

Shop Manual

BULLDOZER

D375A-6

SERIAL NUMBERS 60001 and up

ecot3

KOMATSU

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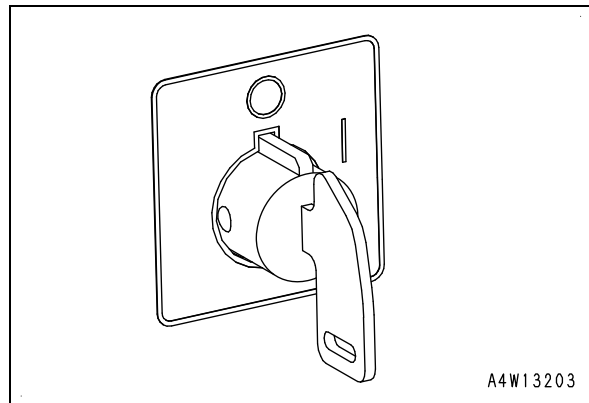
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2. Preparation work

- 1) Before adding oil or making any repairs, park the machine on a hard and level ground, and apply the parking brake and block the wheels or tracks to prevent the machine from moving.
- 2) Before starting work, lower the work equipment (blade, ripper, bucket, etc.) to the ground. If this is not possible, insert the lock pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning tag on them.
- 3) When disassembling or assembling, support the machine with blocks, jacks, or stands before starting work.
- 4) Remove all mud and oil from the steps or other places used to get on and off the machine. Always use the handrails, ladders or steps when getting on or off the machine. Never jump on or off the machine. If it is impossible to use the handrails, ladders or steps, use a stand to provide safe footing.

3. Precautions during work

- 1) Before disconnecting or removing components of the oil, water, or air circuits, first release the pressure completely from the circuit. When removing the oil filler cap, a drain plug, or an oil pressure pickup plug, loosen it slowly to prevent the oil from spurting out.
- 2) The coolant and oil in the circuits are hot when the engine is stopped, so be careful not to get scalded. Wait for the oil and coolant to cool before carrying out any work on the oil or water circuits.
- 3) Before starting work, stop the engine. When working on or around a rotating part, in particular, stop the engine. When checking the machine without stopping the engine (measuring oil pressure, revolving speed, temperature, etc.), take extreme care not to get caught in rotating parts or moving parts.
- 4) **For the machine equipped with a battery disconnect switch, turn the battery disconnect switch to the OFF (O) position and pull the switch key out, before starting the work.** For machines without a battery disconnect switch, remove the cable from the battery, before starting the work. Always remove the cable from the negative (-) terminal first.



- 5) When raising a heavy component (heavier than 25 kg), use a hoist or crane. Before starting work, check that the slings (wire ropes, chains, and hooks) are free from damage. Always use slings which have ample capacity and install them to proper places. Operate the hoist or crane slowly to prevent the component from hitting any other part. Do not work with any part still raised by the hoist or crane.
- 6) When removing a cover which is under internal pressure or under pressure from a spring, always leave 2 bolts in diagonal positions. Loosen those bolts gradually and alternately to release the pressure, and then remove the cover.
- 7) When removing components, be careful not to break or damage the electrical wiring. Damaged wiring may cause electrical fires.
- 8) When removing piping, stop the fuel or oil from spilling out. If any fuel or oil drips onto the floor, wipe it up immediately. Fuel or oil on the floor can cause you to slip and can even start fires.
- 9) As a general rule, do not use gasoline to wash parts. Do not use it to clean electrical parts, in particular.
- 10) Be sure to assemble all parts again in their original places. Replace any damaged parts and parts which must not be reused with new parts. When installing hoses and wires, be sure that they will not be damaged by contact with other parts when the machine is operated.
- 11) When installing high pressure hoses and tubes, make sure that they are not twisted. Damaged hoses and tubes are dangerous, so be extremely careful when installing hoses and tubes for high pressure circuits. In addition, check that connections of them are correct.

Handling of connectors newly used for engines

★ Mainly, following engines are object for following connectors.

- 95E-5
- 107E-1
- 114E-3
- 125E-5
- 140E-5
- 170E-5
- 12V140E-3

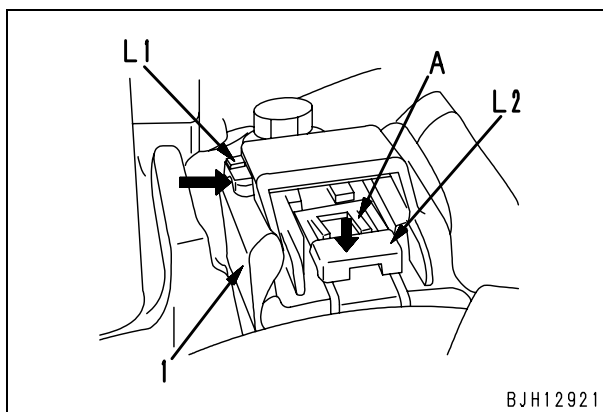
Slide lock type

(FRAMATOME-3,FRAMATOME-2)

- 95–170,12V140 engines
 - Various pressure sensors and NE speed sensorExamples)
Intake air pressure sensor in intake manifold:
PIM (125,170,12V140 engines)
Oil pressure sensor: POIL (125,170,12V140 engines)
Oil pressure switch (95,107,114 engines)
Ne speed sensor of flywheel housing:
NE(95-170,12V140 engines)
Ambient pressure sensor: PAMB
(125,170,12V140 engines)

Disconnect

- 1) Slide lock L1 to the right.
 - 2) While pressing lock L2, pull out connector (1) toward you.
- ★ Even if lock L2 is pressed, connector (1) cannot be pulled out toward you, if part A does not float. In this case, float part A with a small screwdriver while press lock L2, and then pull out connector (1) toward you.



Connect

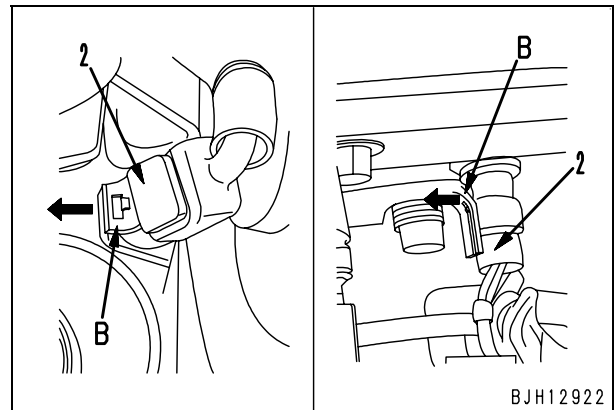
Insert the connector straight until it "clicks".

Pull lock type (PACKARD-2)

- 95–170,12V140 engines
 - Various temperature sensorsExamples)
Intake air temperature sensor in intake manifold: TIM
Fuel temperature sensor: TFUEL
Oil temperature sensor: TOIL
Coolant temperature sensor: TWTR, etc.

Disconnect

Disconnect the connector by pulling lock (B) (on the wiring harness side) of connector (2) outward.



Connect

Insert the connector straight until it "clicks".

Abbreviation	Full Spelling	Purpose of use (major applicable machine(*), or component/system)	Explanation
E.C.U.	Electronic Control Unit	Electronic control system	Electronic control device that uses the signals from the sensors on the machine to indicate to the actuators the optimum actuation. (same as ECM)
E.G.R.	Exhaust Gas Recirculation	Engine	Functions to recirculate part of exhaust gas to combustion chamber in order to reduce combustion temperature, controls emission of Nox.
E.M.M.S.	Equipment Management Monitoring System	Machine monitor	System that allows data (filter, oil replacement interval, abnormalities on machine, failure code, and failure history) from each sensor on the machine to be checked on monitor.
E.P.C.	Electromagnetic Proportional Control	Hydraulic	Control system that moves an actuator in proportion to the amperage of an electric current passing through the solenoid.
F-N-R	Forward-Neutral-Reverse	Operation	Position of the gear shift lever or switch.
G.P.S.	Global Positioning System	Communication (KOMTRAX, VHMS)	System that is used to determine the current location on the Earth of a ship, car, machine, etc. by receiving the radio wave signals transmitted from the navigation satellites.
H.S.S.	Hydrostatic Steering System	Steering (D)	Steering function that uses a combination of hydraulic motor and bevel shaft to control difference in travel speed of left and right tracks to turn machine without using steering clutch.
H.S.T.	Hydro Static Transmission	Transmission (D, WA)	Hydraulic transmission system that uses a combination of hydraulic pump and hydraulic motor to shift gear steplessly without using gears.
I.M.A.	Inlet Metering Actuator	Engine	Valve installed at inlet port of pump to adjust fuel intake amount in order to control fuel discharge amount of supply pump. Same as IMV.
I.M.V.	Inlet Metering Valve	Engine	Valve installed at inlet port of pump to adjust fuel intake amount in order to control fuel discharge amount of supply pump. Described as IMV (IMA).
L.C.D.	Liquid Crystal Display	Machine monitor	Image display device made up of a large number of pixels filled with liquid crystal.
L.E.D.	Light Emitting Diode	Electronic parts	Semiconductor element that emits light when the voltage is applied in forward direction, positive voltage to anode and negative voltage to cathode.
L.S.	Load Sensing	Hydraulic	Function that senses differential pressure of pump and controls discharge amount according to load.
M.M.S.	Multimedia Messaging Service	Communication	Service that allows transmission and reception of short messages consisting of characters or voice or images between cell phones.
N.C.	Normally Closed	Electronic and hydraulic	Device actuated to open electric or hydraulic circuits that are normally closed if not actuated.
N.O.	Normally Open	Electronic and hydraulic	Device actuated to close electric or hydraulic circuits that are normally open if not actuated.
O.L.S.S.	Open-center Load Sensing System	Hydraulic	Hydraulic system that can operate multiple actuators at the same time, regardless of the load.
P.C.	Pressure Control	Hydraulic	Controlling the oil pressure.

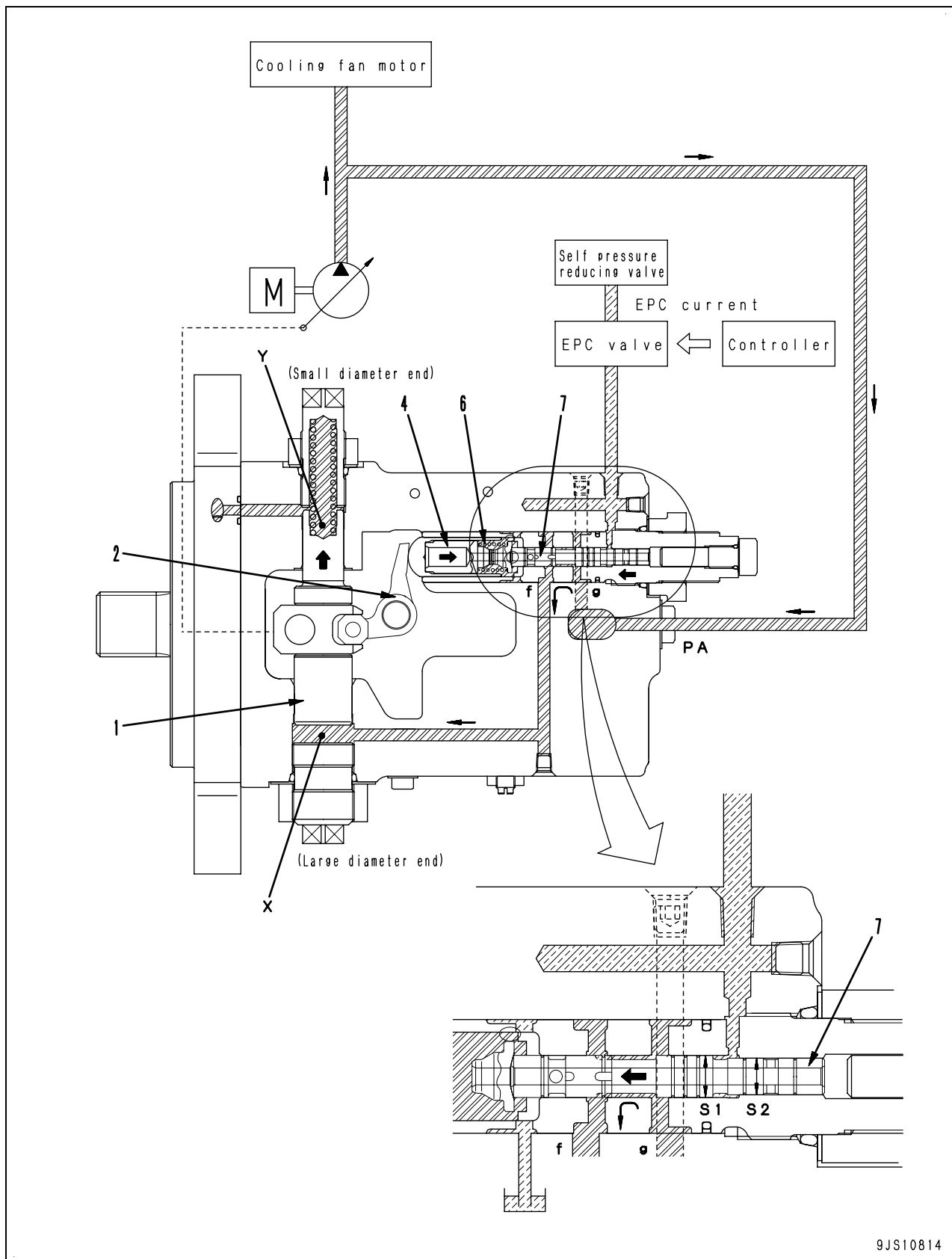
Weight table

⚠ This weight table is prepared for your reference when handling or transporting the components.

Unit: kg

Machine model	D375A-6
Serial number	60001 and up
Engine, damper assembly	3,320
● Engine assembly	3,065
● Damper assembly	185
● Engine mounting parts	70
Radiator assembly	465
Oil cooler assembly	92
Fuel tank assembly (when full)	580 (1,600)
Power train unit	4,220
● Torque converter and PTO assembly	795
● Transmission assembly	1,000
● Transmission valve assembly	13
● Steering clutch and brake assembly	1,712
● Steering valve assembly	13
Final drive assembly	2,200 × 2
Main frame assembly	5,541
Track group assembly (each side)	7,902
● Track frame	1,896
● Idler assembly	478
● Track roller assembly (each single flange x each side)	159 × 2
● Track roller assembly (each double flange x each side)	160 × 6
● Carrier roller assembly (each x each side)	71 × 2
● First bogie and track roller assembly	457
● Each of second – fourth bogie and track roller assembly	742 × 3
● Final bogie and track roller assembly	359
Track shoe assembly (610 mm)	4,305 × 2
Pivot shaft	210 × 2
Equalizer bar assembly	500
Hydraulic tank assembly (excluding oil)	236
Control valve (for single tilt)	119
Control valve (for dual tilt)	125

When EPC output pressure is high [When EPC current (i) is large]

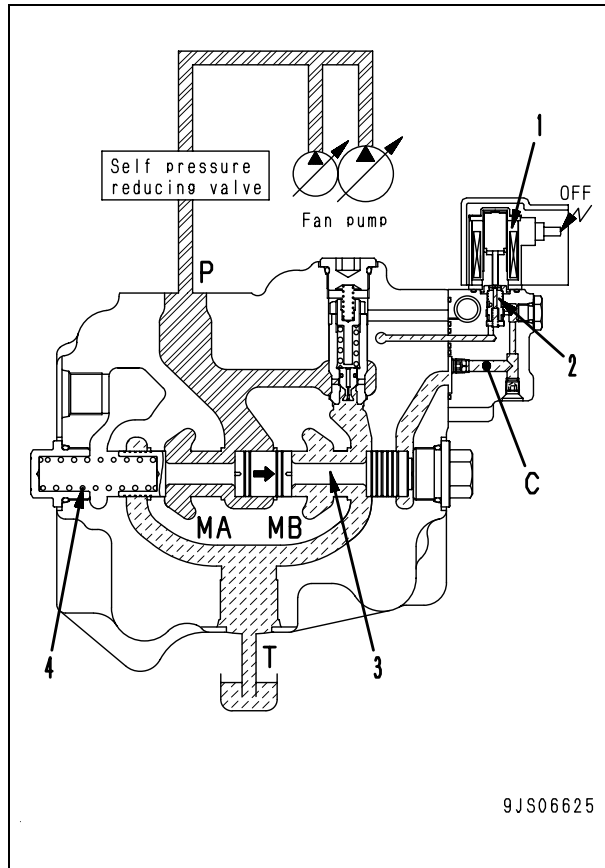


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Operation of reversible valve

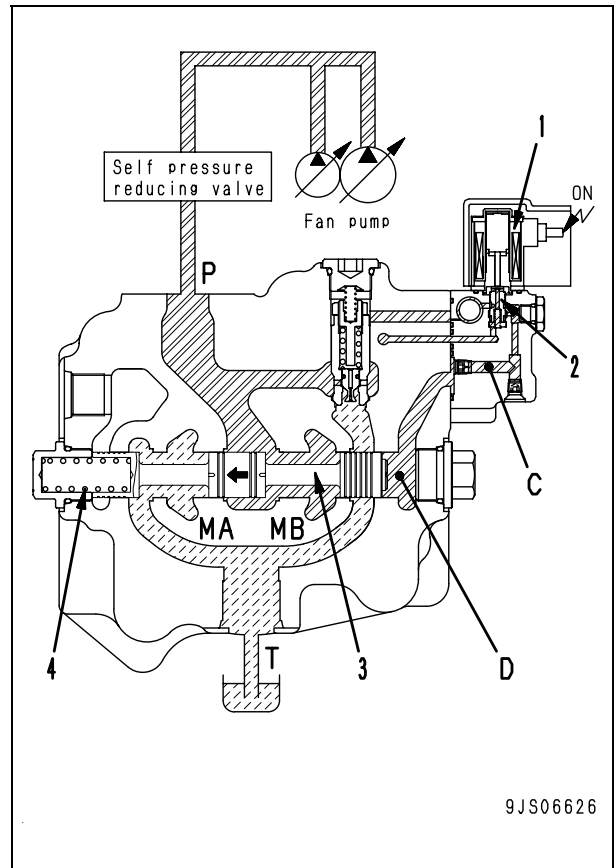
When the ON/OFF solenoid is de-energized

- If ON/OFF solenoid (1) is "de-energized", the pressurized oil from the pump is blocked by ON/OFF selector valve (2), and port (C) connects to the tank circuit.
- Spool (3) is pushed to the right by spring (4).
- Motor port (MA) connects to port (P) and pressurized oil flows in to revolve the motor in normal direction (clockwise).

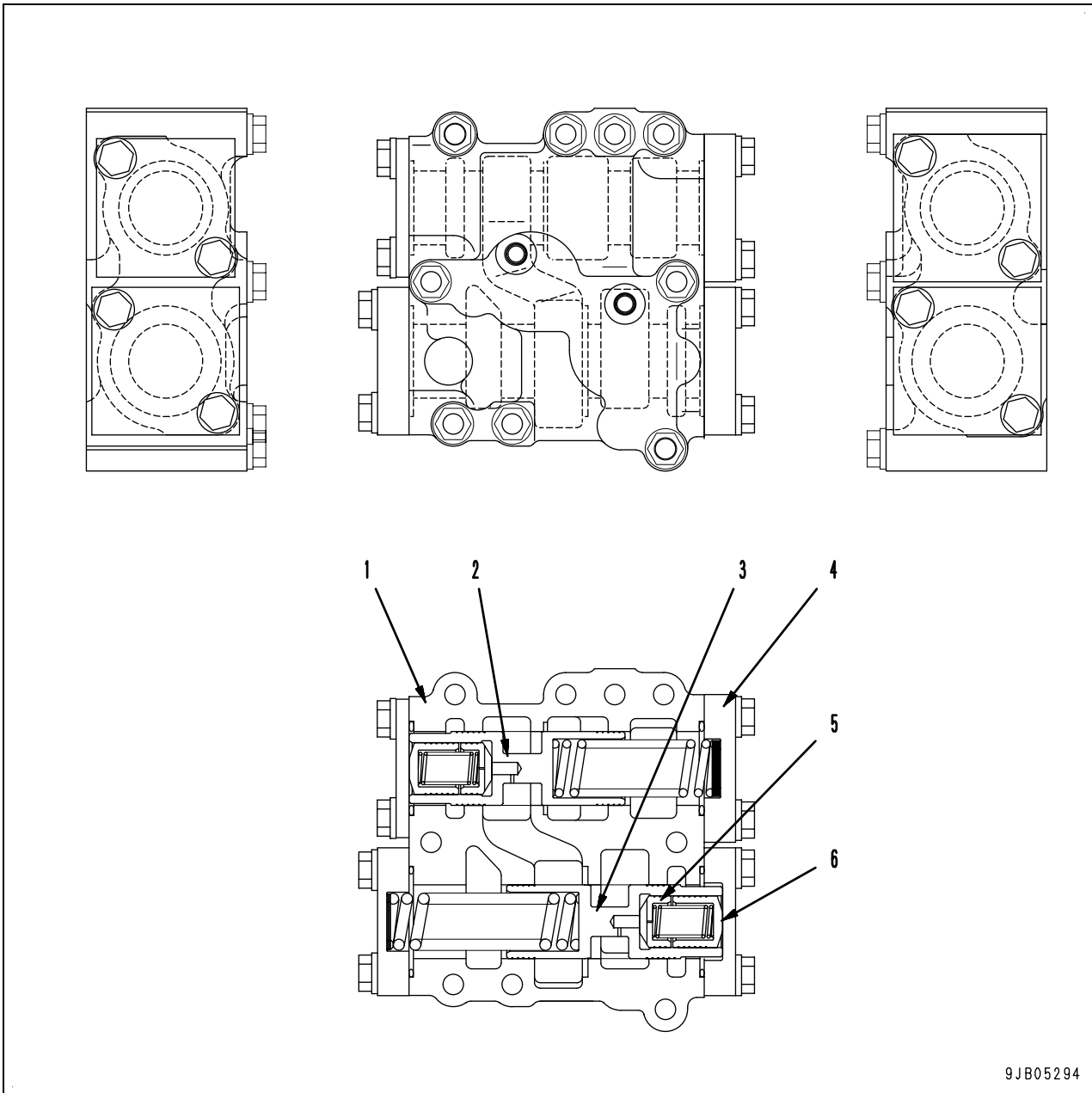


When the ON/OFF solenoid is energized

- If ON/OFF solenoid (1) is "energized", ON/OFF selector valve (2) switches to allow the pressurized oil from the pump to flow through port (C) to spool chamber (D).
- The pressurized oil in chamber (D) pushes valve spool (3) to the left against spring (4).
- Motor port (MB) connects to port (P) and pressurized oil flows in to revolve the motor in reverse (counterclockwise).



Main relief valve and torque converter relief valve



9JB05294

1. Valve body
2. Torque converter relief valve
3. Main relief valve
4. Cover
5. Piston
6. Piston

5. Transmission input shaft
6. Front cover
7. Sun gear for reverse clutch (34 teeth)
8. Ring gear for reverse (hub) (91 teeth)
9. Planetary pinion for reverse clutch (25 teeth)
10. Ring gear for reverse clutch (84 teeth)
11. Sun gear for forward clutch (41 teeth)
12. Planetary pinion for forward clutch (25 teeth)
13. Ring gear for forward clutch (91 teeth)
14. Ring gear for 3rd clutch (91 teeth)
15. Planetary pinion for 3rd clutch (25 teeth)
16. Sun gear for 3rd clutch (41 teeth)
17. Ring gear for 2nd clutch (93 teeth)
18. Planetary pinion for 2nd clutch (23 teeth)
19. 2nd sun gear(47 teeth)
20. 1st clutch gear
21. 1st clutch piston
22. 1st clutch piston housing
23. Output shaft
24. Spacer
25. Collar
26. 1st clutch spring
27. 2nd carrier
28. Plate
29. Carrier for forward and 3rd clutches
30. Piston housing for forward and 3rd speed gear
31. Carrier for reverse clutch
32. Carrier for reverse clutch
33. Clutch piston
34. Clutch spring
35. Clutch plate
36. Clutch disc
37. Washer spring
38. Pin
39. Tie bolt

Outline

- The transmission is a "forward 3-speed and reverse 3-speed" transmission which consists of the planetary gear trains and the disc clutches.
- Transmission selects and locks two clutches out of the five sets of planetary gear trains and disc clutches hydraulically by using the control valve to select one travel direction and one gear speed.
- The transmission transfers the power received by the transmission input shaft to the output shaft by changing the gear speed (forward 1st-3rd or reverse 1st-3rd) with any combination of the forward or reverse clutch, and one of three speed clutches.

No. of plates and discs used

Clutch No.	Number of plates	Number of discs
R clutch	6	6
F clutch	5	6
3rd clutch	4	4
2nd clutch	3	3
1st clutch	5	6

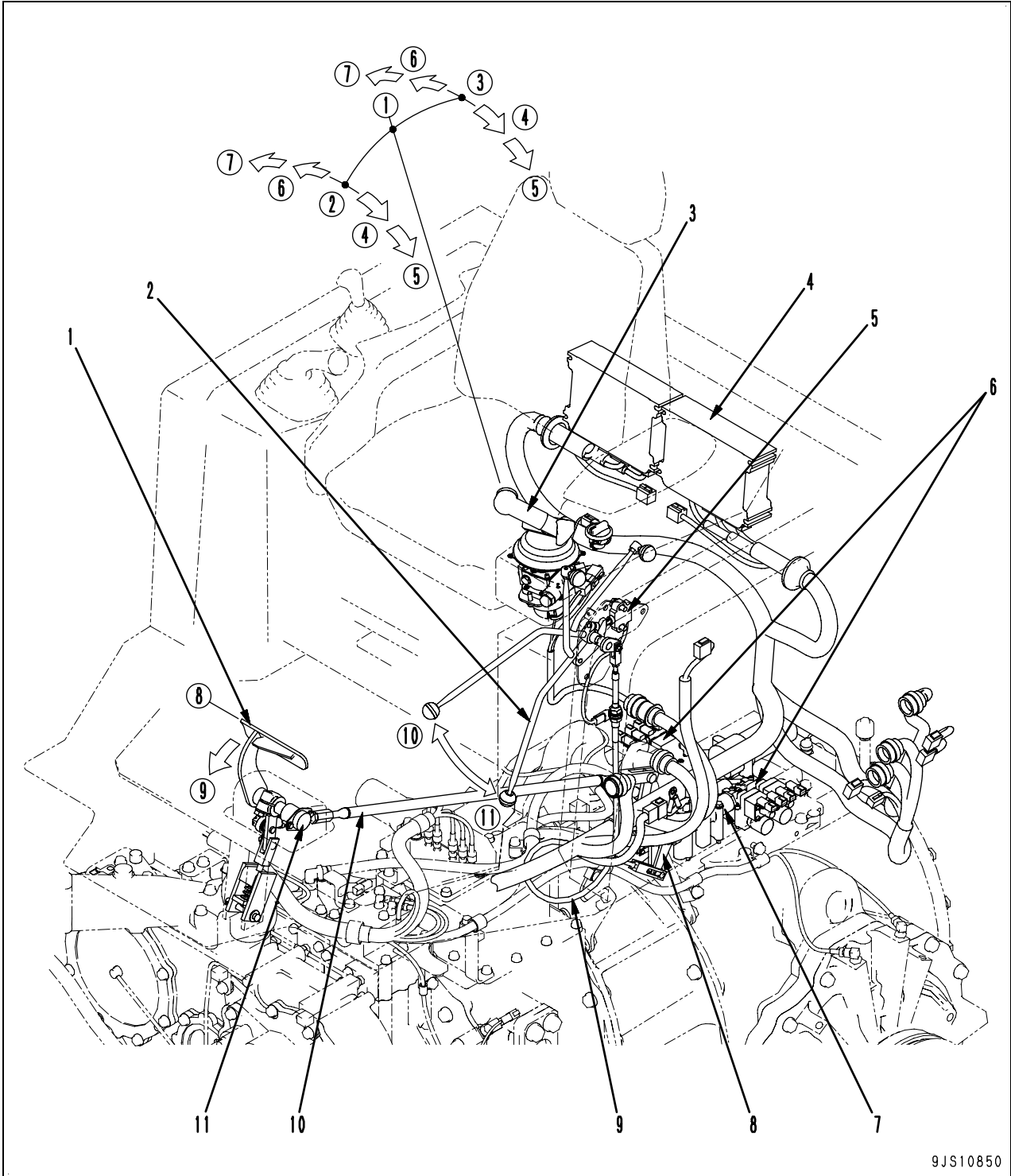
Combinations of clutches at respective gear speeds and reduction ratio

Gear speed	Clutches engaged	Reduction ratio
Forward 1st	F × 1st	3.220
Forward 2nd	F × 2nd	1.745
Forward 3rd	F × 3rd	1.000
Neutral	(*1)	-
Reverse 1st	R × 1st	2.471
Reverse 2nd	R × 2nd	1.339
Reverse 3rd	R × 3rd	0.769

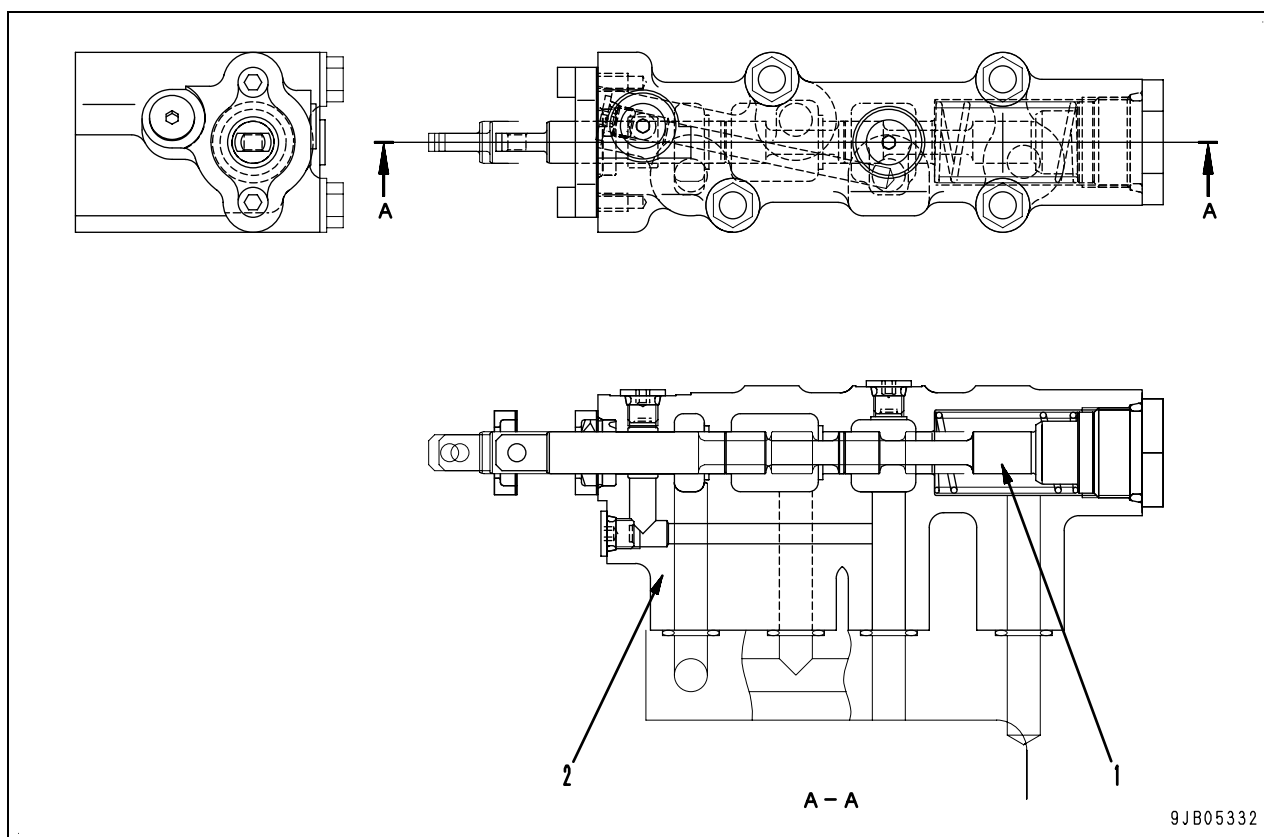
*1: The 1st or 2nd clutch is filled with low-pressure oil.

Steering and brake control

- ★ Regarding the transmission-related description of the operation of the PCCS lever, refer to the "Transmission control".
- ★ PCCS: Palm Command Control System



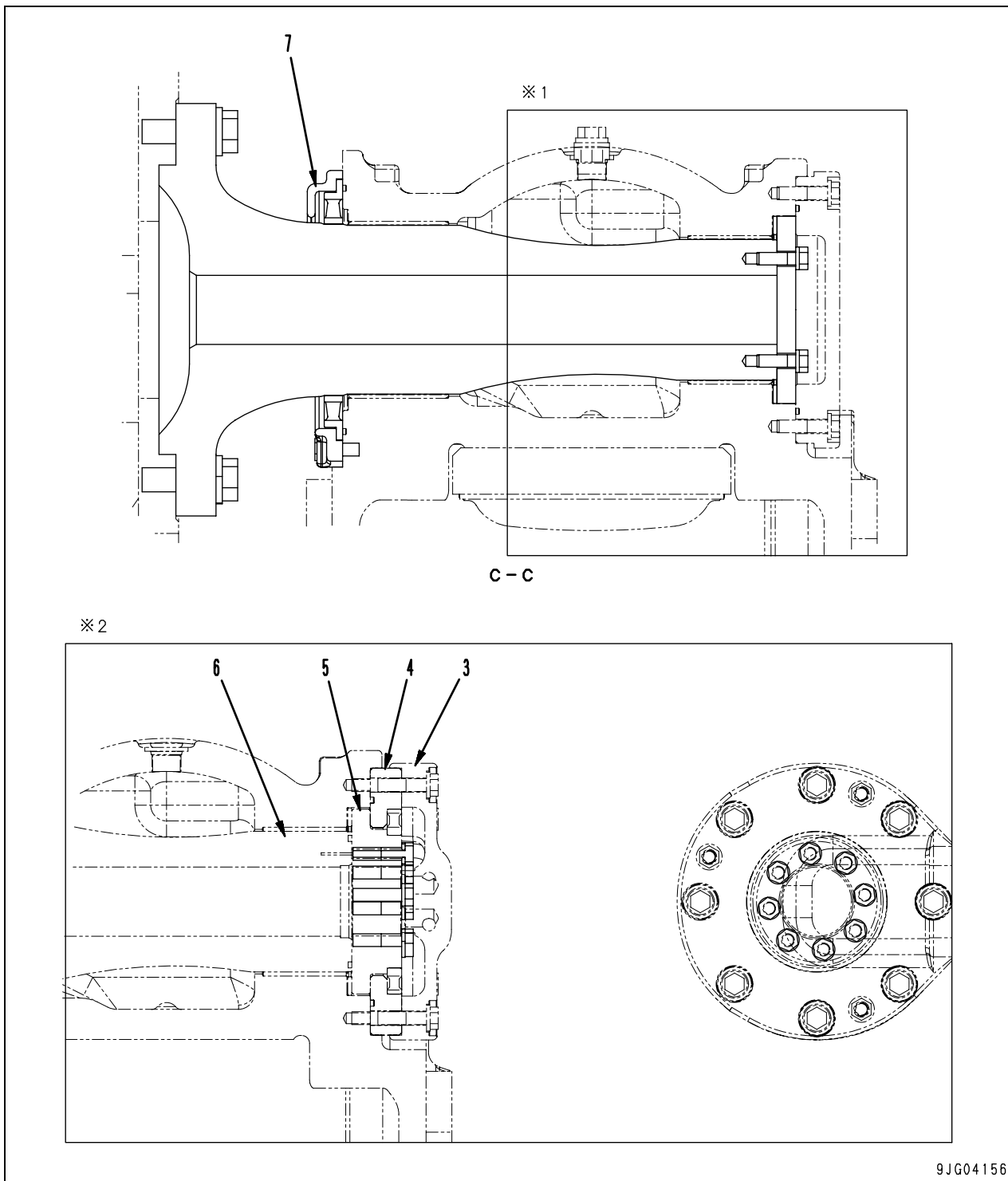
Parking brake valve



1. Spool
2. Valve body

Outline

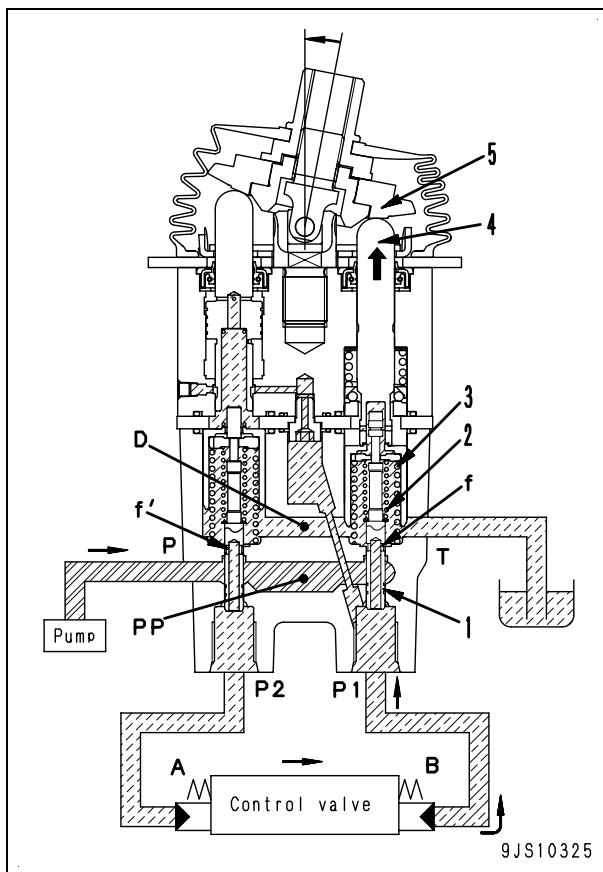
- The parking brake valve is installed to the steering control valve, and spool (1) operates with the parking brake lever.
- When the parking brake lever is in "lock" position, the brake is applied by draining the pressurized oil for the L.H. and R.H. steering brakes.



- *1 . Indicates the left suspension of single tilt specification machines.
- *2 . Indicates the right suspension of single tilt specification machines.
Indicates the left and right suspension of dual tilt specification machines.

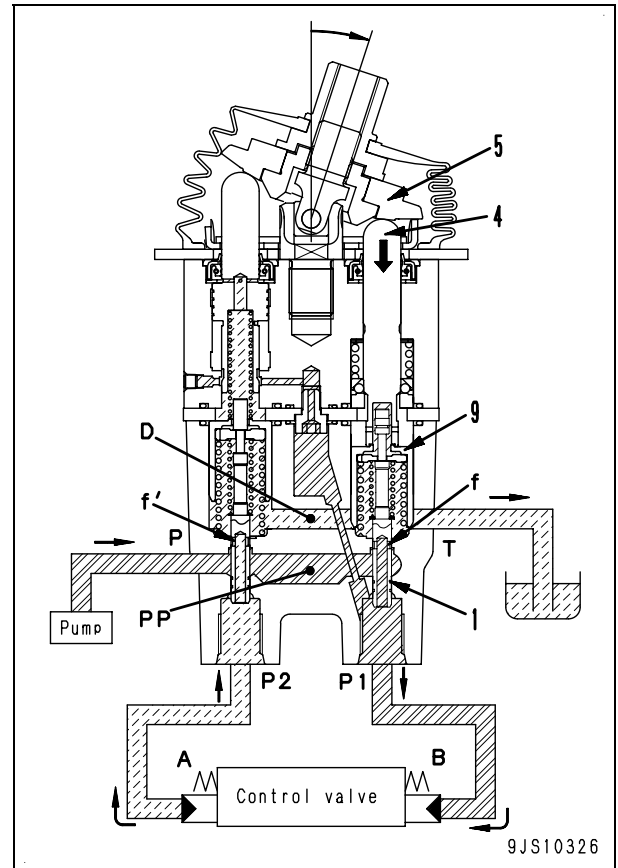
**When blade control lever is in fine control range
 (When blade control lever is returned)**

- When disc (5) begins to return, spool (1) is pushed up by the force of centering spring (3) and the force exerted by 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.
- When the pressure in port (P1) lowers too much, spool (1) is pushed down by metering spring (2) and fine control hole (f) is disconnected from drain chamber (D) and connected to pump pressure chamber (PP) almost simultaneously. Then, the oil at the pump pressure is supplied until the pressure in port (P1) is restored to the level corresponding to the position of the lever.
- When the control valve spool returns, the oil in drain chamber (D) flows through fine control hole (f') of the valve which is not operated and then flows through port (P2) into port (A) to supply oil.



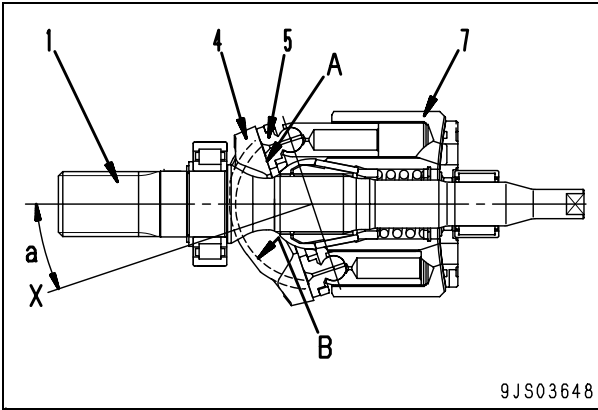
When blade control lever is operated to stroke end

- When disc (5) pushes down piston (4) and re-tainer (9) pushes down spool (1), fine control hole (f) is disconnected from drain chamber (D) and connected to pump pressure chamber (PP).
- Accordingly, the pilot oil flows through fine control hole (f) and port (P1) into port (B) and pushes the control valve spool.
- The oil returning from port (A) flows through port (P2) and fine control (f') into drain chamber (D).

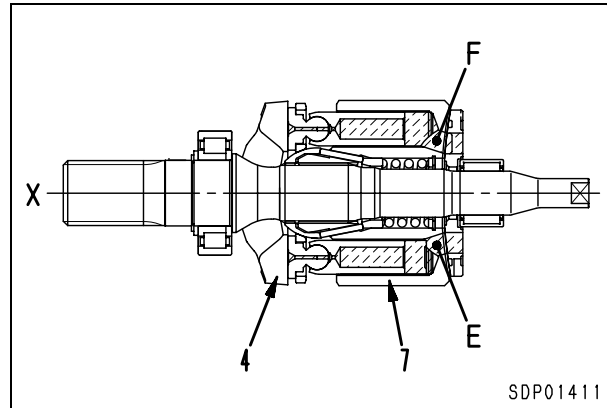


Operation of pump

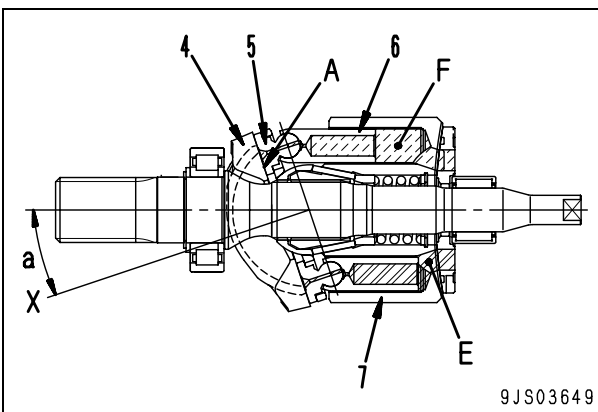
- Cylinder block (1) rotates together with shaft (7), and shoe (5) slides on flat surface (A).
- Rocker cam (4) moves along cylindrical surface (B), so angle (4) between center line (X) of rocker cam (7) and the axial direction of cylinder block (a) changes.
- (a) is called the swash plate angle.



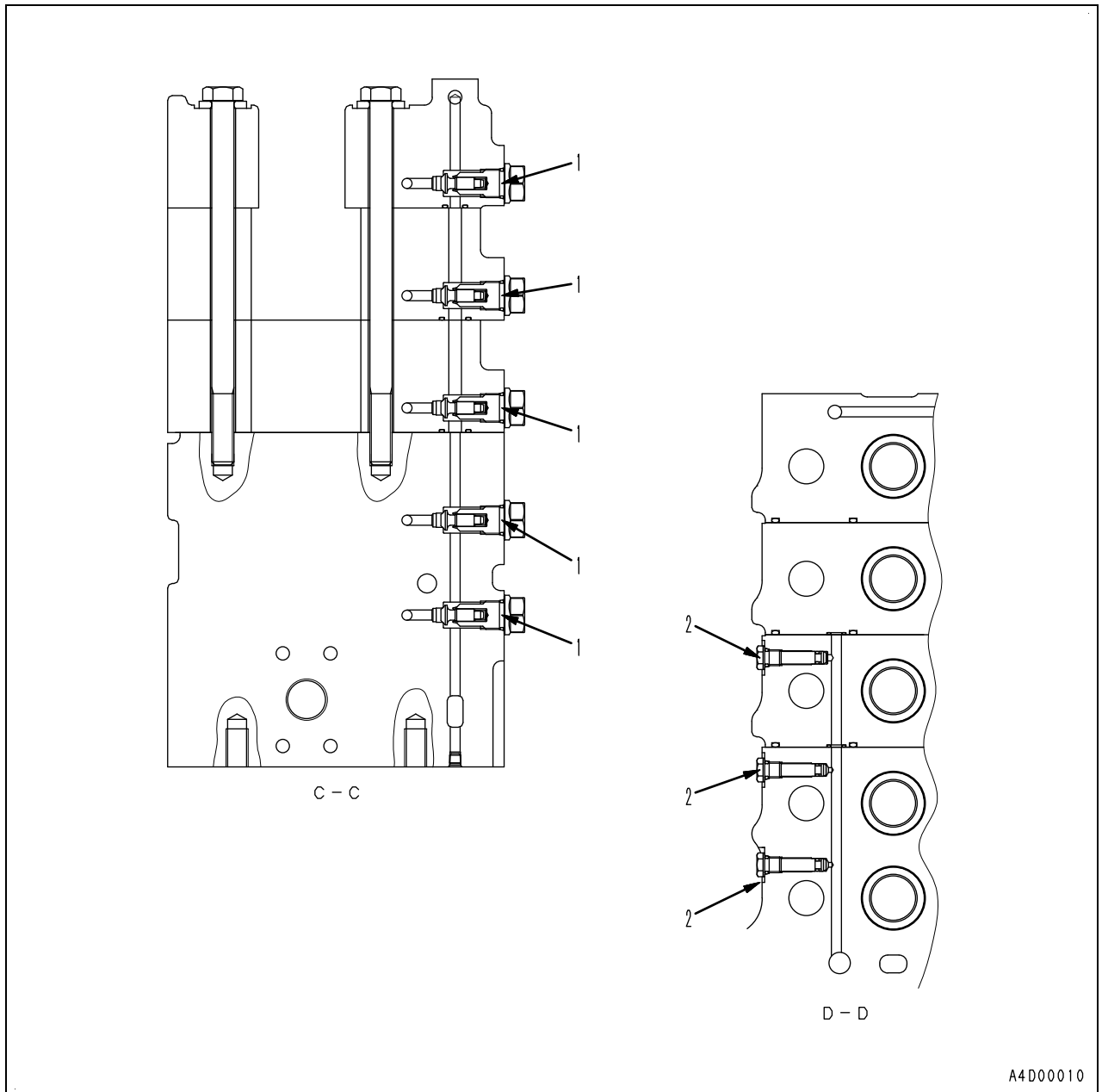
- As center line (X) of rocker cam (4) matches the axial direction of cylinder block (7) (swash plate angle $a = 0$), the difference between volumes (E) and (F) inside cylinder block (7) becomes 0.
- Suction and discharge of pressurized oil is not carried out in this state. Namely pumping action is not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



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

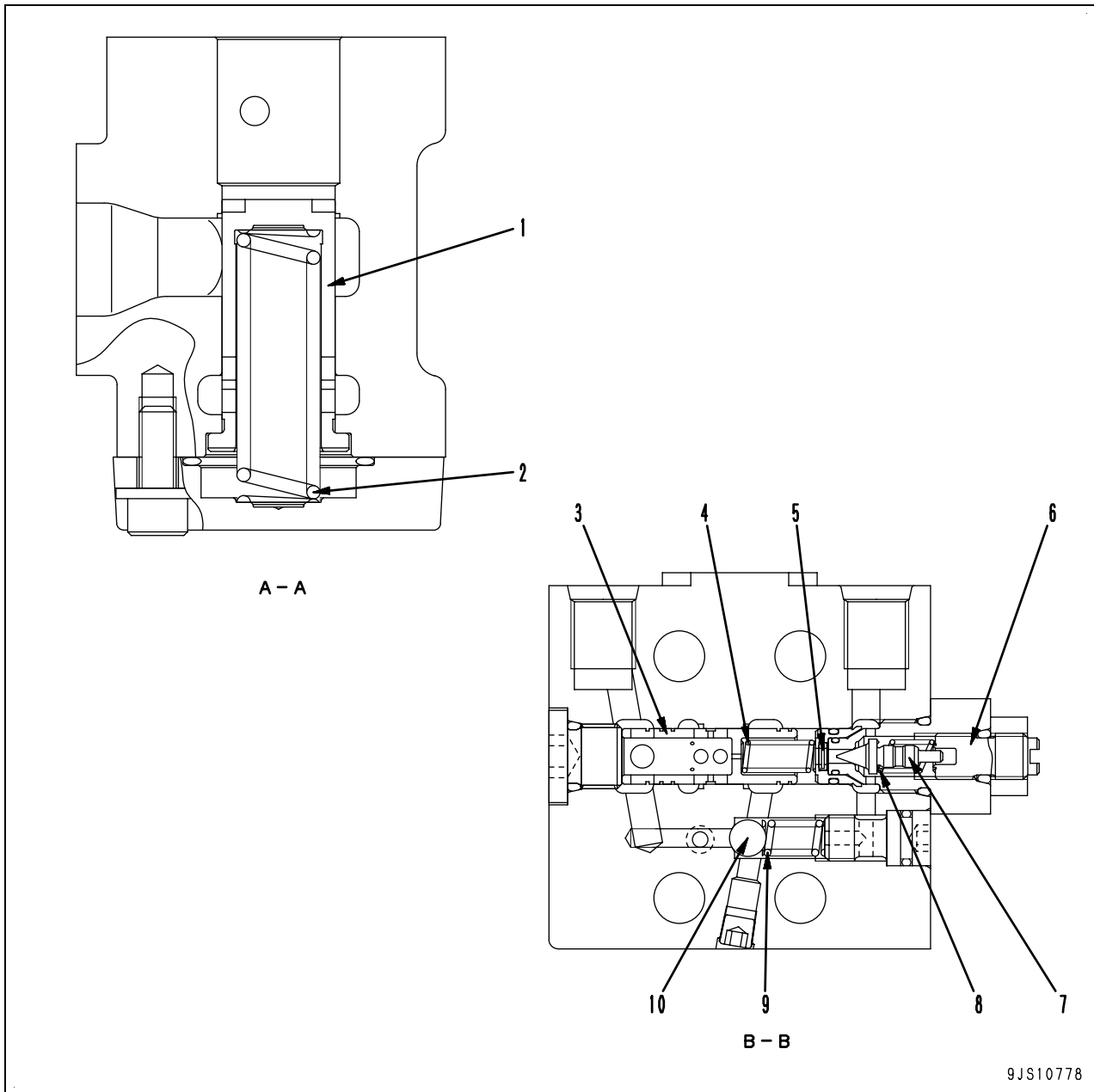


(2/4)



- 1. LS check valve
- 2. Preset plug

Sectional view



1. Valve (sequence valve)

2. Spring

3. Valve (pressure reducing valve)

4. Spring (pressure reducing valve main)

5. Filter

6. Screw

7. Poppet

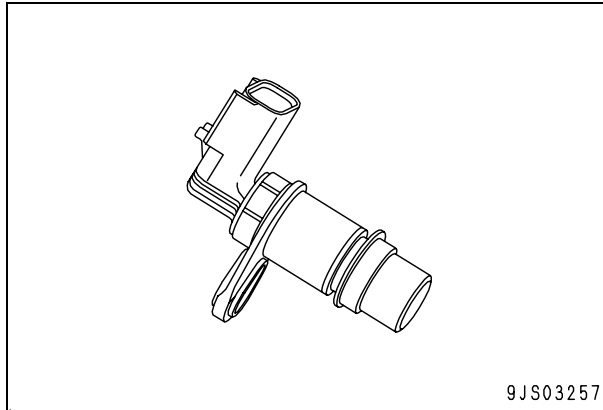
8. Spring (for pressure reducing valve pilot)

9. Spring (safety valve)

10. Ball

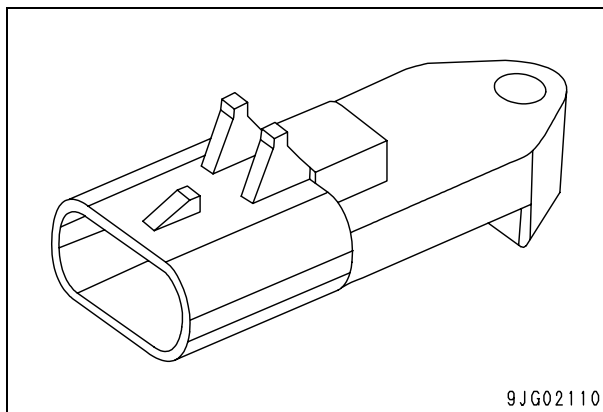
NE speed sensor (Crank angle sensor)

- If the signal hole made on the flywheel passes the sensor, the magnetic line of force changes.
- If the magnetic line of force changes, the output of the Hall element sensor changes linearly and it is converted into pulse of 0 – 5 by the wave form shaping circuit in the sensor, and then output.

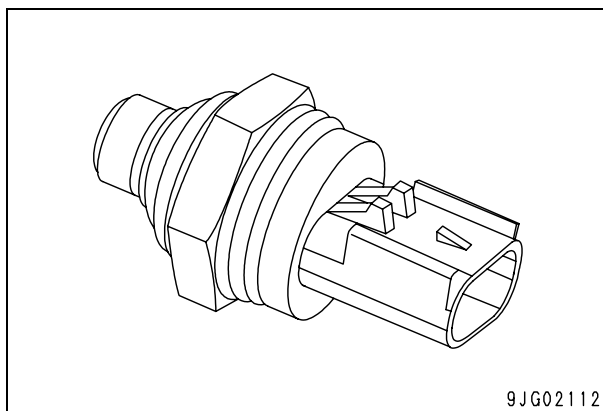


Ambient pressure sensor

- This sensor is used to correct altitude.

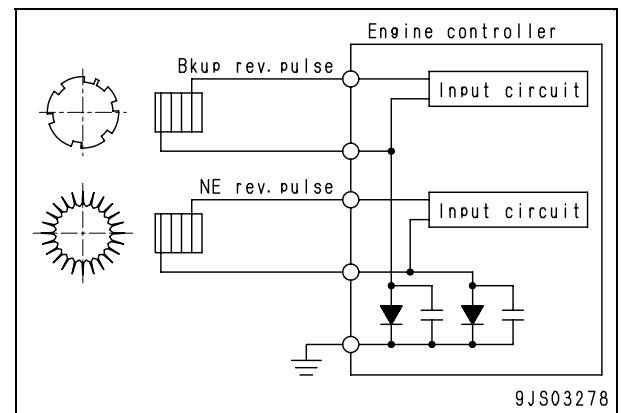
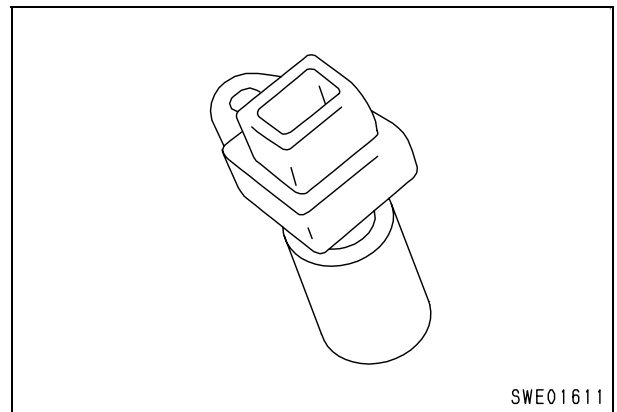


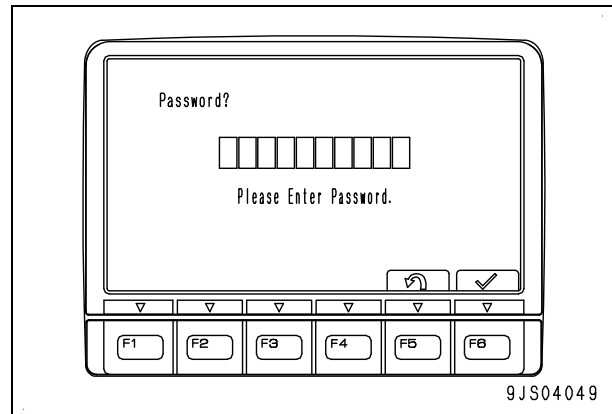
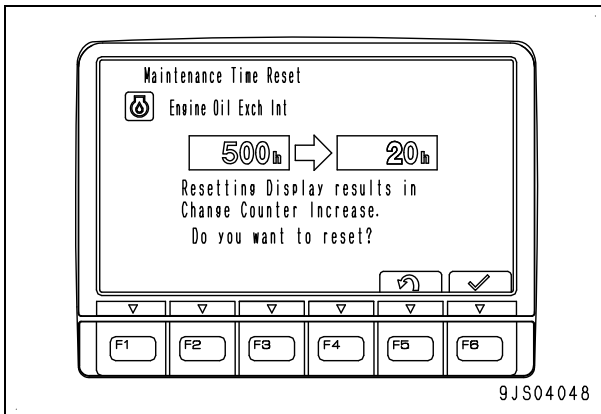
Oil pressure sensor



Bkup speed sensor (G sensor) (Cylinder No. sensor)

- Similarly to the NE speed sensor, this sensor utilizes the pulses of 0 – 5 generated by the change of the magnetic line crossing the sensor unit.
- The disc gear installed to the central part of the camshaft of the high-pressure pump has teeth (cut parts) around it at intervals of 60 °.
- In addition to the above teeth, one more tooth is installed. Accordingly, 7 pulses are generated every 2 revolutions of the engine.
- The standard pulse of the No. 1 cylinder is recognized by the combination of the NE speed sensor pulse and Bkup speed sensor pulse.





F5: Cancels the reset to return to the Maintenance List screen.
 F6: Resets the remaining time and returns to the standard screen.
 No operation at least 30 sec.: Returns to the standard screen.

- The table below shows the maintenance items and replacement intervals.
 The time remaining to maintenance is reduced as the machine is operated.

No.	Item	Replacement interval (Hours)
01	Engine oil	500
02	Engine oil filter	500
03	Fuel main filter	500
41	Fuel pre-filter	500
04	Hydraulic oil filter	2000
07	Damper case oil	2000
08	Finaldrive case oil	2000
10	Hydraulic oil	2000
19	P/L oil	1000
20	P/L oil filter	500

P/L: Power train

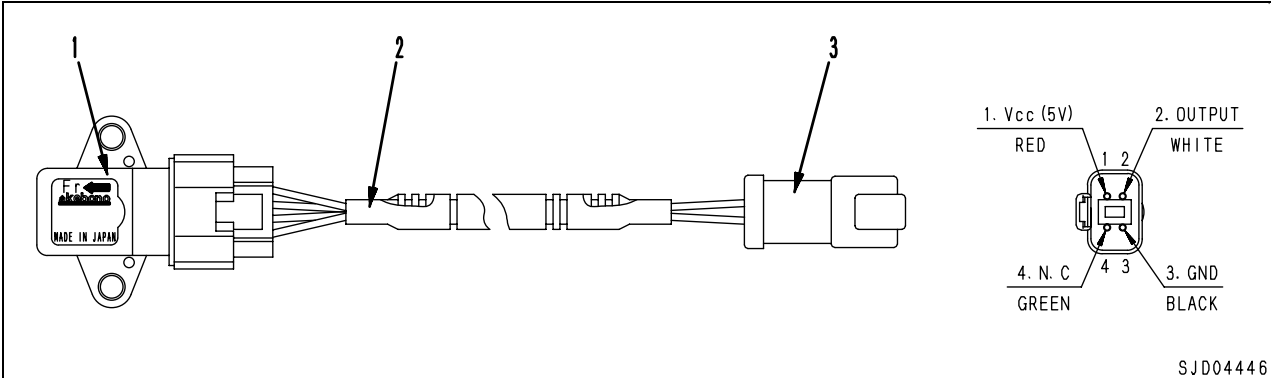
- The display of the maintenance monitor differs according to the remaining time. The relationship is as shown in the table below.

Display	Condition
Not displayed	Remaining time for maintenance for all items is more than 30 hours.
Notice display (black symbol on yellow background)	There is one or more items with less than 30-hour remaining time for maintenance.
Warning display (white symbol on red background)	There is one or more items with less than 0-hour remaining time for maintenance.

- To prevent careless reset of the maintenance interval, the screen is password protected.

- The default password is "000000".
- Enabling the password lock on an attachment-equipped machine locks the attachment setting screen at the same time.
- ★ For information on changing the maintenance password, see "Function of changing maintenance password" of "Testing and adjusting".

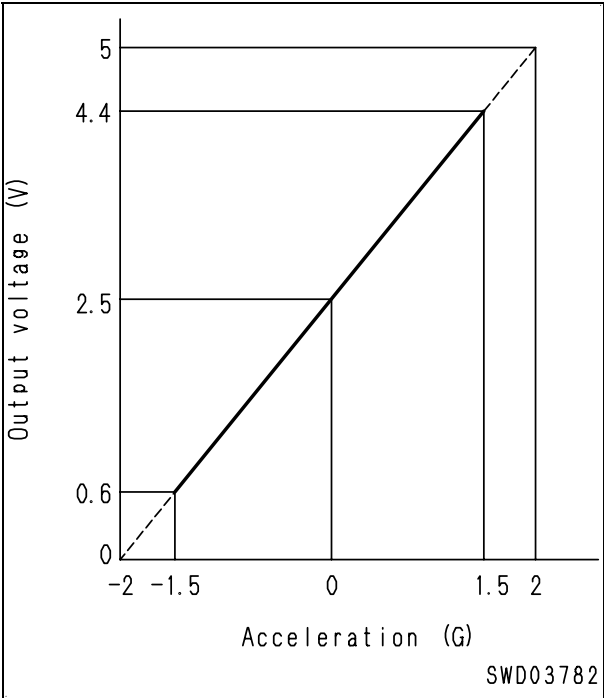
Acceleration sensor



- 1. Sensor portion
- 2. Wire
- 3. Connector

Outline

- The acceleration sensor is installed under the front of the operator's cab.
- The position of the ball inside the sensor changes according to the acceleration. The coil inside the sensor detects the position of the ball. The change in the position is amplified by the amp and is sent as a voltage change to the power train controller.
- The input and output characteristics of the sensor are shown in the figure on the right.



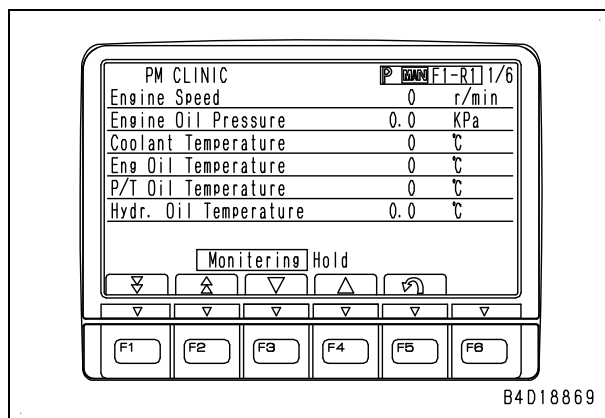
Contents

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- ★ The top of the green range of the power train oil temperature gauge indicates about 118 – 120 °C.
- 7) Repeat above steps 3) – 6) 3 times.
- 8) Perform steps 3) - 5) again and measure the engine speed when the power train oil temperature gauge (T/C TEMPERATURE) indicates 118 °C.
 - ★ Immediately after finishing measuring, return the PCCS lever to the neutral position and lower the power train oil temperature with the engine at high idle.

6. Measuring torque converter stall speed (Inspection on Pm clinic screen)

- 1) Start the engine and set the fuel control dial in the low idle (MIN) position.
- 2) Switch the machine monitor to the "Pm clinic" function display of the service mode.
 - ★ For the operating method, see "Special functions of machine monitor (EMMS)".



- 3) Operate the shiftup (UP) switch of the PCCS lever and set the preset mode display section to [F2-R2].
- 4) While pressing the brake pedal securely, set the parking brake lever in the free position and set the direction of PCCS lever in the forward position.
- 5) Shift to 3rd gear by operating the shift-up (UP) switch of PCCS lever.
 - ★ Before going to the next step, check that [F3] is displayed in the gear speed display section (at the right bottom of the screen).
 - ★ Keep the steering unit in neutral.
- 6) Repeat the measuring process in a similar way by following Step 4) and later of "5. Measuring torque converter stall speed".

7. Measuring torque converter stall + work equipment relief speed (Full stall speed)

- 1) Start the engine and set the fuel control dial in the low idle (MIN) position.

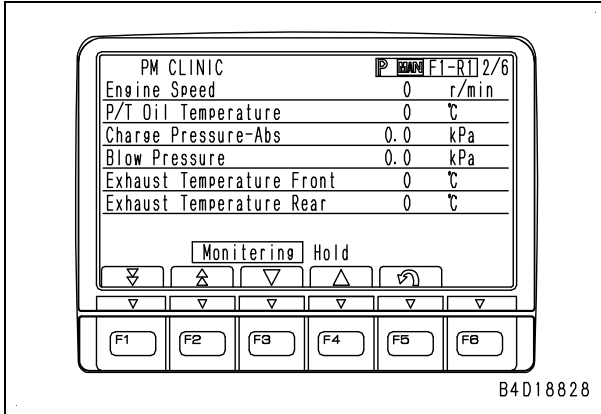
- 2) Operate the shiftup (UP) switch of the PCCS lever and set the preset mode display section to [F3-R3].
 - ★ The preset mode display section (at the right bottom of the screen) can be set to [F3-R3] only while the Adjustment function is selected.
- 3) Set the work equipment lock lever in the free position and operate the ripper control lever to set the ripper lift cylinder to the raise stroke end.
- 4) While pressing the brake pedal securely, set the parking brake lever in the free position and set the direction of PCCS lever in the forward position.
 - ★ Before going to the next step, check that [F3] is displayed in the gear speed display section (at the right bottom of the screen).
 - ★ Keep the steering unit in neutral.
- 5) Press the decelerator pedal and set the fuel control dial in the high idle (MAX) position.
- 6) Return the decelerator pedal slowly to stall the torque converter with the engine at high idle.
 - ▲ **Keep pressing the brake pedal securely and keep your right foot on the decelerator pedal for safety until the work is finished.**
- 7) Right after the power train oil temperature gauge (T/C TEMPERATURE) indicates 118 °C, return the PCCS lever to the neutral position.
 - ★ The top of the green range of the power train oil temperature gauge indicates about 118 – 120 °C.
- 8) Repeat above steps 4) – 7) 3 times.
- 9) Perform steps 4) - 6) again, operate the ripper control lever to relieve the ripper raise system, and measure the engine speed when the power train oil temperature gauge (T/C TEMPERATURE) indicates 118 °C.
 - ★ Immediately after finishing measuring, return the PCCS lever to the neutral position and lower the power train oil temperature with the engine at high idle.

8. Measuring torque converter stall + Work equipment relief speed (Full stall speed) (Inspection on Pm clinic screen)

- 1) Start the engine and set the fuel control dial in the low idle (MIN) position.
- 2) Switch the machine monitor to the "Pm clinic" function display of the service mode.
 - ★ For the operating method, see "Special functions of machine monitor (EMMS)".

2. Testing for VHMS specifications

- 1) Turn the starting switch to the ON position and switch the machine monitor to the "Pm clinic" function display of the service mode.
 - ★ For the operating method, see "Special functions of machine monitor (EMMS)".



- 2) Test the blowby pressure when the torque converter is stalled at high idle speed.
 - ★ For the torque converter stall procedure, see Step 3) and later in "6. Measuring torque converter stall speed (Inspection on Pm clinic screen)" of "Testing engine speed".

Bleeding air from fan pump

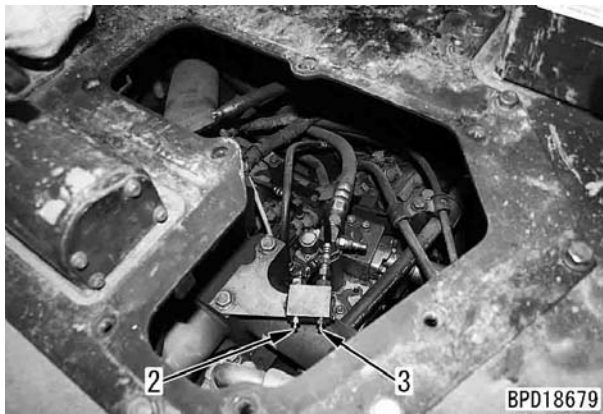
- ★ If the fan pump is removed and installed or its piping is disconnected and connected, bleed air from the pump case according to the following procedure.
- ★ Before bleeding air, check that the hydraulic oil level is proper.

1. Remove the floor mat.

2. Remove left footrest (1).



3. Loosen air bleeders (2) and (3), and leave them for 15 minutes.

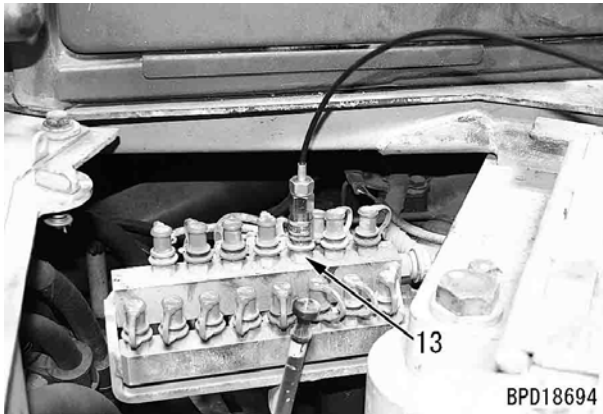


4. After 15 minutes, run the engine at low idle.

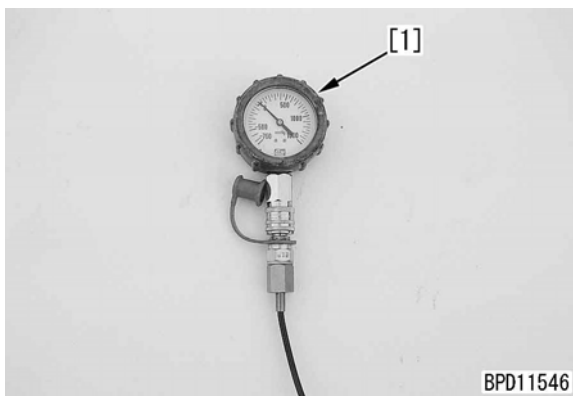
5. When oil flows from air bleeders, tighten air bleeders (2) and (3).

14. Testing right steering clutch pressure (RC)

- 1) Connect oil pressure gauge [1] of hydraulic tester K1 to oil pressure test nipple (13).
 - ★ When using an analog oil pressure gauge, use one of 6 MPa {60 kg/cm²}.



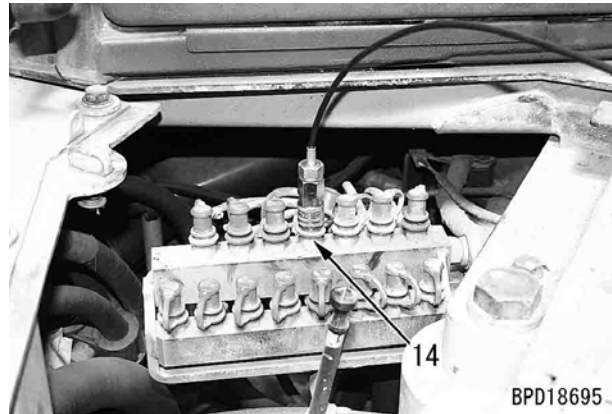
- 2) Start the engine and set the parking brake lever in the FREE position.
- 3) Operate the PCCS lever steering fully to the right.
 - ★ Set the direction to the neutral position.
- 4) Test the right steering clutch pressure with the engine at low idle and high idle.
 - ★ Check that the oil pressure becomes 0 when the PCCS lever steering is returned to neutral.



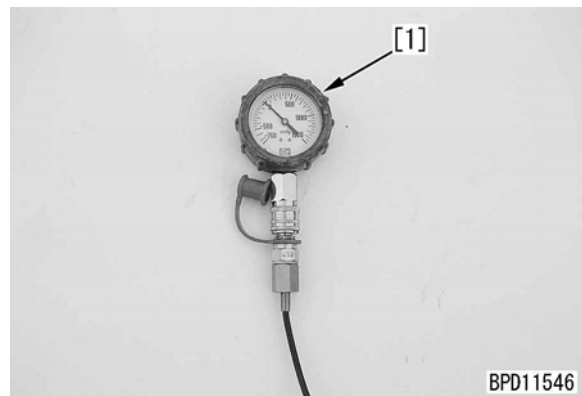
- 5) After finishing measuring, remove all test tools in order to return the machine status as it was.

15. Testing right steering brake pressure (RB)

- 1) Connect oil pressure gauge [1] of hydraulic tester K1 to oil pressure test nipple (14).
 - ★ When using an analog oil pressure gauge, use one of 6 MPa {60 kg/cm²}.



- 2) Start the engine and set the parking brake lever in the FREE position.
- 3) Test the right steering brake pressure with the engine at low idle and high idle.
 - ★ Check that the oil pressure becomes 0 when the PCCS lever steering is operated fully to the right.
 - ★ Check that the oil pressure becomes 0 when the brake pedal is depressed fully or the parking brake lever is operated to the LOCK position.



- 4) After finishing measuring, remove all test tools in order to return the machine status as it was.

Testing control circuit main pressure

Tools for testing control circuit main pressure

Symbol	Part No.	Part name
M	1	799 - 101 - 5002 Hydraulic tester
		790 - 261 - 1204 Digital hydraulic tester

Testing

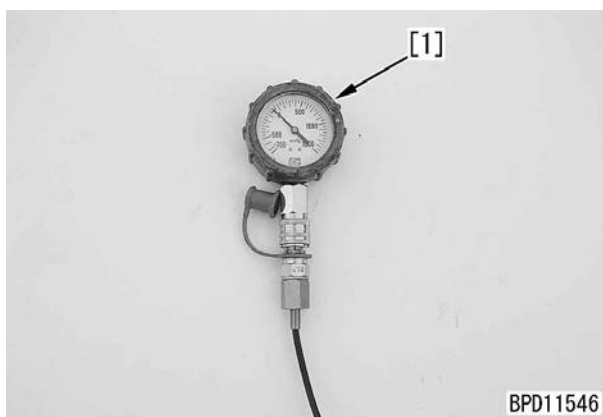
⚠ Stop the machine on level ground, lower the work equipment to the ground, stop the engine, and set the parking brake lever and work equipment lock lever in the lock position.

- ★ Test the control circuit main pressure under the following conditions.
 - Hydraulic oil temperature: 45 – 55°C

1. Open the cover of the main control valve (both sides).
2. Connect oil pressure gauge [1] of hydraulic tester M1.
 - ★ When using an analog oil pressure gauge, use one of 6 MPa {60 kg/cm²}.
 - ★ Inspection nipple (1) is equipped.



3. Start the engine, run it at high idle, and test the oil pressure when the blade lever and ripper lever are placed at the HOLD position.



4. After finishing measurement, remove the measuring tools and return the removed parts.

Adjusting

- ★ The self pressure reducing valve cannot be adjusted.

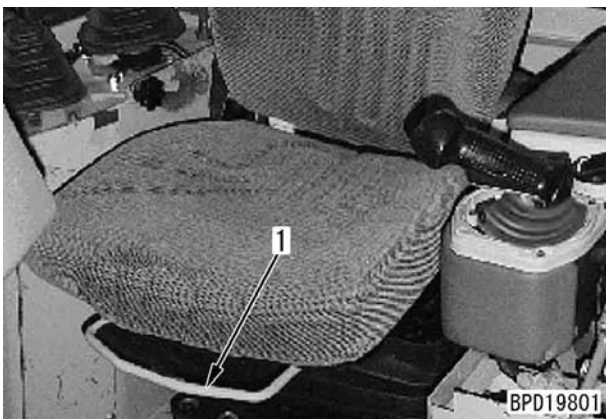
Testing and adjusting operator's seat isolator

★ Machine with operator's seat isolator

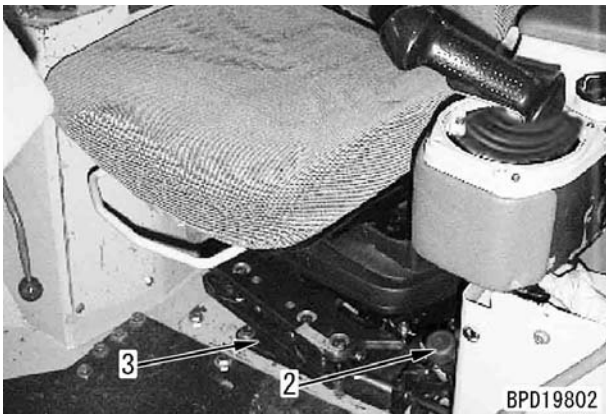
1. Breakage of rubber

- Criterion: When the operator's seat is pressed with the hand, it must not touch the stopper of operator's seat isolator.
- ★ When the criterion is not satisfied.
- Remove and disassemble the operator's seat isolator and check the rubber for breakage.
- If the rubber is broken, replace the operator's seat isolator assembly.

1) Pull slide (1) and move the operator's seat to the forward end.



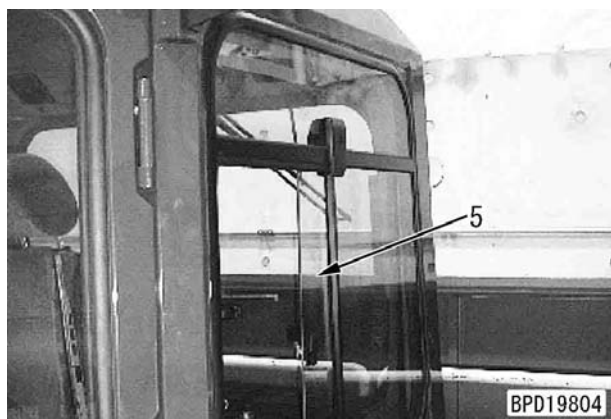
2) Pull turning lever (2) and rotate turntable (3) by 13 degrees.



3) Stand backrest (4) of the operator's seat upright.



4) Open window (5) on the left side of the operator's cab.

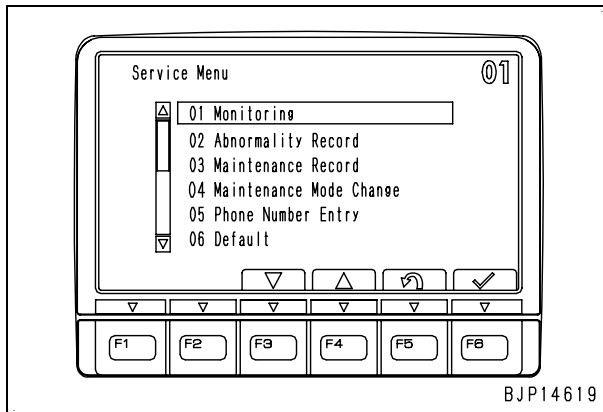


Monitoring

The machine monitor can monitor the condition of the machine in real time by receiving signals from various switches, sensors, and actuators installed to many parts of the machine and the information from the controllers which are controlling switches, etc.

1. Selecting menu

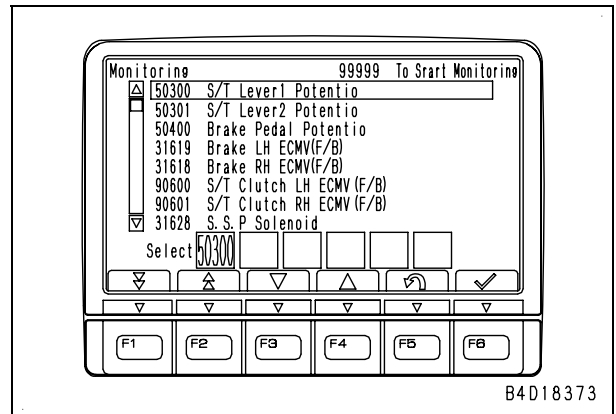
Select "01 Monitoring" on the "Service Menu" screen.



2. Selecting monitoring items

After the "Monitoring selection menu screen" is displayed, select items to be monitored with the function switches or numeral input switches.

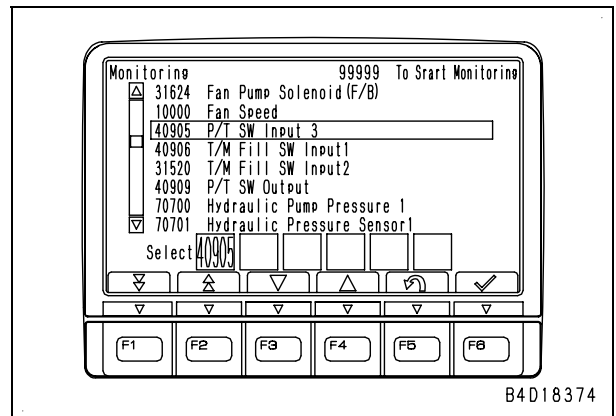
- [F1]: Go to next page (screen)
- [F2]: Go to previous page (screen)
- [F3]: Move to lower item
- [F4]: Move to upper item
- [F5]: Delete input numeral/Return to service menu screen
- [F6]: Confirm selection
- ★ Selection with function switches: Select an item with [F3] or [F4] and confirm it with [F6].
- ★ Selection with numeral input switches: Enter a 5-digit code, and the item of that code is selected directly. Confirm that item with [F6].
- ★ If the color of the selected box changes from yellow to red, selection of the item of that box is confirmed.
- ★ Up to 6 monitoring items can be selected at a time. You may not able to set up to 6 items, however, depending on the display form of those items.



3. Deciding monitoring items

After selecting monitoring items, execute monitoring with the function switch or numeral input switch.

- ★ Execution with function switch: Doubleclick or hold down [F6] (about 2 seconds).
- ★ Execution with numeral input switch: Input [99999] and press [F6].
- ★ When monitoring only 2 items, for example, select them and confirm with [F6]. If [F6] is pressed once more at this time, monitoring is executed.
- ★ If monitoring items are selected up to the limit number, monitoring is executed automatically.



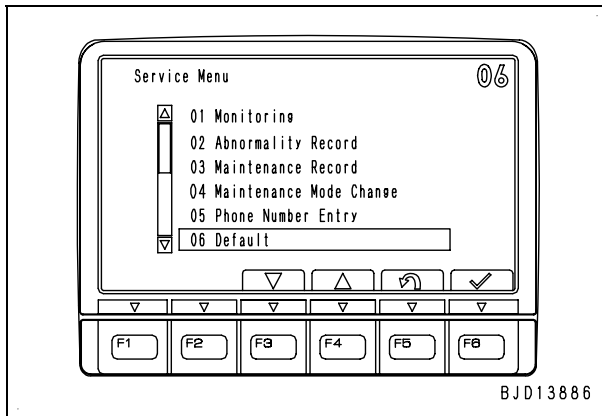
Default setting (Setting of camera)

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

The camera setting function is used to set default setting and removal of a camera.

1. Selecting menu

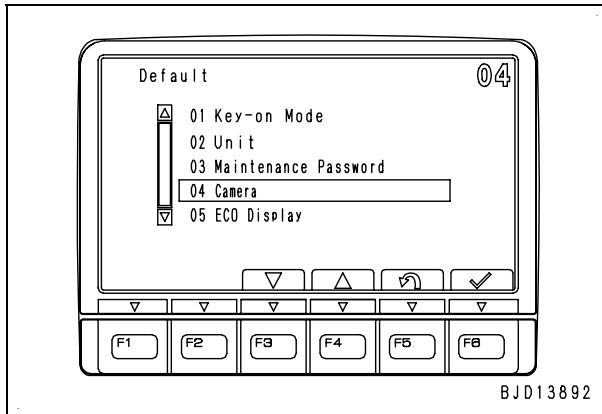
Select "06 Default" on the "Service Menu" screen.



2. Selecting sub menu

After the "Default" screen is displayed, select "04 Camera" with the function switches or numeral input switches.

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



3. Selecting camera setting

After the "Camera" setting screen is displayed, select the setting with the function switches.

- OFF: Camera is not connected
- Original image: Image of connected camera is displayed in original position (as in mirror, used as back monitor)
- Reverse image: Image of connected camera is displayed in reverse position (as seen directly, used as front or side monitor)
- [F3]: Move to left item
- [F4]: Move to right item
- [F5]: Cancel setting before confirmation and return to Default screen
- [F6]: Confirm selection in each line

★ After "Camera" screen is displayed, camera 1 can be always set.

When 2 or more cameras are connected, if camera 1 is set, the screen changes to setting of camera 2 automatically.

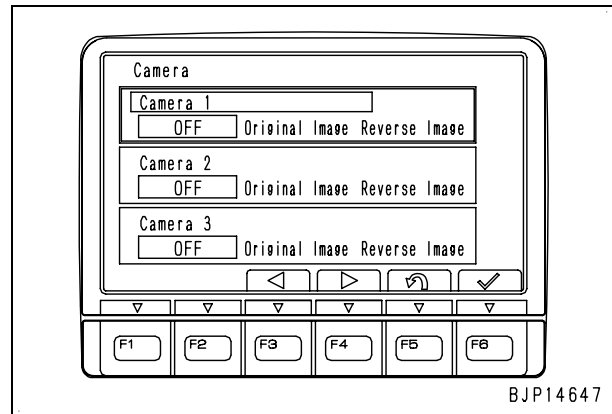
★ After confirming the setting of each line with [F6], return to the "Default" screen with [F5], and the setting is effective.

★ If a camera is connected but not set normally with this function, the graphic mark of camera is not displayed at [F3] in the operator mode. Accordingly, the image of the camera cannot be used.

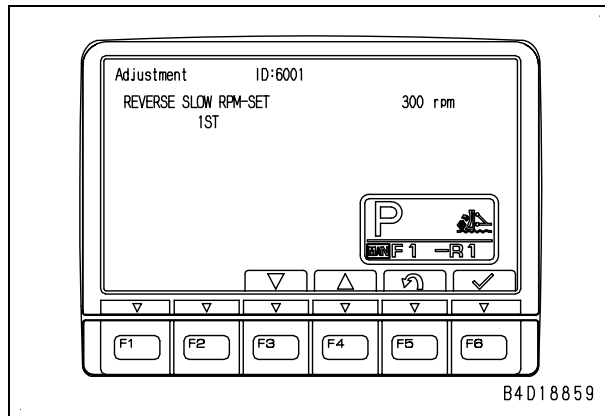
★ If 2 or more cameras are connected, be sure to set the use of them from camera 1 in order.

★ The function of displaying 2 images simultaneously is effective when use of camera 1 and camera 2 is set.

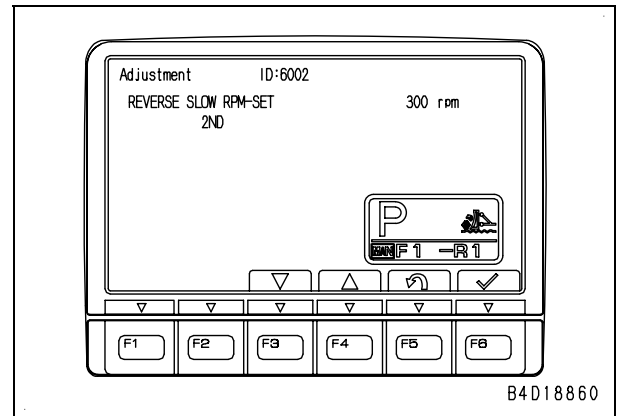
★ When a camera is installed, check that the displayed image is not inverted horizontally in the operator mode.



Adjustment ID: 6001 (R1 reverse slow set speed)



Adjustment ID: 6002 (R2 reverse slow set speed)



- This adjustment code is used to adjust the engine speed applied to travel at gear speed R1 with the reverse slow mode ON.
- ★ Use this adjustment code for work when necessary.
- Functions of function switches
 - [F3]: Increase adjustment value
 - [F4]: Decrease adjustment value
 - [F5]: Return to adjustment item selecting screen (ID inputting screen)
 - [F6]: Save adjustment value
- Information displayed on screen

The lower speed (reduced from the high idle speed of 1,900 rpm) is displayed and the adjustment value is increased or decreased in 50 rpm units.

 - ★ The adjustment value at shipment is 300 rpm.
(Setting at shipment: $1,900 - 300 = 1,600$ rpm)
- Operating method:
 - 1] Increase or decrease the adjustment value by pressing [F3] or [F4].
 - 2] Press [F6] and check that the alarm buzzer sounds.
 - ★ If the set speed has been adjusted, the adjustment value is displayed. It can be adjusted again within the allowable range.
 - ★ It is not necessary to drive the machine during adjustment. After finishing adjustment, however, drive the machine at R1 with the reverse slow mode ON and check that there is not a problem in the actual travel speed.
 - ★ Even if this adjustment code is turned off, the adjustment is effective.

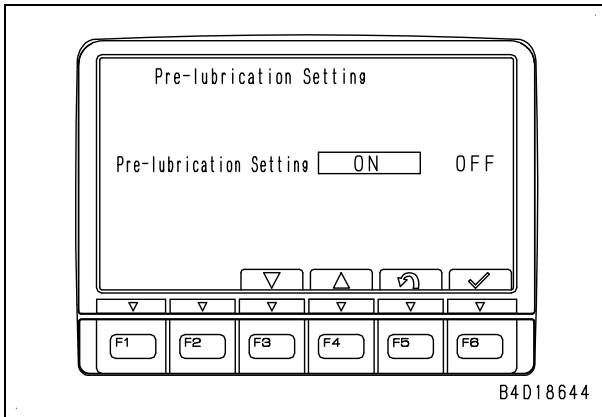
- This adjustment code is used to adjust the engine speed applied to travel at gear speed R2 with the reverse slow mode ON.
- ★ Use this adjustment code for work when necessary.
- Functions of function switches
 - [F3]: Increase adjustment value
 - [F4]: Decrease adjustment value
 - [F5]: Return to adjustment item selecting screen (ID inputting screen)
 - [F6]: Save adjustment value
- Information displayed on screen

The lower speed (reduced from the high idle speed of 1,900 rpm) is displayed and the adjustment value is increased or decreased in 50 rpm units.

 - ★ The adjustment value at shipment is 300 rpm.
(Setting at shipment: $1,900 - 300 = 1,600$ rpm)
- Operating method:
 - 1] Increase or decrease the adjustment value by pressing [F3] or [F4].
 - 2] Press [F6] and check that the alarm buzzer sounds.
 - ★ If the set speed has been adjusted, the adjustment value is displayed. It can be adjusted again within the allowable range.
 - ★ It is not necessary to drive the machine during adjustment. After finishing adjustment, however, drive the machine at R2 with the reverse slow mode ON and check that there is not a problem in the actual travel speed.
 - ★ Even if this adjustment code is turned off, the adjustment is effective.

4. Prelube setting

- ★ Set this item after the machine monitor was replaced, too.
- 1) Input "87" with the numeral input switches and press [F6] in the "Service menu" screen.
- 2) Press [F3] to select "ON" and press [F6] to enter the selection.



5. Setting engine emergency shutdown switch

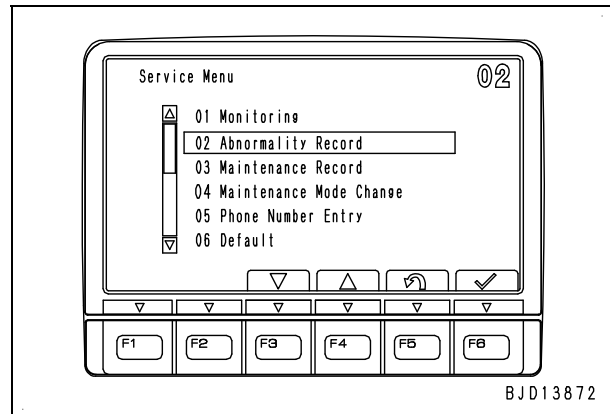
- ★ Check setting of this item after the machine monitor is replaced as well.
- ★ If the engine emergency shutdown switch is installed to the machine and set to default, the engine does not start. Be sure to set it correctly.
- ★ See "1. Controller initial setting", 6).
- 1) Input adjustment ID [6099] directly with the numeral input switches.
- 2) Press [F6].
- 3) Change the engine stop input mode to "INV-OPEN" by pressing [F3] or [F4], and enter the selection by pressing [F6].
- 4) Check that the engine stops when the engine emergency shutdown switch is pushed in.

6. Turning power on again

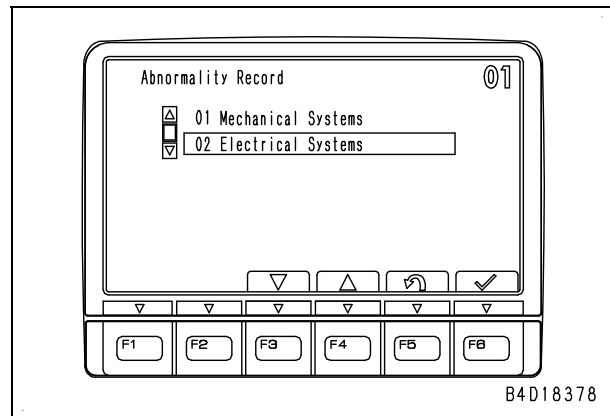
Turn the starting switch to the OFF position and turn it to the ON position again about 1 minute after (the battery relay is turned OFF).

7. Checking failure codes

- 1) Set the machine monitor in the service mode.
- 2) Select "02 Abnormality Record" on the "Service Menu" screen.



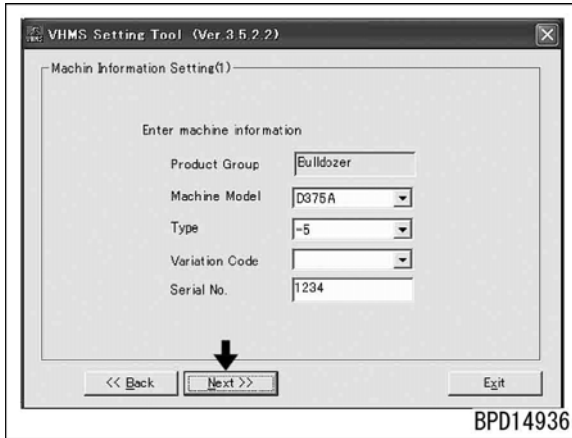
- 3) Press [F3] or [F4] to select "02 Electrical system abnormality recrd" and press [F6] to enter the selection.



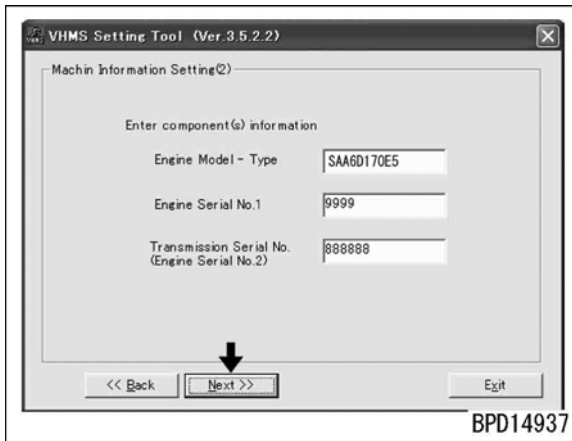
- 4) Check to see if there is any failure code being indicated. If there is not any, delete all the recorded failure codes.
 - ★ If any active failure codes exist, eliminate the cause of the incident by troubleshooting then carry out steps 5 and 6 again.

- ★ Precautions after replacing controller:
If any controller is replaced, the service meter in the oil and filter maintenance mode is reset to 0.
As a result, the replacement period displayed on the monitor panel may be different from the actual operating hours. To solve this problem, determine the first replacement periods of the oils and filters after the replacement of the controller according to the replacement periods recorded before the replacement of the controller.

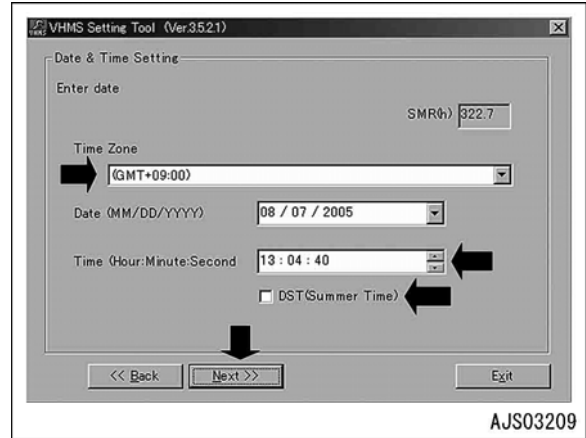
- 3) Check the machine information. If it does not need to be corrected, press the "Next" button.



- ★ If the VHMS was installed additionally, the information of [Serial No.] etc. must be input.



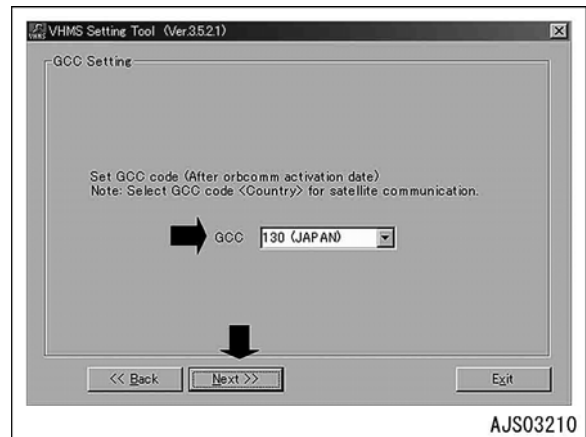
- 4) Select the time zone.
5) Input the local time.
6) If the DST (Daylight Saving Time) is used now, select it and press the "Next" button.
★ If the DST is selected, the clock is advanced 1 hour automatically, thus the time must be corrected again.



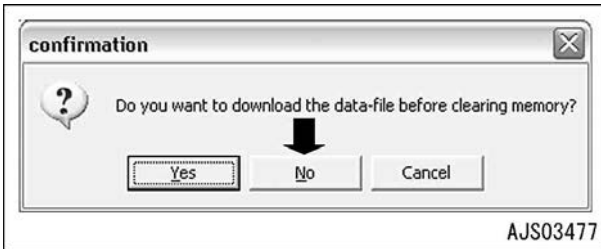
- 7) Set the GCC Code to the applicable area and then press the "Next" button.

GCC Code	Area	Remarks
1	N.America (*1) C.S.Americas Faroe Islands	*1: Except U.S. Territories in Micronesia and Midway Island
120	Europe (*2) Middle East Asia (*3) Africa Oceania CIS	*2: Except Faroe Islands *3: Except Japan
130	Japan	

- ★ If the combination of the country name and code in the list box displayed by the setting tool is different from the above table, select the GCC code in the table or input the value through the keyboard.



- 6) The system asks you if you will save the previous data. Press the "NO" button.
- ★ Usually, you do not need to save the previous data.



- 7) The above completes modification of the setting. Press [OK] button to end the VHMS initial setting tool.



[Work after replacing VHMS controller]

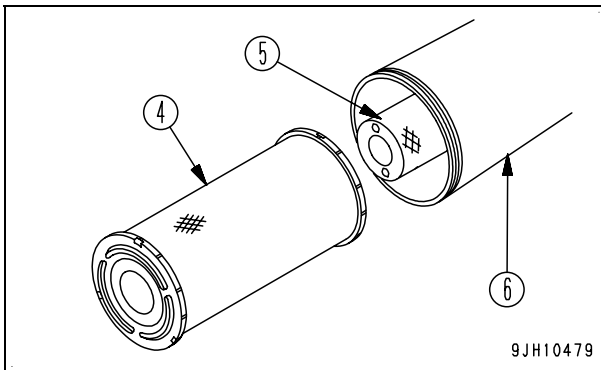
- ★ After replacing the VHMS controller, carry out initialization according to the "Initialization Procedure for VHMS Controller".
- ★ Change the data to the information recorded before the VHMS controller was replaced. (Input the date and time when the VHMS controller was replaced.)
- ★ After completing the setting after the replacement, send the check sheet to VHMS/Web-CARE Support Center of Komatsu, Tokyo.
- ★ Send the data downloaded before and after replacing the VHMS controller by Notes (LAN) or E-mail (WAN).

Komatsu VHMS/WebCARE Support Center
2-3-6, Akasaka Minato-ku Tokyo, Japan
FAX: 81-3-5561-4766 (from outside of Japan)
E-mail: webcare@komatsu.co.jp

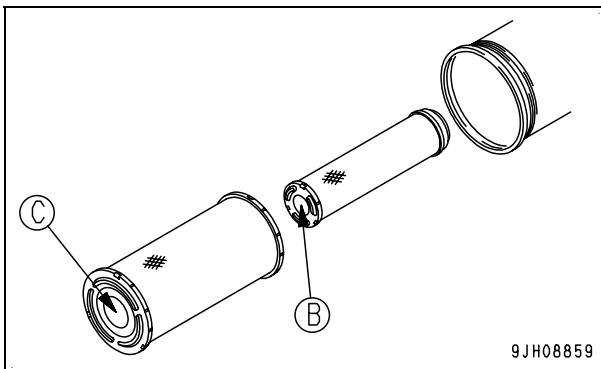
Failure code [DDT5KA] Neutral switch disconnection	40 -388
Failure code [DDT5KB] Neutral switch short circuit	40 -390
Failure code [DDT5KQ] Lever SPEC selection signal disagreement	40 -392
Failure code [DDTSL1] S/C: Fill high	40 -394
Failure code [DDTSLH] S/C: Fill low	40 -396
Failure code [DGE5KX] Ambient temp sensor abnormality	40 -398
Failure code [DGS1KX] Hyd oil temp: signal abnormal	40 -400
Failure code [DGT1KA] T/C oil temp sensor: Abnormal	40 -402
Failure code [DGT1KX] T/C oil temp sensor: Abnormal	40 -404
Failure code [DGT5KA] F exhaust temp sensor disconnection	40 -406
Failure code [DGT5KB] F exhaust temp sensor short circuit	40 -408
Failure code [DGT6KA] R exhaust temp sensor disconnection	40 -410
Failure code [DGT6KB] R exhaust temp sensor short circuit	40 -412
Failure code [DH21KA] Weq pressure sensor: Disconnection	40 -414
Failure code [DH21KB] Weq pressure sensor: Short circuit	40 -416
Failure code [DHE5KB] ENG blow-by pressure sensor disconnection	40 -418
Failure code [DHE5KY] ENG blow-by pressure sensor short circuit	40 -420
Failure code [DHT3KX] T/M oil pressure sensor abnormality	40 -422
Failure code [DHT5KA] T/C in-pressure sensor: Disconnection	40 -424
Failure code [DHT5KB] T/C in-pressure sensor: Short circuit	40 -426
Failure code [DHT7KA] T/C out-pressure sensor: Disconnection	40 -428
Failure code [DHT7KB] T/C out-pressure sensor: Short circuit	40 -430
Failure code [DK10KA] Fuel control Dial: Disconnection	40 -432
Failure code [DK10KB] Fuel control Dial: Short circuit	40 -434
Failure code [DK30KA] ST lever 1: Disconnection	40 -436
Failure code [DK30KB] ST lever 1: Short circuit	40 -438
Failure code [DK30KX] ST lever: Out of normal range	40 -440
Failure code [DK30KZ] ST lever: Disconnection or short circuit	40 -440
Failure code [DK30L8] ST lever: Signal mismatch	40 -441
Failure code [DK31KA] ST lever 2: Disconnection	40 -442
Failure code [DK31KB] ST lever 2: Short circuit	40 -444
Failure code [DK40KA] Brake potentiometer: Disconnection	40 -446
Failure code [DK40KB] Brake potentiometer: Short circuit	40 -448
Failure code [DK55KX] FR lever: Out of normal range	40 -450
Failure code [DK55KZ] FR lever: Disconnection or short circuit	40 -450
Failure code [DK55L8] FR lever: Signal mismatch	40 -451
Failure code [DK56KA] FR lever 1: Disconnection	40 -452
Failure code [DK56KB] FR lever 1: Short circuit	40 -454
Failure code [DK57KA] FR lever 2: Disconnection	40 -456
Failure code [DK57KB] FR lever 2: Short circuit	40 -458
Failure code [DK60KA] Acceleration sensor: Disconnection	40 -460
Failure code [DK60KB] Acceleration sensor: Short circuit	40 -462
Failure code [DKH1KA] Pitch angle sensor: Disconnection	40 -464
Failure code [DKH1KB] Pitch angle sensor: Short circuit	40 -466
Failure code [DLF1KA] T/C out-speed sensor: Disconnection	40 -468
Failure code [DLM3KA] Fan rev. sensor: Disconnection	40 -469
Failure code [DLM3MB] Fan control: Decline	40 -470
Failure code [DLT3KA] T/M out-speed sensor: Disconnection	40 -471
Failure code [DLT3KB] T/M out-speed sensor: Abnormal	40 -472
Failure code [DW59KA] Blade dual selector SOL disconnection	40 -473
Failure code [DW59KB] Blade dual selector SOL short circuit	40 -474
Failure code [DW59KY] Blade dual selector SOL hot short	40 -475
Failure code [DW5AKA] Blade pitch selector SOL disconnection	40 -476
Failure code [DW5AKB] Blade pitch selector SOL short circuit	40 -477
Failure code [DW5AKY] Blade pitch selector SOL Short circuit	40 -478
Failure code [DW7BKA] Fan rev EPC: Disconnection	40 -479
Failure code [DW7BKB] Fan rev EPC: Short circuit	40 -480
Failure code [DWN3KA] Ssp solenoid: Disconnection	40 -481

Replacement of element

1. Remove outer element (4). For details, see "Cleaning of outer element".
2. Remove inner element (5) and install new inner element (5) quickly to air cleaner body (6).
 - ★ Do not clean or reuse the inner element. When replacing the outer element, replace the inner element, too.

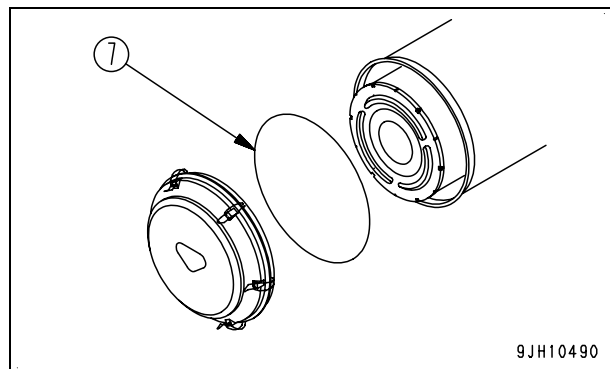


- ★ Install the air cleaner element so that its bottom (end with no hole) (B) will be on cover (3) side. If the air cleaner element is installed in reverse, it may be broken and the engine may be damaged seriously.
- ★ If the outer element and cover are installed while the inner element is not installed securely, the outer element may be broken. Therefore, install the inner element securely.



3. Push the outer element straight into the air cleaner body while swinging it up, down and laterally.
 - ★ Install the air cleaner element so that its bottom (end with no hole) (C) will be on cover (3) side. If the air cleaner element is installed in reverse, it may be broken and the engine may be damaged seriously.

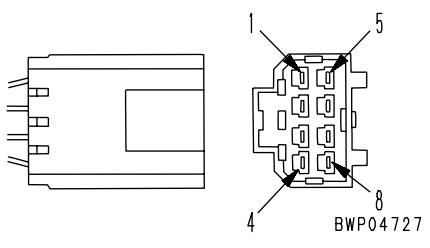
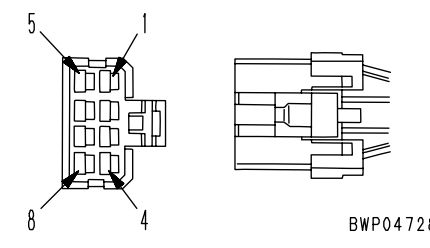
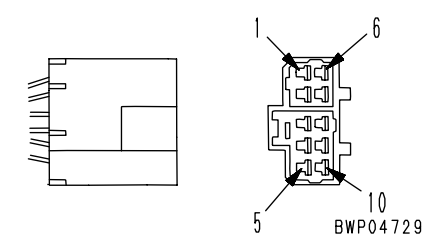
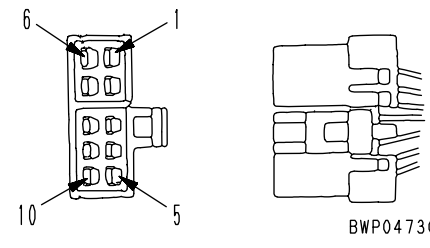
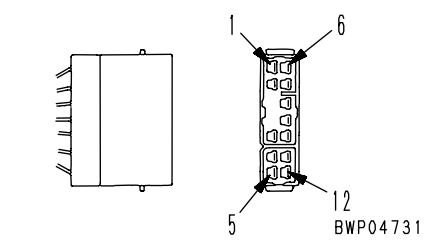
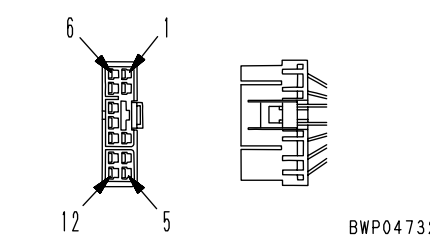
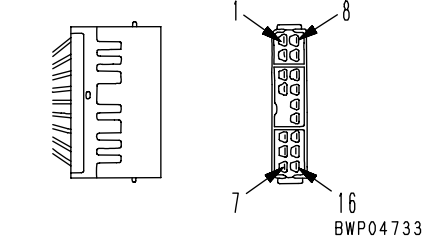
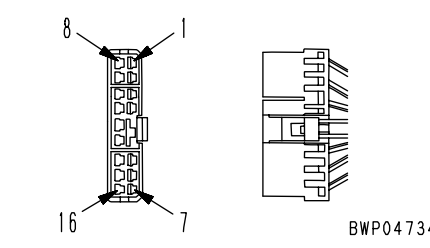
4. Replace O-ring (7) of cover (3) with a new one.



5. Install cover (3). For details, see "Cleaning of outer element".
6. Replace the seal of cover (3) with a new one.

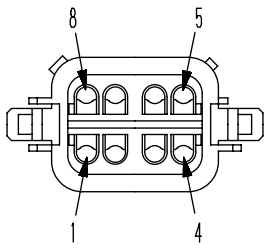
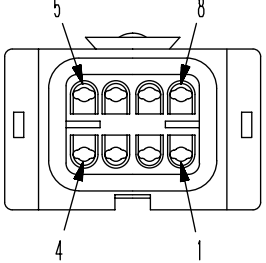
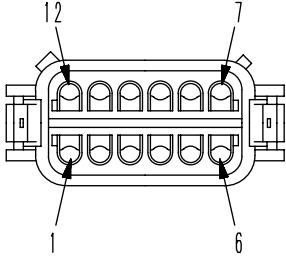
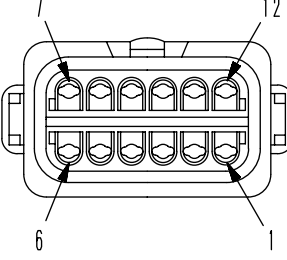
Failure codes table

Failure code	Trouble (Displayed on screen)	Component in charge	Action code	Category of record	Reference document page
1380MW	Lock up clutch:Slip	P/T	–	Electrical system	40-109
1500L0	Transmission clutch:Abnormal	P/T	E03	Electrical system	40-110
15E0MW	Transmission clutch:Slip	P/T	–	Electrical system	40-111
15SAL1	Forward clutch:Fill high	P/T	E03	Electrical system	40-112
15SALH	Forward clutch:Fill Low	P/T	E03	Electrical system	40-114
15SBL1	Reverse clutch:Fill high	P/T	E03	Electrical system	40-116
15SBLH	Reverse clutch:Fill Low	P/T	E03	Electrical system	40-118
15SEL1	Speed 1st clutch:Fill high	P/T	E03	Electrical system	40-120
15SELH	Speed 1st clutch:Fill Low	P/T	E03	Electrical system	40-122
15SFL1	Speed 2nd clutch:Fill high	P/T	E03	Electrical system	40-124
15SFLH	Speed 2nd clutch:Fill Low	P/T	E03	Electrical system	40-126
15SGL1	Speed 3rd clutch:Fill high	P/T	E03	Electrical system	40-128
15SGLH	Speed 3rd clutch:Fill Low	P/T	E03	Electrical system	40-130
15SJL1	L/U :Fill high	P/T	E02	Electrical system	40-132
15SJLH	L/U :Fill low	P/T	E02	Electrical system	40-134
1800MW	P/T clutch:Slip	P/T	E02	Electrical system	40-136
2201L1	Right clutch:Fill high	P/T	E04	Electrical system	40-138
2201LH	Right clutch:Fill low	P/T	E04	Electrical system	40-140
2202L1	Left clutch:Fill high	P/T	E04	Electrical system	40-142
2202LH	Left clutch:Fill low	P/T	E04	Electrical system	40-144
2300NR	Brake Thermal Load Abnormality	P/T	–	Mechanical system	40-146
2301L1	Right brake:Fill high	P/T	E04	Electrical system	40-148
2301LH	Right brake:Fill low	P/T	E04	Electrical system	40-150
2301NR	Steering Brake RH Thermal Load Abnormality	P/T	–	Mechanical system	40-152
2302L1	Left brake:Fill high	P/T	E04	Electrical system	40-154
2302LH	Left brake:Fill low	P/T	E04	Electrical system	40-156
2302NR	Steering Brake LH Thermal Load Abnormality	P/T	–	Mechanical system	40-158
7RFAKA	ECM ACC CUT RELAY:Disconnection	W/E	–	Electrical system	40-160
7RFAKB	ECM ACC CUT RELAY:Short circuit	W/E	–	Electrical system	40-162
AA10NX	Air Cleaner Clogging	MON	–	Mechanical system	40-164
AB00MA	Battery Charge Abnormal	MON	–	Mechanical system	40-166
B@BAZG	Eng Oil Press Low	ENG	–	Mechanical system	40-166
B@BAZK	Eng oil level low	MON	–	Mechanical system	40-167
B@BCNS	Eng Water Overheat	ENG	–	Mechanical system	40-168
B@BCZK	Eng water level low	MON	–	Mechanical system	40-169
B@CENS	T/C Oil Overheat	P/T	–	Mechanical system	40-170
B@HANS	Hyd Oil Overheat	P/T	–	Mechanical system	40-171
B@HAZK	Hyd Oil Level Low	W/E	–	Mechanical system	40-172
CA111	ECM Critical Internal Failure	ENG	E03	Electrical system	40-174
CA115	Eng Ne and Bkup Speed Sens Error	ENG	E03	Electrical system	40-176
CA122	Chg Air Press Sensor High Error	ENG	E03	Electrical system	40-178
CA123	Chg Air Press Sensor Low Error	ENG	E03	Electrical system	40-180
CA131	Throttle Sensor High Error	ENG	E03	Electrical system	40-182
CA132	Throttle Sensor Low Error	ENG	E03	Electrical system	40-184
CA135	Eng Oil Press Sensor High Error	ENG	E02	Electrical system	40-186
CA141	Eng Oil Press Sensor Low Error	ENG	E01	Electrical system	40-188
CA144	Coolant Temp Sens High Error	ENG	E01	Electrical system	40-190
CA145	Coolant Temp Sens Low Error	ENG	E01	Electrical system	40-192
CA153	Chg Air Temp Sensor High Error	ENG	E01	Electrical system	40-194

No. of pins	S type connector		
	Male (female housing)	Female (male housing)	Testing connection use special tool Part No.
8	 <p>BWP04727</p>	 <p>BWP04728</p>	799-601-7140 (T-adapter)
	Part No. : 08056-10871	Part No. : 08056-10881	
10 (White)	 <p>BWP04729</p>	 <p>BWP04730</p>	799-601-7150 (T-adapter)
	Part No. : 08056-11071	Part No. : 08056-11081	
12 (White)	 <p>BWP04731</p>	 <p>BWP04732</p>	799-601-7350 (T-adapter)
	Part No. : 08056-11271	Part No. : 08056-11281	
16 (White)	 <p>BWP04733</p>	 <p>BWP04734</p>	799-601-7330 (T-adapter)
	Part No. : 08056-11671	Part No. : 08056-11681	

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

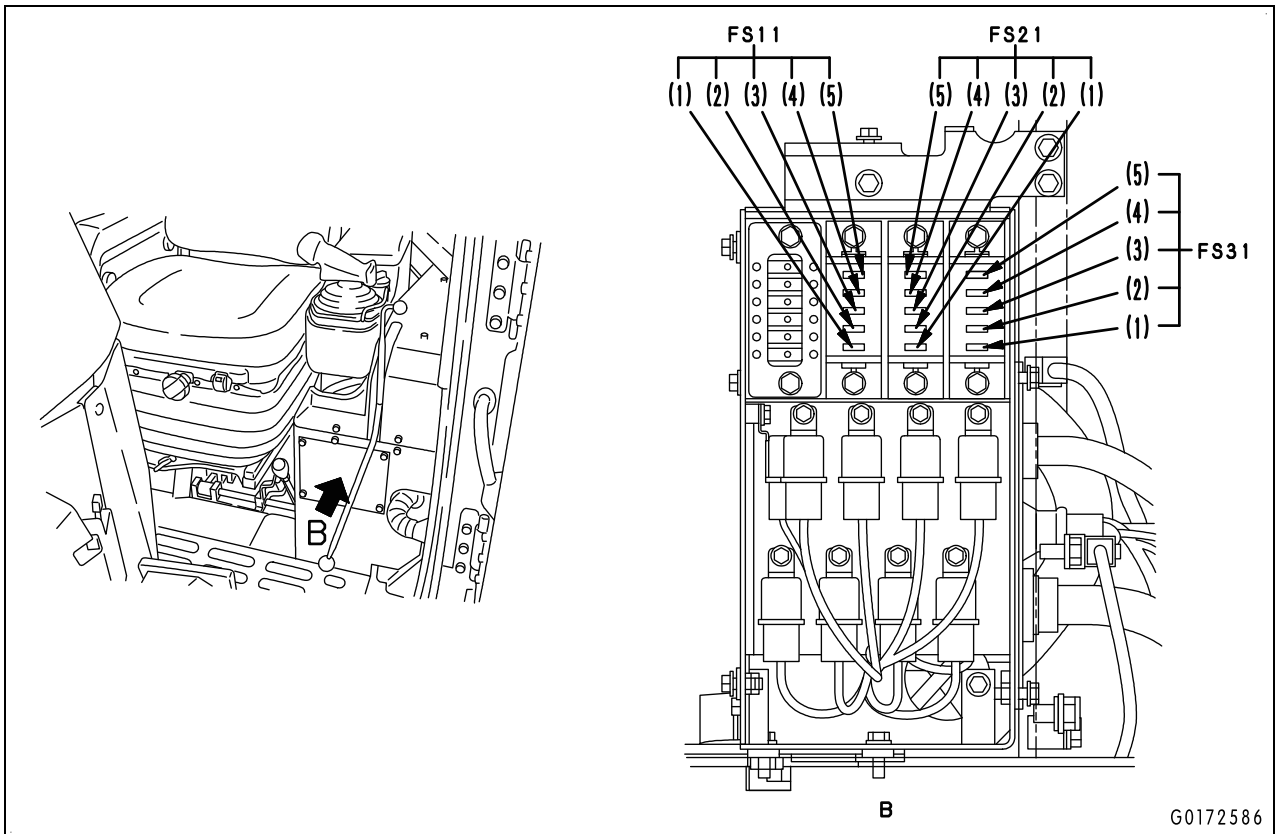
No. of pins	DT Series connector		
	Body (plug)	Body (receptacle)	Testing connection use special tool Part No.
8	 <p style="text-align: center;">BWP05045</p>	 <p style="text-align: center;">BWP05046</p>	8GR: 799-601-9060 (T-adapter) 8B: 799-601-9070 (T-adapter) 8G: 799-601-9080 (T-adapter) 8BR: 799-601-9090 (T-adapter)
	Part No. : 08192-1820□ (normal type) 08192-2820□ (fine wire type)	Part No. : 08192-1810□ (normal type) 08192-2810□ (fine wire type)	
12	 <p style="text-align: center;">BWP05047</p>	 <p style="text-align: center;">BWP05048</p>	12GR: 799-601-9110 (T-adapter) 12B: 799-601-9120 (T-adapter) 12G: 799-601-9130 (T-adapter) 12BR: 799-601-9140 (T-adapter)
	Part No. : 08192-1920□ (normal type) 08192-2920□ (fine wire type)	Part No. : 08192-1910□ (normal type) 08192-2910□ (fine wire type)	

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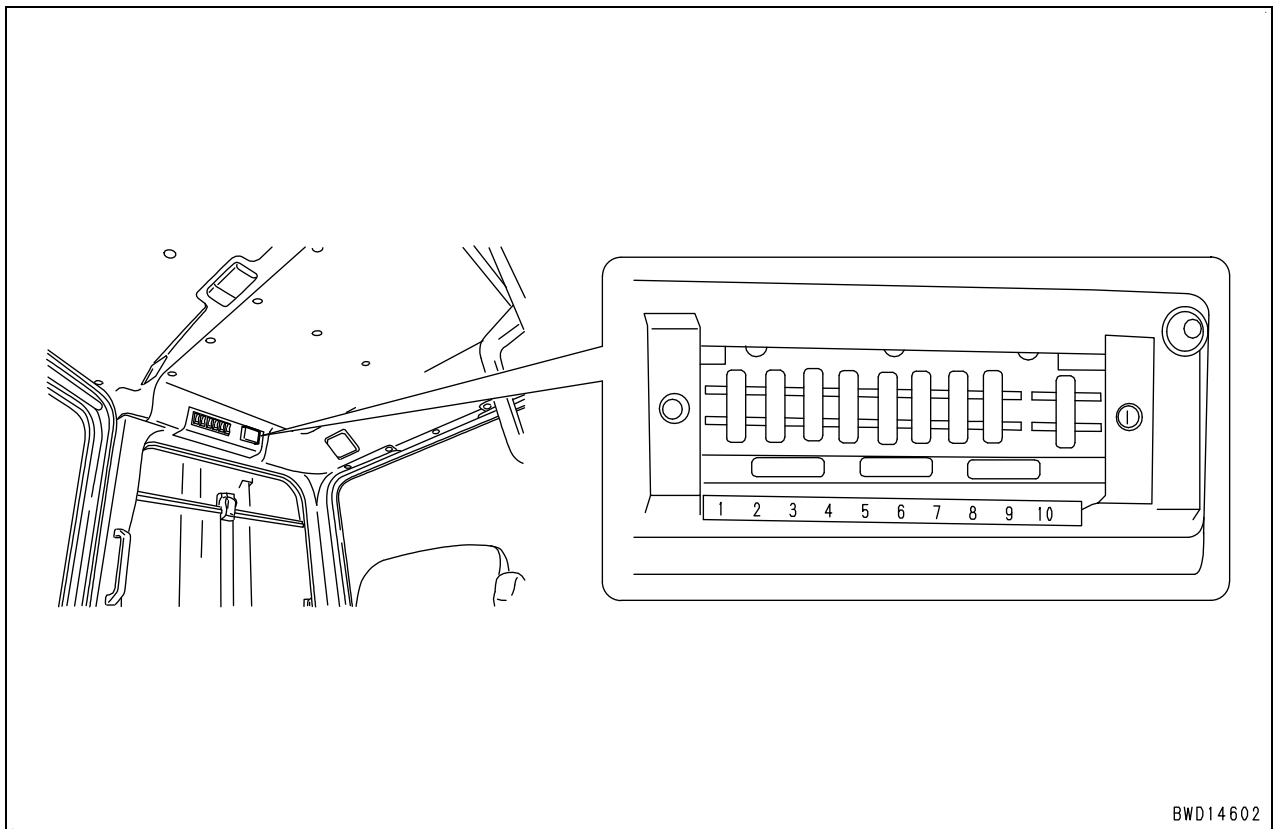
Connector No.	Connector type	Number of pins	Location	Address
CN-6_1	-	1	Heated wire glass relay (EU model)	-
CN-6_2	-	1	Heated wire glass relay (EU model)	-
CN-81	-	2	Room lamp	E-9
CN-9	-	6	Front wiper motor	D-8
CN-AL1	-	2	Headlamp (left)	-
CN-AL2	-	2	Headlamp (right)	-
CN-AL3	-	2	Headlamp (left rear)	-
CN-AL4	-	2	Headlamp (right rear)	-
CN-AL5	-	2	Back-up lamp (left)	-
CN-AL6	-	2	Back-up lamp (right)	-
CN-SM1	-	5		-
CONV	DT	6	Converter	S-1
CT2	DT	3	CAN terminating resistor	AJ-2
CTV	DT	3	CAN terminating resistor	W-2
DEC	DT	3	Deceleration potentiometer	Q-1
DIAL	H	3	Fuel control dial	S-8
DL1	BENDIX	5	VHMS download connector	K-9
DLSW	Terminal	4	Download switch	K-8
DLT	DT	2	VHMS download light	K-9
DPNL	-	2	Emergency evacuation system circuit (C/B model)	AC-1
DS1	DT-B	12	Intermediate connector	N-4
DS2	DT-C	12	Intermediate connector	N-3
DS3	DT-A	12	Intermediate connector	N-4
DS4	DT-D	12	Intermediate connector	N-3
DS5	DT-B	12	Intermediate connector	N-3
E	Terminal	1	Alternator E terminal	AG-1

Connector No.	Connector type	Number of pins	Location	Address
E22	DT-A	12	Intermediate connector	AJ-2
EFP	DT	2	Electric priming pump	AI-1
EG1	DTP04-2P	2	Intermediate connector	AJ-3
EG2	DT-B	12	Intermediate connector	AJ-3
EG3	DT	4	Intermediate connector	AJ-3
EG4	DT-A	12	Intermediate connector	C-7
EG5	DT	4	Intermediate connector	C-8
EG6	DT	6	Intermediate connector	C-7
EGC2	DRC26-50S04	50	Engine controller	AJ-3
EGC3	DTP06-4S	4	Engine controller	AJ-2
EGR	DT	2	EGR valve	AF-3
EHL	Relay	5	Engine holding relay	W-7
ENBP	DT	3	Blow-by pressure sensor	AI-1
ENG	DRC-60	60	Engine controller	AJ-2
EPP	DT	6	(Spare)	C-1
ES2	DT	2	Intermediate connector (male)	E-9
ESD	DT	3	Service connector	T-2
EXAF	DT	3	Exhaust gas temperature sensor, front amp	X-3
EXAR	DT	3	Exhaust gas temperature sensor, rear amp	V-3
EXHF	DT	2	Exhaust gas temperature sensor (front)	AF-9
EXHR	DT	2	Exhaust gas temperature sensor (rear)	AE-8
EXTF	DT	2	Exhaust gas temperature sensor, front amp	X-3
EXTR	DT	2	Exhaust gas temperature sensor, rear amp	V-2

Mounting location of fuse boxes FS11 to FS31



Mounting location of fuse box (Cab top end)

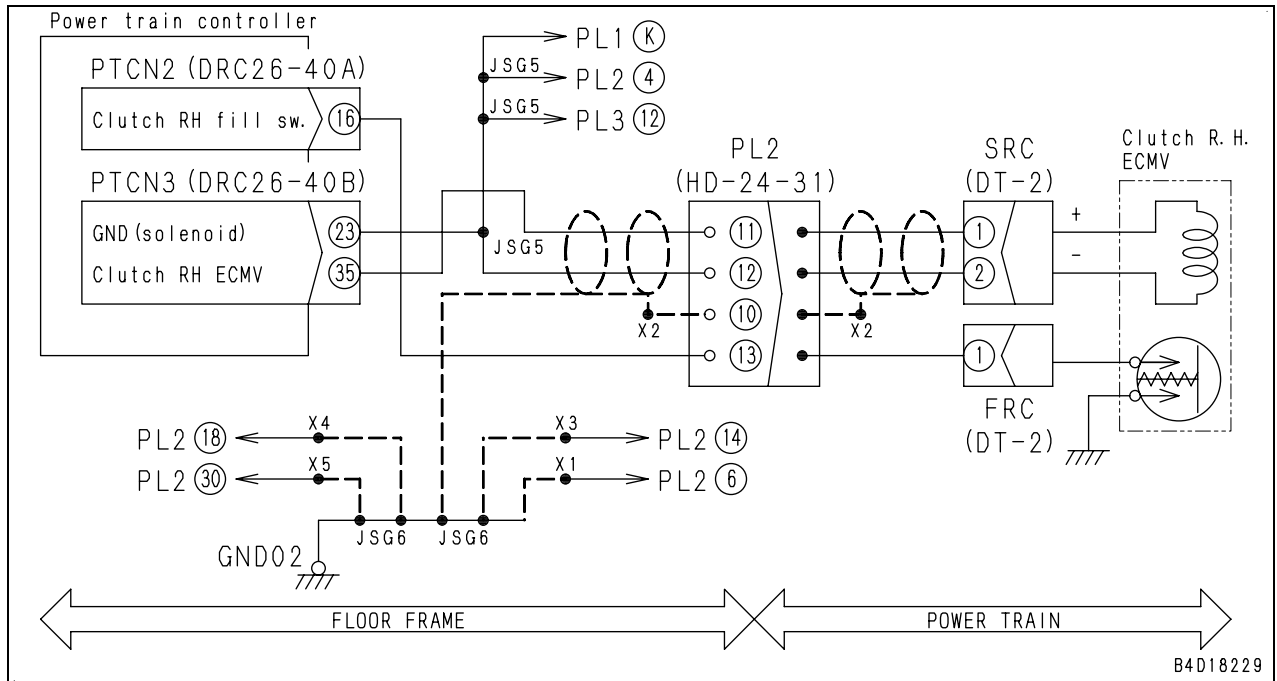


Failure code [15SFL1] Speed 2nd clutch: Fill high

Action code E03	Failure code 15SFL1	Failure	Speed 2nd clutch fill switch is ON. (Power train controller system)
Detail of failure	<ul style="list-style-type: none"> Nevertheless controller does not output command current to transmission 2nd clutch ECMV solenoid circuit, fill switch signal is turned ON. 		
Action of controller	<ul style="list-style-type: none"> Limits operation of engine and transmission. 		
Problem on machine	<ul style="list-style-type: none"> Once machine is stopped, engine speed is limited to medium (half). Once machine is stopped, travel is limited to F2 and R2. The automatic gearshift system does not operate. 		
Related information	<ul style="list-style-type: none"> State (ON/OFF) of 2nd clutch ECMV fill switch signal can be checked with monitoring function. (Code: 40906 T/M Fill Sw Input 1) Method of reproducing failure code: Start engine and set PCCS lever in neutral position. Remove seat (approx. 50 kg) and cover under seat. First, check the power train oil filter for clogging etc. Next, check that clutch pressure is normal by referring to Testing and adjusting, "Testing power train oil pressure". 		

Cause		Procedure, measuring location, criteria and remarks			
1	Defective 2nd clutch ECMV fill switch (Internal short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector F2T and connect T-adapter to male side.			
		Between F2T (female) (1) and ground (Fill switch OFF)	Resistance	Min. 1 MΩ	
2	Ground fault of wiring harness or defective power train controller	1. Turn starting switch to OFF position. 2. Disconnect connector F2T. 3. Start engine			
		If failure code [15SFL1] is still displayed, there is ground fault of wiring harness or power train controller is defective. (If failure code [15SFL1] is not displayed, 2nd clutch fill switch is defective)			
3	Ground fault of wiring harness (Contact with ground circuit)	★ If cause 2 is not the cause for the trouble, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN2 and F2T, and connect T-adapter to female side of either of them.			
		Between PTCN2 (female) (25) or F2T (female) (1) and ground	Resistance	Min. 1 MΩ	
4	Defective power train controller	If "check result of cause 2 is abnormal" and "check result of cause 3 is normal", power train controller is defective.			
		● Reference; the followings are criteria in normal condition.			
		1. Turn starting switch to OFF position. 2. Insert T-adapter into connector PTCN2. 3. Start engine			
		★ Keep PCCS lever in N position.			
		Between PTCN2 (25) and ground	Voltage	7 – 11 V	
		1 – 3 are same as above.			
		4. While depressing brake pedal, operate PCCS lever (to select gear speed) and perform troubleshooting.			
		Between PTCN2 (25) and ground	F2/R2	Voltage	Max. 1 V

Circuit diagram related to right clutch ECMV

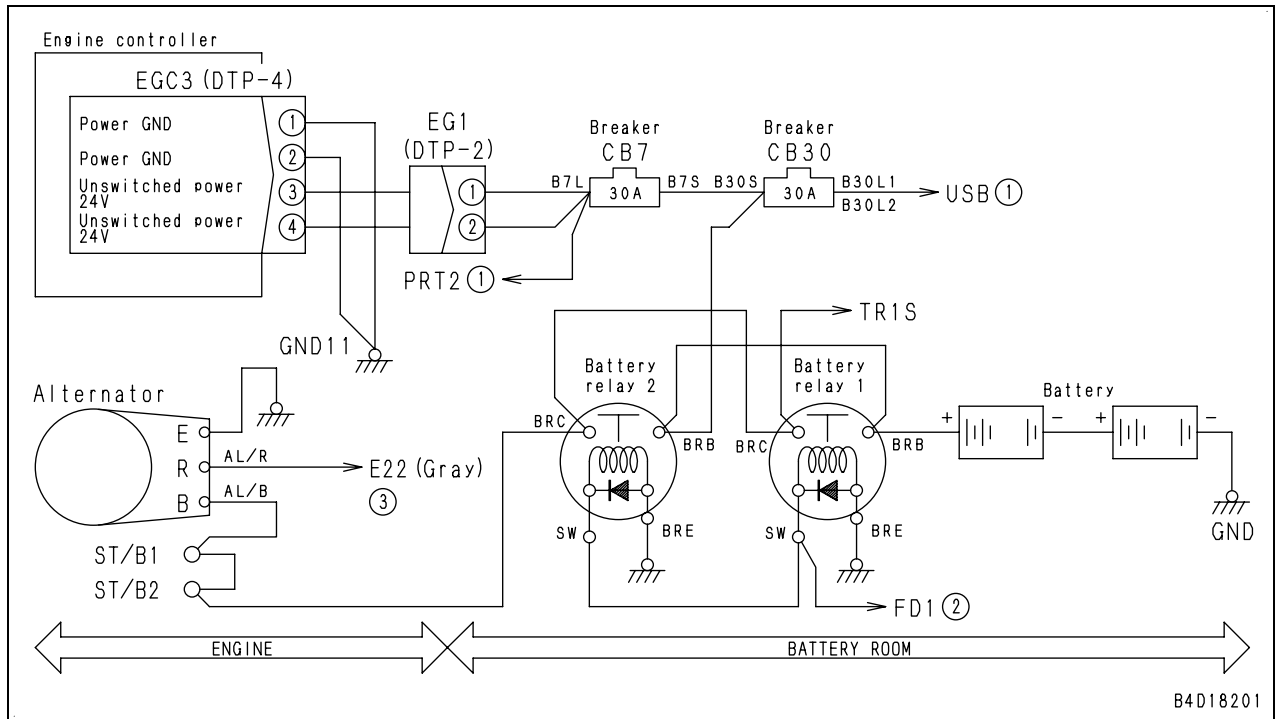


Failure code [2302NR] Steering Brake LH Thermal Load Abnormality

Action code	Failure code	Failure	Left steering brake thermal load abnormality (Power train controller system)
-	2302NR		
Detail of failure	<ul style="list-style-type: none"> Power train controller judged from the angle of inclination, travel speed and continuous operating time of the left steering that the steering brake was heating abnormally. 		
Action of controller	<ul style="list-style-type: none"> None in particular. 		
Indication of problem on machine	-		
Related information	-		

Cause		Procedure, measuring location, criteria and remarks	
1	Improper steering during downhill travel (Machine traveled down a slope and was steered to left continuously)		
2	Defective power train controller	When the operation in cause 1 is not performed	

Circuit diagram related to engine controller power supply



Failure code [CA145] Coolant Temp Sens Low Error

Action code	Failure code	Failure	Coolant temperature sensor signal voltage is too low (Engine controller system)
E01	CA145		
Detail of failure	<ul style="list-style-type: none"> Low voltage was detected in engine coolant temperature sensor signal circuit. 		
Action of controller	<ul style="list-style-type: none"> Sets coolant temperature to fixed temperature (90 °C),and allows for operation. 		
Problem on machine	<ul style="list-style-type: none"> Engine does not start easily at low temperature. Overheat prevention function does not work. 		
Related information	<ul style="list-style-type: none"> Signal voltage from engine coolant temperature sensor can be checked with monitoring function (Code: 04105 (V)). Temperature sensed by engine coolant temperature sensor can be checked with monitoring function (Code: 04107 (°C)). Method of reproducing failure code: Turn starting switch to ON position. If temperature sensor connector is disconnected, this failure code is not displayed but failure code for High Error is displayed. 		

Cause		Procedure, measuring location, criteria and remarks			
1	Defective wiring harness connector	Directly check wire harness and connectors by referring to "c. Electrical equipment" described in "Check before troubleshooting" of "General information on troubleshooting".			
2	Defective coolant temperature sensor	1. Turn starting switch to OFF position. 2. Disconnect connector TWTR and connect socket to male side of connector. ★ If coolant temperature sensor has resistance of 700 Ω - 37 kΩ with coolant temperature above 0 °C, regard coolant temperature sensor as normal.			
		Between TWTR (male) (A) and (B) ★ Coolant temperature-Resistance characteristics	0 °C	Resistance	30 - 37 kΩ
			25 °C	Resistance	9.3 - 10.7 kΩ
			50 °C	Resistance	3.2 - 3.8 kΩ
			80 °C	Resistance	1.0 - 1.3 kΩ
			95 °C	Resistance	700 - 800 Ω
Between (B) and ground	All coolant temperature range	Resistance	Min. 1 MΩ		
3	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector ENG and connect T-adapter to female side.			
		Between ENG (female)(15) and (38) (Coolant temperature: Min. 0 °C) ★ Use "coolant temperature -Resistance characteristics" table shown above as resistance criteria.	Resistance	700 Ω - 37 kΩ	
4	Ground fault in wiring harness (Contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors ENG and TWTR, and connect T-adapter to female side of ENG.			
		Between ENG (female) (15) and ground	Resistance	Min. 1 MΩ	
5	Defective engine controller	If no abnormality is found by above checks, engine controller is defective. (Since this is an internal failure, troubleshooting cannot be performed.)			

Failure code [CA234] Eng Overspeed

Action code	Failure code	Failure	Engine overspeed (Engine controller defective)
E02	CA234		
Detail of failure	<ul style="list-style-type: none"> ● Engine speed exceeded operating range. 		
Action of controller	<ul style="list-style-type: none"> ● Reduce fuel injection rate until engine speed lowers in operating range. 		
Problem on machine	<ul style="list-style-type: none"> ● Engine speed fluctuates. 		
Related information	<ul style="list-style-type: none"> ● Engine speed can be checked by monitoring function (Code: 01002 (rpm)). ● Method of reproducing failure code: Start engine and keep it running at high idle. 		

Cause		Procedure, measuring location, criteria and remarks
1	Use of improper fuel	Improper fuel may be used. Check it directly.
2	Defect in related system	If another failure code is displayed, perform troubleshooting for it.
3	Usage is improper	The method of using machine may be improper, so instruct the operator on how to use machine properly.
4	Defective engine controller	If causes 1 and 2 are not cause of failure, engine controller may be defective. (Since this is an internal failure, troubleshooting cannot be performed.)

Failure code [CA325] Inj #6 (L#6) Open/Short Error

Action code	Failure code	Trouble	Injector #6 (L#6) open / short circuit error (Engine controller system)
E03	CA325		
Detail of failure	● Opening or short circuit was detected in drive circuit of No. 6 injector.		
Action of controller			
Problem on machine	<ul style="list-style-type: none"> ● Engine output drops. ● Engine speed does not stabilize. 		
Related information	<ul style="list-style-type: none"> ● Method of reproducing failure code: Start engine. ● Pulse voltage of approx. 65 V is normally supplied to injector (+) side while engine is running normally but it cannot be measured with circuit tester . 		

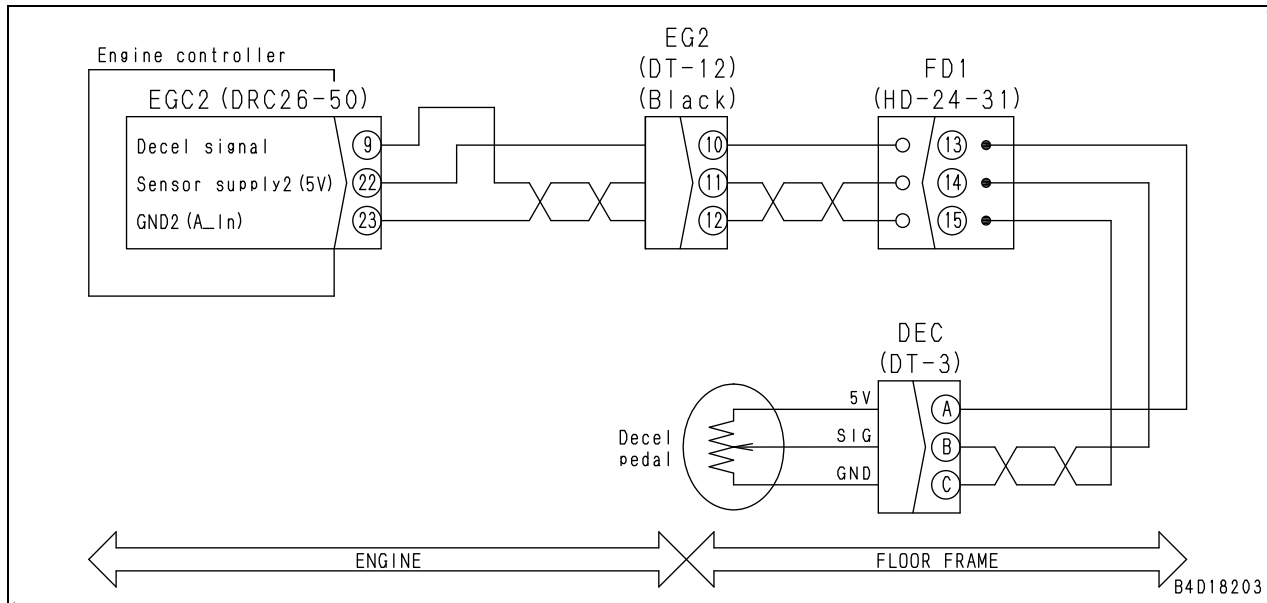
Cause		Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	See descriptions of wiring harness and connectors in "c: Electrical equipment" in "Checks before troubleshooting" of "General information on troubleshooting" , and check them directly.		
2	Defective injector #6	1. Turn starting switch to OFF position.		
		2. Disconnect connector CN6 and connect T-adapter to male side.		
		Between CN6 (male) (1) and (2)	Resistance	0.4 - 1.1 Ω
		Between CN6 (male) (1) and ground	Resistance	Min. 1 MΩ
3	Disconnection in, or ground fault of wiring harness	1. Turn starting switch to OFF position.		
		2. Disconnect connector ENG and connect T-adapter to female side.		
		Between ENG (female) (57) – (59)	Resistance	0.4 - 1.1 Ω
		Between ENG(female)(57) and ground	Resistance	Min. 1 MΩ
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 ENG and CN6, and connect T-adapters to each female side.		
		Between ENG (female) (57) and CN6 (female) (1)	Resistance	Max. 1 Ω
		Between ENG (female) (59) and CN6 (female) (2)	Resistance	Max. 1 Ω
5	Ground fault of wiring harness (Contact with GND circuit)	★ 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 ENG and CN6, and connect T-adapter to female side of either one of them.		
		Between ENG (female) (57) or CN6 (female) (1) and ground	Resistance	Min. 1 MΩ
6	Short circuit in wiring harness	1. Turn starting switch to OFF position.		
		2. Disconnect connectors ENG and CN6, and connect T-adapter to female side of ENG.		
		★ Check with circuit tester in continuity mode.		
		Between ENG (female) (57) and each pin other than pin (57) pin.	No continuity (No sound is heard)	
		Between ENG (female) (59) and each pin other than pin (59) pin.	No continuity (No sound is heard)	
7	Defective injector or wiring harness of another cylinder	If the failure codes for other injectors are displayed, perform troubleshooting for them, too.		
8	Defective engine controller	If no abnormality is found by above checks, engine controller is defective. (Since failure is in it, troubleshooting cannot be performed.)		

Failure code [CA2186] Throt Sens Sup Volt Low Error

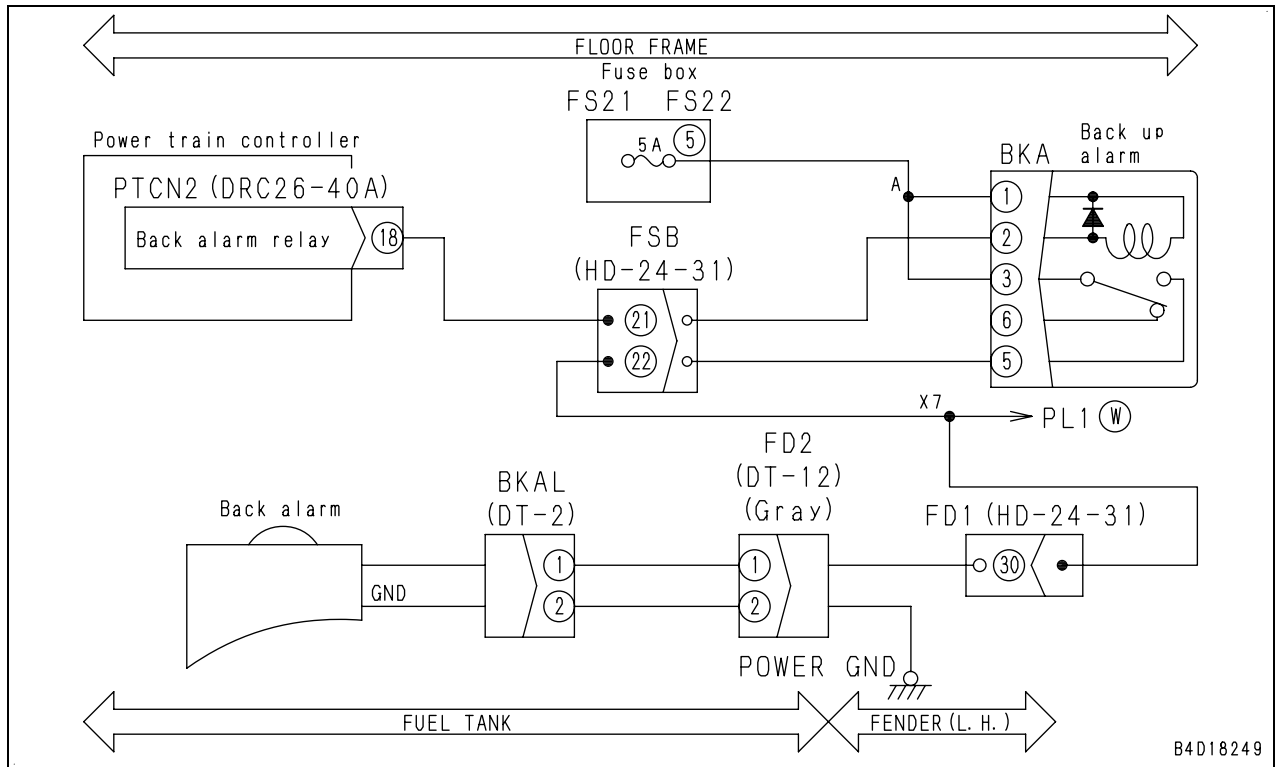
Action code	Failure code	Failure	Throttle sensor power supply voltage is too low (Engine controller system)
E03	CA2186		
Detail of failure	<ul style="list-style-type: none"> Low voltage was detected in throttle sensor power supply circuit. 		
Action of controller	<ul style="list-style-type: none"> Controls engine with decelerator pedal position at fixed value. 		
Problem on machine	<ul style="list-style-type: none"> Engine speed cannot be controlled with decelerator pedal. 		
Related information	<ul style="list-style-type: none"> Method of reproducing failure code: Turn starting switch to ON position. 		

Cause	Procedure, measuring location, criteria and remarks		
1 Defective wiring harness connector	Directly check wire harness and connectors by referring to "c. Electrical equipment" described in "Check before troubleshooting" of "General information on troubleshooting".		
2 Defective throttle sensor (decelerator pedal)	1. Turn starting switch to OFF position. 2. Disconnect connector DEC and turn starting switch to ON position. If this failure code is not displayed, throttle sensor is defective. ★ Other failure code is displayed together. This is because that the sensor connector is disconnected. Ignored except the failure code other than [CA2186].		
3 Ground fault of wiring harness (Contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors EGC2 and DEC and connect T-adapters to either female side. Between EGC2 (female) (22) or DEC (female) (A) and ground	Resistance	Min. 1 MΩ
4 Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector EGC2 and DEC and connect T-adapter to female side of EGC2. 3. Turn starting switch to ON position. Between EGC2 (female) (22) and each pin other than EGC2 (female) (22) pin	Resistance	Min. 1 MΩ
5 Defective engine controller	1. Turn starting switch to OFF position. 2. Disconnect connector EGC2 and connect T-adapter to male side. 3. Turn starting switch to ON position with connecting engine wiring harness disconnected. Between EGC2 (female) (22) and (23)	Voltage	4.75–5.25V

Circuit diagram related to decelerator pedal



Circuit diagram related to back-up alarm relay



B4D18249

Cause		Procedure, measuring location, criteria and remarks		
13	Open circuit in wiring harness (wire breakage or defective contact of connector)	<ul style="list-style-type: none"> ● ACC signal from starting switch <ol style="list-style-type: none"> 1. Turn starting switch to OFF position and disconnect ground strap. 2. Insert T-adapters into connectors PTCN3, WECN3, V1, CM01, ACT and EGC2. 3. Connect the ground cable and turn the starting switch to ON position. 		
		Between PTCN3 (14) or (24) and (31)	Voltage	20 – 30 V
		Between WECN3 (14) or (24) and (31)	Voltage	20 – 30 V
		Between V1 (17) and (19)	Voltage	20 – 30 V
		Between CM01 (14) and (3)	Voltage	20 – 30 V
		Between ACT(1), (3) and ground	Voltage	20 – 30 V
14	Ground fault in wiring harness (Contact with ground circuit)	<ul style="list-style-type: none"> ● CAN communication line ★ If another failure code related to CAN communication such as [DB2RKR] is displayed on machine monitor, this check is not required. ★ If check result of cause item 11 is normal (there is open circuit), measure at only 1 place. <ol style="list-style-type: none"> 1. Turn starting switch to OFF position and disconnect ground strap. 2. Disconnect connectors PTCN2, WECN2, V4A, CM02 and EGC2, and connect T-adapters to either female side. 		
		Between PTCN2 (female) (32), WECN2 (female) (32), V4A (female) (4), CM02 (female) (8), (9) or EGC2 (female) (46) and ground	Resistance	Min. 1 MΩ
		Between PTCN2 (female) (22), WECN2 (female) (22), V4A (female) (12), CM02 (female) (10) or EGC2 (female) (47) and ground	Resistance	Min. 1 MΩ
		<ul style="list-style-type: none"> ● ACC signal from starting switch <ol style="list-style-type: none"> 1. Turn starting switch to OFF position and disconnect ground strap. 2. Disconnect connectors PTCN3, WECN3, V1, CM01 and ACT, and connect T-adapters to either female side. 3. Disconnect connectors EGC2 and connect T-adapter to female side. 		
		Between PTCN3 (female) (14), (24), WECN3 (female) (14), (24), V1 (female) (17) or CM01 (female) (14) and ground	Resistance	Min. 1 MΩ
		Between EGC2 (female) (39) and ground	Resistance	Min. 1 MΩ
15	Short circuit or hot short circuit in wiring harness (Contact with 24 V circuit)	<ul style="list-style-type: none"> ★ If another failure code related to CAN communication such as [DB2RKR] is displayed on machine monitor, this check is not required. ★ If check result of cause item 11 is normal (there is no disconnection), measure at only 1 place each. <ol style="list-style-type: none"> 1. Turn starting switch to OFF position and disconnect ground strap. 2. Insert T-adapter into connector PTCN2, WECN2, V4A, CM02 or EGC2. 3. Connect ground strap. 4. Turn starting switch to ON position. <ul style="list-style-type: none"> ★ Since voltages of CAN H and CAN L are 2.5 ± 1 V even while communication is continued, they are judged to be normal if they are 1 - 4 V. 		
		Between PTCN2 (32), WECN2 (32), V4A (4), CM02 (8), (9) or EGC2(46) and ground	Voltage	1 – 4 V
		Between PTCN2 (22), WECN2 (22), V4A(12), CM02(10), or EGC2 (47) and ground	Voltage	1 – 4 V

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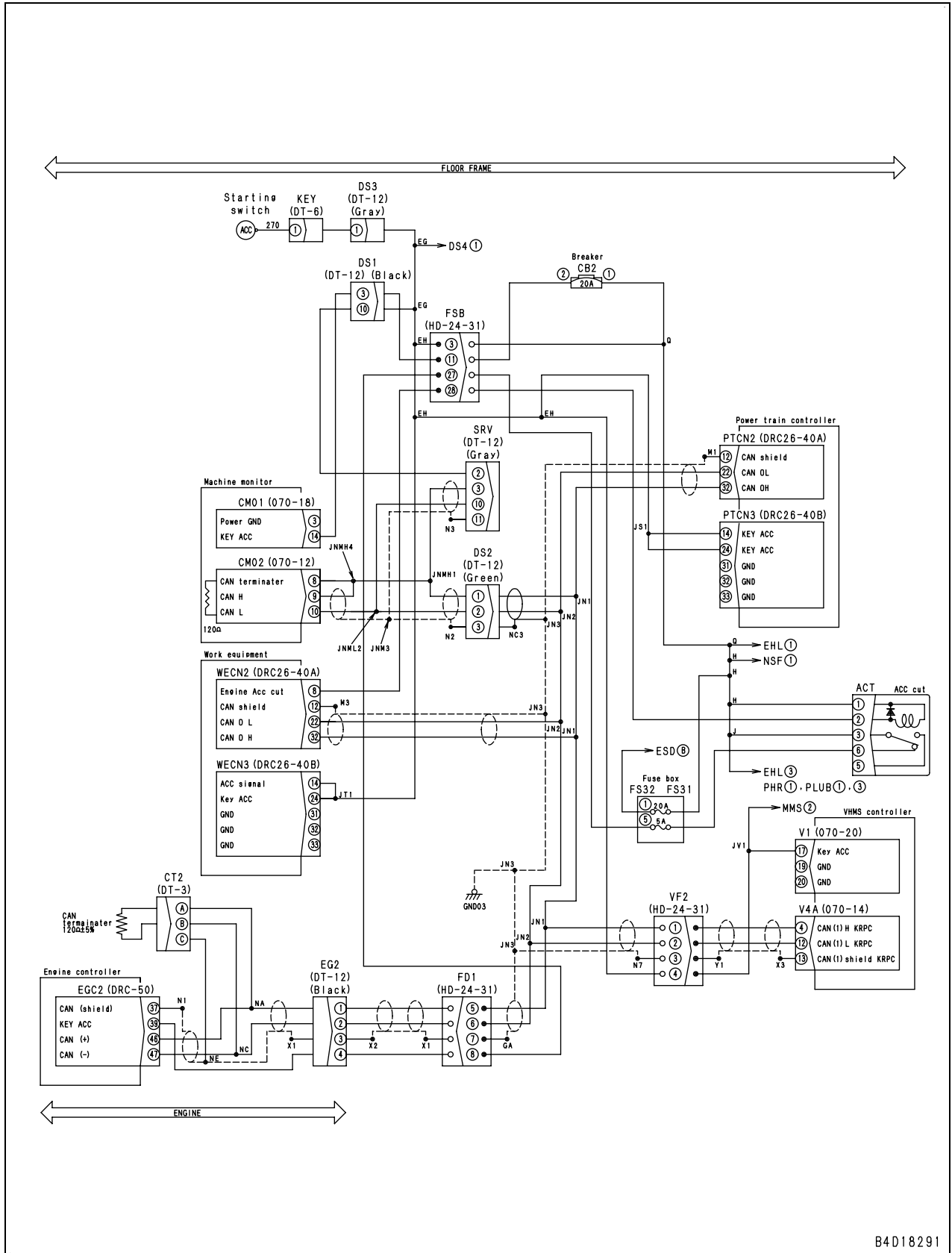
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Circuit diagram related to CAN



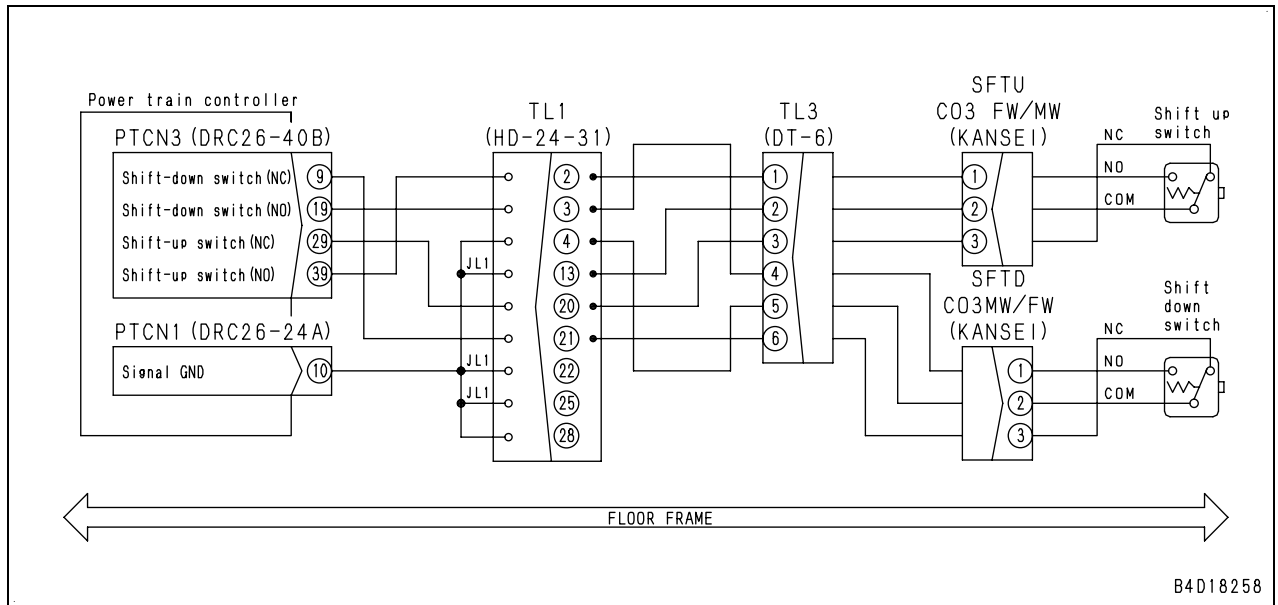
B4D18291

Failure code [DBE5KK] PT cont.: Sensor voltage 5 V (1) reduction

Action code E03	Failure code DBE5KK	Failure	Power train controller 5 V power supply (1) abnormality (Power train controller system)
Detail of failure	<ul style="list-style-type: none"> • Voltage of 5 V power supply (1) circuit from power train controller to sensors is below 4.5 V or above 5.5 V. • Abnormal current flowed in 5 V power supply (1) circuit for power train controller sensors. 		
Action of controller	<ul style="list-style-type: none"> • Stops output to 5 V power supply (1) circuit, if abnormal current flows. • Limits operation of engine and transmission. 		
Problem on machine	<ul style="list-style-type: none"> • System may not operate properly. • Once machine is stopped, engine speed is limited to half of full speed. • Once machine is stopped, travel is limited to F1 and R1. 		
Related information	<ul style="list-style-type: none"> • Method of reproducing failure code: Turn the starting switch to ON position. 		

Causes		Procedure, measuring location, criteria and remarks		
1	Defective fuel control dial, brake pedal or PCCS lever (Internal defect)	1. Turn starting switch to OFF position. 2. Disconnect following connectors one by one and turn starting switch to ON position each time. 3. After troubleshooting, return to 1.		
		<ul style="list-style-type: none"> • If this code is not displayed when a sensor is disconnected, that sensor is defective. 		
		★ Other failure codes are displayed at the same time. This is because the connector is disconnected. Ignore failure codes other than [DBE5KK].		
		Device	Connector	
		Fuel control dial	DIAL	
2	Defective transmission controller	1. Turn starting switch to OFF position. 2. Disconnect connector PTCN1 and connect T-adaptor to female side. 3. Turn starting switch to ON position.		
		Between ground and any one of PTCN1 (female) (22) and (21)	Voltage	4.5 – 5.5 V
3	Ground fault of wiring harness (Contact with GND circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN1, DIAL and TL2, and connect T-adaptor to female side of any one of them.		
		Between ground and any one of PTCN1 (female) (22), TL2 (female) (4)/(5), BRK (C) or DIAL (female) (1)	Resistance	Min. 1 MΩ
4	Hot short in wiring harness (Contact with 24 V circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors DIAL, TL2 and BRK, and connect T-adaptor to female side of any one of them. 3. Turn starting switch ON.		
		Between TL2 (female) (4) and (1), or between TL2 (female) (5) and (8), between BRK (C) and (A), or between DIAL (female) (1) and (3)	Voltage	4.5 – 5.5 V

Circuit diagram related to shift down switch



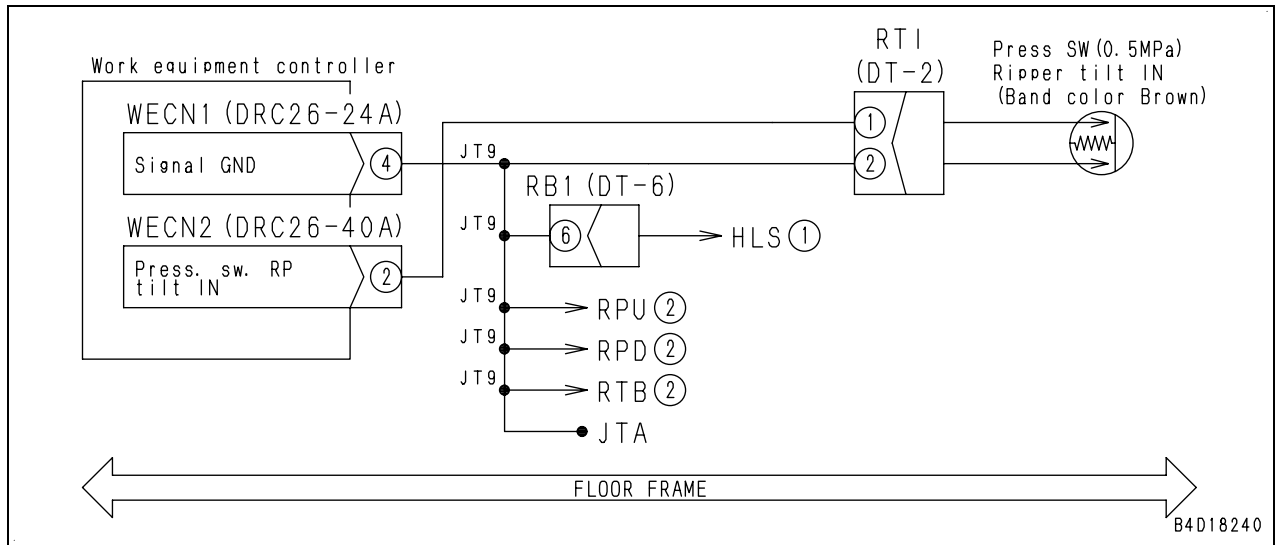
B4D18258

Failure code [DDN3LD] Blade tilt LH pressure SW abnormality

Action code	Failure code	Failure	Blade tilt left hand oil pressure switch is pressing for long time (Work equipment controller system)
—	DDN3LD		
Detail of failure	<ul style="list-style-type: none"> The signal of the blade tilt left oil pressure switch circuit is kept turned ON for 60 seconds. 		
Action of controller	<ul style="list-style-type: none"> Recognizes that the oil pressure switch is turned to OFF position. 		
Problems on machine	<ul style="list-style-type: none"> Data communication of VHMS may be abnormal. 		
Related information	<ul style="list-style-type: none"> The input state (ON/OFF) from the blade tilt left hand oil pressure switch can be checked monitoring function. (Code 90802: Blade oil pressure switch input state) Method of reproducing failure code: Turn the starting switch to ON position (Error is reproduced after 60 seconds). First, check the power train oil filter for clogging etc. Next, check that hydraulic pressure of work equipment is normal by referring to Testing and adjusting, "Testing work equipment hydraulic pressure". 		

Cause		Procedure, measuring location, criteria and remarks		
1	Wrong operation of lever (When electrical system is normal)	If the error code lamp still lights up (resetting is still urged) after the resetting operation is performed, it is suspected that the lever was operated to cause an error.		
2	Defective blade tilt left hand oil pressure switch (Internal short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector TLS and connect T-adaptor to male side. Between TLS (female)(1) and (2) (Oil pressure switch is OFF position)	Resistance	Min. 1 MΩ
3	Ground fault of wiring harness or defective work equipment controller	1. Turn starting switch to OFF position. 2. Disconnect connector TLS. 3. Turn starting switch to ON position (and wait for longer than 60 sec.) If failure code [DDN3LD] is still displayed, there is ground fault of wiring harness or work equipment controller is defective. (If failure code [DDN3LD] is not displayed, blade tilt left oil pressure switch is defective.)		
4	Ground fault of wiring harness (Contact with ground circuit)	★ If cause 3 is not the cause for the trouble, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors WECN2 and TLS, and connect T-adaptor to female side of either one of them. Between WECN2 (female) (17) and ground, or between TLS (female) (1) and ground.		
5	Defective work equipment controller	If "check result of cause 3 is abnormal" and "check result of cause 4 is normal", power train controller is defective. ● Reference; the followings are criteria in normal condition. 1. Turn starting switch to OFF position. 2. Insert T-adaptor into connector WECN1 and WECN2. 3. Start engine. ★ Keep PCCS lever in N position. Between WECN2(17) and WECN1(4)		
			Voltage	7 – 11 V
		1. – 3. are same as above.		
		Between WECN2(17) and WECN1(4)	L.H. tilt	Voltage Max. 1 V

Circuit diagram related to ripper tilt in oil pressure switch

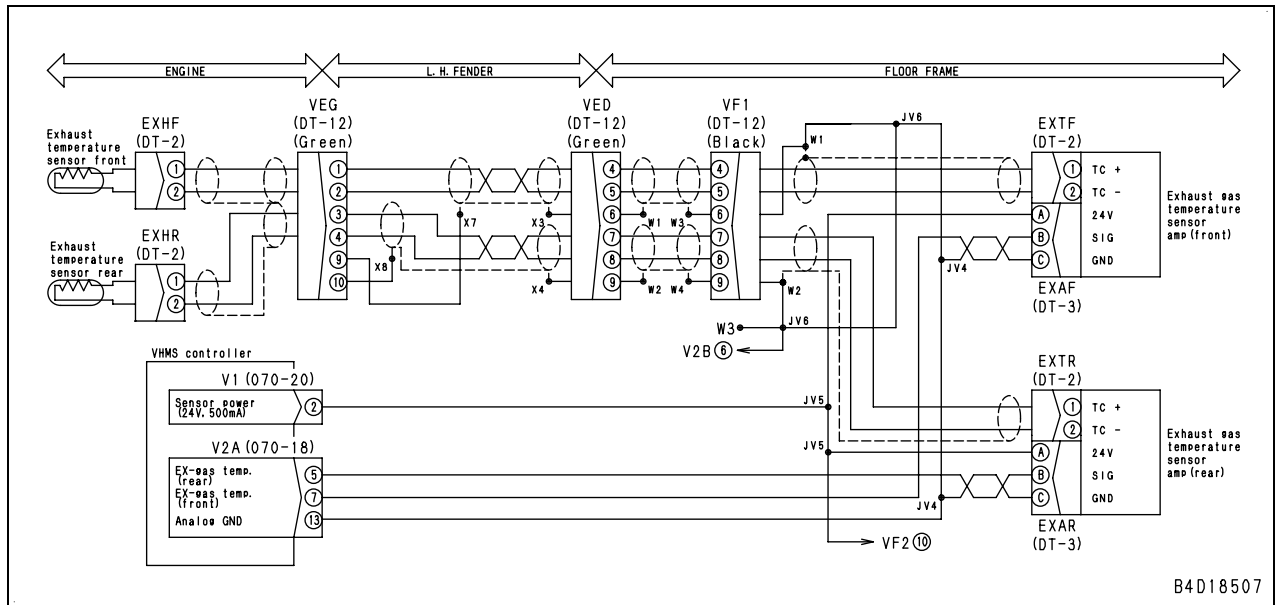


Failure code [DDTSLH] S/C: Fill low

Action code E02	Failure code DDTSLH	Failure	Stator clutch oil pressure 2 (Power train controller system)
Detail of failure	<ul style="list-style-type: none"> Nevertheless controller does not output to torque converter stator clutch ECMV solenoid circuit, fill switch signal is turned OFF. 		
Action of controller	<ul style="list-style-type: none"> None in particular 		
Problem on machine	<ul style="list-style-type: none"> Sufficient traveling torque may not be obtained 		
Related information	<ul style="list-style-type: none"> ON/OFF of stator clutch ECMV fill switch signal can be checked with monitoring function. (Code: 31520 T/M fill SW input 2) Method of reproducing failure code: Start engine. Remove seat (approx. 50 kg) and seat bottom cover. First, check the power train oil filter for clogging etc. Next, check that clutch pressure is normal by referring to Testing and adjusting, "Testing power train oil pressure". 		

Cause		Procedure, measuring location, criteria and remarks		
1	Defective stator clutch ECMV fill switch (Fill switch-dose not turn to ON position)	1. Turn starting switch to OFF position. 2. Disconnect connector FSTC and connect T-adapter to male side. 3. Start engine.		
		Between FSTC (female) (1) and ground (Fill switch: ON)	Resistance	Max. 1 Ω
2	Disconnection in wiring harness (Disconnection or defective contact)	1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN2 and FSTC and connect T-adapter to female side of either of them.		
		Between PTCN2 (female) (2) and FSTC (female) (1)	Resistance	Max. 1 Ω
3	Defective power train controller	If no abnormality is found by the above checks, power train controller is defective. <ul style="list-style-type: none"> Reference; the followings are criteria in normal condition. 1. Turn starting switch to OFF position. 2. Insert T-adapter into connector PTCN2.		
		Between PTCN2 (2) and ground	Voltage	7 – 11 V
		1–2 are same as above. 3. Start engine. ★ Keep PCCS lever in N position.		
		Between PTCN2 (2) and ground	Voltage	Max. 1 V

Circuit diagram related to exhaust temperature sensor

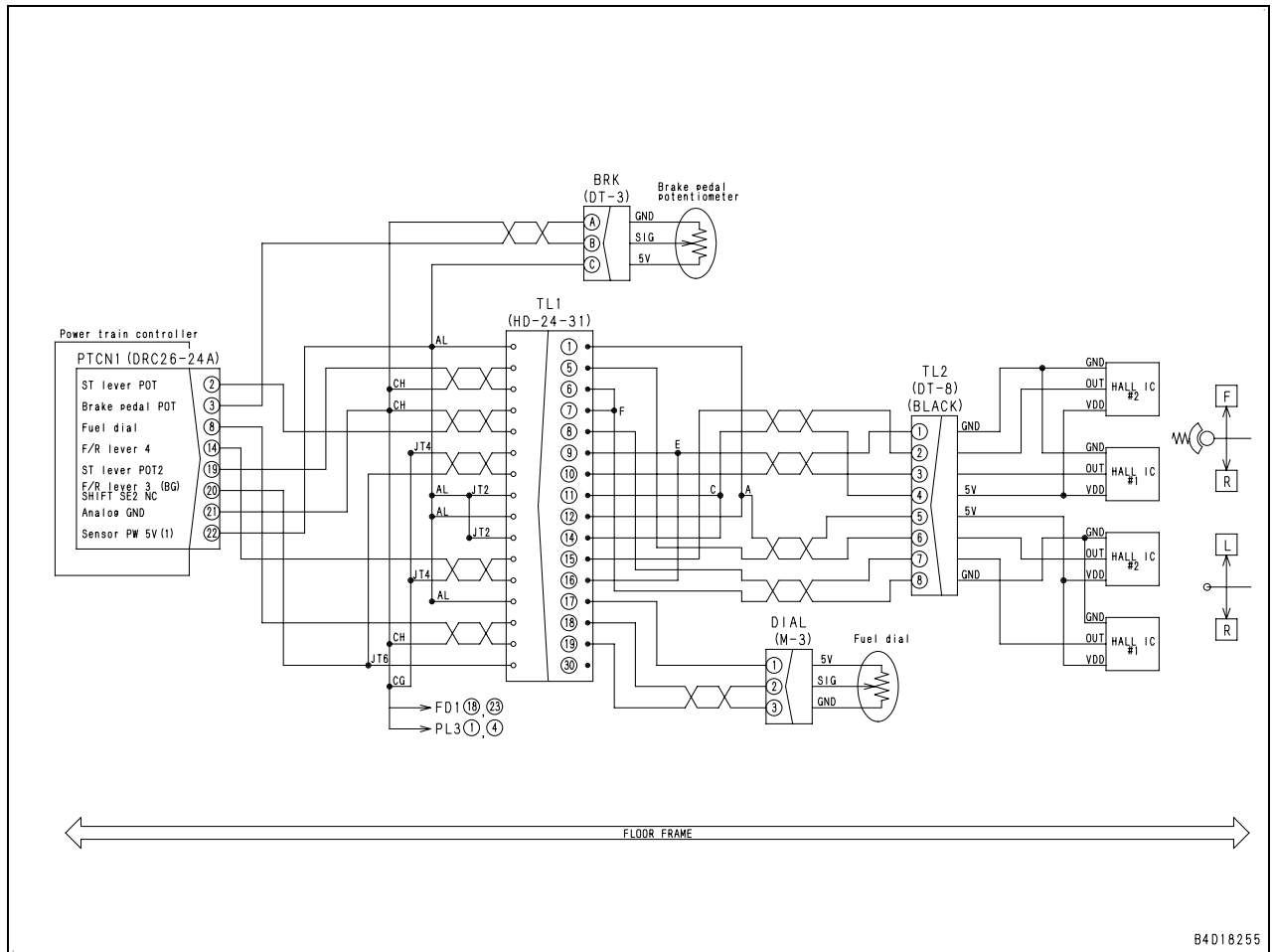


Failure code [DHT7KB] T/C out-pressure sensor: Short circuit

Action code	Failure code	Failure	Torque converter outlet pressure sensor: short circuit (Power train controller system)
E02	DHT7KB		
Detail of failure	<ul style="list-style-type: none"> Signal voltage of torque converter outlet pressure sensor is above 4.7 V. 		
Action of controller	<ul style="list-style-type: none"> None in particular. 		
Problem on machine	<ul style="list-style-type: none"> No hydraulic pressure can be monitored at torque converter outlet. Gear shift shock of transmission increases. 		
Related information	<ul style="list-style-type: none"> Signal voltage of torque converter outlet pressure sensor can be checked with monitoring function. (Code 32604: Torque converter outlet pressure sensor voltage) Method of reproducing failure code: Turn starting switch to ON position. If the sensor connector is disconnected in the normal condition and turn starting switch to ON position, failure code [DHT7KA] is displayed. 		

Cause		Procedure, measuring location, criteria and remarks			
1	Defective sensor power supply system	If failure code [DBE6KK] is also displayed, troubleshoot it first.			
		1. Turn starting switch to OFF position. 2. Disconnect connector TOP and connect T-adapter to female side. 3. Turn starting switch to ON position. ★ If power supply voltage is abnormal, go to cause 3 or after.			
		Between TOP (female) (B) and (A)	Power supply	Voltage	20 – 30 V
2	Defective torque converter outlet pressure sensor (internal failure) or ground fault	1. Turn starting switch to OFF position. 2. Disconnect connector TOP. 3. Turn starting switch to ON position.			
		If failure code [DHT7KB] is not displayed, torque converter outlet pressure sensor is defective. (If failure code [DHT7KB] is still displayed, it shows that wiring harness or power train controller is defective.)			
3	Hot short in wiring harness (Contact with 24 V circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector TOP and connect T-adapter to female side. 3. Turn starting switch to ON position.			
		Between TOP (female) (C) and (A) or ground		Voltage	Max. 1 V
4	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN1 and TOP, and connect T-adapter to female side of PTCN1. ★ Check with tester in continuity mode.			
		Between PTCN 1 (female) (7) and each pin other than (7)		No continuity (No sound is heard)	
5	Defective power train controller	If cause is not found by the above checks, power train controller is defective.			
		<ul style="list-style-type: none"> Reference: the followings are standard values in normal condition. 1. Turn starting switch to OFF position. 2. Insert T-adapter into connector PTCN1 3. Turn starting switch to ON position.			
		Between PTCN1 (7) and (21)		Voltage	0.5 – 6.0 V

Circuit diagram related to brake potentiometer



Failure code [DKH1KA] Pitch angle sensor: Disconnection

Action code	Failure code	Failure	Pitch angle sensor: Disconnection (Power train controller system)
E03	DKH1KA		
Detail of failure	<ul style="list-style-type: none"> Signal voltage of pitch angle sensor is below 0.15 V. 		
Action of controller	<ul style="list-style-type: none"> Cannot sense pitch angle of machine. Limits operation of engine and transmission. 		
Problem on machine	<ul style="list-style-type: none"> Gearshift shock is made on slope or steering shock is made on level ground. Once machine is stopped, engine speed is limited to medium (half). Once machine stops, travel is limited to F1 and R1. 		
Related information	<ul style="list-style-type: none"> State of pitch angle sensor signal can be checked with monitoring function. (Code: 60100 Pitch Angle Sensor) Method of reproducing failure code: Turn the starting switch to ON position. If sensor connector is disconnected in normal condition, this code is displayed. 		

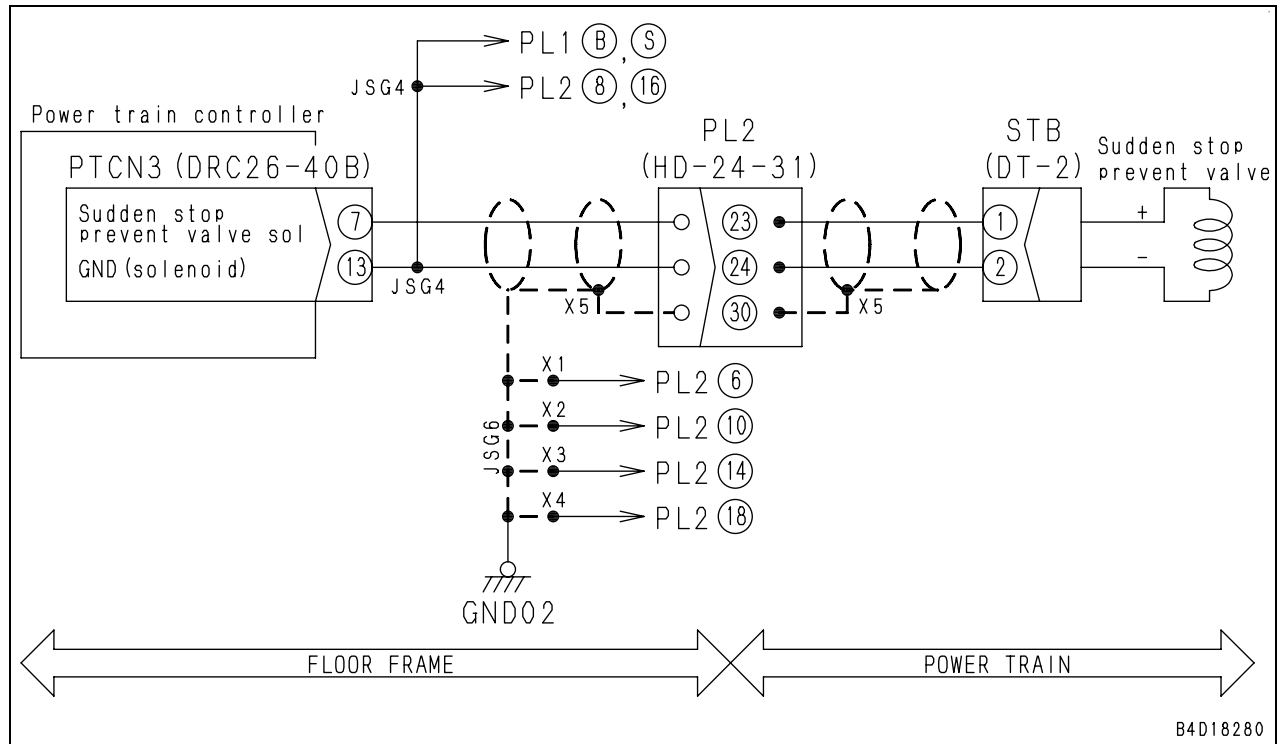
Cause		Procedure, measuring location, criteria and remarks			
1	Defective 24 V power supply system	If failure code [DBE6KK] is also displayed, troubleshoot it first.			
		1. Turn starting switch to OFF position. 2. Disconnect connector PT1 and connect T-adapter to female side. 3. Turn starting switch to ON position. ★ If power supply voltage is abnormal, go to cause 3 or after.			
		Between PT1 (female) (C) and (A)	Power supply	Voltage	20 – 30 V
2	Defective pitch angle sensor (Internal defect) or ground fault	1. Turn starting switch to OFF position. 2. Insert T-adapter into connector PT1. 3. Turn starting switch to ON position. ★ If power supply voltage is normal and sensor output voltage is abnormal (below 0.5 V), internal disconnection and ground fault cannot be identified. In this case, go to cause 4. If check result of cause 4 is normal, pitch angle sensor is defective.			
		Between PT1 (female) (B) and (A)	Sensor output	Voltage	0.24 – 4.76 V
3	Disconnection in wiring harness (Disconnection in wiring or defective contact in connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN1 and PT1, and connect T-adapters to female side of them.			
		★ If power supply voltage in cause 1 is normal, this check is not required.		Resistance	Max. 1 Ω
		Between PTCN3 (female) (16) and PT1 (female) (C)		Resistance	Max. 1 Ω
		Between PTCN1 (female) (21) and PT1 (female) (A)		Resistance	Max. 1 Ω
4	Ground fault of wiring harness (Contact with ground circuit)	★ If cause 2 is not the cause for the failure, this check is not required.			
		1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN1 and PT1, and connect T-adapters to female side of either of them.			
		Between PTCN1 (female) (9) and (21), or between PT1 (female) (B) and (A)	Resistance	Max. 1 MΩ	
		Between PTCN1 (female) (9) and ground, or between PT1 (female) (B) and ground	Resistance	Max. 1 MΩ	
5	Defective power train controller	If cause is not found by above checks, power train controller is defective. <ul style="list-style-type: none"> Reference; the followings are standard values in normal condition. 1. Turn starting switch to OFF position. 2. Insert T-adapter into connector PTCN1 3. Turn starting switch to ON position.			
		Between PTCN1 (9) and (21)	Voltage	0.24 – 4.76 V	

Failure code [DWN3KA] Ssp solenoid: Disconnection

Action code E04	Failure code DWN3KA	Failure	Sudden stop prevention solenoid disconnection (Power train controller system)
Detail of failure	<ul style="list-style-type: none"> When power is output to sudden stop prevention solenoid circuit, no current flows. 		
Action of controller	<ul style="list-style-type: none"> Stops output to sudden stop prevention solenoid circuit. Restricts operations of engine, transmission, and brake. 		
Problem on machine	<ul style="list-style-type: none"> Once machine is stopped, engine speed is restricted to medium (half). Once machine is stopped, it becomes impossible to travel. 		
Related information	<ul style="list-style-type: none"> Output condition to sudden stop prevention solenoid can be checked with monitoring function. (Code: 31628 Sudden stop prevention valve current (F/B)) Method of reproducing failure code: Turn the starting switch to ON position. 		

Cause		Procedure, measuring location, criteria and remarks		
1	Defective sudden stop prevention solenoid (Internal disconnection)	1. Turn starting switch to OFF position. 2. Disconnect connector STB and connect T-adapter to male side.		
		Between STB (male) (1) and (2)	Resistance	5 – 15 Ω
2	Disconnection or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector PTCN3 and connect T-adapter to female side. ★ If resistance is above 1 MΩ, wiring harness has disconnection. If resistance is below 1 Ω, wiring harness has short circuit.		
		Between PTCN3 (female) (7) and (13)	Resistance	5 – 15 Ω
3	Disconnection in wiring harness (Disconnection in wiring or defective contact in connector)	★ If cause 2 is not the cause for the failure, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN3 and STB, and connect T-adapters to their female sides.		
		Between PTCN3 (female) (7) and STB (female) (1)	Resistance	Max. 1 Ω
		Between PTCN3 (female) (13) and STB (female) (2)	Resistance	Max. 1 Ω
4	Defective power train controller	If cause is not found by above checks, power train controller may be defective. (Since failure is in it, troubleshooting cannot be performed.)		

Circuit diagram related to sudden stop prevention solenoid

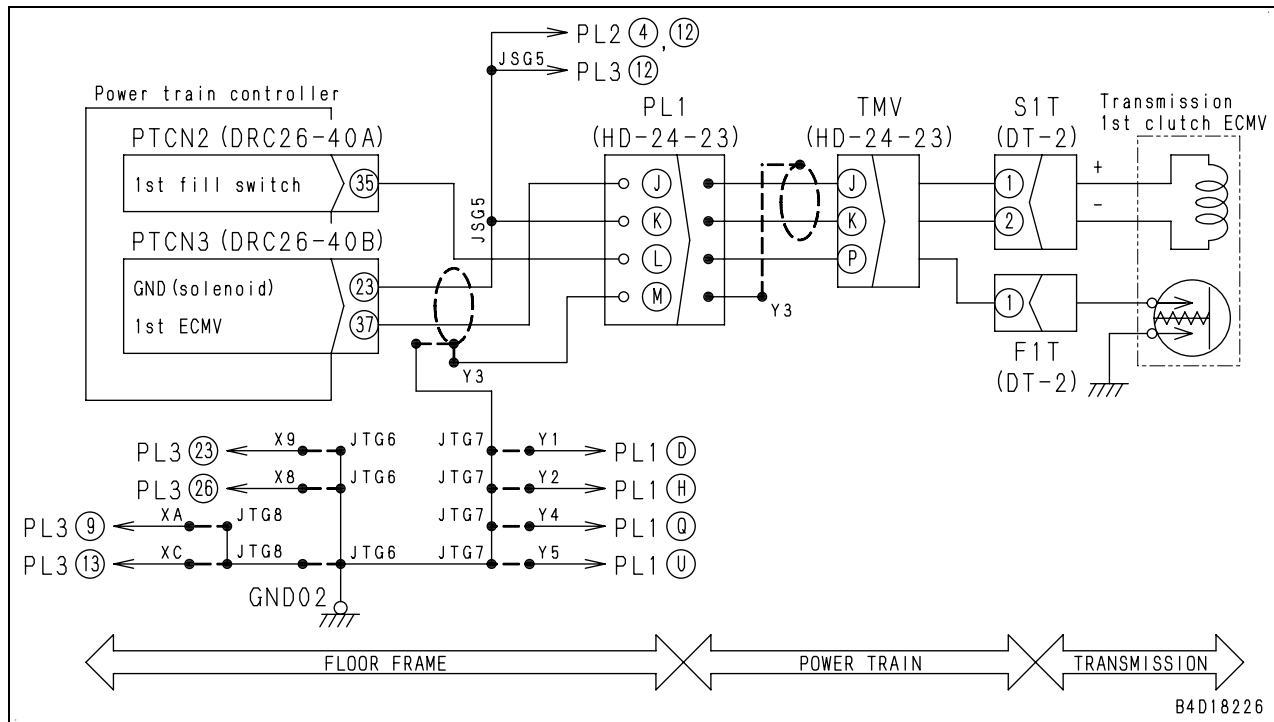


Failure code [DXH4KA] 1st clutch ECMV: Disconnection

Action code	Failure code	Failure	1st clutch ECMV: Disconnection (Power train controller system)
E03	DXH4KA		
Detail of failure	<ul style="list-style-type: none"> When power is output to transmission 1st clutch ECMV solenoid circuit, no current flows. 		
Action of controller	<ul style="list-style-type: none"> Stops output to transmission 1st clutch ECMV solenoid circuit. Restricts operation of engine and transmission. 		
Problem on machine	<ul style="list-style-type: none"> Automatic gear shifting function does not operate. Once machine stops, engine speed is restricted to medium (half). Once machine stops, travel is limited to F2 and R2. 		
Related information	<ul style="list-style-type: none"> Output condition to 1st clutch ECMV solenoid can be checked with monitoring function. (Code: 31612 T/M Clutch 1st ECMV (F/B)) Method of reproducing failure code: Start engine and set gear to F1 or R1. 		

Cause	Procedure, measuring location, criteria and remarks
1 Defective 1st clutch ECMV solenoid (Internal disconnection)	1. Turn starting switch to OFF position. 2. Disconnect connector S1T and connect T-adapter to male side. Between S1T (male) (1) and (2) Resistance 3 - 13 Ω
2 Disconnection or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector PTCN3 and connect T-adapter to female side. ★ If resistance is above 1 MΩ, wiring harness has disconnection. If resistance is below 1 Ω, wiring harness has short circuit. Between PTCN3 (female) (37) and (23) Resistance 3 - 13 Ω
3 Disconnection in wiring harness (Disconnection or defective contact in connector)	★ If cause 2 is not the cause for the failure, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN3 and S1T, and connect T-adapters to their female sides. Between PTCN3 (female) (37) and S1T (female) (1) Resistance Max. 1 Ω Between PTCN3 (female) (23) and S1T (female) (2) Resistance Max. 1 Ω
4 Defective power train controller	If cause is not found by the above checks, power train controller may be defective. (Since failure is in it, troubleshooting cannot be performed.)

Circuit diagram related to 1st clutch ECMV

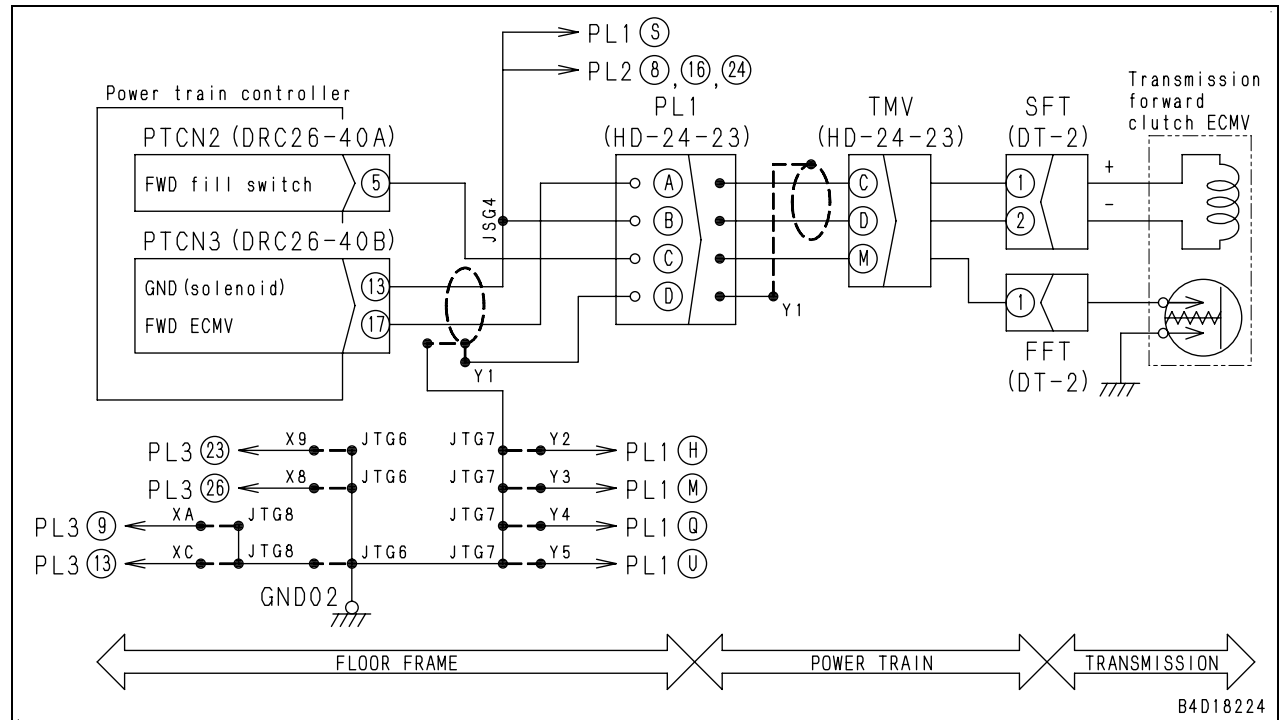


Failure code [DXH8KB] F clutch ECMV: Short circuit

Action code	Failure code	Failure	Forward clutch ECMV: Short circuit (Power train controller system)
E03	DXH8KB		
Detail of failure	<ul style="list-style-type: none"> When power was output to transmission F clutch ECMV solenoid circuit, abnormal current flowed. 		
Action of controller	<ul style="list-style-type: none"> Stops output to transmission F clutch ECMV solenoid circuit. Restricts operation of engine and transmission. 		
Problem on machine	<ul style="list-style-type: none"> Once machine stops, engine speed is restricted to medium (half). Once machine is stopped, travel is restricted to R1. 		
Related information	<ul style="list-style-type: none"> Output condition to F clutch ECMV solenoid can be checked with monitoring function. (Code: 31622 T/M Clutch F ECMV (F/B)) Method of reproducing failure code: Start engine and set gear to F (Forward). 		

Cause	Procedure, measuring location, criteria and remarks
1 Defective F clutch ECMV solenoid (Internal short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector SFT and connect T-adapter to male side.
	Between SFT (male) (1) and (2) Resistance 3 - 13 Ω
	Between SFT (female) (1) and ground Resistance Min. 1 MΩ
2 Ground fault of wiring harness (Contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN3 and SFT and connect T-adapter to female side of either of them.
	Between PTCN3 (female) (17) or SFT (female) (1) and ground Resistance Min. 1 MΩ
3 Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN3 and F SET and connect T-adapter to female side of either of them.
	Between PTCN3 (female) (17) and (13), or between SFT (female) (1) and (2) Resistance Min. 1 MΩ
4 Defective power train controller	If cause is not found by the above checks, power train controller may be defective. (Since failure is in it, troubleshooting cannot be performed.)

Circuit diagram related to forward clutch ECMV

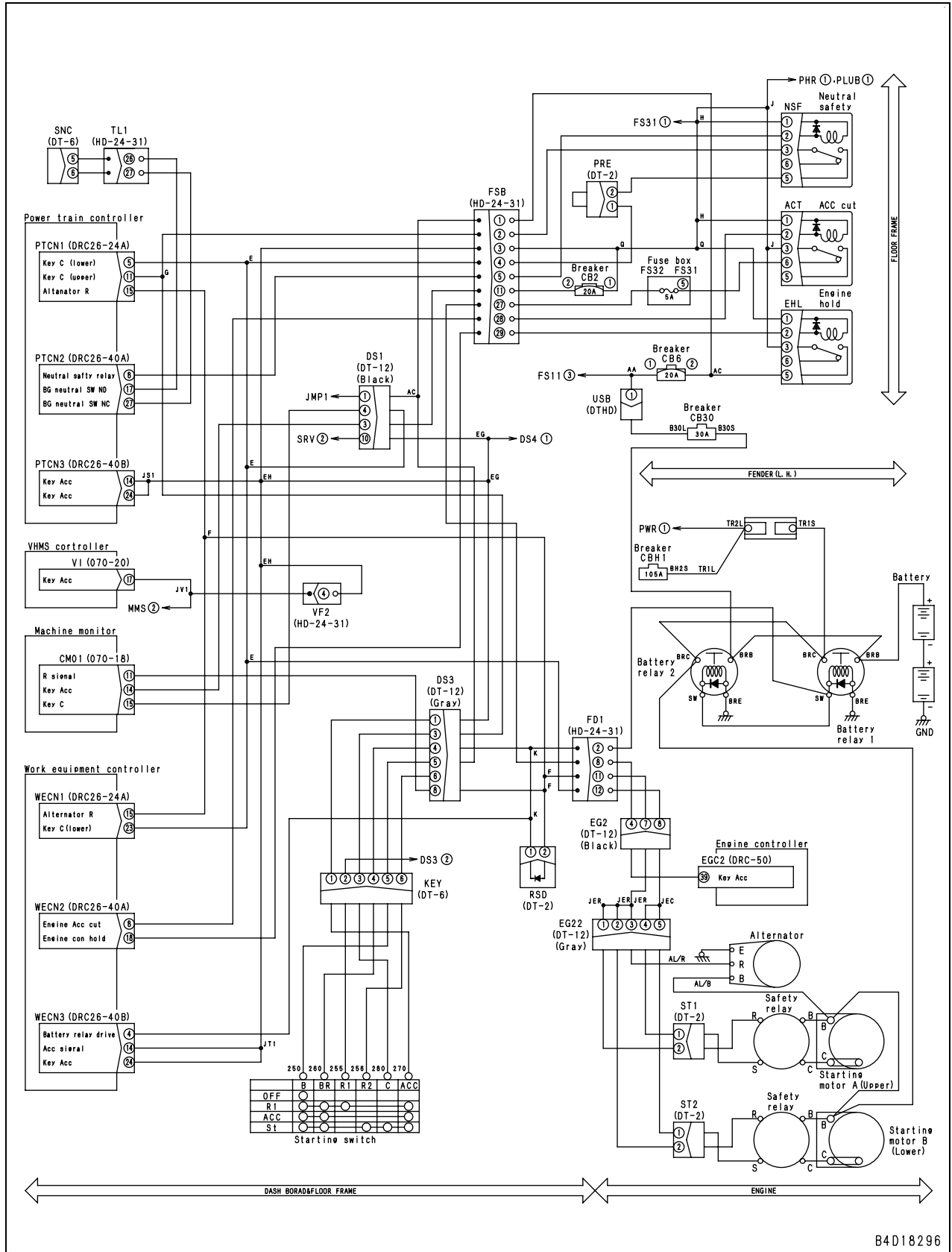


Failure code [DXHCKY] Left brake ECMV: Short circuit

Action code E04	Failure code DXHCKY	Failure	Left brake ECMV hot short (Power train controller system)
Detail of failure	<ul style="list-style-type: none"> When power is output left steering brake solenoid circuit, current flows. 		
Action of controller	<ul style="list-style-type: none"> Stops output to left steering brake ECMV solenoid circuit. Restricts operation of engine, transmission and brake. Operates sudden stop prevention valve. 		
Problem on machine	<ul style="list-style-type: none"> Left brake does not operate. Once machine is stopped, engine speed is restricted to medium (half). Once machine is stopped, it cannot travel at all. 		
Related information	<ul style="list-style-type: none"> Output condition (current) to left steering brake ECMV solenoid can be checked with monitoring function. (Code: 31619 Left brake ECMV output current(F/B)) Method of reproducing failure code: Turn starting switch to ON position and operate parking brake lever (Lock). 		

Cause		Procedure, measuring location, criteria and remarks		
1	Defective left steering brake ECMV solenoid (Internal disconnection)	1. Turn starting switch to OFF position.		
		2. Disconnect connector SLB and connect T-adapter to male side.		
		Between SLB (male) (1) and (2)	Resistance	3 - 13 Ω
		Between SLB (male) (1) and ground	Resistance	Min. 1 MΩ
2	Hot short in wiring harness (Contact with 24 V circuit)	1. Turn starting switch to OFF position.		
		2. Disconnect connector SLB and connect T-adapter to female side.		
		3. Turn starting switch to ON position.		
		Between SLB (female) (1) and ground	Voltage	Max. 1 V
3	Short circuit in wiring harness	1. Turn starting switch to OFF position.		
		2. Disconnect connectors PTCN3 and SLB, and connect T-adapter to female side of PTCN3.		
		★ Check with tester in continuity mode.		
		Between PTCN3 (female) (5) and each pin other than (5)	No continuity (No sound is heard)	
		1. Turn starting switch to OFF position.		
		2. Disconnect connectors PTCN1 to PTCN3 and SLB, and connect T-adapters to female sides of PTCN1 to PTCN3.		
		★ Check with tester in continuity mode.		
		Between PTCN3 (female) (5) and each pin of PTCN1 (female)	No continuity (No sound is heard)	
		Between PTCN3 (female) (5) and each pin of PTCN2 (female)	No continuity (No sound is heard)	
4	Defective power train controller	If cause is not found by the above checks, power train controller may be defective. (Since failure is in it, troubleshooting cannot be performed.)		

Circuit diagram related to starting of engine



B4D18296

E-11 Contents of display by machine monitor are different from applicable machine

Trouble	● Contents of display by machine monitor are different from applicable machine.	
Related information		
Cause		Procedure, measuring location, standard (value) and remarks
1	Defective machine monitor	Machine monitor may be defective.(Since trouble is in system, troubleshooting cannot be performed.)

E-12 Machine monitor does not display some items

Trouble	● Machine monitor does not display some items	
Related information	● The LCD panel sometimes has black points (points which are not lighted) and bright points (points which do not go off) for the reason of its characteristics. If the number of the bright points and black points does not exceed 10, those points are not a failure or a defect.	
Cause		Procedure, measuring location, standard (value) and remarks
1	Defective machine monitor (LCD panel)	★ Turn starting switch ON and carry out troubleshooting.
		When following switches are operated, if all LCD panel is lighted up (all surface becomes white), LCD panel is normal. ● Operation of switches: [4] + [F2] (Press simultaneously)
2	Defective machine monitor (body)	If cause 1 is not detected, machine monitor may be defective. (Since trouble is in system, troubleshooting cannot be performed.)

E-13 Function switch does not work

Trouble	● Function switch does not work	
Related information		
Cause		Procedure, measuring location, standard (value) and remarks
1	Defective machine monitor	Machine monitor may be defective.(Since trouble is in system, troubleshooting cannot be performed.)

8	Ground fault of wiring harness (Contact with GND circuit)	★ If cause 6 is not the cause for the trouble, this check is not required.		
		1. Turn starting switch to OFF position.		
		2. Remove fuse FS22-1.		
		3. Disconnect connectors LRER, LREL, LRP, LMRE and RLSW, and connect T-adapter to female side of LMRE.		
		Between LMRE (female) (1) and ground	Resistance	Min. 1 MΩ
		Between LMRE (female) (3) and ground	Resistance	Min. 1 MΩ
		Between LMRE (female) (5) and ground	Resistance	Min. 1 MΩ

E-30 Gear cannot be shifted

Trouble	● Gear cannot be shifted (Shift switch does not work).
Related information	

Cause		Procedure, measuring location, standard (value) and remarks
1	Trouble in shift operation switch	★ When failure code related to shift operation switch is not displayed. Press shift operation switch for more than 10 seconds. If any of following failure code is displayed at this time, carry out troubleshooting for it. [DD12KA], [DD12KB], [DD13KA], [DD13KB], [DDK5KA], [DDK5KB]
	● Shift up switch	
	● Shift down switch	
	● Shift switch (Optional-type lever)	★ When failure code related to shift operation switch is displayed. Carry out troubleshooting for displayed failure code.
2	Internal defect of transmission clutch	The inside of the transmission clutch is supposed to be defective, check it directly.

H-14 Blade lift cylinder speed is too slow or lacks power

Trouble	<ul style="list-style-type: none"> Blade lift cylinders speed is too slow or lacks power.
Related information	<ul style="list-style-type: none"> Before performing troubleshooting, check that hydraulic tank oil level is normal. Check whether the blade is remodeled. When hydraulic drift rate of the blade lift cylinders is also high, perform troubleshooting for "H-18 Excessive hydraulic drift of blade Lift cylinders." If either one of failure code of [DDNALD] or [DDNFLD] is displayed, troubleshooting corresponding to such code are to be reformed.

Possible causes and standard value for judgement	Cause		Standard value /Remarks on troubleshooting	
	1	Defective operation of PPC valve	★ Prepare with starting switch OFF, then run the engine of the full speed position to perform troubleshooting.	
Blade control lever			PPC valve output pressure	
Raise stroke end			Min. 3.1 MPa {Min. 32 kg/cm ² }	
2	Defective operation of blade lift control valve (spool)	Operation of the blade lift valve spool may be defective. Check it directly.		
3	Air entering blade lift cylinders	Air blade lift cylinders. Bleed air and check whether the phenomenon changes.		

H-15 Blade tilt cylinder speed is too slow or lacks power

Trouble	<ul style="list-style-type: none"> Blade tilt cylinders speed is too slow or lacks power.
Related information	<ul style="list-style-type: none"> Before performing troubleshooting, check the hydraulic oil level is normal. Check whether the blade is remodeled. When the hydraulic drift rate of the blade tilt cylinders is also high, perform troubleshooting for "H-19 Excessive hydraulic drift of blade tilt cylinders." If either one of failure code of [DDNZLD] or [DDN3LD] is displayed, troubleshooting corresponding to such code are to be performed.

Possible causes and standard value for judgement	Cause		Standard value /Remarks on troubleshooting	
	1	Defective operation of PPC valve	★ Prepare with starting switch OFF, then run the engine at the full speed position to perform troubleshooting.	
Blade control lever			PPC valve output pressure	
Raise stroke end			Min. 3.1 MPa {Min. 32 kg/cm ² }	
2	Defective operation of blade tilt control valve (spool)	Operation of the blade tilt valve spool may be defective. Check it directly.		
3	Air entering blade tilt cylinders	Air may enter the blade tilt cylinders. Bleed air and check whether the phenomenon changes.		

S-3 Engine does not rev up smoothly (response-up is poor)

General causes why engine does not pick up smoothly

- Insufficient intake of air
- Insufficient supply of fuel
- Fuel injection condition not normal
- Improper selection of fuel
- Controller in derate control mode
 (Controlling injection capacity (output) due to an error in the electrical system)
- EGR valve is stuck in open state
 (Shortage of air intake due to excessive EGR gas)

		Cause													
		Clogged air cleaner element	Defective EGR valve or bypass valve	Defective contact of valve and valve seat	Improper valve clearance	Seizure and interference of turbocharger	Worn piston ring, cylinder liner	Clogged air breather hole in fuel tank cap	Leakage, clogging, air in fuel piping	Clogged fuel filter, strainer	Clogged feed pump gauze filter	Stuck or seized supply pump plunger	Defective operation of flow damper (excessive injector leakage)	Clogged injection nozzle, defective spray	
Questions tem- perature	Confirm recent repair history														
	Degree of use of machine	Operated for long period	△	△	△		△			△	△				
	Engine pick-up suddenly became poor		○			○		○						○	
	Non-specified fuel is being used									○	○	○		○	
	Replacement of filters has not been carried out according to Opera-		○							○	○				
	Engine oil must be added more frequently						○								
	Check items	Dust indicator is red	○												
		Clogged air breather hole in fuel tank cap							○						
		Rust and water are observed when fuel tank is drained								○	○				
		Leakage from fuel piping								○					
No response or heavy resistance felt when operating priming pump									○	○	○				
When exhaust manifold is touched immediately after starting engine, temperature of some cylinders is low													○	○	
Color of exhaust gas		Blue under light load					○								
		Black	○	○		○								○	
When engine is cranked, abnormal noise is heard from around cylin-					○										
When engine is cranked, abnormal noise is heard from around turbo-						○									
Troubleshooting	High idle speed under no load is normal, but speed suddenly drops when load is applied						○		○	○					
	There is hunting from engine (rotation is irregular)						○		○	○			○		
	Blow-by gas is excessive				○	○									
	Inspect air cleaner directly	●													
	Carry out troubleshooting for "EGR valve abnormality (*1)" or "Bypass valve abnormality (*1)".		●												
	When compression pressure is measured, the oil pressure is low.			●		●									
	Inspect valve clearance directly				●										
	When turbocharger is rotated by hand, it is found to be heavy					●									
	Air is discharged when the air is bled from the fuel system								●						
	Inspect the fuel filter, strainer directly									●					
Inspect the fuel feed pump gauze filter directly										●					
Carry out troubleshoot by "Rail Press Very Low Error (*2)"											●				
Speed of some cylinders does not change when operated in reduced												●	●		
	Remedy	Clean	Replace	Replace	Adjust	Replace	Replace	Clean	Correct	Clean	Clean	Replace	Replace	Replace	

S-16 Vibration is excessive

General causes that vibration is excessive

- Defective parts (abnormal wear, breakage, etc)
- Misalignment of engine and chassis
- Abnormal combustion
- ★ If there is abnormal noise together with the vibration, perform troubleshooting also for "S-15 Abnormal noise is heard".

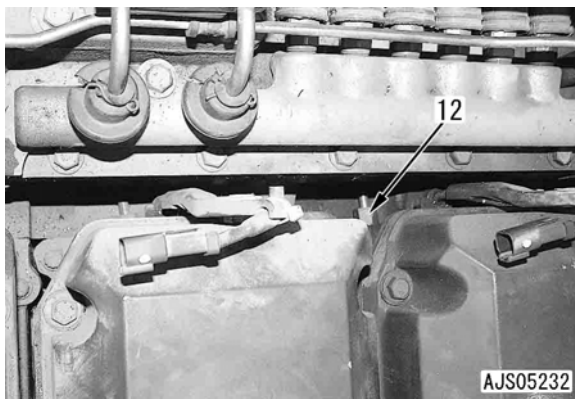
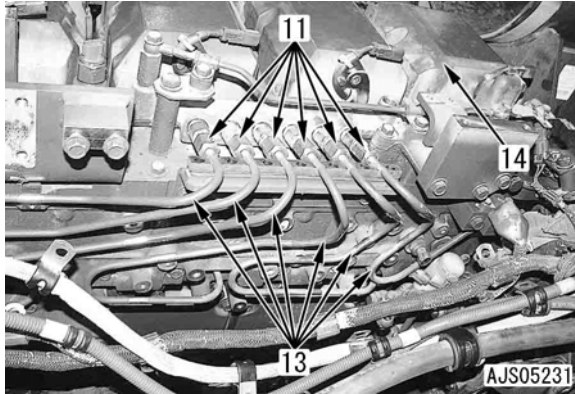
		Cause							
		Stuck valve system (valve, rocker lever, etc.)	Worn main bearing or connecting rod bearing	Improper gear train backlash	Worn camshaft bushing	Loose engine mounting bolts or broken cushions	Misalignment of engine and torque converter	Wear of front support spigot joint	Broken parts in damper
Questions	Check recent repair history								
	Degree of use	Operated for long period		△		△	△		△
	Vibration	Suddenly increased.	○						
		Gradually increased.		○		○	○		○
	Non-specified fuel is being used		○		○				
Check items	Metal particles are found when oil is drained from oil filter.		◎		◎				
	Metal particles are found when oil is drained from oil pan.		◎		◎				
	Oil pressure is when running engine low at low idle.		○		○				
	Vibration occurs when running engine at mid-range speed.					○			○
	Vibration follows engine speed.			○		○	○	○	○
	Exhaust smoke is black.	◎							
Troubleshooting	Inspect valve system directly.	●							
	Inspect main bearing and connecting rod metal directly.		●						
	Inspect gear train directly.			●					
	Inspect camshaft bushing directly.				●				
	Inspect engine mounting bolts and cushions directly.					●			
	When face runout and radial runout are inspected, they are found to be incorrect.						●		
	Inspect front support portion directly.							●	
	Inspect inside of damper directly.								●
	Remedy	Replace	Replace	Replace	Replace	Replace	Adjust	Replace	Replace

Device	Symbol	Part No.	Part name	Necessity	Q'ty	N/R	Sketch	Work item and remarks	
Track shoe assembly	7	20	791-632-1170	● Guide		1		Disassembly and assembly of one link assembly in field	
		21	791-680-5551	● Guide		1			
		22	791-680-9630	● Adapter		1			
		23	791-632-1160	● Guide		1			
		24	195-32-61210	Bolt		1			
		25	790-101-4300	Cylinder (1,470 kN {150 ton})	■	1			
		26	790-101-1102	Pump	■	1			
		27	790-101-4200	Cylinder (294 kN {30 ton})	■	1			
		28	791-680-1630	Spacer	■	1	N		
Track shoe assembly	R	1	791-646-7351	Push tool	■	1		Disassembly and assembly of master link	
		2	791-660-7460	Pin brush	■	1			
		3	791-646-7900	Push tool (for large plug)	■	1			
		4	791-701-3000 or 791-601-1000	Seal checker Oil pump	■	2			
		5	791-932-1110	Push tool (for small plug)	■	1			
		6	791-632-1021	Installer	■	1			
		7	1	791-632-1100	Remover & installer assembly	■	1		
			2	791-632-1130	● Adapter		1		
			3	790-434-1610	● Guide		1		
			4	01010-51440	● Bolt		2		
			5	791-685-9510	● Frame		1		
			6	791-685-9530	● Rod		1		
			7	791-685-9520	● Frame		1		
			8	791-685-9550	● Nut		3		
			9	04530-12030	● Eyebolt		1		
			10	791-685-9560	● Bolt		4		
			11	791-126-0150	● Adapter		1		
			12	791-685-9540	● Rod		1		
			13	791-632-1140	● Adapter		1		
			14	791-680-5520	● Guide		1		
			15	01010-51030	● Bolt		1		
			16	791-632-1150	● Pusher		1		
			17	791-685-9620	● Extension		1		
			18	791-632-1180	● Adapter		1		
			19	791-630-5543	● Adapter		1		
			20	791-632-1160	● Guide		1		
			21	791-680-5551	● Guide		1		
			22	791-680-9630	● Adapter		1		
			23	791-632-1160	● Guide		1		
			24	195-32-61210	Bolt		2		
			25	790-101-4300	Cylinder (1,470 kN {150 ton})	■	1		
			26	790-101-1102	Pump	■	1		
			27	790-101-4200	Cylinder (294 kN {30 ton})	■	1		
			28	791-680-1630	Spacer	■	1		
		8	1	791-632-1300	Push tool assembly	■	1		N
			2	791-632-1260	● Push tool		1		
			3	791-632-1270	● Adapter		1		
			4	791-632-1220	● Pin (small)		1		
			5	791-632-1230	● Ring		1		
			6	791-632-1240	● Plate		1		
			7	791-685-5730	● Bar		1		
8	791-632-1250		● Ring		1				
9	791-632-1280		● Spring		1				
10	01252-30605		● Bolt		1				
11	01580-01210		● Nut		1				

38. Disconnect sleeves (11) and (12) at 6 places each.

39. Remove high-pressure pipes (13).

40. Remove cylinder head cover (14).

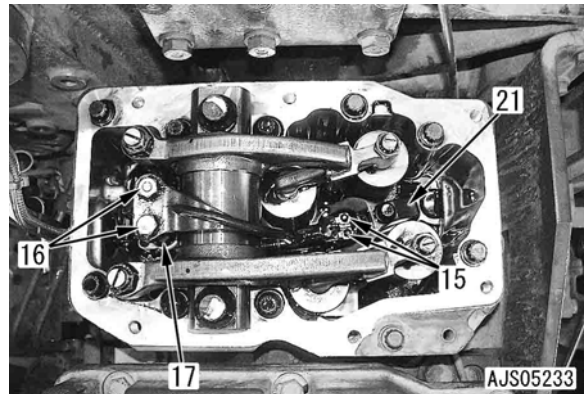


41. Remove terminal mounting nuts (15).

★ Loosen the nuts alternately.

42. Remove wiring harness assembly mounting bolts (16) and spacer (17).

43. Remove fuel injector holder (21).

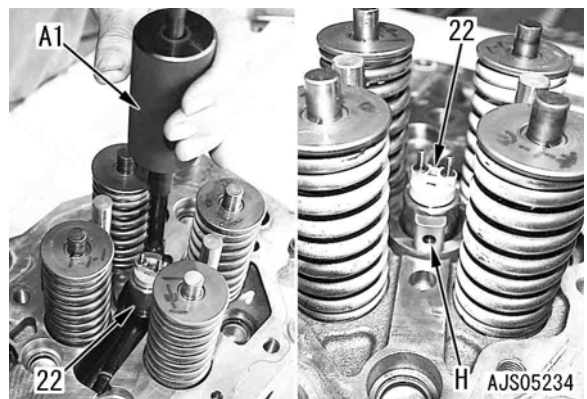


44. Using tool A1, remove fuel injector assembly (22).

★ Hook the end of tool A1 onto hole (H) of the fuel injector to pull out.

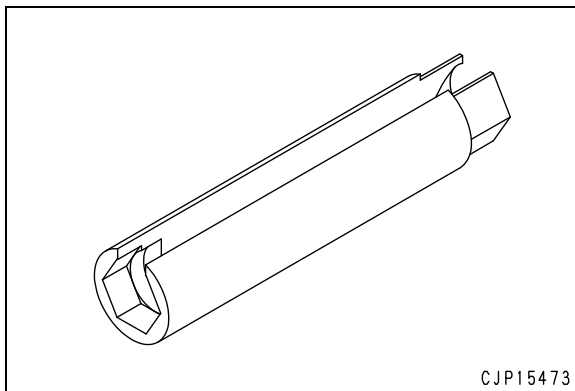
★ Never grip the solenoid valve on the top of the fuel injector with pliers, etc. to pull out.

★ The figure shows the fuel injector after the rocker arm and shaft assembly is removed.



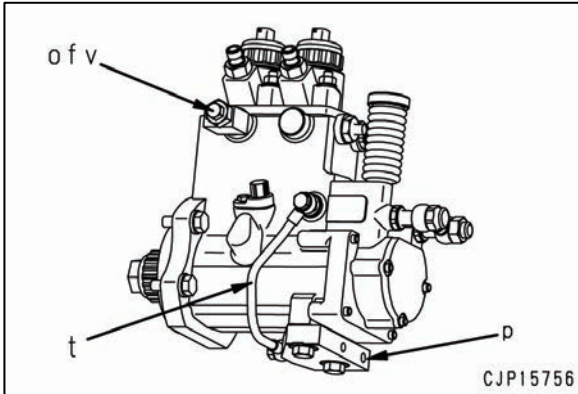
★ If tool A2 is not available, disconnect sleeve (12) from above.

● Tool A2



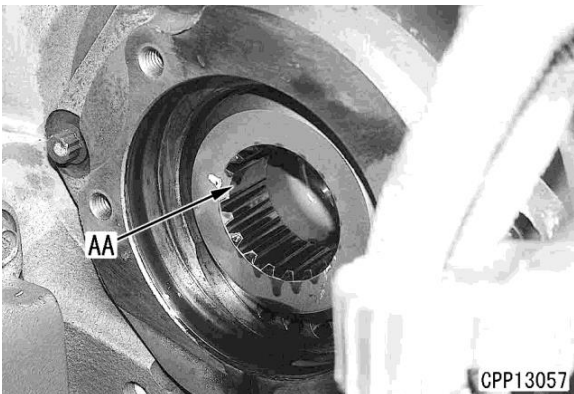
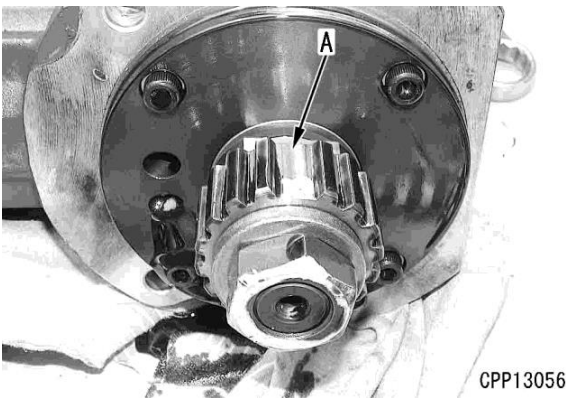
8. Fuel supply pump

- ★ If overflow valve (ofv) is loosened or oil tube (t) and plate (p) are removed, install them, referring to "Removal and installation of fuel supply pump assembly".




- 1) Place the fuel supply pump assembly to the drive case according to the following procedure.

- ★ Match part (A) of the fuel supply pump drive gear where there is one tooth missing with part (AA) of the coupling where there is one spline missing to place the fuel supply pump assembly.



Fuel supply pump (66) mounting bolt:


Width across flats 17 mm

 Fuel supply pump (66) mounting bolt:

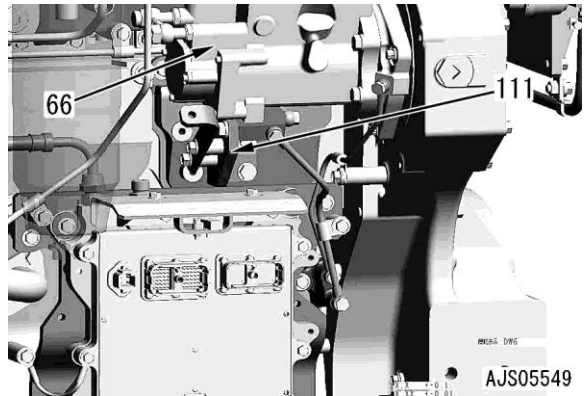
59 - 74 Nm {6 - 7.5 kgm}

Lower bracket (111) mounting bolt:

Width across flats 17 mm

 Lower bracket (111) mounting bolt:

59 - 74 Nm {6.0 - 7.5 kgm}




9. High-pressure pipe

- ▲ **Handle the high-pressure pipe and clamp in the same way as the pipe between the fuel injector and common rail (noted in the foregoing) is handled.**

- 1) Tighten high-pressure pipes (57) partially.
- 2) Tighten clamps (55), (56) and (109) partially.
- 3) Tighten bracket (110) partially.
- 4) Tighten high-pressure pipes (57) to the specified torque.

High-pressure pipe sleeve nut:

Width across flats 19 mm

 High-pressure pipe sleeve nut:

39.2 - 44.1 Nm {4.0 - 4.5 kgm}

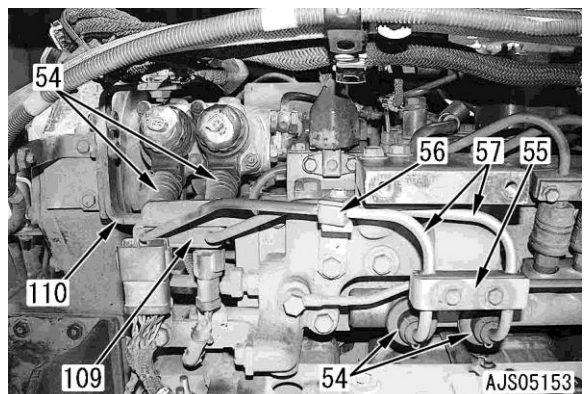
- 5) Tighten clamps (55), (56) and (109) to the specified torque.

Clamp bolt: **Width across flats 10 mm**

 Clamp bolt:

9.8 ± 1.0 Nm {1 ± 0.1 kgm}

- 6) Tighten bracket (110) to the specified torque.
- 7) Install covers (54).



Removal and installation of engine assembly

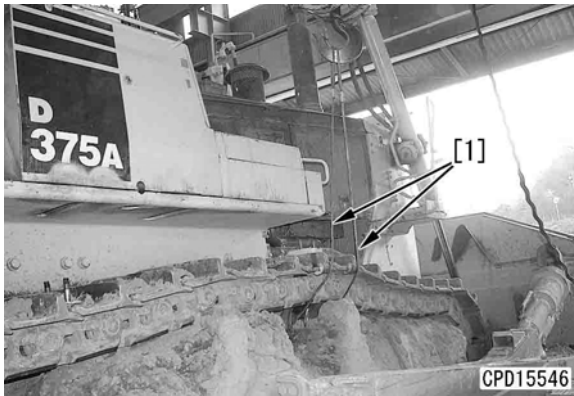
Removal

- ⚠ Park the machine on a level surface and lower the work equipment to the ground.
- ⚠ Set the parking brake lever and work equipment lock lever in the lock position.
- ⚠ Stop the engine and disconnect the cable from the negative (-) terminal of the battery.
- ⚠ If the radiator coolant temperature is high, wait until the temperature decreases to avoid getting scalded, and then drain the coolant or disconnect the radiator hoses.

1. Drain the coolant.



 Coolant: **120 ℓ**

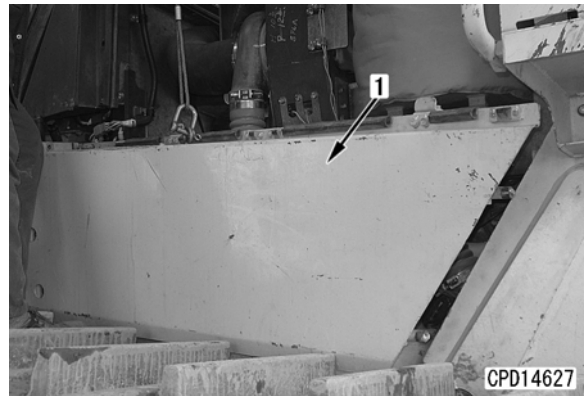
2. Using sling [1], gradually open the undercover of the engine and power train.



3. Remove the engine hood assembly. For details, see "Removal and installation of engine hood assembly".

4. Remove left and right lower side covers (1).

 Left lower side cover: **40 kg**
 Right lower side cover: **50 kg**



5. Disconnect starting motor wiring (2) and wiring clamp (3).

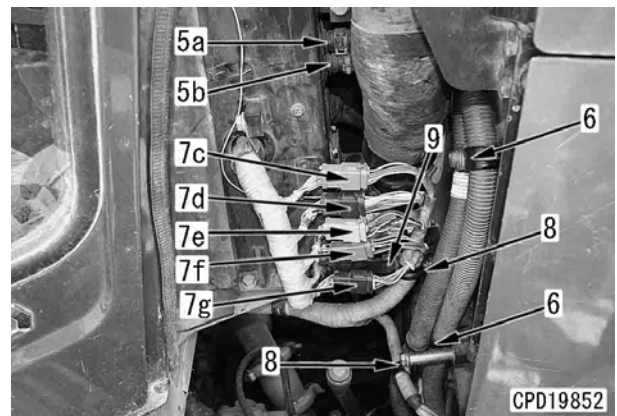
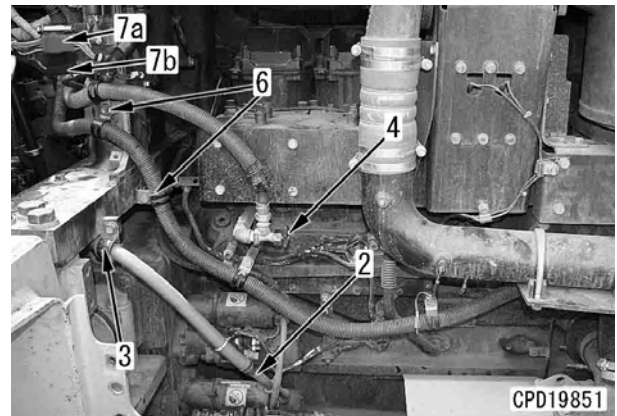
6. Close heater valve (4) and disconnect heater pipes (5a) and (5b).

7. Disconnect four heater pipe clamps (6).


8. Disconnect nine wiring connectors (7a) to (7g).

9. Disconnect two wiring clamps (8).

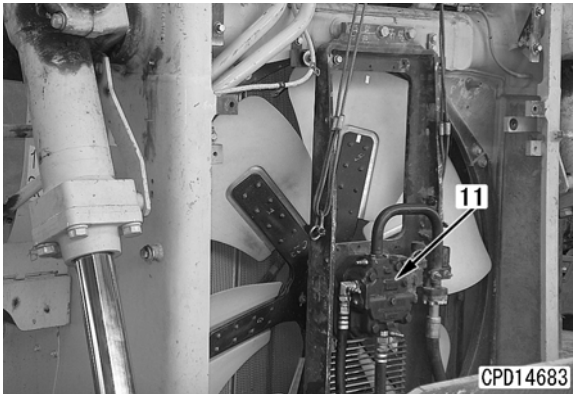
10. Remove wiring connector bracket (9).



8. Lift off fan drive assembly (11). [*1]

 Fan drive assembly: **200 kg**

- ★ Install the wire to the left and right of the fan drive, lift it at a point, and pull out it evenly to remove.



Installation

- Carry out installation in the reverse order to removal.

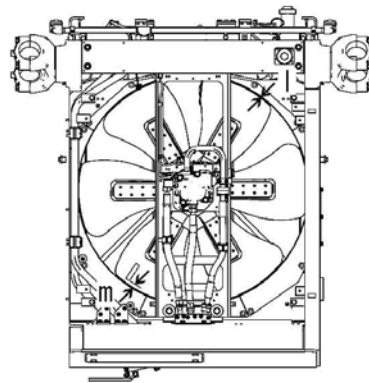
[*1]

- ★ Ensure that position (m) of the reflector tape for measuring the fan speed is of the specified dimension.


Distance (m) from fan blade end: Max. 5 mm

- ★ After installing the fan, check clearance (ℓ) between the fan blade and the shroud. If the clearance is larger or smaller than the specified dimension, adjust it.

Clearance (ℓ): **6 + 3/ - 1 mm**



- Refilling of oil (Hydraulic tank)
Supply oil through the oil filler to the specified level. Run the engine to circulate the oil through the system. Then, check the oil level again.

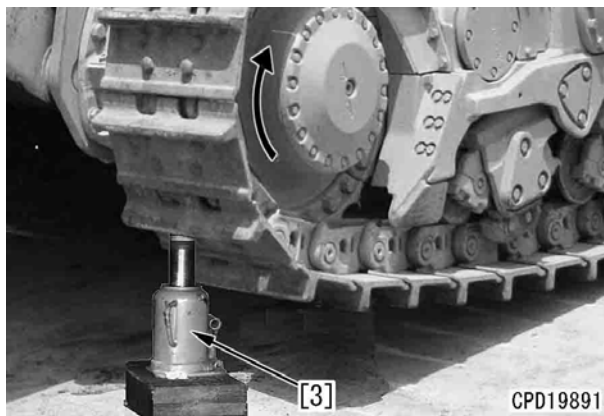
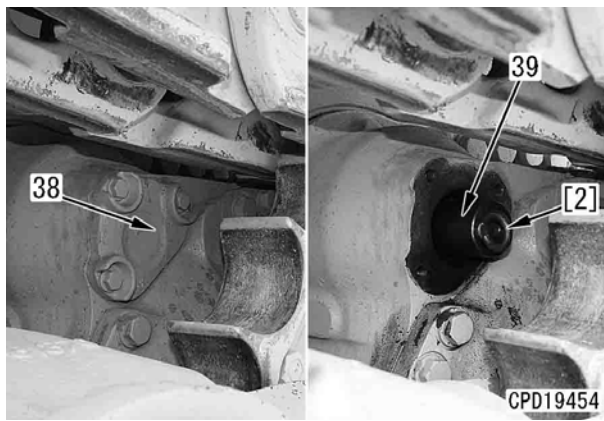
 Hydraulic tank: **130 ℓ**

26. Remove cover (37).



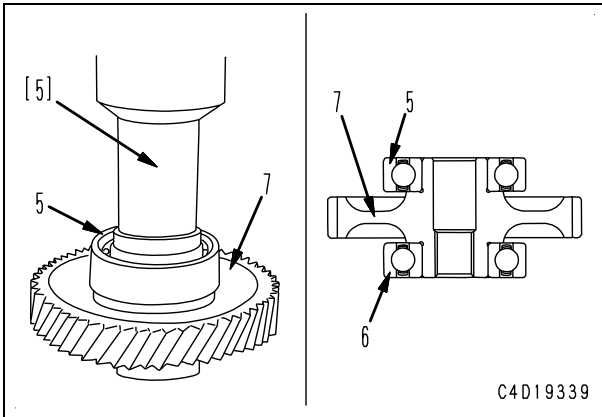
27. Pull out left and right drive shafts (39) according to the following procedure. [*3]

- 1) Remove cover (38).
 - 2) Install eyebolt [2] to drive shaft (39).
 - 3) Pull out drive shaft (39).
- ★ If the drive shaft cannot be pulled out, push up the shoe grouser by using jack [3] from the ground to rotate the sprocket clockwise or counterclockwise, and set it to a position where the shaft can be pulled out easily.
- ★ Pull out the shaft until it touches the sprocket.



6. Work equipment pump and PPC pump gear assembly

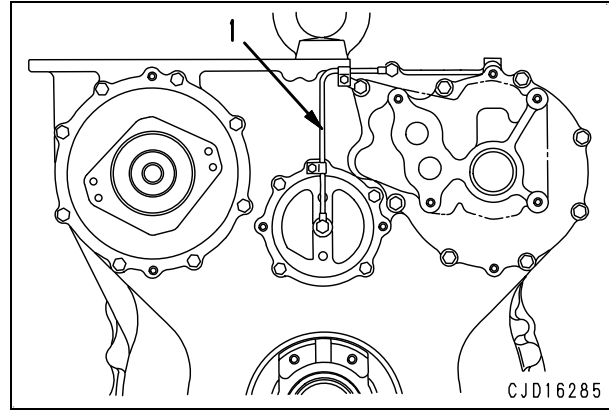
- 1) Using push tool [5], press fit bearings (5) and (6) to gear (7).



7. Lubrication tube

Sling the PTO assembly and install lubrication tube (1).

- ★ Install three lubrication tubes also on the opposite side.



- 2) Using push tool [6], press fit gear assembly (3) to cover (4).

- ★ Set the assembly with the side where the bearing end face is flush with the gear end face facing the cover.

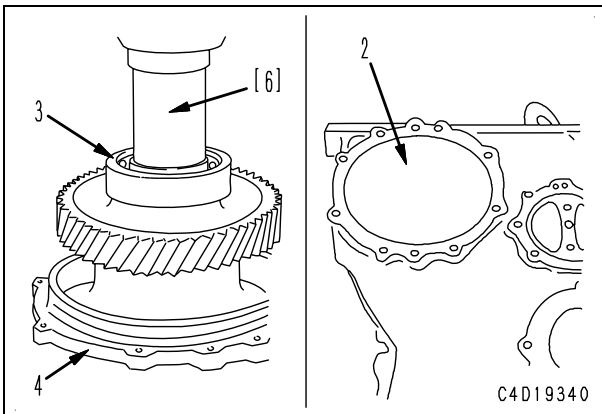
 Gear spline:

Molybdenum disulphide grease (LM-G)

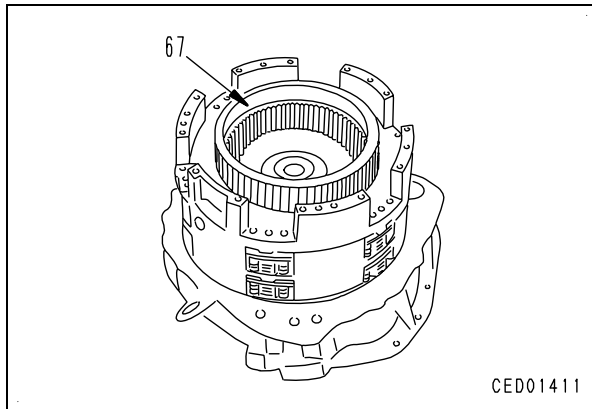
- 3) Fit the O-ring, then hoist cover assembly (2) and install to the case.

- ★ If the cover assembly does not fit in the case, tap its periphery evenly with a plastic hammer to install.

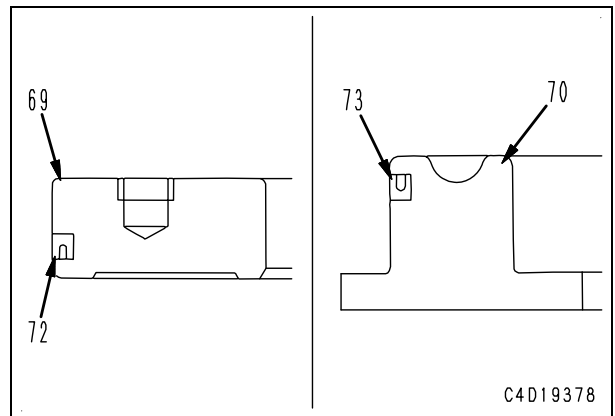
- ★ Drop approx. 6 cc power train oil (TO-10 or TO-30) on the bearing and rotate the bearing approximately 10 turns.



11. No. 2 ring gear
Remove No. 2 ring gear (67).

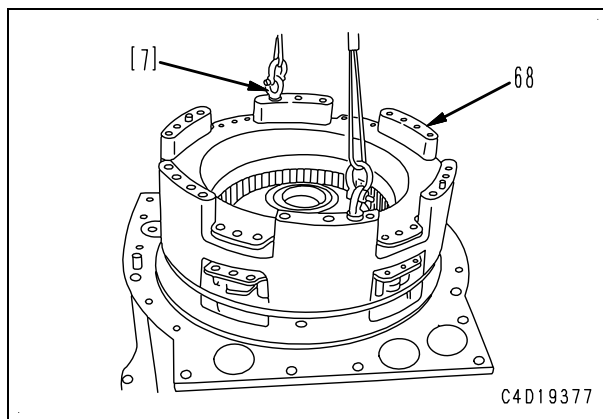


- 2] Remove seal ring (72) from piston (69).
3] Remove seal ring (73) from piston (70).

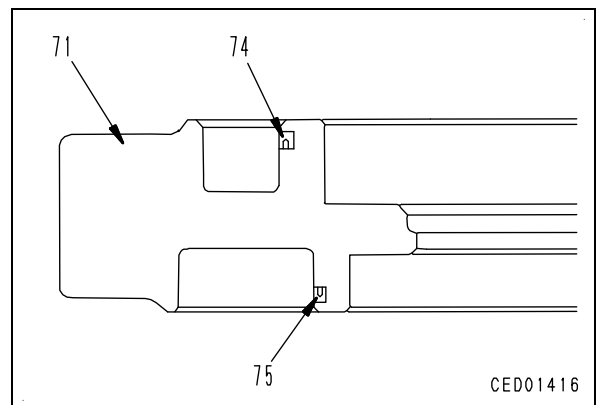


12. No. 2 and No. 3 housing assembly

- 1) Using eyebolts [7], remove No. 2 and No. 3 housing assembly (68) together with the upper and lower pistons.
★ Bind the lower piston with a wire to prevent it from coming off.

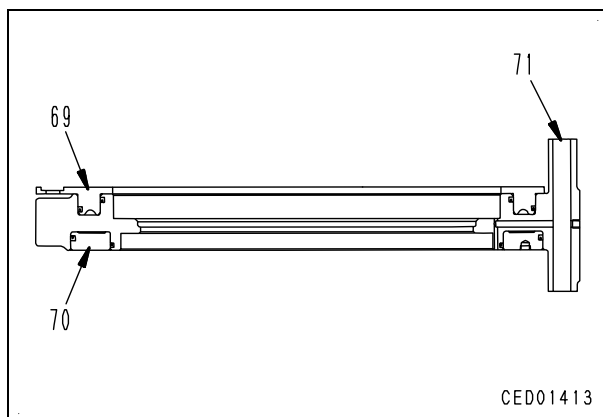


- 4] Remove seal rings (74) and (75) from housing (71).



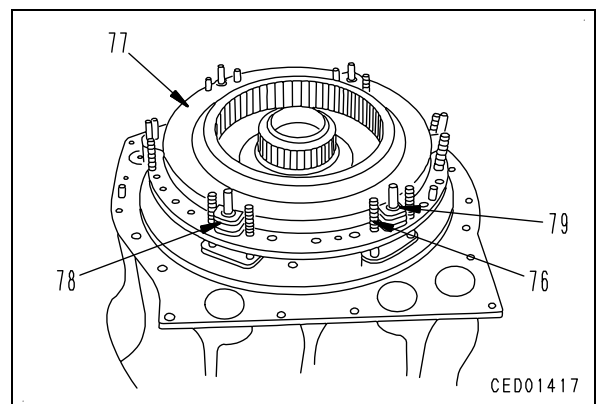
- 2) Disassemble the No. 2 and No. 3 housing assembly according to the following procedure.

- 1] Remove pistons (69) and (70) from housing (71).



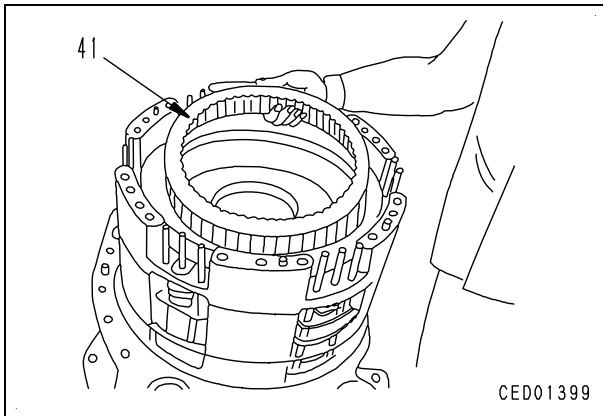
13. No. 3 disc, plate, and spring

- 1) Remove the guide plate and remove twelve springs (76).
2) Remove four discs (77), four springs (79), and three plates (78) in turn.
★ Keep the disc and plate on a flat surface so that they do not warp.



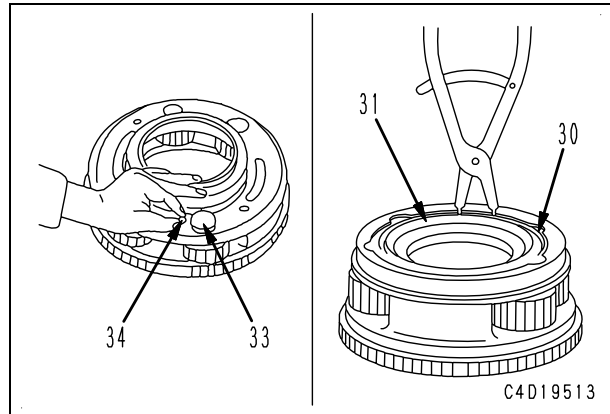
16. No. 1 clutch ring gear

Install No. 1 clutch ring gear (41).



2] Fit balls (34) and install shafts (33) to the carrier.

3] Install collar (31) to the carrier and fix it with snap ring (30).

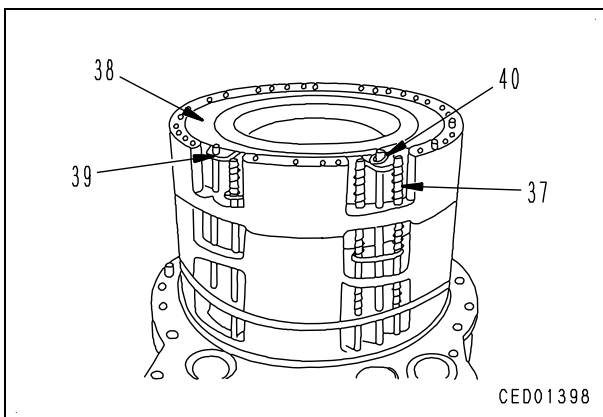


17. No. 1 disc, plate, and spring

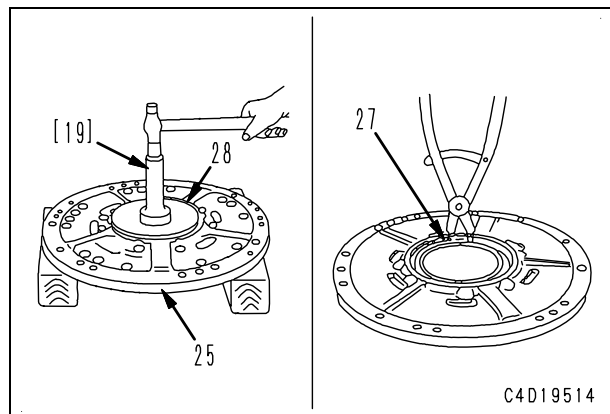
1) Install the guide plate and install twelve springs (37).

★ Spring free length: 66 mm

2) Install six discs (38), six springs (40), and five plates (39) in turn.



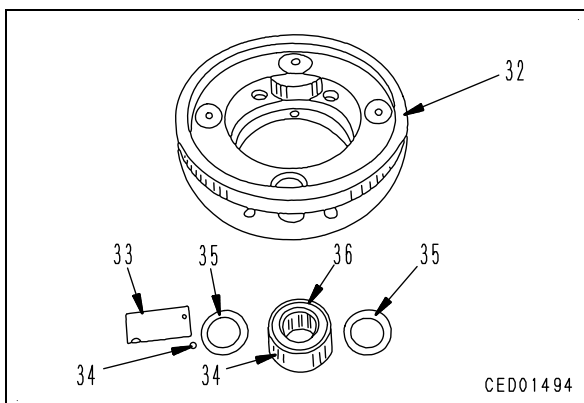
4] Using push tool [19], press fit ball bearing (28) to plate (25) and fix it with snap ring (27).



18. Input shaft and No. 1 carrier assembly

1) Assemble the input shaft and No. 1 carrier assembly according to the following procedure.

1] Install needle bearings (36) to gears (34), fit thrust washers (35) to both sides of the gears, and set them to carrier (32).



7. Steering control valve and seat assembly

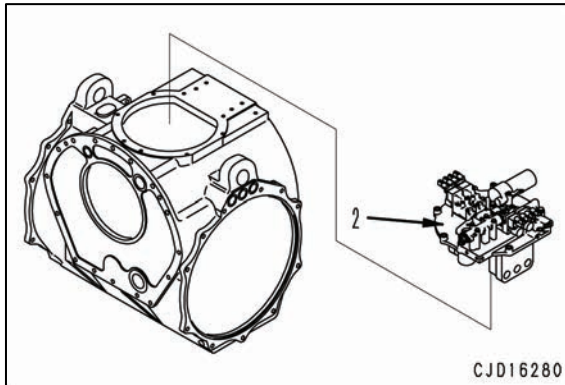
1) Install steering control valve and seat assembly (2) in position.

2) As for the mounting bolts, tighten them after installing pipes (48) described in the next step.

Mounting bolt: **Width across flats 19 mm**

- Mounting bolt:

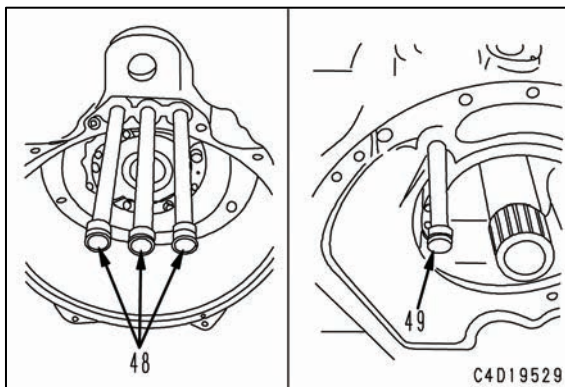
$49.0 \pm 4.9\text{Nm}$ { $5.0 \pm 0.5\text{kgm}$ }



8. Pipes

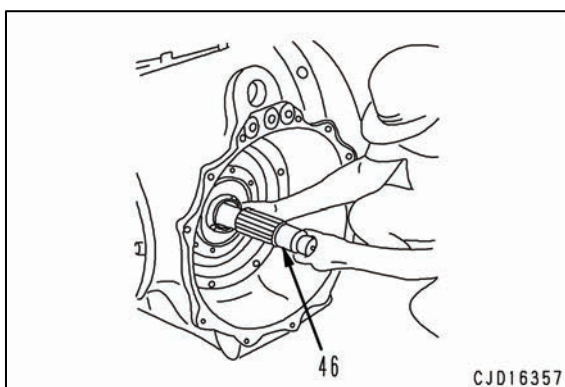
1) Install pipe (49).

2) Install left and right pipes (48).



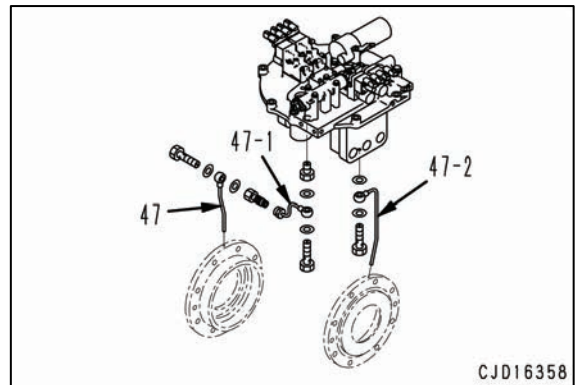
9. Shaft

Install left and right shafts (46).



10. Lubrication tube

Install lubrication tubes (47), (47-1), and (47-2).



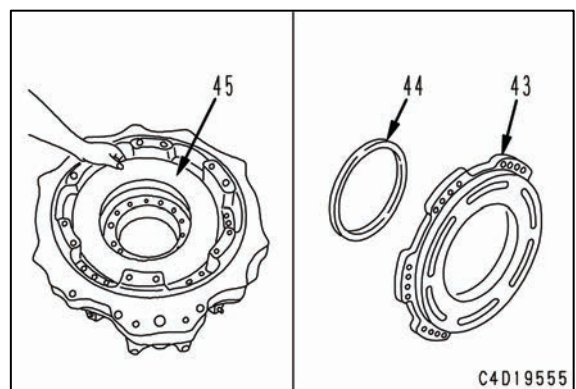
11. Clutch and brake assembly

1) Assemble the clutch and brake assembly as follows:

1] Install Belleville springs (45).

- ★ Set the Belleville springs back to back to install.

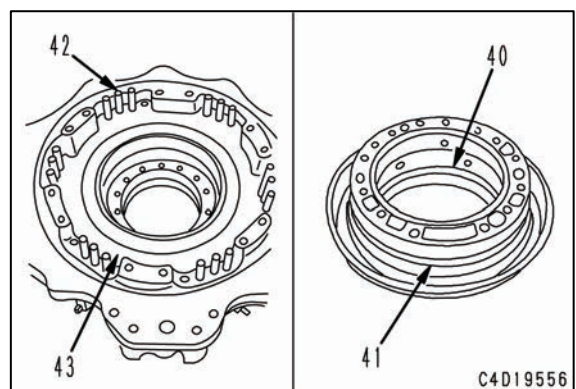
2] Install seal ring (44) to piston (43).



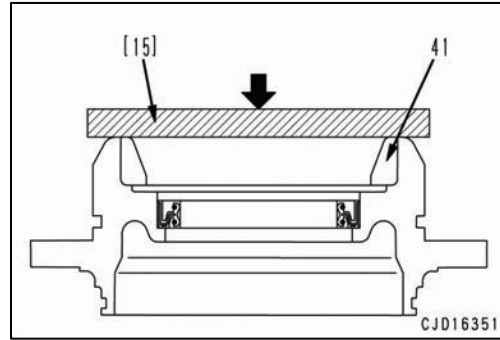
3] Install piston (43).

4] Install torque pins (42).

5] Install seal ring (41) and bearing outer race (40) to the brake cage using the push tool.




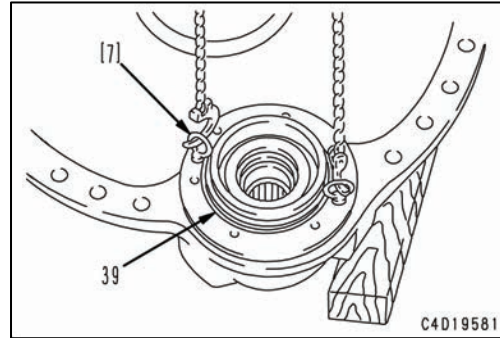
2] Press fit bearing outer race (41) with push tool [15].



2) Using eyebolts [7], set case assembly (39) to the case, and equally tighten the cage mounting bolts (C) and (D).

Mounting bolt: **Width across flats 24 mm**

 Mounting bolt: **14.7 Nm {1.5 kgm}**




3) Using feeler gauge [16] as shown in the figure below, measure the clearances (a) and (b) between cage (A) and case (B), at the two points "m" distance away from bolts (C) and (D), respectively.

4) Determine total thickness (c) of the shim pack and select shims to use according the table below.

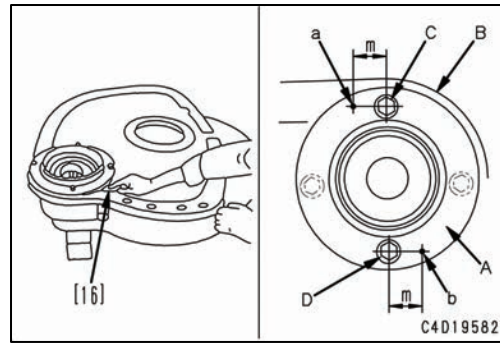
5) Insert the shims selected in Step 4 in position, and tighten four cage mounting bolts.

Mounting bolt: **Width across flats 24 mm**

 Mounting bolt:

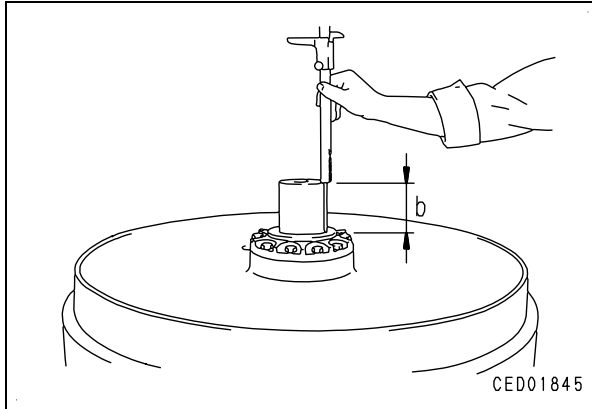
227.3 ± 80.85 Nm {23.25 ± 8.25 kgm}

★ Equally tighten the bolts while rotating the gear by hand, and then remove tool J8.





(a) + (b) [mm]		Number of shims to be used			Total thickness of shims (c) [mm]
Larger than	Below	t = 0.1	t = 0.5	t = 1.0	
1.6	1.8			1	1.0
1.8	2.0	1		1	1.1
2.0	2.2	2		1	1.2
2.2	2.4	3		1	1.3
2.4	2.6	4		1	1.4
2.6	2.8		1	1	1.5
2.8	3.0	1	1	1	1.6
3.0	3.2	2	1	1	1.7
3.2	3.4	3	1	1	1.8
3.4	3.6	4	1	1	1.9
3.6	3.8			2	2.0
3.8	4.0	1		2	2.1
4.0	4.2	2		2	2.2
4.2	4.4	3		2	2.3
4.4	4.6	4		2	2.4
4.6	4.8		1	2	2.5
4.8	5.0	1	1	2	2.6
5.0	5.2	2	1	2	2.7
5.2	5.4	3	1	2	2.8
5.4	5.6	4	1	2	2.9
5.6	5.8	5	1	2	3.0

- ★ Press fit the seal guide so that press-fitting dimension (b) from the end face of the shaft to the top surface of the seal guide is as follows.
 - Press-fit dimensions (b): 102 ± 0.2 mm
- ★ Turn over the idler assembly and repeat the same procedure to press fit the seal guide (6) on the opposite side.



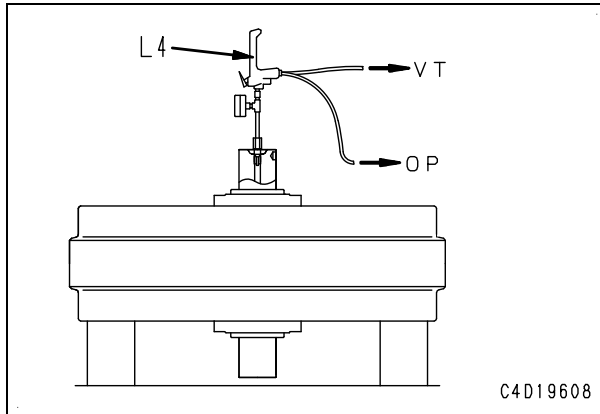
9. Using tool **L4**, supply oil to the specified level and tighten the oil filler plug.

 Idler: **0.95 – 1.05 ℓ (GO140)**

 Oil filler plug: **206 ± 49 Nm { 21 ± 5 kgm}**

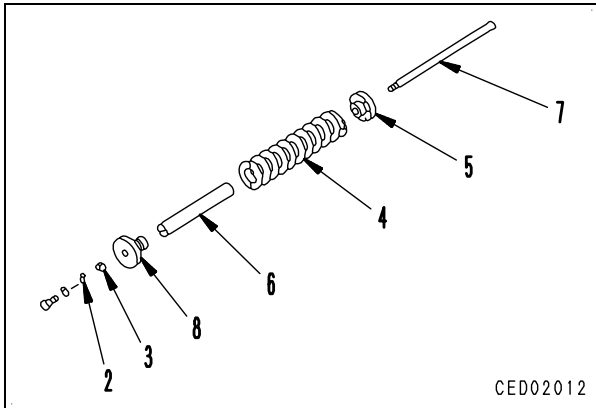
VT: To vacuum tank

OP: To oil pump

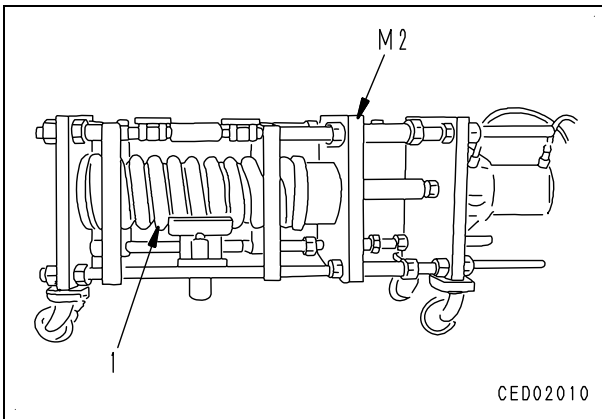


Assembly

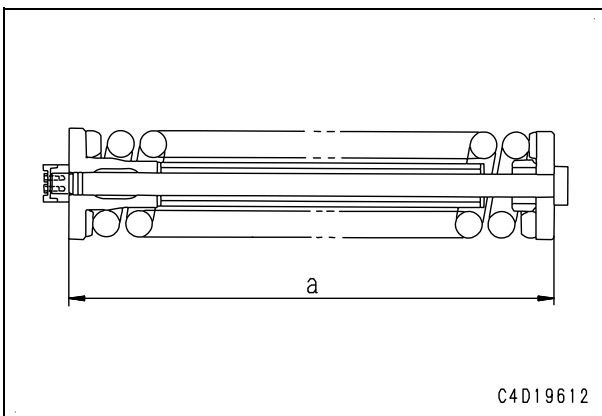
1. Install pilot (8), bolt (7), spacer (6), and rear pilot (5) to spring (4), and set them to tool M2.



⚠ As the spring will be under high installed load, so set them correctly to the tool.



2. Apply hydraulic pressure gradually to compress the spring until the spring installed length is the standard length.
 - ★ Installed length (a) of spring: 1,329.5 mm
 - ★ Installed load of spring: 500 kN {50,994 kg}



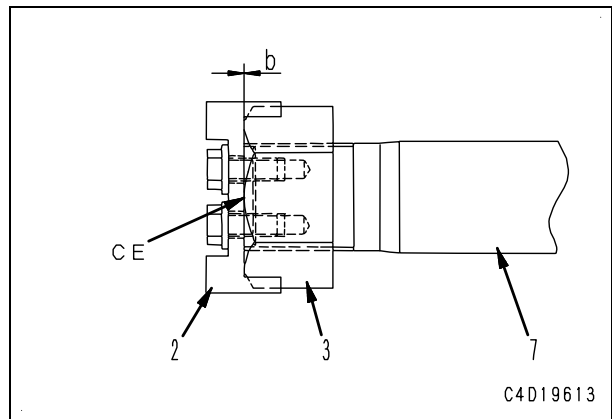
3. Install nut (3), and install lock plate (2) in position.

- ★ To prevent the nut from protruding from the end of bolt (7), make a clearance of 0 – 1.0 mm between the nut and lock plate.
- ★ Bring lock plate (2) and bolt (7) (CE portion) into tight contact to secure.

 Lock plate mounting bolt:

Adhesive (LT-2)

4. Gradually release hydraulic pressure to reduce the spring tension, and then remove recoil spring assembly (1) from tool M2.



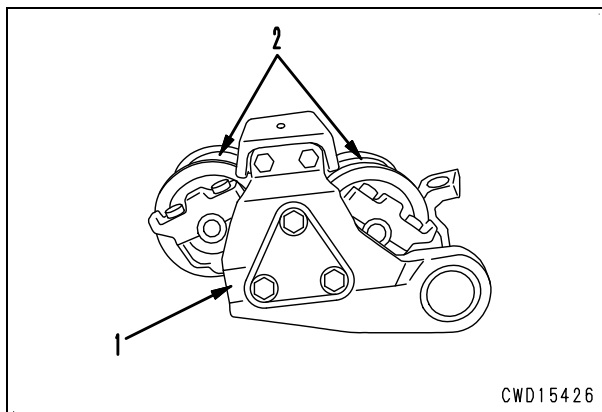
Disassembly and assembly of bogie assembly

Special tools

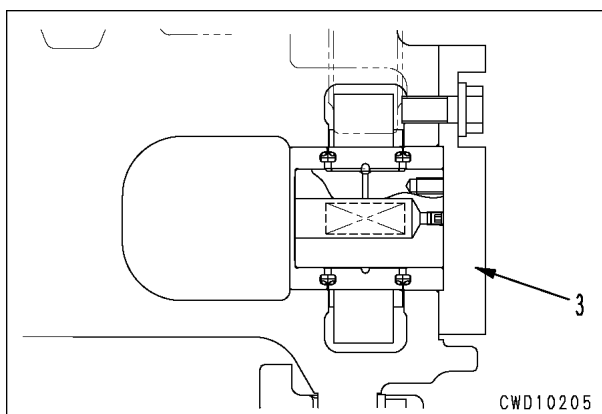
Symbol	Part No.	Part Name	Necessity	Qty	New/remodel	Sketch	
L 16	1	791-630-2260	Plate	■	1		
	2	791-630-2270	Screw	■	3		
	3	01580-12419	Nut	■	3		
	4	01643-32460	Washer	■	3		
	5	790-101-4000	Puller (490 kN {50 ton})	■	1		
	6	790-101-1102	Pump	■	1		
	19	791-601-1000	Oil pump	■	1		

Disassembly

- Track roller assembly
Reverse bogie assembly (1). Then, lift off two track roller assemblies (2).

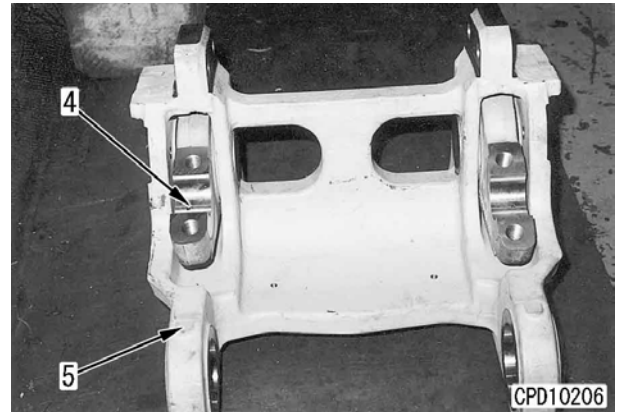


- Remove cover (3).



- Remove the pin assembly following the same procedure as described in the "Removal of bogie assembly".
(See Step 8.)

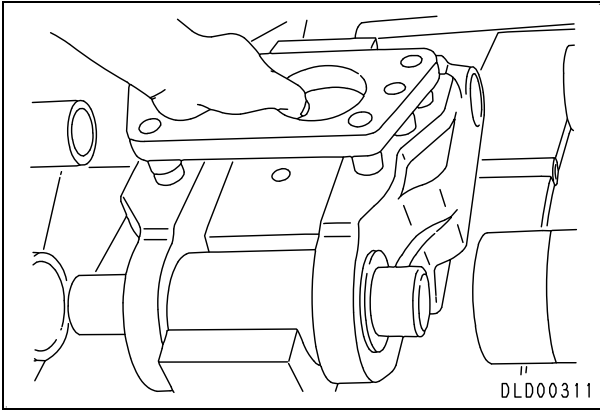
- Disconnection of bogie
Disconnect inner bogies (4) from outer bogie (5).



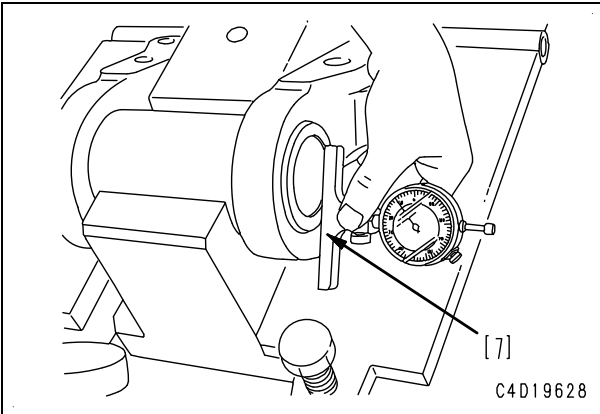
Assembly

- Assembly of pin assembly
Assembly the pin assembly following the same procedure as described in the "Installation of bogie assembly".
(See Steps 3 to 5.)
- Set inner bogies (4) to outer bogie (5).
- Press-fitting of pin assembly
 - Set tool L16 and cover (3) in position.
 - Press fit the pin assembly.
 - ★ Install the pin assembly with arrow (a) on its end face up (when it is mounted on the machine).
 - ★ Push in the pin assembly with cover (3).
 - ★ Push in the pin assembly to the machined surface of the bogie and maintain step (b) of 5 mm between the bogie and the pin assembly.
 - Periphery of pin:
Molybdenum disulphide lubricant (LM-P)
 - ★ Total press fitting force of pin assembly :
245 – 441 kN {25 – 45 ton}

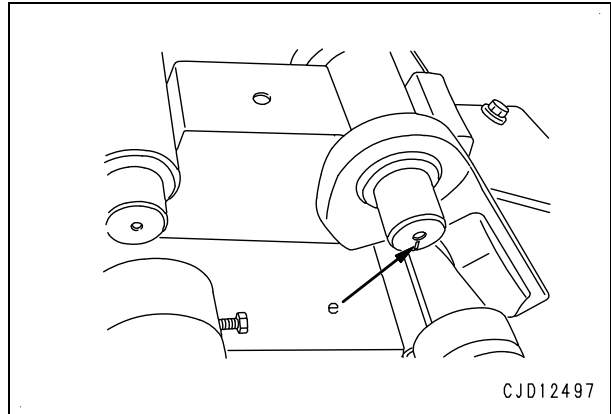
- 3) While checking the distance between the shoe bolt holes of the right and left master links by using the shoe bolt pitch gage, press fit the master links to the bushing until the distance is the standard value.
- ★ Remove all steel chips generated by the press-fitting process completely with compressed air.



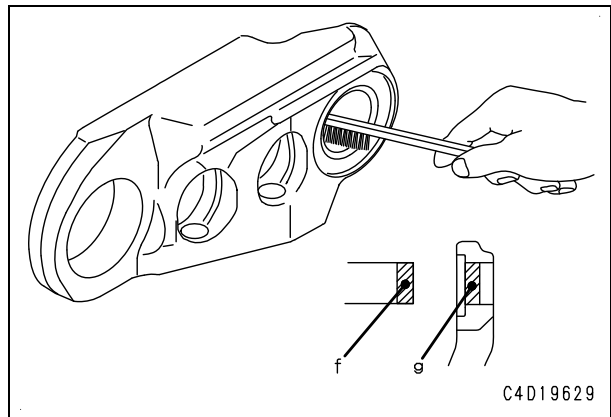
- 4) Turn over the master links and check that they are press fitted in parallel.
- 5) Measure the right and left protrusions of the bushing by using depth gauge [7].
- ★ Adjust the link press press-fitting jigs so that the right and left protrusions of the bushing are even.



- 6) Send out the master link portion, and then set the next pins and bushings.
- ★ Install the pin, even it is reused, with its cross hole (its direction is indicated with mark (e)) facing the link tread as in the case of new one.
- If it is not installed so, the strength of the assembly may be lowered. Accordingly, indicate the direction of the cross hole on the end face to prevent wrong installation.



- 7) Apply liquid gasket (198-32-19890) to all surfaces of pin press-fitting portion (f) and link bore (g).
- ★ This prevents the galling of the pin press-fitting portion that may cause oil to seep out.



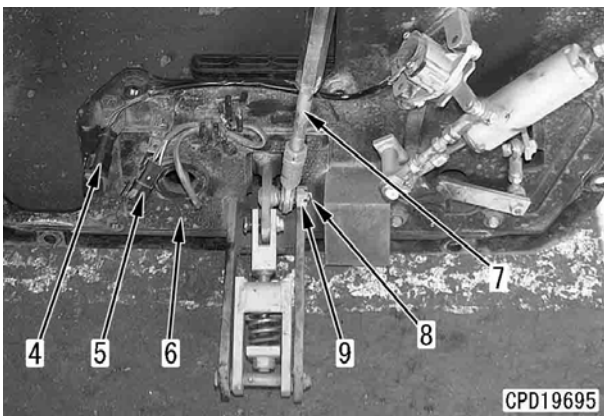
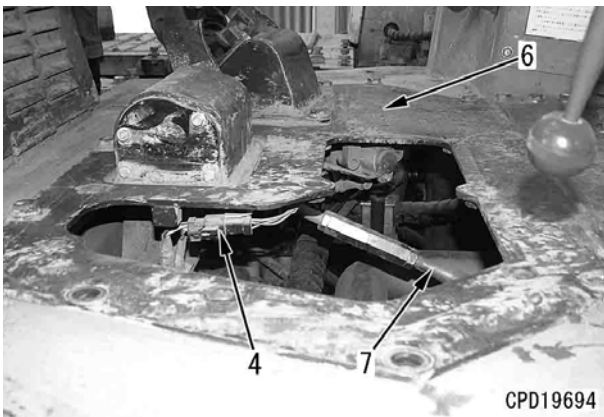
Disassembly and assembly of master link

Special tools

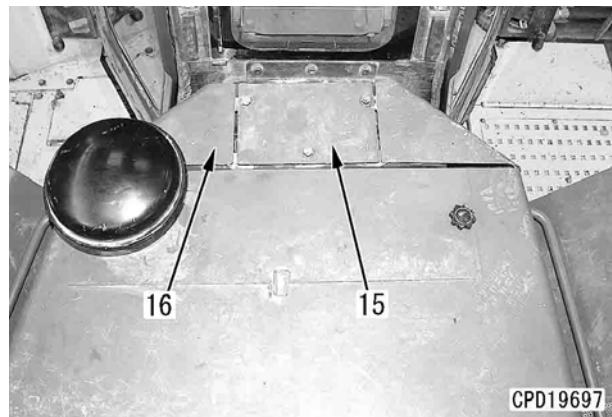
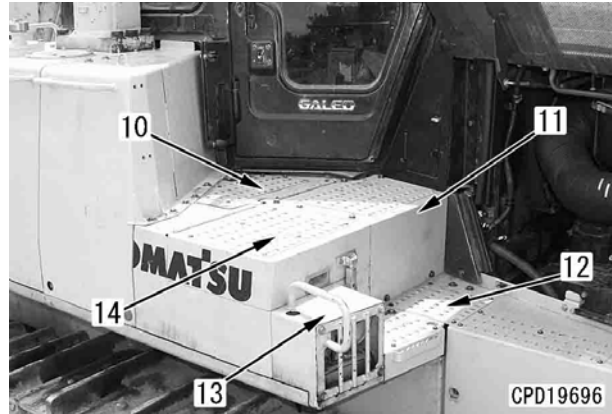
Symbol	Part No.	Part name	Necessity	Qty	New/remodel	Sketch	
R	1	791-646-7351	Push tool	■	1		
	2	791-660-7460	Pin brush	■	1		
	3	791-646-7900	Push tool (for large plug)	■	1		
	4	791-701-3000 or 791-601-1000	Seal checker oil pump	■	2		
	5	791-932-1110	Push tool (for small plug)	■	1		
	6	791-632-1021	Installer	■	1		
	7	1	791-632-1100	Remover & installer assembly	■	1	
		2	791-632-1130	● Adapter		1	
		3	790-434-1610	● Guide		1	
		4	01010-51440	● Bolt		2	
		5	791-685-9510	● Frame		1	
		6	791-685-9530	● Rod		1	
		7	791-685-9520	● Frame		1	
		8	791-685-9550	● Nut		3	
		9	04530-12030	● Eyebolt		1	
		10	791-685-9560	● Bolt		4	
		11	791-126-0150	● Adapter		1	
		12	791-685-9540	● Rod		1	
		13	791-632-1140	● Adapter		1	
		14	791-680-5520	● Guide		1	
		15	01010-51030	● Bolt		1	
		16	791-632-1150	● Pusher		1	
		17	791-685-9620	● Extension		1	
		18	791-632-1180	● Adapter		1	
		19	791-680-5543	● Adapter		1	
20	791-632-1160	● Guide		1			
21	791-680-5551	● Guide		1			
22	791-680-9630	● Adapter		1			
23	791-632-1160	Guide		1			
24	195-32-61210	Bolt		2			
25	790-101-4300	Cylinder (1,470 kN {150 ton})	■	1			

Symbol	Part No.	Part name	Necessity	Qty	New/remodel	Sketch
7	26	790-101-1102	Pump	■	1	
	27	790-101-4200	Cylinder (294 kN {30 ton})	■	1	
	28	791-680-1630	Spacer	■	1	
8	1	791-632-1300	Push tool assembly	■	1	N
	2	791-632-1260	● Push tool		1	
	3	791-632-1270	● Adapter		1	
	4	791-632-1220	● Pin (small)		1	
	5	791-632-1230	● Ring		1	
	6	791-632-1240	● Plate		1	
	7	791-685-5730	● Bar		1	
	8	791-632-1250	● Ring		1	
	9	791-632-1280	● Spring		1	
	10	01252-30605	● Bolt		1	
	11	01580-01210	● Nut		1	
9	1	791-632-1200	Push tool assembly	■	1	N
	2	791-632-1260	● Push tool		1	
	3	791-632-1270	● Adapter		1	
	4	791-632-1210	● Pin (large)		1	
	5	791-632-1230	● Ring		1	
	6	791-632-1240	● Plate		1	
	7	791-685-5730	● Bar		1	
	8	791-632-1250	● Ring		1	
	9	791-632-1280	● Spring		1	
	10	01252-30650	● Bolt		1	
	11	01580-01210	● Nut		1	
10	1	791-632-1290	Push tool assembly	■	2	N
	2	791-685-5730	Bar		1	
	3	01580-01210	Nut		1	

- 2) Disconnect connectors DEC (4) and BRK (5).
- 3) Remove the mounting bolts of floor plate (6).
- 4) Remove brake rod (7) according to the following procedure. [*1]
 - 1] Raise floor plate (6) and support it with a block.
 - 2] Remove cotter pin (8), and then remove nut (9) under floor plate (6).
 - 3] Disconnect brake rod (7).
 - ★ Note the installed dimensions of the rod for installation purpose.
- 5) Remove floor plate and brake pedal assembly (6).



5. Remove the cover according to the following procedure.
 - 1) Remove covers (10), (11) and (12).
 - 2) Remove headlamp protection cover (13).
 - 3) Remove the mounting bolts of battery case (14) and reposition battery case (14) outward.
 - 4) Remove covers (15) and (16).



6. Remove damper case oil level gauge (17) and bracket (18) as a unit from the damper case.



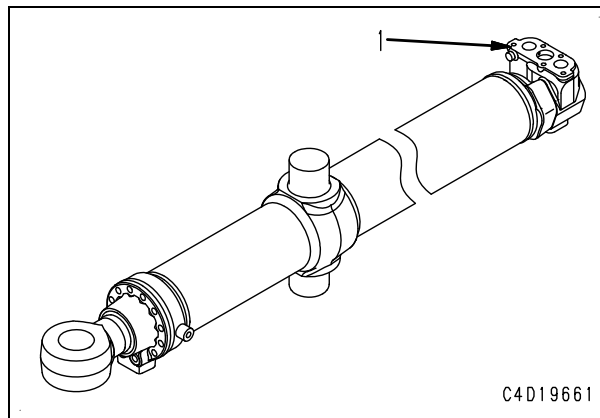
Disassembly and assembly of hydraulic cylinder assembly

Special tools

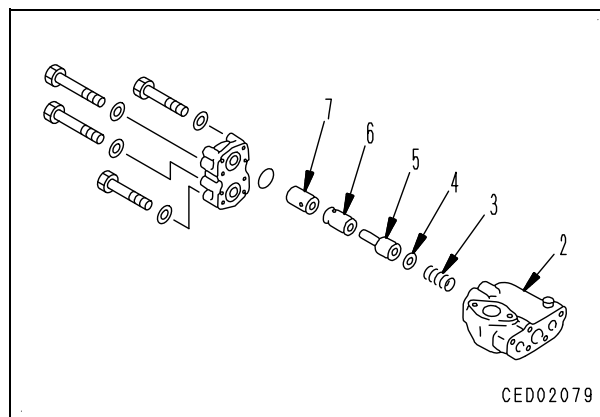
Symbol	Part No.	Part name	Necessity	Q'ty	New/remodel	Sketch	
U	1	790-502-1003	Stand	■	1		
		790-201-1702	Push tool kit	■	1		
		790-201-1841	● Push tool		1		
	2	790-201-1861	● Push tool		1		
		790-101-5021	● Grip		1		
		01010-50816	● Bolt		1		
		790-201-1500	Push tool kit	■	1		
		790-201-1650	● Plate		1		
	3	790-201-1670	● Plate		1		
		790-101-5021	● Grip		1		
		01010-50816	● Bolt		1		
	4	790-720-1000	Expander	■	1		
		796-720-1680	Ring	■	1		
		07281-01589	Clamp	■	1		
	5	796-720-1720	Ring	■	1		
		07281-02429	Clamp	■	1		
		796-720-1690	Ring	■	1		
		07281-02169	Clamp	■	1		
	6	790-102-4300	Wrench	■	1		
		790-102-4310	Pin	■	2		

Disassembly

1. Cylinder tube
Remove the cylinder tube.
2. Quick drop valve assembly
★ Perform this procedure for only the blade lift cylinder.
 - 1) Remove quick drop valve assembly (1).



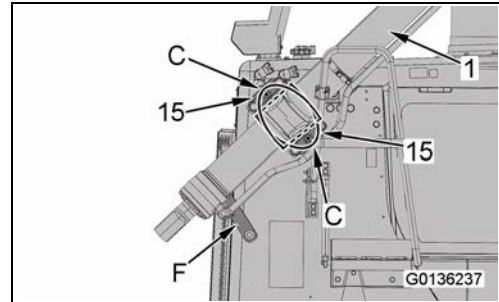
- 2) Disassemble the quick drop valve assembly according to the following procedure.
 - 1] Remove elbow (2).
 - 2] Remove spring (3), washer (4), and valves (5) and (6), and pull out collar (7).



8. Fix cap (15) and blade lift cylinder assembly (1) with wire (C), and remove the fixing tool (F).

NOTICE

- You can lose the balance and fall over when you remove the cap (15). Fix the cap (15) with the wire (C), remove the cylinder, and then remove the cap (15).
- Check the tension of the webbing sling before you remove the fixing tool (F). If the tension of the webbing sling is not sufficient, the blade lift cylinder assembly (1) rotates by its own weight when the fixing tool (F) is removed. It is very dangerous.
- Remove the fixing tool (F) from the blade lift cylinder assembly (1).

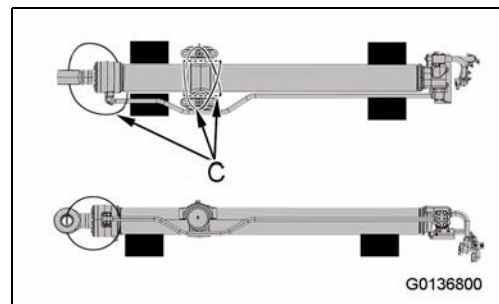
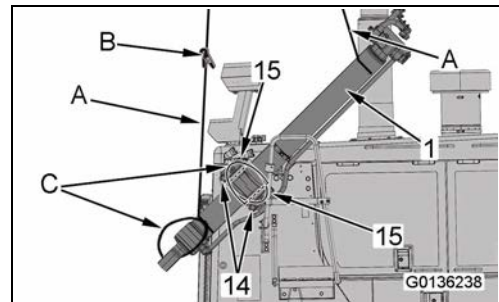


9. Lift the blade lift cylinder assembly (1), hold it, and remove the 4 bolts (14).


NOTICE

Before you remove the bolt (14), make sure that the blade lift cylinder assembly (1) is lifted directly above. If you remove the bolt (14) while the blade lift cylinder assembly (1) is not lifted correctly, it can swing. It is very dangerous.

10. Remove the blade lift cylinder assembly (1), and set it on the stable position (where it does not rotate).



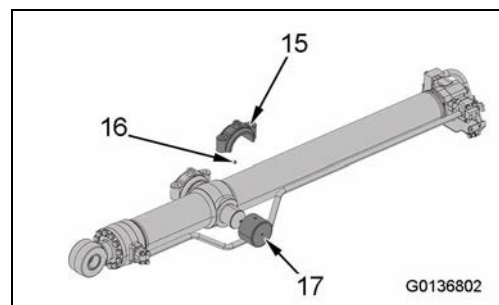
11. Cut the wire (C) that fixes the cap (15), and remove the cap (15).

 Cap (15): **6 kg**

12. Remove the dowel pin (16).
13. Remove the bushing (17).

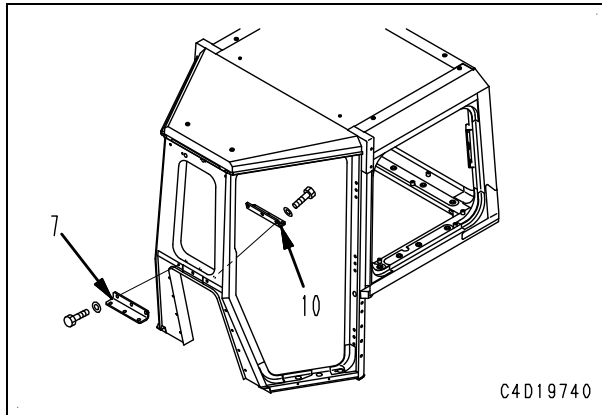
REMARK

Do the same work on the opposite side.

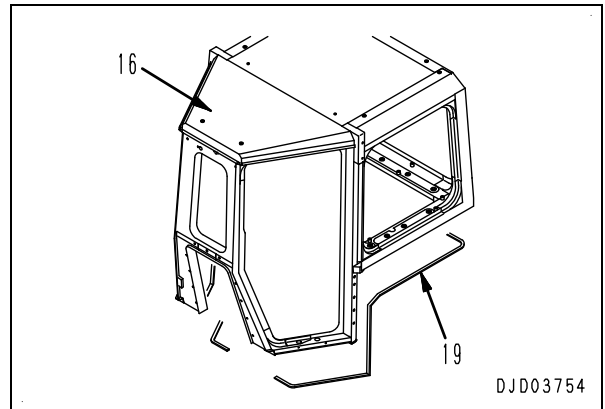


Installation

- ★ Before installing the operator's cab, loosen the mounting bolts of angle (7) and those of angle (10) inside the operator's cab.



- 2) Sling operators cab assembly (16), and bond seal (19) to the mating face.

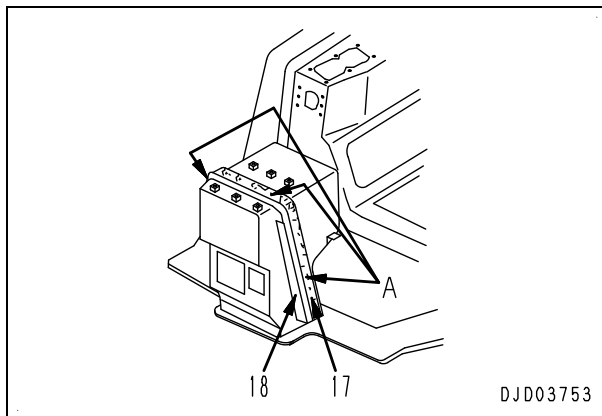


1. Seal

- 1) Fit seal (17) to guide plate (18) of the air conditioner box.

Part (A) on outside of seal (sealing face against cab):

Grease (G2-LI)



Electrical system

Removal and installation of transmission controller assembly and steering controller assembly

Removal

- ▲ Park the machine on a level surface and lower the work equipment to the ground.
- ▲ Set the parking brake lever and work equipment lock lever in the lock position.
- ▲ Stop the engine and disconnect the cable from the negative (-) terminal of the battery.

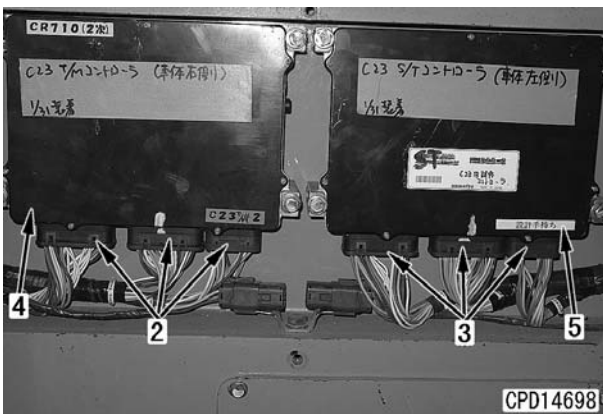
Installation

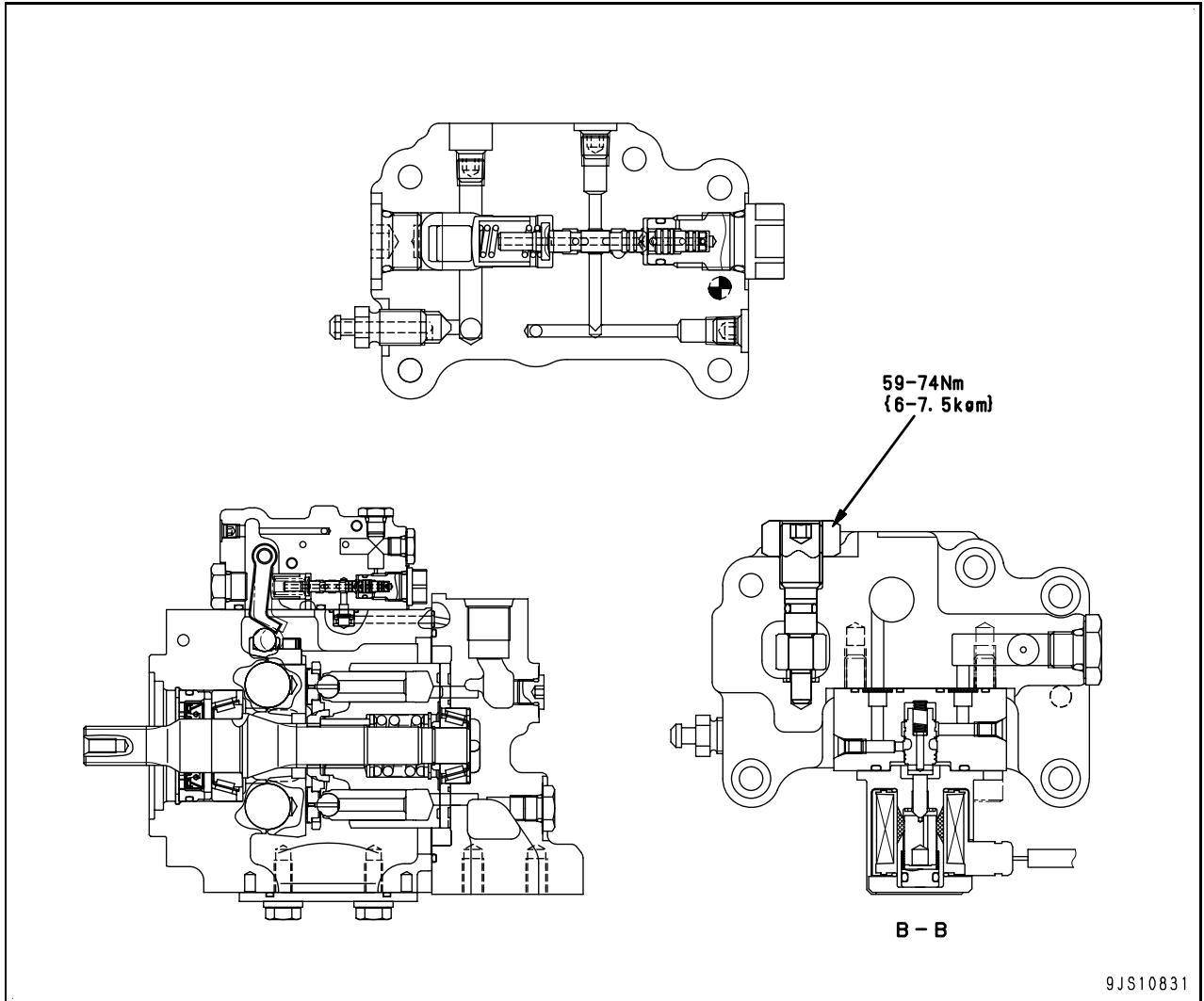
- Carry out installation in the reverse order to removal.

1. Remove plate (1).

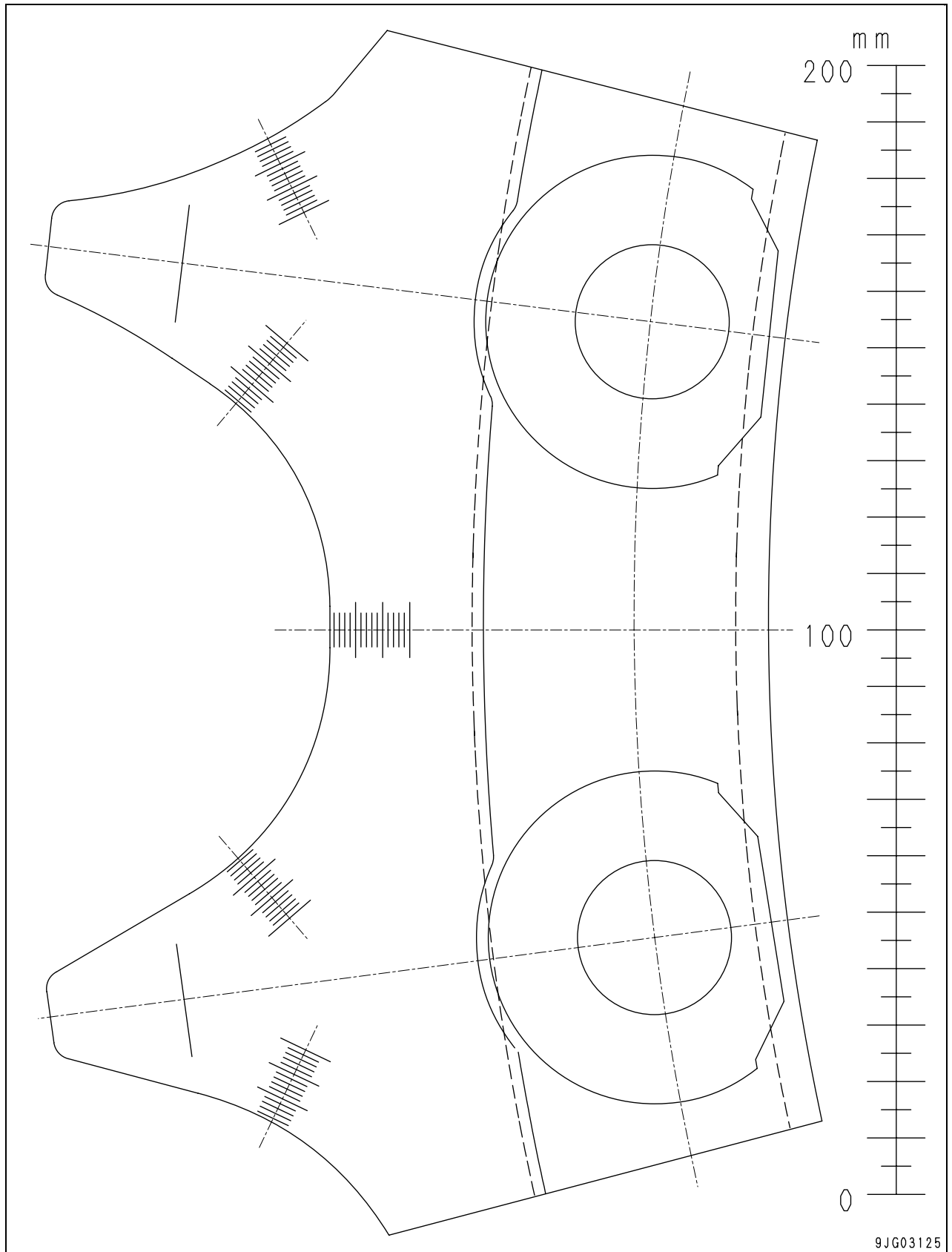


2. Disconnect transmission controller wiring connector (2) and steering controller wiring connector (3). Remove the mounting bolts, and remove transmission controller assembly (4) and steering controller assembly (5).

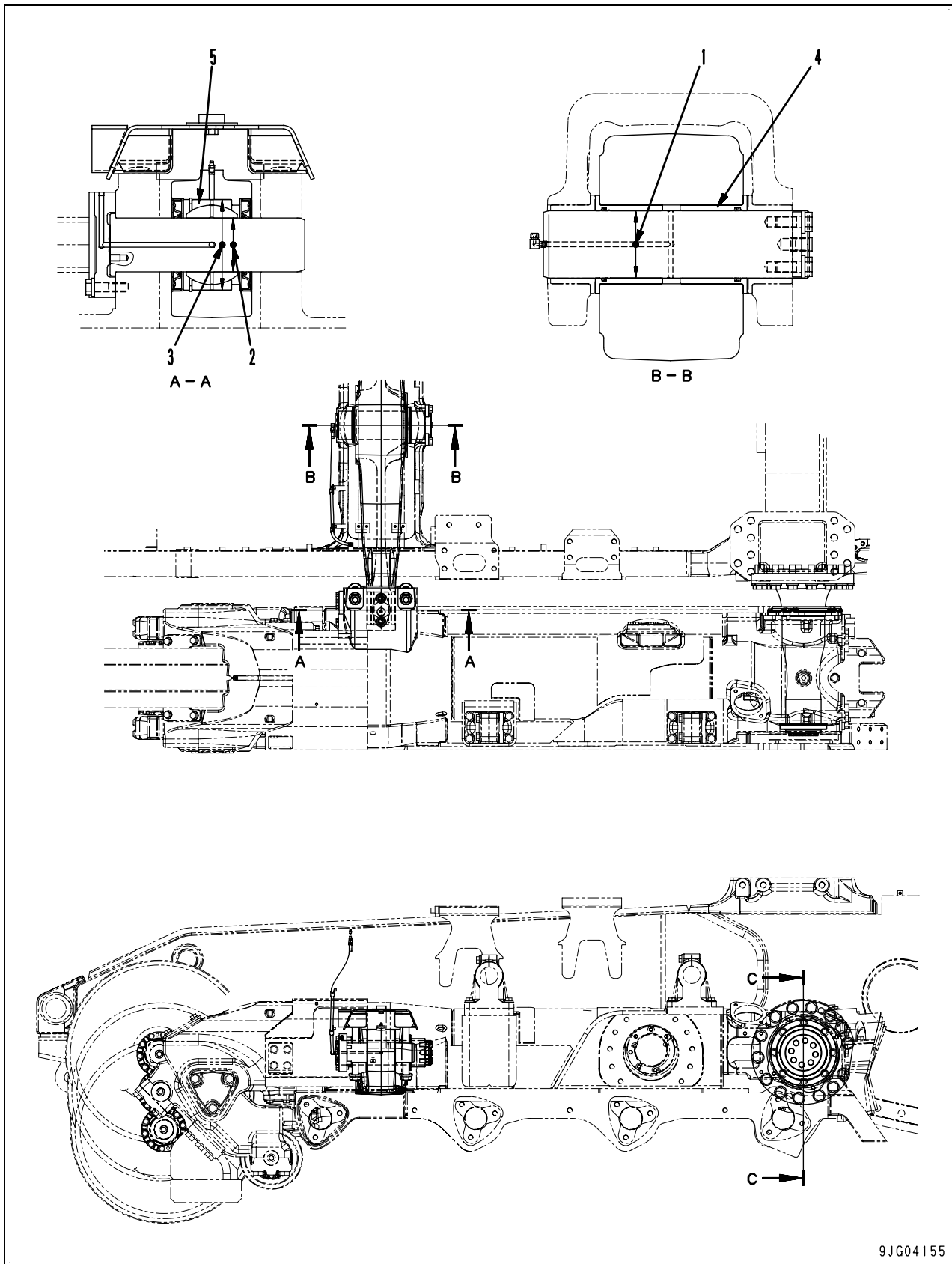




Full-scale drawing of sprocket tooth profile

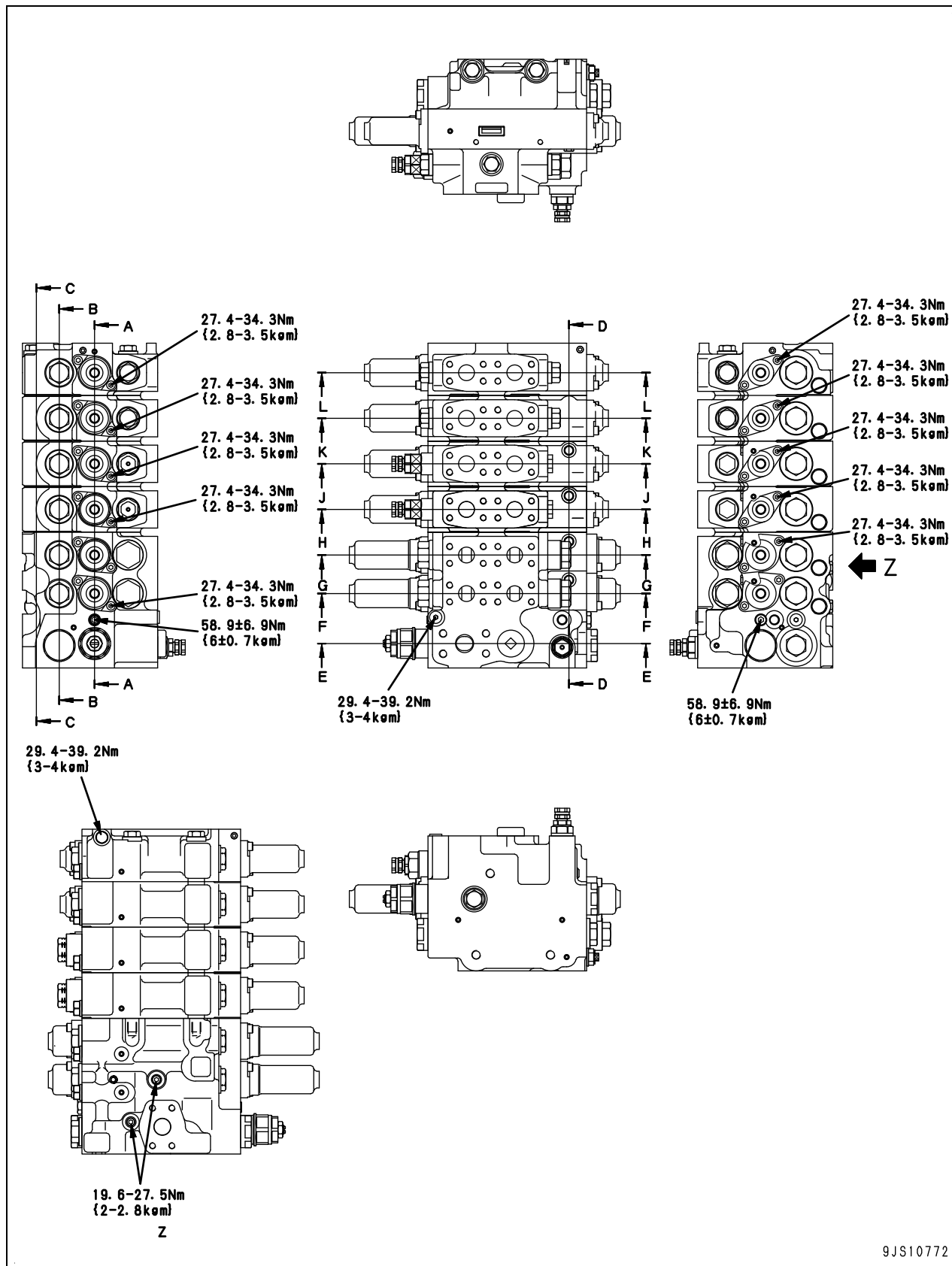


Suspension



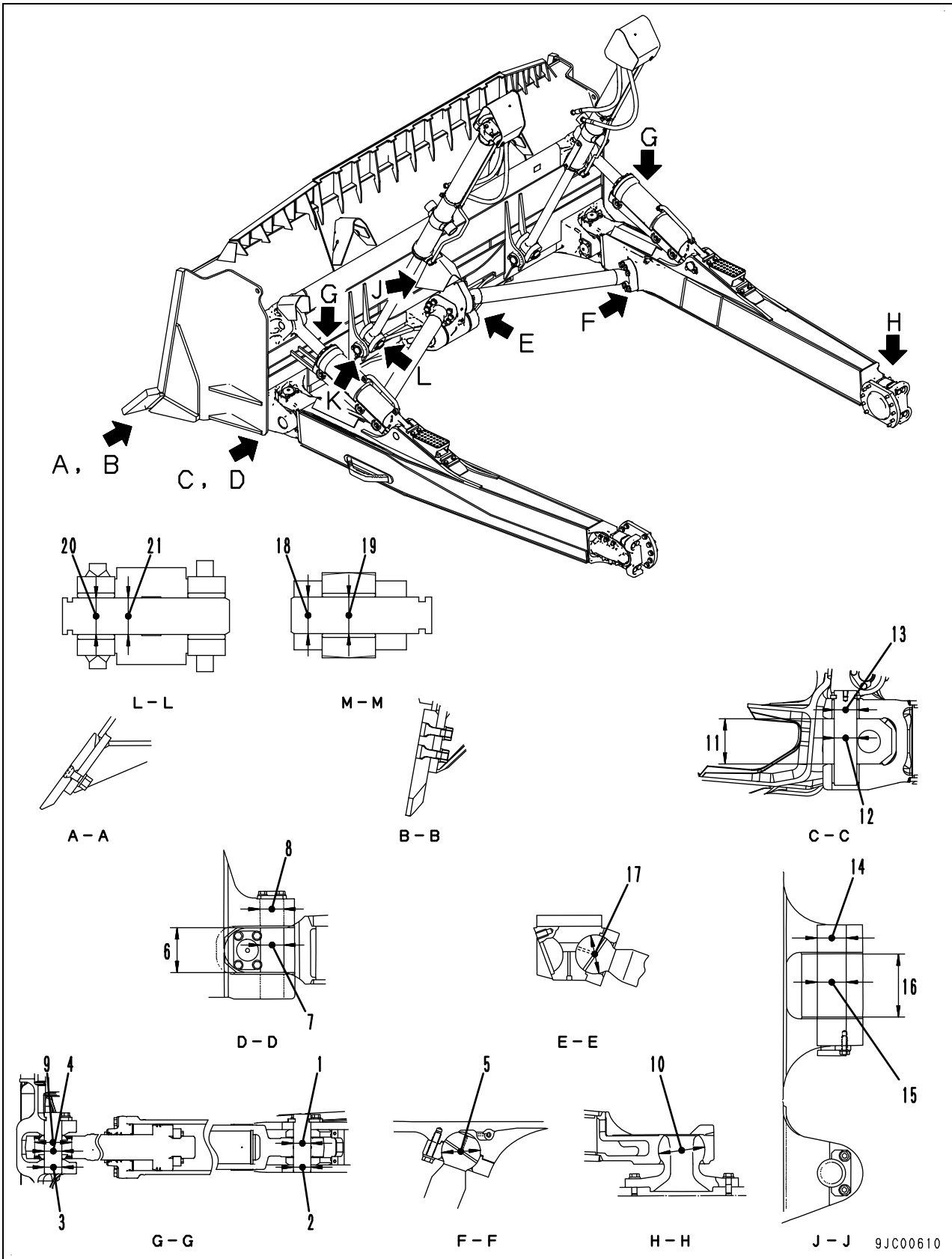
9JG04155

Control valve
6-spool valve for dual tilt
Appearance



9JS10772

Full-U dozer
(The figure shows a dual tilt specification machine)



- A: Refrigerant inlet (From condenser)
- B: Refrigerant outlet (To compressor)
- C: Hot water inlet
- D: Hot water outlet

- 1: Evaporator
- 2: Heater core
- 3: Expansion valve
- 4: Air mix servomotor
- 5: Air mix door
- 6: Blower resistor
- 7: Evaporator temperature sensor
- 8: Hot water valve
- 9: Dual pressure switch
- 10: Compressor clutch relay
- 11: Condenser relay (Not used)

Outline

- The air conditioner unit consists of the evaporator (1) and heater core (2), and is used to cool down or warm up the air in the cab.

Temperature control

- When the temperature control switch on the air conditioner control panel is operated, the air conditioner control panel controls the air mix servomotor (4) which opens or closes the air mix door (5) and hot water valve (8) to adjust the temperature.

Overcooling (freeze) prevention

- Evaporator temperature sensor (7) varies its electrical resistance according to temperature.
- The air conditioner control panel converts the variation in resistance of the evaporator temperature sensor (7) into voltage and uses the voltage for detecting the evaporator (1) temperature.
- The air conditioner control panel activates the compressor clutch relay (10) to stop the compressor and to prevent the evaporator (1) from freezing.

Air flow control

- When the air flow control switch on the air conditioner control panel is operated, the air conditioner control panel controls the blower motor of the blower unit through blower resistor (6) to adjust the air flow.

Functions of major components

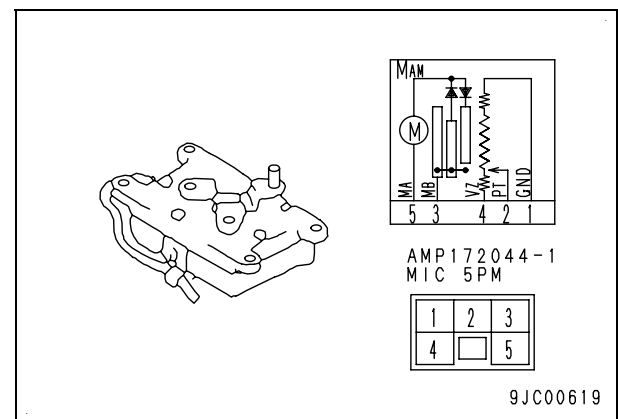
Evaporator

- Evaporator (1) is cooled by the low-pressure, low-temperature refrigerant gas being sent from expansion valve (3). Air from the blower fan is cooled and dehumidified when passing through the evaporator fins.

Heater core

- Heater core (2) is warmed by the hot water (engine coolant) being sent from the engine. Air from the blower fan is warmed as it passes through the heater core fins.

Air mix servomotor



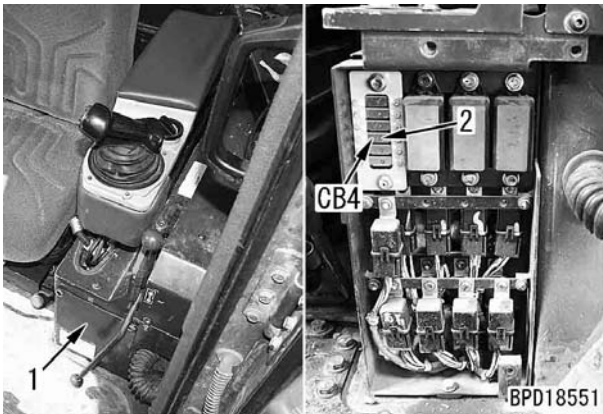
- When the switch on the air conditioner control panel is operated, the motor drive power (24 V) is supplied to servomotor terminal (3) or (5).
- The rotation direction of the motor changes according to the terminal that receives the power.
- The variable resistor is built into the servomotor, and its resistance changes as the motor rotates.
- A voltage of 5V is supplied to the variable resistor from the air conditioner control panel, and the air conditioner control panel detects the motor rotation angle based on the potential difference.
- When the air mix door reaches the position specified by the air conditioner control panel, the air conditioner control panel stops current output to the servomotor to stop the air mix door.
- ★ Do not supply power directly between terminals (3) and (5) of the servomotor to drive the servomotor for testing purposes.

Part and connector locations

The air conditioner unit, blower unit and various relays are in the dashboard.

1. Remove cover (1).

- ★ Right figure shows condition with cover (1) removed.
- Circuit breaker CB4 (4th from the top) :
For power supply for blower motor, air conditioner compressor and air conditioner unit (All equipment related to air conditioner)
- ★ If reset button (2) of the circuit breaker comes out, the circuit is cut off (OFF). In this case, push reset button (2) in. After setting starting switch to ON position, if the reset button does not come out but keeps pushed, it is no problem. If the reset button comes out soon after pushing, the electrical circuit may has a ground fault or another abnormality. (See "Troubleshooting for power supply system")



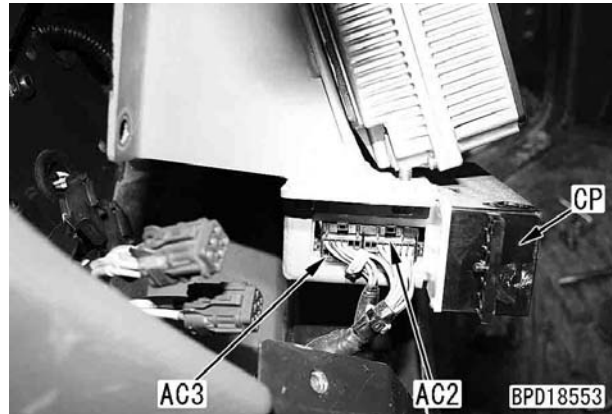
2. Pull out four switches (3) forward and disconnect each connector.

3. Remove cover (4).



★ Condition with cover (4) removed

- AC2, AC3: Air conditioner control panel connectors
- CP: Air conditioner control panel



4. Remove recirculated air filter cover (5).

5. Remove cover (6).



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