SHOP MANUAL

KOMATSU

PC1600-1

MACHINE MODEL SERIAL No.

PC1600-1 10001 and up

- This shop manual may contain attachments and optional equipment that are not available in your area. Please consult your local Komatsu distributor for those items you may require. Materials and specifications are subject to change without notice.
- PC1600-1 mount the SA6D140 engine.
  For details of the engine, see the 6D140-1 Series Engine Shop Manual.

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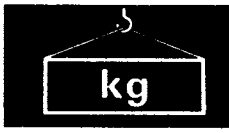
HOISTING INSTRUCTIONS



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

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

2. Wire ropes

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

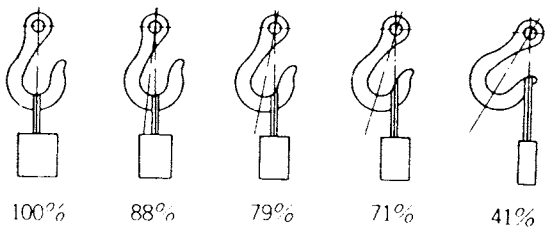
Wire ropes
(Standard "Z" or "S" twist ropes without galvanizing)

Rope diameter (mm)	Allowable load (tons)
10	1.0
11.2	1.4
12.5	1.6
14	2.2
16	2.8
18	3.6
20	4.4
22.4	5.6
30	10.0
40	18.0
50	28.0
60	40.0

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

2) Sling wire ropes from the middle portion of the hook.

Slinging near the edge of the hook may cause the rope to slip off the hook during hoisting, and a serious accident can result. Hooks have maximum strength at the middle portion.



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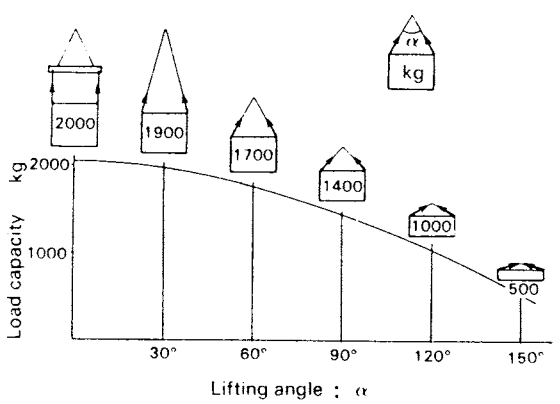
3) Do not sling a heavy load with one rope alone, but sling with two or more ropes symmetrically wound on to the load.

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

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



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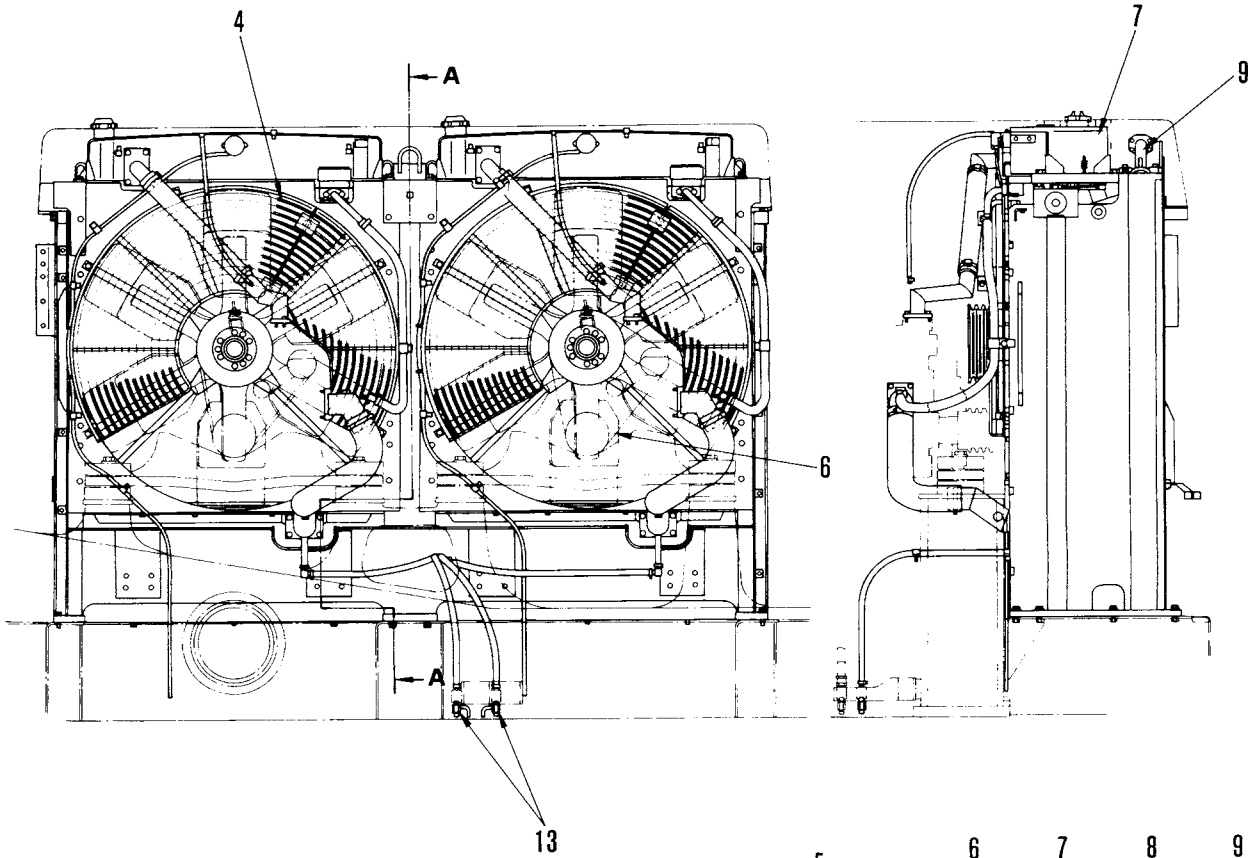
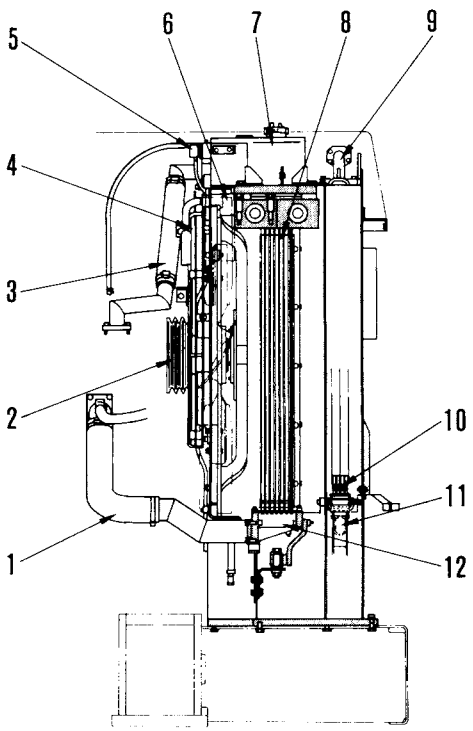
RADIATOR AND OIL COOLER

The fan is driven by a V-belt between the fan pulley and the engine pulley. The fan is a suction type which sucks in the outside air through the radiator core an oil cooler and sends it forcibly to the engine.





Section A – A

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1. Radiator outlet tube
2. Fan pulley
3. Radiator inlet hose
4. Fan guard
5. Pressure valve
6. Fan
7. Radiator upper tank
8. Radiator core
9. Oil cooler inlet tube
10. Oil cooler core
11. Oil cooler outlet tube
12. Radiator lower tank
13. Radiator drain valve

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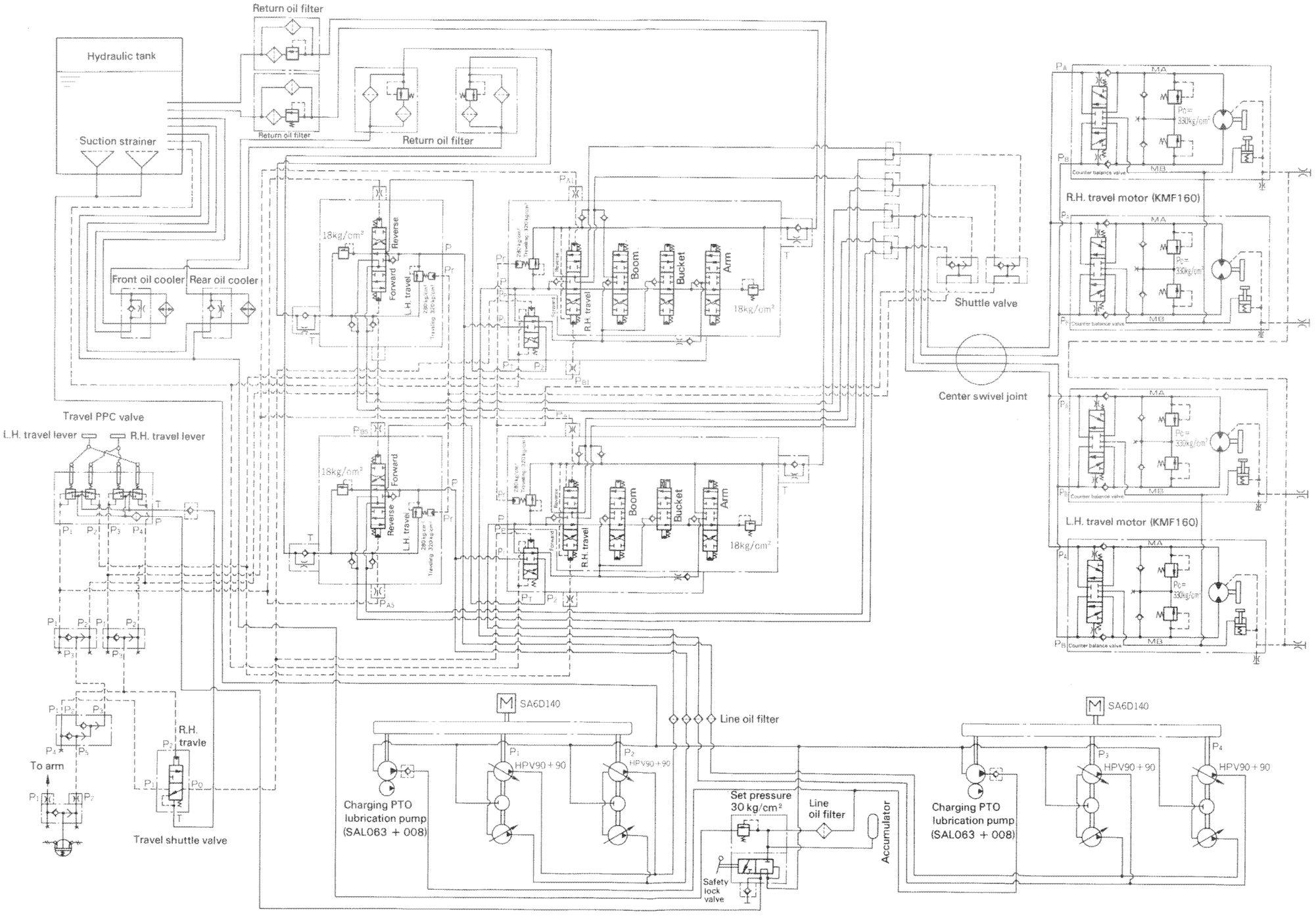
TRAVEL AND BRAKE SYSTEM

1. TRAVEL CONTROL CIRCUIT



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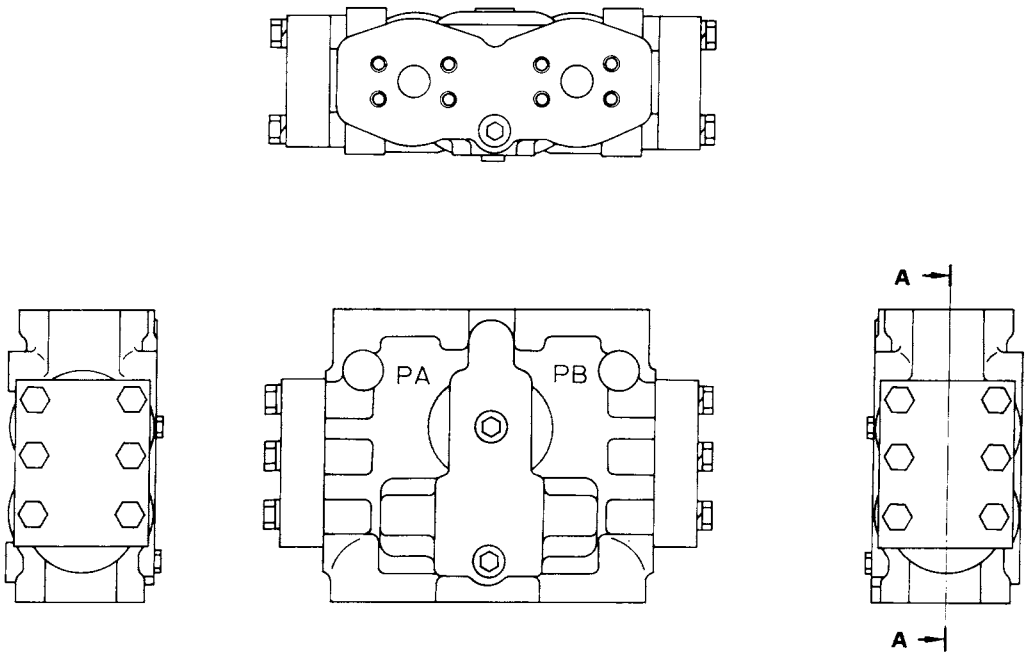
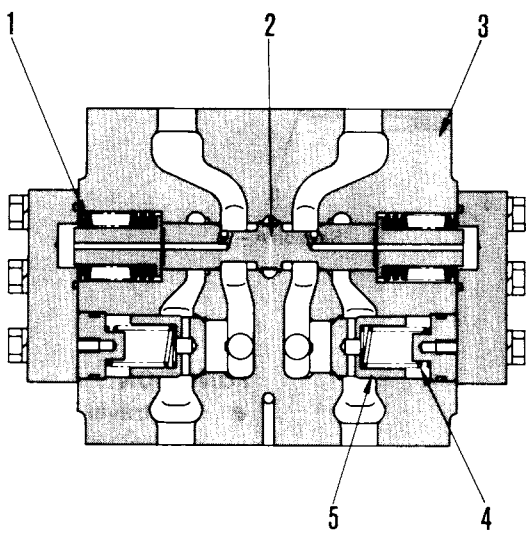
5. TRAVEL BRAKE VALVE





Section A – A

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1. Spool switching spring
2. Counterbalance valve spool
3. Housing
4. Check valve spring
5. Check valve

FUNCTION

This valve prevents the speed of the motor from being increased by the weight of the machine when going downhill.

The brake valve consists of the counterbalance valve, the check valve and the safety valve.

Rated flow: 420 ℓ/min.

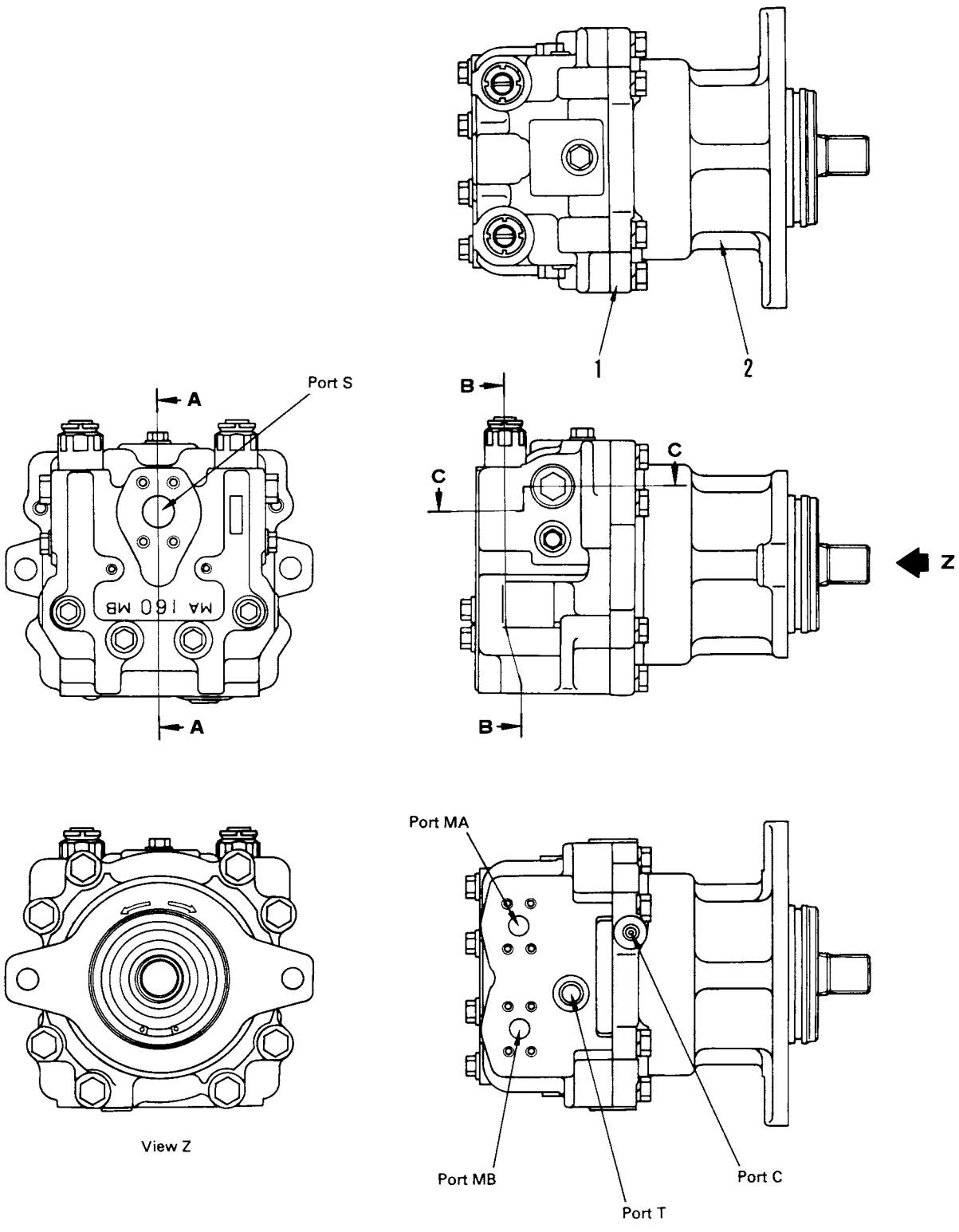
Safety valve set pressure: 330^{+5}_{0} kg/cm²

(at 5 ℓ/min.)

Spool switching pressure: 13 ± 2 kg/cm²

(Cracking pressure)

4. SWING MOTOR (WITH MECHANICAL BRAKE) AND SAFETY VALVE ASSEMBLY

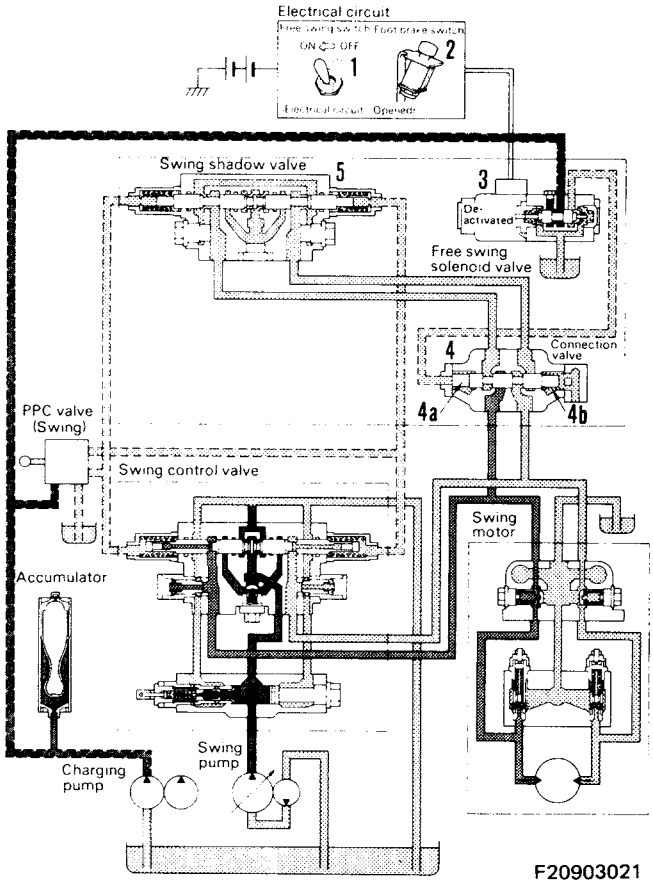


1. Swing motor
2. Swing mechanical brake

OPERATION

Stopping with normal swing

- If free swing switch (acting also as the swing mechanical brake switch) (1) is moved to the ON position, the electrical circuit is opened, solenoid valve (3) is deactivated, and the pressurized oil from the charging pump to connection valve (4) is stopped.
  When this happens, spool (4a) of connection valve (4) is pushed back to the left by return spring (4b). As a result, the swing circuit and swing shadow valve (5) are not connected.
- In this condition, if the swing stop control is operated when the upper structure is swinging, the pressurized oil from the swing motor return side is stopped by the swing control valve (closed center). Therefore, the oil pressure relieved from the safety valve inside the swing motor acts as a hydraulic brake to stop the swing.



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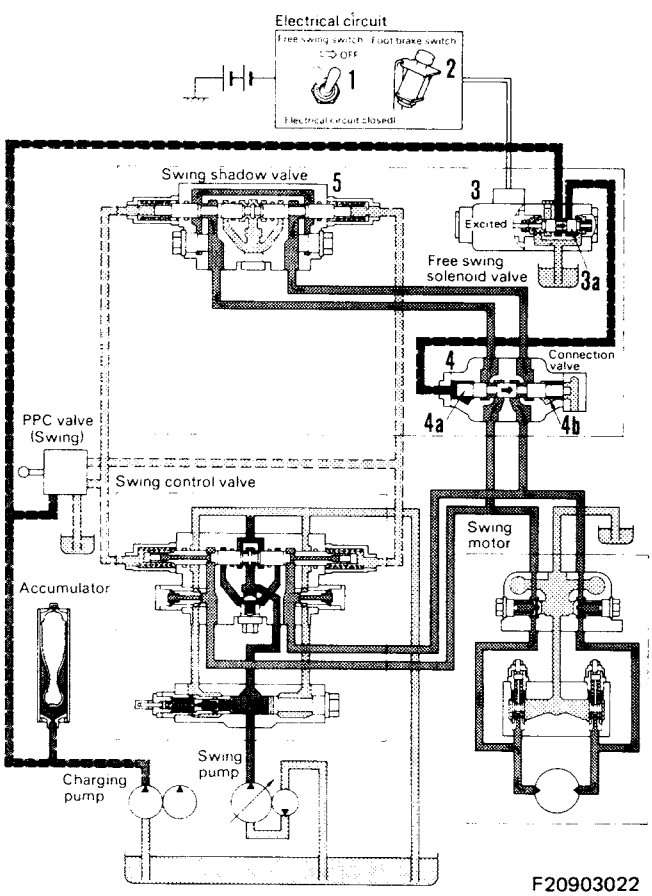
Stopping with free swing

- If free swing switch (1) is set to the OFF position, the electrical circuit is closed, so solenoid valve (3) is excited and spool (3a) is switched.
  When this happens, the pressurized oil from the charging pump acts on the pilot port of connection valve (4) and switches spool (4a). As a result, the swing circuit and swing shadow valve (5) are connected.
- In this condition, if the swing stop control is operated when the upper structure is swinging, the pressurized oil from the swing motor return side is stopped by the swing control valve. However, the swing shadow valve connected to the swing circuit is open center, so the oil from the return side of the motor passes through the inside of the swing shadow valve and flows to the motor supply side.
  As a result, there is no hydraulic brake effect, so the swing is stopped by inertia.
- If foot brake switch (2) is depressed at this time, the electrical circuit is opened and solenoid valve (3) is deactivated. This shuts off the swing circuit and swing shadow valve, so the hydraulic brake is actuated.



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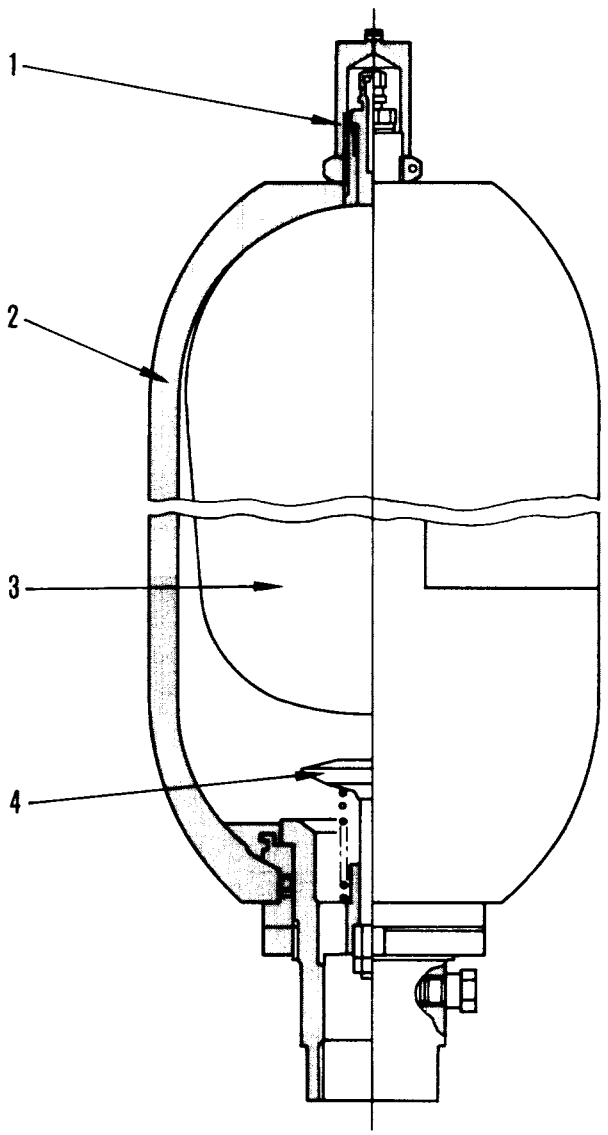
2. ACCUMULATOR



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1. Valve
2. Body
3. Plug
4. Check valve

Volume: 32,500 cc
Operating pressure: 300 kg/cm^2

FUNCTION OF EQUIPMENT

- Greasing switch
  When greasing, turn the switch on to actuate the grease pump.
- Solenoid valve
  The electrical signal from the greasing switch opens or closes the air circuit, thereby opening or closing the supply of air to the grease pump.
- Grease pump
  This is a reciprocal type pump which is driven by air. It generates a grease pressure forty times the air pressure.
  - ★ During greasing, the grease pressure gauge should read 50 — 200 kg/cm^2.
  - ★ If it is below 50 kg/cm^2, it means that the grease can is empty.
  - ★ If it reads more than 200 kg/cm^2, check the indicator of main distributor **A** at the top of the boom foot. If the plunger is out, the line is clogged.

- Stop valve
  When the grease can is being used to pump in grease, this tighten this valve to cut the automatic greasing line.
  - ★ When not using the grease gun, always set to OPEN.
- Hose reel
  This is used to store the grease can hose (automatic wind-in).
- Grease gun
  This is used for greasing (pins around bucket, parts of radiator fan, track tension, etc.).
- Distributor
  This is a valve to distribute the grease coming from the pump to each line. The amount of grease sent to each port is fixed by the internal spool.
  - ★ The spool is a sequential action type (the grease does not flow simply to the low pressure areas, but a fixed amount of grease is supplied properly to each line). So if the line to even one point becomes clogged, the pressure in that line will rise and the system will stop.

1. Accumulator
2. Safety lock valve
3. Pilot relief valve
4. R.H. PPC valve (Bucket)
5. Boom and bucket PPC shuttle valve
6. Line oil filter
7. Engine
8. PTO
9. No. 2 or No. 4 pump
   9a. Front pump
   9b. Rear pump
10. No. 1 or No. 3 pump
   10a. Front pump
   10b. Rear pump
11. Charging pump
12. Pilot of filter
13. Check valve
14. Return oil filter
15. Oil cooler
16. Check valve
17. Hydraulic tank
18. Bucket cylinder
19. Slow-return valve
20. 4-spool control valve (V1 or V3)
   20a. Main relief valve
   20b. Bucket-Hi control valve
21. 5-spool control valve (V2 or V4)
   21a. Main relief valve
   21b. Bucket

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OPERATION

1) Bucket control lever operated to CURL:

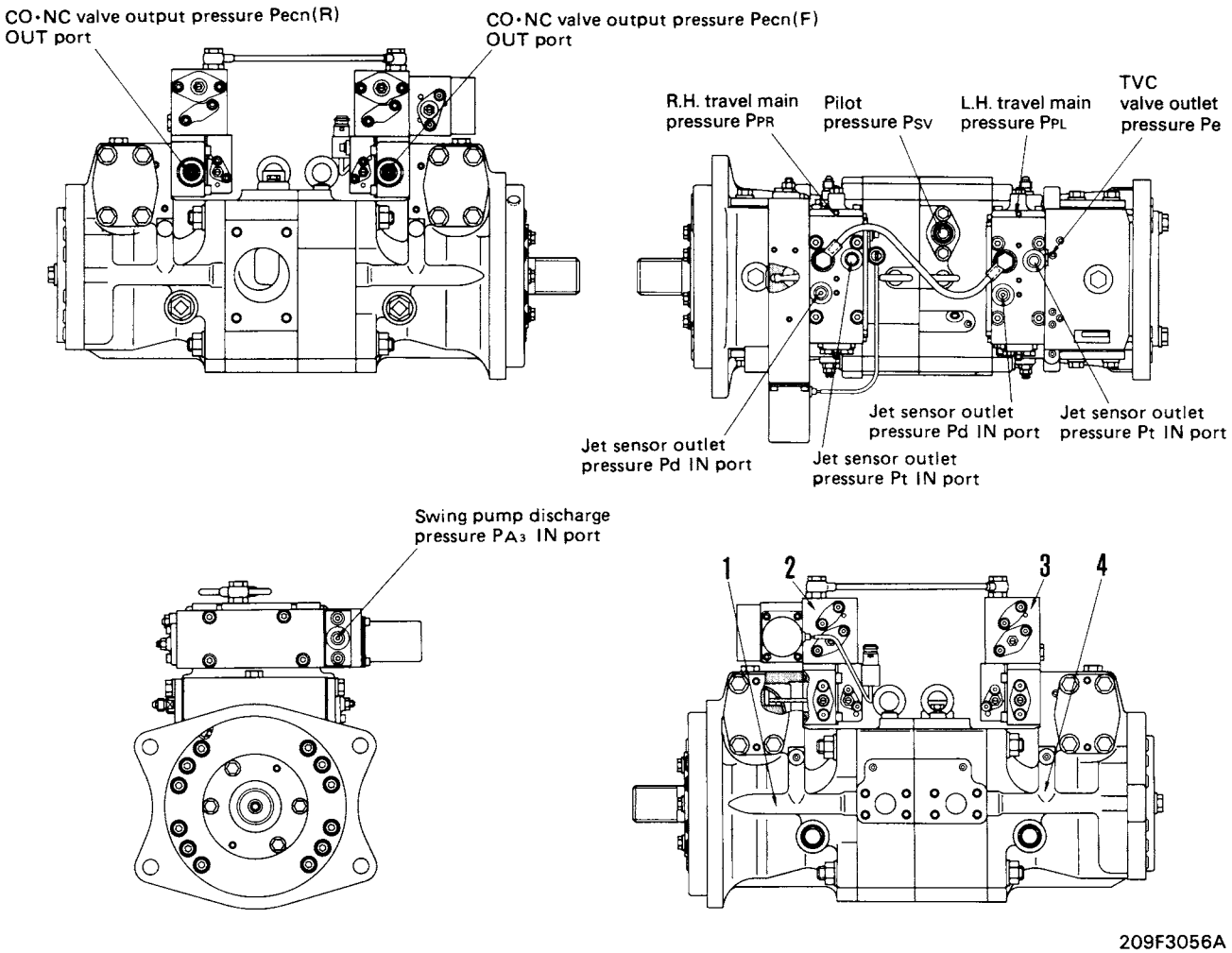
- When the bucket control lever is operated to the CURL position, the spool of PPC valve (4) interconnected with the control lever is actuated. Pilot pressure oil flows from charging pump (11) to the pilot case at the spool end of bucket-Lo control valve (21b) and bucket-Hi control valve (20b), and moves the spool.
- The pressurized oil from No. 2 (or No. 4) rear pump (9b) and No. 1 (or No. 3) rear pump (10b) merges, then passes through bucket-Lo control valve (21b) and enters the bottom end of bucket cylinder (18).
  At the same time, the pressurized oil from No. 2 (or No. 4) front pump (9a) and No. 1 (or No. 3) front pump (10a) merges, then enters bucket-Hi control valve (20b), but the circuit is closed, so the oil does not flow.
- The flow of oil returning from the head end of bucket cylinder (18) is controlled by slow-return valve (19). It flows to bucket-Lo control valve (21b) and bucket-Hi control valve (20b), passes through return oil filter (14) and hydraulic oil cooler (15), and is then drained to hydraulic tank (17).

2) Bucket control lever operated to DUMP:

- When the bucket control lever is operated to the DUMP position, the spool of PPC valve (4) interconnected with the control lever is actuated. Pilot pressure oil flows from charging pump (11) to the pilot case at the spool end of bucket-Lo control valve (21b) and bucket-Hi control valve (20b), and moves the spool.
- The pressurized oil from No. 2 (or No. 4) rear pump (9b) and No. 1 (or No. 3) rear pump (10b) merges, then passes through bucket-Lo control valve (21b) and enters the head end of bucket cylinder (18).
  At the same time, the pressurized oil from No. 2 (or No. 4) front pump (9a) and No. 1 (or No. 3) front pump (10a) merges, then passes through bucket-Hi control valve (20b) and flows also to the head end of bucket cylinder (18).
- All the oil returning from the bottom end of bucket cylinder (18) flows to bucket-Lo control valve (21b), passes through return oil filter (14) and hydraulic oil cooler (15), and is then drained to hydraulic tank (17).

MAIN PUMP

1. No. 2, 4 PUMP ASSEMBLY (HPV90 + 90 WITH TVC VALVE AND CO • NC VALVE ASSEMBLY)



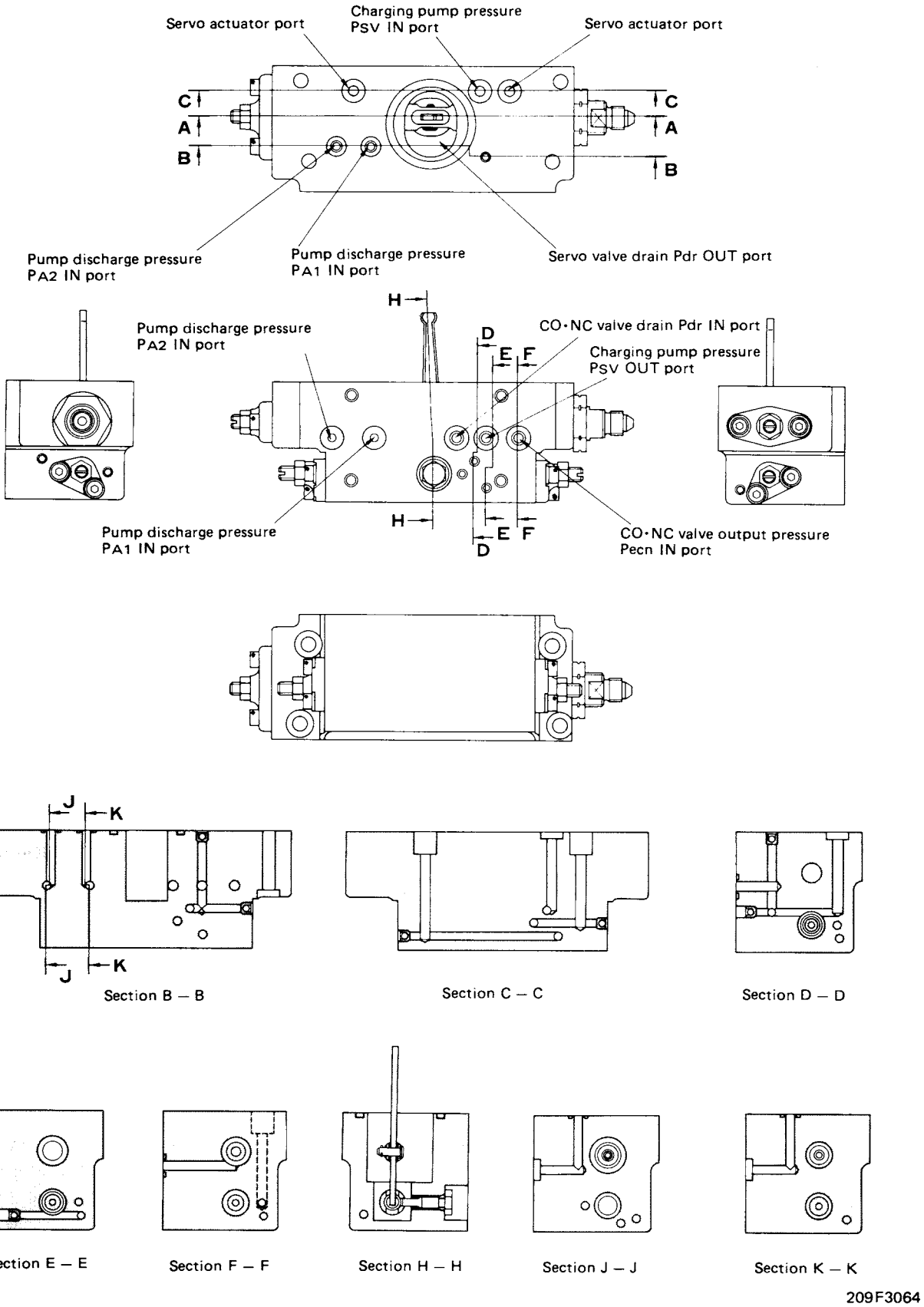
1. Front pump
2. Front pump servo unit assembly
3. Rear pump servo unit assembly
4. Rear pump

OUTLINE

- No. 2, 4 pump assemblies consist of two variable-displacement swash-plate piston pumps, front servo unit assembly, rear servo unit assembly and impeller pump (built in between the front pump and the rear pump).
- The front pump serves 4-spool control valve.
- The rear pump serves 5-spool control valve.

- **SERVO VALVE**
  For No. 2, 4 PUMP and SWING PUMP

★ The diagram shows the servo valve for the No. 2 front pump.



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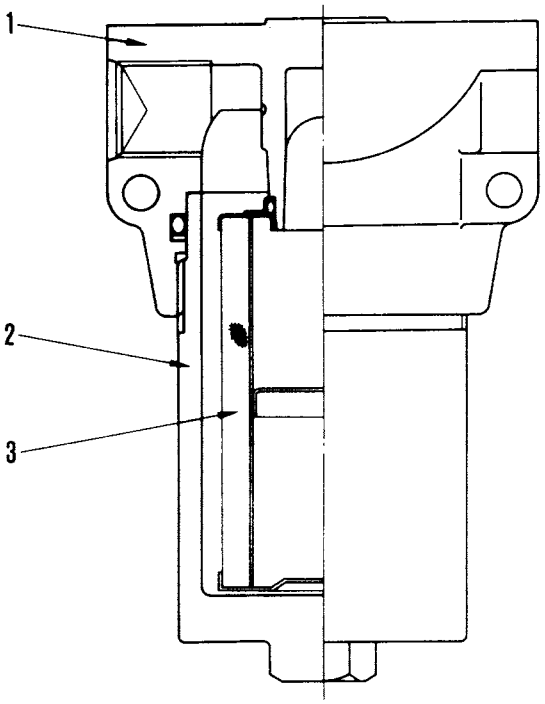
3. PILOT OIL FILTER



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1. Bracket
2. Cartridge
3. Element

OUTLINE

The pilot oil filter is installed to the discharge side of the charging pump. It protects the PPC valves and other pilot pressure equipment.

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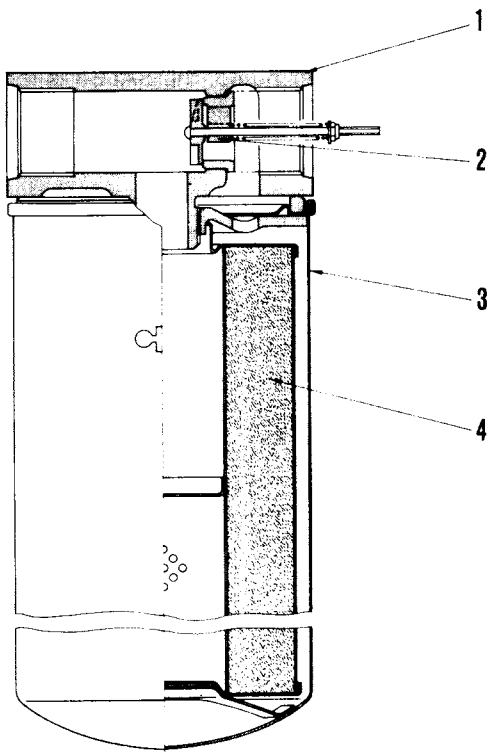
4. DRAIN OIL FILTER



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1. Bracket
2. Safety valve
3. Cartridge
4. Element

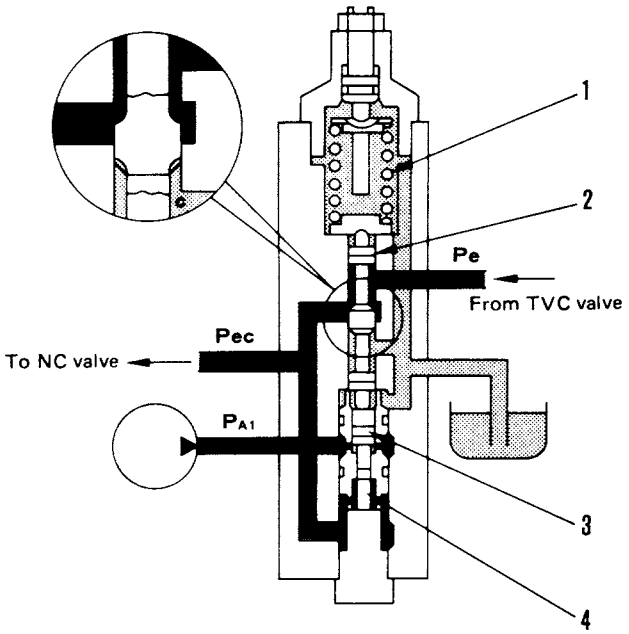
OUTLINE

The filter is installed between the swing motor, travel motor, and hydraulic tank. It acts to remove the dirt and foreign matter in the oil coming from the drain port of each motor.

- Safety valve set pressure: 1.05 kg/cm^2

Operation

1) **When the main pump (or the swing pump) discharge pressure is lower than the relief pressure:**
Since spool (2) is pushed downward by the force of spring (1), port **a** and port **b** are open to each other and TVC valve output pressure **Pe** is equal to the CO valve output pressure. CO valve output pressure **Pec** is then maximized and the main pump (or the swing pump) discharge is also increased to the maximum with the rocker cam angle maximized by the operation of the servo valve.



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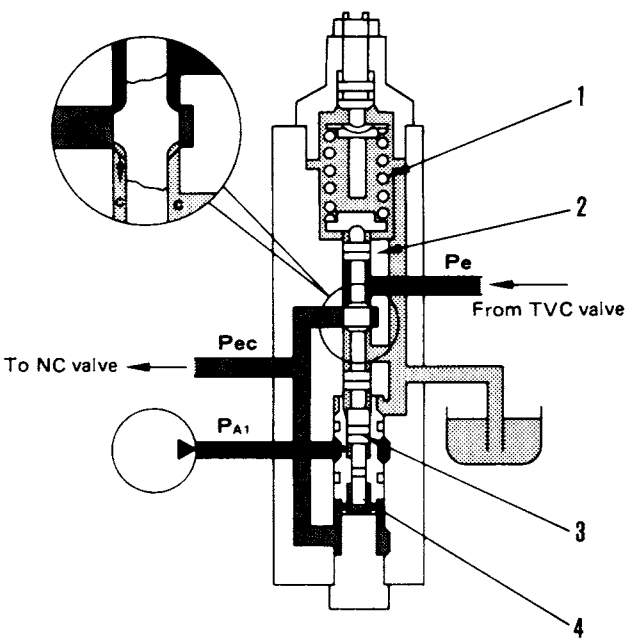
2) **When the main pump (or the swing pump) discharge is higher than the relief pressure:**
When the main pump (or the swing pump) discharge pressure **PA** comes close to the relief pressure owing to an increase in the load, piston (3) is pushed by main pump (or swing pump) discharge pressure **PA** and at the same time piston (4) is pushed by CO valve output pressure **Pec**. When the force of spring (1) is overcome by the pressing force of the piston (2), spool (2) moves upward.
As a result, the spool land restricts the oil flow from port **a** to port **b** and at the same time the opening areas of port **b** and port **c** (drain port) are made larger.
With rocker cam angle reduced by the operation of the servo valve, the main pump (or the swing pump) discharge is reduced.



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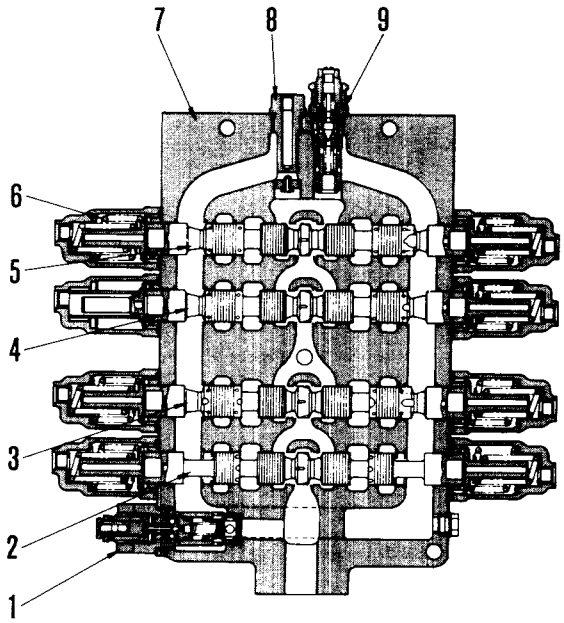
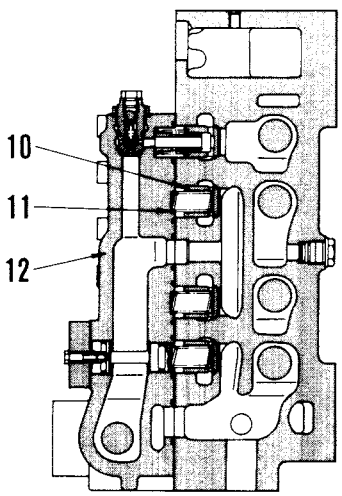
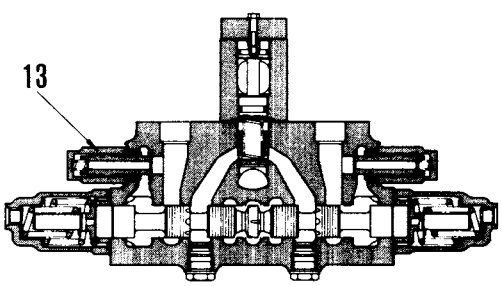


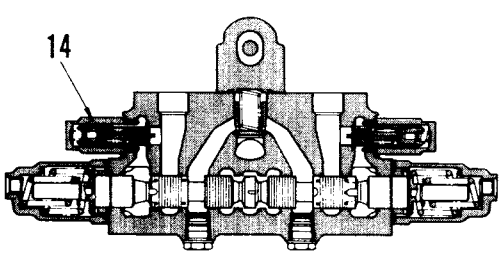
Section A – A



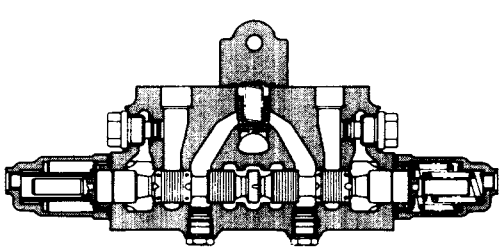
Section B – B



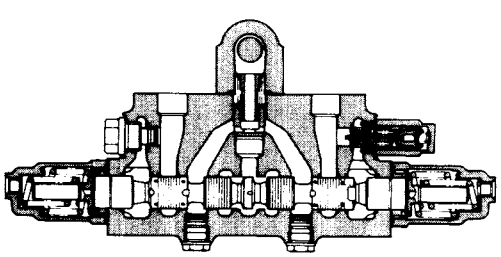
Section C – C



Section D – D



Section E – E



Section F – F

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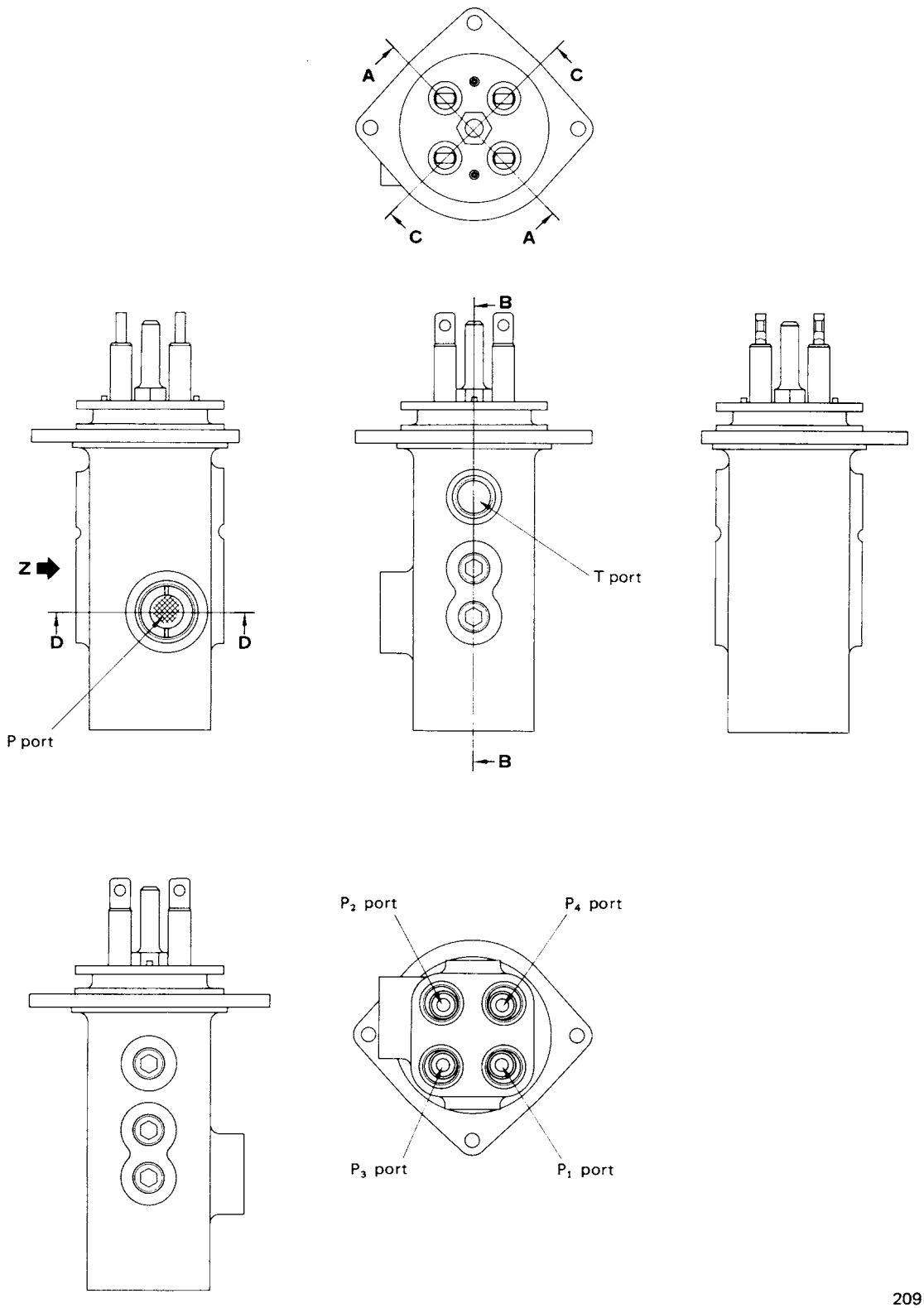
1. Main relief valve
2. Spool (R.H. travel)
3. Spool (Boom-Lo)
4. Spool (Bucket-Hi)
5. Spool (Arm-Hi)
6. Spool return spring
7. Body
8. Jet sensor orifice
9. Jet sensor relief valve
10. Check valve
11. Check valve spring
12. Straight-travel valve (see 10-17)
13. Suction valve
14. Safety-suction valve

FOR TRAVEL CONTROL



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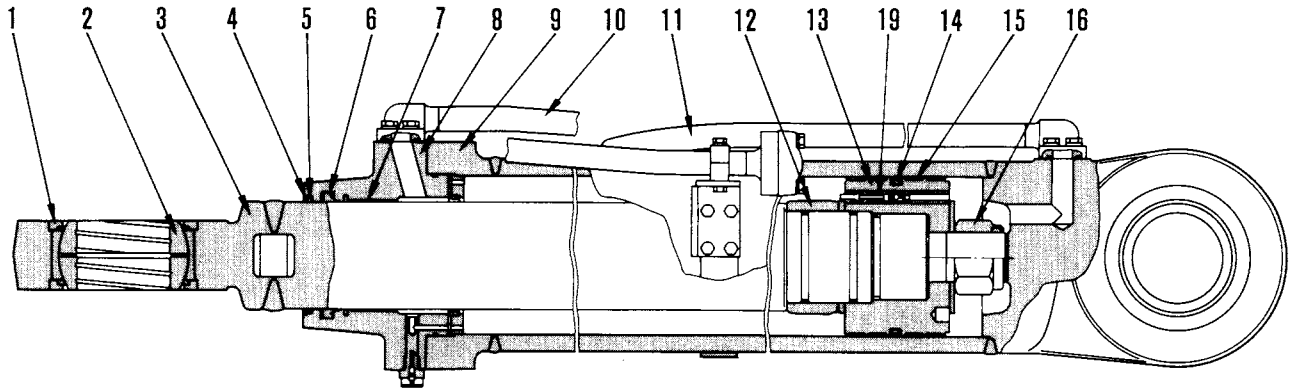
HYDRAULIC CYLINDER

- **BACK HOE**

1. BOOM CYLINDER



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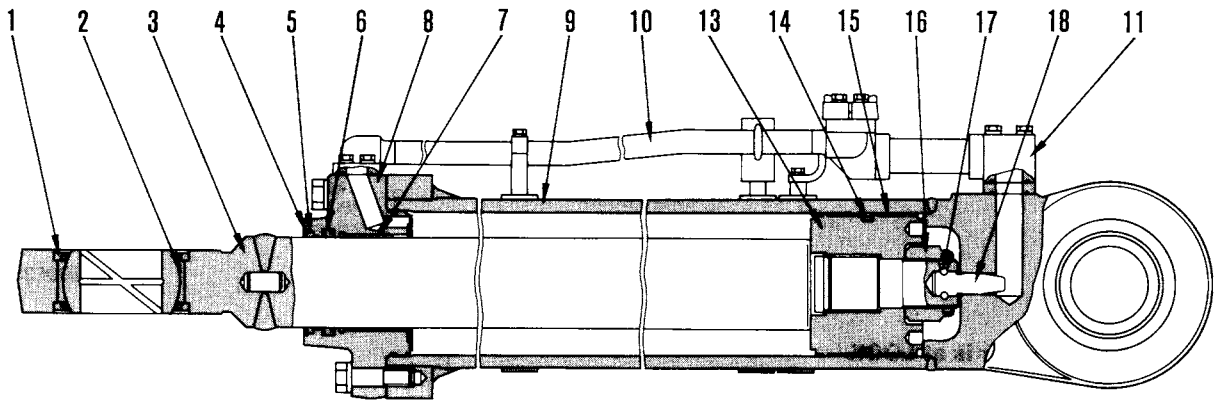
2. ARM CYLINDER



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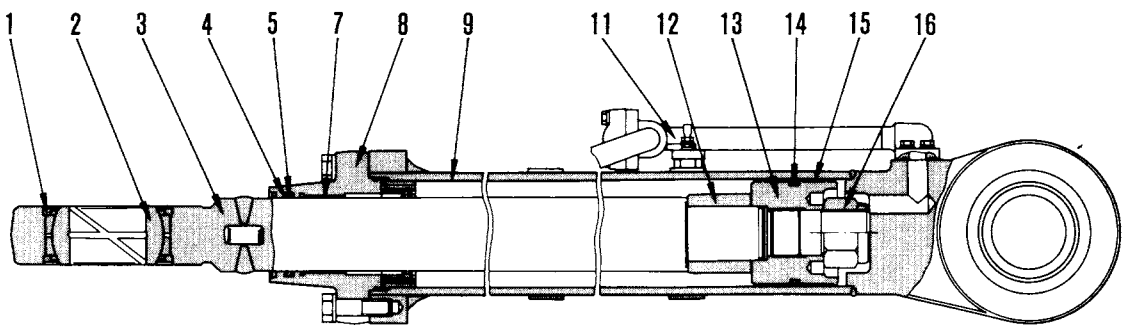
3. BUCKET CYLINDER



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3. TABLE OF SELF-TESTING FUNCTION (ELECTRONIC CONTROL BOX)

1) Priority order for abnormality display
There is an order of priority when displaying the location of abnormalities. When two abnormalities occur at the same time, the item on the left (high priority items) are displayed.
2) To check the abnormality (excluding engine speed sensor), turn the starting switch off and then back to on, and check that the same display appears.

		Display item	Normal display			Abnormality		
			During deceleration (H, S, L modes)	Except during deceleration (H, L modes)	Except during deceleration (S mode)	Abnormality in power source	Abnormality in control box	Abnormality in TVC solenoid system
		Red LED	○	○	○	○	●	◐ /sec 2 times
		Green LED	◐ 2 times /sec	◐ 5 times /sec	●	○	●	○
When operating normally		Engine running (When operating the deceleration)	○					
		Engine running (When putting on the S mode)			○			
		Engien running (When putting on the H, L mode)		○				
		Engine stopped, starting switch ON						
		Prolix switch ON (electronic OLSS cancelled)						○
When abnormality occurs	Prolix circuit switch OFF	Abnormality in power source				○		
		Abnormality in control box					○	
		Abnormality in TVC solenoid system						○
		Abnormality in engine speed sensor system						
		Abnormality in potentiometer (throttle sensor) system						
		Abnormality in auto-deceleration solenoid system						
	Prolix circuit switch ON	Abnormality in power source				○		
		Abnormality in control box					○	
		Abnormality in TVC solenoid system						○
		Abnormality in engine speed sensor system						○
		Abnormality in potentiometer (throttle sensor) system						○
		Abnormality in auto-deceleration solenoid system						○
				Displayed even when deceleration switch is OFF	Displayed even when deceleration switch is OFF	Abnormality displayed if battery voltage goes outside 15 – 30V		

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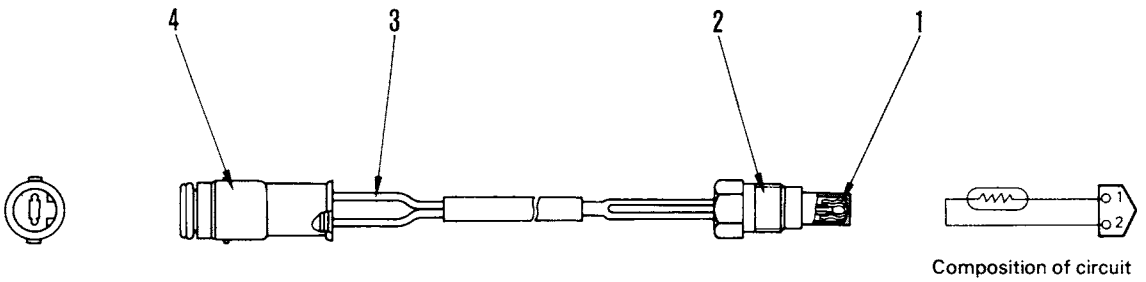
iv) Coolant temperature sensor

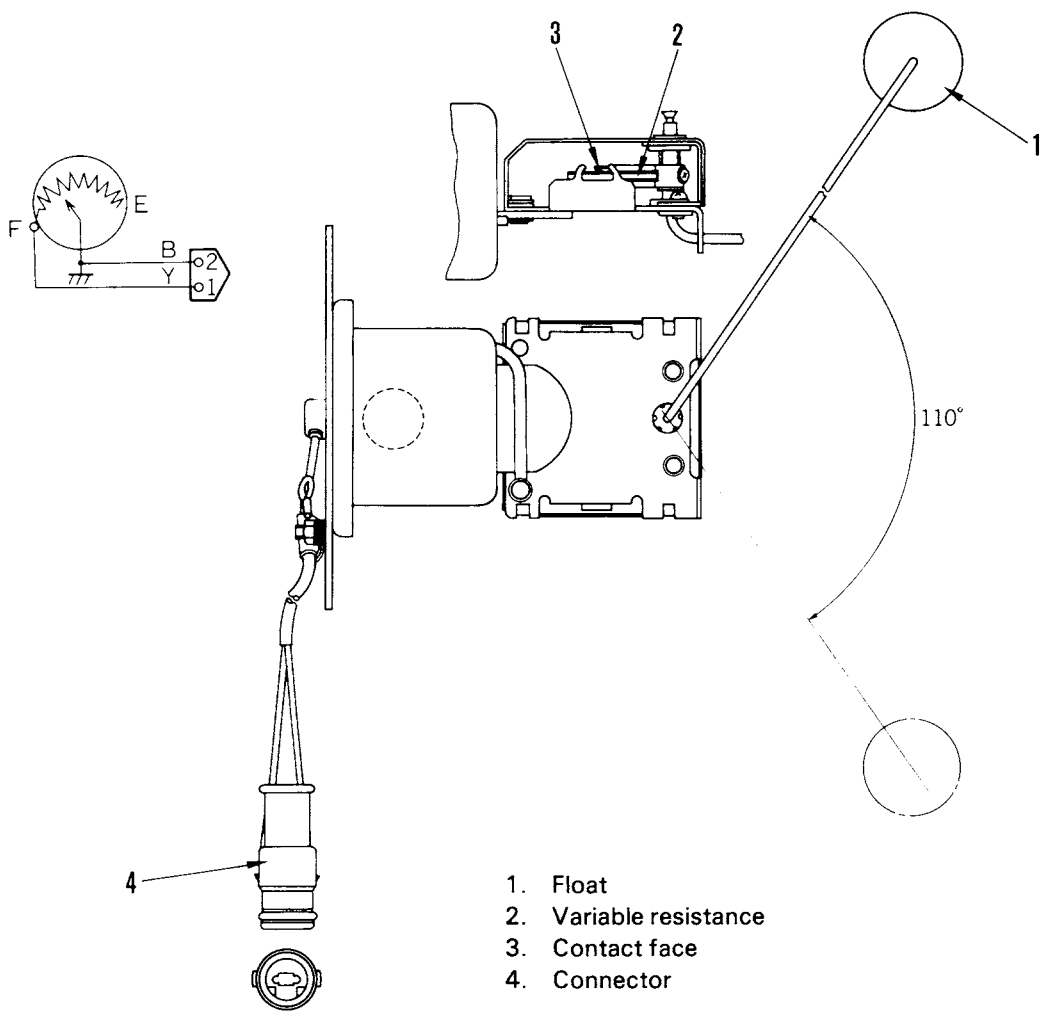


Composition of circuit

21TAF01050

1. Thermister (bead type)
2. Plug (Tightening torque: 4 ± 1 kgm)
3. Wire
4. Connector

v) Fuel level sensor



1. Float
2. Variable resistance
3. Contact face
4. Connector

21TAF01051

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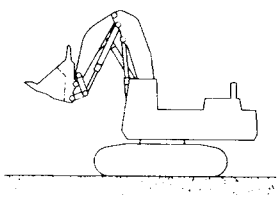
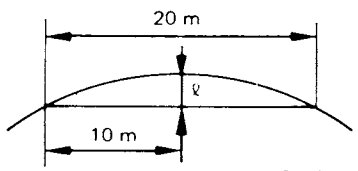
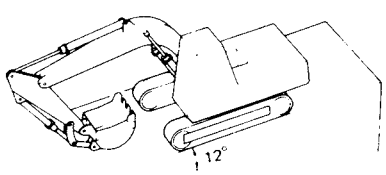
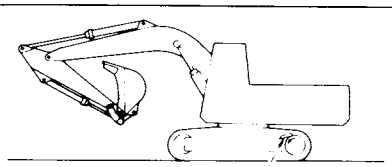
Classification	Item	Conditions	Unit	Standard value	Permissible value
Travel	Travel deviation	Travel posture • BACK HOE  205F2409 • LOADING SHOVEL  21NF01205 • Engine speed: High idling • Oil temp.: 45 – 55°C • On a flat surface, make an approach run of at least 10 m, then travel another 20 m. Measure the travel deviation.  205F2402 * Measure dimension ℓ.	mm	Max. 200	Max. 220
	Hydraulic drift of travel	 F20703007 • Engine: Stopped • Oil temp.: 45 – 55°C • On a slope of 12°, stop the machine with the sprocket sections on the upper side of the slope. • Wait 5 minutes, then measure the distance the machine moves.	mm	0	0
	Leakage of travel motor	 Lock pin F20703008 • Engine speed: High idling • Oil temp.: 45 – 55°C • Relieve oil in travel circuit with lock track shoe.	ℓ/min	Max. 25	30

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<table>
<tr><th>System</th><th>Component</th><th>Connector No.</th><th>Testing method</th><th>Judgement table</th><th>Measurement conditions</th></tr>
<tr><td rowspan="4">Electric and electronic OLSS</td><td>Prolix circuit resistor (For 3-mode selector OLSS)</td><td>CNC7 (male) [Front engine] CNC11 (male) [Rear engine] pins (1), (2)</td><td>Measuring resistance</td><td>Resistance between connector (male) pins (1) – (2): Approx. 10 – 30Ω</td><td>1) Turn starting switch OFF</td></tr>
<tr><td rowspan="3">Mode selector switch</td><td rowspan="3">CNH38 (male) (1), (2), (3), (4) (Check for continuity betweenCNH38 (male) (1) – (2), (4) (3) – (2), (4))</td><td rowspan="3">Continuity</td><td>Input signal normal if it satisfies Tables 1 – 3.
Table 1
BetweenCNH38 (male) (1) – CNH38 (male) (2): No continuity
BetweenCNH38 (male) (3) – CNH38 (male) (4): No continuity</td><td>1) Turn starting switch OFF
2) Turn mode selector switch to H mode</td></tr>
<tr><td>Table 2
BetweenCNH38 (male) (1) – CNH38 (male) (2): No continuity
BetweenCNH38 (male) (3) – CNH38 (male) (4): Continuity</td><td>1) Turn starting switch OFF
2) Turn mode selector switch to S mode</td></tr>
<tr><td>Table 3
BetweenCNH38 (male) (1) – CNH38 (male) (2): Continuity
BetweenCNH38 (male) (3) – CHN38 (male) (4): Continuity</td><td>1) Turn starting switch OFF
2) Turn mode selector switch to L mode</td></tr>
<tr><td rowspan="2">Auto-deceleration</td><td rowspan="2">Hydraulic pressure switch for arm, boom, bucket and travel pick-up</td><td rowspan="2">CNC12 (male) pins (1), (2)</td><td>Short connector</td><td>1) When using the short connector, the following results show that the sensor is defective.
Short connector connected: Deceleration works normally
CNC12 disconnected: Deceleration does not work</td><td>1) Start engine
2) Fuel lever FULL</td></tr>
<tr><td>Continuity</td><td>1) When carrying out a continuity test, the following results show that the sensor is normal.
Each control lever at neutral: Continuity
Any lever in operating position: No continuity</td><td>1) Turn starting switch OFF
2) Start engine</td></tr>
</table>

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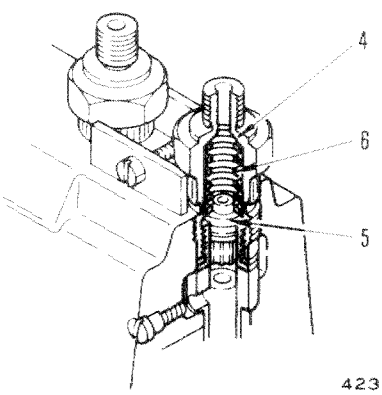
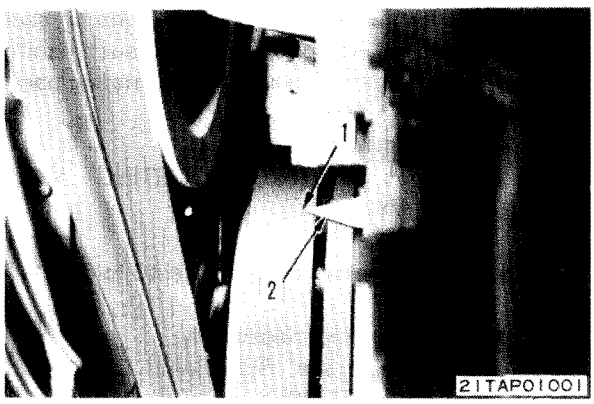
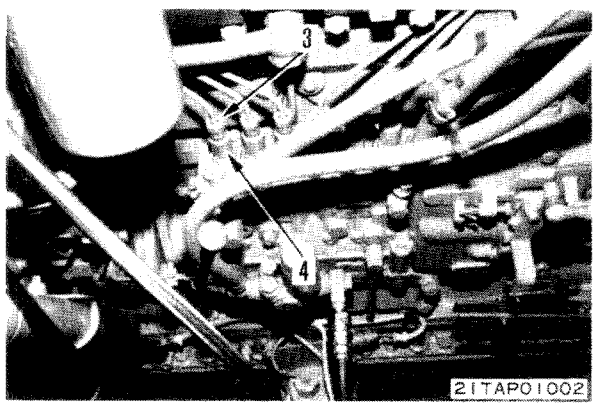
ADJUSTING FUEL INJECTION TIMING

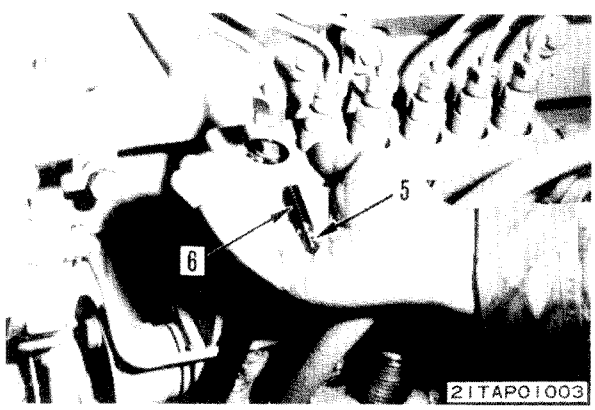
1. Rotate crankshaft in normal direction to align 28° IJ line on crankshaft pulley (1) with pointer (2) correctly.
   ★ When stamp line of coupling end is not in foreground, rotate crankshaft one more turn.
2. Disconnect fuel injection pipe (3) of No. 1 cylinder.
3. Remove delivery valve holder (4), then remove delivery valve (5), spring (6) and spring seat, and install delivery valve holder (4) again.
4. Place fuel control lever at "Full" position.
5. Remove cover, and loosen nuts (7) in oblong hole of mount flange of injection pump.
6. Operating the priming pump, rotate flange on injection pump side little by little until no fuel flows out of delivery valve holder.
   ★ Injection timing is ADVANCED when flange on injection pump side rotate to cylinder block, and RETARD when flange on injection pump side rotate to outside.
7. Tighten nut (7) in oblong hole of mounting flange of fuel injection pump.
8. Remove delivery valve holder (4), assemble spring seat, delivery valve (5) and spring (6), then install delivery valve holder (4) again.
   kgm Delivery valve holder: 11.5 ± 0.5 kgm
9. Connect fuel injection pipe (3).
   kgm Sleeve nut: 2.4 ± 0.1 kgm

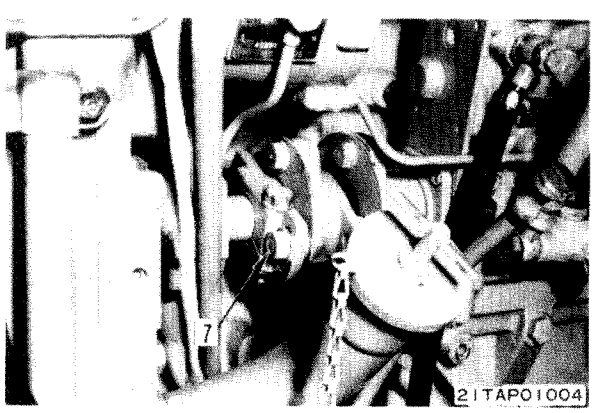


423F302A









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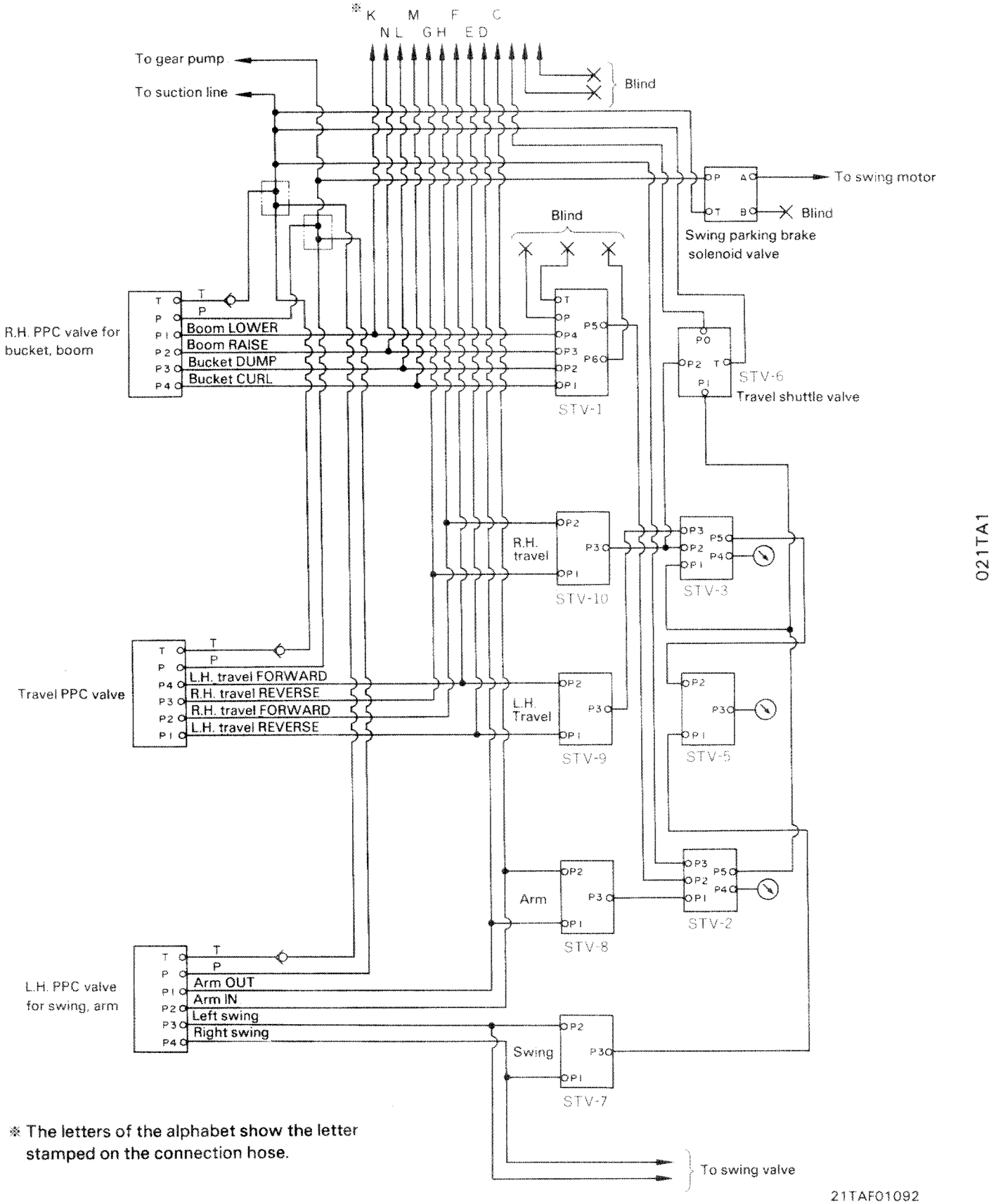
INSIDE CAB BASE, PILOT PIPING CONNECTION DIAGRAM



※ The letters of the alphabet show the letter stamped on the connection hose.

6. Slowly open valve (6) of the nitrogen cylinder further and charge the accumulator with nitrogen gas.
   ★ Close valve (6) of the nitrogen cylinder from time to time and take the reading of pressure gauge (7) of the charging valve assembly when it is steady.

7. When nitrogen gas has been added to the specified pressure, close valve (6) of the nitrogen cylinder firmly.
   ★ Specified pressure: 135 kg/cm^2
   ★ If the nitrogen goes above the specified pressure, turn valve (4) to the left and release the gas gradually until it is the specified pressure.

8. Turn valve (4) to the left until it closes, then turn valve (5) to the left to open it and release the pressure remaining inside the hose and tool **A**.

9. Remove tool **A** and install plug (3).

10. Using handle (209-98-11140), tighten stop valves (2) and (1).

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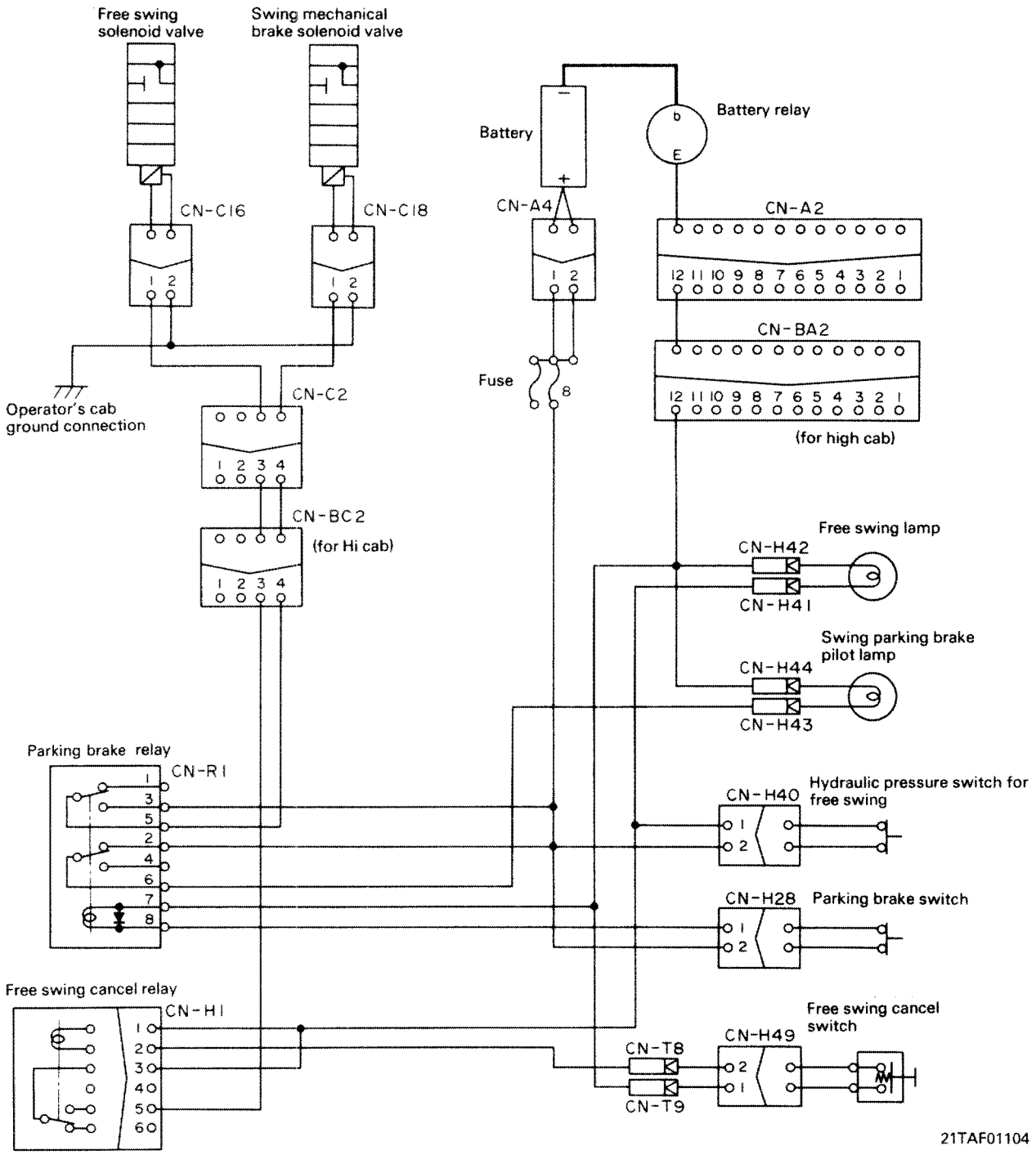
SWING PARKING BRAKE AND SWING BRAKE SYSTEM



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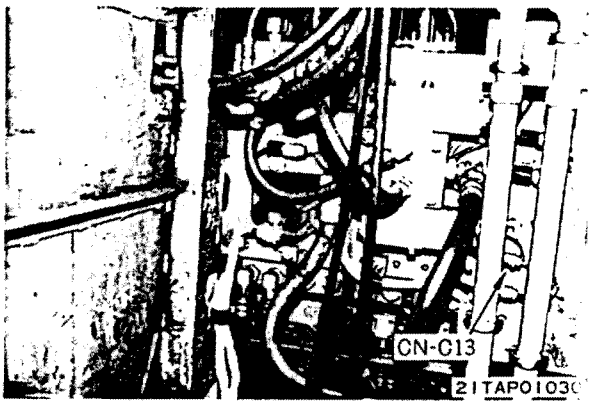
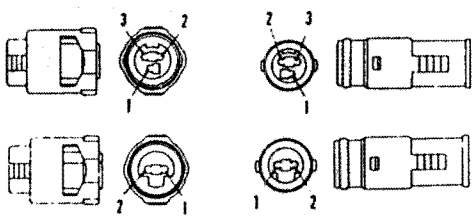
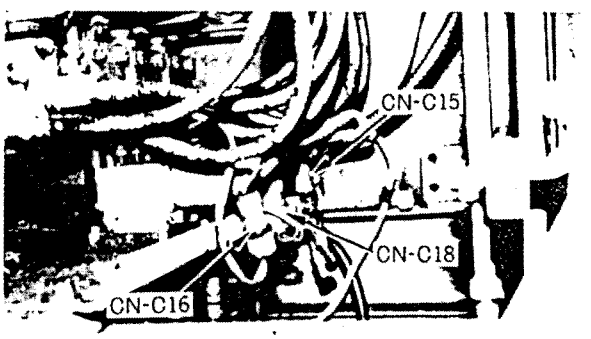
CN-C13 (Bucket EPC solenoid)
ECONOSEAL connector 2 pins



CN-C15 (Bottom dump solenoid)
ECONOSEAL connector 3 pins
CN-C16 (Free swing solenoid)
ECONOSEAL connector 2 pins
CN-C18 (Swing parking brake solenoid)
ECONOSEAL connector 2 pins





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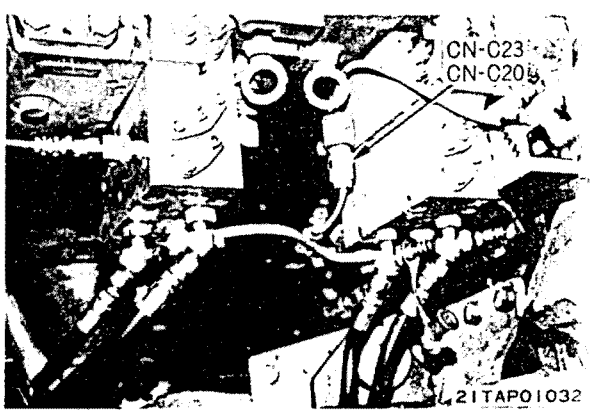
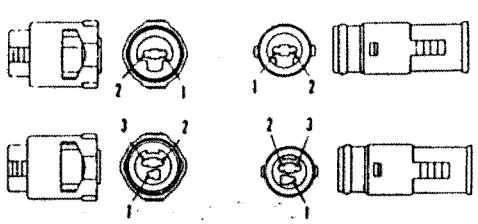
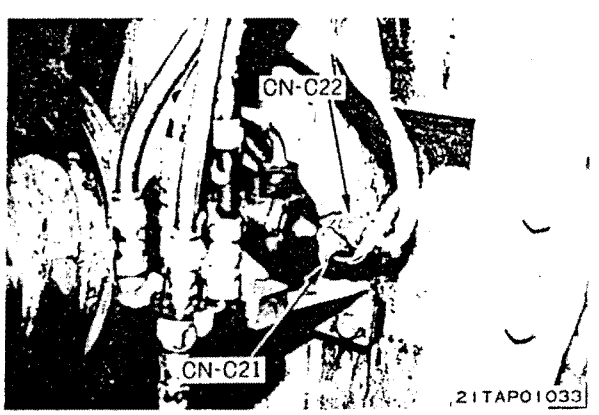
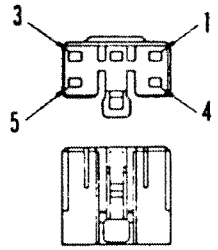
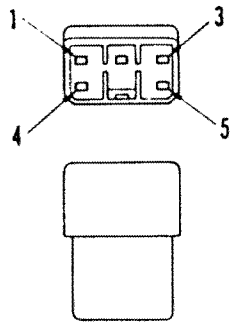
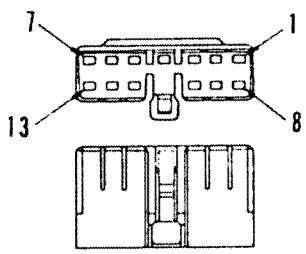
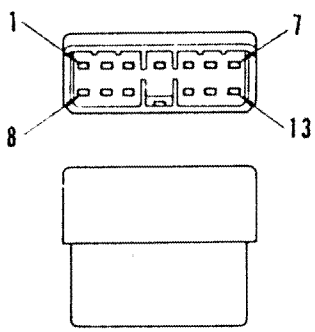
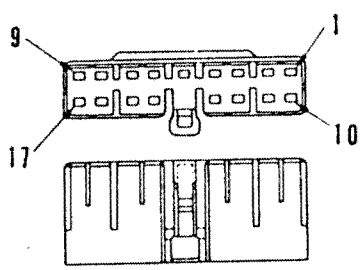
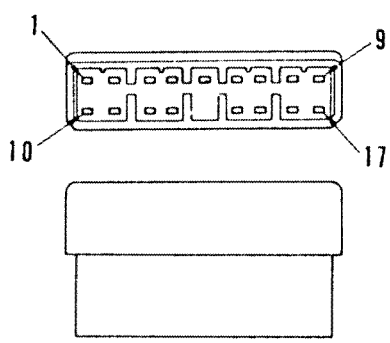
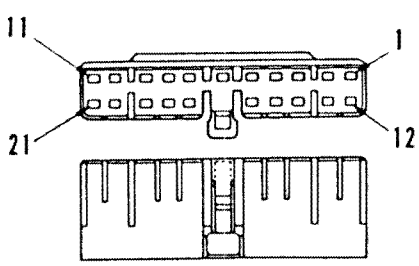
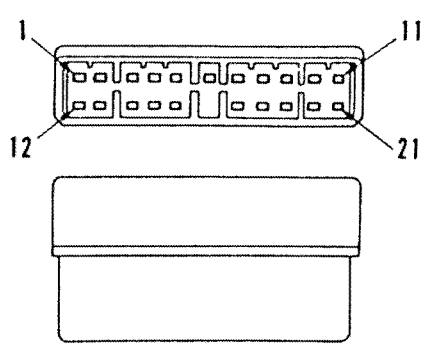
CN-C20 (Front engine TVC solenoid)
ECONOSEAL connector 2 pins
CN-C23 (Rear engine TVC solenoid)
ECONOSEAL connector 2 pins



CN-C21 (Auto-deceleration solenoid B terminal)
ECONOSEAL connector 2 pins
CN-C22 (Auto-deceleration solenoid A terminal)
ECONOSEAL connnector 3 pins





① No. of pins	② MIC CONNECTORS	
	③ Female connector (socket)	④ Male connector (pin)
5	 142F410	 142F411
13	 142F412	 142F413
17	 142F414	 142F415
21	 142F416	 142F417

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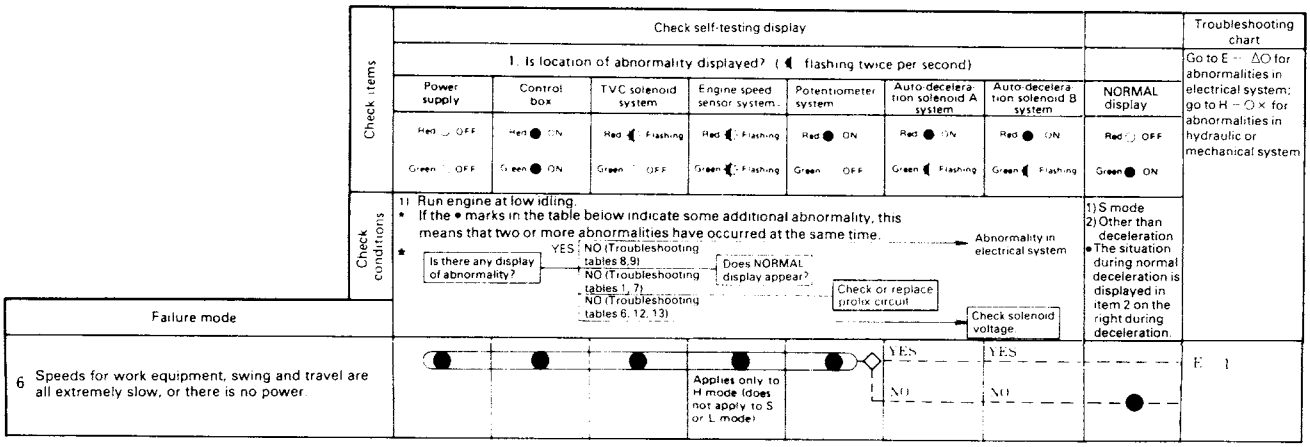
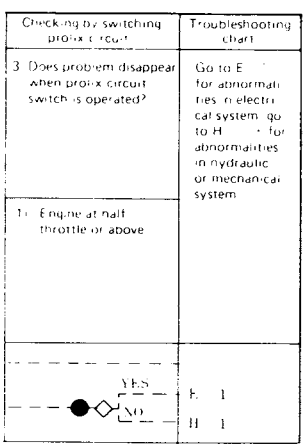
Example Failure mode (machine deviates excessively)

Step 1 Does the self-testing display indicate any abnormality?
Check the red and green LEDs on the control box to see if the self-testing display indicates any abnormality.



Judgement If the abnormality display corresponds to the ● mark in the above table → abnormality in electrical system. Go to troubleshooting table E-1.
If NORMAL display appears in other than S mode and during deceleration → checks next ● mark (checking by switching to prolix circuit).

Step 2 Checking by switching to prolix circuit
Operate to prolix circuit switch, operate in the same way as when the failure symptom appears, and check that the same symptoms appears.
Judgement If symptoms do not appear → abnormality in electrical circuit. Go to E-1 step 9.
If symptoms appears → abnormality in hydraulic or mechanical systems. Go to H-1.



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Cause	Remedy
Control box defective. (circuit between CNC8 (6), (7) and inside of box)	Replace
Disconnection in wiring harness, defective contact or contact between chassis ground and CNE9 (1), (2) — CNA18 (10), (9) — CNC8 (6), (7).	Clean (defective contact) or replace.
Potentiometer defective or mounting defective.	Adjust or replace.
Disconnection in wiring harness, defective contact or contact between chassis ground CNE9 (1), (2) — CNA18 (10), (8) — CNC8 (6), (8).	Clean (defective contact) or replace.
Control box defective. (circuit between CNC8 (6), (8) and inside of box)	Replace

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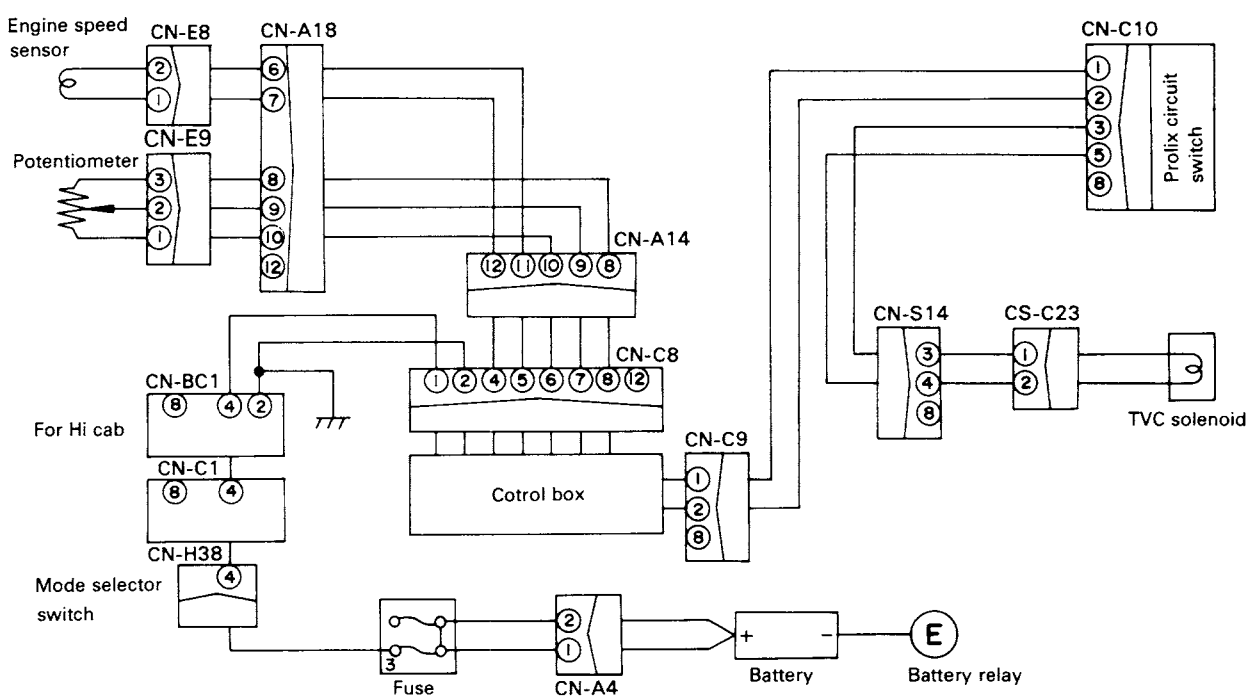
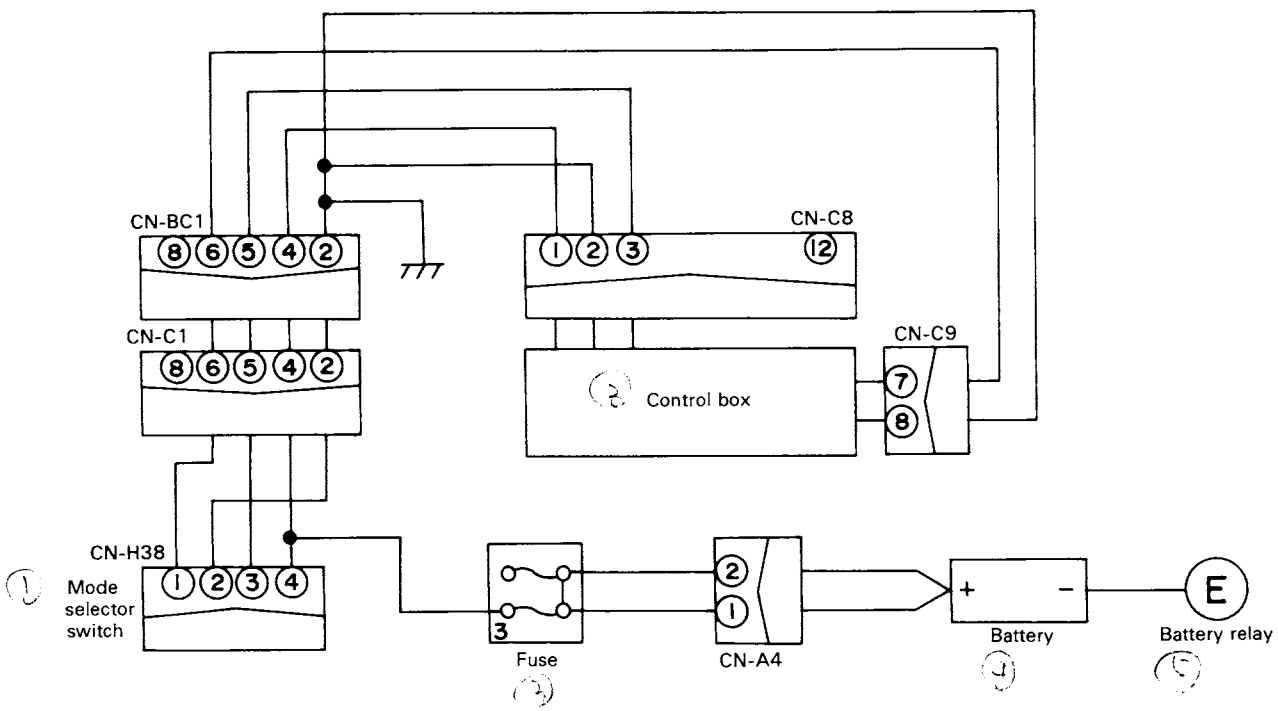
E-1 Related electrical circuit diagram

(2) For rear

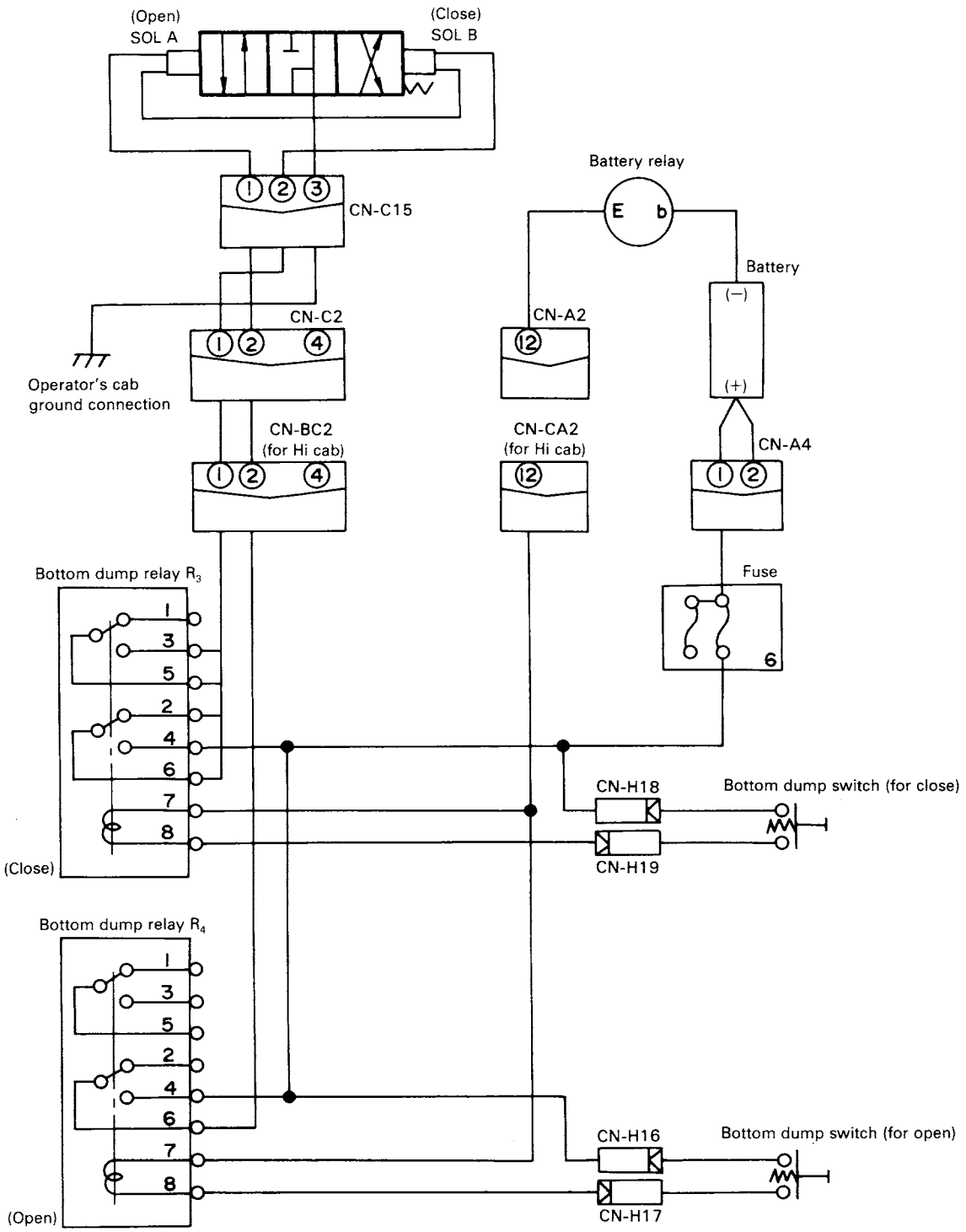


★ FOR MACHINE EQUIPPED WITH 3-STAGE MODE SELECTOR OLSS.

E-3 Related electrical circuit diagram
(2) For rear



E-7 Related electrical circuit diagram



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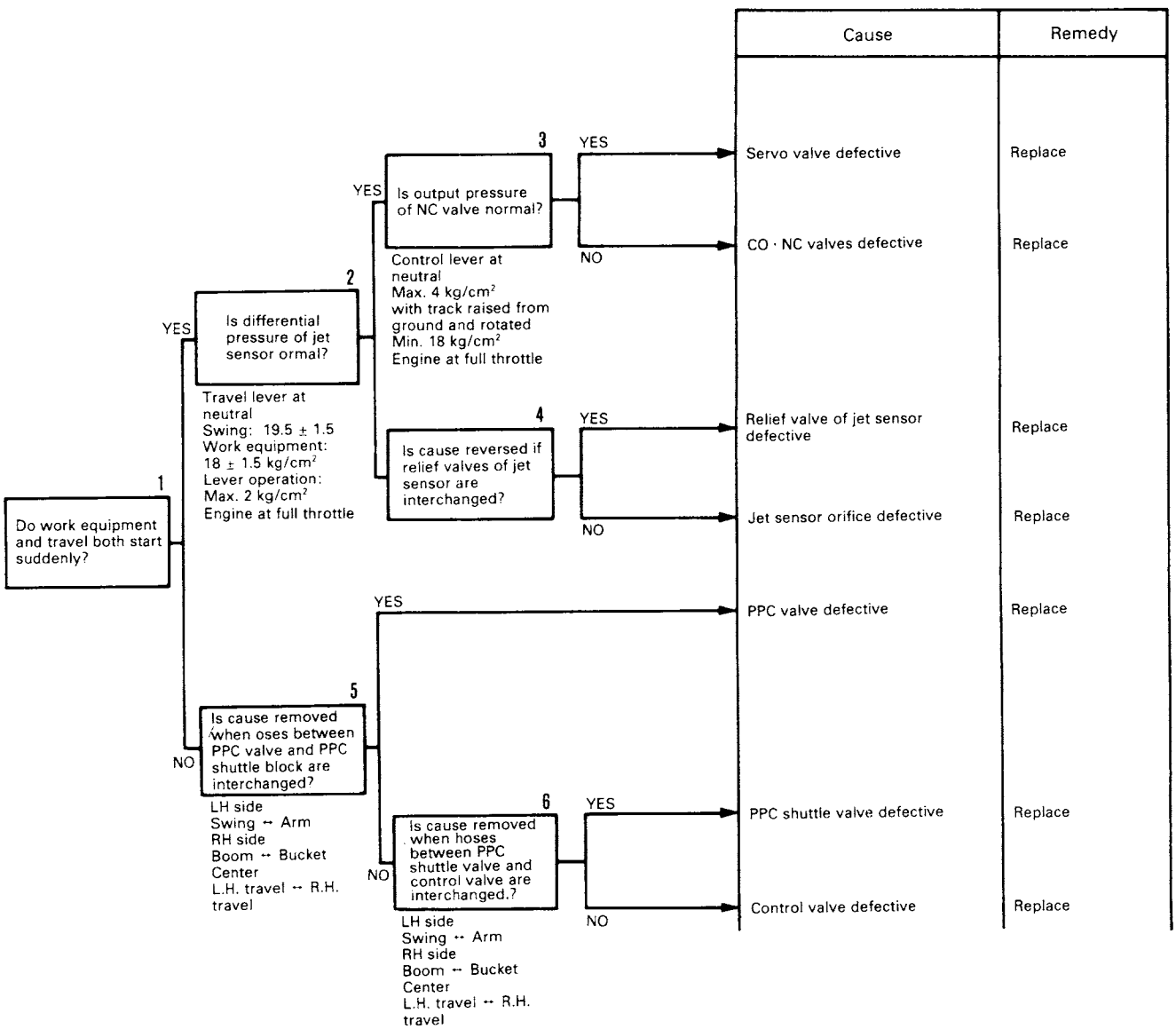
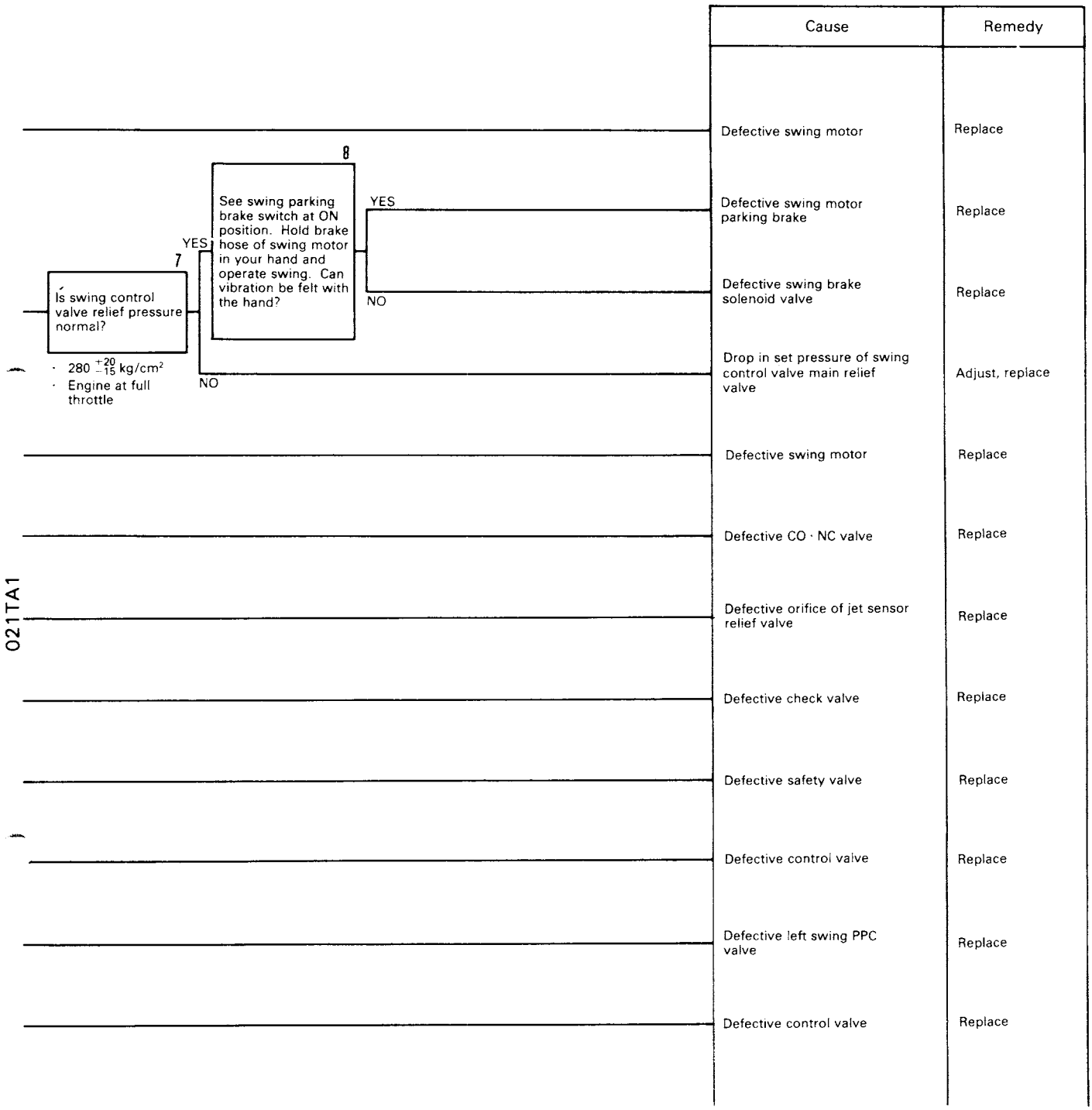
Troubleshooting Chart No. H-5
(3-Stage mode selector OLSS)
Failure mode: Work equipment, travel, and swing start suddenly during fine control operations.

★ The judgement values in the troubleshooting are the values for H mode.



Troubleshooting tools	Oil pressure gauge (60 kg/cm²)	Sleeve nut, plug
	Thermistor kit	—


7
Is swing control valve relief pressure normal?
· 280 +20 −15 kg/cm²
· Engine at full throttle
YES
NO
8
See swing parking brake switch at ON position. Hold brake hose of swing motor in your hand and operate swing. Can vibration be felt with the hand?
YES
NO
Cause
Remedy
Defective swing motor
Replace
Defective swing motor parking brake
Replace
Defective swing brake solenoid valve
Replace
Drop in set pressure of swing control valve main relief valve
Adjust, replace
Defective swing motor
Replace
Defective CO · NC valve
Replace
Defective orifice of jet sensor relief valve
Replace
Defective check valve
Replace
Defective safety valve
Replace
Defective control valve
Replace
Defective left swing PPC valve
Replace
Defective control valve
Replace

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Troubleshooting Chart No. W-1

Failure mode: In ARC digging mode (horizontal selector switch OFF), machine carries out horizontal digging or bucket angle compensation.

★ When disconnecting connectors to connect the T-adapter (or socket adapter), always turn the starting switch OFF.

★ When connecting the T-adapter, connect the connector specified in ( ) to the side specified; if there is no connector specified in ( ), connect to both the male nd female.

★ After checking, connect disconnected connectors immediately.

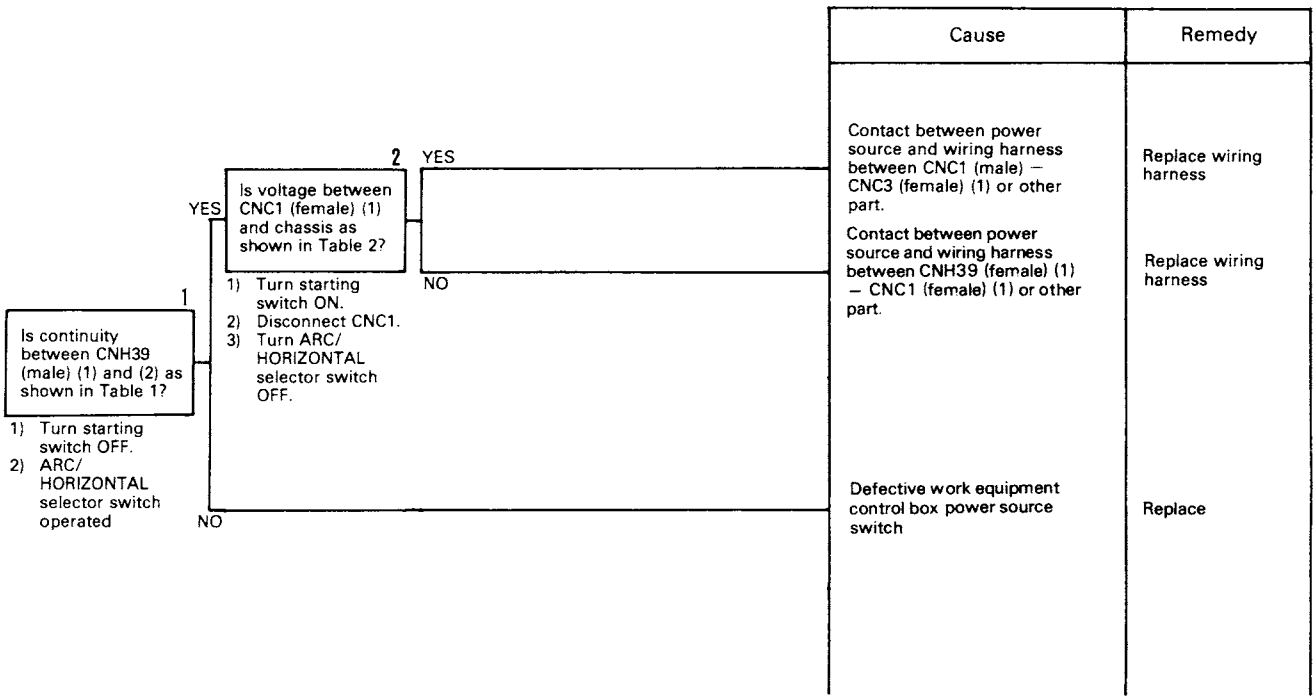

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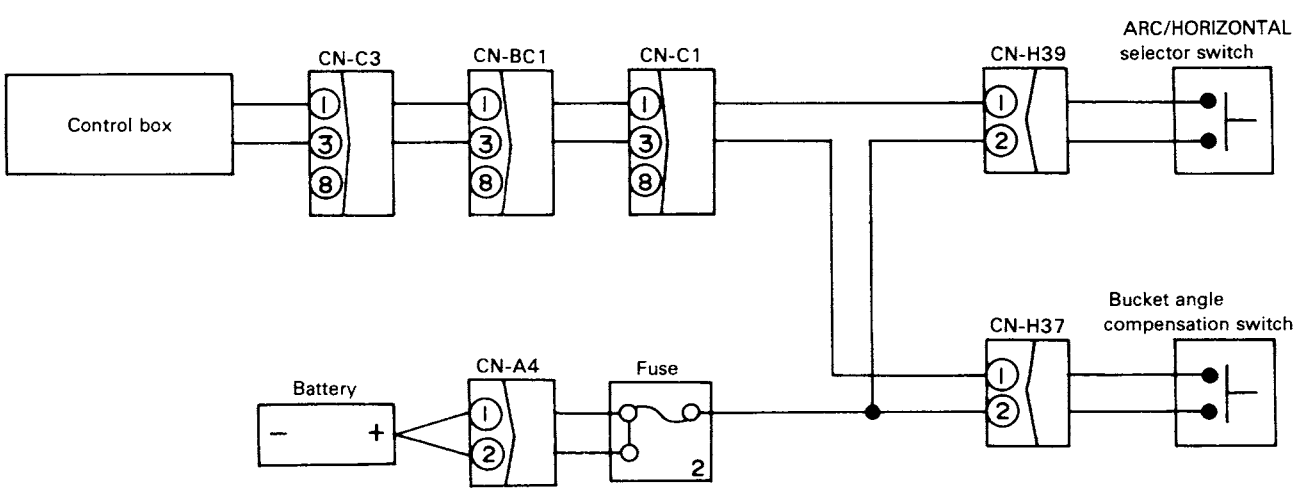
Table 1

Work equipment control box power source switch	ON	Continuity
	OFF	No continuity

Table 2

Work equipment control box power source switch	ON	Approx. 24V
	OFF	0V

W-1 Related electrical circuit diagram



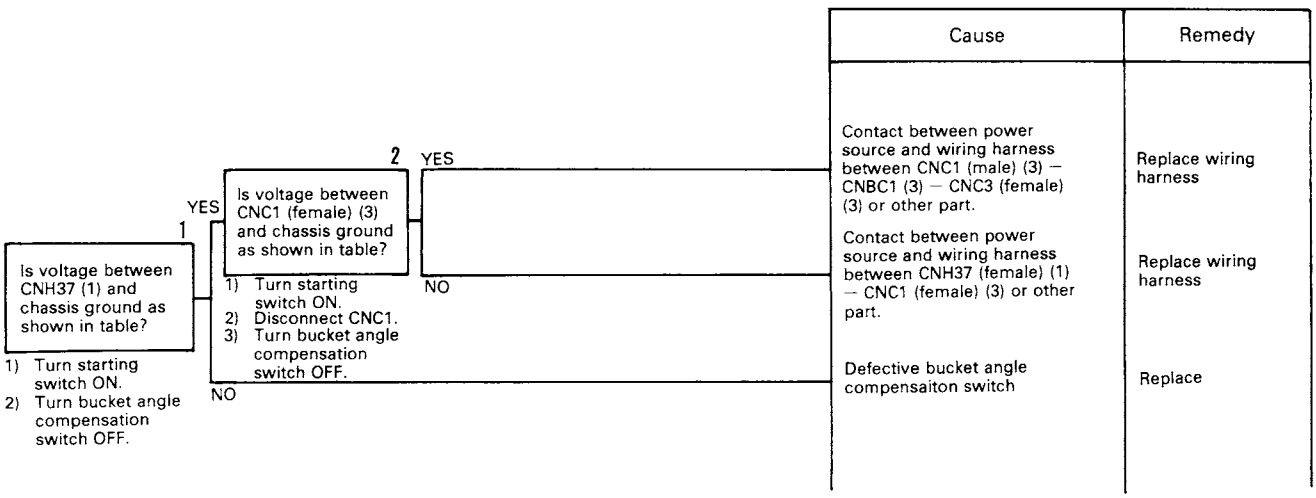
Troubleshooting Chart No. W-3

Failure mode: In horizontal digging mode (bucket angle compensation switch OFF), machine carries out bucket angle compensation.

★ When disconnecting connectors to connect the T-adapter (or socket adapter), always turn the starting switch OFF.

★ When connecting the T-adapter, connect the connector specified in ( ) to the side specified; if there is no connector specified in ( ), connect to both the male and female.

★ After checking, connect disconnected connectors immediately.



Table

Bucket angle compensation switch	ON	24V
	OFF	0V

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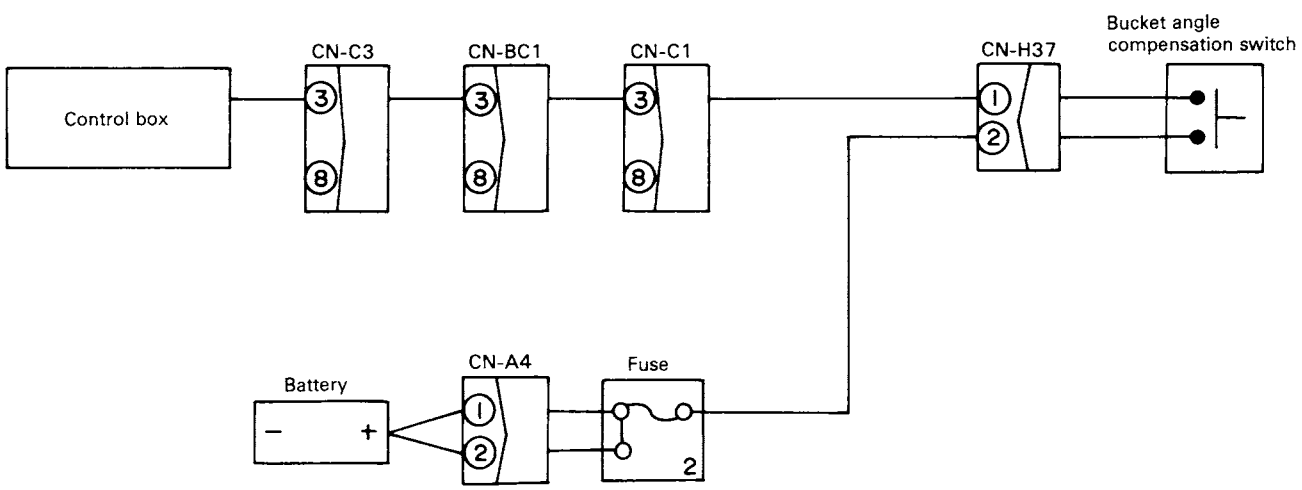
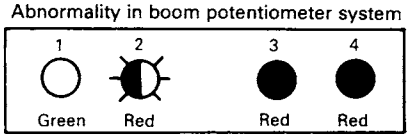
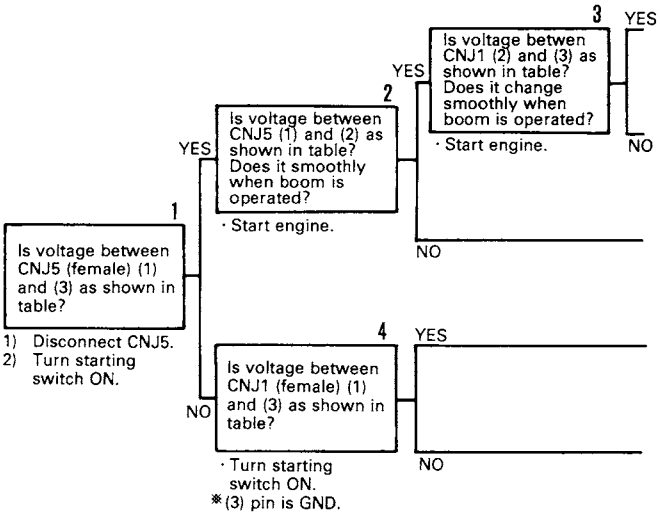
W-3 Related electrical circuit diagram



a) - 5) Abnormality in boom potentiometer system

Abnormality in boom potentiometer system





Table

CN-J5	CN-J1	Voltage V
(1) ~ (3)	(1) ~ (3)	7.3 ~ 7.35
(1) ~ (2)	(2) ~ (3)	0.5 ~ 4.7

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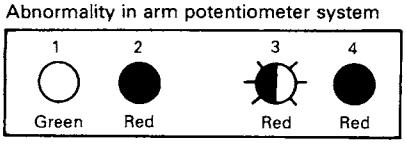
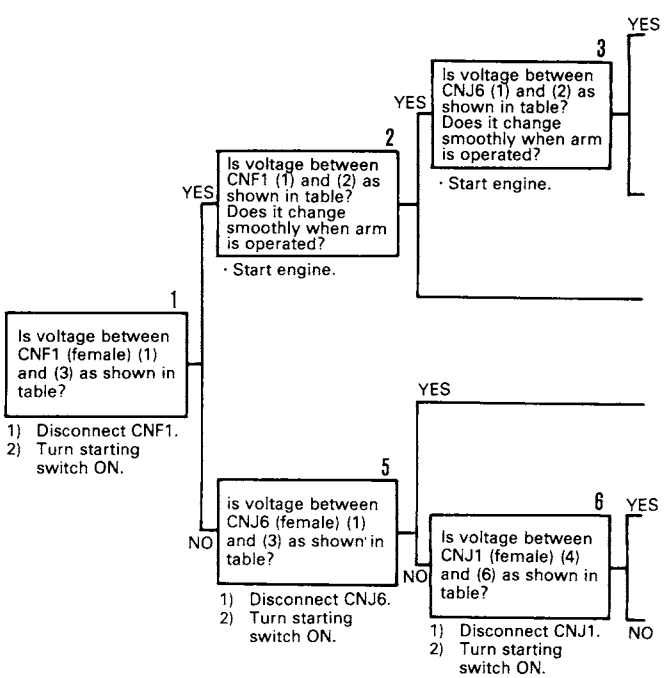
a) - 6) Abnormality in arm potentiometer system

Abnormality in arm potentiometer system

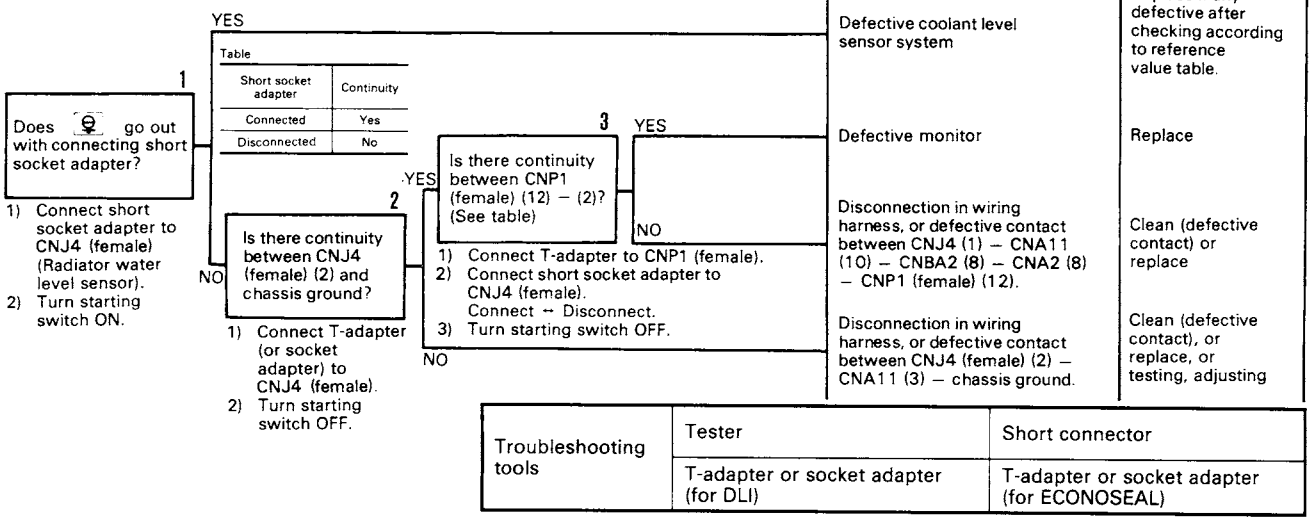




Table

CN-F1	CN-J6	CN-J1	Voltage V
(1) – (3)	(1) – (3)	(4) – (6)	7.3 – 7.35
(1) – (2)	(1) – (2)	(5) – (6)	0.5 – 4.7

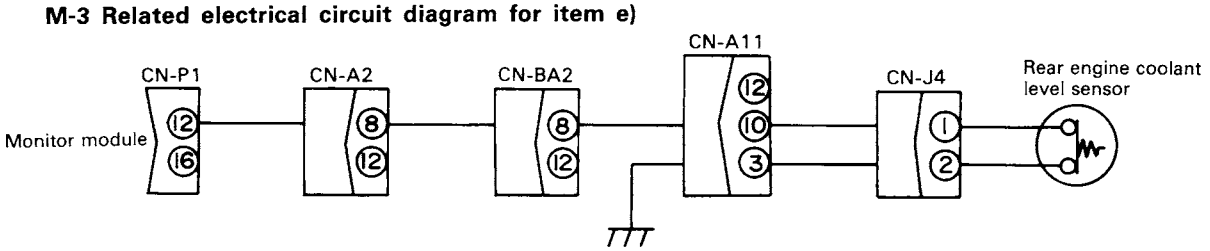
e) (Coolant level) flashes.



Cause	Remedy
Defective coolant level sensor system	Replace if any defective after checking according to reference value table.
Defective monitor	Replace
Disconnection in wiring harness, or defective contact between CNJ4 (1) – CNA11 (10) – CNBA2 (8) – CNA2 (8) – CNP1 (female) (12).	Clean (defective contact) or replace
Disconnection in wiring harness, or defective contact between CNJ4 (female) (2) – CNA11 (3) – chassis ground.	Clean (defective contact), or replace, or testing, adjusting

Troubleshooting tools	Tester	Short connector
	T-adapter or socket adapter (for DLI)	T-adapter or socket adapter (for ECONOSEAL)

M-3 Related electrical circuit diagram for item e)



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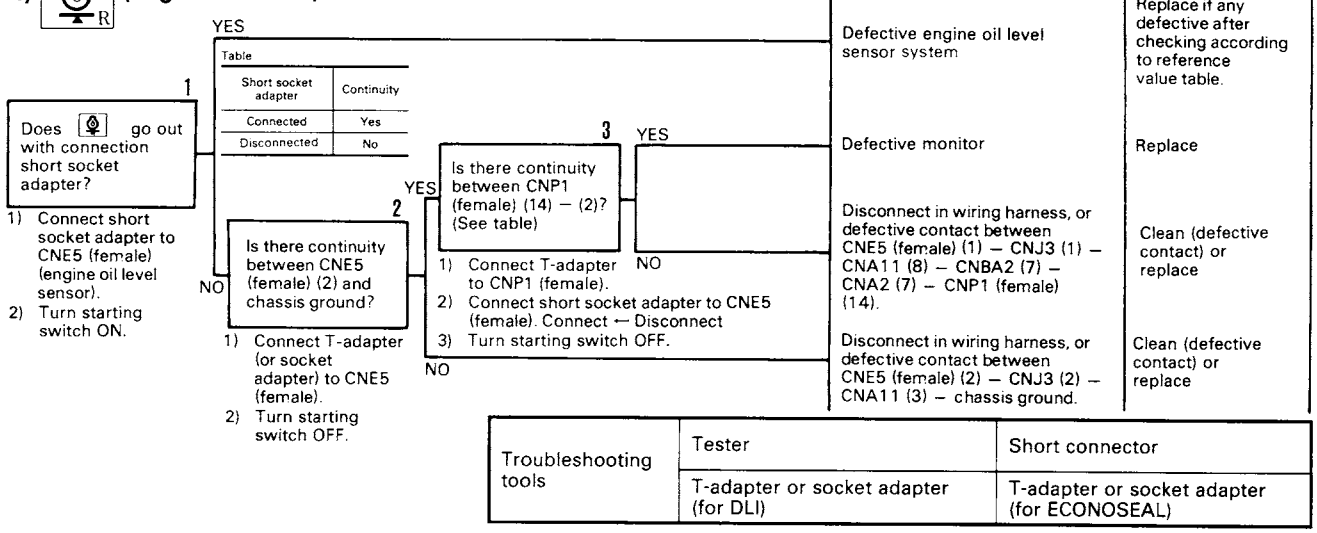
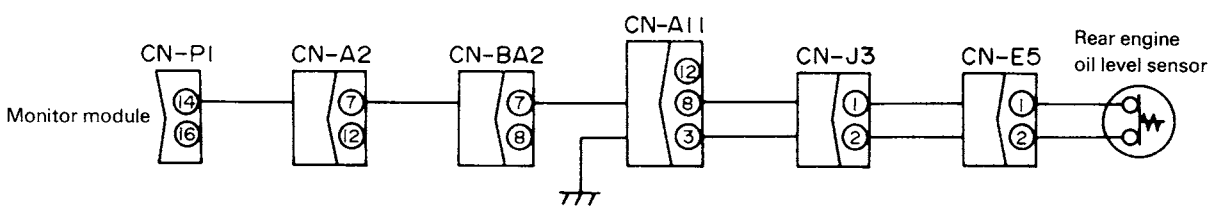
f) (Engine oil level) flashes.



Cause	Remedy
Defective engine oil level sensor system	Replace if any defective after checking according to reference value table.
Defective monitor	Replace
Disconnect in wiring harness, or defective contact between CNE5 (female) (1) – CNJ3 (1) – CNA11 (8) – CNBA2 (7) – CNA2 (7) – CNP1 (female) (14).	Clean (defective contact) or replace
Disconnect in wiring harness, or defective contact between CNE5 (female) (2) – CNJ3 (2) – CNA11 (3) – chassis ground.	Clean (defective contact) or replace

Troubleshooting tools	Tester	Short connector
	T-adapter or socket adapter (for DLI)	T-adapter or socket adapter (for ECONOSEAL)

M-3 Related electrical circuit diagram for item f)



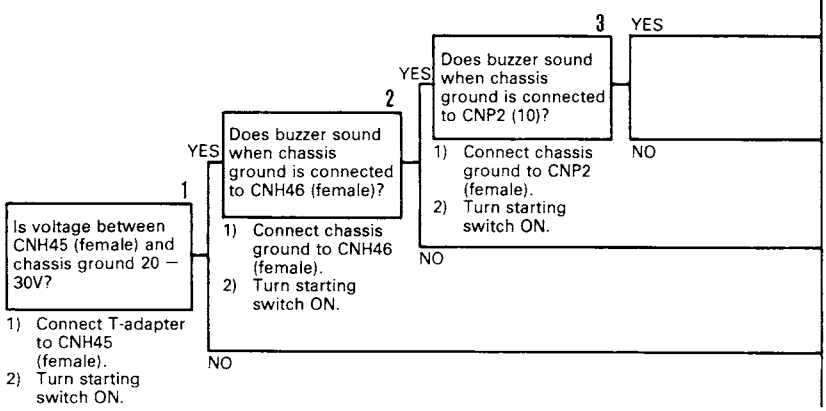
Troubleshooting Chart No. M-7

Failure mode: When starting switch is turned ON (engine stopped), buzzer does not sound for 1 sec. Caution items are flashing, but buzzer does not sound.

★ When disconnecting connectors to connect the T-adapter (or socket adapter), always turn the starting switch OFF.

★ When connecting the T-adapter, connect the male and female; when connecting the socket adapter, connect to the connector specified in ( ).

★ After checking, connect disconnected connectors immediately.



Cause	Remedy
Defective monitor module	Replace
Defective contact, or disconnection in wiring harness between CNH46 (male) — CNP2 (female) (10).	Clean (defective contact) or replace
Defective buzzer	Replace
Defective contact, or disconnection in wiring harness between fuse 1 — CNH45.	Clean (defective contact) or replace

Troubleshooting tools	Tester	Short connector
	T-adapter or socket adapter (for DLI)	T-adapter or socket adapter (for Econoseal)

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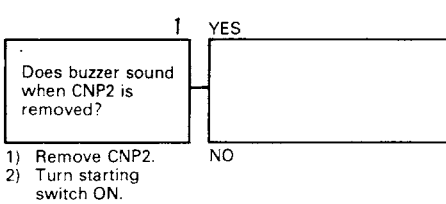
Troubleshooting Chart No. M-8

Failure mode: There is no abnormal display on monitor, but buzzer sounds.

★ When disconnecting connectors to connect the T-adapter (or socket adapter), always turn the starting switch OFF.

★ When connecting the T-adapter, connect the male and female; when connecting the socket adapter, connect to the connector specified in ( ).

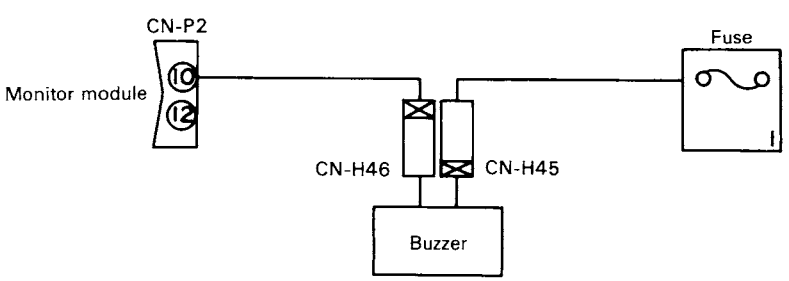
★ After checking, connect disconnected connectors immediately.



Cause	Remedy
Contact of chassis ground with wiring harness between CNH46 — CNP2 (10).	After inspection, repair or replace
Defective monitor module	Replace

Troubleshooting tools	Tester	Short connector
	T-adapter or socket adapter (for DLI)	T-adapter or socket adapter (for Econoseal)

M-7, M-8 Related electrical circuit diagram



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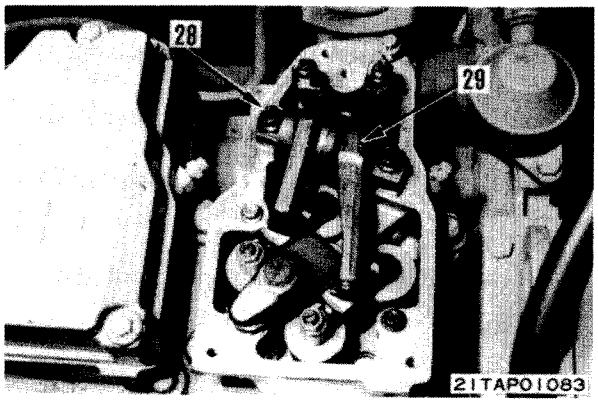

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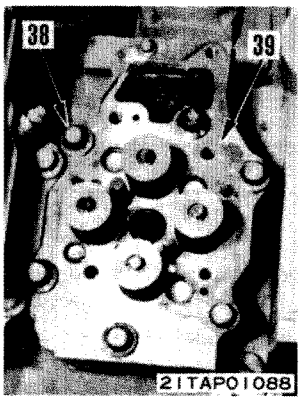

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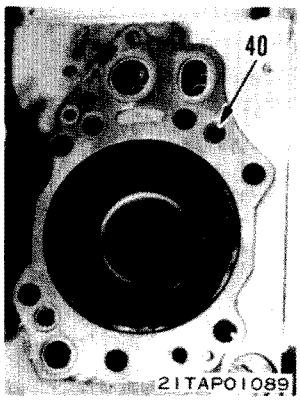

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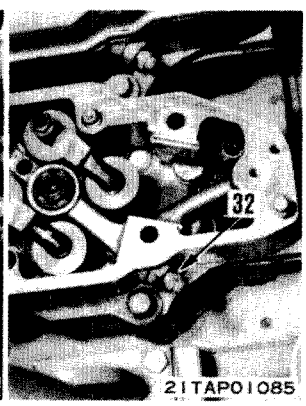

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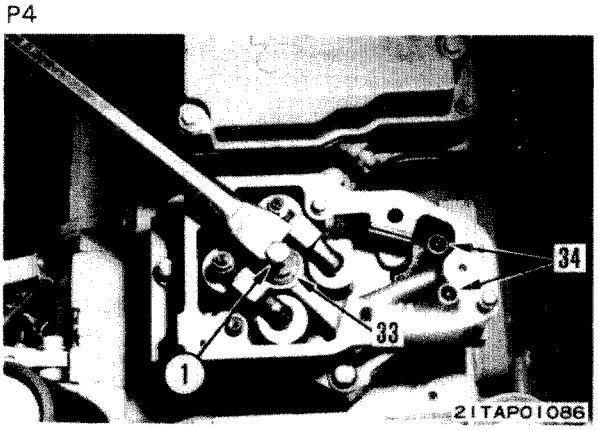

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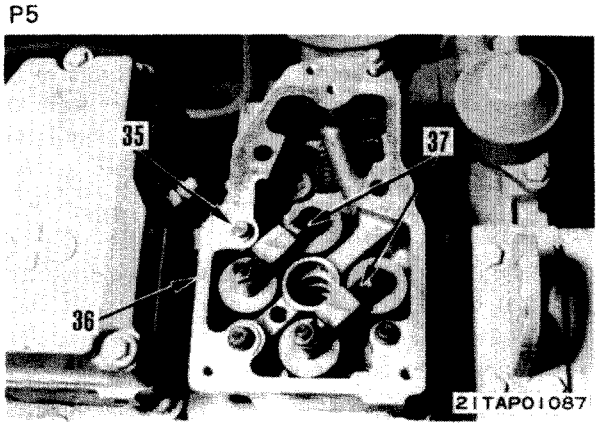

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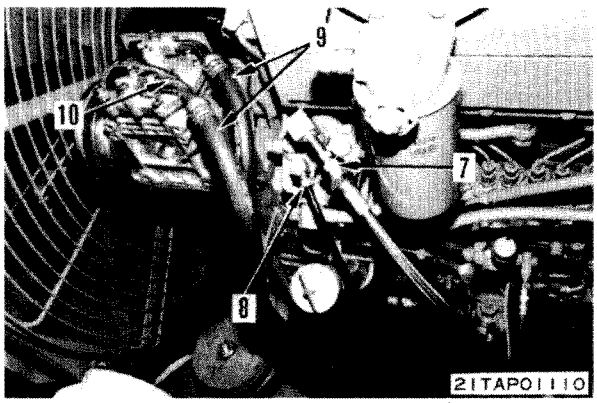

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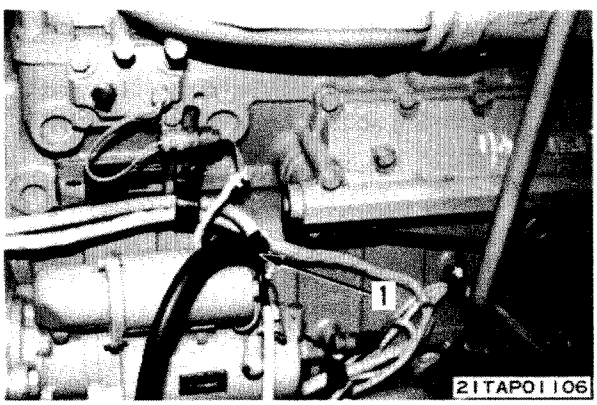

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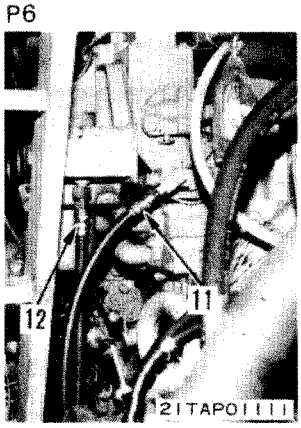

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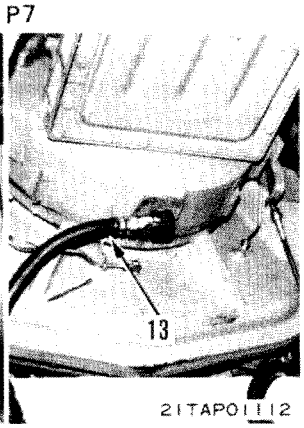

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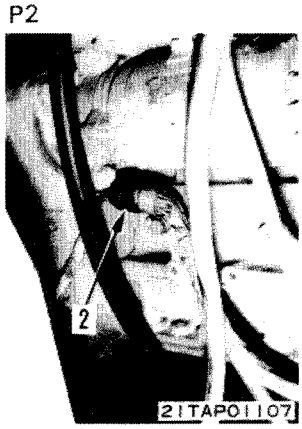

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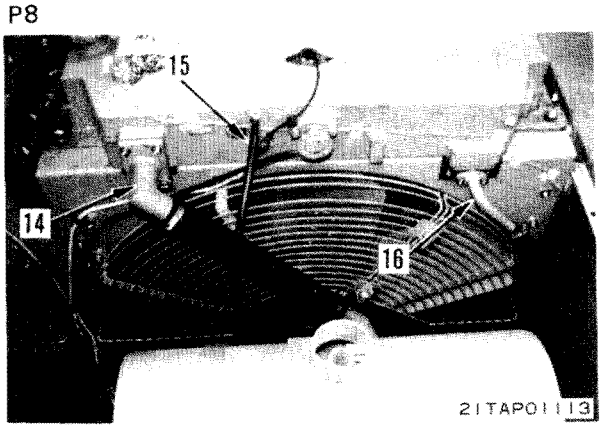

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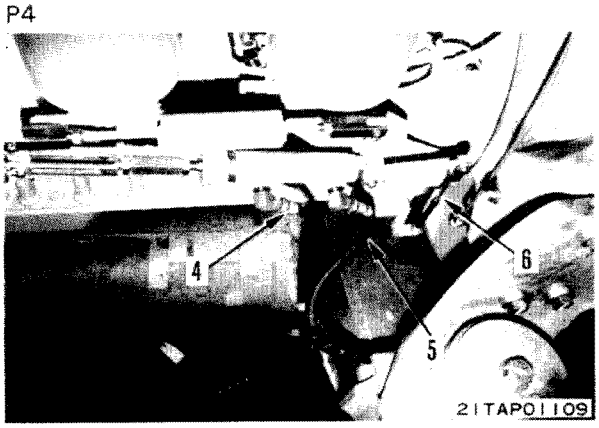

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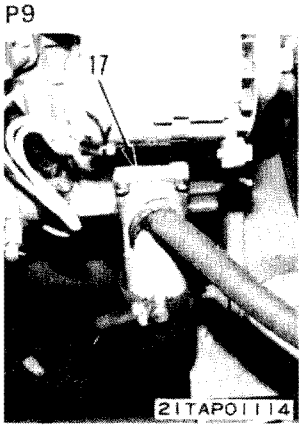

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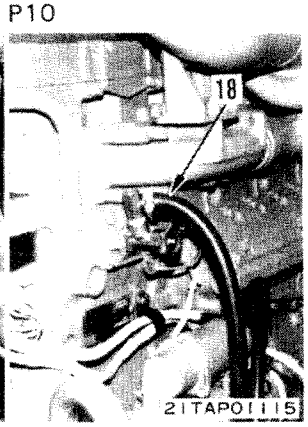

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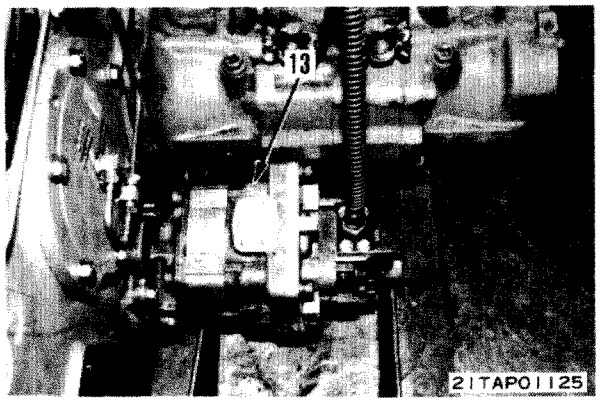

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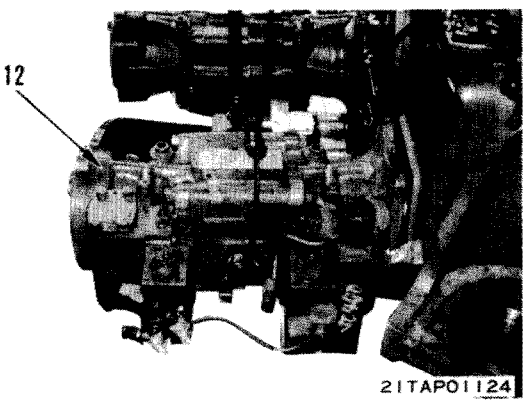

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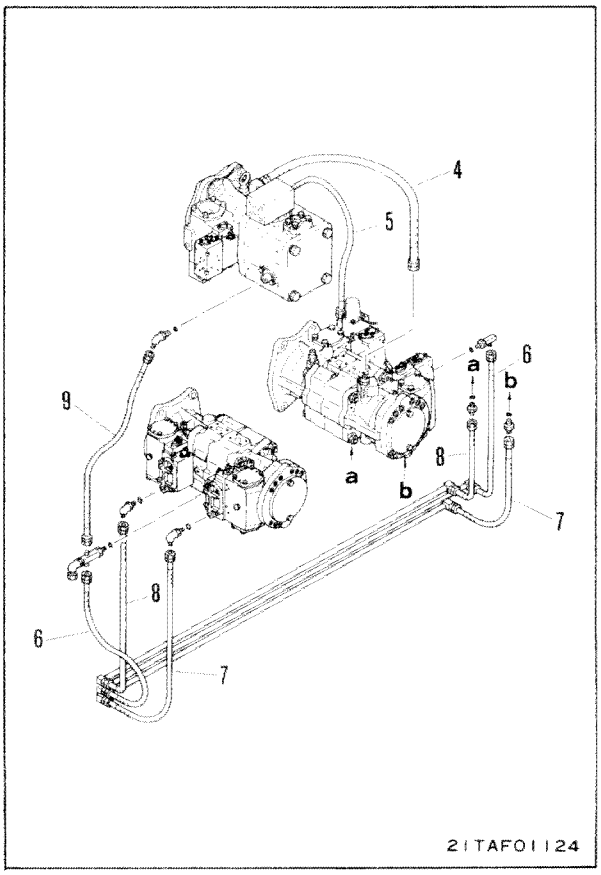

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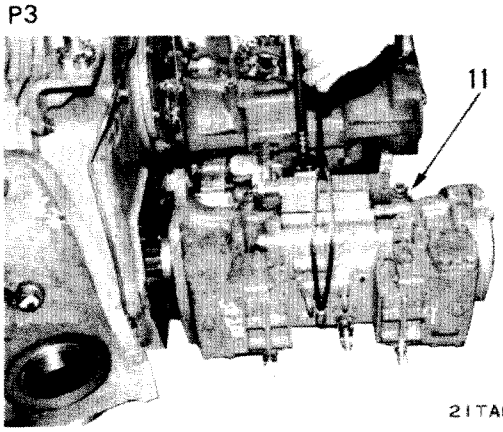

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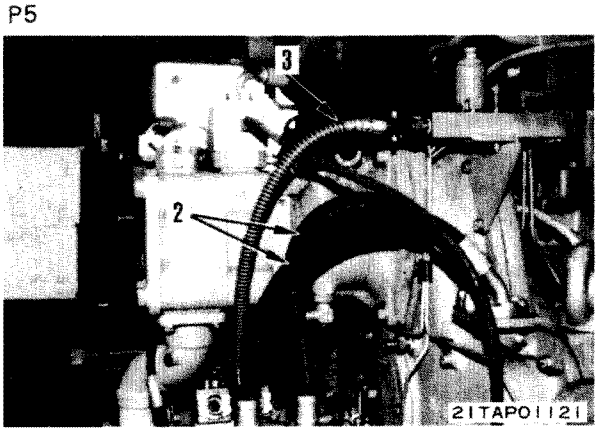

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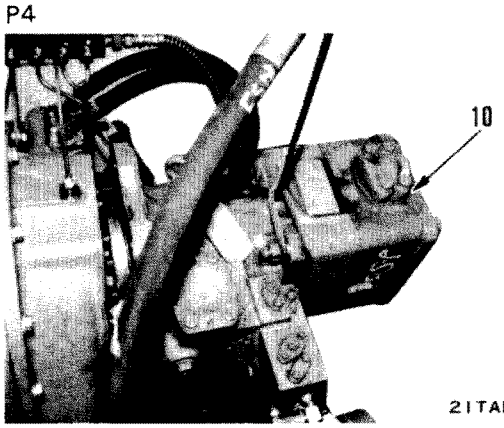

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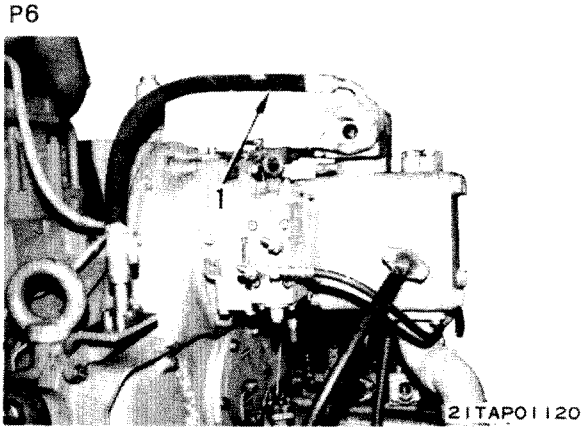

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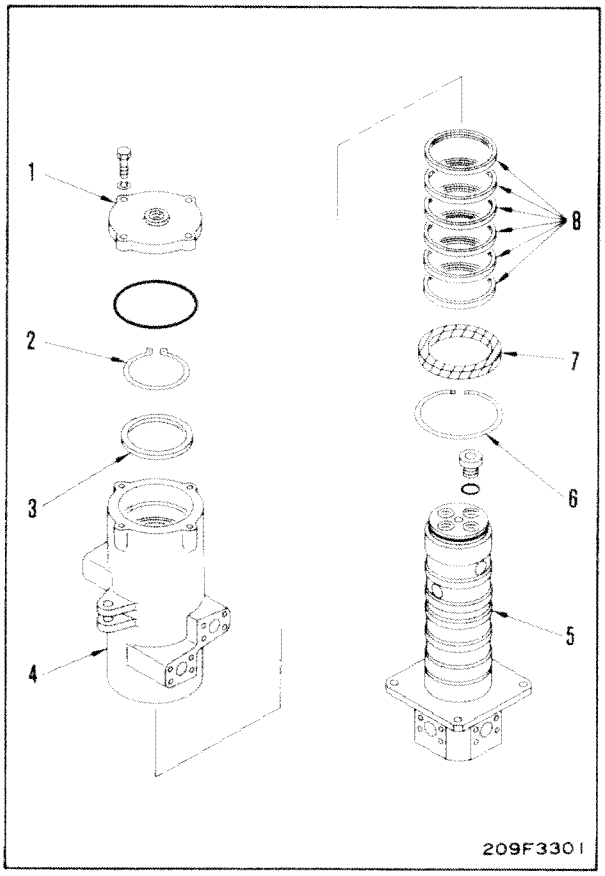

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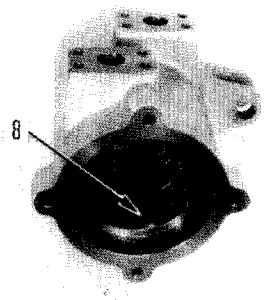

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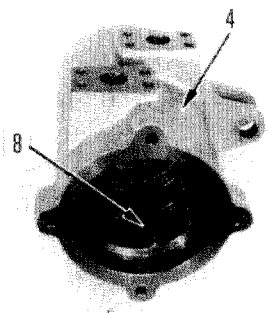

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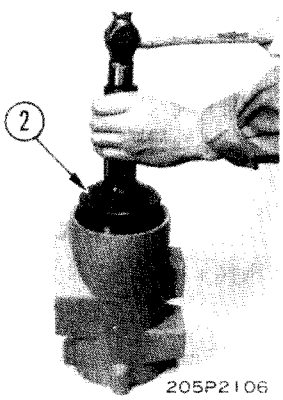

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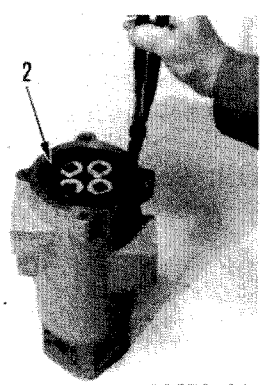

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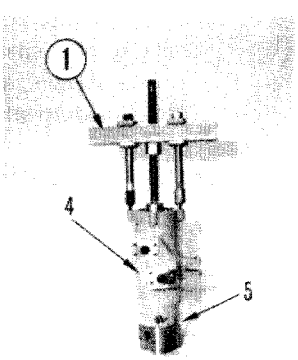

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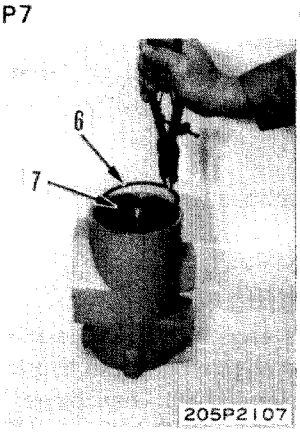

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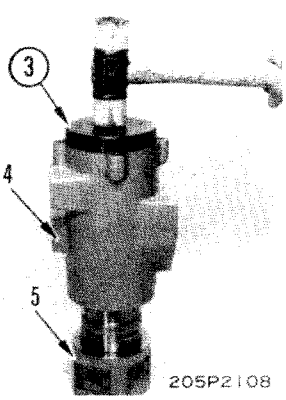

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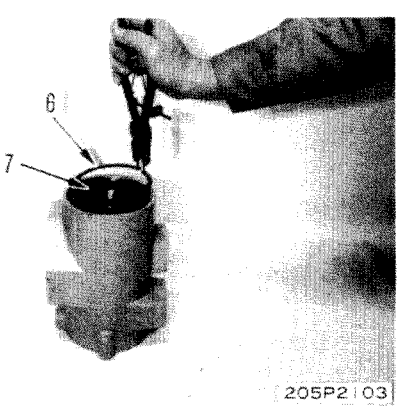

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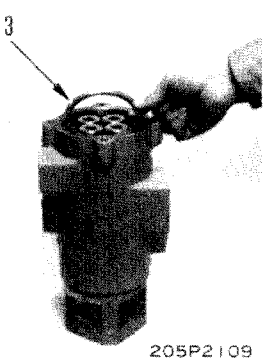

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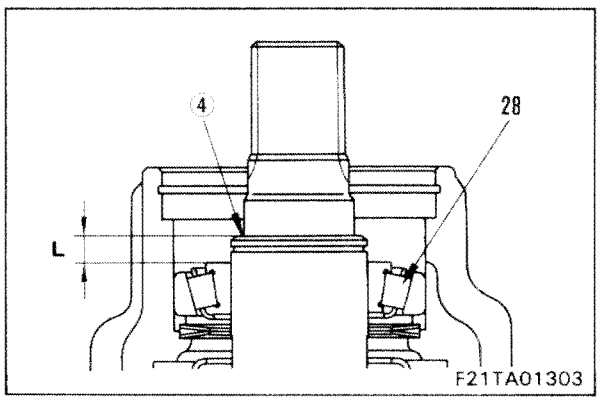

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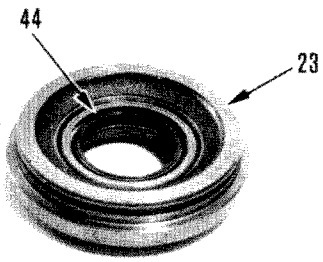

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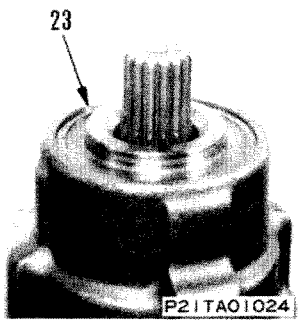

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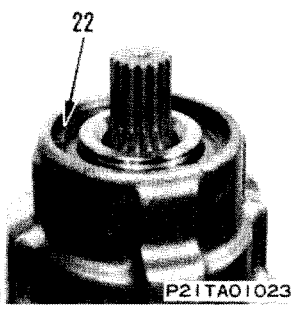

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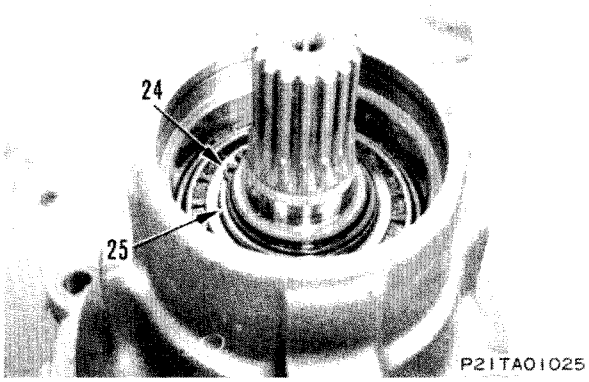

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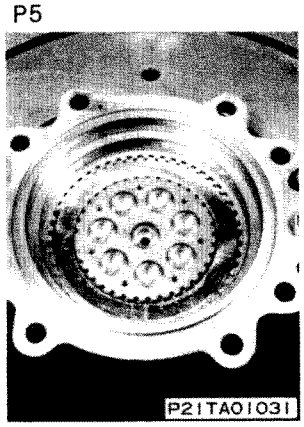

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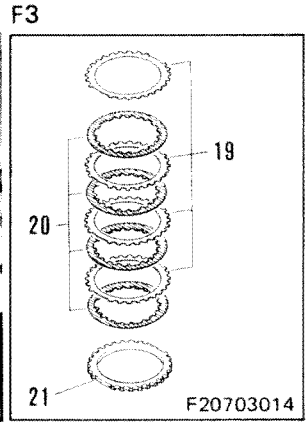

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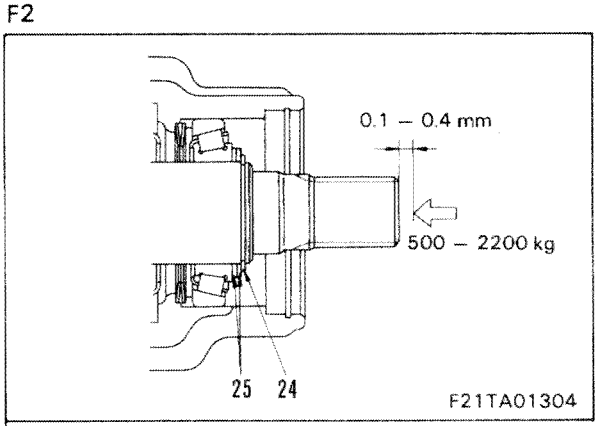

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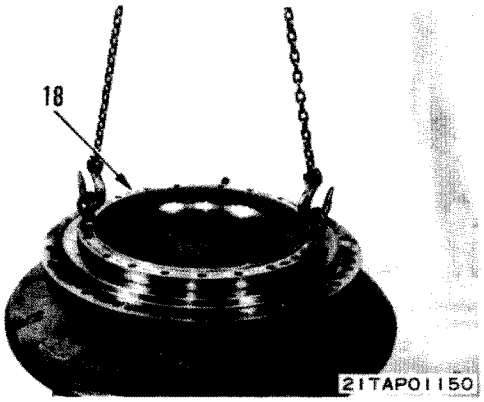

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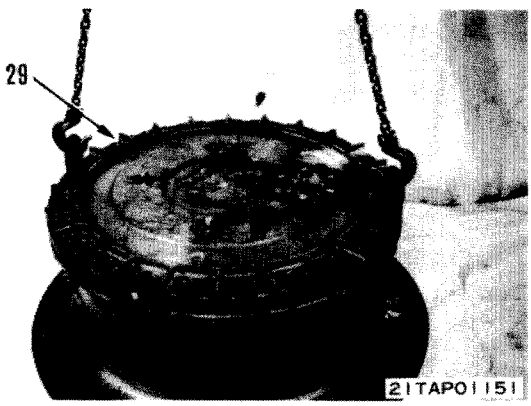

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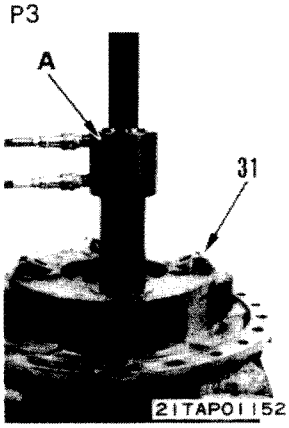

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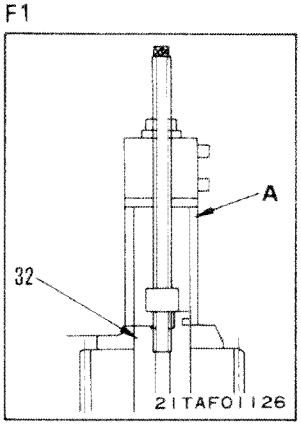

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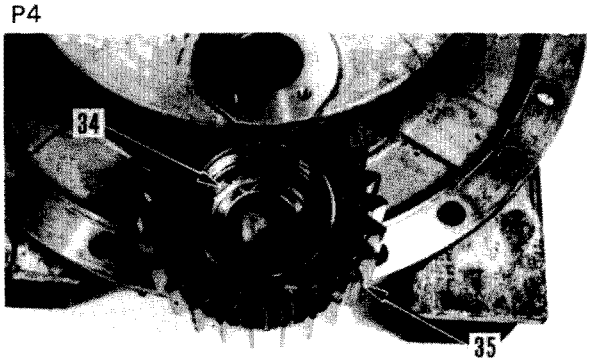

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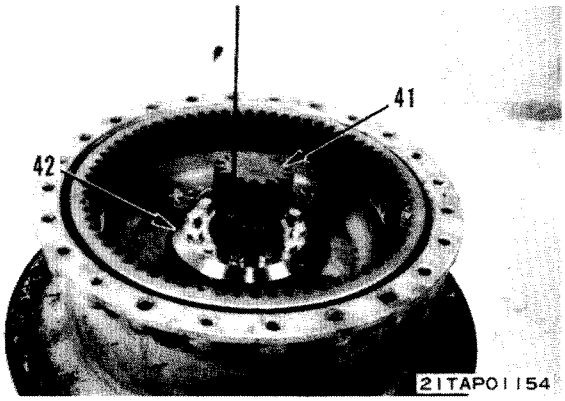

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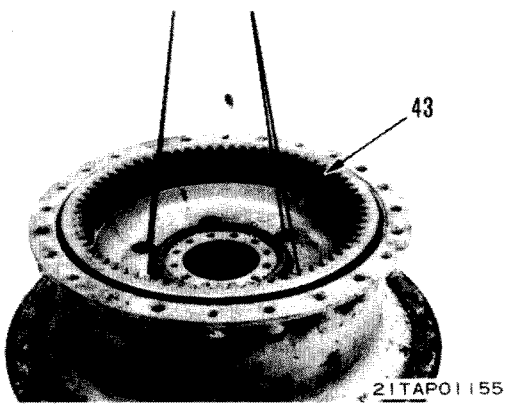

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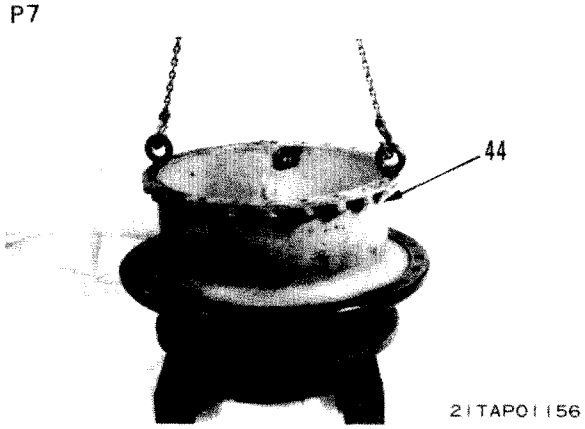

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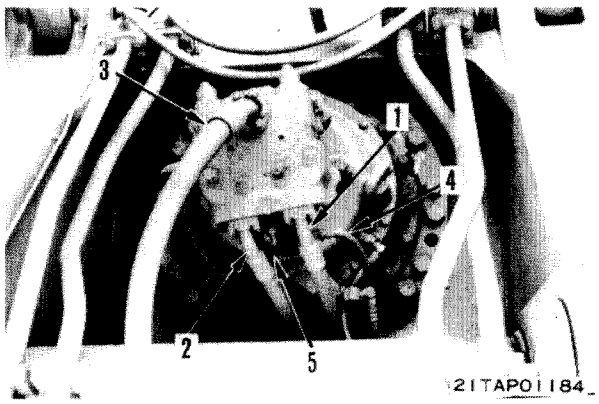

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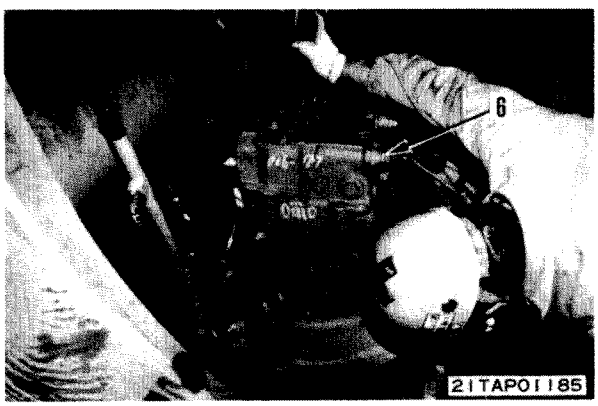

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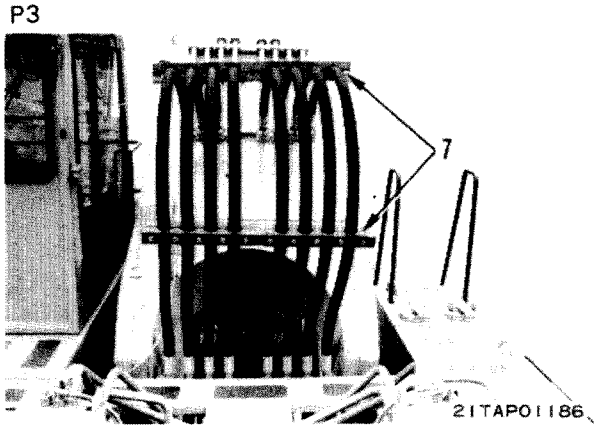

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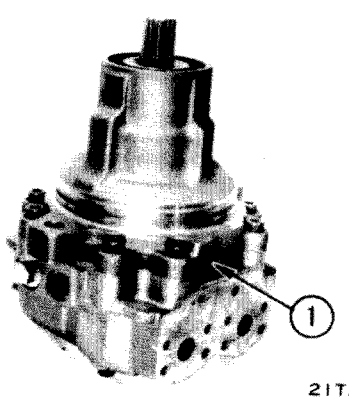

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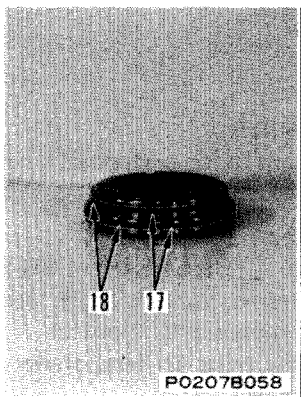

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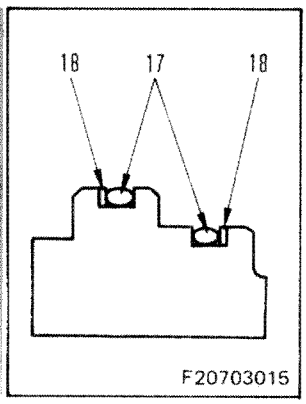

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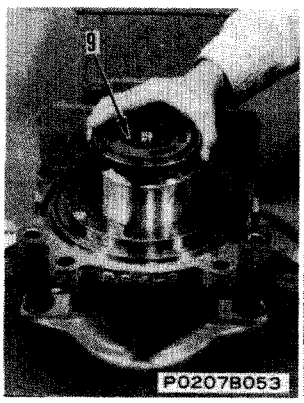

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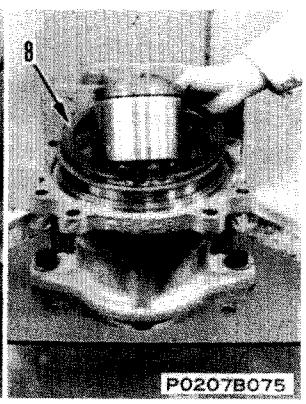

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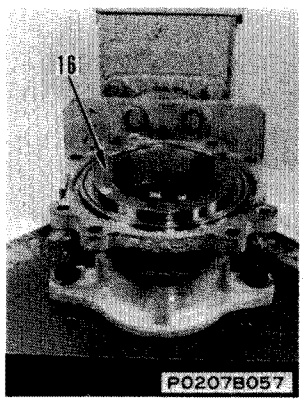

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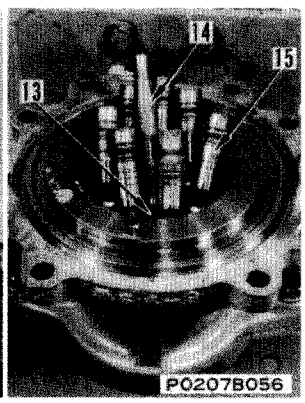

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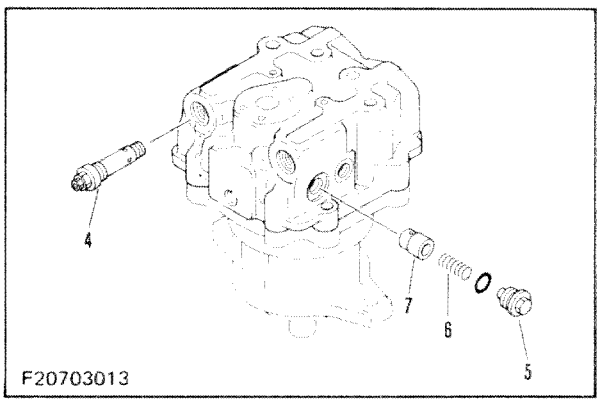

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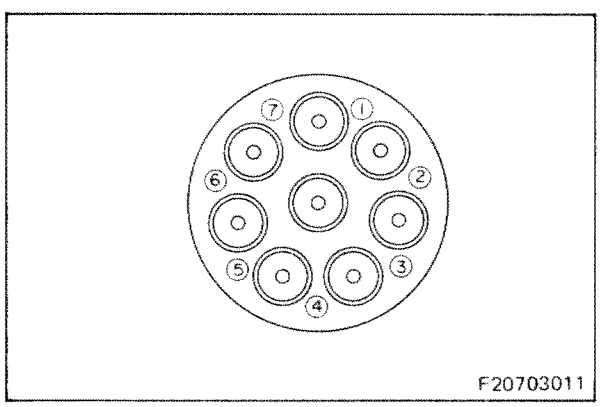

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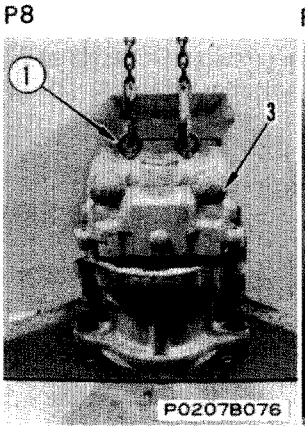

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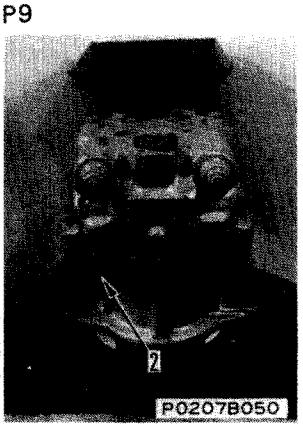

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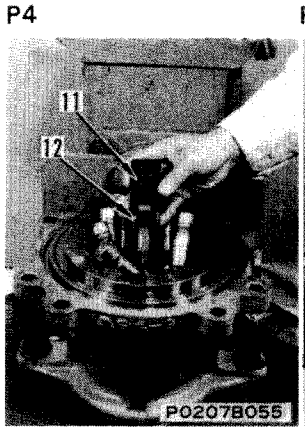

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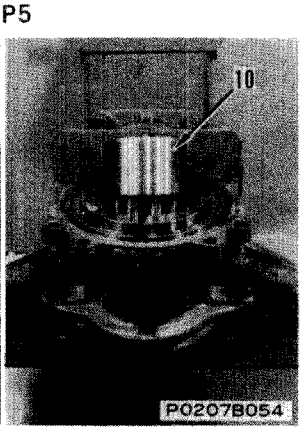

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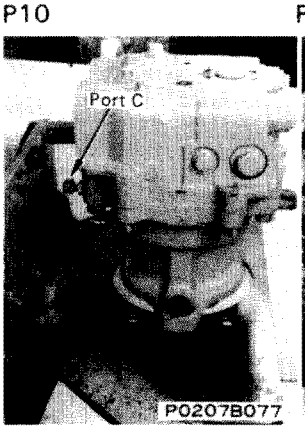

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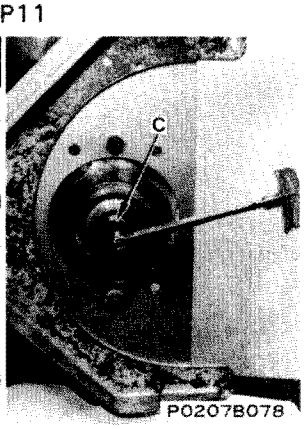

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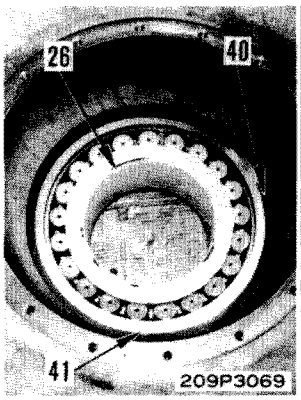

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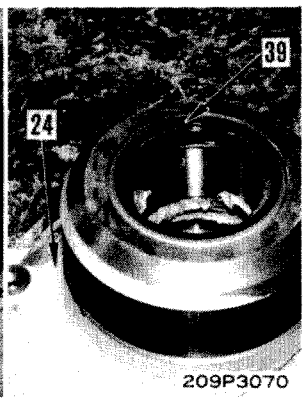

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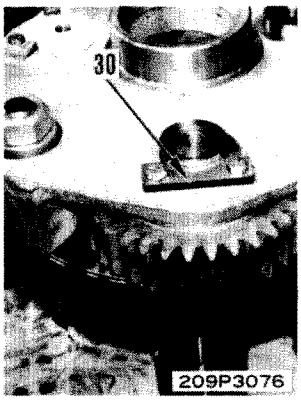

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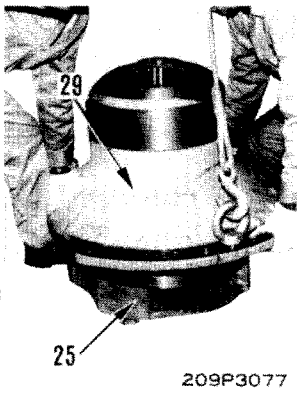

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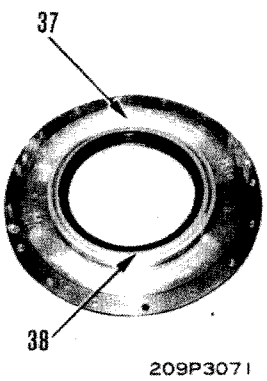

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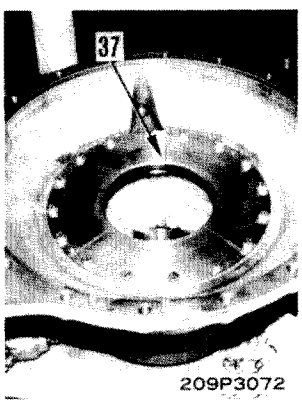

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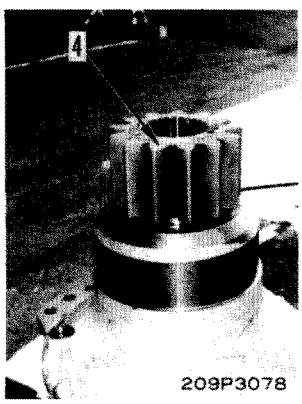

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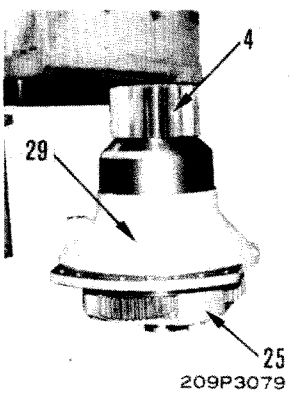

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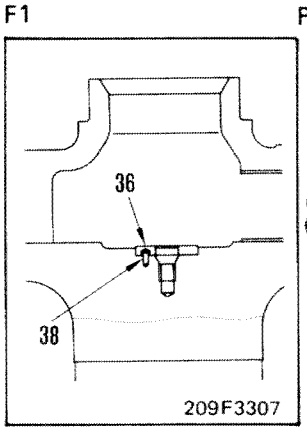

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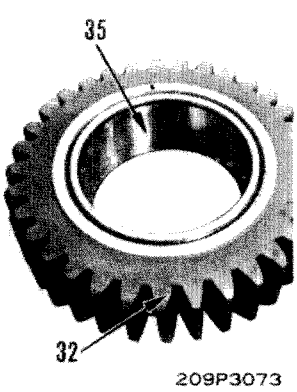

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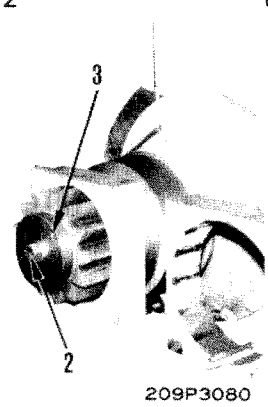

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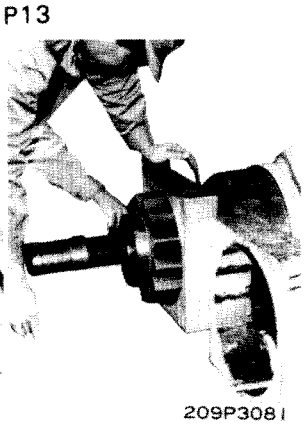

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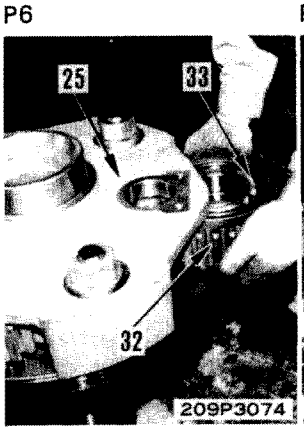

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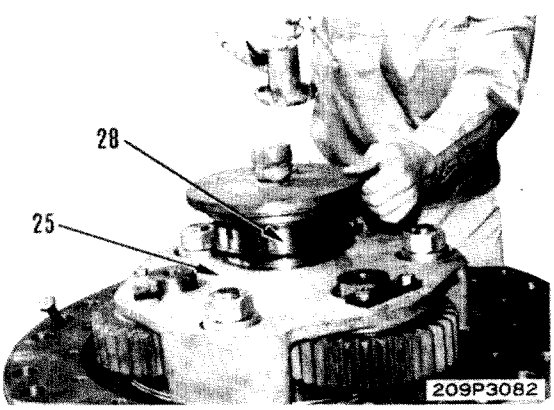

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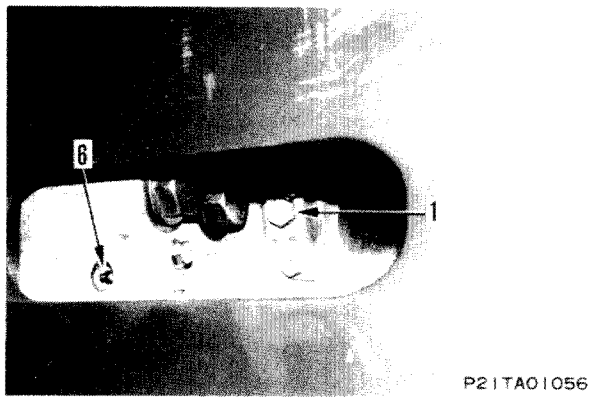

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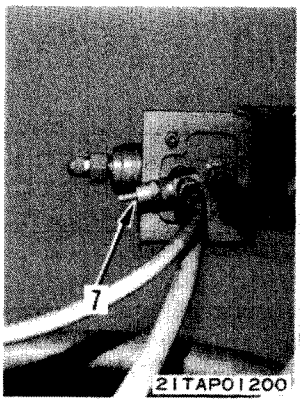

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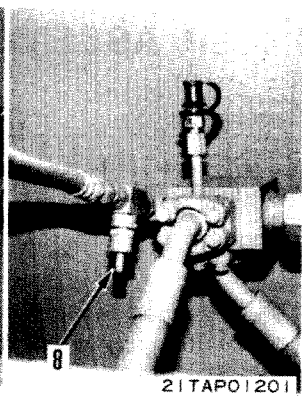

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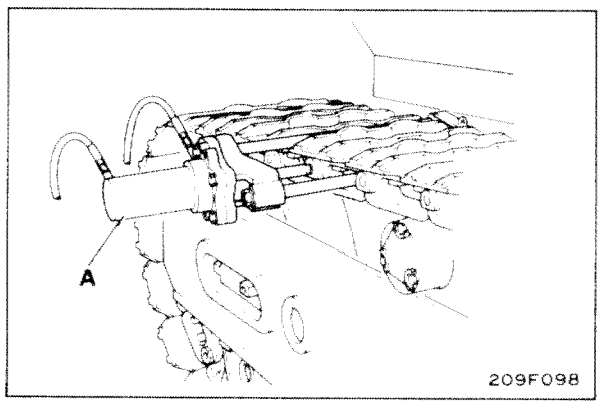

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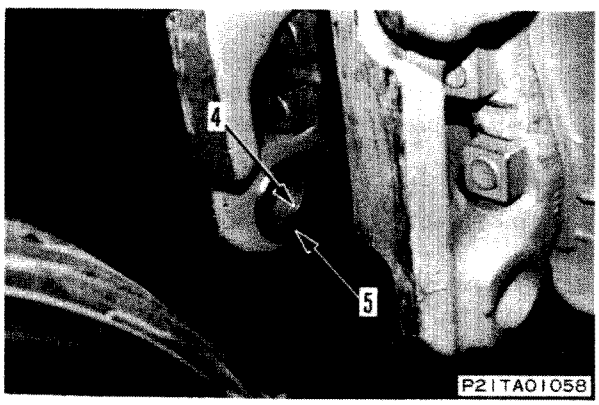

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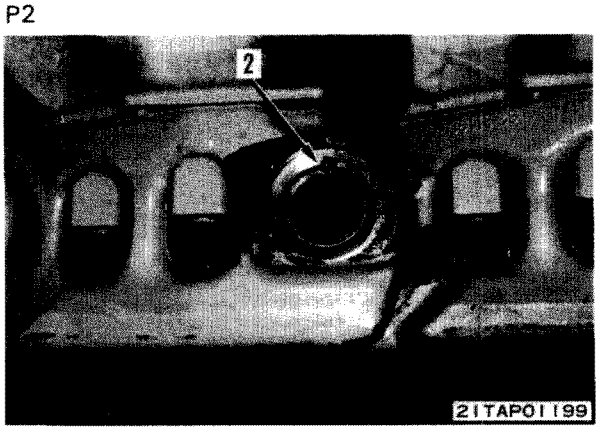

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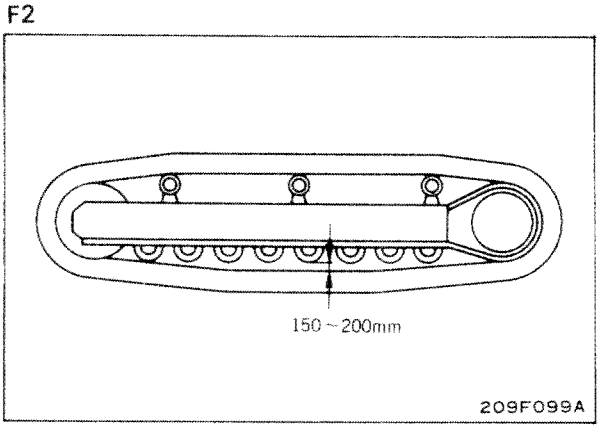

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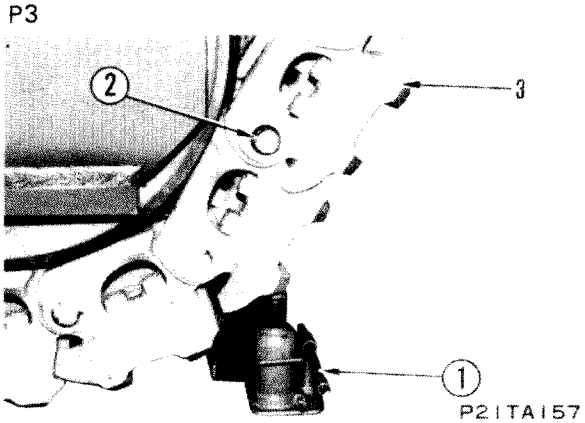

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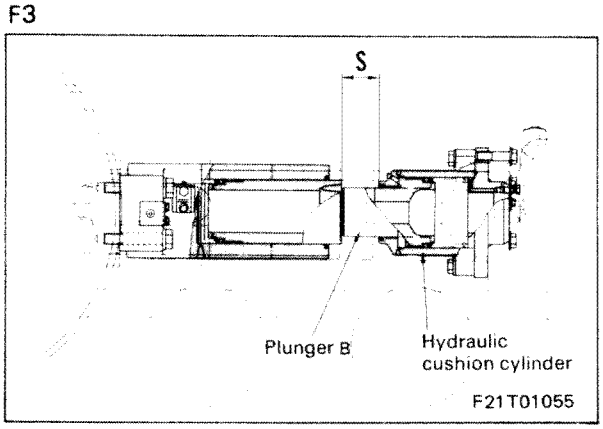

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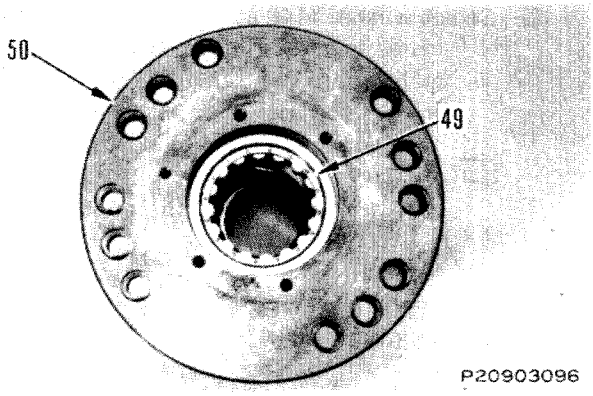

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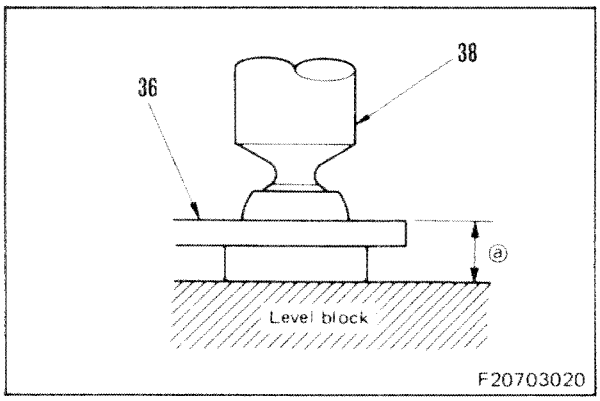

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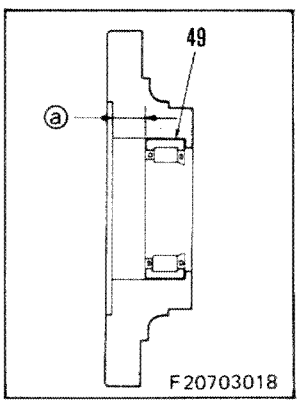

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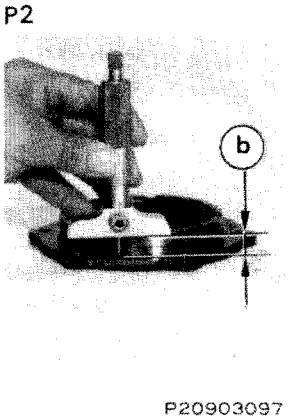

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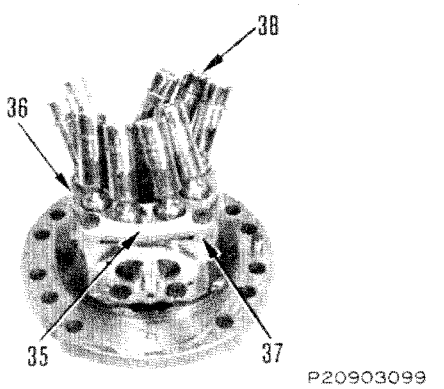

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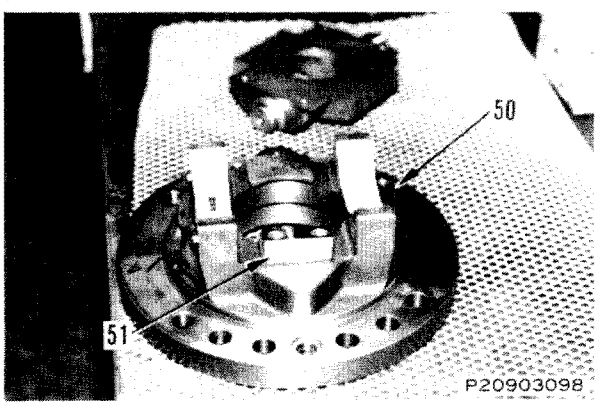

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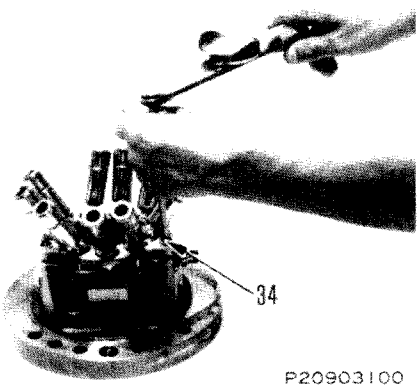

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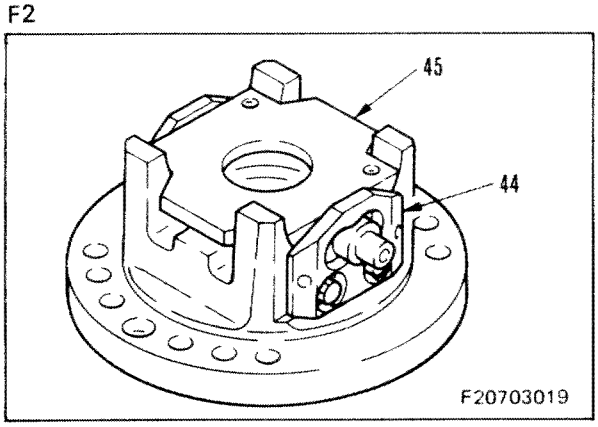

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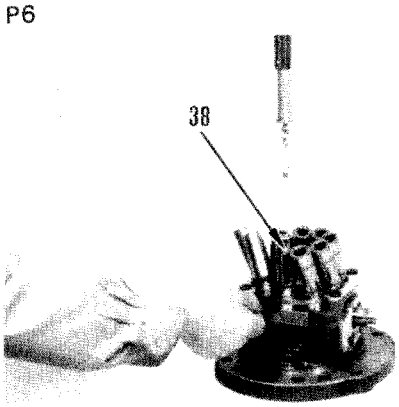

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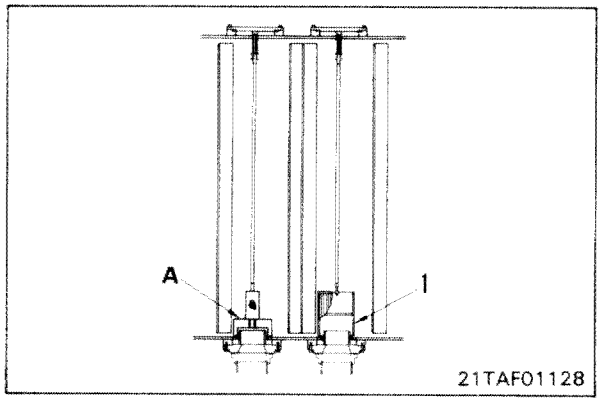

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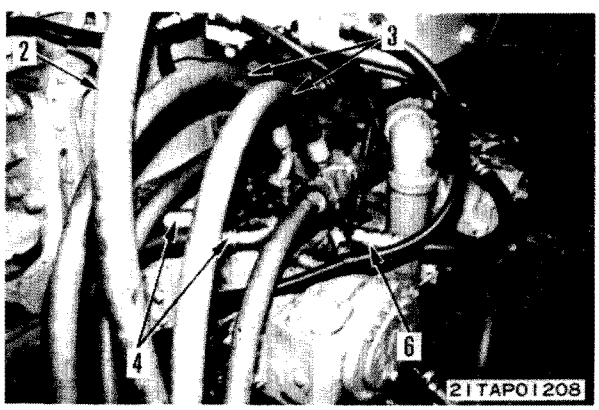

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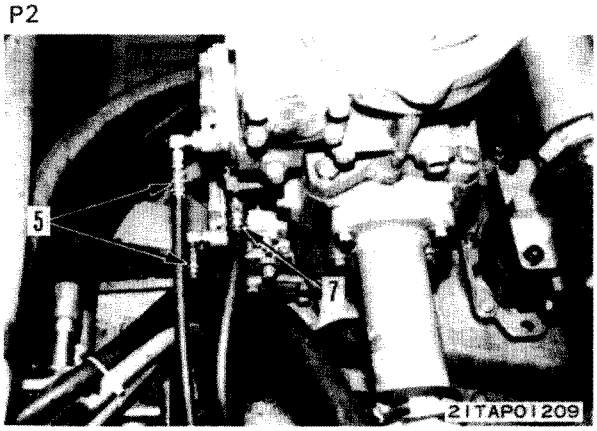

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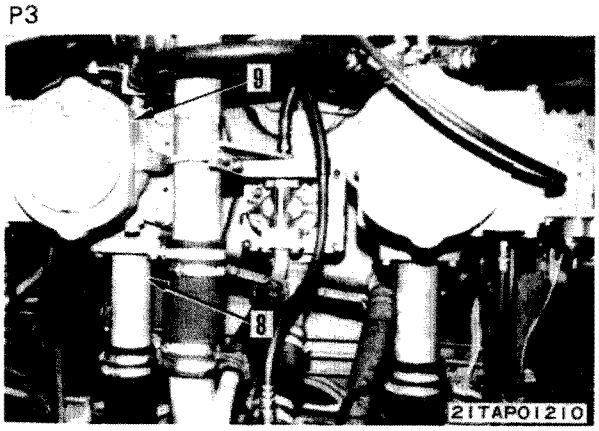

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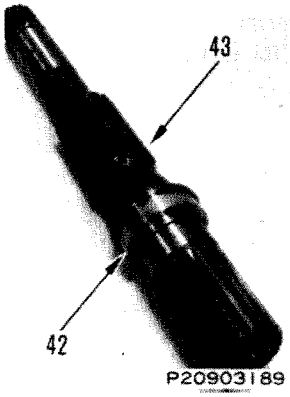

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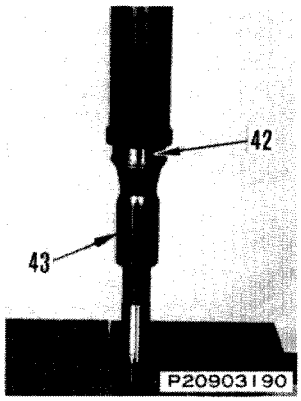

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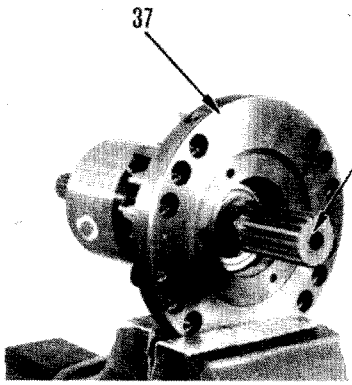

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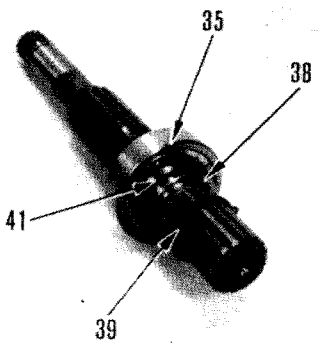

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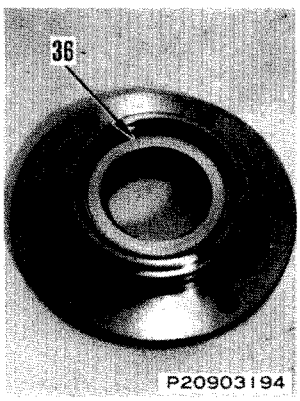

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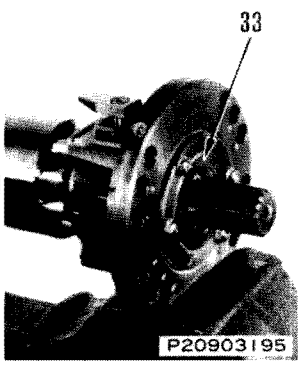

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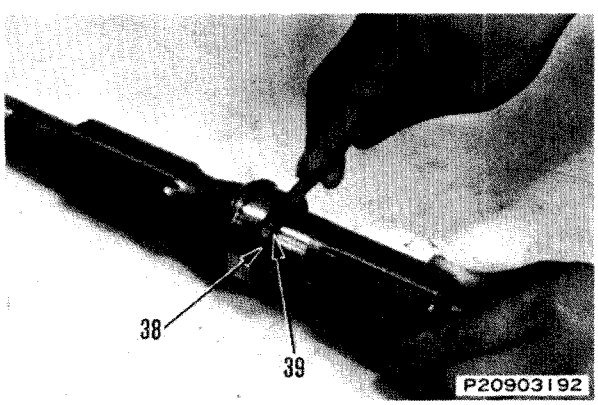

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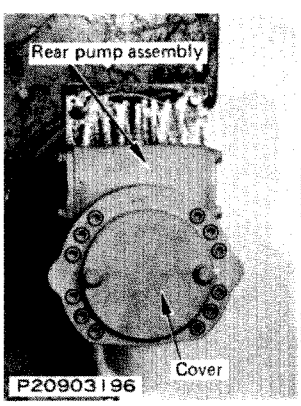

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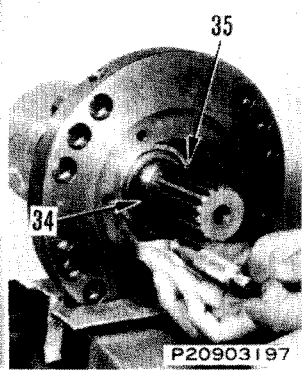

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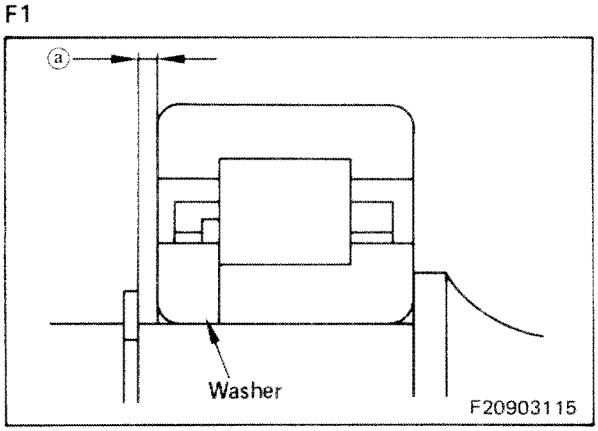

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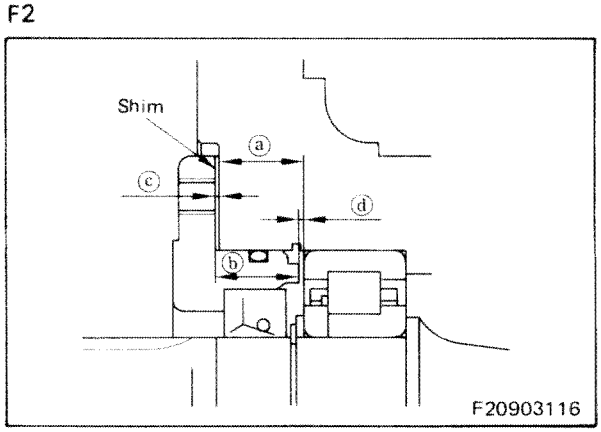

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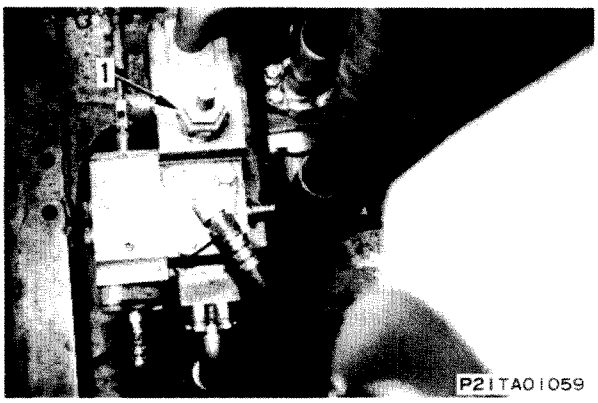

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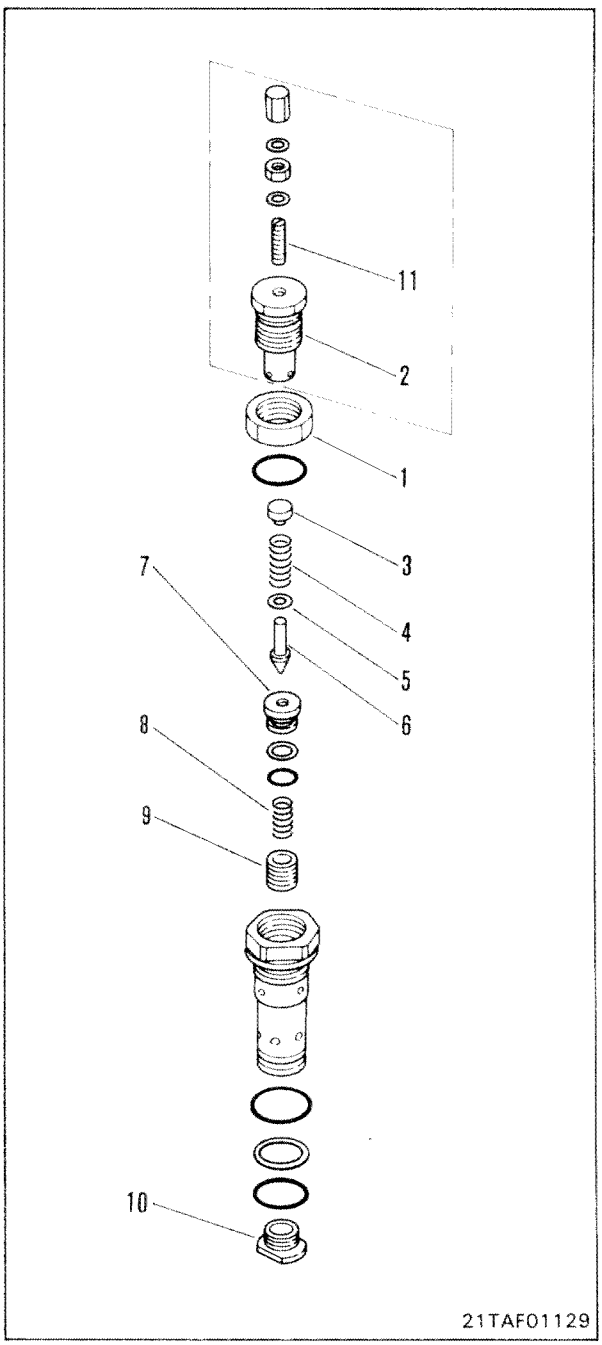

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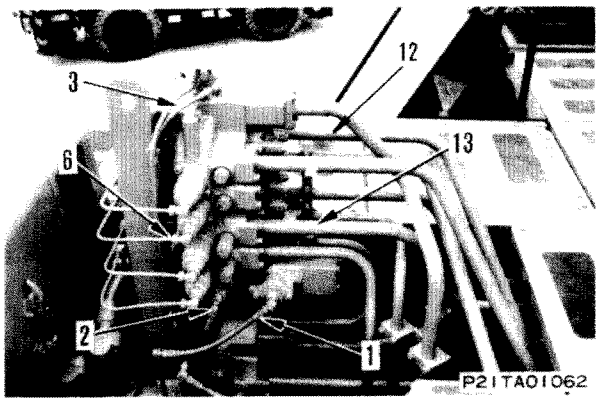

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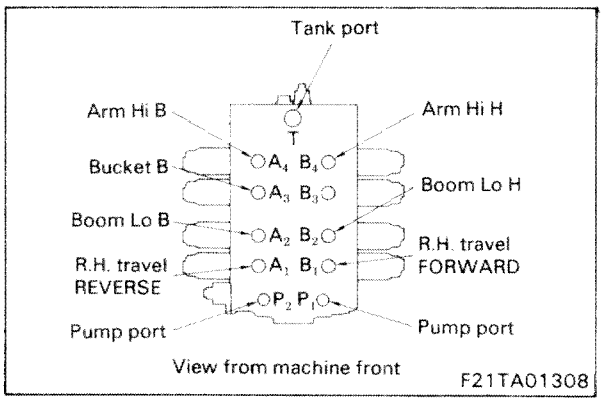

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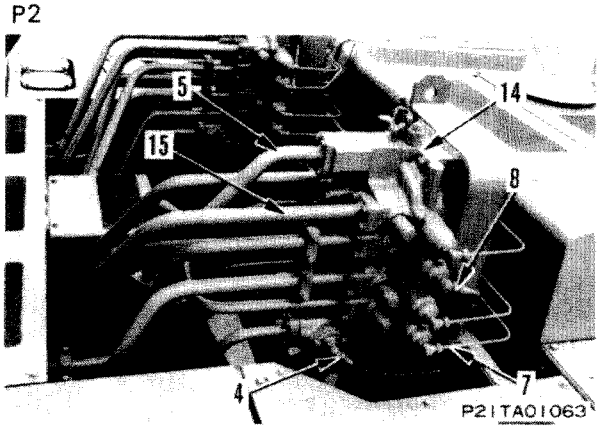

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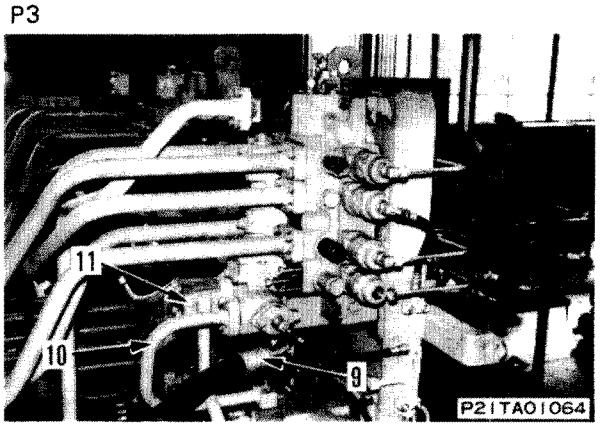

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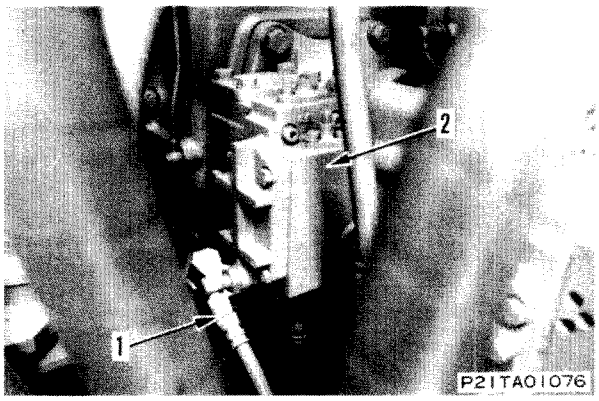

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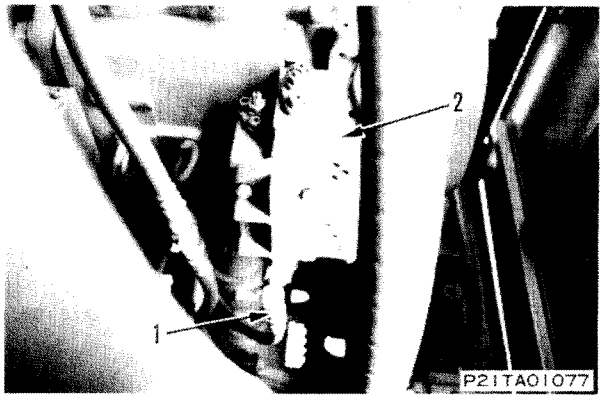

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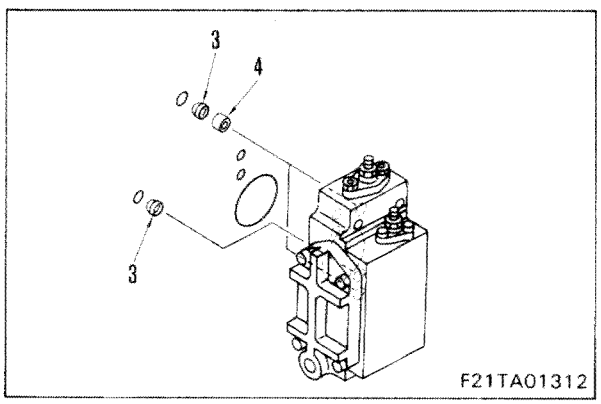

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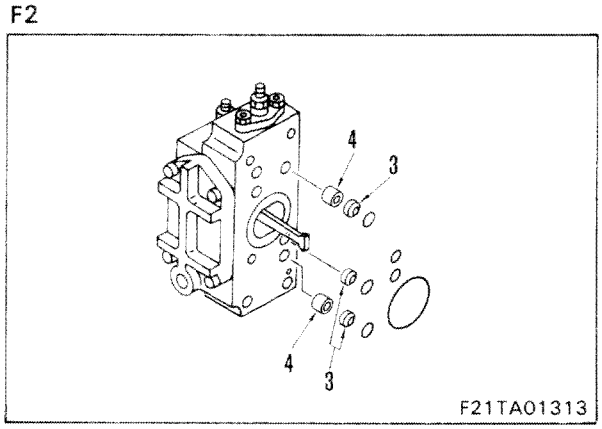

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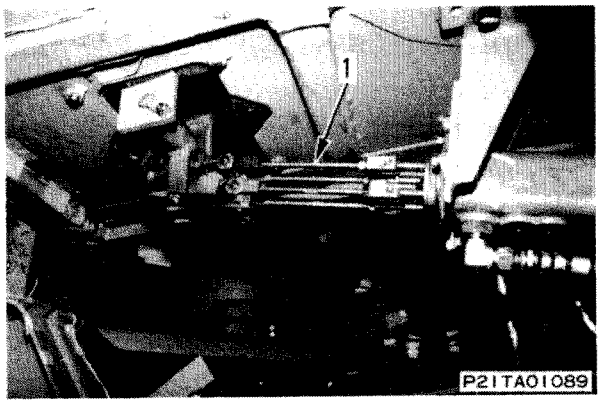

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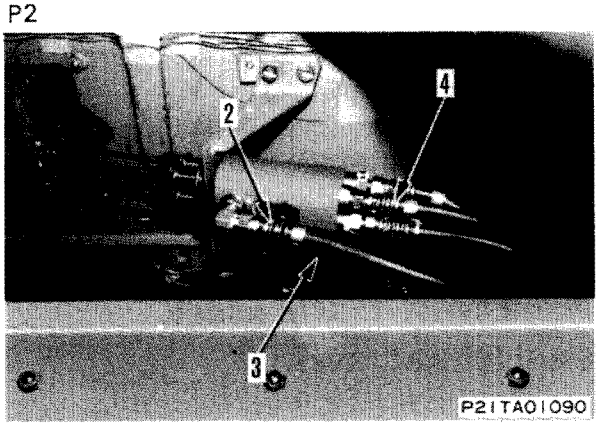

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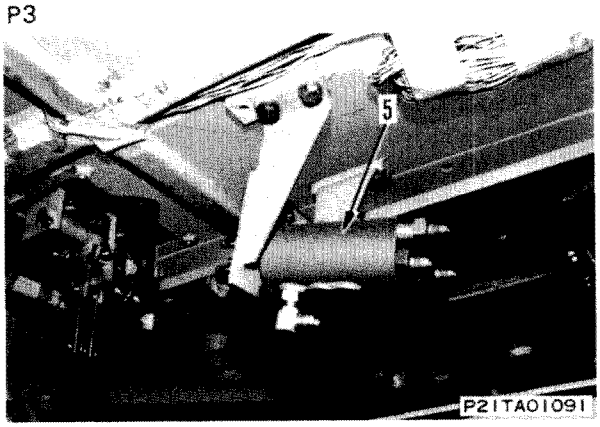

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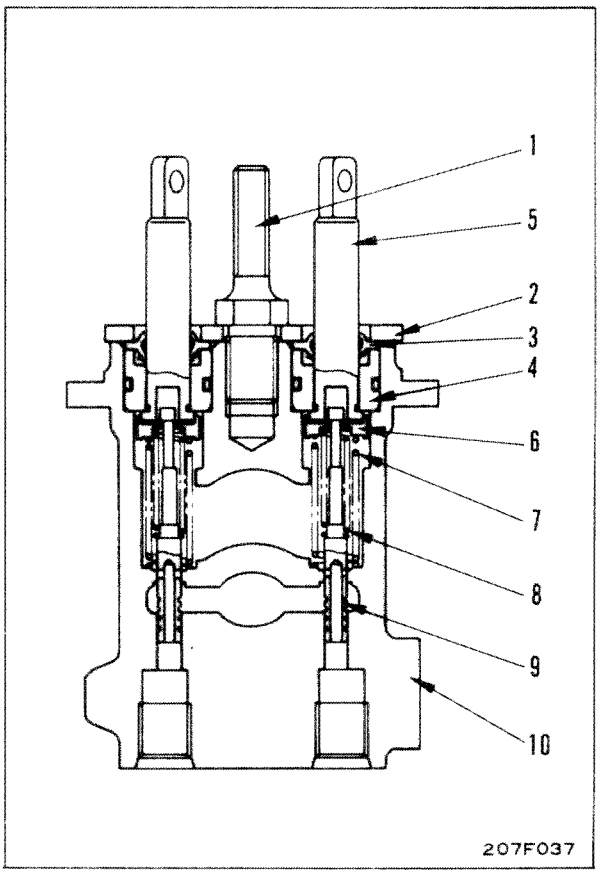

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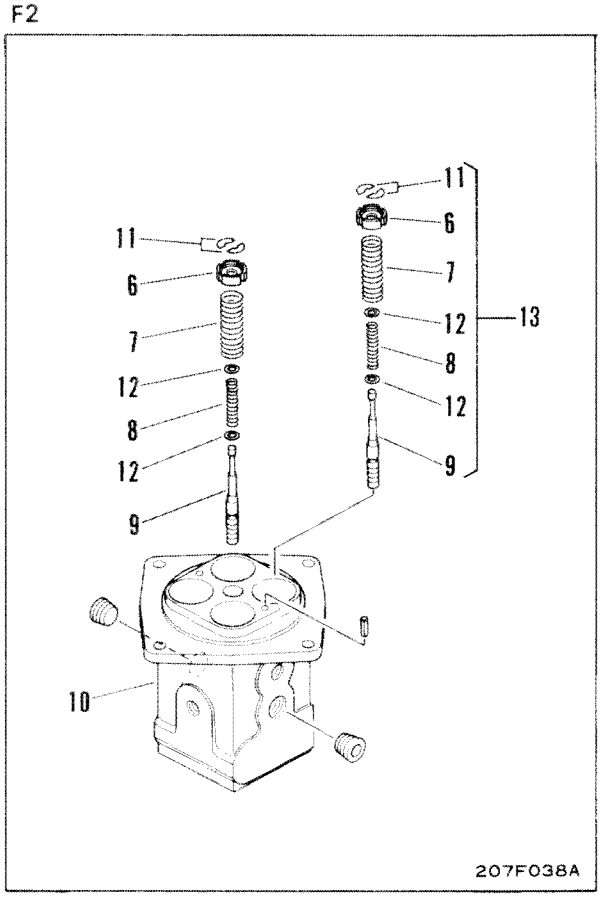

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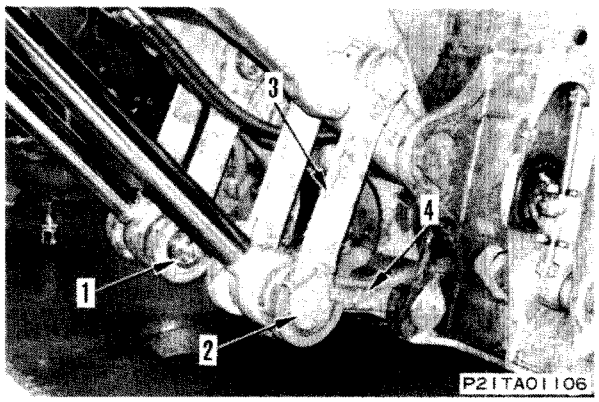

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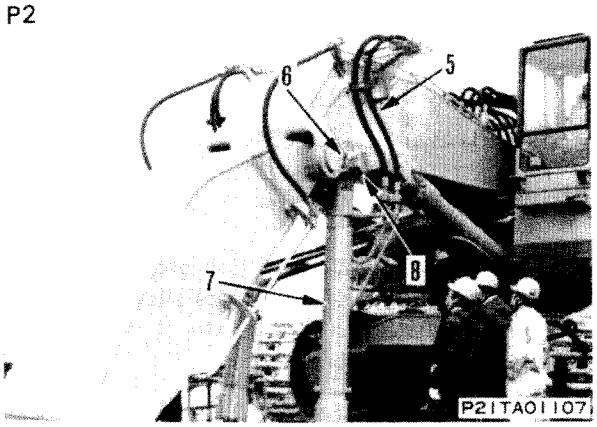

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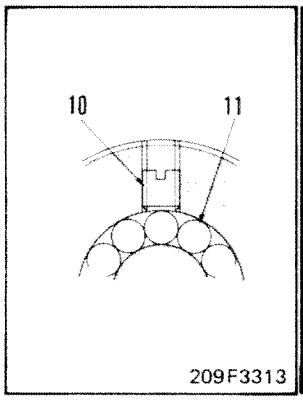

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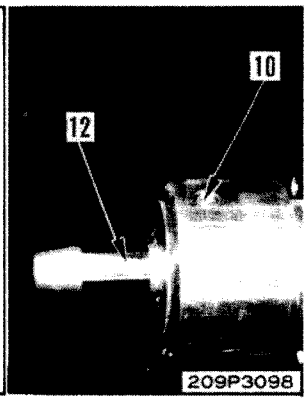

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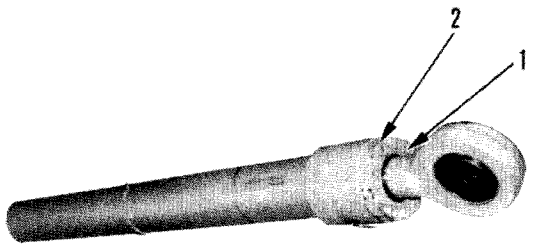

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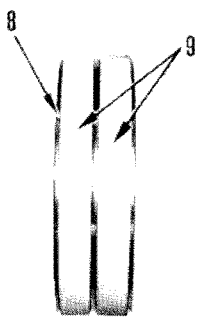

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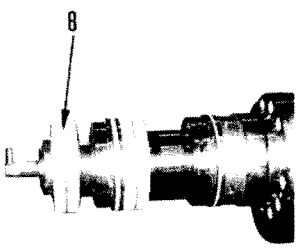

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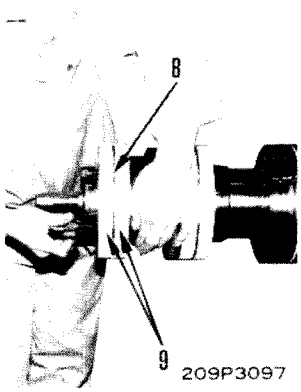

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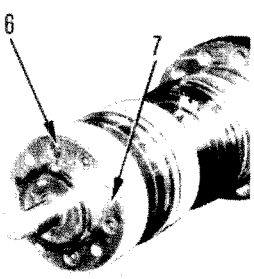

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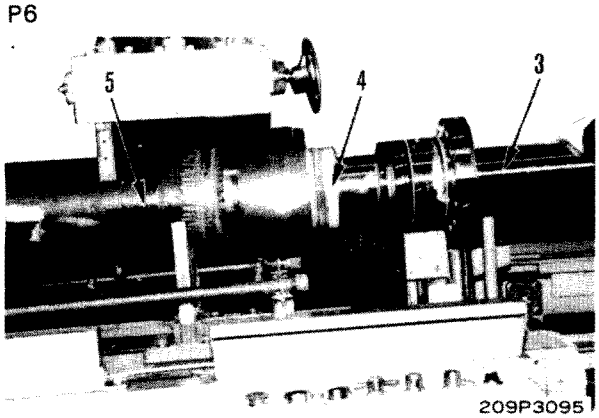

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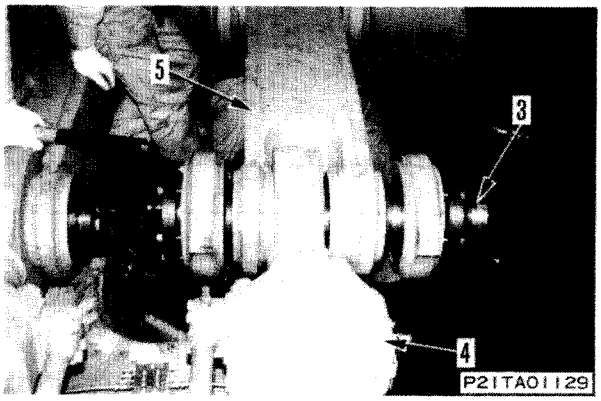

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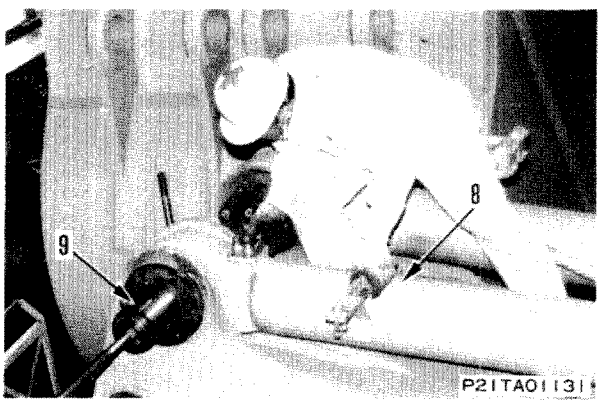

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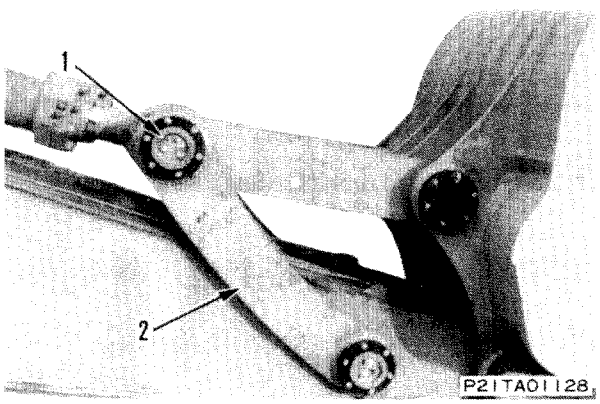

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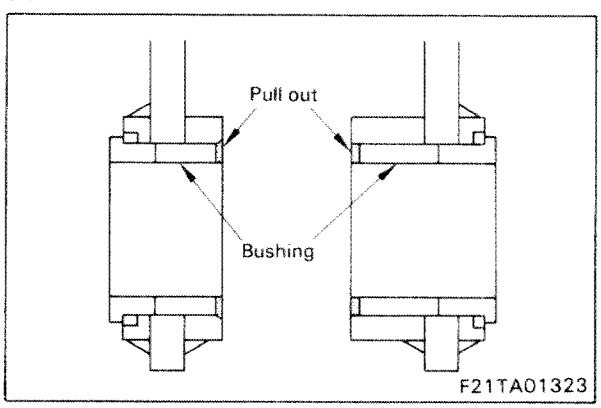

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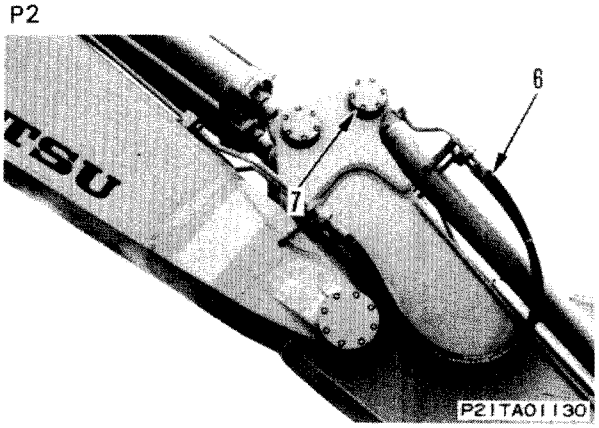

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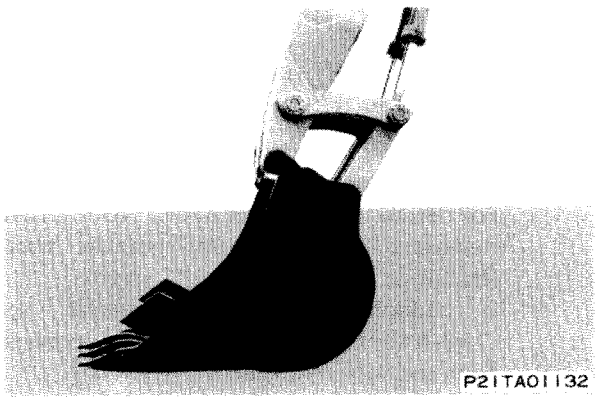

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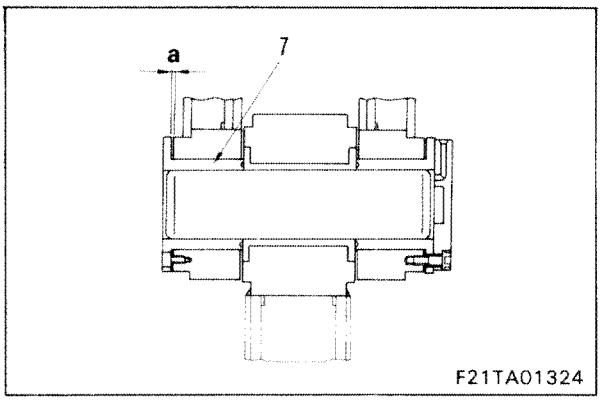

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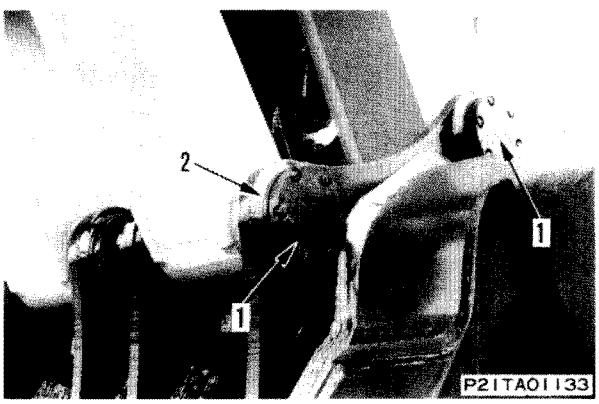

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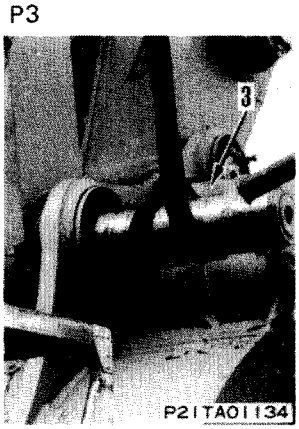

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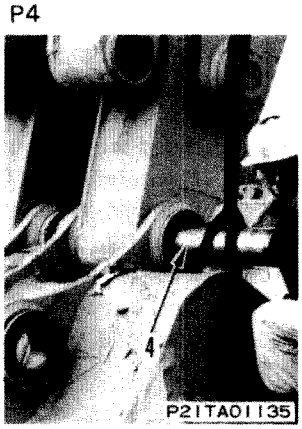

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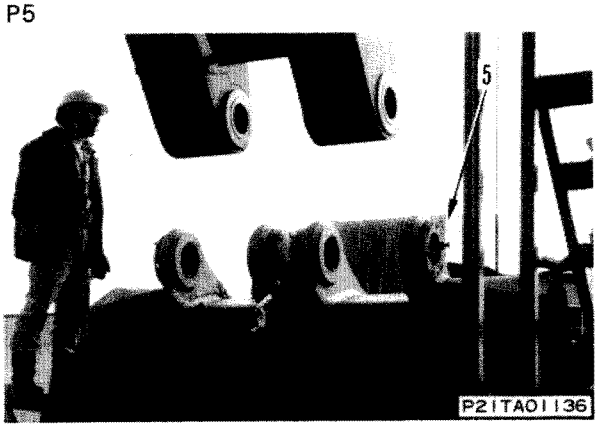

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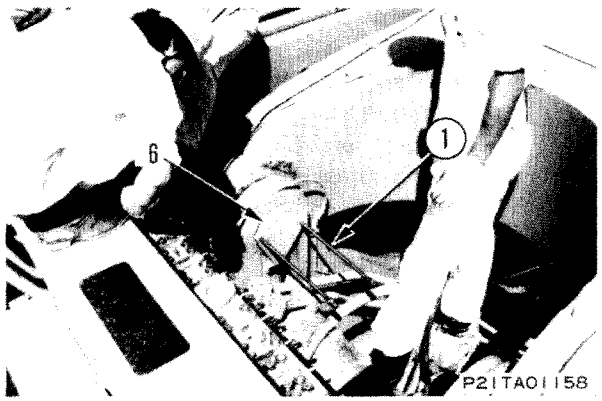

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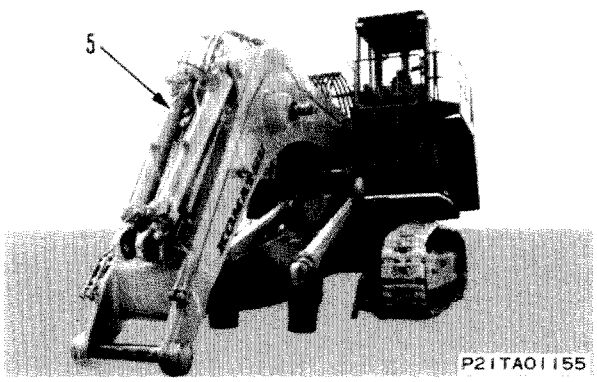

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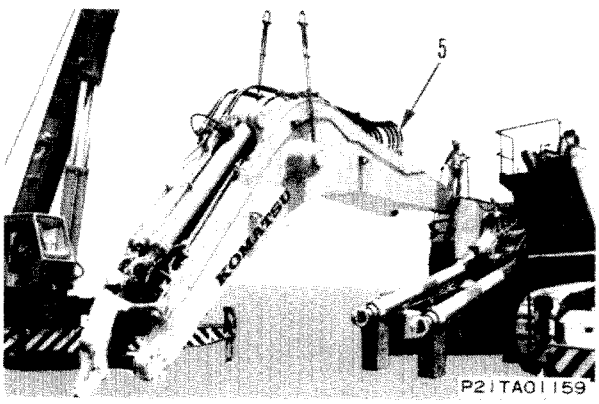

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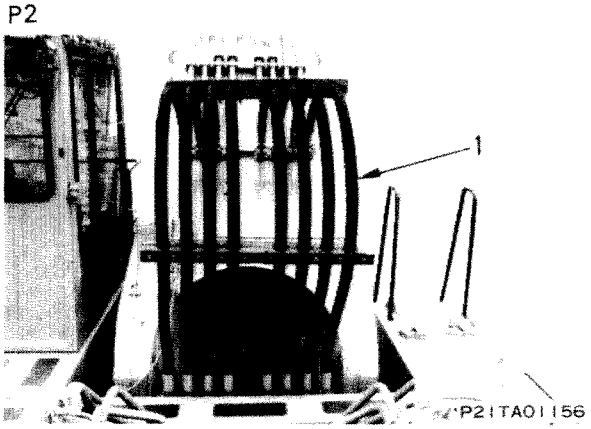

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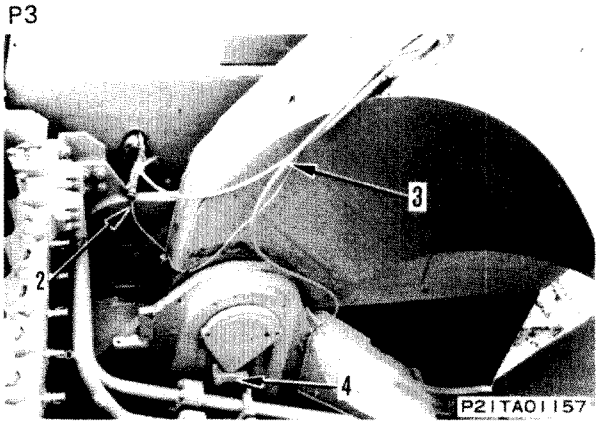

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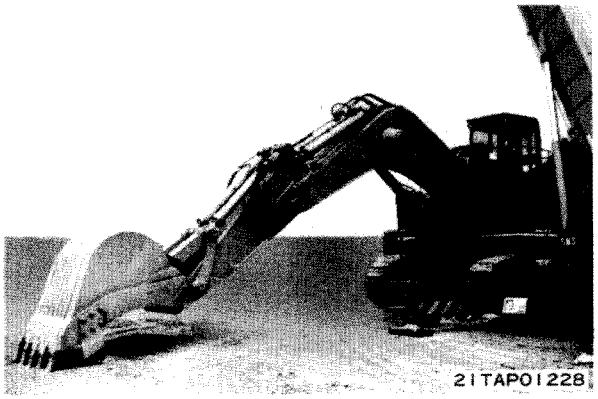

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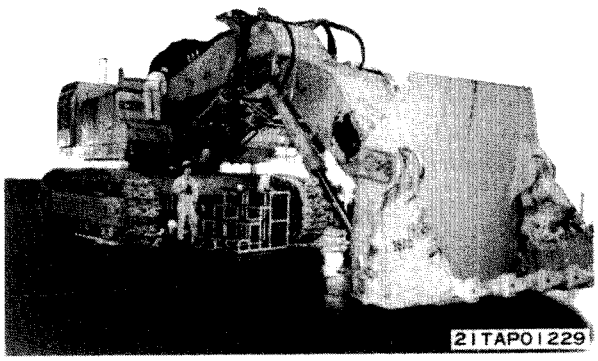

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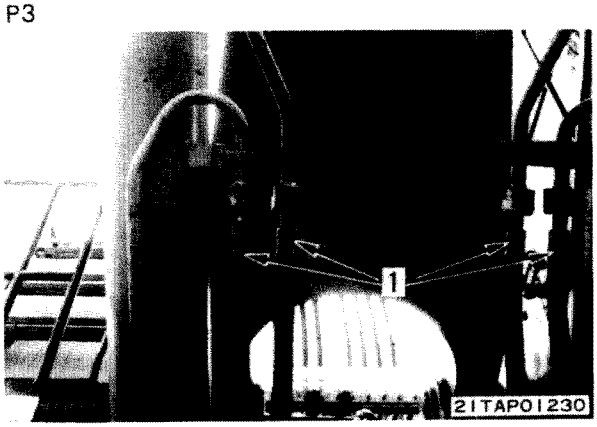

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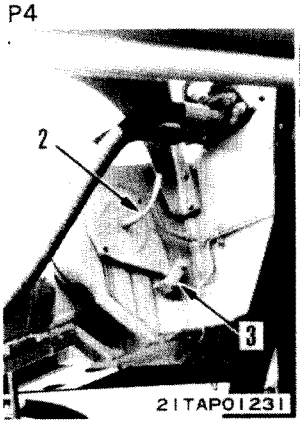

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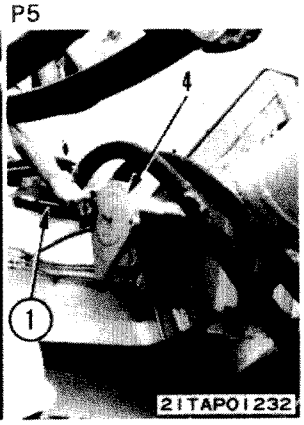

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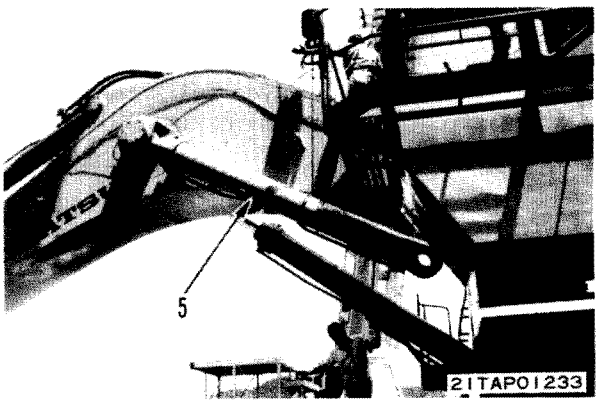

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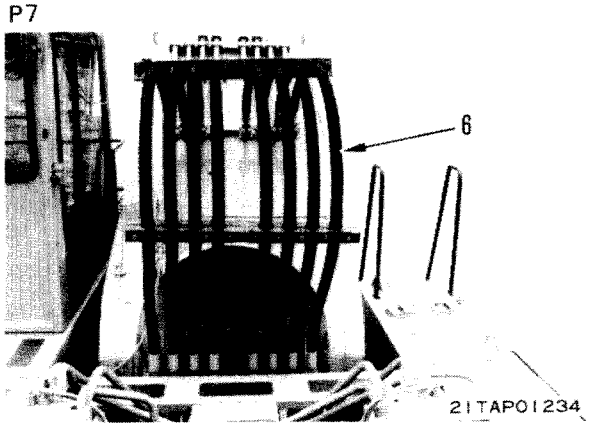

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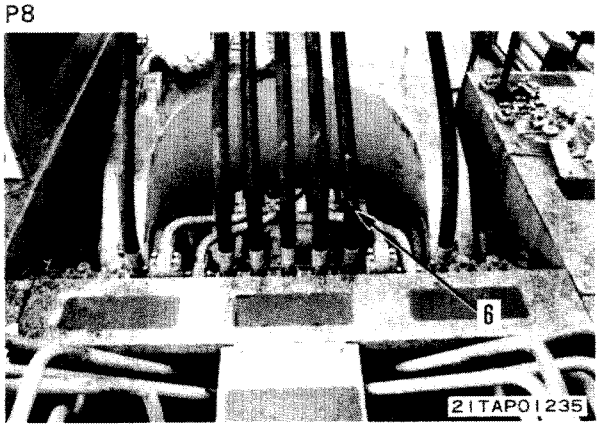

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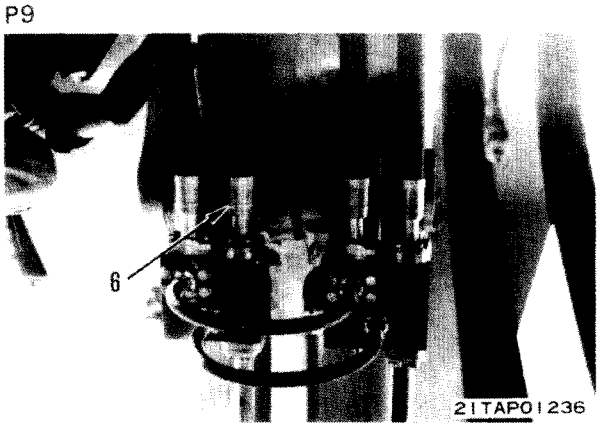
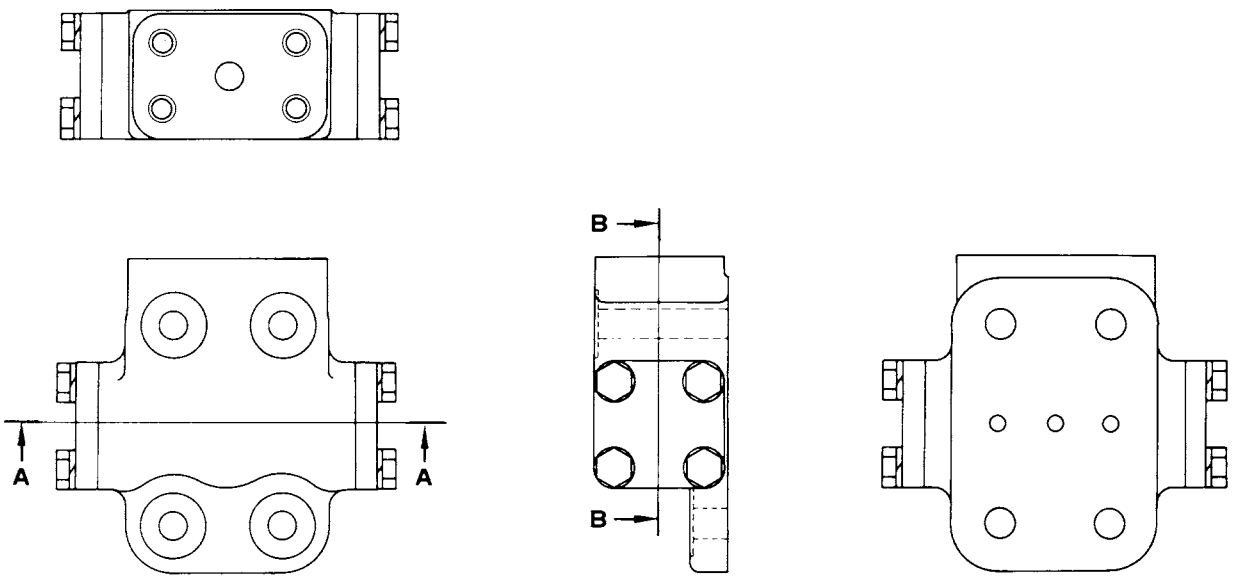
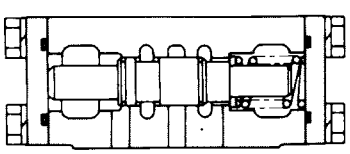
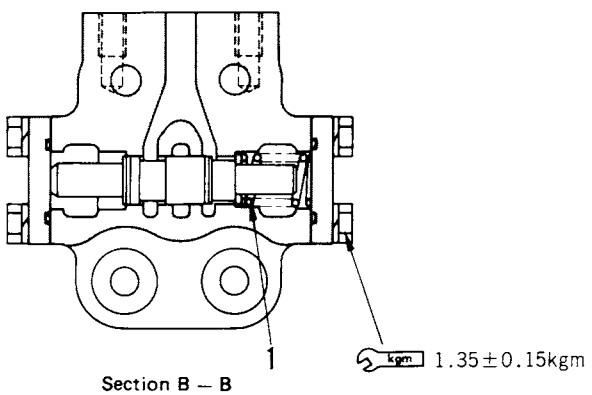


TRAVEL SHUTTLE VALVE





Section A – A



Section B – B

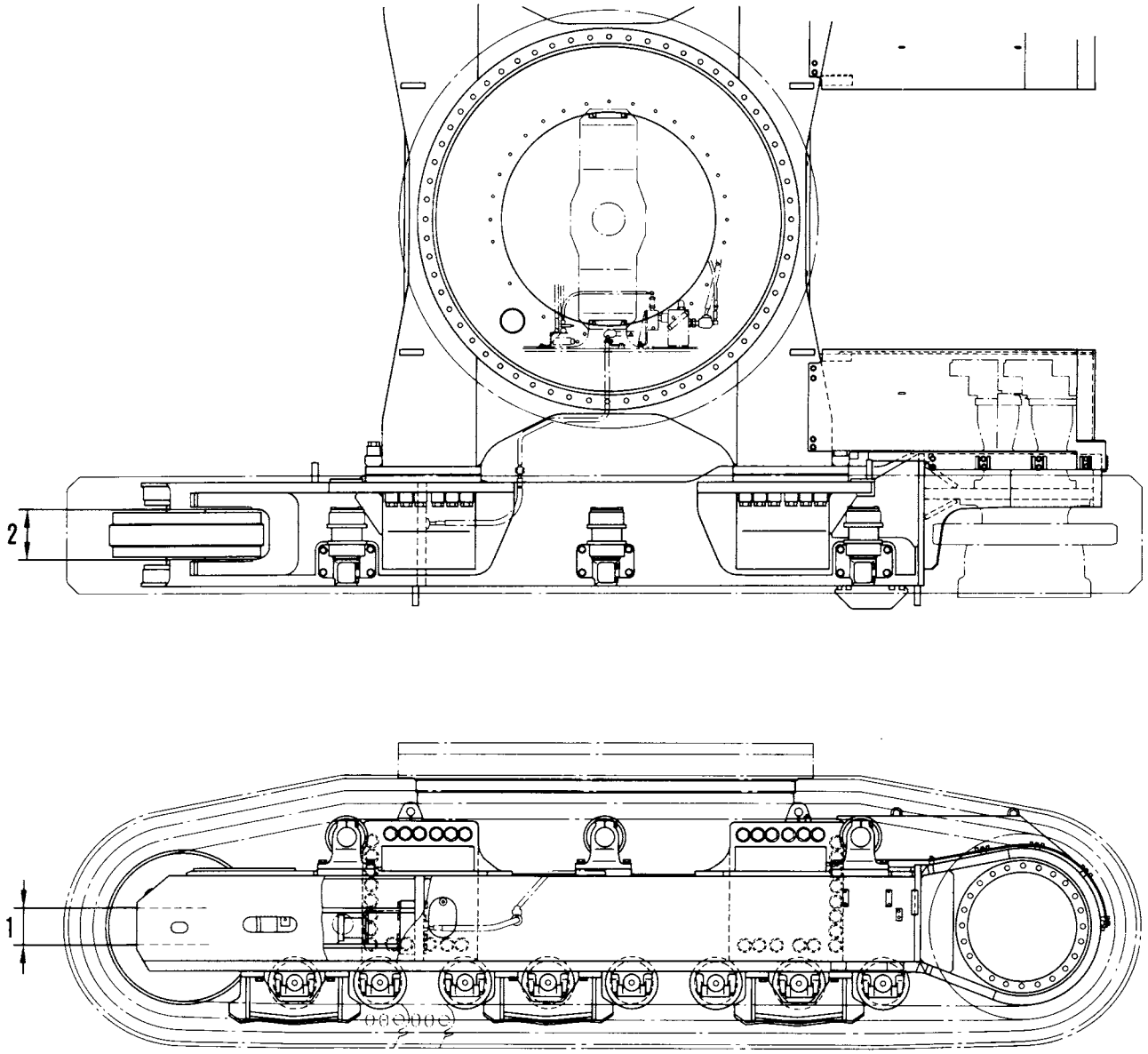
021TA1

209F3153A

Unit: mm

No.	Check item	Criteria					Remedy
		Standard size			Repair limit		
1	Spool return spring	Free length x O.D.	Installation length	Installation load	Free length	Installation load	Replace spring if any damages or deformations are found
		–	20	3.56 kg	–	–	

TRACK FRAME



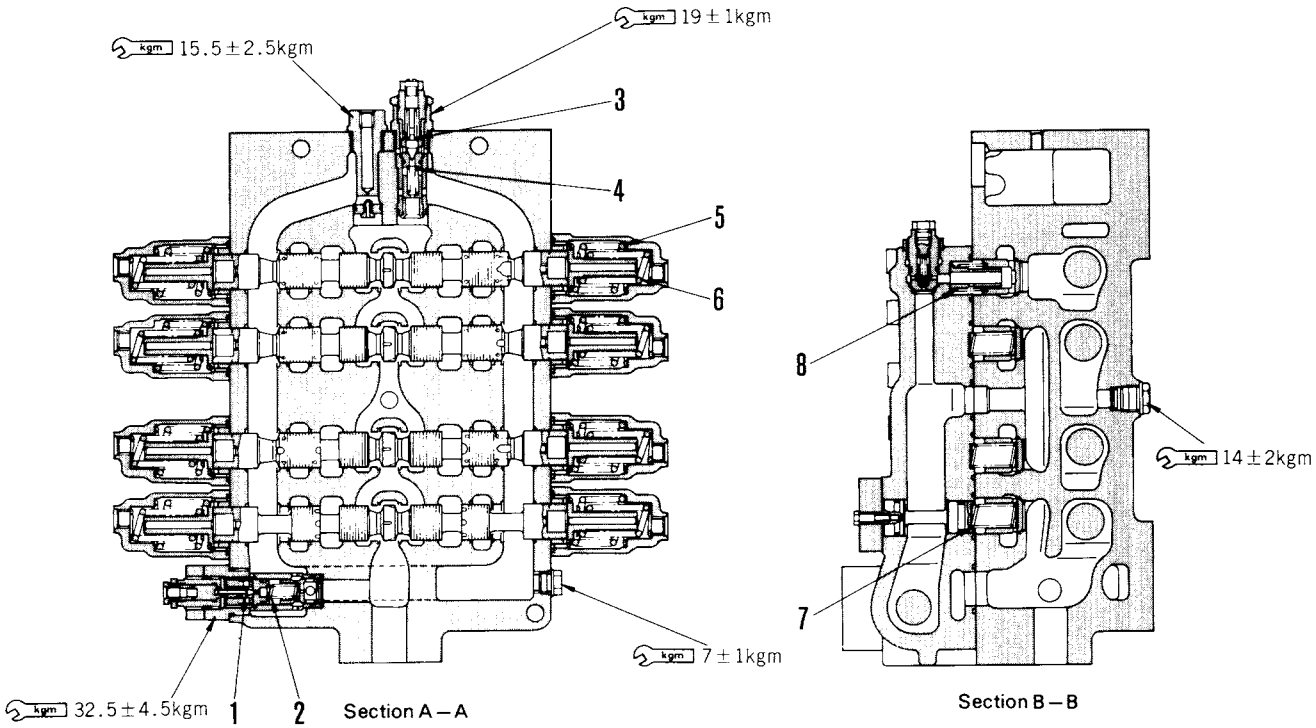
021TA1

21TAF01063

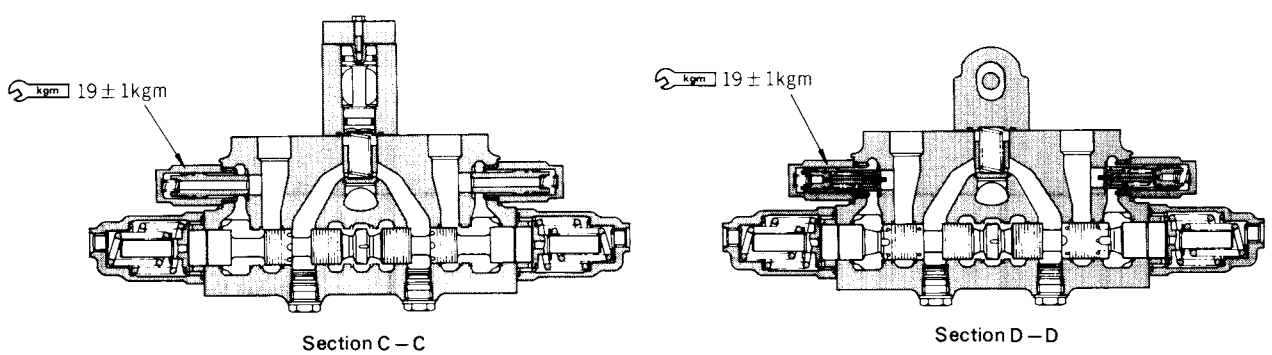
Unit: mm

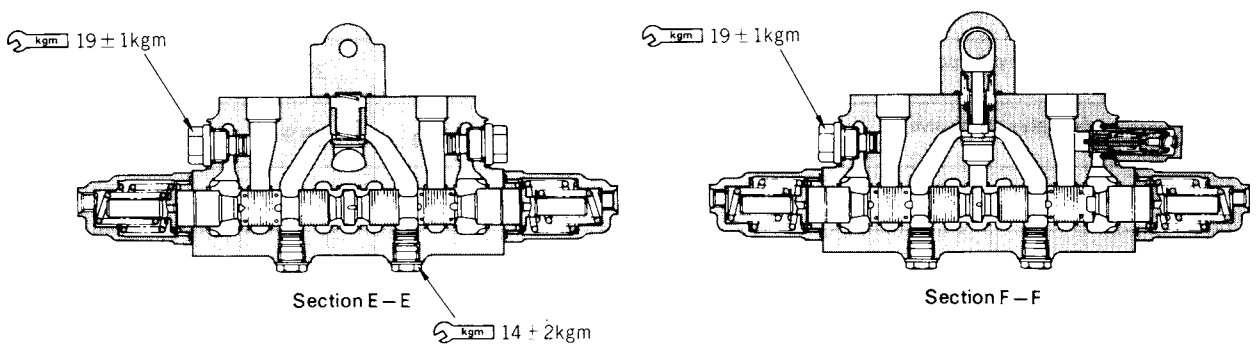
No.	Check item		Criteria			Remedy
			Standard size	Tolerance	Repair limit	
1	Vertical width of idler guide	Track frame	227.5	227.5^{+3}_{-2}	235	Rebuild
		Idler support	225	225 ± 0.5	218	Replace
2	Horizontal width of idler guide	Track frame	420	420^{+5}_{-2}	430	Rebuild
		Idler support	416	—	405	Replace

V1 CONTROL VALVE



021TA1





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