SEBM016404

SHOP MANUAL

KOMATSU

PC75UU-3

MACHINE MODEL	SERIAL NUMBER
PC75UU-3	**15001 and up**

- This shop manual may contain attachments and optional equipment that are not available in your area. Please consult your local Komatsu distributor for those items you may require. Materials and specifications are subject to change without notice.
- PC75UU-3 mount the 4D102-1 and 4D95LE-2 engine.
  For details of the engine, see the 102 Series and 95-2 Series Engine Shop Manual.

Printed in Japan 07-03(02)

METHOD OF DISASSEMBLING, CONNECTING PUSH-PULL TYPE COUPLER

Before carrying out the following work, release the residual pressure from the hydraulic tank. For details, see TESTING AND ADJUSTING, Releasing residual pressure from hydraulic tank.

Even if the residual pressure is released from the hydraulic tank, some hydraulic oil flows out when the hose is disconnected. Accordingly, prepare an oil receiving container.

Disconnection

1) Release the residual pressure from the hydraulic tank. For details, see TESTING AND ADJUSTING, Releasing residual pressure from hydraulic tank.

2) Hold adapter (1) and push hose joint (2) into mating adapter (3). (See Fig. 1)
   - ★ The adapter can be pushed in about 3.5 mm.
   - ★ Do not hold rubber cap portion (4).

3) After hose joint (2) is pushed into adapter (3), press rubber cap portion (4) against (3) until it clicks. (See Fig. 2)

4) Hold hose adapter (1) or hose (5) and pull it out. (See Fig. 3)
   - ★ Since some hydraulic oil flows out, prepare an oil receiving container.

Connection

1) Hold hose adapter (1) or hose (5) and insert it in mating adapter (3), aligning them with each other. (See Fig. 4)
   - ★ Do not hold rubber cap portion (4).

2) After inserting the hose in the mating adapter perfectly, pull it back to check its connecting condition. (See Fig. 5)
   - ★ When the hose is pulled back, the rubber cap portion moves toward the hose about 3.5 mm. This does not indicate abnormality, however.

Type 1

Fig. 1

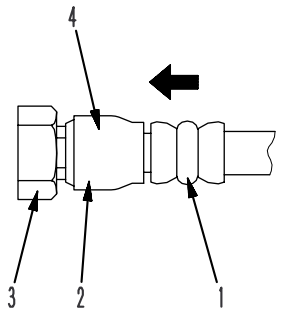


Fig. 2

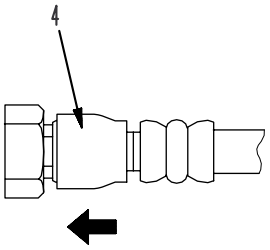


Fig. 3

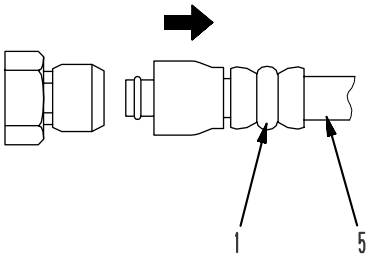


Fig. 4

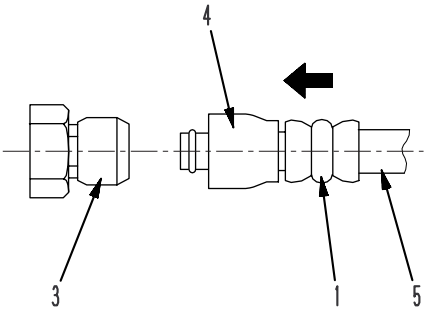
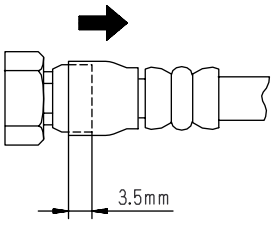


Fig. 5



CWP10701

Liter to U.S. Gallon

1ℓ = 0.2642 U.S. Gal

	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

Liter to U.K. Gallon

1ℓ = 0.21997 U.K. Gal

	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	18.257	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

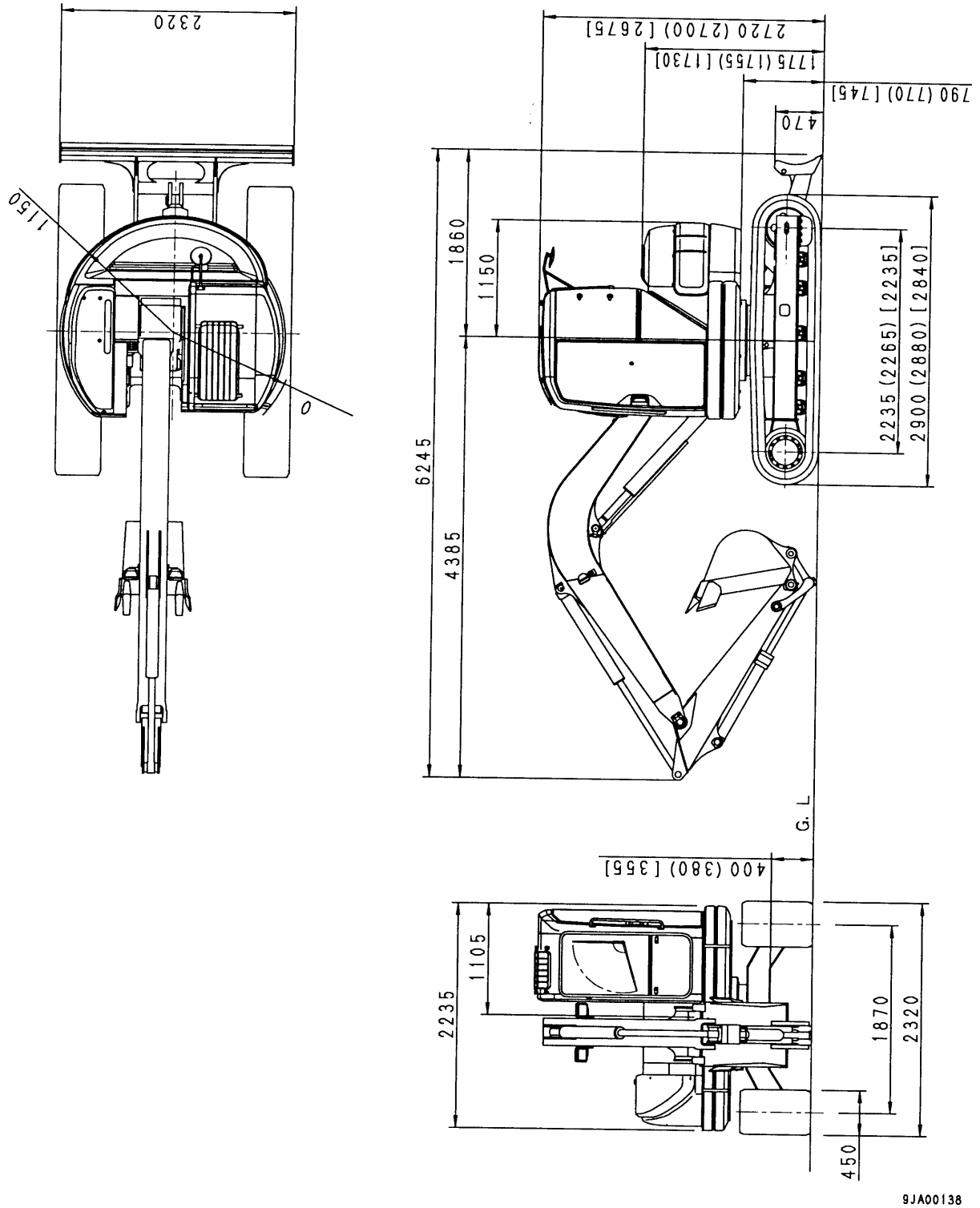
CAB : MONOBOOM SPECIFICATION

Serial No. : 15001 – 19000

Unit: mm

Cab. road liner specification machine
Cab. rubber shoe specification machine
Cab. steel shoe specification machine

The values not in parentheses are the values for the road liner specification machine.
The values inside ( ) are the values for the rubber shoe specification machine.
The values inside [ ] are the values for the steel shoe specification machine.
The dimensions where there is no distinction using ( ) or [ ] are the same values as for the road liner specification machine.



9JA00138

WEIGHT TABLE

⚠ This weight table is a guide for use when transporting or handling component.

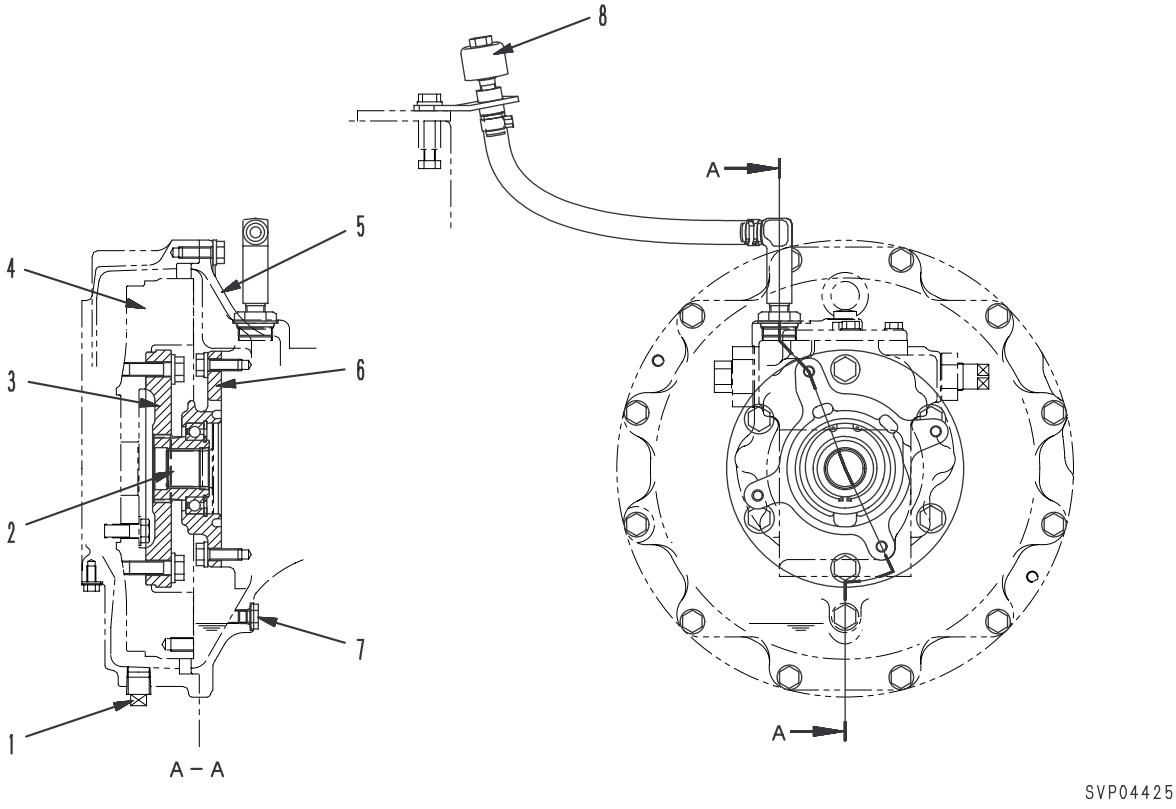
Unit : kg

Machine model	PC75UU-3
Serial Number	15001 – 19000
Engine, hydraulic pump assembly	474
• Engine (with mount)	410
• PTO	7
• Piston pump + gear pump	57
Radiator, oil cooler assembly	41
Fuel tank (without fuel)	8.5
Hydraulic tank (without oil)	59
Canopy	59
Operator's cab	173
Revolving frame (without counterweight)	1,860
Counterweight	1,065
Swing circle	99
Swing machinery	43
Track frame assembly (with piping, cover)	2,335(2,170)[2,222]
• Track frame	834
• Idler	54 x 2
• Recoil spring assembly	40 x 2
• Track roller	13 x 10
• Carrier roller	3.4 x 2 [8 x 2]
• Sprocket	19 x 2
Track shoe assembly	
• Road liner (450 mm)	465 x 2
• Rubber shoe (450 mm)	(380 x 2)
• Steel shoe (450 mm)	[435 x 2]
9-spool control valve (for front pump)	55
Swing motor	21
Center swivel joint	26

* Figures in ( ) : Rubber shoe specification
Figures in [ ] : Steel shoe specification

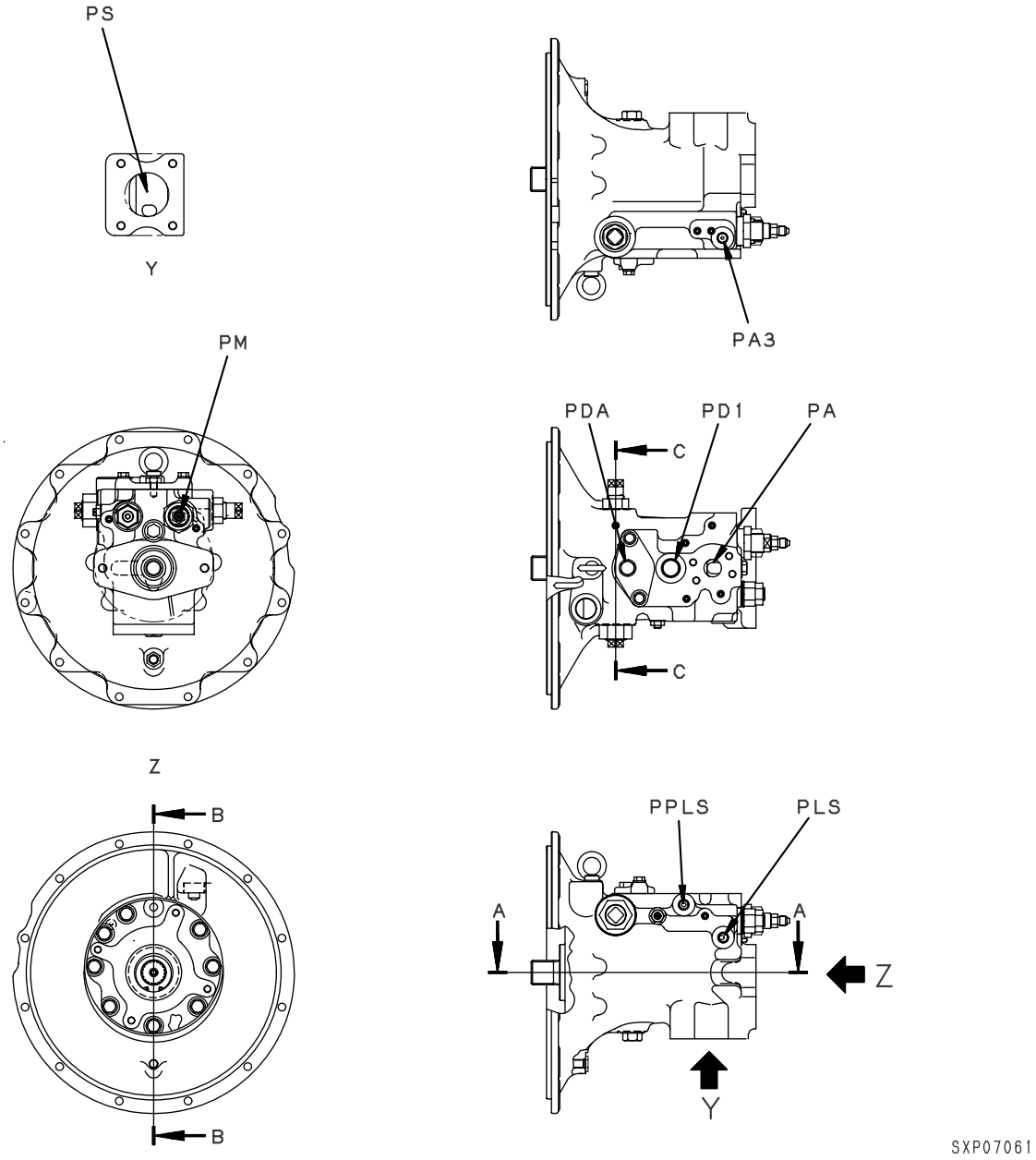
PTO (COUPLING)

Serial No. : 15001 – 19000



1. Drain plug
2. Shaft
3. Coupling
4. Flywheel
5. Pump case
6. Cage
7. Level plug
8. Breather/oil filler plug

1. MAIN PUMP

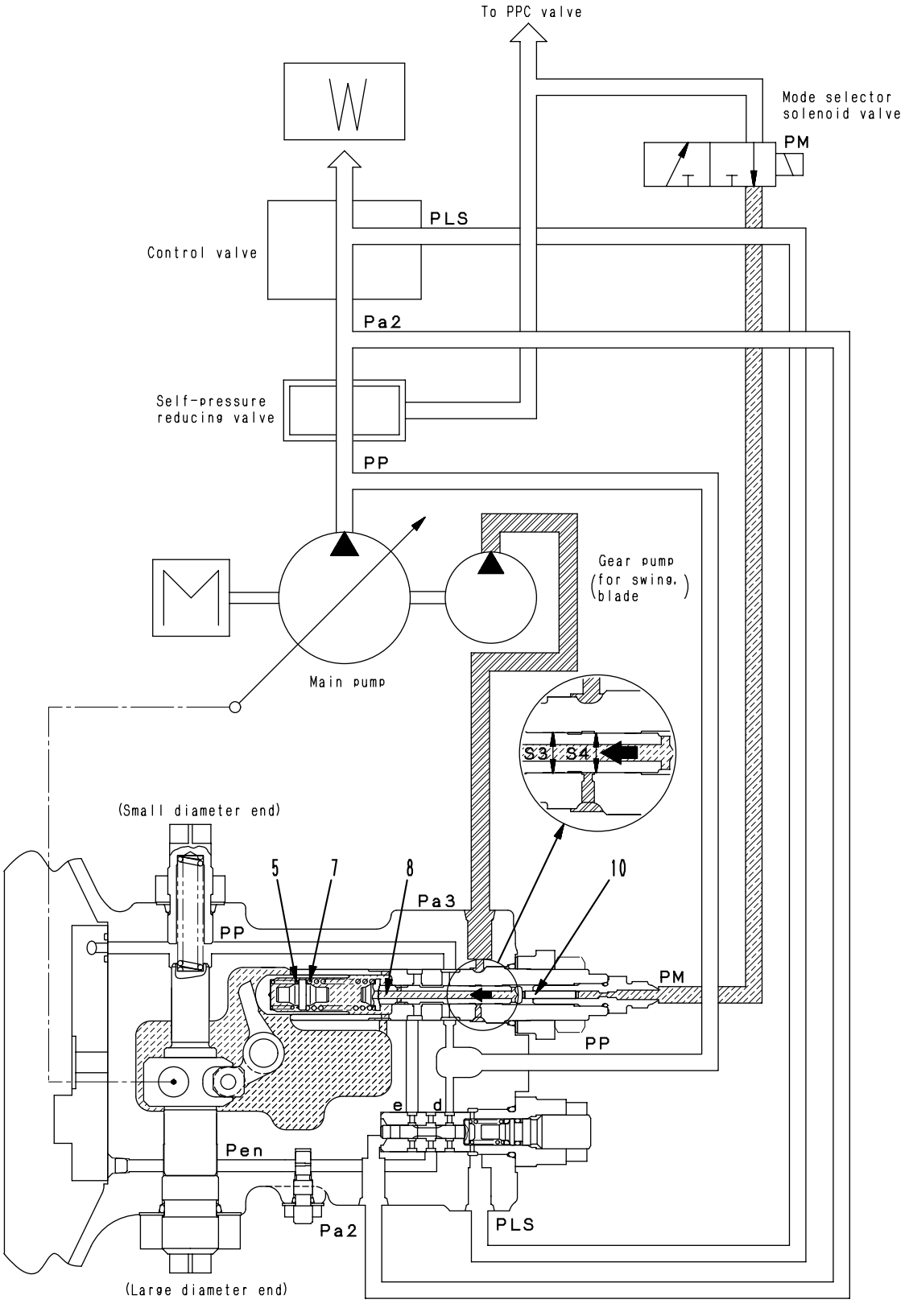


PA : Main pump discharge
PA3 : Swing sensing pilot
PD1 : Drain
PDA : Air bleed port
PLS : Control valve LS pressure inlet
PM : Mode selection solenoid pressure inlet
PPLS : LS pump pressure inlet
PS : Pump suction

★ The main pump consists of one unit formed by the pump, servo piston, PC valve, and LS valve.
The explanation in STRUCTURE AND FUNCTION is divided into two parts: the pump and PC valve + LS valve.

- When the control lever is operated fully, that is, when the area of opening of the control valve becomes larger, the difference between LS pump pressure **Pa2** and LS pressure **PLS** (LS differential pressure △**PLS**) becomes smaller.
- LS pressure **PLS** brought to spring chamber a of the LS valve becomes close to LS pump pressure **Pa2**, and piston (15) is pushed to the left (⬅) by the combined force of LS pressure **PLS** + force of spring (14). This closes port **c** and interconnects port **d** and port **e**.
- As a result, the pressurized oil acting on chamber X at the large diameter end of servo piston (1) flows from port d to port e and is connected to port **f** of the PC valve.
- At this point, port **f** of the PC valve is drained inside the pump case through the inside of the piston, so the pressure in chamber **X** at the large diameter end of servo piston (1) also becomes the drain pressure.
- Because of this, servo piston (1) is moved down in the direction of the maximum swash plate angle (⬇) by pump pressure PP acting on chamber **Y** at the small diameter end of the piston.

3. When mode selector solenoid valve signal pressure is input
When operating swing (blade)



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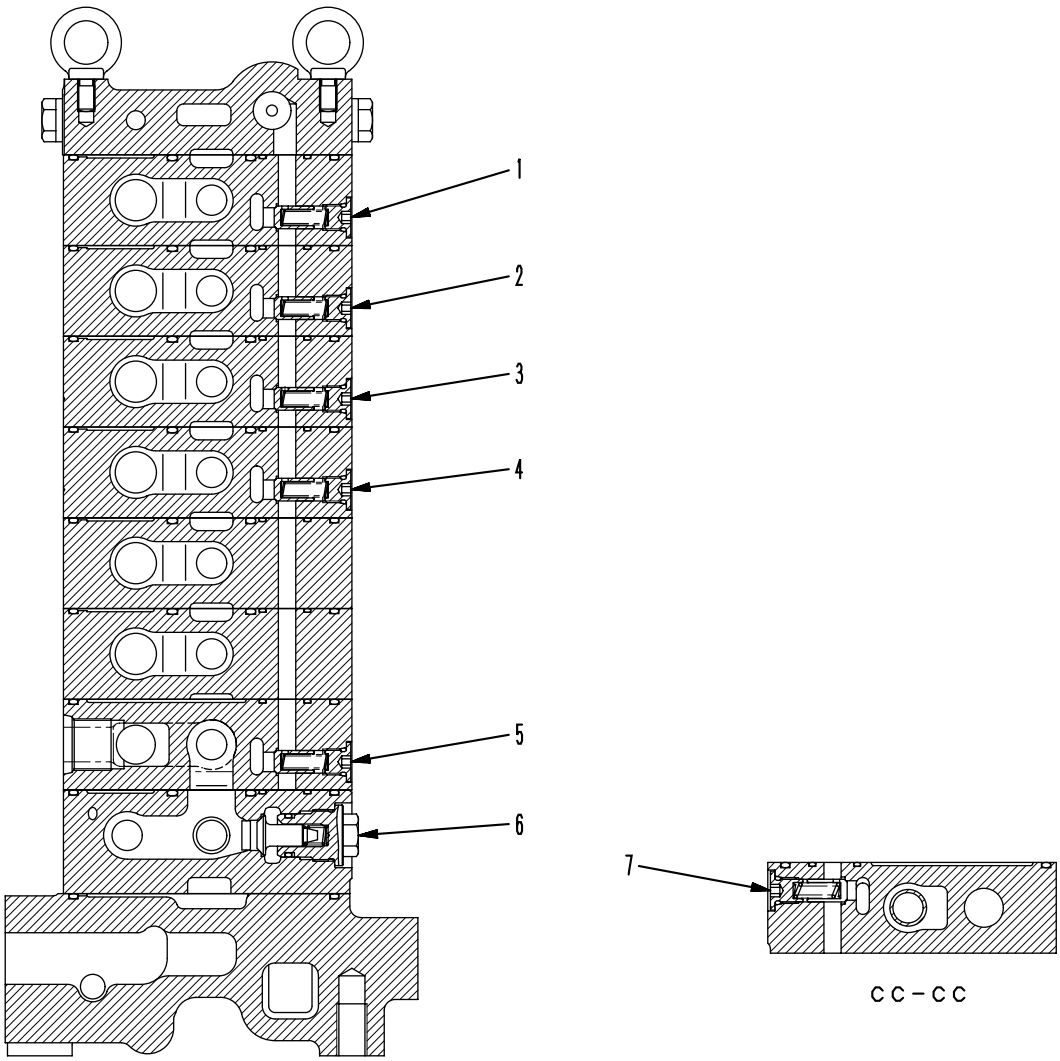


SJP07036

1. Check valve (offset)
2. Check valve (bucket)
3. Check valve (arm)
4. Check valve (boom)
5. Check valve (blade RAISE)
6. Load check valve (swing)
7. Check valve (blade LOWER)

CLSS

OUTLINE OF CLSS

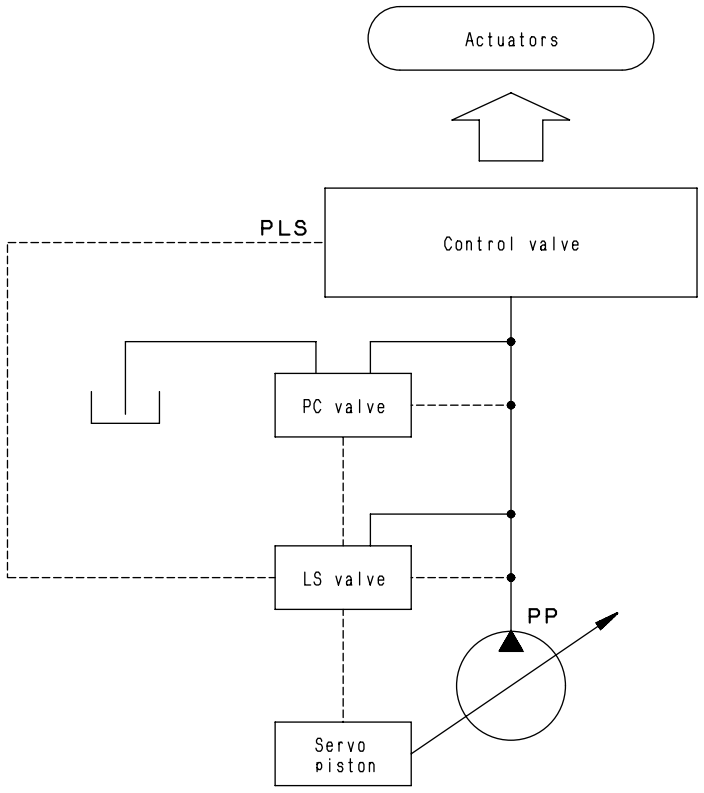
Features

CLSS stands for Closed center Load Sensing System, and has the following features.

- Fine control not influenced by load
- Control enabling digging even with fine control
- Ease of compound operation ensured by flow divider function using area of opening of spool during compound operations
- Energy saving using variable pump control

Structure

- The CLSS consists of a variable capacity single piston pump, control valve, and actuators.
- The pump body consists of the main pump, PC valve and LS valve.

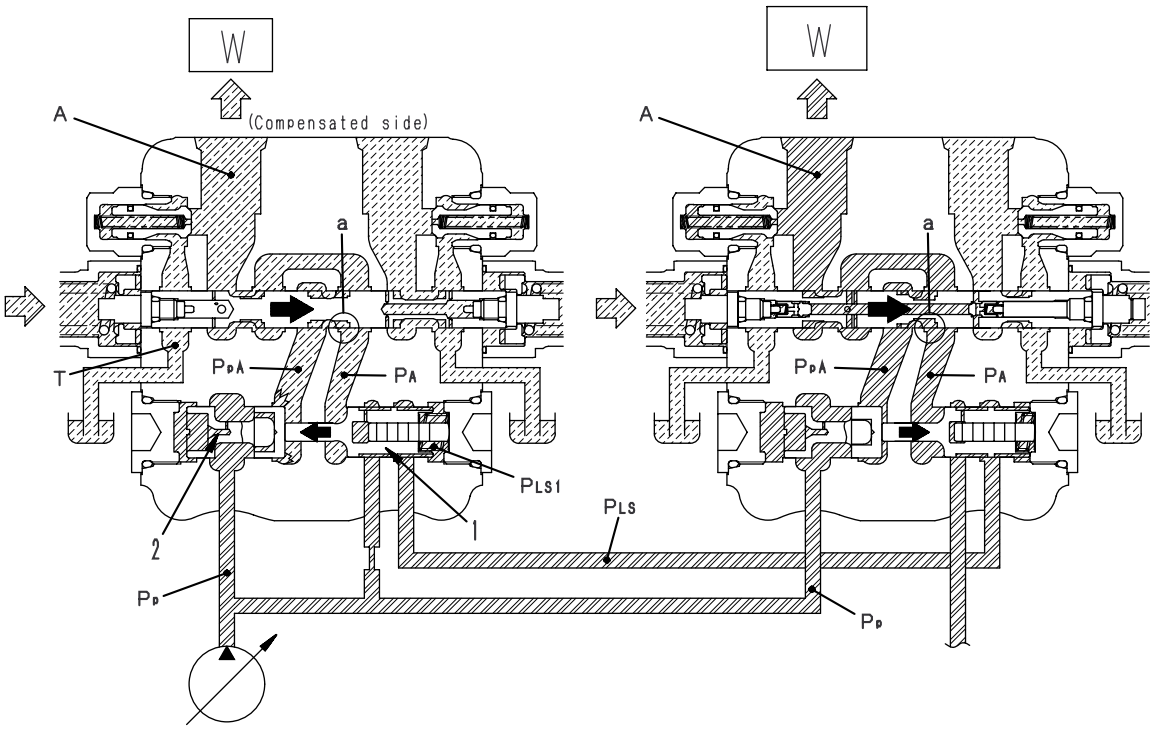


SJP07975

PRESSURE COMPENSATION VALVE

Function

- During compound operations, if the load pressure becomes lower than the other actuator and the oil flow is about to increase, compensation is received. (When this happens, the other actuator being used for compound operation (right side) is at a higher load than the actuator on this side (left side).)



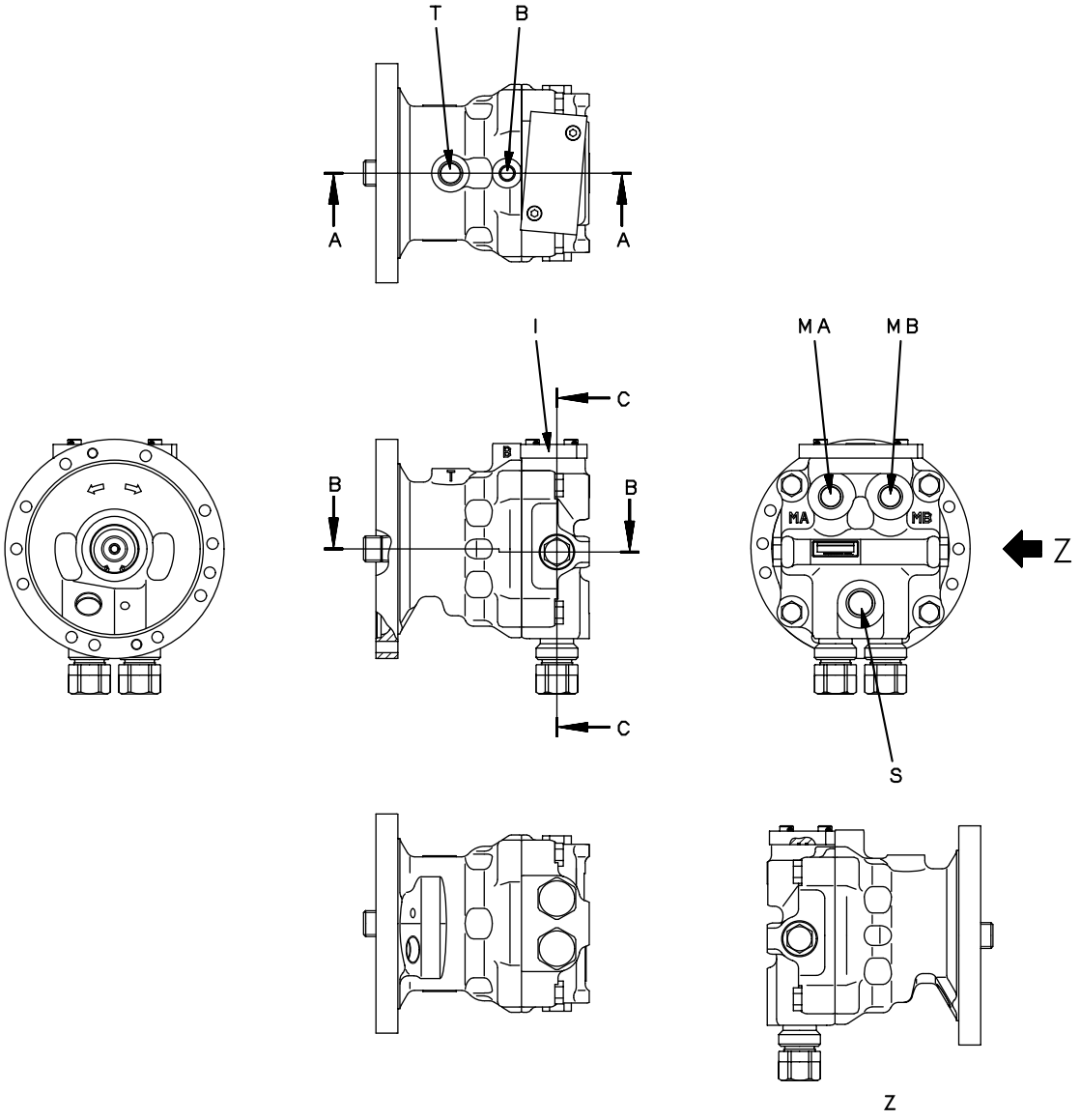
SJP08048

Operation

- If the load pressure of the other actuator (right side) becomes higher during compound operations, the oil flow in actuator circuit **A** on this side (left side) tries to increase.
- If this happens, the LS pressure **PLS** of the other actuator acts on spring chamber **PLS1**, and reducing valve (1) and flow control valve (2) are pushed to the left (⬅).
- Flow control valve (2) throttles the area of opening between pump circuit **PP** and spool upstream **PPA**, and pressure loss is generated between **PP** and **PPA**.
- Flow control valve (2) and reducing valve (1) are balanced in position where the difference in pressure between **PLS** and **PA** acting on both ends of reducing valve (2) and the pressure loss between **PP** and **PPA** on both sides of flow control valve (2) are the same.
- In this way, the pressure difference between upstream pressure **PPA** and downstream pressure **PA** of both spools used during compound operations is the same, so the pump flow is divided in proportion to the area of opening of notch **a** of each spool.

LMF40AL-2 (without reverse rotation prevention valve)

Serial No.: 17264 and up



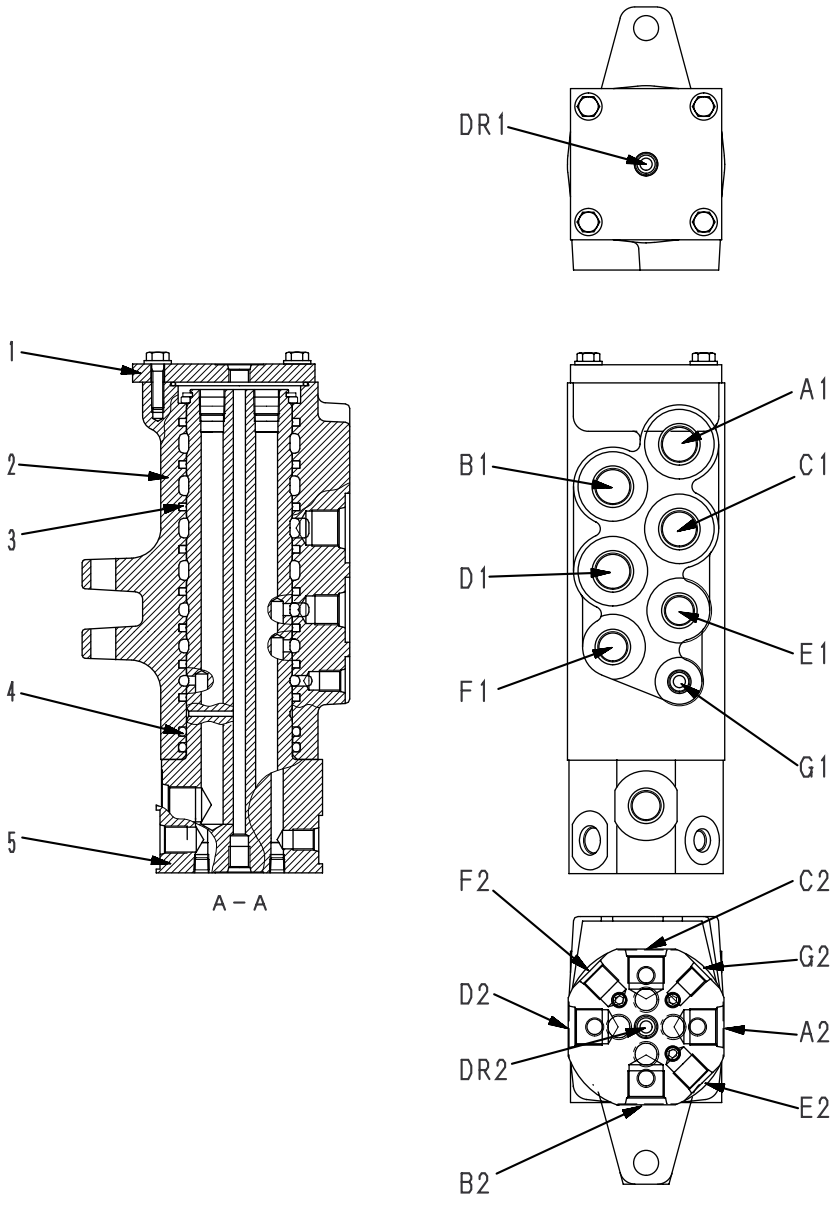
B : From swing brake solenoid valve
MA: From swing control valve
MB: From swing control valve
S : From tank
T : To tank

1. Plate

Specifications

Model : LMF40AL-2
Motor capacity : 40.8 cc/rev
Safety valve set pressure : 22.8 MPa {232 kg/cm^2}
Check valve cracking pressure :
Max. 0.03 MPa {0.3 kg/cm^2}

Serial No. : 19001 and up



SFP06876

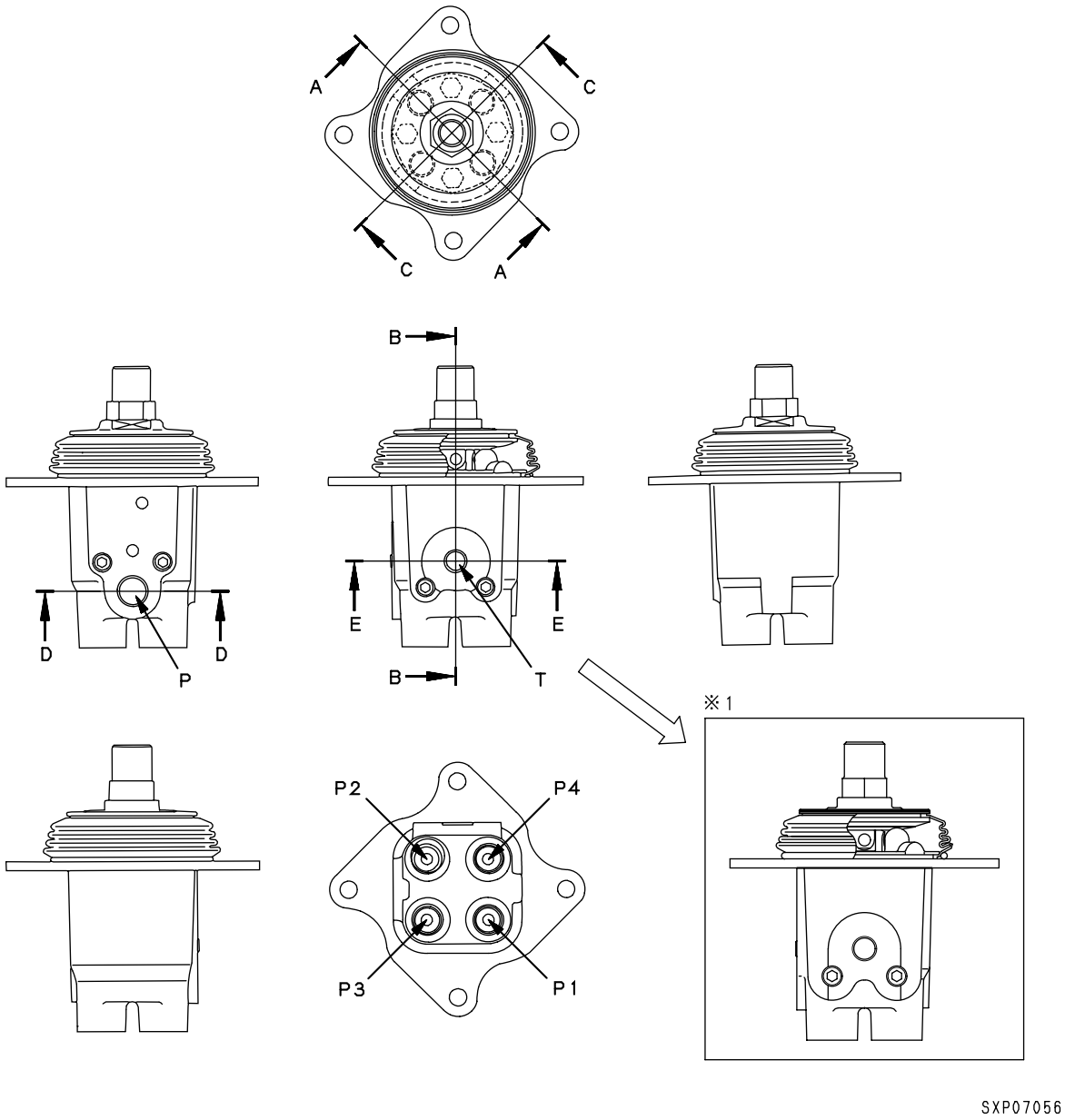
A1. From R.H. travel control valve port A4
A2. To R.H. travel motor port B
B1. From R.H. travel control valve port B4
B2. R.H. travel motor port A
C1. From L.H. travel control valve port A3
C2. To L.H. travel motor port A
D1. From L.H. travel control valve port B3
D2. To L.H. travel motor port B
E1. From blade control valve port A2
E2. To blade cylinder head
F1. From blade control valve port B2
F2. To blade cylinder bottom
G1. From travel speed solenoid valve
G2. To L.H. and R.H. travel motor port D
T1. To tank
T2. To L.H. and R.H. travel

1. Cover
2. Body
3. Slipper seal
4. O-ring
5. Shaft

PPC VALVE

For work equipment, swing

※1 This shows Serial No.: 16520 and up.



P : From PPC lock solenoid
T : To tank
P1: L.H.: Arm OUT / R.H.: Boom LOWER
P2: L.H.: Arm IN / R.H.: Boom RAISE
P3: L.H.: Right swing / R.H.: Bucket CURL
P4: L.H.: Left swing / R.H.: Bucket DUMP

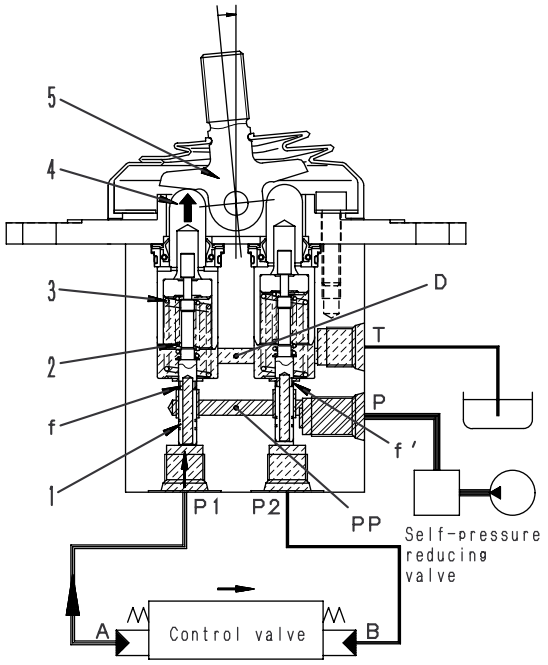
3) Fine control (control lever returned)

When lever (5) starts to be returned, spool (1) is pushed up by the force of centering spring (3) and the pressure at port **P1**.

Because of this, fine control hole **f** is connected to drain chamber **D**, and the pressurized oil at port **P1** is released.

If the pressure at port **P1** drops too much, spool (1) is pushed down by metering spring (2), so fine control hole **f** is shut off from drain chamber **D**. At almost the same time, it is connected to pump pressure chamber **PP**, so the pressure at port **P1** supplies the pump pressure until the pressure recovers to a pressure equivalent to the position of the lever.

When the control valve returns, oil in drain chamber **D** flows in from fine control hole **f'** of the valve on the side that is not moving. It passes through port **P2** and goes to chamber **B** to charge the oil. (Fig. 3)



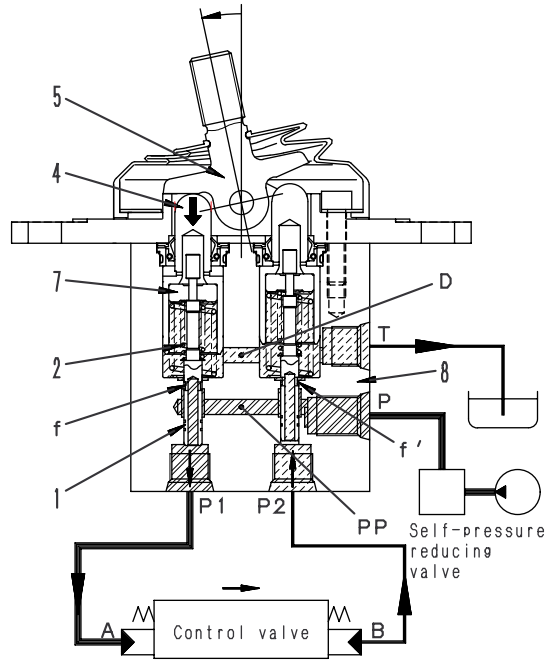
(Fig. 3)

SKP04231

4) At full stroke

Lever (5) pushes down piston (4), and retainer (7) pushes down spool (1). Fine control hole **f** is shut off from drain chamber **D**, and is connected to pump pressure chamber **PP**. Therefore, the pilot pressure oil from the self pressure reducing valve passes through fine control hole **f** and flows from port **P1** to chamber **A** to push the control valve spool.

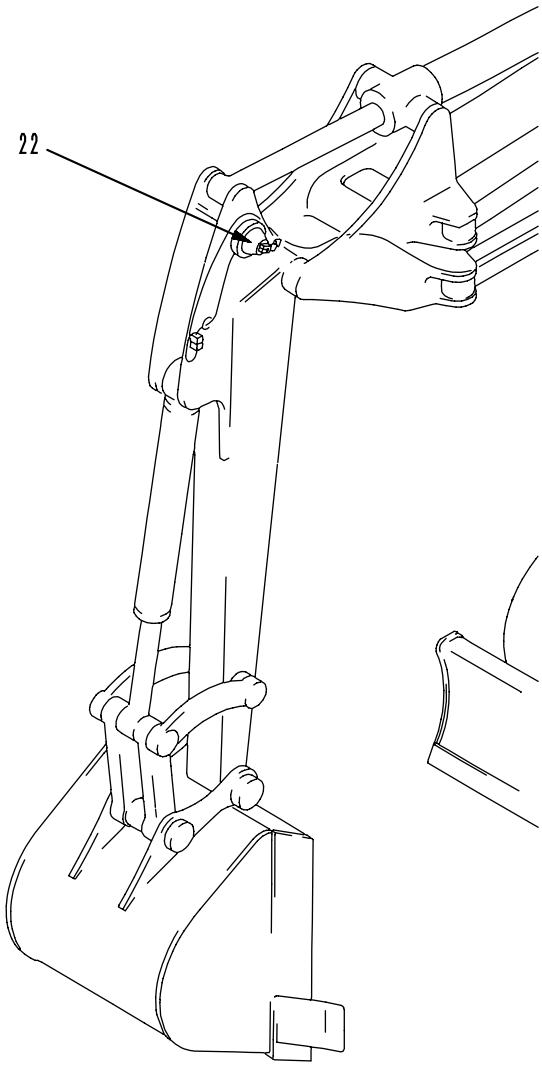
The return oil from chamber **B** passes from port **P2** through fine control hole **f'** and flows to drain chamber **D**. (Fig. 4)



(Fig. 4)

SKP04232

22. Arm potentiometer
23. Battery
24. Battery electrolyte level sensor
    (Serial No.: 15001 – 19000)
25. Fusible link
26. Offset potentiometer
27. Battery relay
28. Work lamp
29. Right swing oil pressure switch
30. Left swing oil pressure switch
31. Boom potentiometer
32. Room lamp (cab specification)
33. Coolant temperature sensor
34. Radio (cab specification)
35. Glow plug
36. Engine stop solenoid
37. Washer tank (cab specification)
38. Engine oil pressure sensor
39. Alternator
40. Starting motor
41. Wiper motor (cab specification)
42. Fuel pump
43. Fuel level sensor
44. Mode selector solenoid valve
45. Travel speed selector solenoid
46. Swing holding brake solenoid valve
47. PPC lock solenoid valve
48. Arm IN oil pressure switch
49. Arm IN stop EPC valve
50. Boom RAISE oil pressure switch
51. Boom RAISE stop EPC valve
52. Boom LOWER stop solenoid valve
53. Left offset stop solenoid valve
54. Horn

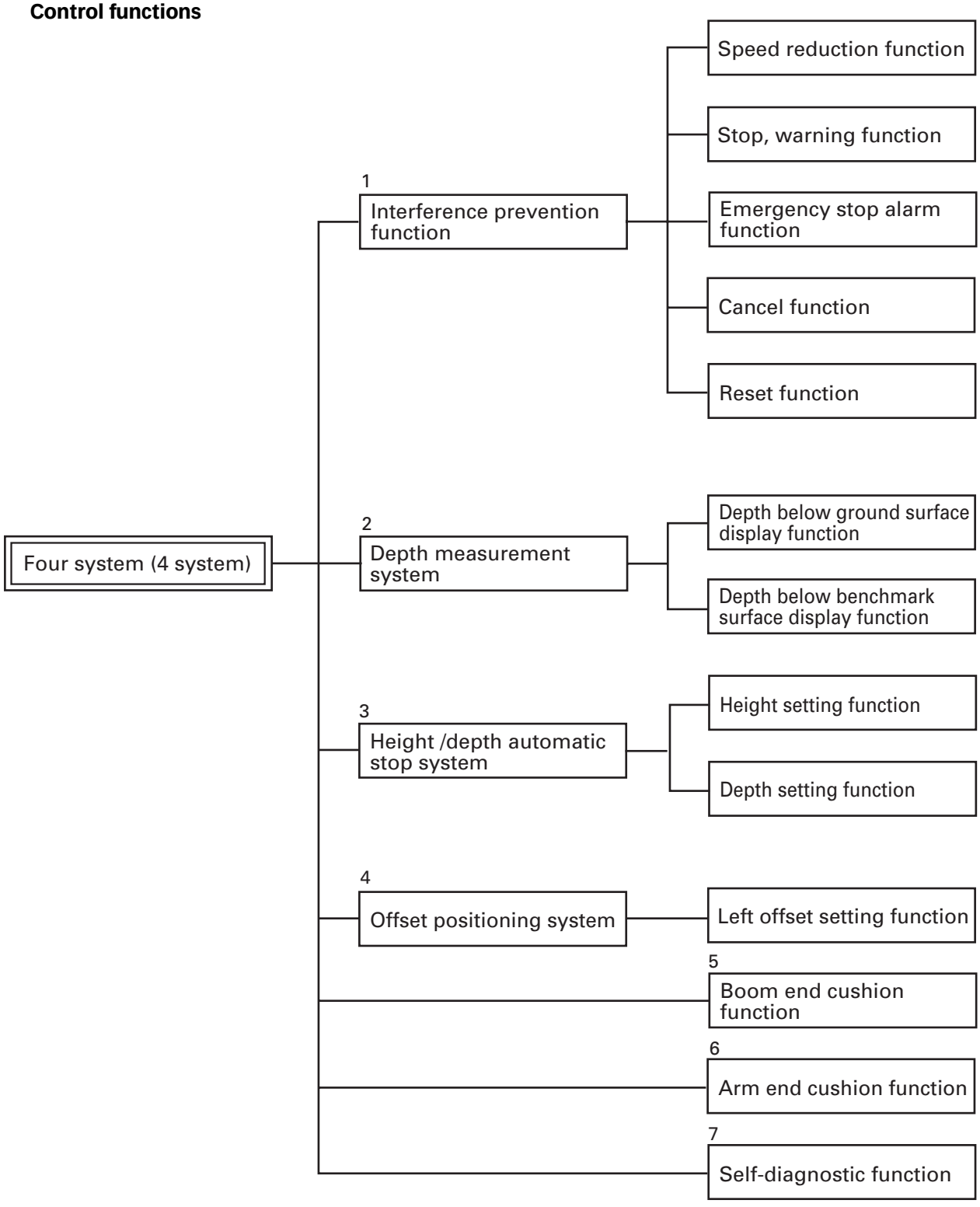


SVP04503

FOUR SYSTEM (4 SYSTEM)

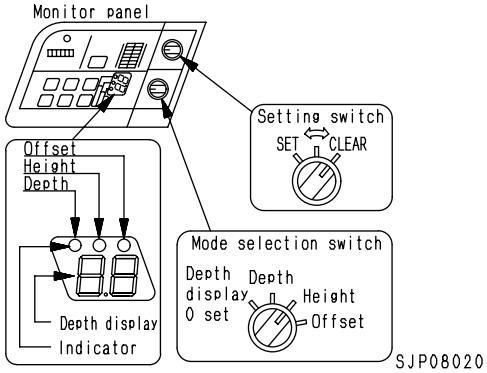
- The 4-system is a 4-system structure consisting of the following: interference prevention function, depth measurement system, height/depth automatic stop system, and offset positioning system. It excels in safety and productivity.

- **Control functions**



3. HEIGHT, DEPTH AUTOMATIC STOP SYSTEM

- If the position to stop the boom is set in advance, the boom will automatically stop at that height or depth during operation."
  This provides excellent productivity and safety when operating on jobsites where there are obstacles such as buried pipes or electric cables.



a) Height set function (height mode)

- If the boom is set to the desired height, the boom will always stop at that height during operations.
- By limiting the range for boom RAISE operations, it is possible to limit the height of the work equipment.

★ Note that this function does not limit the height of the bucket.

[Setting method]

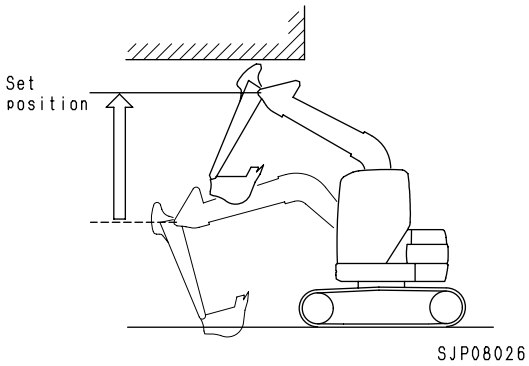
- Set the mode selector switch to [height].
- Raise the boom to the desired position.
- Turn the set switch to SET, and check that the buzzer sounds twice and the indicator lights up.

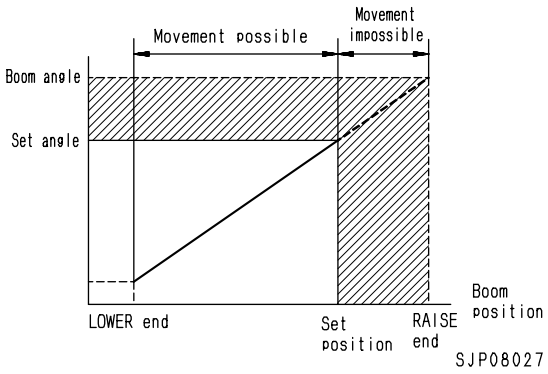
[Operation]

- When the boom is lowered, it will always stop at the set position when it is raised during operations.

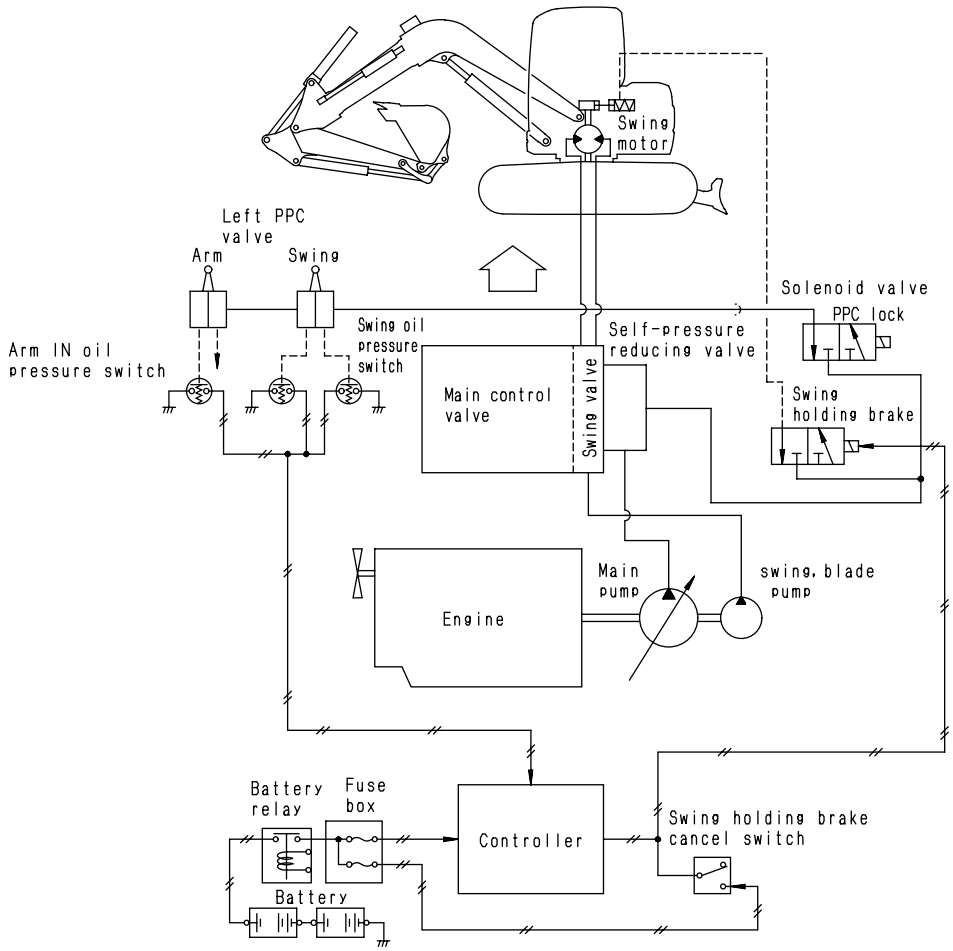
[Cancel method]

- Turn the mode selector switch to [height].
- Turn the set switch to CLEAR and check that the indicator goes out.
- The work equipment is stopped by draining the output pressure from the boom PPC valve to the boom control valve (RAISE) at the EPC valve to the tank.





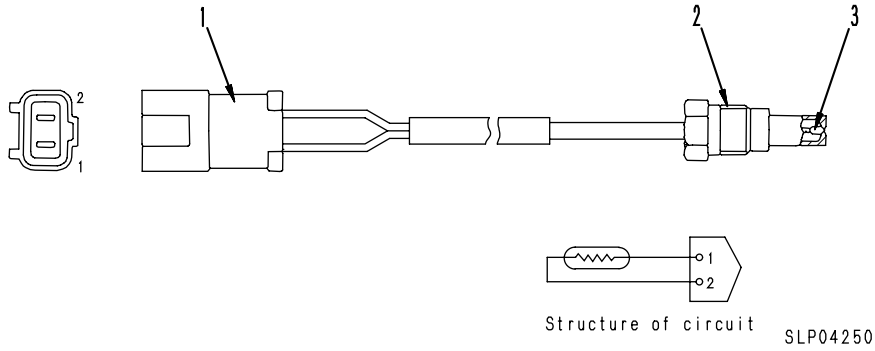
SWING HOLDING BRAKE FUNCTION



Function

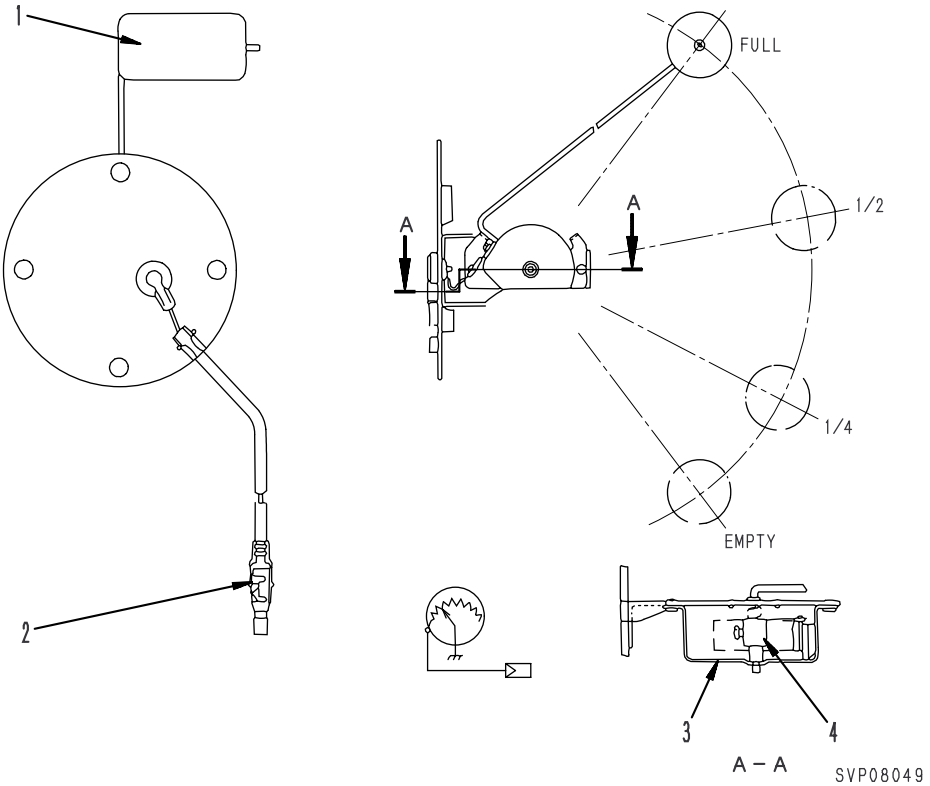
- This provides the swing holding brake function.

3) Coolant temperature sensor



1. Connector
2. Plug
3. Thermistor

4) Fuel level sensor



1. Float
2. Connector
3. Cover
4. Variable resistance

STANDARD VALUE TABLE FOR ELECTRICAL RELATED PARTS

System	Name of component	Connector No.	Inpsection method	Judgement table	Measurement conditions
Controler	Power source voltage	K1	Measure voltage	If the condition is as shown in the table below, it is normal Between (8),(17),(18) – chassis: 20 – 30 V	1) Turn starting switch OFF. 2) Insert T-adapter. 3) Turn starting switch ON.
	PPC basic pressure lock	K1 V1	Measure voltage	If the condition is as shown in the table below, it is normal Between K1(20),(21) – chassis: 20 – 28 V Between V (1) – (2): Safety lock lever at FREE (solenoid ON): 20 – 30 Safety lock lever at LOCK (solenoid OFF): Max. 0 V	1) Turn starting switch OFF. 2) Insert T-adapter. 3) Turn starting switch ON.
	Boom RAISE EPC solenoid	K1	Measure voltage	If the condition is as shown in the table below, it is normal Between (14) – (9), (19): 940±50mA {940±50mV} ★ Measuring the voltage at the (–) connector is the same as measuring the value of the current (= value of the voltage) {value inside ( )}.	1) Turn starting switch OFF. 2) Insert T-adapter. 3) Turn starting switch ON. 4) Except near end of boom RAISE stroke.
	Arm IN stop EPC solenoid	K1	Measure voltage	If the condition is as shown in the table below, it is normal Between (15) – (9), (19): 940±50mA {940±50mV} ★ Measuring the voltage at the (–) connector is the same as measuring the value of the current (= value of the voltage) {value inside ( )}.	1) Turn starting switch OFF. 2) Insert T-adapter. 3) Turn starting switch ON. 4) Except near end of arm IN stroke.
	Left offset stop solenoid	K1	Measure voltage	If the condition is as shown in the table below, it is normal Between (10),(11) – chassis: When left offset stop is actuated (solenoid OFF): Max. 1 V When left offset stop is not actuated (solenoid ON): 20 – 30V	1) Turn starting switch OFF. 2) Insert T-adapter. 3) Turn starting switch ON.
	Potentiometer power source	K2	Measure voltage	If the condition is as shown in the table below, it is normal Between (11) – (9): 5 ± 0.5 V	1) Turn starting switch OFF. 2) Insert T-adapter. 3) Turn starting switch ON.

MEASURING ENGINE SPEED

⚠ When removing or installing the measuring equipment, be careful not to touch any high temperature parts.

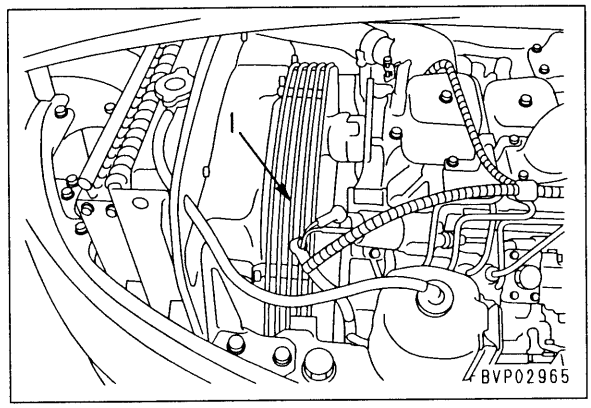
★ Measure the engine speed under the following conditions.
- Coolant temperature: Within operating range
- Hydraulic oil temperature : 45 – 55°C

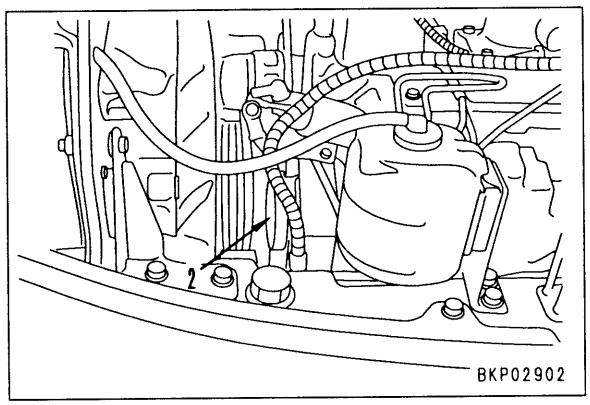
1. **Installing tachometer**
   1) Remove fan guard (1).
   2) Remove cover (2) at timing gear case side.
   3) Install adapter **A2**.
   4) Install the sensor of tachometer **A** to adapter **A2**, then connect to tachometer **A1** with the cable.

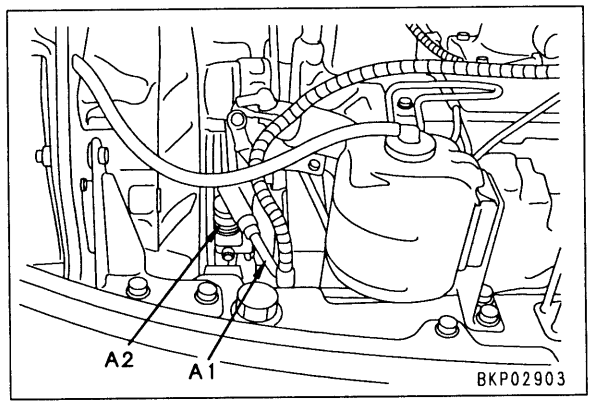
2. Start the engine, and measure the engine speed when it is set to the conditions for measuring.

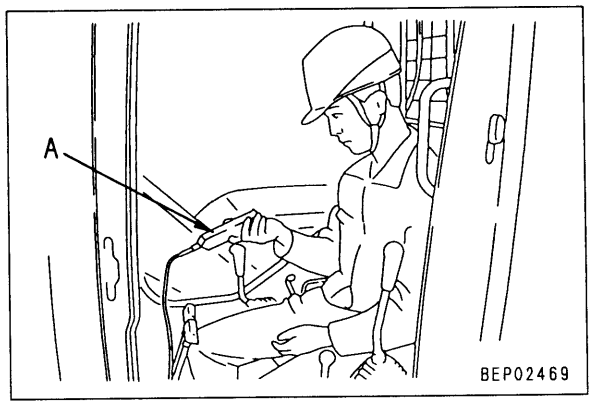
   ⚠ The measurement can only be made with the fan guard removed, so never go close to the fan or any other rotating part. In addition, be careful not to let the tachometer cable get caught or wound on to the fan.

   1) Measuring at low idling and high idling:
   Measure the engine speed with the fuel control dial set to low idling and high idling.
   2) Measuring at near rated speed:
   Run the engine at full throttle, operate the arm lever, and measure the engine speed when the arm OUT circuit is relieved.









2. **Adjusting**

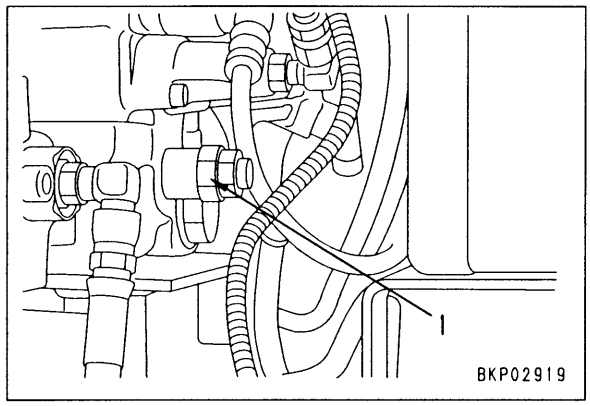
Adjusting main relief valve for boom, arm, bucket, offset, travel circuits

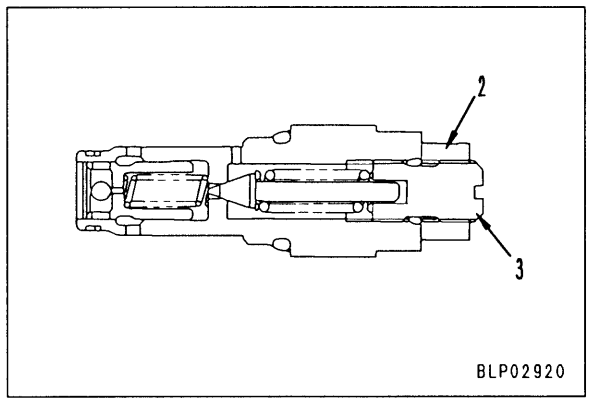
- Loosen locknut (2) of main relief valve (1), then turn adjustment screw (3) to adjust.

★ Turn the adjustment screw to adjust as follows.
  - To INCREASE pressure, turn CLOCKWISE.
  - To DECREASE pressure, turn COUNTER-CLOCKWISE.

★ Amount of adjustment for one turn of adjustment screw : 12.5 MPa {128 kg/cm²}

kgm Locknut : **58.8 – 78.5 Nm {6 – 8 kgm}**





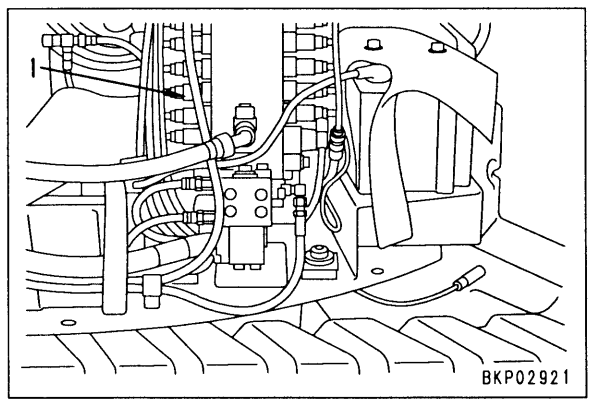
Adjusting main relief valve for swing, blade circuits

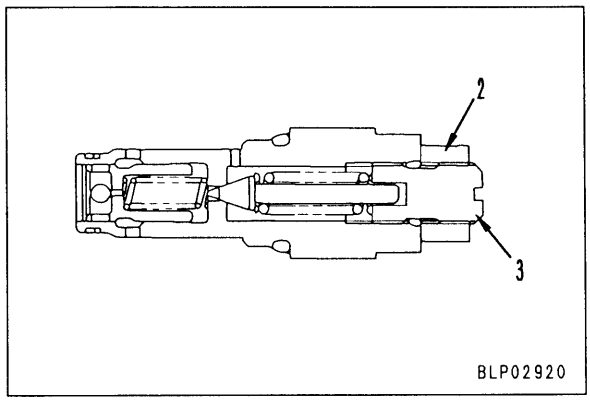
- Loosen locknut (2) of main relief valve (1), then turn adjustment screw (3) to adjust.

★ Turn the adjustment screw to adjust as follows.
  - To INCREASE pressure, turn CLOCKWISE.
  - To DECREASE pressure, turn COUNTER-CLOCKWISE.

★ Amount of adjustment for one turn of adjustment screw: 12.5 MPa {128 kg/cm²}

kgm Locknut : **58.8 – 78.5 Nm {6 – 8 kgm}**



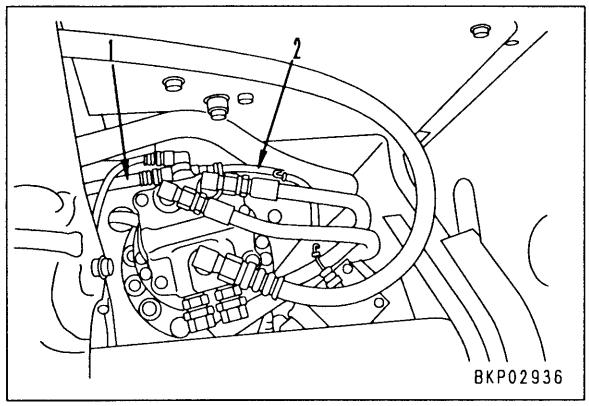


MEASURING SWING, TRAVEL MOTOR OIL LEAKAGE

★ Oil temperature when measuring : 45 – 55°C

1. Swing motor

1) Disconnect drain hose (1) from the swing motor (at the hydraulic tank end) and drain hose (2) (at the swivel joint end).
★ Fit a blind plug at the hydraulic tank end and in hose (2).
2) Dig the bucket into the ground and lock the swing.
3) Start the engine and carry out swing relief with the engine at full throttle.
4) Continue this condition for 30 seconds, then measure the oil leakage for the next one minute.
★ After measuring, swing 180°C and repeat the operation.

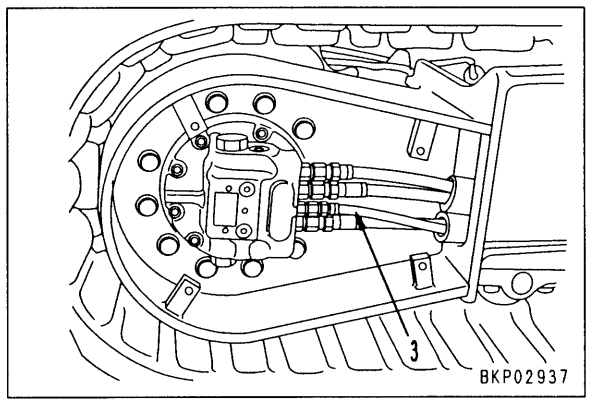


2. Travel motor

1) Disconnect drain hose (3) from the travel motor, then fit a blind plug in the hose.
2) Fit a block under the track shoe grouser, or fit a block between the sprocket and frame to lock the track.
3) Start the engine and carry out travel relief with the engine at full throttle.

⚠ When measuring the oil leakage from the travel motor, mistaken operation of the control lever may lead to a serious accident, so always use signals and check when carrying out this operation.

4) Continue this condition for 30 seconds, then measure the oil leakage for the next one minute.
★ When measuring, move the motor slightly (to change the position between the valve plate and cylinder, and piston and cylinder), and measure several times.



RELEASING REMAINING PRESSURE IN HYDRAULIC CIRCUIT

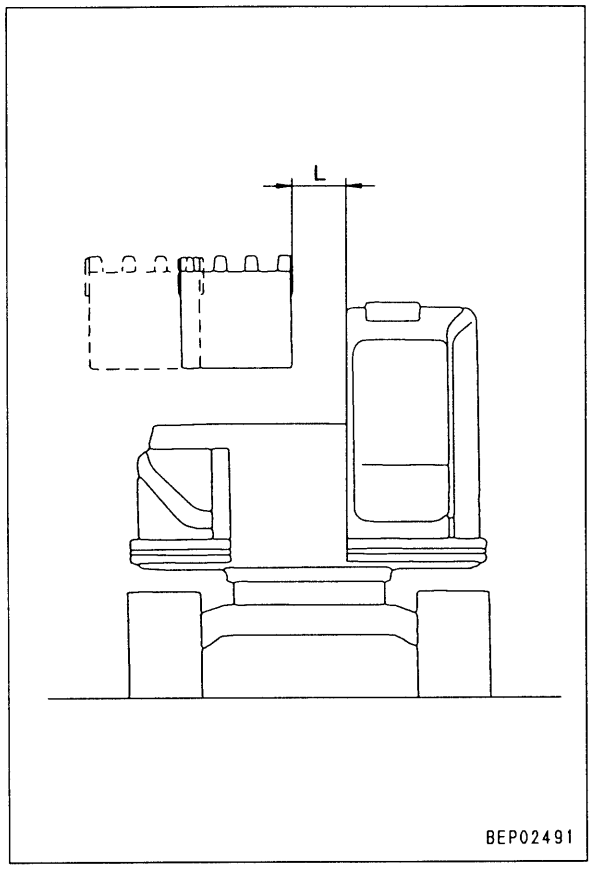
★ No accumulator is installed, so the pressure remaining in the piping between the control valve and the hydraulic cylinder or swing motor cannot be released by operating the control levers. Therefore, when removing the above piping, be careful of the following points.

1) Run the engine at low idling, operate the hydraulic cylinders so that they are not relieved at the end of the stroke, lower the work equipment to the ground, then stop the engine.
★ If the engine is stopped with the cylinder relieved at the end of the stroke, wait for 5 - 10 minutes before starting the operation.
2) When removing the piping, gradually loosen the sleeve nut of the piping to slowly release the pressure remaining in the piping. Remove the piping when the oil stops spurting out.

3. Check automatic stop in left offset direction

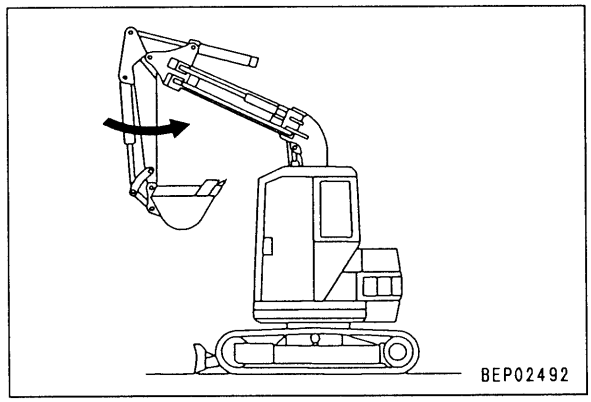
- When the reset operation for the potentiometer input signal in Item 1 is completed, keep the work equipment in the same posture, and check the automatic stop in the left offset direction.
  - ★ Standard value (L): 150 – 200 mm

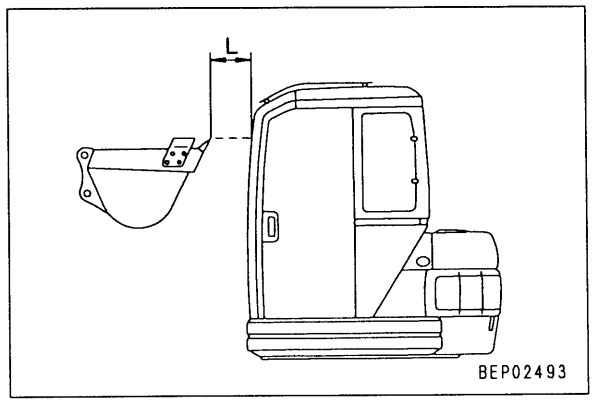
1) With the engine at low idling and the pedal fully depressed, operate from the end of the right offset stroke in the left direction and check that it automatically stops.
2) Run the engine at full throttle to check the above operation.



4. Check automatic stop and stopping distance in front direction
(Use the arm IN operation to check)

1) Check automatic stop
   i) Set the work equipment to the following posture.
      - Boom: Rear face perpendicular
      - Bucket: Horizontal (when stopped)
      - Offset: Align center of bucket with right edge of cab
   ii) With the engine at low idling, operate to the end of the arm IN stroke, and check that it automatically stops.
   iii) Run the engine at full throttle to check the above operation.
2) Check stopping distance
   - Run the engine at full throttle, carry out the automatic stop operation as explained above, and check that distance L between the tip of the bucket teeth and the cab is within the specified range
     - ★ Standard value : 230 ± 30 mm
   - ★ After carrying out the automatic stop operation, if the bucket is not horizontal, make it horizontal, then carry out the measurement.





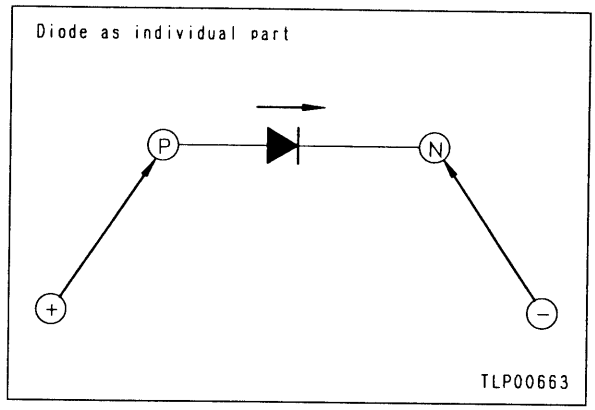
PROCEDURE FOR CHECKING DIODE

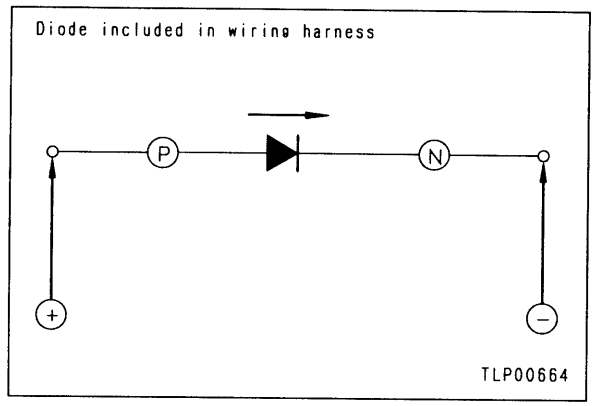
- Use the following procedure to check the diode as individual part and the wiring harness including the diode.
- Use a digital tester with a range for measuring diodes.

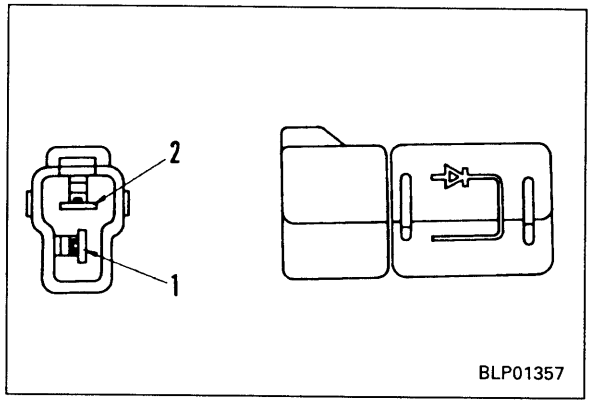
1. Put the red (+) end of the test pin in contact with the anode (P) of the diode, and the black (–) end in contact with the cathode (N).
   ★ There is a mark showing the direction of continuity on the surface of the diode.

2. If a normal tester is switched to the diode range, the voltage of the internal battery is displayed. The value indicates the following.
   - No change: No continuity
   - Changes: There is continuity (normal) (Note)
   - The value is 0 or near 0: Short circuit inside diode

   Note: In the case of silicon diodes, a value between .450 and .600 is displayed.





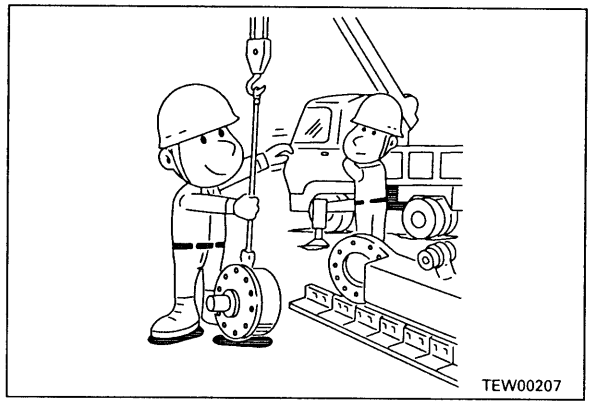


3. POINTS TO REMEMBER WHEN HANDLING HYDRAULIC EQUIPMENT

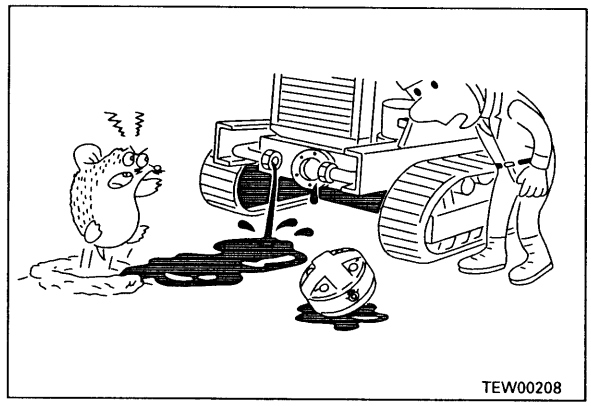
With the increase in pressure and precision of hydraulic equipment, the most common cause of failure is dirt (foreign material) in the hydraulic circuit. When adding hydraulic oil, or when disassembling or assembling hydraulic equipment, it is necessary to be particularly careful.

1) **Be careful of the operating environment.**
Avoid adding hydraulic oil, replacing filters, or repairing the machine in rain or high winds, or places where there is a lot of dust.

2) **Disassembly and maintenance work in the field**
If disassembly or maintenance work is carried out on hydraulic equipment in the field, there is danger of dust entering the equipment. It is also difficult to confirm the performance after repairs, so it is desirable to use unit exchange. Disassembly and main-tenance of hydraulic equipment should be carried out in a specially prepared dustproof workshop, and the performance should be confirmed with special test equipment.


TEW00207

3) **Sealing openings**
After any piping or equipment is removed, the openings should be sealed with caps, tapes, or vinyl bags to prevent any dirt or dust from entering. If the opening is left open or is blocked with a rag, there is danger of dirt entering or of the surrounding area being made dirty by leaking oil so never do this.
Do not simply drain oil out on to the ground, collect it and ask the customer to dispose of it, or take it back with you for disposal.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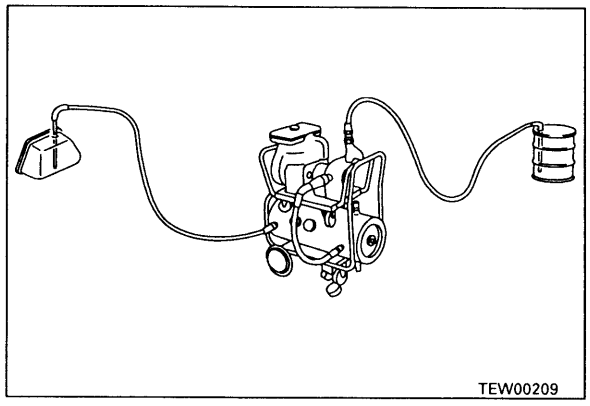
4) **Do not let any dirt or dust get in during refilling operations.**
Be careful not to let any dirt or dust get in when refilling with hydraulic oil. Always keep the oil filler and the area around it clean, and also use clean pumps and oil containers. If an oil cleaning device is used, it is possible to filter out the dirt that has collected during storage, so this is an even more effective method.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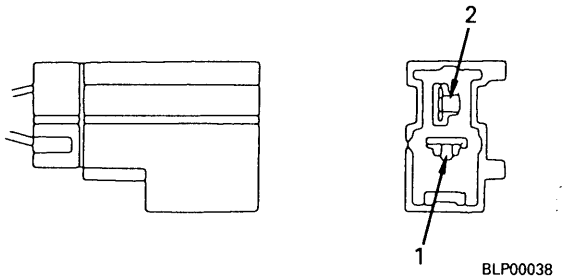
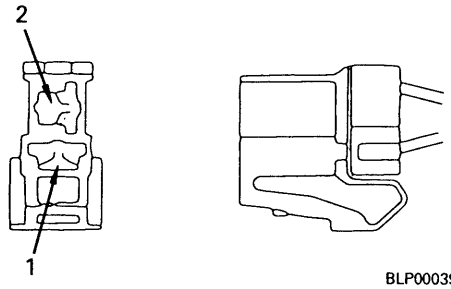
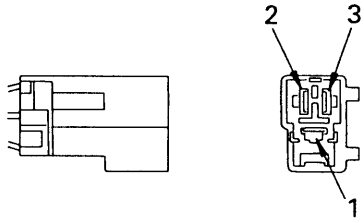
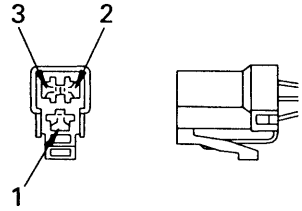
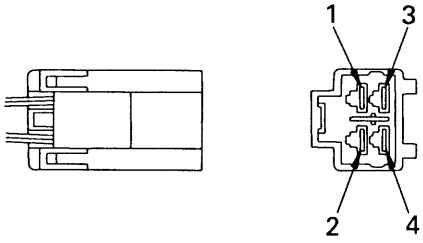
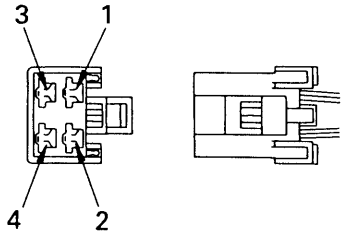
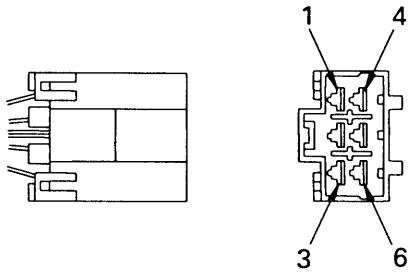
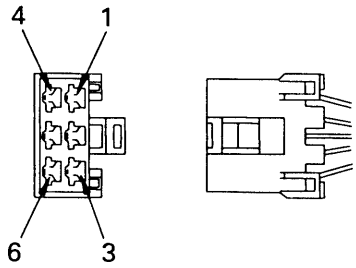
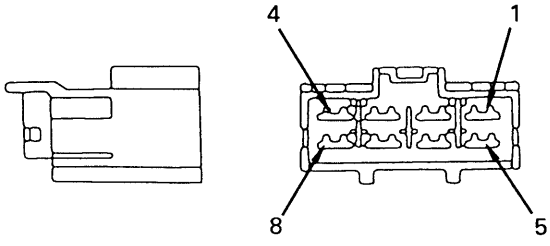
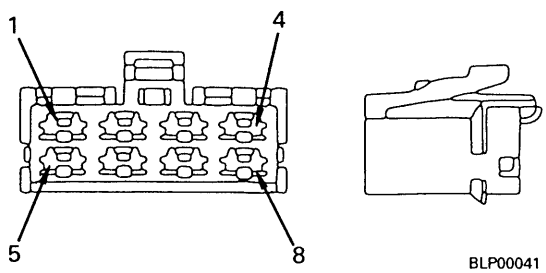
No. of pins	M type connector	
	Male (female housing)	Female (male housing)
2	 BLP00038	 BLP00039
3	 TEW00243	 TEW00244
4	 TEW00245	 TEW00246
6	 TEW00247	 TEW00248
8	 BLP00040	 BLP00041

2. Checking operation of electrical system

When a sequence of operations is carried out using the procedure below, if the monitor panel and controller carry out the actions given below, the input and output signals, and the monitor panel and controller are normal.

Sequence of operation and condition of machine			Check items (when normal)	
			Monitor panel	Controller
(1)	Turn starting switch OFF		• All OFF	• All OFF
(2)	Turn starting switch ON	ON → 3 sec	• All displays light up for approx. 3 sec • Buzzer sounds for approx. 1 sec	• 0.0 is displayed in self-diagnostic display portion
		After 3 sec → until starting	• Engine oil pressure, charge lamp light up • When bucket is above ground level, [UP] is displayed, and when it is below ground level, a number is displayed	
(3)	Start engine (engine at low idling)		• All caution lamps OFF	• Possible to operate work equipment freely • Buzzer does not sound
(4)	Bring bucket close to cab (canopy) from front or side			• Work equipment stops at specified position • Buzzer sounds in approx. 1-second cycle
(5)	Move bucket away from cab (canopy)			• Movement is possible in direction away from cab (arm OUT, right offset) • Buzzer sounds until bucket is required distance from cab (canopy), and does not sound after that
(6)	Turn cancel switch ON ⇩ carry out 4 and 5 ⇩ turn cancel switch OFF		• Electrical system lamp flashes in approx. 1-second cycle	• Buzzer sounds for approx. 7 sec
			• Electrical system lamp flashes in approx. 1-second cycle	• Work equipment can be operated freely (but there is no automatic stop)
			• Electrical system lamp goes OFF	
(7)	Raise work equipment 0.5 m from ground, set mode selection switch to DEPTH, then turn setting switch to SET ⇩ Raise boom, then lower it		• Depth mode indicator light up	• Buzzer sounds twice
				• Work equipment stops near set position • Buzzer sounds twice
(8)	Raise work equipment 1 m from ground, set mode selection switch to HEIGHT, then turn setting switch to SET ⇩ Raise boom, then lower it.		• Height mode indicator lights up	• Buzzer sounds twice
				• Work equipment stops near set position • Buzzer sounds twice
(9)	Offset arm to left, set mode selection switch to OFFSET, then turn setting switch to SET ⇩ Offset arm to right, then offset it to left		• Offset mode indicator lights up	• Buzzer sounds twice
				• Arm stops near set position • Buzzer sounds twice
(10)	Raise work equipment 1 m from ground, set mode selector switch to DEPTH DISPLAY 0 SET, then turn setting switch to SET ⇩ Lower bucket to ground		• Depth display shows 0.0	
			• Value on depth display increases from 0.1	
(11)	Turn starting switch OFF		• All OFF	• All OFF

METHOD OF USING TROUBLESHOOTING CHART

This troubleshooting chart is divided into three sections: **questions, check items, and troubleshooting.** The questions and check items are used to pinpoint high probability causes that can be located from the failure symptoms or simple inspeciton without using troubleshooting tools.

Next, troubleshooting tools or direct inspection are used to check the high probability causes to make final confirmation.

[Questions]

Sections Ⓐ + Ⓑ in the chart on the right corresponds to the items where answers can be obtained from the user. The items in Ⓑ are items that can be obtained from the user, depending on the user's level.

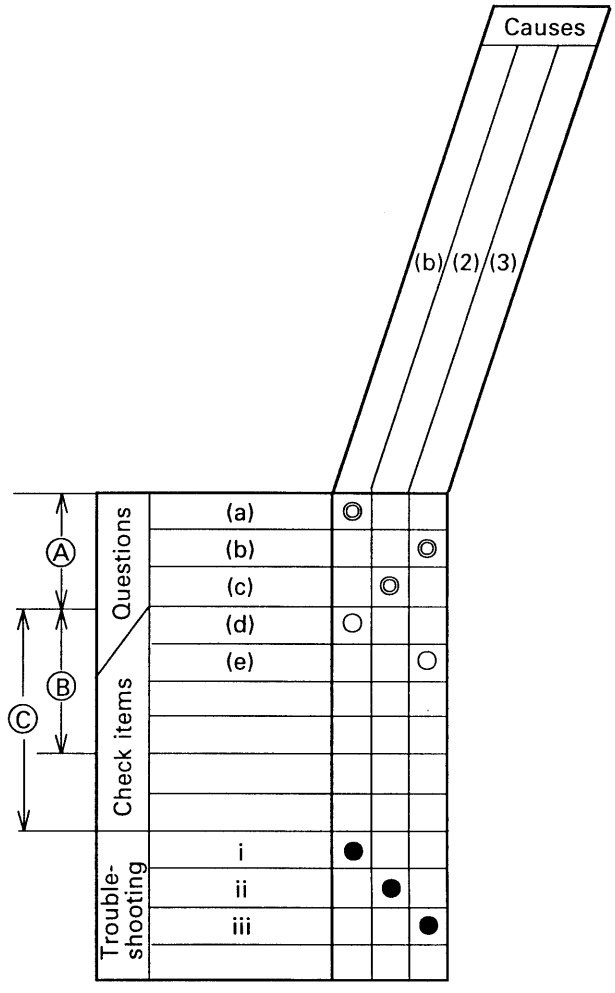
[Check items]

The serviceman carries out simple inspection to narrow down the causes. The items under Ⓒ in the chart on the right correspond to this.

The serviceman narrows down the causes from information Ⓐ that he has obtained from the user and the results of Ⓒ that he has obtained from his own inspection.

[Troubleshooting]

Troubleshooting is carried out in the order of probability, starting with the causes that have been marked as having the highest probability from information gained from **[Questions]** and **[Check items]**.



S-4 Engine stops during operations

General causes why engine stops during operations

- Seized parts inside engine
- Insufficient supply of fuel
- Overheating
  - ★ If there is overheating and the engine stops, carry out troubleshooting for overheating.
- Failure in power train
  - ★ If the engine stops because of a failure in the power train, carry out troubleshooting for the CHASSIS.

Legend
○ : Possible causes (judging from Questions and check items)
◎ : Most probable causes (judging from Questions and check items)
△ : Possible causes due to length of use (used for a long period)
● : Items to confirm the cause.

			Causes: Broken, seized piston, connecting rod	Broken, seized crankshaft bearing	Broken dynamic valve system (valve, rocker lever, etc.)	Broken, seized gear train	Broken pump auxiliary equipment	Broken fuel pump drive shaft, key	Insufficient fuel in tank	Clogged fuel filter, strainer	Clogged feed pump strainer	Broken, seized feed pump piston	Clogged, leaking fuel piping	Clogged air breather hole in fuel tank	Defective injection pump (rack, plunger stuck)	Failure in power train
Questions	Confirm recent repair history															
	Degree of use of machine	Operated for long period							△	△						
	Condition when engine stopped	Abnormal noise was heard and engine stopped suddenly	◎	◎	◎	◎	◎	◎			○			○	◎	
		Engine overheated and stopped	◎	○			○									
		Engine stopped slowly						◎	○	○						
		There was hunting and engine stopped						◎	○	○			○			
	Fuel level lamp lights up							◎								
	Fuel tank is found to be empty							◎								
	Replacement of filters has not been carried out according to Operation Manual								◎	◎						
	Non-specified fuel is being used								○	○	○			○		
	When feed pump is operated, operation is too light or too heavy								○	○		◎				
	Mud is stuck to fuel tank cap												◎			
	Engine rotates, but stops when power train is operated														◎	
Check items	When it is attempted to turn by hand using barring tool	Does not turn at all	◎	◎												Troubleshooting of CHASSIS
		Turns in opposite direction			◎											
		Moves amount of backlash				◎	◎									
		Shaft does not turn						◎								
	Rust and water are found when fuel tank is drained								◎	◎						
	Metal particles are found when oil is drained		◎	◎					○	○						
Troubleshooting	Remove oil pan and inspect directly		●	●												
	Remove head cover and inspect directly				●											
	When gear train is inspected, it does not turn					●										
	Rotates when pump auxiliary equipment is removed						●									
	When fuel filter, strainer are inspected directly, they are found to be clogged								●							
	When feed pump strainer is inspected directly, it is found to be clogged									●						
	Inspect feed pump directly										●					
	When control rack is pushed, it is found to be heavy, or does not return													●		
		Remedy	Replace	Replace	Replace	Replace	Replace	Add	Clean	Clean	Replace	Replace	Correct	Clean	Replace	—

S-14 Water temperature becomes too high (Overheating)

General causes why water temperature becomes too high

- Lack of cooling air (deformation, damage of fan)
- Drop in heat dissipation efficiency
- Defective cooling circulation system
- Rise in oil temperature in power train

★ Carry out troubleshooting for chassis.

Legend
○ : Possible causes (judging from Questions and check items)
◎ : Most probable causes (judging from Questions and check items)
△ : Possible causes due to length of use (used for a long period)
● : Items to confirm the cause.

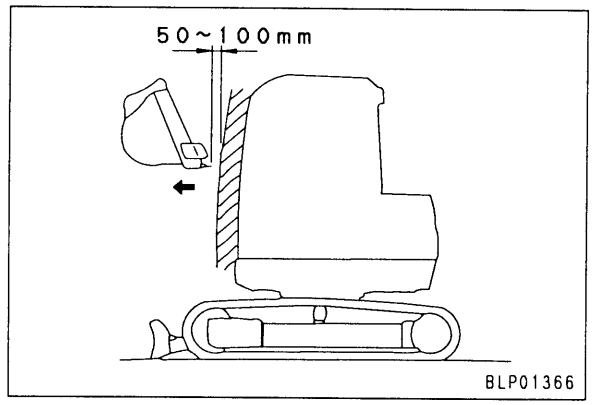
			Causes: Broken water pump	Clogged, crushed radiator fins	Clogged radiator core	Defective thermostat (does not open)	Defective water temperature gauge	Lack of cooling water	Fan belt slipping, worn fan pulley	Clogged, broken oil cooler	Defective pressure valve	Broken cylinder head, head gasket	Holes made by pitting	Rise in torque converter oil temperature
Questions	Confirm recent repair history													
	Degree of use of machine	Operated for long period		△	△						△	△		
	Condition of overheating	Suddenly overheated	◎					○	○					
		Always tends to overheat		◎	◎	○			○					
	Water temperature gauge	Rises quickly				◎		○						
		Does not go down from red range					◎							
Check items	Radiator water level sensor lights up							◎						
	Fan belt whines under sudden load								◎					
	Cloudy white oil is floating on cooling water									◎				
	Cooling water flows out from overflow hose										◎			
	Excessive air bubbles inside radiator, water spurts back											◎		
	Engine oil level has risen, oil is cloudy white								○				◎	
	There is play when fan pulley is rotated		◎											
	Radiator shroud, inside of underguard are clogged with dirt or mud			◎				◎						
	When light bulb is held behind radiator, no light passes through			◎										
	Water is leaking because of cracks in hose or loose clamps						◎							
	When belt tension is inspected, it is found to be loose							◎						
	Power train oil temperature enters red range faster than engine water temperature													◎
Troubleshooting	Temperature difference between top and bottom radiator tanks is excessive		●											Carry out troubleshooting for CHASSIS
	Temperature difference between top and bottom radiator tanks is slight			●										
	When water filler port is inspected, core is found to be clogged				●									
	When function test is carried out on thermostat, it does not open even at cracking temperature					●								
	When water temperature is measured, it is found to be normal						●							
	When oil cooler is inspected directly, it is found to be clogged								●					
	When measurement is made with radiator cap tester, set pressure is found to be low									●				
	When compression pressure is measured, it is found to be low										●			
	Remove oil pan and inspect directly											●		
		Remedy	Replace	Correct	Correct	Replace	Replace	Add	Correct	Replace	Replace	Replace	Replace	—

Condition when normal (voltage, current, resistance)	Action by controller when abnormality is detected	Problem that appears on machine when there is abnormality	Trouble-shooting code
1) Voltage between K3 (9) – (12) : 0.46 – 1.24 V 2) Voltage between K3 (1) – (12) : 0.46 – 1.24 V (standard arm specification) 0.54 – 1.32 V (long arm specification) 0.60 – 1.38 V (slide arm specification) 3) Between K3 (10) – (12) : 3.20 – 4.32 V 4) Between K2 (10) – (9) : 4.9 – 5.1 V	1) Turns output OFF (current 0A) to solenoids for boom RAISE stop, arm IN stop, left offset stop. ★ Even when the location of the failure is restored, the abnormality display continues to be displayed. (The operation also remains stopped)	1) Boom RAISE, arm IN, and left offset cannot be operated	E-4
			E-5
			E-6
1) Voltage between K3 (9) – (12) : 0.46 – 1.24 V 2) Voltage between K3 (1) – (12) : 0.46 – 1.24 V (standard arm specification) 0.54 – 1.32 V (long arm specification) 0.60 – 1.38 V (slide arm specification) 3) Between K3 (10) – (12) : 3.20 – 4.32 V 4) Between K2 (10) – (9) : 4.9 – 5.1 V	1) Turns output OFF (current 0A) to solenoids for boom RAISE stop, arm IN stop, left offset stop. ★ Even when the location of the failure is restored, the abnormality display continues to be displayed. (The operation also remains stopped)	1) Boom RAISE, arm IN, and left offset cannot be operated	E-7
1) Voltage between K3 (2) – (12) : 0.90 – 4.47 V 2) Voltage between K2 (10) – (9) : 4.9 – 5.1 V	1) Displays error code [38] and buzzer sounds, but takes no particular action.	1) Does not display DEPTH or UP on the depth display (displays error code [38] and buzzer continues to sound) 2) All parts of the work equipment work normally	E-8
1) Resistance of solenoid : 5 – 25 Ω	1) Turns output OFF (current 0A) to solenoids for boom RAISE stop, arm IN stop, left offset stop ★ With this system only, it does not carry out self- diagnosis for disconnections (the work equipment stops)	1) None of the work equipment or swing can be operated (travel, blade still work)	E-9
	1) Turns output OFF (current 0A) to solenoids for boom RAISE stop, arm IN stop, left offset stop 2) Turns output OFF (current 0A) to all abnormal solenoids ★ With this system, it does not display any abnormality even when there is a disconnection during operation, but left offset or boom LOWER stop. If the starting switch is turned OFF and then ON again, the display is given.	1) Boom RAISE, arm IN, and left offset cannot be operated	E-10
		1) Boom RAISE, boom LOWER, arm IN, and left offset cannot be operated, or 2) Depth mode (boom depth control) cannot be used	E-11
1) Resistance of solenoid : 3 – 15 Ω 2) Voltage between K1 (15) – (9) : 0.75 – 1.0 V (in safe range for bucket)	1) Turns output OFF (current 0A) to solenoids for boom RAISE stop, arm IN stop, left offset stop ★ Even when the location of the failure is restored, the abnormality display continues to be displayed. (The operation also remains stopped)	1) Boom RAISE, arm IN, and left offset cannot be operated	E-12
1) Resistance of solenoid : 3 – 15 Ω 2) Voltage between K1 (15) – (9): 0.75 – 1.0 V (in safe range for bucket)			E-13
1) Impossible to measure electrical system	1) Turns output OFF (current 0A) to PPC lock solenoid ★ If the location of the failure is restored, the abnormality display goes out, and it returns to normal operation.	1) None of the work equipment or travel can be operated	E-14

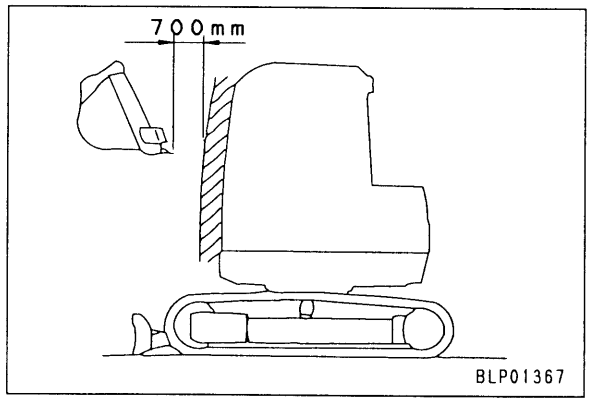
POINTS TO REMEMBER WHEN CARRYING OUT TROUBLESHOOTING OF CONTROLLER SYSTEM

- The controller for interference prevention and automatic control mounted on this machine has special control features that do not appear on conventional machines, such as automatic stop of the work equipment and reducing the speed before carrying out the automatic stop.
  For this reason, particular phenomena appear on this machine which do not appear on conventional machines.
- The following types of phenomena are not failures, so it is important to understand fully the operating condition before carrying out troubleshooting.

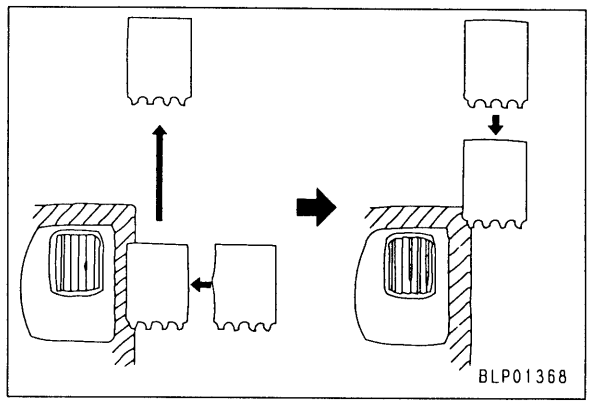
1. After the machine has carried out automatic stop, the boom RAISE, arm IN, and left offset operations cannot be carried out even when the work equipment is moved 50 ✍ 100 mm to the front or right direction. (The diagram shows movement to the front.)
   ★ At 50 ❼ 100 mm, the work equipment is still inside the interference range, so operations will be possible if the work equipment is moved further.



2. After automatic stop, even when the work equipment is moved less than 700 mm to the front, when the boom RAISE and arm IN are operated, the speed is slow.
   ★ The work equipment is still inside the reduced speed area, so the speed will return to normal if it is moved further.



3. After automatic stop with the left offset operation, the work equipment automatically stops if the arm is moved to the front and an attempt is made to return to the original posture.
   ★ The work equipment is still inside the interference area in the left offset direction, so operations will become possible if it is offset approx. 50 mm to the right.



E-6 Error code [34] (Abnormality in offset potentiometer system)

★ Before carrying out troubleshooting, check that all the related connectors are properly inserted.
★ Always connect any disconnected connectors before going on the next step.

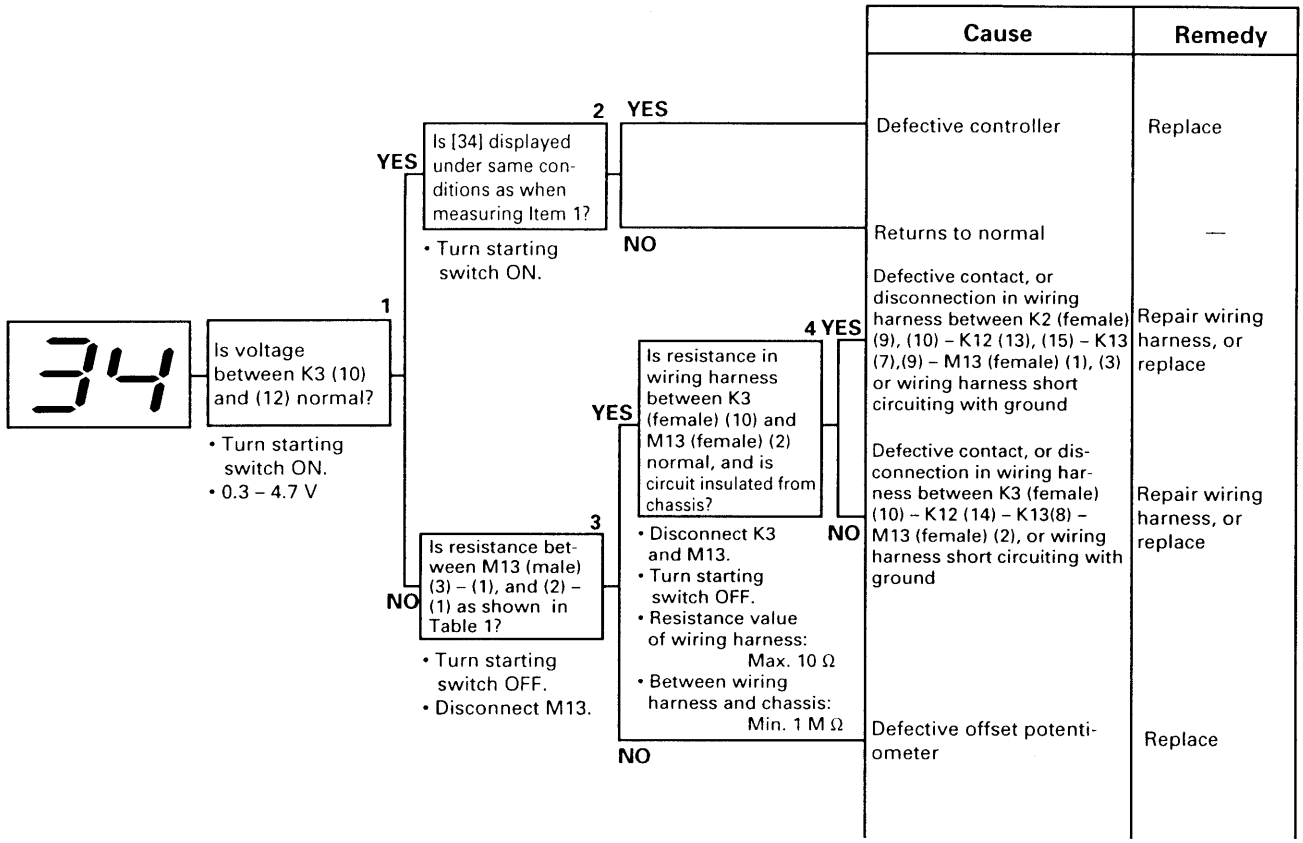
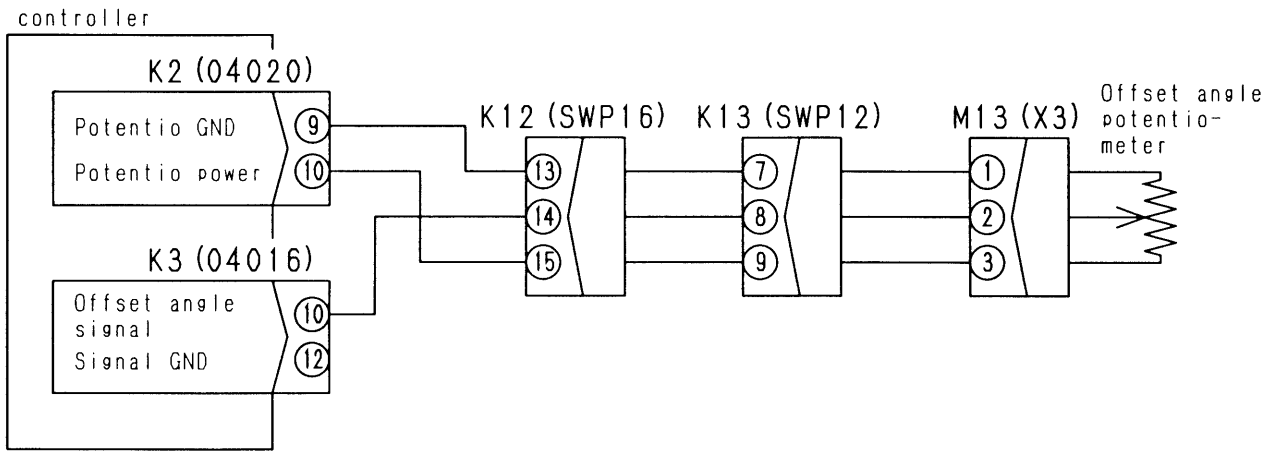


Table 1

M13 (male)	Resistance
Between (3) – (1)	4 – 6 kΩ
Between (2) – (1)	0.2 – 7 kΩ

E-6 Related electrical circuit diagram



E-16 Impossible to select and set depth display 0 set mode, depth mode, height mode, offset mode

★ Before carrying out troubleshooting, check that all the related connectors are properly inserted.
★ Always connect any disconnected connectors before going on the next step.
★ Check that the selection and setting is being carried out outside the interference area.

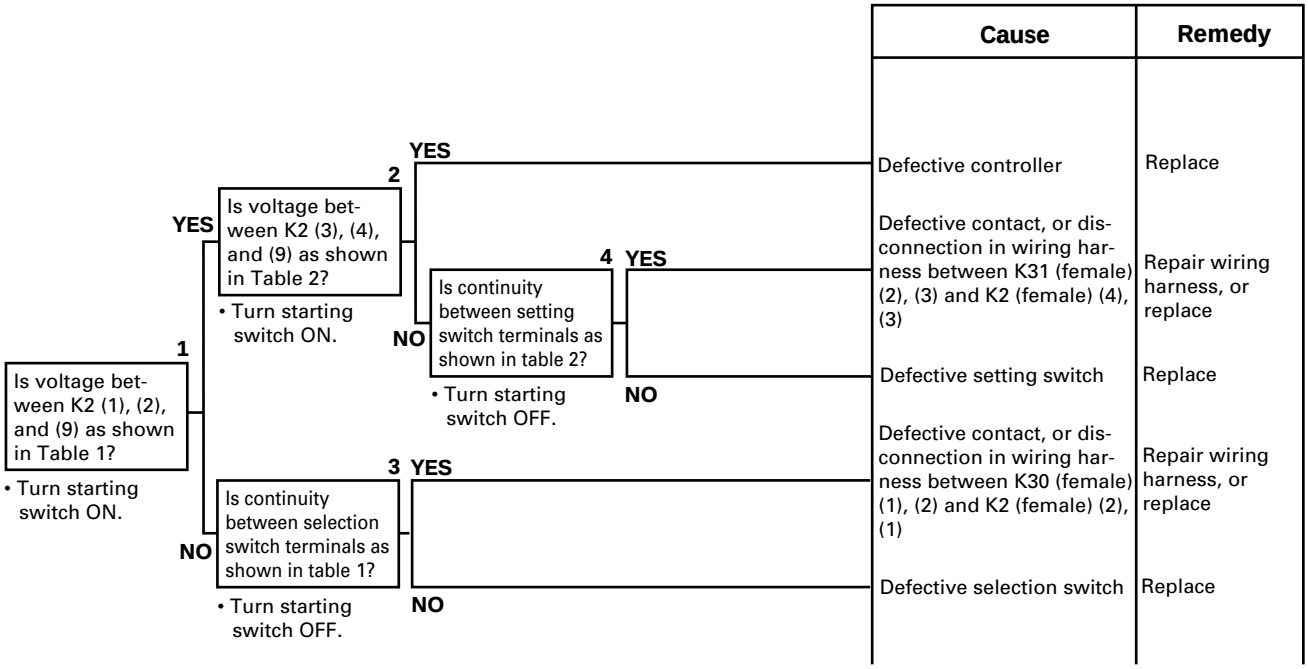


Table 1

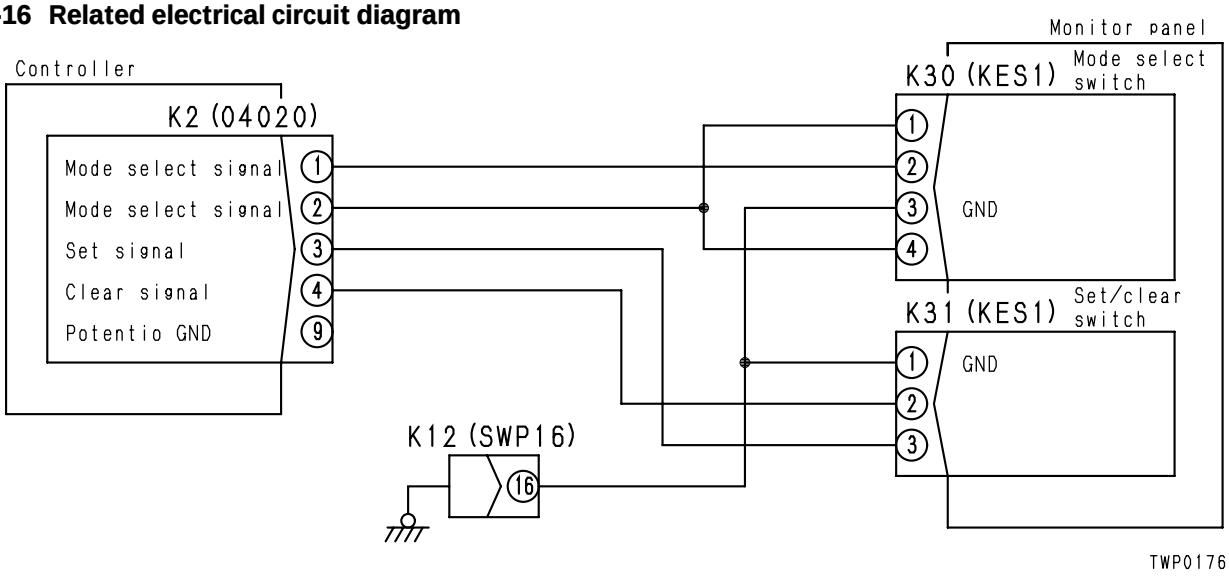
Terminal No. of controller K2		②	①		
Switch terminal No.		1	2	3 (GND)	4
Setting switch Position	Depth display 0 set	(Min. 8 V)	(Min. 8 V)		○
	Depth	(Max. 1 V)	(Min. 8 V)	●	
	Height	(Min. 8 V)	(Max. 1 V)	●	
	Offset	(Max. 1 V)	(Max. 1 V)	●	

Table 2

Terminal No. of controller K2			④	③
Switch terminal No.		1 (GND)	2	3 (GND)
Setting switch Position	SET	●	(Min. 8 V)	(Max. 1 V)
	Neutral		(Min. 8 V)	(Min. 8 V)
	CLEAR	○	(Max. 1 V)	● (Min. 8 V)

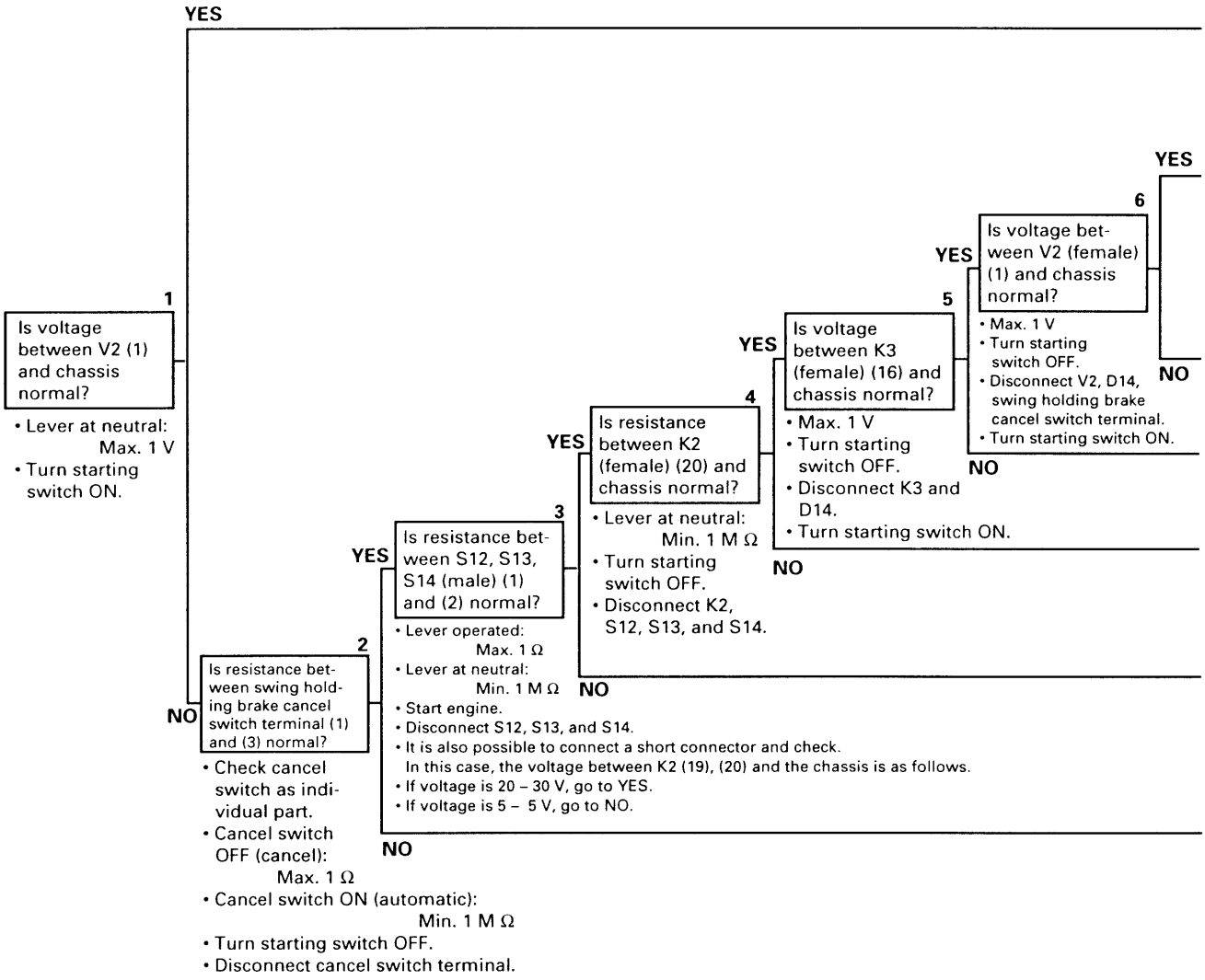
★ Nos. 1 and 4 are connected externally.

E-16 Related electrical circuit diagram



E-24 Excessive hydraulic drift of swing (swing brake has no effect)

★ Before carrying out troubleshooting, check that all the related connectors are properly inserted.
★ Always connect any disconnected connectors before going on the next step.
★ Carry out troubleshooting with the swing holding brake cancel switch ON (automatic).



E-29 a) Related electrical circuit diagram

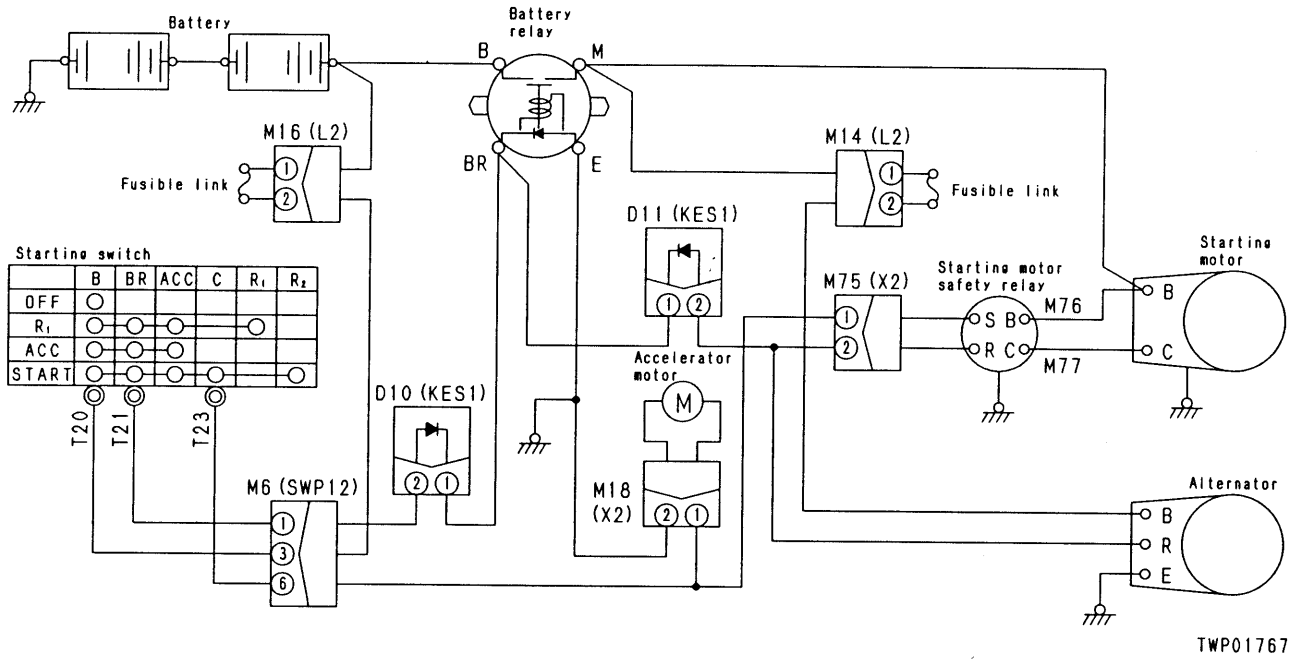
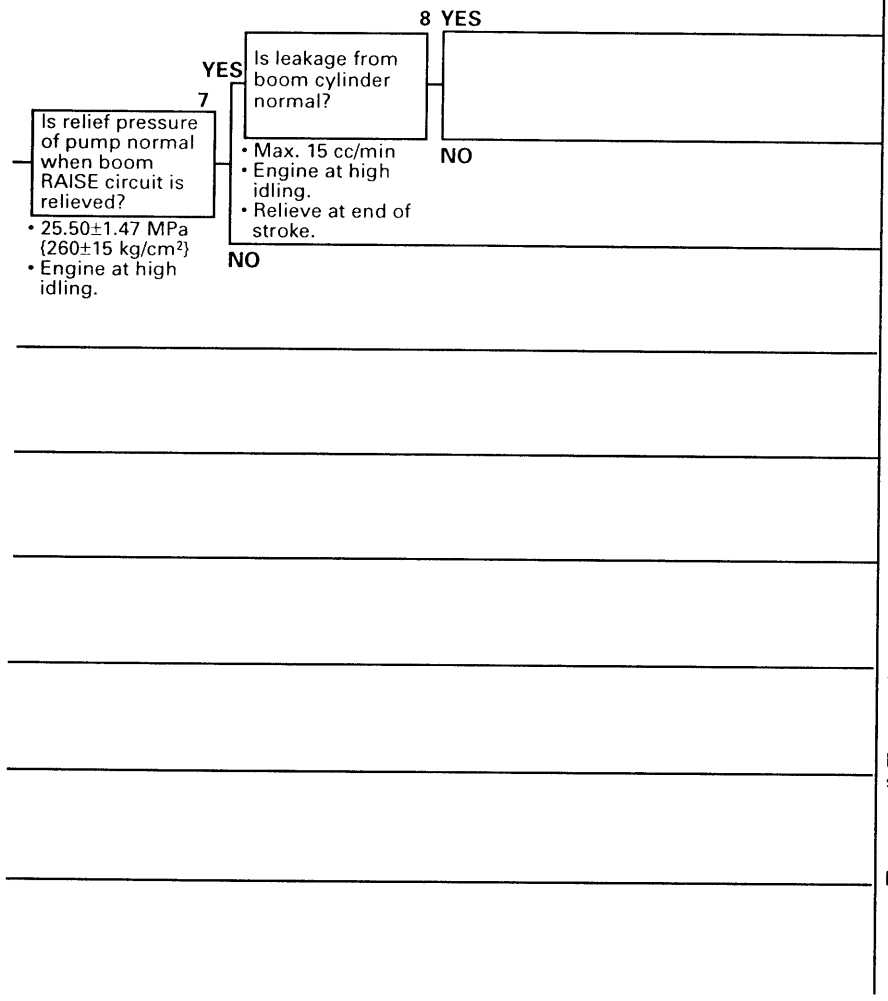


TABLE OF FAILURE MODES AND CAUSES

Failure mode \ Parts causing failure			Piston pump										Control valve						
			PC valve	LS valve	Servo piston	Pump proper	Filter, throttle inside servo	Gear pump	LS circuit throttle	Self-pressure reducing valve	Strainer	PTO spline	Spool	Main relief valve	For piston pump: Unload valve	Main relief valve for gear pump	Pressure compensation valve	Regeneration valve: Boom	Regeneration valve: Arm
All work equipment, travel, swing	Speeds of all work equipment, swing, travel are slow or lack power		○			○								○	○	○			
	There is excessive drop in engine speed, or engine stalls		○		○		○												
	No work equipment, travel, swing move					○		○		○		○		○		○			
	Abnormal noise generated (around pump)					○		○			○					○			
	Fine control ability is poor or response is poor			○	○				○										
Work equipment	Boom is slow or lacks power												○				○	○	
	Arm is slow or lacks power												○				○		○
	Bucket is slow or lacks power												○				○		
	Blade is slow or lacks power																		
	Boom does not move												○						
	Arm does not move												○						
	Bucket does not move												○						
	Offset does not move												○						
	Blade does not move												○						
	Excessive hydraulic drift of work equipment												○						
	Excessive time lag (engine at low idling)			○	○														
Compound operations	In compound operations, work equipment with larger load is slow																○		
	In swing + boom RAISE, boom is slow																		
	In boom RAISE + travel, travel speed drops excessively																○		
Travel system	Travel deviation	Deviation is excessive											○				○		
		Deviation is excessive when starting											○						
	Travel speed is slow or lacks power			○										○					
	Steering is difficult to turn																○		
	Travel speed does not switch or is faster than set speed																		
	Track does not move (one side only)																		
Swing system	Does not swing	Both left and right																	
		One direction only											○						
	Swing acceleration is poor or speed is slow	Both left and right																	
		One direction only											○						
	Excessive overrun when stopping swing	Both left and right																	
		One direction only											○						
	Excessive shock when stopping swing (one direction only)												○						
	Excessive abnormal noise when stopping swing																		
	Excessive hydraulic drift of swing	When swing holding brake is OFF											○						
		When swing holding brake is ON																	

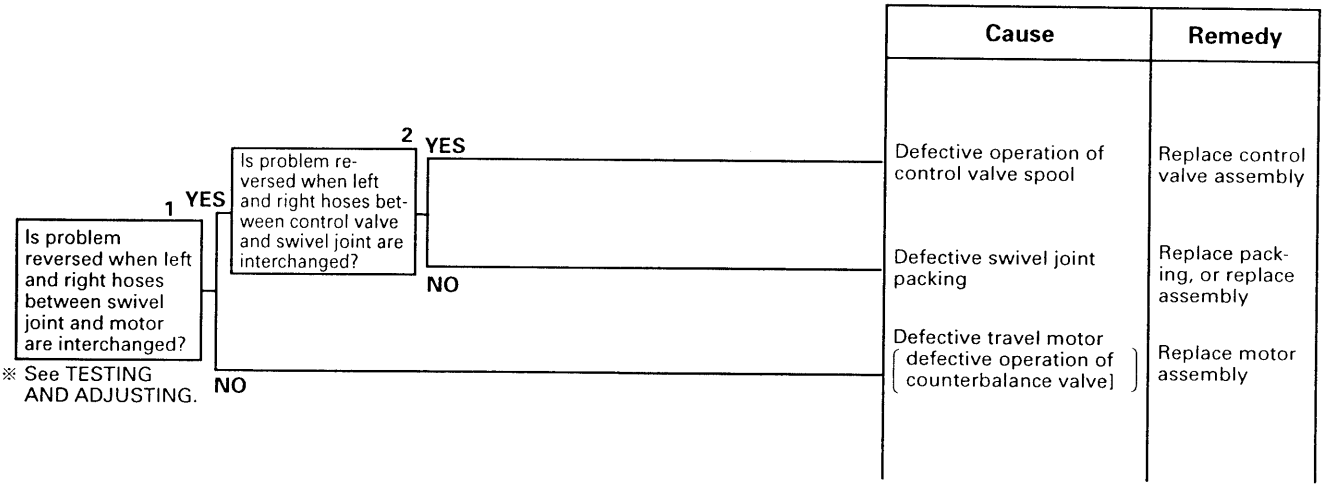
★ The piston pump is for the boom, arm, bucket, offset, travel, and control circuits.
The gear pump is for the swing, blade, and boom RAISE circuits.



Cause	Remedy
Defective boom valve	Replace stack assembly
Defective boom cylinder piston packing	Repair or replace
Defective operation of suction valve	Replace
Defective boom RAISE merge valve	Repair or replace
Defective pressure compensation valve or defective operation of pressure compensation valve	Repair or replace
Defective boom regeneration valve (stuck)	Repair or replace
Defective operation of control valve spool	Repair or replace
Defective boom RAISE stop EPC solenoid valve	Replace
Defective PPC valve	Replace

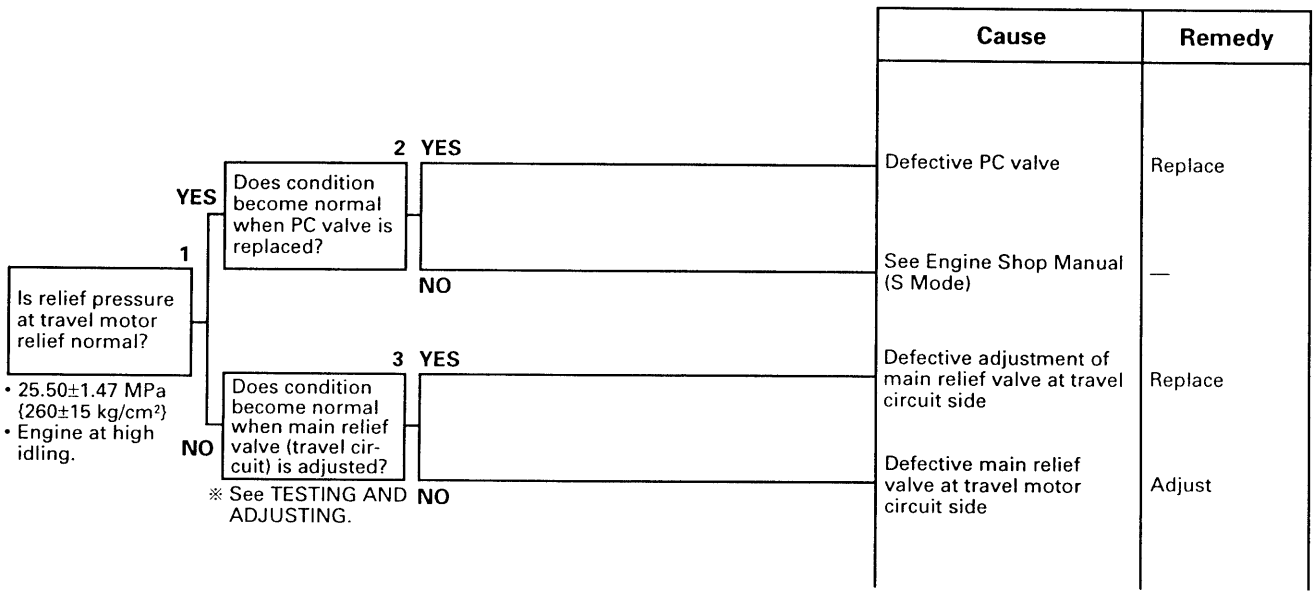
H-17 Excessive deviation when starting

★ When the travel speed is normal
(If there is also deviation during normal travel, go first to "H-16 When machine is traveling, it deviates naturally to one side (deviation is excessive when traveling)".)

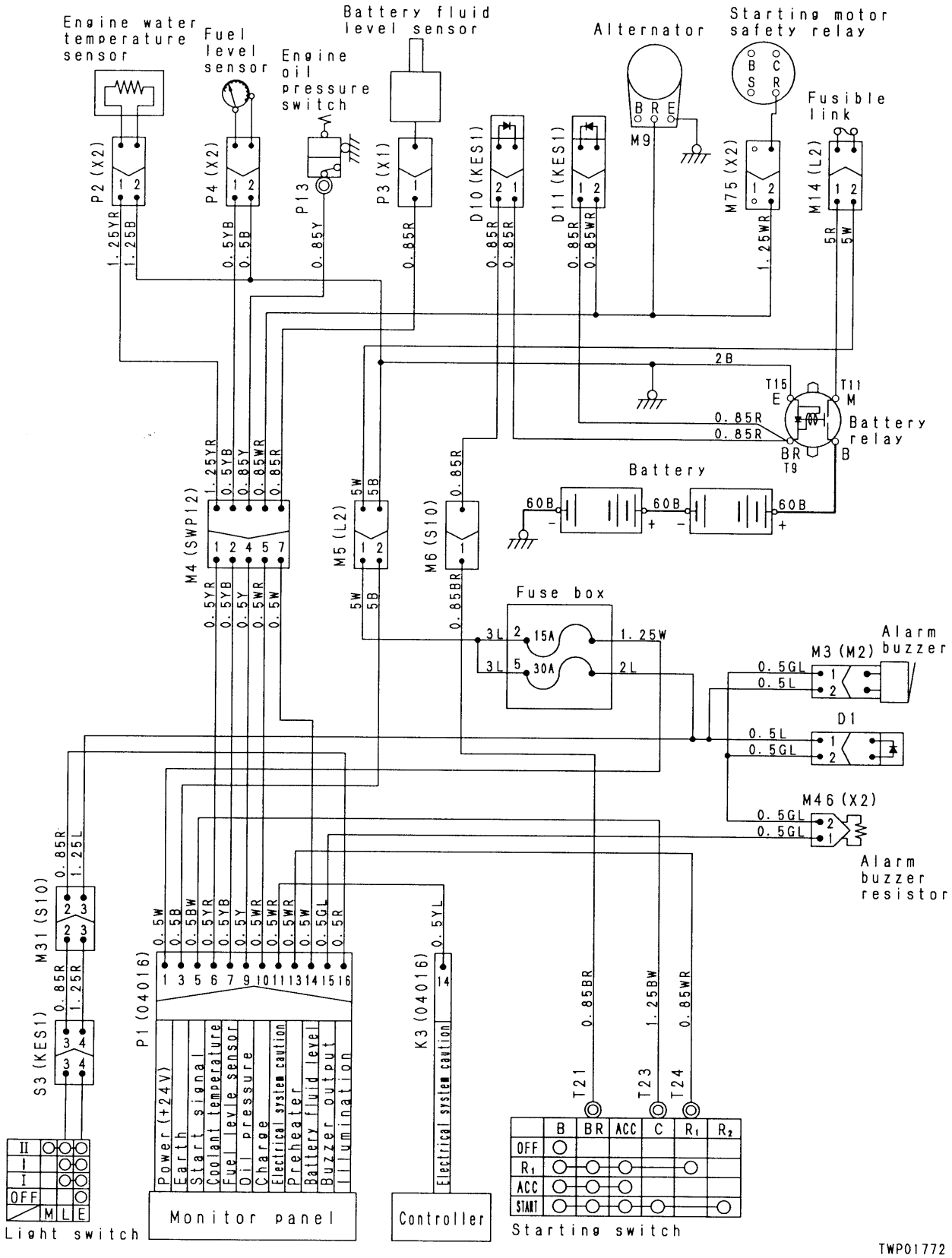


H-18 Travel speed is slow or lacks power

★ When there is no travel deviation. (If there is deviation during normal travel, go first to "H-16 When machine is traveling, it deviates naturally to one side (deviation is excessive when traveling)".
★ When the work equipment speed is normal.



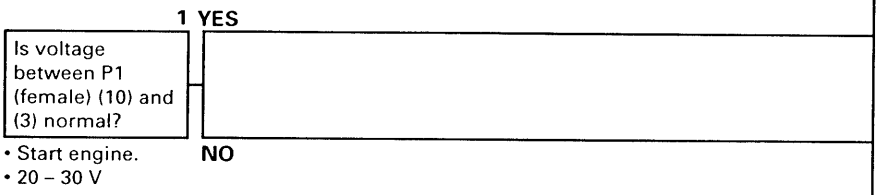
ELECTRIAL CIRCUIT DIAGRAM FOR MACHINE MONITOR SYSTEM



M-12 When engine is running, service meter does not advance

★ Before carrying out troubleshooting, check that all the related connectors are properly inserted.
★ Always connect any disconnected connectors before going on the next step.

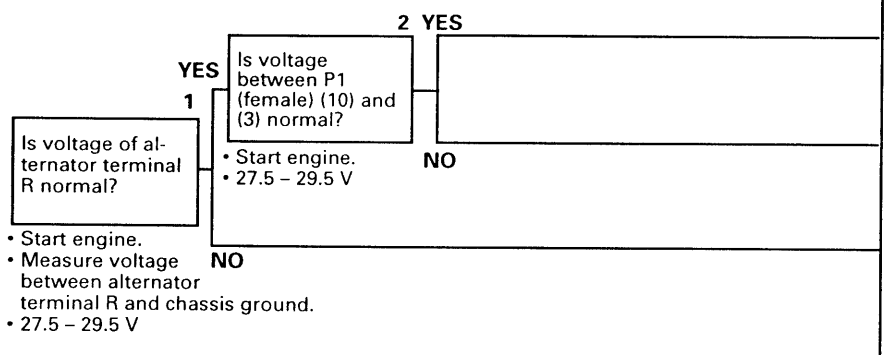
a) When charge caution lamp does not light up



Cause	Remedy
Defective monitor panel	Replace
Defective contact, or disconnetion in wiring harness between P1 (female) (10) – M4 (5) – alternator terminal R	Repair wiring harness, or replace

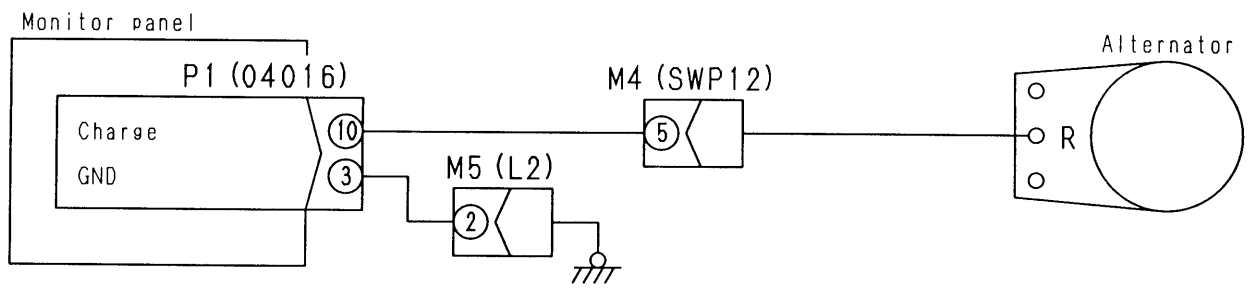
b) When charge caution lamp lights up

★ Go to M-8.



Cause	Remedy
Defective monitor panel	Replace
Contact of chassis ground with wiring harness between alternator terminal P1 (female) (10) and alternator terminal R	Repair or replace
Defective generation of electricity by alternator	Replace

M-12 a), b) Related electrical circuit diagram



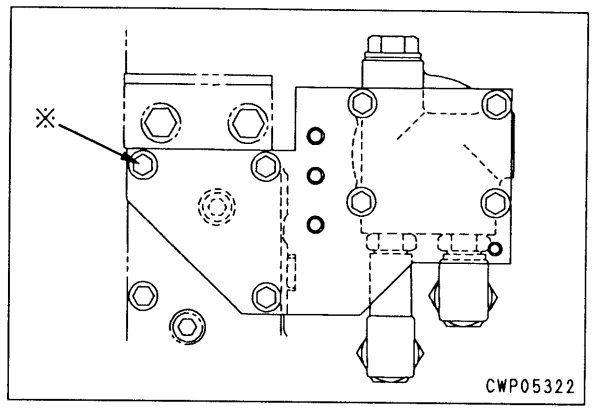
2. **Precautions when carrying out installation work**
- Tighten all bolts and nuts (sleeve nuts) to the specified (KES) torque.
- Install the hoses without twisting or interference.
- Replace all gaskets, O-rings, cotter pins, and lock plates with new parts.
- Bend the cotter pins and lock plates securely.
- When coating with adhesive, clean the part and remove all oil and grease, then coat the threaded portion with 2 – 3 drops of adhesive.
- When coating with gasket sealant, clean the surface and remove all oil and grease, check that there is no dirt or damage, then coat uniformly with gasket sealant.
- Clean all parts, and correct any damage, dents, burrs, or rust.
- Coat rotating parts and sliding parts with engine oil.
- When press fitting parts, coat the surface with anti-friction compound (LM-P).
- After fitting snap rings, check that the snap ring is fitted securely in the ring groove.
- When connecting wiring connectors, clean the connector to remove all oil, dirt, or water, then connect securely.
- When using eyebolts, check that there is no deformation or deterioration, screw them in fully, and align the direction of the hook.
- When tightening split flanges, tighten uniformly in turn to prevent excessive tightening on one side.

★ When operating the hydraulic cylinders for the first time after reassembling cylinders, pumps and other hydraulic equipment removed for repair, always bleed the air as follows:
1. Start the engine and run at low idling.
2. Operate the work equipment control lever to operate the hydraulic cylinder 4 – 5 times, stopping the cylinder 100 mm from the end of its stroke.
3. Next, operate the hydraulic cylinder 3 – 4 times to the end of its stroke.
4. After doing this, run the engine at normal speed.

★ When using the machine for the first time after repair or long storage, follow the same procedure.

3. Precautions when completing the operation
- If the coolant has been drained, tighten the drain valve, and add water to the specified level. Run the engine to circulate the water through the system. Then check the water level again.
- If the hydraulic equipment has been removed and installed again, add engine oil to the specified level. Run the engine to circulate the oil through the system. Then check the oil level again.
- If the piping or hydraulic equipment have been removed, always bleed the air from the system after reassembling the parts.
  ★ For details, see TESTING AND ADJUSTING, Bleeding air.
- Add the specified amount of grease (molybdenum disulphide grease) to the work equipment parts.

INSTALLATION OF FUEL INJECTION PUMP ASSEMBLY



- Carry out the installation in the reverse order to the removal.

※ 1

★ Apply the liquid gasket (LG-7) to the bolts indicated with ※ marking in the figure to the right prior to their installation.

※ 2

★ Adjust the fuel control cable and rod. Adjustment of Control Linkage in the Inspection and Adjustment section.

※ 3

★ Adjust the engine stop solenoid linkage. For details, see TESTING AND ADJUSTING, Testing and adjusting engine stop solenoid linkage.

※ 4

kgm Fuel injection tube nut.
Injection pump side :
24 ± 4 Nm {2.45 ± 0.41 kgm}
Nozzle holder side :
30 ± 5 Nm {3.06 ± 0.51 kgm}

※ 5

kgm Fuel tube joint bolt:
29.4 ± 4.9 Nm {3.0 ± 0.5 kgm}

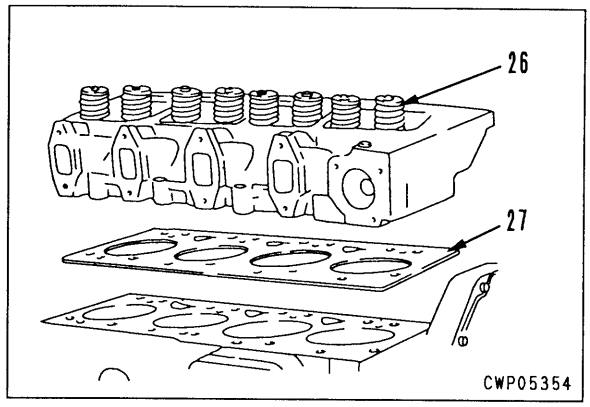
※ 6

kgm Fuel hose joint bolt:
29.4 ± 4.9 Nm {3.0 ± 0.5 kgm}

※ 7

★ Turn the cap 180° to tighten it.

29. Remove the cylinder head assembly (26) by lifting it up.
    kg Cylinder head assembly : **40 kg.**
30. Remove the cylinder head gasket (27).



INSTALLATION OF ENGINE AND MAIN PUMP ASSEMBLY

- Carry out the installation in the reverse order to the removal.

※ 1

kgm Starter Assembly **B** terminal mounting nut
: 15.7 ± 19.6 Nm {1.6 ± 2.0 kgm}

※ 2

★ Adjust the fuel control linkage. For details, see TESTING AND ADJUSTING, Testing and adjusting fuel control linkage.

※ 3

kgm Fuel hose joint bolt :
29.4 ± 4.9 Nm {3.0 ± 0.5 kgm}

※ 4

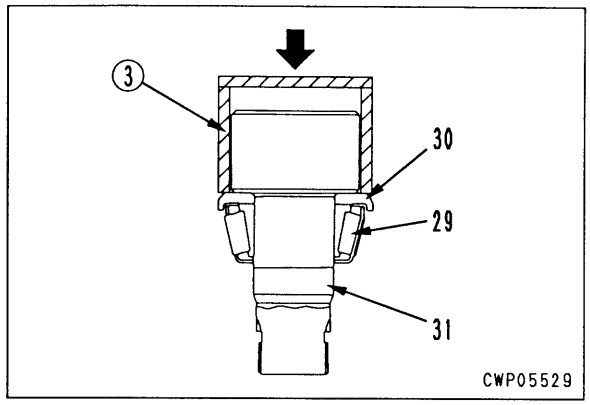
kgm Suction hose clamp:
8.8 ± 0.49 Nm {0.90 ± 0.05 kgm}

- **Refilling with water**
  Fill water up to the specified level, start the engine to circulate coolant through the piping, then check the level again.

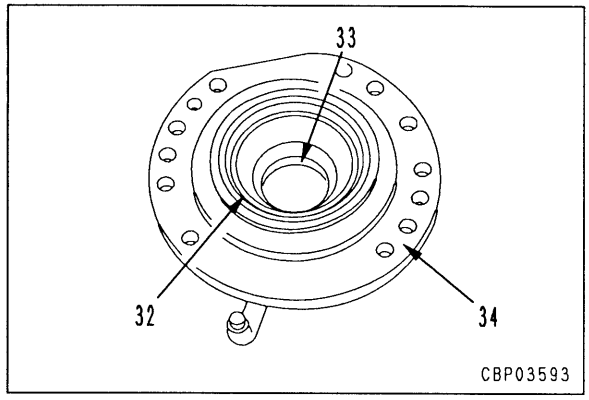
- **Refilling with oil (Hydraulic oil tank)**
  Fill oil up to the specified level via the oil filler port, start the engine to circulate oil through the piping, then check the oil level again.
  Hydraulic oil tank : **57 ℓ (SAE10W-CD).**

- **Air bleeding**
  Bleed air from the travel motor. For details, see TESTING AND ADJUSTING, Testing and bleeding air.

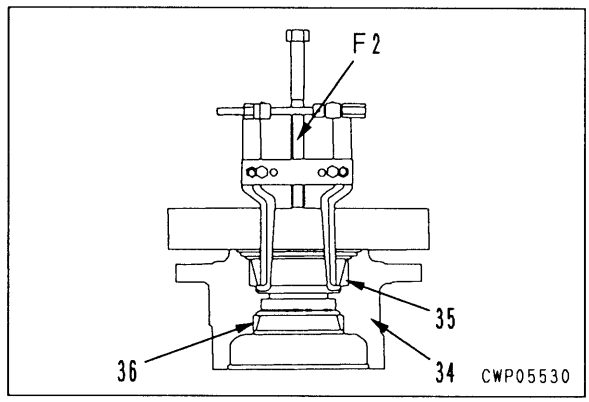
(3) Set the shaft assembly on the press, then remove the main bearing (29), collar (30) and shaft (31) using the push tool ③.



9. Dust seal, oil seal and bearing outer lace
(1) Remove the dust seal (32), and oil seal (33) from the case (34).

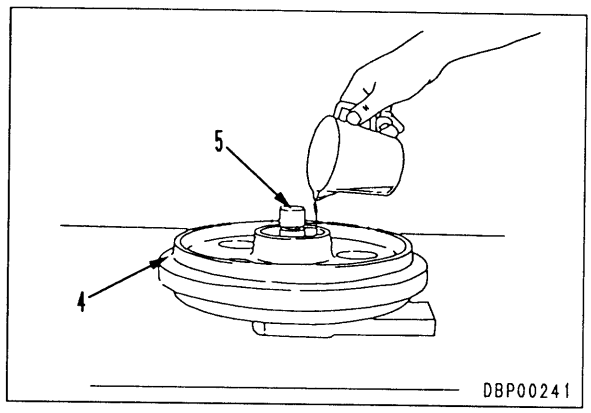


(2) Using the tool **F2**, remove the bearing outer laces (35) and (36) from the case (34).

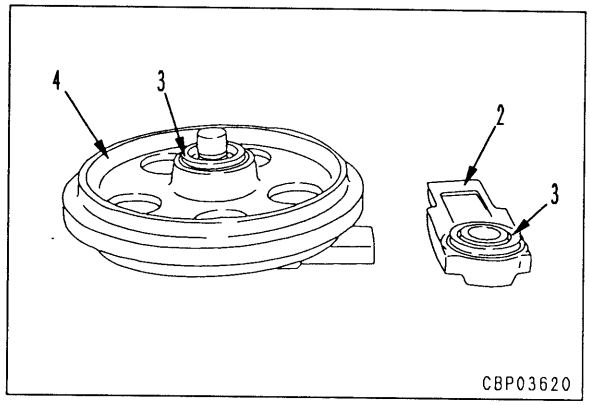


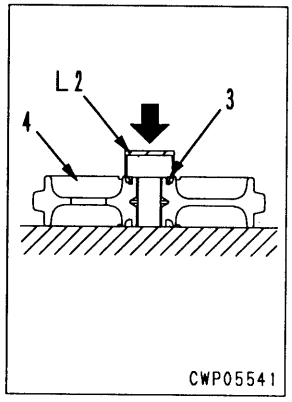
5. Supply oil to the space between the shaft (5) and idler (4).

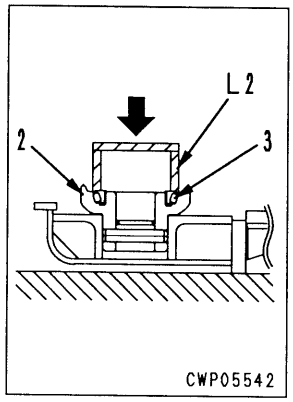
   Volume of oil supplied : **60 cc (ED-30CD)**



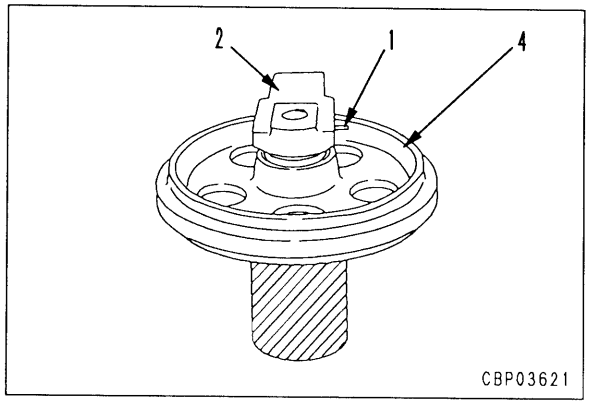
6. Using the tool **L2**, install the floating seal (3) o the idler (4) and support (2).
   - ★ Coat the floating seal sliding surface with oil. Use care so that the surface may not be contaminated by dust.
   - ★ Remove all grease and oil from the contact surface of the O-ring and the floating seal.







7. Attach the O-ring to the support (2), then fix it using the dowel pin (1).



REMOVAL OF RUBBER SHOE ASSEMBLY

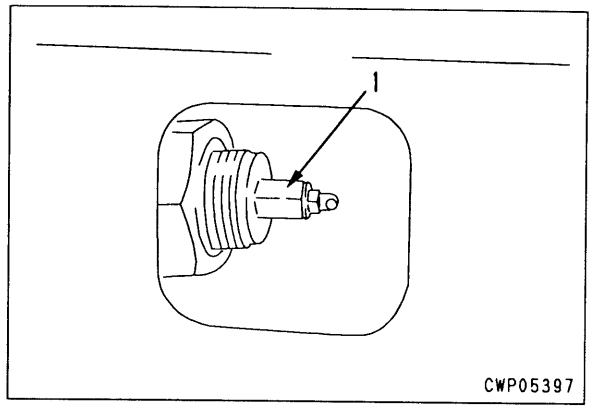
1. Lower work equipment to ground, then loosen lubricator (1) to loosen track shoe. [※ 1]

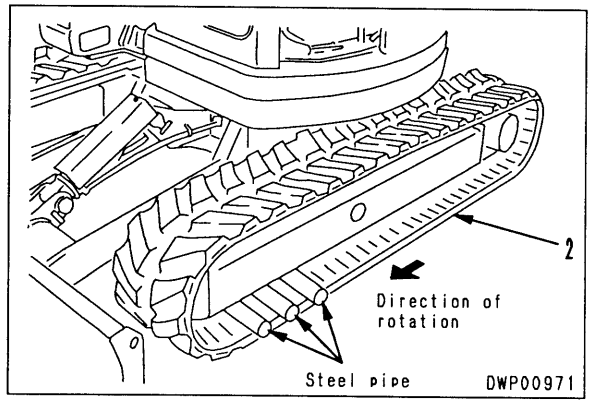
   ⚠ Since the pressure in the adjustment cylinder is very high, do not loosen the lubricator more than 1 turn. If the grease does not come out, move the machine forward and backward.

2. Swing the work equipment by 90° degrees and raise machine body a little.

3. Insert steel pipes in spaces between rubber shoe (2) and rollers, then rotate the sprocket in the reverse direction. If rubber shoe is raised from idler by steel pipes, slide it off sideways.

   [kg] Rubber shoe assembly : **380 kg**



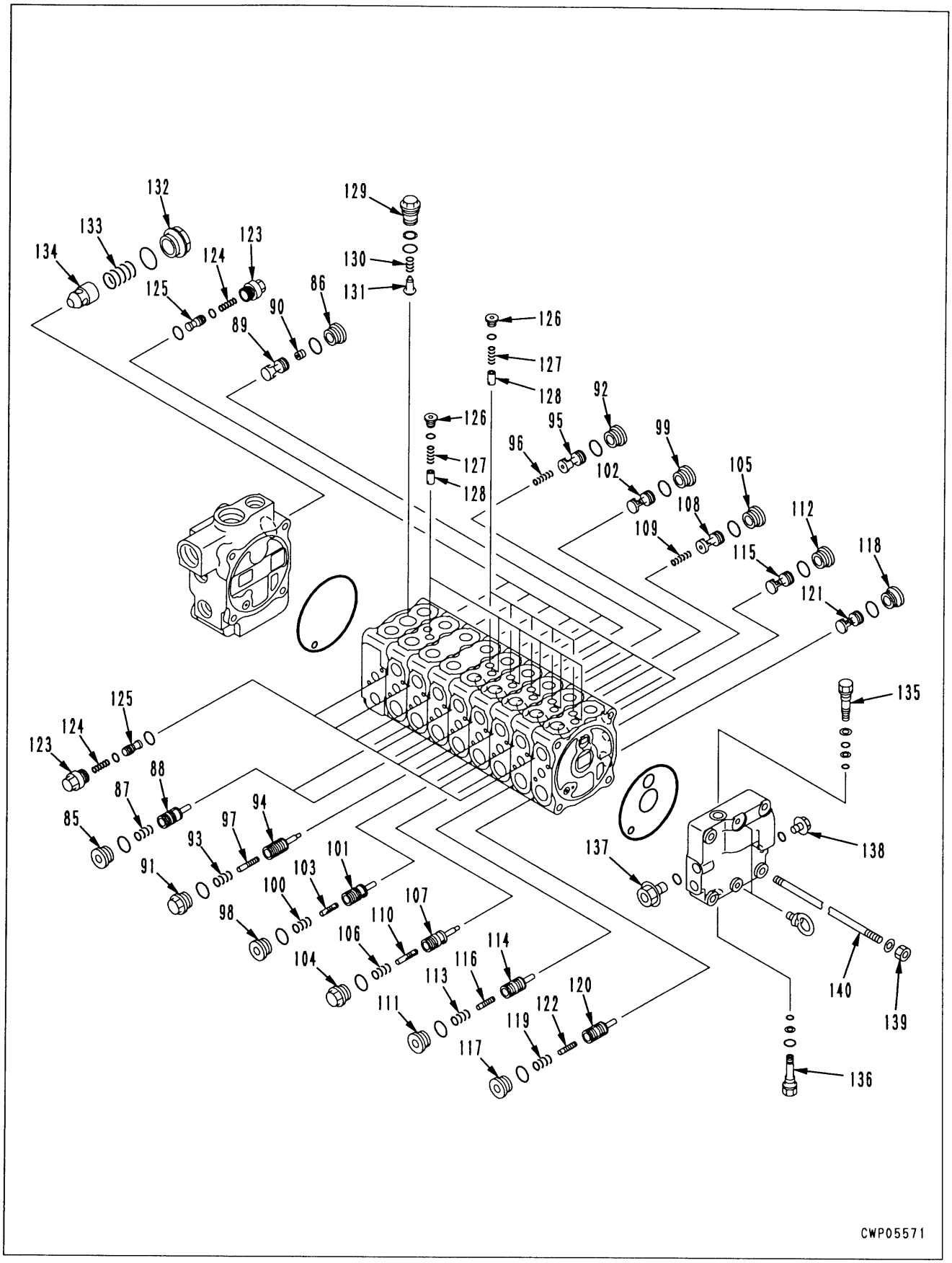


INSTALLATION OF RUBBER SHOE ASSEMBLY

- Carry out installation in the reverse order to removal.

[※ 1]

★ Adjust the track shoe tension. For details, see TESTING AND ADJUSTING, Testing and adjusting track shoe tension.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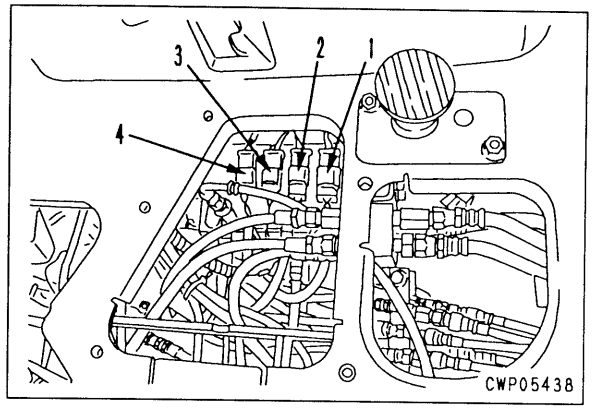
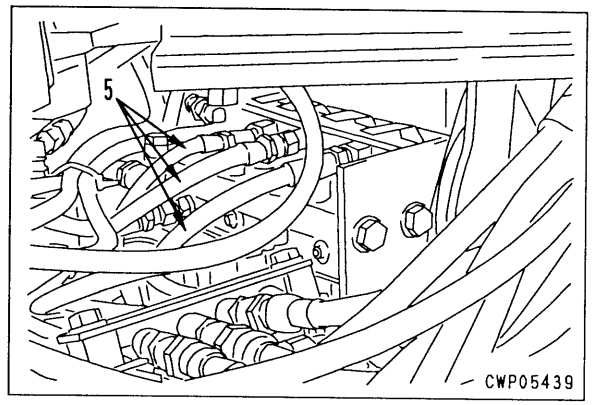
CWP05571

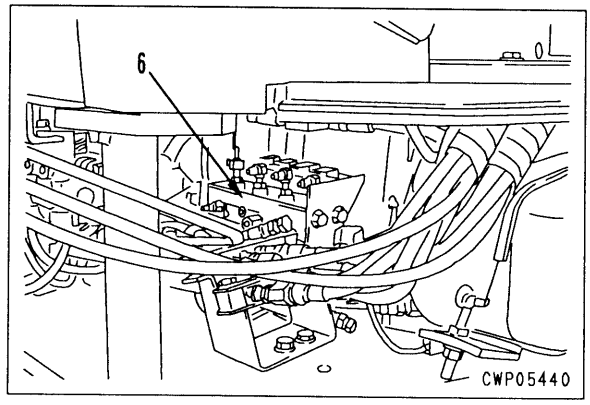
REMOVAL OF SOLENOID VALVE ASSEMBLY (PPC HYDRAULIC LOCK, SWING HOLDING BRAKE, TRAVEL SPEED AND MODE SELECT)

⚠ Lower the work equipment completely to the ground, stop the engine, then relieve pressure in the hydraulic tank by gradually loosening the tank cap.

1. Remove the cover situated at lower front side of the operator cab (canopy).
2. Remove the floor plate.
3. Disconnect the wiring connectors (CN-V1) (1), (CN-V2) (2), (CN-V3) (3) and (CN-V4) (4).
4. Disconnect the 10 hoses (5).
5. Remove the solenoid valve assembly (6).







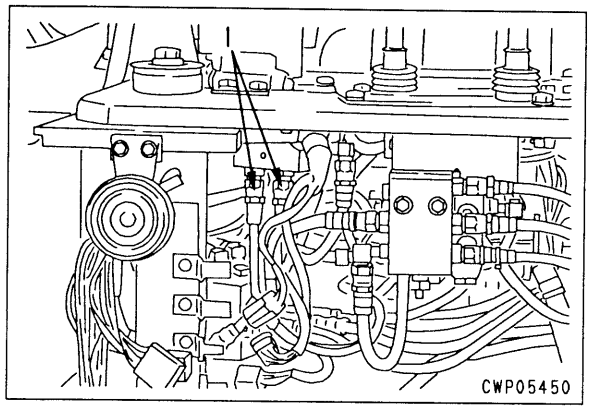
INSTALLATION OF SOLENOID VALVE ASSEMBLY (PPC HYDRAULIC LOCK, SWING HOLDING BRAKE, TRAVEL SPEED AND MODE SELECT)

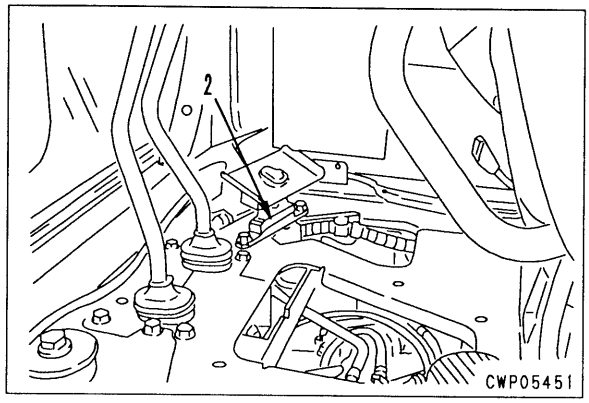
- Carry out the installation in the reverse order to the removal.
- **Refilling with oil (Hydraulic oil tank)**
  Fill oil up to the specified level via the oil filler port, start the engine to circulate oil through the piping, then check the oil level again.

REMOVAL OF OFFSET PPC VALVE ASSEMBLY

⚠ Lower the work equipment completely to the ground, stop the engine, then relieve pressure in the hydraulic tank by gradually loosening the tank cap.

1. Remove the cover situated at the lower front side of the operator cab (canopy).
2. Remove the floor plate.
3. Disconnect the four hoses (1).
4. Remove the offset PPC valve assembly (2).





INSTALLATION OF OFFSET PPC VALVE ASSEMBLY

- Carry out the installation in the reverse order to the removal.
- **Refilling with oil (Hydraulic oil tank)**
  Fill oil up to the specified level via the oil filler port, start the engine to circulate oil through the piping, then check the oil level again.

INSTALLATION OF OFFSET CYLINDER ASSEMBLY

- Carry out the installation in the reverse order of the removal.

※ 1

⚠ Don't insert your finger into the pin hole when aligning the pin hole position.

Pin and sliding surface (prior to assembly): **Lubricant containing molybdenum disulfide (LM-P)**

Greasing after assembly : **Lubricant containing molybdenum disulfide (LM-G)**

★ Adjust the clearance in the pin mounting position to 1 mm or less using the shims.
- Standard shim thickness : **0.5 mm**

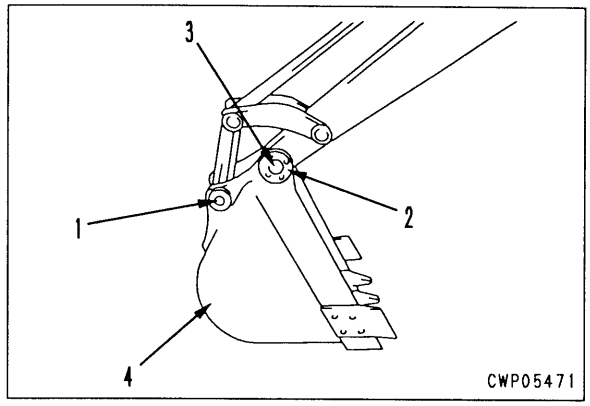
※ 2

⚠ Don't insert your finger into the pin hole when aligning the pin hole position.
- Standard shim thickness : 1 mm

- **Refilling with oil**
  Fill oil up to the specified level via the oil filler port, start the engine to circulate oil through the piping, then check the oil level again.

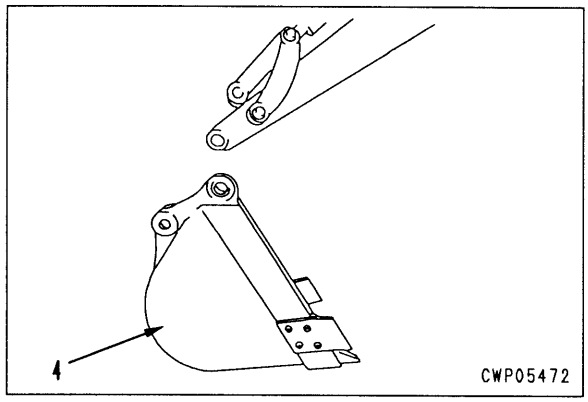
- **Air bleeding**
  Bleed air from the hydraulic system. For details, see TESTING AND ADJUSTING, bleeding air.

REMOVAL OF BUCKET ASSEMBLY



⚠ Lower the work equipment to the ground with the bucket rear side being faced down.

1. Remove the lock bolt, then remove the pin (1) connecting the link and bucket. [※ 1]
2. Remove the lock bolt, remove the plate (2) by driving it in outward, then remove the pin (3) connecting the arm and bucket. [※ 2]
   ★ Check and record number of shims used in each location.
3. Move the work equipment up, then disconnect the bucket assembly (4).
   kg Blade assembly : **210 kg**



INSTALLATION OF BUCKET ASSEMBLY

- Carry out the installation in the reverse order to the removal.

[※ 1]

⚠ Don't insert your finger into the pin hole when aligning the pin hole position.

Pin and sliding surface (prior to assembly): **Lubricant containing molybdenum disulfide (LM-P)**

Greasing after assembly : **Lubricant containing molybdenum disulfide (LM-G)**

[※ 2]

★ Make sure to fit O-ring to the end of bucket boss.

⚠ Don't insert your finger into the pin hole when aligning the pin hole position.

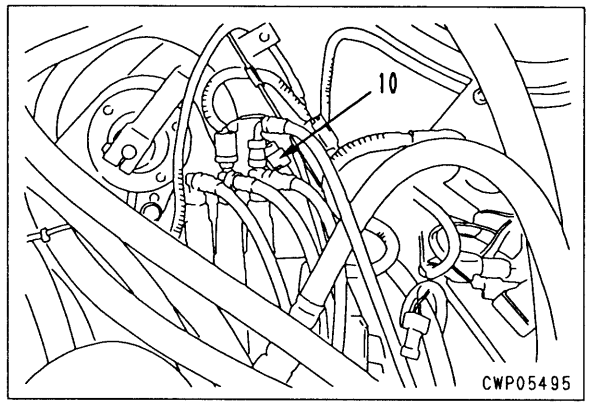
Pin and sliding surface (prior to assembly): Lubricant containing molybdenum disulfide (LM-P)

Greasing after assembly: Lubricant containing molybdenum disulfide (LM-G)

★ Adjust the clearance in the pin mounting position to 0.5 mm or less using the shims.
- Standard shim thickness : **10 mm (0.5 mm x 20 shims)**

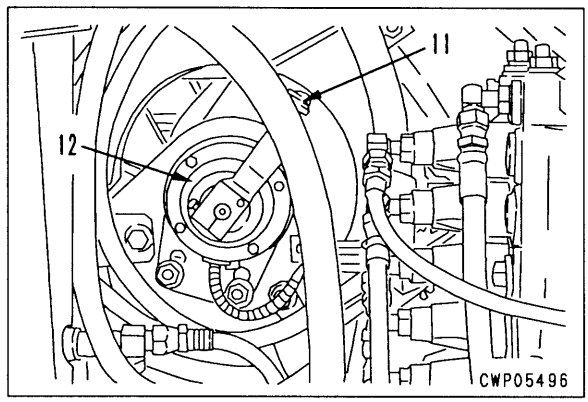
8. Disconnect the boom angle potentiometer wiring connector (10).

9. Disconnect the hose clamp, then remove the control valve side cover .

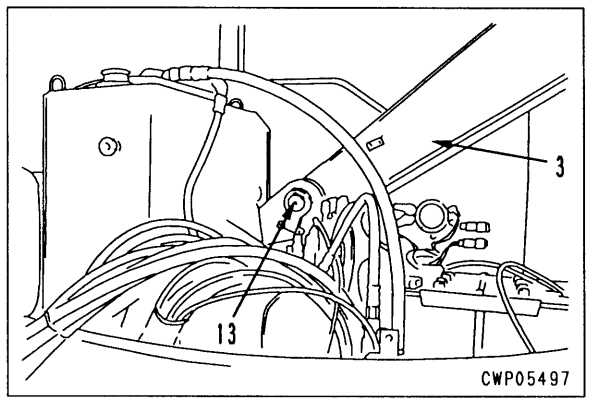


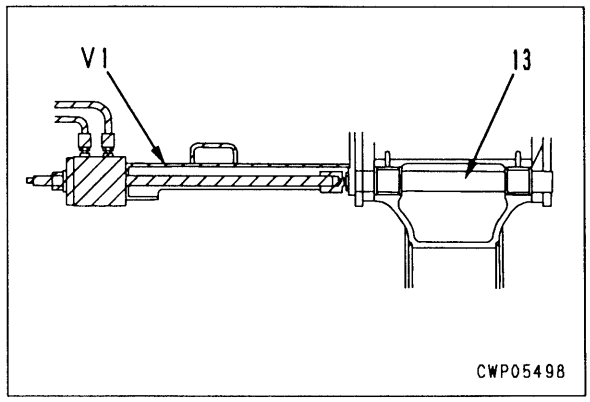
10. Remove the cotter pin (11) on the boom angle potentiometer linkage.

11. Remove the potentiometer assembly (12) along with the boom foot pin stopper plate. ※ 3



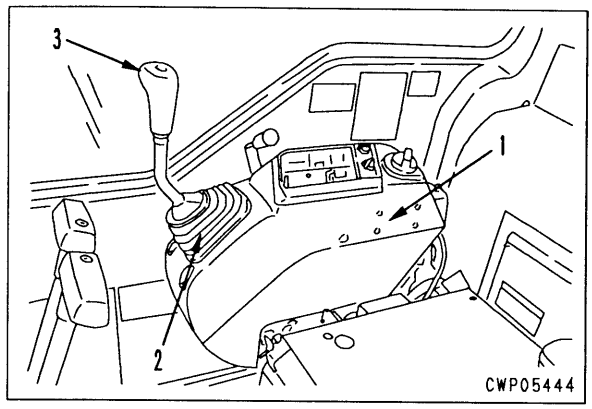
12. Lift the first boom assembly (3) temporarily, remove the foot pin (13) using the tool **V1**, then remove the first boom assembly (3). ※ 4
    ★ Check and record number of shims used in each location.
    kg First boom assembly : **330 kg**

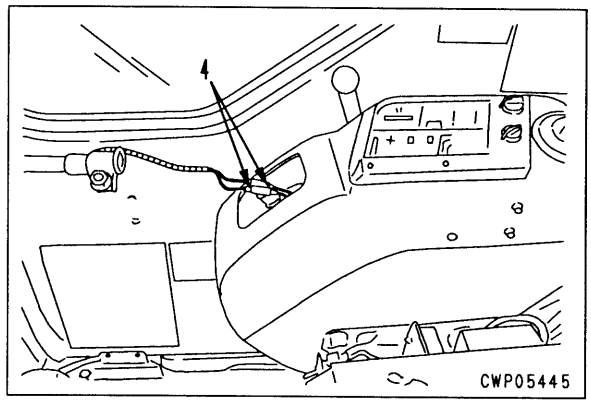




REMOVAL OF MONITOR ASSEMBLY

1. Remove the boots (2) from the cover (1).
   ★ Check direction of the lever beforehand.
2. Lift the lever (3), then disconnect the two wiring (4).
3. Remove the cover (1), then disconnect the three wiring connectors (CN-P1, CN-K30, CN-K31) (5).
4. Remove the monitor assembly (6) from the cover (1). ※ 1



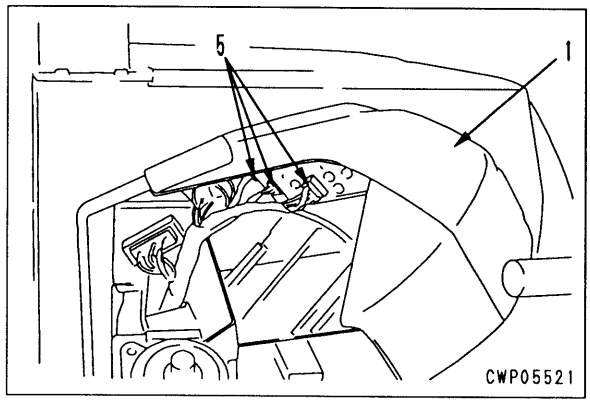


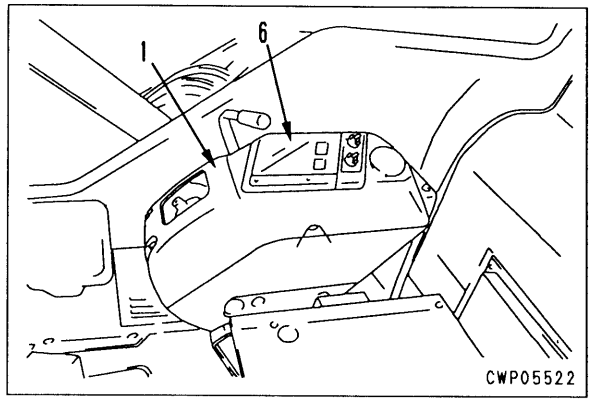
INSTALLATION OF MONITOR ASSEMBLY

- Carry out the installation in the reverse order to the removal.

※ 1

kgm Monitor assembly mounting nut :
7.8 – 8.8 Nm {0.8 – 0.9 kgm}





INSTALLATION OF REVOLVING FRAME ASSEMBLY

- Carry out the installation in the reverse order to the removal.

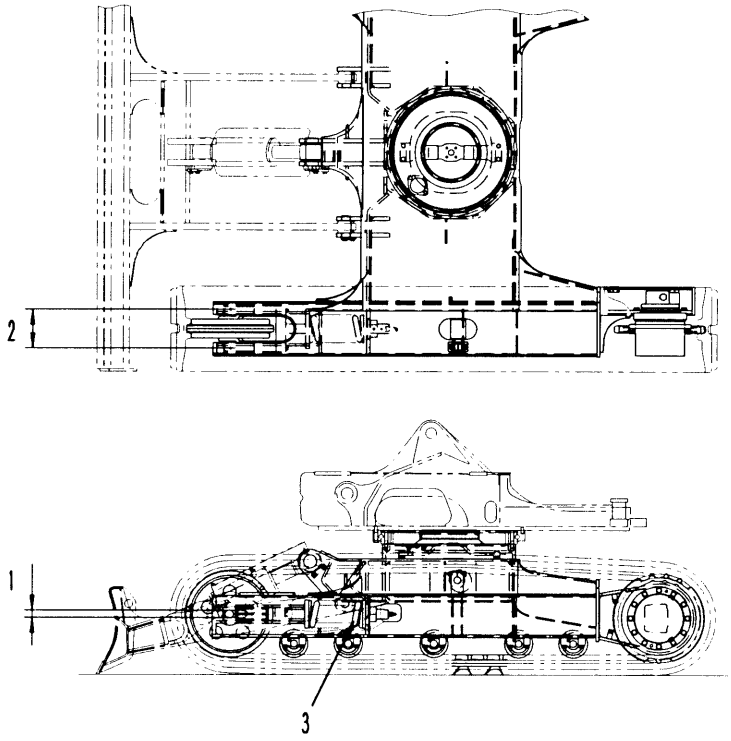
※ 1

Revolving frame mating face :
Liquid gasket (LG-1)

Revolving frame mounting bolt :
Liquid adhesive (LT-2)

kgm Revolving frame mounting bolt :
245 – 309 {25 – 31.5 kgm}
(Target : 279.5 {28.5 kgm})

TRACK FRAME, RECOIL SPRING



SVP04608

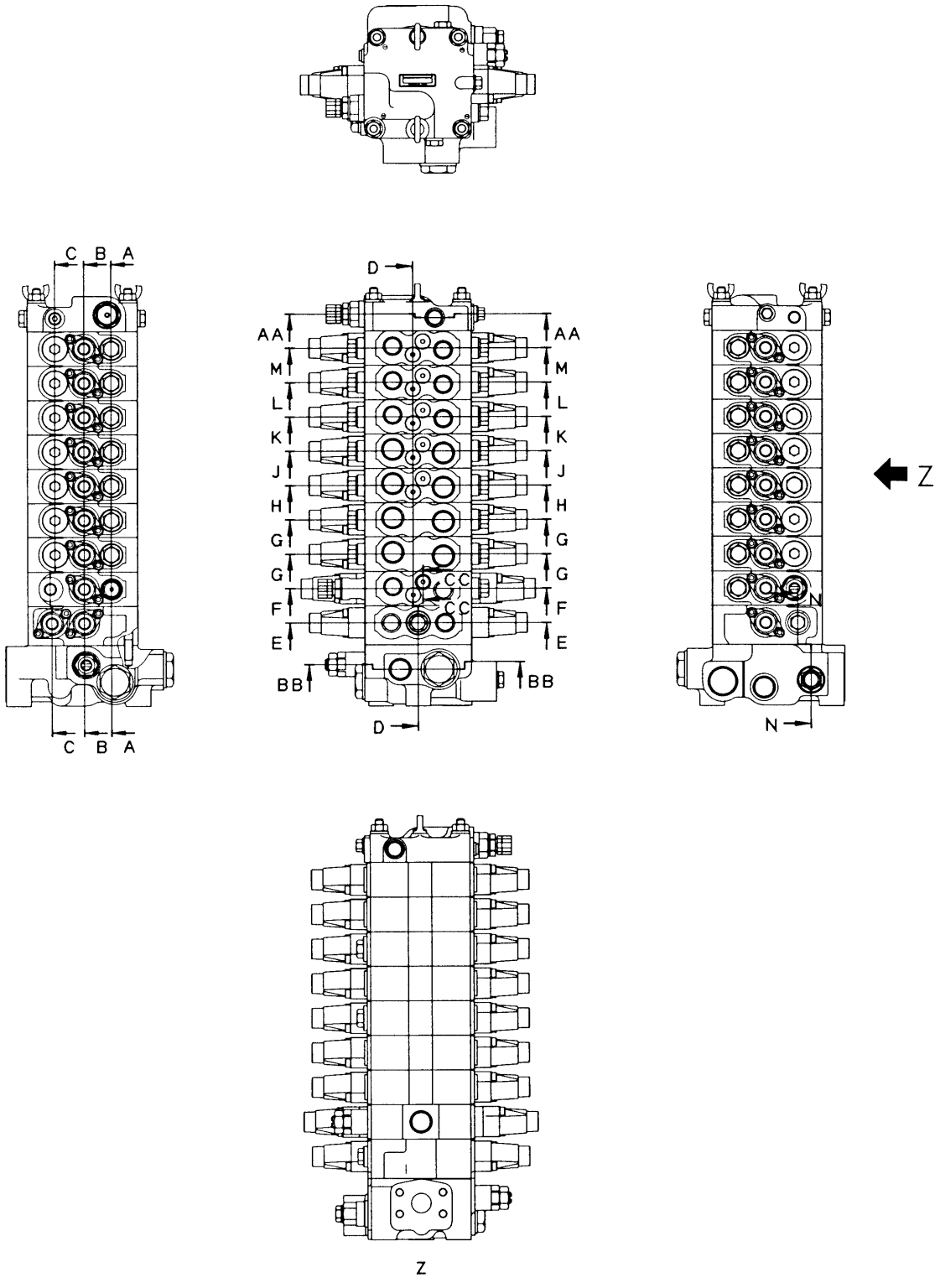
Unit : mm

No	Check item		Criteria					Remedy
1	Deformation of frame			Standard size		Repair limit		Rebuild
			Track frame	74		78		
			Idler support	73		69		Rebuild or replace
2	Vertical width of idler guide		Track frame	158		162		Rebuild
			Idler	156		152		Rebuild or replace
3	Recoil spring		Standard size			Repair limit		Replace
			Free length	Installed length	Installed load	Free length	Installed load	
		Rubber shoe	410	283	69.2 kN (7,061.2 kg)	402	64.9 kN (6,620 kg)	
		Road liner Steel shoe	410	323	47.4 kN (4,837.2 kg)	402	63.0 kN (4,390 kg)	

CONTROL VALVE

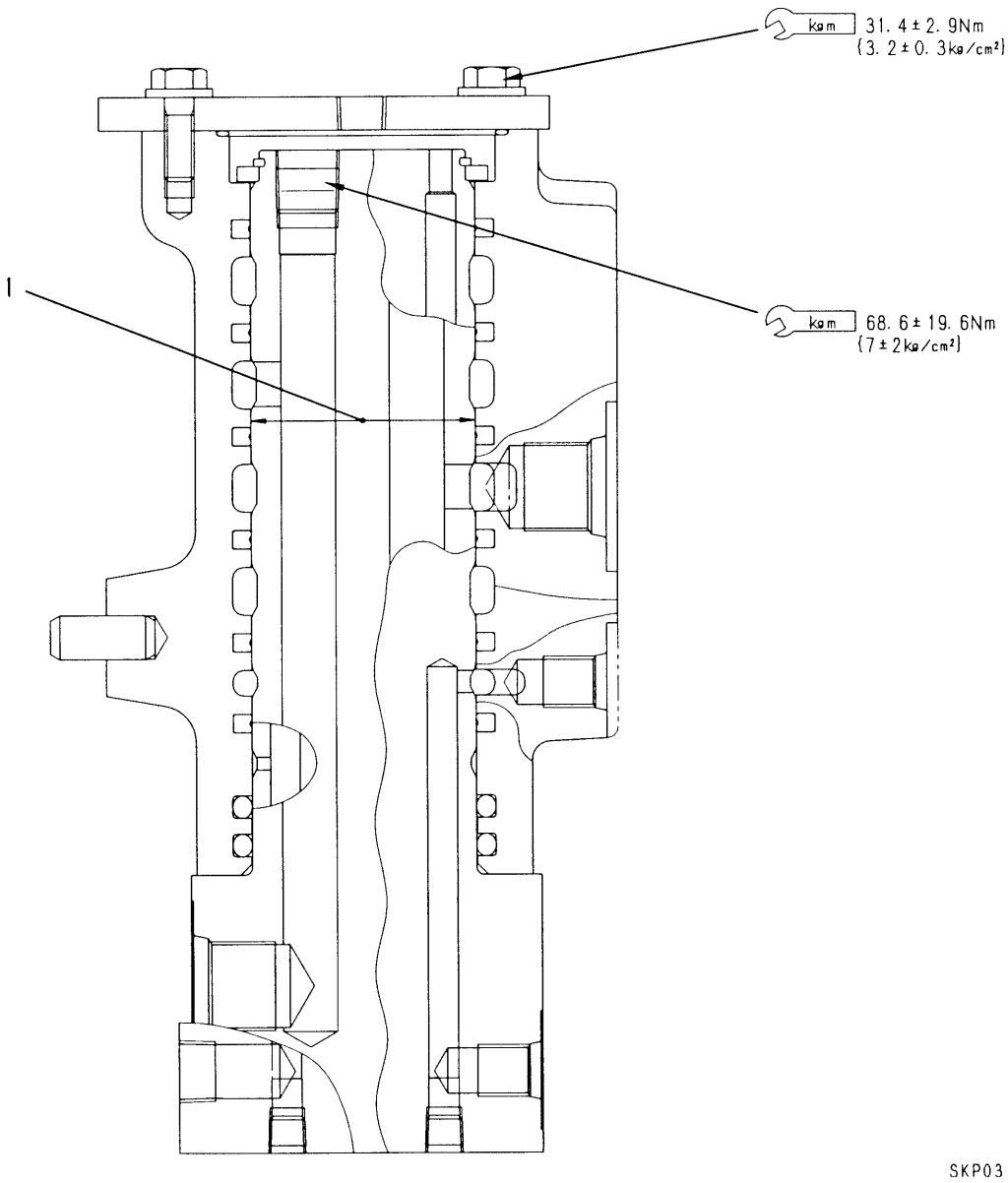
9-SPOOL HYDRAULIC ASSIST TYPE

(1/7)



SVP04615

CENTER SWIVEL JOINT



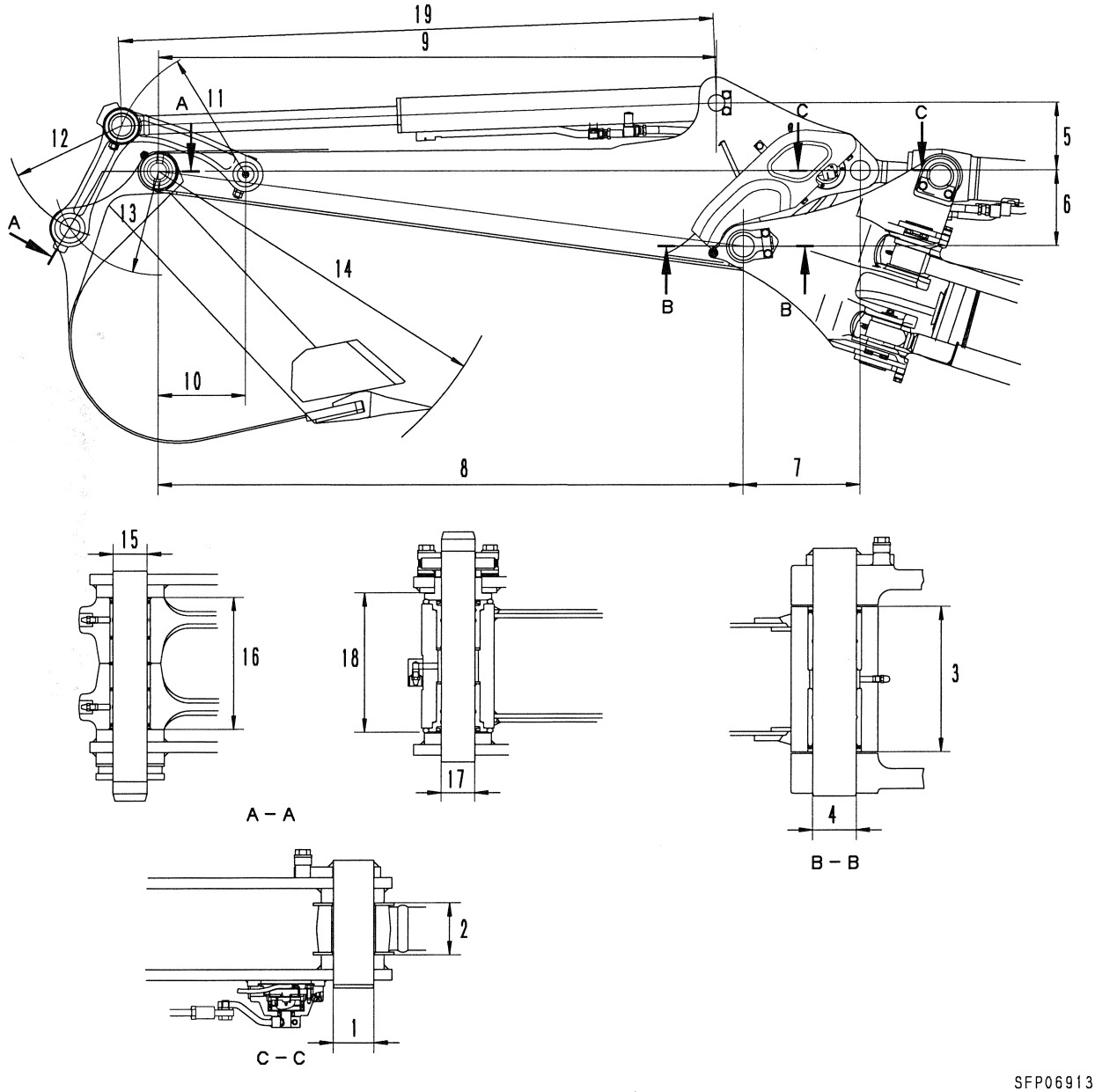
Unit : mm

No	Check item	Criteria			Remedy
		Standard size	Standard clearance	Clearance limit	
1	Clearance between shaft of rotor	70	0.056 – 0.105	0.111	Replace

DIMENSION OF WORK EQUIPMENT

ARM

PC75UU-3 Serial No. : 19001 and up



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