SEN06257-03-NI00

Shop Manual

HYDRAULIC
EXCAVATOR

PC300LC-8M0
PC350LC-8M0

SERIAL NUMBERS PC300LC-N330001 and up
PC350LC-N360001

ecot3

KOMATSU

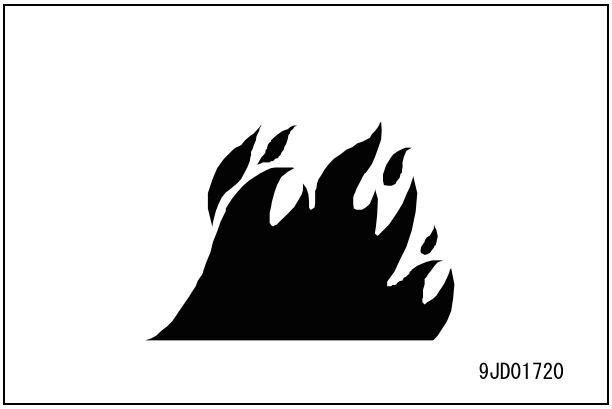
Fire prevention

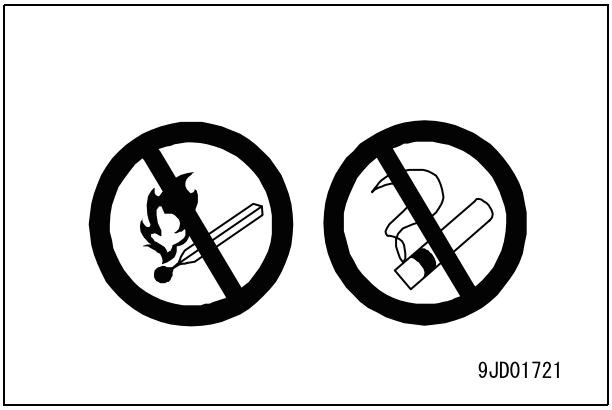
Action if fire occurs

- Turn the starting switch to the OFF position to shutdown the engine.
- Use the handrails and steps to get off the machine.
- Do not jump off the machine. You may fall or suffer serious injury.
- The fume generated by a fire contains harmful materials which have a bad influence on a human body when they are sucked.
  Don't breathe a fume.
- After a fire, there may be harmful compounds left. If it touches your skin it may have a bad influence on your body.
  Be sure to wear rubber gloves when handle the materials left after the fire.
  The material of the gloves, which is recommended is polychloroprene (Neoprene) or polyvinyl chloride (in the lower temperature environment).
  When wearing cotton-work-gloves, wear rubber gloves under them.

Prevent fire

- **Fire caused by fuel, oil, coolant or window washer fluid**
  Do not bring any flame or fire close to flammable substances such as fuel, oil, coolant or window washer fluid.There is danger that they may catch fire. Always observe the following.
  - Do not smoke or use any flame near fuel or other flammable substances.
  - Shut down the engine before adding fuel.
  - Do not leave the machine when adding fuel or oil.
  - Tighten all the fuel and oil caps securely.
  - Be careful not to spill fuel on overheated surfaces or on parts of the electrical system.
  - After adding fuel or oil, wipe up any spilled fuel or oil.
  - Put greasy rags and other flammable materials into a safe container to maintain safety at the workplace.
  - When washing parts with oil, use a non-flammable oil. Do not use diesel oil or gasoline.There is danger that they may catch fire.
  - Do not weld or use a cutting torch to cut any pipes or tubes that contain flammable liquids.
  - Determine well-ventilated areas for storing oil and fuel. Keep the oil and fuel in the specified place and do not allow unauthorized persons to enter.
  - When performing grinding or welding work on the machine, move any flammable materials to a safe place before starting.





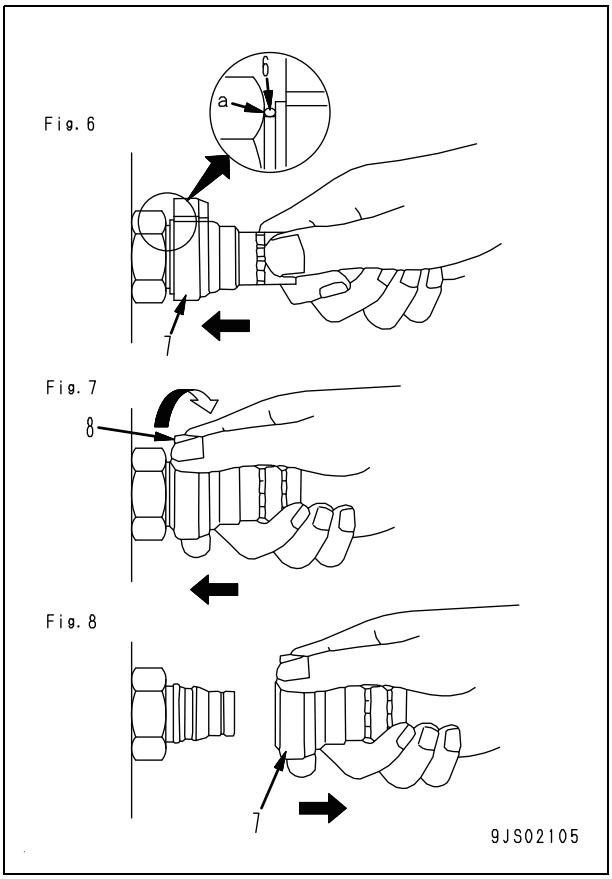
- **Fire caused by accumulation or attachment of flammable material**
  - Remove any dry leaves, chips, pieces of paper, coal dust, or any other flammable materials accumulated or attached to or around the engine exhaust manifold, muffler, or battery, or on the undercovers.
  - To prevent fires from being caught, remove any flammable materials such as dry leaves, chips, pieces of paper, coal dust, or any other flammable materials accumulated around the cooling system (radiator, oil cooler) or on the undercover.

- **Fire coming from electric wiring**
  Short circuits in the electrical system can cause fire. Always observe the following.
  - Keep all the electric wiring connections clean and securely tightened.
  - Check the wiring every day for looseness or damage. Reconnect any loose connectors or refasten wiring clamps. Repair or replace any damaged wiring.

Type 2

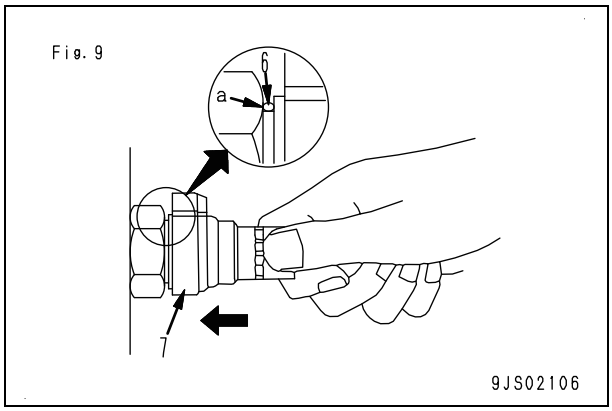
Disconnection

1. While holding the fitting, push body (7) in straight until sliding prevention ring (6) hits contact surface (a) at the hexagonal part on the male side. (Fig. 6)
2. While keeping the condition of Step 1, turn lever (8) to the right (clockwise). (Fig. 7)
3. While keeping the conditions of Steps 1 and 2, pull out whole body (7) to disconnect it. (Fig. 8)



Connection

1. While holding the fitting, push body (7) in straight until sliding prevention ring (6) hits contact surface (a) at the hexagonal part on the male side to connect it. (Fig. 9)



How to read electric wire code

- In the electrical circuit diagram, material, thickness and color of each electric wire are indicated by symbols. The wire code is helpful in understanding the electrical circuit diagram.

Example) AEX 0.85 L: Indicates blue, heat-resistant, low-voltage wire for automobile, having nominal No. of 0.85

AEX	Indicates type of wire by symbol. Type, symbol, and material of wire are shown in Table 1. (Since the use of AV and AVS wires depends on size (nominal No.), their symbols are not indicated on the diagram.)
0.85	Indicates size of wire by nominal No. Size (Nominal No.) is shown in Table 2.
L	Indicates color of wire by color code. Color codes are shown in Table 3.

Type, symbol, and material

- AV and AVS are different in thickness and outside diameter of the coating. CAVC has a circular compressed conductor. It differs from AV and AVS in the outside diameter of conductor and thickness of the coating. And AEX is similar to AV in thickness and outside diameter of the coating but different from AV and AVS in material of the coating.

(Table 1)

Type	Symbol	Conductor Material		Temperature range (°C) in use	Example of use
Low-voltage wire for automobile	AV	Annealed copper for electric appliance	Soft polyvinyl chloride	–30 to +60	For large current wiring (nominal No. 5 and above)
Thin-cover low-voltage wire for automobile (Type 1)	AVS				General wiring (nominal No. 3 and lower)
Thin-cover low-voltage wire for automobile Type 2	CAVS				For mid- to small-size excavators (nominal No. 1.25 and lower)
Heat-resistant low-voltage wire for automobile	AEX		Heat-resistant crosslinked polyethylene	–50 to +110	(Safety factor: Wiring at high-temperature place

List of abbreviation

- This list of abbreviations includes the abbreviations used in the text of the shop manual for parts, components, and functions whose meaning is not immediately clear. The spelling is given in full with an outline of the meaning.
- Abbreviations that are used in general society may not be included.
- Special abbreviations which appear infrequently are noted in the text(marked wit ★).
- This list of abbreviations consists of two parts. The first part is a list of the abbreviations used in the text of the manual, and the second part is a list of the abbreviations used in the circuit diagrams.

List of abbreviations used in the shop manual

Abbreviation	Full Spelling	Purpose of use (major applicable machine (*), or equipment/device)	Explanation
ABS	Anti-skid Brake System	Travel and brake (HD, HM)	Function with which when the tires skid (wheels stop rotating), the brakes are released, and when the wheels start to rotate, the brakes are applied again.
AISS	Automatic Idling Setting System	Engine	Automatic setting function of idling speed
AJSS	Advanced Joystick Steering System	Steering (WA)	Function that a lever can perform the steering operations, shifting gear speed operation and changing direction operation instead of a steering wheel.
ARAC	Automatic Retarder Accelerator Control	Travel and brake (HD, HM)	Function that the retarder works automatically with a certain braking force when the accelerator pedal is released while the machine travels downhill.
ARSC	Automatic Retarder Speed Control	Travel and brake (HD, HM)	Function that the retarder works automatically with a certain braking force so that the machine travels with the speed not exceeding the speed set by the operator when the accelerator pedal is released while the machine travels downhill.
ASR	Automatic Spin Regulator	Travel and brake (HD, HM)	Function with which, when the rear wheels spin on soft ground surfaces, this function automatically uses the optimum braking force to drive both wheels.
ATT	Attachment	Work equipment	A device that can be fixed onto a machine in order to enable it to do different jobs.
BCV	Brake cooling oil control valve	Brake (HD)	Valve that bypasses part of the brake cooling oil to reduce the load on the hydraulic pump when the retarder is not being used.
CAN	Controller Area Network	Communication and electronic control	One of communication standards that is used in the network on the machine
CDR	Crankcase Depression Regulator	Engine	Regulator valve that is installed to the KCCV ventilator It is not used independently and described CDR valve.
CLSS	Closed-center Load Sensing System	Oil pressure	System that can simultaneously actuate multiple actuators regardless of the load (provides better combined operation comparing to OLSS).
CRI	Common Rail Injection	Engine	Function to maintain optimum fuel injection amount and fuel injection timing by using engine controller to perform electronic control of supply pump, common rail, and injector.

HYDRAULIC EXCAVATOR

PC300LC-8M0
PC350LC-8M0

Machine model	Serial number
PC300LC-8M0	N330001 and up
PC350LC-8M0	N360001 and up

01 Specification

100 Specification and technical data

Table of fuel, coolant and lubricants

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

Reservoir	Fluid Type	Ambient Temperature, degrees Celsius -22 -4 14 32 50 68 86 104 122°F -30 -20 -10 0 10 20 30 40 50°C	Recommended Komatsu Fluids
Engine oil pan	Engine oil	(Note.1)	Komatsu EOS0W30
		(Note.1)	Komatsu EOS5W40
			Komatsu EO10W30-DH
			Komatsu EO15W40-DH
			Komatsu EO30-DH
Swing machinery case Final drive case Damper case	Powertrain oil (Note.2)		TO30
Hydraulic system	Powertrain oil		TO10
	Hydraulic oil		HO46-HM
Grease fitting	Hyper grease (Note.3)		G2-T, G2-TE
	Lithium EP grease		G2-LI
Cooling system	Supercoolant AF-NAC (Note.4)		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

* ASTM: American Society of Testing and Material

Unit: ℓ

Applicable portion	PC300LC-8M0, PC350LC-8M0	
	Specified quantity (ℓ)	Refill capacity (ℓ)
Engine oil pan	39	37
Swing machinery case	16	16
Final drive case (each)	9	8
Damper case	1.3	1.3
Hydraulic system	365	188
Fuel tank	605	—
Cooling system	31	31

1. Swing pinion (No. of teeth: 13)
2. Cover
3. Plate
4. No. 2 planetary carrier
5. Ring gear (No. of teeth: 68)
6. No.2 planetary gear (No. of teeth: 25)
7. No.2 sun gear (No. of teeth: 16)
8. No. 1 planetary carrier
9. No. 1 planetary gear (No. of teeth: 24)
10. Swing motor
11. Oil level gauge
12. No. 1 sun gear (No. of teeth: 19)
13. Case
14. Drain plug

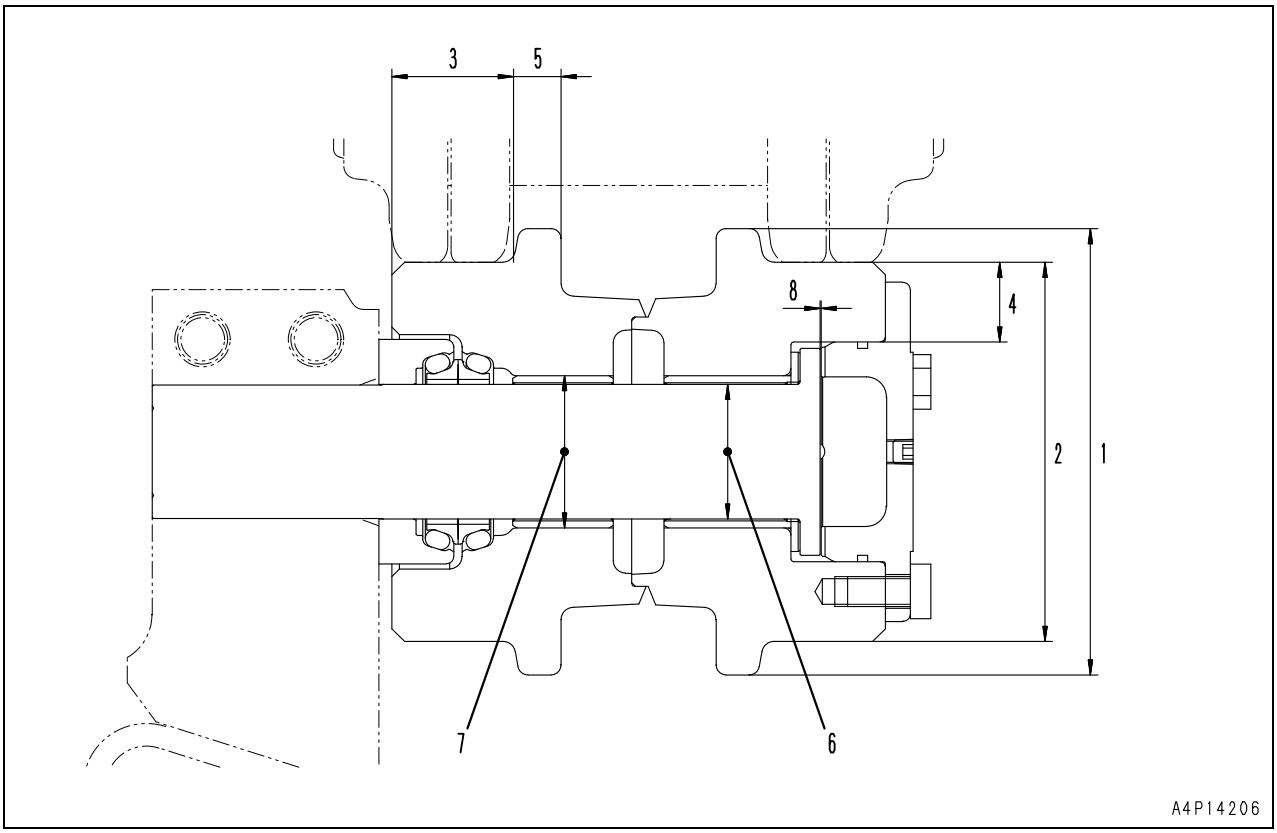
Specifications

Reduction ratio: ((19+68)/19) x ((16+68)/16) = 24.039

Unit: mm

No.	Check Item	Criteria		Remedy
15	Backlash between swing motor shaft and No. 1 sun gear	Standard clearance	Clearance limit	Replace
		0.18 to 0.28	–	
16	Backlash between No. 1 sun gear and No.1 planetary gear	0.15 to 0.51	1.00	
17	Backlash between No. 1 planetary gear and ring gear	0.17 to 0.60	1.20	
18	Backlash between No. 1 planetary carrier and No. 2 sun gear	0.40 to 0.75	1.50	
19	Backlash between No. 2 sun gear and No.2 planetary gear	0.14 to 0.44	0.90	
20	Backlash between No. 2 planetary gear and ring gear	0.16 to 0.55	1.10	
21	Backlash between No. 2 planetary carrier and swing pinion	0.07 to 0.23	–	
22	Backlash between swing pinion and swing circle	0 to 1.21	2.40	
23	Clearance between plate and No. 2 planetary carrier	0.38 to 0.82	–	
24	Wear of swing pinion surface contacting with oil seal	Standard dimension	Repair limit	Reapply hard chrome plating or replace
		$140\ ^{0}_{-0.100}$	–	

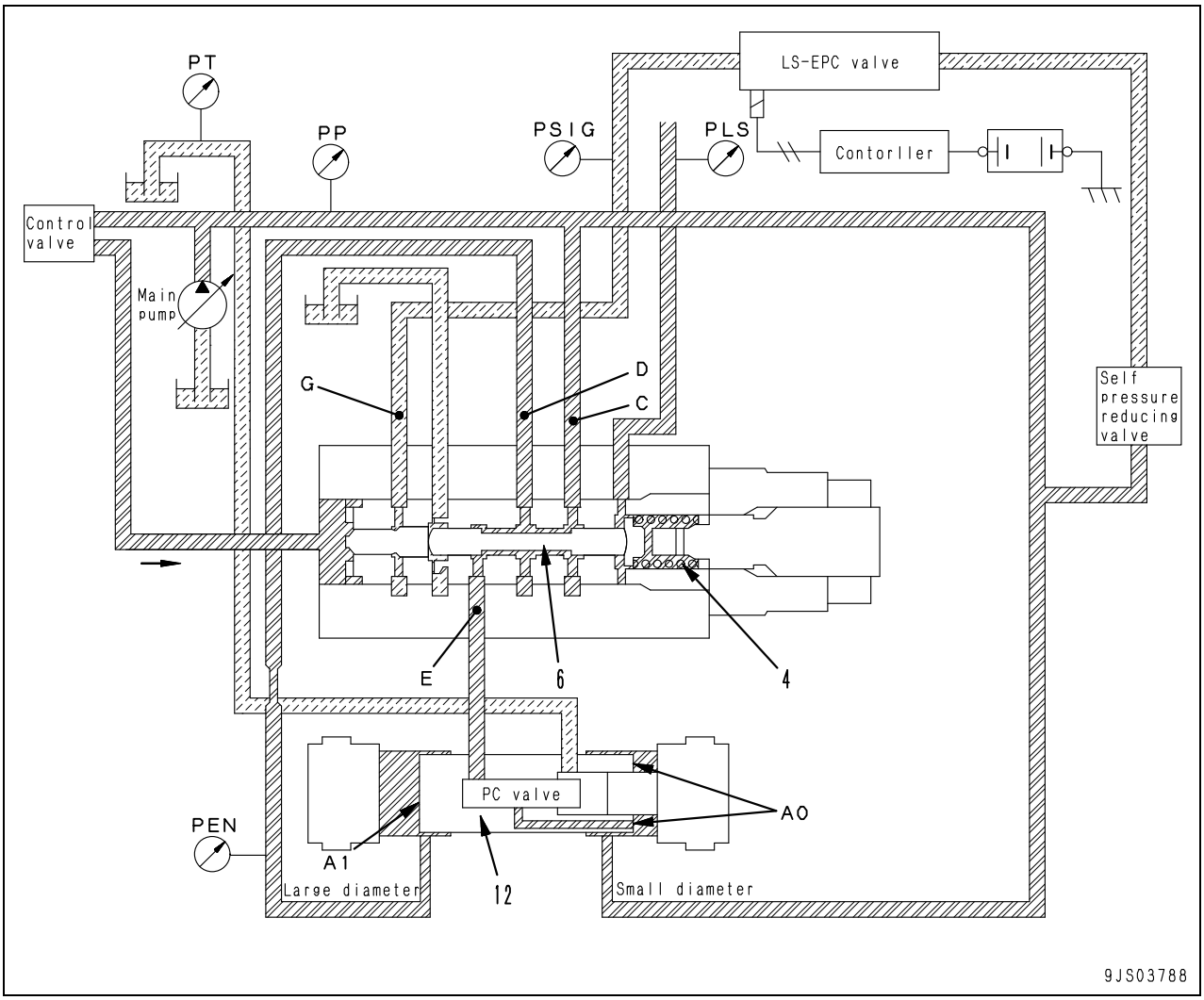
Carrier roller



Unit: mm

No.	Check Item	Criteria					Remedy
1	Outside diameter of flange	Standard dimension			Rapair limit		Replace
		179			—		
2	Outside diameter of tread	152			138		
3	Width of tread	48.2			—		
4	Thickness of tread	32			25		
5	Width of flange	19			—		
6	Clearance between shaft and bushing	Standard dimension	Tolerance		Standard clearance	Clearance limit	
			Shaft	Hole			
		54	–0.250 –0.280	+0.100 –0.036	0.214 to 0.380	—	
7	Interference between roller and bushing	Standard dimension	Tolerance		Standard interference	Interference limit	
			Shaft	Hole			
		61	+0.117 +0.087	+0.030 0	0.057 to 0.117	—	
8	Axial clearance of roller	Standard clearance			Clearance limit		
		0.5 to 0.7			—		

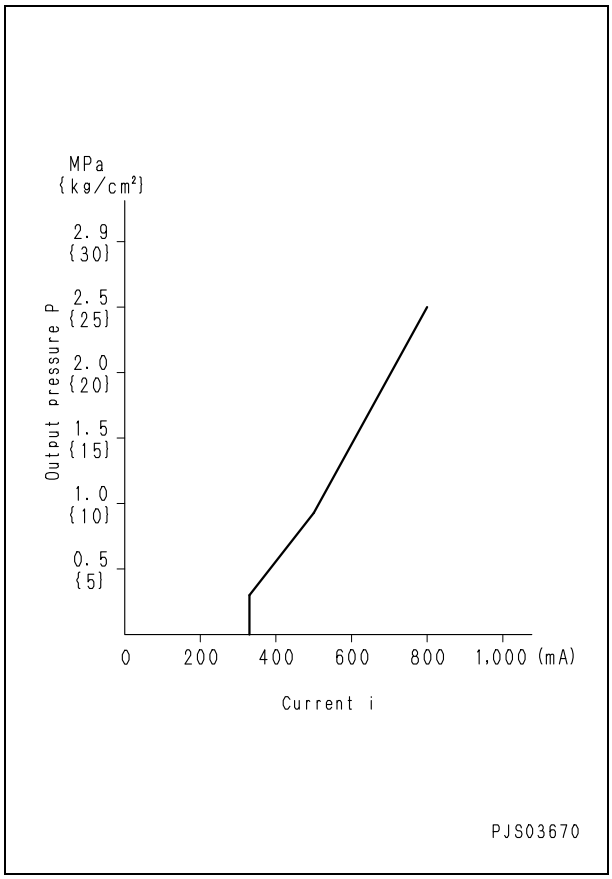
4) When servo piston is balanced



- Let us take the area receiving the pressure at the large diameter end of the piston as (A1), the area receiving the pressure at the small diameter end as (A0), and the pressure flowing into the large diameter end of the piston as (PEN).
- If the main pump pressure (PP) of the LS valve and the combined force of spring (4) and LS pressure (PLS) are balanced, and the relationship is (A0) x (PP) = (A1) x (PEN), servo piston (12) will stop in that position.
- And the swash plate of the pump will be held in an intermediate position. [Spool (6) will be stopped at a position where the distance of the opening from port (D) to port (E) and the distance from port (C) to port (D) is almost the same.]
- At this point, the relationship between the pressure receiving areas across servo piston (12) is (A0) : (A1) = 3 : 5, so the pressure applied across the piston when it is balanced becomes (PP) : (PEN) ≒ 5 : 3
- Force of spring (4) is adjusted in such that the position of the balanced stop of this spool (6) may be determined when (PP) – (PLS) = 2.45 MPa {25 kg/cm^2} on the front pump side and (PP) – (PLS) = 2.55 MPa {26 kg/cm^2} on the rear pump side at the median of the specified value.
- If (PSIG) [Output pressure of LS-EPC valve, 0 to 2.9 MPa {0 to 30 kg/cm^2}] is input to port (G), the position of the balanced stop is changed. The front pump side will be moved in the range of (PP) –(PLS) = 2.45 to 0.98 MPa {25 to 0 kg/cm^2} and the rear pump will be moved in the range of (PP) – (PLS) = 2.55 to 1.08 MPa {26 to 11 kg/cm^2} in proportion to (PSIG) pressure.

Function

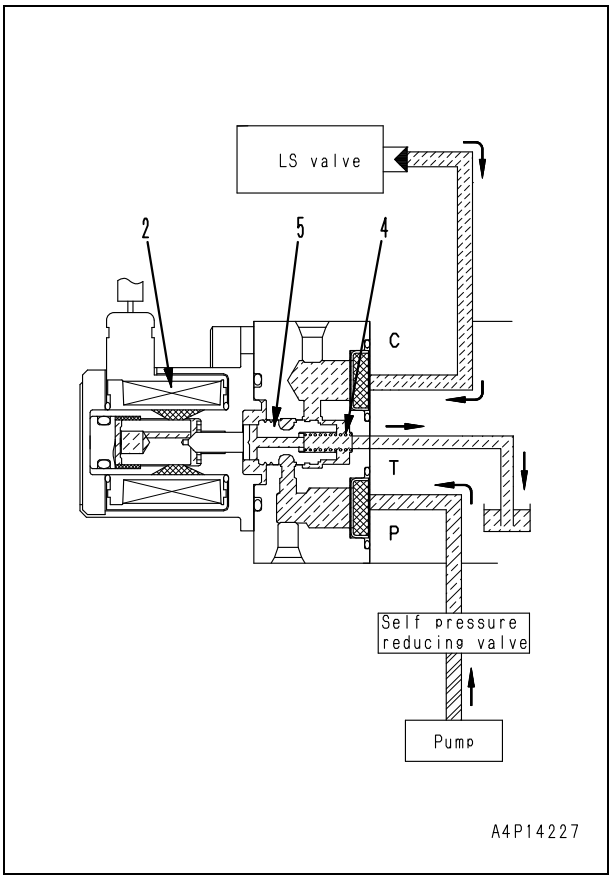
- The EPC valve consists of the proportional solenoid portion and the hydraulic valve portion.
- When it receives signal current (i) from the controller, it generates the EPC output pressure in proportion to the size of the signal, and outputs it to the LS (PC) valve.



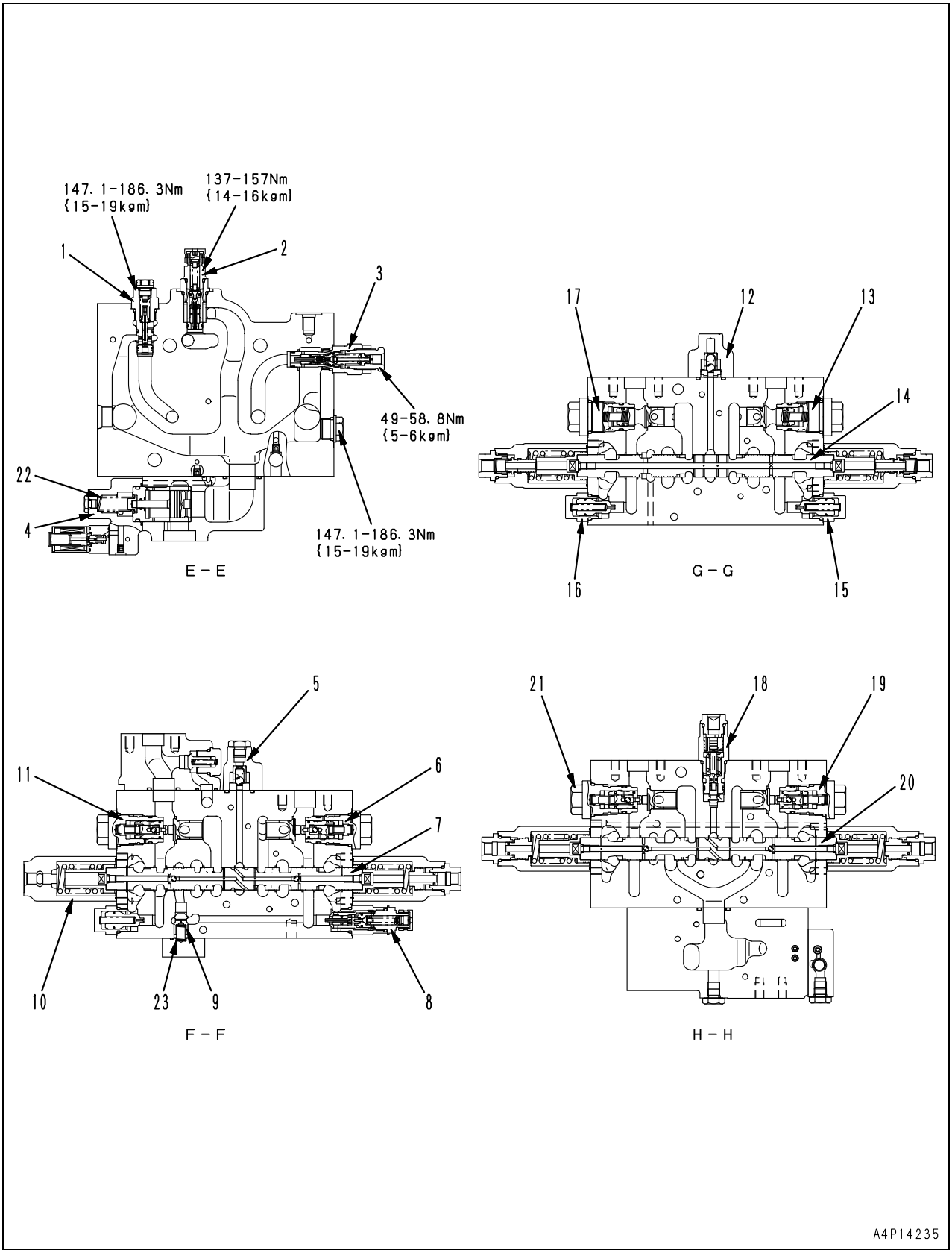
Operation

1) When signal current is 0 (coil is de-energized)

- When there is no signal current flowing from the controller to coil (2), coil (2) is de-energized.
- Spool (5) is pushed to the left by spring (4).
- Port (P) closes and the pressurized oil from the self pressure reducing valve does not flow to the LS (PC) valve.
- The pressurized oil from the LS (PC) valve is drained to the tank via port (C) and port (T).



(3/5)

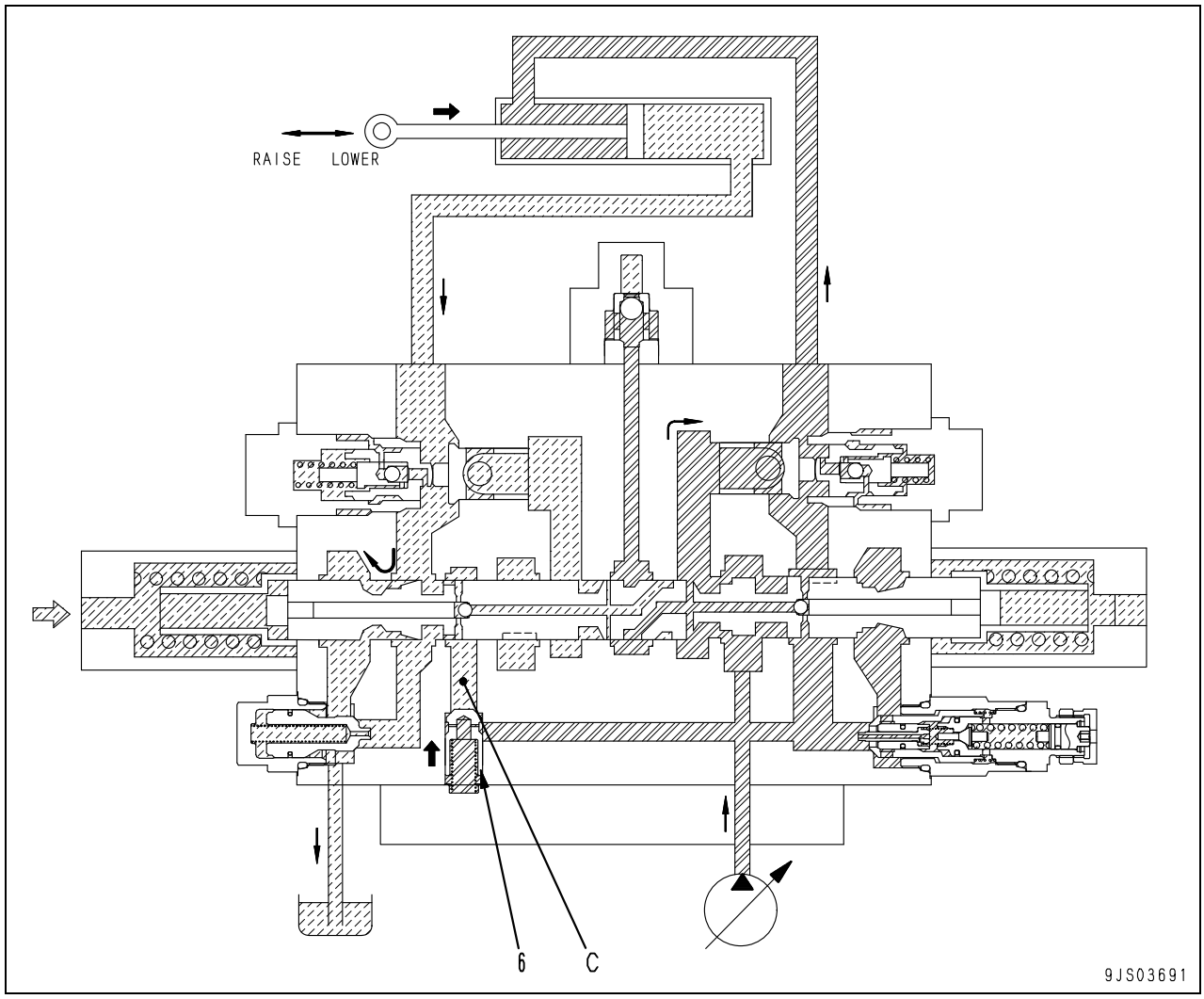

147. 1-186. 3Nm
{15-19kgm}
137-157Nm
{14-16kgm}
1
2
3
49-58. 8Nm
{5-6kgm}
22
4
147. 1-186. 3Nm
{15-19kgm}
E - E
17
12
13
14
16
15
G - G
5
11
6
7
10
23
9
8
F - F
21
18
19
20
H - H
A4P14235

1. Arm valve
2. R.H. travel valve
3. Swing valve
4. Boom valve
5. L.H. travel valve
6. Bucket valve
7. Boom Hi valve
8. Arm Hi valve
9. Service valve 1
10. Service valve 2
11. Spool (arm)
12. Spool (R.H. travel)
13. Spool (swing)
14. Spool (boom)
15. Spool (L.H. travel)
16. Spool (bucket)
17. Spool (boom Hi)
18. Spool (arm Hi)
19. Spool (service 1)
20. Spool (service 2)
21. Pressure compensation valve
22. Pressure compensation valve
23. Suction valve
24. Check valve (for boom regeneration circuit)
25. Check valve (for arm regeneration circuit)
26. LS shuttle valve
27. LS select valve
28. Merge-divider valve
29. Arm quick return valve
30. Self pressure reducing valve
31. Travel junction valve
32. Variable back pressure valve
33. Boom drift prevention valve
34. Boom Hi check valve
35. Main relief valve (bucket side)
    Set pressure:
    36.1 ± 0.25 MPa {367.5 ± 2.5 kg/cm^2}
    (112 ℓ/min)

    When digging force is increased:
    38.2 ± 0.25 MPa {389.5.5 ± 2.5 kg/cm^2}
    (110 ℓ/min)
36. Main relief valve (arm side)
    Set pressure:
    36.1 ± 0.25 MPa {367.5 ± 2.5 kg/cm^2}
    (112 ℓ/min)

    When digging force is increased:
    38.2.1 ± 0.25 MPa {389.5.5 ± 2.5 kg/cm^2}
    (110 ℓ/min)
37. Unload valve (bucket side)
    Cracking pressure:
    3.1 ± 0.5 MPa {32 ± 5 kg/cm^2}
38. Unload valve (arm side)
    Cracking pressure:
    3.1 ± 0.5 MPa {32 ± 5 kg/cm^2}
39. Safety-suction valve (service 1)
    Set pressure:
    17.2 ± 0.5 MPa {175 ± 5 kg/cm^2}
40. Safety-suction valve (dump, digging or arm Hi)
    Set pressure:
    38.2 ± 0.5 MPa {390 ± 5 kg/cm^2}
41. 2-stage safety-suction valve (service 1)
    Set pressure:
    1 stage: 20.1 ± 0.5 MPa {205 ± 5 kg/cm^2}
    2 stage: 17.2 ± 0.5 MPa {175 ± 5 kg/cm^2}
42. 2-stage safety-suction valve (dump or digging)
    Set pressure:
    1 stage: 28.4 ± 0.5 MPa {290 ± 5 kg/cm^2}
    2 stage: 14.7 ± 0.5 MPa {150 ± 5 kg/cm^2}
43. Safety valve
    Set pressure:
    38.2 ± 0.5 MPa {390 ± 5 kg/cm^2}

2. If the cylinder head pressure is higher than the bottom pressure (digging work, etc.)

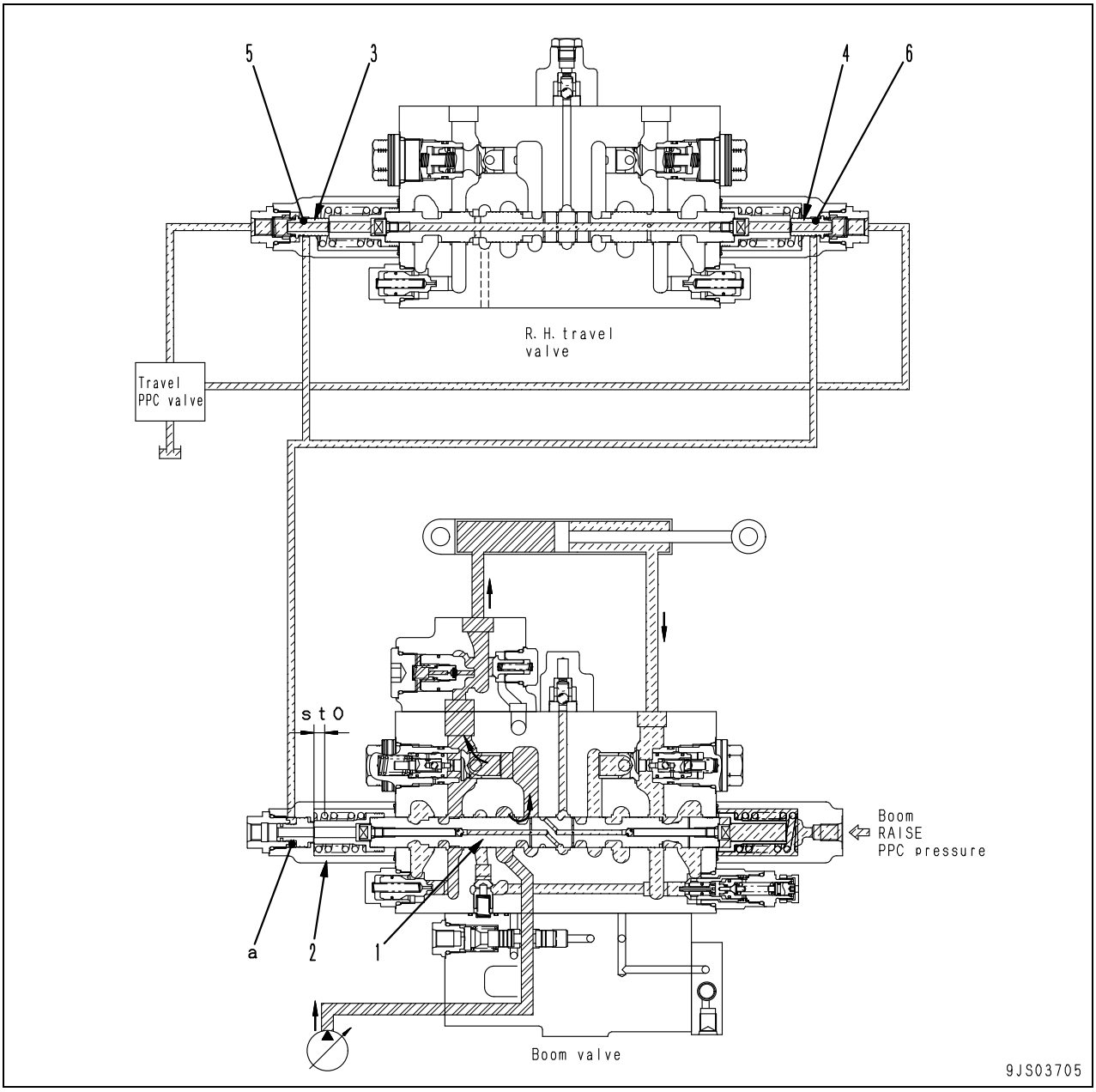


Function

- Check valve (6) provided to regeneration circuit (C) closes to shut off the flow from the cylinder bottom to the head.

Travel PPC shuttle valve

1. When travel lever is in neutral



Function

- Regulates flow to each cylinder by controlling the stroke of each spool of the boom, arm, and bucket using the pilot pressure of travel PPC valve while climbing a steep grade, operating the boom RAISE, arm IN, arm OUT, bucket CURL, bucket DUMP.
- When controlling the stroke of the boom, arm and/or bucket, pilot pressure of travel PPC valve passes through the circuit inside the control valves to actuate the system.

Operation

- The oil in stroke regulation signal chamber (a) is drained through orifices (5) and (6) of pistons (3) and (4) in the travel spring case and the travel PPC valve.
- When operating boom RAISE, (or arm IN, arm OUT, bucket CURL, bucket DUMP), spool (1) moves to the left until it makes contact with the end face of spring casing (2) (st0).

Variable back pressure valve

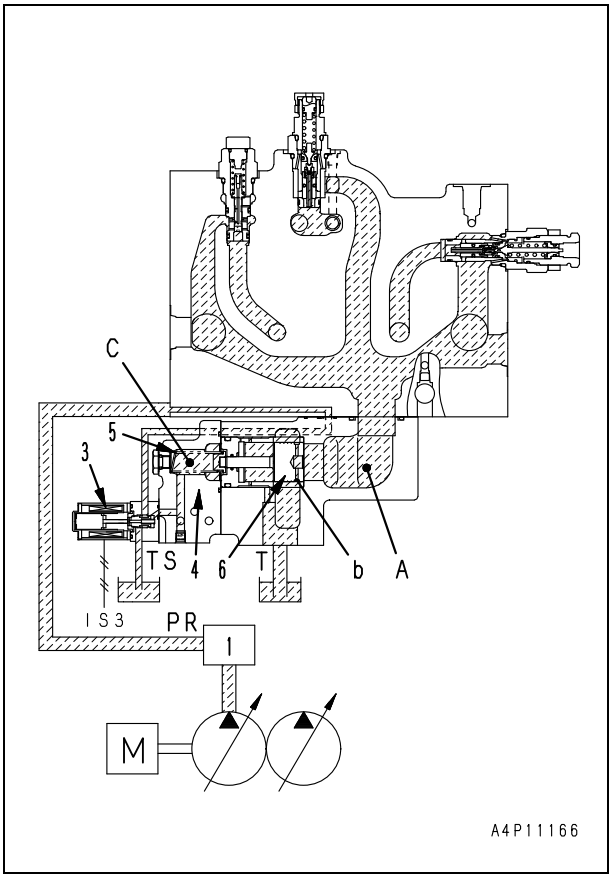
Function

- This valve creates back pressure in the drain circuit to prevent cavitation caused by negative pressure in each actuator circuit (motors, cylinders, etc).
- In order to reduce output loss, this valve reduces the back pressure in the drain circuit when any operation other than the travel and swing is performed.

Operation

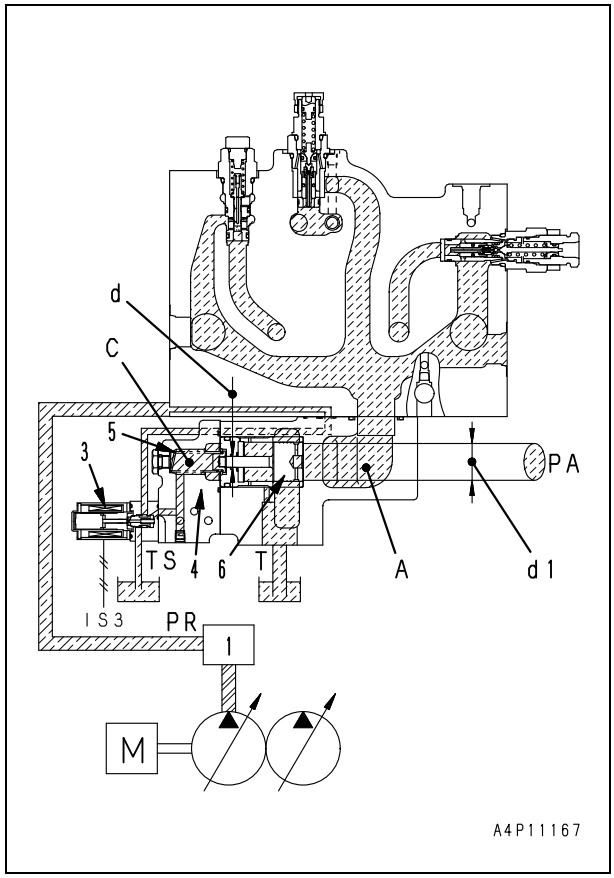
When engine is stopped

- Pressurized oil is not supplied from the main pump to self-pressure reducing valve (1).
- No oil pressure is transmitted from variable back pressure solenoid valve (3) to spring chamber (C), and valve (6) is pressed to the right by the reaction force of spring (5).
- Drain circuit (A) of the control valve is interconnected to port (T) through orifice (b) of valve (6).



When engin is running (during swing or travel operation)

- The pressurized oil (PR) from self-pressure reducing valve (1) flows to variable back pressure solenoid valve (3).
- Since drive signal (IS3) of variable back pressure solenoid valve (3) is OFF, pressurized oil (PR) is flown to spring chamber (C) of variable back pressure valve (4).
- Pressurized oil (PR) transmitted to spring chamber (C) exerts a force on the left end face of valve (6) (surface of ϕd), and it pushes valve (6) to the right as a combined force with the reaction force of spring (5).
- Pressure (PA) of drain circuit (A) of the control valve acts on the right end face of valve (6) (surface of ϕd1) to push valve (6) to the left.
- Valve (6) balances at a position where it creates back pressure (PA) determined as follows; PA=(Area of surface ϕd) x Pressure (PR) + Reaction force of spring (5) / Area of surface ϕd1.
- Accordingly, the oil flow rate from drain circuit (A) of the control valve to port (T) is limited. In other words, the set pressure of variable back pressure valve (4) is adjusted.



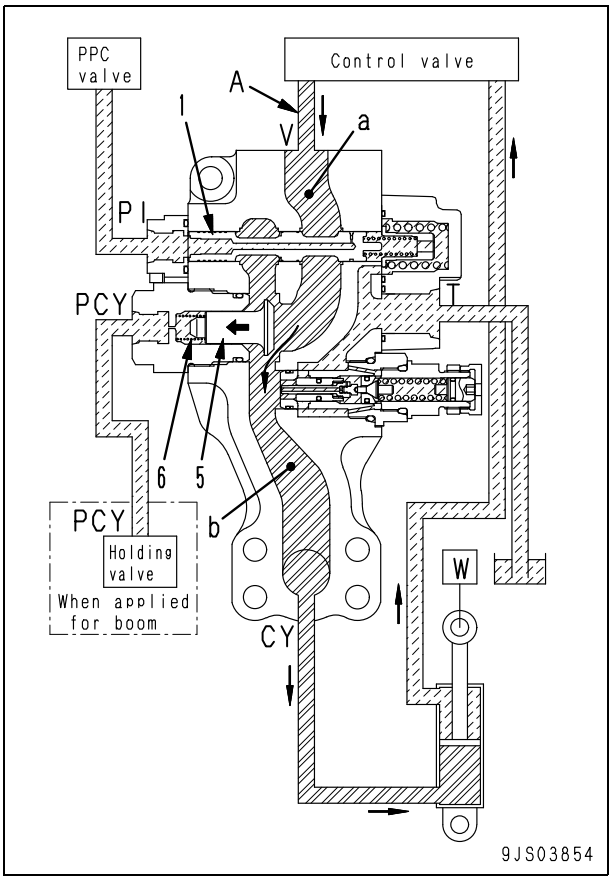
2. When pressurized oil flows from the main valve to the cylinder

When the piping is free of burst

- Pressurized oil led to chamber (a) from the control valve becomes higher than the combined force of pressure from work equipment cylinder circuit chamber (b) and spring (6).
- Check valve (5) opens and chambers (a) and (b) are interconnected.
- Pressurized oil flows from the control valve to the work equipment cylinder.

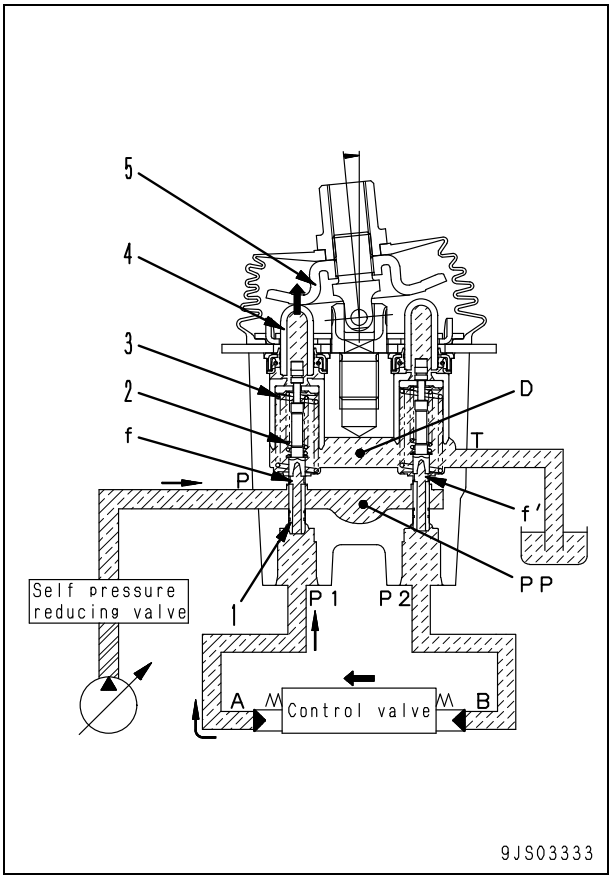
If the piping is bursted

- If piping (A) bursts between the control valve and the work equipment cylinder, pressurized oil in chamber (a) flows outside from the bursted portion.
- Pressure force in chamber (a) drops.
- Pressure force in chamber (a) drops lower than the combined pressure force of chamber (b) and spring (6).
- Check valve (5) closes and chambers (a) and (b) are shuft off.
- Pressure for the work equipment cylinder is held to prevent a sudden drop of the work equipment.



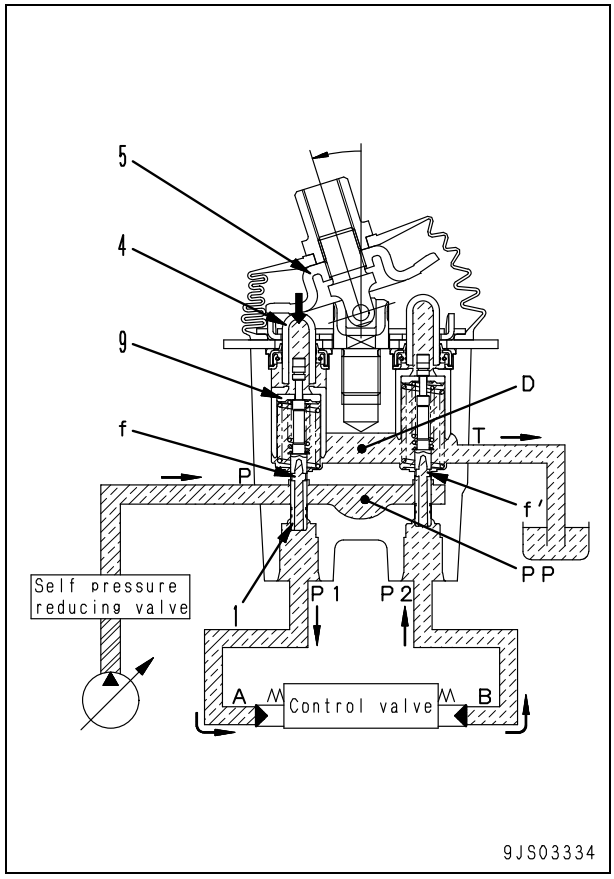
3. During fine control (When control lever is returned)

- When disc (5) starts to be returned, spool (1) is pushed up by the force of centering spring (3) and the pressure at port (P1).
- Because of this, fine control hole (f) is connected to drain chamber (D), and the pressurized oil at port (P1) is released.
- If the pressure of port (P1) is lowered excessively, spool (1) is pushed down by metering spring (2).
- Fine control hole (f) is shut off from drain chamber (D), and it is almost simultaneously interconnected to pump pressure chamber (PP).
- Pump pressure is supplied until the pressure at port (P1) recovers to the level equivalent to the lever position.
- When the spool of the control valve returns, the oil in drain chamber (D) flows in from fine control hole (f') in the valve on the side that is not working. The oil passes through port (P2) and enters chamber (B) to replenish the chamber with pressurized oil.



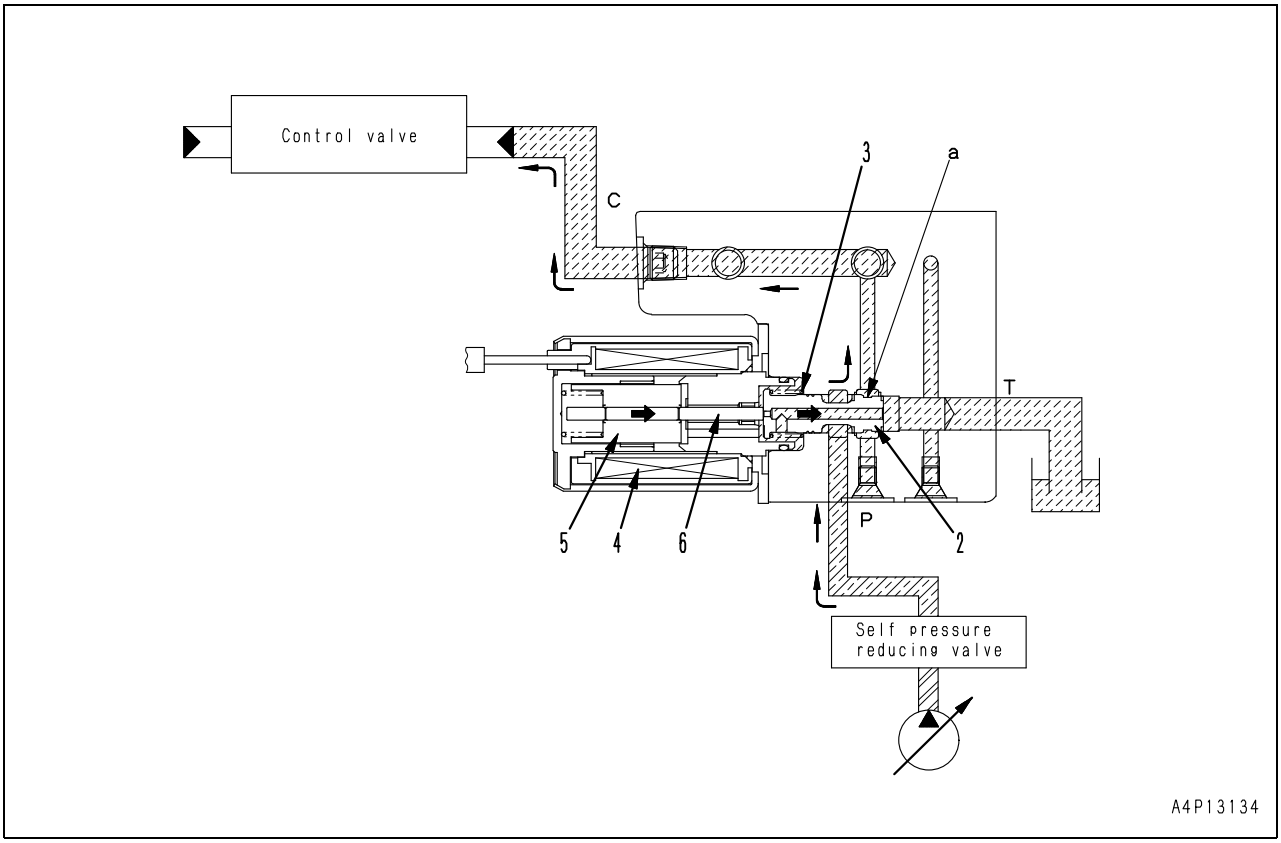
4. At full stroke

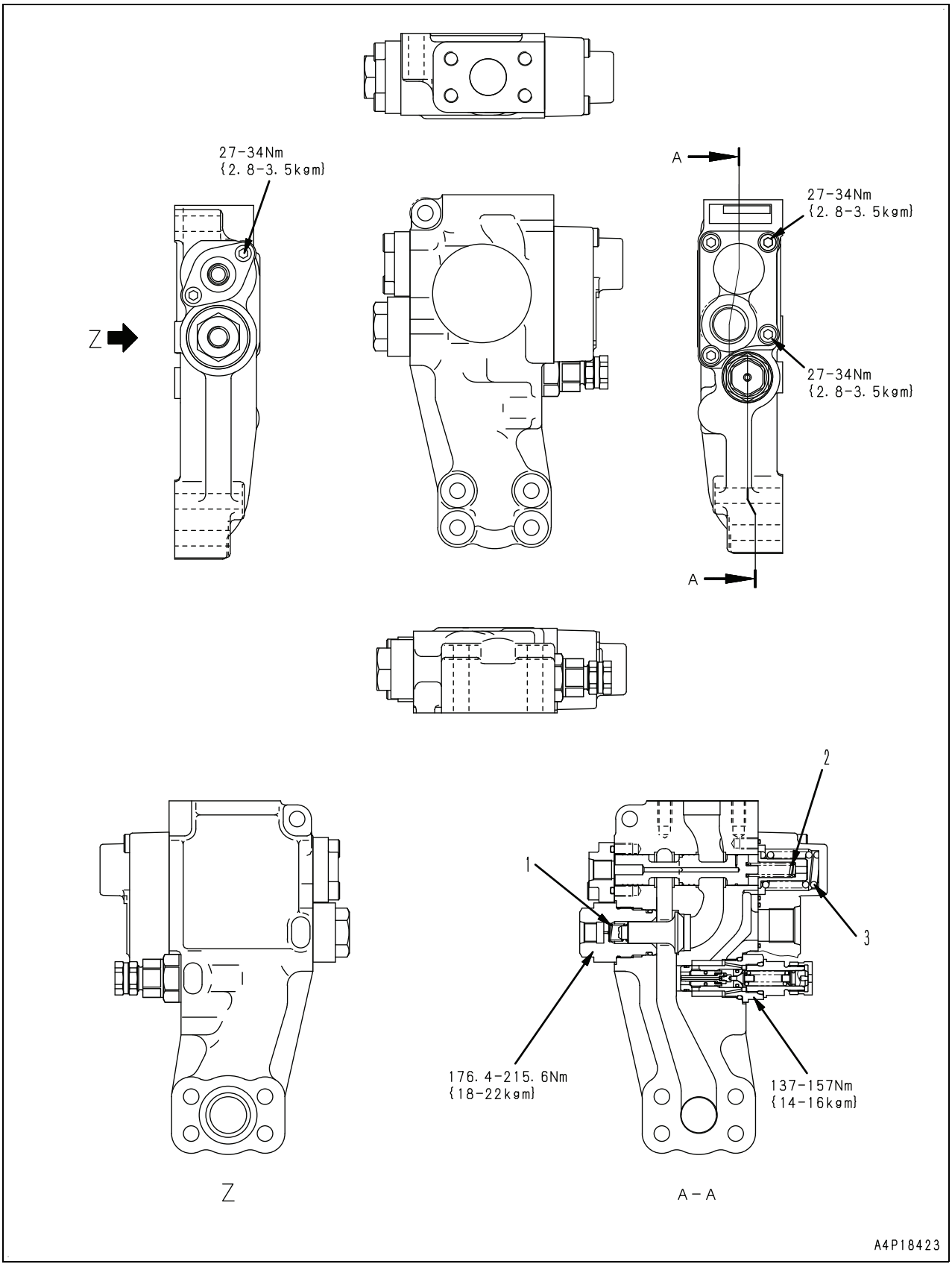
- Disc (5) pushes down piston (4), and retainer (9) pushes down spool (1).
- Fine control hole (f) is shut off from drain chamber (D), and is interconnected to pump pressure chamber (PP).
- Therefore, the pilot pressure oil from the self pressure reducing valve passes through fine control hole (f) and flows to chamber (A) from port (P1) to push the control valve spool.
- The oil returning from chamber (B) passes from port (P2) through fine control hole (f') and flows to drain chamber (D).



2) When signal current is very small (coil is energized)

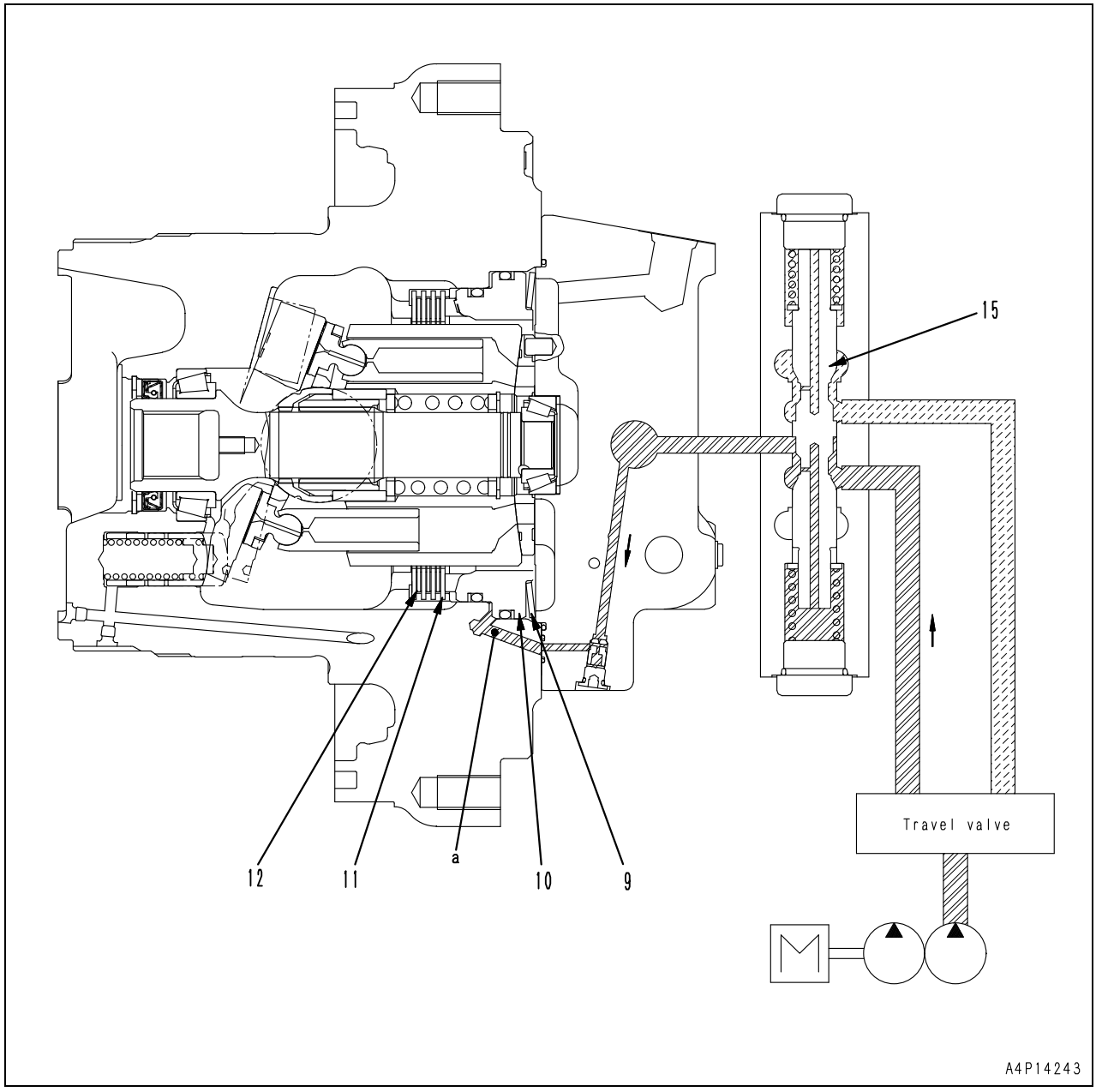
- When a very small signal current flows to coil (4), coil (4) is energized, and a propulsion force is generated on the right side of plunger (5).
- Push pin (6) pushes spool (2) to the right, and pressurized oil flows from port (P) to port (C).
- Pressures on port (C) increases and the force to act on surface (a) of spool (2) and the spring load on spring (3) become larger than the propulsion force of plunger (5).
- Spool (2) is pushed to the left, port (P) is shut off from port (C) and ports (C) and (T) are connected.
- Spool (2) moves so that the propulsion force of plunger (5) may be balance with pressure of port (C) + spring load of spring (3).
- The circuit pressure between the EPC valve and the control valve is controlled in proportion to the size of the signal current.




27-34Nm
{2.8-3.5kgm}
Z
A
27-34Nm
{2.8-3.5kgm}
27-34Nm
{2.8-3.5kgm}
A
2
1
3
176.4-215.6Nm
{18-22kgm}
137-157Nm
{14-16kgm}
Z
A-A
A4P18423

Operation of parking brake

1) When starting travel



- As the travel lever is operated, pressurized oil from the pump activates counterbalance valve spool (15), opening the parking brake circuit.
- The pressurized oil is conducted to chamber (a) of brake piston (10) and compresses brake spring (9), pushing brake piston (10) toward right.
- Since the pushing force to plate (11) and disc (12) disappears, plate (11) is separated from disc (12) and the brake is released.

Relief valve portion

Outline

- The relief valve portion consists of check valves (2) and (3), shuttle valves (4) and (5), and relief valve (1).

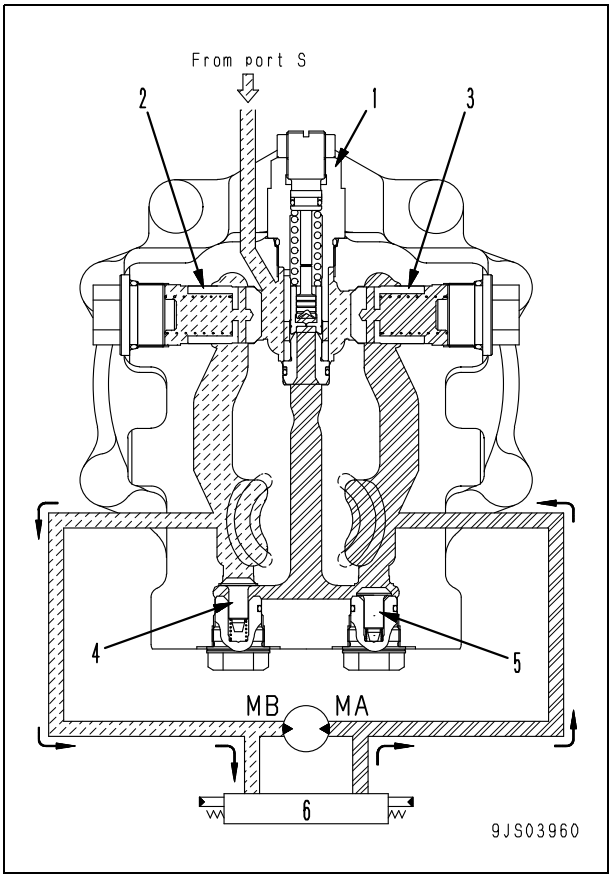
Function

- When the machine is in the swing holding mode, control valve (6) closes the motor outlet circuit, but the motor rotation is continued by inertial force.
- The motor output, therefore, is abnormally increased, resulting in damaging the motor.
- In order to prevent the motor damages, the relief valve relieves the abnormally high pressure to port (S) from the motor outlet side (high-pressure side) of the motor.

Operation

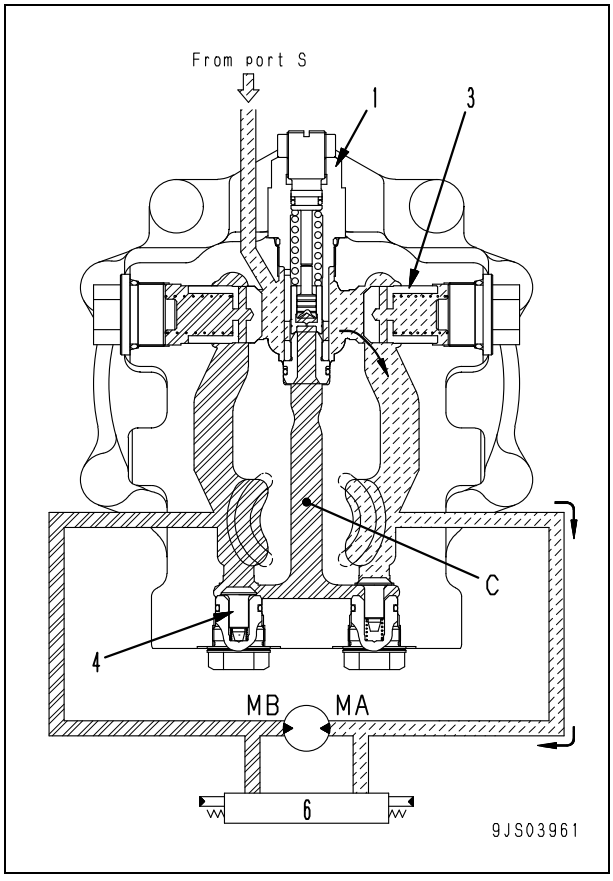
1. When starting swing

- When the swing control lever is operated to the right- swing, the pressurized oil from the pump is supplied to port (MA) via control valve (6).
- The pressure on port (MA) rises, the starting torque is generated in the motor, and the motor starts to rotate.
- The pressurized oil from the outlet port of the motor passes from port (MB) through the control valve (6) and returns to the tank.



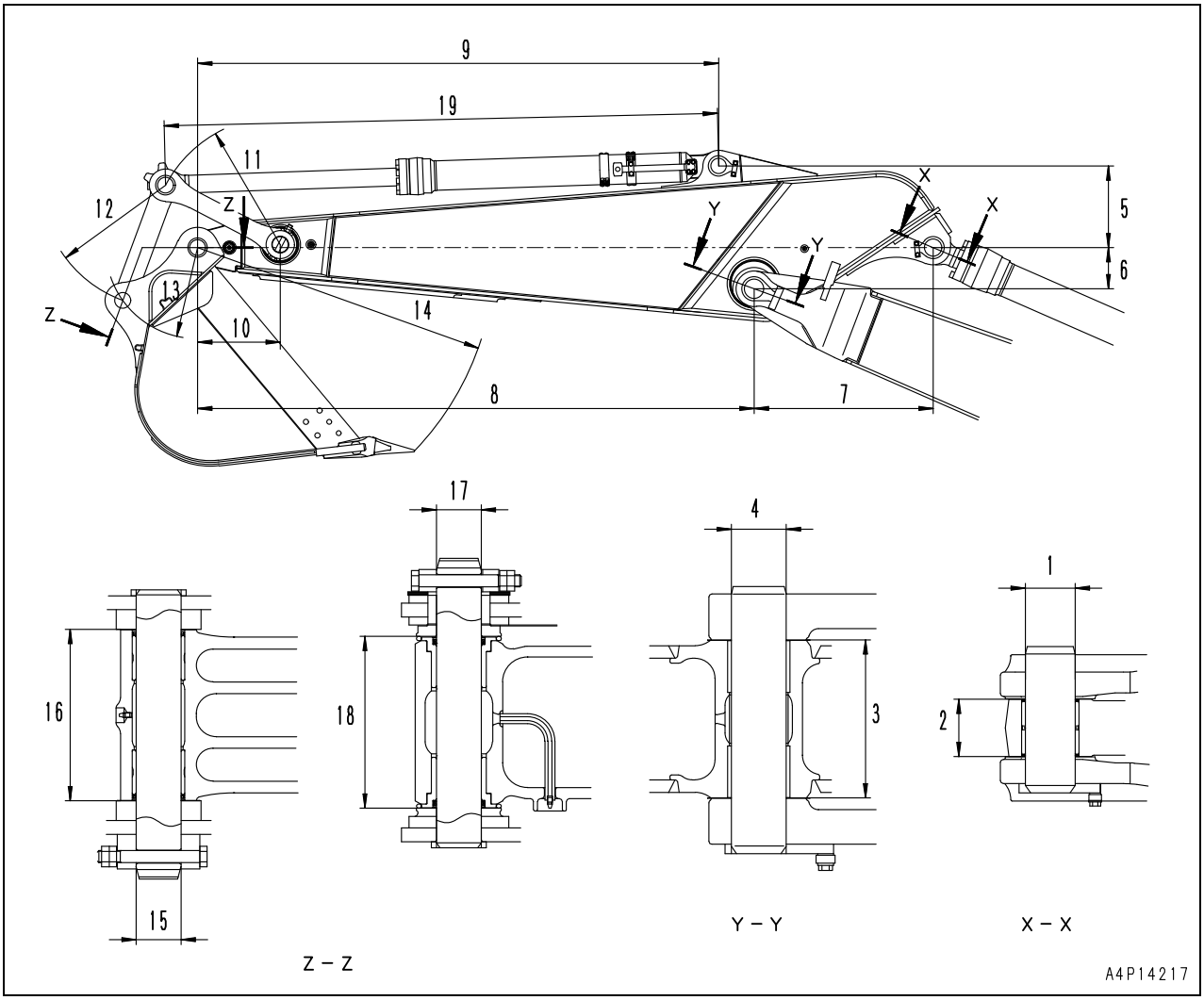
2. When swing is stopped

- When the swing control lever is returned to neutral, the supply of pressurized oil from the pump to port (MA) is stopped.
- The pressurized oil from the motor outlet can't return to the tank since the returning circuit to the tank is closed from control valve (6). Thus, pressure on port (MB) increases.
- Rotation resistance is generated on the motor and hence the brake starts working.
- Shuttle valve (4) is pressed as pressure on port (MB) goes above port (MA).
- The pressure on chamber (C) is increased to the set pressure of relief valve (1) and becomes the same as that of port (MB).
- A high braking torque works on the motor, thereby stopping the motor.
- When relief valve (1) is actuated, the relieved pressurized oil and the pressurized oil from port (S) are fed to port (MA) via check valve (3).
- This prevents cavitation on port (MA).

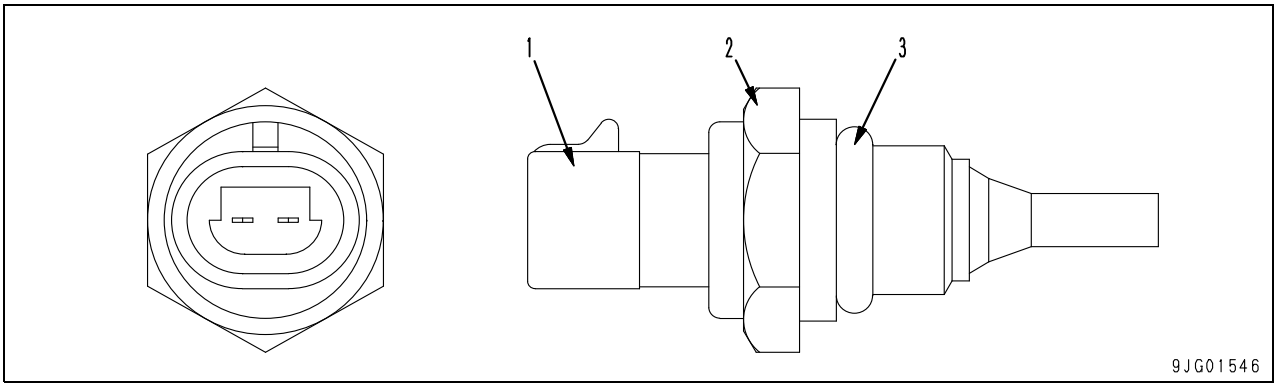


Dimensions of components

1. Dimension of arm

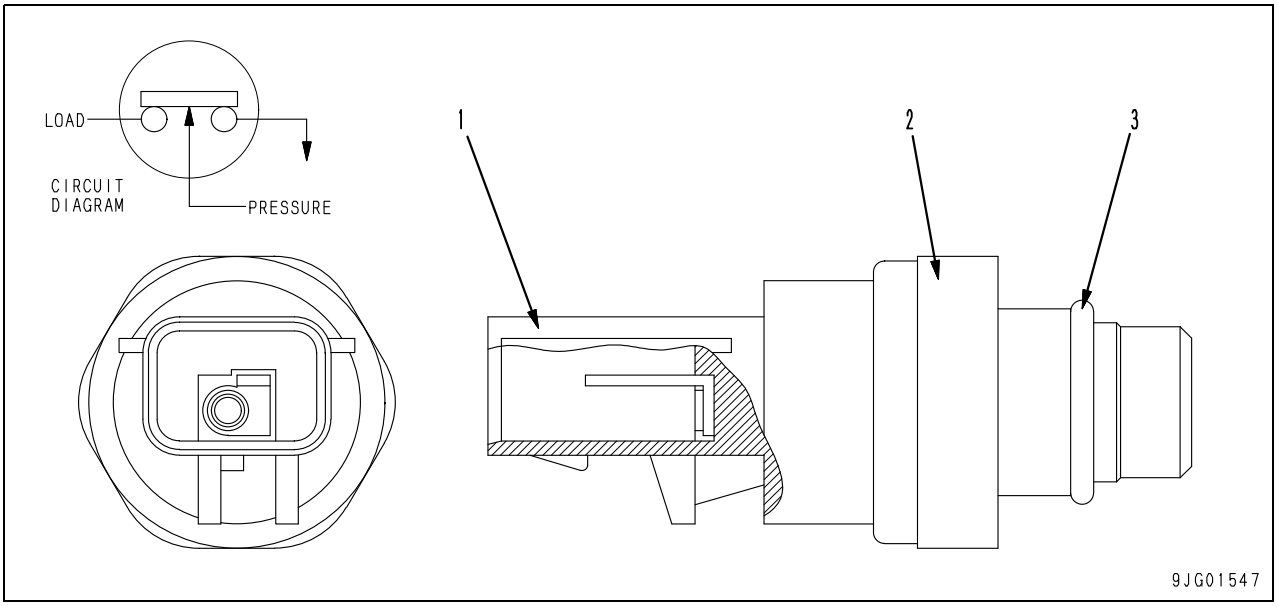


Coolant temperature sensor



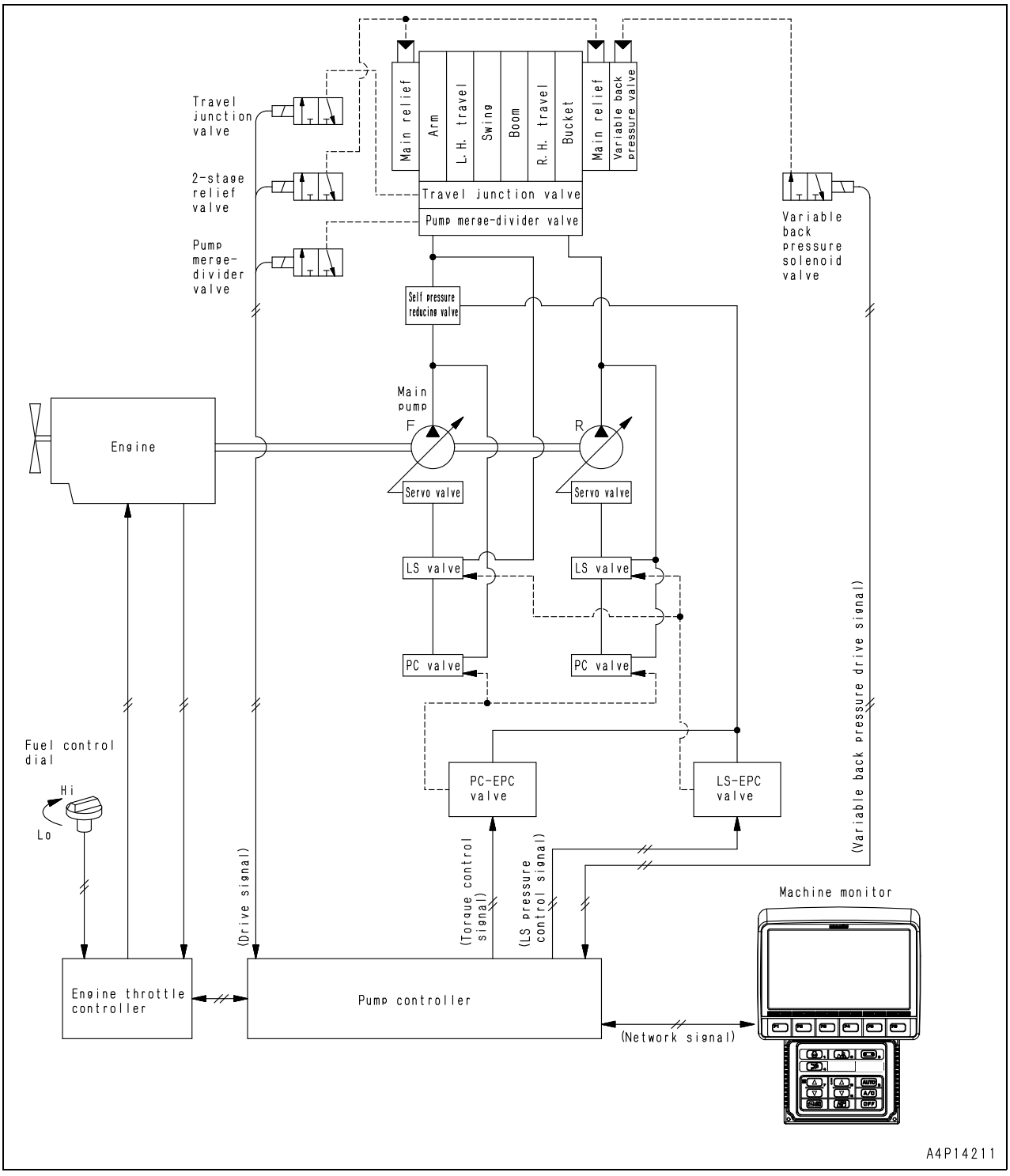
1. Connector
2. Sensor
3. O-ring

Oil pressure switch



1. Connector
2. Sensor
3. O-ring

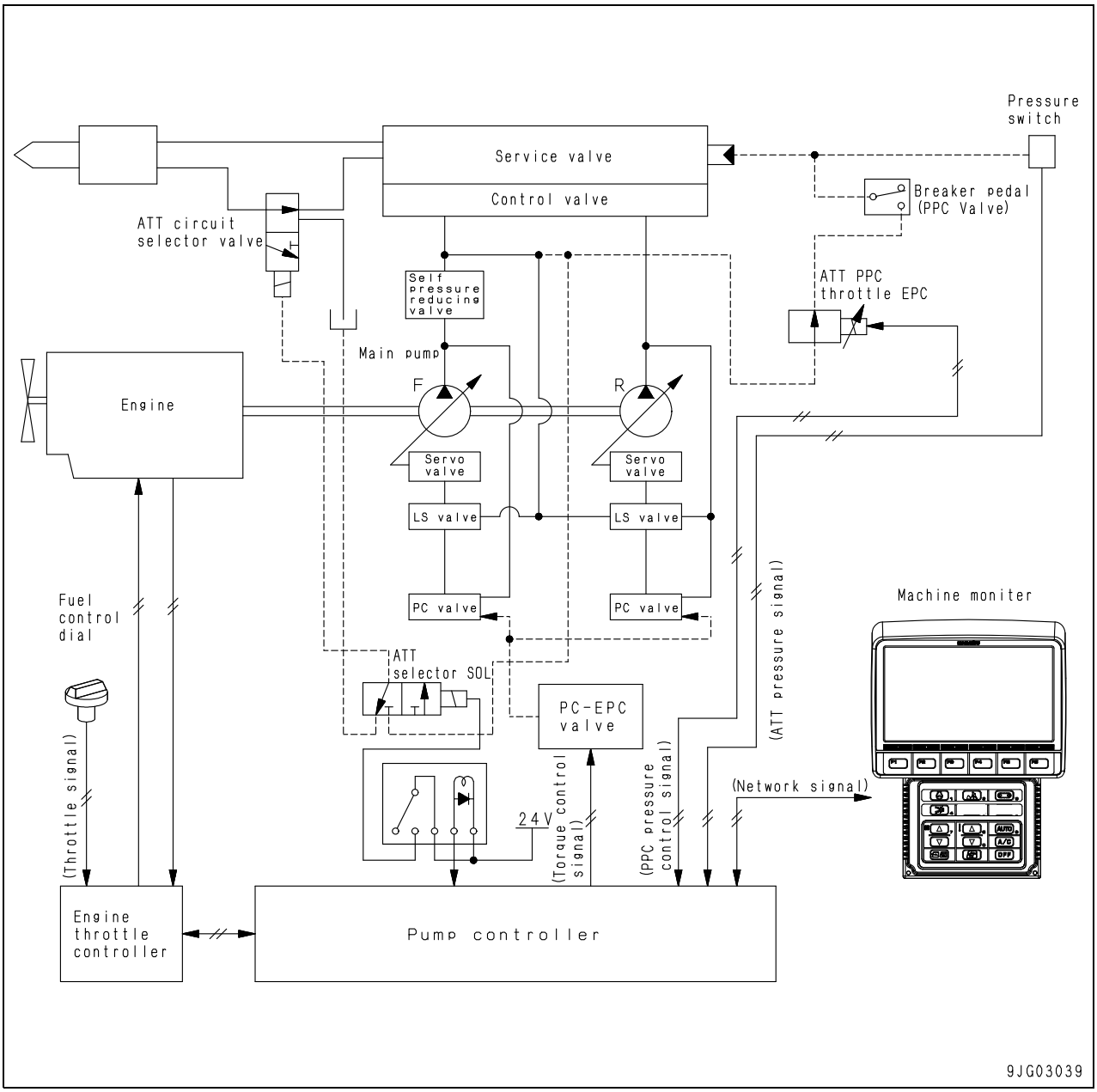
2. Pump and valve control function



Function

- The machine is matched to various types of work properly with the 2-stage relief function to increase the digging force, etc.

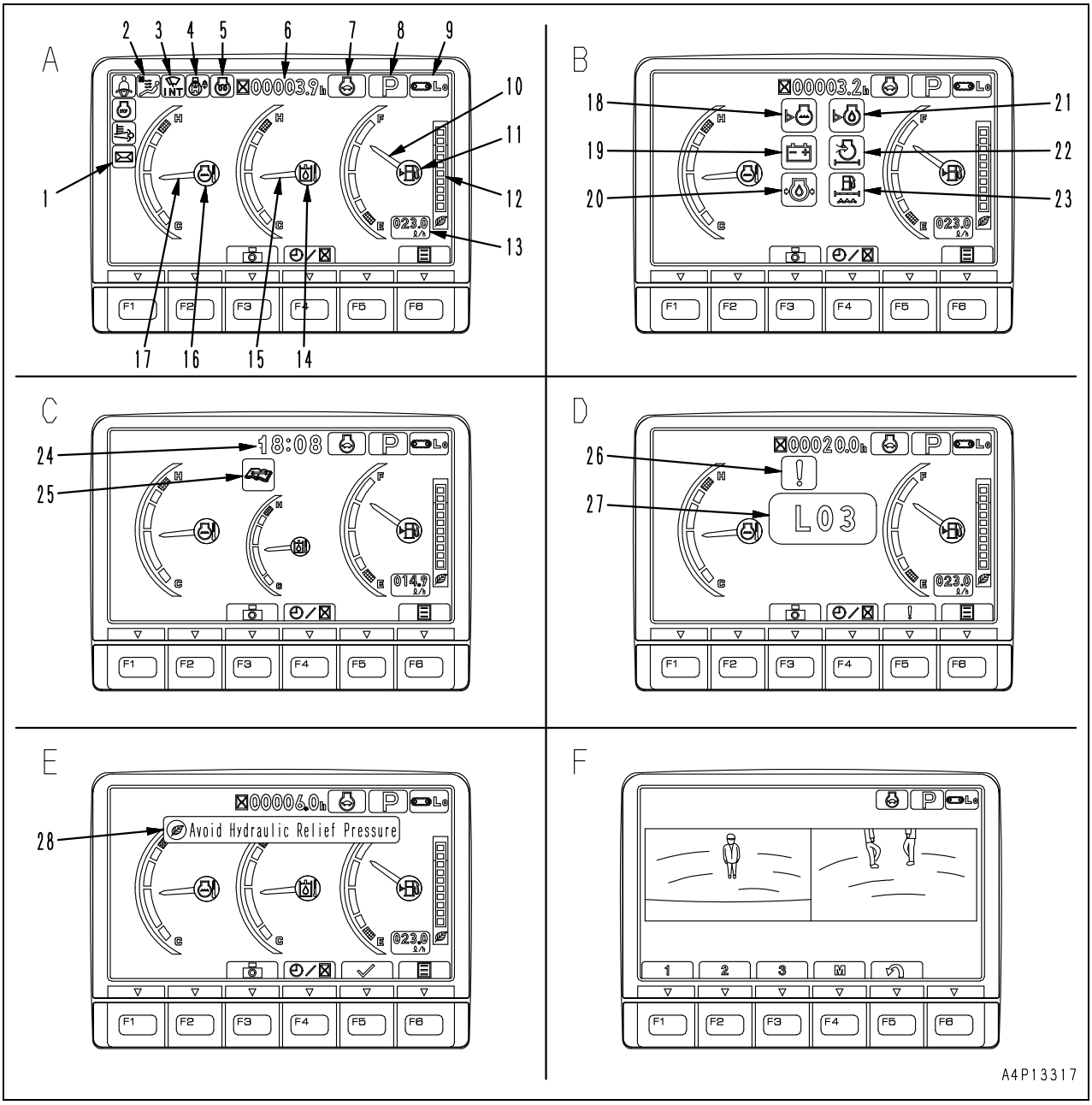
8. Attachment flow control and circuit selector function (if equipped)



Function

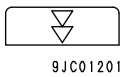
- This function is available only with the attachment specification.
- The function acts as follows according to the flow command and working mode from the monitor.
  1) It throttles the attachment PPC pressure and controls the flow when the pedal is depressed fully.
  2) In B mode and the other modes, it switches to attachment single acting (B) or double acting (other modes).

Display



A: Standard screen
B: Check before starting screen
C: Maintenance interval warning screen
D: Warning screen
E: Guidance screen
F: Camera image screen
★ Camera image screen (F) shown in the figure is when two or more cameras are installed

1. Message monitor
2. Air conditioner monitor
3. Wiper monitor
4. Swing lock monitor
5. Engine preheating monitor
6. Service meter
7. Auto-deceleration monitor
8. Working mode monitor
9. Travel speed monitor
10. Fuel level gauge
11. Fuel level monitor
12. Eco gauge
13. Fuel consumption gauge
14. Hydraulic oil temperature monitor
15. Hydraulic oil temperature gauge
16. Engine coolant temperature monitor
17. Engine coolant temperature gauge
18. Radiator coolant level monitor
19. Charge level monitor
20. Engine oil pressure monitor
21. Engine oil level monitor

Guidance icon	Item	Function
 9JC01201	Switching the select item	Selects the page right below the current page. (To the top page from the bottom page.)
 9JC01202	Clear	Clears selected/displayed item.
 9JC01203	Restores default value	Sets selected item back to default. (Used for screen adjustment.)
 9JC01204	Set	Performs setting.
 9JC01205	Start	Starts function. (Used for starting measurement of split fuel consumption on the fuel consumption display screen.)
 9JC01206	Stop	Stops operation. (Used for stopping measurement of split fuel consumption on fuel consumption display screen.)
 9JC01207	Saving	Saves setting
 9JC01208	Switching to the name setting screen	Switches the current screen to the name setting screen
 9JC01209	Switching to ATT1 oil flow setting screen	Switching the current screen to attachment 1 oil flow setting screen. (Enabled only when attachments 1 and 2 are equipped)
 9JC01210	Switching to ATT2 oil flow setting screen	Switching the current screen to attachment 2 oil flow setting screen. (Enabled only when attachments 1 and 2 are equipped)
 9JC01211	HOLD	Holds the value of the target item of monitoring. (Used when monitoring is turned on)
 9JC01212	Resetting the hold	Resets the currently held value of the target item of monitoring. (Used when monitoring is turned on)

Function

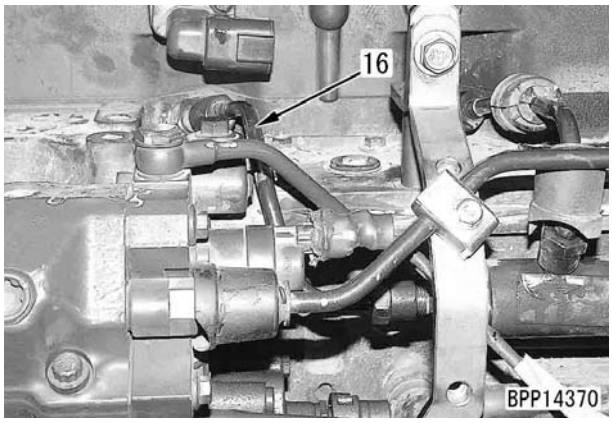
- This terminal uses the satellite communications technology.
- The terminal is an equipment which transmits various machine information obtained through network signals and input signals, as well as GPS positioning data. The terminal can transmit data via the communication antenna.
- The status of the terminal can be checked by using the menu of “KOMTRAX setting” in the service mode of the machine monitor .
- Use of KOMTRAX terminal must be limited for the countries in which such communication is allowed.
- This terminal has LED lamps and 7-segment lamp indicator used for testing and troubleshooting on its display section.

★ When changing the country where the system is used, you must give notice to Komatsu Ltd. the information which country the system is used in advance.
★ When using the KOMTRAX system in Japan, the terminal special to Japan must be mounted.

Applicable model						PC300LC-8M0 PC350LC-8M0	
Category	Item		Measurement condition		Unit	Standard value for new machine	Repair limit
Work equipment	Hydraulic drift of work equipment	Whole work equipment (Lowering distance of tooth tip)	• Hydraulic oil temperature: 45 to 55°C • Flat and level ground • Bucket load: 2,160 kg • Engine stopped • Work equipment control lever in NEUTRAL position • Fall amount for 15 minutes as measured every 5 minutes starting immediately after initial setting • For measuring posture, see **Work equipment 1**		mm	PC300, 300LC-8M0: Max. 450 PC350, 350LC-8M0: Max. 550	PC300, 300LC-8M0: Max. 675 PC350, 350LC-8M0: Max. 825
		Boom cylinder (Retraction distance of cylinder)				PC300, 300LC-8M0: Max. 25 PC350, 350LC-8M0: Max. 30	PC300, 300LC-8M0: Max. 38 PC350, 350LC-8M0: Max. 45
		Arm cylinder (Extraction distance of cylinder)				PC300, 300LC-8M0: Max. 135 PC350, 350LC-8M0: Max. 165	PC300, 300LC-8M0: Max. 203 PC350, 350LC-8M0: Max. 248
		Bucket cylinder (Retraction distance of cylinder)				PC300, 300LC-8M0: Max. 20 PC350, 350LC-8M0: Max. 25	PC300, 300LC-8M0: Max. 30 PC350, 350LC-8M0: Max. 38
	Work equipment speed	Boom	• Hydraulic oil temperature: 45 to 55°C • Engine running at high idle • Working mode: P mode • Time required from raise stroke end till bucket touches ground • For measuring posture, see **Work equipment 2**	RAISE	sec.	PC300, 300LC-8M0: 3.7 ± 0.4 PC350, 350LC-8M0: 3.8 ± 0.4	PC300, 300LC-8M0: Max.4.5 PC350, 350LC-8M0: Max.4.6
				LOWER		PC300, 300LC-8M0: 2.8 ± 0.4 PC350, 350LC-8M0: 2.7 ± 0.4	Max. 4.0
		Arm	• Hydraulic oil temperature: 45 to 55°C • Engine running at high idle • Working mode: P mode • Time required from dumping stroke end to digging stroke end • For measuring posture, see **Work equipment 3**	IN	sec.	PC300, 300LC-8M0: 3.9 ± 0.4 PC350, 350LC-8M0: 3.8 ± 0.4	Max. 4.5
				OUT		PC300, 300LC-8M0: 2.9 ± 0.3 PC350, 350LC-8M0: 3.1 ± 0.3	PC300, 300LC-8M0: Max. 3.5 PC350, 350LC-8M0: Max. 3.7
		Bucket	• Hydraulic oil temperature: 45 to 55°C • Engine running at high idle • Working mode: P mode • Time required from dumping stroke end to digging stroke end • For measuring posture, see **Work equipment 4**	CURL	sec.	3.2 ± 0.3	Max. 3.8
				DUMP		2.3 ± 0.3	Max. 2.9

Testing and adjusting item	Symbol		Part No.	Part name	Q'ty	Remarks
Oil pressure of pump LS control circuit	M	1	799-101-5002	Hydraulic tester	1	Pressure gauge: 2.5, 6, 40, 60 MPa {25, 60, 400, 600 kg/cm^2}
			790-261-1204	Digital hydraulic tester	1	Pressure gauge: 60 MPa {600 kg/cm^2}
		2	799-101-5220	Nipple	1	Size: M10 x 1.25
			07002-11023	O-ring	1	
		3	799-401-1340	Differential pressure gauge	1	
Testing solenoid valve output pressure	N	1	799-101-5002	Hydraulic tester	1	Pressure gauge: 2.5, 6, 40, 60 MPa {25, 60, 400, 600 kg/cm^2}
			790-261-1204	Digital hydraulic tester	1	Pressure gauge: 60 MPa {600 kg/cm^2}
		2	799-401-3100	Adapter	1	Size: 02
			02896-11008	O-ring	1	
		3	799-401-3200	Adapter	1	Size: 03
			02896-11009	O-ring	1	
PPC valve output pressure	P		799-101-5002	Hydraulic tester	1	Pressure gauge: 2.5, 6, 40, 60 MPa {25, 60, 400, 600 kg/cm^2}
			790-261-1204	Digital hydraulic tester	1	Pressure gauge: 60 MPa {600 kg/cm^2}
Oil leakage in work equipment cylinder	Q		Commercially available	Measuring cylinder	1	
Troubleshooting for engine controller/sensors/actuators	—		799-601-4101 or 799-601-4201	T-adapter assembly	1	
			799-601-4130	● T-adapter	1	Ne sensor
			799-601-4150	● T-adapter	1	For oil pressure sensor
			799-601-4211	● T-adapter	1	Engine controller
			799-601-4220	● T-adapter	1	Engine controller
			799-601-4240	● Socket	1	For ambient pressure sensor
			799-601-4250	● Socket	1	For boost pressure sensor
			799-601-4260	● T-adapter	1	Engine controller
			799-601-9040	● T-adapter	1	For injector
			799-601-9430	● Socket	1	For supply pump PCV
Troubleshooting for chassis sensors/wiring harnesses	—		799-601-2500 or 799-601-2700 or 799-601-2800 or 799-601-2900 or 799-601-7100 or 799-601-7400 or 799-601-8000	T-adapter assembly	1	799-601-2900 is not supplied
			799-601-2600	● T-adapter box	1	For Econo (does not include 799-601-2700)
			799-601-2740	● MIC adapter	1	For MIC-5P

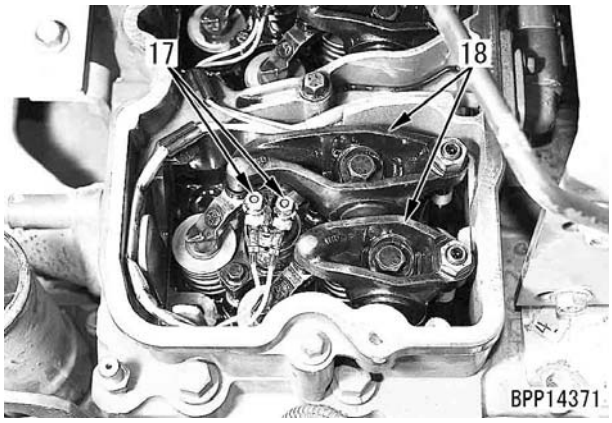
9. Disconnect high-pressure fuel tube (16).



10. Loosen injector terminal nuts (17) and remove the terminal from the injector.

11. Move the cylinder to be tested to the compression top dead center.
    ★ For the adjustment, refer to the section,"Adjusting valve clearance".

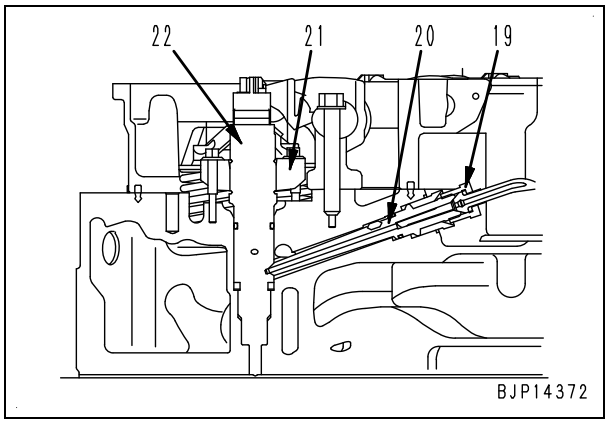
12. Remove rocker arm assemblies (18).

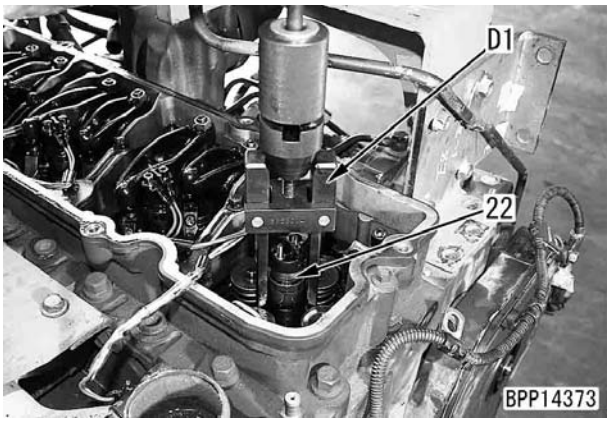


13. Remove retainer (19) and remove fuel inlet connector (20).

14. Remove holder (21).

15. Remove injector (22).
    ★ Remove the injector by using the impacts of the tool, slide hammer **D1**.
    ★ Do not pry the upper part of the injector.





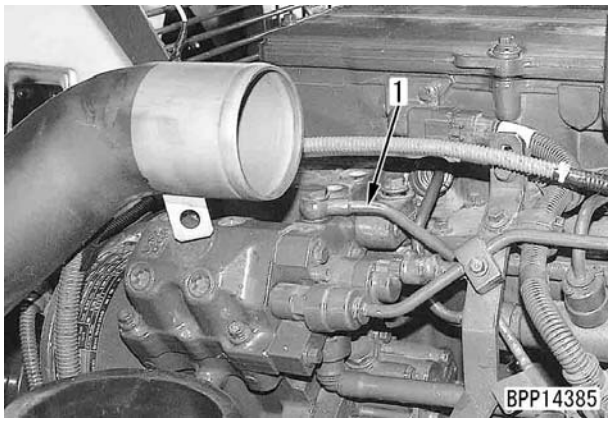
Testing fuel return rate and leakage

★ Testing tools for leakage from pressure limiter and return rate from injector

Symbol		Part No.	Part name
H	1	795-790-4800	Hose kit
	2	795-790-6700	Adapter
	3	Commercially available	Measuring cylinder
	4	6164-81-5790	Joint

⚠ Park the machine in a level ground and lower the work equipment to the ground.

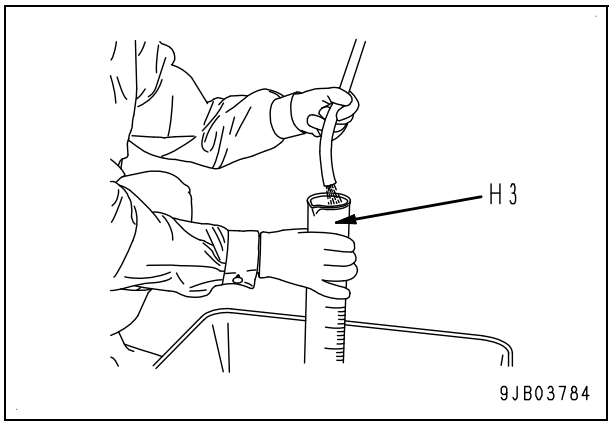
1. Testing supply pump return rate
   1) Disconnect return tube (1) of the supply pump.
      ★ Before starting the work, remove the return hose from the aftercooler so that it does not interfere with the inspection.



   2) Connect hose kit **H1** to the supply pump side, and insert its tip into measuring cylinder **H3**.
   3) Connect joint **H4** to the fuel return connector side to prevent leakage of the fuel.
   4) Install the aftercooler hose, run the engine at low idle and then measure the return rate from the supply pump.
      ★ If the return rate from the supply pump is in the following range, it is normal.

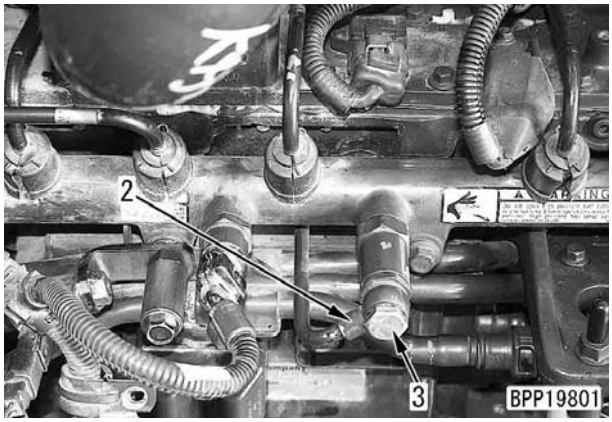
At low idle	Max. 300 cc/30 sec.
At cranking	Max. 200 cc/30 sec.

⚠ If the engine cannot be started, you may measure the fuel return rate while rotating the engine with the starting motor. In order to protect the starting motor, it is prohibited to continue cranking for more than 30 seconds.



   5) After finishing testing, remove the testing tools and return the removed parts.
      Joint bolt (M14):
      24 ± 4 Nm {2.45 ± 0.41 kgm}

2. Testing leakage from pressure limiter
   ★ Before displaying failure code [**CA449**], its troubleshooting must be done beforehand.
   1) Disconnect joint bolt (3) of return tube (2) of the pressure limiter.



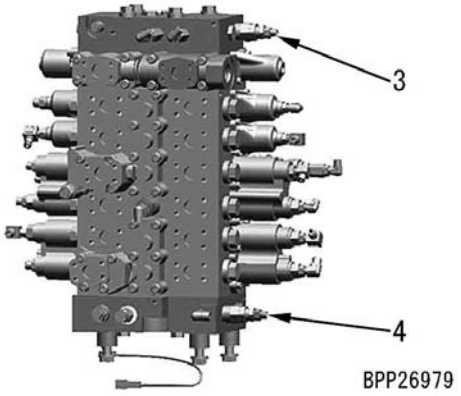
   2) Screw in adapter **H2** together with return tube (2), and insert its tip into measuring cylinder **H3**.
   3) Connect joint **H4** to the return tube joint connection of the cylinder block side to prevent leakage of the fuel.

Adjustment

★ Adjustment of the unload valve is not available.

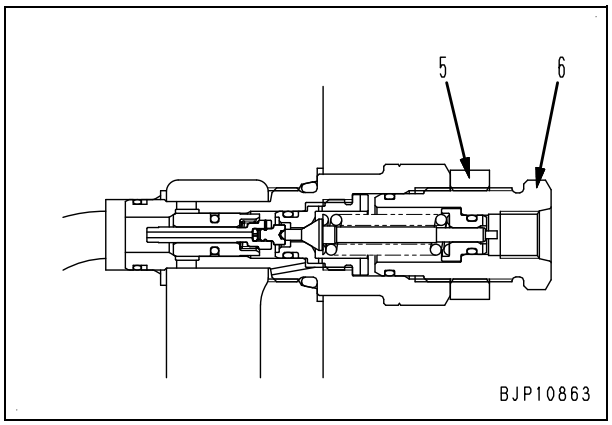
1. Adjustment of main relief pressure
   ★ When the relief pressure of the work equipment circuit or travel circuit is abnormal, adjust main relief valves (3) and (4) according to the following procedure.
   - (3): For the front pump circuit
   - (4): For the rear pump circuit

   ★ As for the main relief valve, be sure to adjust its low-pressure relief pressure alone (adjusting the low-pressure relief pressure automatically sets the high-pressure relief pressure, too.).
   ★ When the low-pressure relief pressure is turned on, the 2-stage relief valve is OFF and thus the pilot pressure is not applicable to the switching port.



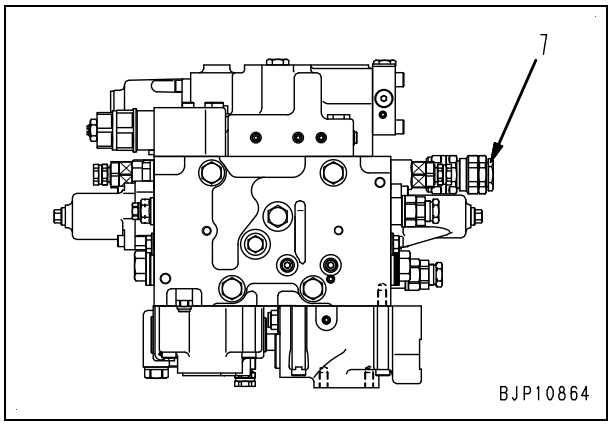
   1) Disconnect the pilot hose.
   2) Loosen locknut (5) and turn holder (6) to adjust the relief pressure.
      ★ Turning the holder clockwise increases the pressure. Turning it counterclockwise decreases the pressure.
      ★ Quantity of adjustment per turn of holder:
      Approximately 20.5 MPa
      {Approximately 209 kg/cm^2}

      Locknut:
      49.0 to 58.8 Nm {5 to 6 kgm}



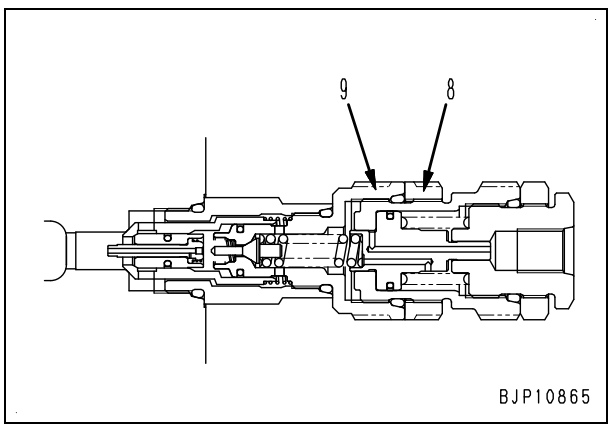
   3) Check the pressure again after the adjustment, following the aforementioned steps for measurement.
      ★ Connect the pilot hose when measuring the oil pressure.

2. Adjustment of boom LOWER relief pressure (on the side where high pressure is set)
   ★ When the high-pressure relief pressure for the boom LOWER is not normal, adjust the high pressure side of the safety and suction valve (7) for the boom LOWER in the following procedure.
   ★ The high-pressure relief pressure mode denotes the state in which the machine push-up switch is turned on, disabling to apply the pilot pressure to the switching port.



   1) Disconnect the pilot hose.
   2) Loosen locknut (8) and turn holder (9) to adjust the relief pressure.
      ★ Turning the holder clockwise increases the pressure. Turning it counterclockwise decreases the pressure.
      ★ Pressure adjustable from a single turn of the holder:
      Approximately 21.8 MPa
      {Approximately 222 kg/cm^2}

      Locknut:
      93 to 123 Nm {9.5 to 12.5 kgm}



Testing solenoid valve output pressure

★ Solenoid valve output pressure measurement tools

Symbol		Part No.	Part name
N	1	799-101-5002	Hydraulic tester
		790-261-1204	Digital hydraulic tester
	2	799-401-3100	Adapter (02 size)
		02896-11008	O-ring
	3	799-401-3200	Adapter (03 size)
		02896-11009	O-ring

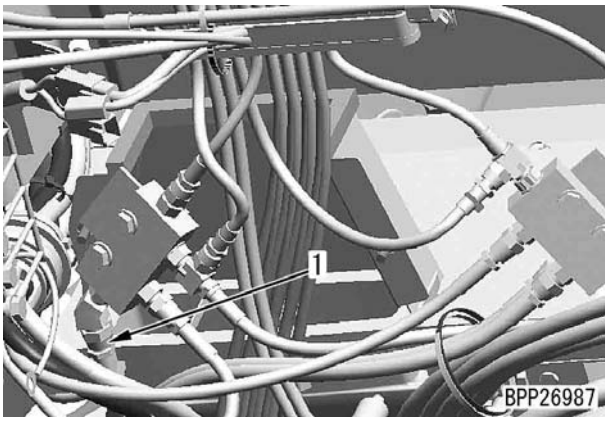
★ Measure the solenoid valve output pressure after confirming that the control circuit source pressure is normal.

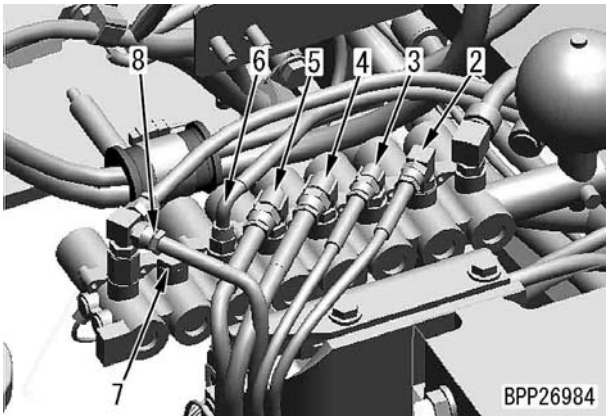
⚠ **Lower the work equipment to the ground, stop the engine, and release remaining pressure in the piping by operating the control lever several times. Then loosen the oil filler cap gradually to release pressure inside the tank.**

1. Disconnect the hoses of solenoid valve to be measured at the outlet side.

No.	Target solenoid valves of measurement
1	PPC lock solenoid valve
2	Travel junction solenoid valve
3	Merge-divider solenoid valve
4	Travel speed switching solenoid valve
5	Swing holding brake solenoid valve
6	Machine push up solenoid valve
7	Attachment selector solenoid valve (for machines equipped with attachment)
8	2-stage relief solenoid valve

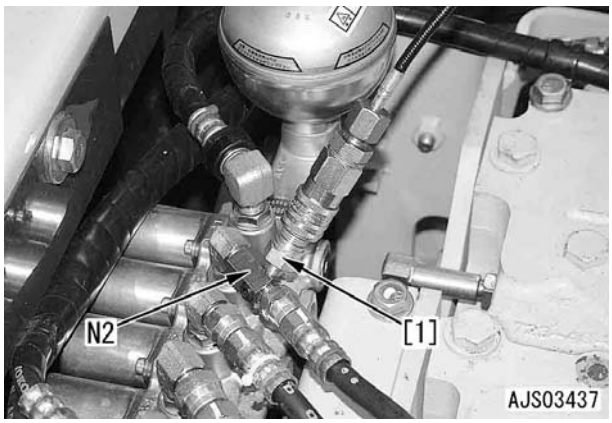
★ Hose (1) is installed in the back side of operator's cab, and hoses (2) through (7) are installed at the center of revolving frame.



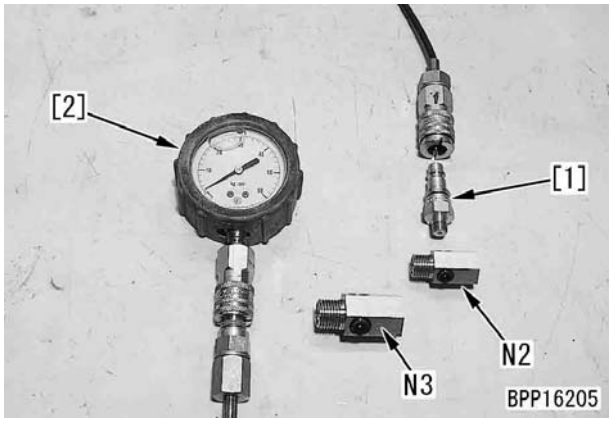


2. Fit adapter **N2** or **N3** and then connect hose currently disconnected.

3. Fit nipple [1] of hydraulic tester **N1** and then connect it to oil pressure gauge [2].
   ★ Use the oil pressure gauge with capacity 6.0 MPa {60 kg/cm^2}.



4. Start the engine and keep it running until the hydraulic oil temperature rises to 45 to 55°C.

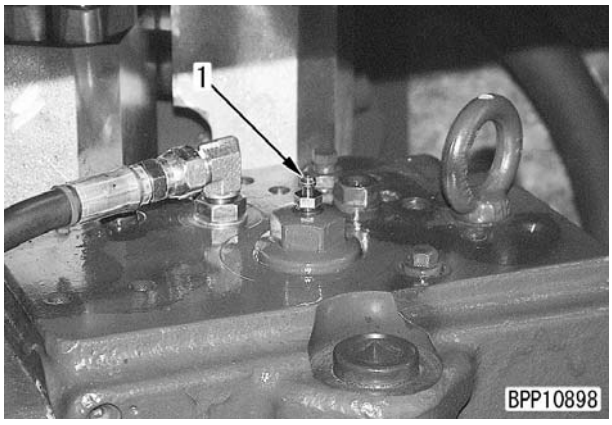


Bleeding air from various parts

Contents of work \ Air bleeding items	Air bleeding procedure					
	1	2	3	4	5	6
	Bleeding air from hydraulic pump	Starting engine	Bleeding air from cylinder	Bleeding air from swing motor	Bleeding air from travel motor	Operation
● Replacement of hydraulic oil ● Cleaning of strainer	●	●	●	● (See note)	● (See note)	●
● Replacement of return filter element		●	→	→	→	●
● Replacement and repair of hydraulic pump ● Removal of suction piping	●	●	●	→	→	●
● Replacement and repair of control valve		●	●	→	→	●
● Replacement of cylinder ● Removal of cylinder piping		●	●	→	→	●
● Replacement of swing motor ● Removal of swing motor pipe		●	→	●	→	●
● Replacement of travel motor and swivel ● Removal of travel motor and swivel piping		●	→	→	●	●

Note: Bleed air from the swing motor and travel motor only when oil in the casing is drained.

1. Bleeding air from hydraulic pump
   1) Loosen air bleeder (1) and check that oil oozes out through the air bleeder.
   2) If the oil oozes out, tighten air bleeder (1).
      Air bleeder:
      7.8 to 9.8 Nm {0.8 to 1.0 kgm}
      ★ Precautions on starting engine:
      When starting the engine after above operations, be sure to run the engine at low idle for 10 minutes.
      If the engine coolant temperature is low, engine speed increases by automatic engine warming-up function.
      Use the fuel dial when it becomes necessary to cancel the automatic warming-up function.

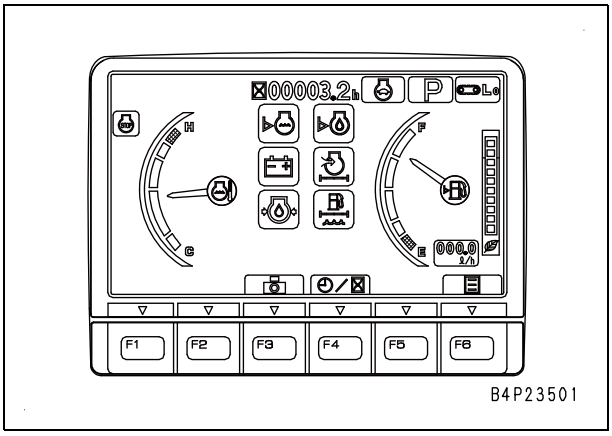


2. Bleeding air from hydraulic cylinder
   1) Start the engine and keep running at low idle for 5 minutes.
   2) Raise and lower the boom 4 or 5 times with the engine running at low idle.
      ★ Stop the piston approximately 100 mm before front of the stroke end so that it may not be relieved.
   3) While running the engine at high idle, perform step 2).
   4) Set the piston rod to the stroke end at low idle and relieve it.
   5) For bleeding air from the arm cylinder and bucket cylinder, follow the same steps explained in Item 2) through 4) above.
      ★ When a cylinder is replaced, perform this operation before connecting the work equipment. In particular, the boom cylinder does not move to the LOWER stroke end while it is installed to the work equipment.

Display of check before starting

When the screen changes to the check before starting screen, the check before starting is performed for 2 seconds.

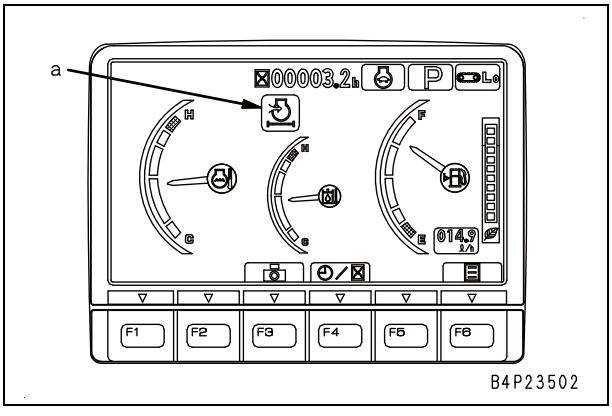
★ If any abnormalities are detected in the check before starting, the screen changes to warning after the check before starting screen or overdue maintenance screen.
★ If no abnormalities were detected in the check before starting, display changes to working mode and travel speed check screen.
★ The monitors (6 monitors) on the screen shows the items currently subjected to the check before starting.



Display of warning after check before starting

If any abnormalities are detected in the check before starting, the alarm monitor is displayed on the screen.

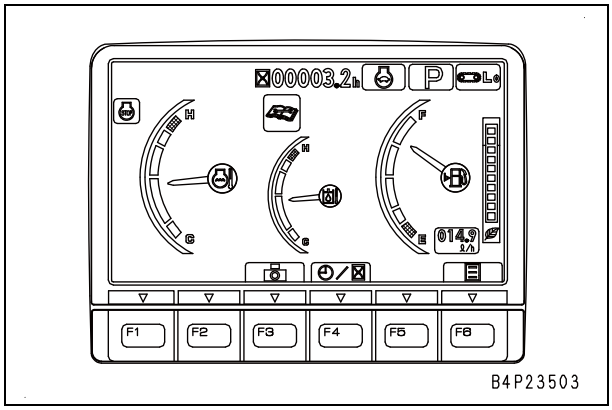
★ The figure shows how air cleaner clogging monitor (a) warns of clogging on air cleaner.



Display of ending of maintenance interval

If the check before starting detected a maintenance item that the maintenance due time is near or over, the maintenance monitor is displayed for 30 seconds to urge the operator to perform maintenance.

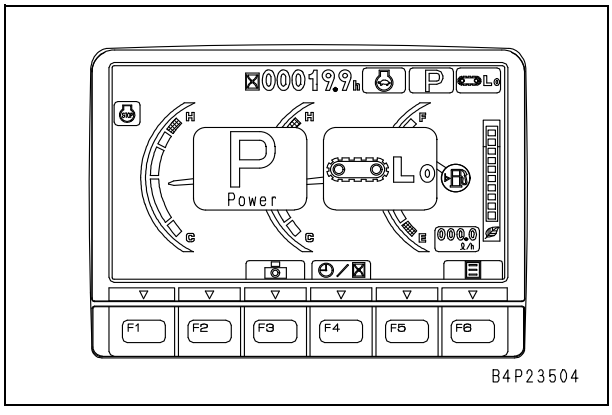
★ This screen is displayed only when the maintenance reminder function is enabled.
★ If the remaining time of any item is less than the set time, the yellow icon is displayed. If the remaining time of any item is less than 0 hours, the red icon is displayed.
★ Setting and changing of the maintenance function can be performed in the service mode.



Display of check of working mode and travel speed

If the check before starting is finished normally, the screen for checking the working mode and travel speed is displayed for 2 seconds.

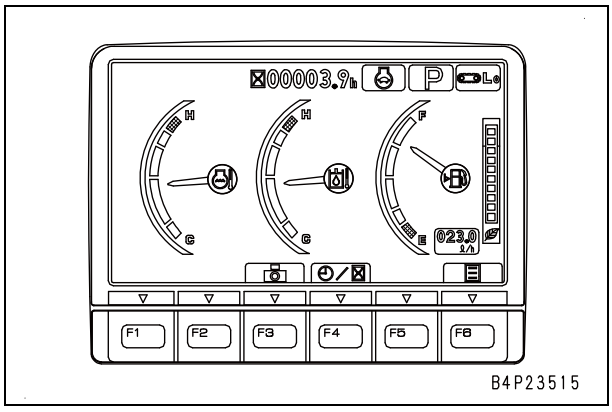
★ After the working mode and travel speed check screen is finished, the screen changes to the standard screen.



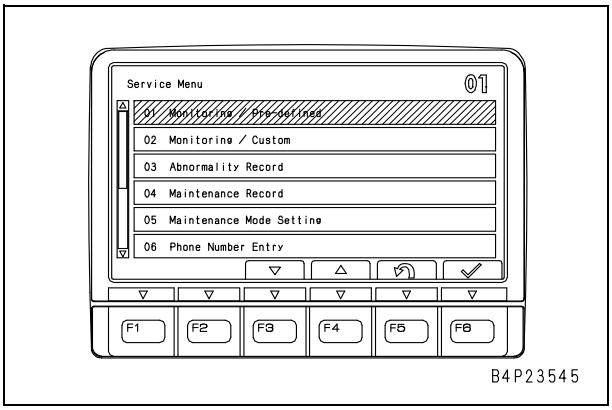
Service mode

To change the mode of the machine monitor to the service mode from the operator mode, perform the following operation.
This operation is always required when you use the service mode.

1. Check of screen display and operation of switches
   While the standard screen is displayed, perform the following operation by using the numeral input switches.
   - Operation of switches (While pressing [4], press the switches in order):
     [4] + [1] → [2] → [3]
   - ★ This operation of the switches is accepted only while the standard screen is displayed.



2. Selecting a service menu
   When the “Service Menu” screen is displayed, the service mode is selected. Select the desired service menu by using the function switches or numeral input switches.
   - [F3]: Moves to lower item
   - [F4]: Moves to upper item
   - [F5]: Returns the display to the standard screen (operator mode)
   - [F6]: Validates the selection
   - ★ If you input a 2-digit code by using the numeral input switches, the corresponding menu is directly selected. This will allow you to validate the selection using [F6].



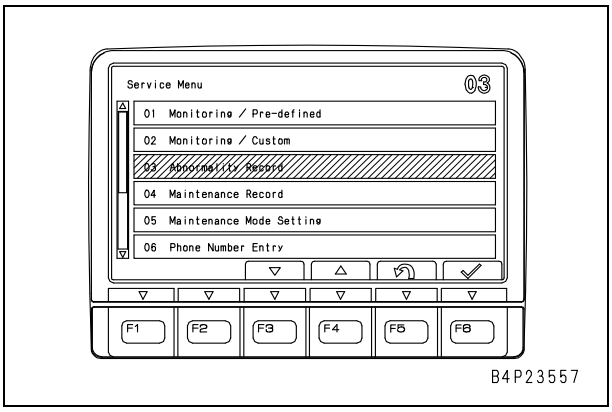
★ “Service Menu” (including some items which need special operations).

01	Monitoring / Pre-defined
02	Monitoring / Custom
03	Abnormality Record (Mechanical Systems)
	Abnormality Record (Electrical Systems)
04	Maintenance record
05	Maintenance Mode Setting
06	Phone Number Entry
07	Default (Key-On Mode)
	Default (Unit)
	Default (With/Without Attachment)
	Default (Camera)
08	Diagnostic Tests (Cylinder Cut-out)
09	Adjustment (Pump Absorption Torque (F))
	Adjustment (Pump Absorption Torque (R))
	Adjustment (Low Speed)
	Adjustment (Attachment Flow Adjustment)
10	No-injection
11	KOMTRAX Settings (Terminal Status)
	KOMTRAX Settings (GPS and Communication Status)
	KOMTRAX Settings (Modem Information)
12	Service Message

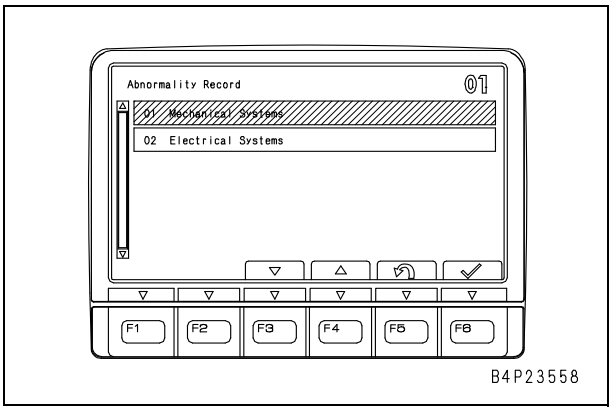
Abnormality Record (Mechanical Systems)

The machine monitor classifies and logs the failures which occurred in the past or which are occurring at present into the mechanical system abnormality, and electrical system abnormality.
To check the mechanical system abnormality record, perform the following procedures.

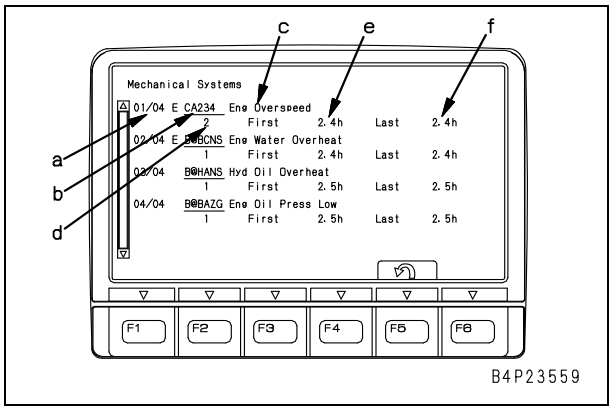
1. Selecting a menu
   Select “Abnormality Record” on the “Service Menu” Screen.



2. Selecting a sub menu
   After the “Abnormality Record” screen is displayed, select “Mechanical Systems” with the function switches or numeral input switches.
   - [F3]: Moves to lower item
   - [F4]: Moves to upper item
   - [F5]: Returns the display to “Service Menu” screen
   - [F6]: Validates the selection
   - ★ You may enter a 2-digit code with the numeral input switches to select the item of that code and enter it with [F6].

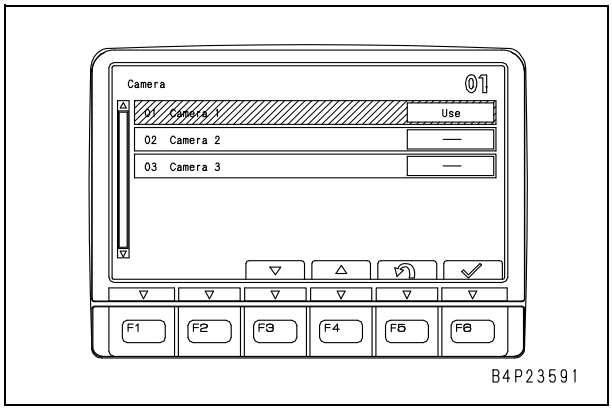


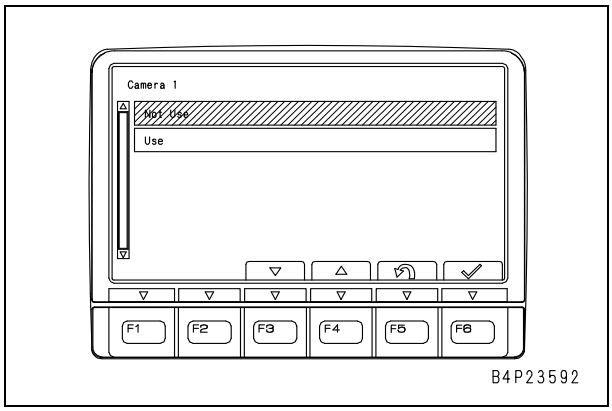
3. Information displayed on abnormality record screen
   On the “Mechanical Systems” abnormality record screen, the following information is displayed.
   (a): Occurrence order of abnormalities from latest one/Total number of abnormalities in the log
   (b): Failure codes
   (c): Detail of failure
   (d): Number of occurrences (displayable range: 0 to 65,535 times)
   (e): Service meter reading at first occurrence
   (f): Service meter reading at last occurrence
   - [F1]: Moves to next page (screen) (if displayed)
   - [F2]: Moves to previous page (screen) (if displayed)
   - [F5]: Returns to the “Abnormality Record” screen
   - ★ If no failure is logged, the message of “No Error” is displayed.
   - ★ If the number of occurrences is one (first occurrence), the service meter reading at the first occurrence and that at the last occurrence are the same.
   - ★ If [**E**] is displayed on the left of a failure code, the abnormality is still occurring or restoration of it has not been confirmed.
   - ★ For all the failure codes that the machine monitor can record, see the “Failure codes table”.

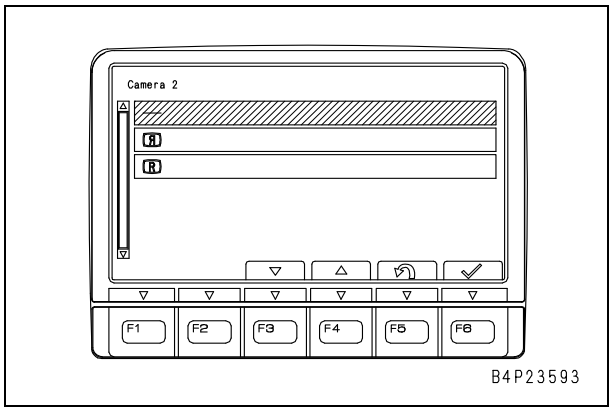


4. Clearing abnormality record
   A contents of the mechanical system abnormality record cannot be cleared.

★ If the camera is installed, check that the right and left portions of the displayed image are correct.

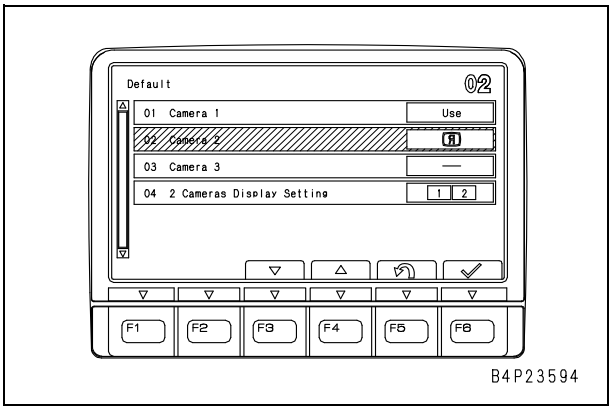


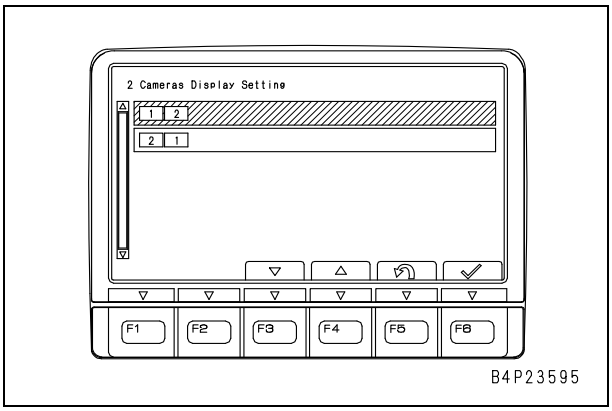




★ If 2 or more cameras are connected, be sure to configure them from camera 1 in order.

★ The simultaneous display function of 2 images becomes effective when camera 1 and camera 2 are configured.

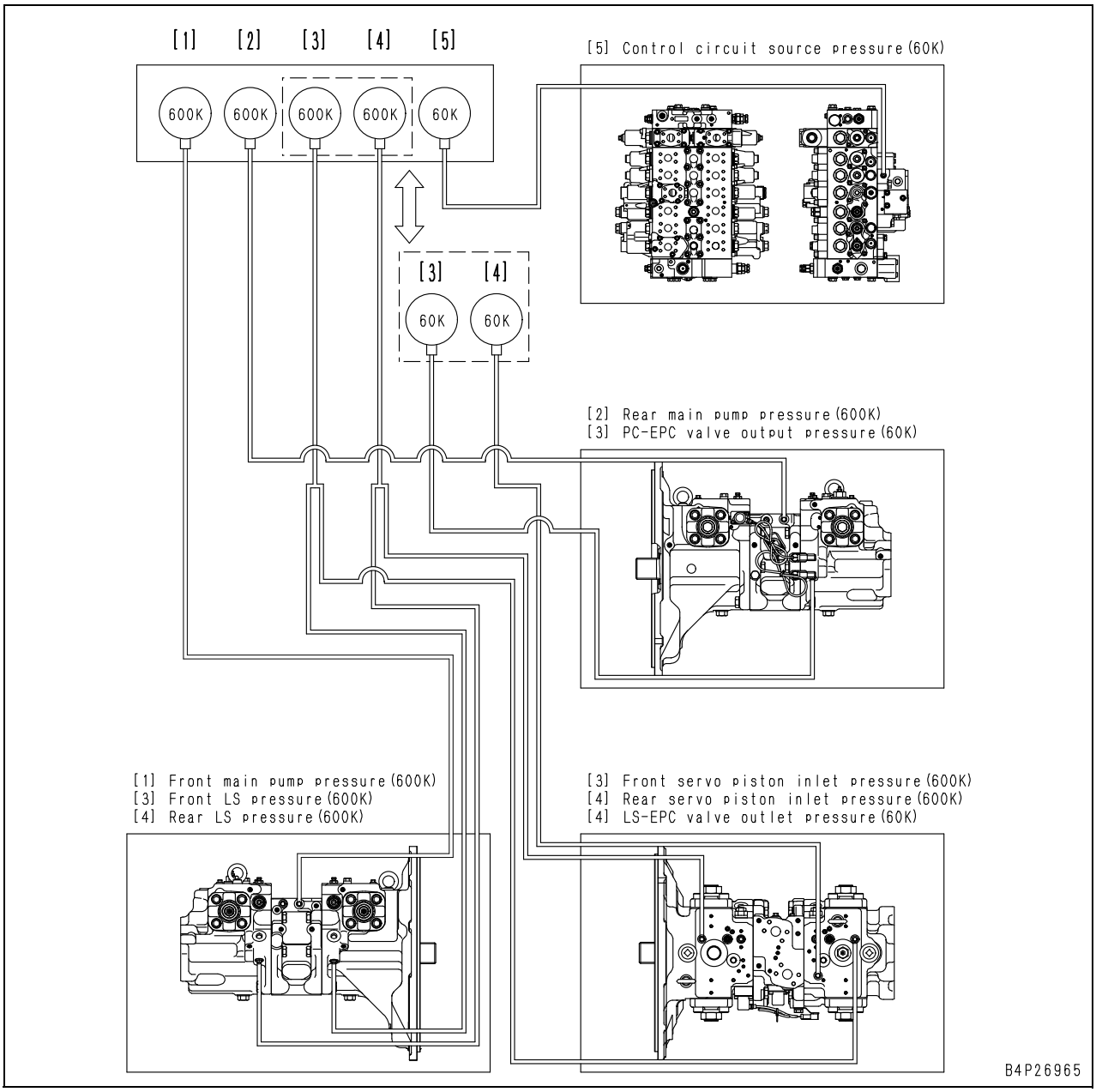




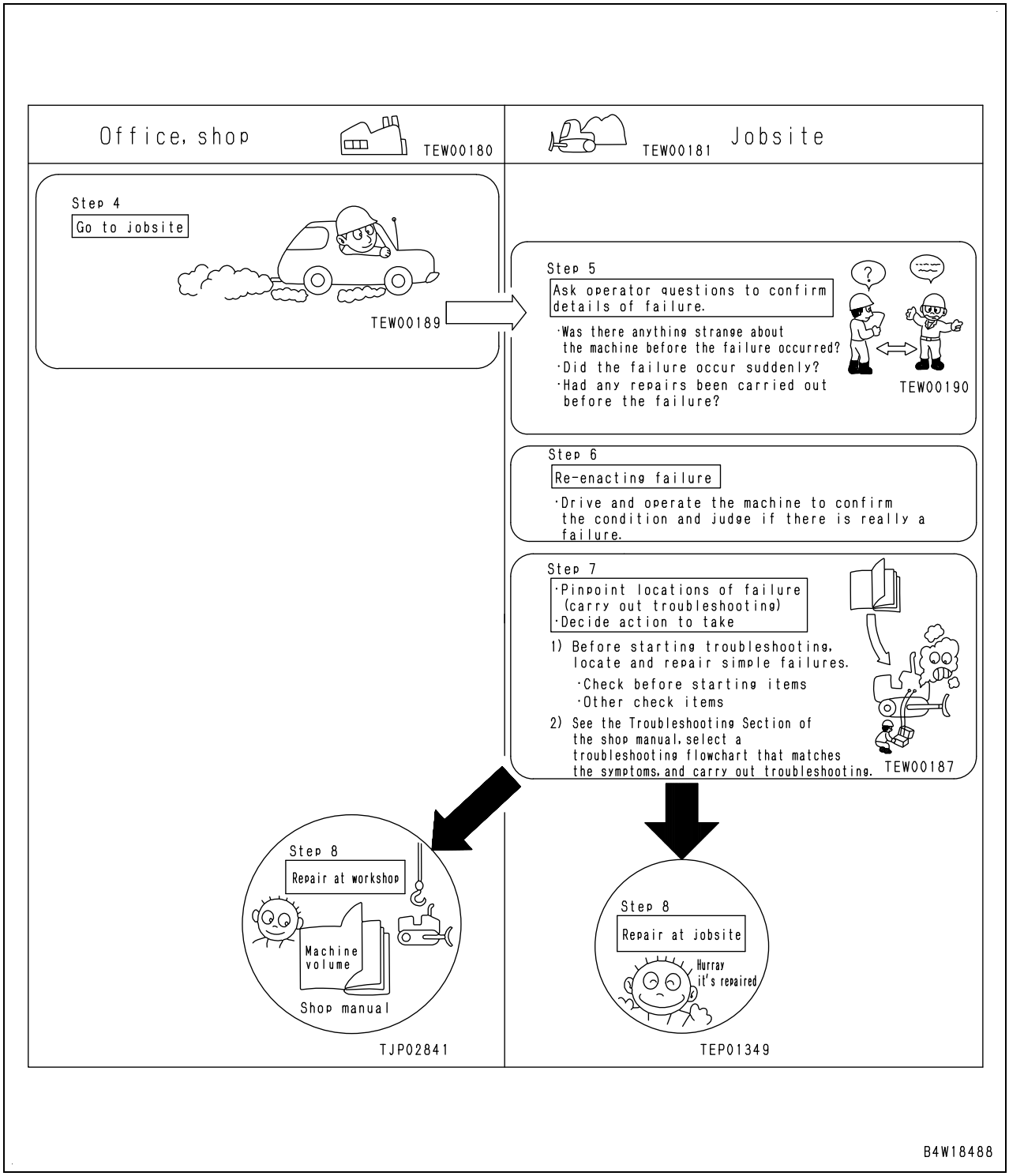
PC300LC-8M0, PC350LC-8M0 HYDRAULIC EXCAVATOR

Form No. SEN06279-00-NI00

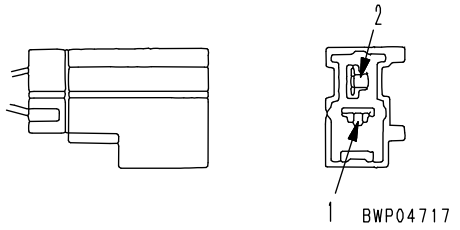
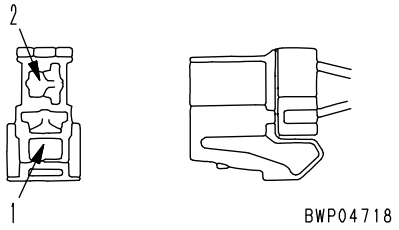
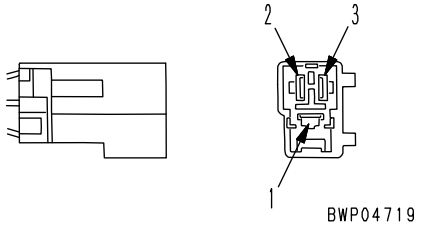
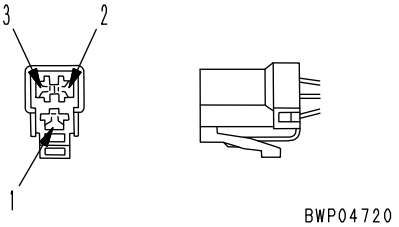
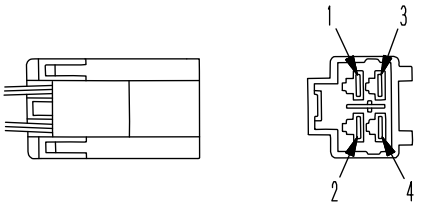
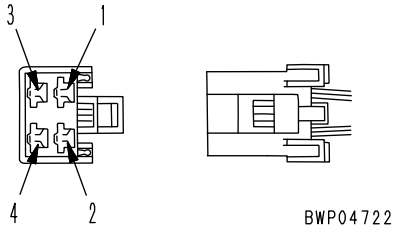
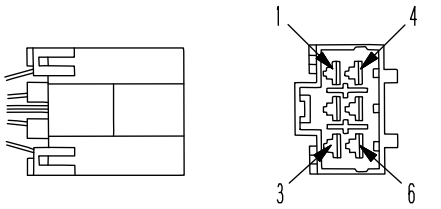
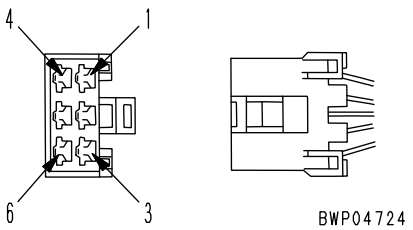
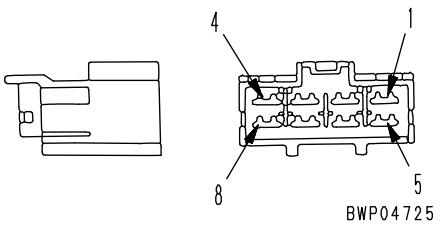
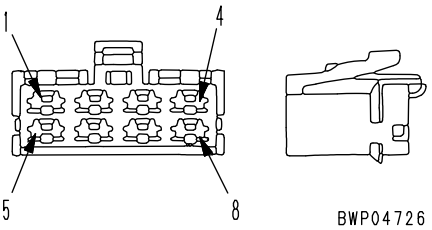
Items related to oil pressure



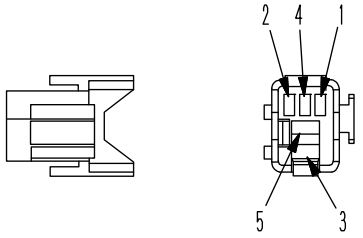
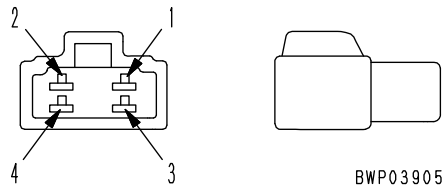
Failure code	Trouble (Displayed on screen)	Component in charge	Action level	Category of record	Reference documents No.
DFB5KZ	Failure code [DFB5KZ] Service Lever sPot.1 Abnormarity	PUMP	L01	Electrical system	Troubleshooting by failure code, part 3 SEN06358-**
DFB6KZ	Failure code [DFB6KZ] Service Lever sPot.2 Abnormarity	PUMP	L01	Electrical system	
DGH2KB	Failure code [DGH2KB] Hyd Oil Sensor Short Circuit	PUMP	L01	Electrical system	
DHA4KA	Failure code [DHA4KA] Air Cleaner Clog Sensor Open Circuit	MON	L01	Electrical system	
DHPAMA	Failure code [DHPAMA] F Pump Press Sensor Abnormality	PUMP	L01	Electrical system	
DHPBMA	Failure code [DHPBMA] R Pump Press Sensor Abnormality	PUMP	L01	Electrical system	
DHS3MA	Failure code [DHS3MA] Arm Curl PPC Press Sensor Abnormality	PUMP	L01	Electrical system	Troubleshooting by failure code, part 4 SEN06359-**
DHS4MA	Failure code [DHS4MA] Bucket Curl PPC Press Sensor Abnormality	PUMP	L01	Electrical system	
DHS8MA	Failure code [DHS8MA] Boom Raise PPC Press Sensor Abnormality	PUMP	L01	Electrical system	
DHS9MA	Failure code [DHS9MA] Boom Lower PPC Press Sensor Abnormality	PUMP	L01	Electrical system	
DHSAMA	Failure code [DHSAMA] Swing RH PPC Press Sensor Abnormality	PUMP	L01	Electrical system	
DHSBMA	Failure code [DHSBMA] Swing LH PPC Press Sensor Abnormality	PUMP	L01	Electrical system	
DHSCMA	Failure code [DHSCMA] Arm Dump PPC Press Sensor Abnormality	PUMP	L01	Electrical system	
DHSDMA	Failure code [DHSDMA] Bucket Dump PPC Press Sensor Abnormality	PUMP	L01	Electrical system	
DHSFMA	Failure code [DHSFMA] Travel Fwd LH PPC Press Sensor Abnormality	PUMP	L01	Electrical system	
DHSGMA	Failure code [DHSGMA] Travel Fwd RH PPC Press Sensor Abnormality	PUMP	L01	Electrical system	
DHSHMA	Failure code [DHSHMA] Travel Rev LH PPC Press Sensor Abnormality	PUMP	L01	Electrical system	
DHSJMA	Failure code [DHSJMA] Travel Rev RH PPC Press Sensor Abnormality	PUMP	L01	Electrical system	
DHX1MA	Failure code [DHX1MA] Overload Sensor Abnormality	PUMP	L04	Electrical system	
DR21KX	Failure code [DR21KX] Camera 2 Picture Rev. Drive Abnormality	MON	L01	Electrical system	
DR31KX	Failure code [DR31KX] Camera 3 Picture Rev. Drive Abnormality	MON	L01	Electrical system	
DV20KB	Failure code [DV20KB] Travel Alarm Short Circuit	PUMP	L01	Electrical system	
DW43KA	Failure code [DW43KA] Travel Speed Sol Open Circuit	PUMP	L01	Electrical system	
DW43KB	Failure code [DW43KB] Travel Speed Sol Short Circuit	PUMP	L01	Electrical system	
DW45KA	Failure code [DW45KA] Swing Brake Sol Open Circuit	PUMP	L03	Electrical system	


Office, shop
TEW00180
TEW00181
Jobsite
Step 4
Go to jobsite
TEW00189
Step 5
Ask operator questions to confirm details of failure.
·Was there anything strange about the machine before the failure occurred?
·Did the failure occur suddenly?
·Had any repairs been carried out before the failure?
TEW00190
Step 6
Re-enacting failure
·Drive and operate the machine to confirm the condition and judge if there is really a failure.
Step 7
·Pinpoint locations of failure (carry out troubleshooting)
·Decide action to take
1) Before starting troubleshooting, locate and repair simple failures.
·Check before starting items
·Other check items
2) See the Troubleshooting Section of the shop manual, select a troubleshooting flowchart that matches the symptoms, and carry out troubleshooting.
TEW00187
Step 8
Repair at workshop
Machine volume
Shop manual
TJP02841
Step 8
Repair at jobsite
Hurray it's repaired
TEP01349
B4W18488

Connector No.	Connector type	Number of pins	Location	Layout address
P12	AMP	3	R.H. travel REVERSE pressure sensor	E-1
P13	X	2	Intermediate connector (service pressure switch)	E-1
P17	S090	2	Air conditioner Hi/Lo pressure switch	J-3
P18	090	2	Air conditioner outside air temperature sensor	H-9
P20	M	3	Fuel control dial	Q-8
P21	X	1	Fuel level sensor	D-8
P22	DT	2	Hydraulic oil temperature sensor	L-4
P23	P23	2	Air cleaner clogging sensor	G-9
P24	X	2	Radiator coolant level sensor	G-9
P25	AMP	3	F pump pressure sensor	J-2
P26	AMP	3	R pump pressure sensor	L-2
P31	YAZAKI	2	Sunlight sensor	N-6
P44	DT	2	Engine oil level sensor	AG-5
P47	DT	2	Coolant temperature sensor	E-9
R01	Terminal	1	Battery relay	C-3
R02	Terminal	1	Battery relay	C-3
R03A	Terminal	1	Battery relay	A-2
R04	Terminal	1	Battery relay	A-3
R05	Terminal	5	Working lamp relay	V-9
R06	Terminal	5	Starting motor cut-off relay (PPC lock)	N-9
R07	Terminal	5	Starting motor cut-off relay (personal code)	N-9
R08	Terminal	5	Horn relay	W-9
R10	Terminal	5	Rear working lamp relay	W-9
R12	Terminal	5	Cab headlamp relay	U-9
R15	Terminal	1	Electrical intake air heater (ribbon heater) relay	C-2
R16	Terminal	1	Electrical intake air heater (ribbon heater) relay	C-2
R17	Terminal	1	Electrical intake air heater (ribbon heater) relay	A-2
R18	Terminal	5	Relay for automatic pre-heater	X-8
R21	Terminal	5	Compressor relay	X-5
R23	Terminal	5	Relay for CM850 (1)	X-8
R24	Terminal	5	Relay for CM850 (2)	X-8
S01	Terminal	6	Starting switch	P-7
S02	SWP	6	Daytime light switch	Q-8
S04	SWP	6	Swing lock switch	R-9
S10	Y090	2	R.H. knob switch (horn)	R-8
S11	Y090	2	L.H. knob switch (one-touch power max.)	S-1
S14	M	3	PPC oil pressure lock switch	T-1
S21	Terminal	12	Emergency pump drive switch	O-8
S22	Terminal	6	Emergency swing parking brake cancel switch	O-9
S25	090	16	Intermediate connector (emergency activation switch)	O-7
S30	S	8	Machine model selection	X-6
T01	Terminal	1	Ground (floor frame)	V-2
T02	Terminal	1	Ground (cab)	AD-2
T04	Terminal	1	Ground (revolving frame)	H-2

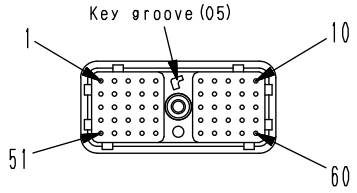
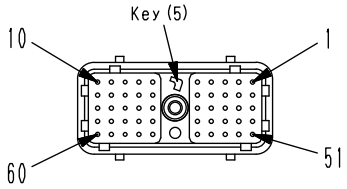
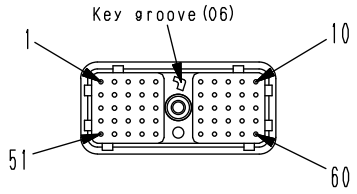
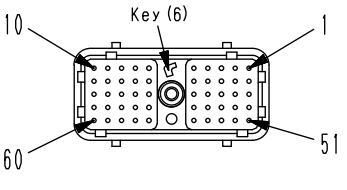
No. of pins	M type connector		
	Male (female housing)	Female (male housing)	Testing connection use special tool Part No.
1	Part No. : 08056-00171	Part No. : 08056-00181	799-601-7080 (T-adapter)
2	 BWP04717	 BWP04718	799-601-7090 (T-adapter)
	Part No. : 08056-00271	Part No. : 08056-00281	
3	 BWP04719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

B4D18193

No. of pins	Connector for relay (Socket type)		Testing connection use special tool Part No.
	Female (female housing)	Relay (male housing)	
5			—
	Part No. :7861-74-5300	Part No. :7861-74-5100	
No. of pins	F type connector		
	Male (female housing)	Female (male housing)	
4			—
	—	—	

B4D18404

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

No. of pins	DRC26 Series connector		
	Male pin (female housing)	Female pin (male housing)	Testing connection use special tool Part No.
60 -05※	 BJD14063	 BJD14064	799-601-4220 (T-adapter) (Kit:799-601-4101)
	–	Part No. 08194-04104	
	※-05:Key position		
60 -06※			799-601-4390 (Socket)
	–	–	
	※-06:Key position		

B4D18415

T- branch box and T- branch adapter table

(Rev. 2009. 03)

★ The vertical column indicates a part number of T-branch box or T-branch adapter, while the horizontal column indicates a part number of harness checker assembly.

Part No.	Part name	Number of pins	Identification symbol	T-adapter kit													Out of kit
				799-601-2500	799-601-2700	799-601-2800	799-601-7000	799-601-7100	799-601-7400	799-601-7500	799-601-8000	799-601-9000	799-601-9100	799-601-9200	799-601-9300	799-601-4101	799-601-4201	
799-601-2600	T-box (for ECONO)	21		●		●		●	●		●							
799-601-3100	T-box (for MS)	37																●
799-601-3200	T-box (for MS)	37																●
799-601-3380	Plate for MS (14-pin)																	●
799-601-3410	Adapter for BENDIX (MS)	24	MS-24P															●
799-601-3420	Adapter for BENDIX (MS)	24	MS-24P															●
799-601-3430	Adapter for BENDIX (MS)	17	MS-17P															●
799-601-3440	Adapter for BENDIX (MS)	17	MS-17P															●
799-601-3450	Adapter for BENDIX (MS)	5	MS-5P															●
799-601-3460	Adapter for BENDIX (MS)	10	MS-10P															●
799-601-3510	Adapter for BENDIX (MS)	5	MS-5P															●
799-601-3520	Adapter for BENDIX (MS)	17	MS-17P															●
799-601-3530	Adapter for BENDIX (MS)	19	MS-19P															●
799-601-2910	Adapter for BENDIX (MS)	14	MS-14P															●
799-601-3470	Case																	●
799-601-2710	Adapter for MIC	5	MIC-5P	●	●				●									
799-601-2720	Adapter for MIC	13	MIC-13P	●	●				●									
799-601-2730	Adapter for MIC	17	MIC-17P	●	●	●		●	●		●							
799-601-2740	Adapter for MIC	21	MIC-21P	●	●	●		●	●		●							
799-601-2950	Adapter for MIC	9	MIC-9P				●	●	●		●							
799-601-2750	Adapter for ECONO	2	ECONO 2P	●	●													
799-601-2760	Adapter for ECONO	3	ECONO 3P	●	●													
799-601-2770	Adapter for ECONO	4	ECONO 4P	●	●													
799-601-2780	Adapter for ECONO	8	ECONO 8P	●	●													
799-601-2790	Adapter for ECONO	12	ECONO 12P	●	●													
799-601-2810	Adapter for DLI	8	DLI-8P	●	●													
799-601-2820	Adapter for DLI	12	DLI-12P	●	●													
799-601-2830	Adapter for DLI	16	DLI-16P	●	●													
799-601-2840	Extension cable (ECONO type)	12	ECONO 12P	●	●				●									
799-601-2850	Case			●														
799-601-4350	T-box (for DRC 60, ECONO)	60														●		
799-601-4360	Case															●		
799-601-7010	Adapter for X (T-adapter)	1							●		●							
799-601-7020	Adapter for X	2	X2P				●	●	●		●							
799-601-7030	Adapter for X	3	X3P				●	●	●		●							
799-601-7040	Adapter for X	4	X4P				●	●	●		●							
799-601-7050	Adapter for SWP	6	SW6P				●	●	●									
799 -601-7060	Adapter for SWP	8	SW8P				●	●	●									
799-601-7310	Adapter for SWP	12	SW12P															●
799-601-7070	Adapter for SWP	14	SW14P						●		●							
799-601-7320	Adapter for SWP	16	SW16P															●
799-601-7080	Adapter for M (T-adapter)	1	-						●		●							
799 -601-7090	Adapter for M	2	M2P				●	●	●		●							
799-601-7110	Adapter for M	3	M3P				●	●	●		●							
799-601-7120	Adapter for M	4	M4P				●	●	●		●							
799-601-7130	Adapter for M	6	M6P				●	●	●		●							
799-601-7340	Adapter for M	8	M8P															●

Failure code [989L00] Engine Controller Lock Caution1

Action level	Failure code	Failure	Engine controller lock caution1 (Machine monitor system)
–	**989L00**		
Detail of failure	● Engine controller lock up is detected (Factor 1).		
Action of controller	● None in particular ● If cause of failure disappears, machine becomes normal by itself.		
Problem on machine	● Engine cannot be started.		
Related information	● If this failure code is generated after machine monitor is replaced, user password must be changed to one before replacement. ● Method of reproducing failure code: Turn starting switch to ON position.		

Cause		Procedure, measuring location, criteria and remarks
1	Replacement of machine monitor	This problem may be caused by replacement of machine monitor.

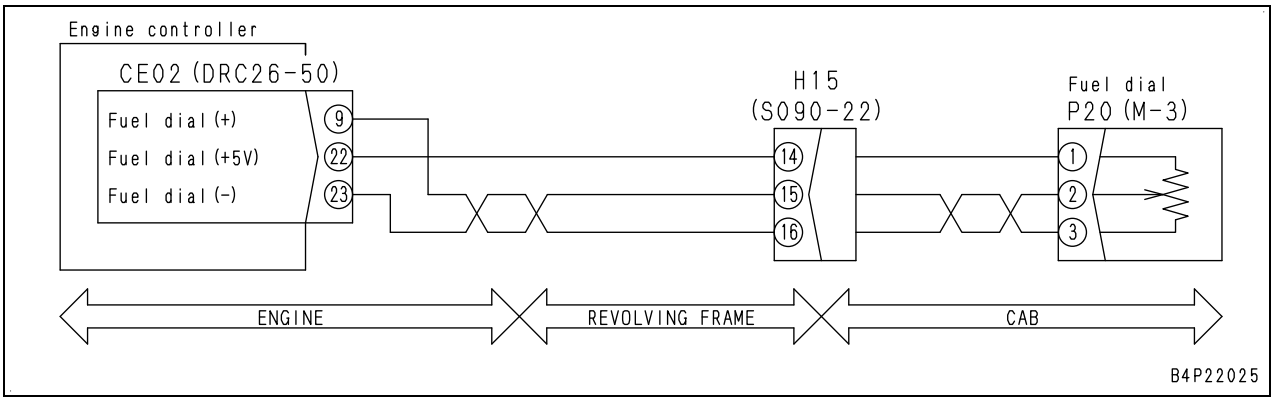
Failure code [B@BCZK] Radiator Coolant Level Low

Action level	Failure code	Failure	Radiator Coolant Level Low (Machine monitor system)
L01	**B@BCZK**		
Detail of failure	● While starting switch is at ON position (with engine stopped) or engine is running, radiator coolant level switch signal voltage does not remain below 1 V, so machine monitor determines that radiator coolant level is low (sensor contact is open).		
Action of controller	● Displays radiator coolant level monitor yellow on machine monitor.		
Problem on machine	● If machine is operated as it is, engine may overheat.		
Related information	● Input (ON/OFF) from radiator coolant level switch can be checked with monitoring function. (Code: 04500) ● Method of reproducing failure code: Turn starting switch to ON position.		

Cause		Procedure, measuring location, criteria and remarks			
1	Lowered radiator coolant level (when system works properly)	Check radiator sub tank for lowering of coolant level. If coolant level is low, add coolant.			
2	Defective coolant level switch (internal defect)	1. Turn starting switch to OFF position. 2. Disconnect connector P24 and connect T-adapters to male side.			
		Between P24 (male) (1) and (2)	Between FULL and LOW lines	Resistance	Max. 1 Ω
			Below LOW line	Resistance	Min. 1 MΩ
3	Open circuit in wiring harness (Wire breakage or defective contact)	1. Turn starting switch to OFF position. 2. Disconnect connectors CM02 and P24, and connect T-adapters to each female side. ★ Add coolant.			
		Between CM02 (female) (3) and P24 (female) (1)		Resistance	Max. 1 Ω
4	Defective machine monitor	If no failure is found by above checks, machine monitor is defective. ● Reference 1. Turn starting switch to OFF position. 2. Insert T-adapters into connector CM02. 3. Turn starting switch to ON position.			
		Between CM02 (3) and CM01 (3)	Between FULL and LOW lines	Voltage	Max. 1 V
			Below LOW line	Voltage	7 to 11 V

Cause		Procedure, measuring location, criteria and remarks			
8	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.) ● Reference 1. Turn starting switch to OFF position. 2. Insert T-adapters into connector CE02. 3. Turn starting switch to ON position. 4. Operate fuel control dial and perform troubleshooting.			
		Between CE02 (22) and (23)	Power supply	Voltage	4.75 to 5.25V
		Between CE02 (9) and (23)	Sensor output	Voltage	0.5 to 4.5 V

Circuit diagram related to throttle sensor

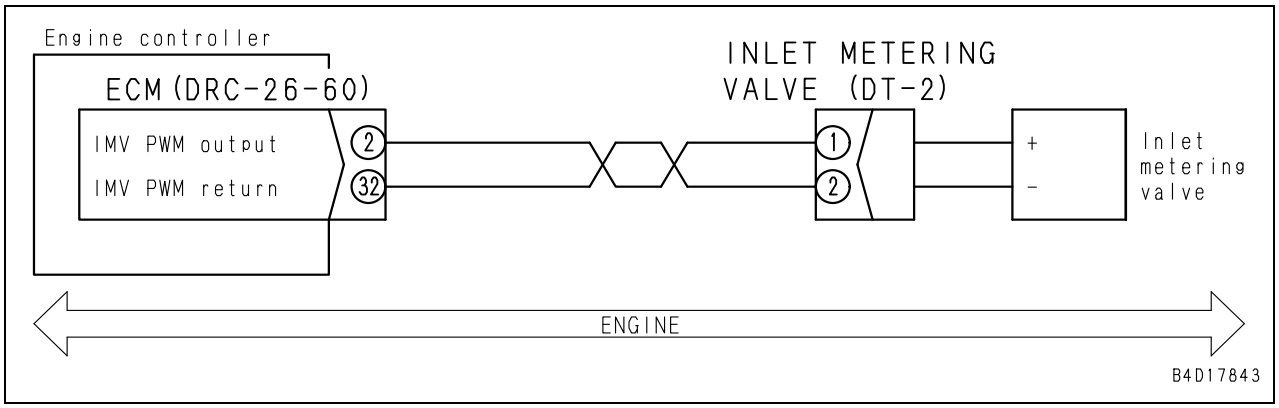


Failure code [CA187] Sens Supply 2 Volt Low Error

Action level	Failure code	Failure	Sensor power Supply 2 Voltage Low Error (Engine controller system)
L03	**CA187**		
Detail of failure	● Low voltage appears in sensor power supply 2 circuit.		
Action of controller	● Takes charge (boost) pressure & temperature to be at fixed values and allows engine to run. ● Restricts engine output and allows engine to run.		
Problem on machine	● Engine output lowers. ● Engine starting performance becomes deteriorated.		
Related information	● Method of reproducing failure code: Turn starting switch to ON position.		

Cause		Procedure, measuring location, criteria and remarks			
1	Defective wiring harness connector	See descriptions of wiring harness and connectors in "c: Electrical equipment" in "Checks before troubleshooting" of "General information on troubleshooting", and check it.			
2	Defective sensor or wiring harness	1. Turn starting switch to OFF position. 2. Disconnect following connectors sequentially one by one and turn starting switch to ON position each time. 3. After each troubleshooting, return to 1.			
		If this failure code is not displayed when a connector is disconnected, that sensor or engine wiring harness is defective. ★ Other failure codes are displayed, too. This is because of disconnection of connector. Ignore failure codes other than [**CA187**].			
		Sensor or harness	Connector		
		Boost pressure/temperature sensor	BOOST PRESS & IMT		
		Common rail pressure sensor	FUEL RAIL PRESS		
		Bkup sensor	CAM SENSOR		
		Engine wiring harness	ECM		
3	Defective engine controller	1. Turn starting switch to OFF position. 2. Disconnect connector ECM and connect T-adapters to male side. 3. Turn starting switch to ON position with connector ECM disconnected.			
		Between ECM (male) (37) and (47)		Voltage	4.75 to 5.25V

Circuit diagram related to IMV/PCV1

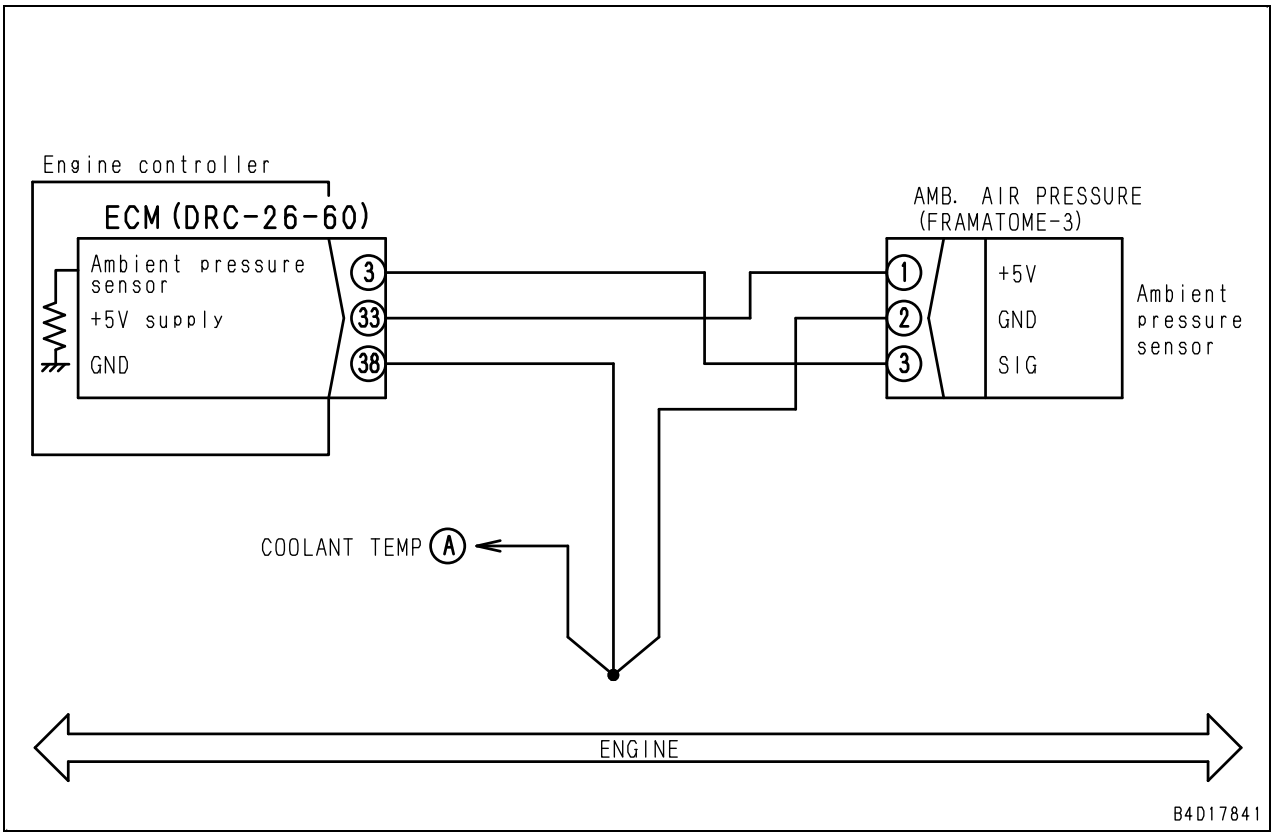


Failure code [CA324] Inj #3(L#3) Open/Short Error

Action level	Failure code	Failure	Injector #3 (L#3) Open or Short Circuit Error (Engine controller system)
L03	**CA324**		
Detail of failure	● Open or short circuit is detected in drive circuit of No. 3 injector.		
Action of controller	● None in particular		
Problem on machine	● Poor combustions or hunting occurs. ● Engine output lowers.		
Related information	● Method of reproducing failure code: Start engine. ● While engine is running normally, approximately 65 V of pulse voltage is supplied to injector (+) side. But it is pulse voltage and cannot be measured with multimeter.		

Cause		Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	See descriptions of wiring harness and connectors in "c: Electrical equipment" in "Checks before troubleshooting" of "General information on troubleshooting", and check it.		
2	Defective No. 3 injector	1. Turn starting switch to OFF position. 2. Disconnect connector INJECTOR CYL 3&4 and connect T-adapter to male side.		
		Between INJECTOR CYL 3&4 (male) (C) and (D)	Resistance	Max. 2 Ω
		Between INJECTOR CYL 3&4 (male) (C) and ground	Resistance	Min. 100 kΩ
3	Open circuit or ground fault in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector ECM and connect T-adapters to female side.		
		Between ECM (female) (55) and (52)	Resistance	Max. 2 Ω
		Between ECM (female) (55) and ground	Resistance	Min. 100 kΩ
4	Open circuit in wiring harness (wire breakage or defective contact of connector)	★ If no failure is found in checks on cause 3, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors ECM and INJECTOR CYL 3&4 and connect T-adapters to each female side.		
		Between ECM (female) (55) and INJECTOR CYL 3&4 (female) (C)	Resistance	Max. 2 Ω
		Between ECM (female) (52) and INJECTOR CYL 3&4 (female) (D)	Resistance	Max. 2 Ω
5	Ground fault in wiring harness (contact with ground circuit)	★ If no failure is found in checks on cause 3, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors ECM and INJECTOR CYL 3&4 and connect T-adapters to either female side.		
		Between ECM (female) (55) or INJECTOR CYL 3&4 (female) (C) and ground	Resistance	Min. 100 kΩ
6	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM and INJECTOR CYL 3&4 and connect T-adapter to female side of ECM. ★ Check with multimeter in continuity mode.		
		Between ECM (female) (55) and each pin other than (55)	No continuity (no sound is heard.)	
		Between ECM (female) (52) and each pin other than (52)	No continuity (no sound is heard.)	
7	Defective other cylinder injectors or wiring harness	If different failure codes are displayed, perform troubleshootings for them on ahead.		
8	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to sensor power supply 1



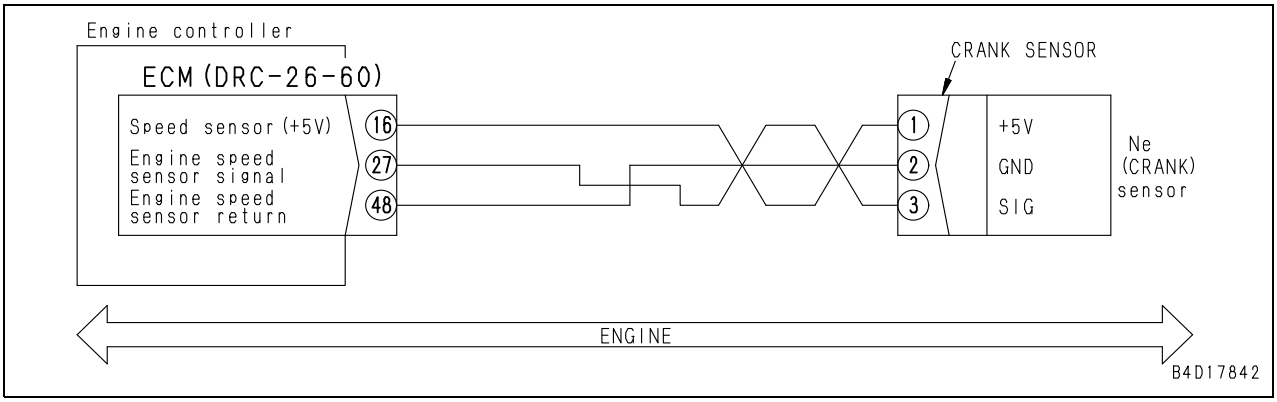
Failure code [CA442] Battery Voltage High Error

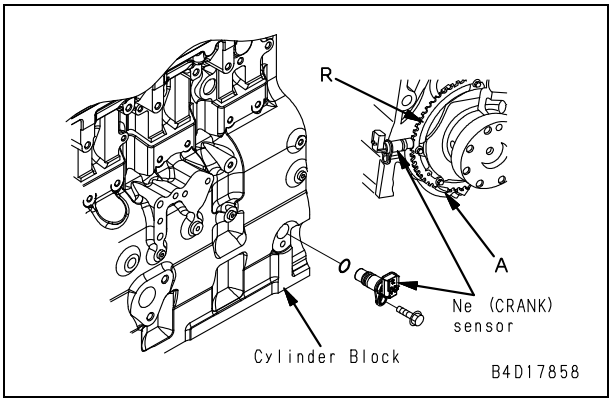
Action level	Failure code	Failure	Battery Voltage High Error (Engine controller system)
L04	**CA442**		
Detail of failure	● High voltage (36 V or higher) appears in controller power supply circuit.		
Action of controller	● None in particular		
Problem on machine	● Engine continues to run normally, but it may stop during running or may not be able to start if it is stopped.		
Related information	● Method of reproducing failure code: Turn starting switch to ON position. ● Power supply voltage to engine controller can be checked with monitoring function. (Code: 03203 (V))		

Cause	Procedure, measuring location, criteria and remarks
Perform troubleshooting for failure code [**CA441**].	

Cause		Procedure, measuring location, standard (value) and remarks
9	Breakage or improper installation (looseness) of speed-sensed ring	1. Remove Ne speed sensor (CRANK SENSOR). 2. Check speed sensing wheel (R) from sensor mounting hole directly. ★ Speed sensing wheel (R) has tooth missing part (A) to sense rotation. ★ When speed sensing wheel (R) is loose, see “Reference”.
10	Defective Ne speed sensor	If no abnormality is found by the above checks, the Ne speed sensor is defective. (Since trouble is in system, troubleshooting cannot be performed.)
11	Defective engine controller	If no abnormality is found by the above checks, the engine controller is defective. (Since the trouble is in system, troubleshooting cannot be performed.)

Circuit diagram related to Ne (CRANK) sensor





Failure code [CA2265] Fuel Feed Pump Open Error

Action level	Failure code	Trouble	Fuel feed pump open error (Engine controller system)
L03	**CA2265**		
Failure description	• Opening was detected in drive circuit of electric fuel feed pump actuator.		
Action of controller	• None in particular.		
Indication of problem on machine	• Engine does not start easily.		
Related information	• Method of reproducing failure code: Turn starting switch to ON position.		

Cause		Procedure, measuring location, standard (value) and remarks		
1	Defective wiring harness connector	See the items related to wiring harness and connectors in "c: Electric and electrical equipment" in "Checks before troubleshooting" in "General information on troubleshooting" section, and check it.		
2	Defective electric fuel feed pump (Internal disconnection or short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector FUEL LIFT PUMP.		
		Between FUEL LIFT PUMP (male) (1) and (2)	Resistance	Max. 20 Ω
3	Disconnection or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector ECM and connect T-adapter to female side.		
		Between ECM (female) (1) and (11)	Resistance	Max. 20 Ω
4	Disconnection in wiring harness (Disconnection in wiring or defective contact in connector)	★ If no abnormality is found in checks on cause 3, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors ECM and FUEL LIFT PUMP and connect T-adapters to each female side.		
		Between ECM (female) (1) and FUEL LIFT PUMP (1)	Resistance	Max. 10 Ω
		Between ECM (female) (11) and FUEL LIFT PUMP (2)	Resistance	Max. 10 Ω
5	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM and FUEL LIFT PUMP, and connect T-adapter to female side of ECM. ★ Check with tester in continuity mode.		
		Between ECM (female) (1) and each pin other than (1) pin	No continuity (No sound is heard)	
6	Hot short in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector FUEL LIFT PUMP. 3. Insert T-adapter between male and female sides of connector ECM or connect T-adapter to female side of FUEL LIFT PUMP. 4. Turn starting switch to ON position and perform troubleshooting after one minute or longer (with connector FUEL LIFT PUMP disconnected). ★ Average voltage is displayed because of PWM.		
		Between ECM (female) (1) and (11), or between FUEL LIFT PUMP (female) (1) and (2)	Voltage	Max. 6 V
7	Defective engine controller	If no abnormality is found by the above checks, the engine controller is defective. (Since the trouble is in system, troubleshooting cannot be performed.)		

Failure code [DA25KP] 5V Sensor 1 Power Abnormality

Action level	Failure code	Failure	5 V Sensor 1 Power supply voltage Abnormality (Pump controller system)
–	**DA25KP**		
Detail of failure	● Voltage of 5V sensor power supply output 1 circuit is below 2.5 V or above 6.0 V.		
Action of controller	● Stops output of power from 5V sensor power supply output 1. ● Even if cause of failure disappears, machine does not become normal until starting switch is turned		
Problem on machine	● Automatic travel speed selector function does not work (pump pressure sensor system). ● Auto-decelerator keeps working and is not canceled or fine control performance of work equipment is lowered (PPC pressure sensor system).		
Related information	● As T-adapter for pump controller connector is "socket-type box", operating voltage cannot be measured at pump controller connector. ● Method of reproducing failure code: Turn starting switch to ON position. ⚠ **Loosen the oil filler cap of the hydraulic tank to release the pressure in the hydraulic tank. For details, see Testing and adjusting "Releasing remaining pressure in hydraulic circuit" when checking and replacing oil pressure sensor.** **With monitoring function (Code: 04401), check that hydraulic oil temperature is 40 °C or lower and cool enough not to burn.**		

Cause		Procedure, measuring location, criteria and remarks		
1	Defective pressure sensor (Internal short circuit)	1. Turn starting switch to OFF position. 2. Disconnect following sensors one by one, and turn starting switch to ON position for each troubleshooting. ★ If this failure code disappears, disconnected sensor is defective. 3. After each troubleshooting, turn starting swith to OFF position.		
		Sensor	Connector	
		Bucket CURL PPC pressure sensor	P01	
		Boom DOWN PPC pressure sensor	P02	
		Bucket DUMP PPC pressure sensor	P05	
		Arm IN pressure sensor	P04	
		Boom RAISE PPC pressure sensor	P06	
		Swing RIGHT PPC pressure sensor	P03	
		Arm DUMP PPC pressure sensor	P08	
		Swing LEFT PPC pressure sensor	P07	
		F pump pressure sensor	P25	
		R pump pressure sensor	P26	
2	Hot short circuit in wiring harness	★ To measure voltage before controller stops output of power. 1. Turn starting switch to OFF position. 2. Disconnect connectors P01 to P08 and P25, and P26. 3. Connect T-adapters to female side of either of disconnected connectors (e.g. P07). 4. Turn starting switch to ON position (with connectors P01 to P08, and P25 and P26 disconnected).		
		Between P07 (female) (3) and ground	Voltage	4.5 to 5.5 V
3	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors CP01, P01 to P08, and P25 and P26. 3. Connect T-adapters to female side of connector CP01.		
		Between CP01 (female) (9) and ground	Resistance	Min. 1 MΩ
4	Defective pump controller	If no failure is found by above checks, the pump controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

<table>
<tr><th colspan="2">Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="3">8</td><td rowspan="3">Short circuit or hot short circuit in wiring harness</td><td colspan="3">★ If no failure is found by check on cause 5 (no open circuit), measure in only one place each.
1. Turn starting switch to OFF position, and disconnect battery ground cable.
2. Disconnect connector at which measurement is performed and insert T-adapters into connector.
3. Connect battery ground cable.
4. Turn starting switch to ON position.
★ Since voltages of CAN H and CAN L lines are 2.5 ± 1 V including during communication, harnesses are considered normal as long as their voltages are between 1 and 4 V.</td></tr>
<tr><td>Between ground and any one of CM02 (female) (8), CP01 (female) (45), CK01 (female) (10), ACP01 (female) (2), CE02(female)(46)</td><td>Voltage</td><td>1 to 4 V</td></tr>
<tr><td>Between ground and any one of CM02 (female) (9), CP01 (female) (64), CK01 (female) (11), ACP01 (female) (1), CE02 (female) (47)</td><td>Voltage</td><td>1 to 4 V</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">Defective engine controller, pump controller, air conditioner unit or KOMTRAX terminal</td><td colspan="3">● If all four failure codes [DA2QKR], [DB2QKR], [D8AQKR], and [DAZQKR] are displayed
★ Repeat following steps 1. to 3. to disconnect controllers one by one from CAN communication and to identify defective controller.
1. Turn starting switch to OFF position and disconnect battery ground cable.
2. Disconnect CAN communication connector of engine controller (connector CE03), pump controller (connector CP01), air conditioner unit (connector ACP01),and KOMTRAX terminal (connector CK01) one by one.
3. Connect battery ground cable, turn starting switch to ON position, then perform troubleshooting.
4. Return to step 1. and troubleshoot next controller.</td></tr>
<tr><td colspan="2">Has the number of displayed failure codes decreased from four?</td><td>If YES, disconnected controller is defective.</td></tr>
<tr><td>10</td><td>Defective engine controller</td><td colspan="3">If no failure is found by above checks, engine controller is defective.
(Since this is an internal defect, troubleshooting cannot be performed.)</td></tr>
<tr><td>11</td><td>Defective machine monitor</td><td colspan="3">If no failure is found by above checks, machine monitor is defective.
(Since this is an internal defect, troubleshooting cannot be performed.)</td></tr>
</table>

HYDRAULIC EXCAVATOR

PC300LC-8M0

PC350LC-8M0

Machine model	Serial number
PC300LC-8M0	N330001 and up
PC350LC-8M0	N360001 and up

40 Troubleshooting

304 Troubleshooting by failure code, Part 4

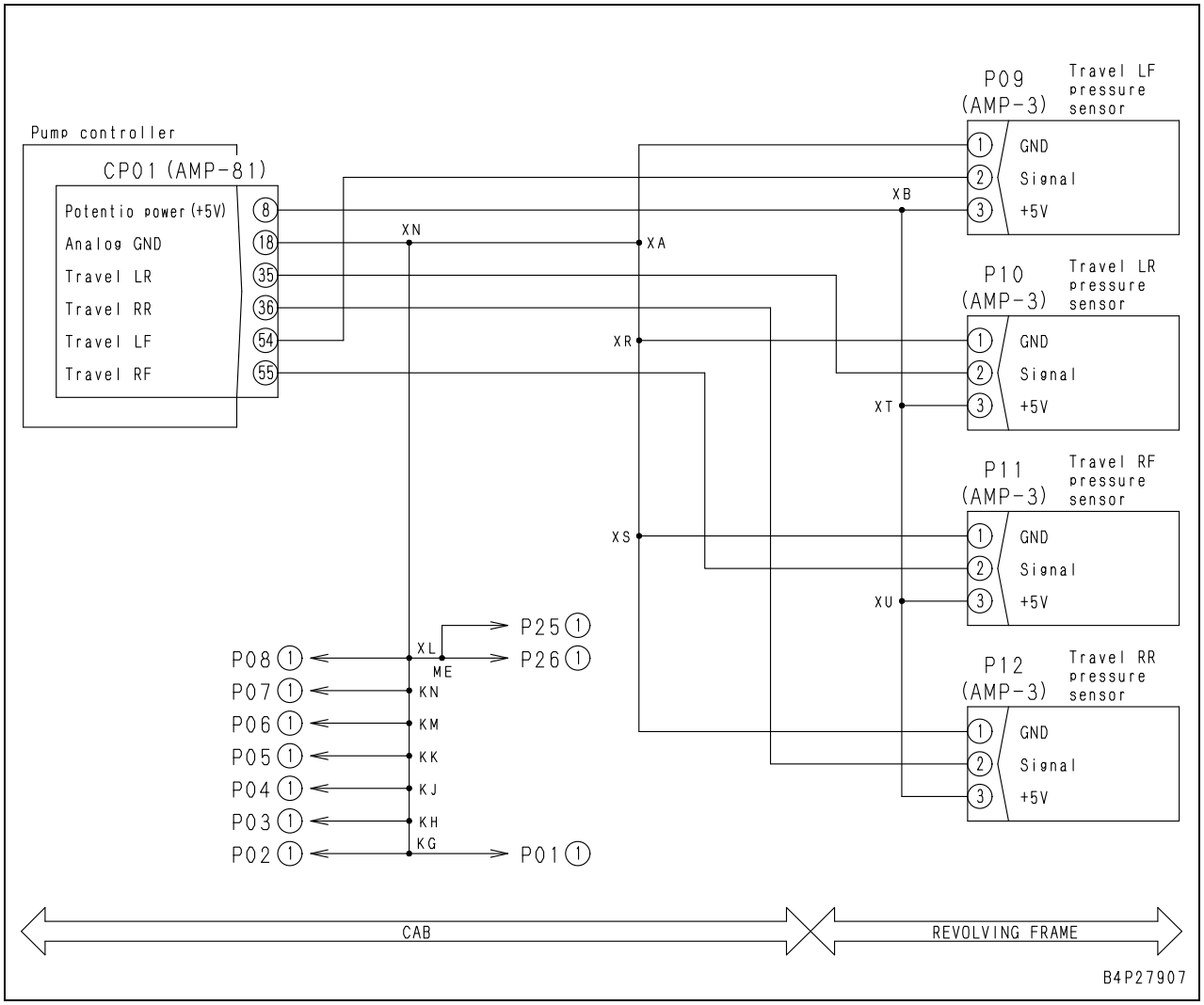
Failure code [DHSAMA] Swing RH PPC Press Sensor Abnormality

Action level	Failure code	Failure	Swing Right PPC Pressure Sensor Abnormality (Pump controller system)
L01	**DHSAMA**		
Detail of failure	● Signal voltage of swing RIGHT PPC pressure sensor is below 0.3 V or above 4.5 V.		
Action of controller	● Controls machine taking it that swing RIGHT PPC pressure is 0 MPa {0 kg/cm^2}. ● If cause of failure disappears, machine becomes normal by itself.		
Problem on machine	● Automatic deceleration does not cancel. ● Controllability of swing RIGHT deteriorates.		
Related information	★ If 5 V circuit (3) and ground circuit (1) of pressure sensor are connected inversely, pressure sensor will be broken. Accordingly, take extreme care when checking. ● As T-adapter for pump controller connector is "socket-type box", operating voltage cannot be measured at pump controller connector. ● Swing RIGHT PPC pressure can be checked with monitoring function. (Code 09002) ● Method of reproducing failure code: Turn starting switch to ON position or start engine. ⚠ **Loosen the oil filler cap of the hydraulic tank to release the pressure in the hydraulic tank. For details, see Testing and adjusting "Releasing remaining pressure in hydraulic circuit" when checking and replacing oil pressure sensor.** **With monitoring function (Code: 04401), check that hydraulic oil temperature is 40 °C or lower and cool enough not to burn.**		

Cause		Procedure, measuring location, criteria and remarks			
1	Defective 5V sensor power supply 1 system	If failure code [**DA25KP**] is also displayed, perform troubleshooting for it first.			
		1. Turn starting switch to OFF position. 2. Disconnect connector P03, and connect T-adapters to female side. 3. Turn starting switch to ON position. ★ If power supply voltage is abnormal, proceed to check on cause 3.			
		Between P03 (female) (3) and (1)	Power supply	Voltage	4.5 to 5.5 V
2	Defective swing RIGHT PPC pressure sensor (internal defect)	1. Turn starting switch to OFF position. 2. Connect T-adapters to connector P03. 3. Turn starting switch to ON position.			
		Between P03 (2) and (1)	Sensor output	Voltage	0.5 to 4.5 V
		★ If power supply voltage is normal and sensor output voltage is abnormal, it is difficult to judge whether cause of failure is defective sensor, ground fault or hot short circuit in wiring harness. Check as below. 1. Turn starting switch to OFF position. 2. Replace connector P03 with connector of other PPC pressure sensor. 3. Turn starting switch to ON position and display "Abnormality Record" screen of electrical system on machine monitor. 4. If E mark is not displayed for this failure code, swing RIGHT PPC pressure sensor is defective. ★ After finishing test, restore connectors.			
3	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors CP01 and P03, and connect T-adapters to each female side.			
		★ If power supply voltage measured in check on cause 1 is normal, this check is not required. Between CP01 (female) (18) and P03 (female) (1)		Resistance	Max. 1 Ω
		Between CP01 (female) (72) and P03 (female) (2)		Resistance	Max. 1 Ω
		★ If power supply voltage measured in check on cause 1 is normal, this check is not required. Between CP01 (female) (9) and P03 (female) (3)		Resistance	Max. 1 Ω

Cause		Procedure, measuring location, criteria and remarks		
4	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors CP01 and P11 and connect T-adapter to female side of either connector.		
		Between CP01 (female) (55) or P11 (female) (2) and ground	Resistance	Min. 1 MΩ
5	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector P11. 3. Connect T-adapters to female side of connector P11. 4. Turn starting switch to ON position.		
		Between P11 (female) (2) and ground	Voltage	Max. 1 V
6	Defective pump controller	If no failure is found by above checks, pump controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to travel PPC pressure sensor

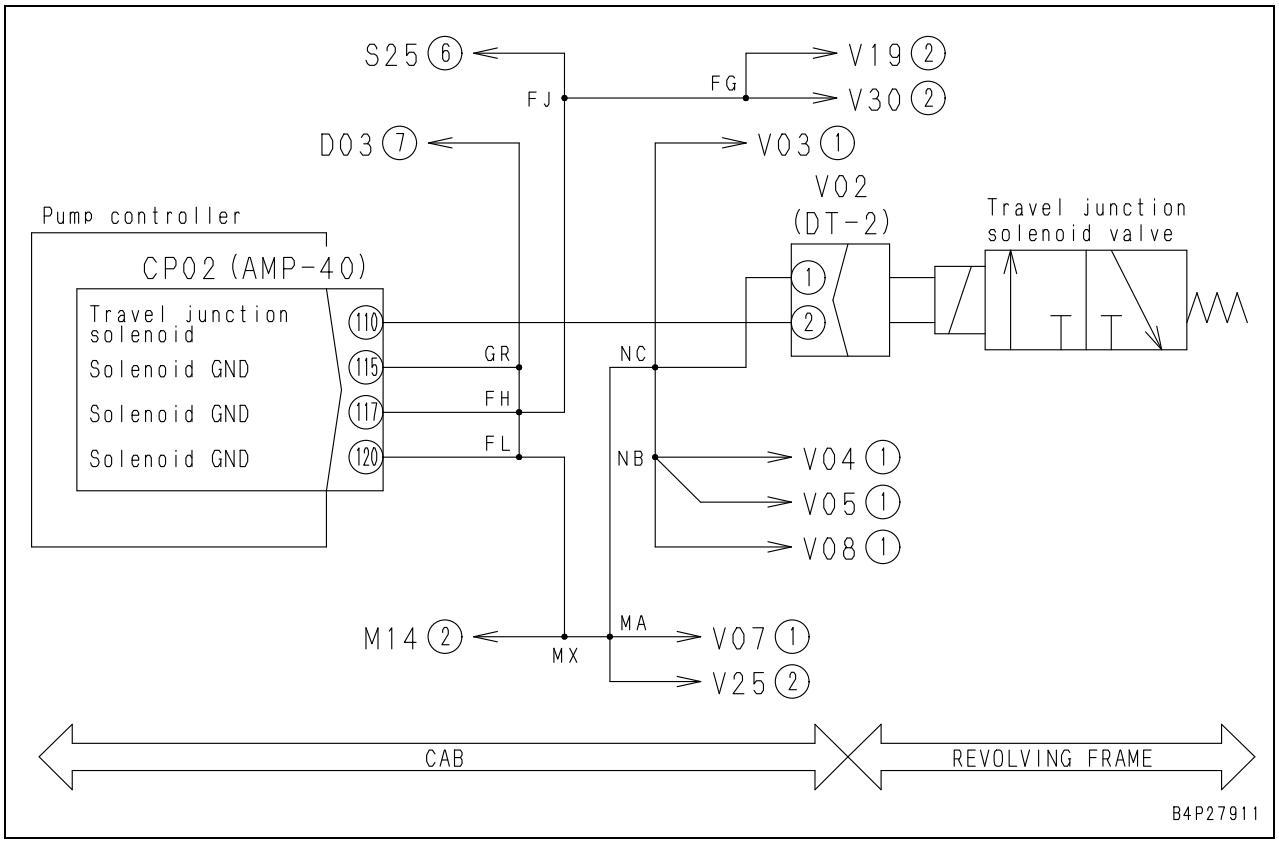


Failure code [DW43KA] Travel Speed Sol Open Circuit

Action level	Failure code	Failure	Travel Speed Solenoid Open Circuit (Pump controller system)
L01	**DW43KA**		
Detail of failure	● No current flows when pump controller drives travel speed selector solenoid, so pump controller determines that open circuit exists in travel speed selector solenoid circuit.		
Action of controller	● None in particular (Since no current flows, solenoid is not energized.) ● If cause of failure disappears, machine becomes normal by itself.		
Problem on machine	● "Hi" travel speed is slow. (Although "Hi" is diaplayed on machine monitor, actual travel speed is still "Mi".)		
Related information	● Controller's command (ON/OFF) to travel speed selector solenoid can be checked with monitoring function. (As long as controller's command to solenoid is "ON", sensor status displayed on monitoring screen is "ON" even if solenoid is not energized due to short circuit.) (Code: 02300) ● Method of reproducing failure code: Start engine, set travel speed to High and operate travel lever.		

Cause		Procedure, measuring location, criteria and remarks		
1	Defective travel speed selector solenoid (Internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector V04, and connect T-adapters to male side.		
		Between V04 (male) (1) and (2)	Resistance	20 to 60 Ω
2	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connector CP02 and connect T-adapters to female side.		
		Between CP02 (female) (87) and each of (115) , (117) and (120)	Resistance	20 to 60 Ω
		★ If no failure is found by above checks , this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors CP02 and V04, and connect T-adapters to each female side.		
		Between CP02 (female) (87) and V04 (female) (1)	Resistance	Max. 1 Ω
		Between V04 (female) (2) and each of CP02 (female) (115), (117) and (120)	Resistance	Max. 1 Ω
3	Defective pump controller	If no failure is found by above checks, pump controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to travel junction solenoid

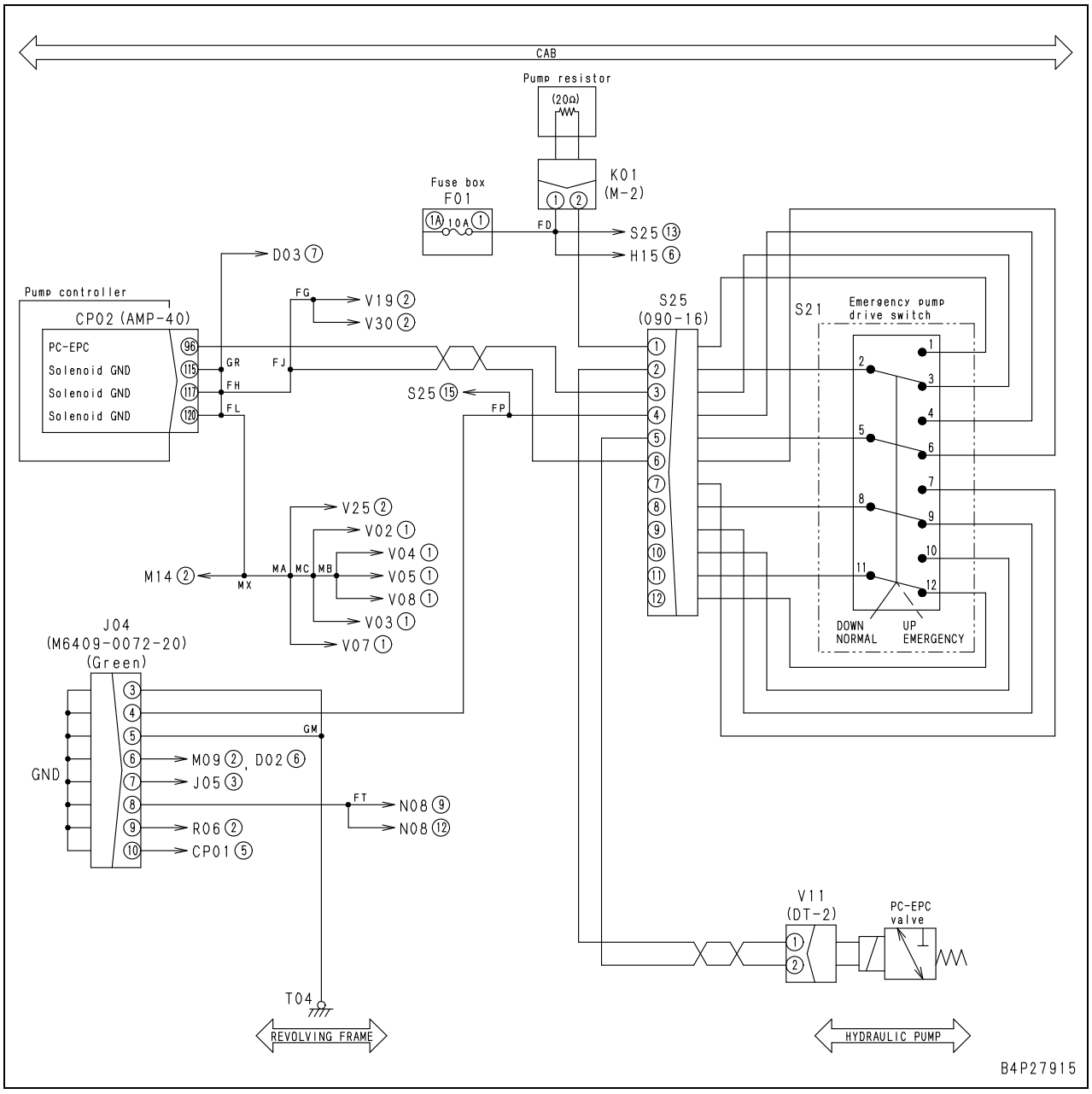


Failure code [DWK0KA] 2-stage Relief Sol Open Circuit

Action level	Failure code	Failure	2-stage Relief Solenoid Open Circuit (Pump controller system)
L01	**DWK0KA**		
Detail of failure	● Controller output voltage to solenoid is above standard value when pump controller does not drive 2-stage relief solenoid, so pump controller determines that open circuit exists in 2-stage relief solenoid circuit.		
Action of controller	● None in particular (Since no current flows, solenoid is not energized.) ● If cause of failure disappears, machine becomes normal by itself.		
Problem on machine	● Travel power is low (main relief valve is not set to high-pressure setting). ● One-touch power maximizing function does not work.		
Related information	● Controller's command (ON/OFF) to 2-stage relief solenoid can be checked with monitoring function. (If controller sends solenoid ON command, monitoring display is ON even if solenoid is not switched ON due to open circuit.) (Code: 02300) ● As T-adapter for pump controller connector is "socket-type box", operating voltage cannot be measured at pump controller connector. ● Controller detects open circuit only when it does not drive solenoid. ● Method of reproducing failure code: Turn starting switch to ON position.		

Cause		Procedure, measuring location, criteria and remarks		
1	Defective 2-stage relief solenoid (Internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector V08, and connect T-adapters to male side.		
		Between V08 (male) (1) and (2)	Resistance	20 to 60 Ω
2	Open or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector CP02 and connect T-adapters to female side. ★ If resistance is above 1 MΩ, wiring harness has open circuit. If resistance is below 1 Ω, wiring harness has short circuit.		
		Between CP02 (female) (109) and each of (115), (117) and (120)	Resistance	20 to 60 Ω
3	Open circuit in wiring harness (wire breakage or defective contact of connector)	★ If no failure is found by check on cause 2, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors CP02 and V08, and connect T-adapters to each female side.		
		Between CP02 (female) (109) and V08 (female) (2)	Resistance	Max. 1 Ω
		Between V08 (female) (1) and each of CP02 (female) (115), (117) and (120)	Resistance	Max. 1 Ω
4	Defective pump controller	If no failure is found by above checks, pump controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to PC-EPC solenoid



E-2 Preheater does not operate

Failure	1) Manual preheating does not function.
Related information	★ This troubleshooting describes procedures to be followed when manual preheating does not function to heat electrical intake air heater (ribbon heater) mounting section. ● “Automatic preheating” and “Manual preheating” functions are available. When either function is operated, preheating monitor lights up. (When only preheating monitor does not light up, perform troubleshooting "3) While preheater is operating, preheating monitor does not light up") ● If "Machine monitor displays nothing" or "Battery relay operation sound is not heard" when turning starting switch to ON position, main electric power supply system may be defective. So, perform troubleshooting for E-3 and E-1. ● Before performing troubleshooting, check that no related failure code is displayed. (If failure codes [**D110KB**] is displayed, troubleshoot it first.)

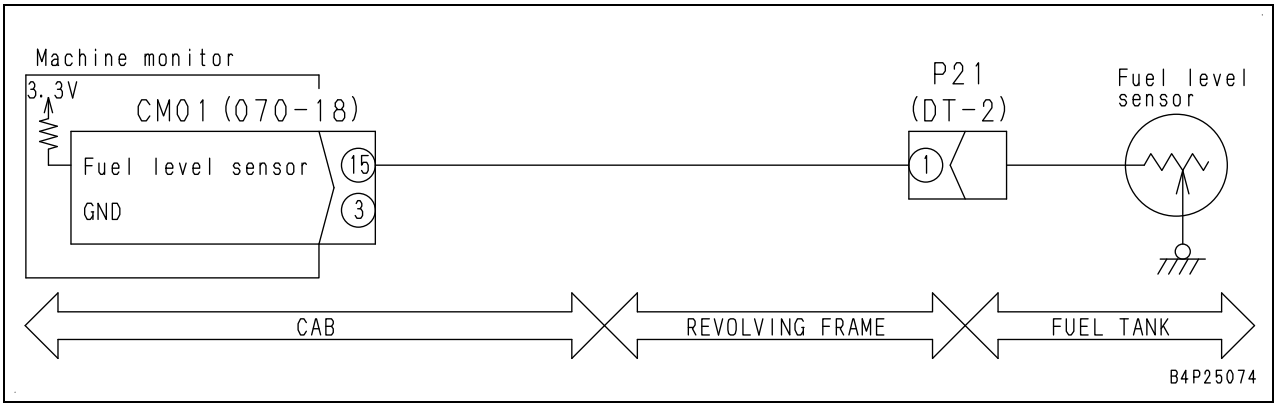
Cause		Procedure, measuring location, criteria and remarks			
1	Defective fuse No. 17 in fuse box F01	If fuse No. 17 in fuse box F01 is broken, circuit probably has ground fault. In this case, perform troubleshooting for cause 8 first.			
2	Loose terminal or open circuit at terminal	1. Turn starting switch to OFF position.			
		Check terminals of heater relay, battery relay, electrical intake air heater (ribbon heater), etc.			
3	Open circuit or ground fault in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors CM01 and H15, and connect T-adapter to female side of H15.			
		★ Heater relay coil resistance Between H15 (female) (3) and ground			Approx. 20 Ω
		1. Turn starting switch to OFF position. 2. Turn starting switch to ON position.			
		Between input terminal on contact side of heater relay and ground		Voltage	20 to 30 V
		1. Turn starting switch to OFF position. 2. Disconnect heater relay terminal R16. ★ To prevent current from flowing through heater when starting switch is turned to HEAT position 3. Turn starting switch to HEAT position (Connect R1).			
		Between heater relay terminal R15 and ground		Voltage	20 to 30 V
4	Defective heater relay (Does not work) (Terminal R16)	If no failure is found by check on cause 3 and heater relay operation sound is not heard, heater relay is defective.			
5	Defective diode D02 (internal open or short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector D02 and connect T-adapters to diode. ★ Check by using multimeter in diode range.			
		Between D02 (male) (1) (+) and (5) (-)		No continuity	
		Between D02 (male) (5) (+) and (1) (-)		Continuity	
6	Defective electrical intake air heater (ribbon heater) (Internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect terminal E01.			
		Between E01 terminal and ground		Continuity	
7	Defective starting switch	1. Turn starting switch to OFF position. 2. Disconnect battery ground cable. 3. Disconnect connector H15 and connect T-adapters to male side. 4. Turn starting switch to OFF/HEAT position and perform troubleshooting.			
		Between H15 (male) (1) and (3)	OFF	Resistance	Min. 1 MΩ
			HEAT	Resistance	Min. 1 MΩ

E-7 Fuel level gauge does not indicate properly

Failure	1) While fuel is added, fuel level gauge indicator does not rise above red range (E). 2) While fuel level is low, fuel level gauge indicator does not lower below green range top (F).
Related information	● Signal voltage of fuel level sensor can be checked with monitoring function. (Code: 04200)

Cause		Procedure, measuring location, criteria and remarks			
1	Defective fuel level sensor (internal open or short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector P21 and connect T-adapters to male side.			
		Between P21 (male) (1) and ground	Fuel level: FULL	Resistance	7 to 11 Ω
			Fuel level: EMPTY	Resistance	85 to 95 Ω
2	Open circuit or ground fault in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector CM01 and connect T-adapter to female side.			
		Between CM01(female) (15) and ground	Fuel level: FULL	Resistance	7 to 11 Ω
			Fuel level: EMPTY	Resistance	85 to 95 Ω
3	Open circuit in wiring harness (wire breakage or defective contact of connector)	★ If no failure is found by check on cause 2, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors CM01 and P21, and connect T-adapters to each female side.			
		Between CM01(female) (15) and P21(female) (1)		Resistance	Max. 1 Ω
4	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors CM01 and P21, and connect T-adapters to either female side.			
		Between CM01(female) (15) and ground, or between P21(female) (1) and ground		Resistance	Min. 1 MΩ
5	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector P21. 3. Insert T-adapters into connector CM01 or connect T-adapters to female side of connector P21. 4. Turn starting switch to ON position.			
		Between CM01(15) and ground, or between P21 (female) (1) and ground		Voltage	Approx. 3.3 V
6	Defective machine monitor	If no failure is found by above checks, machine monitor is defective. (Since this is an internal defect, troubleshooting cannot be performed.)			

Circuit diagram related to fuel level sensor



E-16 Travel speed does not change

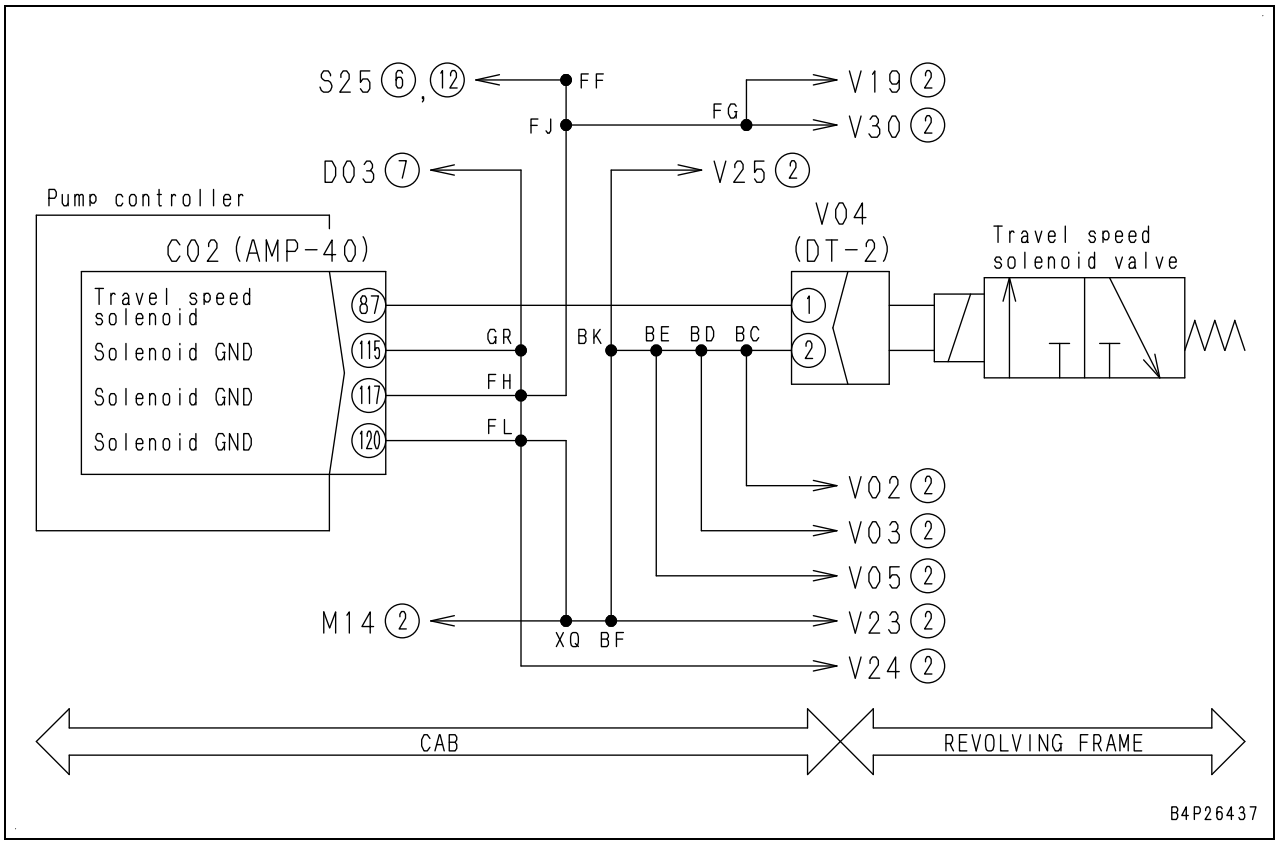
Failure	1) When travel speed selector switch is operated, display of travel speed monitor does not change.
Related information	● Signal of travel speed selector switch can be checked with monitoring function. (Code: 04504)

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

Failure	2) When selection of travel speed is changed, actual travel speed does not change.
Related information	● When failure due to cause 1 occurs, actual travel speed does not decrease when travel speed setting is changed to "Lo". ● As T-adapter for pump controller connector is "socket-type box", operating voltage cannot be measured at pump controller connector.

	Cause	Procedure, measuring location, criteria and remarks		
1	Hot short circuit in wiring harness (contact with 24 V circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector V04 and connect T-adapters to female side. 3. Turn starting switch to ON position.		
		Between V04 (female) (2) and ground	Voltage	Max. 3 V
2	Defective machine monitor	If no problem is found in check on cause 1, machine monitor may be defective. (Since this is an internal defect, troubleshooting cannot be performed.)		
3	Defective pump controller	If no problem is found in checks on causes 1 and 2, pump controller may be defective (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to travel speed solenoid



E-24 Horn does not sound or does not stop

Failure	1) Horn does not sound.
Related information	

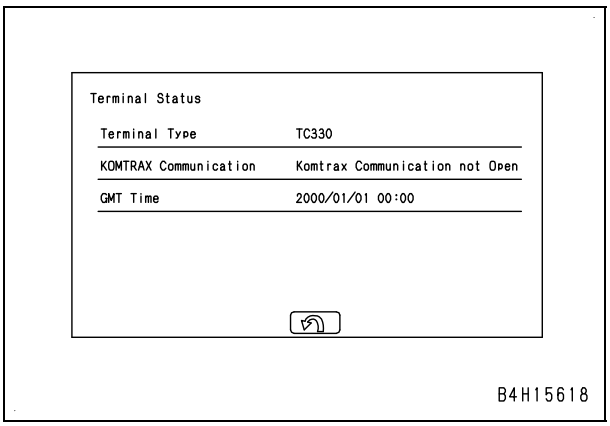
Cause		Procedure, measuring location, criteria and remarks			
1	Defective fuse F01-5	If fuse F01(5) is broken, circuit probably has ground fault. In this case, perform troubleshooting for cause 7 first.			
2	Defective horn relay (internal open or short circuit)	1. Turn starting switch to OFF position. 2. Replace horn relay (connector: R08) with another relay. 3. Turn starting switch to ON position. 4. Press L.H. knob switch.			
		If horn sounds, original horn relay is defective.			
3	Defective horn switch (internal open or short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector S10 and connect T-adapters to male side.			
		Between S10 (male) (1) and (2)	Switch: OFF	Resistance	Min. 1 MΩ
			Switch: ON	Resistance	Max. 1 Ω
4	Defective high-tone horn (M07) or low-tone horn (M08) (internal open or short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors M07 and M08, and connect T-adapters to each male side.			
		Between M07 (male) (1) and (2)		Continuity	
		Between M08 (male) (1) and (2)		Continuity	
5	Defective wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector R08 and connect T-adapters to female side. 3. Turn starting switch to ON position. 4. Press L.H. knob switch.			
		Between R08 (female) (1) and (2)		Voltage	20 to 30 V
		Between R08 (female) (3) and (2)		Voltage	20 to 30 V
6	Open circuit in wiring harness (Wire breakage or defective contact)	1. Turn starting switch to OFF position. 2. Disconnect connector R08 and connect T-adapters to female side.			
		Between R08 (female) (5) and ground		Continuity	
		Between R08 (female) (1) and ground		Continuity	
		★ If no failure is found by above checks, this check is not required. 1. Turn starting switch to OFF position. 2. Remove fuse F01-5. 3. Disconnect connectors R08 and S10, and connect T-adapters to each female side.			
		Between F01-5 and S10 (female) (1)		Resistance	Max. 1 Ω
		Between S10 (female) (2) and R08 (female) (1)		Resistance	Max. 1 Ω
		Between R08 (female) (2) and ground		Resistance	Max. 1 Ω
		Between R08 (female) (3) and F01(5)		Resistance	Max. 1 Ω
7	Ground fault in wiring harness (contact with ground circuit)	★ If fuse is not blown, this check is not required. 1. Turn starting switch to OFF position. 2. Remove fuse F01-5. 3. Disconnect connectors R08, M07, and M08, and connect T-adapters to female side of R08.			
		Between R08 (female) (1) and ground		Resistance	Min. 1 MΩ
		Between R08 (female) (3) and ground		Resistance	Min. 1 MΩ
		Between R08 (female) (5) and ground		Resistance	Min. 1 MΩ

E-38 KOMTRAX system does not operate properly

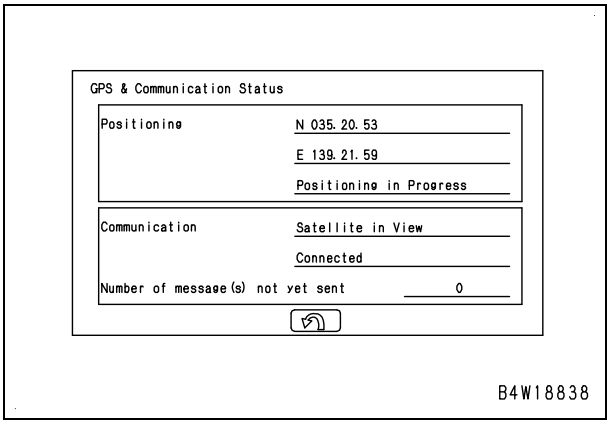
Failure	● KOMTRAX system does not operate properly.
Related information	● Perform following troubleshooting if administrator of KOMTRAX system requests to check whether failure is occurring in system on machine. ● Even when KOMTRAX system is defective, no problem appears on machine. ● Check all of results of troubleshooting on service menu display of machine monitor.

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective communication 1	1. Turn starting switch to ON position. 2. Display “Terminal status” screen.		
		Monitoring display	Check item: Station set-up check	To be completed
2	Defective positioning by GPS	1. Turn starting switch to ON position. 2. Display “GPS & Communication Status” screen.		
		Monitoring display	Check item: Positioning	N ###.##.## (Latitude)
				E ###.##.## (Longitude)
				In positioning
		If latitude and longitude are not displayed within 5 minutes with machine stayed outdoor where opens clearly for sky, contact KOMTRAX service hot line.		
3	Defective communication environment	1. Turn starting switch to ON position. 2. Display “GPS & Communication Status” screen.		
		Monitoring display	Check item: Communication	Satellite in View or No Satellite in View
		If Communication Status does never display “Satellite in View” within 15 minutes with machine stayed outdoor where opens clearly for sky, check if connector of TC330 or antenna on top of cab are properly connected.		
4	Defective communication 2	1. Turn starting switch to ON position. 2. Display “GPS & Communication Status” screen.		
		Monitoring display	Check item: Number of message not yet sent	0 to 60 (normally 0)

★ Select “01 Terminal Status” from “11 KOMTRAX settings” in service menu of machine monitor.



★ Select “02 GPS & Communication Status” from “11 KOMTRAX settings” in service menu of machine monitor.



H-2 Engine speed sharply drops or engine stalls

Trouble	• Engine speed lowers extremely or engine stalls.
Related information	• Set the working mode in P-mode before start.

<table>
<tr><td rowspan="15">Possible causes and standard value in normal state</td><td colspan="2">Cause</td><td colspan="4">Standard value in normal state/Remarks on troubleshooting</td></tr>
<tr><td rowspan="3">1</td><td rowspan="3">Defective adjustment or malfunction of main relief valve</td><td colspan="4">★ Prepare with engine stopped, then run engine at high idle and carry out troubleshooting.</td></tr>
<tr><td colspan="2">Control lever</td><td colspan="2">Main relief pressure</td></tr>
<tr><td colspan="2">Arm IN</td><td colspan="2">33.34 to 36.77 MPa
{340 to 375 kg/cm^2}</td></tr>
<tr><td colspan="4">If oil pressure does not become normal after adjustment, main relief valve may have malfunction or internal defect. Check main relief valve.</td></tr>
<tr><td rowspan="4">2</td><td rowspan="4">Defective adjustment or malfunction of PC valve</td><td colspan="4">★ Prepare with engine stopped, then run engine at high idle and carry out troubleshooting.</td></tr>
<tr><td>Measured oil pressure</td><td>Measurement condition</td><td colspan="2">Oil pressure ratio</td></tr>
<tr><td>Pump discharge pressure</td><td rowspan="2">Swing lock: ON
Arm IN relief</td><td colspan="2">1</td></tr>
<tr><td>PC valve output pressure</td><td colspan="2">Approx. 3/5</td></tr>
<tr><td colspan="4">If oil pressure does not become normal after adjustment, PC valve may have malfunction or internal defect. Check PC valve.</td></tr>
<tr><td rowspan="4">3</td><td rowspan="4">Defective adjustment or malfunction of LS valve</td><td colspan="4">★ Prepare with engine stopped, then run engine at high idle and carry out troubleshooting.</td></tr>
<tr><td rowspan="2">Measured oil pressure</td><td colspan="2">Oil pressure ratio</td></tr>
<tr><td>All lever in neutral</td><td>Travel with no load (Lever operated halfway)</td></tr>
<tr><td>Pump discharge pressure</td><td rowspan="2">Almost same pressure</td><td>1</td></tr>
<tr><td>LS valve output pressure</td><td>Approx. 3/5</td></tr>
<tr><td colspan="4">If oil pressure does not become normal after adjustment, LS valve may have malfunction or internal defect. Check LS valve.</td></tr>
<tr><td>4</td><td>Clogging of orifice or filter in servo devices</td><td colspan="4">Orifices or filters in pump servo devices may be clogged. Check them.</td></tr>
<tr><td>5</td><td>Malfunction of servo piston</td><td colspan="4">Servo piston may have malfunction. Check it.</td></tr>
</table>

H-18 Machine swerves in travel

Trouble	• Machine deviates during travel.
Related information	• Set the working mode in P-mode before start.

<table>
<tr><td rowspan="20">Possible causes and standard value in normal state</td><td colspan="2">Cause</td><td colspan="4">Standard value in normal state/Remarks on troubleshooting</td></tr>
<tr><td rowspan="4">1</td><td rowspan="4">Malfunction of travel PPC valve</td><td colspan="4">★ Prepare with engine stopped, then run engine at high idle and carry out troubleshooting.</td></tr>
<tr><td colspan="2">Travel lever</td><td colspan="2">PPC valve output pressure</td></tr>
<tr><td colspan="2">Travel forward or reverse</td><td colspan="2">Min. 2.7 MPa
{Min. 28 kg/cm^2}</td></tr>
<tr><td colspan="2">Difference between right and left outputs</td><td colspan="2">Within 0.4 MPa
{Within. 4 kg/cm^2}</td></tr>
<tr><td rowspan="3">2</td><td rowspan="3">Malfunction of self pressure reducing valve</td><td colspan="4">★ Prepare with engine stopped, then run engine at high idle and carry out troubleshooting.</td></tr>
<tr><td colspan="2">Control lever</td><td colspan="2">Control circuit basic pressure</td></tr>
<tr><td colspan="2">All levers at neutral</td><td colspan="2">2.83 to 3.43 MPa
{29 to 35 kg/cm^2}</td></tr>
<tr><td rowspan="4">3</td><td rowspan="4">Defective adjustment or malfunction of LS valve</td><td colspan="4">★ Prepare with engine stopped, then run engine at high idle and carry out troubleshooting.</td></tr>
<tr><td rowspan="2">Measured oil pressure</td><td colspan="2">Oil pressure ratio</td></tr>
<tr><td>All lever in neutral</td><td>Travel with no load (Lever operated halfway)</td></tr>
<tr><td>Pump discharge pressure</td><td rowspan="2">Almost same pressure</td><td>1</td></tr>
<tr><td>LS valve output pressure</td><td>Approx. 3/5</td></tr>
<tr><td rowspan="4">4</td><td rowspan="4">Malfunction of travel junction solenoid valve</td><td colspan="4">★ Prepare with engine stopped, then run engine at high idle and carry out troubleshooting.</td></tr>
<tr><td colspan="2">Travel lever</td><td colspan="2">Solenoid output pressure</td></tr>
<tr><td colspan="2">Either side operated</td><td colspan="2">0 MPa {0 kg/cm^2}</td></tr>
<tr><td colspan="2">Both sides operated</td><td colspan="2">2.84 to 3.43 MPa
{29 to 35 kg/cm^2}</td></tr>
<tr><td>5</td><td>Malfunction of travel junction valve</td><td colspan="4">Travel junction valve may have malfunction. Check it.</td></tr>
<tr><td>6</td><td>Malfunction of travel control valve (spool)</td><td colspan="4">Spool of travel control valve may have malfunction. Check it.</td></tr>
<tr><td rowspan="3">7</td><td rowspan="3">Defective travel motor</td><td colspan="4">★ Prepare with engine stopped, then run engine at high idle and carry out troubleshooting.</td></tr>
<tr><td colspan="2">Travel lever</td><td colspan="2">Leakage from travel motor</td></tr>
<tr><td colspan="2">Travel relief</td><td colspan="2">Max. 30 ℓ/min</td></tr>
<tr><td>8</td><td>Defective final drive</td><td colspan="4">Final drive may have internal defect. Check it.
★ It may be checked by abnormal sound, abnormal heating, metal chips in drain oil, etc.</td></tr>
</table>

H-28 Swing hydraulic drift is too big

Trouble (1)	• Hydraulic drift of swing is large (when swing holding brake is applied).
Related information	• When swing emergency reset switch is turned OFF (normal position), swing holding brake operates and upper structure is fixed with disc brake.

	Cause		Standard value in normal state/Remarks on troubleshooting	
Possible causes and standard value in normal state	1	Malfunction of swing holding brake solenoid valve	★ Prepare with engine stopped, then run engine at high idle and carry out troubleshooting.	
			Swing lever	Solenoid valve output pressure
			Neutral	0 MPa {0 kg/cm^2}
			Left or Right	2.84 to 3.43 MPa {29 to 35 kg/cm^2}
	2	Malfunction of swing motor (holding brake)	Holding brake section of swing motor may have malfunction or internal defect. Check it.	

Trouble (2)	• Hydraulic drift of swing is large (when swing holding brake is released).
Related information	• When swing emergency reset switch is turned ON (in an emergency), swing holding brake is released and upper structure is secured by only hydraulic pressure.

	Cause		Standard value in normal state/Remarks on troubleshooting
Possible causes and standard value in normal state	1	Malfunction of swing control valve (spool)	Seal of spool of swing control valve may be defective. Check it.
	2	Malfunction of swing control valve (pressure compensation valve)	Seal of pressure compensation valve section of swing control valve may be defective. Check it.
	3	Defective seal of swing motor (safety valve)	Seal of safety valve of swing motor may be defective. Check it.
	4	Defective seal of swing motor (suction valve)	Seal of suction valve of swing motor may be defective. Check it.
	5	Defective seal of swing motor (check valve)	Seal of check valve of swing motor may be defective. Check it.

c) Exhaust smoke comes out but engine does not start (Fuel is being injected)

General causes why exhaust smoke comes out but engine does not start

- Lack of rotating force due to defective electrical system
- Insufficient supply of fuel
- Insufficient intake of air
- Improper selection of fuel

			Cause													
			Clogged air cleaner element	Worn dynamic valve system (valve, rocker lever, etc.)	Worn piston ring, cylinder liner	Improper fuel used	Clogged air breather hole in fuel tank cap	Leakage, clogging, air in fuel system	Clogged fuel filter	Stuck, seized fuel supply pump plunger	Defective electric lift pump	Clogged injector, defective spray	Defective or deteriorated battery	Defective coolant temperature sensor, defective wiring harness	Defective intake air heater system
Questions	Confirm recent repair history														
	Degree of use of machine	Operated for long period			△				△			△			
	Suddenly failed to start			◎						◎				○	
	Non-specified fuel is being used					◎				○		○			
	Replacement of filters has not been carried out according to Operation & Maintenance Manual		◎						◎						
	Engine oil must be added more frequently				◎										
	Preheating monitor does not work normally during preheating or in low temperatures (when monitor is installed)														◎
Check items	Dust indicator lamp is red (when indicator is installed)		◎												
	Air breather hole in fuel tank cap is clogged						○								
	Rust and water are found when fuel tank is drained								◎						
	When fuel filter is removed, there is no fuel in filter					◎					○				
	There is a leakage from fuel piping							◎							
	Starting motor cranks engine slowly												◎		
	When engine is cranked, abnormal noise is heard from around cylinder head			◎											
	When engine is cranked with starting motor	No fuel comes out even when fuel filter air bleed plug is removed				○			◎		○				
		When hose at collection portion for spill flow from fuel injector is disconnected, spill flow is small								◎					
	When exhaust manifold is touched immediately after starting engine, temperature of some cylinders is low											◎			
Troubleshooting	Check air cleaner directly		●												
	Check dynamic valve system directly			●											
	When compression pressure is measured, it is found to be low				●										
	When air is bled from fuel line, air comes out							●							
	Check fuel filter directly								●						
	Carry out troubleshooting for code display “Supply pump pressure no signal (*1)“									●					
	Carry out troubleshooting for code display “Defective electric lift pump (*2)“										●				
	Possible to start in reduced cylinder mode											●			
	When specific gravity of electrolyte or voltage of battery is measured, it is found to be low.												●		
	Defective coolant temperature gauge display (when coolant temperature gauge is installed)													●	
	Intake air heater mount does not become warm during preheating														●
		Action	Clean	Replace	Replace	Replace	Clean	Correct	Replace	Replace	Replace	Replace	Replace	Replace	Replace

*1: Failure code of code display [CA559] and [CA2249]
*2: Failure code of code display [CA2265] and [CA2266]

S-13 Oil level rises (water, fuel in oil)

General causes why oil level rises

- Water in oil (cloudy white)
- Fuel in oil (diluted, smells of diesel fuel)

★ If there is oil in the coolant, carry out troubleshooting for “S-11 Oil is in coolant“.

			Cause							
			Broken cylinder head, head gasket	Broken injector O-ring	Cracks inside cylinder block	Holes made by pitting	Worn, broken rear oil seal	Broken oil cooler core, O-ring	Defective part inside fuel supply pump	Defective auxiliary equipment seal (pump, air compressor)
Questions	Confirm recent repair history									
	Degree of use of machine	Operated for long period		△		△	△			△
	Fuel consumption has increased			◎					◎	
	Coolant must be added more frequently		○		○					
Check items	There is oil in engine coolant		○	○	○	○		◎		
	Oil smells of diesel fuel			◎					◎	
	Oil is cloudy white		○			○				
	After engine is started, drops of water come from muffler		○							
	When radiator cap is left open and engine is running at low idle, an abnormal number of bubbles appear, or water spurts back		◎			○				
	Exhaust smoke is white			○						
	Oil level goes down in damper chamber						◎			
	Oil level goes down in hydraulic tank									◎
Troubleshooting	When compression pressure is measured, it is found to be low		●							
	Remove injector and check O-ring			●						
	Check cylinder block, liner directly				●	●				
	Check rear oil seal directly						●			
	Pressure-tightness test of oil cooler shows there is leakage							●		
	Remove supply pump and check directly								●	
	Check auxiliary equipment seal directly									●
		Action	Replace	Correct	Replace	Replace	Replace	Replace	Replace	Replace

Primer

Komatsu code	Part No.	Capacity	Container	Main features and applications	
Loctite 712	428-99-80080	100 mℓ	Glass container	• Use to accelerate hardening of instantaneous adhesive.	
SUNSTAR Paint Surface Primer 580 SUPER	417-926-3910	20 mℓ	Glass container	For adhered window glass	• Use as primer for cab side. (Effective period: 4 months after manufacture)
SUNSTAR Glass Primer 580 SUPER		20 mℓ	Glass container		• Use as primer for glass side. (Effective period: 4 months after manufacture)
SUNSTAR Paint Surface Primer 435-95	22M-54-27230	20 mℓ	Glass container		• Use as primer for painted cab sheet metal surface. (Effective period: 4 months after manufacture)
SUNSTAR Glass Primer 435-41	22M-54-27240	150 mℓ	Steel can		• Use as primer for black ceramic-coated glass surface and for hard polycarbonate-coated surface. (Effective period: 4 months after manufacture)
SUNSTAR Sash Primer GP-402	22M-54-27250	20 mℓ	Glass container		• Use as primer for sash (alumite surface treatment). (Effective period: 4 months after manufacture)

Adhesive

Komatsu code	Part No.	Capacity	Container	Main features and applications	
SUNSTAR Penguin Seal 580 SUPER "S" or "W"	417-926-3910	320 mℓ	Polyethylene container	For adhered window glass	• Use “S" in high-temperature season and ”W" in low-temperature season as adhesive for glass. (Effective period: 4 months after manufacture)
Sika Japan Sikaflex 256HV	20Y-54-39850	310 mℓ	Cartridge		• Use as adhesive for glass. (Effective period: 6 months after manufacture)
SUNSTAR Penguin Super 560	22M-54-27210	320 mℓ	Ecocart (special container)		• Use as adhesive for glass. (Effective period: 6 months after manufacture)

Caulking material

Komatsu code	Part No.	Capacity	Container	Main features and applications	
SUNSTAR Penguin Seal No.2505	417-926-3920	330 mℓ	Cartridge	For adhered window glass	• Use for joint seals between glasses (Effective period: 4 months after manufacture)
SEKISUI Silicone Sealant 83	20Y-54-55130	333 mℓ	Cartridge		• Use for front window seal. (Effective period: 6 months after manufacture)
GE TOSHIBA Silicones Tosseal 381	22M-54-27220	333 mℓ	Cartridge		• Use to seal glass-to-glass joint. Translucent white seal (Effective period: 12 months after manufacture)

Removal and installation of supply pump assembly

Special tools

Symbol		Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch
A	1	795-799-1390	Remover	●	1		

⚠ Place the machine on a level ground, lower the work equipment to the ground, and stop the engine.
⚠ Place the lock lever in LOCK position.
⚠ Disconnect the cable from the negative (-) terminal of the battery.

Removal

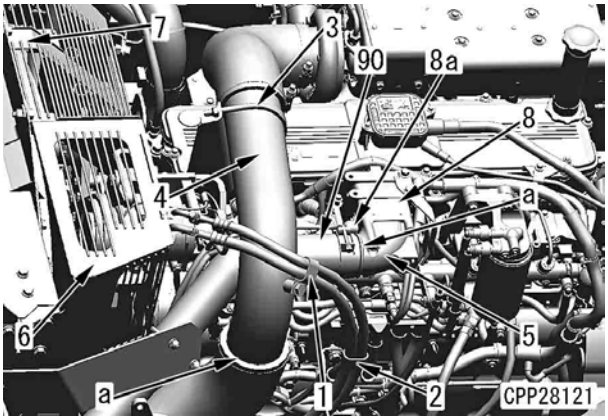
1. Open the engine hood.

2. Remove clamps (1), (2) and U-bolt (3), and remove air intake tube (4). [*1]
   ★ Put a mark on the tube and hose end (**a**) before removal so that the hose insertion depth can be seen.

3. Remove air intake connector (5), electrical intake air heater (ribbon heater) connector (8a), and electrical intake air heater (ribbon heater) (8). [*2]

4. Remove hose (90). [*3]
   ★ Put a mark on the air intake connector and hose end (**a**) before removal so that the hose insertion depth can be seen.

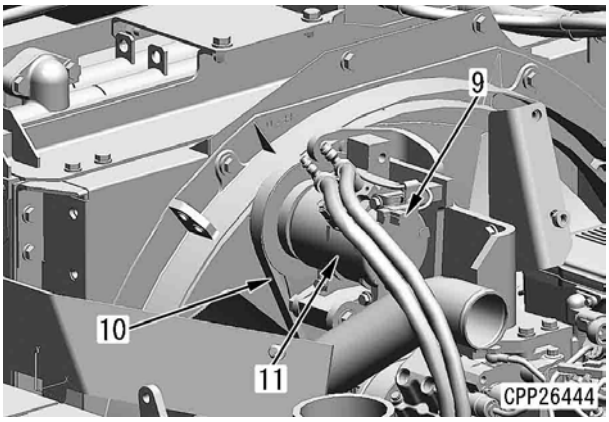
5. Remove belt cover (6) and fan guard (7).



6. Disconnect connector M34 (9).

7. Reduce the tension of air conditioner compressor belt (10), and remove the belt. [*4]

8. Remove air conditioner compressor (11) together with the bracket, and reposition it out of the way.



9. Remove No.1 injector high-pressure pipe (12). [*5]

10. Remove bracket (19).

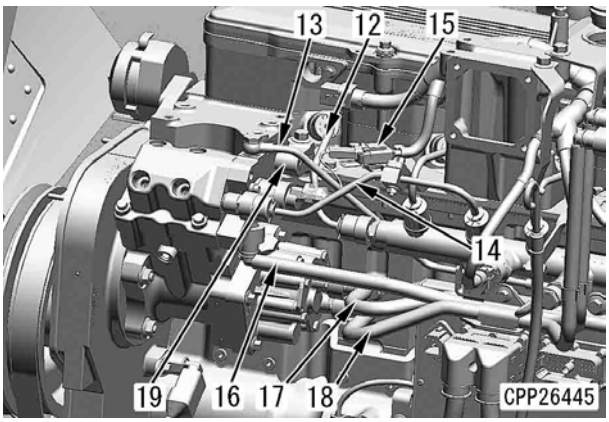
11. Remove overflow tube (13).

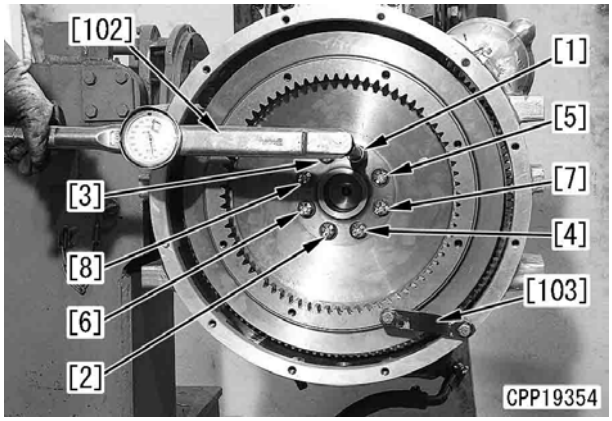
12. Remove outlet high-pressure pipe (14) of the supply pump. [*5]

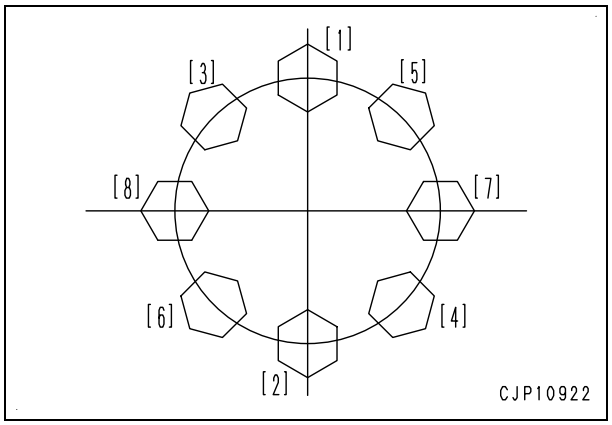
13. Disconnect connector C17 (15).

14. Disconnect inlet hose (16). [*6]

15. Disconnect feed pump hoses (17) and (18). [*6]



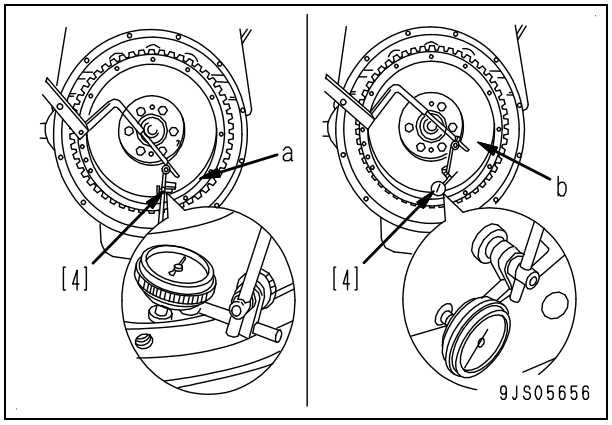




5) After installing the flywheel, measure the radial runout and facial runout by using dial gauge [4].
   - Radial runout: **Max. 0.13 mm**
   - Facial runout: **Max. 0.20 mm**

- Measurement of radial runout
  1] Install dial gauge [4] to the flywheel housing.
  2] Apply the probe of dial gauge perpendicular to the spigot joint part (**a**) or outer circumference of the flywheel.
  3] Rotate the flywheel 1 turn, and measure the maximum readings of the dial gauge pointer.
  ★ When the flywheel rotated 1 turn, check that the dial gauge indicates the same value as it of the starting rotation.

- Measurement of facial runout
  1] Similarly to the measurement of radial runout, set the probe of the dial gauge perpendicular to the end face (**b**) near the outer circumference of the flywheel.
  ★ When measuring, move the crankshaft to either front or rear end to eliminate error caused by the end play.
  2] Rotate the flywheel 1 turn, and measure the difference between the maximum and minimum readings of the dial gauge pointer.

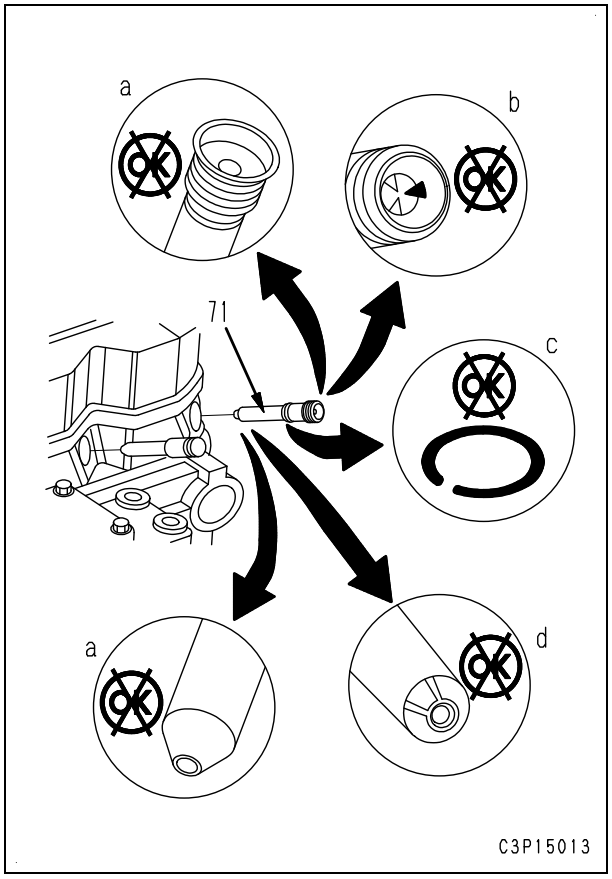


- Perform subsequent installation in the reverse order to removal.

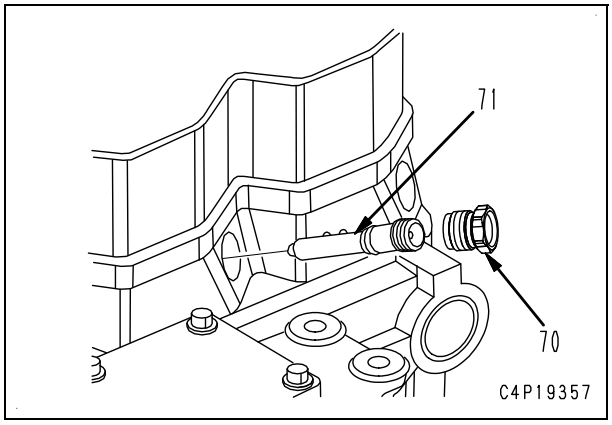
[*1]
Damper assembly mounting bolt:
Liquid adhesive (LT-2)
Damper spline part:
Molybdenum disulfide lubricant (LM-G)

a) If there are burrs or deformation at the inlet or outlet of the connector, do not use the inlet connector.
b) If the edge filter is clogged or dirty or there is sediment in it, do not use the inlet connector.
c) If the O-ring is broken or deteriorated, do not use the inlet connector.
d) If the sealing surface of the outlet side is worn, in contact unevenly or has a trace of leakage, do not use the inlet connector.

If high-pressure fuel leaks, seat surface is eroded and fine streaks or cracks appear. If there are such streaks or flaws, replace the connector and injector.

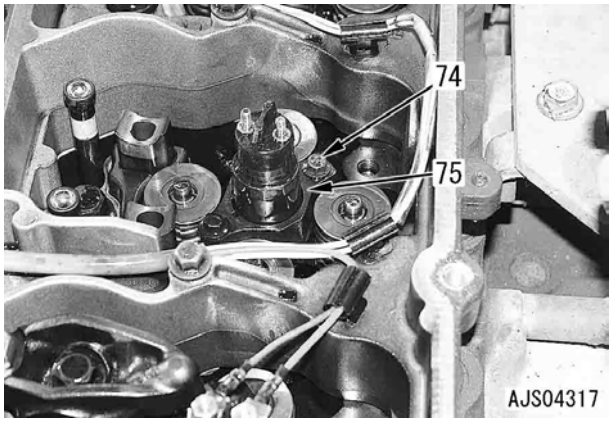


6) Install inlet connector (71) loosely with retainer (70). (Push it into the injector hole.)
   Retainer:
   14.7 ± 5.0 Nm {1.5 ± 0.5 kgm}

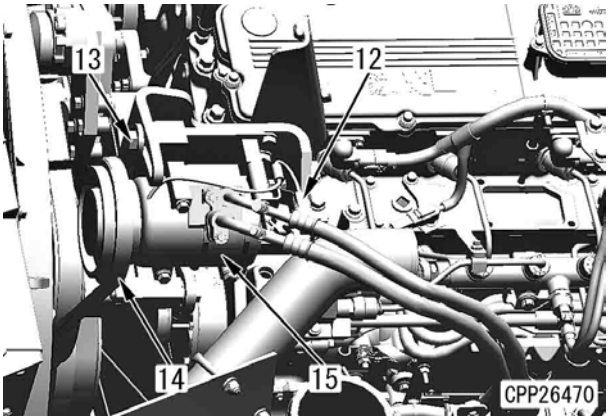


7) Tighten holders (75) with bolts (74) alternately.
   ★ The top of the holder must be in parallel with the top of the cylinder head.
   - Maximum allowable angle: 2.4 deg.

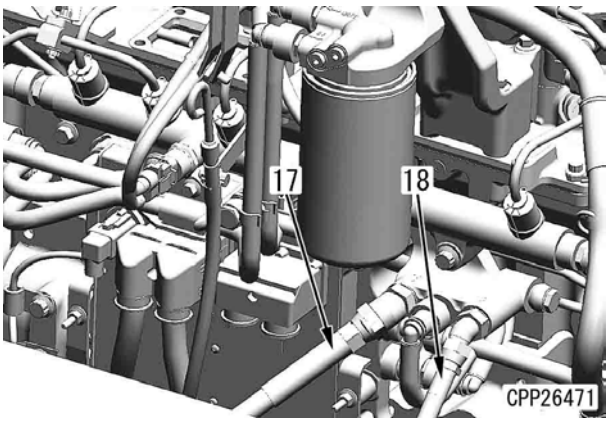
   Bolt:
   9.8 ± 2.0 Nm {1.0 ± 0.2 kgm}



8) Tighten inlet connector (71) to the specified torque.
   Retainer:
   40.2 ± 3.9 Nm {4.1 ± 0.4 kgm}
   Apply the caulking agent (z) (hatched section) to retainer (70) and the cylinder head.
   Caulking agent:
   GE TOSHIBA SILICONES TOSSEAL381



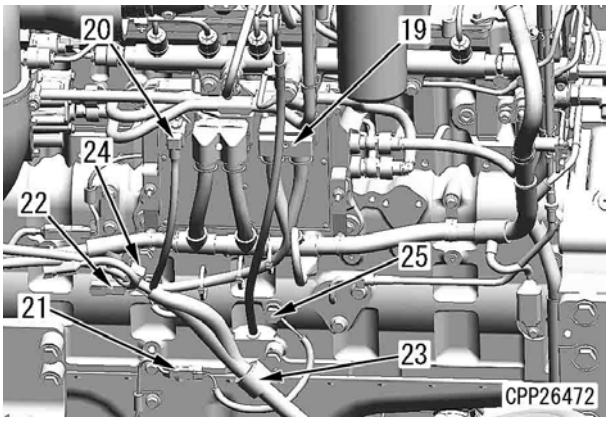
12. Disconnect fuel hoses (17) and (18).



13. Disconnect the following connectors.
    - CE02 (19)
    - CE03 (20)
    - P44 (21)
    - E06/WIF (22)

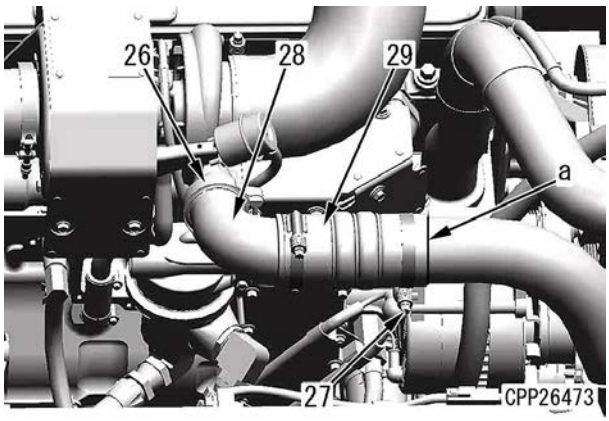
14. Remove clamps (23) and (24).

15. Disconnect ground cable (25).



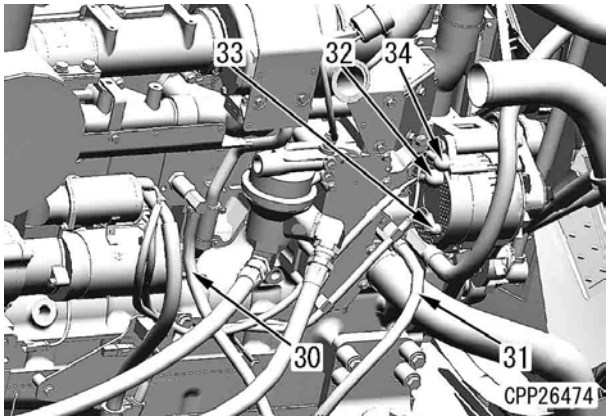
16. Remove clamp (26). [*6]

17. Loosen clamp (27) and remove tube (28) and hose (29) as a unit. [*7]
    ★ Put a mark on the tube and hose end (a) before removal of hose (29) so that the hose insertion depth can be seen.

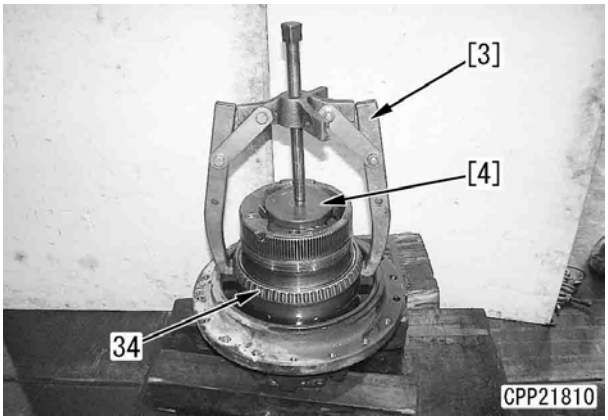


18. Disconnect heater hoses (30) and (31).

19. Disconnect B terminal M21 (32), R terminal M18 (33), and E terminal M22 (34).



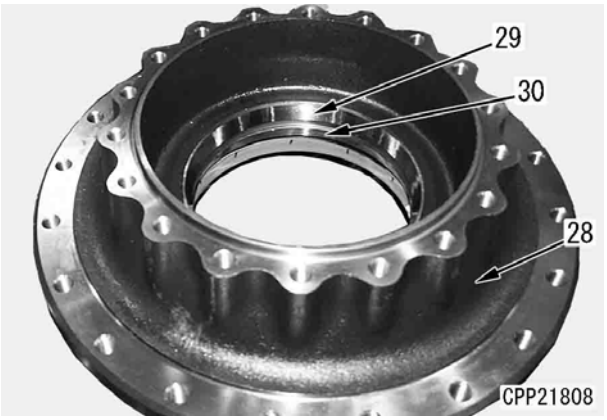
15. Remove bearing (34) by using puller [3] and push tool [4].
    ★ The bearing may be removed without using the puller.



Assembly

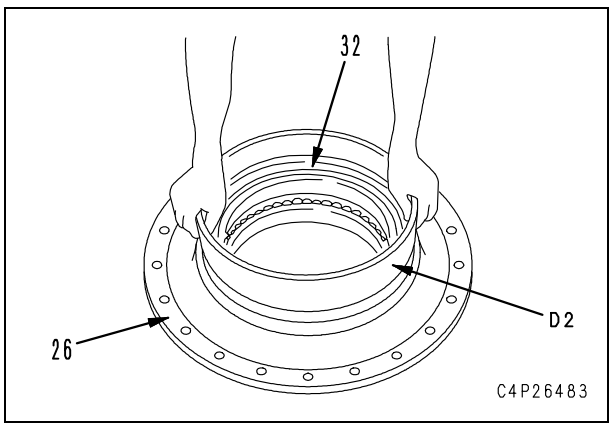
★ Clean the parts completely and inspect them for any foreign material or damage. Apply power train oil (TO30) to the sliding surfaces before assembly.

1. Hub assembly
   1) Use push tool to press-fit bearing outer races (29) and (30) into hub (28).

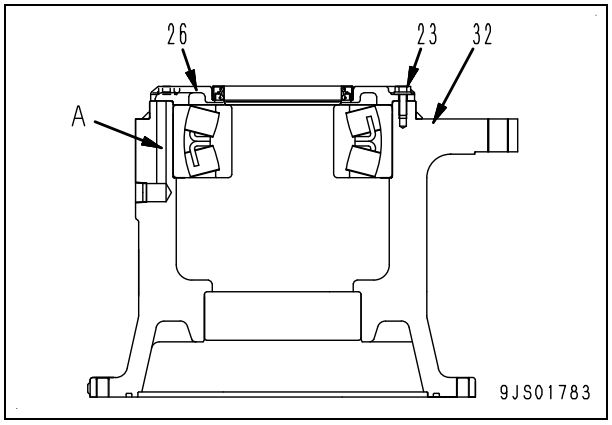


   2) By using tool **D2**, install floating seal (32) to hub assembly (26).
      ★ Install the floating seal after degreasing and drying the O-ring and O-ring contacting surface completely.
      ★ When inserting the floating seal, use tool **D2** and make sure to press the O-ring.
      ★ After installing the floating seal, measure protrusion (Ba to Bd) of the floating seal from the housing at the measuring point shown in the figure below.
      ★ Check that the difference between maximum value (B-max) and minimum value (B-min) of the values from Ba to Bd is 1 mm or less.
        ● B-max – B-min < 1 mm

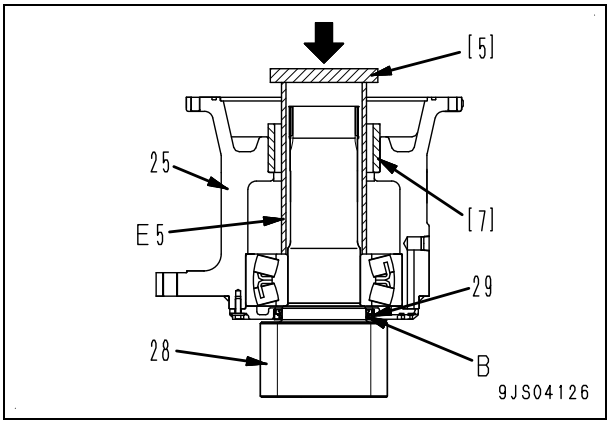
   3) After installing the floating seal, apply a thin coat of power train oil on the sliding surfaces.
      Sliding surface:
      Power train oil (TO30)



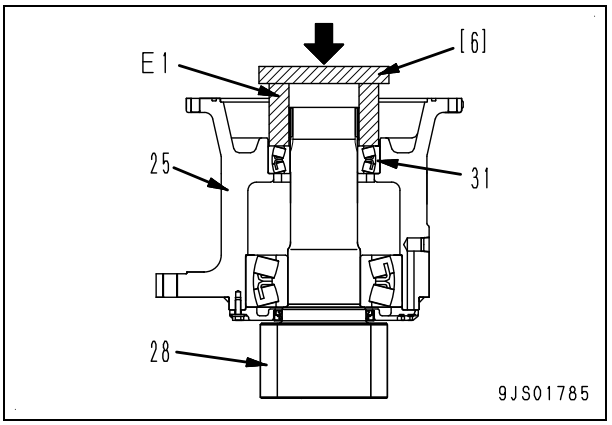
2) Install cover assembly (26) to case (32) and tighten mounting bolts (23).
   ★ Match the oil path of cover assembly (26) with drilled hole (**A**) of case (32).
   Mounting surface of cover:
   Liquid gasket (LG-6)
   ★ Take care that liquid gasket will not stick to drilled hole (**A**).
   Mounting bolt:
   59 to 74 Nm {6.0 to 7.5 kgm}
   Oil seal lip surface:
   Grease (G2-LI)



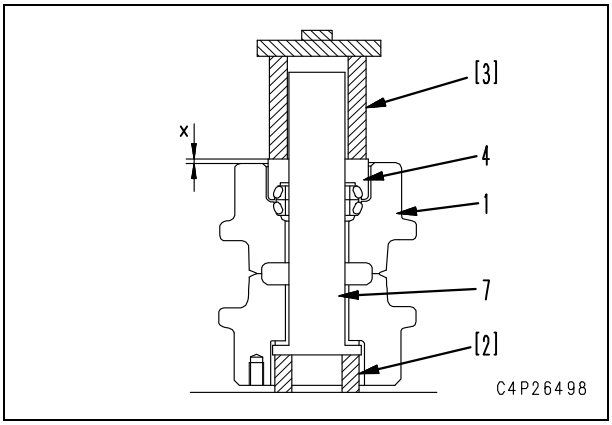
3. Case assembly
   1) Reverse case assembly (25) and set it to shaft (28).
      ★ Take care extremely not to damage the oil seal.
   2) By using push tool **E5**, [5] and guide [7], press-fit the bearing inner race.
      ★ Using push tool **E5** and [5], tap the bearing inner race with a hammer to prevent the shaft from falling, and then set the bearing inner race to the press to press-fit.
      ★ Press-fitting force (reference value):
      39 to 110 kN {3,980 to 11,260 kg}
      ★ Use guide [7] to prevent case assembly (25) from leaning.
      ★ Correct leaning of case assembly (25) by tapping its flange lightly and frequently. In particular, correct so that oil seal contact face (B) of the shaft is set to the center of oil seal (29).



   3) By using push tools **E1** and [6], press-fit bearing (31).
      ★ Use a new bearing.
      ★ Press both inner race and outer race of the bearing simultaneously when press-fitting. Do not press the inner race only when press-fitting.
      ★ After press-fitting the bearing, check that the case rotates smoothly.
      ★ Press-fitting force (reference value):
      Inner side: **15.3 to 43.2 kN {1,560 to 4,410 kg}**
      Outer side: **0 to 16.2 kN {0 to 1,650 kg}**

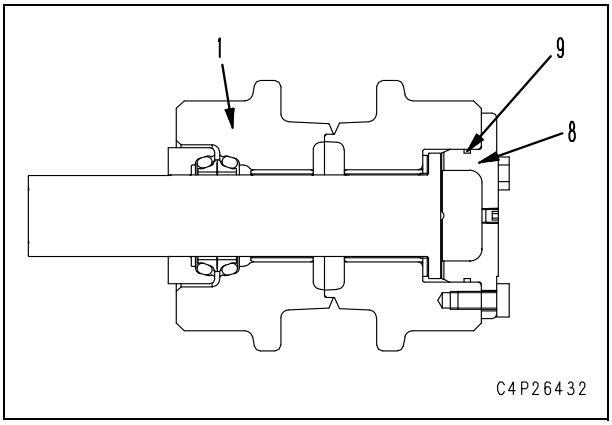


4. By using push tool [3], press-fit ring (4) to the shaft so that the step between roller (1) and ring (4) is (x) mm.
   - x = 5.1 ± 0.2 mm
   - ★ Support shaft (7) from underside by using push tool [2].
   - Press-fitting force: 22 to 25 kN {2.2 to 2.5 ton}
   - ★ Do not give a large impact until cover (8) is installed, since press-fitted ring (4) may slide by it.

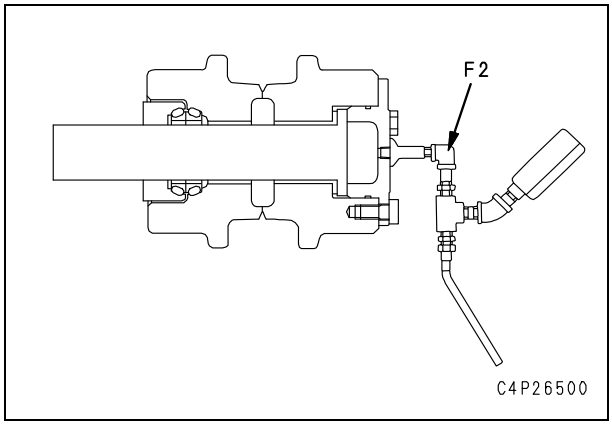


5. Install O-ring (9) to cover (8).

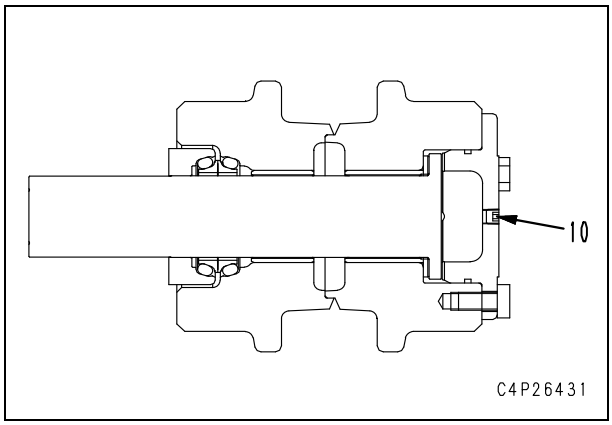
6. Install cover (8) to roller (1).



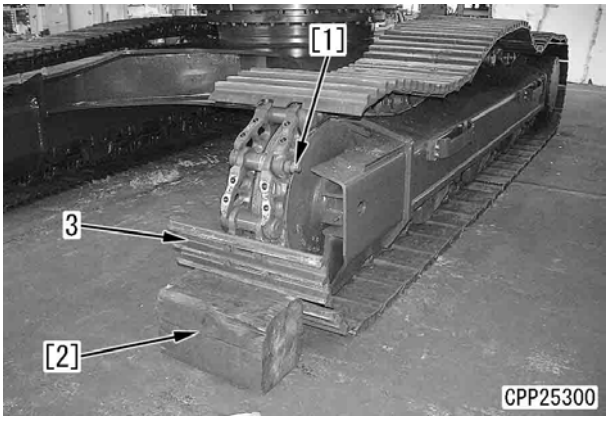
7. By using tool **F2**, apply standard pressure to the roller oil filler port, and check for leakage of air through seal.
   - ★ Standard pressure: 0.1 MPa {1 kg/cm^2}



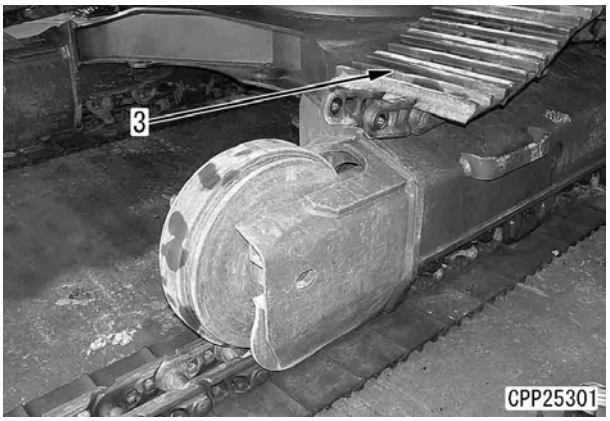
8. Fill the carrier roller assembly with oil, and then tighten plug (10).
   Carrier roller:
   145 to 155 cc (EO30)



7. Pull out guide pin [1] and remove block [2], etc. so that track (3) can be separated.

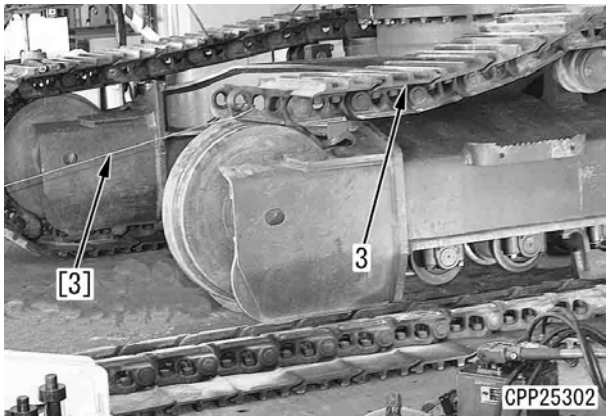


8. Move the machine slowly in reverse to separate track (3). [*4]

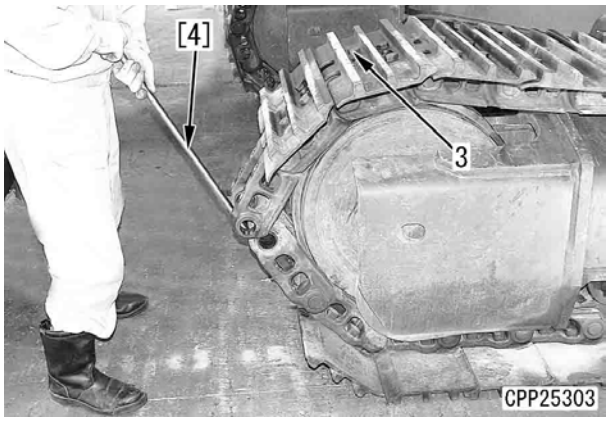


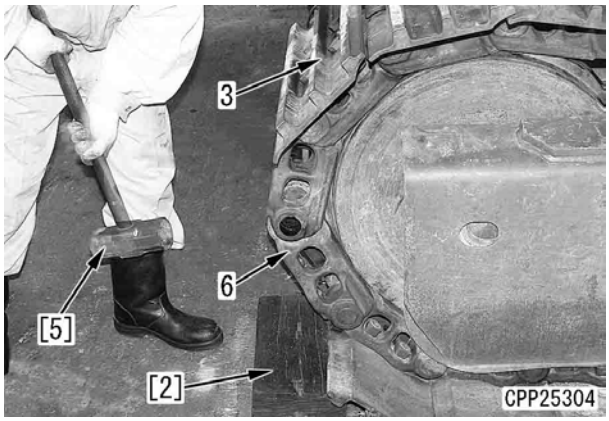
Installation

1. While tensing wire [3] with a forklift truck, work equipment, etc., move the machine forward slowly to wind track (3).



2. By using bar [4] or hammer [5], etc., wind up track (3) and align the pin holes of link (6).
   ★ Place block [2] etc. under track (3) in front of the idler.





3. Hammer in guide pin [1] to link (6).

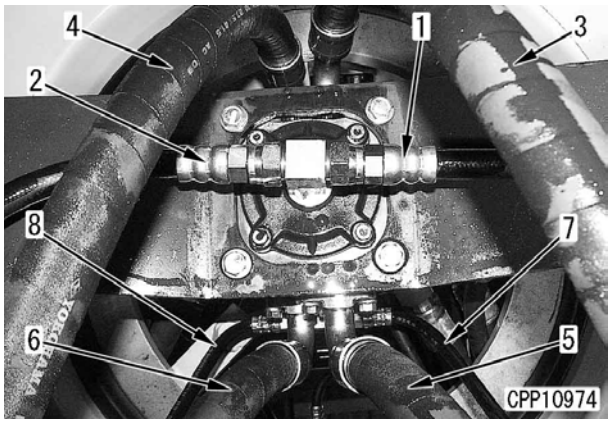
Removal and installation of center swivel joint assembly

⚠ **Place the machine on a level ground, lower the work equipment to the ground, and stop the engine.**
⚠ **Release the remaining pressure in the hydraulic circuit referring to Testing and adjusting, "Releasing remaining pressure in hydraulic cylinder circuit".**
⚠ **Disconnect the cable from the negative (-) terminal of the battery.**

Removal

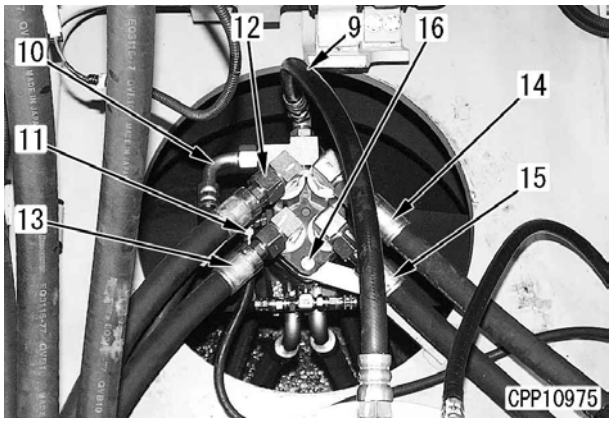
★ Attach the tags to pipings to show their installing positions not to install them wrongly.

1. Disconnect hoses (1) to (8) (8 pieces) between the travel motor and center swivel joint.
   - (1): Center swivel joint (T port) to L.H. travel motor (T port)
   - (2): Center swivel joint (T port) to R.H. travel motor (T port)
   - (3): Center swivel joint (B port) to L.H. travel motor (PA port)
   - (4): Center swivel joint (D port) to R.H. travel motor (PB port)
   - (5): Center swivel joint (A port) to L.H. travel motor (PB port)
   - (6): Center swivel joint (C port) to R.H. travel motor (PA port)
   - (7): Center swivel joint (E port) to L.H. travel motor (P port)
   - (8): Center swivel joint (E port) to R.H. travel motor (P port)

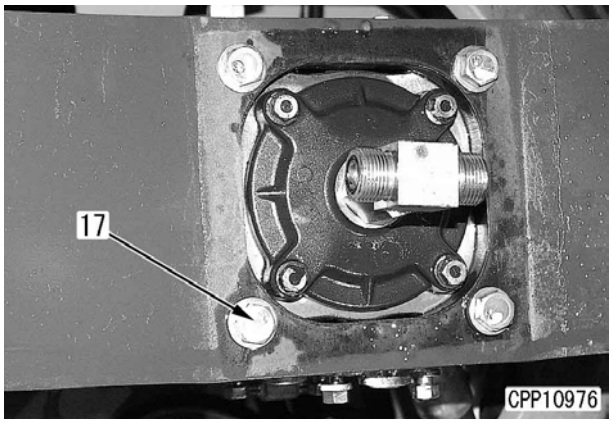


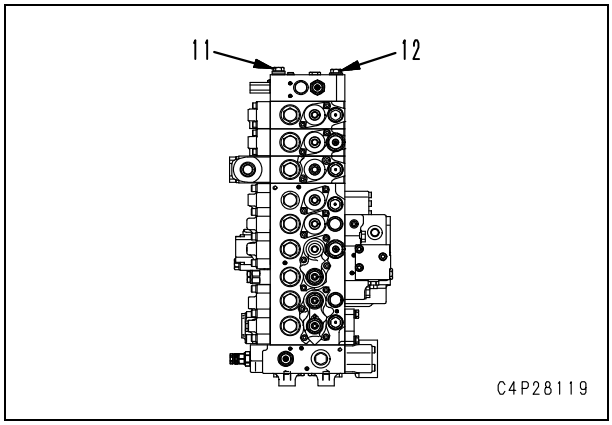
2. Disconnect hoses (9) to (15) (7 pieces).
   - (9): Center swivel joint (D port) to Swing motor (T port)
   - (10): Center swivel joint (D port) to Hydraulic tank
   - (11): Center swivel joint (E port) to Solenoid valve
   - (12): Center swivel joint (B port) to Control valve L.H. Travel (B2 port)
   - (13): Center swivel joint (D port) to Control valve R.H. Travel (B5 port)
   - (14): Center swivel joint (A port) to Control valve L.H. Travel (A2 port)
   - (15): Center swivel joint (C port) to Control valve R.H. Travel (A5 port)

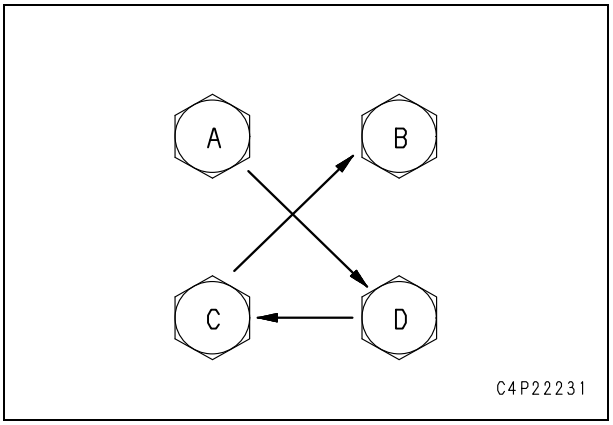
3. Pull out pin (16) on the side of center swivel joint and remove the lock plate from the center swivel joint.



4. Remove mounting bolts (17) (4 pieces).







★ Tighten the mounting bolts of the following parts in the following order. (A→D→C→B)
- Merge-divider valve
- Boom Hi check valve
- Boom hydraulic drift prevention valve
- Variable back pressure valve
- Upper cover of control valve
- Lower cover of control valve
- Arm quick return valve

Merge-divider valve (15) mounting bolt:
156.9 to 176.5 Nm {16 to 18 kgm}

Mounting bolts for upper cover and lower cover of control valve (13) (14):
156.9 to 176.5 Nm {16 to 18 kgm}

Boom Hi check valve (10) mounting bolt:
59 to 74 Nm {6.0 to 7.5 kgm}

Boom hydraulic drift prevention valve (17) mounting bolt:
59 to 74 Nm {6.0 to 7.5 kgm}

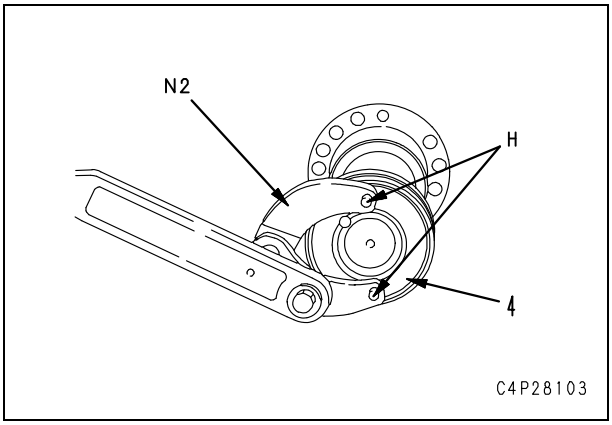
Variable back pressure valve (18) mounting bolt:
59 to 74 Nm {6.0 to 7.5 kgm}

Shuttle valve (19) (20)mounting bolt:
59 to 74 Nm {6.0 to 7.5 kgm}

Shuttle valve for service valve (21) mounting bolt:
27.5 to 34.3 Nm {2.8 to 3.5 kgm}

Arm quick return valve (22) mounting bolt:
59 to 74 Nm {6.0 to 7.5 kgm}

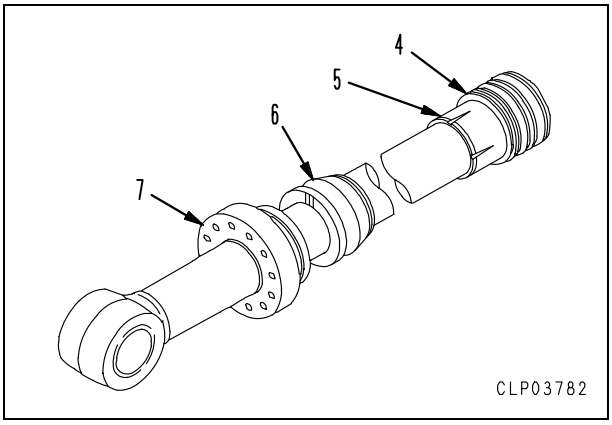
★ When not using tool **N2**, use drill holes (H) (ϕ 10 mm: 2 places) to loosen the piston assembly.



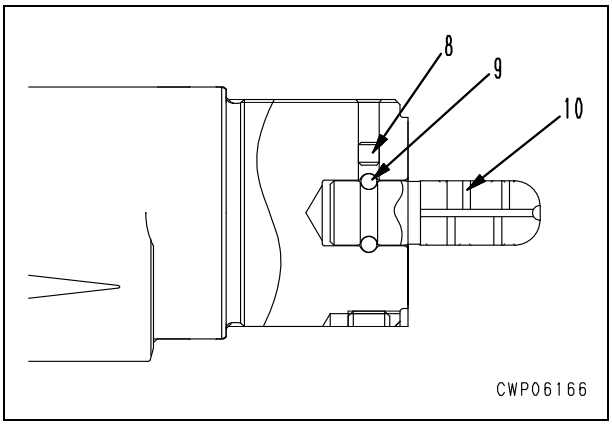
4) Remove plunger (5).
   ★ Only for boom and arm cylinders

5) Remove collar (6).
   ★ Only for boom and arm cylinders

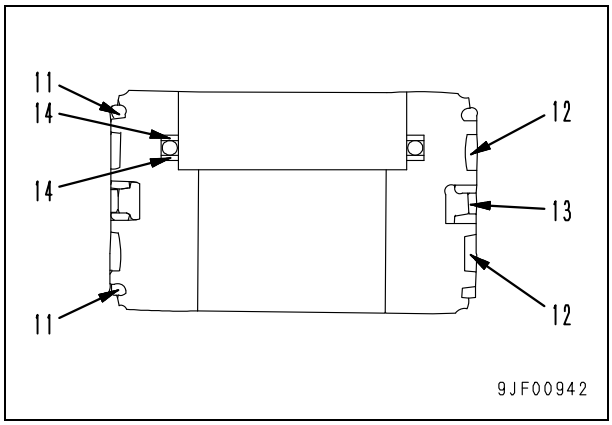
6) Remove cylinder head assembly (7).



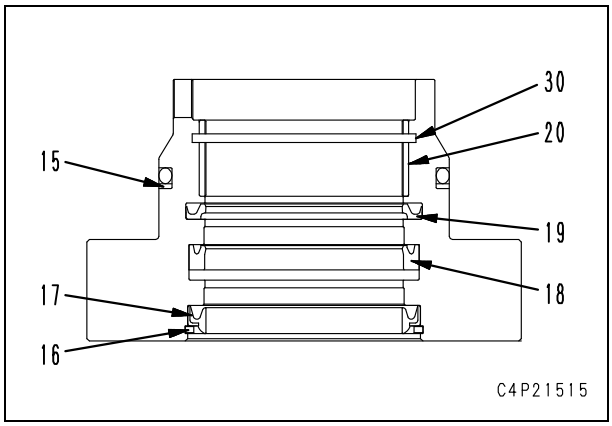
7) Remove cap (8), and remove 12 balls (9), and remove plunger (10).
   ★ Only for arm cylinder



3. Disassembly of piston assembly
   1) Remove rings (11) (2 pieces).
   2) Remove wear rings (12) (2 pieces).
   3) Remove piston ring (13).
   4) Remove the O-ring and backup rings (14) (2 pieces).



4. Disassembly of cylinder head assembly
   1) Remove the O-ring and backup ring (15).
   2) Remove snap ring (16), and remove dust seal (17).
   3) Remove rod packing (18) and buffer ring (19).
   4) Remove snap ring (30).
   5) Remove bushing (20).



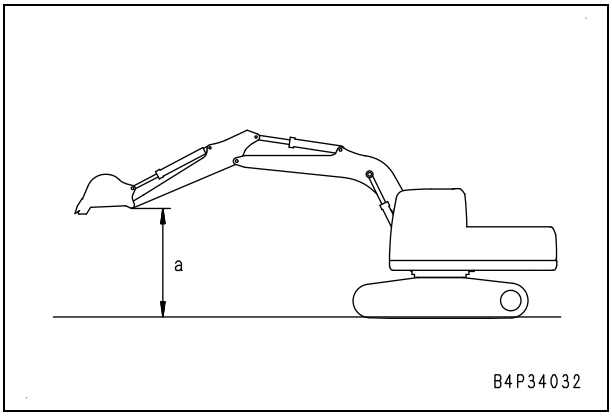
Removal and installation of anti-drop valve assembly for boom

⚠ **Place the machine on a level ground.**
⚠ **Remove the anti-drop valve assembly from the machine body, and then perform disassembling of the anti-drop valve assembly.**
⚠ **High remaining pressure may remain in the anti-drop valve assembly even after performing normal releasing procedure. Be sure to perform this procedure, and then perform the releasing procedure.**
⚠ **When the arm cylinder moves only in one direction inside the anti-drop valve for arm, operate the cylinder to the stroke end in a movable direction. Lower the bucket to the ground, and then perform releasing the remaining pressure.**
If the bucket is not lowered and the anti-drop valve is removed from the cylinder, the high pressurized oil may spurt out. It is very dangerous.
★ Wash around the anti-drop valve assembly in order to prevent any dust or dirt from entering it, and then perform the work.
★ Install a plug or flange in the place where a hydraulic hose is disconnected to prevent oil from flowing out.
★ Check the connector numbers and installed positions before disconnecting wirings and hoses, and record them.

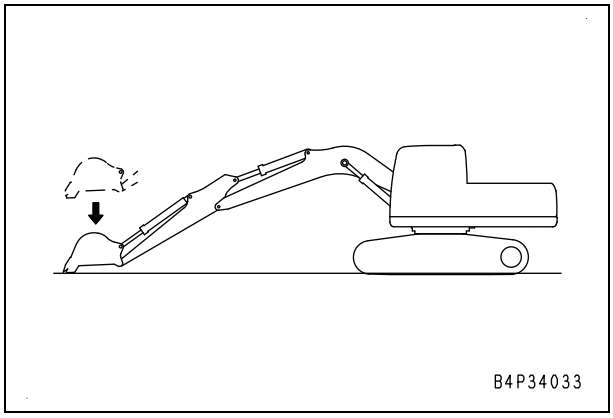
Removal

Check for the function of PPC circuit accumulator.

1. Set the arm cylinder and bucket cylinder to the most retracted position (maximum arm OUT/bucket DUMP position), and hold the work equipment at the height (a) off from the ground.
   (a): 1.5 m



2. Keep the arm cylinder and bucket cylinder at the most retracted position. Turn the starting switch to OFF position to stop the engine.
3. Turn the starting switch to ON position.
4. Set the work equipment lock lever in FREE position.
5. Check that the work equipment is lowered to the ground by operating the work equipment control lever to the boom LOWER direction fully to the stroke end.

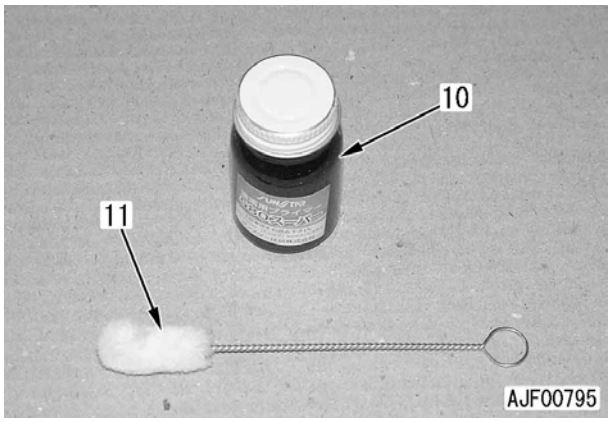


⚠ **Perform the step 3. to 5 in 15 seconds after the engine stopped, since the battery charge in the PPC accumulator lowers gradually.**
⚠ **If the work equipment is not lowered or stops on the way, the battery charge of the PPC accumulator may be lowered. In such case, the remaining pressure cannot be released with this procedure.**
★ If the work equipment is lowered by its own weight to the ground, the battery charge of the PPC accumulator is normal.
★ PPC accumulator is a periodic inspection item and an important periodic replacement part.

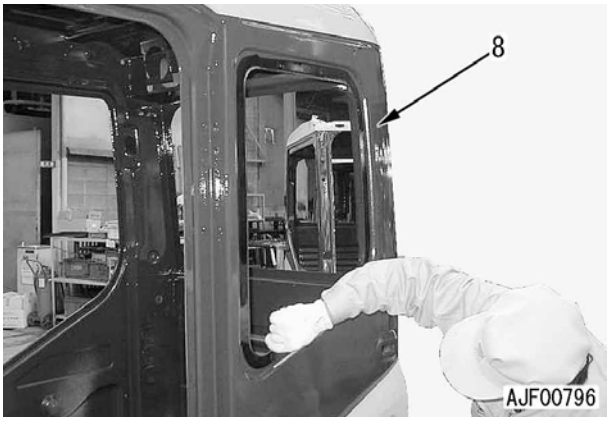
Releasing the remaining pressure in hydraulic cylinder circuit

6. Start the engine.
7. Set the arm cylinder and bucket cylinder to the most extended position (maximum arm IN/bucket CURL position) or the most retracted position (maximum arm OUT/bucket DUMP position), and lower the work equipment to the ground.
   ★ Anti-drop valve is installed to the bottom side of the boom cylinder. When the work equipment is lowered with this posture, the oil in the bottom side of the boom cylinder is drained, and the remaining pressure is low.

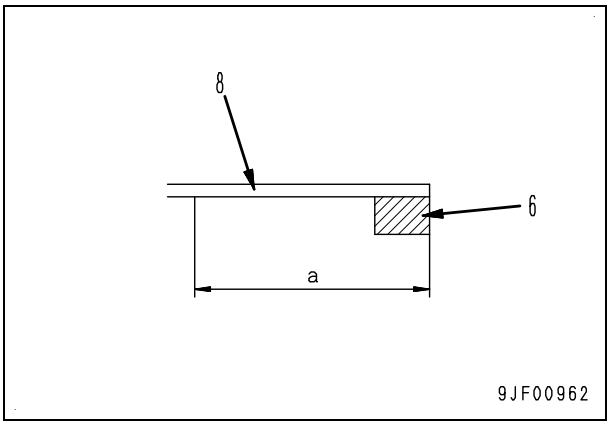
3. Apply primer (10).
   ★ Do not use a primer if it is passed the expiration date which is 4 months after its production date.
   ★ Make sure to use primer within 2 hours after opening its cap.
   ★ Even when it is plugged again immediately after opening, be sure to use it within 24 hours after opening.
   (A primer must be disposed in 24 hours after opening.)
   1) Stir both primers for paint surface and for glass thoroughly before use.
      ★ If a primer was chilled-stored in a depository, leave it at least half a day in room temperature before stirring it.
      (If you open the lid of a primer immediately after having been chilled-stored, the primer will dew-condense. So it must be exposed to room temperature for a sufficient period of time.)
   2) When reusing a brush (11) for applying a primer, clean it with white gasoline before use.
      ★ Check again that the brush is free from stains or fouling after cleaning.
      ★ 2 brushes must be prepared separately, one for the primer for paint surface and another for glass.



   3) Apply primer for paint surface evenly to the mounting part of the dam rubber of operator's cab (8) and the place outside which adhesive is applied to.
      Primer for paint surface:
      SUNSTAR Paint Surface Primer 580 SUPER
      ★ 2 times are the upper limit of primer application.
      (Application beyond 2 times causes degradation.)

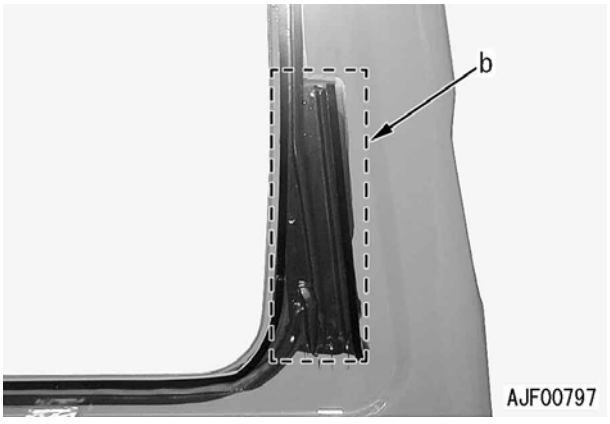


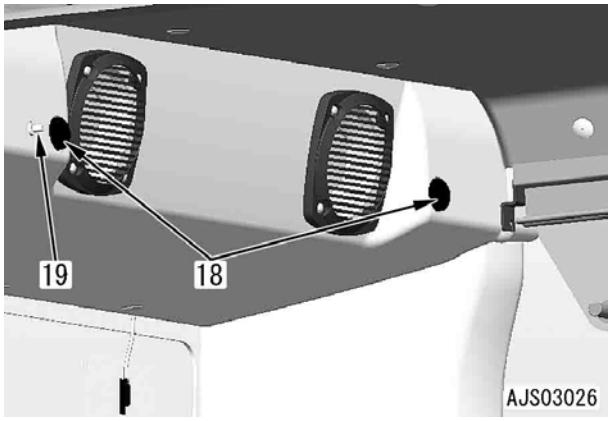
      ★ Application position: Apply to the entire area of the range of dimension (**a**).
      - Primer application dimension (**a**): **25 mm**



      ★ In addition to the above, apply additional primer to R.H. window glass (1) and door lower window glass (3).
      - R.H. window glass (1) additional primer application area: (b)
      - Lower door window glass (3) additional primer application area: (c)

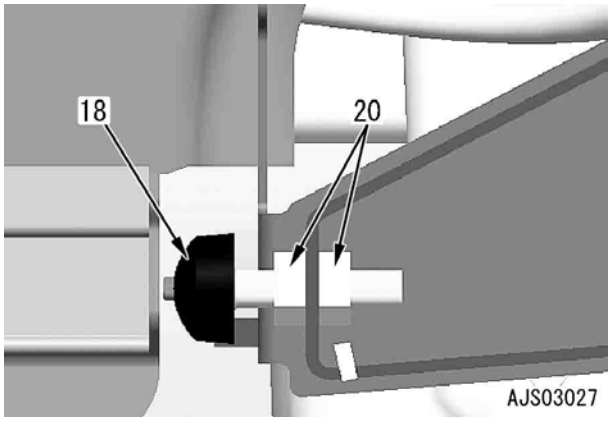
      ★ After applying the primer, leave it in air for at least 5 minutes (maximum 8 hours) to dry.



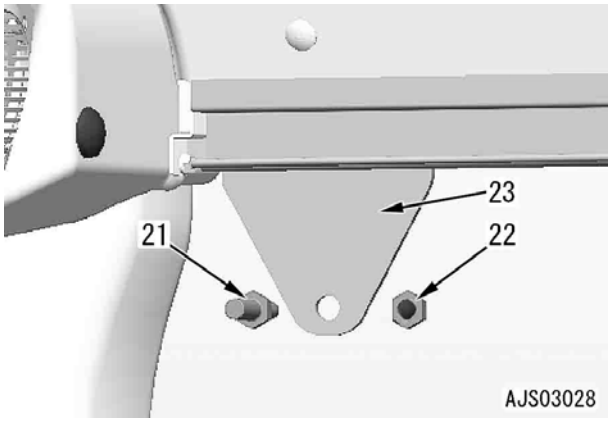


- After checking the above items, if it becomes necessary to do the adjustment;

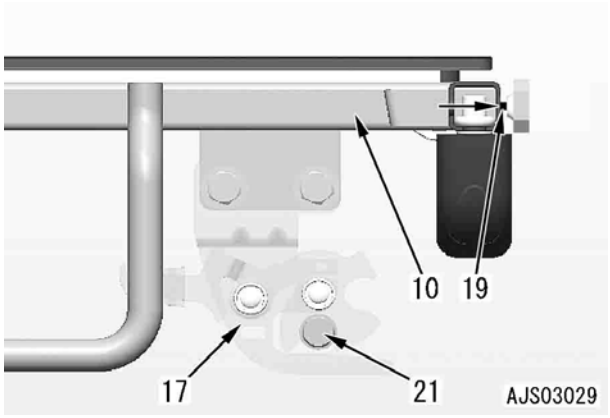
3) Close front window assembly (10).
4) Loosen lock nut (20) of right and left rubber stoppers (18), and retract left and right rubber stoppers (18) backward so that the front window assembly in the "open" state does not come into contact with left and right rubber stoppers (18).



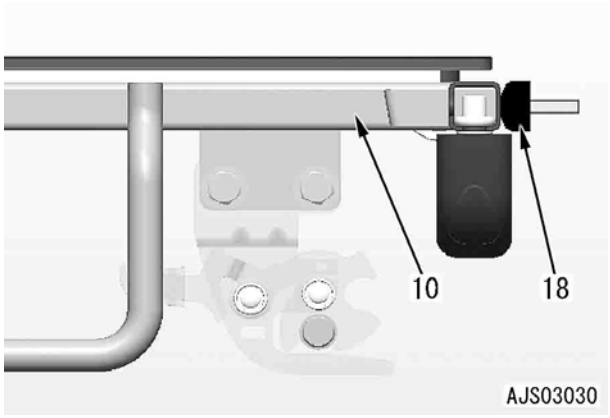
5) Loosen left and right lock nuts (22), and adjust the positions of right and left striker bolts (21).
   ★ Striker bolt (21): M10, Plate (23) hole diameter: ϕ 14.5 mm



1] Limit switch (19) must be pushed backward by 4 to 7 mm by the front window assembly (10) ("open" state).
2] Locking state of lock (17)



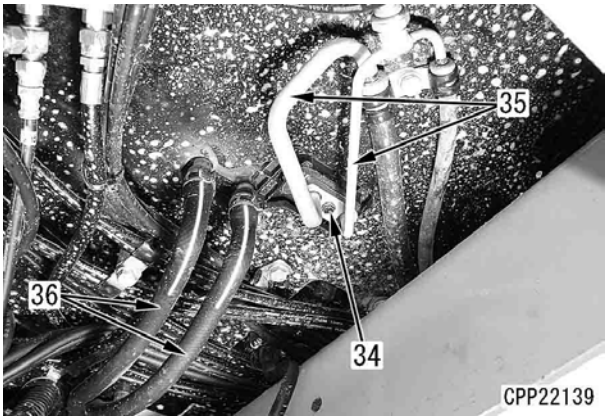
6) Adjustment of right and left rubber stoppers (18)
   1] Bring right and left stopper rubbers (18) into contact with front window assembly (10) (lock "open" state).



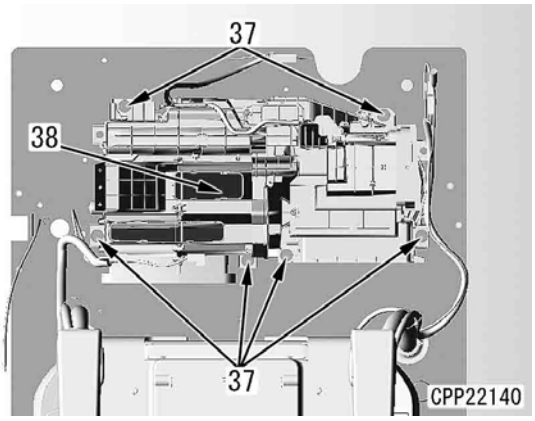
2] Close front window assembly (10).
3] Turn right and left stopper rubbers (18) **counterclockwise 1.5 turns.**
   ★ Turning right and left stopper rubbers (18) counterclockwise 1 turn is equivalent to pressing the rubber by approximately 1.5 mm.
   ★ When the front window assembly is in the "open" state, the front window assembly must push right and left rubber stoppers (18) by 1.5 to 3.0 mm.

22. Remove bolt (34), and disconnect air conditioner tube (35). [*3]

23. Disconnect heater core hose (36). [*4]



24. Remove mounting bolts (37) (6 pieces), then remove air conditioner unit assembly (38).



Installation

- Perform installation in the reverse order to removal.

[*1]

- **Filling of refrigerant (air conditioner gas: R134a)**
  Refill the air conditioner circuit with refrigerant (air conditioner gas: R134a)
  ★ Refill amount: 730±50 g

- **Refilling with air conditioner compressor oil**
  See Air conditioner, "Filling of compressor oil".

- **Refilling with coolant**
  Refill with coolant to the specified level through the coolant filler port of the radiator. Run the engine to circulate the coolant through the system. Then check the coolant level again.
  Radiator:
  For details of coolant level, see "Table of fuel, coolant and lubricants".

[*2]

When installing ducts (24) and (26), remove cover (48), then the work is easier.

★ The mounting bolt of cover (48) is behind cover (47). Remove cover (47) first.

[*3]

When installing the hose for the air conditioner circuit, be careful not to allow invasion of dirt, dusts and water into the hose.

★ Check that the O-rings are fitted to the joints when connecting the air conditioner piping.
★ Once an O-ring is used, it is deformed and deteriorated. Accordingly, do not reuse it.
★ When removing the O-rings, use a soft tool so that the piping is not damaged.
★ Check that the O-ring is not damaged or deteriorated.
★ Apply compressor oil (DENSO: ND-OIL8) for refrigerant (R134a) to O-ring.