

Shop Manual

HYDRAULIC
EXCAVATOR

PC2000-8

SERIAL NUMBERS 20001 and up

KOMATSU

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



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

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

Hydraulic system	SEN02138-07
Removal and installation of hydraulic tank assembly	2
Removal and installation of hydraulic pump assembly	5
Removal and installation of hydraulic pump input shaft oil seal	10
Removal and installation of control valve assembly	11
Disassembly and assembly of control valve assembly	18
Removal and installation of center swivel joint assembly	22
Disassembly and assembly of center swivel joint assembly	23
Removal and installation of swing motor assembly	24
Removal and installation of travel motor assembly	25
Disassembly and assembly of work equipment PPC valve assembly	26
Disassembly and assembly of travel PPC valve assembly	28
Disassembly and assembly of hydraulic cylinder assembly (Backhoe specification)	31
Disassembly and assembly of hydraulic cylinder assembly (Loading shovel specification)	38
Removal and installation of grease pump	43
Disassembly and assembly of grease pump	47
Work equipment	SEN02139-04
Removal and installation of bucket cylinder assembly (Backhoe specification)	2
Removal and installation of bucket cylinder assembly (Loading shovel specification)	4
Removal and installation of bucket assembly (Backhoe specification)	6
Removal and installation of bucket assembly (Loading shovel specification)	8
Removal and installation of arm cylinder (Backhoe specification)	10
Removal and installation of arm cylinder (Loading shovel specification)	12
Removal and installation of arm assembly (Backhoe specification)	13
Removal and installation of arm assembly (Loading shovel specification)	15
Removal and installation of boom cylinder assembly (Backhoe specification)	16
Removal and installation of boom cylinder assembly (Loading shovel specification)	18
Removal and installation of boom assembly (Backhoe specification)	20
Removal and installation of boom assembly (Loading shovel specification)	22
Removal and installation of bottom dump cylinder assembly (Loading shovel specification) ..	24
Cab and its attachments	SEN02140-05
Removal and installation of operator cab assembly	2
Removal and installation of operator cab glass (adhesion glass)	5
Removal and installation of operator cab (assembly-type)	12
Removal and installation of cab base assembly	13
Removal and installation of service center	15
Electrical system	SEN02141-06
Removal and installation of air conditioner unit assembly	2
Removal and installation of monitor assembly	6
Removal and installation of engine controller assembly	7
Removal and installation of pump controller assembly	8
Removal and installation of VHMS controller assembly	9
Removal and installation of Orbcomm terminal assembly for VHMS	9

3. Removing, installing, and drying connectors and wiring harnesses

1) Disconnecting connectors

- 1] Hold the connectors when disconnecting.

When disconnecting the connectors, hold the connectors. For connectors held by a screw, loosen the screw fully, then hold the male and female connectors in each hand and pull apart. For connectors which have a lock stopper, press down the stopper with your thumb and pull the connectors apart.

★ Never pull with one hand.

- 2] When removing from clips

- Both of the connector and clip have stoppers, which are engaged with each other when the connector is installed.

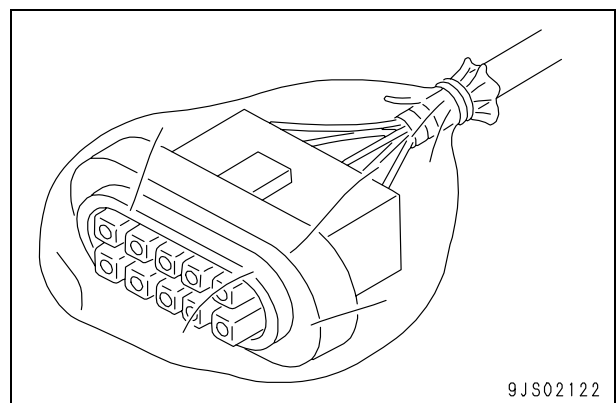
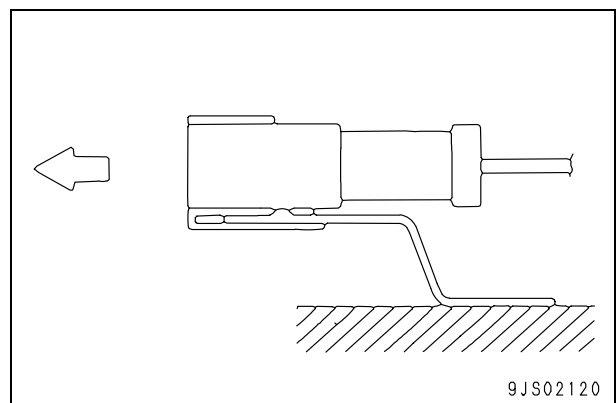
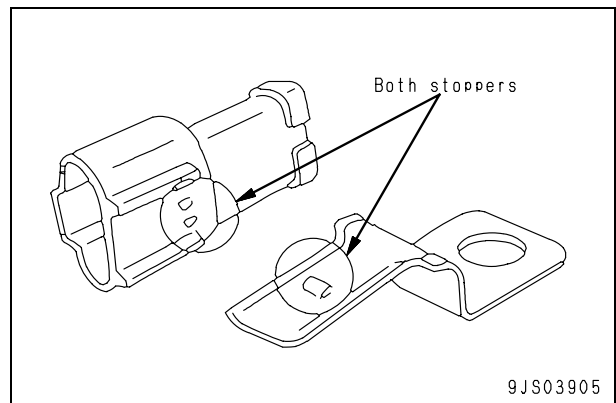
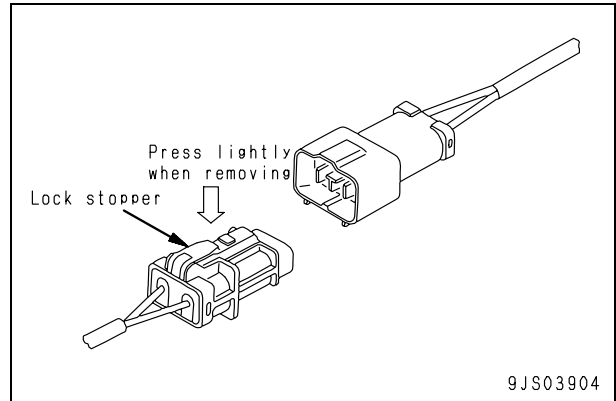
- When removing a connector from a clip, pull the connector in a parallel direction to the clip for removing stoppers.

★ If the connector is twisted up and down or to the left or right, the housing may break.

- 3] Action to take after removing connectors

After removing any connector, cover it with a vinyl bag to prevent any dust, dirt, oil, or water from getting in the connector portion.

★ If the machine is left disassembled for a long time, it is particularly easy for improper contact to occur, so always cover the connector.



- 4) Checking muffler and exhaust pipe for damage and looseness
 - 1] Visually check the muffler, exhaust pipe and their mounting parts for a crack and damage.
If any part is damaged, replace it.
 - 2] Check the mounting bolts and nuts of the muffler, exhaust pipe and their mounting parts for looseness.
If any bolt or nut is loosened, retighten it.
- 5) Checking muffler function
Check the muffler for abnormal sound and sound different from that of a new muffler.
If any abnormal sound is heard, repair the muffler, referring to "Troubleshooting" and "Disassembly and assembly".

HYDRAULIC EXCAVATOR

PC2000-8

Machine model	Serial number
PC2000-8	20001 and up

01 Specification

Specification and technical data

Specification drawings	2
Specifications	6
Weight table	10
Table of fuel, coolant and lubricants.....	16

Table of fuel, coolant and lubricants

★ For details of the notes (Note 1, Note 2...) in the table, see Operation and Maintenance Manual.

Reservoir	Fluid Type	Ambient Temperature, degrees Celsius										Recommended Komatsu Fluids	
		-22	-4	14	32	50	68	86	104	122 °F			
		-30	-20	-10	0	10	20	30	40	50 °C			
Engine oil pan	Engine oil	(Note.1)										Komatsu EOS0W30	
		(Note.1)										Komatsu EOS5W40	
												Komatsu EO10W30-DH	
												Komatsu EO15W40-DH	
												Komatsu EO30-DH	
PTO case	Powertrain oil (Note.2)											TO10	
												TO30	
Swing machinery case Final drive case	Powertrain oil											TO30	
Hydraulic system	Powertrain oil											TO10	
	Hydraulic oil											HO46-HM	
Grease fitting (Note.3)	Hyper grease (Note.4)											G2-T, G2-TE	
	Lithium EP grease											G2-LI	
Cooling system	Supercoolant AF-NAC (Note.5)											AF-NAC	
Fuel tank	Diesel fuel											ASTM Grade No.1-D S15 ASTM Grade No.1-D S500	
												ASTM Grade No.2-D S15 ASTM Grade No.2-D S500	

Unit: ℓ

	Engine oil pan	PTO case	Swing machinery case	Final drive case	Hydraulic system	Fuel tank	Cooling system	Grease
Specified capacity (ℓ)	128	36	(Each of front and rear) 30	(Each of right and left) 85	2400	3400	180	200
Refill capacity (ℓ)	120	36	(Each of front and rear) 30	(Each of right and left) 85	1300	—	—	200

1. Swing pinion (No. of teeth: 16)
2. Cover
3. Case
4. Coupling
5. No. 2 planetary gear (No. of teeth: 32)
6. No. 2 ring gear (No. of teeth: 83)
7. No. 1 ring gear (No. of teeth: 190)
8. No. 1 planetary gear (No. of teeth: 77)
9. Cover
10. Dipstick
11. Swing motor
12. No. 1 sun gear (No. of teeth: 35)
13. No. 1 planetary carrier
14. No. 2 sun gear (No. of teeth: 17)
15. No. 2 planetary carrier
16. Drain plug

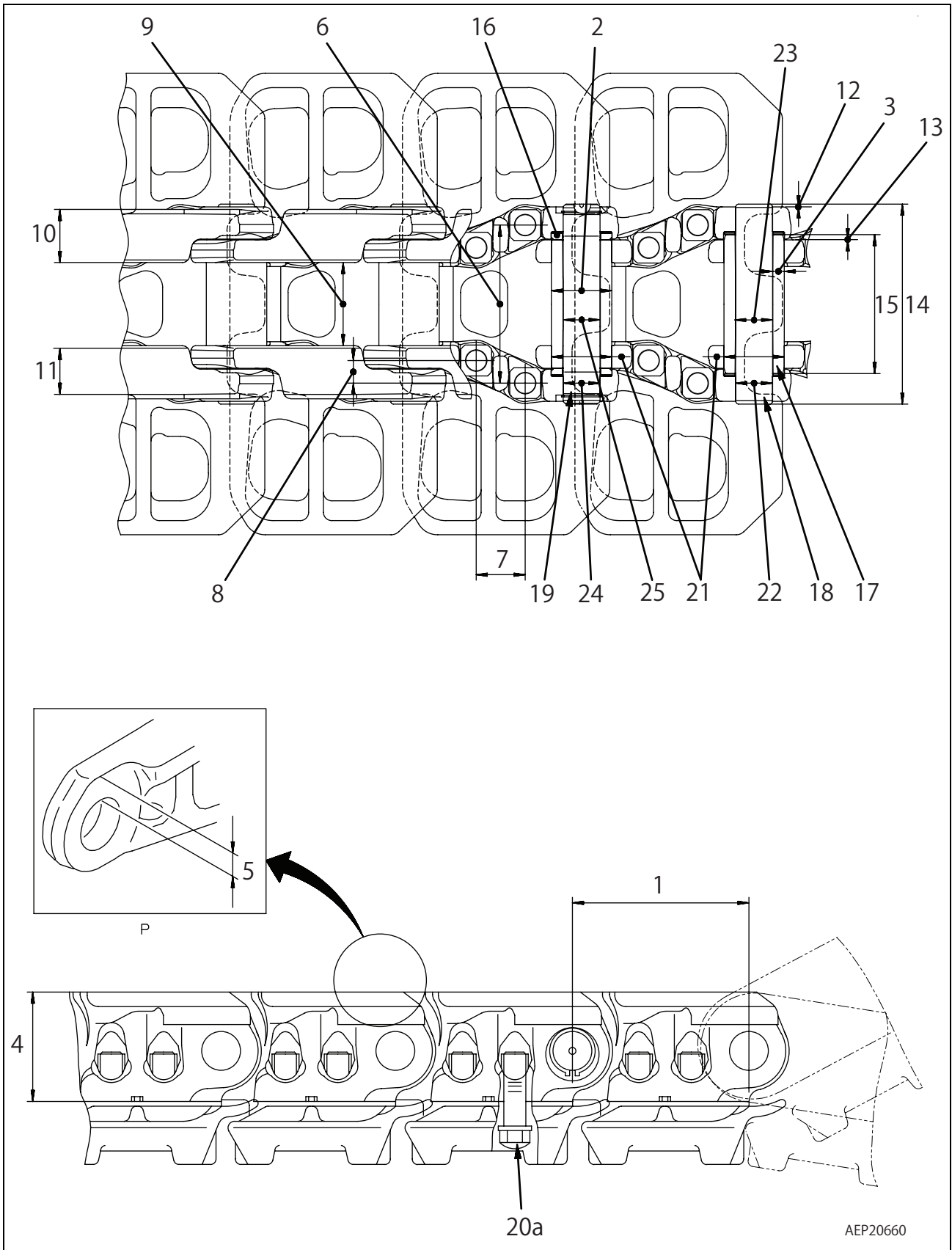
Specification

Reduction ratio: $(35 + 190)/35 \times (17 + 83)/17 = 37.815$

Unit: mm

No.	Check Item	Criteria		Remedy	
		Standard clearance	Clearance limit		
17	Backlash between swing motor shaft and No. 1 sun gear	Standard clearance	Clearance limit	Replace	
		0.177 – 0.282	—		
18	Backlash between No. 1 sun gear and No. 1 planetary gear	0.14 – 0.39	—		
19	Backlash between No. 1 planetary gear and ring gear	0.20 – 0.57	—		
20	Backlash between No. 1 planetary carrier and No. 2 sun gear	0.41 – 0.72	—		
21	Backlash between No. 2 sun gear and No. 2 planetary gear	0.15 – 0.38	—		
22	Backlash between No. 2 planetary gear and ring gear	0.23 – 0.67	—		
23	Backlash between No. 2 planetary gear and coupling	0.06 – 0.24	—		
24	Backlash between coupling and swing pinion	0.09 – 0.25	—		
25	Backlash between swing pinion and swing circle	0.18 – 1.58	—		
26	Clearance between plate and coupling	0.50 – 1.00	—		Repair hard chrome plating or replace
27	Clearance between No. 1 sun gear and ring	2.22 – 4.68	—		
28	Wear of swing pinion oil seal contact surface	Standard size	Repair limit		
		$180_{-0.115}^0$	—		

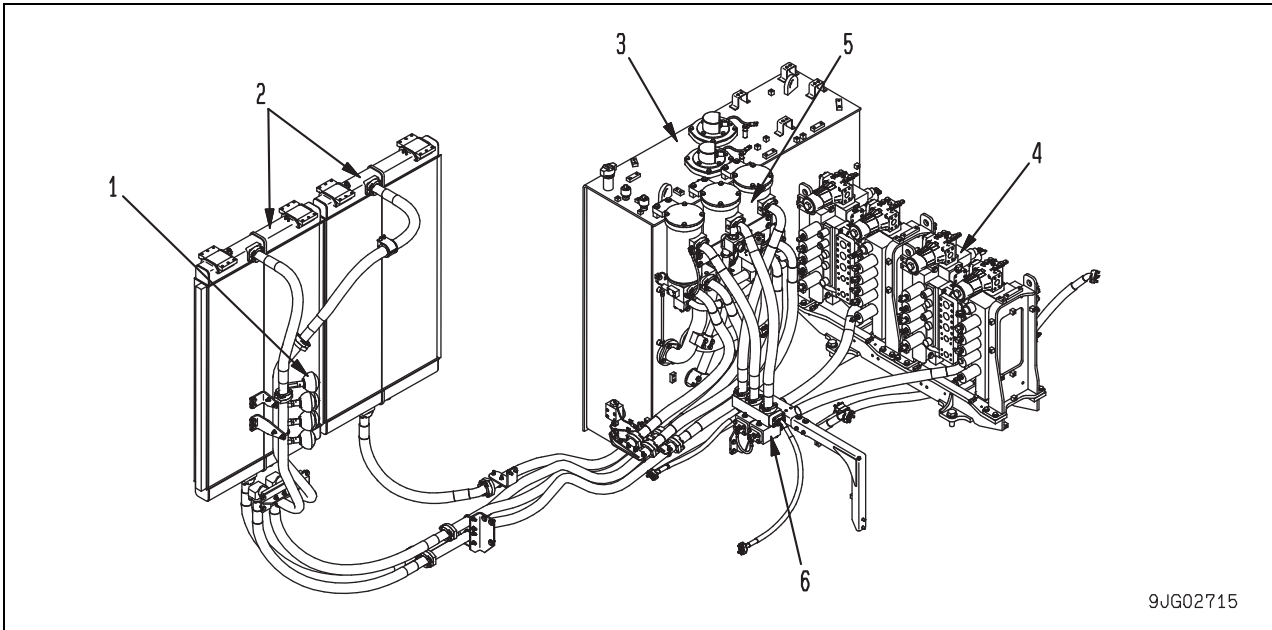
Track shoe



AEP20660

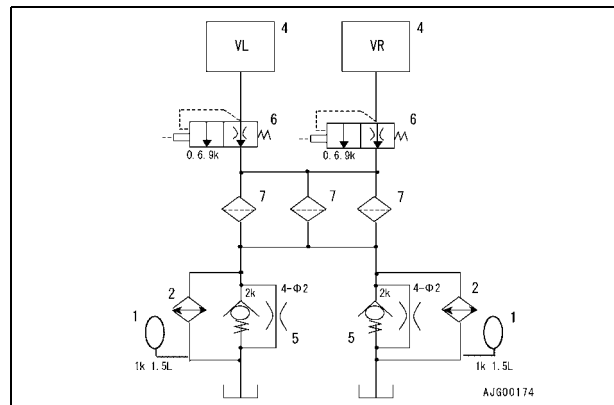
★ P portion shows the link of bushing press fitting end.

Accumulator (for oil cooler pressure)



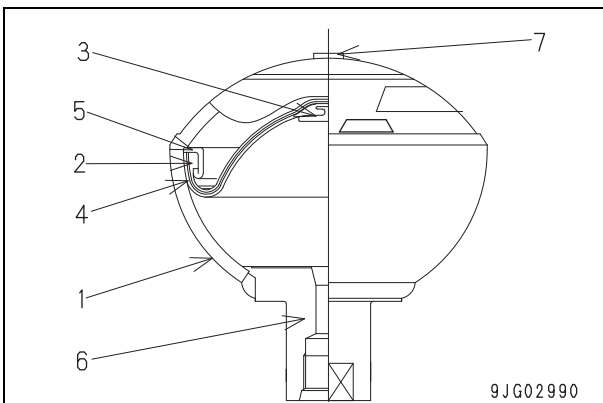
- 1. Accumulator
- 2. Oil cooler
- 3. Hydraulic tank
- 4. Control valve
- 5. Cooler check valve
- 6. Variable back pressure valve
- 7. Return filter

System diagram



Outline

The accumulator is installed in the oil cooler hydraulic circuit to cut the peak hydraulic pressure of the oil cooler and secure the durability and reliability.



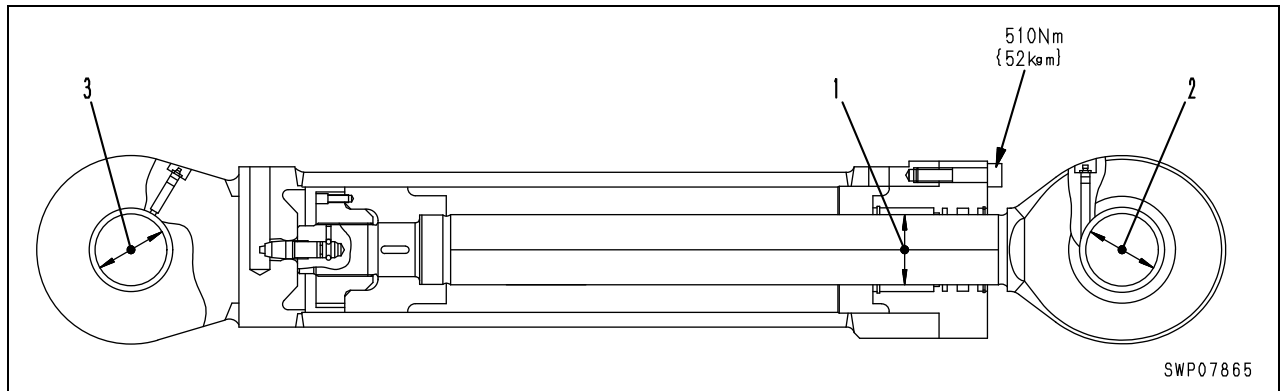
- 1. Body
- 2. Bladder
- 3. Poppet
- 4. Film
- 5. Holder
- 6. Port
- 7. Plug

Specifications

Volume of gas: 500 cm³

Charge pressure: 0.098 MPa {1 kg/cm²}

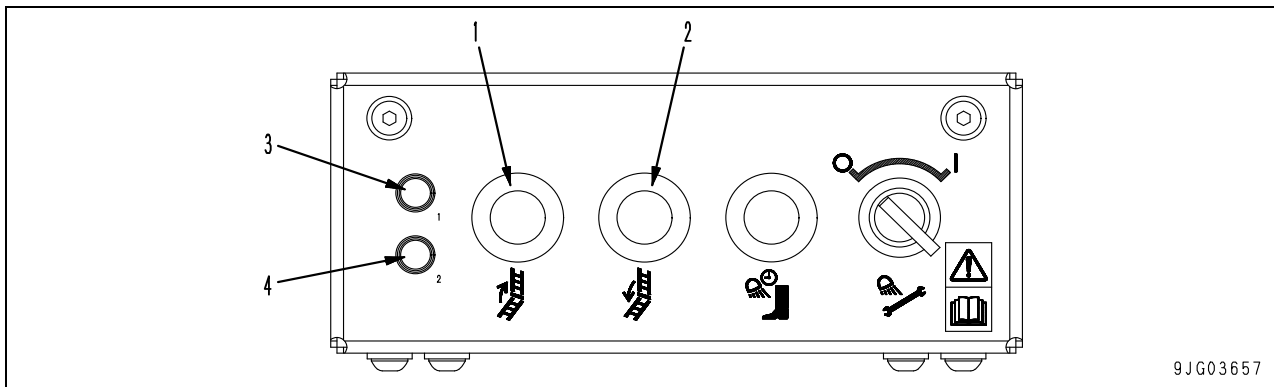
Bottom dump cylinder



Unit: mm

No.	Check item	Criteria					Remedy	
		Name of cylinder	Standard size	Tolerance		Standard clearance		Clearance limit
				Shaft	Hole			
1	Clearance between piston rod and bushing	Boom	180	—	—	—	—	Replace bushing
		Arm	150	—	—	—	—	
		Bucket	160	—	—	—	—	
		Bottom dump	100	—	—	—	—	
2	Clearance between piston rod support shaft and bushing	Boom	150	—	—	—	—	Replace pin, bushing
		Arm	120	—	—	—	—	
		Bucket	120.6	—	—	—	—	
		Bottom dump	100	—	—	—	—	
3	Clearance between cylinder bottom support shaft and bushing	Boom	180	—	—	—	—	Replace pin, bushing
		Arm	120	—	—	—	—	
		Bucket	140.6	—	—	—	—	
		Bottom dump	100.5	—	—	—	—	

Switch box



- 1. Ladder raise switch
- 2. Ladder lower switch
- 3. Proximity switch warning lamp (upper 1)
- 4. Proximity switch warning lamp (upper 2)

Outline

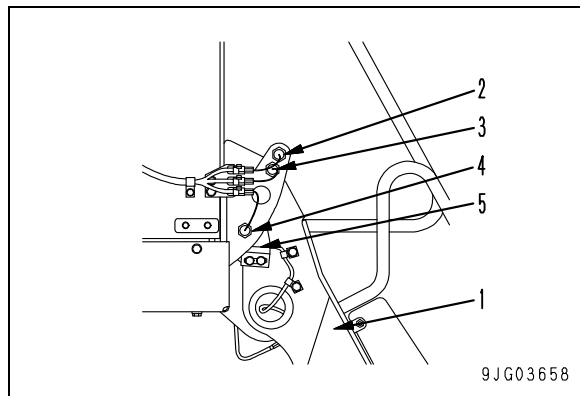
If ladder raise switch (1) is pressed, the ladder rises (only while the engine is running). If ladder lower switch (2) is pressed, the ladder lowers (it lowers by its weight while the engine is stopped).

If either of the proximity switches (upper 1 and 2) has trouble, the proximity switch warning lamps (3) or (4) lights.

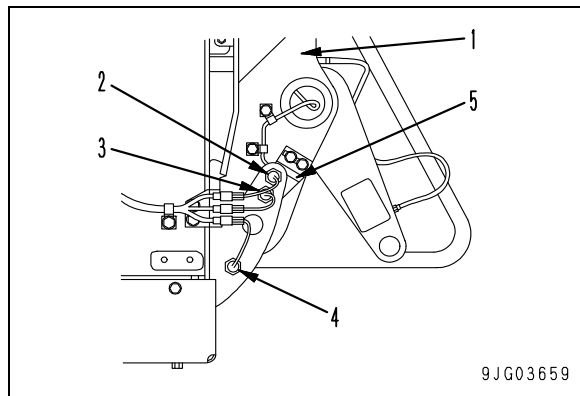
★ If warning lamp lights up, cope with it immediately referring to the "Operation & Maintenance Manual".

Proximity switch section

Ladder lowering position



Ladder storage position



- 1. Ladder unit
- 2. Proximity switch (upper 1)
- 3. Proximity switch (upper 2)
- 4. Proximity switch (lower)
- 5. Sensor plate

Outline

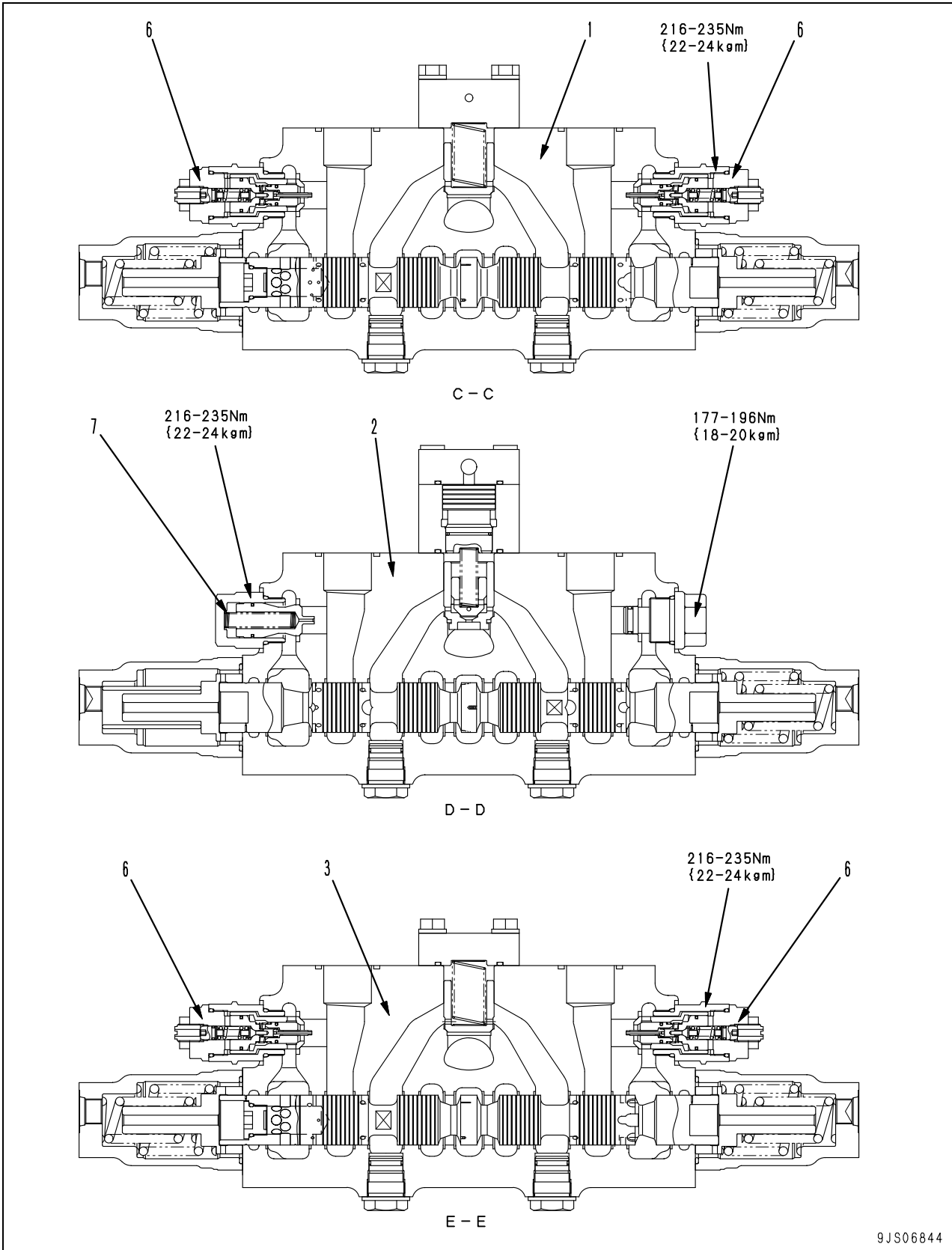
Proximity switches (2), (3) and (4) sense sensor plate (5) installed to ladder unit (1) to check the ladder position.

- A11: To arm cylinder head
- A21: To boom cylinder head
- A31: To bucket cylinder head
- A41: –
- A51: To L.H. travel motor [Port (PB)]
- B11: To arm cylinder bottom
- B21: To boom cylinder bottom
- B31: To bucket cylinder bottom
- B41: –
- B51: To L.H. travel motor [Port (PA)]

1. Main relief valve
2. Spool (Arm Lo)
3. Spool (Boom Lo)
4. Spool (Bucket Hi)
5. –
6. Spool (L.H. travel Hi)
7. Valve body
8. Jet sensor and orifice
9. Jet sensor and relief valve
10. Jet sensor and differential pressure sensor
11. Orifice check valve
12. Check valve
13. Piston
14. Check valve
15. Check valve

Unit: mm

No.	Check item	Criteria					Remedy
		Standard size			Repair limit		
		Free length × outside diameter	Installed length	Installed load	Free length	Installed load	
16	Spool return spring	69.9 × 57	63	431 N {44 kg}	—	345 N {35.2 kg}	If damaged or deformed, replace spring
17	Spool return spring	74.5 × 38.1	71.5	541 N {55.2 kg}	—	433 N {44.2 kg}	
18	Check valve spring	65.28 × 14	46	18.8 N {1.92 kg}	—	15.1 N {1.54 kg}	
19	Check valve spring	78.2 × 26.6	52	18.8 N {1.92 kg}	—	15.1 N {1.54 kg}	
20	Check valve spring	20.8 × 12.2	13.5	12.7 N {1.3 kg}	—	10.2 N {1.04 kg}	



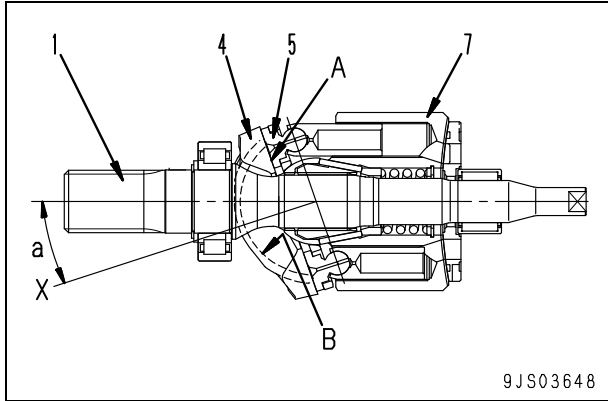
1. Brake spring
2. Drive shaft
3. Spacer
4. Case
5. Disc
6. Plate
7. Brake piston
8. Housing
9. Piston
10. Cylinder block
11. Valve plate
12. Center shaft
13. Center spring
14. Check valve
15. Shuttle valve

Unit: mm

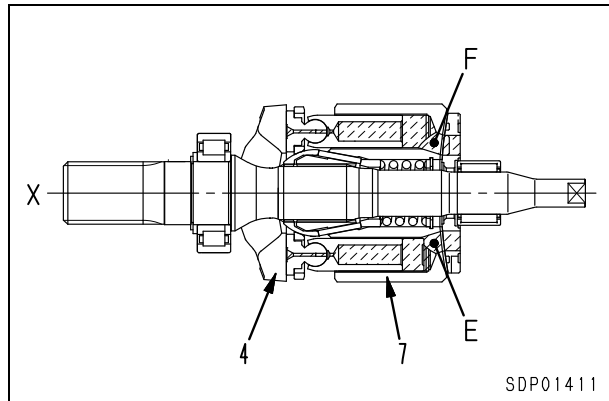
No.	Check item	Criteria					Remedy
		Standard size			Repair limit		
16	Check valve spring	Free length x outside diameter	Installed length	Installed load	Free length	Installed load	If damaged or deformed, replace spring
		66.5 x 25.6	45.0	6.96 N {0.71 kg}	—	5.59 N {0.57 kg}	
17	Shuttle valve spring	24.5 x 11.6	14.5	7.45 N {0.76 kg}	—	5.98 N {0.61 kg}	

Operation of pump

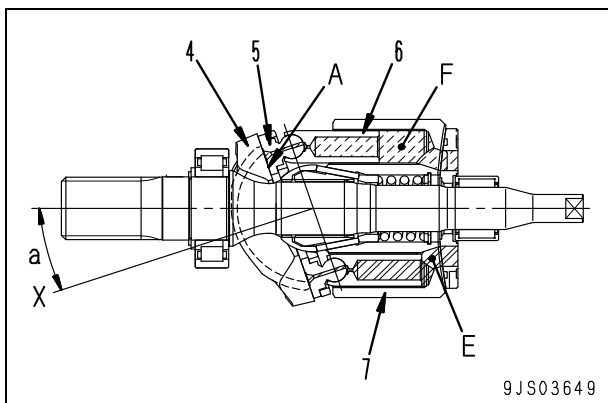
- Cylinder block (7) rotates together with shaft (1), and shoe (5) slides on flat surface (A).
- When this happens, rocker cam (4) moves along cylindrical surface (B), so angle (a) between center line (X) of rocker cam (4) and the axial direction of cylinder block (7) changes.
- Angle (a) is called the swash plate angle.



- As center line (X) of rocker cam (4) matches the axial direction of cylinder block (7) (swash plate angle = 0), the difference between volumes (E) and (F) inside cylinder block (7) becomes 0.
- Suction and discharge of pressurized oil is not carried out in this state. Namely pumping action is not performed. (Actually, however, the swash plate angle is not set to 0)



- With center line (X) of rocker cam (4) at swash plate angle (a) in relation to the axial direction of cylinder block (7), flat surface (A) acts as a cam in relation to shoe (5).
- In this way, piston (6) slides on the inside of cylinder block (7), so a difference between volumes (E) and (F) is created inside cylinder block (7).
- A single piston (6) sucks and discharges the oil by amount (F) – (E).
- As cylinder block (7) rotates and the volume of chamber (E) becomes smaller, the pressurized oil is discharged.
- On the other hand, the volume of chamber (F) grows larger and, in this process, the oil is suctioned.

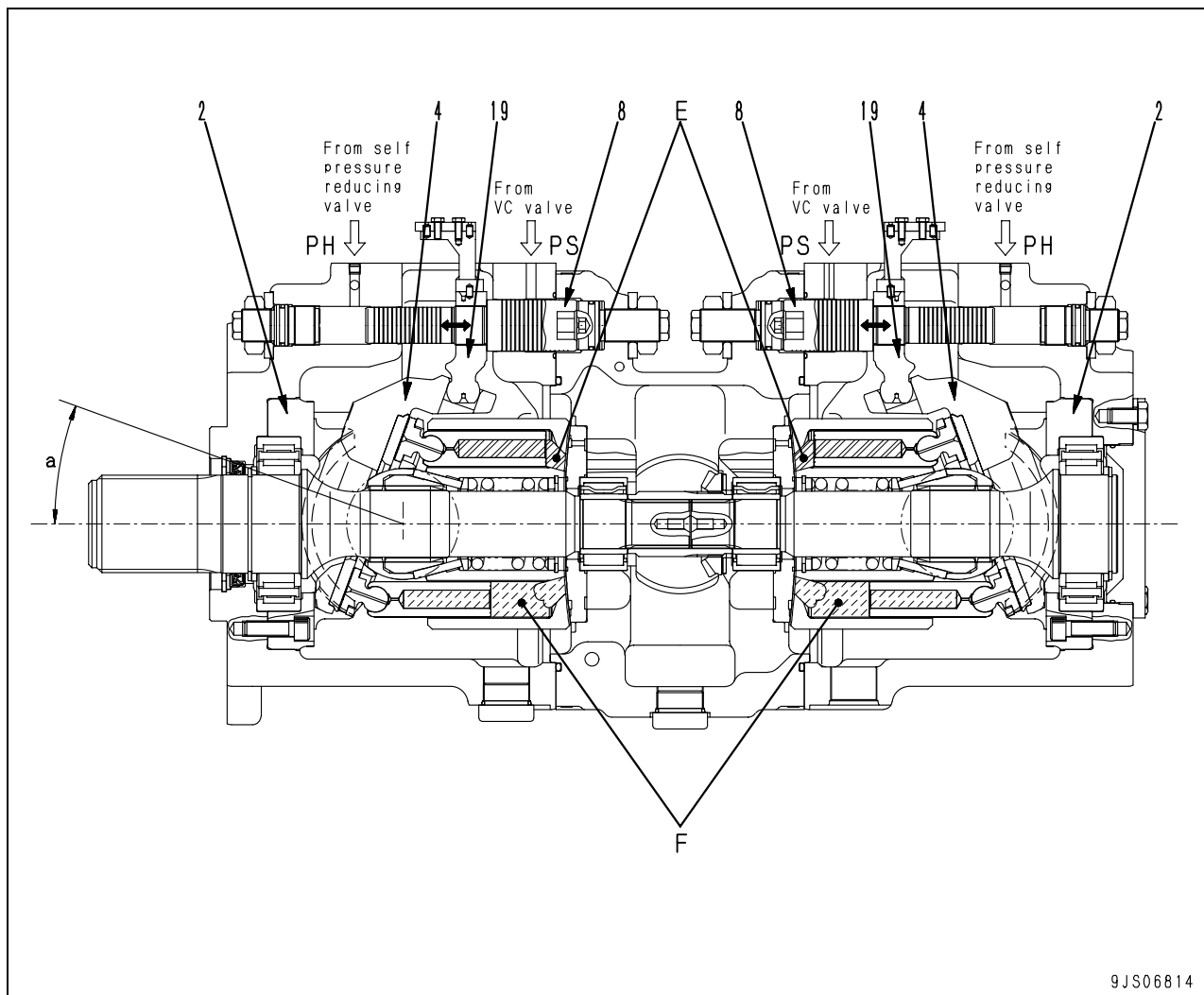


1. Output shaft
2. Motor case
3. Piston
4. Cylinder block
5. Valve plate
6. Housing
7. Plate
8. Disc
9. Oil seal
10. Counterbalance valve spool
11. Retainer
12. Brake spring
13. Brake piston
14. Safety valve
15. Check valve

Unit: mm

No.	Check item	Criteria					Remedy
		Standard size			Repair limit		
16	Check valve spring	Free length x outside diameter	Installed length	Installed load	Free length	Installed load	If damaged or deformed, replace spring
		66.5 x 25.6	45	6.96 N {0.71 kg}	—	6.57 N {0.67 kg}	
17	Spool return spring	63 x 44.5	61.5	520 N {53 kg}	—	—	

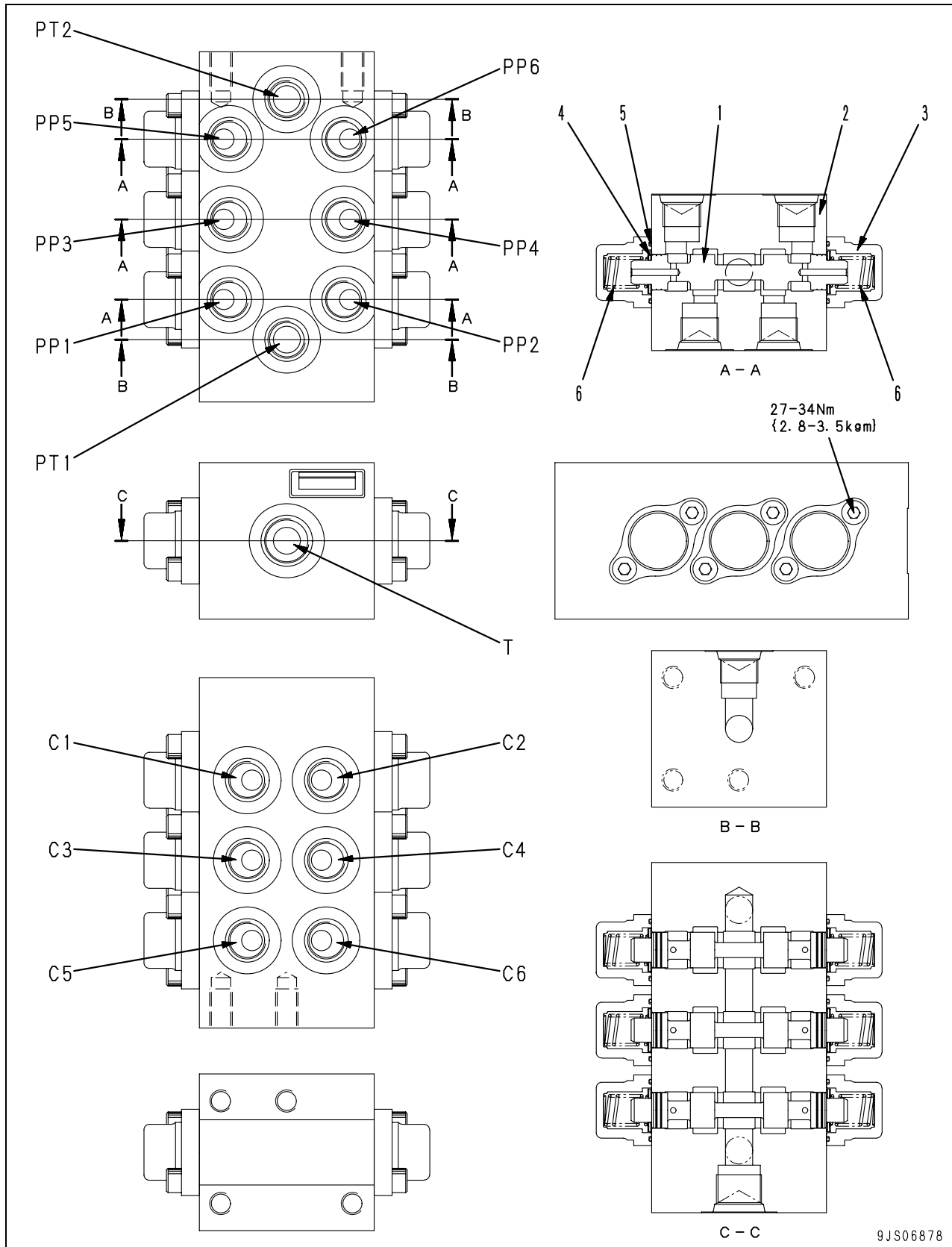
Control of delivery



9JS06814

- If the swash plate angle (a) becomes larger, the difference between volumes (E) and (F) becomes larger and pump delivery (Q) increases.
- Swash plate angle (a) is changed with servo piston (8).
- Servo piston (8) moves in a reciprocal movement according to the signal pressure from the pump controller.
- This linear motion is transmitted to rocker cam (4) through rod (19).
- Being supported by cradle (2) on the cylindrical surface, rocker cam (4) slides on the surface while continuing revolving movement.
- With servo piston (8), the area receiving the pressure is different on the left and the right. The pump discharge pressure (self pressure) (PH) is constantly led to the pressure chamber of the small diameter piston end.
- The pressure chamber of the large diameter piston end is supplied with the VC valve output pressure (PS).
- The relationship in the size of pressure (PH) at the small diameter piston end and pressure (PS) at the large diameter piston end, and the ratio between the area receiving the pressure of the small diameter piston and the large diameter piston controls the movement of servo piston (8).

Suction selector valve



Unit: mm

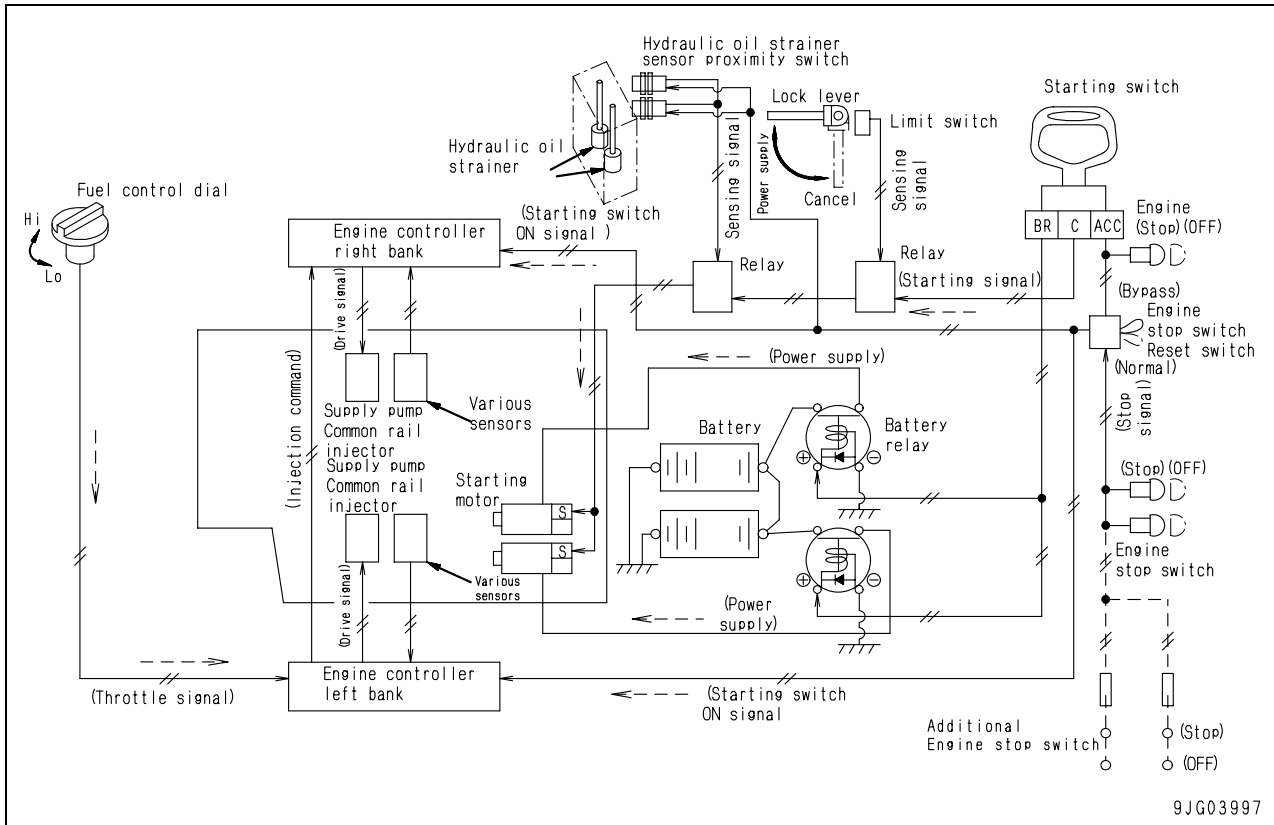
No.	Check item	Criteria					Remedy
		Standard size	Tolerance		Standard clearance	Clearance limit	
			Shaft	Hole			
1	Clearance between boom-revolving frame mounting pin and bushing	160	-0.043 -0.106	+0.456 +0.343	0.386 – 0.562	1.5	Replace
2	Clearance between boom-revolving frame mounting pin and bushing	160	-0.043 -0.106	+0.172 +0.085	0.128 – 0.278	1.5	
3	Clearance between boom cylinder-revolving frame mounting pin and bushing	180	-0.043 -0.106	+0.174 +0.085	0.128 – 0.280	1.5	
4	Clearance between boom-boom cylinder head mounting pin and bushing	180	-0.043 -0.106	+0.160 +0.085	0.128 – 0.266	1.5	
5	Clearance between boom-boom cylinder head mounting pin and bushing	180	-0.043 -0.106	+0.166 +0.085	0.128 – 0.272	1.5	
6	Clearance between boom-arm cylinder mounting pin and bushing	140	-0.043 -0.106	+0.172 +0.085	0.128 – 0.278	1.5	
7	Clearance between boom-arm mounting pin and bushing	200	-0.050 -0.122	+0.581 +0.470	0.520 – 0.703	1.5	
8	Clearance between boom-arm mounting pin and bushing	200	-0.050 -0.122	+0.783 +0.660	0.710 – 0.905	1.5	
9	Clearance between arm-arm cylinder mounting pin and bushing	140	-0.043 -0.106	+0.172 +0.085	0.128 – 0.278	1.5	
10	Clearance between arm-bucket cylinder mounting pin and bushing	120	-0.036 -0.090	+0.190 +0.085	0.121 – 0.280	1.5	
11	Clearance between link-bucket mounting pin and bushing	140	-0.043 -0.106	+0.408 +0.292	0.335 – 0.514	1.5	
12	Clearance between link-bucket mounting pin and bushing	140	-0.043 -0.106	+0.2 +0	0.043 – 0.306	1.5	
13	Clearance between bucket cylinder-link mounting pin and bushing	140	-0.043 -0.106	+0.393 +0.306	0.349 – 0.499	1.5	
14	Clearance between bucket cylinder-link mounting pin and bushing	140	-0.043 -0.106	+0.1 +0	0.043 – 0.206	1.5	
15	Clearance between arm-link mounting pin and bushing	140	-0.043 -0.106	+0.430 +0.299	0.342 – 0.536	1.5	
16	Clearance between arm-link mounting pin and bushing	140	-0.043 -0.106	+0.1 +0	0.043 – 0.206	1.5	
17	Clearance between arm-bucket mounting pin and bushing	140	-0.043 -0.106	+0.421 +0.339	0.382 – 0.527	1.5	

Engine control

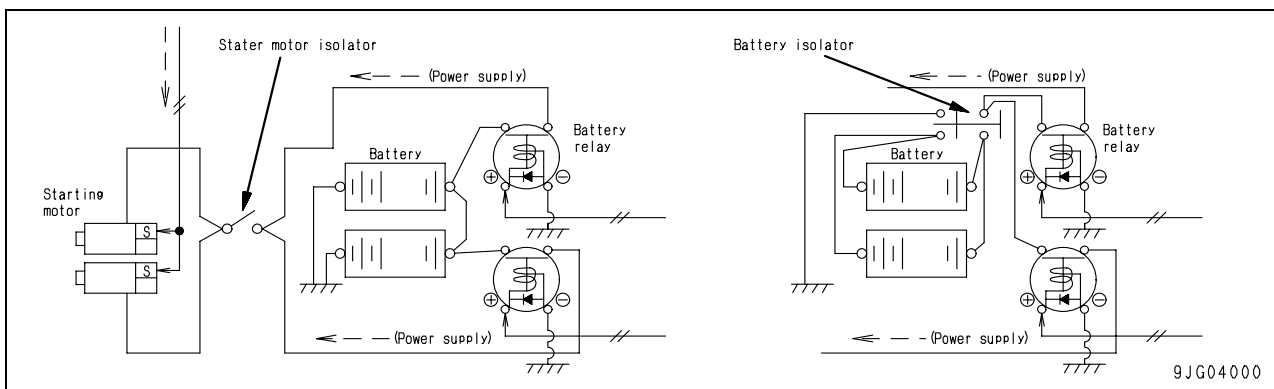
Operation of system

Starting engine

- If the starting switch is turned to the "START" position, the engine controller checks the state that the engine stop switch is OFF and the lock lever is reset and the hydraulic tank strainer is installed and supplies the start signal to the starting motor and then the starting motor rotates to start the engine. At this time, the engine controller checks the signal voltage from the fuel control dial and controls the engine speed to the set speed.



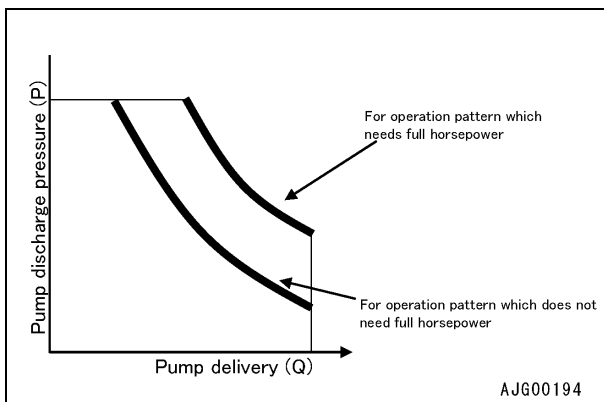
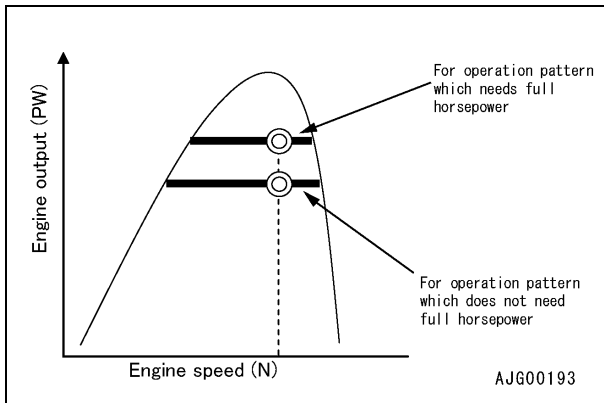
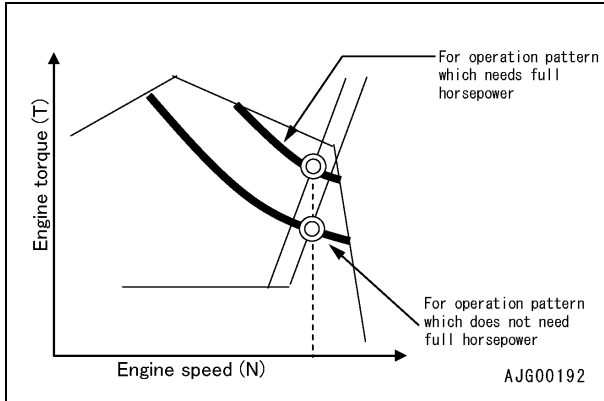
When battery isolator and starting motor isolator (optional) are installed



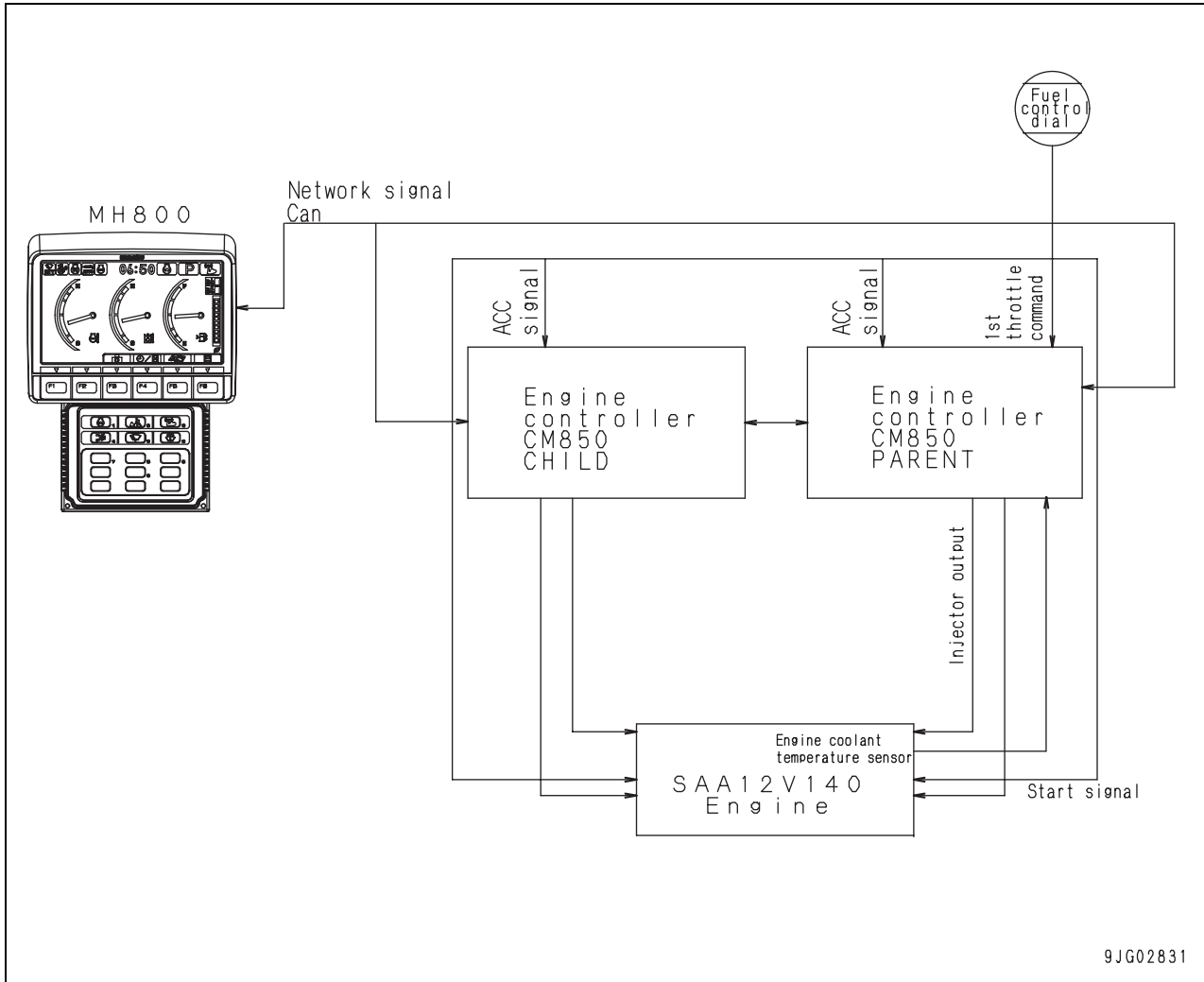
Function

With this function, the engine output and pump absorption torque are controlled properly and excessive fuel consumption is reduced by using multiple engine output curves and selecting proper matching points.

- The pump controller selects a proper engine output curve and pump absorption torque according to the operation pattern.
- The engine controller controls the fuel injection to obtain the selected engine output curve and reduces excessive fuel consumption.



Engine automatic warming-up, overheat prevention function, turbo protect function, split injection function

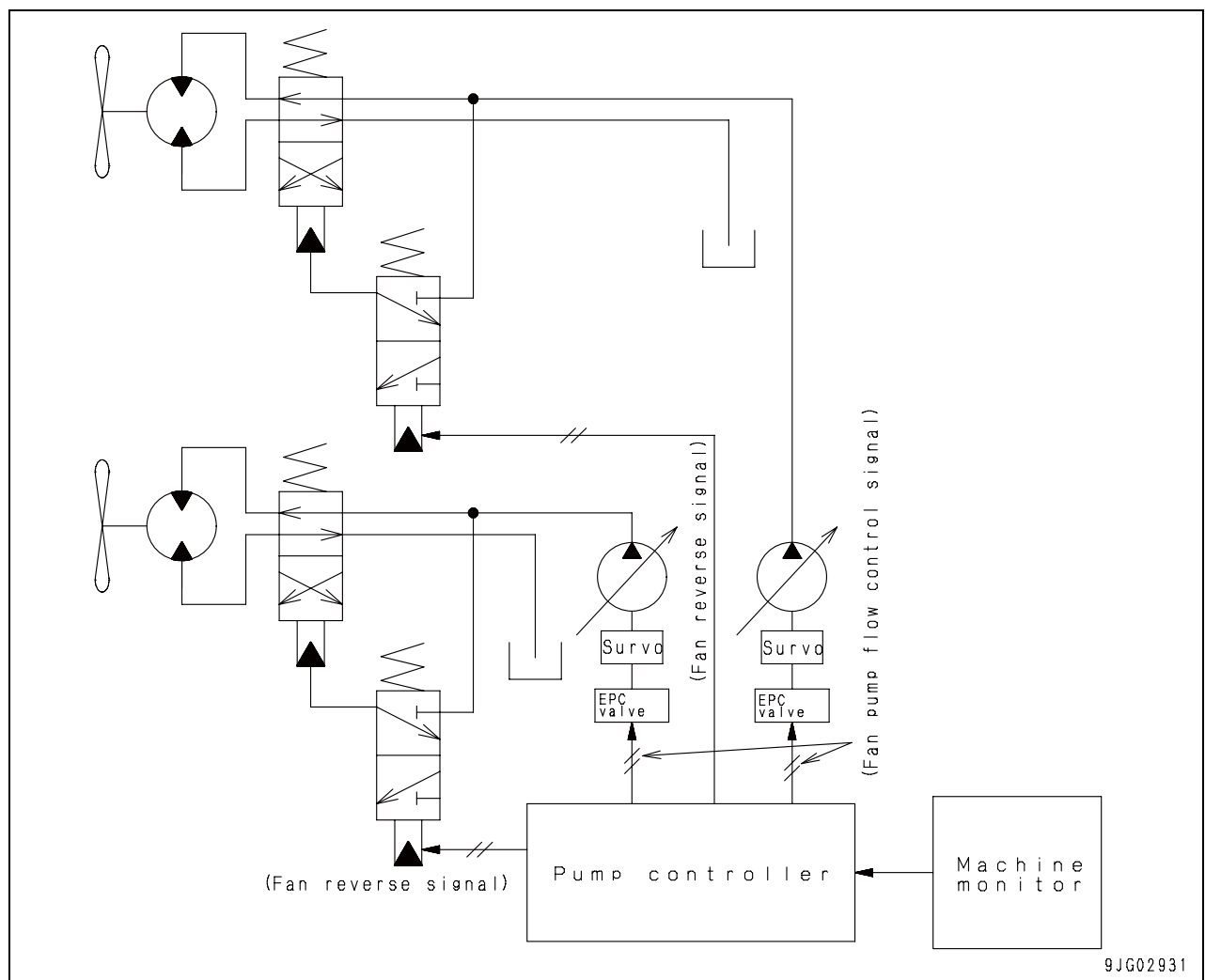


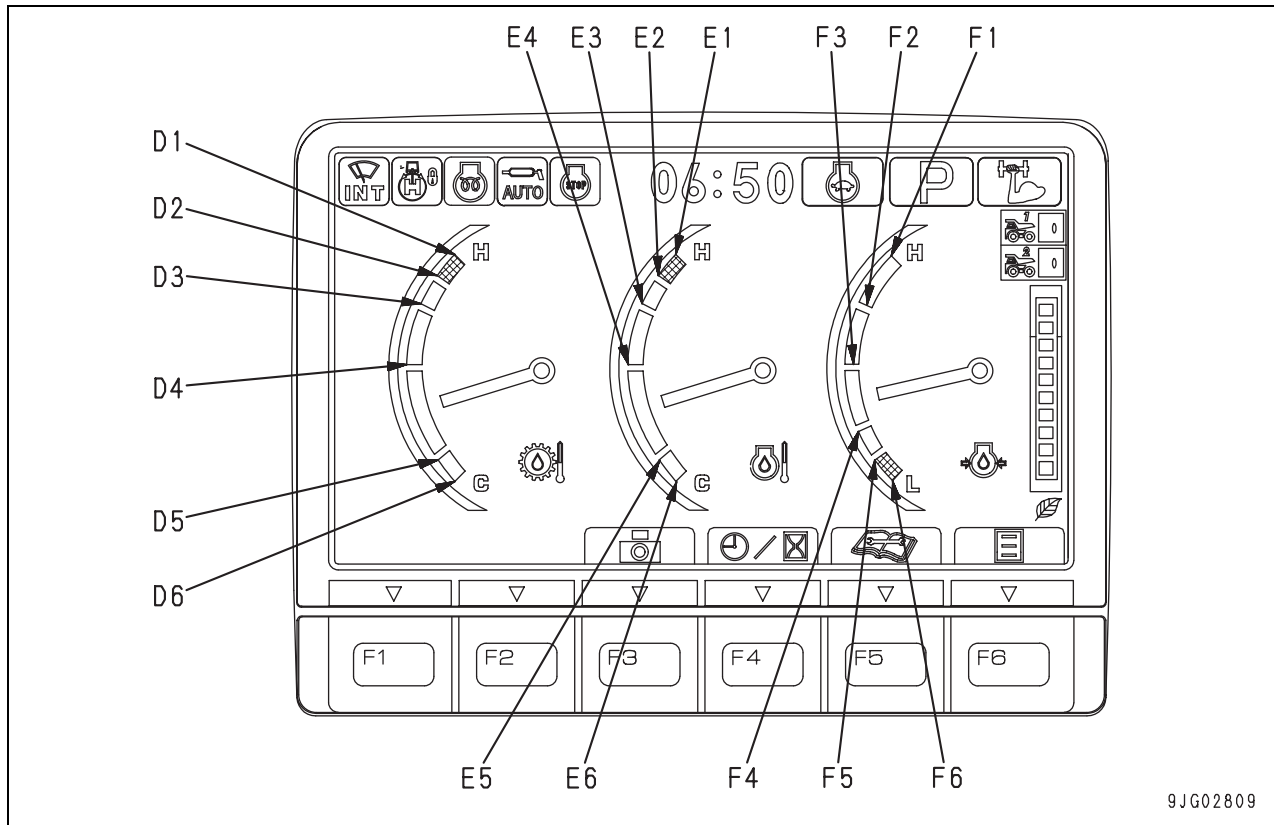
Function

- If the coolant temperature is low, this automatically raises the engine speed to warm up the engine after it is started. In addition, if the coolant temperature rises too high during operations, it reduces the load of the pump to prevent overheating.
- To protect the turbocharger bearing during cold weather, the engine speed is kept below the fixed speed when the engine is started. In addition, to improve the starting ability, a small amount of fuel is injected two or more times before the main injection.

Fan reverse function

- The cooling devices can be cleaned easily by rotating the fan in reverse.
- The heat in the power container can be discharged before servicing by rotating the fan in reverse.
- Upon receiving the fan reverse signal from the machine monitor, the pump controller drives the reverse EPC valve of the fan motor to change the fan reverse valve. By this operation, the fan rotation direction is reversed.
- The fans on the radiator side and oil cooler side cannot be reversed separately.
- The fan speed in reverse direction is controlled by only the engine speed, regardless of the coolant temperature and hydraulic oil temperature.





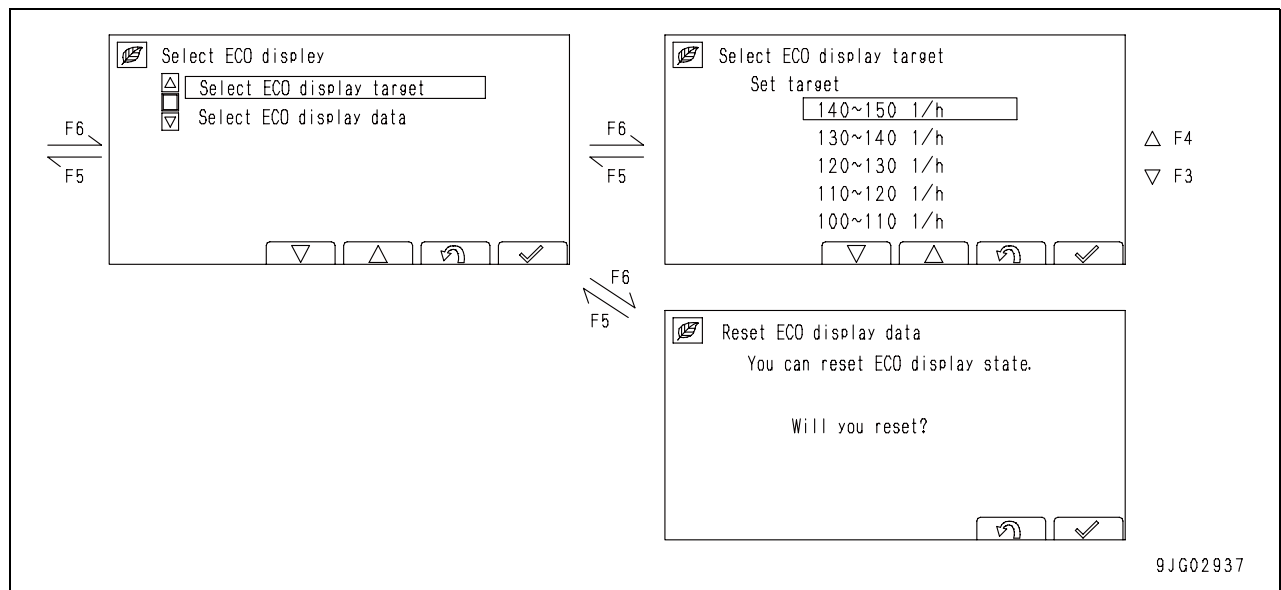
9JG02809

Gauge display: 2/2

Gauge	Range	Temperature or volume	Indicator	Buzzer sound
PTO oil temperature (°C)	D1	125	Red	○
	D2	122	Red	
	D3	120	Off	
	D4	100	Off	
	D5	50	Off	
	D6	0	White	
Engine oil temperature (°C)	E1	125	Red	
	E2	122	Red	
	E3	120	Off	
	E4	100	Off	
	E5	50	Off	
	E6	0	White	
Engine oil pressure (MPa {kg/cm ² })	F1	0.69 {7}	Off	
	F2	0.59 {6}	Off	
	F3	0.39 {4}	Off	
	F4	0.20 {2}	Off	
	F5	0.06 {0.6}	Off	
	F6	0.20 {0.2}	Red	

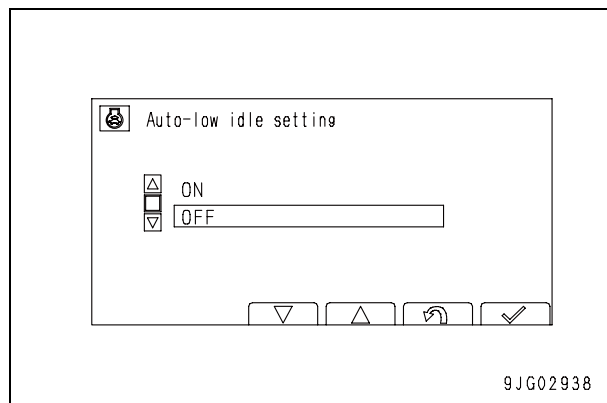
- Engine oil pressure is measured from engine speed by engine controller, and when abnormal, the gauge indicates the middle between F5 and F6 regardless of the value.

ECO display selection



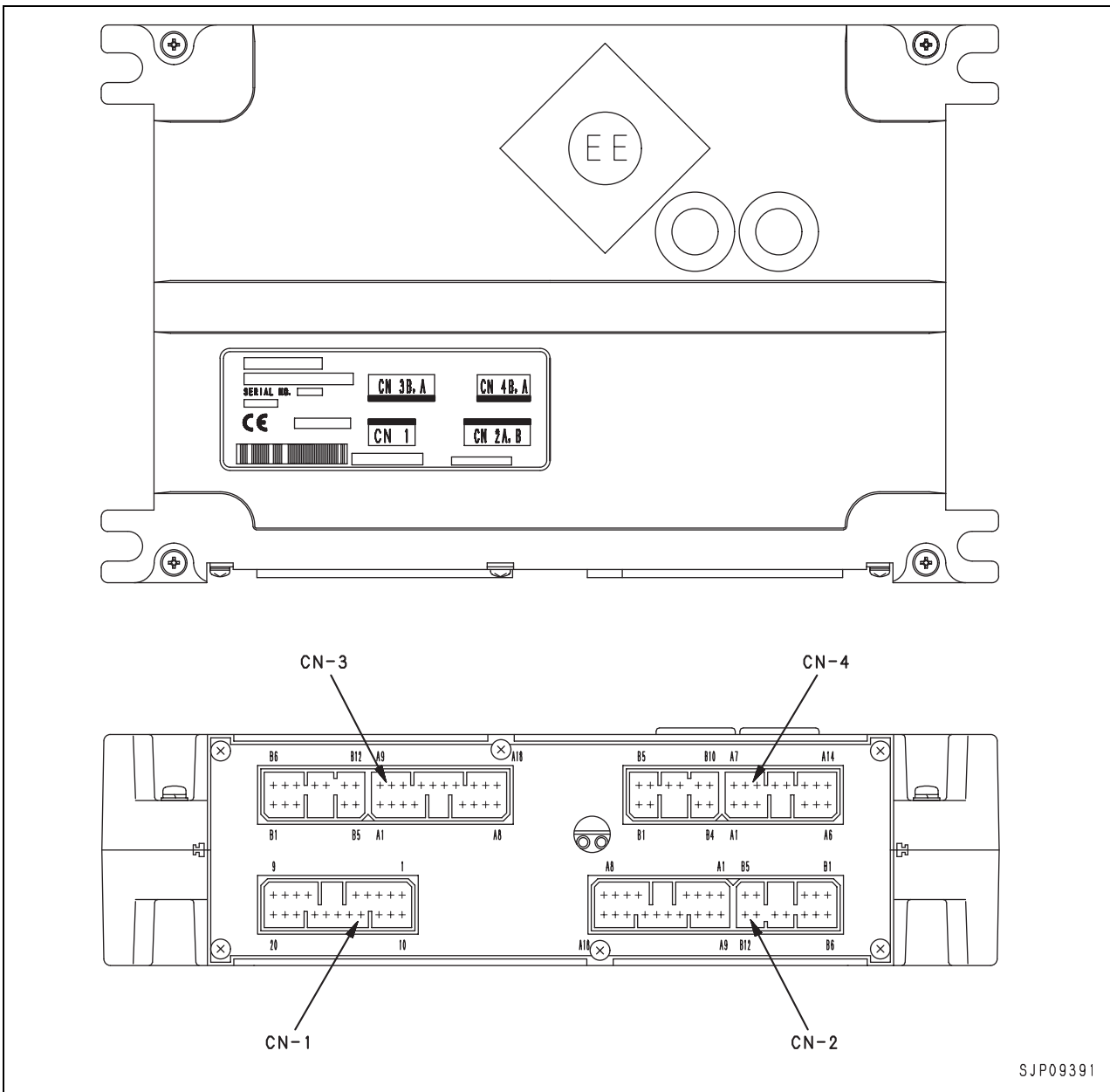
- Select “Select ECO display” on the user menu screen and press F6, and the screen changes to the Select ECO display screen.
- Press F3 or F4 on this screen to select “Select ECO display target” or “Reset ECO display data” and press F6, and the screen changes.

Auto-low idle setting



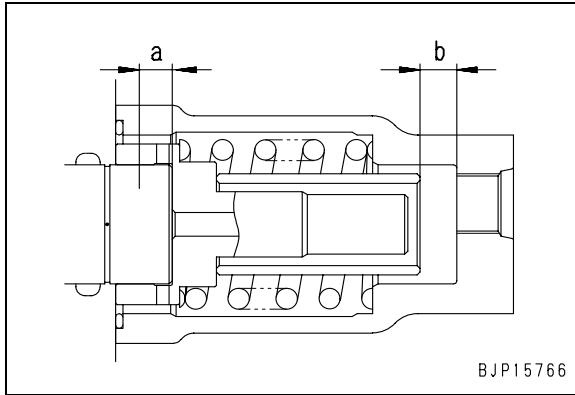
- Select “Auto-low idle setting” on the user menu screen and press F6, and the screen changes to the Auto-low idle setting screen.
- In this menu, you can select the auto-deceleration speed or low idle speed to be set when the auto-deceleration switch is pressed.
ON : Low idle speed
OFF : Auto-deceleration speed

VHMS controller

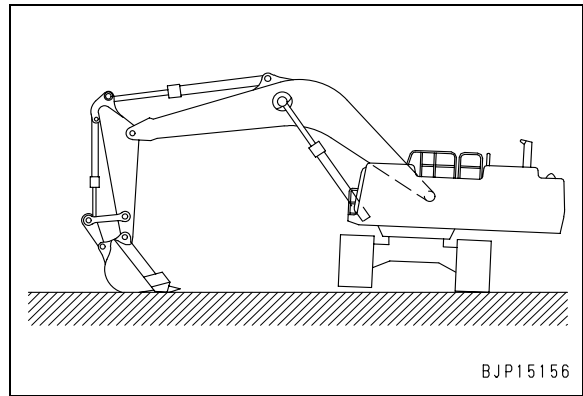


Posture of machine for measuring performance and measurement procedure

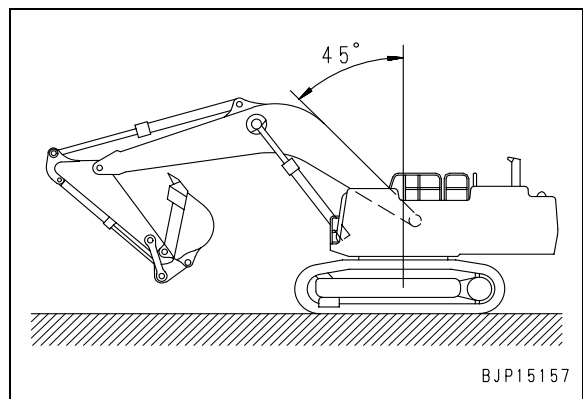
Control valve: spool stroke



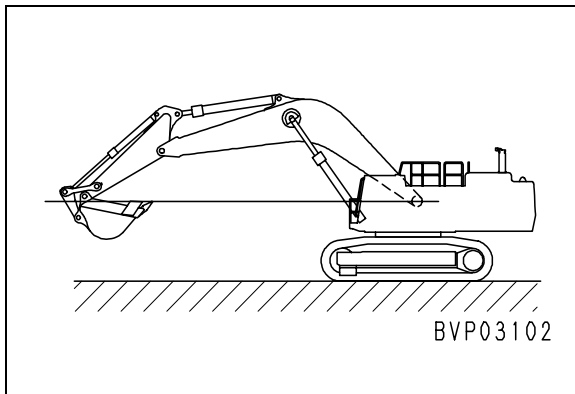
Travel 1: Travel speed (without load)



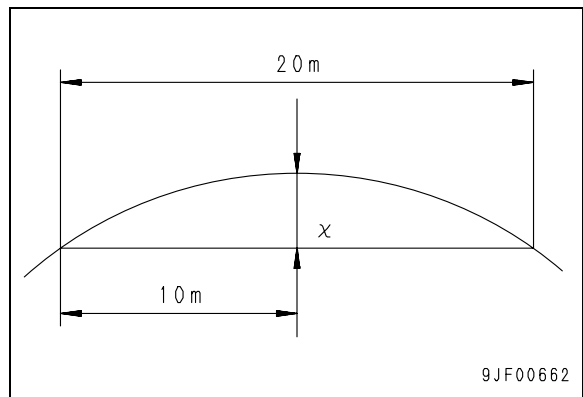
Travel 2: Travel speed (actual run), travel deviation



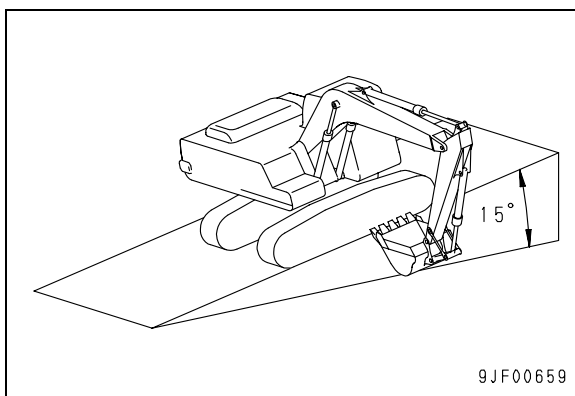
Swing 1: Swing brake angle, time taken to start swing, time taken to swing



Travel 3: Travel deviation



Swing 2: Hydraulic drift of swing



PC2000-8 Hydraulic excavator

Form No. SEN02006-03

© 2008 KOMATSU
All Rights Reserved
Printed in Japan 12-08 (01)

Testing blow-by pressure

★ Testing tool for blow-by pressure

Symbol	Part No.	Part name	Q'ty	
E	1	799-201-1504	Blow-by checker kit	1
	2	799-201-1590	Gauge	1
	3	799-201-1450	Adapter	2
	4	799-201-1511	Nozzle	2
	5	799-201-1571	Tube	1

★ Measure blow-by pressure after the engine is warmed up.

- Hydraulic oil temperature: 45 – 55°C
- Engine coolant temperature: Min. 70°C

1. Equipped blow-by pressure sensor for VHMS control system.

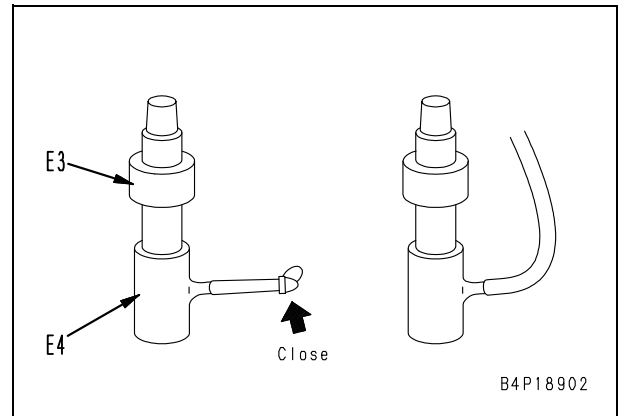
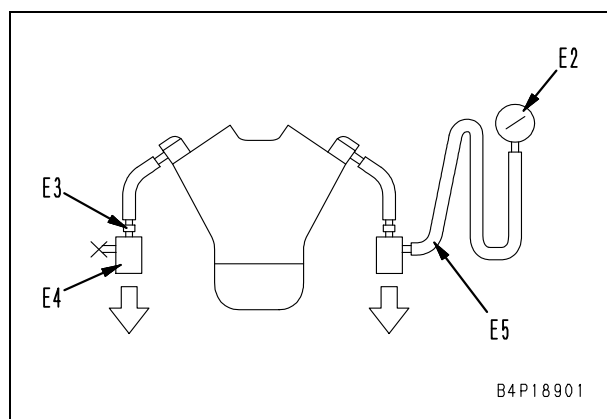
The blow-by signal can be checked by monitoring function equipped machine monitor.

- Monitoring code: 42800 blow by pressure
- ★ Operation procedure is referred to the "Special functions of machine monitor".
- ★ Monitor indication is absolute pressure.

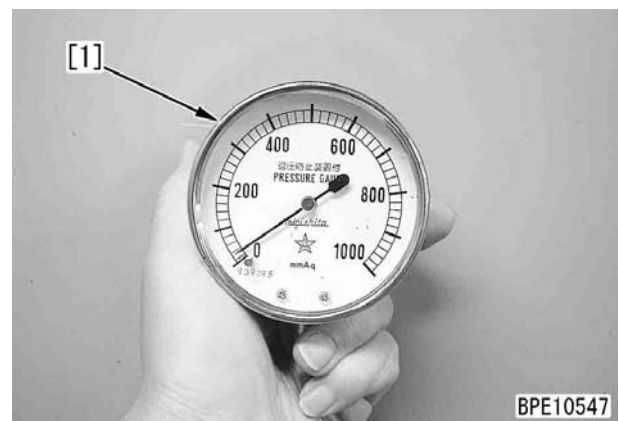
2. If the testing tools are used, check procedure is as follows.

- ★ Breather is provided to each RH and LH banks. Test the breather on either one of the banks.

- 1) Install adapter **E3** and nozzle **E4** to the tip of each breather hose on the RH and LH.
- 2) Connect tube **E5** and gauge **E2** to either one of the nozzles. Close the tube connecting mate of other nozzle with a piece of short cut tube, etc.



- 3) Run the engine at the rated output (P mode and relieve the boom raise) and test the blow-by pressure.

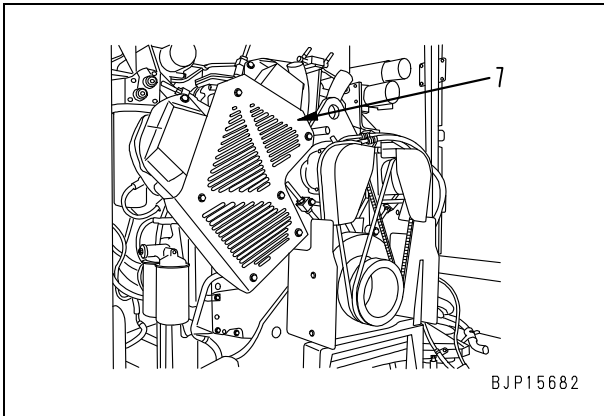


- ★ If rated output is not possible, measure the blow-by in high-idle operation. In this case, approx. 80% of blow-by pressure of the rated output can be obtained.
 - ★ Since blow-by pressure varies sharply depending on engine condition, if measured value is judged abnormal, investigate phenomena associated with defective blow-by such as large oil consumption, abnormal exhaust color, oil degradation and earlier contamination, etc.
- 4) After finishing testing, remove the testing tools and return the removed parts.

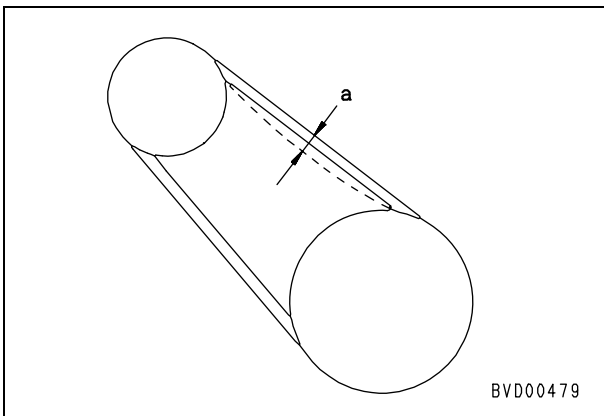
Testing and adjusting alternator belt tension

Testing

1. Remove V belt cover (7) on the rear side of the engine.

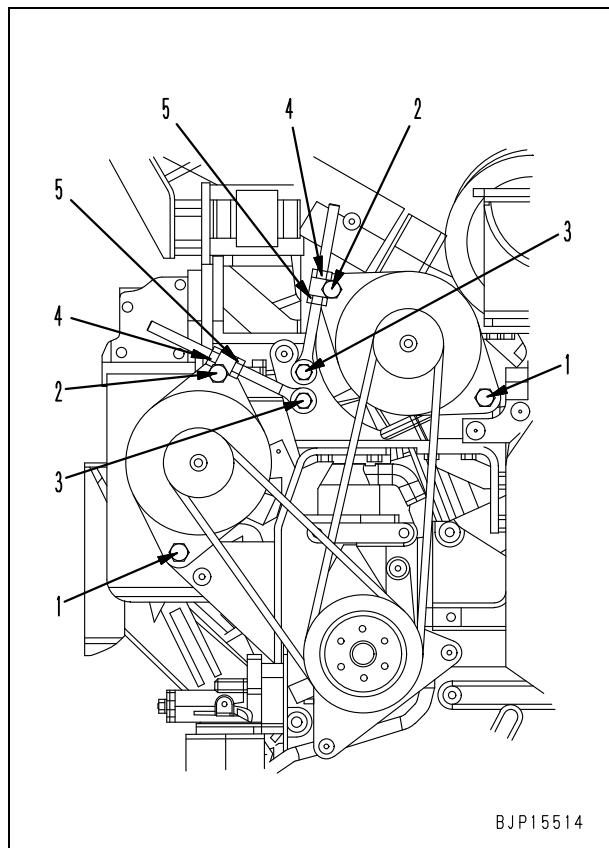


2. Measure the belt deflection (a) when pushing a point midway between the alternator pulley and the drive pulley with the finger.
 - ★ Deflection (a) when pressing force is approx. 58.8 N {approx. 6 kg}: 20 mm



Adjustment

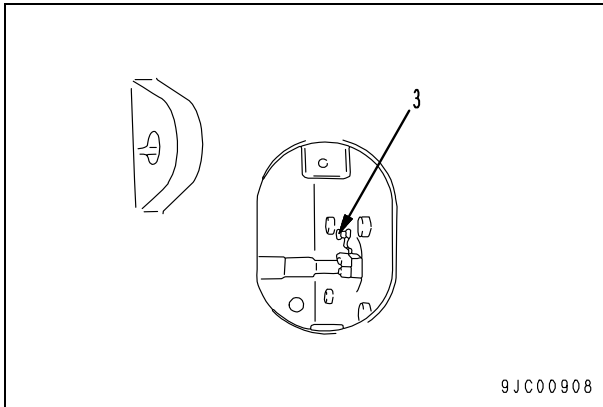
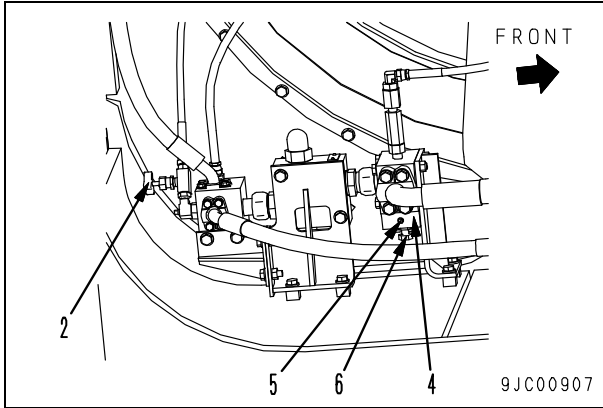
- ★ Adjust the belt according to the following procedure when the belt deflection is not normal.
1. Loosen nuts and bolts (1), (2), (3) and (4) in this order.
 2. Turn nut (5) to move alternator (6), and adjust the belt tension.
 - ★ Nut (5):
 - It is moved to the side that belt is loosened when fastening it clockwise.
 - It is moved to the side that belt is tensioned when loosening it counter-clockwise.
 - ★ Test for breakage of each pulley, friction of V-ditch, friction of belt, and contact between belt and V-ditch.
 - ★ Replace it with new belt if it was too stretched so that adjustability was lost, or cut and crack occurred.
 3. Tighten nuts and bolts (4), (3), (2) and (1) in this order.
 - ★ When the belt was replaced, readjust it after one-hour operation.



6. If clear transparent oil flows out of air bleeding plugs (3) (two placed on the right and left) and the hole of plug (5) at the bottom of check valve block (4), tighten drain valve (2) and air bleeding plugs (3) and (6) securely.

☞ Air bleeding plug:

58.8 – 88.3 Nm {6 – 9 kgm}

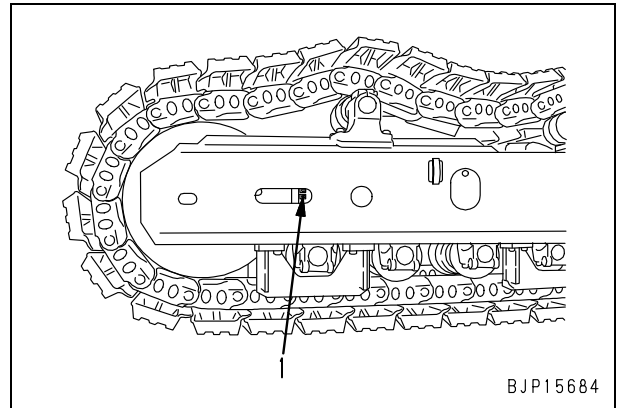


7. Tighten plug (6).

☞ Plug: **3.9 – 6.9 Nm {0.4 – 0.7 kgm}**

8. Tighten plugs (1) (at 2 places on the right and left).

☞ Plug: **58.8 – 88.3 Nm {6 – 9 kgm}**

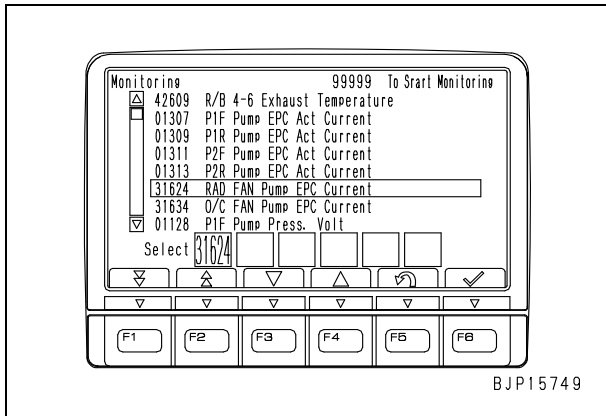


- ★ Be sure to tighten plug (1) last.
- ★ Fully close the drain valve and air bleeding plugs.
- ★ After bleeding air, test and adjust the track shoe tension. For details, see “Testing and adjusting track shoe tension”.

Measuring fan pump EPC solenoid current

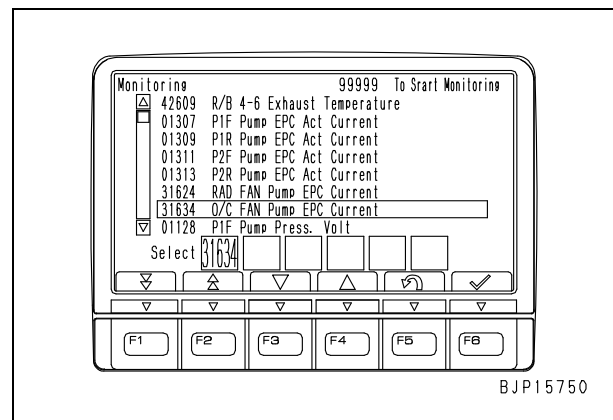
1. Measuring fan (radiator) pump EPC solenoid current

- ★ The fan (radiator) pump EPC solenoid current can be checked with the monitoring function of the machine monitor.
(For the operating method, see “Special functions of machine monitor”.)
 - Monitoring code:
 - 31624 RAD fan pump EPC current
 - The current is displayed in mA.
- ★ Measure the fan (radiator) pump EPC current under the following condition.
 - Hydraulic oil temperature: 45 – 55°C
 - 1) Run the engine at high idle and measure the EPC current with the fan 100% speed mode.



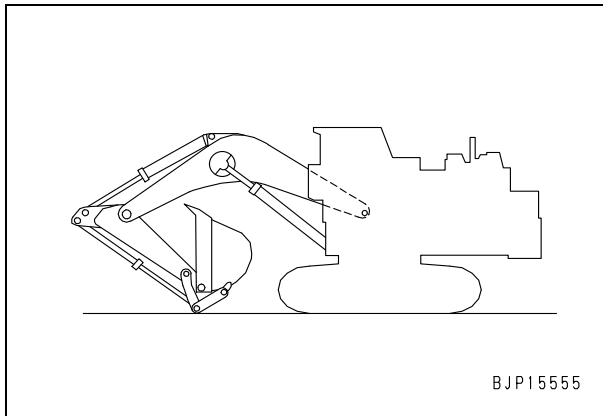
2. Measuring fan (radiator) pump EPC solenoid current

- ★ The fan (oil cooler) pump EPC solenoid current can be checked with the monitoring function of the machine monitor.
(For the operating method, see “Special functions of machine monitor”.)
 - Monitoring code:
 - 31634 O/C fan pump current
 - The current is displayed in mA.
- ★ Measure the fan (oil cooler) pump EPC current under the following condition.
 - Hydraulic oil temperature: 45 – 55°C
 - 1) Run the engine at high idle and measure the EPC current with the fan 100% speed mode.



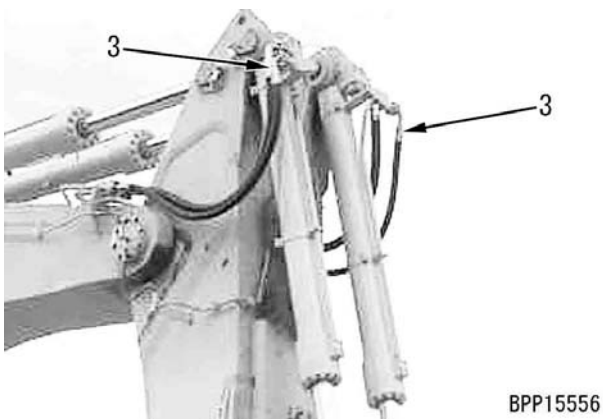
3. Measurement of leakage from bucket cylinder

- 1) Extend the cylinder fully and stop the engine.



- 2) Disconnect the pipe (3) from the head side and block the pipe on the control valve side with flange.

⚠ Be careful not to disconnect the pipe on the bottom side.



- 3) Start the engine, operate the left control lever to the "Bucket CURL" side at high idling and apply the relief oil pressure to the cylinder bottom side.

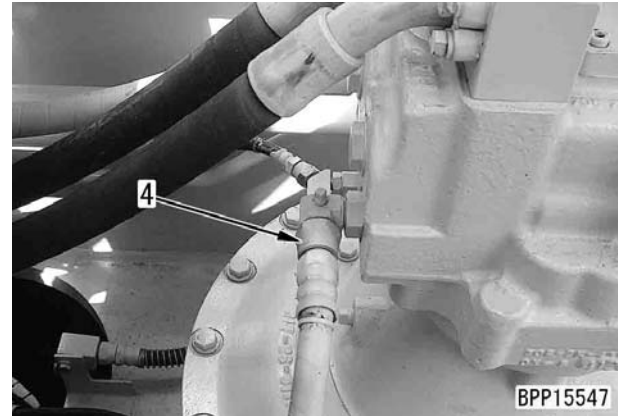
⚠ Be careful not to operate the control lever to the "Bucket DUMP" side.

- 4) After 30 seconds elapsed, measure oil leakage for 1 minute.

4. Measurement of leakage from swing motor

⚠ After the engine stopped, loosen the oil filler cap of the hydraulic tank slowly to relieve pressure from the tank.

- 1) Disconnect the drain hose (4) from the swing motor and block the hose side with plug.



- 2) Start the engine and turn the swing lock switch to the lock position.

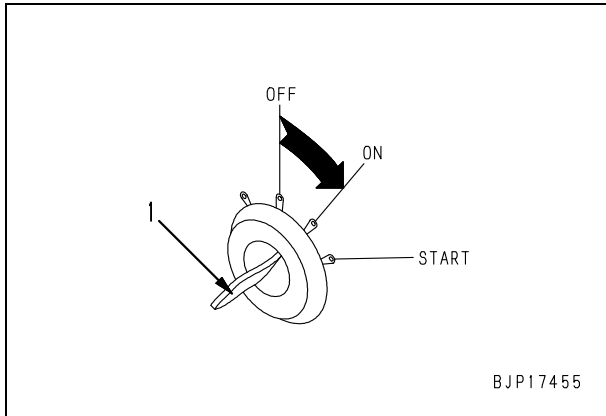
- 3) Run the engine at high idle speed and relieve the swing motor.

- 4) After 30 seconds elapsed, measure oil leakage for 1 minute.

★ Measure oil leakages several times while moving the swing motor little by little (by sliding the valve plate and the cylinder block).

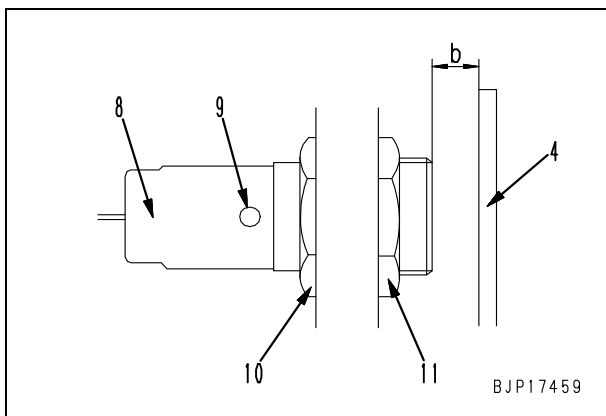
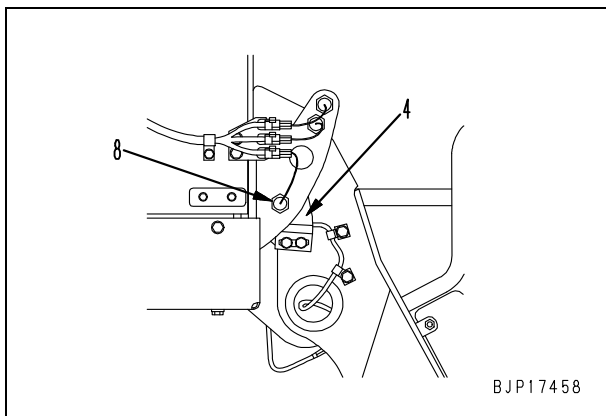
3. Testing clearance of proximity switch (lower)

- 1) Operate the LOWER LADDER switch to lower the ladder.
- 2) Stop the engine and set starting switch key (1) in the ON position.



- 3) Check that clearance (b) between the tip of proximity switch (8) and sensor plate (4) is 3 – 5 mm.

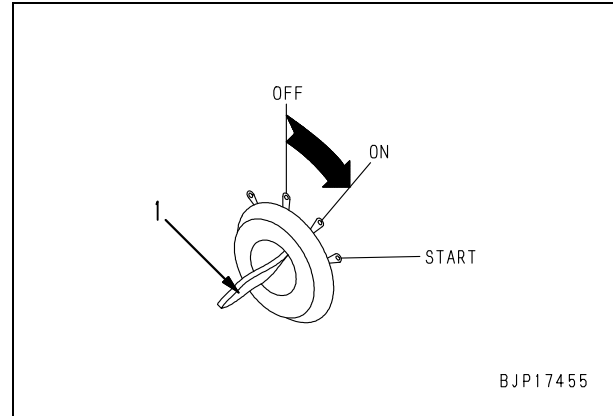
★ While the proximity switch is sensing normally, operation pilot lamp (9) on the proximity switch body side is lighting.



4. Adjusting proximity switch (lower)

- 1) Check that the engine is stopped and the starting switch key (1) is in the ON position.

⚠ Keep the engine stopped to prevent the machine and ladder from moving.



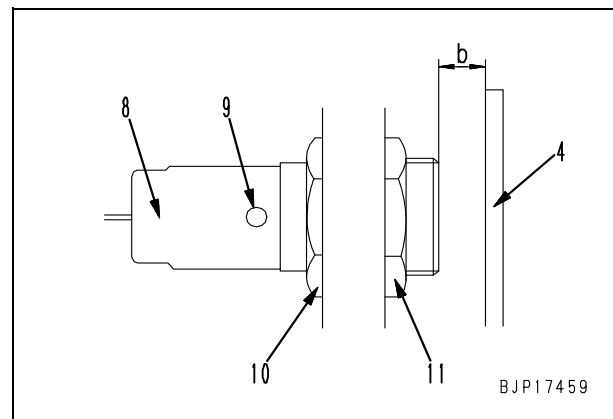
- 2) Loosen nuts (10) and (11) and adjust clearance (b) between the tip of proximity switch (8) and sensor plate (4) to 3 – 5 mm, and then tighten nuts (6) and (7) lightly.

- 3) Check that the operation pilot lamp (9) on the proximity switch body side is lighting.

- 4) Tighten nut (10).

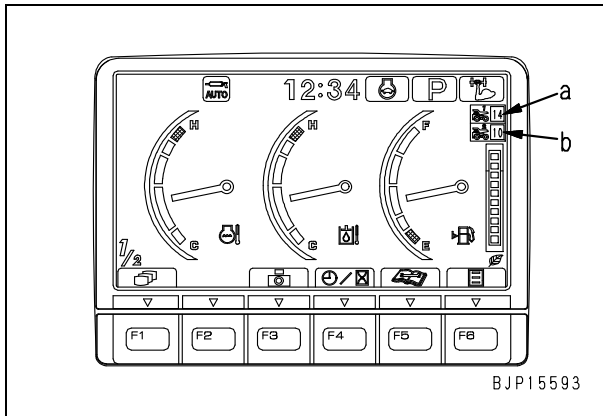
⚙ Nut (10):

14.7 – 19.6 Nm {1.5 – 2.0 kgm}



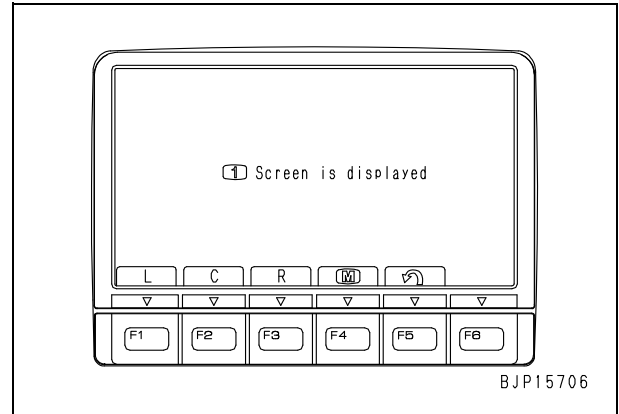
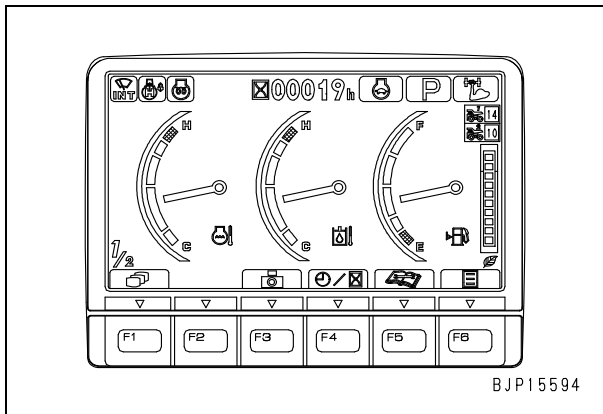
Display of truck counter

While the normal screen is displayed, the number of times of pressing the truck counter switch on the left work equipment control lever can be displayed. There are truck counter 1 switch and truck counter 2 switch on the work equipment control lever. Each time truck counter 1 switch is pressed, the number in "a" increases by 1. Each time truck counter 2 switch is pressed, the number in "b" increases by 1.



Operation to display camera mode (if camera is installed)

When a camera is installed, if [F3] is pressed, the multi-display changes to the camera image (Set the connection of the camera in the service mode).



- ★ If a caution is generated in the camera mode, the caution monitor is displayed at the left upper of the screen (The low hydraulic oil temperature caution is not displayed there, however).
- ★ When an error that there is a user code occurs in the camera mode, if you do not touch any control lever for 10 seconds, the screen changes to the ordinary screen and displays the error information.
- ★ When two or more cameras are connected, the image of one of them or the images of two of them can be displayed.
- ★ If 2-camera image display [F4] is selected, the image of camera 1 is displayed on the left side of the screen and the image of camera 2 is displayed on the right side. The image of camera 3 is displayed only singly.
- ★ If the images of 2 cameras are displayed simultaneously, images are displayed at intervals of 1 second on the right and left screen.

Code No.	Monitoring item	Component in charge	Unit (Initial setting: ISO)		
			ISO	meter	inch
20249	Pump Con2 Ass'y P/N	PUMP (2nd)	—		
20407	Pump Con2 Serial No	PUMP (2nd)	—		
20220	Pump Con2 Prog. P/N	PUMP (2nd)	—		

- ★ Entry order of items in table
The items are entered in the order of display on the monitoring selection menu screen.
- ★ Unit
The display unit can be set to "ISO", "meter", or "inch" freely (Set it with "Unit selecting" in Initialization of the service menu).
"CA" in the display unit is an abbreviation for crankshaft angle.
"mg/st" in the display unit is an abbreviation for milligram/stroke.
- ★ Component in charge
MON: The machine monitor is in charge of detection of monitoring information.
ENG: The engine controller is in charge of detection of monitoring information.
PUMP: The pump controller is in charge of detection of monitoring information.
VHMS: The VHMS controller is in charge of detection of monitoring information.

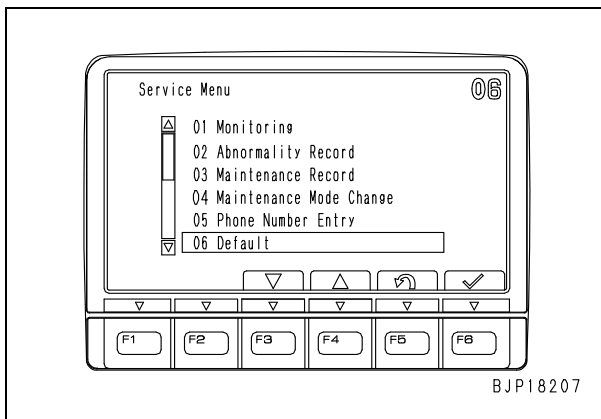
Default (Maintenance Password)

Check or change various settings related to the machine monitor and machine by "Default".

The function of setting maintenance password is used to set the display of the password screen when the functions related to the maintenance are used in the operator mode.

1. Selecting menu

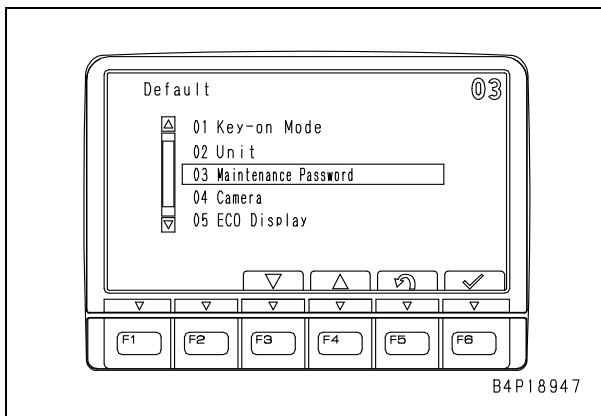
Select "Default" on the "Service Menu" screen.



2. Selecting sub menu

After the "Default" screen is displayed, select "Maintenance Password" with the function switches or numeral input switches.

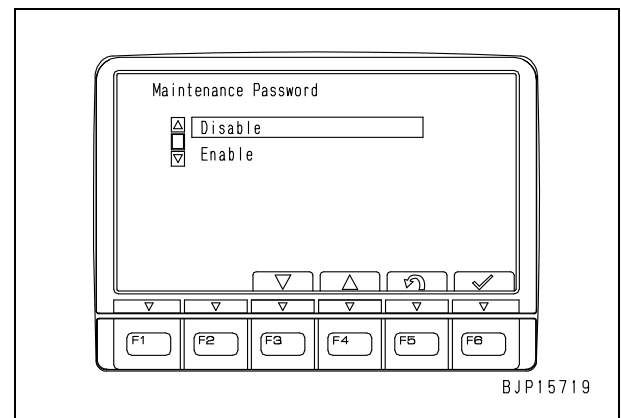
- ★ Select this item similarly to an item on the "Service Menu" screen.



3. Selecting Disable/Enable

After the Maintenance Password screen is displayed, select the setting with the function switches.

- Disable : Password screen is not displayed
- Enable : Password screen is displayed
- [F3] : Move to lower item
- [F4] : Move to upper item
- [F5] : Cancel selection and return to "Default" screen
- [F6] : Confirm selection and return to "Default" screen



4. Displaying maintenance password screen

When the following operation is performed, the password screen is displayed in the operator mode.

- Maintenance mode: The Maintenance table screen is changed to the Maintenance interval reset screen.

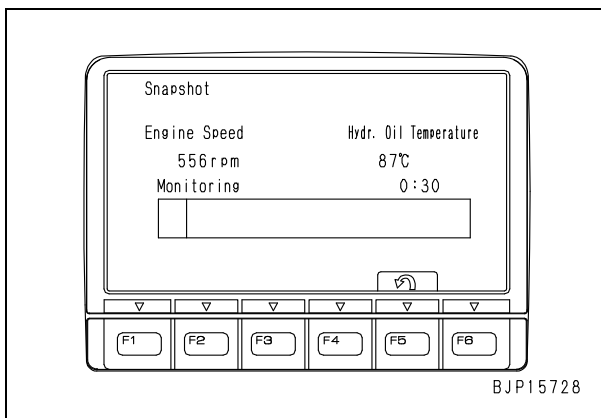
5. Changing maintenance password

The password can be changed by operating the switches specially in the operator mode.

- ★ See Maintenance password changing function in the operator mode.
- ★ Default password: [000000]
- ★ If the password setting is changed from "Enable" to "Disable", the password is reset to the default. When "Enable" is set again, be sure to set a new password.
- ★ The maintenance password is different from the engine start lock password.

Page	Item	PM-clinic display item	ISO	m	inch	Component in charge
8/12	1	Engine speed	r/min	rpm	rpm	ENG
	2	Hydraulic oil temperature	°C	°C	°F	PUMP (2)
	3	P1F pump pressure	MPa	kg/cm ²	psi	PUMP (1)
	4	P1R pump pressure	MPa	kg/cm ²	psi	PUMP (1)
	5	VR1 J/S differential pressure	MPa	kg/cm ²	psi	PUMP (1)
	6	VL1 J/S differential pressure	MPa	kg/cm ²	psi	PUMP (1)
9/12	1	Engine speed	r/min	rpm	rpm	ENG
	2	Hydraulic oil temperature	°C	°C	°F	PUMP (2)
	3	P2F pump pressure	MPa	kg/cm ²	psi	PUMP (1)
	4	P2R pump pressure	MPa	kg/cm ²	psi	PUMP (1)
	5	VR2 J/S differential pressure	MPa	kg/cm ²	psi	PUMP (1)
	6	VL2 J/S differential pressure	MPa	kg/cm ²	psi	PUMP (1)
10/12	1	Engine speed	r/min	rpm	rpm	ENG
	2	Hydraulic oil temperature	°C	°C	°F	PUMP (2)
	3	P1F pump pressure	MPa	kg/cm ²	psi	PUMP (1)
	4	P1R pump pressure	MPa	kg/cm ²	psi	PUMP (1)
	5	P1F pump EPC current	mA	mA	mA	PUMP (1)
	6	P1R pump EPC current	mA	mA	mA	PUMP (1)
11/12	1	Engine speed	r/min	rpm	rpm	ENG
	2	Hydraulic oil temperature	°C	°C	°F	PUMP (2)
	3	P2F pump pressure	MPa	kg/cm ²	psi	PUMP (1)
	4	P2R pump pressure	MPa	kg/cm ²	psi	PUMP (1)
	5	P2F pump EPC current	mA	mA	mA	PUMP (1)
	6	P2R pump EPC current	mA	mA	mA	PUMP (1)
12/12	1	Engine speed	r/min	rpm	rpm	ENG
	2	Ambient temperature	°C	°C	°F	VHMS
	3	O/C fan pulley pressure	MPa	kg/cm ²	psi	PUMP (1)
	4	RAD fan pump pressure	MPa	kg/cm ²	psi	PUMP (1)
	5	RAD fan pump control EPC current	mA	mA	mA	PUMP (1)
	6	O/C fan pump control EPC current	mA	mA	mA	PUMP (1)

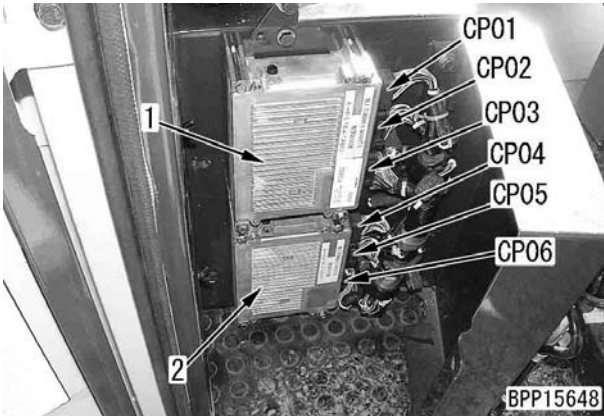
- 6) Operate the fuel dial, swing lock switch, both work equipment control levers, and both travel levers according to the "Operating procedure for Quick Pm" and elapsed time.
- ★ The elapsed time is displayed on the machine monitor.
- ⚠ Since the operator must operate the work equipment, swing the boom, and drive the machine actually for the Quick Pm, take extreme care of safety around the machine during the work.**



- 7) After 5 seconds passes since the bar graph is completed (7 minutes 30 seconds passes after the snap shot is starts), the initial screen of the service menu is displayed again.

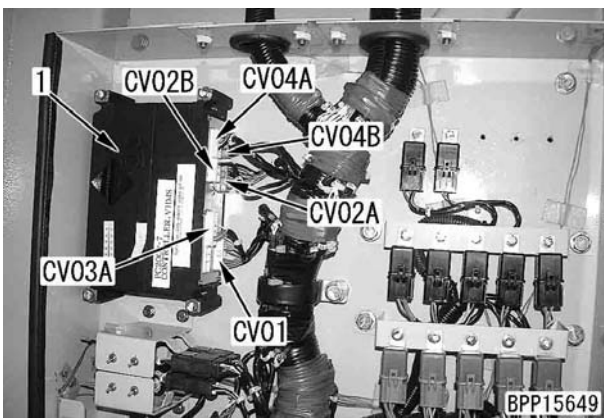
3. Pump controller

- 1) Remove the controller cover bolts and controller cover in the operator's cab.
- 2) Insert or connect troubleshooting T-adapters in or to connectors CP01, CP02 and CP03 of pump controller 1.
- 3) Insert or connect troubleshooting T-adapters in or to connectors CP04, CP05 and CP06 of pump controller 2.



4. VHMS controller

- 1) Open the distribution board cover.
- 2) Insert or connect troubleshooting T-adapters in or to connectors CV01, CV02A, CV02B, CV03A, CV04A and CV04B of the VHMS controller (1).





Pm-Clinic service

--	--	--	--	--	--

— Hour inspection

PC2000-8 Loading shovel	Chassis serial No.
	Engine serial No. (SAA12V140E-3)

Work direction No.	Date of execution	Service meter	Inspector

Interview with operator and walk-around inspection			Accepted	Rejected
Is there any abnormality before starting inspection?				
Coolant temperature Max. _____ °C (During work)	PTO oil temperature Max. _____ °C (During work)	Ambient temperature Max. _____ °C Min. _____ °C Altitude _____ m		

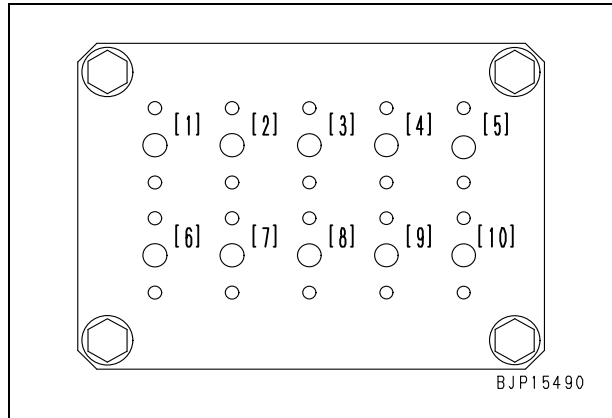
Measurement items	Condition	Unit	Standard value for new machine	Service limit value	Measurement result	Accepted	Rejected
After starting engine							
1-1 Engine speed (in P mode)	Engine: Low idle	rpm	775 – 875	775 – 875			
	Engine: High idle		1930 – 2030	1930 – 2030			
	Engine: Full throttle Boom: Raise relief		1680 – 1880	1680 – 1880			
	Engine: Full throttle Boom: Raise relief + Heavy lift: ON		1680 – 1880	1680 – 1880			
	Auto-deceleration switch: ON Fuel control dial: Max. Control lever: Neutral		1300 – 1500	1300 – 1500			
1-2 Blow-by pressure	At rated horsepower	kPa {mmAq}	Max. 2.94 {Max. 300}	Max. 5.88 {Max. 600}			
1-3 Engine lubricating oil pressure	Engine: Low idle (SAE10)	MPa {kg/cm ² }	Min. 0.08 {Min. 0.8}	Min. 0.06 {Min. 0.6}			
	Engine: Low idle (SAE30)		Min. 0.08 {Min. 0.8}	Min. 0.06 {Min. 0.6}			
	Engine: At rated output (SAE30)		0.29 – 0.44 {3.0 – 4.5}	Min. 0.2 {Min. 2.0}			
1-4 Boost pressure	At rated horsepower	kPa {mmHg}	Min. 125.7 {Min. 950}	Limit is not set			
1-5 Exhaust temperature	At all speed range	°C	Max. 700	Max. 750			
	Ambient temperature		20	20		—	—

2. PTO	2-1 Visual check of filter	—	Metal powder must not be collected.				
	2-2 Check of center bearing thermo-label	°C	120°C range must not be black.				
	2-3 PTO oil temperature		Max. 120°C	Max. 120°C			

3. Work equipment speed	1. Boom RAISE	Engine: Full throttle P mode Hydraulic oil temperature: 45 - 55°C Swing: Measure time for 5 turns after 1 turn. Travel: Raise each track and measure 5 turns with no load after 1 turn.	sec	6.7 – 8.3	Max. 9.0		
	2. Boom LOWER			4.8 – 5.8	Max. 6.4		
	3. Arm IN			6.7 – 8.3	Max. 9.0		
	4. Arm OUT			4.7 – 5.7	Max. 6.2		
	5. Bucket CURL			4.5 – 5.5	Max. 6.0		
	6. Bucket DUMP			3.5 – 4.3	Max. 4.7		
	7. Bottom Dump Open			2.0 – 2.4	Max. 2.6		
	8. Bottom Dump Close			2.0 – 2.4	Max. 2.6		
	9. Swing 5 turns			57.5 – 67.5	Max. 70.0		
	10. Drive right track 5 turns			90.5 – 110.5	90.5 – 110.5		
	11. Drive left track 5 turns			90.5 – 110.5	90.5 – 110.5		

● Circuit breaker (A)

Type of power supply	Circuit breaker (A) Terminal numbers are shown in brackets ().	Destination of power
Circuit breaker (2) for switch power supply 60A	(1) 20A (B25A-B25B)	Pump controller 2
	(2) 20A (B24A-B24B)	Pump controller 1
	(3) 20A (B23A-B23B)	PPC lock solenoid valve
		Working lamp power supply (R08 relay)
	(4) 30A (B22A-B22B)	Right working lamp power supply (R10 relay)
(5) 30A (B21A-B21B)	Left working lamp power supply (R11 relay)	
Constant power supply circuit breaker (3) 60A	(6) 30A (B30A-B30B)	Engine right controller
	(7) 30A (B29A-B29B)	Engine left controller
	(8) 30A (B28A-B28B)	Starting switch
		Machine monitor
		Pump controller 1
(9) 20A (B27A-B27B)	VHMS controller	
Switch power supply circuit breaker (1) 60A	(10) 20A (B26A-B26B)	ORBCOM controller
		VHMS controller

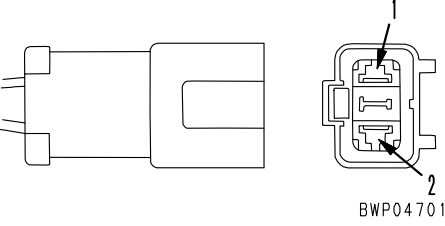
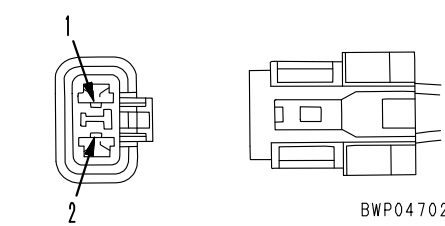
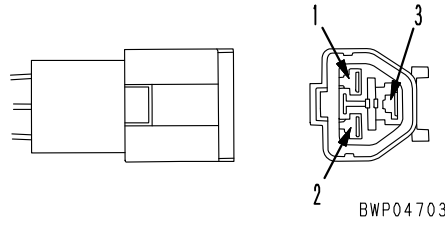
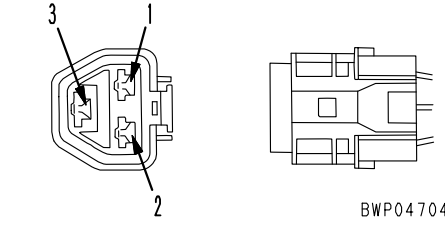
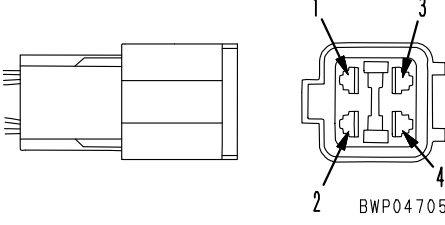
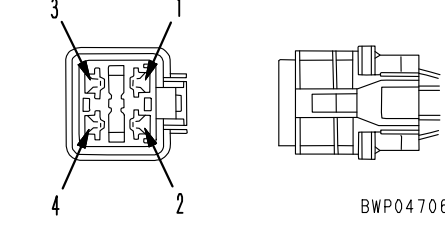


* Figure in the () shows a circuit breaker number in the circuit diagram

Connection table for connector pin numbers

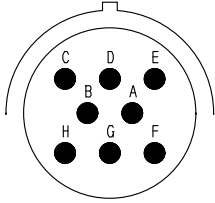
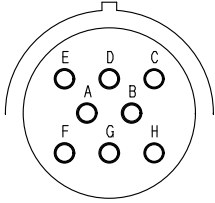
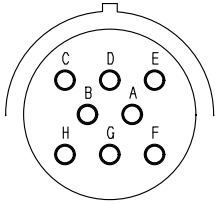
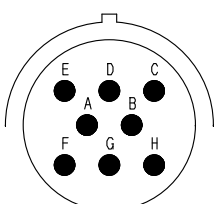
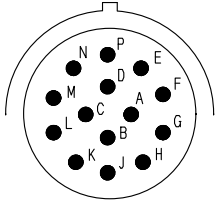
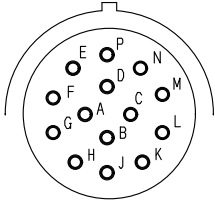
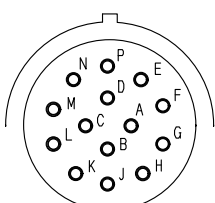
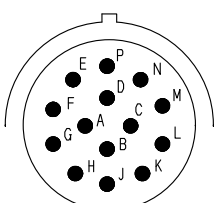
(Rev. 2009.04)

★ The terms of male and female refer to the pins, while the terms of male housing and female housing refer to the mating portion of the housing.

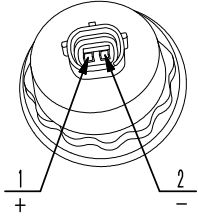
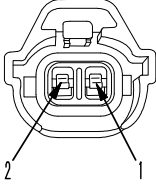
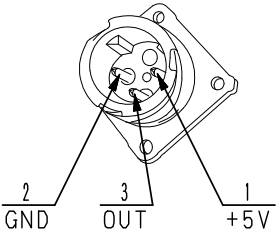
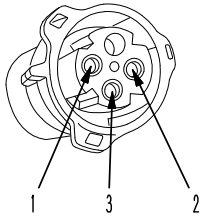
No. of pins	X type connector		
	Male (female housing)	Female (male housing)	Testing connection use special tool Part No.
1	Part No. : 08055-00181	Part No. : 08055-00191	99-601-7010 (T-adapter)
2	 <p>BWP04701</p>	 <p>BWP04702</p>	799-601-7020 (T-adapter)
	Part No. : 08055-00282	Part No. : 08055-00292	
3	 <p>BWP04703</p>	 <p>BWP04704</p>	799-601-7030 (T-adapter)
	Part No. : 08055-00381	Part No. : 08055-00391	
4	 <p>BWP04705</p>	 <p>BWP04706</p>	799-601-7040 (T-adapter)
	Part No. : 08055-00481	Part No. : 08055-00491	
—	Terminal part No. : 79A-222-3370 ·Electric wire size: 0.85 ·Grommet:Black ·Q'ty: 20	Terminal part No. : 79A-222-3390 ·Electric wire size: 0.85 ·Grommet:Black ·Q'ty: 20	—
—	Terminal part No. : 79A-222-3380 ·Electric wire size: 2.0 ·Grommet:Red ·Q'ty: 20	Terminal part No. : 79A-222-3410 ·Electric wire size: 2.0 ·Grommet:Red ·Q'ty: 20	—

B4D18190

[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)	Socket (female terminal)	799-601-9210 (T-adapter)
	 <p style="text-align: right;">BWP05001</p>	 <p style="text-align: right;">BWP05002</p>	
	Part No. :08191-11201, 08191-11202, 08191-11205, 08191-11206	Part No. :08191-14101, 08191-14102, 08191-14105, 08191-14106	
	Socket (female terminal)	Pin (male terminal)	799-601-9210 (T-adapter)
 <p style="text-align: right;">BWP05003</p>	 <p style="text-align: right;">BWP05004</p>		
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)	Socket (female terminal)	799-601-9220 (T-adapter)
	 <p style="text-align: right;">BWP05005</p>	 <p style="text-align: right;">BWP05006</p>	
	Part No. :08191-21201, 08191-21202, 08191-21205, 08191-21206	Part No. :08191-24101, 08191-24102, 08191-24105, 08191-24106	
	Socket (female terminal)	Pin (male terminal)	799-601-9220 (T-adapter)
 <p style="text-align: right;">BWP05007</p>	 <p style="text-align: right;">BWP05008</p>		
Part No. :08191-22201, 08191-22202, 08191-22205, 08191-22206	Part No. :08191-23101, 08191-23102, 08191-23105, 08191-23106		

B4D18405

SUMITOMO connector for engine			
No. of pins	PCV (125, 140, 170, 12V140 engine)		
	Valve side (plug)	Harness side (receptacle)	Testing connection use special tool Part No.
2			799-601-9430 (Socket) (Kit: 799-601-4101) (Kit: 799-601-4201)
	-	-	
CANNON connector for engine			
No. of pins	Boost (air intake) pressure sensor (140 engine)		
	Sensor side (plug)	Harness side (receptacle)	Testing connection use special tool Part No.
4			799-601-4110 (T-adapter) (Kit: 799-601-4101) (Kit: 799-601-4201)
	☆ Without pin (4)	☆ Without pin (4)	

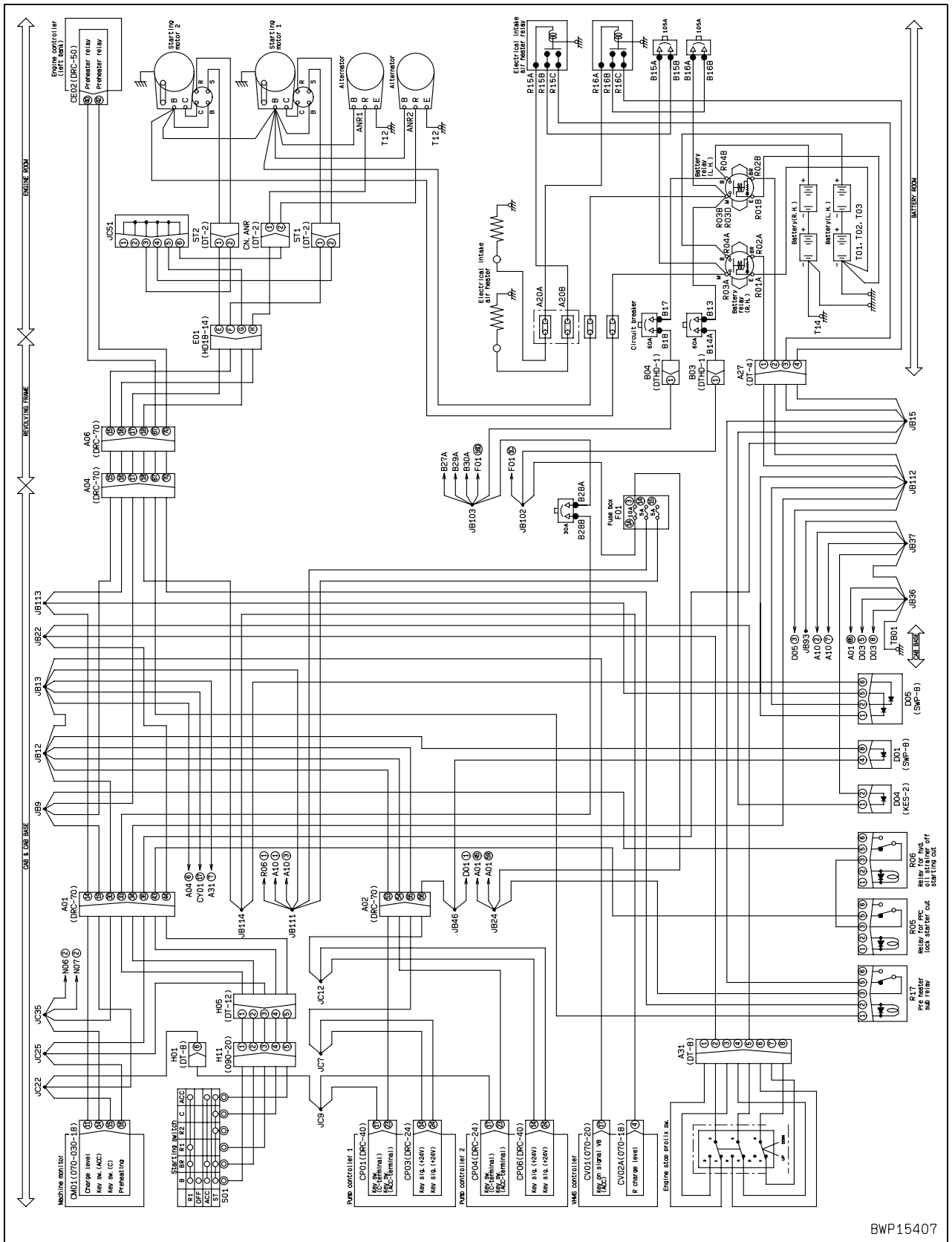
B4D18420

Failure code [0410KB] Fuel LV. Sensor Failure

User code	Failure code	Trouble	Fuel LV. Sensor Failure (Machine monitor system)
—	0410KB		
Contents of trouble	<ul style="list-style-type: none"> Sensor current flows. 		
Action of controller	<ul style="list-style-type: none"> None in particular. 		
Problem that appears on machine	<ul style="list-style-type: none"> Fuel level monitor lights up while engine is running 		
Related information			

Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting			
		1	Low fuel level (when the system is normal)	★ Add fuel.		
2		Defective fuel level sensor (internal disconnection or short circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			P21A (male)	Fuel level	Resistance	
			Between (1) and chassis ground	FULL (Upper limit)	$10^{+1.0}_{-3.0} \Omega$	
EMPTY (Lower limit)		$85^{+10}_0 \Omega$				
3		Ground fault in wiring harness (Contact with GND circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			Between harness CM01 (female) (9) – P21A (female) (1) and the grounding		Resistance	Min. 1 MΩ
4		Defective machine monitor	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			CM01 (female)	Fuel level	Resistance	
			Between (9) and chassis ground	FULL (Upper limit)	$10^{+1.0}_{-3.0} \Omega$	
				EMPTY (Lower limit)	$85^{+10}_0 \Omega$	

Circuit diagram related to engine preheating, starting and charging circuits



Failure code [CA111] ECM Critical Internal Failure

User code	Failure code	Trouble	ECM Critical Internal Failure (Engine controller system)
E10	CA111		
Contents of trouble	<ul style="list-style-type: none"> Controller has abnormality in it. 		
Action of controller	<ul style="list-style-type: none"> Blinks warning lamp and sounds alarm buzzer. 		
Problem that appears on machine	<ul style="list-style-type: none"> Machine continues operation normally but may stop suddenly or may not able to start again once it stops. 		
Related information			

Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting		
		1	Defective circuit breaker	Circuit breaker may be defective. Check it directly. (If fuse is broken or circuit breaker is turned OFF, circuit probably has ground fault.)	
2		Disconnection in wiring harness (Disconnection in wiring or defective contact in connector)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Wiring harness between CE03 (female) (3) – battery (+)	Resistance	Max. 1 Ω
3		Ground fault in wiring harness (Contact with GND circuit)	Wiring harness between CE03 (female) (1) – ground	Resistance	Max. 1 Ω
			★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
4		Defective engine controller	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.		
			CE03	Voltage	
			Between (3) – (1)	20 – 30 V	

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

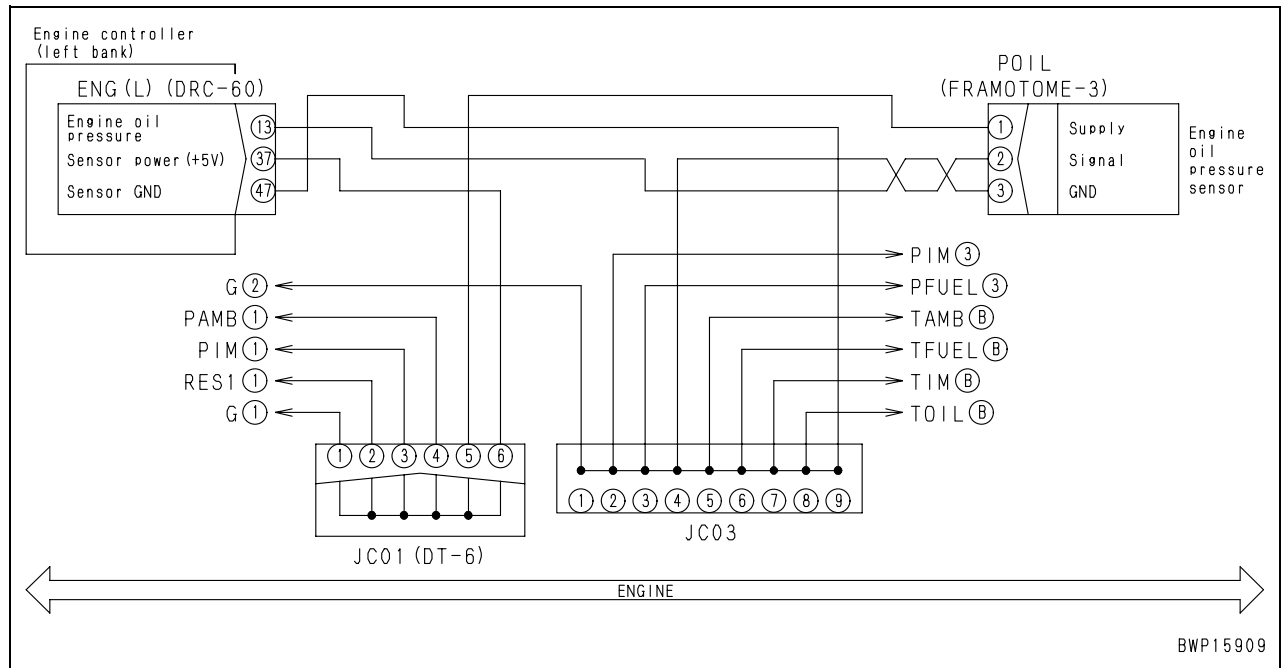
- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



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

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

Circuit diagram related to oil pressure sensor



Failure code [CA213] Eng Oil Temp Sensor Low Error

User code E15	Failure code CA213	Trouble	Eng Oil Temp Sensor Low Error (Engine controller system)
Contents of trouble	<ul style="list-style-type: none"> Low voltage was detected in engine oil temperature sensor circuit. 		
Action of controller	<ul style="list-style-type: none"> Sets oil temperature to default value (100°C) and continues operation. 		
Problem that appears on machine			
Related information			

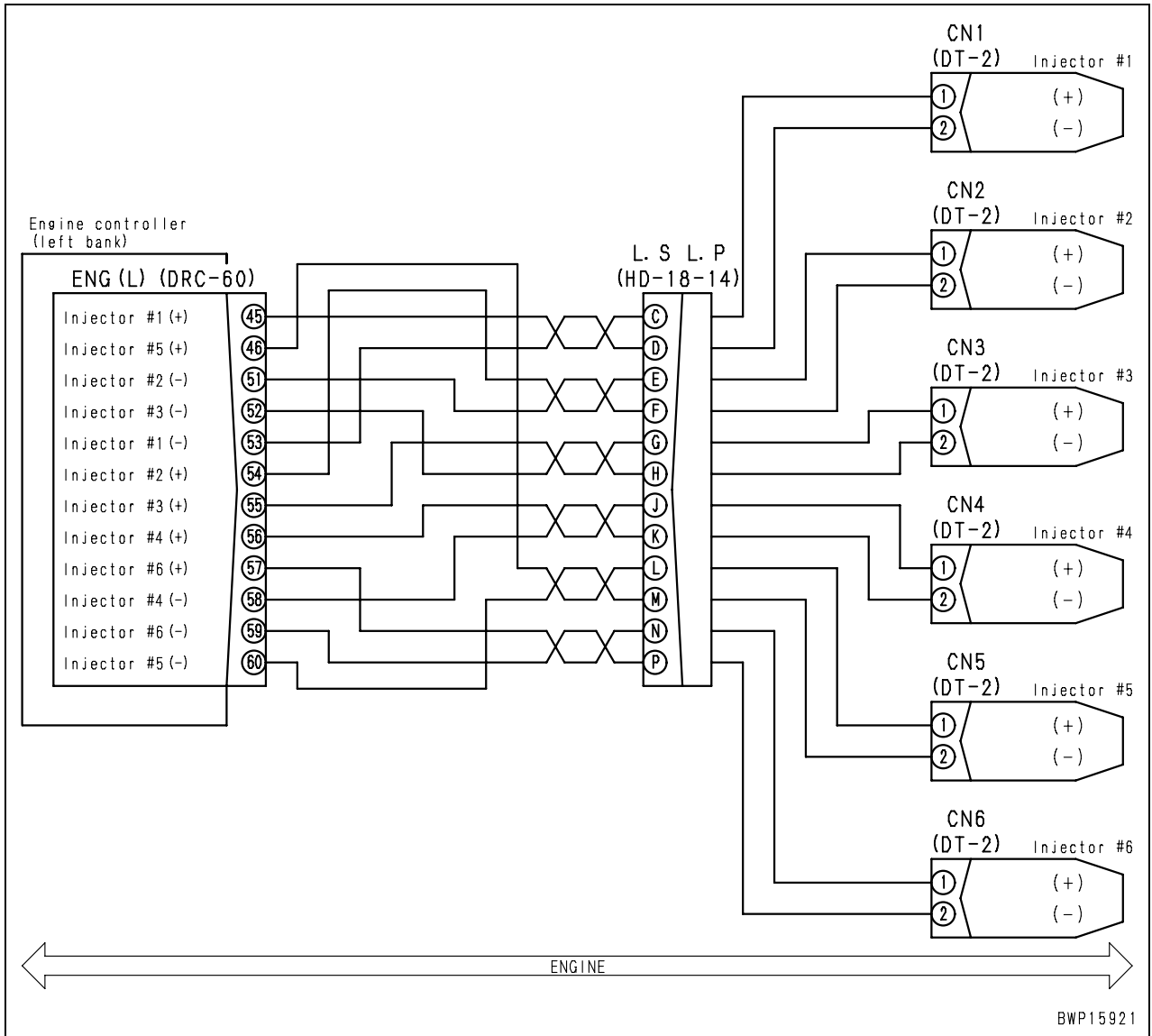
Possible causes and standard value in normal state	Cause	Standard value in normal state/Remarks on troubleshooting
		Carry out troubleshooting for failure code [CA212].

Failure code [CB272] IMV/PCV1 Open Error

User code	Failure code	Trouble	IMV/PCV1 Open Error (Engine controller system)
E10	CB272		
Contents of trouble	<ul style="list-style-type: none"> Disconnection occurred in supply pump PCV1 circuit. 		
Action of controller	<ul style="list-style-type: none"> Blinks warning lamp and sounds alarm buzzer. 		
Problem that appears on machine			
Related information			

Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting	
		1	Defective supply pump PCV1 (Internal disconnection)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.
PCV1 (male)				Resistance
Between (1) – (2)				2.3 – 5.3 Ω
Between (1), (2) – ground				Min. 1 MΩ
2		Disconnection in wiring harness (Disconnection in wiring or defective contact in connector)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.	
			Wiring harness between ENG (R) (female) (4) – PCV1 (female) (1)	Resistance Max. 1 Ω
			Wiring harness between ENG (R) (female) (5) – PCV1 (female) (2)	Resistance Max. 1 Ω
3		Ground fault in wiring harness (Contact with GND circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.	
			Wiring harness between ENG (R) (female) (4) – PCV1 (female) (1)	Resistance Min. 1 MΩ
			Wiring harness between ENG (R) (female) (5) – PCV1 (female) (2)	Resistance Min. 1 MΩ
4	Defective engine controller	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
		ENG (R) (female)	Resistance	
		Between (4) – (5)	2.3 – 5.3 Ω	
		Between (4), (5) – ground	Min. 1 MΩ	

Circuit diagram related to injector No. 3

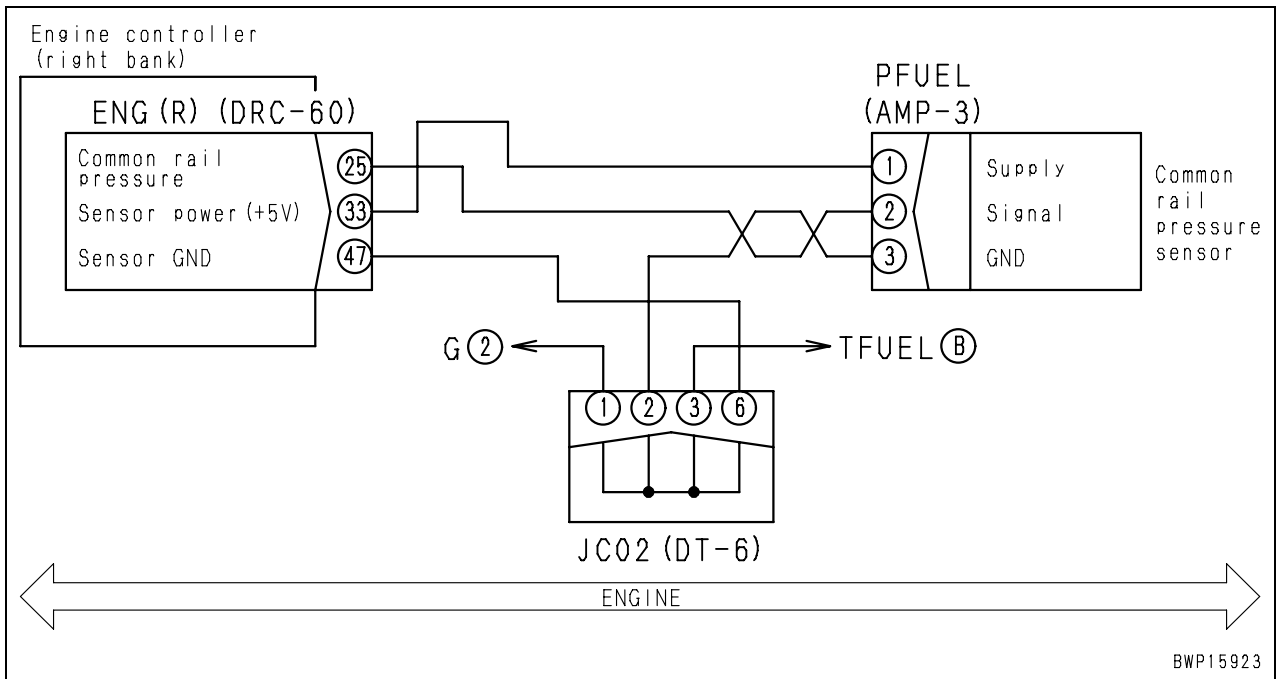


Failure code [CA386] Sens Supply 1 Volt High Error

User code	Failure code	Trouble	Sens Supply 1 Volt High Error (Engine controller system)
E15	CA386		
Contents of trouble	<ul style="list-style-type: none"> High voltage was detected in sensor power supply (1) (5 V) circuit. 		
Action of controller	<ul style="list-style-type: none"> Common rail pressure sensor limits output and continues operation (Limits common rail pressure). Blinks warning lamp and sounds alarm buzzer. 		
Problem that appears on machine	<ul style="list-style-type: none"> Output lowers. 		
Related information			

	Cause		Standard value in normal state/Remarks on troubleshooting		
	Possible causes and standard value in normal state	1	Related defective system	If another code is also displayed, carry out troubleshooting for it.	
2		Defective sensor (Internal defect)	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.		
			When device at right is disconnected, if error code disappears, that device has defect in it.	Left common rail pressure sensor	PFUEL connector
3		Disconnection in wiring harness (Disconnection in wiring or defective contact in connector)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Wiring harness between ENG (L) (female) (33) – PFUEL (female) (1)	Resistance	Max. 1 Ω
			Wiring harness between ENG (L) (female) (25) – PFUEL (female) (2)	Resistance	Max. 1 Ω
			Wiring harness between ENG (L) (female) (47) – PFUEL (female) (3)	Resistance	Max. 1 Ω
4		Ground fault in wiring harness (Contact with GND circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Wiring harness between ENG (L) (female) (33) – PFUEL (female) (1)	Resistance	Min. 1 MΩ
			Wiring harness between ENG (L) (female) (25) – PFUEL (female) (2)	Resistance	Min. 1 MΩ
			Wiring harness between ENG (L) (female) (47) – PFUEL (female) (3)	Resistance	Min. 1 MΩ
5		Short circuit in wiring harness (with another wiring harness)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Between wiring harness between ENG (L) (female) (33) – PFUEL (female) (1) and wiring harness between ENG (L) (female) (25) – PFUEL (female) (2)	Resistance	Min. 1 MΩ
			Between wiring harness between ENG (L) (female) (33) – PFUEL (female) (1) and wiring harness between ENG (L) (female) (47) – PFUEL (female) (3)	Resistance	Min. 1 MΩ
			Between wiring harness between ENG (L) (female) (25) – PFUEL (female) (2) and wiring harness between ENG (L) (female) (47) – PFUEL (female) (3)	Resistance	Min. 1 MΩ
6		Defective engine controller	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.		
			ENG (L)	Voltage	
			Between (33) – (47)	4.75 – 5.25 V	

Circuit diagram related to common rail pressure sensor



Failure code [CB689] Eng Ne Speed Sensor Error

User code	Failure code	Trouble	Eng Ne Speed Sensor Error (Engine controller system)
E15	CB689		
Contents of trouble	<ul style="list-style-type: none"> Abnormal signal of the engine Ne speed sensor has been detected. 		
Action of controller	<ul style="list-style-type: none"> Operates using Bkup speed sensor signal. Flashes warning lamp and turns on alarm buzzer. 		
Problem that appears on machine	<ul style="list-style-type: none"> Engine stops during operation (when Bkup speed sensor is defective at the same time). Engine cannot be started while stopping (when Bkup speed sensor is defective at the same time). 		
Related information			

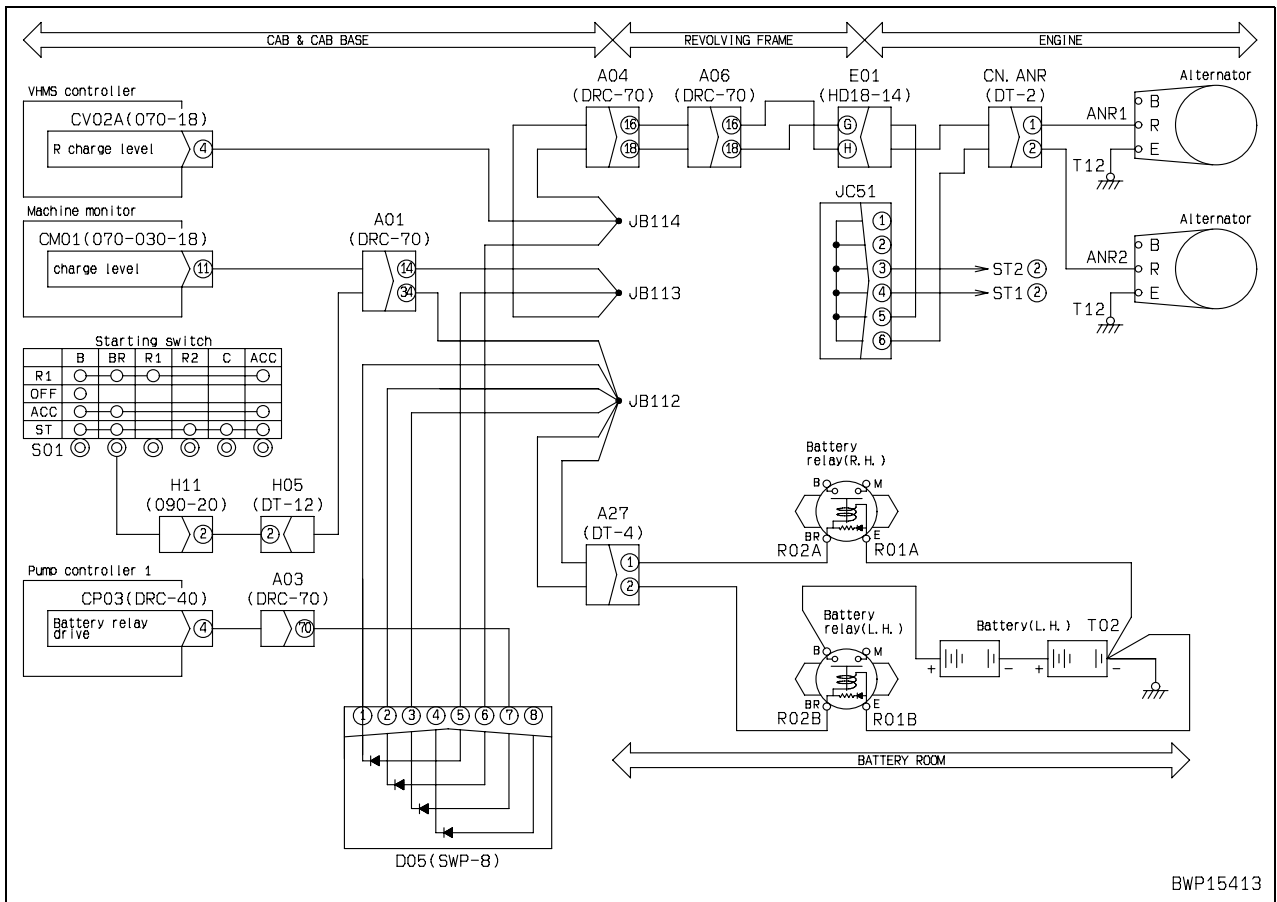
Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting			
		1	Defective sensor power source circuit	If failure code [CB238] is displayed at the same time, carry out troubleshooting for it first.		
2		Disconnection in wiring harness (disconnection or defective contact of connectors)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			Wiring harness between ENG (L) (female) (16) – NE (female) (1)	Resistance	Max. 1 Ω	
			Wiring harness between ENG (R) (female) (48) – NE (female) (2)	Resistance	Max. 1 Ω	
3		Defective harness grounding (contact with ground circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			Between ground and wiring harness between ENG (L) (female) (16) – NE (female) (1)	Resistance	Min. 1 MΩ	
			Between ground and wiring harness between ENG (R) (female) (48) – NE (female) (2)	Resistance	Min. 1 MΩ	
			Between ground and wiring harness between ENG (R) (female) (27) – NE (female) (3)	Resistance	Min. 1 MΩ	
4		Harness short (Harness internal short)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			Between wiring harness from ENG (L) (female) (16) to NE (female) (1) and wiring harness from ENG (R) (female) (48) to NE (female) (2)	Resistance	Min. 1 MΩ	
			Between wiring harness from ENG (L) (female) (16) to NE (female) (1) and wiring harness from ENG (R) (female) (27) to NE (female) (3)	Resistance	Min. 1 MΩ	
5		Defective mounting of sensor or defective parts for speed detection	Since defective mounting of Ne speed sensor (improper gap) or defective parts for speed detection (flywheel) can be suspected, directly check it.			
6	Defective engine Ne speed sensor	Engine Ne speed sensor can be suspected to be defective if no problem is found in causes 1 – 5 (since this is an internal defect, it cannot be diagnosed).				
7	Defective engine controller	Engine controller can be suspected to be defective if no problem is found in causes 1 – 6 (since this is an internal defect, it cannot be diagnosed).				

Failure code [CA1633] KOMNET Data link Time out Error

User code	Failure code	Trouble	KOMNET Data link Time out Error (Engine controller system)
E0E	CA1633		
Contents of trouble	<ul style="list-style-type: none"> Abnormality occurred in KOMNET communication circuit to engine controller (Left bank). 		
Action of controller	<ul style="list-style-type: none"> Operates in default mode or holds the state set when error occurred. Blinks warning lamp and sounds alarm buzzer. 		
Problem that appears on machine	<ul style="list-style-type: none"> Information may not be transmitted or received normally through KOMNET communication system and machine may not operate normally. 		
Related information			

Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting		
		1	Disconnection in wiring harness (Disconnection in wiring or defective contact in connector)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.	
Wiring harness between CE02 (female) (46) – CE05 (female) (46)				Resistance	Max. 1 Ω
Wiring harness between CE02 (female) (47) – CE05 (female) (47)				Resistance	Max. 1 Ω
Wiring harness between CE02 (female) (46) – CE02 (female) (47)				Resistance	54 – 66 Ω
2		Ground fault in wiring harness (Contact with GND circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Wiring harness between CE02 (female) (46) – CE05 (female) (46)	Resistance	Min. 1 MΩ
			Wiring harness between CE02 (female) (47) – CE05 (female) (47)	Resistance	Min. 1 MΩ
3		Defective engine controller	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Wiring harness between CE02 (female) (46) – CE02 (female) (47)	Resistance	54 – 66 Ω
	Wiring harness between CE05 (female) (46) – CE05 (female) (47)		Resistance	54 – 66 Ω	

Circuit diagram related to battery relay drive



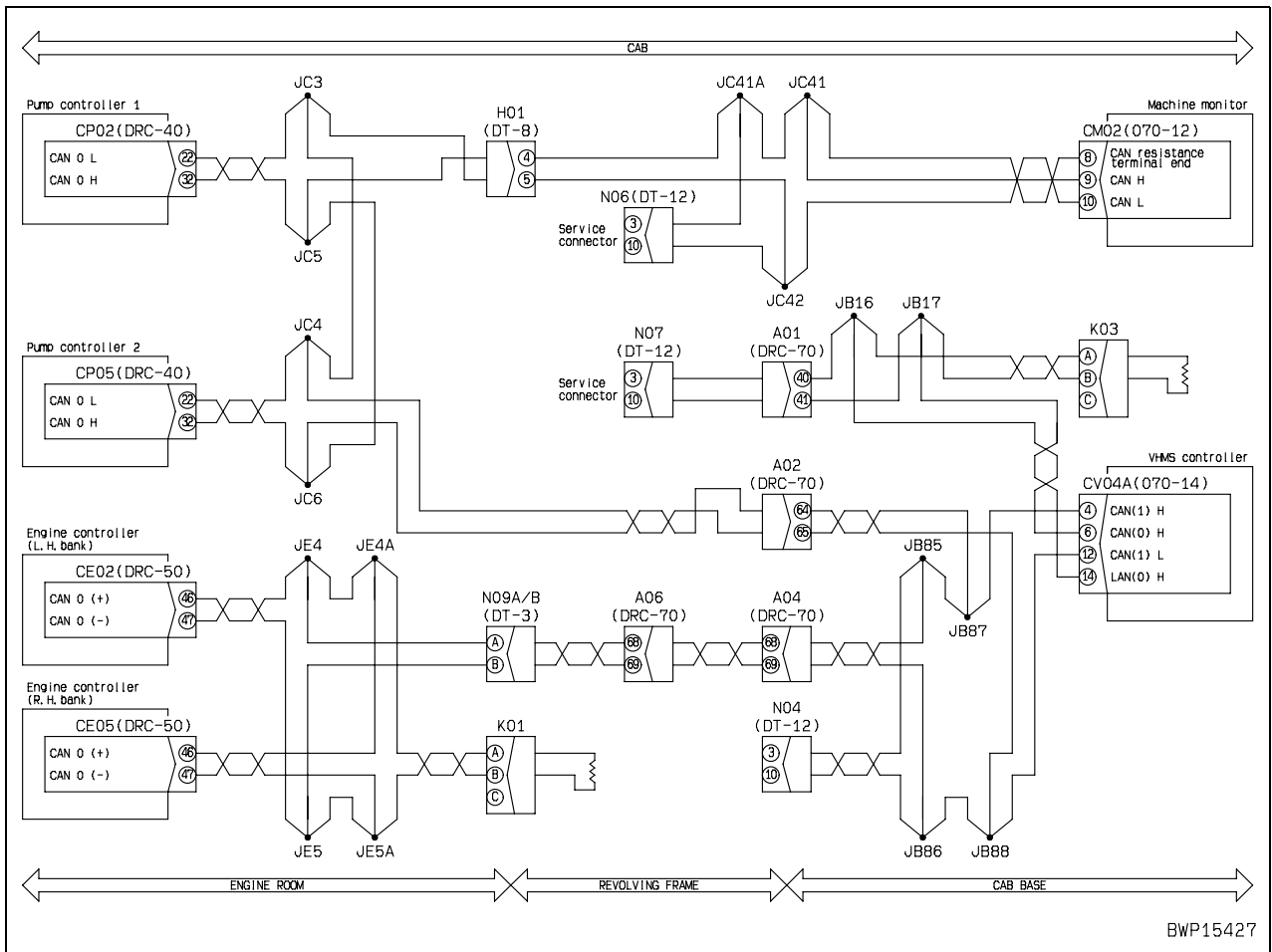
BWP15413

Failure code [DA22KK] Pump 1 Solenoid Power Low Error

User code	Failure code	Trouble	Pump 1 Solenoid Power Low Error (Pump controller 1 system)
E0E	DA22KK		
Contents of trouble	<ul style="list-style-type: none"> Pump controller solenoid valve is below 20 V. 		
Action of controller	<ul style="list-style-type: none"> Limits engine speed to upper limit of 1,400 rpm. 		
Problem that appears on machine	<ul style="list-style-type: none"> If the solenoid supply voltage drops radically, the swing speed of work equipment and machine travel speed are substantially reduced. Engine speed does not rise above 1,400 rpm. 		
Related information	<ul style="list-style-type: none"> If [D110KB] is displayed, carry out troubleshooting for it first. 		

Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting		
		1	Defective circuit breaker B24	★ If circuit breaker B24 is turned OFF, circuit probably has ground fault etc. (See Cause 3.)	
2		Disconnection in wiring harness (Disconnection in wiring or defective contact in connector)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Wiring harness between C03 (female) (1), (2), (12), (22) – A03 (male) (2)	Resistance	Max. 1 Ω
			Wiring harness between A03 (female) (2), (4) – B28B	Resistance	Max. 1 Ω
			Wiring harness between battery relay terminal M – B11	Resistance	Max. 1 Ω
			Wiring harness between starting switch terminal BR – battery relay terminal BR	Resistance	Max. 1 Ω
			Wiring harness between C03 (female) (21), (31), (32), (33) – JB54 – ground	Resistance	Min. 1 MΩ
3		Ground fault in wiring harness (Contact with GND circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Wiring harness between C03 (female) (1), (2), (12), (22) – A03 (male) (2), (4)	Resistance	Min. 1 MΩ
			Wiring harness between A03 (female) (2), (4) – B28B	Resistance	Min. 1 MΩ
			Wiring harness between battery relay terminal M – B28B	Resistance	Min. 1 MΩ
4		Defective pump controller 1	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.		
			Between CP03 (1), (2), (12), (22) – (21), (31), (32), (33)	Voltage	20 – 30 V

Circuit diagram related to CAN communication (pump controller 1)

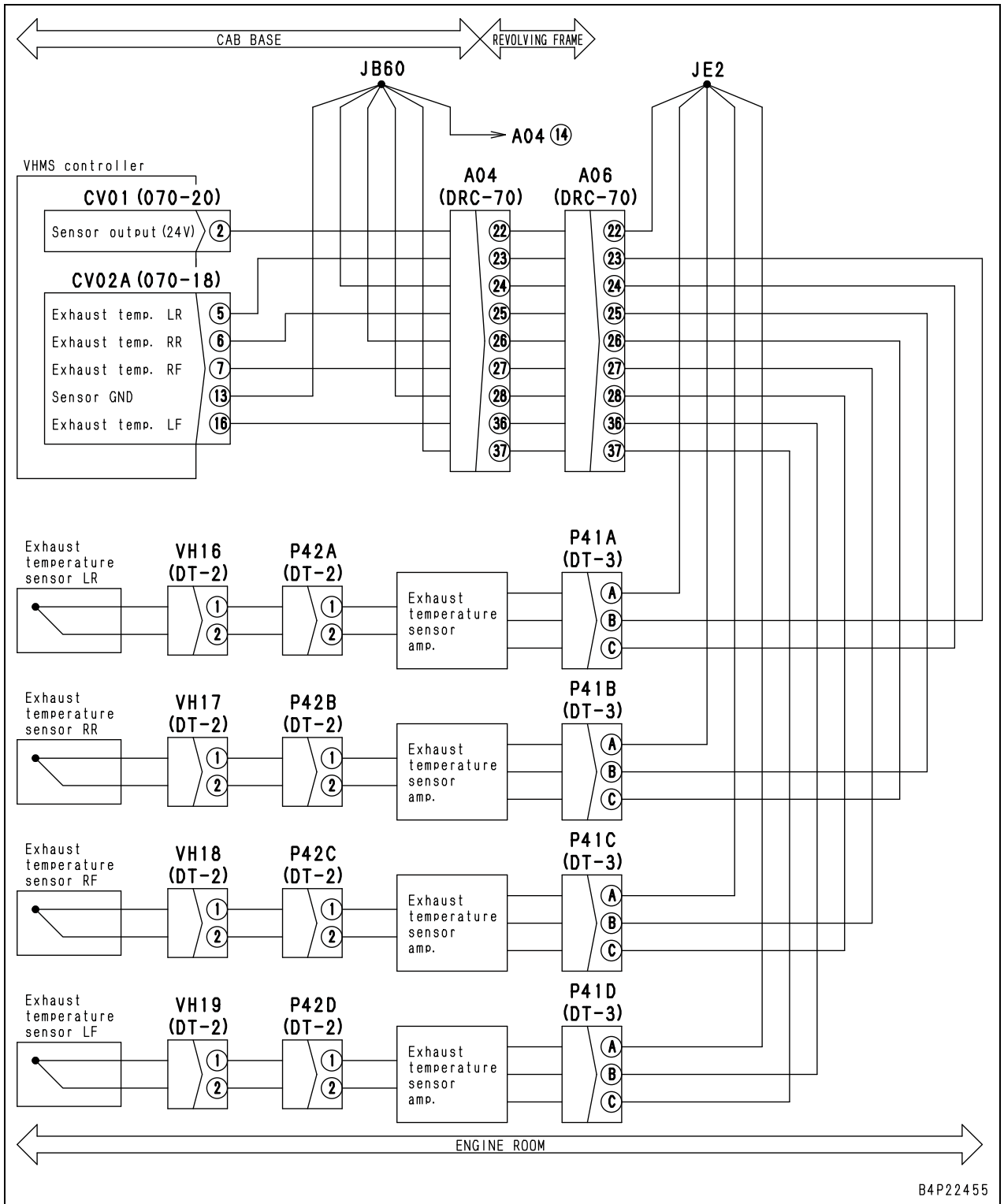


Failure code [DBBQKR] KOM-NET/c error (or change of VHMS-LED display from n8 to 02)

User code	Failure code	Trouble	KOM-NET/c error (VHMS controller system)
—	DBBQKR		
Contents of trouble	<ul style="list-style-type: none"> Communication (CANNET) information from engine controller, pump controller and machine monitor cannot be received. 		
Action of controller	<ul style="list-style-type: none"> The state of error occurred is held. 		
Problem that appears on machine	<ul style="list-style-type: none"> VHMS function fails to collect information from respective controllers. 		
Related information	<ul style="list-style-type: none"> Failure codes of VHMS system are not recorded on the trouble data of the machine monitor. VHMS controller 7-segment LED display: n8 → 02 (codes are displayed by 2 digits) If failure codes [CA1633], [DA2RMC] and [DAFRMC] are indicated, carry out troubleshooting for those codes first. 		

Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting		
		1	Disconnection in wiring harness (Disconnection or defective contact in connector)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.	
Wiring harness between CM02 (female) (10) – CE02, CE05 (female) (47) – CP02, CP05 (female) (22) – VH04 (female) (12)				Resistance	Max. 1 Ω
Wiring harness between CM02 (female) (8), (9) – CE02, CE05 (female) (46) – CP02, CP05 (female) (32) – VH04 (female) (4), (6), (14)				Resistance	Max. 1 Ω
2		Ground fault in wiring harness (Contact with GND circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Wiring harness between CM02 (female) (10) – CE02, CE05 (female) (47) – CP02, CP05 (female) (22) – VH04 (female) (12), and chassis ground	Resistance	Min. 1 MΩ
			Wiring harness between CM02 (female) (8), (9) – CE02, CE05 (female) (46) – CP02, CP05 (female) (32) – VH04 (female) (4), (6), (14), and chassis ground	Resistance	Min. 1 MΩ
3		Hot short in wiring harness (Contact with 24 V circuit)	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.		
			Wiring harness between CM02 (female) (10) – CE02, CE05 (female) (47) – CP02, CP05 (female) (22) – VH04 (female) (12), and chassis ground	Voltage	Max. 1 V
			Between wiring harness between CM02 (female) (8), (9) – CE02, CE05 (female) (46) – CP02, CP05 (female) (32) – VH04 (female) (4), (6), (14), and chassis ground	Voltage	Max. 1 V
4		Defective VHMS controller	1) Turn the starting switch OFF. 2) Replace VHMS controller 3) Turn starting switch ON.		
			Communication normal?	Normal	Defective VHMS controller
				Abnormal	VHMS controller is normal

Circuit diagram related to exhaust temperature sensor

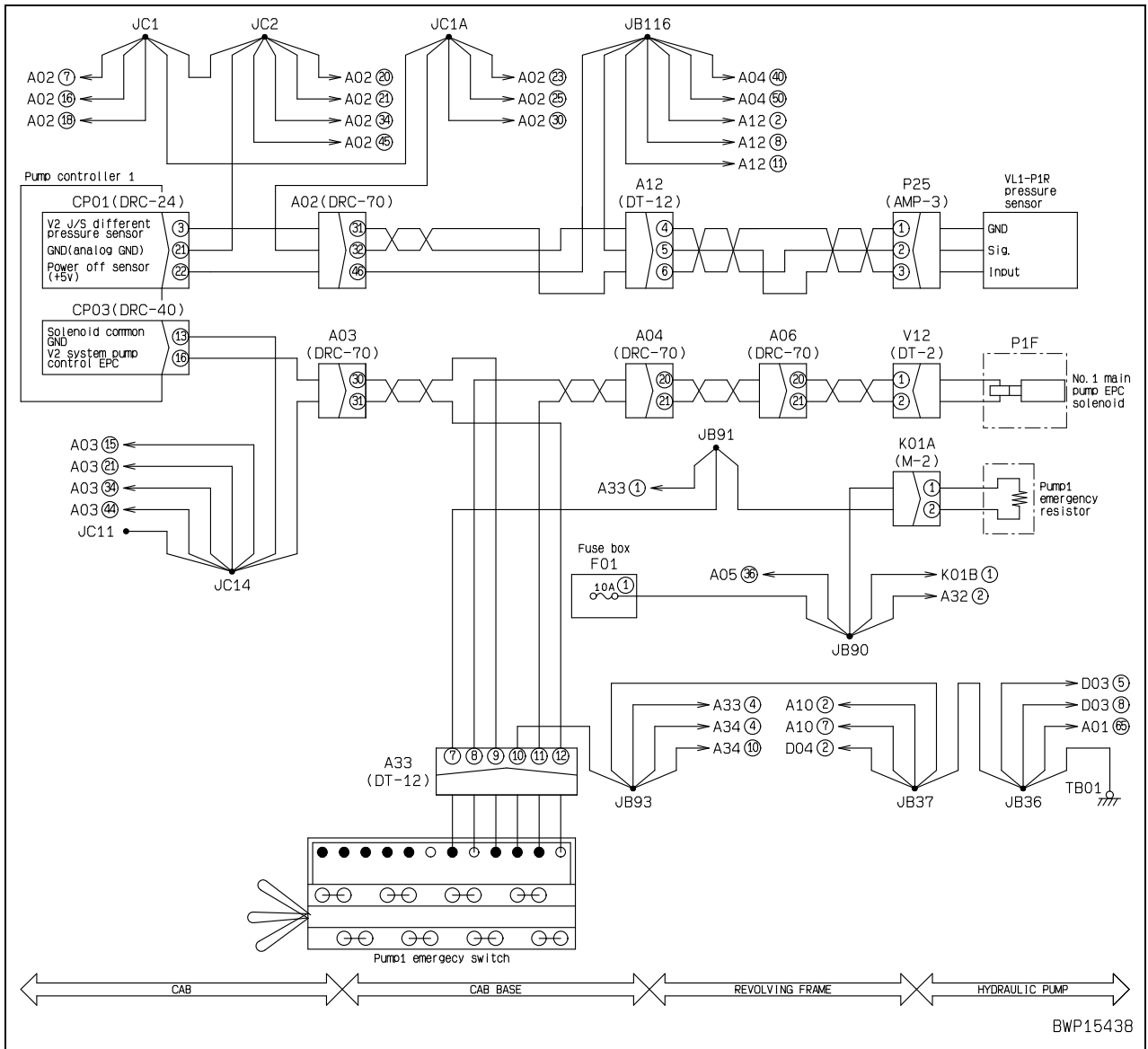


Failure code [DH26KX] VL1/P1R J/S Dif Press Sensor Abnormality

User code	Failure code	Trouble	VL1/P1R J/S Dif Press Sensor Abnormality (Pump controller 1 system)
E07	DH26KX		
Contents of trouble	<ul style="list-style-type: none"> Pressure sensor output voltage is below 0.3 V or above 4.42 V. 		
Action of controller	<ul style="list-style-type: none"> Restricts the pump control (NC control) function. 		
Problem that appears on machine	<ul style="list-style-type: none"> Part of the pump control (NC control) is disabled. 		
Related information	<ul style="list-style-type: none"> Input from the J/S differential pressure sensor can be checked with monitoring function. (Code: 13805 VL1 J/S differential pressure, Code: 13809 VL1 J/S differential pressure sensor voltage) 		

Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting			
		1	Defective 5 V sensor power supply system	If failure code [DA26KP] is also indicated, carry out troubleshooting for it first.		
2		Defective VL1-P1R J/S differential pressure sensor (Internal disconnection or short circuit)	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.			
			P27	Measurement condition	Voltage	
			Between (1) and (2)	Engine stopped	4.5 – 5.5 V	
			Between (3) and (2)	Engine stopped	0.5 – 1.5 V	
3		Disconnection in wiring harness (Disconnection or defective contact in connector)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			Wiring harness between CP01 (female) (2) – P27 (female) (1)	Resistance	Max. 1 Ω	
			Wiring harness between CP01 (female) (21) – P27 (female) (2)	Resistance	Max. 1 Ω	
4		Ground fault in wiring harness (Contact with GND circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			Between wiring harness CP01 (female) (2) – P27 (female) (1) and chassis ground	Resistance	Min. 1 MΩ	
			Between wiring harness CP03 (female) (34) – P27 (female) (3) and chassis ground	Resistance	Min. 1 MΩ	
5		Hot short in wiring harness (Contact with 24 V circuit)	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.			
			Between wiring harness CP01 (female) (2) – P27 (female) (1) and chassis ground	Voltage	Max. 1 V	
			Between wiring harness CP03 (female) (34) – P27 (female) (1) and chassis ground	Voltage	Max. 6 V	
6		Defective pump controller 1	If causes 1 – 5 are not detected, pump controller may be defective. (Troubleshooting cannot be carried out since trouble is in system.)			

Circuit diagram related to VL1/P1R pump pressure sensor



Failure code [DHS8KX] Boom Raise PPC Press Sensor Abnormality

User code	Failure code	Trouble	Boom Raise PPC Press Sensor Abnormality (Pump controller 2 system)
—	DHS8KX		
Contents of trouble	<ul style="list-style-type: none"> Pressure sensor output voltage is below 0.3 V or above 4.42 V. 		
Action of controller	<ul style="list-style-type: none"> None in particular (Provides the error display alone). 		
Problem that appears on machine	<ul style="list-style-type: none"> Boom Raise cannot be judged. 		
Related information	<ul style="list-style-type: none"> Input from boom Raise PPC pressure sensor can be checked with monitoring function. (Code: 07401 Boom Raise PPC pressure sensor voltage) 		

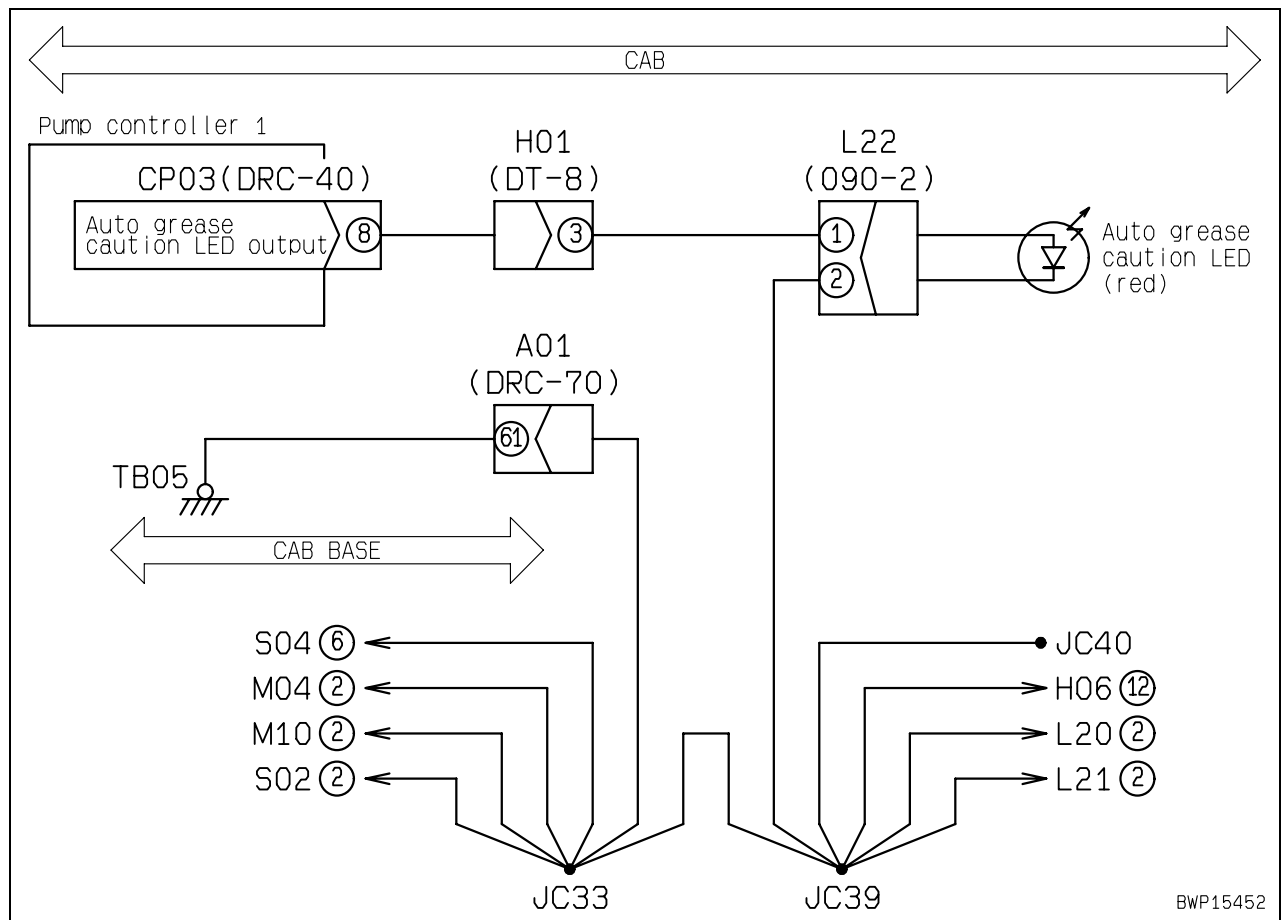
Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting		
		1	Defective 5 V sensor power supply system	If failure code [dA25KP] is also indicated, carry out troubleshooting for it first.	
2		Defective boom Raise PPC pressure sensor (Internal disconnection or short circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			P01 (male)		Voltage
			Between (3) and (1)	4.5 – 5.5 V	
			Between (2) and (1)	0.5 – 4.5 V	
3		Disconnection in wiring harness (Disconnection or defective contact in connector)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Wiring harness between CP04 (female) (20) – P01 (female) (2)	Resistance	Max. 1 Ω
			Wiring harness between CP04 (female) (21) – P01 (female) (1)	Resistance	Max. 1 Ω
			Wiring harness between CP04 (female) (22) – P01 (female) (3)	Resistance	Max. 1 Ω
4		Ground fault in wiring harness (Contact with GND circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Between wiring harness CP04 (female) (20) – P01 (female) (2) and chassis ground	Resistance	Min. 1 MΩ
			Between wiring harness CP04 (female) (22) – P01 (female) (3) and chassis ground	Resistance	Min. 1 MΩ
5		Hot short in wiring harness (Contact with 24 V circuit)	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.		
			Between wiring harness CP04 (female) (20) – P01 (female) (2) and chassis ground	Voltage	Max. 1 V
			Between wiring harness CP04 (female) (22) – P01 (female) (3) and chassis ground	Voltage	Max. 6 V
6		Defective pump controller 2	★ Prepare with starting switch OFF, then turn starting switch ON or start engine and carry out troubleshooting in each case.		
			CP04	Voltage	
			Between (22) and (21)	4.5 – 5.5 V	
			Between (20) and (21)	0.5 – 4.5 V	

Failure code [DUM3KB] Auto Grease Caution LED Short Circuit

User code	Failure code	Trouble	Auto Grease Caution LED Short Circuit (Pump controller 1 system)
—	DUM3KB		
Contents of trouble	<ul style="list-style-type: none"> Short circuit was detected in the automatic lubrication abnormal LED circuit 		
Action of controller	<ul style="list-style-type: none"> Stops output to the circuit. 		
Problem that appears on machine	<ul style="list-style-type: none"> LED is not lit up 		
Related information	<ul style="list-style-type: none"> The input status (ON or OFF) from the automatic lubrication abnormality LED can be checked with the monitoring function. Monitoring code: 03702 Controller output 3 		

Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting	
	1	Ground fault in wiring harness (Short circuit with GND circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON. Wiring harness between CP03 (female) (8) – L22 (female) (1) and chassis ground	Resistance
2	Defective pump controller 1	If cause 1 is not found, the pump controller may be defective. (Troubleshooting cannot be carried out since the trouble is in the system.)		

Circuit diagram related to auto greasing caution LED output

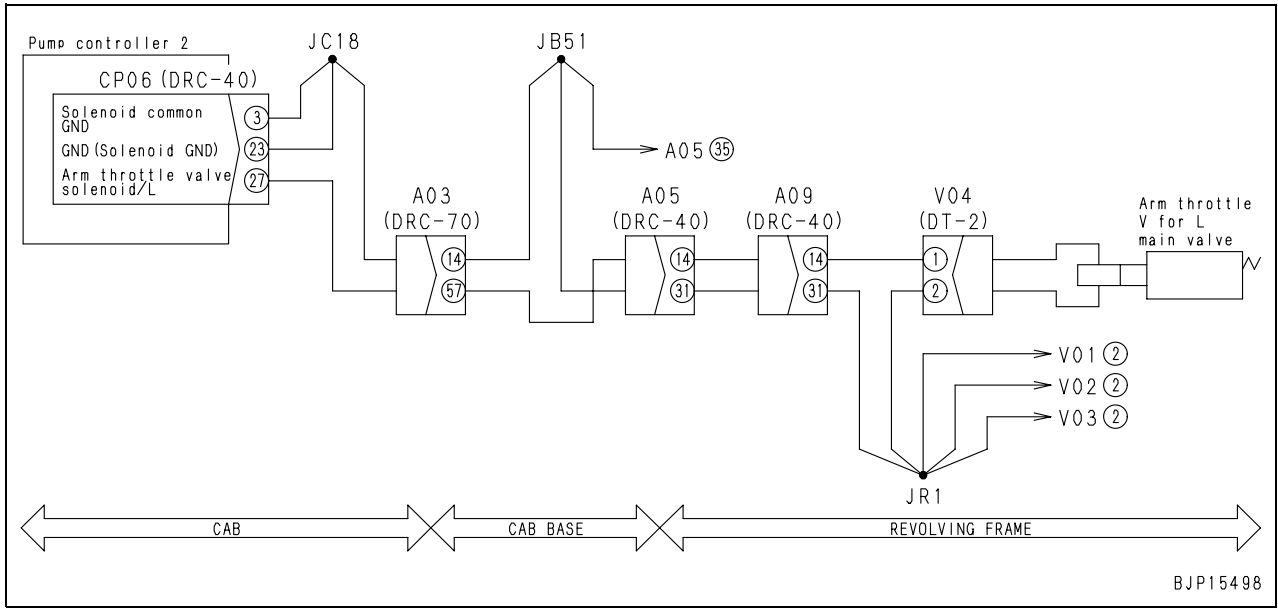


Failure code [DW91KB] Straight-Travel Sol. S/C

User code	Failure code	Trouble	Straight-Travel Sol. S/C (Pump controller 2 system)
—	DW91KB		
Contents of trouble	<ul style="list-style-type: none"> Abnormal current flew to the straight travel circuit, when power was supplied to the circuit. 		
Action of controller	<ul style="list-style-type: none"> Power supply to the straight travel circuit is switched OFF. Even if the failure cause disappears of itself, the solenoid circuit does not return to normalcy, unless the engine starting switch is once turned OFF. 		
Problem that appears on machine	<ul style="list-style-type: none"> When both tracks and work equipment are operated simultaneously, the machine deviates. 		
Related information	<ul style="list-style-type: none"> Operation of the straight travel solenoid (ON or OFF) can be checked in the monitoring function. (Code No. 02300: Solenoid 1) 		

Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting			
		1	Straight travel solenoid defective (Internal short-circuiting or grounding fault)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
V07 (male)				Resistance value		
Between (1) and (2)				20 – 60 Ω		
Between (1) and grounding				Min. 1 MΩ		
2		Grounding fault of wiring harness (Contact with grounding circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			Between wiring harness between CP06 (female) (5) – V07 (female) (1) and grounding	Resistance value	Min. 1 MΩ	
3		Pump controller 2 defective	★ Prepare with starting switch OFF, then start engine and carry out troubleshooting.			
			CP06	Control lever	Voltage	
			Between (5) – (13)	NEUTRAL	Max. 1 V	
Both tracks operation + Work equipment operation	20 – 30 V					

Circuit diagram related to arm throttle valve (L) solenoid

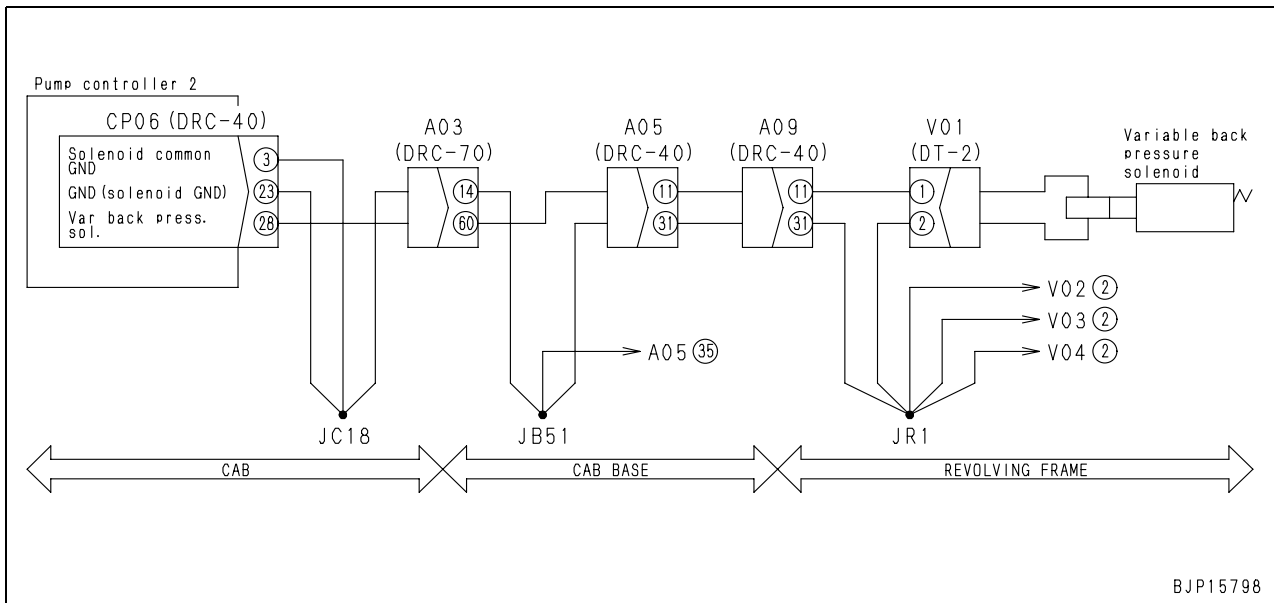


Failure code [DWK2KA] Back Press Comp Valve Sol Open Circuit

User code	Failure code	Trouble	Back Press Comp Valve Sol Open Circuit (Pump controller 2 system)
—	DWK2KA		
Contents of trouble	<ul style="list-style-type: none"> Open error was detected in the variable back pressure solenoid valve circuit. 		
Action of controller	<ul style="list-style-type: none"> None in particular. (Since no current flows, solenoid does not operate.) If cause of failure disappears, the system resets itself. 		
Problem that appears on machine	<ul style="list-style-type: none"> Relief pressure except that for the swing and travel sometimes deviates from the standard set pressure. 		
Related information	<ul style="list-style-type: none"> The input status (ON or OFF) from the variable backpressure solenoid valve can be checked with the monitoring function. (Monitoring code: 02300 Solenoid 3) 		

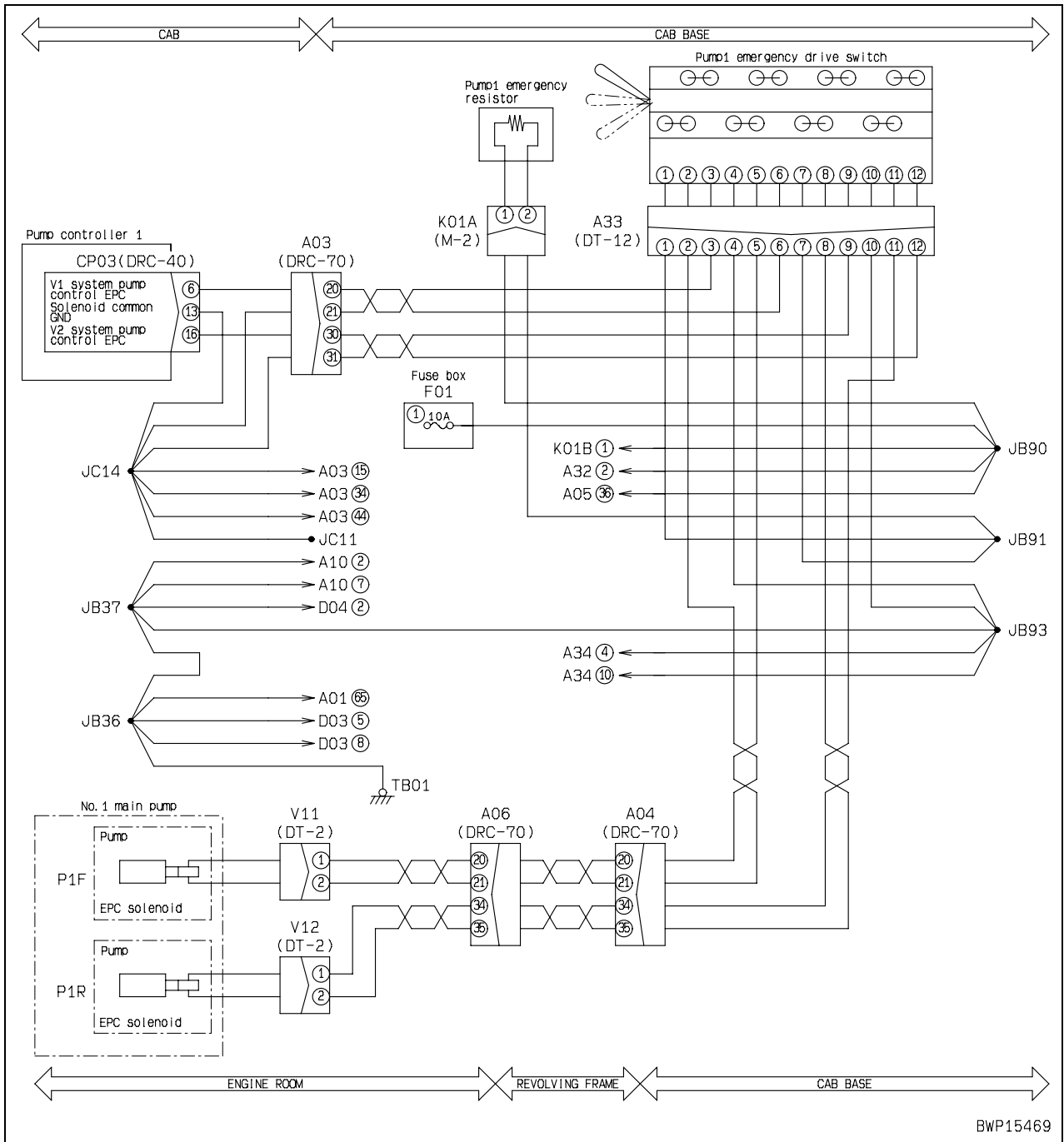
Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting			
		1	Defective variable back pressure solenoid valve (Internal disconnection)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
V01 (male)				Resistance		
Between (1) and (2)				20 – 60 Ω		
2		Disconnection in wiring harness (Disconnection or defective contact in connector)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.			
			Wiring harness between CP06 (female) (3) (23) – V01 (female) (2)	Resistance	Max. 1 Ω	
			Wiring harness between CP06 (female) (28) – V01 (female) (1)	Resistance	Max. 1 Ω	
			★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting			
3		Hot short in wiring harness (Contact with 24 V circuit)	Wiring harness between CP06 (female) (28) – V01 (female) (1) and ground chassis	Voltage	Max. 1 V	
			★ Prepare with starting switch OFF, then turn starting switch ON or start engine and carry out troubleshooting in each case.			
4		Defective pump controller 2	CP06	Swing control lever	Voltage	
			Between (28) – (23)		At neutral	Max. 1 V
					In swing operation	20 – 30 V

Circuit diagram related to back pressure compensation valve solenoid



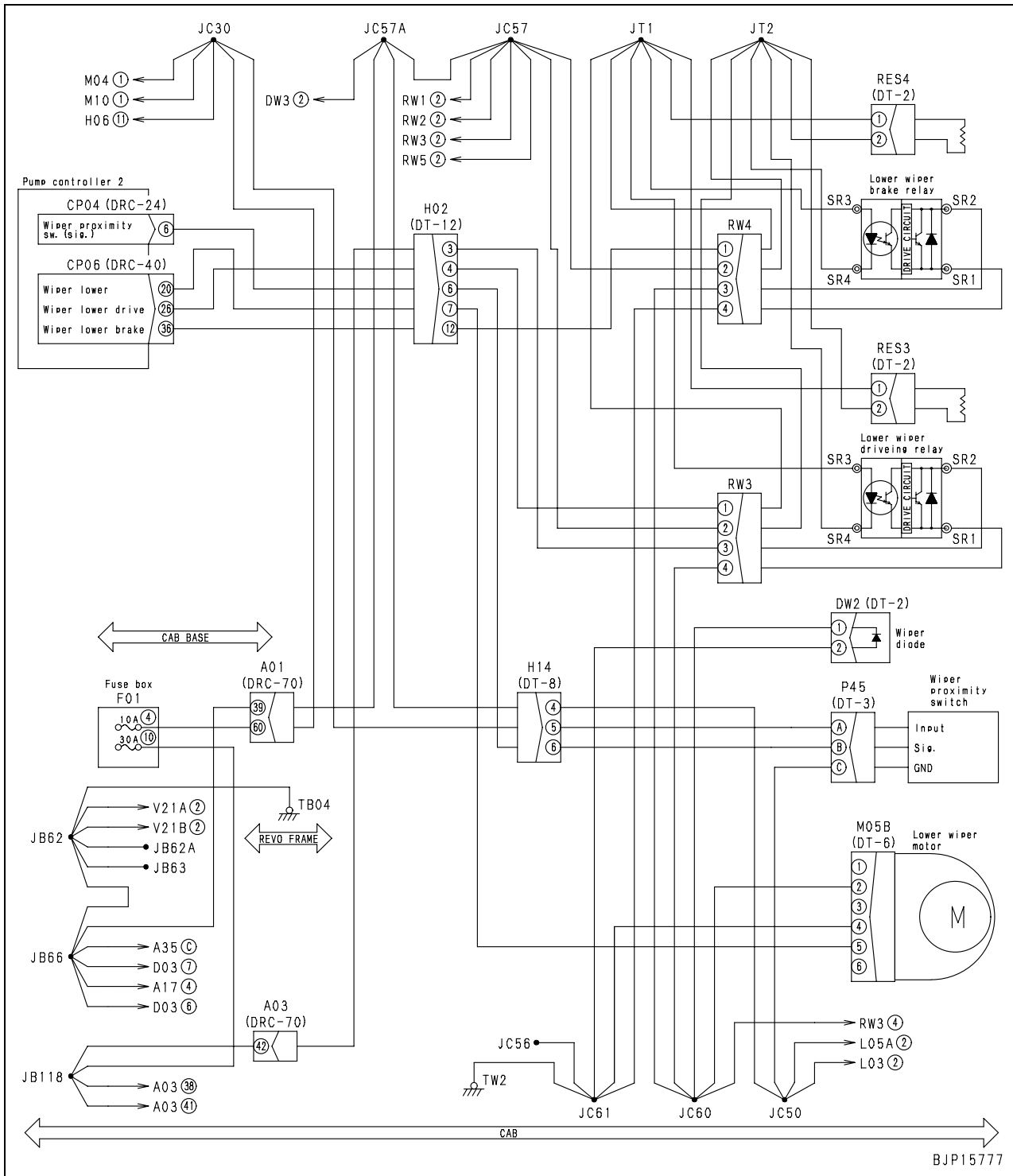
BJP15798

Circuit diagram related to P1R pump EPC solenoid

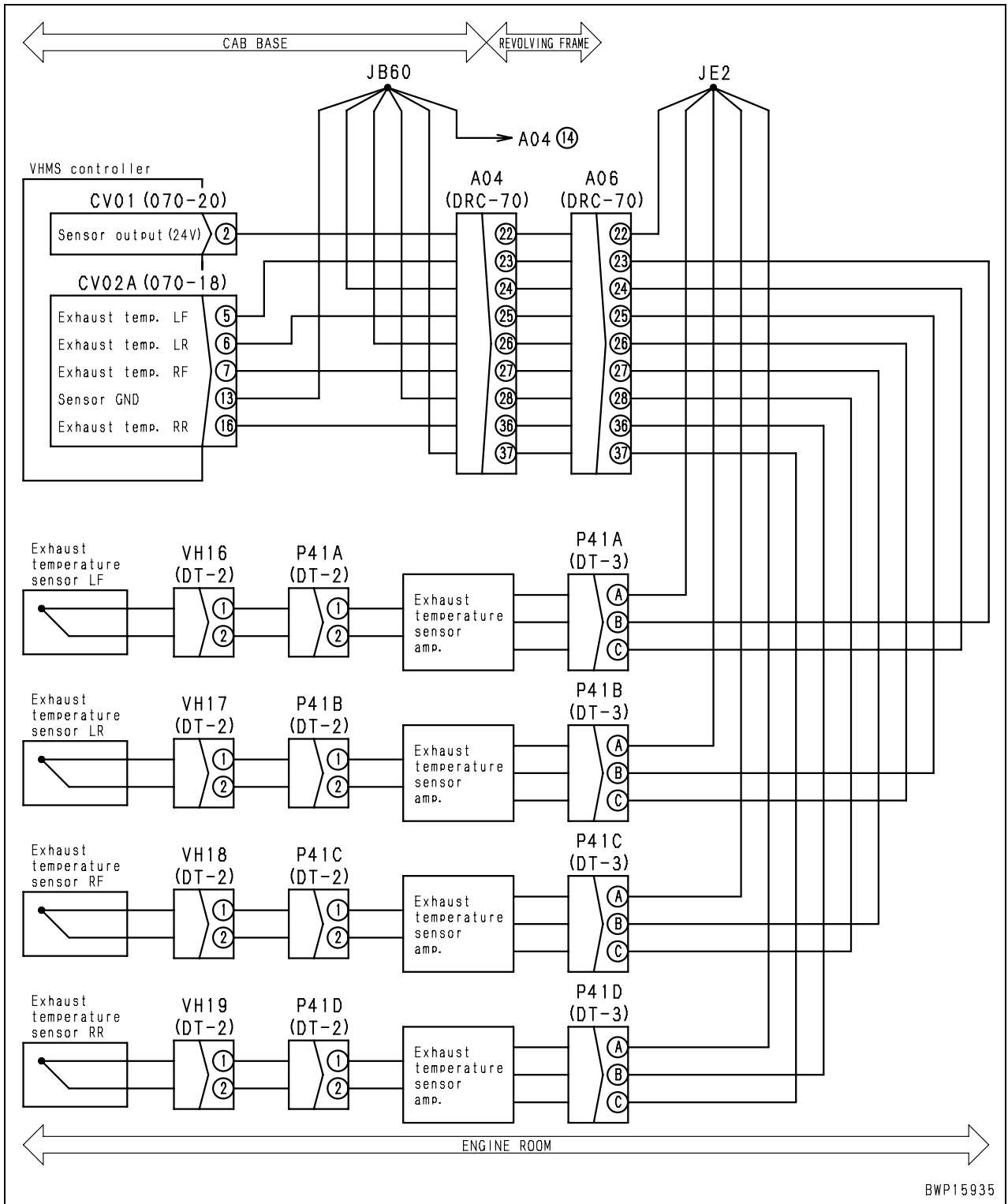


BWP15469

Circuit diagram related to lower wiper motor

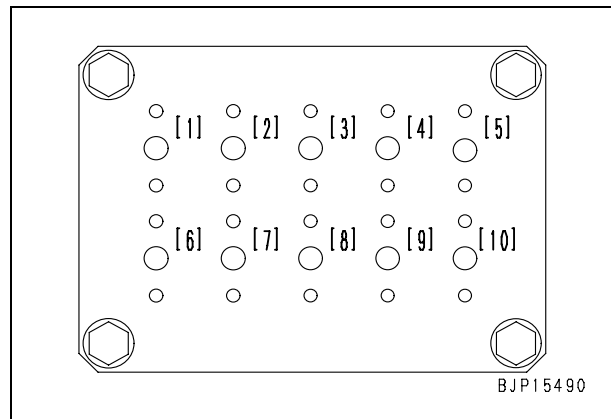


Electrical diagram related to exhaust temperature sensor



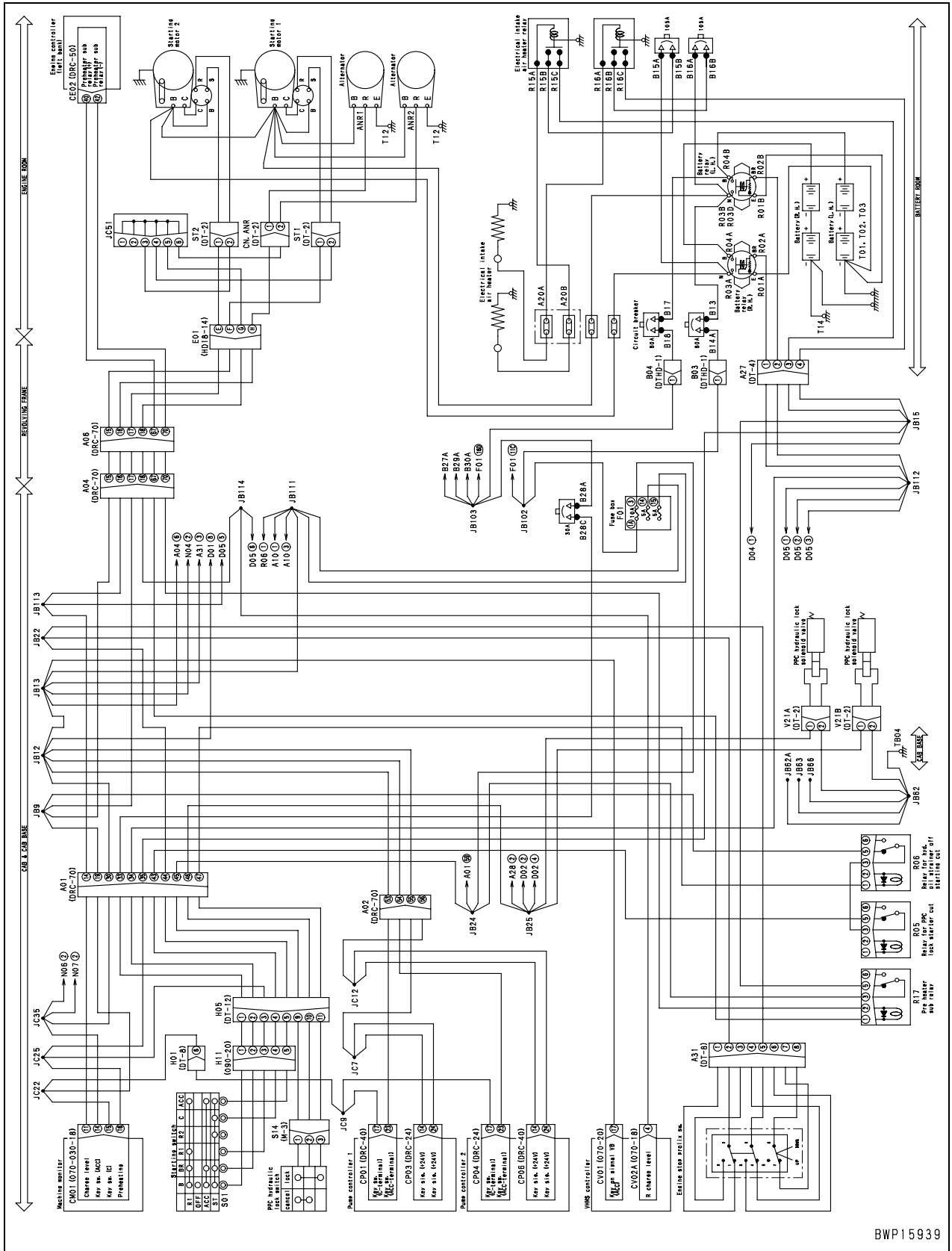
● Circuit breaker (A)

Type of power supply	Circuit breaker (A) Terminal numbers are shown in brackets ().	Destination of power
Circuit breaker (2) for switch power supply 60A	(1) 20A (B25A-B25B)	Pump controller 2
	(2) 20A (B24A-B24B)	Pump controller 1
	(3) 20A (B23A-B23B)	PPC lock solenoid valve
		Working lamp power supply (R08 relay)
	(4) 30A (B22A-B22B)	Right working lamp power supply (R10 relay)
(5) 30A (B21A-B21B)	Left working lamp power supply (R11 relay)	
Constant power supply circuit breaker (3) 60A	(6) 30A (B30A-B30B)	Engine right controller
	(7) 30A (B29A-B29B)	Engine left controller
	(8) 30A (B28A-B28B)	Starting switch
		Machine monitor
		Pump controller 1 Pump controller 2
(9) 20A (B27A-B27B)	VHMS controller ORBCOM controller	
Switch power supply circuit breaker (1) 60A	(10) 20A (B26A-B26B)	VHMS controller



* Figure in the () shows a circuit breaker number in the circuit diagram

Related electrical circuit diagram



BWP15939

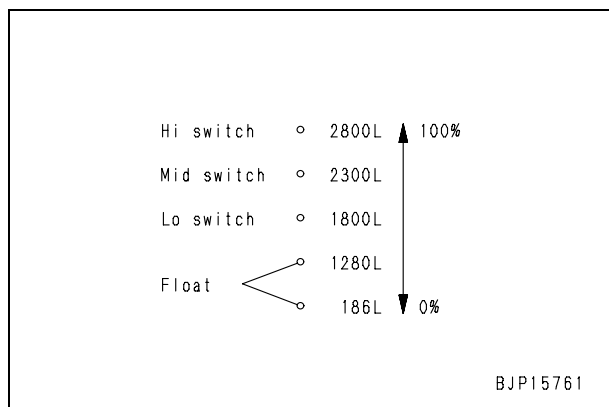
E-14 Fuel level gauge does not indicate normally

Trouble	<ul style="list-style-type: none"> While fuel is added, fuel level gauge does not rise from red range (E). While fuel level is low, fuel level gauge does not lower from green range (F).
Related information	<ul style="list-style-type: none"> If failure code [DA2RMC] or [dA2RMC] is displayed, carry out troubleshooting for those codes first. Input from the fuel level sensor (voltage) can be checked with monitoring function (Code: 04200 Fuel sensor voltage).

Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting					
	Possible causes and standard value in normal state	1	Defective fuel level switch	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.				
Monitoring code: Check the state of the incoming signal from the fuel level switch from 02307 SWITCH INPUT 4.								
When normal (When fuel tank is full)				Hi switch: ON				
				Mid switch: ON				
		Lo switch: ON						
* If either the Mid switch or Lo switch is OFF, the full-tank indication does not appear.								
Possible causes and standard value in normal state	2	Defective fuel level sensor (internal disconnection or short circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.					
			P21A (male)	Fuel level	Resistance			
			Between (1) and chassis ground	FULL (Upper limit)	Approximately 12 Ω			
				EMPTY (Lower limit)	85 – 110 Ω			
Possible causes and standard value in normal state	3	Disconnection in wiring harness (Disconnection in wiring or defective contact of connector)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.					
			Wiring harness between CM01 (female) (9) – P21A (female) (1)		Resistance	Max. 1 Ω		
Possible causes and standard value in normal state	4	Grounding fault in wiring harness (Short circuit with ground circuit)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.					
			Between harness CM01 (female) (9) – P21A (female) (1) and chassis ground		Resistance	Min. 1 MΩ		
Possible causes and standard value in normal state	5	Hot short circuit in wiring harness (Contact with 24V circuit)	★ Prepare with starting switch OFF, then turn starting switch ON and carry out troubleshooting.					
			Between harness CM01 (female) (9) – P21A (female) (1) and chassis ground		Voltage	Max. 1 V		
Possible causes and standard value in normal state	6	Defective machine monitor	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.					
			CM01	Fuel level	Resistance			
			Between (9) and chassis ground	FULL (Upper limit)	Approximately 12 Ω			
				EMPTY (Lower limit)	85 – 110 Ω			

Remarks: For PC 2000, shift in the fuel level up to the present time is interpolated based on the calculation done on the present value indicated by the fuel level switch. If any of the Hi, Mid and Lo switches fails, above calculation is disabled.

- Relationship between the level switches and fuel

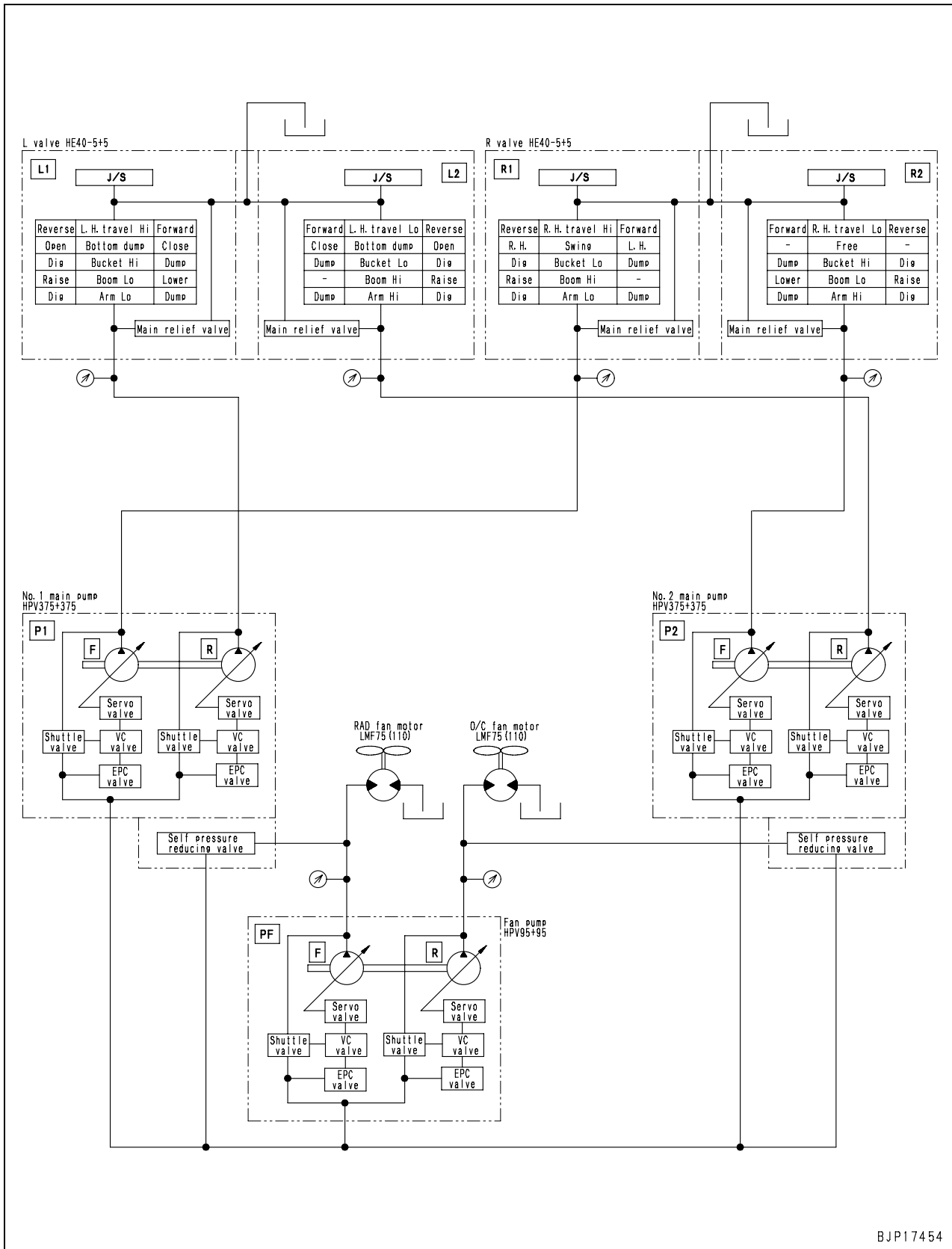


E-20 All of room lamp, headlamp and working lamp do not light up

Trouble (1)	• All of room lamp, headlamp and working lamp do not light up.
Related information	–

	Cause		Standard value in normal state/Remarks on troubleshooting		
	Possible causes and standard value in normal state	1	Shut down of circuit breakers No. B21, B22 and B23 and fuses F01 (3), (8) and (19)	If the circuit breakers and fuses are shut down, the circuit probably has a grounding fault.	
2		Defective light switch	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Between S02 (female) (5) – (4), (5) – (6)	Resistance	
			Light switch ON	Max. 1 Ω	
		Light switch OFF	Min. 1 MΩ		
3		Defective room lamp switch	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Between S16 (female) (5) – (6)	Resistance	
			Room lamp switch ON	Max. 1 Ω	
		Room lamp switch OFF	Min. 1 MΩ		
4		Defective fog lamp switch	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Between S17 (female) (5) – (6)	Resistance	
			Fog lamp switch ON	Max. 1 Ω	
		Fog lamp switch OFF	Min. 1 MΩ		
5		Disconnection in wiring harness (Disconnection in wiring or defective contact in connector)	★ Prepare with starting switch OFF, then carry out troubleshooting without turning starting switch ON.		
			Wiring harness between S02 (female) (5) – F01-3	Resistance	Max. 1 Ω
			Wiring harness between S16 (female) (5) – F01-19	Resistance	Max. 1 Ω
		Wiring harness between S17 (female) (5) – F01-19	Resistance	Max. 1 Ω	
6		Grounding fault in wiring harness (Short circuit with ground circuit)	★ Prepare with starting switch OFF, and then carry out troubleshooting without turning starting switch ON.		
			Wiring harness between S02 (female) (5) – F01-3 and chassis ground	Resistance	Min. 1 MΩ
			Wiring harness between S16 (female) (5) – F01-19 and chassis ground	Resistance	Min. 1 MΩ
		Wiring harness between S17 (female) (5) – F01-19 and chassis ground	Resistance	Min. 1 MΩ	

Loading shovel specification



BJP17454

H-6 Speed or power of arm is low

Trouble	<ul style="list-style-type: none"> Speed or power of arm is low
Related information	<ul style="list-style-type: none"> Make sure that the other work equipment, travel and swing speed is normal. (If not, troubleshoot the related items.) Make sure that the machine does not deviate during traveling. (If machine deviates, troubleshoot the related items.) Set the working mode in P-mode when troubleshooting is carried out. Make sure that the electric circuit of arm control parts is normal before troubleshooting.

Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting	
	Possible causes and standard value in normal state	1	Defective operation of left PPC valve (arm circuit)	★ Prepare with engine stopped, then run engine at high idle speed and carry out troubleshooting.
L.H. work equipment control lever				PPC valve output pressure
During arm IN or OUT in full stroke				Min. 2.74 MPa {Min. 28 kg/cm ² }
2		Defective operation of arm throttle solenoid valve (L1 or R2)	★ Prepare with engine stopped, then run engine at high idle speed and carry out troubleshooting.	
			L.H. work equipment control lever	Solenoid valve outlet pressure
			During arm IN or OUT operation	0 MPa {0 kg/cm ² }
3	Defective operation of arm control valve (spool)	The spool of arm control valve (Lo/Hi) may have malfunctioned. Check it directly.		
4	Defective operation of safety-suction valve mounted on the arm control valve (Lo)	The safety-suction valve, mounted on the arm control valve (Lo/Hi), may have malfunctioned. Check it directly. (If it is replaced with another working circuit for troubleshooting, be sure to reset the safety-suction valve after the troubleshooting because the valve has the different set pressure.)		
5	Defective operation of arm control valve (main body)	The main body of arm control valve (Lo/Hi) may have malfunctioned. Check it directly.		
6	Defective seal of arm cylinder	★ Prepare with engine stopped, then run engine at high idle speed and carry out troubleshooting.		
		L.H. work equipment control lever	Leakage from cylinder	
		Arm IN relief	Max. 20 cc/min	

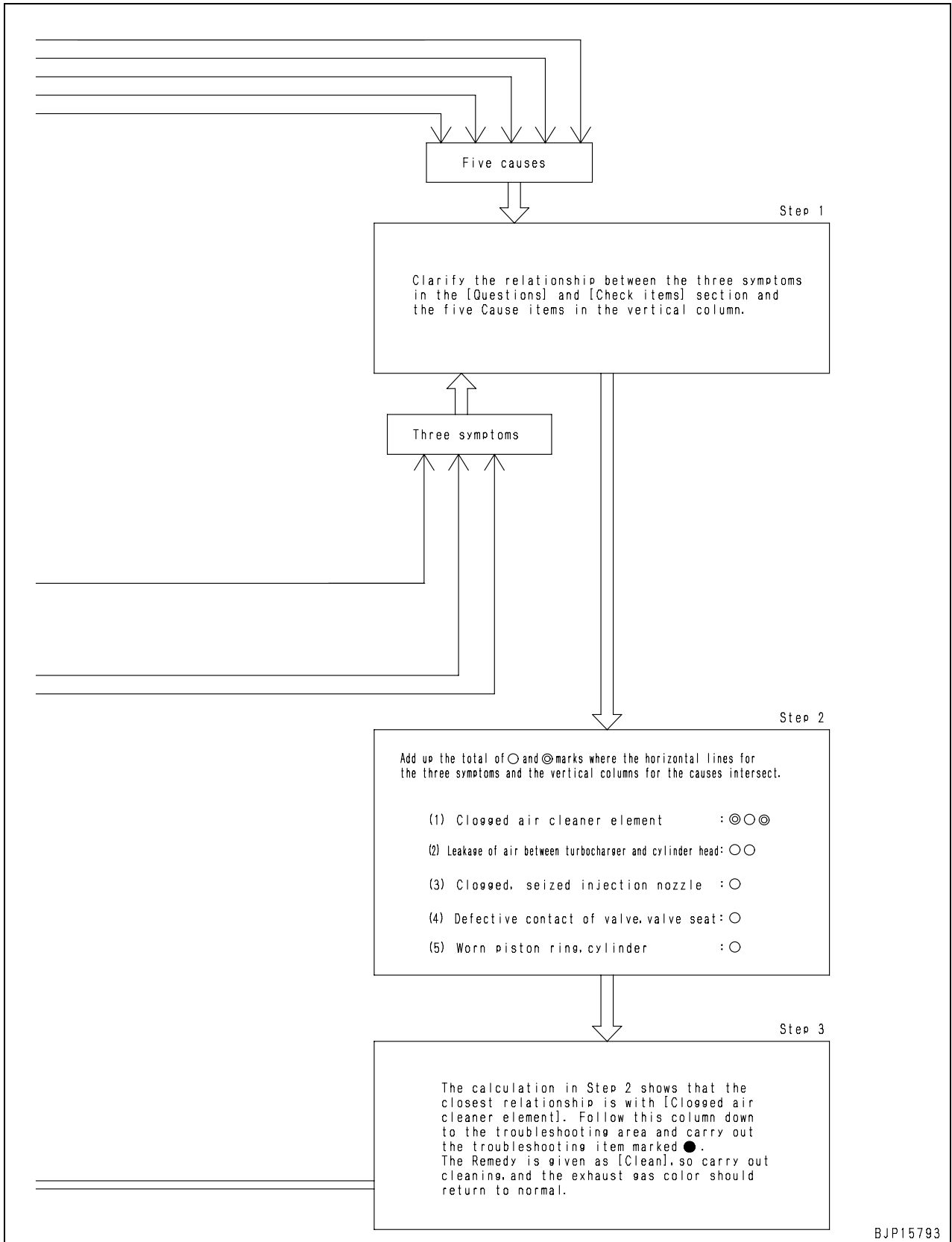
H-22 Swing speed or acceleration is low

Trouble	<ul style="list-style-type: none"> Swing speed or acceleration is low 	(1) Swing speed or acceleration is low in both right and left directions
Related information	<ul style="list-style-type: none"> Make sure that the work equipment operates normally and the machine travels normally. (If not, troubleshoot the related items.) Set the working mode in P-mode and the swing lock switch in OFF state when troubleshooting is carried out. 	

Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting		
		1	Internal leakage of swing motor	★ Prepare with engine stopped, then run engine at high idle speed and carry out troubleshooting.	
L.H. work equipment control lever				Leakage from swing motor	
Swing relief (in either right or left direction)				Max. 10 l/min	
2		Defective operation of swing motor (swing brake)	The swing motor (swing brake) may have malfunctioned. Check it directly.		
3		Defective adjustment or defective operation of swing motor (safety valve)	★ Prepare with engine stopped, then run engine at high idle speed and carry out troubleshooting.		
			L.H. work equipment control lever	Swing relief pressure	
			Swing relief (in either right or left direction)	29.4 ^{+1.0} / _{-2.0} MPa	
				{300 ⁺¹⁰ / ₋₂₀ kg/cm ² }	
		If oil pressure does not become normal after adjustment, the safety valve may have malfunctioned. Check it directly.			
4		Internal defect of swing motor (motor main body)	The main body of swing motor may have an internal defect. Check it directly.		
5	Internal defect of swing machinery	The swing machinery may have an internal defect. Check it directly. (It may be checked by abnormal sound, abnormal heating, metal powders in drain oil, etc.)			

If we look for the linkage of these three phenomena to possible causes, we find that they have causal relationship with five causes.

Let us explain here the method of using this causal relationship to pinpoint the most probable cause.



BJP15793

S-11 Oil is in coolant (or coolant spurts back or coolant level goes down)

General causes why oil is mixed in coolant

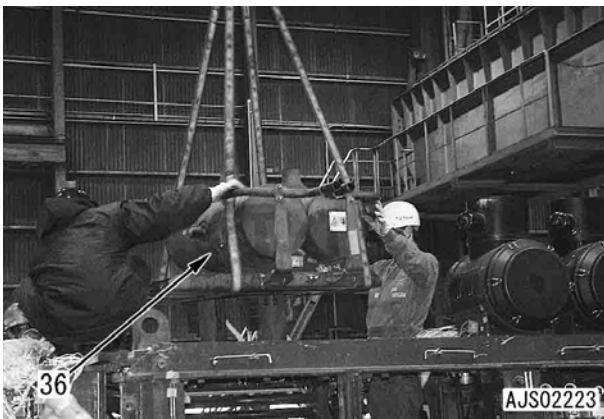
- Internal leakage in lubrication system
- Internal leakage in cooling system

		Causes				
		Broken cylinder head and/or head gasket	Cracks inside cylinder block	Damaged cylinder liner O-ring and/or hole caused by pitting	Insufficient protrusion of cylinder liner	Broken oil cooler core and/or O-ring
Questions	Confirm recent repair history					
	Degree of machine operation	Operated for long period		△		△
	Oil level	Suddenly increased	○			○
		Gradually increased		○	○	
Check items	Hard water is being used as coolant			○		○
	Oil level has risen and oil is milky		○	○		◎
	There are excessive air bubbles in radiator, coolant spurts back	◎			◎	
Troubleshooting	Pressure-tightness test of cylinder head shows there is leakage	●				
	Inspect cylinder block and liner directly		●	●		
	Inspect cylinder liner directly				●	
	Pressure-tightness test of oil cooler shows there is leakage					●
	Remedy	Replace	Replace	Replace	Replace	Replace

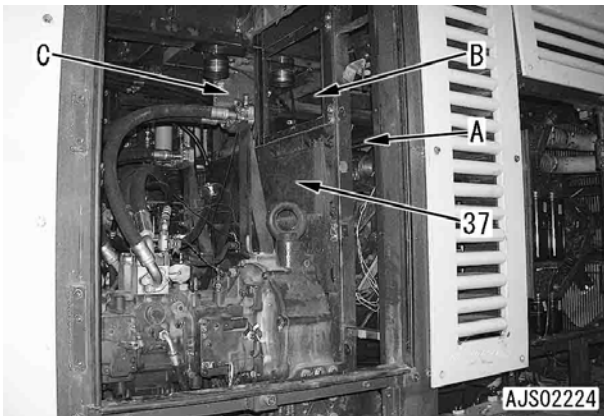
Component	Symbol	Part No.	Part name	Necessity	Qty	New/remodel	Sketch	Nature of work, remarks	
Hydraulic cylinder assembly (Backhoe spec.)	6	790-201-1500	Push tool kit	■	1			Bucket cylinder	
		790-201-1640	• Push tool		1				
		790-101-5021	• Grip		1				
		01010-50816	• Bolt		1				
		792-715-1400	Plate	■	1			Arm cylinder	
		790-101-5421	Grip	■	1				
		01010-51240	Bolt	■	1				
		790-445-4220	Plate	■	1			Boom	
		790-101-5421	Grip	■	1				
		01010-51240	Bolt	■	1				
Hydraulic cylinder assembly (Loading shovel spec.)	U	7	790-502-1003	Cylinder repair stand	■	1		Disassembly, assembly of hydraulic cylinder	
		8	790-720-1000	Expander	■	1		Installation of piston ring	
		9	796-720-1690	Ring	■	1			Compression of piston ring (Bucket cylinder)
			07281-02169	Clamp	■	1			
			796-720-1710	Ring	■	1			Compression of piston ring (Boom and arm cylinders)
			07281-02909	Clamp	■	1			
		10	790-201-1701	Push tool kit	■	1			Press fitting of roll bushing
			790-201-1881	Push tool	■	1			Bucket cylinder
			790-101-5021	Grip	■	1			
			01010-50816	Bolt	■	1			
			791-863-1110	Push tool	■	1			Arm cylinder
			790-101-5421	Grip	■	1			
			01010-51240	Bolt	■	1			
			792-725-1300	Push tool	■	1			Boom cylinder
			790-101-5421	Grip	■	1			
		01010-51240	Bolt	■	1				
		11	790-201-1500	Push tool kit	■	1			Press fitting of dust seal
			790-201-1690	Plate	■	1			Bucket cylinder
			790-101-5021	Grip	■	1			
			01010-51240	Bolt	■	1			
792-715-1400	Plate		■	1			Arm cylinder		
790-101-5421	Grip		■	1					
01010-51240	Bolt		■	1					
792-725-1500	Plate		■	1			Boom cylinder		
790-101-5421	Grip		■	1					
01010-51240	Bolt	■	1						

33. Remove cover (35).

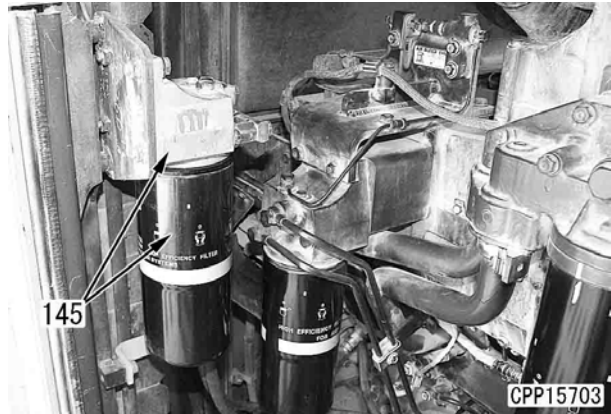
34. Lift and remove muffler and bracket assembly (36).



35. Remove dividing boards A, B and C (37) between the engine room and pump room.




★ In the case of low-grade fuel specification, disconnect fuel filter assembly (145).

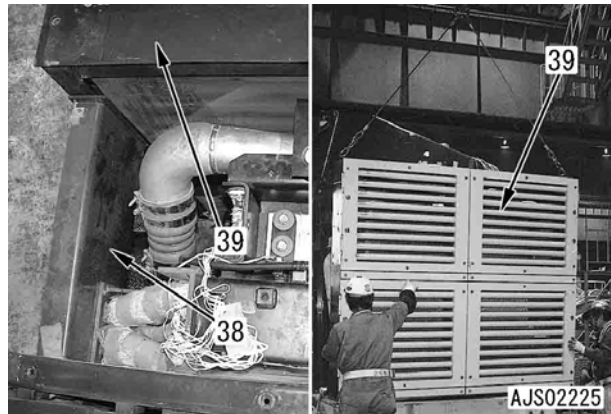


36. Remove bracket (38).

★ Remove the opposite side at the same procedures.

37. Temporarily lift air inlet duct assembly (39), and lift and remove it.

 Air inlet duct assembly: **450 kg**



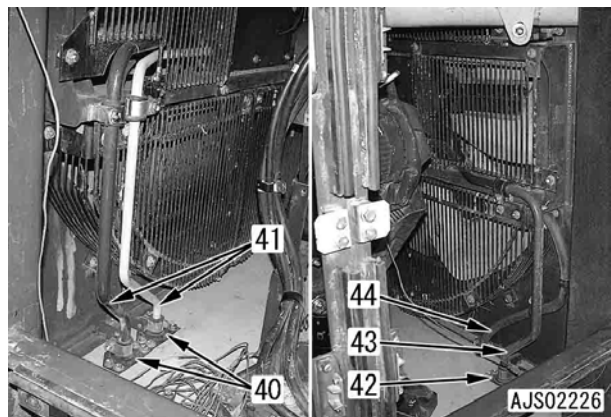
38. Remove 2 clamps (40).

39. Disconnect 2 tubes (41).

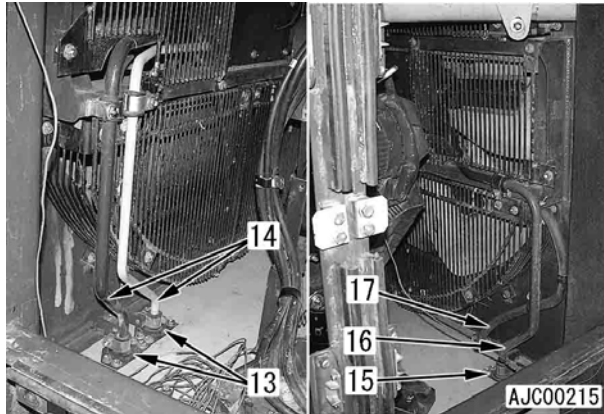
40. Remove clamp (42).

41. Disconnect tube (43).

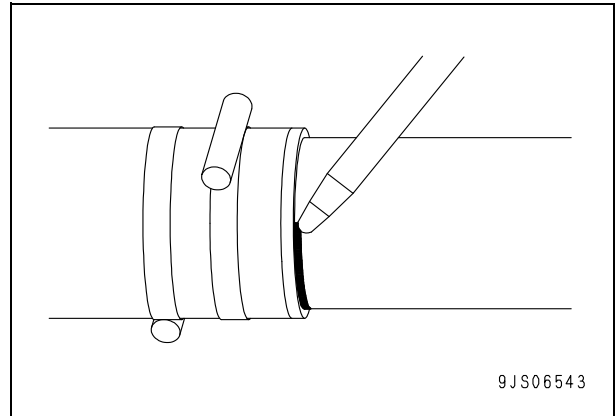
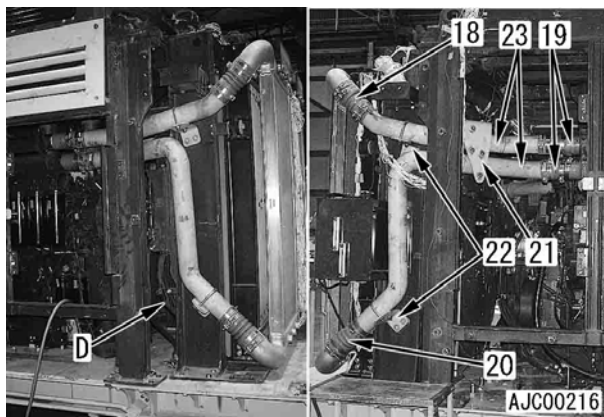
42. Disconnect hose (44).



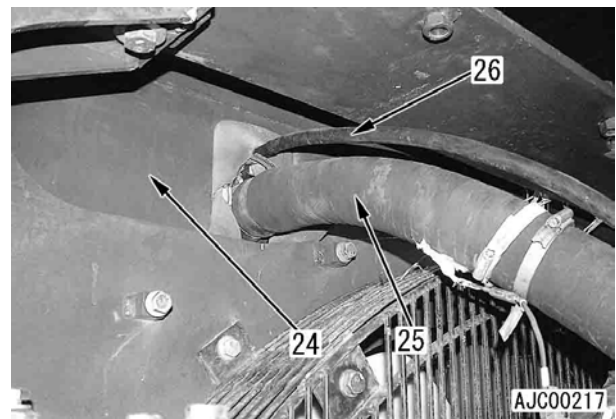
11. Remove 2 clamps (13).
12. Disconnect 2 tubes (14).
13. Remove clamp (15).
14. Disconnect tube (16).
15. Disconnect hose (17).




16. Loosen clamps for hoses (18) to (20). [*2]
 - ★ Apply a marking to the hose end and tube so that their original insertion positions may be identified in later reference. (See the following figure.)
17. Remove dividing board (D) between the radiator room and engine room.
18. Remove clamp bracket (21).
19. Disconnect 2 tube clamps (22). [*3]
20. Remove 2 tubes (23).
 - ★ Remove the opposite side at the same procedures.

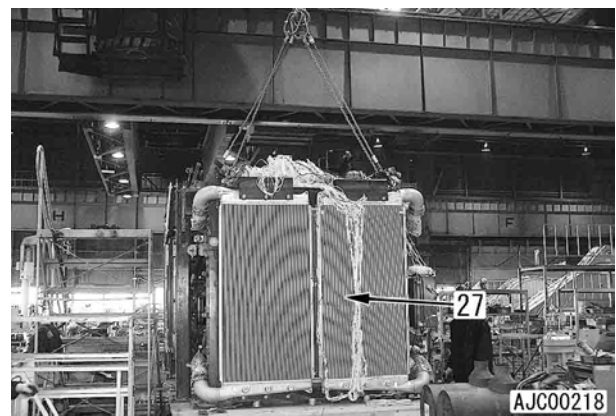


21. Remove cover (24).
22. Disconnect 2 radiator upper hoses (25). [*4]
23. Disconnect hose (26).

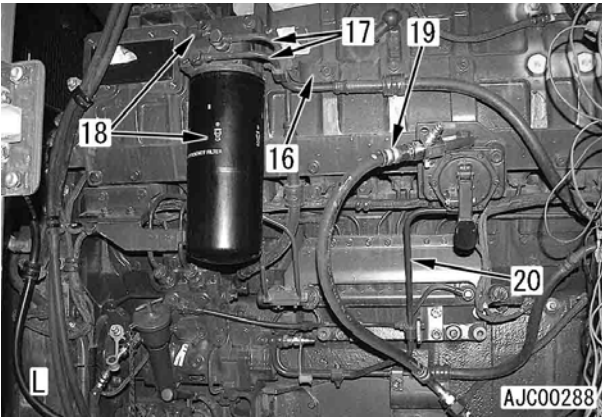


24. Lift cooling (radiator, aftercooler and fan) assembly (27), and remove it.
 - ★ Holes are provided on the top of the frame for lifting.

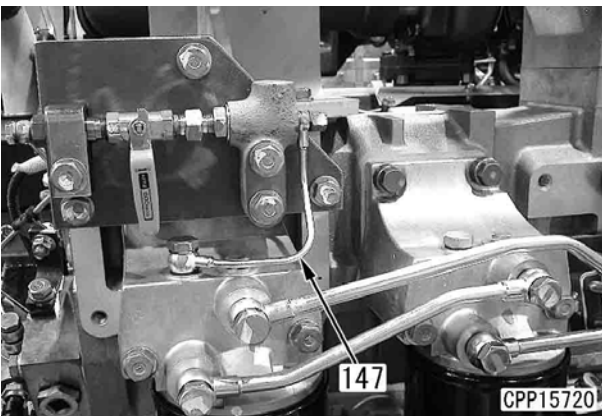
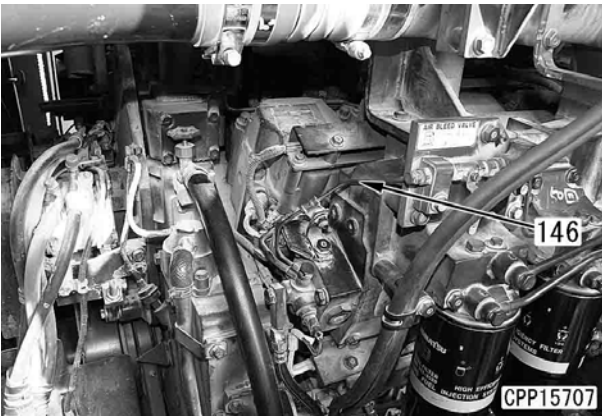
 Cooling (radiator, aftercooler and fan) assembly: **1,200 kg**



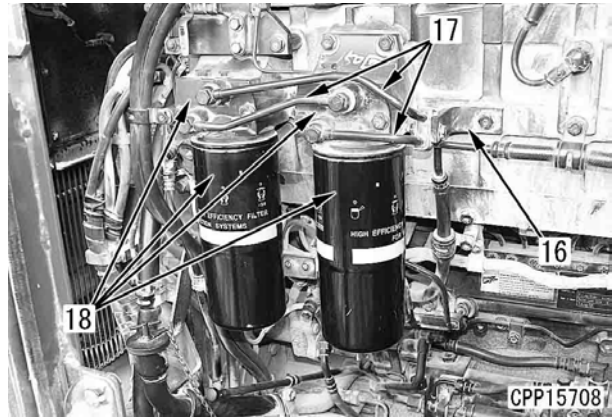
- Left bank (standard specification)
- 15. Remove clamp (16).
- 16. Disconnect fuel tubes (17). [*3]
- 17. Remove fuel filter assembly (18).
- 18. Disconnect fuel hose (19). [*3]
- 19. Disconnect and remove fuel tube (20).



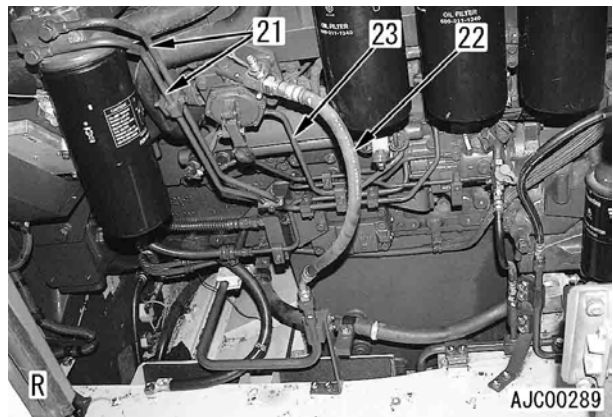
- Left bank (low-grade fuel specification)
- 20. Remove fuel tubes (146) and (147). [*3-1]



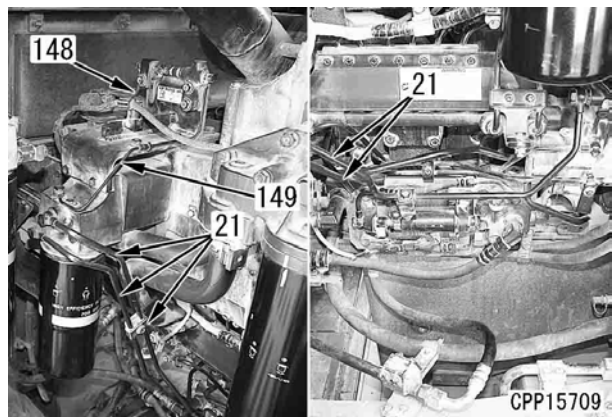
- 21. Remove clamp (16).
- 22. Disconnect fuel tubes (17). [*3]
- 23. Remove fuel filter assemblies (18).




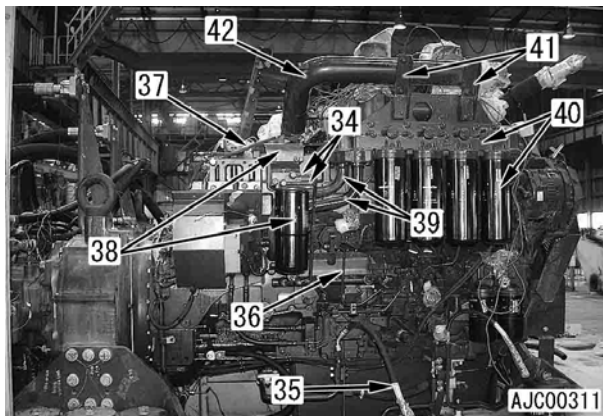
- Right bank (standard specification)
- 24. Remove the clamp and then remove fuel tubes (21). [*3]
- 25. Disconnect fuel hose (22). [*3]
- 26. Disconnect and remove fuel tube (23).



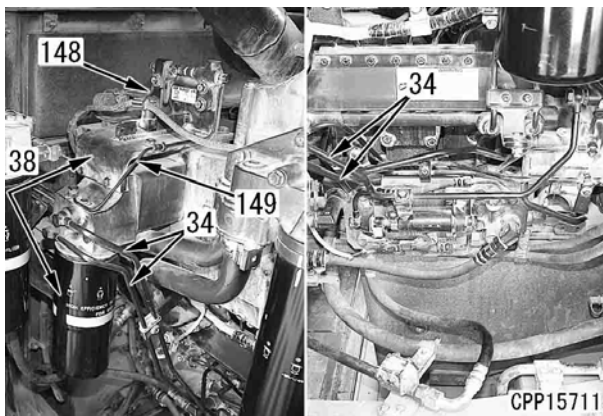
- Right bank (low-grade fuel specification)
- 27. Remove fuel tubes (148) and (149). [*3-2]
- 28. Remove the clamp and then remove fuel tubes (21). [*3]



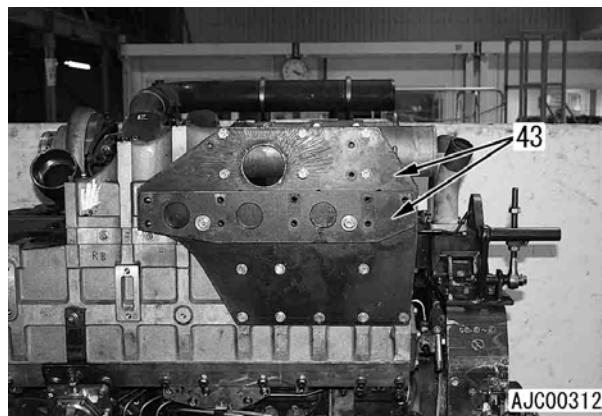
- Right bank
- 30. Remove clamps and disconnect fuel tube (34). [^{*}5]
- 31. Disconnect fuel hose (35). (Standard specification only) [^{*}5]
- 32. Disconnect fuel tube (36). (Standard specification only)
- 33. Remove fuel tubes (148) and (149). (Low-grade fuel specification only) [^{*}5-2]
- 34. Disconnect wiring harness (37).
- 35. Remove fuel filter assembly (38).
- 36. Remove oil tubes (39).
- 37. Remove oil filter assembly (40).
 Oil filter assembly: **50 kg**
- 38. Remove brackets (41).
- 39. Disconnect air tube (42).



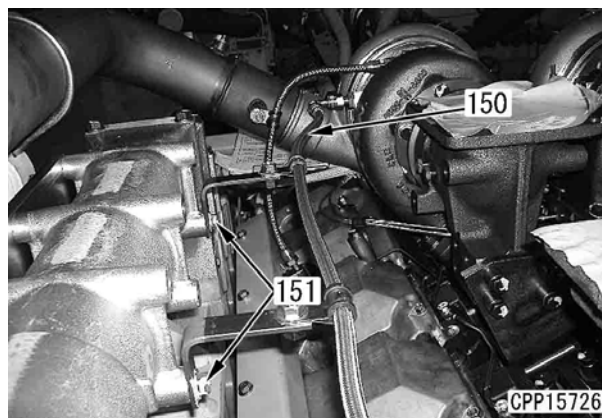
★ Low-grade fuel specification around filter assembly (38).



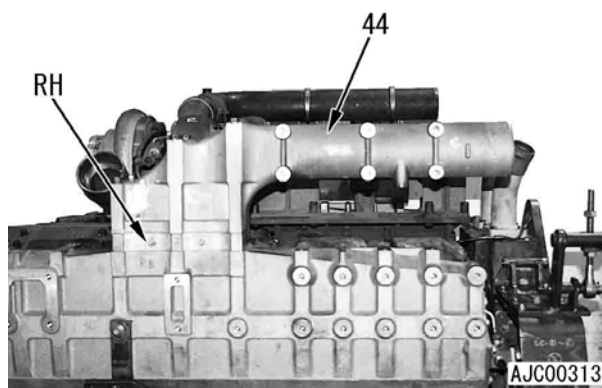
- 40. Remove bracket assembly (43). [^{*}6]



- 41. Disconnect turbocharger coolant hose (150) connection and remove bracket bolt (151). (Both banks) [^{*}7]



- 42. Remove air intake connector (44). [^{*}8]
- ★ Remove the RH: electrical intake air heater with together.
- ★ Remove the harness clamp.

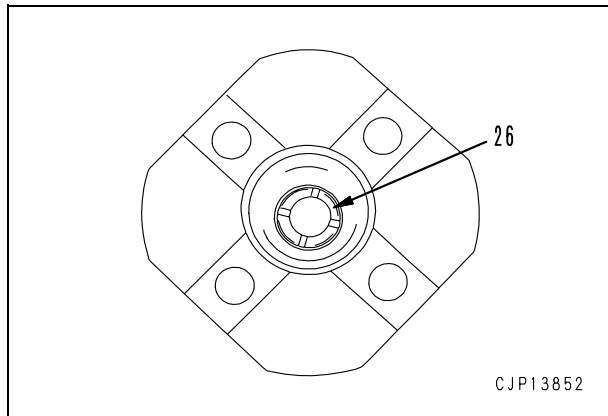


- 43. Remove brackets (45).
- 44. Remove clamp (47).
- 45. Disconnect high-pressure pipes (48).
- 46. Remove bracket (49).

PC2000-8 Hydraulic excavator

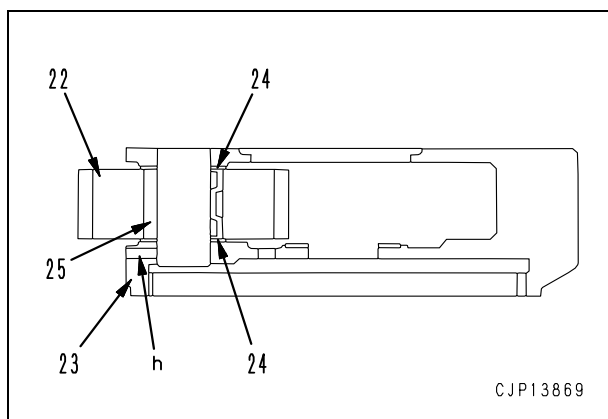
Form No. SEN02135-09

© 2021 KOMATSU
All Rights Reserved
Printed in Japan 11-21 (01)



★ The trace of caulking is left on the end surface of the side hole (h) when the pin was installed previously. Correct the shape (protrusion) of the inner diameter before installation.

2] Assemble bearing (25) on the gear (22), attach thrust washers (24) on both sides, and place gear assembly to the carrier (23).



3] Align the pin holes of the shaft (21) to that of carrier (23), and then drive in the shaft by lightly tapping with a plastic hammer.

★ Install shaft as rotating the planetary gear. Use care not to damage the thrust washers.

4] Insert pin (20).

★ Check the pin for deformation on the pin groove or protrusion, and replace if defective.

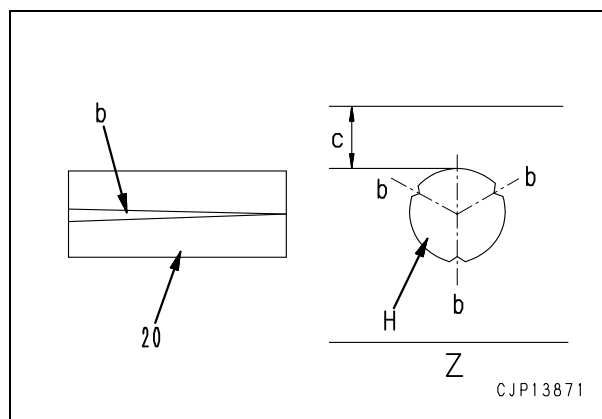
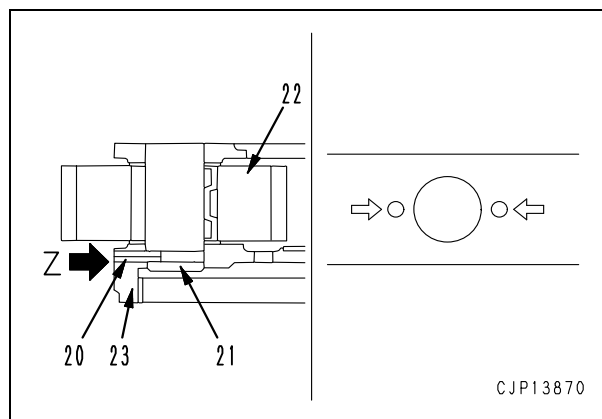
★ Do not locate the pin at the same position where it was caulked previously.

★ When installing the pin, be careful that the claws (b) at 3 locations on the circumference do not overlap with the areas (c) where the carrier is thinner than other areas.

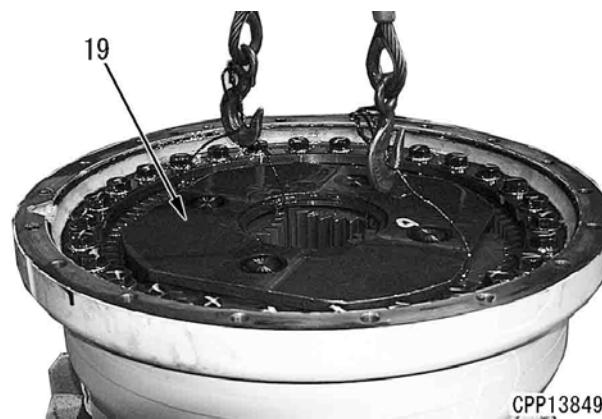
However the thinner areas vary depending on individual carrier. Always check the area before installation.

★ Caulk the pin area (arrow mark) of the carrier after having installed the pin.

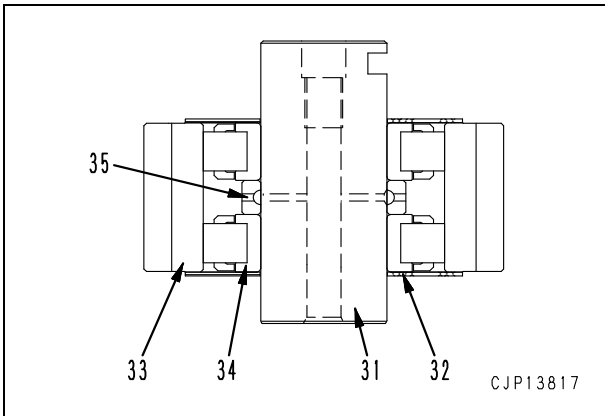
★ After having assembled the carrier assembly, check that the gear (22) rotates smoothly.



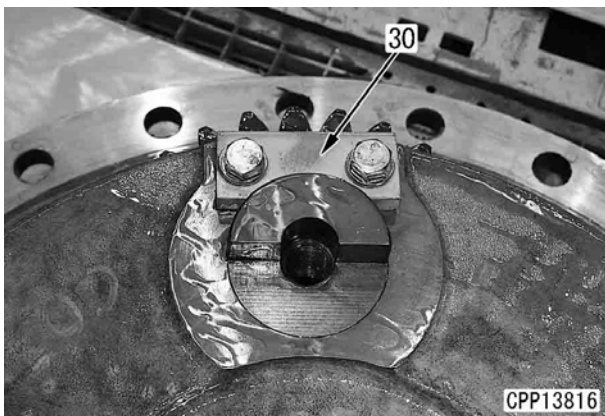
2) Pass wires over the carrier case, and then lift and install the carrier assembly (19) by aligning with the gear of the hub.



- 2] Assemble bearing (34) and spacer (35) to the gear (33).
 - ★ The bearing is coupled with the spacer. Always reassemble with original pairs.
- 3] Apply thrust washers (32) on both side of the gear (33), and install them to the carrier.
 - ★ Align the inner diameter of the spacer to that of the bearing.
- 4] Perform expansion fit to Install shaft (31).
 - ★ If it is difficult to install the shaft, press it using the press.



- 5] Install lockplate (30).
 - ★ Install lockplate (30) to the shaft, and use guide bolt to match the bolt hole.
 - 🔧 Mounting bolt: **245 – 309 Nm {25 – 31.5 kgm}**
 - 🔧 Mounting bolt: **Adhesive (LT-2)**



- 2) Apply gasket sealant to the mounting face of the case assembly of the carrier, and then install the carrier assembly (29) by aligning with the shaft.

🔧 Mounting face of carrier:

Gasket sealant (LG-6)

🔧 Mounting bolt:

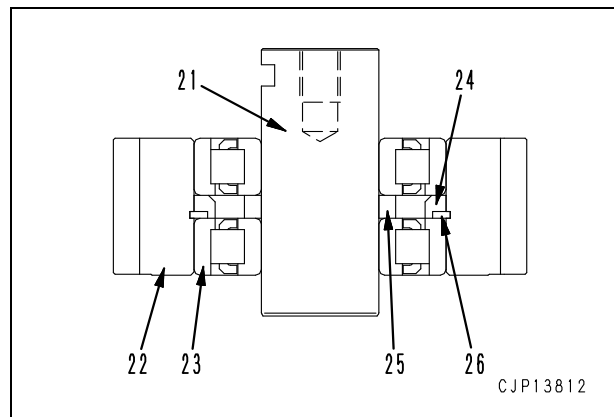
1,520 – 1,910 Nm {155 – 195 kgm}

🔧 Mounting bolt: **Adhesive (LT-2)**



8. Carrier assembly (small)

- 1) Assemble carrier assembly in the following procedure.
 - 1] Install snap ring (26) to the gear (22).
 - 2] Install spacer (24), and then install outer race of the bearing (23).
 - ★ The outer race is coupled with the bearing. Always check the counter marks for reassembly.
 - 3] Assemble inner race of the bearing (23) and spacer (25) to the gear, and set them to the carrier.
 - ★ Align the inner diameter of the spacer (25) to that of the bearing.
 - 4] Perform expansion fit to install shaft (21).
 - ★ If it is difficult to install the shaft, press it using the press.




Disassembly and assembly of track roller assembly

Special tools

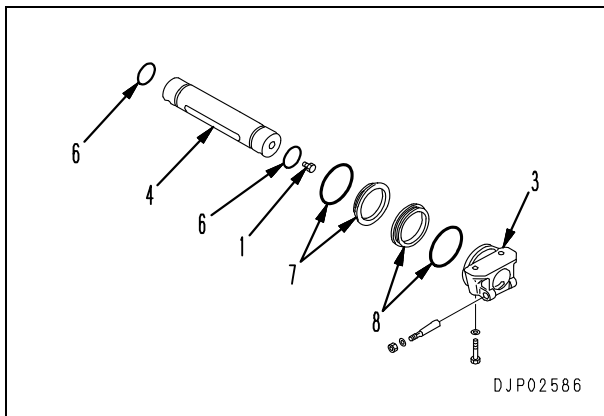
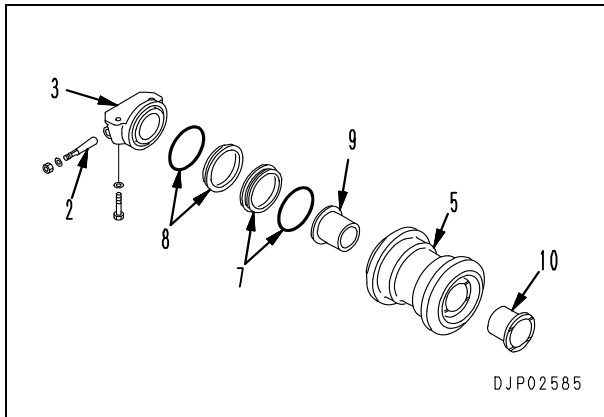
Symbol	Part No.	Part name	Necessity	Q'ty	New/Remodel	Sketch
L	5 796-675-1510	Installer	■	1		
	6 791-601-1000	Oil pump	■	1		

Disassembly

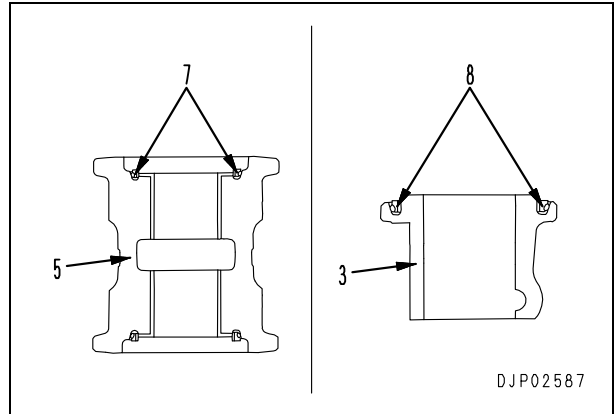
1. Remove plug (1) and drain oil.

 Track roller assembly: 1.3 – 1.45 ℓ

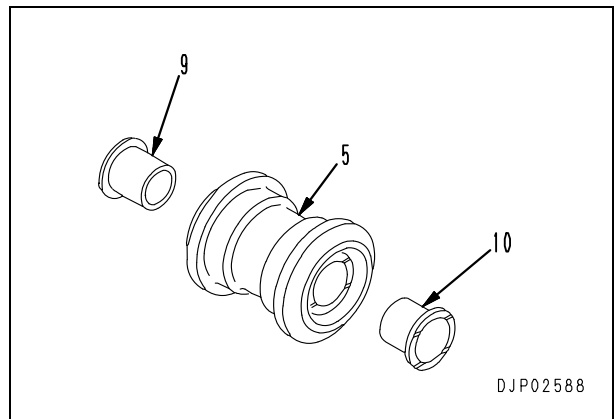
2. Remove bolt (2), and remove collar (3).
3. Remove shaft (4) from roller (5), and remove O-ring (6).



4. Pull out floating seals (7) and (8) from roller (5) and collar (3),



5. Remove bushings (9), (10) from roller (5).




Removal and installation of hydraulic tank assembly

Removal

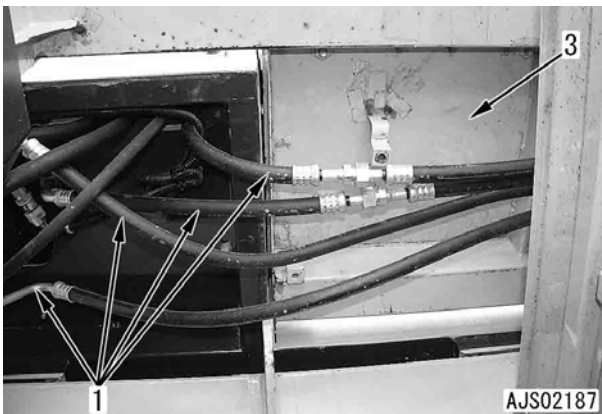
- ⚠ Lower the work equipment completely to the ground and stop the engine.
- ⚠ Loosen the hydraulic tank cap gradually to release the internal pressure.
- ⚠ Lock the work equipment lock lever.
- ⚠ Disconnect the cable from the negative (-) terminal of the battery.
- ⚠ If you drain the coolant or you disconnect the heater hose when the coolant temperature in the radiator is high, you may be scalded. In this case, wait until the coolant temperature lowers and then drain the coolant or disconnect the heater hose.

1. Collect the air conditioner refrigerant (R134a) from air conditioner circuit in advance.
 - ★ Ask professional traders for collecting and filling operation of refrigerant.
 - ★ Never release the refrigerant to the atmosphere.
 - ⚠ If refrigerant gets in your eyes, you may lose your sight. Accordingly, put on protective goggles, gloves and working suits with long sleeves while you are collecting the refrigerant or filling the air conditioner circuit with the refrigerant. Collecting and filling work must be conducted by a qualified person.
 - Refrigerant quantity: **950 ± 50 g**
 - ★ Fasten tags to pipes and hoses to identify them and show their installation position. This helps prevent any mistakes when re-installing.

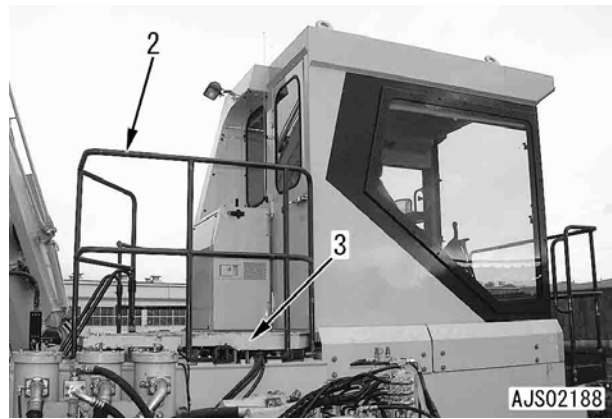
2. Drain hydraulic tank.

 Hydraulic tank: **1,300 ℓ**

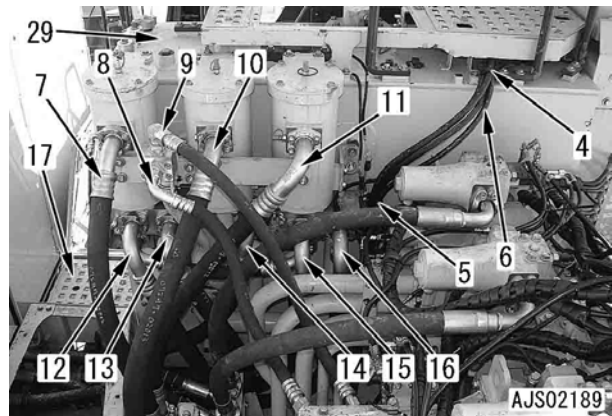
3. Disconnect 4 air conditioner hoses (1) from under floor at the entrance of the operator cab. [^{*2}]



4. Lift and remove hand rail (2) and floor (3).




5. Disconnect clamps (4) and (5) and disconnect 4 air conditioner hoses (6) from the right side of the hydraulic tank assembly.
6. Disconnect hoses (7) to (16).
 - ★ Fasten tags to hoses to identify them for reinstallation.
 - ★ Clamp is provided to the hose (14).
7. Remove cover (17).

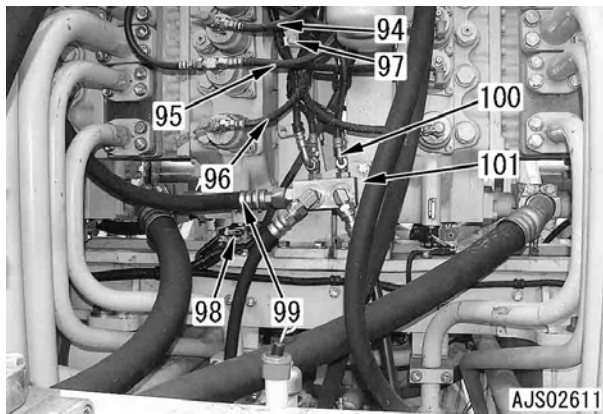
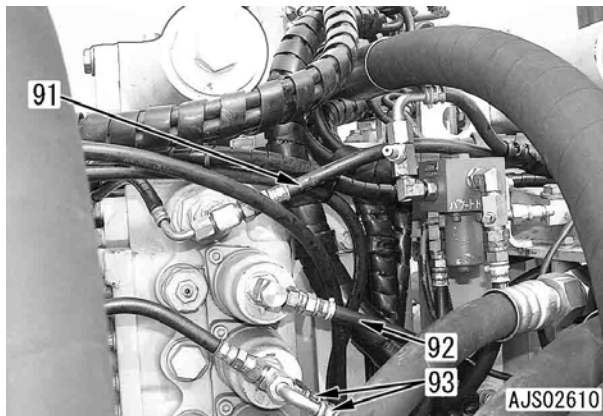
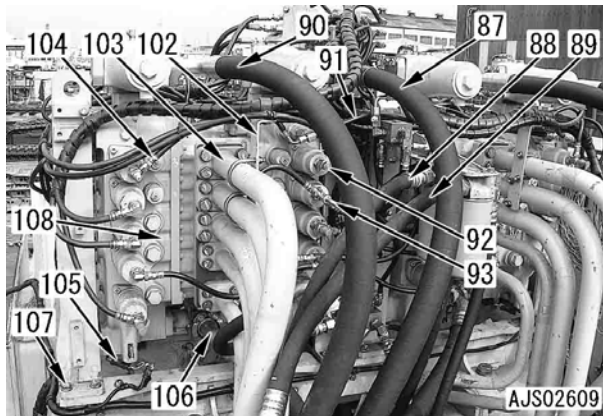


8. Disconnect connectors P39 (18), P22 (19) and P38 (20) from the bottom of the cover (17).
9. Disconnect clamp (21).



33. Remove 8 mounting bolts (107), and then lift and remove control valve assembly (108). [*2]


 Control valve assembly: **1,750 kg**




Installation

- Carry out installation in reverse order of removal.


[*1], [*2]

 Control valve bracket mounting bolt:
245 – 309 Nm {25 – 31.5 kgm}

- **Refilling with oil (Hydraulic tank)**

 Hydraulic tank drain plug:
127.4 – 176.4 Nm {13 – 18 kgm}

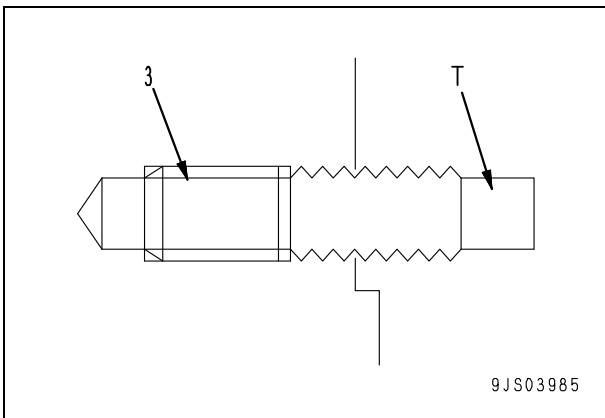
Add oil through oil filler to the specified level. Run the engine to circulate the oil through the system. Then check the oil level again.

 Hydraulic tank: **1,300 ℓ**

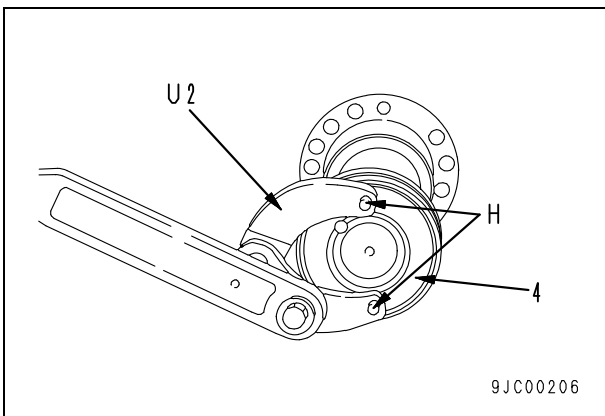
- **Bleeding air**

Bleed air from the parts, refer to “Bleeding air from various system” in Testing and adjusting.

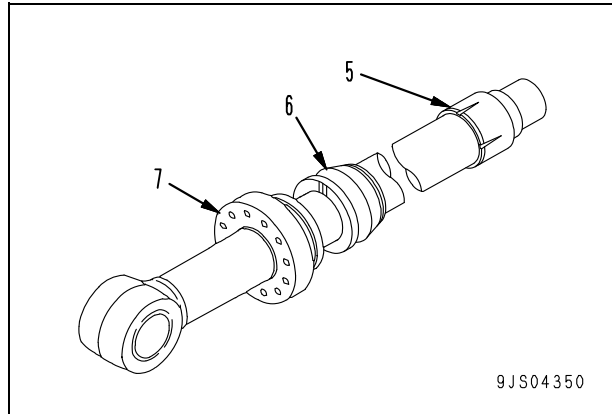
- ★ If screw (3) has been caulked strongly and cannot be removed, screw it in fully, then fit a tap (Tap) to the thread and pull it out.



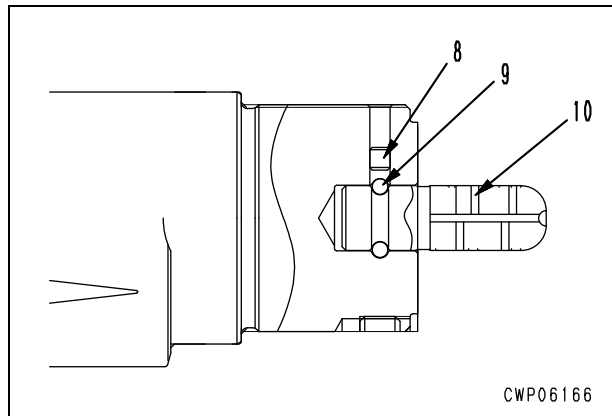
- 3] Using tool **U2**, remove piston assembly (4).
 - When not using tool **U2**, use the drill holes (H) (2 places) and loosen the piston assembly.
 - ★ Drill holes
 - $\varnothing 10$ mm (Bucket, Arm)
 - $\varnothing 16$ mm (Boom)



- 4] Remove plunger (5). (Boom, bucket only)
- 5] Remove collar (6). (Boom, bucket only)
- 6] Remove head assembly (7).

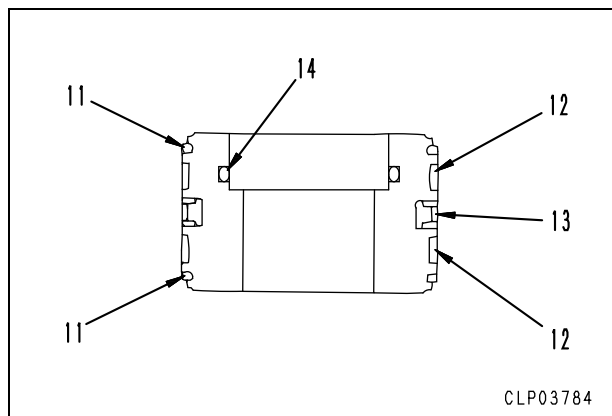


- 7] Remove cap (8), and pull out balls (9), then remove cushion plunger (10).
 - Balls (9): 10 balls (Arm cylinder)
11 balls (Bucket cylinder)
 - ★ Except boom cylinder



2. Disassembly of piston assembly

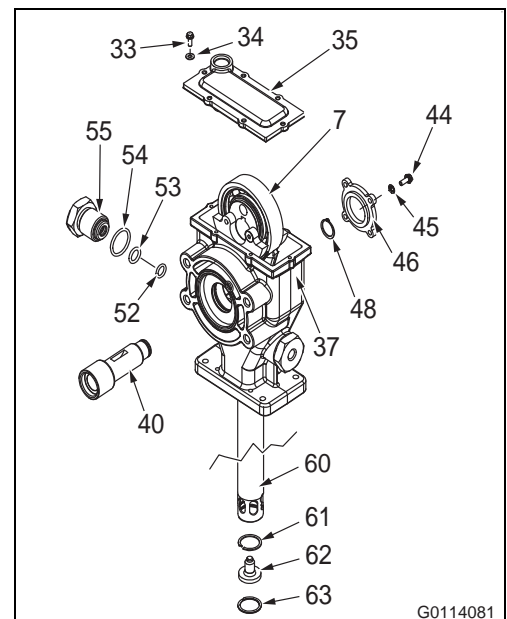
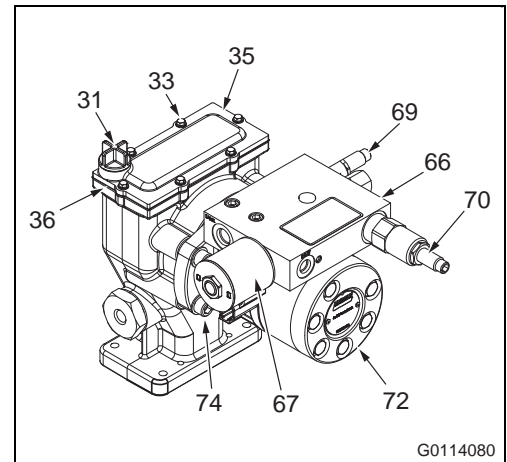
- 1) Remove ring (11).
- 2) Remove wear ring (12).
 - ★ 2 pieces are installed to each of the boom cylinder, and 4 pieces to the bucket cylinder and arm cylinder.
- 3) Remove piston ring (13).
- 4) Remove O-ring and backup ring (14).
 - Boom cylinder



Disassembly and assembly of grease pump

Disassembly Pump

1. Fix the pump with a vise.
2. Remove the dipstick (31).
3. Drain oil.
4. Remove the screw (33) of the housing cover.
5. Remove the housing cover (35) and gasket (36).
6. Remove the bolt (74) and lock washer (73) from the hydraulic motor.
7. Remove the hydraulic motor (72).
8. Remove the manifold assembly (66).
9. Remove the pressure adjustment valve (70).
10. Remove the flow rate adjustment valve (69).
11. Remove the solenoid valve (67).
12. Remove the outlet pin nuts (55) at each side of the housing (37).
13. Remove the O-rings (54) and (53) and backup ring (52) from the outlet pin nut (55).
14. Loosen the bolt (44) of the shaft cover (46) on the pump housing (37).
15. Remove the snap ring (48) from the pump shaft (40).
16. Push the pump shaft from the snap ring side, and remove the pump shaft (40).
17. Remove the snap ring (63) from the housing tube (60).
18. Remove the excavator plug (62) from the housing tube (60).
19. Remove the snap ring (61).



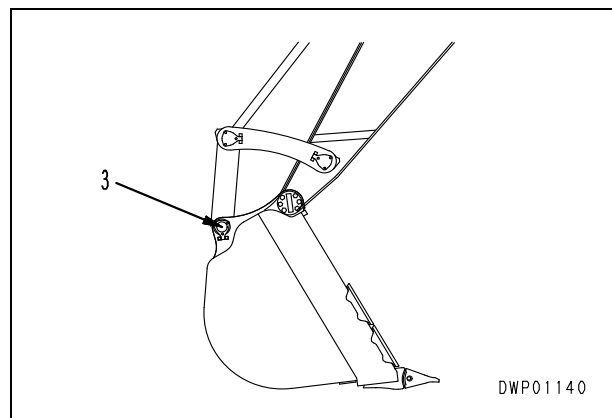
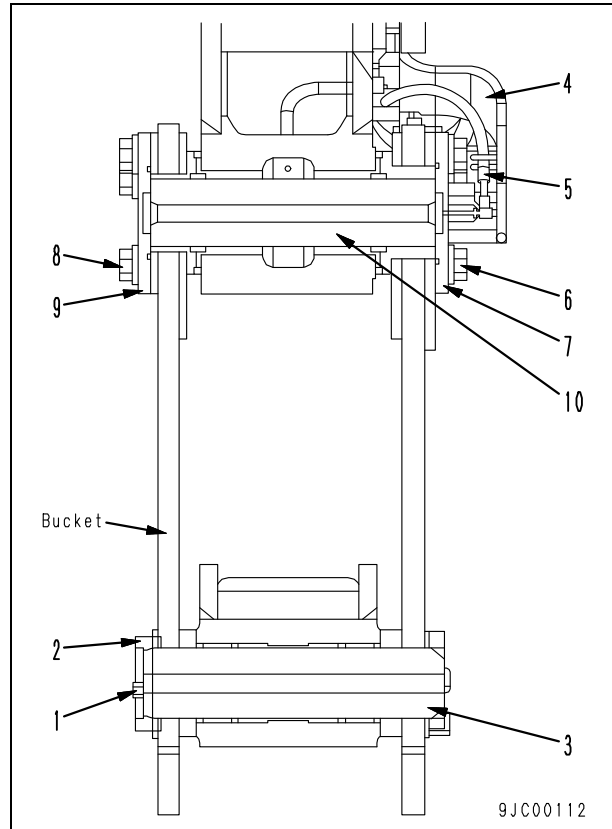
Removal and installation of bucket assembly (Backhoe specification)

Removal

▲ Place the work equipment stably on the ground with the back of the bucket facing downward. Set the lock lever to the lock position.

1. Remove 3 pin lock bolts (1), and then remove the stopper (2).
2. Remove connecting pin (3) for the link and bucket using a forcing screw. [*1]
3. Start the engine and contract the piston rod. Bind the link to the arm with wire to prevent the piston rod from falling out.
4. Remove greasing piping cover (4) and disconnect greasing hose (5).
5. Remove 6 pin cover lock bolts (6), and then remove pin cover (7).
6. Remove 6 pin cover lock bolts (8), and then remove pin cover (9).
7. Remove arm connecting pin (10). [*2]
8. Start the engine, raise the work equipment, disconnect the arm from the bucket and then remove the bucket assembly.


 Bucket assembly: **10,000 kg**




Installation

- Carry out installation in the reverse order to removal.

[*1]

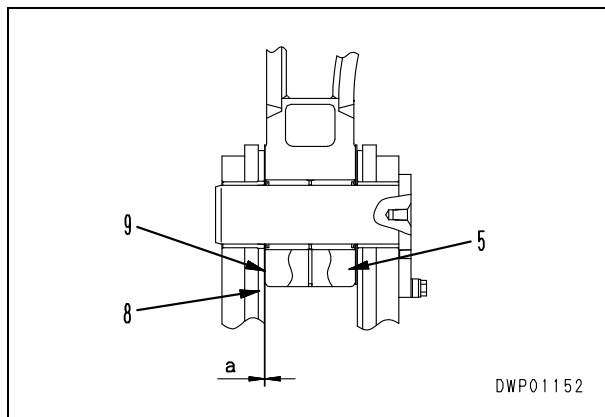
 Inside surface of bushing when assembling pin: **Anti-friction compound (LM-P)**

 Grease after assembling pin: **Grease (LM-G)**

⚠ When aligning the position of the pin hole, never insert your fingers in the pin hole.

- ★ Adjust shim (9) so that the clearance (a) between boom (5) foot end face and bracket (8) shall be 1 mm max.

- Shim thickness: **1.0 mm and 1.5 mm**

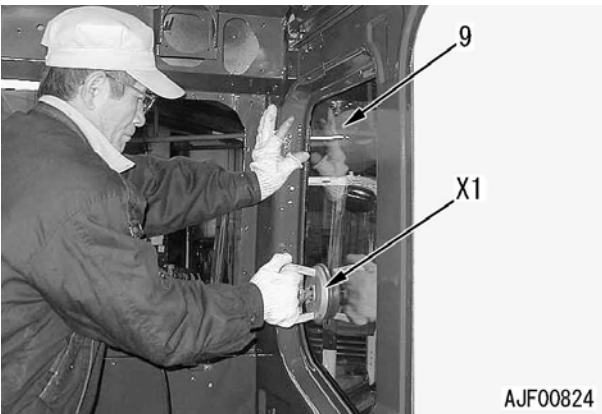


- **Bleeding air**
 - ★ For details, see Testing and adjusting, "Air bleeding from each component."
- **Refilling with oil (Hydraulic tank)**
 - ★ Add oil through the oil filler to the specified level. Run the engine to circulate the oil through the system. Then, check the oil level again.

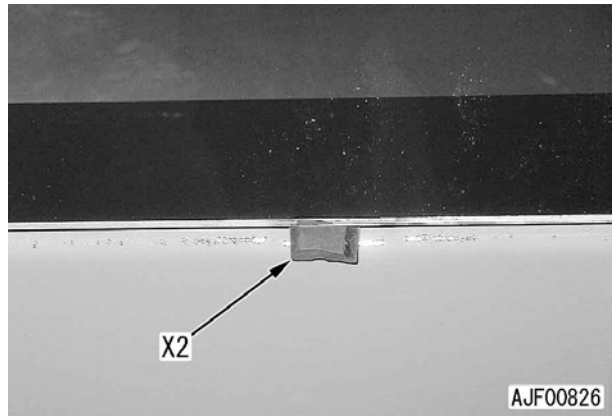
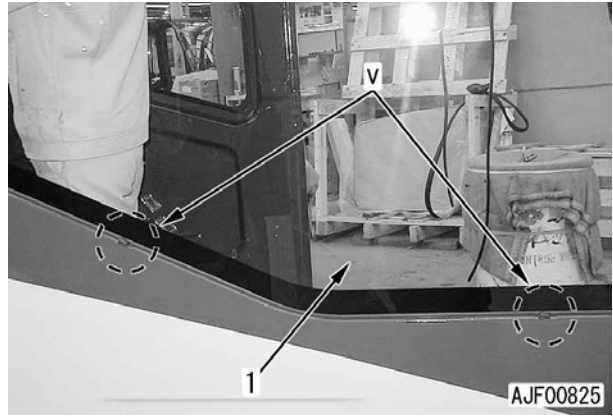
7. Install the window glass.
 - 1) Install window glass (9), matching it to the lines of the positioning tapes drawn in step 5.
 - ★ Since the window glass cannot be removed and stuck again, stick it very carefully.
 - ★ Stick the glass within 5 minutes after applying the adhesive.
 - 2) After sticking window glass (9), press all around it until it is stuck to the both-sided adhesive tape.
 - ★ Press the corners of the window glass firmly.



- ★ You can perform this work efficiently by pulling window glass (9) from inside of the operator's cab with suction cup (X1).



8. Fix the window glass.
 - 1) After installing right window glass (1) to the operator's cab, insert stopper rubbers (X2) to 2 places (v) at the bottom of the glass to fix the glass.



- 2) Using styrene foam blocks [9] and rubber bands [10], fix the window glass and both-sided adhesive tape to fit them completely. (The figure shows the operator's cab of PC200.)



9. After installing the window glass, remove the primer and adhesive from the operator's cab and window glass.
 - ★ Using white gasoline, wipe off the adhesive before it is dried up.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



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

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL