

SHOP MANUAL

KOMATSU

PC300LC-5 WITH KDC 614TA ENGINE

PC400LC-5 WITH CUMMINS LTA-10C ENGINE EXCAVATORS

MACHINE MODEL	SERIAL NUMBERS
PC300LC-5	A30001 and up
PC400LC-5	A40001 and up

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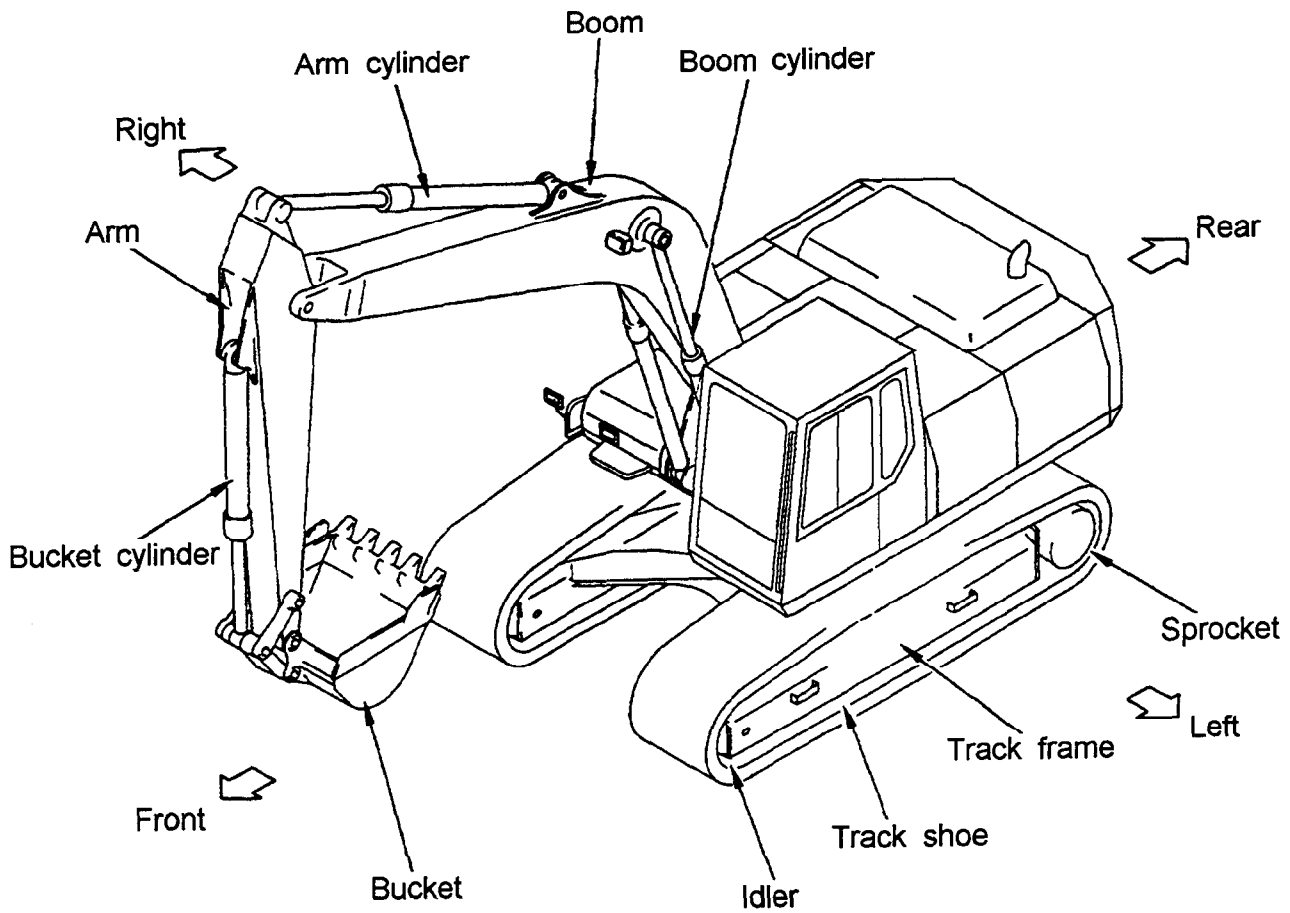
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PRECAUTIONS DURING WORK

11. When removing the oil filler cap, drain plug or hydraulic pressure measuring plugs, loosen them slowly to prevent the oil from spurt- ing out.
Before disconnecting or removing compo- nents of the oil, water or air circuits, first remove the pressure completely from the circuit.
12. The water and oil in the circuits are hot when the engine is stopped, so be careful not to get burned.
Wait for the oil and water to cool before carrying out any work on the oil or water circuits.
13. Before starting work, remove the leads from the battery. Always remove the lead from the negative (-) terminal first.
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 inter- nal pressure or under pressure from a spring, always leave two bolts in position on oppo- site 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. Damaged 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 mini- mum of gasoline when washing electrical parts.
19. Be sure to assemble all parts again in their original places.
Replace any damaged part 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 cir- cuits. Also check that connecting parts are correctly installed.
21. When assembling or installing parts, always use the specified tightening torques. When installing protective parts such as guards, or parts which vibrate violently or rotate at high speed, be particularly careful to check that they are installed correctly.
22. When aligning two holes, never insert your fingers or hand. Be careful not to get your fingers caught in a hole.
23. When measuring hydraulic pressure, check that the measuring tool is correctly assem- bled before taking any measurements.
24. Take care when removing or installing the tracks of track-type machines.
When removing the track, the track separates suddenly, so never let anyone stand at either end of the track.

GENERAL VIEW
PC300LC-5, PC400LC-5



X01AD029

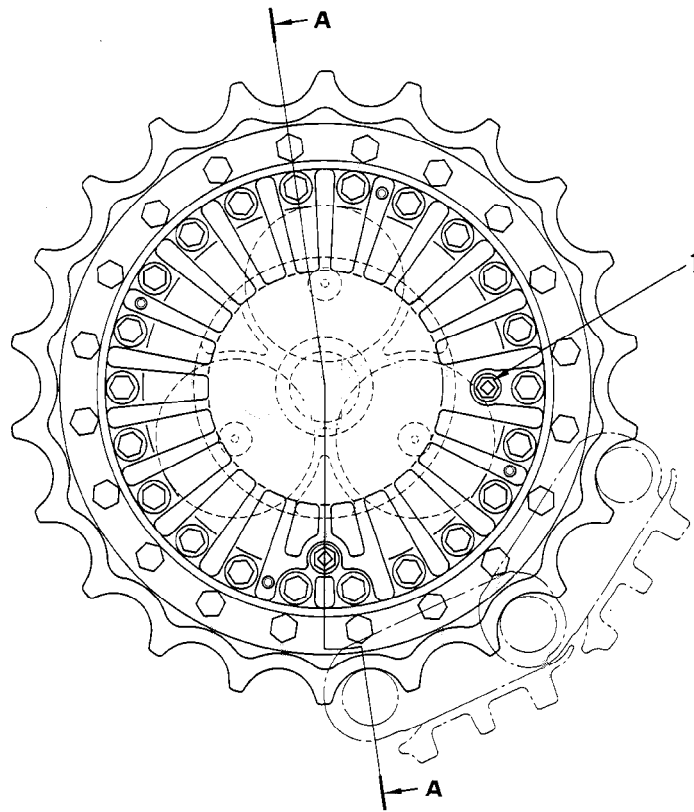
If directions are indicated in this manual, they refer to the directions shown by the arrows in the diagram above.

Machine Model	PC300LC-5	PC400LC-5
Serial Numbers	A30001 and up	A40001 and up
Track shoe assembly		
Triple shoe (600 mm)	3730	4760
Triple shoe (700 mm)	4090	5210
Triple shoe (750 mm)	4270	5440
Wide triple-shoe (800 mm)	4455	5600
Wide triple-shoe (850 mm)	4635	-
Wide triple-shoe (900 mm)	-	6110
Boom assembly	2357	2990
Arm assembly	981	1234
Bucket assembly	1014	1300
Boom cylinder assembly	293x2	400x2
Arm cylinder assembly	425	580
Bucket cylinder assembly	263	345
Link (large) assembly	320	397
Boom pin	76 + 15x2 + 56 + 17 + 42	93 + 20x2 + 73 + 24 + 54
Arm pin	13 + 17	17 + 24
Bucket pin	30x2	34x2
Link pin	27x2	38x2

10 STRUCTURE AND FUNCTION

ENGINE RELATED PARTS AND ENGINE MOUNT		TRACK FRAME AND RECOIL SPRING	
PC300LC	10-4	PC400LC	10-18
ENGINE RELATED PARTS AND ENGINE MOUNT		IDLER	
PC400LC	10-5	PC300LC	10-19
RADIATOR AND OIL COOLER		IDLER	
PC300LC	10-6	PC400LC	10-20
RADIATOR AND OIL COOLER		TRACK ROLLER	10-21
PC400LC	10-7	CARRIER ROLLER	10-21
FUEL TANK AND PIPING		TRACK SHOE	
PC300LC	10-8	PC300LC	10-22
FUEL TANK AND PIPING		TRACK SHOE	
PC400LC	10-9	PC400LC	10-23
POWER TRAIN	10-10	HYDRAULIC PIPING	10-25
FINAL DRIVE		HYDRAULIC CIRCUIT DIAGRAM	10-27
PC300LC	10-11	HYDRAULIC TANK	
FINAL DRIVE		PC300LC	10-29
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SWING CIRCLE		PC400LC	10-30
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SWING CIRCLE		(Open Center Load Sensing System) ..	10-31
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SWING MACHINERY		LINE OIL FILTER	10-52
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SWING MACHINERY		SWING MOTOR	10-66
PC400LC	10-16	CENTER SWIVEL JOINT	10-69
TRACK FRAME AND RECOIL SPRING			
PC300LC	10-17		

FINAL DRIVE PC300LC

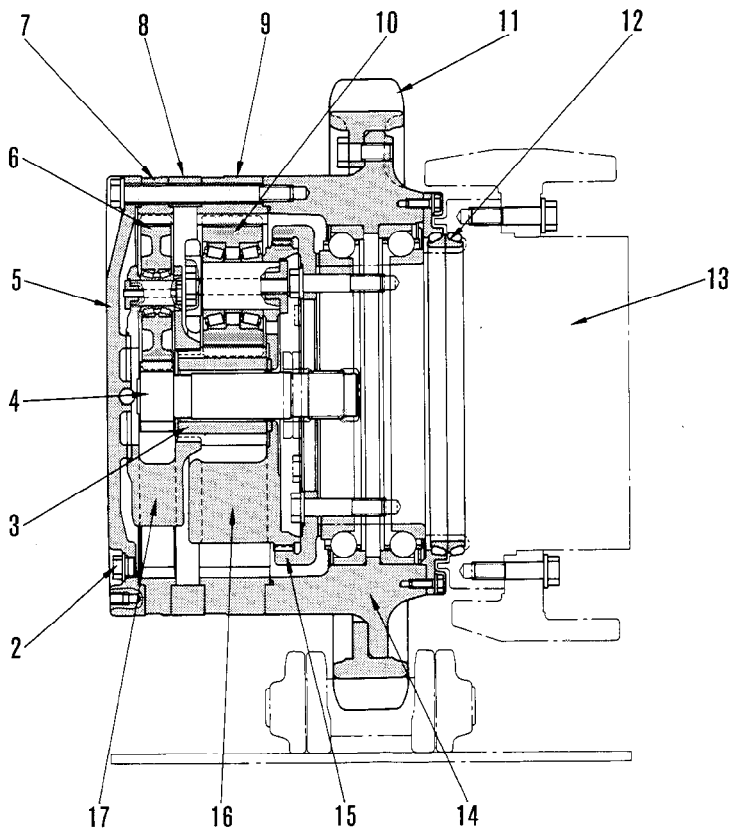


1. Level plug
2. Drain plug
3. No. 1 sun gear (13 teeth)
4. No. 2 sun gear (19 teeth)
5. Cover
6. No. 2 plant gear (30 teeth)
7. No. 2 ring gear (80 teeth)
8. Spacer
9. No. 1 ring gear (80 teeth)
10. No.1 planet gear (33 teeth)
11. Sprocket
12. Floating seal
13. Travel motor
14. Hub
15. Retainer
16. No. 1 planetary carrier
17. No. 2 planetary carrier

SPECIFICATIONS

Reduction ratio:

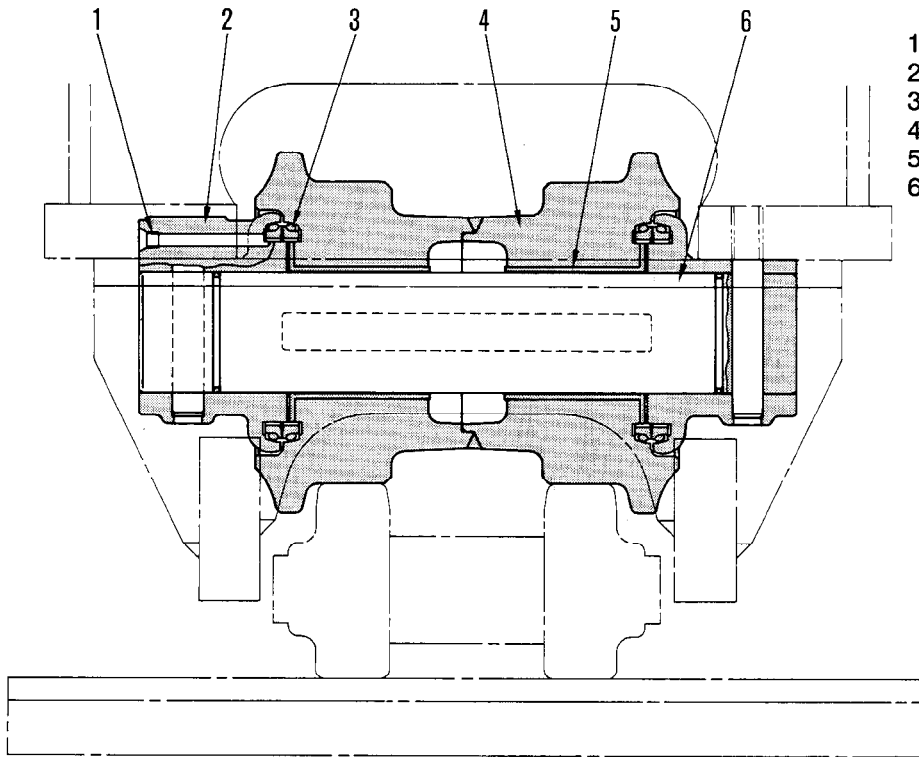
$$- \left(\frac{80+13}{13} \right) \times \left(\frac{80+19}{19} \right) + 1 = -36.275$$



Section A - A

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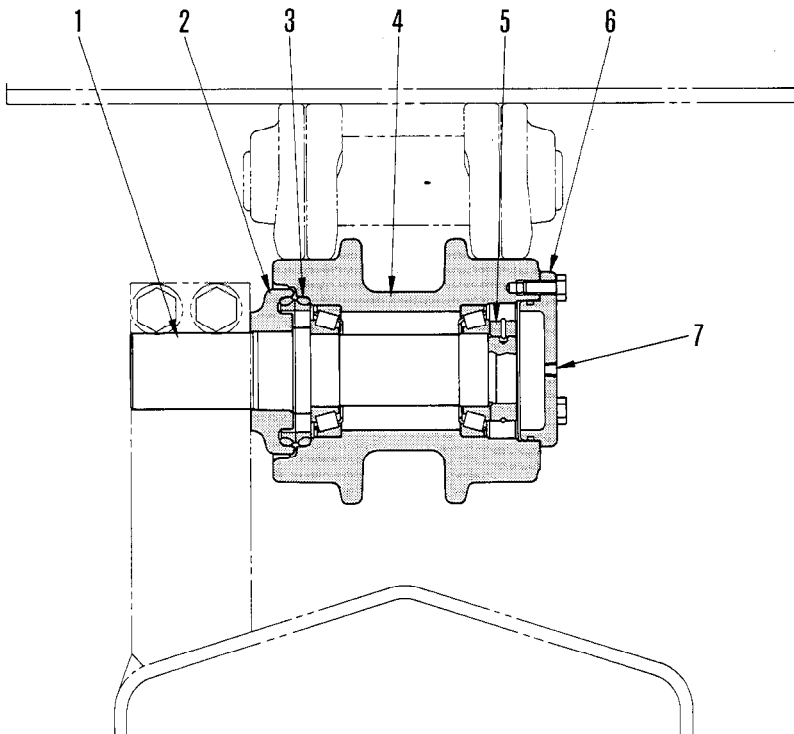
TRACK ROLLER



1. Lubricating plug
2. Collar
3. Floating seal
4. Track roller
5. Bushing
6. Shaft

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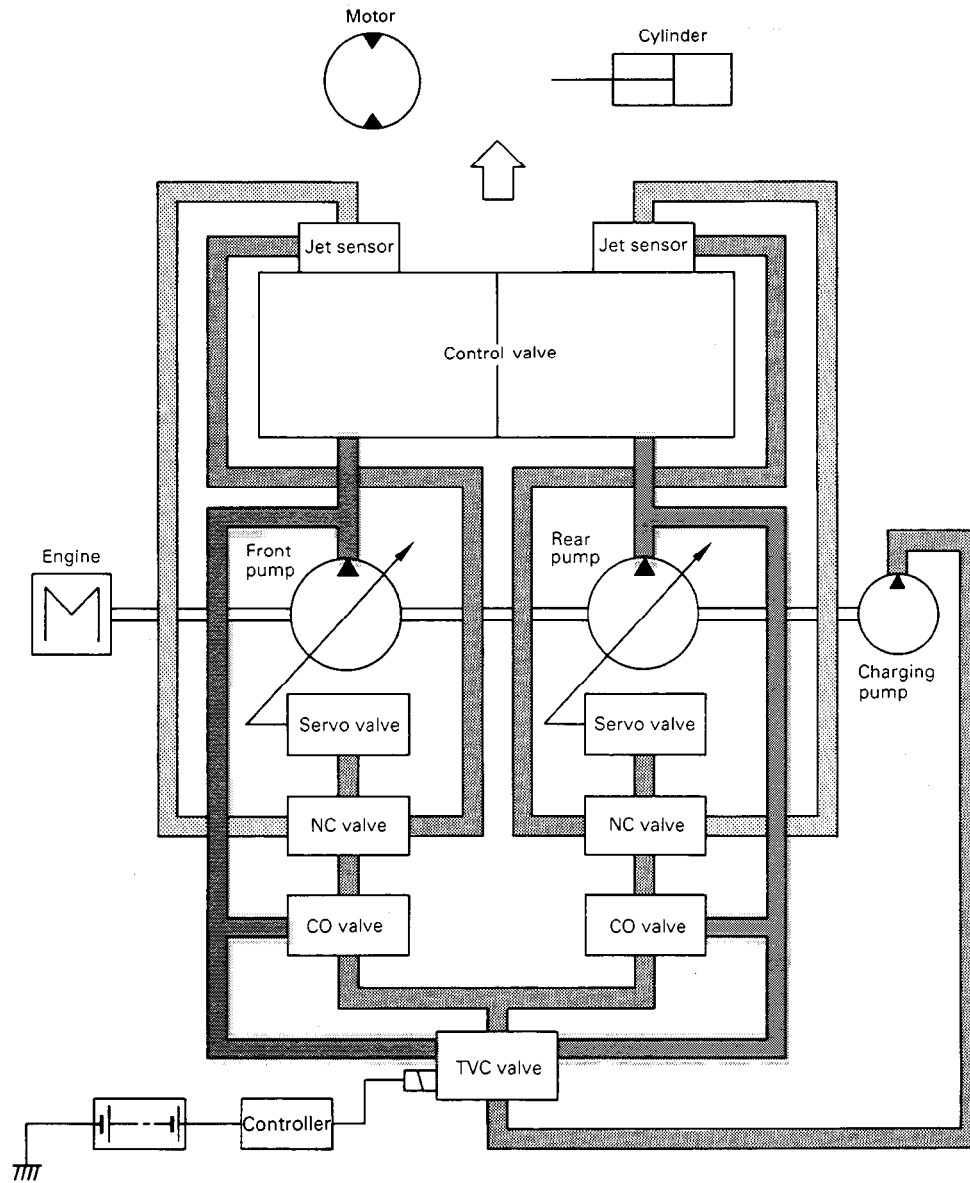
CARRIER ROLLER



1. Shaft
2. Collar
3. Floating seal
4. Carrier roller
5. Ring
6. Cover
7. Lubricating plug

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OLSS (Open Center Load Sensing System)

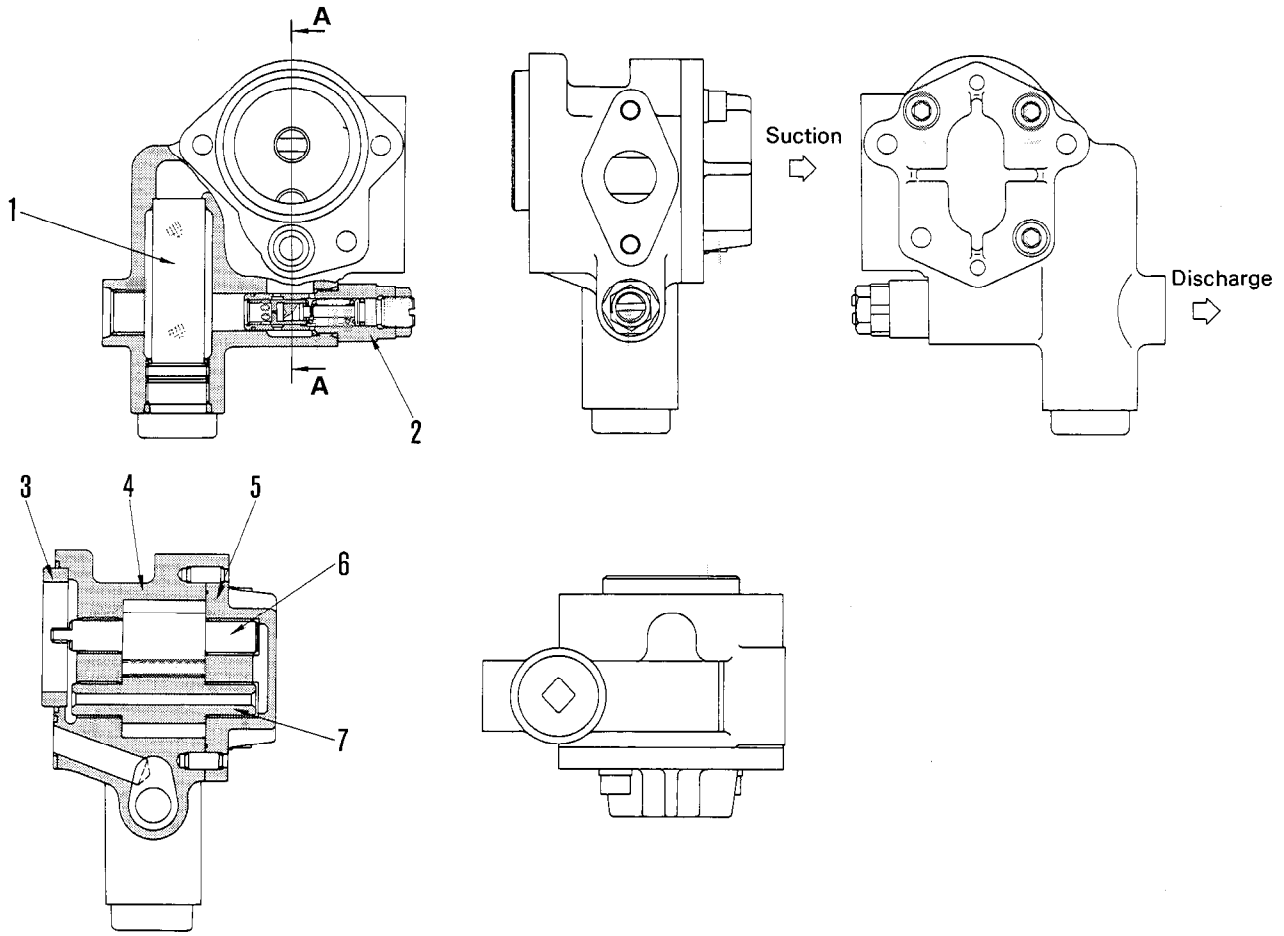


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OLSS (Open Center Load Sensing System) is an energy-saved system to reduce the fuel consumption by means of the swash plate angle (delivery) of the variable-displacement swash-plate type piston pump.

Therefore this system acts to reduce the hydraulic loss during operation, to increase the fine control and to control the pump delivery.

5. CHARGING PUMP



Section A - A

207F05021

1. Filter
2. Relief valve
3. Collar
4. Body
5. Housing
6. Drive gear
7. Driven gear

SPECIFICATIONS

Theoretical delivery: 32.3 cc/rev
Operating pressure: 30 kg/cm²

FUNCTIONS

- The travel shuttle valve is installed to the top of the four-spool valve control valve. It takes the PPC valve pressures from the left travel, work equipment, and swing and sends pilot pressure to the straight-travel valve when the travel and work equipment or swing are operated at the same time.

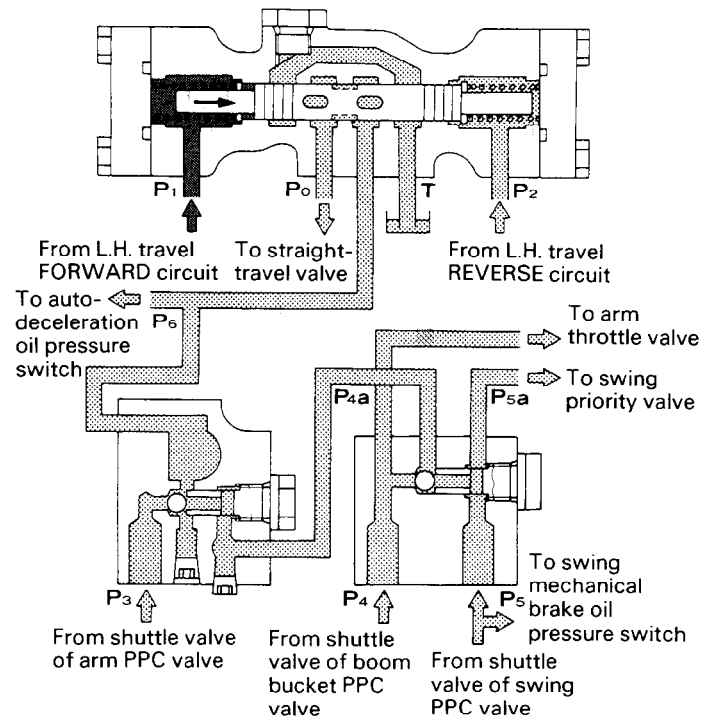
OPERATION

Travel lever at "FORWARD" (other levers at "NEUTRAL")

- Pilot pressure oil flows to **P1** port from the left travel circuit and pushes the spool to the right.

Therefore, ports **P3**, **P4**, **P5** and **P0** are connected through the groove in the spool and are also connected to the straight-travel valve. However, there is no flow of pilot pressure oil from the shuttle valves of the PPC valves, so the straight-travel valve is not actuated.

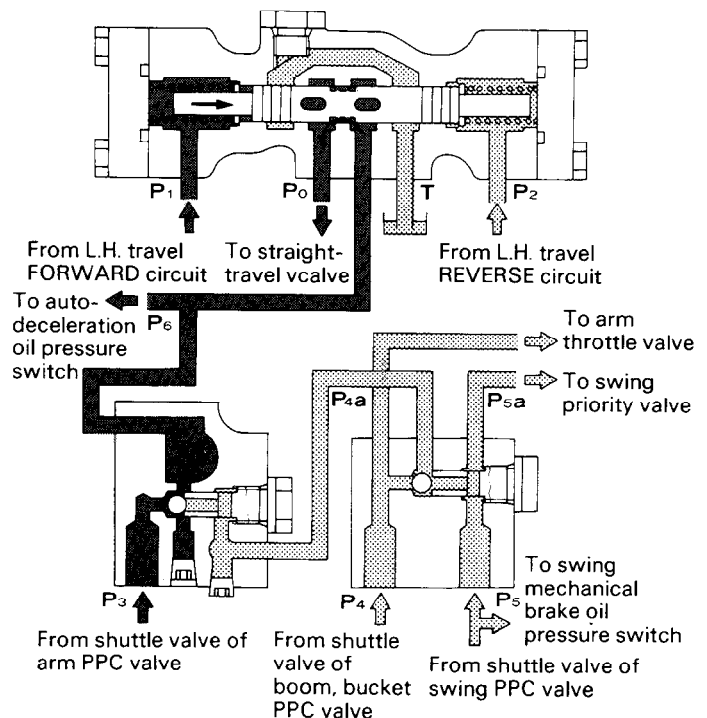
(When operating in "REVERSE", pressure oil is sent to port **P2** and pushes the spool to the left.)



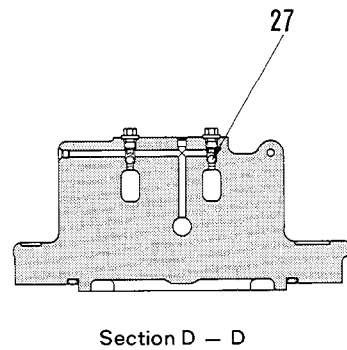
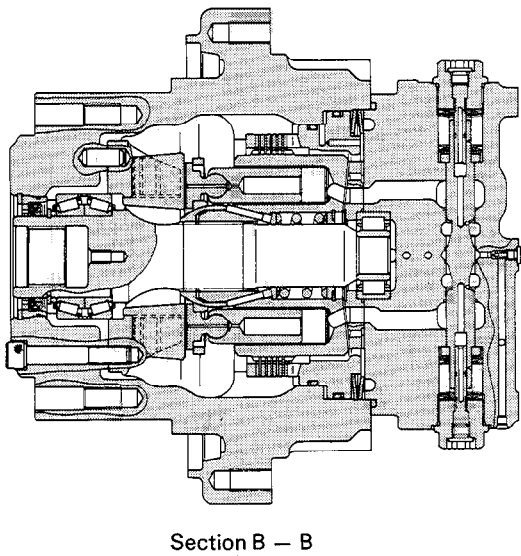
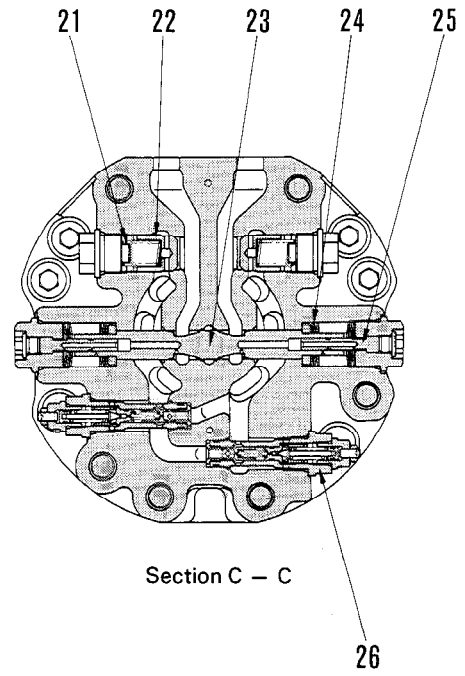
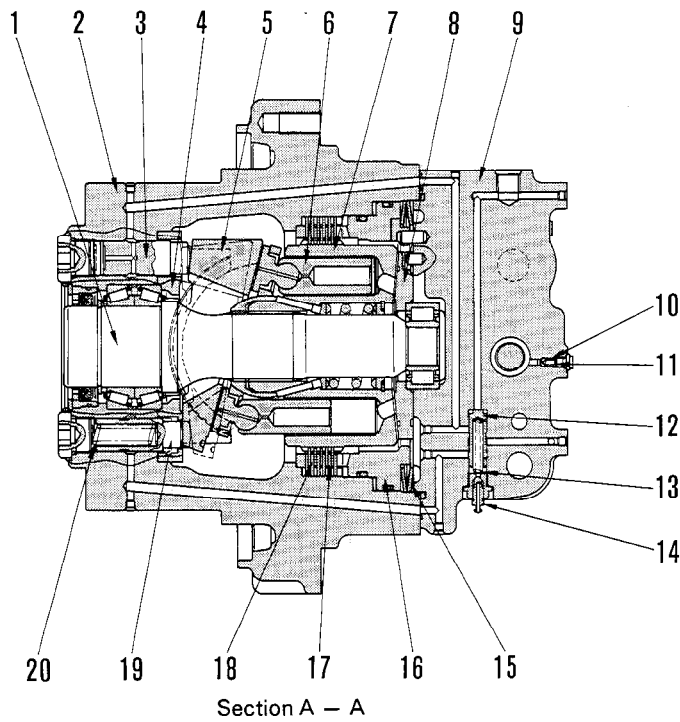
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During simultaneous operation

- When the arm and travel FORWARD are operated at the same time, pilot pressure oil flows from the left travel circuit to port **P1** and pushes the spool to the right.
- At the same time, when the arm is operated, pilot pressure oil flows to port **P3** from the shuttle valve of the arm PPC valve. This passes through the groove in the spool and port **P0** and then flows to the straight-travel valve.
- The pilot pressure oil from the shuttle valve of the swing PPC valve flows port **P5** → port **P0** → straight-travel valve and the pilot pressure oil from the shuttle valve of the boom and bucket PPC valves flows port **P4** → port **P0** → straight-travel valve.

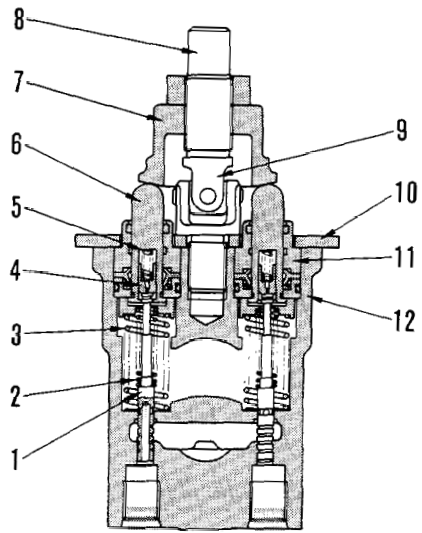


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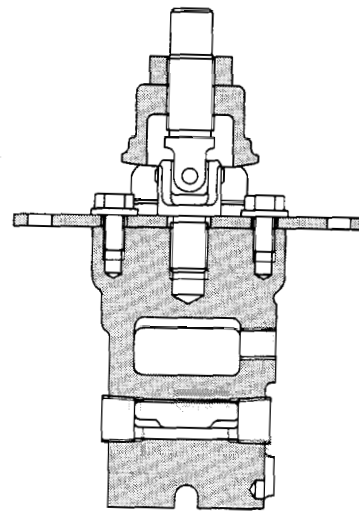


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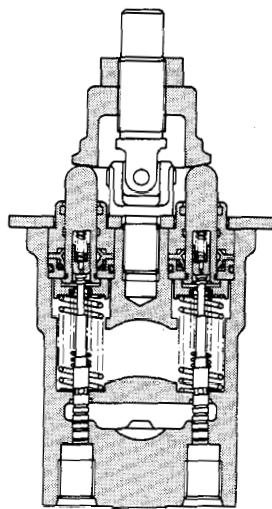
- | | | |
|---------------------|------------------------|--------------------------|
| 1. Output shaft | 10. Check valve | 19. Regulator piston |
| 2. Motor case | 11. Check valve spring | 20. Spring |
| 3. Regulator piston | 12. Regulator valve | 21. Check valve spring |
| 4. Cradle | 13. Spring | 22. Check valve |
| 5. Rocker cam | 14. Air bleeder | 23. Counterbalance valve |
| 6. Piston | 15. Brake spring | 24. Spool return spring |
| 7. Cylinder | 16. Brake piston | 25. Piston |
| 8. Valve plate | 17. Plate | 26. Safety valve |
| 9. End cover | 18. Disc | 27. Check valve |



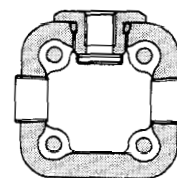
Section A - A



Section B - B



Section C - C



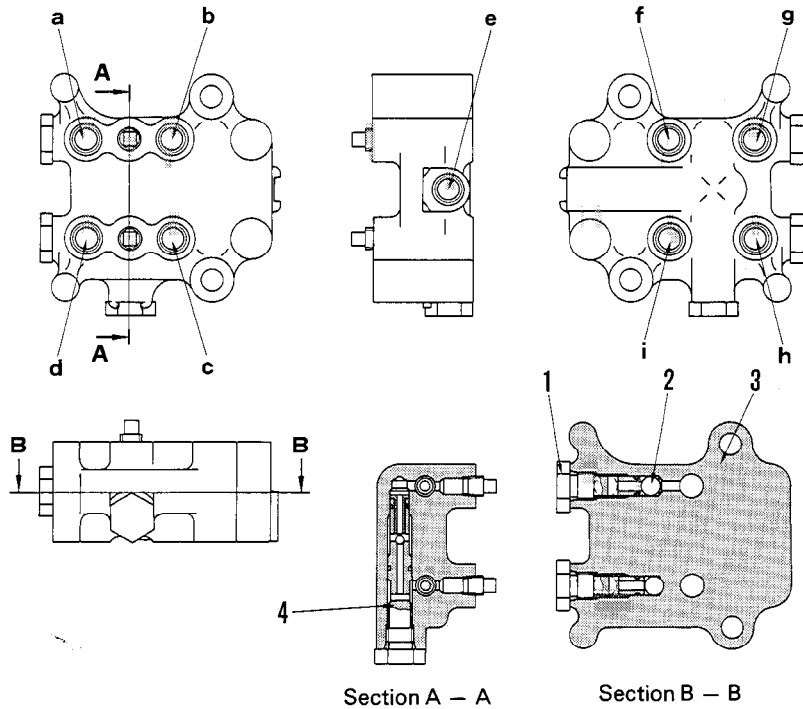
Section D - D

- 1. Spool
- 2. Metering spring
- 3. Centering spring
- 4. Pilot piston
- 5. Pilot spring
- 6. Piston

- 7. Disc
- 8. Lever
- 9. Joint
- 10. Plate
- 11. Collar
- 12. Body

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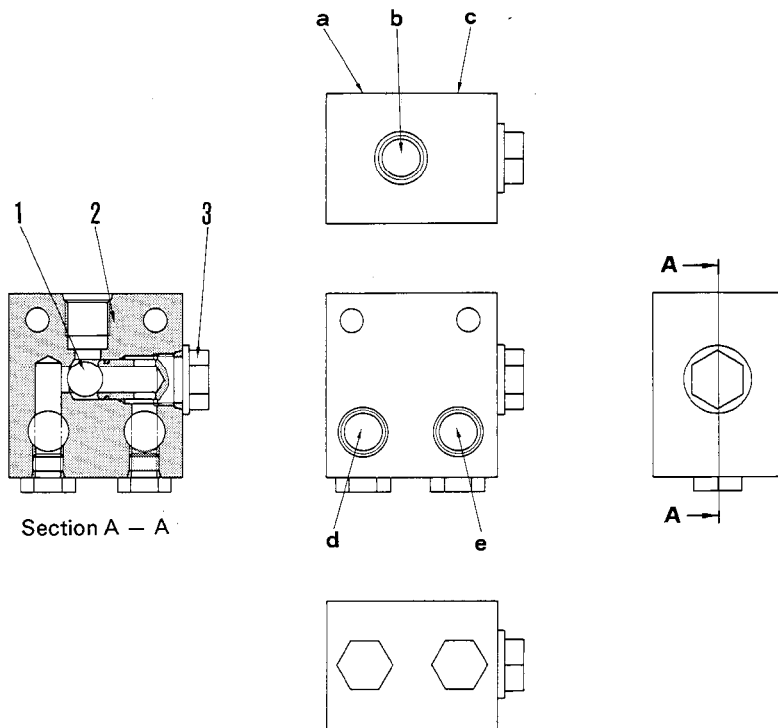
SHUTTLE VALVE FOR BOOM • BUCKET AND TRAVEL



- 1. Plug
- 2. Ball
- 3. Body
- 4. Plug
- a. P1A port (Bucket dump)
[R.H. reverse]
- b. P3A port (Bucket curl)
[R.H. forward]
- c. P4A port (Boom raise)
[L.H. forward]
- d. P2A port (Boom lower)
[L.H. reverse]
- e. P5 port (Travel shuttle valve)
[Travel oil pressure switch]
- f. P3B port (Bucket curl)
[R.H. forward]
- g. P1B port (Bucket dump)
[R.H. reverse]
- h. P2B port (Boom lower)
[L.H. reverse]
- i. P4B port (Boom raise)
[L.H. forward]
- (): For boom•bucket
[]: For travel

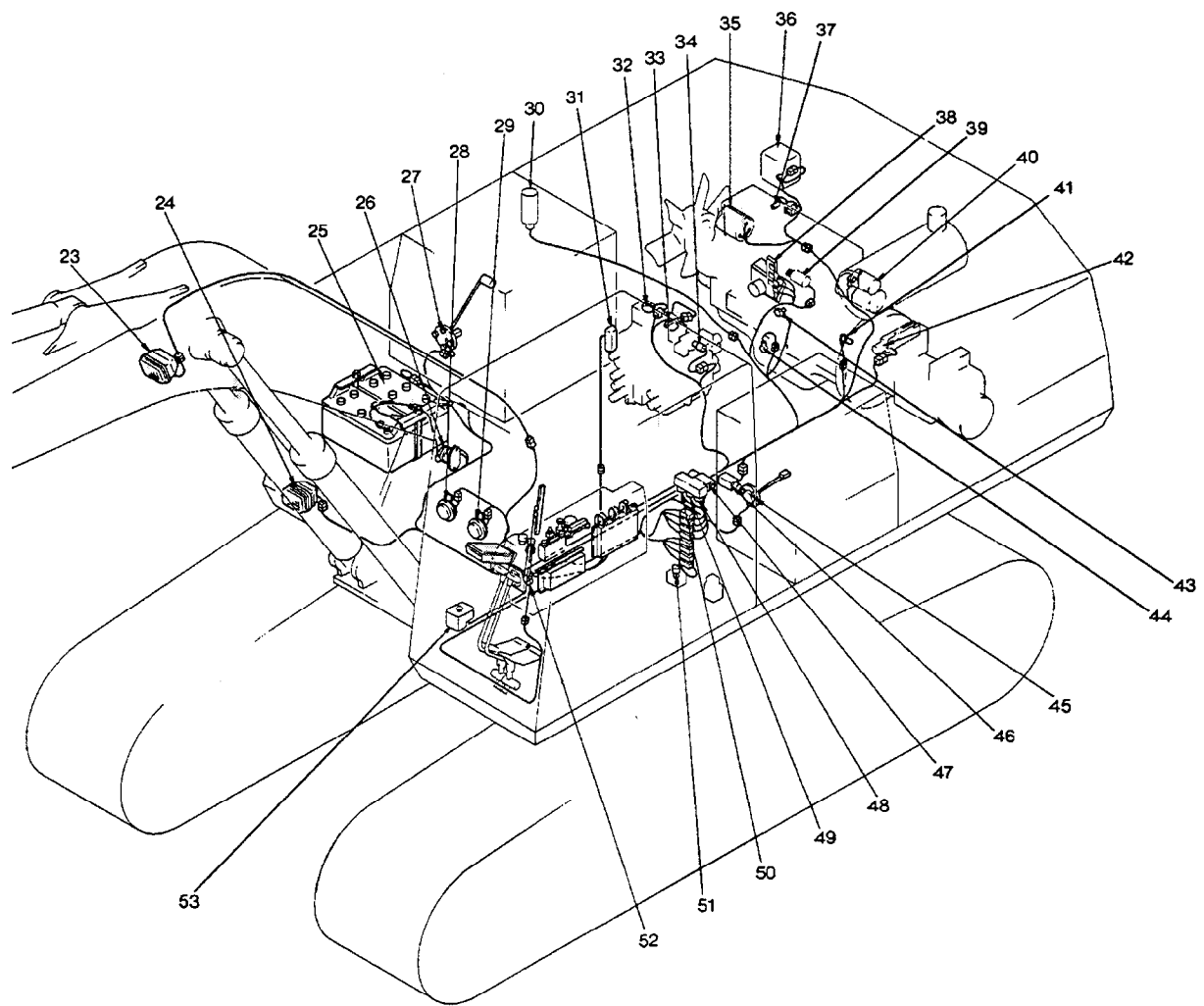
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FOR ARM AND SWING



- 1. Ball
- 2. Body
- 3. Plug
- a. P1A port (Arm out) [L.H. swing]
- b. P3 port (Travel shuttle valve)
[Blind plug]
- c. P2A port (Arm in) [R.H. swing]
- d. P1B port (Arm out) [L.H. swing]
- e. P2B port (Arm in) [R.H. swing]
- (): For arm, []: For swing

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08DD0030

- | | |
|--|-----------------------------------|
| 23. Working lamp | 40. Starting motor |
| 24. Head lamp | 41. Engine speed sensor |
| 25. Battery | 42. TVC valve |
| 26. Battery relay | 43. Engine oil pressure switch |
| 27. Fuel level sensor | 44. Engine oil level sensor |
| 28. Horn (Low tone) | 45. Hydraulic oil lever sensor |
| 29. Horn (High tone) | 46. Arm half flow solenoid valve |
| 30. Ether injector | 47. Swing brake solenoid valve |
| 31. Room lamp | 48. Travel speed solenoid valve |
| 32. Front pump pressure sensor | 49. 2-stage relief solenoid valve |
| 33. Rear pump pressure sensor | 50. CO cancel solenoid valve |
| 34. Work equipment swing oil pressure switch | 51. Travel oil pressure switch |
| 35. Alternator | 52. Wiper motor |
| 36. Coolant level sensor | 53. Washer motor |
| 37. Coolant temperature sensor | |
| 38. Governor motor | |
| 39. Shut off valve | |

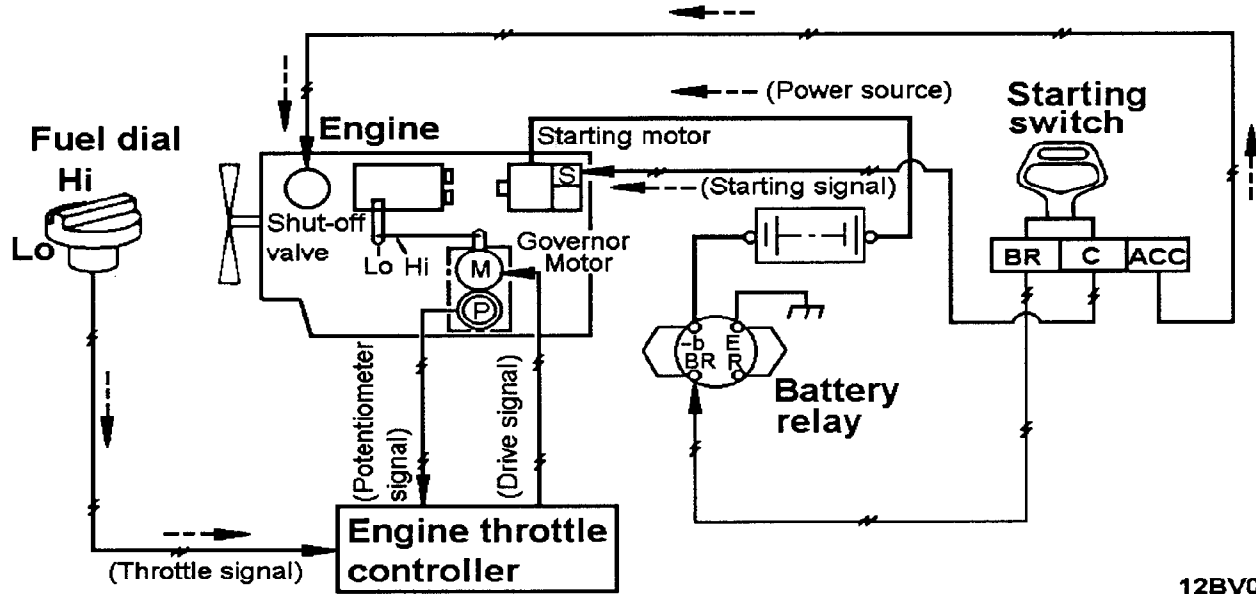
ELECTRICAL CIRCUIT DIAGRAM - Continued
PC400LC

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OPERATION OF SYSTEM

STARTING ENGINE

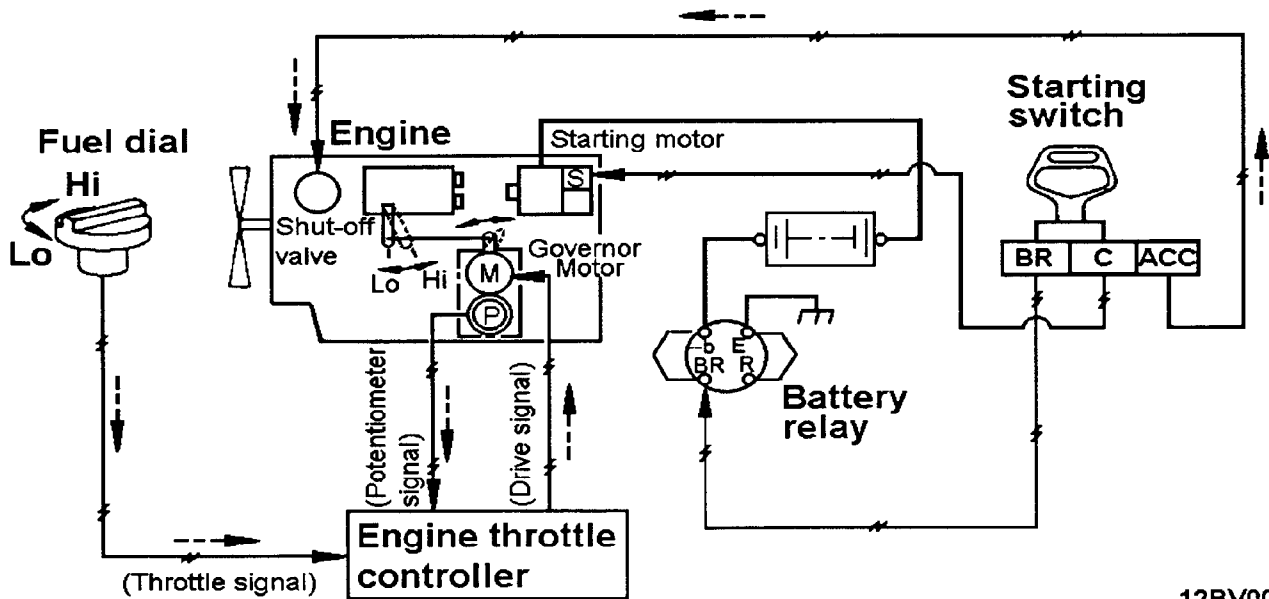
- When the starting switch is turned to the START position, the start signal flows to the starting motor and the starting motor turns to start the engine. Power also flows from the starting switch to the engine shutoff valve, energizing the valve and allowing fuel to flow to the engine. When this happens, the engine throttle controller checks the signal voltage from the fuel control dial and sets the engine speed to the set speed.



12BV0011

ENGINE SPEED CONTROL

- The fuel control dial sends a signal voltage to the engine throttle controller according to the position of the dial. The engine throttle controller calculates the angle of the governor motor according to this signal voltage and drives the governor motor so that it is set to that position. When this happens, it detects the operating angle of the governor motor using a potentiometer and observes the governor motor.



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CONTROL OF H MODE

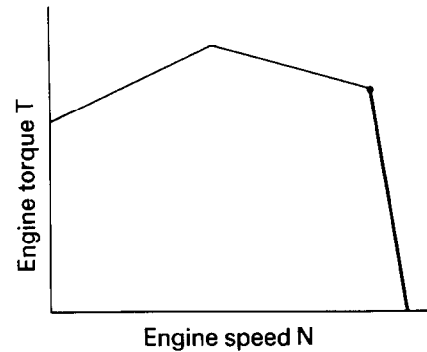
When using H.O, G.O, F.O or L.O. mode and H mode

- Working mode: Same for any mode
- Power set: H
- CO function: Actuated
- Pump absorption: At rated output horsepower:

PC300LC	PC400LC
207 HP/2,000 rpm	276 HP/2,000 rpm

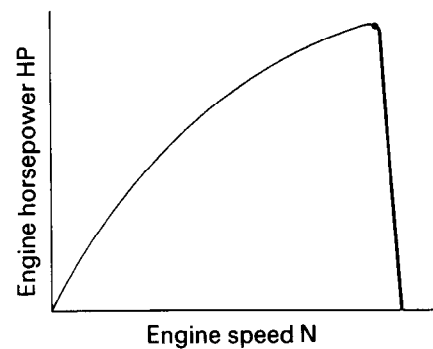
- When the pump controller receives the power set [H] signal from the monitor, it sends out an electric command for the H mode output setting to the engine throttle controller. The engine throttle controller receives this and uses the governor motor to set the engine governor lever to the FULL position.
- If the pump load becomes too high and the engine speed drops, the engine speed sensor reduces the pump discharge amount, and momentarily resets the engine speed to the rated point. In this way, the engine torque and pump absorption torque are always matched at the rated point and the engine horsepower can be used to the maximum.
- The CO (Cut-off) function is actuated and when it reaches near the relief pressure, the pump discharge amount is reduced to reduce hydraulic loss and power loss.

- Engine torque



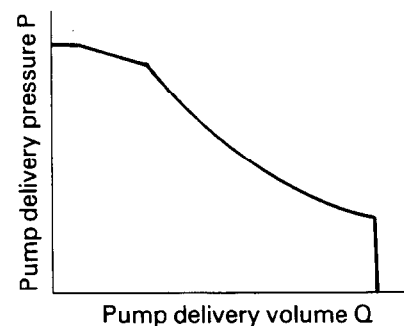
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- Engine horsepower



205F05123

- Main pump delivery



205F05124

★ **Quick warming up of hydraulic oil when swing lock switch is ON.** When the swing lock switch is turned ON, the CO function is canceled.

In this condition, if the work equipment is relieved, the hydraulic oil temperature can be raised quickly to reduce the time taken for warming up.

4) HALF FLOW MODE FUNCTION

When [F.O.] or [L.O.] is selected with the working mode switch the operation of the control valve for the arm Hi (acceleration) is stopped. The pumps actuating the boom and arm are separated, so the digging (finishing) operation is not affected by the load on the other circuit. This improves the fine control and finishing precision.

- Relationship between working mode and pump discharge volume (during independent operation).

%

Working mode	Actuator							
	Boom		Arm		Bucket	Swing	Travel	
	Raise	Lower	In	Out			L.H.	R.H.
H.O.	200	100	200	200	100	100	100	100
G.O.								
F.O.	200	100	100	200	100	100	100	100
L.O.								

★ The portion for one pump is taken as 100%.

★ When the arm is OUT and the bucket is operated simultaneously, the half flow mode does not function.

5) 2-STAGE RELIEF FUNCTION

When the power max. switch is pushed ON (Note 1), the 2-stage relief solenoid valve pilot pressure raises the set pressure of the main relief valve from 325 kg/cm² to 350 kg/cm² to increase the digging power.

	Power max. switch (Note 1)	
	ON	OFF
Main relief valve set pressure (kg/cm ²)	350	325

Note 1) This is only effective when the working mode switch is at [H.O.] or [G.O.].

1) PUMP CONTROL FUNCTION WHEN TRAVELING

When traveling, the following functions are actuated.

- If any of the working mode and power set are selected, the working mode and engine speed stay as they are and the power set only is switched to the equivalent of H mode.

★ For details see, ENGINE AND PUMP MUTUAL CONTROL SYSTEM.

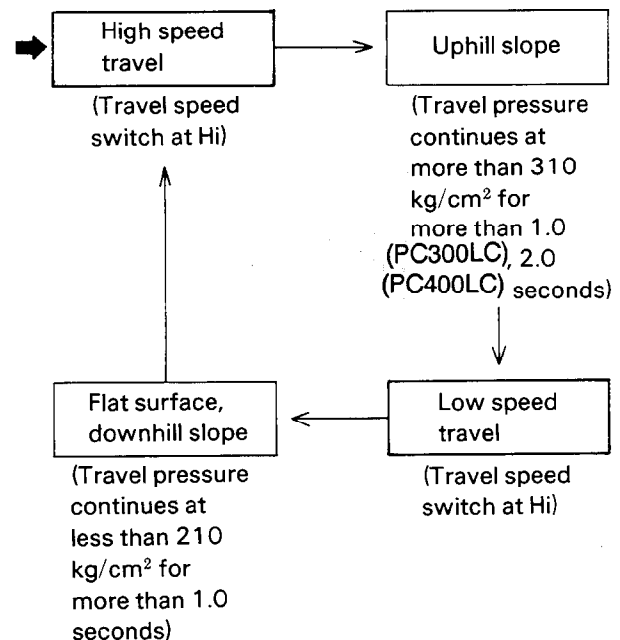
2) TRAVEL SPEED SWITCHING FUNCTION

The switching of the travel speed can be carried out manually or automatically, and has the following functions.

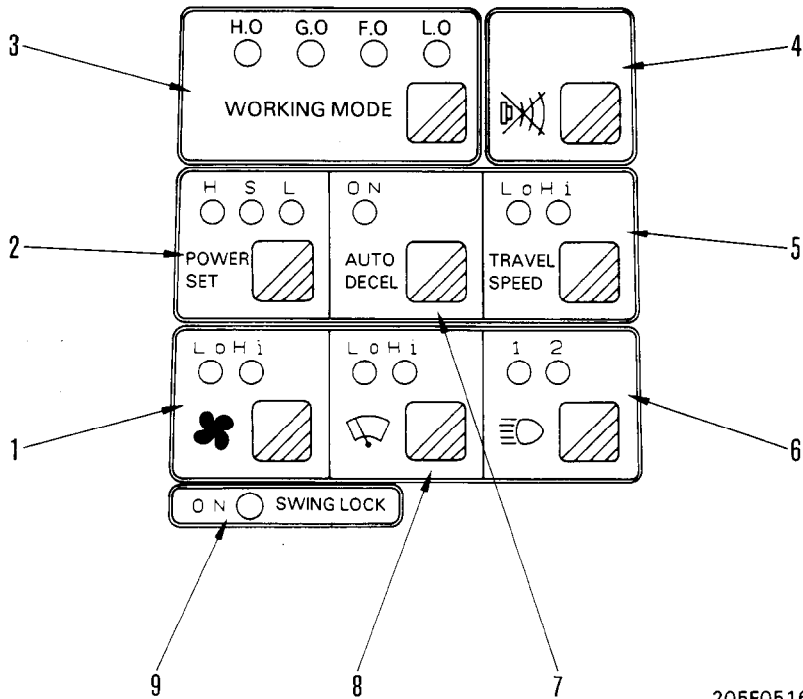
- When the travel speed switch is switched, the solenoid valve is switched. The action of the pilot pressure then changes the motor rocker cam angle and changes the travel speed.
- If the speed setting of the fuel control dial is set to less than approx. 1200 rpm:
 - When traveling in Lo, even if it is switched to Hi, the transmission is not shifted.
 - When traveling in Hi, the transmission is automatically shifted to Lo.

- Automatic switching between Hi and Lo according to pump discharge pressure. When traveling with the travel speed switch at Hi, if the machine travels up a slope and the pressure in the travel circuit goes above 310 kg/cm^2 for more than 1.0 second for the PC300LC, or 2.0 seconds for the PC400LC, the solenoid valve is deactivated (closed) and the travel speed is switched to Lo. If the machine continues to travel at Lo (with the travel speed switch still at Hi) and it comes again to flat ground or travels downhill, and the pressure in the travel circuit drops below 210 kg/cm^2 for more than 1.0 second, the solenoid is excited (opened) and the speed is switched again to high speed.

- ★ Detection of the pressure in the travel circuit when only the travel is being operated is made by sensing the pressure for both the front pump and the rear pump, and taking the higher value; for compound operations, only the sensor for the rear pump pressure is used.



2. SWITCH



1. Heater fan switch
2. Power set selection switch
3. Working mode selection switch
4. Buzzer cancel switch
5. Travel speed switch
6. Lamp switch
7. Auto-deceleration
8. Wiper switch
9. Swing lock lamp

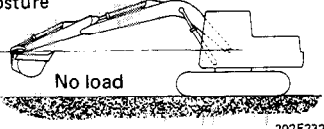
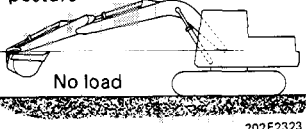
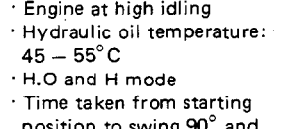
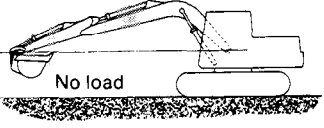
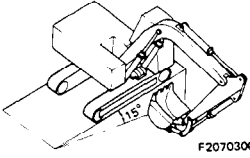
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- The switches consist of four mode selector switches and four electrical component switches; every time the switch is pressed, the condition of the machine changes. The present condition is displayed by the lighting up of the LED above the switch.

Switch actuation table

Item	Action
Working mode	G.O. → H.O. → L.O. → F.O.
Power set	S → H → L
Auto decel	ON → OFF
Travel speed	Lo → Hi
Fan	OFF → Lo → Hi
Wiper	OFF → Lo → Hi
Lamp	OFF → 1 → 2
Buzzer cancel	OFF → ON

- ★ The bold letters indicated the default values when the starting switch is turned ON.

Machine model				PC300LC	
Classification	Item	Measurement conditions	Unit	Standard value	Permissible value
Swing	Swing brake angle	Working equipment Max. reach posture  <small>202F2323</small> <ul style="list-style-type: none"> Engine at high idling Hydraulic oil temperature: 45 – 55°C Stop after swinging one turn and measure distance that swing circle moves (): Distance of movement on outside circumference of swing circle 	Deg. (mm)	Max. 78	Max. 88
	Time taken to start swing	Work equipment Max. reach posture  <small>202F2323</small> <ul style="list-style-type: none"> Engine at high idling Hydraulic oil temperature: 45 – 55°C H.O and H mode Time taken from starting position to swing 90° and 180° 	90°	3.4 ± 0.3	Max. 4.0
		Work equipment Max. reach posture  <small>202F2323</small> <ul style="list-style-type: none"> Engine at high idling Hydraulic oil temperature: 45 – 55°C H.O and H mode Time taken from starting position to swing 90° and 180° 	180°	5.0 ± 0.5	Max. 6.0
	Time taken to swing	Work equipment Max. reach posture  <small>202F2323</small> <ul style="list-style-type: none"> Engine at high idling Hydraulic oil temperature: 45 – 55°C H.O and H mode Swing one turn, and measure time taken to swing next 5 turns 	sec.	30 ± 2	Max. 36
	Hydraulic drift of swing	 <small>F20703006</small> <ul style="list-style-type: none"> Engine stopped Hydraulic oil temperature: 45 – 55°C Set machine on 15° slope, and set upper structure at 90° to the side. Make match marks on swing circle outer race and track frame. Measure distance that match marks move apart after 5 minutes. 	mm	0	0
Leakage from swing motor	<ul style="list-style-type: none"> Engine at high idling Hydraulic oil temperature: 45 – 55°C Swing lock switch ON Relieve swing circuit. 	ℓ/min	Max. 5	Max. 10	

● For Chassis PC400LC

★ The standard values and permissible values shown in this table are all values for H.O (heavy-duty operation) and H mode.

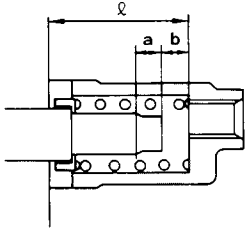
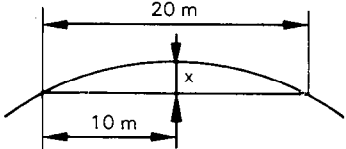
Machine model				PC400LC					
Classification	Item	Measurement conditions	Unit	Standard value			Permissible value		
Engine speed	At 1-pump relief	<ul style="list-style-type: none"> Hydraulic oil temperature: 45 – 55° C Engine oil pressure: Within operating range Coolant temperature: Within operating range 	rpm	2,100 ± 100			—		
	At 2-pump relief								
	Speed when auto-deceleration is actuated	<ul style="list-style-type: none"> Fuel control dial at MAX. Control lever at neutral 		1,600 ± 120			1,600 ± 120		
Spool stroke	Boom-Lo control valve	 <p>202F2302</p>	mm	l	a	b	l	a	b
	Boom-Hi control valve			—	11 ± 0.5	11 ± 0.5	—	11 ± 0.5	11 ± 0.5
	Arm-Lo control valve								
	Arm-Hi control valve								
	Bucket control valve								
	Swing control valve								
	Travel control valve								
Control levers travel	Boom control lever	<ul style="list-style-type: none"> Center of lever knob Read max. value to end of travel Engine stopped Except for neutral play 	mm	65 ± 10			Max. 75 Min. 55		
	Arm control lever			65 ± 10			Max. 75 Min. 55		
	Bucket control lever			65 ± 10			Max. 75 Min. 55		
	Swing control lever			65 ± 10			Max. 75 Min. 55		
	Travel control lever			120 ± 11			Max. 131 Min. 109		
	Play of travel lever			Max. 15			Max. 20		
Control levers operating force	Boom control lever	<ul style="list-style-type: none"> Engine at high idling Oil temperature: 45~55° C Fit push-pull scale to center of control lever knob to measure Measure max. value to end of travel 	kg	2.3 ± 0.6			Max. 3.8		
	Arm control lever			1.8 ± 0.5			Max. 3.0		
	Bucket control lever			1.8 ± 0.5			Max. 3.0		
	Swing control lever			2.3 ± 0.6			Max. 3.8		
	Travel control lever			Lever	3.0			Max. 4.8	
		Pedal	8.4 ± 2.1			Max. 13.4			

TABLE OF SPEEDS FOR S, L MODES

★ The values in this table are reference values for the speed of the work equipment, swing, and travel when switching from H.O and H mode to other modes

Classification	Item		Measurement condition	Unit	PC400LC			
					G.O+S mode	F.O+S mode	L.O+L mode	
Work equipment	Work equipment speed	Boom (Bucket teeth in contact with ground ↔ cylinder fully extended)	<ul style="list-style-type: none"> · Measure full stroke for each cylinder (for boom only, measure time taken to lower to the ground) · Set the machine on a flat horizontal surface. · No load in bucket · Engine at high idling · Hydraulic oil temperature: 45 – 55° C · When measuring boom: arm, bucket cylinders fully retracted · When measuring arm: top surface of boom horizontal bucket cylinder fully retracted · When measuring bucket: top surface of boom horizontal, arm cylinder fully retracted 	Sec.	RAISE	4.2 ± 0.4	4.2 ± 0.4	5.3 ± 0.5
					LOWER	3.2 ± 0.3	3.2 ± 0.3	3.4 ± 0.4
		IN			5.4 ± 0.5	9.7 ± 1.0	12.7 ± 1.3	
		OUT			4.1 ± 0.4	4.1 ± 0.4	4.4 ± 0.4	
		CURL			5.0 ± 0.5	5.0 ± 0.5	6.4 ± 0.6	
		DUMP			3.1 ± 0.3	3.1 ± 0.3	3.7 ± 0.4	
Swing	Time taken to swing		<ul style="list-style-type: none"> · No load in bucket · Swing one turn, then measure time taken to swing next two turns. 	Sec.	14.6 ± 0.7	14.6 ± 0.7	18.4 ± 0.9	
Travel	Travel speed		<ul style="list-style-type: none"> · Engine at high idling · Hydraulic oil temperature: 45 – 55° C · Raise track on one side at a time, rotate one turn, then measure time taken to rotate the next two turns. 	Lo	30.0 ± 1.5	30.0 ± 1.5	36.8 ± 1.8	
				Hi	16.2 ± 0.8	16.2 ± 0.8	20.2 ± 1.0	
	Travel deviation		<ul style="list-style-type: none"> · Amount of deviation when traveling 20 m as shown below ★ Us a hard horizontal surface.  <p style="text-align: center;">205F2402</p> <ul style="list-style-type: none"> ★ Measure dimension x 	mm	Max. 200			

Classification	Component	Connector No.	Inspection method	Judgment table	Measurement conditions																																																		
Monitor system	Monitor panel	GAUGE group		Table 3 (GAUGE group) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">Position of gauge display</th> <th>Display level resistance (kΩ) (Monitor panel input resistance)</th> </tr> <tr> <th colspan="2">Starting switch ON</th> <th>Starting switch OFF</th> </tr> </thead> <tbody> <tr> <td rowspan="14"> Measure resistance between coolant temperature gauge P1 (female) (6) - (3) </td> <td rowspan="7"> Right side ↑ Display position ↓ Left side </td> <td>All OFF</td> <td>Min. - Max. 0 - 0.7</td> </tr> <tr> <td>8</td> <td>0.5 - 3.245</td> </tr> <tr> <td>7</td> <td>3.015 - 3.665</td> </tr> <tr> <td>6</td> <td>3.419 - 4.222</td> </tr> <tr> <td>5</td> <td>3.946 - 5.092</td> </tr> <tr> <td>4</td> <td>4.764 - 6.248</td> </tr> <tr> <td>3</td> <td>5.844 - 7.713</td> </tr> <tr> <td>2</td> <td>7.086 - 10.17</td> </tr> <tr> <td>1</td> <td>9.455 - Disconnection</td> </tr> <tr> <td rowspan="7"> Right side ↑ Display position ↓ Left side </td> <td>10</td> <td>0 - 14.24</td> </tr> <tr> <td>9</td> <td>11.23 - 20.87</td> </tr> <tr> <td>8</td> <td>17.51 - 27.32</td> </tr> <tr> <td>7</td> <td>23.52 - 34.07</td> </tr> <tr> <td>6</td> <td>29.98 - 39.55</td> </tr> <tr> <td>5</td> <td>35.15 - 44.38</td> </tr> <tr> <td>4</td> <td>39.70 - 49.45</td> </tr> <tr> <td>3</td> <td>44.47 - 61.60</td> </tr> <tr> <td>2</td> <td>55.89 - 79.36</td> </tr> <tr> <td>1</td> <td>72.52 - 691.63</td> </tr> <tr> <td>All OFF</td> <td>611.82 - Disconnection</td> </tr> </tbody> </table>		Position of gauge display		Display level resistance (kΩ) (Monitor panel input resistance)	Starting switch ON		Starting switch OFF	Measure resistance between coolant temperature gauge P1 (female) (6) - (3)	Right side ↑ Display position ↓ Left side	All OFF	Min. - Max. 0 - 0.7	8	0.5 - 3.245	7	3.015 - 3.665	6	3.419 - 4.222	5	3.946 - 5.092	4	4.764 - 6.248	3	5.844 - 7.713	2	7.086 - 10.17	1	9.455 - Disconnection	Right side ↑ Display position ↓ Left side	10	0 - 14.24	9	11.23 - 20.87	8	17.51 - 27.32	7	23.52 - 34.07	6	29.98 - 39.55	5	35.15 - 44.38	4	39.70 - 49.45	3	44.47 - 61.60	2	55.89 - 79.36	1	72.52 - 691.63	All OFF	611.82 - Disconnection	1) Turn starting switch OFF, insert dummy resistance, or measure resistance (kΩ) (Monitor panel input resistance) 2) Turn starting switch ON, and check display. 3) Connect socket.
			Position of gauge display			Display level resistance (kΩ) (Monitor panel input resistance)																																																	
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Warming-up signal	P2	Measure resistance	If the condition is as shown in the table below, it is normal. <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>Coolant temperature below 10°C</td> <td rowspan="2">Between (11)-(16)</td> <td>Max. 1V</td> </tr> <tr> <td>Coolant temperature above 50°C</td> <td>8 - 12V</td> </tr> </tbody> </table>	Coolant temperature below 10°C	Between (11)-(16)	Max. 1V	Coolant temperature above 50°C	8 - 12V	1) Turn starting switch ON. 2) Insert T-adaptor.																																														
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TESTING AND ADJUSTING CHARGING PUMP PRESSURE

1. MEASURING

- ★ Oil temperature when measuring: 45-55°C.
- 1. Remove pressure pick-up plug (1) (Thread dia: 14mm, Pitch: 1.5mm) and install hydraulic pressure gauge C1 (60 kg/cm²).
- 2. Start the engine and measure with the engine running at high idling.
- ★ When measuring for internal leakage from equipment in the charging circuit, use the parts given below to shut off the following parts of the circuit when measuring the relief pressure.

No.	Selection of hydraulic circuit shut off	Equipment that can be inspected
1	Piston pump inlet port	Piston pump
2	Charging pump outlet port	Charging pump
3	Solenoid valve inlet port	Solenoid valve
4	Travel PPC valve inlet port	Travel PPC valve
5	L.H. PPC valve inlet port	L.H. PPC valve
6	R.H. PPC valve inlet port	R.H. PPC valve

- ★ Items No. 2 and below can be checked

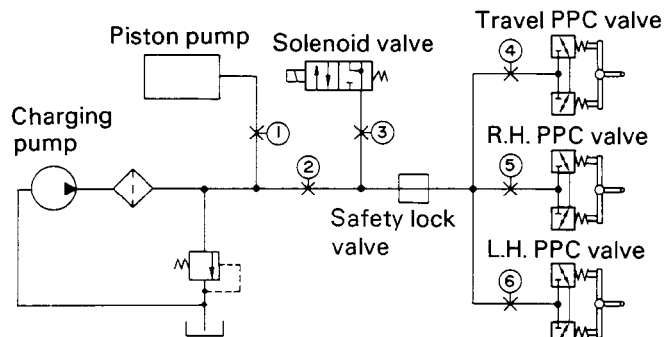
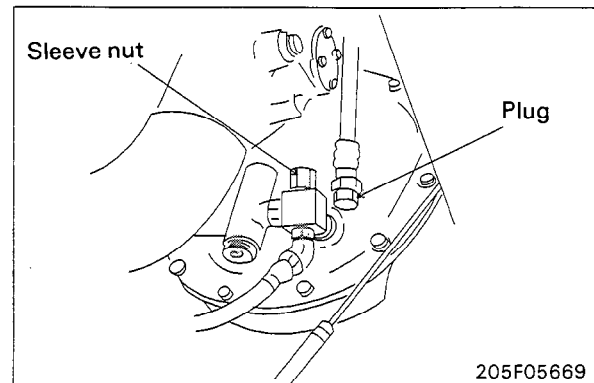
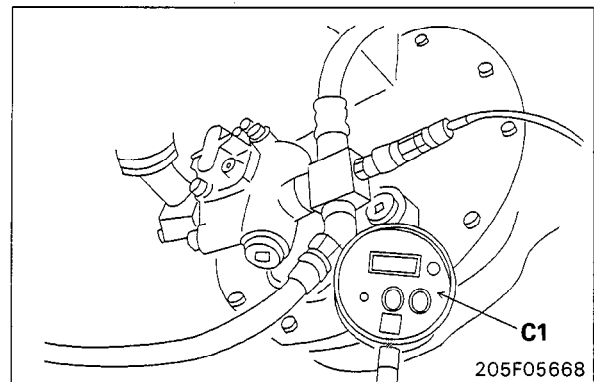
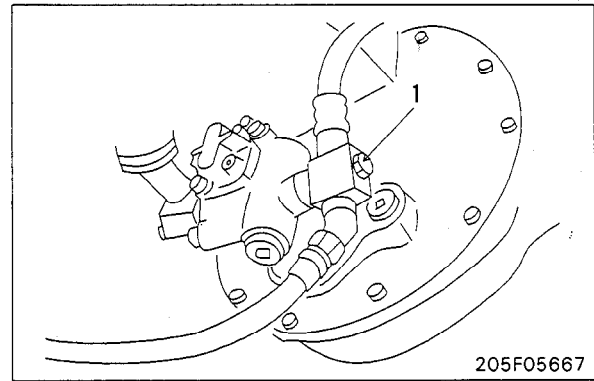
- ★ Items No. 2 and below can be checked if the equipment in the previous number is normal.

- ★ Use the parts given below to shut off the circuit.

- For elbow:
Sleeve nut:
07221-20315, 07221-20422,
07221-20520

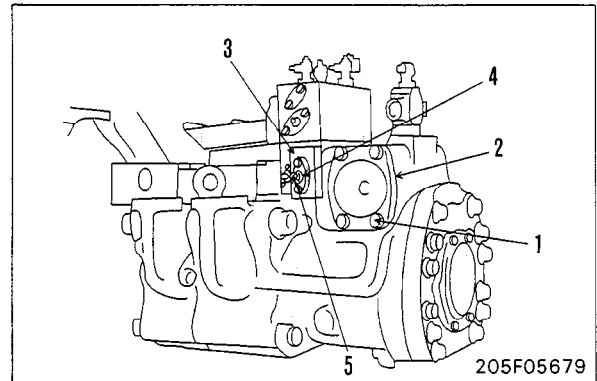
- Plug:
07222-50325, 07222-00414
07222-00515

- For hose:
Plug:
07376-50315, 07376-50422,
07376-50522

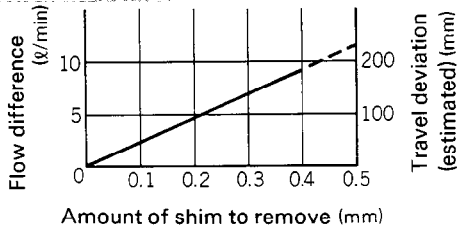


1. Shim adjustment procedure.

- i) Loosen 4 bolts (1).
 - ★ Split shims are used so it is not necessary to remove the bolts.
- ii) Remove the appropriate thickness of shim (2) to match the amount of deviation, then tighten bolts (1).
 - ★ Amount of deviation and amount of shim to remove.

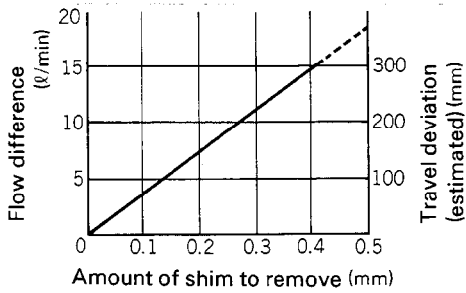


PC300LC




205F05680

PC400LC



205F05681

★ Do not remove more than 0.4mm of shim.

 Mounting bolt: 5.5±2 kgm.

2. Screw adjustment procedure.

- i) Loosen locknut (4) of servo valve (3).
- ii) Screw in adjustment screw (5) the appropriate amount to match the deviation, then tighten locknut (4).

Amount of travel deviation and amount to screw in.

2. BLEEDING AIR FROM HYDRAULIC CYLINDERS


1. Start the engine and run at low idling for approx. 5 minutes.
2. Run the engine at low idling, then raise and lower the boom 4-5 times in succession.
 - ★ Operate the piston rod to approx. 100mm before the end of its stroke.
Do not relieve the circuit under any circumstances.
3. Run the engine at high idling and repeat step (2). After that, run the engine at low idling and operate the piston rod to the end of its stroke to relieve the circuit.

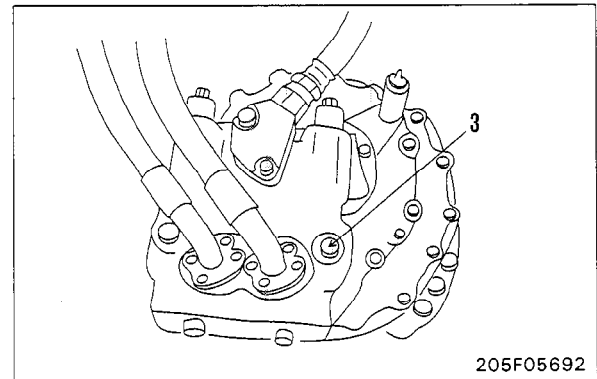
4. Repeat steps 2 and 3 to bleed the air from the arm and bucket cylinders.

★ If the hydraulic cylinder has been replaced, it is better to bleed the air before connecting the work equipment again.


(In particular, for the LOWER end of the boom cylinder, if it contacts the boom, the cylinder cannot be operated to the end of its stroke.)

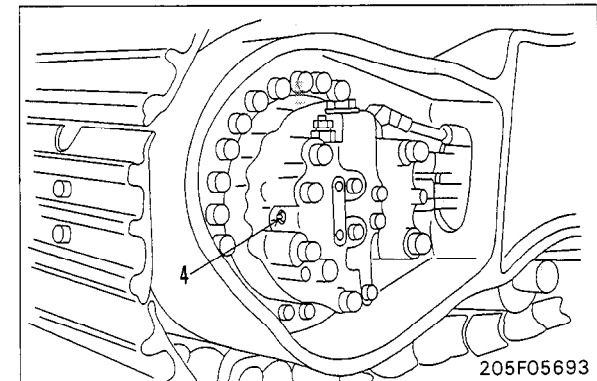
3. BLEEDING AIR FROM SWING MOTOR

1. Run the engine at low idling, loosen air bleed plug (3) and check that oil oozes out.
 - ★ If no oil oozes out from the air bleed plug:
2. Stop the engine and pour oil into the motor case from plug (3).
3. Tighten air bleed plug (3).
 Plug: 14.0 ± 2.0 kgm.

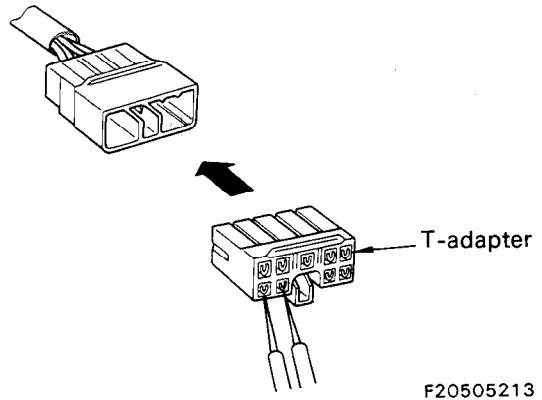


4. BLEEDING AIR FROM TRAVEL MOTOR

1. Run the engine at low idling, loosen air bleeder (4) when oil oozes out, tighten again.
 Bleeder: 0.9 ± 0.1

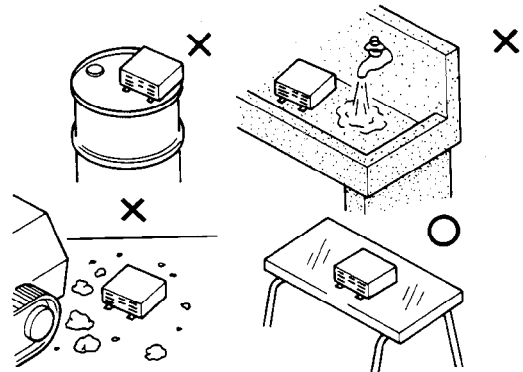
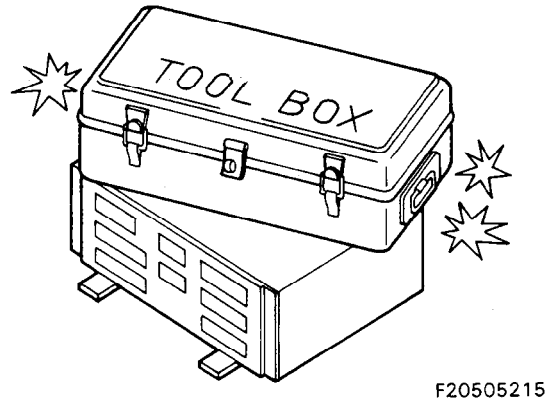
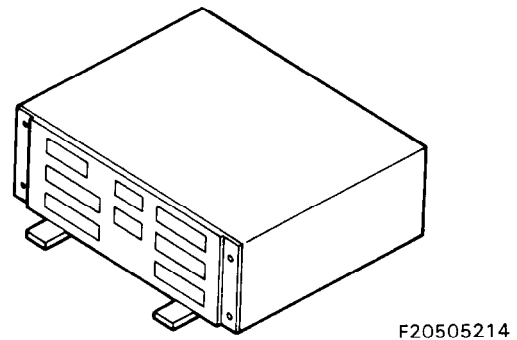


3. Carry out a continuity test on the connector. After drying, leave the wiring harness disconnected and carry out a continuity test to check for any short circuits between pins caused by water.
 - ★ After completely drying the connector, blow it with contact restorer and reassemble.



3) Handling control box

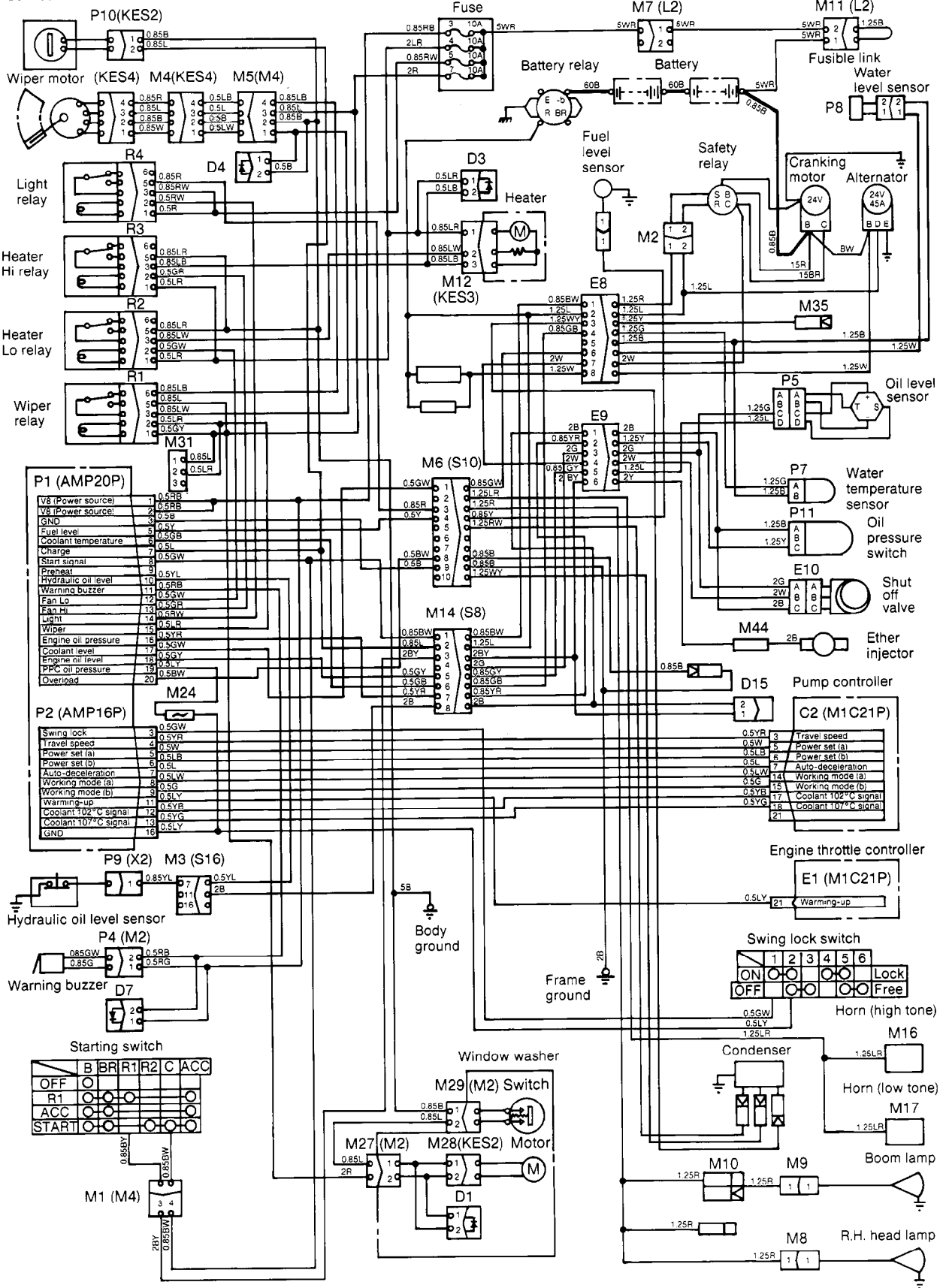
1. The control box contains a microcomputer and electronic control circuits. These control all of the electronic circuits on the machine, so be extremely careful when handling the control box.
2. Do not open the cover of the control box unless necessary.
3. Do not place objects on top of the control box.
4. Cover the control connectors with tape or a vinyl bag.
5. During rainy weather, do not leave the control box in a place where it is exposed to rain.
6. Do not place the control box on oil, water or soil or in any hot place, even for a short time. (Place it on a suitable dry stand.)
7. Precautions when carrying out arc welding. When carrying out arc welding on the body, disconnect all wiring harness connectors connected to the control box. Fit an arc welding ground close to the welding point.



MONITOR SYSTEM

PC300LC

Service meter



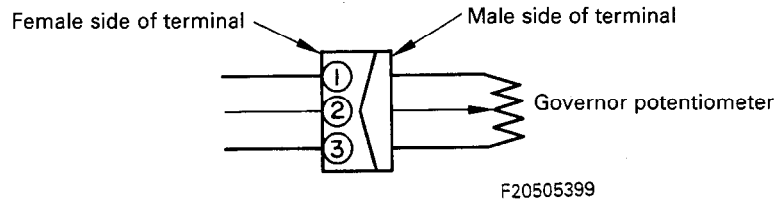
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CONNECTION TABLE FOR CONNECTOR

★ Display of male and female connectors.

All the displays of male and female show the mating portion at the terminal (pin) end. therefore, the diagram does not always match the male and female at the housing mating end.

In the circuit diagrams, the pointed side (the part inside the pointed line) as shown in the diagram below is the male side.

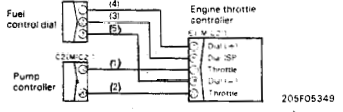
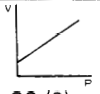


No. of pins	N-SLC CONNECTOR	
	Female connector	Male connector
2	<p style="text-align: right;">423F349</p>	<p style="text-align: right;">423F350</p>
3	<p style="text-align: right;">423F351</p>	<p style="text-align: right;">423F352</p>
4	<p style="text-align: right;">423F353</p>	<p style="text-align: right;">423F354</p>

The pump controller and engine throttle controller have a self-diagnostic function and if any electrical abnormality (disconnection, contact with ground, internal short circuit or short circuit between wires) occurs in the output signals (input signal for the receiving controller) for numbers ① - ⑨ in Fig. 1, the content of the abnormality is displayed.

- If 01 - 09 or 25 are displayed (if a short circuit or other fault causes a current above the specified level to flow to the controller, the controller stops the operation of that system).
- If 11 - 28 are displayed, there is a disconnection (the operation of that system stops) or there is contact of the No. 2 pin of the solenoid with the ground (the solenoid continues to operate).

Even if there is any abnormality in the input signal system for ① - ⑨, the abnormality is not displayed in the display area but the pump controller has a built-in monitor function to check the input signals. The controller starts to work only when there is an input signal and it gives a display on the display panel. Therefore, when investigating if the cause is in the electrical system or in the hydraulic or mechanical system in the case of "There is no abnormality display on the display panel but there is an abnormality in the movement of the unit", the first step when carrying out troubleshooting is to use the method of checking the operation of the electrical system in Item 2 to check if the necessary signal is being output to the pump controller correctly.

Display code	System with abnormality	Details of abnormality	Condition when normal (voltage, current, resistance values)	Action of controller when abnormality is detected	Symptoms shown by machine when there is abnormality
22	Throttle signal	1) Disconnection in wiring harness (1). 2) Wiring harness (1) in contact with ground 3) Disconnection in wiring harness (2). 4) Disconnection in wiring harness (3) or contact with ground 5) Disconnection in wiring harness (4) or contact with ground 6) Disconnection in wiring harness (5).  ★ In the case of 2), 4), 5), and 6), the engine throttle controller also show abnormality.	1. Between E1 (8) and (18) : (MAX) 0.25 – 4.75 V (MIN) : 5 ± 0.5V 3. Between C2 (10) and (20) : (MAX) 0.25 – 4.75 V (MIN)	It acts when the fuel control dial is set to MAX. If it is reset, it acts again in proportion to the movement of the fuel control dial. ★ However, the display does not disappear (disappears when power is turned OFF.) ★ In the case of 2), 4), 5), and 6), the engine throttle controller also shows abnormality.	1. In the case of 1) or 3), i) Operates normally when the fuel control dial is set to MAX. ii) When the fuel control dial is set to "partial", the power feels less than S mode although it is in H mode. 2. In case of 2), 4), 5), or 6), The engine speed does not change even when the fuel control dial is turned.
23 24	Pump pressure sensor signal	1) Defective pressure sensor 2) Disconnection in wiring harness between pressure sensor (3) pin and controller, or contact with ground 3) Disconnection in wiring harness between pressure sensor (1) pin and controller 4) Disconnection in wiring harness between pressure sensor (2) pin and controller, or contact with ground	 205F05350 1. Between C3 (6) and (1) : 0.5 – 4.5V 2. Between C7 (1) and (2) : 18 – 28V 3. Resistance value between C3 (female) (6) and (1), and between (6) and chassis : Min. 1 M Ω (Disconnect connector of pressure sensor and connector at C3 (male))	Operate with pressure at 0 kg/cm ² . If the abnormal place is reset, it operates normally. ★ However, the display does not disappear (disappears when power is turned OFF.)	1. Cannot carry out PEMC control in S or L mode (There is a horsepower difference between H, S, and L mode) 2. Travel speed does not change automatically (does not change from Hi to Lo) ★ Can be changed manually.
25	Pump pressure sensor power source	1) Defective pressure sensor 2) Wiring harness between pressure sensor (2) pin and controller in contact with ground	1. Min. 1 M Ω (Disconnect connector of pressure sensor and connector at C3 (male))	Operates with pressure at 0 kg/cm ² . When it detects an abnormality, it turns the output OFF; when all control levers are returned to neutral, it outputs again. ★ This automatic resetting is repeated up to three times.	Same as display 23
26	Engine speed sensor signal	1) Disconnection inside speed sensor (When the resistance inside the sensor has become extremely high) 2) Disconnection in wiring harness between speed sensor E7 (1) (2) pin and controller	Resistance value: 500 – 1000 Ω	1. Operates when the engine is at low idling. In other words, it judges that the engine speed is low, so it increases the current to the TVC solenoid. If it is reset during operation, it returns to normal. ★ However, the display does not disappear (disappears when power is turned OFF.) 2. When the sensor function has been lost because of disconnection inside the speed sensor, the speed sensor monitor on the controller does not flash.	The output pressure of the TVC valve drops, so the pump discharge pressure drops (the engine load becomes lighter), and the total speed becomes slower.
28	Auto-deceleration signal	1) Disconnection in wiring harness between controller C2 (19) and engine throttle controller E1 (11) 2) Wiring harness between C2 (14) and E1 (11) in contact with ground 3) When auto-deceleration is canceled, and voltage between C2 (19) and (21) drops below 7V.	1. Voltage between C2 (19) and chassis ● During deceleration: 0 – 1V ● When canceled: 8 – 12V 2. Resistance value between C2 (19) and chassis: Min. 1 Ω	It does not carry out any particular action. Therefore, if it is reset during operation, and all control levers are returned to neutral, the output starts again.	When the auto-deceleration switch on the panel is ON 1) When the engine speed has dropped to deceleration speed, it becomes FULL speed. Or, if the engine is running at FULL speed, the engine speed does not drop to deceleration speed even when the levers are placed in neutral. 2) Even when the levers are operated, deceleration is not canceled.
29	Overheat signal	When voltage between controller C2 (17), (18) – (8) is below 1V (when engine is overheating and monitor panel gives coolant temperature warning)	1. Voltage between C2 (17) and chassis, and between (18) and chassis ● When normal: 10 – 13V ● When overheat signal is given: 0 – 2V	1. When 102°C signal is input: No. 2 throttle circuit outputs L mode speed command to engine throttle controller 2. When 107°C signal is input: No. 2 throttle circuit outputs low idling command to engine throttle controller.	1. In the case of 1), it becomes L mode (controller display also becomes L) 2. In the case of 2), the engine speed becomes low idling.
All off	Power source	1) Power source is not input 2) When voltage is more than 38V or less than 19V.	Voltage: 20 – 30V	All functions stop, but when the power source voltage becomes normal, the functions return to normal. ★ The display also becomes normal	1. Upper structure does not swing because swing brake is not released. 2. Current of TVC solenoid becomes 0. (If the load is high, the drop in engine speed is large, and the engine may stall) 3. Travel speed is not switched. 4. Engine speed does not go down to deceleration speed.
●	Only dot lights up	Self-diagnostic check inside controller (cannot be measured from outside)	—	Except for swing brake circuit, all functions stop. ★ However, TVC solenoid only gives a fixed output of approx. 0.7A.	Apart from swing brake and TVC solenoid, same as above.

POINTS TO REMEMBER WHEN CARRYING OUT TROUBLESHOOTING ON ENGINE THROTTLE CONTROLLER SYSTEM

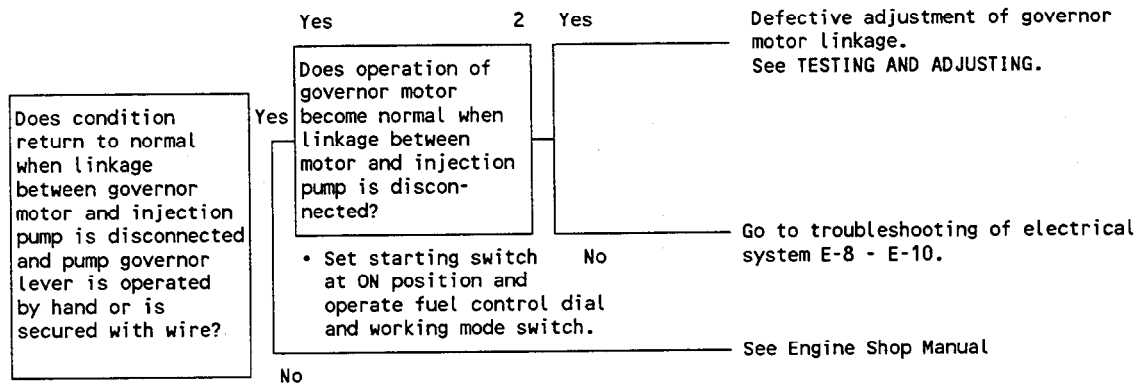
The engine on the PC300LC and PC400LC is controlled by an engine throttle controller. The problems that may arise with this system are as follows.

1. Low idling speed is too high (low).
2. High idling speed is too low.
3. Auto-deceleration speed is too high (low).
4. Automatic warming-up speed is too high (low).
5. There is hunting.
6. Engine does not stop.

If an abnormality occurs and the abnormality is displayed by the self-diagnostic display, use the charts to go to the applicable troubleshooting flowchart G-1 - G-7. However, if there is no self-diagnostic display and there is an abnormality in the machine, it is necessary to determine if the problem is in the mechanical system or in the electrical system.

For example, if there is defective adjustment of the linkage between the governor motor and injection pump, the above problems 1 - 6 may occur.

Therefore, if any of the above problems 1 - 6 occurs, carry out the following troubleshooting procedure.



If the engine does not stop, push the governor lever to the STOP position and check if the engine stops.

After disconnecting or adjusting the linkage as shown above, go to the troubleshooting flow chart for the mechanical system or electrical system.

★ For details of the procedure for adjusting the linkage, see TESTING AND ADJUSTING.

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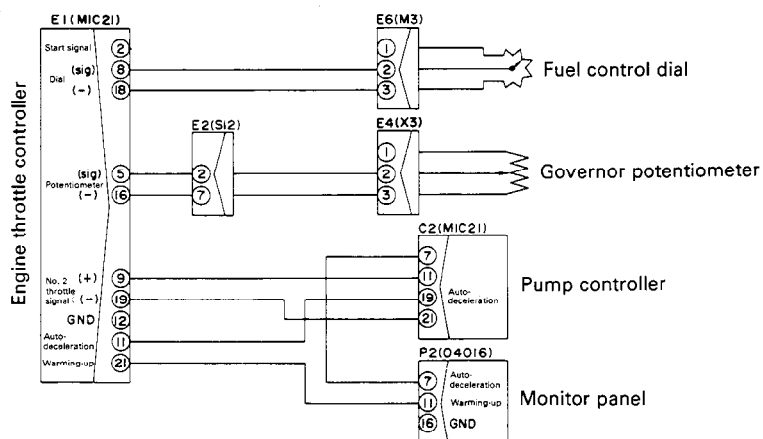
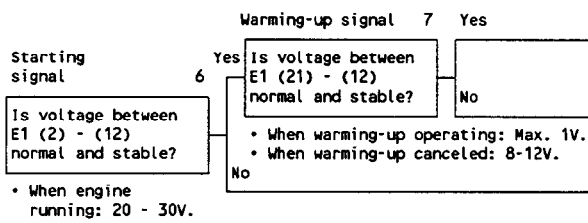


- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

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Cause	Remedy
Defective engine throttle controller	Replace
Defective pump controller	Replace
Contact of wiring harness between E1 (female) (9), (19) – C2 (female) (11), (21)	Repair or replace
Disconnection in wiring harness between E1 (female) (9), (19) – C2 (female) (11), (21)	Repair or replace
Wiring harness between E1 (female) (9), (19) – C2 (female) (11), (21) in contact with ground	Repair or replace

	Cause	Remedy
	Defective injection pump	See Engine Shop Manual
	Defective governor motor	Replace
	Refer to E-11	
	Refer to P-19	
	Refer to E-6	
	Refer to E-4	
	Refer to E-5	
	Defective adjustment of governor motor linkage	Adjust
	Defective injection pump	See Engine Shop Manual



C-3 [03] [SHORT CIRCUIT IN ARM HALF FLOW SOLENOID VALVE SYSTEM] IS DISPLAYED

- ★ If the starting switch is turned OFF after the abnormality occurs, turn the starting switch ON, set the working mode switch to F.O. mode and check that the display is [03]. (If it is not displayed, the system has been reset.)
- ★ Before carrying out troubleshooting, check that all the related connectors are properly inserted.
- ★ Always connect any disconnected connectors before going on to the next step.

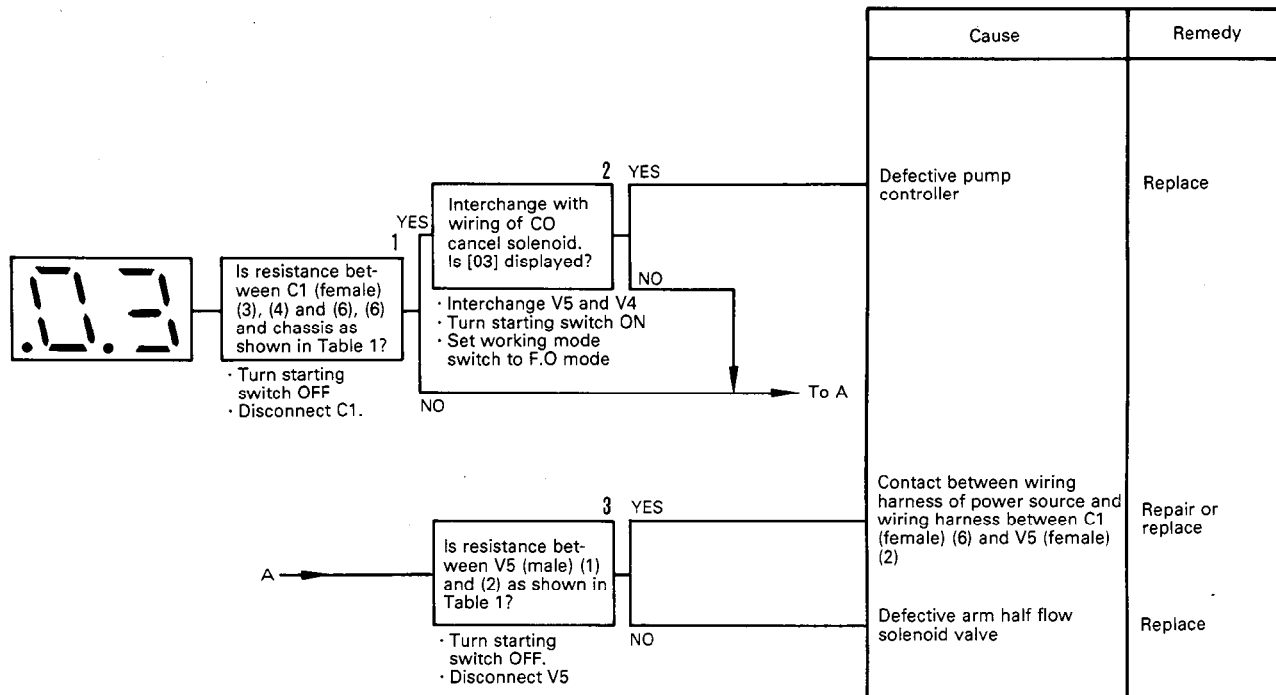
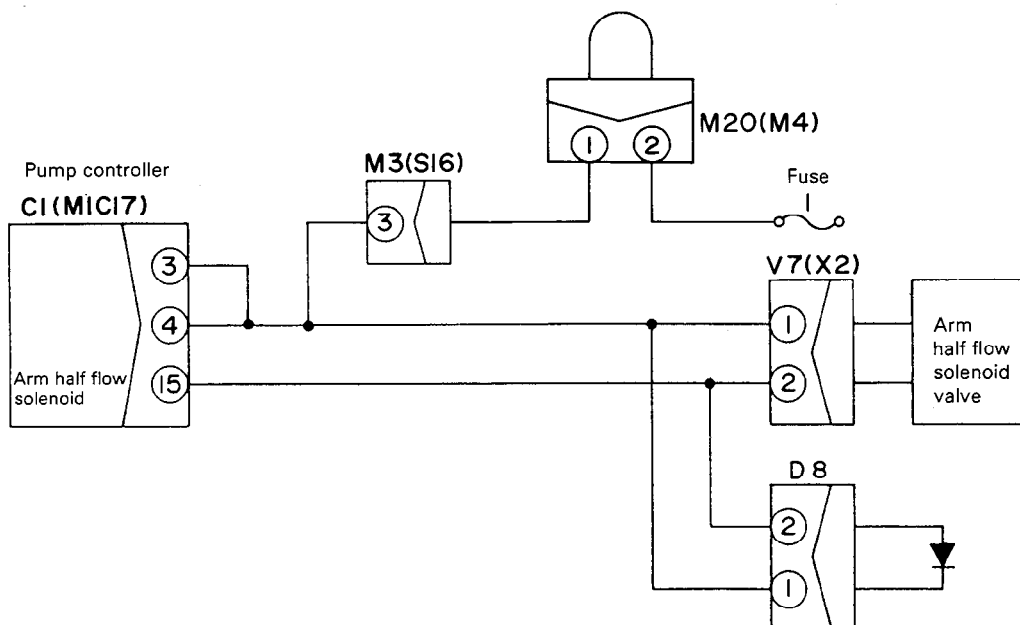


Table 1.

C1 (female)	V5 (lamp)	Resistance value
Between (3), (4) and (6)	Between (1) and (2)	10 - 35Ω
Between (6) and chassis	Between (2) and chassis	Min. 1MΩ



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C-13 [17] [DISCONNECTION IN CO CANCEL SOLENOID VALVE SYSTEM] IS DISPLAYED

- ★ If there is a disconnection in the solenoid or wiring harness, the solenoid is not actuated.
If pin (2) of the solenoid is short circuiting with the ground, the solenoid stays actuated.
- ★ If the starting switch is turned OFF after the abnormality occurs, turn the starting switch ON, then turn the swing lock switch ON and check that the display reads [17]. (If it is not displayed, the system has been reset.)
- ★ If [17] is displayed, start the engine and if there is no difference in the digging force between when the swing lock switch is ON and when the swing lock switch is OFF, start troubleshooting from "A" in the flow chart below.
- ★ Before carrying out troubleshooting, check that all the related connectors are properly inserted.
- ★ Always connect any disconnected connectors before going on to the next step.

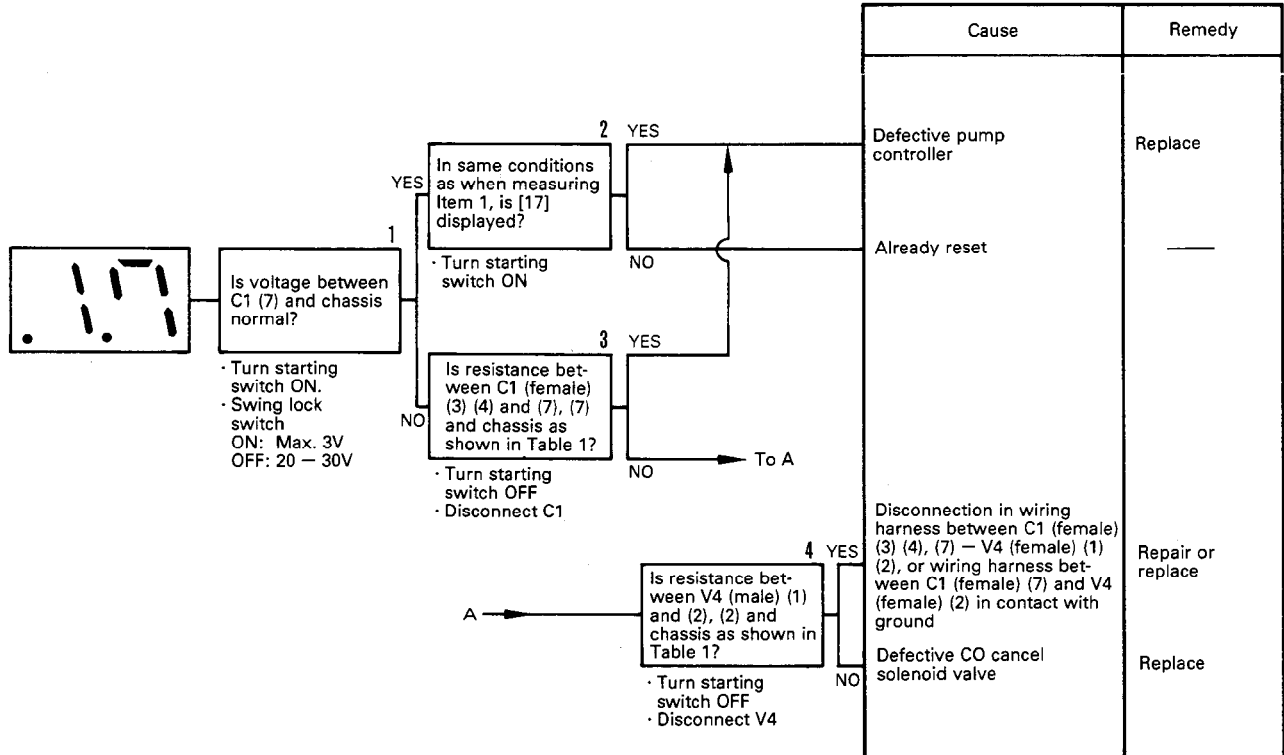
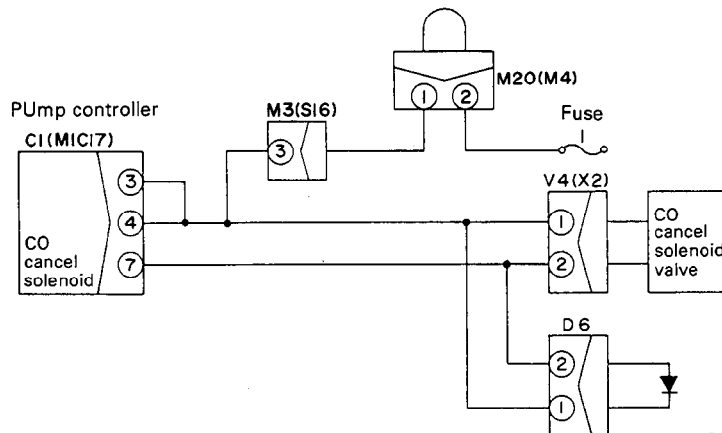


Table 1

C1 (female)	V4 (male)	Resistance value
Between (3), (4) and (7)	Between (1) and (2)	50 - 100Ω
Between (7) and chassis	Between (2) and chassis	Min. 1MΩ



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Cause	Remedy
Defective pump controller	Replace
Already reset	—
Defective front pump pressure sensor	Replace
Defective rear pump pressure sensor	Replace
Defective pump controller	Replace
Disconnection in wiring harness or contact with ground between <ul style="list-style-type: none"> · C3 (female) (1) and C8 (female) (1) · C3 (female) (3) and C7, C8 (female) (2) · C3 (female) (2) and C7 (female) (1) 	Repair or replace

F-4 PUMP CONTROLLER MONITOR DOES NOT DISPLAY [Hi] OR [Lo] [TRAVEL SPEED SWITCH]

- ★ After starting the engine and switching the travel speed switch to Hi or Lo, it is displayed for approx. 1 second.
- ★ If the monitor panel display is normal (if the panel display is not normal, go to P-19).
- ★ Before carrying out troubleshooting, check that all the related connectors are properly inserted.
- ★ Always connect any disconnected connectors before going on the next step.

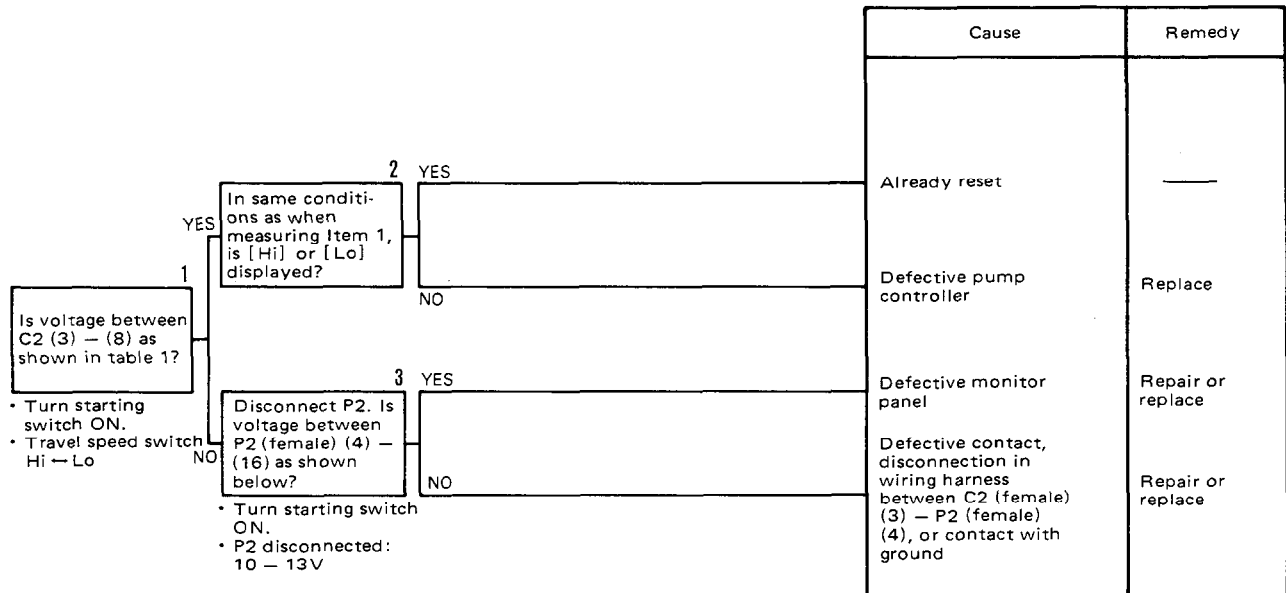
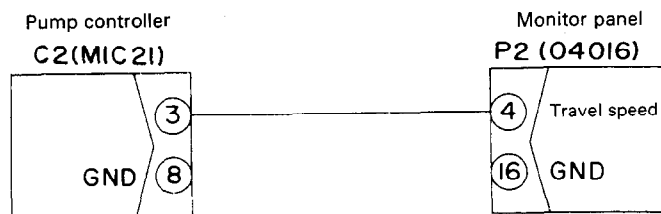


Table 1

Travel speed switch Lo	10 - 13V
Travel speed switch Hi	Max. 1V

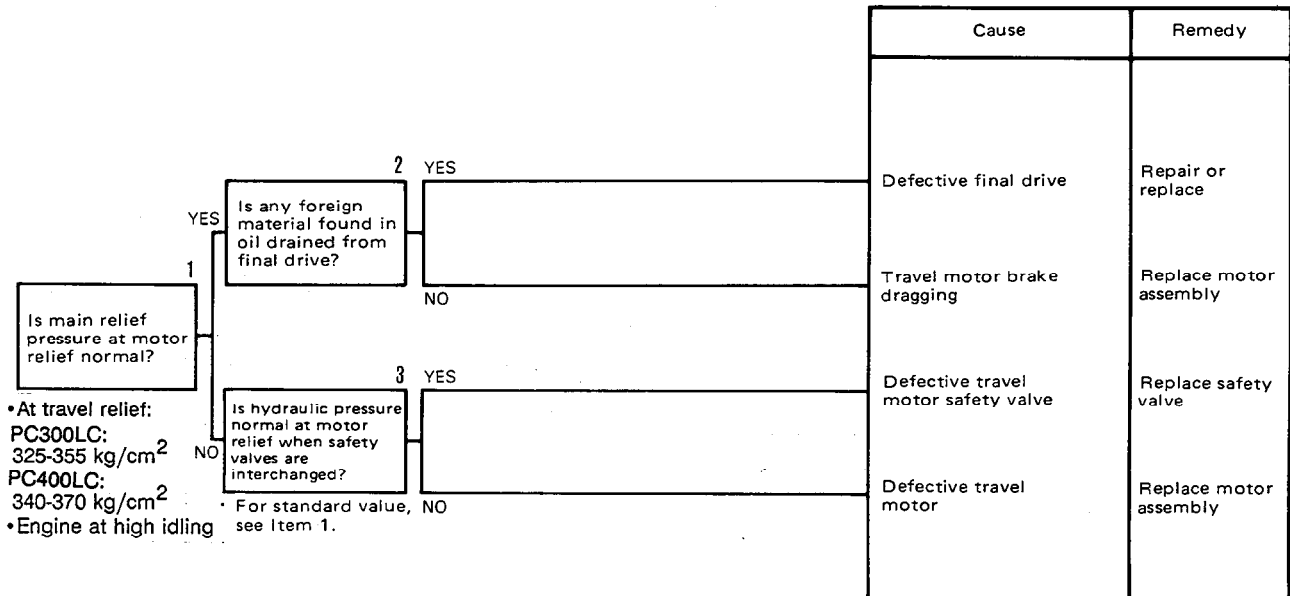


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Cause	Remedy
See Engine shop manual	—
Defective adjustment of CO valve	Adjust
Defective CO valve	Replace
Defective adjustment of TVC valve	Adjust
Defective TVC valve	Replace

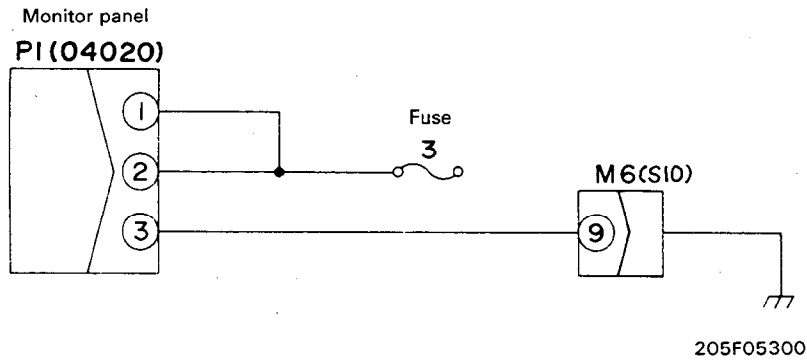
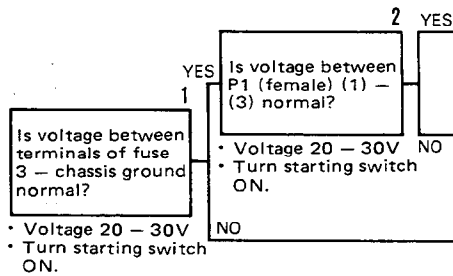
Cause	Remedy
Defective operation of CO cancel solenoid valve	Replace
Defective operation of 2-stage relief solenoid valve	Replace
(Go to H-9, Item 2)	—
(Go to H-9, Item 5)	—
Defective safety (suction) valve	Replace

H-21 MACHINE DOES NOT MOVE (ONE SIDE ONLY)



P-1 MONITOR PANEL LAMPS DO NOT LIGHT UP FOR 3 SECONDS WHEN STARTING SWITCH IS TURNED ON

a) No monitor panel lamps light up.

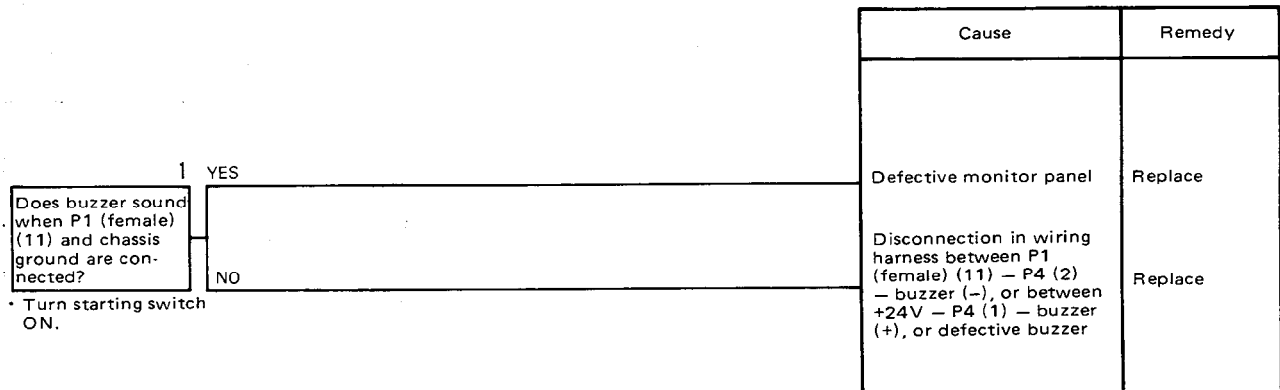


b) Some monitor panel lamps do not light up

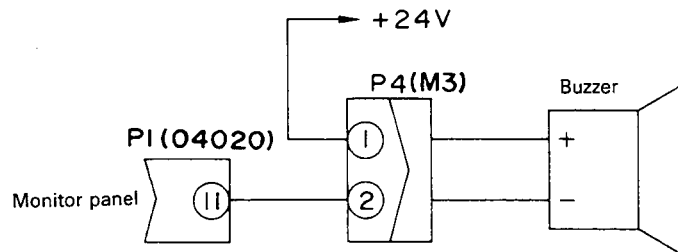
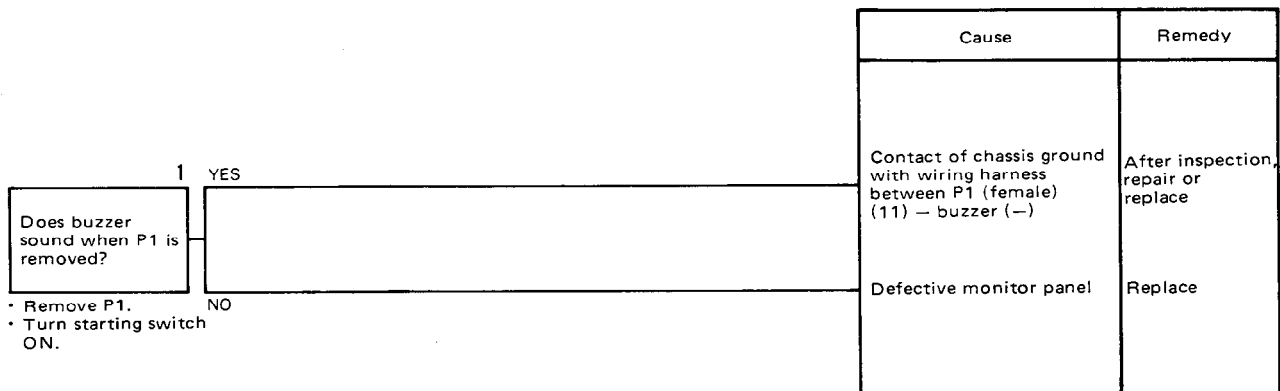
Cause	Remedy
Defective monitor panel	Replace
Defective contact, or disconnection in wiring harness between fuse 3 – P1 (female) (1) or P1 (female) (3) – M6 (9) – chassis ground	Clean (defective contact) or replace
Disconnection in fuse	Replace after inspecting cause of disconnection
Defective monitor panel	Replace

**P-7(a) WHEN STARTING SWITCH IS TURNED ON (ENGINE STOPPED), BUZZER DOES NOT SOUND FOR 1 SECOND
CAUTION ITEM IS FLASHING BUT BUZZER DOES NOT SOUND.**

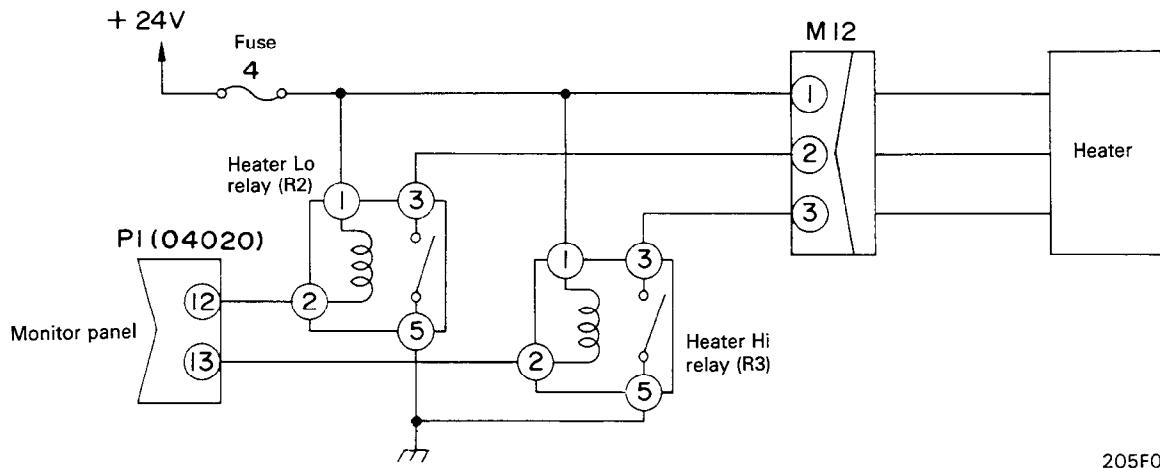
★ Of the CAUTION item, the buzzer does not sound if there is any abnormality in the charge or fuel level.



P-7(b) THERE IS NO ABNORMALITY DISPLAY ON THE MONITOR BUT THE BUZZER SOUNDS



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P-25 COOLANT LEVEL SENSOR SYSTEM DEFECTIVE

Note 1: Variation in coolant level.

The coolant level changes according to the angle and swaying of the machine, so if any abnormal display is given, stop the machine on flat ground and check the coolant level before carrying out the check again.

★ Remove the coolant level sensor when carrying out this troubleshooting.

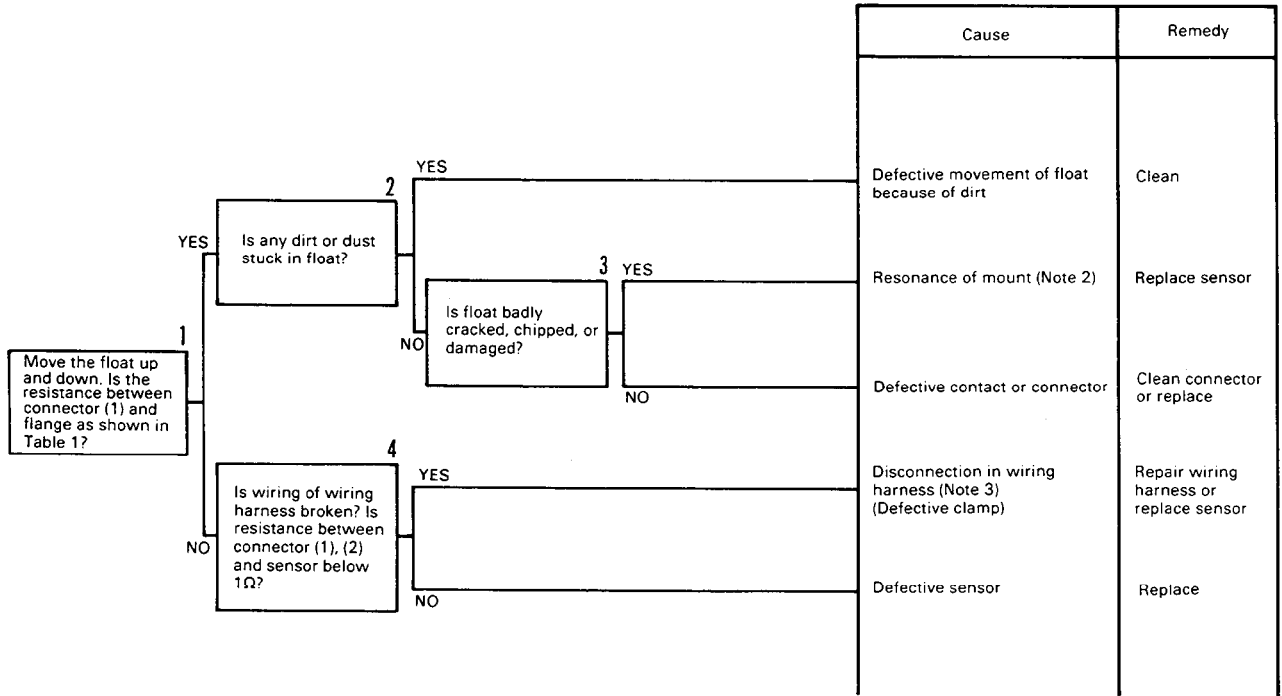
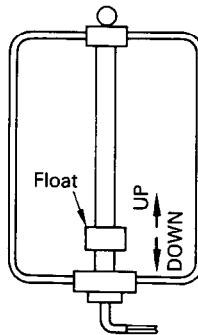


Table 1

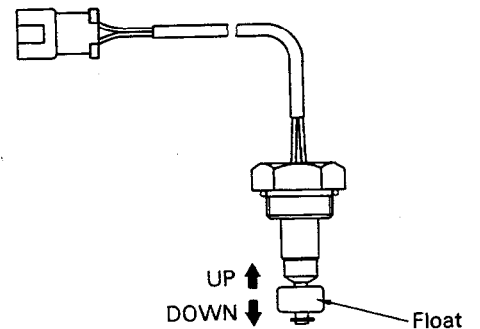
Float UP	Max. 1Ω
Float DOWN	Min. 1MΩ

PC300LC



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PC400LC



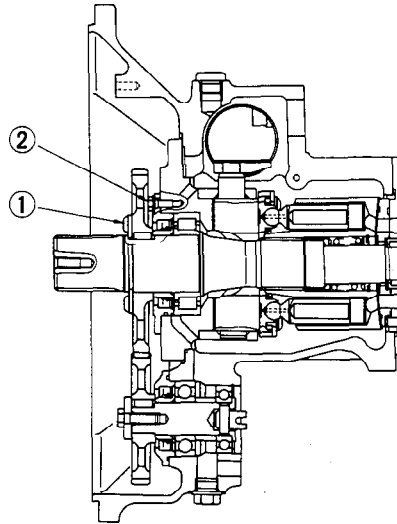
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Note 2: There is a strong possibility that the mount is resonating, so check the mount of the subtank.

Note 3: Check for any vibration at the connector mount and take the necessary action if the vibration is excessive.

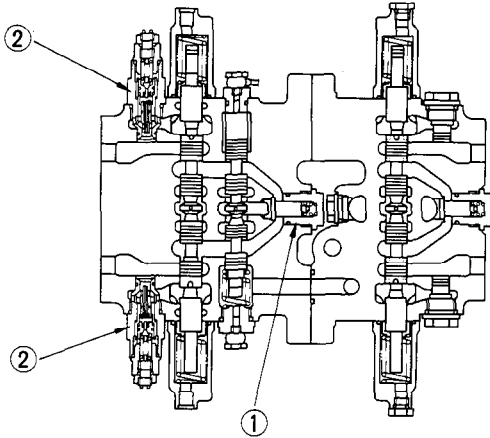
Nature of work	Symbol	Part No.	Part Name	Qty	Remarks		
Disassembly, assembly of travel motor assembly	G	1	790-501-5000 or 790-501-5200	Repair stand	1		
			790-901-2110	Bracket	1		
			790-901-1361	Plate	1		
		2	799-301-1600	Oil leak tester	1	1	Removal of brake piston
		3	796-765-1140	Bolt	1	1	Removal, installation of spring of cylinder block
			01580-03024	Nut	1		
			01643-33380	Washer	1		
			796-765-1150	Washer	1		
		4	790-201-2720	Push tool	1	1	Press fitting of bearing inner race
		5	796-765-1120	Push tool	1	1	Press fitting of bearing inner race
6	796-765-1110	Push tool	1	1	Press fitting of bearing outer race		
7	790-101-5201	Push tool kit	1	1 1 1	Press fitting of oil seal		
	790-101-5311	• Plate	1				
	790-101-5221 01010-51225	• Grip • Bolt	1				
8	796-765-1130	Push tool	1	1	Press fitting of dowel pin		
Disassembly, assembly of swing motor assembly	H	1	790-501-5000 or 790-501-5200	Repair stand	1		
			790-901-2110	Bracket	1		
			790-901-1470	Plate	1		
		2	796-730-2120	Screwdriver	1	1	Removal, installation of retainer mounting screw
			796-720-2220	Socket	1		
		3	790-201-2840	Push tool	1	1	Press fitting of bearing inner race
		4	796-766-1110	Guide	1	1	Assembly of drive shaft
		5	790-201-2860	Push tool	1	1	Press fitting of bearing outer race
		6	796-720-3800	Wrench	1	1 1	Measurement of rotating torque
			795-630-1803	Torque wrench set	1		

● Main Pump

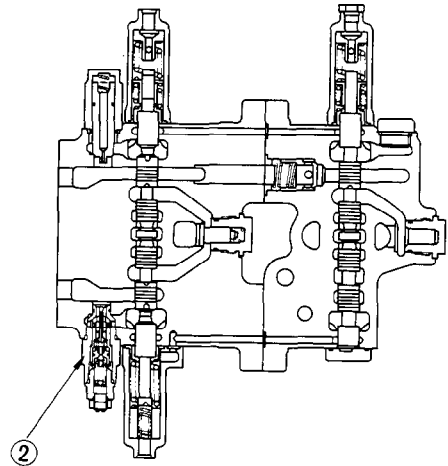


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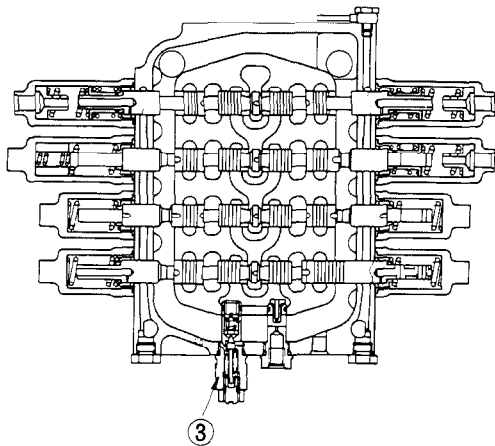
● Control Valve



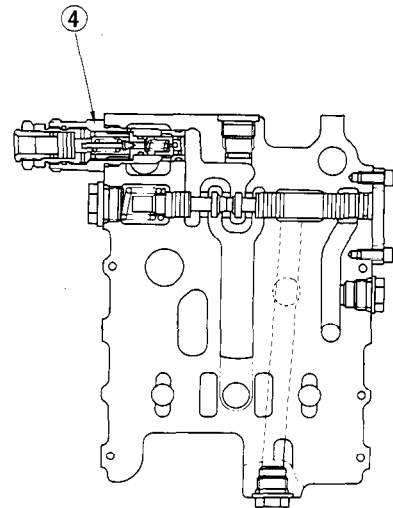
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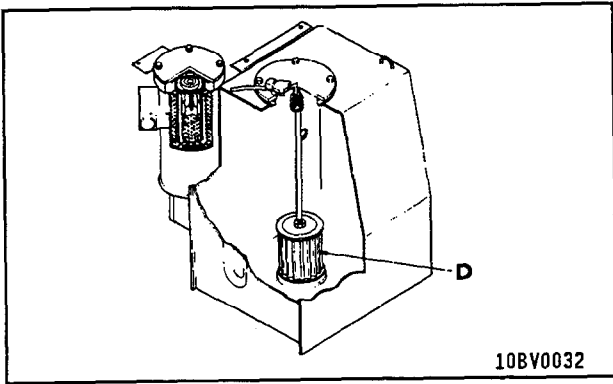


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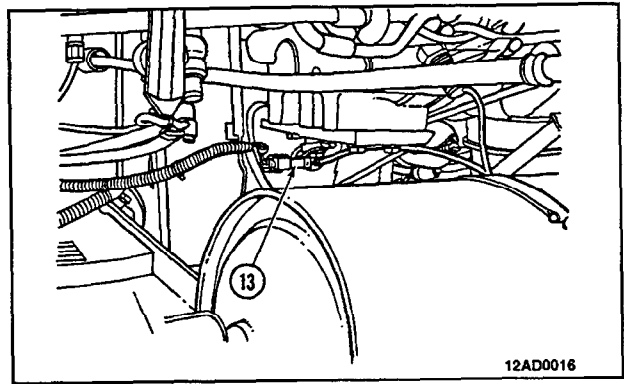


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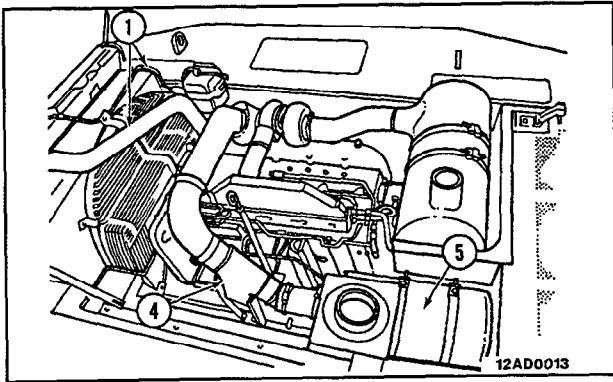
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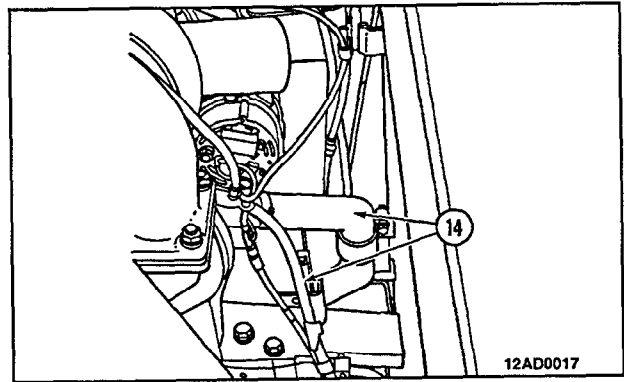
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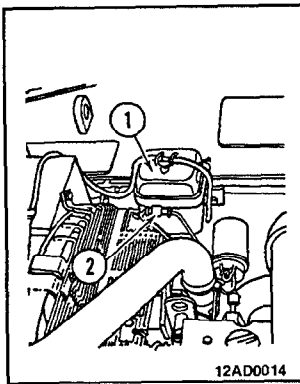
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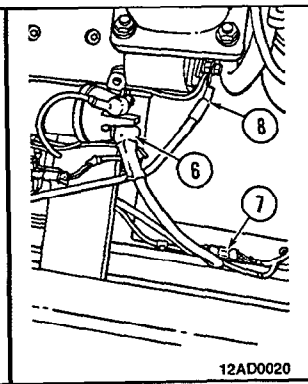
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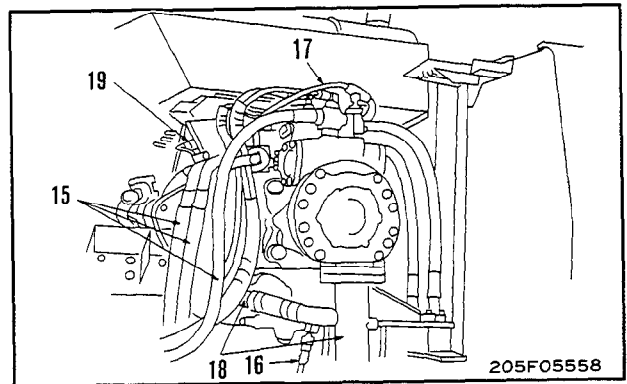
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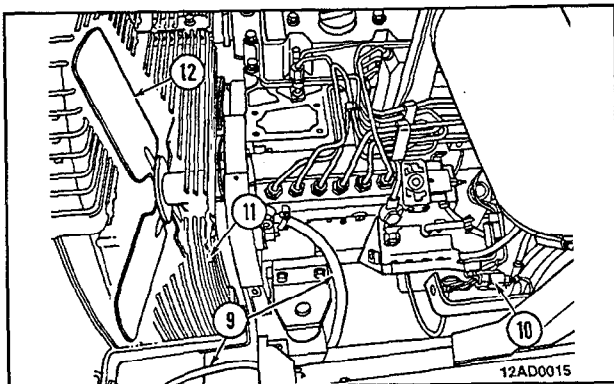
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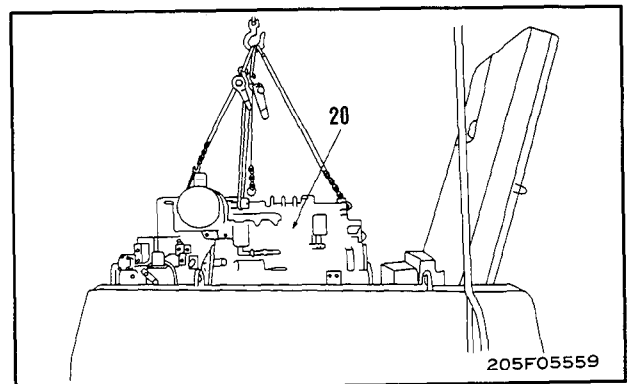
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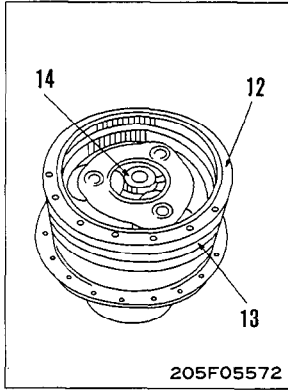
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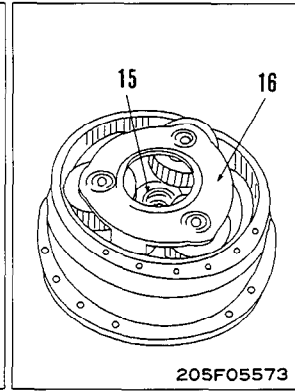
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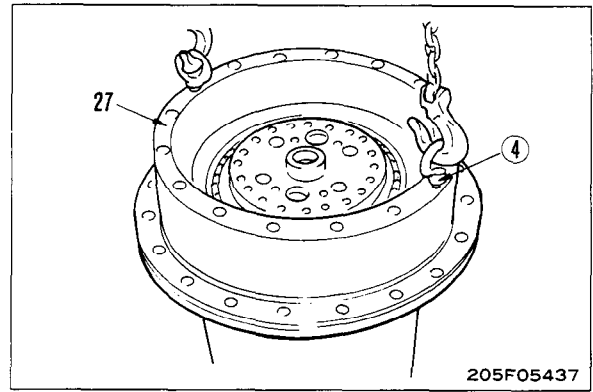
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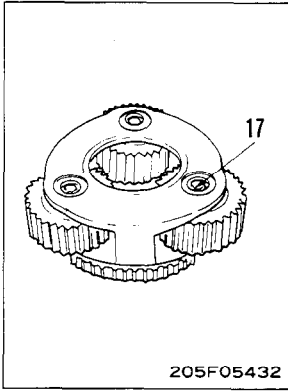
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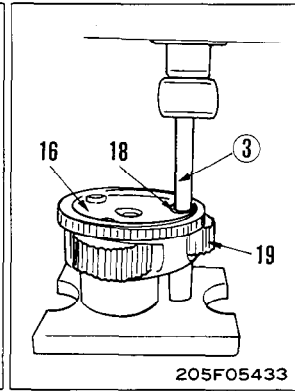
F8



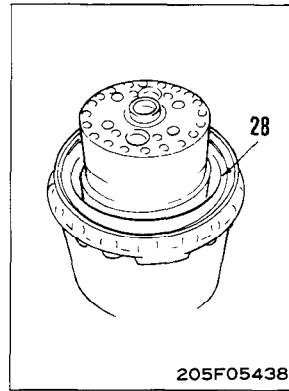
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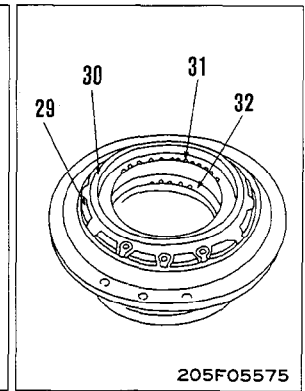
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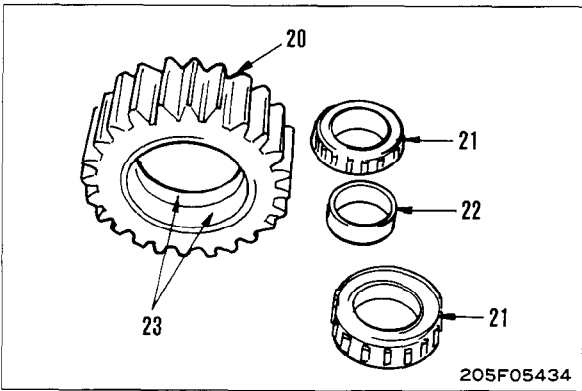
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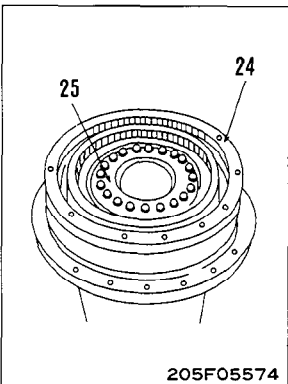
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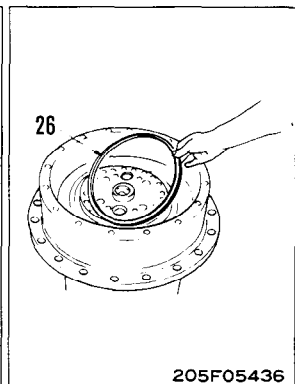
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F6



F7

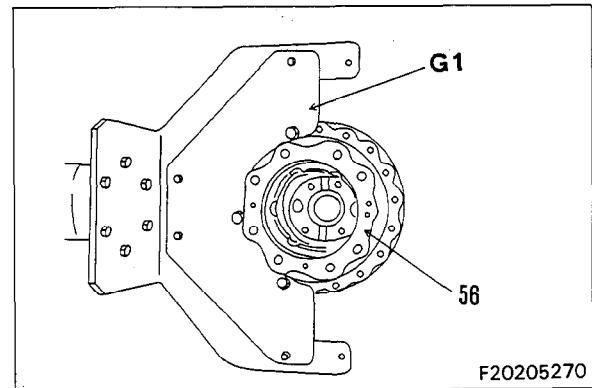


ASSEMBLY OF TRAVEL MOTOR ASSEMBLY (HMV280ADT) (HMV355ADT)

Precautions when assembling

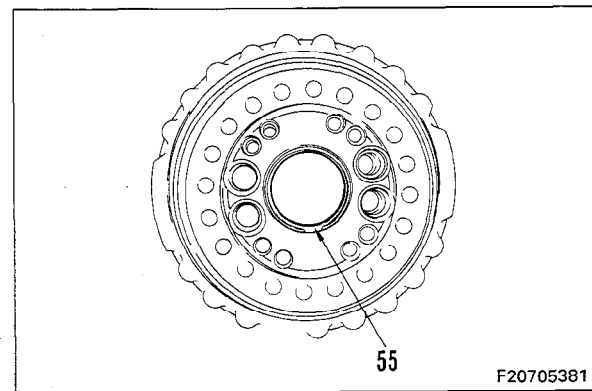
1. Clean all parts, check for dirt or damage, and repair any burrs.
2. Coat the rotating and sliding surfaces of all parts with engine oil (EO10-CD) before installing.
 - ★ Always use the following parts as a set.
 - i) Cradle and rocker cam
 - ii) Cylinder block and valve plate.
 - iii) Main bearing and spacer

1. Set motor case (56) to tool G1



2. Outer race

Using push tool, press fit outer race (55) to case.



3. Shaft assembly

1. Assemble shaft assembly as follows.

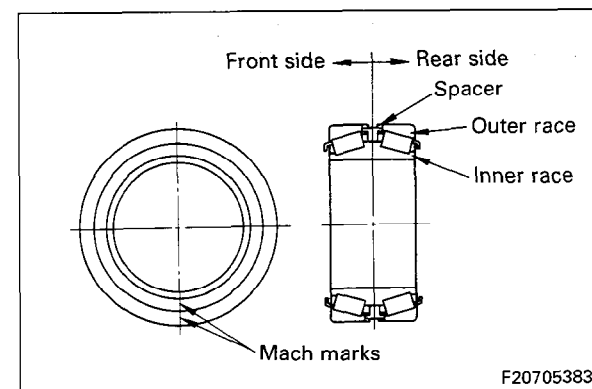
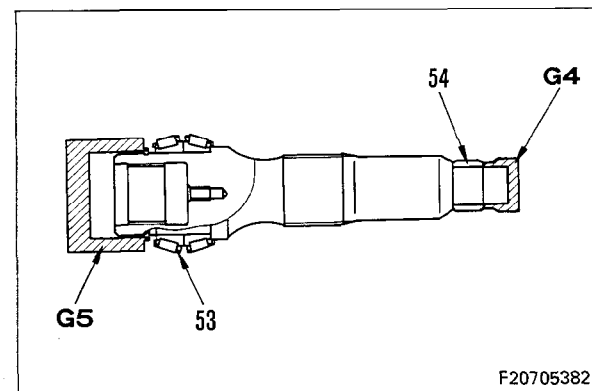
- i) Using tool G4, press fit inner race (54) to shaft.

★ Press fit until it is in tight contact with the end of the shaft.

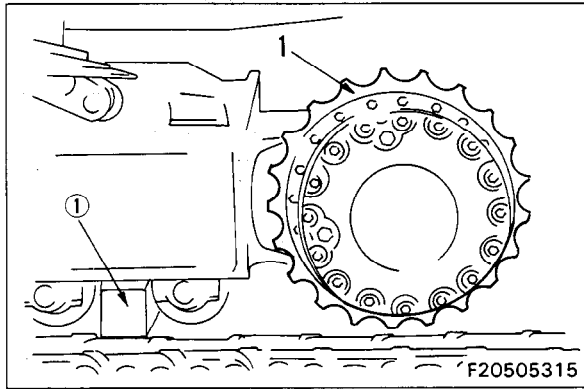
- ii) Using tool G5, press fit main bearing (53).

★ Align the match marks on the main bearing, and assemble.

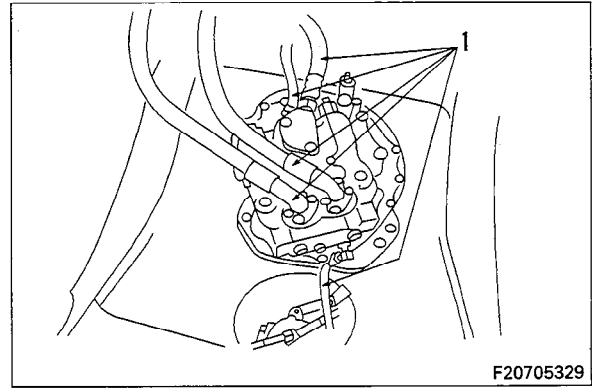
★ Press fit until the end face of the main bearing inner race is in tight contact with the shaft.



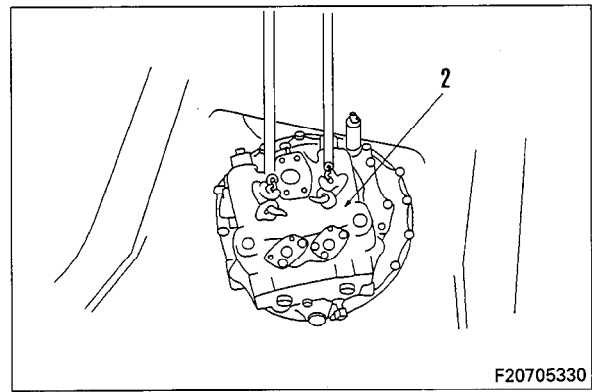
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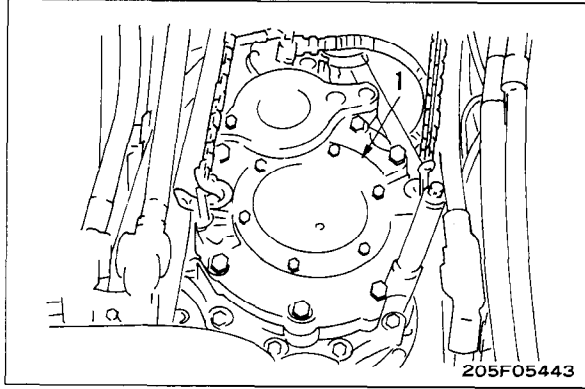
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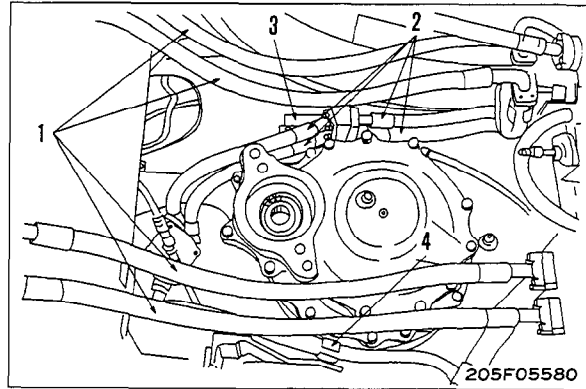
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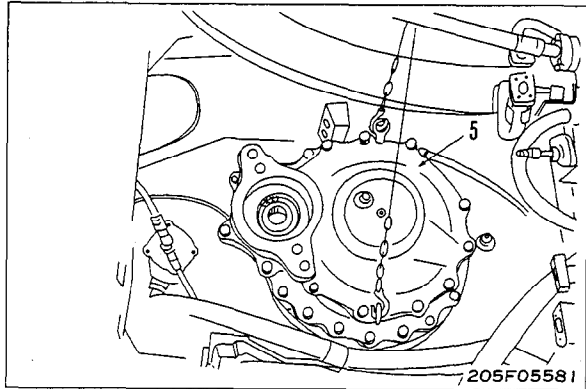
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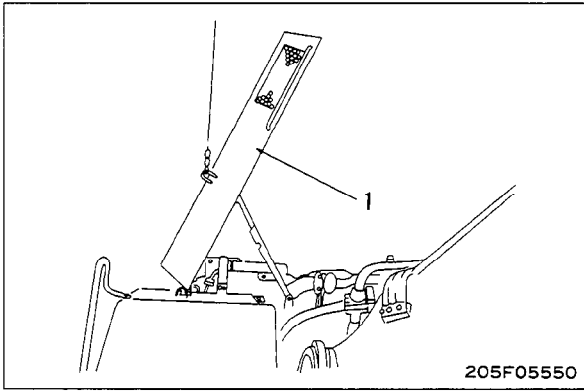
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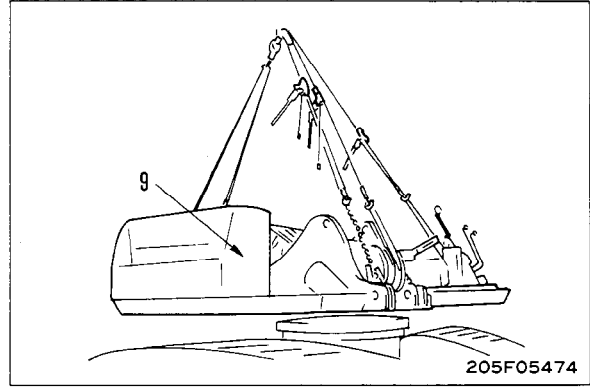


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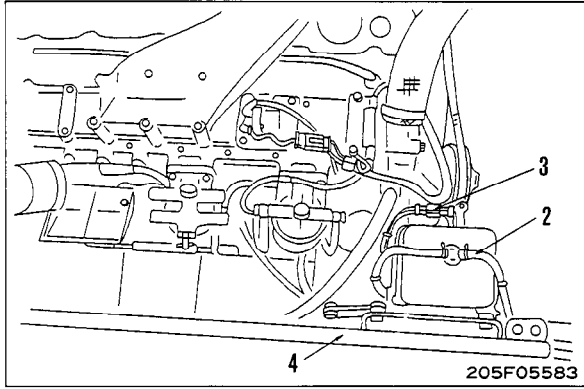
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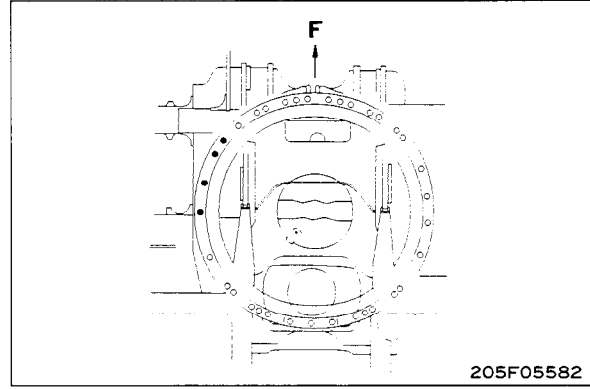
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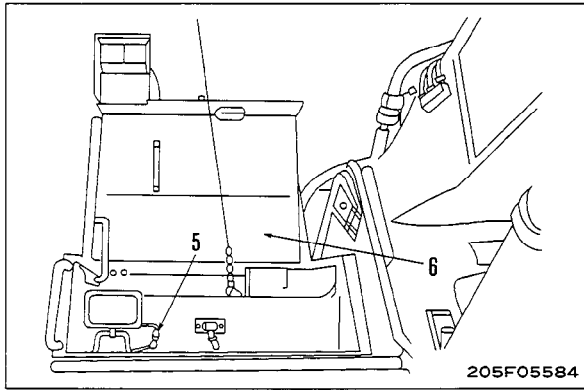
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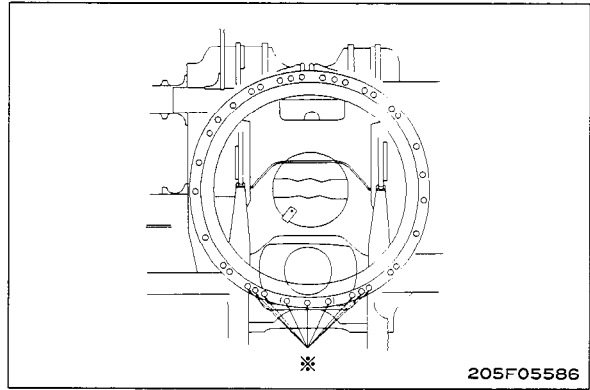
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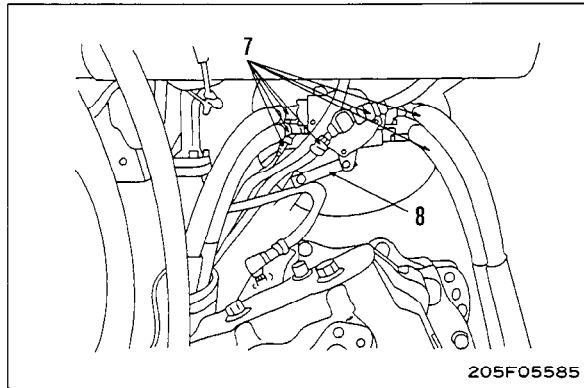
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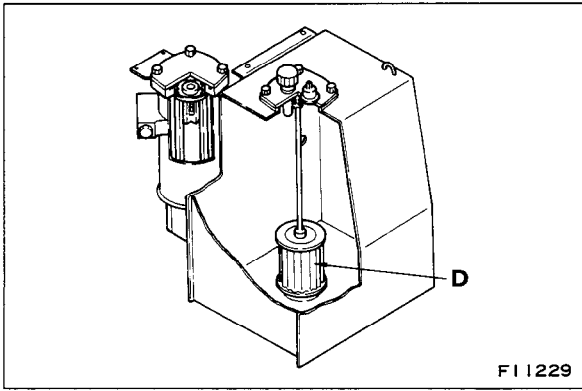
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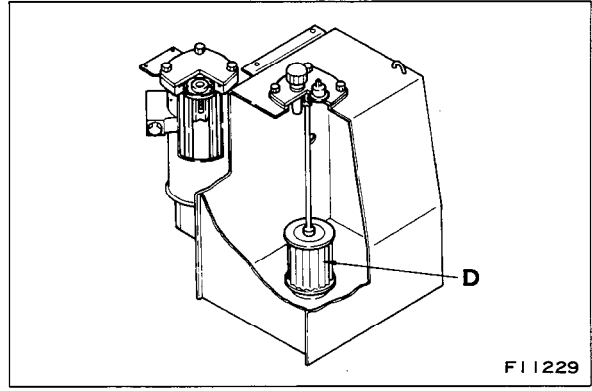
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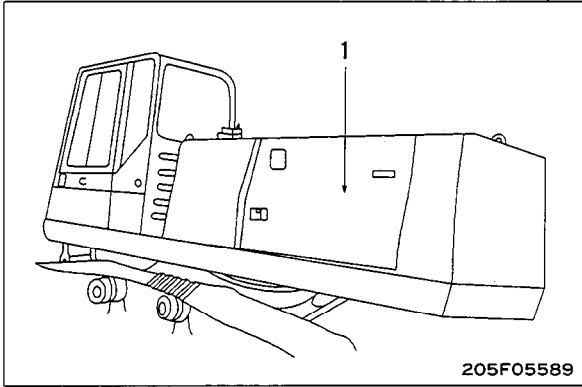
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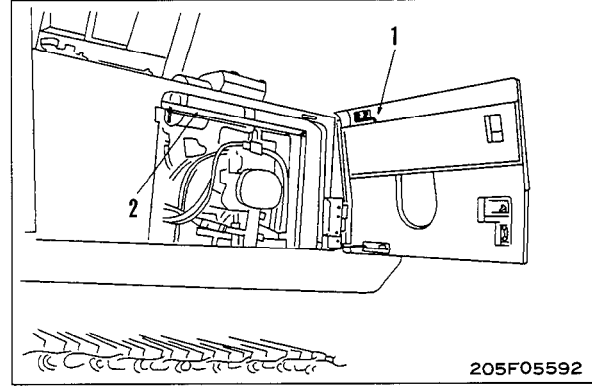
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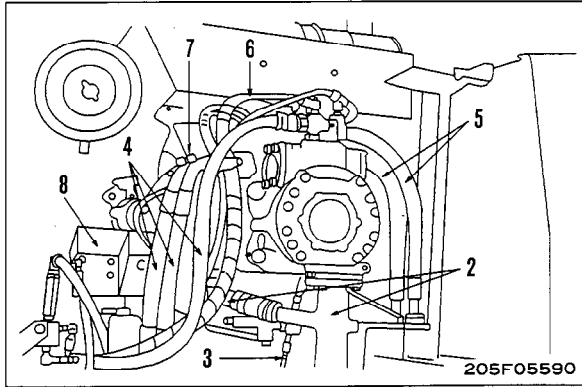
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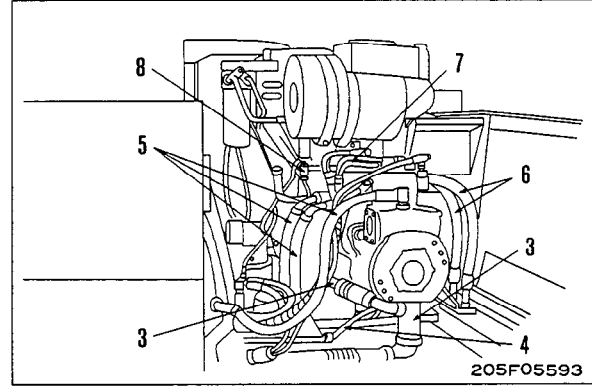
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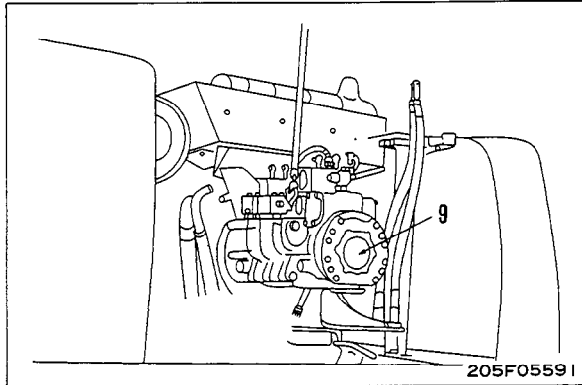
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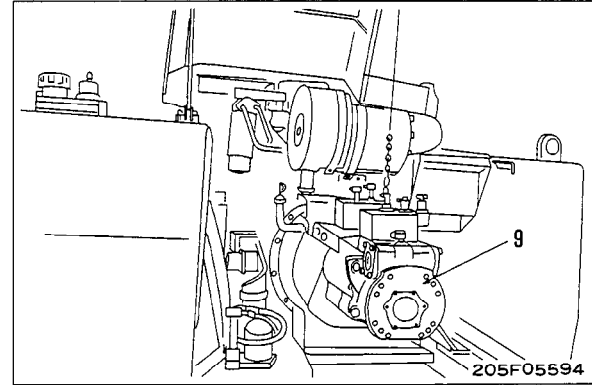
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F4



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F8



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8. Hold rocker cam in position, using tool J6, pull piston (69) with a force of 5 - 6 kg, and measure clearance (X) between piston shoe and rocker cam.

★ Measure the clearance with the rocker cam in position a or b, and measure for all 9 pistons.

★ Clearance: 0.03 - 0.07 mm

★ If clearance (X) is not within the standard range, adjust the spacer again.

2. Cylinder block

Align piston and install cylinder block (54).

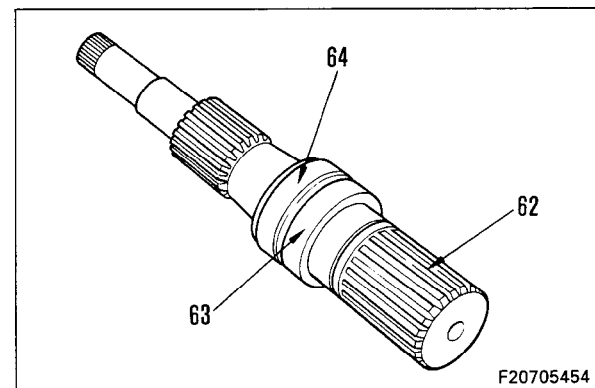
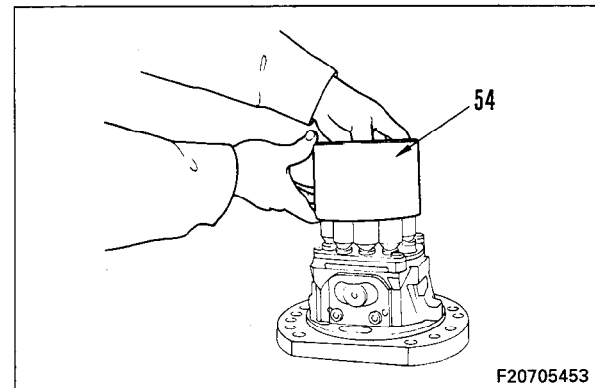
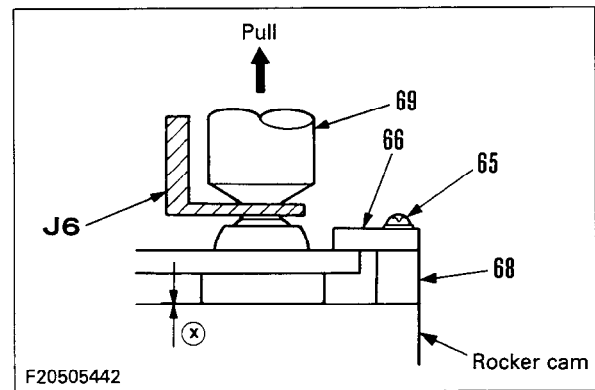
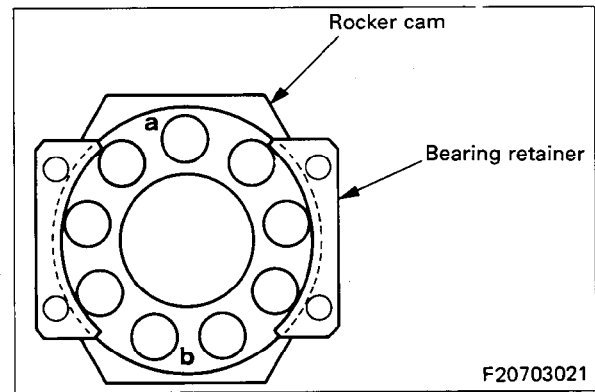
★ Install the spring and washer inside the cylinder after adjusting the preload of the bearing

★ Always install the valve plate (which forms a set with the cylinder) together with the cylinder.

3. Shaft assembly

1. Using push tool, press fit inner race (64), O-ring, collar (63) (inside diameter: 60 mm) on shaft (62).

★ Be sure to install inner race in correct direction.

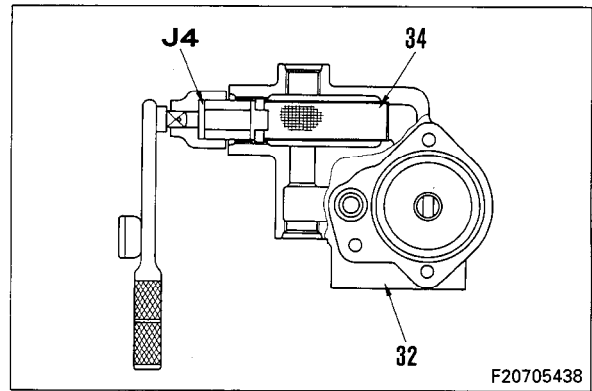


12. Charging pump assembly

1. Using tool J4, install strainer assembly (34), then install plug.


 Plug: See Tightening Torques and Standard Values Table

2. Fit O-ring, then install charging pump assembly (32).




13. Rear pump assembly


1. Install coupling (20).
2. Fit O-ring to end cap, and raise rear pump assembly (5), then tighten 4 nuts (4).

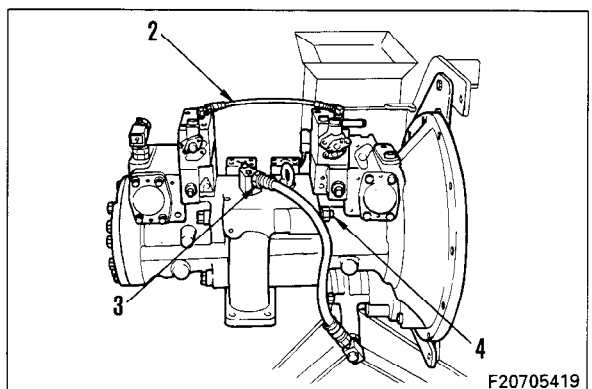
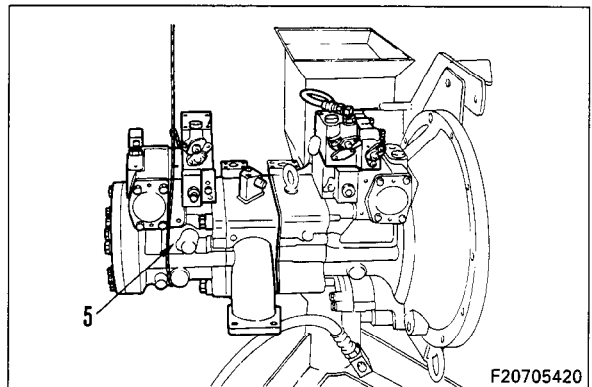
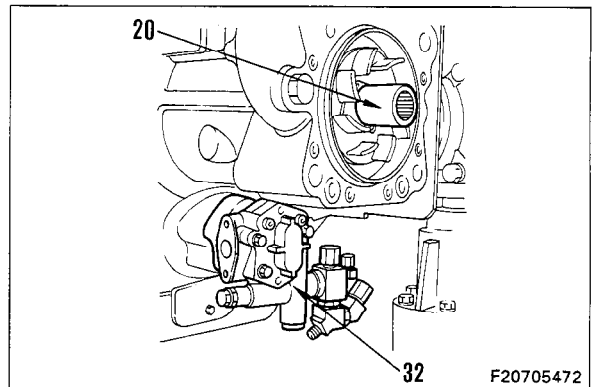
 End cap mounting nut and bolt:
See Tightening Torques and Standard Values Table

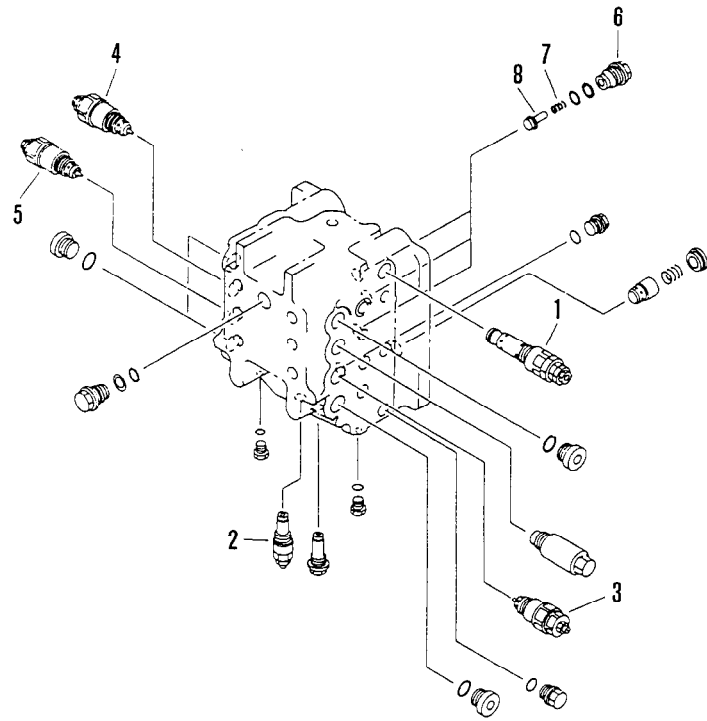
★ Also tighten 4 rear pump end cap mounting bolts (Width across flats = 30 mm).

3. Install hoses (2) and (3).

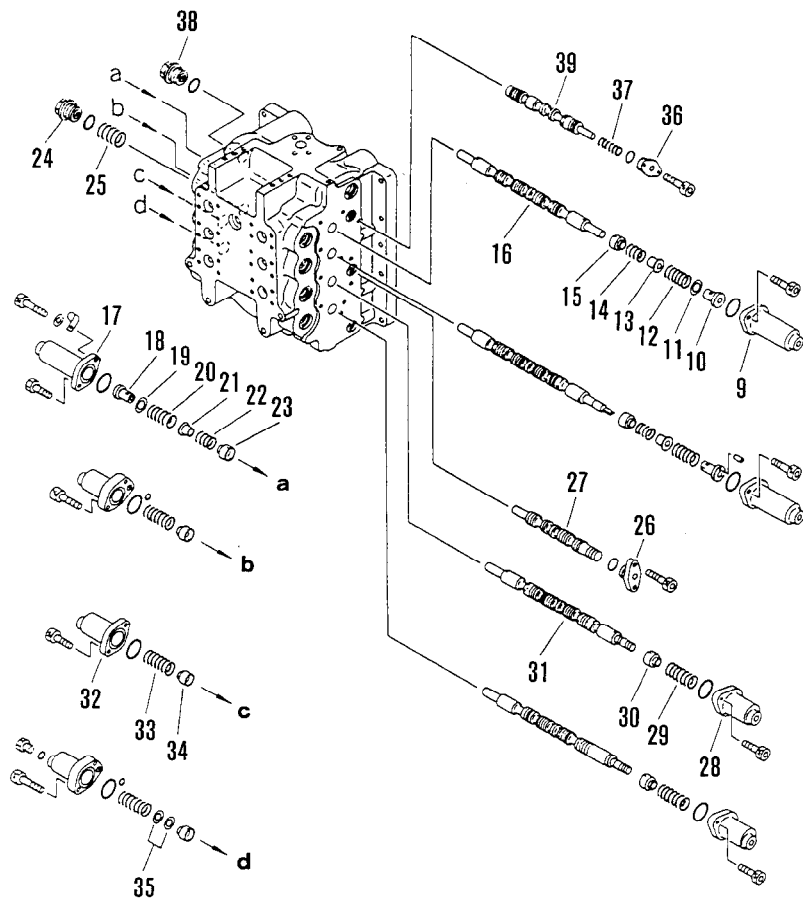
 Sleeve nut of hose (2):
See Tightening Torques and Standard Values Table

 Sleeve nut of hose (3):
See Tightening Torques and Standard Values Table



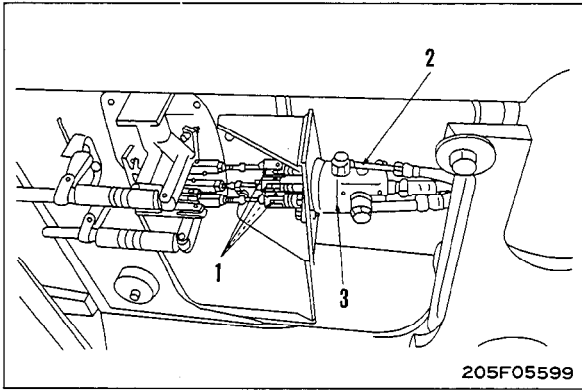


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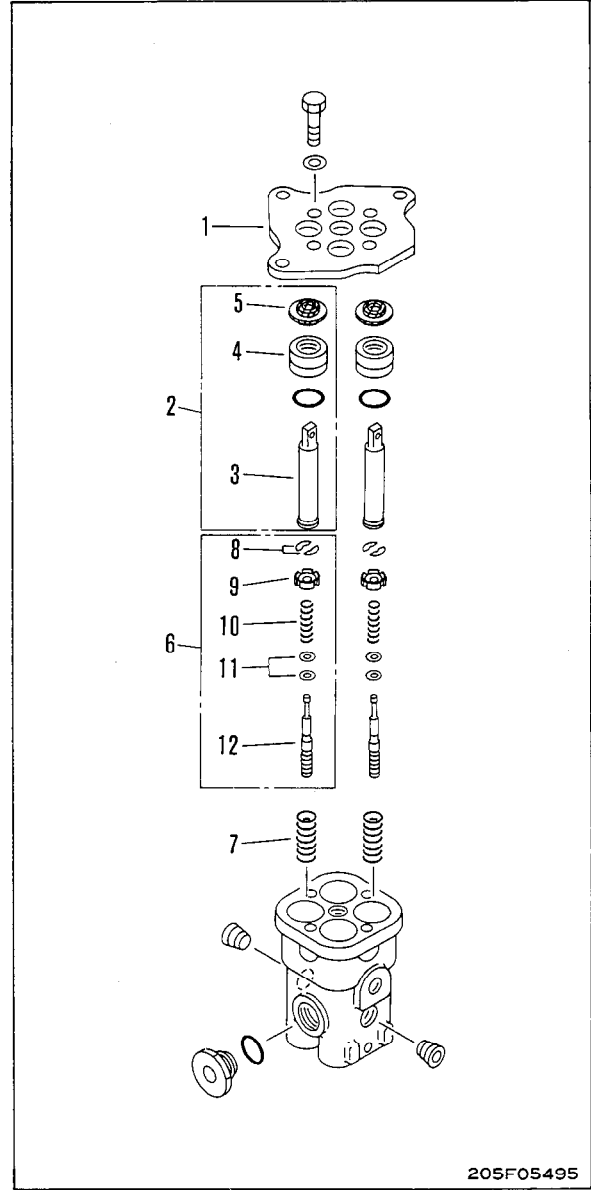


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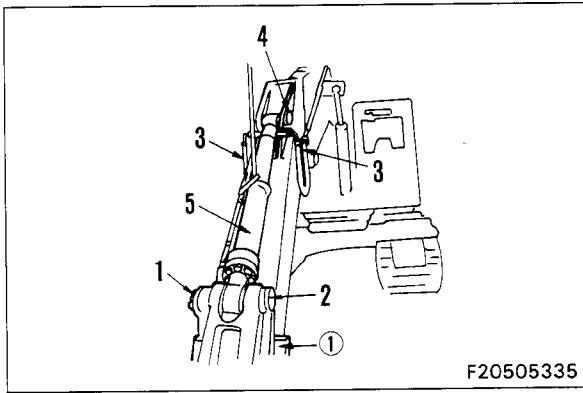
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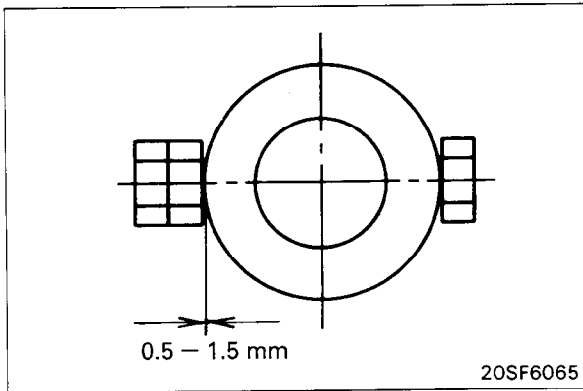
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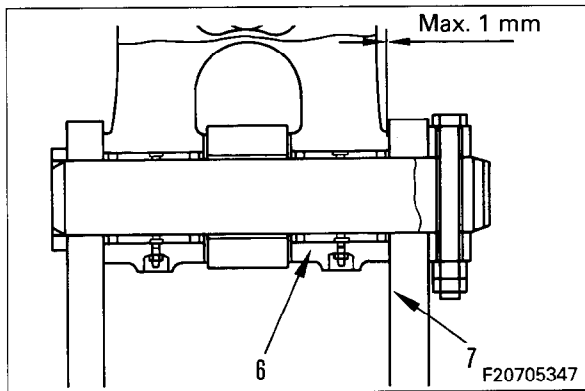
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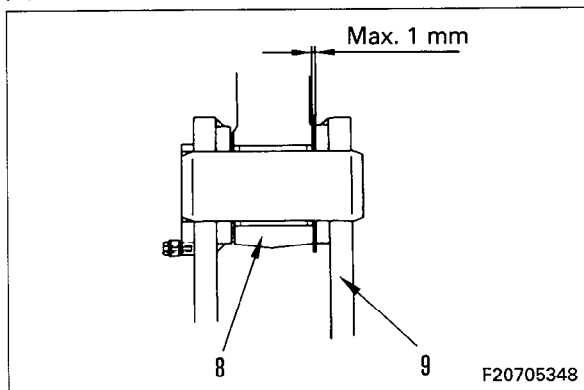
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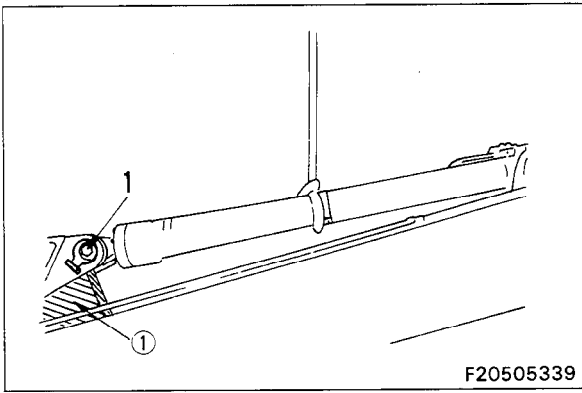
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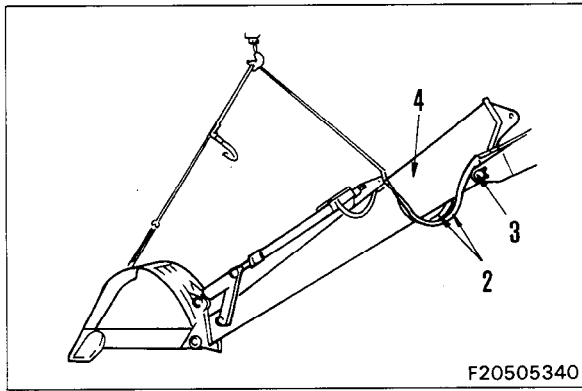
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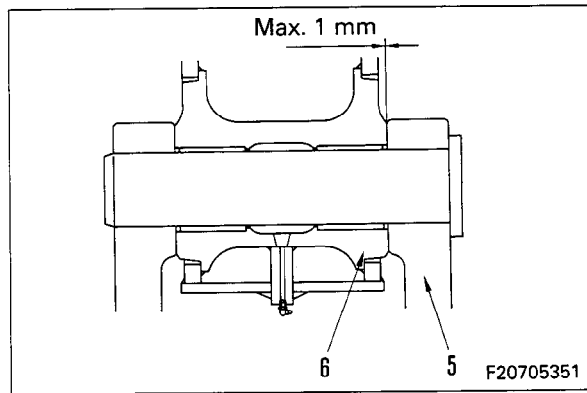
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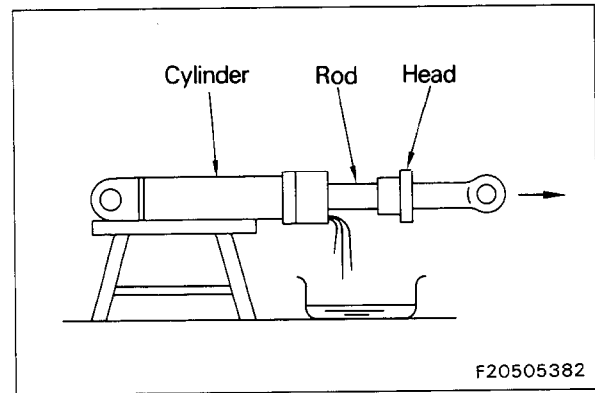
F3



3. Cleaning cylinder

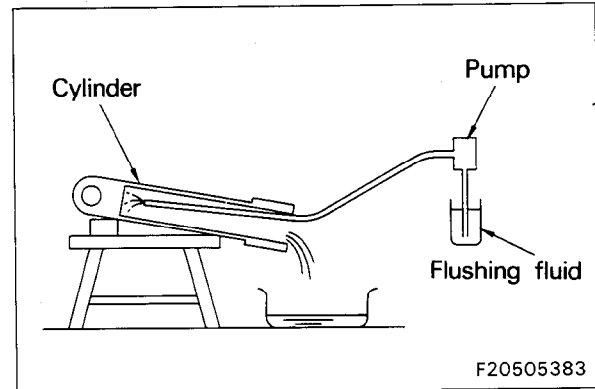
★ Disassemble all cylinders and clean them

- i) Remove cylinder head, then pull out piston rod



- ii) Fix cylinder at an angle, then use a pump to clean with flushing fluid.

★ If no pump is available, use a crane, collect the flushing fluid at the bottom end, shake well, then drain the flushing fluid, and blow with air.



- iii) Apply flushing fluid to the cylinder head and piston and brush well with a nylon brush, then blow with air.

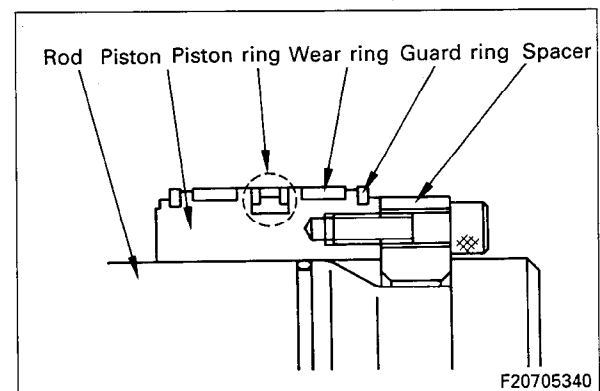
★ Dirt is likely to collect particularly in the insert portions, so clean these parts well.

- iv) Check inside of cylinder for damage.

- Any vertical scratches in cylinder
- Any breakage or seizure of wear rings, piston rings, or guard ring
- Scratches on piston

★ If there is any scuffing of the piston or cylinder, replace the assembly.

★ If only the wear ring, piston ring, or guard ring are damaged, replace the damaged part with a new part, and use again.



3. Flushing pattern [A]

1. Disassembly, cleaning, and reassembly

- i) Failed parts
 - ★ If the part is badly damaged, replace it.
- ii) Hydraulic tank
- iii) Suction strainer
- iv) Oil cooler
 - ★ If excessive amounts of dirt and dust are stuck in the core, replace.
- v) Cylinder
 - ★ For details, see "Cleaning cylinder".
- vi) Other hydraulic equipment

2. Preparatory work for flushing

- i) Install the flushing element, clean the small strainer, then install it again. Replace the pilot filter with a new part.
 - ★ For details, see "Installing filter element".
- ii) Short-circuit the cylinder circuit, swing motor circuit, and travel motor circuit.
 - ★ For details, see "Short-circuiting the piping".
- iii) Add hydraulic oil to the specified level.
- iv) Bleed the air from the main pump.

3. Flushing cylinder circuit, swing motor circuit, travel motor circuit

- i) Run the engine at low idling for 30 minutes.
 - ★ The control levers must not be moved during this time.
- ii) Run the engine at midrange speed for 30 minutes.
 - ★ The control levers must not be moved during this time.
 - ★ If the oil temperature is low, increase the length of the operation in Steps 3....i), and 3....ii) to raise the temperature. The oil temperature should be 50 - 80°C.

iii) Run the engine at high idling and carry out the following operation.

- Operating pattern
Boom RAISE → Boom LOWER → Arm IN → Arm OUT → Bucket CURL → Bucket DUMP → Right swing → Left swing → Left travel → Right travel
- ★ For loader specification machines, continue the above operating pattern as follows: Bottom dump OPEN - Bottom dump CLOSE.
- Operating time
Hold the lever in each position for two minutes.
- Number of times of operation
Repeat the above pattern at least 5 times.

4. Restoring cylinder circuit, swing motor circuit

- i) Restore the cylinder unit and swing motor circuit to the standard circuit.
 - ★ Keep the travel motor circuit short-circuited.
- ii) Add hydraulic oil to the specified level.
- iii) Bleed the air from the main pump, cylinders, and swing motor.

5. Flushing center swivel joint

- i) Run the engine at high idling and carry out the following operation.
 - Operating pattern
Left and right FORWARD + 90° swing
Left and right REVERSE + 90° swing
 - ★ Swing 90° to either the left or right, but swing in the same direction each time.
 - Operating time
Hold the lever in each position for 2 minutes
 - Number of times of operation
Repeat the above pattern 4 times, and rotate the swing one turn.
 - ★ The purpose of swinging 90° each is to remove dirt inside the center swivel from the oil grooves on the rotor side and shaft side around the whole circumference.

Unit: mm

No.	Check item	Criteria		Remedy
1	Backlash between No. 1 sun gear and No. 1 planet gear	Standard clearance	Clearance limit	Replace
		0.20 - 0.57	1.00	
2	Backlash between No. 1 planet gear and No. 1 ring gear	0.20 - 0.57	1.10	
3	Backlash between No. 1 planet carrier and idle gear	0.06 - 0.21	1.20	
4	Backlash between No. 2 sun gear and No. 2 planet gear	0.19 - 0.53	1.00	
5	Backlash between No. 2 planet gear and ring gear	0.20 - 0.57	1.10	
6	Backlash between No. 2 planet carrier and No. 1 sun gear	0.41 - 0.73	-	
7	End play of sprocket shaft	0.10 - 0.15	-	
8	Amount of wear on sprocket tooth	Repair limit: 6		Rebuild or replace
9	Width of sprocket tooth	Standard size	Repair	
		90	87	

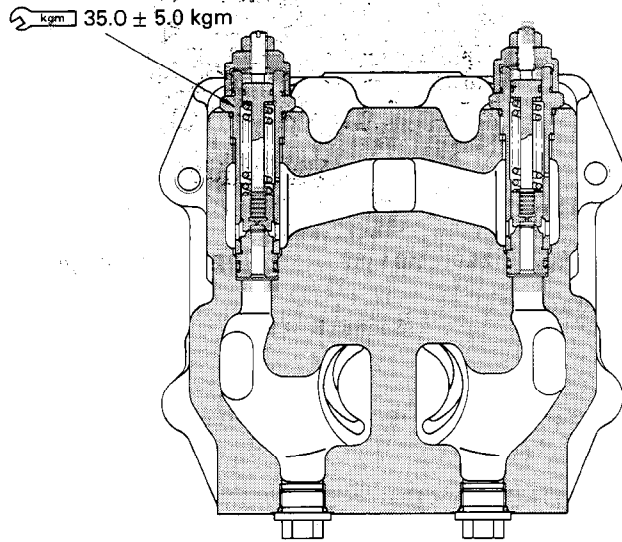
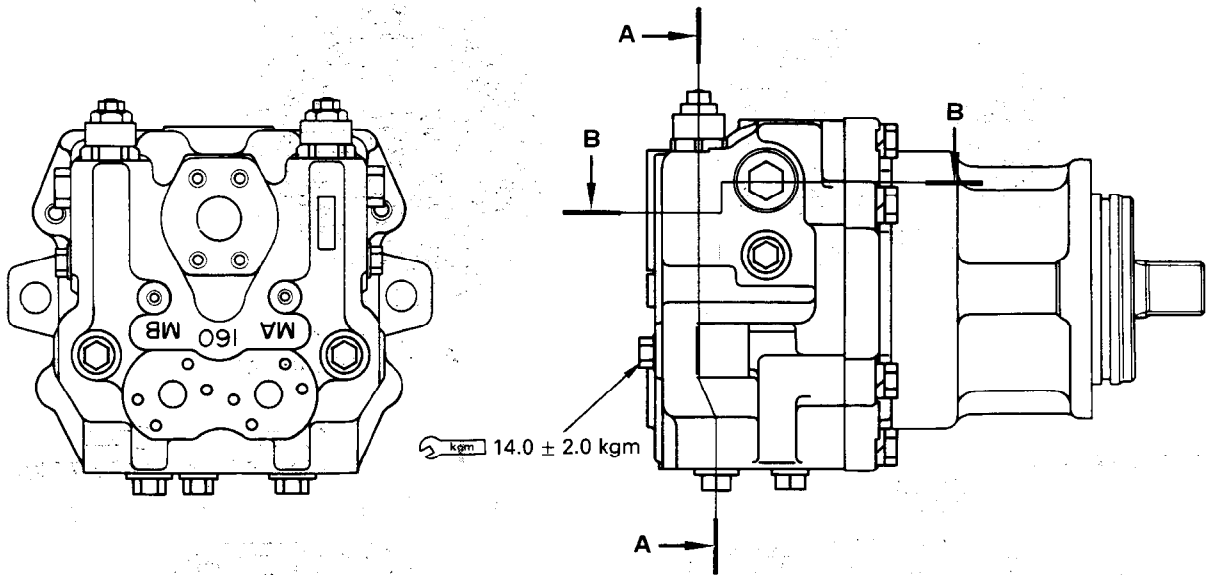
Unit: mm

No.	Check item	Criteria				Remedy	
		Standard size		Repair limit			
1	Outside diameter of protrusion	Standard size		Repair limit		Rebuild or replace	
		630		-			
2	Outside diameter of tread	590		578			
3	Width of protrusion	101		-			
4	Total width	190		-			
5	Width of tread	44.5		50.5		Replace bushing	
6	Clearance between shaft and bushing	Standard size	Tolerance		Standard clearance		Clearance limit
			Shaft	Hole			
		80	-0.225 -0.325	+0.130 -0.010	0.215 - 0.205	1.5	
7	Clearance between shaft and support	80	-0.225 -0.290	-0.085 -0.195	0.030 - 0.205	-	Replace
8	Interference between idler and bushing	Standard size	Tolerance		Standard interference	Interference limit	
			Shaft	Hole			
		87.6	+0.087 +0.037	-0.027 -0.079	0.064 - 0.166	-	Replace bushing
9	Side clearance of idler (each)	Standard size		Repair limit			
		0.68 - 1.22		2			

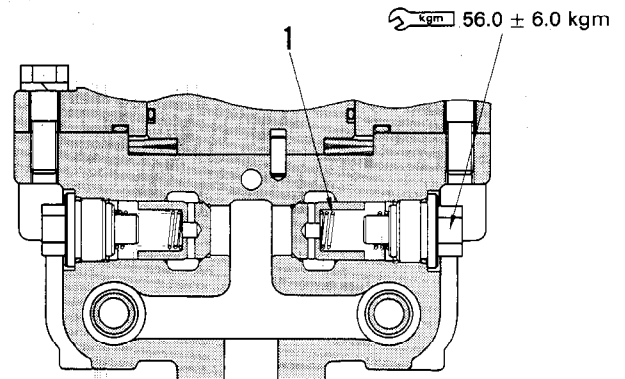
Unit: mm

No.	Check item	Criteria				Remedy	
		Standard size	Repair limit				
1	Link pitch	216.25	220.25		Turn or replace		
2	Outside diameter of bushing	74.3	69.3				
3	Height of grouser	36	21		Lug welding, rebuild or replace		
4	Height of link	129	119		Rebuild or replace		
5	Interface of bushing and link	Standard size	Tolerance		Standard clearance	Interference limit	
		71	Shaft	Hole			
6	Interference of regular pin and link	47.0 (Shaft) 46.72 (Hole)	+0.235 +0.085	+0.062 0	0.380 - 0.494	0.100	Replace
7	Interference of regular master pin and link	46.8 (Shaft) 46.72 (Hole)	+0.230 +0.200	+0.062 0	0.218 - 0.310	0.130	
8	Protrusion of bushing	5.25 ± 0.3					
9	Tightening torque of shoe bolt	Initial tightening torque: 40 ± 5 kgm Additional tighteneing angle: 120 ± 10°				Replace	

SWING MOTOR



Section A – A



Section B – B

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Unit: mm

No.	Check item	Criteria					Remedy
		Standard size			Repair limit		
1	Check valve spring	Free length x O.D.	Installed length	Installed load	Free length	Installed load	Replace spring if any damages or deforma- tions are found
		66.5 x 25.6	45	0.71 kg	-	0.57 kg	

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