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## How to read the shop manual

- Some attachments and optional parts described in this shop manual may not be arranged for certain areas. Contact your Komatsu distributor if one or some of them are required.
- Materials and specifications are subject to change without notice.
- The shop manuals are available for “Machine part” and “Engine part”. For the engine, see the shop manual for the same model of the engine as the one which is mounted on the machine.

### Composition of shop manual

- This shop manual describes the technical information required for the services performed in a workshop.  
The shop manual is divided into the following chapters for the convenience of use.

### 00. Index and foreword

- This section includes the index, foreword, safety and basic information.

### 01. Specification

- This section explains the specifications of the machine.

### 10. Structure, function and maintenance standard

- This section explains the structure, function, and maintenance standard values of each component. The structure and function sub-section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting. The maintenance standard sub-section explains the criteria and remedies for disassembly and service.

### 20. Standard value table

- The standard values for a new machine and trouble shooting are described. This standard value table is used for testing and adjusting, and determining a failure at troubleshooting.

### 30. Testing and adjusting

- This section describes the measuring tools and how to measure, and how to adjust various parts. As for the standard value and failure criterion, see the standard value table.

### 40. Troubleshooting

- This section describes the troubleshooting in a suspected area when a failure occurs and the remedy for the failure. Troubleshooting is described by each failure mode.

### 50. Disassembly and assembly

- This section explains the procedures for removing, installing, disassembling, and assembling each part or component and the special tools for the works as well as precautions for doing them safely. In addition, tightening torque, and quantity and weight of coating material, oil, grease, and coolant required for the works are also explained.

### 80. Appendix

- The structure and function, testing and adjusting, and troubleshooting for all of the other components or equipment which can not be separately classified are explained together in the appendix.

### 90. Diagrams and drawings

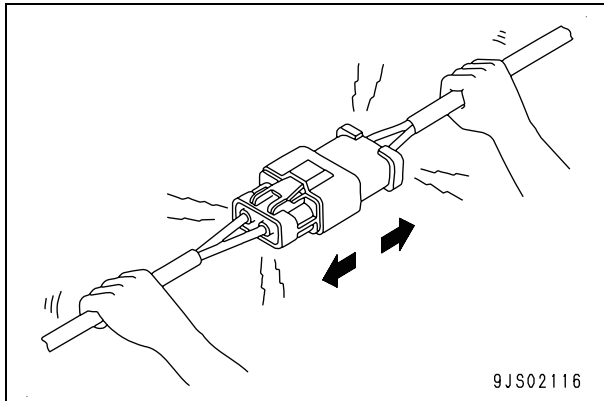
- This section gives hydraulic circuit diagrams and electrical circuit diagrams.

### Revision and distribution

Any additions, revisions, or other change of notices will be sent to KOMATSU distributors. Get the most up-to-date information before you start any work.

### Filing method

File by the brochures in the correct order of the form number printed in the shop manual composition table.

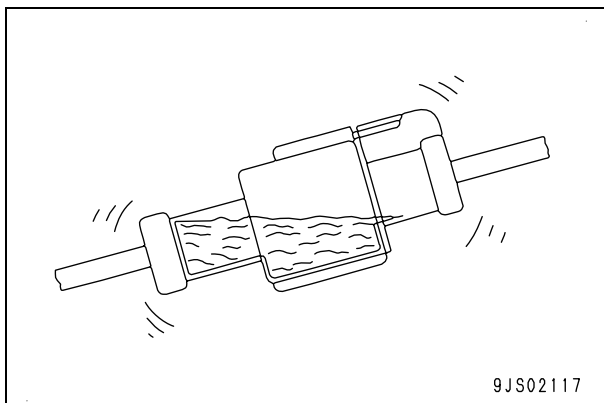
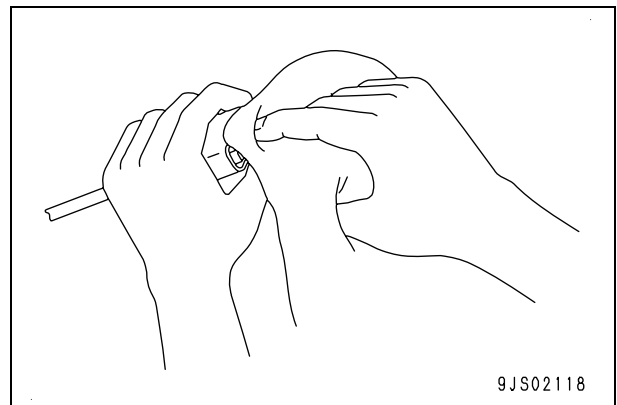


#### Oil, mud or dirt stuck to connector

- If any oil or grease is stuck to the connector and an oil film is formed on the mating surface of the male and female pins, the oil prevents electricity from passing through, resulting in defective contact. If any oil or grease, mud or dirt is stuck to the connector, wipe it off with a dry cloth or blow it with compressed air and spray it with electrical contact restorer.
  - ★ When wiping the joint portion of the connector, be careful not to apply excessive force or deform the pins.
  - ★ If there is oil or water in the compressed air, it causes the contacts to become dirtier. So, remove the oil and water from the compressed air completely before cleaning the connector with the compressed air.

#### High-pressure water entering connector

- The connector is designed to make it difficult for water to enter (drip-proof structure), but if high-pressure water is sprayed directly on the connector, water may enter the connector, depending on the direction of the water jet. Accordingly, take care not to spray water over the connector.  
The connector is designed to prevent water from entering, but once water does enter, it is difficult to drain it. If water should get into the connector, the pins will be short-circuited by the water. So if any water gets in, immediately dry the connector or take other appropriate action before passing electricity through it.



#### Removing, installing, and drying connectors and wiring harnesses

##### Disconnecting connectors

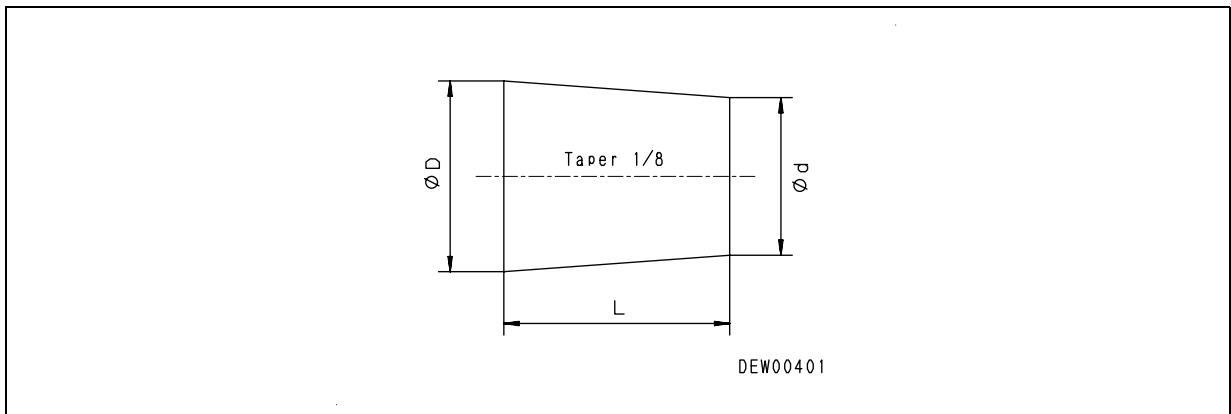
1. Hold the connectors when disconnecting.
  - Disconnect connectors by holding the connector bodies. For the connectors held by a screw, loosen the screw fully, then hold the male and female connectors with each hand respectively and pull them apart horizontally. For the connectors with lock stopper, press down the stopper with your thumb and pull the connectors apart.
    - ★ Never pull the connector with one hand.

#### Entry of water, mud or dirt when disconnecting a connector

- If any water, mud or dirt is stuck to the outside surface of a connector, it can enter inside the connector when the connector is disconnected. Before disconnecting the connector, wipe off any stuck water or dirt by using a piece of dry cloth or blow it with compressed air.

If the part is not under hydraulic pressure, the following corks can be used.

Nominal No.	Part Number	Dimensions		
		D	d	L
06	07049-00608	6	5	8
08	07049-00811	8	6.5	11
10	07049-01012	10	8.5	12
12	07049-01215	12	10	15
14	07049-01418	14	11.5	18
16	07049-01620	16	13.5	20
18	07049-01822	18	15	22
20	07049-02025	20	17	25
22	07049-02228	22	18.5	28
24	07049-02430	24	20	30
27	07049-02734	27	22.5	34



**Precautions for installation work**

- Tighten all of the bolts and nuts (sleeve nuts) to the specified torque (KES).
- Install the hoses without twist and interference, and securely fasten the clamps located in-between if they are.
- Replace all of the gaskets, O-rings, cotter pins, and lock plates with new parts.
- Bend the cotter pins and lock plates securely.
- When applying adhesive, clean and degrease the part, and apply two to three drops of adhesive to the threaded portion.
- When applying liquid gasket, clean and degrease the surface, and apply it uniformly after making sure that the surface is free from dirt or damage.
- Clean all of the parts, and correct any damage, dents, burrs, or rust found on them.
- Coat the rotating parts and sliding parts with engine oil.
- Coat the surfaces of the press-fitting parts with molybdenum disulfide lubricant (LM-P).
- After installing the snap ring, check that the snap ring is settled in the ring groove completely.
- When connecting wiring harness connectors, clean the connectors to remove oil, dirt, or water, then connect them securely.
- Use the eye bolts with no fatigue and deformation and screw them in securely. Match the directions of the eyes and the hook.
- When installing split flanges, tighten the bolts uniformly and alternately to prevent excessive tightening on one side.
- ★ When the hydraulic cylinder is used for the first time after reassembly of the hydraulic equipment such as the hydraulic cylinder, pump, etc. and piping after removing them for repair, be sure to perform air bleeding of the hydraulic circuit according to the following procedure.
  1. Start and run the engine at low idle.
  2. Repeat the operation to extend and retract each cylinder of the work equipment to approximately 100 mm before the stroke end four to five times.

## Conversion table

### Method of using the conversion table

- The unit conversion table enables the simple conversion in the figures between the different units. For further details of the method of use of the conversion table, see the examples given below.

Example: Method of using the conversion table to convert a unit from millimeters to inches

### Conversion of 55 mm into inches

- Locate the number 50 in the vertical column at the left side, take this as (A), and then draw a horizontal line from (A).
- Locate the number 5 in the row across the top, take this as (B), then draw a vertical line down from (B).
- Take the point where the two lines cross as (C). This point (C) gives the value when converting the unit from millimeters to inches. Therefore, 55 mm = 2.165 in.

### Conversion of 550 mm into inches

- The number 550 does not appear in the table, so divide it by 10 (move the decimal point one place to the left) to get 55 mm.
- Then convert 55 mm to 2.165 in by the same procedure as above.
- The original value (550 mm) was divided by 10, so multiply 2.165 inches by 10 (move the decimal point one place to the right) to get the original value. This gives 550 mm = 21.65 in. Therefore, 550 mm = 21.65 in.

Millimeters to inches							(B)	1 mm = 0.03937 in			
	0	1	2	3	4	5	6	7	8	9	
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354	
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748	
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142	
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536	
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929	
(A) 50	1.969	2.008	2.047	2.087	2.126	(C) 2.165	2.205	2.244	2.283	2.323	
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717	
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110	
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504	
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898	

Unit: kg

Machine model	PC210-8M0	PC210LC-8M0
Serial number	N710001 and up	
Boom assembly	1,541	1,541
Arm assembly	848	848
Bucket assembly	810	870
Boom cylinder assembly	196 x 2	196 x 2
Arm cylinder assembly	255	255
Bucket cylinder assembly	137	137
Link (large) assembly	153	153
Link (small) assembly	22 x 2	22 x 2
Boom pin	42 + 8 x 2 + 28 + 10 + 26	42 + 8 x 2 + 28 + 10 + 26
Arm pin	12 + 8	12 + 8
Bucket pin	20 x 2	20 x 2
Link pin	13 x 2	13 x 2

1. Level plug
2. No. 1 planetary gear (No. of teeth: 42)
3. Drain plug
4. No. 1 sun gear shaft (No. of teeth: 10)
5. No. 2 sun gear (No. of teeth: 21)
6. No. 1 planetary carrier
7. Cover
8. Ring gear (No. of teeth: 95)
9. No. 2 planetary carrier
10. Ring nut
11. Hub
12. Sprocket
13. Floating seal
14. Travel motor
15. No. 2 planetary gear (No. of teeth: 36)

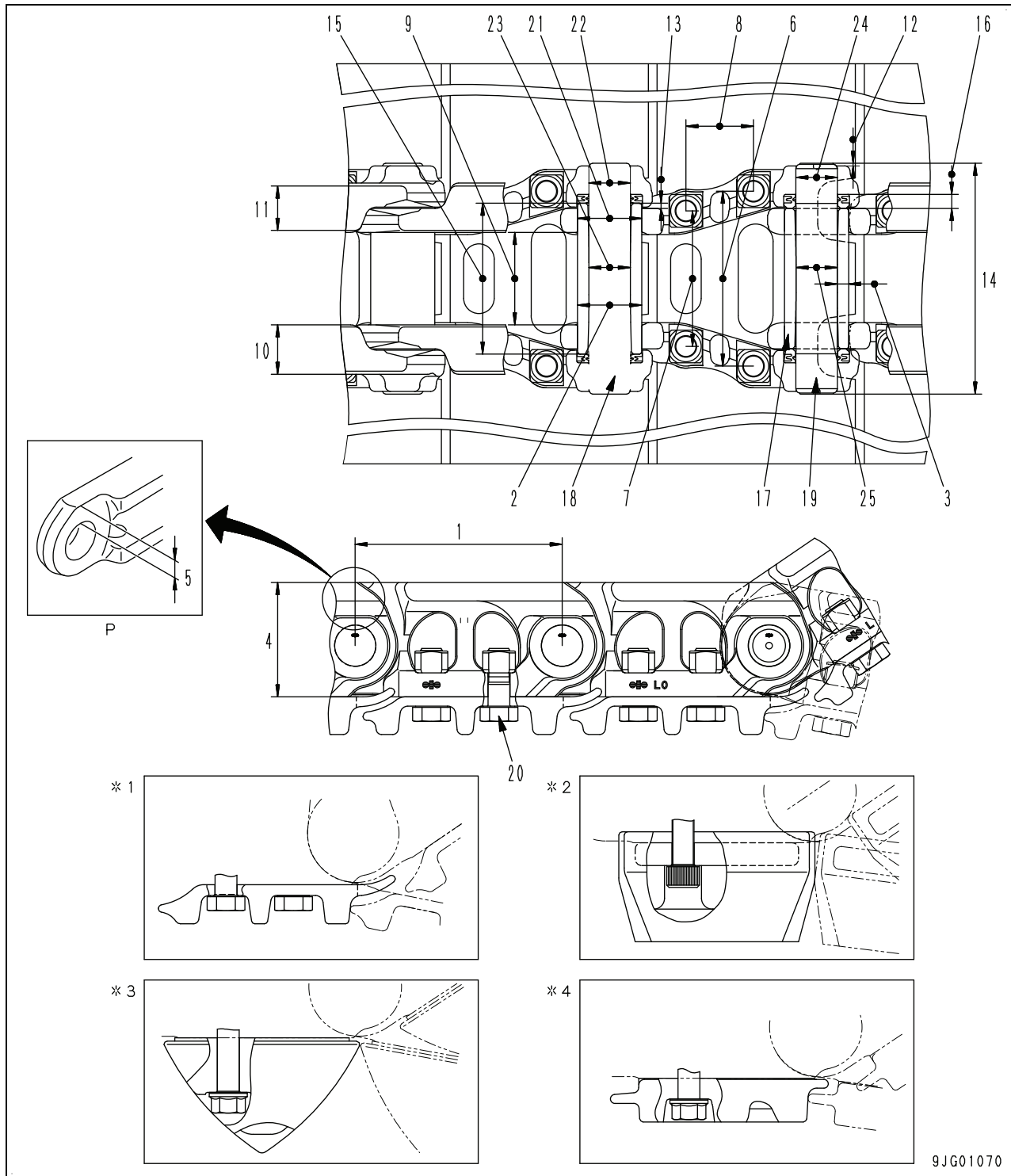
### Specifications

Reduction ratio:  $-\left(\frac{10 + 95}{10}\right) \times \left(\frac{21 + 95}{21}\right) + 1 = -57.000$

Unit: mm

No.	Check item	Criteria		Remedy
		Standard dimension	Repair limit	
16	Backlash between travel motor and No.2 planetary carrier	Standard clearance	Allowable clearance	Replace
		0.06 to 0.25	1.00	
17	Backlash between No. 2 planetary gear and ring gear	0.17 to 0.57	1.10	
18	Backlash between No. 2 planetary gear and No. 2 sun gear	0.15 to 0.49	—	
19	Backlash between No. 1 planetary gear and ring gear	0.17 to 0.57	1.10	
20	Backlash between No. 1 planetary gear and No. 1 sun gear shaft	0.14 to 0.46	1.00	
21	Backlash between No. 1 planetary carrier and No. 2 sun gear	0.38 to 0.66	1.00	
22	Amount of wear on sprocket tooth	Repair limit: 6		Rebuild by build-up welding or replace
23	Width of sprocket tooth	Standard dimension	Repair limit	
		71	68	

Track shoe

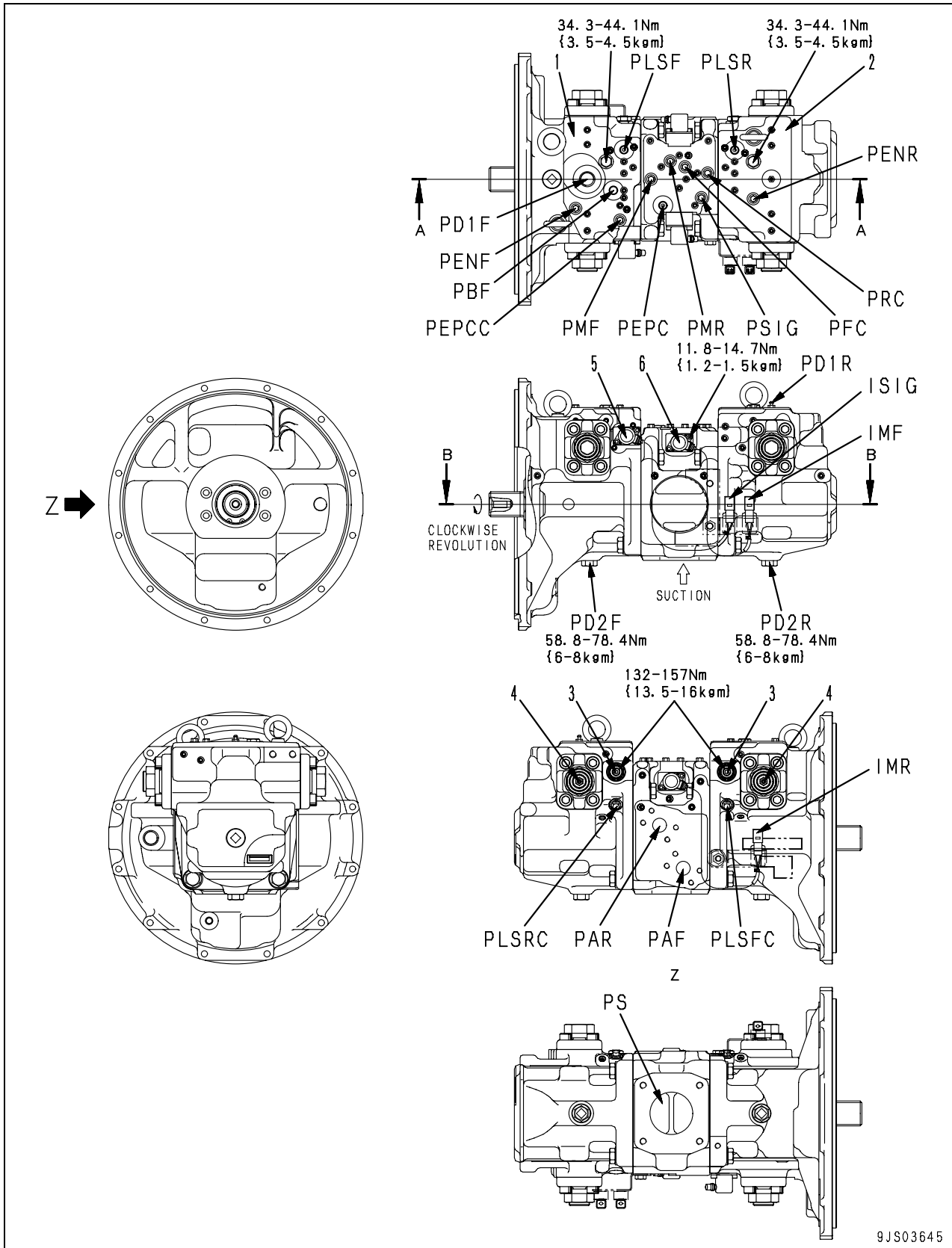


★ P portion shows the link of bushing press fitting end.

- \*1. Triple grouser shoe
- \*2. Road liner
- \*3. Swamp shoe
- \*4. Flat shoe

# Hydraulic pump

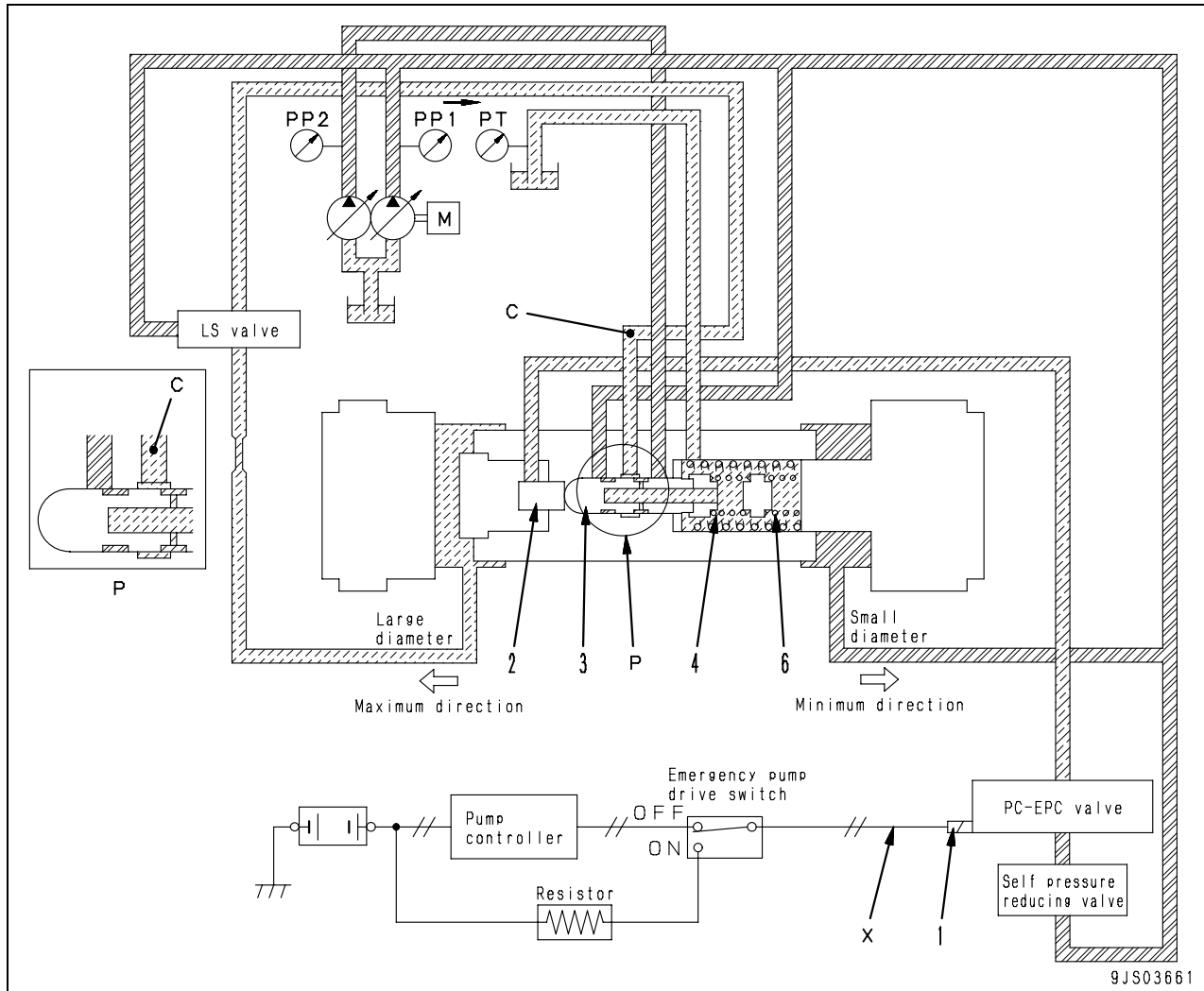
Model: HPV95+95



Operation

1) When pump controller is normal

(1) When the load on the actuator is small and pump discharge pressures (PP1) and (PP2) are low



Action of PC-EPC valve solenoid (1)

- Command current (X) is being sent to PC-EPC valve solenoid (1) from the pump controller.
  - This command current acts on PC-EPC valve to output the signal pressure in order to modify the force pushing piston (2).
  - Spool (3) stops at a position where the combined spool-pushing force is balanced by the setting force of springs (4) and (6) as well as the pump pressures (PP1) (self-pressure) and (PP2) (another pump's pressure).
  - The pressure [port (C) pressure] output from PC valve is changed depending on the above position.
  - The size of command current (X) is determined by the nature of the operation (lever operation), the selected working mode, and the set value and actual value of the engine speed.
- ★ Other pump's pressure denotes the pressure of the pump situated on the opposite side. For the front pump pressure, the other pump's pressure is that of the rear pump. And for the rear pump pressure, the other pump's pressure is that of the front pump.

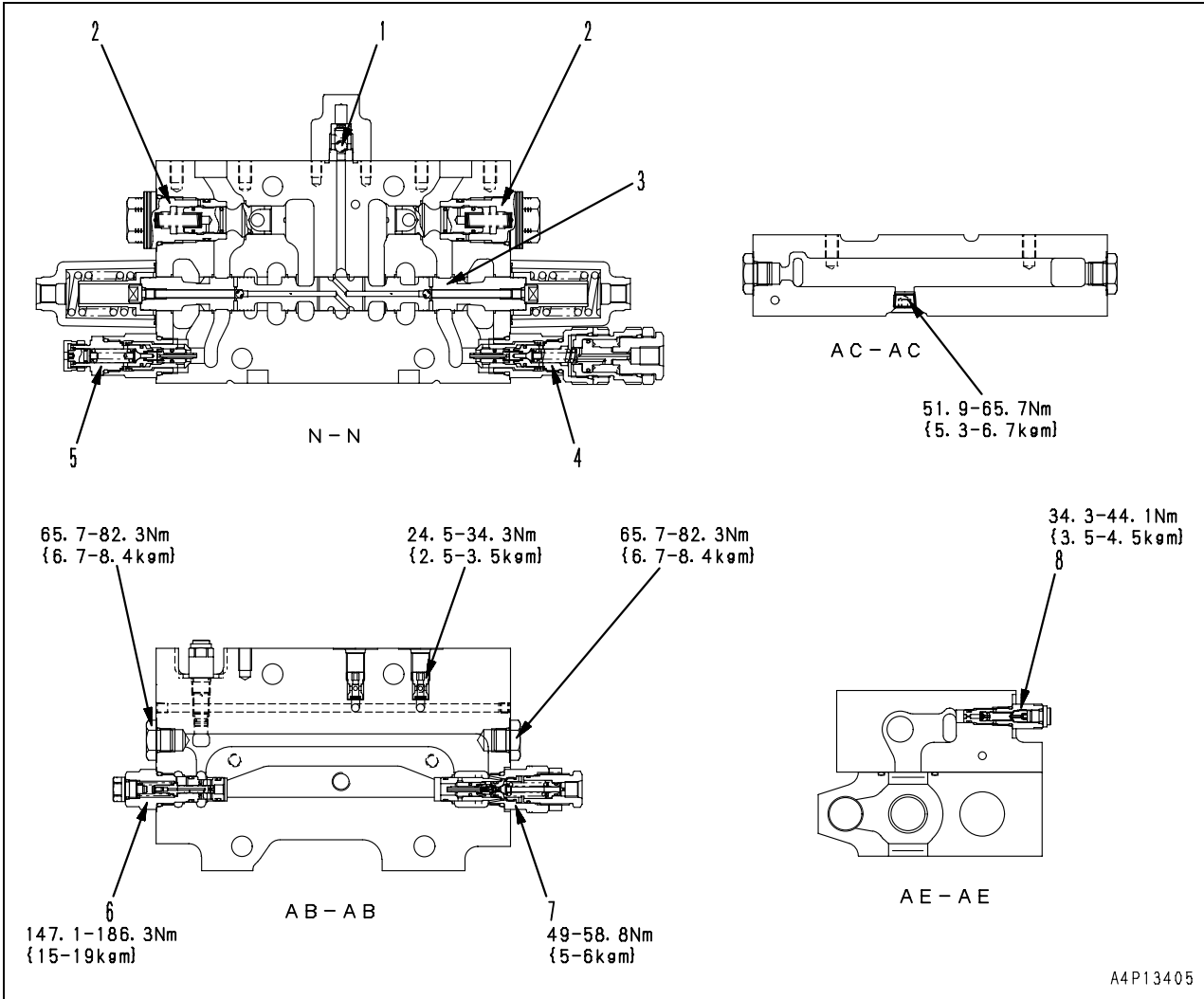
PC210-8M0, PC210LC-8M0 Hydraulic excavator

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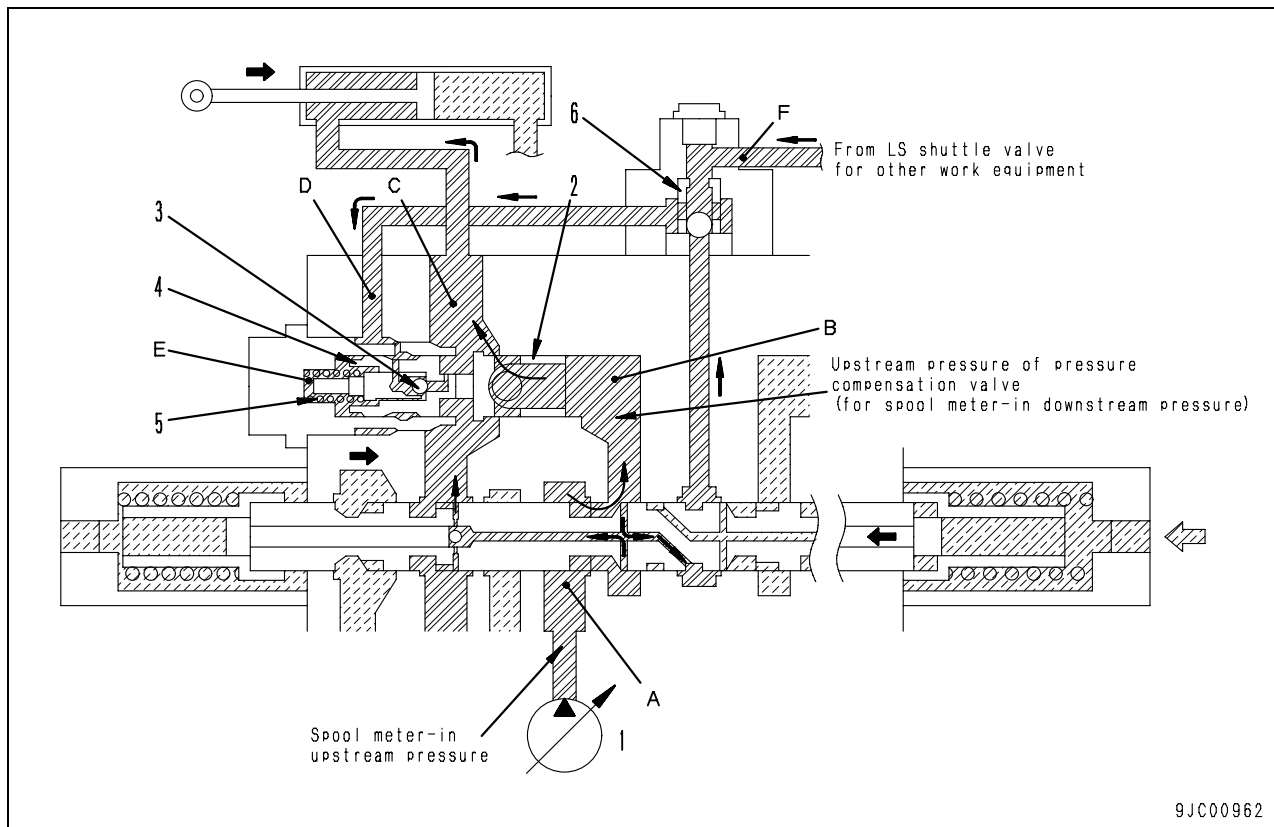
1. LS shuttle valve
2. Pressure compensation valve
3. Spool
4. 2-stage suction safety valve
5. Suction safety valve
6. Unload valve
7. Main relief valve
8. LS bypass plug

### Structure

- The control valves of the following types are set.  
6-spool valve (without service valve)  
7-spool valve (6-spool valve with service valve)
- This control valve consists of a 6-spool valve (unit type) and a set of service valve. A merge-divider valve, a variable back pressure valve and a boom hydraulic drift prevention valve are installed to it.
- Since all the valves are assembled together with connecting bolts and their passes are connected to each other inside the assembly, the assembly is compact and easy to maintain.
- With one spool provided for one work equipment, this control valve is simple in structure.

**When compensated**

(When the load pressure is lower than other work equipment during a combined operation)

**Function**

- The pressure compensation valve closes by the LS pressure of port (D), and the spool meter-in downstream pressure of port (B) becomes equivalent to the maximum pressure of other work equipment.
- Since the spool meter-in upstream pressure of port (A) is the pump pressure, the spool meter-in differential pressure [upstream pressure port (A) pressure] - downstream pressure [port (B) pressure] becomes equivalent to all the spools in operation.
- Pump flow is divided according to the ratio of the meter-in opening areas.

**Operation**

- Spring chamber (E) is interconnected to port (D).
- Piston (4) and valve (2) are moved in the closing direction (to the right) by the LS circuit pressure of port (F) from other work equipment.
- Valve upstream pressure (= spool meter-in downstream pressure) of port (B) is controlled with the LS pressure.

### Self-pressure reducing valve

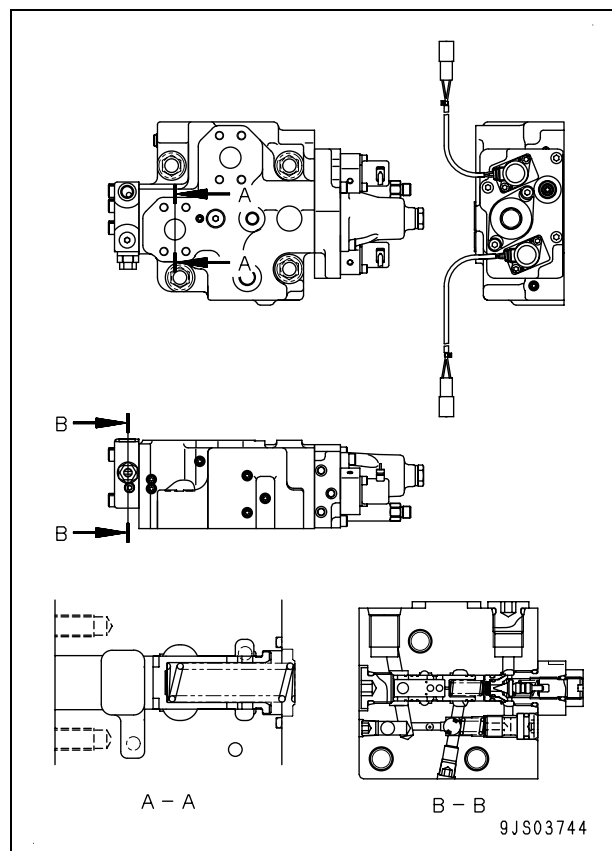
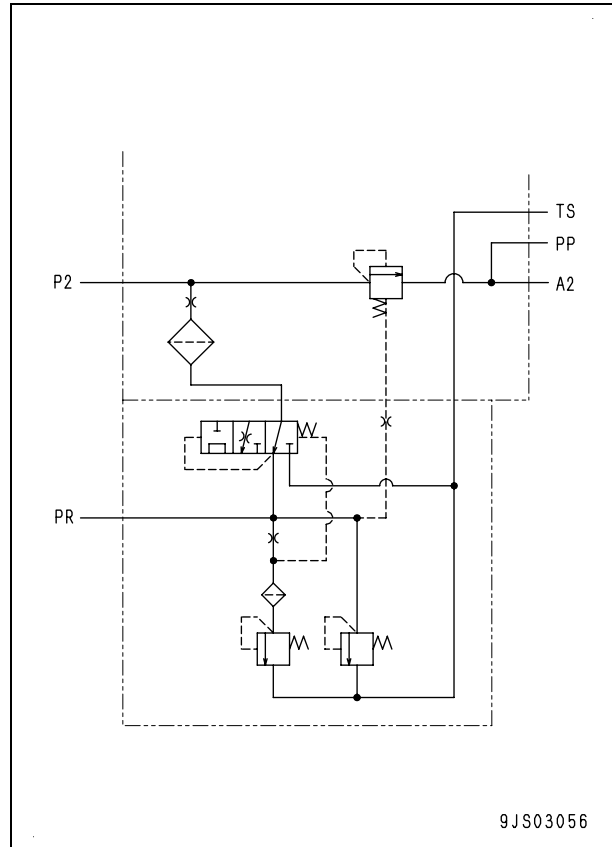
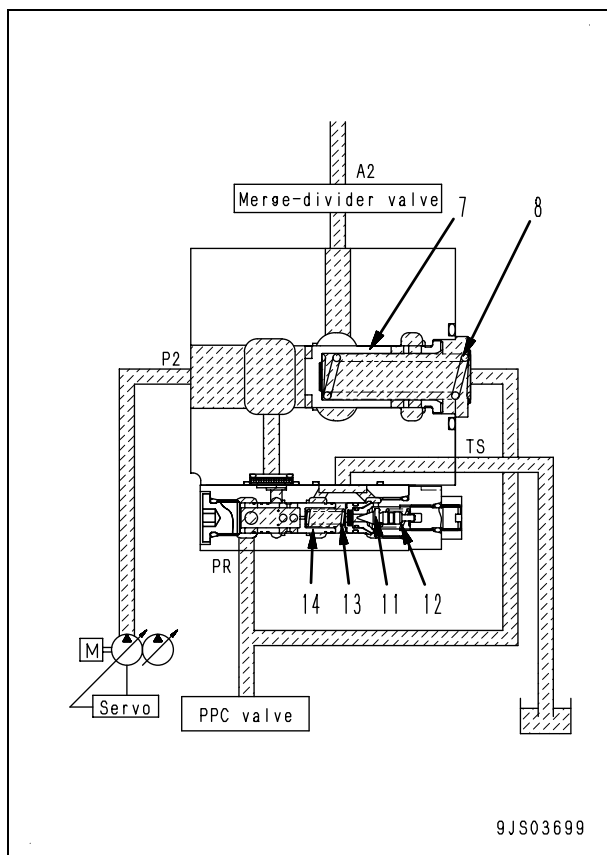
#### Function

- This valve serves to reduce the discharge pressure of main pump and provide it for solenoid valves, EPC valves, etc. for use as the control pressure.

#### Operation

##### When engine is stopped

- Poppet (11) is pressed against the seat by spring (12), so port (PR) is disconnected from port (TS).
- Valve (14) is pressed to the left by spring (13), so port (P2) is disconnected from (TS).
- Valve (7) is pressed to the left by spring (8), so port (P2) is disconnected from port (A2).



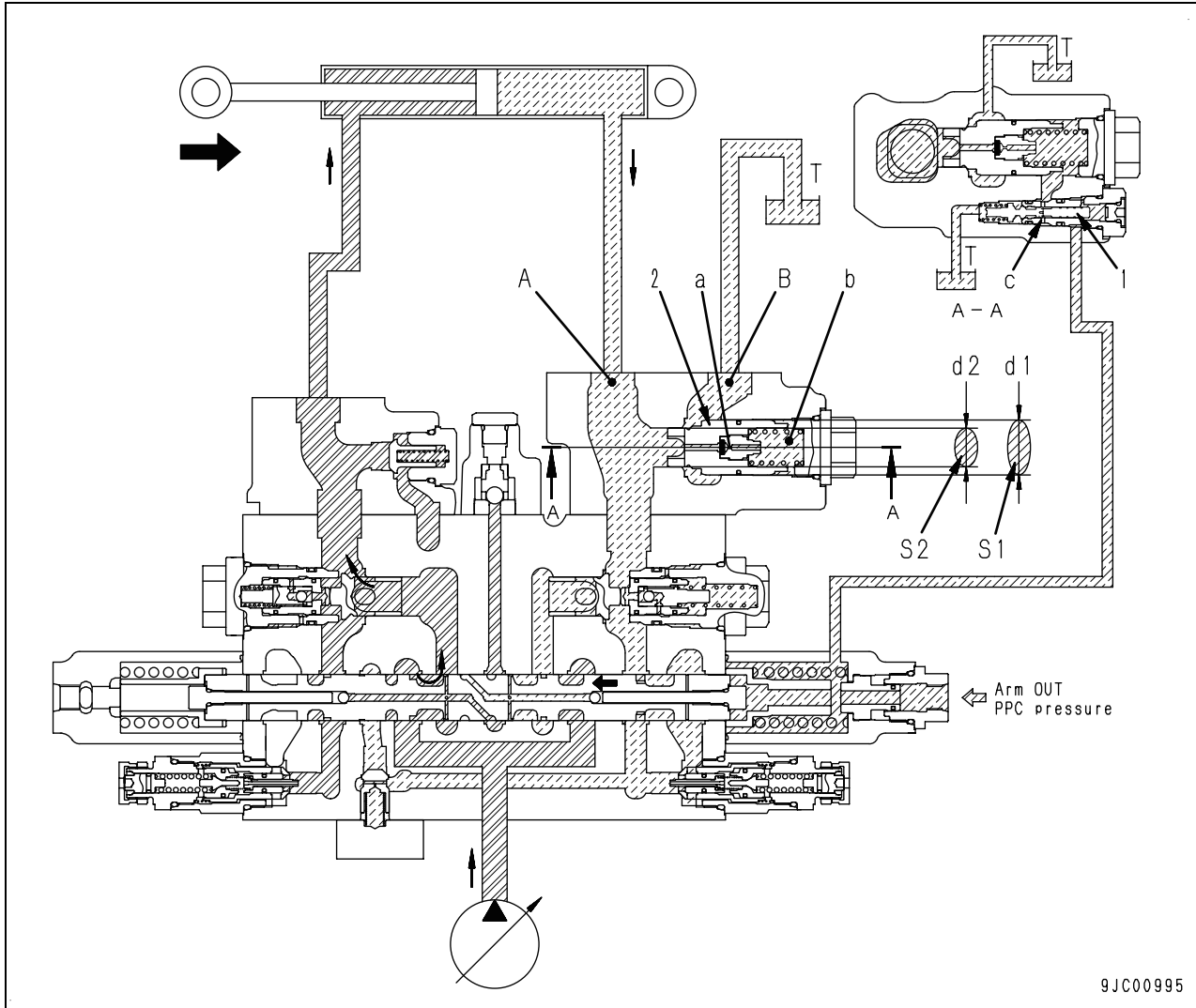
**Arm quick return valve**

**Function**

- Large amount of oil is returned from the cylinder bottom when arm OUT operation is performed.
- The valve reduces this pressure loss.

**Operation**

**In arm “OUT” operation**



9JC00995

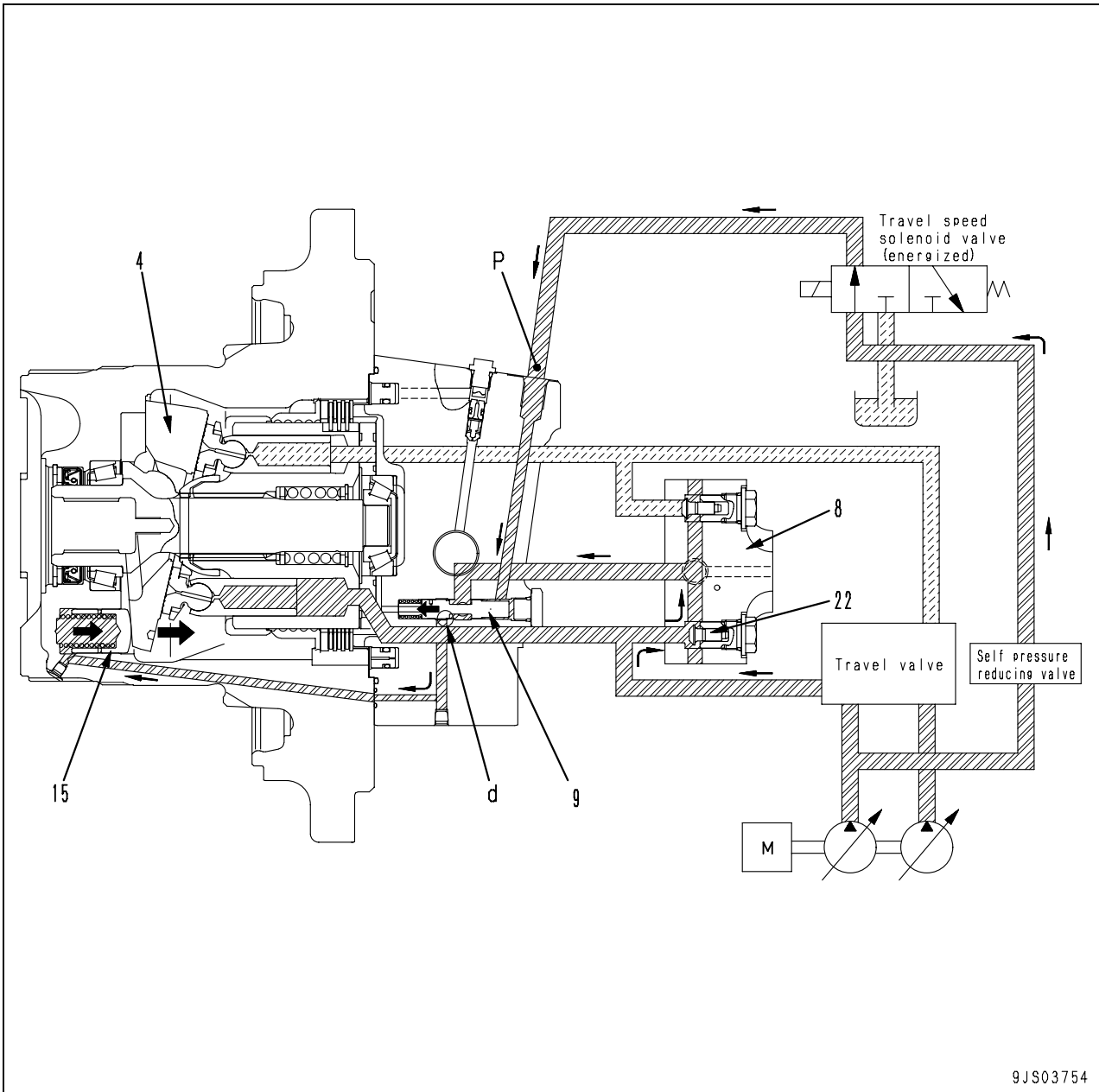
- In arm “OUT” operation, the pilot pressure from the PPC valve pushes pilot piston (1).
- The pressurized oil in chamber (b) inside the valve is drained through orifice (c).
- The pressurized oil of the arm cylinder bottom side flows from orifice (c) to drain port (T) through orifice (a) and chamber (b).
- Chamber (b) and drain port (T) are interconnected, and the pressure of chamber (b) drops.
- If the pressure in chamber (b) drops lower than that of port (A), the force exerted on the pressure receiving surface of [Area (S2) of  $\phi d2$  (surface of seat diameter)] on the port (A) side exceeds the combined force of the force exerted on the pressure receiving surface [Area (S1) of  $\phi d1$ ] on the chamber (b) side of valve (2) and the spring force.
- The result is, (Force exerted on surface of  $\phi d2 >$  Force exerted on surface of  $\phi d1 +$  Force of spring).
- Valve (2) is pressed to the right and pressurized oil flows from port (A) to port (B).
- The pressurized oil of the arm cylinder bottom side is drained directly to the tank from port (B).

1. Brake spring
2. Drive shaft
3. Spacer
4. Case
5. Disc
6. Plate
7. Brake piston
8. Housing
9. Piston
10. Cylinder block
11. Valve plate
12. Center shaft
13. Center spring
14. Check valve
15. Shuttle valve

Unit: mm

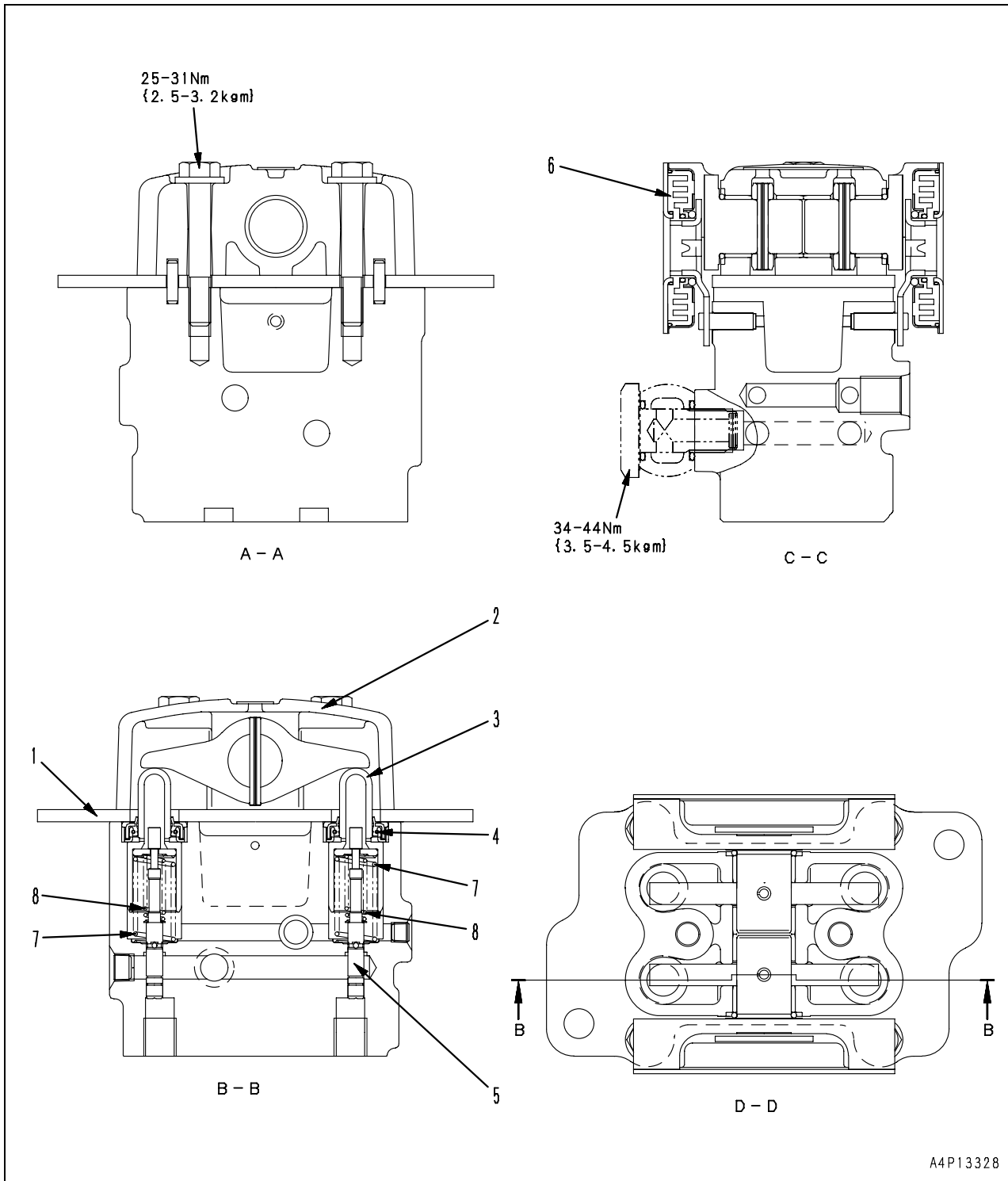
No.	Check item	Criteria					Remedy
		Standard dimension			Repair limit		
		Free length x Outside diameter	Installed length	Load at installed length	Free length	Load at installed length	
16	Check valve spring	57.2 x 20.0	30.9	3.43 N {0.35 kg}	—	2.74 N {0.27 kg}	Replace spring if damaged or deformed
17	Shuttle valve spring	16.4 x 8.9	11.5	13.7 N {1.4 kg}	—	11.0 N {1.12 kg}	

2) At high speed (motor swash plate angle at minimum)



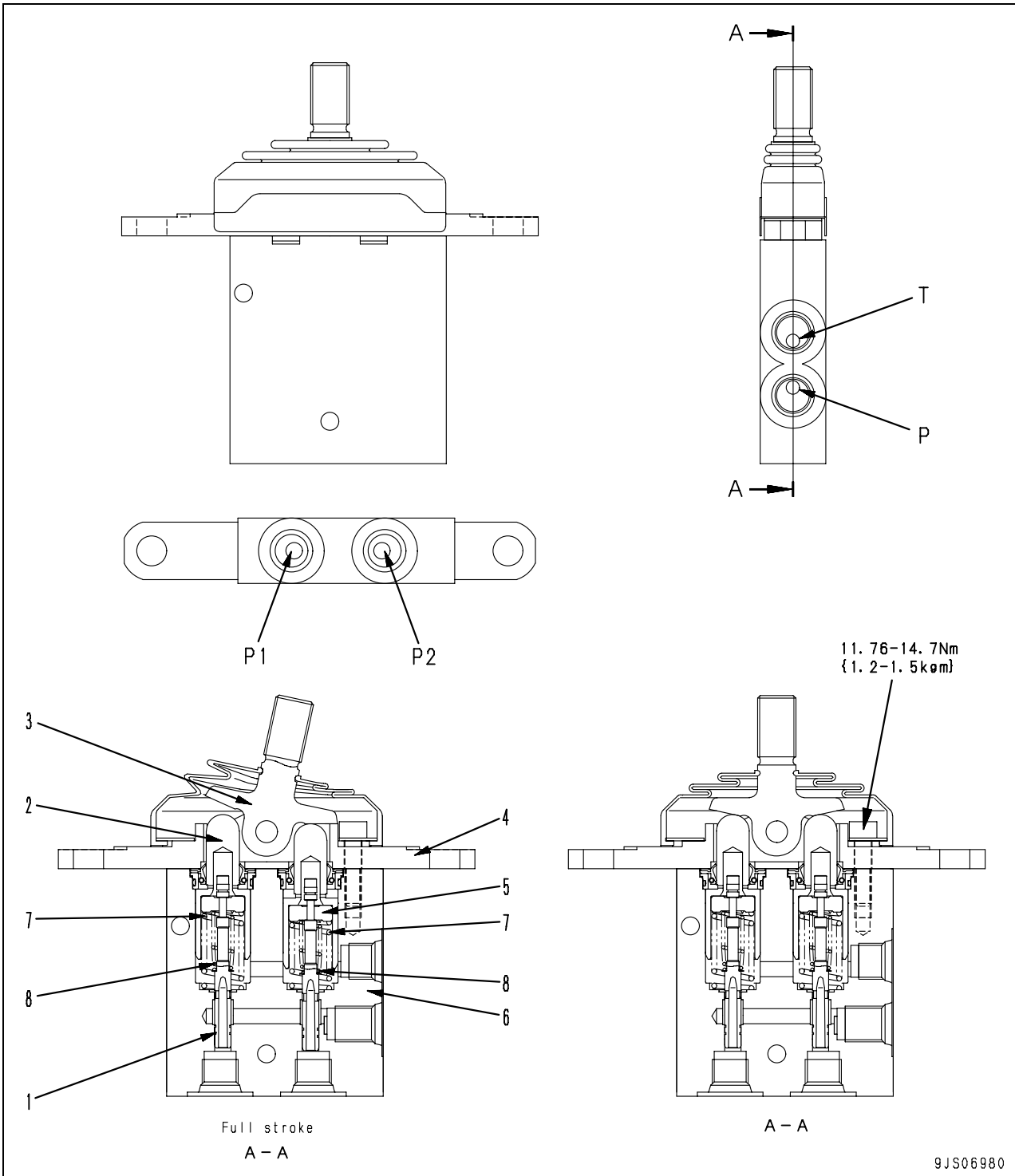
9JS03754

- As the solenoid valve is energized, the pilot pressurized oil from the self pressure reducing valve flows to port (P).
- Regulator valve (9) is pushed to the left.
- The pressurized oil from the control valve passes through passage (d) in regulator valve (9) and enters regulator piston (15).
- Regulator piston (15) is pushed to the right.
- Rocker cam (4) is inclined in the minimum swash plate angle direction. The motor capacity becomes minimum, turning on the high speed travel.



- 1. Plate
- 2. Case
- 3. Piston
- 4. Seal
- 5. Spool
- 6. Damper

Service PPC valve



★ For the details of operation, see the paragraph of “Work equipment and swing PPC valve“.

PC210-8M0, PC210LC-8M0 Hydraulic excavator

Form No. SEN06121-00

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PC210-8M0, PC210LC-8M0 Hydraulic excavator

Form No. SEN06122-00

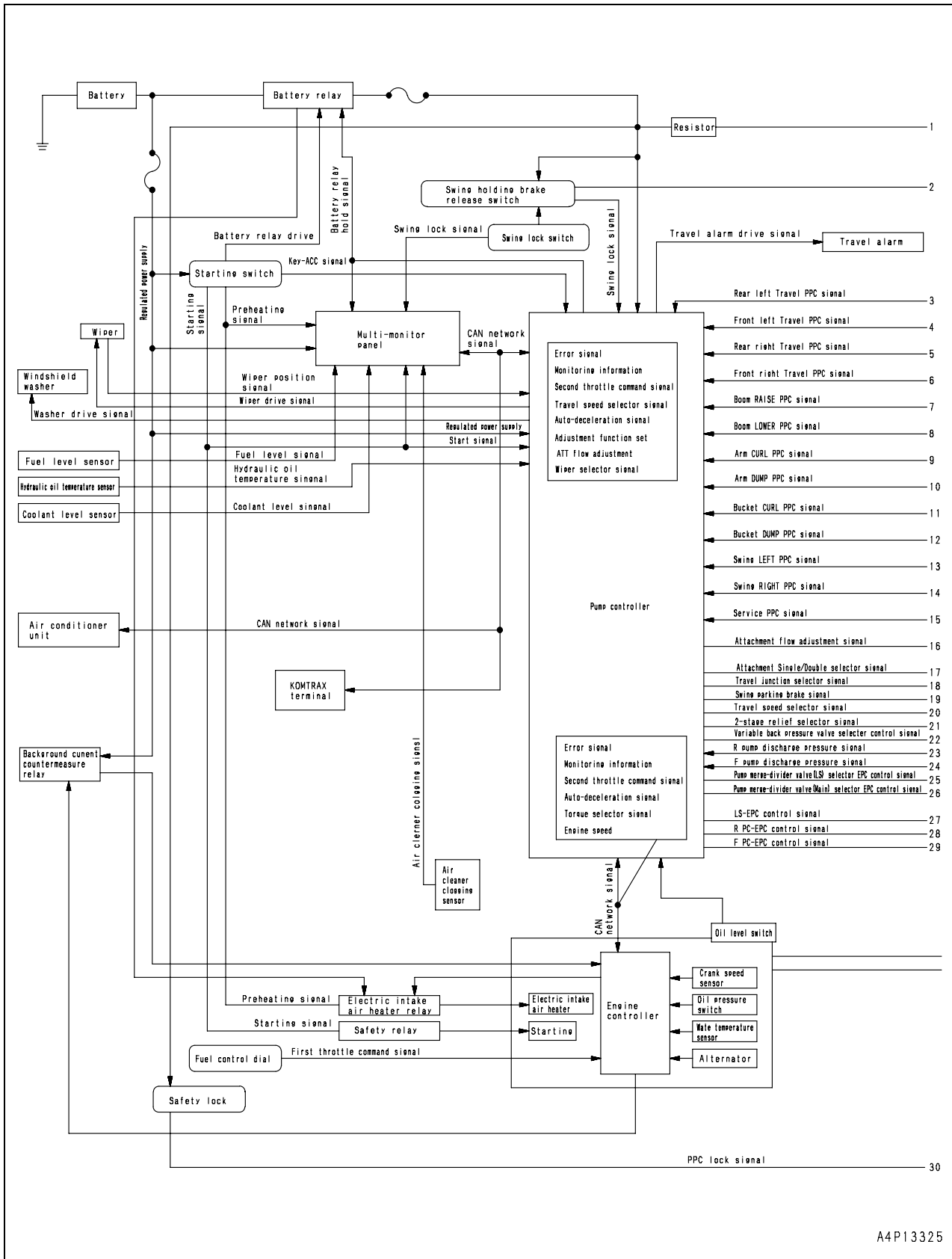
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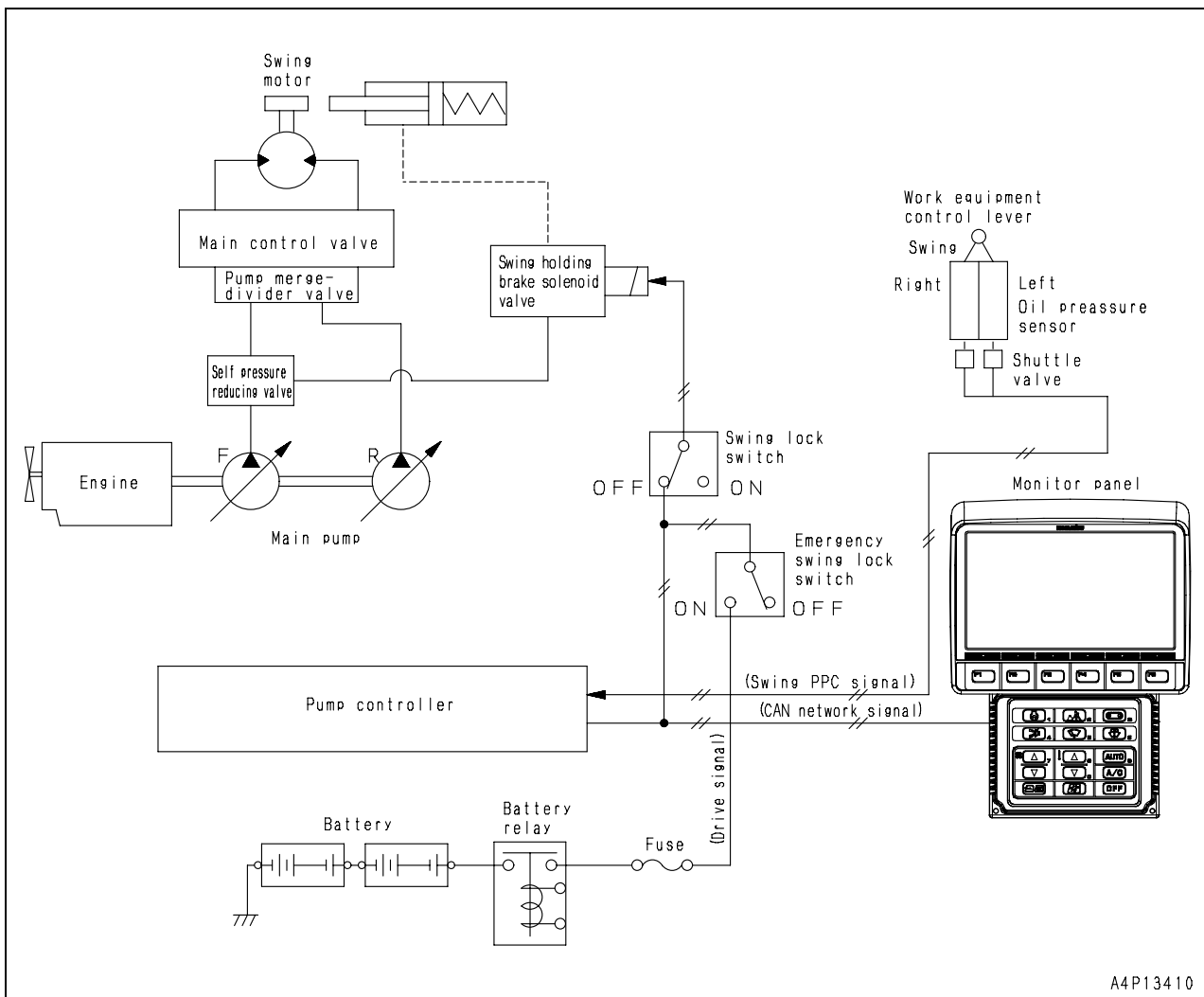
# Electrical control system

## Machine control system diagram



A4P13325

6. Swing control function

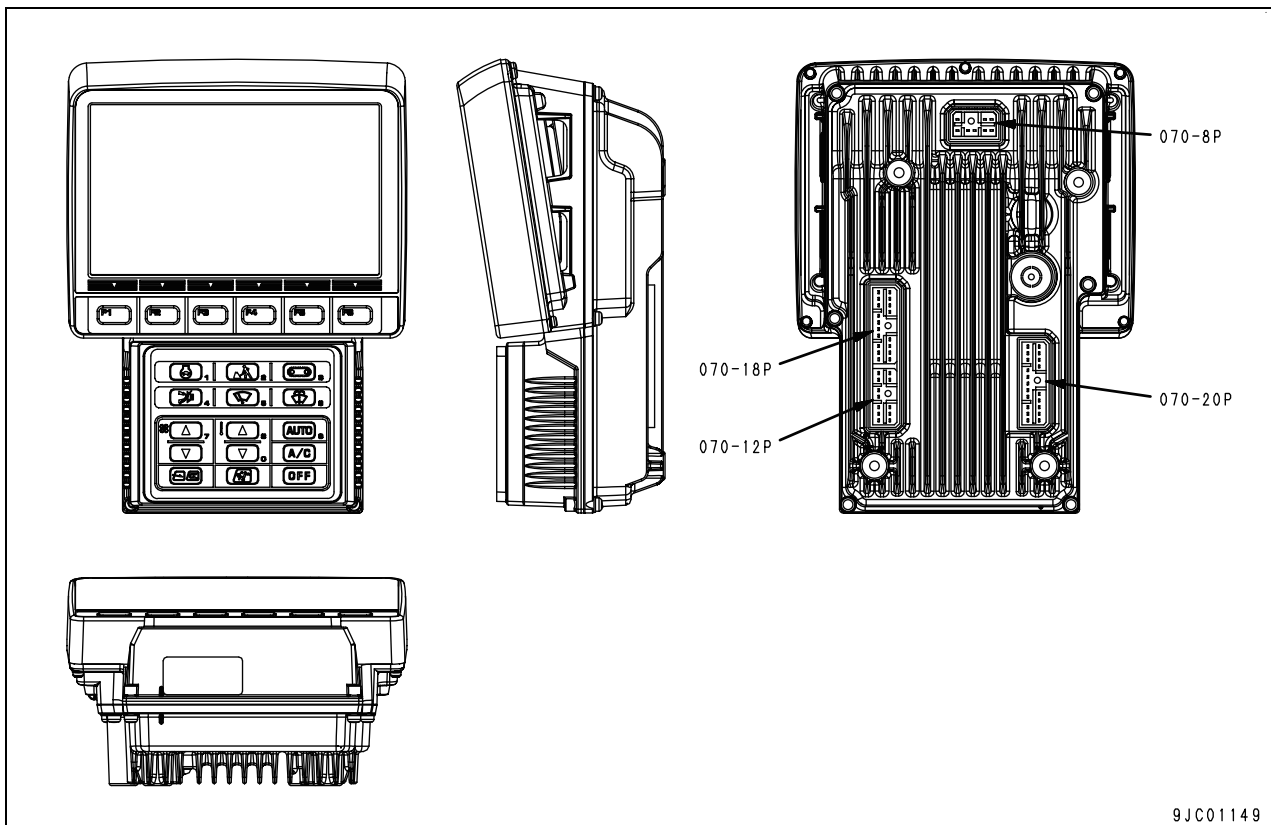


A4P13410

**Function**

The swing lock and swing holding brake function are provided as a swing control function.

## Machine monitor



9JC01149

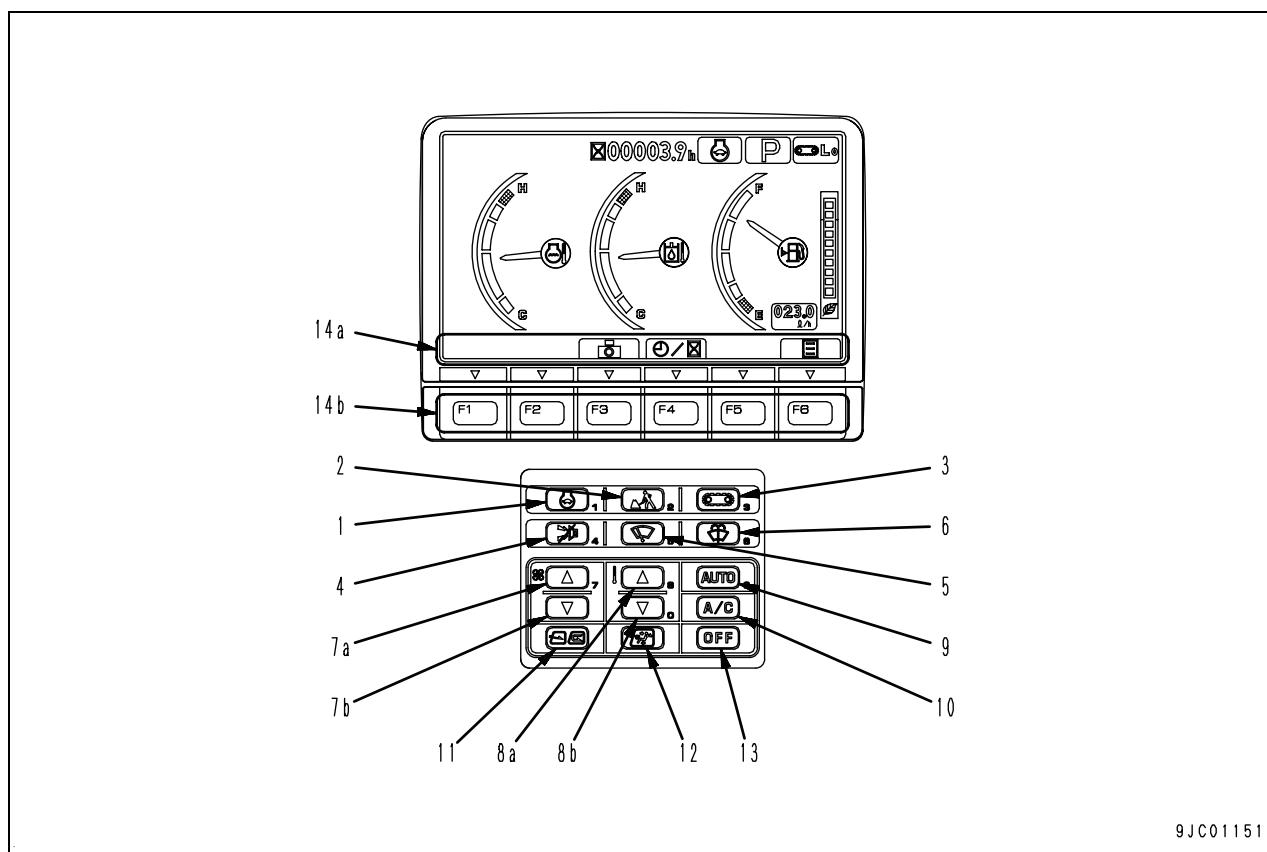
### Function

- The machine monitor has monitor display function, mode selection function and switch function for electrical parts etc. Also it has an alarm buzzer.
- The machine monitor has a CPU (Central Processing Unit) in it to process, display, and output the information.
- The machine monitor consists of a display and switches: the display is of LCD type, and the switches are of flat sheet switch.
- If a failure occurs in the machine monitor itself, controller or wiring circuit between monitor and controller, the monitor does not display properly.
- When the engine is started, the battery voltage may drop suddenly, depending on the ambient temperature and the condition of the battery. In this case, the machine monitor display may go off for a moment. However, this phenomenon is not a failure.
- Continuous operation of the machine monitor may display blue bright spots on the screen having a black background; it is quite normal. Blue bright spots can never be a problem as the screen has usually blue or white background. (White in the LCD is made up of red, green and blue.)

### Precautions on the machine monitor display

- One of the features of liquid crystal display panels is that there may be black spots (spots that do not light up) or white spots (spots that stay lit up) on the screen. If there are fewer than 10 black or white spots, this is not a failure or a defect. Products having 10 or less black or bright spots conform the product specification; such the condition is quite normal.

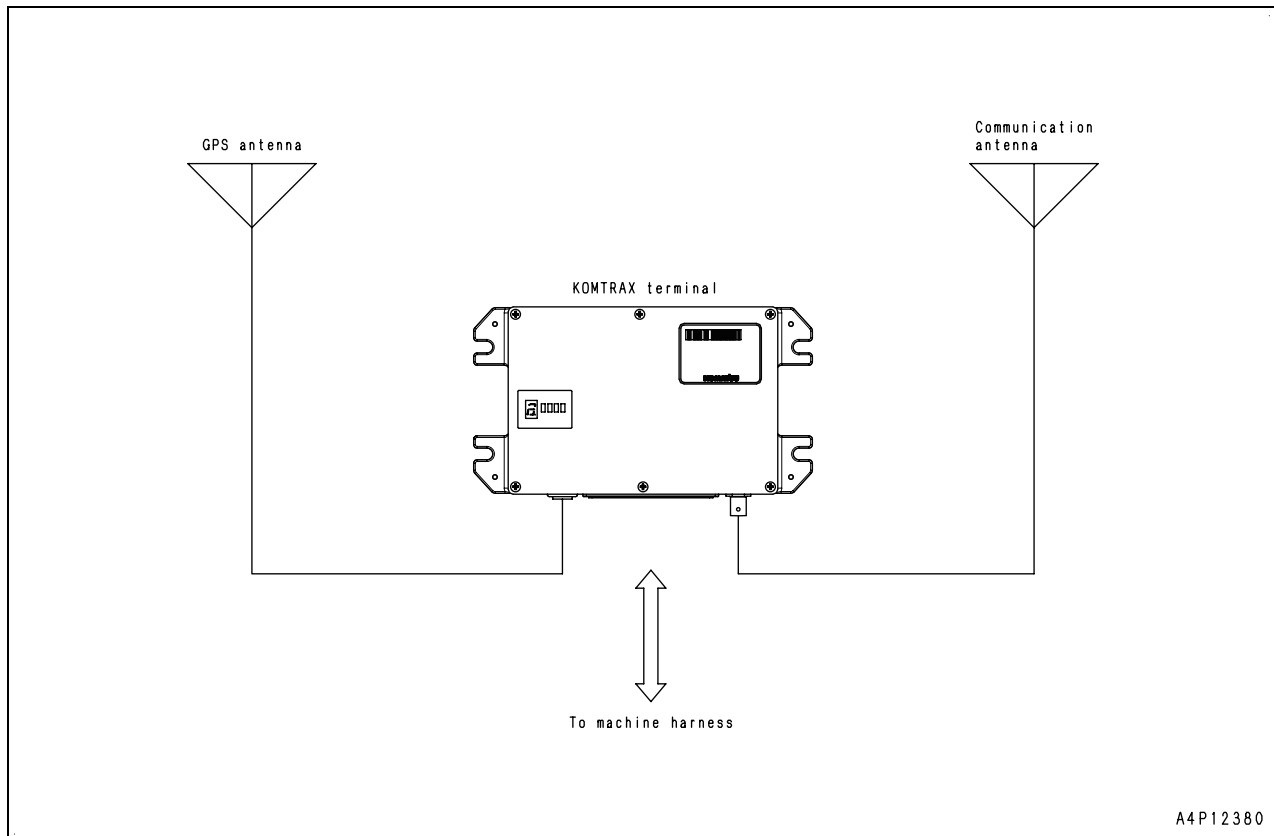
Switches



9JC01151

No.	Name	Function	Operation
1	Auto-deceleration switch [Numeric keypad: 1]	Switches the auto-deceleration function ON/OFF. Lights up: ON Lights off: OFF	<ul style="list-style-type: none"> <li>When working mode is "L", this switch is always "OFF" after engine started.</li> <li>OFF ↔ ON</li> </ul>
2	(*1) Working mode selector switch [Numeric keypad: 2]	Displays the working mode selector screen.	P: Heavy-duty operation E: Low-fuel operation L: Fine operation B: Breaker operation ATT-P: Double-acting attachment operation ATT-E: Double-acting attachment and low-fuel operation
3	Travel speed selector switch [Numeric keypad: 3]	Changes the travel speed. Lo lights up: Low speed Mi lights up: Medium speed Hi lights up: High speed	<ul style="list-style-type: none"> <li>Speed is sequentially changed as shown below.</li> <li>Lo (Low speed) → Mi (Medium speed) → Hi (High speed) → Lo (Low speed)</li> </ul>
4	Buzzer cancel switch [Numeric keypad: 4]	Stops the alarm buzzer. (Some alarm buzzer does not stop sounding even if the switch is pressed.)	<ul style="list-style-type: none"> <li>The alarm buzzer stops sounding.</li> <li>The alarm buzzer sounds again if another error worth alarming is detected.</li> </ul>
5	(*2) Wiper switch [Numeric keypad: 5]	Operates the front glass wiper. INT: Intermittent operation ON: Continuous operation Lights off: Holds in position	<ul style="list-style-type: none"> <li>Pressing the switch sequentially changes the wiper operation.</li> <li>OFF (Stop) → INT (Intermittent) → ON (Continuous) → OFF (Stop)</li> </ul>

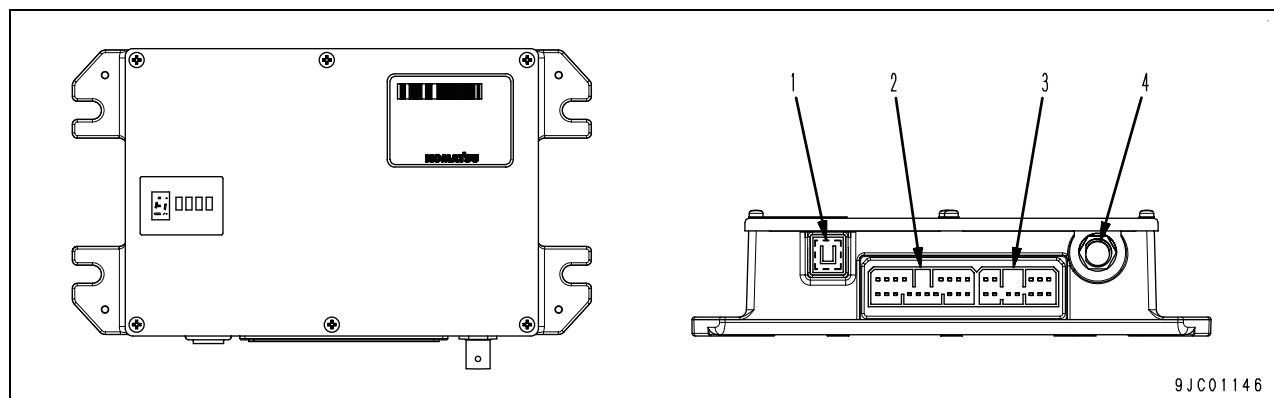
## KOMTRAX system



- The KOMTRAX system consists of the KOMTRAX terminal, communication antenna and GPS antenna.
- This system transmits various machine information by use of the radio communication. This system allows the KOMTRAX operator to refer the information and provide various services to the customers.
- Information transmittable from the KOMTRAX system are as follows.
  1. Operation map
  2. Service meter reading
  3. Location information
  4. Abnormality record
- ★ To provide the services, you need to make an arrangement for starting the KOMTRAX service separately.

### KOMTRAX terminal

Model: TC330



- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. GPS antenna connection</li> <li>2. Machine harness connection (070-18P)</li> </ol> | <ol style="list-style-type: none"> <li>3. Machine harness connection (070-12P)</li> <li>4. Communication antenna connection</li> </ol> |
|--|--|

Applicable model				PC210, 210LC-8M0		
Category	Item	Measurement condition	Unit	Standard value for new machine	Judgement criteria	
Work equipment	Time lag	Boom	<ul style="list-style-type: none"> <li>Hydraulic oil temperature: Within operating range</li> <li>Engine running at low idle</li> <li>Working mode: P mode</li> <li>Lower boom from RAISE stroke end and measure time from when work equipment touches the ground until front side of machine rises</li> <li>For measuring posture, see <b>Work equipment 5</b></li> </ul>	sec.	Max. 1.0	Max. 1.2
		Arm	<ul style="list-style-type: none"> <li>Hydraulic oil temperature: Within operating range</li> <li>Engine running at low idle</li> <li>Working mode: P mode</li> <li>Move arm to IN from OUT stroke end and measure time from when arm stops momentarily until it starts moving again</li> <li>For measuring posture, see <b>Work equipment 6</b></li> </ul>	sec.	Max. 2.0	Max. 2.8
		Bucket	<ul style="list-style-type: none"> <li>Hydraulic oil temperature: Within operating range</li> <li>Engine running at low idle</li> <li>Working mode: P mode</li> <li>Move bucket to CURL from DUMP stroke end and measure time from when bucket stops momentarily until it starts moving again</li> <li>For measuring posture, see <b>Work equipment 7</b></li> </ul>	sec.	Max. 1.0	Max. 3.6
	Internal leakage	Cylinders	<ul style="list-style-type: none"> <li>Hydraulic oil temperature: Within operating range</li> <li>Engine running at high idle</li> <li>Leakage amount for one minute with cylinder or travel to be measured in relief condition</li> </ul>	cc/min	4.5	20
		Center swivel joint		cc/min	10	50
Performance in compound operation	Travel deviation in simultaneous operation of work equipment and travel	<ul style="list-style-type: none"> <li>Hydraulic oil temperature: Within operating range</li> <li>Engine at high idle</li> <li>Working mode: P mode</li> <li>Traveling speed: Lo</li> <li>Travel deviation (x) in travel of 20 m after running up 10 m on hard and flat ground</li> <li>For measuring posture, see <b>Travel 2 and 3</b></li> </ul>	mm	Max.200	Max.220	
Characteristics of PC flow control valve	Time required for turning from 0 to 90° with boom raised	<ul style="list-style-type: none"> <li>Hydraulic oil temperature: Within operating range</li> <li>Engine at high idle</li> <li>Working mode: P mode</li> <li>Rated load applied to bucket (1.0m<sup>3</sup>: 1,800kg)</li> <li>On hard and flat ground, set arm vertically and lower back of bucket to ground</li> <li>Time required till passing spot of 90° starting from illustrated posture and with boom raised</li> <li>For measuring posture, see <b>Work equipment 8</b></li> </ul>	sec.	4.2 ± 0.4 (Reference value)		
—	Discharge amount of hydraulic pump	See performance of hydraulic pump (next page)				

Testing/Adjusting item	Sym- bol	Part No.	Part name	Qty	Remarks
Removal and installation of engine oil pressure sensor	—	795-799-6210	Deep socket	1	27 mm deep socket
Removal and installation of engine coolant temperature sensor (6261-81-6900) Engine serial No.: 26500006 – 26530192	—	Commercially available	Deep socket	1	21 mm deep socket (MITOLOY 4ML-21 or equivalent)
Removal and installation of engine coolant temperature sensor (6261-81-6901) Engine serial No.: 26530193 and up	—	795T-981-1010	Deep socket	1	19 mm deep socket

- ★ For the model names and part Nos. of the T-boxes and T-adapters used for troubleshooting for the machine monitor, controllers, sensors, actuators, electrical equipment, and wiring harnesses, see “Troubleshooting (General information on troubleshooting), List of T-boxes and T-adapters”.

## Handling fuel system parts

- ★ Precautions for checking and maintaining fuel system  
The common rail fuel injection system (CRI) consists of more precise parts than the conventional fuel injection pump and nozzle. If foreign matter enters this system, it can cause a trouble.  
When checking and maintaining the fuel system, take care more than the past. If dust, etc. sticks to any part, wash that part thoroughly with clean fuel.
- ★ Precautions for replacing fuel filter cartridge  
Be sure to use the Komatsu genuine fuel filter cartridge.  
Since the common rail fuel injection system (CRI) consists of more precise parts than the conventional fuel injection pump and nozzle, it employs a high-efficiency special filter to prevent foreign matter from entering it. If a filter other than the genuine one is used, the fuel system may have a trouble. Accordingly, never use such a filter.

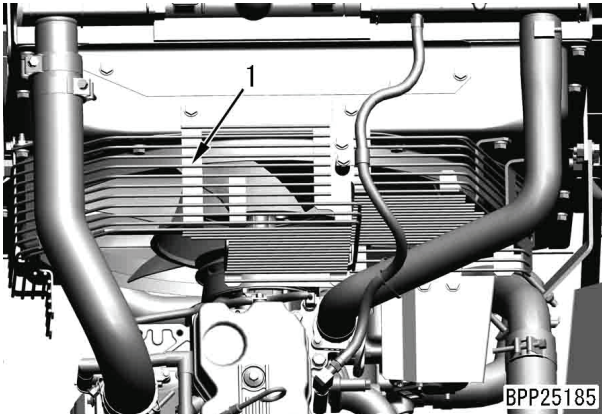
## Releasing residual pressure from fuel system

- ★ Pressure is generated in the low-pressure circuit and high-pressure circuit of the fuel system while the engine is running.  
Low-pressure circuit:  
Feed pump – Fuel main filter – Supply pump  
High-pressure circuit:  
Supply pump – Common rail – Injector
- ★ The pressure in both low-pressure circuit and high-pressure circuit lowers to a safety level automatically 30 seconds after the engine is stopped.
- ★ Before the fuel circuit is checked and its parts are removed, the remaining pressure in the fuel circuit must be released completely. Accordingly, observe the following.
- ⚠ **Before checking the fuel system or removing its parts, wait at least 30 seconds after stopping the engine until the residual pressure in the fuel circuit is released. (Do not start the work just after stopping the engine since there is residual pressure.)**

## Replacing alternator belt

- ★ The auto-tensioner is provided for the fan belt. Thus, testing and adjustment of the belt is usually not necessary.
- ★ Disconnect air conditioner compressor belt before replacing the fan belt.
- ⚠ **Stop the machine on a level ground and lower the work equipment to the ground.**

1. Open engine hood and remove fan belt cover (1).

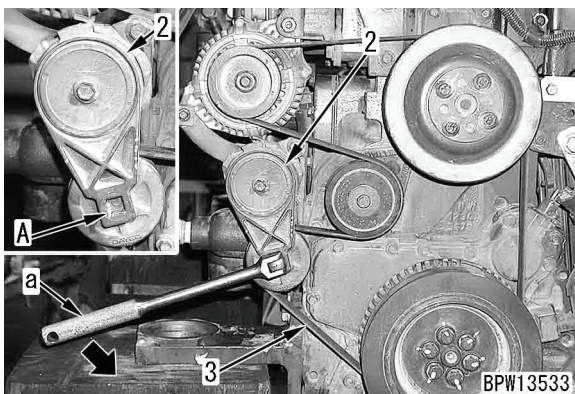


2. Insert a wrench to the portion (A) (width across flats  $\square$  12.7 mm) of the tensioner assembly (2), and rotate it to the opposite to the winding-up direction to decrease the fan belt (3) tension.

⚠ **Make sure that the wrench is secured at the portion (A) of the tensioner assembly (2) before rotating it. (The spring of the tensioner assembly (2) is strong. If the wrench is loosely inserted, the wrench may accidentally come off while being rotated and it is extremely dangerous.)**

⚠ **After removing the fan belt (3), return the tensioner assembly (2) slowly with care.**

⚠ **Be careful not to get your fingers caught between the pulley and fan belt (3) during work.**



3. Replace the fan belt (3).
  - Check each pulley for breakage and crack.

- 5) Run the engine at high idle, set all the levers and pedals for work equipment control, swing control, and travel control in neutral, and measure the oil pressure. Then, operate the travel lever to run the track in the air and measure the oil pressure.

**⚠ While taking extreme care for safety, run the raised track shoe.**

- ★ Do not operate the travel lever to its stroke end (but stop it halfway).



- ★ Testing condition and judgment method: When the hydraulic pressures are within ratio in the table, LS valve is normal.

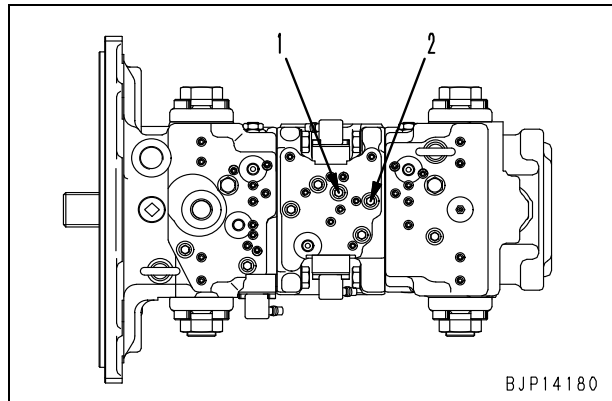
		Position of levers and pedals	
		All levers and pedals are at neutral	Travel lever move half-way (Travel without load)
Hydraulic pressure to be measured	Pump discharge pressure	Almost same pressure	1 (Actual value is set as 1)
	LS valve output pressure		Approx. 3/5 of pressure above

- 6) After finishing measurement, remove the measuring tools and return the removed parts.

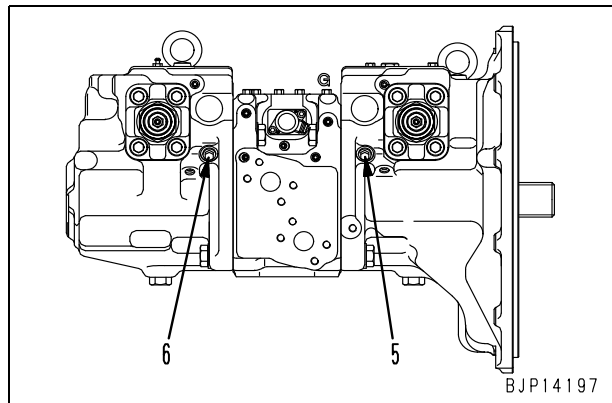
**2. Measurement of LS differential pressure**

- ★ Measure the pump discharge pressure and LS pressure (actuator load pressure) simultaneously and calculate the difference between them, to obtain the LS differential pressure.

- 1) Open the side cover of the pump room and remove oil pressure pickup plugs (1), (2), (5), and (6).
  - (1): Front pump discharge pressure pickup plug
  - (2): Rear pump discharge pressure pickup plug



- (5): Front LS pressure pickup plug
- (6): Rear LS pressure pickup plug

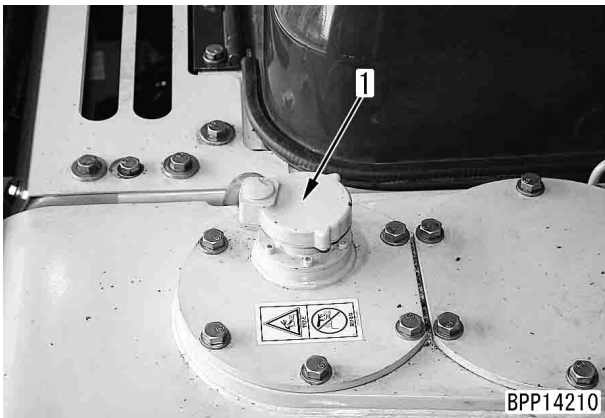


## Releasing remaining pressure from hydraulic circuit

### 1. Releasing remaining pressure from hydraulic tank

**⚠** Since the hydraulic tank is enclosed and pressurized, release the residual pressure from it when removing a hose or a plug connected to it.

- 1) Lower the work equipment to the ground in a stable posture and stop the engine.
- 2) Loosen oil filler cap (1) of the hydraulic tank gradually to release the air in the tank.



### 2. Release of remaining pressure from hydraulic cylinder circuit

**⚠** When disconnecting a pipe between a hydraulic cylinder and the control valve, release the remaining pressure from the piping according to the following procedure.

- 1) Lower the work equipment to the ground and release the residual pressure from the hydraulic tank. For details, see “Releasing remaining pressure from hydraulic tank”.
  - ★ Keep the oil filler cap of the hydraulic tank removed.
- 2) Turn the starting switch to ON position and set the lock lever to the FREE position, and then operate the right and left work equipment control levers forward, backward, to the right, and to the left.
  - ★ The control valve is operated by the pressure in the accumulator. The pressure in the accumulator is used up, however, after the control valve is operated 2 – 3 times.
- 3) Run the engine at low idle for 5 seconds to increase the pressure in the accumulator.
  - ★ The engine does not start until the lock lever is set to the LOCK position once.

- 4) Repeat steps 2) and 3) above 2 – 3 times, and the residual pressure in the piping is released completely.

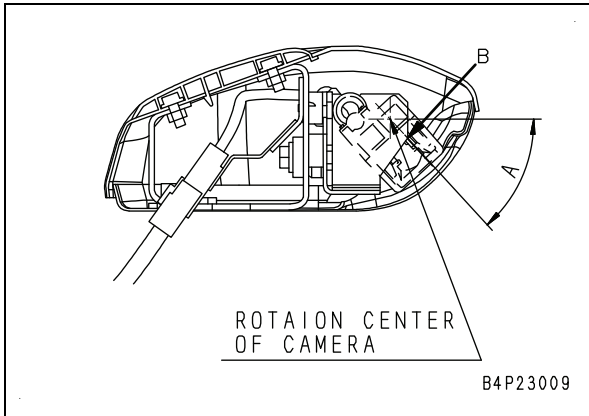
### 3. Release of remaining pressure from swing motor circuit

The remaining pressure in the swing motor circuit can be released by performing the operation for “Releasing remaining pressure from hydraulic cylinder circuit” (Operate the lever to SWING only, however).

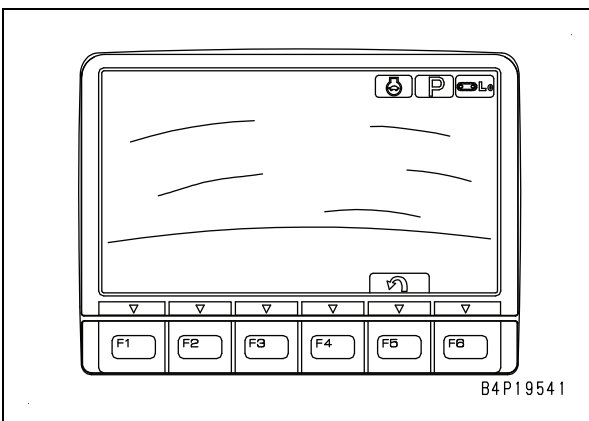
### 4. Release of remaining pressure from travel motor circuit


Since the control valve spool of the travel motor circuit is connected to the drain circuit, the pressure in this circuit can be released by performing “Releasing remaining pressure from hydraulic tank”.

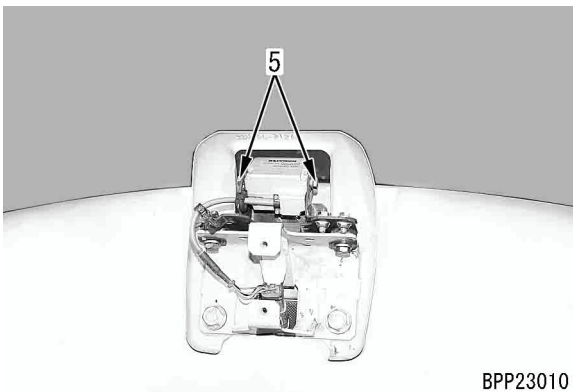
4. Loosen mounting bolts (5) of camera (1) and adjust installation (A) of camera so that the side line of camera is matched with the corner (B) of the bracket.  
 Angle (A):  $48^{\circ}(+2^{\circ}/0)$



- ★ A part of the machine is displayed on the monitor screen.  
 Adjust the camera so that the image of the counterweight occupy approximately 10 to 15% of the monitor screen.

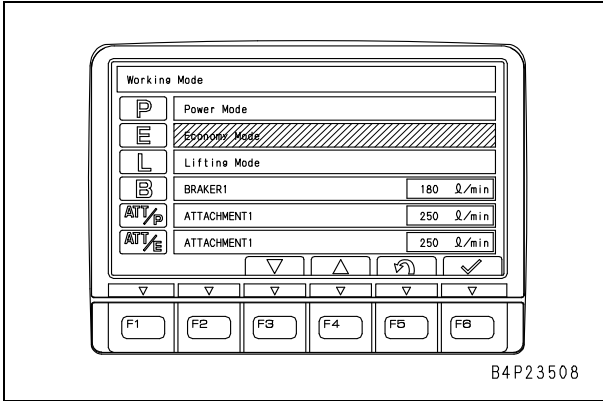


5. After adjusting, tighten bolts (5).  
 Camera mounting bolt:  
**11.8 to 14.7 Nm {1.2 to 1.5 kgm}**



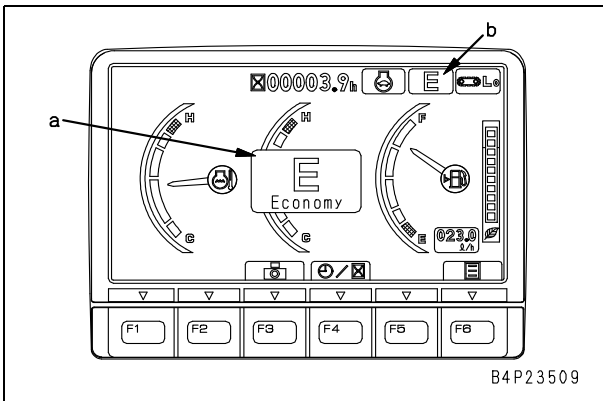
6. Install covers (2) and (3).

- ★ If you do not touch any of the function switches and working mode selector switch for 5 seconds, the selection is determined and the screen changes to the standard screen.



- When the ordinary screen is displayed again, large working mode monitor (a) is displayed for 2 seconds, and then the setting of the working mode is changed to the selected mode.

- ★ When large monitor (a) is displayed, the display of working mode monitor (b) is changed, too.

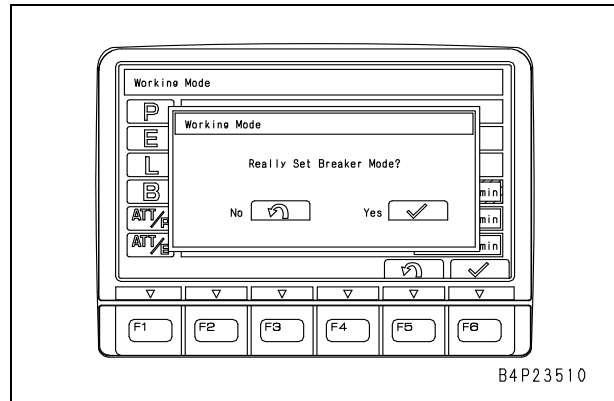


<Precautions for selecting breaker mode [B]>

- If breaker mode [B] is selected, both of the control of the hydraulic pump and the setting of the hydraulic circuit are changed.
- If an attachment other than the breaker is used, the machine may move unexpectedly or may not operate normally or the hydraulic components may be damaged.
- After the breaker mode is selected, the screen to confirm the selection of the breaker mode is displayed (The buzzer sounds intermittently while this screen is displayed).
- If the setting is confirmed on this screen, the screen changes to the standard screen.

If "No" is selected: Screen returns to working mode selecting screen

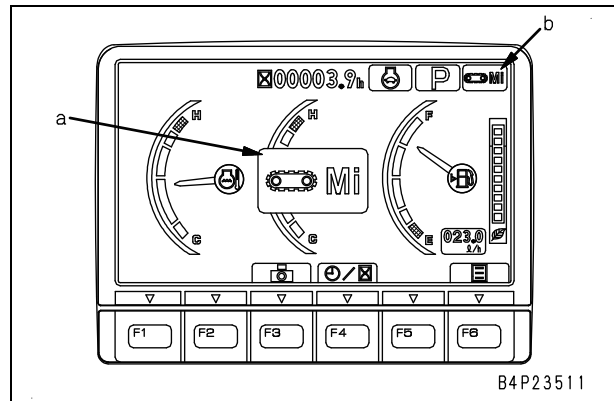
If [Yes] is selected: Working mode is set to breaker mode [B]



**Selection of travel speed**

While the standard screen is displayed, if the travel speed selector switch is pressed, large travel speed monitor (a) is displayed for two seconds and the setting of the travel speed is changed.

- ★ Travel speed setting sequentially changes between [Lo] → [Mi] → [Hi] → [Lo] in this order every time the switch is pressed.
- ★ When large monitor (a) is displayed, the display of travel speed monitor (b) is changed, too.



**Operation to stop alarm buzzer**

While the alarm buzzer is sounding, if the alarm buzzer cancel switch is pressed, the alarm buzzer stops.

- ★ Even if the alarm buzzer cancel switch is pressed, the screen display does not change.

## Support screen (5/7) PPC pressure

No.	ID	Item name	Unit (SI)	Applicable equipment
1	01002	Engine speed	r/min	ENG
2	07400	Boom Raise PPC pressure	MPa	PUMP
3	07500	Boom Lower PPC pressure	MPa	PUMP
4	07200	Arm In PPC pressure	MPa	PUMP
5	07600	Arm Out PPC pressure	MPa	PUMP
6	04401	Hydr. oil temperature	°C	PUMP

## Support screen (6/7) PPC pressure

No.	ID	Item name	Unit (SI)	Applicable equipment
1	01002	Engine speed	r/min	ENG
2	09002	Swing Right PPC pressure	MPa	PUMP
3	09001	Swing Left PPC pressure	MPa	PUMP
4	07300	Bucket Curl PPC pressure	MPa	PUMP
5	07301	Bucket Dump PPC pressure	MPa	PUMP
6	04401	Hydr. oil temperature	°C	PUMP

## Support screen (7/7) PPC pressure

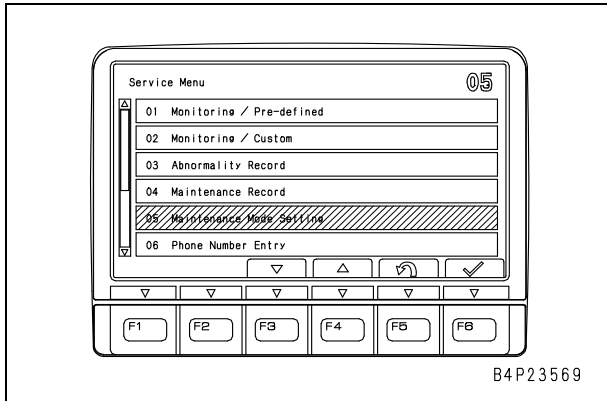
No.	ID	Item name	Unit (SI)	Applicable equipment
1	01002	Engine speed	r/min	ENG
2	07102	Travel Fwd LH PPC pressure	MPa	PUMP
3	07103	Travel Fwd RH PPC pressure	MPa	PUMP
4	07104	Travel Rev LH PPC pressure	MPa	PUMP
5	07105	Travel Rev RH PPC pressure	MPa	PUMP
6	04401	Hydr. oil temperature	AaC	PUMP

**Maintenance Mode Setting**

The actuating condition of the maintenance reminder function in the operation mode can be set and changed by using this menu.

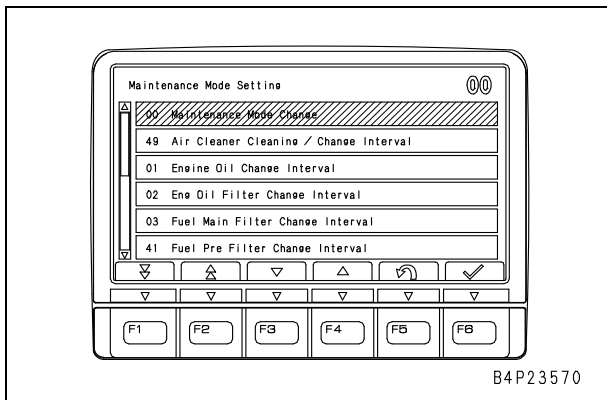
- To enable or disable the function
- To change set replacement interval (by item)
- To initialize all set replacement intervals

1. Selecting the menu  
Select "Maintenance Mode Setting" on the "Service Menu" screen.



2. Selecting sub menu  
After the "Maintenance Mode Setting" screen is displayed, select an item to change the setting with the function switches or the numeral input switches.
  - [F1]: Moves to the next page (screen)
  - [F2]: Moves to the previous page (screen)
  - [F3]: Moves to lower item
  - [F4]: Moves to upper item
  - [F5]: Returns the display to the service menu screen
  - [F6]: Validates the selection

★ You may enter a 2-digit code by using the numeral input switches to select the item of that code and enter it by using [F6].

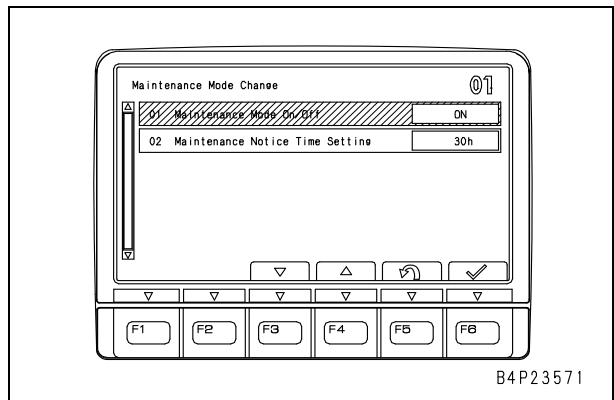


- ★ The following items can be selected on the "Maintenance Mode Setting" screen.

00 Maintenance Mode Change
49 Air Cleaner cleaning / Change Interval
01 Engine Oil Change Interval
02 Eng Oil Filter Change Interval
03 Fuel Main Filter Change Interval
41 Fuel Pre Filter Change Interval
04 Hyd. oil filter change interval
05 H/tank breather change interval
07 Damper Case Service Interval
08 Final Drive Oil Change Interval
09 S/Machinery oil change interval
10 Hydraulic Oil Change Interval
99 All Default Value

3. Contents of "Maintenance Mode Change"  
After selecting "Maintenance Mode Change" and the screen is displayed, select the desired setting with the function switches.
  - ON: Functions of all maintenance items are set effective in operator mode
  - OFF: Maintenance reminder functions of all maintenance items are disabled in operator mode
  - [F3]: Moves to lower item
  - [F4]: Moves to upper item
  - [F5]: Cancels selection and return to the "Maintenance Mode Change" screen
  - [F6]: Enters selection and return to the "Maintenance Mode Change" screen

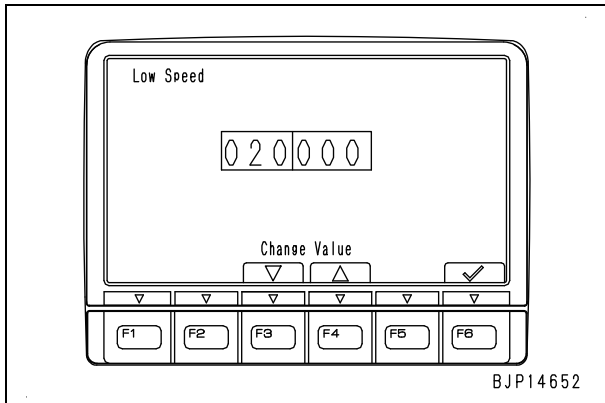
★ Even if ON/OFF of each item has been set, if the above setting is changed, it overrides the individual setting.



3. Selecting low speed

After the “Low Speed” screen for setting is displayed, select a set value in the right column by using the function switches.

- Set value code: For the actual travel speed at Low setting, see the table shown below.
- [F3]: Increases set value
- [F4]: Decreases set value
- [F6]: Confirms setting and returns to the adjustment menu screen
- ★ The 3-digit number in the left column do not change since it is the code of this function.



- ★ Relationship between set value and travel speed at Low setting

Code	Set value code	Travel speed at Low
020	000	3.0 km/h
	001	2.8 km/h
	002	3.2 km/h
	003	3.4 km/h

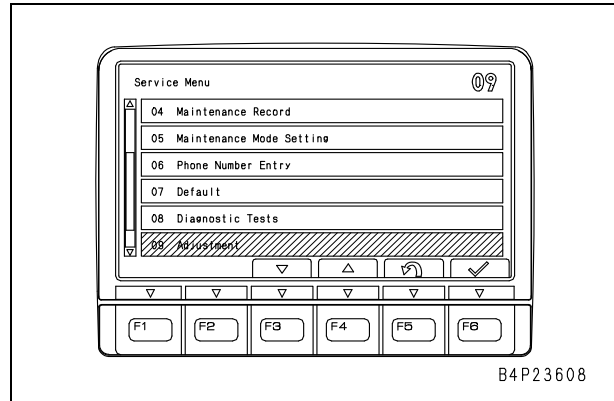
**Adjustment (Attachment Flow Adjustment)**

The machine monitor allows for adjustment of various items related to the machine with the machine monitor.

The sub menu of “Attachment Flow Adjustment” allows for fine adjustment of the oil flow to the attachment during combined operation.

1. Selecting the menu

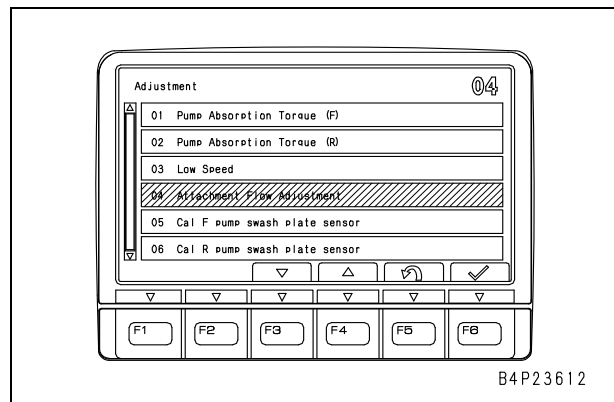
Select “Adjustment” on the “Service Menu” screen.



2. Selecting sub menu

After the “Adjustment” screen is displayed, select “Attachment Flow Adjustment” by using the function switches or numeral input switches.

- ★ Select this sub menu as in the case of selecting a menu on the “Service Menu” screen.



3. Selecting set value code for oil flow distribution

After the screen of “Attachment Flow Adjustment” is displayed, select a set value in the right column by using the function switches.

- Set value code: For actual distribution of oil flow, see the table shown below
- [F3]: Increases set value
- [F4]: Decreases set value
- [F6]: Confirms setting and returns to the adjustment menu screen

★ **Removal and installation of sensor**

A deep socket is necessary for removal and installation of the engine oil pressure switch. See "Tools for testing, adjusting, and troubleshooting".

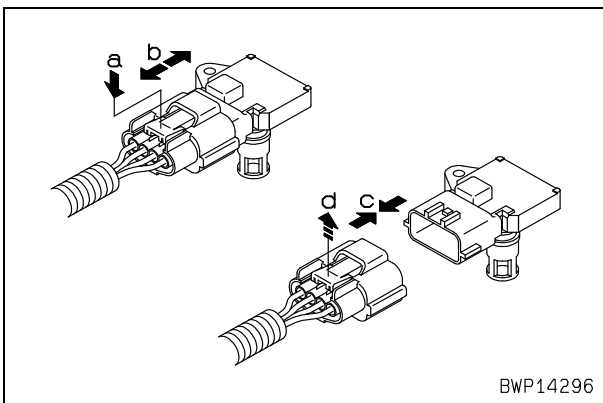
**6. Boost pressure and temperature sensor (BOOST PRESS & IMT)**

★ **Disconnection and connection of connector**

The connector of the boost pressure and temperature sensor has a special locking mechanism. Disconnect it according to steps (a) to (b) and connect it according to steps (c) to (d) as shown below.

**Disconnection:** (a) Unlock – (b) Disconnect connector.

**Connection:** (c) Connect connector – (d) Lock.



★ **Removal and installation of sensor**

A torque wrench is necessary for removal and installation of the boost pressure and temperature sensor. See "Tools for testing, adjusting, and troubleshooting".

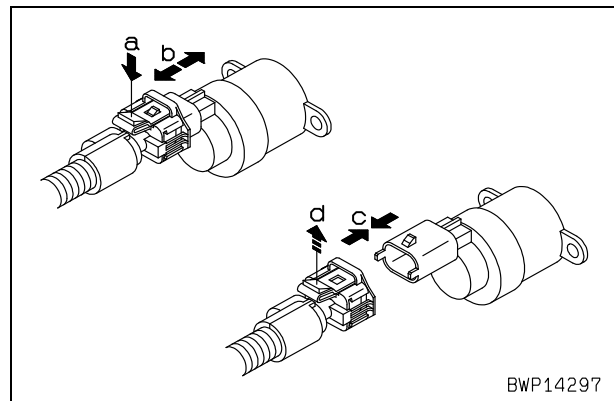
**7. Supply pump IMV solenoid (FUEL REGULATOR)**

★ **Disconnection and connection of connector**

The connector of the supply pump IMV solenoid has a special locking mechanism. Disconnect it according to steps (a) to (b) and connect it according to steps (c) to (d) as shown below.

**Disconnection:** (a) Unlock – (b) Disconnect connector.

**Connection:** (c) Connect connector – (d) Lock.



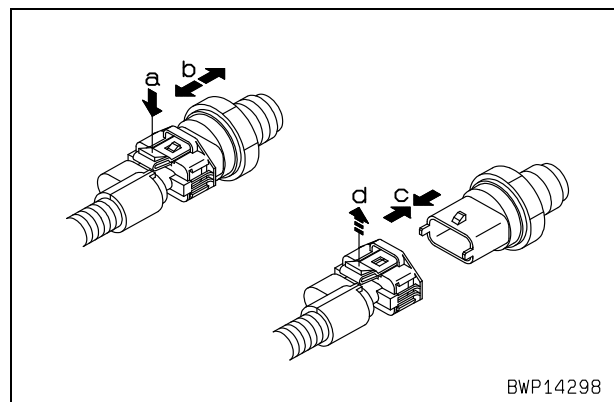
**8. Common rail pressure sensor (FUEL RAIL PRESS)**

★ **Disconnection and connection of connector**

The connector of the common rail pressure sensor has a special locking mechanism. Disconnect it according to steps (a) to (b) and connect it according to steps (c) to (d) as shown below.

**Disconnection:** (a) Unlock – (b) Disconnect connector.

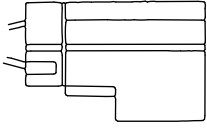
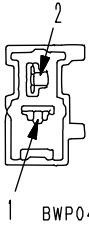

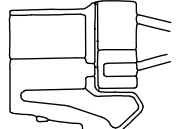
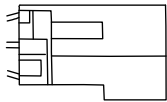
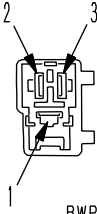
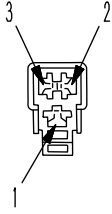
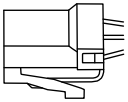
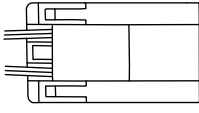
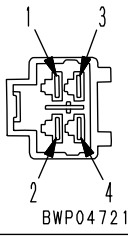
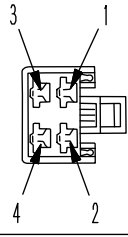
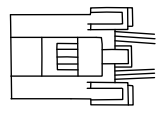
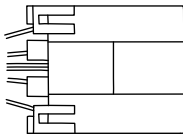
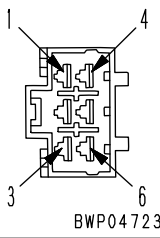
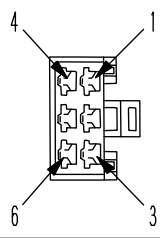
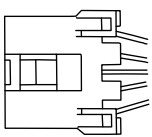
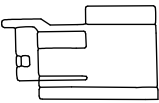
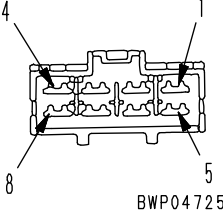
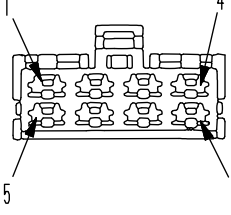

**Connection:** (c) Connect connector – (d) Lock.



Failure code	Trouble (Displayed on screen)	Component in charge	Action level	Category of record	Reference documents No.
CA132	Throttle Sensor Low Error	ENG	L03	Electrical system	Troubleshooting by failure code, Part 1 SEN06133-**
CA144	Coolant Temp Sens High Error	ENG	L01	Electrical system	
CA145	Coolant Temp Sens Low Error	ENG	L01	Electrical system	
CA153	Chg Air Temp Sensor High Error	ENG	L03	Electrical system	
CA154	Chg Air Temp Sensor Low Error	ENG	L03	Electrical system	
CA155	Chg Air Temp High Speed Derate	ENG	L03	Electrical system	
CA187	Sens Supply 2 Volt Low Error	ENG	L03	Electrical system	
CA221	Ambient Press Sens High Error	ENG	L03	Electrical system	
CA222	Ambient Press Sens Low Error	ENG	L03	Electrical system	
CA227	Sens 2 Supply Volt High Error	ENG	L03	Electrical system	
CA234	Eng Overspeed	ENG	—	Electrical system	
CA238	Ne Speed Sens Supply Volt Error	ENG	L01	Electrical system	
CA271	IMV/PCV1 Short Error	ENG	L03	Electrical system	
CA272	IMV/PCV1 Open Error	ENG	L03	Electrical system	
CA322	Inj #1(L#1) Open/Short Error	ENG	L03	Electrical system	
CA323	Inj #5(L#5) Open/Short Error	ENG	L03	Electrical system	
CA324	Inj #3(L#3) Open/Short Error	ENG	L03	Electrical system	
CA325	Inj #6(L#6) Open/Short Error	ENG	L03	Electrical system	
CA331	Inj #2(L#2) Open/Short Error	ENG	L03	Electrical system	
CA332	Inj #4(L#4) Open/Short Error	ENG	L03	Electrical system	
CA342	Calibration Code Incompatibility	ENG	L04	Electrical system	
CA351	Injectors Drive Circuit Error	ENG	L03	Electrical system	
CA352	Sens Supply 1 Volt Low Error	ENG	L03	Electrical system	
CA386	Sens Supply 1 Volt High Error	ENG	L03	Electrical system	
CA428	Water in Fuel Sensor High Error	ENG	L01	Electrical system	

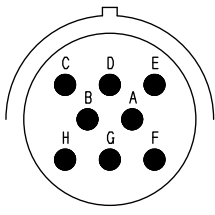
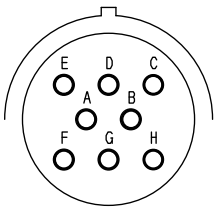
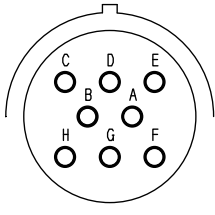
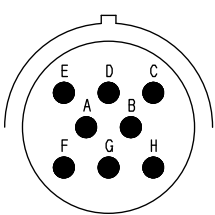
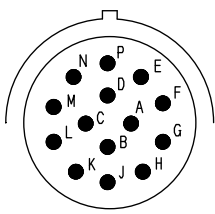
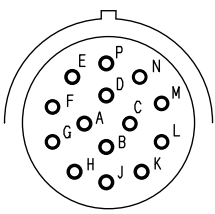
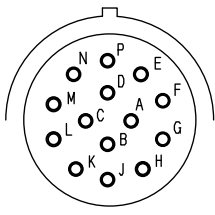
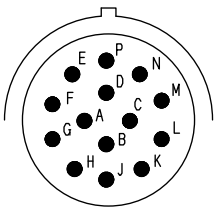


Connector No.	Model	Number of pins	Component name	Address of stereogram
H16	S	12	Intermediate connector	X-3
INJECTOR #1	DT	2	Injector #1	AE-4
INJECTOR #2	DT	2	Injector #2	AF-4
INJECTOR #3	DT	2	Injector #3	AF-5
INJECTOR #4	DT	2	Injector #4	AG-5
INJECTOR #5	DT	2	Injector #5	AH-5
INJECTOR #6	DT	2	Injector #6	AH-6
INJECTOR CYL. 1&2	DT	4	Intermediate connector	AE-1
INJECTOR CYL. 3&4	DT	4	Intermediate connector	AG-5
INJECTOR CYL. 5&6	DT	4	Intermediate connector	AI-6
J01		20	Junction connector (Black)	W-3
J02		20	Junction connector (Black)	W-2
J03		20	Junction connector (Green)	V-2
J04		20	Junction connector (Green)	X-3
J05		20	Junction connector (Green)	X-6
J06		20	Junction connector (Green)	X-8
K01	M	2	Pump (PC) resistor	O-8
K02	DT	3	CAN terminal resistance	AH-1
L01	DT	2	Working lamp (Boom)	E-8
L02	DT	2	Right headlamp	F-9
L03	M	2	Room lamp	T-9
L05	SWP	2	Intermediate connector	AC-8
L09	DT	2	Rear working lamp [Rear working lamp specification]	
L15	DT	2	Rotary lamp [Rotary lamp specification]	AB-8
M01	PA	10	Radio	U-1
M02	M	2	Speaker (Left)	AC-8
M03	M	2	Speaker (Right)	AB-9
M04		2	Cigarette lighter	S-9
M05	M	6	Wiper motor	O-4
M06	YAZAKI	2	Window washer tank	L-2
M07	090	2	Horn (High tone)	G-1
M08	090	2	Intermediate connector	G-1
M09	M	2	Optional power supply connector (1)	M-1
M10	M	2	Intermediate connector	N-1
M14	DT	2	Travel alarm	I-1
M40	X	2	Headlamp [Headlamp specification]	AB-1
M41	X	2	Headlamp [Headlamp specification]	Y-8
N08	DT	12	Service connector	T-9
OIL PRESSURE SWICH	FRAMATOME	2	Engine oil pressure switch	AI-1
P01	AMP	3	Bucket curl PPC pressure sensor	K-9
P02	AMP	3	Boom lower PPC pressure switch	K-9
P03	AMP	3	Swing left PPC pressure sensor	L-6

No. of pins	M type connector		
	Male (female housing)	Female (male housing)	Testing connection use special tool Part No.
1	Part No. : 08056-00171	Part No. : 08056-00181	799-601-7080 (T-adapter)
2	  <p>BWP04717</p>	  <p>BWP04718</p>	799-601-7090 (T-adapter)
	Part No. : 08056-00271	Part No. : 08056-00281	
3	  <p>BWP04719</p>	  <p>BWP04720</p>	799-601-7110 (T-adapter)
	Part No. : 08056-00371	Part No. : 08056-00381	
4	  <p>BWP04721</p>	  <p>BWP04722</p>	799-601-7120 (T-adapter)
	Part No. : 08056-00471	Part No. : 08056-00481	
6	  <p>BWP04723</p>	  <p>BWP04724</p>	799-601-7130 (T-adapter)
	Part No. : 08056-00671	Part No. : 08056-00681	
8	  <p>BWP04725</p>	  <p>BWP04726</p>	799-601-7340 (T-adapter)
	Part No. : 08056-00871	Part No. : 08056-00881	

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[The pin No. is also marked on the connector (electric wire insertion end)]

Type (shell size code)	HD30 Series connector		
	Body (plug)	Body (receptacle)	Testing connection use special tool Part No.
18-8 (1)	Pin (male terminal)  BWP05001	Socket (female terminal)  BWP05002	799-601-9210 (T-adapter)
	Part No. :08191-11201, 08191-11202, 08191-11205, 08191-11206	Part No. :08191-14101, 08191-14102, 08191-14105, 08191-14106	
	Socket (female terminal)  BWP05003	Pin (male terminal)  BWP05004	799-601-9210 (T-adapter)
	Part No. :08191-12201, 08191-12202, 08191-12205, 08191-12206	Part No. :08191-13101, 08191-13102, 08191-13105, 08191-13106	
18-14 (2)	Pin (male terminal)  BWP05005	Socket (female terminal)  BWP05006	799-601-9220 (T-adapter)
	Part No. :08191-21201, 08191-21202, 08191-21205, 08191-21206	Part No. :08191-24101, 08191-24102, 08191-24105, 08191-24106	
	Socket (female terminal)  BWP05007	Pin (male terminal)  BWP05008	799-601-9220 (T-adapter)
	Part No. :08191-22201, 08191-22202, 08191-22205, 08191-22206	Part No. :08191-23101, 08191-23102, 08191-23105, 08191-23106	

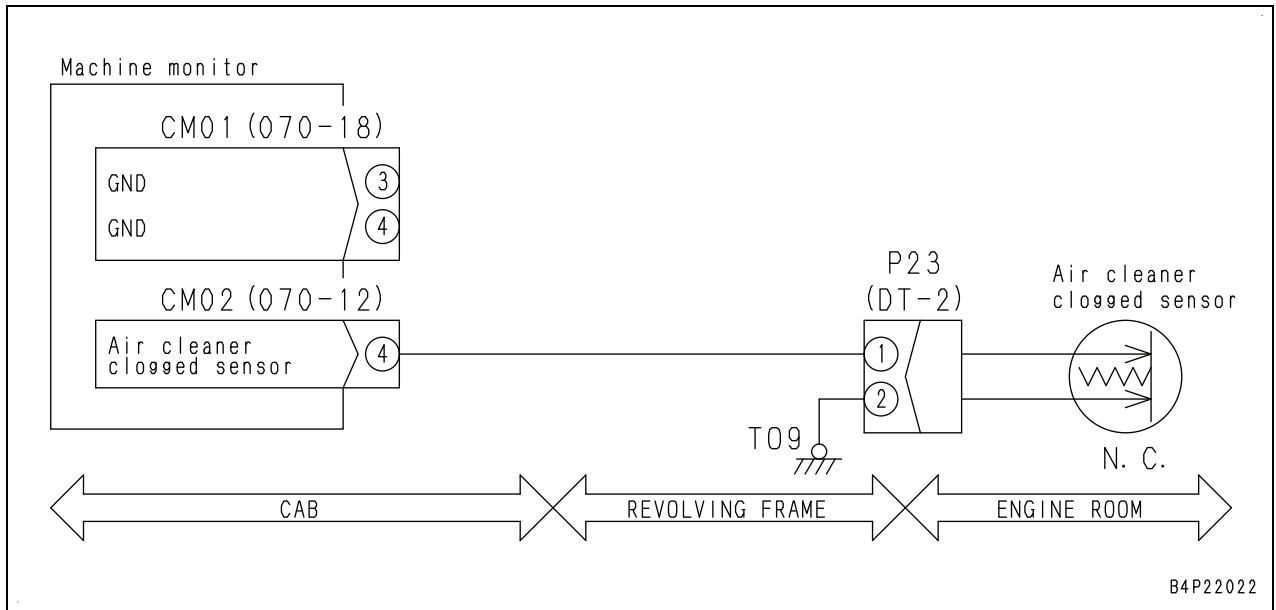
B4D18405

AMP connector for pump controller (CH700)		
No. of pins	PC200/220-8, PC270-8, PC300-8, PC400-8, PC128/138US-8 and so on	Testing connection use special tool Part No.
81	Controller side (plug)	
	—	
	Harness side (receptacle)	
	Part No. : 7880-70-9040	799-601-4280 (Socket)
40	Controller side (plug)	
	—	
	Harness side (receptacle)	
	Part No. : 7880-70-9010	

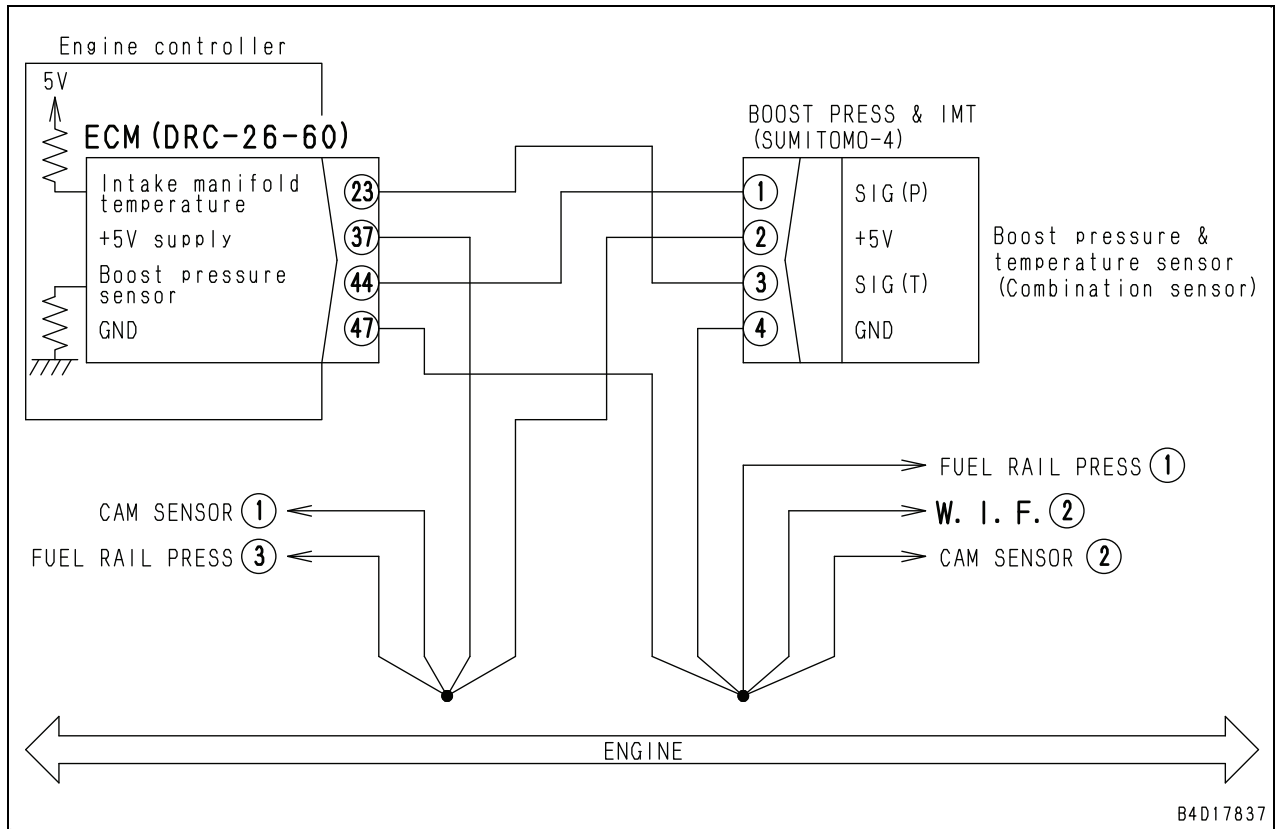
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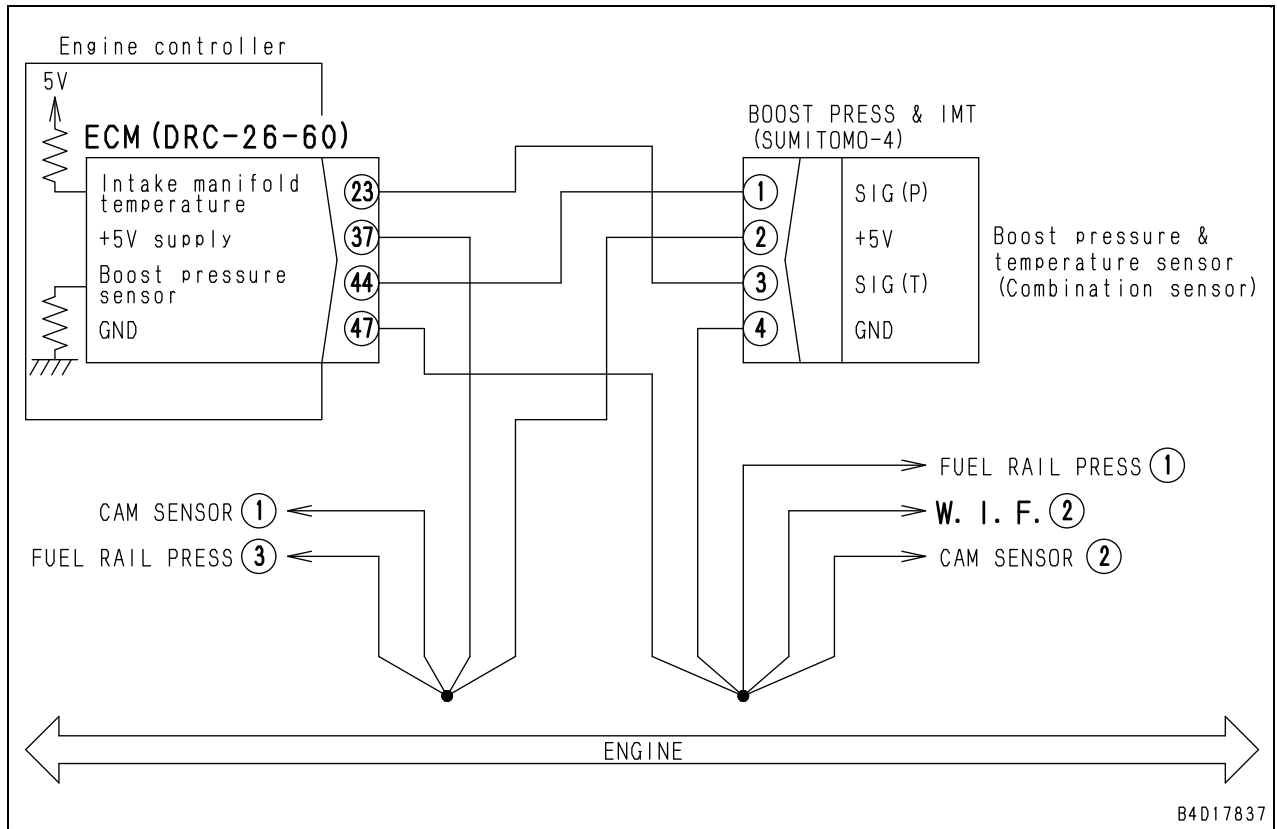
Circuit diagram related to air cleaner clogging



Circuit diagram related to charge pressure sensor



Circuit diagram related to charge temperature sensor

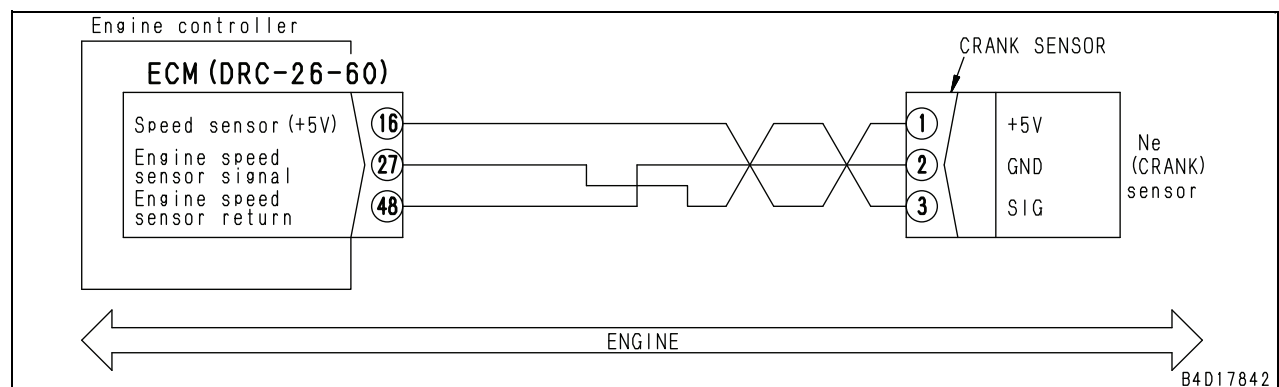


## Failure code [CA238] Ne Speed Sens Supply Volt Error

Action level	Failure code	Failure	Ne Speed Sensor Supply Voltage Error (Engine controller system)
<b>L01</b>	<b>CA238</b>		
Detail of failure	<ul style="list-style-type: none"> <li>Low voltage appears in power supply circuit of engine Ne speed sensor.</li> </ul>		
Action of controller	<ul style="list-style-type: none"> <li>Controls engine with signal from engine Bkup speed sensor.</li> </ul>		
Problem on machine	<ul style="list-style-type: none"> <li>Running engine stops (when Bkup speed sensor is also defective).</li> <li>Stopped engine cannot be started (when Bkup speed sensor is also defective).</li> <li>Starting performance is poor.</li> <li>Engine hunts.</li> </ul>		
Related information	<ul style="list-style-type: none"> <li>Method of reproducing failure code: Turn starting switch to ON position.</li> </ul>		

Cause		Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	See descriptions of wiring harness and connectors in "c: Electrical equipment" in "Checks before troubleshooting" of "General information on troubleshooting", and check them.		
2	Defective sensor or wiring harness	1. Turn starting switch to OFF position. 2. Disconnect following connectors one by one and turn starting switch to ON position each time. 3. After each troubleshooting, return to step 1.		
		If this failure code is not displayed when a sensor is disconnected, sensor or engine wiring harness is defective.		
		★ Other failure codes are also displayed. This is because of disconnection of connector. Ignore failure codes other than [CA238].		
		Sensor or harness	Connector	
	Ne speed sensor	CRANK SENSOR		
	Engine wiring harness	ECM		
3	Defective engine controller	1. Turn starting switch to OFF position. 2. Disconnect connector ECM and connect T-adapters to male side. 3. Turn starting switch to ON position with engine wiring harness disconnected.		
		Between ECM (male) (16) and (48)	Voltage	4.75 to 5.25 V

### Circuit diagram related to Ne speed sensor



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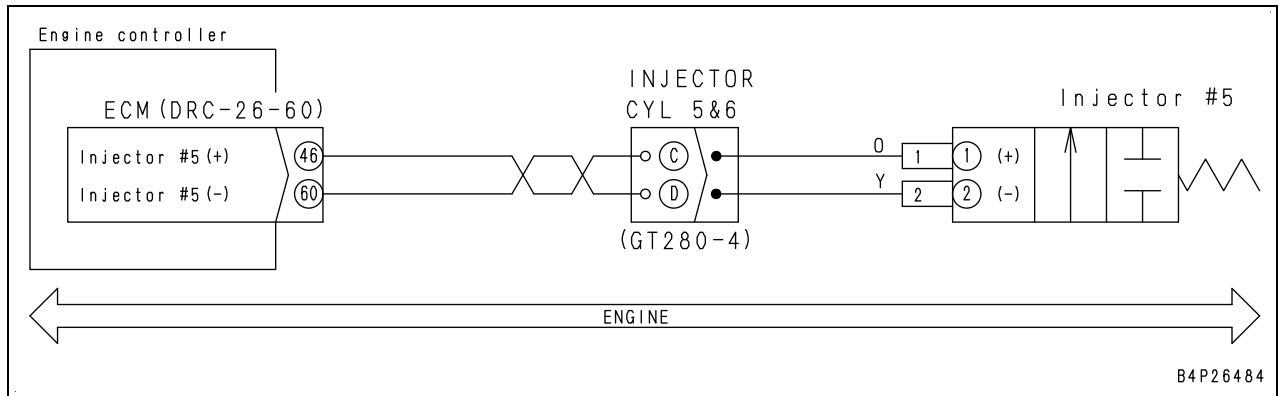
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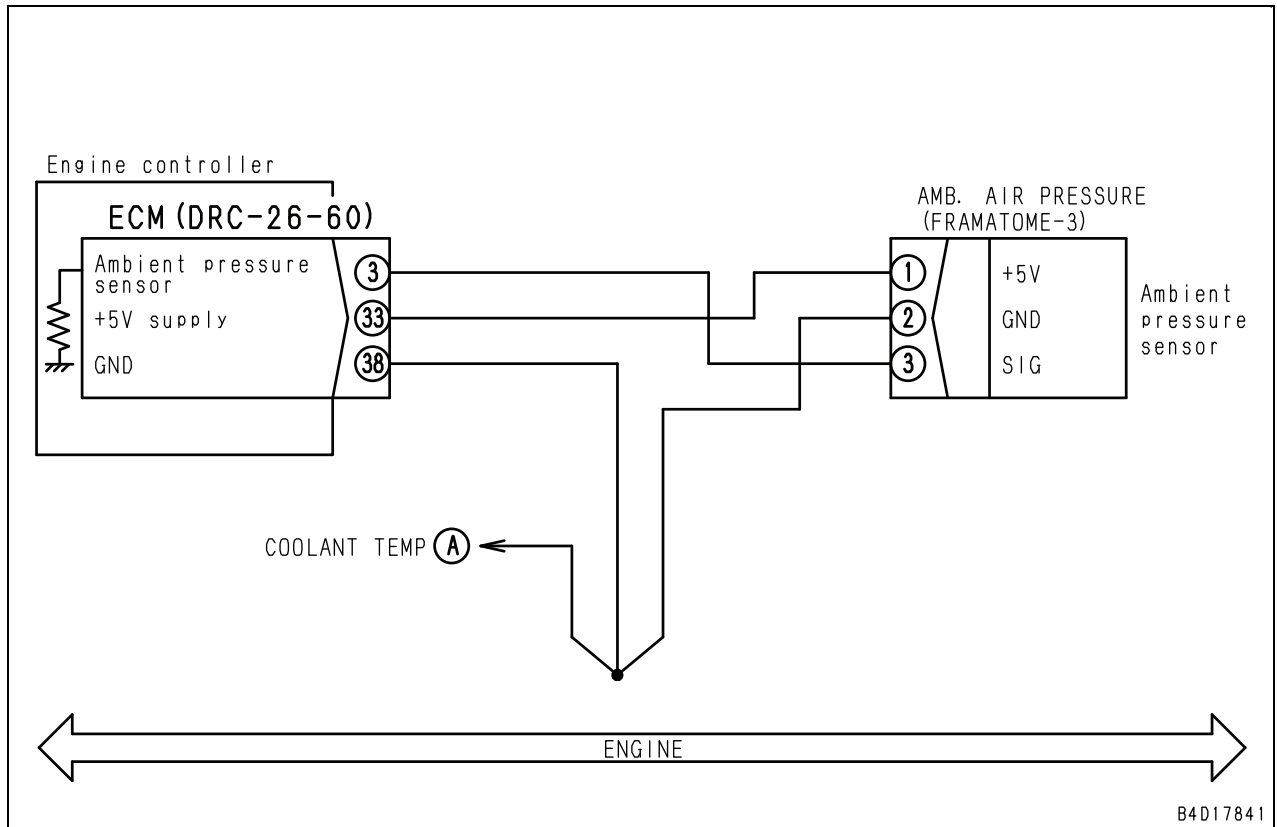
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**Circuit diagram related to injector #5**



Circuit diagram related to sensor power supply 1



## Failure code [CA449] Rail Press Very High Error

Action level	Failure code	Failure	Common Rail Pressure Very High Error (Engine controller system)
<b>L03</b>	<b>CA449</b>		
Detail of failure	<ul style="list-style-type: none"> <li>High pressure error (2) occurs in common rail circuit.</li> </ul>		
Action of controller	<ul style="list-style-type: none"> <li>Restricts engine output and allows engine to run.</li> </ul>		
Problem on machine	<ul style="list-style-type: none"> <li>Engine sound becomes large when no or light load is applied.</li> <li>Engine output lowers.</li> </ul>		
Related information	<ul style="list-style-type: none"> <li>Common rail pressure can be checked with monitoring function. (Code: <b>36400</b> Common rail pressure)</li> <li>Method of reproducing failure code: Start engine.</li> </ul>		

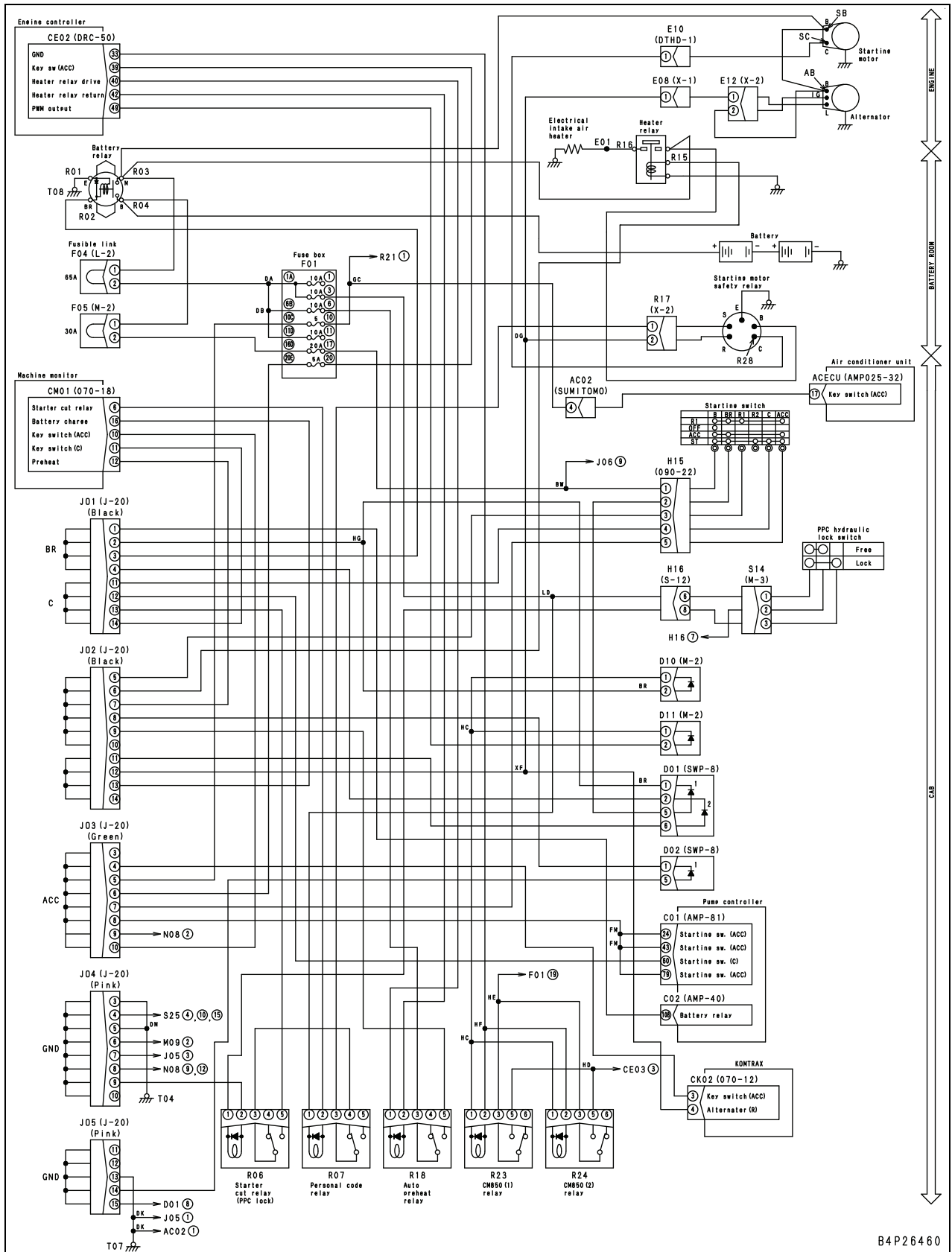
Cause		Procedure, measuring location, criteria and remarks		
1	Defect in related system	If another failure code is displayed, perform troubleshooting for it.		
2	Air in low pressure circuit	Air may be in low-pressure circuit. Check it directly according to following procedure. <ol style="list-style-type: none"> <li>Remove fuel pressure pickup port plug (outlet side) of fuel main filter.</li> <li>Operate feed pump of fuel pre-filter.</li> <li>Check fuel and air from pressure pickup plug for leakage level.</li> </ol>		
3	Defect in fuel return circuit parts	★ For check of pressure in fuel return circuit, see Testing and adjusting, "Testing fuel pressure".		
		Fuel return circuit pressure	Engine at low idle or cranking	Max. 0.02 MPa {Max. 0.19 kg/cm <sup>2</sup> }
4	Defective common rail pressure sensor system	Perform troubleshooting for failure codes [CA451] and [CA452]		
5	Defective pressure limiter	★ For check of leakage from pressure limiter, see "Checking fuel return rate and leakage" in Testing and adjusting.		
		Leakage from pressure limiter	At low idle	0 cc (no leakage)
6	Defective supply pump	If no failure is found by above checks, supply pump may be defective.		

## Failure code [CA757] All Continuous Data Lost Error

Action level	Failure code	Failure	All Continuous Data Lost Error (Engine controller system)
<b>L04</b>	<b>CA757</b>		
Detail of failure	<ul style="list-style-type: none"> <li>All data in engine controller are lost.</li> </ul>		
Action of controller	<ul style="list-style-type: none"> <li>None in particular</li> </ul>		
Problem on machine	<ul style="list-style-type: none"> <li>Engine may stop and may not be started again.</li> <li>Monitoring function of machine monitor (engine controller system) may not work normally.</li> </ul>		
Related information	<ul style="list-style-type: none"> <li>Method of reproducing failure code: Turn starting switch to ON position.</li> </ul>		

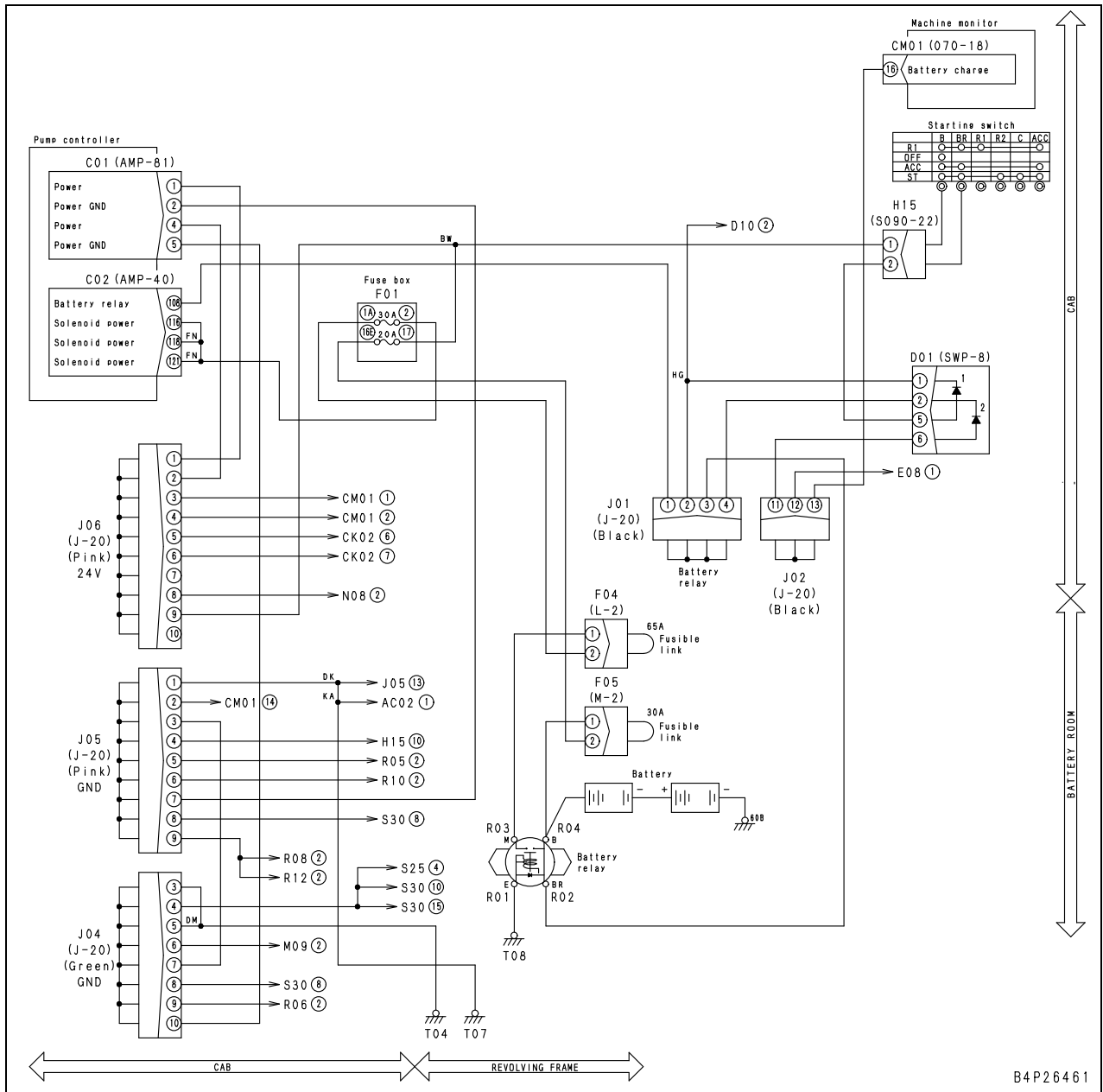
Cause		Procedure, measuring location, criteria and remarks
1	Defect in related system	If another failure code is displayed, perform troubleshooting for it.
2	Perform troubleshooting for failure code [CA441].	

Circuit diagram related to intake air heater relay



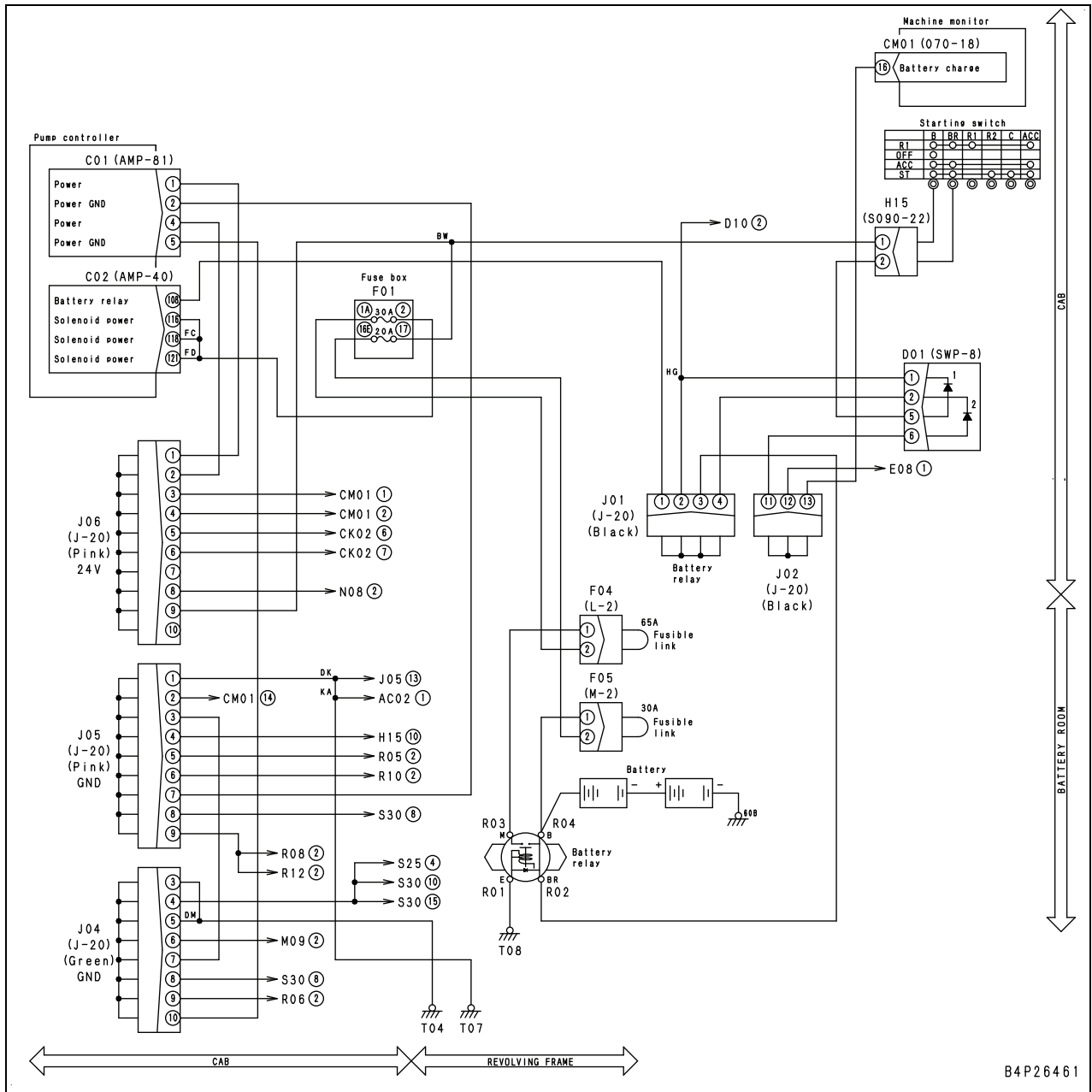
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Circuit diagram related to power supply



B4P26461

Circuit diagram related to pump controller power supply



Cause		Procedure, measuring location, criteria and remarks		
5	Open or short circuit in wiring harness	<ul style="list-style-type: none"> <li>● CAN communication line</li> <li>★ Machine monitor also has 120 Ω CAN terminating resistor in it. Since 120 Ω resistors are connected in parallel, if resistance measured at connector of controller other than machine monitor is 60 Ω which is combined resistance, there is no open circuit in wiring harness.</li> <li>1. Turn starting switch to OFF position and disconnect battery ground cable.</li> <li>2. Disconnect related connectors and connect T-adapters to connector at which measurement is performed.</li> <li>★ If short circuit occurs (if resistance between terminals is 1 Ω or less), disconnect all CAN communication connectors of each controller. Then, check whether short circuit is in wiring harness or within controller.</li> </ul>		
		Between CM02 (female) (8) and (9)	Resistance	Approx. 120 Ω
		Between CE02 (female) (46) and (47)	Resistance	Approx. 60 Ω
		Between C01 (female) (45) and (64)	Resistance	Approx. 60 Ω
		Between AC01 (female) (1) and (2)	Resistance	Approx. 60 Ω
		Between CK01 (female) (10) and (11)	Resistance	Approx. 60 Ω
		Between K02 (female) (A) and (B)	Resistance	Approx. 120 Ω
6	Open circuit in wiring harness (wire breakage or defective contact of connector)	<ul style="list-style-type: none"> <li>● ACC signal from starting switch (CAN communication start is not recognized)</li> <li>1. Turn starting switch to OFF position, and disconnect battery ground cable.</li> <li>2. Disconnect connector at which measurement is performed and insert T-adapters into it.</li> <li>3. Connect battery ground cable, and turn starting switch to ON position.</li> </ul>		
		Between CM01 (10) and (3)	Voltage	20 to 30 V
		Between CE02(39) and CE03(1)	Voltage	20 to 30 V
		Between C01 (24), (43) and (79) and (2)	Voltage	20 to 30 V
		Between AC02 (4) and (1)	Voltage	20 to 30 V
		Between CK02 (3) and (1)	Voltage	20 to 30 V
		<ul style="list-style-type: none"> <li>★ If no failure is found by check on cause 5, this check is not required.</li> <li>1. Turn starting switch to OFF position, and disconnect battery ground cable.</li> <li>2. Disconnect related connectors and connect T-adapters to female side of connector at which measurement is performed.</li> </ul>		
		Between CM02 (female) (8) and C01 (female) (45)	Resistance	Max. 1 Ω
		Between CM02 (female) (9) and C01 (female) (64)	Resistance	Max. 1 Ω
		Between CM02 (female) (8) and CE02 (female) (46)	Resistance	Max. 1 Ω
		Between CM02 (female) (9) and CE02 (female) (47)	Resistance	Max. 1 Ω
		Between CM02 (female) (8) and AC01 (female) (2)	Resistance	Max. 1 Ω
		Between CM02 (female) (9) and AC01 (female) (1)	Resistance	Max. 1 Ω
		Between CM02 (female) (8) and CK01 (female) (10)	Resistance	Max. 1 Ω
Between CM02 (female) (9) and CK01 (female) (11)	Resistance	Max. 1 Ω		
Between CE02 (female) (46) and K02 (female) (A)	Resistance	Max. 1 Ω		
Between CE02 (female) (47) and K02 (female) (B)	Resistance	Max. 1 Ω		
7	Ground fault in wiring harness (contact with ground circuit)	<ul style="list-style-type: none"> <li>★ If no failure is found by checks on cause 5 (no open circuit), measure voltage at one connector.</li> <li>1. Turn starting switch to OFF position and disconnect battery ground cable.</li> <li>2. Disconnect related connectors and connect T-adapters to female side of connector at which measurement is performed.</li> </ul>		
		Between ground and any point in C01 (female) (45), CM02 (female) (7), (8) or CE02 (female) (46)	Resistance	Min. 1 MΩ
		Between ground and any point in C01 (female) (64), CM02 (female) (9) or CE02 (female)(47)	Resistance	Min. 1 MΩ

# HYDRAULIC EXCAVATOR

## PC210-8M0

## PC210LC-8M0

Machine model	Serial number
PC210-8M0	N710001 and up
PC210LC-8M0	N710001 and up

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## 40 Troubleshooting

### 304 Troubleshooting by failure code, Part 4

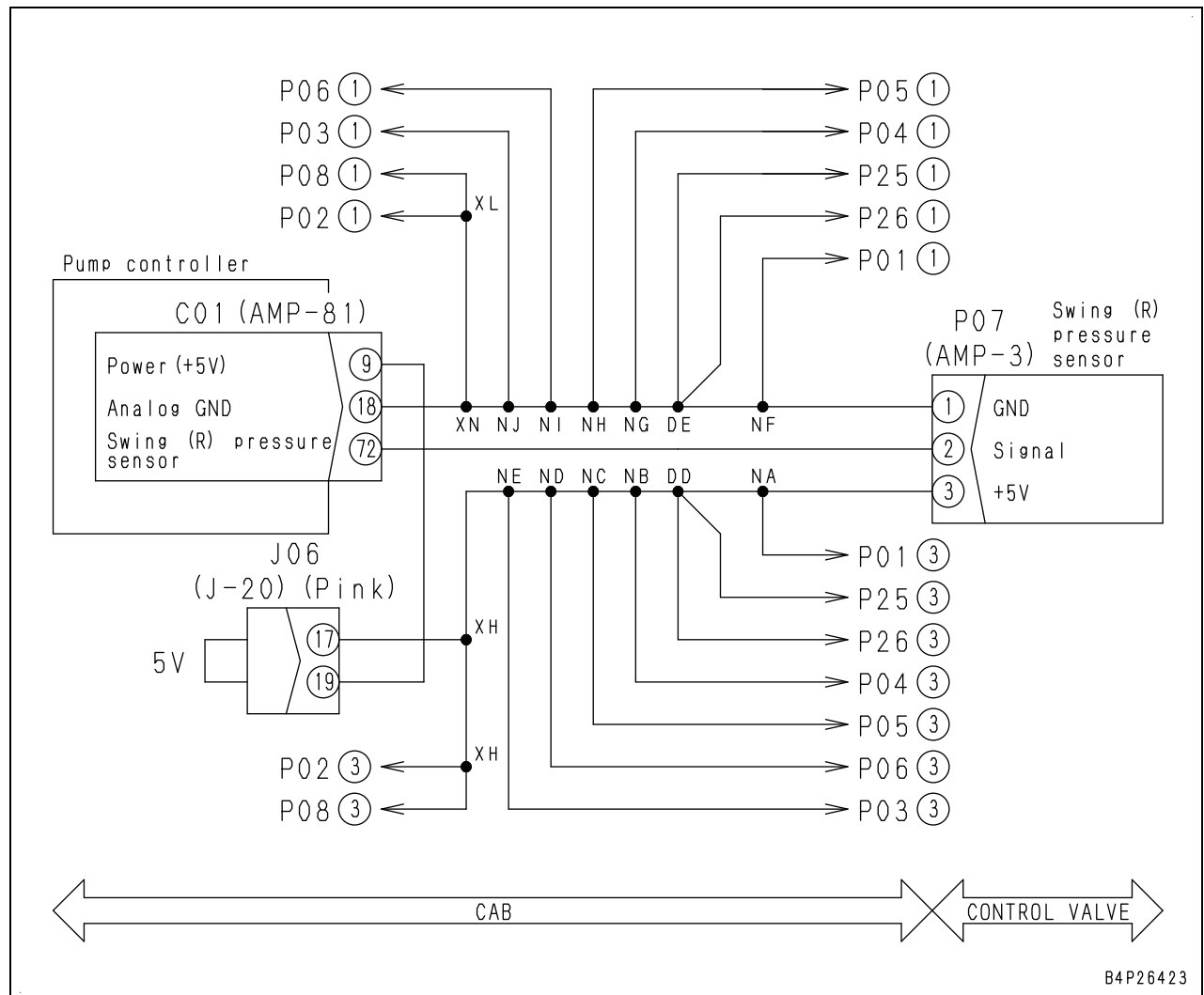
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Failure code [DHS3MA] Arm Curl PPC Press Sensor Abnormality .....	4
Failure code [DHS4MA] Bucket CURL PPC Press Sensor Abnormality .....	6
Failure code [DHS8MA] Boom Raise PPC Press Sensor Abnormality .....	8
Failure code [DHS9MA] Boom Lower PPC Press Sensor Abnormality .....	10
Failure code [DHSAMA] Swing RH PPC Press Sensor Abnormality .....	12
Failure code [DHSBMA] Swing LH PPC Press Sensor Abnormality .....	14
Failure code [DHSCMA] Arm Dump PPC Press Sensor Abnormality .....	16
Failure code [DHSDMA] Bucket Dump PPC Press Sensor Abnormality .....	18
Failure code [DHSFMA] Travel FW L PPC Press Sensor Abnormality .....	20
Failure code [DHSGMA] Travel FW R PPC Press Sensor Abnormality .....	22
Failure code [DHSHMA] Travel BW L PPC Press Sensor Abnormality .....	24
Failure code [DHSJMA] Travel BW R PPC Press Sensor Abnormality .....	26
Failure code [DHX1MA] Overload Sensor Abnormality .....	28
Failure code [DR21KX] Camera 2 Picture Rev. Drive Abnormality .....	30
Failure code [DR31KX] Camera 3 Picture Rev. Drive Abnormality .....	32
Failure code [DV20KB] Travel Alarm Short Circuit .....	34
Failure code [DW43KA] Travel Speed Sol Open Circuit .....	36
Failure code [DW43KB] Travel Speed Sol Short Circuit .....	38
Failure code [DW45KA] Swing Brake Sol. Valve Open Circuit .....	40
Failure code [DW45KB] Swing Brake Sol Short Circuit .....	42

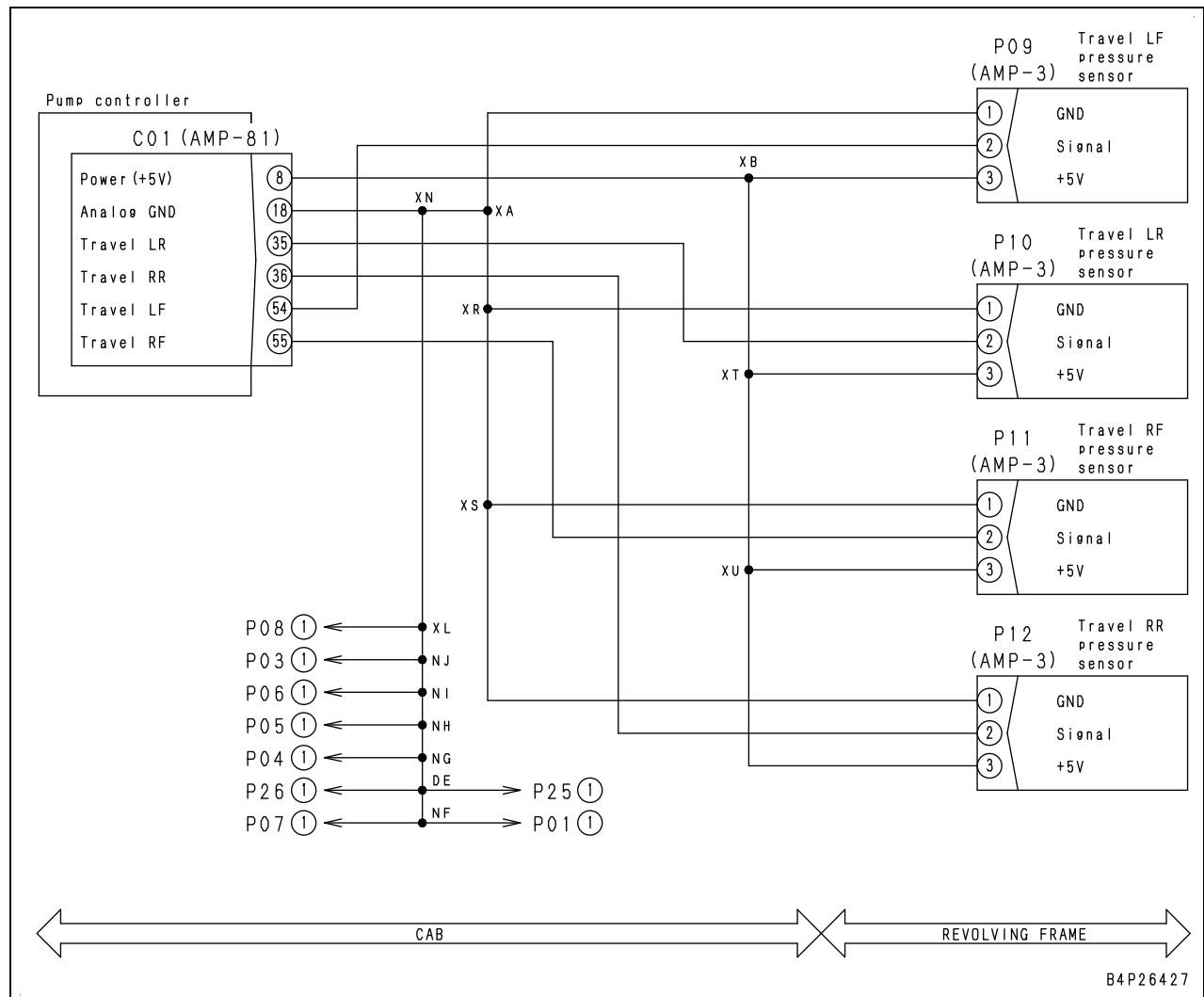
Cause		Procedure, measuring location, criteria and remarks		
5	Hot short circuit in wiring harness (contact with 5 V/24 V circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector P07. 3. Connect T-adapters to female side of connector P07. 4. Turn starting switch to ON position.		
		Between P07 (female) (2) and ground	Voltage	Max. 1 V
6	Defective pump controller	If no failure is found by above checks, pump controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

**Circuit diagram related to swing right PPC pressure sensor**



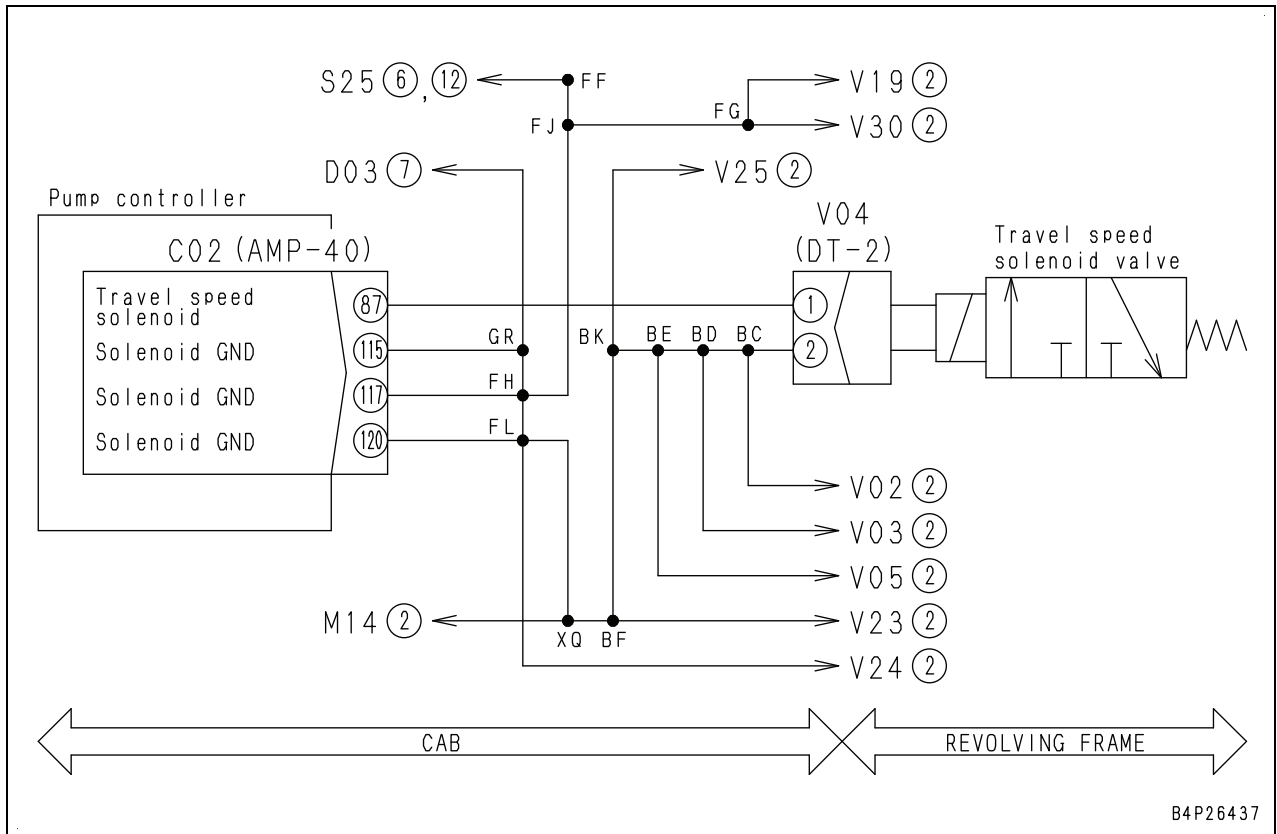
Cause		Procedure, measuring location, criteria and remarks		
5	Hot short circuit in wiring harness (contact with 5 V/24 V circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector P10. 3. Connect T-adapters to female side of connector P10. 4. Turn starting switch to ON position.		
		Between P10 (female) (2) and ground	Voltage	Max. 1 V
6	Defective pump controller	If no failure is found by above checks, pump controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

**Circuit diagram related to travel PPC pressure sensor**



B4P26427

Circuit diagram related to travel speed solenoid



# HYDRAULIC EXCAVATOR

## PC210-8M0

## PC210LC-8M0

Machine model	Serial number
PC210-8M0	N710001 and up
PC210LC-8M0	N710001 and up

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## 40 Troubleshooting

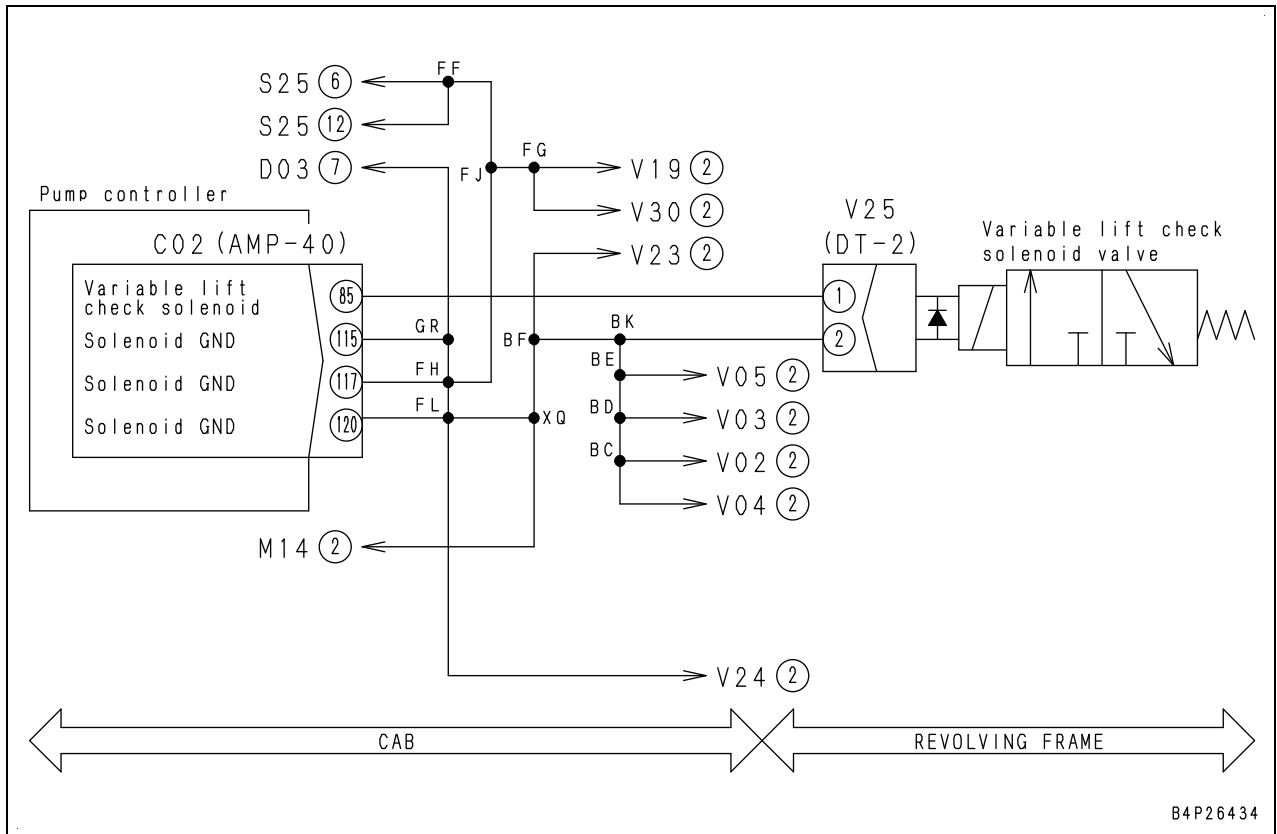
### 305 Troubleshooting by failure code, Part 5

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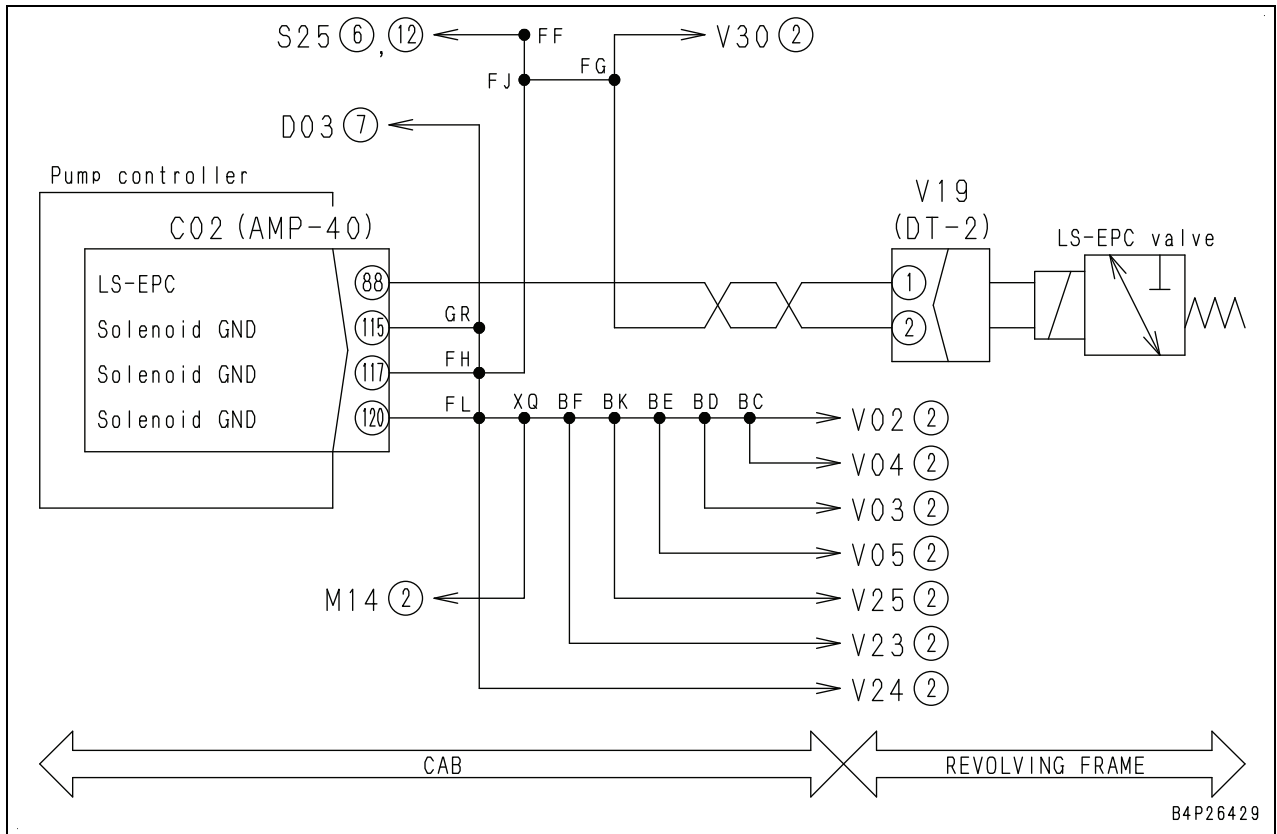
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Failure code [DWA2KA] Attachment Sol Open Circuit.....	4
Failure code [DWA2KB] Attachment Sol Short Circuit.....	6
Failure code [DWK0KA] 2-stage Relief Sol Open Circuit.....	8
Failure code [DWK0KB] 2-stage Relief Sol Short Circuit.....	10
Failure code [DWK2KA] Variable Back Press Sol Open Circuit.....	12
Failure code [DWK2KB] Variable Back Press Sol Short Circuit.....	14
Failure code [DXA8KA] PC-EPC (F) Sol Open Circuit.....	16
Failure code [DXA8KB] PC-EPC (F) Sol Short Circuit.....	18
Failure code [DXA9KA] PC-EPC (R) Sol Open Circuit.....	20
Failure code [DXA9KB] PC-EPC (R) Sol Short Circuit.....	22
Failure code [DXE0KA] LS-EPC Sol Open Circuit.....	24
Failure code [DXE0KB] LS-EPC Sol Short Circuit.....	26
Failure code [DXE4KA] Attachment Flow EPC Open Circuit.....	28
Failure code [DXE4KB] Attachment Flow EPC Short Circuit.....	30
Failure code [DXE5KA] Merge-divide Main Sol Open Circuit.....	32
Failure code [DXE5KB] Merge-divide Main Sol Short Circuit.....	34
Failure code [DXE6KA] Merge-divide LS Sol Open Circuit.....	36
Failure code [DXE6KB] Merge-divide LS Sol Short Circuit.....	38
Failure code [DY20KA] Wiper Working Abnormality.....	40
Failure code [DY20MA] Wiper Parking Abnormality.....	42

**Circuit diagram related to variable back pressure solenoid**

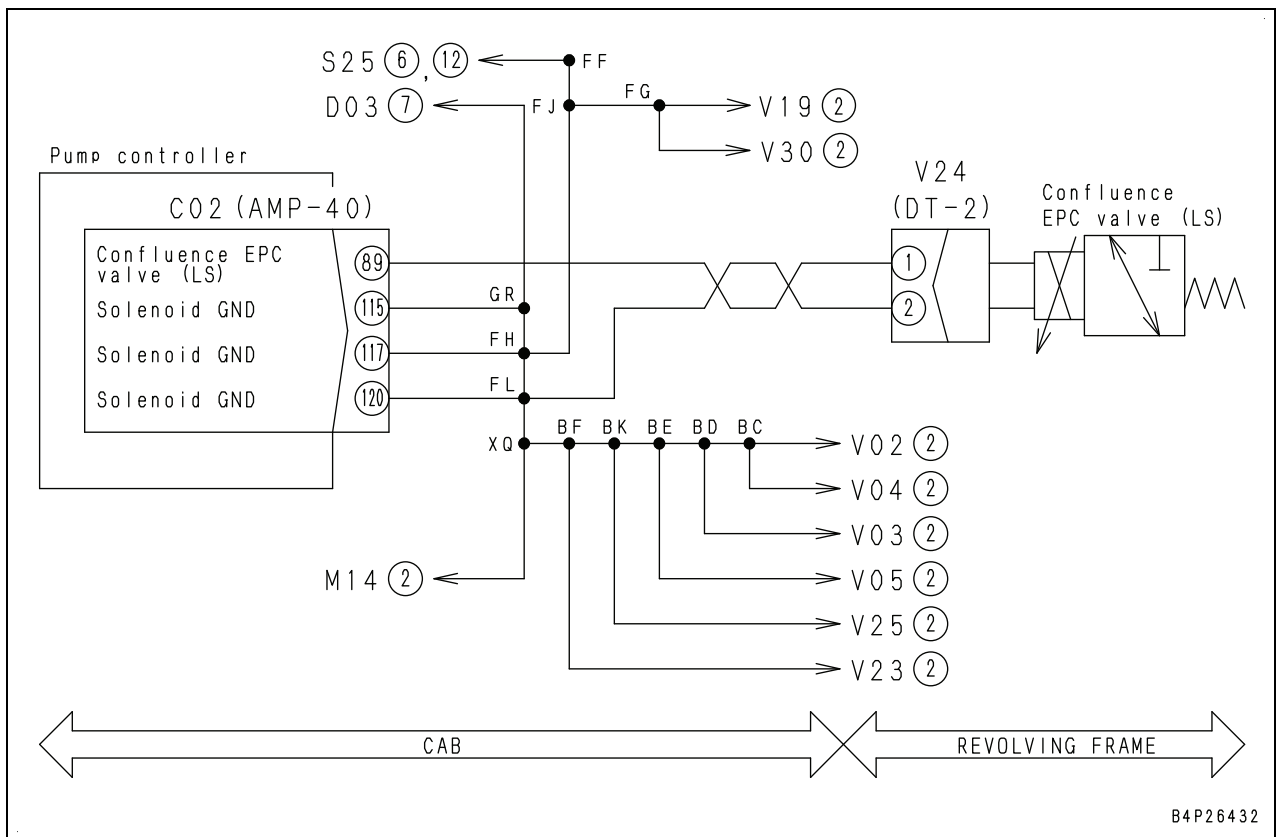


Circuit diagram related to LS-EPC solenoid



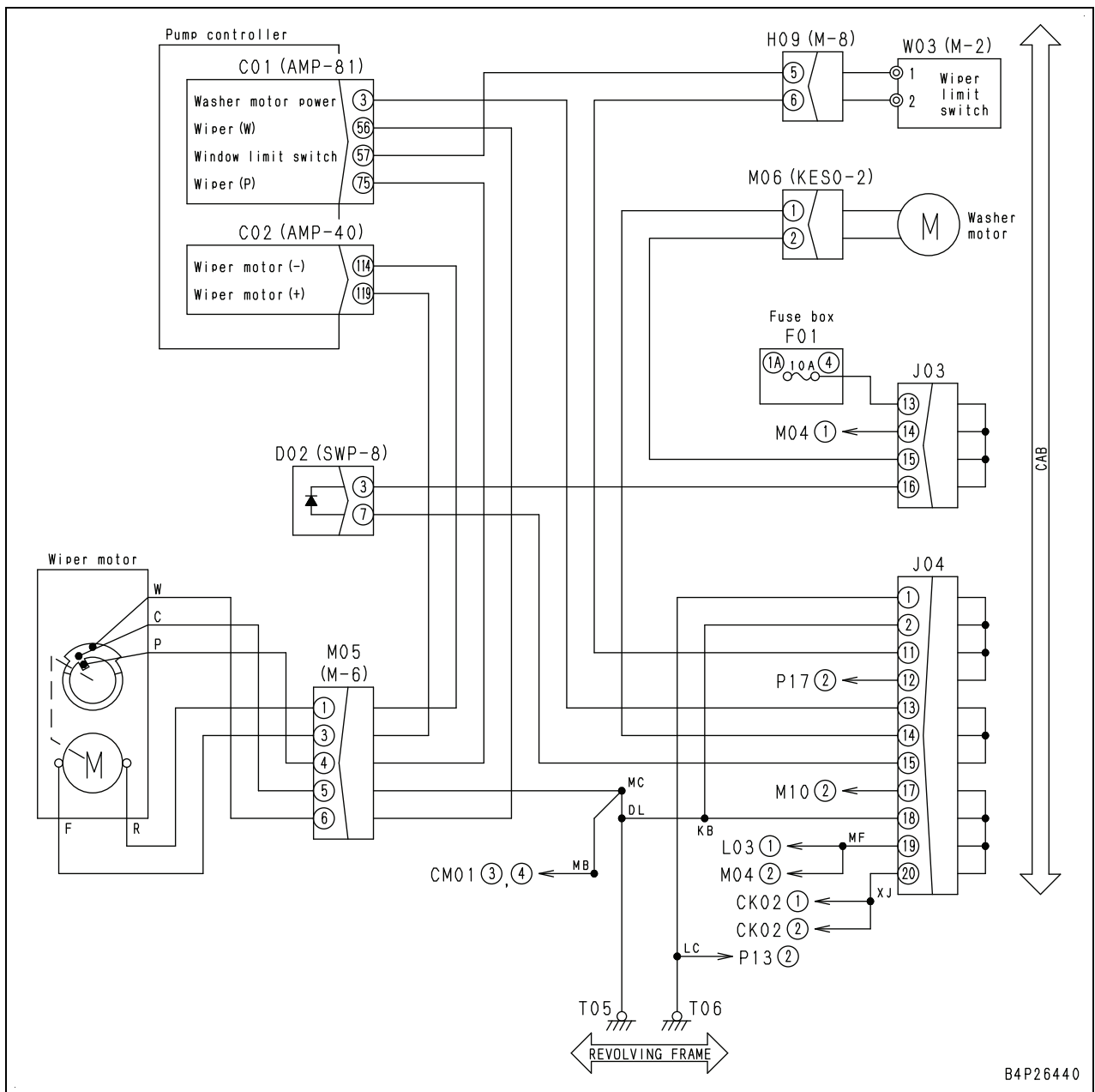
B4P26429

**Circuit diagram related to merge-divider LS EPC solenoid**



B4P26432

Circuit diagram related to wiper



B4P26440

Cause		Procedure, measuring location, criteria and remarks		
16	Open circuit in wiring harness (wire breakage or defective contact of connector)	★ If fuse or fusible link is broken, replace it.		
		1. Turn starting switch to OFF position.		
		2. Disconnect H15, S14, R06 and R07.		
		3. Connect T-adapters to female sides of H15, R06 and R07, and to male side of S14.		
		4. Remove fuse F01-3.		
		Between H15 (female) (4) and R06 (female) (5)	Resistance	Max. 1 Ω
		Between R06 (female) (3) and R07 (female) (4)	Resistance	Max. 1 Ω
		Between R07 (female) (1) and S14 (male) (1)	Resistance	Max. 1 Ω
		Between R07 (female) (2) and CM01 (female) (6)	Resistance	Max. 1 Ω
		Between R07 (female) (3) and starting motor safety relay terminal S	Resistance	Max. 1 Ω
		Between alternator terminal B and starting motor terminal B	Resistance	Max. 1 Ω
		Between starting motor B and battery relay R03	Resistance	Max. 1 Ω
		Between starting motor safety relay R terminal and alternator L terminal	Resistance	Max. 1 Ω
Between alternator terminal L and D01 (female) (6)	Resistance	Max. 1 Ω		
Between F01-3 and S14 (male) (1)	Resistance	Max. 1 Ω		
Between S14 (male) (3) and R06 (male) (1)	Resistance	Max. 1 Ω		
Between R06 (male) (2) and ground (T04)	Resistance	Max. 1 Ω		
17	Defective battery relay (Does not work)	If only terminal R03 voltage is abnormal during battery relay check for cause 16, battery relay is defective.		
18	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position.		
		2. Disconnect H15, S14, R06 and R07.		
		3. Connect T-adapters to female sides of H15, R06 and R07, and to male side of S14.		
		4. Remove fuse F01-3.		
		Between H15 (female) (4) and ground, or between R06 (female) (5) and ground	Resistance	Min. 1 MΩ
		Between R06 (female) (3) and ground, or between R07 (female) (4) and ground	Resistance	Min. 1 MΩ
		Between R07 (female) (3), or R17 (female) (1) and ground	Resistance	Min. 1 MΩ
		Between starting motor safety relay B or battery relay R03 and ground	Resistance	Min. 1 MΩ
Between starting motor safety relay C or starting motor C (SC) and ground	Resistance	Min. 1 MΩ		
Between ground and F01-3 or S14 (male) (1)	Resistance	Min. 1 MΩ		
Between ground and S14 (male) (3) or R06 (female) (1)	Resistance	Min. 1 MΩ		
19	Hot short circuit in wiring harness (contact with 24 V circuit)	1. Turn starting switch to OFF position.		
		2. Insert T-adapter between male and female sides of connector R17 or E08.		
		3. Turn starting switch to ON position.		
		Between R17 (female) (2) or E08 (1) and ground	Voltage	Max. 1 V

## E-6 Emergency stop monitor lights up while engine is running

Failure	1) Engine coolant temperature monitor lights up in red.
Related information	<ul style="list-style-type: none"> <li>Signal of engine coolant temperature sensor is input to engine controller and then data is transmitted to machine monitor through CAN communication system.</li> <li>Engine coolant temperature can be checked with monitoring function (Code: 04107 Engine coolant temperature)</li> </ul>

Cause		Procedure, measuring location, criteria and remarks
1	Overheating of engine coolant (when system works properly)	If monitor lights up in red, engine coolant temperature may be high (above approximately 102 °C). Cool down engine coolant (run engine at low idle). <ul style="list-style-type: none"> <li>Lighting up in red: Engine coolant temperature is high (overheating).</li> <li>Lighting up in blue: Engine coolant temperature is proper.</li> </ul> Perform troubleshooting for "S-14 Coolant temperature becomes too high (overheating)".
2	Defective engine coolant temperature gauge system	If no failure is found by check on cause 1, engine coolant temperature gauge system may be defective. Perform troubleshooting for "E-8 Engine coolant temperature gauge does not indicate properly".

Failure	2) Hydraulic oil temperature monitor lights up in red.
Related information	<ul style="list-style-type: none"> <li>Signal of hydraulic oil temperature sensor is input to pump controller and then the data is transmitted to machine monitor through CAN communication system.</li> <li>Hydraulic oil temperature can be checked with monitoring function (Code: 04401 Hydraulic oil temperature)</li> </ul>

Cause		Procedure, measuring location, criteria and remarks
1	Overheating of hydraulic oil (when system works properly)	If monitor lights up in red, hydraulic oil temperature may be high (above approximately 102 °C). Cool down hydraulic oil (run engine at low idle or stop engine). <ul style="list-style-type: none"> <li>Lighting up in red: Hydraulic oil temperature is high (overheating).</li> <li>Lighting up in blue: Hydraulic oil temperature is proper.</li> </ul>
2	Defective hydraulic oil temperature gauge system	If no failure is found by check on cause 1, hydraulic oil temperature gauge system may be defective. Perform troubleshooting for "E-9 hydraulic oil temperature gauge does not indicate properly".

Failure	3) Engine oil pressure monitor lights up in red.
Related information	<ul style="list-style-type: none"> <li>Signal of engine oil pressure switch is input to engine controller. If engine oil pressure switch is turned ON while engine is running, failure code <b>[B@BAZG]</b> is transmitted from engine controller to machine monitor through CAN communication.</li> </ul>

Cause		Procedure, measuring location, criteria and remarks
1	Low engine oil pressure (when system works properly)	Engine oil pressure may be low. Check it. If it is low, perform troubleshooting for "S-12 Oil pressure decreases".
2	Defective engine oil pressure switch system	If no failure is found by check on cause 1, engine oil pressure switch system may be defective. Perform troubleshooting for failure code <b>[CA435]</b> .

### E-16 Travel speed does not change

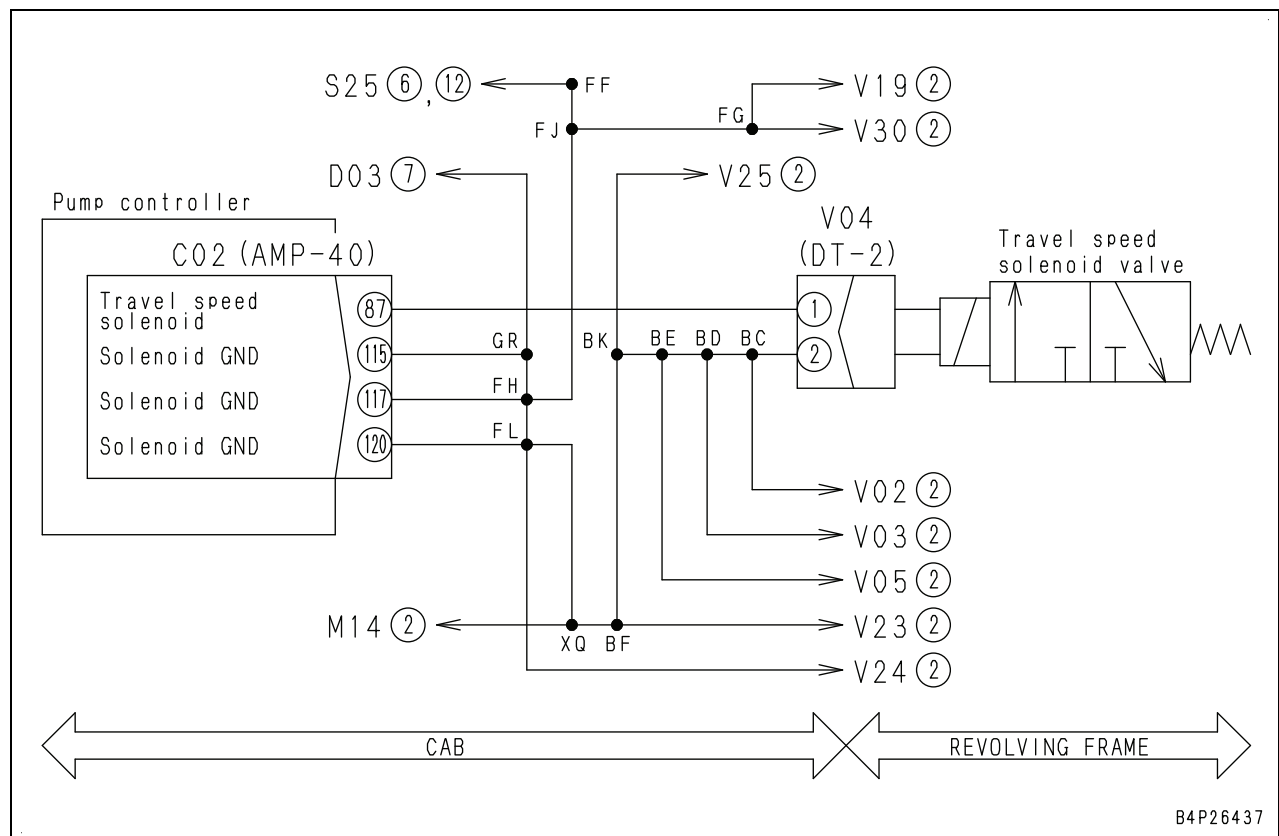
Failure	1) When travel speed selector switch is operated, display of travel speed monitor does not change.
Related information	<ul style="list-style-type: none"> <li>Signal of travel speed selector switch can be checked with monitoring function. (Code: 04504 Monitor 1st, 2nd line switches)</li> </ul>

Cause	Procedure, measuring location, criteria and remarks
1 Defective machine monitor	Machine monitor may be defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Failure	2) When selection of travel speed is changed, actual travel speed does not change.
Related information	<ul style="list-style-type: none"> <li>When failure due to cause 1 occurs, actual travel speed does not decrease when travel speed setting is changed to "Lo".</li> <li>As T-adapter for pump controller connector is "socket-type box", operating voltage cannot be measured at pump controller connector.</li> </ul>

Cause	Procedure, measuring location, criteria and remarks			
1 Hot short circuit in wiring harness (contact with 24 V circuit)	<ol style="list-style-type: none"> <li>Turn starting switch to OFF position.</li> <li>Disconnect connector V04 and connect T-adapters to female side.</li> <li>Turn starting switch to ON position.</li> </ol> <table border="1" style="width: 100%; margin-top: 5px;"> <tr> <td>Between V04 (female) (2) and ground</td> <td>Voltage</td> <td>Max. 3 V</td> </tr> </table>	Between V04 (female) (2) and ground	Voltage	Max. 3 V
Between V04 (female) (2) and ground	Voltage	Max. 3 V		
2 Defective machine monitor	If no problem is found in check on cause 1, machine monitor may be defective. (Since this is an internal defect, troubleshooting cannot be performed.)			
3 Defective pump controller	If no problem is found in checks on causes 1 and 2, pump controller may be defective (Since this is an internal defect, troubleshooting cannot be performed.)			

#### Circuit diagram related to travel speed solenoid

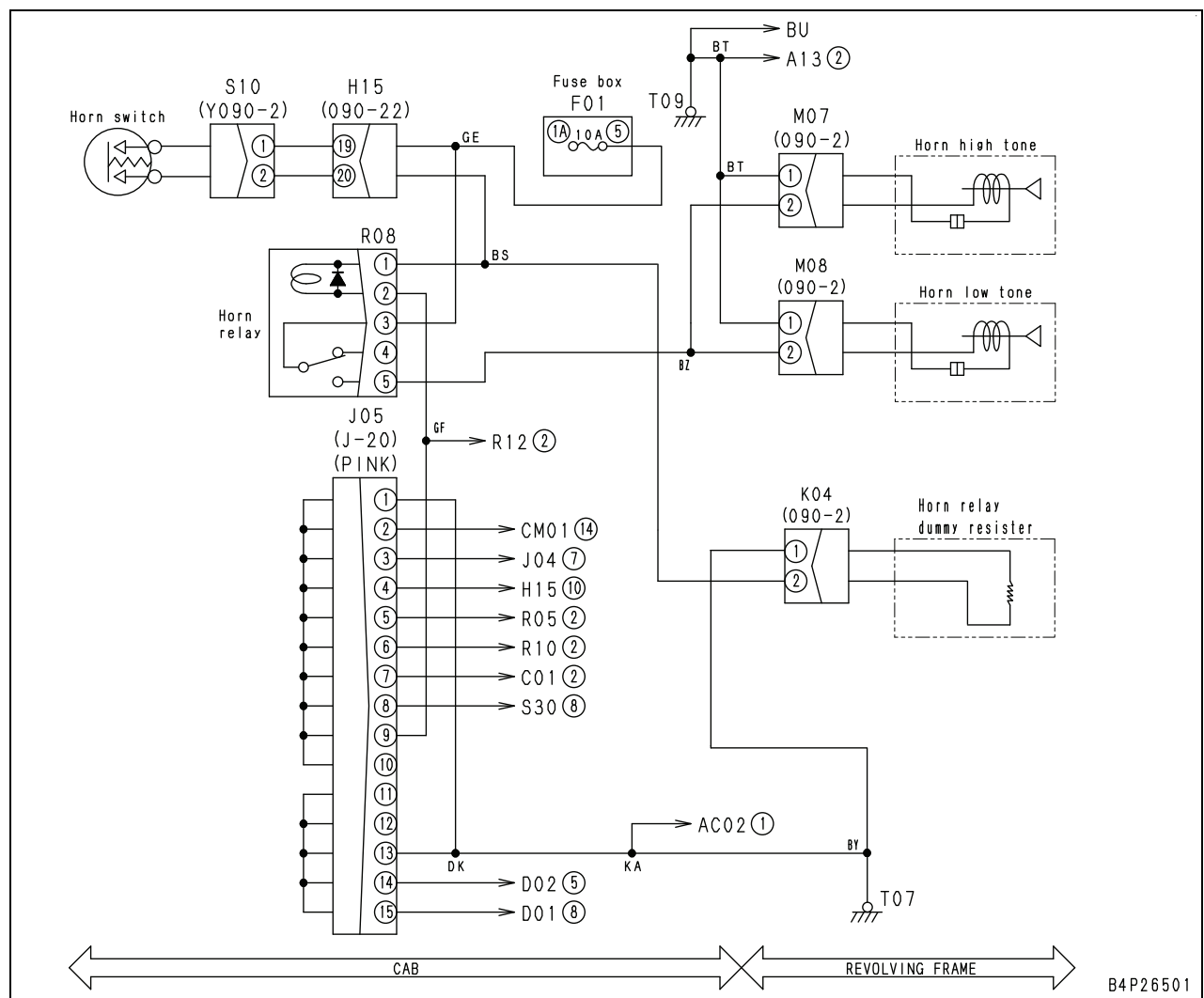


Cause	Procedure, measuring location, criteria and remarks
8 Defective horn (internal defect)	If no failure is found by above checks, horn may be defective.

Failure	2) Horn does not stop sounding.
Related information	

Cause	Procedure, measuring location, criteria and remarks		
1 Defective horn relay (R08) (internal open or short circuit)	<ol style="list-style-type: none"> <li>Turn starting switch to OFF position.</li> <li>Remove horn relay (connector R08).</li> <li>Turn starting switch to ON position.</li> </ol> <p>If horn stops sounding, original horn relay is defective.</p>		
2 Hot short circuit in wiring harness (contact with 24 V circuit)	<ol style="list-style-type: none"> <li>Turn starting switch to OFF position.</li> <li>Disconnect connectors M07 and M08, and connect T-adapters to each female side.</li> <li>Turn starting switch to ON position.</li> </ol>		
	Between M07 (female) (2) and (1)	Voltage	Max. 1 V
	Between M08 (female) (2) and (1)	Voltage	Max. 1 V

**Circuit diagram related to horn**



B4P26501

# HYDRAULIC EXCAVATOR

## PC200-8M0

## PC210LC-8M0

Machine model	Serial number
PC210-8M0	N710001 and up
PC210LC-8M0	N710001 and up

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## 40 Troubleshooting

### 500 Troubleshooting of hydraulic and mechanical system (H-mode)

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System diagram of hydraulic and mechanical system .....	4
Failure mode and cause table.....	6
Information in troubleshooting table.....	8
H-1 Speed or power of whole work equipment, swing, and travel is low .....	9
H-2 Engine speed lowers significantly or engine stalls .....	11
H-3 Work equipment, swing, and travel systems do not work .....	12
H-4 Unusual noise comes out from around hydraulic pump .....	13
H-5 Fine control performance or response is low .....	14
H-6 Speed or power of boom is low .....	15
H-7 Speed or power of arm is low .....	16
H-8 Speed or power of bucket is low .....	17
H-9 Work equipment does not move in its single operation.....	18
H-10 Hydraulic drift of work equipment is large .....	19
H-11 Time lag of work equipment is large.....	21
H-12 Other work equipment moves when one of work equipment is relieved.....	22
H-13 One-touch power maximizing function does not work.....	23
H-14 In combined operation of work equipment, equipment having heavier load moves slower. ....	24
H-15 In combined operation of swing and boom RAISE, boom rising speed is low .....	25

## H-4 Unusual noise comes out from around hydraulic pump

Failure	<ul style="list-style-type: none"> <li>Unusual sound is heard from around hydraulic pump</li> </ul>
Related information	

Probable causes and criteria	Cause		Criteria and troubleshooting procedure
	1	Lowering of hydraulic oil level	Hydraulic oil level may be low. Check it.
2	Defective hydraulic oil	Air may be mixed in hydraulic oil. Check oil.	
3	Clogging of hydraulic tank cap	Negative pressure may be generated in hydraulic tank because of clogged hydraulic tank cap. Check cap.	
4	Clogging of hydraulic tank strainer	Negative pressure may be generated in suction circuit because of clogged hydraulic tank strainer. Check strainer.	
5	Defective piston pump	Piston pump may have internal defect. Check it.	

## H-15 In combined operation of swing and boom RAISE, boom rising speed is low

Failure	<ul style="list-style-type: none"> <li>In combined operations of swing and boom RAISE, boom rising speed is low</li> </ul>
Related information	<ul style="list-style-type: none"> <li>If boom RAISE speed is also low when it is operated singly, perform troubleshooting for "H- 6 Boom operation lacks speed or power".</li> </ul>

Probable causes and criteria	Cause		Criteria and troubleshooting procedure
	1	Malfunction or defective sealing of swing control valve (LS select valve)	

## H-25 Shock is large when upper structure stops swinging

Failure	<ul style="list-style-type: none"> <li>Shock is larger when upper structure stops swinging</li> </ul>
Related information	<ul style="list-style-type: none"> <li>Perform all troubleshooting with working mode in power mode (P).</li> </ul>

Probable causes and criteria	Cause		Criteria and troubleshooting procedure	
	1	Malfunction of swing PPC valve	★ Be ready with engine stopped, then troubleshoot with engine high idle.	
Left work equipment control lever			PPC valve output pressure	
Neutral			0 MPa {0 kg/cm <sup>2</sup> }	
Left swing Right swing			2.84 to 3.43 MPa {29 to 35 kg/cm <sup>2</sup> }	
2	Clogged swing PPC slow return valve	Swing PPC slow return valve may malfunction. Check it. * This failure can be checked by interchanging right and left swing PPC slow return valve and watching how condition changes.		
3	Malfunction of swing motor (shockless valve)	Shockless valve of swing motor may malfunction. Check it.		

## S-2 Engine does not start

### a) Engine does not crank

General causes why engine does not crank

- Internal parts of engine seized.  
→See "S-4 Engine stops during operations"
- Defective electrical system
- Defect in hydraulic pump

		Cause								
		Broken flywheel ring gear	Defective or deteriorated battery	Defective connection of battery cable terminal	Defective battery relay	Defective starting switch	Defective safety relay	Defective starting motor (motor section)	Defective starting circuit wiring	Defective hydraulic pump
Questions	Check recent repair history.									
	Machine operation hours	Operated for long period	△	△						
	Condition of horn when starting switch is turned ON	Horn does not sound. Horn volume is low.		○		○			○	
Check items	Battery electrolyte level is low.		○							
	Battery cable terminal is loose			○						
	When starting switch is turned ON, no operating sound is heard from battery relay.		○		○					
	When starting switch is turned to START, starter pinion does not plunge.		○			○			○	
	When starting switch is turned to START, starter pinion plunges, but:	Rotation speed is low.		○						
		Unusual noise is heard around ring gear.	○						○	
	Pinion returns halfway.						○			
	Unusual noise is heard around relay and engine does not rotate.		○				○	○	○	
Troubleshooting	Check flywheel ring gear.	●								
	Specific gravity of electrolyte and voltage of battery are low.		●							
	Turn starting switch to OFF position and connect cable, and perform troubleshooting with starting switch at ON.	Voltage (20 – 30 V) between battery relay terminal B and terminal E is not found.				●				
		When terminal B and terminal C of starting switch are connected, engine cranks.					●			
		When terminal B at safety relay outlet and terminal C are connected, engine cranks.						●		
		Even if terminal B at safety relay outlet and terminal C are connected, engine will not crank.							●	
When terminal at safety switch and terminal B at starting motor are connected, engine cranks.							●			
								Perform E-mode troubleshooting	Perform H-mode troubleshooting	
	Remedy	Replace	Replace	Repair	Replace	Replace	Replace	Replace	-	-

## S-12 Oil pressure drops

General causes why oil pressure drops

- Leakage, clogging, or wear on lubrication system
- Defective oil pressure control
- Selection of oil by the temperature etc. specified in the Operation and Maintenance Manual is not observed.
- Deterioration of oil due to overheating

		Cause										
		Worn main bearing	Lack of oil in oil pan	Coolant or fuel in oil	Clogged strainer in oil pan	Clogged or broken pipe in oil pan	Defective oil pump	Defective regulator valve	Clogged oil filter	Leaking, crushed, clogged oil piping	Defective coolant temperature sensor or wiring harness	
Questions	Check recent repair history.											
	Machine operation hours	Operated for long period	△				△	△				
	Oil pressure monitor indicates low oil pressure.							○	○			
	Oil other than specified one is used		○						○			
	Filters are not replaced as indicated in the Operation and Maintenance Manual.								○			
	Oil pressure monitor: (if installed)	Indicates pressure drop at low idle.	○									
		Indicates pressure drop at low and high idle.		○		○	○	○				
		Indicates pressure drop on slope.		○								
		Sometimes indicates pressure drop.						○				○
	Oil pressure monitor indicates low oil pressure.		○								○	
Oil level in oil pan is low.		○										
Check items	External lubrication piping is leaking or crushed.								○			
	Oil is milky or smells of diesel fuel.			○								
	Metal particles are found in oil drained from oil pan.	○										
	Metal particles are found in the removed oil filter.	○					○					
Troubleshooting	Metal particles are found in oil filter.	●										
	Inspect oil pan strainer and pipe.					●	●					
	Oil pump rotation is heavy or there is play in oil pump.						●					
	Valve and spring of regulator valve are fatigued or damaged.							●				
	Check oil filter.								●			
	If oil level sensor is replaced, oil level monitor indicates correct oil level.										●	
	Remedy	Replace	Add	-	Clean	Clean	Replace	Adjust	Adjust	Repair	Replace	

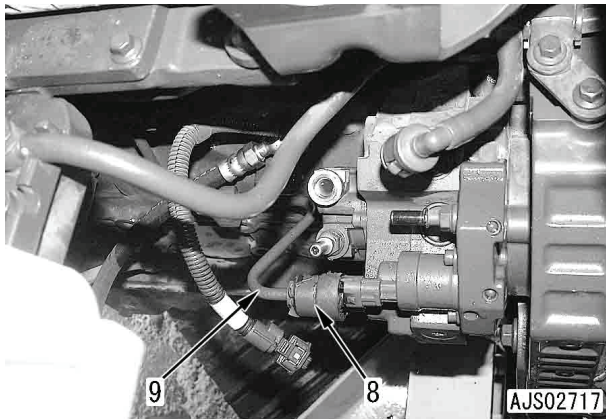
## Special tools list

- ★ Tools with part number 79\*T-\*\*\*-\*\*\*\* means that they are not available from Komatsu Ltd. (i.e. tools to be made locally).
- ★ Necessity:
  - ..... Special tools that cannot be substituted and should always be used
  - ..... Special tools that will be useful if available and are substitutable with tools available on the market
- ★ New/Redesign: N ..... Tools newly developed for this model. They have a new part number respectively.  
 R ..... Tools made available by redesigning the existing tools which were developed for other models. Each of them has a new part number assigned by setting forward the part number of the existing tool.  
 Blank ..... Tools already available for other models. They can be used without any modification.
- ★ Tools marked with ○ in the sketch column are presented in the sketches of the special tools (See "Sketches of special tools").

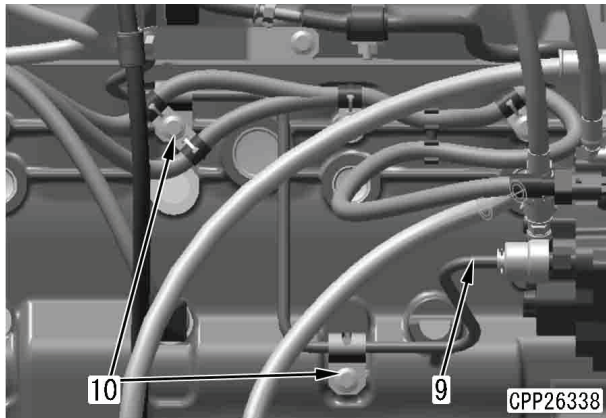
Work item	Sym- bol	Part number	Part name	Necessity	Qty	N/R	Sketch	Work content		
Engine front oil seal	A	1	795-799-6400	■	1	N		Installation of engine front oil seal		
Engine rear oil seal		2	795-799-6500	■	1	N		Installation of engine rear oil seal		
Cylinder head assembly, fuel injector assembly		3	795-799-6700	Primer	■	1	N		Removal of fuel injector	
		4	795-799-1131	Gear	■	1			Positioning with 3RD and 4TH cylinder top	
		5	795-799-8150	Remover	●	1	N		Removal of inlet connector	
Cylinder head assembly		6	790-331-1120	Wrench (Angle)	●	1			Angle tightening of bolt	
		7	795-790-4510	Gauge	●	1	N		Judgment of cylinder head bolt length	
Engine and hydraulic pump assembly		8	796T-401-1110	Plate	●	1	N	○	Removal and installation of engine and hydraulic pump assembly	
		9	795-790-9300	Lifting tool	●	1	N			
Hydraulic pump assembly, Engine and hydraulic pump assembly, Control valve assembly, Center swivel joint assembly		10	796-460-1210	Oil stopper	●	1			Stopping oil	
		11	796-770-1320	Adapter	●	1				
Fuel supply pump assembly		12	795-799-6130	Support	■	1			Removal and installation of gear	
Swing motor and swing machinery assembly	F	1	796T-426-1410	Push tool	■	1		○	Press fit of main bearing	
		2	796-426-1120	Push tool	■	1			Press fit of sub bearing	
		3	796T-426-1130	Plate	■	1			○	Press fit of oil seal
			790-101-5421	Grip	■	1				
			01010-81240	Bolt	■	1				
Final drive assembly	J	1	796-427-1400	Wrench assembly	■	1	N		Removal and installation of nut	
			796-427-1410	• Wrench		1	N			
			796-427-1140	• Pin		3				
			01314-20612	• Screw		3				

11. Remove bellows (8). [\*2]

12. Disconnect high-pressure pipe (9). [\*2]



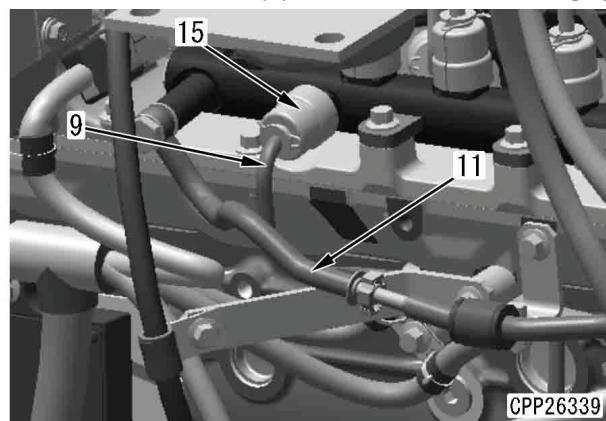
13. Disconnect 2 tube clamps (10). [\*2]



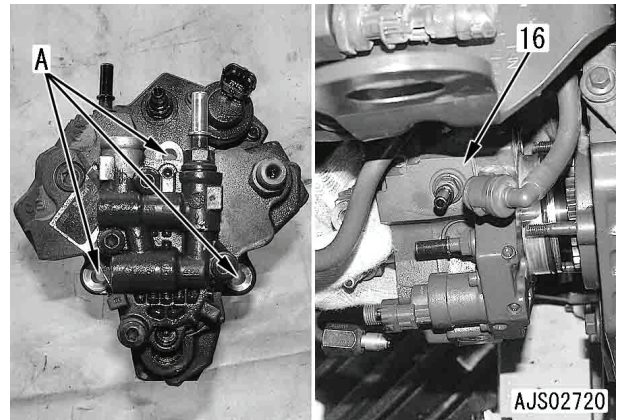
14. Disconnect fuel return tube (11). [\*3]

15. Remove bellows (15). [\*2]

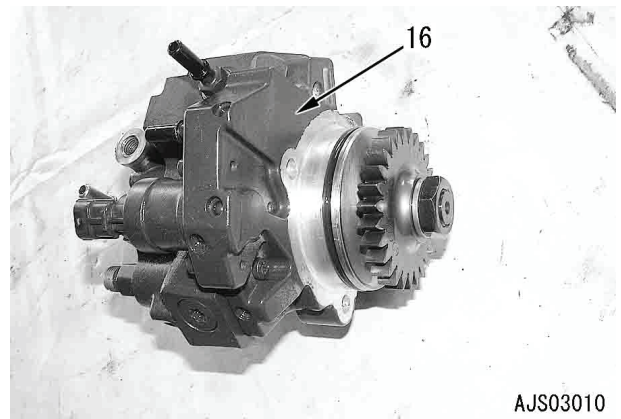
16. Disconnect tube (9). [\*2]



17. Remove 3 nuts (A parts) and remove fuel injection pump assembly (16). [\*4]



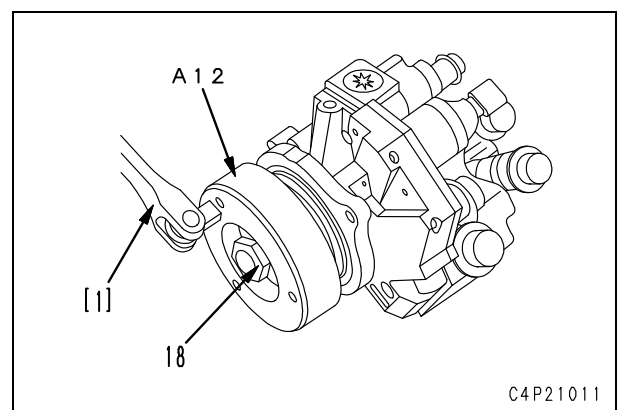
★ Fuel injection pump assembly (16) comes off in one piece with the gear. No treatment (tooth extraction etc.) has been given to the gear teeth for aligning the 1st and 6th cylinder tops.



18. When disassembling the fuel pump drive gear from the fuel supply pump, follow the procedure described below. [\*5]

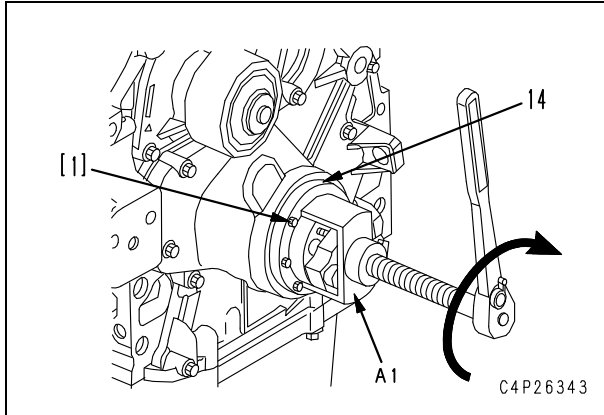
1) Use a support **A12** and a 1/2 inch spinner handle [1] to retain the gear, then loosen the nut (18).

★ Do not remove the nut (18) from the shaft.



17. Remove engine front oil seal (14) according to the following procedure.

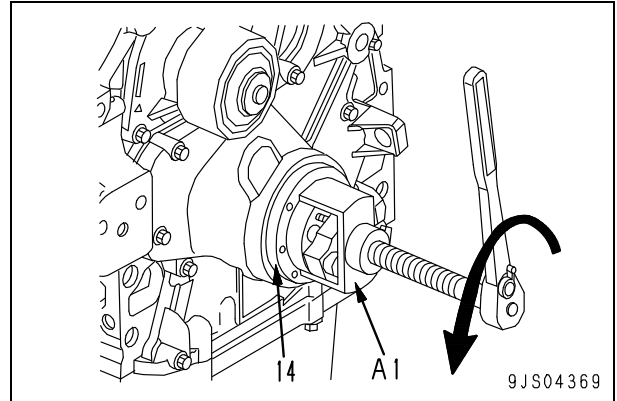
- 1) Install tool **A1** to crankshaft.
- 2) Screw in tapping screw [1] of tool **A1** to seal carrier part of engine front oil seal (14).
- 3) Rotate the handle clockwise to remove engine front oil seal (14).



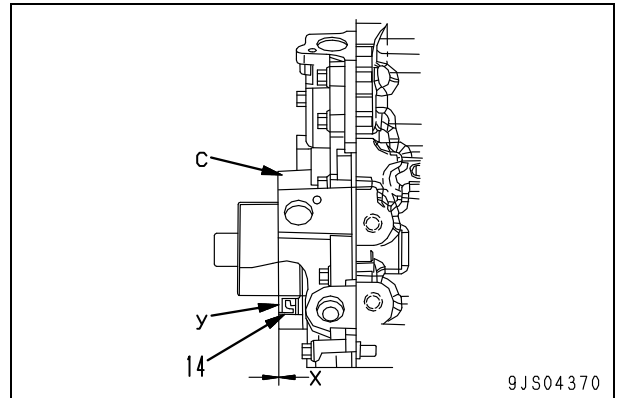
- ★ Take care not to damage the crankshaft while removing the seal.

### Installation

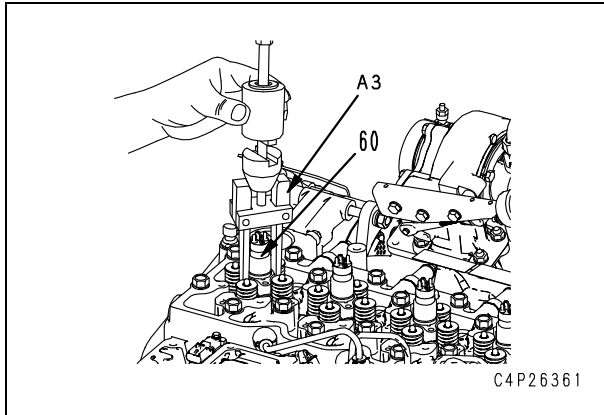
1. Install front oil seal (14) using tool **A1**.
  - ★ Before installing the seal, check that the end corners and lip sliding surfaces of the crankshaft are free from flaw, burr, and rust of the housing.
  - ★ When installing the seal, do not apply oil, grease, etc. to the shaft and seal lip. Also, wipe off grease from the shaft completely.



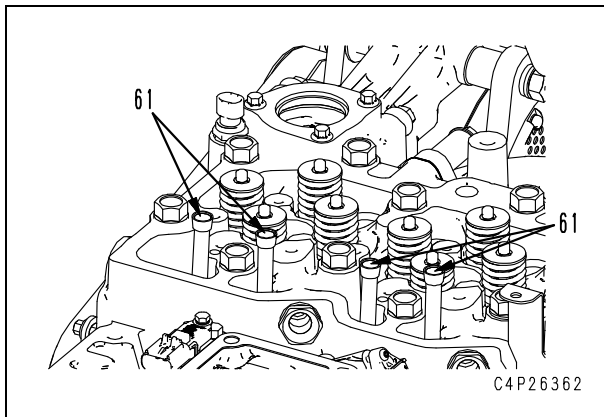
- ★ From cover (C) of oil seal (14)
  - Extrusion (x): **less than 0.38 mm**
  - Facial runout (y): **less than 0.25 mm**



49. By using tool **A3**, remove fuel injector assembly (60).
- ★ Do not pry up the injector top.
  - ★ Take care that dirt and foreign material do not enter the fuel injector assembly mounting area.

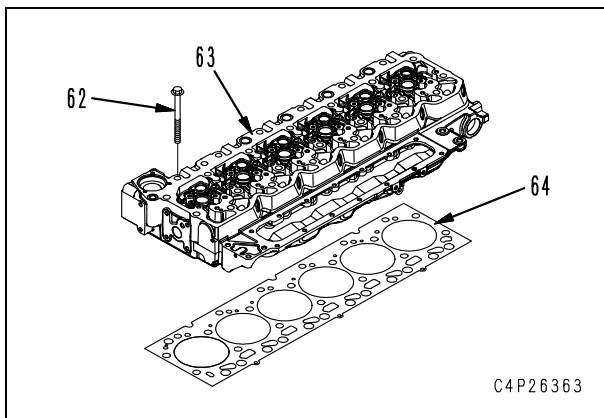


50. Remove push rod (61).



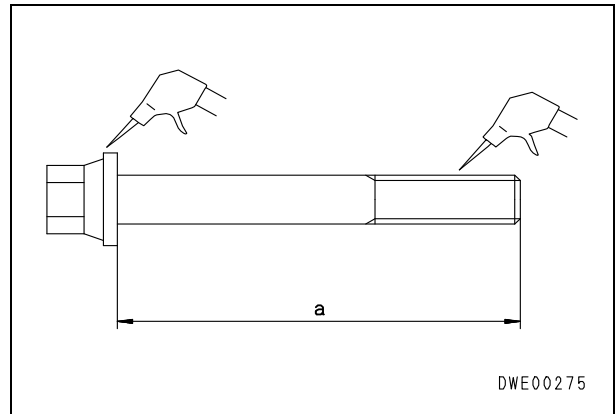
51. Remove mounting bolts (62), and then sling and remove cylinder head assembly (63).  
☞ Cylinder head assembly: **75 kg**

52. Remove cylinder head gasket (64).

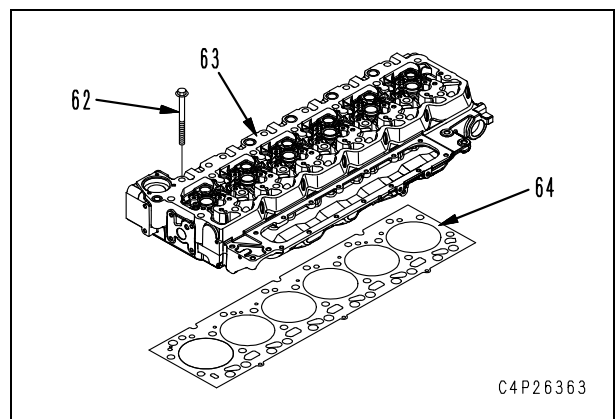


## Installation

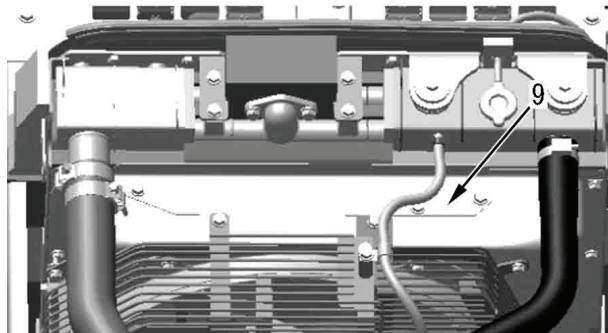
1. Cylinder head assembly
- 1) Measure stem length "a" of mounting bolt for every cylinder head and check that it is less than the using limit.
    - Using limit length of bolt: **Below 132.1 mm**
    - ★ If a bolt is longer than the using limit, do not reuse it but replace it.



- 2) Set cylinder head gasket (64) on the cylinder block.
  - ★ Check that the cylinder head mounting face and inside of the cylinder are free of dirt and foreign material.
  - ★ Check that the cylinder head gasket is matched with the holes on the cylinder head.
- 3) Sling cylinder head assembly (63) and set it on the cylinder block, and then finger-tighten mounting bolts (62) at least two to three turns.



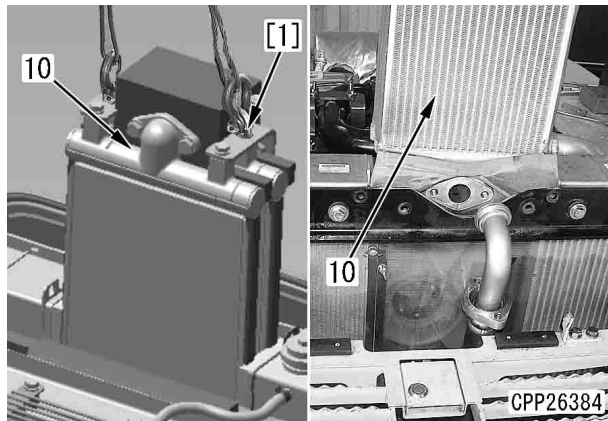
12. Move cover (9).



CPP26383

13. Lift out hydraulic oil cooler assembly (10) by using eyebolt (M10) [1]. [\*1]

 Hydraulic oil cooler assembly: **25 kg**



CPP26384

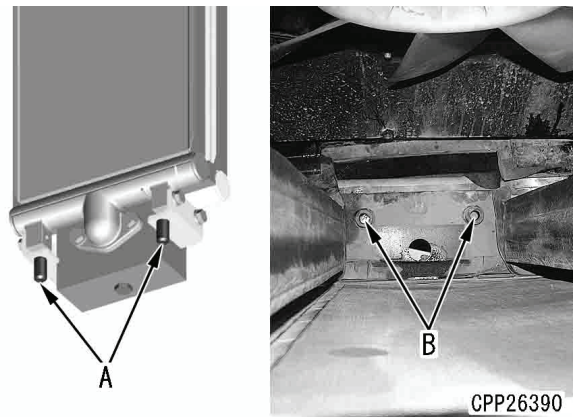
### Installation

- Installation is done in the reverse order of removal.

[\*1]

- ★ Confirm that the heat insulating seal material (sponge) of the radiator peripheral part is not damaged. If the heat insulating seal material (sponge) is damaged, replace it to the new one.

Confirm from the under cover side that convexity (A) of the radiator is correctly set to concavity (B).



CPP26390

- **Refilling with oil (hydraulic tank)**  
Refill hydraulic oil through the oil filler port to the specified level. Let the oil circulate in the hydraulic system by starting the engine. Then check the oil level again.

## Installation

- Installation is done in the reverse order of removal.

[\*1]

- ☞ Air cleaner band:  
**8.8 – 10.8 Nm {0.9 – 1.1 kgm}**

[\*2], [\*5]

- ★ Use a new MIKALOR clamp.
  - 1) Align the hose to the original position (marking position).
    - ★ Reference  
Inserted air hose length
      - Aftercooler side: 60 mm
      - Engine side: 80 mm
      - Turbocharger side: 65 mm
    - 2) Set the bridge (BR) under the clamp bolt and lap it over band (BD) at least (b) reaches 5 mm.
      - ★ Do not use an impact wrench.
- ☞ Clamp bolt (BC): **Lubricating oil (THREEBOND PANDO 18B)**

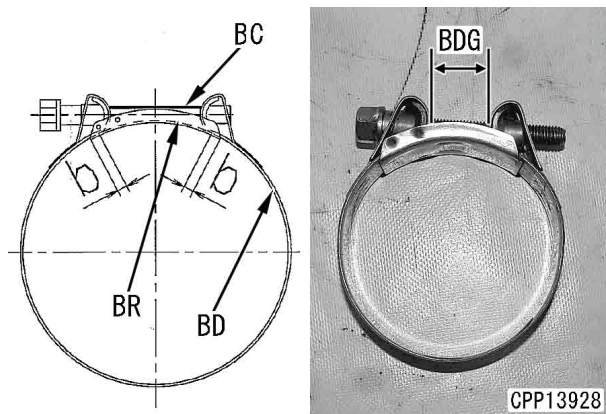
- **When reusing the hose**

Install the clamp to the clamp mark made on the hose.

- ☞ Tighten to torque of at least **6 Nm {0.6 kgm}**.

- **When using a new hose**

Tighten until dimension (BDG) is **7 – 10 mm**.



[\*3]

- ★ Align the hose to the original position (marking position).
- ★ Align the clamp to the original position.
- ★ Reference  
Inserted air hose length: 49 mm
- ☞ Radiator hose clamp:  
**10.8 – 11.8 Nm {1.1 – 1.2 kgm}**

[\*4]

- ☞ Tube clamp:  
**10.0 – 11.0 Nm {1.02 – 1.12 kgm}**

[\*5]

Refer to [\*2].

[\*6]

- ★ The internal parts of the hose adapter may be damaged when the hose is removed. Accordingly, do not reuse the adapter but use new one when installing the hose again, as a rule.

[\*7]

- ☞ Fan mounting bolt:  
**43 ± 6 Nm {4.4 ± 0.6 kgm}**

[\*8]

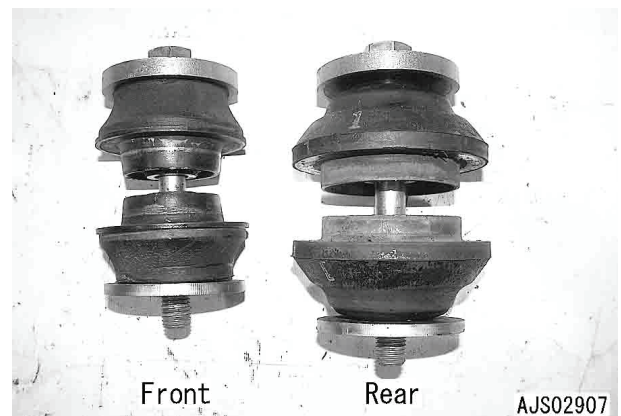
- ★ Refer to the "Checking and adjusting air compressor belt tension" section in the Testing and adjusting chapter in this manual.

[\*9]

- ☞ Flange mounting bolt:  
**43 ± 6 Nm {4.4 ± 0.6 kgm}**
- ★ Reference  
Inserted radiator hose length: **40 mm**
- ☞ Radiator hose clamp:  
**10.8 – 11.8 Nm {1.1 – 1.2 kgm}**

[\*10]

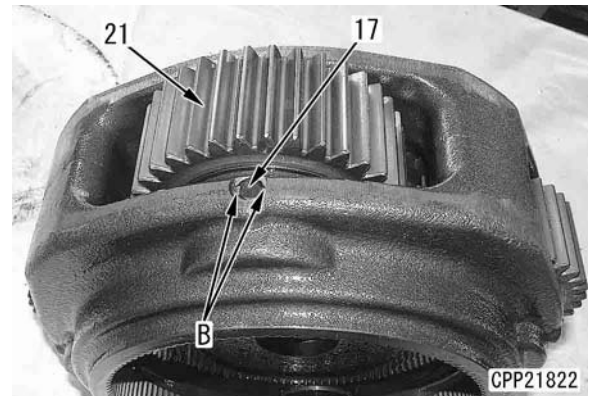
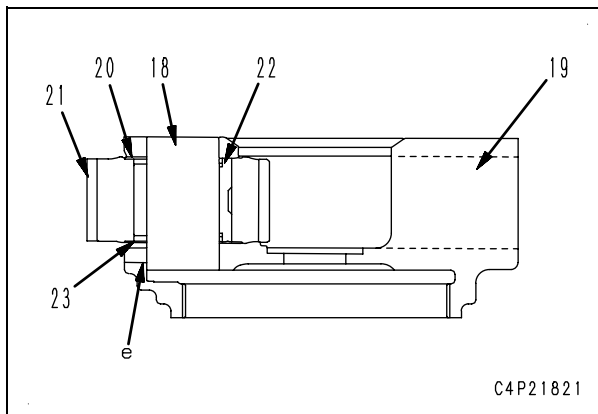
- ★ The bolt length of the engine front side is shorter than that of rear side.
- ★ The engine mounting rubber size of the engine front side is smaller than that of rear side.



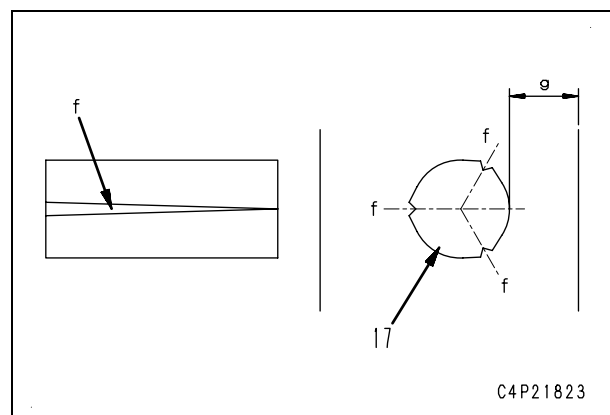
## 7. No.2 planetary carrier assembly

- 1) Assemble No.2 planetary carrier assembly as follows.
  - ★ Replace thrust washers (20) and (23) as well as pin (17) with new ones.
  - ★ There are traces of expansion on the end surface of No.2 planetary carrier side hole (e) which were originally caused when the pin was inserted. Make such the end surfaces are smooth enough before reassembly.

- 1] Assemble needle bearing (22) to No.2 planetary gear (21), fit top and bottom thrust washers (20) and (23) and then set the gear assembly on No.2 planetary carrier (19).
- 2] Align the pin holes on the shaft (18) and the carrier, and install the shaft (18) by tapping it lightly with a plastic hammer.
  - ★ Install the shaft, rotating the No.2 planetary gear (21). Take care so the thrust washer is not damaged.



- ★ After the pin is inserted, stake the pin (B) on the carrier.

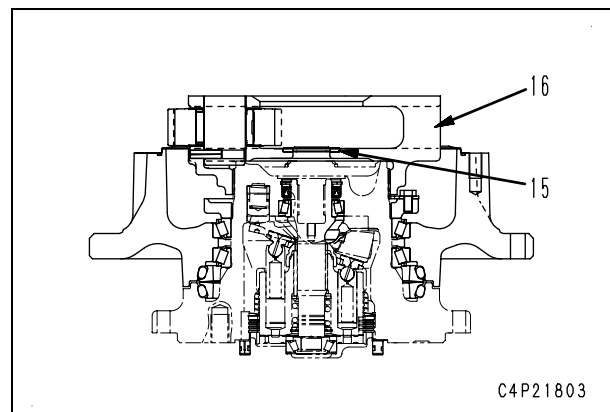


- 2) Install No.2 planetary carrier assembly (16).
  - ★ Align the 4 gear shaft ends of the No.2 planetary carrier assembly (16) with the 4 dimples on the motor case end surface to install.

- 3] Insert pin (17).
  - ★ When inserting the pin, take care so that any of the three pawls on the circumference (Portion (f)) may not touch the thin-walled portion on the No.2 planetary carrier (Portion (g)). Take note, however, that the thin-walled portion is likely to be on the opposite side of the carrier, depending on actual individual items. Pay attention so that a pin pawl will not come to the slender side of the No.2 planetary carrier anyway. And when traces of the groove are present, assembly must be done avoiding such locations.
  - ★ After assembling the No.2 planetary carrier assembly, check that No.2 planetary gear (21) rotates smoothly.

## 8. Thrust washer

Install thrust washer (15).

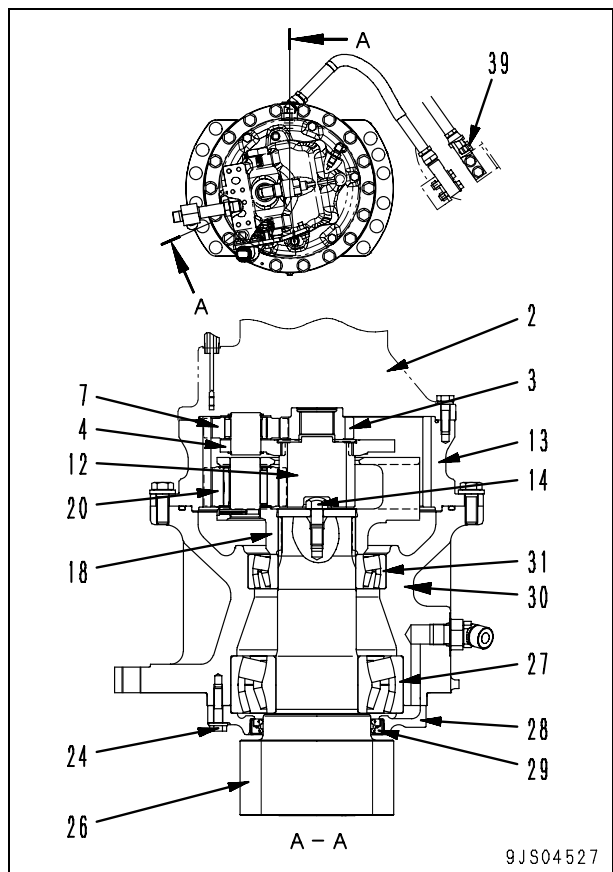


## Disassembly and assembly of swing motor and swing machinery assembly




### Special tools

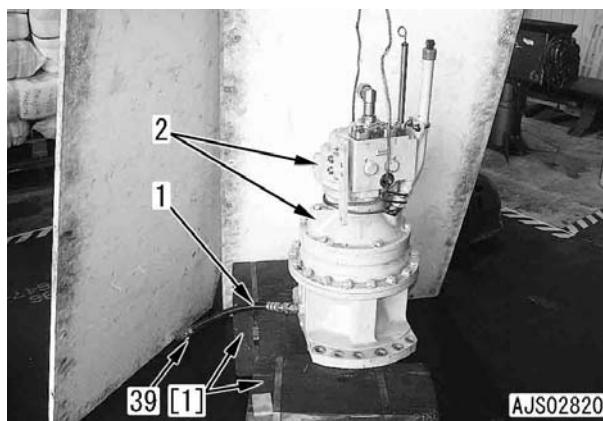
Symbol	Part number	Part name	Necessity	Q'ty
F	1 796T-426-1410)	Push tool	■	1
	2 796-426-1120	Push tool	■	1
	796T-426-1130	Plate	■	1
	3 790-101-5421	Grip	■	1
	01010-81240	Bolt	■	1

- Sectional view
- ★ A number shows the number in the text.
- ★ Though the drawing is for PC210, 210LC-8M0 also operates in a similar way basically. The different parts are indicated in the text.

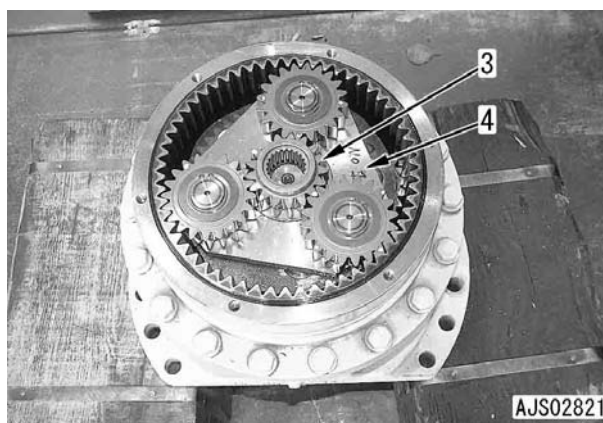


### Disassembly

1. Set the swing motor and the swing machinery assembly into block [1].
2. **Oil drain**  
Loosen drain plug (39) and drain the oil inside the swing machinery case.  
 Swing machinery case:  
PC210, 210LC-8M0: 7.1 ℓ  

3. Remove drain hose (1).
4. Remove 6 pcs. of the mounting bolt and remove the swing motor assembly (2).  
 Swing motor assembly: 70 kg



5. Remove No.1 sun gear (3).
6. **No.1 carrier assembly**  
1) Remove No.1 carrier assembly (4).



PC210-8M0, PC210LC-8M0 Hydraulic excavator

Form No. SEN06144-00

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Printed in India 03/2014

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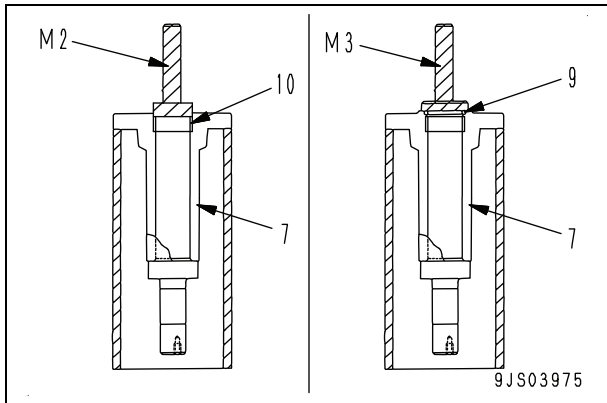
**Assembly**

**1. Assembly of piston (2)**


- 1) Install ring (16) and U-packing (15) to piston (11), and secure them with snap ring (14).
- 2) Tighten valve (13) lightly, and secure it with lock plate (12).

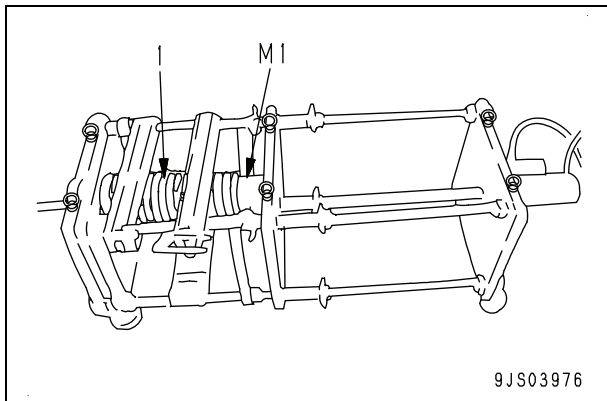
**2. Assembly of idler cushion**

- 1) Using tool **M2**, press fit bushing (10) into cylinder (7).
- 2) Using tool **M3**, install dust seal (9) to cylinder (7).
- 3) Secure them by using snap ring (8).



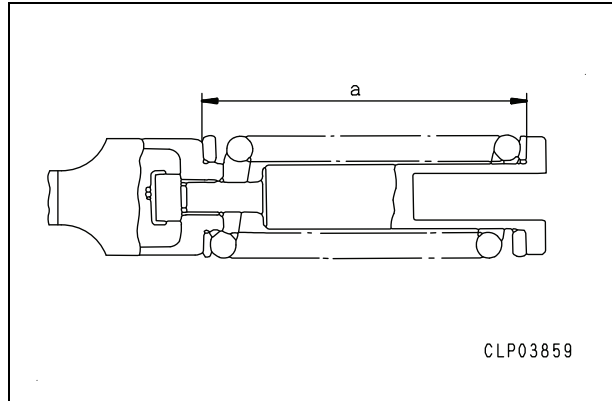
- 4) Install plate (7a), cylinder (7) and yoke (6) to spring (5). Install the assembly to tool **M1**.

 Sliding surface of cylinder:  
**Grease (G2-LI)**




- 5) Apply hydraulic pressure slowly to compress the spring, and then tighten nut (4) so that the installed length of the spring is dimension (a) and secure it with lock plate (3)


- ★ Installed length (a) of spring:  
PC210-8M0: 389 mm  
PC210LC-8M0: 433 mm



- 6) Remove idler cushion assembly (1) from tool **M1**.

3. Install piston assembly (2) to idler cushion assembly (1).

 Sliding surface of cylinder:  
**Grease (G2-LI)**

-  Wear ring: **Grease (G2-LI)**
- ★ Install the piston assembly with the valve installed position facing outward.
- ★ Pump 300 cc of grease (G2-LI) into the cylinder and bleed air. Check that grease comes out of the grease hole.

## Removal and installation of center swivel joint assembly

### Removal

**⚠ Lower the work equipment to the ground completely, after the engine is stopped, loosen the hydraulic tank cap gradually to reduce the pressure inside, and set the lock lever in the lock position.**

**⚠ Disconnect the cable from the negative (-) terminal of the battery.**

★ Attach an identification tag to each piping to avoid a mistake in the position of installation later.

1. Swing to right 45°. (For hydraulic tank oil drain)  
★ For the way not to drain the hydraulic tank oil by using oil stopper, see "Removal and installation of hydraulic pump assembly".

2. Drain hydraulic tank oil.

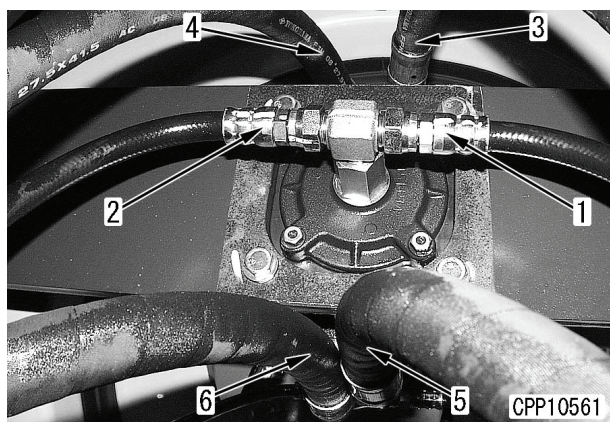


Hydraulic tank:

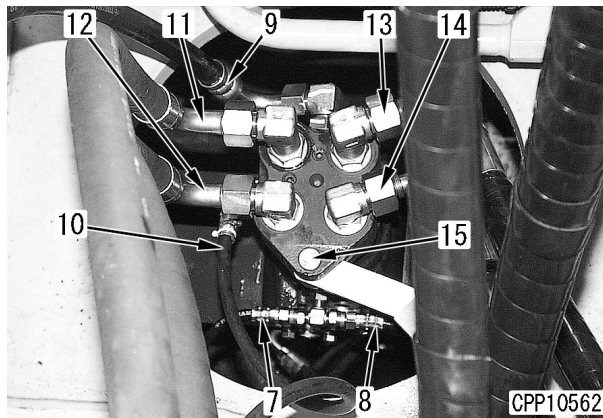
237 ℓ (PC210/210LC-8M0)

3. Disconnect 6 center swivel joint hoses (1) through (6) from the travel motor.

- (1): Center swivel joint (T port) – L.H. travel motor (T port)
- (2): Center swivel joint (T port) – R.H. travel motor (T port)
- (3): Center swivel joint (B port) – L.H. travel motor (PA port)
- (4): Center swivel joint (D port) – R.H. travel motor (PB port)
- (5): Center swivel joint (A port) – L.H. travel motor (PB port)
- (6): Center swivel joint (C port) – R.H. travel motor (PA port)



4. Disconnect 8 hoses (7) through (14).
  - (7): Center swivel joint (E port) – L.H. travel motor (P port)
  - (8): Center swivel joint (E port) – R.H. travel motor (P port)
  - (9): Center swivel joint (D port) – Swing motor (T port)
  - (10): Center swivel joint (E port) – Solenoid valve
  - (11): Center swivel joint (B port) – L.H. travel control valve (A2 port)
  - (12): Center swivel joint (D port) – R.H. travel control valve (B5 port)
  - (13): Center swivel joint (A port) – L.H. travel control valve (B2 port)
  - (14): Center swivel joint (C port) – R.H. travel control valve (A5 port)
5. Pull out pin (15) on the center swivel joint side, and remove the jam plate from center swivel joint. [\*1]



## Disassembly and assembly of control valve

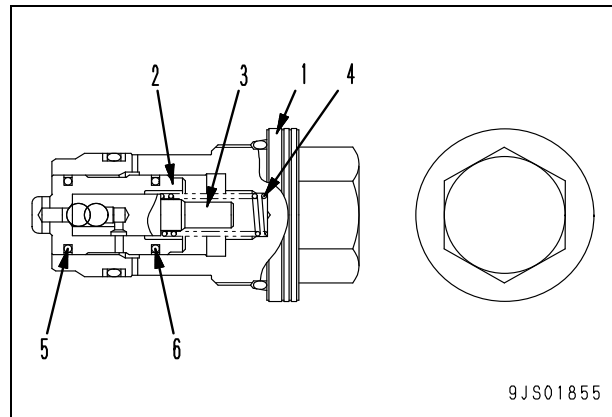
★ This section explains only the precautions for assembling the control valve assembly.

### Special tools

Symbol	Part number	Part name	Necessity	Q'ty
2	796-946-1310	Guide $\phi$ 21.8 mm	■	1
	(For 723-46-40100)			
	796-946-1610	Guide $\phi$ 21.4 mm	■	1
	(For 723-46-41100)			
	796-946-1810	Guide $\phi$ 21.2 mm	■	1
	(For 723-46-43100 and 723-46-43400)			
	796-946-1910	Guide $\phi$ 21.0 mm	■	1
(For 723-46-46101 and 723-46-46300)				
3	796-946-2210	Guide $\phi$ 20.6 mm	■	1
	(For 723-46-45100 and 723-46-45700)			
	796-946-1320	Guide $\phi$ 21.8 mm	■	1
	(For 723-46-40100)			
	796-946-1620	Guide $\phi$ 21.4 mm	■	1
	(For 723-46-41100)			
	796-946-1820	Guide $\phi$ 21.2 mm	■	1
(For 723-46-43100 and 723-46-43400)				
4	796-946-1920	Guide $\phi$ 21.0 mm	■	1
	(For 723-46-46101 and 723-46-46300)			
	796-946-2220	Guide $\phi$ 20.6 mm	■	1
	(For 723-46-45100)			
	796-946-1420	Guide $\phi$ 21.6 mm	■	1
	(For 723-46-42700)			
	T	796-946-1330	Sleeve	■
(For 723-46-40100)				
796-946-1630		Sleeve	■	1
(For 723-46-41100)				
796-946-1830		Sleeve	■	1
(For 723-46-43100 and 723-46-43400)				
796-946-1930		Sleeve	■	1
(For 723-46-46101 and 723-46-46300)				
T	796-946-2230	Sleeve	■	1
	(For 723-46-45100)			
	796-946-1430	Sleeve	■	1
	(For 723-46-42700)			

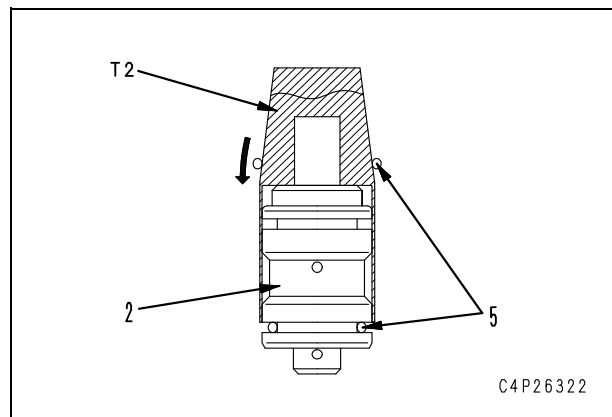
### Procedures for replacing pressure compensation valve seal

- ★ Since many types of pressure compensation valves are installed, put a mark on each and record the installed position when removing them.
1. Remove piston (2), plug (3) and spring (4) from pressure compensation valve (1).
  2. Remove seals (5) and (6) from piston (2).



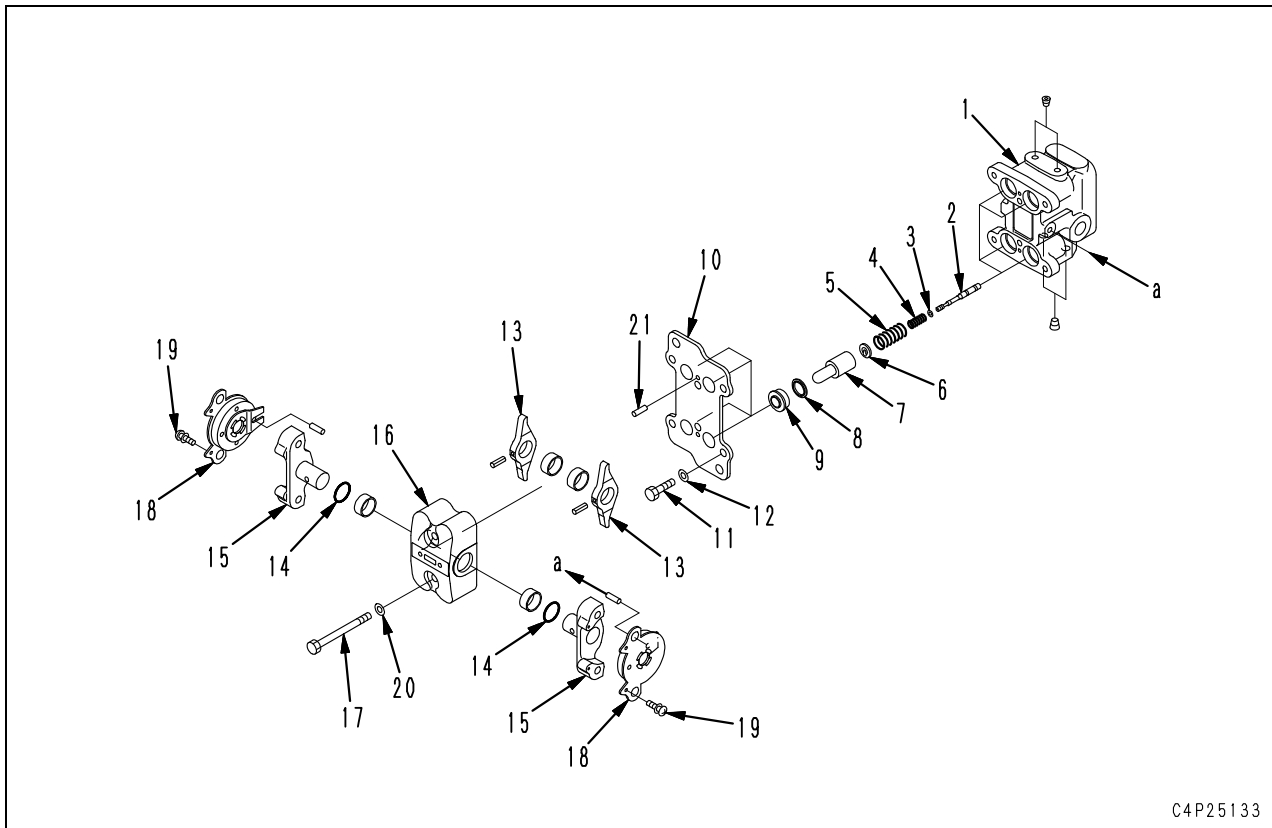
★ There are many types of pistons.

3. Place tool **T2** on piston (2), put seal (5) on the tool, and then push the seal down slowly in such a way that it expands evenly to install it in position.
- ★ Put the seal on the tool and push it down to the flat part of the tool. Then you may install the tool to the piston to push in the seal further.



## Disassembly and assembly of travel PPC valve

Figure of structure



C4P25133

### Disassembly

1. Remove screws (19) and remove damper assemblies (18).
2. Remove mounting bolt (17) and remove case (16), shafts (15) and levers (13) as a unit.
3. Remove mounting bolts (11) to remove plate (10).
  - ★ Note the thickness and installed position of washer (12).
  - ★ Remove pin (21) from valve body (1).
4. Remove seals (9) and collars (8).
5. Remove pistons (7), and then to remove retainers (6), springs (5) and (4), and shims (3).
  - ★ Note the installed position, quantity and thickness of shims (3) and keep them.
6. Remove valves (2) from valve body (1).

## Removal and installation of work equipment assembly

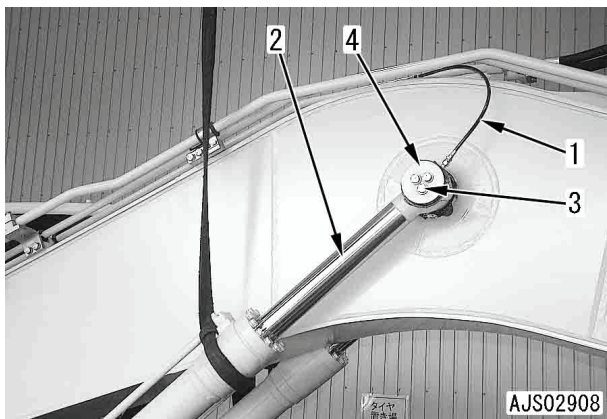
### Special tools

Symbol	Part number	Part name	Essentiality	Quantity
V	796-900-1200	Remover	■	1
	796-900-1210	• Sleeve		1
	792-900-1520	• Plate		1
	799-900-1230	• Screw		1
	796-900-1240	• Adapter		1
	01643-33080	• Washer		1
	01803-13034	• Nut		1
	790-101-4000	Puller (490 kN {50 ton} long)	■	1
	790-101-1102	Pump (294 kN {30 ton})	■	1

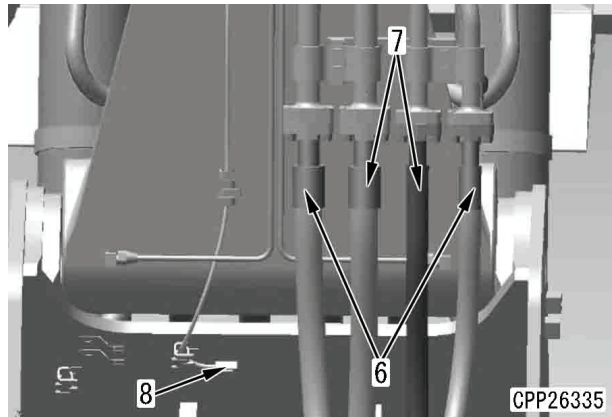
### Removal

- ⚠ **Safely lower the work equipment to the ground by extending the arm and the bucket completely. Set the lock lever in the lock position,**
- ⚠ **After performing step 5, release the residual pressure in the hydraulic circuit. Refer to the "Releasing residual pressure from hydraulic circuit" section in the Testing and adjusting chapter of this manual.**
- ⚠ **Disconnect the cable from the negative (-) terminal of the battery.**

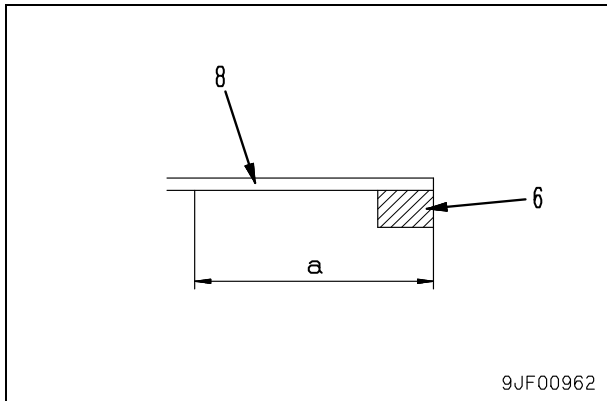
1. Disconnect grease hose (1).
2. Sling the boom cylinder assembly (2).
3. Remove lock bolt (3).
4. Remove plate (4) and remove the head pin. [\*1]
  - ★ Check the number as well as locations of the shims used.



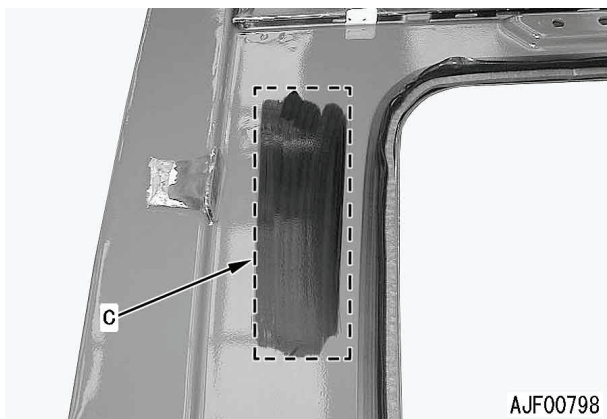
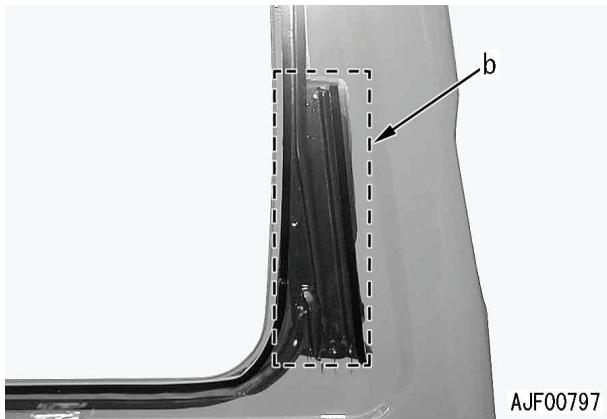
5. Start the engine and then retract the piston rod.
  - ★ Bind the piston rod with wire etc. and put it down on the blocking tools so that the piston rod does not slip out, or allot a support so that the cylinder doesn't fall down to the bottom side. If a support is allotted, remove the grease fitting at the bottom side.
  - ★ Remove the boom cylinder on the other side in the same manner.
  - ★ If bumping of the lifting hook against the work equipment lamp is anticipated in lifting the work equipment, the lamp must be removed.
6. Disconnect 2 pieces of bucket cylinder hose (6) and 2 pieces of arm cylinder hose (7).
  - ★ Apply the oil restraining plug and then fix the hoses to the valve side by use of ropes.
7. Disconnect intermediate connector for working lamp A13 (8).



- ★ Parts to be coated with primer; Apply the primer all over dimension (a).
- Dimension to apply primer (a): **25 mm**



- ★ In addition to the above parts, additionally apply the primer to right side window glass (1) and door lower window glass (3).
- Range to apply primer additionally for right side window glass (1): (b)
- Range to apply primer additionally for door lower window glass (3): (c)
- ★ After applying the primer, leave it for at least 5 minutes (within 8 hours) to dry.

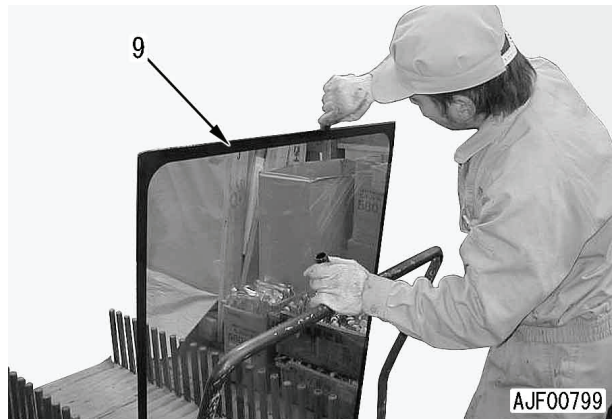


- ★ Never apply the wrong primer.  
If the glass primer, etc. is applied by mistake, wipe it off with white gasoline.

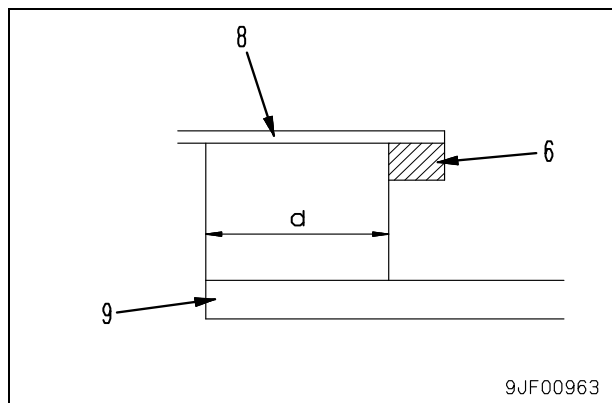
- 4) Apply the glass primer to the sticking surfaces of window glass (9).

🖌️ Glass primer:  
**Sunstar primer for glass 580 super or equivalent**

- ★ Do not apply the primer more than 2 times.  
(If it is applied more than 2 times, its performance will be lowered.)

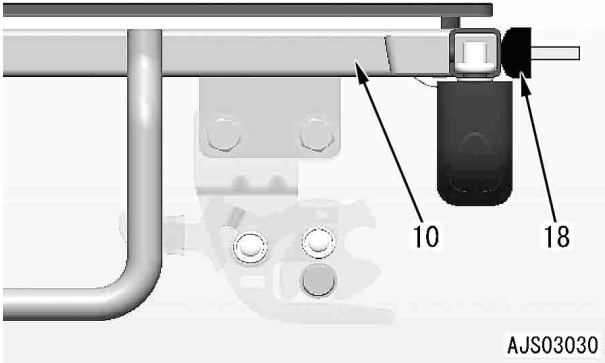


- ★ Parts to be coated with primer; Apply the primer to all around of sticking surface (d) of window glass (9) for dam rubber (6) installation position and operator's cab (8).
- ★ Do not apply the primer to the boarder about 5mm wide between the black part and transparent part of the glass.
- ★ After applying the primer, leave it for at least 5 minutes (within 8 hours) to dry.
- ★ Never apply the wrong primer.  
If the paint primer, etc. is applied by mistake, wipe it off with white gasoline.

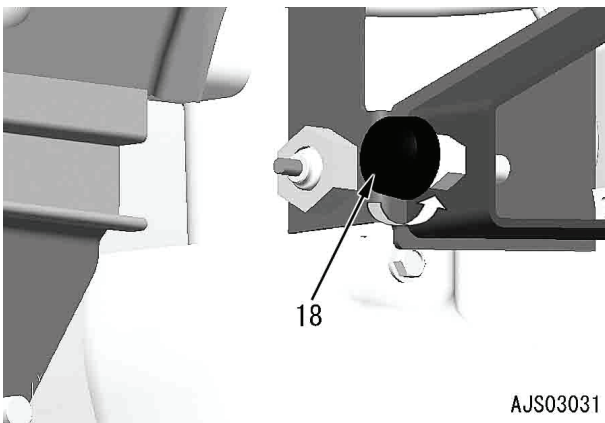


- 6) Adjustment of right and left rubber stoppers (18).

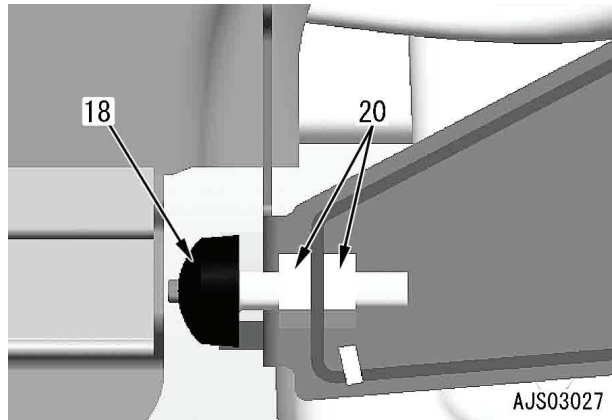
- 1] Bring front window assembly (10) (the lock should be in "Open" position) into contact with right and left rubber stoppers (18).



- 2] Close front window assembly (10).  
3] Turn right and left rubber stoppers (18) **to the left for one and a half rotation**.  
★ One turn of rubber stopper (18) to the left is equivalent to squashing the rubber for approximately 1.5 mm.  
★ When the front window assembly is in "Open" position, the front window assembly must be pushing right and left rubber stoppers (18) for 1.5 – 3.0 mm.

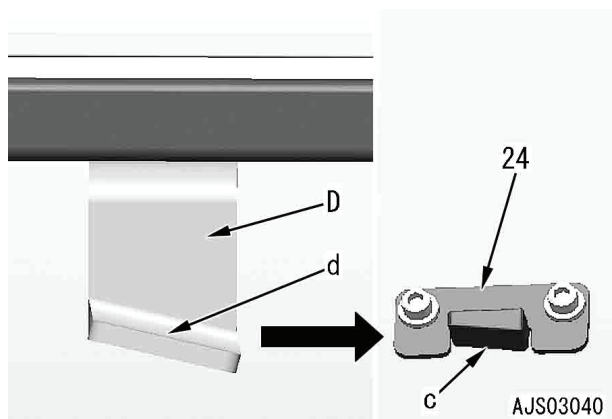
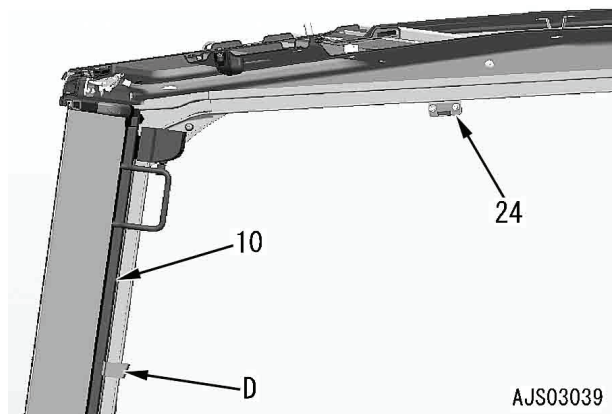


- 4] Tighten locknuts (20) of the both sides of rubber stopper (18).



9. Adjust stopper (24) of the front window assembly.

- 1) Adjust and lock both sides of stopper (24) so that when pulling up the front window assembly (10), surface (d) of stopper (D) of front window assembly (10) is in contact with surface (c) of stopper (24).



PC210-8M0, PC210LC-8M0 Hydraulic excavator

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### Operation

- Thermoprobe (1a-2) senses the refrigerant temperature after it passes through the evaporator (3).
- After the refrigerant passes through evaporator (3), its temperature is transferred to the refrigerant gas (2) in the diaphragm chamber (hatched area) through the thermoprobe (1a-2).
- The pressure of the refrigerant gas (2) sealed in the diaphragm chamber (hatched area) changes in response to the temperature change of the thermoprobe (1a-2), which therefore changes the force ( $F_g$ ) pushing the needle valve (1a).
- The opening level of the needle valve (1a) is determined based on the balance between the reaction force exerted by the spring (1b) in a rightward direction, and the force ( $F_g$ ) of the refrigerant gas (2) pushing the needle valve (1a) through the diaphragm (1a-1) in a leftward direction.
- The refrigerant flow rate flowing from the receiver drier to evaporator (3) is determined based on the opening level of needle valve (1a).

### When evaporator (3) outlet temperature is high: [When not cooled yet: Condition (A) in the figure]

- The pressure of the refrigerant gas (2) in the diaphragm chamber is high and the volume is increased.
- The force ( $F_g$ ) of the refrigerant gas (2) pushing the needle valve (1a) is increased, and the needle valve (1a) moves leftward.
- As a result, the opening level of the needle valve (1a) is increased and the refrigerant flow rate to the evaporator (3) is increased to improve cooling capacity.

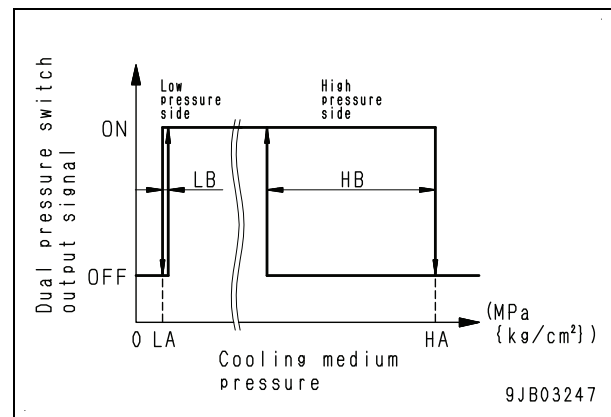
### When evaporator (3) outlet temperature is low: [When cooled already: Condition (B) in the figure]

- The pressure of the refrigerant gas (2) in the diaphragm chamber is low and the volume is decreased.
- The force ( $F_g$ ) of the refrigerant gas (2) pushing the needle valve (1a) is reduced, and the needle valve (1a) is moved rightward by the spring force (1b).
- The opening level of the needle valve (1a) is reduced and the refrigerant flow rate to the evaporator (3) is reduced to lower the cooling capacity.

### Dual pressure switch

- ★ The dual pressure switch is mounted on the air conditioner hose under the floor.
- The dual pressure switch turns "OFF" when the refrigerant circuit pressure becomes abnormally low or abnormally high.
- When the dual pressure switch turns "OFF", the air conditioner controller turns the compressor clutch relay "OFF". As a result, the compressor's magnet clutch is released and air conditioner components are protected.

### Function



- ★ LA or lower: Abnormally low pressure
- ★ HA or higher: Abnormally high pressure
- LA: 0.20 MPa {2 kg/cm<sup>2</sup>}
- LB: 0.02 MPa {0.2 kg/cm<sup>2</sup>}
- HA: 3.14 MPa {32 kg/cm<sup>2</sup>}
- HB: 0.59 MPa {6 kg/cm<sup>2</sup>}

## Parts and connectors layout

- Three fuses related to the air conditioner are in the fuse box at the right rear of the operator's seat.
  - The air conditioner unit is mounted inside the rear cover of at the rear cover of the operator's seat.
- ▲ **Park the machine on a level surface, swing the upper structure by 90 degrees, lower the work equipment to the ground so that it is stable, and stop the engine.**
- ▲ **Turn the battery disconnect switch to the "OFF" position and pull out the key.**
- ★ Note the connector numbers and installed positions before disconnecting wiring and hoses.

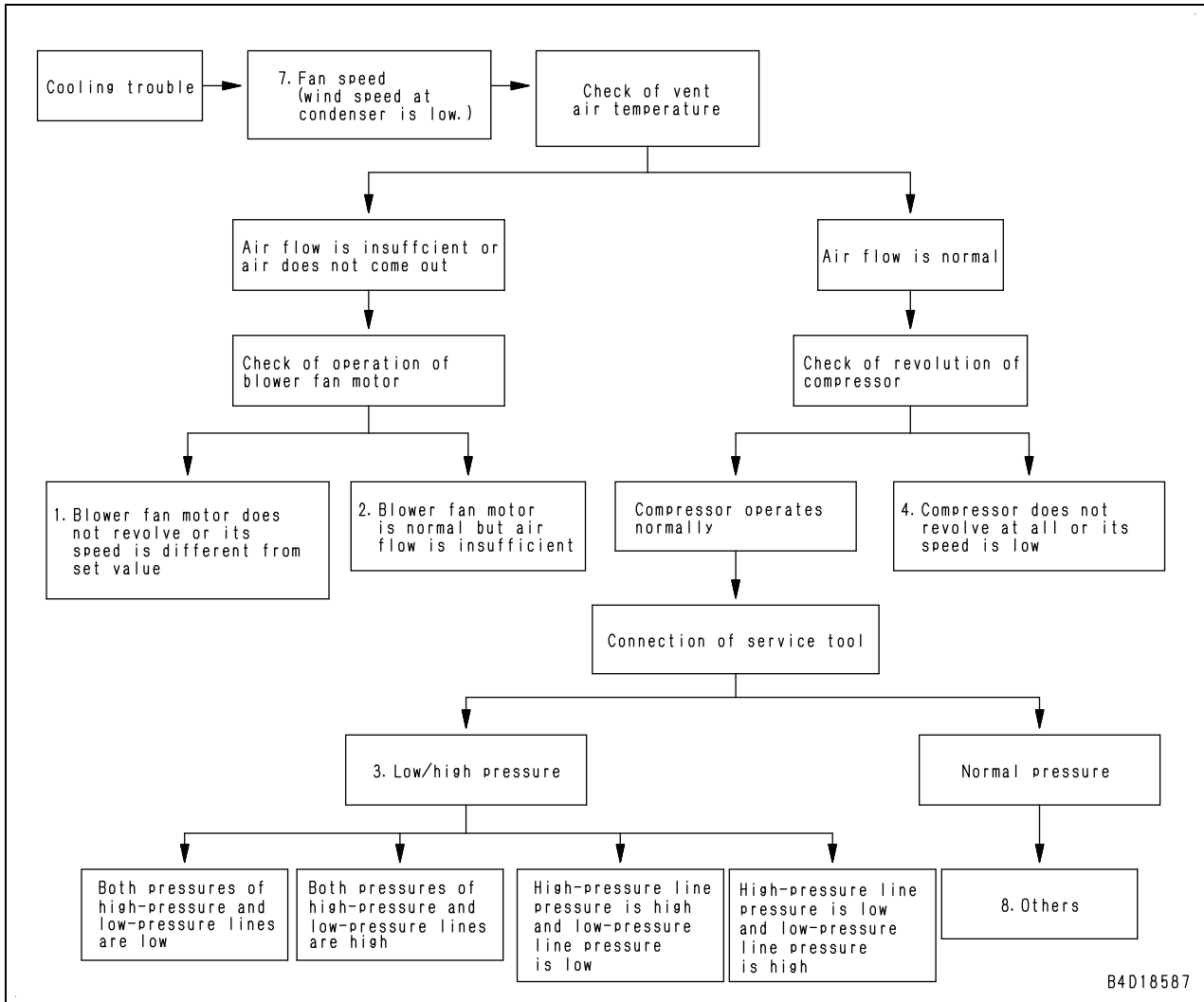
Connector No.	Remarks	Location	Reference item
AC01	Intermediate connector	Right rear of cab	2.
AC02	Intermediate connector	Right rear of cab	2.
AC03	Air conditioner compressor	Engine	7.
ACECU	Engine controller	Rear of cab	2.
CM01*	Machine monitor	Front of cab	5.
CM02	Machine monitor	Front of cab	5.
CM03*	Machine monitor	Front of cab	5.
CM04*	Machine monitor	Front of cab	5.
F01	Fuse box	Right rear of cab	1.
P17	Dual pressure switch ★ Swing upper structure 90 deg.	Under cab	6.
P18	Outside air temperature sensor	Cooling unit	8.
P31	Sunlight sensor	Machine monitor	4.
R21	Relay	Rear of cab	2.
[2]	Power transistor	Air conditioner unit	3.
[5]*	FRESH/RECIRC air changeover servomotor	Air conditioner unit	3.
[6]*	Inside air temperature sensor	Air conditioner unit	3.
[7]*	Evaporator temperature sensor (frost sensor)	Air conditioner unit	3.

\*: Connectors that are not involved in the troubleshooting

# Troubleshooting chart 1

The numbers in the boxes are the item numbers in the troubleshooting table.

## 1. Cooling trouble

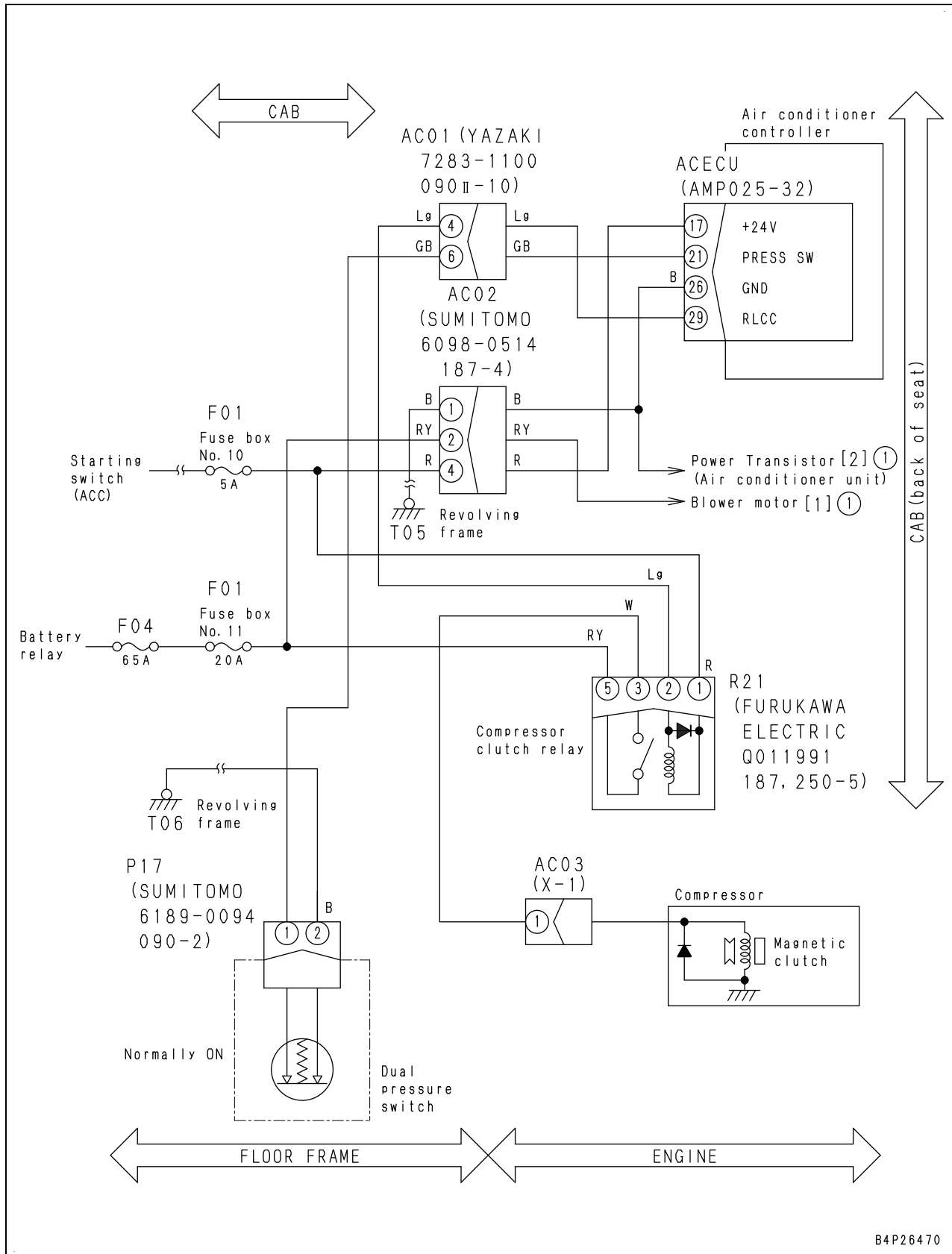


**Failure code [879CKA] Ventilating sensor Open Circuit**

Action level	Failure code	Failure	Open circuit in temperature (frost) sensor (Machine monitor system)
-	<b>879CKA</b>		
Detail of failure	<ul style="list-style-type: none"> <li>● Air conditioner controller detected open circuit in evaporator temperature (frost) sensor.</li> </ul>		
Action of controller	<ul style="list-style-type: none"> <li>● The air conditioner controller sends information about the evaporator temperature (frost) sensor open circuit to the machine monitor via CAN communication.</li> <li>● Stops the air conditioner.</li> </ul>		
Problem on machine	<ul style="list-style-type: none"> <li>● The air conditioner does not operate due to an open circuit in the evaporator temperature (frost) sensor.</li> </ul>		
Related information	<ul style="list-style-type: none"> <li>● Method of reproducing failure code: Turn starting switch to ON position.</li> <li>● Check whether this failure code is displayed in the "Electrical Systems" (electrical systems abnormality record) screen in the service mode of the machine monitor.</li> <li>● Troubleshooting cannot be performed since the connector portion of the evaporator temperature (frost) sensor cannot be checked while the air conditioner unit is installed on the machine.</li> </ul>		

Cause		Procedure, measuring location, criteria and remarks
1	Defective air conditioner controller	If no failures are found by the above checks, the air conditioner controller may be defective. (Since this is an internal defect, troubleshooting cannot be performed.)
2	Defective air conditioner unit	If no failures are found by the above checks, the air conditioner unit may be defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Circuit diagram related to compressor and refrigerant system



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