WEBM000702

SHOP MANUAL

PC110R-1

HYDRAULIC EXCAVATOR

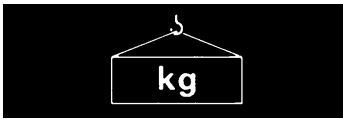
SERIAL NUMBER

PC110R-1 2265010001 and up

KOMATSU

Utility

HOISTING INSTRUCTIONS



⚠ Heavy parts (25 kg or more) must be lifted with a hoist etc. In the **Disassembly and Assembly** section, every part weighing 25 kg or more is clearly indicated with the symbol kg

1. If a part cannot be smoothly removed from the machine by hoisting, the following checks should be made:
   - Check for removal of all bolts fastening the part to the relative parts.
   - Check for any part causing interference with the part to be removed.

2. Wire ropes

1) Use adequate ropes depending on the weight of parts to be hoisted, referring to the table below:

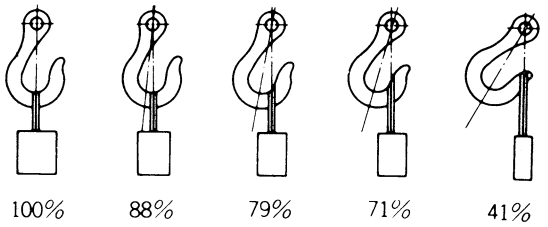
WIRE ROPES
(Standard «S» or «Z» twist ropes without galvanizing)

Rope diameter (mm)	Allowable load (tons)
10.0	1.0
11.2	1.4
12.5	1.6
14.0	2.2
16.0	2.8
18.0	3.6
20.0	4.4
22.4	5.6
30.0	10.0
40.0	18.0
50.0	28.0
60.0	40.0

The allowable load value is estimated to be one-sixth or one-seventh of the breaking strength of the rope used.

2) Sling wire ropes from the middle portion of the hook. Slinging near the edge of the hook may cause the rope to slip off the hook during hoisting, and a serious accident can result.

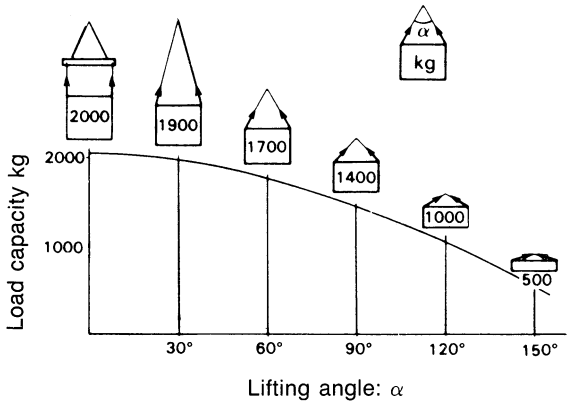
Hooks have maximum strength at the middle portion.



3) Do not sling a heavy load with one rope alone, but sling with two or more ropes symmetrically wound on to the load.

⚠ Slinging with one rope may cause turning of the load during hoisting, untwisting of the rope, or slipping of the rope from its original winding position on the load, which can cause dangerous accidents.

4) Do not sling a heavy load with ropes forming a wide hanging angle from the hook.
When hoisting a load with two or more ropes, the force subjected to each rope will increase with the hanging angles.
The table below shows the variation of allowable load (kg) when hoisting is made with two ropes, each of which is allowed to sling up to 1000 kg vertically, at various handing angles.
When two ropes sling a load vertically, up to 2000 kg of total weight can be suspended.
This weight becomes 1000 kg when two ropes make a 120° hanging angle.
On the other hand, two ropes are subjected to an excessive force as large as 4000 kg if they sling a 2000 kg load at a lifting angle of 150°.



From liter to U.S. Gall.

1 ℓ = 0.2642 U.S. Gall.

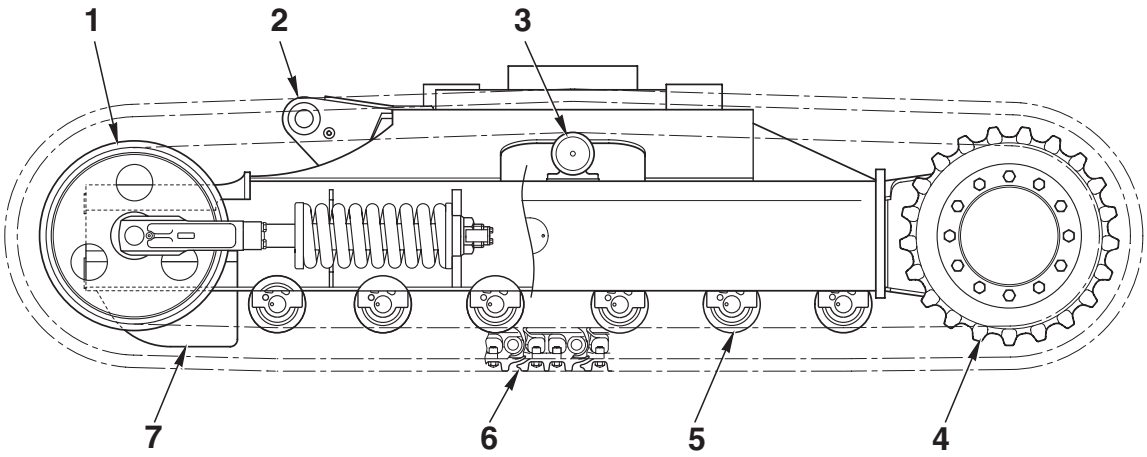
	0	1	2	3	4	5	6	7	8	9
0	0	0.264	0.528	0.793	1.057	1.321	1.585	1.849	2.113	2.378
10	2.642	2.906	3.170	3.434	3.698	3.963	4.227	4.491	4.755	5.019
20	5.283	5.548	5.812	6.076	6.340	6.604	6.869	7.133	7.397	7.661
30	7.925	8.189	8.454	8.718	8.982	9.246	9.510	9.774	10.039	10.303
40	10.567	10.831	11.095	11.359	11.624	11.888	12.152	12.416	12.680	12.944
50	13.209	13.473	13.737	14.001	14.265	14.529	14.795	15.058	15.322	15.586
60	15.850	16.115	16.379	16.643	16.907	17.171	17.435	17.700	17.964	18.228
70	18.492	18.756	19.020	19.285	19.549	19.813	20.077	20.341	20.605	20.870
80	21.134	21.398	21.662	21.926	22.190	22.455	22.719	22.983	23.247	23.511
90	23.775	24.040	24.304	24.568	24.832	25.096	25.361	25.625	25.889	26.153

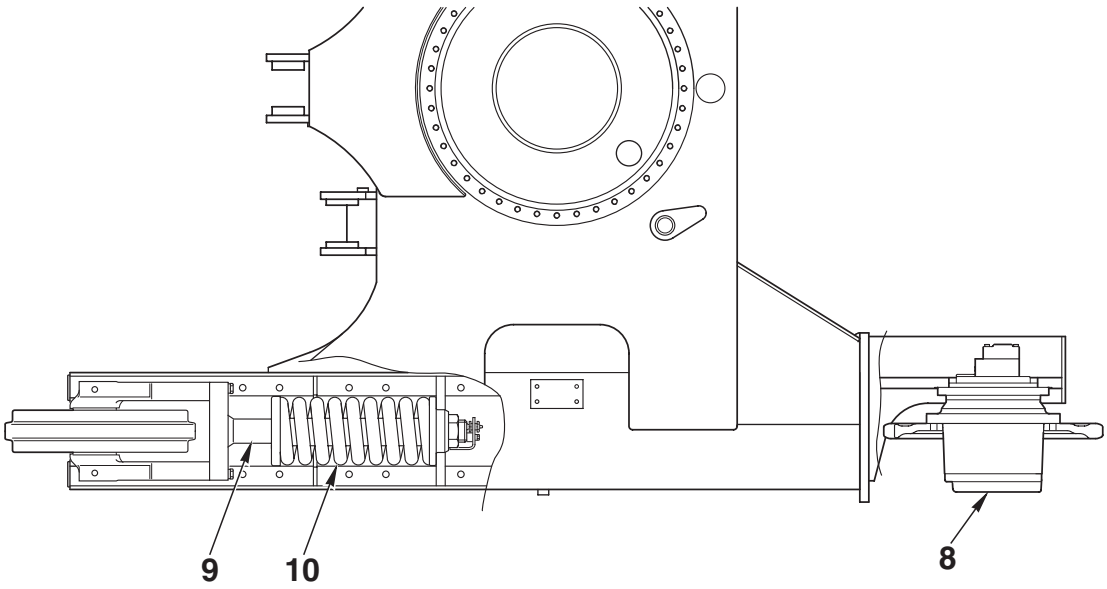
From liter to U.K. Gall.

1 ℓ = 0.21997 U.K. Gall.

	0	1	2	3	4	5	6	7	8	9
0	0	0.220	0.440	0.660	0.880	1.100	1.320	1.540	1.760	1.980
10	2.200	2.420	2.640	2.860	3.080	3.300	3.520	3.740	3.950	4.179
20	4.399	4.619	4.839	5.059	5.279	5.499	5.719	5.939	6.159	6.379
30	6.599	6.819	7.039	7.259	7.479	7.969	7.919	8.139	8.359	8.579
40	8.799	9.019	9.239	9.459	9.679	9.899	10.119	10.339	10.559	10.778
50	10.998	11.281	11.438	11.658	11.878	12.098	12.318	12.528	12.758	12.978
60	13.198	13.418	13.638	13.858	14.078	14.298	14.518	14.738	14.958	15.178
70	15.398	15.618	15.838	16.058	16.278	16.498	16.718	16.938	17.158	17.378
80	17.598	17.818	18.037	12.257	18.477	18.697	18.917	19.137	19.357	19.577
90	19.797	20.017	20.237	20.457	20.677	20.897	21.117	21.337	21.557	21.777

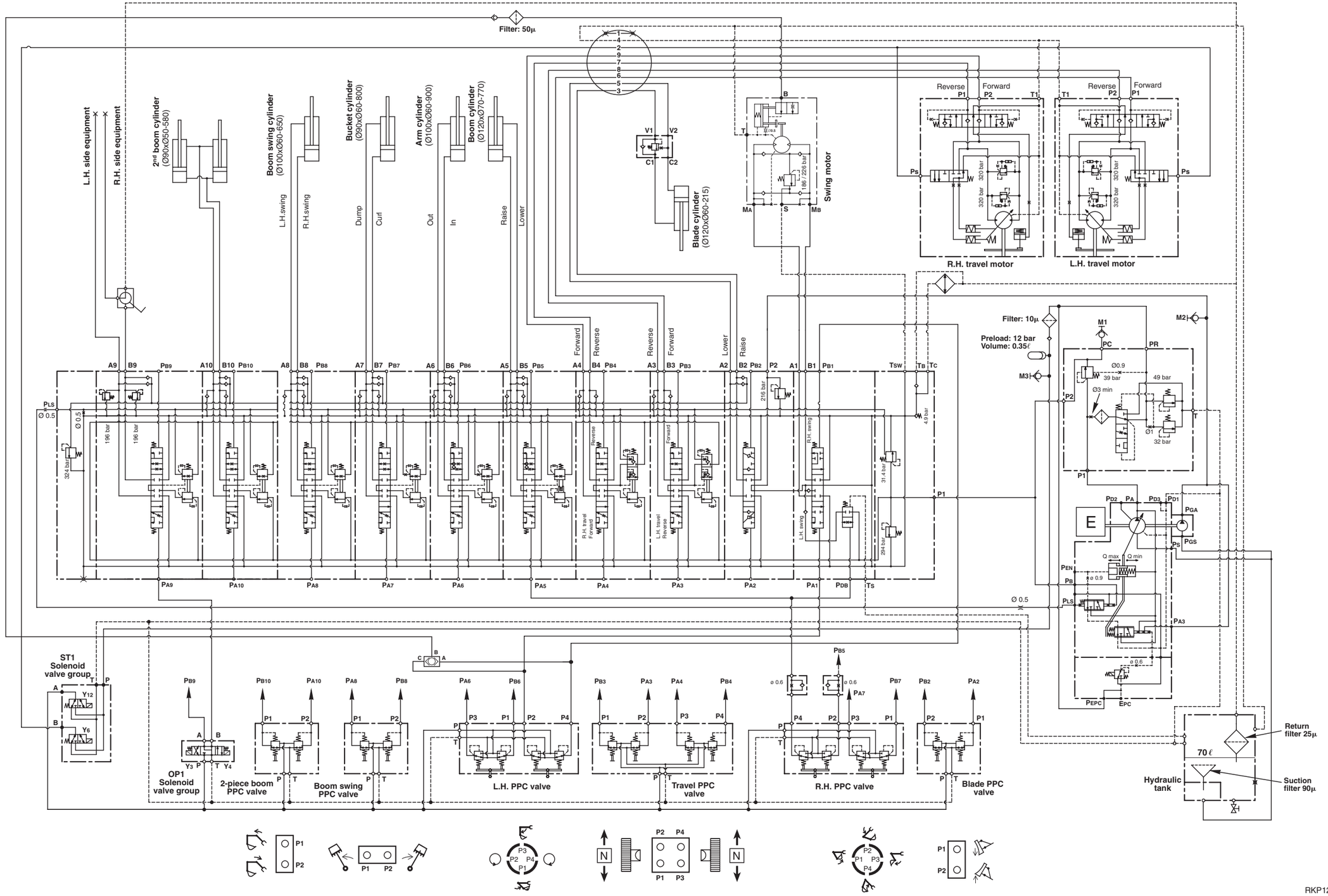
TRACK FRAME





1. Idler
2. Track frame
3. Carrier roller
4. Sprocket
5. Track roller
6. Track shoe
7. Guard
8. Final drive
9. Idler cushion
10. Recoil spring

HYDRAULIC DIAGRAM WITH 2-PIECE BOOM



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a) Action of PC-EPC solenoid

- The command current from resistor flows to **PC-EPC** solenoid (1).
  This command current acts on the **PC-EPC** valve and outputs the signal pressure.
  When this signal pressure is received, the force pushing piston (2) is changed.
- On the opposite side to this force pushing piston (2) is the spring set pressure of springs (4) and (6) and pump pressure **PP** pushing spool (3). Spool (3) stops at a position where the combined force pushing spool (3) is balanced, and the pressure (pressure of port **C**) output from the **CP** valve.

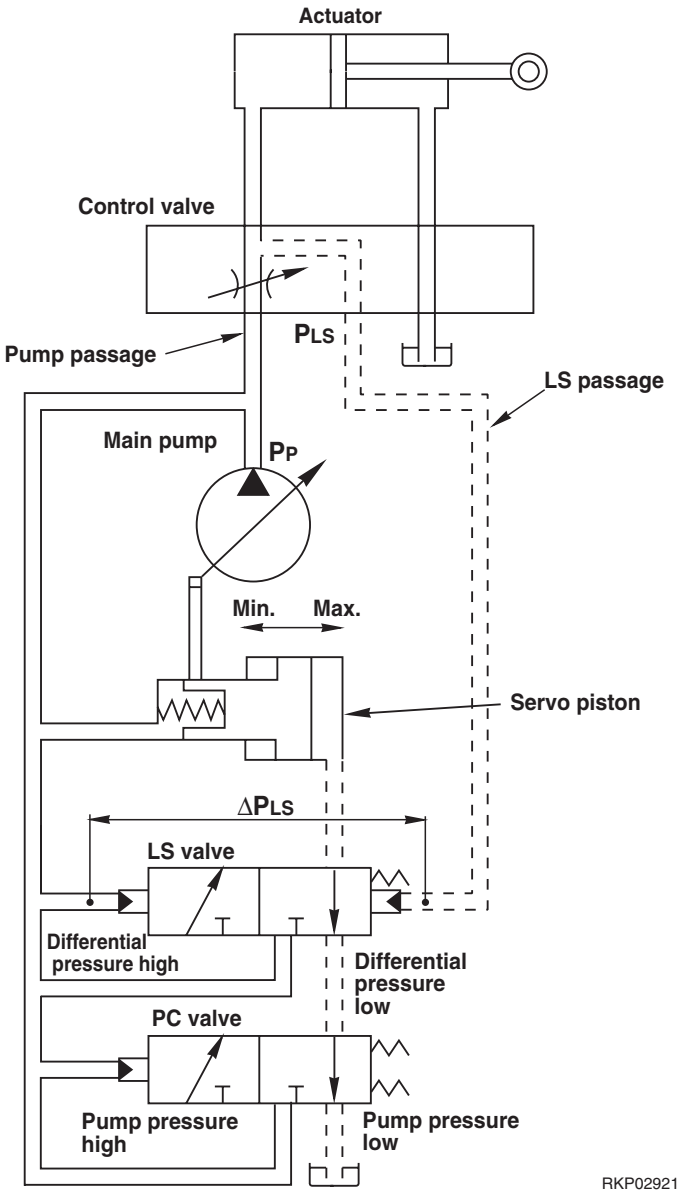
a. P1 Port - From servocontrol feed unit (P2 Port) and pump (PB Port)
b. P2 Port - From gear pump (PGA Port)
c. A1 Port - To swing motor (MA Port)
d. B1 Port - To swing motor (MB Port)
e. A2 Port - To swivel joint (5A Port)
f. B2 Port - To swivel joint (3A Port)
g. A3 Port - To swivel joint (8A Port)
h. B3 Port - To swivel joint (6A Port)
i. A4 Port - To swivel joint (9A Port)
j B4 Port - To swivel joint (7A Port)
k A5 Port - To boom cylinder (Bottom side)
l. B5 Port - To boom cylinder (Head side)
m. A6 Port - To arm cylinder (Head side)
n. B6 Port - To arm cylinder (Bottom side)
o. A7 Port - To bucket cylinder (Head side)
p. B7 Port - To bucket cylinder (Bottom side)
q. A8 Port - To boom swing cylinder (Head side)
r. B8 Port - To boom swing cylinder (Bottom side)
s. A9 Port - To optional attachment (L.H. side)
t. B9 Port - To optional attachment (R.H. side)
u. TSW Port - To swing motor (S Port)
v. TC Port - To oil cooler
x. TB Port - To hydraulic tank
y. A10 Port - To 2-piece boom cylinder (Head side)
w. B10 Port - To 2-piece boom cylinder (Bottom side)
xx. TS Port - To hydraulic tank
aa. PLS Port - To hydraulic pump (PLS Port)
Pa. PA1 Port - From L.H. PPC valve (P2 Port)
Pb. PB1 Port - From L.H. PPC valve (P4 Port)
Pc. PA2 Port - From blade PPC valve (P1 Port)
Pd. PB2 Port - From blade PPC valve (P2 Port)
Pe. PA3 Port - From travel PPC valve (P2 Port)
Pf. PB3 Port - From travel PPC valve (P1 Port)
Pg. PA4 Port - From travel PPC valve (P3 Port)
Ph. PB4 Port - From travel PPC valve (P4 Port)
Pi. PA5 Port - From R.H. PPC valve (P4 Port)
Pj. PB5 Port - From R.H. PPC valve (P2 Port)
Pk. PA6 Port - From L.H. PPC valve (P3 Port)
Pl. PB6 Port - From L.H. PPC valve (P1 Port)
Pm. PA7 Port - From R.H. PPC valve (P3 Port)
Pn. PB7 Port - From R.H. PPC valve (P1 Port)
Po. PA8 Port - From boom swing PPC valve (P1 Port)
Pp. PB8 Port - From boom swing PPC valve (P2 Port)
Pq. PA9 Port - From OP1 solenoid valve group (B Port)
Pr. PB9 Port - From OP1 solenoid valve group (A Port)
Ps. PDB Port - From PA5 Port
Pt. PA10 Port - From 2-piece boom PPC valve (P2 Port)
Pu. PB10 Port - From 2-piece boom PPC valve (P1 Port)

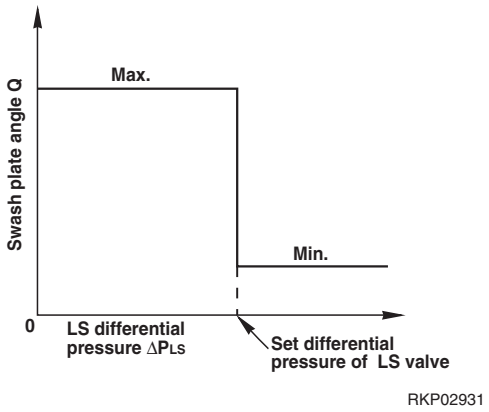
FUNCTION PRINCIPLE

1. Control of pump swash plate angle

- The pump swash plate angle (pump discharge amount) is so controlled that the **LS** differential pressure Δ**PLS**, which is the difference between the pump discharge pressure **PP** and the **LS** pressure **PLS** at the outlet Port of the control valve (actuator load pressure), is maintained at a constant level.
  (**LS** differential pressure Δ**PLS**=Pump discharge pressure **PP** – **LS** pressure **PLS**).
- If the **LS** differential pressure Δ**PLS** becomes lower than the setting pressure of the **LS** valve, the pump swash plate angle becomes larger, and if it becomes higher, the pump swash plate angle becomes smaller.

★ For the details of this action, refer to the descriptions of "HYDRAULIC PUMP".

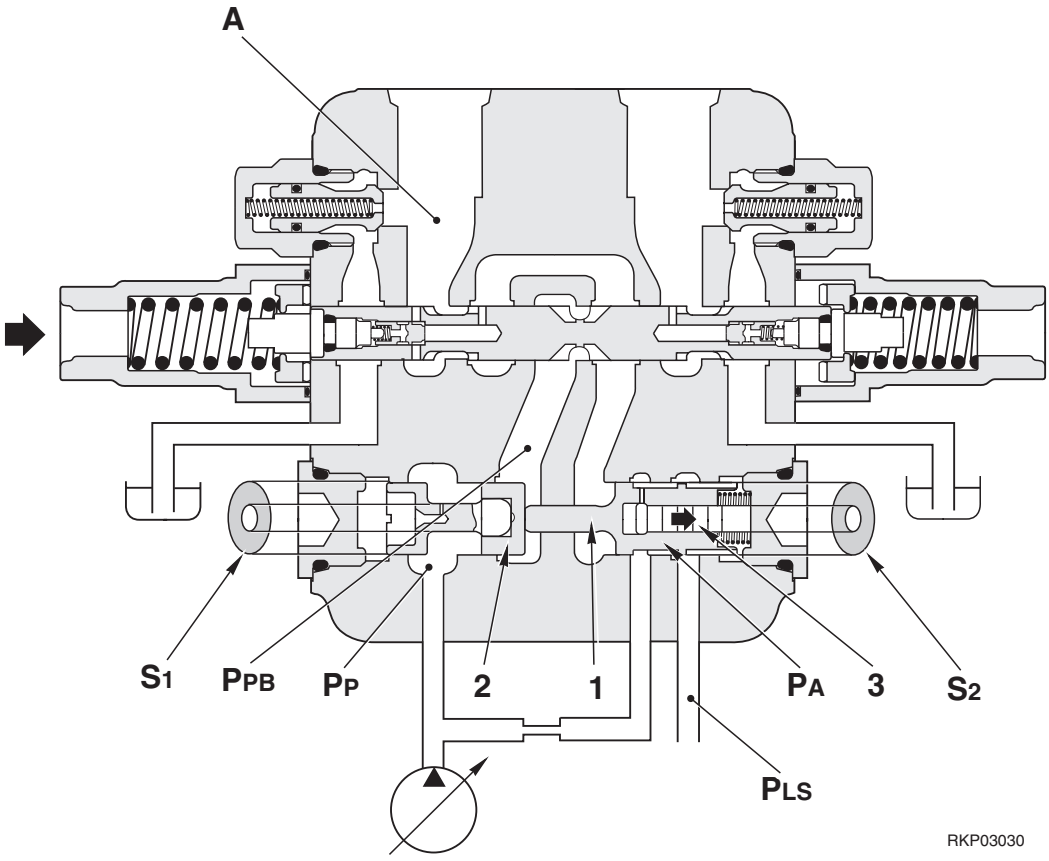




Area ratio of pressure compensation valve

FUNCTION

- The pressure compensation valve determines the compensation characteristics by carrying out fine adjustment of the area ratio (**S1/S2**) between the area **S1** of the flow control valve (2) side and the area **S2** of the pressure reducing valve (1) side to match the characteristics of each actuator.
  S1= Area of the flow control valve (2) – Area of the piston (3)
  S2= Area of the pressure reducing valve (1) – Area of the piston (3)



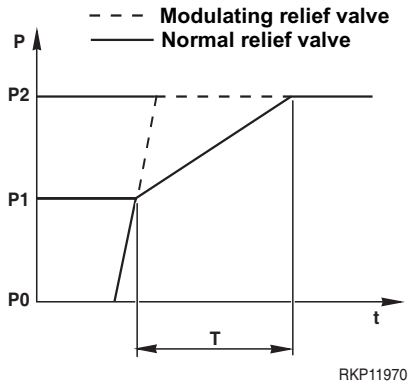
Area ratio (S1/S2) and compensation characteristics

- When the ratio is 1.00 :
  [Pump pressure **PP** – Upstream pressure of the spool notch **PPB**]≒[**LS** circuit pressure **PLS** – Actuator circuit pressure **PA** (=**A**)]
  Thus, the flow is distributed in proportion of opening areas of the spool.
- When the ratio is larger than 1.00 : **PP – PPB>PLS – PA (=A)**
  Thus, the flow is divided less than the proportion of opening areas of the spool.
- When the ratio is smaller than 1.00 : **PP – PPB<PLS – PA**
  Thus, the flow is divided more than the proportion of opening areas of the spool.

OPERATION OF THE MODULATING RELIEF VALVE

FUNCTION

- The relief valve for the swing motor has the properties to suppress the rapid increase of the relief pressure as per shown in the figure right, and serves to reduce the shock at the time of start and stop of swing.



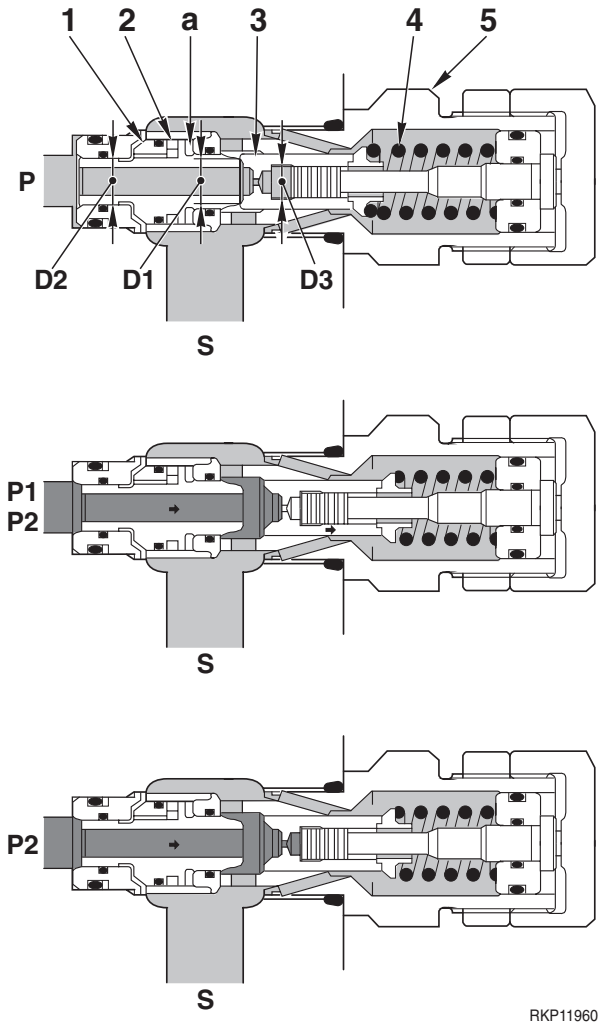
OPERATION

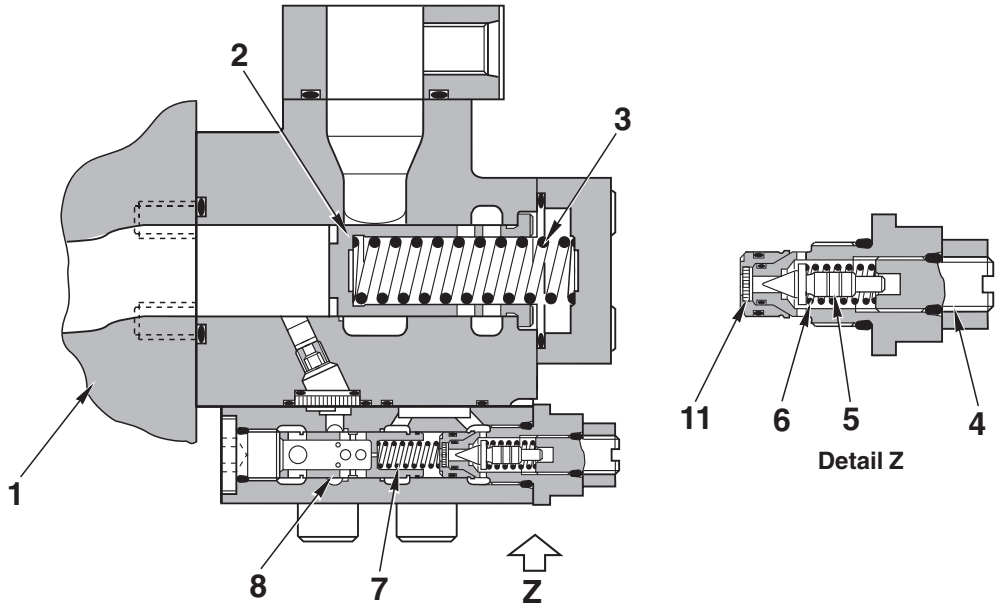
When the circuit pressure is P0

- The relief valve does not operate.

When the circuit pressure has rapidly increased

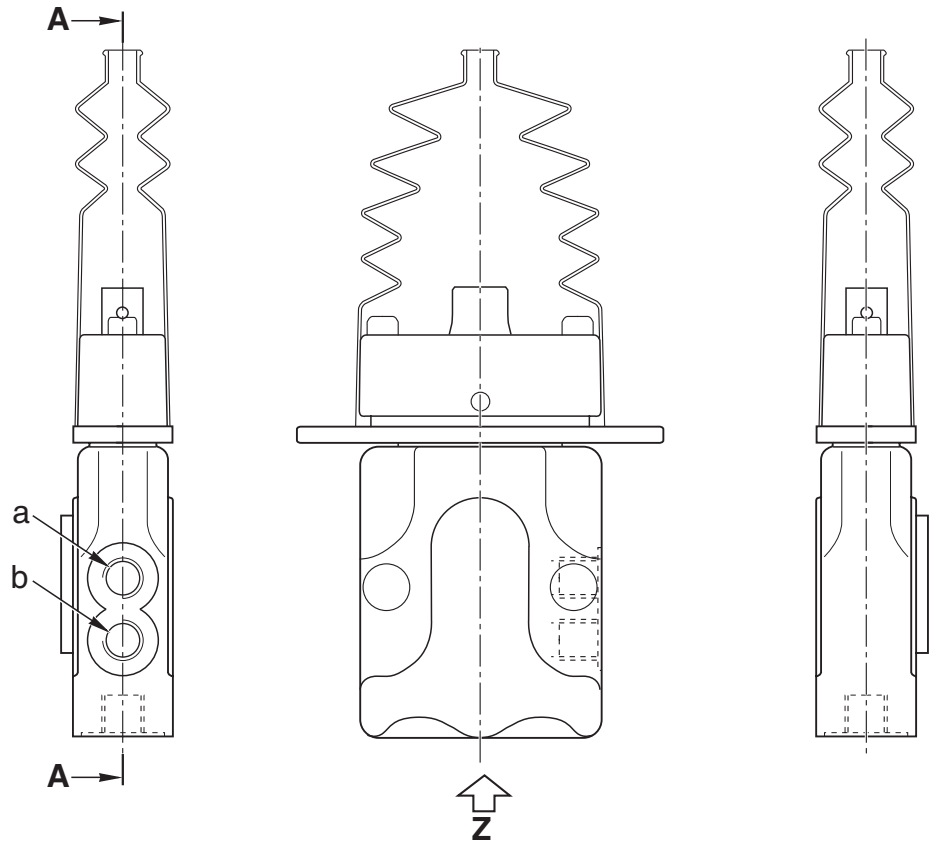
- When the circuit pressure increases to **P1,** the valve (3) starts to open bacause the oil pressure acts on the difference in area between **D1** and **D3** (**D1>D3**), thus pressing the spring (4).
  On this occasion, the seat (1) tries to follow the valve (3) because the pressure acts on the difference in area between **D1** and **D2** (**D1<D2**).
  However, the route that the oil in the chamber **a** compressed by the movement of the seat (1) can flow to the **S** port has been throttled by the ball (2), so that the movement of the seat (1) is slower than that of the valve (3).
  Therefore, during the time **T** until the seat (1) makes contact with the sleeve (5), the relief pressure gradually increases from **P1** to **P2**.





1. Hydraulic pump
2. Valve
3. Spring
4. Screw
5. Poppet
6. Spring (reducing valve pilot)
7. Spring (reducing valve)
8. Spool (reducing valve)
9. Spring (safety valve)
10. Ball
11. Filter

BLADE PPC VALVE



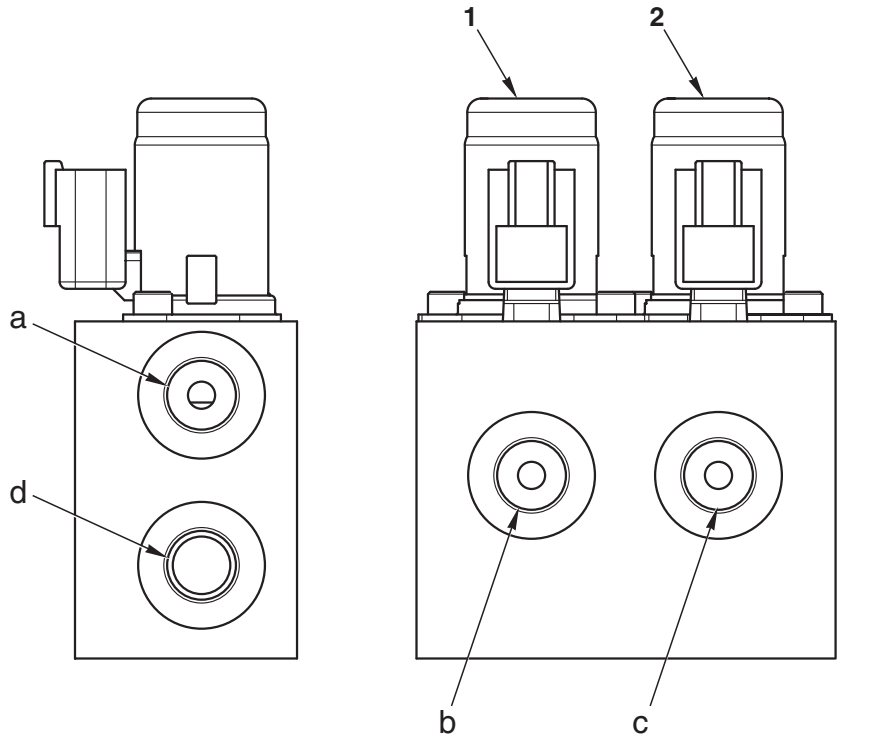
View Z

RKP12241

a. T Port - To hydraulic tank
b. P Port - From solenoid valve group (A Port)
c. P1 Port - To control valve (PA2 Port) (lower blade)
d. P2 Port - To control valve (PB2 Port) (raise blade)

SOLENOID VALVES

SOLENOID VALVE GROUP ST1



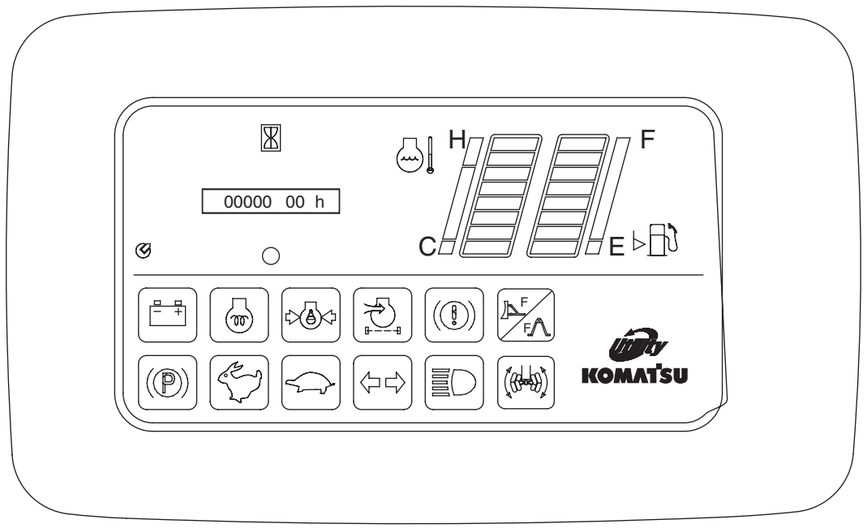
a. P Port - From servocontrol feed unit (PR Port)
b. B Port - To swivel joint (2 Port)
c. A Port - To servocontrol
d. T Port - To hydraulic tank

1. Y4 Travel speed increment
2. Y7 Servocontrol

ELECTRICAL DIAGRAM (4/5)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

STRUMENTO MULTIFUNZIONALE MULTIFUNCTION



X6

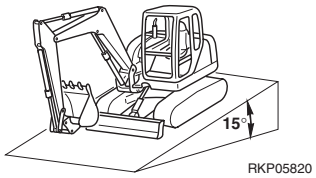
PIN	FUNZIONE CONNESSA	COMANDO	COLORE FILO
1	COMUNE SPIE LENTA/VELOCE COMMON W/L SLOW/FAST GEAR	NEGATIVO	
2	STRUMENTO IND. LIV. CARB. FUEL LEVEL GAUGE	ohm	
3	STRUMENTO TEMPERATURA COOLANT TEMP. GAUGE	ohm	
4	SEGNALE DI START START SIGNAL	+50	
5			
6	MASSA GROUND	GND	
7	SPIA PALA-STABILIZZATORI (giallo) W/L SHOVEL-STABILIZER (yellow)	NEGATIVO	
8	POSITIVO ALIMENTAZIONE (+12V) POWER SUPPLY (+12V)	+15	
9	ILLUMINAZIONE NOTTURNA NIGHTLIGHT	+LUCI	
10	USCITA BUZZER BUZZER O/P	NEGATIVO	
11	SPIA AVARIA FRENI (rosso) W/L BRAKE SYSTEM FAILURE (red)	NEGATIVO	
12	SPIA PRERISCALDO (giallo) W/L PREHEAT (yellow)	POSITIVO	
13	SPIA BLOCCAGGIO PONTE (giallo) W/L AXLE BLOCKED (yellow)	NEGATIVO	
14	SPIA FILTRO ARIA (rosso) W/L AIR FILTER (red)	NEGATIVO	
15	SPIA GENERATORE (rosso) W/L CHARGE (red)	NEGATIVO	
16	SPIA PRESS. OLIO MOTORE (rosso) W/L ENGINE OIL PRESS. (red)	NEGATIVO	

9	10	11	12	13	14	15	16
1	2	3	4	5	6	7	8

LATO FILI
WIRE SIDE VIEW

RKP11650

FOR MACHINE

Machine model				PC110R-1	
Classification	Check item	Test conditions	Unit	Standard value	Permissible value
Travel	Hydraulic drift of travel motors	Measuring posture  RKP05820 • Engine: switched off • Oil temperature: 45–55 °C • Stop machine on a slope with blade raised and sprocket facing straight up the slope. • Measure the drift after 5 minutes	mm	–	–
	Leakage of travel motors	• Engine speed: high idling • Oil temperature: 45–55 °C • Lock shoes and check leakage ★ Measure one motor at a time	ℓ/min	–	–

MEASURING THE ENGINE SPEED

⚠ When measuring the speed (rpm) of the engine, do not touch heated parts and take care not to become entangled in rotating elements.

★ Do not start to measure engine speed until the following conditions have been met:
- Engine cooling water temperature: 68–80°C
- Hydraulic system oil temperature: 45–55°C.

1 - Install and connect the tachometer **C1**.
★ If a stroboscopic tachometer **C2** is used, make a distinct mark on the motor pulley to facilitate the reading.

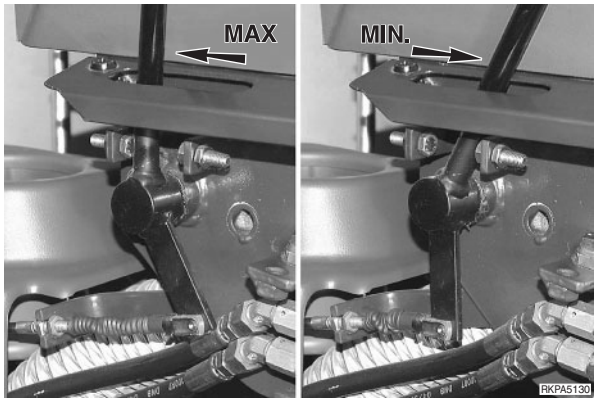
2 - Start the engine and check:
- Low idling without load (accelerator lever in «minimum» position).
- High idling without load (accelerator lever in «maximum» position).
  ★ Low idling: 1050±50 rpm
  ★ High idling: 2200±50 rpm

★ If the minimum and maximum engine speeds without load do not fall within the correct range, check the position stops of the accelerator lever and the accelerator cable sheathing (See «ACCELERATOR LEVER ADJUSTMENT») before performing the stress tests.
- Engine rpm with the pumps working.

★ Max. speed with the **P1** pump working: $2050^{-}_{+}{}^{50}_{100}$ rpm

★ Max. speed with the **P1** and **P2** pumps working: $2050^{-}_{+}{}^{70}_{100}$ rpm

★ If the efficiency is not within the permissible limits, call the Authorised Repair Shop to come and give the engine a diagnostic check.



TESTING AND ADJUSTING TRACK-SHOE TENSION

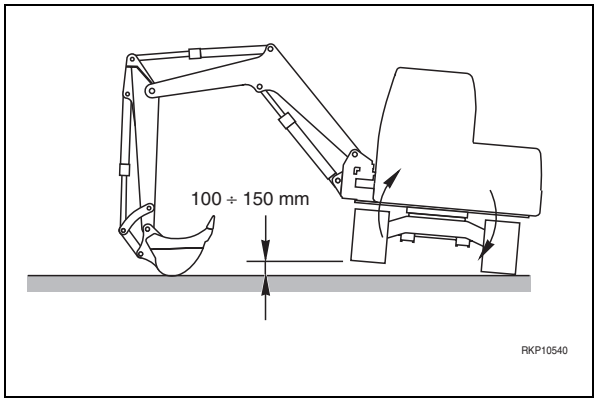
1. Test

★ Test conditions:
- Firm, flat ground.
- Work equipment resting on the ground.

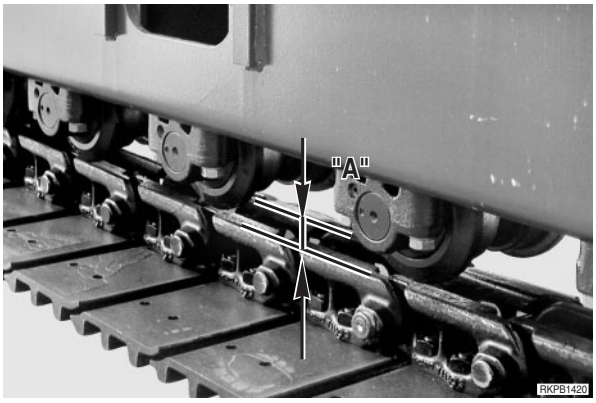
1 - Swing the turret 90° to the side of the track to be tested.

2 - Close the bucket, position the arm perpendicular to the ground and rest the bucket on the ground.

3 - Push down with the boom until the track-shoe to be tested has been raised completely from the ground.



4 - Measure the distance between the track-shoe race and the central track rollers.
★ Measure «**A**» between track roller and track-shoe: 20–25 mm

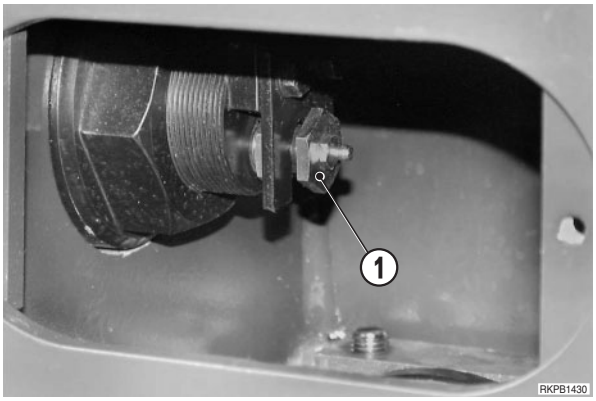


2. Adjustment

If track-shoe tension is not within permissible limits, adjust them as follows.

★ Before introducing the grease-pump (2), and on completion of the adjustment, thoroughly clean the grease nipple and the surrounding area.

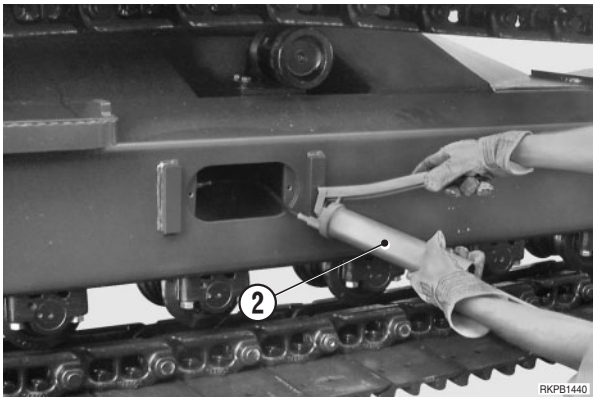
1 - If the tension is too slack.
Inject grease through the grease nipple (1).
★ If the grease proves difficult to inject, move the machine backwards and forwards slowly over a short stretch.



2 - If the tension is too tight.
Loosen the grease nipple (1) slowly to allow grease to flow out of the valve.

The grease contained in the stretching cylinder is under pressure and could injure the operator. For this reason the valve should not be loosened by more than one turn.

★ If the grease does not flow easily, move the machine backwards and forwards slowly over a short stretch.

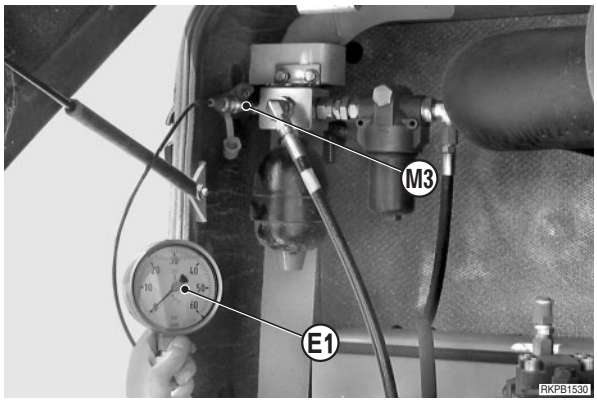


CHECKING AND ADJUSTING PRESSURES IN THE SERVOCONTROL FEED UNIT

★ Test conditions:
- Hydraulic oil: 45–55°C.

Release any residual pressures from the circuits (See «RELEASING RESIDUAL PRESSURES FROM THE CIRCUITS»).

1 - Connect the pressure gauge **E1** to the adapter **M3**.

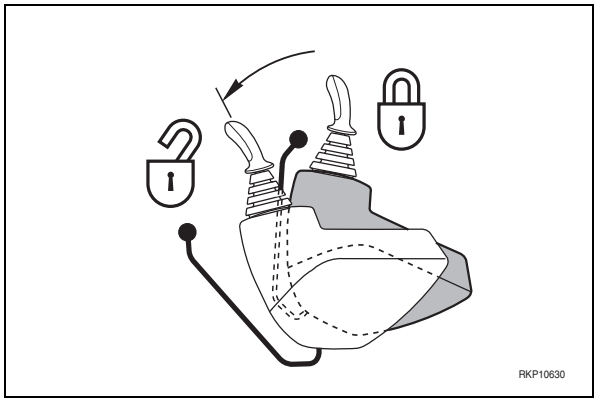


2 - Start the engine and move the accelerator into its maximum position.

3 - Put the lever of the safety device in its working position, (UNLOCKED).

4 - Bring a servocontrol circuit up to pressure by operating the work equipment (i.e. bucket).

5 - Check the working pressure on the pressure gauge **E1**
- ★ Working pressure: 32^{-2}_{+1} bar
- ★ If the working pressure is lower that the permissible value, check servocontrol feed unit valve.



3. Preparation for testing:

- **travel motors**
- **travel brakes**
- **speed increment**

1 - Relieve all residual hydraulic pressures (See «RELEASING RESIDUAL PRESSURES FROM THE CIRCUITS»).

2 - Identify the branch involved in the test (1).

3 - Disconnect the hoses (2) from the branches adjacent to the part to be tested and cap them tightly.

⚠ Make sure that the detached tubes are securely sealed, to prevent jets of high-pressure oil escaping if circuits that are not undergoing tests should accidentally become pressurised.

★ The tubes of the adjacent branches must be disconnected from the upper parts of the swivel joint.

4 - Provisional hoses (3) for collecting any oil leakages should be connected to the inlets of the branches adjacent to the one being tested.

4. Preparation for testing the blade

1 - Relieve all residual hydraulic pressures (See «RELEASING RESIDUAL PRESSURES FROM THE CIRCUITS»).

2 - Identify the branch involved in the test.

3 - Disconnect the tube corresponding to the branch to be tested from the safety valve input and cap it.

⚠ Make sure that the detached tubes are securely sealed, to prevent the escape of jets of oil at high pressure.

4 - Cap the valve to prevent entry of impurities.

5 - Disconnect from the swivel joint the hoses (2) of the branches adjacent to the branch to be tested, and cap them tightly.

⚠ Make sure that the detached hoses are securely sealed, to prevent jets of high-pressure oil escaping if the circuits that are not undergoing tests should accidentally become pressurised.

★ The tubes of adjacent branches must be disconnected from the upper parts of the swivel joint.

6 - Provisional hoses (3) to collect any leaking oil should be connected to the inlets of the branches adjacent to the one being tested.

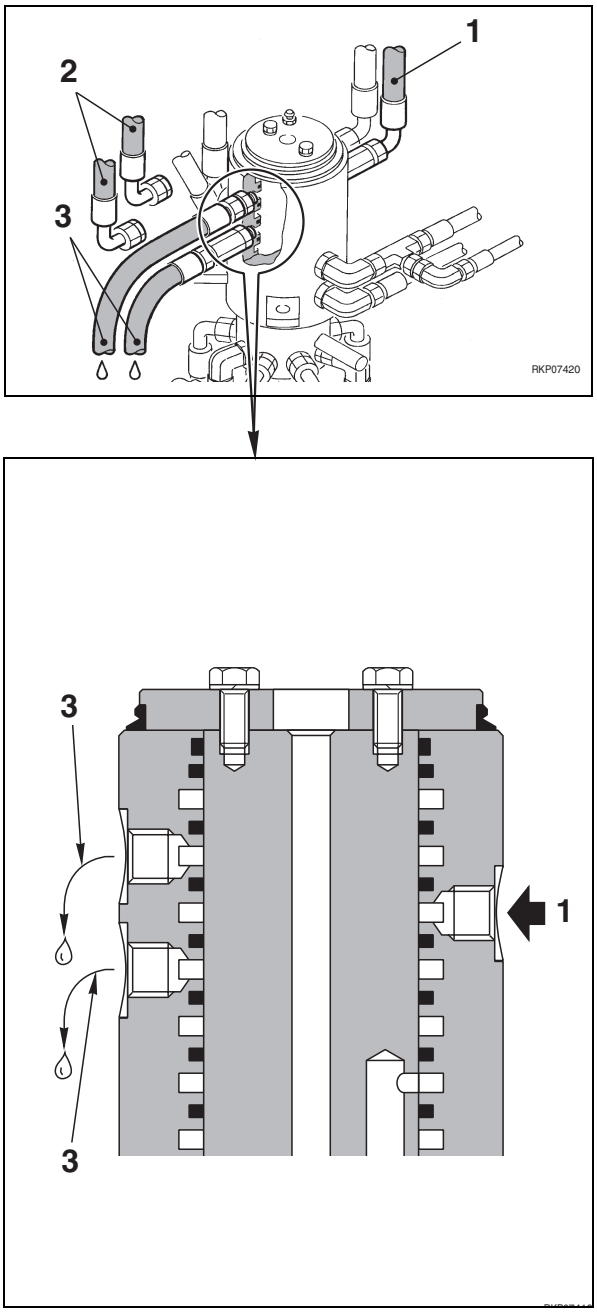
5. Test

1 - Start the engine and bring it up to the test speed described for each group or component.

2 - Pressurise the branch to be tested.

3 - After 30 seconds, watch for another minute if there are any leakages.

★ If oil leaks out of one of the two provisional hoses, it means that there is a leakage in the intermediate gasket between the branch connected to the provisional hose and the pressurised branch.

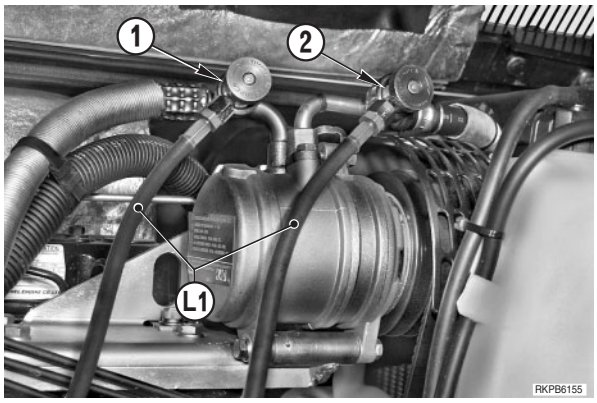


EMPTYING THE AIR-CONDITIONING UNIT

1 - Connect the maintenance station **L1** to the service valves (1) and (2) and follow the specific maintenance station instructions relative to the drainage of the unit.

2 - Disconnect the group to be substituted or reconditioned immediately after switching off the maintenance station. **Plug the removed or disconnected connection tubes tightly and with a minimum of delay.**

3 - Carefully check the quantity of anti-freeze oil recovered and contained in the disassembled parts, since the same quantity must be replaced when the air-conditioning unit is refilled.



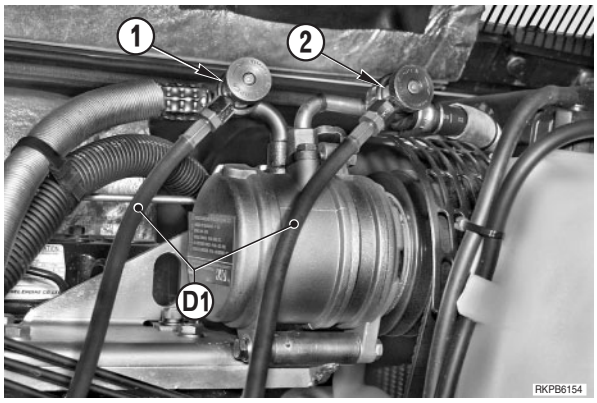
REMOVAL OF THE AIR-CONDITIONING UNIT COMPRESSOR

(Only for machines equipped with an air-conditioning unit)

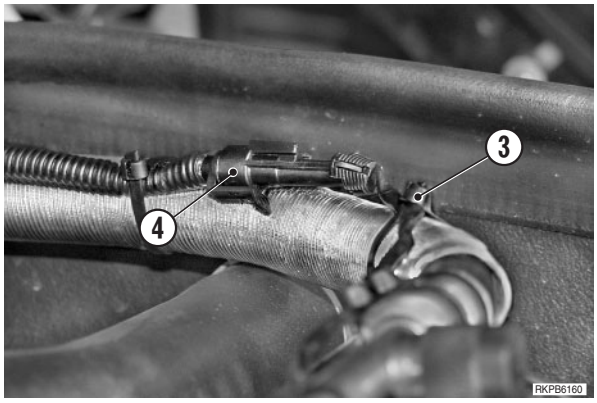
⚠ Disconnect the cable from accumulator negative terminal (–).

1 - Connect the outlets (1) and (2) to the maintenance station for air-conditioning units **D1** and drain the cooling fluid.

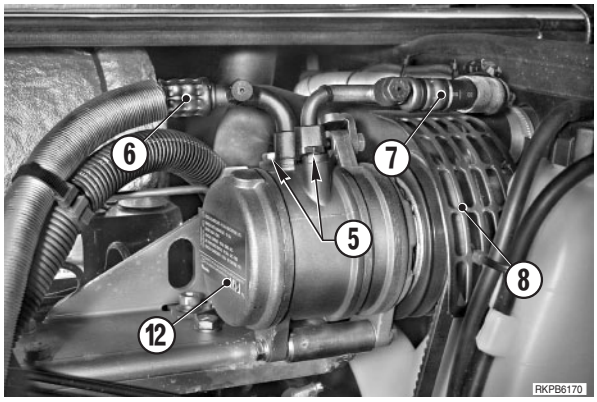
Quantity of fluid R134a: 1100 $^{-30}_{+50}$ g



2 - Remove the clamp (3) and disconnect the connector (4).

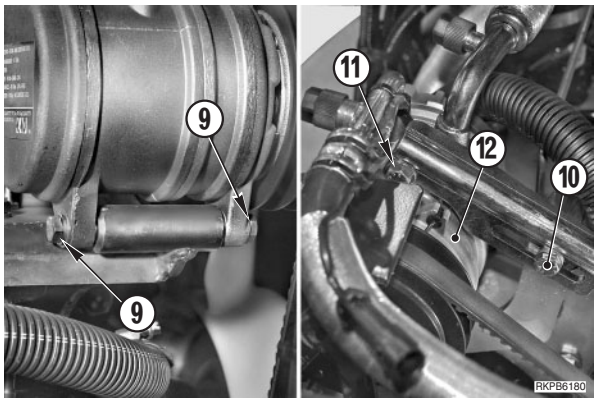


3 - Loosen screw (5) and remove return (6) and delivery (7) pipes. ※1



4 - Remove the fan guard (8). ※2

5 - Loosen screws (9), (10) and (11) to leave free the compressor (12).



REMOVAL OF THE CYLINDER HEAD

⚠ Disconnect the cable from accumulator negative terminal (–).

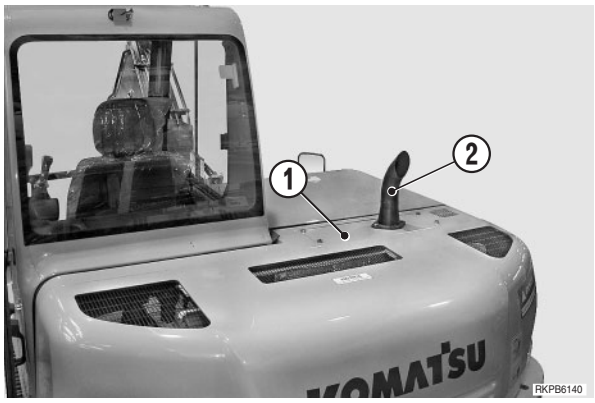
★ Drain the cooling liquid.

Cooling liquid: 18 ℓ

※ 1

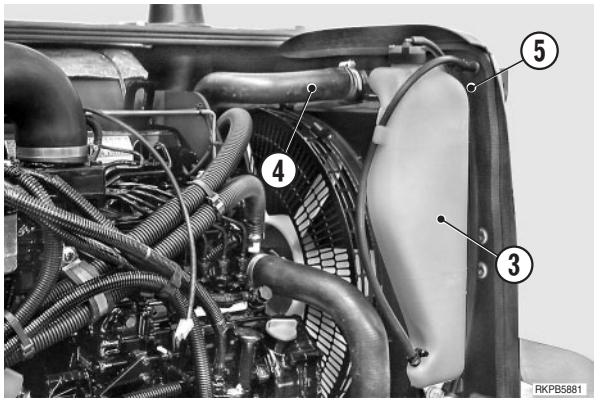
1 - Remove the engine hood.
(For details see: «REMOVAL OF ENGINE HOOD»).

2 - Remove cover (1) (No. 5 screws) together with the exhaust pipe (2).



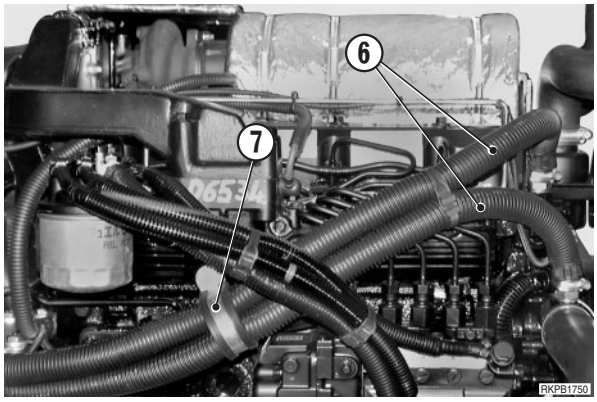
3 - Remove the coolant tank (3).

4 - **Only for machines equipped with an air-conditioning unit.**
Remove the compressor.
(For details, see «REMOVAL OF THE AIR-CONDITIONING UNIT»).



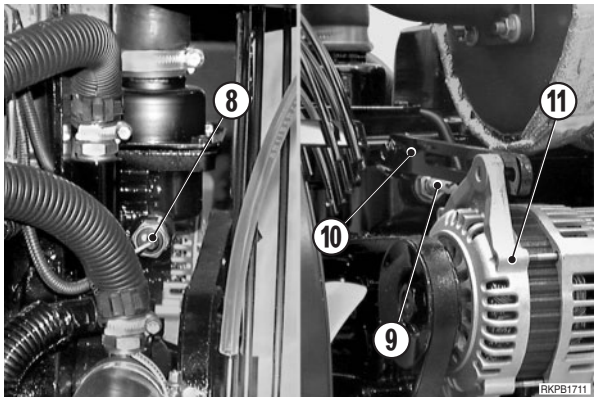
5 - Remove hose (4) from the radiator (5) and disconnect the heater pipes (6).

6 - Loosen the clamp (7).



7 - Disconnect the water temperature sensor cable (8) and the water temperature alarm sensor cable (9).

8 - Disconnect the alternator (11) support bracket (10).



REMOVAL OF CONDENSER UNIT

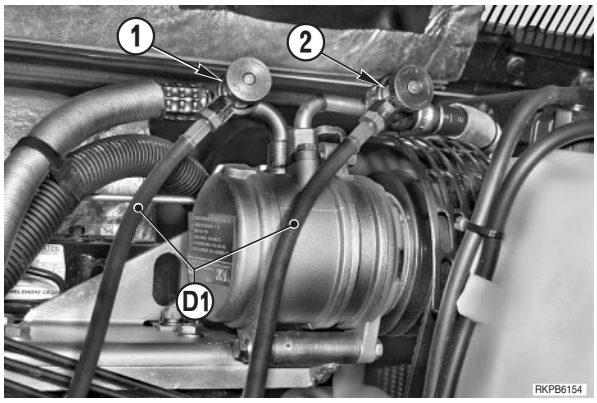
(Only for machine equipped with an air conditioning unit)

⚠ Disconnect the cable from accumulator negative terminal (–).

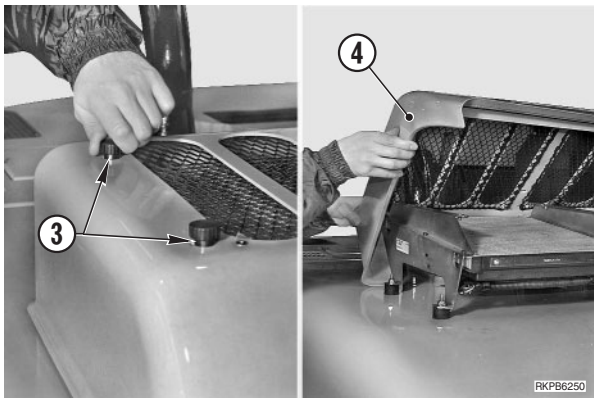
⚠ Lower the work equipment until it is resting on the ground and switch off the engine.

1 - Connect the outlets (1) and (2) to the maintenance station for air-conditioning units **D1** and drain the cooling fluid.

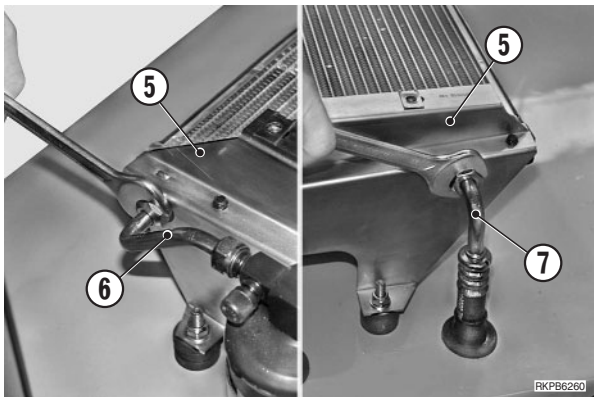
Quantity of fluid R134a: 1100 $^{-30}_{+50}$ g



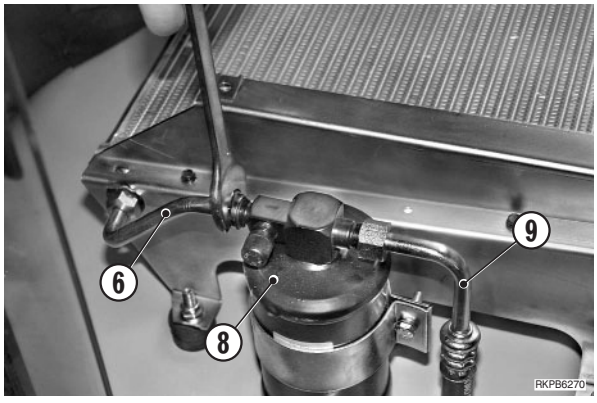
2 - Loosen the knobs (3) and remove the hood (4).



3 - Disconnect pipes (6) and (7) from condenser unit (5).



4 - Disconnect pipes (6) and (9) from filter (8).



REMOVAL OF FUEL TANK

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

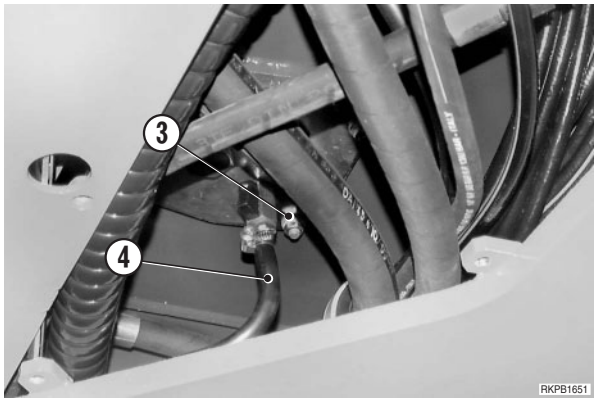
⚠ Disconnect the lead from the negative (–) battery terminal.

★ Turn the turret 45° towards the right.

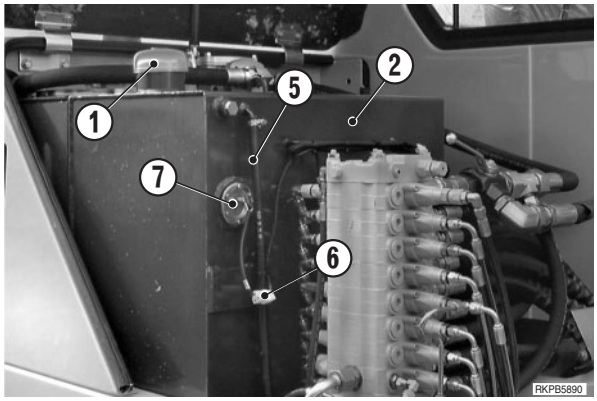
1 - Remove the front hood (for details, see «REMOVAL OF FRONT HOOD») and the bottom right guard of the turret.

2 - Remove the cap (1) of the fuel tank (2), open the tank drainage cock (3), and drain the fuel.

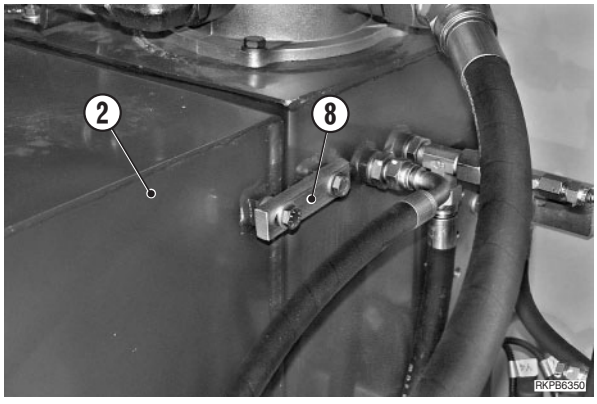
3 - Disconnect the fuel suction pipe (4).



4 - Disconnect the fuel return pipe (5) and the connector (6) of the level gauge (7).



5 - Disconnect the plate (8) that joins the tanks.



REMOVAL OF GEAR-PUMP

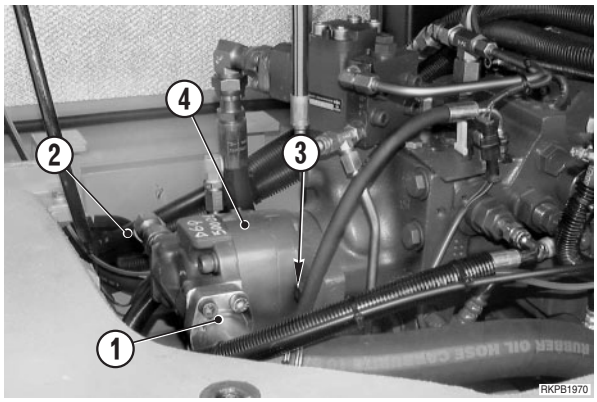
Lower the work equipment until it is resting on the ground and switch off the engine.

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

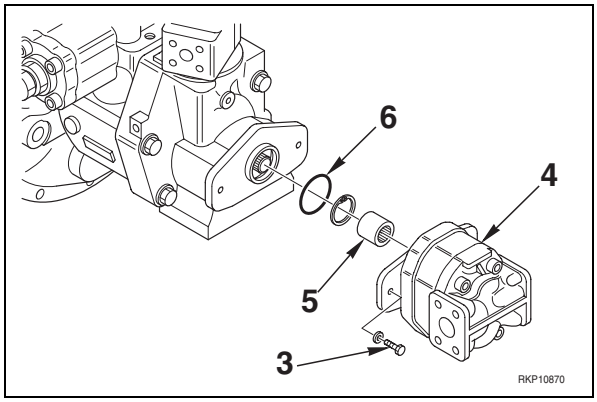
- Drain the hydraulic oil.

Quantity of oil: approx. 84 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.

Nm Flange screws: 35±3.5 Nm

※ 2

Joint: ASL800050

Nm Pump fastening screws: 98–123 Nm

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: approx. 84 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.

ASSEMBLY OF SWING MACHINERY

1. IMPORTANT REMARKS

When installing the swing machinery, some fundamental rules must be followed:

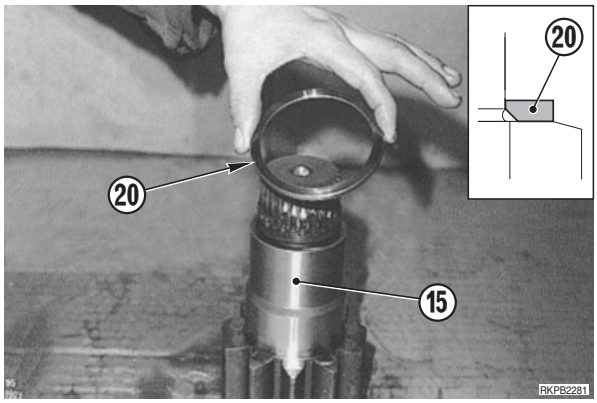
a - In the case of a damaged sun gear, the entire reduction unit must be substituted, not just the single sun gear.

b - Always fit a new O-ring with the part to be replaced, after thoroughly cleaning the installation seating and after having spread a film of grease (ASL800050) over the seatings and the seals to facilitate installation.

2. INSTALLATION

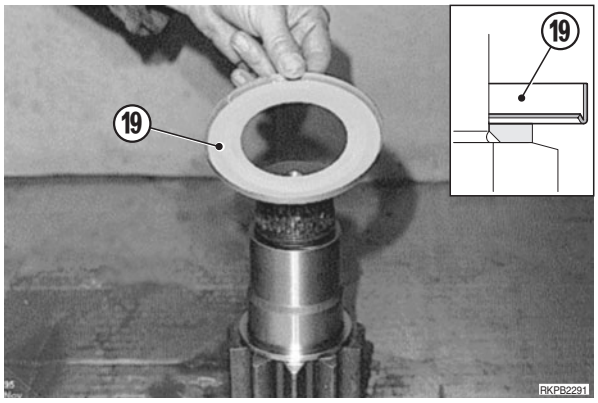
1 - Mount the spacer (20) on the swing pinion shaft (15).

★ Check that the chamfered part rests on the pinion.



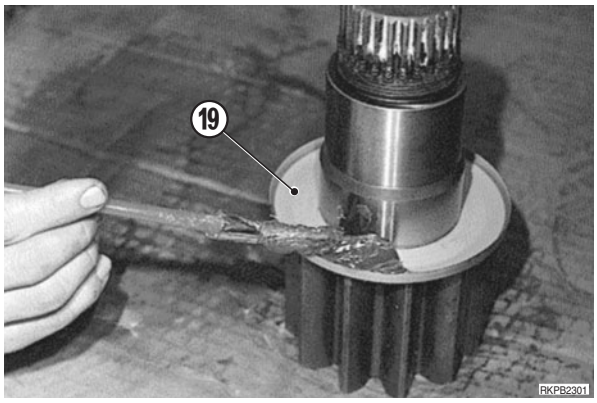
2 - Mount the metal sealing ring (19).

★ Take care to the orientation of seal ring



3 - Fill the metal sealing ring (19) with grease.

Metal sealing ring: ASL800050



INSTALLATION OF REVOLVING FRAME

- To install, reverse the removal procedure.

※1
- ★ After connecting up all the hydraulic tubes, start the engine and move all parts of the equipment several times to bleed air from the circuits, while checking for leakages.
- ★ Switch off the engine and check level of the hydraulic oil.

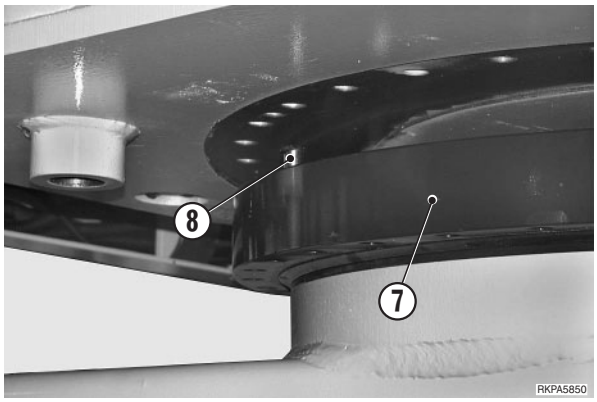
※2
- ★ Align the two positions corresponding to the centering pins (8), then assemble.

Sealant and swing circle platform gaskets: ASL800050

Internal swing circle grease: approx. 25 kg

※3

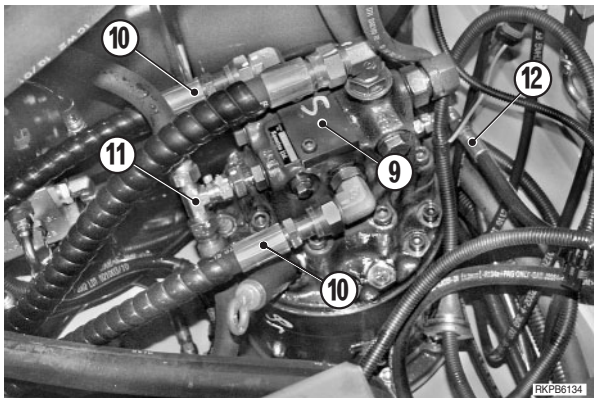
Revolving frame attachment screws (without nut): Loctite 262



Installation Procedure

In order to swing the revolving frame for centering the reference pins (8), and the pinion-swing circle coupling:

1 - Disconnect the feed pipes (10), the drain line connection (11) and the brake release tube (12) from the swing motor (9).
- ★ Plug connections to avoid impurity entry.



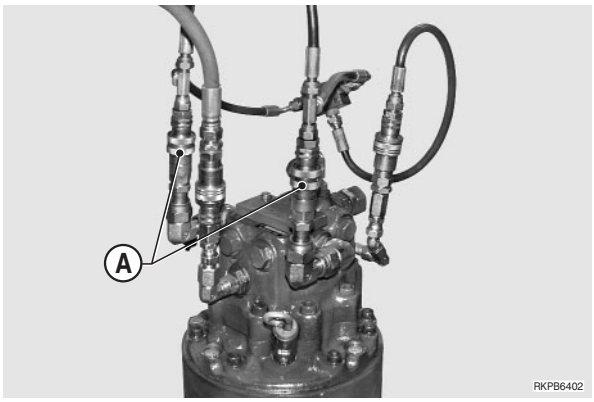
2 - Connect a hydraulic power unit "**A**" and slowly rotate the turret until correct centring is obtained.

3 - Insert the two screws left in the swing circle (7) and secure them.

4 - Insert all the other screws (5).

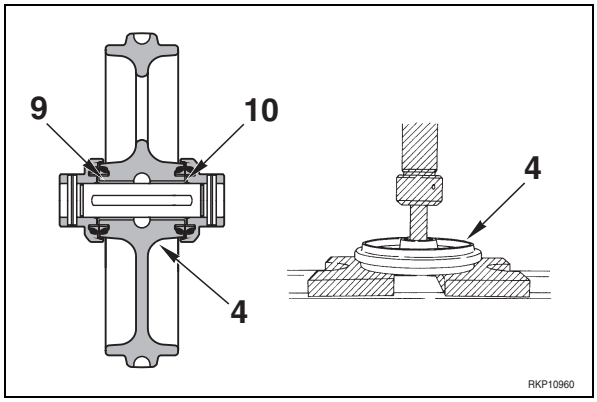
5 - After having secured all the screws that joint the swing circle to the revolving frame, reconnect the delivery tubes (10) of the swing motor (9), and the brake release tube (12) and the drain line connection.

6 - Detach the hoisting tackle.

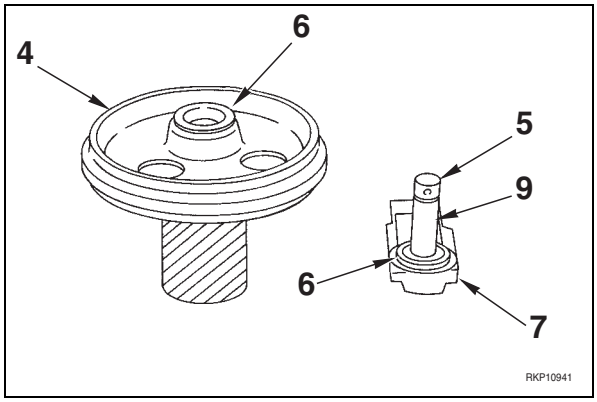


DISASSEMBLY OF IDLER ASSEMBLY

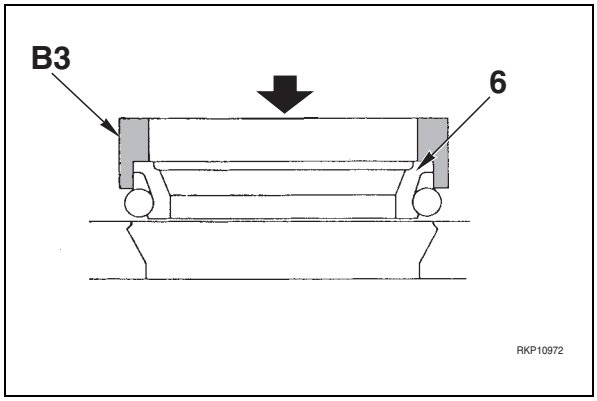
1 - Press fit bushes (9) and (10) to idler (4).



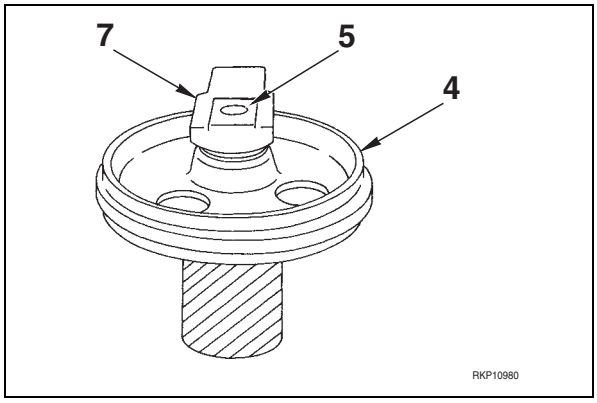
2 - Fit the O-Ring seal (11) and mount the support bracket (7) to the shaft (5) insert the dowel pin (8).
★ Ensure the correct orientation of the milled surface.



3 - Using tool **B3**, install floating seal (6) to idler (4) and shaft (5) and support (7) assembly.
★ Coat the sliding surface of the floating seal with oil, and be careful not to let any dirt or dust get stuck to it.
★ Remove all grease and oil from the contact surface of the O-Ring and the floating seal.



4 - Assembly shaft (5) and support (7) assembly to idler (4).



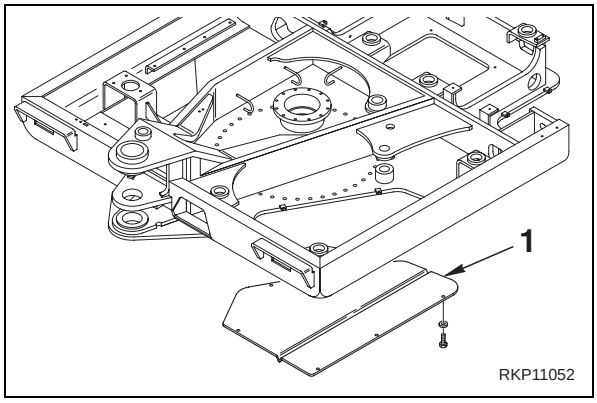
REMOVAL OF BOOM SWING PEDAL CONTROL

- Rotate the turret 90° to the left.

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

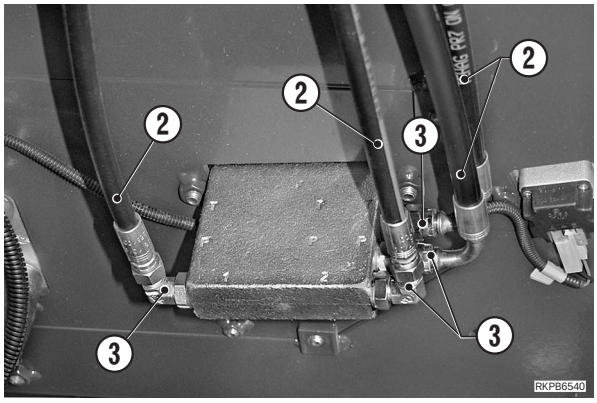
Release residual pressures from all circuits. (For details, see «20. TESTING AND ADJUSTMENTS»).

1 - Remove the bottom left cover (1).

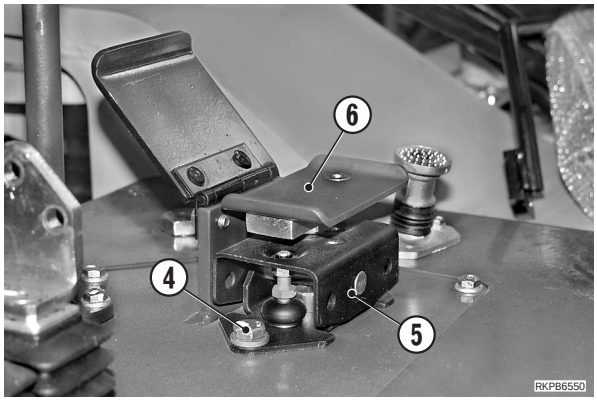


2 - Disconnect the pipes (2) (No. 4 tubes) from the pedal control.
  ★ Place an identifying mark on the pipes to avoid mixing them up during installation.

3 - Remove the connections (3) from the pedal control.



4 - Pull out the screws (4) and remove the pedal control (5) with the operation pedal (6).



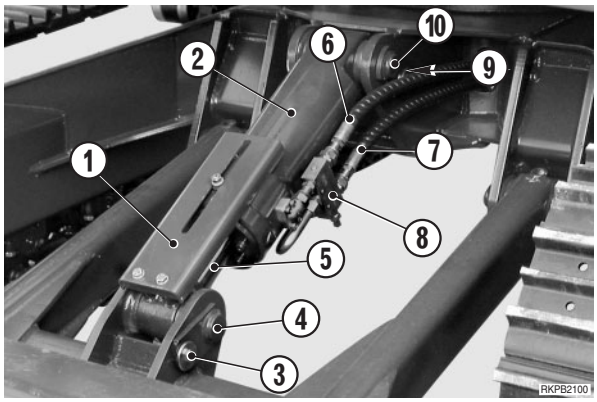
INSTALLATION OF 1st BOOM SWING PEDAL CONTROL

- To install, reverse the removal procedure.

1 - Start the engine to circulate the oil.

2 - Bleed air from the front boom swing cylinder. (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 and 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 spacers 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 spacers 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»).

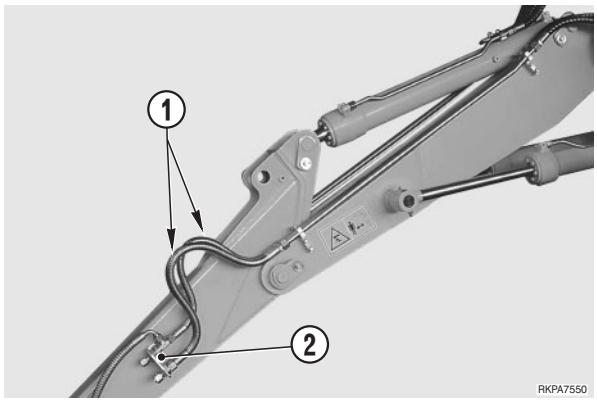
★ After bleeding the air, check the level of oil in the tank.

REMOVAL OF ARM

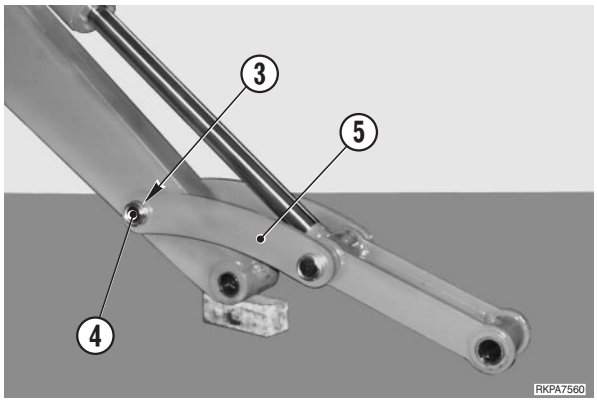
1 - Remove the bucket. (For details, see «REMOVAL OF BUCKET»).

2 - Remove the bucket cylinder. (For details, see «REMOVAL OF BUCKET CYLINDER»).

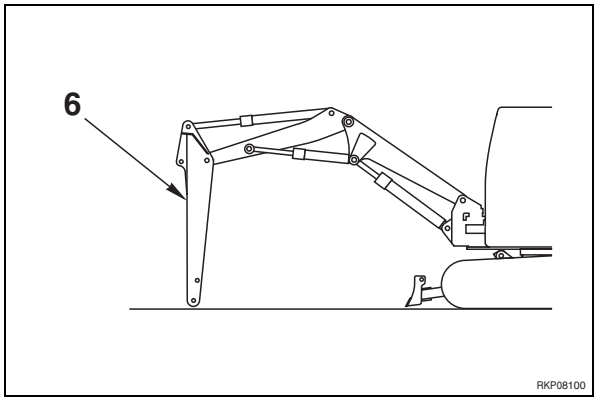
3 - If the machine is designed for the application of optional front equipment, disconnect the boom (or the 2-piece boom), the tubes (1) and remove the supports (2).



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.

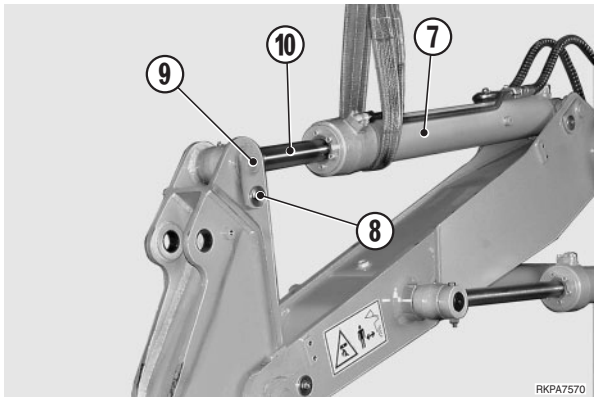


6 - Switch off the engine and release residual pressures.

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

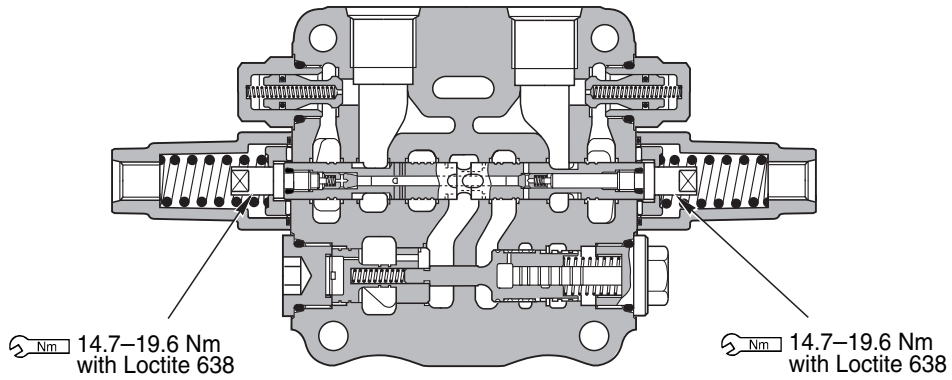
★ To hold the piston rod in its fully retracted position, tie it with wire.



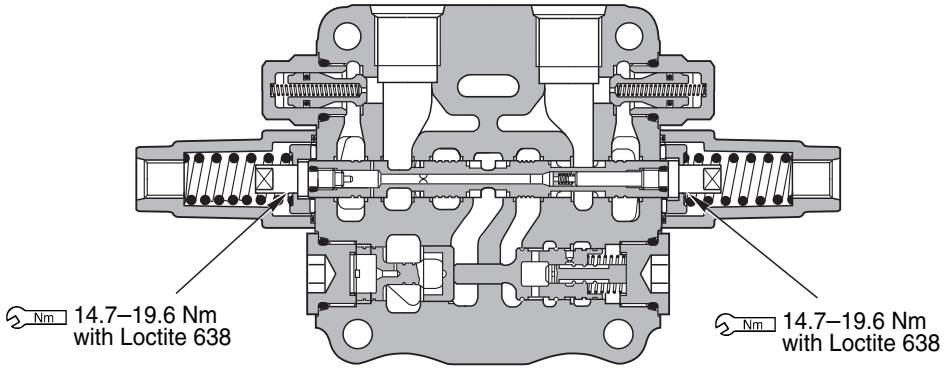
40 STANDARD MAINTENANCE

Unit: mm

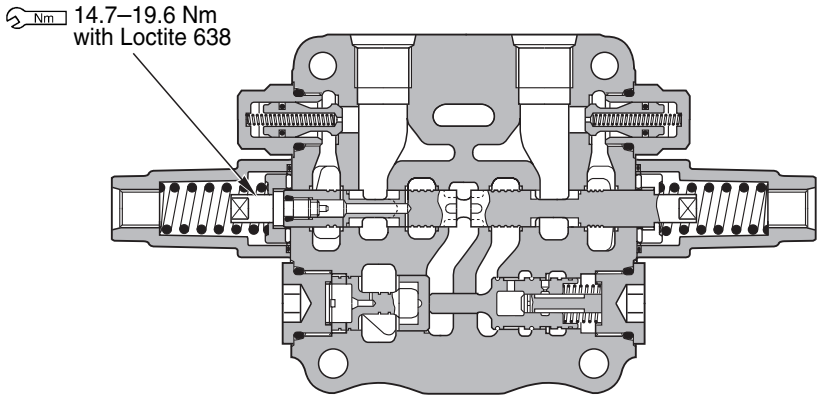
No.	Check item	Criteria		Remedy
1	Backlash between No. 2 planetary gear and housing	Standard clearance	Clearance limit	Replace
2	Backlash between No. 1 planetary gear and housing			
3	Backlash between No. 1 sun gear and No. 1 planetary gear			
4	Backlash between No. 2 sun gear and No. 2 planetary gear			
5	Backlash between swing pinion and swing circle gear			
6	Wear of swing pinion shaft surface contacting with oil seal	Standard size	Size limit	



Section H - H RKP02863



Section J - J RKP02873



Section K - K RKP02883

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