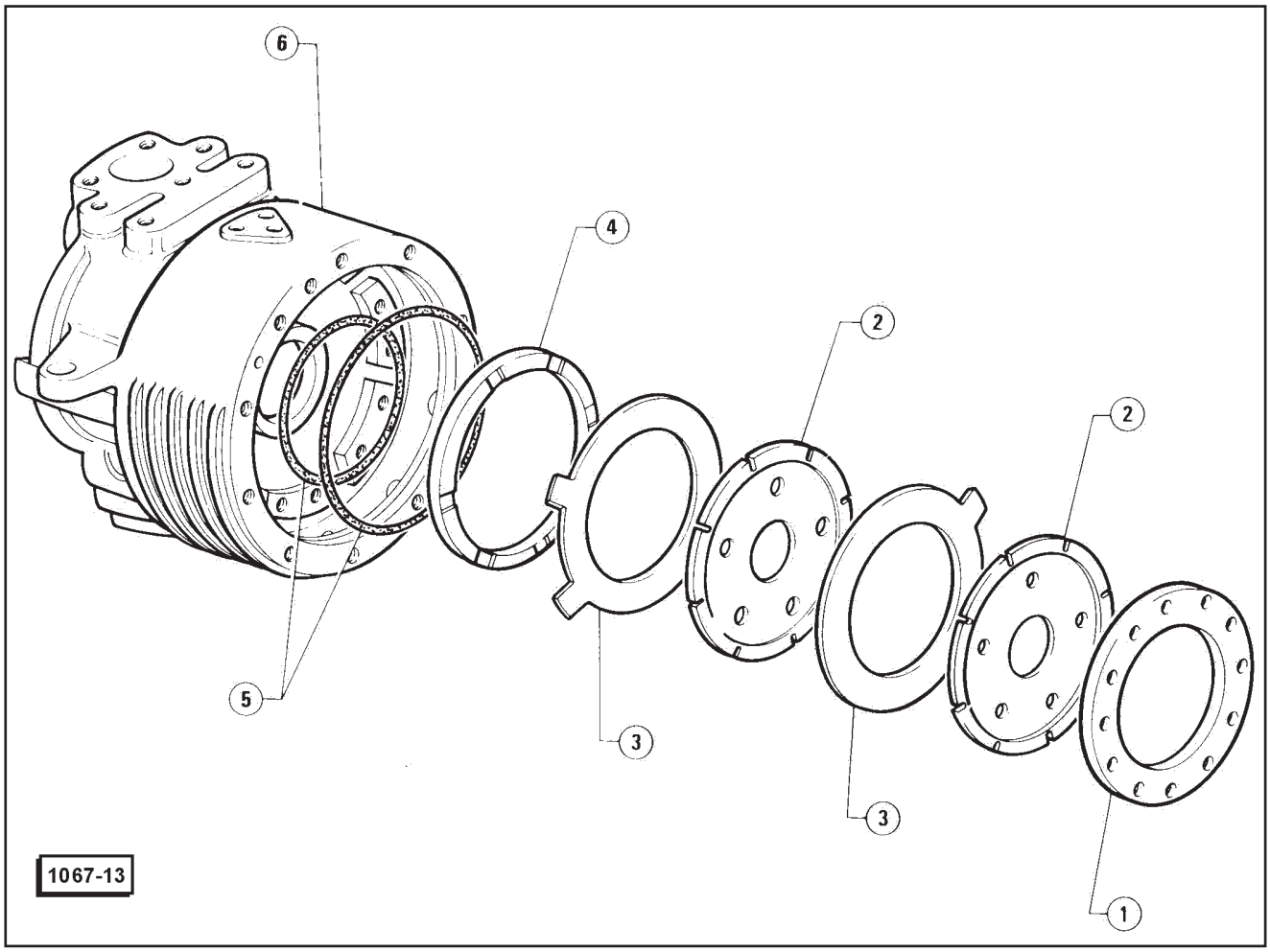
CHECKS AND VERIFICATIONS

1. Check the braking system piping (pipes and hoses) and verify that they are free from deformations, scratches or evident signs of external oxidation. Replace the faulty components.
2. In the event of hydraulic fluid leaks, restore the tightening if they are caused by loosening; if required, replace the faulty components.

REMOVALS AND INSTALLATIONS

If replacement or installation of brake piping is required, comply with the following.
— Remove the plug of brake and clutch hydraulic system supply tank and, by means of a syringe, suck the oil from the tank.
— Each time the piping is disassembled, plug the ends to prevent foreign matter from entering.
— To remove the pipes, unscrew the unions from both ends.
— To remove the hoses, unscrew the unions connecting pipes to hoses, then remove them. Subsequently, disconnect the hose from the other side.
— Unscrew all clamps securing piping to tractor.
— When reassembling piping on tractor take care not to twist them.
— At the end of reassembly, restore the oil level in the tank, and carry out bleeding (refer to: Hydraulic System Bleeding).

FRONT BRAKES



1 - Flange
2 - Brake disc
3 - Intermediate disc
4 - Piston
5 - Seal ring
6 - Fork

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DISASSEMBLY

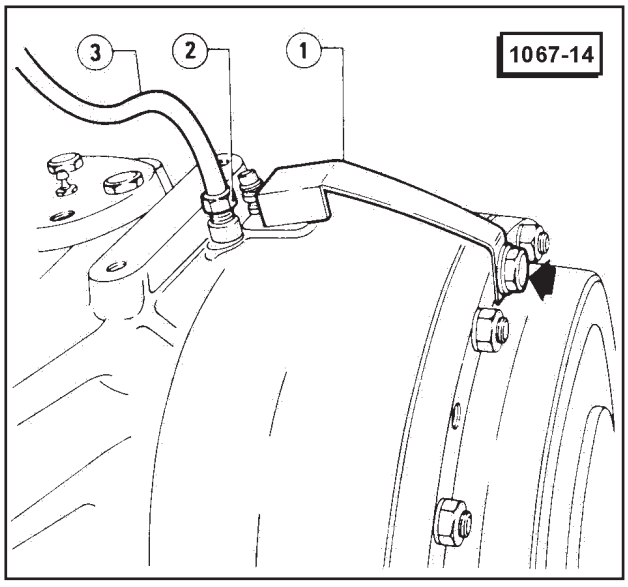
1. Leave the vehicle on a level surface with speeds disengaged.
2. Operate the parking brake.
3. Remove the front wheel.

CAUTION
Two operators are needed to remove the wheels.

(1) Loosen the eight nuts securing the wheel.
(2) Place a lifting jack under the front axle, interposing a wooden wedge; lift the tractor.
(3) Carefully withdraw the wheel from hub.
4. Place a container under the fork, unscrew the plug placed under the fork, and drain the oil.

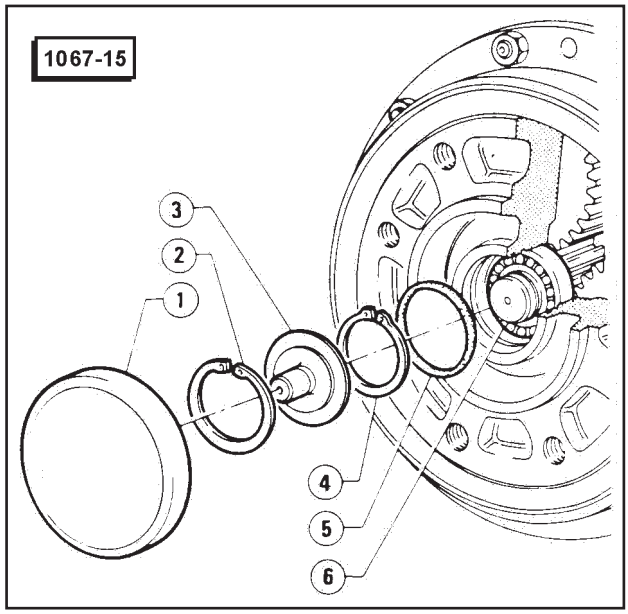
CAUTION
Always use a light alloy hammer or punch when tapping on cast iron components.

5. Unscrew the securing screw and remove protection **1** of oil drain valve.
6. Unscrew union **2**, and remove brake piping **3**.



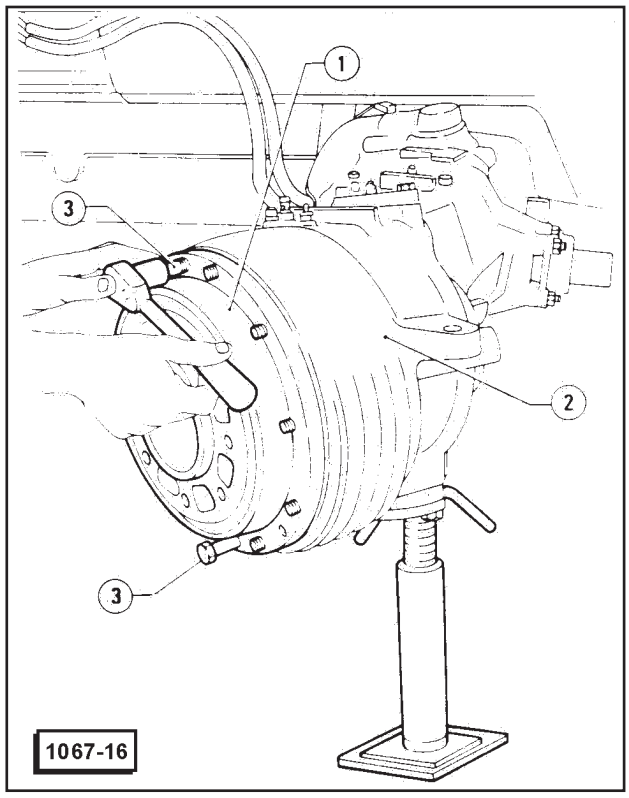
1 - Valve protection
2 - Union
3 - Braking system pipe

7. Unscrew cover **1** placed at the center of hub, and remove it.
8. Extract Seeger ring **2**, placed in front of the plug with threaded hole **3**. Remove the cover, by screwing a screw on the grease nipple and pulling outwards.
9. Remove retaining ring **3**, and Seeger ring **4**.



1 - Cover
2 - Seeger ring
3 - Plug with threaded hole
4 - Retaining ring
5 - Seal ring
6 - Bearing

10. Unscrew the ten nuts securing epicyclic reduction gear **1** to fork **2**.
11. Screw the two longest screws **3** into the holes not used for the fixing and remove the epicyclic reduction gear and the O-ring by tightening the screws fully home on the fork.

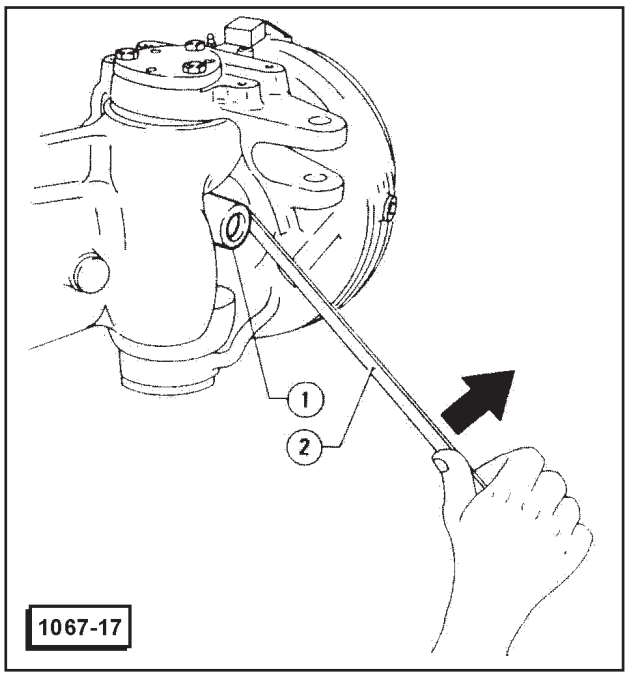


1 - Epicyclic reduction gear
2 - Fork
3 - Screws

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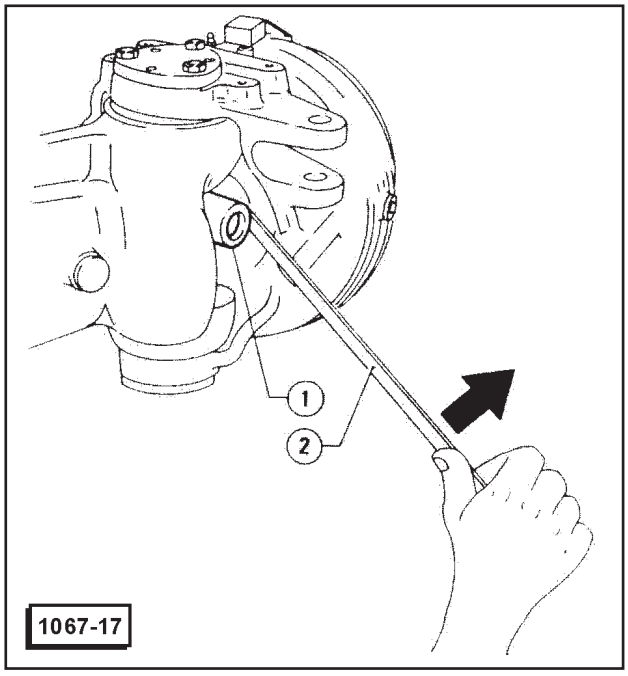
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CAUTION
When removing the epicyclic reduction gear, use lever 1 as shown in the figure, and act on cross journal 2 in order to prevent the axle shaft from moving unintentionally with consequent damage of the seal rings housed inside the fork.



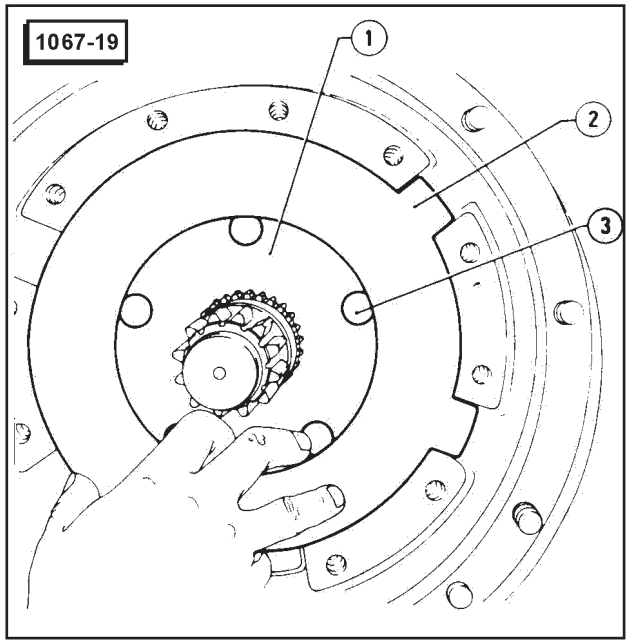
1 - Lever
2 - Cross journal

12. Unscrew the twelve self locking screws securing the brake assembly flange **1** and remove it together with oil deflector plate **2**.



1 - Brake assembly flange
2 - Oil deflector plate

13. Extract brake discs **1**, and intermediate disc **2**, then let compressed air into the brake oil union, and remove the brake control piston **3**.



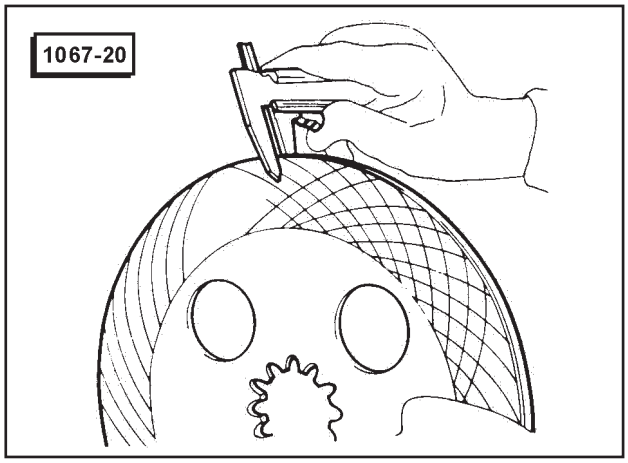
1 - Brake discs
2 - Intermediate discs
3 - Brakes control piston

CHECKS AND VERIFICATIONS

Wash all brake components with suitable liquid, and dry them with compressed air.
Perform an accurate visual inspection verifying in particular the following.
1. Check for scratches on both inner and outer sliding surfaces of piston. Replace it if required.
2. Verify that the seal ring seats are clean. If required, blow compressed air into the seats.
3. Verify the seal ring conditions; replace them if required.
4. Verify that the ground surfaces mating with the brake discs are free from excessive scratches.
If not, replace the damaged components.
5. Check the discs by operating as follows.
(1) Verify that the sliding surfaces of discs are not worn, splintered or scratched. Replace the damaged discs.
(2) Check that discs can slide freely into their seats.
(3) Use a gauge to check that the thickness of disc package is not lower than the value given in “Technical Data and Specifications - Checks and Adjustments” for the model of, tractor in object. Replace if required.

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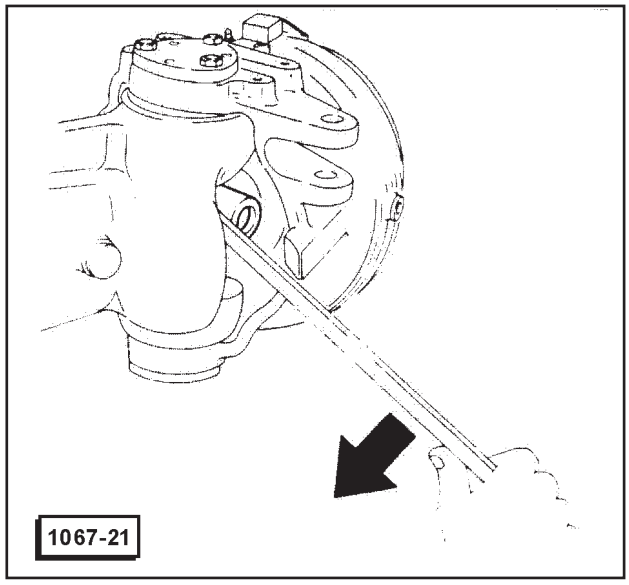


(4) Examine the disc broachings, checking for wear or damage signs.

REASSEMBLY

Carry out reassembly by reversing the order of disassembly, complying with the following.

— Lubricate the piston sliding surfaces with the grease prescribed, and fit it in place keeping the slots present on piston itself pointing outwards. Then fit the intermediate piston and the flange; screw a few of the screws securing the flange so as to push the piston into its seat uniformly until fitting it onto the inner retaining rings.
— When reassembling the brake discs, verify that the intermediate discs are correctly housed into their seats.
— Install the epicyclic reduction gear taking care to hold the axle shaft by levering on the cross journal, to prevent the axle shaft from with drawing from brake discs when moving backwards.



— Tighten the screws securing the brake assembly flange, and the nuts securing the epicyclic reduction gear to the prescribed torque.

Tightening torques
- Nuts securing epicyclic reduction gear
- Screws securing brake flange

See: GENERALITY
Rules for tightening of nuts bolts

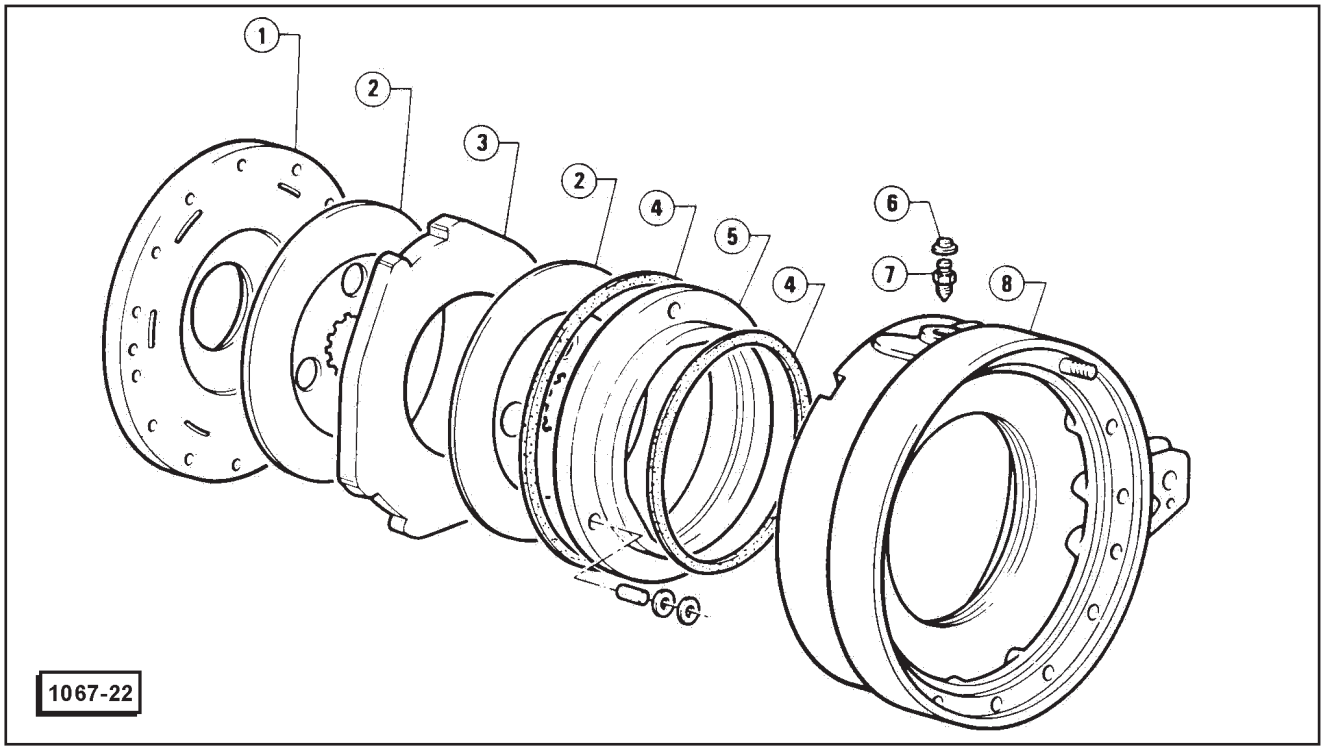
— Carry out bleeding (refer to: Braking System Bleeding).

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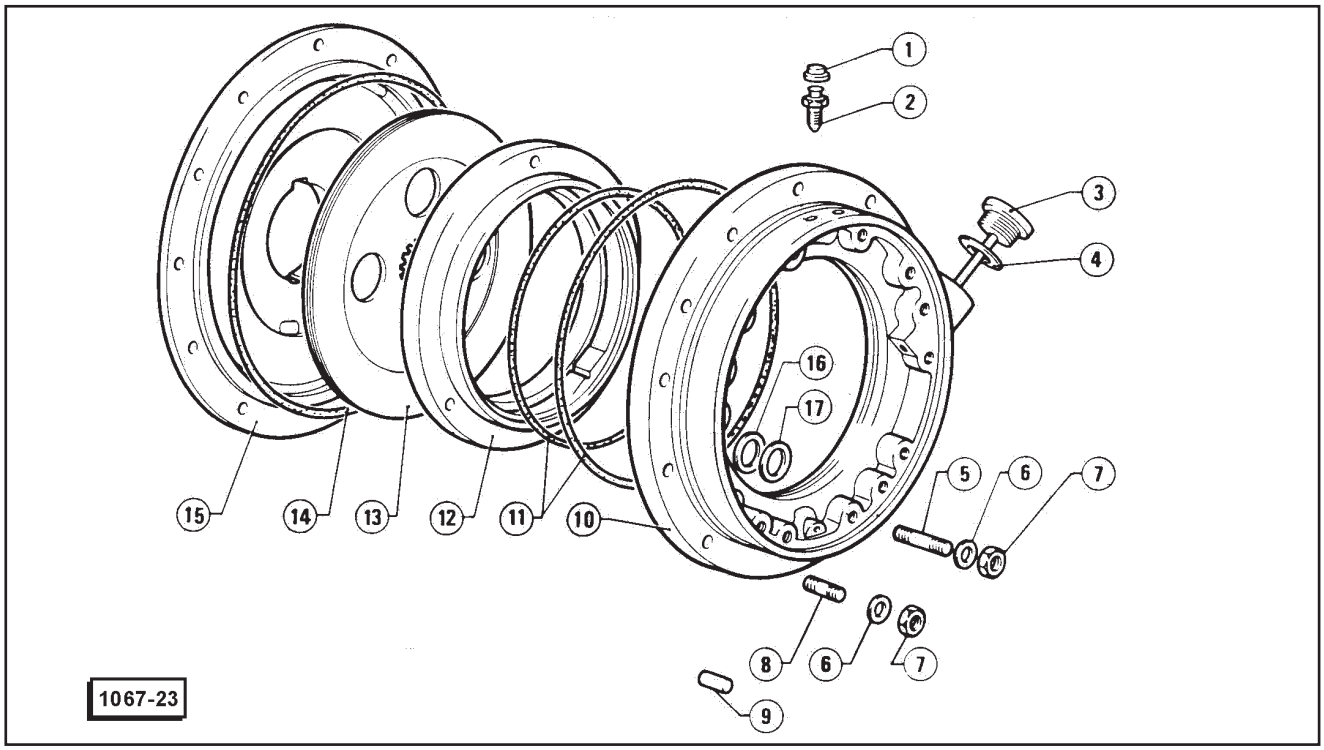
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REAR BRAKES

DISASSEMBLY



1 - Flange
2 - Brake disc
3 - Intermediate disc
4 - Seal ring
5 - Piston
6 - Protective cap
7 - Bleeder
8 - Brake housing



1 - Cap
2 - Bleeder
3 - Oil dipstick
4 - Gasket
5 - Stud
6 - Washer
7 - Nut
8 - Stud
9 - Pin
10 - Housing
11 - Piston seal ring
12 - Piston
13 - Disc
14 - Seal ring
15 - Flange
16 - Shim
17 - Shim

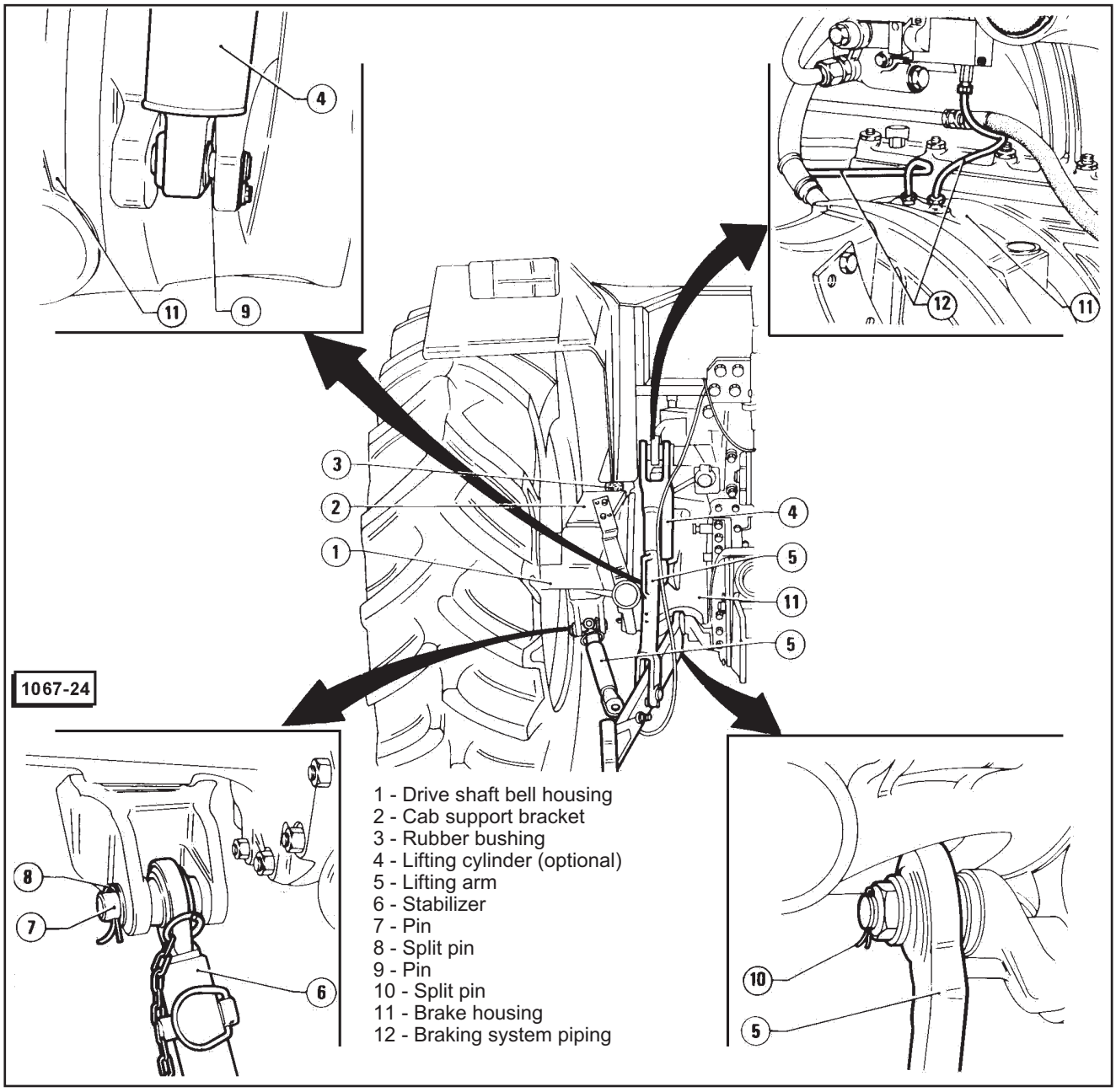
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1. Operate the parking brake and leave the tractor on a level surface with speeds disengaged.
2. Remove the rear wheel.

CAUTION
Two operators are needed to remove the wheels.

(1) Loosen the eight nuts securing the wheel.
(2) Place a jack under the rear axle, interposing a wooden wedge; lift the tractor.
(3) Carefully remove the wheel from hub.
(4) Place a safety stand under the differential casing.
3. Place a container under the brake housing, unscrew the related cap, and drain the brake lubrication oil.
4. Remove split pin **8**, and withdraw pin **7** securing stabilizer **6** to bell housing **1**.
5. Remove split pin **10**, and unscrew the nut securing lifting arm **5**. Detach the arm from the related pin.
6. If mounted, unscrew the screw securing pin **9**, withdraw it, and disconnect cylinder **4** from brake housing **11**.
7. Unscrew the bolt securing the cab to rubber bushing **3**.
8. Unscrew the four screws securing cab support bracket **2** to bell housing **1**.
9. Sling the cab suitably and lift it enough to remove cab support.
10. Unscrew the unions securing brake piping **12** to brake housing and disconnect them. Plug the piping suitably.



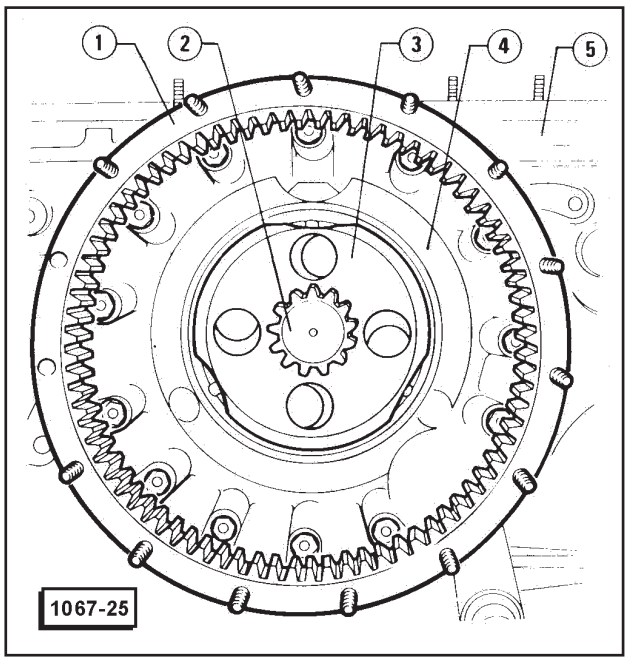
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11. Place a safety stand under the tank and unscrew the thirteen nuts and the two bolts securing the drive shaft bell housing to brake housing.
12. Use a suitable lifting device to support the drive shaft bell housing when removing it from the brake housing.

WARNING
Carefully check that both tractor and bell housing are well balanced to prevent dangerous oscillations during the removal operation.

13. Carefully remove the bell housing from brake housing.
14. Only for 150-130
(1) Remove crown gear **1** from brake housing **4**, by slightly tapping with a hammer.
(2) Remove drive shaft **2** by withdrawing it from brake discs **3**.
(3) Unscrew the thirteen inner nuts **6** and the outer nut securing brake housing **4** to differential casing **5**.
(4) Carefully remove the brake housing recovering brake discs **3** which are not secured.



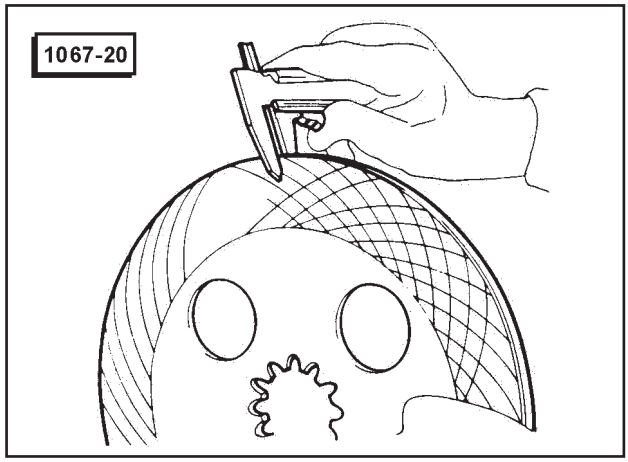
1 - Crown gear
2 - Inner drive shaft
3 - Brake disc
4 - Brake housing
5 - Differential casing
6 - Nut

(5) Let compressed air into one of the brake oil inlets on the housing to facilitate the brake piston removal. Recover the washers of piston dowel pins taking care not to mix them.

15. Only for 110
(1) Unscrew the thirteen nuts of the flange securing brake housing to differential casing; withdraw the housing taking care not to drop the brake disc, since it is not axially secured.
(2) Remove the drive shaft by withdrawing it from the brake discs; recover the brake disc.
(3) Let compressed air into one of the brake oil inlets on the housing to facilitate the brake piston removal. Recover the washers of piston dowel pins without mixing them.

CHECKS AND VERIFICATIONS

Wash all brake components using a suitable liquid, and dry them with compressed air. Perform an accurate visual inspection taking special care for the following.
1. Check for scratches or rust inside the cylinder and on piston. Replace them if required.
2. Check the wear degree of both cylinder and piston. If excessive backlash is present, replace cylinder or piston.
3. Verify conditions of the seal rings mounted on cylinder. Replace them if required.
4. Check that the ground surfaces mating with a brake disc are free from evident scratches. If not, grind the friction surfaces taking into account that the thickness of the material removed shall not exceed **2 mm** (0.08 in).
5. Check the brake discs for models 130 - 150 (or the single disc for model 110) by operating as follows.
(1) Verify that the disc friction surfaces are not worn, splintered, or scratched. Replace the damaged discs.
(2) Check that discs slide freely into their seat.
(3) Use a gauge to check that thickness of each disc is not lower than the value given in “Technical Data and Specifications - Checks and Adjustments”, for the model of tractor in object. Replace if required.



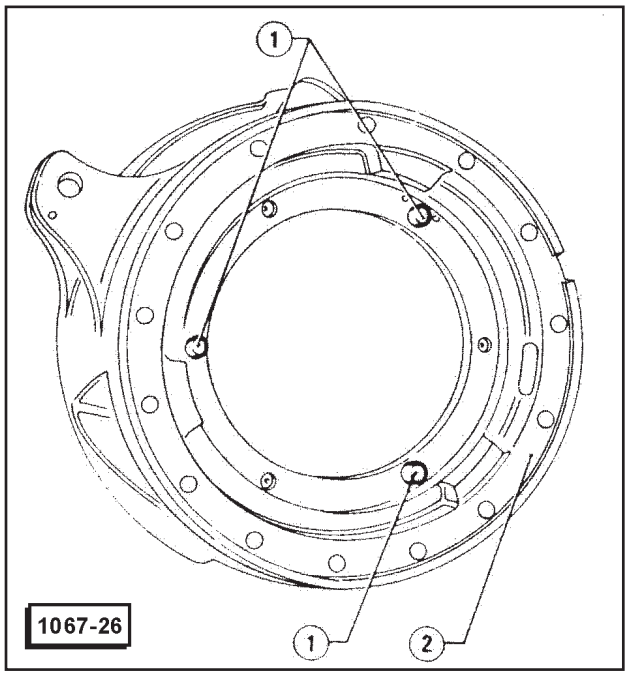
(4) Examine the disc broaching making sure that they are not worn or damaged.

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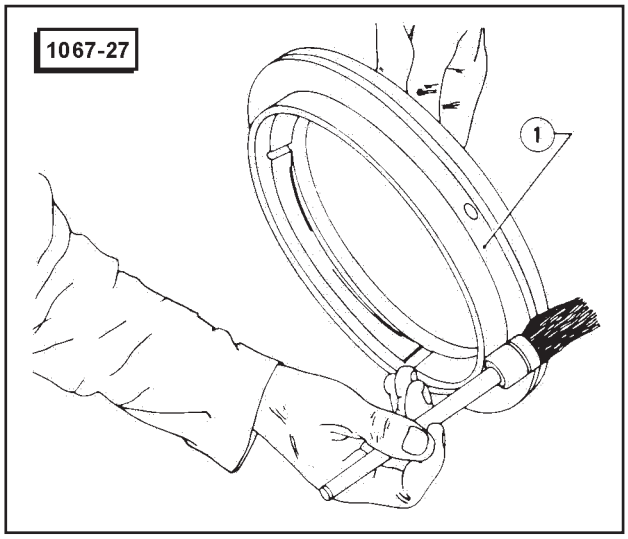
REASSEMBLY

1. Check that shim washers **1,** removed during disassembly, are present inside the reference pins.



1 - Reference pins
2 - Brake housing

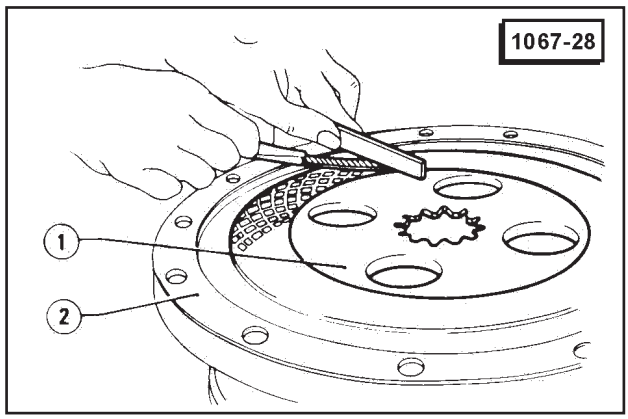
2. Mark a reference on both piston and brake housing in correspondence with a reference pin in order to facilitate reassembly.
3. Apply the prescribed grease on the surface of piston **1** mating with the brake housing seal rings.



1 - Piston

4. Carefully fit the piston into the brake housing.
5. Fit the brake discs into brake housing, and for models 130-150 the intermediate disc.

6. Use a feeler gauge, as shown in the figure, to measure the distance between brake disc **1** and surface **2** mating with the differential casing.



1 - Brake disc
2 - Mating surface with differential casing

7. Verify that the value measured is equal to that given in “Technical Data and Specifications - Checks and Adjustments” for the model of tractor in object. If not so, add or remove the shim washers located underneath the piston. Repeat the measurement until the correct value is obtained.
8. Refer to the enlarged view, and reassemble brake housing **8** and the drive shaft bell housing by reversing the order of disassembly complying with the following.
— Apply the sealant prescribed on the inner surface of brake housings **8** and the two surfces of the epicyclic reduction gear crown wheel.
— For models 130 and 150 verify that, when reassembling the brake housing, intermediate disc **3** is correctly housed into its seat.
— Tighten the nuts securing the brake housings and the drive shaft bell housings to the prescribed torque.

Tightening torques

Nuts securing brake housing to differential casing

150	**127 Nm**	**110**	**See: GENERAL**
130	**(13 - Kgm; 94 ft lb)**		**Nuts bolts**

Nuts securing drive shaft bell housing to brake housing

150	**127 Nm**	**110**	**88 Nm**
130	**(13 Kgm; 94 ft lb)**		**(9 - Kgm; 66ft lb)**

— Carry out bleeding (refer to: Hydraulic System Bleeding).

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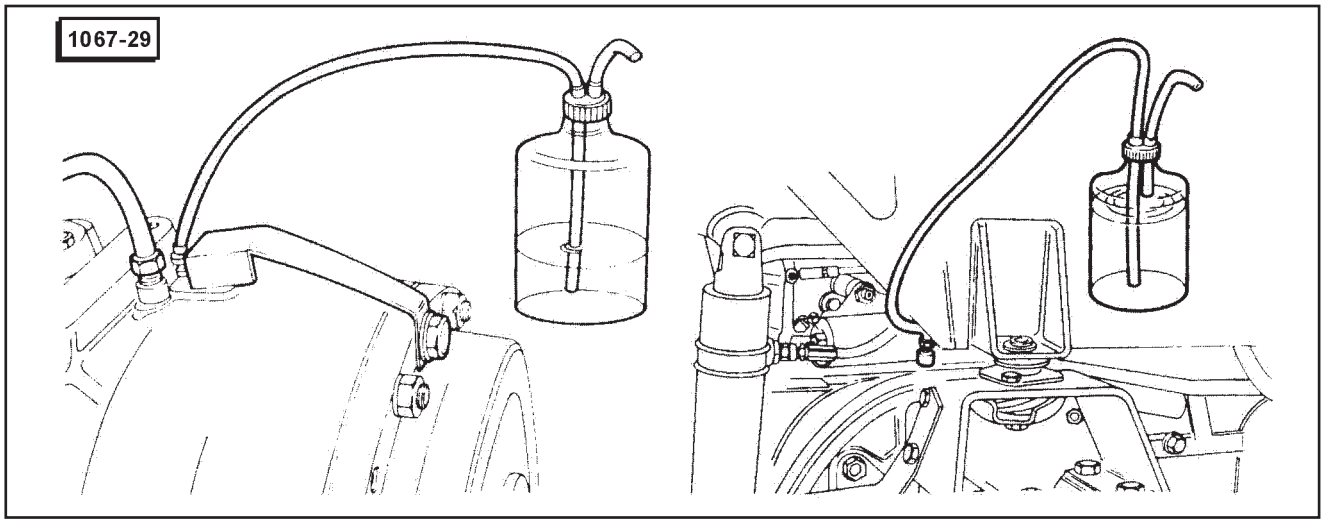
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HYDRAULIC SYSTEM BLEEDING

Bleeding of brake and clutch hydraulic system is to be carried out each time the system is connected or when air enters it.

CAUTION
— **Do not reuse the hydraulic fluid drained during bleeding.**
— **Operate carefully to prevent the oil coming into contact with the paint, since this could be damaged.**
— **During the bleeding operation, keep the oil level in the tank above the min. mark.**

1. Remove the plug of the hydraulic system supply tank; if required, restore the level using the oil prescribed.
2. Disconnect the two brake pedals by removing the latch. Operate first on the brake of one side, then repeat the same operations for those on the other side.
3. Fit a hose on the bleeder screws of both front and rear brakes, and submerge its end into a transparent container filled with the same oil of the system.
4. Operate one of the pedals several times then, keeping it fully pressed, slightly unscrew the related bleeder screws and tighten them immediately after.
5. Repeat this operation several times until oil comes out of bleeder screw without air bubbles.
6. Fully press the pedal and check whether after its initial idle stroke, a direct and non-spongy action can be felt. If not, repeat bleeding.
7. Restore the oil level in the tank using the brake oil prescribed; refit the related plug.

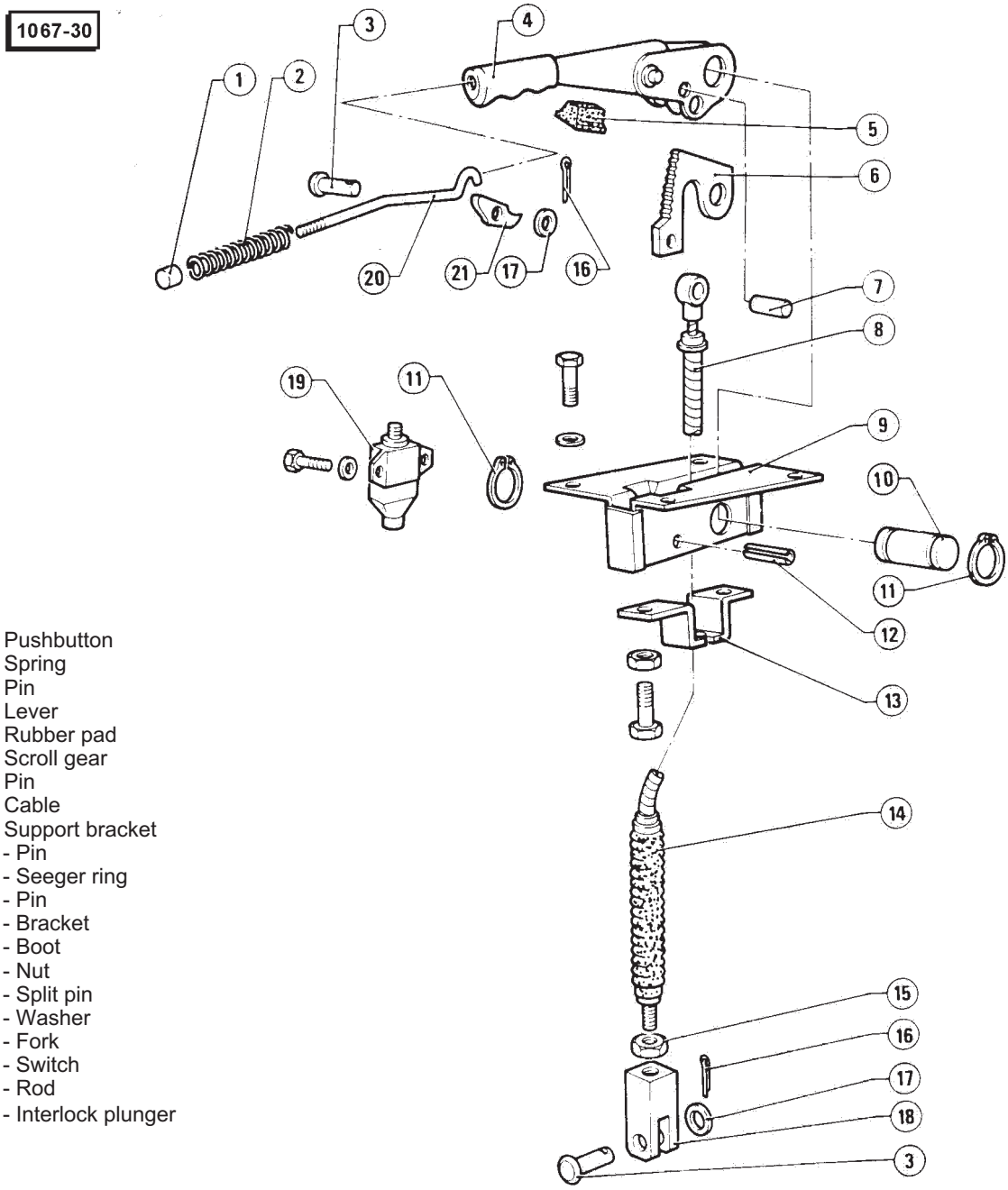


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PARKING BRAKE

CONTROL LEVER



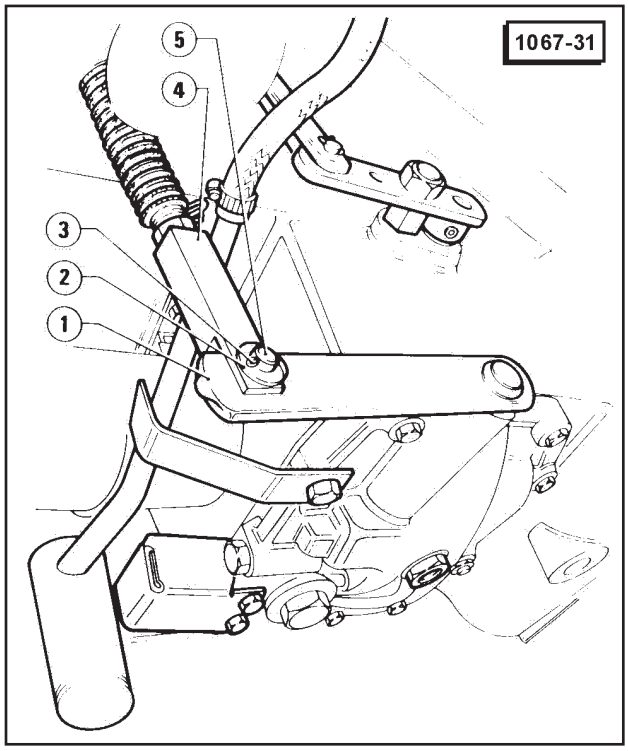
1 - Pushbutton
2 - Spring
3 - Pin
4 - Lever
5 - Rubber pad
6 - Scroll gear
7 - Pin
8 - Cable
9 - Support bracket
10 - Pin
11 - Seeger ring
12 - Pin
13 - Bracket
14 - Boot
15 - Nut
16 - Split pin
17 - Washer
18 - Fork
19 - Switch
20 - Rod
21 - Interlock plunger

REMOVAL

1. Operating from under the tractor, remove split pin **2** and washer **3**, then withdraw pin **5** and disconnect transmission fork **4** from parking brake control lever **1**.

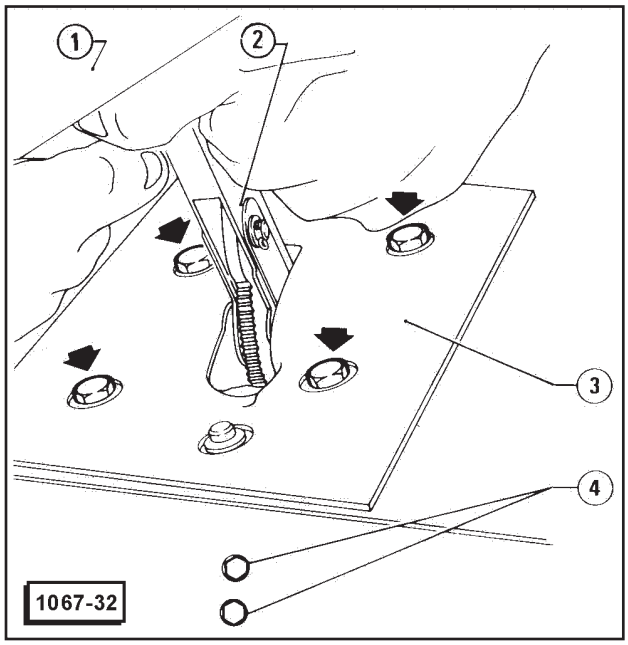
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1 - Parking brake control lever
2 - Washer
3 - Split pin
4 - Fork
5 - Pin

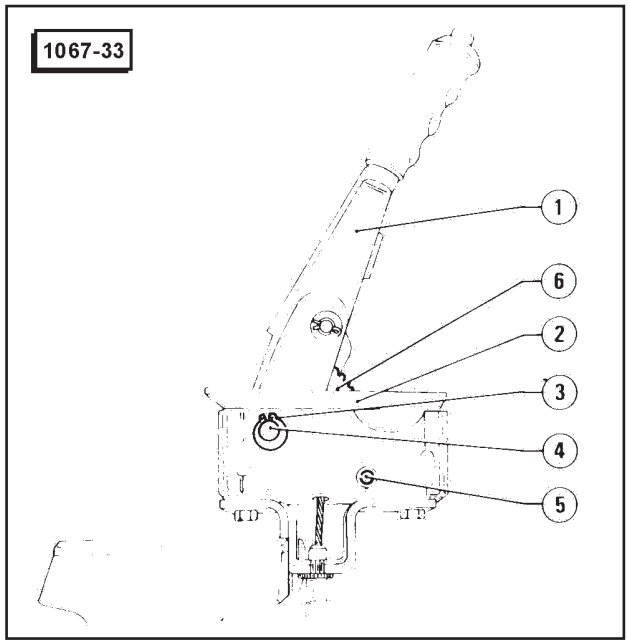
2. Operating from inside the cab, lift trim **1** placed under the seat, and unscrew the four screws securing bracket **3** to floor.
3. Remove lever **2** together with bracket **3**, control cable, and rubber pad
4. If required, operating from under the cab, disconnect wiring of the brake warning lamp, unscrew the two screws **4** securing the switch, and remove this last.



1 - Cab floor trim
2 - Parking brake lever
3 - Lever support bracket
4 - Screws

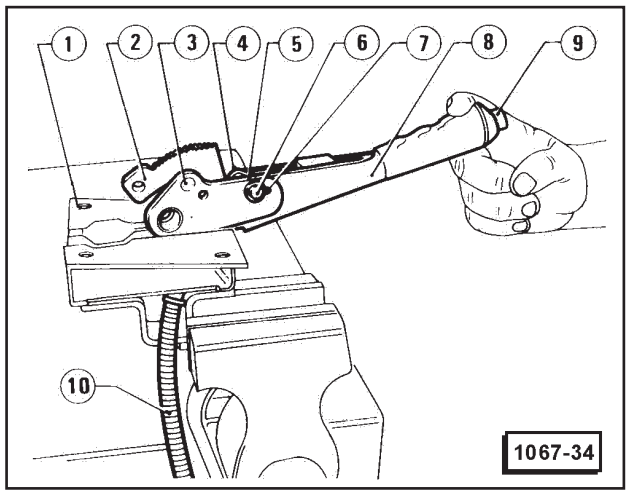
DISASSEMBLY

1. Place control lever support bracket **2** on a vice, remove Seeger ring **3**, and withdraw stud **4**. Remove pin **5** using a hammer and a punch.



1 - Lever
2 - Support bracket
3 - Seeger ring
4 - Stud
5 - Pin
6 - Scroll gear

2. Overturn lever **8**, withdraw pin **3,** remove control cable **10** scroll gear **2** and the lever
3. Remove split pin **7**, washer **5** underneath, and withdraw pin 6. Remove interlock plunger **4** and, from the handgrip, pushbutton **9**, together with the spring and rod underneath.



1 - Support bracket
2 - Scroll gear
3 - Pin
4 - Interlock plunger
5 - Washer
6 - Pin
7 - Split pin
8 - Lever
9 - Pushbutton
10 - Control cable

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CHECKS AND VERIFICATIONS

1. Visually inspect that each component is not excessively worn or damaged. In particular, check the pin surfaces and the wear degree of the teeth of interlock plunger and scroll gear.
2. Check for interruptions in the electric cables and that the switch signalling that parking brake is in operates correctly.
3. Check that spring is not strained or deformed.
4. Replace the faulty or worn components.

REASSEMBLY

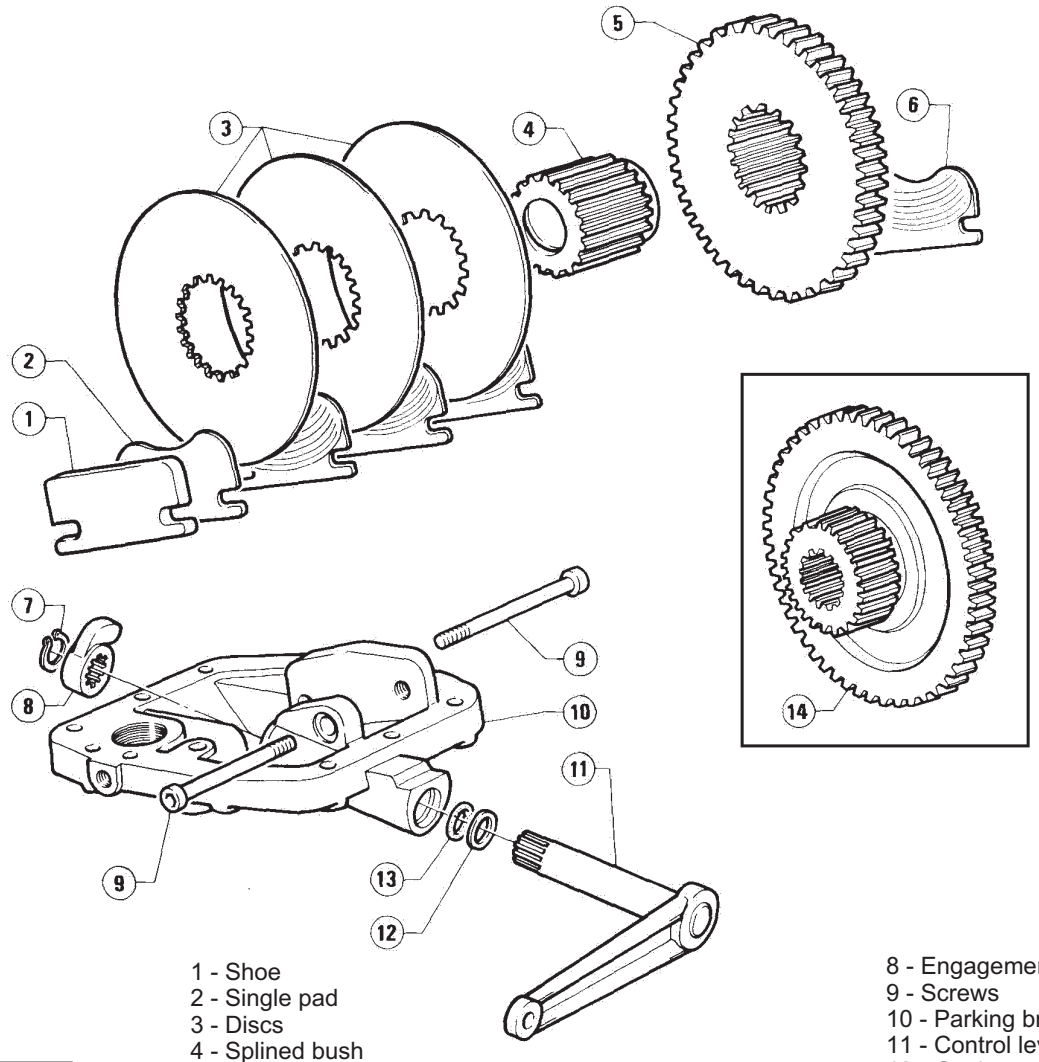
Reassemble the lever by reversing the order of disassembly, complying with the following.
— - Lubricate pins **3**, **7** and **10**, scroll gear **6** and interlock Plunger **21** with the grease prescribed.
— Install the first cable **8** on lever **4** trough pin **7.**
— Install the ratchet gear replacing split pin **16**.

INSTALLATION

Install the control lever on tractor by reversing the order of removal, complying with the following.
— Refer to the exploded view and lubricate pin **3** with the prescribed grease; replace split pin **16**.
— Verify that tractor starts being braked when lifting the parking brake control lever by 3 to 4 notches; whilst, when the lever is completely released , the tractor must be free.

If not so, loosen locknut **15,** and unscrew or screw fork **18** accordingly until obtaining a correct braking action.

BRAKE UNIT



1067-35

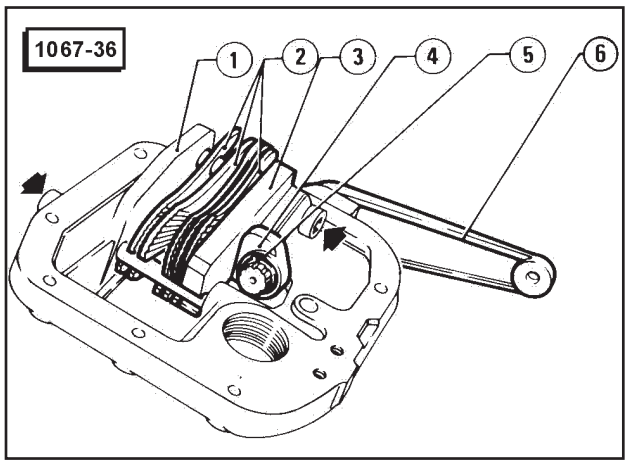
1 - Shoe
2 - Single pad
3 - Discs
4 - Splined bush
5 - Gear
6 - Double pad
7 - Seeger ring
8 - Engagement lever
9 - Screws
10 - Parking brake support
11 - Control lever
12 - Gasket
13 - O-ring
14 - Gear

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DISASSEMBLY

1. Detach the parking brake support (refer to: Speed gear - Front Drive P.T.O. - Disassembly - steps 1. to 12).
2. Unscrew one of the two screws securing pads **2** to support **1**. Withdraw pads and shoe **3**.
3. Remove Seeger ring **5**, withdraw engagement lever **4** and, operating from the outside, control lever **6** recovering the O-ring.



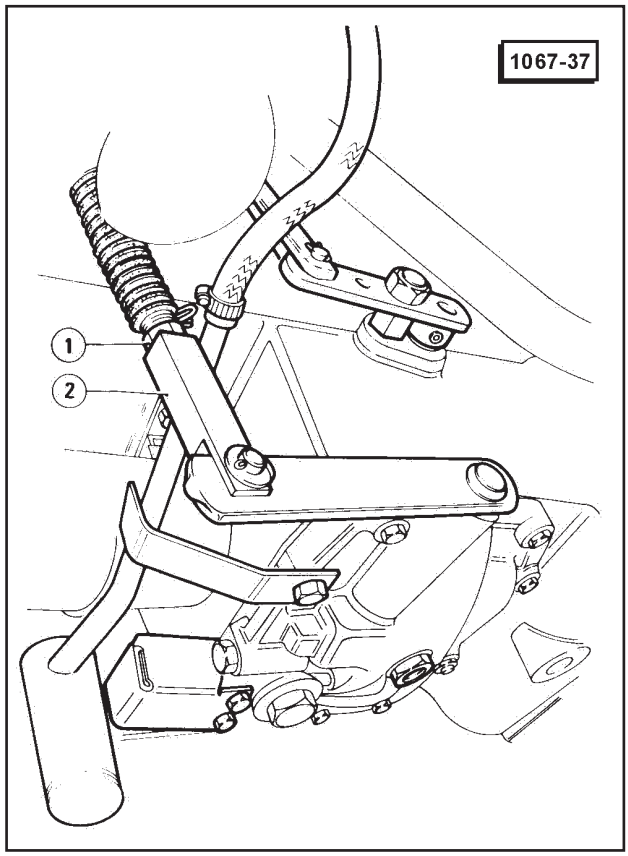
1 - Support
2 - Pads
3 - Shoe
4 - Engagement lever
5 - Seeger ring
6 - Control lever

CHECKS AND VERIFICATIONS

1. Thoroughly wash all components and carefully check for superficial defects.
2. Measure the pad thickness and check for irregular wear. If pad thickness is lower than the limit value given in “Technical Data and Specifications - Checks and Adjustments” for the model of tractor in object, replace all of them.

REASSEMBLY

Reassemble the brake by reversing the order of disassembly, complying with the following.
— Replace the O-ring, and lubricate it with the grease prescribed.
— Carefully install the pads interposing them between brake discs.
— Once reassembly has been carried out, verify that tractor starts being braked after the parking brake control lever, in the cab, has been lifted by 3 to 4 notches, whilst with control lever released, the tractor must be perfectly free.
— If not, loosen locknut **1** and unscrew or screw fork **2** accordingly, until obtaining a correct braking action.

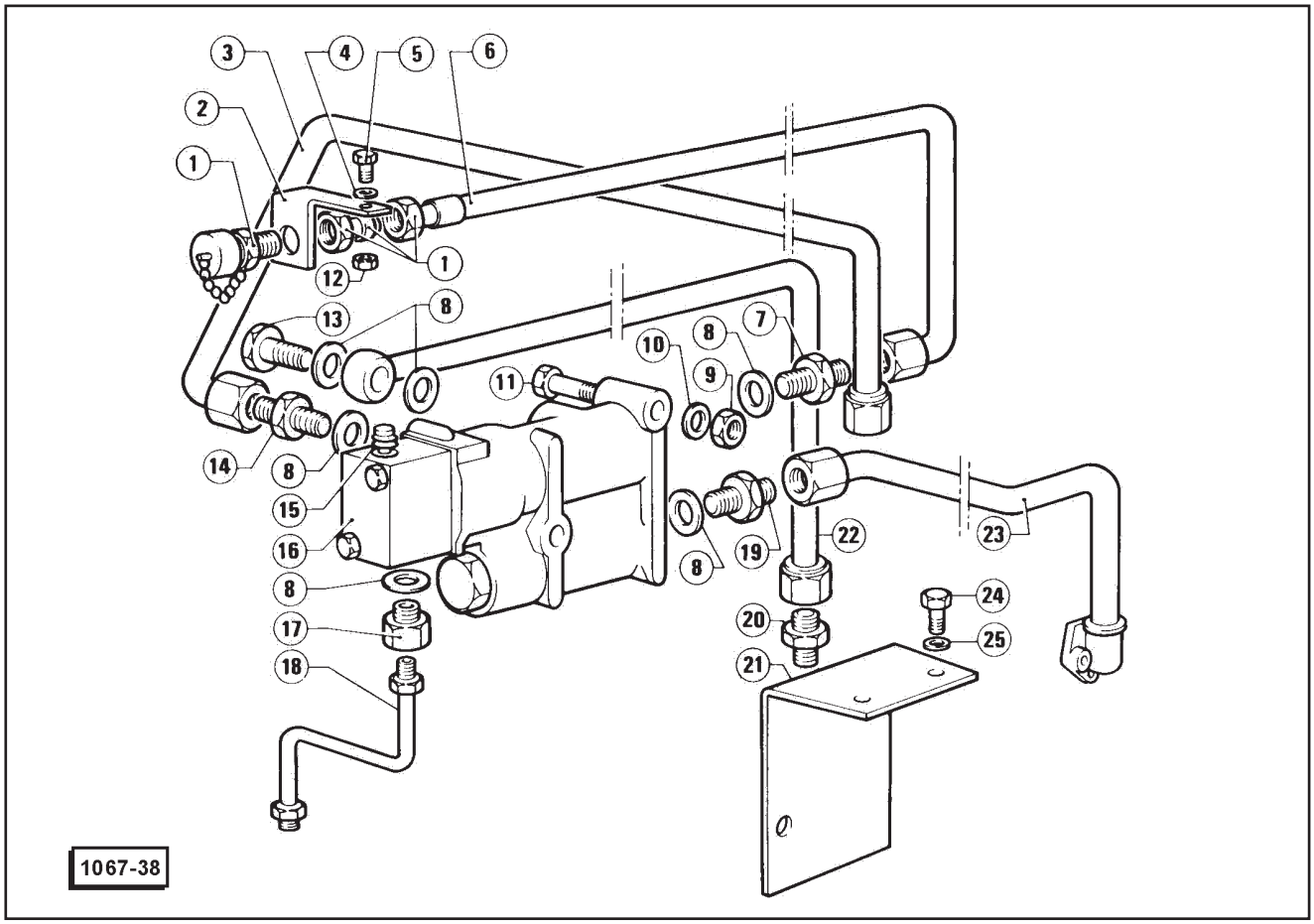


1 - Locknut
2 - Control cable fork

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DISTRIBUTOR FOR TRAILER HYDRAULIC BRAKING



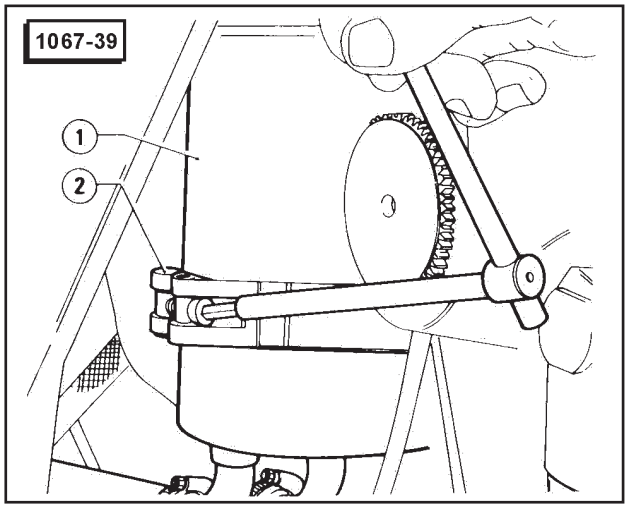
1 - Connector
2 - Support
3 - Pipe
4 - Notched washer
5 - Screw
6 - Pipe
7 - Fitting
8 - Gasket
9 - Nut
10 - Notched washer
11 - Screw
12 - Nut
13 - Union
14 - Fitting
15 - Bleeder valve
16 - Distribution valve
17 - Reduction
18 - Rear brake connection pipe
19 - Fitting
20 - Fitting
22 - Pipe
23 - Pipe
24 - Screw
25 - Notched washer

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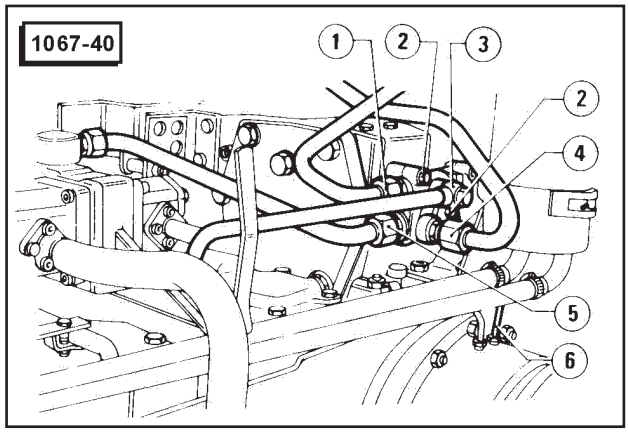
REMOVAL

1. Without disconnecting the piping, remove the hydrostatic steering tank **1** loosening the clamp screw **2**.



1 - Hydro steering oil tank
2 - Tank fastening band

2. Lower the tank left of the fuel in order to have sufficient space to work, loosen fittings **1**,**4** and **5** and the threaded union **3**, then unloosen the screw **2**, the connection pipe **6** and remove the distribution valve.



1 - Fitting
2 - Clamping screw
3 - Screwed union
4 - Fitting
5 - Fitting
6 - Rear brake connection pipe

INSTALLATION

Proceed with the installation in reverse order to that of the removal, taking care to replace all the fitting gaskets, then on completion of work, remove the air from the system by joining a pipe in a container partially filled with hydraulic oil, to the bleeder valve, present on the distribution valve, and follow the procedure described in “Hydraulic System Bleeding”.

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TECHNICAL DATA AND CORRECTIONS

TECHNICAL FEATURES

Service Brakes

Particulars		Model		
		110	130	150
Constructor				
Type		Plates in oil bath		
Number of disks per brake	Front	1	2	
	Rear	1	2	
Disk outside diameter	Front	223,4		
	Rear	302		
Originai disk thickness	Front	4,80		
	Rear	10		
Minimum permissible disk thickness	Front	3,80		
	Rear	9		
Pump type		BENDITALIA 81”		

Parking brake

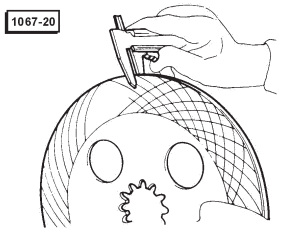
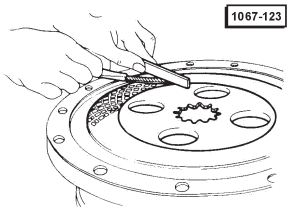
Particulars			Model		
			110	130	150
Type			Plates in oil bath		
Number of single surface braking plates			2		
Number of double surface braking plates			2	3	
Original plate thickness	double brake surface	mm	5		
	single brake surface	mm	3,5		
Plate minimum permissible thickness	double	mm	4,2		
	single	mm	3,1		
Number of brake disks			3	4	
Traverse of the parking brake lever			120		

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CHECK AND ADJSTMENTS

Unit: mm

Dimension quota		**Model**
		110 - 130 - 150
Front plate minimum thickness		3,80 (0.14)
Rear plate minimum thickness		9 (0.35)
Brake plate distance from connection surface		0,3 (0.01)
Minimum thickness parking brake plate	double brake surface	4,2 (0.16)
	single brake surface	3,1 (0.12)

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TIGHTENING TORQUES

Measuring unit: Nm (kgm)

Parts	Model		
	110	130	150
Fixing nuts - brake holder box to rear gear box	See: GENERALITY Tightening torques nuts and bolts	127 (13)	
Fixing nuts - axle shaft support to brake holder box	88 (9)	127 (13)	

GENERAL SPECIFICATIONS

Fluids and Lubricants

Application	Type	Denomination	Model	Q.ty
Rear axle and differential oil refill	Oil	AGIP Rotra I HT (API GL-3)	110 - 130 - 150	
Hydraulic circuit drive refill	Hydraulic oil	AGIP ATF DEXRON (GM Type à Suffix A)		
- Brake operation piston surface lubrication	Grease	AGIP GREASE 30 (Grease 30)		
- Lubrication for: Bearing Front axle				
Lubrication a) bush, pins and pedal latch b) pump inside sliding surfaces c) brake piston surfaces in contact with brake holder box support links d) parking brake components and pins				

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TROUBLE SHOOTING AND CORRECTIONS

The following are indispensable in any search for defects in the brake system:
— Check wear of tyres
— Check pressure of tyres
— Check brake fluid and anyway verify that it is within the maintenance programmed

Fault	Probable cause	Corrective action
The pedal goes the full run (oil in the float lowers)	Loss of fluid from brake plant unions	Tighten unions
	Loss of fluid from brake pump	Overhaul brake pump
	Internal draw-by in brake unit	Overhaul brake unit
	Piston holding gasket or sliding surface worn	Change gaskets or sliding surfaces
The pedal goes the full run (oil in float does not lower)	Air in the unit	Bleed the unit
	Holding gasket of command pump inefficient	Overhaul the brake pump
	Flexible pipe swollen a therefore inefficient or pipes used of poor quality	Change flexible pipes and bleed the unit
Pedal resilient	Air in the brake system	Bleed the unit
	Breather hole on tank cover blacked	Clean a bleed the unit
	Work of brake fluid with boiling point too low	Change the brake fluid a bleed the unit
Brake action poor	Loss of fluid from the brake unit pipes	Check brake pump a wheel cylinders to fend eventual loss a repair
	Air in brake unit	Bleed the brake unit
	Friction unit worn	Change discs
	Control piston worn or seized	Overhaul control piston a change if necessary
	Brake pump not working correctly	Repair or change

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Fault	Probable cause	Corrective action
Brake action poor	Mechanical obstacles in pedal fun	Free as necessary
Brakes uneven	Tyre pressure incorrect	Pump to correct pressure
	Pump piston loose	Overhaul brake pump
	Connection pipe damaged or blocked	Change pump connection pipe
	Control piston seal ring worn	Change seal rings
	Clearing pipe blocked or bicken	Repair or change
	Delivery pipe blocked or bicken	Change piping
	Brake disc gasket worn on one side of vehicle	Change brake discs
Brake vibrating	Unevenly worn or chipped brake	Change damaged discs
	Oil polluted with water	Change oil in unit
Brake does not move forward	Movement of pedal obstructed	Grease the connection check the wear of return spring
	Brake pump piston seized	Overhaul pump a bleed the unit
	Discs very worn	Repair of or change disc
	Hand brake does not return	Check a repair
	Brake pump cylinder blocked	Overhaul pump a bleed the unit
	Piping blocked	Check a dean
Parking brake doesn’t	Adjustment incorrect	Adjust
	Plates worn	Change plates
On removing parking brake the tractor remains braked	Cable return blocked	Unblock a change cables
	The unlock lever button doesn’t return	Dismount a unblock or change the lever
	Plates sticking to discs	Unblock or change the defective part

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Fault	Probable cause	Corrective action
Brake light does not light up	Electrical connection broken	Repair the connection
	Switch faulty	Change
	Light faulty	Change
Trailer brake inefficient	Trailer hydraulic brake distributor	Repair or change
	Rear brake distributor connection pipe damaged	Change the piping

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WHEELS AND TYRES

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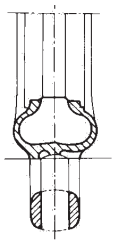
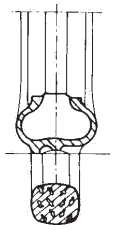
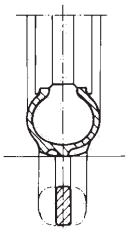
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CHECK OF TYRE CONDITION

1. Check the condition of the tread. If it is deformed or too worn, change the tyre.
2. Removes bits, stones or any other foreign matter which is trapped between the lugs of the treads.
3. Check that the tread and the sides of the tyres are not cracked; split of otherwise damaged.
4. Verify that there is no loss of air or, in the case of ballasting, no loss of water from the valve.

EXCESSIVE WEAR

In case of excessive wear of tyres work in conformity with the following table:

Fault	Probable cause	Corrective action
 1067-118 Shoulders worn	Insufficient inflation pressure (rapid wear of treads threads)	Measure and regulate the pressure
 1067-119 Irregular wear Circumference slits of the front bars	Tyre too old Too slippery when ploughing	Increase inflation pressure (within given limits) Ballast within the load limits allowed for tyres
 1067-120 Tread threads worn in the middle	Too much inflation	Measure & regulate the pressure

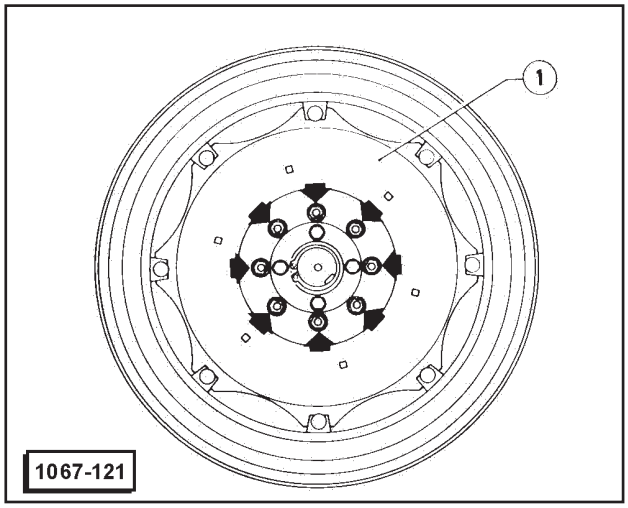
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DISMOUNTING AND REMOUNTING OF WHEELS

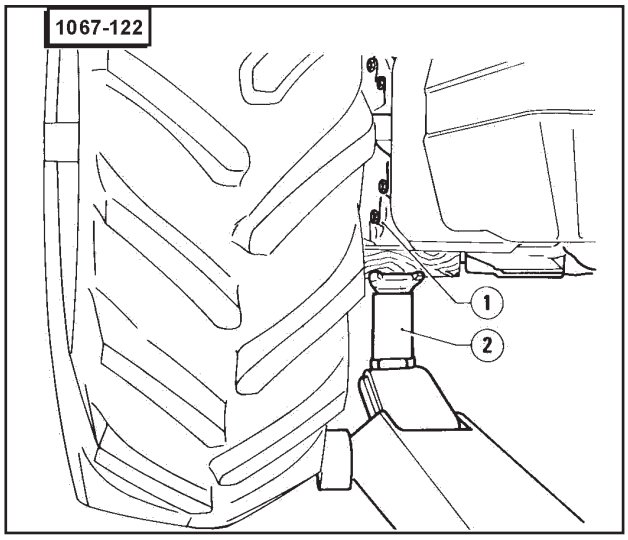
WARNING
To carry out the following operations it is advisable to have two operators, necessary in any case when working on the back wheels.

1. Park the vehicle on the flat with the handbrake on.
2. Using a spanner with a long handle, loosen the eight nuts fixing the wheel **1**.



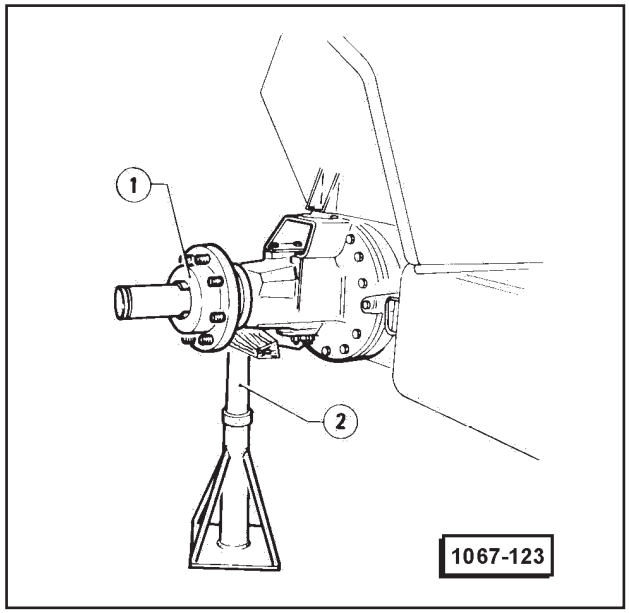
1 - Wheel

3. Working on the back wheel, lift the wheel with the help of a chain to the necessary height.
4. Position a wheel jack **2** with a block of wood placed between it and the wheel, under the front support if you are working on the front panel, and jack up the vehicle.



1 - Rear support
2 - Wheel jack

5. Place a safety tripod **2** with a block of wood placed between it and the wheel, under the back support **1** or under the front support and than take the wheel off the hub and lower the hoist.



1 - Back support
2 - Safety tripod

CAUTION
When working on the back wheel keep the chain pulled tight during the removal of the wheel so as to avoid it falling. When working on front wheels, even though they are smaller, be extremely careful during their removal especially if you are not using any hoisting.

6. Proceed with the remounting of the wheel working in the reverse order taking care to tighten the eight fixing nuts properly.

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COMPLETE CABINE

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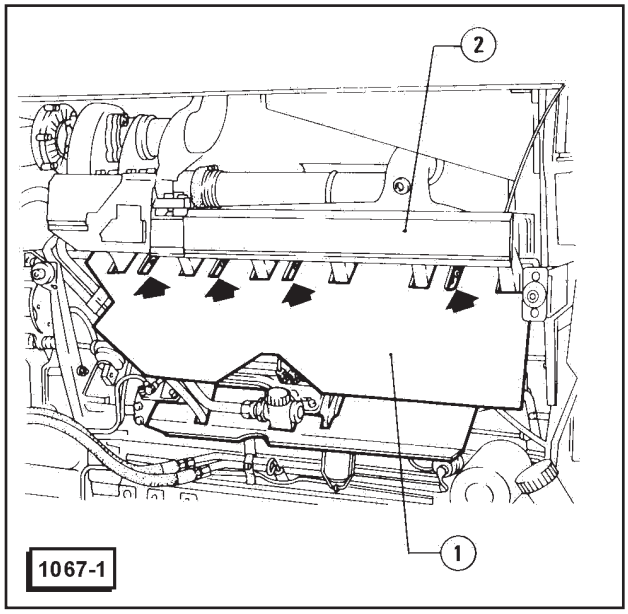
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COMPLETE CABINE

DISMOUNTING

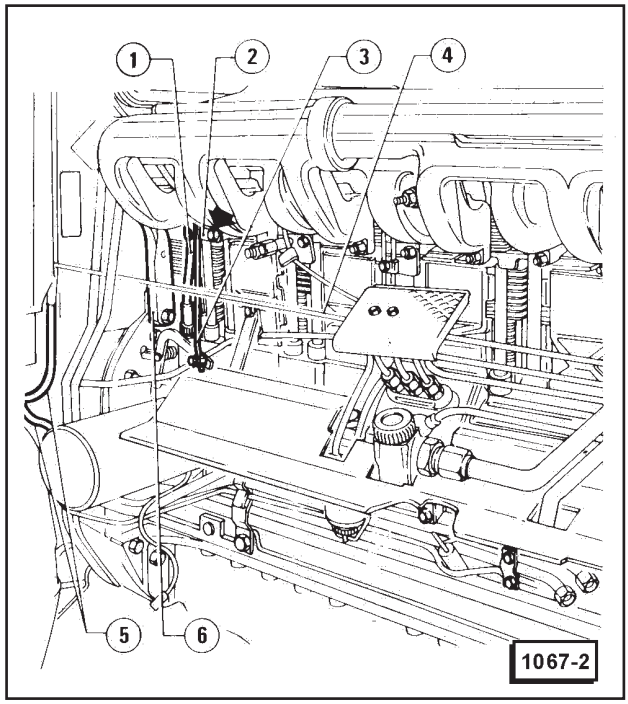
PRELIMINARY OPERATION

Operating from the right side, proceed with the dismounting as follows:
1. Unloosen the three fastening nuts from the guide vane of the engine side hoods and remove.
2. Separate the battery terminals.
3. Unscrew the four fastening nuts of the spoiler **1** placed on the right side and remove together with the exhaust manifold guard **2**.



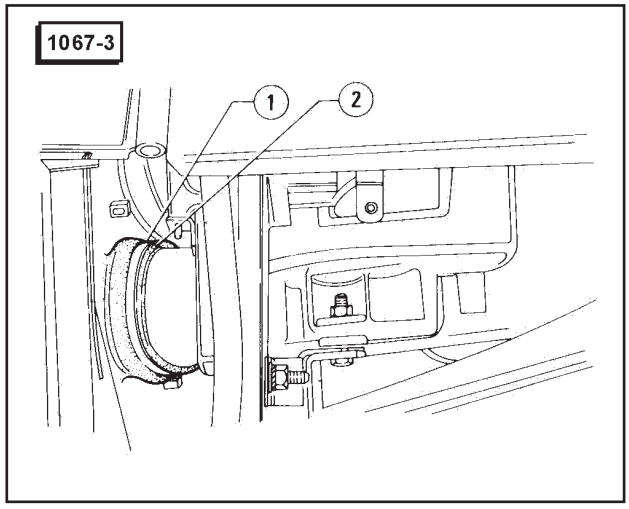
1 - Spoiler
2 - Exhaust manifold

4. Unscrew the fastening nuts of the pilot engine **2**, the fastening nut of the stop engine cable **3** and the nut of the cable **1** of the speedometer and remove them.
5. Unscrew the fittings of the two brake circuit flexible tubes **5**.
6. Unloosen the two fastening screws (on both sides) of the panel **6** placed between the engine and cabin.
7. Disconnect from the rear the accelerator control rod **4** from the relative control lever, extracting the fastening split pin.



1 - Speedometer cable
2 - Pilot engine
3 - Stop engine cable
4 - Accelerator
5 - Brake circuit pipe fittings
6 - Panel

8. Disconnect, on both sides, the fastening clamps **1** of the conditioner-heater unit of the cab.
9. Trig the air conveyor union **2** of the cab.

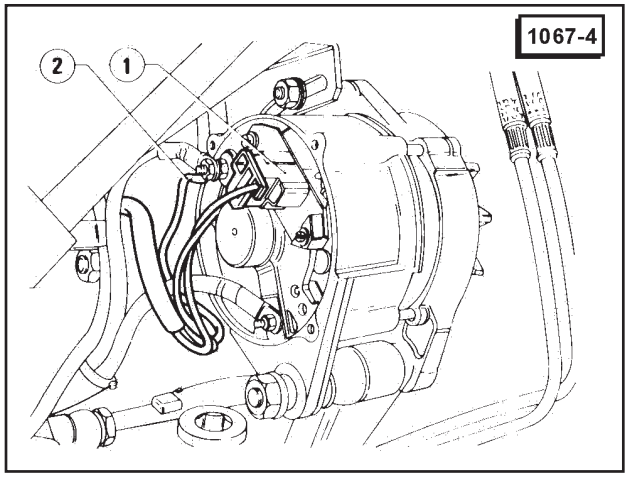


1 - Clamp
2 - Air conveyor union

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10. Remove from the alternator of the heating system, the multiple plug **1** and the cable **2**.

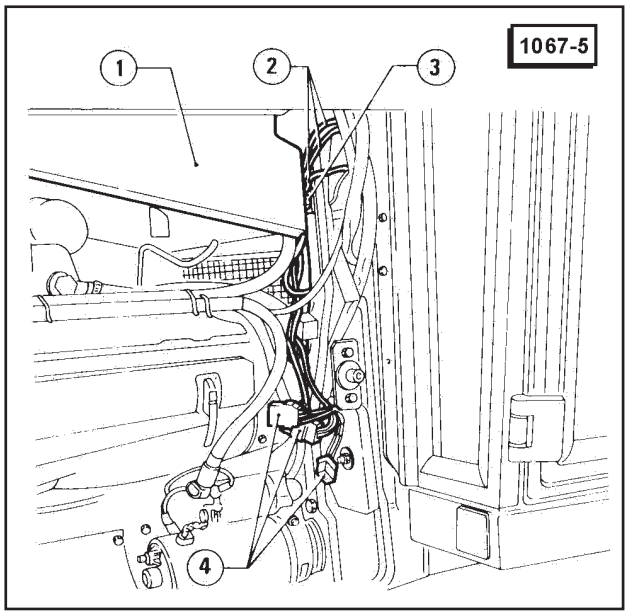


1 - Multiple plug
2 - Cable

Working on the left side, proceed with the dismountings as follows:
1. Unloosen the three fastening nuts from the guide vane of the engine side hoods and remove.
2. Unloosen the five fastening screws and remove the thermoprotective panel **1** of the heater.
3. Disconnect the connectors **4** of the electric circuit, unscrew the nut **3** and remove the earth cables **2.**

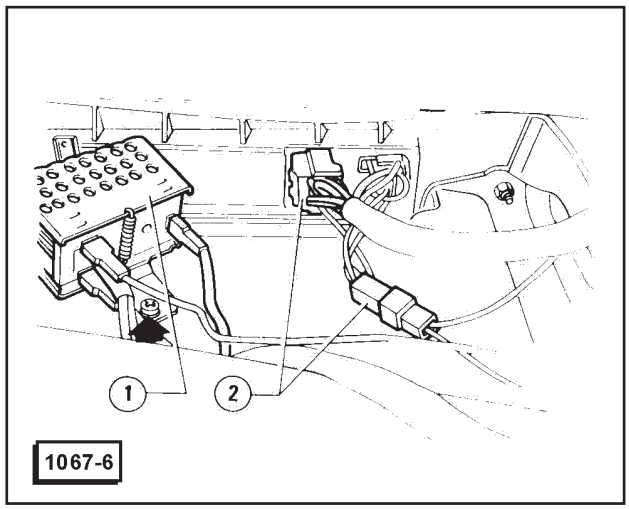
NOTE
Disengage the cables from the fastening clamp.

4. Disconnect all the electric contacts of the starter motor.



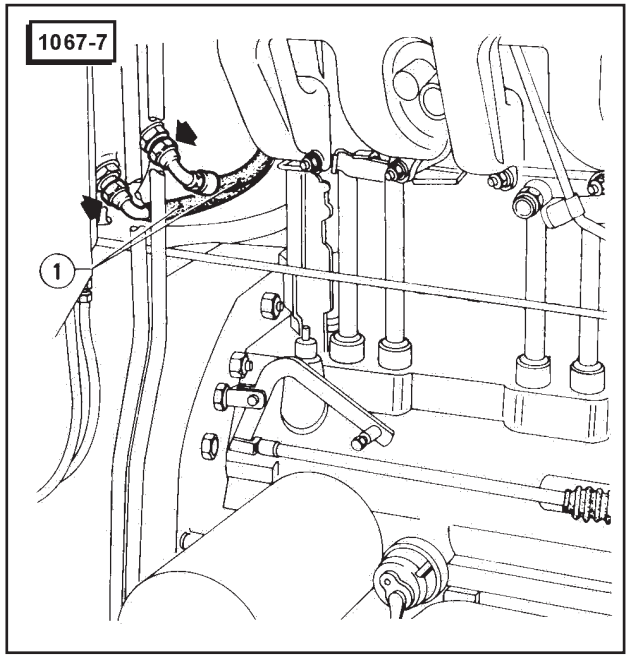
1 - Thermoprotective panel
2 - Earth cables
3 - Nut
4 - Connectors

5. Disconnect the two connectors **2** and Unloosen the fixing screw from the resistance and remove together with the electric cables **1**.



1 - Resistance
2 - Connectors

6. Cut the cable fastening clamps and take off the cables from the alternator.
7. Proceed with the removal of the upper hood (see: Hoods - Upper Hood - Dismounting and Installation).
8. Drain the oil from the steering system (see: Hydrostatic Steering - Complete Hydraulic Circuit - Oil Draining).
9. Unscrew the fittings of the four hydro steering pipes **1** (of which only two are visible in the diagram) positioned at the centre of the front cab bulkhead.

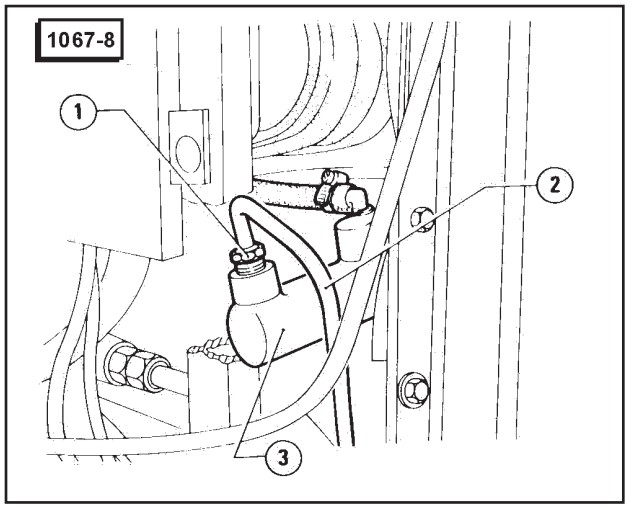


1 - Hydro steering pipes

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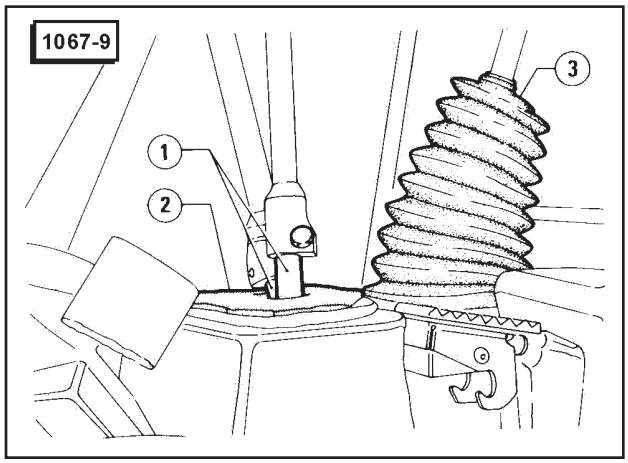
10. Unscrew the fitting **1** and remove the pipe **2** from the clutch pump **3**.



1 - Fitting
2 - Clutch control circuit pipe
3 - Clutch pump

GEAR ENGAGEMENT LEVER

1. Remove the bellows **3** from the gear engagement lever, taking off from their seats and unscrew the fixing screw of the lever to the gear sector **1**.
2. Remove the two sound proofing panels **2** placed under the gear level.

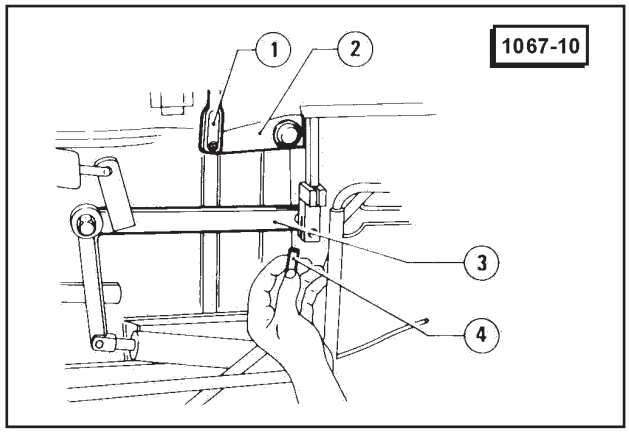


1 - Gear selector
2 - Sound proofing panels
3 - Rubber bellows

LOCKING LEVERAGE DIFFERENTIAL AND P.T.O.

CAUTION
To be avoided, during the remounting, the leverage adjustment, disconnect these without touching the adjustment nuts.

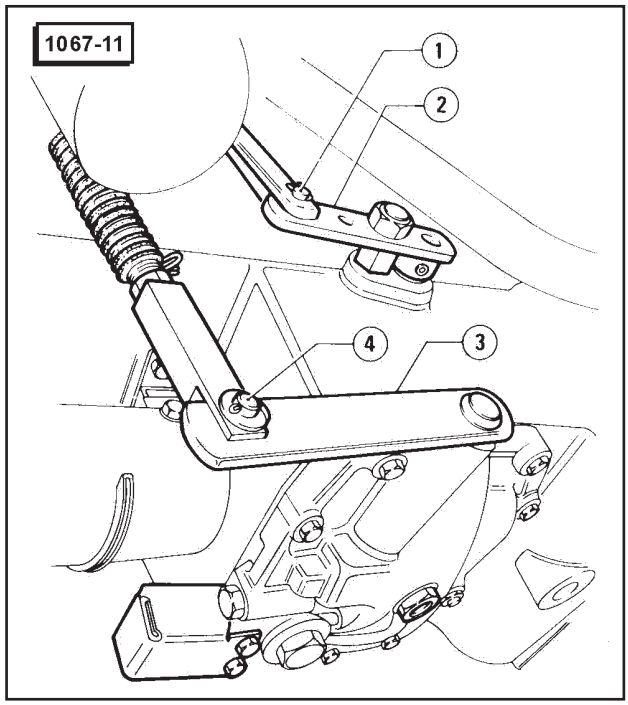
1. Remove the fastening split pin of the pivot **4** slip off the pivot and disconnect the differential lock lever **3**.
2. Open and extract the safety fastener **1** and disconnect the engagement lever.



1 - Safety fastener
2 - P.T.O. control lever
3 - Differential lock control lever
4 - Pivot

DOUBLE TRACTION ENGAGEMENT LEVERAGE AND PARKING BRAKE

1. Take off the split pin, extract the pivot **4** and disconnect from the left side the parking brake control lever 3.
2. Take off the split pin, extract the pivot **1** and disconnect the double traction control lever **2.**



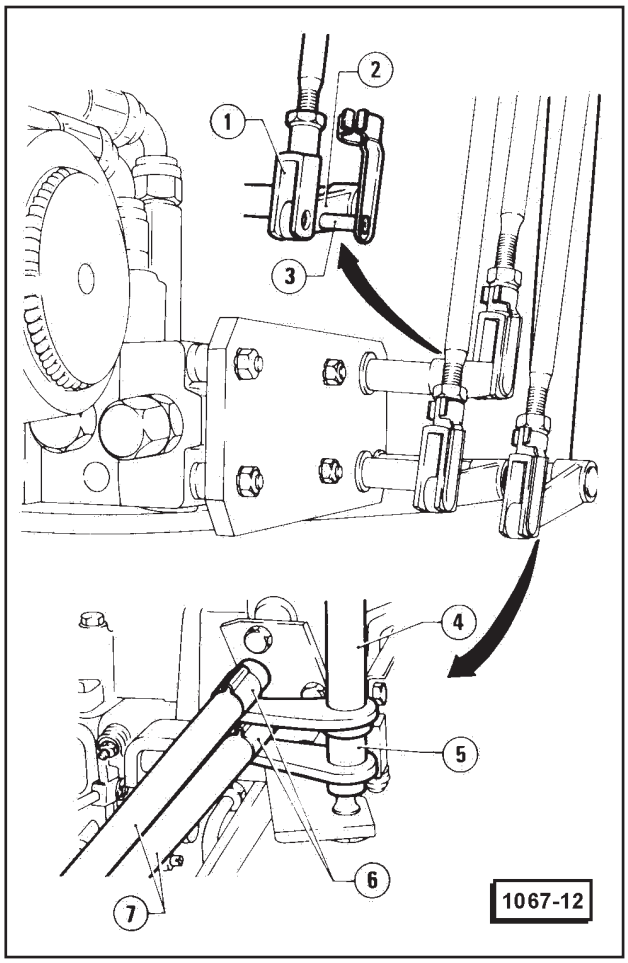
1 - Pivot
2 - Double traction control lever
3 - Parking brake control lever
4 - Pivot

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AUXILIARY DISTRIBUTOR TIE ROD AND HYDRAULIC HOISTER TIE ROD

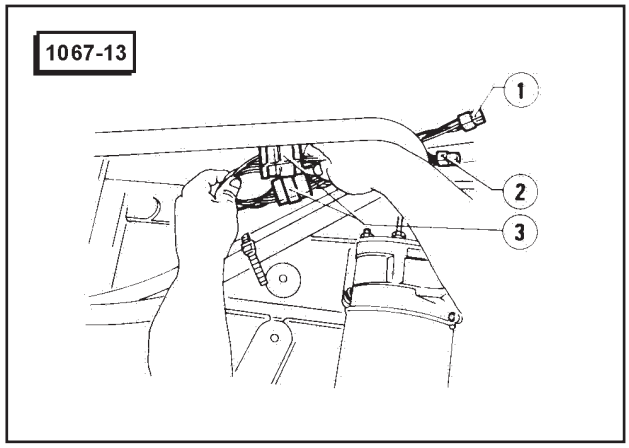
1. Open and extract the three fasteners **3** and disconnect the three tie rods **1** from the lever **2**, to the right of the lifting housing.
2. Extract the two clips **6** and disconnect the two lifter control rods **7** from the shafts **4** and **5**.



1 - Auxiliary distributor tie rod
2 - Lever
3 - Safety fastener
4 - Outside shaft
5 - Inside shaft
6 - Metal clip
7 - Lifter control rod

ELECTRICAL CONNECTION

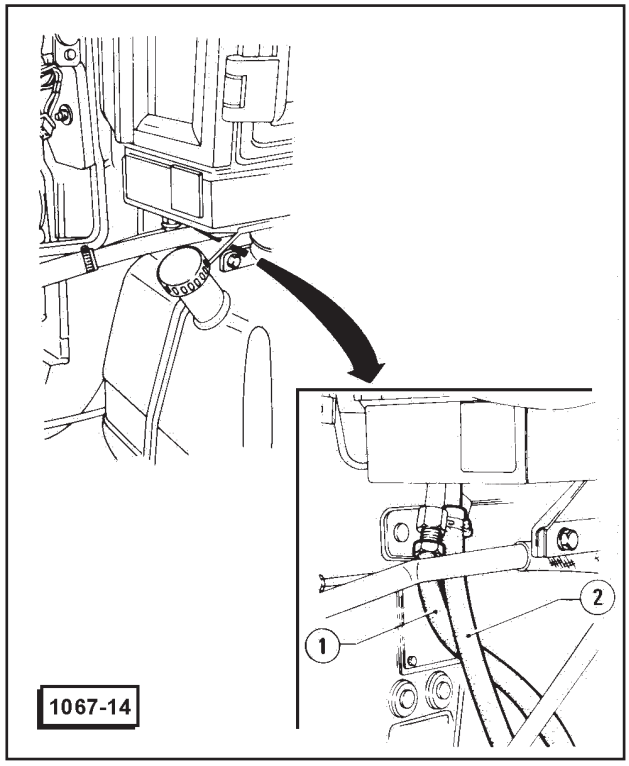
1. Disconnect the connects **1** and **2** from the parking brake warning light and the double traction warning light.
2. Disconnect the two big connectors **3** from the rear end of the vehicle.



1 - Parking brake warning light connector
2 - Double traction warning light connector
3 - Rear connector

HVDROSTATIC STEERING CIRCUIT PIPE

1. Disconnect on the left side, unscrewing the fitting, the delivery pipe **1** of the hydrostatic steerage.
2. Unloosen the clamp and extract the hydrostatic steerage oil return pipe **2.**



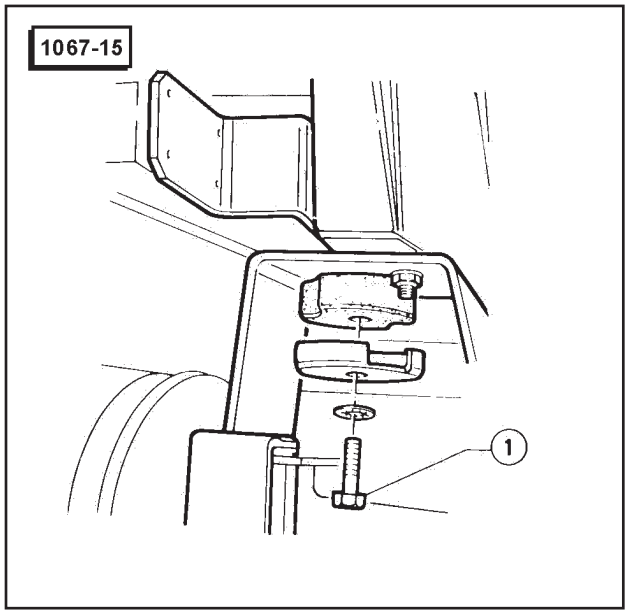
1 - Oil delivery pipe
2 - Oil return pipe

CAB REMOVAL

1. Unscrew and remove the fastening bolts **1** of the four silent blocks that support the cab.

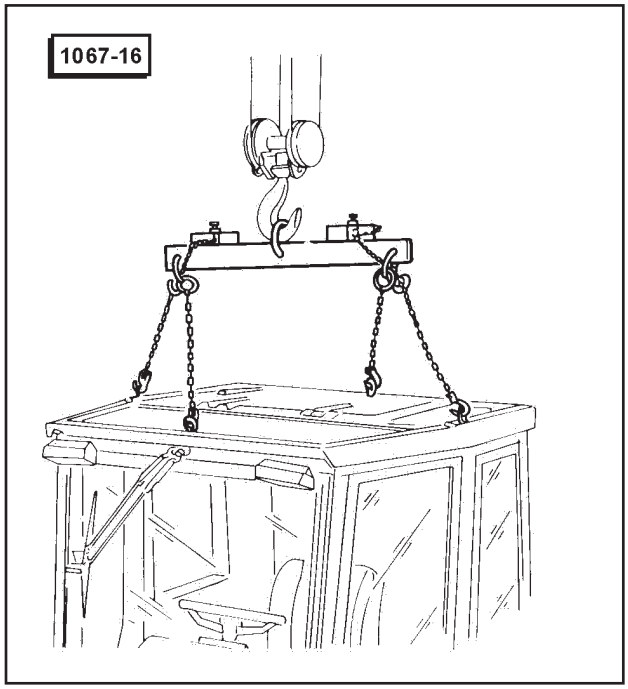
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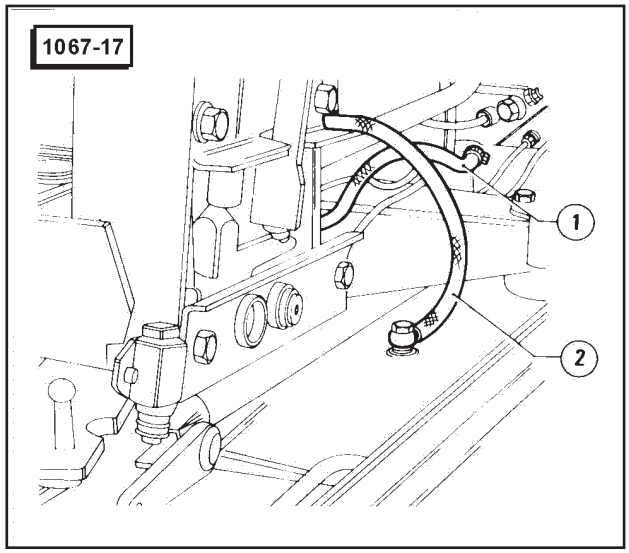


1 - Silent block fastening bolt

2. Remove the tour fastening screws (**Ø12 mm**; 0.47 in) of the root, and screw in their place tour eyebolts then using a spring equalizing rocker arm and a hoister, lift with precaution the cab about **10 cm** (3.9 in).



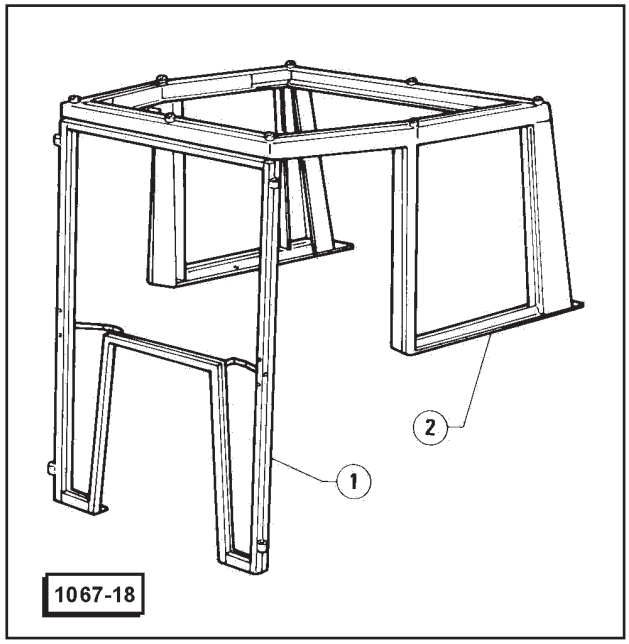
3. Disconnect on the right side, the electric cables of the fuel level indicator, the fuel reserve warning light and the stop light.
4. Loosen the clip and remove the fuel supply pipe **1**, the fuel recovery pipe **2** from the injectors and the pump injector, and the fuel air vapor pipe.



1 - Fuel supply pipe
2 - Fuel recovery pipe

5. Remove with caution the cab, checking that no component hinders the removal.

CAUTION
Do not carry out any repairs on the components illustrated in the diagram, as they are subject to homologation.



1 - Cab front structure
2 - Cab frame

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INSTALLATION

1. Position the cab above the vehicle about 10 cm (3.9 in), so that the fastening points of the silent-block are aligned.
2. Recover, working in reverse order to that of the removal, the following components:
— Fuel supply pipes
— Fuel recovery pipe of the injectors and the pump injector
— Fuel air vapor pipe
— Electric cables of the fuel level indicator, fuel reserve indicator and the stop indication light.

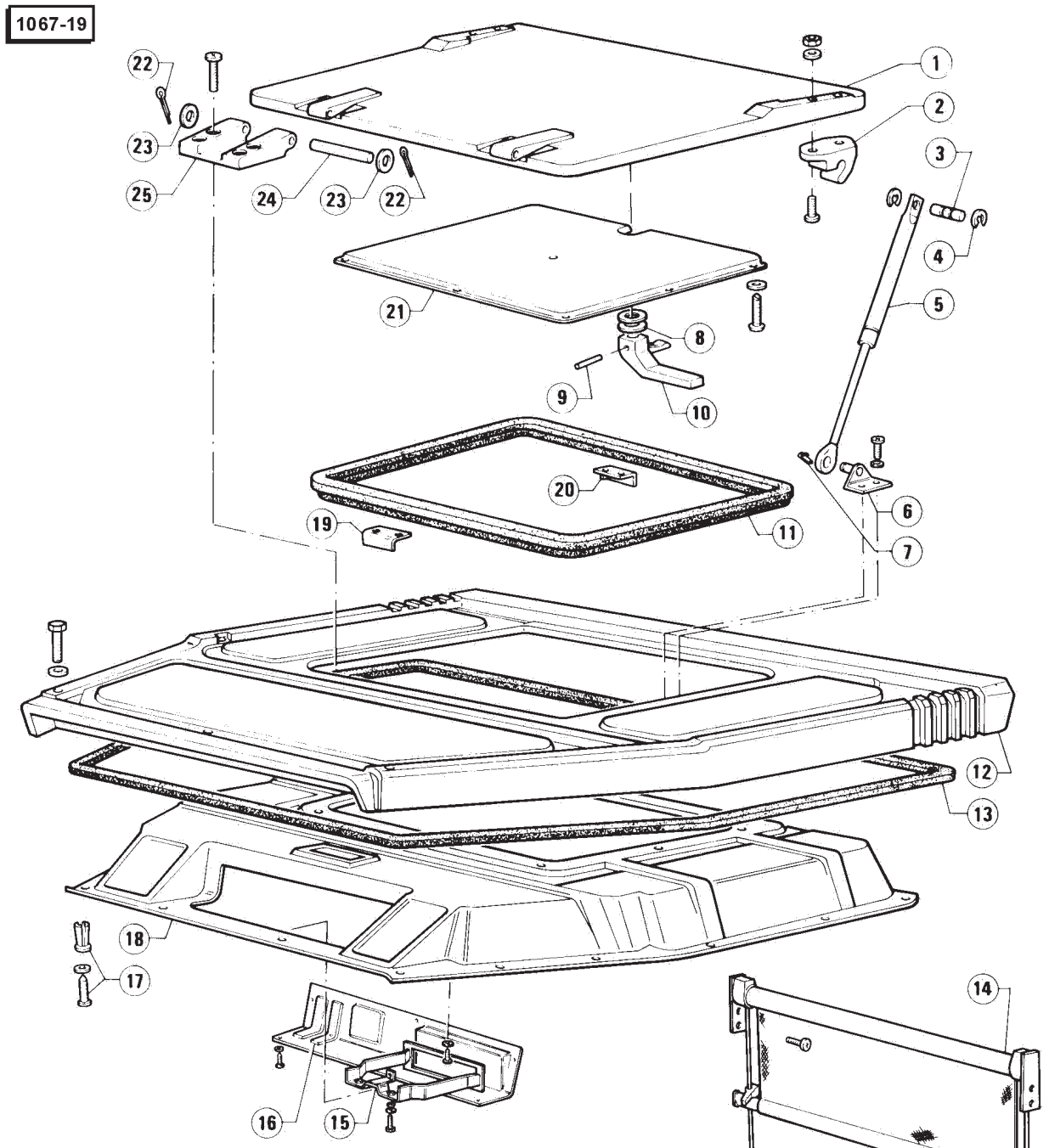
3. Leave the cab on the silent-block, screw the fastening bolt of the silent block and working in reverse order to that of the removal, fasten the following components:
— Hydrostatic steering circuit oil return and oil recovery pipes.
— Parking brake warning light and double traction electric cables.
— Connections on the rear end of the vehicle.
— Hydraulic lifting control leverage.
— Auxiliary hydraulic distributor leverage
— Double traction engagement leverage
— Parking brake leverage.
— P.T.O. control leverage.
— Differential blockage control leverage.
— Gear engagement lever.
— Clutch control circuit pipe.
— Hydrostatic gear circuit pipes.
— Starter motor electric cable.
— Connector on the cab front side.
— Earth cables.
— Heater resistance and relative cables.
— Heather alternator electric cable
— Thermo protective side panels.
— Air conveyor union
— Accelerator control leverage.
— Bulkhead between engine and cab.
— Brake circuit pipes.
— Engine stop cable.
— Speedometer cable.
— Air deflector.
— Battery terminals.
— Hood sides.

4. Remove the spring equalizing rocker-arm, unscrew the eyebolt and rescrew the screws on the cab roof, and seal with a suitable silicone product to avoid possible infiltration to the under structure.
5. Proceed with the air bleeding of the clutch hydraulic system (see: Clutch - Gear Clutch - Hydraulic System Bleeding) of the hydraulic brake system (see: Brakes Hydraulic System Air Bleeding) and of the hydrostatic steering system (see: Hydrostatic Steering - Complete hydraulic Circuit - Deareation).

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CAB ROOF AND INSIDE ROOF TRIM



1 - Sun roof
2 - Fork
3 - Pivot
4 - Retaining ring
5 - Shock absorber
6 - Bracket
7 - Clinch
8 - Shoulder ring
9 - Plug
10 - Sunroof lock handle
11 - Sunroof canopy gasket
12 - Cab roof
13 - Cab roof gasket
14 - Sun shade
15 - Radio socket bracket
16 - Consol
17 - Screw anchor
18 - Ceiling cab trim
19 - Retainer block
20 - Connecting link
21 - Sunroof trim
22 - Split pin
23 - Washer
24 - Pivot
25 - Hinge

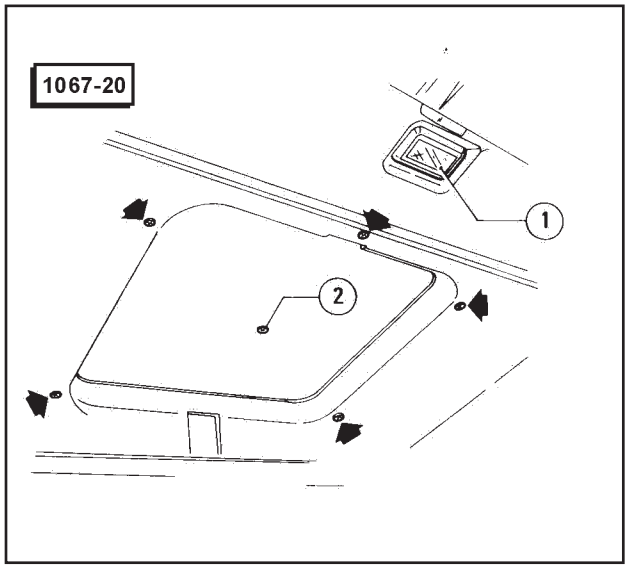
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CAB ROOF

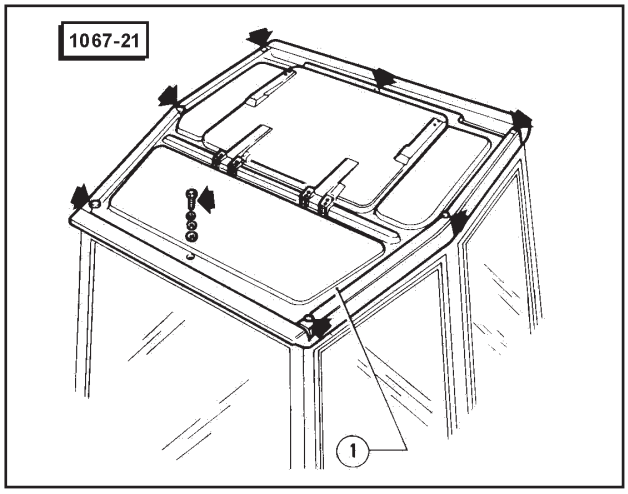
REMOVAL AND INSTALLATION

1. If the cab has a sunroof, with reference to the previous diagram, remove the retainer block **19**, the connecting link **20**, and the sunroof gasket **11** inserted by pressure.
2. With reference to the following diagram, remove the compartment glass ceiling bowl **1**, (see: Electrical System – Internal lighting - Ceiling bowl).
3. Unloosen the screws as shown in the diagram and remove the cab roof from the sunroof trim (unloosen the screws **2** only when the cab is fitted with a sunroof).



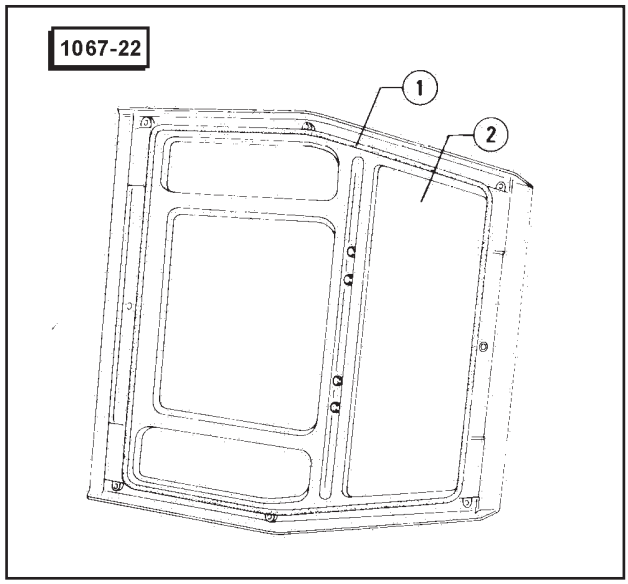
1 - Compartment ceiling bowl
2 - Screw

4. Unloosen the screws shown in the diagram and remove the cab roof.



1 - Cab roof

5. Remove the gasket **1** from the cab roof **2** inserted by pressure, being careful to not deform the metal insert in case of reuse.



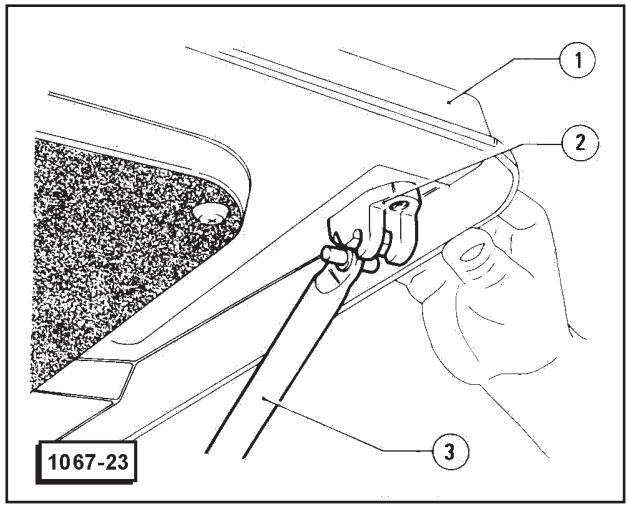
1 - Cab roof gasket
2 - Cab roof

6. Remount the cab roof working in reverse order to that of the removal, taking care to apply a suitable silicon product to the fastening screws of the cab roof to avoid infiltration to the understructure.

SUNROOF

REMOVAL AND INSTALLATION

1. Unhook the shock absorbers **3** from the fork **2** pushing upwards the sunroof **1**.

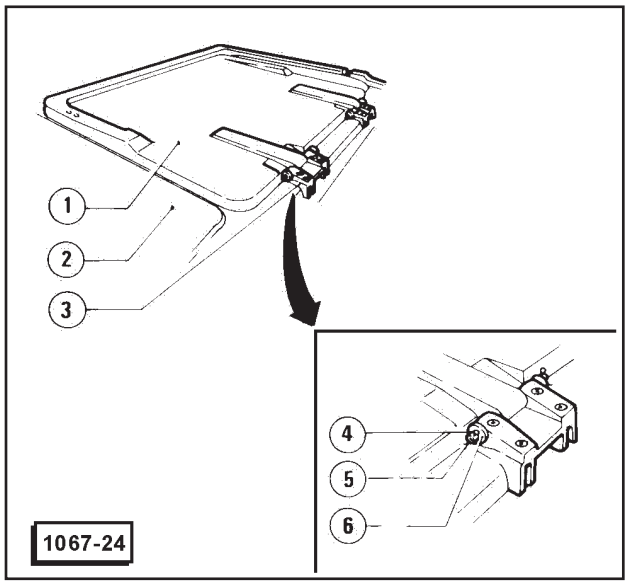


1 - Sunroof
2 - Fork
3 - Shock absorbers

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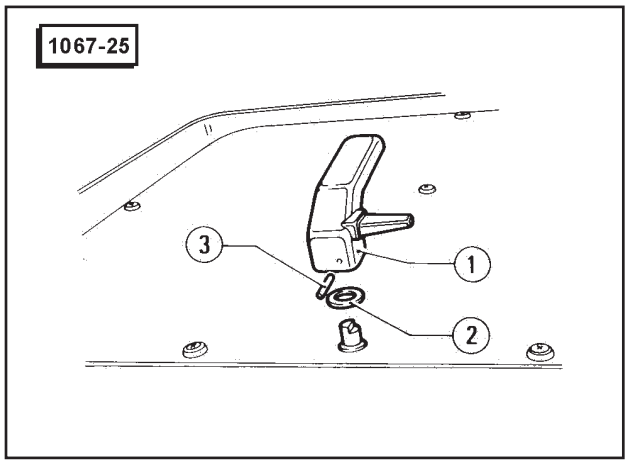
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2. Unloosen the screws indicated in the diagram and remove the sunroof **1** from the cab roof **2**.
3. Remove the split pin **4**, slip off the pivot **5** together with the washer **6** and remove the hinge **3**.



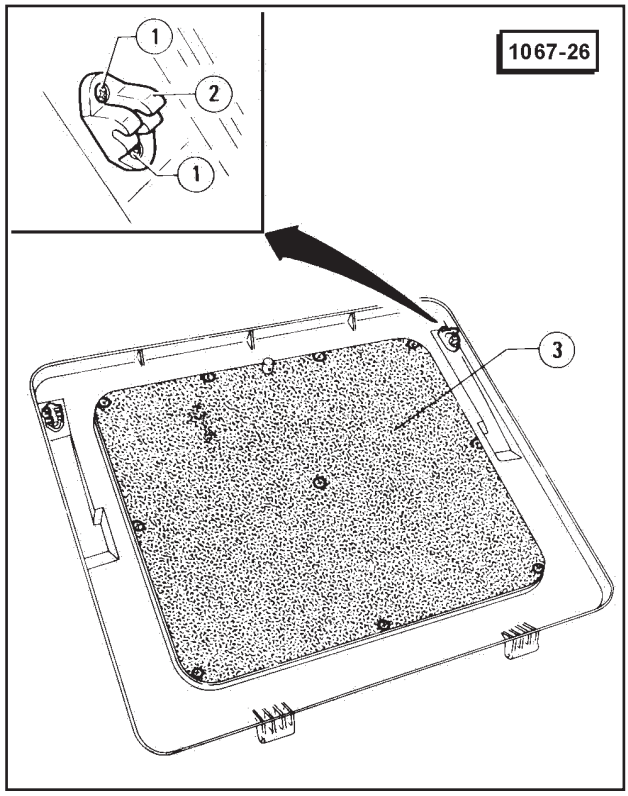
1 - Sunroof
2 - Cab roof
3 - Hinge
4 - Split pin
5 - Pivot
6 - Washer

4. Extract the plug **3** and remove the handle **1** together with the shoulder ring **2.**



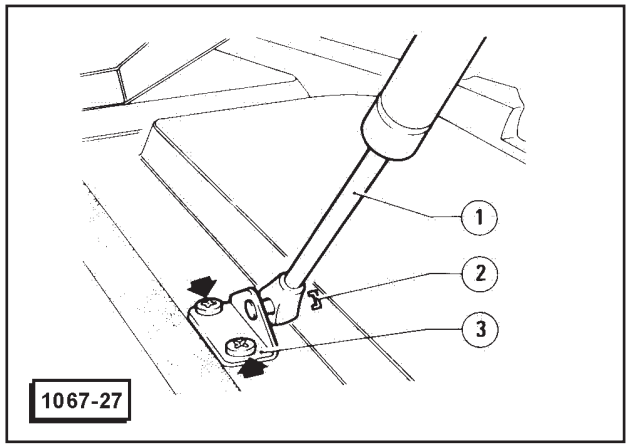
1 - Sunroof lock handle
2 - Plastic shoulder ring
3 - Plug

5. Unloosen the screws **1**, remove the fork **2**, then unloosen the screws shown in the diagram fastening the trim **3** to the canopy and remove.



1 - Screws
2 - Fork
3 - Sunroof trim

6. Remove the clinch **2** and unhook the shock absorbers **1** from the bracket **3**.
7. Unloosen the screw shown in the diagram and remove the bracket.

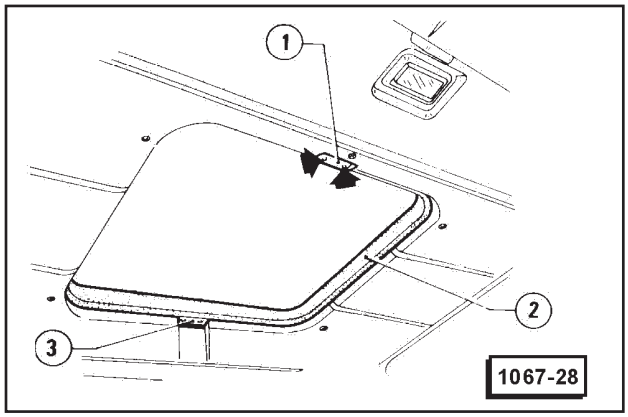


1 - Shock absorber
2 - Clinch
3 - Bracket

8. Unloosen the fastening screws **1** of the connecting link of the retaining block **3** and remove.
9. Remove the gasket **2**, paying attention not to deform the metal insert in case of reuse.

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1 - Connecting link
2 - Gasket
3 - Retaining block

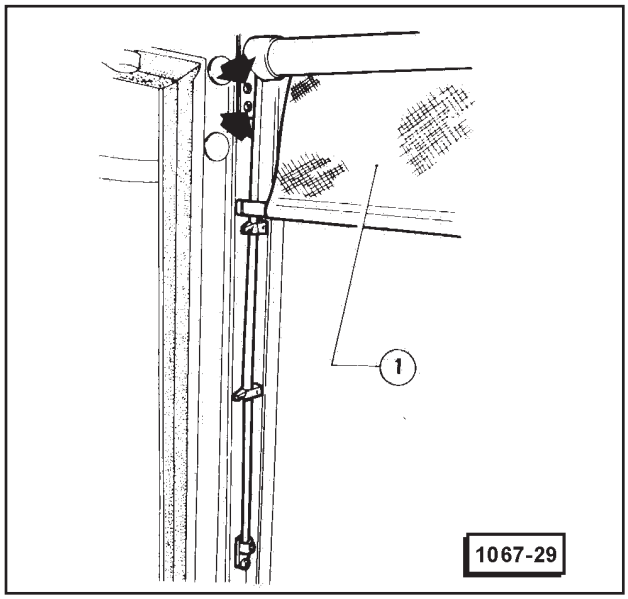
10. Refit the sunroof, working in reverse order to that of the dismounting and according to the following specifications:
— Lubricate with the specific grease the hinge, the pivot of the lock handle and shock absorber attachment points.
— Do not tighten excessively the fastening screws of the roof trim, of the connecting link and the fastening block.

INSIDE ROOF TRIM

REMOVAL AND INSTALLATION

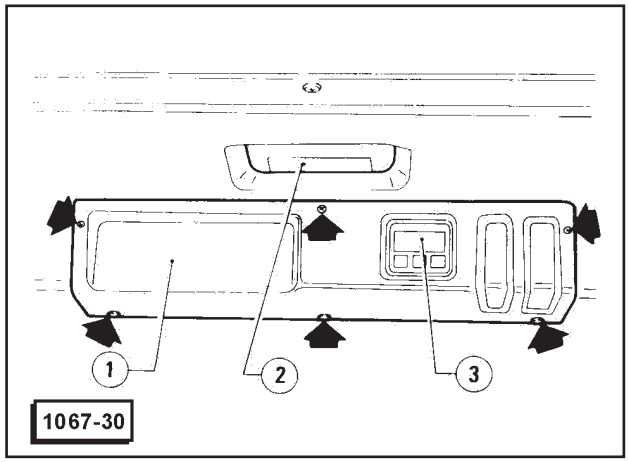
NOTE
If removed, replace always the screw anchors.

1. Unloosen the screws shown in the diagram, fixing the sun shade **1** on both sides of the cab, and remove the shade.



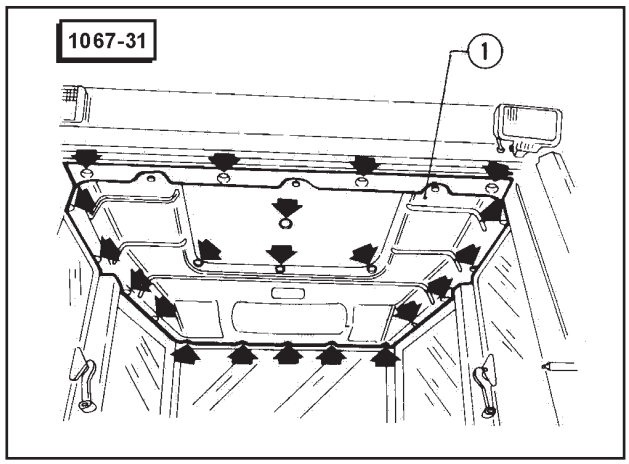
1 - Sun shade

2. Remove the trim from the post (see: Inside Trim Dismounting).
3. Unloosen the screws shown in the diagram and remove the consol **1**, and if present, the digital clock connector **3**.
4. Remove the bowl **2** (see: Electric System - Inside Lighting - Compartment Ceiling Bowl).



1 - Consol
2 - Bowl
3 - Digital clock

5. If the cab is fitted with a sun roof, remove the gasket of the sun roof and the retaining block (see: Sun Roof Dismounting and Installation).
6. Unloosen the screws of the screw anchor shown in the diagram and remove the inside roof trim **1,** paying attention not to deform it.



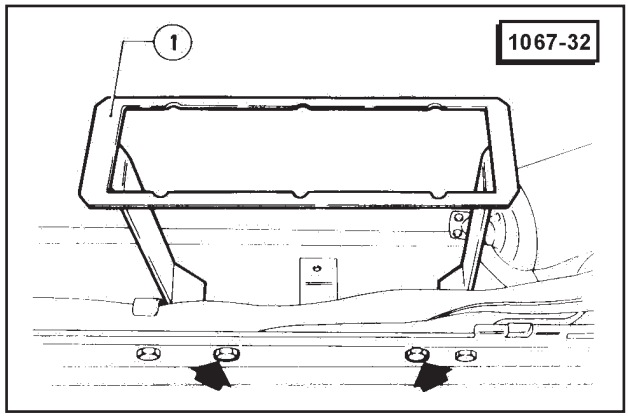
1 - Inside cab roof trim

7. Whenever the tractor is predisposed for the fitting of a radio, unloosen the screws shown in the diagram and remove the radio rack bracket **1**.

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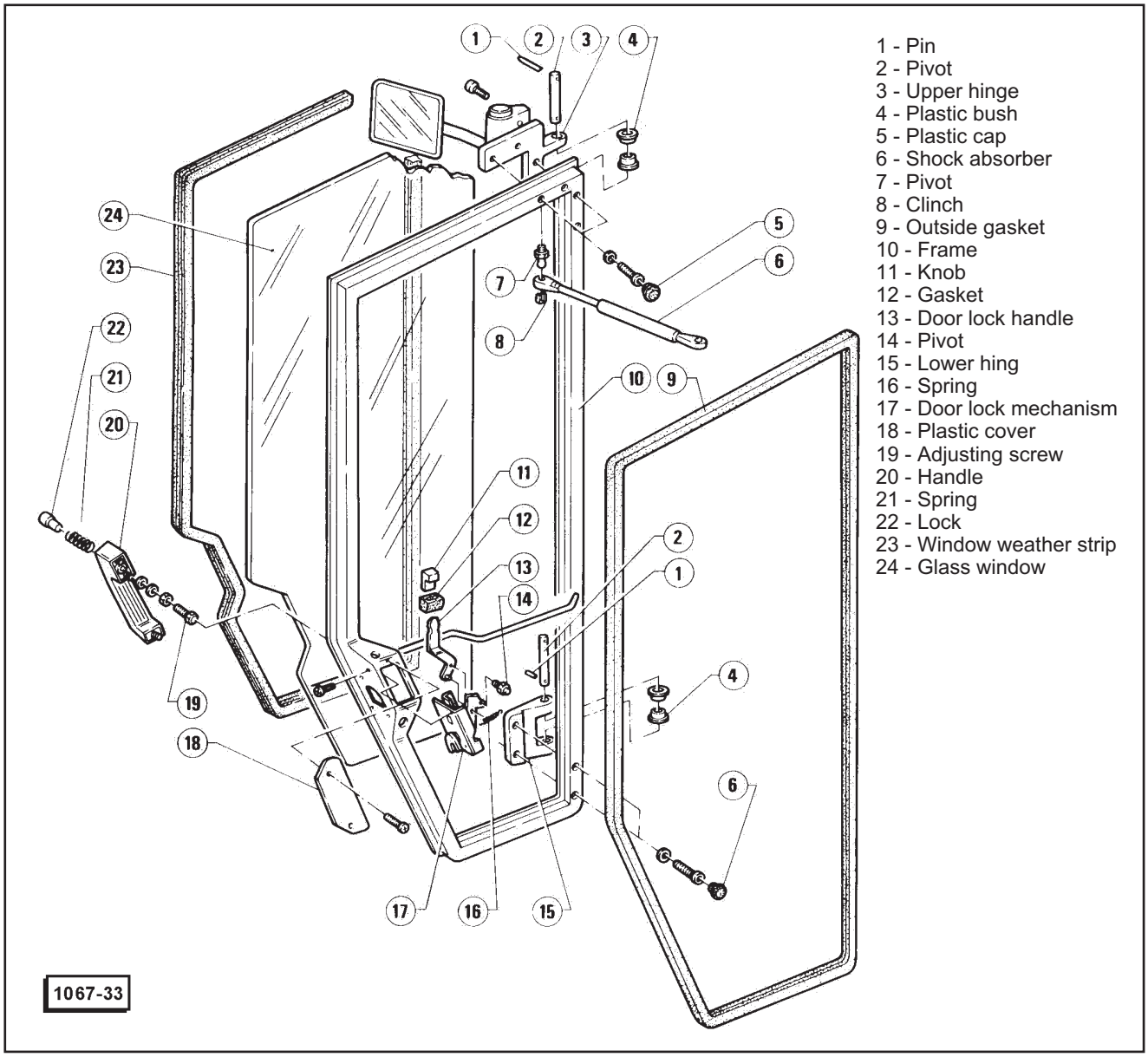
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8. Remount the internal trim working in reverse order to that of the dismounting, taking care not to tighten too much the screws.



1 - Radio rack bracket

DOOR



1 - Pin
2 - Pivot
3 - Upper hinge
4 - Plastic bush
5 - Plastic cap
6 - Shock absorber
7 - Pivot
8 - Clinch
9 - Outside gasket
10 - Frame
11 - Knob
12 - Gasket
13 - Door lock handle
14 - Pivot
15 - Lower hing
16 - Spring
17 - Door lock mechanism
18 - Plastic cover
19 - Adjusting screw
20 - Handle
21 - Spring
22 - Lock
23 - Window weather strip
24 - Glass window

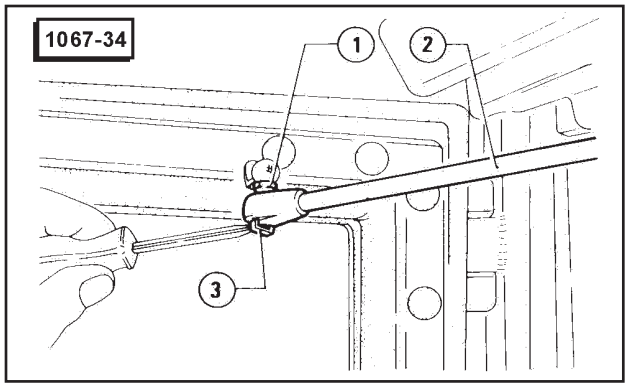
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COMPLETE DOOR

REMOVAL AND INSTALLATION

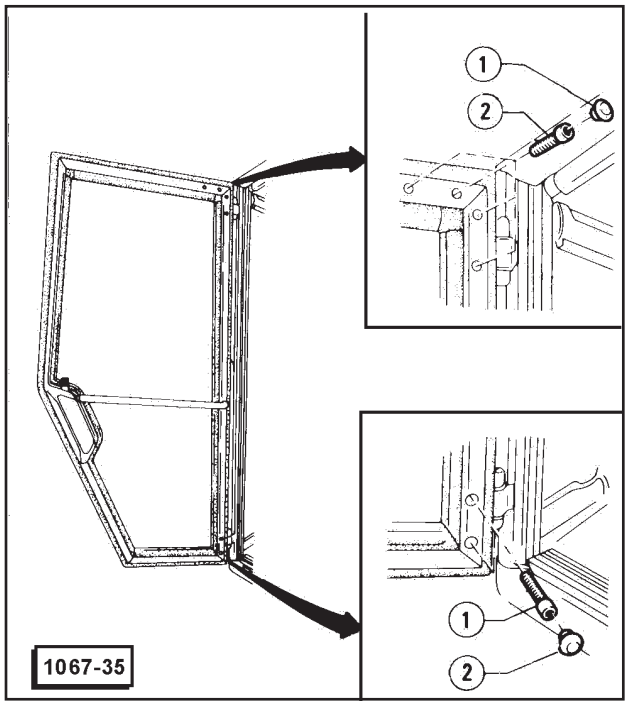
1. Using a screwdriver, remove the plastic clinch **3** and take off the shock absorbers **2** from the pivot **1**.



1 - Pivot
2 - Shock absorbers
3 - Plastic clinch

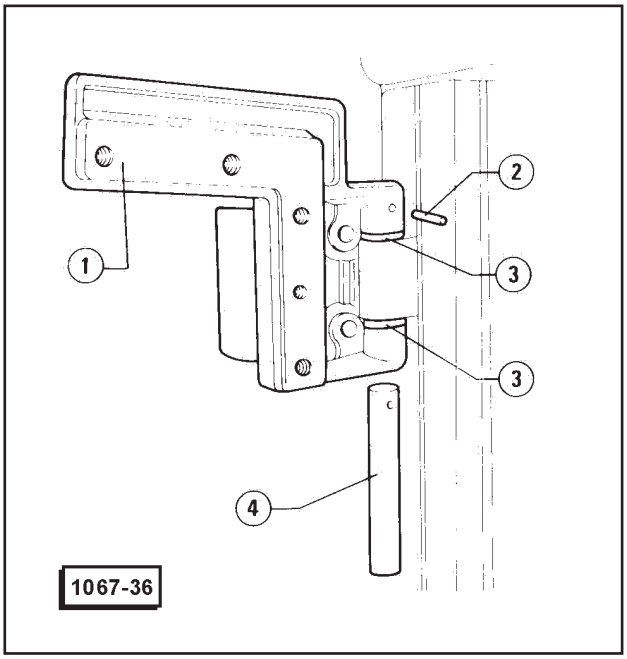
2. Remove the rubber plugs **1**.
3. Hold the door, unloosening the screws **2** that fix it to the hinge and remove them, preferably with the help of a second person.

CAUTION
Take care not to let the screws fall on the inside of the door frame.



1 - Rubber plugs
2 - Screws

4. Remove the rear view mirror (see: Profile of Finishing and External Accessories - Outside Accessories).
5. If necessary, strip the hinge working as follows:
(1) Extract the pin **2** and take off the pivot **4.**
(2) Remove the hinge **1** and take off the bush **3**.



1 - Hinge
2 - Pin
3 - Plastic bush
4 - Pivot

6. Install the door working in reverse order to that of the removal, taking note of the following:
— Lubricate with the specified grease the pivot and bush of the hinge.
— Orientate with a screw driver the pivots of the hinge so as to coincide the pin holes present on the pivots and the hinge.

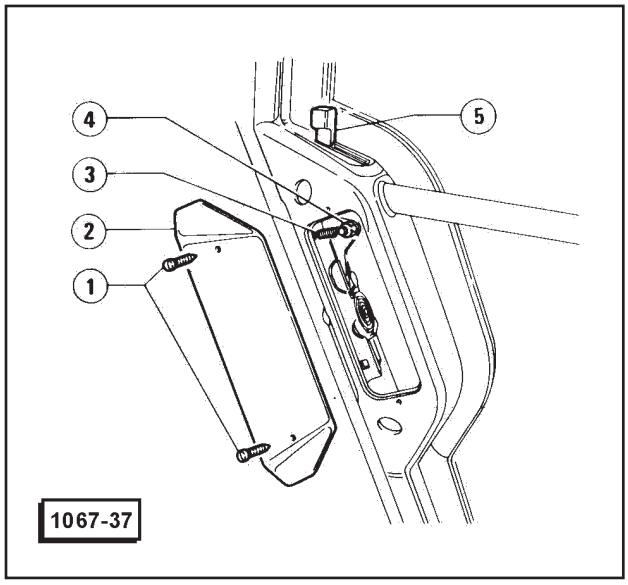
LOCK AND HANDLE

REMOVAL AND INSTALLATION

1. Loosen the screws **1** and remove the plastic cover **2.**
2. Unhook the spring **3** and unscrew the threaded pivot **4.**
3. Extract upwards the lever **5.**

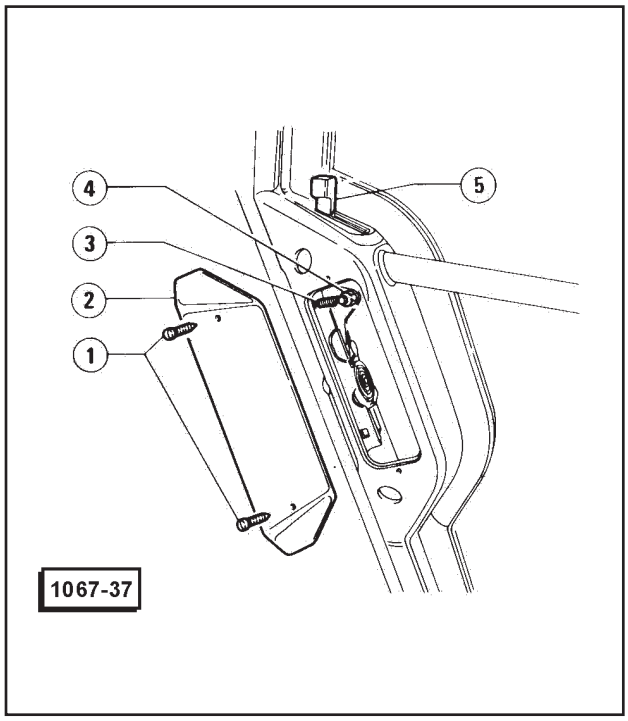
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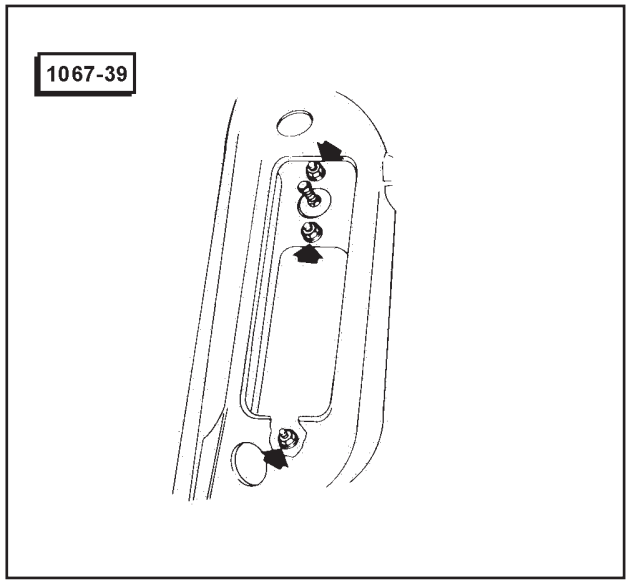
1 - Screws
2 - Plastic cover
3 - Spring
4 - Threaded pivot
5 - Door lock lever

4. Unloosen the fastening screws of the lock mechanism 1 and remove.

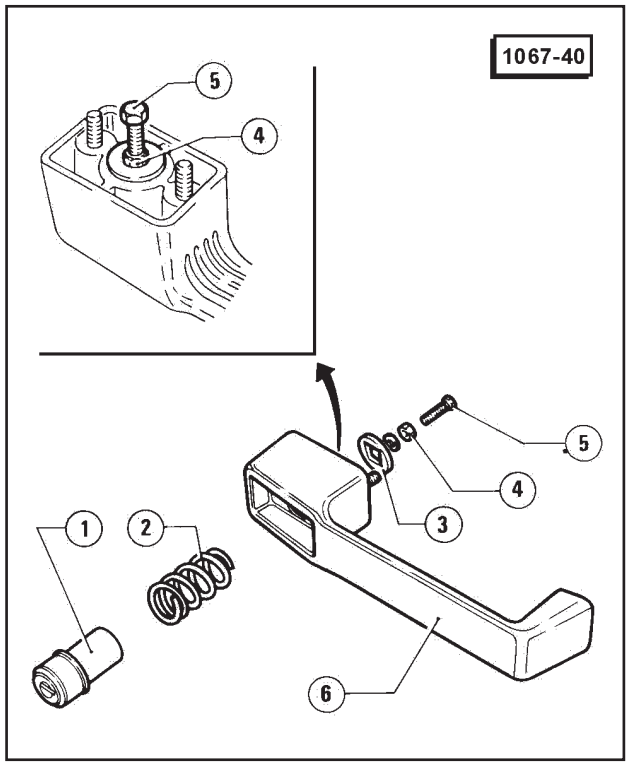


1 - Lock mechanism

5. Unscrew the nuts indicated in the diagram and remove the handle together with the lock block.



6. If necessary, remove the lock block **1** working as follows:
(1) Loosen the lock nut **4**, unloosen the adjusting screw **5** and remove together with the washer and shoulder ring **3**.
(2) Take off the lock block **1** together with the spring **2**.

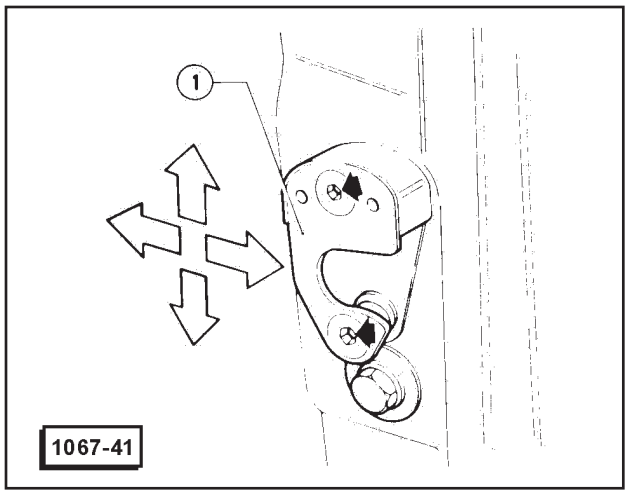


1 - Lock block
2 - Spring
3 - Shoulder ring
4 - Lock nut
5 - Adjusting screw
6 - Handle

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7. Refit the handle and door lock mechanism, working in reverse order to that of the dismounting taking note of the following.
— Lubricate with the specified grease the door lock mechanism.
— If necessary, adjust the run of the lock clamp by way of the adjusting screw and the lock nut.
8. Remounting completed, control the functioning of the door lock mechanism and if necessary, loosen the two fastener adjusting screws **1** and orientate until a perfect closing of the door is made.



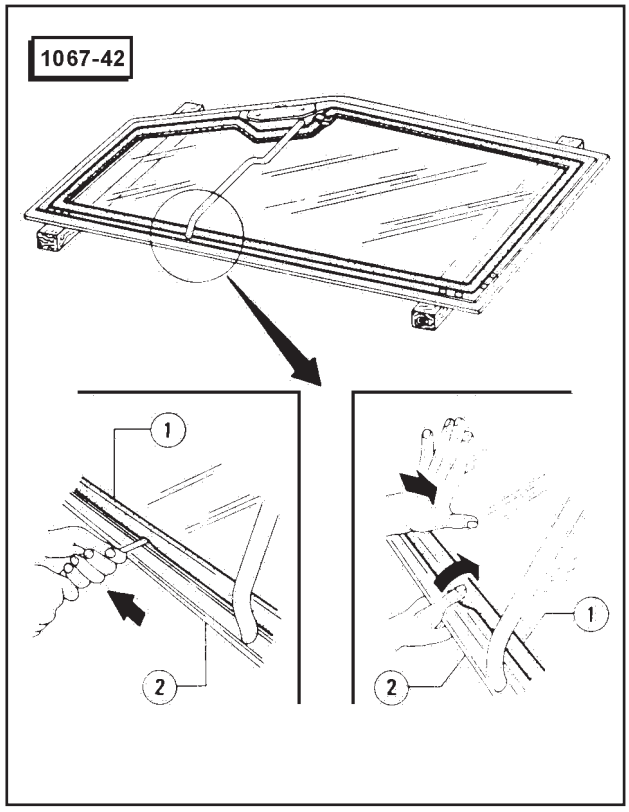
1 - Lock fastener

GLASS AND GASKET

REMOVAL

1. Remove the door (see: Complete Door - Removal and Installation).
2. Position the door horizontally, leaning the outside of the frame on a wooden block.
3. Using a screwdriver, move the weather strip **1** from the edge of the glass unsticking it from the frame **2** in the places where it may have been glued (1st phase).
4. Push the glass downwards (external side of the door) and at the same time take off the weather strip from the metal border of the frame (2nd phase).

CAUTION
Carry out the operation the full perimeter paying attention not to damage the glass especially at the corners. Remove then the glass, together with the weather strip from the frame.



1 - Glass weather strip
2 - Door frame

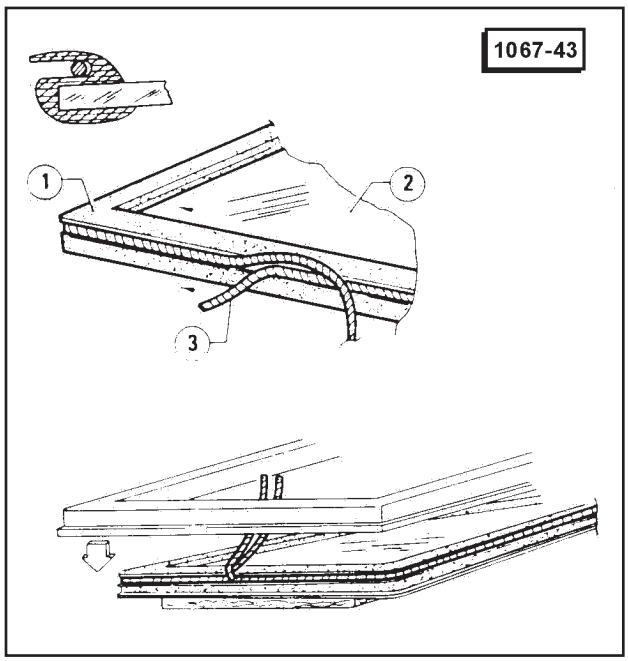
5. Remove the weather strip fixed end mounted on the window taking it off towards the outside.
6. Remove the outside weather strip from the door taking it off towards the outside. If necessary, reuse the weather strip, taking care not to stretch the metal lip insert where the door sheet frame is fixed.

INSTALLATION

1. Insert the weather strip on the glass.
2. Lean the glass complete with weather strip on a level, keeping it lifted with some wooden blocks.
3. Spread the weather strip with non oil y lubricant liquid (e.g. neutral soap and water solution) so as to make the handling of the weather strip easier when inserted on the frame.
4. Place around all the perimeter the weather strip **1**, and in the slot seat of the border of the sheet frame, sheather cable **3**, flexible and quite strong (in hemp or nylon with a diameter of 3 mm; 0.12 in).

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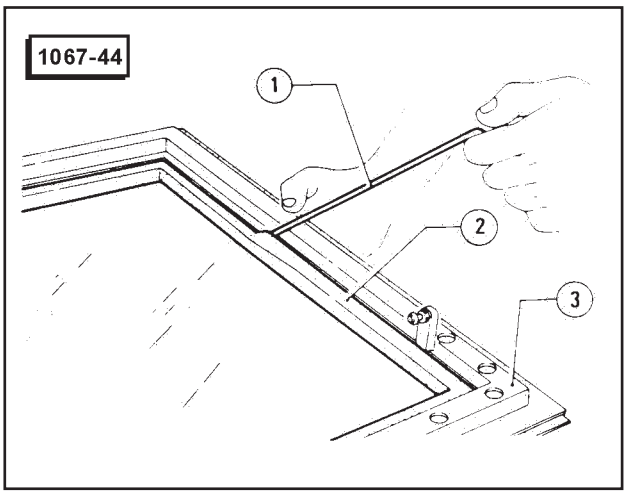
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1 - Weather strip
2 - Glass
3 - Cable

5. Place on top of the glass, the door frame with the external side downwards, taking care to keep together and facing upwards the two ends of the sheathed cable **1**.

6. Pull slowly one end of the cable in order to trig the lip of the weather strip **2** on the border of the sheet frame **3**. Taking care, especially to the glass corners, with the help of a screwdriver, position the weather strip in the positions where it, has not been inserted correctly.



1 - Sheather cable
2 - Weather strip
3 - Frame

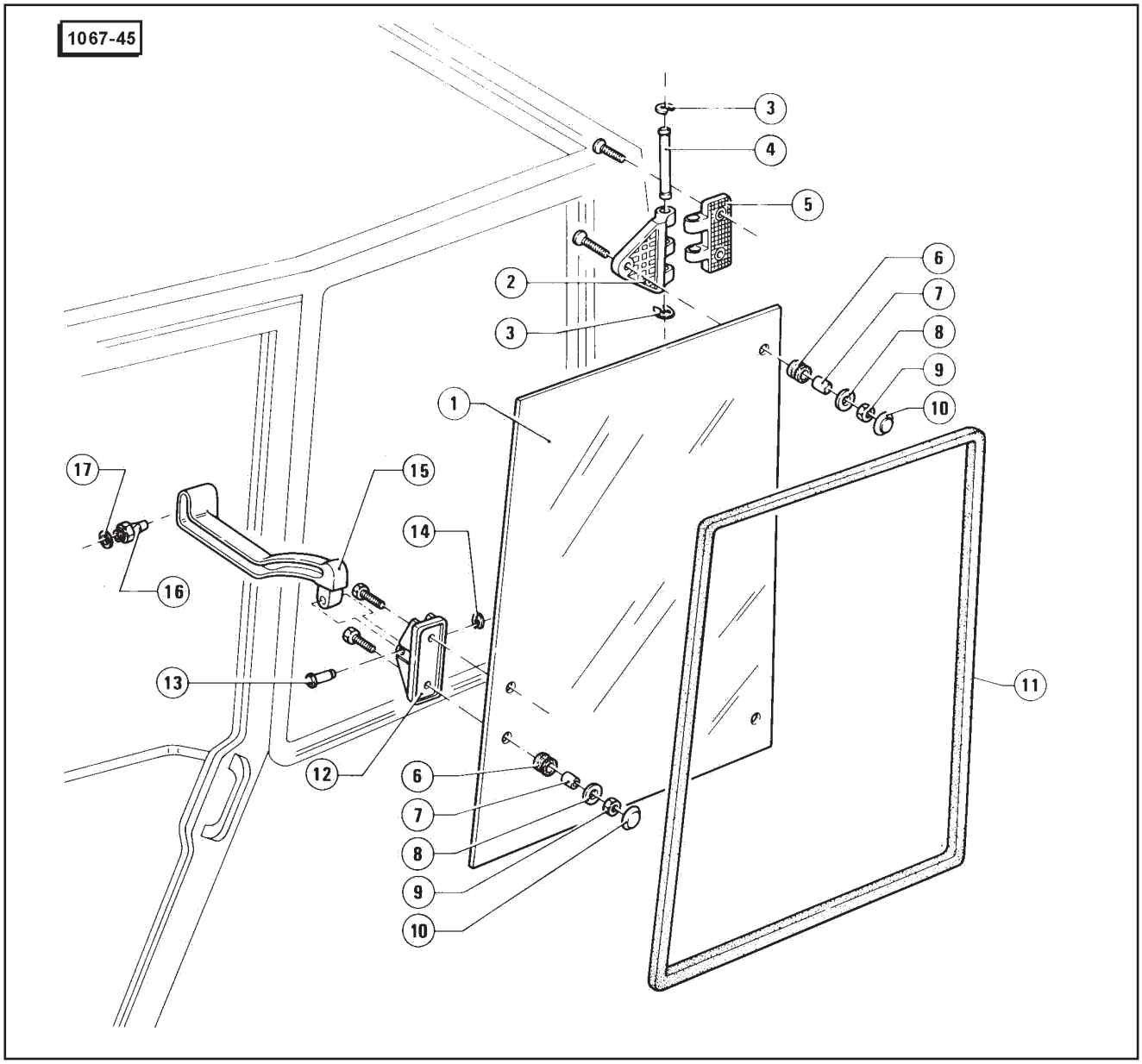
7. Insert the outside weather strip to the door frame, closing the lip with the metal insert on the border of the sheet.

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WINDOWS

SIDE WINDOWS



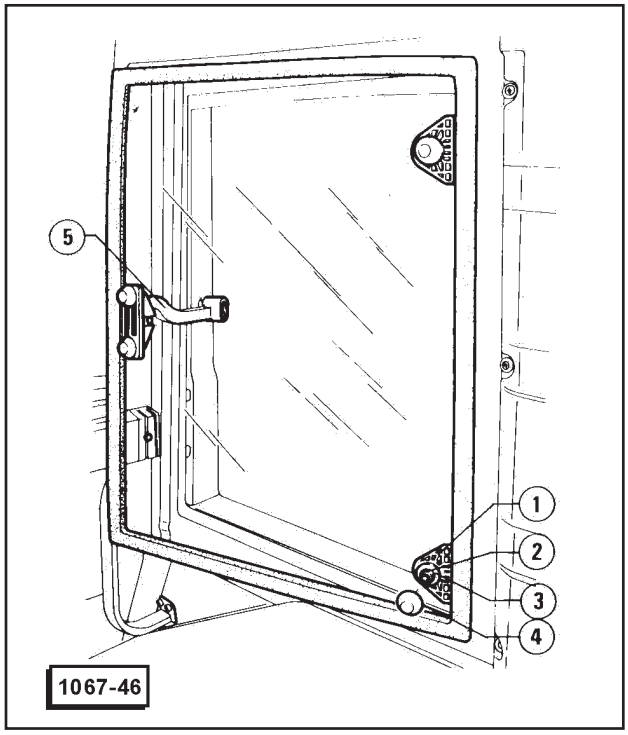
1 - Window glass
2 - Movable part of the hinge
3 - Retaining ring
4 - Pivot
5 - Fixed part of the hinge
6 - Rubber small block
7 - Spacer
8 - Washer
9 - Nut
10 - Cap
11 - Frame
12 - Fork
13 - Pivot
14 - Retaining ring
15 - Window blockage handle
16 - Threaded pivot
17 - Washer

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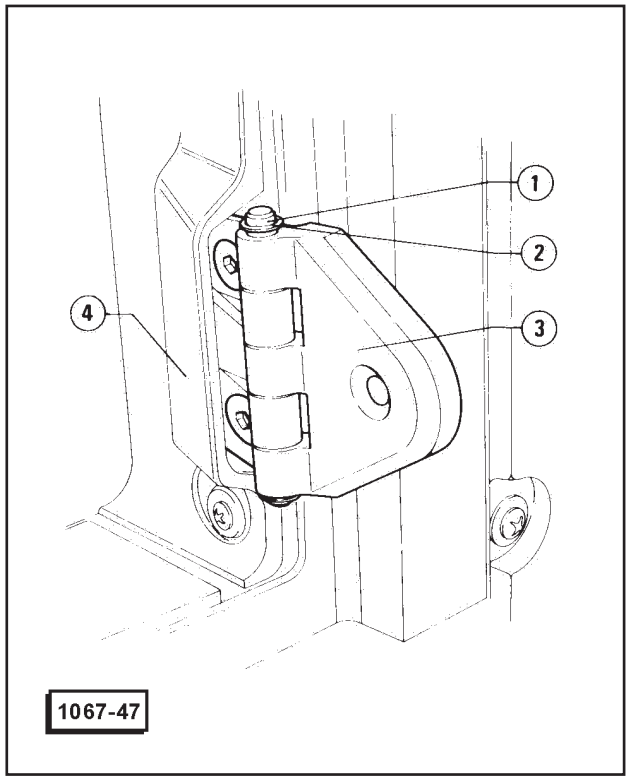
REMOVAL AND INSTALLATION

1. Remove the two caps **4** of the window fastening nuts from the rear hinges **1**.
2. Holding the window, unscrew the two nuts **2** and remove the washer **3**. Free the lock handle **5** from the pivot and remove the window.



1 - Rear hing
2 - Nut
3 - Washer
4 - Cap
5 - Window lock handle

3. With reference to the diagram on page 299, remove the cap **10** that covers the fastening nuts **9** of the washer **2** to the glass, remove the nuts and the washer and the lock handle **15**.
4. Remove the retaining ring **14**, the pivot **13** and separate the handle **15** from the fork **12**.
5. With reference to the following diagram, remove the trim of the rear post **4**, unloosen the fastening screws of the hinge **3** and remove.
6. Remove one of the retaining rings **2**, take off the pivot **1** and separate the two parts of the hinge.



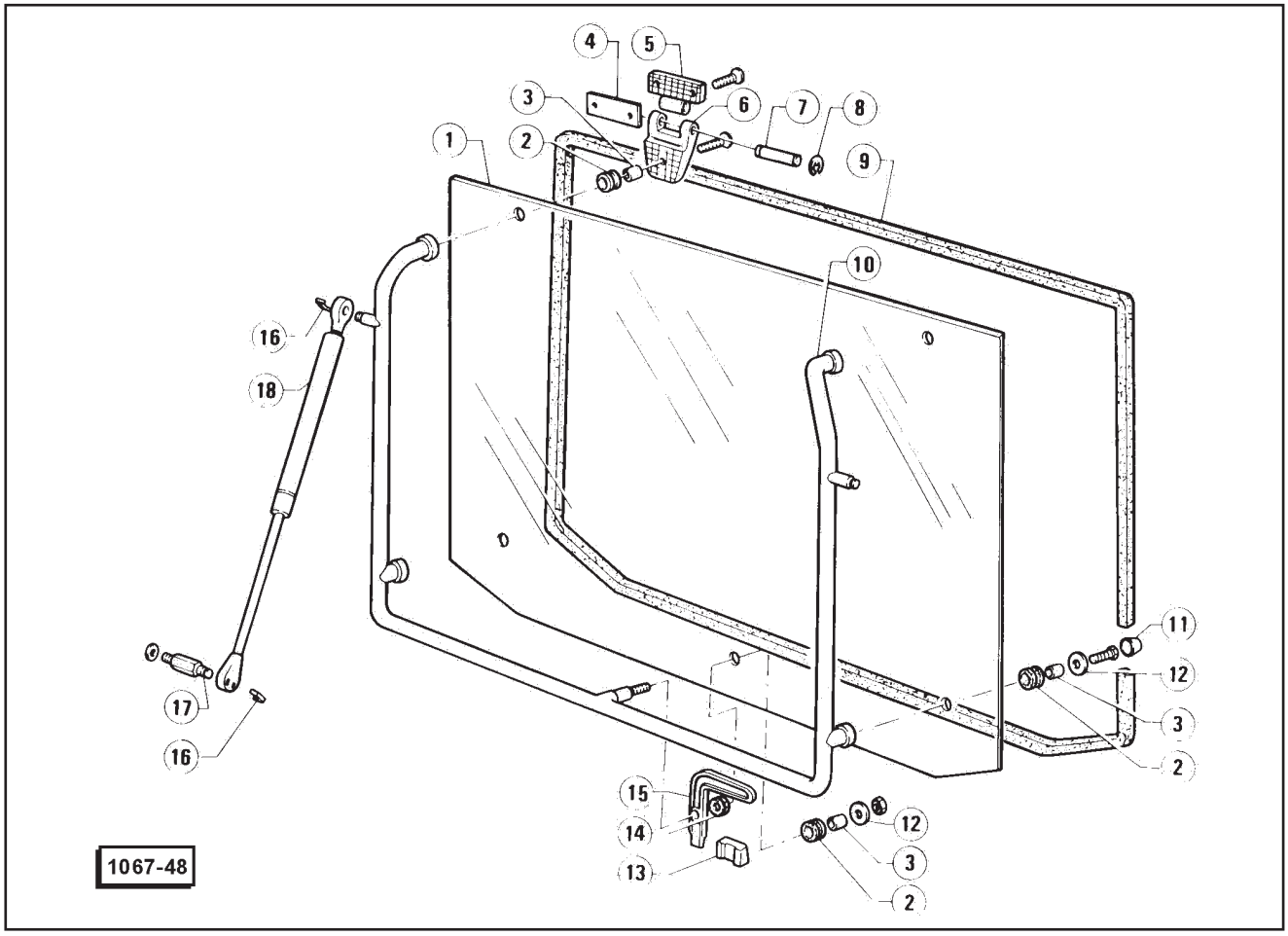
1 - Pivot
2 - Retaining ring
3 - Hinge
4 - Rear post trim

7. With reference to the diagram on page 299, take off the spacers **7** present on all four touching points of the window glass, and remove the rubber small block.
8. Remove the weather strip **11** mounted on the glass. In case of reuse of the strip, attention must be paide not to deform the metal insert lip where the glass is placed.
9. Proceed with the installation of the window working in reverse order to that of the removal, lubricating with the specified grease the hinge pivots and the lock handle pivots.

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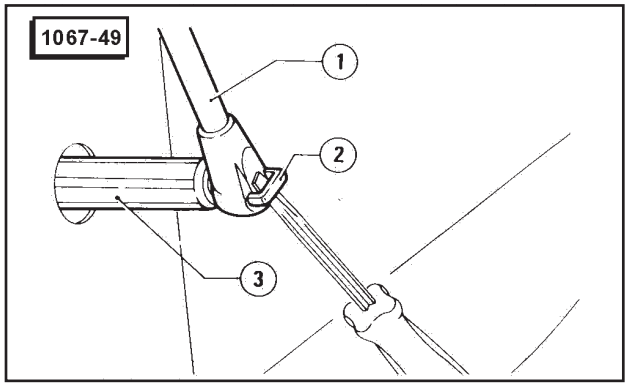
REAR WINDOW



1 - Glass shutter
2 - Rubber small block
3 - Spacer
4 - Spacer
5 - Fixed part of the hinge
6 - Mobile part of the hinge
7 - Pivot
8 - Retaining ring
9 - Weather strip
10 - Frame
11 - Cap
12 - Washer
13 - Block catch
14 - Nut
15 - Window lock handle
16 - Plastic clinch
17 - Threaded pivot
18 - Shock absorber

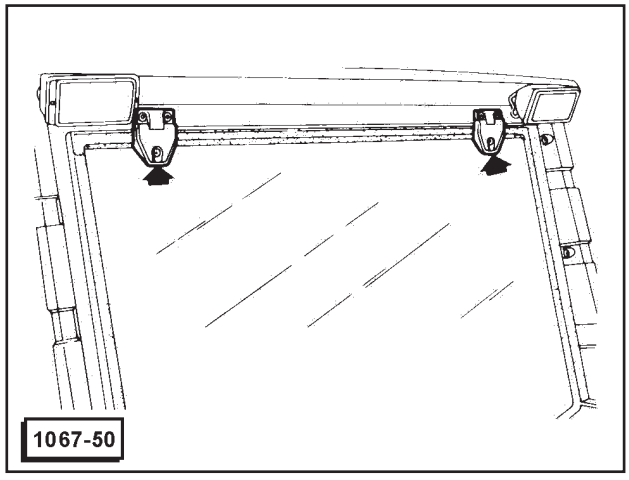
REMOVAL AND INSTALLATION

1. Remove the clinch 2 that keeps the shock absorbers 1 in position on the pivots 3 and disconnect the rods of the shock absorbers taking them off sideways.



1 - Shock absorbers
2 - Clinch
3 - Pivot

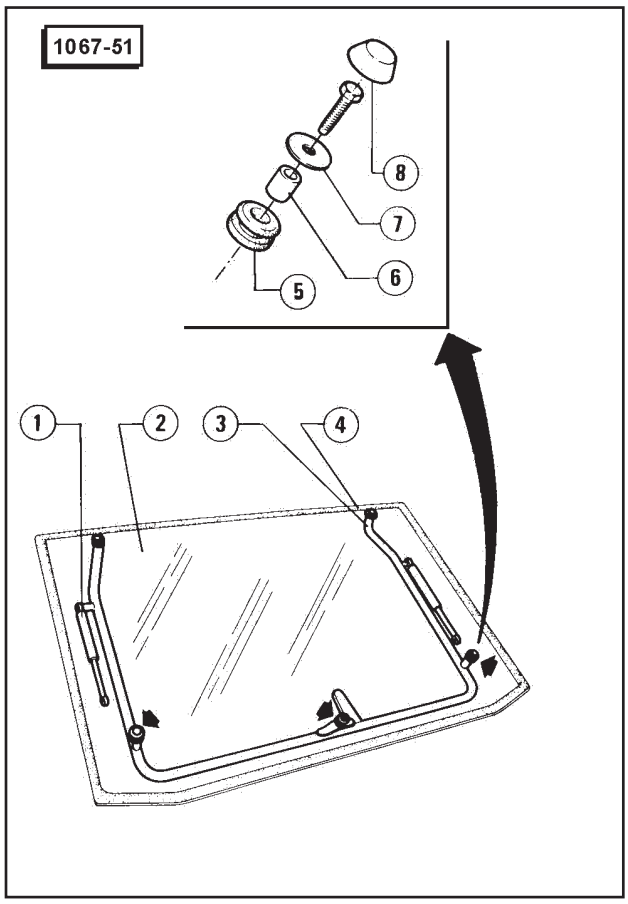
2. Holding the window, unloosen the two screws that fix the glass to the hinge and remove the complete window.



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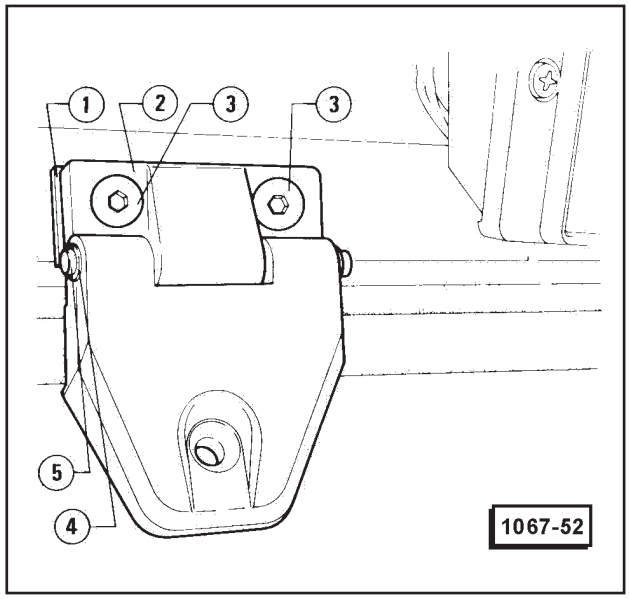
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3. Remove the shock absorbers **1** from the frame **3**. Remove the cap **8** that cover the contact points of the frame **3** to the glass **2**, then unloosen the two screws and the nuts shown in the following diagram and separate the glass from the frame **3** recovering the washer **7**.
4. Take off the spacers **6** and remove the small rubber blocks **5**.
5. Remove the weather strip **4** fixed by pressure on all the perimeter of the glass. In the need that the weather strip has to be reused, take care not to stretch the metal insert of the lip where the glass fits.



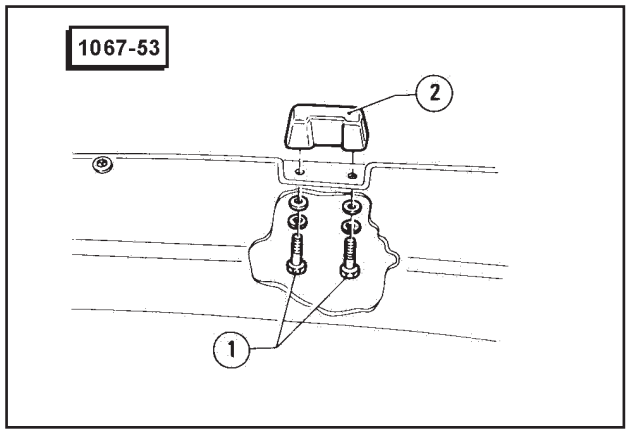
1 - Shock absorbers
2 - Glass
3 - Window frame
4 - Weather strip
5 - Small rubber block
6 - Spacer
7 - Washer
8 - Cap

6. Unloosen the two screws **3** that hold the hinge **2** to the cab and remove the hinge and the spacer **1**.
7. Remove one of the two retaining rings **4**, slip off the pivot **5** and separate the two parts of the hinge.



1 - Spacer
2 - Hinge
3 - Screw
4 - Retaining ring
5 - Pivot

8. With reference to the diagram on page 301, unscrew the nut **14** and remove the handle **15** from the frame **10**.
9. If necessary, with reference to the following diagram, unloosen the two screws **1** that fix the lock clamp **2** to the cab and remove them.
10. For the installation work in the reverse order to that of the dismounting, taking note of the following specifications:
— Lubricate the hinge pivot and the blockage handle with the recommended grease.
— Check the correct closing of the window and if necessary regulate the position of the lock clamp **2** blocking it with the screws **1**.

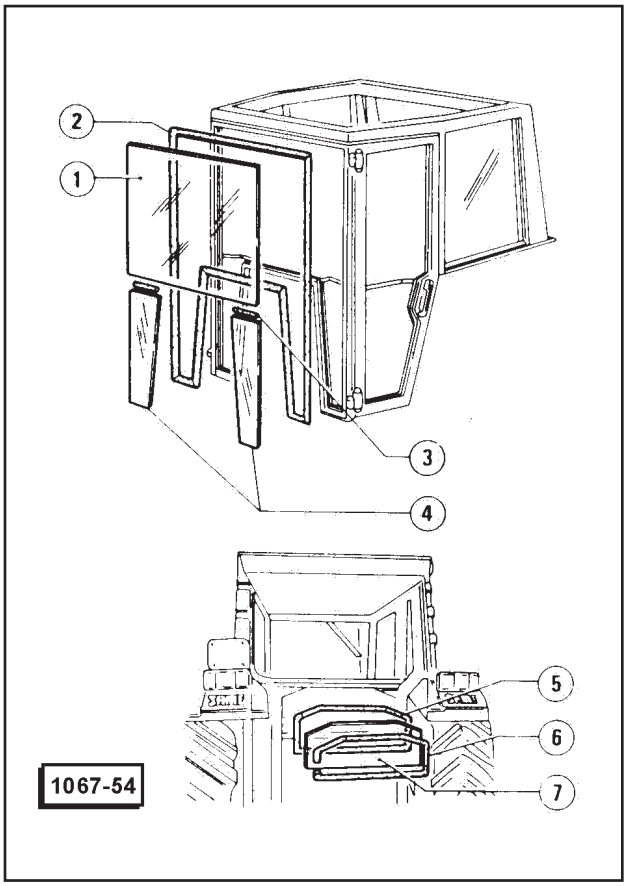


1 - Screws
2 - Lock clamp

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FIXED GLASS AND GASKET



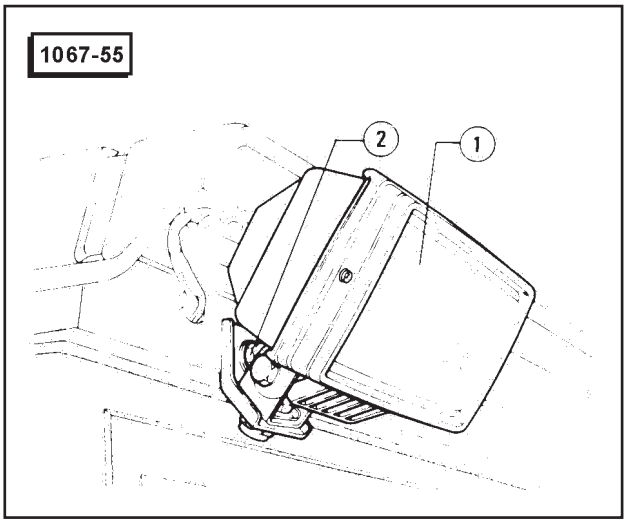
1 - Glass windscreen
2 - Gasket
3 - Intermediate structure
4 - Side glass
5 - Gasket
6 - Rubber insert
7 - Rear glass

FRONT GLASS

REMOVAL

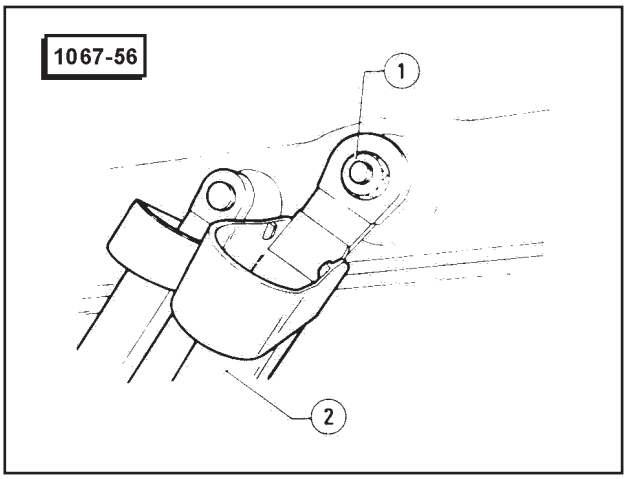
CAUTION
— **It is advisable to take off the glass, in one piece, only if necessary considering how it is fragile.**
— **To remove the glass from the cab, two operators are needed.**

1. Remove the inside trim of the cab roof (see: Cab Roof and Inside Roof Trim - Inside Roof Trim).
2. Unscrew the fastening bolt **2** of the work floodlight **1** on the cab and remove it without disconnecting the electric cables (if necessary leave it on the cab roof); recovering the nuts on the inside of the cab frame.



1 - Front work floodlight
2 - Bolt

3. Unscrew the fastening nut of the windscreen wiper arm **2** and move it sideways so as not to obstruct the removal of the glass.



1 - Nut
2 - Windscreen wiper principle arm

4. Remove the sun screen (see: Cab Roof and Roof Internal Trim - Roof Internal Trim).
5. Working from the inside of the cab, slip off the lip of the gasket **1** with two screwdrivers, so as to bring it below the border of the frame sheet **2** as shown in the following diagram, carry out this operation along all the perimeter of the windscreen glass.

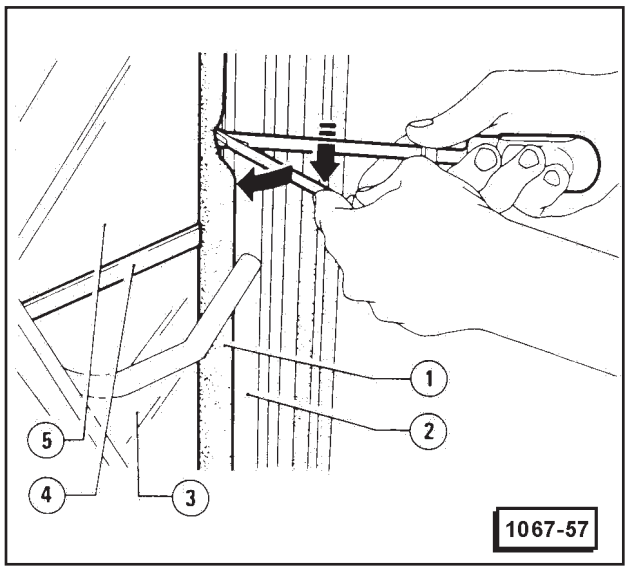
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CAUTION
— **During the operation support the glass from the outside of the cab.**
— **Avoid creating dangerous flexion of the glass.**

6. Free the glass windscreen from the gasket.
7. Remove the intermediate structure **3**.
8. For the dismounting of the side windows **4** proceed as for the windscreen windows.

NOTE
It is possible to remove the side glass without first having removed the windscreen glass.

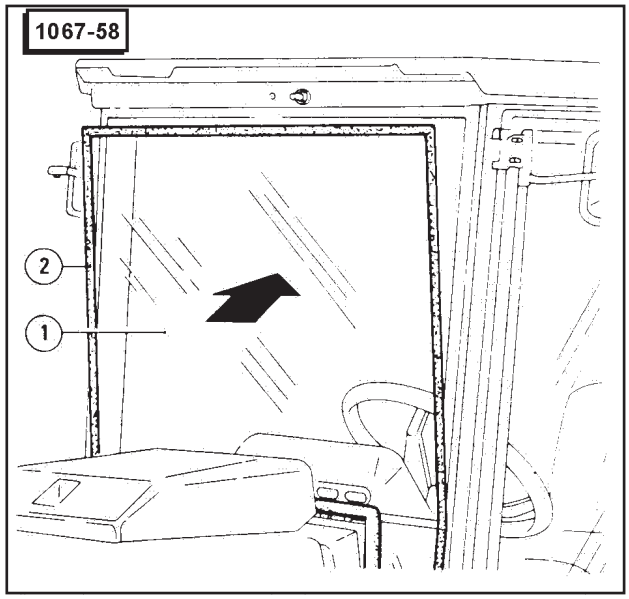


1 - Front glass gasket
2 - Cab frame
3 - Intermediate structure
4 - Side glass
5 - Windscreen glass

9. Remove the gasket of the front glass.

INSTALLATION

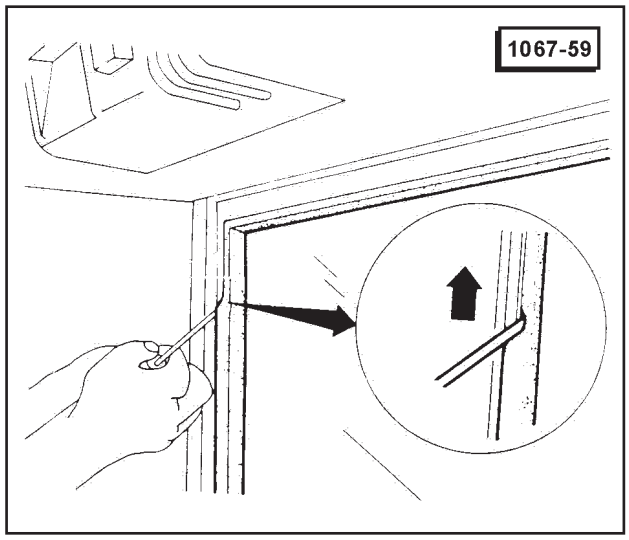
1. Trig the gasket on the glass windscreen **1** then cover the gasket with a non greasy lubricating liquid (for example: neutral soap and water solution) to ease the sliding.
2. Lean the lower end of the windscreen glass on its cab frame seat, fixing the border of the sheet in the seat of the gasket.
3. Press lightly the windscreen glass against the cab.



1 - Windscreen glass
2 - Gasket

4. Working from the inside of the cab, trig the gasket lip on the border of the cab sheet, working with a pointed instrument.

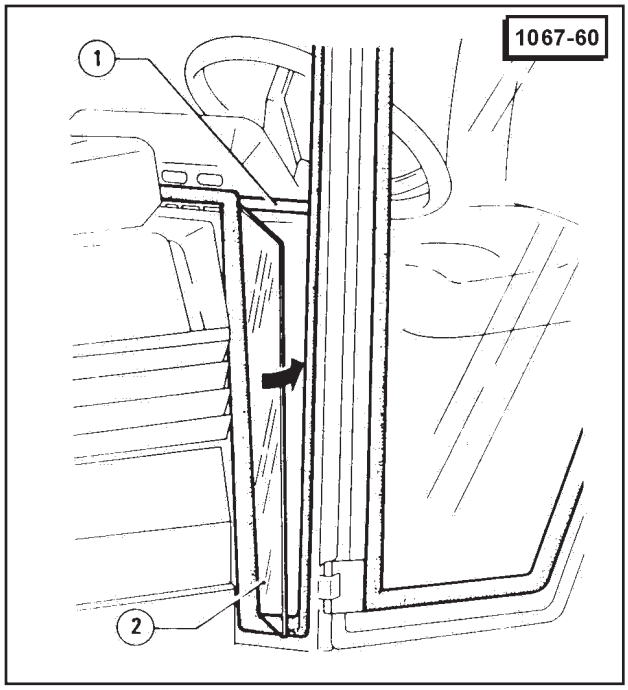
NOTE
Start the operation on the posts proceeding parallel so as not to create dangerous flexions in the glass, then work on the upper side.



5. Fix in position the intermediate structure **1**, apply on the zone indicated in the diagram the sealer Loctite 495, then mount the side glass **2** in the same way as the windscreen glass was mounted.

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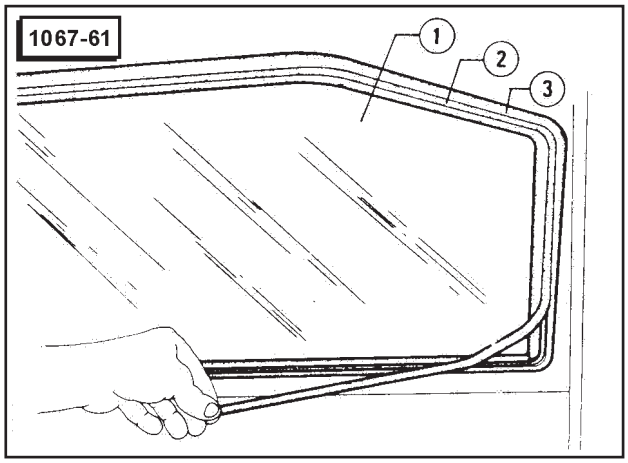
1 - Intermediate structure
2 - Side glass

6. Install the windscreen wiper arm, the lights, the sunscreen and the cab ceiling trim.

REAR GLASS

REMOVAL

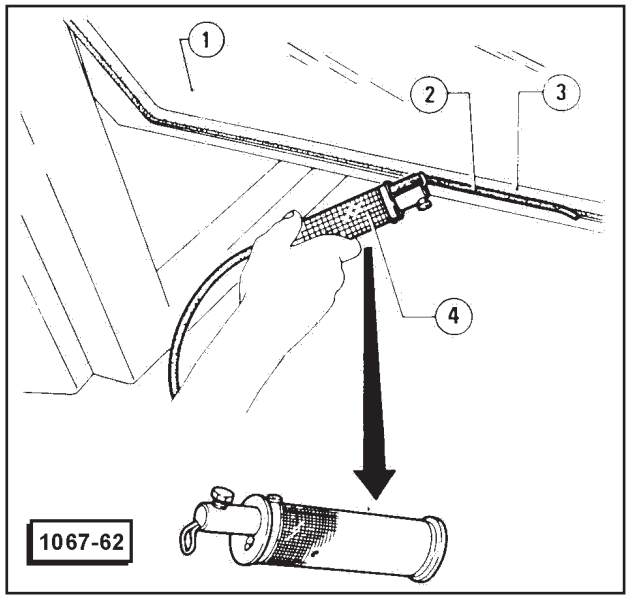
1. Take out the rubber insert **2** from its seat in the gasket **3** and remove.
2. Push the rear glass **1** towards the outside and remove.
3. Remove the gasket from the seat in the cab.



1 - Rear glass
2 - Rubber insert
3 - Gasket

INSTALLATION

1. Place the seal **3** in the cabin seat then spread the seal with non oil liquid lubricant (e.g. neutral soap and water solution).
2. Position the glass **1** and trig the lip of the seal on the glass with a pointed implement.
3. Using the implement **4** shown in the diagram, put in the rubber insert **2** into the seal.

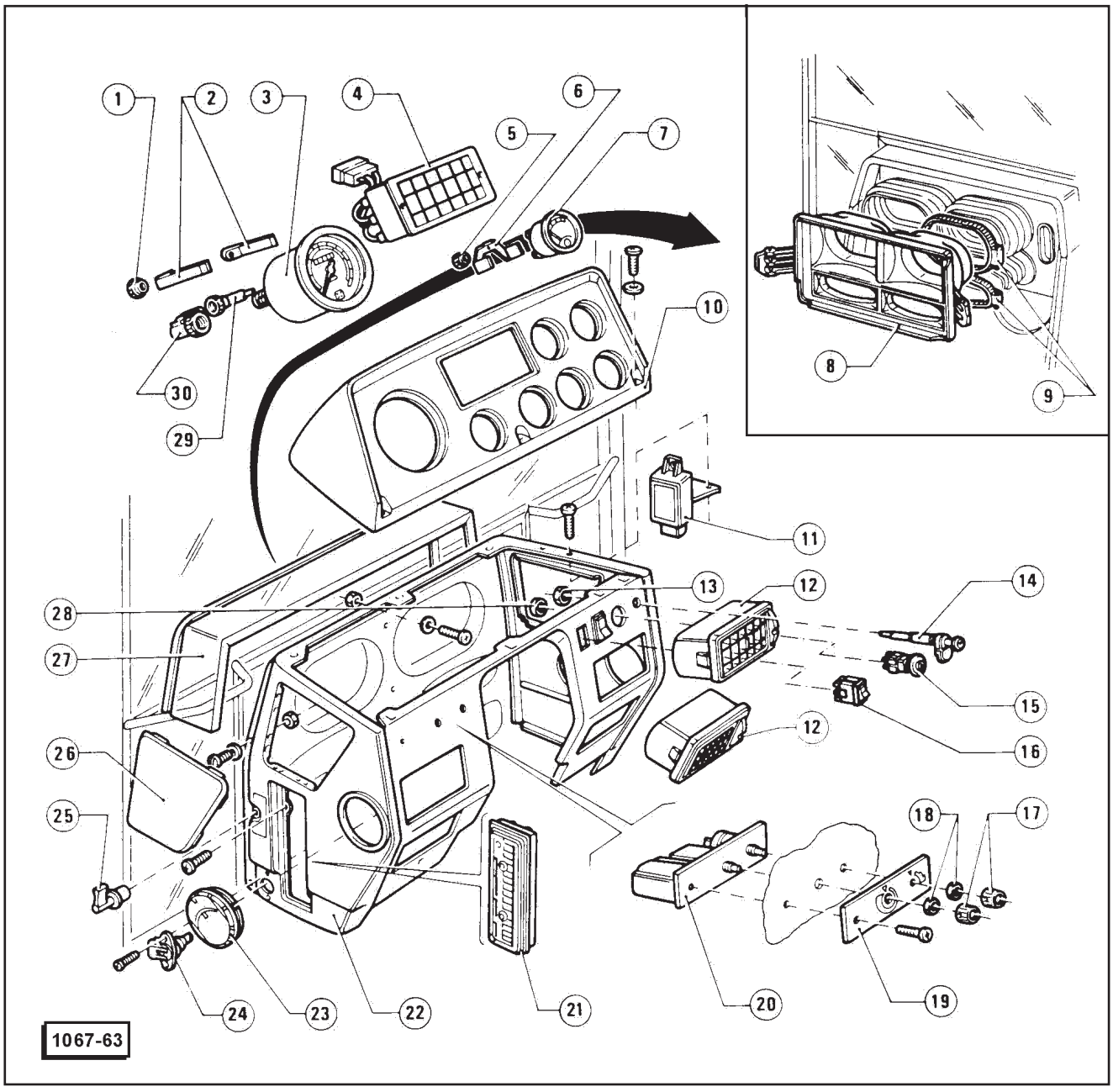


1 - Rear glass
2 - Rubber insert
3 - Seal
4 - Special tools

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DASHBOARD



1 - Ring nut
2 - Bracket
3 - Speedometer
4 - Group of warning light signals
5 - Ring nut
6 - Bracket
7 - Indicator
8 - Ventilation ducts
9 - Clamp
10 - Instrument panel
11 - Jogging unit
12 - Pallet opening
13 - Nut
14 - Stop engine
15 - Push button
17 - Knob
16 - Switch
19 - Plate
18 - Nuts
20 - Ventilation control unit
21 - Fuse carrier
22 - Instruction panel
23 - Diffuser
24 - Current plug
25 - Ventilation regulation lever
26 - Cover
27 - Frame
28 - Ring nut
29 - Speedometer cable
30 - Return

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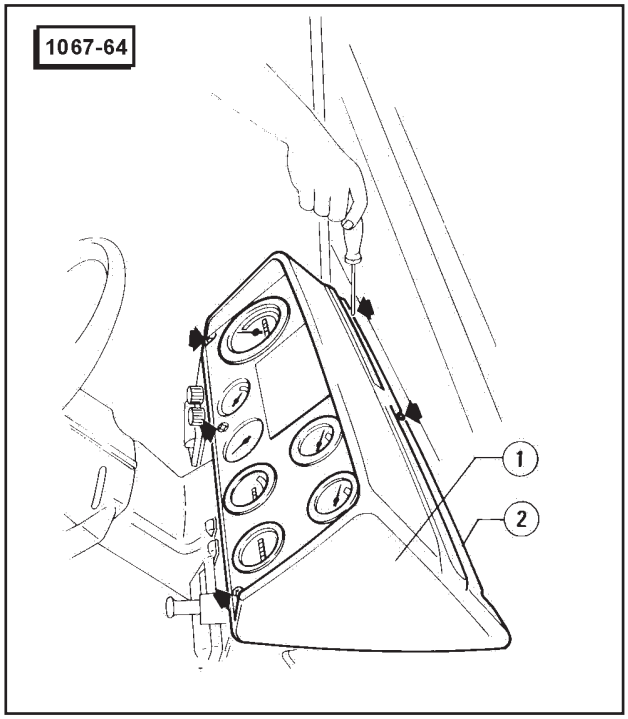
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INSTRUMENT PANEL

REMOVAL AND INSTALLATION

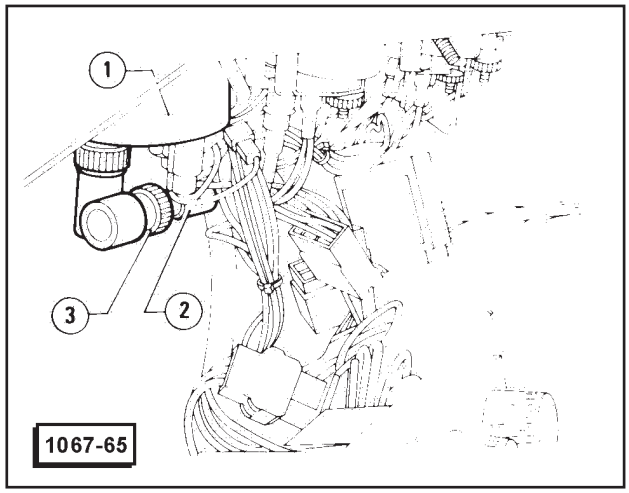
CAUTION
— **Always mark the cables before disconnecting them to facilitate the installation.**
— **Disconnect the earth cable from the battery.**

1. Remove the steering wheel (see: Hydrostatic Steering - Steering Wheel and Column).
2. Unloosen the six screws as shown in the diagram and remove with care the instrument panel 1 from the dashboard **2**.



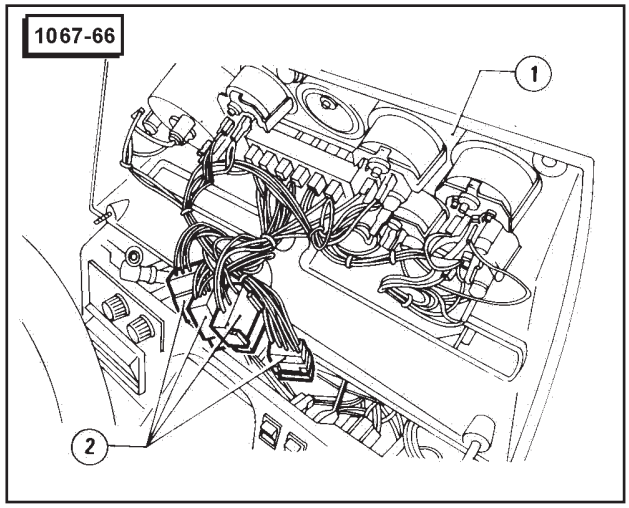
1 - Instrument panel
2 - Dashboard

3. Disconnect the cable **2** of the speedometer **1** by unscrewing the ring nut **3.**



1 - Speedometer
2 - Speedometer cable
3 - Ring nut

4. Disconnect the five connectors **2** and remove the instrument panel **1**.

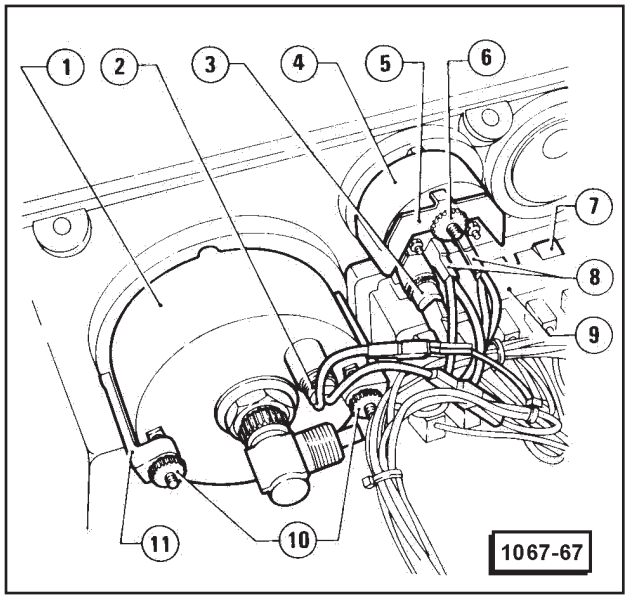


1 - Instrument panel
2 - Connector

5. Unscrew the ring nut **10** and remove the bracket **11**.
6. Detach the lamp **2** from the speedometer and extract it towards the outside of the instrument panel.
7. Disconnect the connector faston **8** and detach the lamp **3** from the indicator instrument **4**.
8. Unscrew the ring nut **6**, remove the bracket **5** and extract the instrument towards the outside of the instrument panel.
9. Compress the spring **7** and extract towards the outside of the warning signal unit **9**.

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1 - Speedometer bulb
2 - Bayonet bulb
3 - Bayonet bulb
4 - Indicator instrument
5 - Bracket
6 - Ring nut
7 - Bodkin
8 - Faston connector
9 - Warning signal unit
10 - Ring nut
11 - Bracket

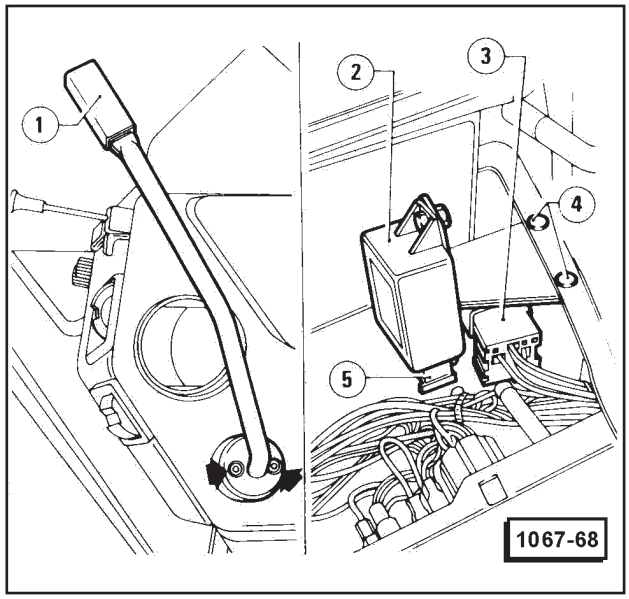
10. Install the instrument panel working in reverse order to that of the removal.

INSTRUCTION PANEL

REMOVAL AND INSTALLATION

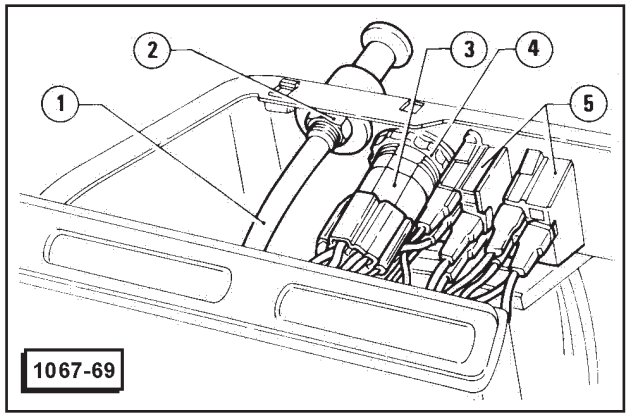
CAUTION
— **Always mark the cables before disconnecting them to facilitate the installation.**
— **Detach the earth cable from the battery.**

1. Detach the cab (see: Complete cab - Dismounting).
2. Remove the instrument panel (see: Instrument Panel - Removal and Installation).
3. Remove the protection from the devioguide unit and the column, remove the column (see: Hydrostatic Steering - Steering Wheel and Column).
4. Unloosen the screws shown in the diagram and remove the lever **1.**
5. Disconnect the connectors **3** and **5**, unloosen the two screws **4** and remove the jogging unit **2**.
6. Unscrew the nut **2** and take off the engine stop control cable **1.**



1 - Hand accelerator control lever
2 - Jogging unit
3 - Connector
4 - Screw
5 - Connector

7. Disconnect the cables of the emergency light switch **3,** unscrew the ring nut **4** and extract the emergency light switch.
8. Disconnect the cables of the work floodlight **5** press the plastic springs of the switch and remove.

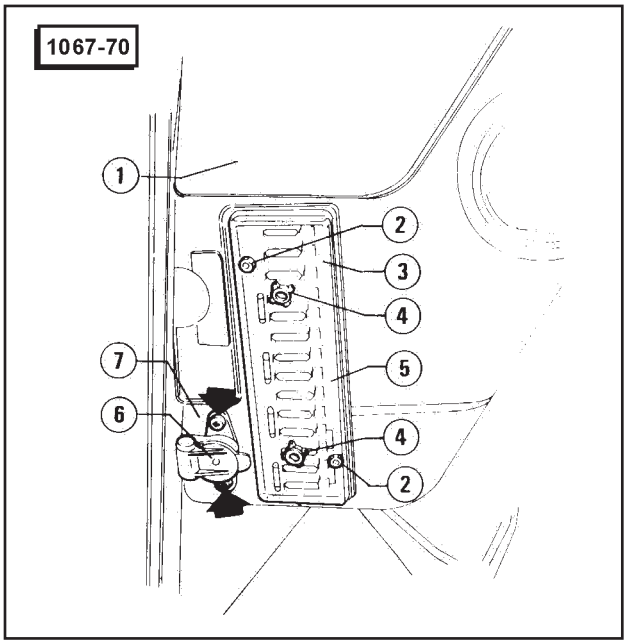


1 - Engine stop control cable
2 - Nut
3 - Emergency light switch
4 - Ring nut
5 - Floodlight switch

9. Remove the cover **1** forcing it towards the outside with a screwdriver.
10. Unscrew the nuts **4** and remove the fuse holder unit cover **3** then unscrew the nuts **2**, disconnect the fuse holder cables **5** and remove.
11. Unloosen the screws shown in the diagram extract towards the outside the current plug **6** and disconnect the cables.

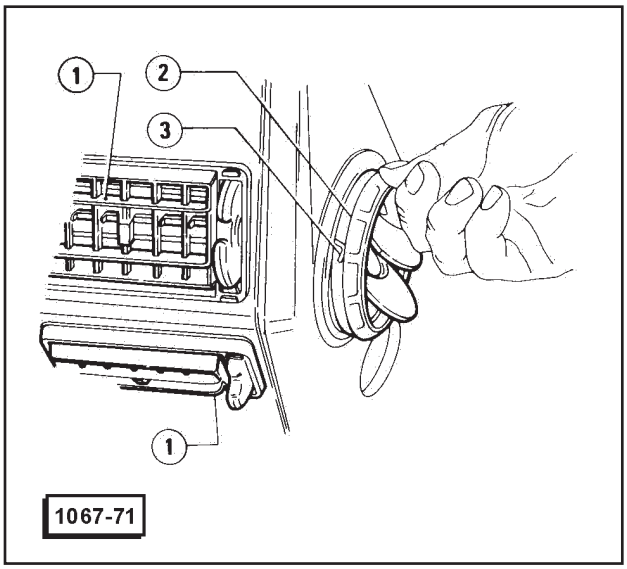
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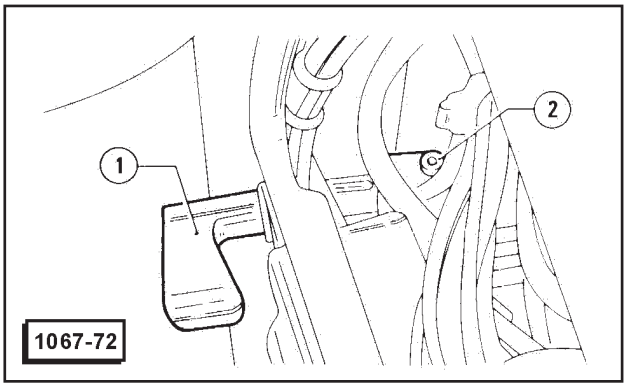
1 - Cover
2 - Nut
3 - Fuse holder unit cover
4 - Nut
5 - Fuse holder
6 - Current plug
7 - Dashboard

12. Remove, on both sides of the dashboard, the opening **1** and the diffuser **2** unhooking the springs **3**.



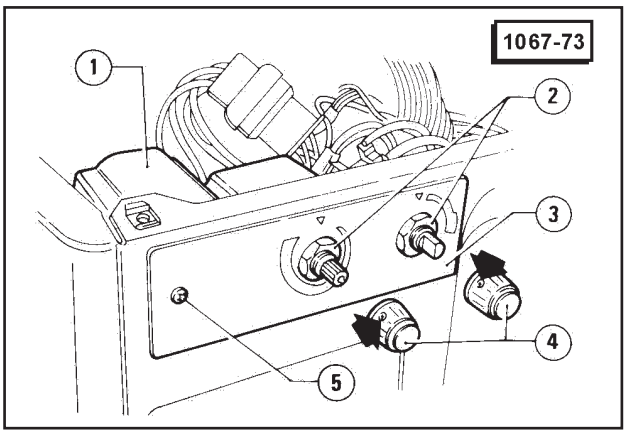
1 - Opening
2 - Diffuser
3 - Spring

13. Loosen the threaded dowel **2** and take off the lever **1**.



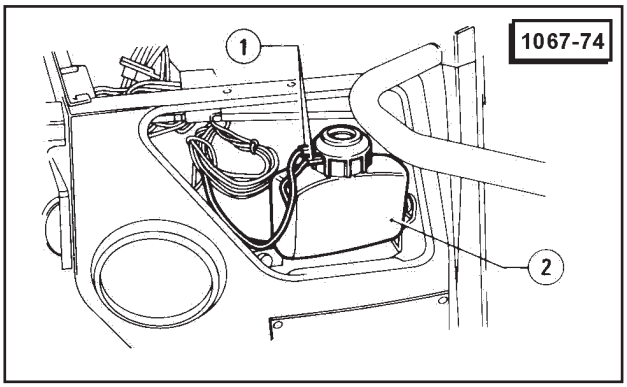
1 - Ventilation flow regulation lever
2 - Threaded dowel

14. Disconnect the cables of the air conditioning unit.
15. Loosen the dowels shown in the diagram and take off the knob **4** unscrew the nuts **2** and take off the air conditioning control unit **1**.
16. Unloosen the screw **5** and remove the plate **3**.



1 - Air conditioning control unit
2 - Nut
3 - Plate
4 - Knob
5 - Screw

17. Disconnect the cables **1** on the tank **2.**

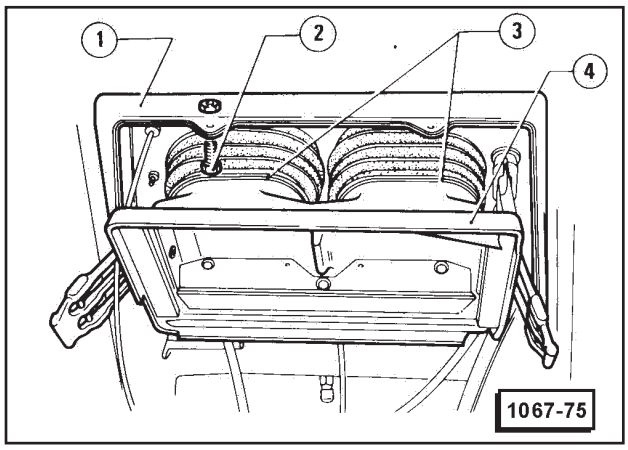


1 - Cables
2 - Clutch and brake circuit oil tank

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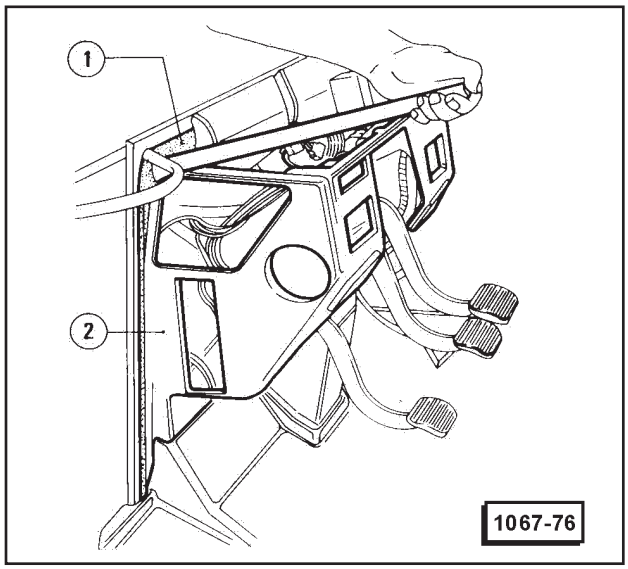
18. Unscrew the four fastening bolts **2** of the frame **1** and remove.
19. Cut and remove the four clamps **3,** then take off the air conditioning conveyor **4**.



1 - Frame
2 - Bolts
3 - Clamp
4 - Air conditioning conveyor

20. Unscrew the instrument panel fastening bolts to the cab.
21. Spread with a non oil lubrication liquid (e.g. neutral soap and water solution) the seal 1.
22. Making a lever with an appropriate implement, take off the dashboard 2 from the cab seat.

CAUTION
Do not excessively flex the cabin frame to avoid breaking the glass windscreen.



1 - Dashboard seal
2 - Dashboard

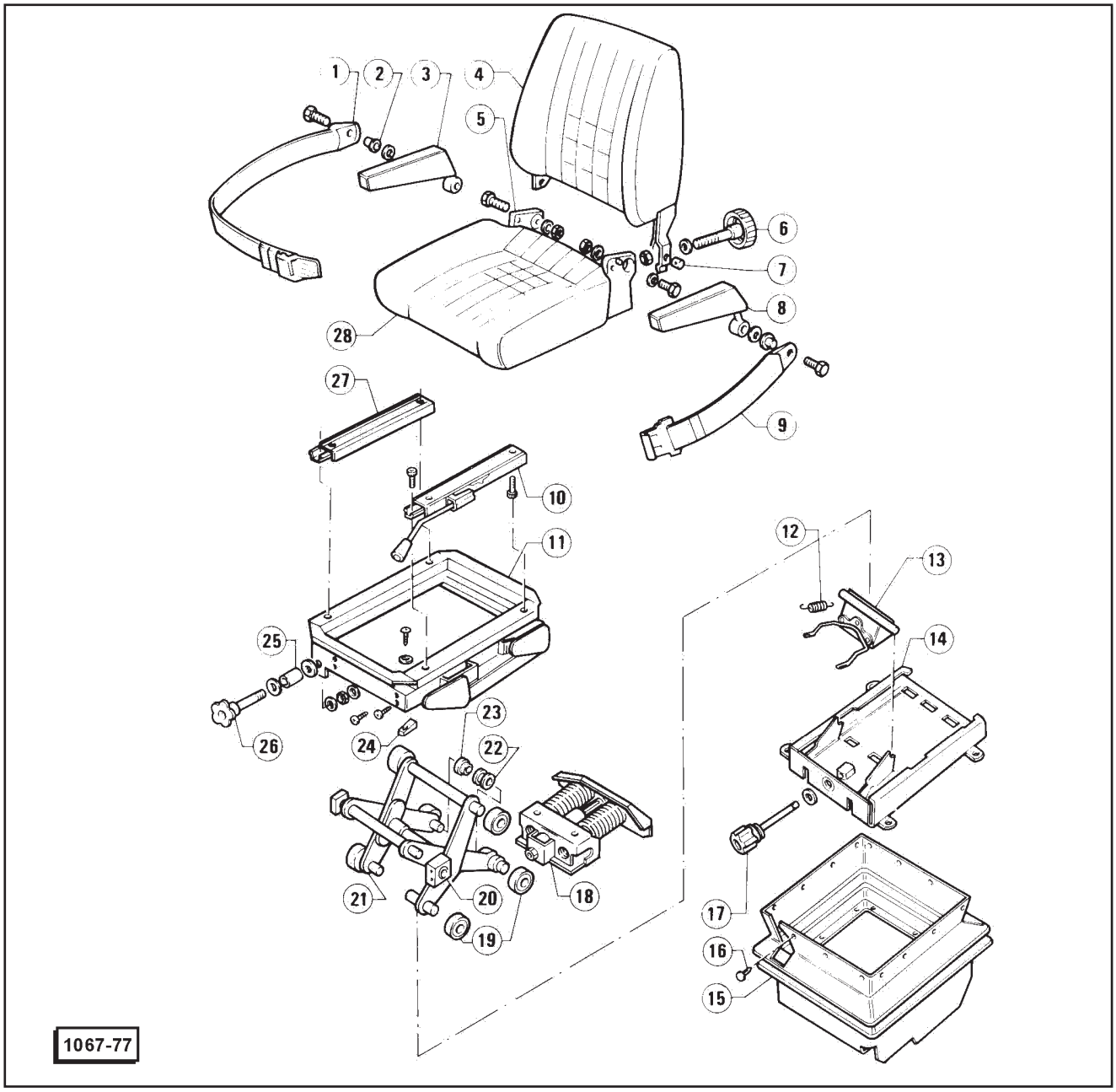
23. Remount the dashboard working in reverse order to that of the removal, taking care to adequately lubricate the seal.

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SEATS

SABLE SEAT



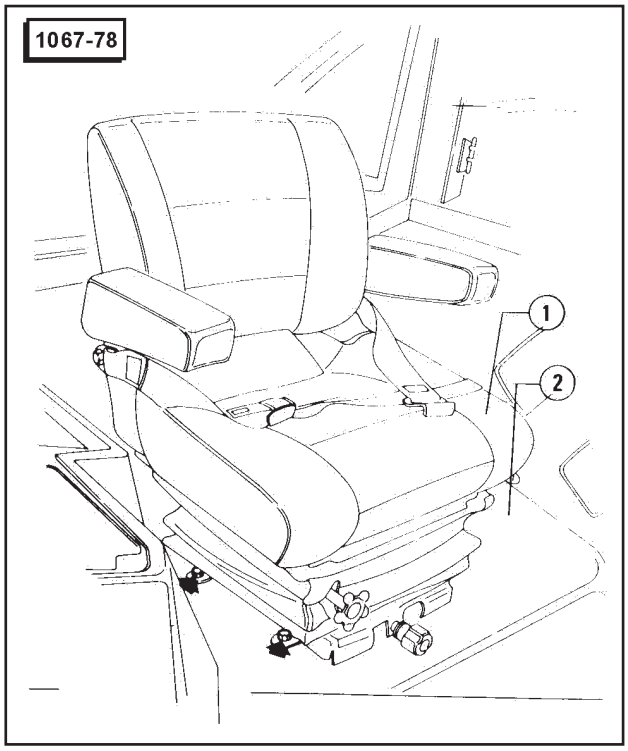
1 - Safety belt
2 - Bush
3 - Right armrest
4 - Back rest
5 - Bush
6 - Back rest reclining regulation knob
7 - Pivots
8 - Left armrest
9 - Safety belt clamp
10 - Left seat drive
11 - Mobile frame
12 - Spring
13 - Swinging slide
14 - Fixed frame
15 - Bellow
16 - Plastic nail
17 - Shock absorber regulating knob
18 - Spring unit
19 - Plastic roller
20 - Block
21 - Lever unit
22 - Grooved roller
23 - Bush
24 - Lock block
25 - Bush
26 - Seat height regulating knob
27 - Right seat drive
28 - Seat

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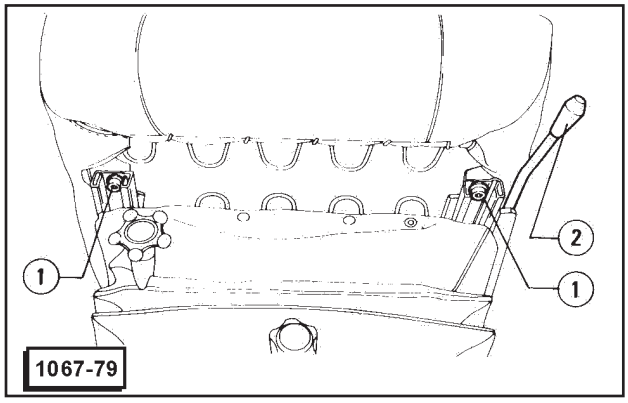
REMOVAL AND INSTALLATION

1. Unloosen the four screws **1** fastening the seat to the cab **2** and remove the seat complete with the shock absorber mechanism.



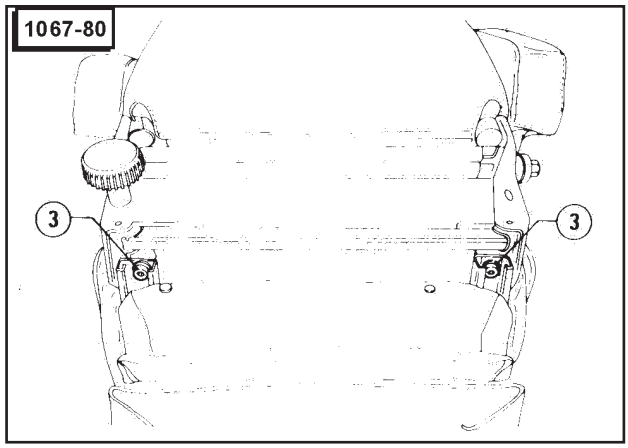
1 - Complete seat
2 - Cab floor

2. If necessary, remove only the seat without the shock absorber mechanism, operating in the following way.
(1) Working on the mover control lever **2,** bring completely forward the seat and then unloosen the front screws **1**.



1 - Seat fastener screw
2 - Seat mover control lever

(2) Working on the mover control lever, bring completely backwards the seat and then unloosen the rear screws **3**.

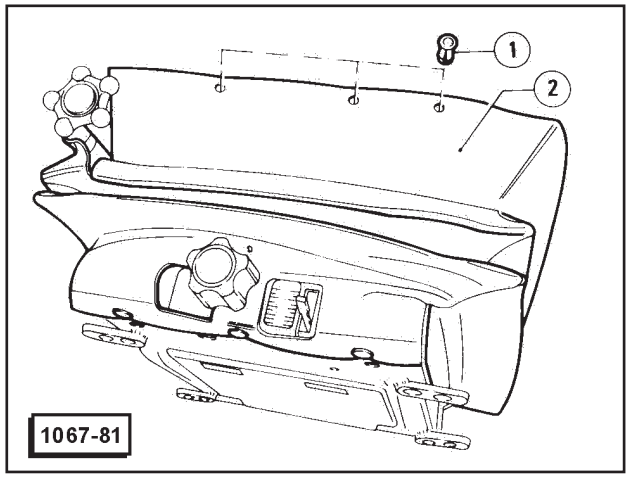


3 - Rear seat fastening screws

3. Install the seat working in reverse order to that of the removal taking note to lubricate the drive with the specific grease.

DISMOUNTING

1. Remove the plastic nails **1** and take off the bellow **2**.

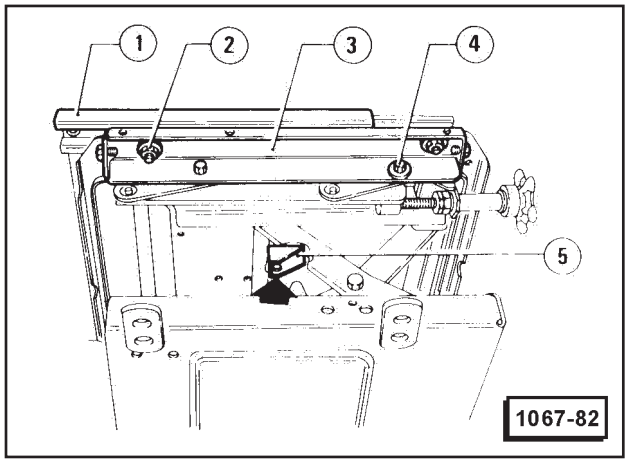


1 - Plastic nail
2 - Bellow

2. Move backwards completely the mobile part of the drive **1** then unscrew the rear bolts **2**.
3. Move forwards completely the mobile part of the drive, then unscrew the front bolts **4** and remove the drive **1** from the mobile frame **3**.
4. Compress the shock absorber mechanism so as to bring the mobile frame to that of the fixed one. Keeping the mechanism compressed, unloosen the screw shown in the diagram and remove the lock block **5**.

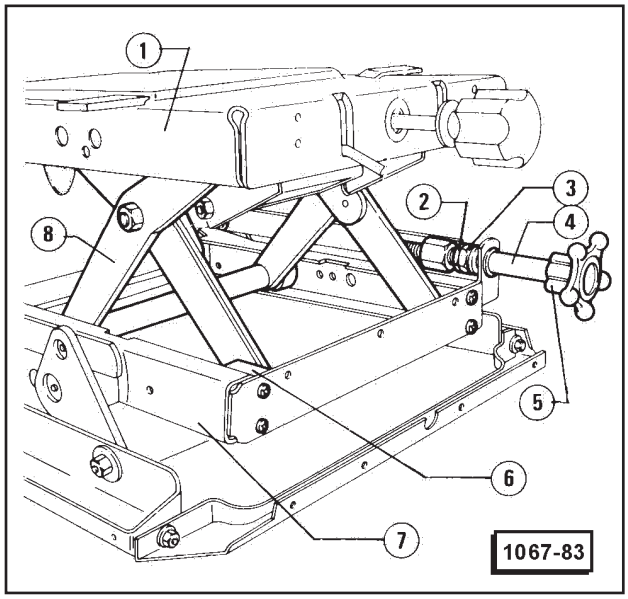
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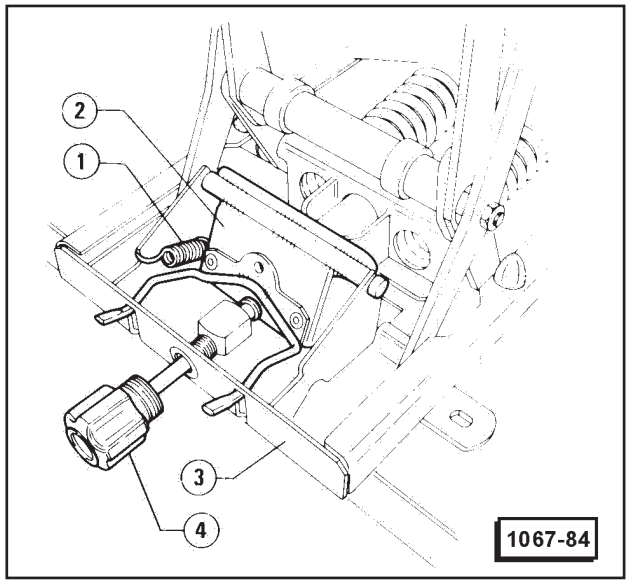
1 - Seat drive
2 - Rear bolt
3 - Mobile frame
4 - Front bolt
5 - Lock block

5. Unloosen the screws fastening the block **6** to the mobile frame **7**.
6. Take off the fixed frame **1** complete with the lever unit **8** from the mobile frame **7** taking it out from the rear side.
7. Unloosen the lock nut **2** and the nut **3,** unscrew the knob **5** and take off the bush **4**.



1 - Fixed frame
2 - Locknut
3 - Nut
4 - Bush
5 - Knob
6 - Block
7 - Mobile frame
8 - Lever unit

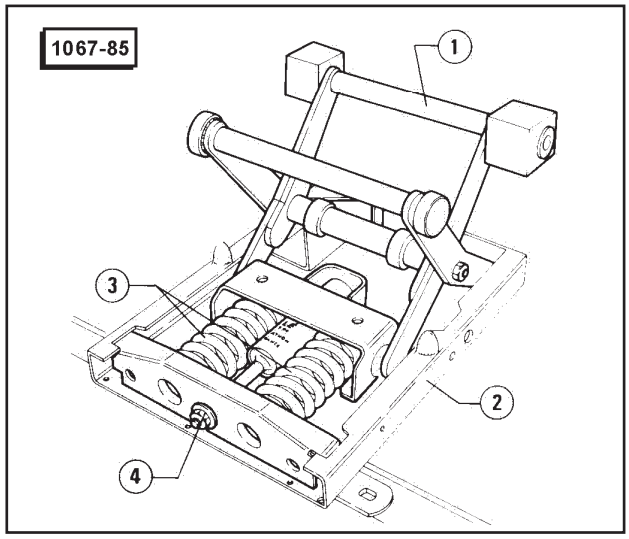
8. Unhook the spring **1** from the fixed frame **2** and remove it.
9. Remove the rocking slide **2**.
10. Remove the shock absorber regulating knob **4.**



1 - Spring
2 - Rocking slide
3 - Fixed frame
4 - Shock absorber regulating knob

11. Close the lever unit arms **1** and take off the fixed frame **2.**
12. Unhook the spring unit **3** from the fixed frame slit and remove.

CAUTION
Avoid unscrewing the nut 4 until the spring unit is dismounted: the remounting will otherwise be particularity difficult.

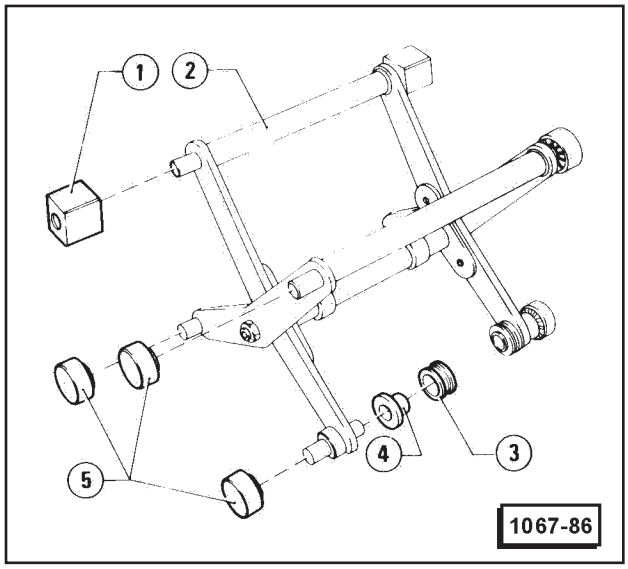


1 - Lever unit
2 - Fixed frame
3 - Spring unit
4 - Nut

13. Take off the pivots of the lever unit **2** the blocks **1**, the plastic rollers **5** and the channelled roller **3** with the plastic bush **4**.

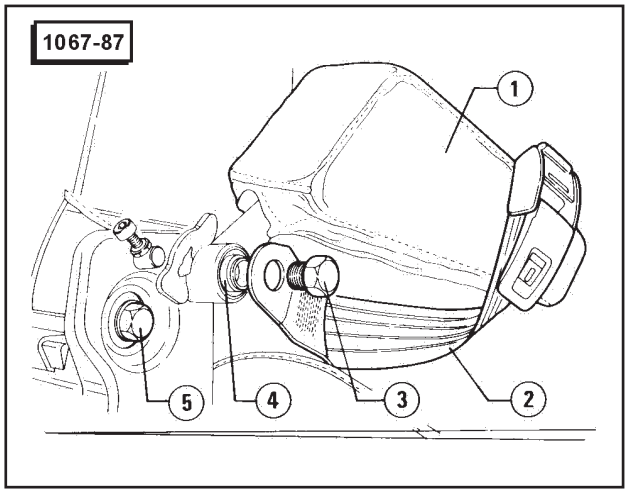
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1 - Blocks
2 - Lever unit
3 - Channelled roller
4 - Plastic bush
5 - Plastic roller

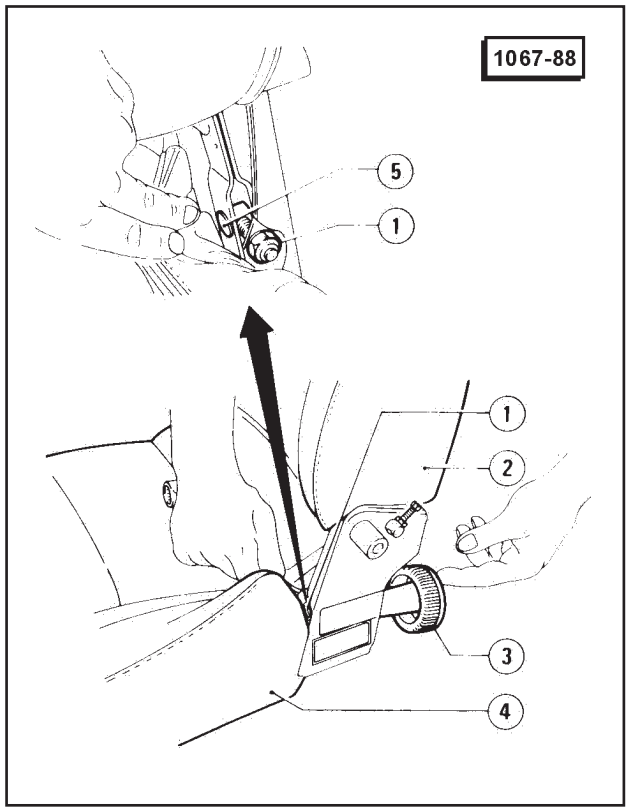
14. Unscrew screw **3** then remove the arm **1** together with the safety belt **2** and bush **4**.
15. Unscrew the bolt **5** fastening the seat back to the seat.



1 - Arm
2 - Safety belt
3 - Screw
4 - Bush
5 - Bolt

16. Holding blocked the nut **1** unscrew the knob **3** and remove it.

17. Separate the seat back **2** from the seat **4** and takeoff the pivot **5.**



1 - Nut
2 - Seat back
3 - Seat inclination regulating knob
4 - Seat
5 - Pivot

CHECKS AND CONTROLS

— Check that the plastic rollers the bush and the channelled roller that will be used in the spring unit are whole.
— Check that the shock absorbers of the spring unit are still efficient and have no oil leaks.
— Check that the shock absorber mechanism bellow has no holes or lacerations; if so replace.

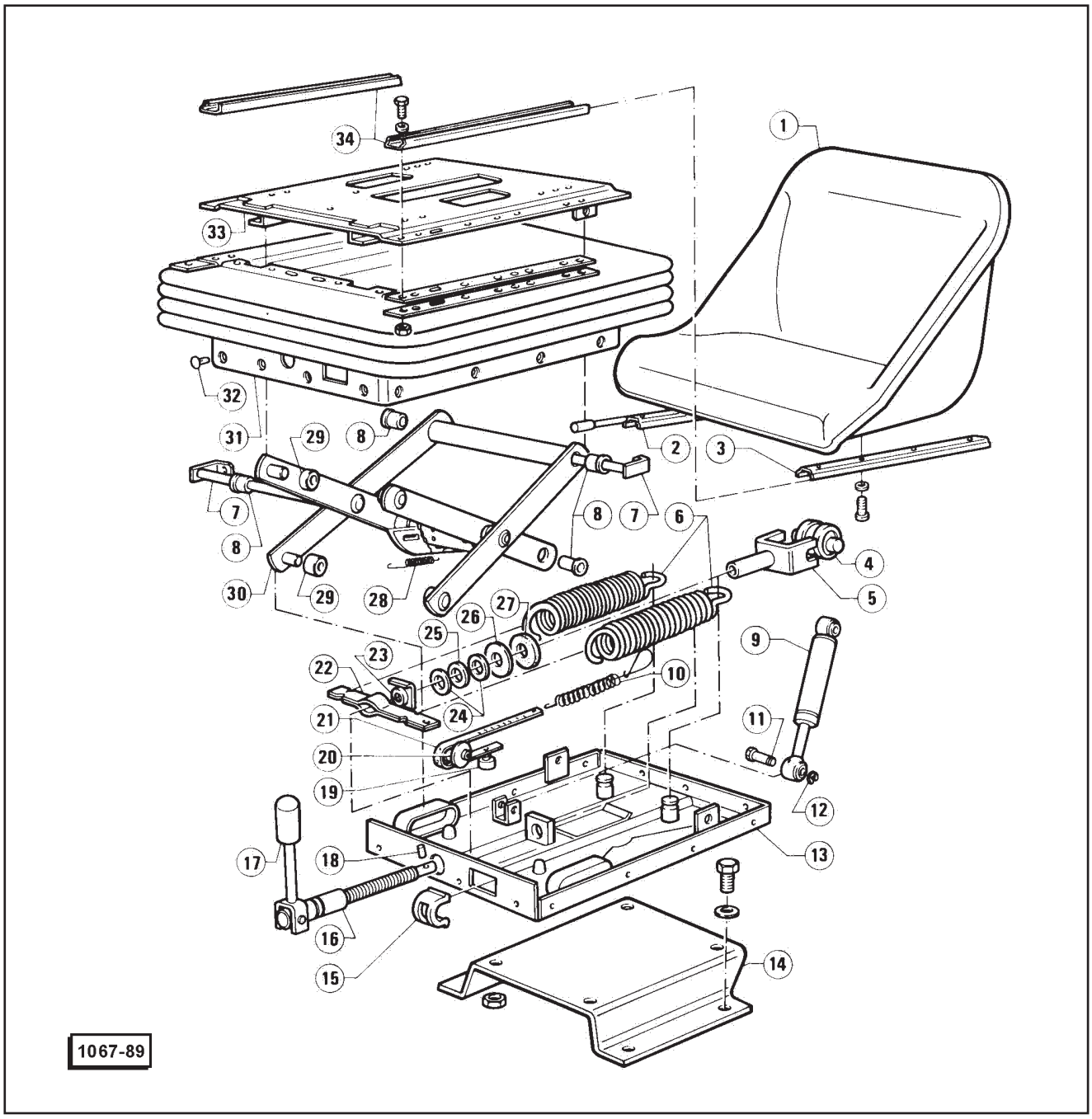
REMOUNTING

Proceed with the remounting of the seat, working in reverse order to that of the removal, lubricating with the recommended grease the rollers, the pivots, the threads of the regulation knob and the drive of the mobile and fixed frames.

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GRAMMER SEAT



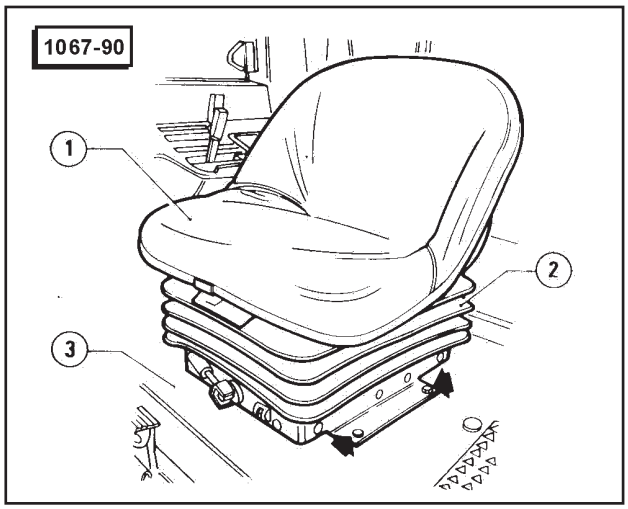
1 - Seat
2 - Mobile part of the right drive
3 - Mobile part of the left drive
4 - Roller unit
5 - Fork
6 - Spring
7 - Pivot
8 - Antifriction bush
9 - Shock absorber
10 - Spring
11 - Pivot
12 - Retaining ring
13 - Fixed frame
14 - Bracket
15 - Bezel
16 - Shock absorber regulating puller
17 - Knob
18 - Pin
19 - Plastic nail
20 - Roller
21 - Graduated strip
22 - Bracket
23 - Threaded bush
24 - Spacer
25 - Ball bearing
26 - Shoulder ring
27 - Rubber ring
28 - Spring
29 - Plastic roller
30 - Lever unit
31 - Bellow
32 - Plastic nail
33 - Mobile nail
34 - Fixed part of the drive
35 - Listel

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REMOVAL AND INSTALLATION

1. Unloosen the four screws fastening the shock absorber mechanism **2** to the cab floor **3** and remove the seat and complete shock absorber mechanism.
2. It necessary, remove only the seat without the shock absorber mechanism, working on the seat mover lever **1** of the shock absorber mechanism **2**.

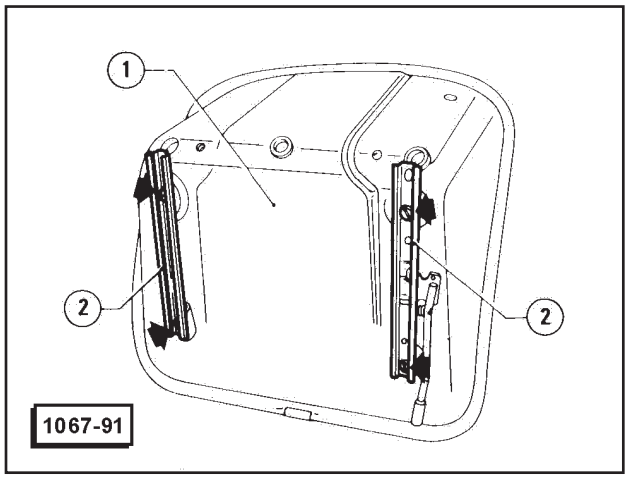


1 - Complete seat
2 - Shock absorber mechanism
3 - Cab floor

3. To replace the seat work in the reverse order to that of the removal, taking care to lubricate the drive with the specified grease.

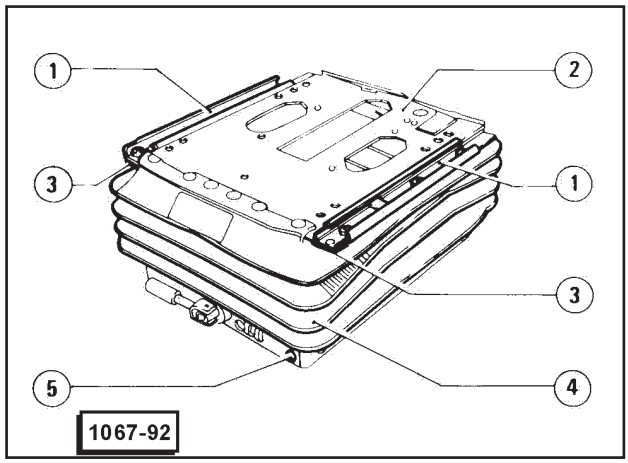
DISMOUNTING

1. Unloosen the screws that fasten the mobile part of the drive **2** to the seat **1** and remove.



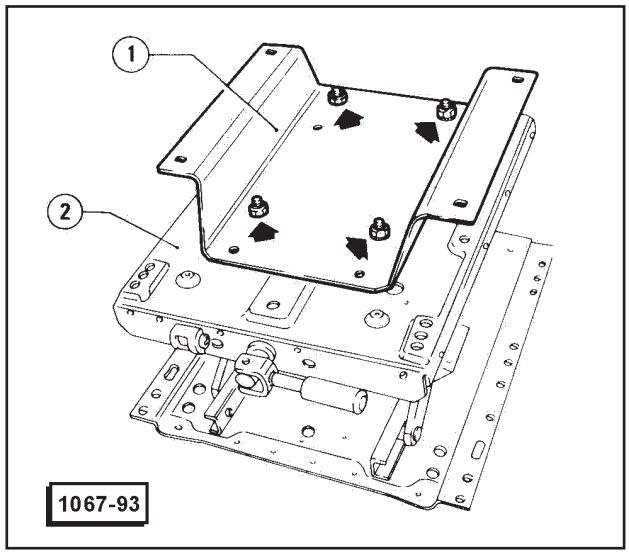
1 - Seat
2 - Mobile part of the drive

2. Unloosen the screws that fasten the fixed part of the drive **1** to the mobile frame **2** and remove, together with the listel **3**.
3. Remove the plastic nails **5** that fasten the bellow **4** to the shock absorber mechanism.



1 - Fixed part of the movable seat drive
2 - Mobile frame
3 - Listel
4 - Bellow
5 - Plastic nail

4. Unscrew the nuts that fasten the bracket **1** to the fixed frame **2**.

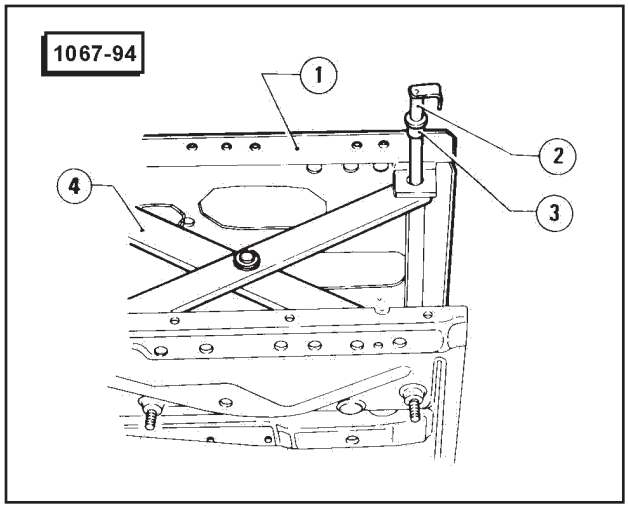


1 - Bracket
2 - Fixed frame

5. Fold with a lever the tab of the upper pivot **2** that joins the mobile frame **1** to the lever unit **4**.
6. Using a hammer and punch in soft metal, hit on the pivot **2** end without a tab, and take off together with the antifriction bush **3**.

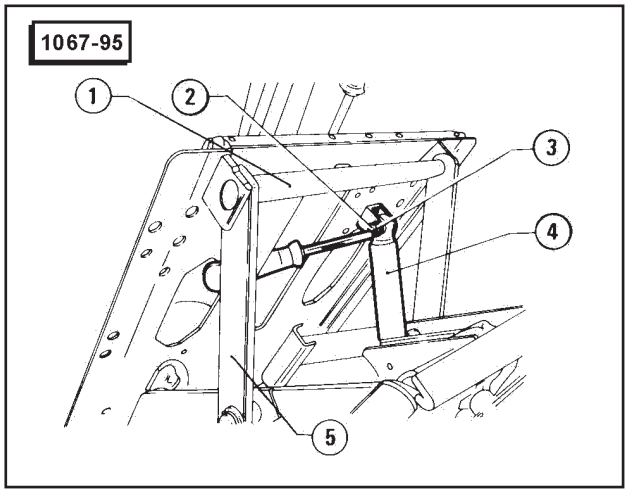
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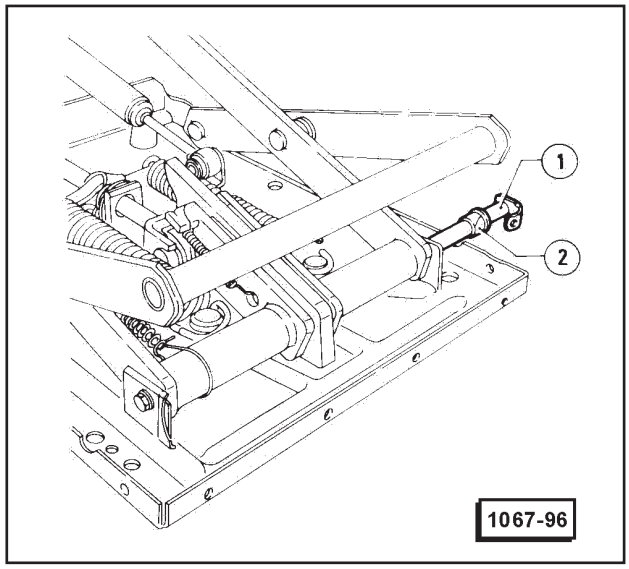
1 - Mobile frame
2 - Upper pivot
3 - Antifriction bush
4 - Lever unit

7. Remove the retaining ring **3** take off the pivot **2** and remove the shock absorber **4** from the seat on the mobile frame **1**.
8. Take off the mobile frame of the lever unit **5** extracting it forwards.



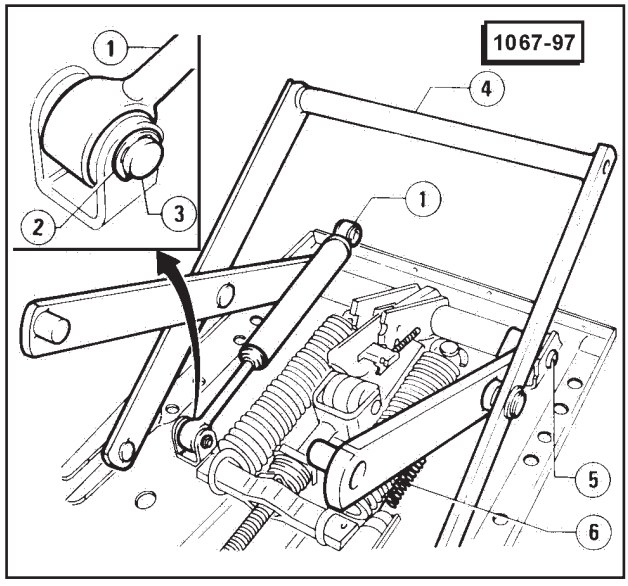
1 - Mobile frame
2 - Pivot
3 - Retaining ring
4 - Shock absorber
5 - Lever unit

9. Bend with a lever the pivot tab **1**.
10. Using a punch and hammer in soft metal knock on the end of the pivot with a tab **1** and remove it together with the antifriction bush **1.**



1 - Lower pivot
2 - Antifriction bush

11. Unhook the spring **6** and remove the lever unit **4** from the fixed frame.
12. Remove the retaining ring **2**, take off the pivot **3** and remove the shock absorber **1** from its seat on the fixed frame.

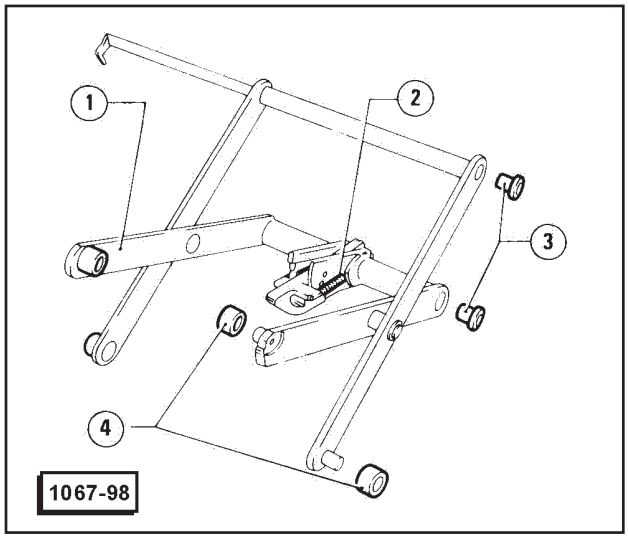


1 - Shock absorber
2 - Retaining ring
3 - Pivot
4 - Lever unit
5 - Lower pivot
6 - Spring

13. Remove the bush **3** from the seat of the lever unit **1.**
14. Unhook the spring **2** and remove, then take off the rollers **4** from the pivots of the lever unit.

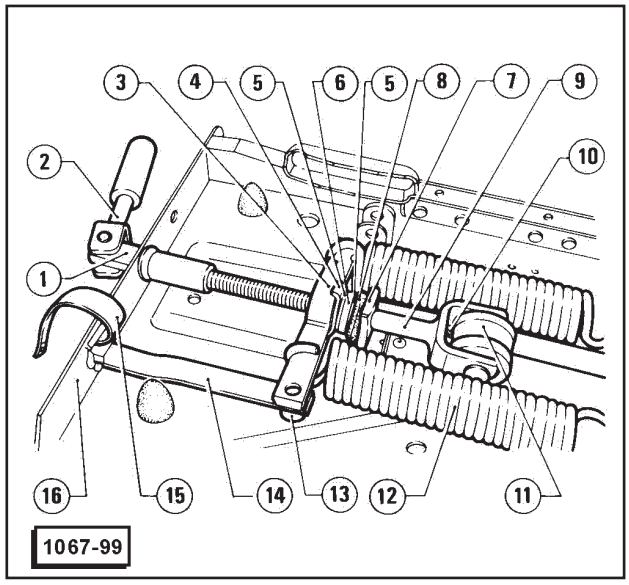
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1 - Lever unit
2 - Spring
3 - Bush in antifriction material
4 - Plastic roller

15. Remove the pin **10** and take off the fork **9**.
16. Unhook, with a lever, the central pivot of the roller unit **11** from the fork **9**.
17. Remove the nails **13** and the graduated strip **14.**
18. Unscrew and remove the stay bolt **1** and remove the knob **2.**
19. Using a robust spring puller unhook the spring **12** of the fixed frame and remove, then remove the bracket **3,** the threaded bush **4**, the spacers **5**, the ball bearing **6** the shoulder ring **7** and the rubber **8**.



1 - Shock absorber adjustment stay bolt
2 - Knob
3 - Bracket
4 - Threaded bush
5 - Spacer
6 - Ball bearing
7 - Shoulder ring
8 - Small rubber
9 - Fork
10 - Pin
11 - Roller unit
12 - Spring
13 - Plastic nail
14 - Graduated strip
15 - Roller
16 - Frame

CHECKS AND CONTROLS

— Check the wear of the antifriction bush, of the rollers and ball bearings, and if necessary replace them.
— Replace the shock absorber if inefficient or if there is an oil leak.
— Check that the shock absorber mechanism bellow has no holes or lacerations, if necessary replace.

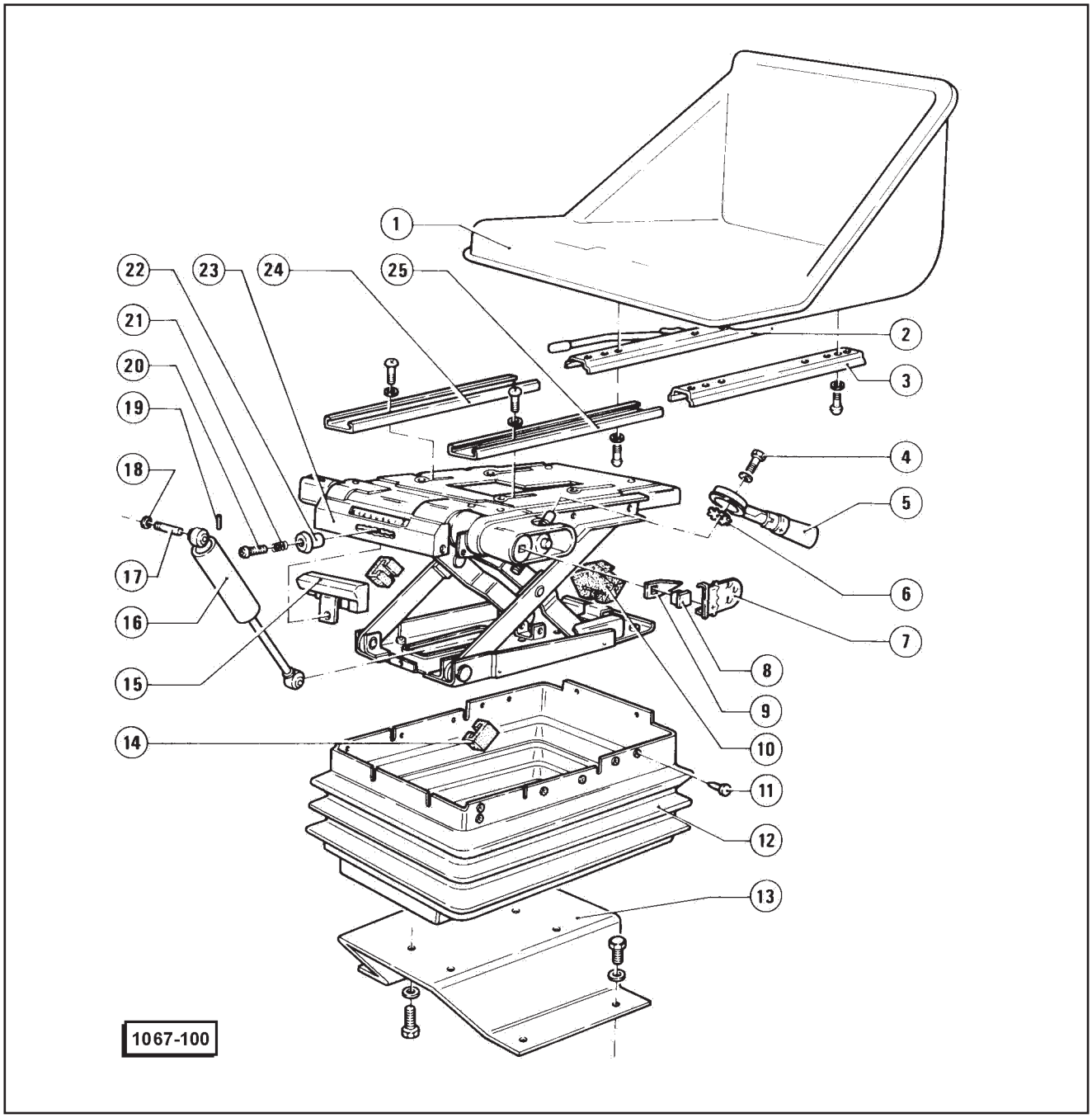
REMOUNTING

Remount the seat and the shock absorber mechanism working in reverse order to that of the removal, respecting the following specifications.
— Do not knock on the roller ball bearing.
— With reference to the diagram on page 315, lubricate with the recommended grease the rollers, pivots, anti-friction bush, roller unit, fork, threaded bush, shock absorber adjustment tie rod and seat drive.

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BOSTROM SEAT



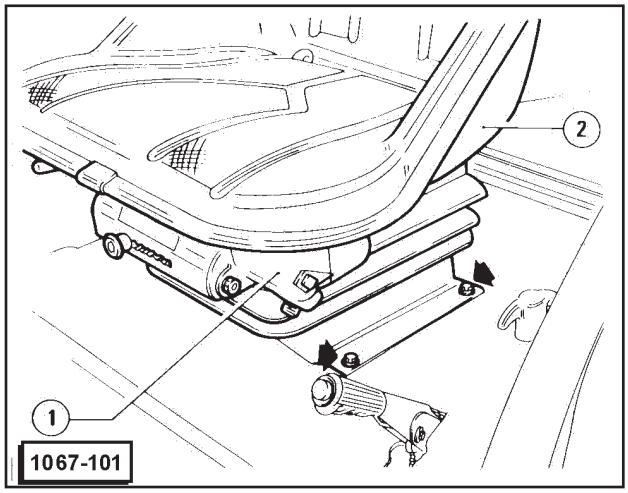
1 - Seat
2 - Mobile part of the right drive
3 - Mobile part of the left drive
4 - Screw
5 - Adjustment knob of the springs
6 - Dented disk
7 - Plate
8 - Tap
9 - Index
10 - Rubber tampon
11 - Plastic nail
12 - Bellow
13 - Bracket
14 - Rubber tampon
15 - Lock block
16 - Shock absorber
17 - Pivot
18 - Retaining ring
19 - Split pin
20 - Screw
21 - Spring
22 - Seat height adjustment knob
23 - Suspension mechanism
24 - Fixed part of the right drive
25 - Fixed part of the left drive

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REMOVAL AND INSTALLATION

1. Unloosen the four screws fastening the suspension mechanism **1** to the cab floor and remove the seat complete with the suspension mechanism.
2. If necessary, remove only the seat **2** without the suspension mechanism working the seat traverse block lever and take off the seat from its drive.

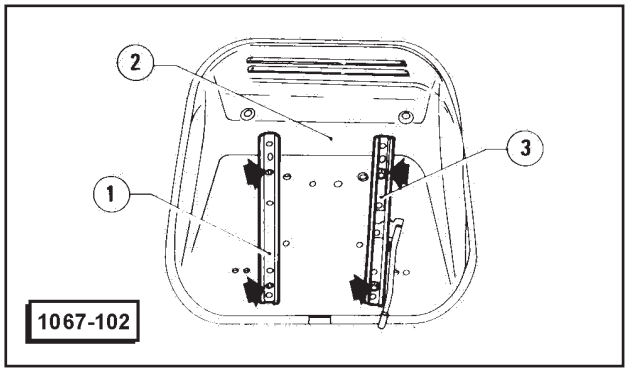


1 - Suspension mechanism
2 - Seat

3. To install the seat, work in reverse order to that of the removal taking care to lubricate the drive with the recommended grease.

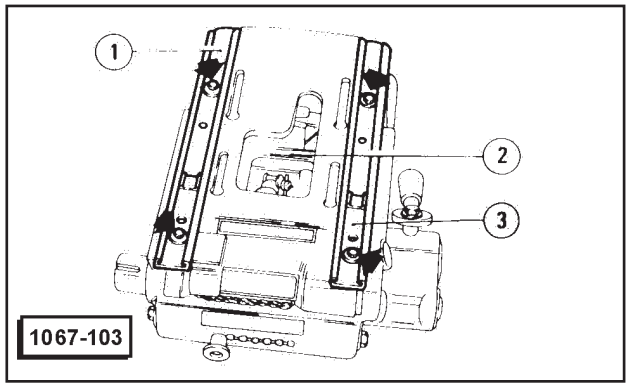
DISMOUNTING

1. Unloosen the fastening screws of the mobile part left drive **1** and of the mobile part right drive **3** and remove the seat **2**.



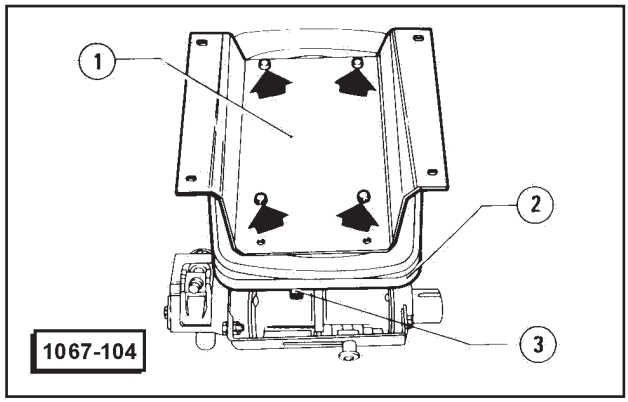
1 - Mobile part left drive
2 - Seat
3 - Mobile part right drive

2. Unscrew the fastening screw of the fixed part of the right drive **1** and of the fixed part left drive **3** and of the suspension mechanism **2**.



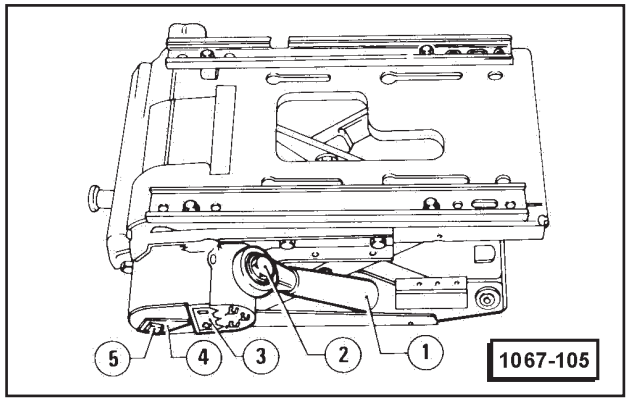
1 - Fixed part of the right drive
2 - Suspension mechanism
3 - Fixed part of the left drive

3. Unscrew the fastening screws of the bracket **1** and remove.
4. Unhook the clinch **3**, remove the plastic nails that fix the bellow **2** and remove.



1 - Bracket
2 - Bellow
3 - Clinch

5. Unloosen the screw **2** and remove the spring adjustment knob **1** and the dented disk.
6. Remove the plate **3**, take off the tap **5** and remove the index.

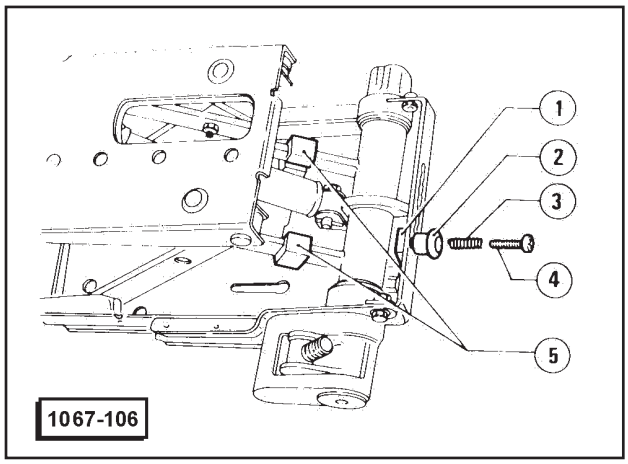


1 - Spring adjustment knob
2 - Screw
3 - Plate
4 - Index
5 - Tap

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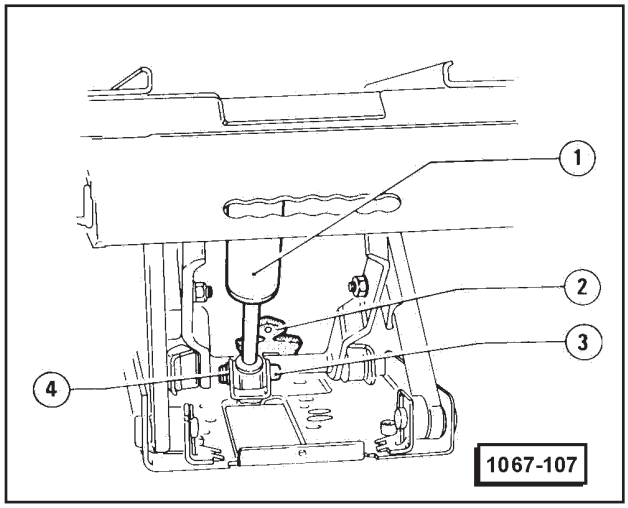
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7. Unloosen the screw **4** remove the spring **3**, the knob **2,** and the lock block **1**.
8. Remove the rubber tampon **5**.



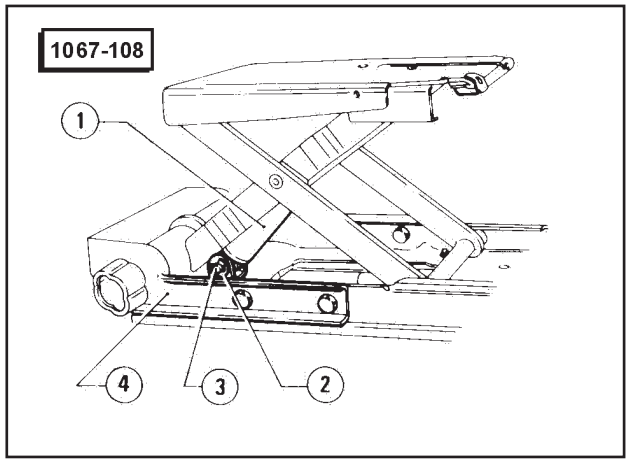
1 - Lock block
2 - Seat height adjustment knob
3 - Spring
4 - Screw
5 - Rubber tampon

9. Remove the rubber tampon **2.**
10. Remove the retainer ring **4** extract the pivot **3** and separate the shock absorber **1** from the fixed frame.



1 - Shock absorber
2 - Rubber tampon
3 - Pivot
4 - Retaining ring

11. Remove the retaining ring **2**, extract the pivot **3** and the shock absorber **1** from the mobile frame **4**.



1 - Shock absorber
2 - Retaining ring
3 - Pivot
4 - Mobile frame

CHECKS AND CONTROLS

— Replace the shock absorber if it is inefficient or has oil leaks or scratched rod.
— Check that the suspension mechanism bellows have no holes or lacerations, replace if necessary.

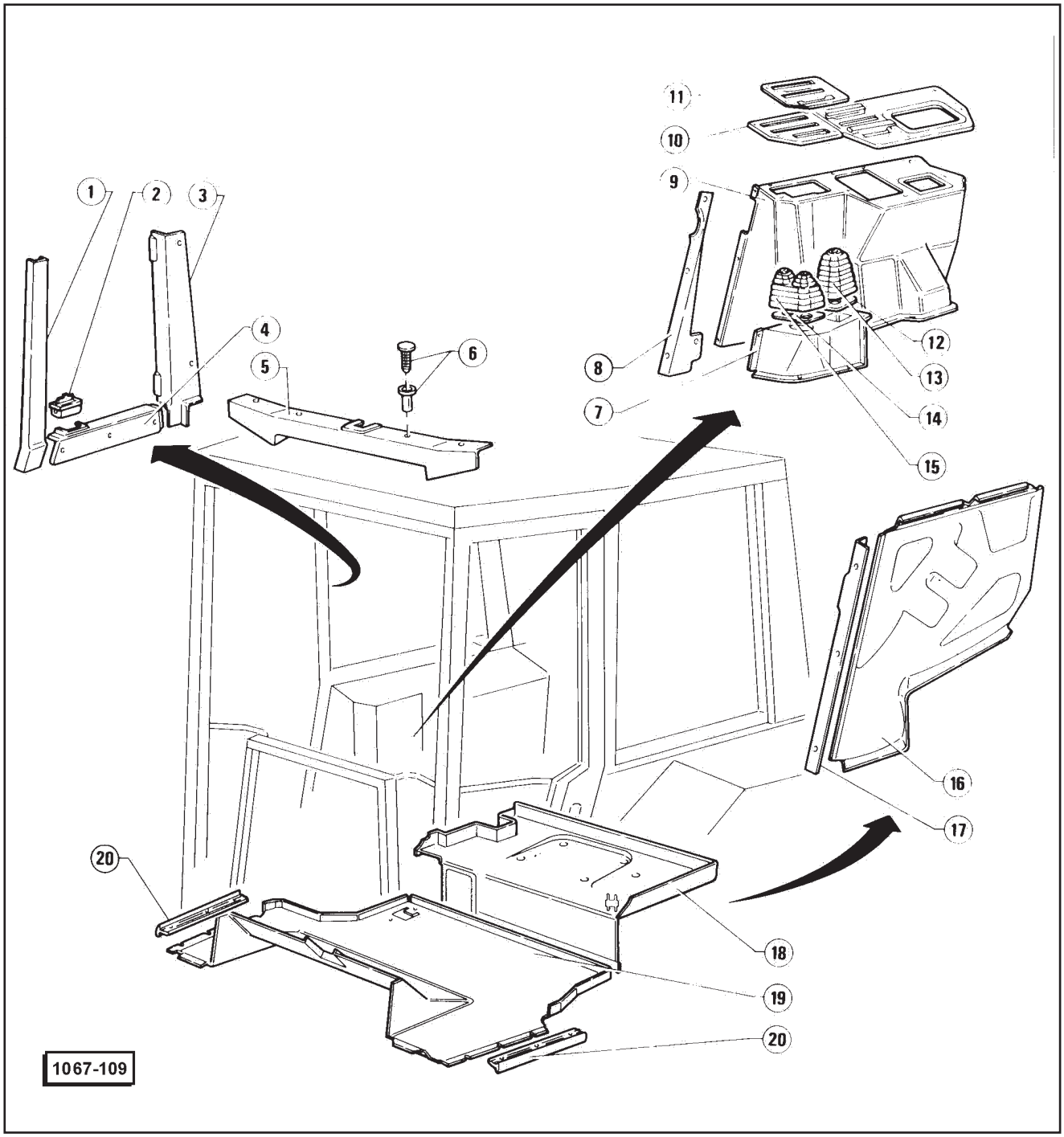
REMOUNTING

Remount the seat working in reverse order to that of the dismounting, taking care to lubricate with the recommended grease -the toothed disk the seat drive and the shock absorber pivots.

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INSIDE TRIM



1 - Front post trim
2 - Ashtray
3 - Rear post trim
4 - Sill trim
5 - Rear cross trim
6 - Screw anchor
7 - Gear protection lever
8 - Right wheelhouse corner trim
9 - Left wheelhouse trim
10 - Template
11 - Grill
12 - Sound proof panel
13 - Single rubber bellow
14 - Left wheelhouse trim
15 - Double rubber bellow
11 - Right wheelhouse corner trim
17 - Rear mat
18 - Front mat
19 - Border

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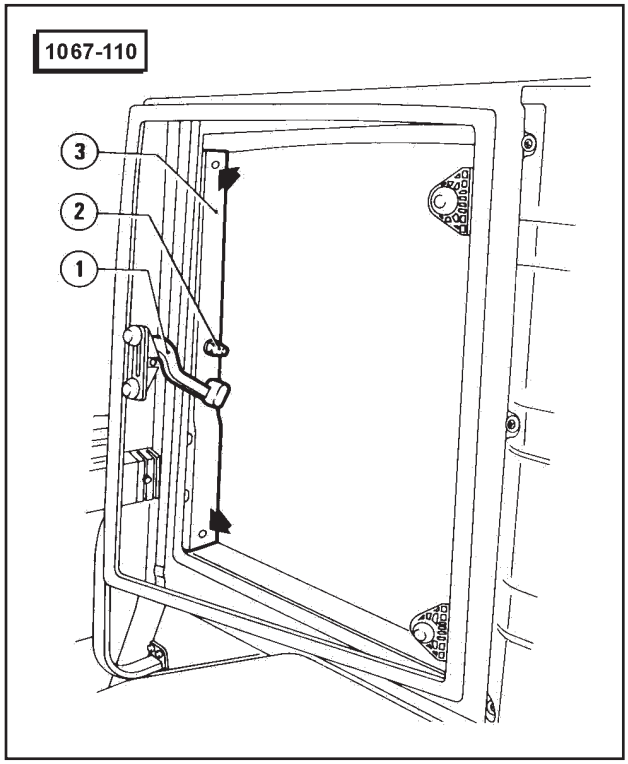
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REMOVAL

NOTE
To remove the screw anchor that fixes the inside trim, the plastic screws must be unscrewed and then extract the anchor from its seat, when remounting replace the anchor screw previously removed.

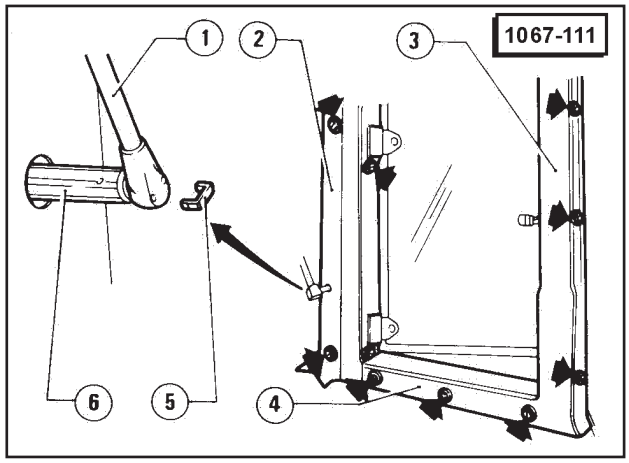
POST, SILL AND CROSS TRIM

1. Unhook the lock handle **1** from the fastener pivot **2** of the side window.
2. Remove the screw anchor indicated in the diagram that fixes the central post trim **3** to the cab.



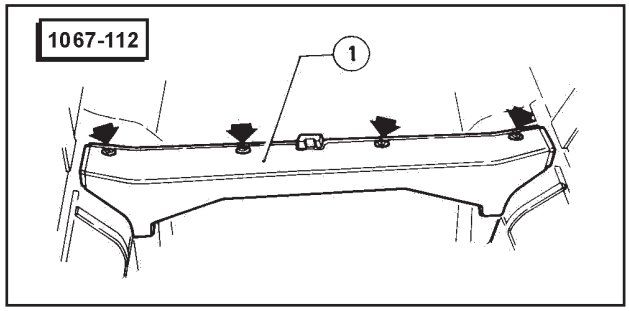
1 - Window lock handle
2 - Pivot fastener
3 - Centre post

3. Remove the screw anchor that fastens the centre post trim **3** on the door side and remove the trim.
4. Remove the anchor that fixed the centre sill trim **4** and remove it.
5. Remove with a screwdriver the clinch **5** then disconnect the shock absorbers **1** from the pivot **6**.
6. Remove the screw anchor that fixes the rear post trim **2** to the cab and remove the trim.



1 - Shock absorber
2 - Rear post trim
3 - Centre post trim
4 - Centre sill trim
5 - Clinch
6 - Pivot

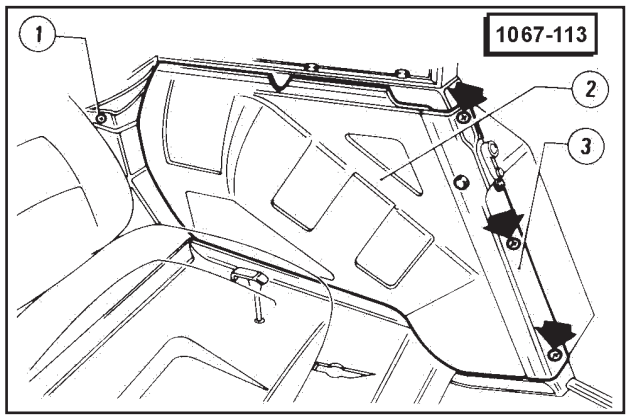
7. Remove the four anchor screws that fix the rear traverse **1** and remove from the cab.



1 - Rear traverse trim

LEFT WHEELHOUSE TRIM

1. Unloosen the screws of the wheelhouse corner trim **3** and remove.
2. Remove the anchor **1** that fastens the left wheelhouse trim **2**, then disconnect from the cab.



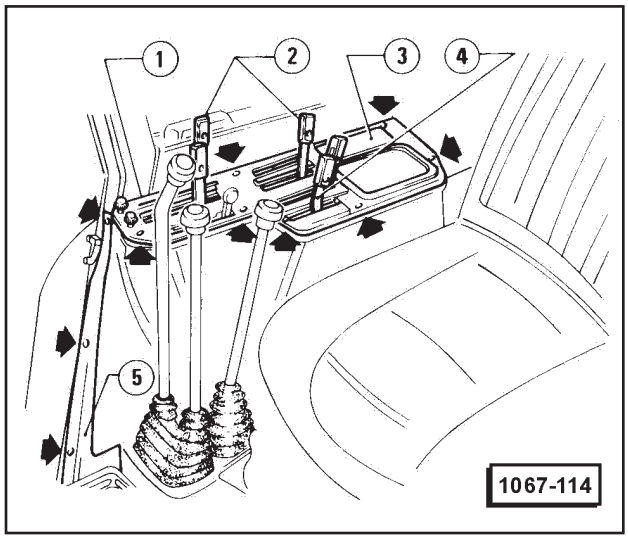
1 - Anchor
2 - Left wheelhouse trim
3 - Left wheelhouse corner trim

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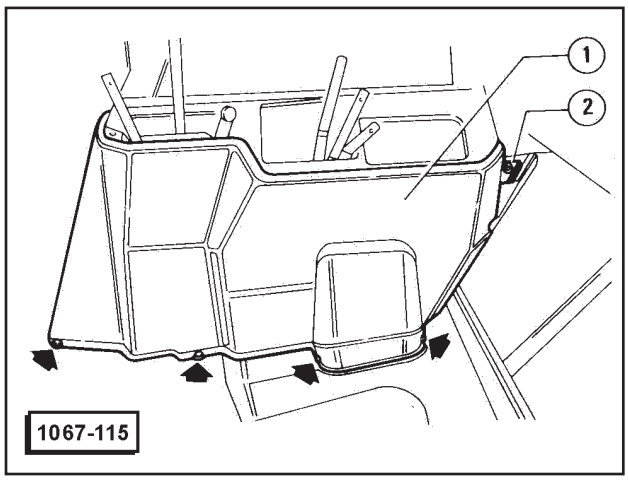
RIGHT WHEELHOUSE TRIM

1. Unscrew the screw that fastens the knob **2** to the lever **4** and remove from the knob.
2. Unloosen the screws and the bolt shown in the diagram and remove the template **3** and the grill **1**.
3. Remove the anchor that fixes the trim to the corner right wheelhouse and remove.



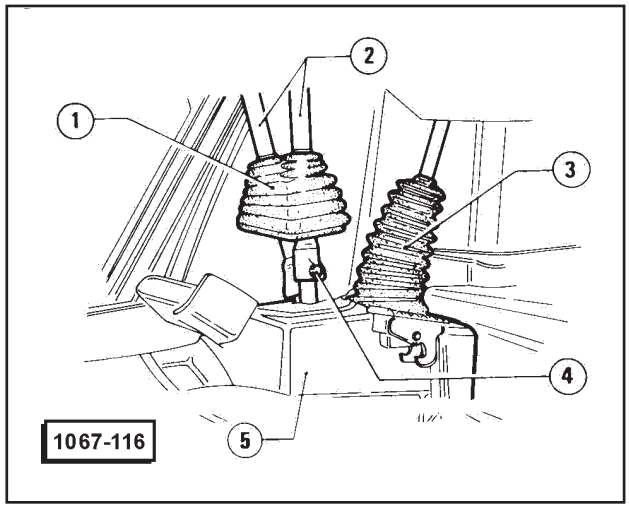
1 - Lifter control lever grill
2 - Knob
3 - Template
4 - Lever
5 - Right wheelhouse corner trim

4. Remove the seat (see: Seats).
5. Lift the mats, remove the anchor **2** and the four screws fixing the right wheelhouse trim **1**, then remove the trim together with the inside padding.



1 - Right wheelhouse trim
2 - Anchor

6. Lift the rubber bellow **1** and **3,** loosening the screws **4** and take off the lever **2** together with the bellows.

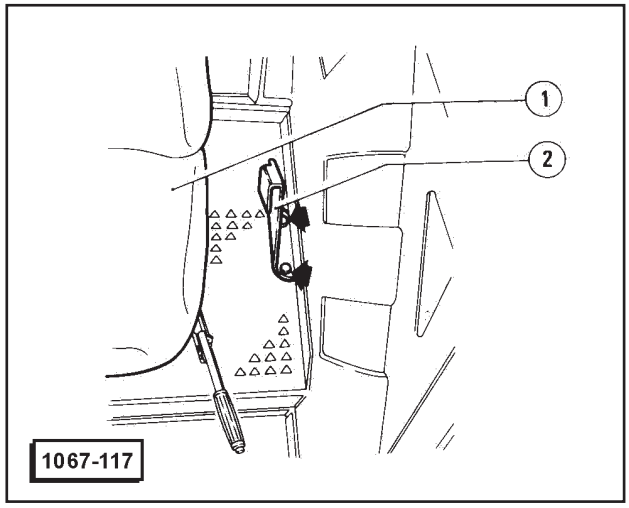


1 - Double rubber bellow
2 - Gear lever
3 - Single rubber bellow
4 - Screws
5 - Gear lever protection

7. With reference to the previous diagram, unloosen the screw that fastens the protection **5** and remove, together with the sound proofing panels.

FLOOR TRIM

1. Remove the seat **1** (see: Seats) unscrew the two screws shown in the diagram and remove the bracket **2** if present.

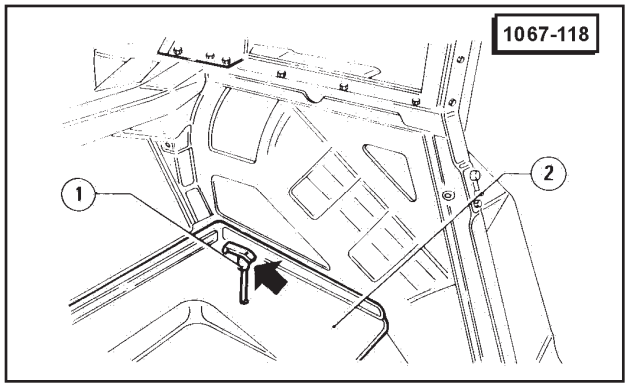


1 - Seat
2 - Bracket

2. Remove the retaining ring shown in the diagram and remove the engagement-disengagement double traction handle **1**.
3. Remove the rear mat **2**.

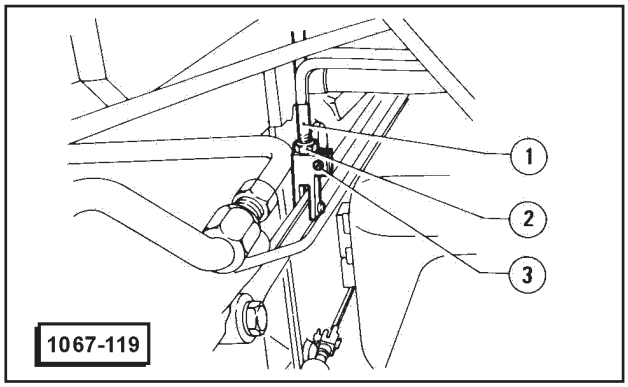
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1 - Engagement-disengagement double traction handle
2 - Rear mat

4. Unloosen the screw **3**, unscrew the nut **2** and unscrew from the inside of the cab the differential lock control pedal rod **1.**



1 - Differential lock pedal rod
2 - Nut
3 - Screw

5. With reference to the diagram shown on page 323 unloosen the fastening screws of the two borders **19** and remove them.
6. Remove the front mat **18**.

INSTALLATION

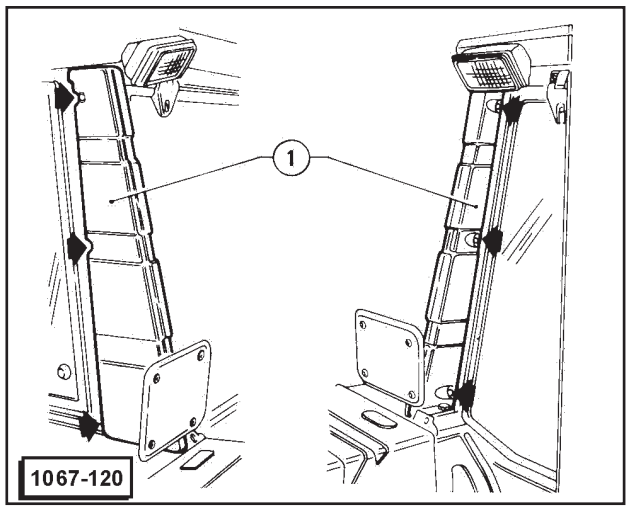
Reassemble the inside trim working in reverse order to that of the dismounting, noting the following specifications.
— Do not tighten excessively the anchor screw
— To replace the glued trim and padding, eliminate the residual traces of the glue, then put the specified glue on both surfaces and join with light pressure.
— In the case of the removal of the floor trim proceed with the adjustment of the differential lock pedal (see: Gear - Rear Gearbox - Differential Lock System).

FINISHING PROFILE AND EXTERNAL ACCESSORIES

FINISHING PROFILE

REMOVAL AND INSTALLATION

1. Unloosen the screw of the anchor screw shown in the diagram, removing the anchor and the two finishing profiles.
2. Remount the profile **1** working in reverse order to that of the removal taking care to replace the anchor screws previously removed.



1 - Finishing profile

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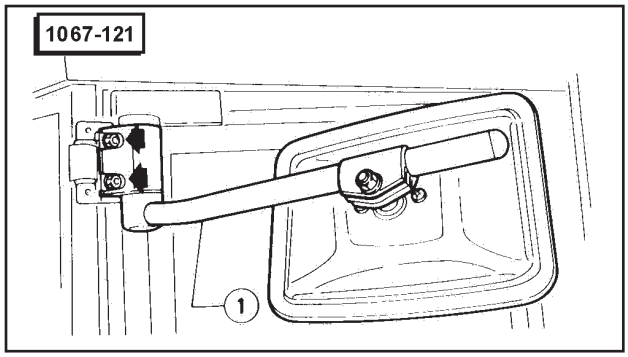
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EXTERNAL ACCESSORIES

REMOVAL AND INSTALLATION

Rear view mirror

1. Unloosen the screw shown in the diagram and remove the rear view mirror **1.**

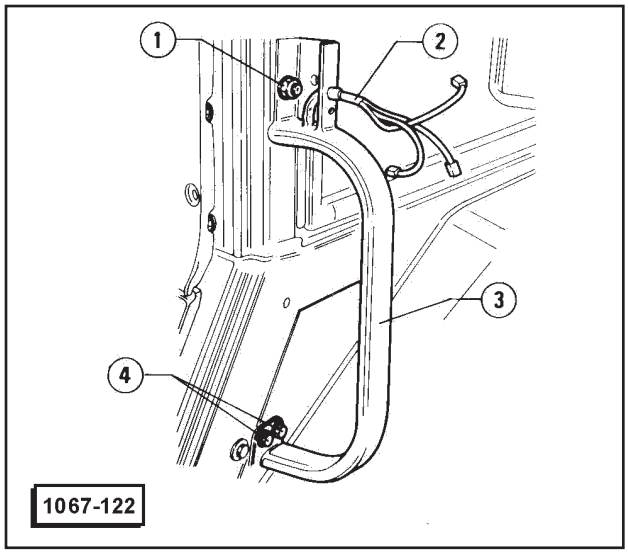


1 - Rear view mirror

2. Install the rear view mirror working in reverse order to that of the removal.

Handle

1. Remove the side view unit (see: Electric System Side View Unit - Removal and Installation).
2. Unscrew the nut **1** and the screws **4**.
3. Extract the cables **2** and remove the handle **4** together with the gaskets.

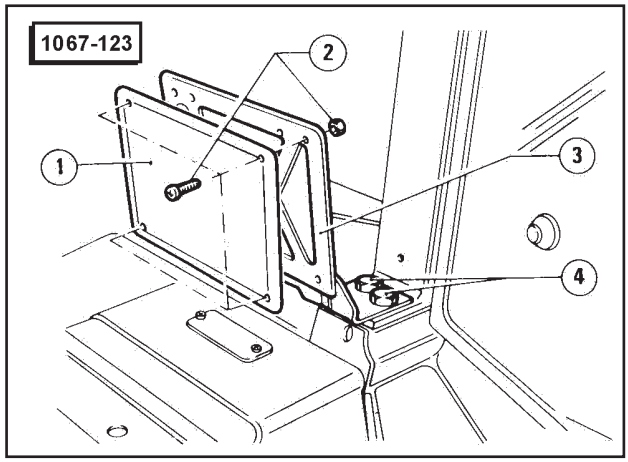


1 - Nut
2 - Cables
3 - Handle
4 - Screw

4. Install the handle working in reverse order to that of the removal.

Plate holder

1. Unscrew the bolts **2** and remove the plate **1**.
2. Unscrew the bolts **4** and remove the plate holder bracket **3**.

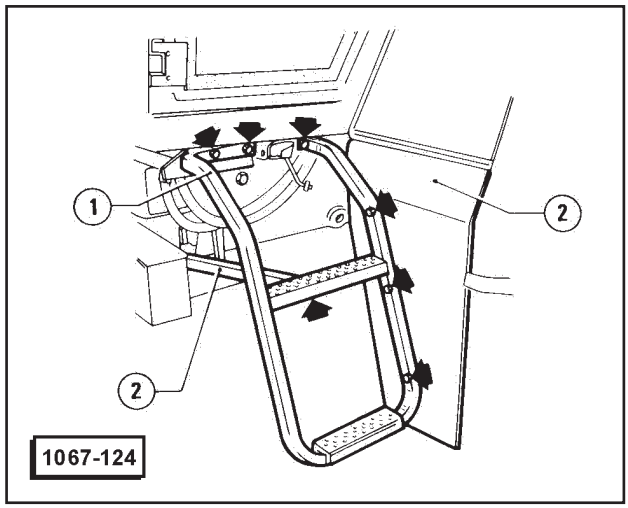


1 - Plate
2 - Bolt
3 - Bracket plate holder
4 - Bolts

3. Install the plate holder working in reverse order to that of the removal.

Ramp

1. Unloosen the two screws and the bolt **1** fastening the ramp to the cab.
2. Unloosen the bolts fastening the bracket **3** to the ramp and remove the ramp.
3. Unscrew the three bolts fastening the protector **2** to the ramp and remove the protection.



1 - Ramp
2 - Protection
3 - Bracket

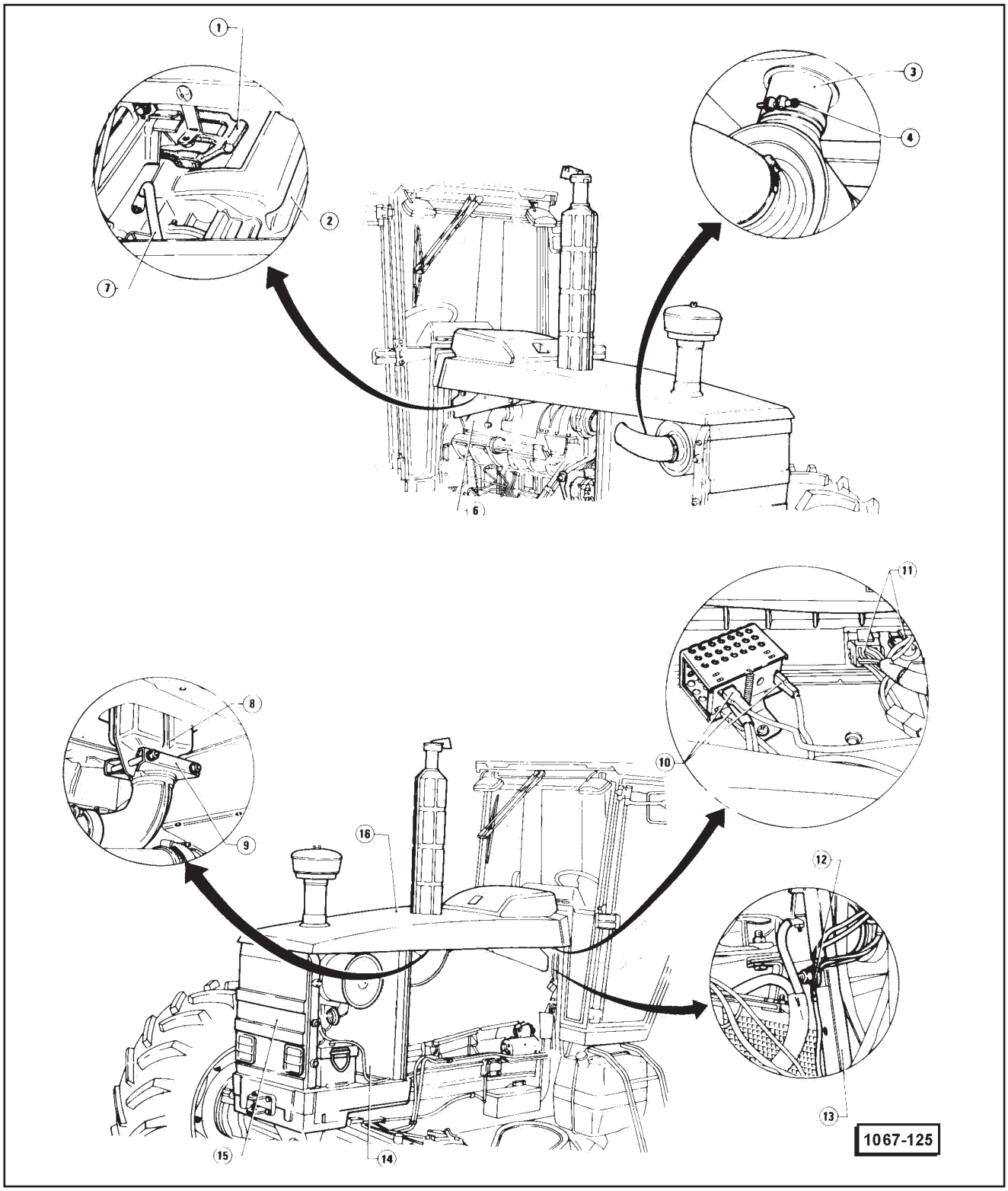
4. Install the ramp working in reverse order to that of the removal.

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HOODS

UPPER HOOD



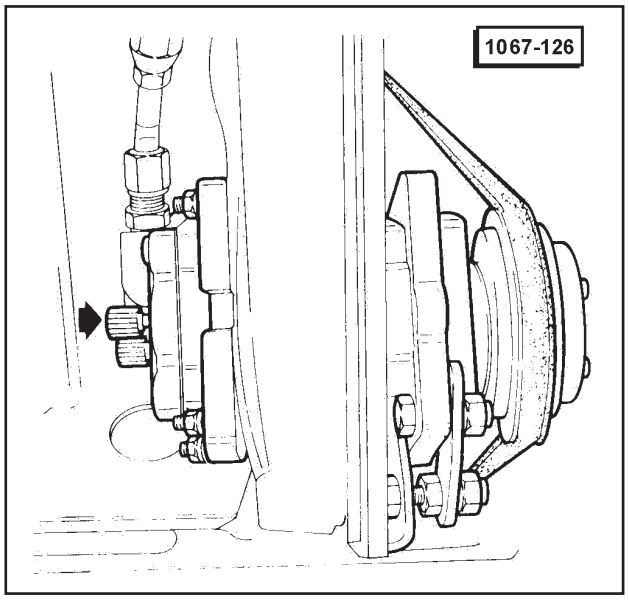
1 - Rubber clip
2 - Heater
3 - Air prefilter adaptor pipe
4 - Clip
5 - Windscreen washer liquid tank
6 - Thermosoundproof panel
7 - Heating feeder cables
8 - Silencer
9 - Bracket (only for 150)
10 - Resistance cables
11 - Electric ventilator cable
12 - Earth cable
13 - Rear bulkhead
14 - Front bulkhead
15 - Front template
16 - Upper hood

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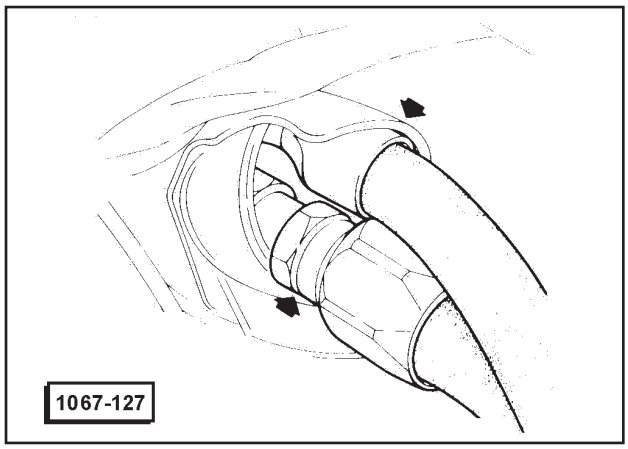
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REMOVAL AND INSTALLATION

With reference to the previous diagram, remove the upper hood as follows:
1. Unscrew the guide vane nuts and remove the side hood.
2. Unloosen the fastening screw of the clamp **4** and remove upwards the air prefilter adaptor pipe **3**.
3. Unloosen the five fastening screws of the right and left thermo-soundproofing panels **6** and remove.
4. Disconnect the window wiper liquid tank pipe **5** blocking the electric pump feeder.
5. Unscrew the two fastening nuts of the heater feeder cables, on both sides of the heater **2.**
6. When the conditioner is assembled, carry out the following procedure.
— Discharge the system by the valves shown in the diagram.



— Disconnect the two fittings shown in the diagram using a contrast spanner.

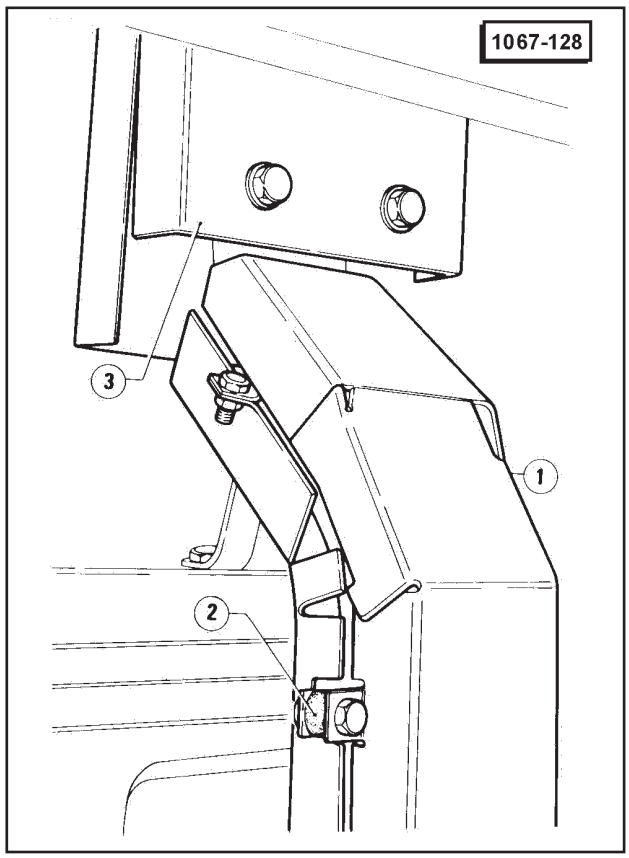


7. With reference to the diagram on page 327 disconnect the rubber clip **1** connecting the heater **2** to the cab on both sides.

8. Unscrew the earth cable fastening bolt **12** coming from the cab and disconnect.
9. Only for 150, unscrew the bolts of the fastening bracket **9** of the silencer **8** and remove the silencer from above.

Only for 130 - 110. With reference to the following diagram, unloosen the screws and the fastening nuts from the antiheat protector **1** and recuperate the protector and the rubber spacer **2**.

NOTE
The bolts of the silencer fastening bracket fasten also the protector **3**, therefore recuperate the protector before proceeding with other operations.



1 - Exhaust pipe antiheat protector
2 - Rubber spacer
3 - Silencer antiheat protector

10. With reference to the diagram on page 327, disconnect the cables **11** and **10**.
11. Unloosen the seven screws **16** fastening the upper hood to the front template **15**, to the front bulkhead **14** and to the rear bulkhead **13**. Remove with care the hood.

CAUTION
Two operators are needed to remove the upper hood.

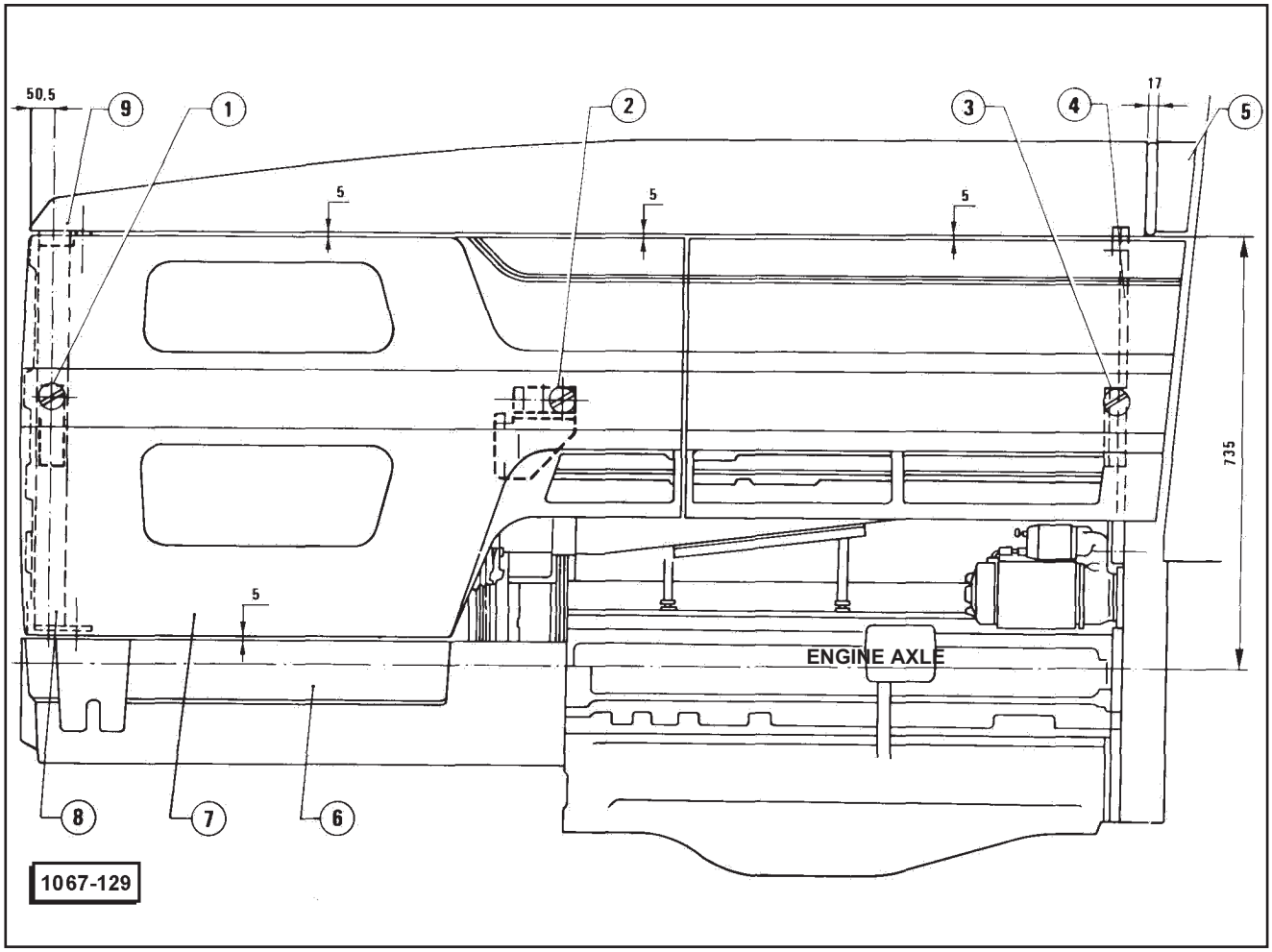
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12. Install the upper hood working in reverse order to that of the removal, noting the following specifications.
— Check and eventually top-up the level of the windscreen wiper liquid.
— Proceed with the recharging of the conditioner if present.
— Proceed with the eventual adjustment of the hood position (see: Hood Position Adjustment).

HOOD POSITION ADJUSTMENT

The correct procedure is hereby given and the quotas to be respected for assembly of the fastening link and the frame to -obtain the alignment of the hoods and their correct spacing.



1 - Side hood fastening link
2 - Side hood fastening link
3 - Side hood fastening link
4 - Rear small window frame
5 - Dashboard rim
6 - Front support
7 - Side hood
8 - Front frame
9 - Upper hood

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UPPER HOOD

Adjust at assembly the upper hood position by the rear frame **4,** until the quota of **735 mm** (28.94 in) is reached between the engine axis and the lower border of the upper hood. Adjust the position of the front frame **8** until the quota **50,5 mm** (1.99 in) is reached between the centre of the frame and the front profile of the hood, then fix the hood to the front support.

DASHBOARD FRAME

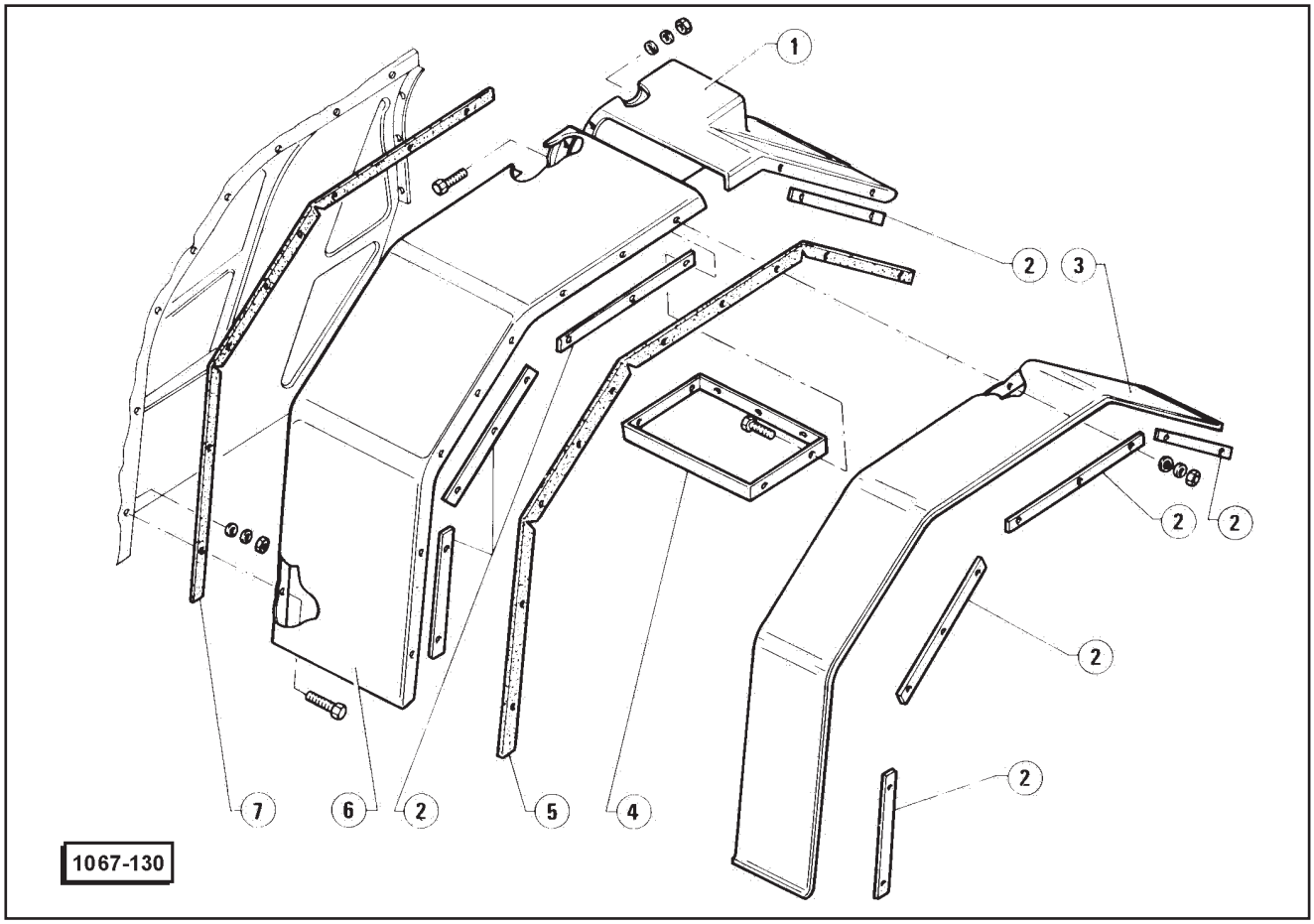
Adjust the position of the dashboard frame **5** until in alignment to the upper border of the upper hood, and is at a quota of **17 mm** (0.67 in) between the upper hood and the rim **5.**

SIDE HOODS

By using a special template and by working on the plates **1**, **2** and **3** in a suitable way, adjust the position of the side hoods so as to reach the following quotas:
1) a space of 5 mm (0.20 in) between the side hoods **7** and the upper hood **9**.
2) a space of 5 mm (0.20 in) between the side hoods and the front support **6**.
3) Alignment between the side hood and the front profile of the upper hood.

MUDGUARDS

REAR MUDGUARD



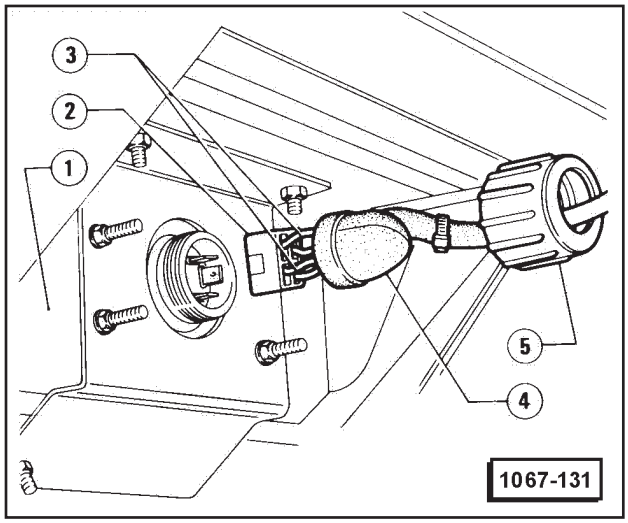
1 - Splash guard
2 - Supplementary splash guard
3 - Strap
4 - Frame
5 - Gasket
6 - Rear mudguard
7 - Gasket

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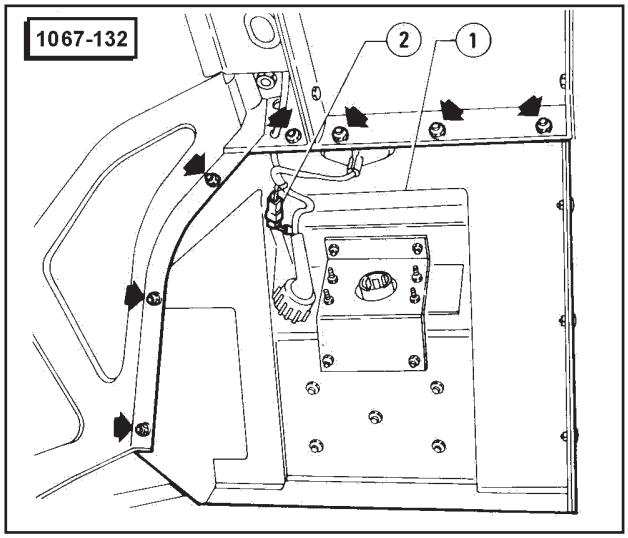
REMOVAL AND INSTALLATION

1. Remove the rear wheel (see: Wheel and Pneumatics - Disassembly - Assembly).
2. With reference to the previous diagram, remove the supplementary splashguard **2** (if fitted) unscrewing the bolts and recuperating the strap **3** and the gasket **5**.
3. With reference to the previous diagram, unscrew the ring nut **5** and disconnect the container **2** from the rear optic unit.
4. Detach the cable terminal **3** of the connector **2** unhooking the lock spring of the cable with a thin pointed tool.
5. Take off the connector, the cap **4** and the ring nut **5**.



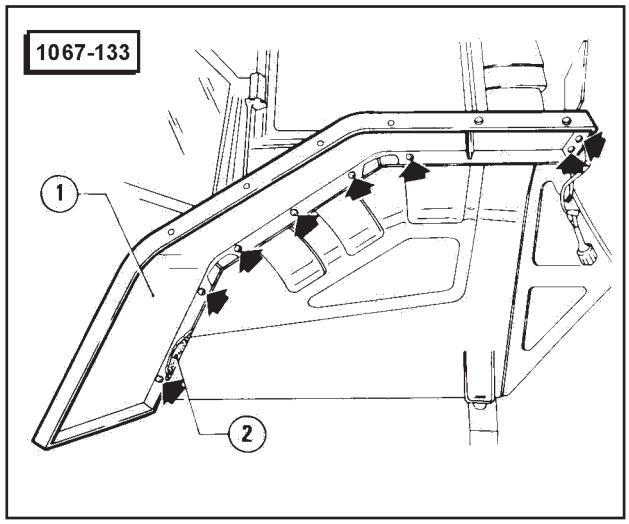
1 - Rear optic unit
2 - Connector
3 - Cable terminal
4 - Cap
5 - Ring nut

6. Disconnect the connectors from the plate light **2.**
7. Unscrew the bolts shown in the diagram and remove the splashguard **1**.



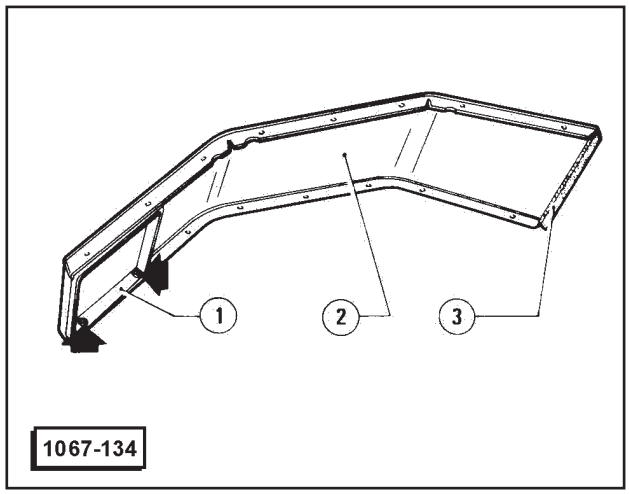
1 - Splashguard
2 - Plate light connector

8. Unscrew the bolts indicated in the diagram and remove the mudguard **1** with the gasket **2**.



1 - Mudguard
2 - Seal

9. Unscrew the bolt shown in the diagram and remove the frame **1**.
10. Remove the seal **3** mounted on the front border of the mudguard **2**.



1 - Frame
2 - Mudguard
3 - Seal

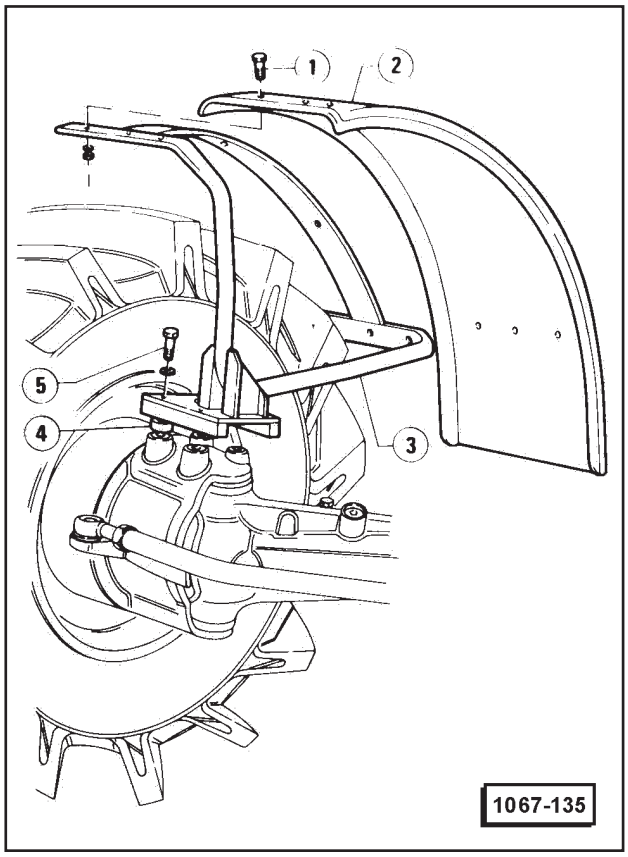
11. Install the mudguard working in the reverse order to that of the removal.

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FRONT MUDGUARDS

REMOVAL AND INSTALLATION



1 - Bolt
2 - Mudguard
3 - Frame
4 - Spacer
5 - Screw

1. With reference to the diagram, unscrew the four screws **5,** remove the frame **3** complete with the mudguard **2** and spacers **4**.
2. Unscrew the eight bolts **1** and separate the mudguard **2** from the frame **3**.
3. Install the front mudguard working in reverse order to that of the removal.

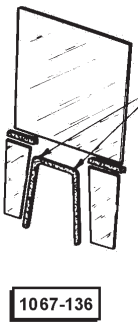
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TECHNICAL DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

Sealers

Application	Type	Denomination	Model
 Corners of profile held between front and dashboard	Fixing	LOCTITE 495	110 - 130 - 150
Roof fastener screw	Fixing	BOSTIK 122	110 - 130 - 150
Cable passage hole in the front floodlight shell			
Covering wheelhouse			

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LIFTING GROUP

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ELECTRICAL LIGHTING

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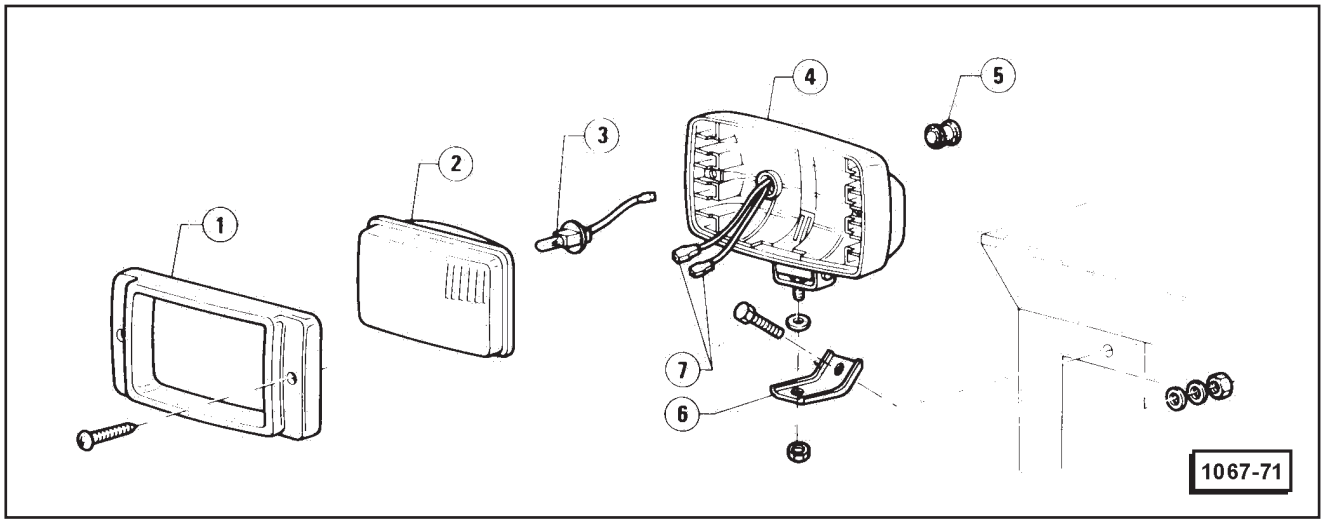
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HEADLIGHTS

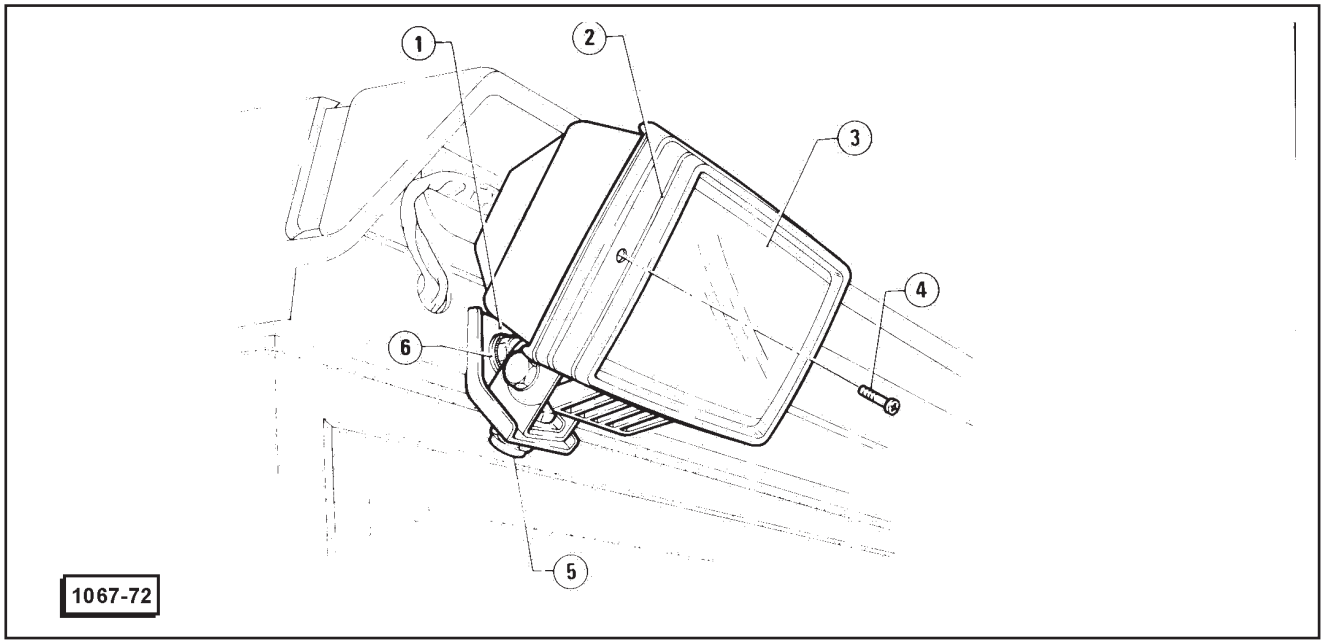
FRONT HEADLIGHTS



1 - Rim
2 - Optical centre
3 - Bulb
4 - Headlamp
5 - Rubber wiring holder
6 - Clip
7 - Wiring harness

REMOVAL AND INSTALLATION

1. Loosen the screws **4** fixing the rim **2** and remove.
2. Referring the enlarged diagram, remove the faston connectors **7** and remove the optical centre **2**.
3. Remove the rubber wiring holder **5** and slip the electrical wiring from the headlamp shell **4**.
4. Refer to the following diagram and loosen the nut **5** and remove the headlamp shell from the harness **1**.



1 - Harness
2 - Rim
3 - Optical centre
4 - Screws
5 - Automatic lock nut

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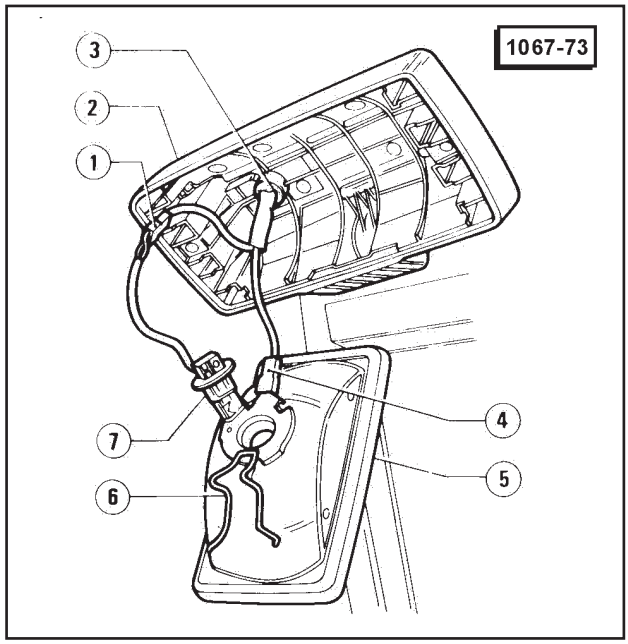
5. Reassemble the front headlamps working in the reverse order taking care to close the wiring passage hole with silicone sealer.

BULB REPLACING

1. Remove the headlamp rim, disconnect the optical centre **5** and keep suspended.
2. Unfasten the clip **6**.
3. Disconnect the faston connector **1** and remove the bulb **7**.

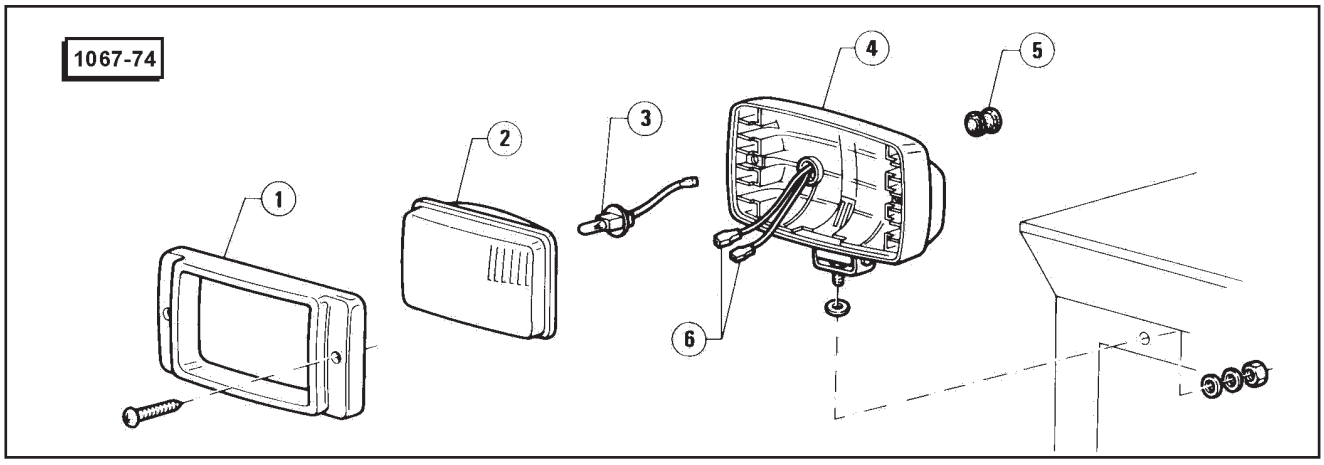
CAUTION
Don't touch the bulb 7 with your bare hands. Should you do so clean it with alcohol.

4. Replace the bulb and reassemble in reverse order.



1 - Faston connector
2 - Headlamp
3 - Rubber wiring holder
4 - Faston connector
5 - Optical housing
6 - Clip
7 - Bulb

REAR HEADLAMPS



1 - Rim
2 - Optical housing
3 - Bulb
4 - Headlamp shell
5 - Rubber wiring holder
6 - Wiring harness

REMOVAL AND INSTALLATION

1. Loosen the screws **1**and remove the rim **4**.
2. Disconnect the internal wiring and remove the optical housing working as described for front headlamps.
3. Loosen the nut **3** and remove headlamp shell from the clamp on the cabin.

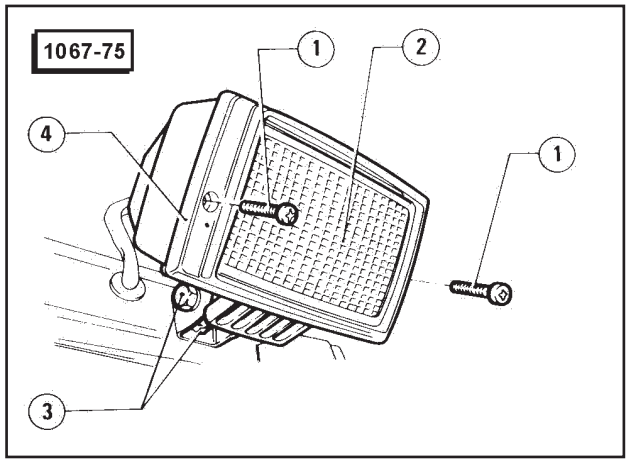
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4. Reassemble the headlamp working in the reverse order taking care to seal the wiring hole with a silicone sealer.

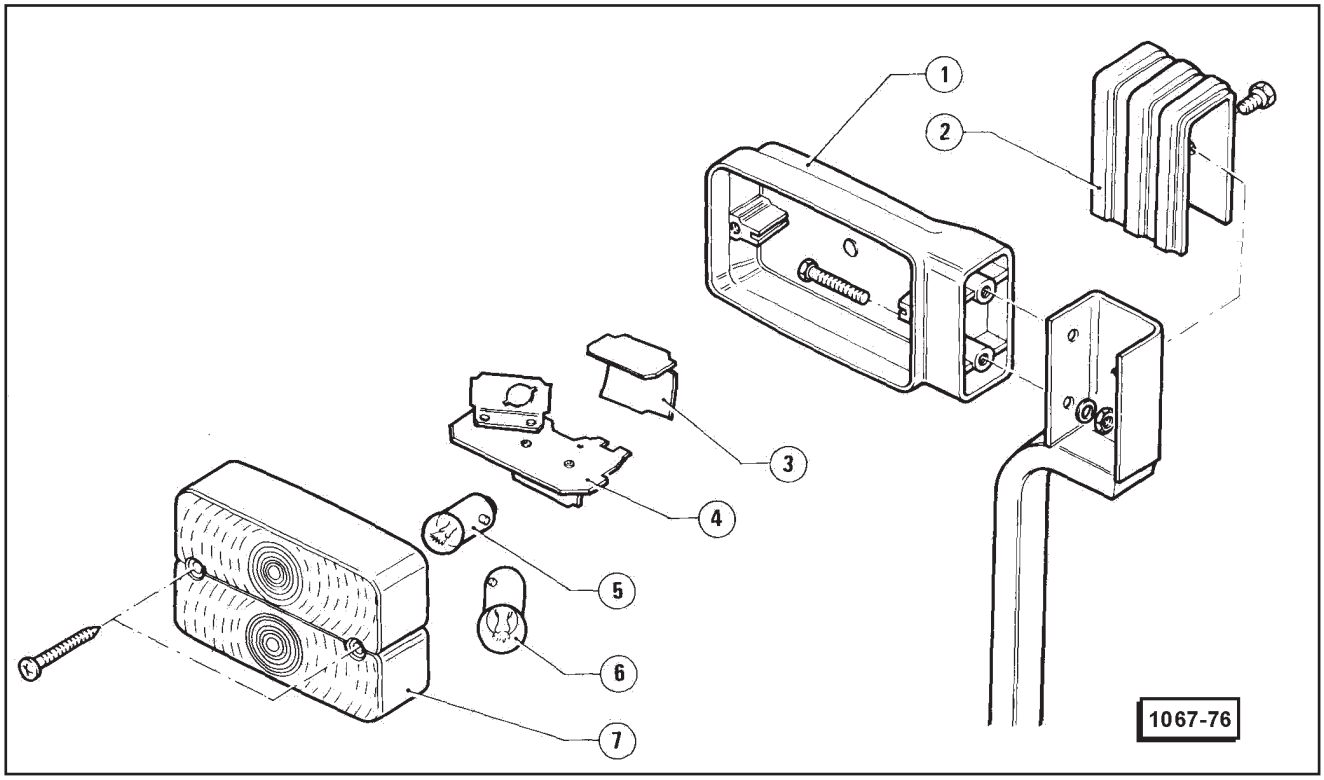
BULB REPLACING

Refer to: Front Headlight - Bulb Replacing.



1 - Screws
2 - Optical housing
3 - Nuts
4 - Rim

SIDE LIGHT GROUP



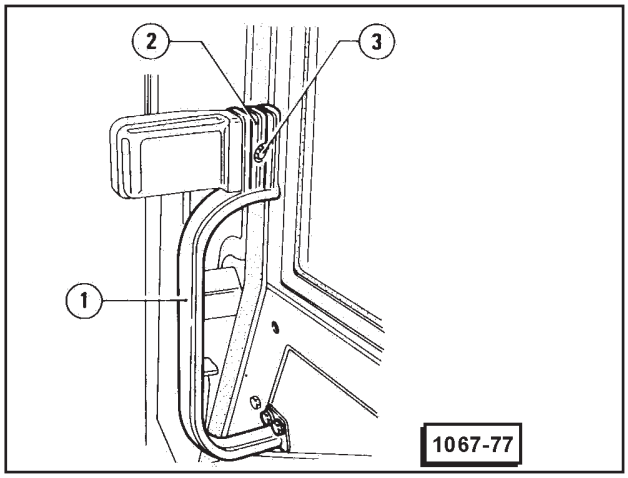
1 - Optical centre shell
2 - Cover
3 - Shield
4 - Lamp holder
5 - Position light bulb
6 - Indicator light bulb
7 - Glass cover

REMOVAL AND INSTALLATION

1. Loosen the screw **3** which fixes the cover **2** to the handle **1** and remove the cover.

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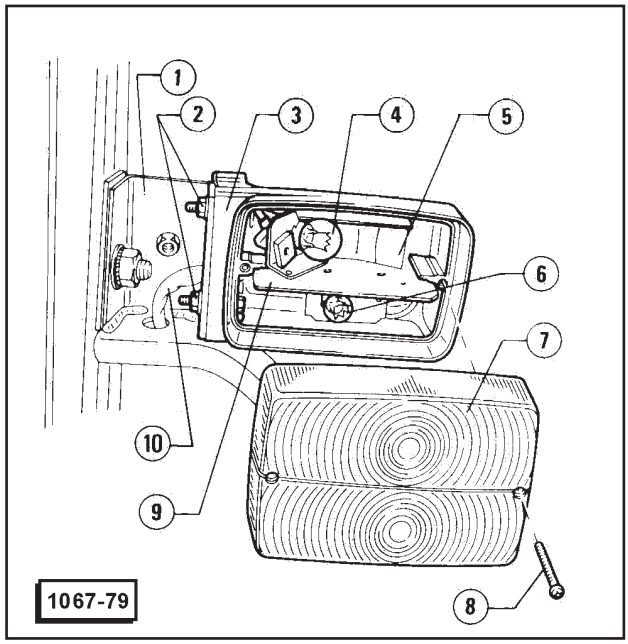


1 - Handle
2 - Cover
3 - Screw

2. Referring to the following diagram of the bumper, loosen the two screws **8** and remove the glass cover **7**.
3. Remove the frame **9** and the shield **5** and disconnect the wiring **10**.
4. Unscrew the nuts **2** and remove the shell **3** from the handle.
5. Reassemble the optical group using the reverse order.

BULB REPLACING

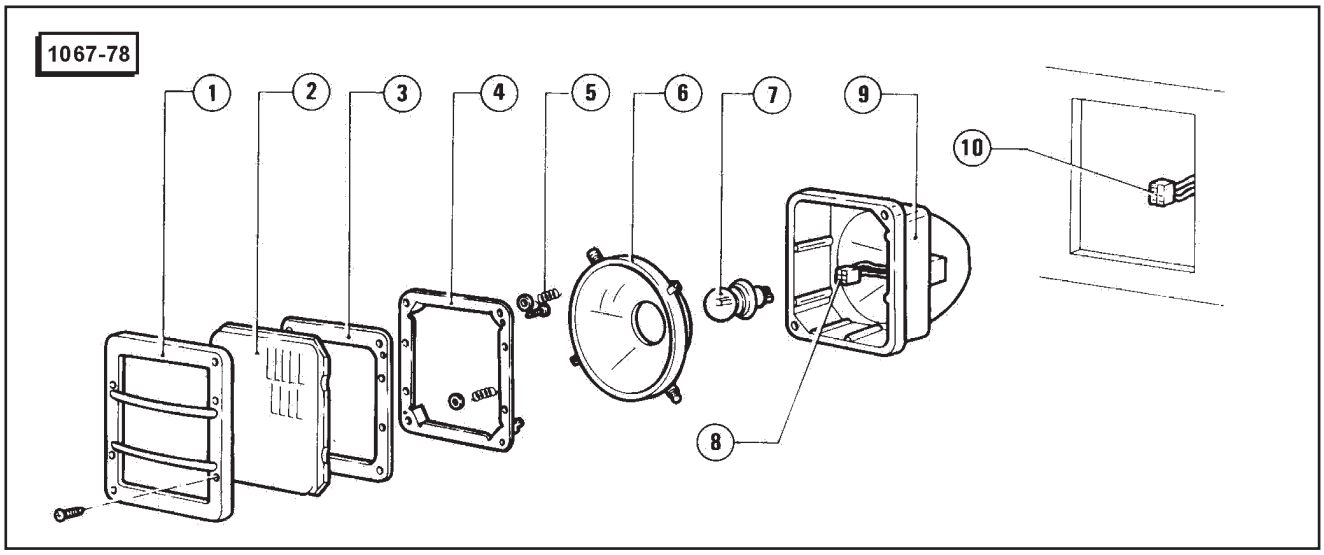
1. Loosen the two screws **8** that fix the glass cover **7** and remove.
2. Remove the direction indicator bayonet bulb **4** and the parking light bayonet bulb **6.**



1 - Handle
2 - Nuts
3 - Headlamp shell
4 - Direction indicator bayonet bulb
5 - Shield
6 - Parking light bayonet bulb
7 - Glass cover
8 - Screws
9 - Frame
10 - Wiring

3. Change the bulb and reassemble working in the reverse order.

FRONT HEADLIGHTS



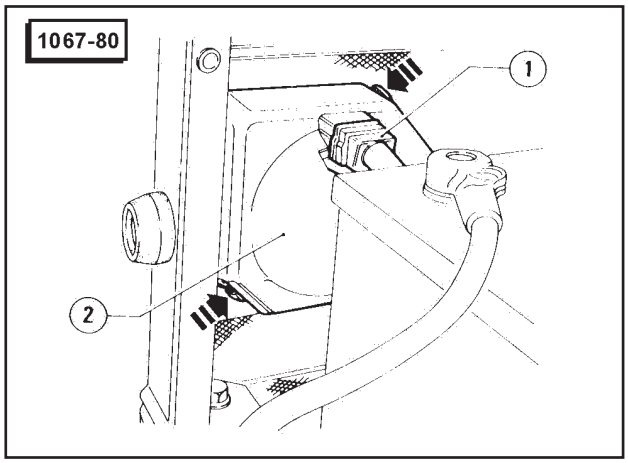
1 - Rim
2 - Glass
3 - Trimming
4 - Frame
5 - Spring
6 - Shield
7 - Bulb
8 - Internal wiring
9 - Headlamp shell
10 - External wiring

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REMOVAL AND INSTALLATION

1. Unscrew the winged nuts and remove the engine side hood.
2. Disconnect the connectors **1**.
3. Press the fixing clip as indicated in the diagram, and remove the complete front headlight.

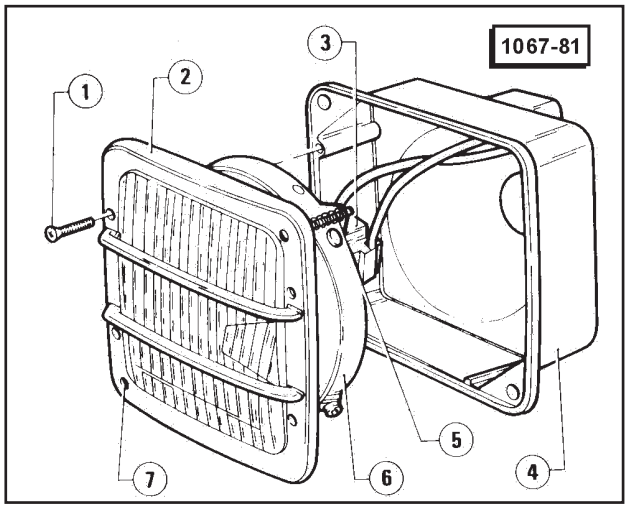


1 - External wiring connector
2 - Front headlight

4. To remount the front headlight work in the reverse order.

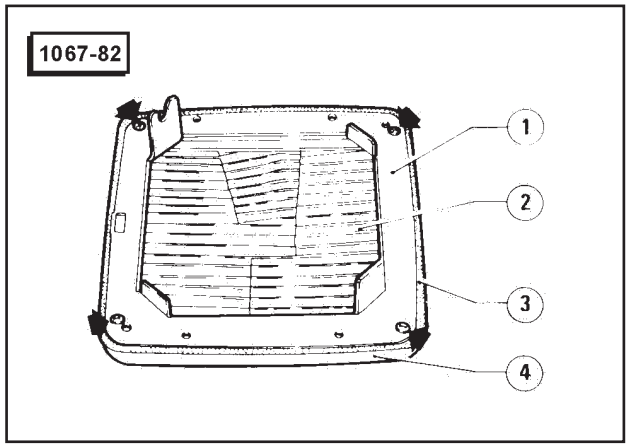
DISASSEMBLY AND REASSEMBLY

1. 1.Loosen the four screws **1** and remove the optical group **2** from the headlamp shell **4.**
2. Loosen the two screws **7** and remove the shield **6** and remove the spring **5**.



1 - Screws
2 - Optical group
3 - Internal wiring connector
4 - Light shell
5 - Spring
6 - Shield
7 - Screws

3. Loosen the frame fixing screws **1** remove the frame itself, the glass **2** the rim **4** and the trimming **3**.

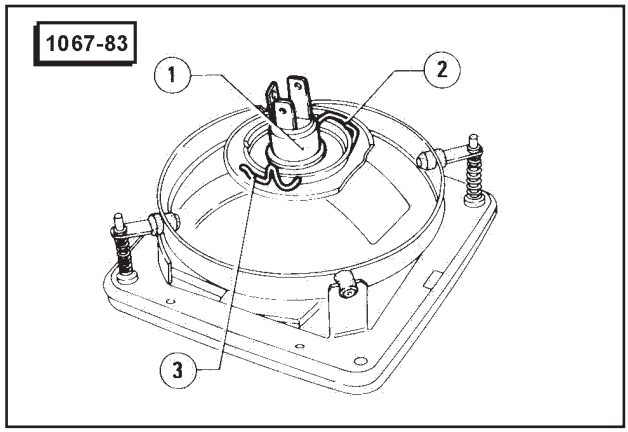


1 - Frame
2 - Glass
3 - Trimming
4 - Rim

4. Remount the front headlight working in the reverse order.

BULB REPLACING

1. Without removing the headlight from the tractor, remove the optical group (refer to: Dismounting and Remounting).
2. Unhook the clips (3) by lifting them, and slip out the bulb (1).



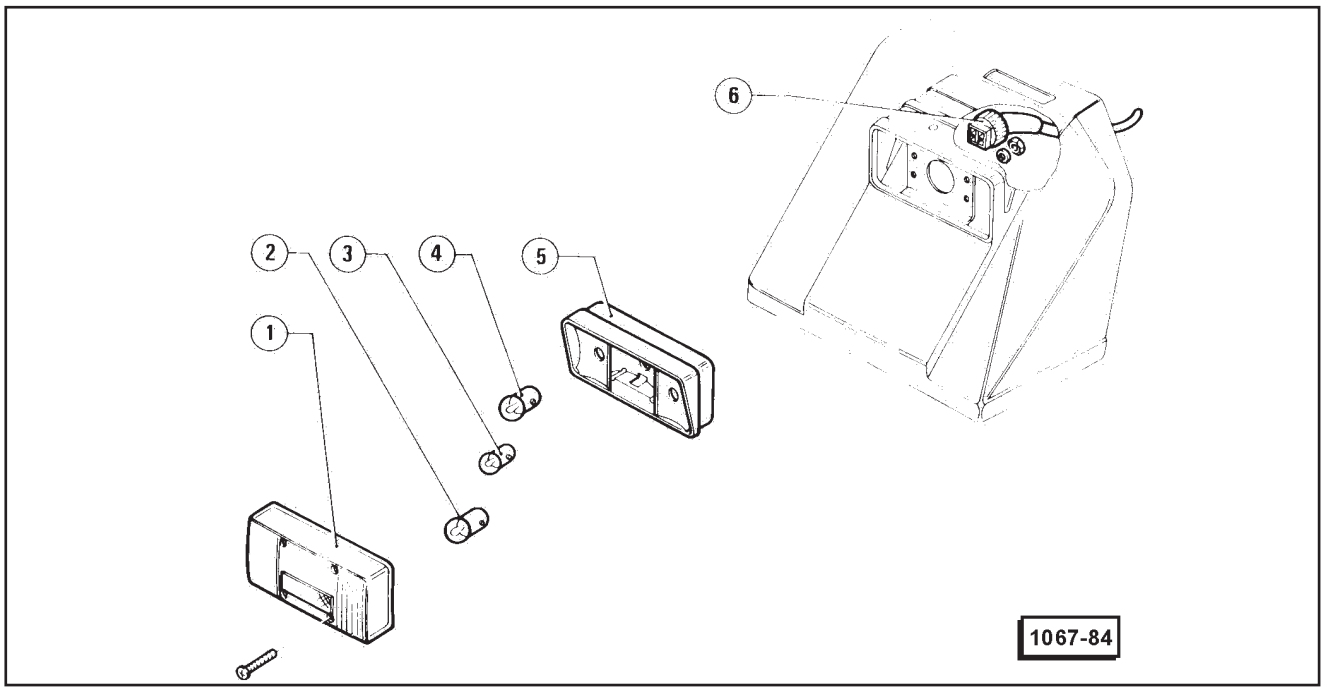
1 - Bulb
2 - Clips

3. Change the bulb and remount the headlight working in the reverse order.

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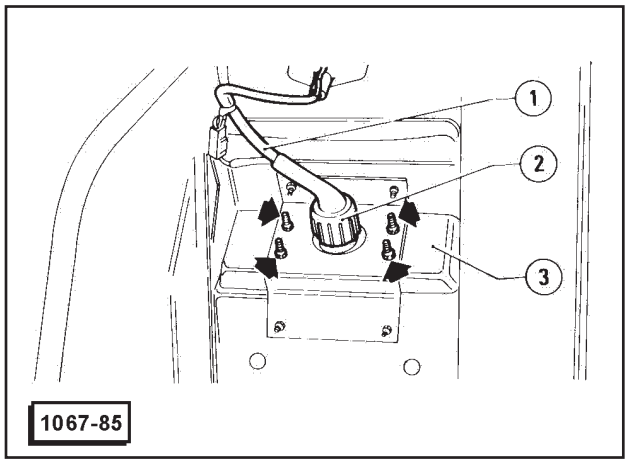
REAR LIGHTING GROUP



1 - Glass
2 - Stop light bulb
3 - Parking light bulb
4 - Indicator light bulb
5 - Light shell
6 - Wiring

REMOVAL AND INSTALLATION

1. Unscrew the ring nut **2** and remove the wiring **1.**
2. Loosen the nut **3** fixing the light, and remove.

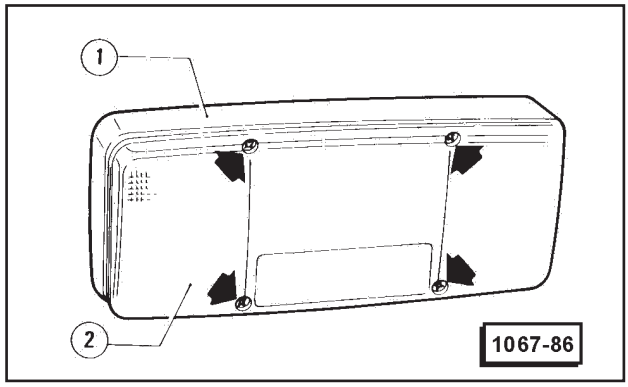


1 - Wiring
2 - Ring nut
3 - Back light

3. If necessary, loosen the screws fixing the glass and take out the light.
4. Remount the back light working in the reverse order.

BULB REPLACING

1. Loosen the screws fixing the glass **2** to the shell of the light 1 and remove the glass.



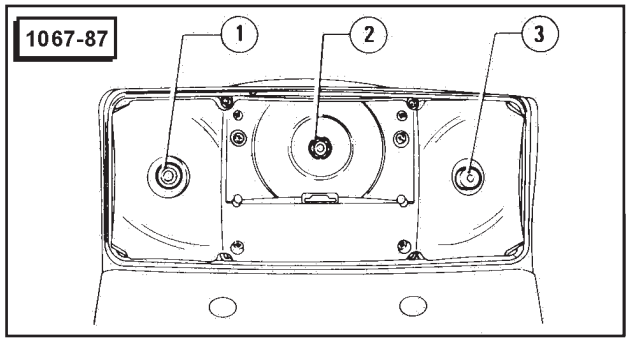
1 - Light shell
2 - Glass

2. Remove the defective bulb and change it.

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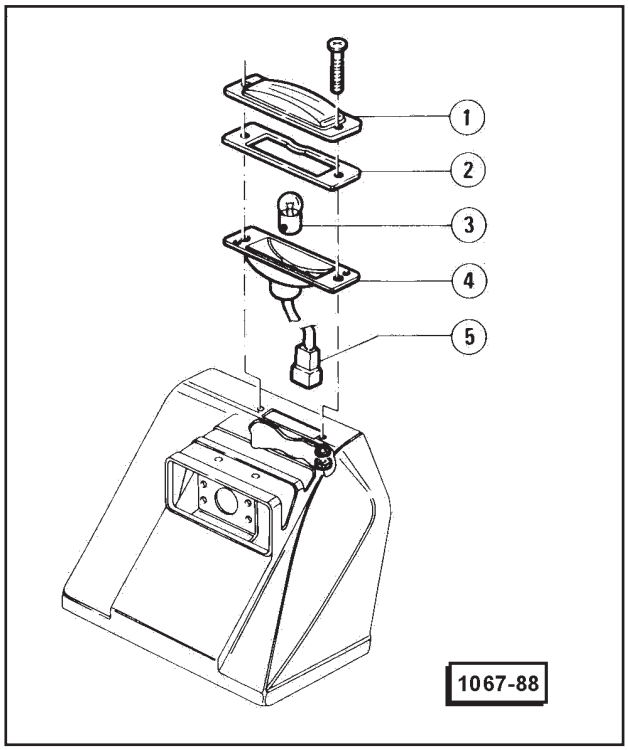
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3. Re-install the back light parts working in the reverse order.



1 - Indicator light bulb
2 - Parking light bulb
3 - Stop light bulb

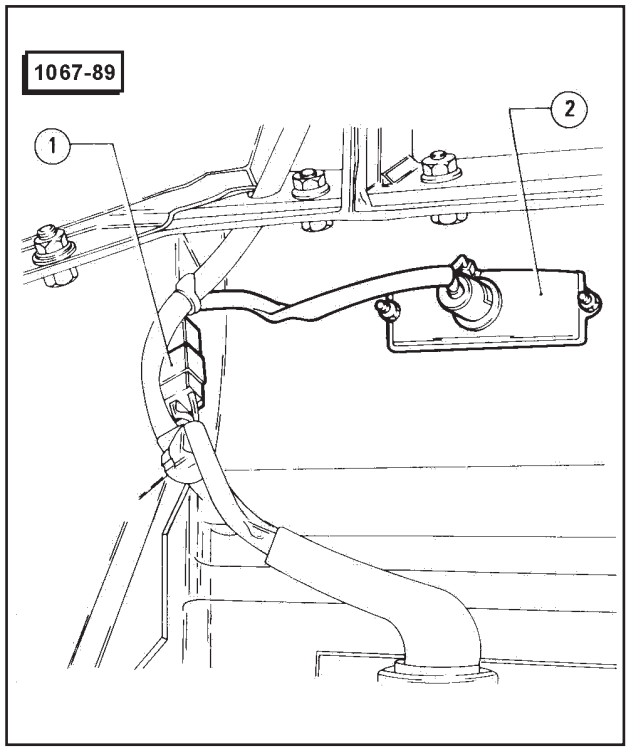
NUMBER PLATE LIGHT



1 - Glass
2 - Trimming
3 - Bulb
4 - Bulb holder
5 - Wiring connection

REMOVAL, BULB REPLACING, INSTALLATION

1. Disconnect the connection **1**, loosen the two nuts fixing the bulb holder **2** and remove.



1 - Wiring connection
2 - Bulb holder

2. Referring to the diagram remove the glass **1**, the trim **2** and the bulb **3**.

NOTE
To change the bulb it is not necessary to remove the bulb holder from the tractor.

3. Remount the number plate light working in the reverse order.

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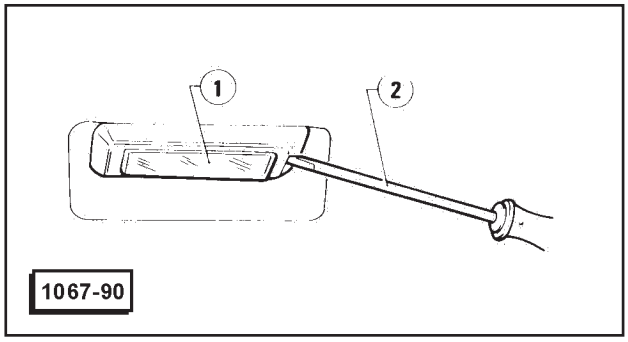
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INTERNAL LIGHTING

CABIN ROOF LIGHT

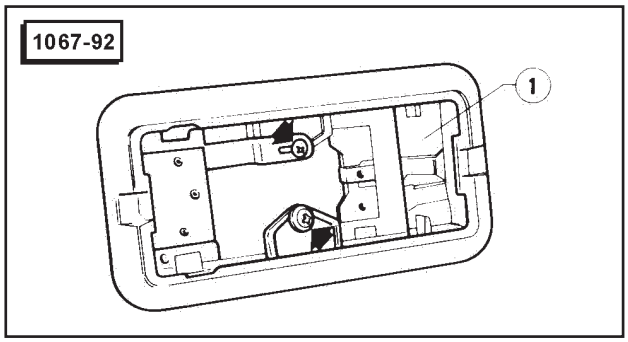
REMOVAL AND INSTALLATION

1. With the help of a screwdriver slip out the glass **1** (complete with bulb) from the relative holder **2**.



1 - Roof light glass
2 - Roof light holder

2. Loosen the two screws indicated in the diagram and disconnect the wiring. Remove the roof light holder **1.**



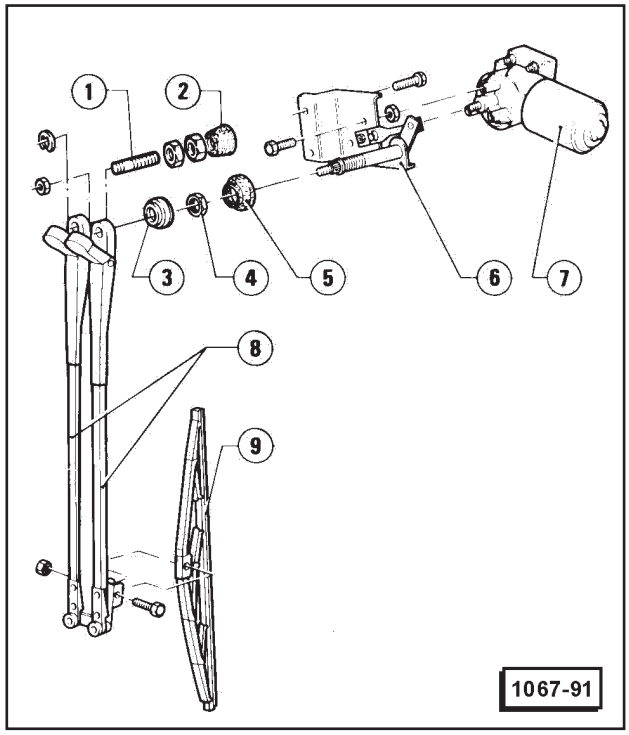
1 - Roof light holder

BULB REPLACING

Remove the glass from the roof light and change the bulb which is pressure inserted the two contacts.

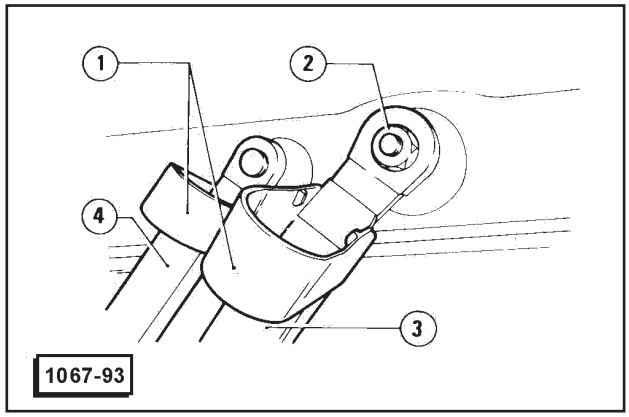
WINDSCREEN WIPERS

REMOVAL AND INSTALLATION



1 - Threaded pin
2 - Gasket
3 - Cap
4 - Nut
5 - Gasket
6 - Transmission mechanism
7 - Motor
8 - Arms
9 - Brushes

1. Roll the caps **1** protecting the arms **3** and **4** towards the outside.
2. Unscrew the nut **2** and unhook the left arm **3**.

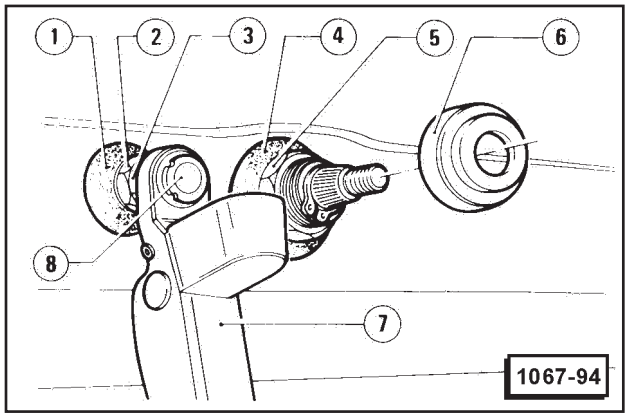


1 - Cap
2 - Nut
3 - Left arm
4 - Right harm

3. Unscrew the lock nut **3** and nut **2** and remove the arm **7** the threaded pin **8** and the gasket **1**.
4. Slip off the cap **6** unscrew the nut **5** and slip off the gasket **4**.

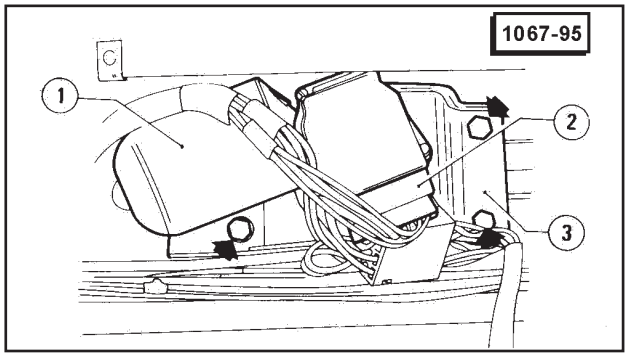
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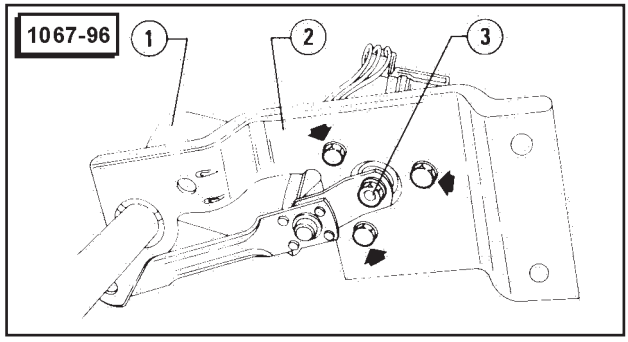
1 - Gasket
2 - Nut
3 - Locknut
4 - Gasket
5 - Nut
6 - Cap
7 - Left arm
8 - Threaded pin

5. Remove the bracket (refer to: Cabin and Cabin Root Internal Root Covering).
6. Disconnect the connection **2**.
7. Loosen the screws fixing the motor **1** and the transmission remove the motor complete with mechanism **3**.



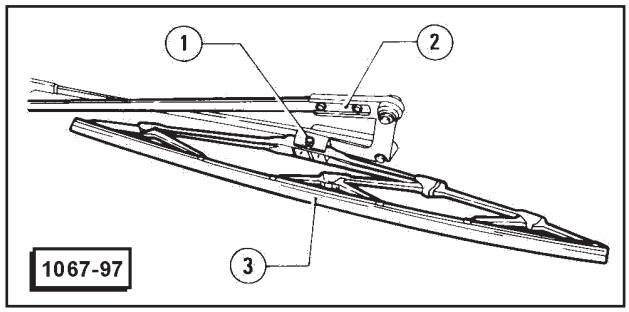
1 - Motor
2 - Connection
3 - Transmission connection

8. Loosen the three screws indicated in the diagram and the nut **3** and separate the motor **1** from the transmission mechanism **2**.



1 - Motor
2 - Transmission mechanism
3 - Nut

9. Loosen the nut **1** and remove the brushes **3** from the arms **2**.



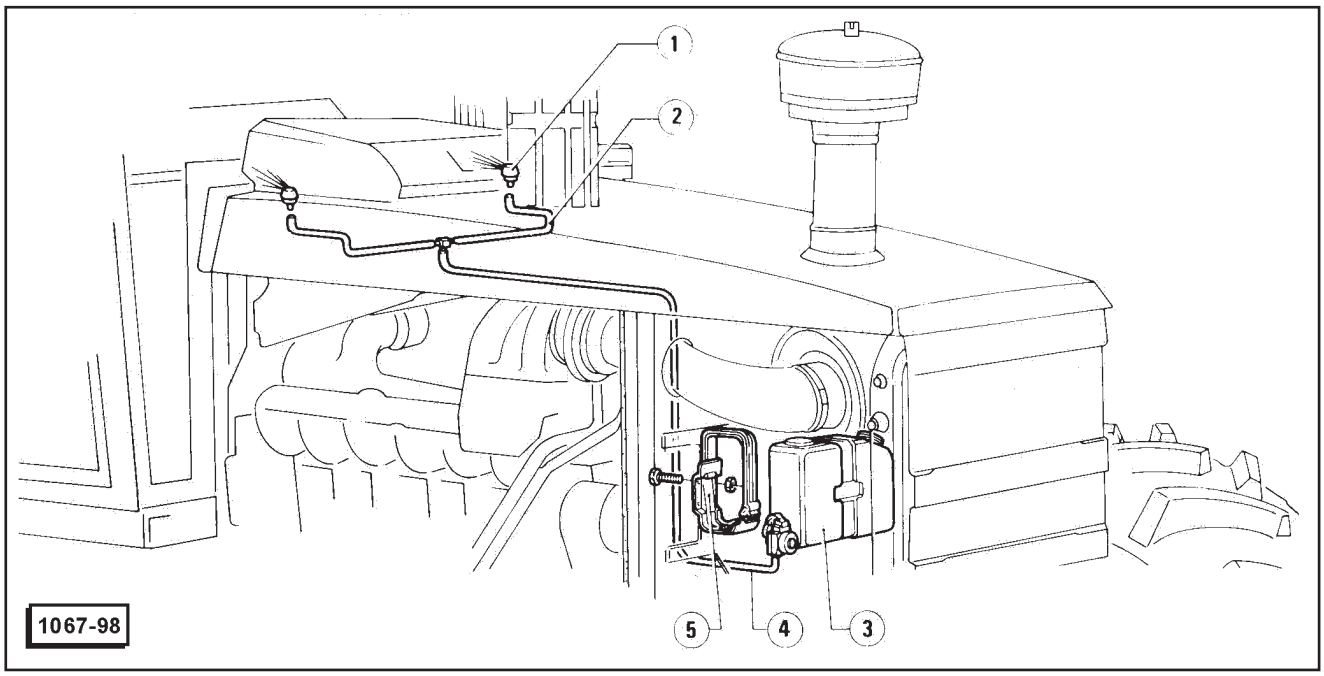
1 - Nut
2 - Arms
3 - Brushes

10. Remount the windscreen wipers working in the reverse order being careful to lubricate the arm attachments and the transmission mechanism with the prescribed lubricant.

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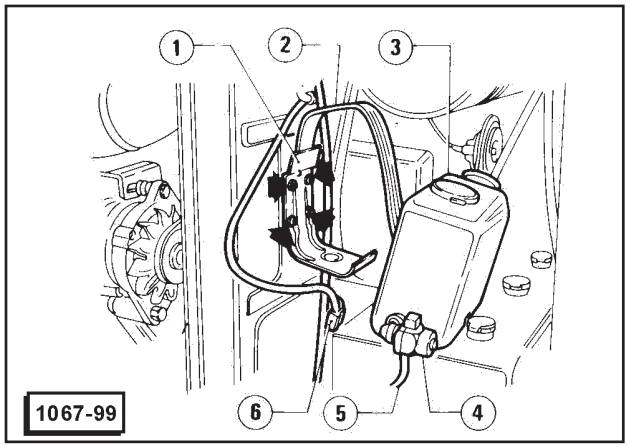
WINDSCREEN WASHER



1 - Sprayer
2 - Lateral tube
3 - Tank
4 - Main tube
5 - Bracket

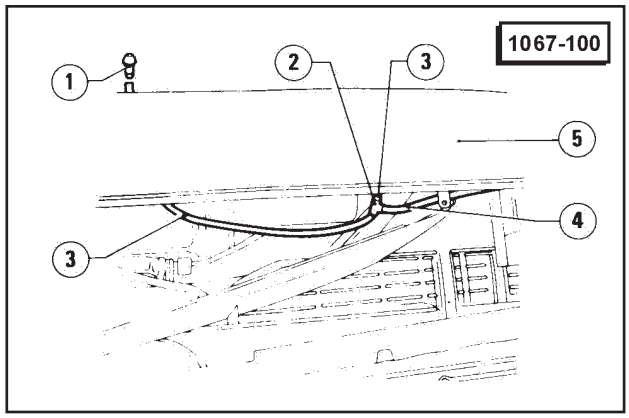
REMOVAL AND INSTALLATION

1. Loosen the winged nuts and remove the engine side hood.
2. Disconnect the connections **6** and the tube **5** from the pump **4** taking care to plug the tube and unions so that they don't leak.
3. Unhook the band **2** and remove the tank **3**.
4. It necessary, unscrew the nuts indicated in the Diagram and remove the bracket **1**.



1 - Sprayer
2 - Lateral tube
3 - Tank
4 - Windscreen washer pump
5 - Main tube
6 - Connections

5. Disconnect the main tube **4** and the side tube **3** and remove the T union
6. Slip off the sprayers **1** and remove them from the upper hood **5**.



1 - Sprayers
2 - T Union
3 - Side tube
4 - Main tube
5 - Upper hood

7. Reassemble the windscreen washing circuit working in the reverse order, then top up the windscreen washing liquid.

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GEARBOX CLUTCH

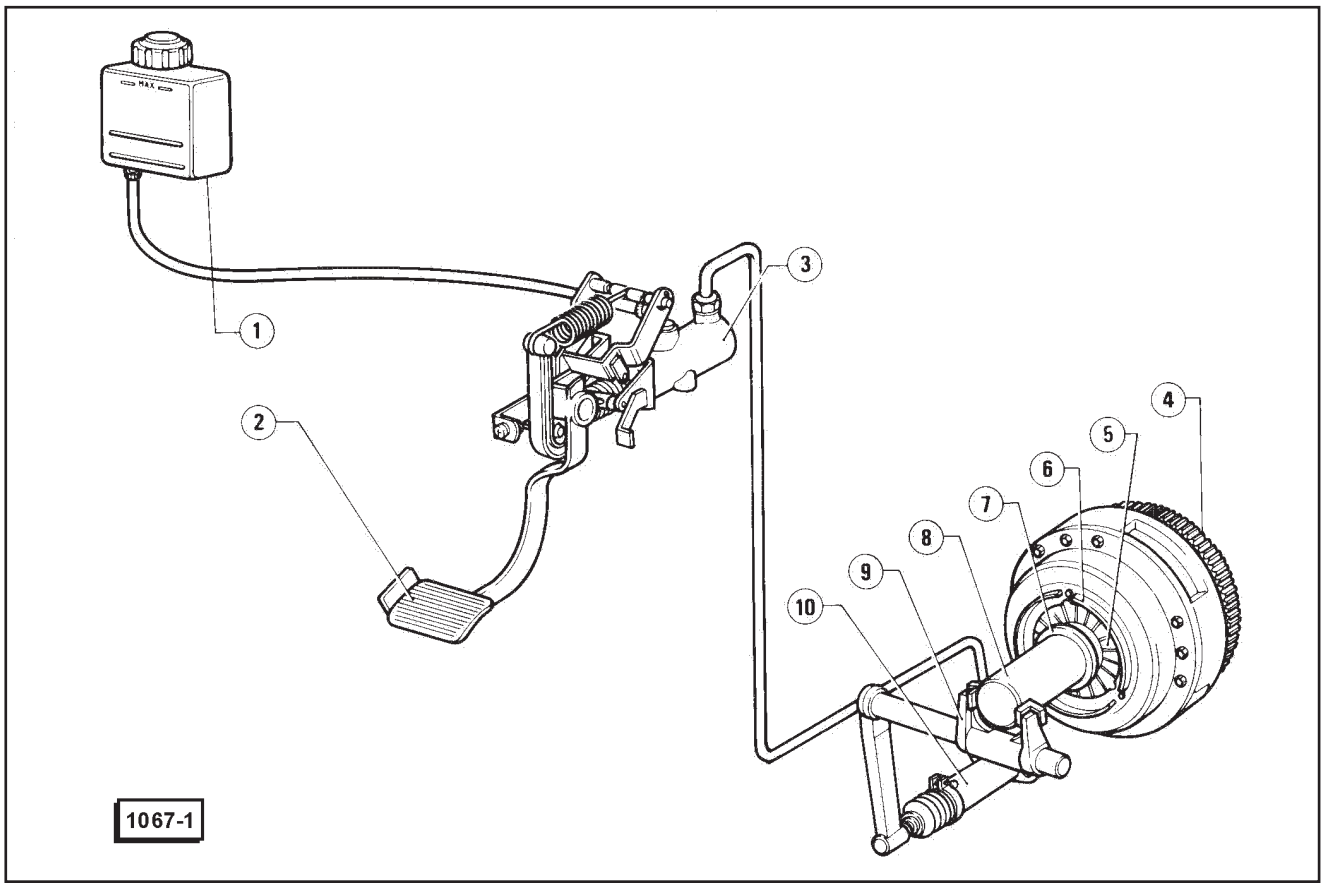
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GENERAL FEATURES



1 - Clutch and brakes hydraulic system supply tank
2 - Clutch pedal
3 - Clutch master cylinder
4 - Engine flywheel
5 - Diaphragm spring
6 - Pressure plate
7 - Thrust bearing
8 - Sliding sleeve
9 - Fork
10 - Clutch operating cylinder

The clutch is of single dry plate type; it is composed of a clutch disk, pressure plate **6**, fitted with a diaphram spring **5**, and a thrust bearing **7**.
The thrust bearing is kept in constant contact with the diaphragm spring through a spring inside jack **10**.
The clutch plate is circular for the models 110 or star-shaped for the models 130-150, it is made of a high friction coefficient material with extremely limited wear.
The clutch casing is fitted with air intakes to permit the heavily stressed components to be effectively cooled down.

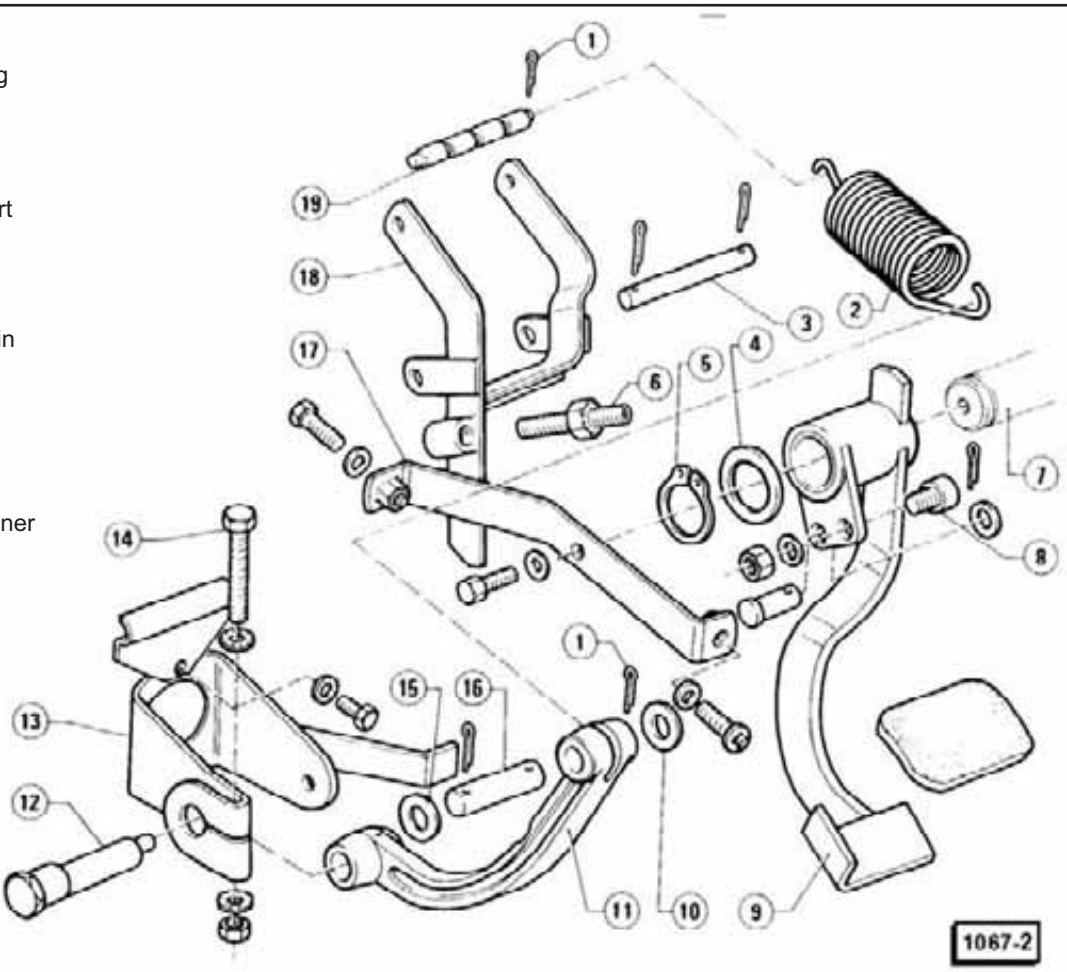
The pressure exerted by diaphragm spring **5**, drives the driven plate.
The clutch disengagement is realized through master cylinder **2** which, operated by pedal **3**, transmits the liquid pressure increase to the piston of operating cylinder **10**. This last, acts on clutch disengagement control fork **9** throug a pushrod, and moves sleeve **8** and thrust bearing **7** which overcomes the diaphragm spring action.
Through the seal rings that exert friction on operating cylinder, the piston takes up the possible backlash, thus automatically recovering the clutch plate wear.

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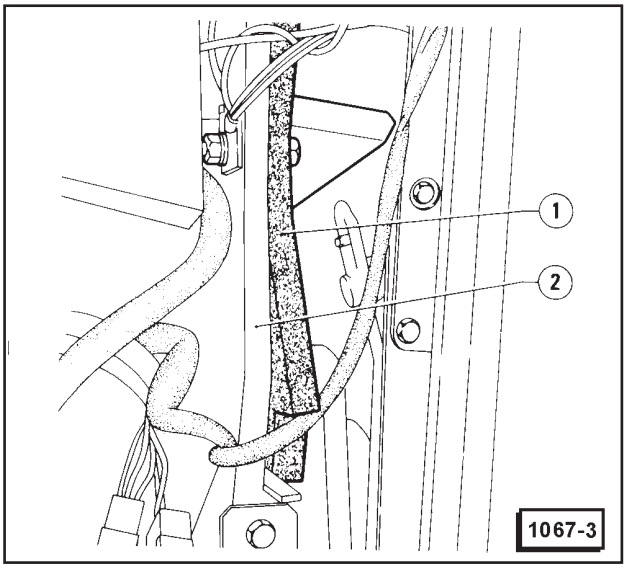
CLUTCH PEDAL

1 - Split pin
2 - Return spring
3 - Pin
4 - Washer
5 - Seeger ring
6 - Adjuster
7 - Pedal support
8 - Screw
9 - Clutch pedal
10 - Washer
11 - Lever
12 - Eccentric pin
13 - Bracket
14 - Bolt
15 - Washer
16 - Pin
17 - Bracket
18 - Frame
19 - Spring retainer



REMOVAL

1. Remove the tractor engine side lids, and unscrew the two bolts securing heat shield **1** to rear bulkhead **2.**



1 - Heat shield
2 - Rear bulkhead

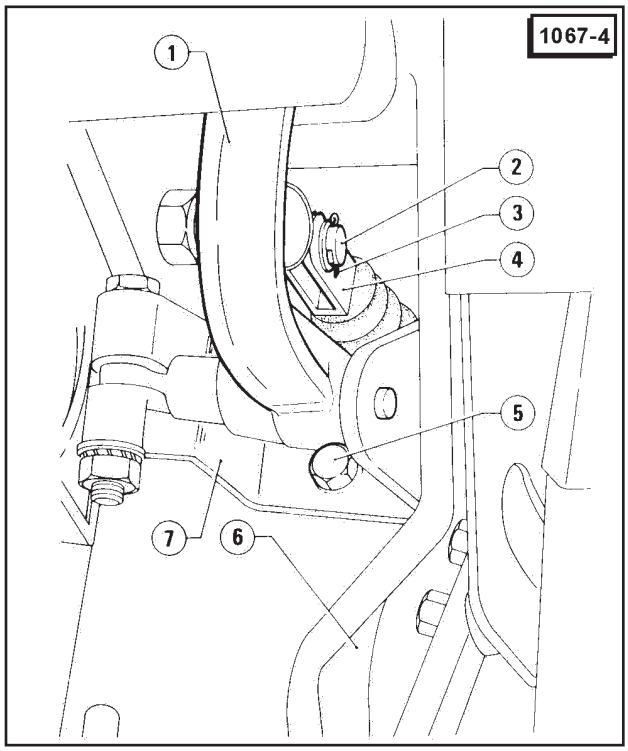
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2. Operating from the inside of the cabin, remove the split pin **3** and take off the retaining pin **2** from the fork **4** the pedal **6** recovering the washer.

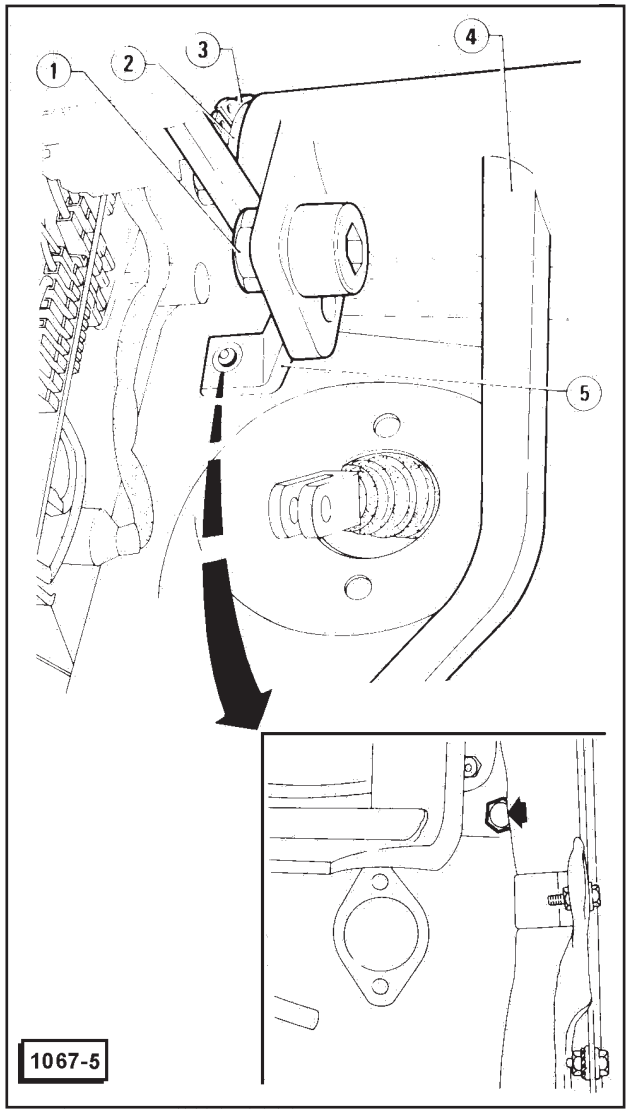
CAUTION
Take care not to press the clutch pedal since it is fitted with a return spring that moves the pedal abruptly to the end of travel.

3. Unloosen the two retaining screws **5** from the pump to the bracket **7**. Take off with caution from the engine bay the pump without removing the entrance and exit piping.



1 - Lever
2 - Pin
3 - Split pin
4 - Master cylinder fork
5 - Screw
6 - Pedal
7 - Lever support bracket and pedal return spring

4. Unloosen the two retaining screws of the bracket **5** displaced in the engine bay and beneath the instruction panel, then unloosen the retaining screw **1** of the pedal **4** to the support, remove the Seeger ring **3** and the washer **2** then take off the pedal **4** from the support integral with the instruction panel removing contemporarily the leverage of the pedal.



1 - Pedal retaining screw
2 - Washer
3 - Seeger ring
4 - Clutch pedal
5 - Bracket

CHECKS AND VERIFICATIONS

Visually inspect all the disassembled components, and replace those that are worn or damaged, verifying in particular the following:
1. Verify that both pedal and related pad are not deformed or strained.
2. Check that pins and related seats are not too worn or seized.
3. Verify that spring is not damaged or strained.
4. Check that bearing rotates freely and that no excessive backlash is present.

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INSTALLATION

Install the clutch pedal by reversing the order of removal, complying with the following.
— Refer to the enlarged view, and lubricate the bush of pedal **9**, pins **16** and **12** of lever **11**, and retaining pin of the pump fork, using the prescribed grease.
— Replace the split pins.
— Adjust the clutch pedal (refer to: Adjustment).

ADJUSTMENT

After having installed the various components, perform the adjustments required following the procedure below:

1. Positioning of lever **1** and clutch pedal **6**.
(1) Keep pedal **6** against end-of-travel **1**
(2) Loosen locknut **2**, tighten screw **3** until lever **1** is at the end of travel; tighten locknut **2**.

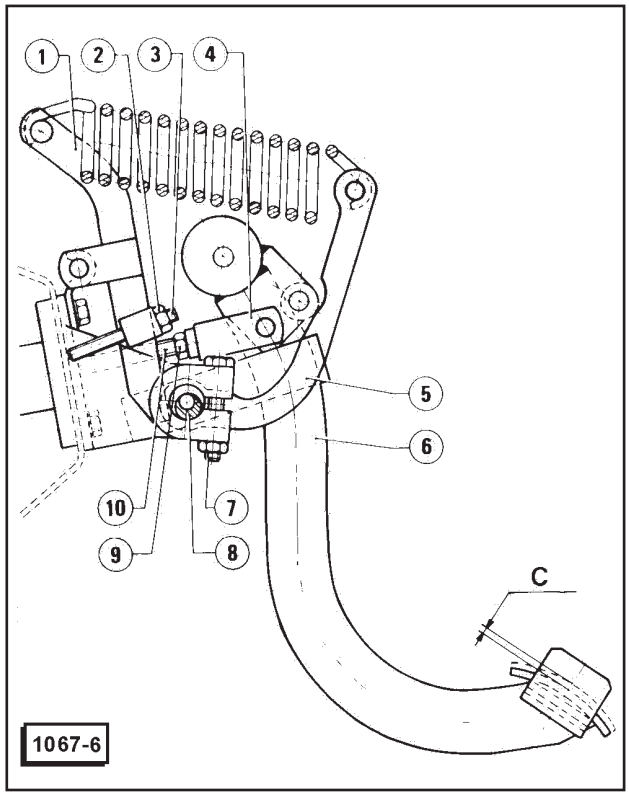
2. Adjustment of master cylinder control fork.
(1) With pedal **6** against lever **1** loosen locknut **9**, and act on rod **10** (screwing or unscrewing it) until taking up the backlash between master cylinder piston and pedal **6**.
(2) Act again on rod **10** to restore **0.5 to 1 mm (0.02 to 0.4 in)** backlash between master cylinder and pedal **6** corresponding to pedal idle travel “C”.

C = 4 to 8 mm (0.16 to 0.31 in)

(3) At the end of adjustment, tighten locknut **9**.

3. Adjustment of pedal return device.
(1) Press pedal **6** fully, then release it, and verify that return takes place gradually.
(2) If not, loosen bolt **7** and rotate the eccentric **8**; lock bolt **7**, and repeat the check. Repeat the operation until pedal returns gradually.
(3) Should the adjustment with eccentric **8** not be sufficient, loosen locknut **2**, and gradually change the position of lever **1** by unscrewing screw **3**, until the pedal optimal return is obtained; tighten locknut **2**.

CAUTION
The adjustment through screw 3 must be carried out only when strictly necessary, since it increases the load or pedal 6.



1 - Lever
2 - Locknut
3 - Adjusting screw
4 - Master cylinder fork
5 - Lock
6 - Clutch pedal
7 - Bolt
8 - Eccentric pin
9 - Locknut
10 - Control rod

CLUTCH MASTER CYLINDER

REMOVAL

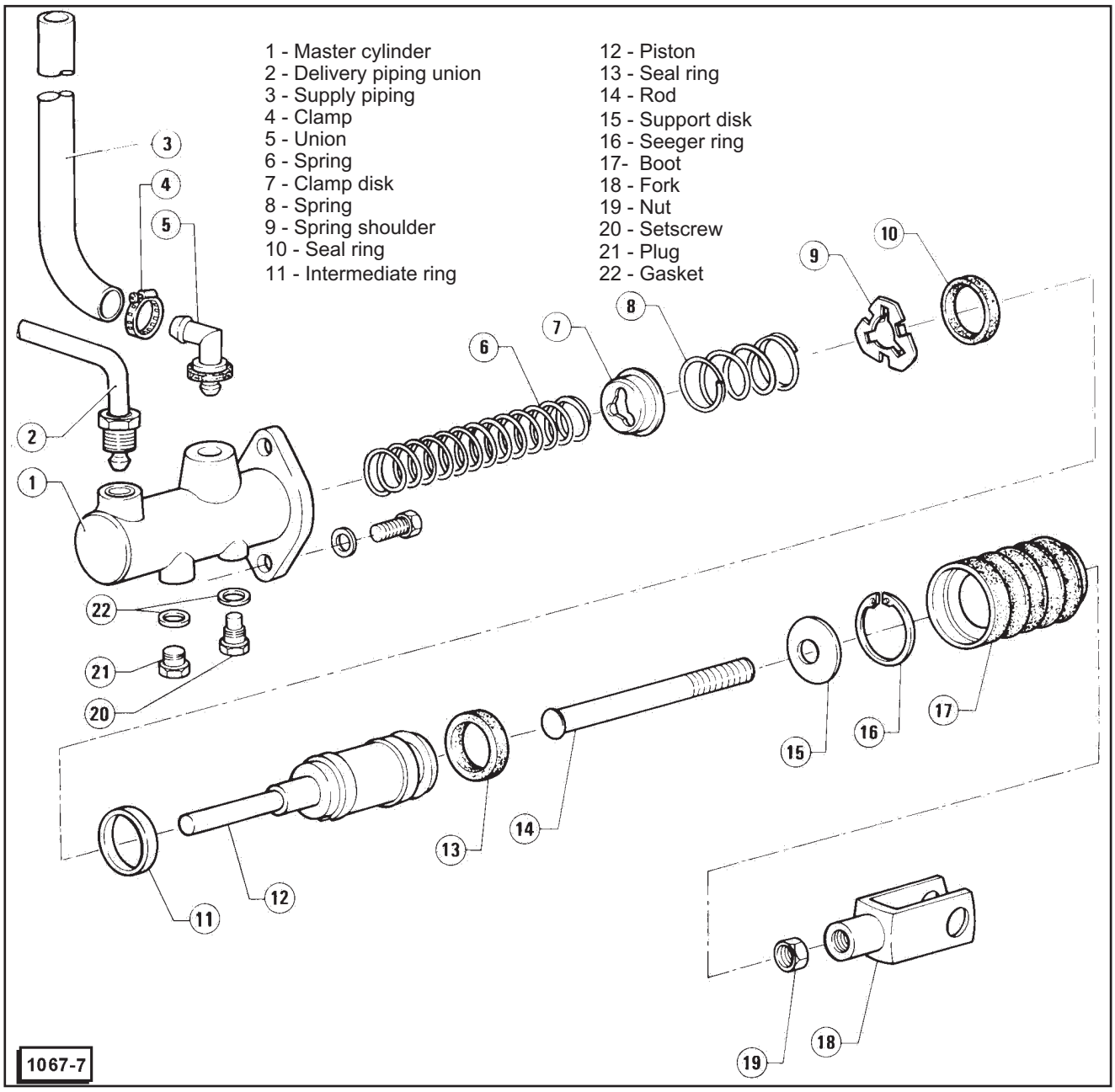
1. Remove the clutch master cylinder (refer to: Clutch Pedal - Removal - Steps 1. to 3.).

2. Referring to the following exploded view, disconnect the entry and exit piping unscrewing the pipe union **2** and extract the union **5**.

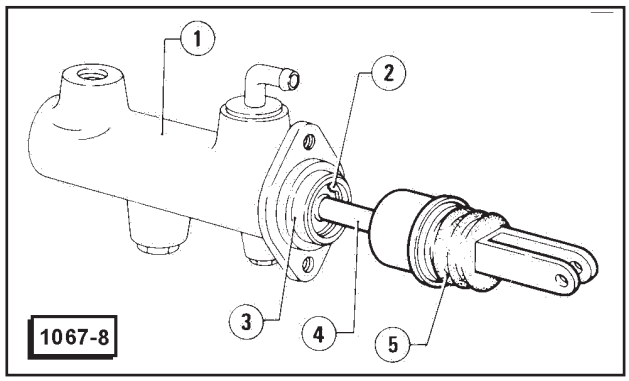
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DISASSEMBLY



1. Withdraw boot **5,** remove Seeger ring **2** and withdraw rod **4** together with support disk **3**.

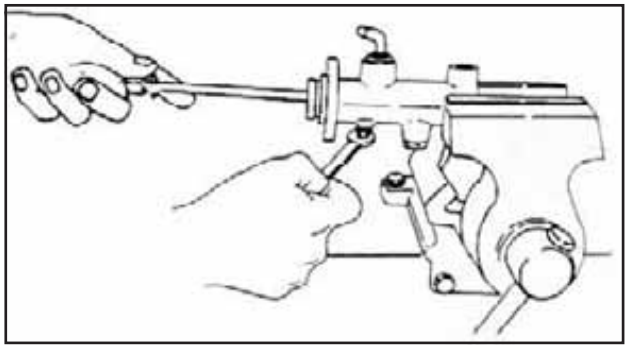


1 - Master cylinder
2 - Seeger ring
3 - Support disk
4 - Rod
5 - Boot

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2. Place the master cylinder on a vice fitted with protective jaws, then, partially pushing the piston towards master cylinder inside as shown in the figure, unscrew the screw securing the piston and remove it together with the spring underneath.



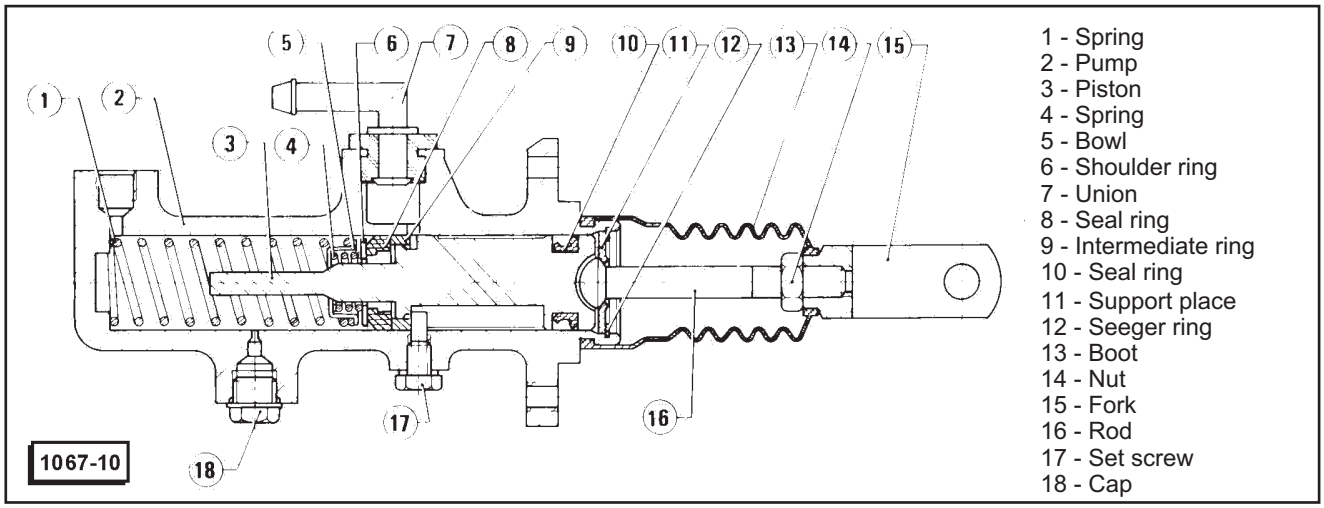
3. Refer to the enlarged view and, working with the appropriate tool, remove the bowl and the second spring from the inside of the cylinder pump taking care not to damage the inside surface.

CHECKS AND VERIFICATIONS

CAUTION
To clean and wash the master cylinder components use only the oil prescribed for the brakes and clutch. Do not use petrol, kerosene, or other mineral oils to prevent damaging the rubber components.

1. Check for scratches on both inner and outer sliding surfaces of piston. Replace it if required.
2. Verify that the seal ring seats are clean. If required, blow compressed air into the seats.
3. Check conditions of seal rings and boot; replace the damaged components.
4. Check all components, openings, and master cylinder internal passages, and verify that they are dean and free from foreign matter.
5. Verify that springs are not strained or deformed, replace them if required.

REASSEMBLY

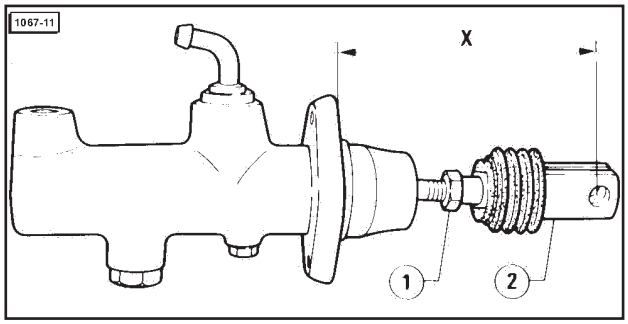


1 - Spring
2 - Pump
3 - Piston
4 - Spring
5 - Bowl
6 - Shoulder ring
7 - Union
8 - Seal ring
9 - Intermediate ring
10 - Seal ring
11 - Support place
12 - Seeger ring
13 - Boot
14 - Nut
15 - Fork
16 - Rod
17 - Set screw
18 - Cap

Reassemble the master cylinder by reversing the order of removal, complying with the following:
— Lubricate the relative motion sliding surfaces with the grease prescribed.
— When inserting the piston **3** into cylinder **2** verify that the slot present on the piston is correctly aligned with the set screw **17**.
— Verify the master cylinder correct functioning, making sure that the piston performs the whole travel freely.
— If fork **15** has been disassembled, verify that, with the rod **16** kept completely outwards, distance "**X**" between the master cylinder body resting plane and the centre of fork hole is that prescribed for the model of tractor in object (refer to: Technical Data and Specifications - Checks and Adjustments).
If not so, remove the boot, loosen locknut **1** and screw or unscrew fork **2** accordingly, until the locknut is blocked; refit the boot.

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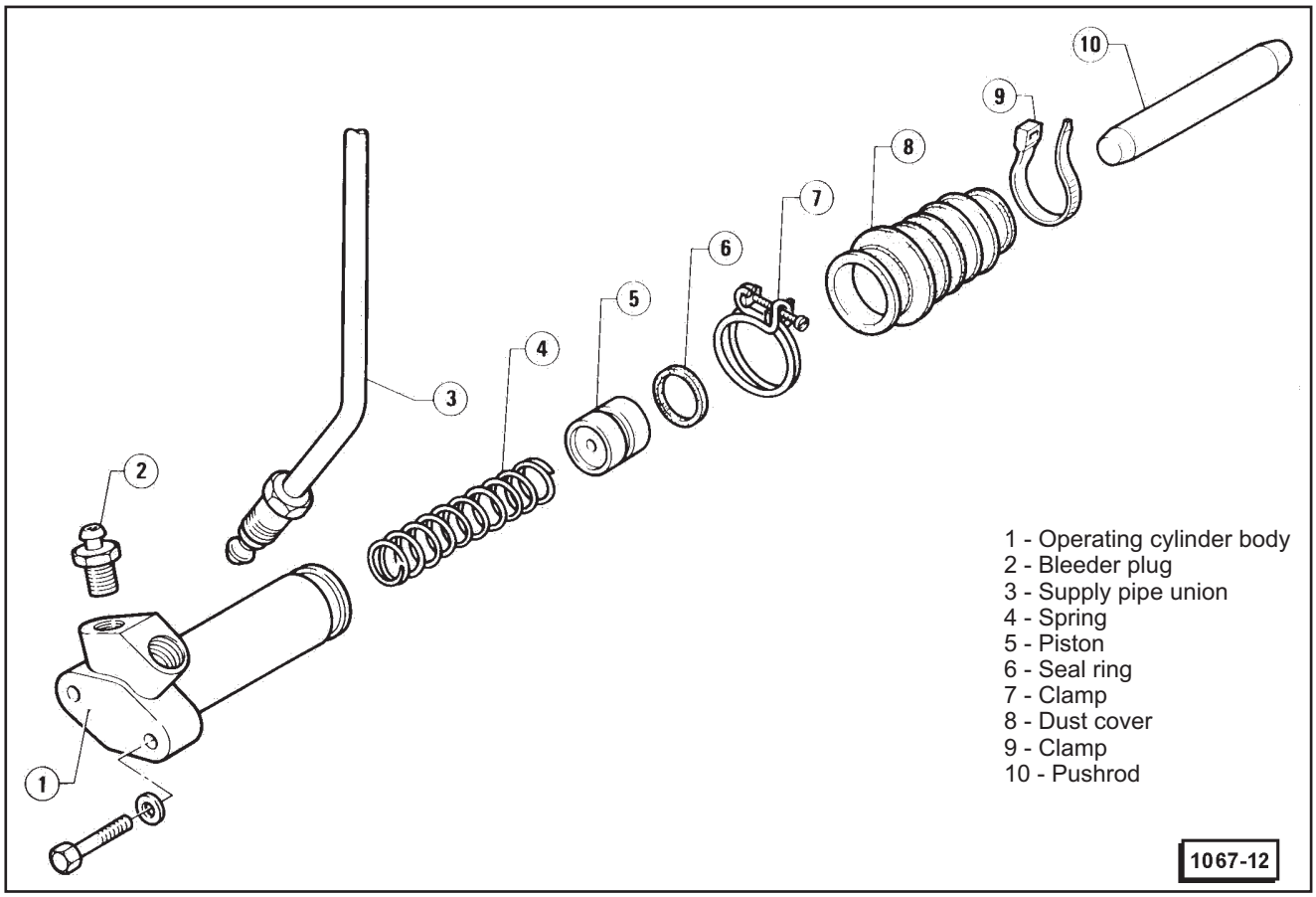


1 - Locknut
2 - Fork

INSTALLATION

Install the master cylinder on tractor by reversing the order of removal; then proceed to bleed the hydraulic system (refer to: Hydraulic System Bleeding).

CLUTCH OPERATING CYLINDER



1 - Operating cylinder body
2 - Bleeder plug
3 - Supply pipe union
4 - Spring
5 - Piston
6 - Seal ring
7 - Clamp
8 - Dust cover
9 - Clamp
10 - Pushrod

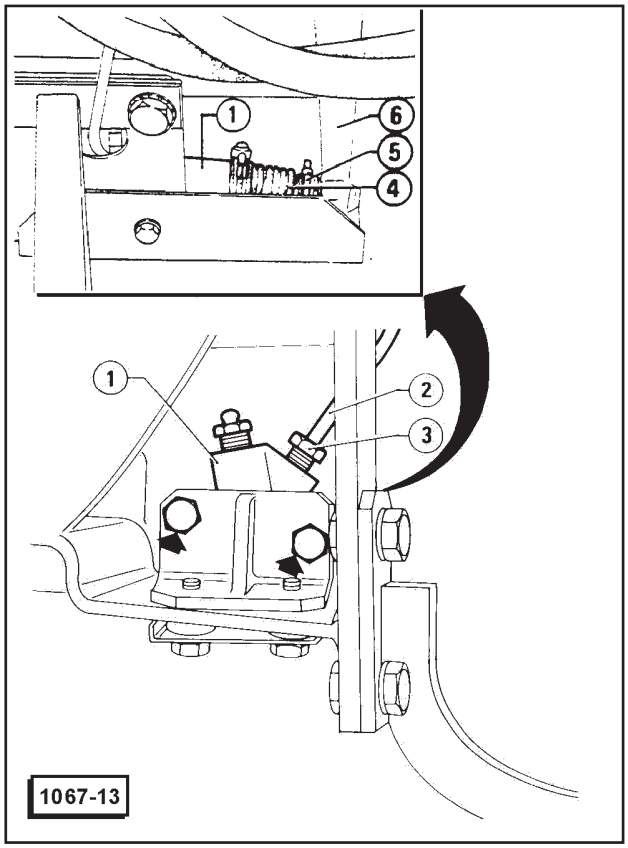
REMOVAL

1. Cut clamp **5** securing boot **4** to fork **6**.
2. Unscrew union **3** and disconnect supply pipe **2** of operating cylinder **1** plugging it suitably.
3. Unscrew the two screws securing clutch operating cylinder, and remove it recovering the pushrod.

CAUTION
Keep fork 6 in contact with the clutch sliding sleeve, to prevent it unhooking.

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1 - Clutch operating cylinder
2 - Supply pipe
3 - Union
4 - Boot
5 - Clamp
6 - Fork

DISASSEMBLY

Refer to the exploded view and proceed as follows.

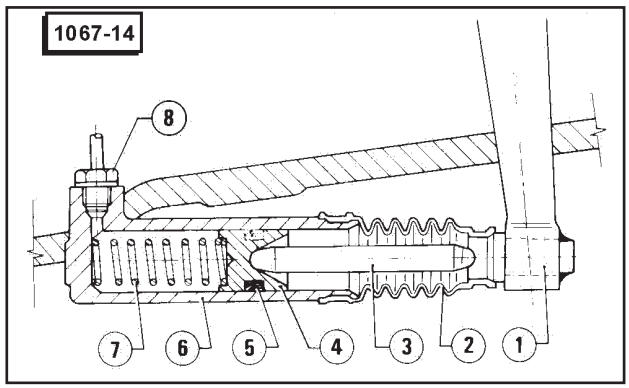
1. Loosen clamp **7**, and remove it together with boot **8**.
2. Supplying with low pressure compressed air, carefully withdraw piston from cylinder.
3. Extract spring **4** from operating cylinder, and unscrew bleeder screw **2** . Withdraw seal ring **6** from piston **5**.

CHECKS AND VERIFICATIONS

CAUTION
To clean and wash the operating cylinder components use only the oil prescribed for the brakes and clutch. Do not use petrol, kerosene, or other mineral oils to prevent damaging the rubber components.

1. Check for scratches on both inner and outer sliding surfaces of piston. Replace it if required.
2. Verify that the seal ring seats are clean, if necessary, blow compressed air into the seats.
3. Verify conditions of seal rings, dust cover, and spring efficiency; replace the damaged components.
4. Verify that bleeder ho le is free from impurities.

REASSEMBLY



1 - Control lever
2 - Dust cover
3 - Pushrod
4 - Piston
5 - Seal ring
6 - Jack cylinder
7 - Spring
8 - Union

Reassemble the clutch operating cylinder on tractor by reversing the order of removal, complying with the following:
— Lubricate with the prescribed grease the relative sliding surfaces.
— Control the correct functioning of the operating cylinder. being sure that the piston 4 makes the full traverse freely.

INSTALLATION

Reassemble the clutch operating cylinder on tractor by reversing the order of removal, complying with the following.
— Verify that fork is correctly secured to the clutch sliding sleeve.
— Before connecting the operating cylinder, fill it with the prescribed oil to facilitate the bleeding operation.
— Bleed the hydraulic system (refer to: Hydraulic System Bleeding).

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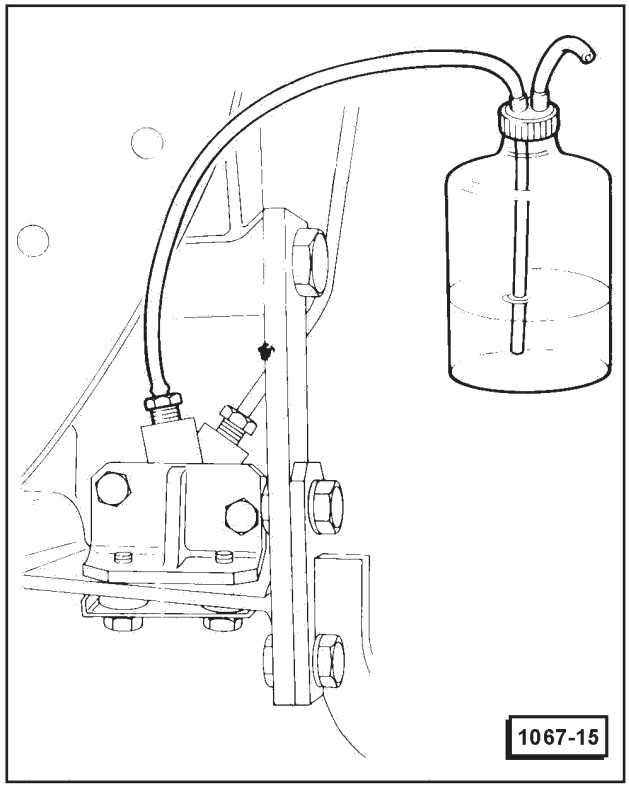
HYDRAULIC SYSTEM PIPING

CHECKS AND VERIFICATIONS

1. Visually inspect that all piping and unions of the system are in good conditions. Replace the damage components.
2. In the event of oil leaks from unions, if due to loosening, restore the correct tightening and, if required, replace the damaged components.

REMOVALS AND INSTALLATIONS

1. Remove the plug of brake and clutch hydraulic system supply tank and, by means of syringe, suck the oil from the tank.
2. Loosen the clamps securing the hose connecting tank to master cylinder, and remove it.
3. Unscrew the unions of the pipe connecting master cylinder to clutch operating cylinder and remove it.
4. Install the piping by reversing the order of removal, providing for system bleeding (refer to: Hydraulic System Bleeding).



HYDRAULIC SYSTEM BLEEDING

Bleeding of brake and clutch hydraulic system is to be carried out each time the system is connected or when air enters it.

CAUTION
— **Do not reuse the oil drained during the bleeding operation.**
— **During the bleeding operation, keep the oil level in the tank above the min. mark**.

1. Remove the top-up plug from the hydraulic system supply tank and, if necessary restore the level using the oil prescribed.
2. Fit a hose on the bleeder screw of clutch operating cylinder, and submerge its end into a transparent container filled with the same oil of the system.
3. Loosen the bleeder screw and, at the same time, fully press the clutch pedal; then tighten the bleeder screw, and slowly release the pedal.
Repeat the operation until the air bubbles are eliminated.
4. With the pedal fully pressed, tighten the bleeder screw and remove the hose.

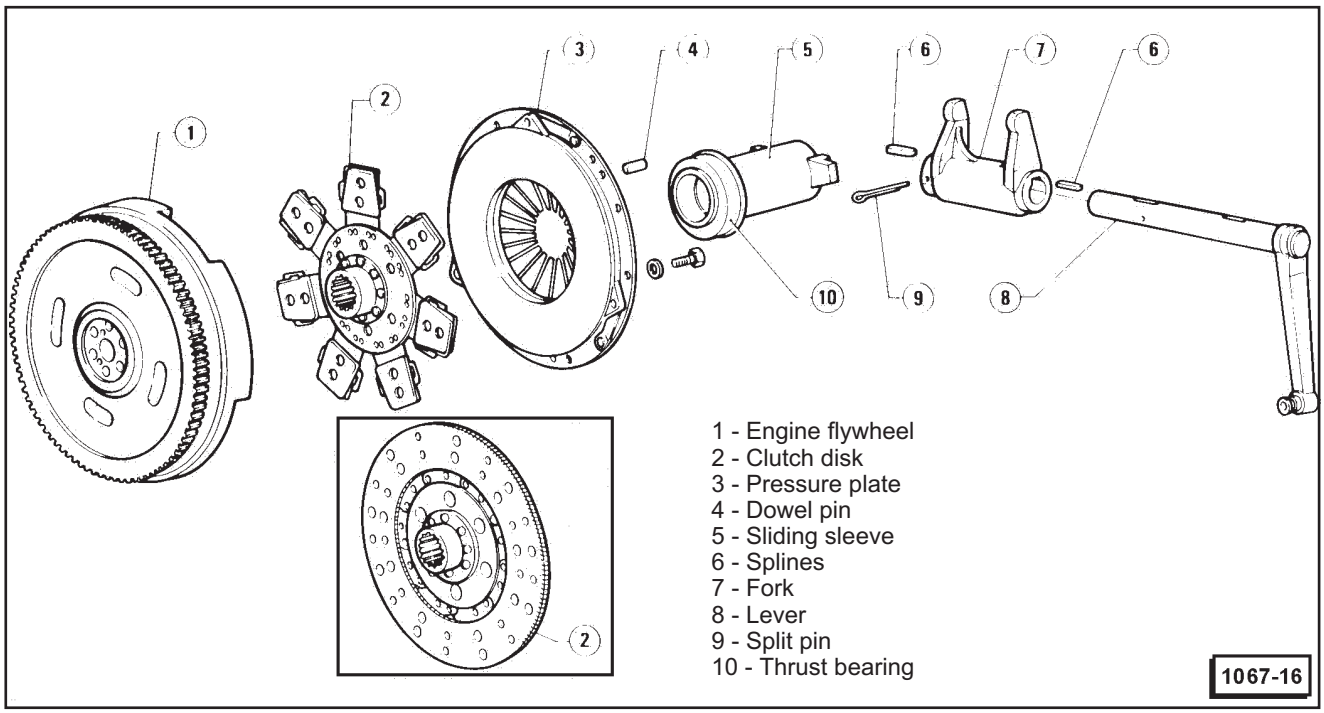
NOTE
To facilitate the bleeding operation, it is possible to disconnect the supply pipe from the clutch operating cylinder, and push the pushrod into the operating cylinder so that the air is eliminated from the supply piping. This operation is required in the event that the pedal becomes spongy when carrying out normal bleeding.

5. Restore the oil level in the tank using the oil prescribed; refit the relative plug.
6. Verify the correct functioning of the system, and adjust the clutch disengagement and speed engagement.

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CLUTCH



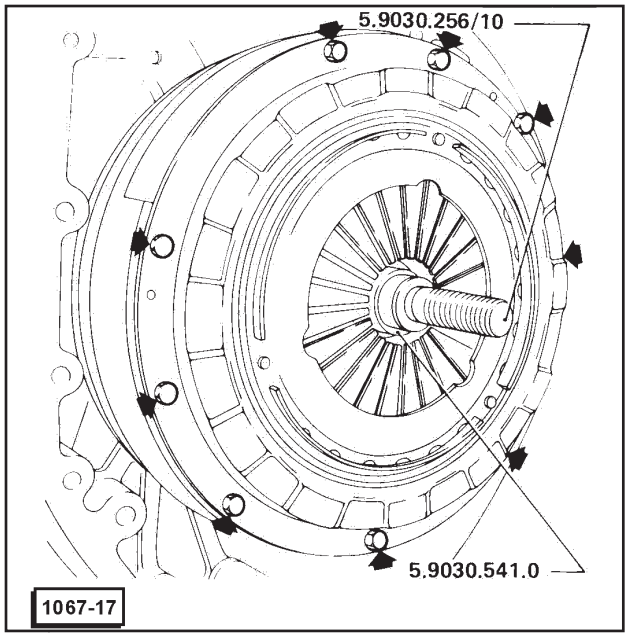
1 - Engine flywheel
2 - Clutch disk
3 - Pressure plate
4 - Dowel pin
5 - Sliding sleeve
6 - Splines
7 - Fork
8 - Lever
9 - Split pin
10 - Thrust bearing

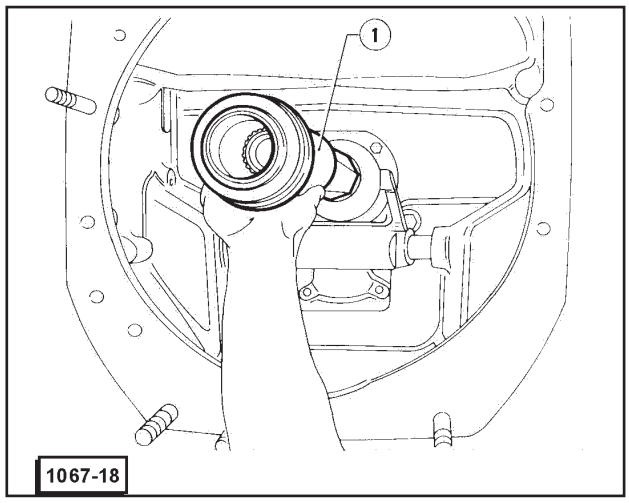
DISASSEMBLY

1. Disconnect the engine (refer to: Engine Removal).
2. Insert centering tool 5.9030.256.0/10 with bush 5.9030.541.0 on the flywheel, and unscrew the nine screws securing pressure plate.

3. Carefully remove both pressure plate and clutch disk.
4. Remove sliding sleeve **1** by withdrawing it from the support of mini reduction gear main shaft.

CAUTION
Should washing of the inside gearbox be required, protect the self-lubricated thrust bearing that must not be washed in any case.



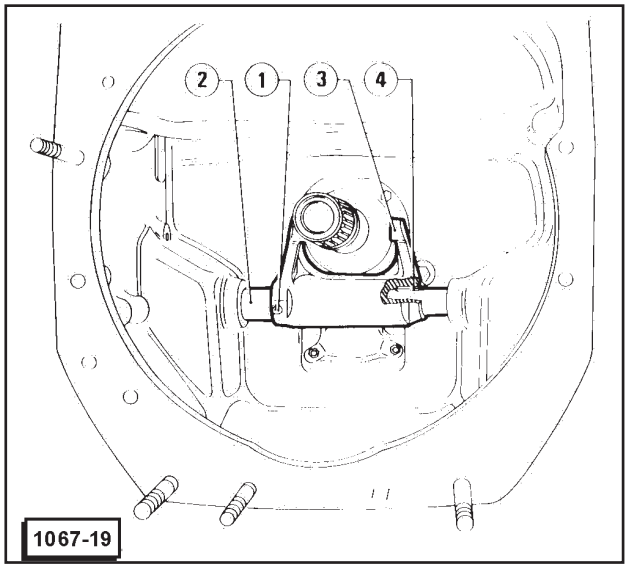


1 Sliding sleeve

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5. Operating on the gearbox, cut the clamp securing the clutch operating cylinder boot to control lever.
6. Remove split pin **1**, and withdraw outer lever **2** to the left, keeping fork **3** still. During the operation, recover the two splines **4**.



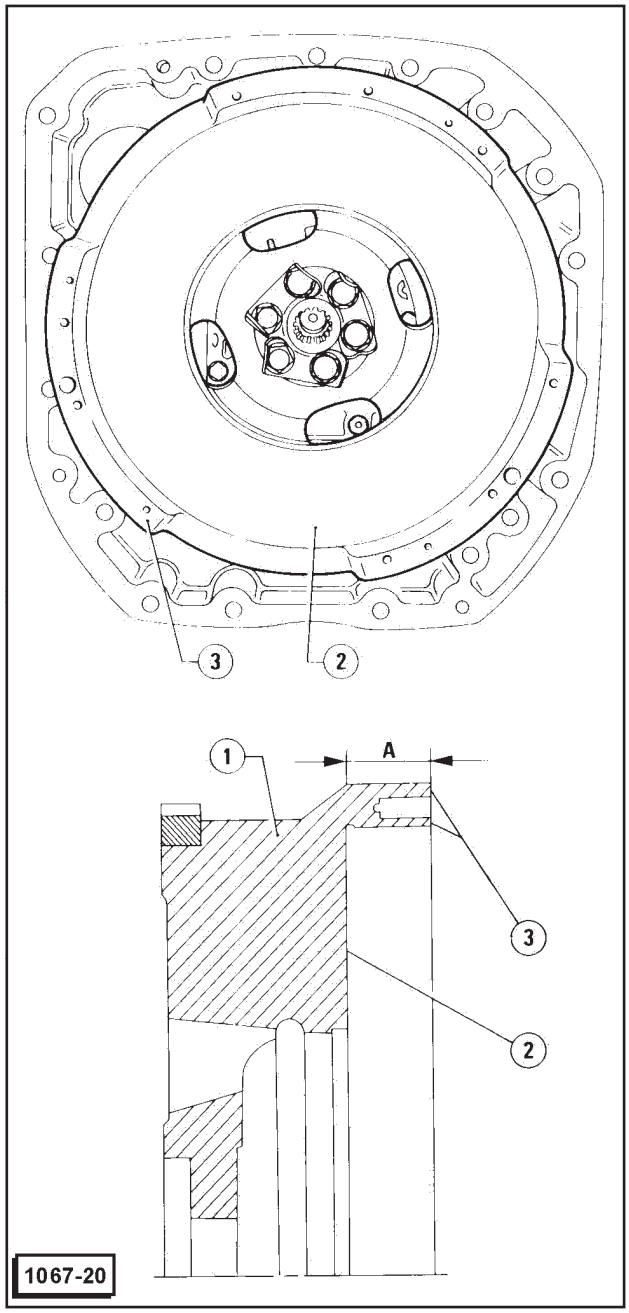
1 - Split pin
2 - Fork control lever
3 - Fork
4 - Spline

CHECKS AND VERIFICATIONS

Before carrying out the checks and verifications, use the appropriate solvent to wash all components, except the thrust bearing, to eliminate any traces of dirt and grease.

FLYWHEEL

Verify that the flywheel working surface **2** is free form signs of overheat, irregular wear, scratches or material removal.
1. If required, disassemble the flywheel (refer to: Engine - Disassembly - Preliminary Operations) and grind both working surface and resting plane **3** of pressure plate.
2. The same quantity of material removed when grinding the working surface **2** shall be removed also from pressure plate resting plane **3**, so as not to modify dimension "**A**".



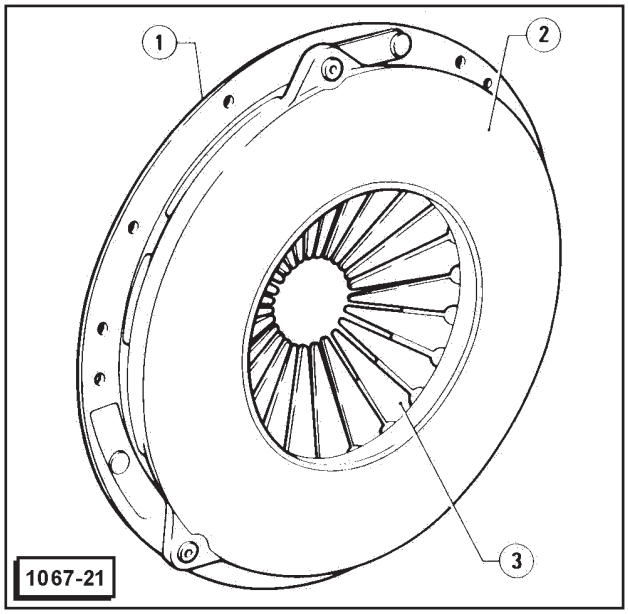
1 Flywheel
2 Flywheel working surface
3 Pressure plate resting plane

PRESSURE PLATE

Check for signs of overheat, irregular wear. scratches, material removal on pressure plane working surface **2**; check also for signs of excessive wear on the thrust bearing resting plane. If required, replace the pressure plate.

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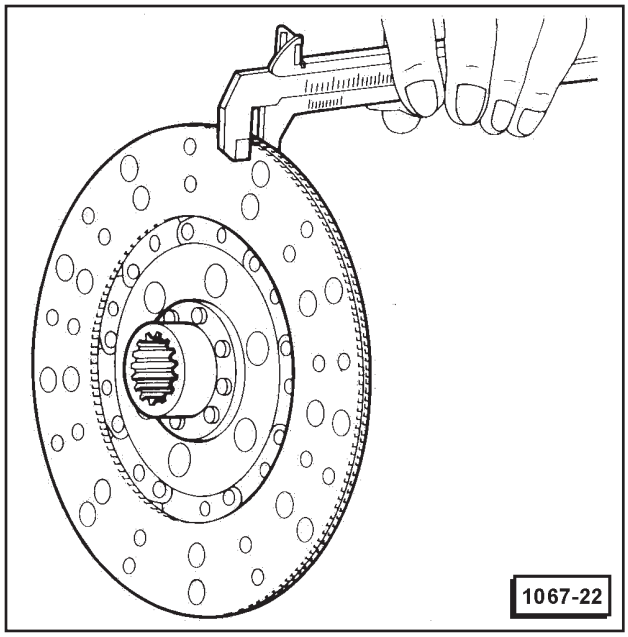
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1 - Pressure plate
2 - Pressure plate working surface
3 - Diaphragm spring

CLUTCH DISK

1. Check that all gaskets of clutch disk are free from burns and grease, the securing rivets correctly riveted and for Models 100 that the springs are in good condition.
2. In the event of clutch malfunctions due to oil leaks from engine or gearbox, replace the seal rings where the leaks occurred. Wash the clutch disk, or replace it if required.
3. Use a gauge to check that the gasket wear is uniform and that the thickness of clutch disk is not near the limit value for the model of tractor in object (refer to: Technical Data and Specifications - Checks and Adjustments).



4. Check that the clutch hub is in good conditions and that it slides without excessive backlash or seizing on direct drive shaft. If required, replace the clutch disk.

FORK, SLIDING SLEEVE, AND THRUST BEARING

1. Verify that the clutch control fork is free from deformations, cracks, or excessive wear in the working areas. Replace it if required.
2. Visually inspect that both sleeve and thrust bearing are free from deformations or signs of excessive wear in the working areas. In the event of bearing hardening or seizing, replace it. Check also that the sliding surfaces of both bearing and sleeve are free from signs of seizing or excessive backlash. Replace the damaged components.

REASSEMBLY

NOTE

Clutches are marked with a point having different colour in relation to the models, as shown in the following table.

Colour	Model
Green	150
Red	130
White	110

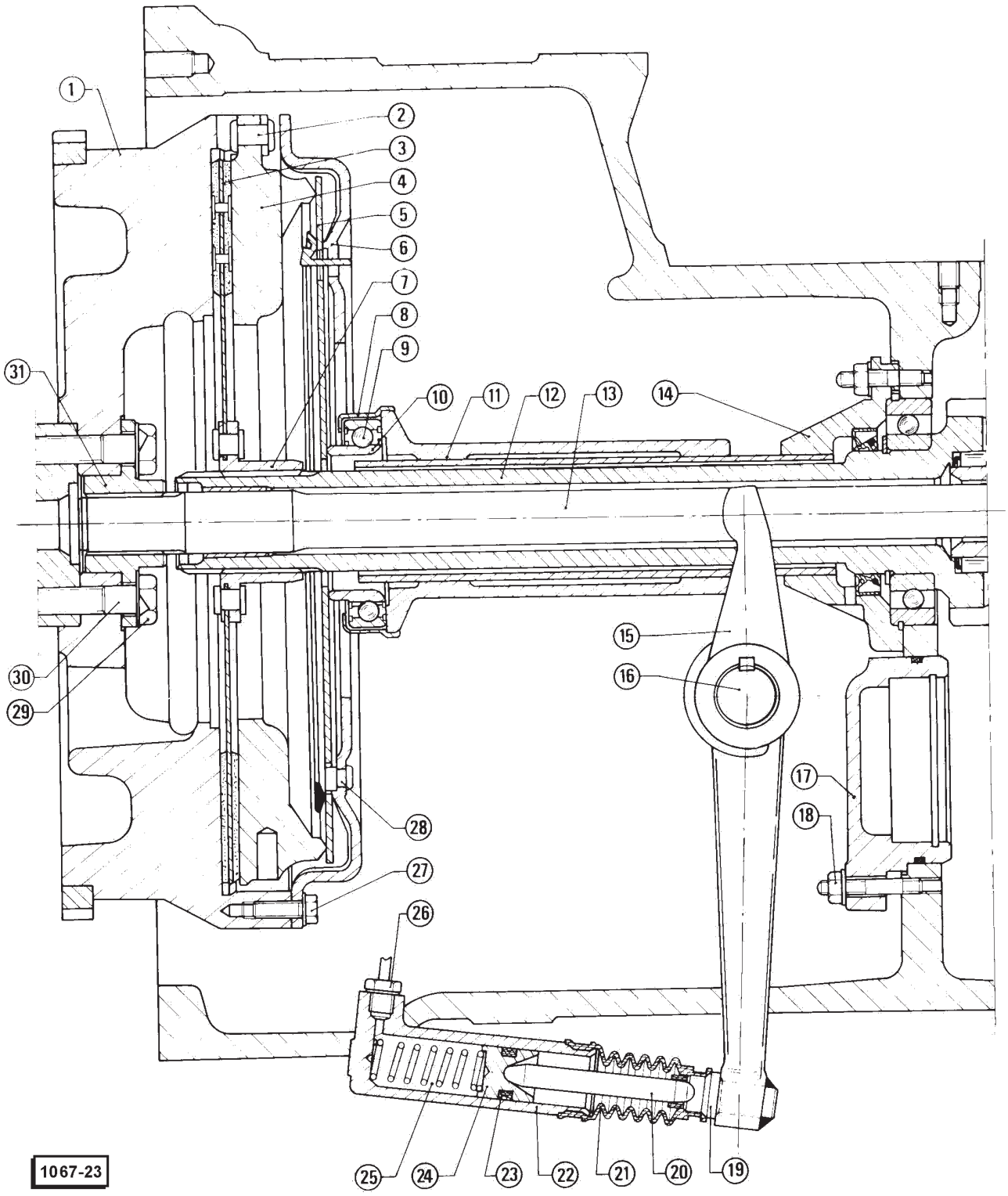
Install the clutch by reversing the order of removal, complying with the following.
— Refer to the exploded view and lubricate the following components with the grease prescribed: lever **8** on gearbox, through the side grease nipples, and the inner sliding surface of sliding sleeve **5** through the appropriate grease nipple.
— Once the fork has been reassembled, insert the split pin by bending one end only.
— Mount the clutch disk and pressure plate, by centering them on the engine flywheel by means of tool **5.9030.256.0/10** with bush **5.9030.541.0**

NOTE
The protruding part of clutch disk must face the gearbox. An arrow is marked on clutch disk indicating the rotation direction (clockwise, seen from the gearbox side).

— Install the engine (refer to: Engine - Installation).

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1 - Engine flywheel
2 - Rivet
3 - Clutch plate
4 - Shoulder ring
5 - Flat spring
6 - Clutch plate
7 - Clutch plate hub
8 - Thrust bearing cover
9 - Thrust bearing
10 - Thrust bearing inside ring
11 - Sliding sleeve
12 - Clutch main shaft
13 - P.T.O. shaft
14 - Flanged sleeve
15 - Coupling fork
16 - Pin
17 - Clutch secondary shaft cover
18 - Nut
19 - Pin
20 - Operating cylinder shaft
21 - Boot
22 - Operating cylinder body
23 - Seal ring
24 - Piston
25 - Spring
26 - Union
27 - Screw
28 - Rivet
29 - Safety button
30 - Screw
31 - Toothed bush connecting flywheel P.T.O. shaft

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TECHNICAL DATA AND SPECIFICATIONS

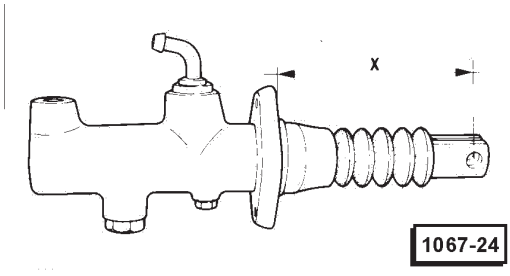
TECHNICAL FEATURES

Gearbox clutch

Particular		Model		
		110	130	150
Constructor		VALEO		
Clutch type		Circular single disk with diaphram spring	7 point star single disk with diaphram spring	
Control type		Hydrostatic		
Sleeve coupling traverse	mm	11^{0}_{+1}		
Disk diameter	mm	348		
Clutch disk thickness	mm	7,5 (max use)	9,7 + 10,2 - under thrust 1260 - of N	
Friction material type		Organic (FERODO IF 324)	Cerametallik	
Pump type		Benditalia Ø 1		
Oil type		AGIP ATF DEXRON		

CHECKS AND ADJUSTMENTS

Unit: mm (in)

Dimension quota	Model		
	110	130	150
Clutch plate minimum thickness	7,5 (0.295)	9,7 (0.381)	
Distance ”X” between face and fork hole 	162 ± 3 (6.377 ± 0.188)		

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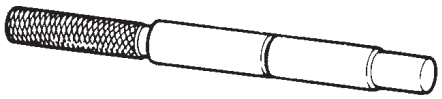
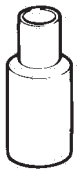
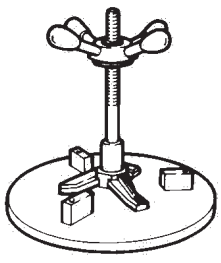
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GENERAL SPECIFICATIONS

Fluids and lubricants

Application	Type	Denomination	Model	Q.ty
Lever work bushes and sleeve and fork contact surface	Grease	AGIP GREASE 30	110	-
Inside sleeve surface	Grease	AGIP GREASE 30	130	-
Topping up hydraulic oil tank clutch operating control	Hydraulic oil	AGIP ATF DEXRON	150	

SPECIAL TOOLS

Tool no.	Denomination	Page ref.
5.9030.256.0/10	Centering pin  1067-25	11, 13
5.9030.541.0	Centering pin bush  1067-26	11, 13
5.9030.48S.4	Clutch disassembly bench  1067-27	-

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TROUBLESHOOTING AND CORRECTIONS

Condition	Probable cause	Corrective action
The clutch slides	Traces of lubricant in clutch housing	Replace the front gear box and rear engine retaining ring
		Clean with petrol the gasket contact surface and verify the functioning efficiency
	Worn clutch plate	Replace disk
	Thrust bearing hardened on the seat	Replace and clean the seat
The clutch jerks	Dirty plate surface	Clean the friction surface
	Deformed plate surface	Replace disk
	Worn plate	Replace disk
	Loose plate gasket	Replace disk
The clutch does not disconnect (with engine on the gears engage with difficulty)	Worn clutch plate	Replace disk
	Inefficient hydraulic pump	Check the traverse of the piston and replace the worn part
	Clutch plate stuck to the flywheel	Clean with meta l brush and petrol the contact surface
	Incorrect oil	Replace oil
	Inefficient jack drive	Overhaul and/or replace
	Piping clogged or damaged	Overhaul and if necessary replace
	Air present in the system	Release the air
The clutch is noisy when disconnecting	Worn parts in the clutch mechanism	Replace the parts

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GEARBOX

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GENERAL FEATURES

The transmission has been designed to stand up to the most rigorous conditions of use of the whole traction guarantees a more complete manouverability.

It is constructed with two fundamental parts:
— the gearbox completely synchronized
— the epicyclic reduction gear with movable sleeve.

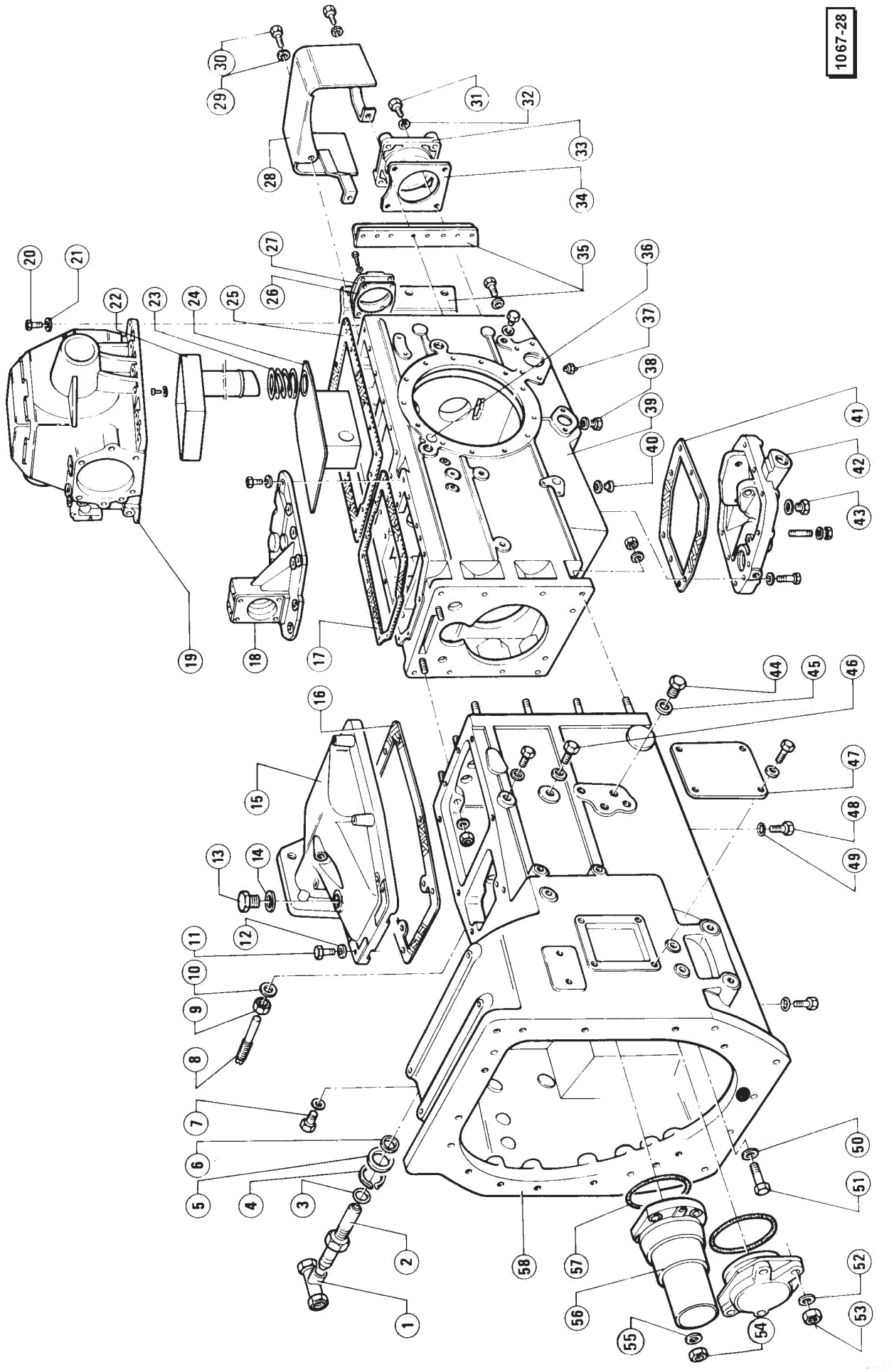
On models 110 the gearbox comes complete with four gears and the reverse, which coupled with 3 speed epicyclic reduction gear (switch range) puts twelve forward gears and three reverse gears at the disposition of the driver.
On request for models 110, models 130 and 150 come already mounted with a supplementary reduction (mini reduction gear) on the main gearbox, necessarily accompained by the reversal, which increases the range of gears to twenty forward and twelve reverse, this solution is necessary in order to use the tractor in particularly difficult jobs or transport. On request, it is always possible to alternate the assembly for a supplementary reducer with a particularly high reduction (super reduction gear) always accompained by a reversal, on models in the range. The gearbox on models 130 and 150 is equipped with epicyclic gears, and is guaranteed a notably silent working and high mechanical efficiency; the lubrication of the pressure type, is obtained through an independent pump.
The crown wheels of all models are mounted on taper rollered bearings, the mounting doesn't require special tools.
Two final epicycle type reduction gears, situated in the rear supports of the brakes, permit a notable reduction in the transmission stress.



1 - Valve
2 - Oil union
3 - Gasket
4 - Seeger ring
5 - Spacer
6 - O-ring
7 - Cap
8 - Gear shaft registration screw
9 - Nut
10 - Gasket
11 - Gearbox cover fixing screw
12 - Washer
13 - Gearbox oil introduction cap
14 - Gasket
15 - Front gearbox lever cover
16 - Lever cover gasket
17 - Pump support cover gasket
18 - Rear gearbox pump cover
19 - Hydraulic lifting housing
20 - Hydraulic lifting box fixing screw
21 - Gasket
22 - Lifting group oil sump collector
23 - Spring
24 - Oil sump
25 - Hydraulic lifting Box gasket
26 - Gasket
27 - PTO back shaft cover
28 - PTO protection
29 - Washer
30 - PTO protection fixing screw
31 - PTO flange support fixing screw
32 - Gasket
33 - PTO flange support
34 - Flange gasket
35 - Back support
36 - Differential block shaft plug
37 - Grease nipple
38 - Transmission oil relief
39 - Rear geabox
40 - Oil relief plug
41 - Lower gasket cover
42 - Lower cover
43 - 4 Wheel drive PTO oil filter
44 - Plug
45 - Washer
46 - Plug
47 - Clutch spare cover
48 - Gear oil relief plug
49 - Gasket
50 - Holding washer
51 - Shaft reversallock screw
52 - Oiling
53 - Secondary mini reduction gear/super reduction gear
54 - Nut
55 - Holding washer
56 - Flanged sleeve
57 - Support link
58 - Front gearbox

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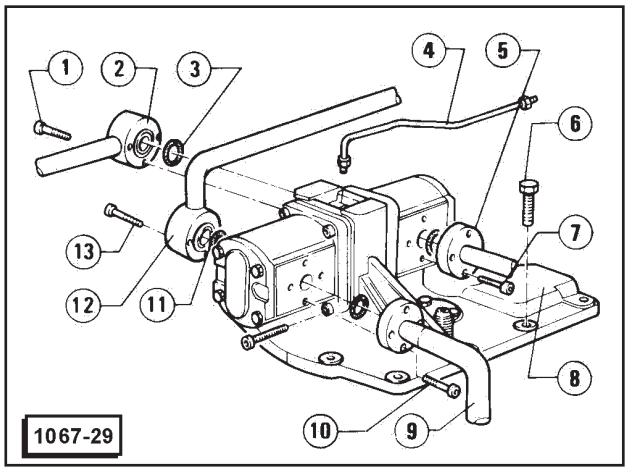
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PRELIMINARY OPERATIONS

The preliminary operations, given below, include, where necessary, specific instructions before each single dismounting.

REAR GEARBOX PUMP COVER REMOVAL

1. Loosen the three socket head screws fixing the delivery pipes **2** and **12**.
2. Loosen the four socket head screws fixing the oil intake pipes **5** and **9**.
3. Collect the O-rings found under the unions of the pump pipes.
4. Disconnect the pipes **4** loosening the two unions positioned on the pump support and on the lifting housing.
5. Loosen the twelve screws **6** fixing the cover **8** and remove.

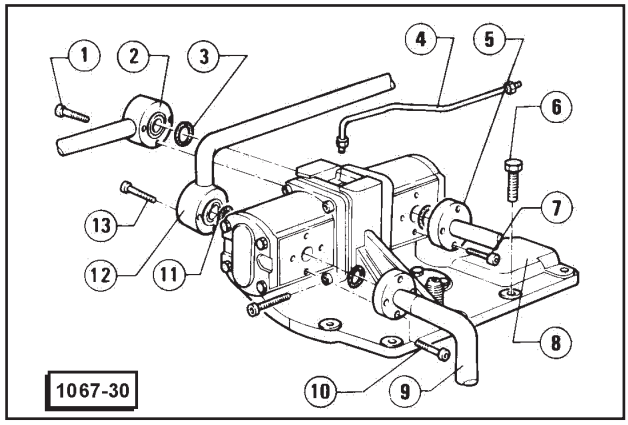


1 - Screw
2 - Hydrostatic steering oil delivery pipe
3 - O-ring
4 - Lubrication pipe
5 - Hydrostatic fixing screw
6 - Pump cover fixing screw
7 - Screw
8 - Pump cover
9 - Hydraulic fitting pump intake pipe
10 - Screw
11 - O-ring
12 - Hydraulic lifter oil delivery pipe
13 - Screw

REMOVAL OF AXLE SHAFT SIDE SUPPORT

130 - 150
Follow the procedure given in Brakes - Rear Brakes - Dismounting - Steps from **1.** to **14** until step (4).

110
1. Follow the procedure in: Brakes - Rear Brakes . Dismounting - Steps from **1.** to **10**.
2. Loosen the thirteen nuts fixing the flange and those fixing the brake housing to the bell using an adequate method to hold the bell during the removal of the rear gearbox.



WARNING
Accurately check the balancing of the tractor and the bell to prevent them clashing during the removal operation.

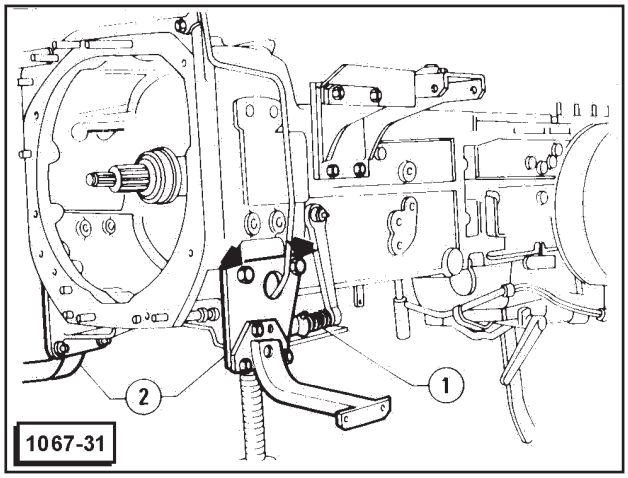
3. Remove the final reduction gear bracket taking it from the brake discs.

ENGINE GEARBOX SEPARATION

1. Separate the engine from the gearbox (refer to: Complete Engine - Removal - Including the removal of the Front Axle).
2. Cut the clutch piston dust guard band **1** and loosen the two screws fixing to two brackets **2** to the gearbox. Remove the brackets.

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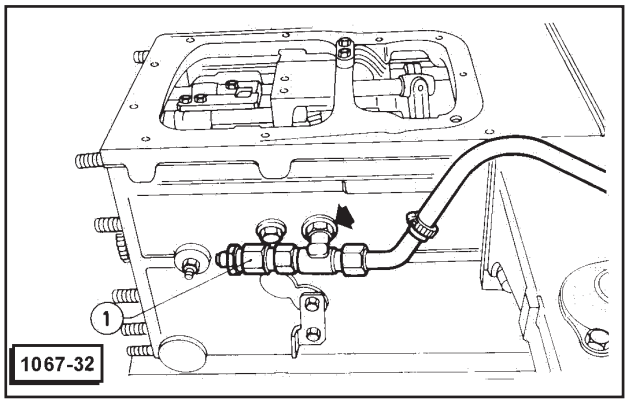
1 - Band
2 - Diesel tank holding bracket

CAUTION
Always use a soft metal hammer and punch when it is necessary to tap on metal parts.

3. Remove the friction clutch sleeve and control fork (refer to: Gearbox Friction Clutch - Clutch - Removal).

Only for models 130 - 150

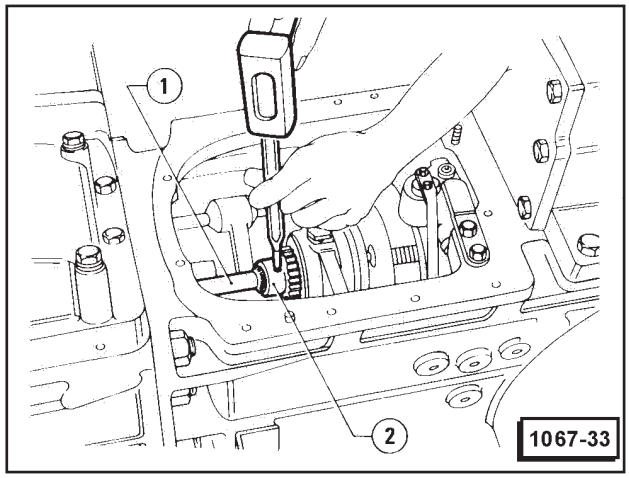
4. Loosen the nut fixing the valve **1** to the gearbox and remove it together with its piping.



1 - Gear oil pressure limit valve

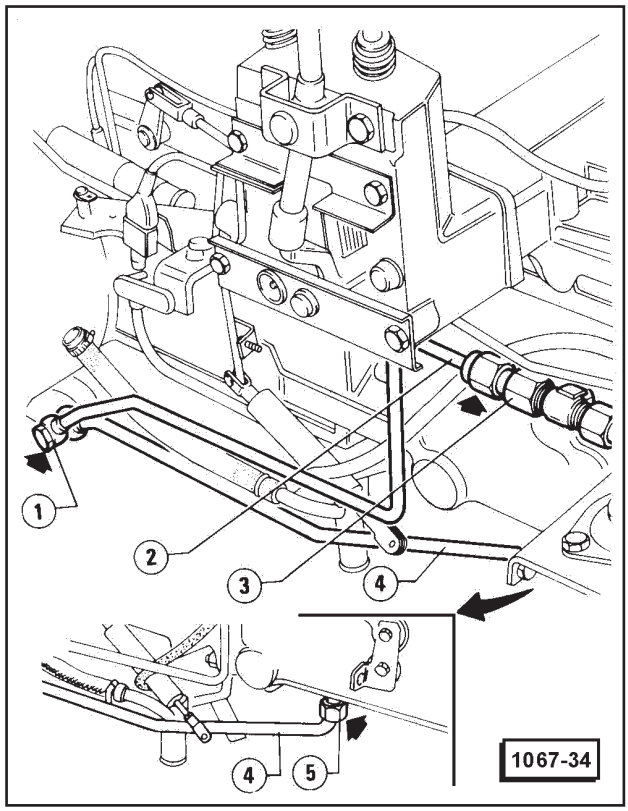
REMOVAL AND REATTACHMENT OF BACK AND FRONT GEARBOX

1. Remove the driving cabin (refer to: Cabin - Complete Cabin - Removal).
2. Remove the pump cover from the rear box (refer to: Preliminary Operations). With the help of a hammer and punch take out the pin fixing the shaft **1** to the control shaft at the pump **2**.



1 - PTO shaft
2 - PTO pump control shaft

4. Remove the fuel tank (refer to: Feeding - Tank Removal).
5. Place a container under the back gearbox, loosen the plugs of the section you're working on and bleed the oil (numbers **38**, **40**, **43** and **48** of the enlarged diagram).
6. Loosen the unions **1** and **5** of the two pipes **4** of the oil leveller and only for models 130-150,the unions **3** of the oil discharge and remove excess.



1 - Union
2 - Excess oil discharge pipe
3 - Excess oil discharge pipe union
(Only for models 150-130
4 - Oil levelling pipe
5 - Union

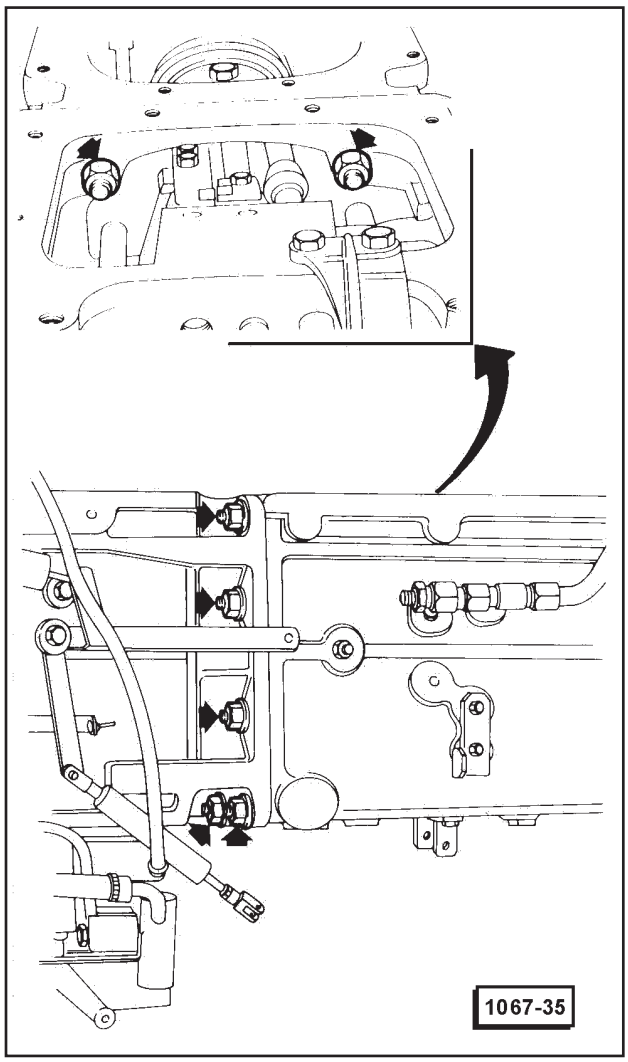
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7. Place a jack under the rear gearbox, being careful not to touch the metal parts by placing a wooden block in between.
8. Sling the front gearbox in order to hold it in a lifted position during the removal of the rear gearbox.

WARNING
Accurately check the balance of the tractor and the bell in order to avoid dangerous clashing during the removal operation.

9. Remove the front gearbox lever cover (refer to: External Controls - Dismounting - Steps from 1. to 3.).
10. Place the gearbox sling in traction loosen the twelve nuts fixing the two boxes.



11. Levering between the two boxes, carefully remove the front gearbox being careful not to lift it too high so as not to damage the PTO control shaft, then place the gearbox on a stand

CAUTION
Be careful that the epicyclic reduction gear which is not fixed in the differential box, does not move.

Remount the gearbox working in the reverse order adhering to the following instructions:
— Check that the box is not cracked.
— Check that the upper cover surface is not damaged, and that it has sufficient holding for the gaskets.
— Eliminate any defect, eliminate them with the help of a file. Change the very damaged or worn parts.
— Check that the epicyclic reduction gear is in it's correct position in the differential box.
— Spread the mating area of the differential housing and the gearbox with prescribed sealer.
— Insert the PTO control rod and check the parallelism of the box during the mounting.
— It is advisable to manually engage a gear and turn the main shaft to help the insertion of the secondary gear shaft in the epicyclic reduction gear.
— Tighten the fixing screws of the two boxes to the prescribed torque.

Tightening torque
Nuts fixing gearbox to differential housing

Refer to: GENERAL
Nut tightening

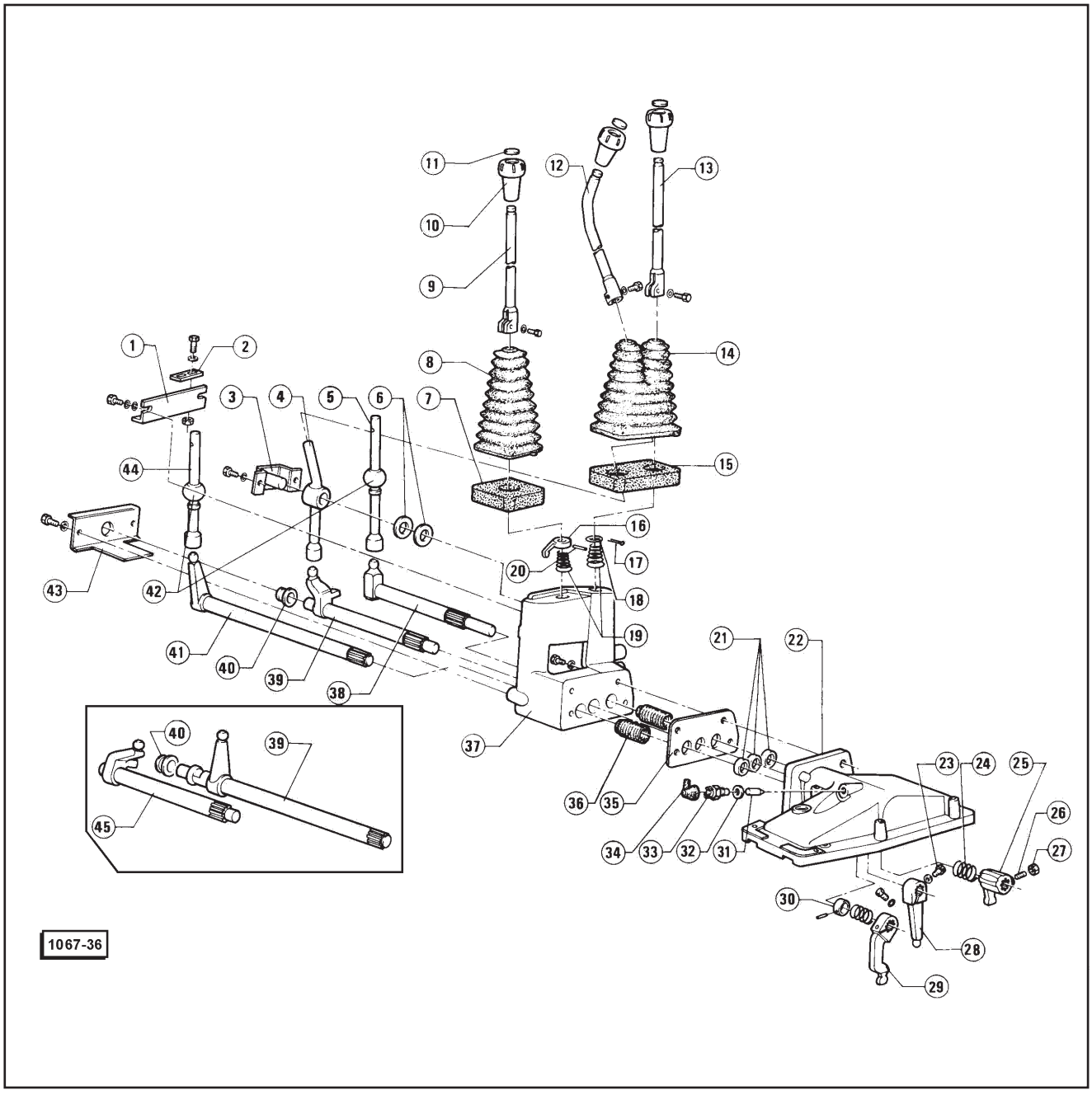
— Top up the level of the oil using the prescribed lubricant.

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EXTERNAL GEARS

DISMOUNTING



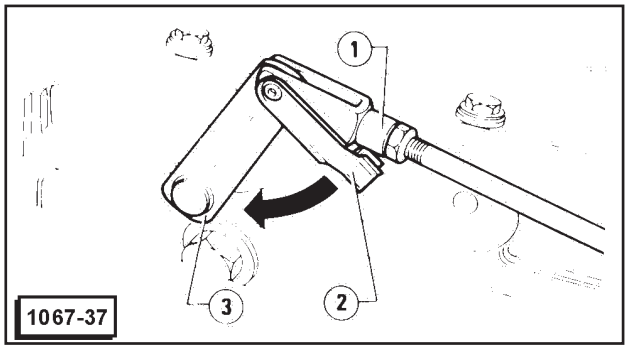
1 - Bracket
2 - Adjusting plate
3 - Bracket
4 - Epicyclic reduction gear control rod
5 - Gear control rod
6 - Shims
7 - Acoustic panel
8 - Single bellow
9 - Mini reduction gear reversal lever
10 - Knob
11 - Cover
12 - Epicyclic reduction lever
13 - Gear lever
14 - Double bellow
15 - Acoustic panel
16 - Leverr
17 - Split pin
18 - Shoulder washer
19 - Spring
20 - Lock pin
21 - Support link
22 - Gearbox cover
23 - Screw
24 - Spring
25 - Gear lever control
26 - Tapered screw
27 - Nut
28 - Epicyclic reduction control lever
29 - Mini reduction gear and reversal control lever
30 - Stop ring
31 - Rod
32 - Gasket
33 - Starter switch
34 - Protection cap
35 - Plate
36 - Rubber bellow
37 - External control support
38 - Gear control box
39 - Epicyclic reduction control rod
40 - Bush
41 - Mini reduction gear reversal control bar
42 - Ball pin
43 - Bracket
44 - Mini reduction gear and reversal control bar
45 - Mini reduction gear and reversal control bar

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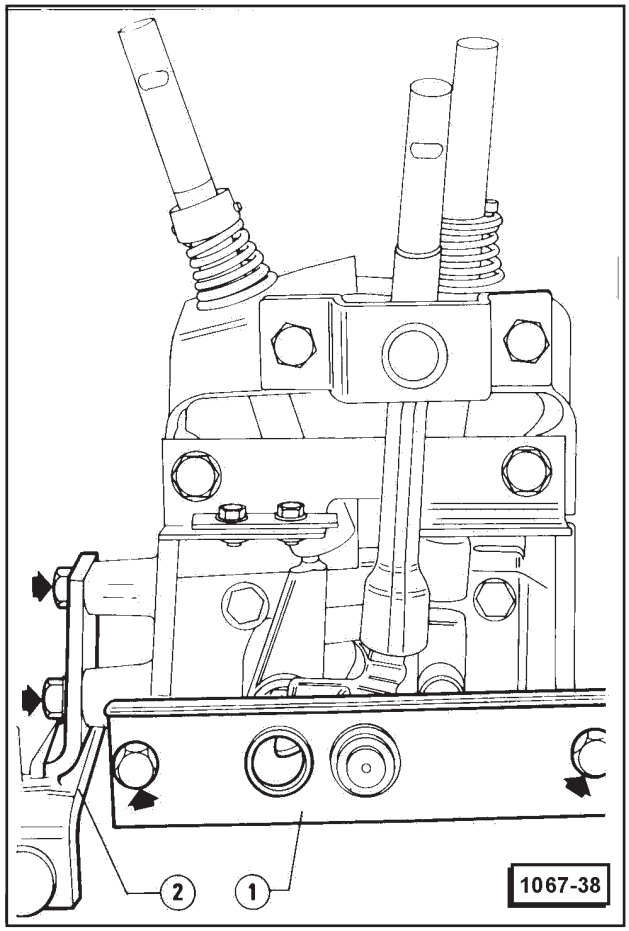
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CAUTION
Always use a soft metal hammer and punch when working on ferrous metal.

1. Remove the drive cabin (refer to: Cabin - Complete Cabin - Removal).
2. Take out the safety clip **2**and remove disconnecting the rod **1** from the PTO clutch coupling control lever **2**.



1 - Return rod
2 - Safety clip
3 - PTO clutch coupling control lever



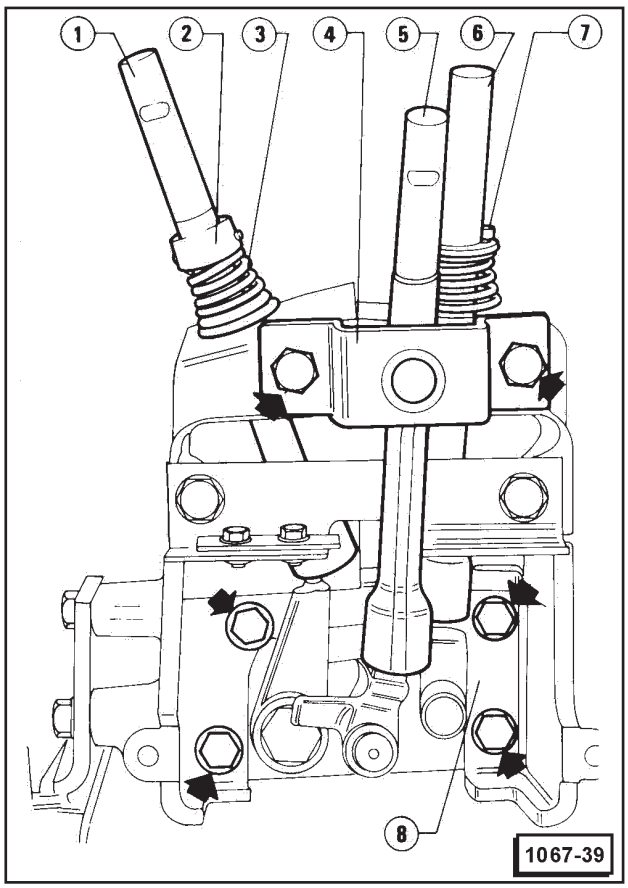
1 - Bracket
2 - PTO clutch coupling return lever control

3. Loosen the eleven screws fixing the cover to the gearbox. Remove the cover complete with the relative gaskets, being careful not to loose the springs which keep the gear lock ball bearings in place.
4. Loosen the two screws fixing the PTO clutch coupling return **2** to the control lever and remove.
5. Loosen the two screws fixing the bracket **1** to the control lever and remove it.

6. Loosen the four screws fixing the lever support **8** to the cover. Remove the support complete with the rod.
7. If necessary, remove the three rods of the gear control **6** and the reduction gear controls **1** and **5** from the lever support using the following procedure:
(1) Loosen the two screws fixing the bracket **4** to the lever support. Remove the brackets and epicyclic reduction gear control rod **5** recovering the spacers.
(2) Take off the split pin **7** and remove the gear control from the base of the rod **6** recovering the spring, shoulder ring and ball bearing.
(3) Using a hammer and punch, remove the pin **3** fixing the lever **2** to the mini reduction gear and reversor to the rod **1**. Remove the spring, gear and ball bearing from the base of the rod.

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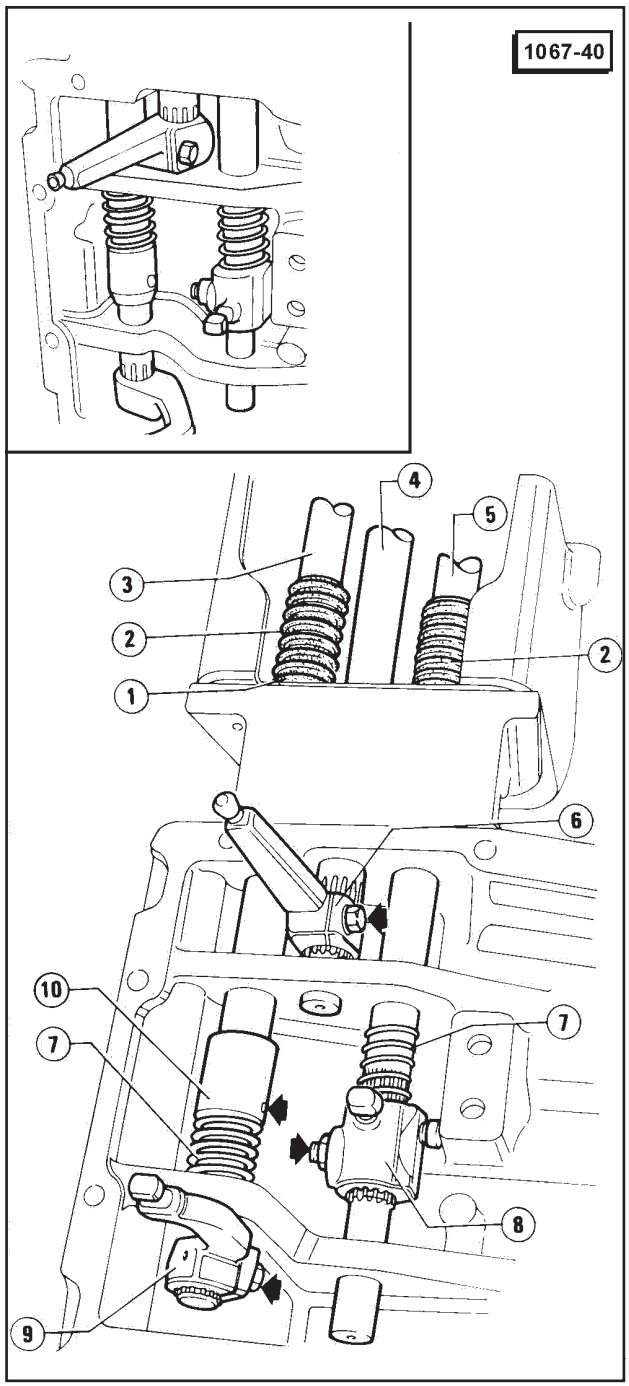
1 - Mini reduction gear and reversal control rod
2 - Lever
3 - Pin
4 - Bracket
5 - Epicyclic reduction gear control rod
6 - Gear control rod
7 - Split pin
8 - Lever support

8. Loosen the starter motor switch and remove it from the cover, with the help of a magnet remove the cap.

WARNING
Before beginning to dismount the bar lever, mark the lever positions on the bar to help you in remounting them.

9. Loosen the screws fixing the lever **7** to the bar 4 of the epicylic reduction gear control. Take off the bar and collect the lever.
10. Loosen the tapered screw fixing the lever **8** to the gear control bar 5.
11. Loosen the screws fixing the lever **9** to the mini reduction gear and reversal control bar 3. Using hammer and punch remove the pin fixing the holding ring **10** to the bar 3.

12. Carefully take off the bars **3** and **5** together with the bellow **2** and the plate **1**. Collect the levers **9** and **6**, the spring **7** holding ring **10** and the three holding rings found in the cover.
13. If necessary, take off the two bars from the relative bellows.



1 - Plate
2 - Rubber bellows
3 - Mini reduction gear control and reversal control bar
4 - Epicyclic reduction gear control rod
5 - Gear control rod
6 - Epicyclic reduction gear control lever
7 - Spring
8 - Gear control lever
9 - Mini reduction gear control and reversal control lever
10 - Holding ring

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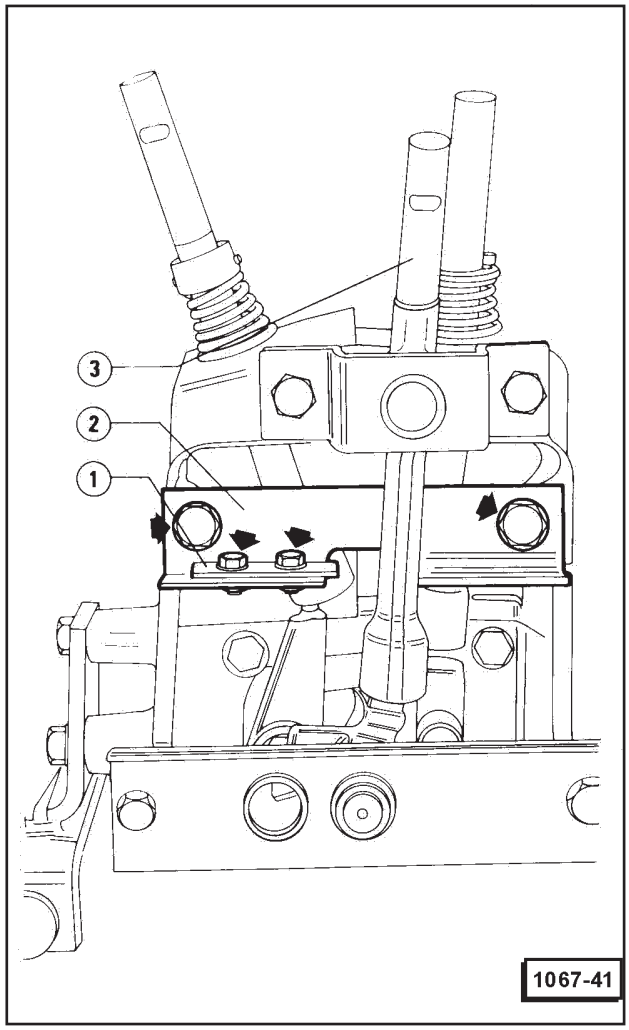
CHECKS AND CONTROLS

1. Clean the metal parts of the controls with solvant and control their good working.
2. Check the amount of wear of the joints between the rods and bars.
3. Check the rubber bellows. Change any that are worn or damaged.
4. Check that the return springs are not deformed or twisted. Change them if necessary.

REMOUNTING

Remount the external controls working in the reverse order adhering to the following instructions:
— Mount the new support links being careful that the larger diameter is turned towards the outside of the cover.
— **Lubricate** the lever joints with prescribed grease.

1. Position the three levers on their respective rods referring to the signs made on the rods when dismounting, checking that the notches present on the grooved part of the bar are correctly positioned to allow the fixing of the lever with respective screws.
2. Se careful to exactly position the springs, then having positioned the cover on the box, check that the three levers are correctly positioned in the slots.
3. After mounting, adjust the position limit of the epicyclic reduction gear control rod **3** using the following procedure:
(1) Loosen the four screws fixing the brackets **2** and the adjustment plate **1**.
(2) Carefully put the rod into action **3** and connect the reduced speed.
(3) Position the bracket **2** in such a way that the internal edge is approximately a millimetre from the rod **3**. Block the bracket.
(4) Connect the slow reduction and position the plate **1** using the same method as when connecting the bracket.



1 - Adjustment plate
2 - Bracket
3 - Epicyclic reduction gear control rod

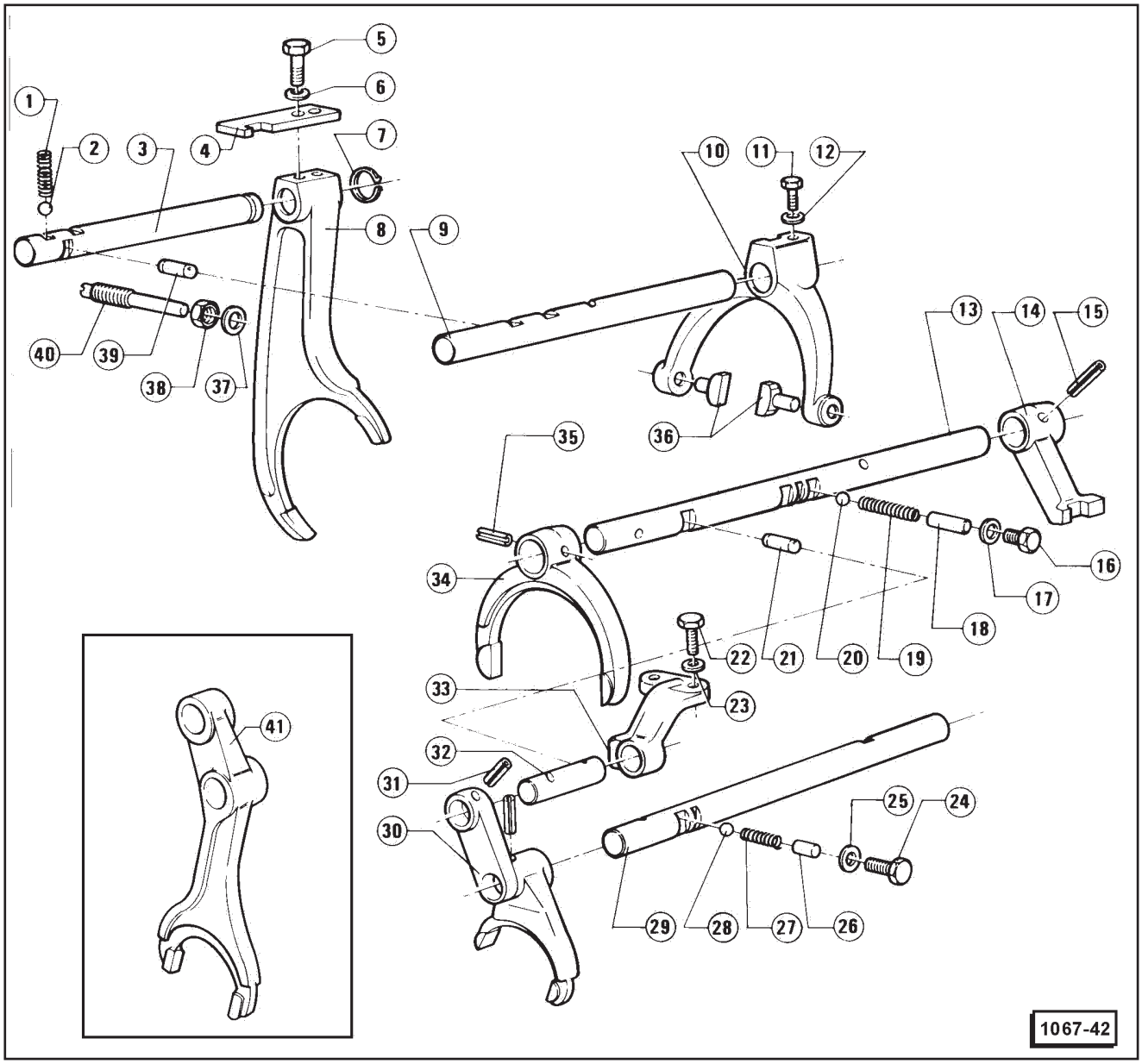
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FRONT GEARBOX

RODS AND FORKS

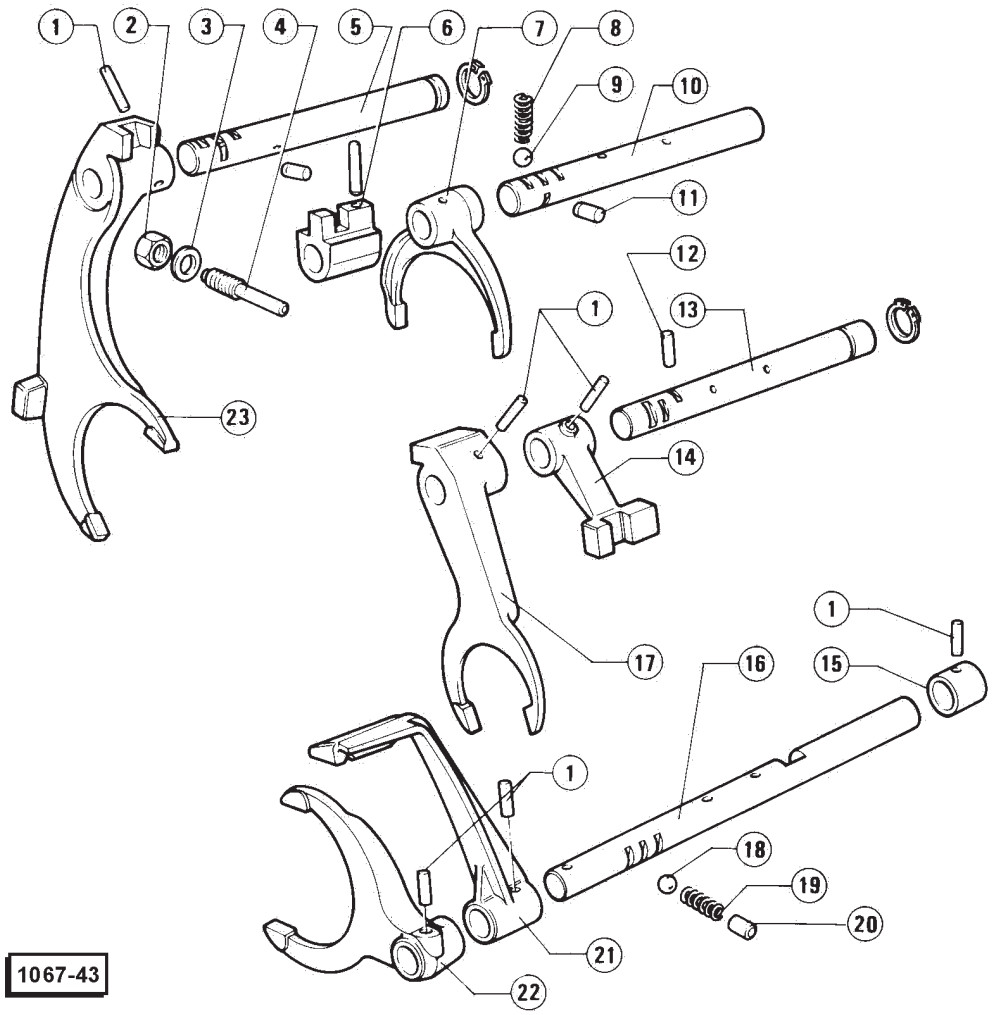
DISMOUNTING



1 - Spring
2 - Ball
3 - 1st and 2nd gear coupling rod
4 - Connecting plate
5 - Screws
6 - Washer
7 - Seeger ring
8 - 1 st and 2nd gear coupling fork
9 - 3rd and 4th gear coupling rod
10 - 3rd and 4th gear coupling fork
11 - Screw
12 - Washer
13 - Mini reduction gear (super reduction gear coupling rod)
14 - Return lever
15 - Lock pin
16 - Screw
17 - Washer
18 - Cap
19 - Spring
20 - Ball
21 - Safety pawl
22 - Screw
23 - Washer
24 - Screw
25 - Washer
26 - Cap
27 - Spring
28 - Ball
29 - Reversal coupling rod
30 - Reversal coupling fork (mini reduction gear version)
31 - Lock pin
32 - Rod
33 - Bracket
34 - Mini reduction gear coupling fork
35 - Lock pin
36 - Pressure pad
37 - Gasket
38 - Nut
39 - Safety pawl
40 - Adjusting screw
41 - Reversal coupling fork (super reduction gear version)

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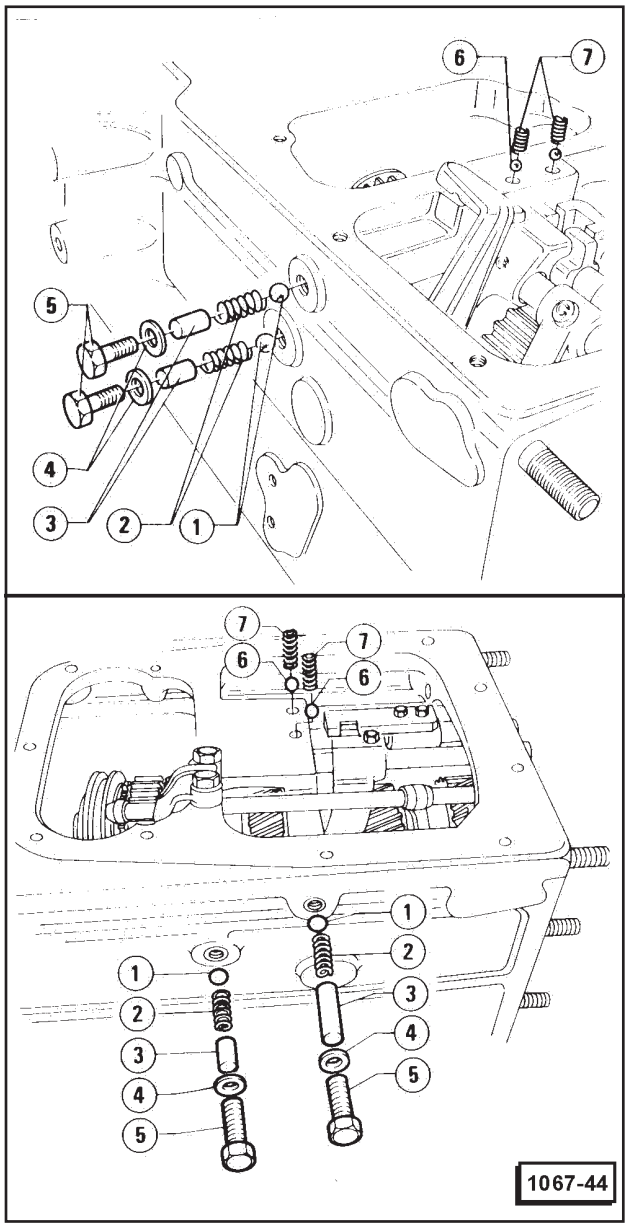
1 - Lock pin
2 - Nut
3 - Washer
4 - 1st and 2nd gear fork adjustment screw
5 - 1st and 2nd gear control rod coupling
6 - Control prong
7 - 3rd and 4th gear fork coupling
8 - Spring
9 - Ball
10 - 3rd and 4th gear control rod coupling
11 - Block rod gear coupling with inserted reversal
12 - Block rod reversal coupling
13 - Control rod reversal coupling
14 - Control area
15 - Bush
16 - Mini reduction gear control rod coupling
17 - Reversal fork coupling
18 - Ball
19 - Spring
20 - Spacer
21 - Reversal lever block coupling with mini reduction gear
22 - Mini reduction gear fork coupling
23 - 1st and 2nd gear fork coupling

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Preliminary operations

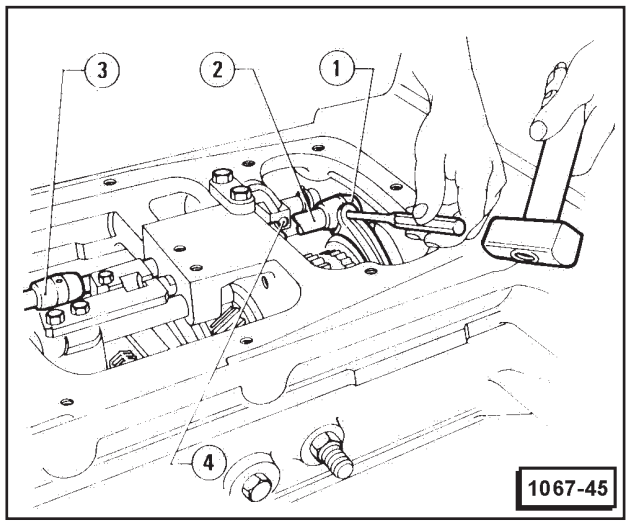
1. Separate the two gearboxes (refer to: Preliminary Operations).
2. Remove the lever cover of the front gearbox (refer to: External Controls - Dismounting - Steps from 1. to 3.).
3. Recover the two springs **7** and the balls **6** using a magnet.
4. Loosen the two cups **5** and take off the spacer **3** spring **2** and the ball **1** with a magnet.



1 - Rod positioning ball
2 - Spring
3 - Spacer
4 - Gasket
5 - Cap
6 - Ball
7 - Spring

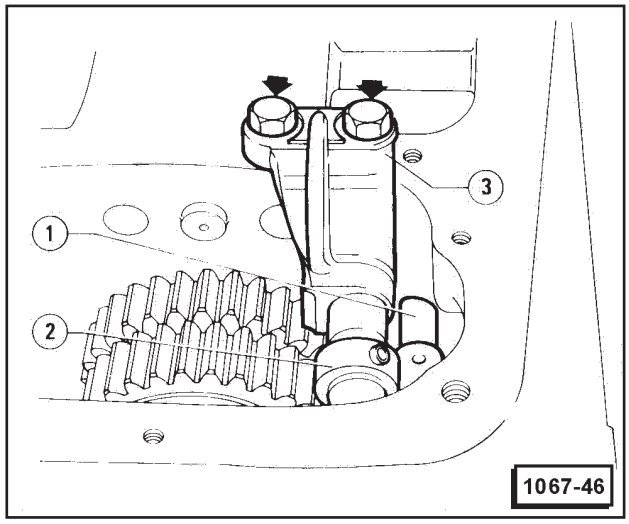
Operations for 130-150

1. Remove rod and mini reduction gear fork coupling using the following procedure.
(1) Using a hammer and punch remove the pin fixing the fork **1** to the rod **2** and the lever **3** to the rod **2**.
(2) Take off the rod, the fork, the lever and collect the safety pawl **4**.



1 - Fork
2 - Mini reduction gear rod coupling
3 - Gear control lever coupling
4 - Safety pawl

2. Remove and reversal fork coupling using the following procedure.
(1) Remove the pin fixing the fork **2** to the rod **3** and take it off.
(2) Loosen the two screws fixing the brackets **3** to the box. Remove the bracket.



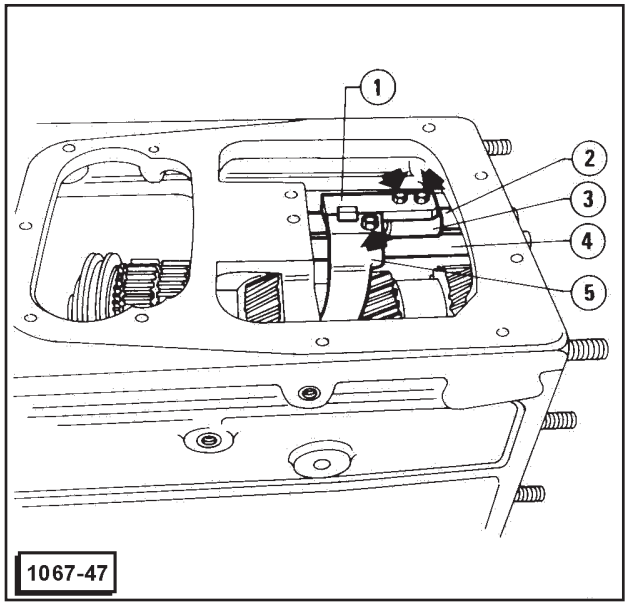
1 - Reversal rod coupling
2 - Fork and support
3 - Bracket

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3. Remove rod and fork I - II and rod and forks III - IV using the following procedure:

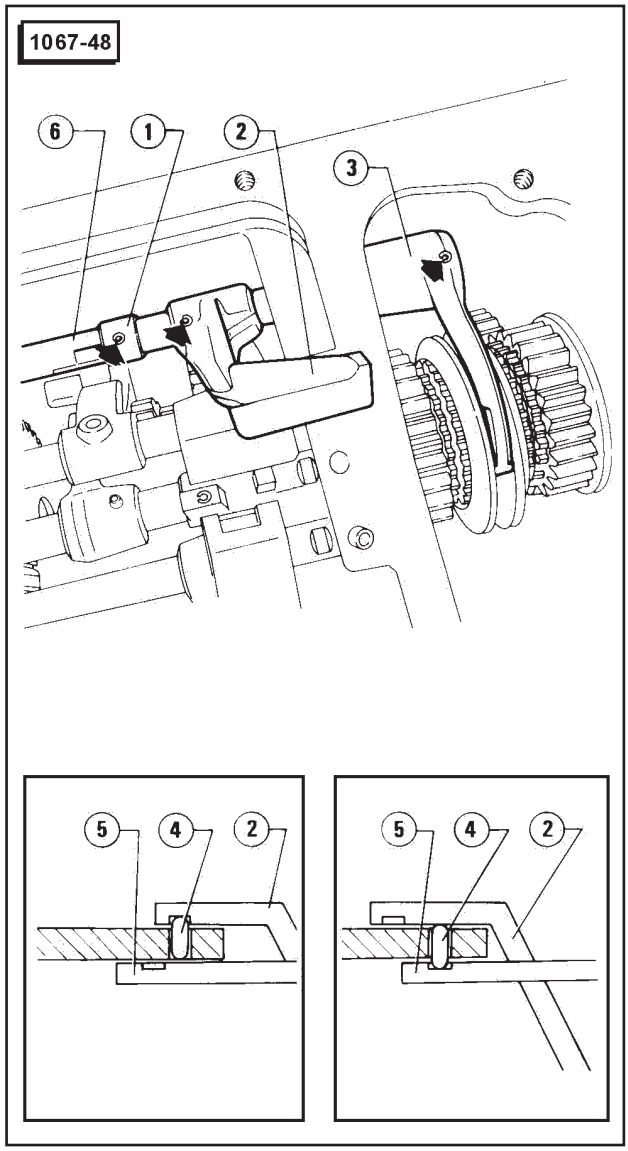
(1) Remove the screw adjusting the position of the fork coupling fork I and II.
2) Loosen the three screws fixing the fork coupling **5** III and IV of fork **3** to the relative rod. Remove the plate **1** take out the rod **2** and relative fork **3**.
(3) Take off rod **4** and remove the fork **5** being careful that the movable pads do not slip off it. Recover the safety pawl found in the box between the two rod seats.



1 - Coupling plate
2 - I and II gear rod coupling
3 - I and II gear fork coupling
4 - III and IV gear rod coupling
5 - III and IV gear fork coupling

Interventions for models 110

1. Remove rod and mini reduction gear coupling using the following procedure:
(1) With a lever move the fork **3** towards the back of the box in order to take out the lock pin of the block lever **2** without interfering with the back gear wheels.
(2) Using a hammer and punch extract the pin fixing the bush **1** the block lever **2** and the fork **3**.
(3) Take out the control rod **4** and recover the fork **3**, the lever **2** and the bush **1**. Using a magnet recover the reversal gear blocking pushrod found under the lever **2**.



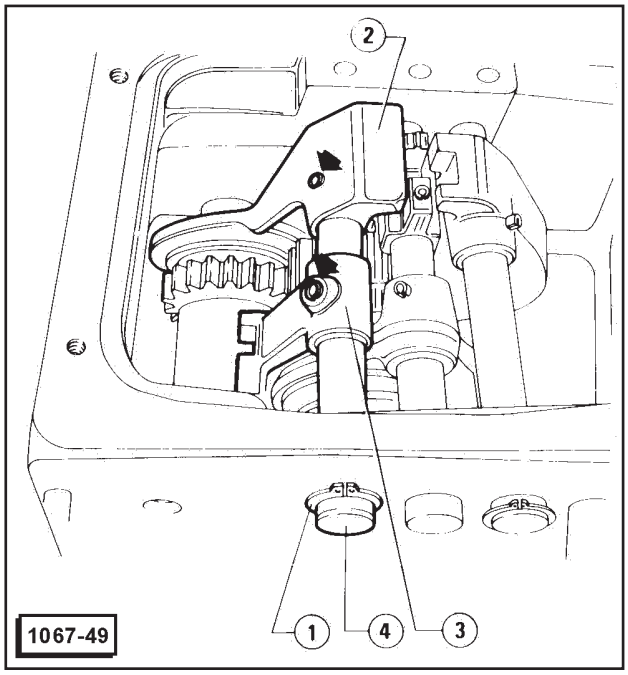
1 - Bush
2 - Block lever
3 - Mini reduction rod gear coupling fork
4 - Blocking push rod
5 - Reversal rod
6 - Control rod

2. Remove the rod and the reversal coupling fork using the following procedure:

(1) Take the Seeger ring **1** found at the extreme end of the rod **5** off.
(2) Using a hammer and punch extract the pin that blocks the fork **2** and the control sector.

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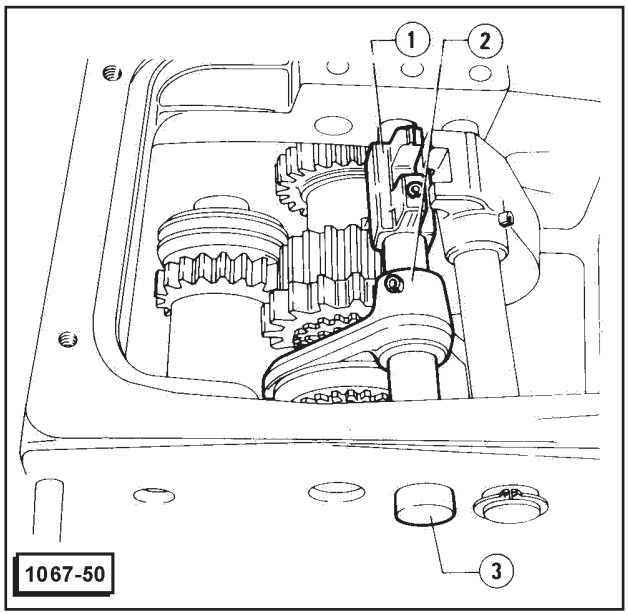
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1 - Seeger ring
2 - Reversal coupling fork
3 - Control sector
4 - Reversal coupling rod

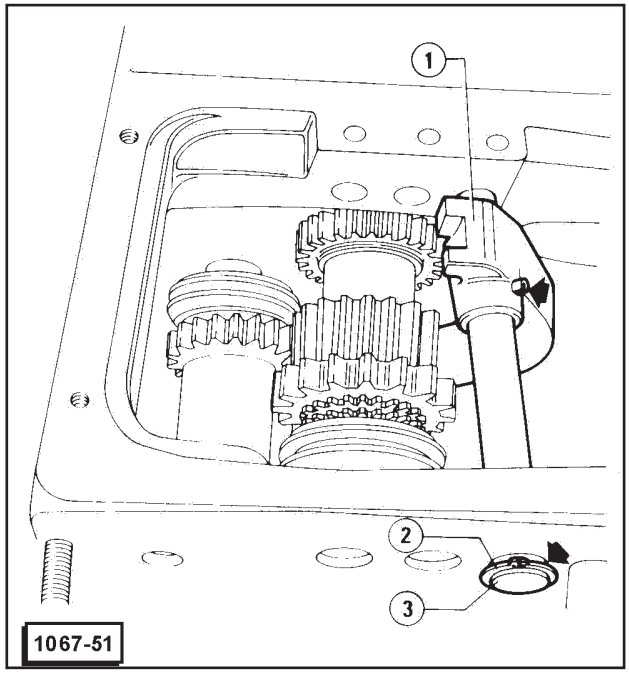
(3) Take out the rod **3** and recover the fork **2** and the control sector.

3. Remove rod and fork coupling III and IV using the following procedure:
(1) Using a hammer and punch extract the lock pins that block the prong **1** and the fork **2**.
(2) Take out the rod **3** and recover the fork **2** and the prong **1**.
(3) Using a magnet, remove the push rod that stops the reversal coupling when a gear is inserted from the passage hole in the bulkhead.



1 - Prong
2 - Fork coupling III and IV gears
3 - Rod coupling III and IV gears

4. Remove the rod and fork coupling I and II gears operations as follows:
(1) Referring to the enlarged diagram on page 11, loosen the blocking nut **2** until you are able to remove the adjusting screw **4** of the fork coupling I and II and remove it together with the gasket **3**.
(2) Remove the final run Seeger ring **2** found on the control rod **3**.
(3) Using a hammer and punch extract the pin fixing the fork **1** then take off the rod and recover the fork.



1 - Fork coupling I and II gear
2 - Final run Seeger ring
3 - Control rod coupling I and II gear

(4) Using a hammer recover the second pushrod blocker working through the passage hole of the rod present on the bulkhead.

CHECKS AND CONTROLS

NOTE
Before carrying out the following operations accurately clean ali the parts. This is in order to be able to accurately check for damage and wear to some of them.

1. Check that the forks are not over worn or deformed.
2. Check that the control rods have not been deformed.
3. Check that the cables on the control rods present no splits.
4. Check that the rod positioning pawl and the safety coupling pawl are not split or show signs of wear.

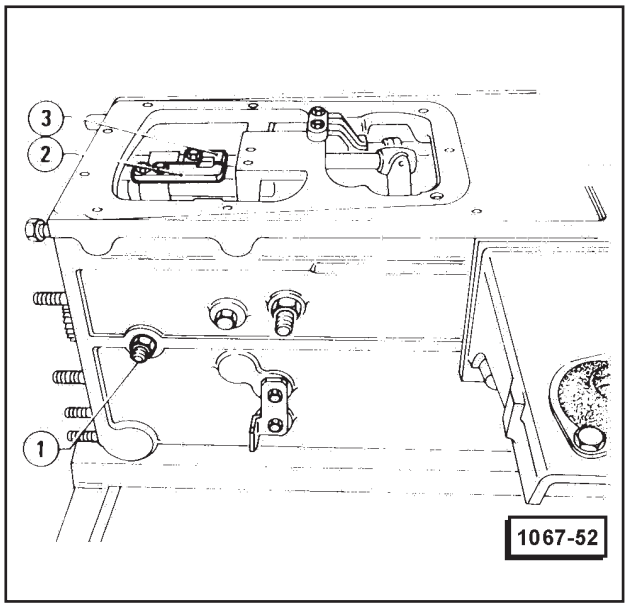
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REMOUNTING

Remount the rods and the forks working in reverse order and adhering to the following procedure:
— Position the two safety pawls before positioning the relative rods.
— After mounting the fork coupling I and II tighten the adjustment screw 1 until it touches the fork, then loosen the screw by one turn and block it with the nut.

— Only for models 130 and 150
Check that cables that couple the forks III and IV **3** and that of the plate **2** of the fork I and II are perfectly facing each other.



1 - Adjusting screw
2 - Coupling plate 130 and 150
3 - Fork coupling III and IV gear 130 and 150

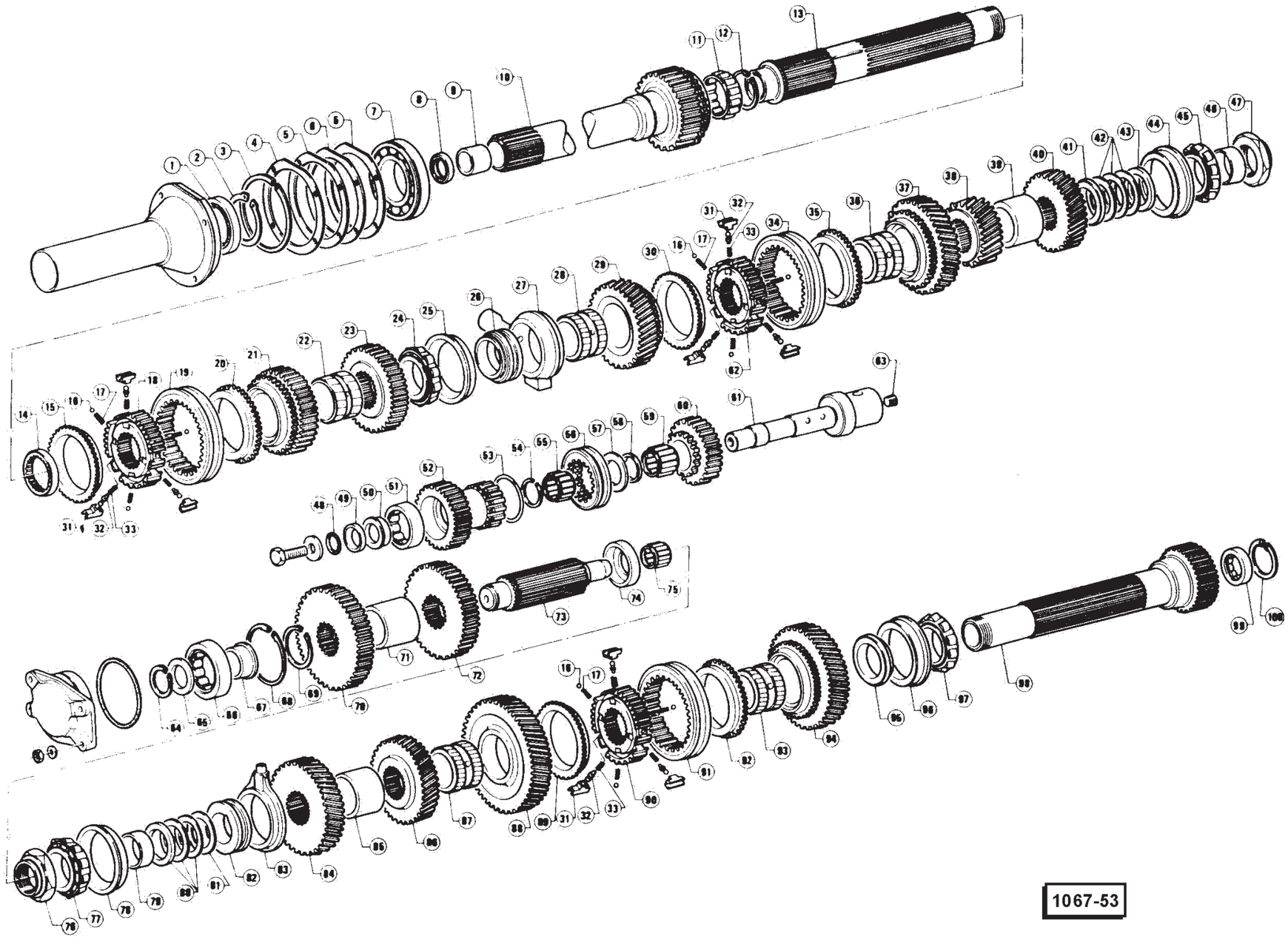
TESTING

Check that the spring, pawls, rods all work together correctly, and that the gear coupling takes place without forcing and that the sleeve runs smoothly along the whole course of the coupling.
Also check that when the center rod is in position coupling cannot take place on the side rods, if this is possible, check that you have correctly mounted the safety pawl.

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SHAFTS AND GEARING
For 130 - 150
DISMOUNTING



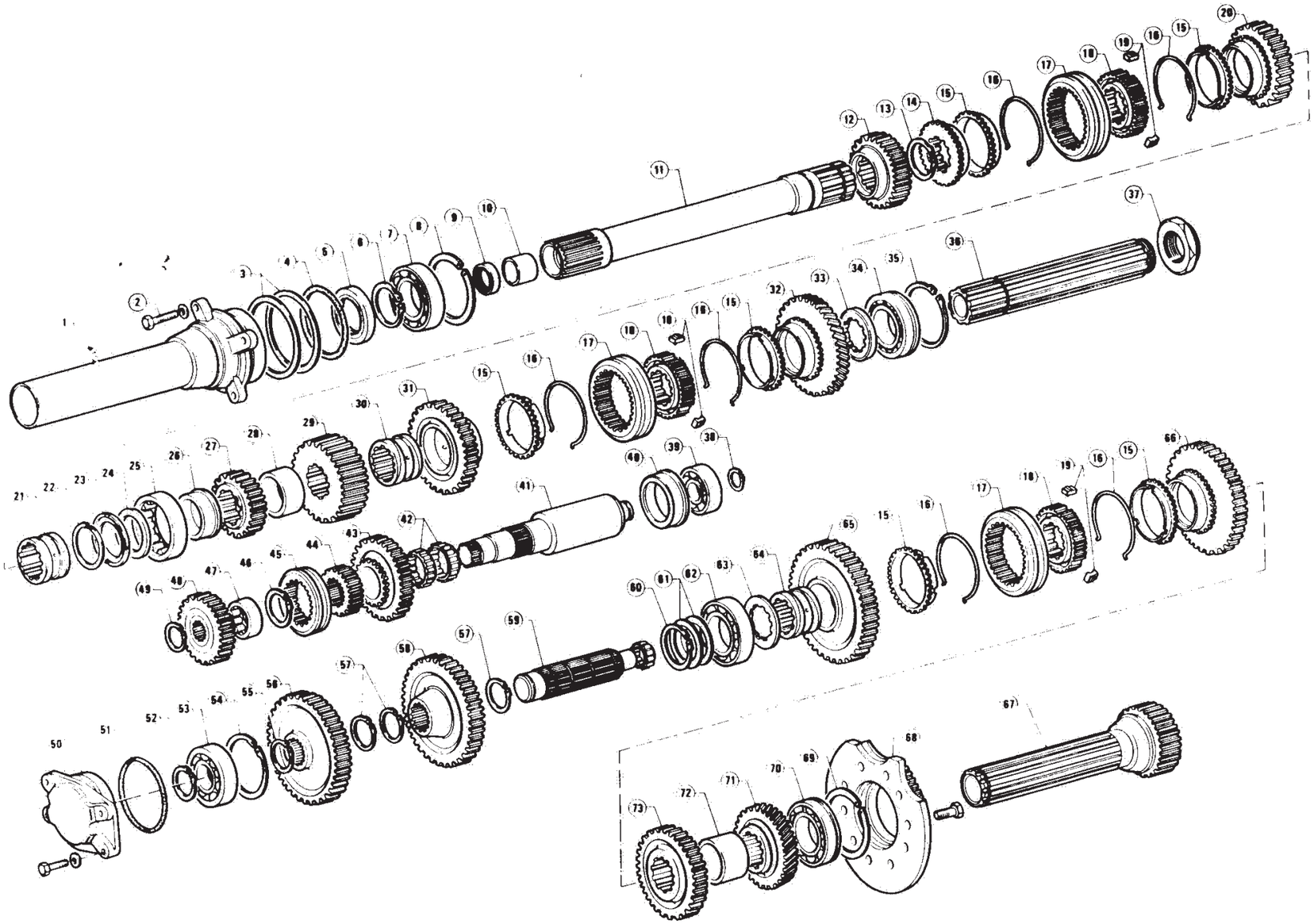
1 - Support link
2 - External Seeger ring
3 - Compression ring
4 - External gasket
5 - Shim
6 - Internal gasket
7 - Ball bearing
8 - Shell
9 - Bush
10 - Clutch shaft
11 - Retainer
12 - Seeger ring
13 - Shaft gear
14 - Shoulder ring
15 - Synchronizer ring
16 - Ball
17 - Spring
18 - Toothed hub
19 - Grooved sleeve
20 - Synchronizer ring
21 - Reduction gear wheel
22 - Bush
23 - Reversal gear
24 - Internal tapered retainer track
25 - External track
26 - Lubrication manifold
27 - Lubrication bush
28 - Bush
29 - Gear conduit III
30 - Synchronizer ring
31 - Pad
32 - Ball pin
33 - Spring
34 - Grooved sleeve
35 - Synchronized ring
36 - Bush
37 - Gear conduit IV
38 - Gear conduit I
39 - Spacer
40 - Gear conduit II
41 - Shim adjustment ring
42 - Shim
43 - Shim adjustment ring
44 - External track
45 - Internal tapered retainer track
46 - Bush
47 - Ring nut
48 - O-ring
49 - Shoulder
50 - Internal track
51 - External retainer track
52 - Fixed gear
53 - Seeger ring
54 - Seeger ring
55 - Retainer
56 - Grooved sleeve
57 - Shoulder
58 - Spacer
59 - Retainer
60 - Moveable gears
61 - Reversal shaft
62 - Sleeve
63 - Cap
64 - External Seeger ring
65 - Shoulder ring
66 - External retainer track
67 - Internal track
68 - External Seeger ring
69 - External Seeger ring
70 - Reduction gear
71 - Spacer
72 - Reduction gear
73 - Reduction gear secondary shaft
74 - Spacer
75 - Retainer
76 - Ring nut
77 - Internal retainer track
78 - External track
79 - Bush
80 - Shim adjustment
81 - Shims
82 - Lubrication bush
83 - Lubrication manifold
84 - Gear conduit III
85 - Spacer
86 - Gear conduit IV
87 - Bush
88 - Gear conduit I
89 - Synchronized ring
90 - Toothed hub
91 - Grooved sleeve
92 - Synchronized ring
93 - Bush
94 - Gear conduit II
95 - Spacer
96 - External track
97 - Internal retainer track
98 - Secondary gear shaft
99 - Roller bearing
100 - Seeger ring

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For 110

1 - Flanged sleeve
2 - Sleeve fixing screw
3 - Shim adjusting ring
4 - O-ring
5 - Support link
6 - Seeger ring
7 - Bearing
8 - Seeger ring
9 - Support link
10 - Bush
11 - Clutch shaft
12 - Mini reduction gear input
13 - Seeger ring
14 - Crown nut coupling
15 - Synchronized ring
16 - Compression ring
17 - Coupling collar
18 - Toothed hub
19 - Pad
20 - Mini reduction gear outlet
21 - Seeger ring
22 - Spacer ring
23 - Spacer ring
24 - Shoulder ring
25 - External bearing track
26 - Internal bearing track
27 - Gear conduit I
28 - Spacer
29 - Gear conduit II and reversal
30 - Bush
31 - Gear conduit III
32 - Gear conduit IV
33 - Shovel ring
34 - Bearing
35 - Compression ring
36 - Main gear shaft
37 - Ring nut
38 - Seeger ring
39 - Bearing
40 - Inserted bearing seat
41 - Reversal shaft
42 - Retainer
43 - Gear
44 - Toothed hub
45 - Coupling collar
46 - Seeger ring
47 - Bearing
48 - Gear
49 - Seeger ring
50 - Secondary mini reduction gear shaft cover
51 - O-ring
52 - Seeger ring
53 - Bearing
54 - Seeger ring
55 - Seeger ring
56 - Gear
57 - Seeger ring
58 - Gear
59 - Mini reduction gear secondary
60 - Seeger ring
61 - Shims
62 - Bearing
63 - Shoulder ring
64 - Bush
65 - Gear conduit I
66 - Gear conduit II
67 - Secondary gearbox shaft
68 - Flange
69 - Compression ring
70 - Bearing
71 - Gear conduit IV
72 - Spacer
73 - Gear conduit III



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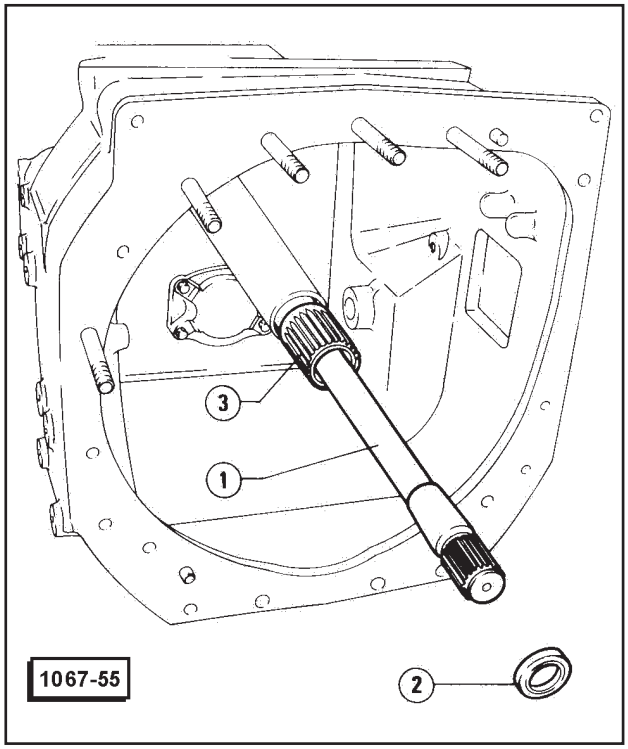
PRELIMINARY OPERATIONS

The following procedure is to be used only in operations on the whole of the gearbox.
To work on a single part of the shaft it is possible to use a reduced dismounting which will be explained as you go along, telling you what you don't need to dismount.

1. Separate the two gearboxes (refer to: Preliminary Operations).
2. Separate the front gearbox from the engine (refer to: Preliminary Operations).

CAUTION
Always use a soft metal hammer and punch when you are working with ferrous metal. During the dismounting of gear wheel packs mark the side to be mounted first of the non-symmetric parts.

3. Remove the PTO shaft **1** and take out the support link **2** from the inside of the main shaft **3**.



1 - PTO shaft
2 - Support link
3 - Main shaft

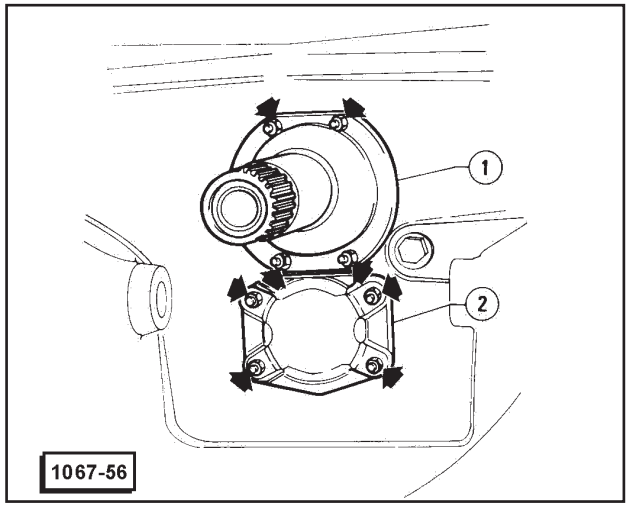
4. Remove rods and forks (refer to: Rods and Forks - Dismounting).

GEARBOX WITH MINI REDUCTION GEAR AND REVERSAL FOR 130 - 150

Clutch shaft and countershaft of the mini reduction gear

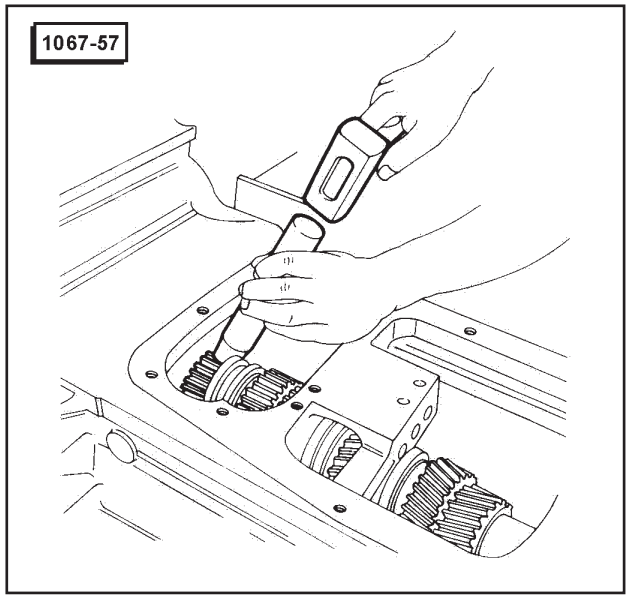
The dismounting of the clutch shaft and countershaft of the mini reduction gear are interdependent because it is impossible to remove the clutch shaft without removing the countershaft, because of the teeth of the synchronizer and the lower gear. In order to work the mini reduction gear is not necessary to separate the two gearboxes and remove the rod and fork.

1. Loosen the four nuts fixing the sleeve **1** and the cover **2**. Partly take out the cover with the countershaft until the gearwheels and the spacers fall onto the bottom of the gearbox.



1 - Clutch shaft flanged sleeve
2 - Mini reduction gear countershaft cover

2. With the help of light taps as illustrated in the diagram, take out the shaft and collect the parts.



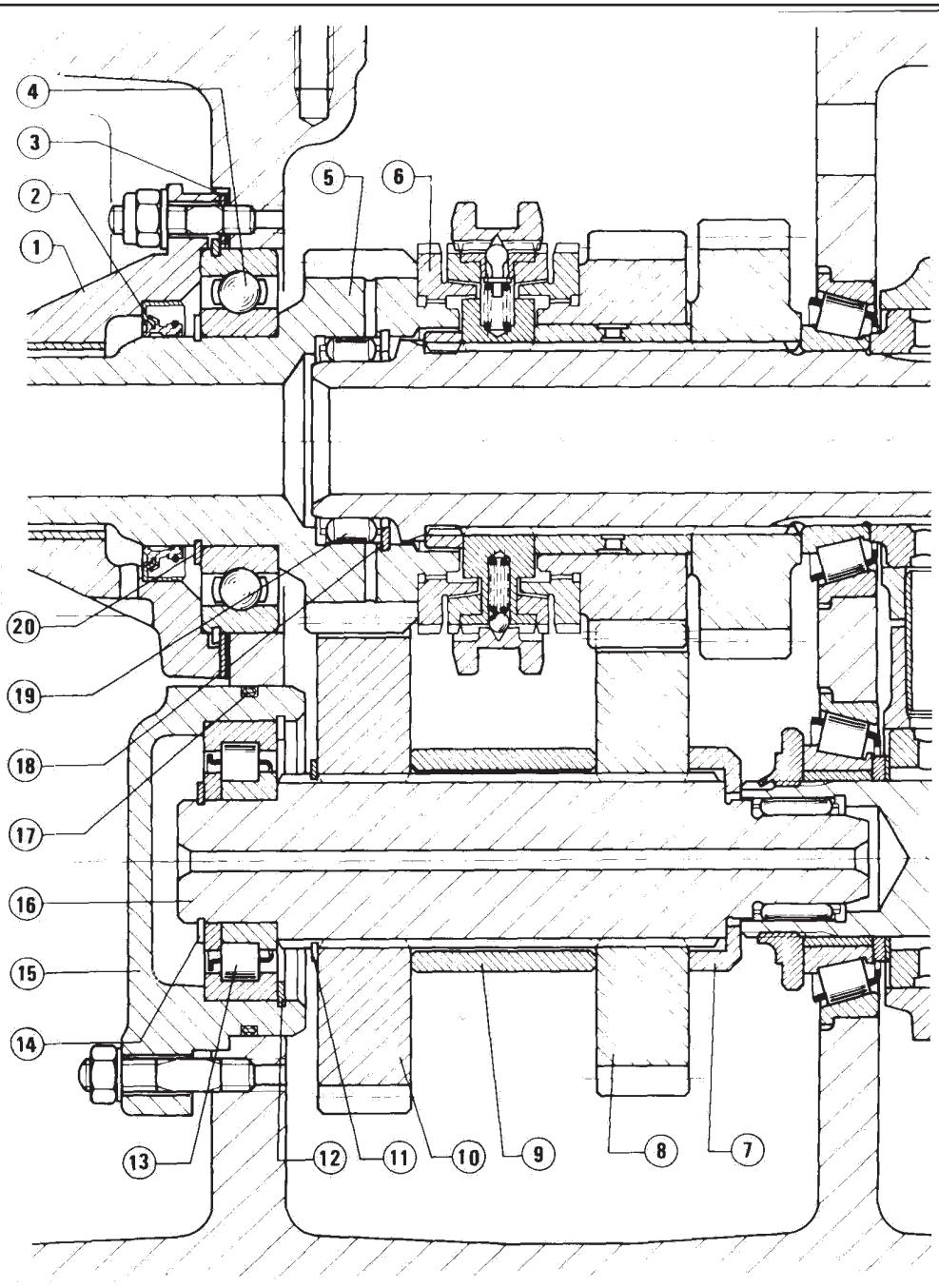
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3. Referring to the technical drawing, collect all the shims and gaskets 3 taking note of the total thickness, to use as an indication in the remounting.
4. If necessary, remove the bearing 4 using the following procedure:
(1) Block the shaft in a vice with protective teeth and remove the Seeger ring **20** and remove the bearing.
5. If necessary, remove the Seeger ring **18** and extract the retainer **19**.

CAUTION
Take care not to move the coupling collar of the synchronizer so as not to free the spring loaded pad.

6. If you need to work on the synchronizer or on the gears mounted on the gearbox main shaft it is necessary to remove the main shaft and separate the two gearboxes (refer to: Rods and Forks - Dismounting).
7. Completely take off the cover **15** with the countershaft **16** and collect from the bottom of the gearwheels **10** and **8** from the bottom of the box together with spacers **9** and **7**.
8. If necessary, remove the bearing **13** using the following procedure:
(1) Remove the Seeger ring **12** and take off the bearing and shaft from the cover **15**.
(2) Remove the Seeger ring **14** and take off the bearing from the shaft.



1 - Clutch shaft flanged sleeve support
2 - Support link
3 - Shims and gaskets
4 - Ball bearings
5 - Clutch shaft
6 - Synchronized ring
7 - Spacer
8 - Gearwheel
9 - Spacer
10 - Gearwheel
11 - Seeger ring
12 - Seeger ring
13 - Roller bearing
14 - Seeger ring
15 - Cover
16 - Mini reduction gear control shaft
17 - O-ring
18 - Seeger ring
19 - Retainer
20 - Seeger ring

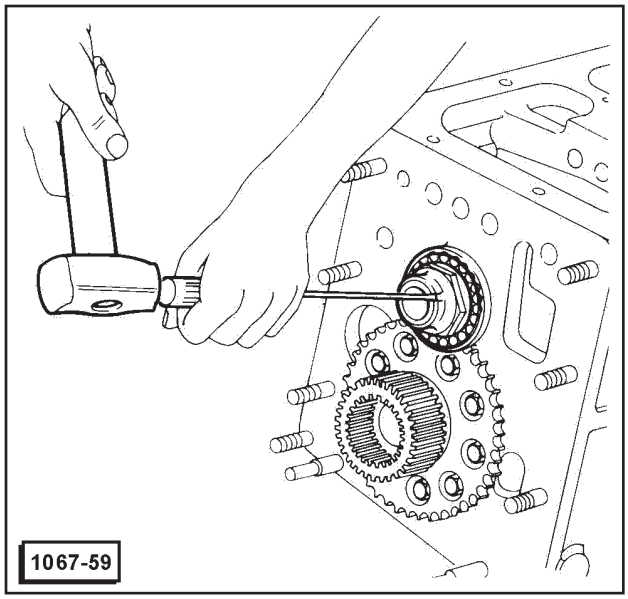
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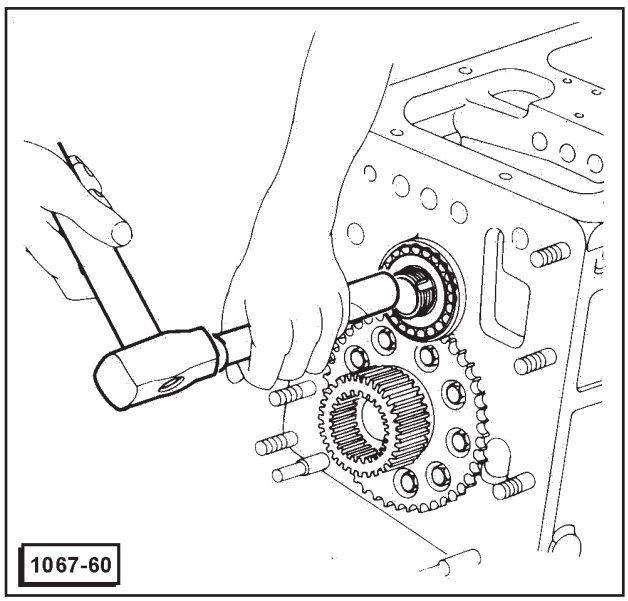
Gearbox main shaft

To dismount the main shaft you must carry out all the preliminary operations, the removal of the clutch shaft and the mini reduction gear control shaft.

1. Loosen the force feed lubrication union of the gearbox.
2. Remove the ring nut fixing the main shaft.



3. Lightly tapping with a hammer, take off as indicated in the diagram, the main shaft keeping the gearwheel and the synchronizer with the spacers.



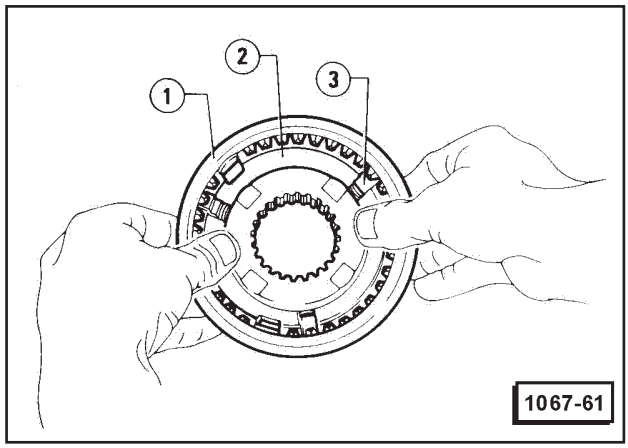
4. If necessary take the gear synchronizer I and II to pieces (refer to: Synchronizer).
5. If necessary, to remove the external tracks of the tapered bearings, using a hammer and punch lightly tap the tracks from the inside of the gearbox towards the outside.

CAUTION
Always keep the external rings of the bearings paired with their respective crowned roller and inside rings.

Synchronizer

NOTE
It is advisable to dismount the synchronizer group working inside a box in order to avoid losing the parts that are spring loaded.

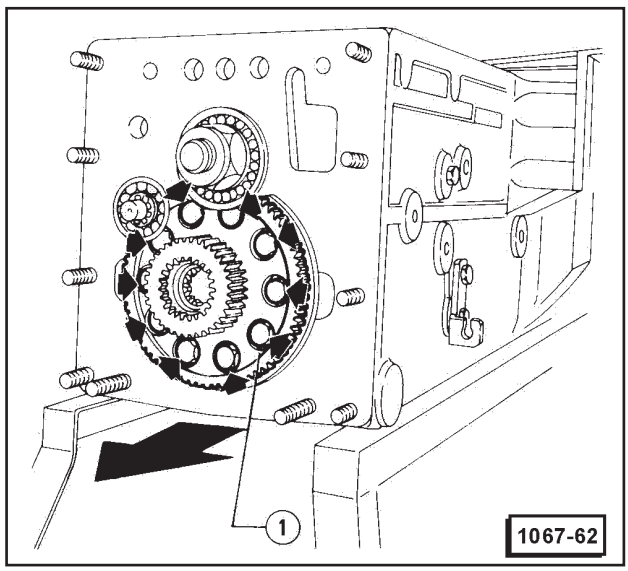
1. Remove the two synchronized external rings.
2. Working as shown in the diagram, carefully remove the hub **2** from the grooved sleeve **1** being careful not to lose the three balls and three pads **3** which are spring loaded.



1 - Grooved sleeve
2 - Toothed hub
3 - Pad

Gearbox counter shaft

1. Loosen the ten screws fixing the flange 1 to the box and remove.

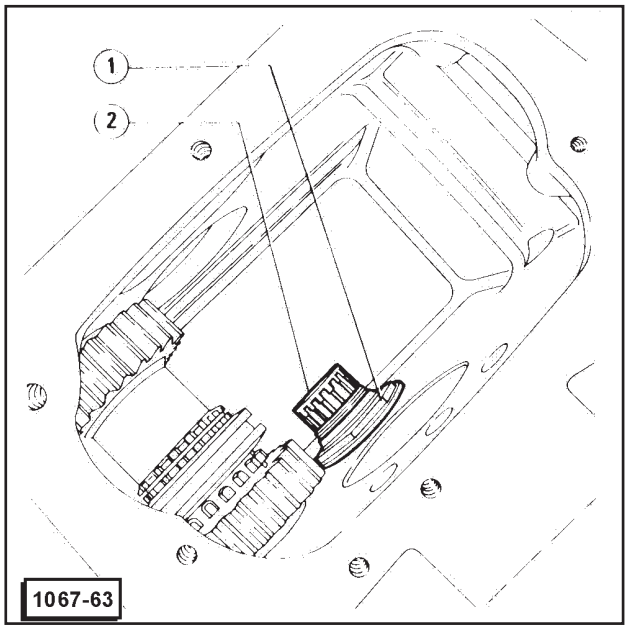


1 - Epicyclic reduction gear crown wheel fixing flange

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2. Extract the retainer **2** from inside the shaft then loosen the ring nut **1** fixing the main shaft.



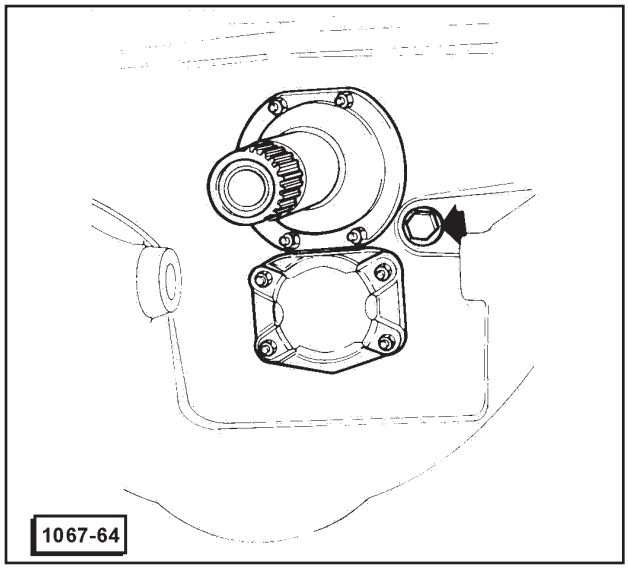
1 - Ring nut
2 - Retainer

3. Take off, as shown in the diagram, the countershaft keeping the gearwheel pack with the relative synchronizer and spacers.
4. If necessary, remove the tapered bearing external ring working as described for the main shaft.

Reversal shaft

The dismounting of the reversal shaft is possible without first having to remove the other gear.

1. Loosen the screw fixing the reversal shaft to the gearbox.



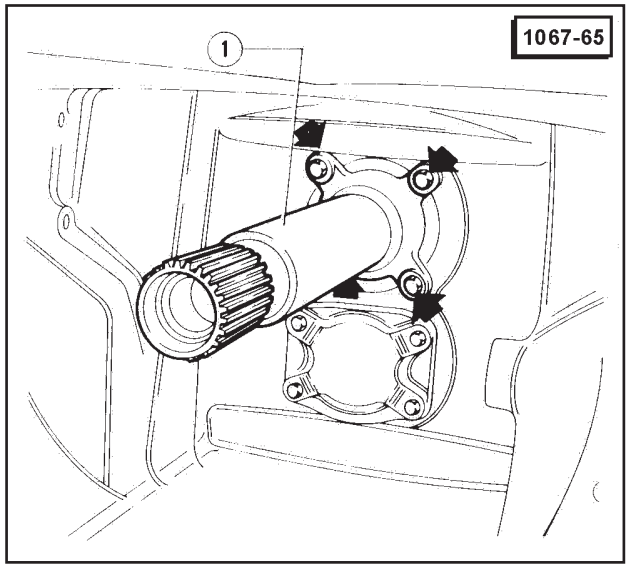
2. Take off as indicated in the diagram, the reversal shaft, holding the gearwheel pack.

FOR 110

Clutch shaft

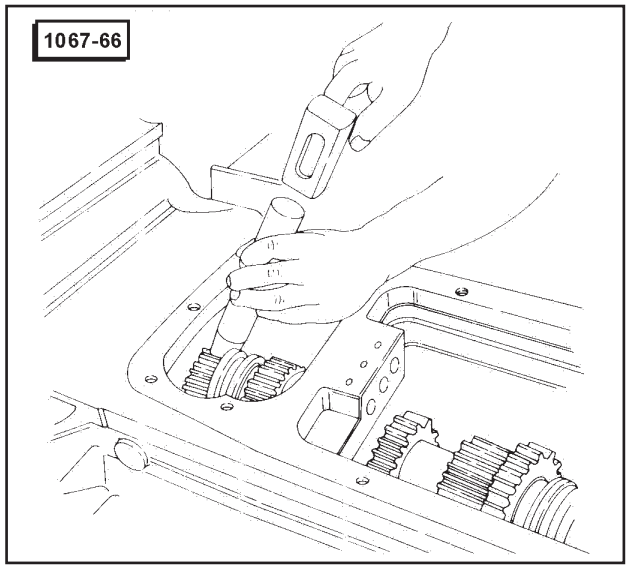
To remove the clutch shaft you only need to remove the fork coupling and the mini reduction gear.

1. Loosen the four screws fixing the flanged sleeve **1**.



1 - Clutch shaft flanged sleeve

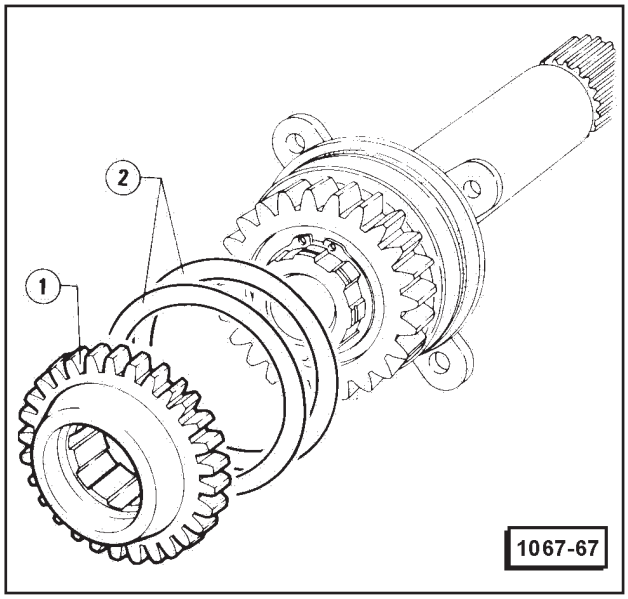
2. Using light taps with a hammer, take off the main shaft from the clutch as shown in the diagram.



3. Take off the synchronizer ring 1 and the shim adjustment rings 2 from the clutch main shaft, measuring the total thickness to be able to use as an indication when remounting.

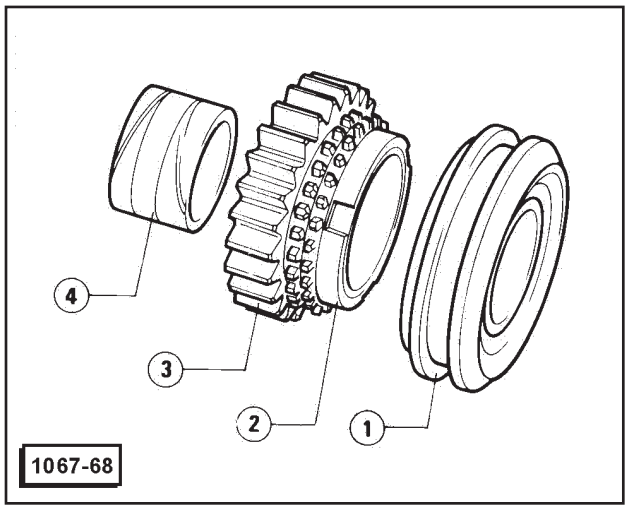
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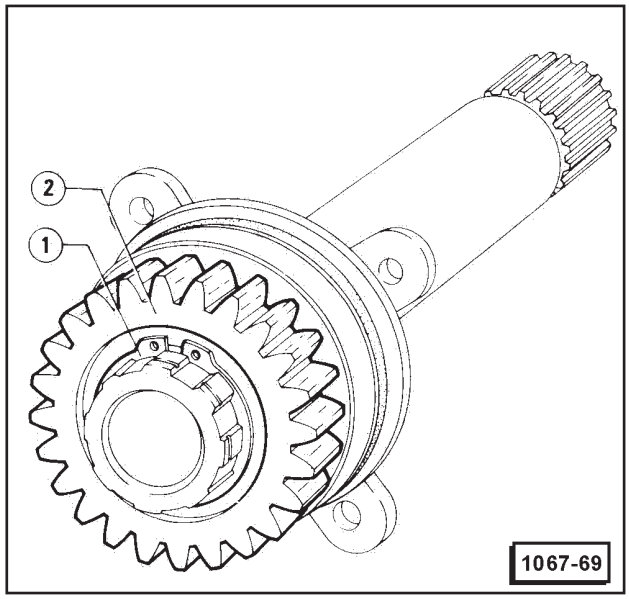
1 - Synchronizer ring
2 - Shim adjusting rings

4. If you have to remove the synchronizer complete with the following wheel, you will have to partially move back the gearbox main shaft, which is only possible if you separate the two gearboxes (refer to: Preliminary Operations). It is now possible to take off the synchronizer **1** the second synchronized ring **2** gearwheel **3** and bush **4** from the very end of the main shaft.



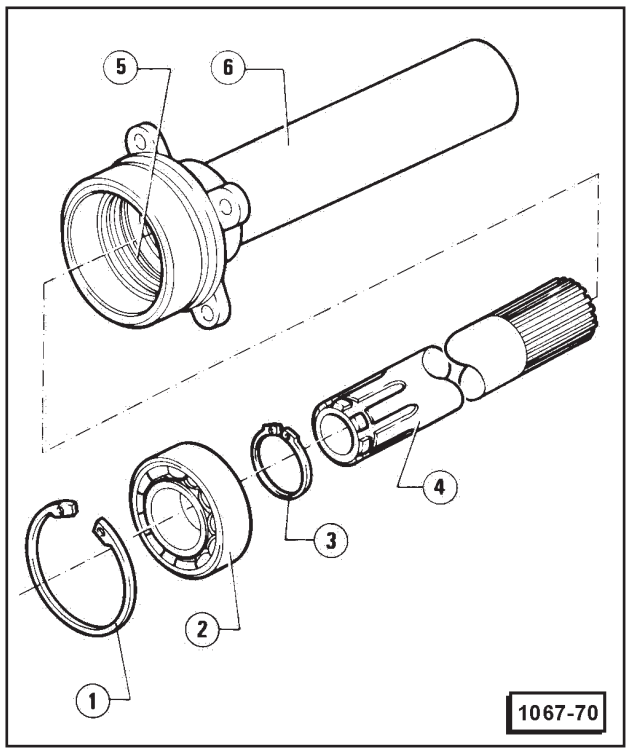
1 - Synchronizer
2 - Synchronizer ring
3 - Mini reduction gear outlet gear
4 - Bush

5. If necessary, remove the bearing which is left in the flange, or the flange internal shell, working as follows
(1) Block the flange into a vice with protective teeth and remove the Seeger ring **1** that blocks the gear **2** and remove the gear wheel.



1 - Seeger ring
2 - Gear wheel

(2) Remove the Seeger ring **1** that blocks the bearing **2**.
(3) Tap on the shaft **3** to loosen the bearing **2** of the flanged sleeve **6** and take off together with the shaft and bearing.
(4) Take off the bearing **2** from the shaft.
(5) Remove the shell **5** placed on the inside of the flanged sleeve **6**.



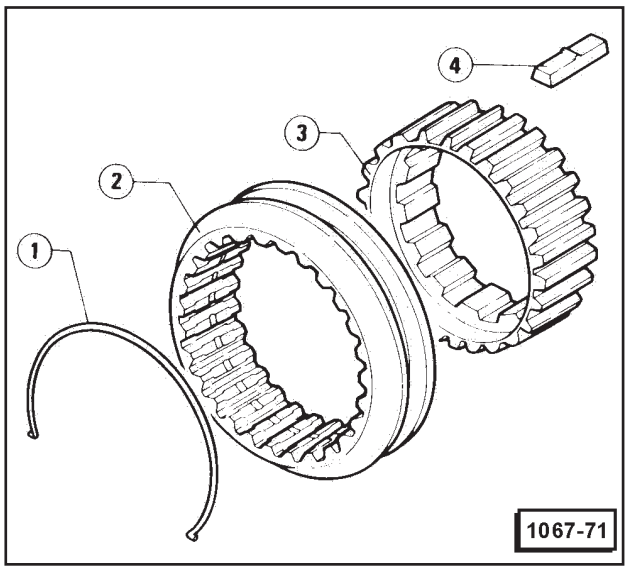
1 - Internal Seeger ring
2 - Bearing
3 - Seeger ring
4 - Main shaft
5 - Shell
6 - Flanged sleeve

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Synchronizer

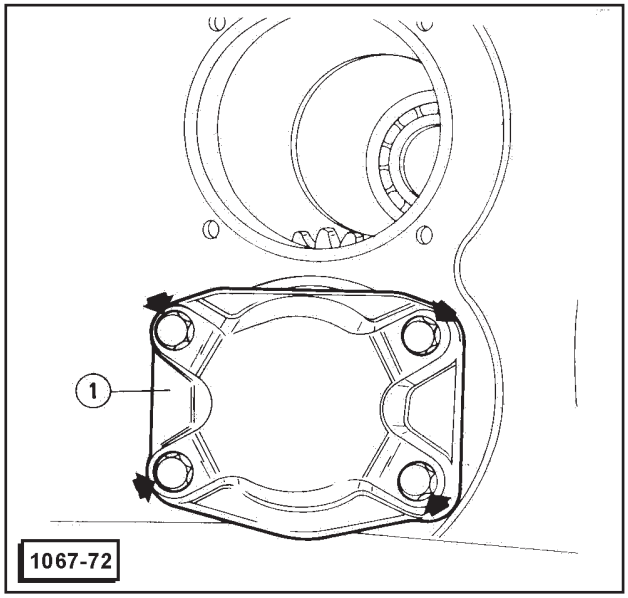
If necessary, dismount the synchronizer group using the following procedure:
(1) Remove the two compression rings **1**.
(2) Take out the hub **2** of the toothed sleeve **3**.
(3) Collect the three pads **4**.



1 - Compression ring
2 - Toothed hub
3 - Toothed sleeve
4 - Pad

Mini reduction gear counter shaft

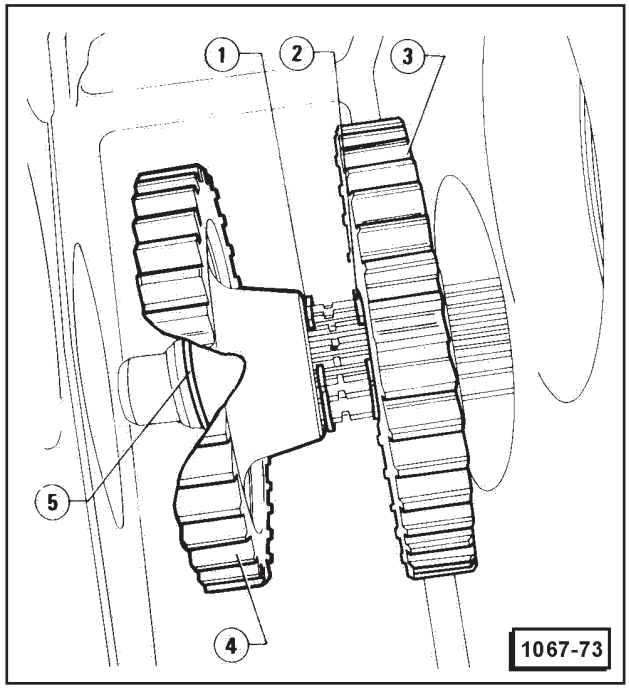
To dismount the counter shaft of the mini reduction gear, it is necessary to remove the shaft from the clutch but it isn't necessary to separate the two gearboxes.
1. Loosen the four screws fixing the cover **1** from the clutch side.



1 - Mini reduction gear secondary shaft cover

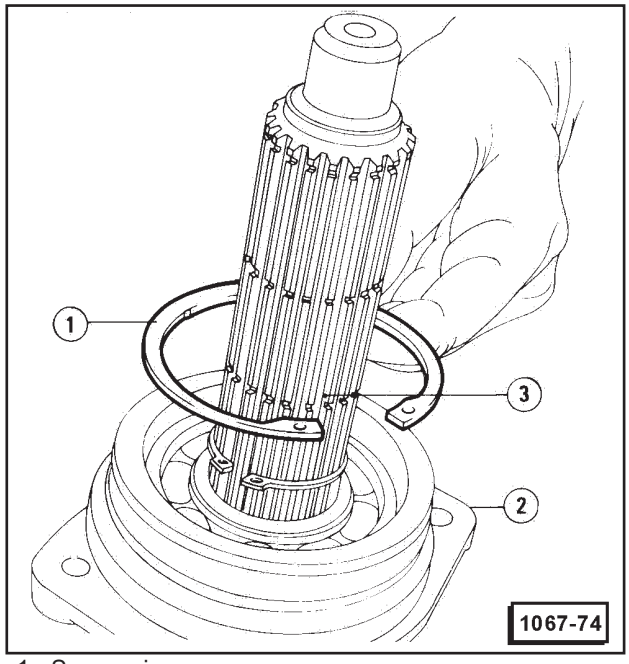
2. Partially take off the cover, remove the Seeger ring **5** and take off the gearwheel **4**.

3. Remove the Seeger rings **1** and **2** and completely remove the cover collecting the gear wheel **3**.



1 - Seeger ring
2 - Seeger ring
3 - Gear wheel
4 - Gear wheel
5 - Seeger ring

4. If necessary, change the bearing found on the inside of the cover as follows:
(1) Remove the Seeger ring **1** inside the cover **2**.
(2) Block the shaft **3** in a vice with protective teeth.

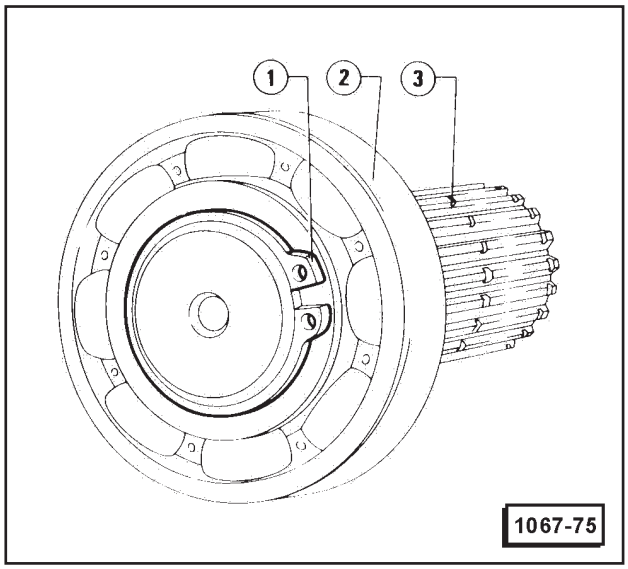


1 - Seeger ring
2 - Cover
3 - Shaft

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(3) Tap on the edge of the cover until you take out the bearing **2** of the shaft **3** and take out the bearing **2**.
(4) Remove the Seeger ring **1** on the shaft **3** and take out the bearing **2**.



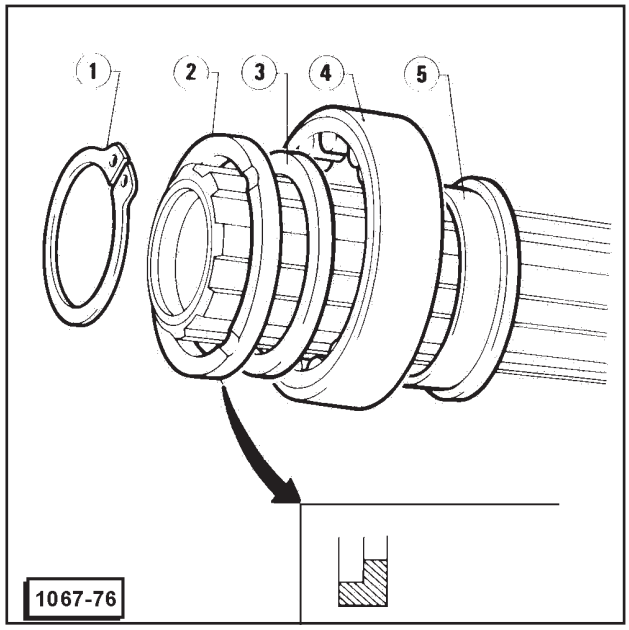
1 - Seeger ring
2 - Bearing
3 - Shaft

5. If necessary, collect the roller crown nut inserted in the gearbox counter shaft.

Gearbox main shaft

To remove the gearbox main shaft it is necessary to carry out all the preliminary operations and the removal of the clutch shaft.

1. Loosen the ring nut fixing the main shaft as explained for models 130 and 150
2. With the help of light taps with a hammer and working as explained for models 130 and 150, take off the main shaft towards the space of the main shaft mini reduction gear keeping hold of the gear pack.
3. If necessary, remove the main shaft front bearing, still mounted on the shaft working as follows.
(1) Extract the Seeger ring **1** that fixes the bearing on the shaft.
(2) Take off the spacers **2** the shoulder ring **3** the outer ring with rollers **4** and finally the inner ring **5**.



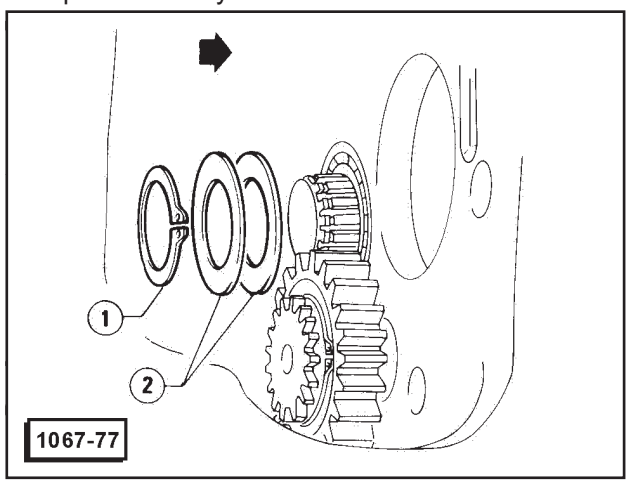
1 - Seeger ring
2 - Spacer
3 - Shoulder ring
4 - Outer ring and rollers
5 - Inner ring

4. If necessary take the III and IV gear synchronizer to pieces (refer to: Synchronizer - Dismounting).

Gearbox counter shaft

To remove the gearbox counter shaft, you must remove the clutch shaft and the main shaft and counter shaft of the mini reduction gear.

1. Loosen the ten flange screws fixing the crown wheel to the epicyclic reduction gear.
2. Take off the Seeger ring **1** mounted on the tip of the shaft, protruding into the space of the mini reduction gear and collect the shim adjustment rings **2** and the shoulder ring.
3. Take off, as indicated in the figure, the counter shaft, keeping aside the relative gear wheel pack with the spacers and synchronizer.

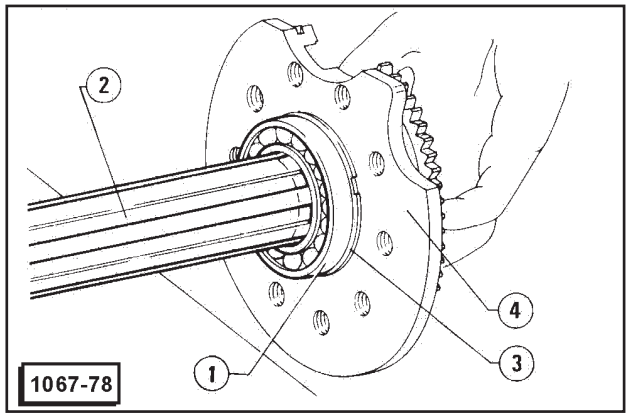


1 - Seeger ring
2 - Shim adjustment ring

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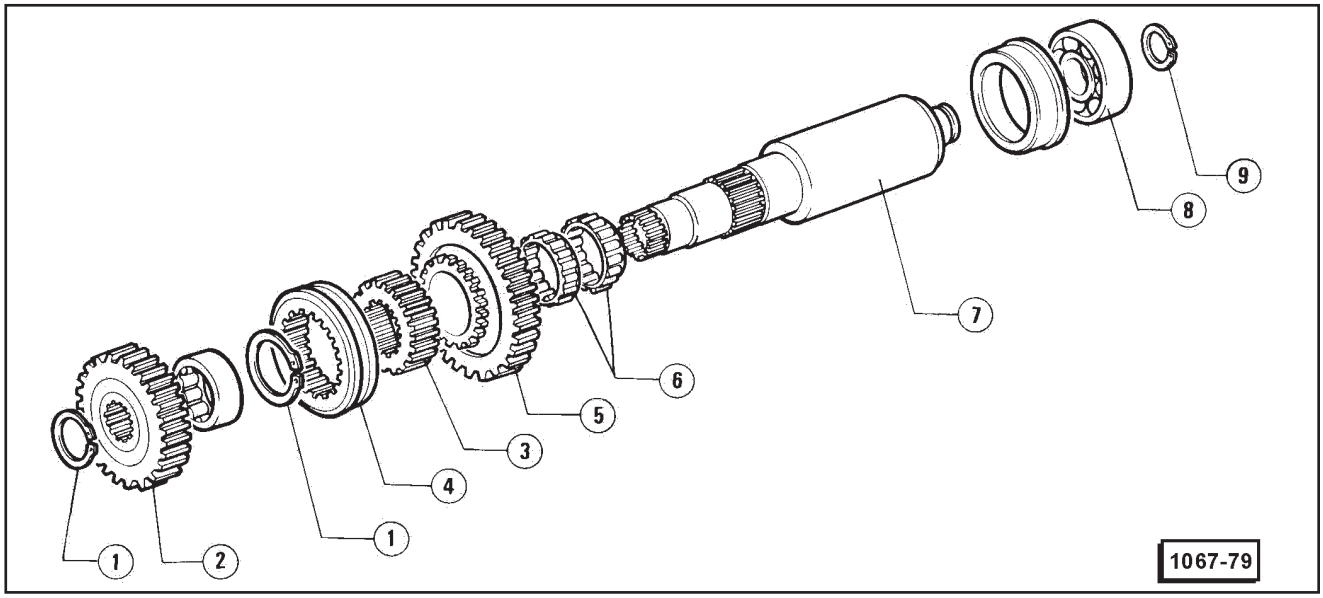
4. If necessary, remove the rear bearing **1** and the shaft **2** by pushing the flange **4** and taking off the bearing **1** from the shaft **2**. Finally remove the compression ring **3** from the bearing outer ring.



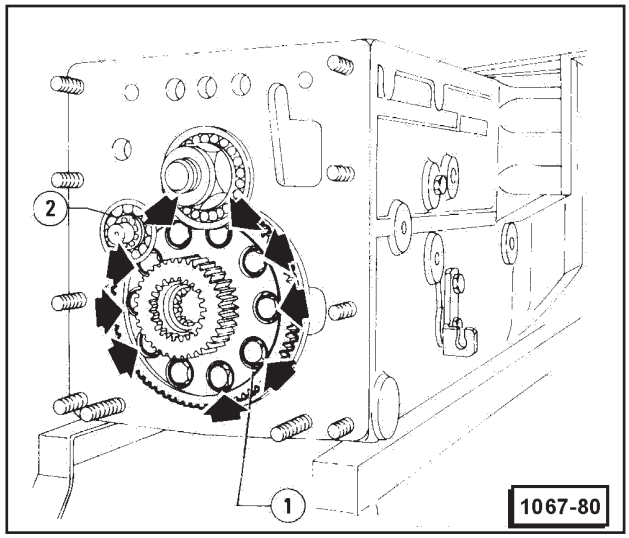
1 - Rear bearing
2 - Gearbox counter shaft
3 - Compression ring
4 - Epicyclic reduction gear toothed flange

Reversal shaft

It is possible to remove the reversal shaft without the other gears and without separating the gearbox from the engine. You only need to separate the gearboxes (refer to: Preliminary Operations).



1. Loosen the ten screws fixing the toothed flange **1** and turn it so as to bring the milling into line with the reversal bearing of the shaft **2**.

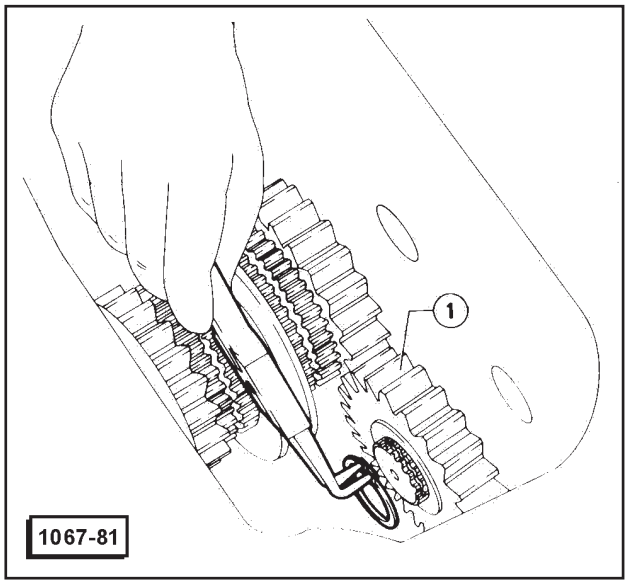


1 - Toothed flange
2 - Reversal shaft bearing

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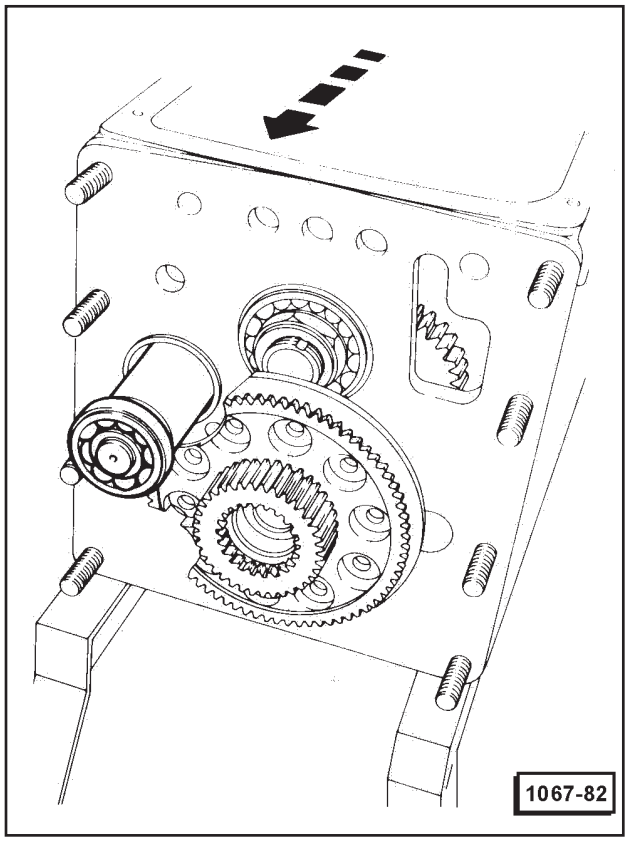
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2. Take off the Seeger ring that block the reverse gear wheel, placed in the area of the mini reduction gear and take off the gear wheels **1**.

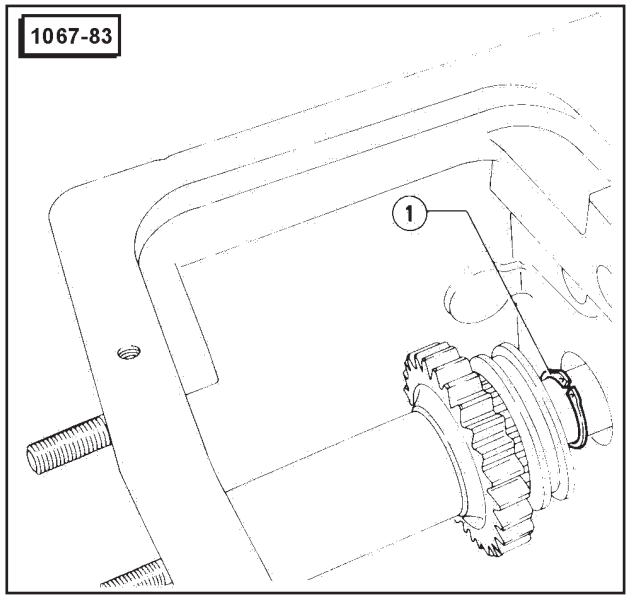


1 - Reverse gear wheel

3. Partially take out the shaft by tapping on the front tip until it comes out as shown in the diagram.

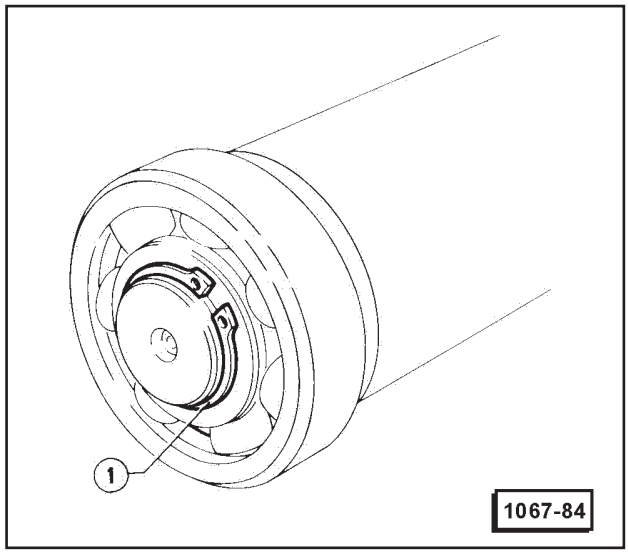


4. Remove the second Seeger ring **1** and completely take out the shaft collecting the parts.



1 - Seeger ring

5. If necessary, remove the Seeger ring **1** and take the rear bearing to pieces.



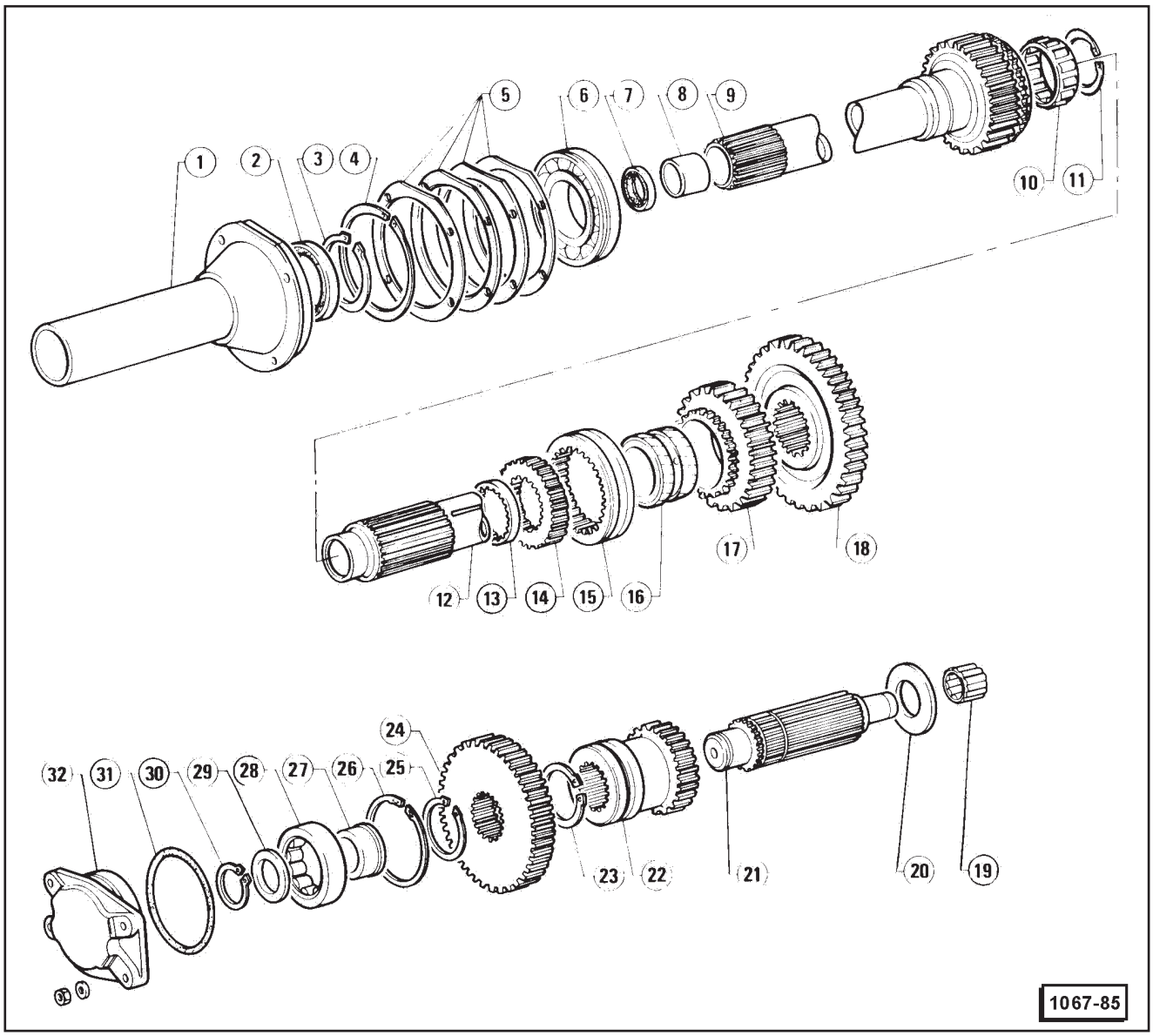
1 - Seeger ring

6. If necessary, remove the front bearing outer track from the internal wall of the gearbox by tapping with a soft metal hammer and punch.

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GEARBOX WITH SUPER REDUCTION GEAR AND REVERSAL (For 130 - 150)



1 - Flanged sleeve
2 - Seal ring
3 - Seeger ring
4 - Seeger ring
5 - Shims
6 - Ball bearing
7 - Support link (Seal ring)
8 - Bush
9 - Clutch shaft
10 - Retainer
11 - Seeger ring
12 - Gearbox main shaft
13 - Spacer
14 - Toothed hub
15 - Coupling collar
16 - Bush
17 - Gear wheel
18 - Gear wheel
19 - Retainer
20 - Shoulder ring
21 - Super reduction gear counter shaft
22 - Reversal gear coupling sleeve
23 - Seeger ring
24 - Gear wheel
25 - Seeger ring
26 - Seeger ring
27 - Internal bearing ring
28 - Retainer
29 - Shoulder ring
30 - Seeger ring
31 - O-ring
32 - Counter shaft cover

Clutch shaft

The removal of the clutch shaft follows the same procedure as given in “Clutch Shaft” for models 130 and 150 being careful not to remove the counter shaft of the super reduction gear because it is very easy to take out the shaft without interferring with the gear wheels under it. It is not necessary to proceed with the separation of the gearbox and the removal of the rods and forks.

1. Using a hammer and punch take out the lock pin fixing the coupling forks, the super reduction gear and the re versal.
2. With reference to the enlarged diagram above removethe sleeve **1** together with the clutch shaft **9** as shown in steps 1. and 2. of the gearbox with mini reduction gear and reversal for models 130 and 150 “Clutch Shaft and Mini Reduction Shaft”.

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3. 3.If necessary, remove the bearing **6** opening the Seeger ring **3** and taking the bearing from the shaft **9**.
4. If necessary, remove the retainer **10** opening the Seeger ring **11** taking it out from it's seat on the shaft **9**.
5. If necessary, extract the holding ring **2** from the inside of the sleeve **1** after having taken off the shaft **9**.
6. If necessary, remove parts **13,14**, **16**, **17** and **18**; in which case it will be necessary to proceed with the separation of the gearbox (refer to: Preliminary Operations).

Super reduction gear counter shaft

1. Loosen the four screws fixing the lid **32** to the gearbox.
2. Open the Seeger ring **23** and take off the lid with the gearbox shaft collecting the shoulder ring **20** the sleeve **22** and the gear wheel **24**.
3. If necessary, remove the bearing **28** opening the Seeger ring **26** and take out the shaft with bearing from the cover **32** then open the Seeger ring **25** and take out the bearing.

4. If necessary, extract the retainer **19** from the inside of the gearbox counter shaft.

Gearbox main shaft

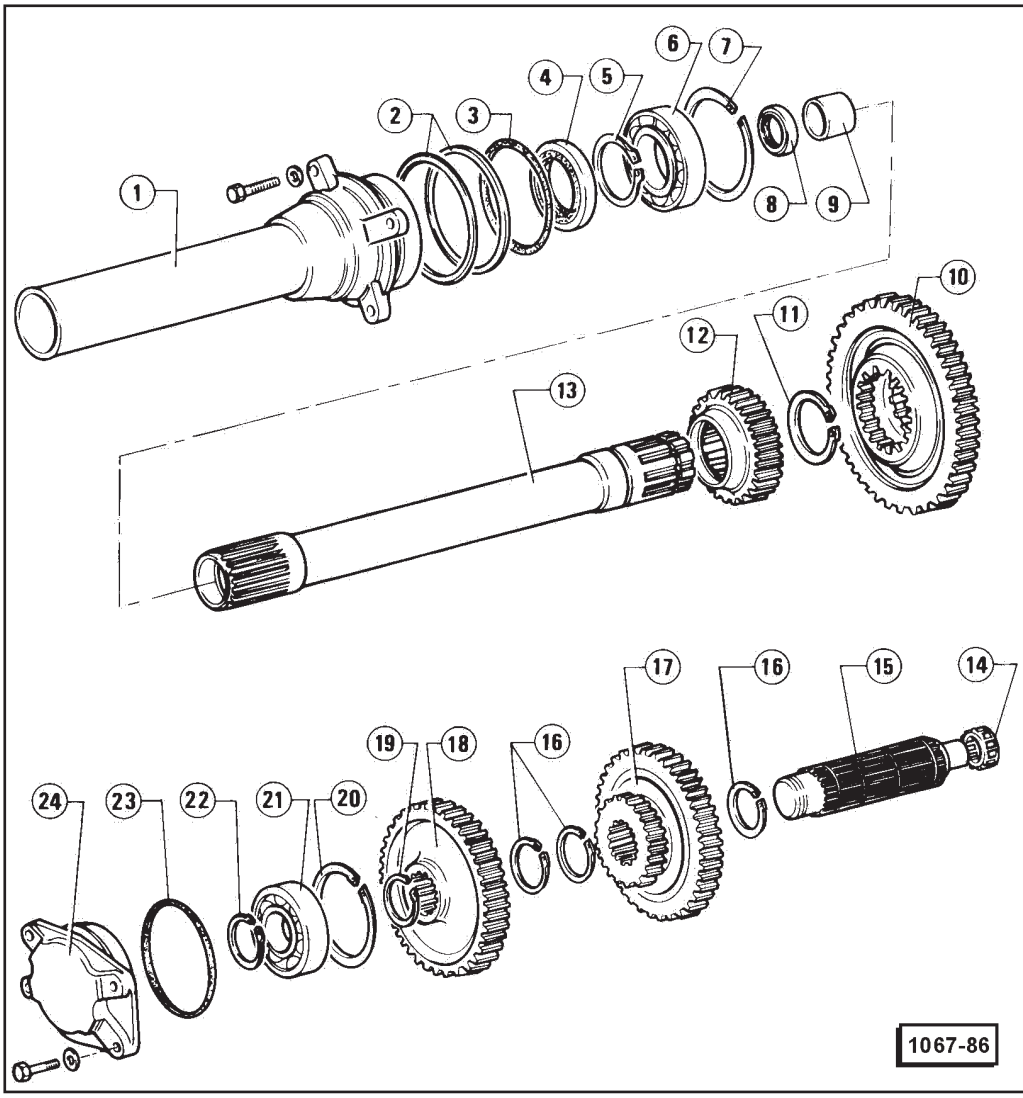
Dismount the gearbox main shaft working as given in: Gearbox with mini reduction gear and reversal 130 and 150. Gearbox main shaft, taking note that it is not necessary to first remove the super reduction counter shaft.

Gearbox counter shaft

Dismount the gearbox counter shaft working as given in: Gearbox with mini reduction gear and reversal 130 - 150 Gearbox counter shaft.

Reversal shaft

Dismount the reversal shaft working as given in: Gearbox with mini reduction gear and reversal 130 and 150 - Reversal Shaft.



1 - Flanged sleeve
2 - Shims
3 - O-ring
4 - Seal ring
5 - Seeger ring
6 - Bearing
7 - Seeger ring
8 - Seal ring
9 - Bush
10 - Super reduction gear outlet gear wheel
11 - Seeger ring
12 - Super reduction gear entry gear wheel
13 - Clutch shaft
14 - Retainer
15 - Super reduction gear control counter shaft
16 - Seeger ring.
17 - Super reduction gear conduit gear wheel
18 - Super reduction gear conductor gear wheel
19 - Seeger ring
20 - Seeger ring
21 - Bearing
22 - Seeger ring
23 - O-ring
24 - Super reduction gear counter shaft cover

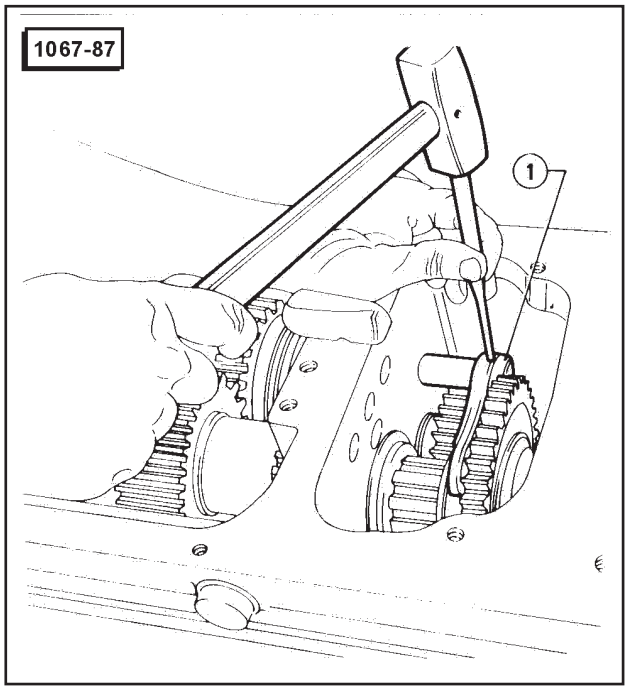
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Clutch shaft

T o remove the clutch shaft it is not necessary to carry out the separation of either the gearbox or the dismounting of the rods and forks.

1. Using a hammer and punch remove the lock pin of the fork **1**.



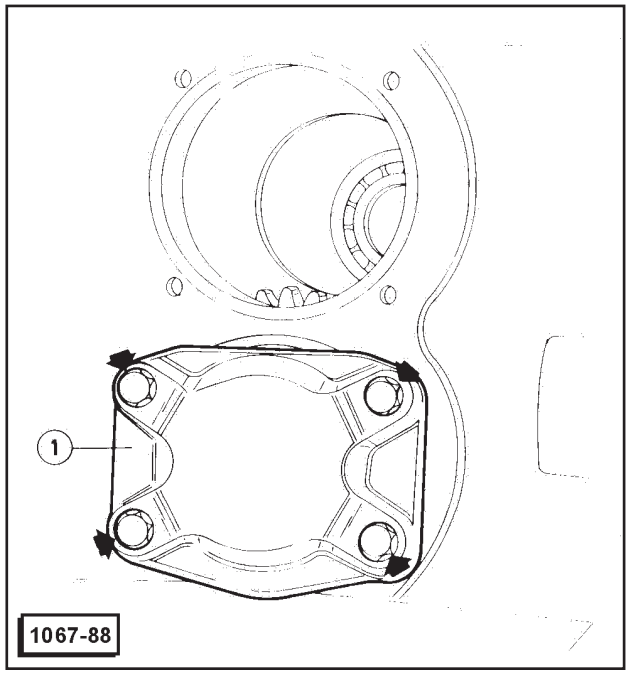
1 - Super reduction gear coupling fork

2. Remove the super reduction gear main shaft. Use the following procedure given in: Gearbox with mini reduction 110 Mini reduction gear main shaft steps from 1. to 3.
3. Referring to the enlarged diagram on page 29 the Seeger ring **11** and take out the gear wheel **12**. Open the Seeger ring **7** and take out shaft **13** with the bearing **6** mounted in the sleeve **1**.
4. If necessary, remove the bearing **6** of the shaft **13** open the Seeger ring **5** and take out the bearing of the shaft.

NOTE
To remove gearwheel **10** which bears the coupling hook it is necessary to remove the super reduction gear countershaft or the clutch shah.

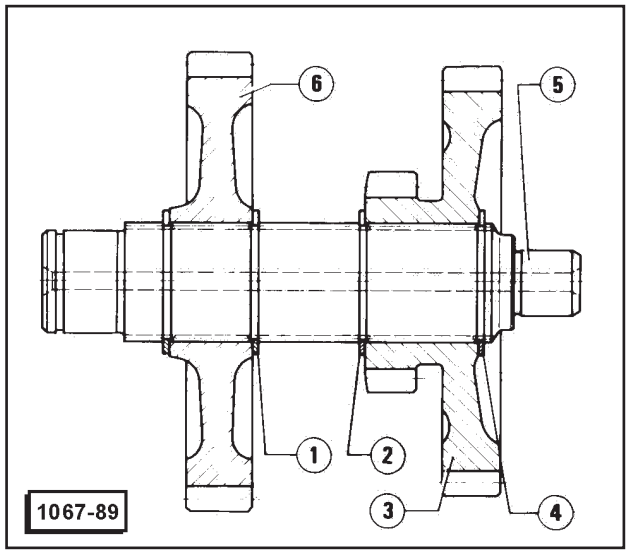
Super reduction gear counter shaft

1. Loosen the four screws fixing the cover **1** and the clutch side.



1 - Cover

2. Open the Seeger ring **1** and **2** and run them towards the centre of shaft **5** then move gearwheel **3** and remove the Seeger ring **4**. Take off gearwheel **3** and the Seeger ring **1** and **2** then extract the shaft **5** collecting the gearwheel **6**.

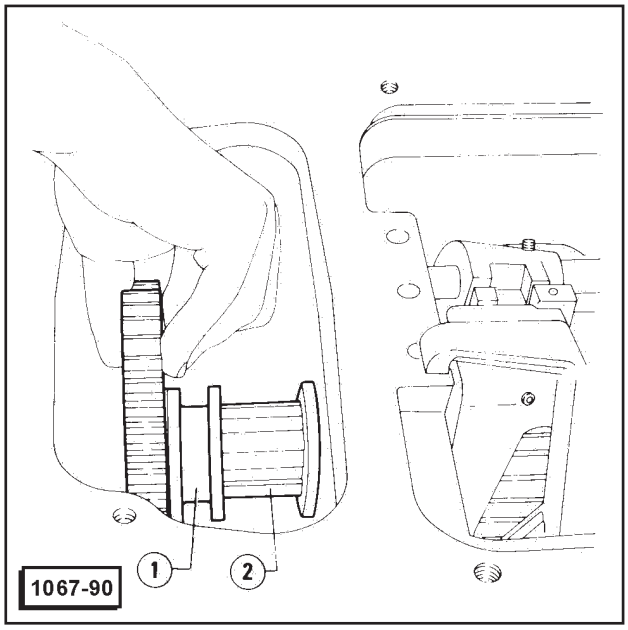


1 - Seeger ring
2 - Seeger ring
3 - Gear wheel
4 - Seeger ring
5 - Super reduction gear counter shaft
6 - Gear wheel

3. Take off the main gear wheel **1** with it's sleeve, from the tip of the gearbox main shaft **2**.

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1 - Gear wheel
2 - Gearbox main shaft

WARNING
The procedure previously described is extremely difficult because of the restricted working area. It is therefore advisable to separate the two gearboxes (refer to: Preliminary Operations) to allow the gearbox main shaft to be moved backwards, if you also need to work on the main shaft, completely remove it leaving the dismounting of the countershaft until last.

4. If necessary, remove the bearing found inside the cover as given in step 5. of section “Gearbox with mini reduction gear and reversal” 110 - Mini reduction counter shaft.
5. If necessary, recover the retainer track found on the inside of the gearbox counter shaft.

Gearbox main shaft

Dismount the main shaft working as given in “Gearbox with Mini Reduction Gear and Reversal 110 - Gearbox Main Shaft.

Gearbox counter shaft

Dismount the gearbox counter shaft working as given in “Gearbox” with Mini reduction gear and Reversal - 110 Gearbox counter Shaft.

Reversal shaft

Dismount the reversal shaft working as given in: Gearbox with Mini Reduction Gear and Reversal 110 Reversal Shaft.

STANDARD GEARBOX

Gearbox main shaft

1. Referring to the relative diagram, remove the flange 1 loosening the four screws **2**.
2. Loosen the ring nut **17** and remove it.
3. Tap with a soft metal hammer on the back tip of the main shaft **5** until it comes off. Recover the gear wheel pack, the synchronizer **13** and the spacers **10** and **15**.

Gearbox countershaft and reverse gear shaft

1. Loosen the ring nut **34** until you can remove it and then take out the gear wheel **33**.
2. Tapping with a soft metal hammer, take off the countershaft **21**, and collect the gearwheel pack, the synchronizer **29** and the spacers **25** and **31**.
3. Loosen the fixing screws **23** of the flange **19**, remove and turn the flange, then remove the Seeger ring **39** and take off the gear wheel **40**. Then tapping with a soft metal hammer on the front tip of the reverse gearshaft, take it off collecting the gear and collar **43**.
4. If necessary, collect the support link **4** inside the sleeve **1**.
5. If necessary, extract from the gearbox the bearing **8** by tapping with a soft metal hammer and punch on the outer ring.
6. If necessary, extract the outer ring of bearing **32** by tapping on the outer ring.
7. If necessary, dismount the synchronizer **13** and **29** (refer to: Synchronizers.
8. If necessary remove the bearing **18** taking off the flange **19** by unscrewing the ten fixing nuts **23**.

NOTE
The reverse gearshaft can be removed without working on the other gears and without separating the engine gearbox.

CHECKS AND CONTROLS NOTE

NOTE
Before carrying out any checks, accurately wash the parts. In this way you will be able to make a closer inspection of the wear and efficiency of the various parts.

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Gearwheels and grooves

1. Check that the gearwheel teeth and the shaft grooves are working on all sides. If you find gearwheels that are worn or with clipped teeth they must be changed. Also check that the other gearwheels of each pair are not damaged.
2. Follow the same procedure for the grooved shafts. Also verify that the teeth and grooves on the synchronizer ring are free from splits, signs of rubbing and excessive wear. Change all parts that are imperfect.

Bearings

1. Carefully examine all bearings turning them slowly. If a bearing is in good working order it should not vibrate, make noise or stick.
2. Examine the surfaces of the rings and moving parts to see if they are scratched, dented or show signs of rubbing due to foreign matter. Change any imperfect parts.

Bushes

Check the wear of the main shaft and counter shaft bushes, to see that the surfaces working together with the gearwheels are not scratched or show signs of sticking. Check that the measurements of the bushes are within those given in “Technical Data and Prescriptions” relative to the tractor in question.

Change any parts that are not in good condition.

Syncronization device

Check that all moveable areas are free of indentations, that the sleeves move freely on their respective hubs and that the syncronizer rings are not excessively worn, by fitting them on their respective gears making certain that they are in beat and that the internal surfaces still have the lubrication grooves. Check that the helical spring for Models 130-150, and the retaining rings for Model 110 are not twisted. Check the wear of the pads.

Change any parts which are not integral.

REMOUNTING

PRELIMINARY OPERATIONS

NOTE
— Accurately wash the gearbox with adequate solvant and dry with compressed air.
— On remounting, change all the support links, the gaskets and the O-rings.
— Lubricate the parts before mounting them on their respective shafts with a film of grease.
— In order to keep the parts in position during remounting it is advisable to use adequate grease.
— It is advisable to carry out the remounting with the help of a second operator.
— Pay particular attention to the method of remounting the parts, referring to the diagram given in the section.

GEARBOX WITH MINI REDUCTION GEAR AND REVERSAL

For 130 - 150
Referring to the technical drawing proceed with the remounting as follows.

Gearbox counter shaft

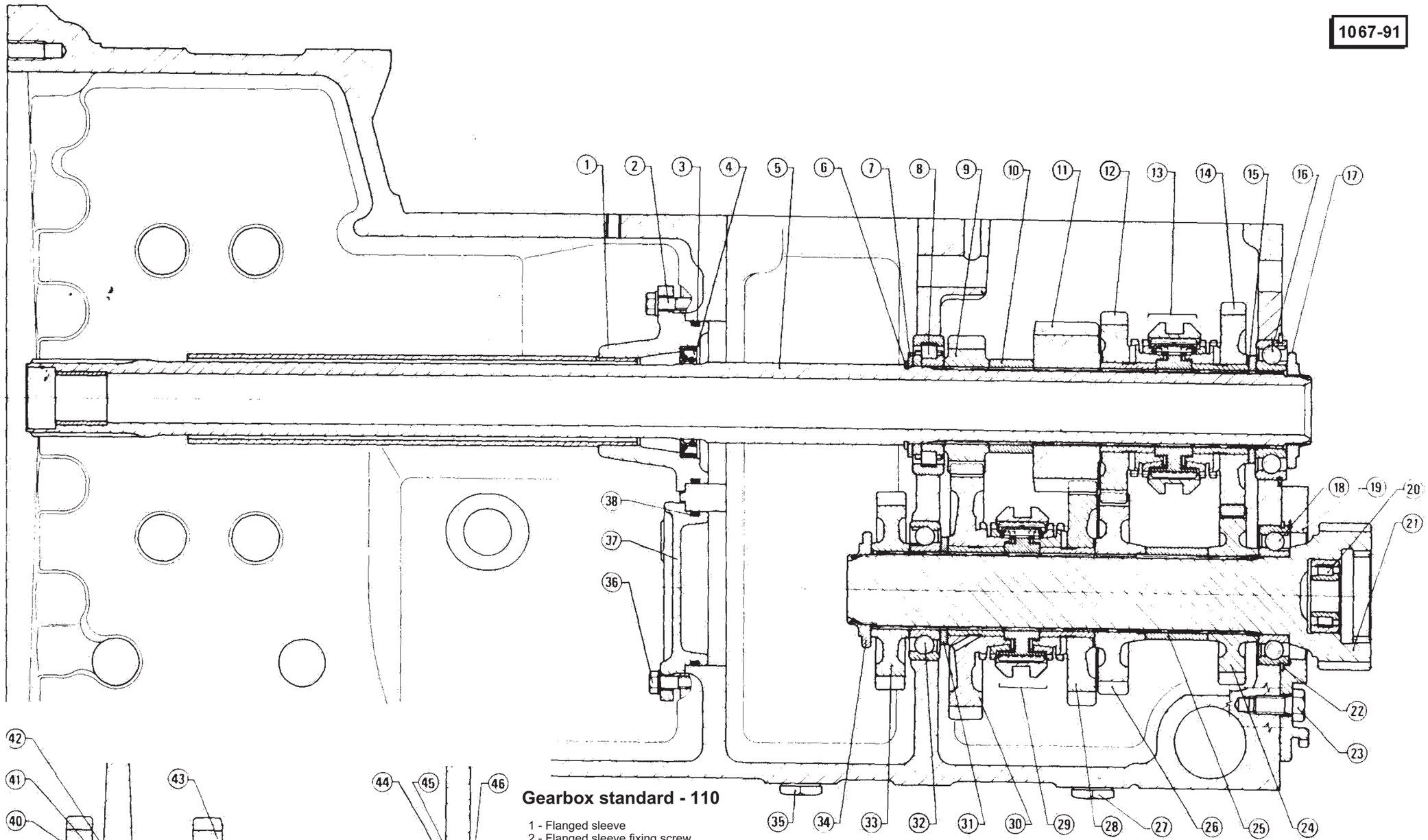
1. If previously dismounted, remount the tapered bearing external rings working in the reverse order.
2. If previously dismounted, remount the synchronizer (refer to: Synchronizer - Remounting).
3. Open the gearwheel pack on the workbench and pay particular attention to the order of remounting of the spacer **31** of the lubrication bush **39** and the lubrication manifold **40**.

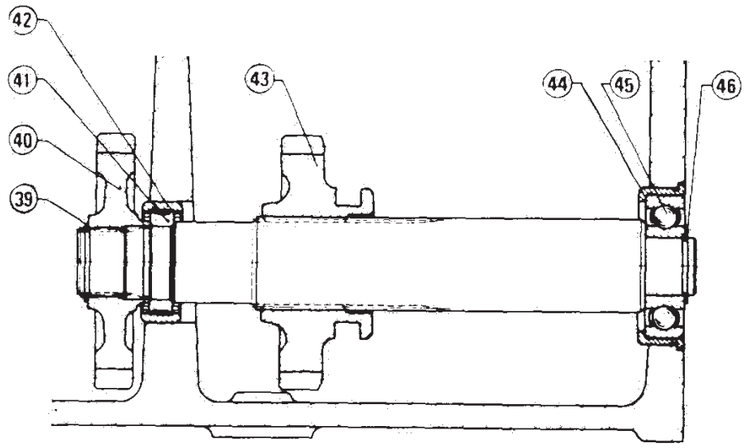
NOTE
Prepare the shim pack **41** so that it is thicker than when it was dismounted. This is in order to make the adjustment of the bearing spring load easier.

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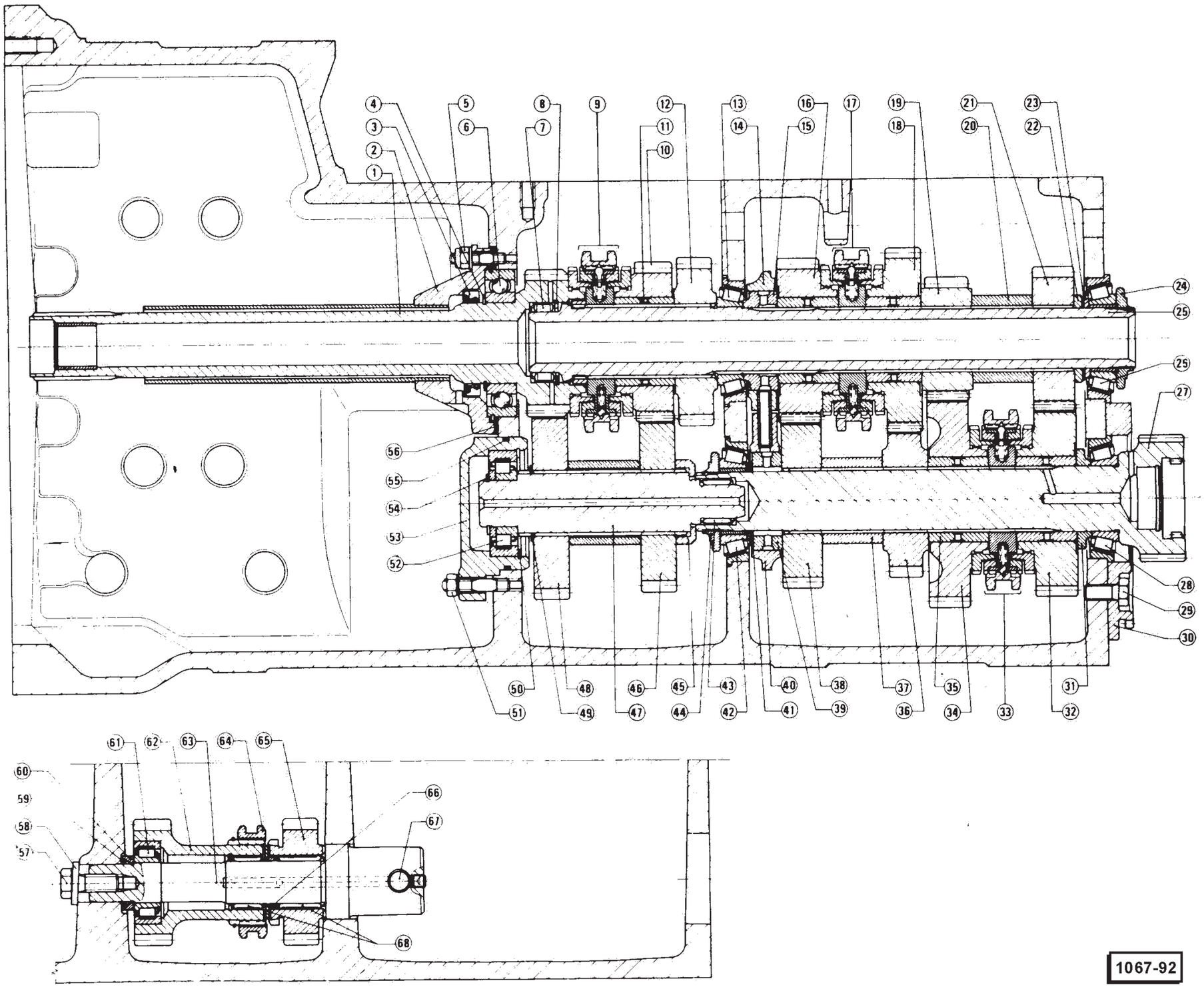


Gearbox standard - 110

1 - Flanged sleeve
2 - Flanged sleeve fixing screw
3 - O-ring
4 - Support link
5 - Gearbox main shaft
6 - Seeger ring
7 - Shoulder ring
8 - Bearing
9 - 1 st gear
10 - Spacer
11 - 2nd gear and reverse gear
12 - 3rd gear
13 - 3rd and 4th synchronizer
14 - 4th gear
15 - Spacer
16 - Bearing
17 - Main shah fixing ring nut
18 - Bearing
19 - Epicyclic reduction gear toothed flange
20 - Tapered pinion roller bearing
21 - Gearbox counter shaft
22 - Compression ring
23 - Screw
24 - Gearbox main shaft ring lock nut
25 - Gearbox main shaft
26 - 3rd gear
27 - Rear gearbox oil discharge plug space
28 - 2nd gear
29 - 1 st and 2nd gear synchronizer
30 - 1 st gear
31 - Shoulder ring
32 - Bearing
33 - Reverse gear
34 - Gearbox counter shaft fixing ring nut
35 - Front gearbox oil discharge plug space
36 - Cover fixing screw
37 - Cover
38 - O-ring
39 - Seeger ring
40 - Reverse ring
41 - Retainer
42 - External ring
43 - Coupling gear with collar
44 - Inserted bearing seat
45 - Bearing
46 - Seeger ring

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Gearbox with mini reduction and reversal 130 - 150

1 - Clutch shaft
2 - Flanged sleeve
3 - Support link
4 - Seeger ring
5 - Flanged sleeve fixing nut
6 - Bearing
7 - Retainer
8 - Seeger ring
9 - Synchronizer
10 - Gearbox entry gear
11 - Bush
12 - Reversal gear
13 - Tapered roller bearing
14 - Main shaft lubrication manifold
15 - Main shaft lubrication bush
16 - 1 st gear
17 - 1st and 2nd synchronizer
18 - 2nd gear
19 - 3rd gear
20 - Spacer
21 - 4th gear
22 - Spacer
23 - Shim package
24 - Gearbox main shaft ring lock nut
25 - Gearbox main shaft
26 - Tapered roller bearing
27 - Gearbox countershaft
28 - Tapered roller bearing
29 - Toothed flange fixing screw
30 - Epicyclic reduction gear toothed flange
31 - Spacer
32 - 4th gear
33 - 3rd and 4th synchronizer
34 - 3rd gear
35 - Bush
36 - 2nd gear
37 - Spacer
38 - 1 st gear
39 - Countershaft lubrication bush
40 - Countershaft lubrication manifold
41 - Shim package
42 - Tapered roller bearing
43 - Retainer
44 - Countershaft ring lock nut
45 - Spacer
46 - Mini reduction gear manifold
47 - Mini reduction countershaft
48 - Gear
49 - Seeger ring
50 - Seeger ring
51 - Mini reduction gear cover fixing nut
52 - Roller bearings
53 - Countershaft mini reduction cover gear
54 - Seeger ring
55 - O-ring
56 - Shims and gaskets
57 - Reversal shaft fixing screws
58 - Washer
59 - O-ring
60 - Shoulder ring
61 - Roller bearing
62 - Reversal gear entrance
63 - Reversal gear
64 - Coupling collar
65 - Reversal gear outlet
66 - Shoulder ring
67 - Oil sump
68 - Roller bearings

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4. Partially fit the shaft into the seat in the gearbox and mount on it the gear wheel parts one by one.
5. Fit the shaft completely into its seat tightening the ring fixing nut tightening it to the prescribed torque. Loosen it then tighten it.

Tightening torque
Gearbox secondary shaft gearwheel tightening ring nut
46,5 ÷ 51,5 Nm
(4,75 ÷ 5,25 kgm; 34.34 to 37.96 ft lb)

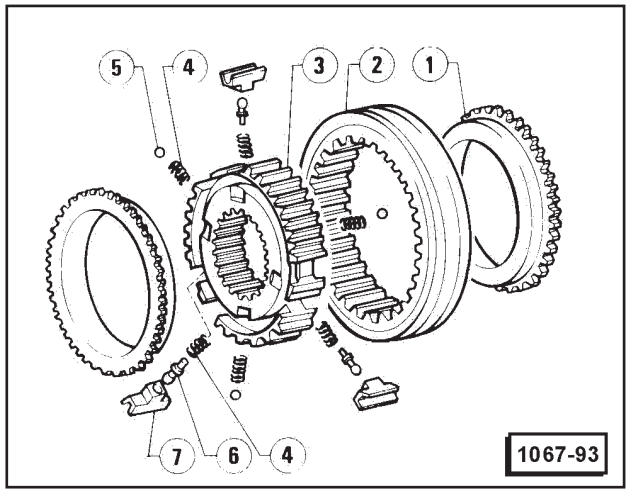
6. Proceed with the adjustment of the tapered rollers (refer to: Checks and Controls-Play Adjustment of Gearbox Main and Counter Shaft).
7. Caulk the ring nut.
8. Block the epicyclic reduction gear flange fixing crown wheel on the gearbox by means of the ten screws tightening them to the prescribed torque.

Tightening torque
Epicyclic reduction gear flange fixing crown wheel on the gearbox
140 ÷ 154 Nm
(14,25 ÷ 15,75 kgm; 103.03 to 113.87 ft-lb)

Synchronizer

NOTE
It is advisable to remount the synchronizer from inside a container in order to avoid losing the spring loaded parts.

Referring to the following diagram proceed to remount using the following procedure:
1. Position in the special hub seats the three groups of springs **4**, the ball pin **6** and the pad **7** with the help of very thick grease to keep them in position.
2. Partly mount the grooved sleeve **2** on the hub, checking that the three pads **7** are inserted under the sleeve.
3. With the help of a screwdriver, position a spring **4** with its ball **5** in their seats on the hub, then lower the sleeve until it blocks the ball in place.
4. Use the same procedure for the other two balls being careful not to loose the balls already in position.



1 - Synchronized rings
2 - Grooved sleeve
3 - Hub
4 - Spring
5 - Ball
6 - Ball pin
7 - Pad

Gearbox main shaft

1. It previously dismounted, remount the external tapered bearings rings working in reverse order.
2. It previously dismounted, remount the synchronizer (refer to: Synchronizer).
3. It still to be mounted, place the mini reduction gear pack the inside of the gearbox placing the retainer **43** on the inside of the gearbox counter shaft.
4. Put the complete gearwheel pack on the workbench and check the mounting order of the lubrication bush **15** and the lubrication manifold **14**.

NOTE
To make adjustment of the bearing spring load easier, prepare the shim package **23** in sue h a way that the final shim thickness is greater than that when dismounted.

5. Partially fit the shaft in the gearbox and mount the gearwheel pack on it one by one. To help position in the internal bearing track **13** tap lightly with a hammer on the shaft.
6. Fit the shaft completely into its seat, tightening the ring fixing nut **24** and tighten to the prescribed torque.

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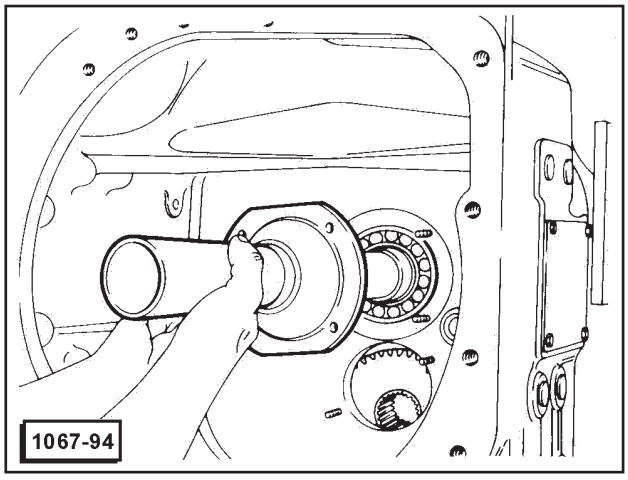
Tightening torque
Gearbox main shaft gearwheel pack ring fixing nut
46,5 ÷ 51,5 - Nm
(4,75 ÷ 5,25 - kgm; 34.34 to 37.96 ft lb)

7. Proceed with the adjustment of the roller bearing (refer to: Checks and Adjustments - Adjustment of Main and Secondary Shaft Bearings).
8. Caulk the ring nut.

Clutch shaft

Place the mini reduction gear gearwheels with the spacers in the correct sequence, turned the correct way, into the gearbox, referring to the diagram on page 34.

1. If previously dismounted, remount the ball bearing 6 on the clutch shaft, the retainer **7** on the inside of the clutch shaft and the tapered bearing on the countershaft working in the reverse order.
2. Mount the clutch shaft, with the help of light taps with a hammer to help the bearing lie correctly.
3. Mount the new support link **3** on the inside of the shaft flanged sleeve support **2** and lubricate with grease.
4. Mount the flanged sleeve **2** on the shaft checking that the hold on it is turned towards the bottom.

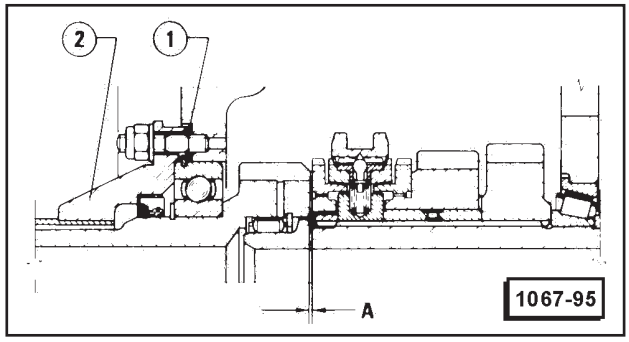


5. Position the shim package **56** on the sleeve **2** turning it correctly, referring to the figure on page **46**. Then mount the new washer with the rubber lip on the studs so as to ensure a good oil seal, then tighten the nuts **5** to the prescribed torque.

Tightening torque
Screws fixing flanged sleeve to gearbox

Refer to: GENERAL
Nuts screws tightening torque

6. Find and if necessary, adjust the play at point A following the procedure given in Checks and Adjustments - Clutch Shaft Play Adjustment - Gearbox with Mini reduction Gear and Reversal 130 and 150.



1 - Shims 2 - Flanged sleeve

7. Verify the efficiency of the adjustment checking that the shaft turns independently to that of the main shaft.

Mini reduction gear countershaft

With reference to the figure on page 34 proceed as follows:
1. Mount a new O-ring **55** on the cover **53.**
2. Partially fit the mini reduction gear of the countershaft **47** in its seat on the gearbox and mount on it, one by one, the parts of the gearwheel pack.
3. Mount the new washers with the rubber lip on the studs to ensure a good oil seal, then fit the four nuts **51** and tighten them to the prescribed torque.

Tightening torque
Nuts fixing mini reduction gear countershaft cover to gearbox

Refer to: GENERAL
Nut tightening methods

Reversal shaft

1. Place the gearwheel pack in the box without entering the shouldering **60**. Check that the new O-ring **59** is correctly placed.
2. Insert the shouldering **60** and fit the shaft **62** into its seat. Check that the sump **67** of the shaft is in a vertical position.
3. Fix the shaft **63** to the gearbox with its screws **57** and block it to the prescribed torque.

Tightening torque
Screw fixing reversal shaft to the gearbox

Refer to: GENERAL
Nut tightening methods

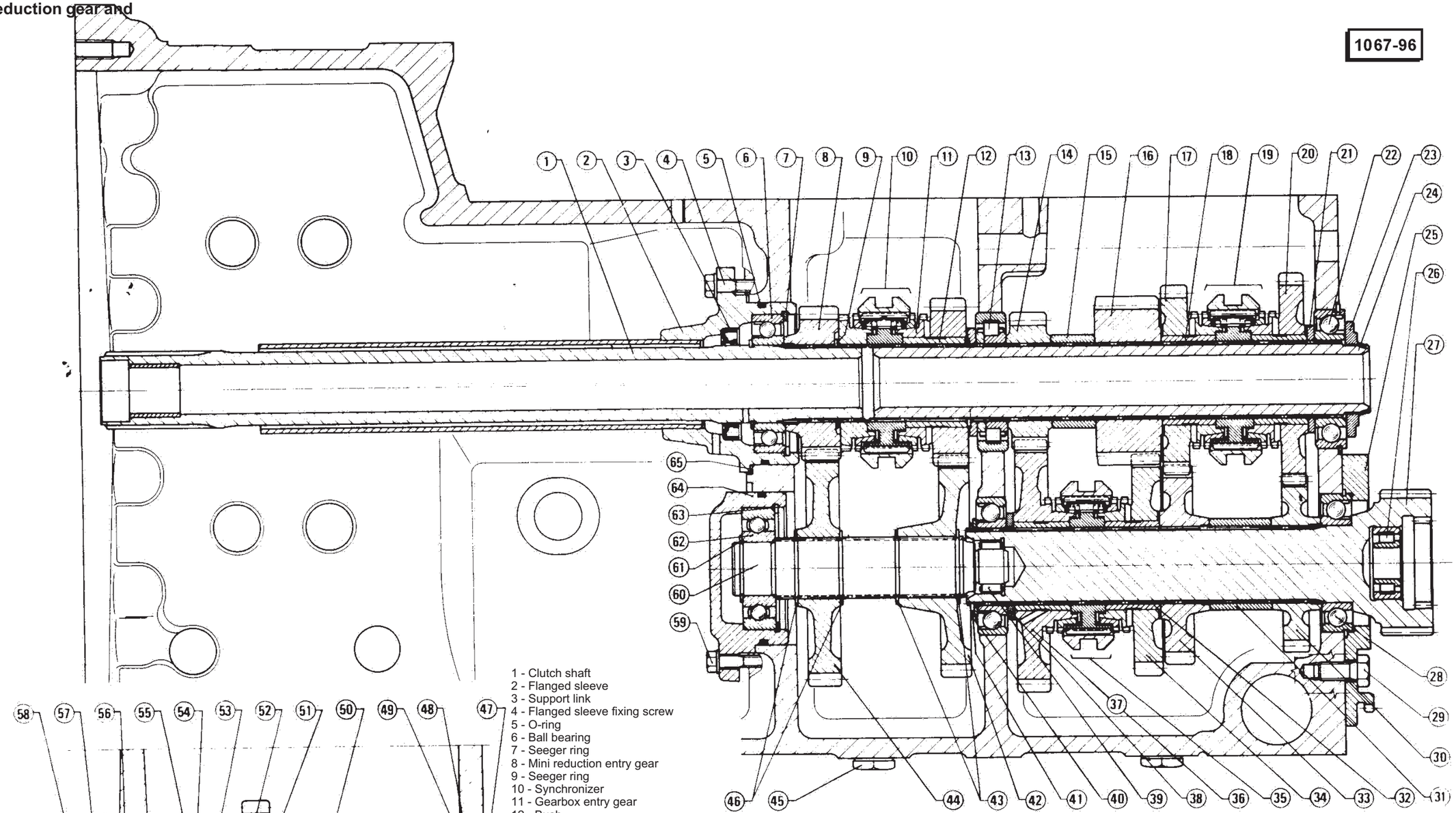
4. Having mounted the reversal shaft, check that it turns freely, without sticking on the bearings.

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Gearbox with mini reduction gear and reversal for 110

1067-96



1 - Clutch shaft
2 - Flanged sleeve
3 - Support link
4 - Flanged sleeve fixing screw
5 - O-ring
6 - Ball bearing
7 - Seeger ring
8 - Mini reduction entry gear
9 - Seeger ring
10 - Synchronizer
11 - Gearbox entry gear
12 - Bush
13 - Roller bearing
14 - Gear I
15 - Spacer
16 - Gear II and reverse gear
17 - Gear III
18 - Bush
19 - Synchronizer III and IV
20 - Gear IV
21 - Shoulder ring
22 - Ball bearing
23 - Gearbox main shaft fixing ring nut
24 - Gearbox main shaft
25 - Epicyclic reduction gear toothed flange
26 - Tapered pinion roller bearing
27 - Gearbox countershaft
28 - Ball bearing
29 - Toothed flange fixing screw
30 - Gear IV
31 - Spacer
32 - Bush
33 - Gear III
34 - Gear IV
35 - Synchronizer I and II
36 - Gear oil drain plug
37 - Gear I
38 - Shoulder ring
39 - Retainer
40 - Shim package
41 - Seeger ring
42 - Mini reduction gear conduit
43 - Seeger ring
44 - Gear
45 - Mini reduction gear oil drain plug
46 - Seeger ring
47 - Seeger ring
48 - Ball bearing
49 - Inserted bearing seat
50 - Reversal shaft
51 - Roller crown
52 - Reversal gear
53 - Toothed hub
54 - Reversal coupling collar
55 - Seeger ring
56 - Roller bearing
57 - Reversal gear
58 - Seeger ring
59 - Cover fixing screw
60 - Mini reduction gear counter shaft
61 - Seeger ring
62 - Bearing
63 - Seeger ring
64 - Mini reduction gear countershaft cover
65 - Shims

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Gearbox countershaft

1. If previously dismounted, reposition the rear bearing on the gearbox shaft.
2. If previously dismounted, remount the synchronizer (refer to: Synchronizers).
3. Open the complete gearwheel' and check their exact positions.
4. Cover external bush faces with grease, MOLYKOTE Type BR 2 to avoid seizing.
5. Partially fit the shaft complete with flange, then mount the other parts.
6. Tighten the flange screws to the prescribed torque.

Tightening torque
Fixing screws blocking the epicyclic reduction gear flange
140 ÷ 154 Nm
(14,25 ÷ 15,75 - Kgm; 103.03 to 113.87 ft lb)

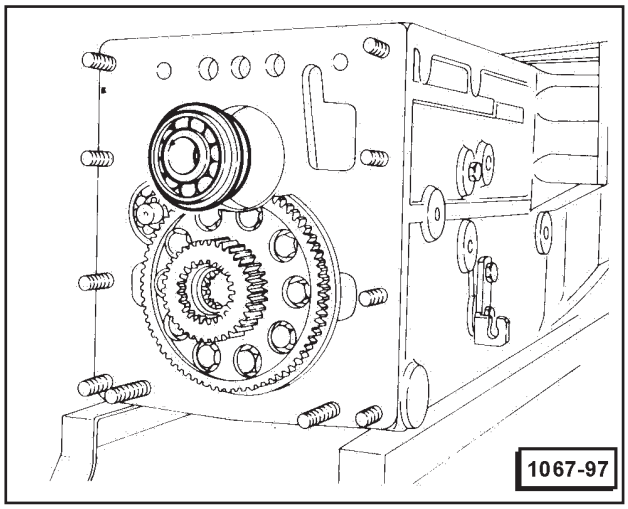
— Insert the front bearing into the mini reduction gear space and drive it into its seat.
— Slip in the shoulder ring and the shim package.
— Close with the Seeger ring.
— Carry out the play adjustment of the countershaft of the gearbox (refer to: Checks and Adjustments of Main and Counter Shaft Bearings).

Synchronizer

Proceed with remounting working in reverse order.

Gearbox main shaft

1. If previously dismounted remount the bearing in the rear bulkhead. This bearing is part of the final mounting of the lock pin mounted on the outside track that has to be turned towards the back as indicated in the figure.



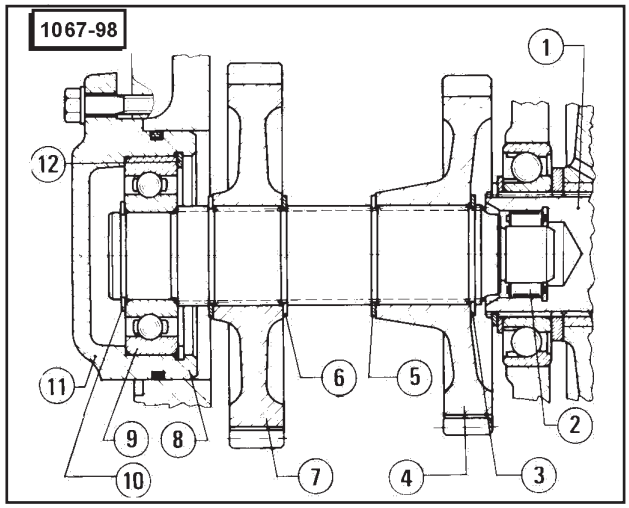
2. Cover the outside of the bush with grease MOLYKOTE Type BR 2.
3. If previously dismounted, remount the mini reduction gear of the countershaft first.
4. Fit in the shaft and mount the other parts.
5. Fit in the internal track of the front bearing then the external track with the rollers and drive them into the bulkhead.
6. Fit the shoulder ring taking care to mount it correctly (refer to the figure on page 37) and the spacer, then close with the Seeger ring.
7. Fit the ring nut, tighten, loosen and then tighten to the given torque.

Tightening torque
Ring nut fixing the gearwheels of the main shaft of the gearbox
46,5 ÷ 61,5 Nm
(1,75 ÷ 5,25 Kgm; 12.65 to 37.96 ft lb)

8. Caulk the ring nut.

Mini reduction gear and countershaft

1. If previously removed, re-insert the roller crown **2** on the inside of the gearbox counter shaft **1**.
2. If previously dismounted, remount the bearing **9** on the mini reduction gear countershaft fixing it with a Seeger ring **10** then place it in the cover **11** and block with Seeger ring **12**.
3. Fit the Seeger ring **8** on the shaft.
4. Fit the shaft in the box and slip on the gearwheel **7**.
5. Block the gearwheel **7** with the Seeger ring **6**.
6. Insert the Seeger ring **5** and then slip on the gearwheel **4** and block it with a Seeger ring.
7. Fit the shaft fully into place being careful not to damage the roller bearing retainer **2** fitted into the countershaft.



1 - Gearbox countershaft
2 - Roller bearing
3 - Seeger ring
4 - Gear
5 - Seeger ring
6 - Seeger ring
7 - Gear
8 - Seeger ring
9 - Bearing
10 - Seeger ring
11 - Cover
12 - Seeger ring

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8. Mount the new rubber lipped washer to avoid oil leaks, then fit the four screws and tighten to the given torque.

Tightening torque
Screws fixing mini reduction gear countershaft cover to gearbox

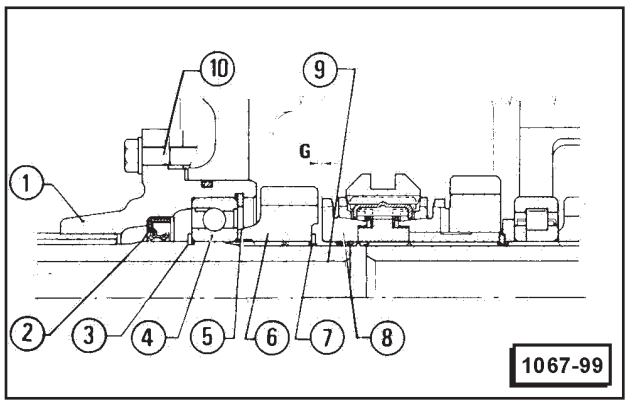
Refer to: GENERAL
Nut tightening instructions

Clutch shaft

1. If previously moved, remount the support link **2** in the flanged sleeve **9**.
2. Remount the bearing **4** on the shaft fixing it with a Seeger ring **3**.
3. Fit the shaft into the flanged sleeve taking care not to damage the support link **2** then fix with a Seeger ring **5**.
4. Mount gear **6** and fixed it with Seeger ring **7**.
5. Fit the shaft with the flanged sleeve into the gearbox correctly positioning the sleeve hole, and insert the synchronizer ring **8**. Mount the new rubber lipped washer to avoid oil leaks, then fit the four sleeve fixing screws and tighten to the given torque.

Tightening torque
Screws fixing flanged sleeve to the gearbox

Refer to: GENERAL
Nut tightening instructions

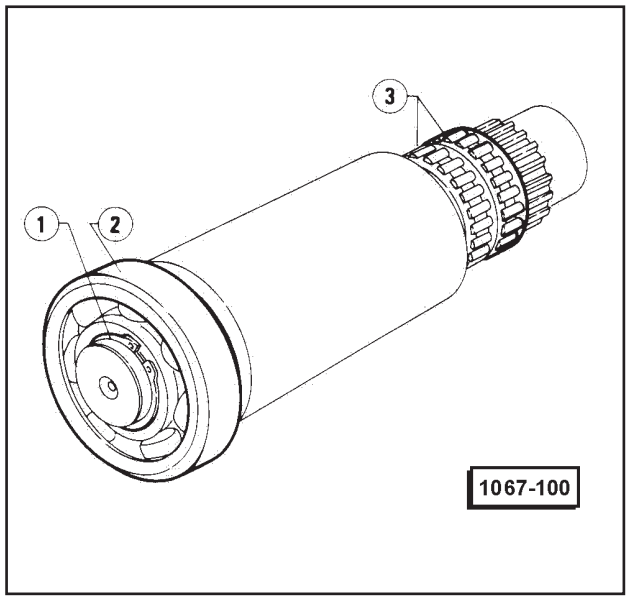


1 - Flanged sleeve
2 - Support link
3 - Seeger ring
4 - Bearing
5 - Seeger ring
6 - Gear
7 - Seeger ring
8 - Synchronizer ring
9 - Clutch shaft
10 - Shims

6. Read the play at point “G” as indicated, and if the values are not within those of **0.4 to 0.6 mm** (0.0157 to 0.0236 in) adjust the play as indicated in: Checks and Adjustments - Clutch Shaft Play Adjustment - Gearbox with Mini Reduction Gear and Reversal 110.

Reversal shaft

As in the dismounting; the remounting of the reversal shaft is dependent on other remounting. We give below the instructions for the correct remounting.
1. If the rear bearing **2** has been removed, remount them on the shaft and fix with a Seeger ring **1**.
2. If moved, insert the front retainer **3** in its shaft.

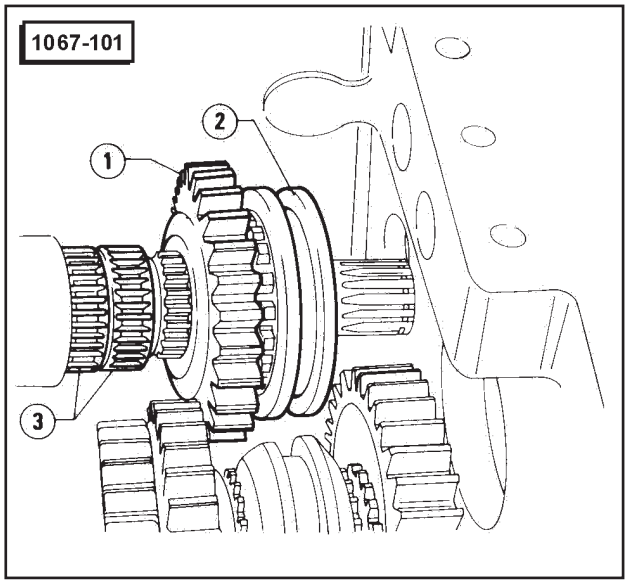


1 - Seeger ring
2 - Rear bearing
3 - Roller bearing

3. Turn the profiling on the countershaft flange in such a way as to insert the shaft in the hole on the rear bulkhead of the gearbox.
4. Insert the shaft being careful not to damage the gear **1** and the coupling collar **2** or the roller bearing **3**.

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1 - Gear
2 - Coupling collar
3 - Roller bearing

5. By way of the Seeger ring, fix the coupling collar.

SUPER REDUCTION ANDREVERSAL GEARBOX

For 130 - 150

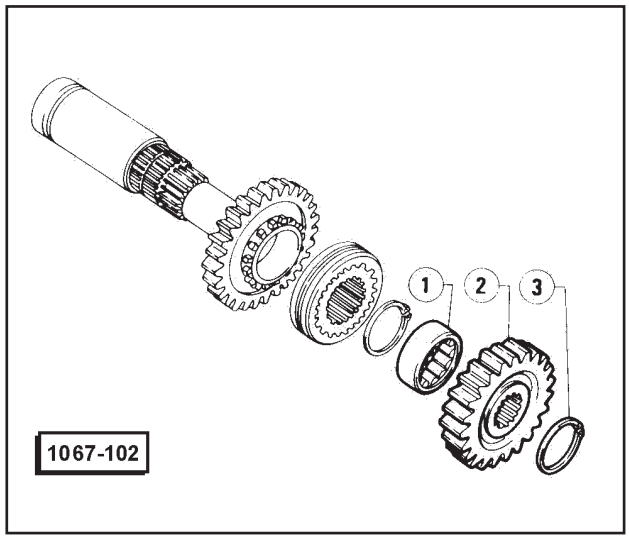
Gearbox countershaft

Refer to Mini Reduction and Reversal Gearbox - Countershaft Gearbox.

Gearbox main shaft

1. If still to be mounted, remount it on the inside of the countershaft gearbox of the upper reduction, positioning the retainer on the inside of the gearbox countershaft.
2. If previously dismounted, remount the external tapered roller bearing working in reverse order.
3. If previously dismounted, remount the coupling collar.
4. Fit parts (**8**, **10**, **11**, **12** and **13** of the technical drawing on page 41) of the super reduction gear onto the main shaft, then the internal ring of the tapered roller bearing and prepare the main shaft gearwheel package on the workbench paying attention to the order you mount **4** and **5** of the technical drawing on page Enfiler complètement l'arbre et battre sur le roulement postérieur jusuq'à l'insérer dans le siège.

Fit the shaft home and tap on the rear bearing until it enters its seat.
If moved insert the internal track with the front roller bearing **1** and tap with a soft metal hammer and punch until it lies flat. Fit the gearwheel **2** into the mini reduction gear space and fix with a Seeger ring **3**.



1 - Roller bearing external track
2 - Gear
3 - Seeger ring

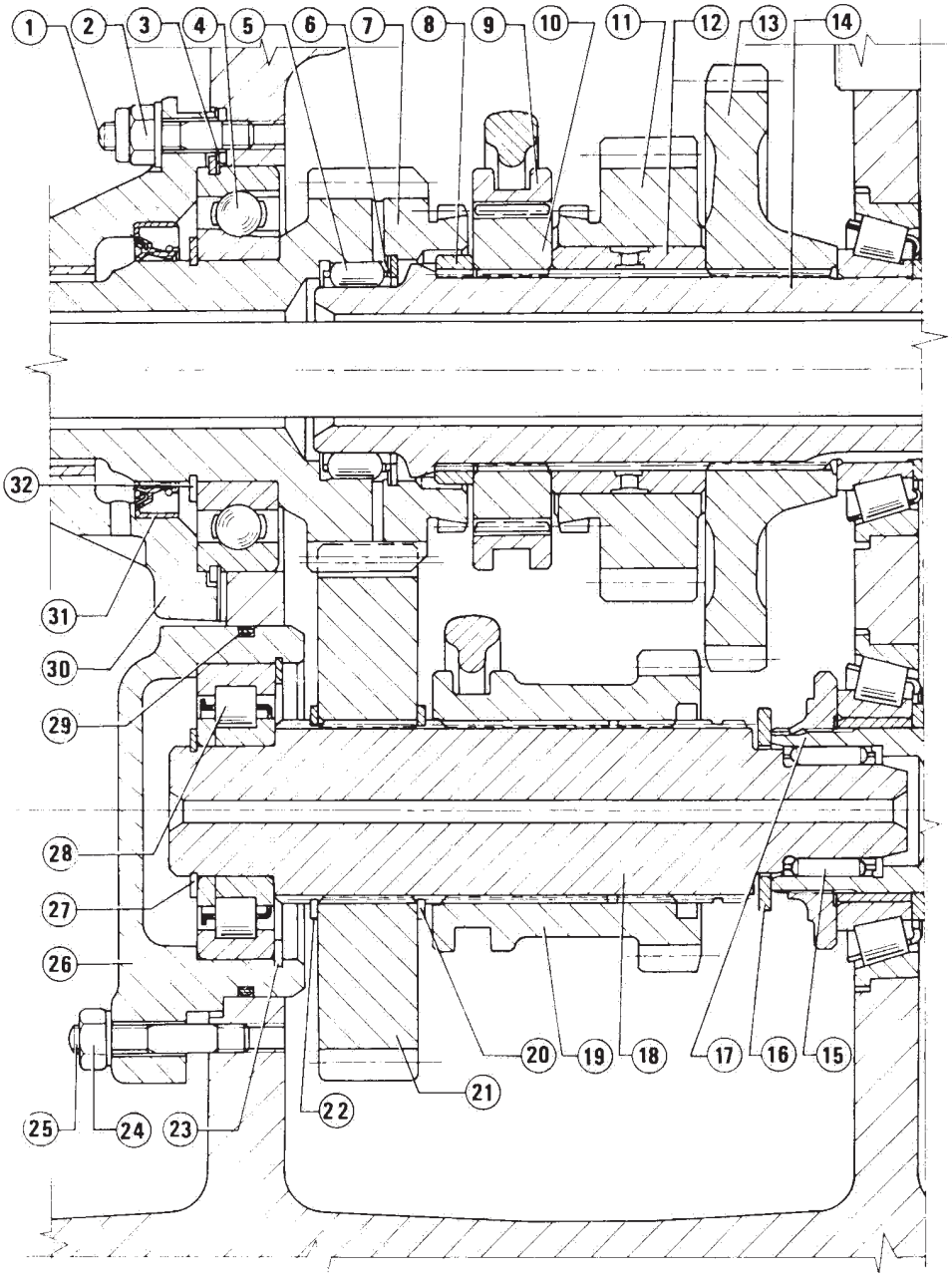
5. Partially fit the shaft into the gearbox and slip on the gearwheel pack one by one. To help position the internal track of the rear bearing lightly tap with a hammer on the front tip of the shaft.
6. Slip the fixing ring nut and tighten, loosen then tighten again to the given torque.

Tightening torque
Ring nut fixing the gearwheel pack on the gearbox main shaft
385 ÷ 441 Nm
(40 ÷ 45 - Kgm; 289.2 to 325.35 ft-lb)

7. Proceed with the adjustment of the tapered bearing: refer to Checks and Adjustments - Play Adjustment of Main and Counter Shaft.
8. Caulk the ring nut.

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1 - Stud
2 - Flanged sleeve fixing nut
3 - Shims
4 - Bearing
5 - Retainer
6 - Seeger ring
7 - Clutch shaft
8 - Spacer
9 - Coupling collar
10 - Toother hub
11 - Reversal gear
12 - Bush
13 - Gearbox gear entrance
14 - Gearbox counter shaft
15 - Retainer
16 - Shoulder ring
17 - Gearbox counter shaft
18 - Super reduction gear counter shaft
19 - Coupling sleeve
20 - Seeger ring
21 - Gear
22 - Seeger ring
23 - Seeger ring
24 - Super reduction gear counter shaft fixing nut
25 - Stud
26 - Super reduction gear counter shaft cover
27 - Seeger ring
28 - Bearing
29 - O-ring
30 - Flanged sleeve
31 - Support link
32 - Seeger ring

Super reduction gear counter shaft

1. If previously dismounted, remount the bearing **28** on the countershaft **18** and then insert it in the cover **26** after having mounted a new O-ring **29**.
Working in reverse order.
2. If previously moved; insert the retainer **15** on the inside of the countershaft **14**.
3. Fit the Seeger ring **22** on the shaft and then partially fit the shaft and the gearwheels **21** blocking them with the Seeger ring **21** then fit the sleeve **19** and the shoulder ring **16**.
4. Fit the cover on its seat and change the rubber lipped washer to ensure that there is no leak. Fit the nuts **24** on the studs **25** and tighten to the prescribed torque.

Tightening torque for nuts fixing super reduction gear countershaft cover

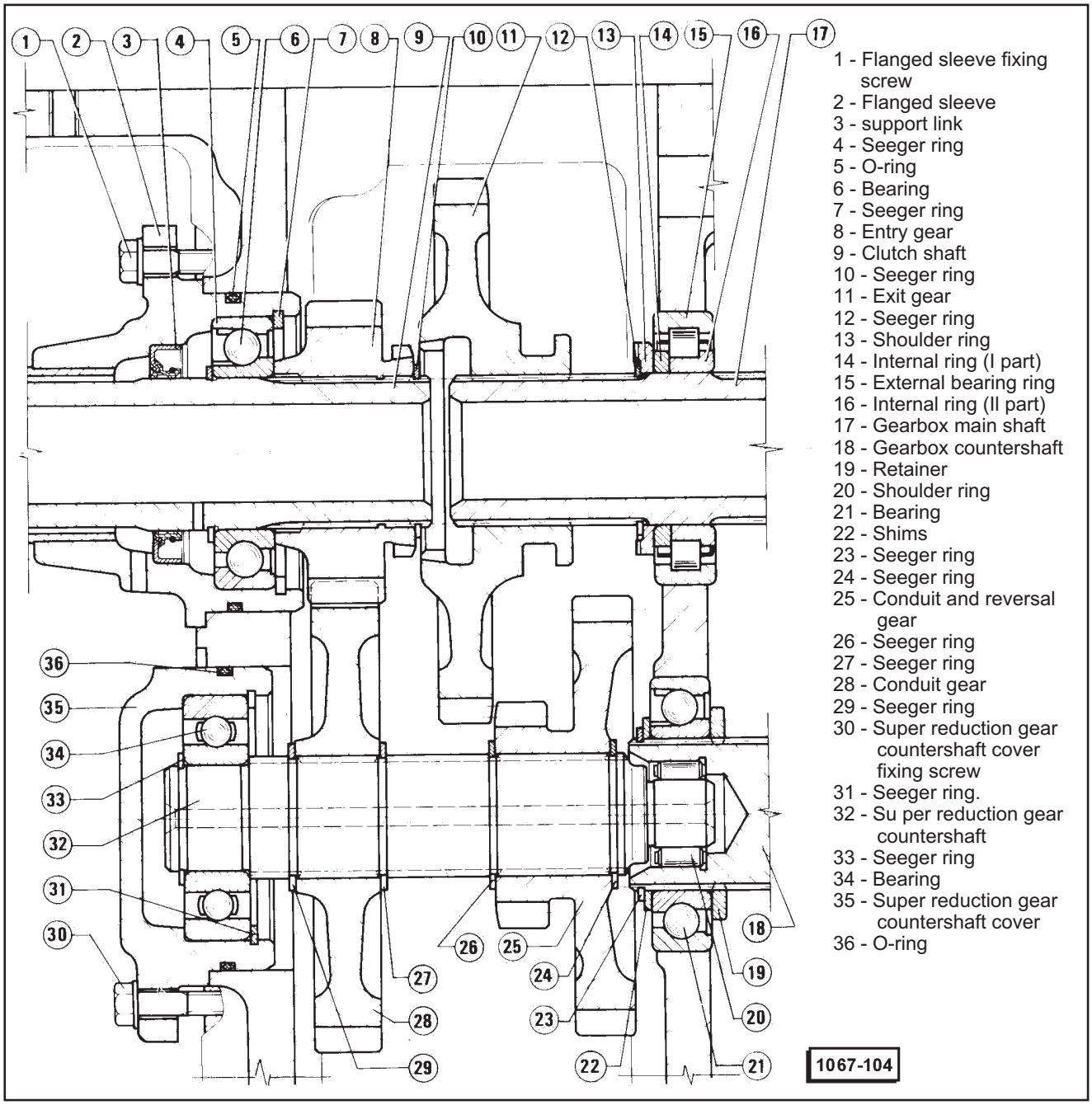
Refer to: GENERAL
Nut tightening information

Clutch shaft

1. If previously moved, insert the retainer **5** on the main shaft then block it with a Seeger ring **6**.
2. If previously moved, remount the support link **31** on the inside of the flanged sleeve **30**.
3. It previously dismounted, remount the bearing **4** on the inside of the sleeve **30** working in the reverse order, then tit the main shaft **7** on the inside of the sleeve **30** being careful not to damage the support link **31**.

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4. Insert the sleeve **30** into its seat with the shims **3** properly alternated and adequately shimed (refer to: Checks and Adjustments - Play Adjustment of Clutch Shaft - Super Reduction Gear and Reversal - Gearbox 130 and 150). Change the rubber lipped washer in order to ensure no oil leaks then tighten the nuts to the prescribed torque.

Gearbox countershaft

Pour 110

Refer to the Mini reduction and Reversal Gearbox 110 Gearbox Counter Shaft.

Tightening torque for nuts fixing flanged screws

Refer to: GENERAL
Method of fixing nuts

REVERSAL SHAFT

Refer to: Mini reduction Gear and Reversal 130 - 150 Reversal Shaft.

Gearbox main shaft

Proceed working in reverse order being careful to fit the super reduction gear **11** before mounting the super reduction counter shaft.

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1. If previously moved, remount the retainer **19** on the inside of the countershaft **18**.
2. If previously moved, remount the bearing **34** on the shaft fixing it with a Seeger ring **33** then fit it in the cover **35** and fix with a Seeger ring **31**.
3. Mount a new O-ring **36** on the cover **35**.
4. Mount the Seeger ring **29** on the shaft **32** partially fitting the shaft into the gearbox.
5. Fit the gearwheel **11** on the main shaft of the gearbox.
6. Fit the gearwheel **29** on the countershaft **32**, slip on the Seeger rings **27**; and 26 and gearwheel **25**. Fix with a Seeger ring **24** then put Seeger rings **27** and **26** into their seats.
7. Fit the cover **35** into its seat, change the washer and ensure that the oil doesn't leak, then tighten the screw **30** to the prescribed torque.

Tightening torque
Super reduction gear countershaft cover fixing screw

Refer to: GENERAL
Nut tightening regulations

Clutch shaft

1. If previously moved, insert the seal ring **3** into the inside of the flanged sleeve **2**.
2. If previously moved, remount the bearing **6** onto the clutch shaft **9** blocking, it with a Seeger ring **4**.
3. Mount a new O-ring on the sleeve **2**.
4. Slip the shaft 9 into the sleeve **2**, insert the bearing into its seat **6** and block with a Seeger ring *7*.
5. Fit the gearwheel **8** on the shaft **9** and block it with a Seeger ring **10**.
6. Fit the shaft into the gearbox; change the rubber lipped washer to ensure that there is no oil leak, then tighten the screw **1** into the sleeve **2** and tighten to the prescribed torque.

Tightening torque
Flanged sleeve fixing screw

Refer to: GENERAL
Nut tightening regulations

Reversal shaft

Refer to: Mini reduction and Reversal Gearbox - Reversal Shaft.

STANDARDGEARBOX
For 110

Gearbox countershaft

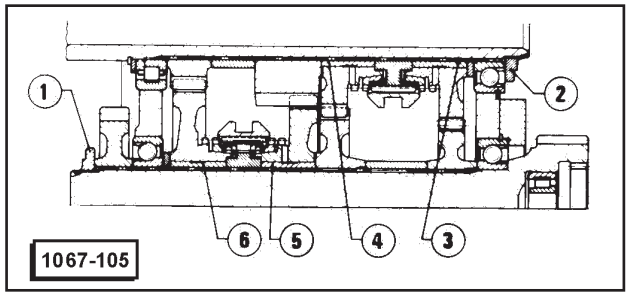
Remount the gearbox countershaft working in reverse order taking care to spread the bushes 5 and 6 with MOLYKOTE BR-2 grease so that it doesn't seize, then fit the ring nut 1 and tighten, loosen and tighten again, that caulk it.

Tightening torque
Gearbox countershaft blocking ring nut
46,5 ÷ 51,5 Nm
(4,75 ÷ 5,25 Kgm; 34.34 to 37.96 ft-lb)

Gearbox main shaft

Remount the gearbox main shaft working in the reverse order, taking care to spread the bushes 3 and 4 with **MOLYKOTE BR-2** grease to avoid seizing, then slip on the ring nut 2 tightening, loosening then tightening again to the prescribed torque, then caulk.

Tightening torque
Main shaft blocking ring nut
46,5 ÷ 51,5 Nm
(4,75 ÷ 5,25 kgm; 4.34 to 37.96 ft-lb)



1 - Gearbox countershaft fixing ring nut
2 - Gearbox main shaft fixing ring nut
3 - Bush
4 - Bush
5 - Bush
6 - Bush

Reverse gear shaft

Remount the reverse gear shaft working in reverse order.

FINAL OPERATIONS

If previously removed - remount:
1. Rods and forks.
2. Rejoin the two gearboxes.
3. Re-unite the gearbox and engine.
4. Remount the control lever cover.
5. Only for models 110 equipped with super reduction gear proceed with the adjustments of the reduction gear lever run for the series (refer to: Checks and Adjustments).
6. Remount the rear gearbox pump cover.
7. Remount the hydraulic lifter cover.
8. Remount the drivers cabin.

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9. Top up the level of the gearbox oil pouting the lubricant through the special hole on the half shaft, after, having removed the stick **1**.

CHECKS AND ADJUSTMENTS

PLAY ADJUSTMENT OF THE GEARBOX MAIN AND COUNTER SHAFT BEARINGS

Gearbox counter shaft

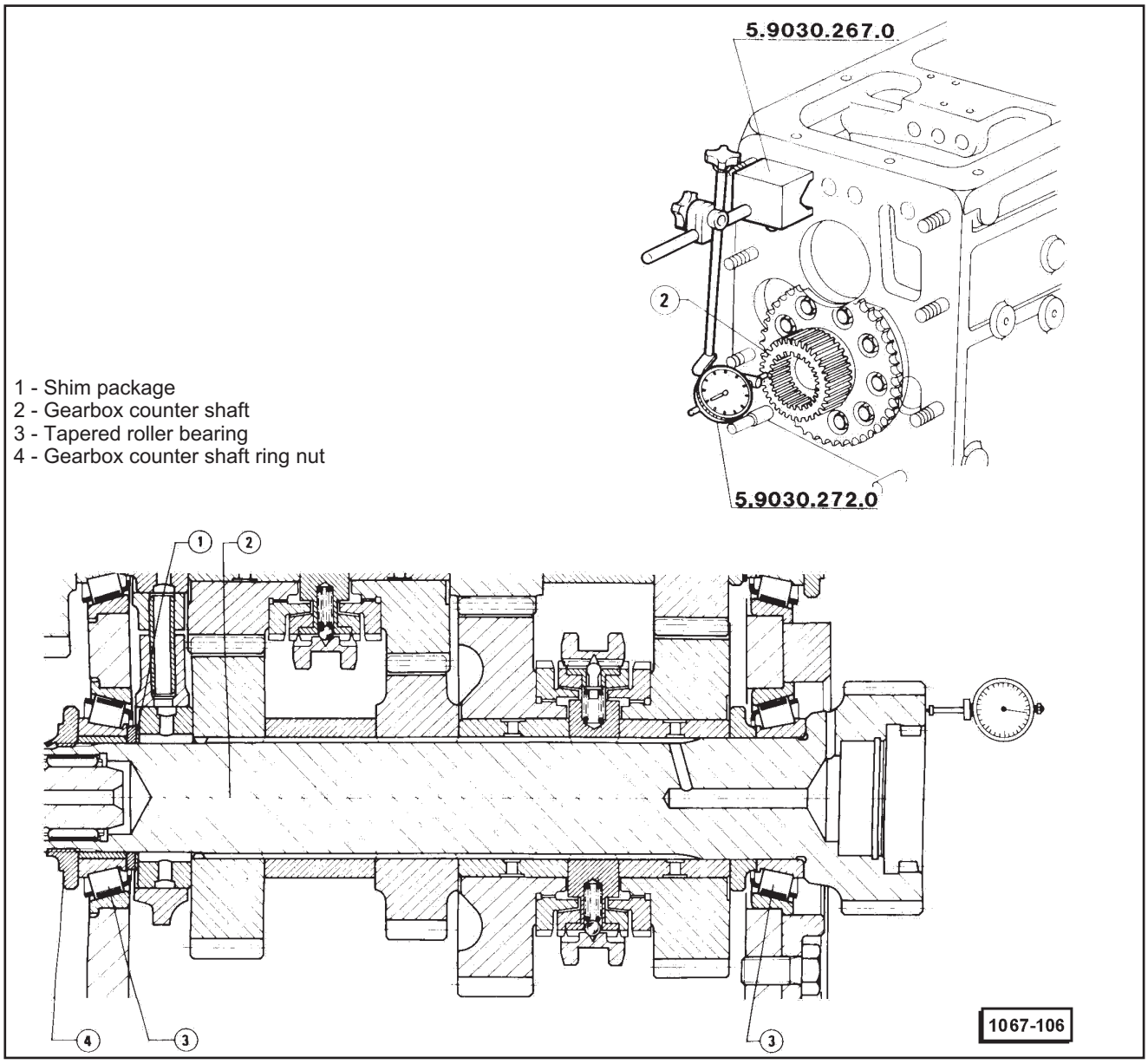
For 130 - 150

1. Proceed to find the axial play of the shaft after mounting the various parts as described below.

NOTE
It is better to use one shim of 0.2 mm (0.0078 in) rather than two of 0.1 mm (0.0039 in).

1. Using a hammer lightly tap on the shaft to settle it.
2. Mount the magnetic base support 5.9030.267.0 with a centesimal comparator 5.9030.272.0 and fix the gauge on the tip of the shaft.
3. Using a lever, move the shaft to one side to start the comparator.
4. Always using a lever, move the shaft to the other side and wait for the comparator needle to stop moving.
5. Find the axial play of the shaft. If it is different from the prescribed **0.1 mm** (0.0039 in) adjust the shim package **1** then tighten the ring nut **4** to the prescribed torque and caulk.

Tightening torque
Gearbox counter shaft ring nut
395 ÷ 441 Nm
(40 ÷ 45 - Kgm; 289.2 to 325.35 ft lb)



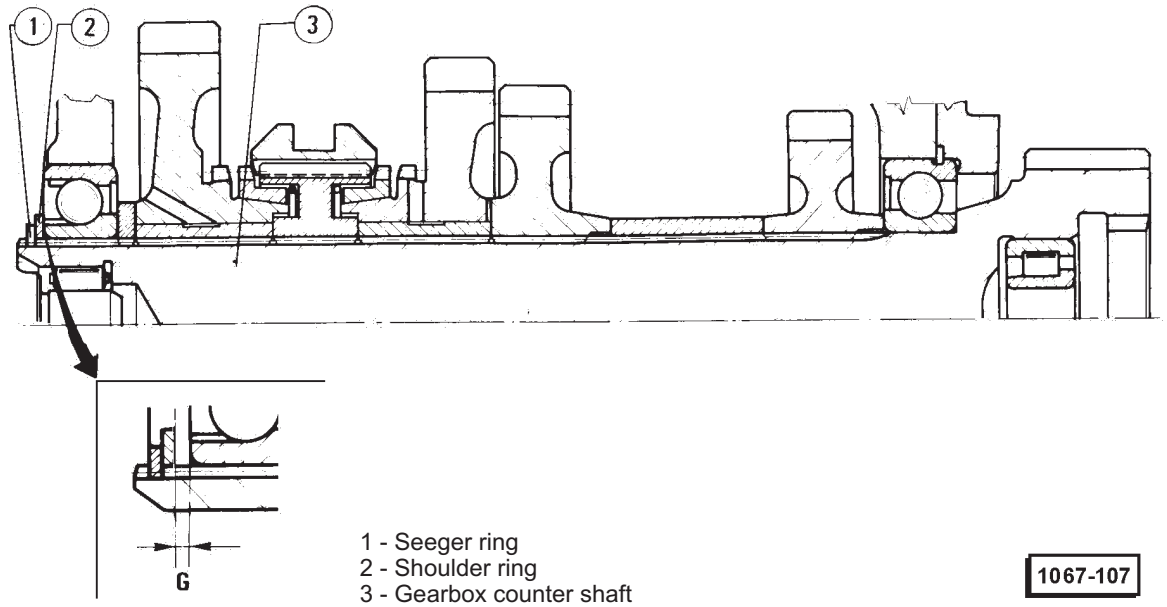
1 - Shim package
2 - Gearbox counter shaft
3 - Tapered roller bearing
4 - Gearbox counter shaft ring nut

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Gearbox countershaft (version with mini-reduction gear reversal and super-reduction gear reversal for 110)

Check, with a spessimetre inserted between the shoulder ring **2** of the bearing and the closing Seeger ring **1**. that the play is less than 0.3 mm (0.0118 in). If not place some shims between the Seeger ring **1** and the shoulder ring **2** so as to correct the value.



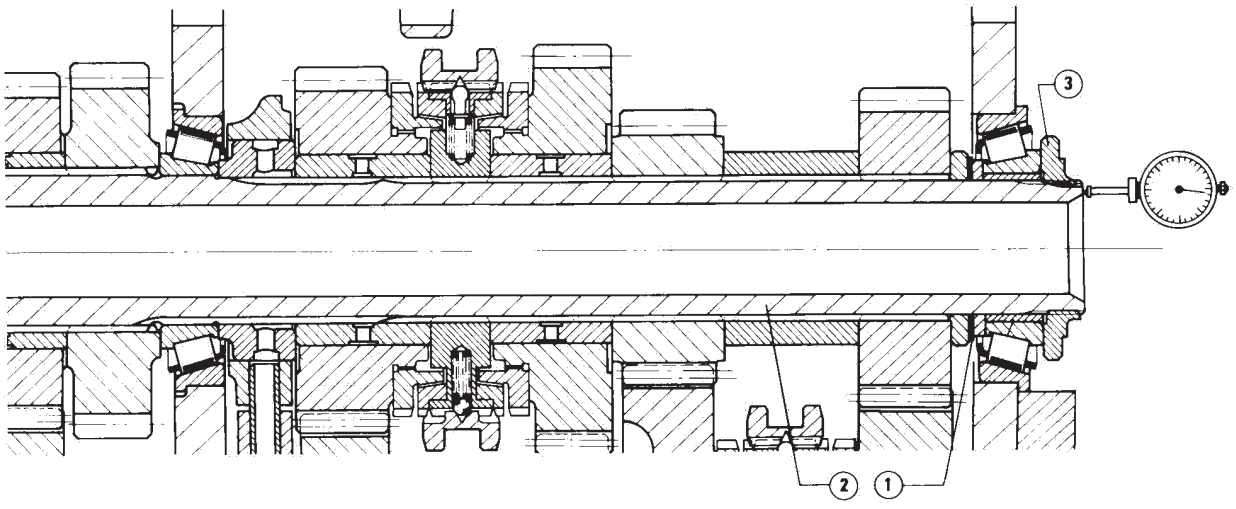
1 - Seeger ring
2 - Shoulder ring
3 - Gearbox counter shaft

1067-107

Gearbox main shaft (For 130 - 150)

1. Find axle play “G” following the same procedure used for the counter shaft for models 130 and 150 then tighten the ring nut **3** to the prescribed torque and calk.

Tightening torque
Gearbox main shaft ring nut
395 ÷ 441 Nm
(40 ÷ 45 - Kgm; 289.2 to 325.35 ft-lb)



1067-108

1 - Shim package
2 - Gearbox main shaft
3 - Ring nut

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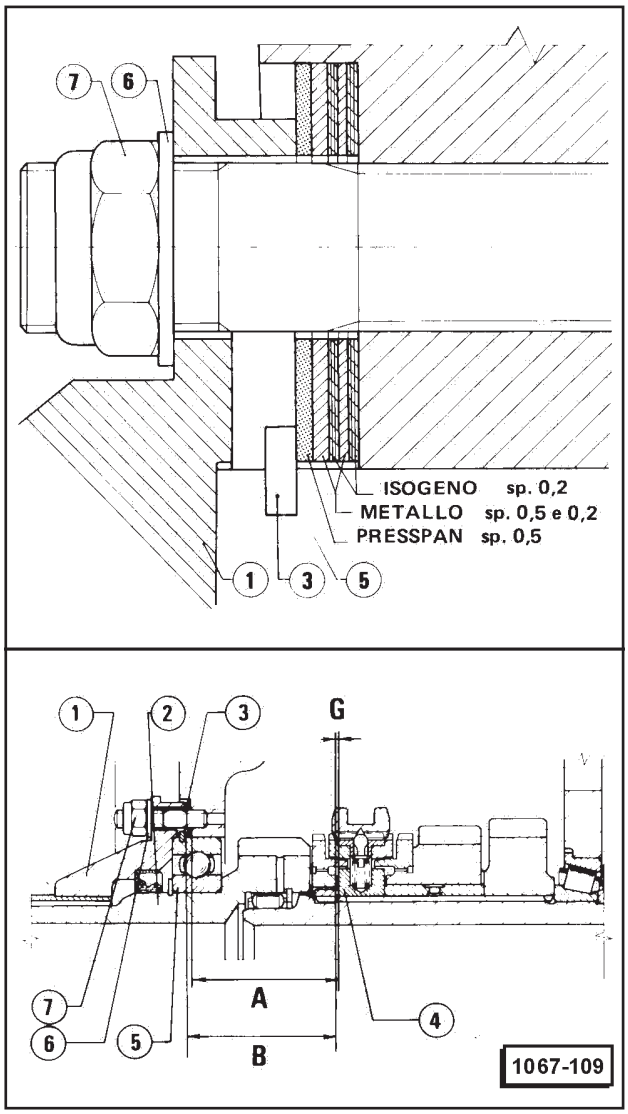
PLAY ADJUSTMENT OF CLUTCH SHAFT

Gearbox with mini reduction and reversal for 130 - 150

Using a gauge, find out the distance “A” between the grooved hub **4** surface and the mating surface on the gearbox and the distance “B” between the clutch shaft **2** surface and the compression ring **3** mounted on the bearing.

The difference B - A should give a to13l value between 0.2 mm (0.0078 in) and 0.4 mm (0.0157 in).

If not modify the shim package **A** accordingly, paying attention that you correctly alternate the gaskets and shims as indicated in the figure.



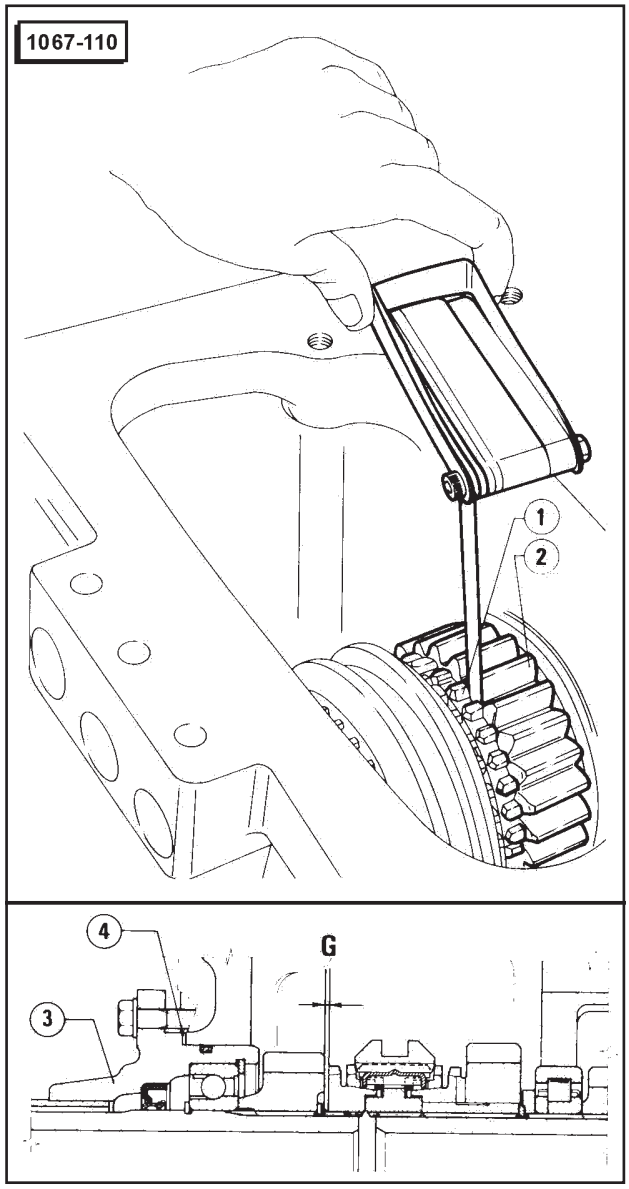
1 - Flanged sleeve
2 - Clutch shaft
3 - Compression ring
4 - Toothed hub
5 - Bearing
6 - Washer
7 - Flanged sleeve fixing nut

Keep the magnetic gasket in contact with the wall of the gearbox and the various metal shims interposed with magnetic gaskets.
Insert, after having changed the rubber lipped washer **6** against the sleeve **1**, then tighten the nut **7** to the prescribed torque.

Tightening torque far nut fixing flanged sleeve

Refer to: GENERAL
Nut tightening method

For 110
1. Find the play between the synchronizer **1** and the gearwheel **2** of the mini reduction gear with the help of a spessimeter, inserted as shown.



1 - Synchronizer ring
2 - Entry gears
3 - Flanged sleeve
4 - Shim package

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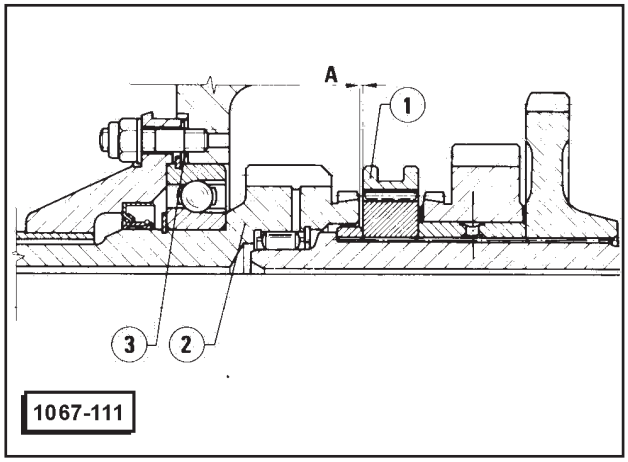
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2. If the value is not within that of **0.4 to 0.6 mm** (0.0157 to 0.0236 in) work on the shims 4 found under the flanged sleeve **3** until you obtain the correct value being careful to place them in the same way as given above.

Gearbox with super reduction and reversal

For 130 - 150

Fing the “A” play existing between the toothed hub **1** and the entry gear **2**. If you are unable to find the correct value of **1.3 to 1.7 mm** (0.0511 to 0.0669 in) work on the shim package **3** as explained in step 2. and in the following paragraph.

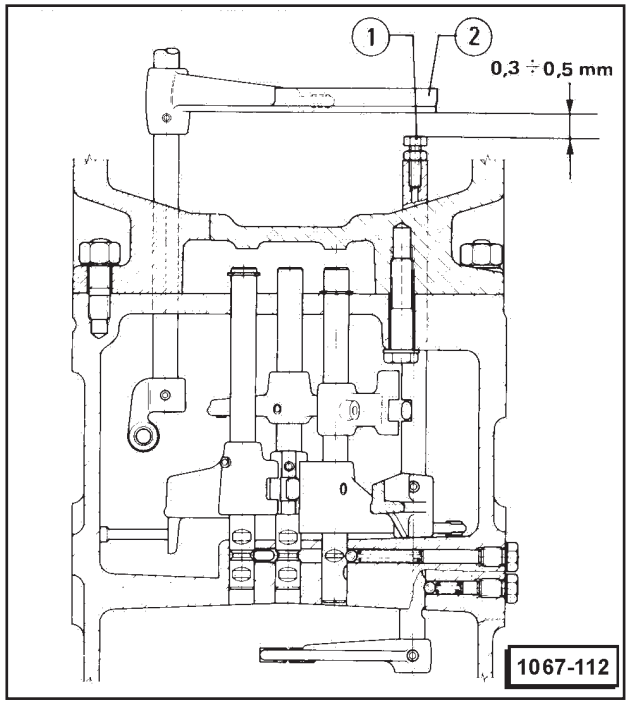


1 - Toothed hub
2 - Entry gear
3 - Shim package

EPICYCLIC REDUCTION GEAR WITH SUPER REDUCTION PLAY ADJUSTMENT

For 110

Place the super-reduction gear in neutral and the reduction gear in the “fast” position then adjust the screw **1** until you reach the quota of **0.3 to 0.5 mm** (0.0118 to 0.0196 in) from the fork **2.**



1 - Super reduction gear rod run adjusting screw
2 - Speed range coupling fork

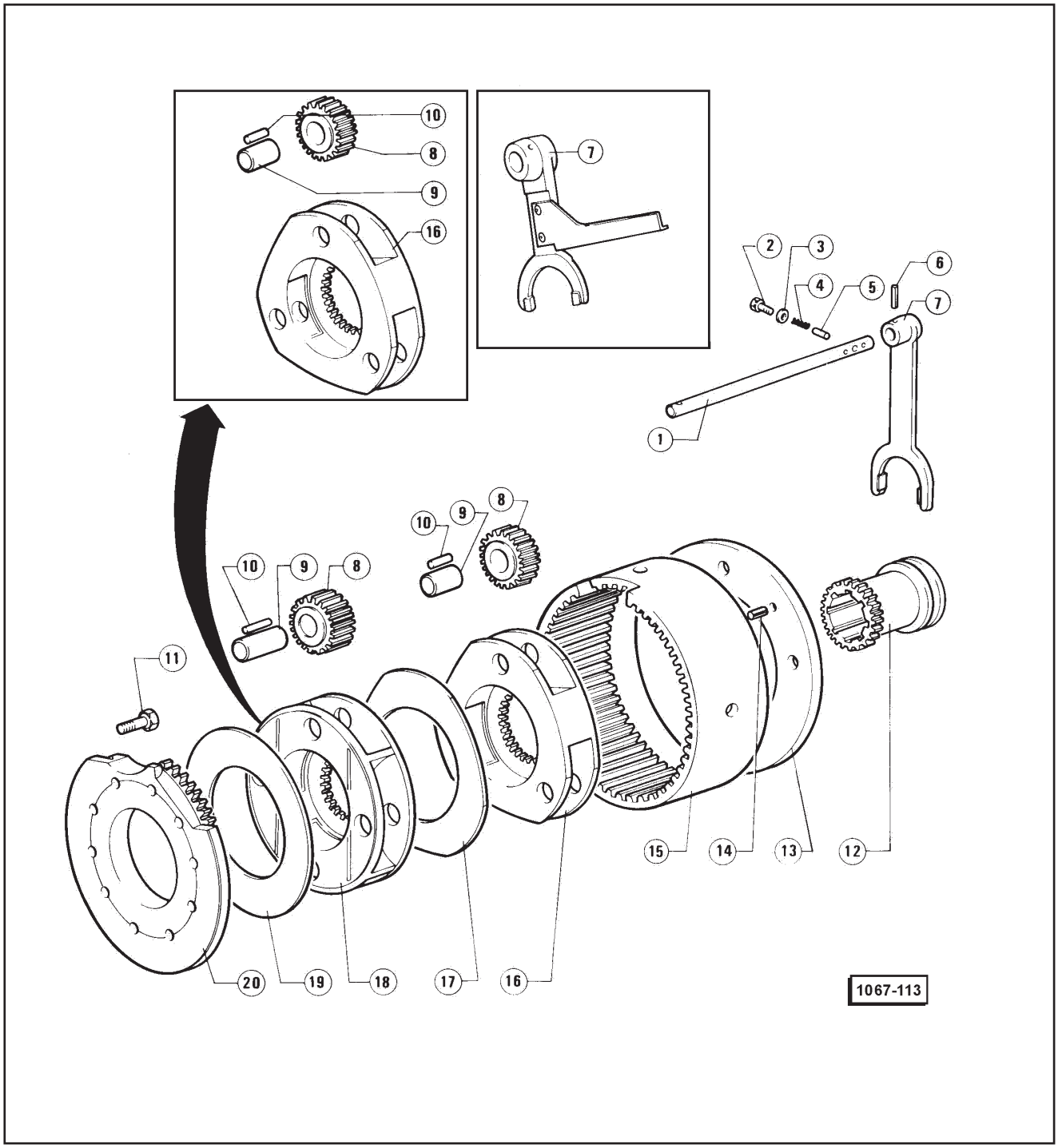
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REAR GEARBOX

EPICYCLIC REDUCTION GEAR

DISMOUNTING

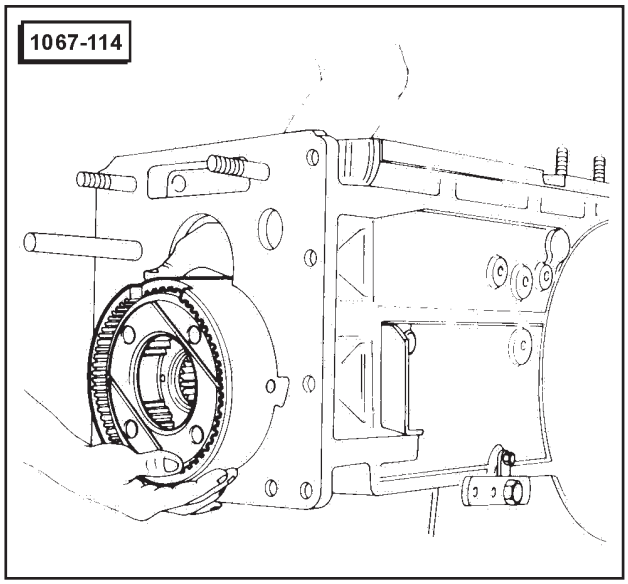


1 - Reduction gear coupling rod
2 - Cap
3 - Gasket
4 - Spring
5 - Rod positioning pin
6 - Pin
7 - Coupling fork
8 - Side pinion
9 - Pin
10 - Small roller
11 - Screw
12 - Toothed sleeve
13 - Shouldering
14 - Guide pin
15 - Crown wheel
16 - Mill holder with three side pinions
17 - Shim adjustment
18 - Mill holder with four side pinions
19 - Shim adjustment
20 - Crown wheel flange fixing

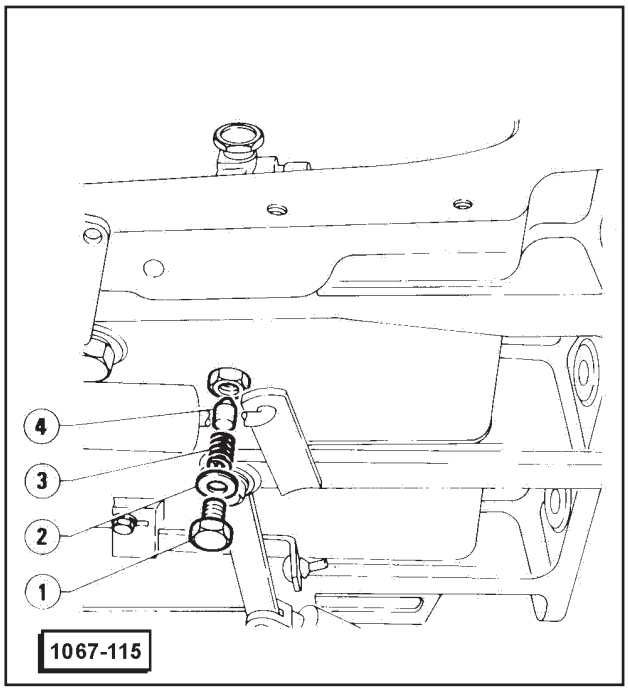
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1. Separate the two gearboxes (refer to: Preliminary Operations).
2. Take off with caution; as shown in the figure, the reduction group collecting the rear shouldering.

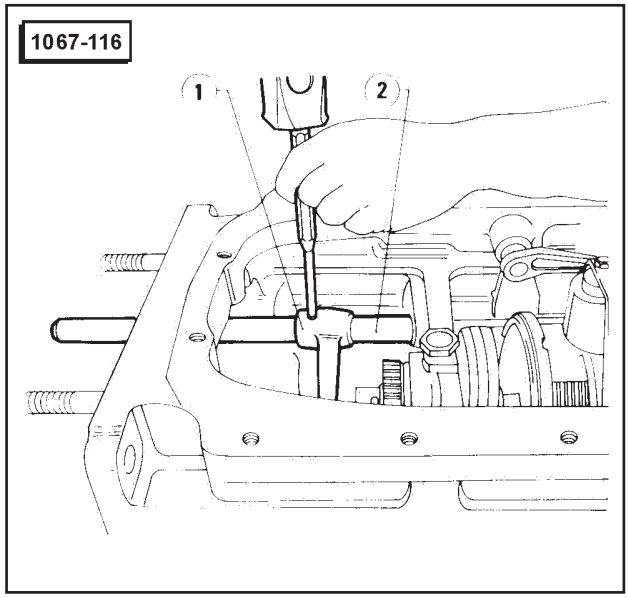


3. Loosen the cap **1** and take off the spring **3** and the pawl (or the ball) **4** using a magnet.



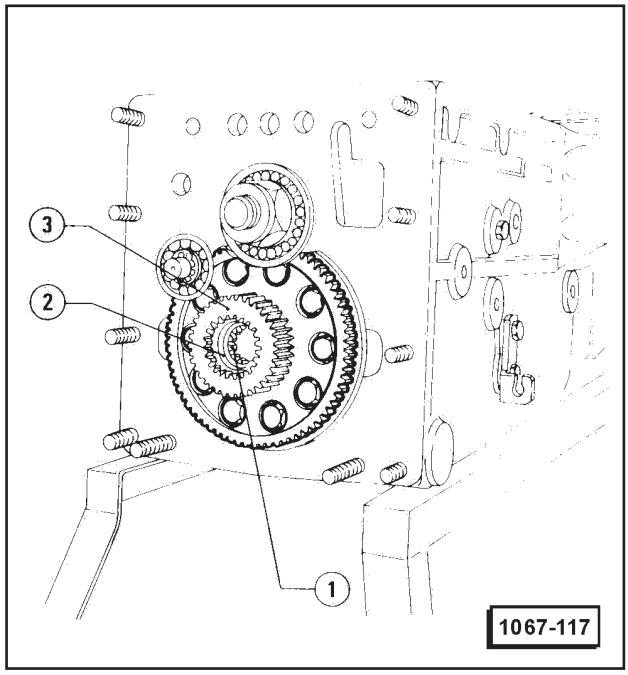
1 - Cap
2 - Gasket
3 - Spring
4 - Rod positioning pawl

4. Using a hammer and punch remove the pin fixing the coupling fork **1** to the rod **2**. Take out the rod, the fork and extract the sleeve.



1 - Coupling fork
2 - Reduction coupling fork

5. If necessary, remove the side pinion of the mill holder taking it off the pin. Recover the rollers.
6. If necessary, extract the external ring **2** and the roller crown wheel **1** of the front bearing, housed on the inside of the gearbox counter shaft **3**.



1 - Roller crown wheel
2 - External ring
3 - Gearbox counter shaft

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CHECKSANDCONTROLS NOTE

NOTE
Accurately wash the parts and carefully check them for surface defects.

Rod and fork

1. Check that the fork is not worn or deformed.
2. Verify that the control rod is not deformed.
3. Check that the cable on the control rod is not split.
4. Verify that the rod positioning pawl is not split or show signs of seizing.

Gears

1. Check that the reduction gear teeth work properly on all edges. If you find gearwheels that are irregular and with chipped teeth you must change them and also check that the gearwheels with which they are paired are in good working order.
2. Check that the teeth and grooves on the solar that you examining are not split, show signs of seizing or excessive wear. Change any elements that are not perfect.

Rollers

Examine the surface of the rollers checking that they are not scratched, dented show signs of rubbing due to foreign matter. If necessary always change all the rollers at once.

REMOUNTING

Remount the epicyclic reduction gear working in reverse order and adhering to the following:
— **Lubricate** the parts with a film of prescribed grease before mounting on the shafts.
— If previously moved, remount the side pinions maintaining in position the rollers with prescribed grease.
— On mounting, turn the fixing pin so that the slit faces the axial so as to limit the deformation of it.
— Pay particular attention to the method of mounting the parts referring to the figure on page 48.

TESTING

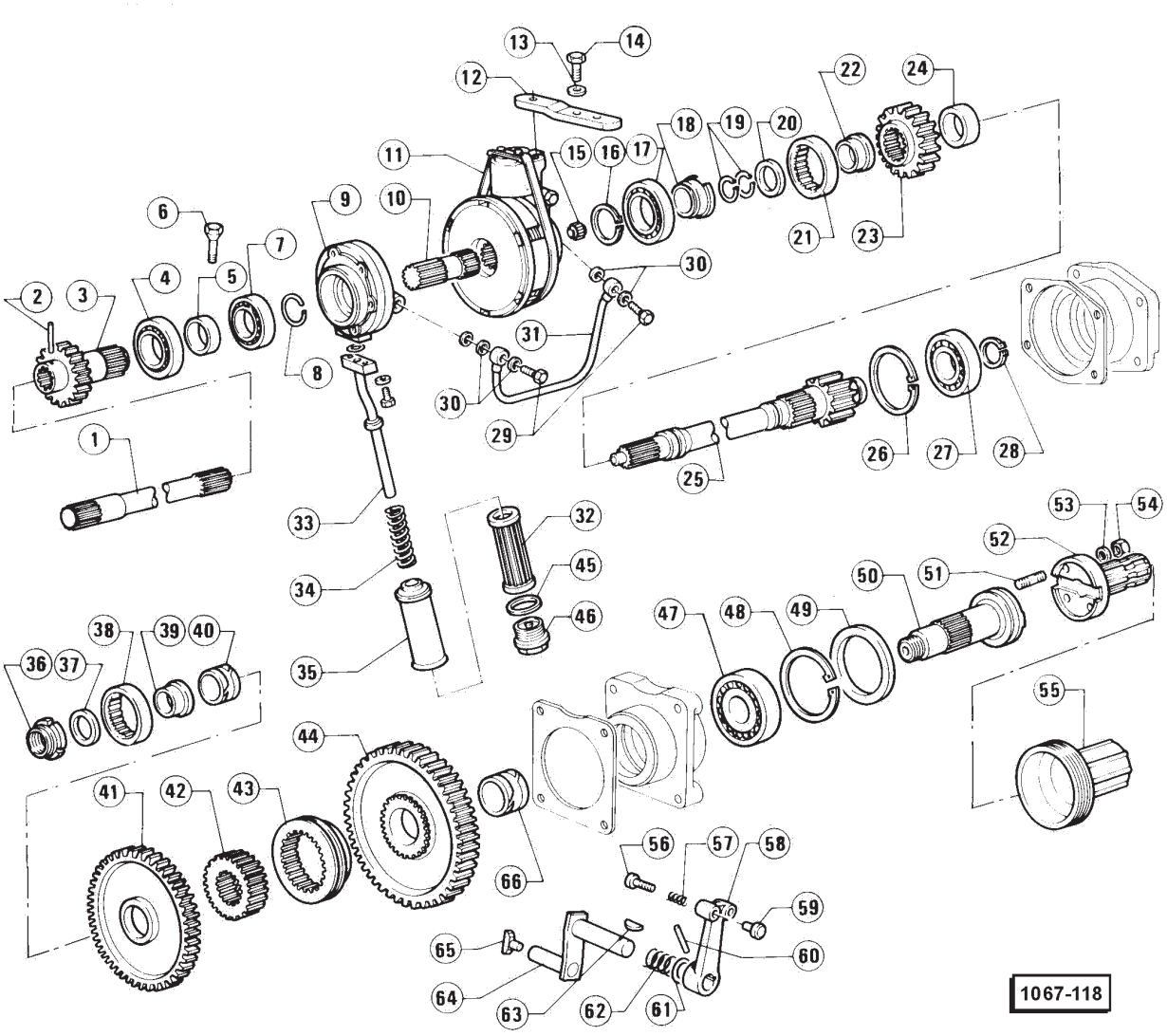
After having moved the back and front gearboxes, check that they work properly with the spring, roller and rod, checking that the coupling of the reductions is done smoothly and that the sleeves move along the whole of the coupling run.

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CLUTCH P. T.O. (For 130 - 150)

DISMOUNTING

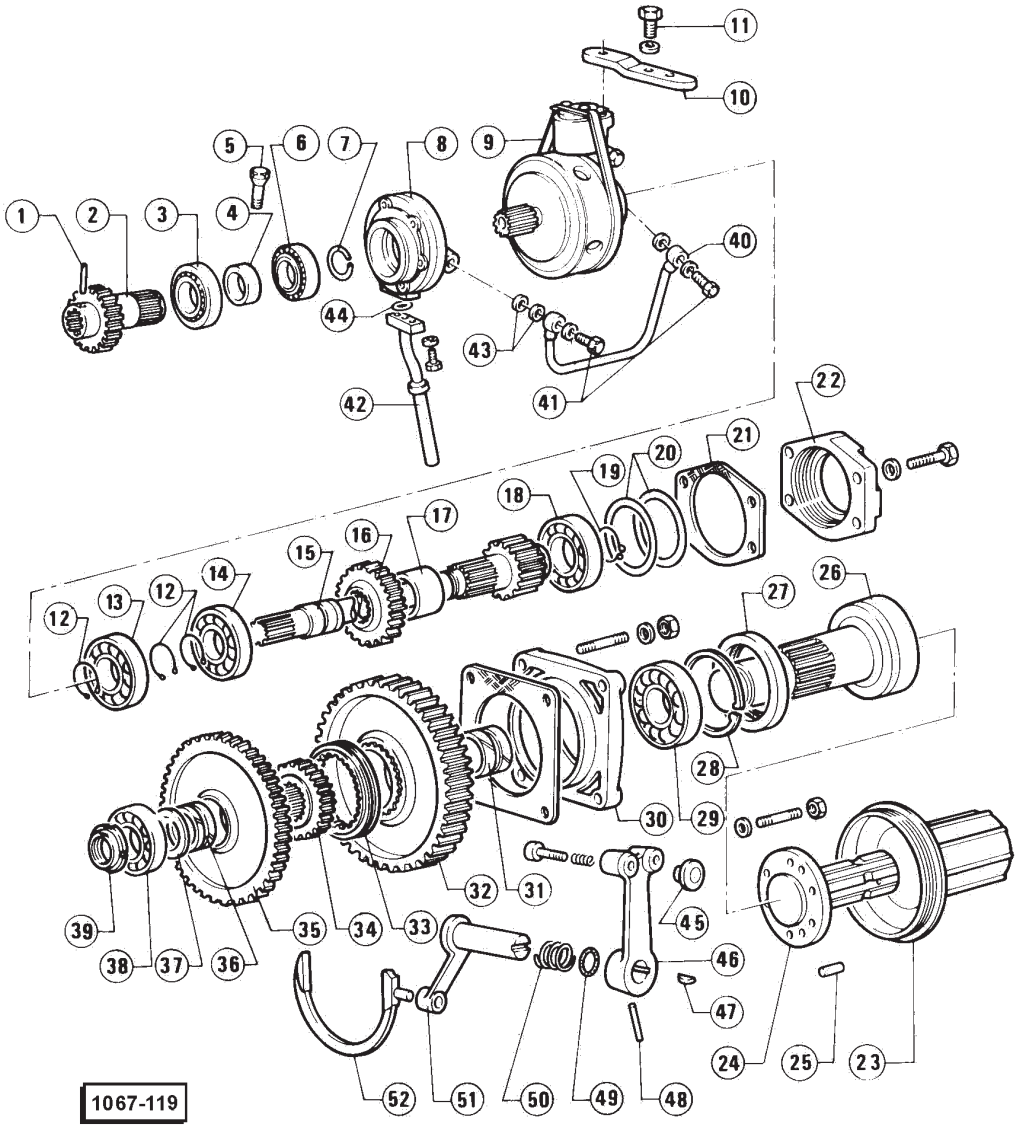


1 - P.T.O. Shaft
2 - Compression ring
3 - Pump support shaft
4 - Ball bearing
5 - Spacer
6 - Positioning screw
7 - Ball bearing
8 - Compression ring
9 - P.T.O. pump
10 - P.T.O. middle pump shaft
11 - P.T.O. clutch
12 - Registering bracket
13 - Washer
14 - Screw
15 - Retainer
16 - Seeger ring
17 - Ball bearingv
18 - Bush
19 - Seeger ring
20 - Shoulder ring
21 - Outside track and retainer
22 - Inside track
23 - Gear conduit
24 - Spacer
25 - P.T.O. main shaft
26 - Seeger ring
27 - Retainer
28 - Seeger ring
29 - Union
30 - Gasket
31 - Clutch pump pipe joint
32 - Pump filter
33 - Breather pipe
34 - Spring
35 - Filter container
36 - Ring nut
37 - Shoulder ring
38 - External track and retainer
39 - Internal track
40 - Bush
41 - Gear conduit
42 - Grooved bush
43 - Grooved sleeve
44 - Gear conduit
45 - Gasket
46 - Cap
47 - Ball bearing
48 - Seeger ring
49 - Seal ring
50 - P.T.O. counter shaft
51 - Studs
52 - P.T.O.
53 - Washer
54 - Nut
55 - P.T.O. protection
56 - Pin
57 - Spring
58 - P.T.O. speed insertion gear control
59 - Knob
60 - Compression ring
61 - O-ring
62 - Spring
63 - Tongue
64 - P.T.O. speed coupling lever
65 - Pad

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(For 110)



1 - Compression ring
2 - Connecting shaft
3 - Bearing
4 - Spacer
5 - Blocking screw
6 - Bearing
7 - Compression ring
8 - P.T.O. oil pump
9 - P.T.O. clutch
10 - Registering plate
11 - Screw
12 - Seeger ring
13 - P.T.O. front main shaft bearing
14 - P.T.O. counter shaft bearing
15 - P.T.O. main shaft
16 - Gear wheel
17 - Spacer
18 - Rear bearing
19 - Seeger ring
20 - Shim adjustment ring
21 - Cover gasket
22 - Cover
23 - P.T.O. protection hood
24 - P.T.O. grooved tang
25 - Reference pin
26 - Counter shaft
27 - Seal ring
28 - Seeger ring
29 - Bearing
30 - Flange bearing holder
31 - Bush
32 - Gearwheel
33 - Coupling collar
34 - Grooved sleeve
35 - Gearwheel
36 - Bush
37 - Shoulder ring
38 - Bearing
39 - Ring nut
40 - Oil delivery pipe
41 - Union
42 - Drag pipe
43 - Gasket
44 - Gasket
45 - Knob
46 - Control lever
47 - Key
48 - Pin
49 - Seal ring
50 - Spring
51 - Transmission lever
52 - Coupling fork

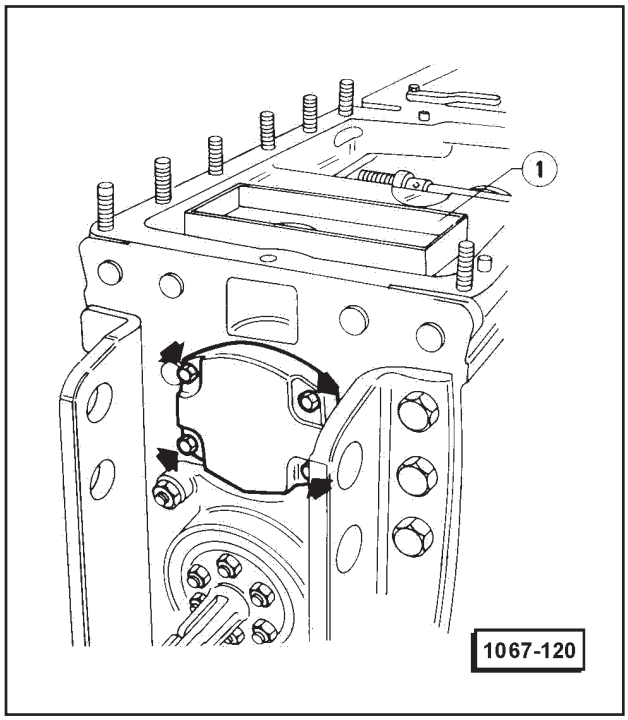
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WARNING
— **Always use a soft metal hammer and punch when it is necessary to tap on ferrous parts.**
— **During the dismounting of the gear package mark the order of the non symmetric parts.**

Preliminary operations

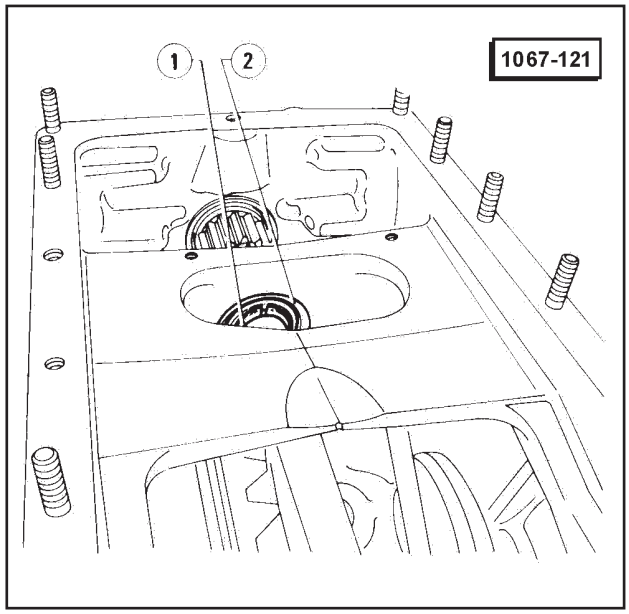
1. Remove the cover that mounts the hydraulic lifter pump and the hydraulic lifter (refer to: Lifting Group Lifting Housing - Removal).
2. Loosen the three screws fixing the rear P.T.O. protection drive shaft to the gearbox and remove it.
3. If mounted, remove the trailer hook after having taken out the fixing pins of the gearbox.
4. Remove the P.T.O. protection unscrewing it.
5. Loosen the two screws fixing the oil collector sump **1** of the hydraulic lifter and remove it lifting it up. Remove the spring found on the lower end of the sump.



1 - Hydraulic lifter, hydraulic oil sump

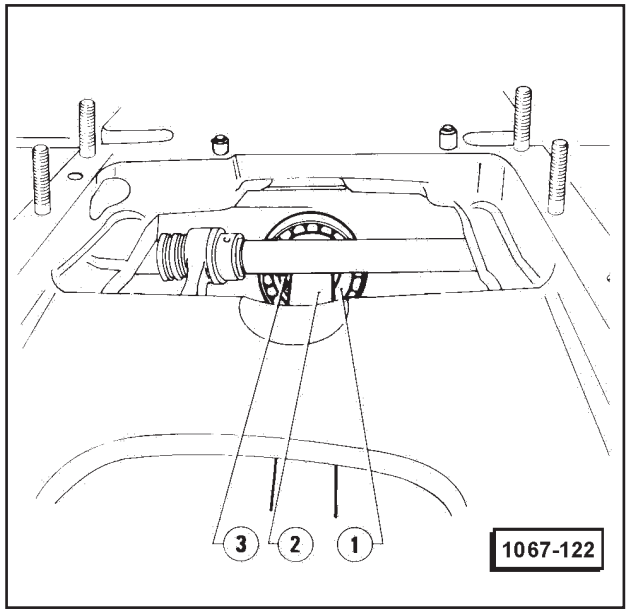
P.T.O. main shaft (For 130-150)

1. Referring to the previous diagram, loosen the four screws fixing the cover of the P.T.O. main shaft to the gearbox.
2. Remove the rear Seeger ring **1** positioning the middle bearing **2**.



1 - Rear Seeger ring
2 - Roller bearing

3. Turn the shaft **2** until the two wing nuts of the front Seeger ring **3** do not appear in the bush space.

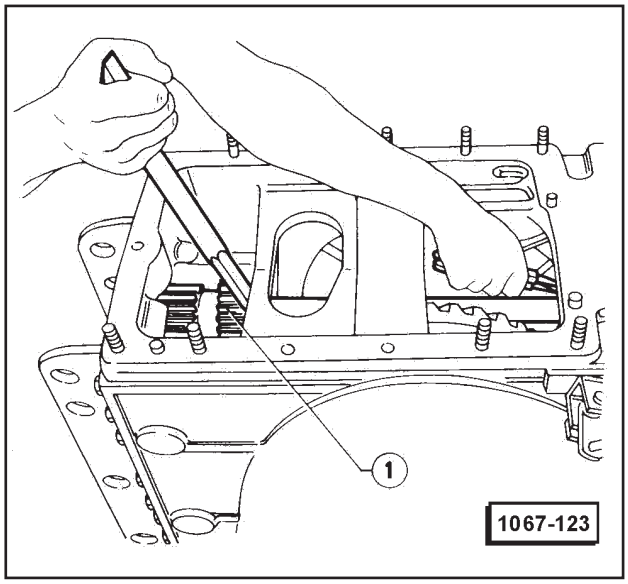


1 - Bush
2 - P.T.O. of main shaft
3 - Front Seeger ring

4. Working as illustrated, keep the front Seeger ring open with pliers and at the same time move the shaft backwards keeping the gearwheel **1** still.

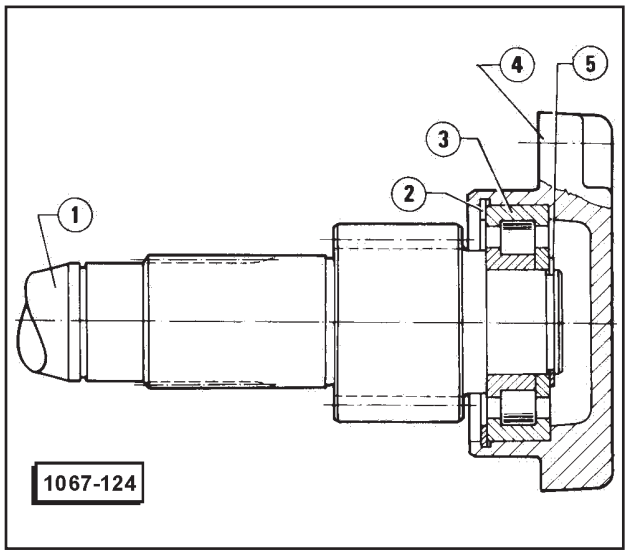
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1 - P.T.O. gearwheel

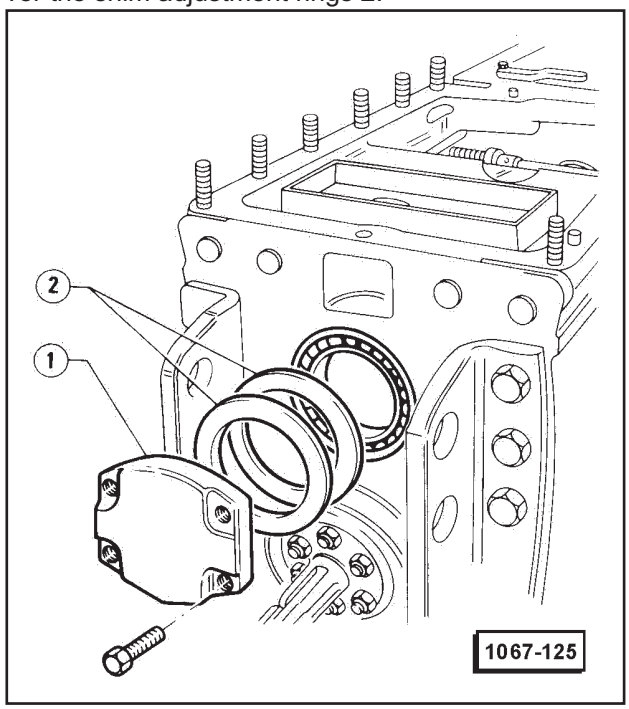
5. Remove the shaft from the gearbox collecting the rear Seeger ring, the internal ring of the middle bearing consisting of two parts, and the P.T.O. gearwheel.
6. If necessary, remove the bearing **3** using the following procedure.
(1) Remove the Seeger ring **2** then separate the shaft and bearing from the cover **4**.
(2) Block the shaft **1** in a vice with protective jaws and the Seeger ring **5**, and using hammer and punch give light taps on the inside bearing ring until you remove it.



1 - P.T.O. main shaft
2 - Seeger ring
3 - Roller bearing
4 - Cover
5 - Seeger ring

7. If necessary, remove the bearings still mounted in the gearbox; working on the external rings of the bearings.

For 110
1. Loosen the four screws fixing the cover **1** and recover the shim adjustment rings **2**.

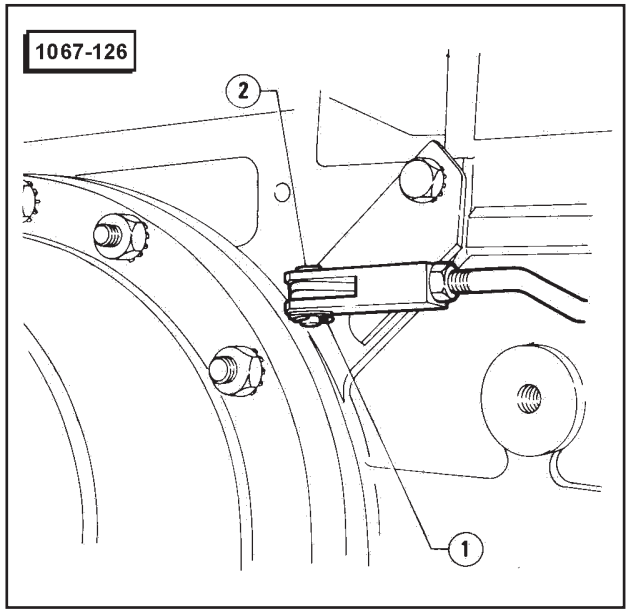


1 - P.T.O. main shaft cover
2 - Shim adjustment ring

2. Dismount the differential control lock working as follows.

Only for model 110

(1) Remove the split pin **1** that blocks the pin **2**.

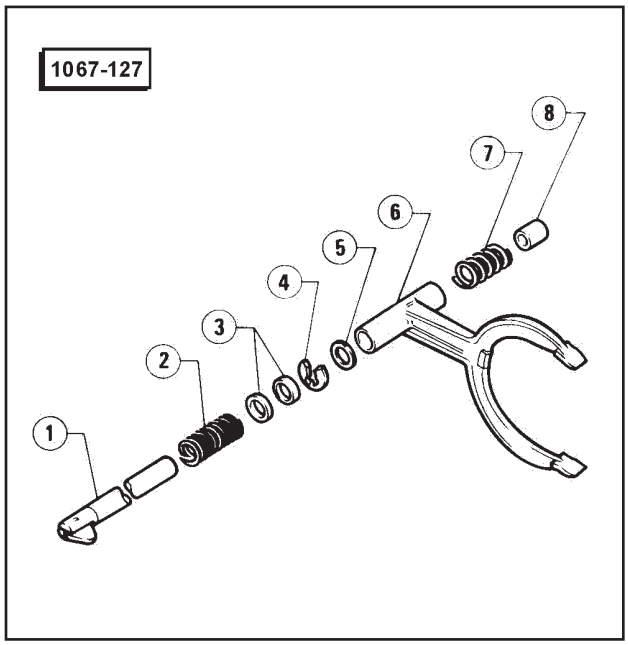


1 - Split pin
2 - Control plate pin

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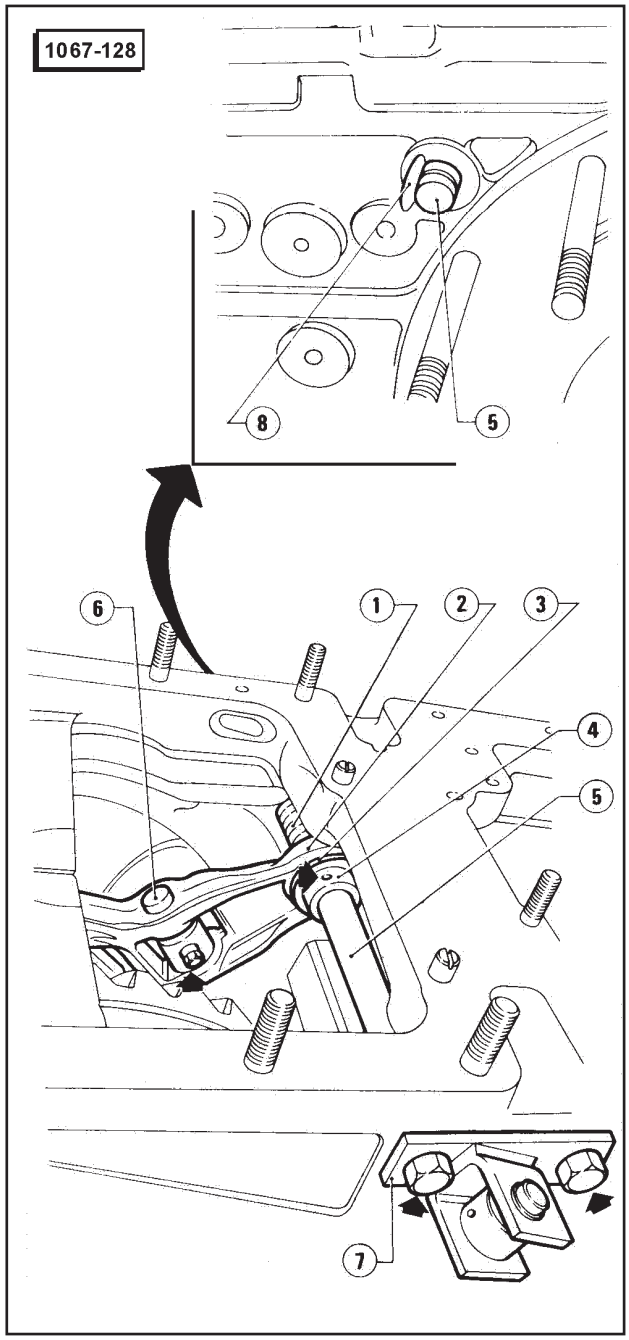
(2) Remove the compression ring **4** of the shaft **1**.
(3) Take out the shaft, collecting the bush **8**, the spring **7**, the fork **6**, the shoulder ring **5** the spacer **3** and the other spring **2**.



1 - Differential lock shaft
2 - Spring
3 - Spacer
4 - Compression ring
5 - Shoulder ring
6 - Fork
7 - Spring
8 - Bush

Only for models 110

(1) Loosen the two screws fixing the shaft **7** to the gearbox and remove it.
(2) Loosen the tapered screws fixing the pin **6** to the fork **2**.
(3) Remove the pin **6** taking it out before it comes completely out of the fork.
(4) Remove the pin fixing the stop ring **4** on the rod **5**. Collect the pin before it comes completely out of the ring.
(5) Take off, towards the right; the rod **5** and remove the spring **1**, the fork **2** (being careful of the pads which are loose) the shouldering **3** and the stop spring **4**.
(6) Take off towards the left, the rod **5** and tap lightly with a hammer until you completely remove the cover **8**. Recover the cover and extract the rod.

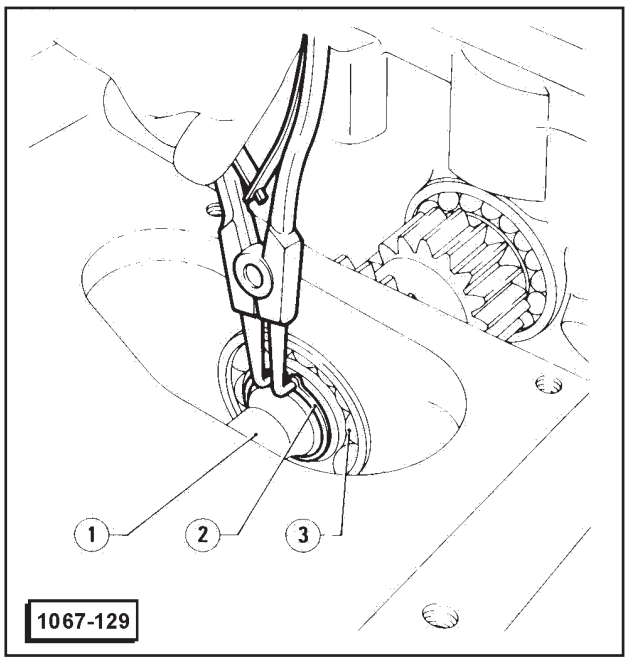


1 - Spring
2 - Fork
3 - Shouldering
4 - Stop pin
5 - Differential control rod lock
6 - Pin
7 - Bracket
8 - Cover

3. Open and take out the front Seeger ring **2** from the middle bearing **3** in order to allow the shaft **1** to move freely.

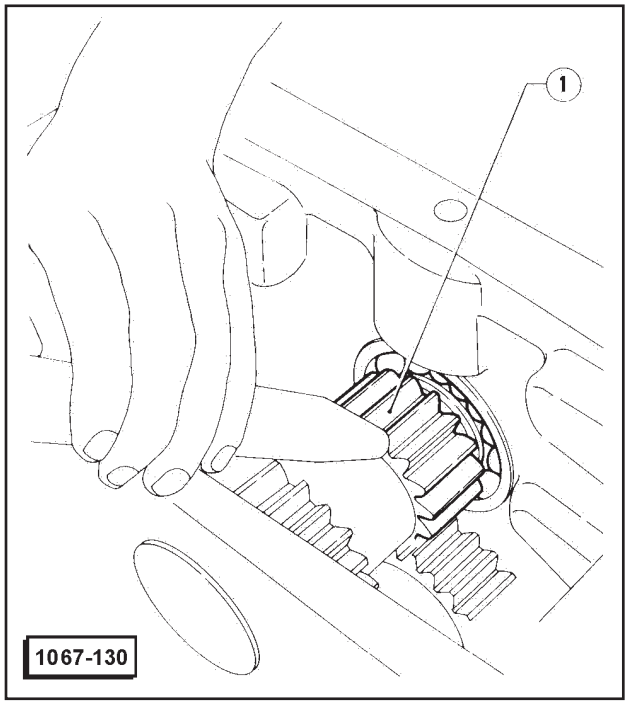
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1 - P.T.O. main shaft
2 - Front Seeger
3 - Middle bearing

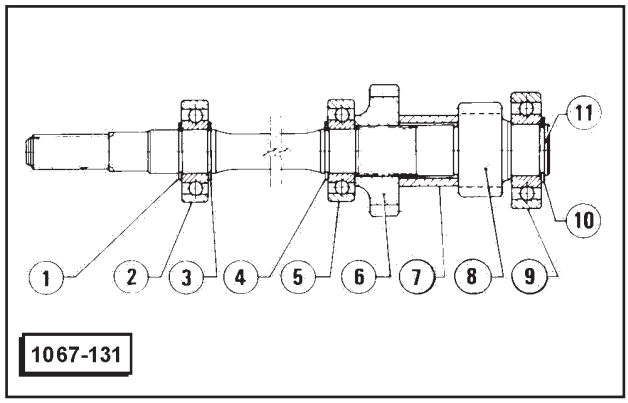
4. Tap on the rear gear wheel teeth **1** to extract the front and rear bearings from their seats.



1 - Rear crown wheel

5. After having partially removed the shaft remove the Seeger ring **1** of the front bearing **2**, take out the bearing and completely extract the shaft recovering the gear wheel **6** and the spacer **7**.
6. If necessary; work on the middle bearing **5** tapping on the outside ring until you extract it from its seat.

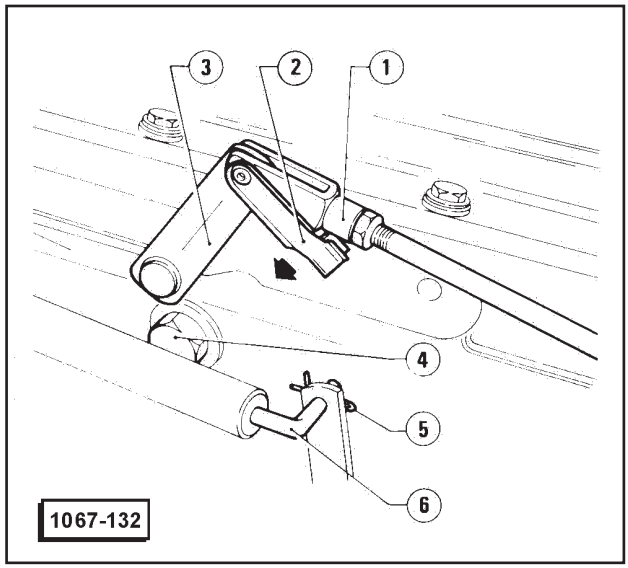
7. If necessary, change the rear bearing **9** open the Seeger ring **10** and take out the bearing from the P.T.O. main shaft **11**.



1 - Front bearing front Seeger ring
2 - Front bearing
3 - Rear bearing front Seeger ring
4 - Middle bearing front Seeger ring
5 - Middle bearing
6 - P.T.O. entry gear conduit
7 - Spacer
8 - P.T.O. gear exit
9 - Rear bearing
10 - Rear bearing Seeger ring
11 - P.T.O. main shaft

P.T.O. clutch pump

1. Turn the safety catch **2** downwards and unhook the clutch coupling rod **1** of the lever **3**.
2. Remove the split pin **5** and take out the spring **6** from the differential block coupling levers.
3. Remove the cap **4** containing the positioning pawl of the clutch coupling lever.

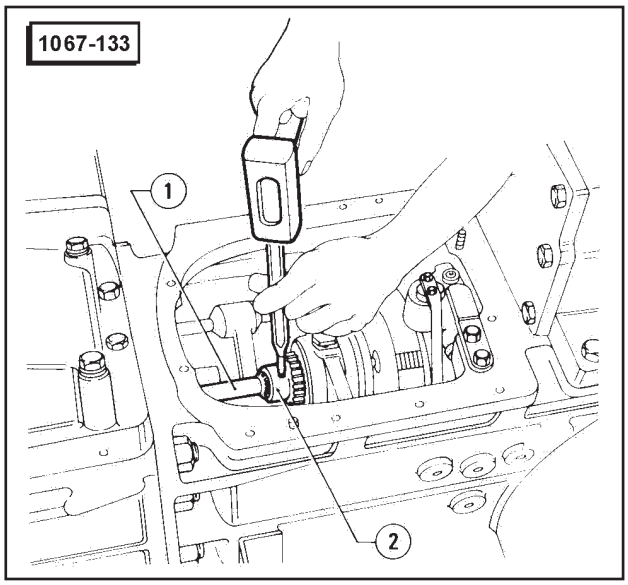


1 - Clutch coupling rod
2 - Safety clamp
3 - Clutch coupling lever
4 - Cap
5 - Split pin
6 - Reactor spring

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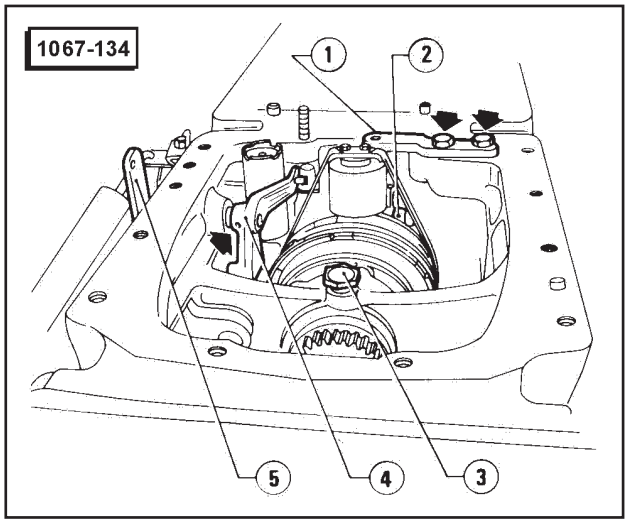
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4. Using a hammer and punch take out the pin fixing the P.T.O. Shaft **1** of the control shaft **2** of the pump. Unblock the shaft by lightly tapping with a hammer.



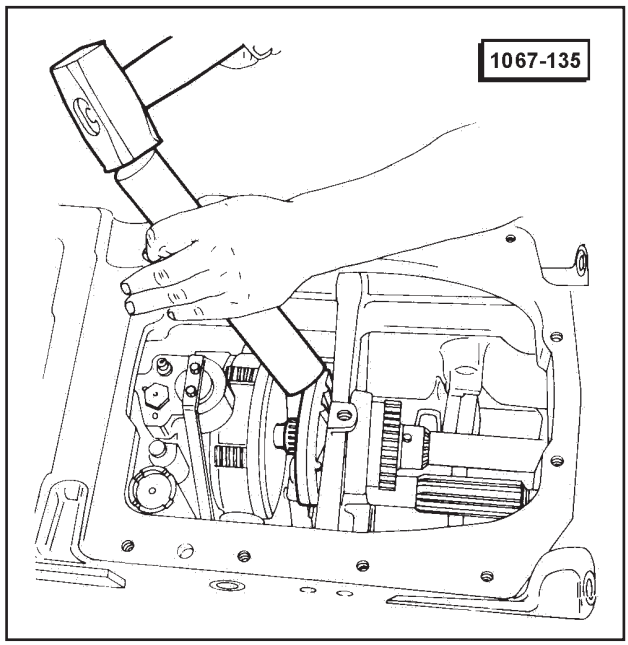
1 - P.T.O. shaft
2 - Pump control shaft
(Diagram VALEO Clutch 130 - 150)

5. Loosen the two screws fixing the plate **1** to the gearbox and remove it.
6. ERemove the pin fixing the fork **4** to the lever **5** of the clutch coupling.
7. Loosen the screw fixing the union **2** of the oil delivery pipe to the clutch. Disconnect the pipe from the clutch.
8. Loosen the positioning screw **3** of the shaft bearing of the P.T.O. pump.



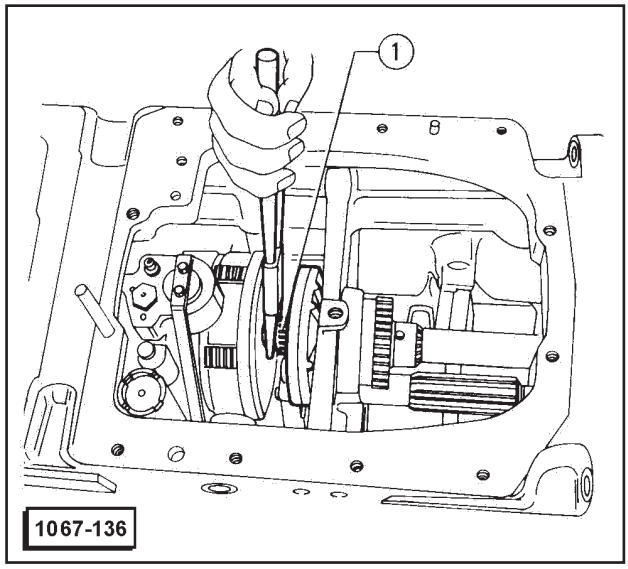
1 - Plate
2 - Union
3 - Bearing positioning screw
4 - Fork
5 - Clutch coupling lever
(Diagram VALEO Clutch 130 - 150)

9. As illustred, give light taps on the P.T O. pump until you push it against the shouldering of rear gearbox.



(Diagram: VALEO clutch 130 - 150)

10. Move the shaft back **1** until you free the clutch, and remove it.

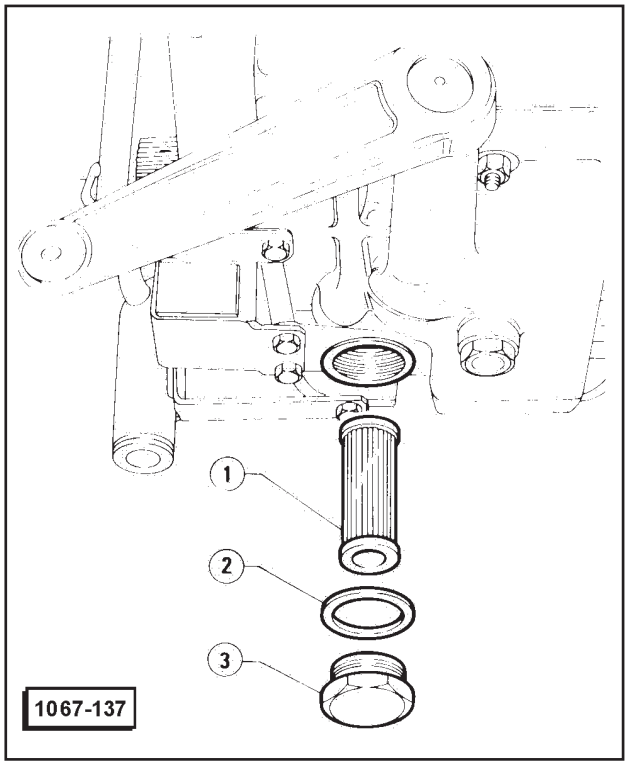


1 - P.T.O. clutch, pump pinion shaft
(Diagram VALEO models 130 - 150)

11. Take out the pump and if necessary remove the retainer mounted on the inside of the shaft, breaking it from the clutch shaft.
12. If necessary dismount the clutch (refer to: P.T.O. Clutch - Clutch - Dismounting).
13. Place a bowl under the differential box and loosen the cap 3. Remove the filter **1** of the P.T.O. pump.

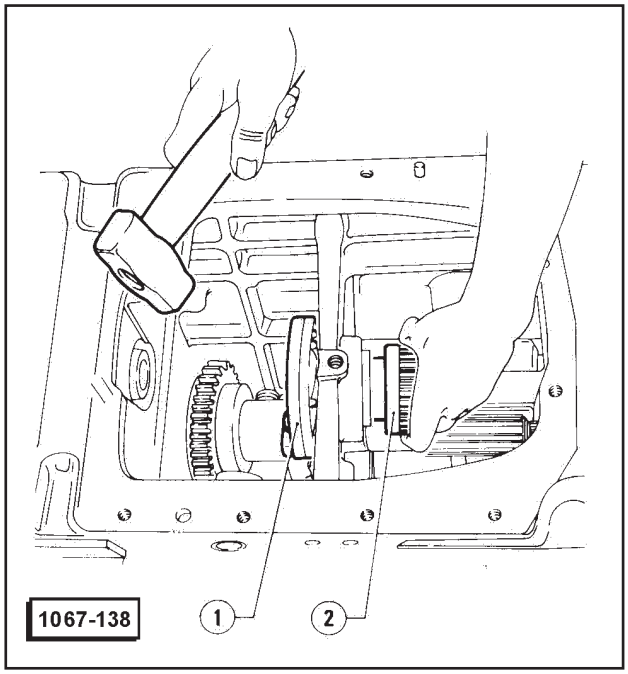
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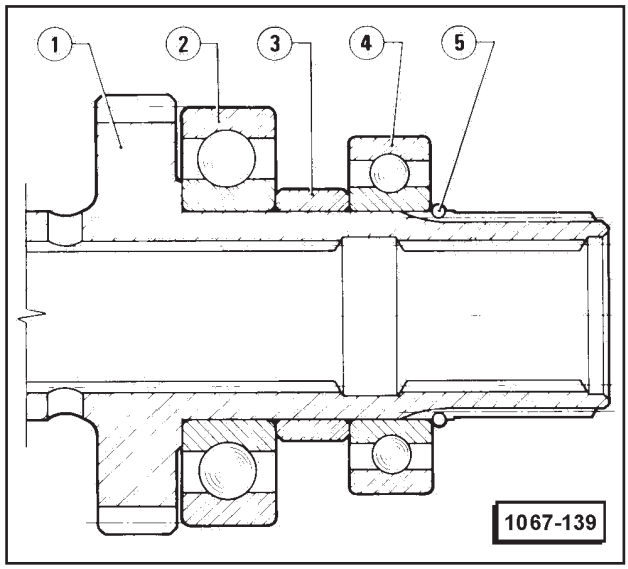
1 - Filter
2 - Gasket
3 - Cap

14. As illustrated, give light taps on the shaft **2** until you free the pump**1**. Remove the pump together with the filter casing.



1 - P.T.O. pump
2 - P.T.O. pump control shaft

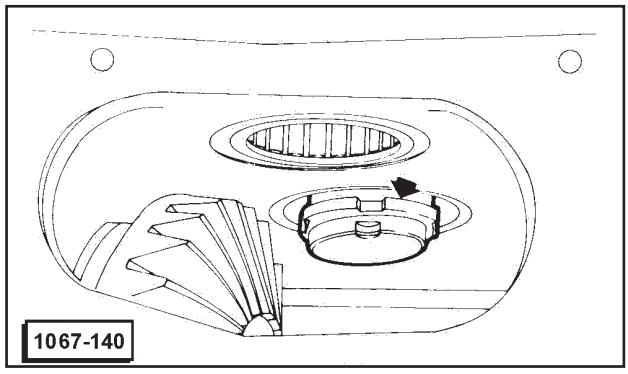
15. If necessary, dismount the pump (refer to: P.T.O. Clutch - Clutch Pump - Dismounting).
16. If necessary remove the pump control shaft and the bearings **2** and **4** using the following procedure.
(1) Remove the pump control shaft **1**.
(2) Fix the shaft on a vice with protective jaws and remove the compression ring **5**.
(3) Using a hammer and punch give light taps on the bearing ring **4** until you remove it. Proceed in the same way for the bearing **2**.



1 - P.T.O. pump control shaft
2 - Ball bearing
3 - Spacer
4 - Ball bearing
5 - Compression ring

P.T.O. counter shaft

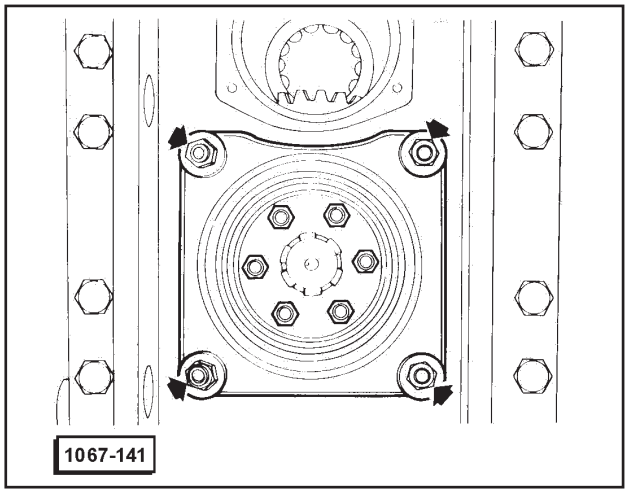
1. Loosen the fixing ring nut of the P.T.O. countershaft using a special spanner. Recover the ring nut and the spacer underneath.



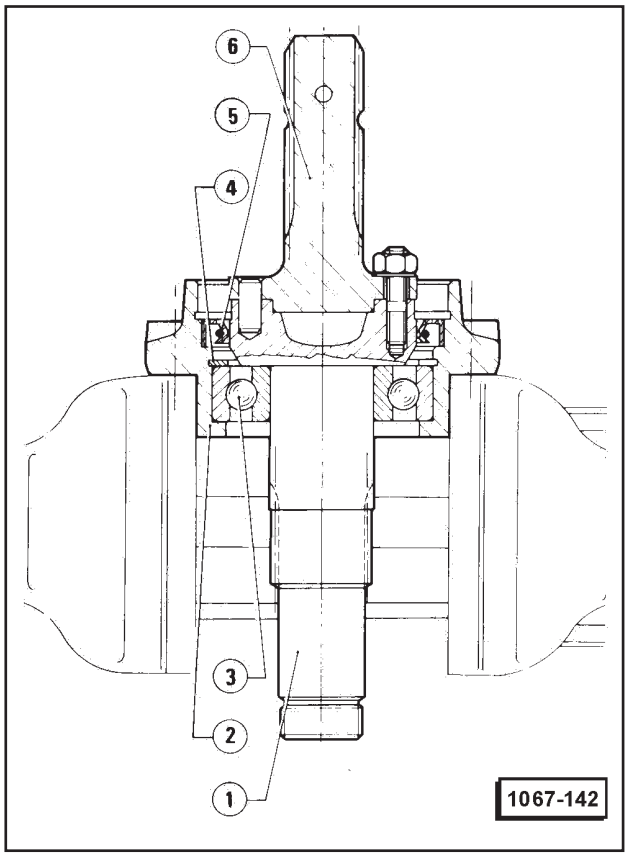
2. Loosen the four nuts fixing the rear flange support of the shaft. With the help of a lever, extract the flange complete with the shaft holding up the relative gear package.

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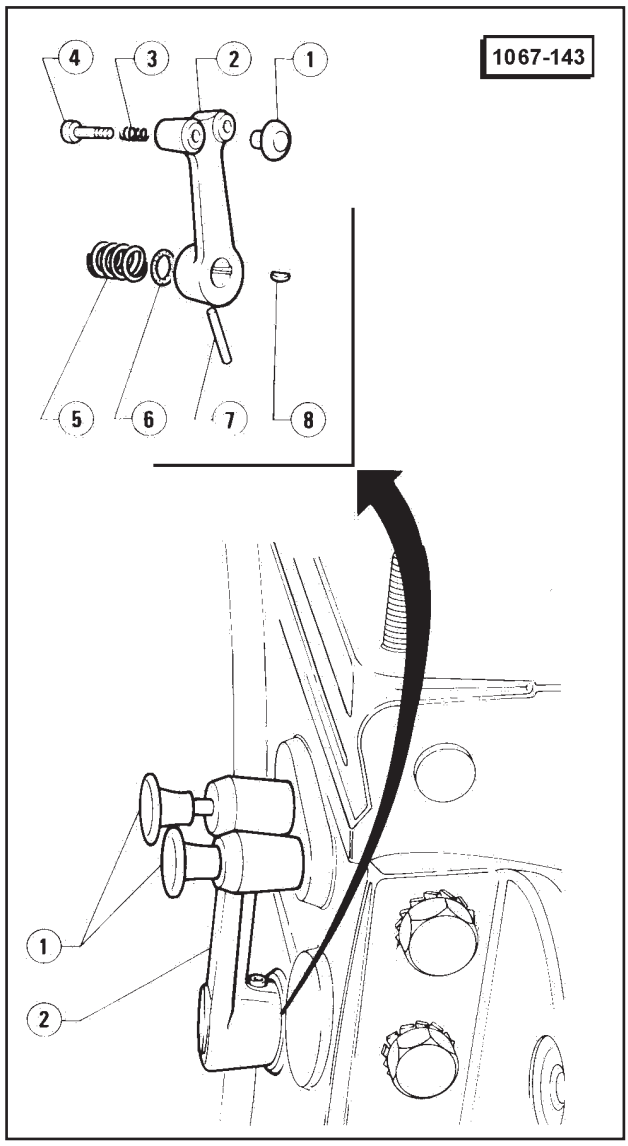


3. If necessary, take the counter shaft support flange to pieces using the following procedure:
(1) Fix the flange **2** on a vice with protective jaws and loosen the six fixing screws of the P.T.O. **6** of the shaft **1**. Remove the P.T.O.
(2) With the help of a hammer extract the shaft **1** of the flange **2**.
(3) Remove the compression ring **5** with a screwdriver.
(4) Remove the Seeger ring **4** and give light taps on the external bearing ring **3** until you remove it.



1 - P.T.O. counter shaft
2 - Shaft support flange
3 - Ball bearing
4 - Seeger ring
5 - Compression ring
6 - P.T.O.

4. If necessary, dismount the control coupling of the two P.T.O. speeds using the following procedure:
(1) Remove from the bottom towards the top; the pin **7** fixing the control lever **2** to the coupling lever. Remove the lever **2**, the tongue **8** underneath and, from inside the box, the coupling lever with the relative pad.
(2) Loosen the knobs 1 of the control lever and remove them together with the relative spindles **4** and springs **5**.



1 - Knob
2 - P.T.O. speed control lever
3 - Spring
4 - Spindles
5 - Spring
6 - O-ring
7 - Pin
8 - Tongue

CHECKS AND CONTROLS

Accurately wash the parts and carry out a careful check for eventual surface defects.

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Gears and grooves

1. Check that the 'teeth of the gearwheels and of the grooved shafts work on all sides. If you find gears that are irregularly worn or with chipped teeth you must change it, and verify that the gears they are coupled with are not damaged. Proceed in the same way with the grooved shafts.
2. Also check that the toothing under scrutiny is not split, does not stick or show signs of excessive wear. Change any parts that are no longer perfect.

Bushes

Check the wear of the bushes on the P.T.O. counter shaft, making certain that all the surfaces of the gears are not scratched nor show signs of sticking. Change the parts that are no longer perfect.

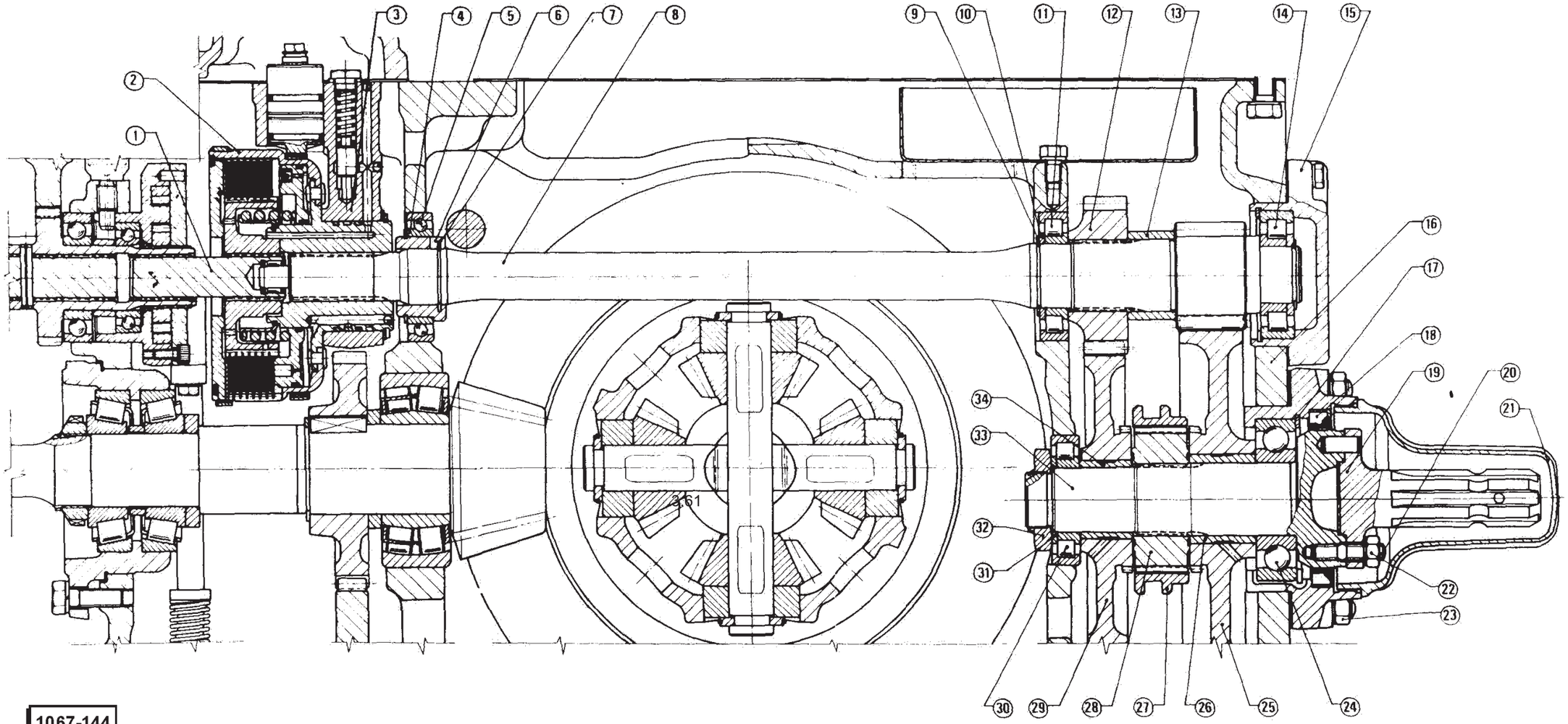
Bearings

1. Carefully examine the bearings turning them slowly, if a bearing is in good condition it should not vibrate, make noise or stick.
2. Examine all rings and moving part surfaces, making certain that they are not scratched, dented, or show signs of rubbing from foreign bodies. Change any parts that are no longer perfect.

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REMOUNTING (For 130 - 150)



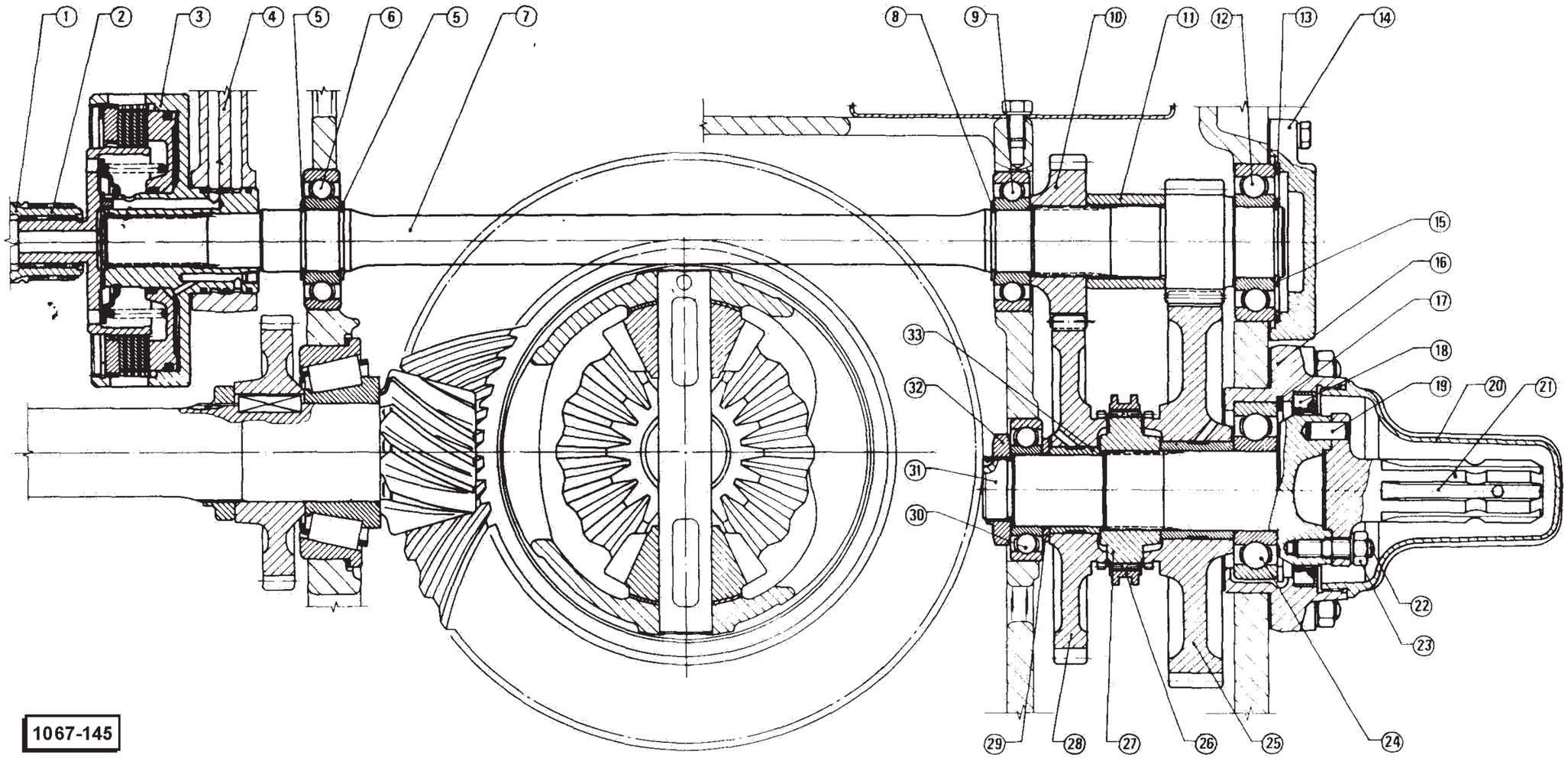
1067-144

1 - Reduction gear shaft
2 - P.T.O. clutch bell
3 - Distributor
4 - Seeger ring
5 - P.T.O. front main shaft bearing
6 - Bush
7 - Seeger ring
8 - P.T.O. main shaft
9 - Seeger ring
10 - Shoulder ring
11 - Bearing
12 - Gear
13 - Spacer
14 - Bearing
15 - P.T.O. main shaft cover
16 - Flange
17 - Seeger ring
18 - Seal ring
19 - P.T.O. grooved tang
20 - Stud
21 - P.T.O. protection tang
22 - P.T.O. tang fixing nut
23 - Flange fixing nut
24 - Bearing
25 - Gear
26 - Bush
27 - Coupling collar
28 - Toothed hub
29 - 1000 rev gear
30 - Bearing
31 - Shoulder ring
32 - Ring nut
33 - P.T.O. counter shaft
34 - Bush

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For 110



1067-145

1 - Reduction gear shaft
2 - P.T.O. clutch hub
3 - P.T.O. clutch bell
4 - Distributor
5 - Seeger ring
6 - P.T.O. front main shaft bearing
7 - P.T.O. main shaft
8 - Seeger ring
9 - P.T.O. main shaft middle ring
10 - Gear
11 - Spacer
12 - P.T.O. rear main shaft bearing
13 - Shims
14 - P.T.O. main shaft cover
15 - Seeger ring
16 - Flange
17 - Seeger ring
18 - Seal ring
19 - Reference pin
20 - Tang protection
21 - Grooved tank
22 - Stud
23 - P.T.O. tang fixing nut
24 - Bearing
25 - Gearwheel
26 - Coupling collar
27 - Toothed hub
28 - Gearwheel
29 - Shoulder ring
30 - Bearing
31 - P.T.O. counter shaft
32 - Ring nut
33 - Bush

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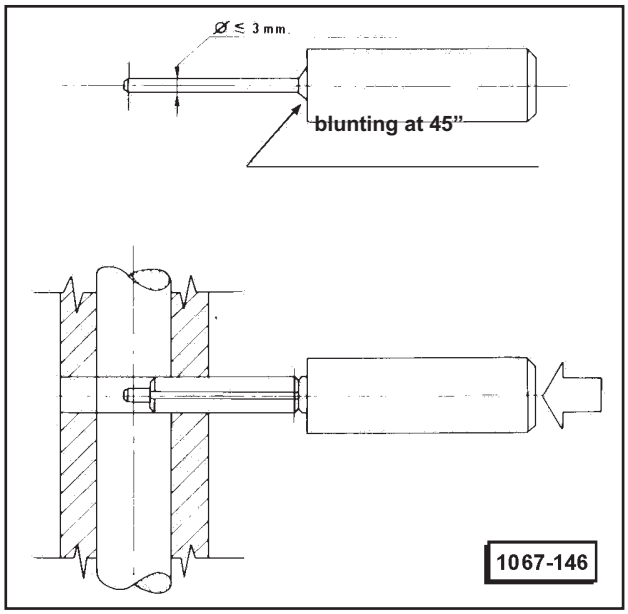
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REMOUNTING

Remount the P.T.O. working in the reverse order paying attention to the mounting order of the non symmetrical parts referring to the previous figure and adhering to the following:

CAUTION

— **Pay attention when inserting the lock pins that you don't bend them. Use a special tool operating as shown in the figure.**

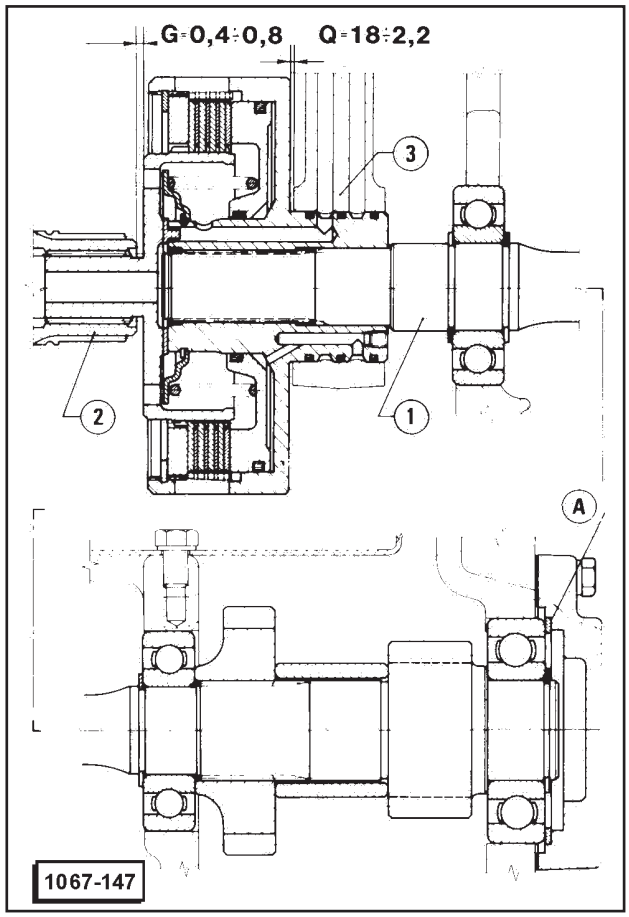


— **On remounting, change all the seal rings, the gaskets and the O-rings, lubricating them with prescribed grease.**
— **Apply the prescribed fixative on all the seal rings with metal on the outside.**
— **Lubricate the parts with a film of prescribed grease before mounting them on their respective shafts.**
— **To make more simple the remounting use the prescribed grease to maintain in position the components.**
— **It is advisable to use two operators when mounting the shafts.**
— **Pay particular attention to the order when remounting the parts and refer to the enlarged figure on page 51 and 52 and to the technical drawing.**
— **If dismounted, remount the coupling lever of the two P.T.O. speeds, before mounting the counter shaft.**
— **Block the two screws fixing the clutch positioning plate with some prescribed fixative.**
— **Tighten the fixing ring nut of the counter shaft to the prescribed torque.**

Tightening torque
P.T.O. countershaft gearwheel pack, fixing ring nut
422 ÷ 441 - Nm
(43 ÷ 45 - Kgm; 310.90 to 325.35 ft lb)

ADJUSTMENTS

Verify that play "G" between the rear shaft of the P.T.O. **1** and the front shaft **2** is within the values **0.4 to 0.8 mm** (0.0157 to 0.0314 in). If it is greater or less, add or remove shims from the package placed in "A" under the rear cover. Adjust the position of the manifold **3** (refer to: P.T.O. Clutch – Adjustments. Play adjustment between the manifold and the clutch body). Check that the reading "Q" is equal to **1.8 to 2.2 mm** (0.0708 to 0.0866 in).



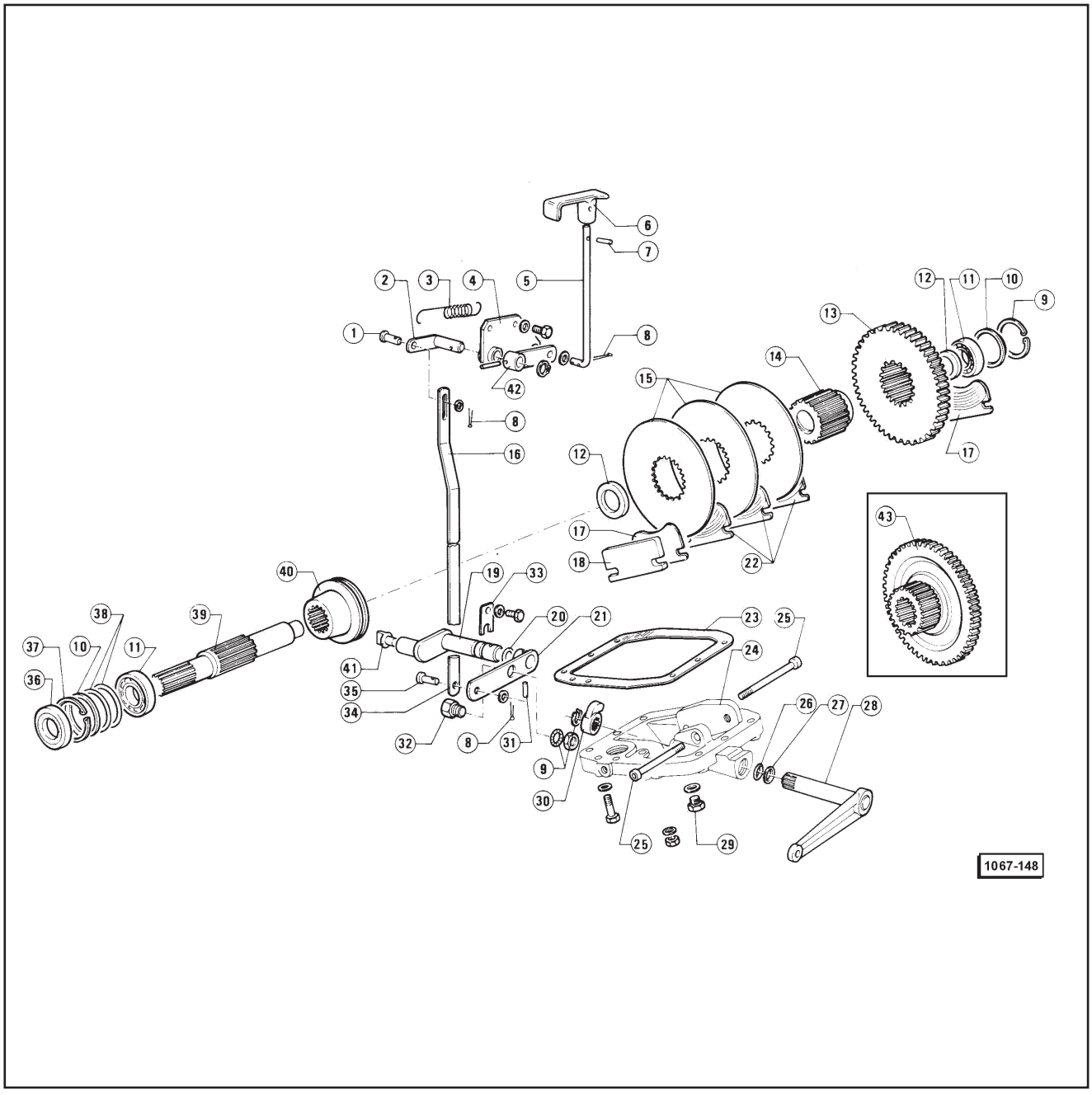
1 - P.T.O. rear shaft
2 - P.T.O. front shaft
3 - Manifold

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SHAFT P.T.O. FOR FRONT TRACTION (For 130 - 150)

DISMOUNTING



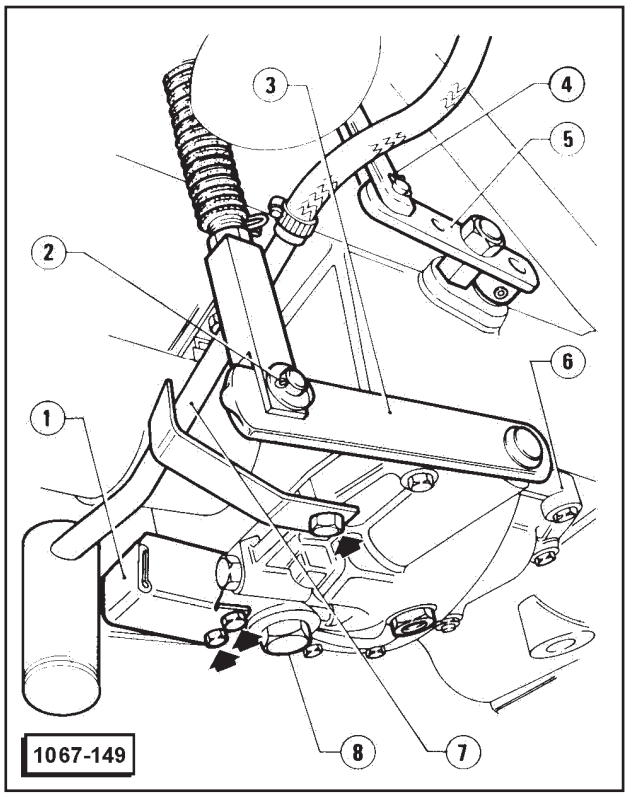
1 - Pin
2 - Return control lever
3 - Spring
4 - Bracket
5 - Front drive control rod
6 - Knob
7 - Lock pin
8 - Split pin
9 - Seeger ring
10 - Cover
11 - Tapered roller bearing
12 - Spacer
13 - Gear wheel
14 - Grooved bush
15 - Disc
16 - Return control rod
17 - Single pad
18 - Shoe
19 - Front drive coupling lever
20 - O-ring
21 - Front drive control lever
22 - Double pad
23 - Gasket
24 - Lever cover
25 - Socket head screw
26 - O-ring
27 - Gasket
28 - Parking brake control lever
29 - Oil drain plug
30 - Parking brake coupling lever
31 - Pin
32 - Adjusting nut
33 - Positioning plate
34 - Washer
35 - Pin
36 - Seal ring
37 - Seeger ring
38 - Shims
39 - Shaft
40 - Sleeve
41 - Pad
42 - Return control lever
43 - Gear wheel

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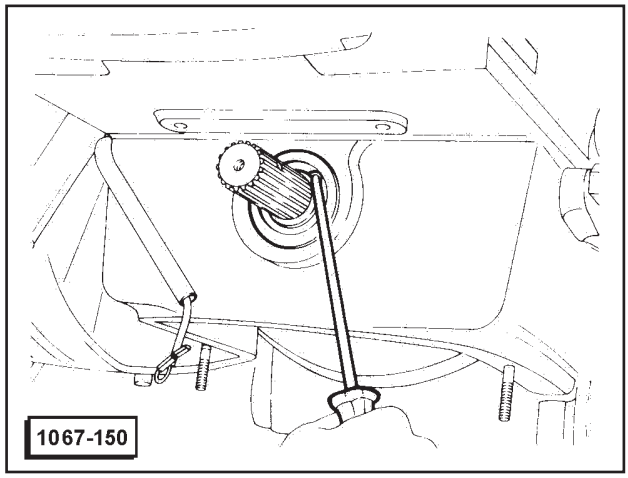
CAUTION
Always use a soft metal hammer when working on ferrous metals.

1. Stop the tractor on the flat with the gear in neutral and place a suitable container under the differential box to collect the oil.
2. Remove the transmission shaft (refer to: Engine Removal and Replacing - Preliminary Operations Step 2.).
3. Remove the split pin **2** and take out the pin joining the parking brake control lever **3** and the relative rod.
4. Remove the split pin and take out the pin connecting the front injection lever **5** to the relative rod.
5. Loosen the cap **8** placed in the cover **24** of the parking brake and wait for the oil to drain out.
6. Loosen the screw fixing the combustion by-pass pipe support **7** to the cover and lower it.
7. Loosen the two screws fixing the P.T.O. pump filter block sensor protection **1** and remove it. Disconnect the sensor cables.

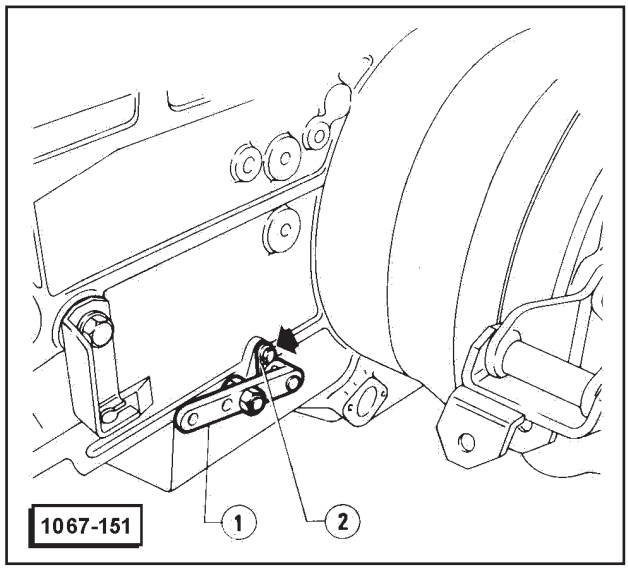


1 - P.T.O. pump filter blocking sensor protection
2 - Split pin
3 - Parking brake control lever
4 - Split pin
5 - Front drive injection lever
6 - Cover
7 - Combustion by-pass pipe
8 - Oil drain plug

8. Loosen the seven screws and the two nuts fixing the cover to the gearbox. Remove the cover carefully, recovering the P.T.O. pump filter, its protection and its spring.
9. With the help of a screwdriver, take out the seal ring from the front P.T.O. shaft.



10. Remove the Seeger ring, the spacer and the shims underneath the seal ring, being careful to accurately separate the shims for their eventual remounting.
11. Loosen the screws fixing the positioning plate **2** of the lever **1.** Partially extract the lever.



1 - Front drive injection control lever
2 - Positioning plate lever

12. Remove the P.T.O. shaft working as follows.

Only for 110

(1) With the help of a lever move the shaft forwards until you free the external ring of the bearing **5.**

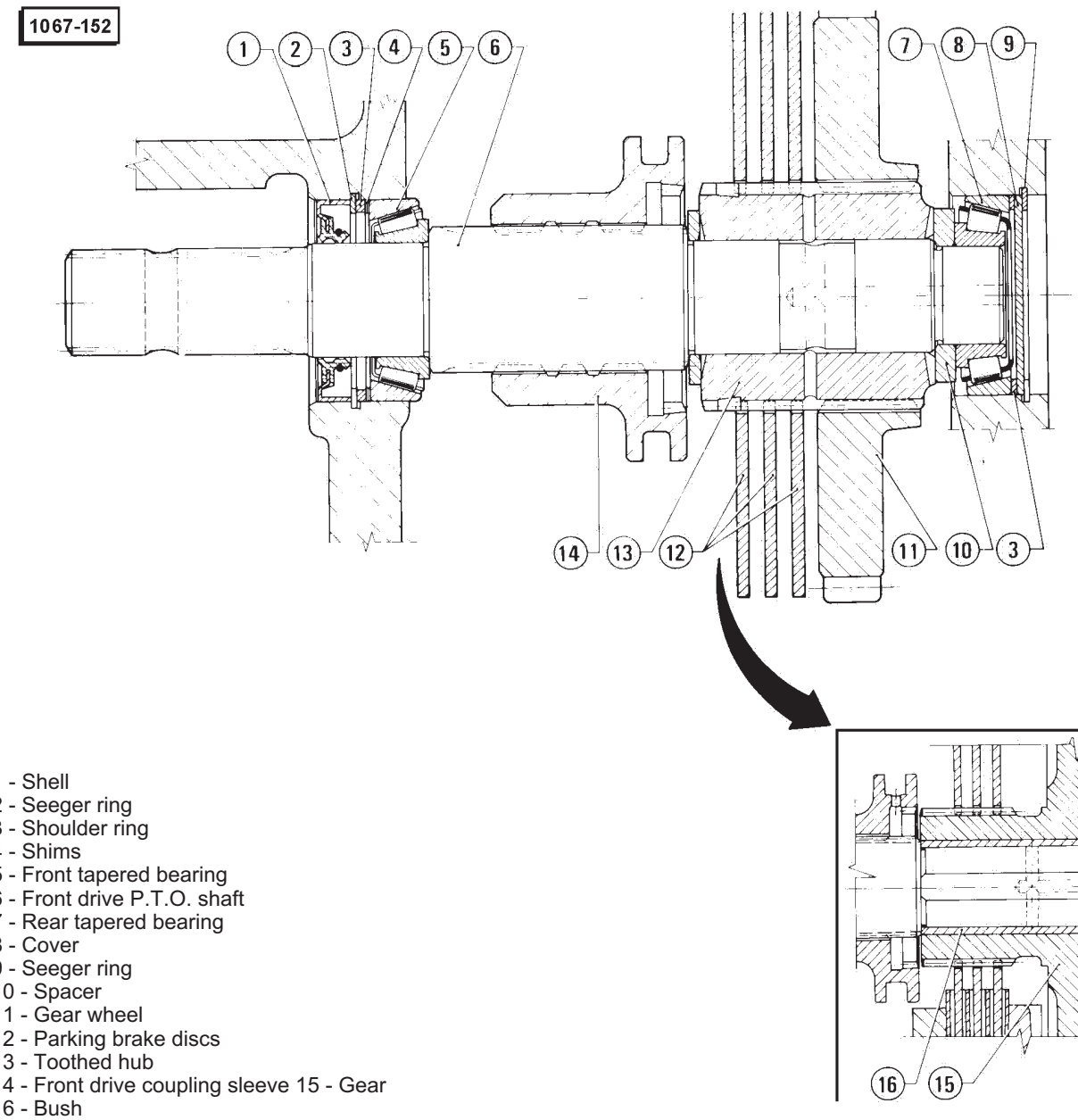
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(2) Remove the bearing **7** from the shaft then take out the shaft keeping the gear wheel **11** the three discs **12** the toothed hub **13** and the sleeve **1**, separate.
(1) With the help of a lever move it forwards until you free the external bearing ring.
(2) Remove the bearing **5** from the shaft **6** then take out the shaft holding the gear wheel **11** with the respective bush **14** the three discs **12** and the sleeve**13**.

CAUTION
Take care when removing the shaft not to damage the tracks and the tapered bearing seats.

13. If necessary, fix the shaft in a vice with protective jaws and lightly tap with a hammer and punch on the internal ring until you remove the bearing **5** from the shaft **6**.
14. To remove the external bearing ring **7** it is necessary to remove the Seeger ring **9** and the cover **8** found on the inside of the differential box (refer to: Rear Gear Box - Differential P.T.O - Removal) then remove the external ring.



1 - Shell
2 - Seeger ring
3 - Shoulder ring
4 - Shims
5 - Front tapered bearing
6 - Front drive P.T.O. shaft
7 - Rear tapered bearing
8 - Cover
9 - Seeger ring
10 - Spacer
11 - Gear wheel
12 - Parking brake discs
13 - Toothed hub
14 - Front drive coupling sleeve 15 - Gear
16 - Bush

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15. If you have to remove the coupling lever of the front drive, refer to the enlarged diagram on page 64 and take out the pin **31** fixing the control lever **21** to the coupling lever **19** then remove the two levers, collecting the pad **41**.
16. If necessary, change the pads of the parking brake (refer to: Brakes - Parking Brake - Removal).

CHECKS AND CONTROLS NOTE

NOTE
Accurately clean the parts and check them for defects.

Gears and grooves

1. Check that the gear teeth of the grooved shaft and the grooved sleeve work on all sides. If you find irregular or chipped teeth you must change the gear and then check that the gear with which it is paired is not damaged. Carry out the same check on the shaft grooves and the sleeve.
2. Verify that the teeth are free from splits, signs of seizing or excessive wear. Change any parts that are not perfect.

Bearings

Examine all the surfaces of the rings and other turning parts to make certain that they are not scratched, dented, show signs of rubbing from foreign matter. Change any parts that are imperfect.

Discs

Check the wear of parking brake discs making certain that all areas work with the pads and don't show signs of scratching or sticking. Change any that do.

Pads

Measure the thickness of pads and check that they have no signs or irregular wear. If the thickness of the pads is less than that given in Brakes - Parking Brake - Technical Data and Prescriptions, change all of them.

REMOUNTING NOTE

NOTE
— Change the seal rings, gaskets and O-rings on remounting, and lubricate them with prescribed grease.
— To make remounting easier, it is advisable to use sufficient grease to keep the parts in place.
— Pay particular attention to the order of mounting the parts referring to the enlarged diagram on page 64 and the technical drawings on page 66.

1. Referring to the enlarged figure on page 64, if previously dismounted, remount the Seeger ring **9** cover **10** and the external ring of the tapered bearing.
2. Mount the front drive coupling lever **21** and the relative control working in reverse order.
3. Remount the shaft working in the reverse order and adhering to the following instructions.

With reference to the technical figure on page 66.

— Turn the grooved sleeve **14** with the blunt teeth towards the front.
— Place the shim package **4** between the shoulder ring **4** and the tapered roller bearing **5** so as to make the Seeger ring mounting easier **2**.
— Check that the bearings turn freely in their seats.
— Mount the seal ring 1.

With reference to the technical figure on page 64.

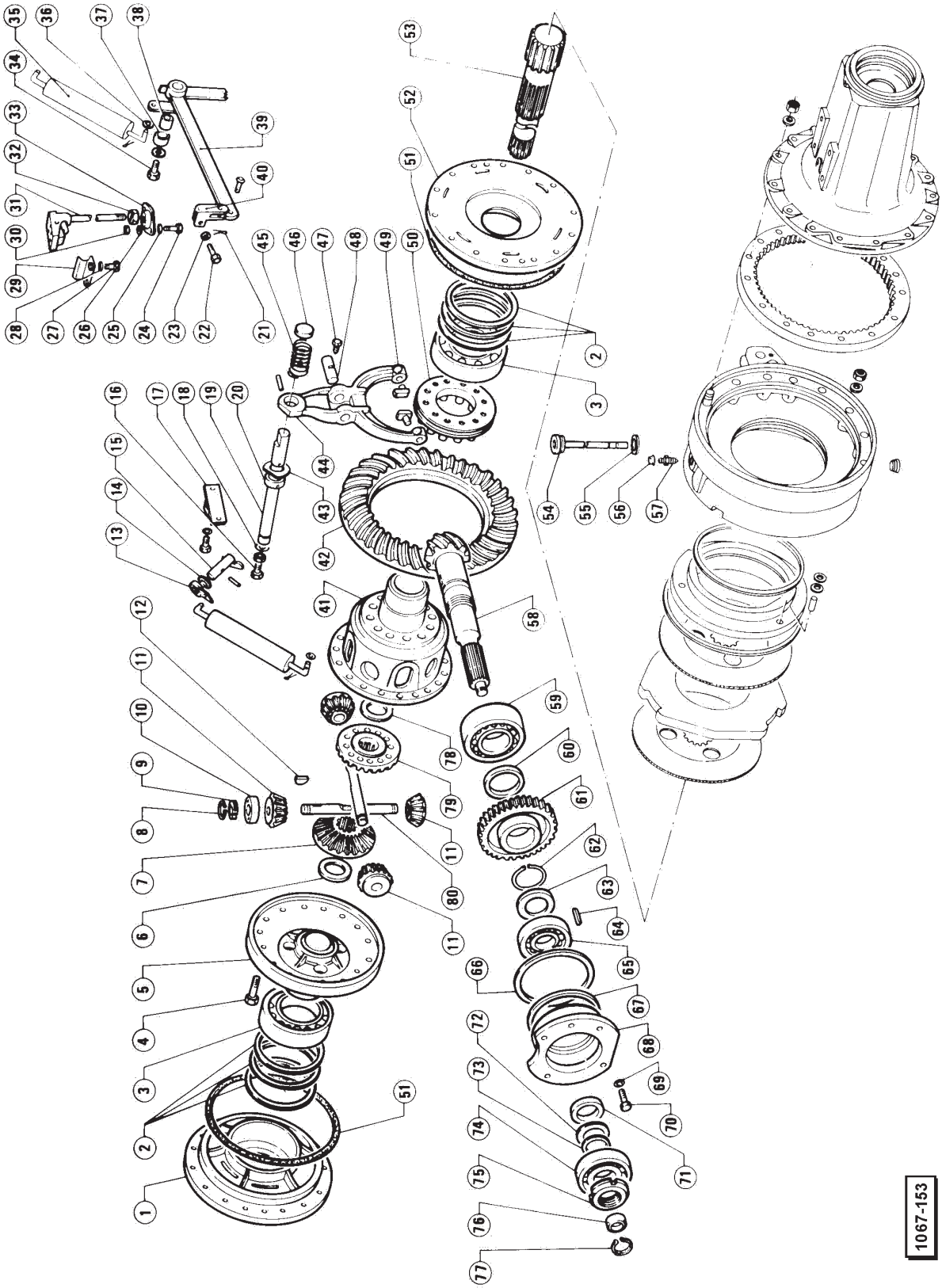
4. Check that, by working on the lever **21** you have a complete coupling - and disengaging of the front drive using the sleeve **40**. If this does not occur, loosen the eccentric nut **32** regulating it until you arrive at the correct control working, then block the position using the relative lock nut.
5. Remount the pad housing cover working in the reverse order taking care until the discs **15** and the gears **13** are alternated with the pads correctly.

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CROWN GEAR AND PINION (For 130 - 150)

DISMOUNTING



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1 - Flange
2 - Differential shaft adjusting shims
3 - Tapered roller bearing
4 - Differential half box fixing screw
5 - Differential half box
6 - 5th wheel
7 - Crown wheel
8 - Seeger ring
9 - Half ring shouldering
10 - Centering bush
11 - Side pinion
12 - Key
13 - Differential lever control block
14 - Bush
15 - Pin
16 - Screw
17 - Support
18 - O-ring
19 - Differential rod block
20 - Stop ring
21 - Split pin
22 - Screw
23 - Washer
24 - Screw
25 - Washer
26 - Washer
27 - Screw
28 - Washer
29 - Bracket
30 - Nut
31 - Differential control rod lever
32 - Nut
33 - Support
34 - Screw
35 - Shock absorber
36 - Washer
37 - Bush
38 - Spacer
39 - Return rod control
40 - Fork
41 - Differential control rod cover
42 - Crown wheel
43 - Shouldering
44 - Fork
45 - Spring
46 - Cover
47 - Tapered screw
48 - Pin
49 - Pad
50 - Differential blocking screw
51 - O-ring
52 - Flange
53 - Reduction shaft
54 - Oil dip stick
55 - Gasket
56 - Cap
57 - Grease nipple
58 - Pinion
59 - Barrel roller bearing
60 - Spacer
61 - Gearwheel
62 - Seeger
63 - Spacer
64 - Key
65 - Tapered roller bearing
66 - Shim
67 - Shim
68 - Support flange pinion
69 - Washer
70 - Screw
71 - Spacer
72 - Shim
73 - Shim
74 - Tapered roller bearing
75 - Ring nut
76 - Roller bearing
77 - Seeger
78 - 5th wheel
79 - Block able crown wheel
80 - Side pinion shaft

CAUTION
— **Always use a soft metal hammer and punch when you have to tap on ferrous metal parts.**
— **During the dismounting of the gearwheel package, mark the order of mounting of non symmetrical parts.**
— **Two operators are necessary to carry out the following operations.**

1. Separate the two gearboxes (refer to: Preliminary Operations).
2. Remove the hydraulic lifting gearbox (refer to: Lifting Group - Lifting Housing - Removal).
3. Remove the epicycle reduction gear (refer to: Epicyclic Reduction Gear - Removal).
4. Remove the P.T.O. (refer to: P.T.O. - Dismounting).
5. Remove the axle shaft bell support (refer to: Preliminary Operations).

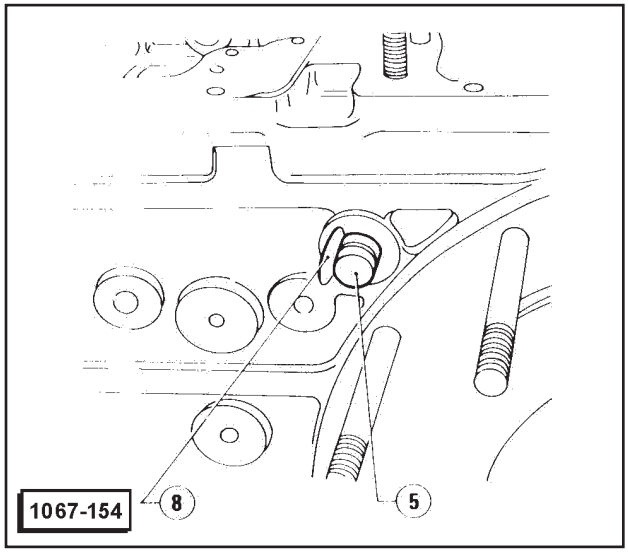
WARNING
During the removal of the bells take care that the differential box remains well balanced on the stands that are holding it up.

6. Remove the rod and differential blocking control using the following procedure.
(1) Loosen the screws fixing the bracket **7** to the box and remove it.
(2) Loosen the tapered screw fixing the pin **6** to the fork **2**.
(3) Remove the pin **6** being careful to remove it before it is completely out of the fork.
(4) Remove the pin fixing the stop ring **4** to the rod **5**. Recover the pin before it comes completely out of the ring.
(5) Take out the rod **5** towards the right hand side, and remove from it the spring **1** and the fork **2** being careful of the pads which are loose, the shouldering **3** and the stop ring **4**.

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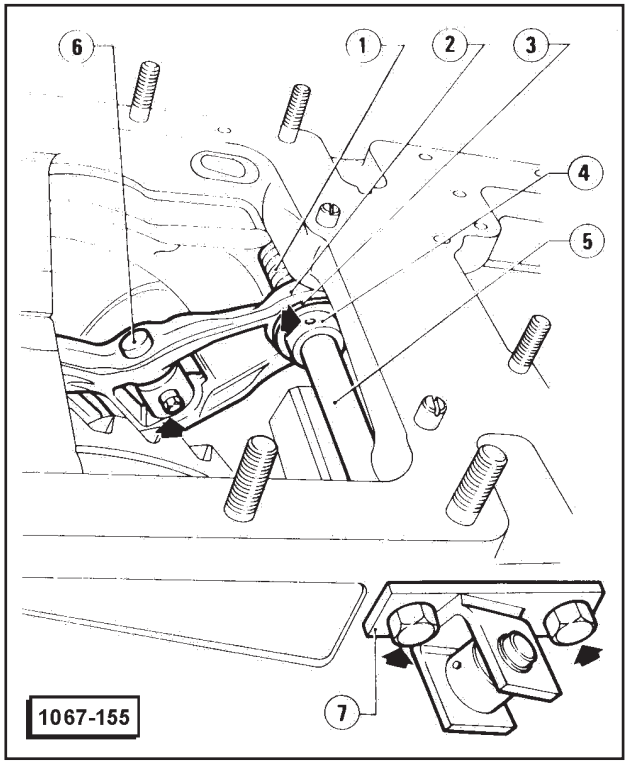
(6) Move the rod **5** towards the left and tap lightly with a hammer until you remove the cover **8**.
Then extract the rod.



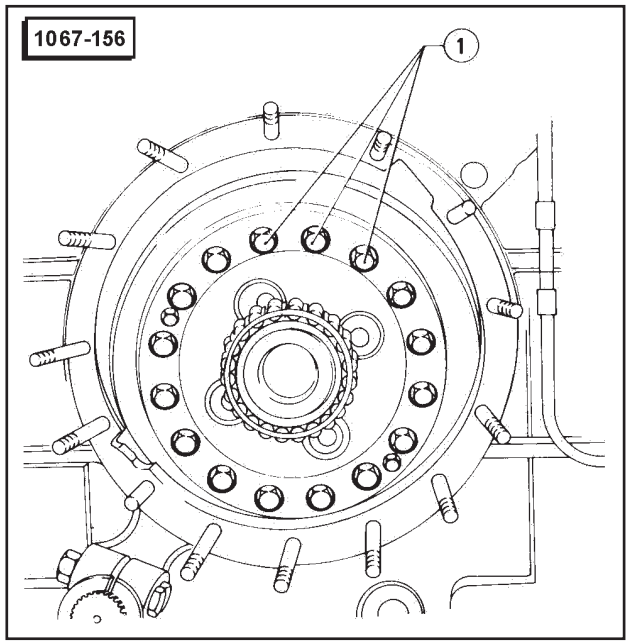
7. Remove the differential using the following procedure.
(1) Punch some marks on the tapered roller bearing support and on the differential box in order to find the correct position when remounting.
(2) Remove the differential tapered roller bearing flange support, if necessary, with the help of light taps with the hammer on the flange from the inside of the differential box.

CAUTION
Remove the second flange being careful that you hold the differential so that parts don't fall on the oil sump underneath.

(3) If necessary remove the external bearing rings using the holes on the flange, and collect the shims underneath, taking care to keep them separate to make remounting easier.
(4) Loosen the seventeen screws**1** fixing the crown wheel to the differential.



1 - Spring
2 - Fork
3 - Shouldering
4 - Stop ring
5 - Differential control rod blocking
6 - Pin
7 - Bracket
8 - Cover

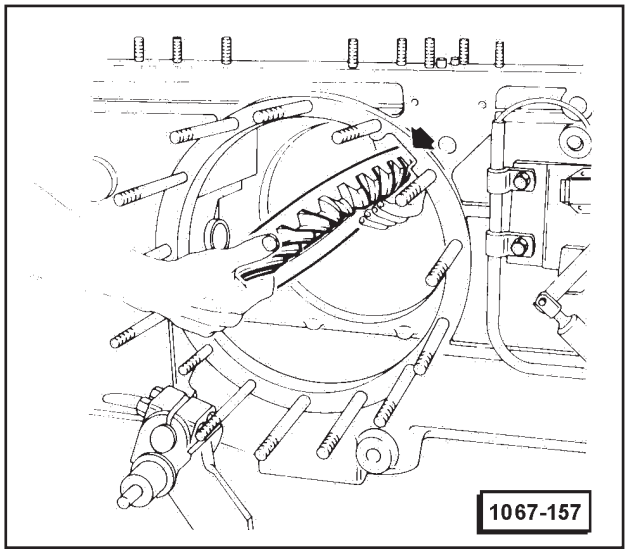


1 - Screw

(5) Remove the differential box from the side, then extract the crown wheel turning it so that it comes from the special space in the gearbox.

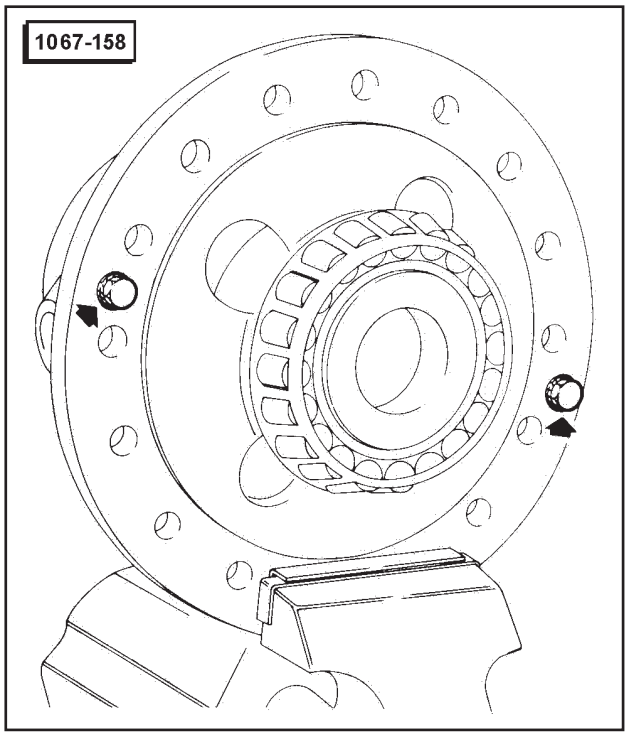
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(6) Extract the oil sump.

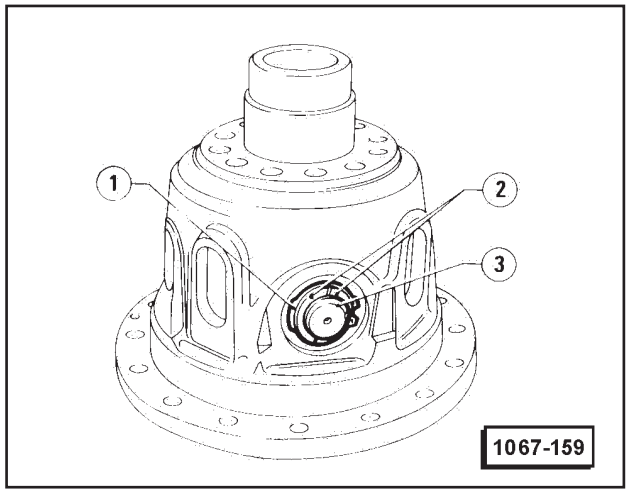
8. Dismount the differential adopting the following procedure.
(1) Fix the differential in a vice fitting with protective jaws and loosen the two screws fixing the half box.



(2) With the help of light taps with a hammer, divide the two half boxes then collect the 5th wheel and the crown wheel.
(3) Punch some marks on the head of the side pinion shafts and on the half box in order to remember the correct order when remounting.

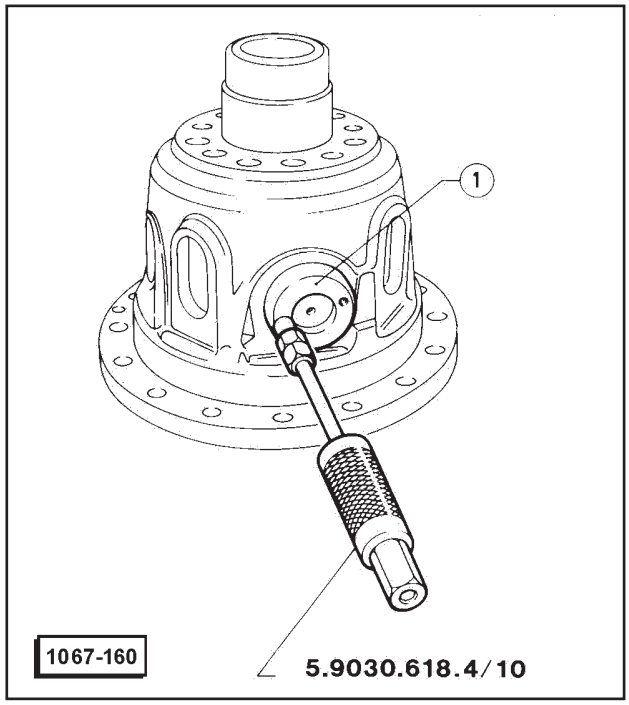
NOTE: Immediately remount the side pinions with their respective 5th wheels on their shafts as soon as you have dismounted them so that they don't get confused.

(4) Remove the Seeger ring **1** and the half ring shouldering **2** underneath.



1- Seeger ring
2 - Half ring shouldering
3 - Centering bush

(5) Tighten the union of the extractor **5.9030.618.4/10** on the centering bush **1** and extract it. Recover the key.

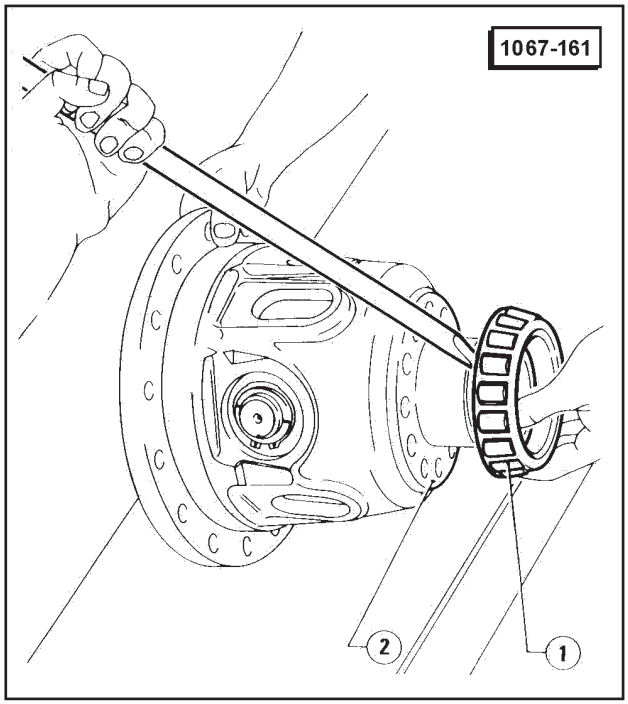


1 - Centering bush

(6) Proceed in the same way for the Seeger ring, the half rings shouldering and the centering bush mounted on the other side of the shaft.
(7) Remove the shaft and the two side pinions.
(8) If mounted, remove the other two side pinions in the same way.
(9) Remove the crown wheel and the 5th wheel.
(10) If necessary to remove the tapered bearings, work as indicated in the diagram.

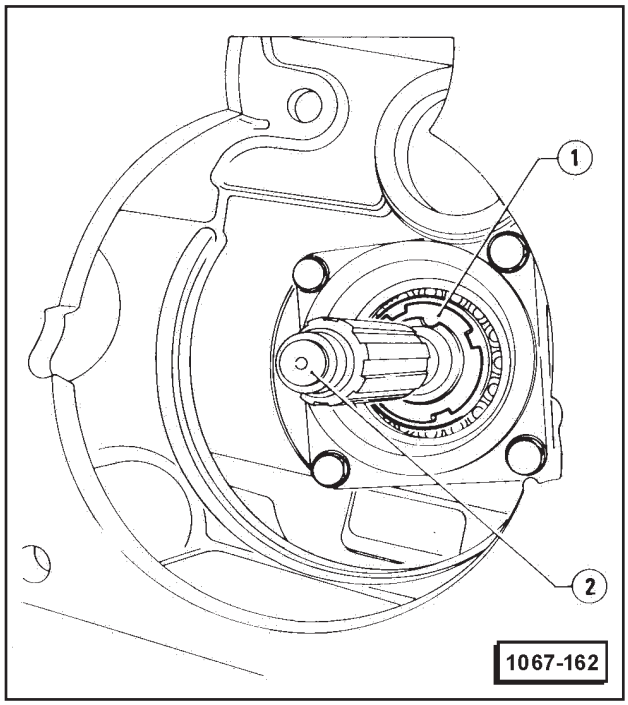
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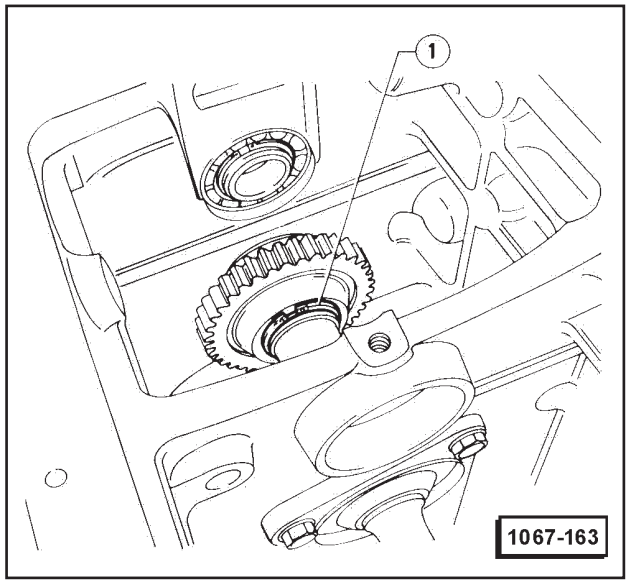
1 - Tapered roller bearings
2 - Differential blocking sleeve

9. Remove the pinion using the following procedure.
(1) Undo the ring nut **1** fixing the pinion **2** and loosen it using the proper tool.



1 - Ring nut
2 - Pinion

(2) Remove the Seeger ring **1** from its seat and leave it on the pinion.

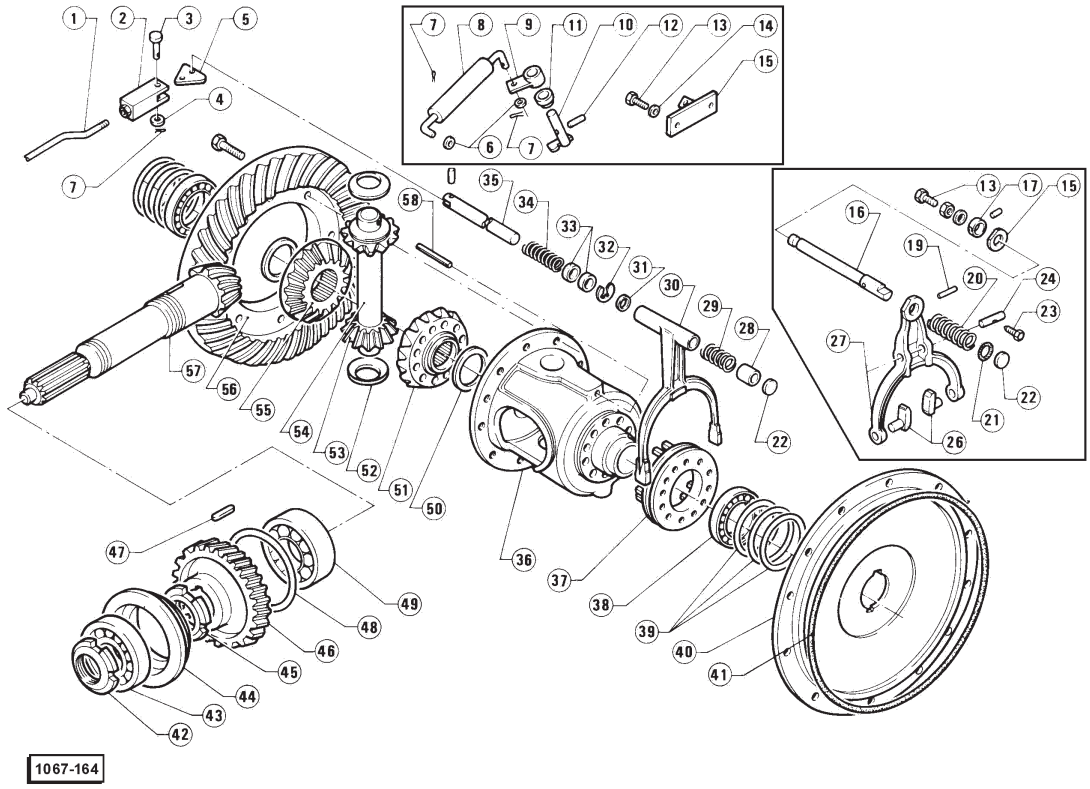


1 - Seeger ring

(3) Give light taps on the pinion and remove it from the back holding the parts held on it. Recover the key mounted on the pinion.
(4) If necessary, remove the barrel roller bearing.
(5) If necessary, remove the flange pinion support loosening the four screws that fix it to the box and remove it recovering the shims underneath being careful to group them together, after having accurately measured the thickness, in case they are used when remounting.

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Only for model 110

1 - External tie rod control
2 - Joining fork
3 - Pin
4 - Washer
5 - Plate
6 - Washer
7 - Split pin
8 - External tie rod
9 - Plate
10 - Pin
11 - Ring
12 - Pin
13 - Screw
14 - Washer
15 - Bracket
16 - Control shaft
17 - Stop ring
18 - Shoulder ring
19 - Pin
20 - Spring
21 - O-ring
22 - Cover
23 - Tapered screw
24 - Pin
25 - Coupling fork
26 - Pad
27 - Coupling fork
28 - Bush
29 - Spring
30 - Coupling fork
31 - Shoulder ring
32 - Compression ring
33 - Spacer
34 - Spring
35 - Control shaft
36 - Differential box
37 - Differential blocking roller
38 - Tapered roller bearing
39 - Shim ring
40 - Flange
41 - O-ring
42 - Ring nut
43 - Front pinion bearing
44 - Bearing seat on pinion front
45 - Ring nut
46 - 4RM transmission gear and/or parking brake
47 - Key
48 - Shim adjustment ring
49 - Rear pinion bearing
50 - 5th wheel
51 - Blockable crown nut
52 - 5th wheel
53 - Side pinion
54 - Side pinion pin
55 - Ring nut
56 - Grooved crown nut
57 - Pinion
58 - Compression ring

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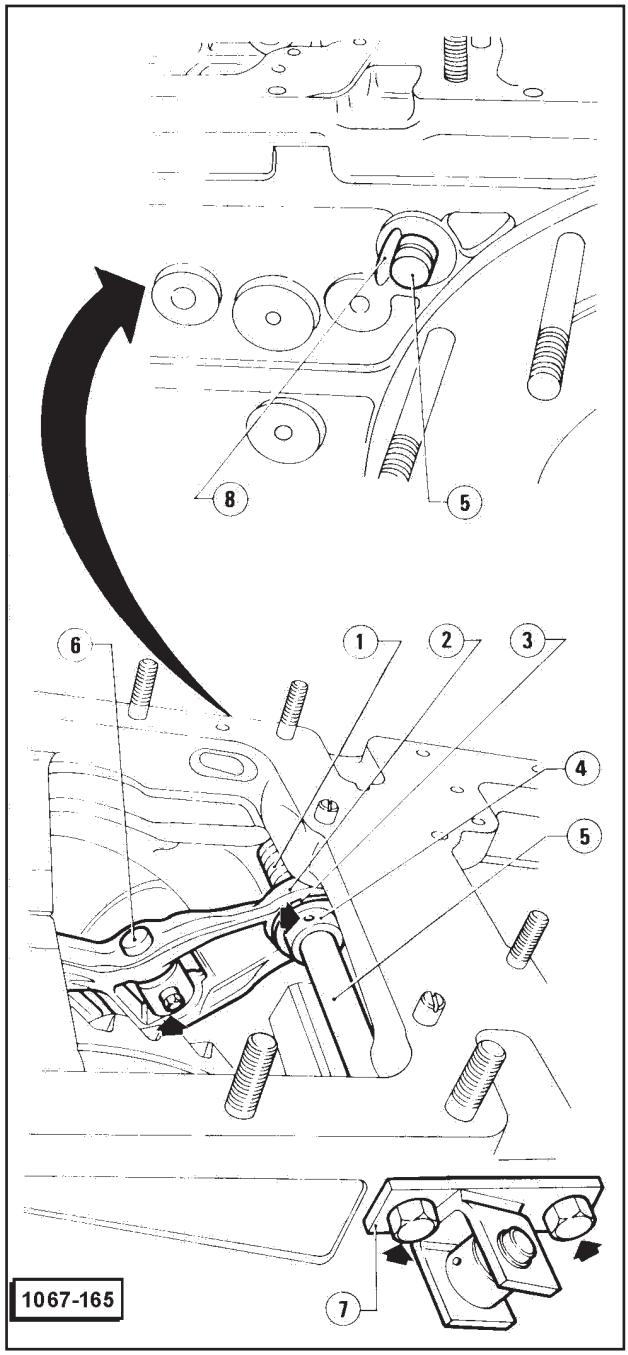
CAUTION
— **Always use a soft metal hammer and punch when it is necessary to tap on ferrous metal parts.**
— **During the dismounting of the gear wheel pack mark the order of the parts to help you when re-mounting them.**
— **Carry out the following operations with the help of a second operator.**

1. Separate the two gearboxes (refer to: Preliminary Operations).
2. Remove the hydraulic lifting box (refer to: Lifting Group. Lifting Box. Removal).
3. Remove the epicyclic reduction gear (refer to: Epicyclic Reduction Gear - Removal).
4. Remove the main shaft of the P.T.O. (refer to: P.T .O. Dismounting).
5. Remove the bell support of the axle shaft (refer to: Preliminary Operations).

WARNING
During the removal of the bell ensure the differential box is well balanced on the stand which holds it up.

6. Only for model 110

Remove the rod and the differential blocking control fork working as follows:
(1) Loosen the two screws fixing the bracket **7** to the box and remove it.
(2) Loosen the tapered screw fixing the pin **6** to the fork **2**.
(3) Remove the pin **6** taking care to recover it before it actually falls out of the fork.
(4) Remove the fork fixing the stop ring **4** to the rod **5**. Recover the pin before it comes completely away from the ring.
(5) Take out from the right hand side of the rod **5** and remove from it the spring **1**, the fork **2** (paying attention to the pads which are loose) the shouldering **3** and the stop ring **4**.
(6) Move the rod **5** towards the left lightly tapping with a hammer until you remove the cover **8**. Recover the cover and extract the rod.



1 - Spring
2 - Fork
3 - Shouldering
4 - Stop ring
5 - Differential blocking control rod
6 - Pin
7 - Bracket
8 - Cover

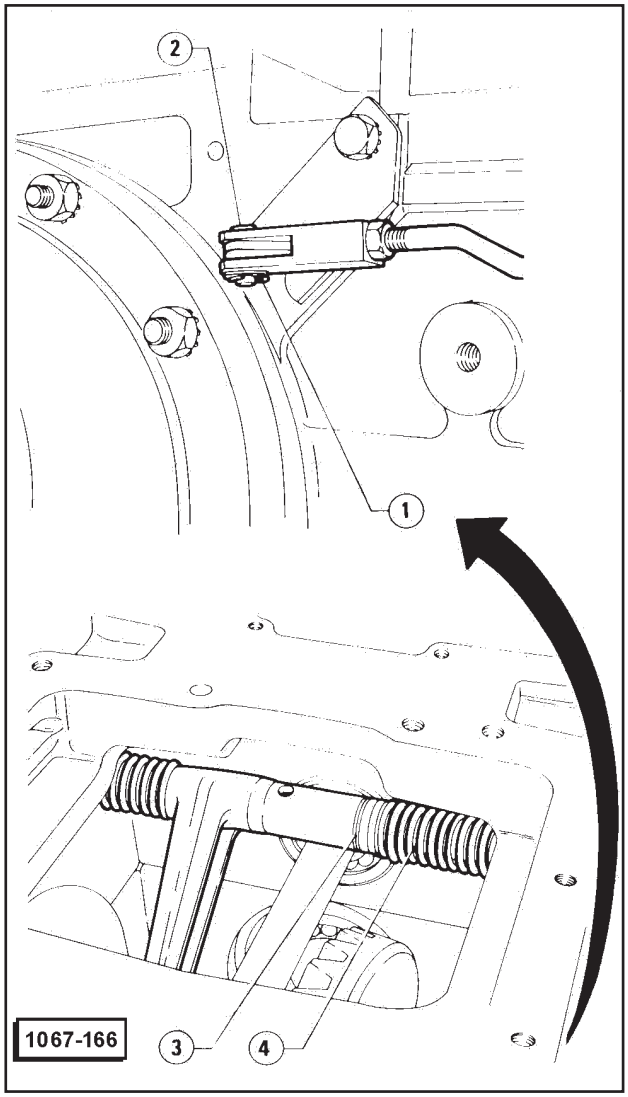
Only for model 110

Remove the differential blocking control rod working as follows:

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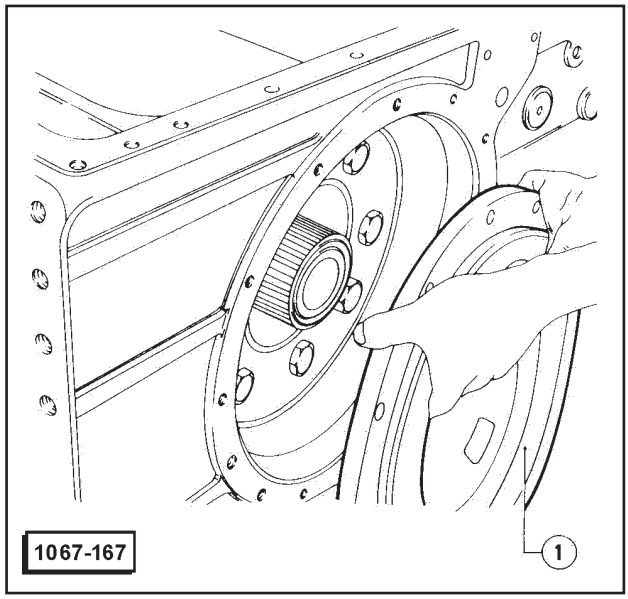
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(1) Take out the split pin **1** that blocks the pin that controls the bevel square **2**.
(2) Remove the blocking compression ring **3** on the shaft **4.**
(3) Take the shaft out from the right hand side and collect the parts.



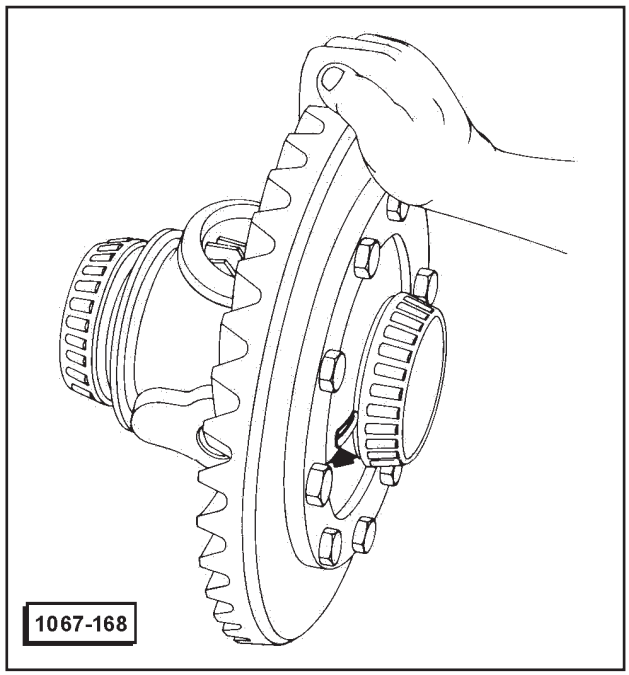
1 - Split pin
2 - Bevel square
3 - Compression ring
4 - Shaft

7. Holding the shaft from above, take out the flange **1** and the opposite flange by pressing on the differential box.
If the operation means that you have to change parts that require differential or axle play adjustment, such as the tapered roller bearing of the differential box, remove from the flange **1**, the external bearing rings, recovering the shims underneath being careful to keep them grouped ready for their remounting.



1 - Flange

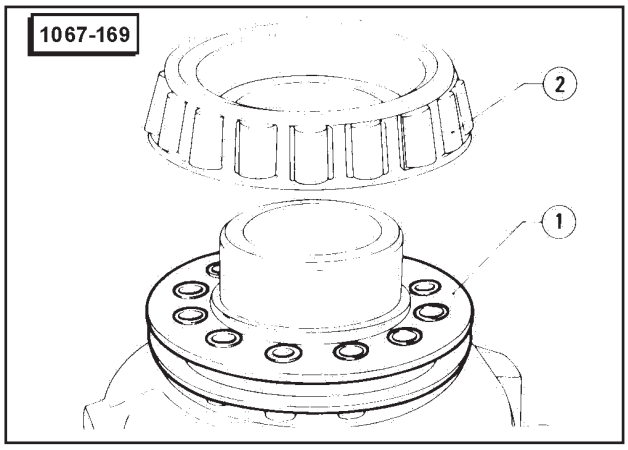
8. Extract the differential box turning it so that it enters the space occupied by the flange.
9. If necessary, remove the external rings complete with the retainer, using an extractor inserted into the special grooves of the differential box.



10. If necessary, remove the collar **1** coupling the differential block, extract the internal track **2** of the bearing then take out the collar.

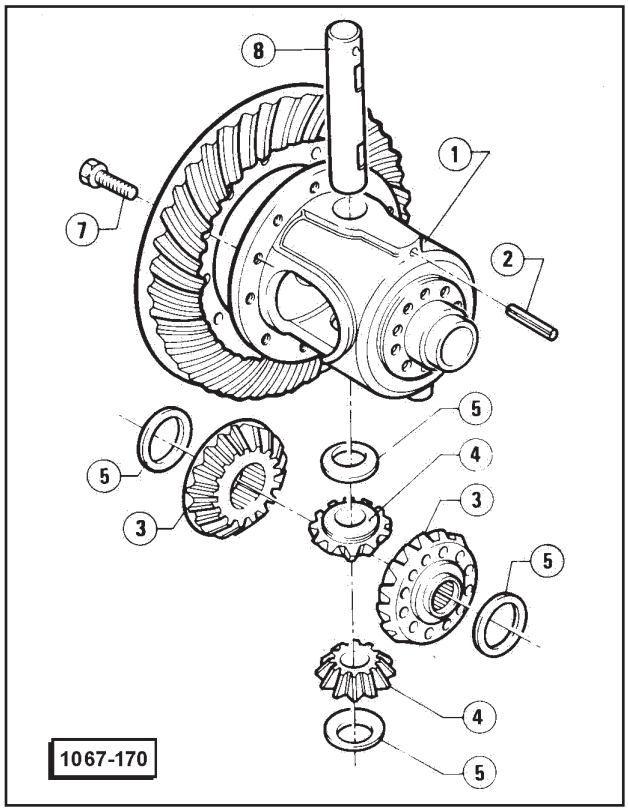
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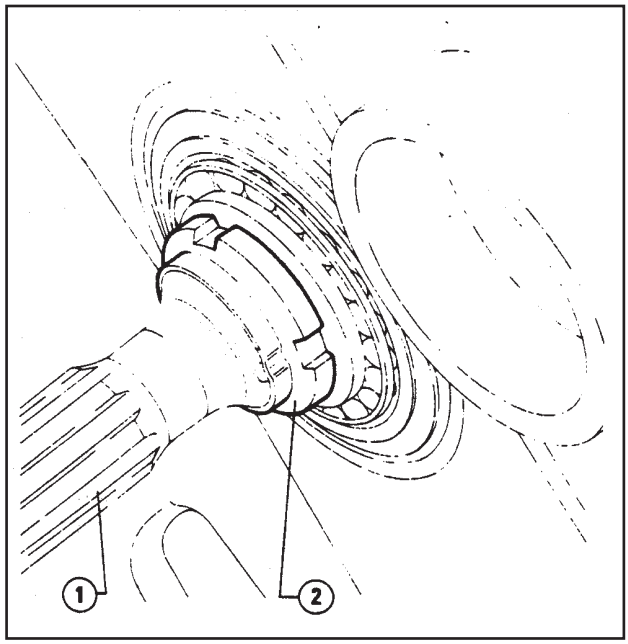
1 - Differential block collar
2 - Internal tapered roller bearing track

11. Dismount the differential working as follows.
(1) Fix the differential group on a vice with protective jaws and then loosen the fixing screws **7** of the crown wheel **6** to the differential box and remove.
(2) Extract with a hammer and pin remover the lock pin 2 that blocks the side pinion pins **1** and remove it.
(3) Turn the crown wheel **3** until you bring the side pinion **4** in line with the opposite opening then recover the side pinion with the respective bronze 5th wheel.
(4) Extract the crown wheel **3** with the respective bronze 5th wheel **3**.



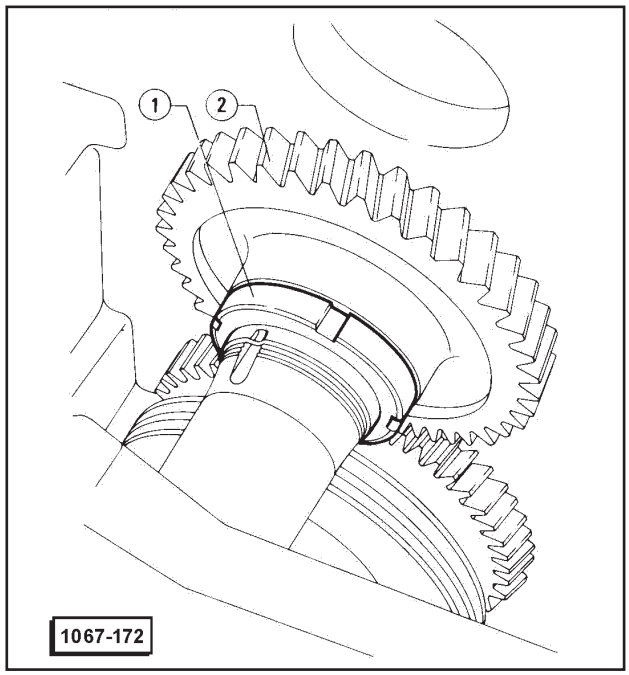
1 - Differential box
2 - Lock pin
3 - Crown wheel gear
4 - Side pinion gear
5 - Bronze 5th wheel
6 - Toothed crown nut
7 - Crown nut fixing screw
8 - Side pinion pin

12. Remove the pinion working as follows:
(1) Open the fixing ring nut **2** of the pinion **1** found in the space left free by the epicyclic reduction gear and unscrew it completely.



1 - Pinion
2 - Ring nut

(2) Loosen the second ring nut **1** found in the space left free by the P.T.O. Clutch and that blocks the P.T.O. gear wheel **2** of the four wheel drive tractor.



1 - Ring nut
2 - P.T.O. gear wheel of the four wheel drive tractor and of the parking brake

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(3) Tapping on the front end of the shaft take out the pinion collecting the gear wheel and the ring nut.
13. If it is necessary to change the external ring of the front bearing, unblock it, by tapping on the rear end of the bearing support flange then separate the bearing from it.
14. If necessary remove, using the correct tool, the internal ring of the rear bearing.
15. If necessary, remove the external ring of the rear bearing left in the gearbox.

CHECKS AND CONTROLS

Accurately wash the parts and then work as follows.
1. Verify that the moving parts of the rotating track do not show signs of irregular wear, cuts, signs or seizing or overheating. If so change the parts.
2. Check that the tapered pinion teeth work in all sides, if you find chipped teeth you must change the pinion and the crown wheel. Also check that both parts do not have signs of seizing and splits, or are excessively worn.

REMOUNTING

NOTE
— Accurately wash the differential box with solvent and dry with compressed air.
— On remounting change all the seal rings, the gaskets and the O-rings lubricating them with prescribed grease.
— Lubricate the parts before remounting with a film of prescribed grease.
— In order to keep the parts in position during the remounting, it is advisable to use a suitable grease.
— It is advisable to carry out the remounting with a second operator.
— Pay particular attention to the order of remounting of the parts referring to the enlarged diagram on pages 68 and 73.

1. Remount the differential box working in the reverse order using the following instructions:
— Mount the 5th wheel so that the grooved side faces the half box.
— Remount the side pinion and the relative shafts checking the punch marks made during the dismounting.

— **Only for models 130 and 150**
Be careful that you mount the Seeger ring fixing the side pinion shafts so that their openings are not the same as those between the half shouldering rings **16**.

— **Only for models 130 and 150**
Block the two screws fixing the half box with the prescribed fixative after having removed the traces of the old fixative.
— Check that the wheels turn freely.

For 130 - 150
2. Mount the pinion inserting the shim package found when dismounting and then adjust the bearing spring load (refer to: Pinion Bearing Play Adjustment Models 130 and 150).
3. Mount the differential without the crown wheel and adjust the preload of the differential bearings (refer to: Differential Bearing Preload Adjustment).
4. Adjust the position of the pinion without removing the differential in that the bearing support flange can be taken out in front without moving the pinion (refer to: Adjustment of the Pinion Position).
5. Take out the flange and mount it on the differential the crown wheel blocking the screws to the prescribed torque.

Tightening torque
Differential crown nut fixing screws 127
127 Nm
(13 Kgm; 93.99 ft lb)

6. Adjust the play between the toothing of the pinion and the crown wheel (refer to: Play Adjustment Between the Pinion Teeth and the Crown Wheel).

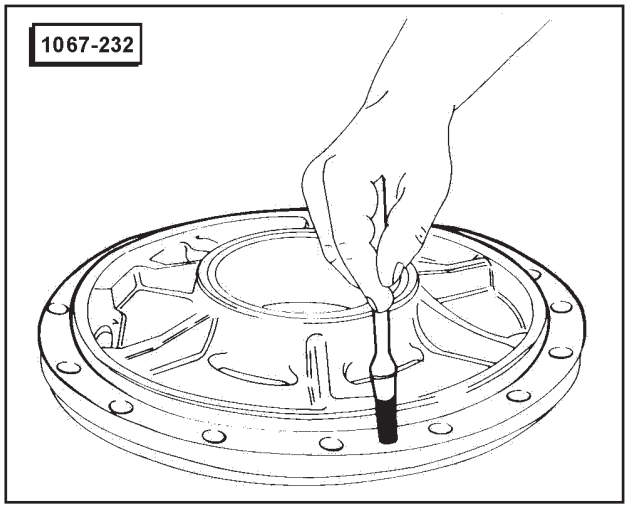
For 110
2. Mount the crown wheel on the differential to the prescribed torque tightening the screws.

Tightening torque
Differential crown nut fixing screws 107
107 Nm
(11 Kgm; 79.53 ft lb)

3. Adjust the preload of the differential bearings (refer to: Differential Bearing Preload Adjustment).
4. Remove the differential and mount the pinion, adjusting the preload of the bearings and the position of the pinion (refer to: Pinion Bearing Preload Adjustment 110 and Pinion Position Adjustment.
5. Remount the differential and adjust the play between the toothing of the pinion and the crown wheel (refer to: Play Adjustment between the Pinion Teeth and the Crown Wheel).
6. Mount the brake housing **52** and the support bells of the axle shaft working in the reverse order to the following instructions.
— Spread the internal surfaces of the flange **40**, mounted on the right side, the internal surfaces of the brake housing **52** and the two surfaces of the crown wheel **50** with prescribed grease.

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— **Only for models 130 and 150**
Check that the middle disc of the brake housing **42** is properly in its seat.
— Tighten to the prescribed torque the fixing nuts of the brake housing and the bell support of the axle shaft.

Tightening torque
- Nuts fixing brake housing to the differential box
130 - 150
130 - Nm (13 - Kgm; 93.99 ft lb)

110
88 - Nm (9 - Kgm; 65.07 ft lb)

Nuts fixing the axle shaft support bell to the brake housing 130-150
130 - Nm
(13 - Kgm; 93.99 ft lb)

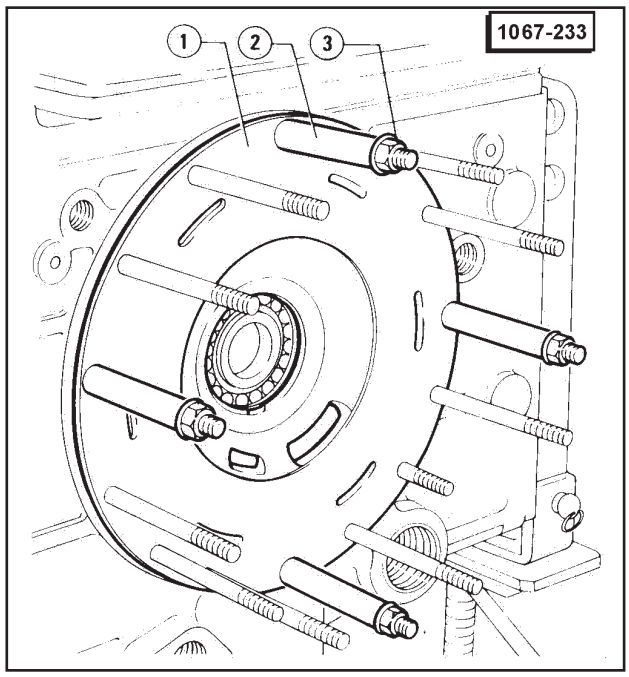
7. Mount the differential block control working in the reverse order adhering to the following instructions.
— Mount the pin **37** with the hole for the fixing screw **36** turned the correct way.
— Spread the cover **51** with the prescribed grease after having mounted it.
— Check that the control works properly, if necessary adjusting the rod run **31** by tightening or loosening the screw **28**.

ADJUSTMENT

NOTE
When using the shim adjustments it is always preferable to group more shims in one e.g. it is better to use one shim of **0.2 mm** (0.0078 in) rather than two of **0.1 mm** (0.0039 in).

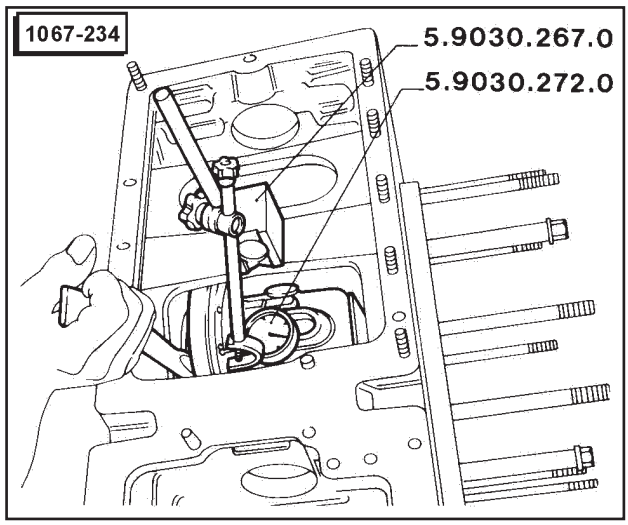
Differential bearing preload adjustment

1. Mount the differential box in the rear gearbox inserting the flange **1,** the shim package found on dismounting if necessary made smaller, then fix the flange using the found nuts **3** and the respective spacers **2**.



1 - Flange
2 - Spacer
3 - Nut

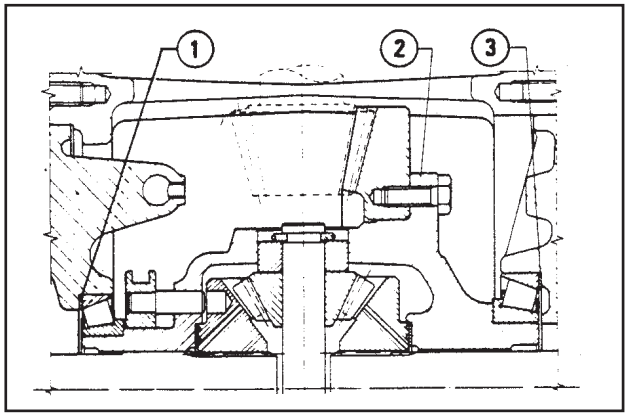
2. Using a hammer tap gently on the differential to bed it in.
3. Mount the magnetic base 5.9030.267.0 with the centesimal comparator 5.9030.272.0 on the differential box and place the gauge perpendicular on the crown wheel flat.
4. Using a lever move, as illustrated in the figure, the differential, totally towards the left then zero the comparator



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5. Always using a lever move the differential package to the other side and wait for the comparator needle to stop moving.
6. Take the reading of the differential axle play and then prepare the shim package, the size of which should be increased by **0.1 mm** (0.0039 in) with respect to the value found.
7. Mount the prepared shim package under the external ring of one of the bearings inserted in the flange in one of the positions indicated in the figure.



1 - Shim package
2 - Differential
3 - Shim package

8. Check, after having correctly adjusted, that the differential box turns freely even though it has a slight preload.

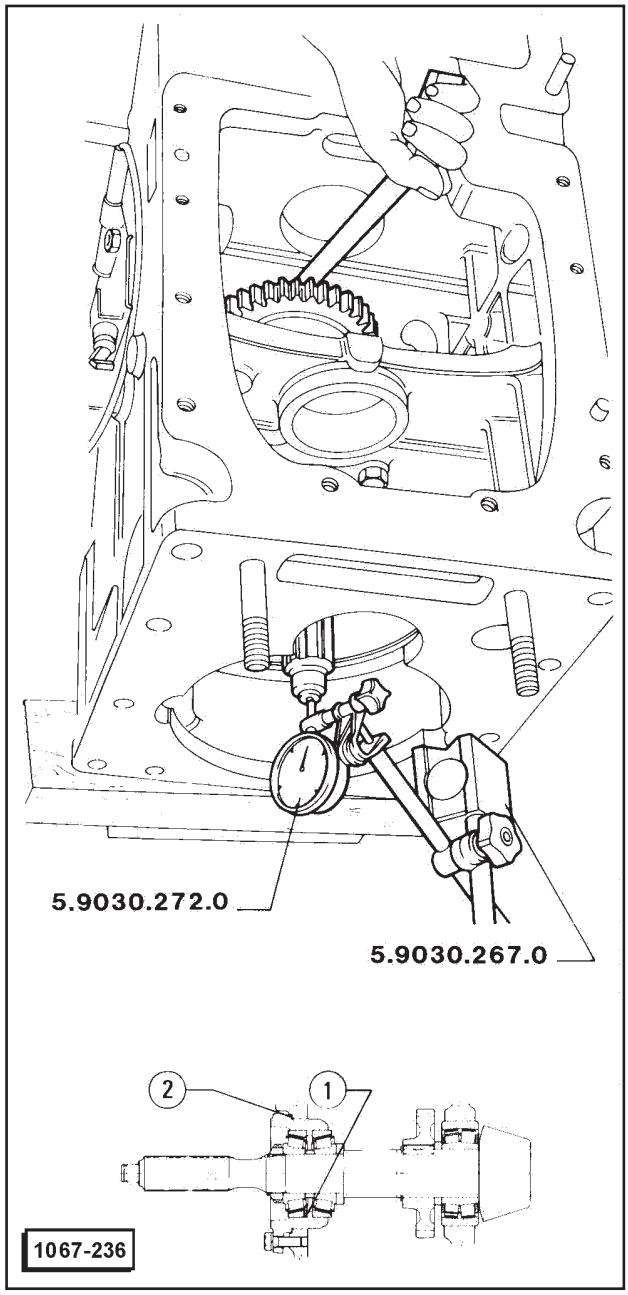
Pinion bearing play adjustment

For 130 - 150

1. Mount the pinion working in the reverse order. Mount the shim package **2** removed at the dismounting and then mount the pinion or the tapered bearings and if than that removed.
2. Tighten the fixing ring nut of the pinion, then loosen and tighten again to the prescribed torque.

Tightening torque
Pinion fixing ring nut (130 - 150)
290 ÷ 340 Nm
(30 ÷ 35 - kgm; 216.9 to 253.05 ft lb)

3. Using a comparator 5.9030.272.0 and the magnetic base 5.9030.267.0 positioned as in the figure and levered as shown, take an axle play reading of the pinion. If the reading does not enter into the value of **0.03** to **0.05 mm** (0.0011 to 0.0020 in); correct the amount until you bring it within the correct reading by working on the shim package **1**.



1 - Bearing preload shim adjustment package
2 - Shim adjustment package for pinion position

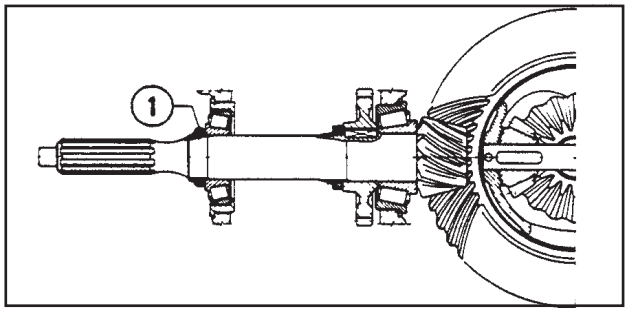
Pinion and bearing preload adjustment 110

Tighten the ring nut 1 to the prescribed torque.

Tightening torque
Pinion bearing preload ring nut
107 Nm
(11 kgm; 79.53 ft lb)

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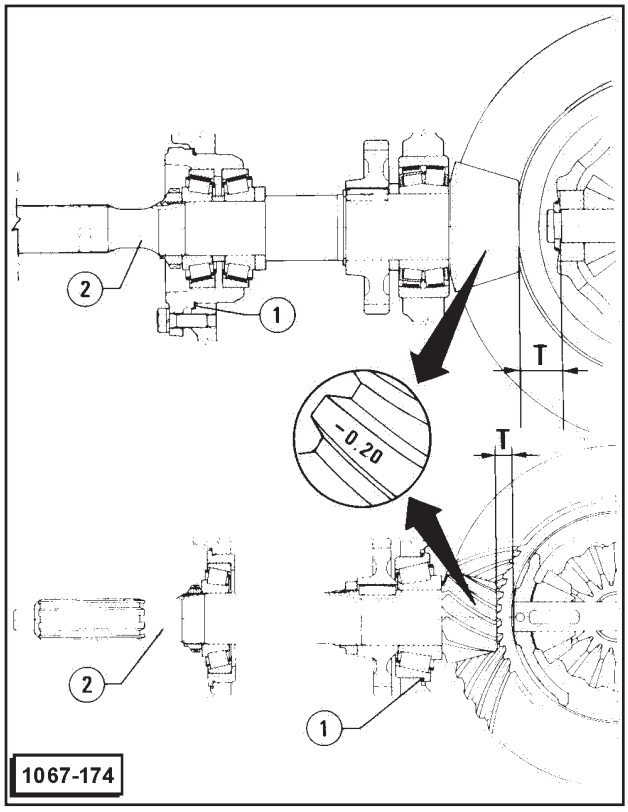
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1 - Pinion tightening ring nut

Adjustment of pinion position

1. Mount the pinion positioning the shim package **1** under the flange **4** on the bearing **3** and proceed if necessary, to adjust the preload of the bearings then mount the differential.
2. Take a note of the number stamped on the end of the pinion teeth in the position indicated in the diagram.
3. Add or subtract this number as shown from the specification for the model or version of tractor in question and as given in the table “Pinion” (refer to: Technical Data and Prescriptions - Checks and Adjustments).
4. The number obtained rounded to the nearest **5** centesimal, should be the same as the reading between the pinion and the rectified surface of the differential box.
5. If you are not satisfied with the reading take the measurement of the “T” reading working on the shim package **1**.



1 - Shim adjustment package for pinion position
2 - Pinion

CAUTION
Pay particular attention to the fact that if you increase the shims for models 130 and 150 you also increase the given quota, while for model 110 increasing the shims the quotas decreases and vice a versa.

6. In order to avoid repeating the operation you must take care to calcolate the difference between the amount stamped on the pinion which has been removed and on the new one to be mounted. This amount added, or decreased from the shim package will allow you to find the correct amount.

Example of calculation No.1
— amount stamped on removed pinion q_v= + 0,20
— amount stamped on the new pinion q_n= - 0,20
— difference between the two
(q_v - q_n) = S: + 0,20
- (- 0,20)
= + 0,40

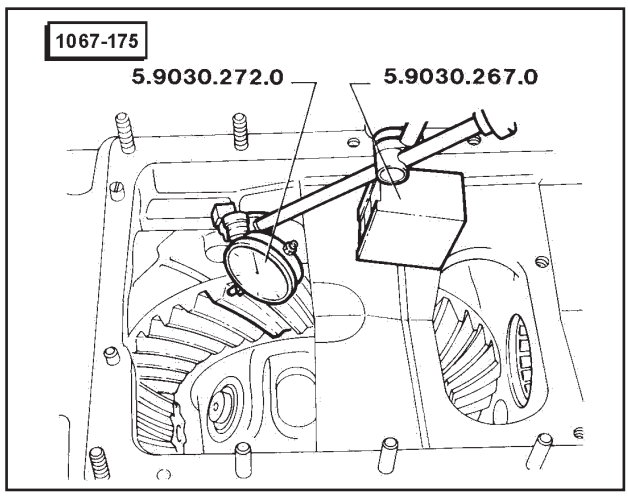
S = +0.40 mm10.0157 in = thickness to be added to the present shims

Example of calculation No.2
— amount stamped on removed pinion q_v= - 0,10
— amount stamped on the new pinion q_n=+ 0,30
— difference between the two
(q_v - q_n) = S: - 0,10
- (+0,30)
= - 0,40

S = - 0.40 mm 10.0157 in = thickness to be removed from the present shims

Play adjustment between the pinion teeth and the crown wheel

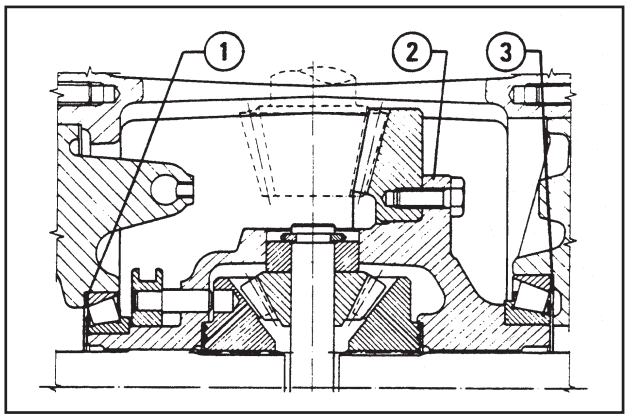
1. After having carried out the adjustment of the preload of the differential bearings, the preload of the pinion bearings and the position of the pinion, mount the magnetic base 5.9030.267.0 with the centesimal comparator 5.9030.272.0 on the differential box placing the test pin in contact with the teeth of the crown wheel.



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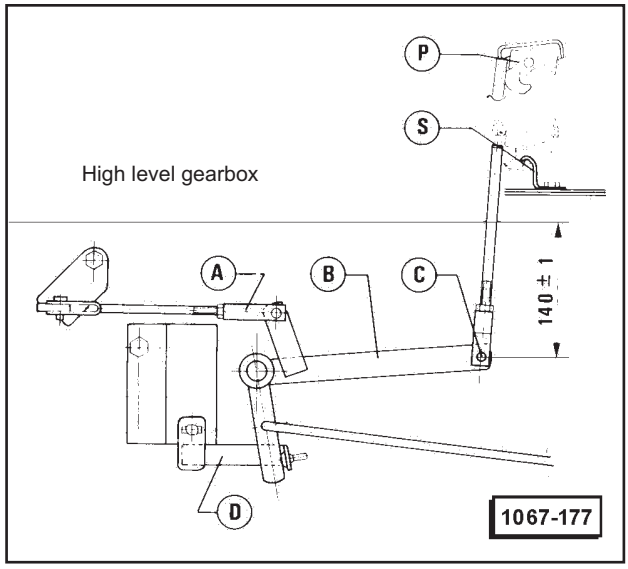
2. Block the pinion rotation and turn the crown wheel taking a comparator reading of the play existing between the teeth of the pinion and the crown wheel.
3. Check that the measurement given is between the values given on the table “Pinion and Crown Wheel” for the mode in question (refer to: Technical Data and Prescriptions - Checks and Adjustments).
4. If the play is more than that required remove some shims from the pack **1** to pack **2** or vice a versa. Repeat the measurement until you reach the given figure.



1 - Left shim package
2 - Right shim package
3 - Differential box

Checks, controls and adjustments

Proceed to accurately clean the parts with solvant and then check the movable surfaces and the toothing and grooves. If you find chips, cracks, dents or excessive wear change the parts then proceed to adjust the control working as follows:
1. Position on fork **A** adjust the position of lever **B** so that in the removal position the hole C of the lever **B** on the tie rod is at **140 ± 1 mm** (5.51 ± 0.04).
2. Keeping lever **B** still adjust the stop **D** placing the rubber at lever **B**.
3. Adjust the position of the pedal **P** so that it has a sufficient run to be able to connect and disconnect the differential block and that at the same time it can always guarantee the hooking or unhooking of pedal **P** with the bevel plate **S**.



DIFFERENTIAL BLOCKING SYSTEM

General characteristics

The blocking system of the differential is made up of a movable sleeve, controlled by a fork, which by way of the coupling of its teeth to special seats on the external side of the pinion blocks the differential box making it one with the two axle shafts and therefore allows it to use its strength on the wheel; making the movement of the tractor on heavy soil easier.
The external control levers are equipped with a tie rod controlled from the cabin which allow you also to block the front differential.

Dismounting

Dismount the internal command of the differential box following the instructions given in: Bevel Gear - Dismounting step 6. (for 130 - 150) - step 7. (for 110).

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TECHNICAL DATA AND SPECIFICATIONS

TECHNICAL DATA

Clutch - Transmission Ratios

Detail			Model		
			110	130	150
Number of gears	base		12 AV +3 RM	-	
	with mini reduction gear and reversal		24 - AV +12 - RM		
	with super reduction gear and reversal		20 - AV +12 - RM		
Gear ratio	First gear		21/41 = 1/1,9524	24/41 = 1/1,8636	
	Second gear		26/36 = 1/1,3846		
	Third gear		30/32 = 1/1,0667		
	Fourth gear		35/29 = 1/0,8289		
	Reverse gear		26/32 =1/1,2308		
Reversal ratio			(24/39) x (36/23) x (27/26) = 1/0,9997	27/31 = 1/1,1481	
Reduction gear ratio	Slow		(36/36 + 72) x (36/36 + 72) = 1/9,000	(36/36+72) x (36/36+72)=1/9000	
	Normal		(36/36 + 72) = 1/3,000	(36/36 + 72) = 1/3,000	
	Fast		1/1 = 1/1,000		
Minireduction gear ratio			(24/39)x (36/26) = 1/1,5271	(27/36) x (33/29) = 1/1,1717	
Superreduction gear ratio			(24/39)x (17/45) = 1/4,3015	(27/36)x (26/53) = 1/2,7179	
Front axle ratio	Bevel gear	25 km/h (15.53 mi/h)	8/45 = 1/5,6250		
		30 km/h (18.63 mi/h)	9/42 = 1/4,6667		
	Total ratio	25 km/h (15.53 mi/h)	1/26,8333	1/33,8462	
		30 km/h (18.63 mi/h)	1/32,4237	1/28,3846	

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P.T.O.

Unit: r.p.m.

Detail			Model		
			110	130	150
Minimum engine revs			650 ÷ 700		
P.T.O. revs	Minimum engine revs	540	179 ÷ 193	168 ÷ 182	
		1000	306 ÷ 330	284 ÷ 307	
Maximum engine revs when idling			2340 ÷ 2360	2440 ÷ 2460	2360 ÷ 2380
P.T.O. revs	Minimum engine revs	540	645 ÷ 651	632 ÷ 638	611 ÷ 617
		1000	1101 ÷ 1111	1067 ÷ 1077	1032 ÷ 1042

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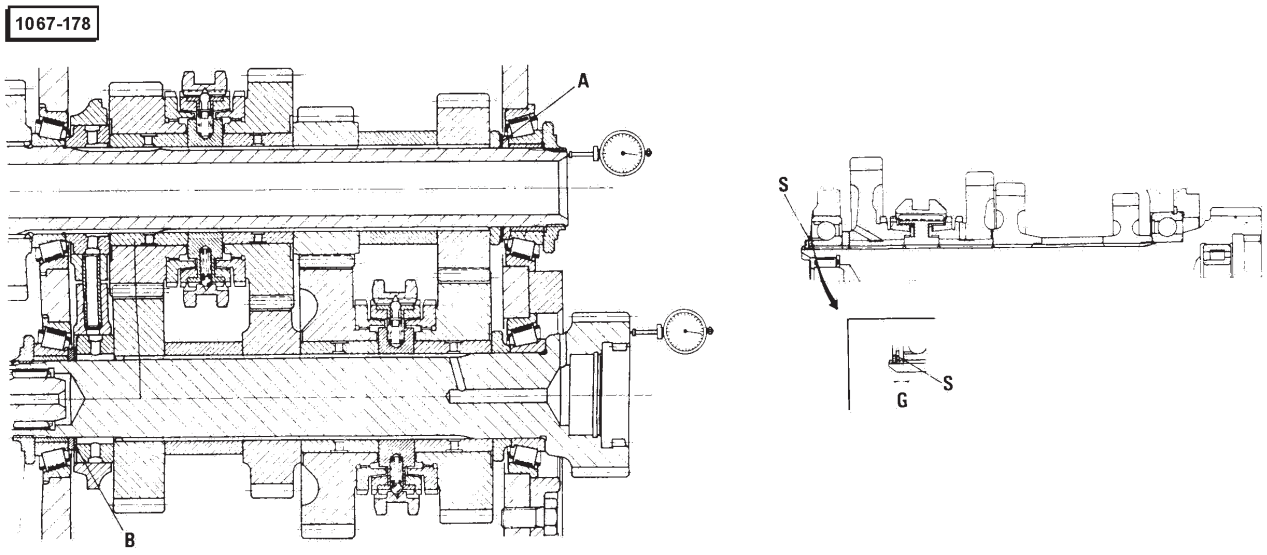
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CHECKS AND CONTROLS

Clutch with mini reduction and reversal gear / Clutch with super reduction and reversal gear

Main and counter shaft 130 - 150

Counter shaft 110



Unit: mm (in)

Type of check	Model		
	110	130	150
a) Axle play of bearing of the main shaft, adjustable with shim packs A and B	-	0,1 (0.004)	
b) Axle play “G” of bearing of counter shaft adjustable with shim pack “S"	0 ÷ 0,3 (0 to 0.012)	-	

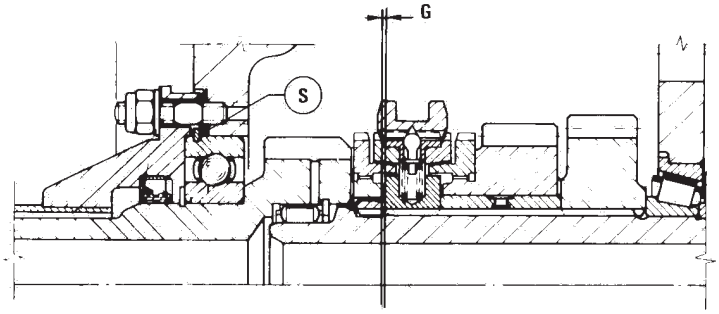
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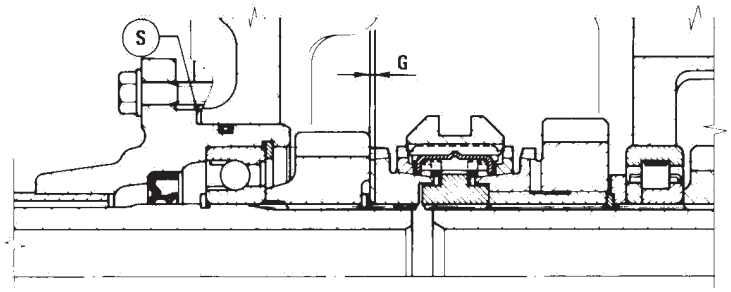
Clutch with mini reduction and reversal gear - Clutch shaft

1067-179

For 130 - 150



For 110



Unit: mm (in)

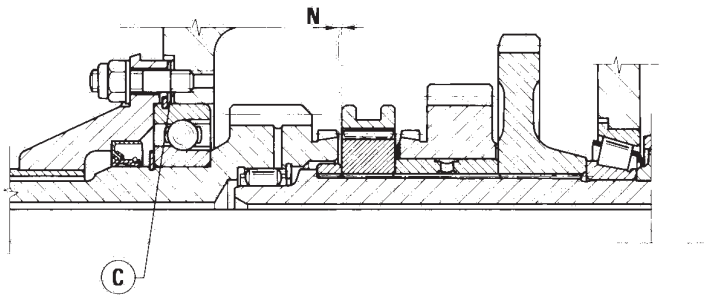
Type of check	Model		
	110	130	150
Play “G” of the clutch shaft adjustable with shim pack 5 (1)	0,4 ÷ 0,6 (0.015 to 0.023)	0,2 ÷ 0,4 (0.008 to 0.015)	

(1) For the correct placing of the shims and gaskets refer to “Clutch with super reduction and reversal gear - Adjustment of clutch shaft play”.

Clutch with super reduction and reversal gear - Clutch shaft

1067-180

For 130 - 150



Unit: mm (in)

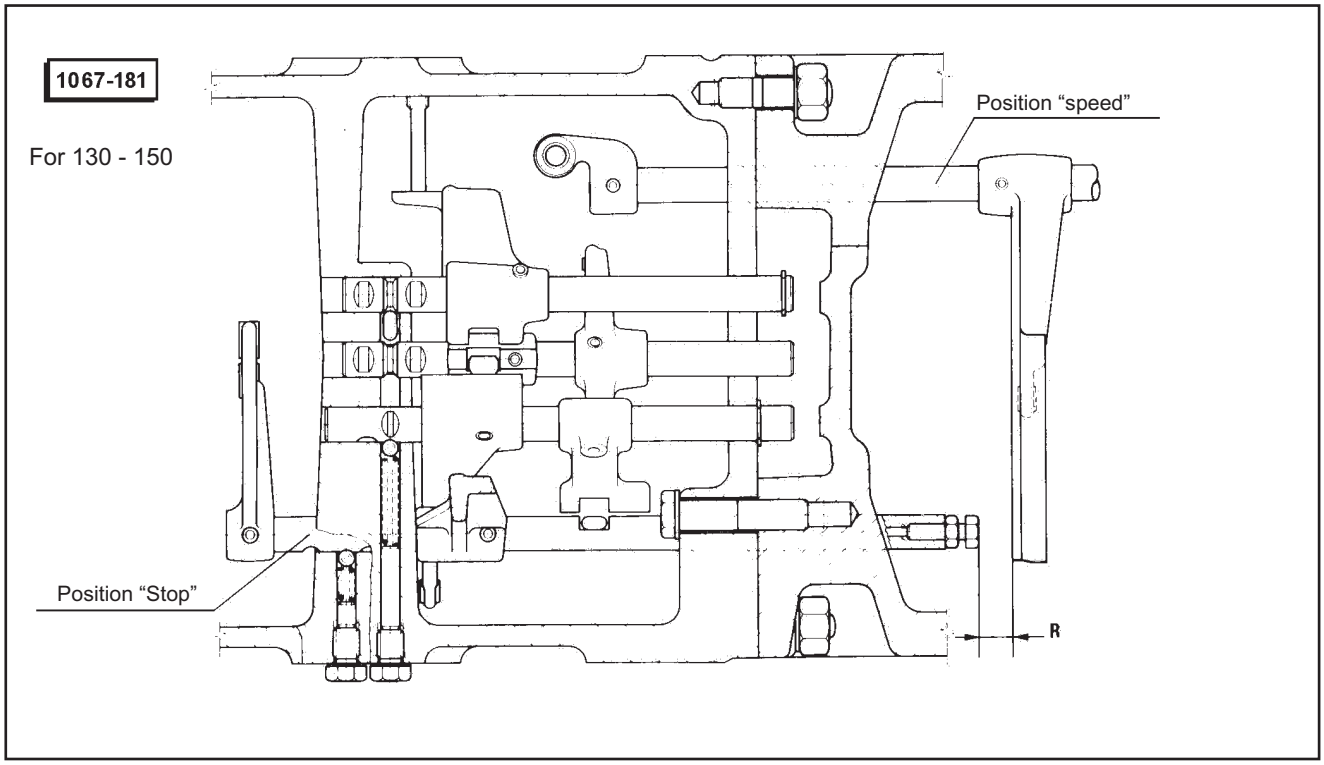
Type of check	Model		
	110	130	150
Play “N” of the clutch shaft adjustable with shim pack C (1)	1,3 ÷ 1,7 (0.051 to 0.067)		

(1) For the correct positioning of the shims and gaskets refer to: “Clutch with super reduction gear” and reversal - Adjustment of clutch shaft play".

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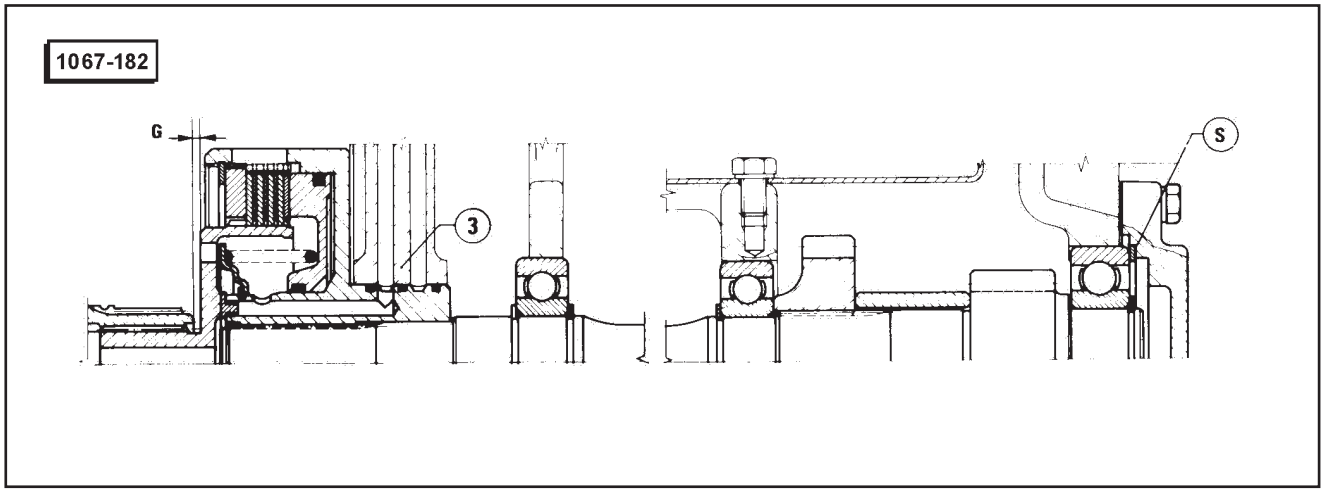
Starter lever - Super reduction gear



Unit: mm (in)

Type of check	Model		
	110	130	150
Coupling run “R” of the lever	0,3 ÷ 0,5 (0.012 to 0.019)		

P.T.O. - Rear shaft



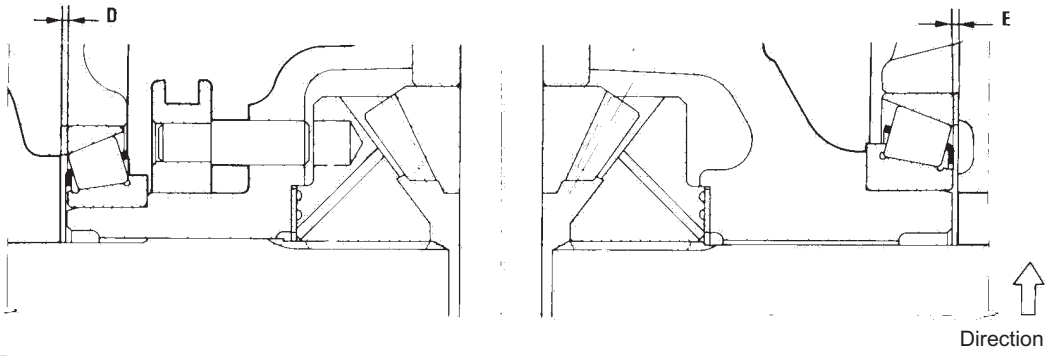
Unit: mm (in)

Type of check	Model		
	110	130	150
Axle play “G” of the rear shaft adjustable with shim pack S	0,4 ÷ 0,8 (0.015 to 0.031)		

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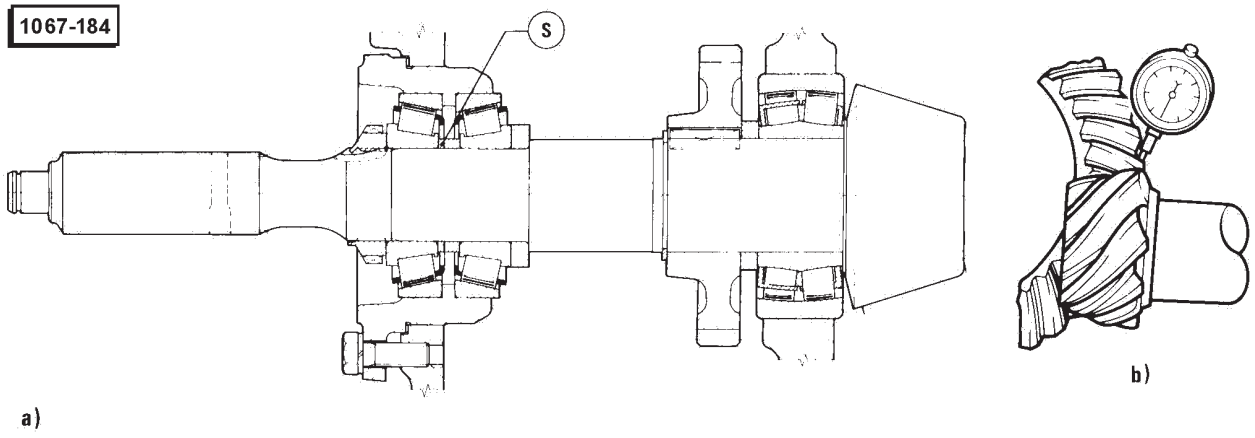
Differential



Unit: mm (in)

Type of check	Model		
	110	130	150
Bearing preload adjustable with shim pack D and E	0,1 (0.004)		

Pinion and Crown Wheel



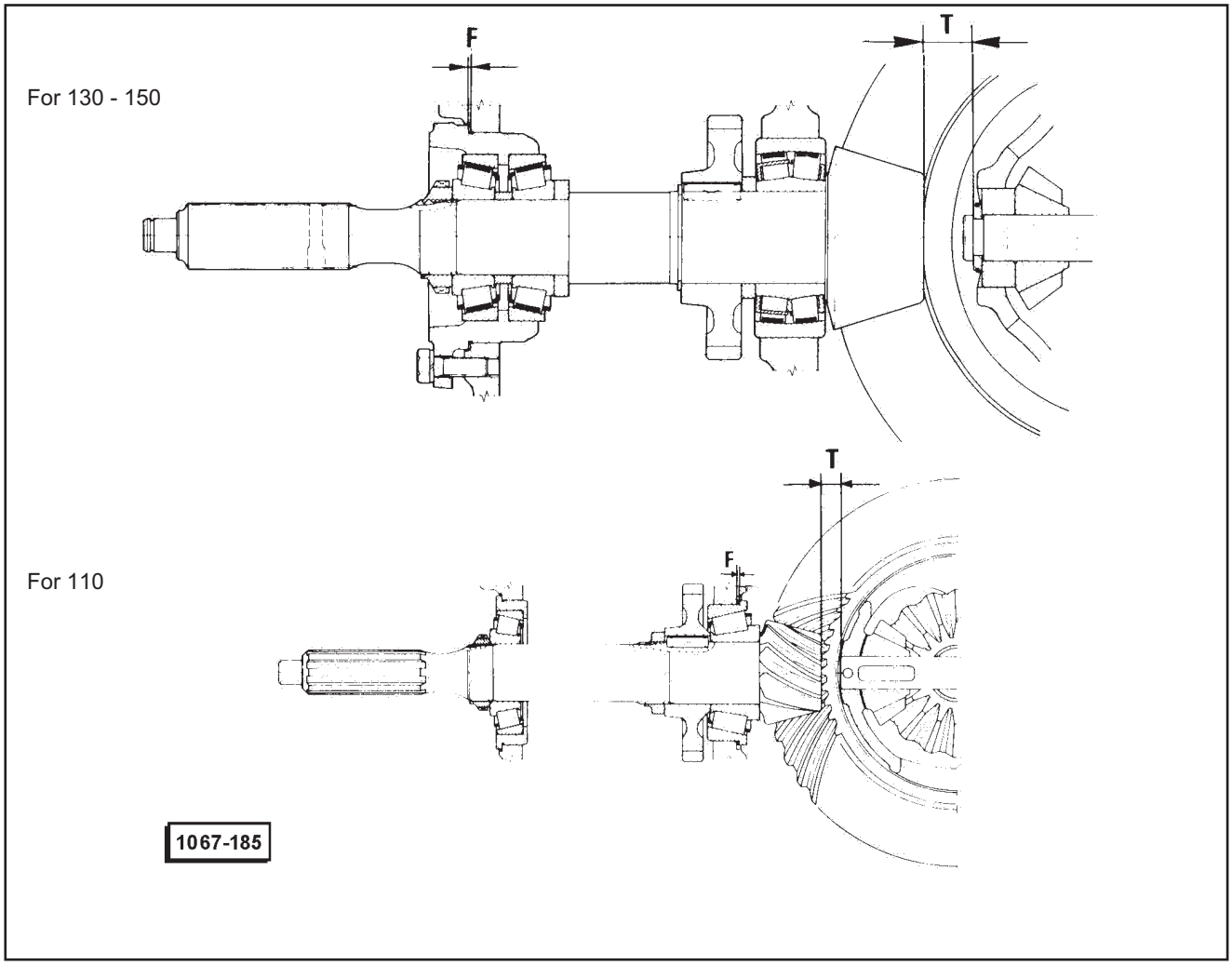
Unit: mm (in)

Type of check	Version		Model		
			110	130	150
a) Pinion axle play adjustable with shim package S			0,03 ÷ 0,05 (0.012 to 0.020)		
b) Play between pinion teeth and crown wheel	With bevel gear for speed	25 km/h (15.53 mi/h)	0,20 ÷ 0,28 (0.008 to 0.010)	0,22: 0,30 (0.08 to 0.011)	
		30 km/h (18.63 mi/h)	0,21 ÷ 0,29 (0.008 to 0.011)	0,23 ÷ 0,32 (0.009 to 0.012)	

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Pinion



Unit: mm (in)

Type of check	Version		Model		
			110	130	150
Minimum quota “T” of pinion positioning (1) & (2)	With bevel gear for speed	25 km/h (15.53 mi/h)	16 (0.629)	23 (0.905)	
		30 km/h (18.63 mi/h)	16 (0.629)	23,5 (0.925)	

(1) The nominal value corresponds at random to the amount stamped = to zero.
(2) The amount to be varied from the shim package F is according to the working tolerance of the pinion. For the correct use of this value refer to “Adjustment of Pinion position”.

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TIGHTENING TORQUES

Clutch

Unit: Nm (Kgm)

Details	Model		
	110	130	150
Fixing screws	M14 132 (13,5)	147 (15)	
Engine clutch flange	M12 88 (9)		
Lower clutch tightening ring nut	46,5 ÷ 51,5 (4,75 ÷ 5,25)	385 ÷ 441 (40 ÷ 45)	
Main clutch gearwheel fixing ring nut	46,5 ÷ 51,5 (4,75 ÷ 5,25)	385 ÷ 441 (40 ÷ 45)	
Lower clutch shaft fixing ring nut	-	385 ÷ 441 (40 ÷ 45)	
P.T.O. counter shaft gear wheel fixing ring nut	422 ÷ 441 (43 ÷ 45)		

P.T.O. - Differential

Unit: Nm (Kgm)

Details	Model		
	110	130	150
P.T.O. counter shaft fixing ring nut	-	421 ÷ 441 (43 ÷ 451)	
Nut fixing brake box to the rear gearbox	88 (9)	127 (13)	
Screw fixing crown wheel of differential	127 (13)		
Ring nut fixing pinion	107 (11)	290 ÷ 340 (30 ÷ 35)	
Screw fixing pinion flange	59 (6)		

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General specifications

Fluids and Lubricants

Application	Type	Details	Model	Q.ty
Differential gearbox	Oil	AGIP ROTRA THT	110	76l
Bearings & various parts	Grease	AGIP GREASE 30	130	-
Gearbox main & counter shaft bushes	Grease	MOLYKOTE BR-2	150	-

Sealants and Fixatives

Application	Type	Details	Model	Q.ty
Differential gearbox Joining surface of gearbox - differential	Sealant	SILASTICK 738	110 - 130 - 150	-
Seal ring with metal outside and diametre more than 10 mm		LOCTITE N 222		-
P.T.O. Screw fixing P.T.O. clutch positioning plate	Fixative	LOCTITE N'242		-
Bevel gear Screw fixing differential half box				-
Differential bearing support right flange internal surface Internal & external surfaces of the crown wheel of the epicyclic rear axle	Sealant	HYLOMAR		-
Cover of the introduction hole of the differential blocking rod	Sealant	SILASTICK 738		-

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TROUBLE SHOOTING AND CORRECTIVE ACTION

Trouble	Probable cause	Corrective action
Noisy transmission in forward gear	Find the origin of the noise, not necessarily from the engine and with the following procedure, localize the noisy area: - take the engine up to the rev; where the noise begins - keeping the engine at this rev insert various gears. Determine the cause of the noise and change or repair the defective parts.	
	Loss of oil from gaskets & seal rings	Change the gaskets &/or seal rings
	Pinion shaft bearings (noisy only when gear inserted & in all gears)	Change the bearings
	Pinion shaft bearings (in this case the noise should occur even when in neutral)	Change the bearings
	Insufficient oil level or inadequate lubrificant characteristics of oil	Top up the correct level of prescribed oil
Noisy when vehicle moving even when in neutral	Bevel pinion bearing noisy	Check &/or change
	Differential support bearing broken or seizing	Change the bearings
	Counter shaft bearing noisy	Change the bearings
A specific gear is noisy	Contact surface of the gearwheel teeth worn or slightly sticking	Change the gearwheels
Transmission noisy in neutral (vehicle still)	Lack of oil	Top up the level
	Irregular changes in the torque	Adjust the minimum rev of the engine
Transmission noisy when turning both in gear and in neutral (check the axle shaft)	Gearwheel and side pinion and crown wheel teeth worn, damaged or sticking	Change the differential box

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Trouble	Probable cause	Corrective action
“Pull & release” noisy (check the axle shaft)	Excessive play of bevel gear wheel	Check & eventually change
	Excessive play of gear pack	Adjust the packs
	Bevel gear fixing screw loose	Tighten the screws
	Differential gearwheel worn or damaged	Change the gearwheel
	Blocking ring nut of the pinion shaft loose	Check pinion parts and tighten the nut
Difficulty in inserting & letting out the gears, mini reduction reversal, epicyclic reduction	First of all determine the origin of the problem & decide whether it is the speed gear or the control system. If the clutch transmits couping when the pedal is lowered, it doesn’t disconnect. If the clutch couples when the pedal is left, or discouples when the pedal is lowered, the engine to the gearbox in the correct way. If the clutch is not faulty, then it is the speed clutch or the system of control that is at fault.	
	Syncronizer group faulty	Refer to “Faulty Syncronizer Group”
	External tie rod control not adjusted &/or there is a lack of oil in the joints	Check the tie rod and/or control the control joints
	Lack of oil in the differential gearbox	Top up the correct oil level
	Insufficient run of the tie rod external parts due to excessive play	Check the system and if necessary change the worn parts
	Internal controls deformed or worn	Repair and change the defective parts
The gears jump out	Sleeve gearwheels worn or damaged	Change the worn parts
	Excessive axle play for gearwheels that disengage on their own (Pull & release also noisy)	Check the adjustment of the gear package
Gear coupling sensibility scarce	Spring either worn or broken	
	Milling of the rod worn or deformed	Change the rods
	Fork and/or lever worn or damaged	Change the fork &/or the levers
	Pawl worn or damaged	Change the pawls

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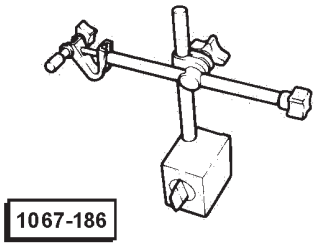
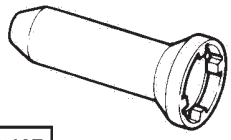
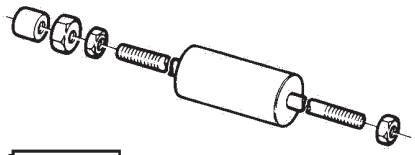
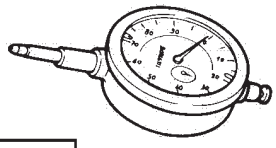
Trouble	Probable cause	Corrective action
Syncronizing group defective or “sticks”	Distance between front teeth of the gear wheel & sleeve incorrect	Change the defective parts
	Sleeve and gearwheel with front teeth worn or damaged	Change the defective parts
	Syncronizer ring worn	Change
	Sleeve grooves worn or damaged	Change
Seizing, sticking or breaks	Shortage of oil or oil incorrect type	Change the defective parts & use correct oil
	Adjustment of bearings & gear- wheel incorrect	Readjust
	Fixing screws loose	Change the defective part and retighten screws
	Insufficient play	Adjust the play and change the defective parts
The control levers of the mini reduction reversal and the epicyclic reduction gears make a noise and vibrate	Movement on the external control lever wrong	Change the part that need changing
	Refer to noisy gears	
	Return spring of the lever not working properly	Change the spring
Difficulty in engaging & disengaging the front traction	Front wheel drive coupling control external levers not adjusted &/or shortage of oil in the joints	Check the levers &/or check the control joints
	Internal controls damaged or worn	Repair or change the defective parts
	External lever run insufficient due to excessive play	Check the system & if necessary repair or change the worn parts
	Shortage of oil in the differential gear box	Top up the oil level
On inserting the front clutch the signal light does not work	The rear drive coupling signal light switch not working properly	Change the switch
	Electrical wiring faulty	Check the wiring
The front wheel drive disengages	Internal controls worn or not working correctly	Change the defective parts



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SPECIAL TOOLS

Tool Number	Name	Page No.
5.9030.267.0	Magnetic base support  1067-186	
5.9030.596.0	Pinion ring nut spanner  1067-187	
5.9030.618.4/10	Extractor for centering differential side pinion bushes  1067-188	
5.9030.627.0	Centesimal comparator  1067-189	

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GEARBOX LUBRICATION SYSTEM

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GEARBOX LUBRICATION SYSTEM

GENERAL FEATURES

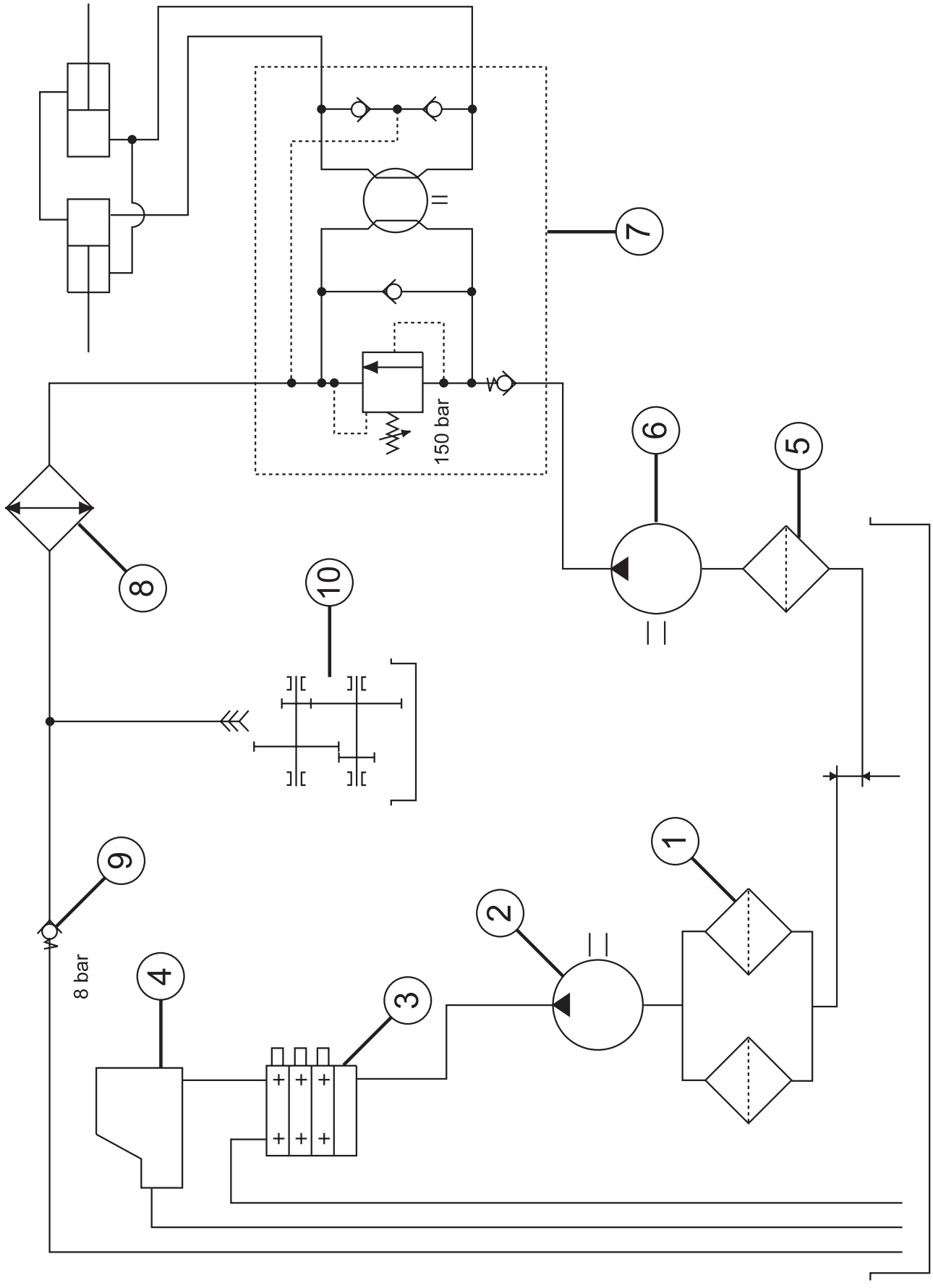
Only for 130-150, the gearbox is lubricated through an independent system. This system, through a forced lubrication, guarantees a suitable oil delivery to all gearbox components at any r.p.m., thus ensuring components long-life, low noise, and lower leaks due to friction. Ali this results in a reduced maintenance.
The system is composed as follows:

— One gear pump directly operated by crankshaft through a flange integral with drive pulley
— One radiator mounted on the upper side of air duet, permitting the oil to be kept at such a temperature so as not to alter its features
— One pressure relief valve that, in the event of excessive pressure increase, opens, thus causing the back gearbox oil to be discharged
— Two filters located on the left-hand side of vehicle, permitting any oil impurities to be eliminated.

1 - Oil filters 25 μ
2 - Hydraulic pumps
3 - Auxiliary hydraulic valves
4 - Hydraulic rear lift
5 - Oil filters 15 μ
6 - Hydraulic pumps
7 - Power steering directional control valve
8 - Radiator
9 - By-pass valve
10 - Hydraulic circuit of the transmission lubrication

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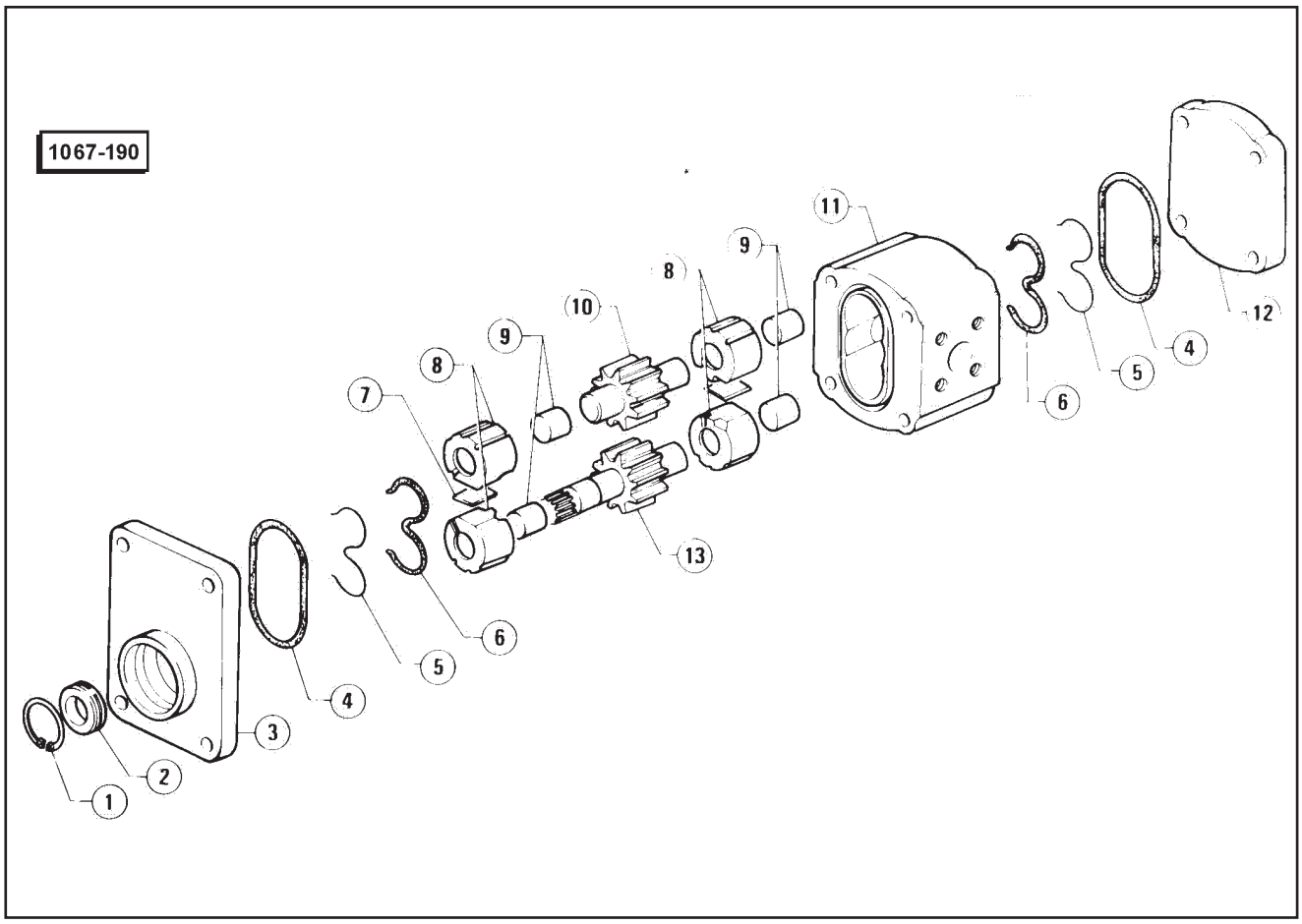
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OIL PUMP



1 - O-ring
2 - Support link
3 - Cap
4 - Gasket
5 - Heart
6 - Gasket
7 - Key
8 - Bearing
9 - Bush
10 - Pinion duct
11 - Pump housing
12 - Base
13 - Pinion conductor

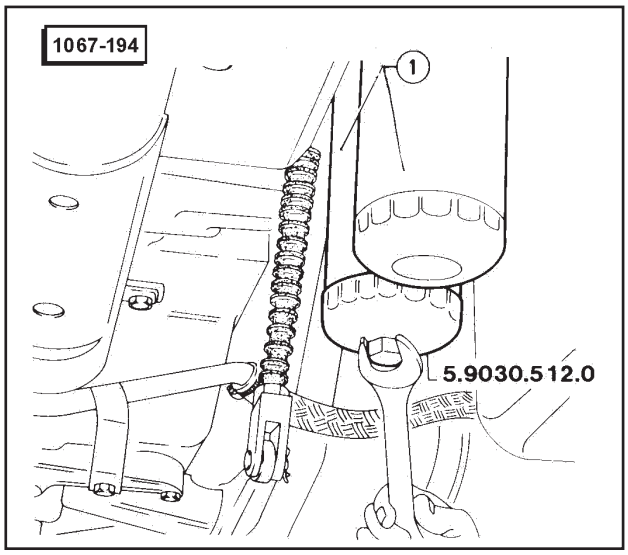
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OIL FILTERS

REPLACEMENT

1. Operating from under the vehicle and using wrench 5.9030.512.0, 'unscrew the two filters **1** and remove them.



1 - Oil filter

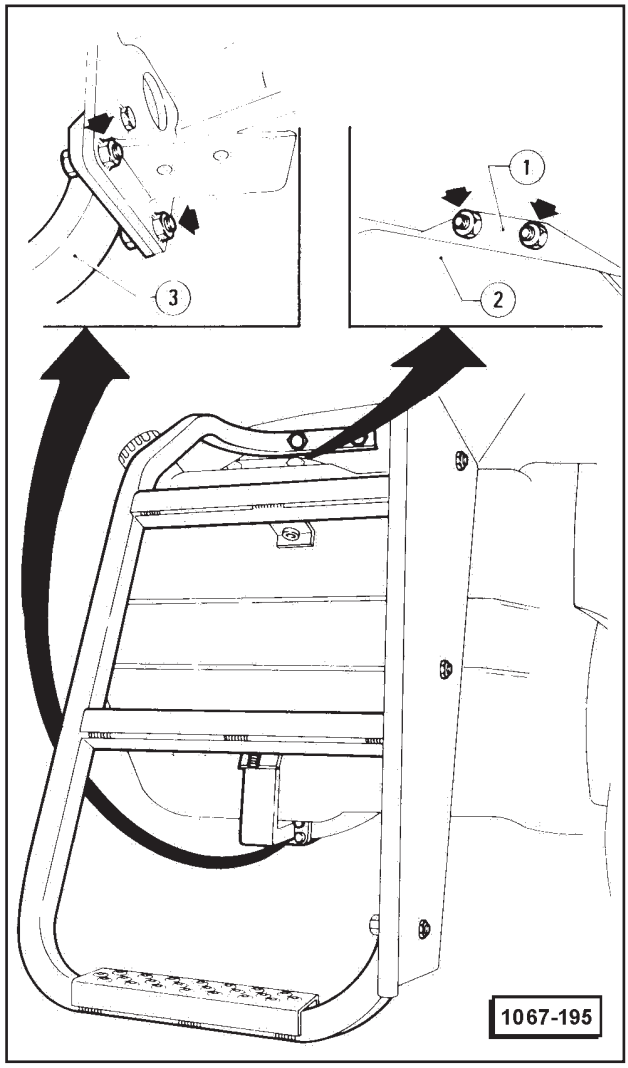
2. When reassembling, fill the new filters with the oil prescribed, lubricate the related gasket, and tighten them manually on filter support.

3. Run the engine and check for oil leaks from filter gaskets.

PRESSURE RELIEF VALVE

REPLACEMENT

1. Unscrew the two bolts of upper bracket **1** supporting right-hand tank **2**.
2. Unscrew the two screws securing bracket **3** supporting right-hand tank lower side, and tilt the tank by resting it on a suitable support.

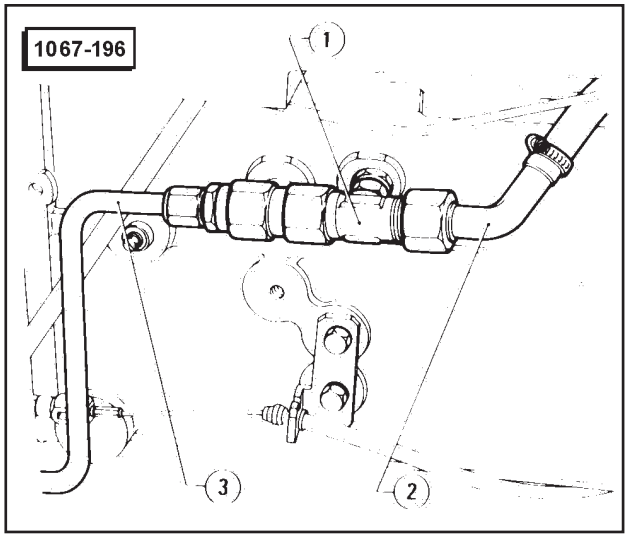


1 - Upper bracket
2 - Fuel tank
3 - Lower bracket

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3. Place a tank to collect the oil under valve unit 1 and disconnect piping **2** and **3** from unit itself.
4. Unscrew the valve unit **4** and remove it from gearbox.



1 - Pressure relief valve unit
2 - Oil delivery pipe
3 - Excess ail drain pipe

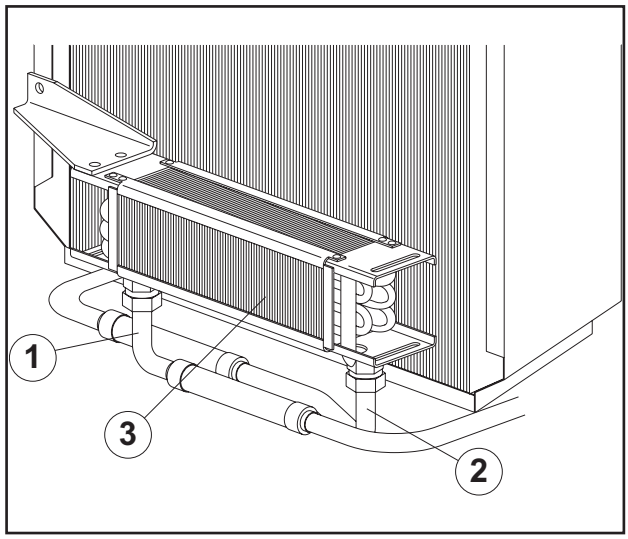
5. Install a new valve unit by reversing the order of removal. At the end of the operation check the gearbox oil level.

OIL RADIATOR

REMOVAL AND INSTALLATION

1. Unscrew the wing nuts, and remove the side left-hand engine lids.

2. Unscrew the unions of piping **1** and **2** from radiator, then remove radiator **3**, handling it with extreme care to avoid excessive oil leaks during removal.



1 - Oil delivery pipe
2 - Oil return pipe
3 - Gearbox ail radiator

3. Install the radiator by reversing the order of removal, checking good condition of radiator rubber bushes. Check also the gearbox oil level; top up if necessary.

CLEANING

1. Thoroughly clean the radiator honey-comb with a jet of compressed air and a wooden stick.
2. Use a spray gun to wash with solvent the radiator inside until the solvent comes out clean.

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TECHNICAL DATA AND SPECIFICATIONS

TECHNICAL DETAILS

Gear lubrication

Particulars			Model		
			110	130	150
Type			-	BOSCH HY/ZFS 11/BL201-0510-425-307	
Maximum engine speed		l/1’	-	17,5	
Pressure relief valve setting		bar (p.s.i.)	-	1 (14.5)	
Lubricating oil pressure (with hot oil)		bar (p.s.i.)	-	1 (14.5)	
Total capacity of gear box and hydraulic circuit		l	76		
Oil filters	Constructor		FIAAM		
	Type		FT 4952 IN		
	Quantity		2		
	Degree of filtration	µm	25		
	Filtering area	cm	7550 x 2		
Gear oil cooler	Type		-	In-flow of air not adjustable	
	Constructor		-	LANGERER 5 & REICH	

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GENERAL SPECIFICATIONS

Gear Oil - Differential

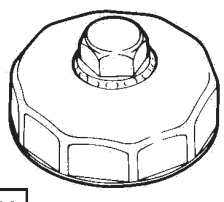
Application	Type	Denomination	Model	Q.ty
Lubrication gear-differential	Oil	AGIP ROTRA THT (API - GL3)	110 - 130 - 150	96 l

NOTE:
— The above quantity refers to the maximum capacity. The good functioning of the group is guaranteed also with a slightly inferior quantity as long as the level is between the minimum and maximum marking shown on the dipstick.
— Control oil level every 150 hours.

Sealants and Fixatives

Application	Type	Denomination	Model	Q.ty
Safety valve screw thread connector of gear lubrication circuit	Fixative	LOCTITE 270	130 - 150	-

SPECIAL TOOLS

Tool number	Denomination	Page ref.
5.9030.512.0	Oil filter wrench  1067-199	5

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CLUTCH P.T.O.

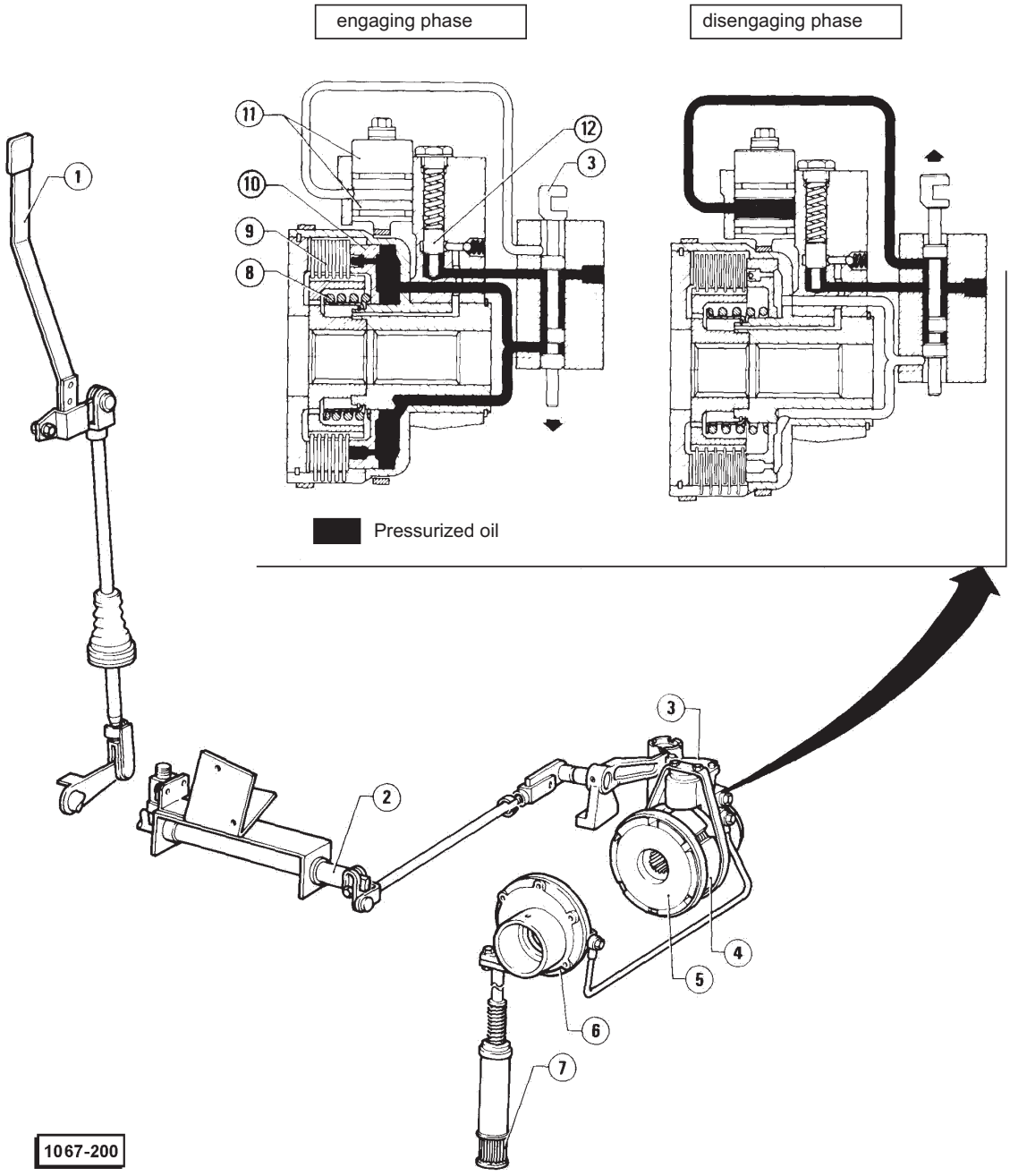
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GENERAL FEATURES



1 - Clutch control lever
2 - Starter lever
3 - Distributor
4 - Clutch PTO
5 - Brake band
6 - Clutch fuel pump
7 - Filter
8 - Spring
9 - Disc package
10 - Pistons
11 - Pistons
12 - Safety valve

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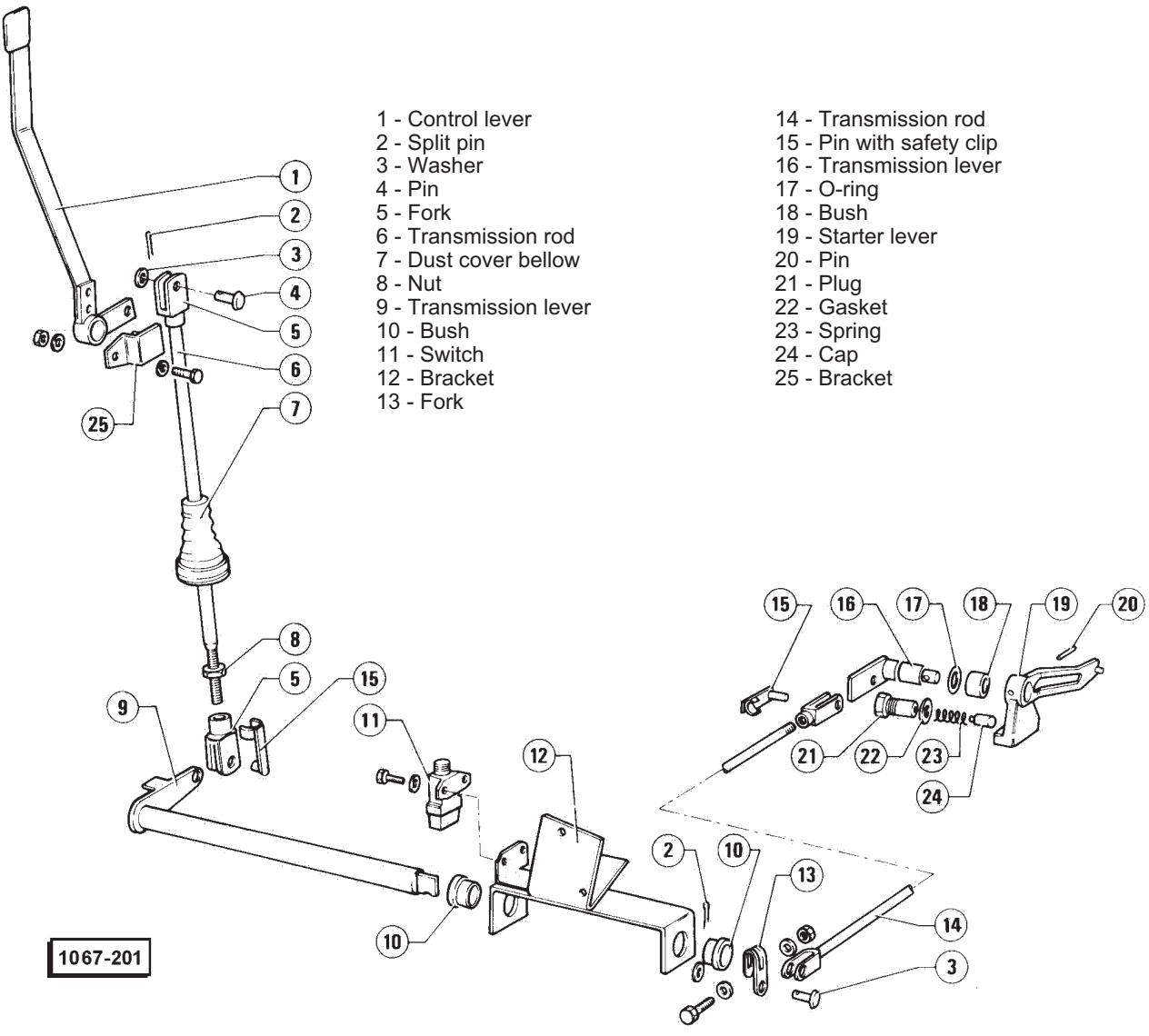
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The clutch P.T.O. is completely independent of the other mechanical parts of the tractor. It is of the multi-disc type in an oil bath with hydraulic controls. The control lever **1** actions, by way of a series of levers **2**, the distributor **3**, allowing pressurized oil to work on the piston **10**; and so allowing the joining of the driving plates with the pressure plates transmitting this to the external drive shaft of the power thrust.

The oil necessary for the working of the clutch is taken from the differential gearbox, and filtered, reaches the pump and gears **6** in direct drive with the engine. The pistons **11** also controlled by the hydraulic distributor **3** at the same time work on the upper plate and the brake band **5** to block the disc housing bell when the clutch is disengaged, and finally to stop the rotation of the external shaft (disengaging phase).

A safety valve **12** eliminates any damage to the hydraulic circuit in the event of an increase in oil pressure caused by bad functioning.

CLUTCH CONTROL LEVER



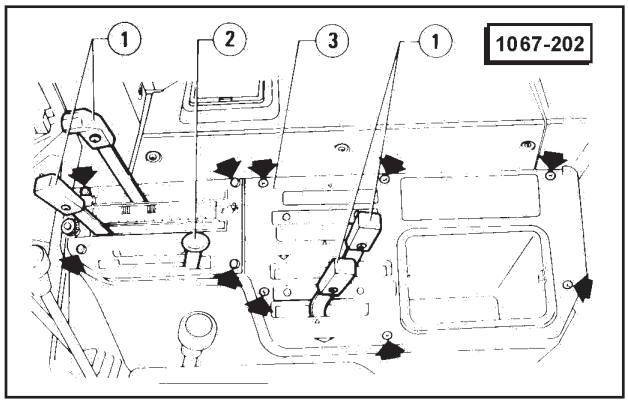
1 - Control lever
2 - Split pin
3 - Washer
4 - Pin
5 - Fork
6 - Transmission rod
7 - Dust cover bellow
8 - Nut
9 - Transmission lever
10 - Bush
11 - Switch
12 - Bracket
13 - Fork
14 - Transmission rod
15 - Pin with safety clip
16 - Transmission lever
17 - O-ring
18 - Bush
19 - Starter lever
20 - Pin
21 - Plug
22 - Gasket
23 - Spring
24 - Cap
25 - Bracket

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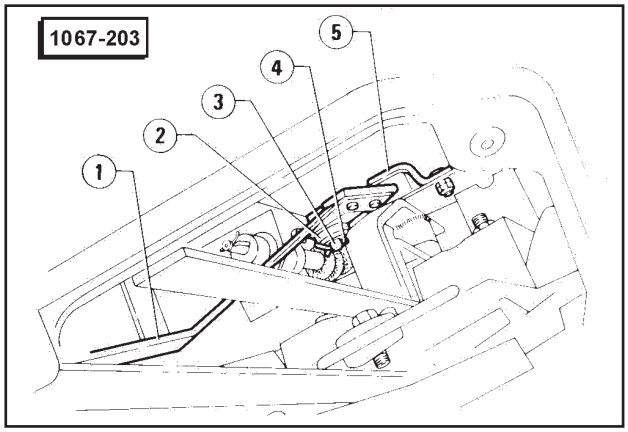
REMOVAL

1. Working from inside the cabin loosen the screws fixing the knobs **1** present on the right side control panel. Remove the knobs.
2. Unscrew the ten fixing nuts on the control panel **3** and remove.



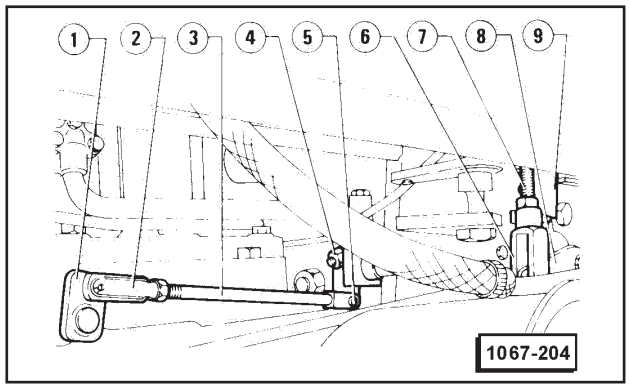
1 - Knobs
2 - Clutch control lever
3 - Control panel

3. Remove the split pin **4** and slip out the pin **3** joining the control lever **1** and the transmission rod fork **2**.
4. Loosen the bracket fixing nut **5** and remove together with the control lever **1**.



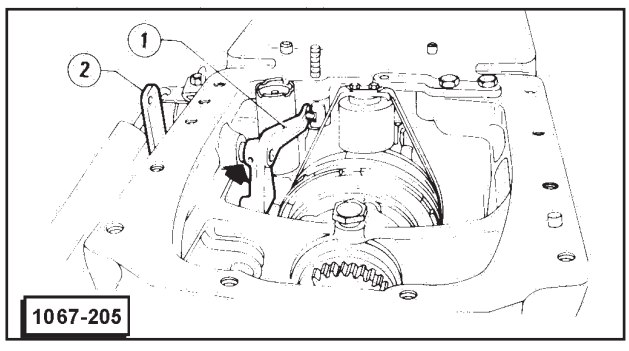
1 - Clutch control lever
2 - Transmission rod fork
3 - Pin
4 - Split pin
5 - Lever support bracket

5. Working from underneath the cabin unhook the safety catch **7** and remove unfastening the rod **6** from the lever **8**. If necessary remove the transmission rod **6** pulling it from inside the cabin together with the protection cover.
6. Loosen the nut **4** fixing the lever **8** to the rod catch. Remove lever **8** with drawing it on the right.
7. Unhook the safety chain **2** and remove unfastening the rod **3** from the lever **1**.
8. If necessary, loosen the two screws fixing the switch **9** and remove.



1 - Transmission lever
2 - Safety catch and pin
3 - Transmission rod
4 - Nut
5 - Pin
6 - Transmission rod
7 - Safety catch and pin
8 - Transmission lever
9 - Switch

9. Remove the hoisting box from the gearbox (refer to: Hoisting Group - Hoisting Box Removal) and the cap of the support pump.
10. With the help of a hammer and punch, remove the pin fixing the coupling lever **1** to the transmission lever 2. Remove both the levers.



1 - Clutch coupling lever
2 - Transmission lever

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CHECKS AND CONTROLS

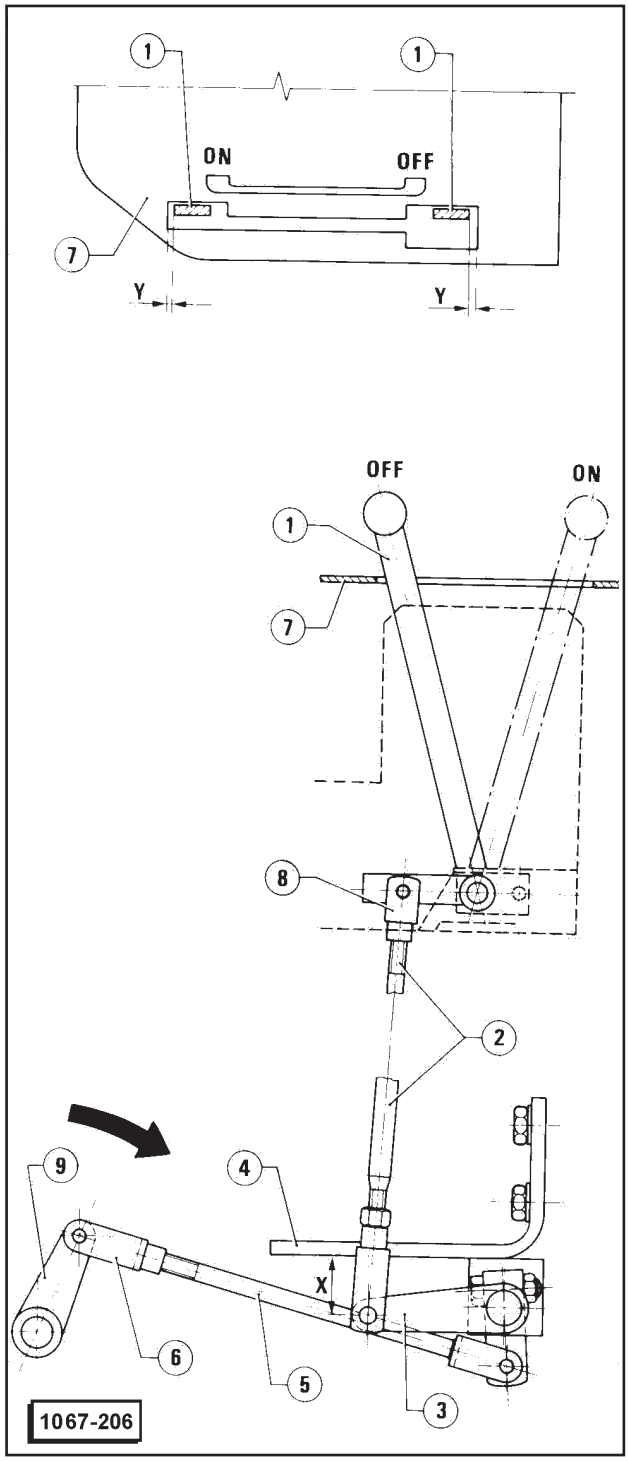
1. Clean the metal parts of the clutch coupling control with adequate solvant and visually check their workability.
2. Control the wear between the levers and rod.
3. Control all the rubber bellows. Change any that appear worn or damaged.

INSTALLATION

Reassembly the clutch control levers working in the reverse order.
— Change the O-ring greasing it with the prescribed grease.
— Lubricate the linkages with the prescribed grease.
— Reassembly completed, control the correct functioning of the levers checking that the engaging and disengaging of the clutch is correct and that the levers do not slip from the working position.
— Proceed with the adjustment of the clutch control lever (see: Adjustment).

ADJUSTMENT

Proceed with the necessary adjustments after the reassembly of the various parts as described in “Reassembly”, scrupulously adhering to the following instructions.
1. With rod **2** disconnected, turn the lever **9** in the direction indicated by the arrow and check that the distance “X” between the transmission lever **3** and the relative support **4** is the same as that given in “Technical Data and Prescriptions - Checks and Adjustments” for the model in question.
2. If unable to obtain the correct distance, either loosen or tighten the fork **6** of the rod **5** until you obtain it.
3. Remount the lever **2**, move lever **1** to the ON/OFF and check that the distance “Y” between the control lever **1** and the panel **7** is the same as that given in “Technical Data and Prescriptions and Checks and Adjustments” for the tractor in question.
4. If unable to obtain the correct value, loosen or tighten the fork **8** of the rod **2** until it is reached.



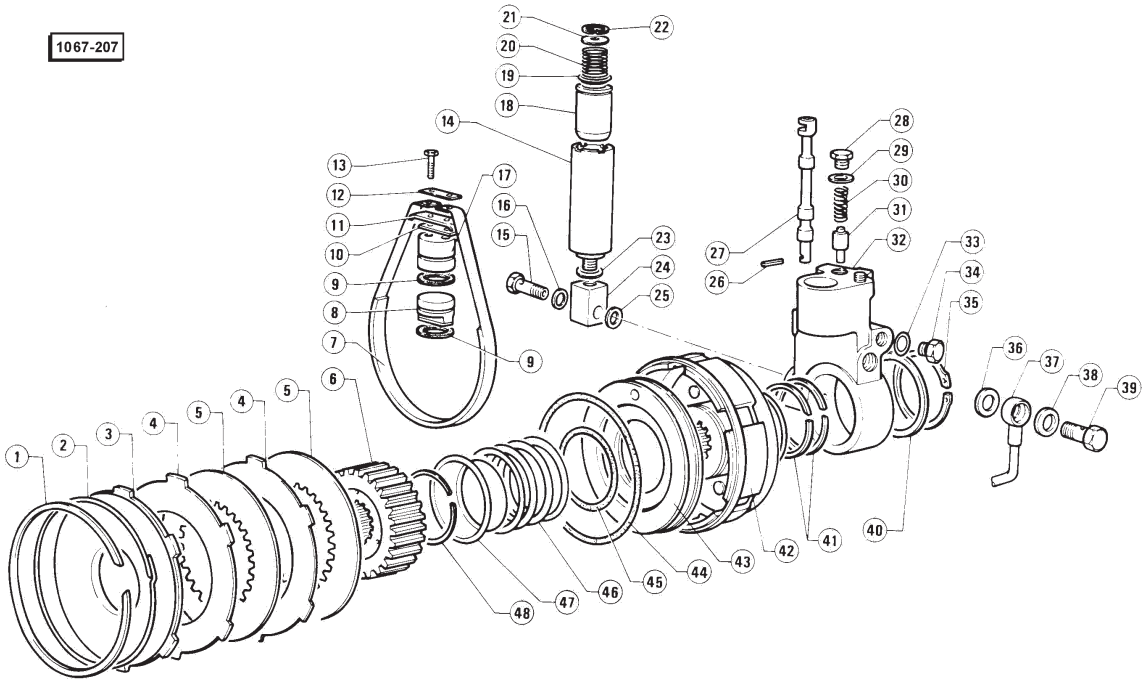
1 - Clutch control lever
2 - Transmission rod
3 - Transmission lever
4 - Support
5 - Transmission rod
6 - Fork
7 - Control panel
8 - Fork
9 - Lever

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CLUTCH

For 130 - 150

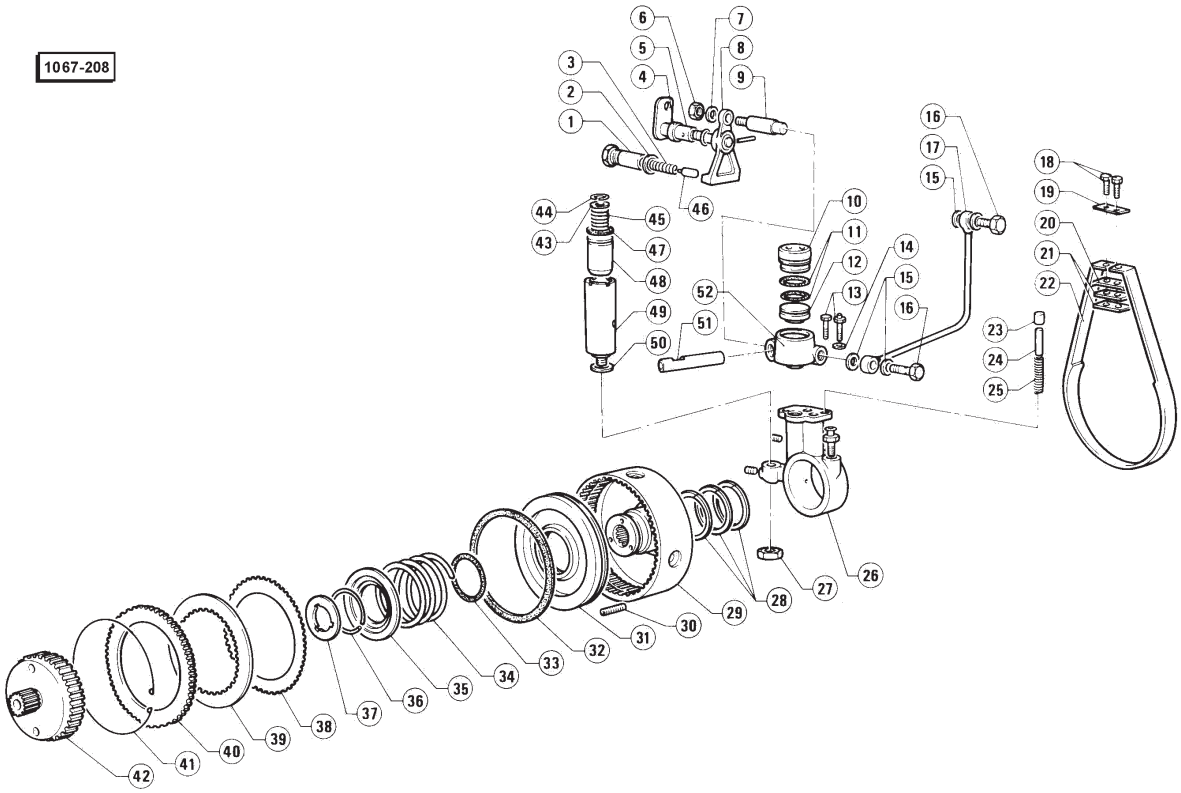


1 - Retaining ring
2 - Safety ring
3 - Parcelling ring
4 - Metal discs
5 - Clutch discs
6 - Toothed wheel
7 - Brake band
8 - Secondary pistons
9 - O-ring
10 - Shims
11 - Blocking plate
12 - Plate
13 - Main piston band brake fixing screw
14 - Shock absorber cylinder
15 - Union
16 - Gasket
17 - Main piston
18 - Shock absorber piston
19 - O-ring
20 - Spring
21 - Shoulder disc
22 - Seeger ring
23 - O-ring
24 - Union block
25 - Gasket
26 - Pin
27 - Distributor
28 - Plug
29 - Gasket
30 - Spring
31 - Safety valve
32 - Distributor body
33 - Gasket
34 - Plug
35 - Seeger ring
36 - Gasket
37 - Fuel pipe
38 - Gasket
39 - Union
40 - Washer
41 - Metal support link
42 - Clutch body
43 - Pistons
44 - Support link
45 - Support link
46 - Spring
47 - Retainer
48 - Compression ring

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For 110



1 - Plug
2 - Gasket
3 - Spring
4 - Spacer
5 - Transmission levers
6 - Nut
7 - Notched washer
8 - Coupling lever
9 - Pin
10 - Main piston
11 - O-ring
12 - Secondary piston
13 - Screws
14 - Notched washer
15 - Gaskets
16 - Union
17 - Rigid union tube
18 - Band brake fixing screw
19 - Blocking plate
20 - Plate
21 - Shims
22 - Band brake
23 - Piston
24 - Drive shaft
25 - Spring
26 - Manifold
27 - Shock absorber fixing nut
28 - Compression ring
29 - Clutch body
30 - Headless screw
31 - Piston
32 - Gasket
33 - Support link
34 - Spring
35 - Spring
36 - Compression ring
37 - Shoulder ring
38 - Ring with external teeth
39 - Ring with internal teeth
40 - Spacer
41 - Compression ring
42 - Support discs
43 - Shoulder ring
44 - Compression ring
45 - Spring
46 - Cap
47 - Support link
48 - Shock absorber piston
49 - Shock absorber cylinder
50 - Gasket
51 - Distributor
52 - Distributor body

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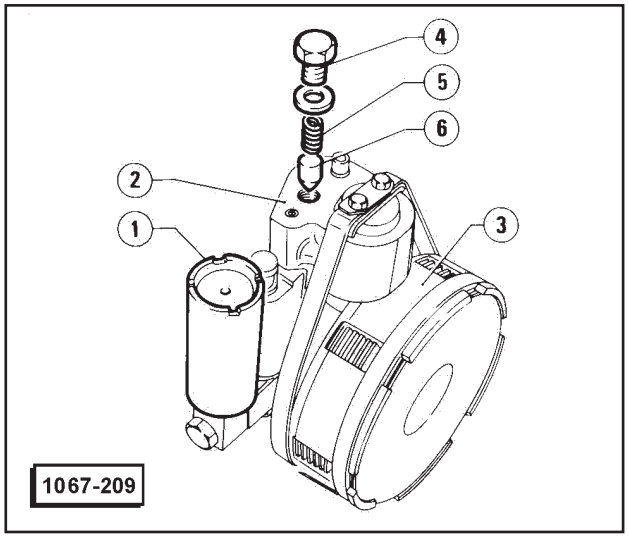
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REMOVAL

Remove the clutch from the differential box (refer to: Gearbox - P.T.O. - Disassembly).

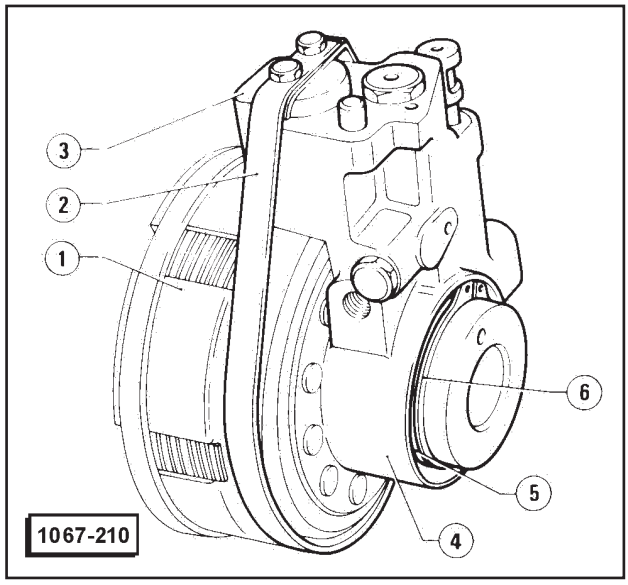
DISASSEMBLY

Only far models 130 and 150 (Clutch VALEO)
1. Unscrew the plug **4** fixing the safety valve, and using a magnet extract the spring **5** and the valve **6**.
2. Loosen the screw fixing the shock absorber **1** to the clutch and remove.



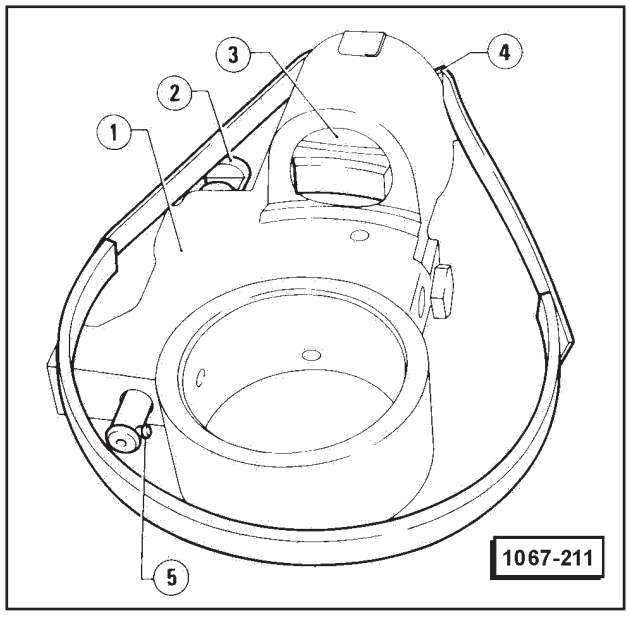
1 - Shock absorber
2 - Distributor
3 - Clutch
4 - Plug
5 - Spring
6 - Spring

3. Refer to the enlarged diagram if necessary, and dismount the shock absorber. Remove the Seeger ring **22** together with the shoulder disc **21** and extract the spring **20** and the piston **18**.
4. Refer to the following diagram and remove the Seeger ring **6** and the washer **5** under it. Carefully remove the distributor body **4** with the band brake **2** from the clutch body **1**. Remove the metal support links from the clutch body.



1 - Clutch body
2 - Band brake
3 - Distributor
4 - Distributor body
5 - Washer
6 - Seeger ring

5. Slip piston **3** and piston **4** with the band brake from the distributor body. Remove the pin **5** and take off the distributor upwards.

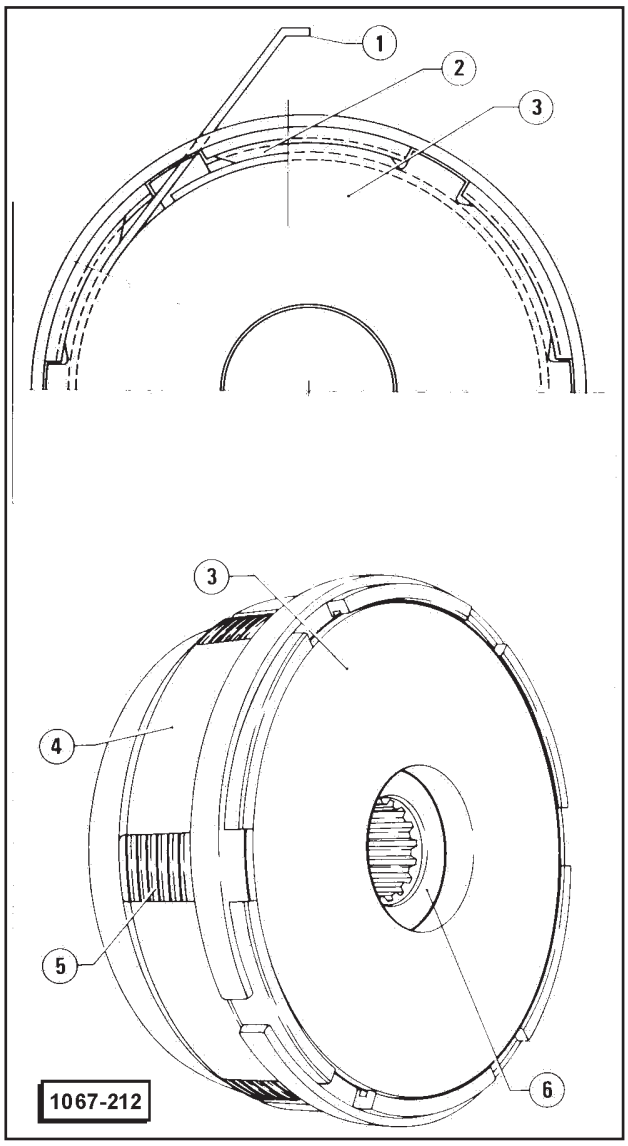


1 - Distributor body
2 - Distributor
3 - Piston
4 - Band brake piston
5 - Pin

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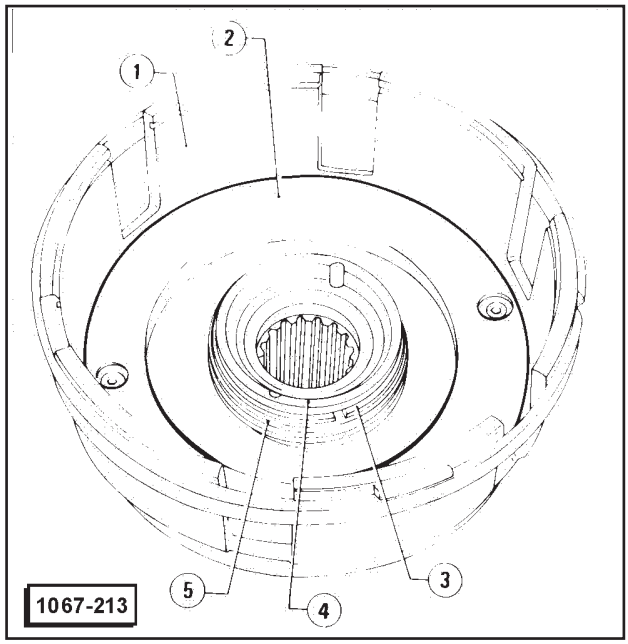
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6. Dismount the clutch body using the following procedure.
(1) Block the clutch body on a vice with protective jaws and move the safety ring **1** so that the end of it coincides with one of the slits in the clutch body.
(2) Using pliers, carefully remove the safety band **1**.
(3) Remove the compression ring **2**.
(4) Remove the packaging ring **3** the disc package **5** and the indented wheel **6**.



1 - Safety band
2 - Compression ring
3 - Packaging ring
4 - Clutch body
5 - Disc parcel
6 - Indented wheel

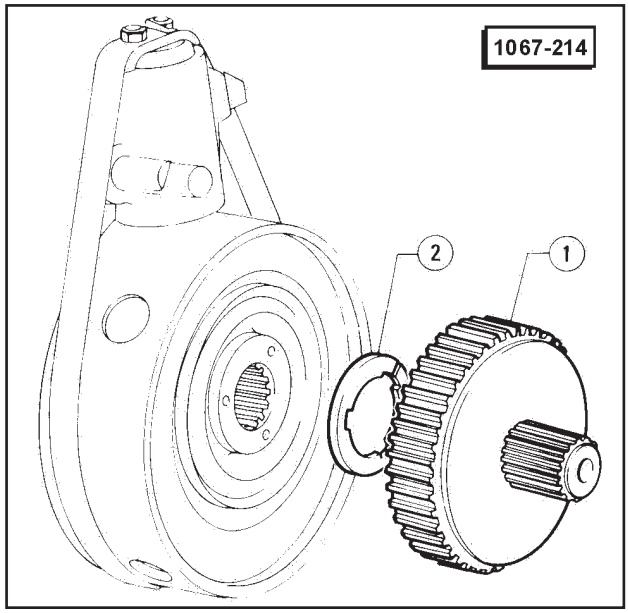
(5) Hold the retainer **4** still, and remove the compression ring **3**. Remove the retainer **4** and the spring **5.**
(6) Using compressed air remove the piston **2**.



1 - Clutch body
2 - Piston
3 - Compression ring
4 - Retainer
5 - Spring

Only for model 110

1. Take off the support **1** and the shovel ring **2** from the clutch.

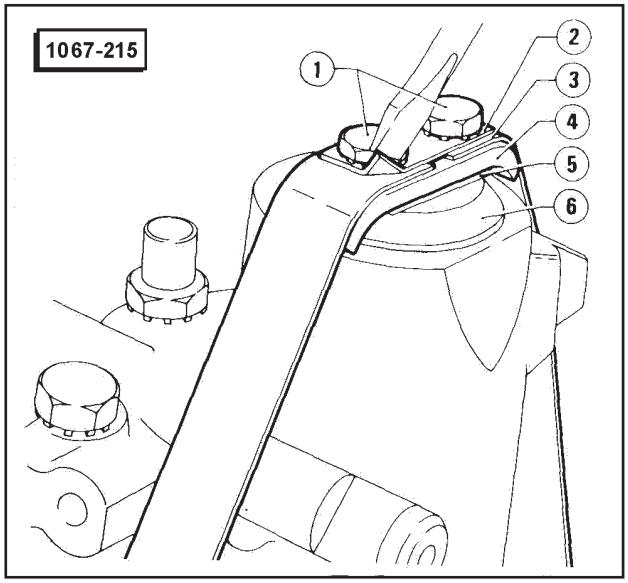


1 - Disc support
2 - Shovel ring

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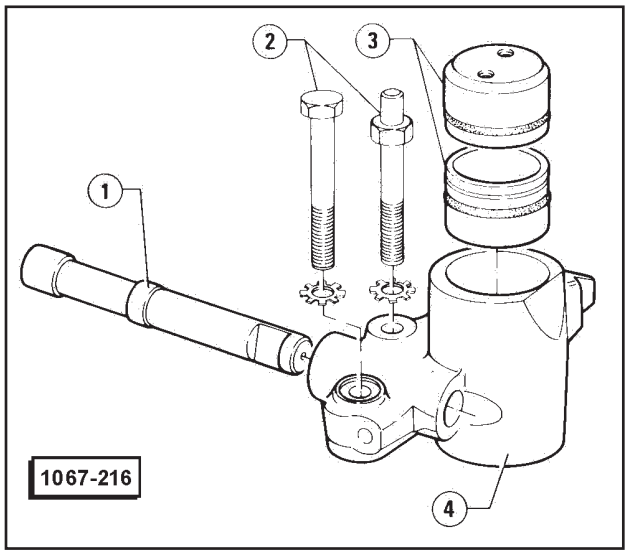
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2. Referring to the first enlarged diagram, unscrew the nut **27** take off the cylinder **49** and then open the compression ring **44** and withdraw the shoulder ring **43**, the spring **45**, the support link **47** and the piston **48**.
3. Flatten the wings of the two screws **1** fixing the block plate and the band **3** to the main piston **6**, loosen the two screws and remove the block plate **2** the band brake **3** and the secondary plate **4** and the shims **5**.



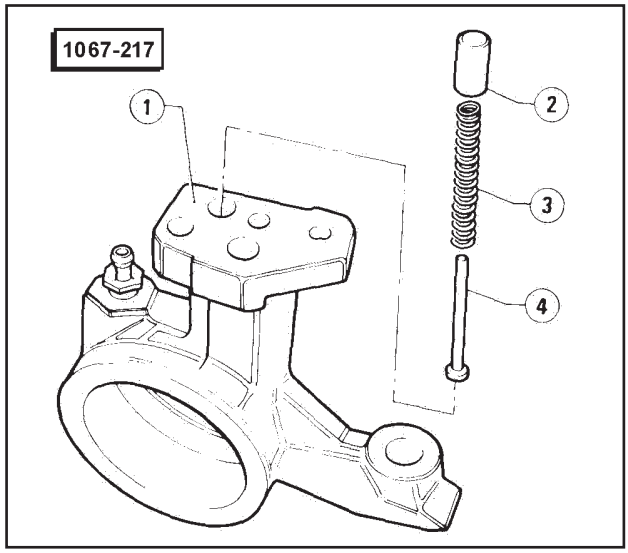
1 - Sand fixing screws
2 - Block plate
3 - Sand brake
4 - Secondary plate
5 - Shims
6 - Main piston

4. Loosen the two screws **2** fixing the distributor body 4 and remove.
5. If necessary remove the distributor **1** and the two pistons **3** from the distributor body **4.**



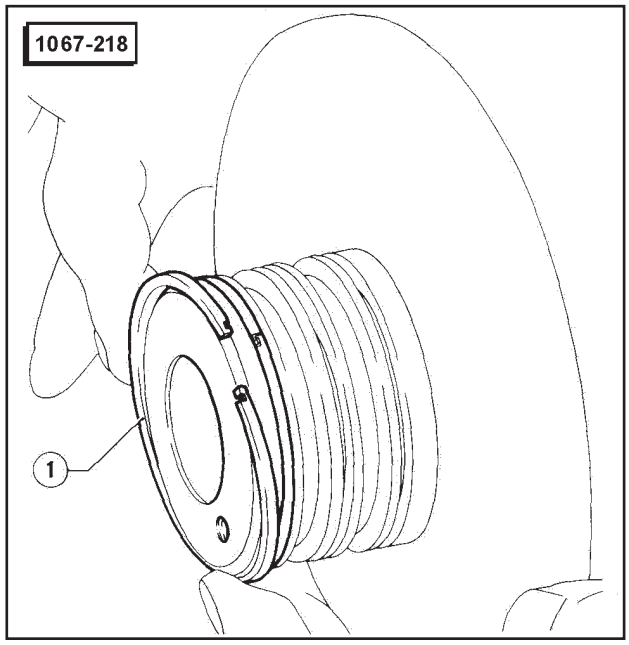
1 - Distributor
2 - Fixing screws
3 - Piston
4 - Distributor body

6. Remove the manifold **1** from clutch body and extract the piston **2**, the spring **3** and the drive shaft **4**.



1 - Manifold
2 - Piston
3 - Spring
4 - Drive shaft

7. It necessary, remove the compression band **1** opening the clips.

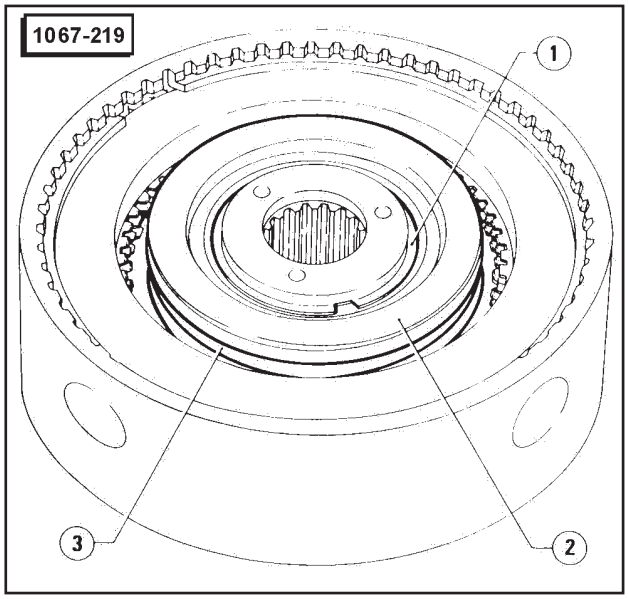


1 - Compression band

8. It necessary, dismount the discs using the following procedure.
(1) Open the compression band **1** take off the disc **2** and the spring **3.**

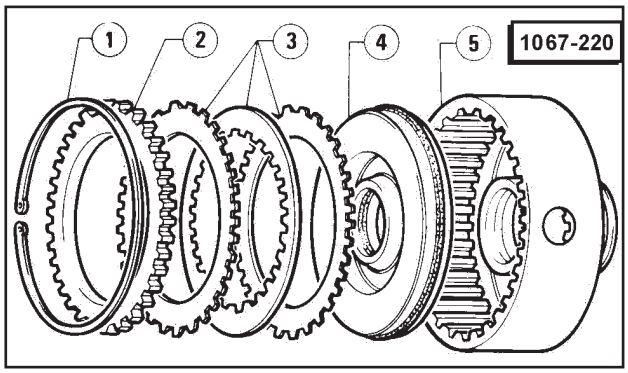
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1 - Compression ring
2 - Disc
3 - Spring

(2) Take off the compression band **1** and take out the spacer **2** and the disc package **3** then, using compressed air, extract the piston **4** from the clutch body **5**.



1 - Compression ring
2 - Spacer
3 - Disc package
4 - Piston
5 - Clutch body

CHECKS AND VERIFICATIONS

Wash all parts of the clutch with prescribed solvant and dry them with compressed air. Proceed to check each part, particularly the following, carefully for defects.

1. Check the distributor and the clutch body pistons.
(1) Check that the inside of the cylinders and the pistons are not rusty. If necessary change them.
(2) Check the wear and tear of cylinder and pistons. If there is too much play change the complete cylinder or piston.
(3) Check that the piston thrust disc does not show signs of tempering or marks. If so, change it.
(4) Check the conditions of the support links, changing the faulty parts.
(5) Check all the spaces, openings and internal passages of the clutch and distributor bodies are clean and free from particles.

2. Clutch disc check
(1) Check that all the sliding areas of the discs are not worn; chipped or scratched. Change any faulty discs.
(2) Check that the discs move freely in their seats.

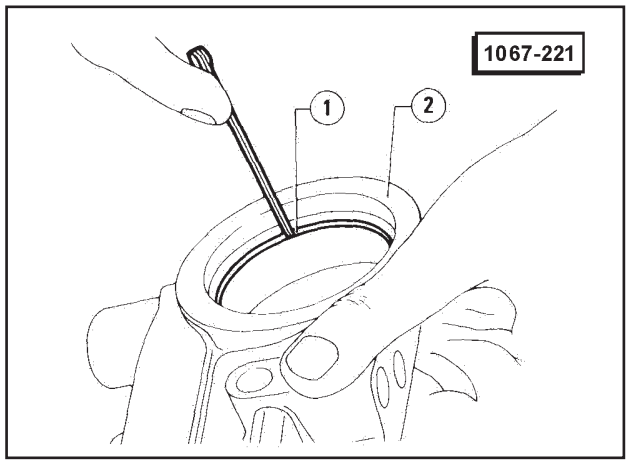
3. Check that the teeth of the indented support work on all sides. If you find broken or faulty teeth must change the wheel. If you find teeth with bumps, remove them with a file.

4. Control the fix efficiency of the springs checking that they are not twisted or deformed. If necessary change them.

5. Check that the distributor and safety valve are not deformed, scratched or have excessive play in their seats. If necessary, change the faulty parts.

6. Check the wear of the friction gasket of the brake band and the relative piston. Change the parts if too worn.

7. Only for models 130 and150 (Clutch VALEO)
Temporarily position the metal support links 1on the inside of the distributor body 2.
Using a feeler gauge, check that the play between the end of the links is not less than the value given in “Technical Data and Prescriptions - Checks and Controls”.



1 - Metal support link
2 - Distributor body

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REASSEMBLY

Remount the clutch working in the reverse order adhering to the following instructions.
— On remounting change all the support links, the gaskets and the O-rings, lubricating them with prescribed oil.
— Pay particular attention to the- manner in which the parts are mounted referring to the enlarged diagram.
— Remount the disc package checking that the first and last disc are metal.
— After having remounted the disc package check that they have enough play.
— Block the threaded unions with the prescribed sealants.

Only for model 110
— Spread the unions between the manifold and the distributor body with the prescribed sealant.

INSTALLATION

Remount the clutch in the differential housing (refer to: Gearbox - P.T.O. - Remounting) and carry out the necessary adjustment (refer to: Adjustments).

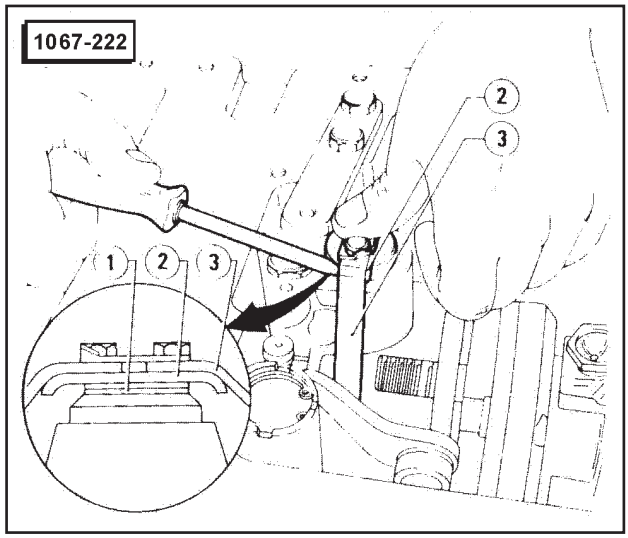
ADJUSTMENTS

Proceed with the necessary adjustments after mounting the various parts as described in “Remounting and Reassembly”, carefully adhering to the following procedure:

PLAY ADJUSTMENT BETWEEN THE STARTER PISTON AND THE BAND BRAKE

1. Press with the finger on the main piston as shown in the diagram, and at the same time lift the band brake with a screwdriver.
2. Sensitivity check that the play is around **1 to 2 mm** (0.0393 to 0.0787 in).
3. If the play is not that given, increase or reduce the shims **1** until you obtain the correct value.

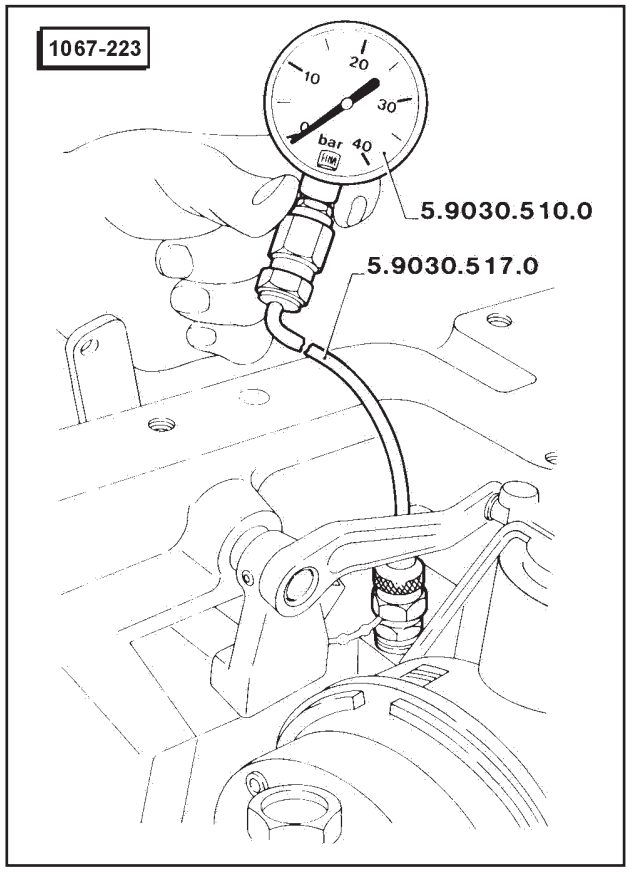
CAUTION
So that the band brake does not break under strain, correctly position the shims 1 touching the pistons and covered by the plate 2.



1 - Shims
2 - Plate
3 - Band brake

CLUTCH OPERATING - PRESSURE CHECK

1. Using the correct spanner, loosen the shock absorber and remove it.
2. Screw a flexible pipe 5.9030.517.0 and manometer 5.9030.510.0 onto the union block.



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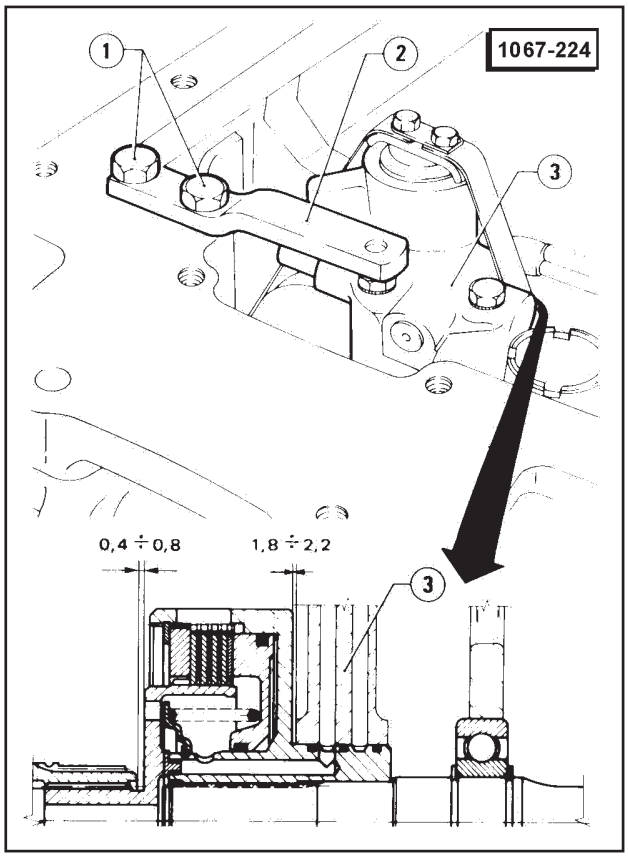
3. Start the engine, action the P.T.O. clutch and check the pressure value reading on the manometer 5.9030.510.0 is the same as that given in “Technical Data and Prescriptions - Technical Data” for the tractor model in question.
4. If the value is not correct, proceed with another accurate check of the clutch and/or the fuel pump (refer to: Hydraulic Pump Check).
5. Having checked, remount the shock absorber, blocking the union threads with the prescribed sealer.

ADJUSTMENT OF PLAY BETWEEN THE MANIFOLD AND THE CLUTCH BODY

For 110

— Find out what play there is between the manifold and the clutch body. If it is not within the values of **1.8 to 2.2 mm** (0.0708 to 0.0866 in) adjust it as follows.

(1) Loosen the two screws **1** fixing the bevel square **2**.
(2) Move the manifold **3** in such a way to reach values given above, then tighten the screws **1**.

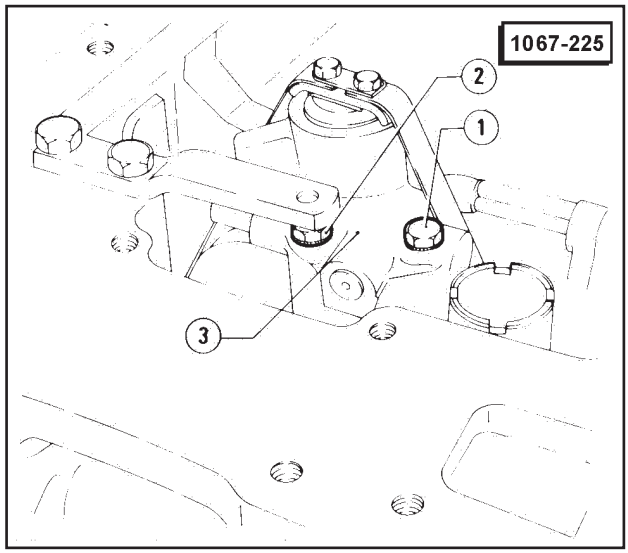


1 - Fixing screws
2 - Adjusting screws
3 - Distributor body

ADJUSTMENT OF THE DISTRIBUTOR PISTON POSITION

For 110

— Check that the piston is free from the rod lever. Se certain that when the control lever is fully pushed back, the distributor is in line with the back edge of the distributor body.
To adjust the position of the distributor, first loosen the screw **1** then screw **2** at the same time moving the distributor body **3** until you bring it to the correct position, then tighten first screw **2** then screw **1**.

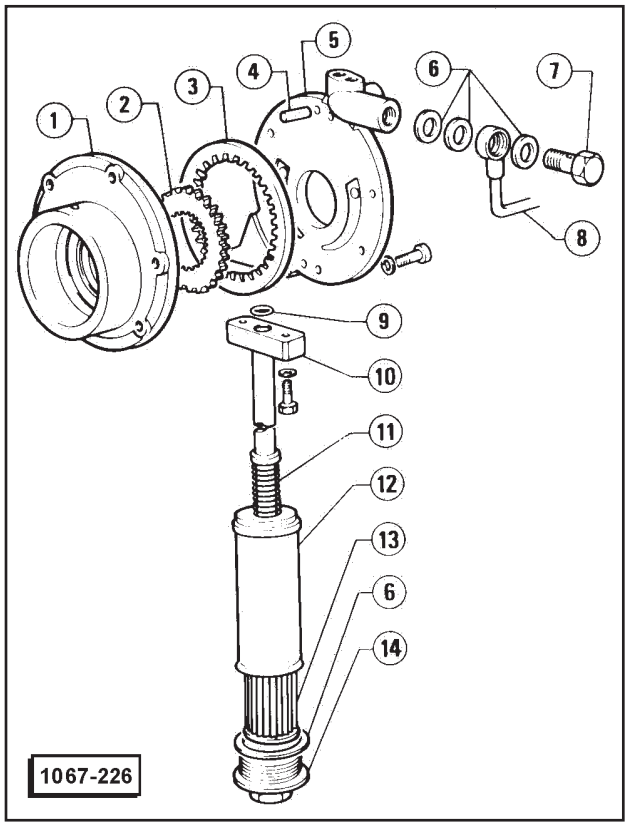


1 - Fixing screw
2 - Adjusting screw
3 - Distributor body

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HYDRAULIC PUMP



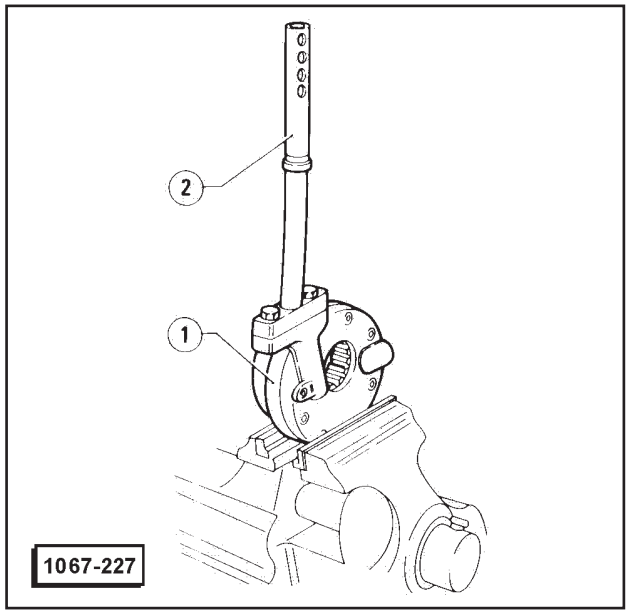
1 - Pump body
2 - Internal gears
3 - External gears
4 - Pin
5 - Pump cover
6 - Gasket
7 - Union
8 - Delivery pipe to clutch
9 - O-ring
10 - Fuel piping
11 - Spring
12 - Cover
13 - Filter
14 - Plug

REMOVAL

Remove the pump from the differential box (refer to: Gearbox - P.T.O. - Dismounting).

DISASSEMBLY

1. Fix the pump onto a vice with protective teeth and loosen the screws fixing the pipes **2** to the pump. Remove the pipes together with the O-ring.
2. Loosen the six screws fixing the pump. Open the pump and remove the two internal gears.



1 - Pump
2 - Pump fuel pipes

CHECKS AND VERIFICATIONS

Accurately wash the parts and visually check each one for defects.
1. Check that the teeth of the gears works on all sides. If not, change any that are faulty.
2. Also check that the teeth are not chipped or show signs of excessive wear. If necessary change them.
3. Check that the mating surfaces of the two parts of the pump body are free from splits; bumps or chips. If necessary change the defective parts.
4. Check that the spaces and internal passages of the pump body are dean and free from particles.

REASSEMBLY

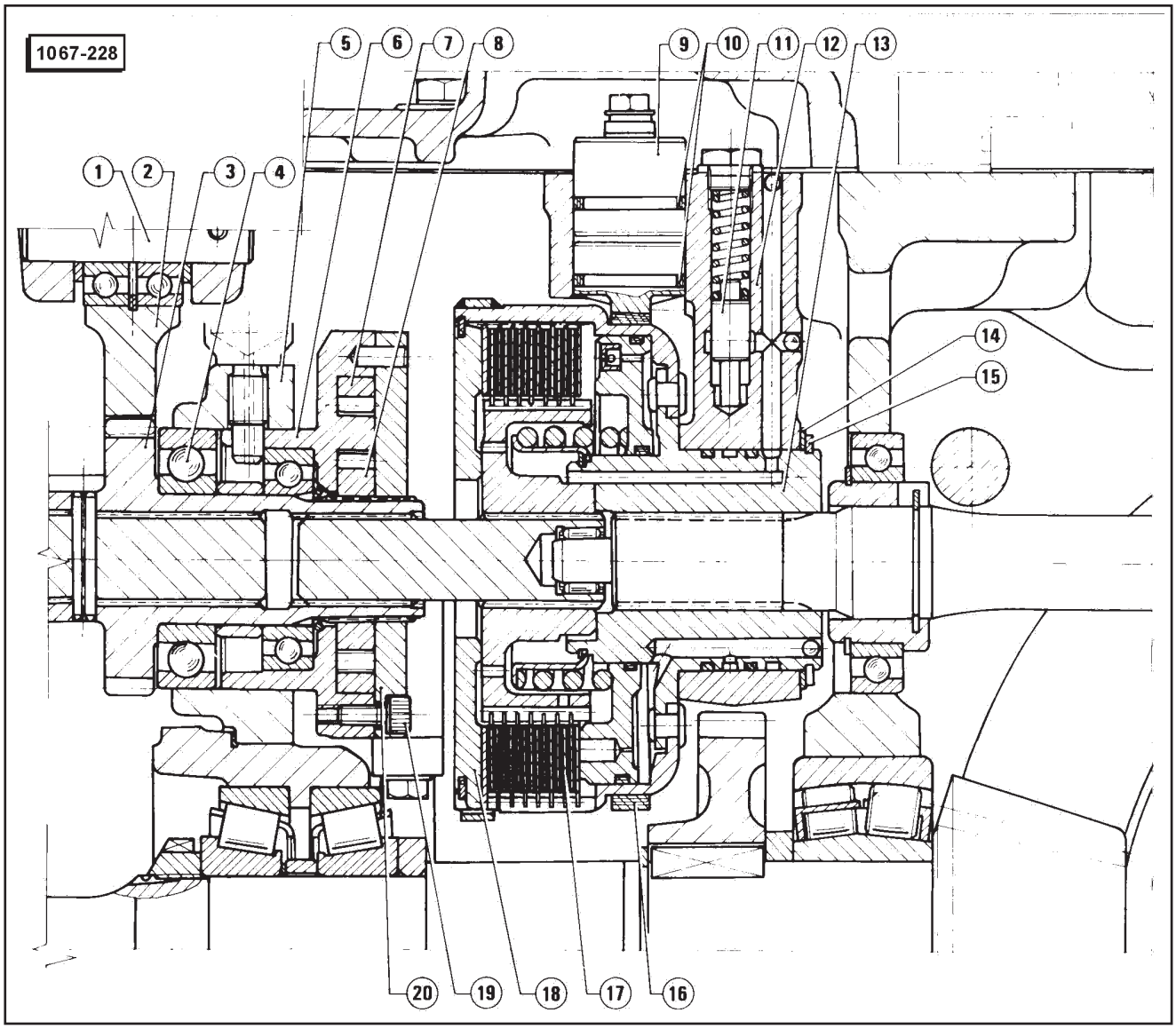
Remount the pump working in the reverse order, changing the O-ring and the gaskets.

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INSTALLATION

Remount the pump into the differential box (refer to: Gearbox - P.T.O. - Remounting).



1 - Pump gear lever pin
2 - Pump gear lever
3 - Gear conductor
4 - Bearing
5 - Union
6 - Oil pump PTO body
7 - External gears
8 - Internal gears
9 - PTO clutch brake piston
10 - O-ring
11 - Safety valve
12 - Manifold
13 - PTO clutch body
14 - Shovel ring
15 - Seeger ring
16 - Band brake
17 - Disc package
18 - Packaging ring
19 - PTO pump closing screw
20 - PTO pump cover

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TECHNICAL DATA AND SPECIFICATIONS

TECHNICAL DATA

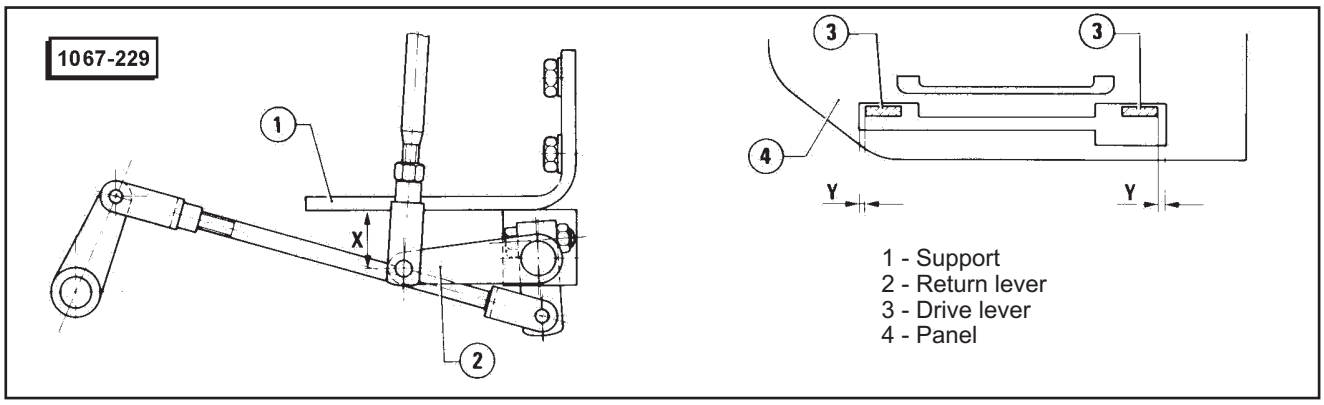
Clutch PTO

Features		Model		
		110	130	150
Clutch manufacturer		Manufacturer	VALEO	
Type		hydraulic multidisc with band brake		
Number of discs		4	7	
Diameter of discs	mm (in)	149 (5.87)	140 (5.51)	
Number of shoulder rings		5	8	
Disc lubrification pressure (P.T.O. release)	bar	10 ÷ 14	7,5	
Free run of brake control piston	mm (in)	1,5 (0.06)	1,5 ÷ 2 (0.06 to 0.08)	
Hydraulic pump		as gears		
Max. engine rev.	l/1	9 ÷ 11	25	
Max. calibrating pressure (P.T.O. disengaged)	bar	10 ÷ 14	12 ÷ 17	
Oil filter		in metal		
Filtration capacity	micron	90		
Filtration area	mm (in)	330 (12.10)		
Hydraulic distributor run	mm (in)	14 (0.55)		
Play between piston ring ends	mm (in)	0,2 (0.008)		

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CHECKS AND ADJUSTMENTS



Unit: mm (in)

Type of check	Model		
	110	130	150
"X" distance between the return lever and relative support	45 (1.77)		
"Y" play between drive lever and panel	2 ÷ 3 (0.08 to 0.12)		
Play between starter piston and band brake	1 ÷ 2 (0.04 to 0.08)		
Play between manifold and clutch body	1,8 ÷ 2,2 (0.07 to 0.09)		

GENERAL PRESCRIPTIONS

Fluids and Lubricants

Application	Type	Denomination	Model	Q.ty
Topping up of differential gear oil	Oil	AGIP ROTRA THT (API - GL3)	110 - 130 - 150	

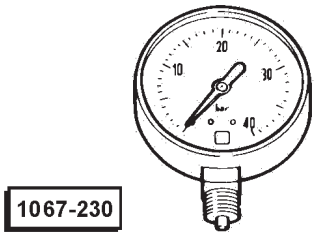
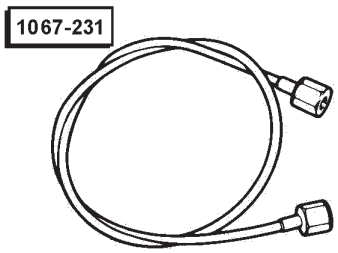
Fixatives and Sealants

Part	Type	Denomination	Model	Q.ty
Distributor body manifold	Sealant	HYLOMAR	110 - 130	-
Threaded unions	Fixative	LOCTITE 270	150	-

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SPECIAL TOOLS

Tool Number	Tool Name	Page No.
5. 9030.510.0	Manometer in glycerine bath O to 40 bar (0 te 580 p.s.i.)  	
5.9030.517.0	Flexible union piping  	

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TROUBLE SHOOTING AND CORRECTIVE ACTION

Trouble	Probable cause	Corrective action
P.T.O. is late starting	Incorrect distributor run	Register control lever
	Distributor position incorrect	Register distributor position
	Distributor body position incorrect	Register distributor body position
	Overpressure valve damaged	Check the valve
	Piston rings worn	Change piston rings
	Brake discs deformed	Change brake discs
	Piping blocked	Dismount and clean the clutch body and distributor
	Pump capacity insufficient	Adjust fuel pump PTO
P.T.O. slides under stess	Control course incorrect	Adjust distributor and levers
	Brake discs worn	Change discs
	Insufficient pressure control	Check oil level Adjust the pump and distributor housing
P.T.O. doesn't stop when disengaged	Band brake worn	Change band brake
	Leakage in starter piston	Adjust piston and distributor housing
	Incorrect control run	Adjust levers and distributor

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HYDROSTATIC STEERING

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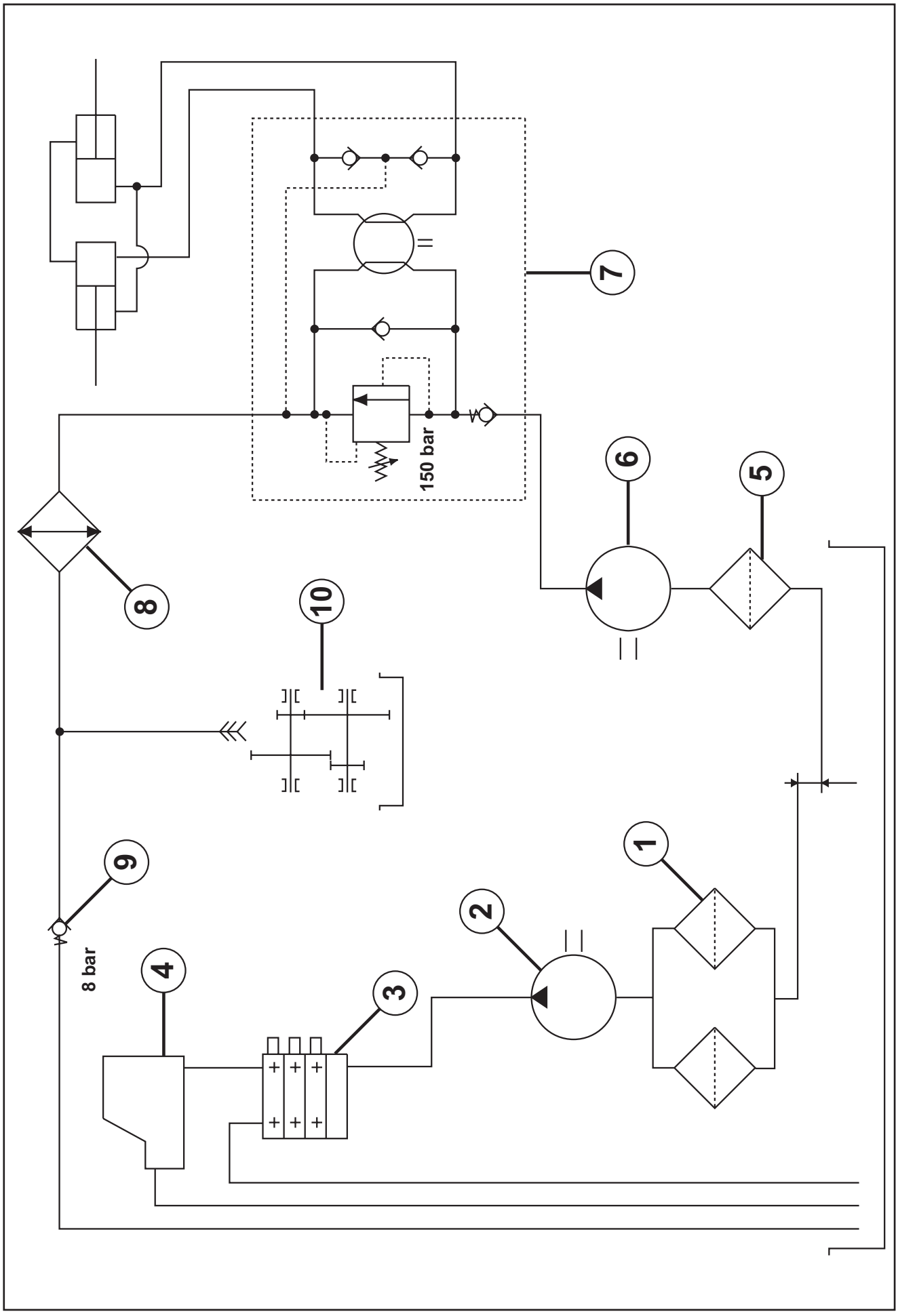
CARACTERISTIQUES GENERALES

The steering system which is without any direct mechanical link between the wheels and the steering wheel, stops vibrations going from the tyres to the driver. Designed with reactive open center, it consents the driver to feel turning movement on the steering wheel so that he can quickly change direction.
The movement which is felt on the steering wheel increases the effect of the self centering, so that, when you leave the steering wheel, the wheels automatically align themselves with the tractor.
The oil from a special tank **1** is sent in pressure through a resounder **12** to the distributor **3** of a pump **14** found on the upper lid **15** of the gearbox, and actioned continuously by a speed gear.
By turning the steering wheel **2** you work on the distributor positioning helical, and on the capacity shutter which permits the flow of oil in pressure to the control cylinders **10** in the necessary quantity for the required turning. Depending which way you turn, the oil which is found in the opposite cylinder chamber, returns through the pipes **5** to the distributor and from it through the pipe **8** to the tank.
Before the oil is taken in by the pump it passes through a filter which removes impurities in the oil.
The presence of the resounder, allows variations in pressure and consequently vibrations, to be absorbed, therefore reducing the noise of the engine.
The two control cylinders, either double effect (for the 4 RM model) of single effect for (the 2 RM model) joined to the front hub **11** ensures the necessary thrust for turning in any conditions.
This system also offers the advantage of being able to drive the tractor even if the engine stop motor fails. A valve situated in the distributor, consents the capacity shutter to take in oil from the exhaust circuit when the pump delivery circuit has insufficient pressure.

1 - Oil filters 25 µ
2 - Hydraulic pumps
3 - Auxiliary hydraulic valves
4 - Hydraulic rear lift
5 - Oil filters 15 µ
6 - Hydraulic pumps
7 - Power steering directional control valve
8 - Radiator
9 - By-pass valve
10 - Hydraulic circuit of the transmission lubrication

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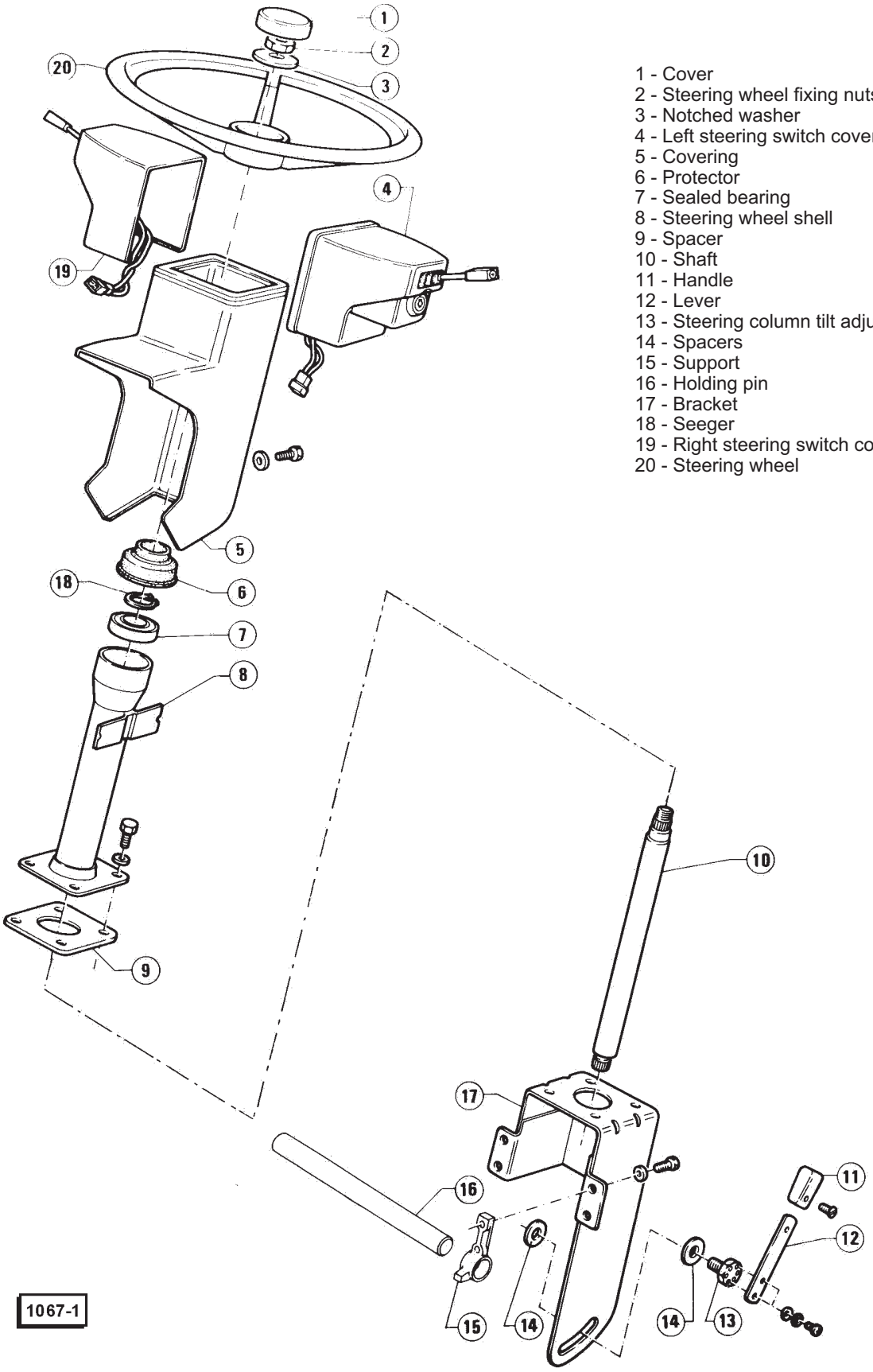
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STEERING WHEEL AND STEERING COLUMN



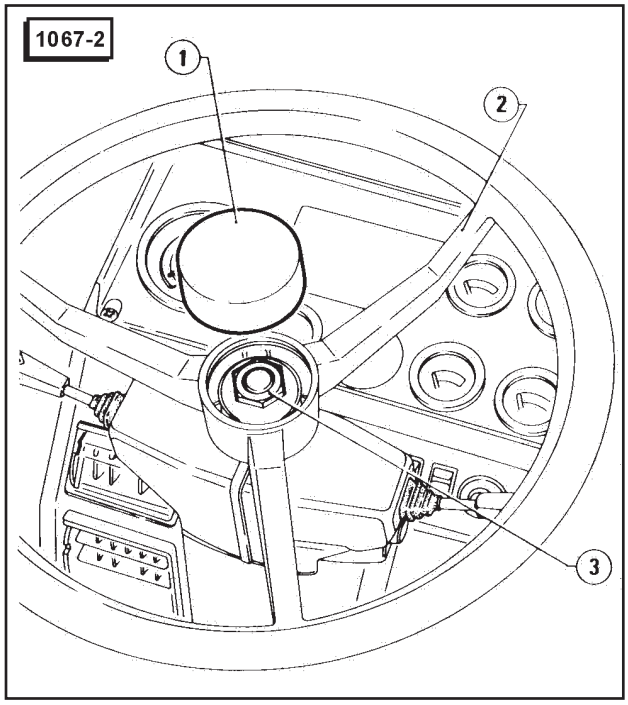
1 - Cover
2 - Steering wheel fixing nuts
3 - Notched washer
4 - Left steering switch cover
5 - Covering
6 - Protector
7 - Sealed bearing
8 - Steering wheel shell
9 - Spacer
10 - Shaft
11 - Handle
12 - Lever
13 - Steering column tilt adjusting screw
14 - Spacers
15 - Support
16 - Holding pin
17 - Bracket
18 - Seeger
19 - Right steering switch cover
20 - Steering wheel

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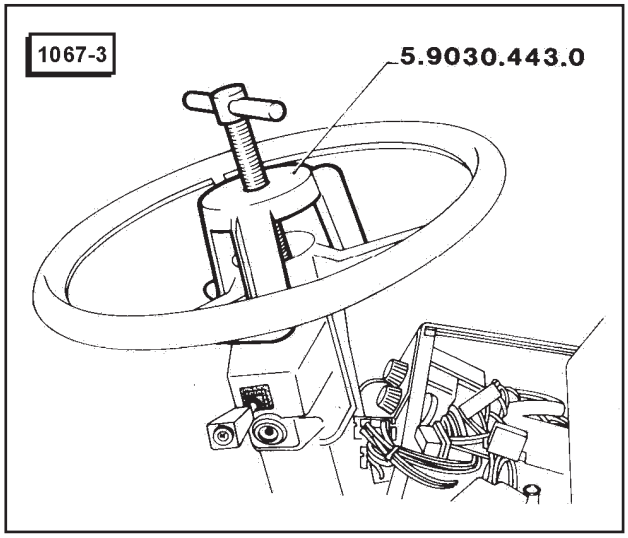
REMOVAL

1. Unscrew and remove the cover **1** from the middle of the steering wheel **2**.
2. Loosen the steering wheel fixing nut **3**.

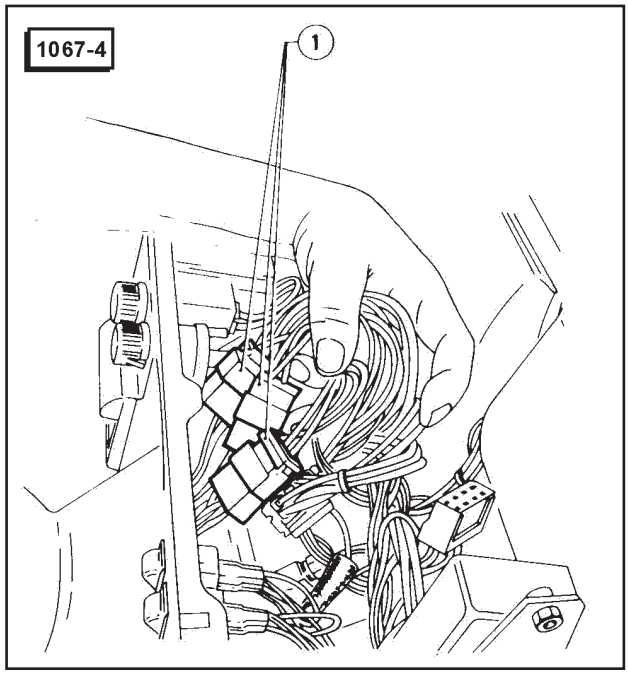


1 - Cover
2 - Steering wheel
3 - Steering wheel fixing nut

3. Using extractor 5.9030.443.0 remove the steering wheel.

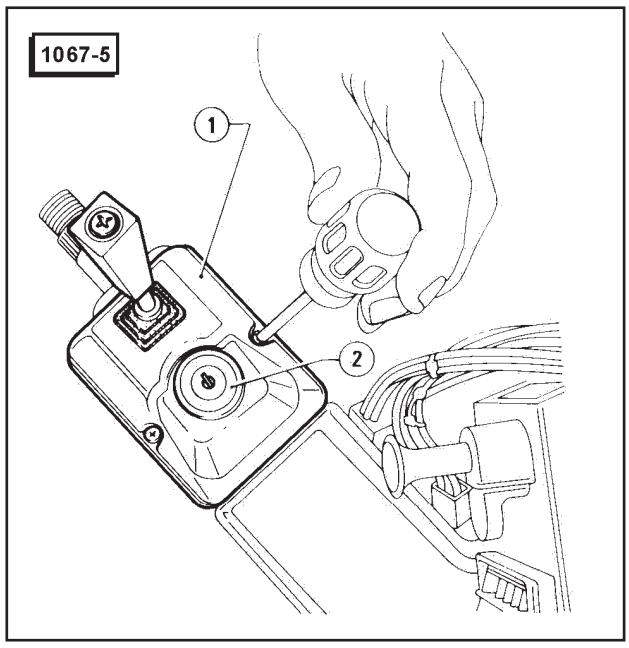


4. Remove the instrument panel (refer to: Cabin Dashboard).
5. Disconnect the four wiring connections **1** of the steering switch release.



1 - Steering switch release wiring connections

6. Loosen the two screws fixing the right steering switch release group **1** in which the ignition change over switch **2** is found, and remove the cover.



1 - Right steering switch release cover
2 - Ignition change aver switch

7. Loosen the two inside screws of the left cover **1** of the steering switch release and remove it.

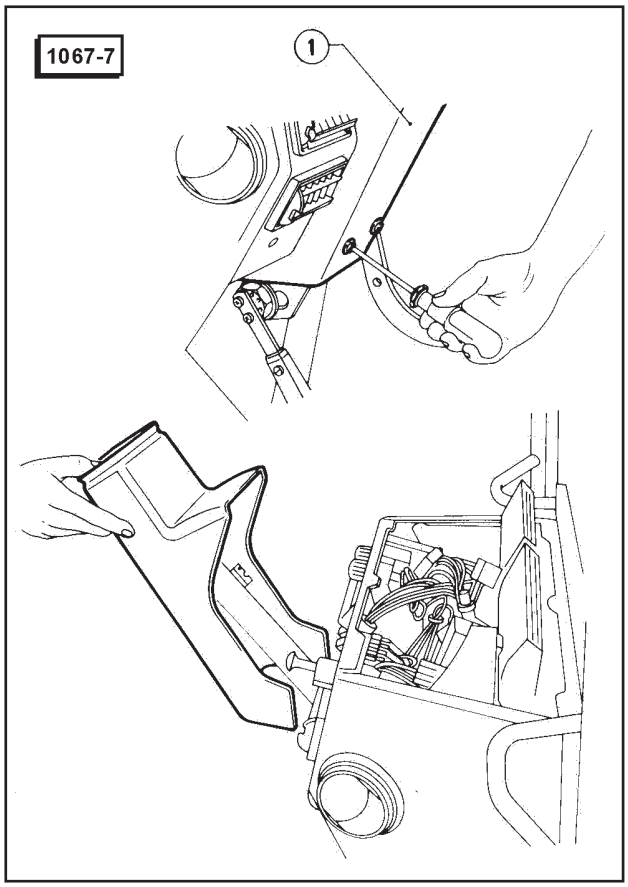
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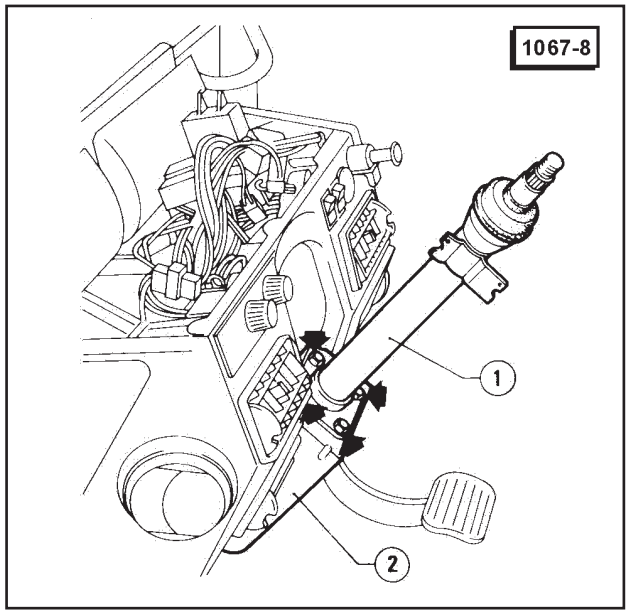
1 - Left Steering switch release cover

8. Loosen the two screws of the cover **1** from the steering column of the steering wheel and remove it.



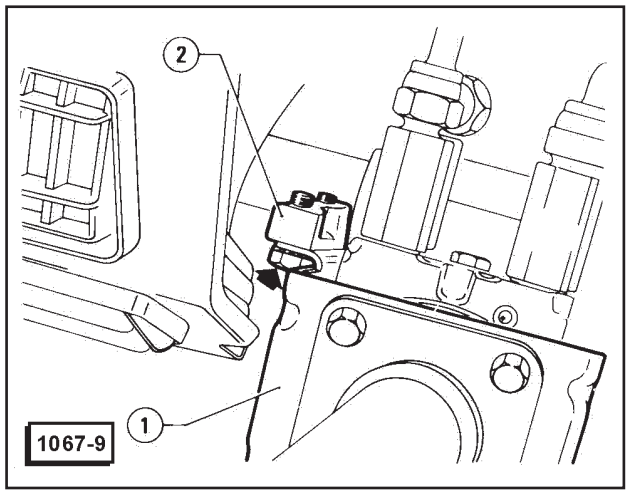
1 - Steering column cover

9. Loosen the four screws fixing the steering column to the shaft **2** and to the distributor under it.



1 - Steering column
2 - Shaft

10. Loosen the four screws fixing the shaft 1 to the supports **2**.



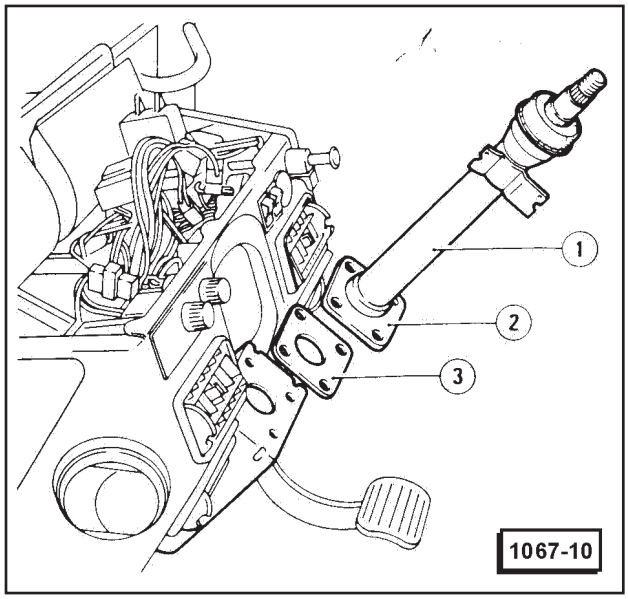
1 - Shaft
2 - Supports

11. Lift the steering wheel column **1** off, removing the spacer **2** placed under the holding plate **3**.

CAUTION
During the removal of the steering column take care to hold the distributor properly so that it doesn't fall and get damaged.

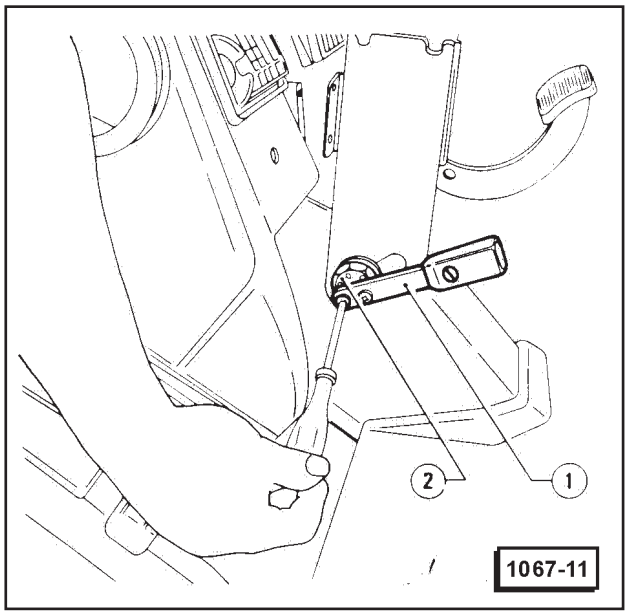
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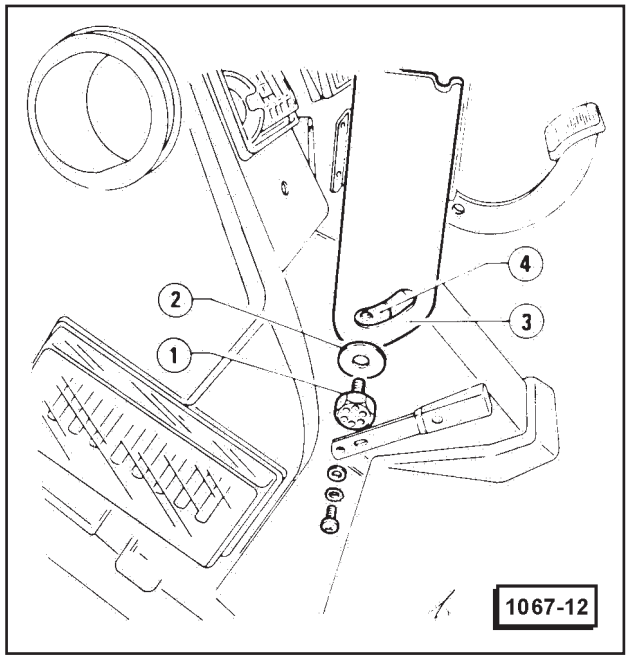
1 - Steering column
2 - Spacer
3 - Holding plate

12. Loosen the two screws fixing the steering wheel tilt lever **1** to the regulator screw **2**.



1 - Steering wheel tilt regulator lever
2 - Regulator screw

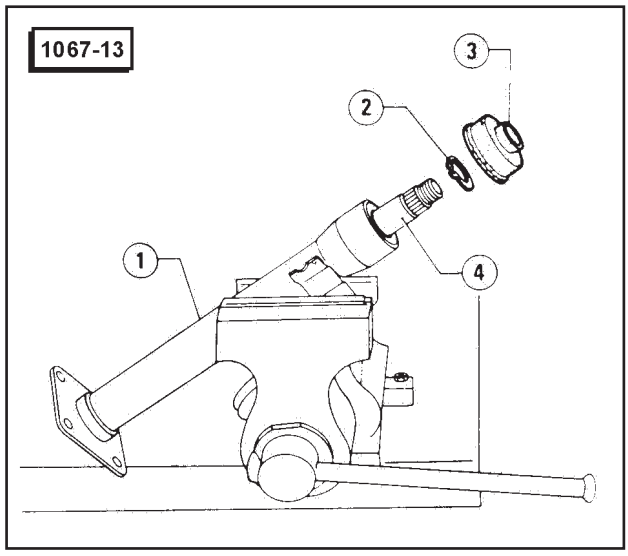
13. Loosen the regulator screw **1** and remove the spacer **2.**
14. Lift the shaft **3** off upwards complete with the clutch spacer **4.**



1 - Regulator screw
2 - Spacer
3 - Shaft
4 - Clutch spacer

DISASSEMBLY

1. Fix the steering wheel housing **1** onto a vice, and remove the rubber protection **3** with the help of a pointed tool.
2. Extract the Seeger ring **2** then carefully tap with a rubber hammer on the upper part of the steering column **4** then slip it out from below.



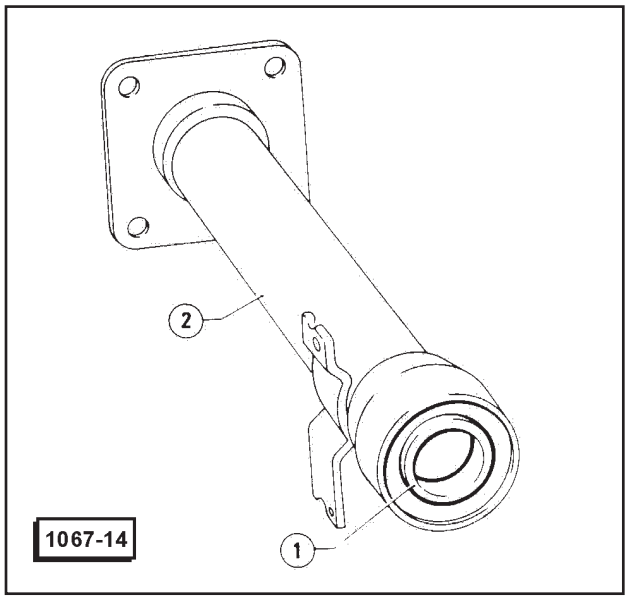
1 - Steering wheel housing
2 - Seeger ring
3 - Rubber protection
4 - Steering column

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CHECKS AND CONTROLS

1. Check that the bearing 1 inserted in the shell 2 is not damaged, nor presents any form of malfunction. If so change the shell.

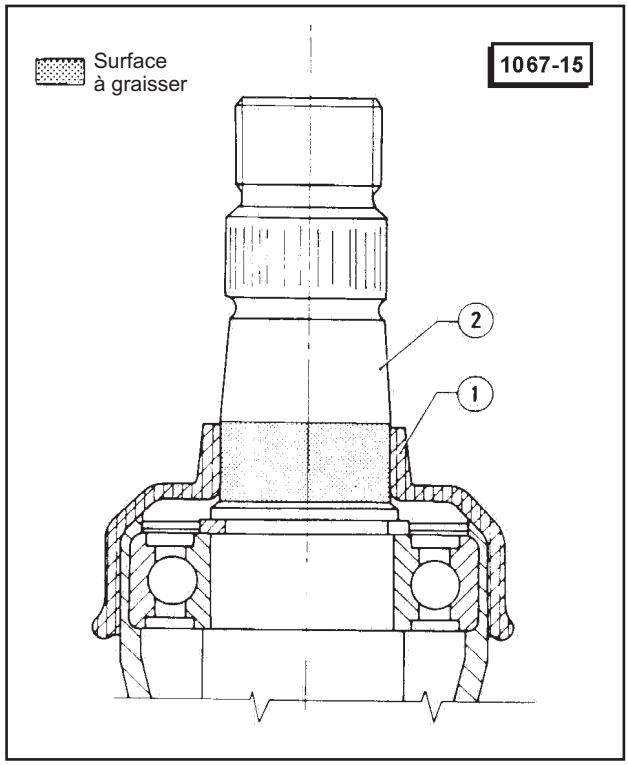


1 - Bearing
2 - Shell

2. Verify the integrity of the steering column. In particular verify that the working seat of the bearings are not scratched, and that the teeth of the grooves are not worn or damage.
3. Verify the integrity of the support shaft and if necessary, change it.

REMOUNTING

Proceed with the reassembly working in the reverse order, adhering to the following instructions.
— Tap, carefully, on the shaft until it touches the bearing inside the steering housing.
— Neither grease nor lubricate the bearing inserted in the shell.
— Verify that the steering column turns freely without sticking, but that it does not have excessive play.
— Before remounting the rubber protection 1 spread the steering column 2 with prescribed grease in the position indicated in the diagram.



1 - Rubber protection
2 - Steering column

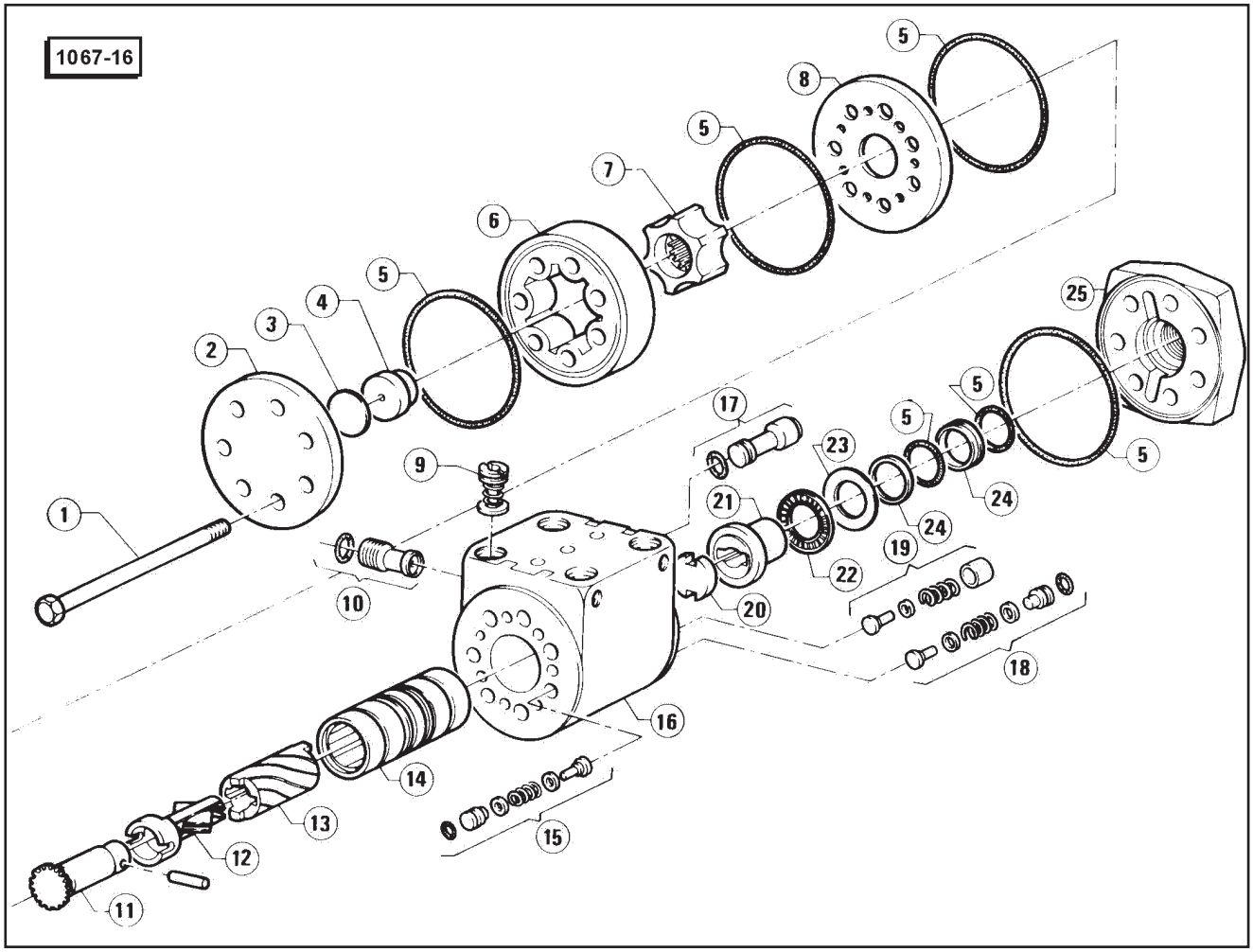
REASSEMBLY

Reassemble the steering column of the steering wheel working in the reverse order adhering to the following instructions.
— Take care that the steering column is placed under no stress during the reassembly.
— Take care to correctly match the distributor and the steering column.
— Regulate the tightening of screws fixing the steering wheel tilt lever in such a way as to obtain the required position.
— After tightening all parts, verify that the maximum range of the steering wheel (full up and full down) works correctly.
— Mounting completed, verify that the steering switch and the warning horn work correctly.

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DISTRIBUTOR



1 - Fixing screw
2 - Lower cap
3 - Shim
4 - Spacer
5 - O-ring
6 - Stator
7 - Rotor
8 - Intermediate flange
9 - Non return valve
10 - Pressure limit valve
11 - Capacity shutter
12 - Spring holder
13 - Helical entrainer
14 - Distributor
15 - Anticavitation valve
16 - Distributor body
17 - Antishock valve
18 - Anticavitation valve
19 - Short circuit valve
20 - Coupling
21 - Grooved hub
22 - Bearing
23 - Fifth wheel
24 - Teflon ring
25 - Upper cap

REMOVAL

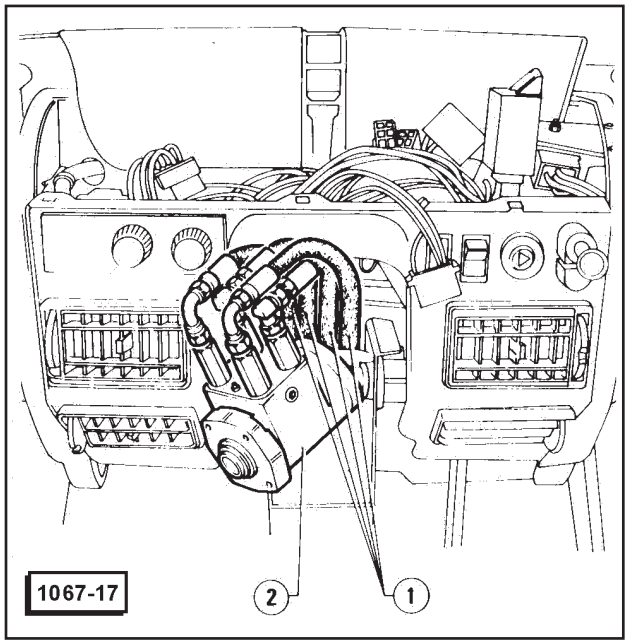
1. Remove the steering wheel and steering column (refer to: Steering Wheel and Column - Removal).
2. Carry out the bleeding of the hydraulic circuit (refer to: Complete Hydraulic Circuit - Bleeding of oil from Hydraulic Circuit).

CAUTION
Keep the distributor pipes in a vertical position so as to avoid the loss of too much fluid.

3. Loosen the unions of the four pipes **1** and remove the distributor **2**.

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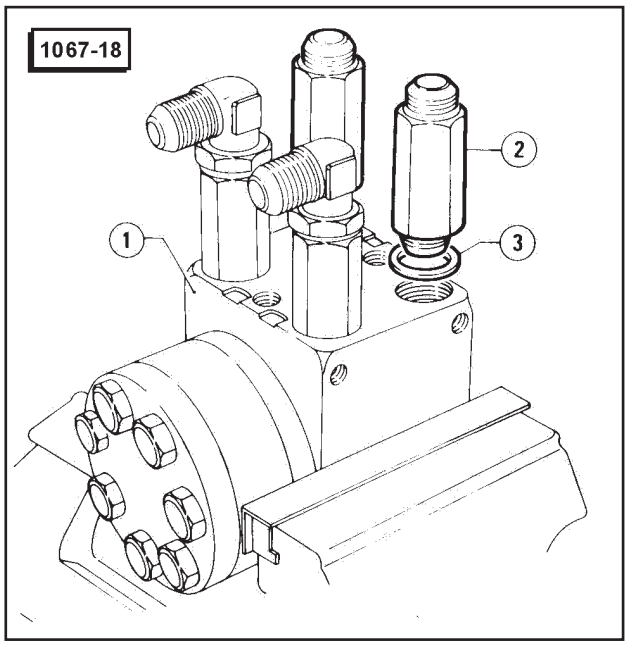
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1 - Distributor pipes
2 - Distributor

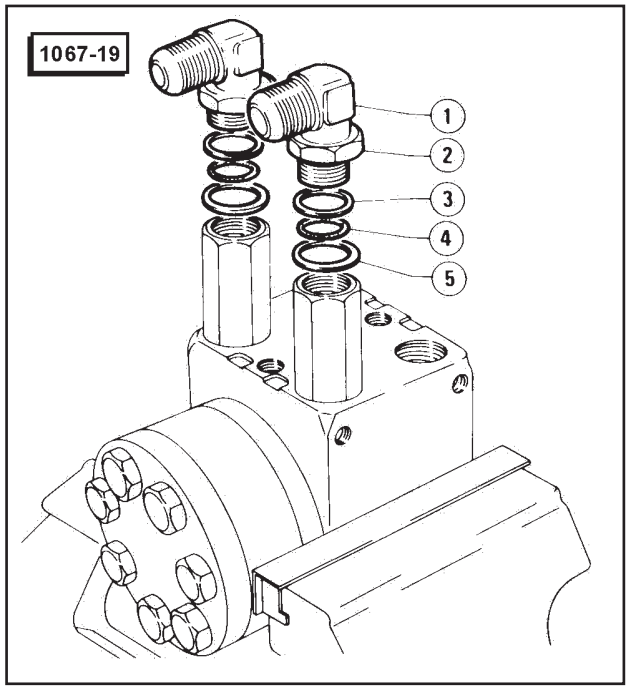
DISMOUNTING

1. Fix the distributor **1** in a horizontal position in a vice.
2. Loosen the unions **2** and remove the copper washers 3 underneath.



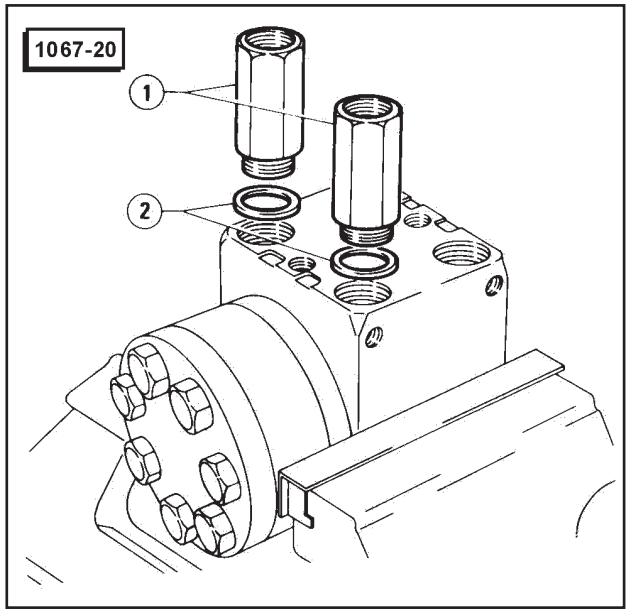
1 - Distributor
2 - Unions
3 - Washers

3. Loosen the lock nut **2** and remove the L union **1** together with ring **3**, O-ring **4** and the washer **5.**



1 - L union
2 - Lock nut
3 - Positioning ring
4 - O-ring
5 - Washer

4. Loosen the unions **1** and remove the copper washers **2** underneath.



1 - Unions
2 - Washers

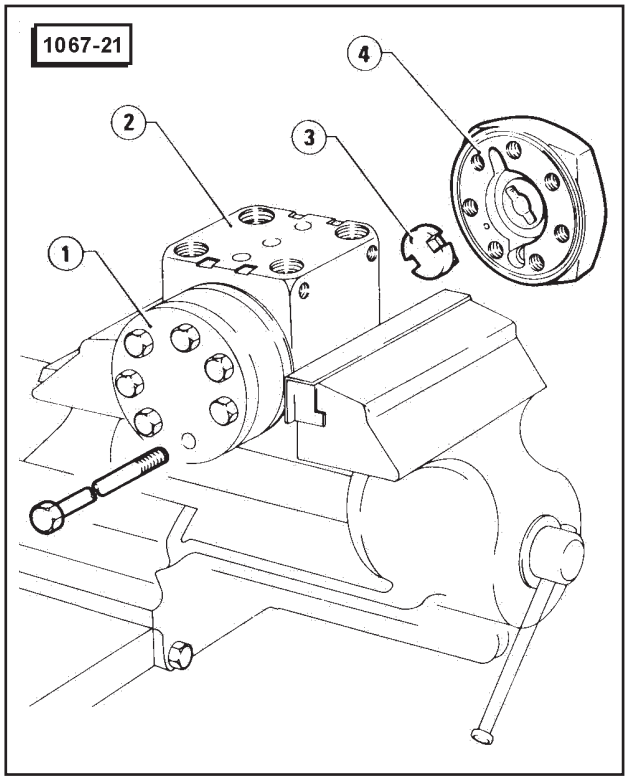
5. Only if necessary, having had to change the seal on the cover, work as follows:

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CAUTION
— **Only two of the seven fixing screws of the distributor body caps must be only loosened, in order to proceed with the timing of the distributor during the remounting.**
— **Before proceeding to take the distributor apart, mark the relative position between the upper cover and the distributor body with a notch.**
— **Proceed to remove the parts taking care not to drop any or loss their order.**

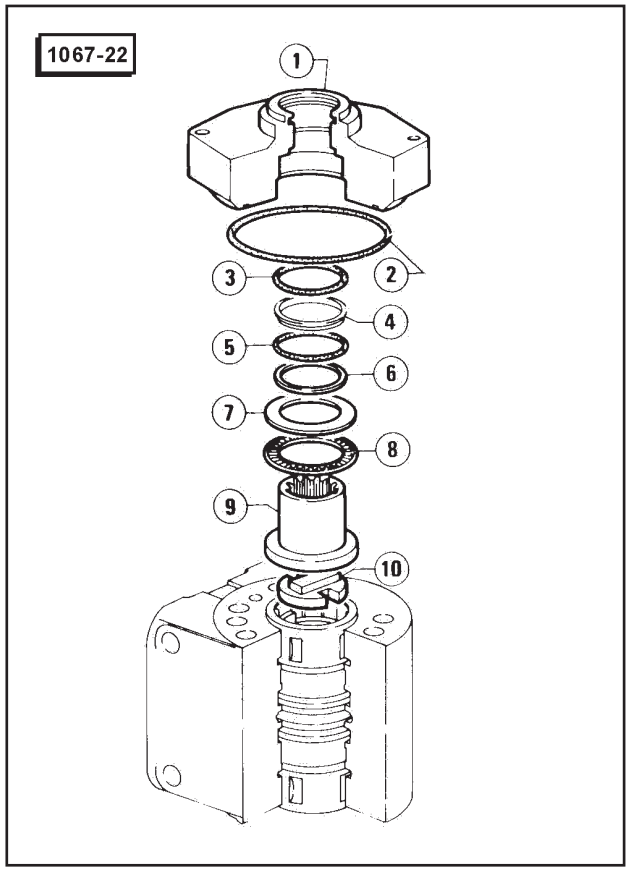
(1) Loosen five of the seven fixing screws of the upper cover **4** and lower cover **1** of the distributor body **2** then loosen the other two screws.
(2) Remove the upper cover complete with the joint **3**.



1 - Lowe r cover
2 - Distributor body
3 - Joint
4 - Upper cover

(3) Pushing from the outside towards the inside, remove the grooved hub **9** the axle bearing **8** and the fifth wheel **7.**
(4) Pick off the O-ring placed on the top inside of the cover **1** with a pointed instrument.

(5) Remove the teflon ring **6**, the high pressure O-ring **5** and then the ring **3** and the low pressure O-ring **3** placed inside the cover, with the help of a pointed implement.

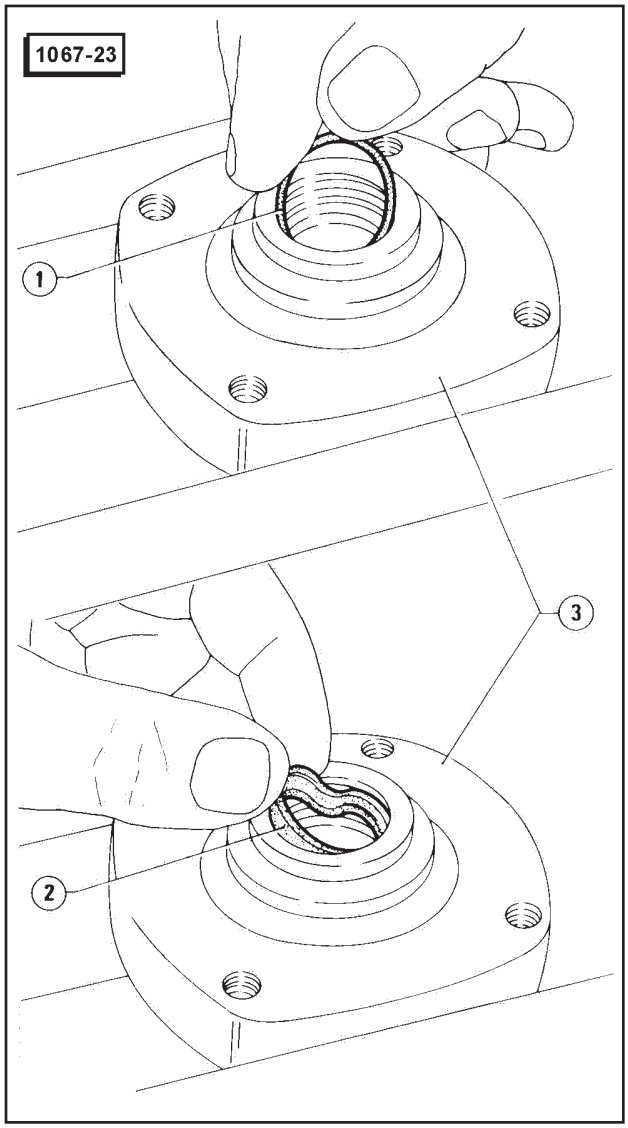


1 - Cover
2 - O-ring
3 - Low pressure O-ring
4 - Teflon low pressure ring
5 - High pressure O-ring
6 - Teflon high pressure ring
7 - Fifth wheel
8 - Axle bearing
9 - Grooved hub
10 - Joint

(6) Lubricate the new seals then proceed with the remounting of the low pressure seals, first inserting the O-ring **1** in the external radial grooves of the hole in the cover **3**, then the Teflon ring **2**, being careful to bend the ring into a heart shape and to place it on the O-ring so that it lies properly all the way round.

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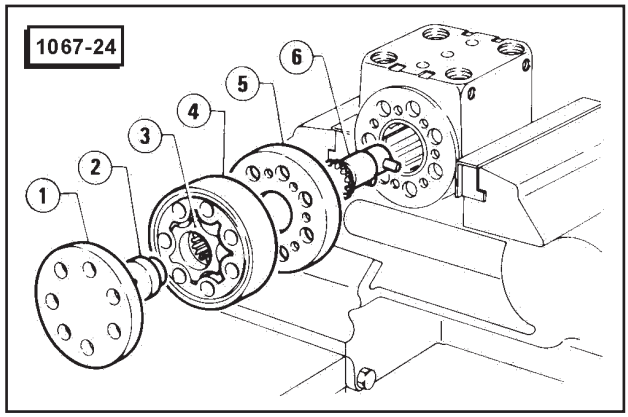


1 - O-ring
2 - Teflon ring
3 - Cover

(7) Referring to the previous enlarged diagram mount the new high pressure seal first placing the O-ring **5** and then ring **6**.

NOTE
Press down the Teflon rings after you have positioned them in order to get them to lie correctly.

6. Use the following procedure only if you have had to change the seals placed in the back part of the distributor.
(1) Completely loosen the last two fixing screws.
(2) Remove the lower cover **1**, the spacer **2**, the rotors **3**, the stator **4**, the flange **5** and the capacity shutter **6**.



1 - Lower cover
2 - Spacer
3 - Rotor
4 - Stator
5 - Flange
6 - Capacity shutter

(3) Remove the O-rings on the stator and the flange from their seats and lubricate the new O-rings and replace them correctly.

CLEANING CHECKS AND CONTROLS

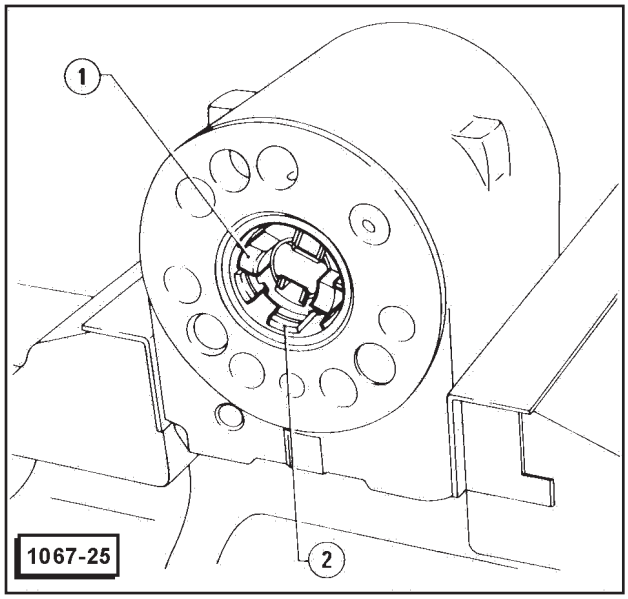
1. Proceed with an accurate cleaning of the distributor parts.
2. Check that all reconditioned areas present no trace of excess wear, scratches nor other faults; if so change them.
3. Check that the grooves of the capacity shutter, rotors and stator are not worn or cracked. If so change the damaged parts.
4. Verify that the distributor body is not craked or damaged in any way. If so change the distributor.
5. Check the condition of the threads on the distributor and on the outside of unions. If they are worn or damaged change them.

REMOUNTING

CAUTION
If during remounting; you loose the order of the parts of the entrainer with respect to those of the distributor, insert the entrainer 1 in the distributor 2 in such a way that the helical cables are turned towards the front of the distributor, and the helical is placed in such a way that its upper part enters the distributor by about 1.5 mm (0.0590 in).

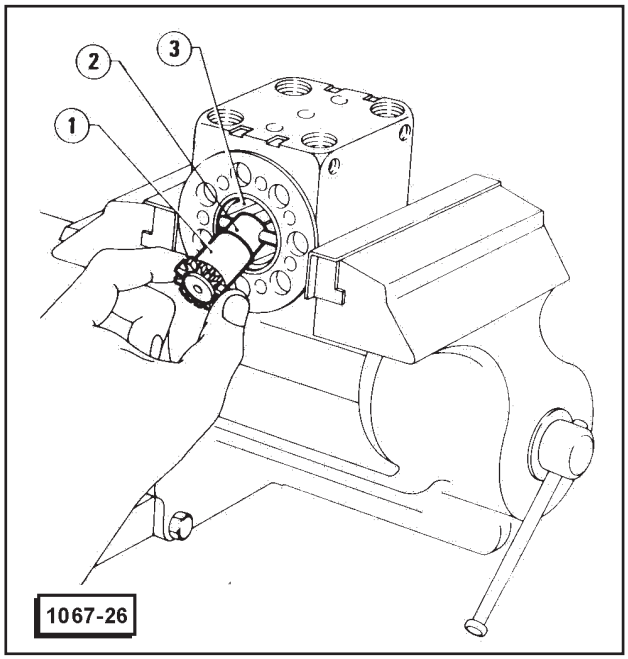
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1 - Entrainer
2 - Distributor

1. Position the control spigot of the capacity shutter **1** taking care that the pin **2** is fixed inside the two cables of the distributor which are aligned with the serration of the hook of the entrainer **3**.

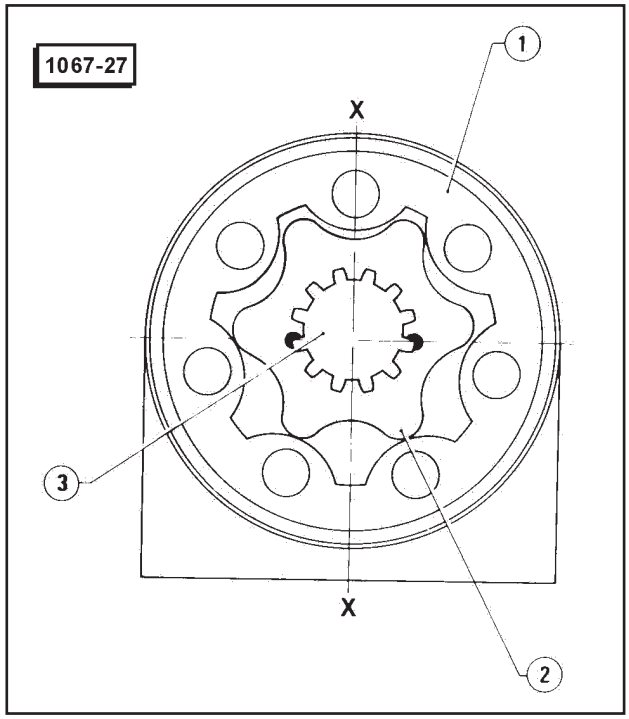


1 - Capacity shutter
2 - Pin
3 - Entrainer

2. Turn the capacity shutter until the two nuts are in line, as shown on the serration, and are parallel with the external face of the distributor body.

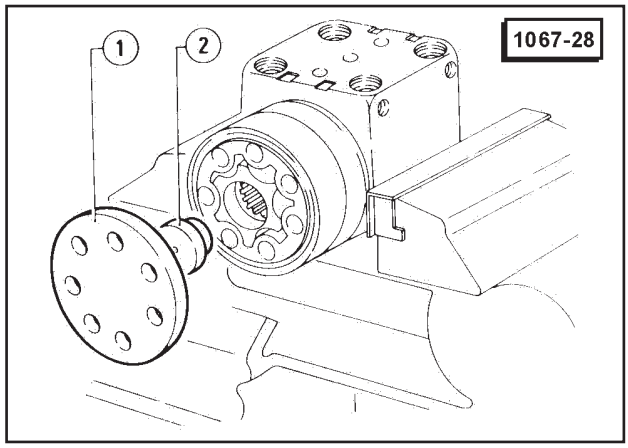
NOTE
During the following steps keep the entrainer and the capacity shutter in the indicated position.

3. Position the intermediate flange being careful to correctly center the holes for the fixing screws.
4. Position the stator **1** centering the fixing screw holes with those of the intermediate flange.
5. Position the rotor **2** keeping the cable housing between the rotor and the stator turned down and aligned with centreline X-X.
6. Couple the spigot **3** of the capacity shutter in the rotor, with the line of the two bolts perpendicular to centerline X-X.



1 - Stator
2 - Rotor
3 - Spigot

7. Proceed to check the axle play only if it has been necessary to change one of the parts (refer to: Axle Play Adjustment).
8. Mount the spacer **2** and the lower cover **1** and insert the seven fixing screws.



1 - Lower cover
2 - Spacer

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9. Proceed with the remounting of the front parts working in the reverse order and adhering to the following instructions.
— Lubricate the grooved hub on the front cover before mounting.
— Check that the notches on the upper and the distributor body coincide.
— Tighten the fixing screws to the following torque:

Tightening torque
Distributor cover fixing screws
20±3 Nm (196 ± 2,94 kgm; 1417.08 ± 21.26 ft lb)

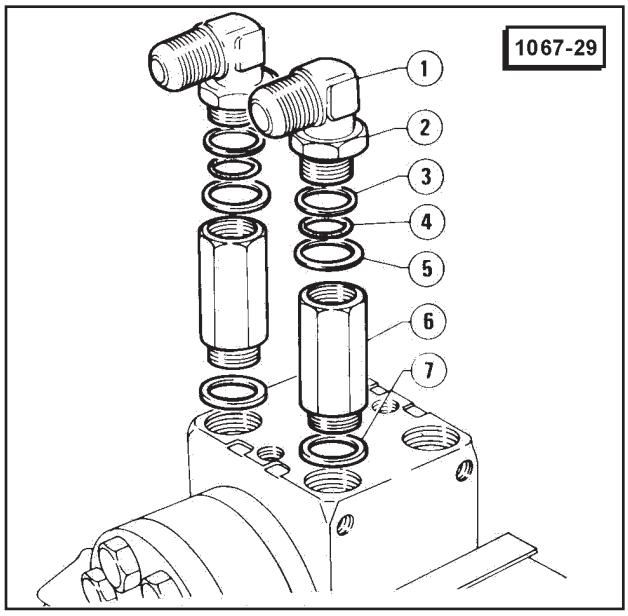
— During the tightening of the fixing screws try a turn the hub on the upper cover, this is in order to guarantee a uniform distribution of the spring load.

10. Remount the unions of the distributor working in the following manner.
(1) Position the washer **7** and tighten the unions **6** to the prescribed torque.

Tightening torque
Refer to: GENERAL
Bolt tightening regulations

(2) Position the washer **5** on the unions **6**, fit ring **3** and O-ring **4** on the L union and tighten it until the O-ring touches the washer underneath it.
(3) Keeping the position of the union **1** use a box wrench to tighten the lock nut **2** to the prescribed torque.

Tightening torque
Refer to: GENERAL
Bolt tightening regulations



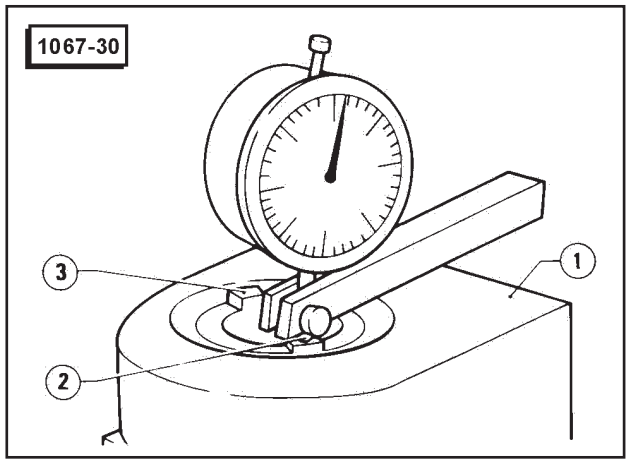
1 - L union
2 - Lock nut
3 - Positioning ring
4 - O-ring
5 - Washer
6 - Union
7 - Washer

AXIAL PLAY ADJUSTMENT

CAUTION
The adjustment which is indispensable if there have been replacements and anyway necessary if the inside of the distributor has been taken to pieces, serves to determine the spacer thickness, placed between the metering pump and the spigot lever, so as to correctly position the distributor in its housing.

NOTE
Before attaching the comparator to the distributor body place it flat and zero it.

1. Using the test bar 5.9030.333.0 together with a centesimal comparator 5.9030.272.0 positioned on the upper part of the distributor body **1**, push the feeler pin **2** into contact with the groove **3** of the helical entrainer and take the reading.



1 - Distributor body
2 - Knob
3 - Entrainer groove

CAUTION
Turn the distributor body with extreme caution so as not to move the internal parts.

2. Turn the distributor and position the spacer **1** then position the test bar 5.9030.333.0 together with the centesimal comparator 5.9030.272.0 on the distributor body **2** in such a way that the feeler pin **3** touches the edge of the spacer.
3. Turn the entrainer and take a reading: if the medium movement between the two values is greater than **0.05 mm** (0.0019 in) insert a spacer **1** of an adequate size.

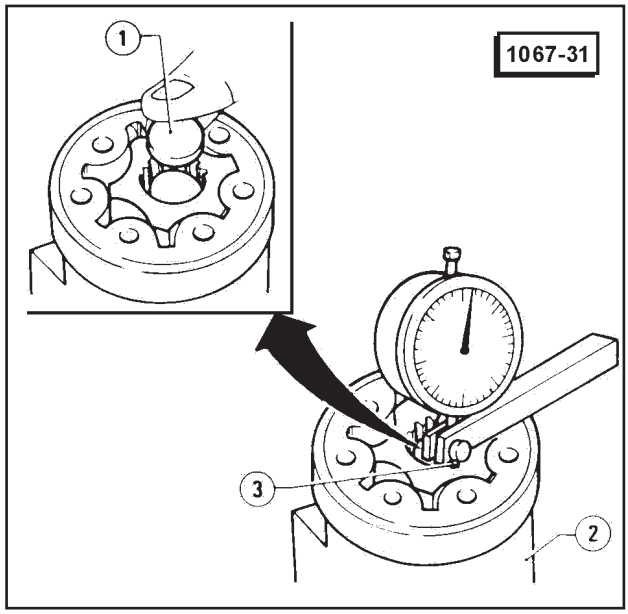
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REASSEMBLY

Proceed with the reassembly of the distributor working in the reverse order (refer to Steering Wheel Steering Column - Reassembly) adhering to the following instructions:

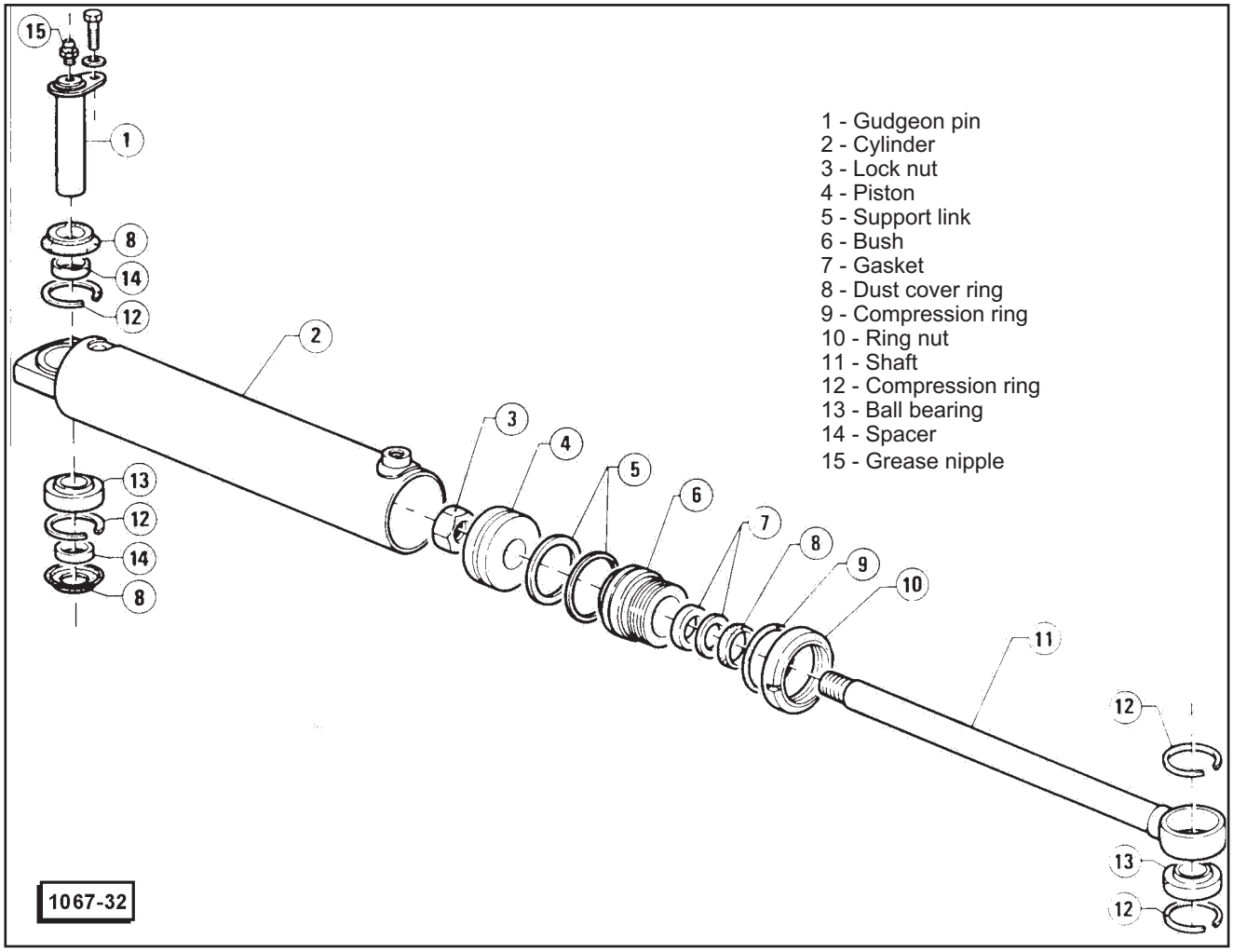
— Top up the level of the hydrostatic circuit oil (refer to: Steering Oil Tank - Reassembly).
— Deareate the circuit (refer to: Complete Hydraulic Circuit - Deaereation of the Hydraulic Circuit).



1 - Spacer
2 - Distributor
3 - Feeler pin

POWER STEERING HOUSING

DOUBLE EFFECT FOR 4 WHEEL/DRIVE TRACTOR



1 - Gudgeon pin
2 - Cylinder
3 - Lock nut
4 - Piston
5 - Support link
6 - Bush
7 - Gasket
8 - Dust cover ring
9 - Compression ring
10 - Ring nut
11 - Shaft
12 - Compression ring
13 - Ball bearing
14 - Spacer
15 - Grease nipple

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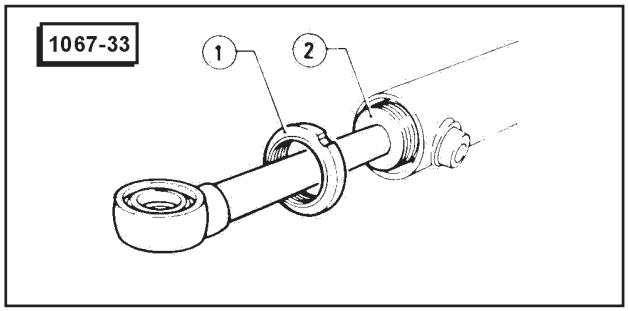
REMOVAL

Unfasten the unions and remove the power steering housing (refer to: Front Axle - Removal).

CAUTION

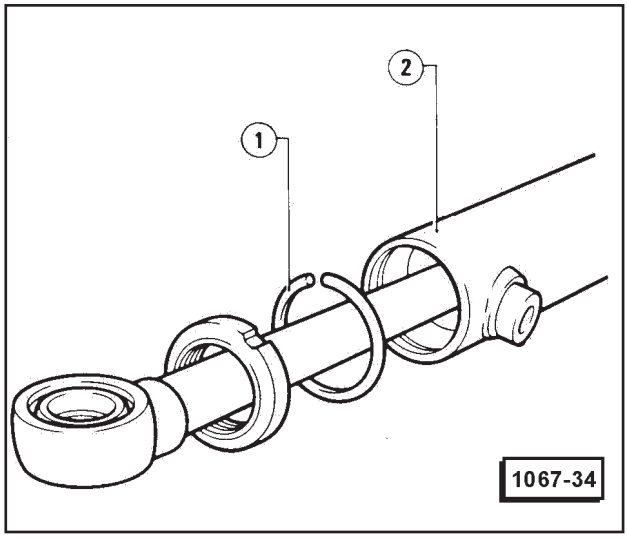
AVERTISSEMENT
Never put the cylinder in a vice blocking it from the cable end.

1. Fix the jack ball bearing in a vice with protective jaws.
2. Loosen the ring nut **1** of the bush **2** and push it inside the cylinder.



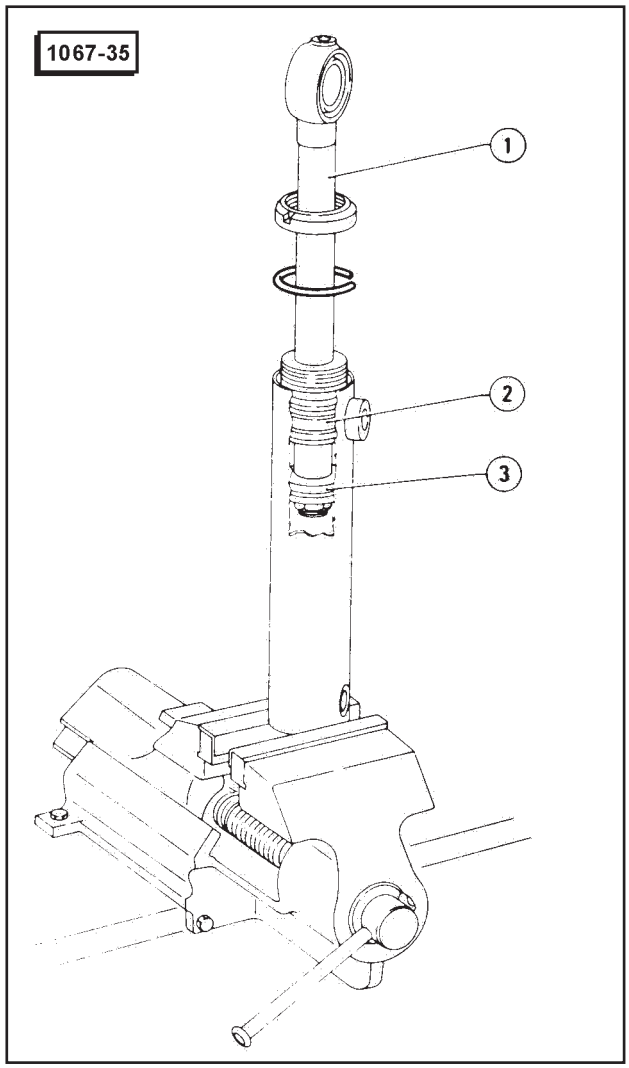
1 - Ring nut
2 - Bush

3. Remove the compression ring **1** from its seat on the cylinder **2** using a pointed tool.



1 - Compression ring
2 - Cylinder

4. By pulling it from the inside, extract the shaft **1** complete with the bush **2** and the piston **3**.

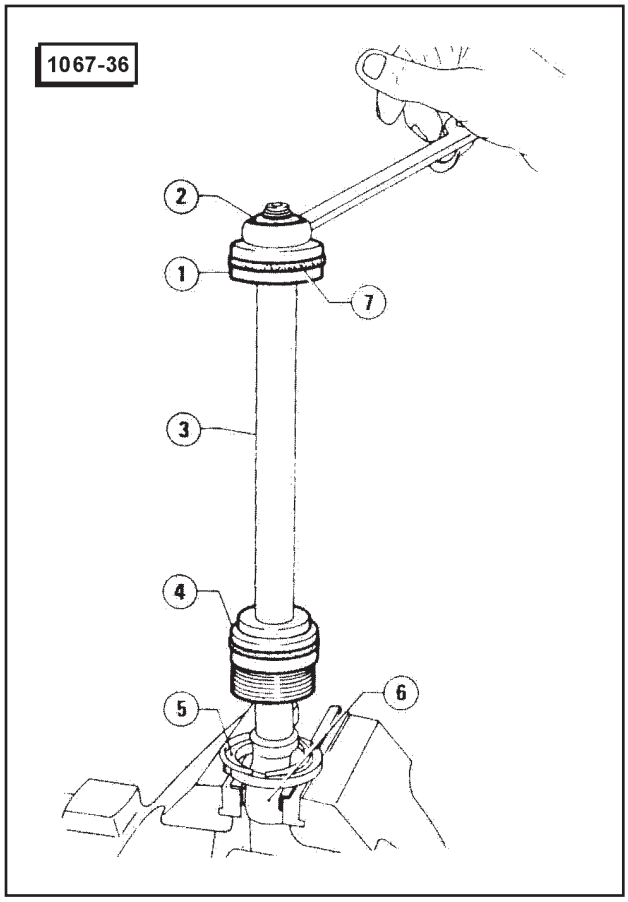


1 - Shaft
2 - Bush
3 - Piston

5. Fix the roller **6** on the shaft in a vice and loosen the lock nut **2.**
6. Remove the piston **1** the bush **4** and the ring nut **5** by pulling it off the shaft. It necessary push the support link **7** on the piston with a pointed implement.

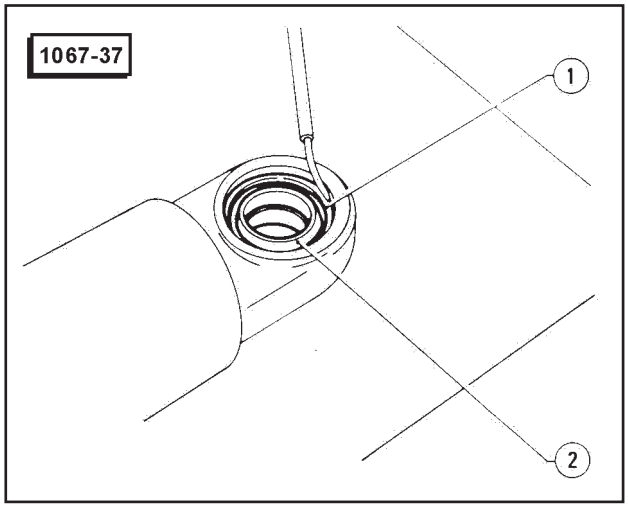
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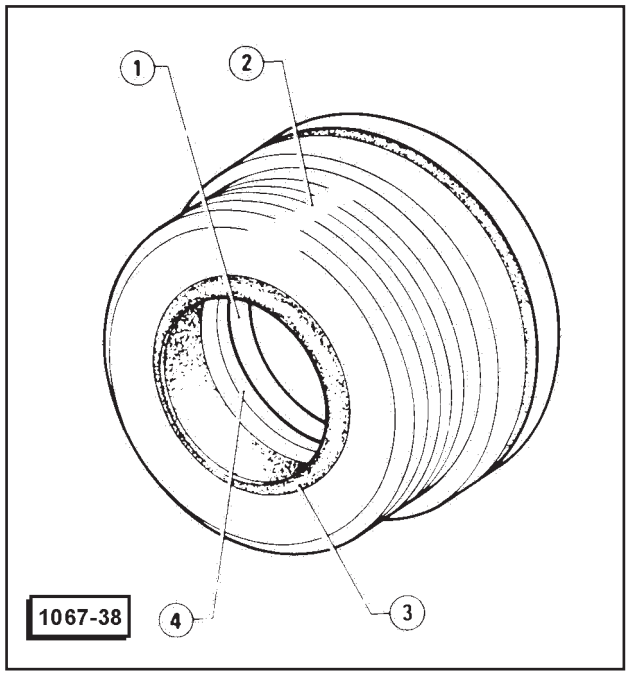
1 - Piston
2 - Self locking nut
3 - Shaft
4 - Bush
5 - Ring nut
6 - Roller
7 - Support link

7. If necessary, with the help of a pointed implement, take the compression rings **1** from their seats then, tapping with a hammer and punch, extract the ball bearing **2** from the side you have taken the compression ring from.



1 - Compression ring
2 - Ball bearing

8. If it is necessary to change the gasket **1** on the inside of the bush **2**, first remove the dust ring **3** then remove the gasket.



1 - Gasket
2 - Bush
3 - Dust ring
4 - Extruder ring

CHECKS AND CONTROLS

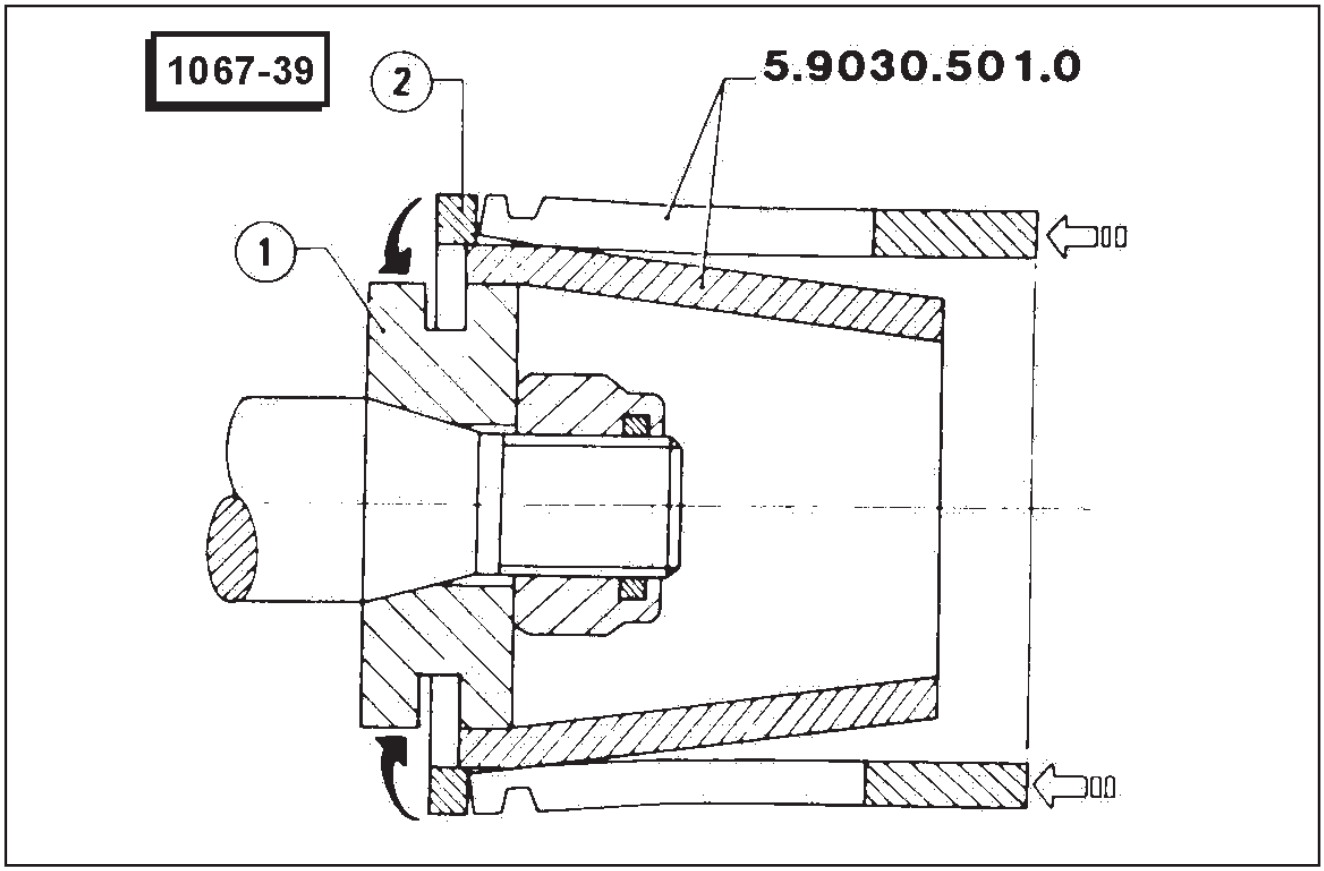
1. Check that the support links and dust rings are not worn. If so, change them.
2. Check that all the sliding areas of the shaft and the cylinder are not scratched, too worn or are damaged in any way. If they are change them.
3. Check the fixing roller works correctly; in particular check for excessive wear, scratches or oxidization. If damaged change it.

REMOUNTING

1. If previously moved, mount the support link on the piston working as follows:
(1) Heat the support link in water heated to a temperature of 90°C (194°F) for approximately five minutes.
(2) Using tool 5.9030.501.0 place it on the inside of the piston **1** and slip on it the support link **2**.
(3) Press the support link into its seat on the inside of the piston **1** with the sleeve of the tool. Then using a ring gauge press and keep this position until the ring is completely cold.

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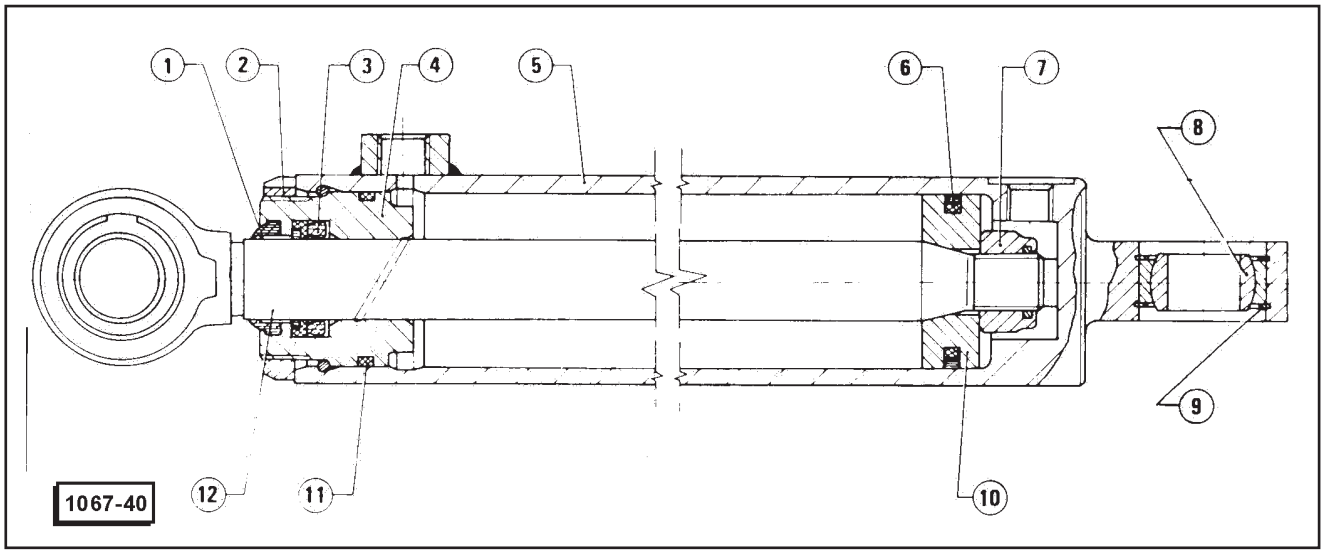
1 - Piston
2 - Support link

2. Proceed with the remounting of the power steering working in reverse order adhering to the following instructions.
— If it has been necessary to remove the gasket inside the bush be careful not to damage the new parts when remounting them as shown in the diagram.
— Remount the compression ring placed in front of the bush, first inserted one end and then the other so as to avoid the bending of the ring.
— Accurately lubricate the dust ring and the roller.
— Correctly position the two conical parts of the piston and shaft then tighten the fixing screws.

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REASSEMBLY



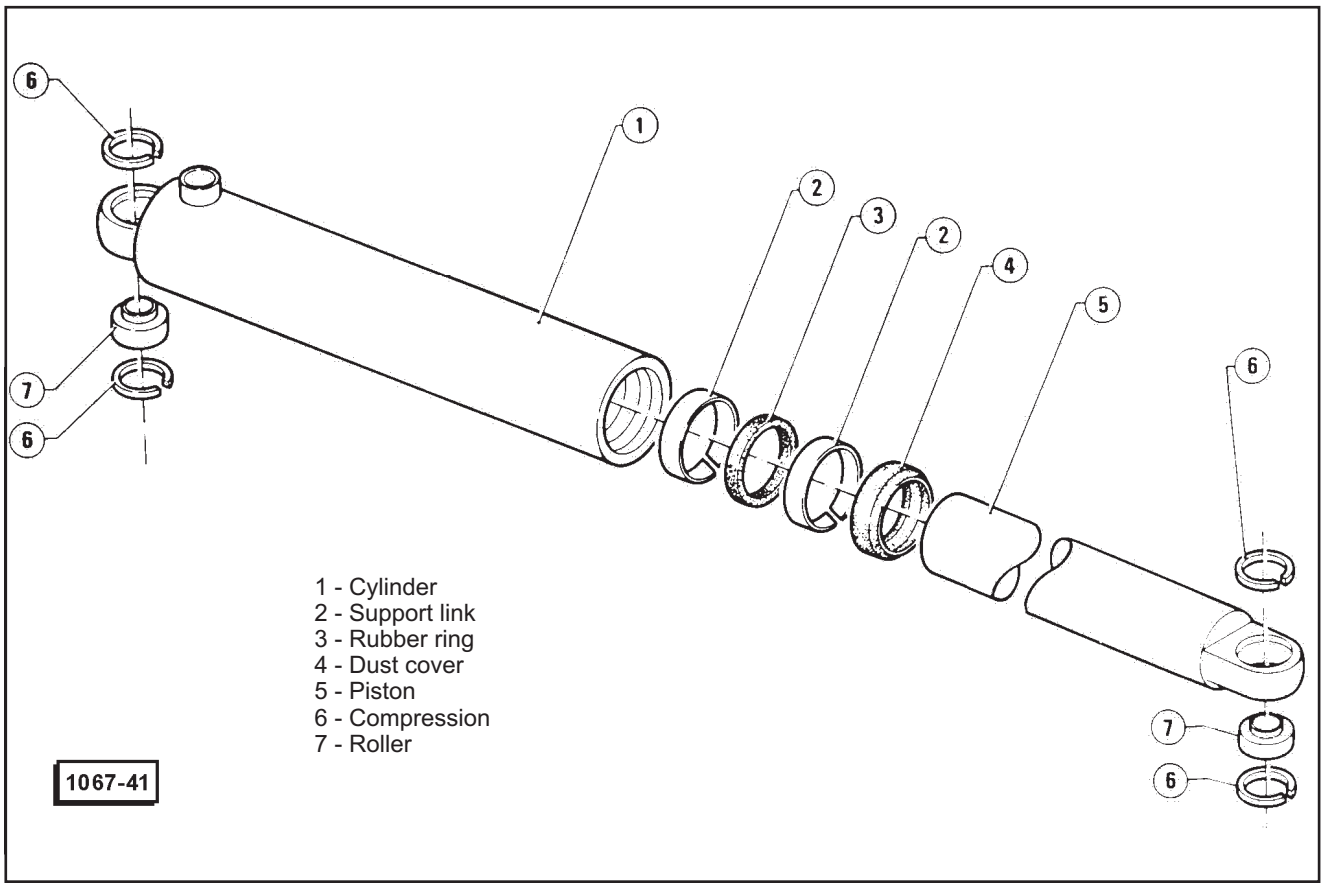
1 - Dust ring
2 - Ring nut
3 - Gasket
4 - Bush
5 - Cylinder
6 - Support link
7 - Self locking nut
8 - Ball bearing
9 - Compression rings
10 - Piston
11 - O-ring
12 - Shaft

Proceed with the reassembly of the power steering working in the reverse order (refer to: Front Axle - Reassembly) adhering to the following instructions.
— Reassembly completed, grease the fixing pins by way of the grease nipples.
— Top up the level of the hydraulic circuit oil (refer to: Steering Oil Tank. Reassembly).
— Proceed with the deaereation of the circuit (refer to: Complete Hydraulic Circuit - Deareation of the Hydraulic Circuit).

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SINGLE EFFECT FOR 2 WHEEL/DRIVE TRACTOR



REMOVAL

Loosen the cylinder and remove the power steering (refer to: Front Axle -Power Steering - Removal).

DISMOUNTING

Referring to the initial enlarged diagram operate as follows:
1. Fix the roller of cylinder **1** in a vice with protective jaws then extract the piston **5**.
2. If necessary pick out the compression ring **6** and extract the roller **7** from the side you have removed the compression ring using a hammer and punch.
3. If necessary, pick out with a pointed tool, the dust cover **4** the plastic support links **2** the rubber ring **3**.

CHECKS AND CONTROLS

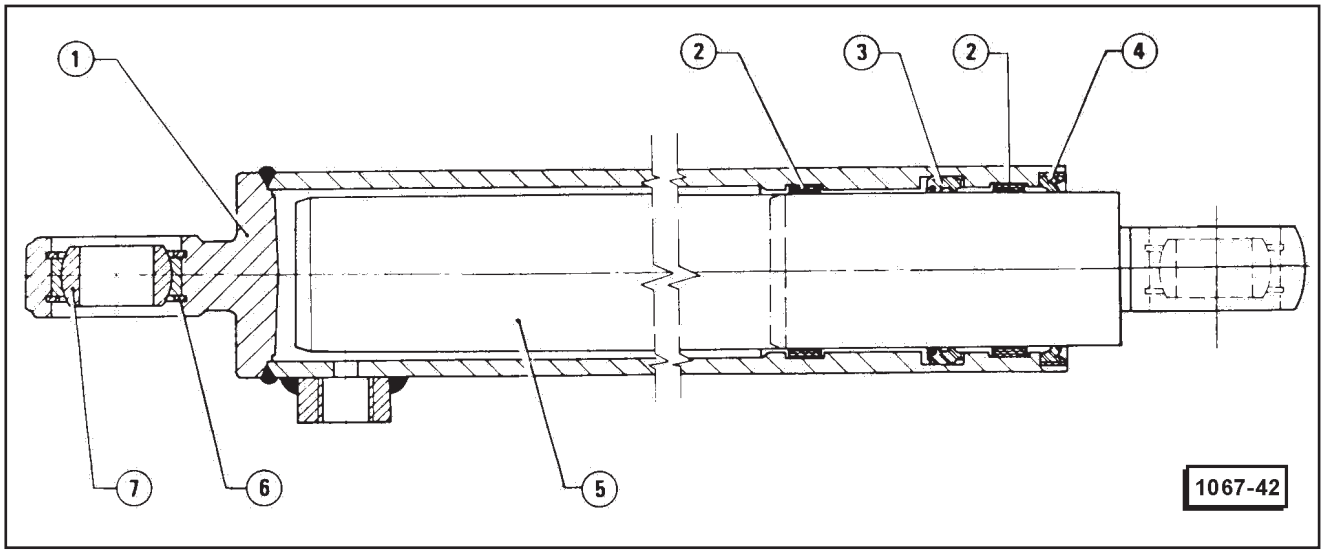
1. Verify that the sliding areas both of the shaft and the cylinder do not show signs of scratching, are excessively worn or are damaged in any way. If they are change the damaged parts.
2. Verify that the support links and the dust guard rings are in good condition. If not change them.
3. Verify that the roller works correctly. Also check far excessive wear, scratching or signs of oxidization. If faulty change it.

REMOUNTING

Proceed with the remounting of the power steering working in the reverse order adhering to the following instructions.
— Remount the support links in the order given in the diagram and then the dust guard.
— **Accurately lubricate the dust guard and the rollers.**

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1 - Cylinder
2 - Support link
3 - Rubber ring
4 - Dust guard
5 - Piston
6 - Compression ring
7 - Roller

REASSEMBLY

Proceed with the reassembly of the cylinders working in the reverse order (refer to: Front Axle - Remounting) adhering to the following.
— Reassembly completed, lubricate the fixing pins by way of the nipples.
— Top up with the level of the hydraulic oil (refer to: Steering Oil Tank - Reassembly).

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PIPING

CHECKS AND CONTROLS

With reference to the diagram on page 1 (Circuit Diagram) proceed with a careful visual check of all the piping and unions.

FLEXIBLE PIPES

Check that the pipes **9**, **6** and **12** are not damaged, and in particular do not show signs of rubbing, slits, holes or porosity or are in any way damaged. If necessary change the pipes that are damaged.
Above all check that the flexible pipes do not touch or interfere with the engine block should that move through vibrations.

RIGID PIPES

Check that pipes **5**, **7, 13** and the union pipes on the power steering are not damaged and in particular do not show signs of marks, oxidization or are deformed. If necessary change the pipes that are damaged.

UNIONS

— Check that the threaded unions present are tightened properly and have no traces of oxidization or are otherwise damaged.
— If there are oil leaks, gently tighten the unions and clean the leak. If it insists, change the union.

NOTE
On union where there is an O-ring present, or a gasket, if the leak persists check the integrity of the part and if necessary change it.

REPLACEMENT

a. Common procedure for all piping.

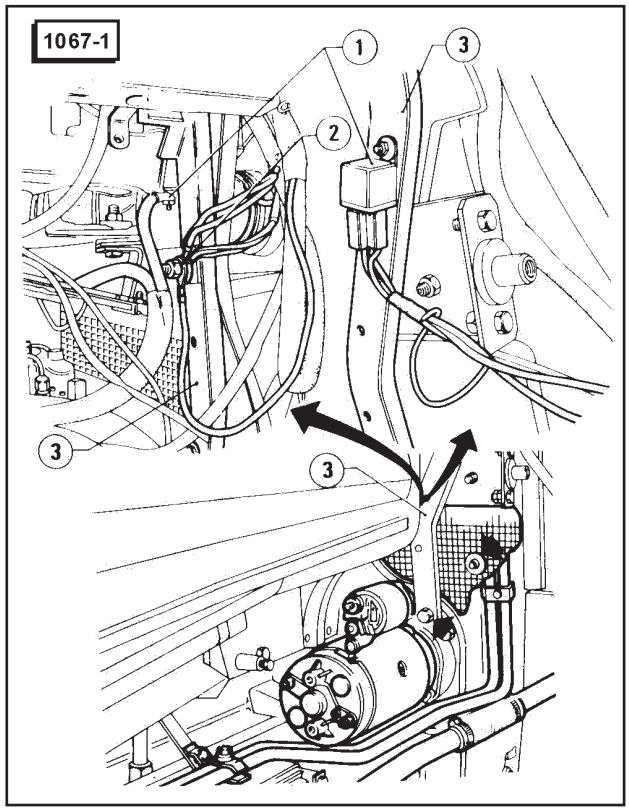
WARNING
Operate with care if the engine is hot.

1. Bleed the hydraulic circuit (refer to: Oil Bleeding).
2. When you start dismounting pipes block the ends to avoid the entry of foreign matter.
3. To remove the rigid pipes, loosen the unions from both ends.
4. To remove the flexible ones, disconnect the flexible pipes from the other end then remove.
5. Loosen all the bands that fix the pipes to the tractor.
6. On remounting the pipes be careful not to twist them.
7. On completion of the operation tighten all the unions to the torque prescribed and top up the oil to the quantity and type prescribed. Tightening torque (refer to: Steering Oil Tank - Reassembly)

b. Special procedure for various types of pipes

Pipes leading out of the distributor

1. Remove the steering wheel and the steering column (refer to: Steering Wheel Steering Column - Removal).
2. Remove the side hoods.
3. Disconnect the electrical connections **1** and the cable mass **2** fixed to the back of the panel board **3** then loosen the two fixing screws, one on the left and one on the right hand side of the panel board.
4. Working with great care, remove the panel board without damaging the pipes, electric cables or anything else near them.

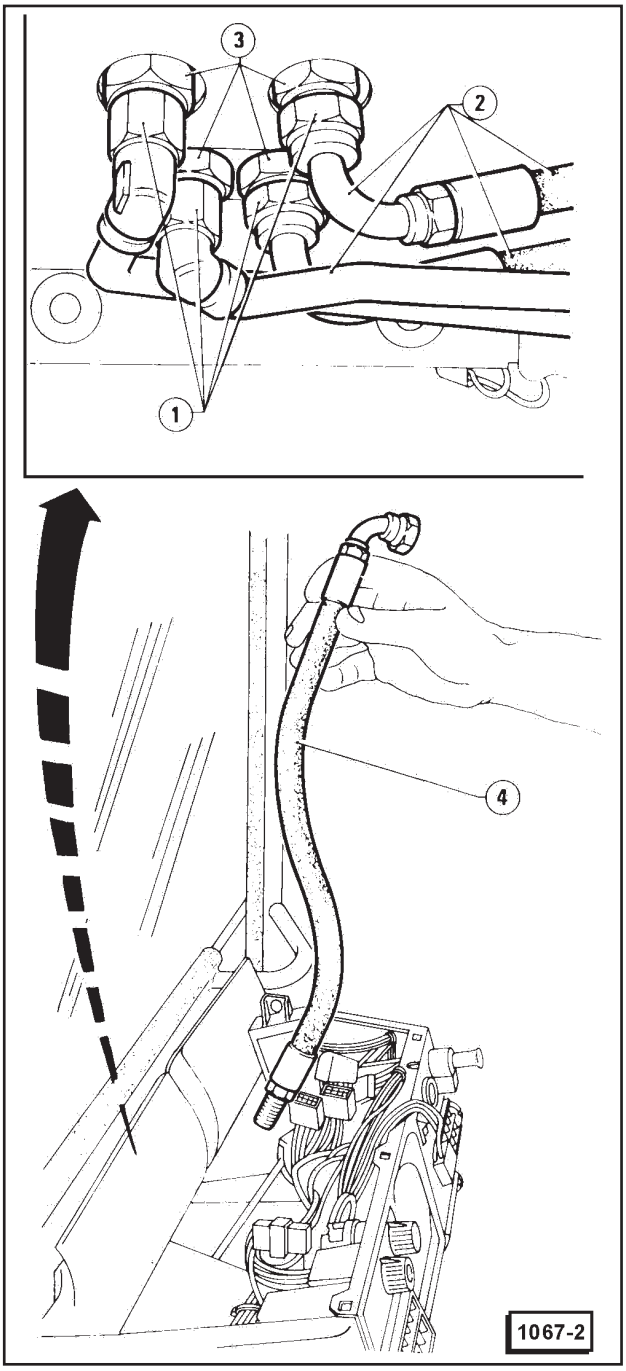


1 - Electrical connections
2 - Cable mass
3 - Back of panel board

5. Bleed the steering oil (refer to: Oil Bleeding).
6. Disconnect the unions **1** from the engine side pipes 2 loosen the lock nut **3** and remove the pipes **4** from the inside of the cabin.

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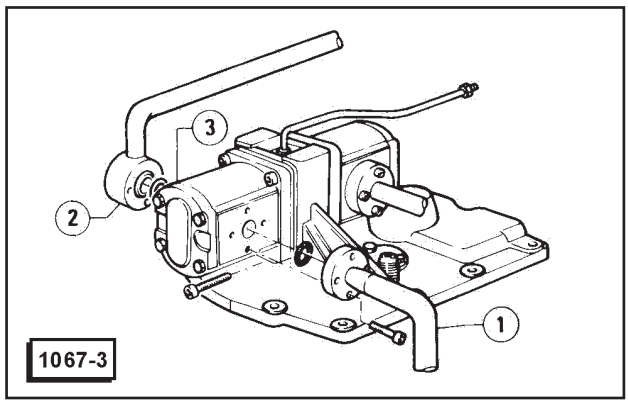
1 - Unions
2 - Engine side piping
3 - Lock nut
4 - Distributor pipes

7. Only if it is necessary to remove the rigid side pipes of the steering, loosen the T unions placed on the end of the unions already removed.
8. Following the run of the rigid pipes, loosen all the parts that fix to the engine and remove.

Pipes entering and coming out of the pump

1. Lift the tractor onto a stand, remove the back wheels and then lower the tank (refer to: Fuelling - Tanks - Removal steps from 1. - 9.).

2. Loosen the three socket head fixing screws of the intake pipe **1** and that of the breather pipe **2** of the oil pump **3**.
3. If necessary, then loosen the other end of the pipe and remove it, either from the tank or from the left side of the tractor.



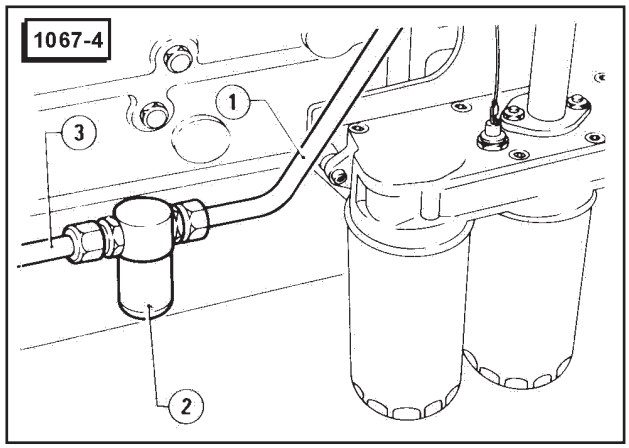
1 - Intake pipe
2 - Breather pipe
3 - Oil pump

RESOUNDER

REPLACEMENT

NOTE
To facilitate the operation it is necessary to lower the left tank (refer to: Fuelling - Tanks - Removal steps from 1. - 9.).

1. Loosen the pipe unions **1** and **3** using a contrast spanner on the resounder union, then remove the resounder **2**.
2. Proceed with the reassembly of the new resounder working in the reverse order and tightening the pipe unions with a contrast spanner.

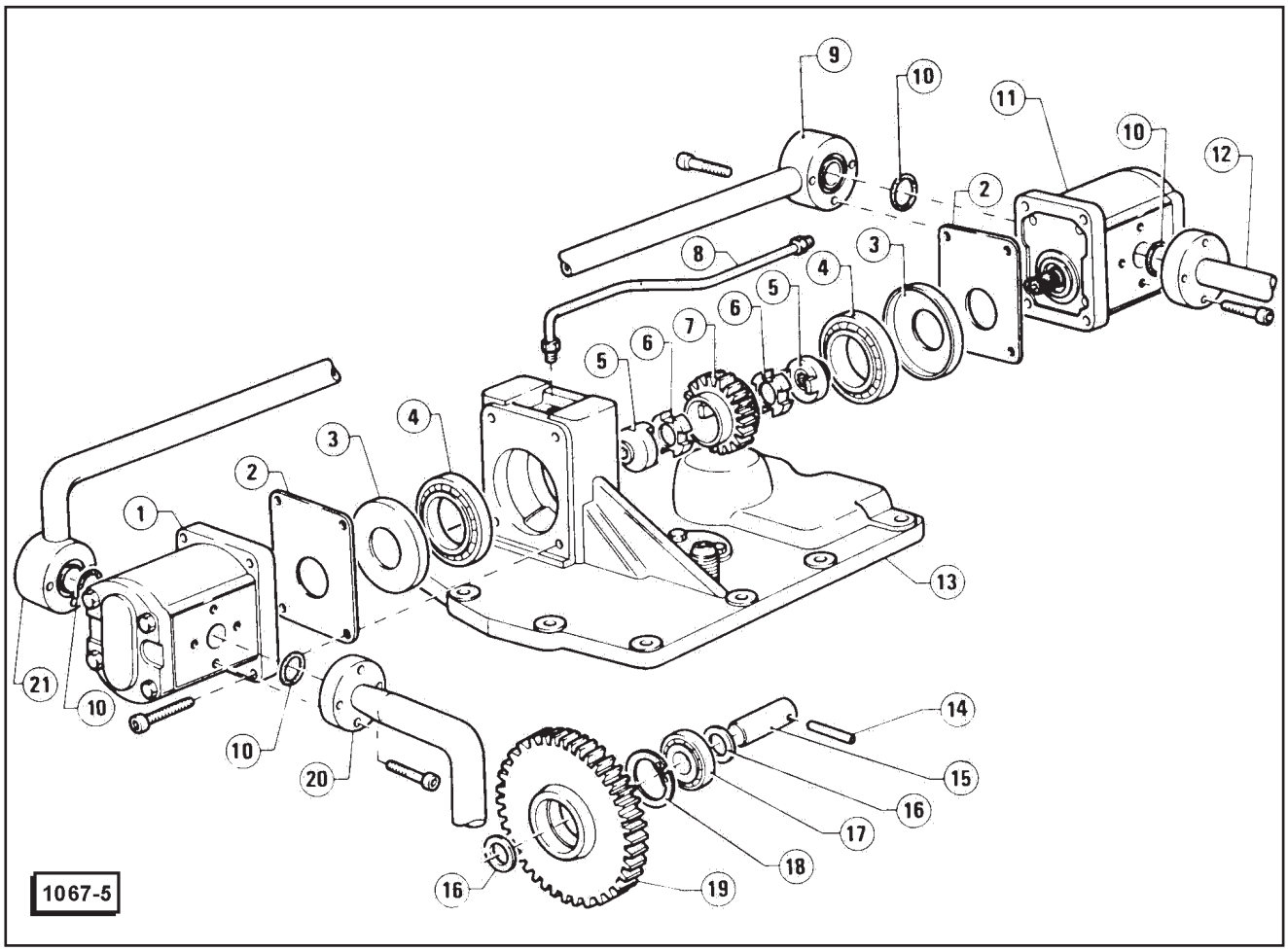


1 - Pipe joining resounder to pump
2 - Resounder
3 - Pipe joining resounder the hydrostatic distributor

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OIL PUMP



1 - Hydraulic lifting pump
2 - Gasket
3 - Spacer
4 - Ball bearing
5 - Joint
6 - Universal joint
7 - Gear wheel
8 - Lubrication pipe
9 - Hydrostatic steering breather pipe pump
10 - O-ring
11 - Hydrostatic steering hydraulic pump
12 - Hydrostatic steering delivery pipe pump
13 - Cover
14 - Pin
15 - Pivot
16 - Shoulder ring
17 - Ball bearing
18 - Seeger
19 - Gear wheel
20 - Lifting pump breather pipe
21 - Lifting pump oil delivery pipe

REMOVAL

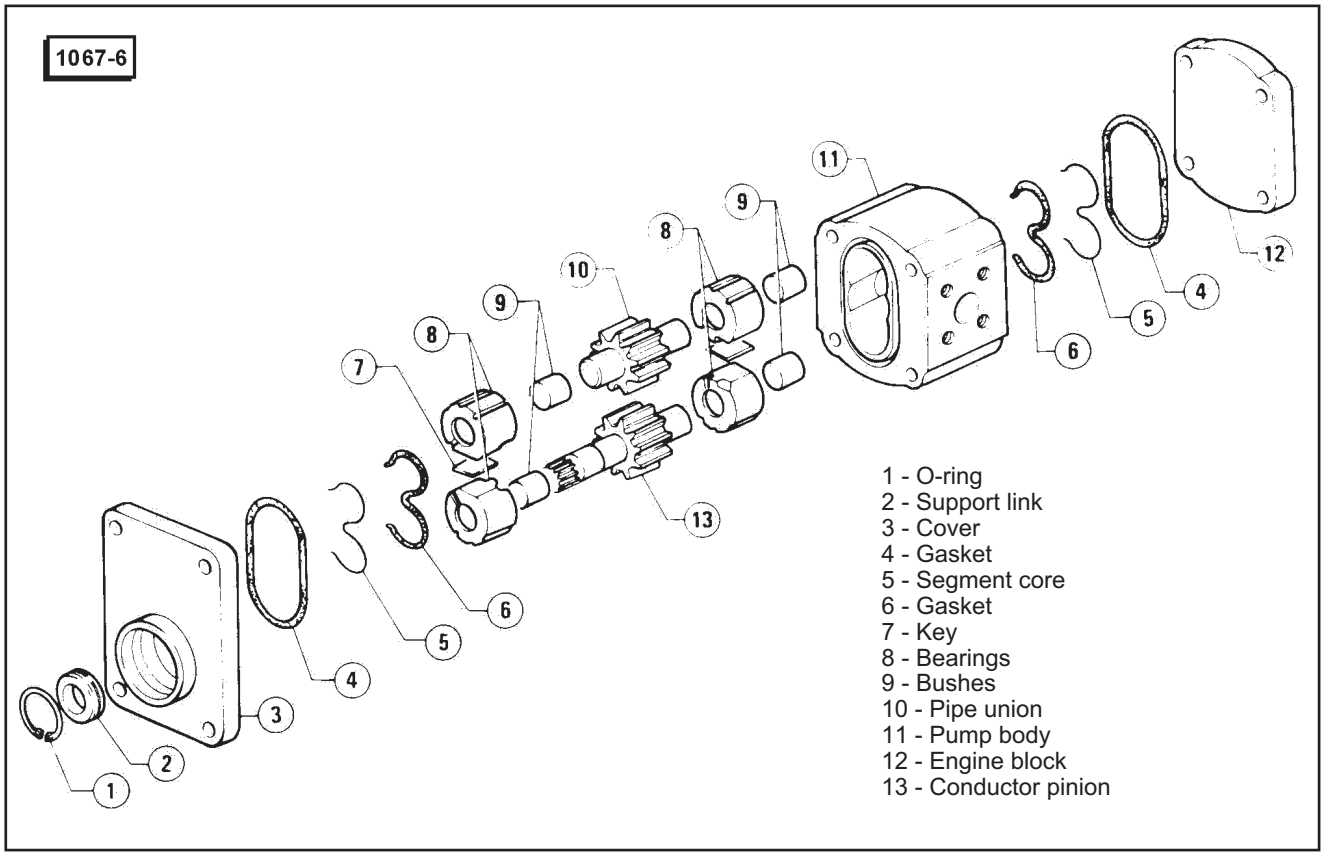
1. Hold the tractor on a stand and remove the back wheels, then lower the tank (refer to: Fuelling - Tanks Removal steps from 1. - 9.).
2. Referring to the original enlarged diagram loosen the three socket head screws fixing the delivery pipe **12** and loosen the fixing bands of the flexible breather pipes **19** from the oil pump.
3. Loosen the four screws fixing the pump **11** to the cover **13**.
4. Remove the pump together with the gasket **2** and the O-ring **10** of the delivery pipe **12.**
5. With reference to the original enlarged diagram remove the spacer **3** and the joint **5** then using a magnet remove the two universal joints **5** joining the joints **5** to the gear **7**.
6. Only if you have had to work on the main pump, use the following instructions.
(1) Remove the lifting housing (refer to: Lifting Group Lifting Housing - Removal).
(2) Loosen the unions for the lubrication pipes **8.**
(3) Loosen the three socket head screws fixing the oil pump delivery pipe **21.**

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(4) Loosen the bands from the pump breather pipe **20**.
(5) Loosen the four screws fixing the lifting pump **1** and remove it together with the gasket **2,** the spacer **3** and the joint **5**.
(6) Loosen the twelve screws fixing the cover and remove it **13**.
(7) Fix the cover in a vice, then using a hammer and punch extract the pin **14.**
(8) Extract the pivot **15** using a hammer and punch, then remove the gear **19** together with the shoulder ring **16.**
(9) Extract the gear **7** together with the two ball bearings **4** from the cover **13**.

DISMOUNTING

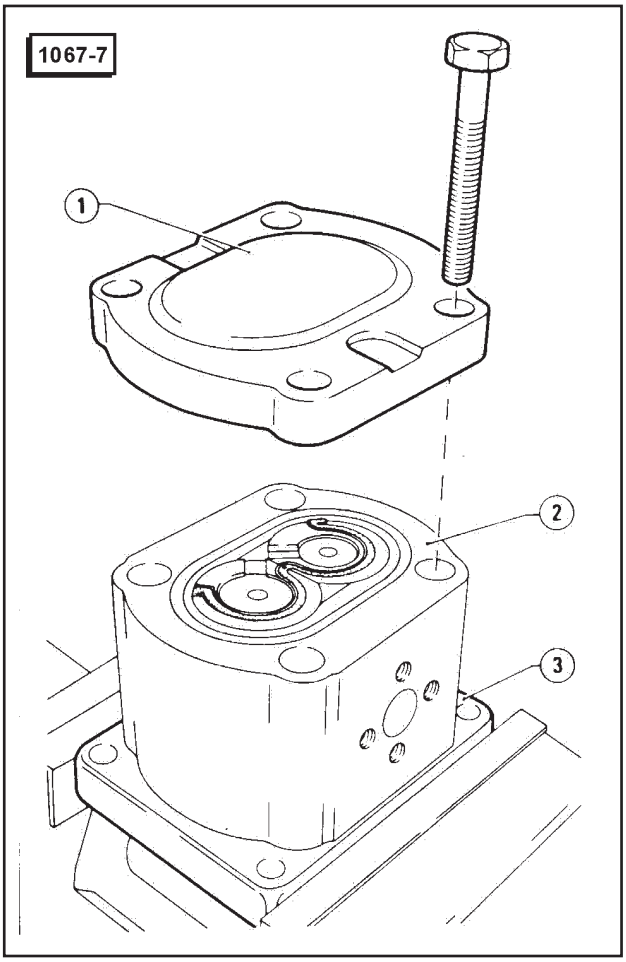


CAUTION
Pumps that have bearings, pinions or sumps which are damaged or worn cannot be repaired because of their construction.
During a check, because of the possible loss of oil or a irregular delivery pressure it is only possible to change the gaskets listed in the spares list.
When remounting, use in any case, a new set of gaskets, after having verified that the pump does not show signs of wear because of rubbing or any other damage.
It is also indispensable to mark each single part in order to be sure that you remount them in the correct order.

1. Loosen the four screws fixing the cover **1** and the engine block **3** to the pump body **2**. Remove the washers underneath and then the cover.

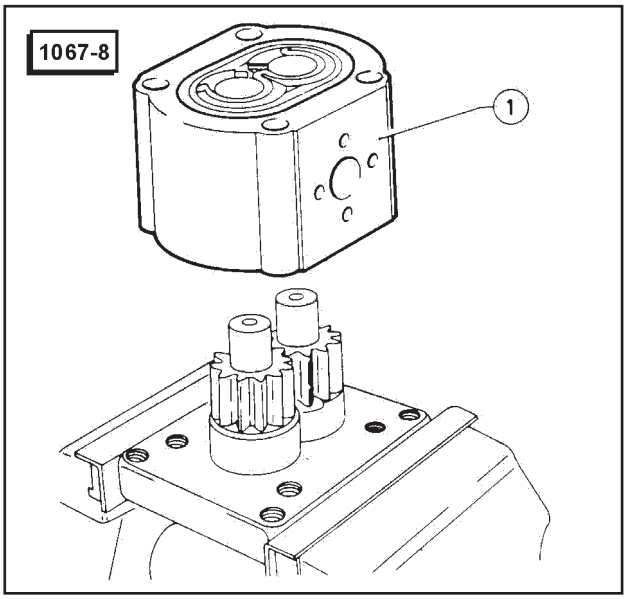
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1 - Cover
2 - Pump body
3 - Engine block

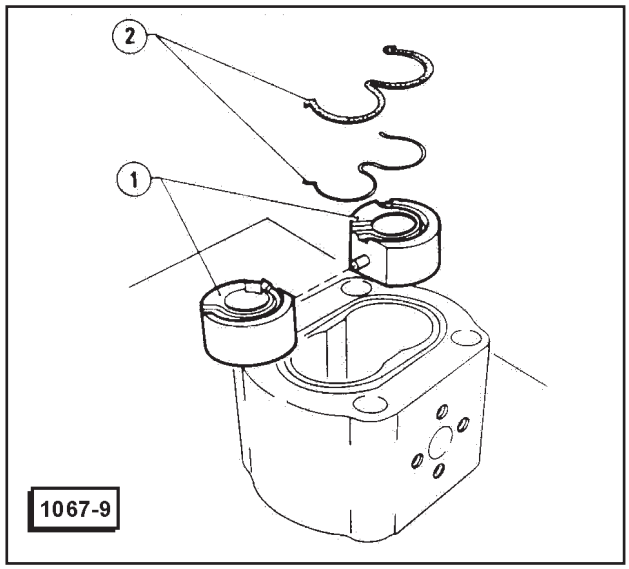
2. Remove the pump body **1** complete with the gasket underneath.



1 - Pump body

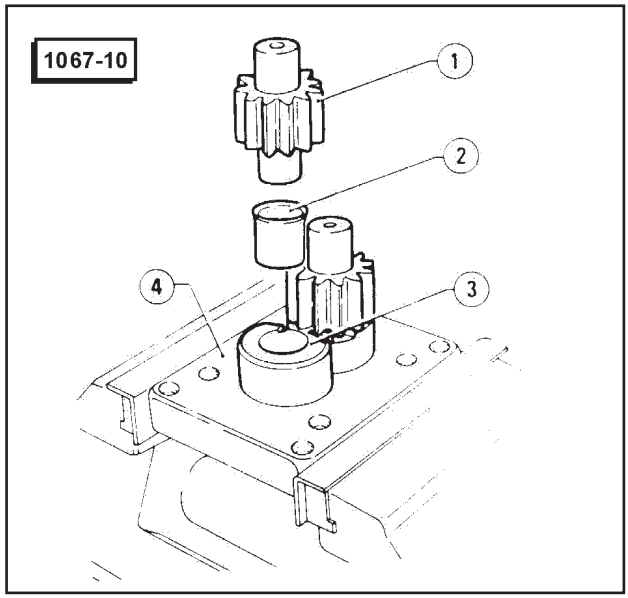
3. In order to help with the remounting, mark the bearing **1** of the pump body.

4. Using a pointed implement lift out the gaskets **2** then extract the bearings from their seats pushing from the inside towards the outside being careful not to loose the joint pin.



1 - Bearings
2 - Gaskets

5. Lift off the two pinions **1** and remove the bushes **2** from the bearings **3** on the engine block **4.**

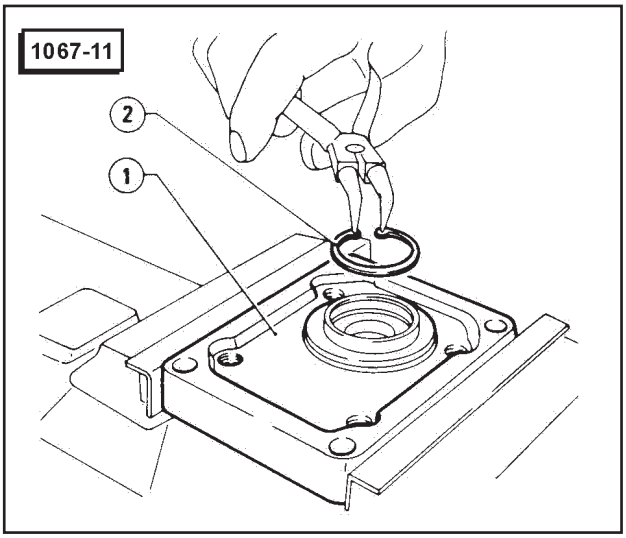


1 - Pinion
2 - Bushes
3 - Bearing
4 - Block

6. In order to help with the remounting mark the two bearings on the block.
7. Remove the bearings being careful not to damage the joint pin.
8. Put the block **1** in a vice with the under side upwards and remove the seeger ring **2**.

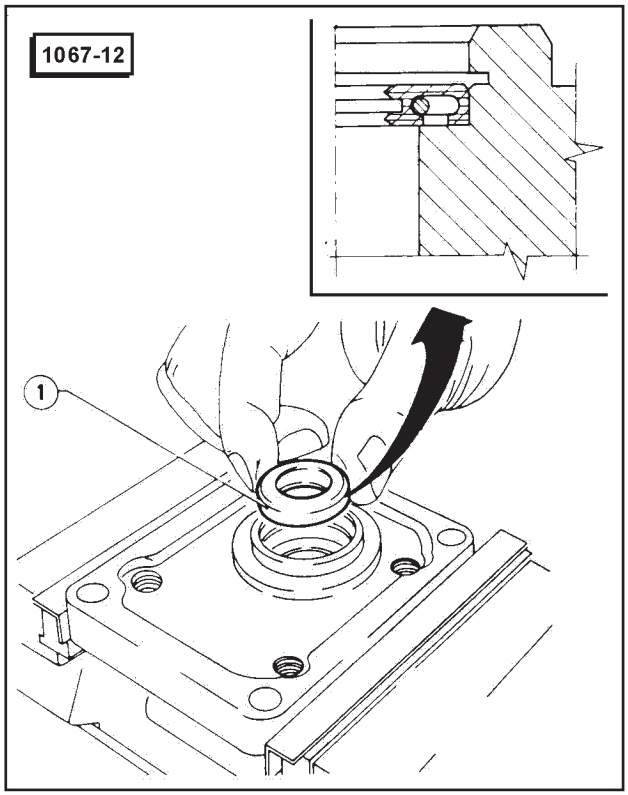
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1 - Block
2 - Seeger ring

9. Remove the support link **1**.



1 - Support link

CHECKS AND CONTROLS

1. After having removed all the gaskets present both on the cover and on the pump body, proceed with an accurate cleaning of all the parts with solvant.
2. Accurately dry all the parts with compressed air being careful that no solvant remains on them and so damages the parts.
3. Visually check the inside of the pump body to see that it is not damaged.

4. Check both the bearings and the pinions and make certain that they are not worn, rubbed by foreign matter or dented.

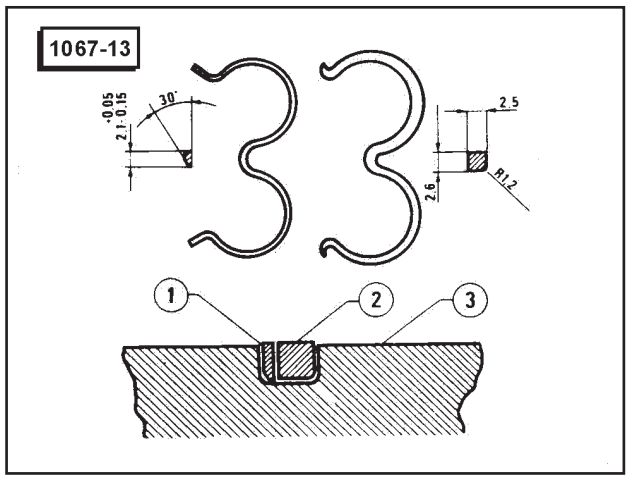
NOTE
With the reference of gaskets, if any of the parts are worn or damaged you must change the whole pump.

CAUTION
Do not press on the antiextrusion ring to avoid damaging it.

5. Check with a micrometer, that the height of the antiextrusion ring in within $21^{+0,05}_{-0,15}$ mm, if not change it remembering to check the height of the new ring.
6. If the value is higher than that given mount the new ring and correct the height with a very fine file.

REMOUNTING

1. Lubricate all parts with oil before mounting.
2. Correctly position all the gaskets in their seats, taking particular care to correctly position the antiextrusion ring **1** and the gaskets **2** in the bearing seats **3**.



1 - Antiextrusion ring
2 - Gaskets
3 - Bearings

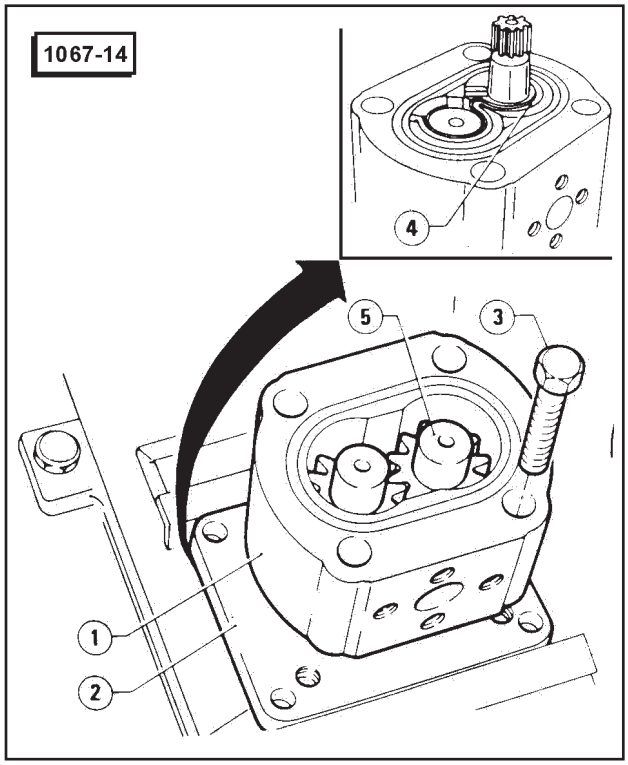
3. Place the pump body **1** on the block **2** and keep it in position by placing in the holes on the pump body two of the fixing screws **3** of the cover.
4. Being careful to remember the references made during the dismounting, spread the block with a thin layer of grease then replace the lower bearings **4**.

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NOTE
The open side of the gasket must be turned towards the suction side of the pump body.

5. Insert the two pinions **5** making certain that they are correctly positioned and that they rotate freely.



1 - Pump body
2 - Base
3 - Screws
4 - Bearings
5 - Pinions

6. Remove the two screws previously used to fix the pump and insert the upper bearings.
7. Spread the inside of the cover with a thin layer of grease then fit the pump body and tighten the four fixing screws to the prescribed torque.

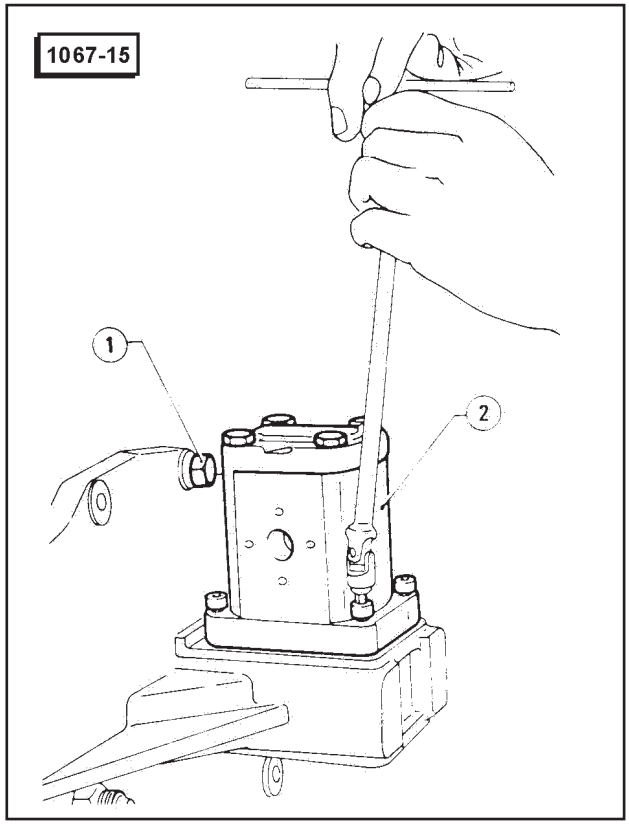
CAUTION
Gradually tighten the screws at the same time making certain that the rotors turn freely.

Tightening torque
Pump cover fixing screws
- M8
20 ± 3 Nm
(2,04 ± 0,30 kgm; 14.75 ± 2.17 ft lb)

- M10
41 ± 5 Nm
(4,2 ± 0,5 kgm; 30.37 ± 3.62 ft lb)

INSTALLATION

Proceed to install the pump working in the reverse order to the removal adhering to the following instructions. If it has been necessary to remove the gearbox cover first fit the fixing screw **1** of the cover then the lifting pump **2.**



1 - Screw
2 - Hydraulic lifting pump

— Top up the oil level (refer to: Steering Oil Tank Reassembly).
— Proceed to remove the air from the hydraulic circuit (refer to: Complete Hydraulic Circuit - Hydraulic Circuit Air Removal).

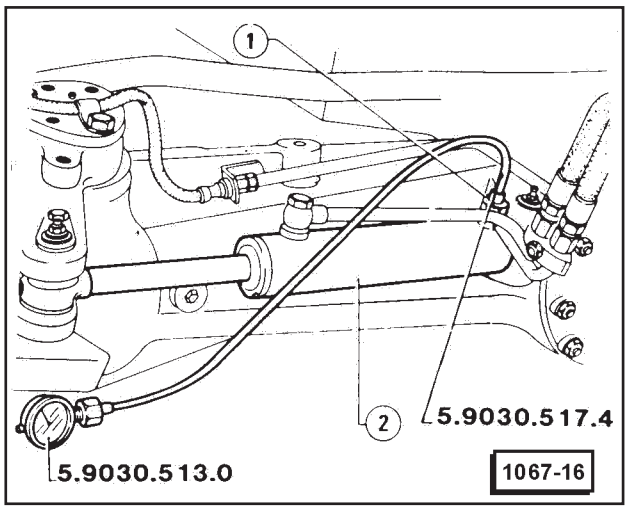
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COMPLETE HYDRAULIC CIRCUIT

SAFETY VALVE CALIBRATION CHECK

1. Place a manometer 5.9030.513.0 with the help of a flexible pipe 5.9030.517.4 and union 5.9030.579.0 on the internal union **1** of the power steering **2.**



1 - Union
2 - Power steering

2. Switch on the engine and let it run in idle for a few seconds.
3. Turn the steering as far as it will go, then turn the steering wheel clockwise until the manometer pin stops at a maximum value.
4. If the indicated value is different to that of the maximum operating pressure for the model in question, change the valve taking care to use one with the same identification number so that you do not change the calibration value (refer to: Technical Data and Specifications - Technical Details).
5. Repeat the same operation with the manometer and relative union mounted on the external union of the power steering, turning the steering wheel anti-clockwise.

REMOVAL OF AIR

1. Switch on the engine and let it run at minimum.
2. Loosen the two unions found on the power steering and turn the steering wheel both ways until all the oil with air bubbles comes out from them.
3. Tighten the two unions and check the level of the oil in the tank. Top up if necessary.

NOTE
— It is recommended to change the oil every 1200 working hours by first emptying out the circuit (refer to: Removal of Oil from Hydraulic Circuit) and then refilling it (refer to: Reassembly - Steering Oil Tank).

OIL REMOVAL

1. Loosen the oil feeder unions on the power steering.
2. Switch on the engine.
3. Slowly turn the steering wheel both ways for not more than ten seconds each way so as to avoid seizing the pump.

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TECHNICAL DATA AND SPECIFICATIONS

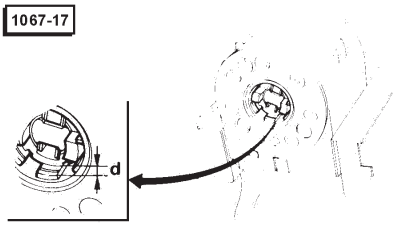
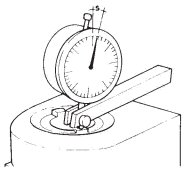
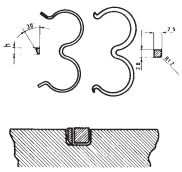
TECHNICAL DATES

Details			Model		
			110	130	150
Dinamic oil pump	Manufacturer		BOSCH		
	Type of pump		HY/ZFS 11/]1 - L201		
	Max. engine rev. capacity	l/1	41		
	Max. oil temperature	°C	90		
Hydraulic distributor	Manufacturer		ZF (ZAHNRADFABRIK FRIEDRICHSHAFENAG)		
	Distributor type		SERVOSTAT 8491.955.576	SERVOSTAT 8494.955.186	
	Rotor size	mm (in)	11.1 (0.44)	25.4 (1)	
	Steering wheel volume capacity	cm3	84	191	
	Necessary capacity for servopump	l/min	9	17	
	Allowed capacity for servopump	l/min	6 ÷ 30	12 ÷ 50	
	Max. capacity	l/min	80		
	Max. operating pressure bar	delivery	210		
		return	130		
	Max. operating Temp.	°C	80		
	Pressure of pressure limiting calibration valve	bar	120		
	Antishock valve calibration pressure	bar	180		
	Antinoise valve calibration pressure	bar	1,2		
	Identification plate readings				
	(1) From 8490 to 8497 open circui From 8470 to 8477 closed circuit		8494		
	(2) Pump rotor height		955		
	(3) Calibration rating		102		
	(4) Safety valve calibration value		100		
	(5) Serial number		0878		
	(6) Guarantee date		10/82		
Power steering	Thrust capacity	Kg	4560		
	Max. piston run	mm	185		
	Steering wheel turns for a complete turn		3,14		
Oil filter	Type		with wire net cartdridge in the tank		

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CONTROLS AND ADJUSTMENTS

Details		Model		
		110	130	150
1067-17  Helical distribution positioning	Entrance “d”	1,5 mm		
1067-18  Distributor axial play	Normal movement “s”	0,05 mm		
1067-19  Antiextrusion ring hydrostatic oil pump plant	height “h”	$21^{+0,05}_{-0,15}$ mm		

TIGHTENING TORQUES

Unit: Nm (kgm)

Details	Model		
	110	130	150
Distributor cover fixing screws	20 ± 3 (196 ± 294)		

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GENERAL PRESCRIPTIONS

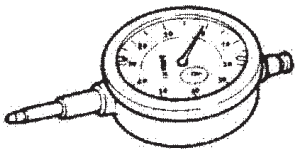
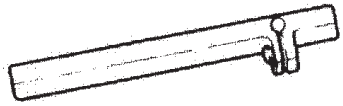
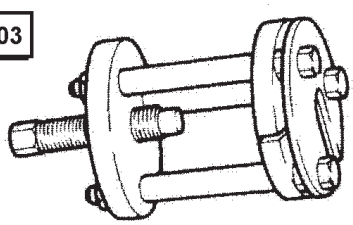
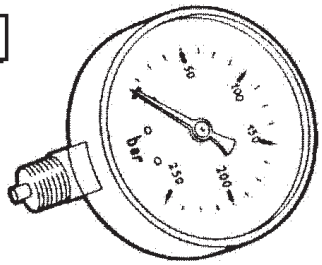
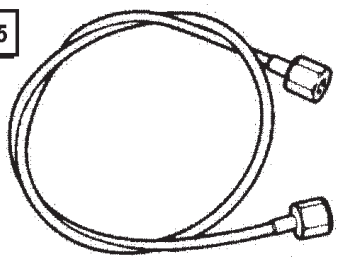
LUBRICANTS

Application	Type	Make	Model	Q.ty
Working fluid	Oil	AGIP ATF Dexron (GM Type à Suffix A)	110 - 130 - 150	2 l
Steering column	Grease	AGIP Grease 30 - (Grease 30)	110 - 130 - 150	
Distributor support links	Oil	AGIP ATF Dexron		
Hydrostatic distributor grooved hub	Oil	AGIP ATF Dexron		
Power steering fixing pin	Grease	AGIP Grease 30		
Lever ball bearings and dust rings	Oil	AGIP ATF Dexron		

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SPECIAL TOOLS

Tool No.	Name	Page Ref.
5.9030.272.0	Comparator 1067-101 	
5.9030.333.0	Comparator support 1067-102 	
5.9030.443.0	Steering wheel puller 1067-103 	
5.9030.513.0	Manometer 1067-104 	
5.9030.517.4	Flexible pipes 1067-105 	

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TROUBLE SHOOTING AND CORRECTIVE ACTION

Before carrying out other trouble diagnosis first check:
— The pressure and wear of tyres
— Toe in check
— Vehicle must be on flat and dry land with the engine at minimum.

Trouble	Probable cause	Corrective action
Loss of circuit oil	Distributor support links inefficient	Change support links on distributor
	Loss of oil from unions on distributor, on pump and on power steering housing	Tighten union to prescribed torque. If necessary change union gasket
Steering wheel hard and/or wheels rubbing	Straining of distributor or power steering	Change worn rings
	Presence of air in circuit	Remove air from circuit
	Safety valve calibration inadequate	Correct the calibration or change the valve
	Pump delivery pressure too low	Check and if necessary change pump
	Oil level too low	Top up oil level
	Air breather pipe position wrong	Change position of pipe if necessary, change
	(Only 2 RM) excessive play in steering rod	Adjust play and if necessary change worn parts
	Power steering nut loose	Tighten to prescribed torque
Servosteering noisy	Too little oil in the section	Top up oil to correct level, then proceed to remove the air
	Presence of air in the circuit	Deaerate the circuit
	Air breather unions loose	Tighten unions to prescribed torque
	Pipes interferring with the engine block or axle	Change the lie of pipes or if necessary change them
	Oil tank filter blocked	Change the filter
	Screws fixing the steering column distributor loose	Tighten the screws

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Trouble	Probable cause	Corrective action
Tractor doesn't turn	Distributor oil not arriving	
	- Tank filter blocked	Change the filter
	- Delivery pipe damaged	Check the piping and eventually change any that are damaged
	- Flexible breather pipes crushed or obstructed	Change the lie of the pipes and if necessary change
	- Irregular function of pump	Check and if necessary change the pump
	- Presence of air in circuit	Deaereate the circuit
Distributeur bloqué	Oil very dirty	Change oil
	Oil too hot	
	Pressure limit valve blocked	Unblock valve and if necessary change it
	Front axle too heavy	Unload the axle
Delivery shutter of distributor worn	Inadequate oil	Change the worn parts and fill the circuit with correct oil
	Filter blocked	Change the filter and the worn parts

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WORKSHOP MANUAL

LASER 110
LASER 130
LASER 150

SAME

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WORKSHOP MANUAL

Seat and headquarters:
V.le Ing. F. Cassani, 15
24047 Treviglio (BG)
Tel. 0363/4211
Telex: 311472 Samtra I

LASER 110
LASER 130
LASER 150

introduction

This publication is intended for the trained technician who must operate on our tractors.

It contains all general information relating to our tractor range, and in particular it highlights the inspection, overhauling and adjustment procedures as well as the main instructions for dismantling and reassembling operations.

The workshop manual is a natural summary for the mechanic who has attended the vocational training and specialization courses, which are held every year at our Service School, to permit him to perform a precise and qualified work on tractor.

Its contents are therefore an exhaustive reference book for the experienced mechanic who desires to refresh his memory on the sequence of the operations to be done. It is then good practice for every authorized dealer mechanic to have at his disposal this publication, so that it may be consulted quickly when necessary.

We wish to thank in advance for the cooperation all thos people, who will let us have their suggestions in order to make this publication more complete.

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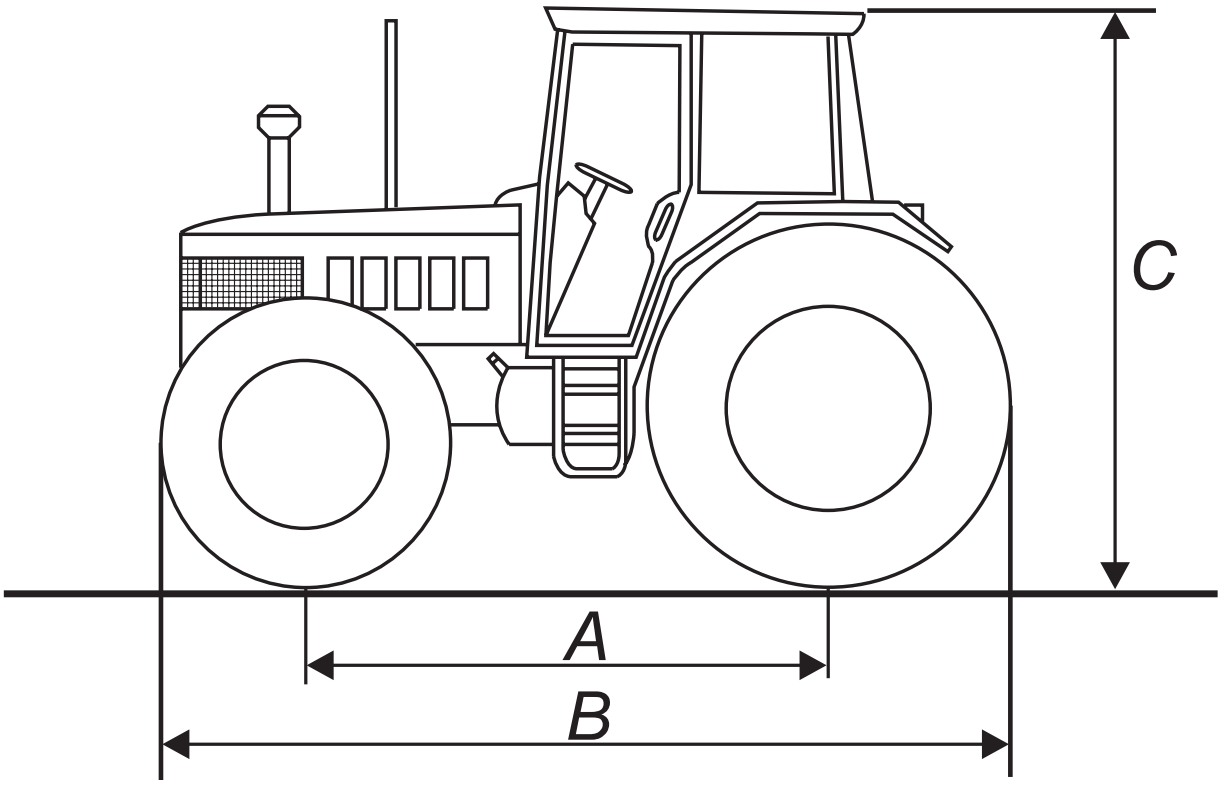
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DIMENSIONS AND WEIGHTS

Description		*LASER 110*	*LASER 130*	*LASER 150*
Tyres				
- front		14.9R28	16.9R28	16.9R30
- rear		16.9R38	18.4R38	20.8R38
Max length with front linkage B	mm	4585	4620	4650
	in	180,65	182,03	183,21
Max width	mm	2340	2330	2360
	in	92,20	91,80	92,98
Wheel base A	mm	2761	2761	2761
	in	108,78	108,78	108,78
Max. Height at safety frame	mm	2705	2730	2765
	in	106,58	107,56	108,94
Max. Height with cab (standard)	mm	2690	2720	2748
	in	105,99	107,17	108,27
Operating weight with driver platform	kg	4880	4990	5090
	lb	10758	11001	11221
Total max permissible load	kg	7500	8100	8500
	lb	16535	17857	18739
Operating weight with cab	kg	4800	5300	5800
	lb	10582	11684	12787



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PRESCRIBED LUBRICANTS AND FUELS

PRESCRIEBED LUBRICANTS AND FUELS LASER 110 - 130 - 150

Part to be supplied	Litres (U.S. gal)	Product	Specifications SDFG	Change hours
Engine	16.2** (4.28)**	AKROS TURBO	SAE 15W40 SAE 10W30 ACEA E 3-96 API CF SDFG OM-1991 MIL-L-2104 E level MB 228.3 level	300*
Gearbox and Rear axle	76 (20.06)	AKROS MULTI FCT	SAE 10W30 UTTO / API GL4 / SDFG OT1891-A	1200
Central axle	13 (3.43)	AKROS MULTI FCT	SAE 10W30 UTTO / API GL4 / SDFG OT1891-A	1200
Side reductions	2.5 (0.66) x2			
Brakes and clutch control	MAX	AKROS MATIC	ATF DEXRON II D / SDFG OF 1691	
Lubrication points		AKROS GREASE T2	NLGI 2 SDFG GR-1202 L	50
Radiator antifreeze	16 (4.22)	AKROS FREEZE	SDFG EC-1599 A	1200

(*) 1° replace after 50 hours

(**) With filter + 1 l.

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CONVERSION TABLE FROM

FROM	TO	multiply by:
inch	cm	2.540
cm	inch	0.394
foot	m	0.305
m	foot	3.281
yard	m	0.914
m	yard	1.094
Eng. miles	km	1.609
km	Eng. miles	0.622
Sq.in.	cm^2	6.452
cm^2	Sq.ft.	0.155
Sq.ft.	m^2	0.093
m^2	Sq.ft.	10.77
Sq.yard	m^2	0.835
m^2	Sq.yard	1.197
Cu.in.	cm^3	16.39
cm^3	Cu.in.	0.061
Cu.ft.	Liter	28.36
Liter	Cu.ft.	0.035
Cu.yard	m^3	0.763
m^3	Cu.yard	1.311
Imp.gall.	Liter	4.547
Liter	Imp.gall.	0.220
US gall.	Liter	3.785
Liter	US gall.	0.264
pint	Liter	0.568
Liter	pint	1.762
quart	Liter	1.137
Liter	quart	0.880
oz.	kg	0.028
kg	oz.	35.25
lb.	kg	0.454
kg	lb.	2.203
lb.ft.	kgm	0.139
kgm	lb.ft.	7.233
lb/in.	kg/m	17.87
kg/m	lb/in.	0.056
lb./sq.in.	kg/cm^2	0.070
kg/cm^2	lb/sq.in.	14.22
lb./Imp.gall.	kg/l	0.100
kg/l	lb./Imp.gall.	10.00
lb./US gall.	kg/l	0.120
kg/l	lb./US gall.	8.333
lb./cu.ft.	kg/m^3	16.21
kg/m^3	lb./cu.ft.	0.062
cu.ft./lb.	m^3/kg	0.062
m^3/kg	cu.ft./lb.	16.21
Nm	kgm	0.102
kgm	Nm	9.81
kW	PS	1.36
PS	kW	0.736
bar	kg/cm^2	1.014
kg/cm^2	bar	0.981
dm^3	l	1
l	dm^3	1

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HOW TO ORDER SPARE PARTS

To ensure perfect tractor efficiency thus avoiding serious drawbacks, and to optimize your investment and the operational expenses, the use of “ORIGINAL SPARE PARTS” is recommended.
Spare parts orders must specify the following:

— **Tractor serial number and engine serial number (if the engine is concerned).**
— **Spare part name and reference code.**

TRACTOR IDENTIFICATION DATA PLATE



ENGINE TYPE AND SERIAL NUMBER



TRACTOR FRAME TYPE AND SERIAL NUMBER



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ENGINE

Important: For all the instructions of assembly-disassembly, testing and adjustments, and the regulations of the engine, please refer to the specific manual of reparation Motors series 1000/W (code 307.1072.3.5)

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GENERAL FEATURES

DESCRIPTION

- The automatic command system of the lifter makes the vehicle a complete working instrument.
- The lifter controls are grouped on a dashboard situated to the right of the operator.

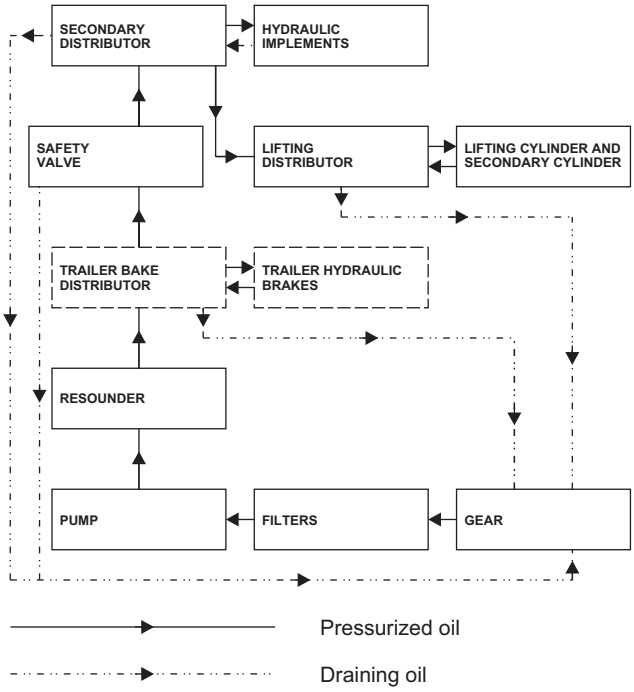
— The lever with the yellow knob; permits the lifting and lowering of the implement and determines the desired work position for controlled position jobs.
— The lever with the green knob permits the automatic control of the implement's work depth in function with any resistance that the implement may encounter.
— Suitably positioning the control levers, the mixed command strain-position is obtained.

- A special valve (valvematic device) regulates the flow rate of the oil in the circuit during the lowering of the implement, reducing the speed during the last **20 to 30 cm** (7.8 to 11.7 in) of descent, independent of the implements weight.
- An anti-shock valve, mounted on the delivery to the: cylinder allows the avoidance of sudden pressure increase provocated by the bouncing of the implement, with repercussions to the distributor, cylinder and hydraulic circuit components.
- The automatic strain control device (SAME original system) is connected directly to the lower arms of the lifter. This solution allows an extraordinary sensitivity in appraising the load variations on the implement.
- The sensitive machine part, placed to the right of the lifting housing, is achieved by a lever of the arms of the three point connection In function with the load variations on the implement, the sensitive machine part controls the distributor shaft so as to vary the work depth of the implement.
- The circuit utilizes the gear oil and consists of the following components.

— Two parallel filters; placed before the pump; eliminate eventual impurities present in the oil. A special pressure sensor permits the signalling in the cabin of any eventual blockages of the filters.
— A large capacity hydraulic pump positioned on the cover of the gearbox; draws out the engine in a continuous way by a change wheel and sends pressurized oil to the lifting unit and to the auxiliary distributor.
— A beeper placed between the pump and the lifting housing, absorbes pressure variations and eliminate vibrations and the consequent noise of the system.
— For the versions with the trailer hydraulic braking system, the oil coming from the pump crosses the brake control distributor before entering the lifting housing.
— Inside the lifting housing; special oil galleries send oil to the auxiliary distributor (refer to: Supplementary Hydraulic Circuit) and then to the lifting distributor.

NOTE
The engaging of the auxiliary distributor excludes the functioning of the lifter (with excepetion of the position "FLOAT").

— The distributor, at open center, sends oil to the cylinders of the lifter and controls the lifting and lowering of the implement.
— For certain versions two outside auxiliary hydraulic cylinders; working on the lifting lever, increase the lifting capacity.
— The hydraulic circuit oil is accumulated in the gearbox, completing the cycle.



DISTRIBUTOR FUNCTIONAL DIAGRAM

LIFTING PHASE

The movement towards the left of the distributor shaft **5** allows the oil coming from the pump to flow over the external area of the start up pilot valve. The valve **6** then moves left allowing the pressurized oil to work on the start up valve **7** so as to close the flow to the drain.

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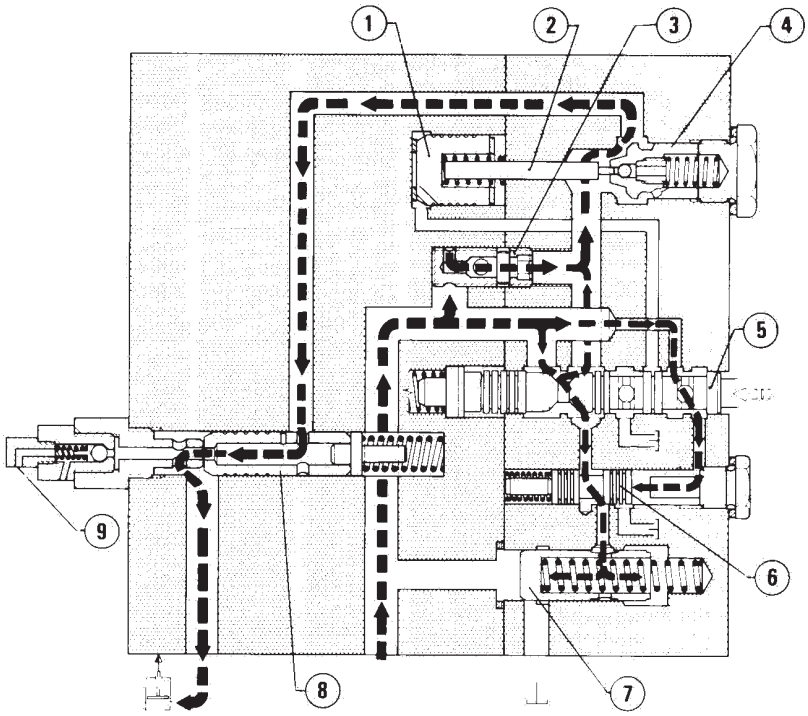
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The flow of oil towards the distributor shaft **5** (minor quantity) and the intake valve **7** can flow towards the non-return valve **4** and the valvematic **8** and feed the lifting cylinder.

1 - Piston
2 - Push rod
3 - Intake valve
4 - Non return valve
5 - Distributor shaft
6 - Start up pilot valve
7 - Start up valve
8 - Valvematic
9 - Anti-shock valve

External action
Pressurized oil

1067-41



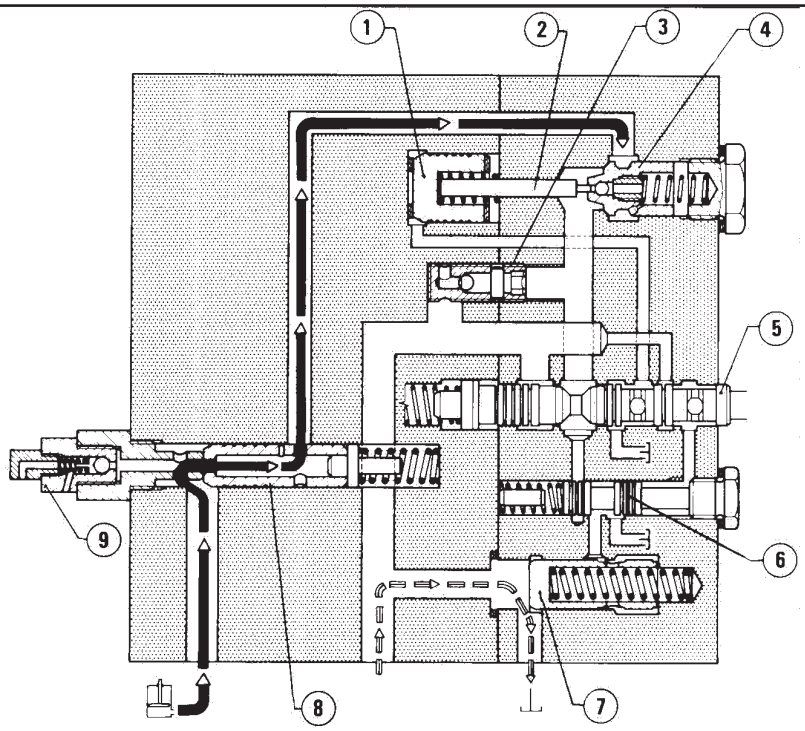
NEUTRAL PHASE

In neutral, the distributor shaft **5** is in a position to block the flow of oil to the pilot start up valve. In consequence the start up valve does not close the flow to drain but allows the down flow of the oil coming from the pump.
The arms of the lifter remain in position whilst the non-return valve **4** remains closed, stopping the oil in the lifting cylinder **2** from flowing down towards the drain. The pressure of oil in the section of circuit between the lifting cylinder and the non-return valve **4** is determined by the weight of the part.

1 - Secondary piston
2 - Push rod
3 - Intake valve
4 - Non return valve
5 - Distributor shaft
6 - Start up pilot valve
7 - Start up valve
8 - Valvematic
9 - Antishock valve

Oil coming fromthe pump
Pressurized oil

1067-42

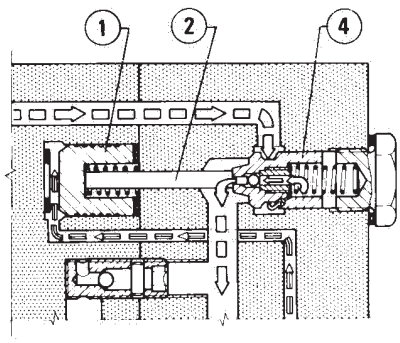


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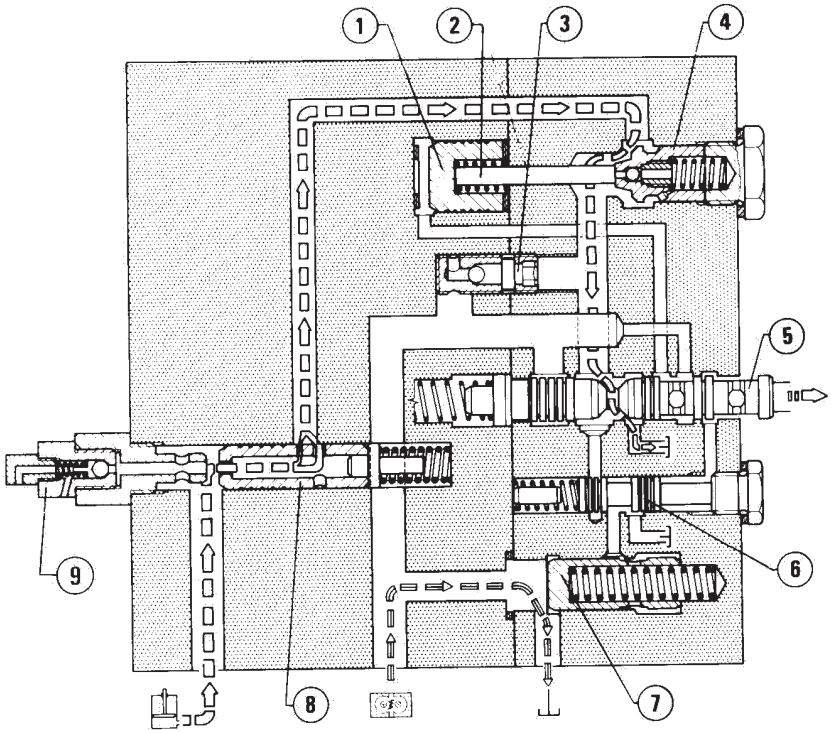
LOWERING PHASE

By moving the distributor shaft **5** to the right a certain quantity of oil is permitted to come from the pump and presses on the outside surface of the secondary piston **1**.
De ce fait, le petit piston **1** se déplace vers la droite et pousse l'embout **2**, qui agit sur la bille à l'intérieur de la soupape de non retour **4**.
Consequently the secondary piston 1 moves towards the right and pushes the push rod **2** which works on the ball on the inside of the non-return valve. The movement of the ball allows a small amount of oil present in the inside chamber of the valve **4** to down flow towards the outside provocating a fall in pressure. The difference in pressure established between the upstream of the valve **4** and the relative internal chamber determines the movement of the valve towards the right, therefore the conduit completely opens towards the drain. The speed of the down flow of the lifting cylinder oil is kept constant to the valvematic **8** independent of the weight of the lifter.



1 - Secondary piston
2 - Push rod
3 - Intake valve
4 - Non-return valve
5 - Distributor shaft
6 - Start up pilot valve
7 - Start up valve
8 - Valvematic
9 - Anti shock valve

External action
Oil flowing fowards the drain
Oil coming fromthe pump



1067-43

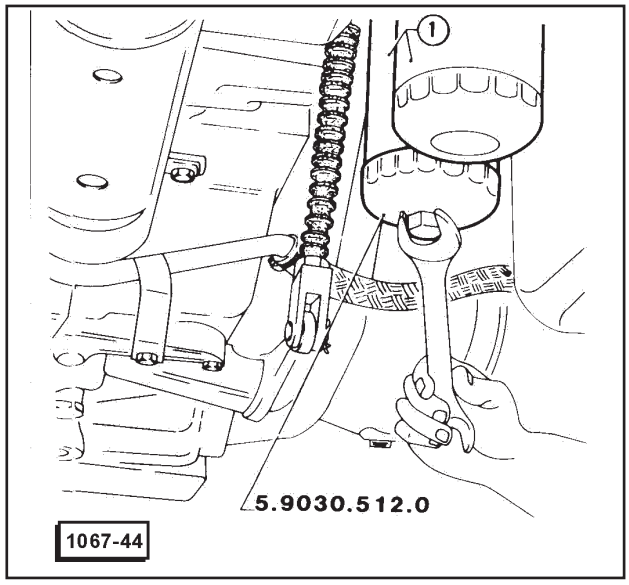
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OIL FILTER

REPLACEMENT

1. Operating underneath the vehicle and using spanner 5.9030.512.0 unloosen then remove the two filters **1.**
2. On remounting refill the new filters; with the recommended oil, lubricate the gasket and hand tighten to the filter support.
3. Start the engine and check that there is no oil leak from the filter gaskets.



1 - Hydraulic circuit oil filters

OIL PUMP

For the overhauling of the oil pump lifting control housing circuit follow the procedure described in “Hydrostatic Steering - Oil Pump”.

NOTE
The lifting control circuit oil pump is found in front of that of the steering circuit. To facilitate the dismounting and remounting it is advised to support the tractor with an adequate jack and remove the left back wheel and lower the fuel tank.

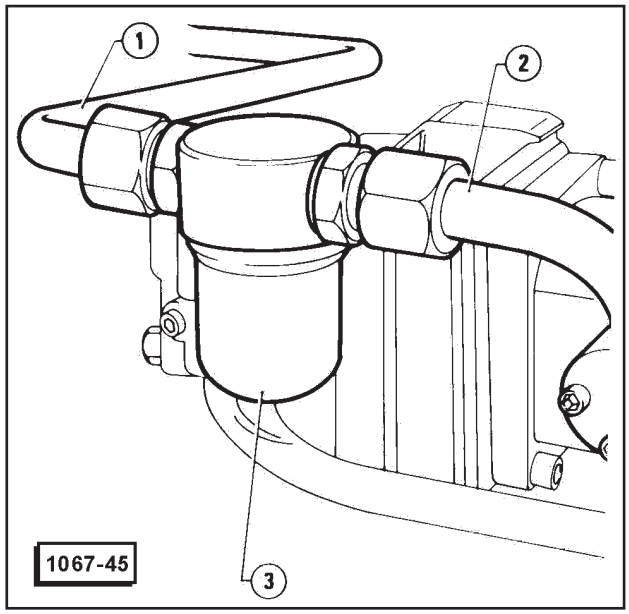
CAUTION
On remounting the pump it is advised to refill the pipe between the pump and oil filters with oil in such a way as to facilitate the priming of the pump.

RESOUNDER

REPLACEMENT

NOTE
For working ease it is advisable to remove the right rear wheel supporting the, tractor with an adequate jack.

1. Loosen the pipe fittings **1** and **2** using a contrast spanner for the fitting of resounder **3**. Remove the resounder.
2. Proceed with the remounting using the reverse order and tighten the pipe fittings using a contrast spanner.



1 - Resounder connection pipe - lifting housing
2 - Pump connection pipe - resounder
3 - Resounder

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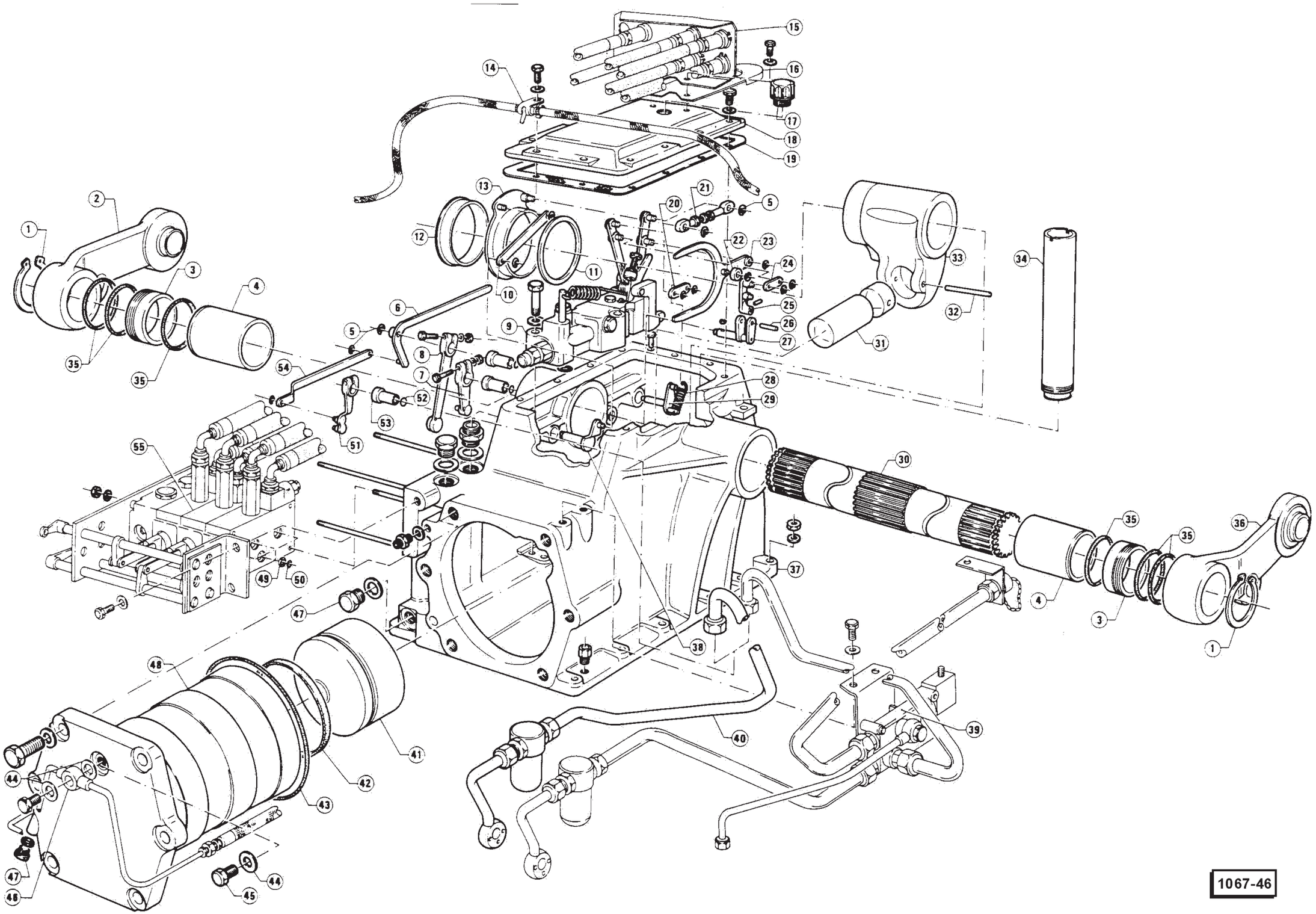
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LIFTING HOUSE

1 - Seeger ring
2 - Right arm
3 - Bush
4 - Bush
5 - Seeger ring
6 - Rear position control lever
7 - Strain control lever
8 - Sensitive machine part lever
9 - Distributor with control lever
10 - Tie rod
11 - Shim adjustment ring
12 - Spacer
13 - Cam return lever
14 - Fuel vapour air valve
15 - Plate
16 - Retainer
17 - Air cap
18 - Cover
19 - Gasket
20 - Tie rod
21 - Adjustable tie rod
22 - Roller
23 - Fork
24 - Tie rod
25 - Lever
26 - Pin
27 - Strain check return lever
28 - Spring
29 - Sensitive machine part return lever
30 - Shaft
31 - Connecting rod
32 - Lock pin
33 - Inside arm
34 - Oil level pipe
35 - O-ring
36 - Left arm
37 - Lifting house
38 - Position control return lever
39 - Trailer hydraulic brake distributor with brackets and pipes (only for certain models)
40 - Resounder lifting pipe - lifting house
41 - Piston
42 - Gasket
43 - O-ring
44 - Gasket
45 - Cap
46 - Secondary lifting cylinder control pipe fitting (only for certain models)
47 - Cap
48 - Cylinder
49 - Teflon ring
50 - O-ring
51 - Position control lever
52 - O-ring
53 - Bush
54 - Tie rod
55 - Secondary distributor with brackets and control lever

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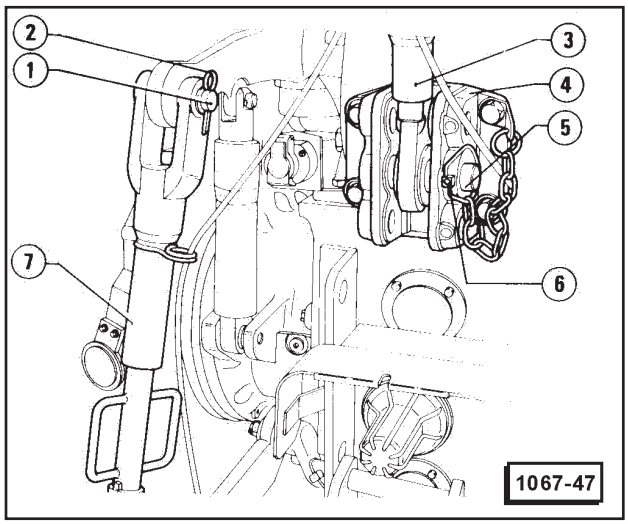
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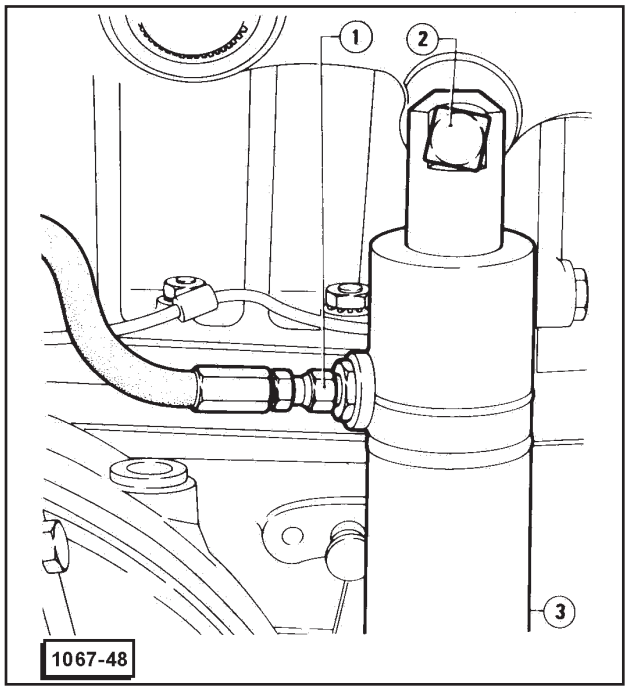
REMOVAL

1. Support the central strut **3** and remove the pin **6** and slip off the pivot and remove the strut.
2. Remove the split pin **2** support the side tie rod **7** and slip off the pin **1**.
3. Unloosen the clamp screws and remove the support **4**.



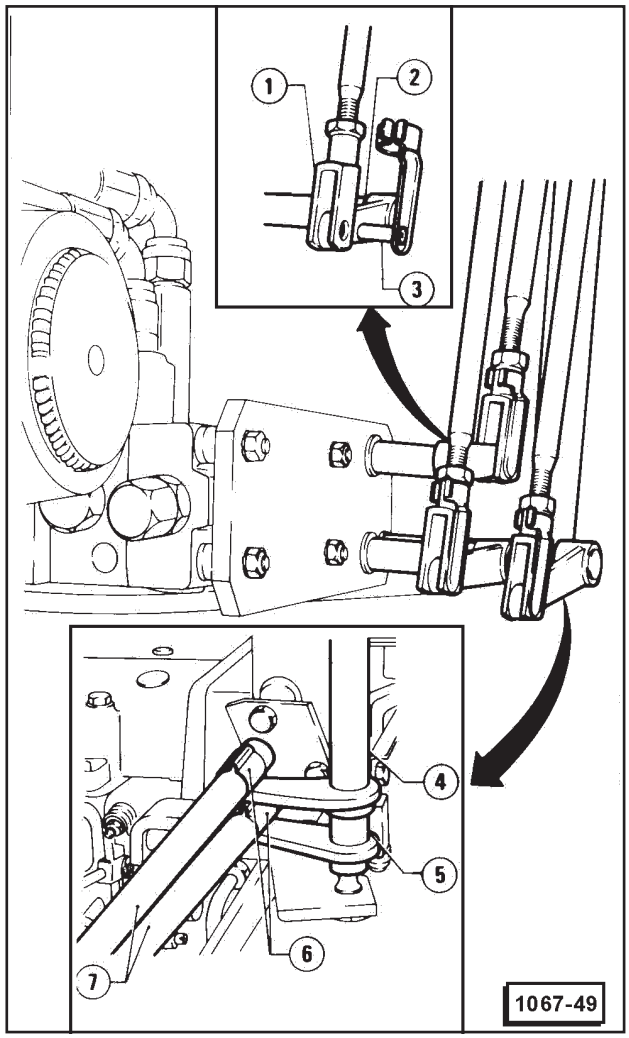
1 - Pin
2 - Split pin
3 - Central strut
4 - Support
5 - Pivot
6 - Pin
7 - Side tie rod

4. For models with secondary hydraulic cylinders, remove the cylinder as follows.
(1) Loosen the fitting **1** of the fuel pipe of the cylinders **3**.
(2) Remove the fixing split pin and slip off the pivot **2** and the relative bush and turn the cylinder downwards.



1 - Fitting
2 - Secondary cylinder fixing pivot of the arm of the lifter
3 - Secondary hydraulic cylinder

5. Unhook the clamping springs of the pivots **3** joining the forks **1** and the lever **2**. Slip off the pivots and disconnect the lever.
6. Unhook the spring **6** which fix the rods **7** to the shaft **4** and **5** and separate.

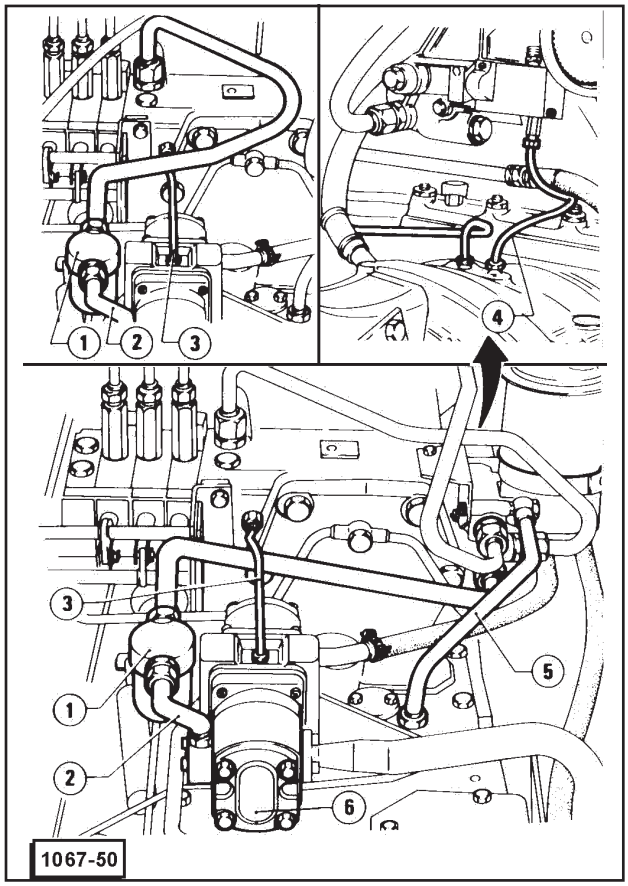


1 - Fork
2 - Distributor control lever
3 - Pivot with bracket
4 - Outside shaft
5 - Inside shaft
6 - Metal clip
7 - Lower rod

7. Remove sensitive machine parts (refer to: Sensitive Machine Parts - Dismounting).
8. Disconnect the pipes working as follows.
(1) Take off from the two fuel tanks the relative air pipes.
(2) Disconnect the union fitting tube **3** on the lifting house.
(3) Unscrew the clamp screw and remove pipe **2** from the pump **6.**
(4) For models with hydraulic brake distributor for trailers, unscrew the union and separate the pipe **5** from the gear cover. Separate also the pipe **5** from the fitting of the trailer brake distributor.

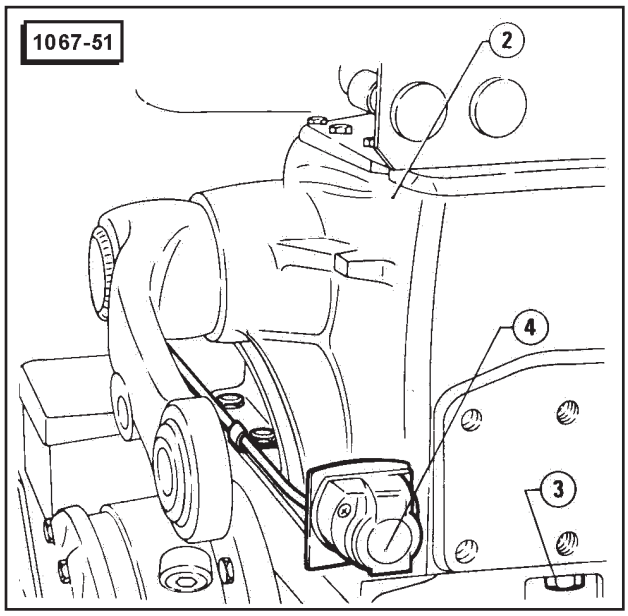
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1 - Resounder
2 - Pressurized oil delivery pipe
3 - Pipe far pump bearing lubrication
4 - Pipe far trailer brake distributor
5 - Oil return pipe far trailer brake
6 - Hydraulic circuit pump

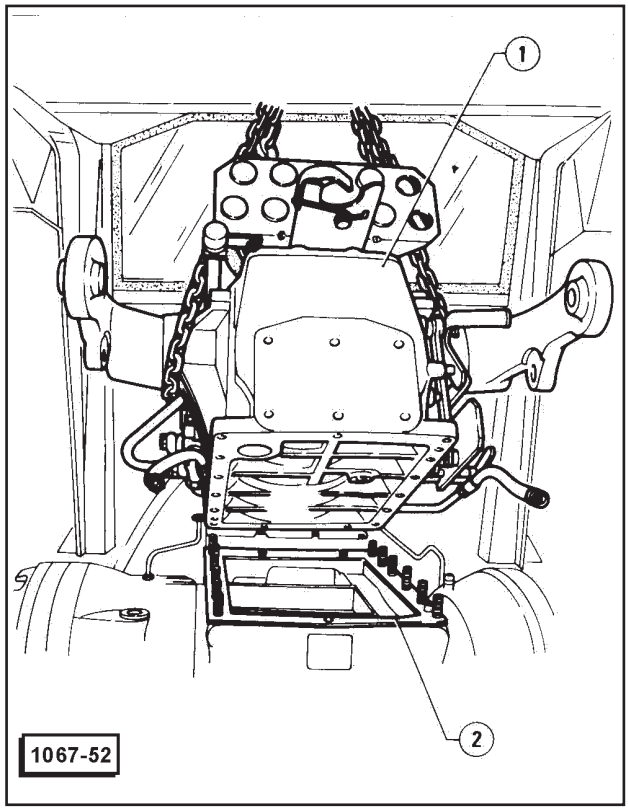
9. Unscrew the clamp nuts of the tank **1** and of the plug 4 and move to the side. Unloosen sere **3** and all remaining nuts fixing the lifting housing **1** to the gear box.



2 - Lifting house
3 - Screws
4 - Plug for trailer lights

10. Unhook the lifting housing **1** and using a crane. Lift the unit, slipping off the studs and the balancing pin found on the gear box. If present; also remove gasket **2**.

CAUTION
Work with particular so as not to damage the cabin.



1 - Lifting housing
2 - Gasket

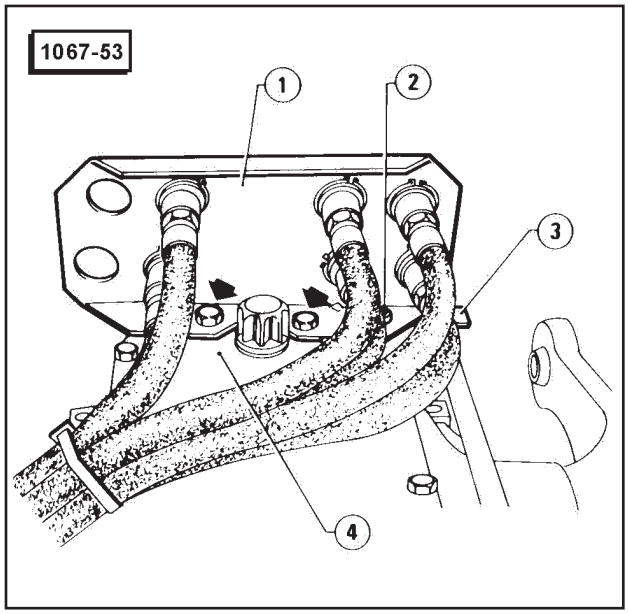
DISMOUNTING

COVER

1. For models with a trailer hydraulic brake system unscrew the bolt **2** and disengage the bracket **3** of the plate **1.**
2. Unloosen the two clamp screws of the plate **1** to the lifting housing, move the plate to the side without disconnecting the secondary distributor pipes.

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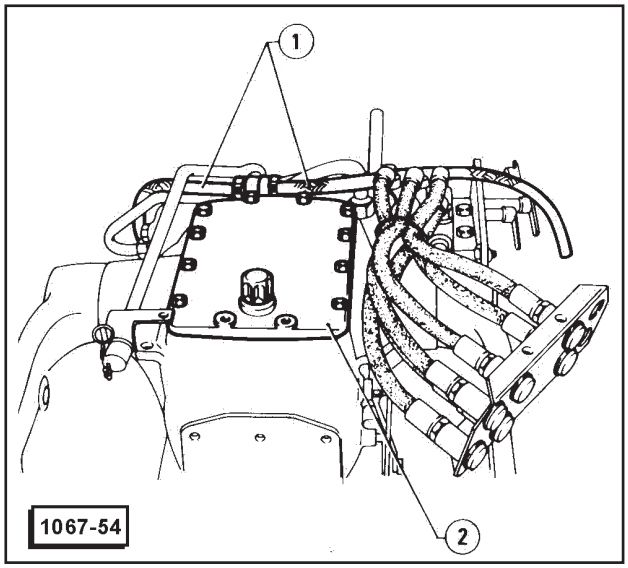
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1 - Pipe support plate
2 - Bolt
3 - Pipe holding arm for trailer hydraulic brake
4 - Lifting housing cover

3. Unloosen the clamp screws of cover **2** of the lifting housing and remove with its gasket.

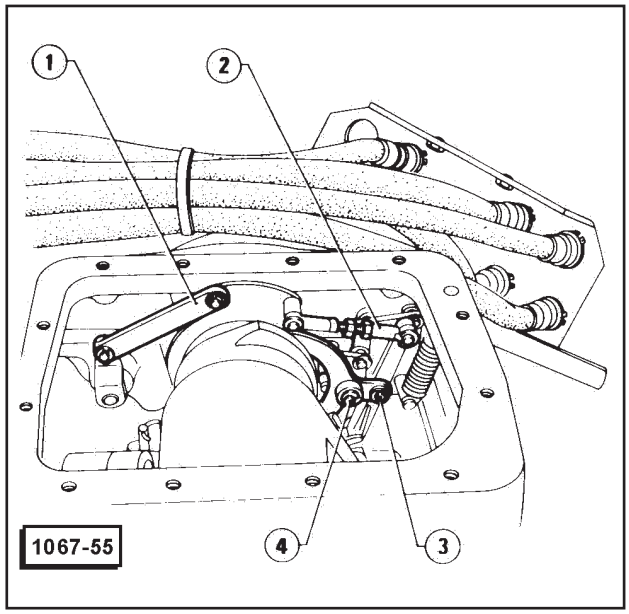
NOTE
One of the screws fixes the fuel vapour air valve.



1 - Fuel tank air pipe
2 - Lifting housing cover

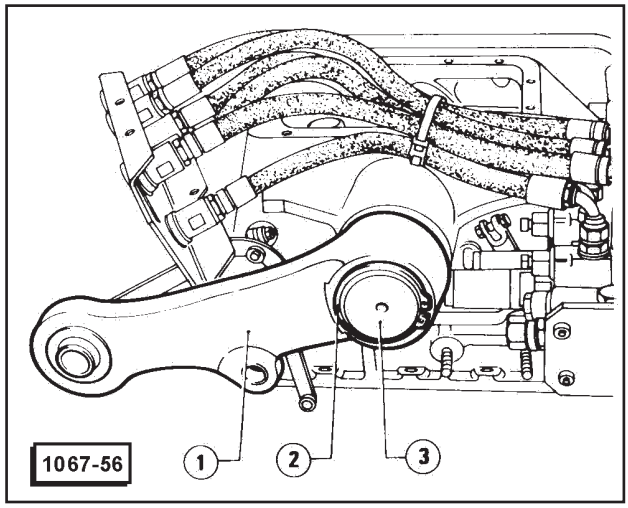
LIFTING CONTROL ARMS

1. Unhook the Seeger clamp rings of the tie rod **1** and **2** and remove, also remove the clamping Seeger ring **3** of the fork **4**.



1 - Tie rod
2 - Adjustable tie rod
3 - Seeger ring
4 - Fork

2. Remove the Seeger ring **2** on the right side and take off the arm **1** of the shaft **3** knocking the arm with a mallet of soft metal.



1 - Right arm
2 - Seeger ring
3 - Shaft

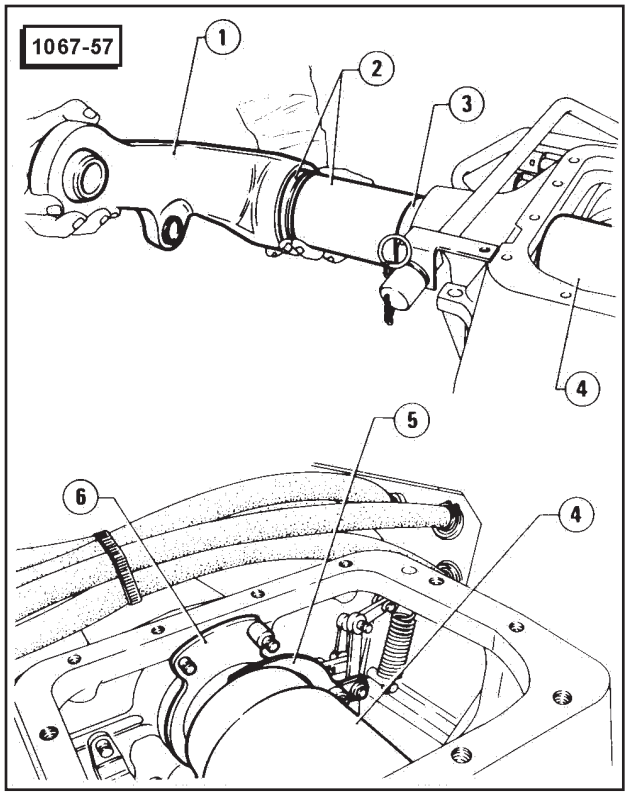
3. From the left side of the lifting housing remove shaft **3** with arm **1** and bush **2**. From the inside of the housing remove lever **6** with the relative inside bush, fork **5** with the shim adjusting ring and the inside arm **4** complete with connecting rod.

CAUTION
The lifting shaft can only be removed from the housing from the left hand side.

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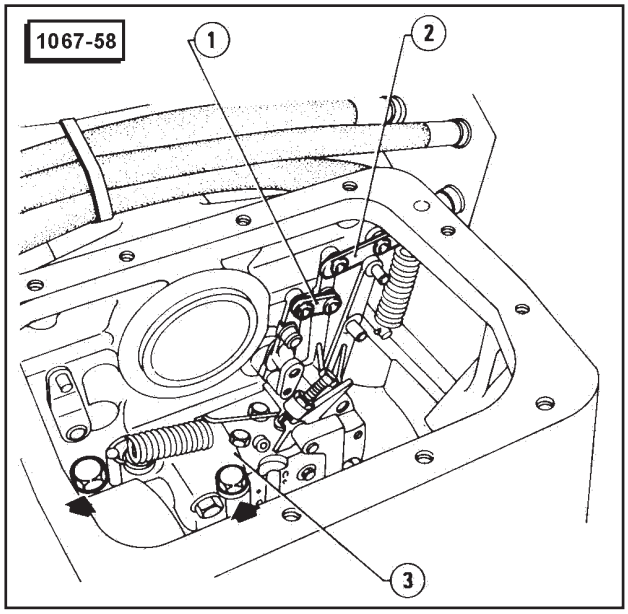
4. Take the lifting housing and the bush complete with O-ring from the shaft.



1 - Left arm
2 - Bush
3 - Shaft
4 - Inside arm
5 - Fork
6 - Return lever with cam

DISTRIBUTOR

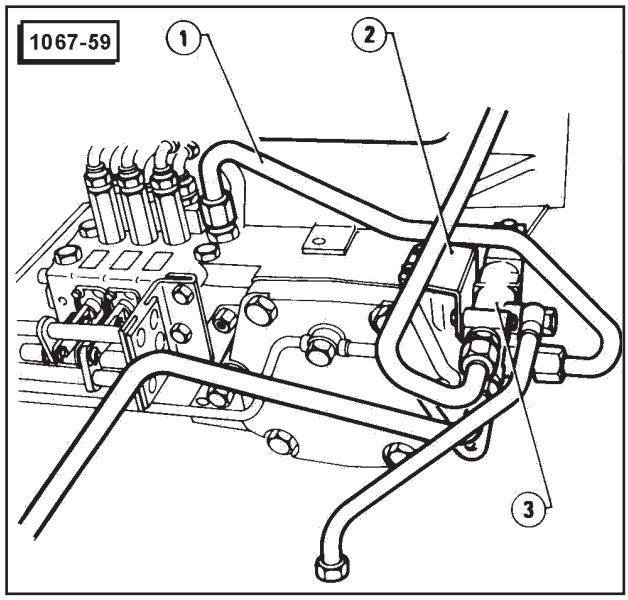
1. Remove the tie rod **1** and **2**, separating the relative fixing range.
2. Loosen the two screws shown in the diagram and remove the distributor **3** together with the underlying O-ring.



1 - Tie rod
2 - Tie rod
3 - Lifting control distributor

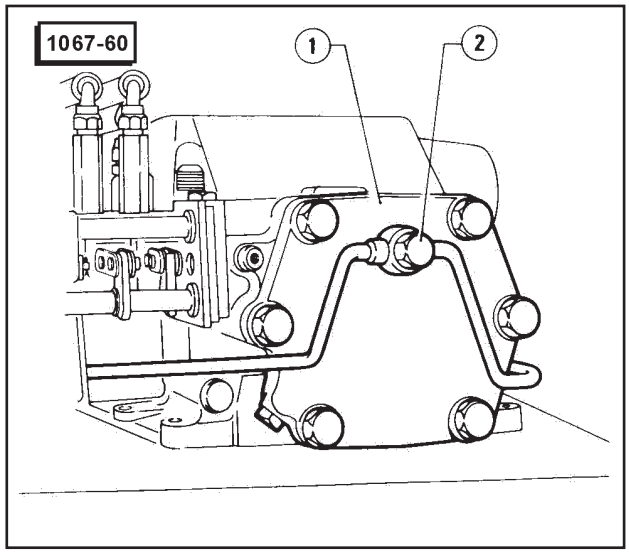
CYLINDER AND PISTON

1. For models with trailer hydraulic brake distributor, it is advisable to remove the distributor, working as follows:
(1) Unscrew the pipe fitting **1** and remove the lifting housing.
(2) Loosen the two bracket **2** clamp screws of the lifting housing and remove the distributor **3** complete with pipes and bracket.



1 - Oil delivery pipe to the lifting housing
2 - Bracket
3 - Trailer hydraulic brake distributor

2. Unloosen the six clamping screws of the flange **1** and take off the cylinder complete with piston and O-ring situated behind the flange.
3. If necessary, for models with secondary hydraulic cylinders, unscrew the union **2** and remove complete with its gasket and secondary cylinder delivery pipe.



1 - Lifting control cylinder flange
2 - Union fitting

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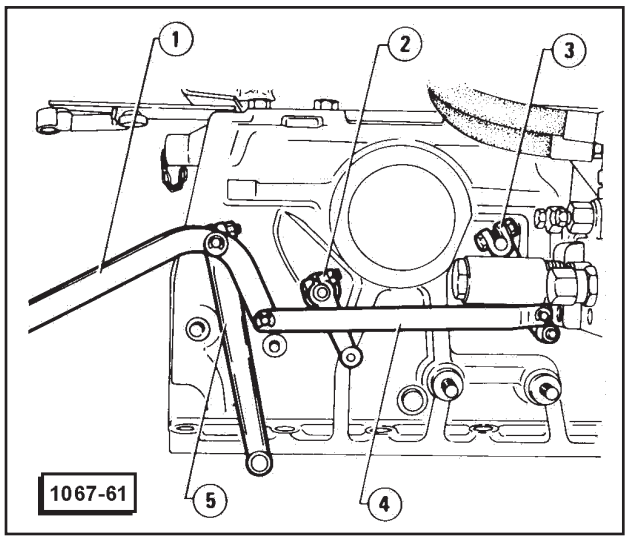
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4. Gradually blow compressed air into the cylinder fuelling conduit in order to push the piston to the outside.

CAUTION
Work with caution so that the piston is not expelled violently from the cylinder.

DISTRIBUTOR CONTRO L LEVER

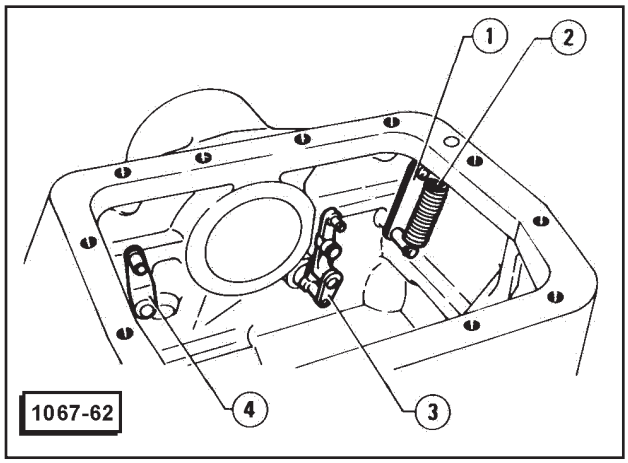
1. Working from the outside of the lifting housing, unscrew the lever bolts that need removing, take the levers off the return pins and recuperate the tongue.



1 - Position control lever
2 - Strain check lever
3 - Position control lever
4 - Tie rod
5 - Sensitive machine part lever

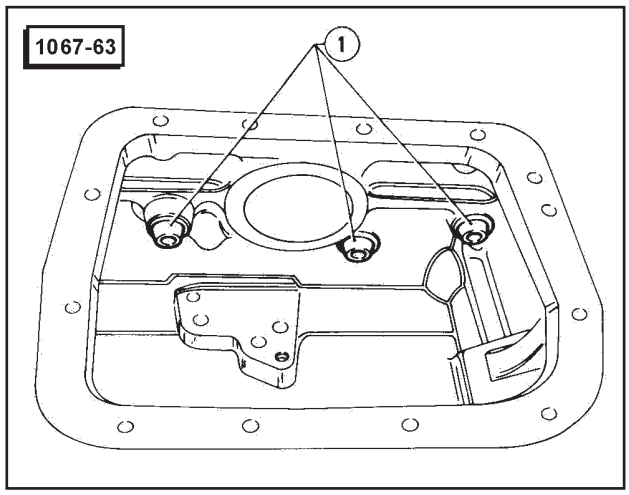
2. From the inside of the housing; take off the return lever.

NOTE
Before removing the return lever **1** from the sensitive machine part unhook the spring **2**.



1 - Sensitive machine part return lever
2 - Spring
3 - Strain check return lever
4 - Position control return lever

3. If necessary substitute the O-rings on the inside of the bush **1.**
4. If necessary, remove the bush **1** pusing it towards the outside with punch and hammer.



1 - Bush

SECONDARY DISTRIBUTOR REMOVAL

1. If necessary, remove the secondary distributor to the outside of the lifting housing (refer to: Supplementary Hydraulic Circuit - Distributor Dismounting).

CHECKS AND ADJUSTMENTS

1. Accurately clean all components.
2. Check that the grooved profiles of the inside and outside of the lever and of the lifting shaft are not dented or show signs of excessive wear; if they do, replace the defective components.
3. Check that the bush of the lifting gear shaft is not scratched or show signs of seizing or excessive wear. Replace the components that are not damaged.
4. Check that all the bushes on the lever and on the lifting housing are not worn and that they are firmly inserted in their seats.
5. Note the diameters “d” and “D” of the piston and lifting cylinder and check that they are within the value limit in the table “Piston, Cylinder and Secondary Cylinders” (refer to: Technical Data and Specifications Checks and Adjustments).

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REMOUNTING

Proceed with the reassembly of the lifting housing working in reverse order to the disassembly, taking note of the following specifications.
— Clean and accurately degrease all the coupling surfaces of the components.
— Replace all the gaskets and the O-ring, and check that they are correctly in their seats.
— Replace the gasket on the lifting cylinder piston.
— Apply recommended sealer to the coupling area and the cylinder flange and lifting control housing.
— Tighten to the prescribed torque the following components.

Tightening torque
Cylinder clamp screw to the lifting housing
275 ÷ 295 Nm
(28 ÷ 30 Kgm; 202.44 to 216.9 ft lb)

— Lubricate with recommended grease, the grooved profiles of the lifter arms and the ends of the shaft where they have to be mounted.
— When remounting the shaft on the outside arms and on the inside arm observe the position of oversized teeth markings on the grooved profiles.
— When remounting the shaft knock, with a soft metal hammer, to set and allow mounting of the Seeger ring of the outside arms.
— Replace the gasket between the lifting housing and the relative cover, remount temporarily, the cover without blocking it, as after installation you must proceed with the adjusting of the inside components.

REASSEMBLY

Proceed with reassembly of the lifting housing using the reverse order to that of the disassembly, using the following recommendations.
— Clean and degrease accurately the coupling area between the lifting housing and gear box and apply the recommended sealer.
— Position the lifting housing on the gearbox central pin.
— Lubricate with the recommended grease the lifting mechanism joints before joining.
— Reassembly completed, start the engine and work the lifter in such a way that the oil in the hydraulic circuit circulates. Stop the engine, control the oil level in the gear and if necessary top up.

NOTE
Because the oil travels slowly from the lifting housing .to the gearbox, wait for a few minutes before checking the oil level.

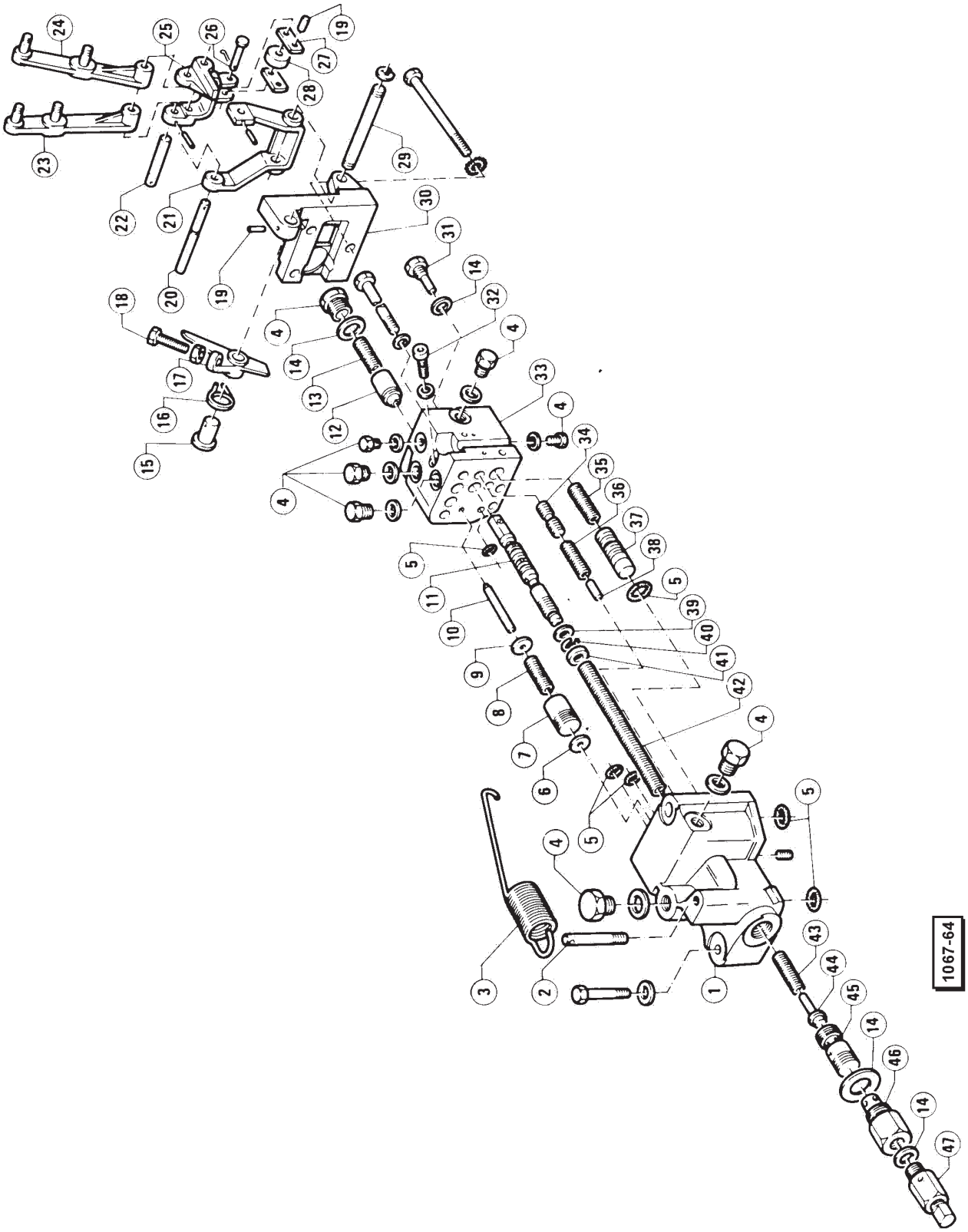
— Carry out the adjustment on the lifting housing and check the sensitivity of the lifter (refer to: Checks and Adjustments).

DISTRIBUTOR

1 - Front body
2 - Spring fixing pin
3 - Spring
4 - Cover
5 - O-ring
6 - Shim adjustment ring
7 - Non return valve piston control
8 - Spring
9 - Washer
10 - Non return valve control push rod
11 - Distributor shaft
12 - Non return valve
13 - Spring
14 - Gasket
15 - Pivot
16 - Spring
17 - Limit stop lever
18 - Adjustment screw
19 - Lock pin
20 - Pivot
21 - Fork
22 - Pivot
23 - Lever
24 - Lever
25 - Intermediate fork
26 - Pivot
27 - Small plate
28 - Spacer
29 - Pivot
30 - Lever support
31 - Cap
32 - Intake valve
33 - Rear body
34 - Start up valve
35 - Spring
36 - Spring
37 - Start up pilot valve piston
38 - Spacer
39 - Shoulder ring
40 - Retaining ring
41 - Washer with retaining ring seat
42 - Distributor spring
43 - Spring
44 - Spacer
45 - Valvematic piston
46 - Union
47 - Anti-shock valve

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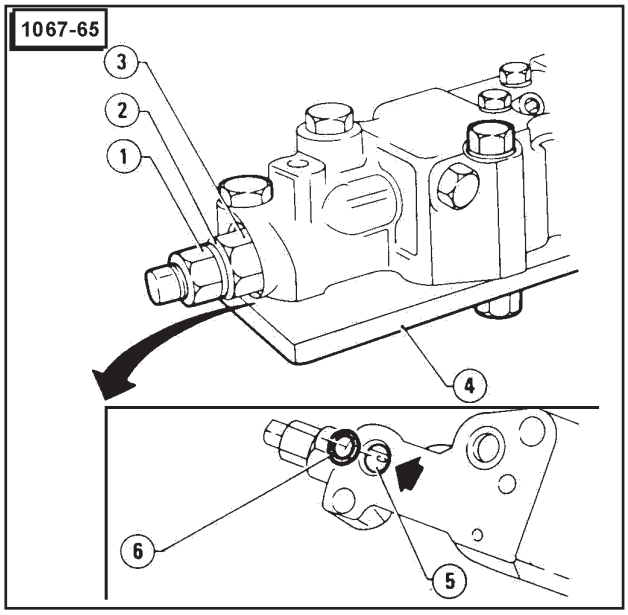
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REMOVAL

Remove the distributor from the lifting housing, working as described in “Lifting Housing - Disassembly”.

ASSEMBLED DISTRIBUTOR CHECKS

Before dismounting the distributor proceed with the control of the seal of the non return valve, using the following instructions.
1. Push the O-ring **6** into the seat of the space **5** indicated in the figure and fix a plate **4** below the distributor with two bolts, so that the space **5** is perfectly closed.
2. Unloosen the anti-shock valve **1** keeping the fitting **3** blocked with a contrast spanner. Remove the valve with its gasket **2**.
3. Join the hydraulic pump 5.9030.520.4 to fitting **3**, pressurize the oil with the pump and check that there are no leaks from the distributor.



1 - Anti-shock valve
2 - Gasket
3 - Union - fitting
4 - Plate
5 - Lifting cylinder delivery oil hole
6 - O-ring

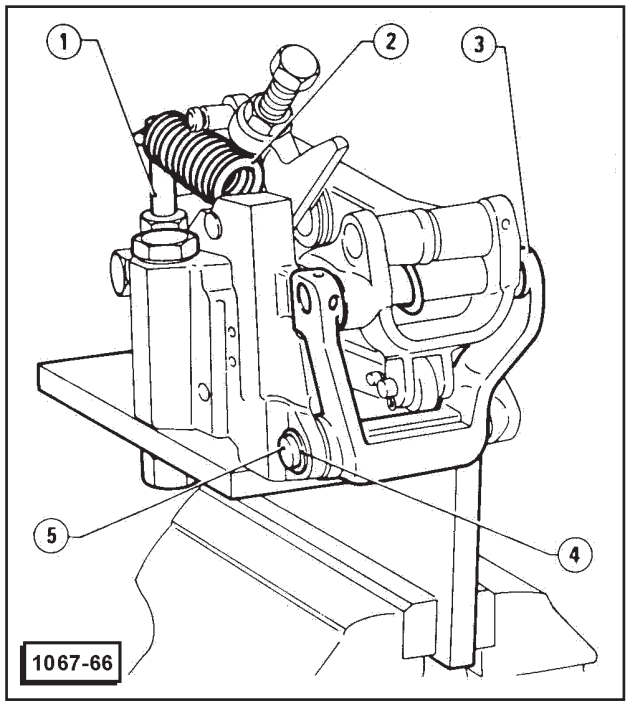
4. If there is oil leakage it could be caused by the inefficiency of the non return valve, therefore proceed with overhauling of the distributor.

DISMOUNTING

DISTRIBUTOR CONTROL LEVER

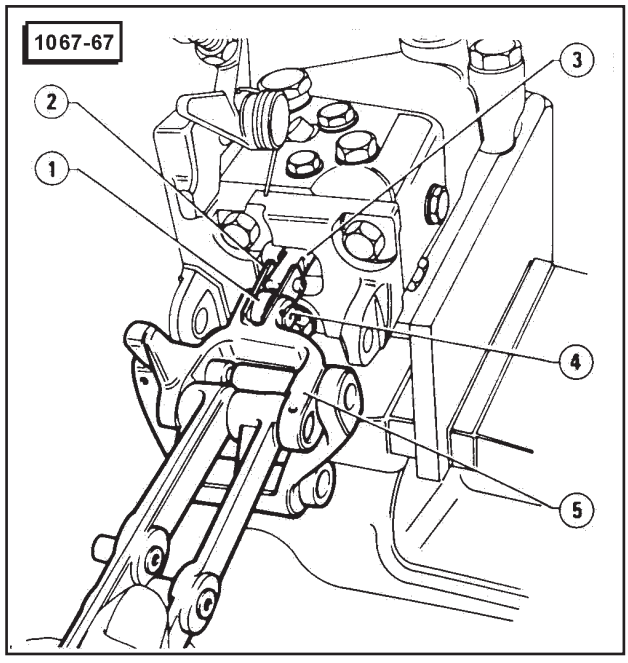
1. Fit the distributor on a suitable implement fixed by a clamp.

2. Remove the Seeger ring **4** and slip off the pivot **5** so as to free the fork **3** of the distributor.
3. Remove the spring **2** and if necessary unscrew the pivot **1**.



1 - Spring fixing pivot
2 - Spring
3 - Fork
4 - Seeger ring
5 - Pivot

4. Working on lever unit **5** partially extract the distributor shaft **3**, and remove the split pin fixing the pivot **4**. Take off the pivot **4** and remove the lever group **5**, recovering the washer **2** and the spacer **1**.

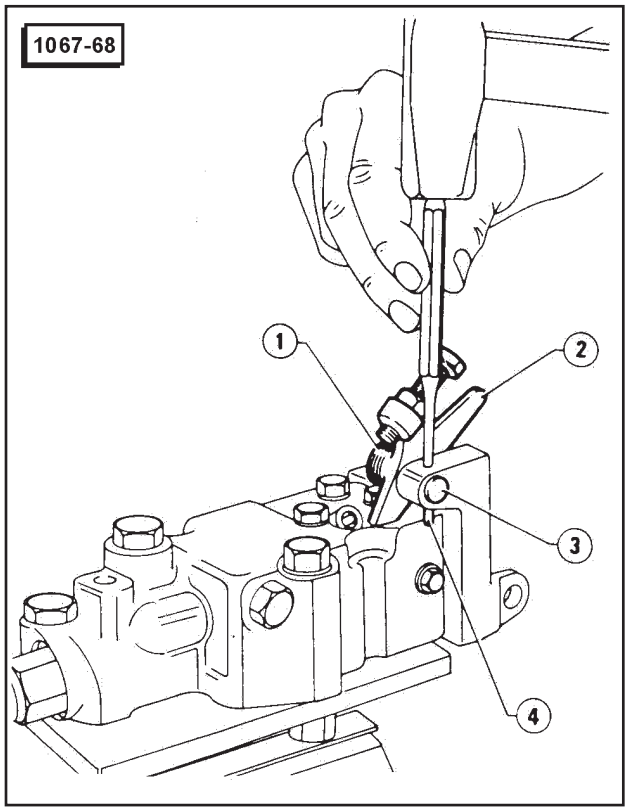


1 - Spacer
2 - Washer
3 - Distributor shaft
4 - Pivot
5 - Lever unit

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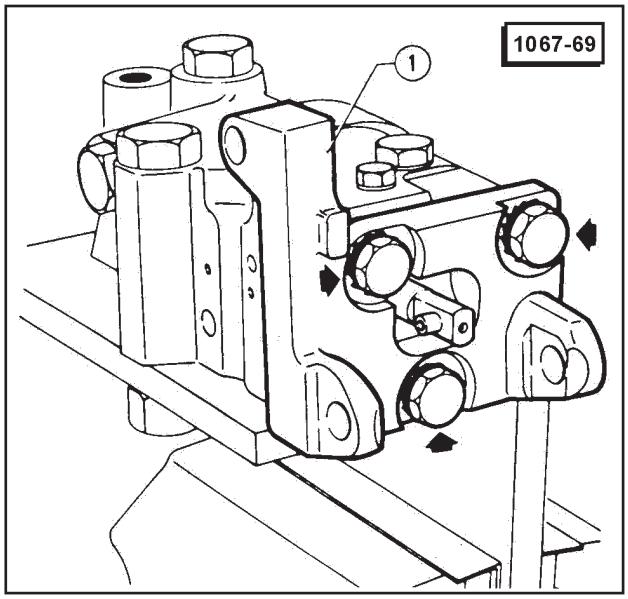
5. If necessary strip the lever unit taking off the relative fixing lock pin with hammer and punch.
6. If necessary dismount lever **2** so as to remove the fixing lock pin **4** from the pivot **5**, freeing the spring 1 and extract the pivot **3** with the lever **2**.



1 - Spring
2 - Limit stop lever
3 - Pivot
4 - Lock pin

DISTRIBUTOR BODY

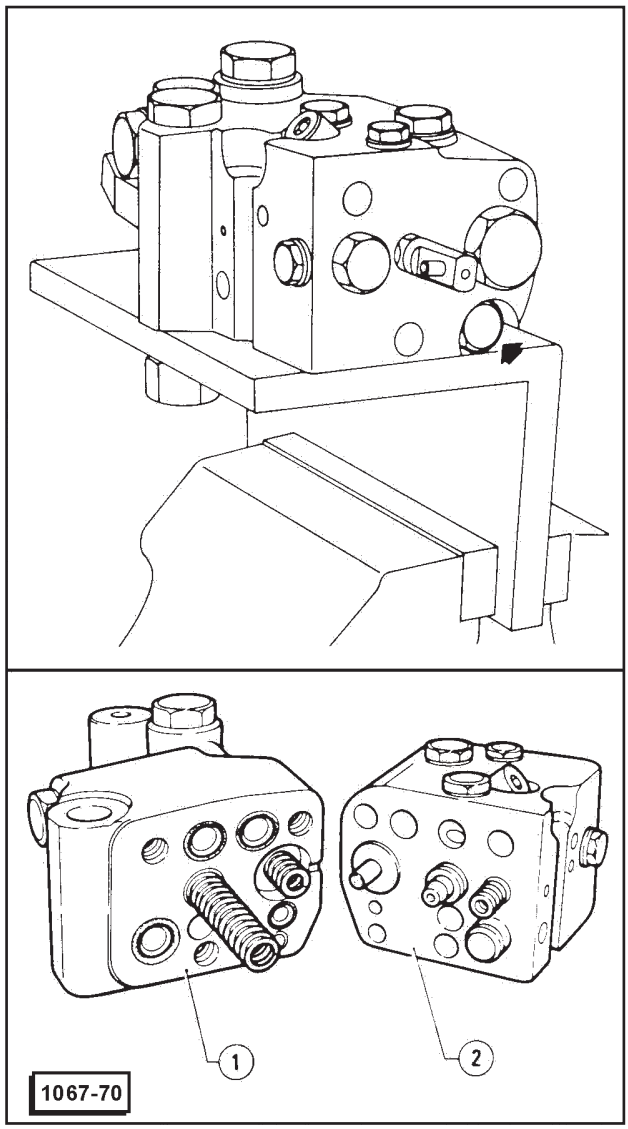
1. Unloosen the three screws shown in the diagram. Remove the lever support **1**.



1 - Lever support

2. Unloosen the lower screw indicated in the diagram and separate the two distributor bodies.

CAUTION
Work with the necessary caution so as to avoid damaging the inside compartments.



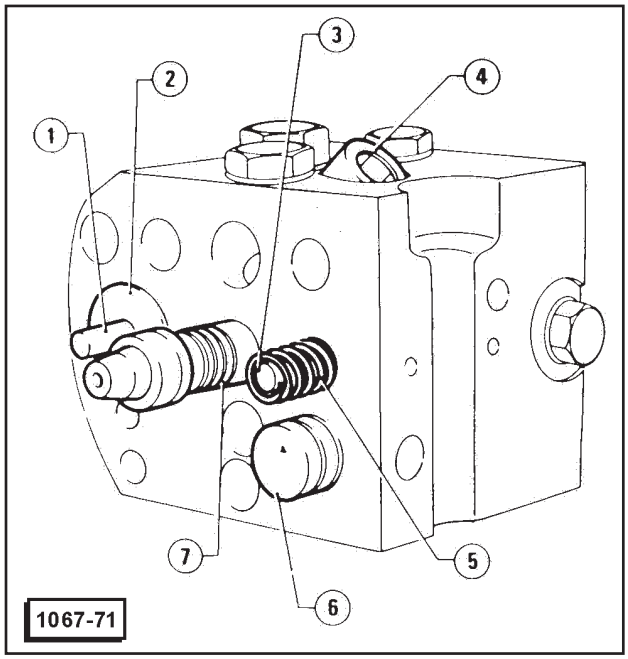
1 - Front body
2 - Rear body

REAR BODY

1. Remove from the rear body the push rod **1** and the relative washer **2**, the spring **5** and the relative spacer **3** and the piston **6** from the start up valve.
2. If necessary, remove the lock pin at the end of the distributor shaft **7** and extract the shaft **7** from the front.
3. If necessary, loosen the valve **4** and remove.

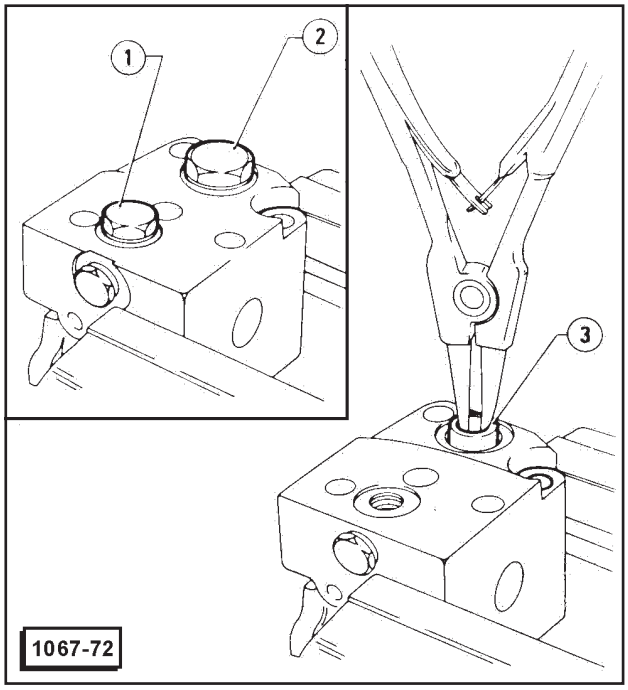
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1 - Non return valve control push rod
2 - Washer
3 - Spacer
4 - Intake valve
5 - Start up pilot valve spring
6 - Start up valve piston
7 - Distributor shaft

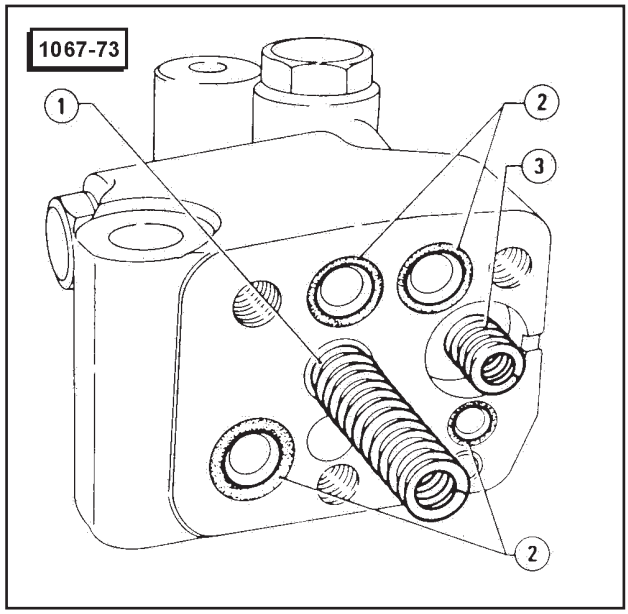
4. Fix the rear body onto a clamp, unscrew cap **2** and extract from the front end the piston of the start up pilot valve.
5. Unscrew the cap **2**, extract the spring and valve **3** with pliers.



1 - Start up pilot valve cap
2 - Non return valve cap
3 - Non return valve cap

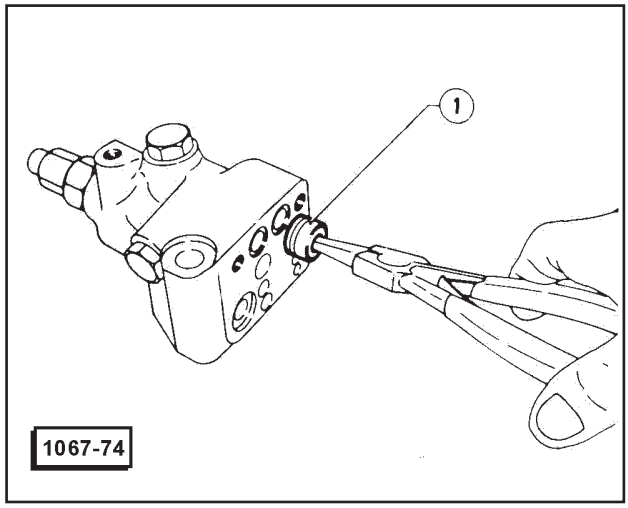
FRONT BODY

1. Remove the O-ring and take off springs **1** and **3**.



1 - Distributor spring
2 - O-ring
3 - Spring

2. Using pliers take from the body front the piston **1** and the inside shim adjustment ring.

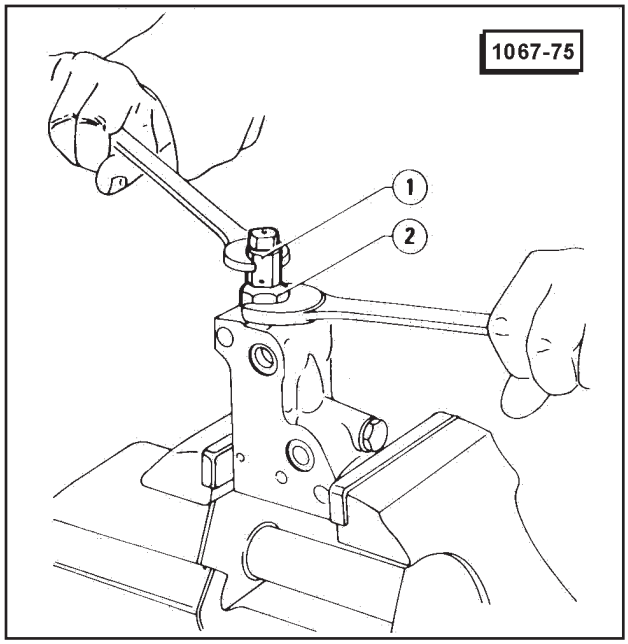


1 - Non return valve control piston

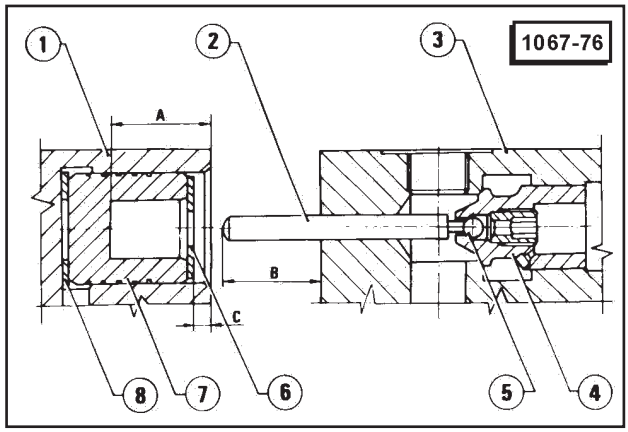
3. Fix the front body onto a clamp, unscrew the anti-shock valve **1** keeping blocked the fitting **2** with a contrast spanner.
4. Unscrew fitting **2** and take off in the following order: piston, spacer, spring and gasket.

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1 - Anti-shock valve
2 - Fitting



1 - Front body
2 - Non return control valve push rod
3 - Rear body
4 - Non return valve
5 - Ball
6 - Washer
7 - Non return control valve piston
8 - Shim adjustment ring

CHECKS AND ADJUSTMENTS

1. Accurately clean all components of the distributor.
2. Check that the distributor shaft, the various pistons inside the distributor body and the relative work seats are not scratched or show signs of excessive wear.
3. Check that the distributor shaft and pistons of the various valves move smoothly in their seats.
4. Check the relative dimensions of the push rod **2** and the pistons **7** working as follows:
(1) Insert the valve **4** into the distributor rear body and press the ball **5** against the seat on the same valve.
(2) Insert the push rod **2** to make contact with the ball **5** and note the protrudence “B” of the push rod with respect to the distributor body surface.
(3) Insert the shim adjustment ring **8** and the piston **7** in the seat on the distributor front body and note the dimension “A” between the inside area of the small rod and the distributor body surface.
(4) Check that the dimensional difference shown corresponds to the recommended value.

A – B ≥ 0,5 mm

If the recommended value is not found adjust the thickness of the shim ring **8** or replace the push rod **2**.
(5) Insert the washer **6** and check that the value between the outside surface of the washer and the distributor body surface is as follows:

C ≥ 0,5 mm

If not eliminate the washer **6.**

5. Check that the calibrated specifications of the spring are within the values specified in the table “Distributor Spring” (refer to: Technical Data and Specifications Technical Details).

REMOUNTING

Proceed with the remounting working in the reverse order to that of dismounting, taking note of the following instructions:
— Clean with specified solvant the cap threads and the fittings.
— Replace the copper gaskets and support links.
— Apply the specified sealer to the cap threads.
— Tighten to the necessary torque the following components.

Tightening torque
Anti-shock valve to the distributor
78 ± 4,8 Nm
(8 ± 0,5 kgm; 57.84 ± 3.62 ft lb)

REASSEMBLY

Proceed with the remounting of the distributor on the lifting housing working in reverse order to the dismounting taking note of the recommendations described in “Lifting Housing - Remounting”.

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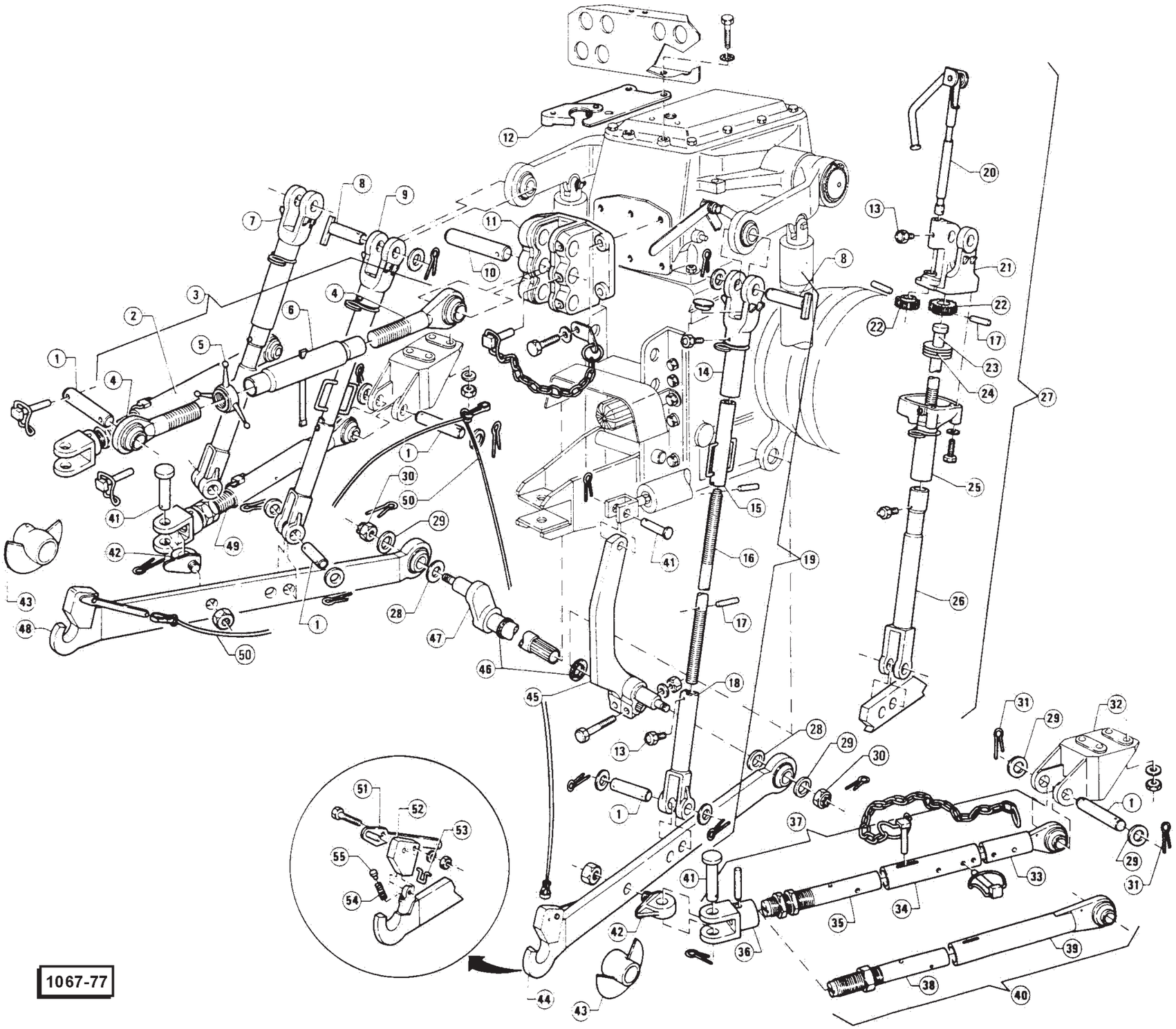
LIFTING MECHANISM

1 - Pivot
2 - Left stabilizer 110
3 - Adjustable strut
4 - Joint
5 - Ring nut stopper
6 - Threaded coupling
7 - Left tie rod 110
8 - Pivot with fastener
9 - Left adjustable tie rod 130-150
10 - Pivot
11 - Flange
12 - Fastener
13 - Greaser
14 - Upper fork
15 - Adjustable coupling
16 - Adjusting screw
17 - Lock nut
18 - Lower fork
19 - Right adjustable tie rod 130-150
20 - Crank handle
21 - Capped fork
22 - Gear wheel
23 - Adjusting screw
24 - Axle bearing
25 - Adjusting body device
26 - Lower fork
27 - Adjustable tie rod device 110
28 - Spacer
29 - Washer
30 - Notched nut
31 - Split pin
32 - Bracket
33 - Joint
34 - Coupling
35 - Threaded tie rod
36 - Fork
37 - Right stabilizer 130-150
38 - Threaded coupling
39 - Coupling with joint
40 - Right stabilizer 110
41 - Pivot.
42 - Bracket
43 - Contour fastener
44 - Lower right arm
45 - Control lever for sensor parts
46 - Oil retainer ring
47 - Connecting shaft lower arm
48 - Left lower arm
49 - Left stabilizer 130-150
50 - Cord
51 - Handle
52 - Lever
53 - Spring
54 - Spring
55 - Pivot

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LIFTING GROUP

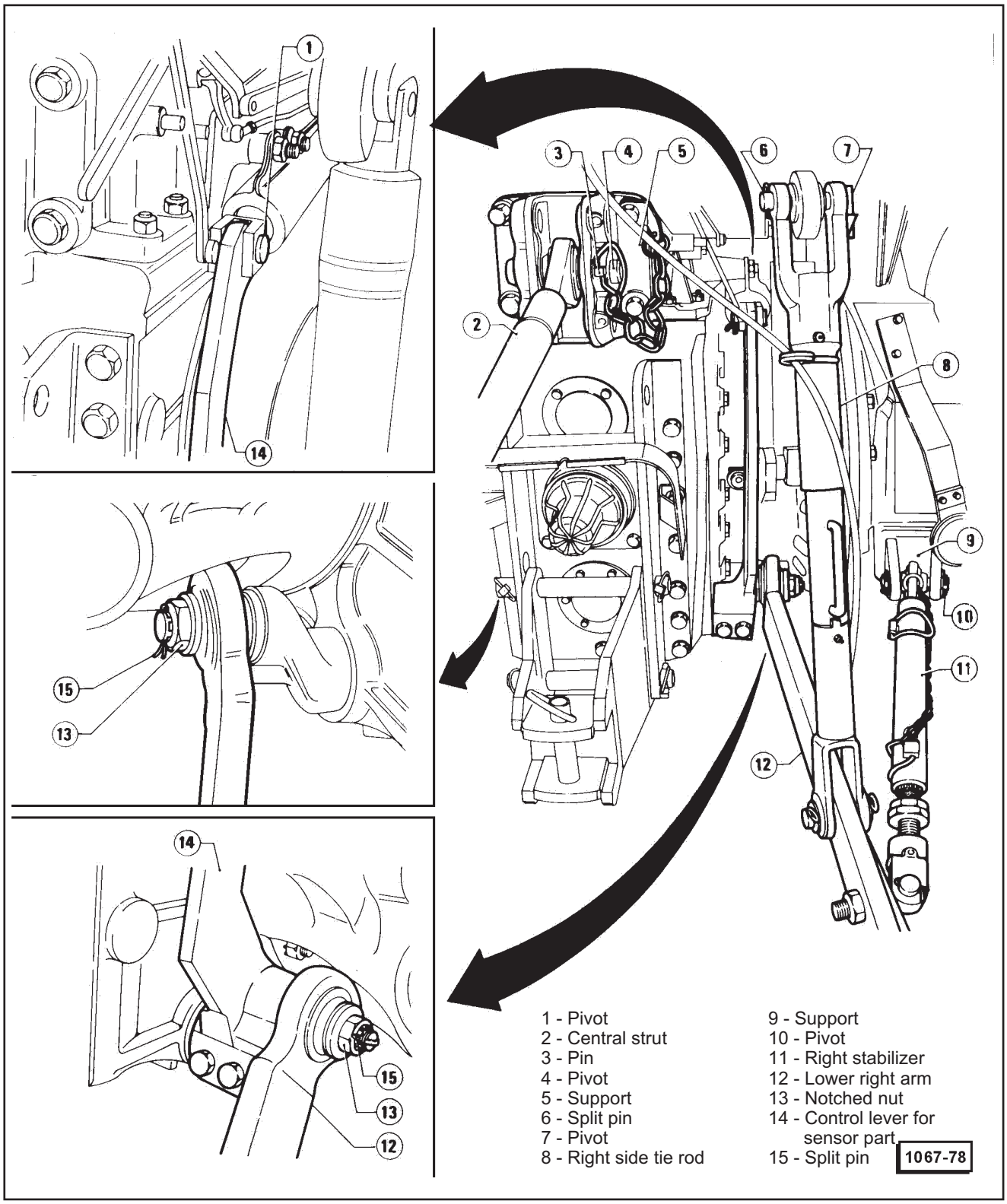


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REMOVAL

1. Support the central strut **2**, extract the pin **3**. Take off the pivot **4** and remove the pin.
2. If necessary, unloosen the support clamp screws **5** from the lifting housing and remove the support.
3. Extract the pin **6**. Support the lifting unit, tak off the pivot and separate the side tie rod **8** from the lifting arm. Place the lower arm **12** on the floor.
4. Take off the split pin and extract the pivot **10**, collecting the relative washers and separate the stabilizer **11** from the support **9**.
5. Take off the split pin **15** from both sides of the sensor parts of the control shaft and loosen the two nuts **13**.
6. Take off the split pin, extract the pivot **1** and remove the lever **4** from the sensor part.



1 - Pivot
2 - Central strut
3 - Pin
4 - Pivot
5 - Support
6 - Split pin
7 - Pivot
8 - Right side tie rod
9 - Support
10 - Pivot
11 - Right stabilizer
12 - Lower right arm
13 - Notched nut
14 - Control lever for sensor part
15 - Split pin

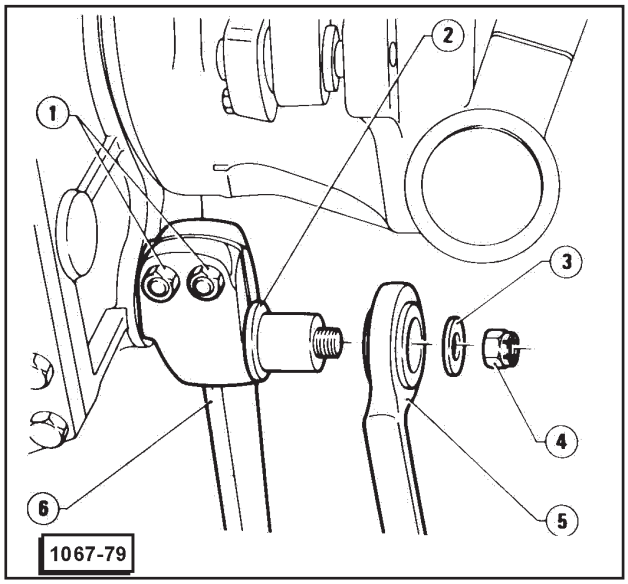
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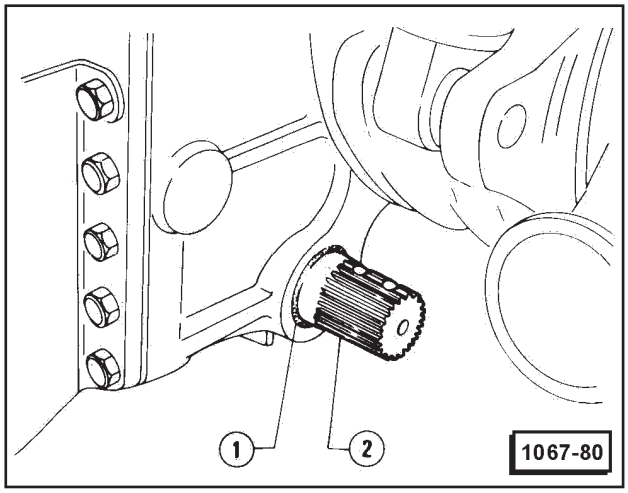
7. Unscrew the nut **4** and take off the pivot of the lever 6, the washer **3**, the arm **5** and the spacer **2**.
8. If necessary unscrew the bolts **1** and remove. Meanwhile remove the lever **6** from the grooved shape of the sensor part control shaft.

NOTE
If necessary hit with a soft metal hammer, on the inside of the sensor part control lever.



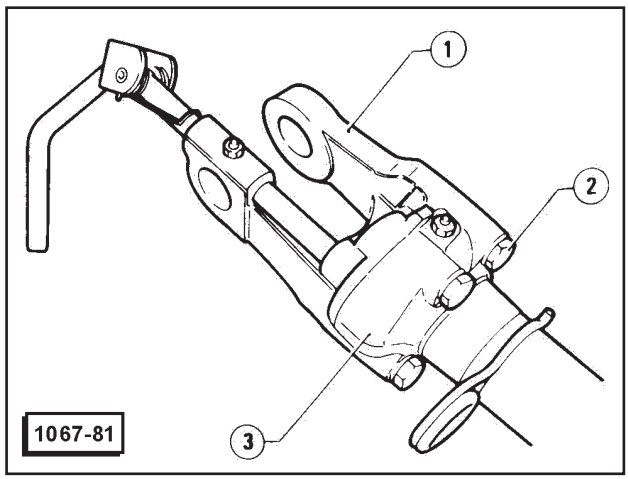
1 - Bolt
2 - Spacer
3 - Washer
4 - Castellated nut
5 - Lower right arm
6 - Command lever sensor part

9. If necessary remove the shaft **2** as follows:
(1) Drain off oil.
(2) Take off the shaft **2** on the left side of the gear.
(3) Remove the oil guard ring **1** from both sides of the gearbox.



1 - Oil guard ring
2 - Shaft

10. Only for models 110
When necessary, proceed with the dismounting of the side tie rod length adjusting device as follows.
(1) Unloosen the four screws **2** and separate the cover 1 from the body **3**.



1 - Forked cap
2 - Screw
3 - Adjusting device body

(2) Referring to the enlarged diagram on page **21**, extract the pin **17** and remove the gear wheel **22** of the cranking handle **20** and the adjusting screw **23**.
(3) Loosen the adjusting screw **23** and take off the bearing **24**.

CHECKS AND CONTROLS

1. Accurately clean the components.
2. Check that the articulated joints do not show excessive play or signs of oxidization.
3. Check that the lower arms, the stabilizers and the tie rods are not deformed and are functioning correctly. If not, replace the defective components.

4. Only for models 110
Check the correct functioning of the tie rod length adjusting device, in particular check that the gear wheels of the device are not damaged.

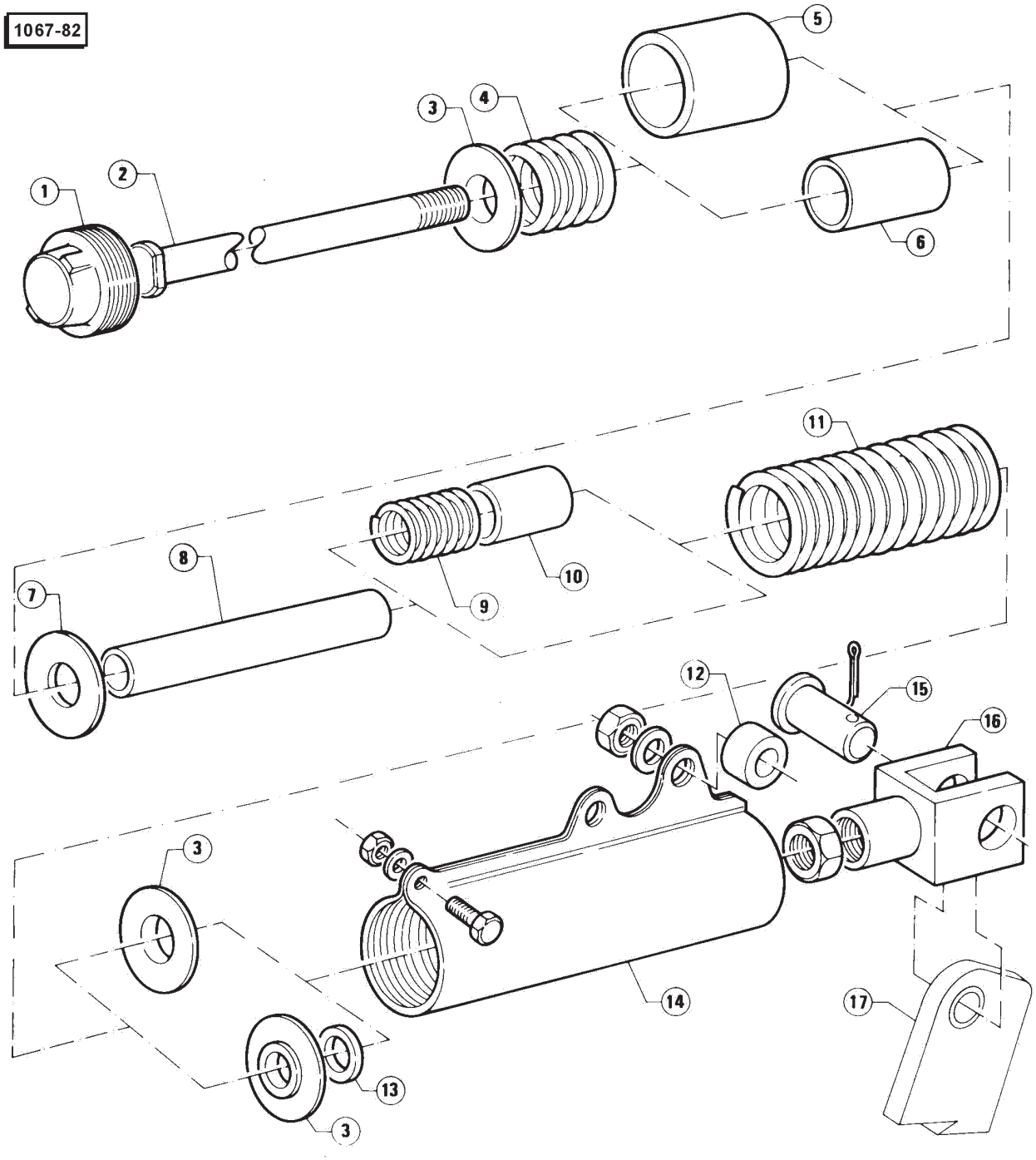
REASSEMBLY

Proceed with the remounting operating in the reverse order to the dismounting taking note of the following instructions:
— Lubricate all the pins of the mechanism joints before remounting.
— If the shaft has been removed from the inside of the gearbox replace the oil guard rings and top up the oil in the gearbox.
— Lubricate with the recommended grease, the nipples on the side of the mechanism.

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SENSITIVE MACHINE MEMBERS



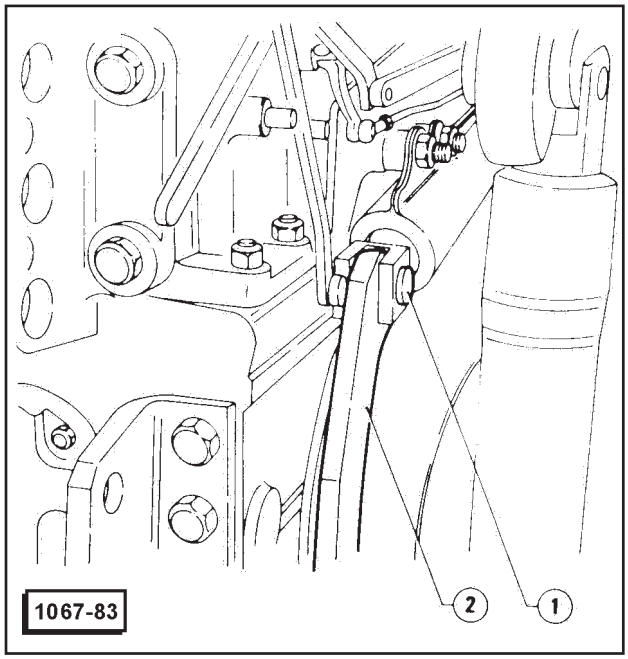
1 - Cover
2 - Tie rod
3 - Shoulder ring
4 - Front spring
5 - Front spacer 130-150
6 - Front spacer 110
7 - Ring
8 - Rear spacer
9 - Central spring 130-150
10 - Spacer 130-150
11 - Rear spring
12 - Spacer
13 - Spacer ring 110
14 - Sensitive machine members
15 - Pivot
16 - Fork
17 - Sensitive machine member control lever

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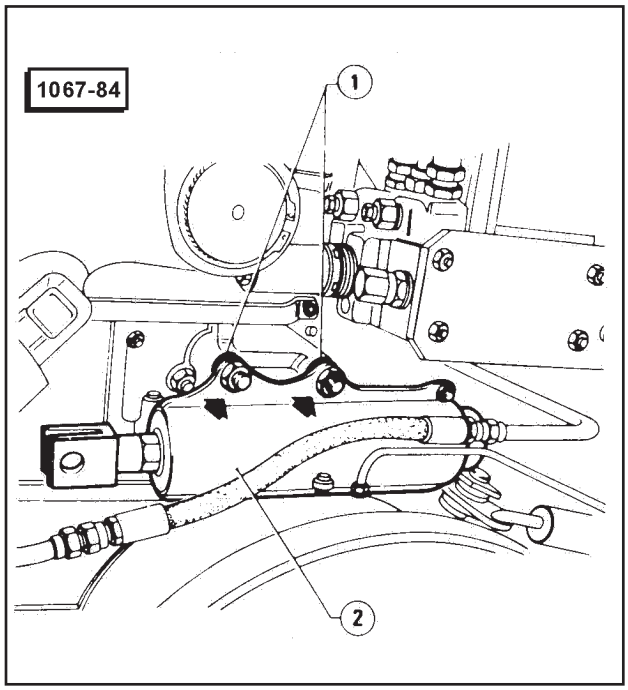
REMOVAL

1. Remove the split pin and take off the connecting pivot **1** between the lever **2** and the fork of the sensor part.



1 - Pivot
2 - Sensitive machine member control lever

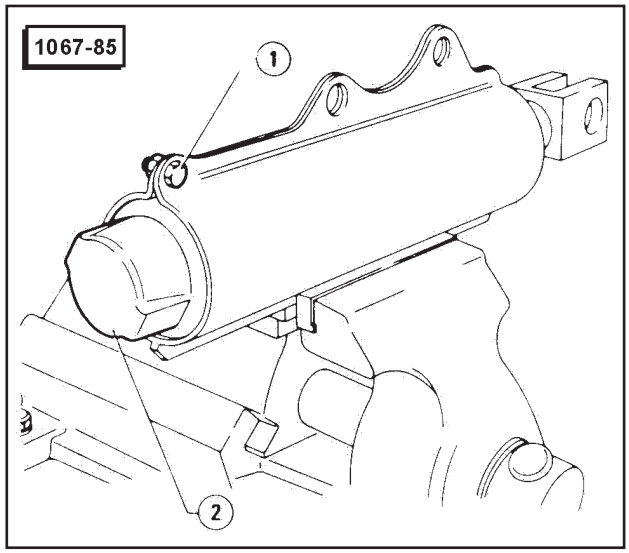
2. Unscrew the two nuts shown in the diagram. Remove the sensitive machine member **2** and the two spacers **1**.



1 - Spacer
2 - Sensor part

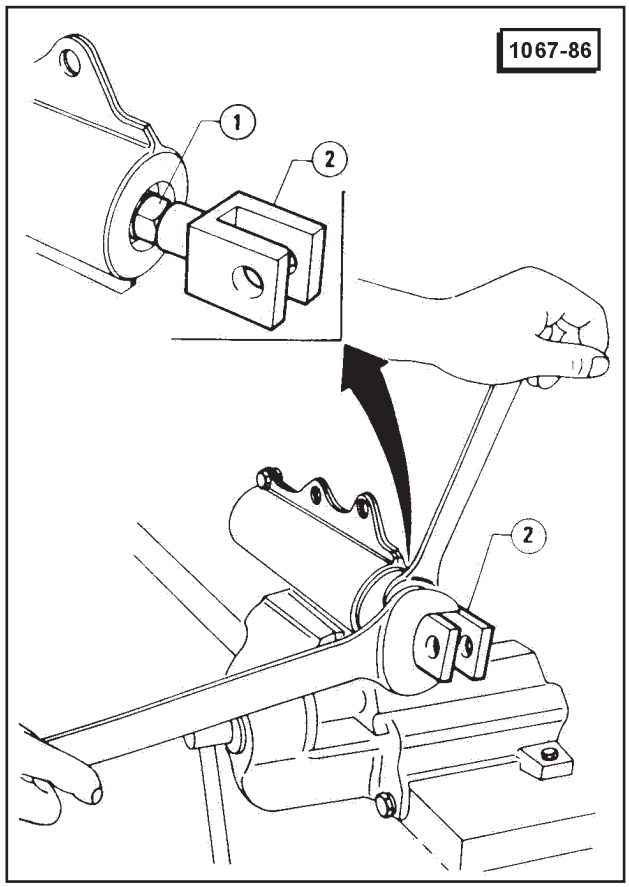
DISMOUNTING

1. Fix the sensor part onto a clamp and loosen the bolt **1**.
2. Unscrew the cover **2** and remove.



1 - Bolt
2 - Cover

3. Loosen the nut **1** keeping the fork **2** blocked with a contrast spanner.

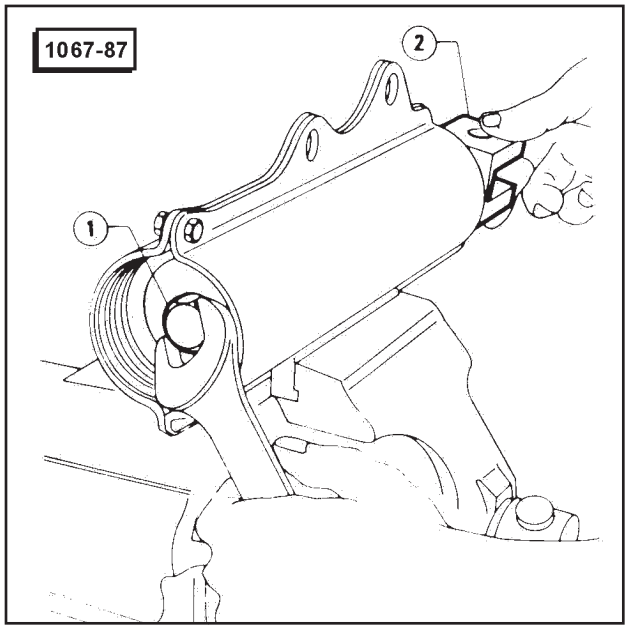


1 - Nut
2 - Fork

4. Unscrew the fork **2** keeping the tie rod **1** blocked with a contrast spanner.

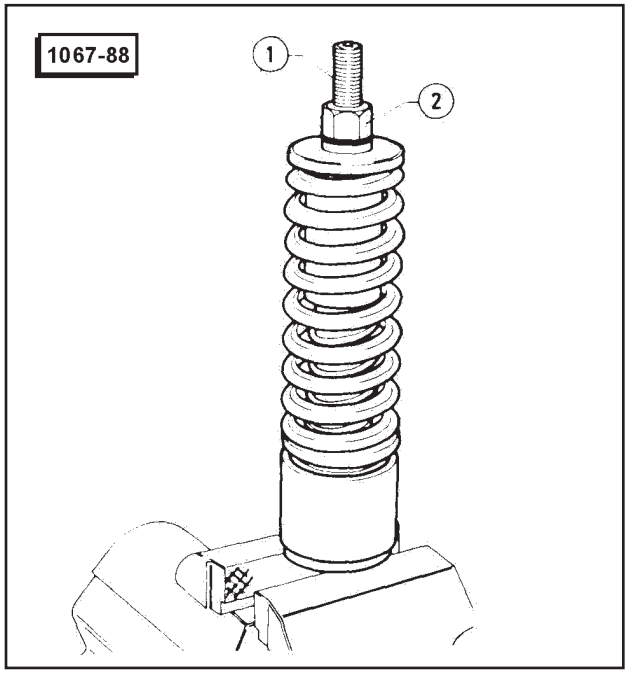
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1 - Tie rod
2 - Fork

5. Take off from the box the complete spring unit.
6. Fix the end of the tie rod **1** on the clamp. Unscrew the nut **2** and take off the sensor part components.



1 - Tie rod
2 - Nut

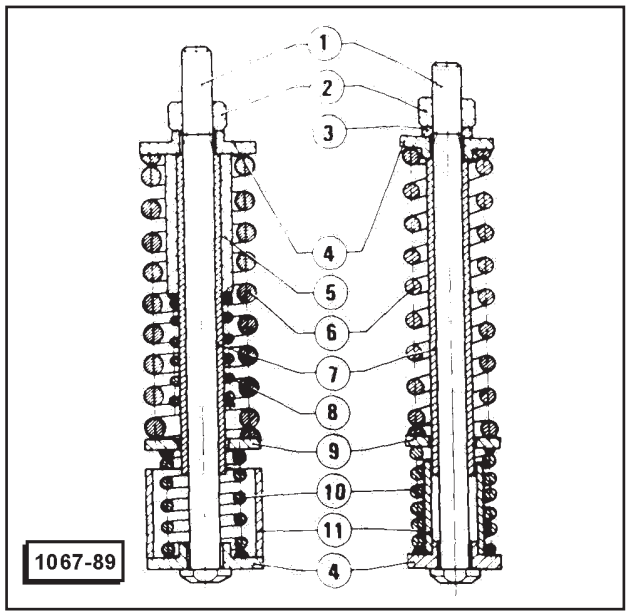
CHECKS AND CONTROLS

1. Accurately clean the components of the sensor parts.
2. Proceed with a careful visual examination of the components and check that there are no signs of oxidization.
3. Check that the calibrated specifications of the spring are within the recommended value of the table “Sensitive Member Part Spring” (refer to: Technical Data and Specifications - Technical Details).

REMOUNTING

1. Remount the tie rod **1** all the components of the sensor parts including the shoulder rings **4**, then tighten the nuts **2** by hand, until you eliminate the play between the two nuts **4**.

NOTE
For models 110 fit the spacer **3** between the nut **2** and the shoulder ring **4**.



1 - Tie rod
2 - Nut
3 - Spacer 110
4 - Shoulder rings
5 - Spacer 130-150
6 - Rear spring
7 - Rear spacer
8 - Center spring 130-150
9 - Ring
10 - Front spring
11 - Front spacer

2. Grease the spring unit and place into the relative casing and tighten by hand the fork on the tie rod.
3. Tighten the nut by a half turn so as to give the two outside springs a preload, then block the fork against the nut.
4. Tighten by hand the casing cover so as to eliminate the play between the spring unit and the casing. When this is done tighten the lock bolt.

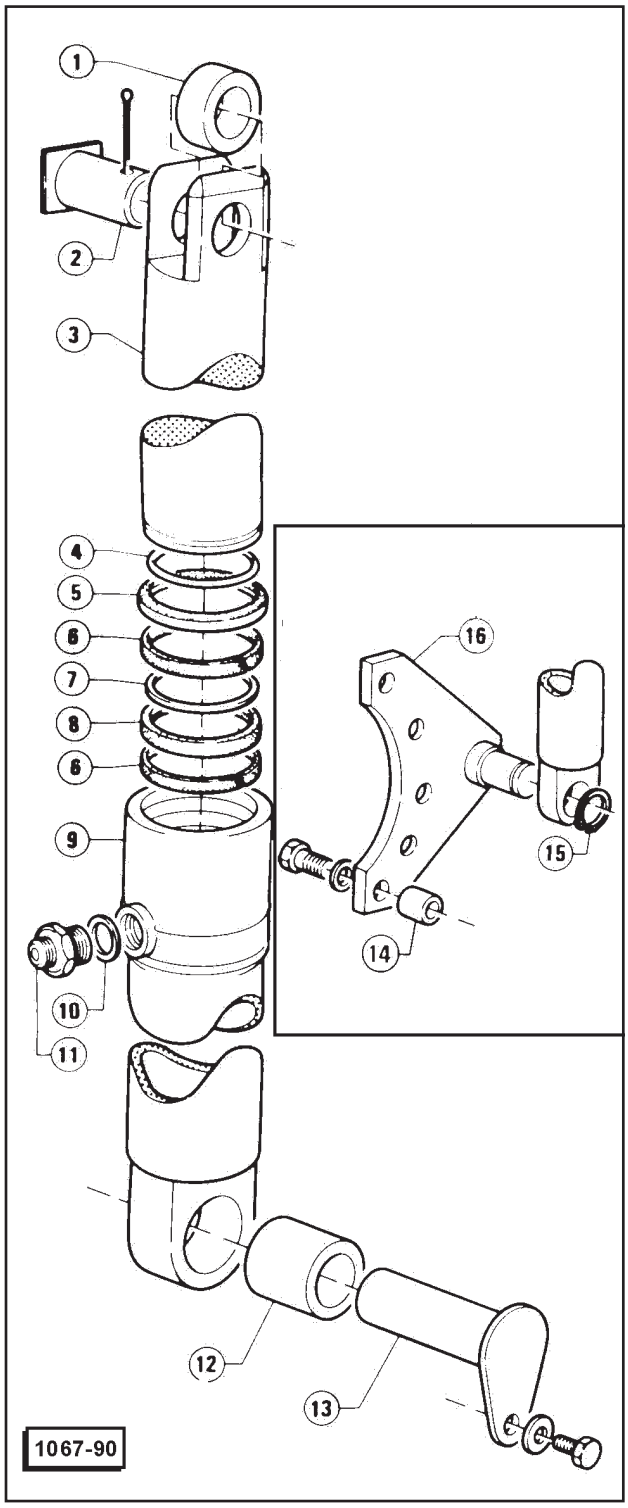
REASSEMBLY

Proceed with remounting working in the reverse order to the dismounting, then carry out the check of lifting sensitivity (refer to: Checks and Adjustments - Checks of Lifting Sensitivity).

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SECONDARY HYDRAULIC CYLINDER



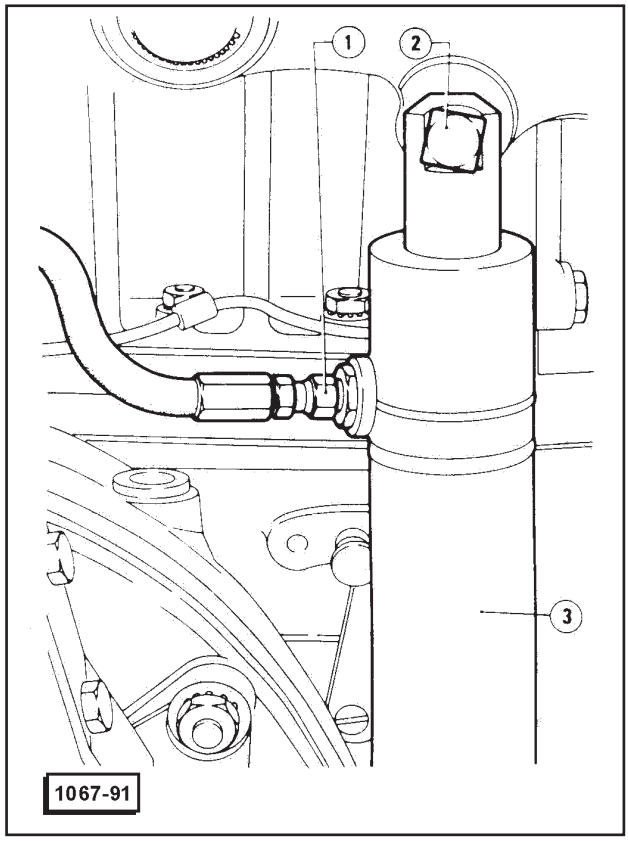
1 - Bush
2 - Upper arm
3 - Shaft
4 - Lock ring
5 - Seal ring
6 - Guide ring
7 - Teflon ring
8 - Seal ring
9 - Cylinder
10 - Gasket
11 - Fitting
12 - Bush (150)
13 - Lower pivot (150)
14 - Spacer (110)
15 - Seeger ring (110-130)
16 - Bracket (110-130)

REMOVAL

1. Unloosen the fitting **1** of the cylinder **3** fuel pipe.

NOTE
Keep the pipe turned upwards to avoid loss of oil.

2. Support the cylinder, extract the holding split pin and take off the pivot **2** and its relative bush.

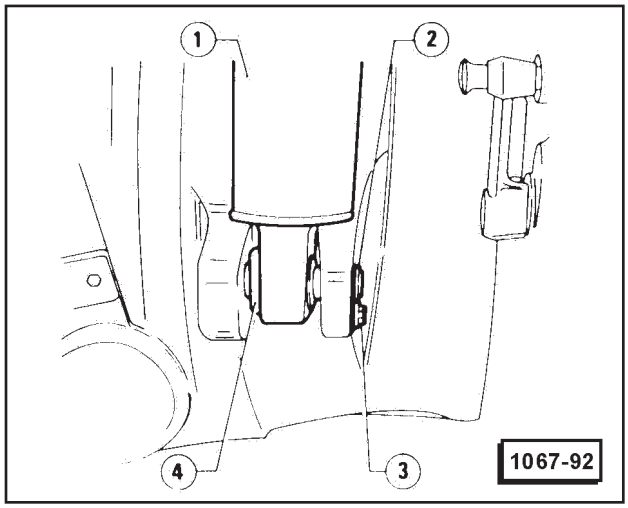


1 - Fittings
2 - Fixing pivot of the secondary cylinder on the arm of the lifter
3 - Secondary hydraulic cylinder

3. Only for model 150
Unloosen the screw **3,** take off the pivot **2** and remove the cylinder **1**. If necessary take off the bush **4** from the cylinder seat.

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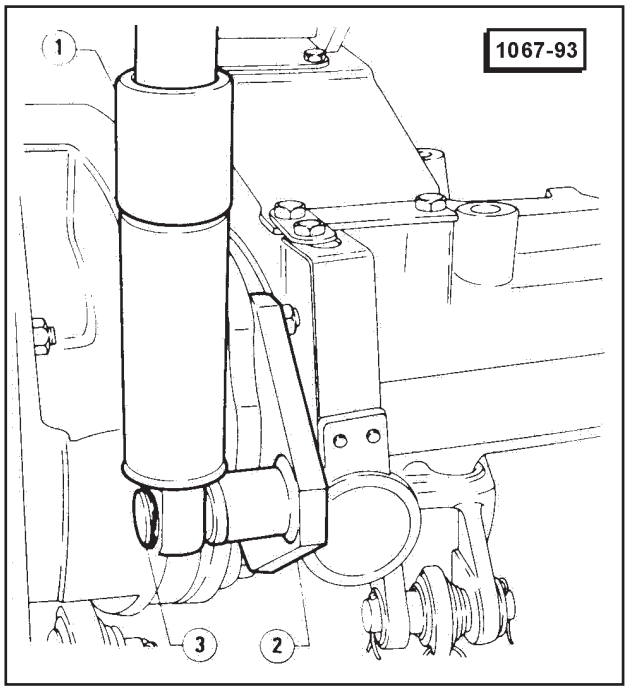
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1 - Secondary hydraulic cylinder
2 - Lower pivot
3 - Lower pivot clamping screw
4 - Bush

Only for models 110-130

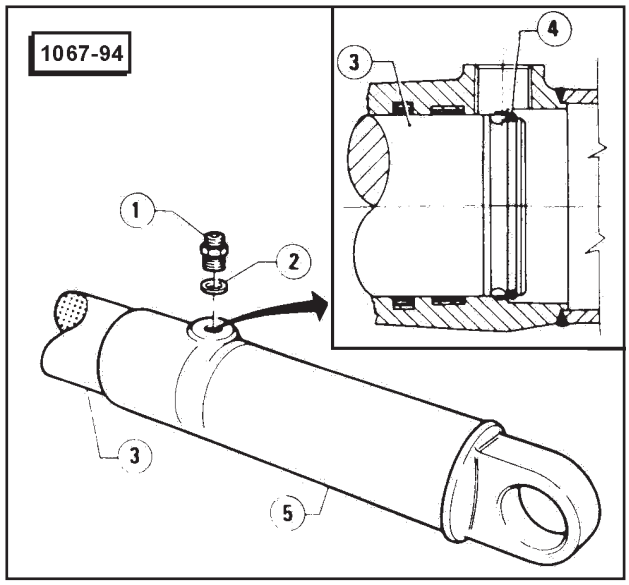
Remove the Seeger ring **3** and take off the cylinder **1** from the bracket **2** pin.



1 - Secondary hydraulic cylinder
2 - Bracket
3 - Seeger ring

DISMOUNTING

1. Unscrew the fitting **1** and remove together with the gasket **2.**
2. Extract the shaft **3** of the cylinder until the retaining ring **4** mounted on the extreme end of the shaft, is accessible from the hole on the fitting already dismounted.
3. Working with caution, unhook the retaining ring **4**, and then take off the shaft from the cylinder and collect the retaining ring.



1 - Fitting
2 - Gasket
3 - Shaft
4 - Retaining ring
5 - Cylinder

4. Remove the oil seal ring and the rubber ring from the cylinder.

CAUTION
Work with caution so as not to damage the gasket seat.

CHECKS AND CONTROLS

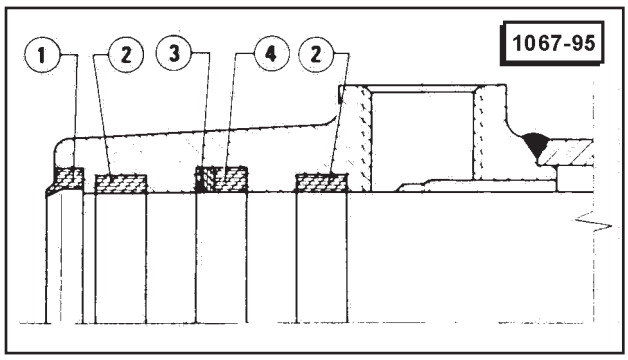
1. Accurately clean the shaft and the seat of the cylinder gasket.
2. Check the sliding area of the shaft is not scratched, has no trace of excessive wear or signs of damage, if it has substitute the shaft.
3. Measure the diameter “d1” of the shaft and check that it is within the value limits given the table “Piston, Cylinders and Secondary Cylinder” (refer to: Technical Data and Recommendations - Control and Adjustments).

REMOUNTING

Proceed with the remounting of the hydraulic cylinders working in the reverse order to the dismounting taking note of the following instructions.
— Lubricate the new gasket and fit into the seat on the cylinder as shown on the diagram.

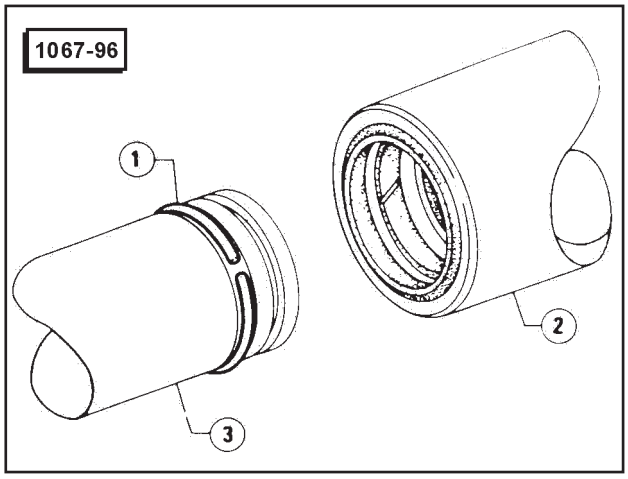
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1 - Oil seal ring
2 - Spring ring
3 - Teflon ring
4 - Seal ring

— Position the retaining ring **1** in the cavity of the shaft **3** before placing it in the cylinder **2.**



1 - Retaining ring
2 - Shaft
3 - Cylinder

— Place the shaft in the cylinder and push the retaining ring into its seat working through the fitting hole.

CAUTION
Work with particular caution so as not to damage the shaft and the fitting screw thread.

REASSEMBLY

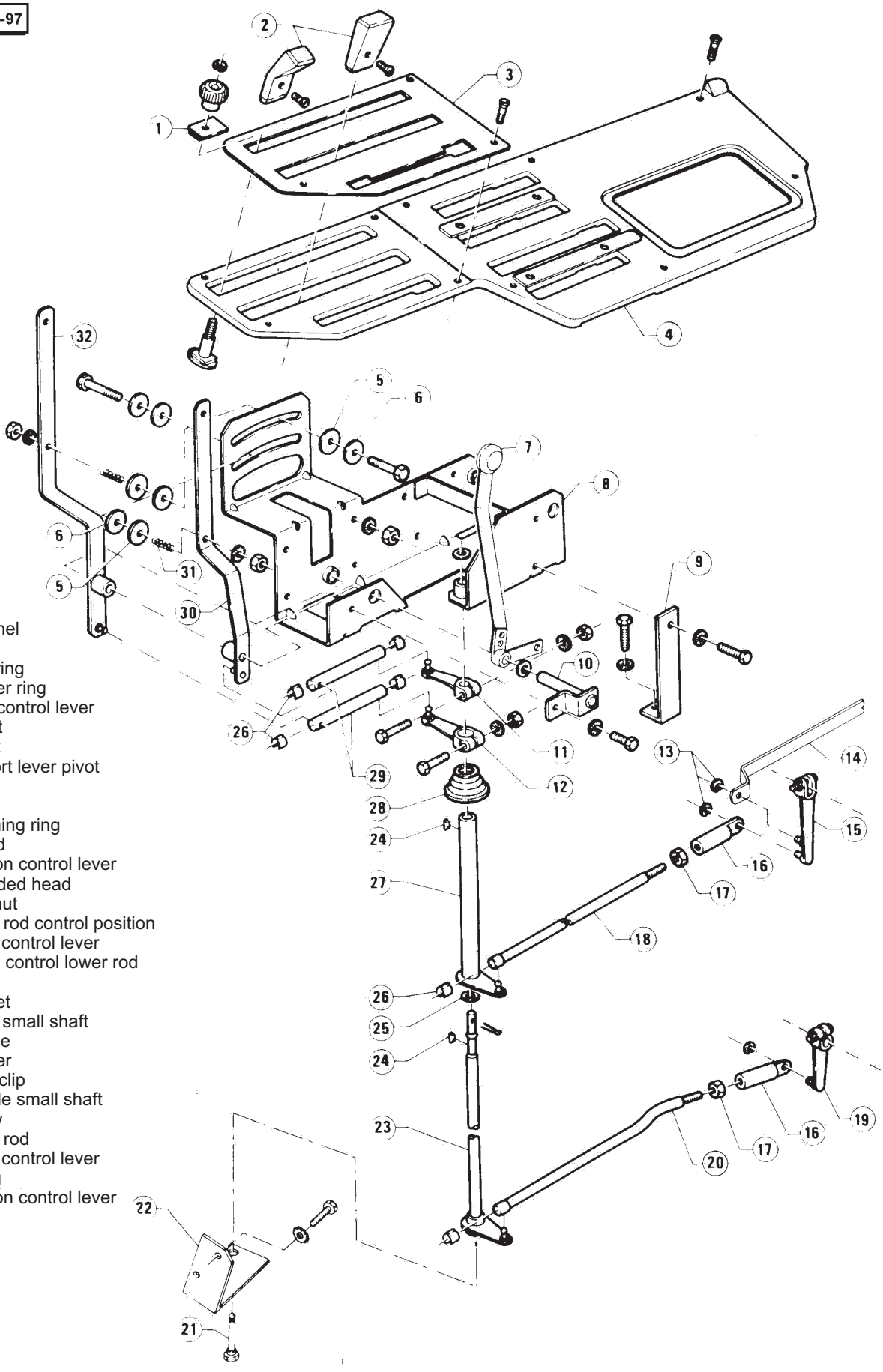
Proceed with remounting of the hydraulic cylinders on the vehicle, working in reverse order to that of the dismounting and lubricate the bushes and clamping pivots.

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LIFTING CONTROL LEVER

1067-97



1 - Clasp
2 - Knob
3 - Dial panel
4 - Panel
5 - Teflon ring
6 - Shoulder ring
7 - P.T.O. control lever
8 - Support
9 - Bracket
10 - Support lever pivot
11 - Lever
12 - Lever
13 - Retaining ring
14 - Tie rod
15 - Position control lever
16 - Threaded head
17 - Lock nut
18 - Lower rod control position
19 - Strain control lever
20 - Stress control lower rod
21 - Pivot
22 - Bracket
23 - Inside small shaft
24 - Tongue
25 - Washer
26 - Metal clip
27 - Outside small shaft
28 - Bellow
29 - Upper rod
30 - Strain control lever
31 - Spring
32 - Position control lever

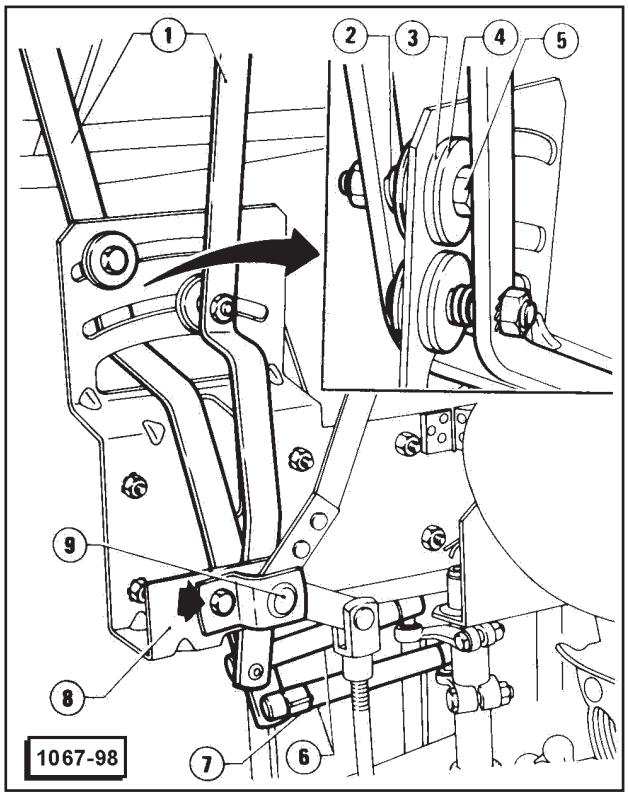
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REMOVAL

LEVERS INSIDE OF THE CABIN

1. Remove the control panel and the right wheelhouse trim on the inside of the cabin (refer to: Cabin Inside Trimmings - Removal Right Mudguard Trim).
2. Unhook the clips **7** and disconnect the levers **1** from the rod **6**.
3. Unscrew the nuts **5**, take the spring **2** and the rings **3** and **4** and disengage the lever **1** from the support **8.**
4. Unloosen the screw shown in the diagram. Take off the pivot **9** keeping aside the washers between the levers **1**. Remove the levers **1** and the P.T.O. lever.



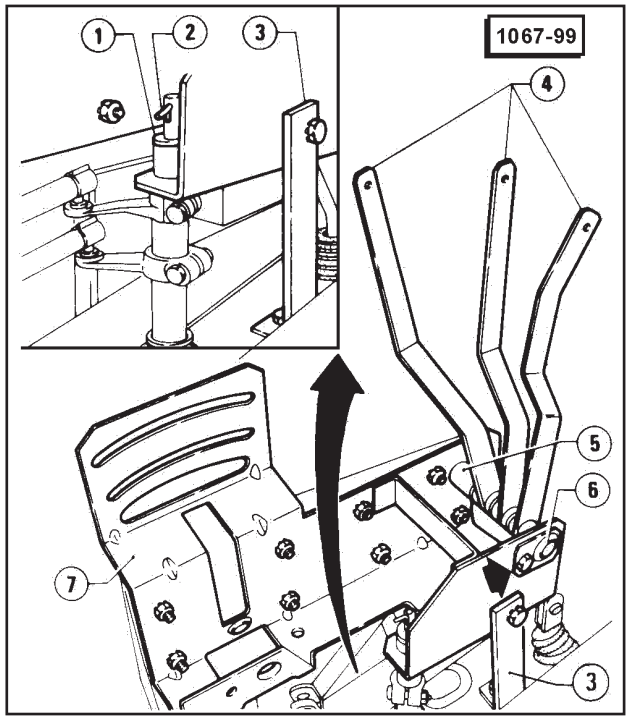
1 - Lifting control lever
2 - Spring
3 - Teflon ring
4 - Shoulder ring
5 - Bolt
6 - Rod
7 - Metal clip
8 - Support
9 - Pivot

SUPPORT LEVERS

1. Take off the split pin **2** and extract the washer **1**.
2. Unloosen the clamp screws of the pivot **6**, take off the pivot and disconnect the levers **4,** keeping the spacer **5** and the washers placed between each lever separate.

NOTE
For models with four distributors, the spacer **5** is substituted with a fourth control lever.

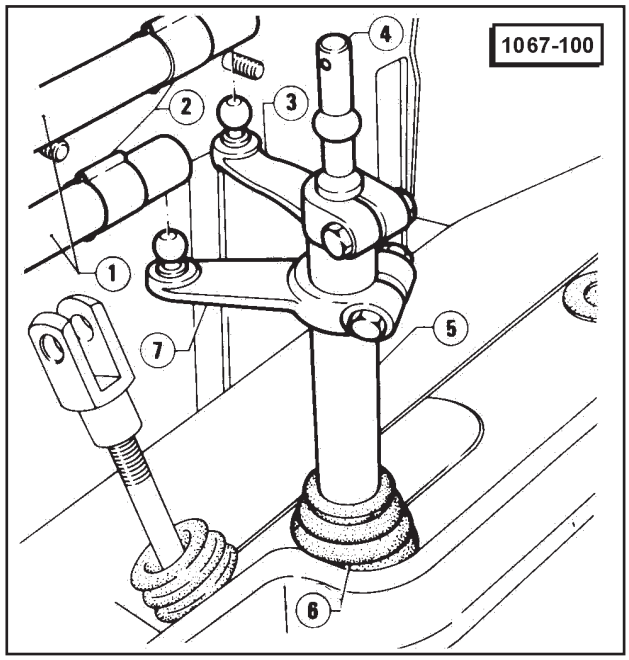
3. Unscrew the eight nuts fixing the support **7** to the cabin, and the two screws that fix the bracket **3**. Remove the support **7** taking it off from the coaxial small shaft.



1 - Washer
2 - Split pin
3 - Bracket
4 - Secondary distributor control lever
5 - Spacer
6 - Pivot
7 - Lever support

CO-AXIAL SHAFT

1. Undo the clips **2** and disconnect the rod **1** from levers **3** and **7**.
2. Unloosen the bolts of the levers **3** and **7** and remove them from the small shafts **4** and **5**, keeping the relative tongues.
3. Remove the bellow **6** from the shaft **5.**

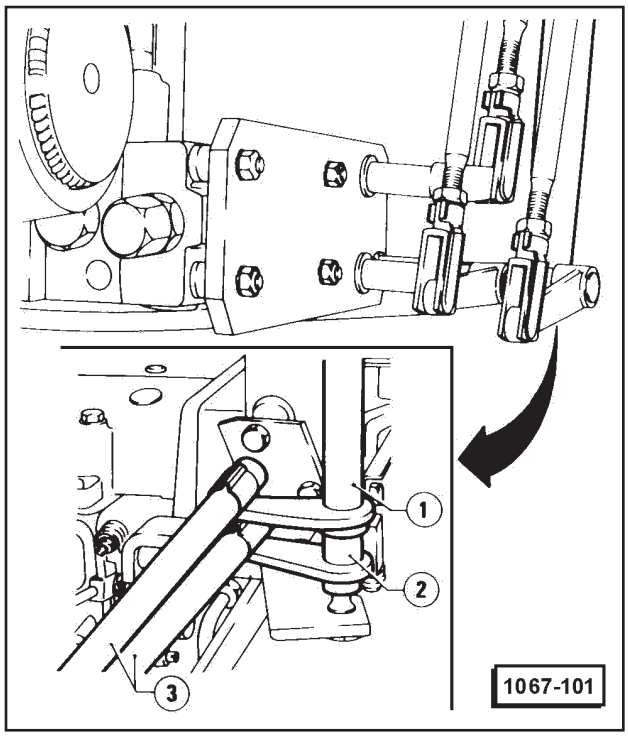


1 - Rod
2 - Metal clips
3 - Lever
4 - Inside shaft
5 - Outside shaft
6 - Bellows
7 - Lever

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4. Working from the rear of the vehicle, undo the clips that fix the rods **3** to the shafts **2** and **1** and separate.
5. Remove the shaft **2** from the lower support pivot, then tilt the shafts **1** and **2** and take off from underneath.
6. If necessary, disconnect the rear end of the rod **3**, removing the retaining ring.



1 - Outside shaft
2 - Inside shaft
3 - Lower rod

REASSEMBLY

Proceed with the remounting of the levers working in reverse order to that of the dismounting, observing the following recommendations.
— Lubricate with the recommended grease the joints of the levers and control lever of the two co-axiale shafts.
— Remounting completed, start the engine, and action the levers to check the correct functioning of the lifter checking that the control levers move freely without force.
— If necessary, proceed with the adjusting of the length of the control lever. (Refer to: Checks and Adjustments):

PIPING

CHECKS AND CONTROLS

1. Check the hydraulic circuit pipes for signs of deformation, or outside oxidization and/or and signs of detoriation. Replace the damaged components.
2. If there are oil leaks from the fitting tighten the faulty fitting and clean the area. If, during the functioning, the leak persists, proceed with the replacement of the gaskets (for fittings that have them) or of the complete piping.

REPLACEMENT

In case of removal and installation of piping, take not of the following recommendations:
— To avoid the entry of foreign matter in the circuit, clean the pipe connecting area that has to be removed, and after the disconnection block the fittings disconnected.
— Having disconnected the pipe joining the gearbox to the filters, completely drain the oil of the gearbox.
— Put new gaskets on fitting that need them.
— For pipes with a connection flange, fit with precision, the clamp screws and tighten gradually, in cross order.
— Mounting completed, start the engine, action the lifting circuit to check that there are no leaks from the fittings.
— Then refill the gear oil.

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CHECKS AND ADJUSTMENTS

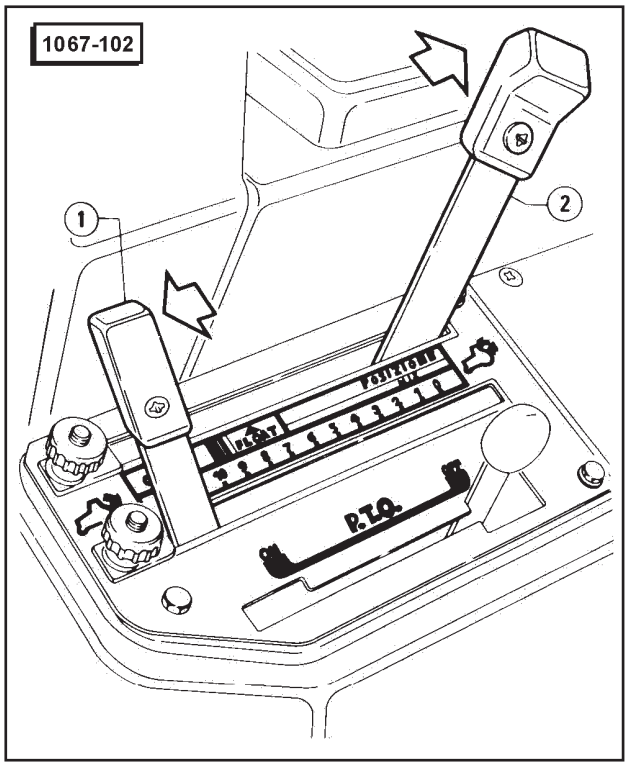
NOTE
The following adjustments must be made keeping note of the correct order.

— Before proceeding with the adjustments, apply a counterweight of approximately 300 kg (660 lb) with point linkage to vehicle.
— The internal adjustment of the lifting housing is necessary whenever the housing has been dismounted and/or whenever detective inside components have been replaced.

ADJUSTMENT OF THE POSITION CONTROL

EXTERNAL CONTROLS OF THE LIFTING HOUSING

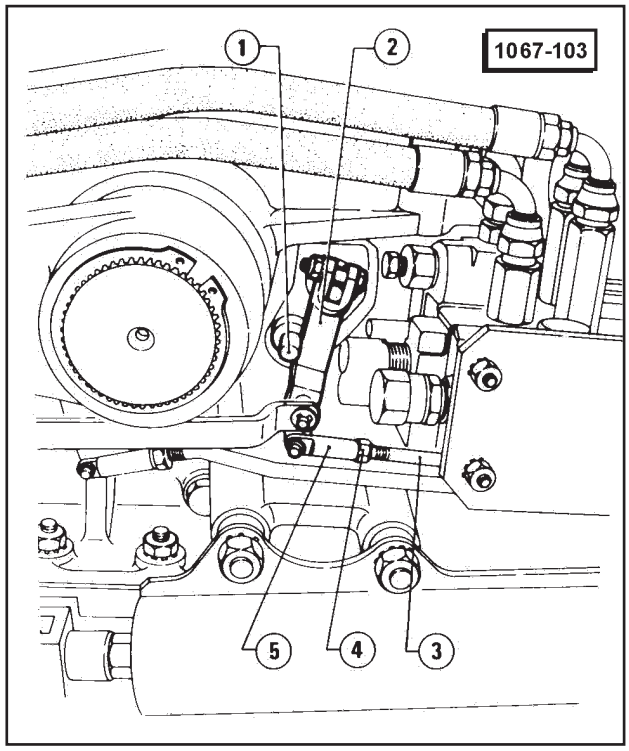
1. Move the position control lever **2** (yellow knob) to the end of section “POSITION” and the stress control lever **1** (green knob) to graded section “12".



1 - Strain command lever
2 - Position control lever

2. Check that the lever **2** is in beat on the pivot **1**. If not proceed with the adjustment of the rod **3** length, working as follows:

(1) Disconnect the head **5** of the lever **2.**
(2) Loosen the lock nut **4** and loosen or unscrew the head **5** until you are able to connect to the lever **2** (in beat on the pivot **1**).
(3) Tighten the lock nut **4** and reconnect the head **5** to the lever **2.**



1 - Block pin
2 - Lever
3 - Lower position control rod
4 - Lock nut
5 - Threaded head

LIFTING HOUSING INSIDE CONTROLS

1. Remove the cover of the lifting housing and its relative gasket.
2. Remove the oil level holding pipe on the inside of the lifting housing and replace with a shorter pipe, so that components to be controlled are above the level of oil during the check.
3. Start the engine and engage the parking brake.
4. Check that the with the lever **2** in beat on the pivot 1 the piston **5** of the litter protrudes from the cylinder by the recommended “A”.

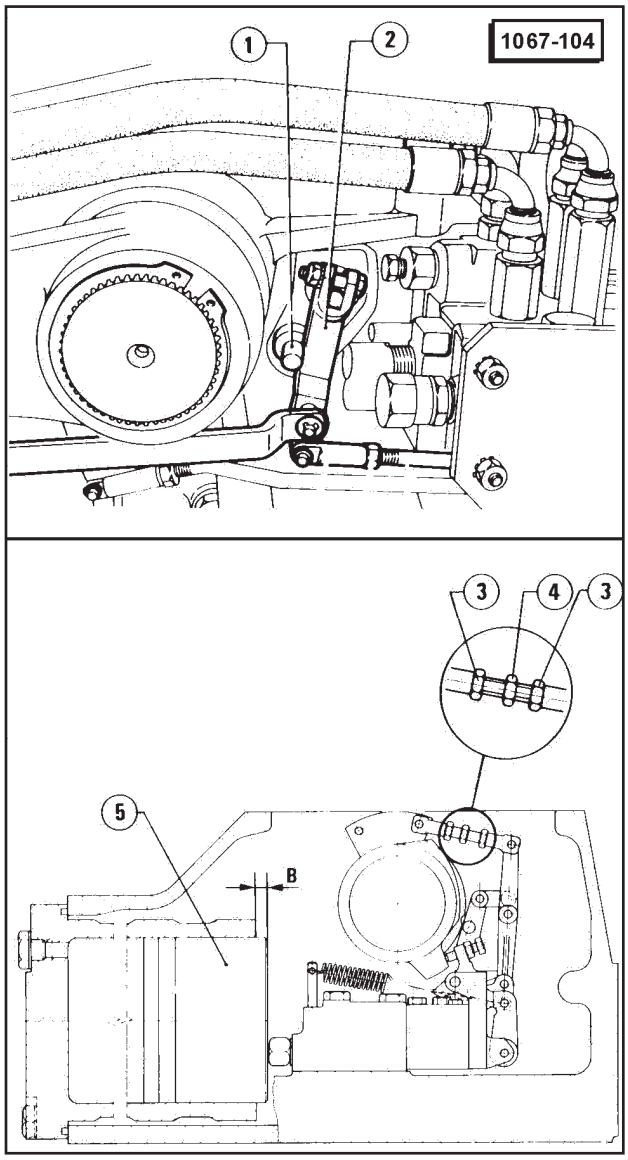
$$A = 10\ ^{+0}_{-1}\ mm$$

5. It you are unable to verity the above, loosen the nuts **3** and tighten or untighten the tie rod until the piston protrudes from the cylinder by the recommended quota, then lock the nuts **3.**

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NOTE
Lengthening the adjustable tie rod increases the protrudence of the piston and vice-versa.

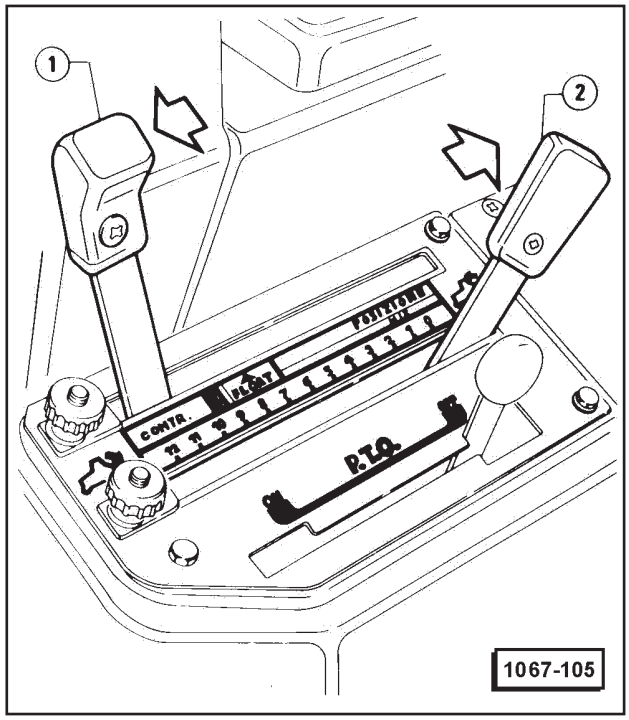


1 - Block pin
2 - Lever
3 - Nuts
4 - Adjustable tie rod
5 - Piston

6. Proceed with the checking of the strain command control.

CHECKING OF THE STRAIN COMMAND

1. With the engine running move the position control lever **1** (yellow knob) to the end of section “CONTR.” and the strain control lever **2** (green knob) to the position “O” of the graduated section.



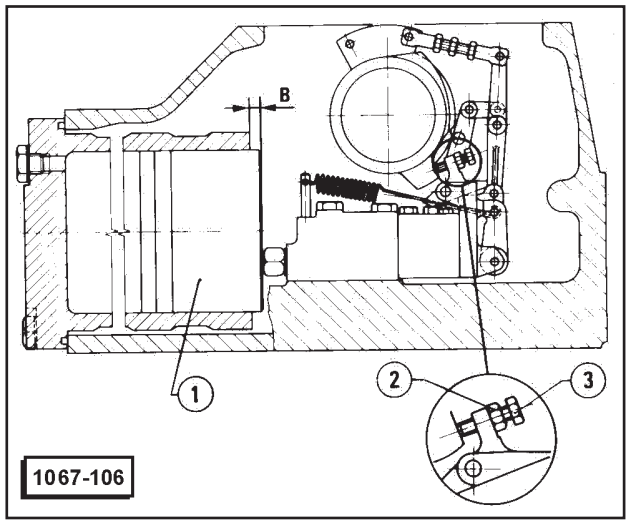
1 - Position control lever
2 - Strain control lever

2. Check that in this position the piston **1** of the lifter protrudes from the cylinder by the recommended “B” quota.

$$B = 15\ ^{+0}_{-1}\ mm$$

3. It the above cannot be verified unloosen the nut **2** and tighten or loosen the screw **3** until the piston protrudes from the cylinder to the specified quota, then block the nut **2**.

NOTE
Loosening the adjustment screw increases the protrudence of the piston and vice-versa.



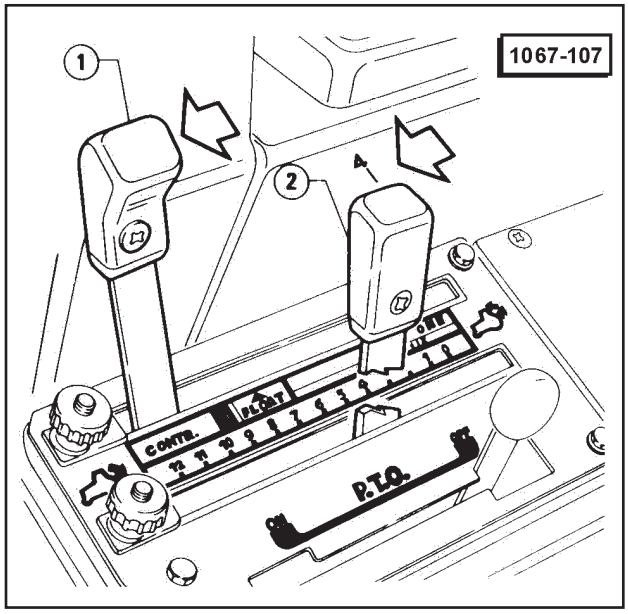
1 - Piston
2 - Nut
3 - Adjusting screw

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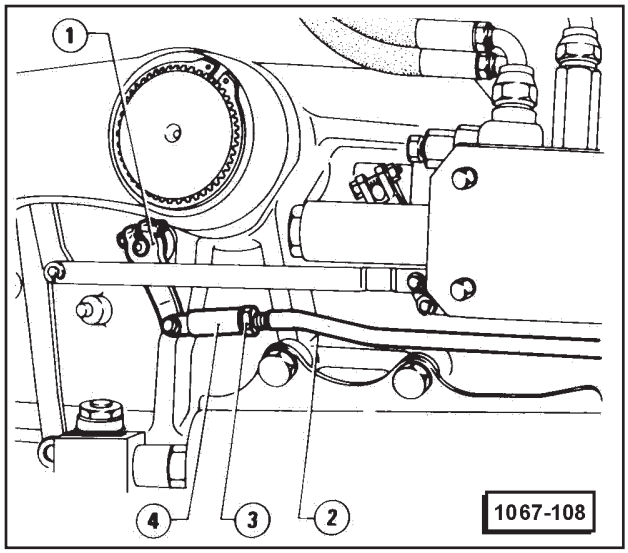
4. Keep the control position lever **1** (yellow knob) to the end of the section “CONTR.”, and move the strain command lever **2** (green knob) to the position “4" of the graduated section and check that the lifter start to come up.

NOTE
The centerline of the lever must be in alignment with the notch of position “4".



1 - Position control lever
2 - Strain command lever

5. If the lifter does not start to come up as it should, proceed with the adjustment of the rod length **2** as follows:
(1) Disconnect the head **4** from the lever **1**.
(2) Loosen the lock nut **3** and tighten or untighten the head **4** until it starts to lift with the strain command lever in position “4".
(3) Tighten the lock nut and reconnect the head **4** to t-he lever **1**.

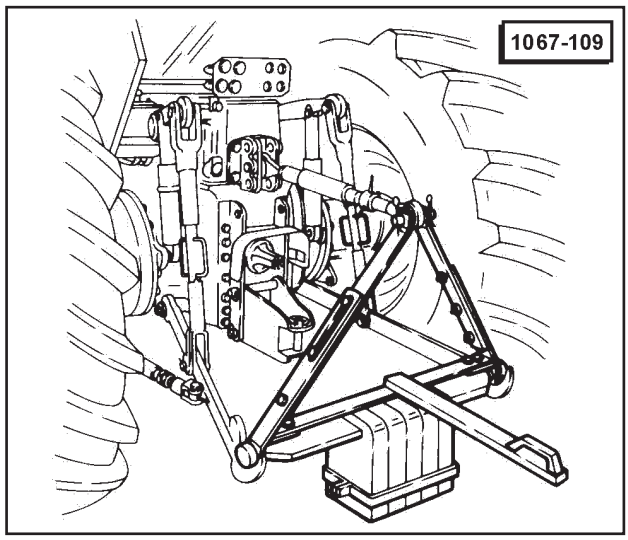


1 - Lever
2 - Lower strain command rod
3 - Lock nut
4 - Threaded head

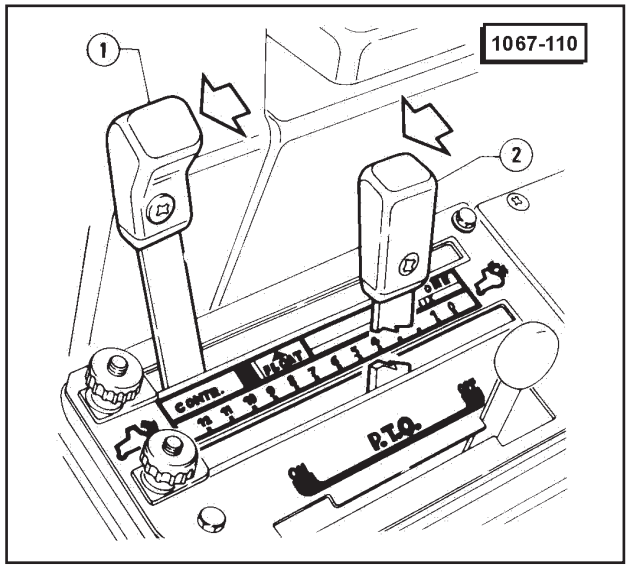
6. After checking, remount the oil lever hold pipe and the lifting housing cover together with the relative gaskets.

CHECKING OF THE LIFTING SENSITIVITY

NOTE
To carry out this operation it is also necessary to hook a counterweight of about 300 kg (660 lb) to the 3rd position.



1. Start the engine.
2. Keep the drive position lever 1 (yellow knob) to the end of the “CONTR.” section; move the strain command lever 2 (green knob) so that the lifting equipment lifts slightly, then stop the lifter in a balanced position (lever in a position around “4" of the graduated section).



1 - Drive position lever
2 - Strain command lever

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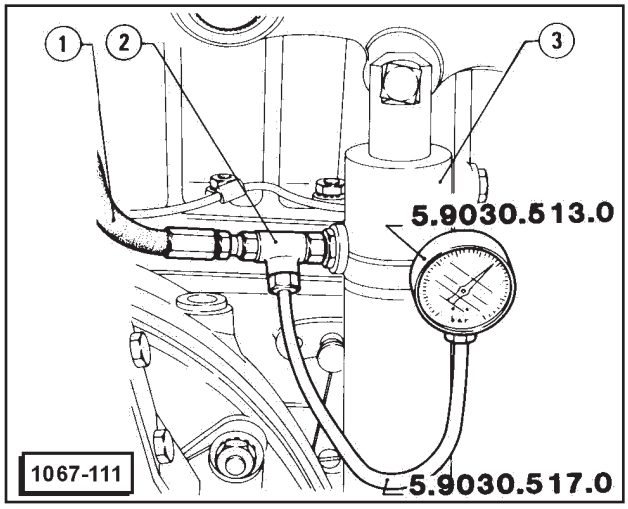
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3. Check that:
— Manually pulling the counterweight upwards the lifter continues to ride with ease.
— Manually pushing down the counterweight the lifter continues to lower with ease.
4. If the unable to obtain the described conditions check that the lifting mechanism and all the kinematic position drivings are reacting and are not forced.

CONTROL OF THE WORKING PRESSURE

Models with secondary hydraulic cylinders.

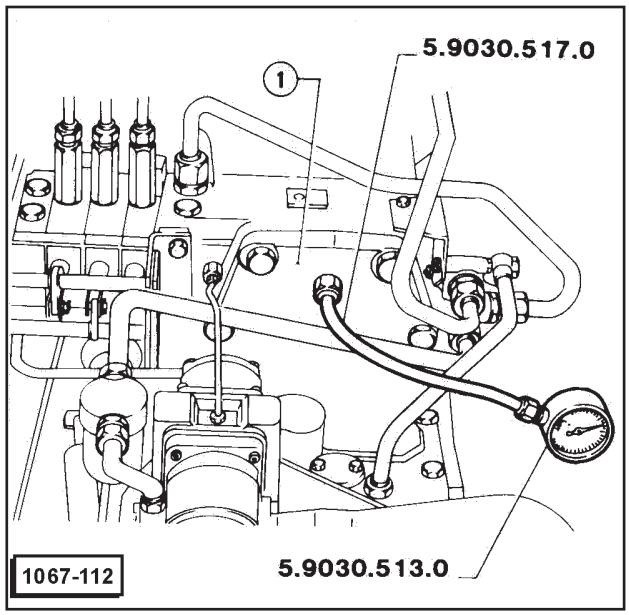
Unscrew from the cylinder **3** the pipe **1** fitting and apply suitable T union between pipe and cylinder.
Join to the T union, flexible pipe 5.9030.517.0 with gauge 5.9030.513.0.



1 - Cylinder fuel pipe
2 - T union
3 - Secondary hydraulic cylinder

For models without secondary hydraulic cylinders

1. Working from under the cabin unscrew the cap position on the lifting cylinder 1 and attach the flexible pipe 5.9030.517.0 with gauge 5.9030.513.0.



1 - Lifting cylinder

2. Start the engine, put the lifter into action and note on the gauge the effective working pressure of the circuit.

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TECHNICAL DATA AND SPECIFICATIONS

TECHNICAL DATA

Hydraulic lifting circuit

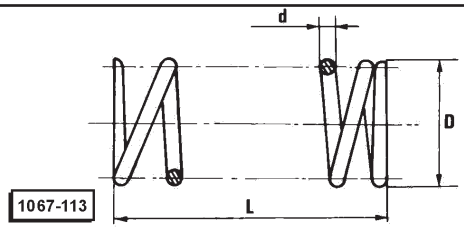
Measurement unit: mm

Details			Model		
			110	130	150
Lifter type			original with open center distributor		
Pump type			6OSCH HY/ZFS 11/22,5 L 215		
Pump capacity (max engine speed)		l/1	64		
Safety valve calibration pressure (auxiliary distributor)		bar	180^{+10}_{0}		
Anti shock calibration pressure		bar	210^{+10}_{0}		
Auxiliary cylinders shaft stroke capacity		mm	170		
Lifting capacity with load concentratedon rotule at center rear wheels height		kg	4600	5400	
As above, with auxiliary cylinders		kg	6400	7000	
Oil filters	Constructor		FIAAM		
	Model		FT 4952 IN		
	Quantity		2		
	Filtration grade		25		
	Filtration area	cm^2	7550 x 2		

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Distributor spring



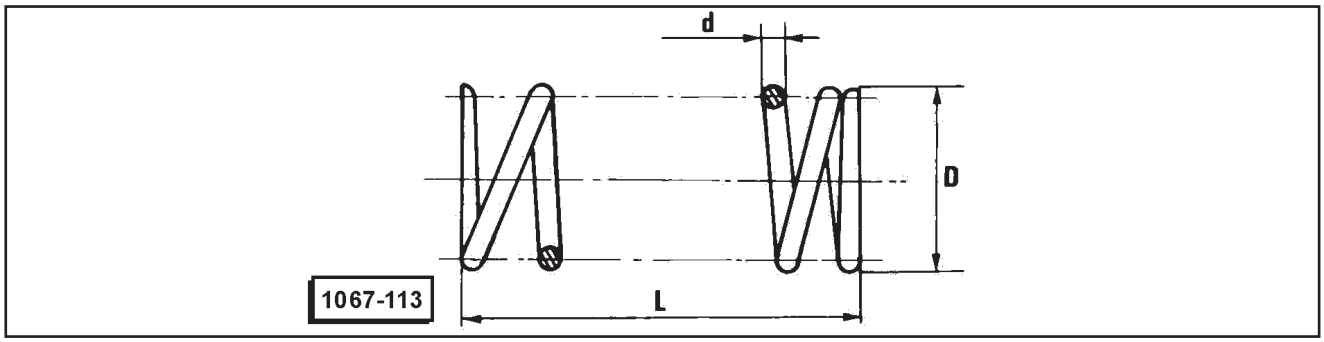
Measurement unit: mm

Details			Model		
			110	130	150
Consenst valve spring	Quantity	n	1		
	Wire diameter “d”		1,4		
	Outside diameter “D”		7,8		
	Free spring length “L”		54		
		4,115 kg	47,5		
		6,727 kg	43,37		
Consenst pilot valve spring	Quantity	n	1		
	Wire diameter “d”		0,9		
	Outside diameter “D”		7,8		
	Free spring length “L”		25,5		
	Spring length under load	2,133 kg	15,2		
		2,899 kg	11,5		
Hydraulic distribu-torrod spring	Quantity	n	1		
	Wire diameter “d”		1,2		
	Outside diameter “D”		10,4		
	Free spring length “L”		110		
	Spring length under load	4,4 kg	65		
		4 kg	60		
Non return valve spring	Quantity	n	2		
	Wire diameter “d”		1,1		
	Outside diameter “D”		8,8		
	Free spring length “L”		25		
	Spring length under load	2,96 kg	17		
		4,43 kg	13		
Valvematic spring	Quantity	n	1		
	Wire diameter “d”		1,2		
	Outside diameter “D”		12,2		
	Free spring length “L”		70		
	Spring length under load	2,7 kg	40		

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Sensitive member part spring



Measurement unit: mm

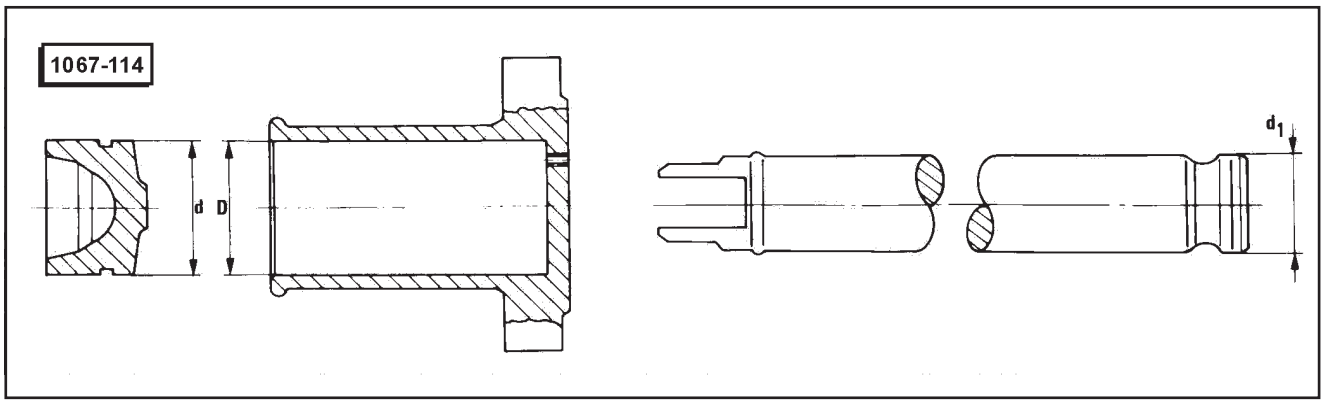
Details			Model		
			110	130	150
Front spring	Quantity	n	1		
	Wire diameter “d”		9		
	Outside diameter “D”		51,5 ± 0,5		
	Free spring length “L”		62		
	Spring length under load	245 ± 5 kg	53		
	Flexibility	mm/kg	0,0367		
Rear spri ng	Quantity	n	1		
	Wire diameter “d”		10,5	13	
	Outside diameter “D”		51,5 ± 0,5	65	
	Free spring length “L”		163	160	
	Spring length under load	596 ± 10 kg	132	-	
		272 kg	-	149,7	
		790 kg	-	130	
	Flexibility	mm/kg	0,05197	0,038	
Central spring	Quantity	n		1	
	Wire diameter “d”			7	
	Outside diameter “D”			37	
	Free spring length “L”			62	
	Spring length under load	221 kg		50	
	Flexibility	mm/kg		0,0542	

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CONTROL AND ADJUSTMENTS

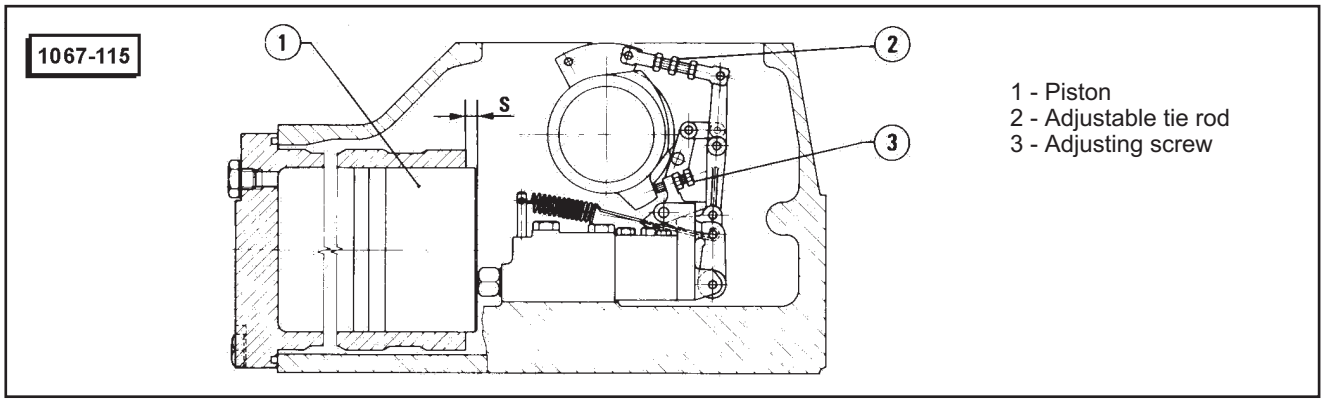
Piston, cylinder and slave cylinders



Measurement unit: mm

Dimension check		Model		
		110	130	150
Piston minimum diameter allowance	”d”	129,900	144,900	
Cylinder maximum diameter allowance	”D”	130,100	145,100	
Slave cylinder rod minimum diameter allowance	”d_1”	49,900		

Adjustment of position control lever and Strain control



Measurement unit: mm

Dimension check	Model		
	110	130	150
Piston protrudence “S" from the cylinder	$10^{0}_{-1,0}$ (1) (2)		
	$15^{0}_{-1,0}$ (3) (4)		

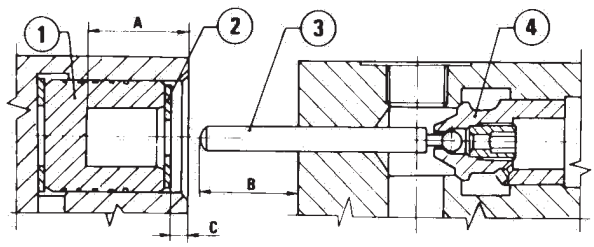
Lever position when being checked:

(1) Strain command lever (green knob) in position “12’
(2) Position control lever (yellow knob at the end of the sector “POSITION” (lever on the outside ot the lifting housing at end stroke against the stop).
(3) Strain command lever (green knob) in position “0”
(4) Position control lever (yellow knob) at the end of sector “CONTR”

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Distributor



1067-116

1 - Small piston
2 - Washer
3 - Push rod
4 - Non return valve

Measurement unit: mm

Checking dimensions	Model		
	110	130	150
Gap between push rod and inside of the non return valve drive pin (1) "A-B"	0,5		
Gap "C" between the washer outside surface of the washer and the surface of the distributor casing front	0,5		

(1) The dimensions should be measured with the push rod being supported by the ball and the ball touching its seat of the non return valve

TIGHTENING TORQUES

Measuring unit: Nm

Details	Model		
	110	130	150
Cylinder clamp screws to the lifting housing	275 ÷ 295 (28 ÷ 30)		
Anti shock valve to the distributor	78 ± 4,8 (8 ± 05)		

NOTE
All screw threads should be degreased and cleaned before tightening

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GENERAL PRESCRIPTIONS

Fluids and lubricants

Application	Type	Make	Model	Q.ty
Gear box	Oil	AGIP ROTRA THT (API GL - 3)	110-130-150	76 l
Lifting housing (1)				20 l (1)
Lifter arms drive shaft grooved profile	GREASE	Molikote MOLY - PASTE 450 - P		-
Lever joints and control rod	GREASE	AGIP - GREASE 30		-
Sensitive machine part spring				
Lifter greasing mechanism				

(1) Only during the functioning 20 l (4.4 imp. Gall) of oil accumulated in the inside of the lifting housing; with the engine stopped all the oil gradually goes to the gear box. (Only for models 110-130-150)

Sealant and Fixatives

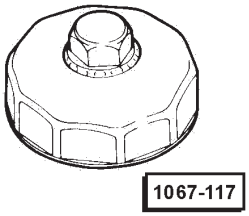
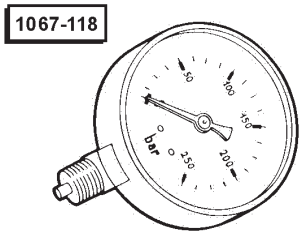
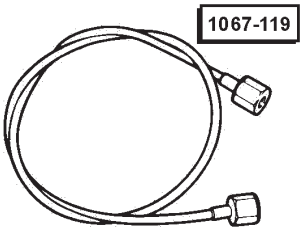
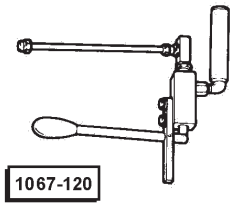
Application	Type	Make	Model	Q.ty
Distributor cap screw threads	Mastic	Loctite 971		-
Contact surface between lifting housing and gearbox	Mastic	Loctite 510		-



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SPECIAL TOOLS

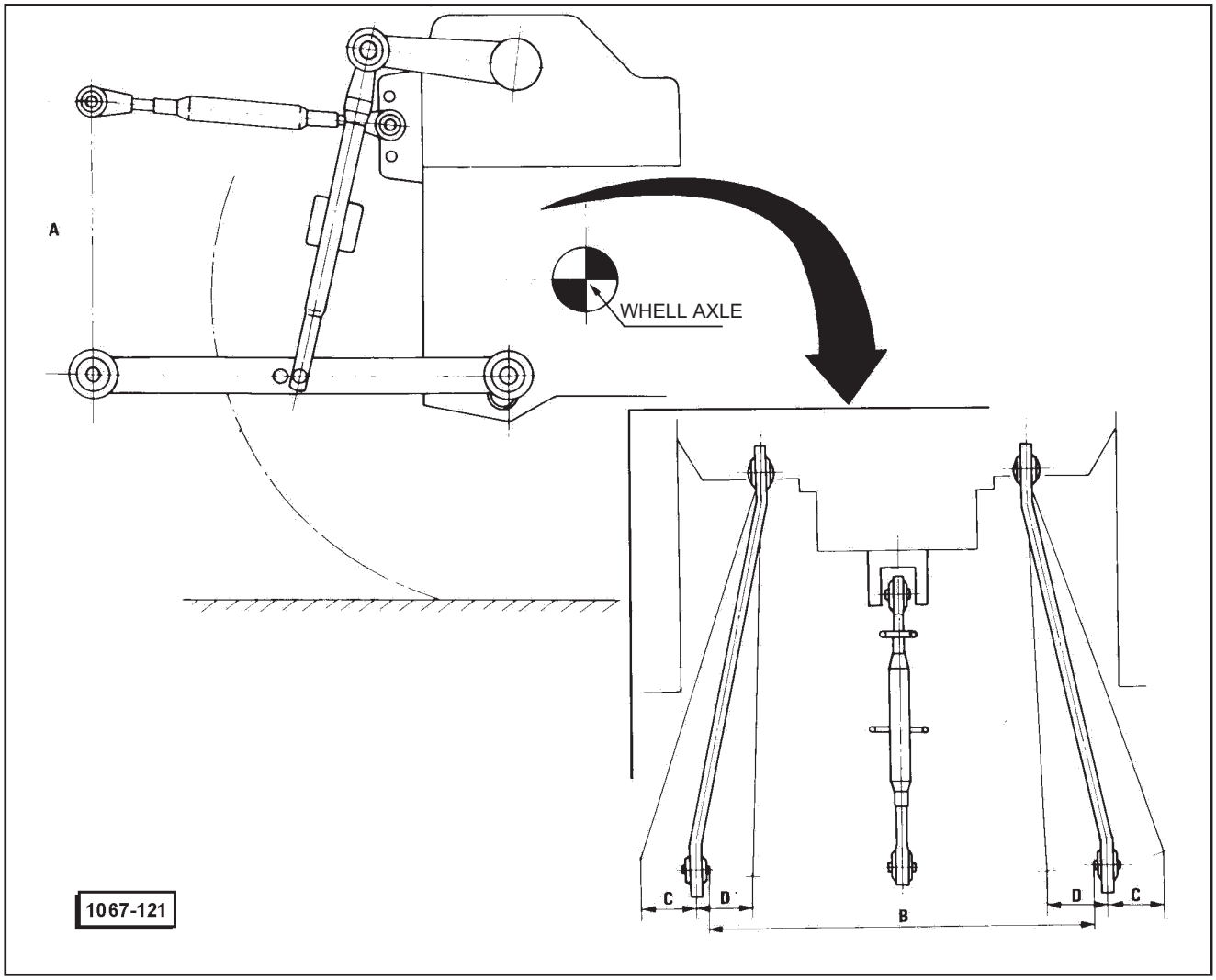
Tool Number	ToolName	Ref. page
5.9030.512.0	Hydraulic circuit oil filter wrench 	5
5.9030.513.0	Gauge 0 to 250 bar (0 to 3625 p.s.i.) in glycerine bath 	36
5.9030.517.0	Flexible pipe for hydraulic circuit 	36
5.9030.520.4	Hydraulic pump 	16

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TROUBLESHOOTING AND CORRECTIONS

Note
The following trouble diagnosis describes the possible conditions of the hydraulic circuit of the lifter with the presumption that the mechanism of the lifter is in working condition.
Therefore, check that the lifting mechanism is adjusted correctly, that the load of the lifter is not above the maximum recommended weight and that the levers and tie rods are not damaged.
In the following diagram there is shown the geometric configuration of the lifter with the maximum permissible load, in function with the implement category.



Measuring unit: mm

Implement type	2nd category	3rd category
Felltures	Model	
	110 - 130 - 150	150
A: Distance between load application point and the lower arm hook	510	560
B: Distance between lower arm hooks	825 ± 1,5	965 ± 1,5
C: Movement towards the outside of the lower arm hook	125	125
D: Movement towards the inside of the lower arm hook	125	125

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Condition	Probable cause	Corrective action
The lifter is unable to lift or is lifting too slowly	Overloaded lifter	Avoid overloading above the maximum bearable weight
	Incorrect quality of oil in the circuit	Replace with the recommended quality of oil
	Insufficient oil in the circuit	Check gearbox oil level, and if necessary top-up
	Oil filter blocked (warning light)	Replace oil filters
	Excessively worn gaskets on lifter piston	Replace the gaskets
	Distributor in-take valve blocked	Overhaul the distributor
	Worn or defective oil pump	Overhaul and eventually replace
	Emulsified oil	Check that the fittings are correctly tightened and that the gaskets are efficient
	Supplementary hydraulic circuit defective	Refer to: Supplementary hydraulic circuit
	Incorrect calibration of the safety valve	Check the calibration pressure; if necessary adjust
The lifter hoists only partially	Control lever incorrectly adjusted	Adjust correctly
The arms of the lifter remain blocked in the raised position, or they lower too slowly	The distributor shaft does not slide in its seat	Overhaul the distributor
	Valvematic device or non return valve blocked	Overhaul the distributor
The lifter works irregularly (jerking)	Air present in the circuit (entered during the maintenance work)	Start the engine for some minutes and engage the distributor, in this way the air present is eliminated
	Worn or defective oil pump	Overhaul and if necessary replace
	Emulsified oil or incorrect quality of oil	Replace with the recommended quality of oil
	Defective non return valve	Overhaul and if necessary replace the defective valve

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Condition	Probable cause	Corrective action
The lifter swings (unable to remain in reached position)	Incorrect adjustment of control lever	Adjust correctly
	Defective safety valve or scarce grip of the non return valve	Overhaul and proceed with the correct calibration
	Excessive wear of the piston gaskets and/or of the secondary hydraulic cylinders (if mounted)	Replace the gaskets
When the lifter arms are raised to the maximum height, the safety valve discharges oil	Incorrect adjustment of the Distributor control lever and/or of the safety valve	Adjust correctly
With the engine OFF the lifter arms lower	Defective non return valve	Overhaul the distributor and check the non return valve
	Excessive wear of the piston gasket and/or of the secondary hydraulic cylinders Of mounted)	Replace the damaged gaskets
Excessively noisy system (with circuit pipe vibrations)	Air is present in the circuit	Check that the fittings are tightened correctly and that the gaskets are efficient
	Interference in the pipes (visual check)	Move the pipes so there is no contact between them and other components
Circuit oil leakage	Loosened pipe fittings	Tighten correctly
	Worn or defective gaskets	Replace
	Damaged pipes	Replace
Slowness or absence of movement of the lifter whilst working with control of the strain	Wrong fixture or fixture incorrectly coupled	Check the fixture and that it is also correctly attached
	Excessive play of the lifting meccanism	Overhaul the lifting meccanism and eliminate any excessive play
	Sensitive machine part wrongly adjusted or damaged	Overhaul sensitive machine part and eventually replace the damaged component
	Incorrect adjustment of the control lever	Adjust correctly
	Hardening of the lower arms support shaft of the lifter	Overhaul the lifting meccanism

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SUPPLEMENTARY HYDRAULIC CIRCUIT

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(*) Seer: Lifting Group

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GENERAL FEATURES

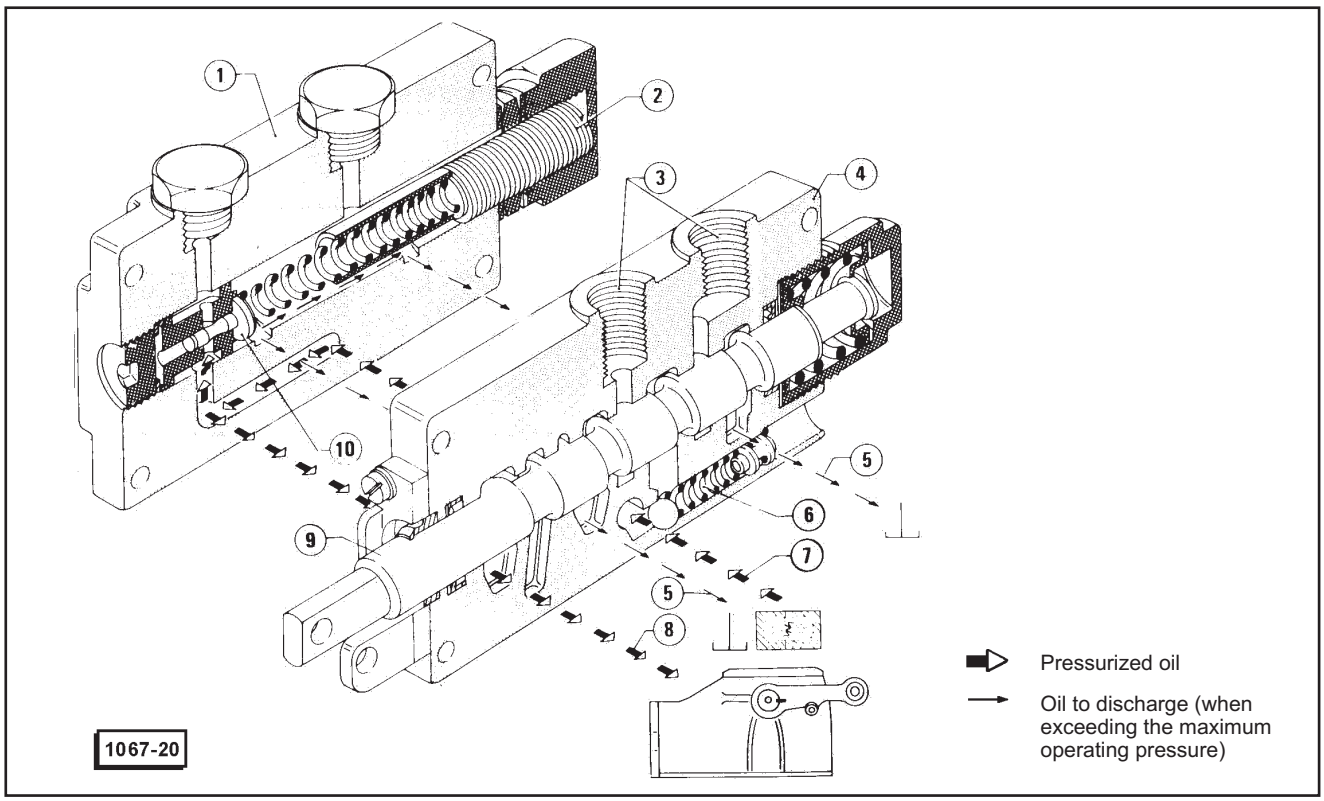
DESCRIPTION

- The supplementary hydraulic circuit system permits the rapid joining of various hydraulic implements to the rear of the vehicle.
- The circuit that fuels the auxiliary distributor is the same as for the lifting drive (see: Lifting Group General Specifications).
- The distributors are of the modular type and the following models are equipped with a six way fitting for double effect use:
  - Simple/double effect distributor: a special device allows the transformation of the distributor to simple effect for particular jobs.
  - Simple/double effect distributors with automatic centering (kickout effect): offer the possibility of being transformed to single effect. A special device also allows the distributor shaft to be kept in one of the two control, positions. The return to neutral is automatic when the machine has completed the given operation and consequently the circuit pressure value is higher than that of the device.
  - - Double effect distributor with float position: as well as the normal double function, it also consents the distributor shaft to move to the position FLOAT, in this way the machine is free to self regulate for external actions.
  - - For specific requirements it is possible to install a fourth distributor in order to obtain a control unit with a total of 8 outlets.

WORKING DIAGRAMS

NEUTRAL PHASE

In the neutral phase the distributor shaft **9** is positioned in such a way as to block the oil flow to the users two delivery fittings **3**. The pressurized oil crosses the distributor body and flows to the safety valves **10** and from there, by way of the pipe **8**, to the lifting distributor.
Whenever the circuit pressure value is higher than that of the calibrator value of the security valve, the oil is drained by way of the pipes **5**. In this position of the shaft **9** the fittings **3** are not connected with the exhaust pipes, therefore the implement controlled by the distributor is maintained in the reached position.



1 - Safety valve body
2 - Maximum operating pressure adjusting screw
3 - Connection fittings to utilizer
4 - Distribution casing
5 - Oil backflow pipes (exhaust)
6 - Non return valve
7 - Oil delivery pipe (pressurized)
8 - Delivery pipe to lifting distributor (by way of neutral pipes)
9 - Distributor shaft
10 - Safety valve

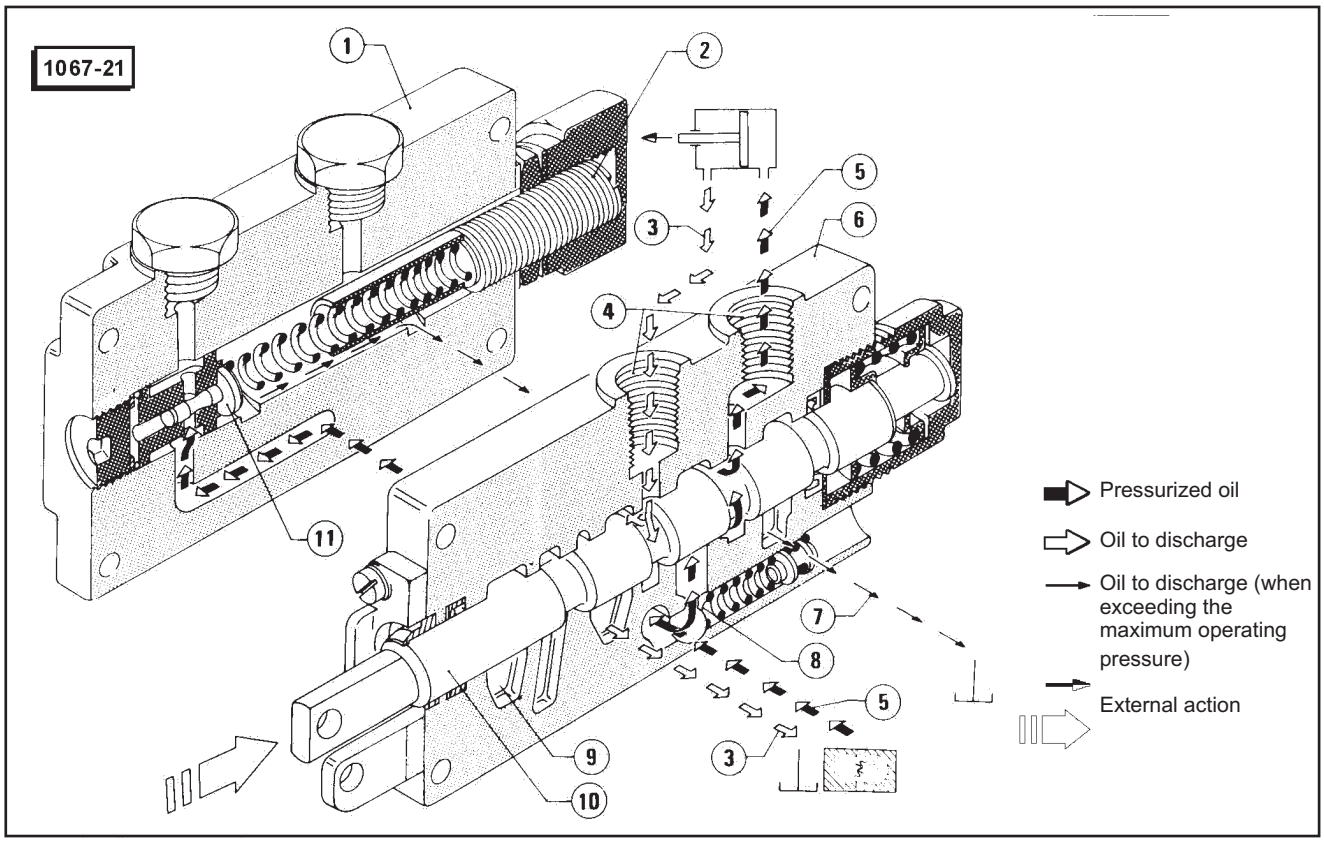
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WORKING PHASE

The moving of the distributor shaft **10** to the right (Work position) determines the pressurized oil delivery flow **5** to the utilizer; simultaneously allowing the flow of oil **3** from the utilizer to the exhaust (crossing fittings **4**)
The pressurized oil also flows to the safety valve **11**. Whenever pressure in the circuit exceeds that of the calibrated value of the safety valve, the oil is drained by way of pipe **7**.

In shaft position **10**, oil does not flow to the lifting distributor because the distributor neutral pipe b is closed. The movement of the shaft towards the left **10** determines the reverse flow **3** and **5**. In any case the previous instructions are still valid.



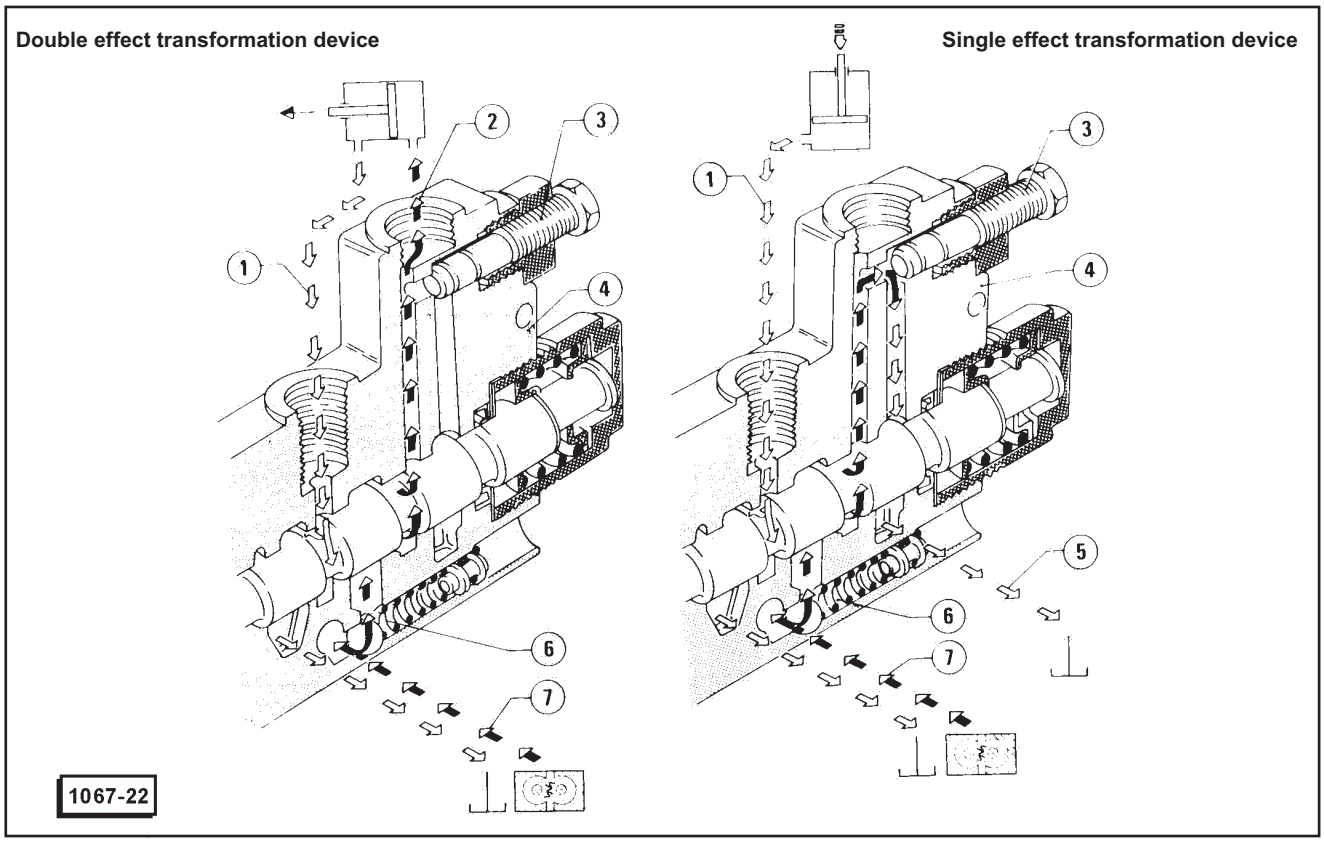
1 - Security valve casing
2 - Maximum operating pressure adjusting screw
3 - Oil backflow pipe (exhaust)
4 - Utilizer connection fitting
5 - Oil delivery pipe (pressurized)
6 - Distributor casing
7 - Oil backflow (exhaust)
8 - Non return valve
9 - Neutral conduit (delivery to the lifting distributor)
10 - Distributor shaft
11 - Securing valve

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For distributors equipped with the simple/double effect transformation device, the previous instructions are valid. In this version working on screw 3, it is possible to send direct to exhaust (pipe 5) the pressurized oil coming from the pump (pipe 7).

In this way the delivery pipe 2 to the utilizer is stopped and therefore, the distributor can, at the same time, fuel single effect functional tools.



1 - Oil backflow pipe (discharge)
2 - Delivery pipe to utilizer
3 - Single/double effect transformation device
4 - Distributor casing
5 - Oil backflow (discharge)
6 - Non return valve
7 - Oil delivery pipe (pressurized)

Pressurized oil

Oil to discharge

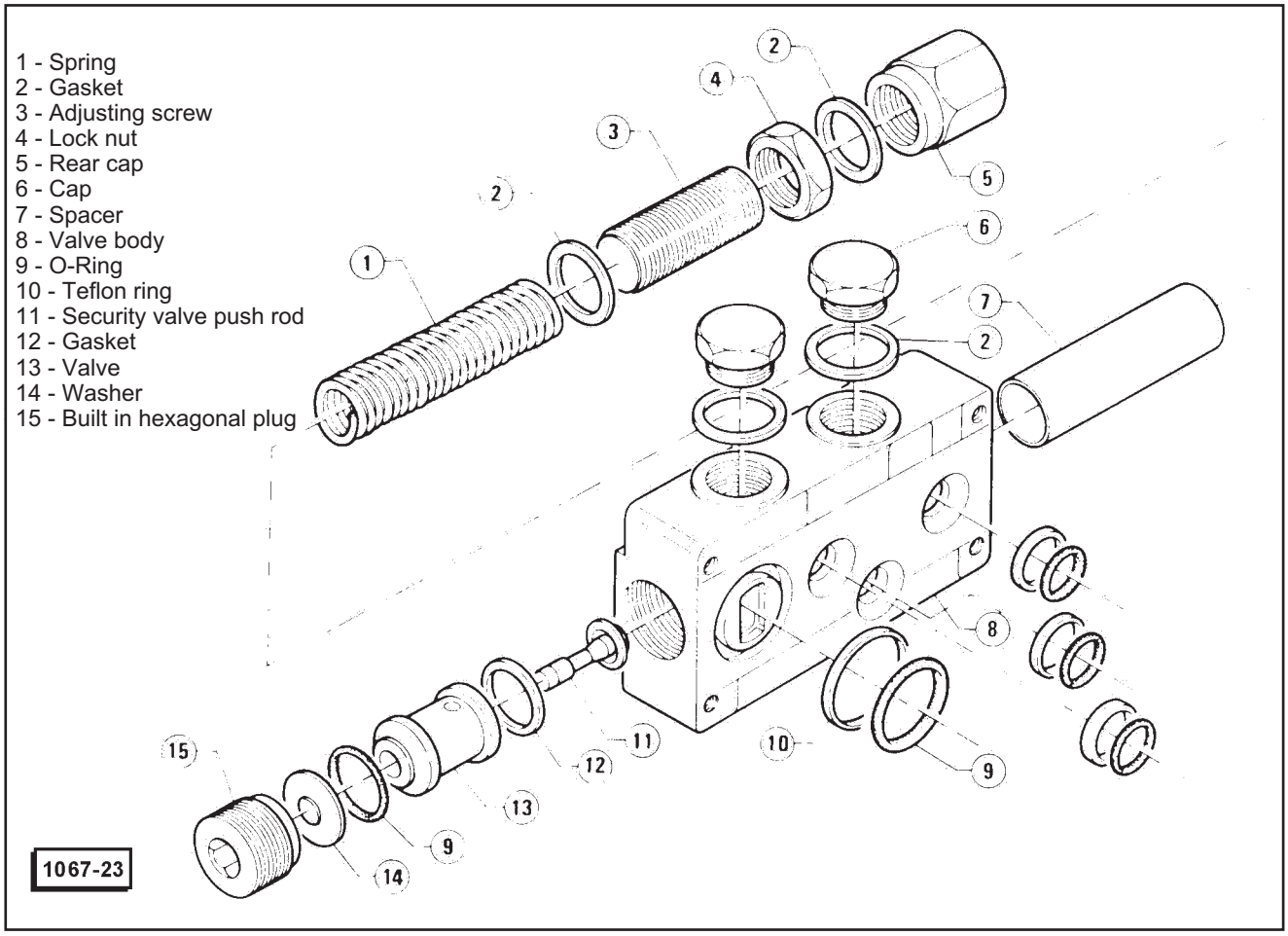
Movement

External action

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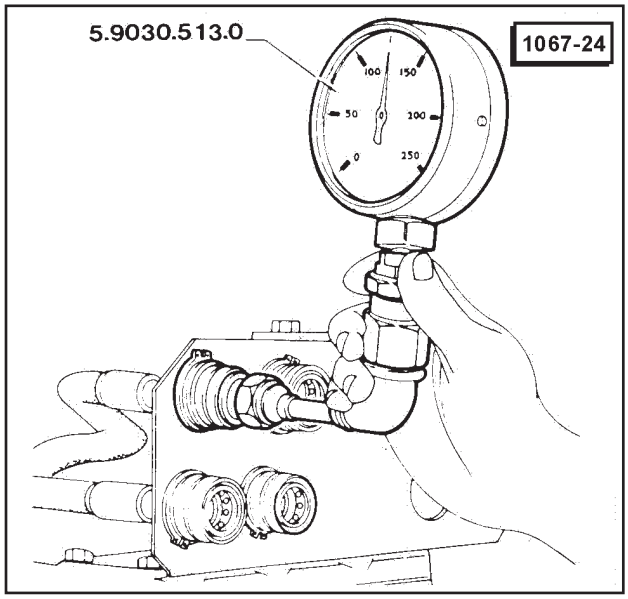
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SAFETY VALVE



CHECKS AND ADJUSTMENTS OF MAXIMUM OPERATING PRESSURE

1. Join the gauge 5.9030.513.0 with the suitable fitting to a rear quick coupling plug.



2. Start the engine, insert the parking brake and start the distributor which is connected by a fitting to the gauge.

NOTE
When the distributor is equipped with an automatic centering device, it is necessary to keep it inserted manually to attain the maximum pressure in the circuit.

3. Check the gauge reading and verify that it is within the prescribed value.

Safety valve pressure calibrating value

$$180^{+10}_{0}\ \text{bar}$$

4. When the recommended values have not been verified adjust as follows:
(1) Unscrew cap **4** keeping locked the locknut **1** with a contrast spanner. Remove the cap and the gasket.
(2) Loosen locknut **1** and unscrew adjusting screw **2** until the correct pressure value is reached.

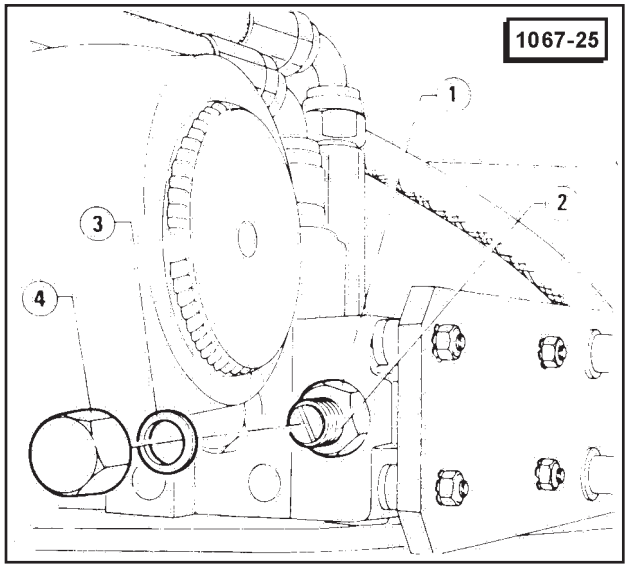
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NOTE
— Loosen the screw to reduce pressure.
— Tighten the screw to increase pressure.

(3) On completion of the check, tighten lock nut **1** to recommended torque. Fit a new gasket **3** and the cap **4**, tightening to the recommended torque.

Tightening torque
Cap and locknut on rear side of safety valve
50 ÷ 55 Nm
(5 ÷ 5,5 kgm; 36.15 to 39.77 ft lb)



1 - Locknut
2 - Adjusting screw
3 - Gasket
4 - Rear cap

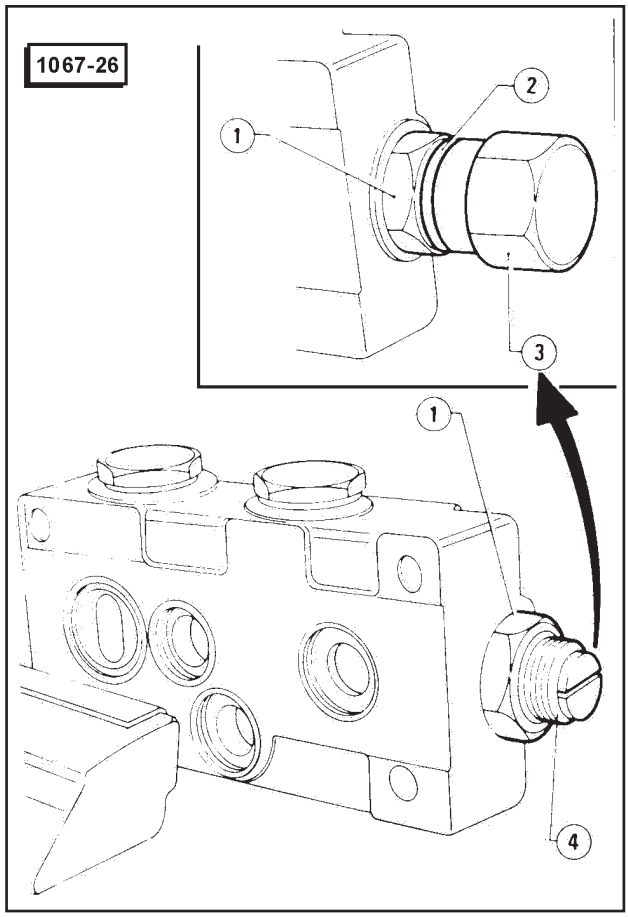
DISASSEMBLY AND REASSEMBLY

1. For the disassembly of the safety valve, refer to: Distributors - Disassembly steps 1. -7. taking care not to strip distributor box.
2. Reassemble in reverse order observing the following instructions.
— Accurately clean the connecting surface between valve body and distributor.
— Fit new O-Rings and teflon ring in the four seats of the hydraulic circuit on the valve body.
— On completion of the re-assembly, control the registration of the maximum operating pressure (refer to: Checks and Adjustments of the Maximum Operating Pressure).
— Check gear oil level, and if necessary refill.

DISASSEMBLY

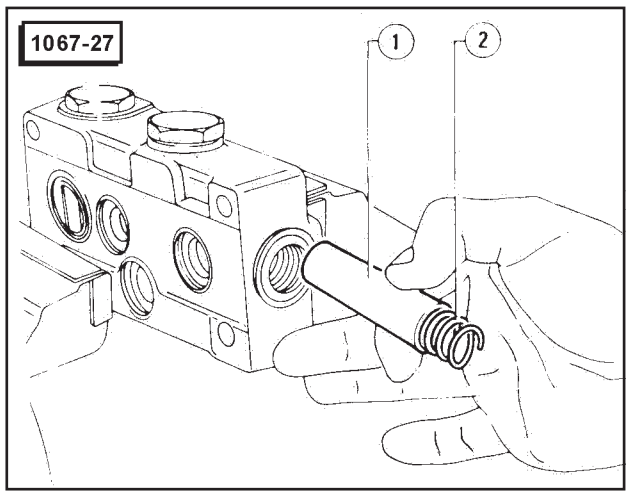
1. Fit the safety valve on a clamp with protective jaws and unscrew the cap **3**, keeping the lock nut **1**, secure with the contrast spanner, remove the cap and gasket **2**.

2. Loosen the lock nut **1** and unscrew the adjusting screw **4** and remove together with the gasket.



1 - Lock nut
2 - Rear gasket
3 - Cap
4 - Adjusting screw

3. Remove the spring **2** and the spacer **1** from the valve casing.



1 - Spacer
2 - Spring

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4. With reference to the enlarged diagram, unscrew cap **15** and remove the washer **14**, O-Ring **9**, valve **13** complete with push rod **11** and gasket **12** from the valve casing.
5. If necessary unscrew and remove the caps **6** together with their gaskets.

CHECKS AND VERIFICA TIONS

1. Accurately clean the valve components and their seats.
2. Check that parts are not scratched or oxidized.

REASSEMBL Y

Reassemble in reverse order using the following specifications.
— Degrease cap and fitting threads with specified solvant.
— Apply specified sealer on cap and fitting threads.
— Replace all O-rings, copper gaskets and the hexagonal built-in washer.
— Tighten the following components to the recommended torque.

Tightening torque
Hexagonal built-in cap on front
24 ÷ 27 Nm
(2,4 ÷ 2,7 - kgm; 17.35 to 19.52 ft lb)

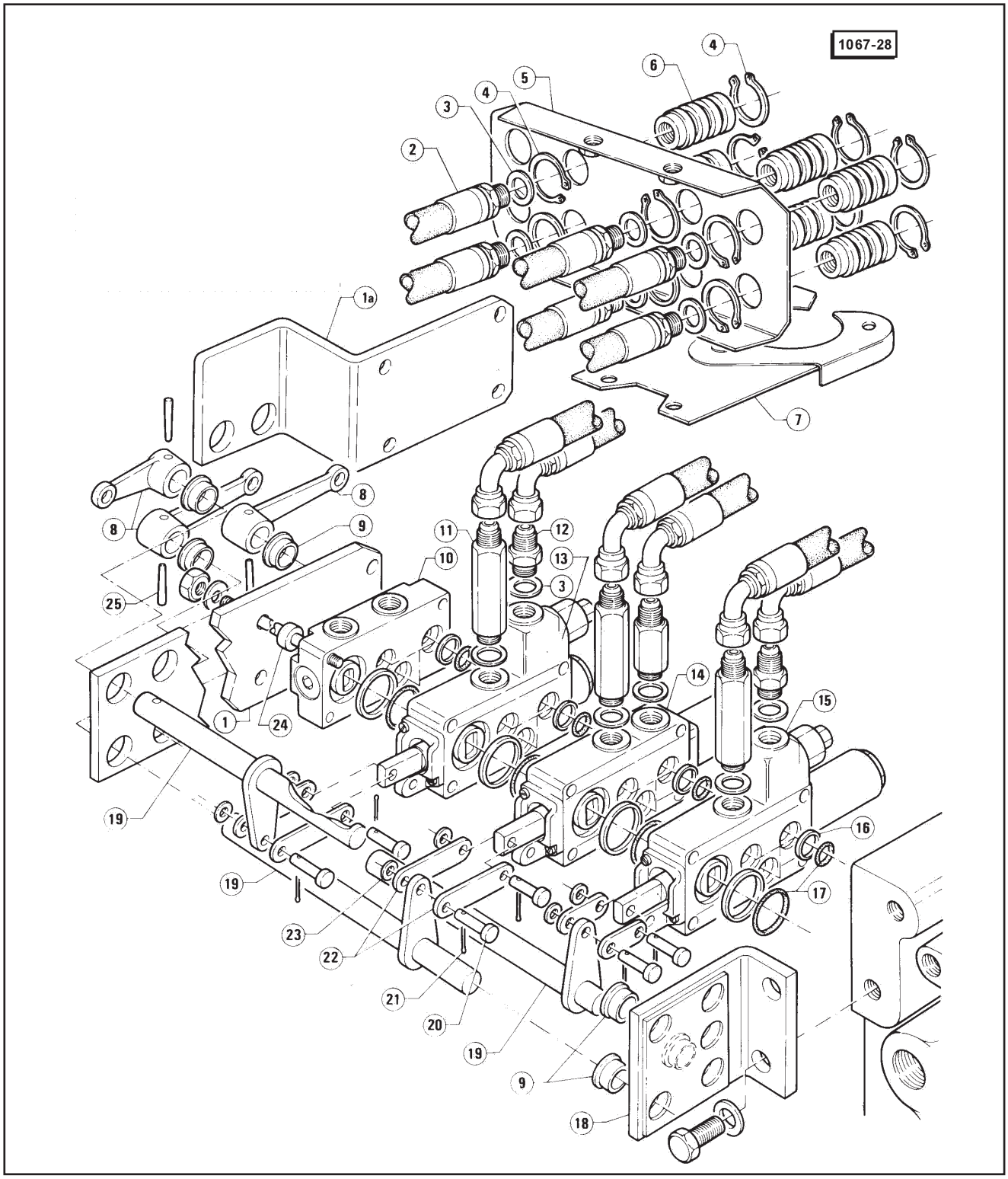
— Fit adjusting screw and partially tighten so that the valve is tightened to a pressure lower than that recommended.
— After the refitting of the safety valve to the distributor box, proceed with the calibration (refer to: Checks and Controls Maximum Operating Pressure).
— Refit locknut and cap with the gaskets, tightening to the specific torque.

Tightening torque
Rear side safety valve cap and locknut
50 ÷ 55 Nm
(5 ÷ 5,5 kgm; 36.15 to 39.77 ft lb)

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DISTRIBUTORS



1 - Plate (three distributors version)
1a - Plate (two distributors version)
2 - Pipes.
3 - Gaskets
4 - Seeger ring
5 - Plate
6 - Quick connector
7 - Retainer
8 - Distributor control lever
9 - Plastic bush
10 - Safety valve
11 - Fitting
12 - Fitting
13 - Simple/double effect distributor
14 - Double effect distributor with float posit.
15 - Single/double effect distributor with automatic centering (kickout effect)
16 - Teflon ring
17 - O-Ring
18 - Lever support
19 - Relay rod
20 - Pin
21 - Split pin
22 - Connecting link
23 - Washer
24 - Spacer
25 - Lock pin

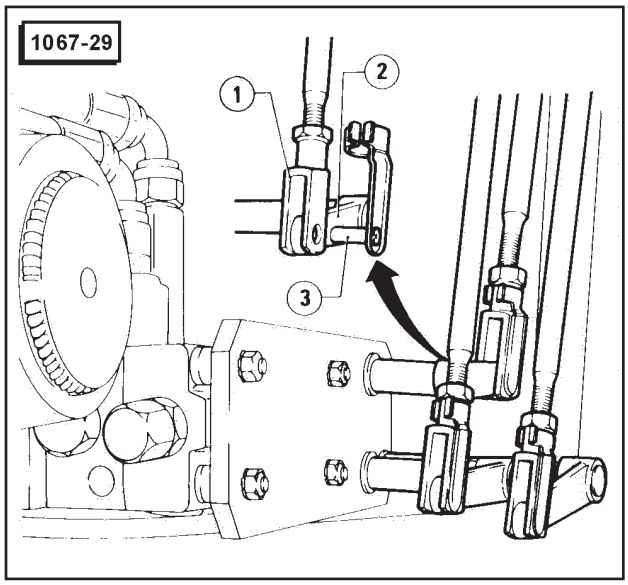
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DISASSEMBLY

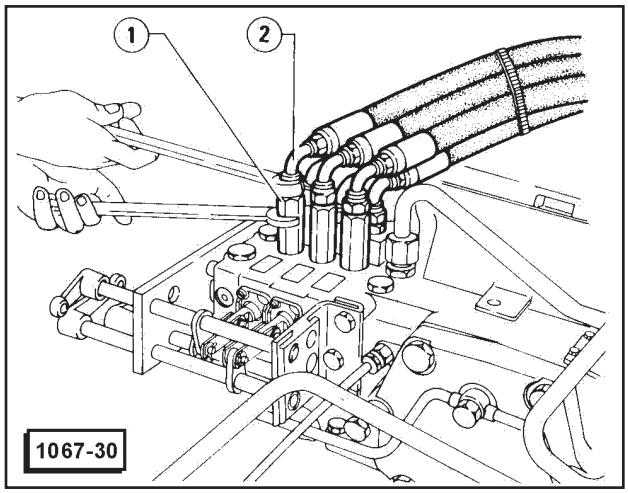
NOTE
The operation refers to a vehicle with three distributors, but can also be applied to vehicles with a different number of distributors.

1. Working behind the vehicle, unhook the fixing spring of the pivots **3**, connecting fork **1,** and the lever **2**. Slip off the pivots and separate the levers.



1 - Fork
2 - Distributor command lever
3 - Pivot

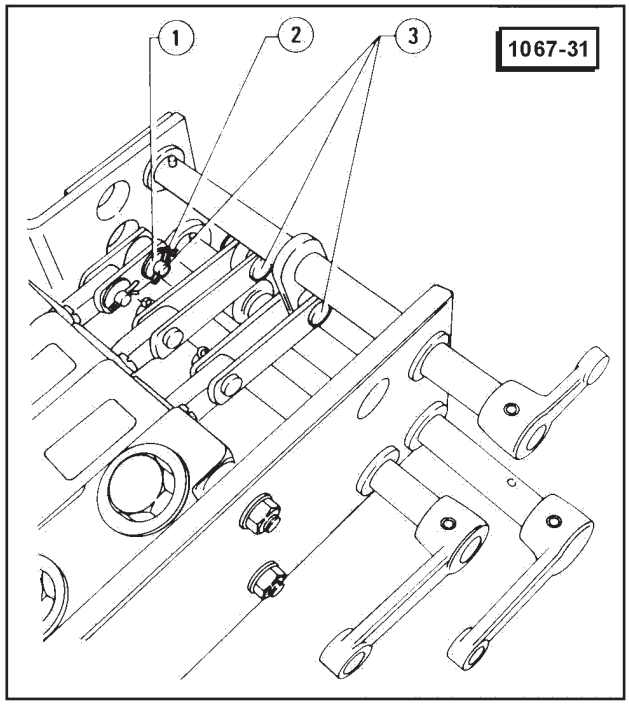
2. Unscrew distributor pipe fittings 2 that need removing, holding firm with contrast spanner, the connector 1 on the distributor.



1 - Distributor fitting
2 - Pipe fitting

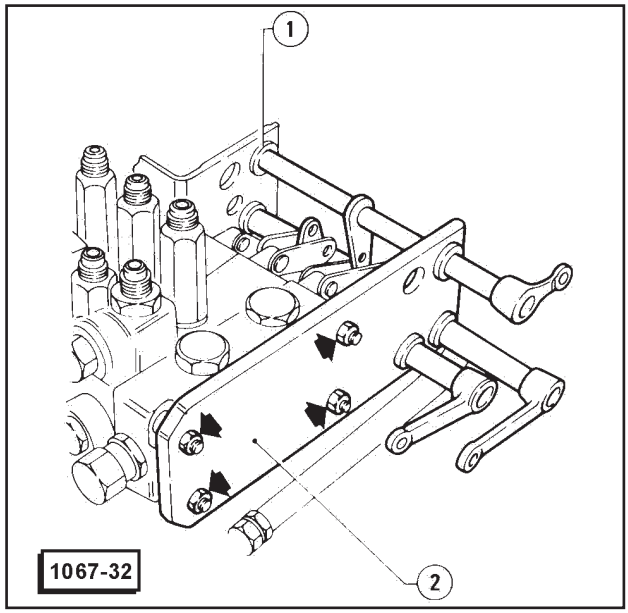
3. Slip off the pivot **3** holding split pin **2**. Remove pivots and collect the washers **1**.

NOTE
The inside distributor pivot has two washers.



1 - Washers
2 - Split pin
3 - Pivots

4. Unscrew the nuts indicated in the diagram and remove the plate **2** complete with relay rod leaving the bushes **1** mounted on the internal support.



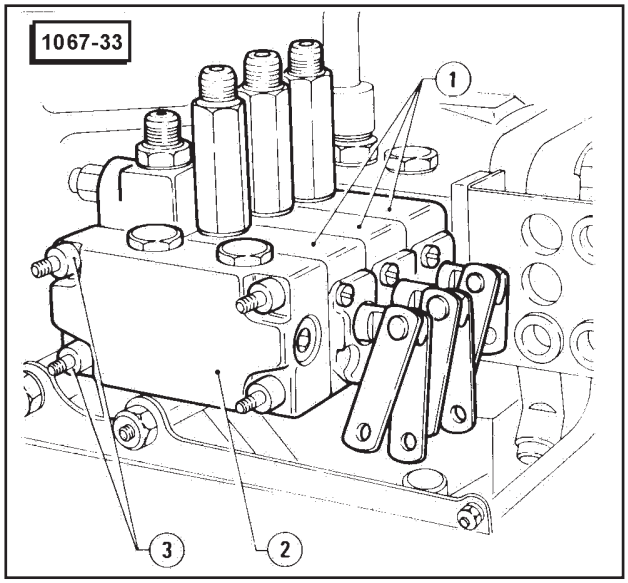
1 - Plastic bush
2 - Plate

5. Mark the assembly position of the distributors so as to facilitate reassembly.
6. Collect the four spacers **3**, and slip off the valve **2** and the distributors **1**.

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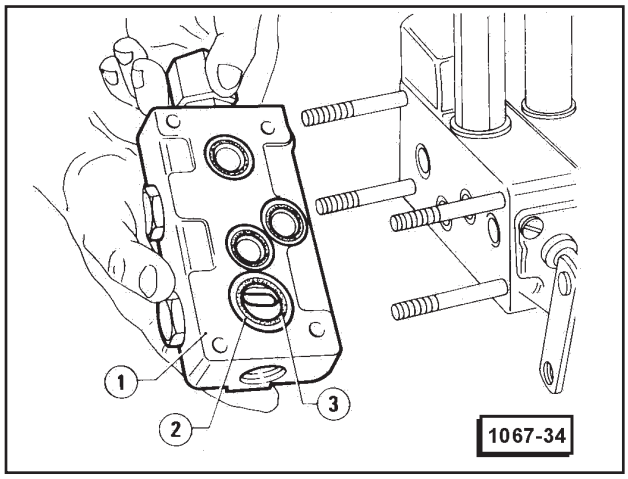
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NOTE
For versions with four auxiliary distributors it is necessary to unscrew and remove the four fixing studs as there is insufficient space to slip the components off sideways.



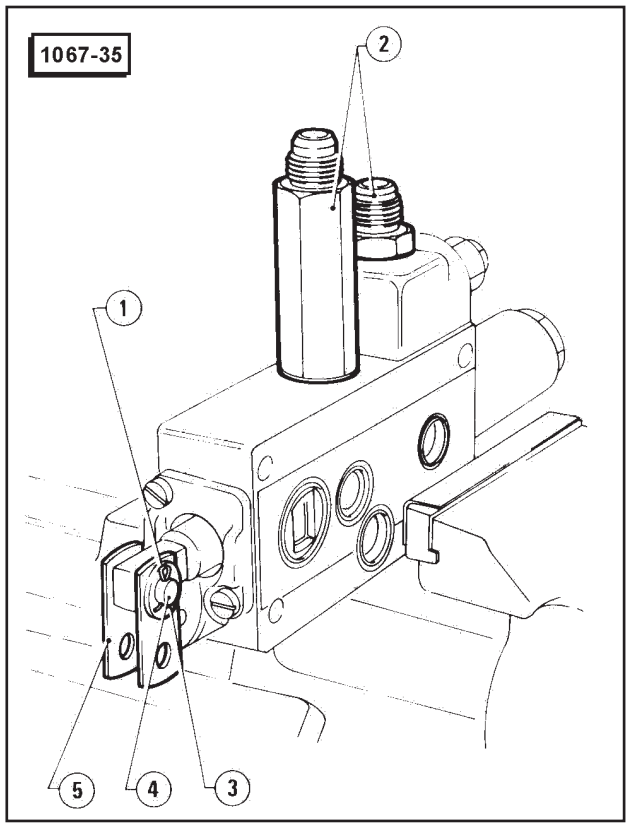
1 - Distributors
2 - Safety valve
3 - Spacers

7. Recover the four O-rings **3** and the relative teflon rings **2** for each component.



1 - Safety valve
2 - Teflon ring
3 - O-ring

8. Fix the distributor on the clamp with protective jaws. Slip off the split pin **1**, remove the pivot **4** the washers **3** and the plates **5**
9. If necessary, unscrew and remove the connectors **2** and relative gaskets.

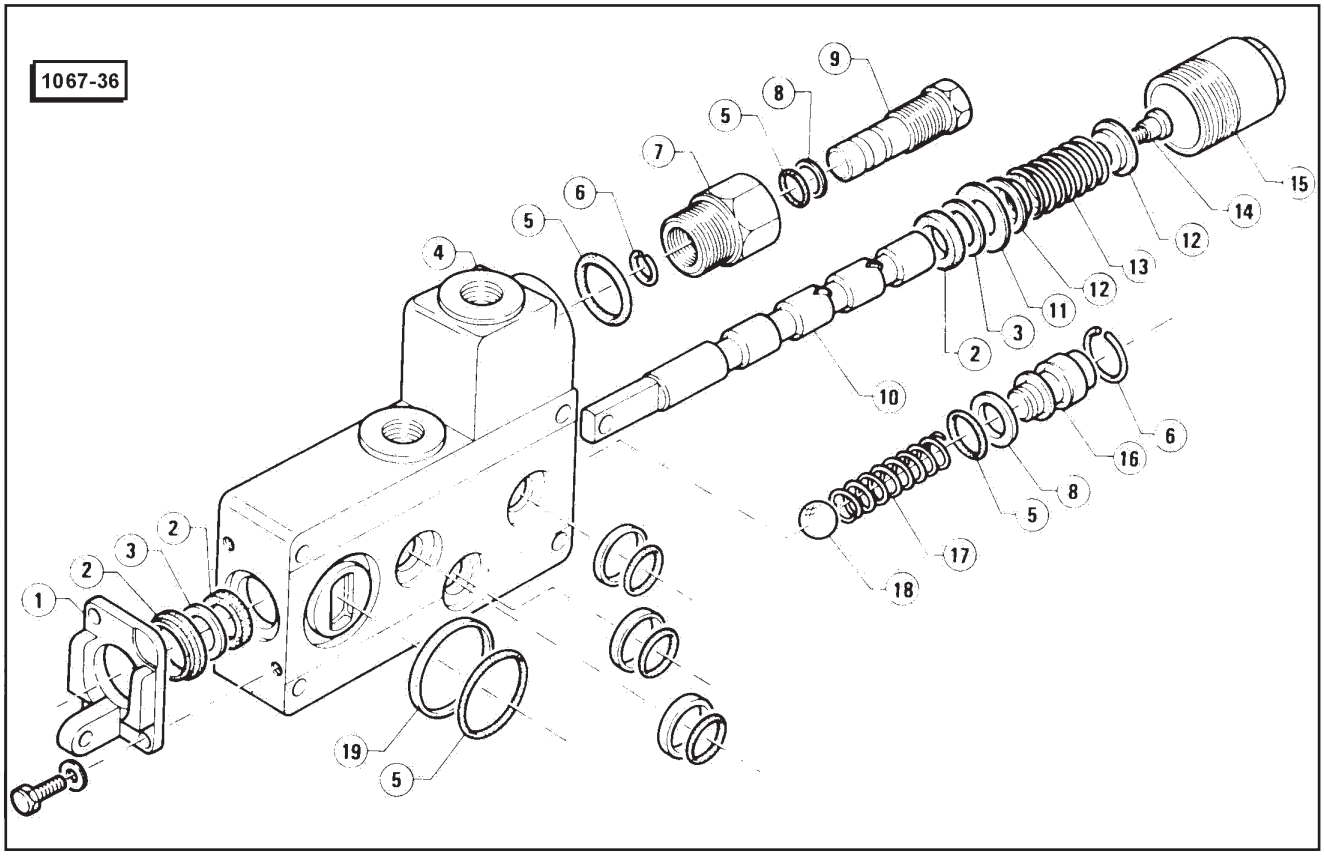


1 - Split pin
2 - Fittings
3 - Washer
4 - Pivot
5 - Connecting link

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SIMPLE/DOUBLE EFFECT DISTRIBUTOR

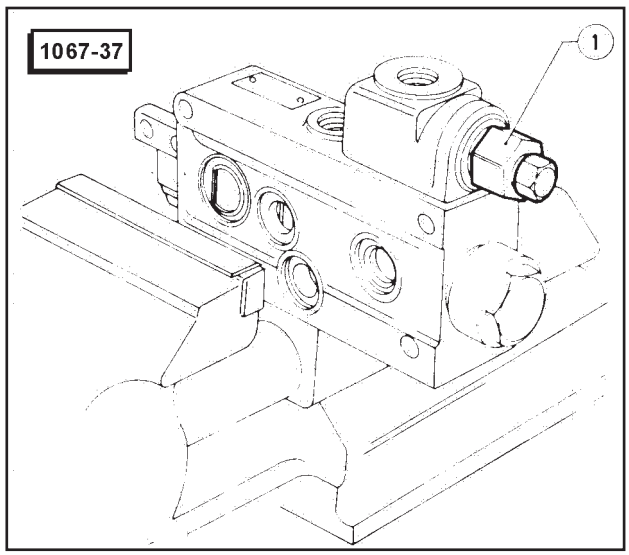


1 - Support
2 - Oil guard ring
3 - Teflon ring
4 - Distributor casing
5 - O-ring
6 - Retaining ring
7 - Fitting
8 - Teflon ring
9 - Transformation screw for simple/ double effect
10 - Distributor shaft
11 - Shovel ring
12 - Bell socket
13 - Spring
14 - Spring fixing screw
15 - Cap
16 - Non return valve
17 - Spring
18 - Non return ball valve
19 - Teflon ring

DISASSEMBLY

Single/double effect device

1. Fix distributors into clamp with protective jaw. Unscrew the fitting **1** and remove it together with O-ring.

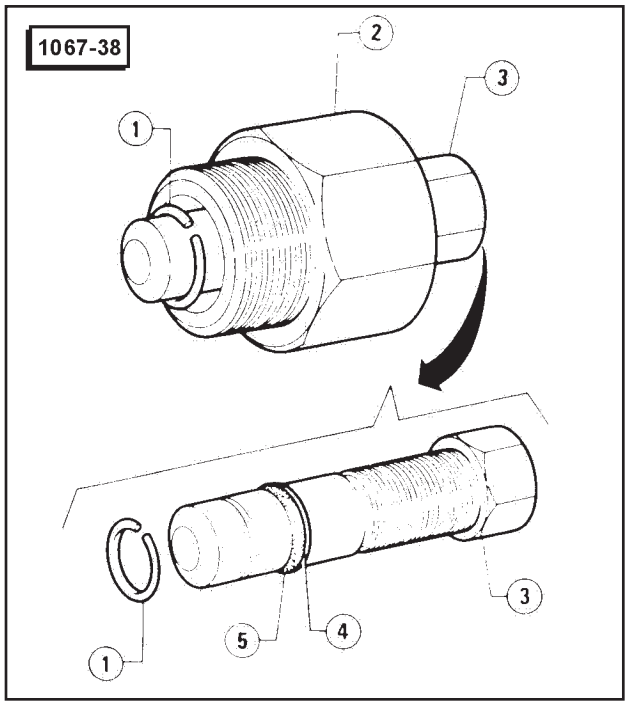


1 - Fitting

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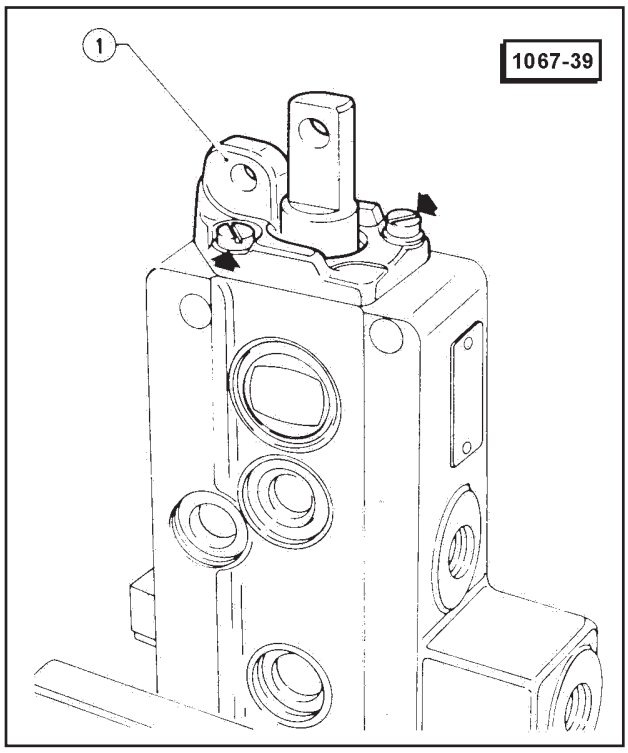
2. If necessary remove the retaining ring **1**, undo the screws **3** and replace the O-ring **5** and the teflon ring **4**.



1 - Retaining ring
2 - Fitting
3 - Simple/double effect transformation screw
4 - Teflon ring
5 - O-ring

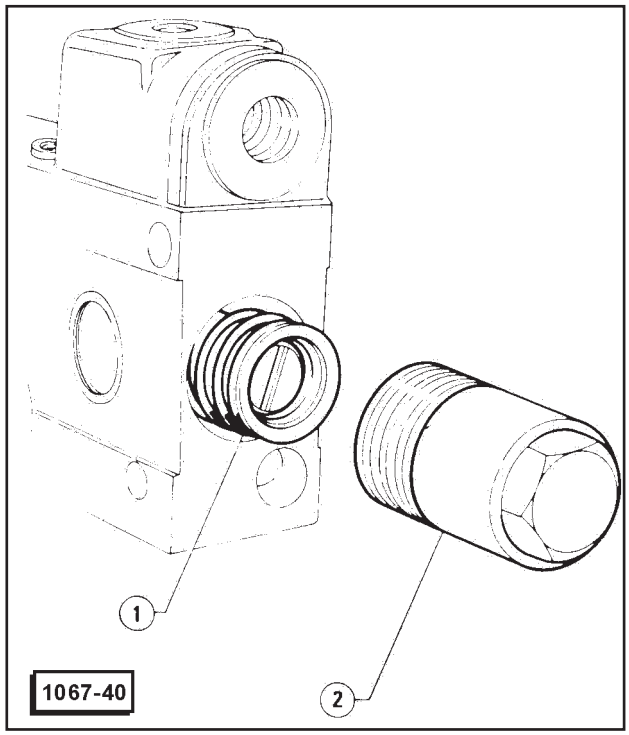
Distributor shaft

1. Unscrew the two clamp screws of the support **1**, remove the support and the oil guard ring.



1 - Support

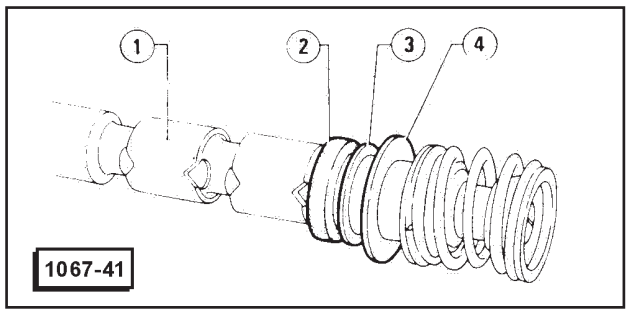
2. Unscrew the cap **2** then slip off the distributor shaft complete with spring.



1 - Distributor shaft and spring group
2 - Cap

3. Slip off the oil guard ring, the teflon ring and the shoulder ring **4** from the distributor shaft.

CAUTION
Operate with caution so as not to damage the distributor shaft.



1 - Distributor shaft
2 - Oil guard ring
3 - Teflon ring
4 - Shoulder ring

4. Only when absolutely necessary, remove the distributor shaft spring as follows.

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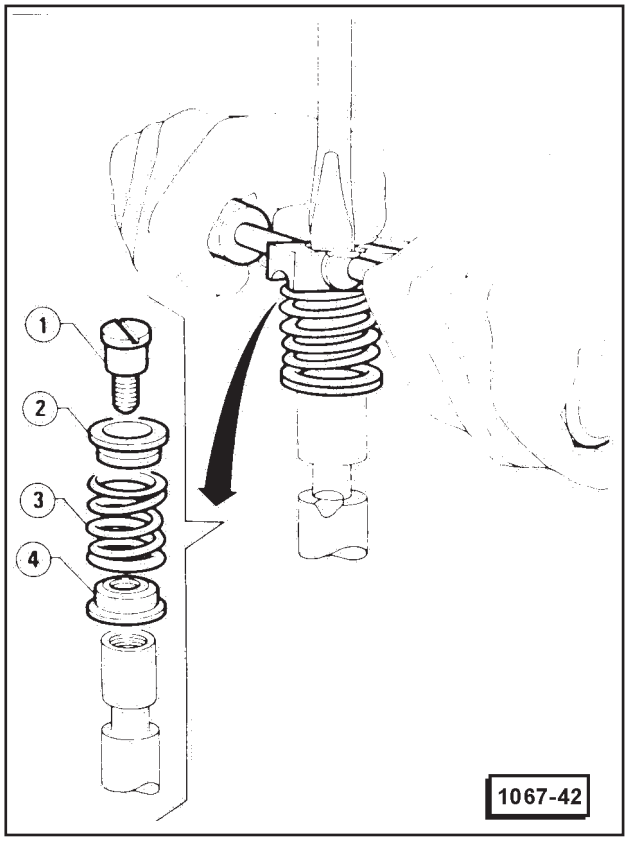
WARNING
The operation should be carried out only when absolutely necessary as the spring clamp screw is fixed to the specified torque with sealer and for this reason the operation can be difficult.

(1) Fix the end of the distributor shaft onto the clamp.

WARNING
So as not to provocate bending stress to the distributor shaft, it is advisable to insert it into the distributor casing.

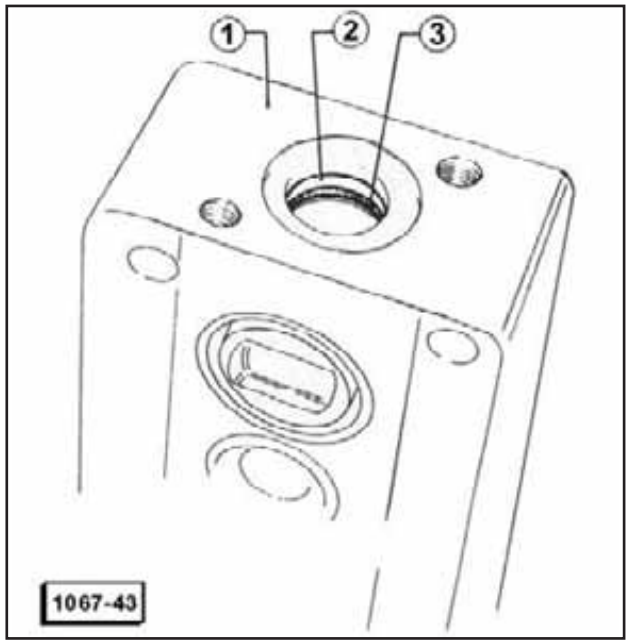
(2) With the suitable implement compress the spring **3** in order to remove the bell **2** of the screw **1.**
(3) Loosen screw **1**; release the spring gradually and then remove it.

WARNING
It is advisable to heat the distributor shaft to approximately 150°C (302°F) before loosening the screw so as to eliminate the sealer action.



1 - Screw
2 - Outside bell
3 - Spring
4 - Inside bell

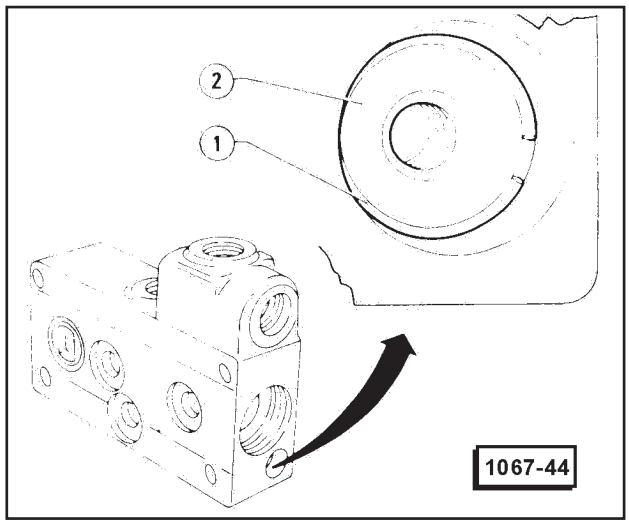
5. It necessary remove teflon ring **2** and the oil guard **3** from the distributor casing **1**.



1 - Distributor casing
2 - Teflon ring
3 - Oil guard ring

Non return valve

1. Push the valve **2** to the inside and remove the retaining ring **1**.

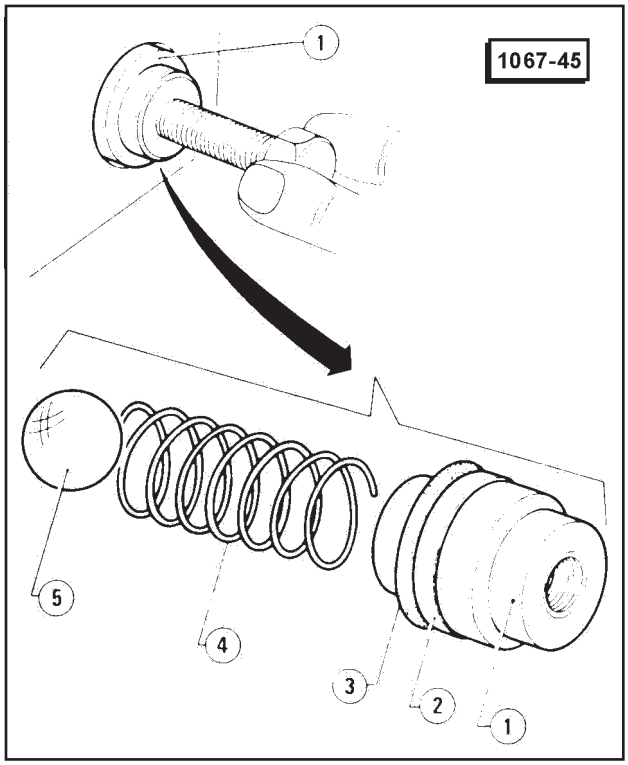


1 - Retaining ring
2 - Non return valve

2. Screw a threaded screw M5, onto the valve **1** and take off the valve from the distributor. Remove spring 4 and the ball **5** from the seat.
3. Remove the O-ring **3** and the teflon ring **2** from the valve **1.**

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1 - Non return valve
2 - Teflon ring
3 - O-ring
5 - Ball
5 - Sphère

CHECKS AND VERIFICATIONS

1. Accurately clean the components and the seats of the distributor.
2. Check the distributor shaft and working seat are not scratched or show signs of excessive wear.

Check also that the shaft slides easily into the distributor.

REASSEMBLY

Proceed with the remounting working in the reverse order, taking note of the following instructions.
— Degrease the threads of the caps and fittings with solvant.
— Apply recommended sealer to the threads of the caps.
— Replace all the copper gaskets and all the seal rings.
— Tighten to the recommended torque the following components.

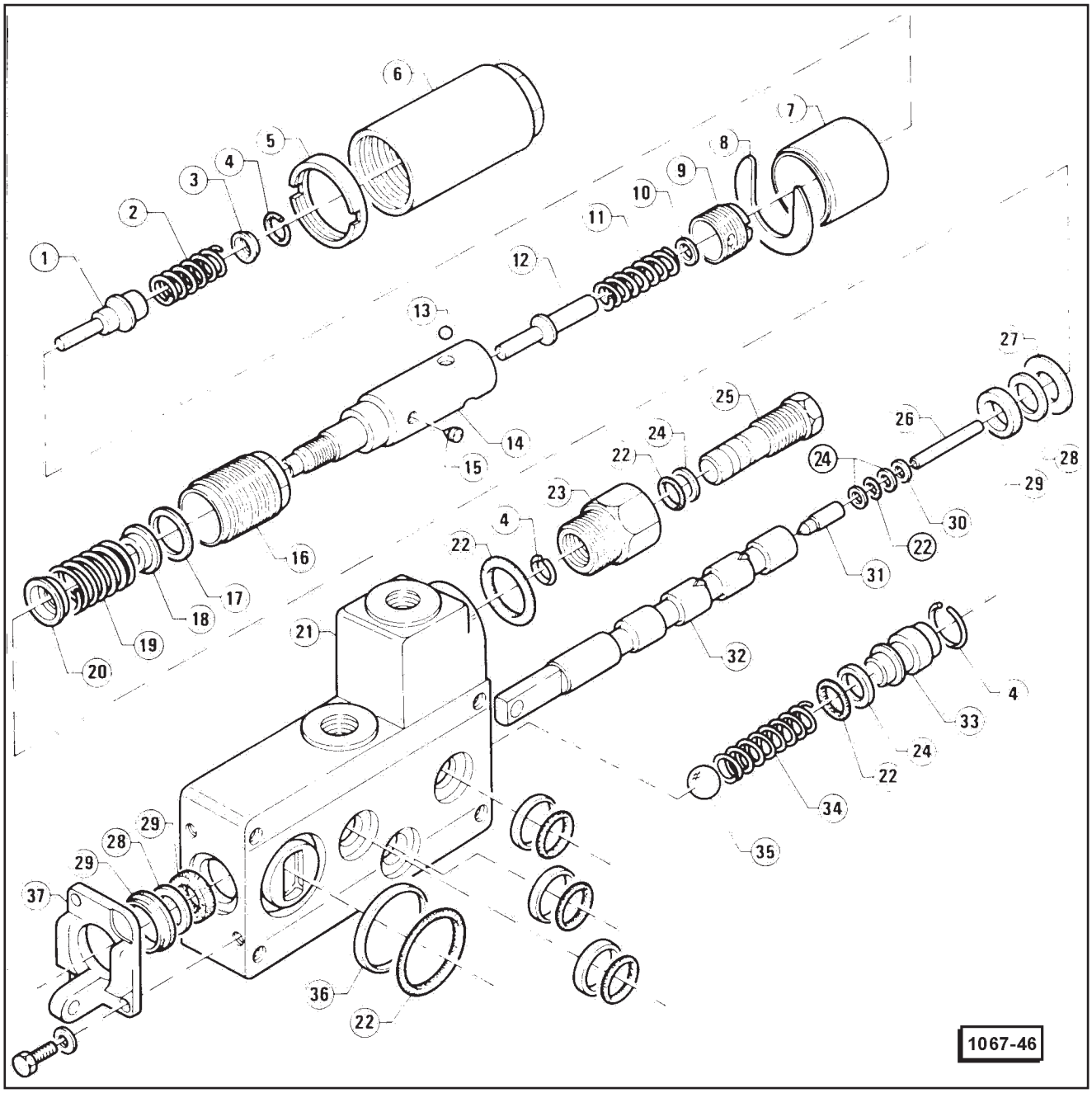
Tightening torque
Clamp screw spring to the distributor shaft
16 ÷ 20 Nm
(1,5 ÷ 2 - kgm; 10.85 to 14.46 ft lb)

Distributor rear end cap
35 ÷ 50 Nm
(3,5 ÷ 5 kgm; 25.31 to 36.15 ft lb)

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SIMPLE/DOUBLE EFFECT DISTRIBUTOR WITH AUTOMATIC CENTERING (KICK-OUT EFFECT)



1 - Pin
2 - Spring
3 - Washer
4 - Retaining ring
5 - Ring nut
6 - Cap
7 - Outside bush
8 - Shim adjustment
9 - Inside cap
10 - Shim ring
11 - Spring
12 - Pin
13 - Ball
14 - Threaded bush
15 - Built-in hexagonal headless screw
16 - Threaded coupling
17 - Shim adjustment ring
18 - Outside bell
19 - Spring
20 - Inside bell
21 - Distributor body
22 - O-ring
23 - Fitting
24 - Teflon ring
25 - Single/double effect transformation screw
26 - Push rod
27 - Shoulder ring
28 - Teflon ring
29 - Oil guard ring
30 - Shoulder ring
31 - Pin valve
32 - Distributor shaft
33 - Non return valve
34 - Spring
35 - Non return ball valve
36 - Teflon ring
37 - Support

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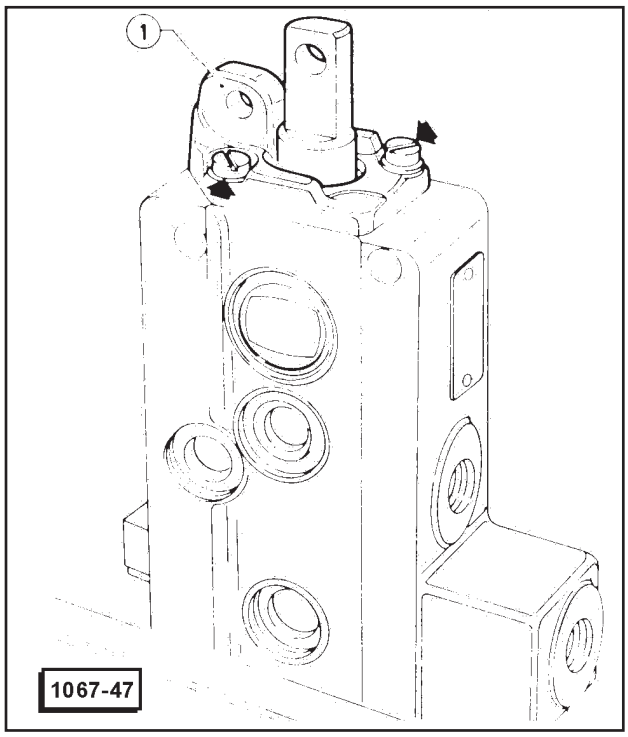
DISMOUNTING

Single/double effect device

For the dismounting refer to: Distributor Single/double Effect - Dismounting - Single/double Effect Device.

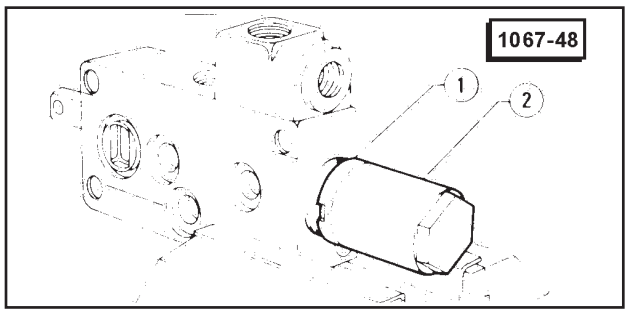
Distributor shaft

1. Fix the distributor on a clamp with protective jaw, unloosen the two clamping screws of the support **1** remove the support and oil guard ring beneath.



1 - Support

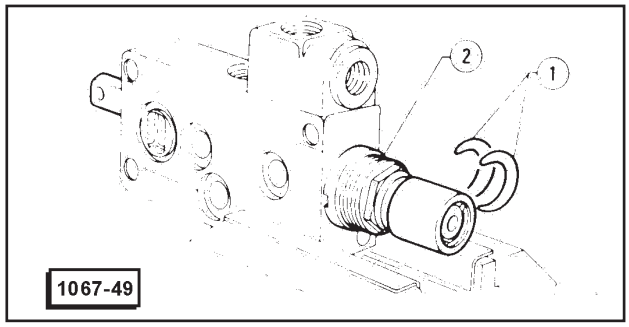
2. Loosen the ring nut **1**, then unscrew the cap **2**.



1 - Ring nut
2 - Cap

3. Recover the shim adjustment **1**, loosen the threaded coupling **2** and take off from the distributor body the shaft, complete with outer devices.

WARNING
Operate with caution so as not to damage the distributor shaft.



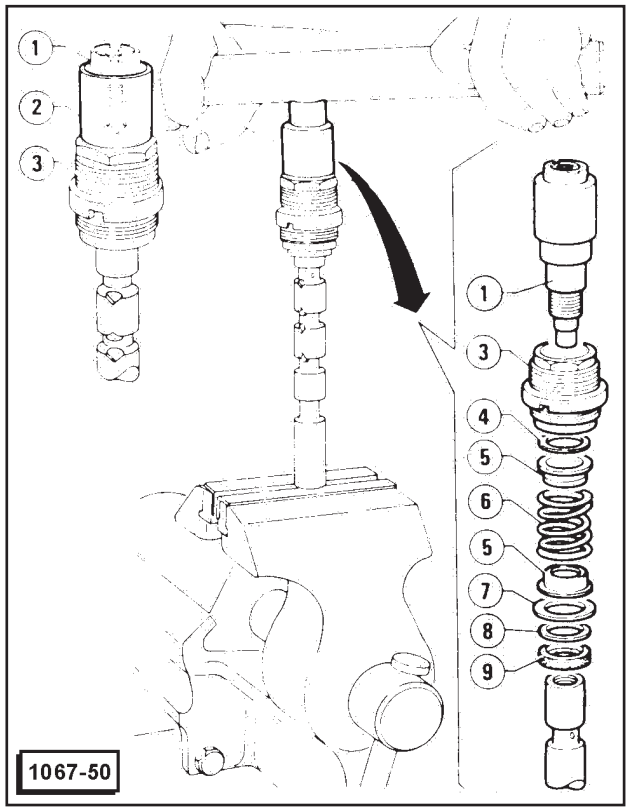
1 - Shim adjustments
2 - Threaded coupling

4. Fix the end of the distributor shaft onto the clamp, push the outside bush **2** towards the threaded coupling **3** so as to reach the notching of the threaded bush **1**.

CAUTION
In order not to provocate bending stress on the distributor shaft it is advised to insert it into the distributor casing.

5. Unscrew and remove the bush **1** complete with outside bush, and recover all the components indicated in the diagram.

WARNING
Unscrew the bush with caution as the spring is loaded.

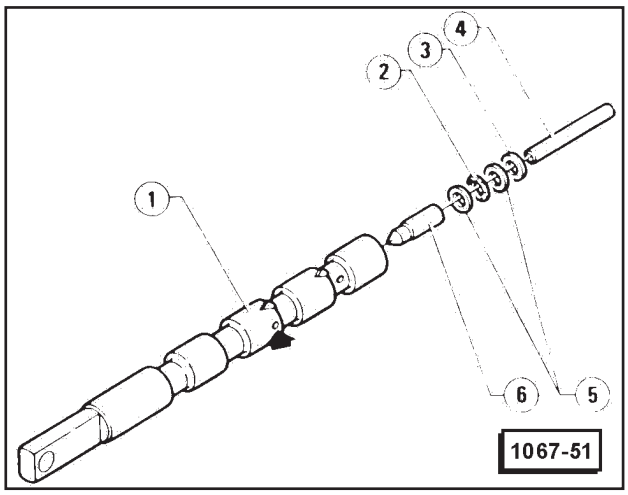


1 - Threaded bush
2 - Outside bush
3 - Threaded coupling
4 - Shim adjustment ring
5 - Bells
6 - Spring
7 - Shoulder ring
8 - Teflon ring
9 - Oil guard ring

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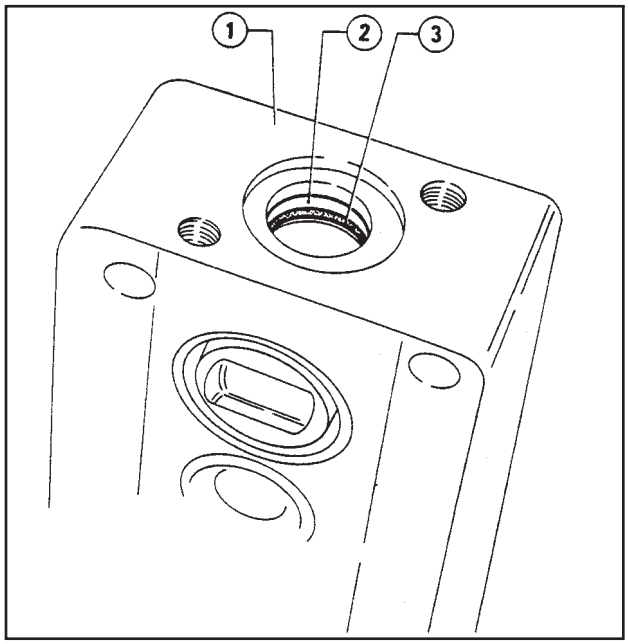
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6. Blow into the hole indicated by the arrow, until valve **6** and the push rod **4** complete with seal ring, slips off the distributor shaft. Then slip the shoulder rings **3**, two teflon rings **5** and the O-ring **2** off the push rod **4**.



1 - Distributor shaft
2 - O-ring
3 - Shoulder ring
4 - Push rod
5 - Teflon ring
6 - Pin valve

7. If necessary remove the teflon ring **2**; oil guard ring 3 from the distributor casing **1**.

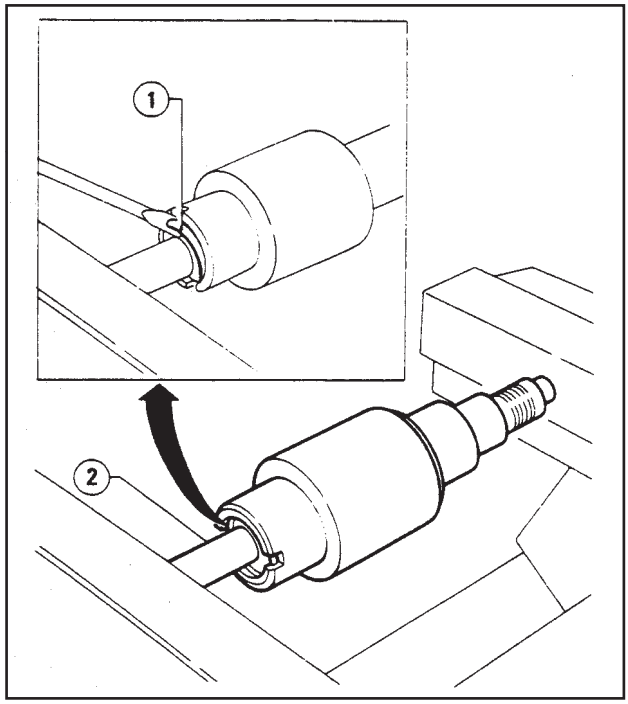


1 - Distributor casing
2 - Teflon ring
3 - Oil guard ring

Automatic centering device

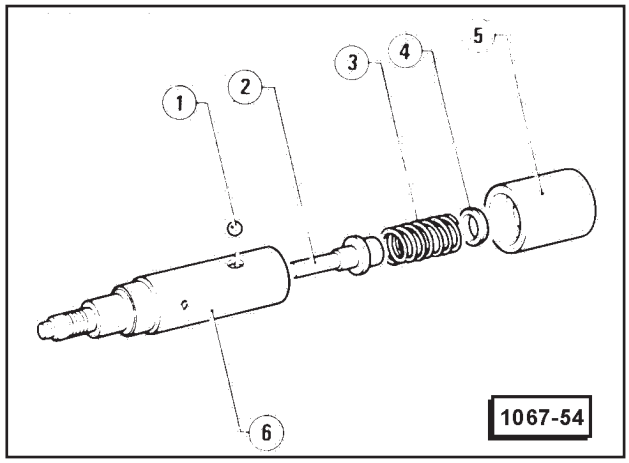
1. Fix the device onto the clamp with protective jaws axially using a suitable pin **2**. Using the clamp jaws in such a way as to load the spring on the inside of the device in order to remove the retaining ring **1**.

CAUTION
Do not excessively force the pin 2 so as not to damage the internal components of the device.



1 - Retaining ring
2 - Pin

2. Slowly remove the clamp jaws in order to gradually unload the spring of the device and remove from the inside: the washer **4** the spring **3** the pin **2,** then slip off the bush **5** and recover the three balls **1.**

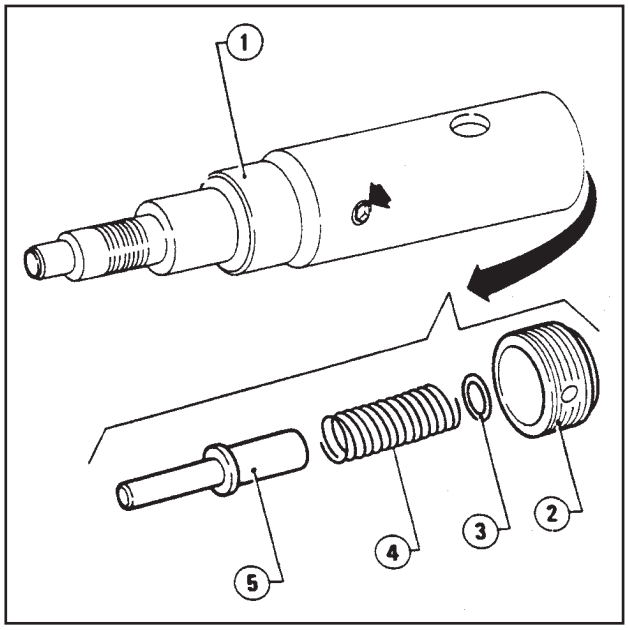


1 - Ball
2 - Pin
3 - Spring
4 - Washer
5 - Outside bush
6 - Threaded bush

3. Loosen the headless screw shown by the arrow in the diagram then unscrew the cap **2** end slip off the shim adjustment ring **3** the spring **4** and the pin **5**.

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1 - Threaded pin
2 - Inside cap
3 - Shim ring
4 - Spring
5 - Pin

Non return valve

For the dismounting refer to: Single/ double Effect Distributors - Dismounting - Non Return Valve.

CHECKS AND VERIFICATIONS

1. Accurately clean the components of the distributor and relative seats.
2. Check that the distributor shaft and relative work seat are not scratched or show signs of excessive wear. Also check that the shaft moves freely in the distributor.

REASSEMBLY

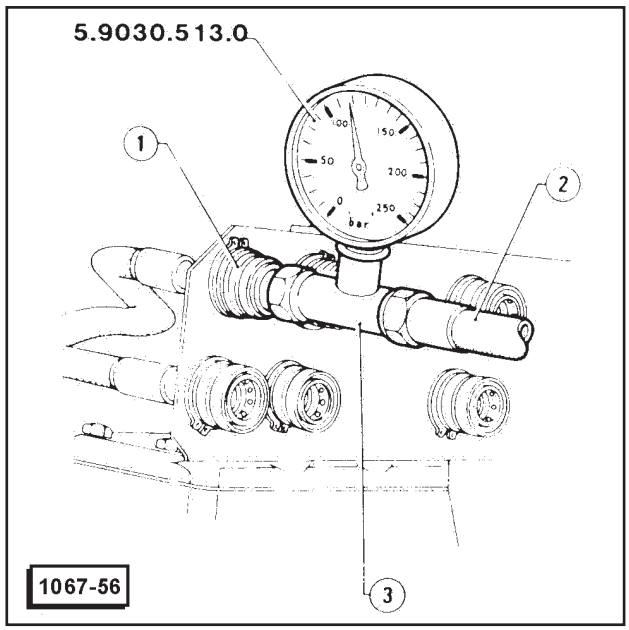
Remount using the reverse order to that of the dismounting following the instructions given below:
— Clean with solvents the cap threads and fittings.
— Apply the recommended sealer to the cap threads.
— Change all the copper gaskets and seal rings.
— With reference to the diagram page **15** proceed with the remounting of cap **9** in the bush **14**, turn cap **9** until the screw **15** coincides with the hole on the bush **14**; then tighten screw **15**.
— Tighten to recommended torque the following components.

Tightening torque
Threaded bush which clamps spring to the distributor shaft
15 ÷ 20 Nm
(1,5 ÷ 2 kgm; 10.85 to 14.46 ft lb)

Cap on the rear of distributor
35 ÷ 50 Nm
(3,5 ÷ 5 kgm; 25.31 to 36.15 ft lb)

CHECKS AND ADJUSTMENT OF THE AUTOMATIC CENTERING PRESSURE CALIBRATOR DEVICE

1. Fit a suitable T fitting between the quick coupling **1** and the control pipe **2** to be examined.
2. Apply the gauge 5.9030.513.0 to the T fitting.



1 - Distributor quick coupling with automatic centering
2 - Implement control pipe
3 - T fitting

3. Start the engine and insert the parking brake and action the distributor with the automatic centering device.
4. Observe the gauge and lower the pressure of the gauge when the automatic centering device interrupts the flow of oil to the implement. The pressure released in this way corresponds to the calibration value of the device.
5. Should the calibrating value not correspond to the recommended value, proceed with the adjustment as follows.

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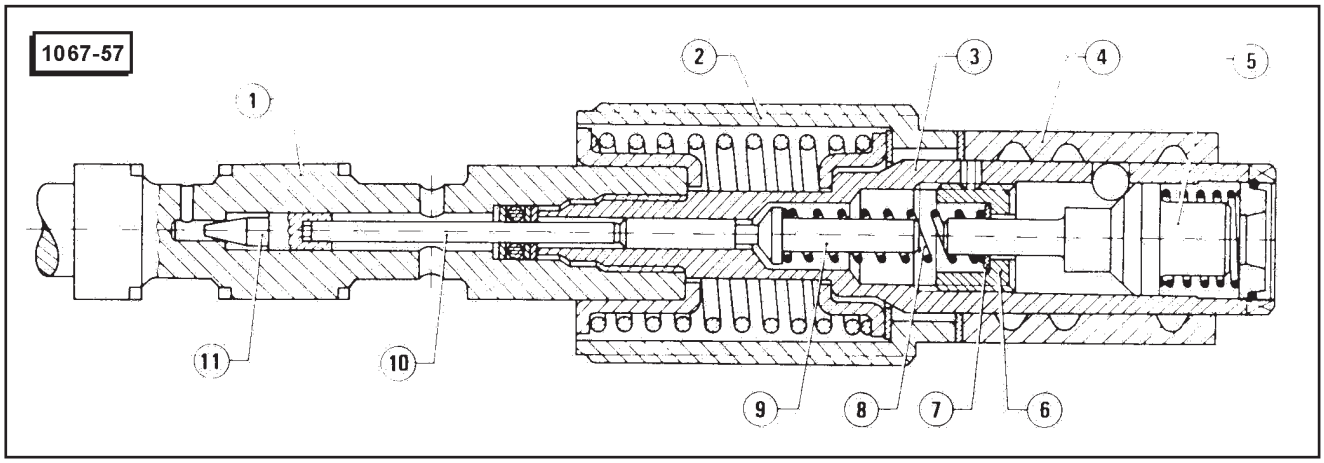
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(1) Remove the distributor from the vehicle (refer to; Removal) and proceed with the dismounting (refer to: Dismounting).
(2) Referring to the diagram, after having dismantled the entire device, add or remove the shim rings **7** to change the calibrator pressure of the device.

NOTE
Adding a shim ring the same thickness as that already mounted you obtain an increase of approximately

10 bar (145 p.s.i.) of the calibrated pressure; and vice-versa, by removing the shim ring there will be a reduction of the adjusting pressure of approximately 10 bar (145 p.s.i.).

(3) Proceed with the reassembly and installation of the distributor and check the calibrating pressure again.

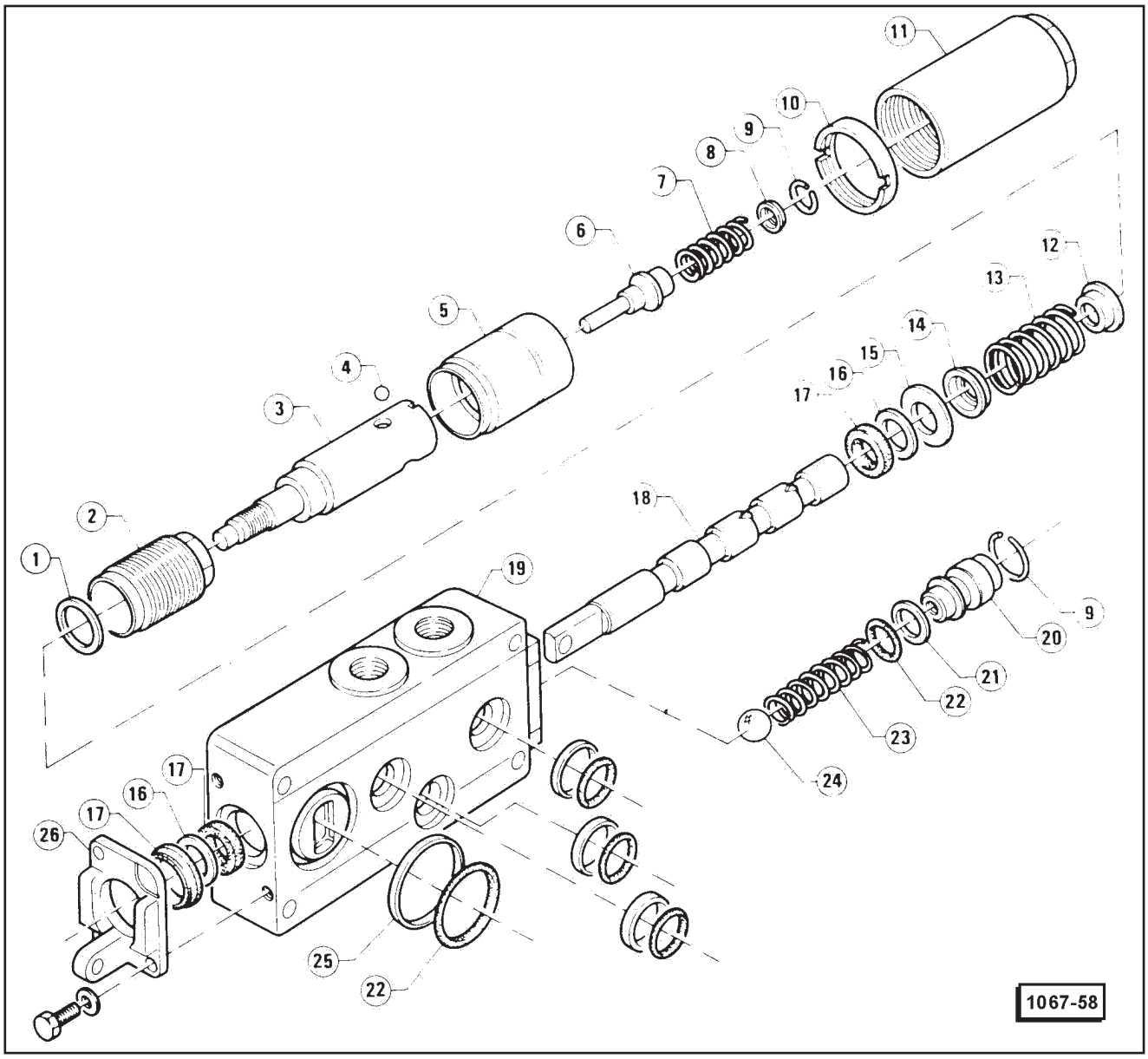


1 - Distributor shaft
2 - Threaded coupling
3 - Threaded bush
4 - Outside bush
5 - Pin
6 - Inside cap
7 - Shim ring
8 - Spring
9 - Pin
10 - Push rod
11 - Pin valve

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DOUBLE EFFECT DISTRIBUTOR WITH FLOAT POSITION



1 - Shim ring
2 - Fitting
3 - Threaded bush
4 - Ball
5 - Outside bush
6 - Pin
7 - Spring
8 - Washer
9 - Retaining ring
10 - Ring nut
11 - Cap
12 - Outside bell
13 - Spring
14 - Inside bell
15 - Shim ring
16 - Teflon ring
17 - Oil guard ring
18 - Distributor shaft
19 - Distributor casing
20 - Non return valve
21 - Teflon ring
22 - O-ring
23 - Spring
24 - Non return ball valve
25 - Teflon ring
26 - Support

DISASSEMBLY

With reference to the previous diagram carry out disassembly as described in “Simple/double Effect Distributors with Automatic Centering” noting the following differences:
— The distributor is not equipped for the transformation to a single effect, therefore it does not have the relative transformation screws.
— In the distributor shaft **18** there is no pin valve.

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— The threaded bush **3** is not equipped with the automatic centering device.
— There is no shim adjustment at **C** between outside bush **5** and fitting **2.**

CHECKS AND VERIFICATIONS

Refer to: Simple/double Effect Distributors - Checks and Verifications.

REASSEMBLY

Proceed to remount using the reverse method to that of the dismounting taking note of the following recommendations:
— Clean with suitable solvant the cap threads and fittings.
— Apply recommended sealer on the cap threads. Replace all the copper gaskets and the seal rings.
— Tighten to the recommended torque the following components:

Tightening torque
Threaded bush which clamps spring to distributor shaft
15 ÷ 20 Nm
(1,5 ÷ 2 kgm; 10.85 to 14.46 ft lb)

Cap on the rear end of distributor
35 ÷ 50 Nm
(1,5 ÷ 2 kgm; 25.31 to 36.15 ft lb)

— Referring to diagram on page 400, remount the outside bush **5** with the outside notching towards the cap **11.**

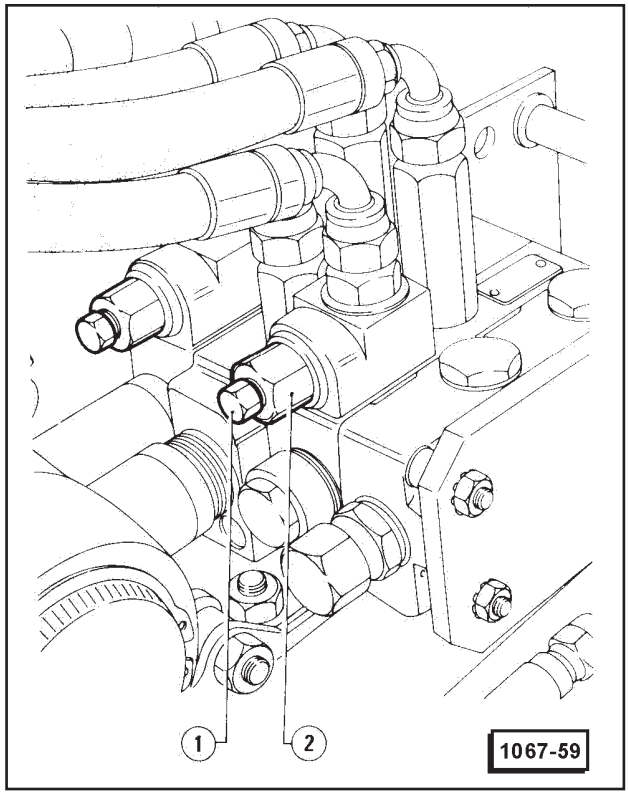
INSTALLATION

Proceed to reassemble the distributors and safety valve using the reverse order to that of the disassembly taking note of the following instructions.

— Replace the teflon rings and O-rings on the surface of the distributor couplings and the safety valve.
— Clean with recommended solvant the fitting threads.
— Apply recommended sealer to the fitting threads on the distributor.
— Tighten the fittings on the distributor inserting the new copper gaskets.
— When the reassembly is completed, start the engine and the distributor so as to check the correct functioning and the absence of leaks.
— Control and eventually refill the gear oil level.

TRANSFORMATION OF DISTRIBUTOR FROM DOUBLE TO SINGLE EFFECT

For certain requirements it is possible to change the distributor from double effect to single effect. To carry out the transformation from double to single effect it is necessary to unscrew the screw **1**; by 4 to 5 turns, keeping the fitting blocked **2**. And vice-versa by totally unscrewing to double effect.

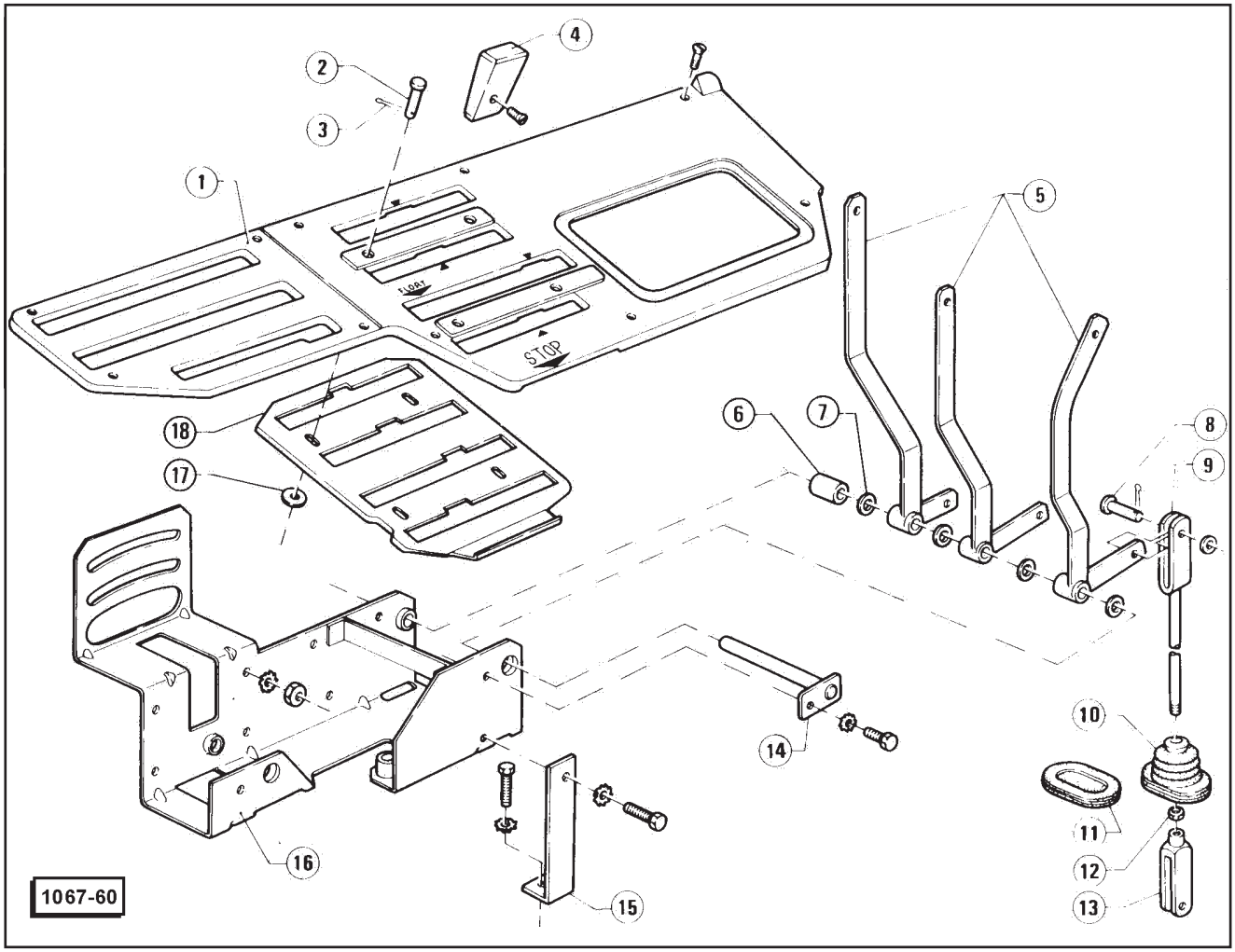


1 - Transformation screw - single/double effect
2 - Fitting

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DISTRIBUTOR CONTROL LEVER



1 - Panel
2 - Pin
3 - Split pin
4 - Knob
5 - Distributor control lever
6 - Spacer
(or lever for 4 distributor version)
7 - Washer
8 - Pin
9 - Rod
10 - Rubber bellow
11 - Rubber cap
12 - Lock nut
13 - Fork
14 - Support lever pin
15 - Bracket
16 - Support
17 - Washer
18 - Lever lock plate

DISASSEMBLY

1. Remove the command panel and the right wheelhouse trim on the inside of the cabin (refer to: Cabin, Hoods and Mudguards - Internal Trim - Disassembly - Right Wheelhouse Trim).
2. Slip off from each lever, the split pin **3** and the washer **2** and remove the pins **4**.

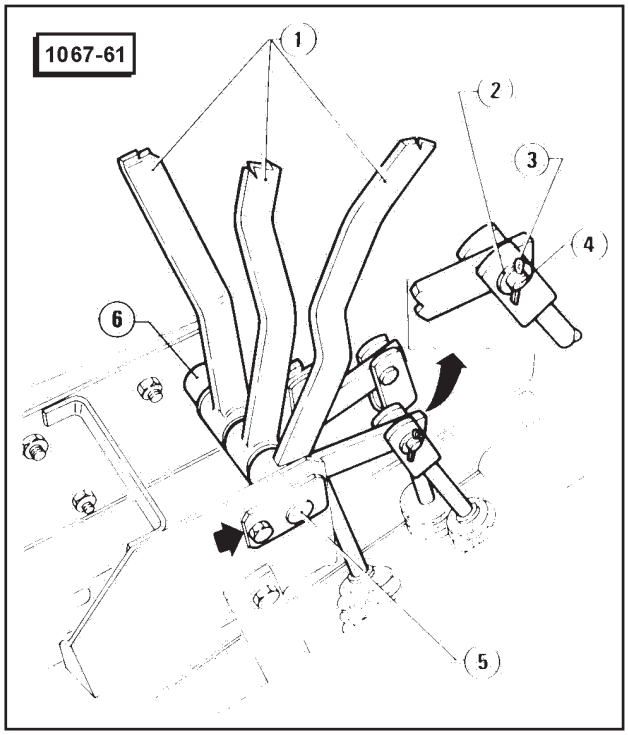
WARNING
It is advisable to mark the position of the lever before removing.

3. Unscrew the clamping screw of the pin **5**, slip off the pin and collect the spacer **6**, the lever **1** and the washers.

NOTE
For versions with four distributors the spacer **6** is substituted by a fourth command lever.

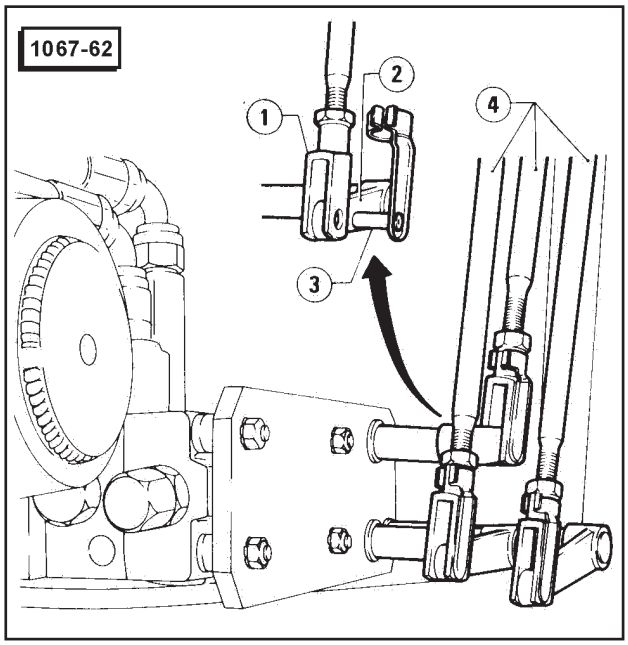
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1 - Distributor control lever
2 - Washer
3 - Split pin
4 - Pin
5 - Lever support pin
6 - Spacer

4. Working behind the vehicle, unhook the small fastening springs of the pins **3** joining the fork **1** and the lever **2**. Slip off the pins and disconnect the lever.
5. Remove the rods **4** together with the rubber bellows.



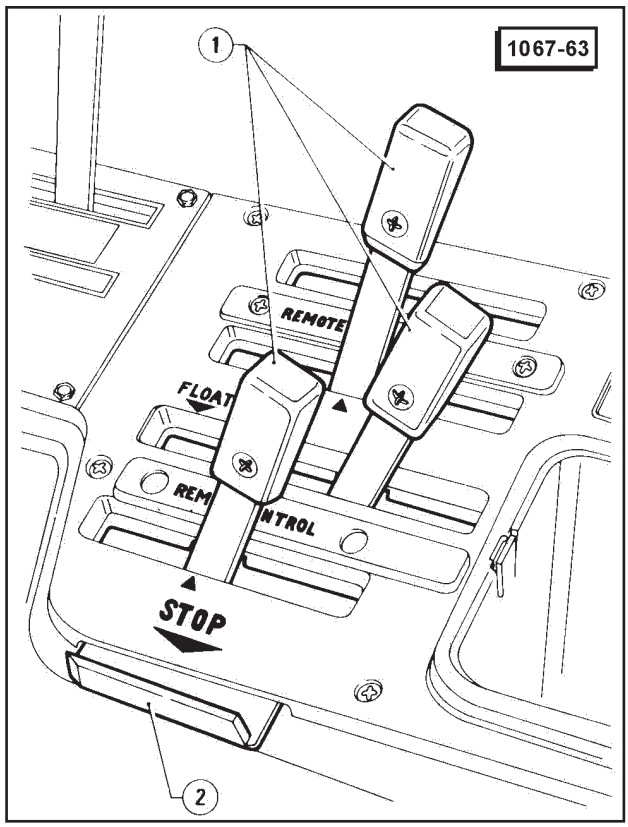
1 - Fork
2 - Distributor control lever
3 - Pin with bracket
4 - Rods

REASSEMBLY

Reassemble using the reverse order to that of the disassembly and observing the following instructions:
— Lubricate the lever joints and control rod.
— Reassembly completed, check that the control lever moves freely.
— If necessary carry out the adjustment of the rod length (refer to: Adjustment of Control Rod Length).

CONTROL ROD LENGTH ADJUSTMENT

1. Start the distributor control lever and check that the "neutral" position of the distributor coincides with the central position of the control lever (shown on the dial).
2. Having started the adjustment, move the lever **1** to the central position and block them, removing the lever lock plate **2.**

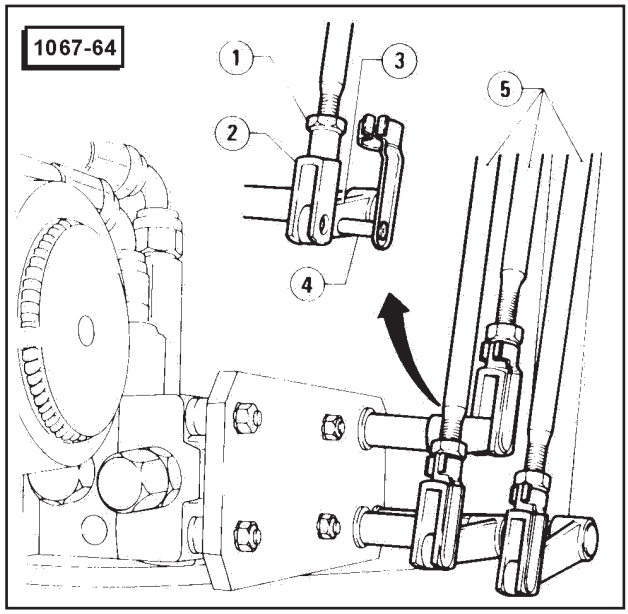


1 - Distributor control lever
2 - Lever lock plate

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3. Separate the forks **2** from the lever **3**; slip off the connecting pin **4**.
4. Check that the levers **3** are in a neutral (central position).
5. Loosen the lock nu**t 1** and tighten or loosen the fork **2** until the hole is in line with the hole on the lever **3**, lock the lock nut **1** and rejoin the fork to the lever by means of the pin **4**.
6. After adjusting check that the levers move smoothly.



1 - Lock nut
2 - Fork
3 - Distributor control lever
4 - Bracket with pin
5 - Rod

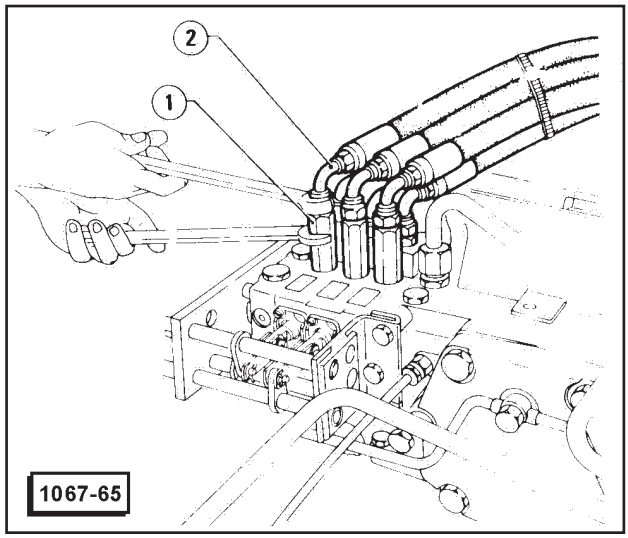
PIPES AND FITTINGS

CHECKS AND VERIFICATIONS

1. Check that the connecting pipes from the distributor to the quick coupling are not damaged in any way or leaking.
Replace any damaged pipes.
2. Check that the unions are not oxidized or deteriorated in any way.
3. If there is an oil leak from the fittings, close off the fitting and clean the area. If the leak persists, replace the gaskets (for fittings that have them) or the complete piping.

REPLACEMENT

When removing and replacing pipes follow the given recommendations.
1. To avoid the entering of foreign bodies in the circuit, clean the pipe joint area you are removing and then close off the fitting.
2. Loosen the fitting **2** of the pipe, being careful to keep locked with a contrast spanner the fitting **1** on the distributor.



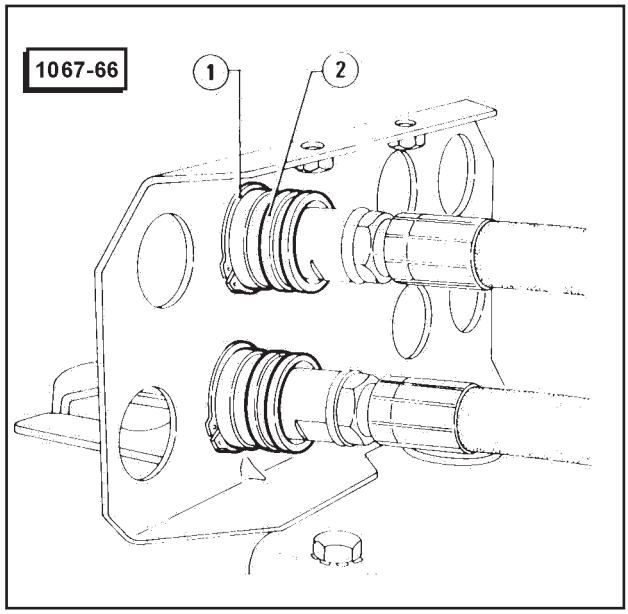
1 - Fitting on the distributor
2 - Pipe fitting

3. If necessary remove the quick coupling **2**, and slip off the Seeger ring.

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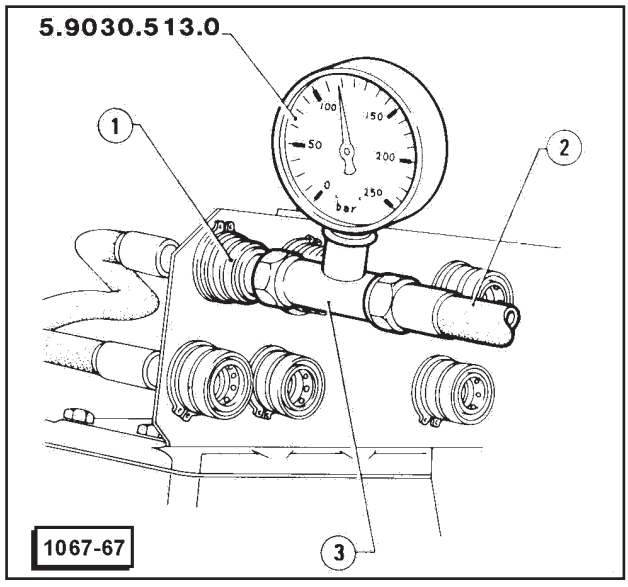
4. On remounting, position the pipes in such a way so that they do not get tangled.
5. Apply recommended sealer to the threads.
6. Mount the new gaskets where necessary and close-off the unions.
7. Check and eventually top-up the oil level.



1 - Seeger ring
2 - Quick coupling

WORKING PRESSURE CHECK OF THE IMPLEMENT

To obtain the working pressure of an implement joined to the auxiliary hydraulic distributor, operate as follows:
1. Join a suitable T fitting between the quick coupling **1** and the control pipe **2** of the implement to be examined.
2. Apply the gauge 5.9030.513.0 to the T fitting.
3. Start the engine and for safety insert the parking brake, and put into action the distributor which controls the implement.
4. The gauge reading provides the working pressure in the implement (and in the circuit).



1 - Quick coupling
2 - Implement control pipe
3 - T fitting

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TECHNICAL DATA AND SPECIFICATIONS

TECHNICAL DATA

Supplementary hydraulic system

Details			Model		
			110	130	150
Pump	Type		BOSCH HY/ZFS 11/22,5 L 214		
	Capacity (at maximum engine speed	l /1	64		
Hydraulic distributor	Make		BOSCH		
	Type		SB 2 and 6 way (optional 8 way) double effect with a one way transformable to single effect.		
Oil filter	Make		FIAMM		
	Type		FT 4952 IN		
	Quantity		2		
	Filtration grade	µ	25		
	Filtration area	cm	7550 x 2		

CHECKS AND ADJUSTMENTS

Calibrator pressure

Measurement unit: bar

Pressure	Model		
	110	130	150
Safety valve calibration pressure	180		
Automatic centering device calibration pressure (kick-out effect)	130		

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TIGHTENING TORQUES

Measurement unit: Nm (kgm)

Details	Model		
	110	130	150
Hexagonal built-in cap on the front side of safety valve	24 ÷ 27 (2,4 ÷ 2,7)		
Oistributor shaft spring fixing screw	15 ÷ 20 (1,5 ÷ 2)		
Threaded bush for spring fixing to the distributor shaft	15 ÷ 20 (1,5 ÷ 2)		
Cap and locknut on the rear end of safety valve	50 ÷ 55 (5 ÷ 5,5)		
Cap on rear end of distributor	35 ÷ 50 - (3,5 ÷ 5)		

Note
All the threads must be degreased and cleaned before tightening

GENERAL SPECIFICATIONS

Fluids and lubricants

Application	Type	Denomination	Model	Q.ty
Gear box	OIL	AGIP ROTRA THT (API GL - 3)	110-130-150	76l
Lifting housing (1)				20 l (1)
Control lever joint	GREASE	GREASE 30		-

(1) Only whilst working 20 l (4.4 imp.gall) of oil accumulates inside the lifting housing; with the engine stopped, all the oil gradually enters the gear box.

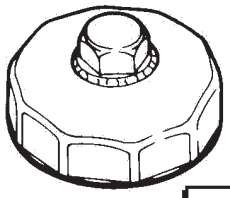
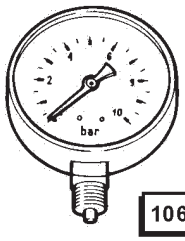
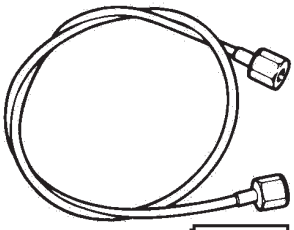
Sealants and fixatives

Application	Type	Denomination	Model	Q.ty
Distributor cap and fitting threads	Fixative	LOCTITE 971		

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SPECIAL TOOLS

Tool No.	Tool Name	Page Ref.
5. 9030. 512. 0	Hydraulic circuit oil filter spanner  1067-68	
5.9030. 513. 0	Gauge 0-250 bar in glycerine bath  1067-69	
5.9030.517.0	Flexible pipe for hydraulic circuit  1067-70	

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TROUBLESHOOTING AND CORRECTIONS

Condition	Probable cause	Corrective Action
The pumps attached to the hydraulic circuit are not functioning correctly	Implement incorrect for that particular hydraulic circuit	Avoid using incorrect hydraulic parts.
	Defect in hydraulic lifting circuit:	Refer to lifting Unit
	Incorrect quantity and/or quality of oil in circuit	Replace or top up oil level in the gear box
	Blocked oil filter	Replace
	Worn or defective oil pump	Overhaul and eventually replace
	Worn distributor shaft (with drawing on the inside)	Overhaul and/or replace the distributor
	Calibration of the safety valve incorrect	Control the calibrating pressure, if necessary proceed with adjustment
	Control lever registration incorrect	Adjust correctly
Excessively noisy (with vibrations of the pipe system)	Air present in the circuit	Check that the fittings have been tightened correctly and that the gaskets are efficient
	Interference of the pipes (visual check)	Move the piping so there is no contact with other components
Oil leak from the circuit	Loose pipe fittings	Tighten correctly
	Defective gaskets	Replace
	Damaged pipes	Replace
Incorrect functioning of the automatic centering device	Inside components of the device damaged or forced	Overhaul the automatic centering device; replace defective components if necessary.
The distributor control lever does not remain in gear	Incorrect adjustment of the control lever	Adjust correctly
	Automatic centering device defective or incorrectly adjusted	Overhaul the device

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