MODELS

FIAT-HITACHI

# D80

## HYDROSTATIC

## SERVICE MANUAL

ENGLISH

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Loads lifted by hydraulic jacks are always dangerous. Transfer load to appropriate blocking as a safety measure, before proceeding with service or maintenance work, according to local or national regulations.

- Steel cables are frayed after prolonged use; always wear appropriate protections (heavy gloves, goggles etc.).

- Handle all parts carefully. Keep hands and fingers away from structures, gears or moving parts. Use and wear always the appropriate protections

- Compressed air systems can have water deposits created by moisture condensation due to changes of atmospheric conditions. If required, discharge deposits, as instructed.

**STARTING**

- Do not run the engine in closed areas without proper ventilation to remove deadly exhaust fumes.

- Do not place head, body, limbs, feet, hands or fingers, near rotating fans or belts. Be especially alert near pusher fans.

- REMEMBER THAT STARTING FLUID IS FLAMMABLE. Follow recommendations printed on containers and in the Operation and Maintenance Manual.

- Containers must be stored in fresh, well ventilated places, out of reach of unauthorised persons. Follow strictly the instructions provided by the Manufacturer. DO NOT PUNCTURE OR BURN CONTAINERS.

**ENGINE**

- Loosen the radiator cap very slowly, to release pressure from the system, before removing it. All coolant level top-ups must be performed with engine OFF.

- Avoid that flammable materials touch exhaust parts. Should this be possible, provide the necessary protections.

- Do not run engine when refuelling and use care if the engine is hot due to the increased possibility of a fire if fuel is spilled.

- Never attempt to check or adjust fan belts when engine is running.

- Do not adjust engine fuel pump when machine is moving.

- Do not lubricate the machine with engine running.

- Do not run the engine with air intakes, door or protections open.

**ELECTRICAL SYSTEM**

- Always disconnect batteries and microprocessor prior to any intervention on machine or electrical system (cleaning, repair, maintenance).

- Should booster batteries be used, remember to connect both ends of the booster cables in the proper manner (+) with (+) and (-) with (-). Avoid short-circuits of the terminals. Follow thoroughly the instructions of this Manual.

- Before any intervention, make sure that the main switch is OFF.

- BATTERY GAS IS HIGHLY FLAMMABLE. Leave battery box open to improve ventilation when recharging batteries. Never check charge by placing metal objects across the posts. Keep sparks or open flames away from batteries. Do not smoke near battery to guard against the possibility of causing an explosion.

- Before any intervention, make sure that there are no fuel or electrolyte leakages; eliminate them before proceeding with further work. Do not charge batteries in closed areas: ensure enough ventilation to prevent the possibility of accidental explosions due to accumulation of gases generated during the recharging.

**HYDRAULIC SYSTEM**

- Fluid escaping under pressure from a very small hole can be almost invisible and can have sufficient force to penetrate the skin. Use a piece of cardboard or wood to search for suspected pressure leaks. DO NOT USE HANDS. If injured by escaping fluid, see a doctor at once. Serious infection or reaction can develop if proper medical treatment is not administered immediately.

- Stop the engine and release all pressures in the system before removing panels, housings, plugs or covers.

- In case pressures must be measured, use instruments of adequate capacity. Always follow the recommended procedures.

**TOOLS**

- Keep head, body, limbs, feet, fingers or hands away from bucket, blade or ripper when in raised position.

- Prior to any intervention, install all safety devices according to current rules and regulations. In case

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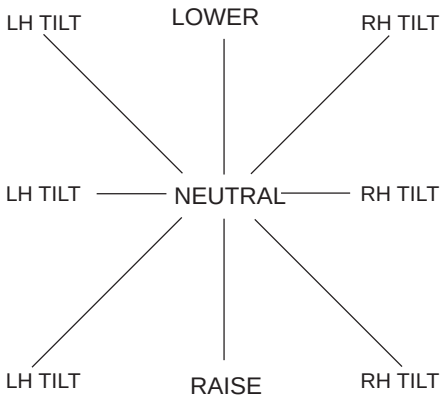
| | | | |
|---|---|---|---|
| **IMPLEMENTS HYDRAULIC SYSTEM** | LOWER | IMPLEMENTS HYDRAULIC PUMP | Type<br>Capacity at governed speed<br>Relief valve pressure |
| | | | Gear type<br>54 l/min - 11.8 gal/min<br>180 bar / 18000 kPa |
| | | MAIN CONTROL VALVE | Type<br>Specifications |
| | | | Three spools<br>Lower - raise<br>Blade left and right tilt control<br>Tilt blade control<br>Tandem circuit<br>Capacity 70l/min (nominal), safety valves on each circuit. |
| | | FRONT IMPLEMENT JOYSTICK | *Functions |
| | | |  |
| | | HYDRAULIC TANK | Type |
| | | | Box type |
| | | HYDRAULIC FILTERS | Return |
| | | | Out of tank, microfiber type and 25 micron filter capacity with by-pass (pressure cal. 0.3 bar). |
| | | LIFT CYLINDERS | Type<br>Cylinder bore<br>Piston stroke<br>Outside diameter of piston rod<br>Max distance between pins<br>Min distance between pins |
| | | | Double acting<br>80 mm / 3.14 in<br>423 mm / 16.6 in<br>45 mm / 1.77 in<br>1158 mm / 45.59 in<br>735 mm / 28.9 in |

* The angle has an electrical button and can be operated in any position.

## UNITS OF MEASURE

The units of measure of this Manual are those used by the International System and supersede those of the M.K.S.

**Force:** decanewton (daN) supersedes kilogram (kg)

**Pressure:** bar supersedes kg/sqcm

**Torque:** decanewton x meter (daNm) supersedes kgm

To convert units of measure, use this table:

| | multiply | by | to obtain |
|---|---|---|---|
| Force | Kg | .9807 | daN |
| Pressure | Kg/sqcm | .9807 | bar |
| Torques | Kg m | .9807 | daNm |

**NOTE** - For common repair use, the following correlations are considered valid:
Kg = daN; Kg/sqcm = bar; Kg m = daN m.

For the conversion of measure units from the International System into British System, please refer to the table below:

| | multiply | by | to obtain |
|---|---|---|---|
| Mass | Kg | 2.205 | lb |
| Length | mm | .03937 | in. |
| Pressure | bar | 14.5 | p.s.i. |
| Torque | daN m | 7.373 | lb.ft |
| Capacity | l/min | 0.2199<br>0.2641 | gal/min (UK)<br>gal/min (US) |

## CLASSIFICATION OF STANDARD PARTS FOR TORQUE DETERMINATION

**NOTE** - If in the different sections torque values are not specifically indicated, refer to “TIGHTENING TORQUES” after identifying exactly the part.

### WARNING

- Lubricate screws and nuts with engine oil up to 24 mm diameter; for larger diameters use tallow.
- Tolerance on tightening torques is ± 5%.
- Strength classes R80, R100, R120, must be considered as follows:

10.9 supersedes R 100<br>12.9 " R 120 } screws

10 supersedes R 80<br>12 supersedes R 100 } nuts

CDT = cadmium plated;
FOSF = phosphate plated;
ZNT = zinc plated.

## MEASURING EQUIPMENT

The following pressure gauges (damped design) and measuring devices should be available:

2 Pressure gauges up to 600 bar / 60000 kPa
HP measurements at measuring ports $M_B/M_A/G_A/G$*.

2 pressure gauges up to 40 bar / 4000 kPa
pilot pressure measurements at the measuring ports $X_1/X_2$ (control lines) and boost pressure measurements at measuring port G.

1 pressure gauge up to 10 bar / 1000 kPa
housing pressure measurements at port R of variable displacement pump and in oil motor drain line.

## SAFETY NOTES RDE 90 301 - 01

## FLUSHING

During commissioning of the installation we recommend a flushing run for the filtering of the main circuit.
If a flushing run is carried out, this must be undertaken under zero load prior to the actual function test and under normal circumstances should last an hour.
With the installation ready for operation two HP super-fine filters, mounted as shown in service lines A and B between the variable displacement pump and the oil motor, will ensure that a flushing run can be carried out in both directions without additional assembly work.
At the same time this ensures that the pump and motor are protected before the first run takes place.
The bore size of the flushing filter should correspond to that of the hydraulic installation. It should have a beta value of at least $ß_{30}$ = 100. The flushing filters should be fitted with a clogging indicator instead of a bypass valve.

## COMMISSIONING

Prior to start:
Has the tank been cleaned and flushed?
Have the lines been cleaned, are pipes free of tension and hoses correctly mounted?
Are all lines connected correctly as shown in the circuit diagram?
Fittings and flanges properly screwed up?
Are coupling or drive elements between prime mover and pump or motor and gearbox correctly mounted and aligned?
Does the direction of rotation of the prime mover agree with the direction of rotation of the pump?
Is the filter correctly mounted in the direction of flow?
Connect measuring devices for test measurements during commissioning.
Fill oil tank with the prescribed fluid to maximum oil level mark.

## IMPORTANT

Depending on the installation position of the pump fill the housing via return line port $T_1/T_2$ and motor housing via drain port T up to overflow. If, due to particular installation conditions, the suction line has not been filled prior to start, this must be filled separately.

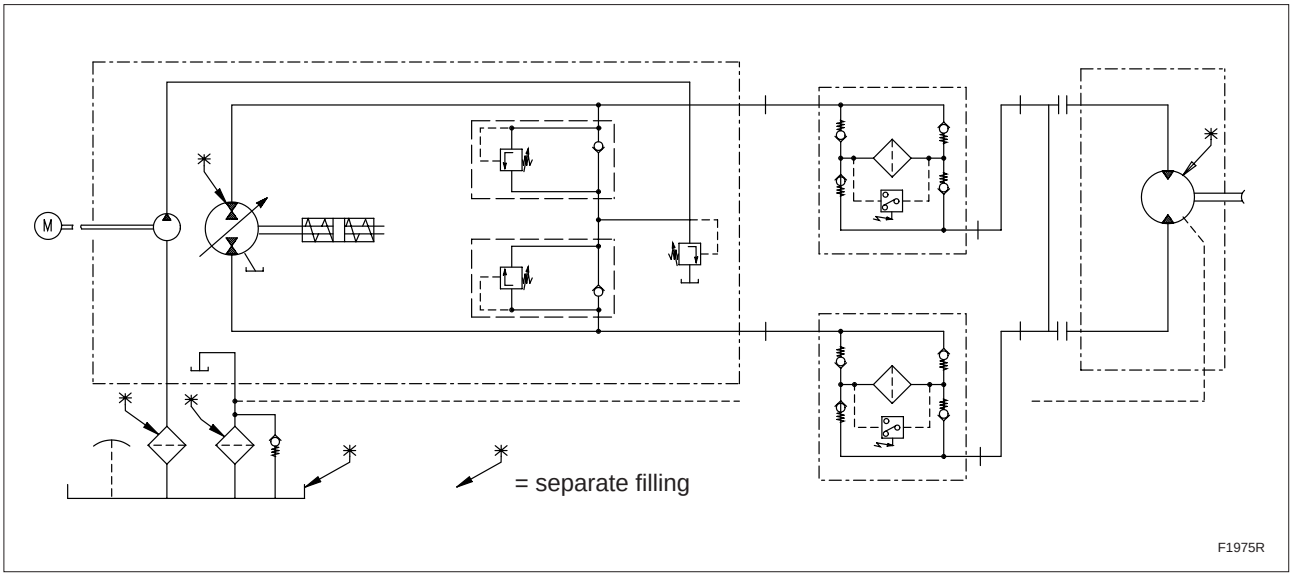
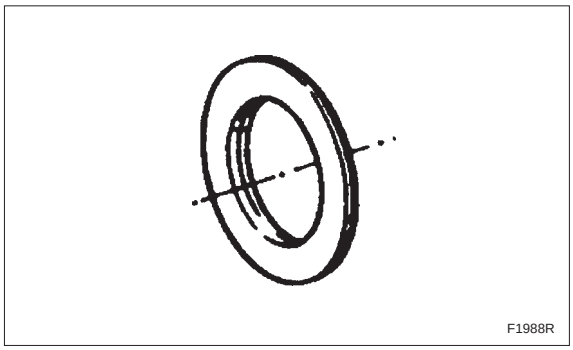


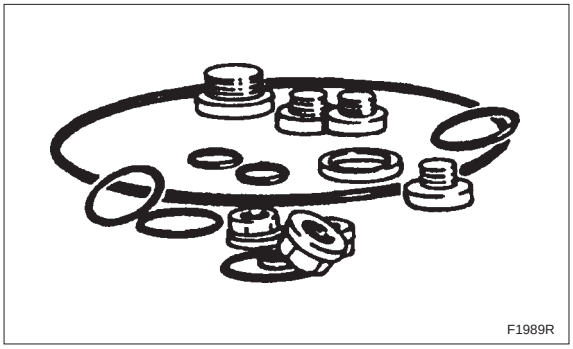

Fig. 2-6

## SEAL KITS AND SUB ASSEMBLY GROUPS

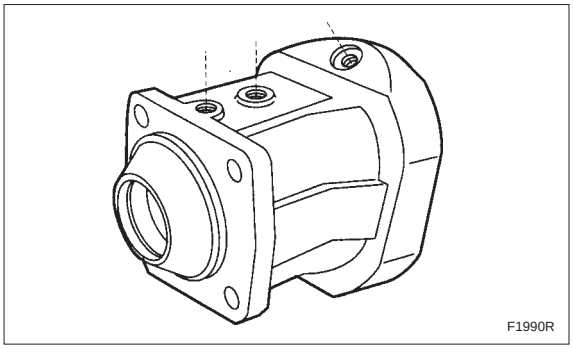
Seal kit for drive shaft.



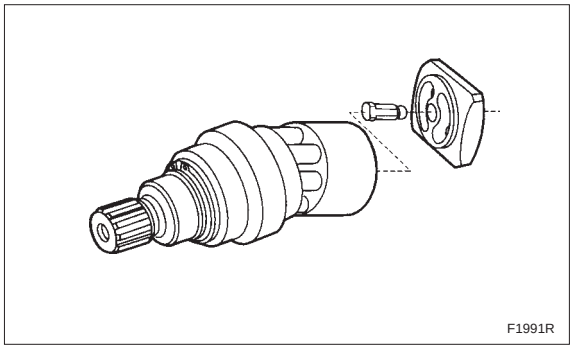

External seal kit.



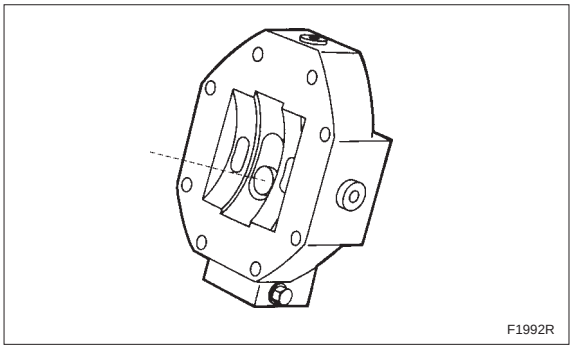

Housing.




Complete rotary group.
**Note**:
Pos. 1 - for port plate with differential piston
Pos. 2 - for port plate with synchronizing piston




Port plate with control piston.
**Note**:
Pos. 1 - for port plate with differential piston
Pos. 2 - for port plate with synchronizing piston



Remove fixing screw (cylinder).
Remove cylinder.

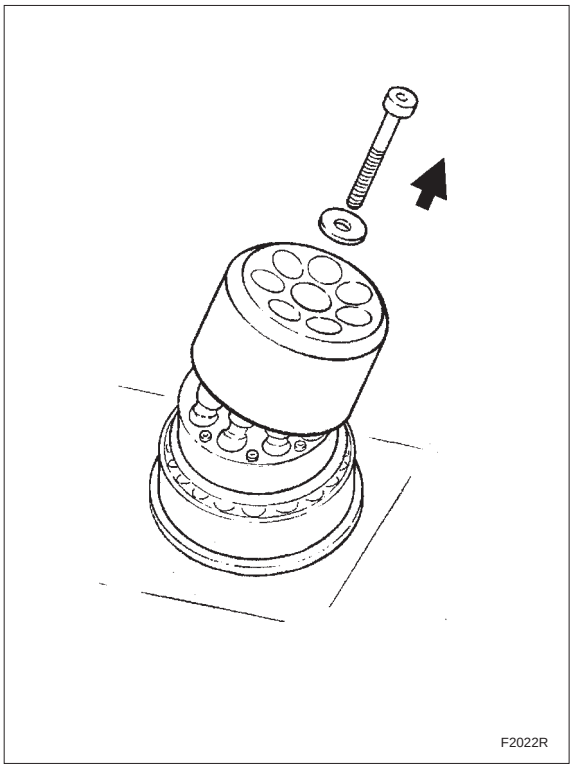



Fig. 2-34

Disassemble retaining plate.
Screws are glued.
Use Torx-tools.

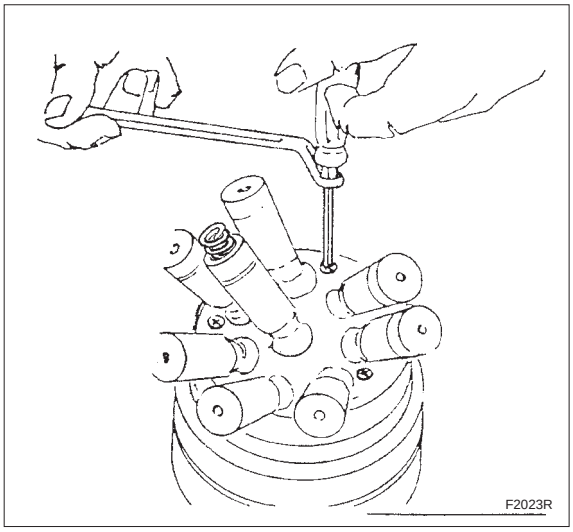



Fig. 2-35

## TIGHTENING TORQUES

### Tightening torques for shaft bolts (Metric ISO Standard Thread)

The values for tightening torques shown in the table are valid only for shaft bolts with metric ISO-standard threads and head support surface dimensions in accordance with DIN 912, DIN 931 and DIN 933. These values are also valid only for light or unoiled, untreated surface as well as for use only with torque-indicating wrenches and force limiting tools.

| Thread size | Strength Classes 8.8 | 10.9 | 12.9 |
|---|---|---|---|
| | Tightening Torque (lb.ft) | | |
| M 3 | 0,8 | 1,2 | 1,4 |
| M 4 | 2,1 | 3,0 | 3,6 |
| M 5 | 4,4 | 6,3 | 7,4 |
| M 6 | 7,4 | 10,3 | 12,5 |
| M 8 | 18,4 | 25,8 | 30,2 |
| M10 | 36,1 | 50,9 | 61,2 |
| M12 | 63,4 | 88,4 | 106,9 |
| M14 | 99,5 | 140,0 | 169,5 |
| M16 | 154,8 | 217,4 | 261,6 |
| M18 | 213,7 | 298,5 | 357,4 |
| M 20 | 302,2 | 427,5 | 508,5 |
| M 22 | 405,4 | 574,9 | 685,4 |
| M 24 | 523,5 | 737,0 | 884,4 |
| M 27 | 773,9 | 1105,5 | 1326,6 |
| M 30 | 1068,7 | 1474,0 | 1768,8 |

### Tightening torques for locking screws VSTI (Metric ISO fine thread)

| Thread size | Designation | | Tightening torques (lb.ft) |
|---|---|---|---|
| M 8 x 1 | VSTI 8 x 1 | -ED/SA | = 4 |
| M 10 x 1 | VSTI 10 x1 | -ED | = 7 |
| M 12 x 1,5 | VSTI 12 x 1,5 | -ED | = 15 |
| M 14 x 1,5 | VSTI 14 x 1,5 | -ED | = 22 |
| M 16 x 1,5 | VSTI 16 x 1,5 | -ED/SA | = 22 |
| M 18 x 1,5 | VSTI 18 x 1,5 | -ED/SA | = 29 |
| M 20 x 1,5 | VSTI 20 x 1,5 | -ED/SA | = 37 |
| M 22 x 1,5 | VSTI 22 x 1,5 | -ED | = 44 |
| M 26 x 1,5 | VSTI 16 x 1,5 | -ED/SA | = 51 |
| M 27 x 2 | VSTI 27 x 2 | -ED | = 66 |
| M 30 x 1 ,5 | VSTI 30 x 1,5 | -ED/SA | = 74 |
| M 33 x 2 | VSTI 33 x 2 | -ED/SA | = 88 |
| M 42 x 2 | VSTI 42 x 2 | -ED/SA | = 147 |
| M 48 x 2 | VSTI 48 x 2 | -ED | = 220 |

### Tightening torques for seal-lock nuts (Metric ISO-Standard Thread)

The values for tightening torques shown in the table are valid only for seal-lock nuts of the strength class 8.8 and with metric ISO-standard thread.

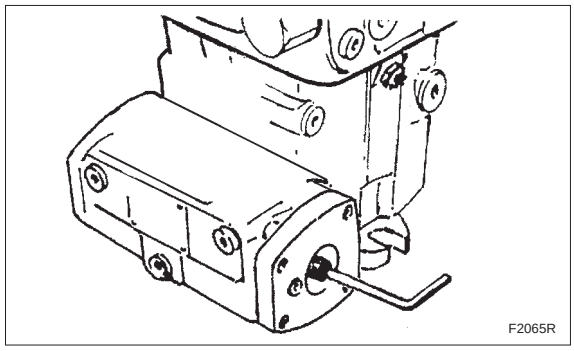
| Thread size | Strength classes 8.8 | 10.9 | 12.9 |
|---|---|---|---|
| | Tightening torque (lb.ft) | | |
| M 6 | 7,4 | | |
| M 8 | 16,2 | | |
| M 10 | 29,5 | | |
| M 12 | 50,9 | | |
| M 14 | 81,1 | | |
| M 16 | 125,3 | | |

### Tightening torques for cross-slotted lens head screws DIN 7985 (Metric ISO-Standard Thread)

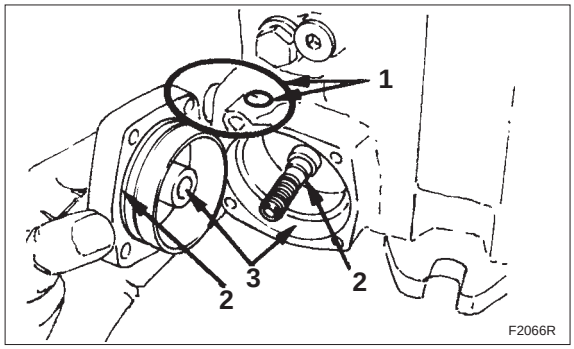
The values for tightening torques shown in the table are valid only for cross-slotted lens head screws DIN 7985 of the strength class 8.8 and with metric ISO-standard thread.

| Thread size | Strength classes 8.8 | 10.9 | 12.9 |
|---|---|---|---|
| | Tightening torques (lb.ft) | | |
| M 3 | 0,8 | | |
| M 4 | 2,1 | | |
| M 5 | 4,4 | | |
| M 6 | 7,4 | | |
| M 8 | 18,4 | | |
| M10 | 36,1 | | |

Pull cover off using zero position adjustment screw.

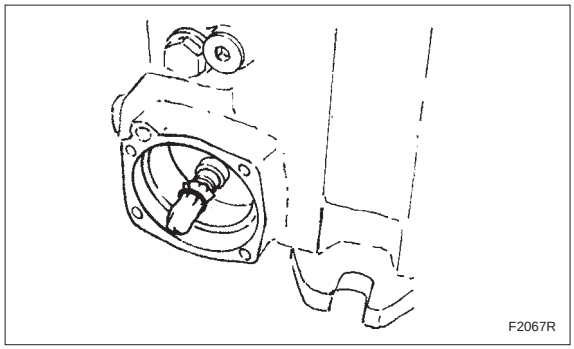

F2065R

Check:
O-ring (1), groove (2), housing (3).

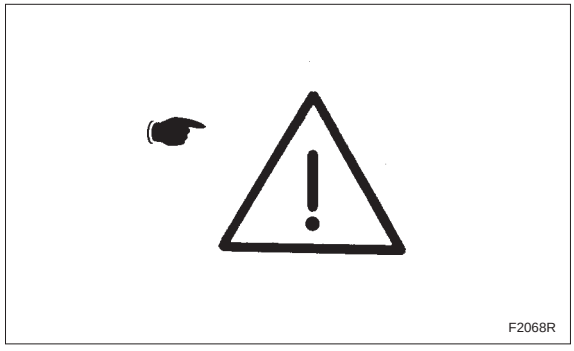


F2066R

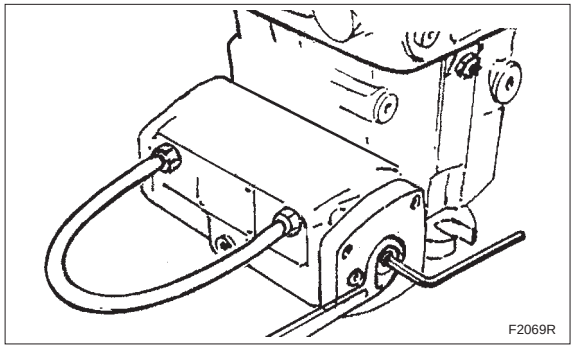
Cover threads, push on small O-ring.
Assemble in reversed order.


F2067R

**Attention**
**Adjustment of the correct zero position to be carried out after installation into the machine or on the test bench.**

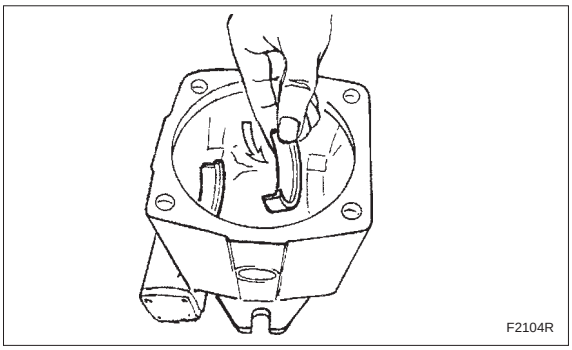

F2068R

Reset mechanical zero position. To do this, connect $X_1$ to $X_2$ (size>6).

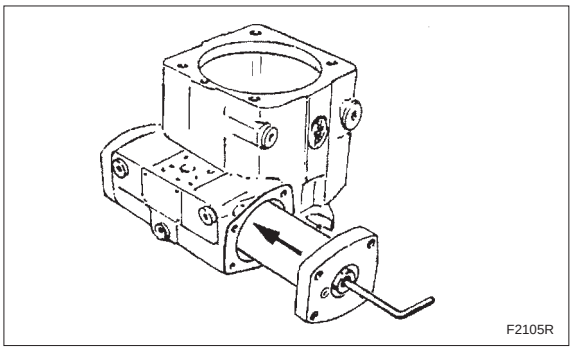

F2069R

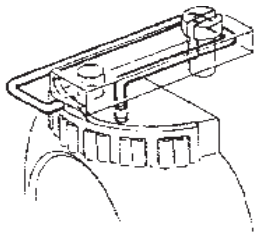
## INSTALLATION OF THE ROTARY GROUP

Insert bearing cup set.

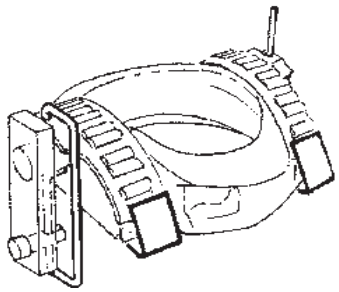

F2104R

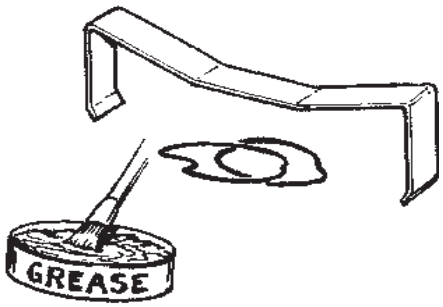
Insert positioning piston into the housing.
Instruction: oil positioning piston before assembly.


F2105R



Assemble bearing, wire, gliding stone and articulating pin.
Assistance devices: clamp/rubber rings/grease.

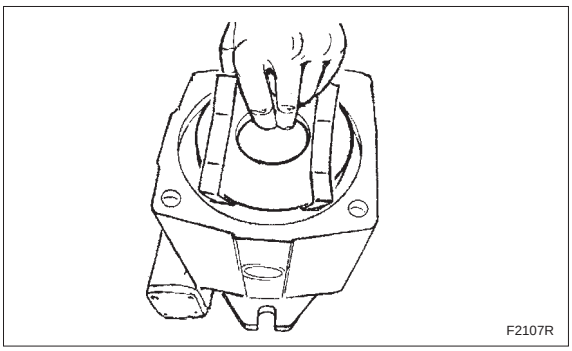




F2106R

Insert completely swivel cradle into the housing.
Pay attention for correct seat of the swivel cradle in the housing.

Remove auxiliary device.


F2107R

## ADJUSTMENT INSTRUCTIONS: HP-VALVES (HIGH PRESSURE) AND PRESSURE CUT-OFF

**Attention**
Observe safety regulations.

**HP valve without bypass-function**
Connect manometer $M_A$ and $M_B$.

HP valves:
Operate valves with small pump flow volume.
Check setting value.
("temperature" only for a short time).
Change "setting value" - check.

Value to be read in $M_A$ e $M_B$.

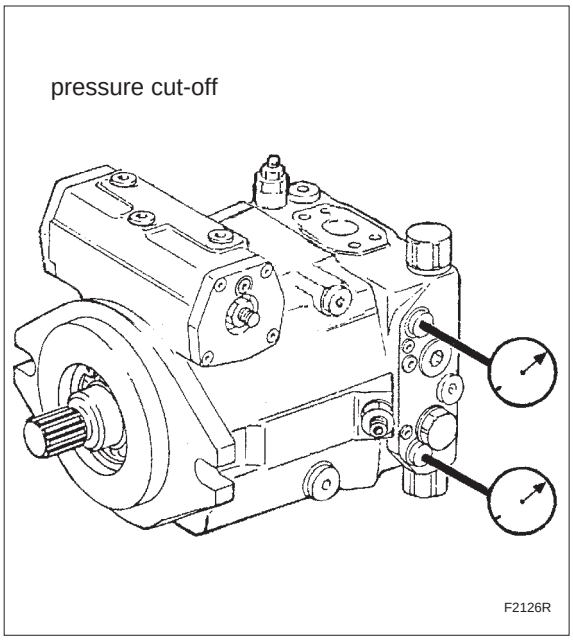



Fig. 2-66

## ADJUSTMENT INSTRUCTIONS: BYPASS VALVE

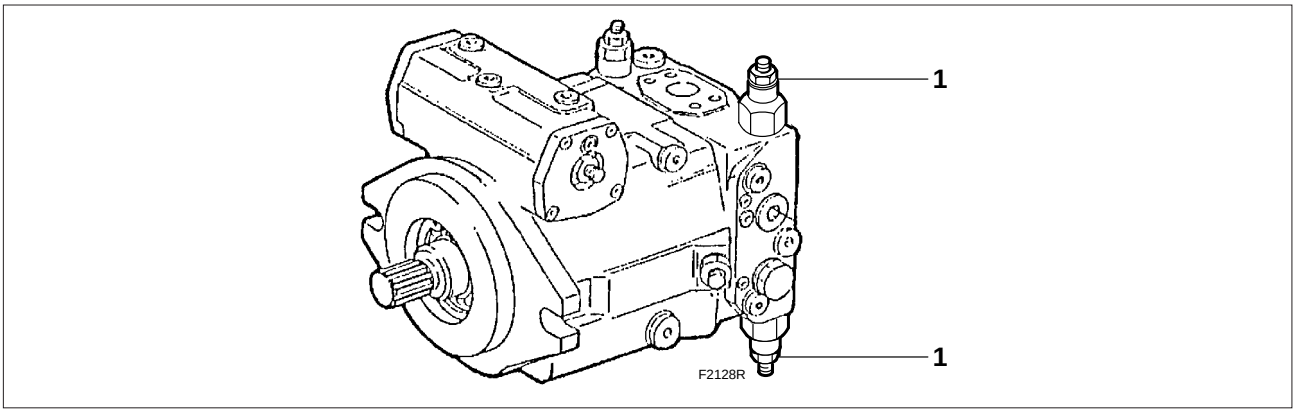



Fig. 2-67

**Vehicle with hydrostatic transmission and gear shift without idling setting position (free wheeling).**

**Hydrostatic transmission, bypass-switching**
In this case the travel transmission is switched on to free wheeling. For this purpose the variable displacement pump has incorporated high pressure relief valves with bypass function. The screw (item 1) is unscrewed to such an extent, that the valve cartridge is released and free oil circulation is possible.

**Towing speed**
The max. towing speed of 2 km/h (1.24 miles/h) should not be exceeded. Higher admissible towing speeds depend on the available hydraulic motor speed and engaged gear shift.

**Towing distance**
The towing distance should not exceed 1 km (0.62 miles/h). If there is a lack of oil boosting, the hydraulic circuit will get empty. Take care of the heat development in the hydraulic motor-rotary group.

**Towing operation terminated**
After termination of the towing operation turn item 1 back. The original pressure value setting of the high pressure relief valves will be available again.

## 2.10 PUMP COUPLER

### 2.10.1 GENERAL INFORMATION

- The motion is transmitted by the drive central shaft which operates the pumps.
- The rotation direction of the outputs is opposite to that of the input shaft.
- Coupling with the pumps is done by means of splined sleeves.

### 2.10.2 INSTALLATION

- The working position of the coupler is as shown on Fig. 2-80.

In this case the connection is direct to the flywheel housing of the diesel engine.

### 2.10.3 MAINTENANCE

- The pump coupler is supplied without oil.

Before their start-up fill it up to the maximum level indicated by the oil dipstick.

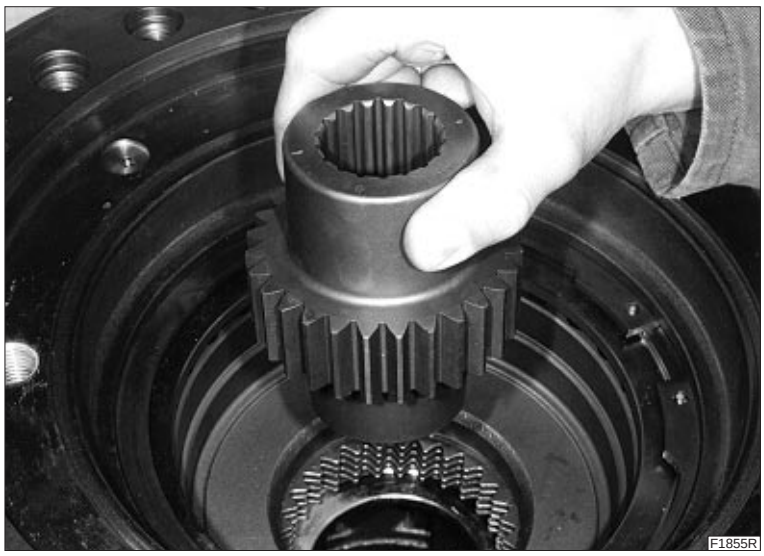
- Use oil for gears with EP additives, minimum viscosity index 95.

Oil type can be chosen, depending on the ambient temperature.

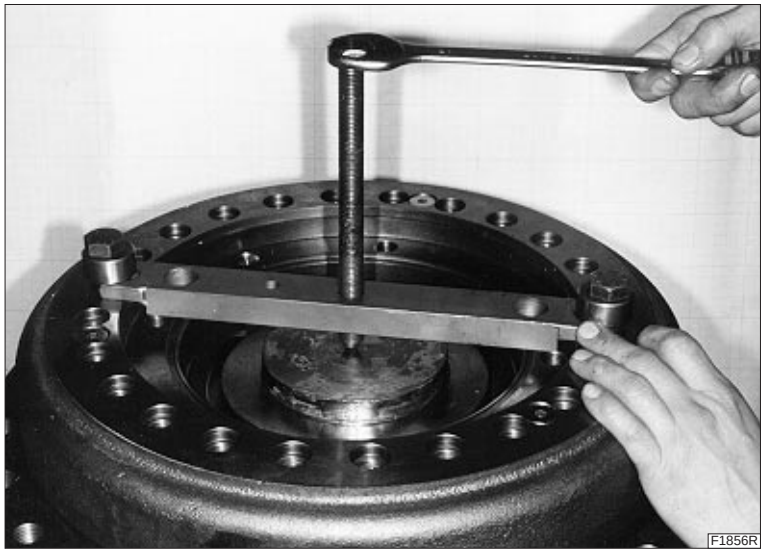
- Effect the first oil replacement after 50 working hours; next ones each 1000 working hours (or, at the longest, every 12 months).
- Periodically check the oil level as explained on the Use and Maintenance manual.
- Ensure that the oil temperature, when working, is not higher than 105° C / 221° F.

## NOTES

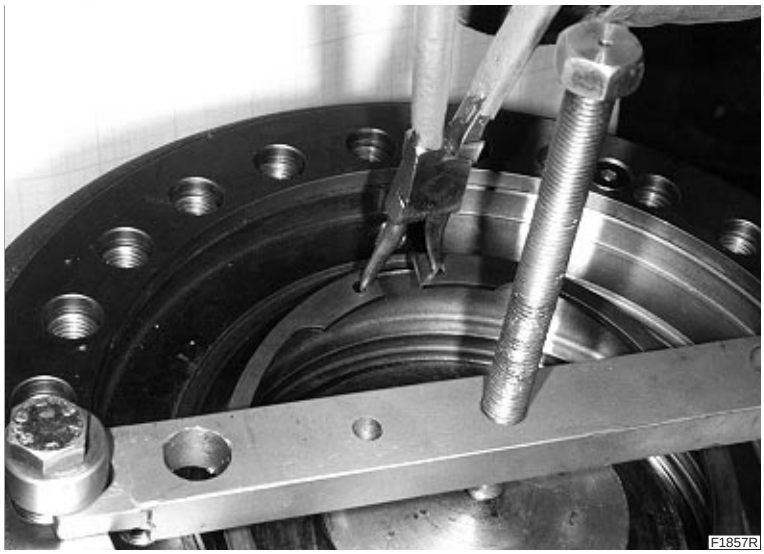
**STEP 6**
Remove the brake shaft (pos. 20).




**STEP 7**
Assemble the equipment on the flanged hub (pos. 16), by screwing the threaded bar (part. C), push the disc (part. B) on the discs retainer (pos.25), thus removing the force of the springs (pos. 24) on the circlip (pos. 26) and allowing its disassembling.




**STEP 8**
Using pliers remove the circlip (pos. 26) from its seat in the the flanged hub (pos. 16).

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## REASSEMBLY

### IMPORTANT NOTES BEFORE REASSEMBLY

When proceeding with the gearbox reassembly, it is necessary to follow the rules listed below:

a) In case of damaged gears, for example a planet, do not replace the single gear, but the whole reduction stage.

b) Replace always the O-rings of the part to be reassambled after having carefully cleaned the seats and having buttered some grease on the seats themselves and on the O-rings to make easier the reassembly.

### 3.4.4 INSTRUCTIONS FOR THE INSTALLATION OF THE HALF SEALS

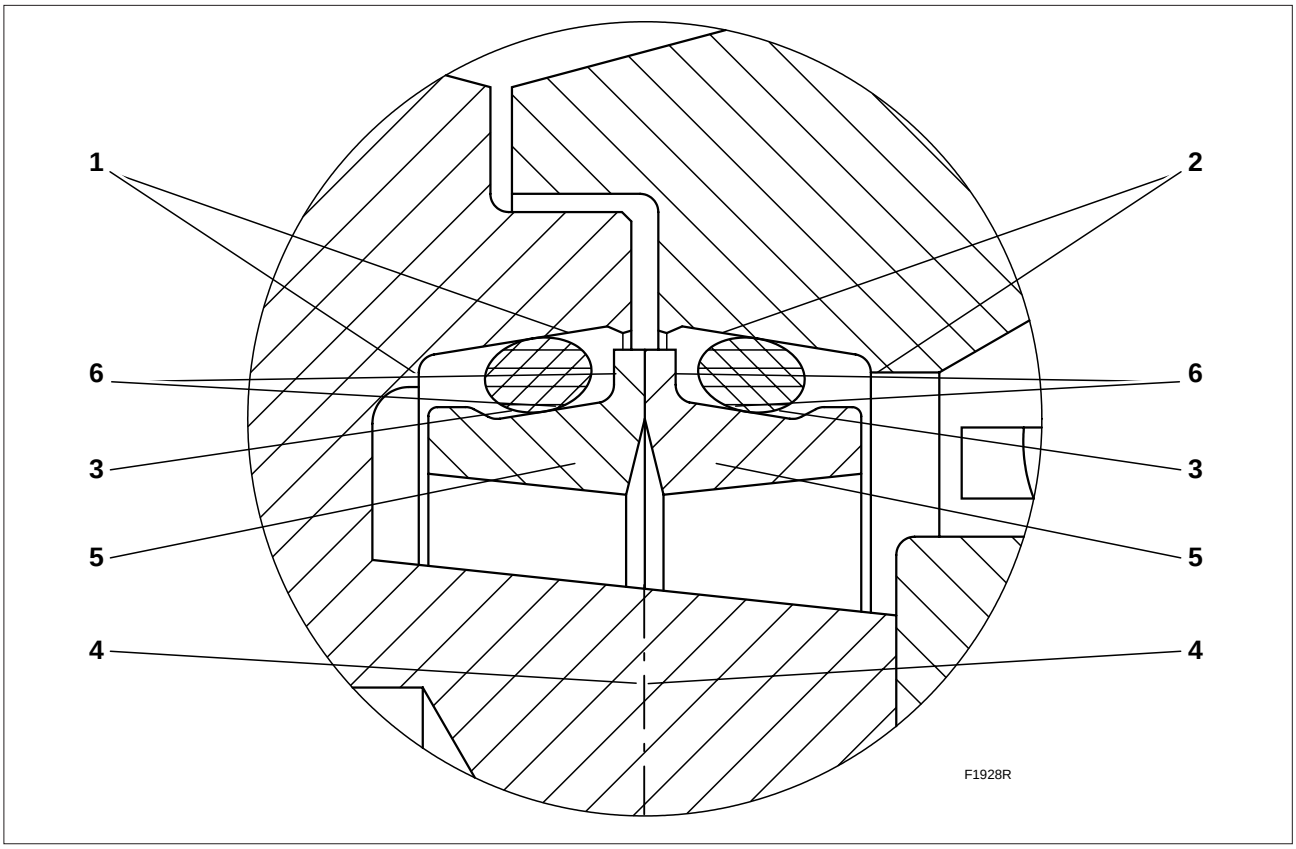



Fig. 3-10 **Detail of seal**

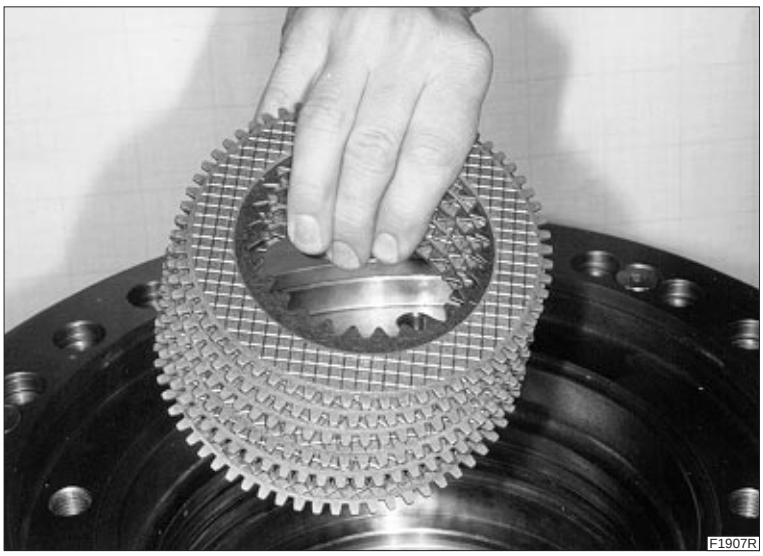
To follow these instructions at the time of fitting, in order to obtain the correct seal:

a) Carefully clean the seats “1” and “2” using, if necessary, metal brushes or solvent (surface in contact with or “3” must be perfectly clean and dry).

b) Make sure that sealing surfaces “4” of metal rings “5” are free from scratches must be perfectly clean and dry.

c) Carefully clean the lapped surface “4” of metal rings “5” and remove dust or fingerprints. Then lubricate them with a thin oil film, taking care not to oil the other components.

**STEP 61**
Assemble the brake discs package according to the following order:
firstly, insert one sintered bronze disc with external teeth (pos. 19).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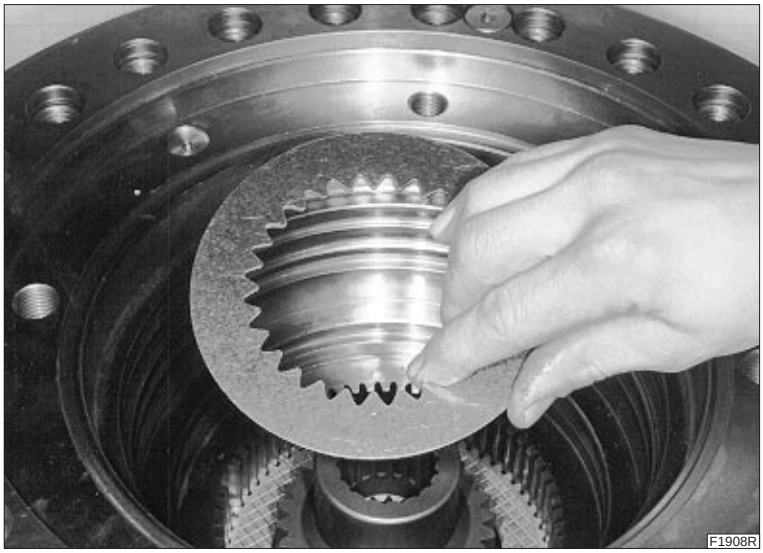
**STEP 62**
Then insert, an internally toothed steel disc (pos. 18).
Repeat the operation untill all 6 sintered bronze discs and 5 steel discs have been assembled.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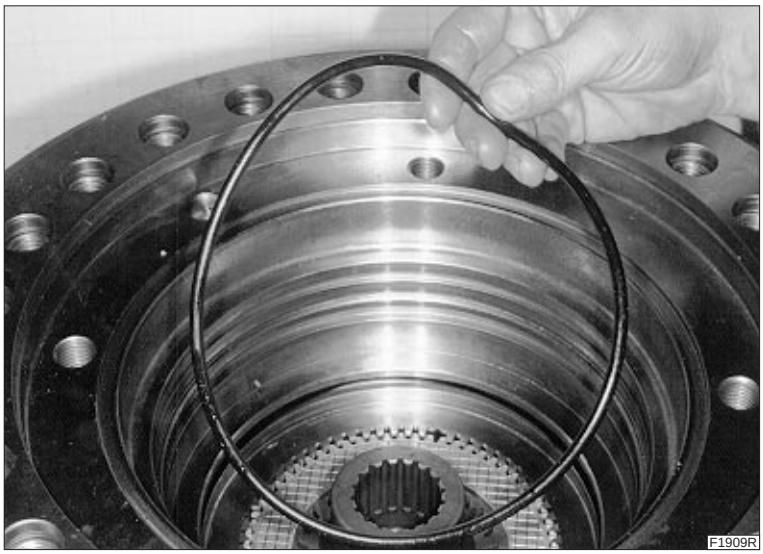
**STEP 63**
Apply in the internal seal's seats of the flanged hub (pos. 16) a coat of grease, and insert the O-rings (pos. 21-22).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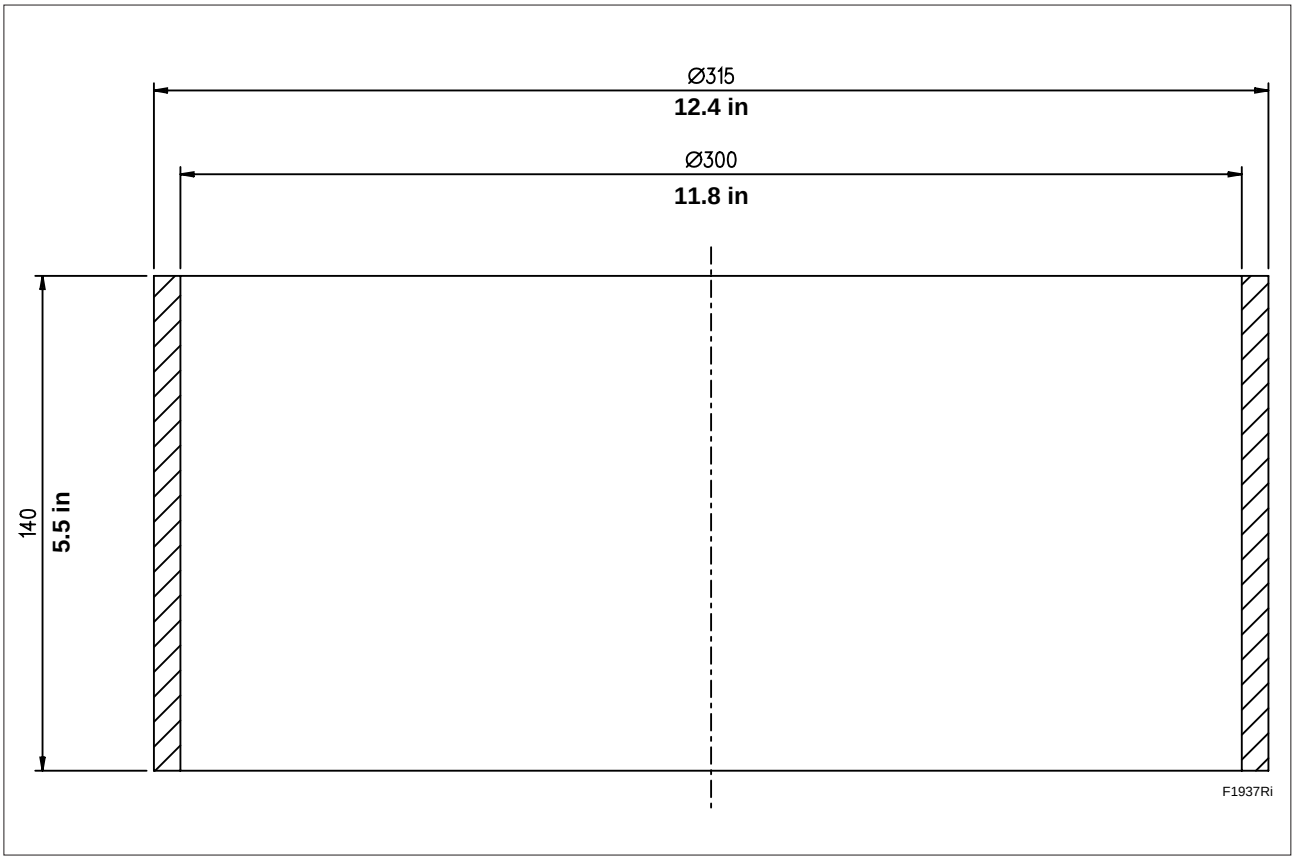


Fig. 3-16

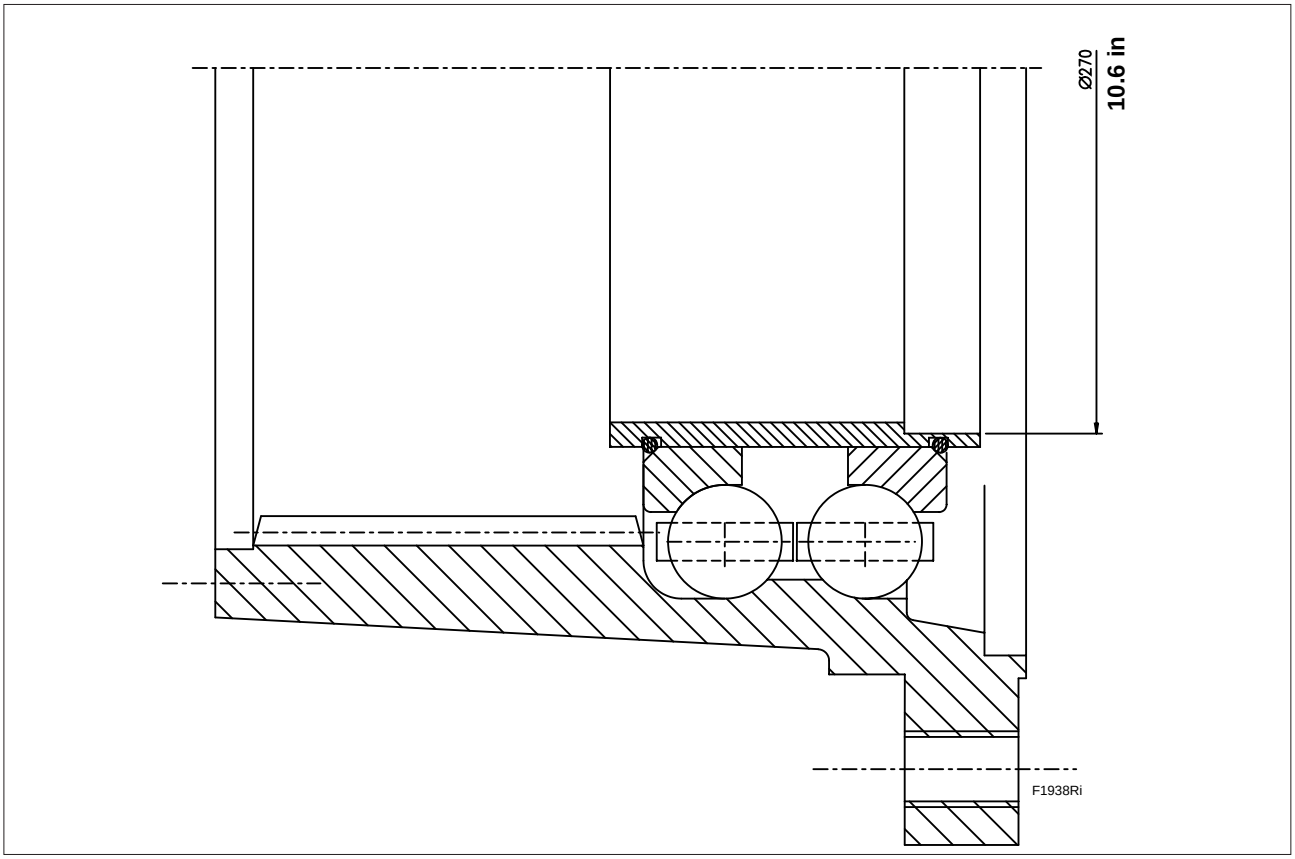


Fig. 3-17

## 4.2 TROUBLESHOOTING OF MAJOR MALFUNCTIONS

**1. Very fast wear of track chain links, pins and bushes.**

Fast wear of teeth of sprocket and rib of idler wheel.

1.1 Possible damage,or failure of sprocket, idler wheel, idler wheel supports, track rollers or guards.

1.2 The chain cannot engage correctly the teeth of the track chain, both in forward and reverse speeds. The track chain can jump the chain when steering.

1.3 The chain is packed by foreign materials.

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**NOTE** - When machines work under conditions where foreign materials can easily enter the undercarriage components, it is recommended that the tension of the system is frequently inspected.
The tension, in fact, can increase when materials interfere with the components of the track chain and the track tension mechanism.
The presence of debris inside the coils of the spring can cause delays or prevent the movement of the track idler wheel and the action of the spring. This phenomenon can result in a dangerous increase of the load on the track chain (pins, bushes and links), on the idler wheel shaft and on the final drives.

---

1.4 Slack track chain, readjust to correct tension.

**2. Insufficient speed and pulling force.**

The machine does not develop the expected pushing force.

2.1 Side skidding to the right or to the left, caused by the track chain more tightened.

2.2 Fast wear of pins, bushes and links.

2.3 Wear of final drive bearings.

2.4 High tension of the track chain; readjust to correct level.

**3. Elongation of screw holes on link.**

3.1 Insufficient tightening of screws securing the shoes onto the track chains. The loosening can be caused by a thinning of the shoes due to wear, or by an incorrect tightening torque of the screws reference the values of the TIGHTENING TORQUE table. Make sure that the mating surface between shoe and track chain is perfectly clean and paint free.

3.2 Operation on high angle slope, wear of the pin ends, inner and outer rims of the track rollers, sprockets and idler wheels.

3.3 Working on high slopes generates strong stresses in the undercarriage components, causing fast wear of the parts involved. If possible, change frequently the moving direction or the trajectory of the machine.

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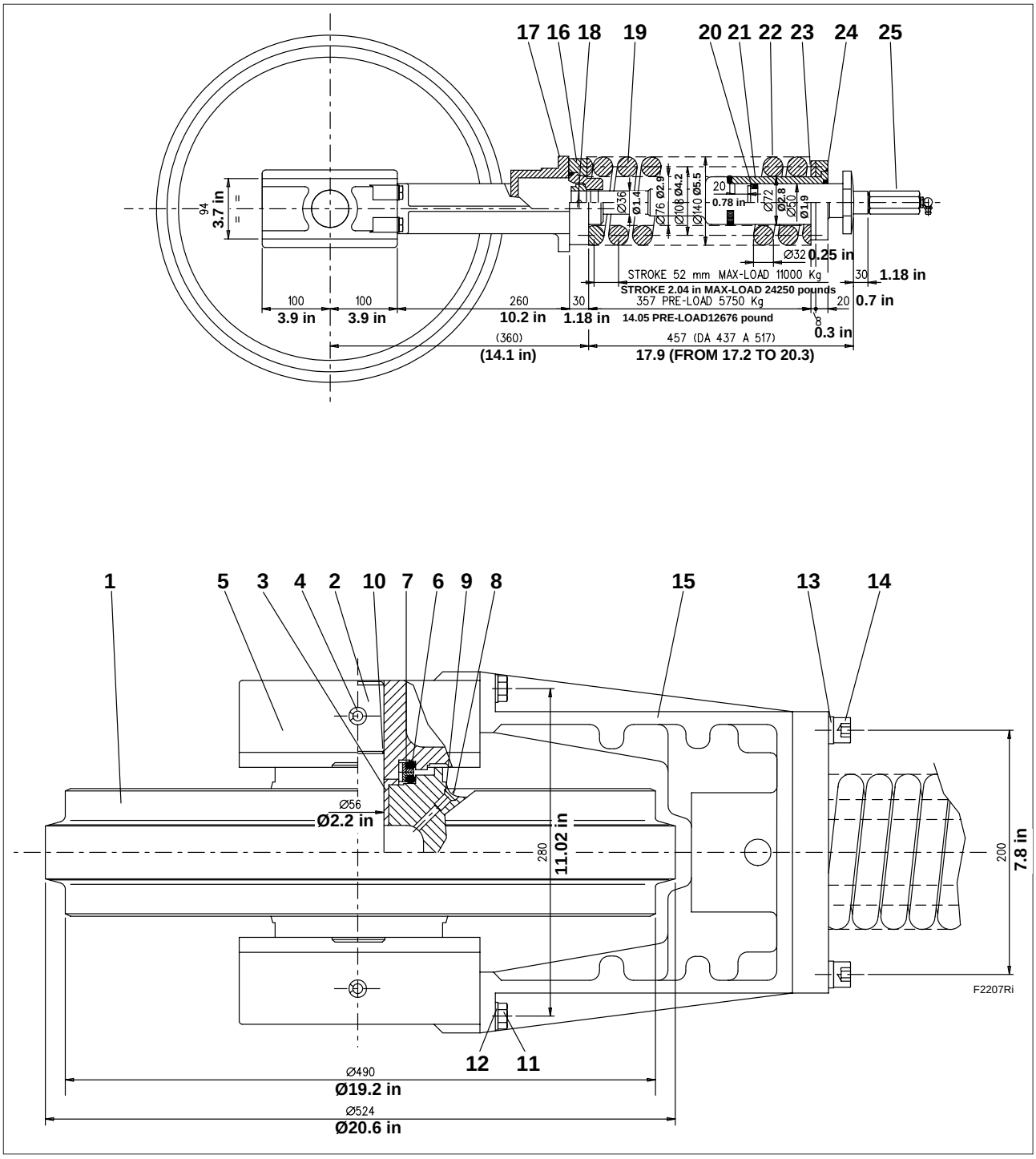


Fig. 4-15 **Idler wheel assembly**

| POS. | DENOMINATION | POS. | DENOMINATION | POS. | DENOMINATION | POS. | DENOMINATION |
|---|---|---|---|---|---|---|---|
| 1 | IDLER | 8 | PLUG | 15 | YOKE | 22 | PISTON |
| 2 | SHAFT | 9 | O-RING | 16 | FLANGE | 23 | SPACER |
| 3 | BUSHING | 10 | O-RING SHAFT | 17 | NUT | 24 | WIPER |
| 4 | PIN | 11 | SCREW | 18 | PIN | 25 | PLUG |
| 5 | BRACKET | 12 | WASHER | 19 | SPRING | 26 | ADJUSTING VALVE |
| 6 | O-RING | 13 | WASHER | 20 | U-PACKING | | |
| 7 | BK | 14 | SCREW | 21 | CYLINDER | | |

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## NOTES

## 5.7.2 PUMP OVERHAUL

Dismantle the pump removing the cover fixing screws (**$C_1$**, fig. 5-9).
Match the gears to the relative supports (**17**) and check the orthagonality and the planarity of the lateral faying surfaces inserting a layer of soot; minimal variations can be removed using very fine abrasive paper lubricated with paraffin.
Check the end play on the gear-support groups with respect to the pump body (fig. 5-10) ensuring that it is within the tolerance 0.20 ÷ 0.25 mm / 0.08 ÷ 0.1 in.
Any attempt to smooth the faying surfaces and bring them within the tolerance values must be carried out exclusively using very fine abrasive paper lubricated with paraffin and removing only a minimum quantity of material.
If it is necessary to replace the pump refit the bushings (**3**, fig. 5-9) on the gear supports (**17**) taking care to:
- line up the lubrication channels (**S**);
- check that the bushings are 2.5 mm / 0.09 in below the faying surface of the supports, ensuring that the bushings do not project from the opposite surface and that they leave the lubrication holes free (**L**). When in position the bushings (**3**) do not require any grinding; check that the lubrication holes (**L**) are free from impurities;
- check that the maximum shift of the X-X axes of the support (**17**) and the lubrication channel (**S**) is not more than 2° / 35.6°F.

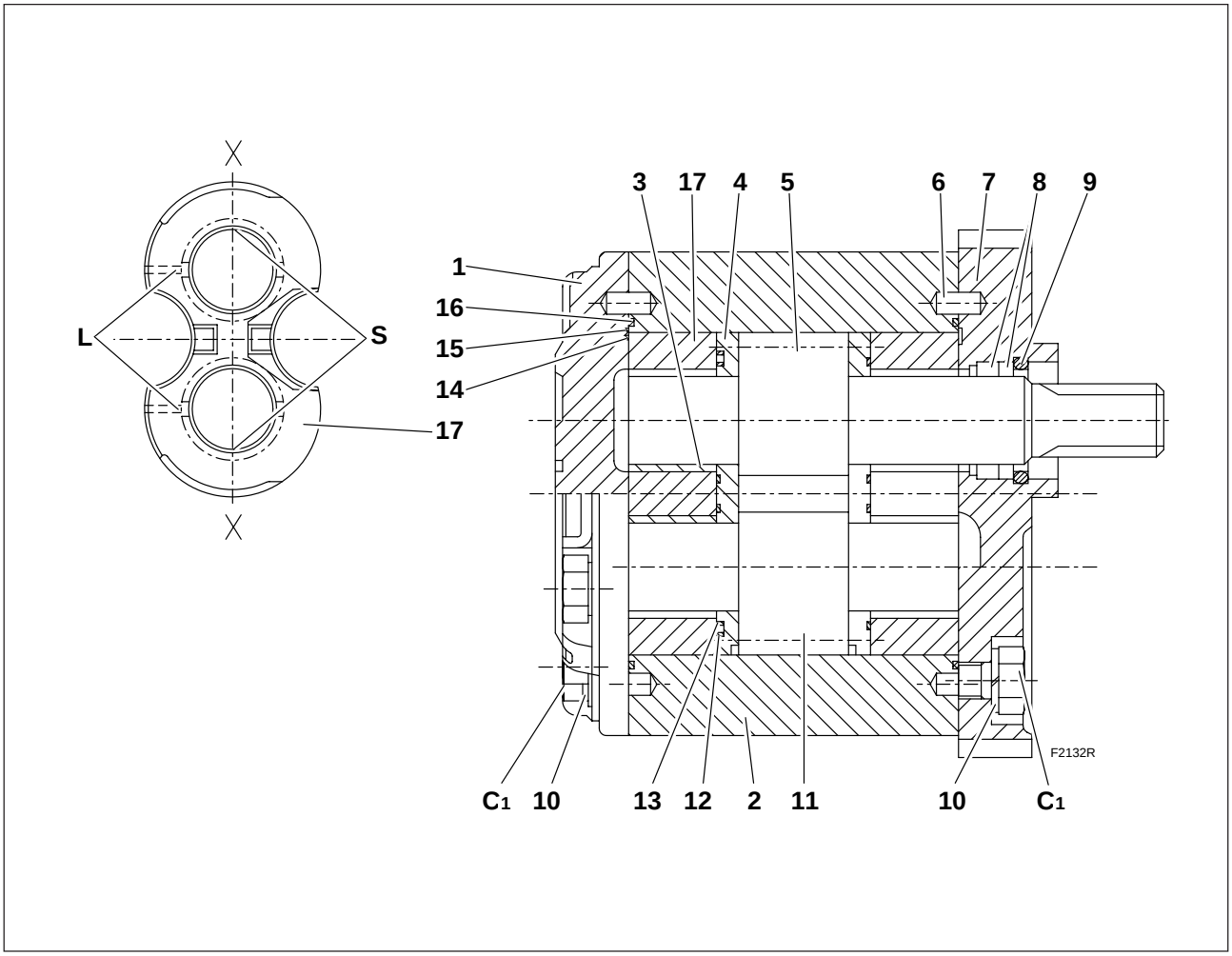


Fig. 5-9 **Longitudinal section of the hydraulic pump**

**$C_1$.** Screws TE M10 x 1,5 x 95 - **1.** Cover - **2.** Body - **3.** Bushings - **4.** Plate - **5.** Driving gear - **6.** Plug - **7.** Cover - **8.** Seals - **9.** Split ring - **10.** Washer - **11.** Driven gear - **12.** Seal - **13.** Ring - **14.** Seal - **15.** Ring - **16.** O-ring - **17.** Gear shaft support.

## 5.11.2 INCLINATION BLADE SOLENOID VALVE

These direct acting spool style solenoid cartridge valves are particularly suitable to operate double acting cylinders, pilot circuits, dual directional motors, etc.
Several spools are available upon demand to meet the different requirements of hydraulic circuits.

- Mounting position: unrestricted
- Balanced spools
- Movable parts in high quality steel, hardened, ground and lapped
- Mechanical parts protected against weather
- Filtration level: 25 micron or lower
- Max. internal leakage: 80 cm³/min. - 4.8 in³/min. at 210 bar / 21000 kPa and 46 cSt
- Operating temperature: -20 +70°C / -4 +158°F
- Min. operating voltage: 90% of nominal voltage
- Coils must be ordered separately.

NOTE: These valves operate only with DC coils.

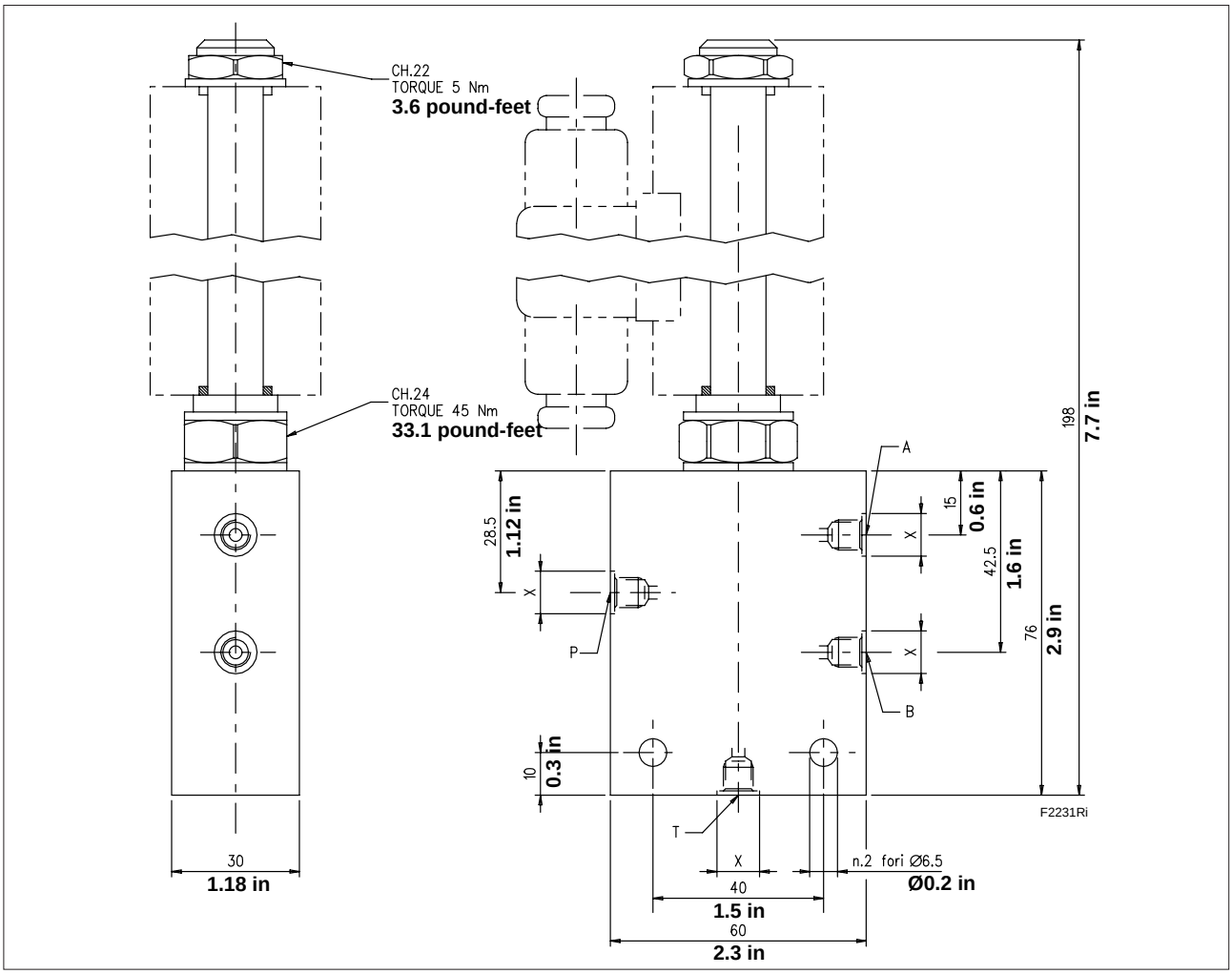


Fig. 5-19

### 5.12.5 BLADE TILT CONTROL CYLINDER

**WARNING**

DO NOT USE YOUR HANDS to locate pressure leaks. Fluid under pressure leaks can be strong enough to penetrate your skin.

- remove fixing pins (**6**, fig. 5-23) and free cylinder from hinge with blade;
- untighten front bottom (**11,** fig. 5-27);
- remove plunger rod complete with front bottom from cylinder housing.

In reassemby carefully lubricate the components and
- set arrangement and orientation of seal elements (**15-14-13**) for rod;
- tighten plunger (**6**, fig. 5-27) at the torque of 40 da Nm;
- tighten plunger retaining screw (**5**, fig. 5-27) at the torque of 3 daNm;
- tighten front threaded bottom at the torque of 70 daNm.

**Note: For assembly and disassembly of threaded bottom (11 fig. 27) and plunger (6 fig. 27) parts use the proper wrench.**

## 6.2 MAIN PARTS LOCATION

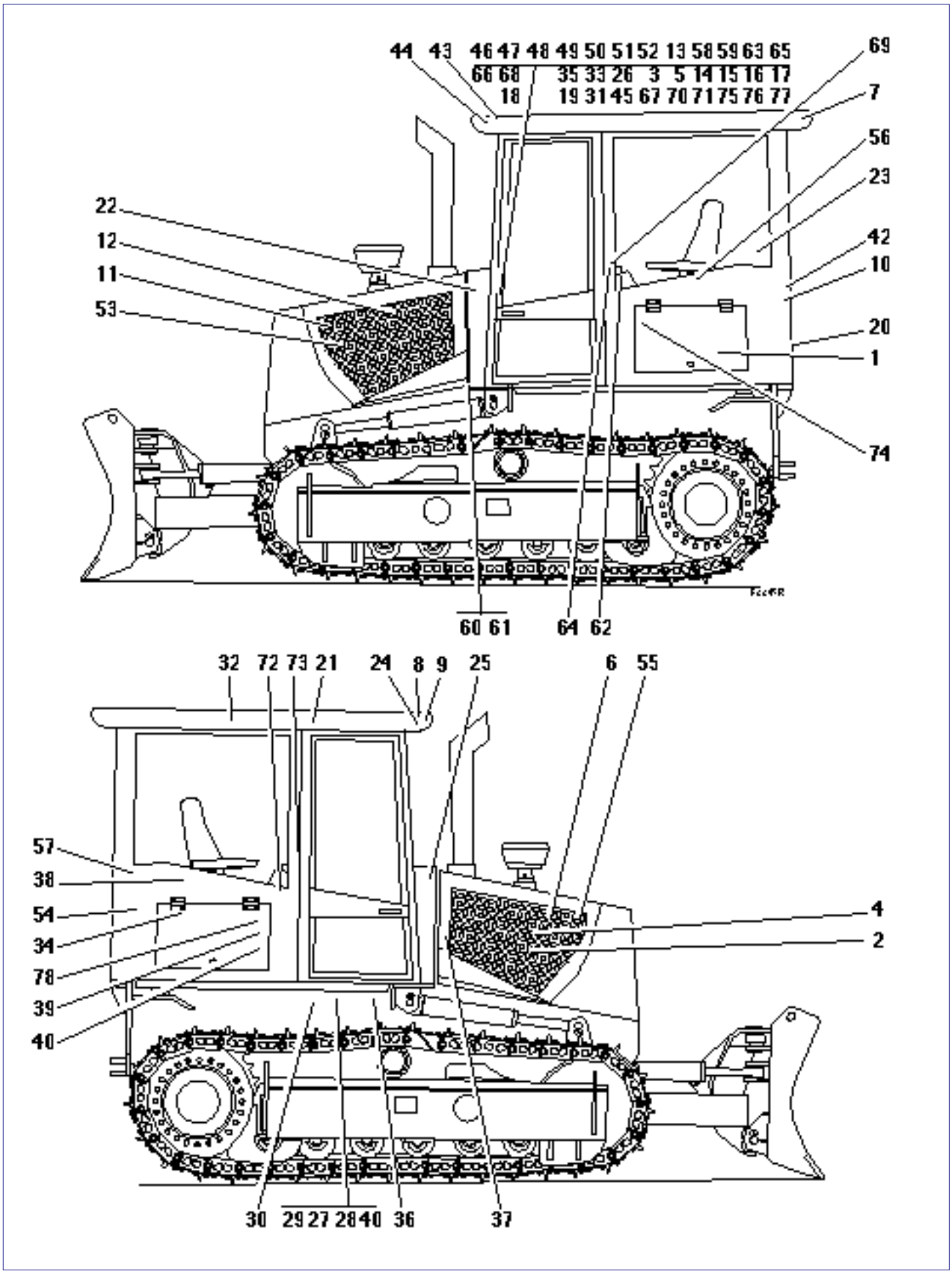


Fig. 6-4

## TECHNICAL DATA OF ROTATION ANGLE SENSOR, TYPE 720

### Electrical features

Measuring range ..... 90° (± 45°)

Supply voltage ..... 5 V CC (others on demand)

Output voltage ..... 0,5 ... 4,5 V

Output current ..... max. 1 mA each system

Current absorption ..... ab. 10 mA each system

Linearity ..... < 0,5 % in the range of rotation angle of 30°

Strength EMV ..... up to 1 Ghz with E = 200 V/m

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