

# SHOP MANUAL

WEBM000500



# PC75-1

## HYDRAULIC EXCAVATOR

SERIAL NUMBER

**5000001**

- This shop manual may contain attachments and optional equipment that are not available in your area.  
Please consult your local FKI distributor for those items you may require.  
Materials and specifications are subject to change without notice.
- PC75-1 mount the KOMATSU 4D98E-1FB engine.  
For detail of the engine, see the KOMATSU series 98 Engine Shop Manual.



**FKI FAI KOMATSU INDUSTRIES S.p.A.**

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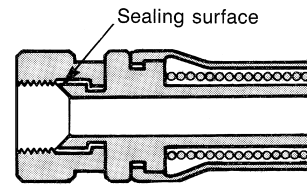
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## STANDARD TIGHTENING TORQUE



### 2. TIGHTENING TORQUE FOR NUTS OF FLARED

Use these torques for nut part of flared.

Thread diameter of nut part (mm)	Width across flats of nut part (mm)	TIGHTENING TORQUE	
		kgm	Nm
1/2" - 20	17	2.6±0.5	25.5±4.9
9/16" - 18	17	4±0.5	39.2±4.9
3/4" - 16	22	6.7±2	65.7±19.6
7/8" - 14	27	8±2	78.5±19.6
1. 1/16" - 12	32	9.7±3	95.15±29.4
1. 5/16" - 12	38	17±3	166.7±29.4
1. 5/8" - 12	50	20±5	196.2±49
22	27	8±2	78.5±19.6
33	41	20±5	196.2±49

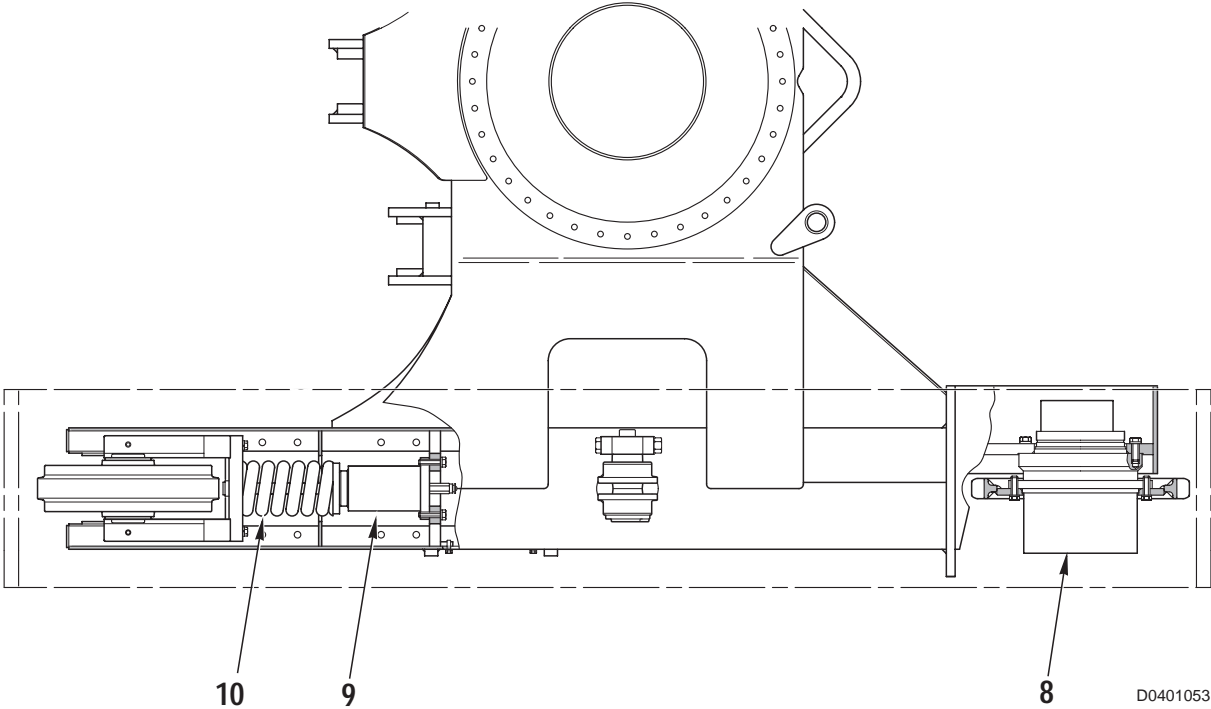
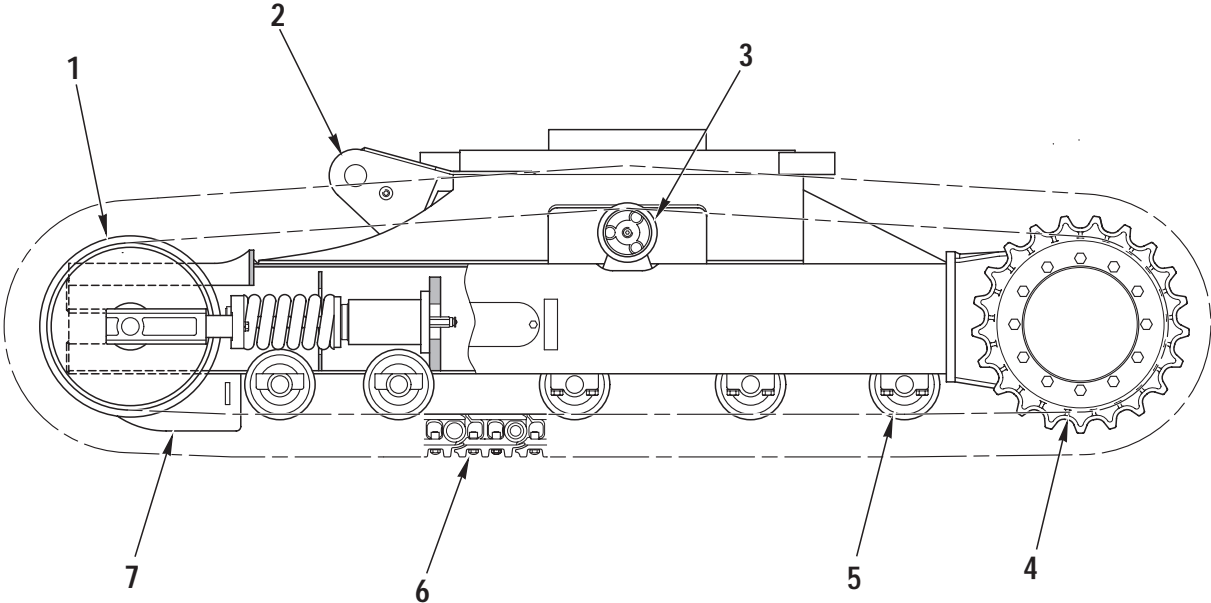


## COATING MATERIALS

The recommended coating materials prescribed in FKI Shop Manuals are listed below:

Nomenclature	Code	Applications
Adhesives	ASL800010	Used to apply rubber pads, rubber gaskets and cork plugs.
	ASL800020	Used to apply resin, rubber, metallic and non-metallc parts when a fast, strong seal is needed.
	LOCTITE 222	Used for low resistance locking of screws, check nuts and adjustment nuts.
	LOCTITE 242	To prevent the loosening of bolts, nuts and plugs and the leakage of oil. Used for medium resistance locking of screws and nuts of every type, and for locking keys and bearings.
	LOCTITE 262	Used for high resistant of threaded parts that can be removed with normal tools.
	LOCTITE 270	Used for high resistant locking and for sealing threaded parts, bolts and stud bolts that normally must to be not removed.
	LOCTITE 542	Used for sealing the union threads for hydraulic tubes.
	LOCTITE 573	Used for sealing rather exact plane surfaces when the option of possible future dismantling is required.
	LOCTITE 675	Used to lock cylindrical couplings and for the permanent locking of threaded parts, and also to lock shafts to bearings, gears, pulleys, pins, bushings, etc.
Gasket sealant	ASL800060	Used by itself to seal grease fittings, tapered screw fittings and tapered screw fittings in hydraulic circuits of less than 50 mm in diameter.
	ASL800070	Used by itself on mounting surface on the final drive and transmission cases. (Thickness after tightening :0,07-0,08 mm).
Antifriction compound (Lubricant including Molybdenum disulfide)	ASL800040	Applied to bearings and taper shaft to facilitate press-fitting and to prevent sticking, burning or rusting.
Grease (Lithium grease)	ASL800050	Applied to bearings, sliding parts and oil seals for lubrication, rust prevention and facilitation of assembling work.
Vaseline	-	Used for protecting battery electrode terminals from corrosion.

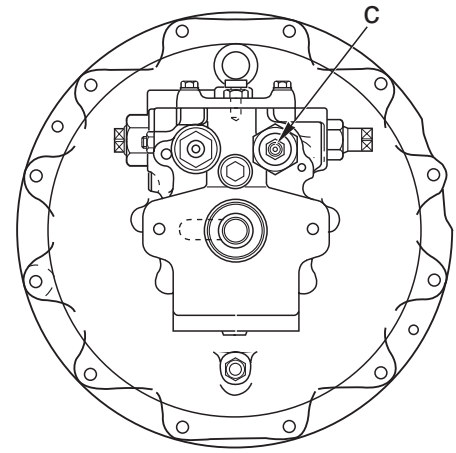
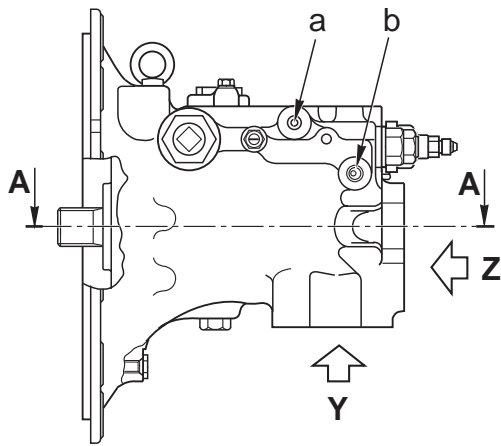
# TRACK FRAME



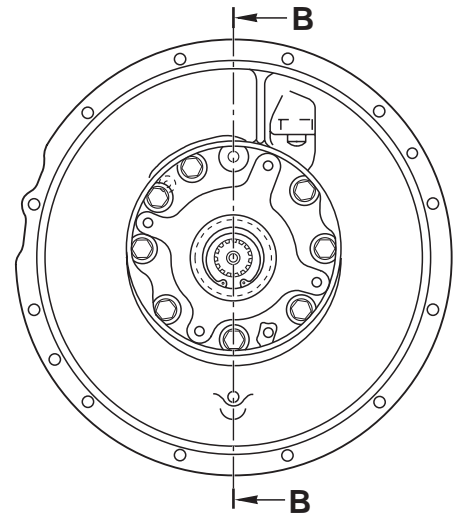
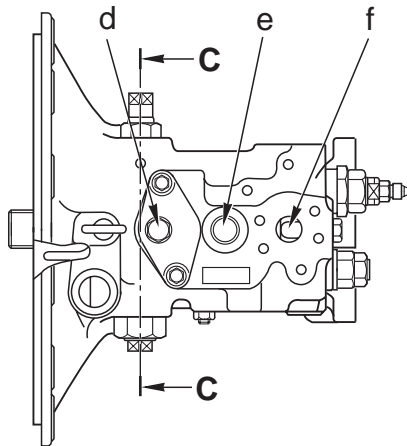
D0401053

- 1. Idler
- 2. Track frame
- 3. Carrier roller
- 4. Sprocket
- 5. Track roller (No. 5)
- 6. Track shoe
- 7. Guard
- 8. Final drive
- 9. Idler cushion
- 10. Recoil spring

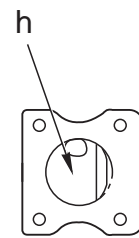
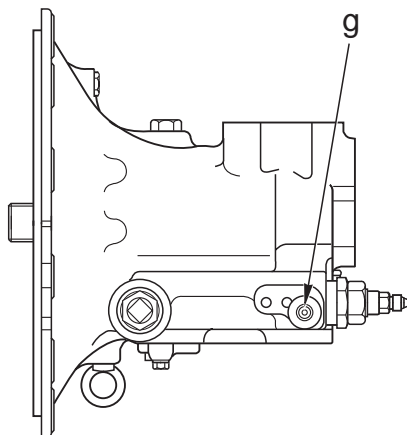
## 1. MAIN HYDRAULIC PUMP



**View Z**



**View B**



**View Y**

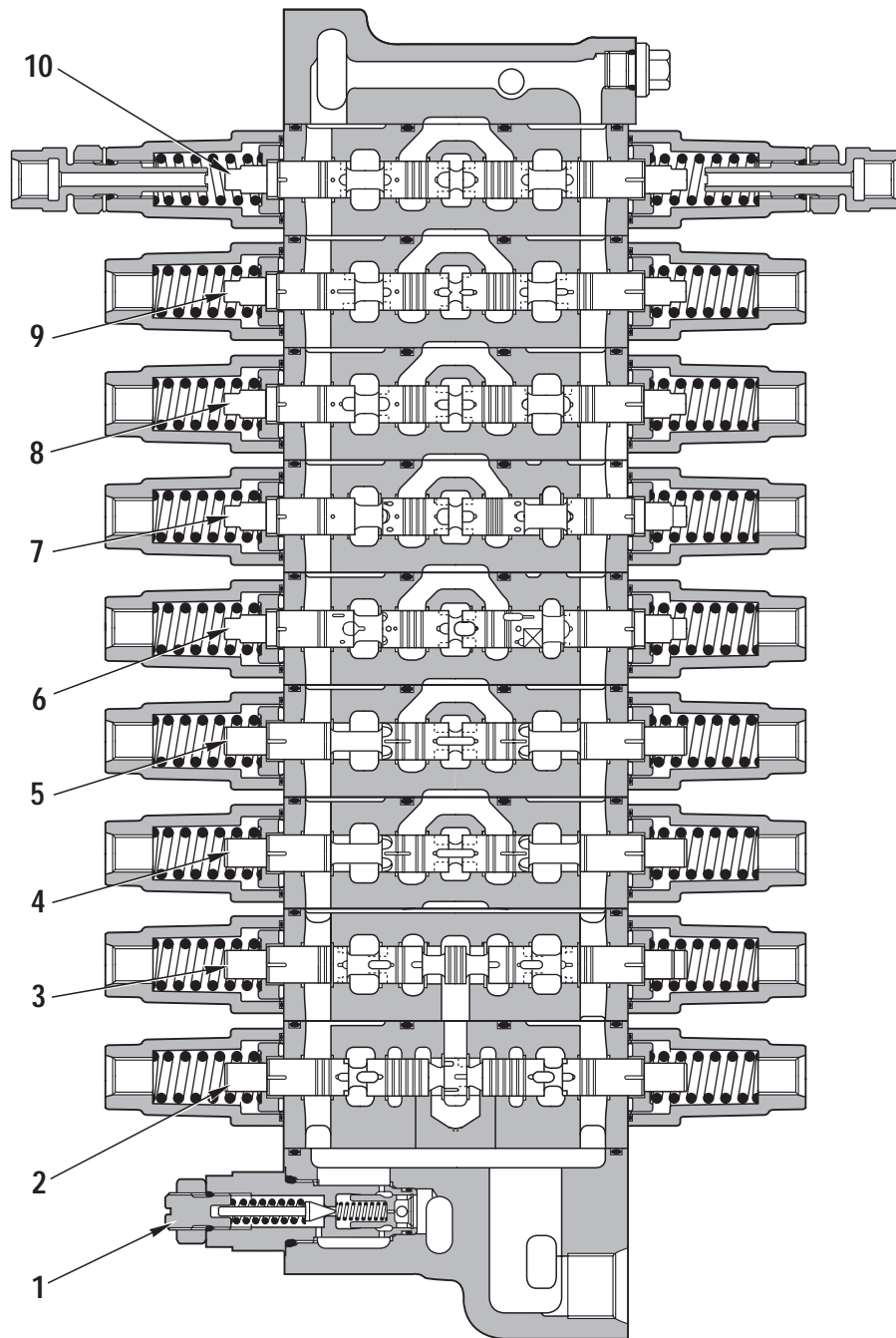
- a. Ps Port - From hydraulic tank
- b. PDA Port - Air breeder Port
- c. PD Port - Main pump drain
- d. PA Port - To servocontrol feed unit
- e. PLS Port - From control valve (PLS Port)

- f. PPLS Port - From control valve (P1 Port) and from servocontrol feed unit (P2 Port)
- g. PA3 Port - From gear pump (PGA Port)
- h. PM Port - From ST1 solenoid valve group (A3 Port)

D0400822

- When the control lever is moved to full-stroke, in other words, as the opening area of the control valve becomes large, the difference of the pump pressure  $P_{PLS}$  and the **LS** pressure  $P_{LS}$  (**LS** differential pressure  $\Delta P_{LS}$ ) becomes smaller.
- **LS** pressure  $P_{LS}$  introduced to the spring chamber **a** of the **LS** valve becomes more or less the same as the pump pressure  $P_{PLS}$  and the piston (15) is pushed to the left side ( ← ) by the combined force of the **LS** pressure and the spring (14), closing the Port **c** and forming a path between the Ports **d** and **e**.
- Therefore, the pressure oil functioning to the chamber **X** at the large diameter side of the servo piston (1) flows to the Port **e** from the Port **d**, and then to the Port **f** of the **PC** valve.
- At this time, since the Port **f** of the **PS** valve is open to the drain inside the pump case through the inside of the piston, pressure in the chamber **X** of the large diameter side of the servo piston also becomes to the drain pressure.
- By this, the servo piston (1) is moved to the max. swash plate angle side ( ↓ ) by the pump pressure  $P_P$  functioning to the chamber **Y** at the small diameter side.

- When the load on the actuator becomes small and the pump discharge pressure **P<sub>P</sub>** lowers, the piston (8) is pushed to the right ( → ) side by the spring force of the springs (5) and (7).
- By this action, at the same time when the path between the Ports **g** and **f** is shut out, the Port **f** becomes open to the drain circuit.
- At this time, if the **LS** valve is working to increase the pump discharge amount, because control of the **PC** valve becomes ineffective, pressure oil the chamber **X** of the large diameter side of the servo piston (1) flows from the Port **d** through the Port **e** of the **LS** valve and drains into the drain circuit from the Port **f** of the **PC** valve.
- Therefore, the servo piston (1) is shifted to the maximum swash plate angle ( ↓ ) side by the pressure **P<sub>P</sub>** in the chamber **Y** at the small diameter side.



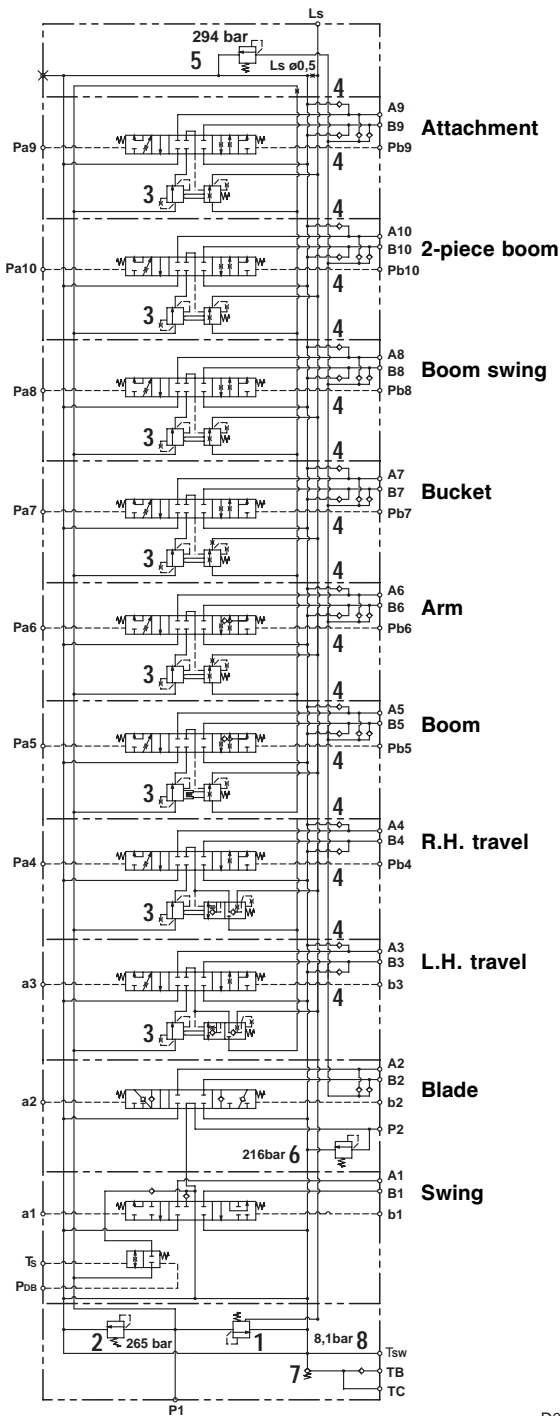
**Section B - B**

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- |                                |                        |
|--------------------------------|------------------------|
| 1. Main relief valve (P1 Port) | 6. Spool (boom)        |
| 2. Spool (swing)               | 7. Spool (arm)         |
| 3. Spool (blade)               | 8. Spool (bucket)      |
| 4. Spool (L.H. travel)         | 9. Spool (boom swing)  |
| 5. Spool (R.H. travel)         | 10. Spool (attachment) |

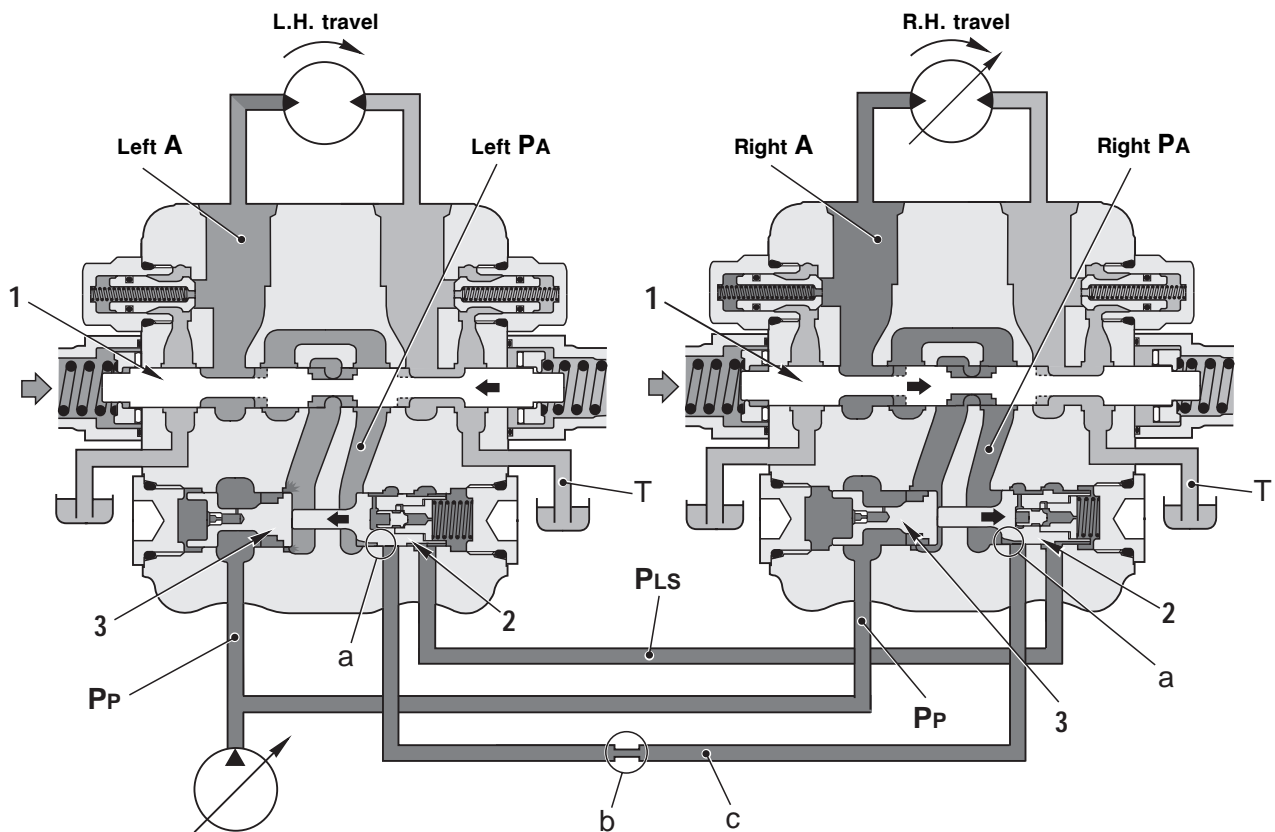
### 3. Operation for each function and valve

#### Hydraulic circuit diagram and names of valves



1. Unload valve  
LS pressure + 23 bar (25 kg/cm<sup>2</sup>)
2. Main relief valve (P1 Port)  
265 bar (270 kg/cm<sup>2</sup>)
3. Pressure compensation valve
4. Suction valve
5. Safety valve  
294 bar (300 kg/cm<sup>2</sup>)
6. Main relief valve (P2 Port): 216 bar (220 kg/cm<sup>2</sup>)
7. Lift check valve
8. Cooler bypass valve  
Cracking pressure: 8.1 bar (8.3 kg/cm<sup>2</sup>)

D0401139



D0401094

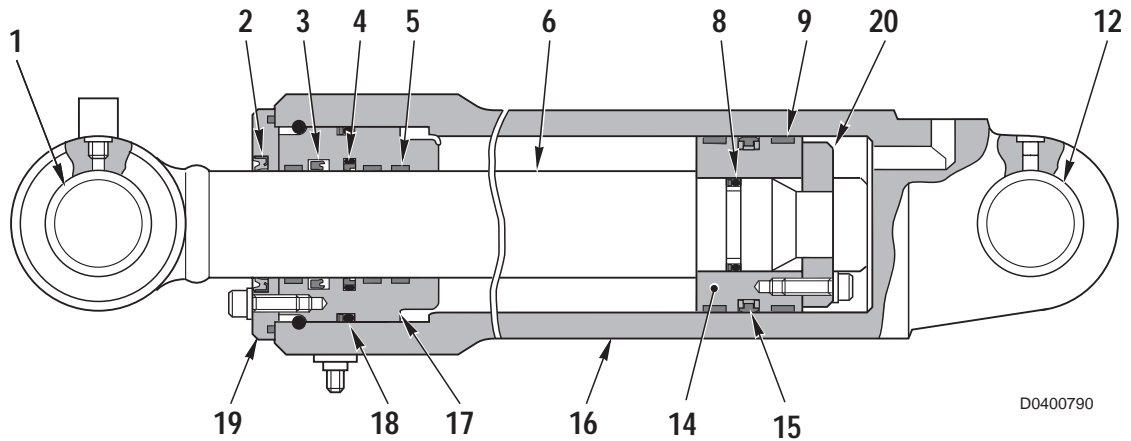
#### When the travel steering is operated

- During the straight travel status, if the L.H. travel spool (L.H. 1) is returned to the NEUTRAL side to operate the steering, difference is generated between the L.H. and R.H. travel actuator circuits  $P_A$ 's ( $R.H. A > L.H. A$ ), and the  $LS$  pressure  $P_{LS}$  becomes the same as  $R.H. A$  which has the higher load pressure.
- By this action, the flow control valve (3) at the L.H. travel side is pushed to the left ( $\leftarrow$ ) by the  $LS$  circuit  $P_{LS}$ , i.e. the load pressure  $R.H. A$  of the R.H. travel, and the opening of the notch a at the left side is closed, shutting off the path between the L.H. and R.H. travel circuits, enabling steering operation.
- Furthermore, the damper b is provided to ease the transient characteristics of rapid opening/closing of the path circuit when the spool is rapidly operated.



**BOOM SWING, BLADE, 2-PIECE BOOM**

(★ The figure shows the blade cylinder)



D0400790

- |                         |                            |                         |
|-------------------------|----------------------------|-------------------------|
| 1. Head bushing         | 8. Washer                  | 15. Washer              |
| 2. Guard ring           | 9. Wear ring               | 16. Cylinder            |
| 3. Washer               | 10. Nut                    | 17. Head-piece          |
| 4. Washer               | 11. Bottom cushion plunger | 18. Washer              |
| 5. Wear ring            | 12. Bottom side bushing    | 19. Coupling flange     |
| 6. Piston rod           | 13. Ball (No. 12)          | 20. Half-flange (No. 2) |
| 7. Head cushion plunger | 14. Piston                 |                         |

Cylinder	Boom	2-piece boom	Arm	Bucket	Boom swing	Blade
Piston rod diameter	70	50	60	55	60	60
Cylinder inside diameter	110	90	95	85	100	120
Piston stroke	765	580	905	730	650	215
Max. cylinder length	1965	1510	2245	1810	1650	790
Min. cylinder length	1200	930	1340	1080	1000	575
Piston nut width across flat	70	—	—	55	—	—

## FUNCTION

### 1. At neutral

Ports **A** and **B** of the control valve and Ports **P1** and **P2** of the PPC valve are connected to drain chamber **D** through fine control hole **f** in spool (1). (Fig. 1)

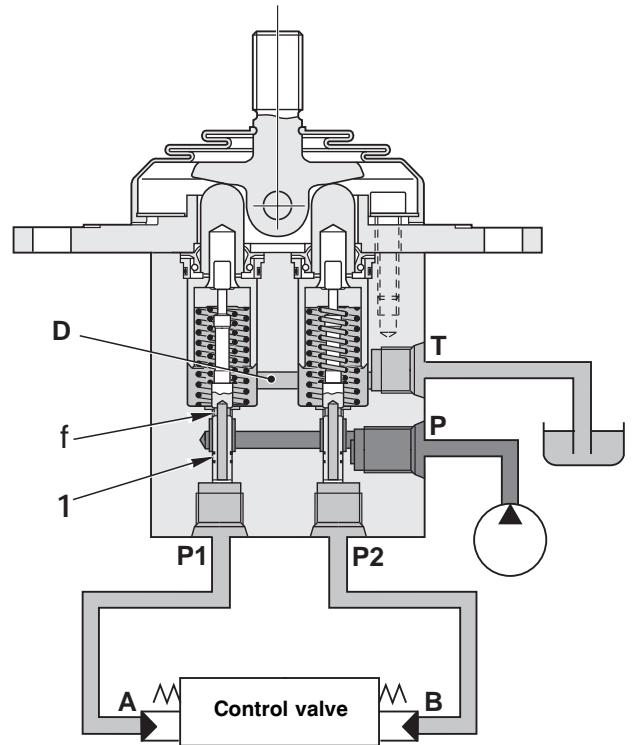


Fig. 1

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### 2. During fine control (NEUTRAL → fine control)

When piston (4) starts to be pushed by lever (5), retainer (7) is pushed; spool (1) is also pushed by metering spring (2), and moves down.

When this happens, fine control hole **f** is shut off from drain chamber **D**, and at almost the same time, it is connected to pump pressure chamber **Pp**, so pilot pressure oil from the control pump passes through fine control hole **f** and goes from Port **P1** to Port **A**.

When the pressure at Port **P1** becomes higher, spool (1) is pushed back and fine control hole **f** is shut off from pump pressure chamber **Pp**.

At almost the same time, it is connected to drain chamber **D** to release the pressure at Port **P1**. When this happens, spool (1) moves up or down so that the force of metering spring (2) is balanced with the pressure at Port **P1**. The relationship in the position of spool (1) and body (8) (fine control hole **f** is at a point midway between drain hole **D** and pump pressure chamber **Pp**) does not change until retainer (7) contacts spool (1).

Therefore, metering spring (2) is compressed proportionally to the amount of movement of the control lever, so the pressure at Port **P1** also rises in proportion to the travel of the control lever. In this way, the control valve spool moves to a position where the pressure in chamber **A** (the same as pressure at Port **P1**) and the force of the control valve spool return spring are balanced. (Fig. 2)

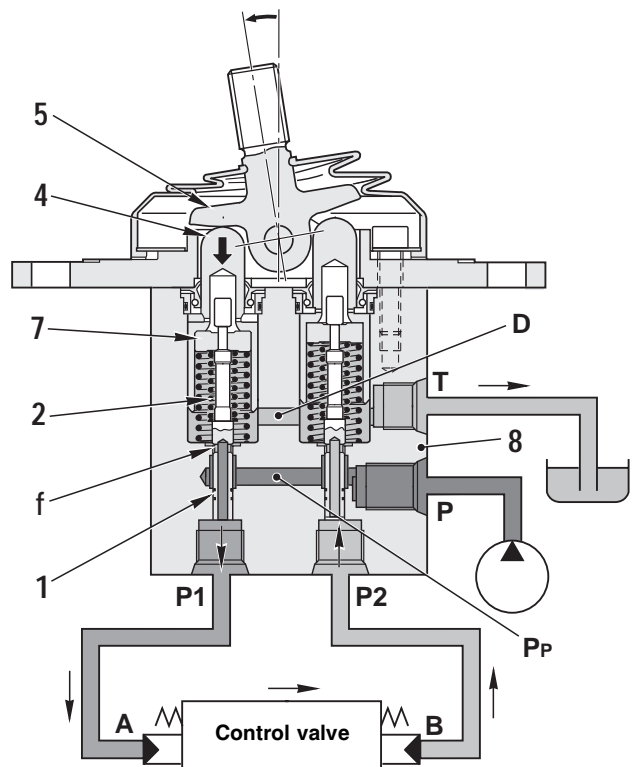
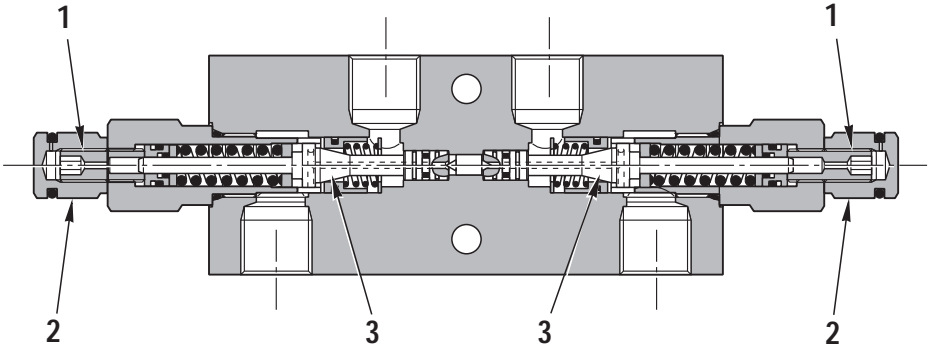
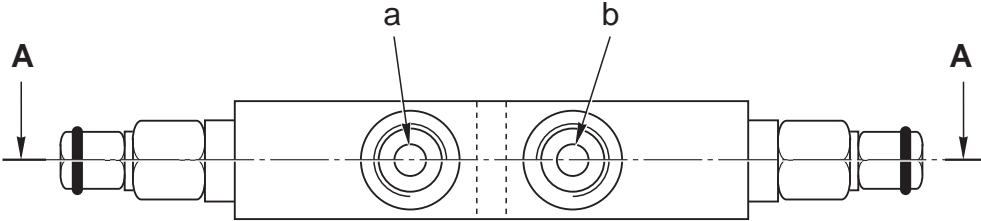


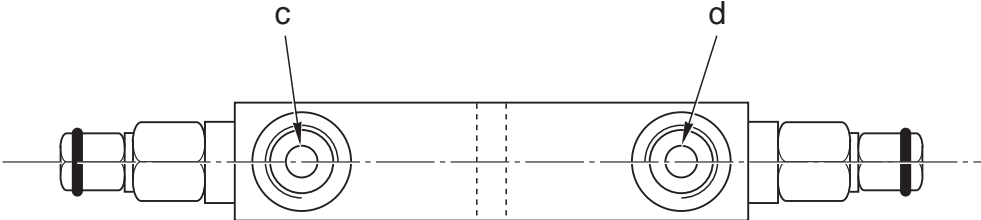
Fig. 2

D0400800

# 2-PIECE BOOM SAFETY VALVE



Section A - A

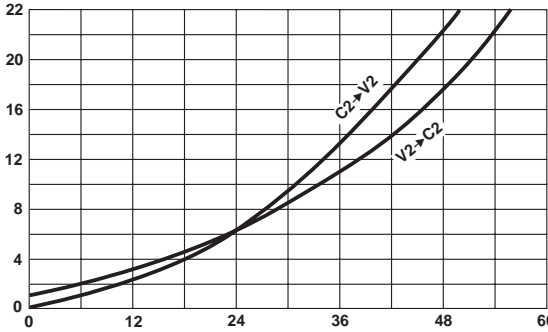


D0400793

- 1. Screw
- 2. Plug
- 3. Valve
  
- a. C1 Port - To 2-piece boom (Head side)
- b. C2 Port - To 2-piece boom (Bottom side)
- c. V1 Port - From control valve (A10 Port)
- d. V2 Port - From control valve (B10 Port)

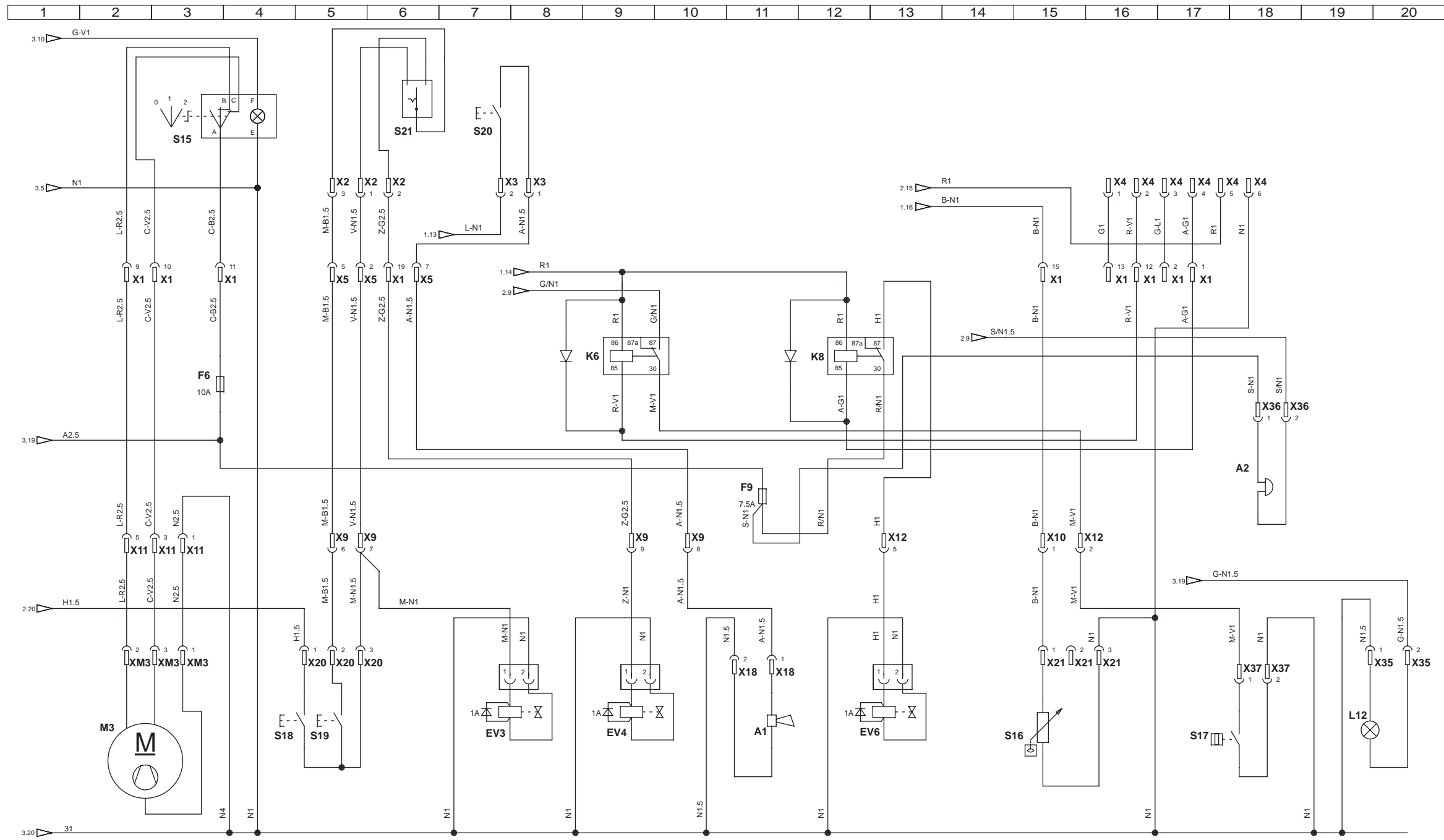
### SPECIFICATIONS

Pilot ratio: 4.25:1



D0400794

# ELECTRICAL DIAGRAM (4/4)



D0401311

## COMPONENTS

- A1 - Acoustic horn
- A2 - Alarm buzzer
- K6 - TBG relay
- K8 - Speed increase relay
- L12 - Optional service light
- M3 - Heating electric fan
- S15 - Fan speed selector
- S16 - Fuel level gauge
- S17 - Anti-tilting pressure-switch
- S18 - Hammer push-button

- S19 - Hammer push-button
- S20 - Horn push-button
- S21 - Clamshell bucket switch
- EV3 - Hammer solenoid valve
- EV4 - Bucket solenoid valve
- EV6 - Speed increase solenoid valve

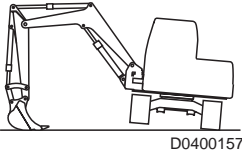
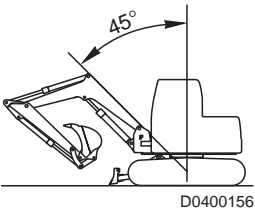
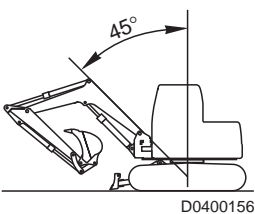
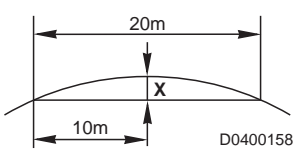
## FUSES

- F6 - Fan fuse
- F9 - Buzzer alarm fuse

## CONNECTORS

- X1 - 21-way connector for right-hand dashboard
- X2 - 3-way connector for bucket switch
- X3 - 2-way connector for horn push-button
- X4 - 6-way connector for optional function
- X5 - 5-way connector for right-hand dashboard
- X9 - 11-way connector for left-hand light line
- X10 - 5-way connector for right-hand light line
- X11 - 5-way connector in box for fan motor
- X12 - 9-way connector for solenoid valve line
- X18 - 2-way connector for horn
- X20 - 3-way connector for hammer push-button
- X21 - 3-way connector for fuel level gauge
- X35 - 2-way connector for service light socket
- X36 - 2-way connector for buzzer
- X37 - 2-way connector for anti-tilting pressure switch
- XM3 - Connector for heating electric fan

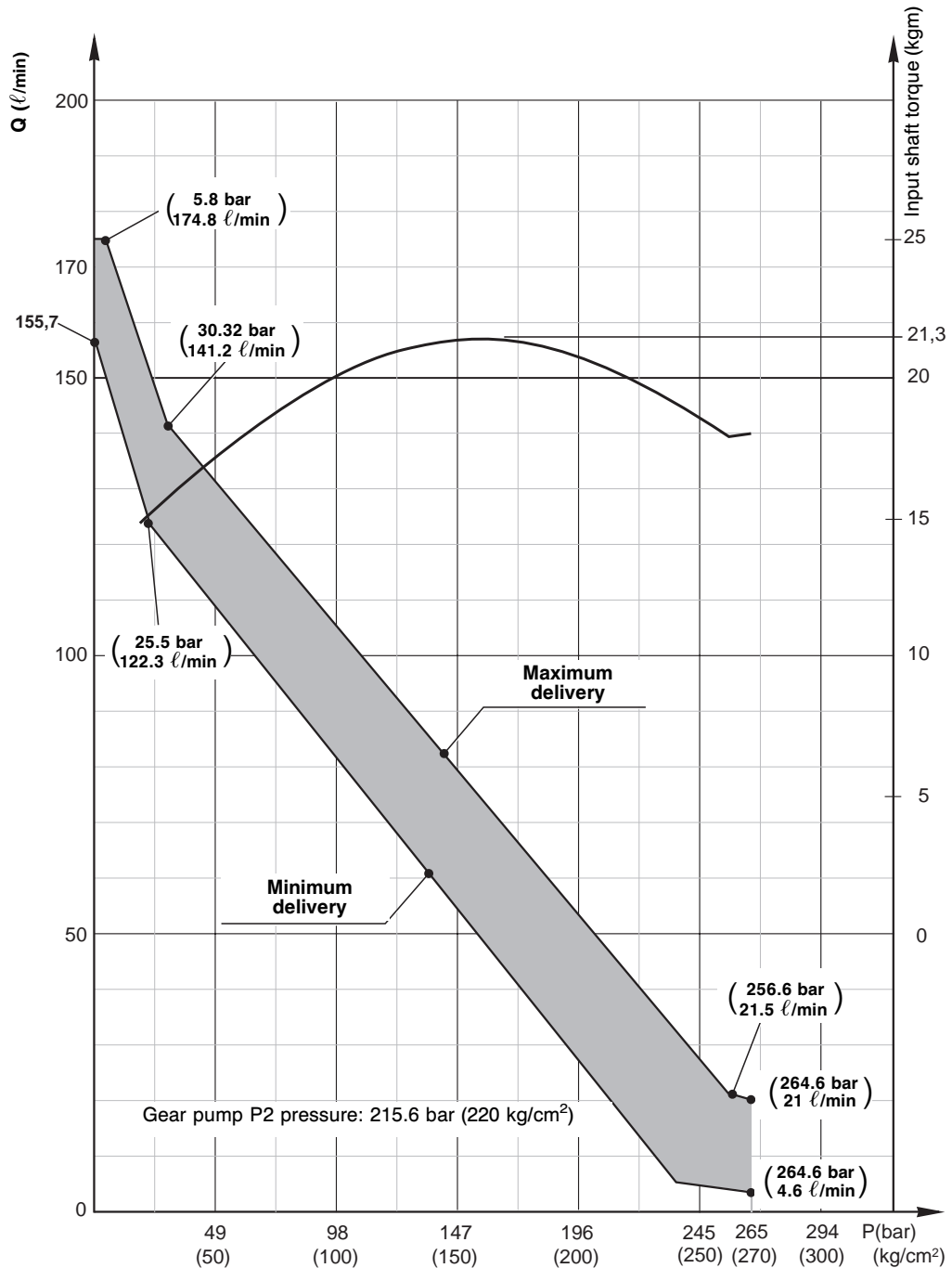
● FOR MACHINE

Machine model				PC75-1		
Classification	Check item	Test conditions	Unit	Standard value	Permissible value	
Travel	Travel motor swing speed (1) (no-load)	Measuring posture 	Low speed	rpm	20	Min. 17
		<ul style="list-style-type: none"> <li>● Engine speed: high idling</li> <li>● Oil temperature: 45 – 55°C</li> <li>● Rest the bucket on the ground, raise one track-shoe and mark a position on the reduction unit. Measure the rotating speed of the sprocket wheel. Repeat for the 2<sup>nd</sup> track-shoe</li> </ul>	High speed		32	Min. 28
	Travel speed (2)	Measuring posture 	Low speed	sec	24	Max. 27 Min. 21
<ul style="list-style-type: none"> <li>● Engine speed: high idling</li> <li>● Oil temperature: 45 – 55°C</li> <li>● On flat ground</li> <li>● Travel for at least 10 metres and then check on the time needed to cover 20 metres</li> </ul>	High speed	14	Max. 16 Min. 12			
Travel deviation		<ul style="list-style-type: none"> <li>● Engine speed: high idling</li> <li>● Oil temperature: 45 – 55°C</li> <li>● Travel 20 metres on flat ground and measure the deviation.</li> <li>★ The surface must be hard and horizontal.</li> </ul> 	mm	200	Max. 250	
		<ul style="list-style-type: none"> <li>★ Measure dimension «X»</li> </ul>				

## Classification

- Delivery of individual piston pumps P1
- WORKING MODE selector: position P
- Pump speed: 2300 rpm.
- Oil temperature: 45 – 55°C.

## Pump characteristics



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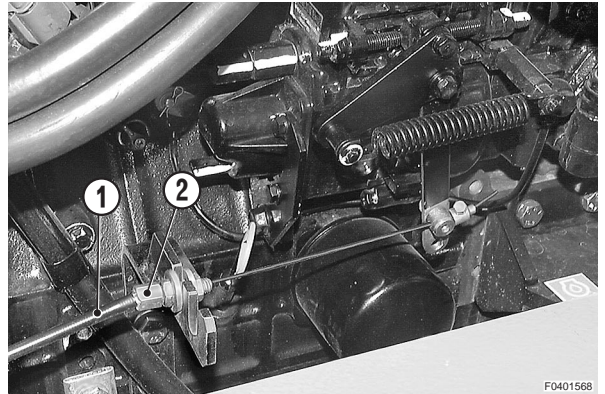
- ★ When measuring the deliveries with the pumps mounted on the machine, it becomes difficult to use the accelerator to set the number of engine rpm corresponding to the test speed prescribed for the pump.  
Measure the delivery with the engine set to 2300 rpm, and perform a proportional calculation to find the delivery value required for the test.

## ADJUSTING THE STROKE OF THE ACCELERATOR LEVER

★ Test conditions:

- Engine: Switched off, but at working temperature.
- Low idling: within correct range.
- Hydraulic oil: 45–55°C
- Accelerator lever at the mid-point of its stroke.

1 - Use the stretcher (2) to eliminate clearance in the jacket (1).



2 - Raise the right-hand cover in order to reach the screws (3) and (4).

3 - Unscrew the nuts (5) and (6) and tighten the screws (3) and (4) in the support.

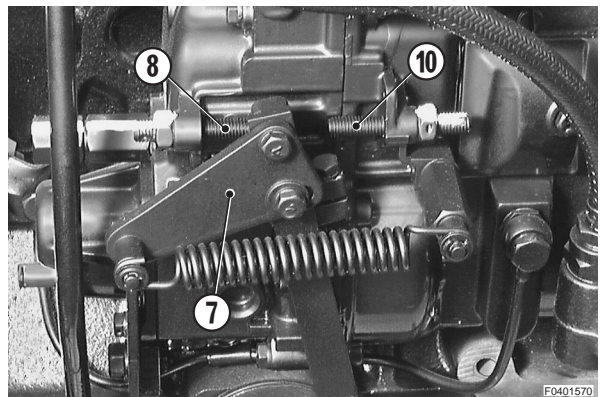
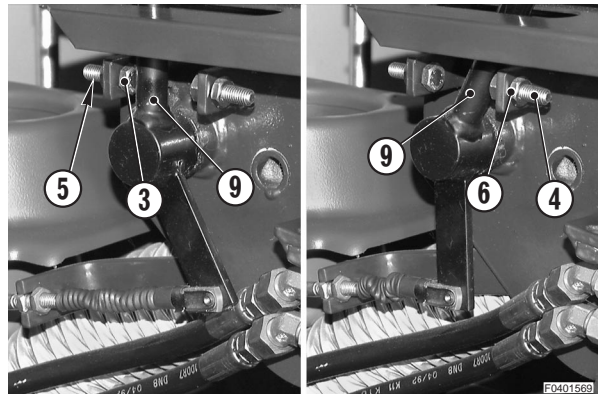
4 - Move the accelerator lever (9) slowly towards low idling position. Stop this movement when the lever (7) on the cover of the injection pump comes into contact with the low idling adjustment screw (8).

5 - Adjust the screw (3) until it is 0.1 mm from the lever (9) and lock it in this position with the nut (5).

6 - Move the lever (9) towards the high idling position. Stop this movement when the lever (7) on the cover of the injection pump rests against the lead-sealed high idling adjustment screw (10).


7 - Adjust the screw (4) to 0.1 mm from the lever (9) and lock it in this position with the nut (6).

- ★ After adjustment, replace the right-hand cover and check that the aperture does not impede the movement of the lever (9) towards its extreme positions.



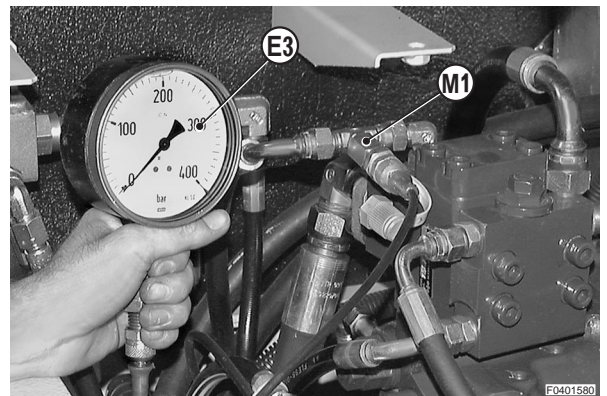
## TESTING AND SETTING OF MAIN VALVES

- ★ Check condition:
  - Engine: at working temperature
  - Engine idling MIN. and MAX.: within standard values
  - Hydraulic oil: 45 – 55°C
  - WORKING MODE selector: position P
  - Swing lock pin: applied.

 Release the remain pressure from circuits.  
(See «REMAIN PRESSURE REMOVAL FROM CIRCUITS»).

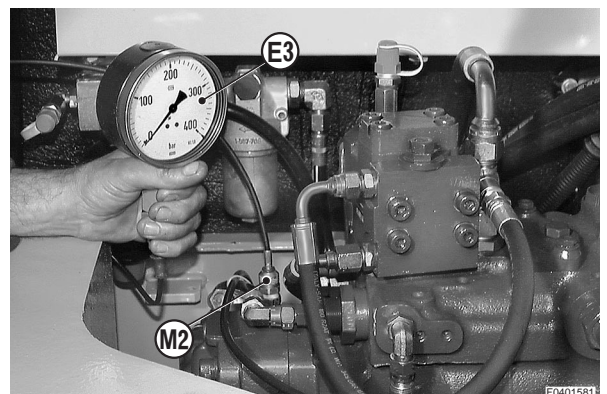
### 1. Main valve Section 1

- 1 - Connect to pressure port **M1** the gauge **E3** (400 bar).
  - 2 - Start the engine and bring the accelerator on high idling speed position.
  - 3 - Acting on one of upper attachments (boom, arm, bucket) bring the piston rod at the end of its stroke and check that the pressure value reading on gauge is  $265 \pm 5$  bar ( $270 \pm 5$  kg/cm<sup>2</sup>).
- ★ If the reading values on gauge are not the same as shown, proceed to main valves setting.



### 2. Main valve Section 2

- 1 - Connect to pressure port **M1** the gauge **E3** (400 bar).
  - 2 - Start the engine and bring the accelerator on high idling speed position.
  - 3 - Raise the blade up to the end of stroke and check that the gauge connected to port **M2** shows a pressure of  $206 \pm 5$  bar ( $210 \pm 5$  kg/cm<sup>2</sup>).
  - 4 - Put the blade on the ground and make the upper structure swing on both directions; check that the gauge connected to port **M2** shows a pressure value of  $206 \pm 5$  bar ( $210 \pm 5$  kg/cm<sup>2</sup>).
- ★ If the pressure values are lower than the value shown, check the safety valves of swing motor.



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## MEASURING INNER OIL LEAKAGE OF TRAVEL MOTOR

**⚠** When measuring oil leakage from the travel motor, mistaken operation of the levers can lead to accidents.

Make this works using two persons and always follow agreed signals when measuring.

★ Check condition:

- Hydraulic oil: 45 – 55°C
- WORKING MODE selector: position P
- Tracks tension: within the permissible values
- Upper structure: turned of 180°.

1 - Remove the covers (1).

2 - Disconnect drain hose (2) from the travel motor to check and fit a blind plug at the hose end.

3 - Connect to travel motor a temporary hose «A» to catch possible oil leakages.

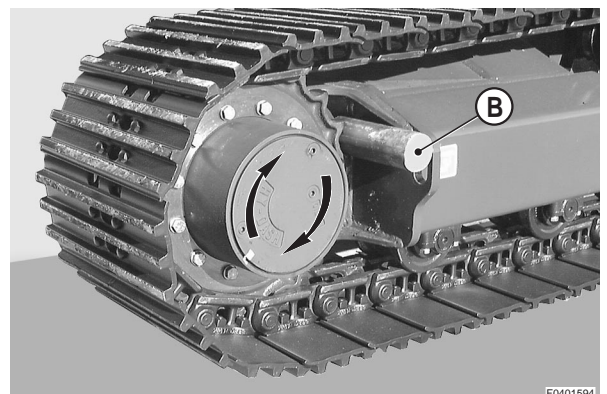
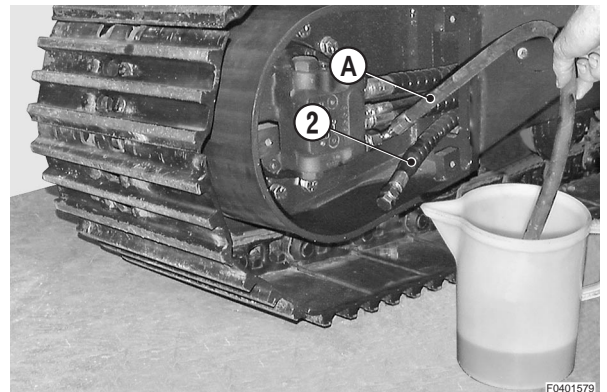
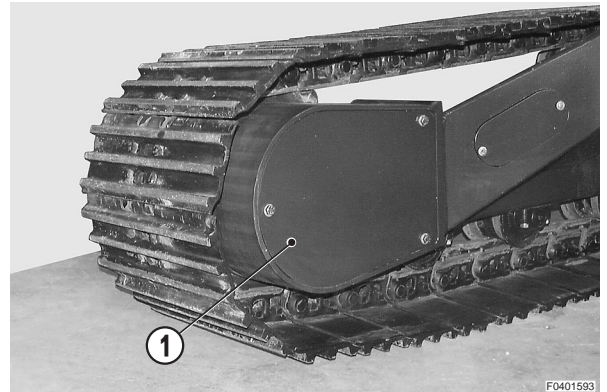
4 - Put a steel bar «B» of 70mm diameter between sprocket and frame.

5 - Run the engine and start to rotate the blocked sprocket; bring gradually the engine at full throttle and bring the travel lever control to the end of its stroke.

6 - Relieve the circuit for 30 seconds and then measure the leakage for the next minute.

★ When measuring, move the motor slightly (move the position of the valve plate and cylinder, and piston and cylinder), and measure several times.

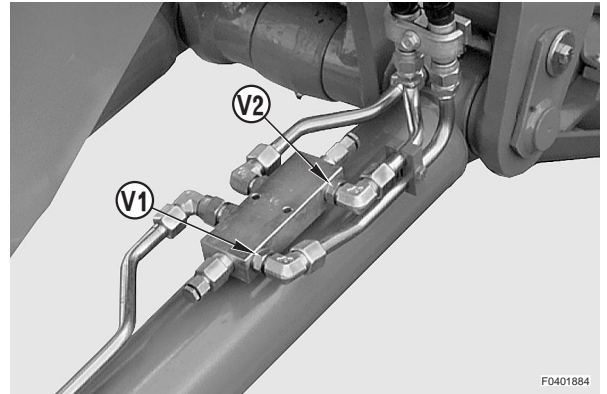
7 - Stop the engine and, with the same procedure, make the measuring for the other travel motor.



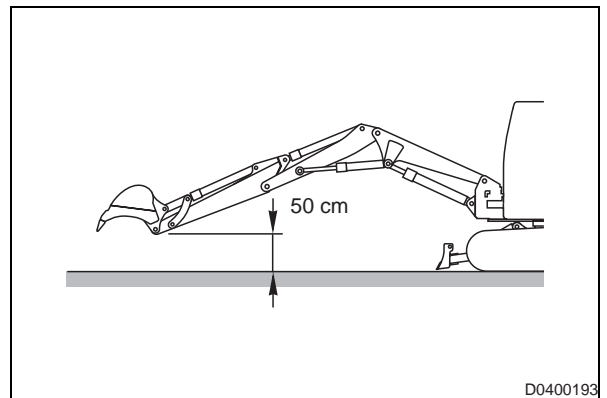
**5. Testing the functionality of the 2<sup>nd</sup> boom safety valves**

★ This test should be performed after having ascertained that the drift is not due to the cylinders. (See «2<sup>nd</sup> BOOM TEST») and after having checked the adjustment of the safety valves (See «ADJUSTING 2<sup>nd</sup> BOOM SAFETY VALVES»).

- 1 - Position the machine with the arm and 2<sup>nd</sup> boom fully extended. Rest the bucket teeth on the ground.
- 2 - Stop the engine and relieve any residual hydraulic pressures.
- 3 - Disconnect the connecting tubes of the safety valves (two pipes of ports **V1** and **V2** for each valve).
- 4 - Start the engine and raise the boom.
- 5 - Stop the engine and check the position of the 2<sup>nd</sup> boom for 5 minutes.
  - If the 2<sup>nd</sup> boom tends to close, both safety valves are defective.



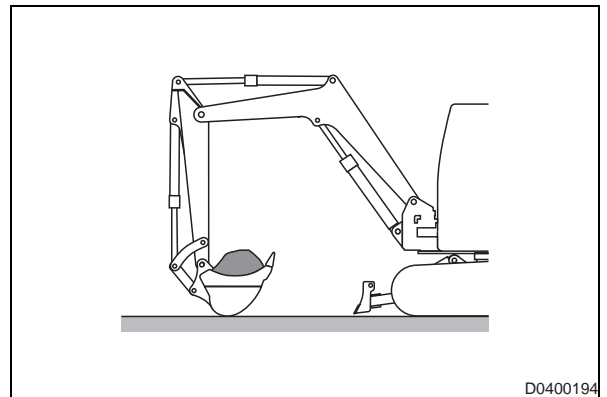
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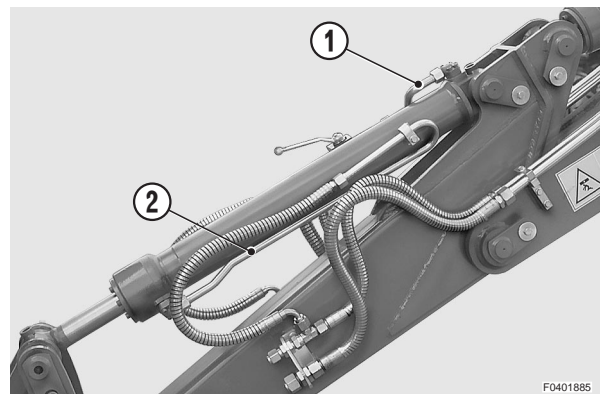
D0400193

**6. Bucket test**

- 1 - Position the machine with the arm vertical and the bucket horizontal and resting on the ground. Put a weight in the bucket, or fill it with earth.
- 2 - Stop the engine and release any residual hydraulic pressure.
- 3 - Disconnect the pipes (1 and 2) of the bucket cylinder and cap them to prevent entry of impurities.
- 4 - Cap the hole in the bucket cylinder on the bottom side and attach a provisional hose on the head side to collect any oil leakages.



D0400194

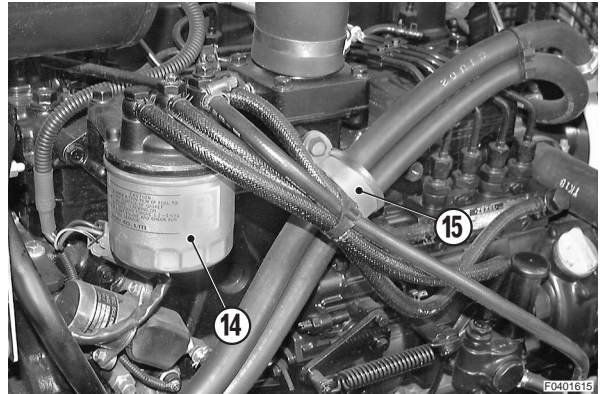


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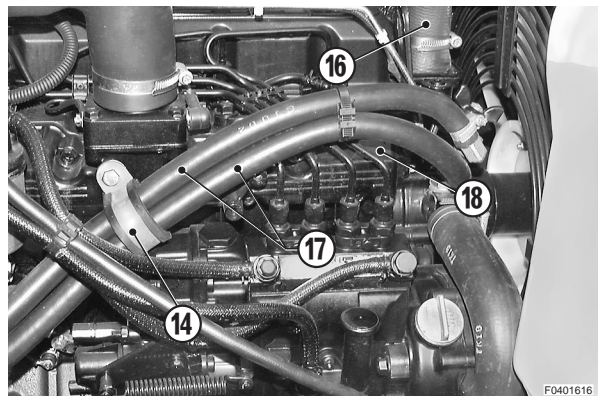
## SPECIAL TOOLS

Nature of work	Symbol	Code	Description	Q.ty	Notes	
Removal/Installation revolving frame Installation of swing machinery for revolving frame	A	1	ATR201320	Coupling for brake/swing release	1	—
		2	ATR200400	Rear raising equipment	1	—
		3	ATR200410	Front raising equipment	1	—
Removal/Installation of counterweight Disassembly/Assembly of cylinder nut	B	1	ATR800230	Dynamometric wrench with multiplier	1	Max. 700 kgm (700 dNm)
Removal/Installation of track-shoes	C	1	ATR200460	Pin removing tool	1	For track-shoe joint pin - idler
		2	ATR200450	Raising equipment		For idlers
Removal/Installation of swing circle	D	1	ATR200420	Swing circle raising equipment	1	—
Disassembly/Assembly the recoil spring group	E	1	ATR200430	Press equipment	1	—
Disassembly/Assembly the cylinders	F	1	ATR200470	Pliers for mounting gaskets	1	All cylinders
		2	ATR200480	Ø 50 calibrator	1	To calibrate piston rod gaskets
			ATR201330	Ø 55 calibrator	1	
			ATR200490	Ø 60 calibrator	1	
			ATR200500	Ø 70 calibrator	1	
		3	ATR201030	Ø 85 plunger	1	To assemble piston gaskets
			ATR200510	Ø 90 plunger	1	
			ATR200520	Ø 100 plunger	1	
			ATR201340	Ø 110 plunger	1	
			ATR200530	Ø 120 plunger	1	
		4	ATR201030	Ø 85 calibrator ring	1	To calibrate piston gaskets
			ATR200540	Ø 90 calibrator ring	1	
			ATR200550	Ø 100 calibrator ring	1	
			ATR201350	Ø 110 calibrator ring	1	
			ATR200560	Ø 120 calibrator ring	1	
		5	ATR200570	Ø 50 insertion bushing for piston rod	1	To mount flange and head
			ATR201360	Ø 55 insertion bushing for piston rod	1	
			ATR200580	Ø 60 insertion bushing for piston rod	1	
			ATR200590	Ø 70 insertion bushing for piston rod	1	
		6	ATR200600	Pliers for mounting snap-ring	1	All cylinders
		7	ATR800240	Socket wrench (6-point 55)	1	Bucket cylinders
			ATR800250	Socket wrench (6-point 70)	1	Boom and arm cylinder
		8	ATR200610	Tool for disassembly and assembly cylinders	1	All cylinders

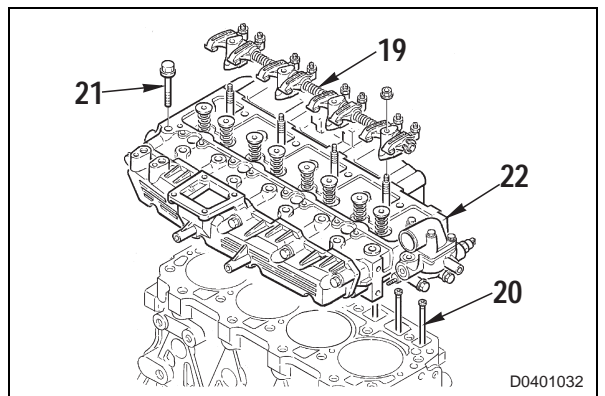
- 9 - Remove fuel filter (14).
- 10 - Remove clip (15).



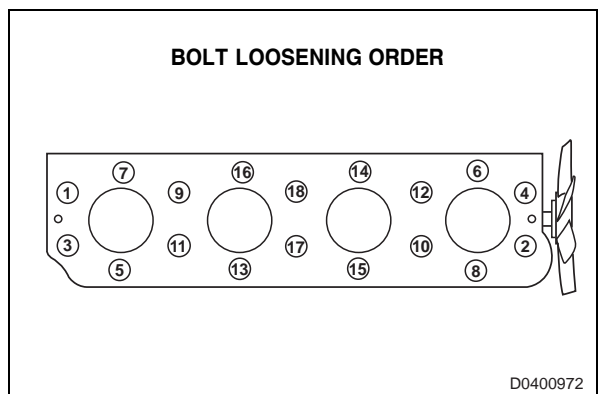
- 11 - Disconnect coolant pipe (16) and heating pipe (17) from cylinder head.
- 12 - Remove nozzle holder. (For details, see «REMOVAL OF NOZZLE HOLDER»).



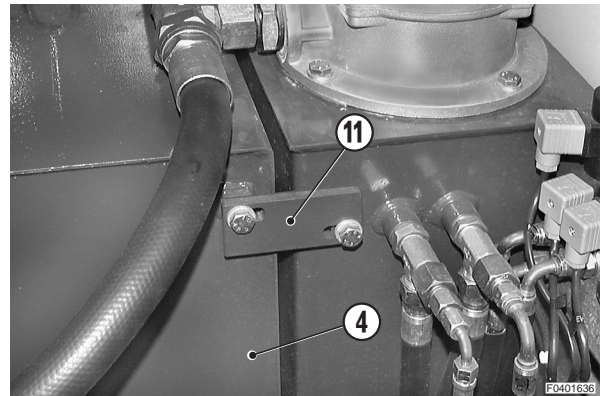
- 13 - Remove the valve-tappets cover (18). ※ 5
- 14 - Remove the rocker shaft (19).
  - ★ Loosen lock nut and unscrew valve tappets of 2-3 turns. ※ 6
- 15 - Remove the push rods (20).



- 16 - Remove screw (21) and the cylinder head (22) following the indicated order for bolts loosening. ※ 7
  - ★ Bolts loosening order: see illustration
  - ⚠** Loosen cylinder head bolts in two stages.




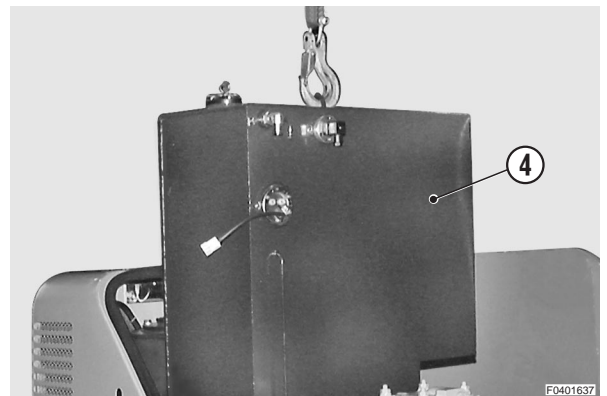
7 - Disconnect the plate (11) that joins the tanks.



8 - Hook the tank (4) to the hoisting equipment and slightly put the rope under tension.

9 - Remove the screws and remove the tank.

 Fuel tank: 40 kg



## INSTALLATION OF FUEL TANK

- To install, reverse the removal procedure.
- ★ Fill the fuel tank and start the engine.

## REMOVAL OF GEAR-PUMP

**⚠** Lower the work equipment until it is resting on the ground and switch off the engine.

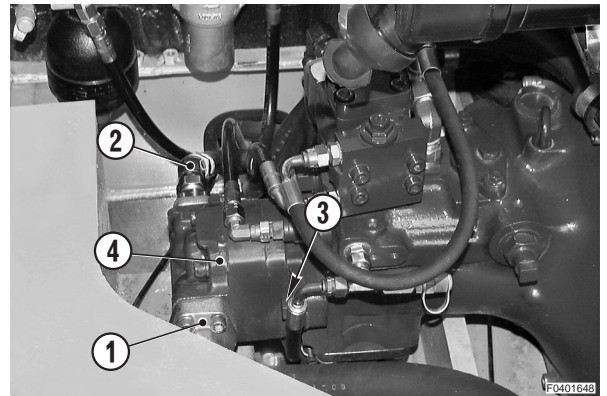
**⚠** Release residual pressures from all circuits. (For details, see «20. TESTING AND ADJUSTMENTS»).

- Drain the hydraulic oil.

 Quantity of oil: 70 ℓ

1 - Disconnect the suction flange (1) and the delivery pipe (2) from the pump. ※ 1

2 - Remove the bolts (3) and the pump (4), the joint (5) and the gasket (6). ※ 2




## INSTALLATION OF GEAR-PUMP

- To install, reverse the removal procedure.


※ 1

★ Before connecting the suction flange, check the condition of the seal and keep it in its seat by applying grease ASL800050.

 Flange screws:  $35 \pm 3.5$  Nm ( $3.6 \pm 0.3$  kgm)


※ 2

 Joint: ASL800050

 Pump fastening screws:  
98 – 123 Nm (10 – 12.5 kgm)

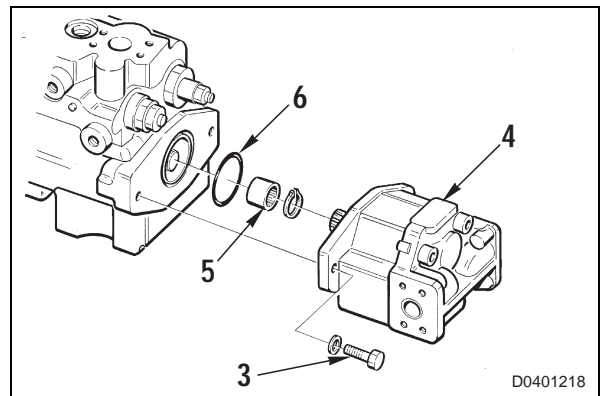
1 - Fill the hydraulic oil tank to maximum level.

**⚠** While filling, bleed air from the main pump piston. (For details, see «20. TESTING AND ADJUSTMENTS»).

 Hydraulic oil needed: 70 ℓ

2 - Start the engine to circulate the oil and check that there are no leakages.

3 - Switch off the engine, check the level and, if necessary, top it up.



D0401218

## REMOVAL OF CONTROL VALVE

**⚠** Lower the work equipment until it is resting on the ground and switch off the engine.

**⚠** Release residual pressures from all circuits. (For details, see «20. TESTING AND ADJUSTMENTS»).

★ Mark all pipes before removal.

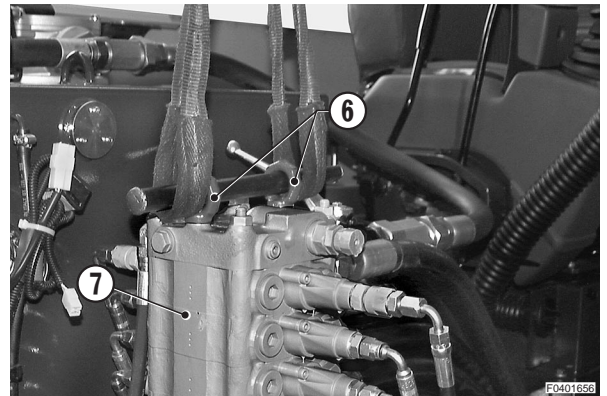
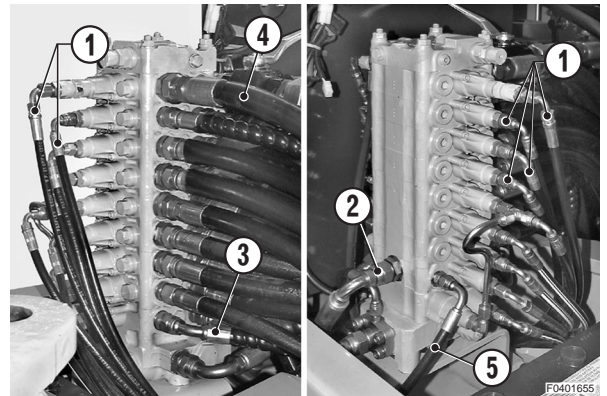
1 - Disconnect pipes in the following sequence: servo control pipes (1), feed pipes (2), exhaust pipes (3), function pipes (4) and LS pipes (5).

★ Plug all holes so as to keep out impurities.


2 - Fit the unit with two eyebolts (6). (M8x1.25)

3 - Hook the unit (7) to the hoisting equipment and slightly put the ropes under tension.

4 - Remove screws (8) (No. 3) and remove the control valve.




※ 1

 Complete control valve: 55 kg

## INSTALLATION OF CONTROL VALVE

● To install, reverse the removal procedure.

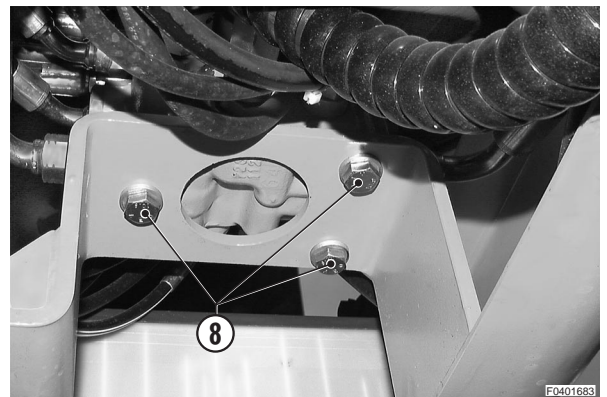
※ 1

 Control valve check screws: 190 Nm (195 kgm)

 Control valve check screws: Loctite 262


1 - Check the level of the tank; start the engine to allow oil to circulate to all parts of the equipment. Switch off the engine and top up the oil level.

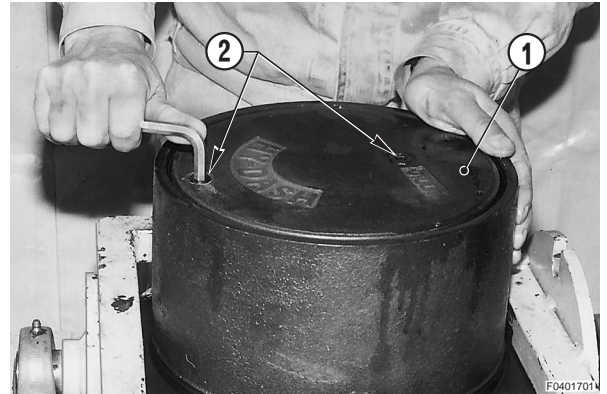
2 - Bleed air from all parts of the equipment. (For details, see «20. TESTING AND ADJUSTMENTS»).



### 3. Draining gear oil

- 5 - Turn the unit upside down and partially extract the three plugs (2) from the cover (1).  
Turn the unit upside down again and remove the plugs (2) to drain the gear oil.

 Reduction gear oil: approx. 1.7 ℓ

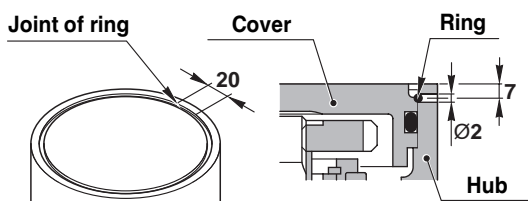


### 4. Removing cover

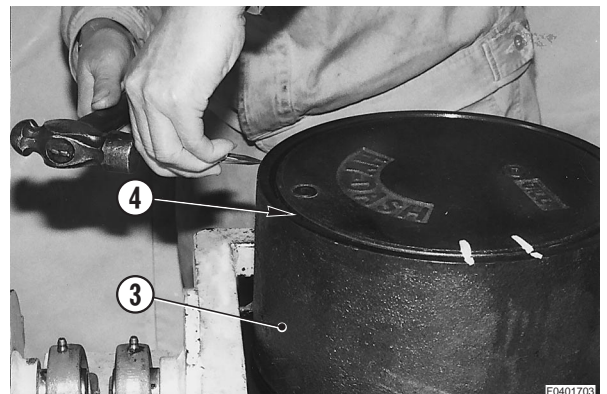
- 6 - Turn the unit upside down bringing the cover (1) to top side.  
Scribe match marks between the hub (3) and the cover (1) by using a paint marker.



- 7 - Locate the gap of ring (4).  
Using a punch, make a mark on the hub (3) at a point about 20 mm from ring (4) end and at 7 mm from the surface of the hub (3).

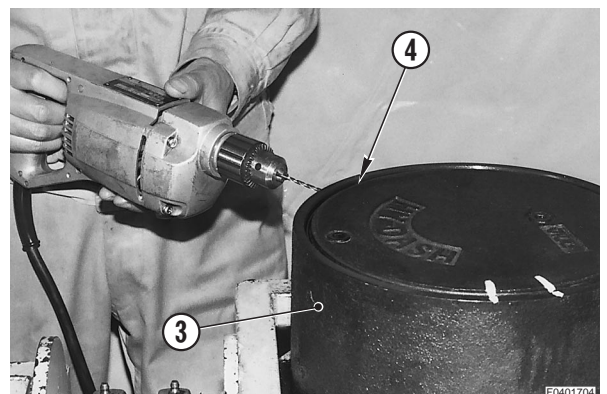


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- 8 - Using an electric drill, make a 2 mm diameter hole at the punch mark as shown at point 7.

- ★ Make sure that the hole is parallel to the surface of the hub (3) and keep drilling until reaching the ring (4).
- ★ After drilling, wipe off chippings and cinders completely.



### 18. Removing flange

45 - Remove the flange (61) from the reduction gear support (60).

- ★ Make match marks across hold flange (61) and reduction gear support (60) by using a paint marker. This to ensure that the parts are in their correct position when re-assembled.

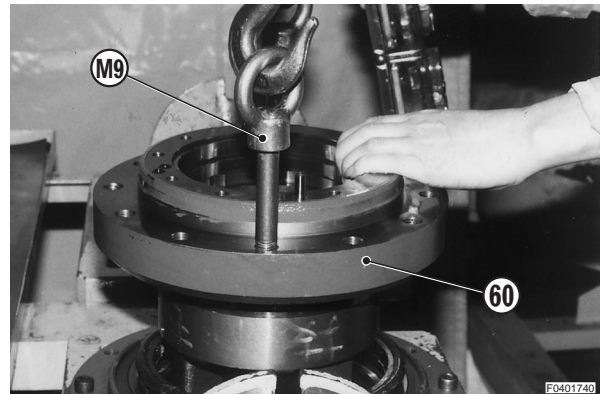
- ⚠ The holes for reamer bolts (63) in the flange (61) are machined with the hold flange attached to the reduction gear support; if one of the parts is damaged, replace the entire assembly at the same time.



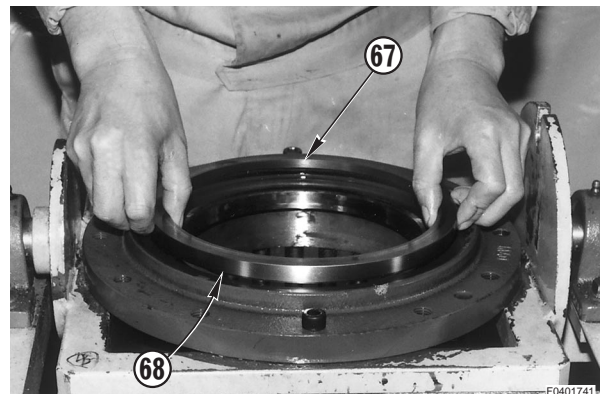
### 19. Removing reduction gear support

46 - Remove the two clamps **M2** applied at point (42) and after screwing two eye-bolts **M9** into two opposing screw-holes, remove the reduction gear support (60) and the floating seal (64), the outer race of bearing (65) and the seal (66).

- ★ The removed floating seal must be disposed of.



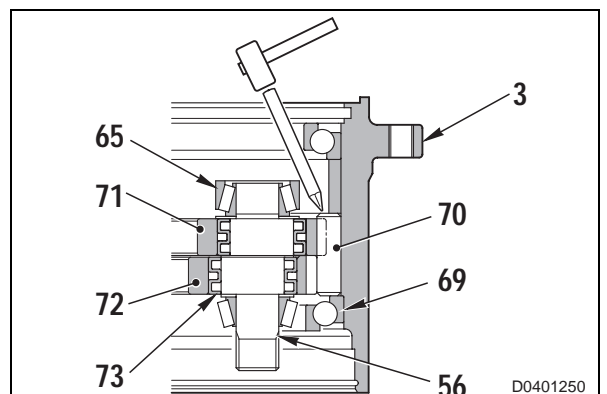
47 - Remove the distance piece (67) and the O-ring (68).



### 20. Removing ball bearings, gears and pins

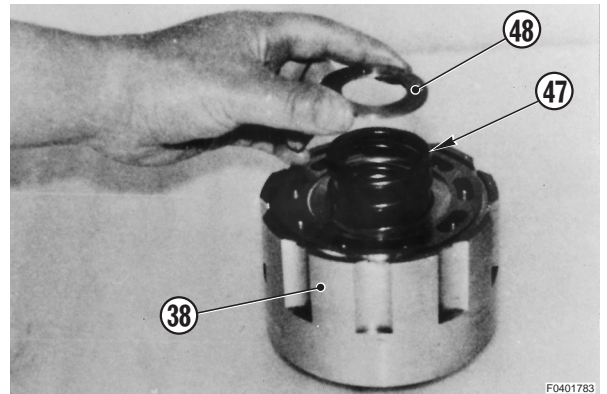
48 - Remove the ball bearing (69) from the hub (3) by simultaneously taking out the pins (70) using a pin punch and a hammer.

Through this process, the RV gear assembly is also removed. The RV gear assembly consists of gear A (71), gear B (72), crankshafts (56), tapered-roller bearings (65) and needle-roller bearings (73).



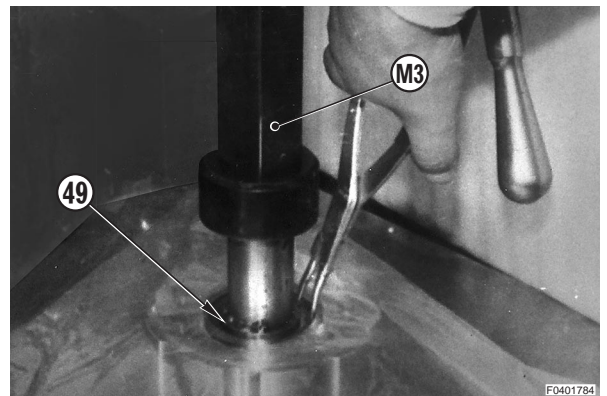
### 9. Cylinder block

28 - Insert washer (48), spring (47), the second washer (48) and the snap ring (49) into the cylinder block.



29 - Place the block under a press and using a retainer **M3** centred on the outer washer (48), press the spring until the snap ring groove becomes cleared. Fit the snap ring.

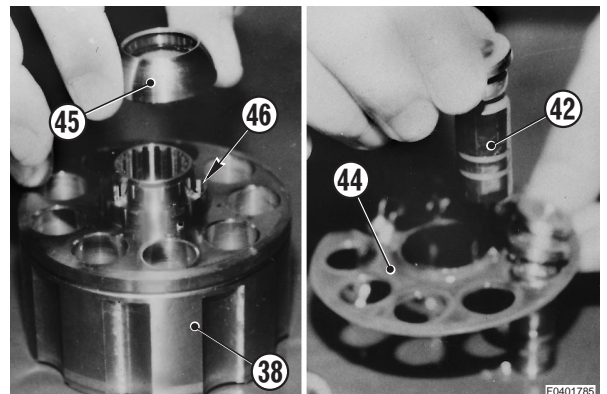
- ★ Protect the surface of the cylinder block to prevent any damage.



### 10. Hydraulic motor parts

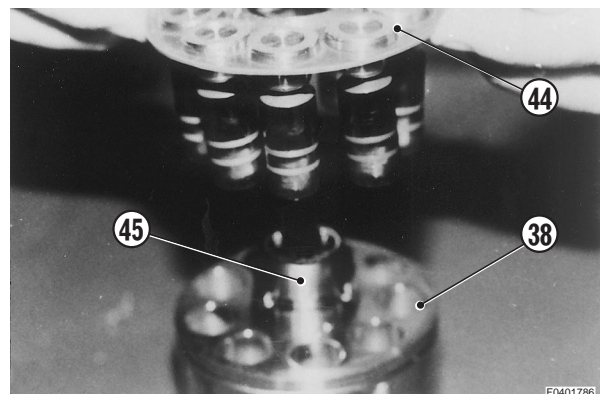
30 - Insert the three dowel pins (46) into the pin holes of the cylinder block (38). Install the thrust ball (45) onto the dowel pins (46).

31 - Insert the 9 pistons (42) into the retainer plate (44) and immerse the sub-assembly in hydraulic oil.



32 - Install the sub-assembly consisting of pistons and retainer-plate into the cylinder block (38).


- ★ Check that the retainer plate (44) fits snugly to the thrust ball (45).



## REMOVAL OF IDLER AND RECOIL SPRING ASSEMBLY


1 - Position the connecting pin (1) of the track shoe above the idler (2).

2 - Slowly loosen the grease nipple (3) to let the grease out and release the track-shoe tension.

 The grease contained in the track-shoe idler is under pressure and could cause serious injury to the operator. For this reason the valve should not be loosened for more than one turn.

★ If the grease does not run out easily, slowly move the machine backwards and forwards.

※ 1

 Rest the work equipment on the ground and switch off the engine.

3 - Remove the connecting pin (1) using the tool **C1**.

★ While taking the track shoe to pieces, support the part of the shoe that encircles the idler by placing a block beneath the shoe ribbing.

4 - Lay the track shoe out on the ground.

5 - Using the tool **C2**, put a sling around the group (4) and draw it out of the track-frame guides (5).

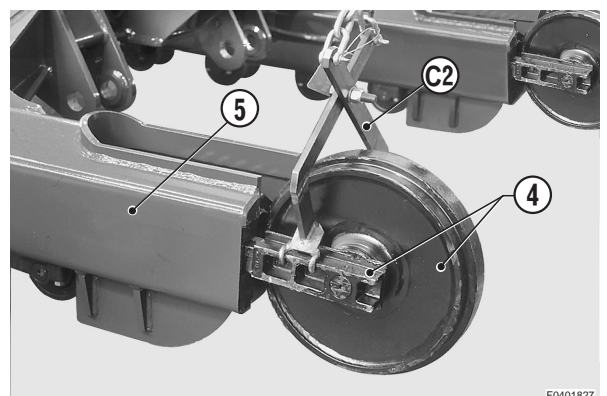
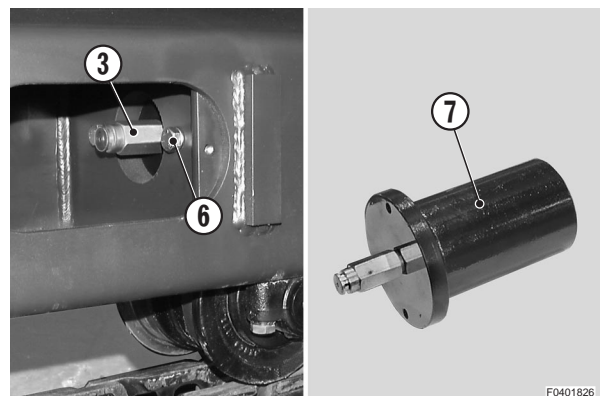
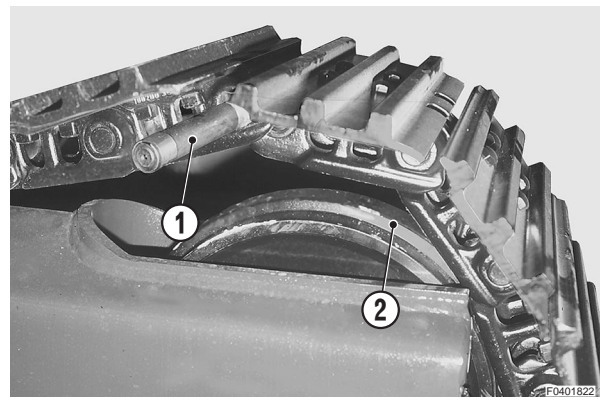
 Complete group: 75 kg

6 - Unscrew and take out the screws (6) and remove the cylinder (7).

★ Take care not to damage the grease nipple (3).

7 - Set the group down firmly on a flat surface, support the track shoe idler (2) and remove the screws (8) that join the track shoe idler group (4) to the recoil spring group (9).

★ Before removing the screws (8) mark the connecting bracket (10) and the spacers.

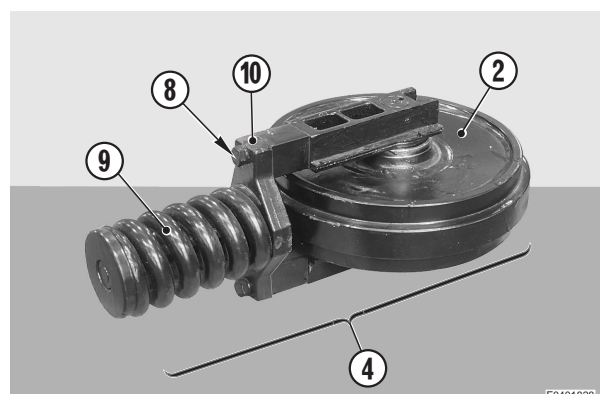


## INSTALLATION OF IDLER AND RECOIL SPRING ASSEMBLY

- To install, reverse the removal procedure.

※ 1

★ Adjust the tension of the track shoe. (For details see «20. TESTING AND ADJUSTMENTS»).



## REMOVAL OF TRAVEL PEDAL CONTROL

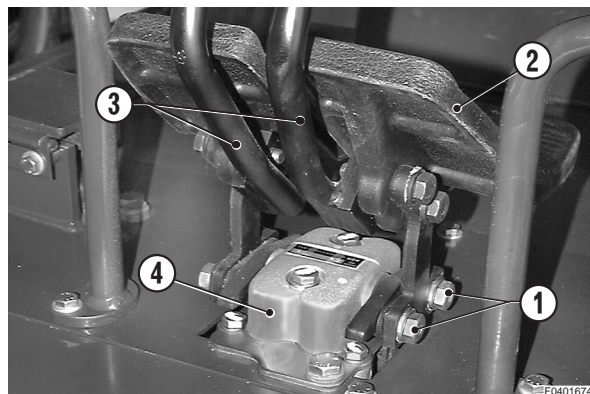
- Rotate the turret by 90° to the left.

**⚠** Lower the work equipment until it is resting on the ground and switch off the engine.

**⚠** Release residual pressures from all circuits. (For details, see «20. TESTING AND ADJUSTMENTS»).

- 1 - Pull out the screws (1) and remove pedals (2) and levers (3).

※ 1



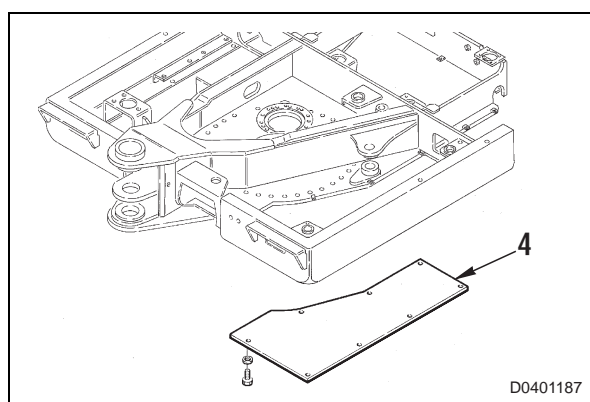
- 2 - Remove the bottom left casing (4).

- 3 - Disconnect the pipes (6) (No. 6) from the pedal control.

★ Make an identifying mark on the pipes to avoid mixing them up during installation.

- 4 - Remove the side connections (7) (No. 2) from the pedal control.

- 5 - Pull out the screws (8) and remove the pedal control (5).



## INSTALLATION OF TRAVEL PEDAL CONTROL

- To install, reverse the removal procedure.

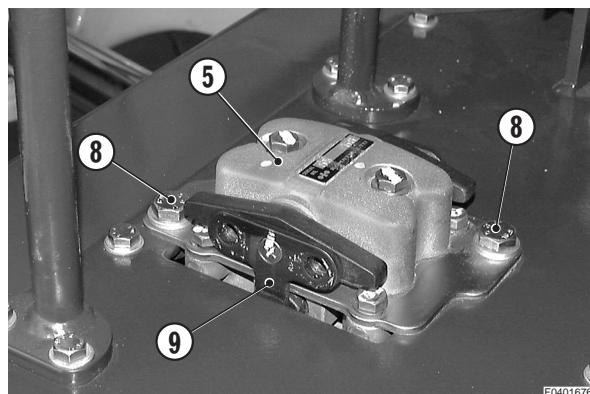
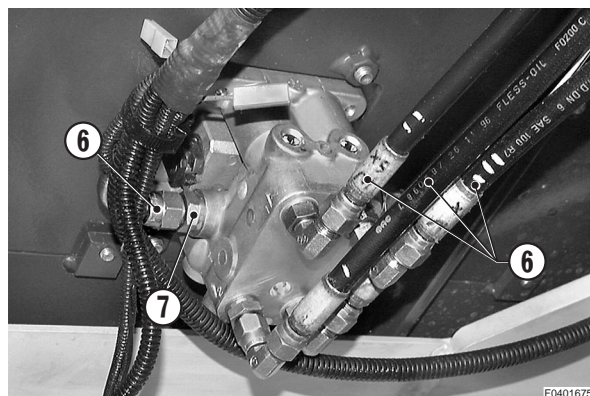
※ 1

★ Before proceeding to the final locking of pedals and levers, check the centring of shifting and the alignment in the neutral position.

**⚠** To equalise shifting, shift the lever (9).

- 1 - Start the engine to circulate the oil.

- 2 - Bleed air from the travel motors (For details, see «20. TESTING AND ADJUSTMENTS»).



## REMOVAL OF BLADE CYLINDER

**!** Swing the upper revolving frame 90° to the right and lower the blade and the work equipment to the ground in their safe positions.

- 1 - Remove the protection (1).
- 2 - Put the blade cylinder (2) in a sling and put the cable under slight tension.
- 3 - Switch off the engine and release pressures in the cylinder by moving the lever of the blade PPC valves several times in both directions.
- 4 - Take out the screw (3) and remove the pin (4).

※1 ※3

- 5 - Start the engine and retract the piston (5). ※2
  - ★ To hold the piston in its completely retracted position, tie it with wire.

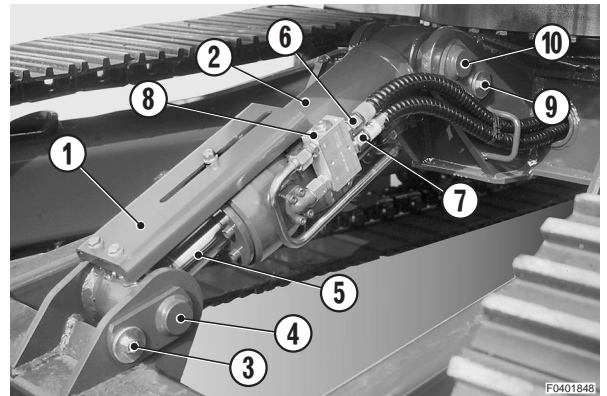
- 6 - Stop the motor and release any residual hydraulic pressures. (For details, see 20. TESTING AND ADJUSTMENTS).

- 7 - Disconnect the tubes (6-7) from the safety valve (8). Plug the tubes and the safety valves to prevent entry of impurities.

- 8 - Take away the screw (9) and remove the pin (10).

※2 ※3

- 9 - Remove the blade cylinder (2).



## INSTALLATION OF BLADE CYLINDER

- To install, reverse the removal procedure.


※1

- ★ Insert the adjustments to a given clearance on both sides of the piston.

※2

- !** When aligning the hole and pin, let the engine run at minimum idling. Do not insert fingers into the hole to check the alignment.

※3

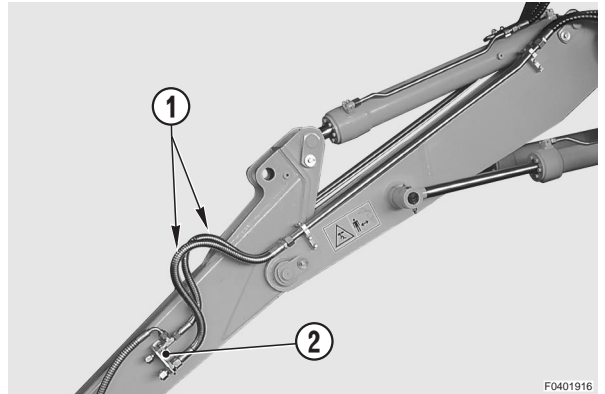
-  Inside bushings: ASL800050

※4

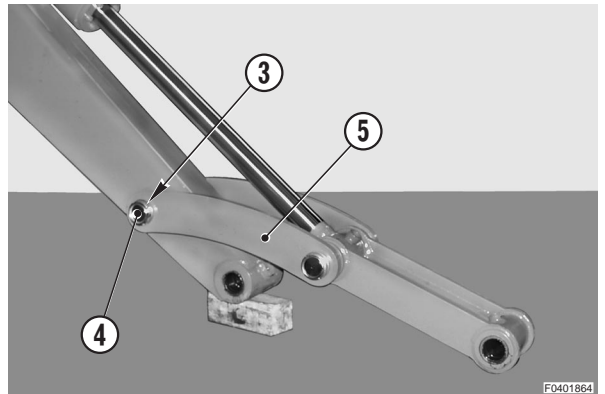
- ★ Insert the adjustments to a given clearance on both sides of the piston.
- Start the engine and bleed air from the cylinder. (For details, see «20. TESTING AND ADJUSTMENTS»).
- ★ After bleeding the air, check the level of oil in the tank.

## REMOVAL OF ARM

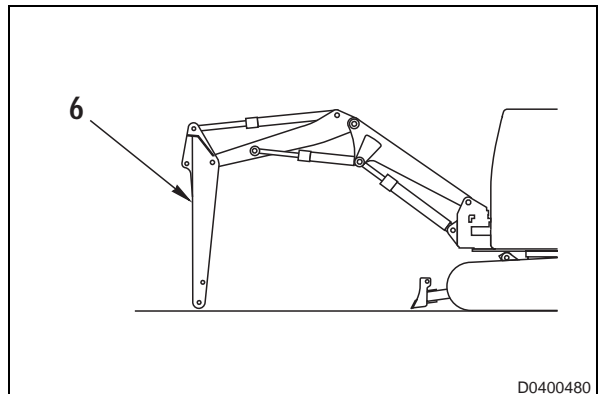
- 1 - Remove the bucket (For details, see «REMOVAL OF BUCKET»).
- 2 - Remove the bucket cylinder. (For details, see «REMOVAL OF BUCKET CYLINDER»).
- 3 - If the machine is designed for the application of optional front equipment, disconnect the boom (or the 2-piece boom), the tubes (1) and remove the supports (2).



- 4 - Loosen the ring nut (3) and pin (4) and remove the thrust lever (5). ※1 ※2

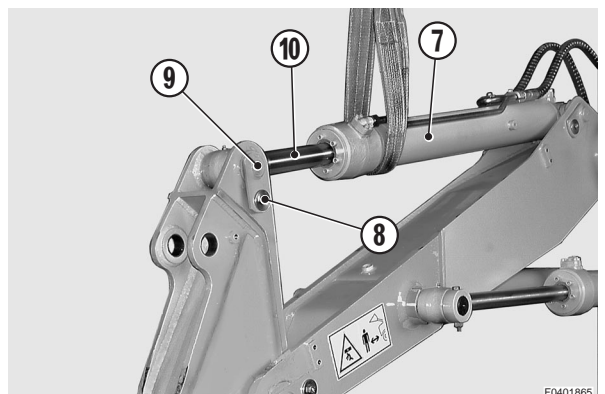


- 5 - Raise the boom and bring the arm (6) into a vertical position and then lower it to the ground.



- 6 - Switch off the engine and release residual pressures.
- 7 - Put the arm cylinder (7) in a sling, remove the screw (8) and take out the pin (9).
- 8 - Start the engine and fully retract the piston (10). ※3

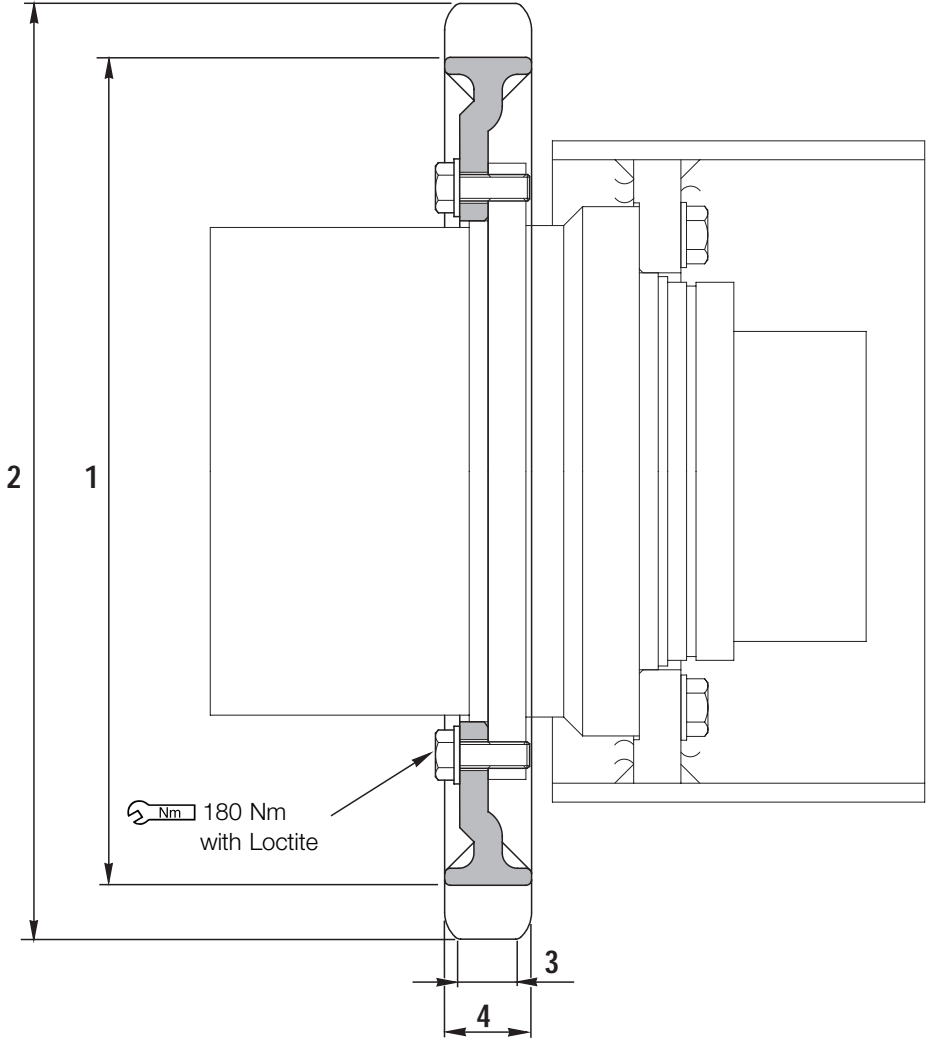
- ★ To hold the piston rod in its fully retracted position, tie it with wire.



**GRUPPO  
GROUP**

**40**

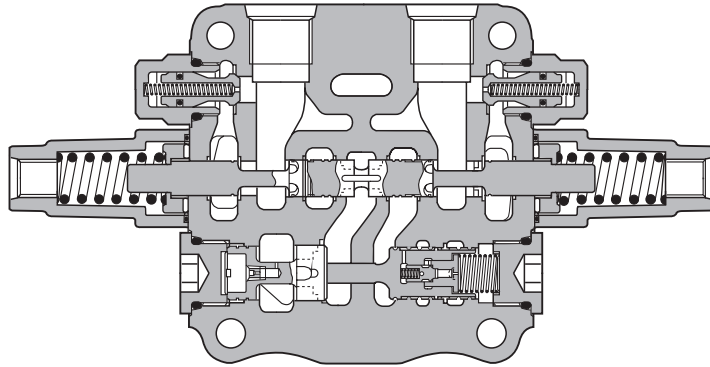
# SPROCKET



D0401060

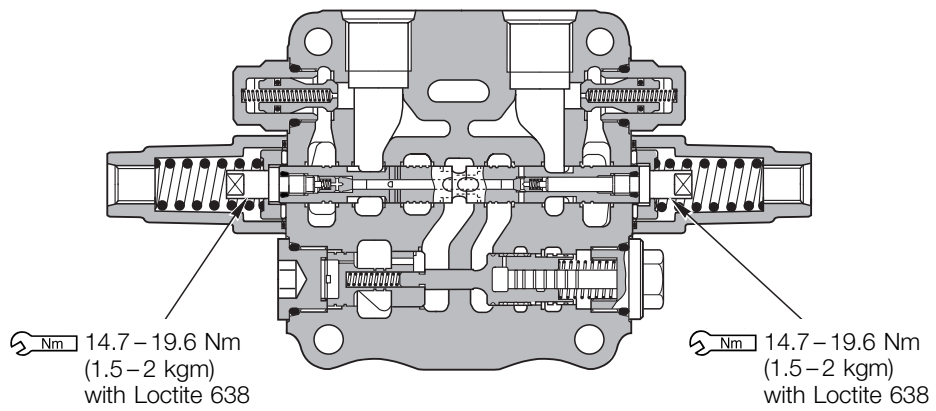
Unit: mm

No.	Check item	Criteria			Remedy
		Standard size	Tolerance	Repair limit	
1	Wear of roots of sprocket teeth	438	$\frac{0}{-3}$	425	
		495	$\frac{0}{-2}$	482	
3	Face width of sprocket teeth (teeth crest)	32	—	29	
4	Face width of sprocket teeth (bottom land)	46	$\pm 1.5$	42	



D0401067

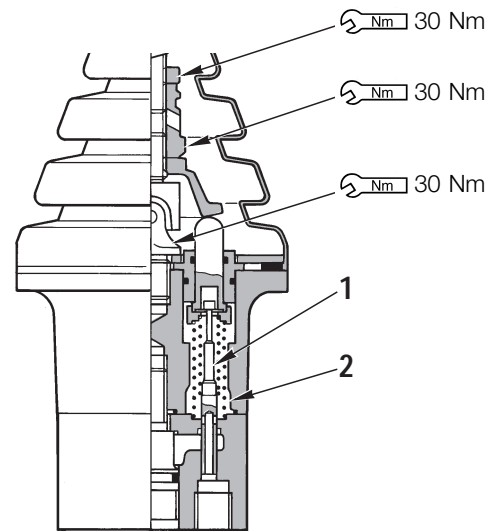
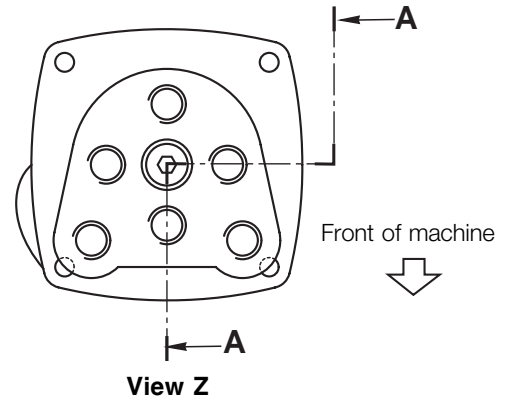
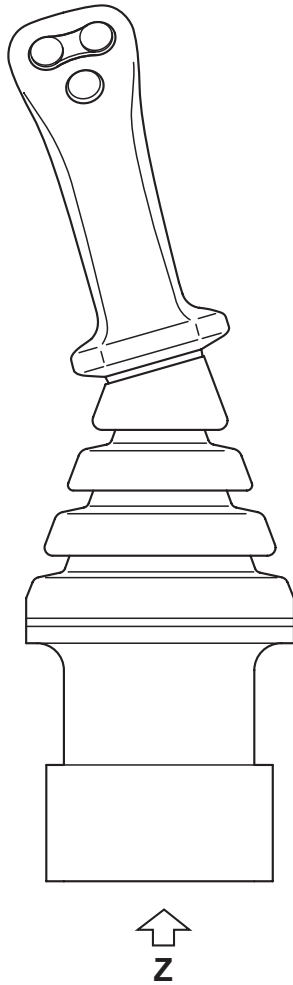
**Section G - G**



D0401068

**Section H - H**

**R.H.**



**Section A - A**

D0401057

Unit: mm

No.	Check item	Criteria					Remedy
		Standard size			Repair limit		
		Free length	Installed length	Installed load	Free length	Installed load	
1	Metering spring	30.5	29	15.9 N	—	—	Replace
2	Centering spring	40.9	36.4	15 N	—	—	

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