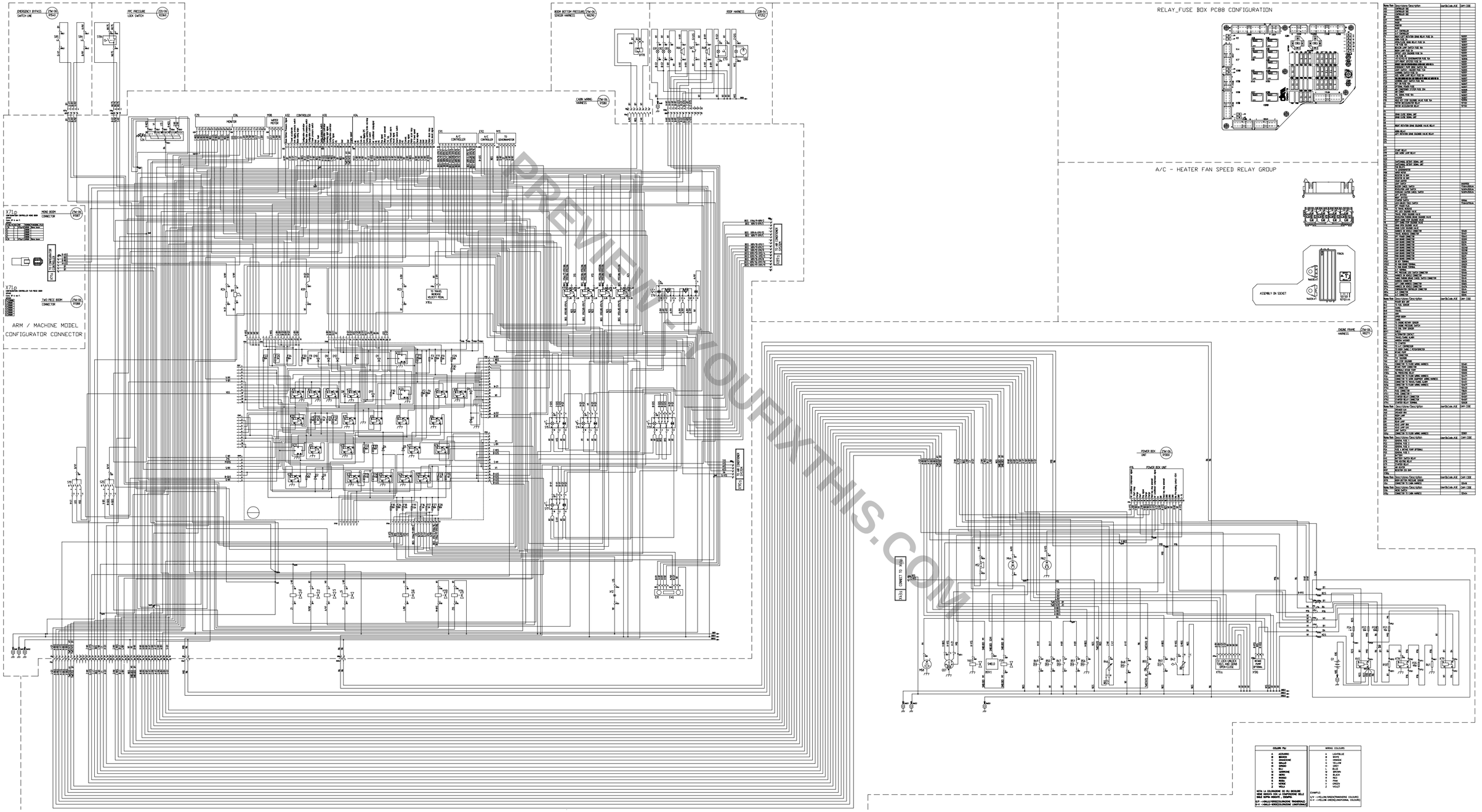
ELECTRICAL CIRCUIT DIAGRAM

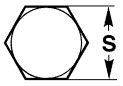
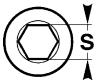


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STANDARD TIGHTENING TORQUE

The following charts give the standard tightening torques of bolts and nuts.
Exceptions are given in section of «Disassembly and Assembly».

1. STANDARD TIGHTENING TORQUE OF BOLTS AND NUT

Thread diameter of bolts (mm)	Pitch of bolts (mm)	Width across flat (mm)		8.8		10.9	
				kgm	Nm	kgm	Nm
6	1	10	8	0.96±0.1	9.5±1	1.3±0.15	13.5±1.5
8	1.25	13	6	2.3±0.2	23±2	3.2±0.3	32.2±3.5
10	1.5	17	8	4.6±0.5	45±4.9	6.5±0.6	63±6.5
12	1.75	19	10	7.8±0.8	77±8	11±1	108±11
14	2	22	12	12.5±1	122±13	17.5±2	172±18
16	2	24	14	19.5±2	191±21	27±3	268±29
18	2.5	27	14	27±3	262±28	37±4	366±36
20	2.5	30	17	38±4	372±40	53±6	524±57
22	2.5	32	17	52±6	511±57	73±8	719±80
24	3	36	19	66±7	644±70	92±10	905±98
27	3	41	19	96±10	945±100	135±15	1329±140
30	3.5	46	22	131±14	1287±140	184±20	1810±190
33	3.5	50	24	177±20	1740±200	250±27	2455±270
36	4	55	27	230±25	2250±250	320±35	3150±350
39	4	60	—	295±33	2900±330	410±45	4050±450

This torque table does not apply to bolts or nuts which have to fasten nylon or other parts non-ferrous metal washer.

★ **Nm (newton meter): 1 Nm = 0.102 kgm**

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COUNTERWEIGHT

Removal

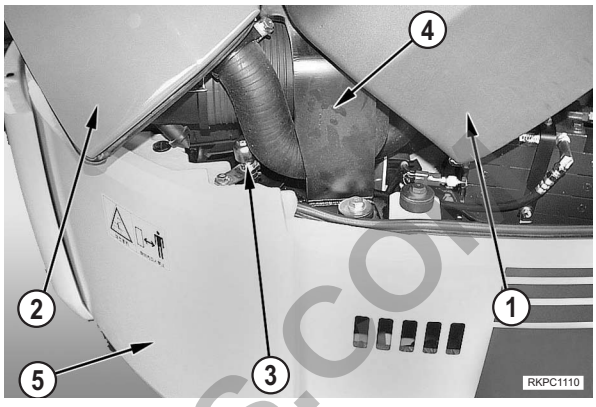
⚠ Stop the machine on a level surface; swing the revolving frame by about 20° to access the mounting screws.
Lower the equipment to the ground and stop the engine.

1 -Remove the hydraulic oil tank hood (1).

2 -Remove the engine-hood. (2).

3 -Remove the vent bracket (3).

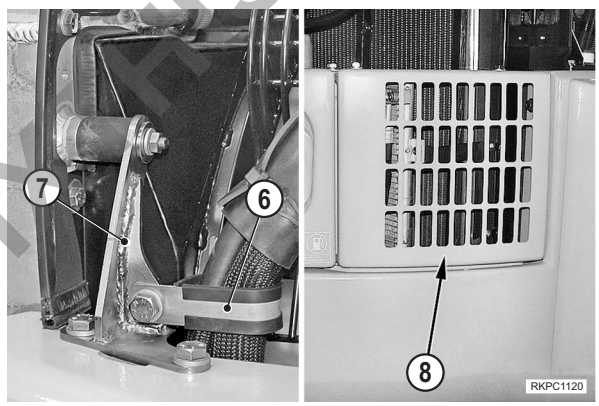
4 -Remove the screws retaining the air filter bracket (4) to the counterweight (5).



5 -Remove the screw retaining the strap (6) for the air conditioning hoses.

6 -Remove the radiator mounting bracket (7) from the counterweight.

7 -Remove grill (8).

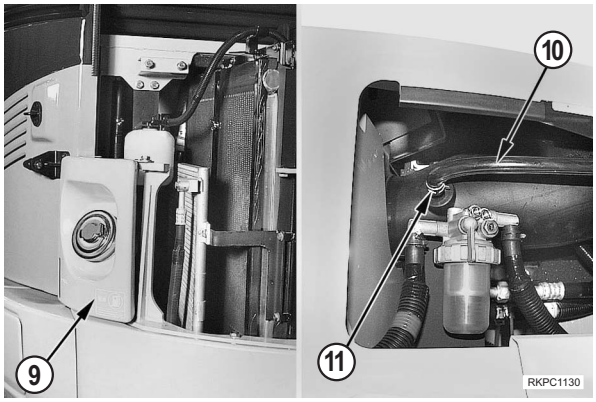


8 -Remove fuel filler cap (9).

9 -Remove the strap (10) for the level hose (11)

★ Disconnect the hose (11) on the cap side (9) and remove them simultaneously.

★ When removing the level hose, check that the fuel level is lower than the union fitting.



10 -Tighten three lifting eyes "**A**" in the holes provided; connect the counterweight (5) to a hoist and slightly tension the chains.
Loosen and remove 3 screws retaining the counterweight.

[*1]

11 -Remove the counterweight (5).

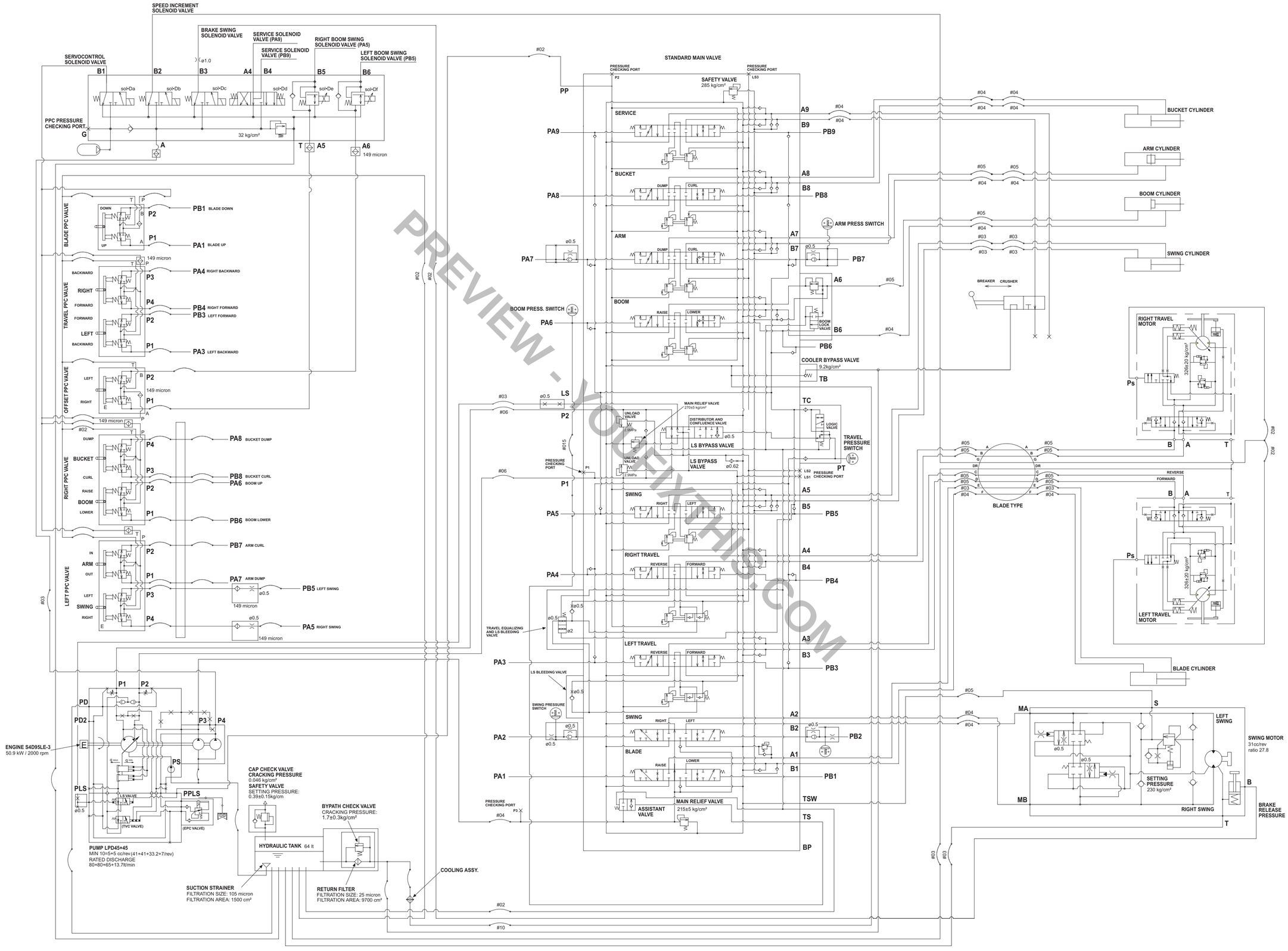
Counterweight: approx. 965 kg



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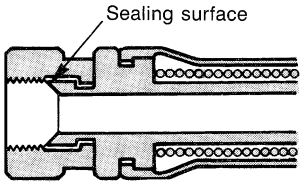
HYDRAULIC CIRCUIT DIAGRAM (STANDARD)



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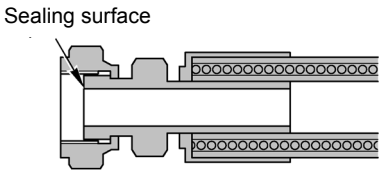
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2. TIGHTENING TORQUE FOR NUTS OF FLARED



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



Thread diameter of nut part (mm)	Width across flats of nut part (mm)	TIGHTENING TORQUE	
		kgm	Nm
9/16” - 18	17	2.3–2.5	23–25
11/16” - 16	22	3.4–3.9	33–38
13/16” - 16	24	5.2–5.8	51–57
1” - 14	30	8.2–9.2	80–90
1.3/16 - 12	36	12.2–13.3	120–130
1.7/16 - 12	41	15.3–17.3	150–170
1.11/16 - 12	50	18.4–20.4	180–200
2” - 12	57	20.4–24.4	200–240

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INJECTION PUMP

Removal

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

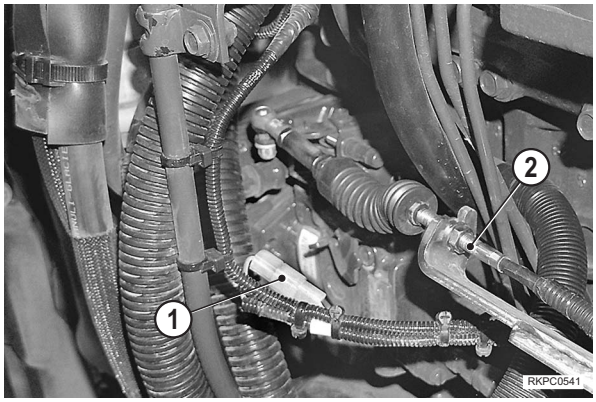
⚠ Disconnect cable from battery negative terminal (–).



1 - Remove the counterweight .
(For details, see "COUNTERWEIGHT").

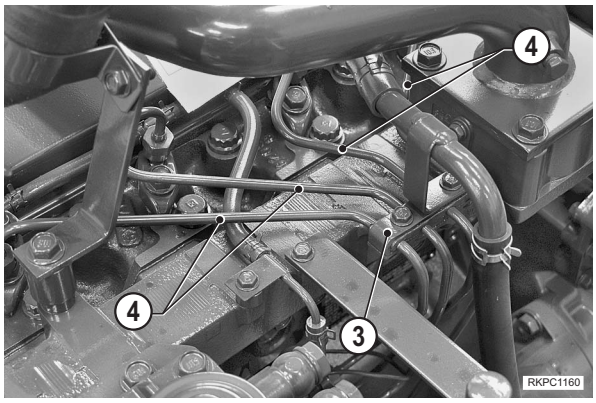


2 - Disconnect the engine stop connector (1) and the throttle cable (2).



3 - Remove the strap (3) and the delivery lines (4) to the injectors.

[*1]



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ENGINE HEAD

Removal

⚠ Fully lower the equipment until it is resting on the ground, and stop the engine.

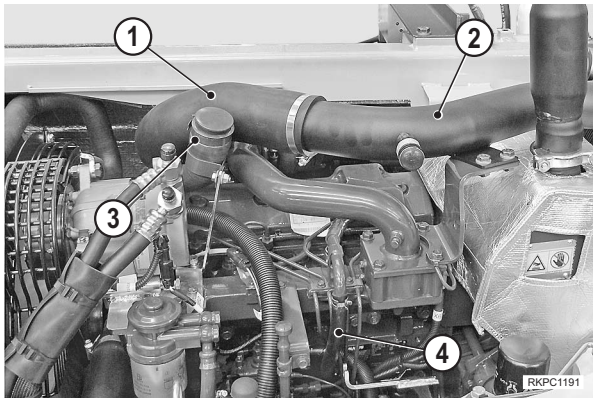
⚠ Disconnect cable from battery negative terminal (–).



1 - Remove the counterweight .
(For details, see "COUNTERWEIGHT").



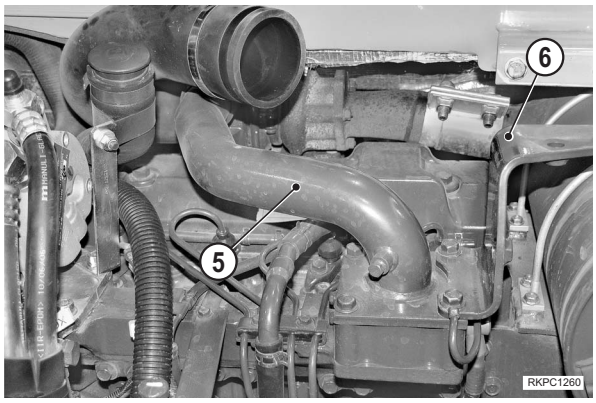
2 -Remove suction lines (1) and (2) between turbocharger filter, engine oil input line (3) and vapour bleed line (4).



3 -Remove line (5) and bracket (6).

★ Replace thermal starter seals at each disassembly.

★ Note down the retaining position of the ground wire.



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REVISED PAGES

The affected pages are indicated by the use of the following marks. It is requested that necessary actions be taken to these pages according to table below.

Mark	Indication	Action required
○	Page to be newly	Add
●	Page to be replaced	Replace
( )	Page to be delete	Discard

Pages having no marks are those previously revised or made additions.

Mark	Page	Time of rev.	Mark	Page	Time of rev.	Mark	Page	Time of rev.	Mark	Page	Time of rev.	Mark	Page	Time of rev.
	00-1			10-30			10-84			20-32			30-21	
	00-2			10-31			10-85			20-33			30-22	
	00-3			10-32			10-86			20-34			30-23	
	00-4			10-33			10-87			20-35			30-24	
	00-5			10-34			10-88			20-36			30-25	
	00-6			10-35			10-89			20-37			30-26	
	00-7			10-36			10-90			20-38			30-27	
	00-8			10-37			10-91			20-39			30-28	
	00-9			10-38			10-92			20-40			30-29	
	00-10			10-39			10-93			20-41			30-30	
	00-11			10-40			10-94			20-42			30-31	
	00-12			10-41			10-95			20-43			30-32	
	00-13			10-42			10-96			20-44			30-33	
	00-14			10-43			10-97			20-45			30-34	
	00-15			10-44			10-98			20-46			30-35	
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	00-17			10-46			10-100			20-48			30-37	
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	00-19			10-48			10-102			20-50			30-39	
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				10-54			20-2			20-56			30-45	
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	10-27			10-81			20-29			30-18			30-72	
	10-28			10-82			20-30			30-19			30-73	
	10-29			10-83			20-31			30-20			30-74	

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IMPORTANT SAFETY NOTICE

Proper service and repair is extremely important for the safe operation of your machine.
The service and repair techniques recommended by Komatsu and describe in this manual are both effective and safe methods of operation. Some of these operations require the use of tools specially designed by Komatsu for the purpose.

To prevent injury to workers, the symbol ⚠ is used to mark safety precautions in this manual. The cautions accompanying these symbols should always be carefully followed. If any danger arises or may possibly arise, first consider safety, and take necessary steps to face.

SAFETY

GENERAL PRECAUTIONS

Mistakes in operation extremely dangerous.
Read all the Operation and Maintenance Manual carefully BEFORE operating the machine.

1. Before carrying out any greasing or repairs, read all the precautions written on the decals which are suck on the machine.
2. When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.
   - Always wear safety glasses when hitting parts with a hammer.
   - Always wear safety glasses when grinding parts with a grinder, etc.
3. If welding repairs are needed, always have a trained, experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, glasses, cap and other clothes suited for welding work.
4. When carrying out any operation with two or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR signs on the controls in the operator's compartment.
5. Keep all tools in good condition and learn the correct way to use them.
6. Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places. Always keep the work area clean and make sure that there is no dirt or oil on the floor. Smoke only in the areas provided for smoking. Never smoke while working.

PREPARATIONS FOR WORK

7. Before adding or making any repairs, park the machine on hard, level ground, and block the tracks to prevent the machine from moving.
8. Before starting work, lower outrigger, bucket or any other work equipment to the ground. If this is not possible, use blocks to prevent the work equipment from falling down. In addition, be sure to lock all the control levers and hang warning sign on them.
9. When disassembling or assembling, support the machine with blocks, jacks or stands before starting work.
10. Remove all mud and oil from the steps or other places used to get on and off the machine. Always use the handrails, ladders or steps when getting on or off the machine.
    Never jump on or off the machine.
    If it is impossible to use the handrails, ladders or steps, use a stand to provide safe footing.

PRECAUTIONS DURING WORK

11. When removing the oil filler cap, drain plug or hydraulic pressure measuring plugs, loosen them slowly to prevent the oil from spurting out.
    Before disconnecting or removing components of the hydraulic circuit and engine cooling circuit, first remove the pressure completely from the circuit.
12. The water and oil in the circuits are not hot when the engine in stopped, so be careful not to get burned.
    Wait for the oil water to cool before carrying out any work on the cooling water circuits.
13. Before starting work, remove the leads from the battery. Always remove the lead from the negative (–) terminal first.

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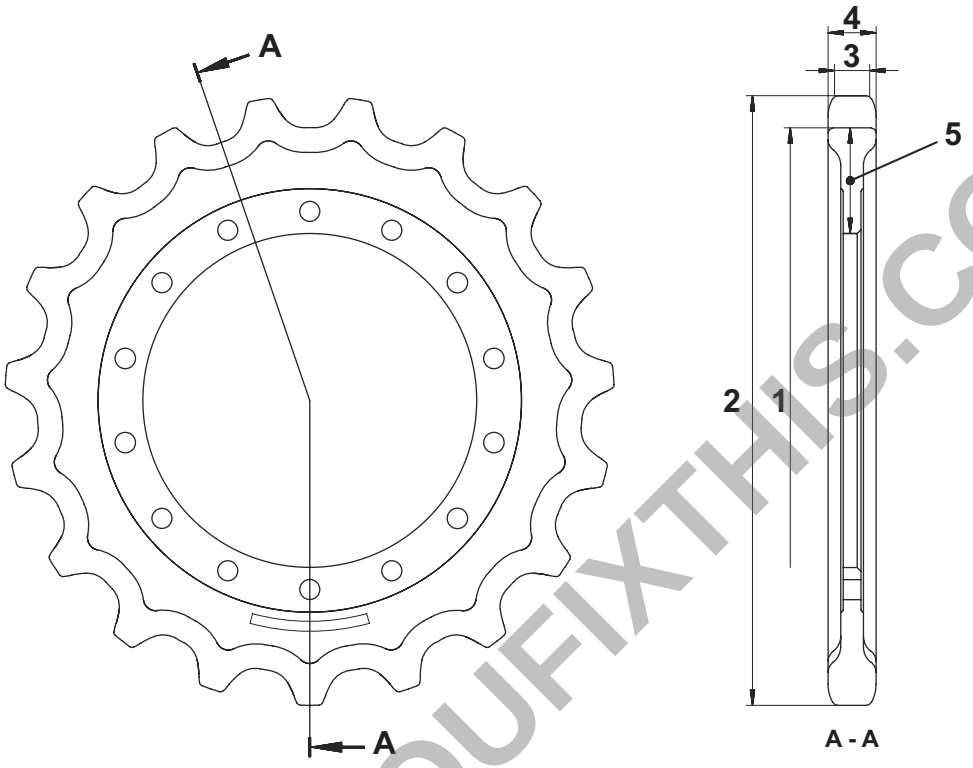
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14. When raising heavy components, use a hoist or crane. Check that the wire rope, chains and hooks are free from damage.
    Always use lifting equipment which has ample capacity. Install the lifting equipment at the correct places.
    Use a hoist or crane and operate slowly to prevent the component from hitting any other part.
    Do not work with any part still raised by the hoist or crane.
15. When removing covers which are under internal pressure or under pressure from a spring, always leave two bolts in position on opposite sides. Slowly release the pressure, then slowly loosen the bolts to remove.
16. When removing components, be careful not to break or damage the wiring.
    Damage wiring may cause electrical fires.
17. When removing piping, stop the fuel or oil from spilling out. If any fuel or oil drips on to the floor, wipe it up immediately.
    Fuel or oil on the floor can cause you to slip, or can even start fires.
18. As a general rule, do not use gasoline to wash parts. In particular, use only the minimum of gasoline when washing electrical parts.
19. Be sure to assemble all parts again in their original places. Replace any damage parts with new parts. When installing hoses and wires, be sure that they will not be damaged by contact with other parts when the machine is being operated.
20. When installing high pressure hoses, make sure that they are not twisted. Damaged tubes are dangerous, so be extremely careful when installing tubes for high pressure circuits. Also, check that connecting parts are correctly tightened.
21. When assembling or installing parts, always use specified tightening torques.
    When installing the parts which vibrate violently or rotate at high speed, be particulary careful to check that they are correctly installed.
22. When aligning two holes, never insert your fingers or hand.
23. When measuring hydraulic pressure, check that the measuring tool is correctly assembled before taking any measurement.
24. Take sure when removing or installing tracks.
    When removing tha track, the track separately suddenly, so never let anyone stand at either end of the track.

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SPROCKET



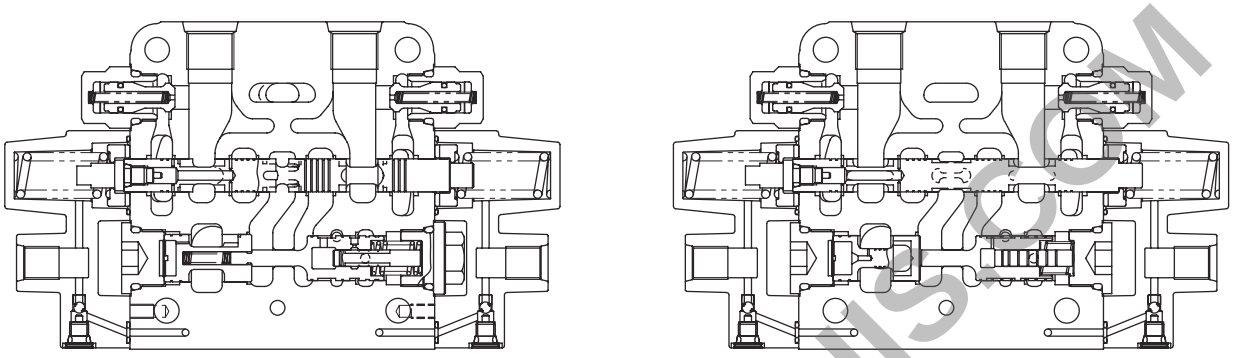
RKP15750

Unit: mm

No.	Control	Criteria			Remedy
1	Wear of root diameter	Basic dimension	Allowable	Limit size	Overlay or replace
		Ø 433.004	+ 1.0 - 2.0	Ø 421	
2	Wear of tip diameter	Ø 483.7	± 2.0	Ø 472	
3	Wear of dip width	28	–	23	
4	Wear of root width	38	+ 0.5 - 2.5	33	
5	Thickness of root	84.002	+ 0.475 - 1.150	78	

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AC - AC AD - AD

RKP17490

1. Pump pressure pickup plug (P1)
2. LS bypass plug (LS1)
3. Check valve (P1)
4. Check valve (P2)

Unit: mm

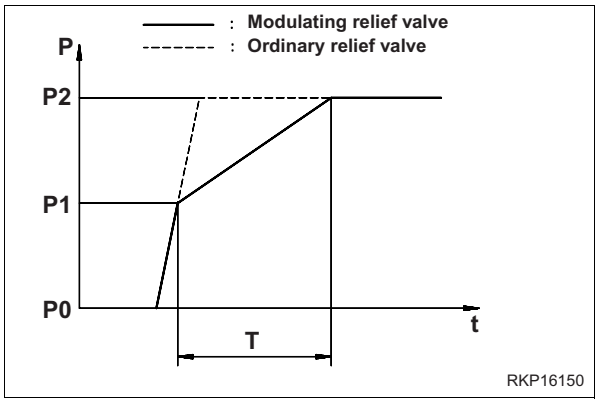
No.	Control	Criteria					Remedy
		Basic dimension			Limit size		
		Free length x Outside diameter	Installed length	Installed load	Free length	Installed load	
5	Check valve spring	21.9 x 5.0	15.8	1.96 N	–	1.57 N	If damaged or deformed
6	Hydraulic drift prevention valve spring	16.6 x 13.0	13	11.2 N	–	12.6 N	
7	Hydraulic drift	13.0 x 8.8	7.5	10.8 N	–	8.64 N	

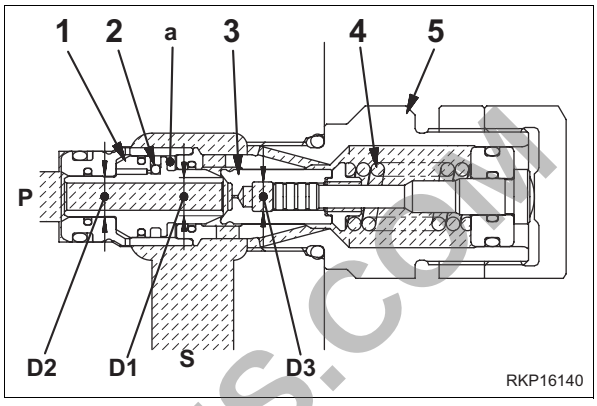
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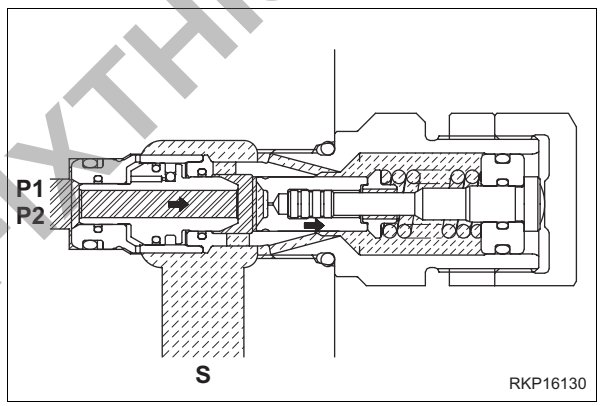
OPERATION OF THE MODULATING RELIEF VALVE

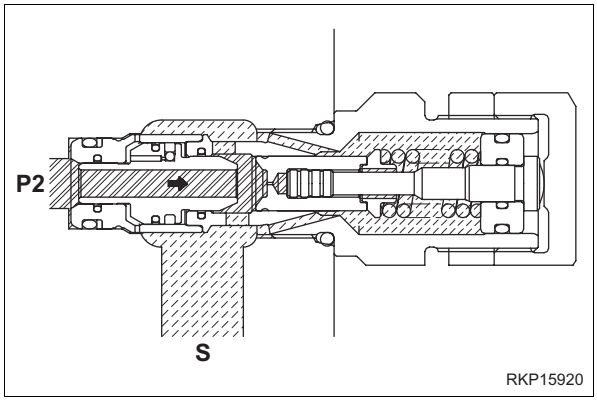
FUNCTION

The relief valve for the swing motor prevents the relief pressure from rising sharply to reduce **shocks** when the machine starts and stops swinging.









OPERATION

1. When circuit is > P0

- The relief valve does not operate.

2. When circuit pressure rises sharply

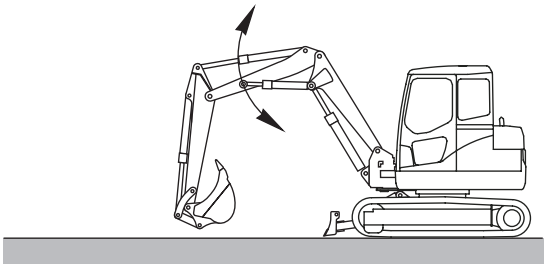
- When circuit pressure rises to **P1**, the hydraulic pressure acts on the area differ- ence between **D1** and **D3** (**D1** > **D3**) and pushes spring (4) to open valve (3).
- At this time, pressure acts on the area difference between **D1** and **D2** (**D2** > **D1**), so seat (1) follows valve (3).
- As seat (1) moves, the passage for the pressurized oil in chamber **d** to flow into port **S** is narrowed by ball (**c**). Accordingly, seat (1) does not move so fast as valve (3).
- As a result, the relief pressure rises gradually from **P1** to **P2** while seat (1) is moving to sleeve (5).

4

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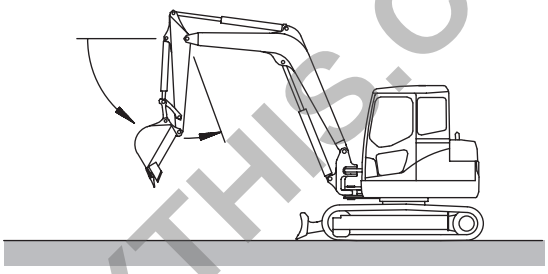
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Fig. J



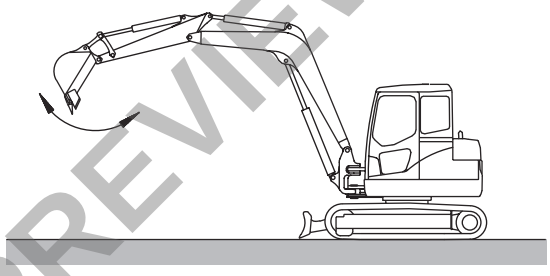
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Fig. K



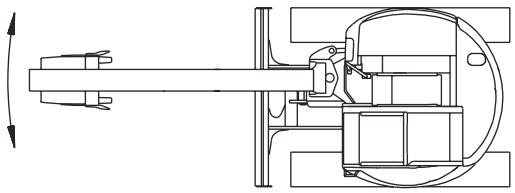
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Fig. L



RKP16700

Fig. M



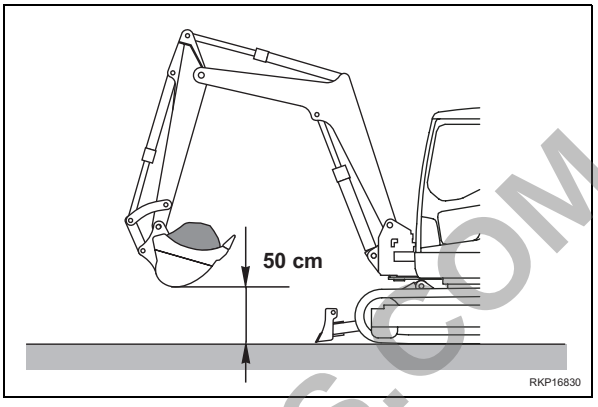
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5 - Start the engine and raise the boom.

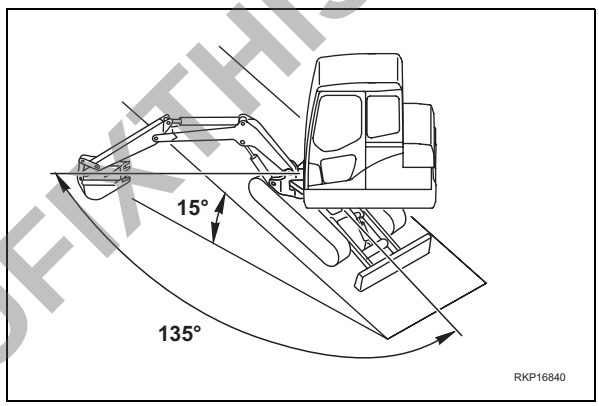
6 - Stop the engine and check the position of the bucket for 5 minutes.
- If the bucket tends to open, the drift is due to the cylinder gasket.
- If the bucket does not tend to open, the drift is due to the control valve.



5. Boom swing test

1 - Position the machine with the boom, arm and bucket raised and with the revolving frame turned 135° to the right.

2 - Stop the engine and release any residual hydraulic pressure.

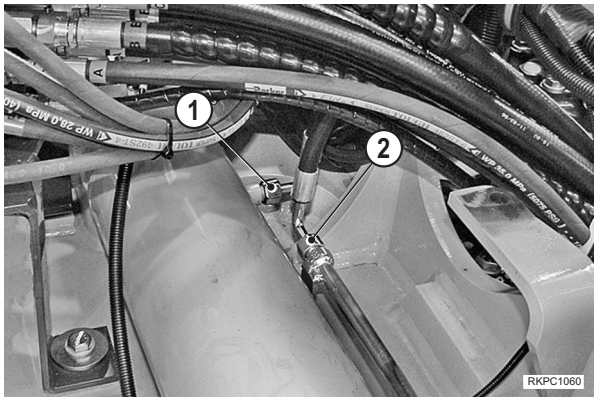


3 - Disconnect the pipes (1 and 2) of the boom swing cylinder and cap them.

4 - Cap the hole in the boom swing cylinder on the bottom side and attach a provisional hose to the head side to collect any oil leakages.

5 - Start the engine and move the machine onto a 15° slope.

6 - Stop the engine and check the position of the boom for 15 minutes.
- If the boom tends to swing, the drift is due to the cylinder gasket.
- If the boom does not tend to swing, the drift is due to the control valve.



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ENGINE - PUMPS

Removal

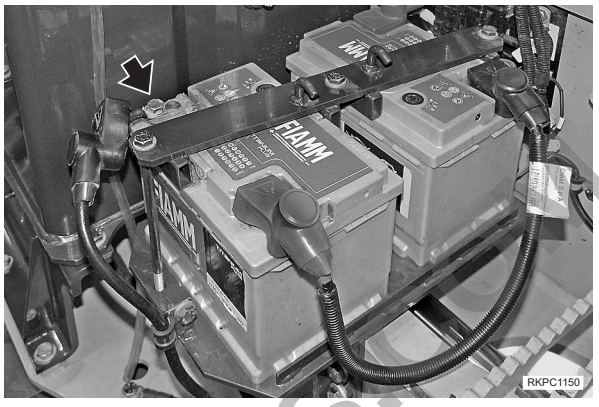
★ Remove the engine hood and counterweight. (For details see "COUNTERWEIGHT").

⚠ Swing the revolving frame by 30° to the right: allow the attachments to settle on the ground and stop the engine.

⚠ Relieve pressure from tank by slowly loosening the fill cap.

⚠ Disconnect cable from battery negative terminal (–).

⚠ Drain the air conditioning system. (For details see: "20 TESTING AND ADJUSTMENTS").

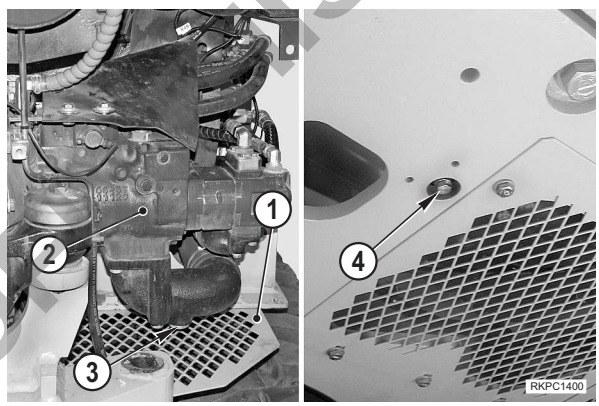


1 - Remove lower shield (1) of pump (2). Remove plug (3) and drain the hydraulic oil.

Hydraulic oil: approx 80 ℓ

2 - Loosen plug (4) and drain the coolant liquid.

Coolant liquid needed: approx 8 ℓ



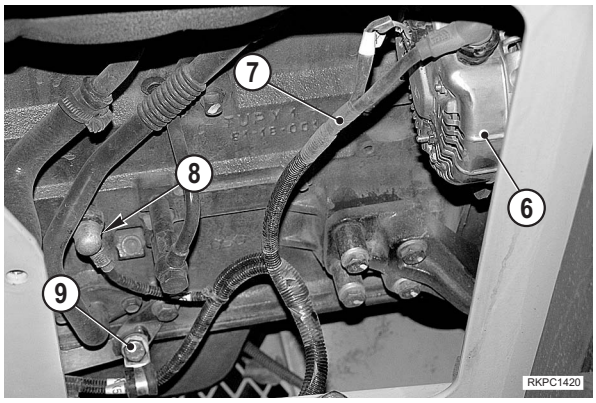
3 - Remove the revolving frame lower panels (5).



4 - Disconnect wiring harness (7) from alternator (6).

5 - Disconnect the connector from the engine oil pressure sensor (8); also disconnect the engine RPM sensor connector.

6 - Remove two lower screws and remove the main wiring harness tie straps (9).



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TRAVEL PPC VALVE

Removal

⚠ 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").

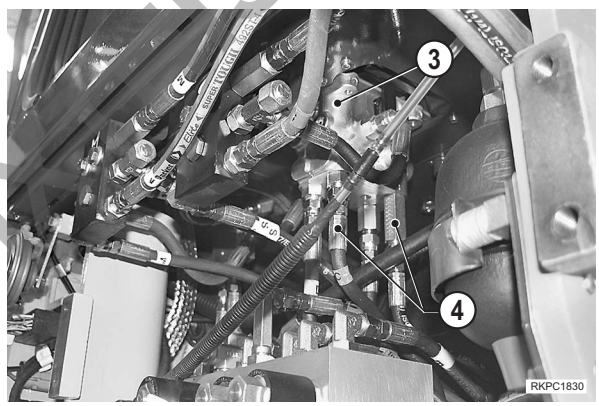
1 - Remove the front left protective panel (1) and crossbar (2).



2 - Disconnect six hoses (4) from PPC valve (3).

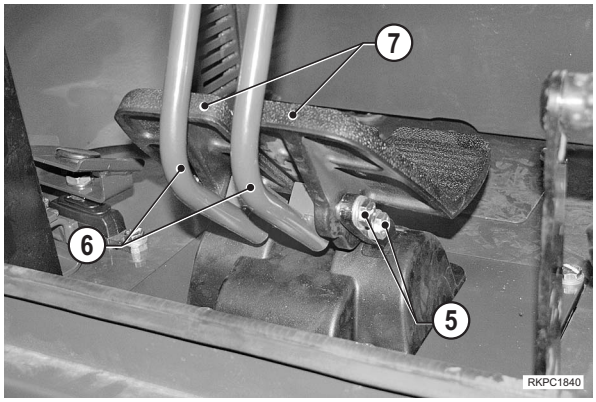
★ Mark the position of lines to avoid mixing them during installation.

★ Plug all pipes to keep out impurity.

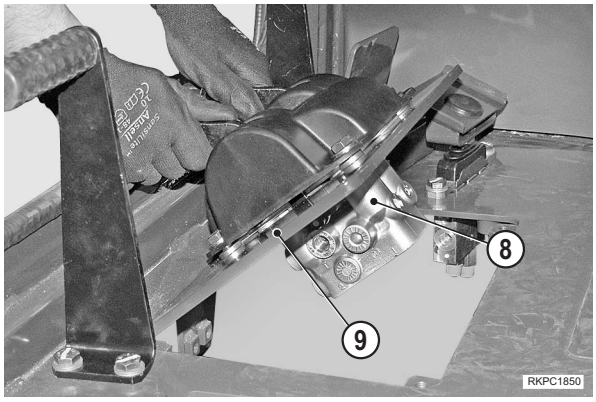


3 - Remove screws (5) and remove travel control levers (6) and pedals (7).

[*1]



4 - Remove the retaining screws and remove the PPC valve unit (8) together with the mounting plate (9).

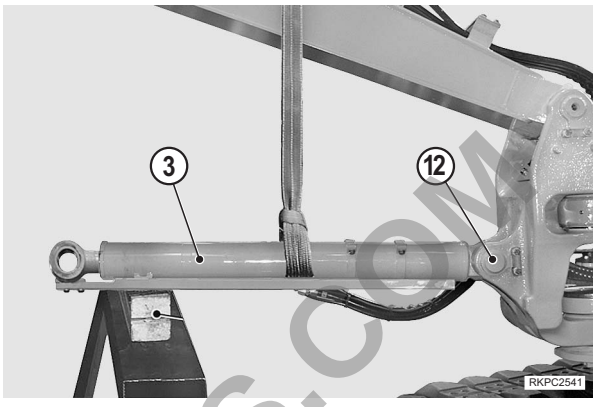


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14 - Connect cylinder (3) to a hoist, remove the screws and remove pin (12).
[*1] [*2] [*3]

15 - Remove cylinder (3).



Installation

- To install, reverse the removal procedure.

[*1]

★ Insert the spacers to a given clearance (distributed on both sides of the cylinder rod) until a clearance of 0.5 – 1 mm is obtained.

[*2]

⚠ When aligning the positions between hole and pin, run the engine at minimum idling. Do not insert fingers in the holes to check the alignment.

[*3]

Inside bushings: ASL800050

[*4]

Insert shims on both sides of the piston rod until a clearance of 0.5 – 1 mm is obtained.

[*5]

★ Introduce the pin into the piston and continue until the tool is expelled.

- Start the engine to circulate the oil, and bleed air from the cylinder.
(For details see "20 TESTING AND ADJUSTMENTS").

★ After bleeding the air, switch off the engine and check the oil level in the tank.

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