SEN06521-16

Shop Manual

BULLDOZER

D155AXi-8

SERIAL NUMBERS 100040 and up

KOMATSU

⚠ **Put on the protective eyeglasses, gloves and working clothes with long sleeves while you are collecting or filling the refrigerant. Otherwise, when refrigerant gas (R134a) gets in your eyes, you may lose your sight, and when it touches your skin, you may suffer from frostbite.**

- When loosening the nuts fixing air conditioner hoses and tubes, be sure to use 2 wrenches; use one wrench to fix and use the other one to loosen the nut.

Precautions for Air Conditioner Piping

- When installing the air conditioner piping, be careful so that dirt, dusts and water do not enter the hose.
- Check that the O-rings are fitted to the joints when connecting the air conditioner piping.
- Do not reuse an O-ring because it is deformed and deteriorated if it is used once.
- When removing the O-rings, use a soft tool so that the piping is not damaged.
- Check that the O-ring is not damaged or deteriorated.
- Apply compressor oil for refrigerant (R134a) to O-ring.

REMARK

Do not apply oil to the threaded portion of a bolt, nut or union.

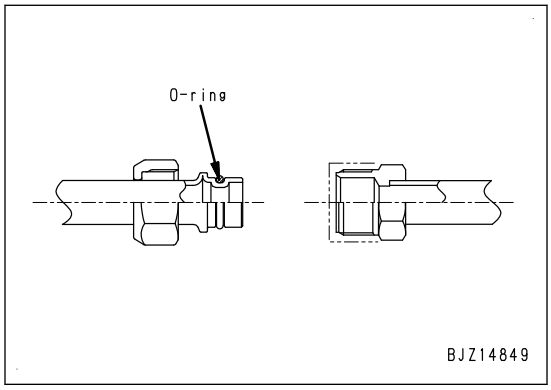
Manufacturer	Part name
DENSO	ND-OIL8
VALEO THERMAL SYSTEMS	ZXL100PG (PAG46 or equivalent)
SANDEN	SP-10

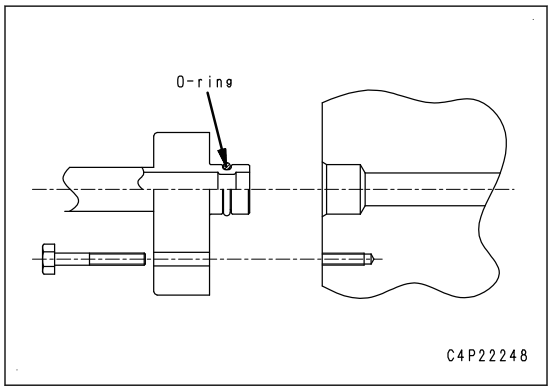
When tightening nuts of the air conditioner hoses and tubes, be sure to use 2 wrenches. Use one wrench to fix and tighten the nut with the other wrench to the specified torque (Use a torque wrench for tightening).

REMARK

- The figure shows an example of fitting of O-ring.
- An O-ring is fitted to every joint of the air conditioner piping.

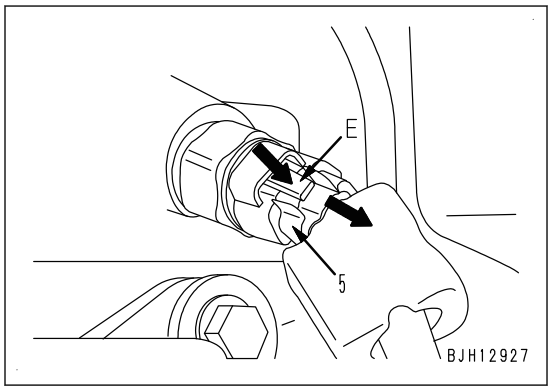
For tightening torques, see Others, “Precautions for Disconnection and Connection of Air Conditioner Piping”.





How to Disconnect Connector with Lock to Push (AMP-3)

While pressing lock (E), pull out connector (5) in the direction of the arrow.



How to Connect Connector with Lock to Push (AMP-3)

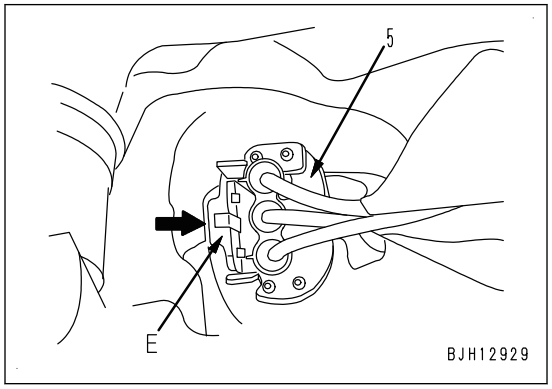
Insert it straight until it clicks.

How to Disconnect Connector with Lock to Push (SUMITOMO-3)

While pressing lock (E), pull out connector (5) in the direction of the arrow.

REMARK

Pull up the connector straight.

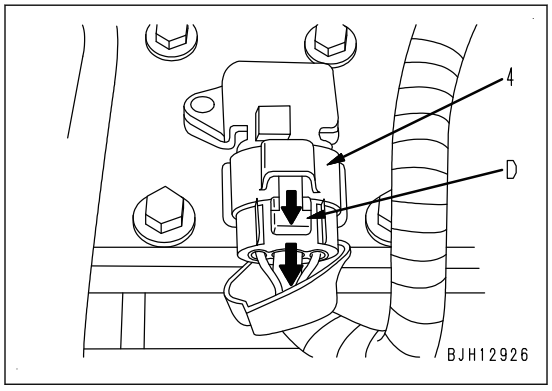


How to Connect Connector with Lock to Push (SUMITOMO-3)

Insert it straight until it clicks.

How to Disconnect Connector with Lock to Push (SUMITOMO-4)

While pressing lock (D), pull out connector (4) in the direction of the arrow.



How to Connect Connector with Lock to Push (SUMITOMO-4)

Insert it straight until it clicks.

10 Structure and Function

NOTICE

- **Before you shut off the battery power supply circuit, turn the starting switch to the “OFF” position, and make sure that the system operating lamp is off, and then set the battery disconnect switch to the “OFF” position.**
- **A controller data loss error can occur if the battery disconnect switch is set to the “OFF” position (the battery power supply circuit is shut off) while the system operating lamp is on. Do not operate the battery disconnect switch while the system operating lamp is on.**
- **If the system operating lamp keeps lit when you want to cut off the battery circuit for maintenance, turn the starting switch to the “ON” position, and then turn it to the “OFF” position. The lamp goes off in the maximum of 6 minutes.**
  When the system operating lamp goes off, immediately set the battery disconnect switch to the “OFF” position.

REMARK

- The system operating lamp possibly looks as if it gives off a little light in the dark even when it is off. It is because of the minute leakage of current and this is not an abnormal phenomenon.
- The gateway function controller starts and stops continuously to keep the periodic communication even when the starting switch is in the “OFF” position.
  The start and stop cycle (sleep cycle) of the gateway function controller changes in response to the communication state and the time when the machine is not in operation. The lamp can be lit approximately for the maximum of one hour.
- The system operating lamp goes off in a maximum of 6 minutes after the starting switch is turned to the “OFF” position.
- After the engine is stopped, DEF is automatically purged from the inside of the DEF injector and DEF pump to the DEF tank to prevent defective operation of equipment caused by frozen DEF or deposited urea. Accordingly, the system operating lamp keeps lit for a while even after the starting switch is turned to the “OFF” position. This is not a problem.

3: Air bleeding hose
4: Radiator assembly
5: Overflow hose
6: Inlet hose
7: Reservoir tank
8: Cooling fan pump
9: Outlet hose
10: Inlet hose (for circulation at coolant temperature low level)
11: Hydraulic oil cooler bypass valve
12: Hydraulic oil cooler
13: Aftercooler
14: Cushion
15: Cooling fan motor
16: Fan
17: Drain valve
18: Lower tank (with built-in power train oil cooler)

Specifications of Cooling System

Radiator

Core type: Rectangular corrugated fin

Fin pitch: 8.0/2P

Heat dissipation area: 40.05x3 m^2

Relief pressure of pressure valve: 0.09 MPa {0.9 kgf/cm^2}

Vacuum pressure of pressure valve: 0.005 MPa {0.05 kgf/cm^2}

The reservoir tank is installed inside the right mudguard.

Aftercooler

Core type: Rectangular straight fin

Fin pitch: 8.0/2P

Heat dissipation area: 23.15 m^2

Power Train Oil Cooler

Core type: PTO-OL

Inner fin type: TF8-C

Cooling method: Built in lower tank

Heat dissipation area: 2.47 m^2

The power train oil cooler is built in the lower tank.

Hydraulic Oil Cooler

Core type: Rectangular corrugated fin

Fin pitch: 8.0/2P

Inner fin type: TF6-C

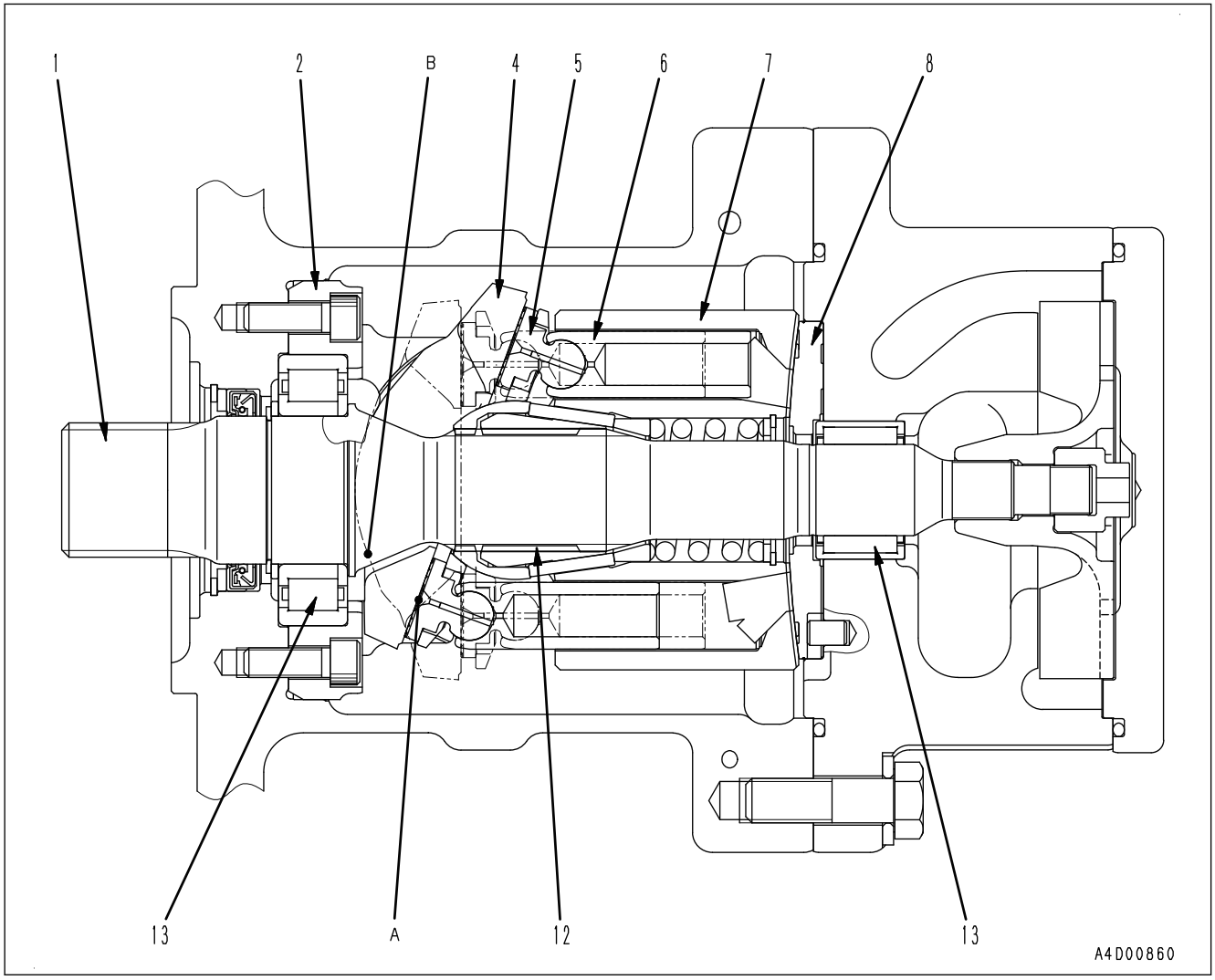
Cooling method: Cooling with air

Heat dissipation area: 6.57 m^2

Pilot Lamps Shown on Machine Monitor

<table>
<tr><th>Gauge</th><th>Item to be shown</th><th colspan="3">Range and method to show</th><th>Remarks</th></tr>
<tr><td rowspan="6"> 
9JC01177</td><td rowspan="6">Preheating</td><td>Automatic preheating</td><td colspan="2">• This function operates automatically when the temperature is low. (The lamp is on for approximately 40 seconds at maximum.)
• Goes off after the engine is started.</td><td rowspan="6">Shows the operation state of preheating.</td></tr>
<tr><td rowspan="5">Automatic preheating</td><td>Time after the starting switch HEAT (preheating) is turned to the ON position</td><td>Monitor display</td></tr>
<tr><td>0 to 30 seconds</td><td>On</td></tr>
<tr><td>30 to 40 seconds</td><td>Flash</td></tr>
<tr><td>40 seconds or longer</td><td>Off</td></tr>
<tr><td></td></tr>
<tr><td> 
9JC01436</td><td>Work equipment lock</td><td colspan="3">On: Locked
Flash: When it is necessary to be locked
Off: Free</td><td>Shows the state of the work equipment lock lever.</td></tr>
<tr><td> 
9JC01437</td><td>Parking brake</td><td colspan="3">On: Locked
Flash: When it is necessary to be locked
Off: Free</td><td>Shows the state of the parking brake lever.</td></tr>
<tr><td> 
9JC01175</td><td>Blow</td><td colspan="3">On: ON
Off: OFF</td><td>Shows the operation state of the blower function of cooling and heating</td></tr>
<tr><td> 
9JC01181</td><td>Seat belt not fastened</td><td colspan="3">On: Seat belt is not fastened.
Off: Seat belt is fastened.</td><td>Shows the wearing state of the seat belt.</td></tr>
<tr><td> 
9JC01182</td><td>Engine stop</td><td colspan="3">On: When the engine is stopped
Off: When the engine runs</td><td>Shows the operation state of the engine.</td></tr>
<tr><td> 
G0174581</td><td>Fan reverse rotation (*1)</td><td colspan="3">On: Cooling fan rotation is in reverse.
Off: Cooling fan rotation is normal.</td><td>Shows the operation state of the cooling fan.</td></tr>
<tr><td> 
9JC01438</td><td>Fan reverse rotation (*1)</td><td colspan="3">On: Cooling fan rotation is in reverse.
Off: Cooling fan rotation is normal.</td><td>Shows the operation state of the cooling fan.</td></tr>
</table>

Structure Drawing



- Cylinder block (7) is supported on shaft (1) by spline (12).
- Shaft (1) is supported by each bearing (13).
- The end of piston (6) is a concave sphere, and it is caulked to be combined with shoe (5).
- Piston (6) and shoe (5) form a spherical bearing.
- Shoe (5) slides in a circular pattern as always being presses against the flat surface (A) of rocker cam (4).
- Rocker cam (4) rocks on cylindrical surface (B) of cradle (2) fixed to the case. High-pressure oil is supplied between them to form a static pressure bearing.
- Piston (6) moves relatively in the axial direction in each cylinder chamber of cylinder block (7).
- Cylinder block (7) rotates relatively to valve plate (8) while seal the pressurized oil.
- The oil pressure is balanced properly on this surface.
- The pressurized oil is sucked in and discharged from each cylinder chamber in cylinder block (7) through valve plate (8).

Specifications of Work Equipment and HSS Pump

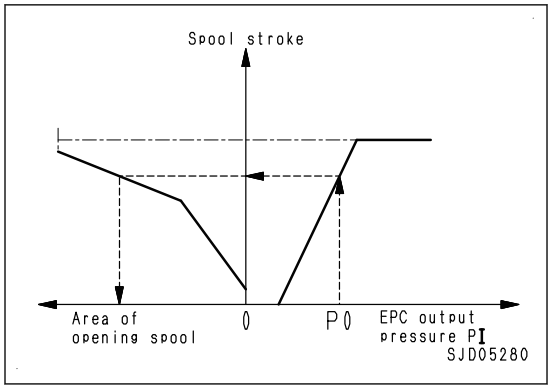
Model: HPV190

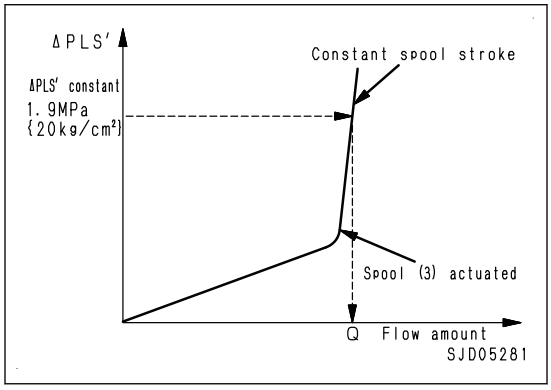
Type: Variable displacement swash plate type piston pump

Theoretical discharged volume : 427 ℓ/min(when engine speed is 2249 rpm)

Rated discharged pressure: 41.2 MPa {420 kgf/cm^2}

1. When PCCS lever is operated to “LEFT”, pilot pressure (PI) acts on the right end of steering spool (1) through the EPC valve.
2. When the pressure becomes greater than the set load of spring (2), steering spool (1) moves to the left and is balanced at a position that matches pilot pressure (PI).
3. Chambers (C) and (D) are connected, and the oil discharged from the pump flows through ports (A), (B), (C) and (D) to HSS motor (6).
4. At the same time, the load pressure in chamber (D) of the steering spool is transmitted through LS orifice (5) and chamber (H) to chamber (G) of steering priority valve, and is further transmitted through LS circuit (O) to the LS valve of the work equipment and HSS pump.
5. Since chamber (B) pressure ≒ chamber (C) pressure, and chamber (G) pressure ≒ chamber (D) pressure, steering priority valve spool (3) is controlled by the differential pressure of steering spool (1) [chamber (C) pressure - chamber (D) pressure] and balanced with spring (4).
6. If the oil flow is too large, the differential pressure of steering spool (1) becomes larger, so steering priority valve spool (3) moves in the direction to throttle the oil flow.
7. On the other hand, if the oil flow is too small, steering priority valve spool (3) moves in the direction to increase the oil flow.





8. LS valve of the pump is controlled so that the differential pressure between pump discharged pressure (P) and LS pressure (LS) [LS differential pressure: ΔPLS] remains constant, so a suitable amount of oil flows to ensure that the loss of pressure at the control valve (ΔPLS') is equal to ΔPLS.
9. The loss of pressure in the control valve is determined by the area of the opening of steering spool (1), so the oil flow matches the opening of steering spool (1).
10. The return oil flow from HSS motor (6) is drained through chamber (E) and chamber (F).

8: Sprocket
9: Final drive
10: HSS motor
11: HSS open hydraulic circuit
12: Servo valve
13: Engine controller

Input/output signal

A: Directional signal
B: Steering signal
C: Engine control information
D: CAN communication network

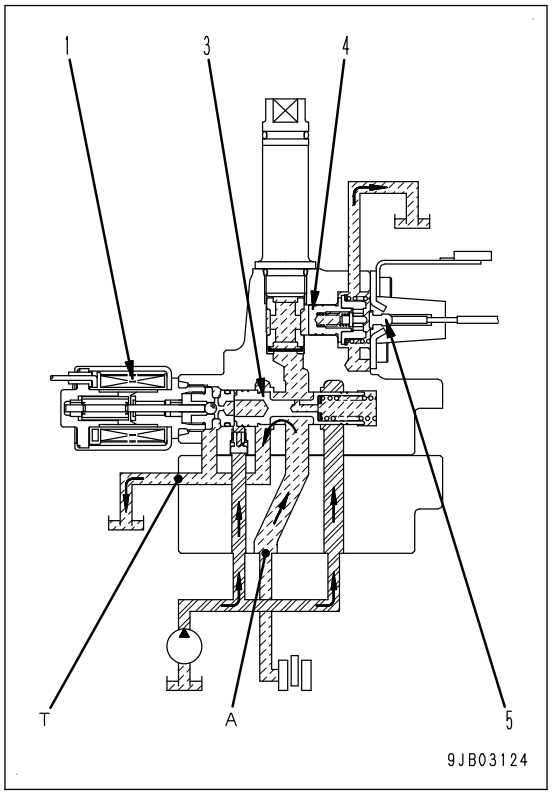
Function of HSS System

- HSS is an abbreviation for Hydrostatic Steering System.
  Hydrostatic means fluid statics.
- As shown in the figure, the HSS system consists of one set of control valve (3), work equipment and HSS pump (4), and HSS motor (10). With this system, the machine can turn by creating a difference between the right and left track speeds without decreasing the travel speed.
- Power train controller (2) controls the rotation direction and speed of HSS motor (10) via EPC valve (6) of control valve (3) corresponding to the tilting direction and angle of joystick (steering, directional, and gear shift lever) (PCCS lever) (1).
- HSS motor (10) drives the planetary gear mechanism on the bevel gear shaft and creates a difference in speed between right and left sprockets (8) to turn the machine.
- Power train controller (2) detects the engine speed and hydraulic pressure at each part to control the transmission and control valve (3) so that the engine will not stall.
- Engine control information including the engine speed is exchanged through the CAN communication network between engine controller (13) and power train controller (2).

Operation of Transmission ECMV

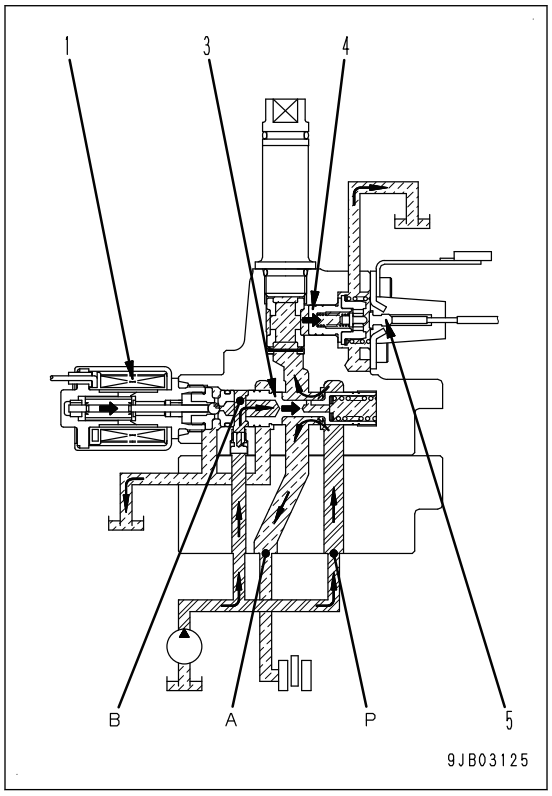
Operation Before You Shift Gear (When Oil is Drained)

1. While no current is flowing to the proportional solenoid (1), pressure control valve (3) drains the oil from clutch port (A) through drain port (T).
2. Fill switch (5) is turned “OFF” at this time since no oil pressure is applied to pressure detection valve (4).



Operation When It is Filled

When the current flows in proportional solenoid (1) with no oil in the clutch, the oil pressure force equal to the solenoid force acts on chamber (B) and pushes pressure control valve (3) to the right. As a result, pump port (P) and clutch port (A) are connected and oil starts to fill the clutch. When the clutch is filled with oil, pressure detection valve (4) turns fill switch (5) “ON”.



Theoretical discharged volume: 100.5 cm^3/rev

Max. discharged pressure: 2.94 MPa {30 kgf/cm^2}

Max. speed: 2500 rpm

Function of Steering Lubrication Pump and Power Train Pump

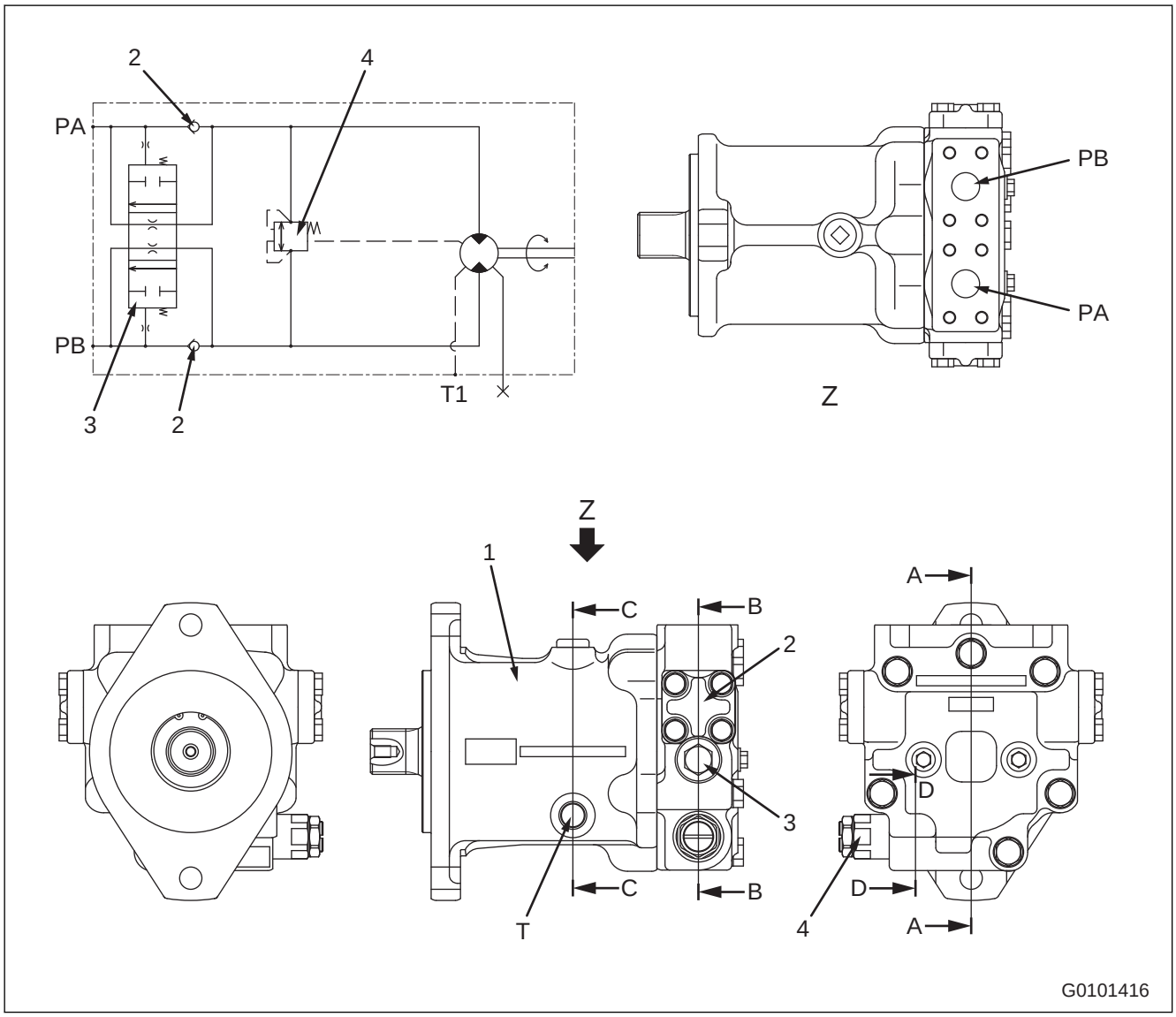
- The steering lubricating pump and power train pump are installed to the torque converter case and is driven by the power from the engine.
- The steering lubricating oil pump sucks oil from the bottom of the steering case through a strainer and sends it to the steering lubricating oil circuit.
- The power train pump sucks oil from the bottom of the steering case through a strainer and sends it to the power train control circuit.

HSS Motor

HSS

Abbreviation for Hydrostatic Steering System

Structure of HSS Motor

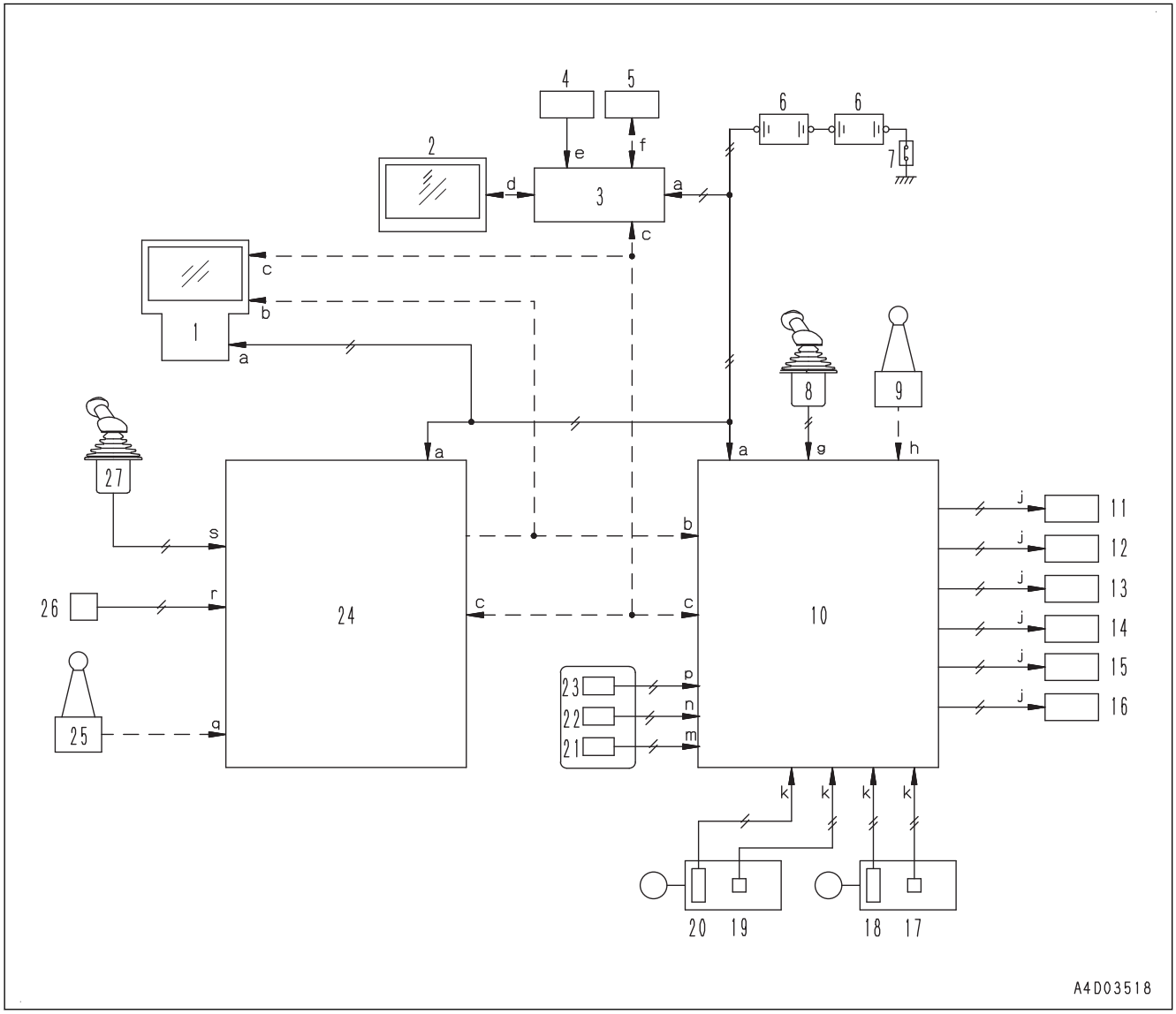


PA: From control valve

PB: From control valve

T: To tank

System Diagram of ICT Control System



Input and output signals

a: Controller power supply

b: CAN signal 1 (komnet/r)

c: CAN signal 2 (komnet/c)

d: LAN communication

e: GNNS signal

f: CAN signal 3

g: Blade control lever and auto/manual switch signal

h: Work equipment lock signal

1: Machine monitor

2: Control box

3: GNSS receiver

4: GNSS antenna

5: IMU sensor

6: Battery

j: Cylinder EPC valve drive signal

k: Cylinder stroke and reset signal

m: Back grade mode switch signal

n: Cut/fill offsets switch (Down) signal

p: Cut/fill offsets switch (Up) signal

q: Travel lock switch signal

r: Transmission output shaft speed sensor signal

s: Steering, directional and speed range shift signal

7: Battery disconnect switch

8: Blade control lever and auto/manual switch (PCCS lever)

9: Work equipment lock switch

10: Work equipment controller

11: Blade lift cylinder EPC valve (RAISE)

12: Blade lift cylinder EPC valve (LOWER)

CAB Related Parts

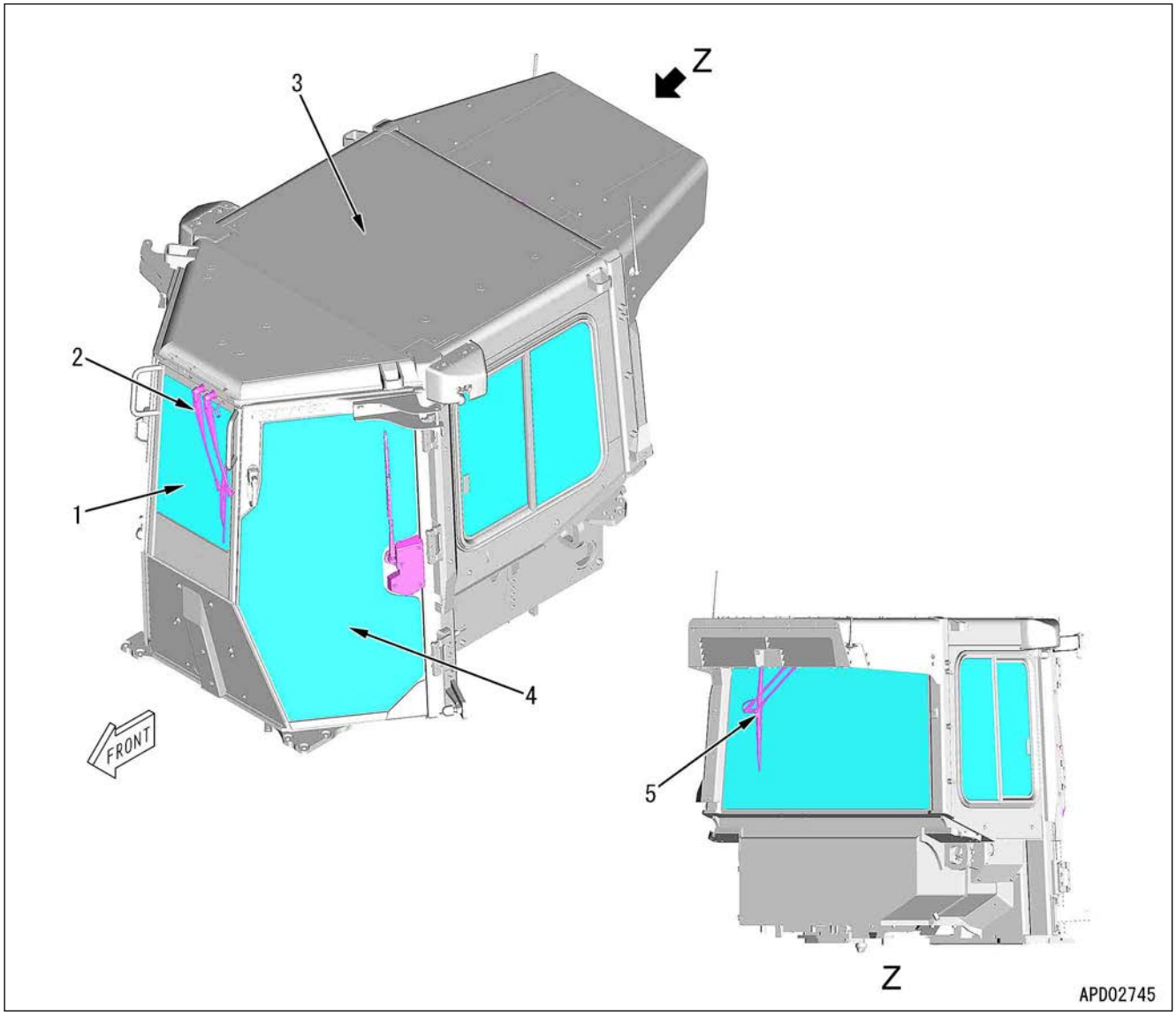
ROPS CAB

ROPS

Abbreviation for Roll-Over Protective Structure

Structure of ROPS CAB

General View



1: Front window
2: Front wiper
3: ROPS (with built-in cab)
4: Door
5: Rear wiper

Function of ROPS CAB

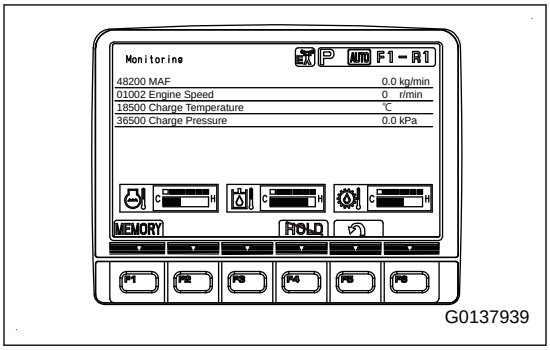
ROPS cab is to protect the operator wearing seat belt from being crushed when the machine rolls over.

Equipment name	Procedure, measuring location, criteria, and remarks		
Lockup clutch ECMV solenoid	1. Starting switch: OFF 2. Disconnect connector SLUC, and connect T-adapter to male side.		
	Resistance	Between SLUC (male) (1) and (2)	3 to 13 Ω
		Between SLUC (male) (1) and ground	Min. 1 MΩ
Transmission 1st clutch ECMV solenoid	1. Starting switch: OFF 2. Disconnect connector S1T, and connect T-adapter to male side.		
	Resistance	Between S1T (male) (1) and (2)	3 to 13 Ω
		Between S1T (male) (1) and ground	Min. 1 MΩ
Transmission 2nd clutch ECMV solenoid	1. Starting switch: OFF 2. Disconnect connector S2T, and connect T-adapter to male side.		
	Resistance	Between S2T (male) (1) and (2)	3 to 13 Ω
		Between S2T (male) (1) and ground	Min. 1 MΩ
Transmission 3rd clutch ECMV solenoid	1. Starting switch: OFF 2. Disconnect connector S3T, and connect T-adapter to male side.		
	Resistance	Between S3T (male) (1) and (2)	3 to 13 Ω
		Between S3T (male) (1) and ground	Min. 1 MΩ
Transmission Reverse clutch ECMV solenoid	1. Starting switch: OFF 2. Disconnect connector SRT, and connect T-adapter to male side.		
	Resistance	Between SRT (male) (1) and (2)	3 to 13 Ω
		Between SRT (male) (1) and ground	Min. 1 MΩ
Transmission Forward clutch ECMV solenoid	1. Starting switch: OFF 2. Disconnect connector SFT, and connect T-adapter to male side.		
	Resistance	Between SFT (male) (1) and (2)	3 to 13 Ω
		Between SFT (male) (1) and ground	Min. 1 MΩ
Right steering brake ECMV solenoid	1. Starting switch: OFF 2. Disconnect connector SBRR, and connect T-adapter to male side.		
	Resistance	Between SBRR (male) (1) and (2)	3 to 13 Ω
		Between SBRR (male) (1) and ground	Min. 1 MΩ
Left steering brake ECMV solenoid	1. Starting switch: OFF 2. Disconnect connector SBRL and connect T-adapter to male side.		
	Resistance	Between SBRL (male) (1) and (2)	3 to 13 Ω
		Between SBRL (male) (1) and ground	Min. 1 MΩ
Blade lift up EPC solenoid	1. Starting switch: OFF 2. Disconnect connector WEP1, and connect T-adapter to male side.		
	Resistance	Between WEP1 (male) (1) and (2)	4.5 to 14.5 Ω
		Between WEP1 (male) (1) and ground	Min. 1 MΩ

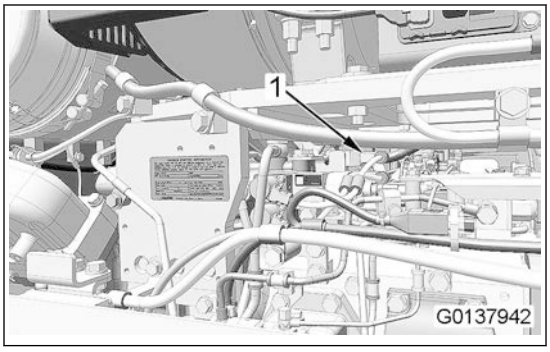
14. Set the joystick (steering, directional, and gearshift lever) (PCCS lever), blade control lever, and ripper control lever in the NEUTRAL position.
15. Turn the fuel control dial to the MAX (high idle) position.
16. Hold it for 60 seconds at engine high idle, and record the values of each monitoring items.

REMARK

The number can be held if you press the function switch F4.



17. Turn the fuel control dial to the MIN position (low idle), and stop the engine.
18. Make sure that the system operating lamp is not lit, and then set the battery disconnect switch to the OFF position.



19. Connect the connector EGR-SOL (1).
20. Set the battery disconnect switch to the ON position.
21. Turn the starting switch to the ON position.
22. Make sure that the failure code [CA2349] is not shown in the Current Abnormality screen.

REMARK

- “E” is not shown on the abnormality record in the service mode.
- The engine power limit can be released if you turn the starting switch to the OFF position.

23. Open the inspection check sheet “MAFreading_checksheet_D155-8_**.xlsx”. For details, see the service news “No.AT20085”.

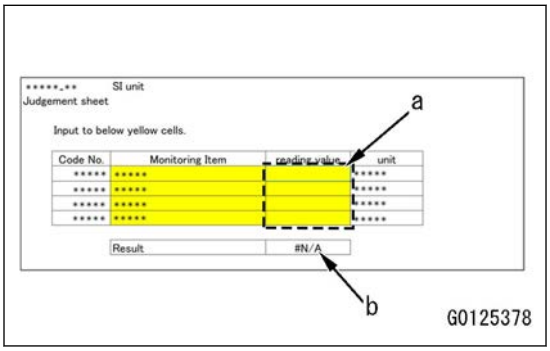
REMARK

The content of the inspection check sheet changes in response to the target machine model.

24. Input the written value in part (a) of the inspection check sheet.
25. Check the result part (b).

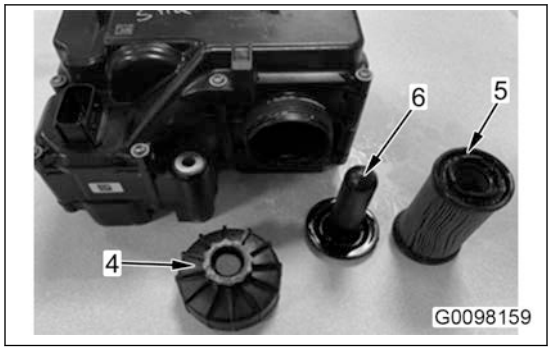
NOTICE

When the result is “NG”, replace the air cleaner and mass air flow and temperature sensor.



Test State	Content	Details	Required action
1	DEF pump pressure is being increased.	Being changed to “Test State”“10”	Wait for “Test State to ”become “10”.
10	Being tested	It is on the following state depending on the contents. • Being pressure-fed by DEF pump • DEF is being injected. • The operation of energization cycle at a fixed time after specific time passes. • “SCR Denitration Efficiency Test” is being performed. • “Ash in Soot Accumulation Correction” is being performed.	• Check the items to be performed during the test. • For “SCR Denitration Efficiency Test” or “Ash in Soot Accumulation Correction” test, wait for the test to finish.
5	Pressure drop of DEF pump is detected (failure code [CA3574] is displayed)	Pressure drops (only when the DEF pump is pressure-fed) while the display of “Test State” is “10”.	Perform troubleshooting for the failure code [CA3574]. For details, see “40 Troubleshooting”.
20	Test has been finished.	• DEF is being purged. • Heater energizing has been completed.	• If “Please turn the key off.” is displayed, turn the starting switch to OFF position, and shut down the engine controller. (*1) • If “STOP” is displayed, press the corresponding switch to return the test to initial state. Other than the above, the state automatically returns to initial state.
11	Purging (energizing temporarily stops) or test cannot be performed.	• DEF is being purged. • A particular error is being displayed.	• Turn the starting to OFF position, and perform the test again after shutting down the engine controller. • If a specific error is displayed, see “40 Troubleshooting” and perform troubleshooting for the failure code.
12	DEF tank or DEF pump is at high temperature (energizing temporarily stops)	DEF tank temperature exceeds 70 °C or DEF pump temperature exceeds upper limit.	Wait for DEF tank temperature or DEF pump temperature to be lowered. After the display of “Test State” changes to “10”, the test restarts automatically.
14	SCR temperature is out of specified range	SCR temperature is 450 °C and above, or 250 °C and below (temperature range is set by each test level)	In “SCR Denitration Efficiency Test”, it is displayed at switching of step, so wait for few minutes. After the display of “Test State” changes to “10”, the test restarts automatically.
15	Mass air flow is out of specified range	Exhaust gas flow rate is 0.89 kg/sec. and above or 0.07 kg/sec. and below.	Under the condition described on the left, “SCR Denitration Efficiency Test” does not finish successfully. Perform the troubleshooting for the failure code. For details, see “40 Troubleshooting”.

15. Remove the filter cap (4), DEF filter (5), and element (6). For details, see the Operation and Maintenance Manual, “METHOD FOR REPLACING DEF FILTER”.



NOTICE

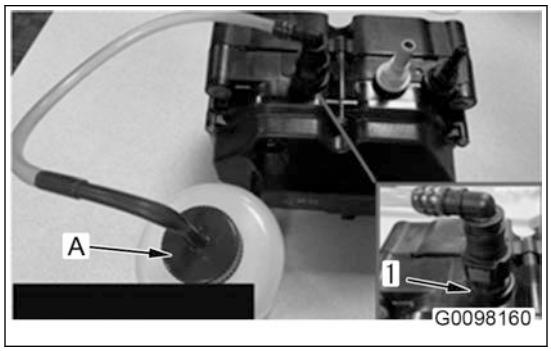
- **Be sure to discard the DEF filter (5) and element (6). If they are used again, it can cause the failure.**
- **Protect the removed filter cap (4) with a plastic bag or such to prevent entry of the foreign material.**

16. Fill the DEF pump cleaning kit A with DEF, distilled water, or deionized water.

NOTICE

Be sure not to fill it with tap water. Minerals in tap water accumulates inside the DEF pump, and it can cause the failure.

17. Connect the DEF pump cleaning kit A to the DEF inlet connector (1).



REMARK

- If necessary, remove the DEF pump mounting bolt and parts around it. For details, see Disassembly and Assembly, “Remove and Install DEF Pump”.
- Do not disconnect the connector of the DEF pump. Do the work while it is connected.

18. Put the resin container B below the filter port of the DEF pump.

19. Test the DEF pump raised pressure. For details, see “How to Examine DEF Pump Raised Pressure”.

Test with Machine Monitor

The monitoring function can measure only the pressures on the mark P side of the control valve (unload pressure, work equipment relief pressure, and HSS relief pressure) and cannot measure the pressures on the LS marked side (work equipment LS relief pressure and HSS LS relief pressure).

1. Display the following monitoring items. For details, see “Set and Operate Machine Monitor”.

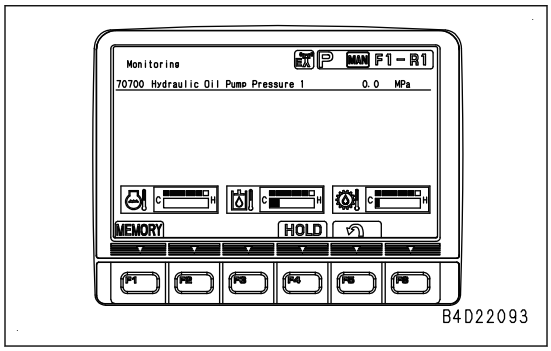
   Monitoring code: “70700 Hydraulic Oil Pump Pressure 1”

2. Start the engine and measure each oil pressure.

   REMARK

   The testing conditions for each oil pressure are the same as those for each measurement taken with a gauge in the preceding steps.

   For standard values, see “Standard Value Table for Machine”.



How to Adjust Oil Pressure of Work Equipment and HSS

Adjust Unload Pressure

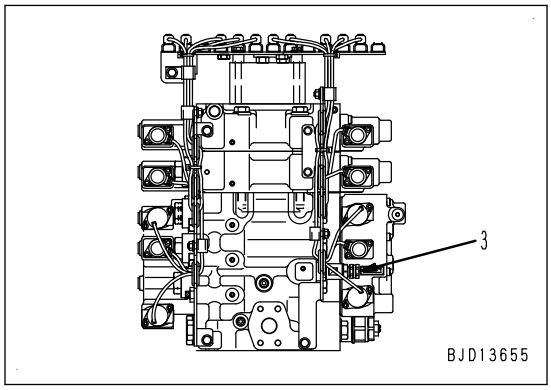
The unload pressure cannot be adjusted.

Adjust Work Equipment Oil Pressure

If the work equipment oil pressure is not normal, adjust LS relief valve (3) for the work equipment according to the following procedure.

REMARK

The figure shows the 5-spool valve for the single tilt specification (The dual tilt specification has the 6-spool valve).



1. While fixing adjustment nut (4), loosen lock nut (5).
2. Turn adjustment nut (4) to adjust the pressure.

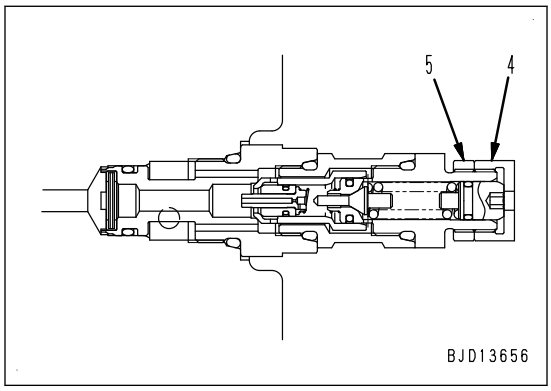
   When the adjustment nut is
   - turned clockwise, the pressure is increased.
   - turned counterclockwise, the pressure is decreased.

   REMARK

   Quantity of adjustment per turn of adjustment nut: Approximately 19.6 MPa {Approximately 200 kgf/cm^2}

3. While fixing adjustment nut (4), tighten lock nut (5).

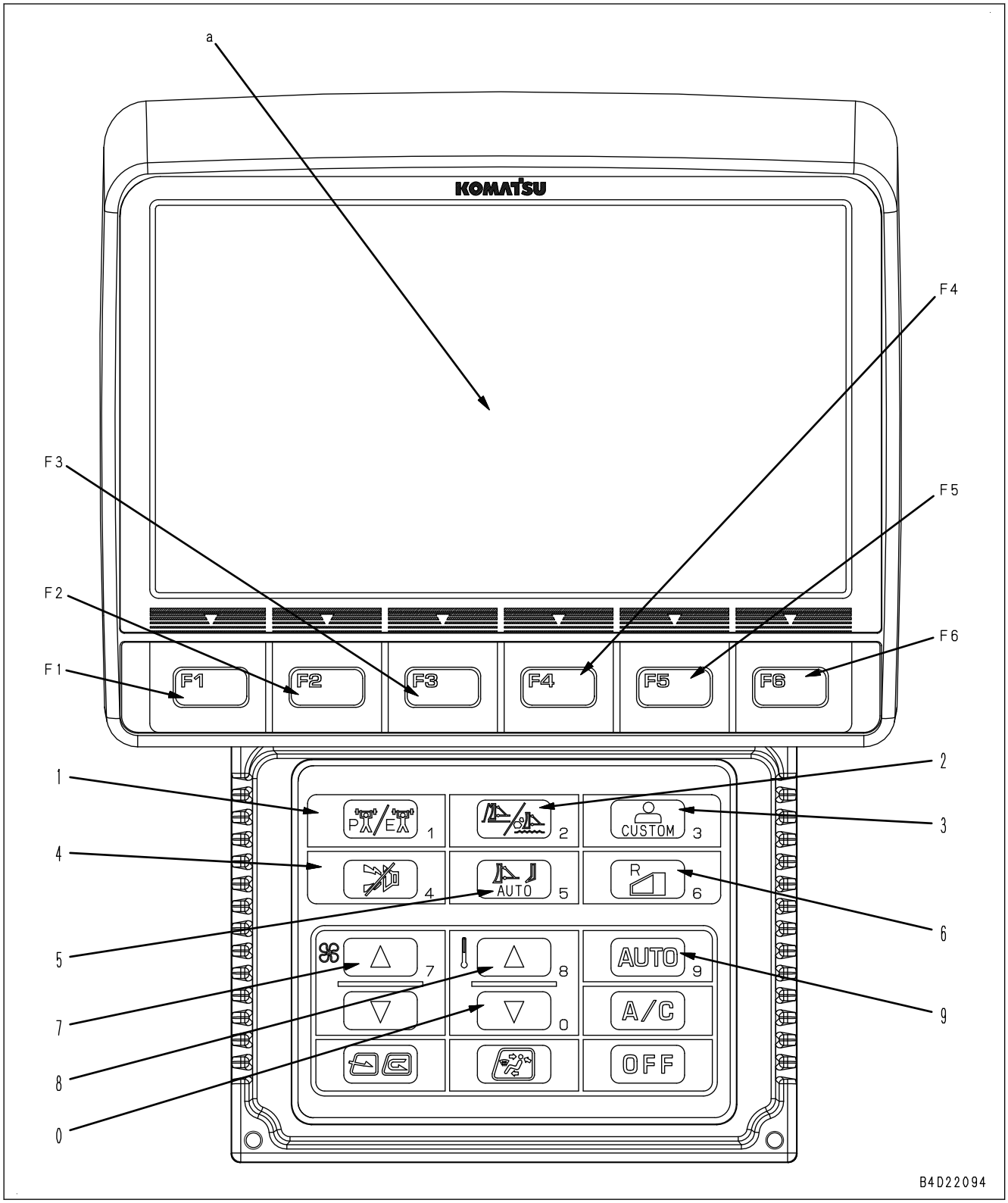
   Locknut (5):
   39 to 49 Nm {4 to 5 kgfm}



When the adjustment if finished, test work equipment oil pressure again. For details, see “How to Examine Work Equipment and HSS Oil Pressure”.

Electrical System

Set and Operate Machine Monitor

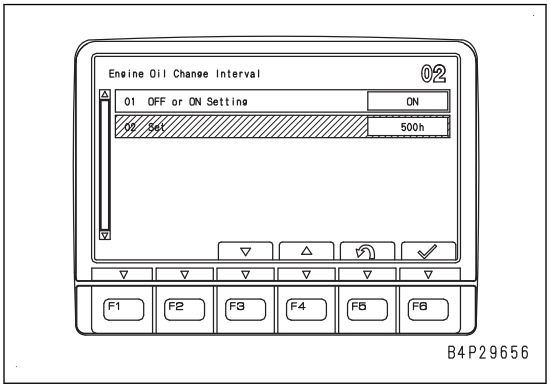


Upper Part of the Machine Monitor (Multi-Information Display)

(a): Multi-information display

F6: Enters the selection and returns the screen to “Maintenance Mode Change” screen.

6. The screen is shifted by selecting “set value” of each maintenance item, perform the setting with the function switches.



“Default”: Maintenance set time set on the machine monitor (Recommended by the manufacturer and not changeable).

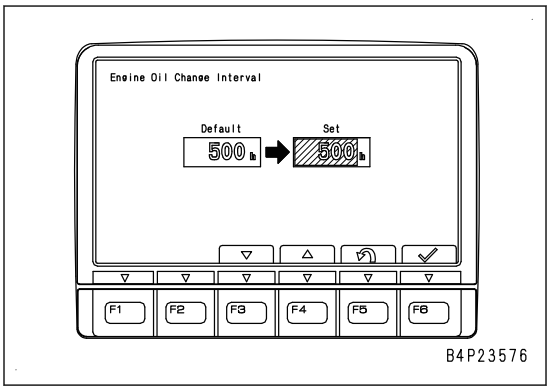
“Set”: Maintenance notice time that can be freely set. Maintenance reminder function works according to this set time in operator mode (the time can be increased or decreased in multiples of 25 hours).

F3: Decreases the set value

F4: Increases the set value

F5: Cancels contents of setting before entry and returns the screen to “Maintenance Mode Change” screen.

F6: Enters the setting and returns to each maintenance item screen.



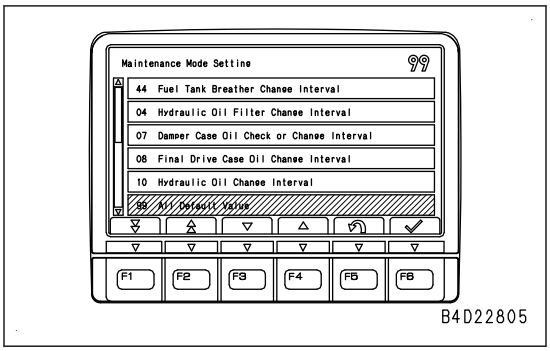
REMARK

- The setting becomes effective after you enter it with F6 and return the screen to “Maintenance Mode Setting” screen with F5.
- If the value of an item which is set to “ON” is changed after one operating hour or more from the setup, the change is recognized as a reset operation.

NOTICE

Maintenance notice time can be set at “Set” in “Air Cleaner Cleaning Interval or Change Interval”. However, perform the cleaning or replacement of the air cleaner element when air cleaner clogging “Air cleaner clogging monitor” lights up.

7. The screen is shifted by selecting “All Default Value”, perform the setting with the function switches.



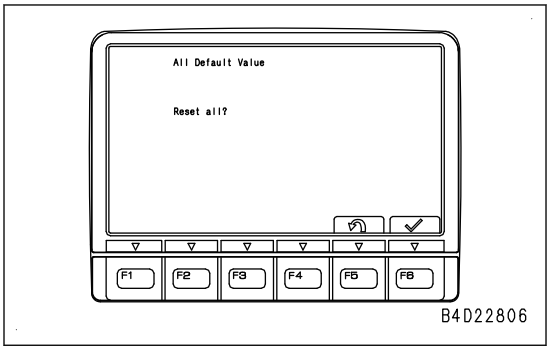
If this item is executed, the set values of all the maintenance items return to the default values.

F5: Returns the screen to “Maintenance Mode Setting” screen.

F6: Executes initialization.

REMARK

Press F6, and the initialization completion screen is displayed after a short while. “Maintenance Mode Setting” screen is displayed after that, and initialization is completed.



REMARK

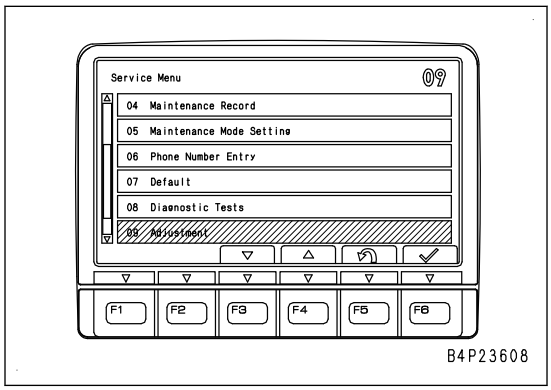
- If the specification code “111” of “MEMORY CODE SET MODE”does not appear, the wiring harness of the work equipment controller or the work equipment controller main unit may be defective.
- In this adjustment, the memorized setting values are effective even when the starting switch is turned to OFF position after the adjustment is completed.

Adjustment ID: 0005 (Brake Pedal Potentio Initial Set)

By “Brake Pedal Potentio Initial Set”, the power train controller recognizes the zero point of the brake pedal potentiometer.

When the power train controller or brake pedal potentiometer has been replaced, or when brake pedal linkage has been disconnected or connected, be sure to perform this adjustment.

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



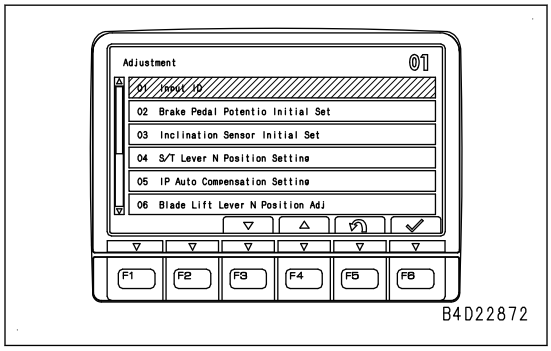
2. On “Adjustment” menu, select “Input ID” to be set.

   F3: Moves the selection downward.

   F4: Moves the selection upward.

   F5: Cancels the adjustment and returns the screen to “Service Menu” screen.

   F6: Enters the selection and moves the screen to the next “Adjustment” screen.



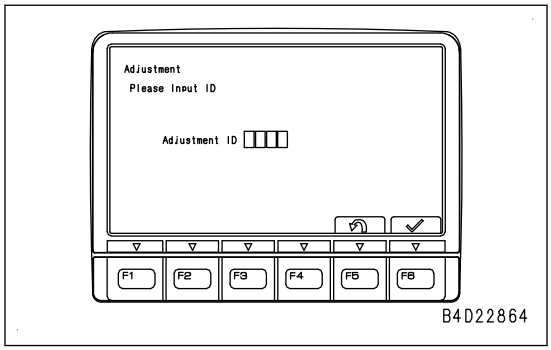
3. On “Input ID” screen, directly input Adjustment ID “0005” with the numeral input switches.

   F5: Returns the screen to “Adjustment” screen.

   F6: Enters input Adjustment ID.

   REMARK

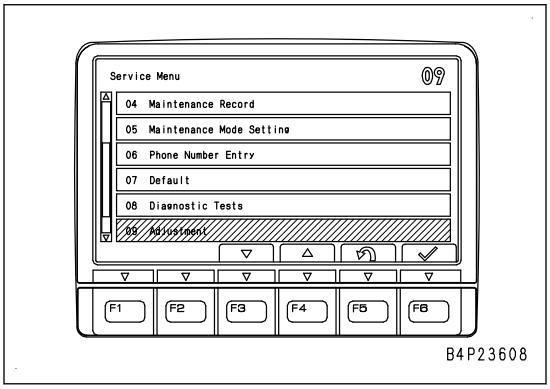
   - For details of Adjustment ID and adjustment items, see “Adjustment Item Table”.
   - When the input Adjustment ID is incorrect, “Incorrect ID” appears, and the screen next to “Input ID” does not appear (you can input Adjustment ID again when this screen is displayed).



Adjustment ID: 8008 (Ripper Lift Lever Lower Stroke End Adjustment)

By “Ripper Lift Lever LOWER Stroke End Adjustment”, the work equipment controller recognizes the maximum LOWER position of the lift potentiometer of the ripper control lever.

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



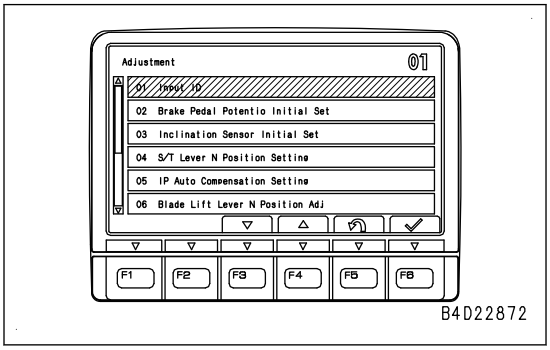
2. On “Adjustment” menu, select “Input ID” to be set.

   F3: Moves the selection downward.

   F4: Moves the selection upward.

   F5: Cancels the adjustment and returns the screen to “Service Menu” screen.

   F6: Enters the selection and moves the screen to the next “Adjustment” screen.



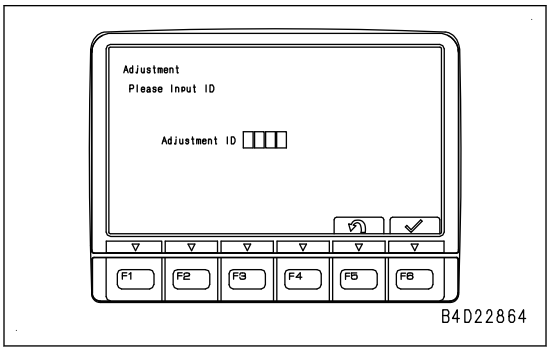
3. On “Input ID” screen, directly input Adjustment ID “8008” with the numeral input switches.

   F5: Returns the screen to “Adjustment” screen.

   F6: Enters input Adjustment ID.

   REMARK

   - For details of Adjustment ID and adjustment items, see “Adjustment Item Table”.
   - When the input Adjustment ID is incorrect, “Incorrect ID” appears, and the screen next to “Input ID” does not appear (you can input Adjustment ID again when this screen is displayed).



4. On “Adjustment” screen, perform adjustment of “Ripper Lift Lever LOWER Stroke End Adjustment” with function switches.

   F3: Not used.

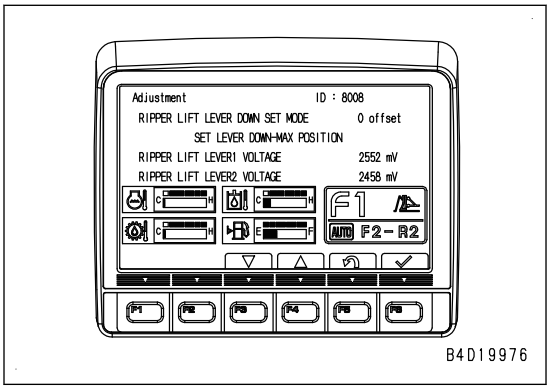
   F4: Not used.

   F5: Returns the screen to “Input ID” screen.

   F6: Saves the adjustment value.

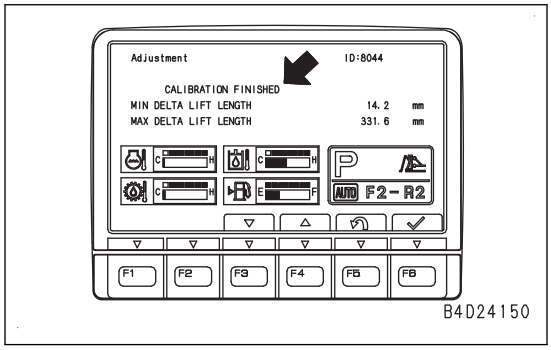
   1) Hold the lift control side of the ripper control lever at the LOWER stroke end position.

   2) Press F6, and check that warning buzzer sounds.



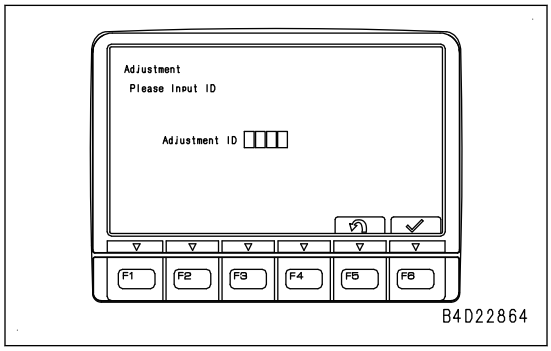
Sequence	Work equipment operation	Machine monitor display
2/5	Pitch back	PITCH BACK (2/5)
3/5	Tilt RIGHT	TILT RIGHT (3/5)
4/5	Tilt LEFT	TILT LEFT (4/5)
5/5	Lift LOWER	LIFT DOWN (5/5)
-	Blade stops	CALIBRATION FINISHED

11. When “CALIBRATION FINISHED” is displayed on the machine monitor screen, and the buzzer makes a “Beep” sound, press F5.



12. When “Input ID” screen is displayed, turn the starting switch to OFF position. Check that the machine monitor goes out, and then turn the starting switch to ON position again.

    The characteristics of the control valve are saved in the work equipment controller.

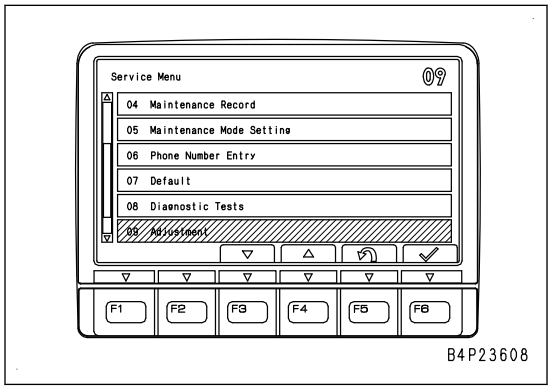


Adjustment ID: 9995 (Control Brake Release Mode)

“Control Brake Release Mode” opens the control brake (R.H. and L.H. brake ECMV) to check the operation of the backup brake (brake pedal solenoid valve).

Perform this adjustment as required when testing, adjusting, troubleshooting, etc.

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



Item	Applicable work	Purpose	Reference page
Check and adjustment of the blade edge elevation	• When the control box is replaced • When the work equipment controller is replaced. • When the lilt cylinder is replaced, removed, and installed. • When the blade is replaced, removed, and installed. • When the lift cylinder is replaced, removed, and installed. • When the stroke sensor is replaced or repaired. • When the reset sensor is replaced or repaired • When GNSS antenna is replaced, removed, or installed • When the undercarriage and cutting edge is replaced • When the straight frame is replaced, removed, and installed. • When the cab is replaced, removed, or installed • When the track frame assembly is replaced, removed, and installed.	To check the accuracy of blade edge	CHECK BLADE ELEVATION, ADJUST
Test of the stroke sensor for lift cylinder	• When the result of “Testing of blade edge elevation” is extremely different • When automatic control accuracy is degraded • When the work equipment controller is replaced. • When the stroke sensor is replaced or repaired. • When the lift cylinder is replaced and repaired • When the blade is replaced, removed, and installed. • When the straight frame is replaced, removed, and installed. • When the track frame assembly is replaced, removed, and installed.	To test the stroke sensor if it is operating normally	TEST STROKE SENSOR FOR LIFT CYLINDER

20. Press the input column (22) on “GPS Antenna Position” screen.

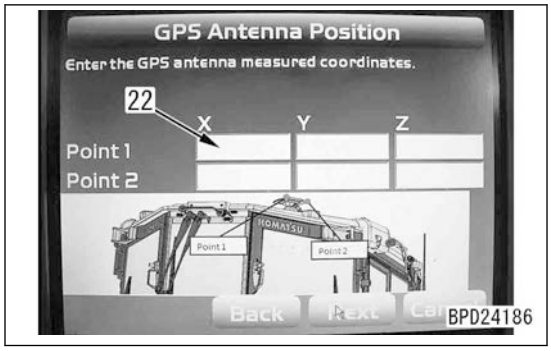
“Back”: The screen returns to the previous screen.

“Next”: Proceeds the screen to the next screen.

“Cancel”: Cancels “Machine Cal Step B”. The screen returns to the main screen.

REMARK

Input the coordinates of corner position (b) at the front of the machine in “Point 1”. Input the coordinates of left corner position (c) in “Point 2”.



21. Input the recorded coordinates on the numeric keypad (23), and press “Ok” (24).

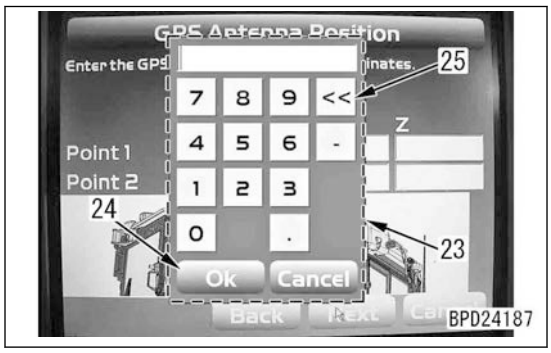
“Ok” (24): Enters the input, and clears numeric keyboard (23)

Backspace key (25): Deletes the input value one by one

“Cancel”: Input is canceled. Numeric keyboard (23) disappears.

REMARK

You can correct the value before “Ok” (24) is pressed. To correct a value, press the back space key (25) to erase the input value, and then input again.



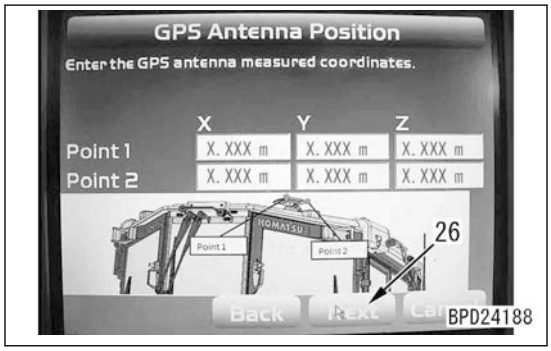
22. Check that the coordinates of GPS antenna position are input, and press “Next” (26).

“Back”: The screen returns to the previous screen.

“Next” (26): Proceeds the screen to the next screen.

“Cancel”: Cancels “Machine Cal Step B”. The screen returns to the main screen.

“Left Track Frame Position” screen is displayed by pressing “Next” (26).



23. Measure the coordinates of the center position (d) of the 1st track roller according to the following procedure.

1) Start the engine.

2) Raise the blade until the center position (d) of the 1st track roller (27) can be seen from the total station A.

⚠ Set the block or blocking tool E in order to prevent the blade from lowering.

3) Turn the starting switch to ON position.

NOTICE

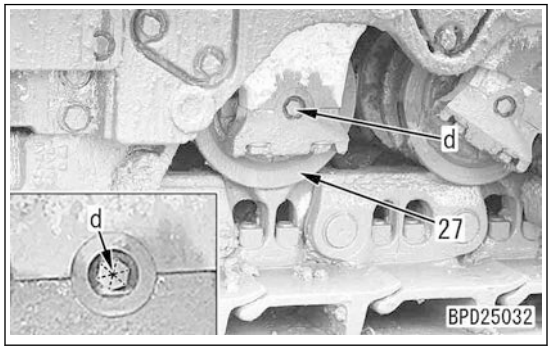
Do not turn the starting switch to OFF position.

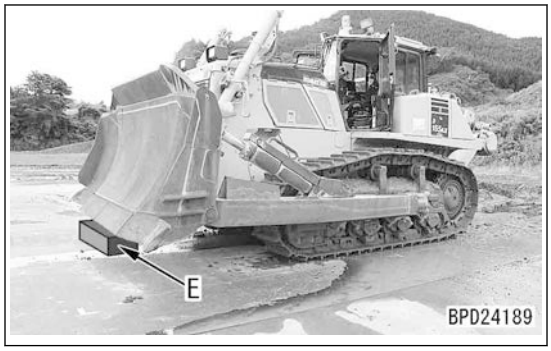
4) Put a mark on the center position (d) of the 1st track roller (27) for easier collimation.

5) Set the total station A to the non-prism mode.

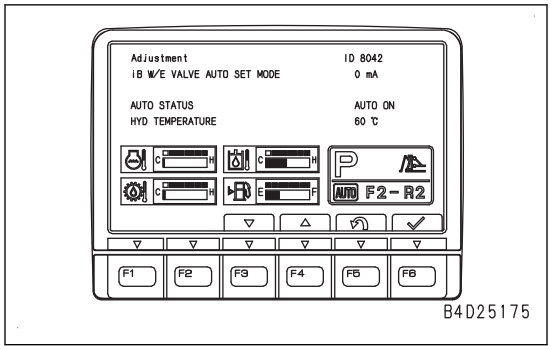
REMARK

For the method of setting the non-prism mode, see the Operation and Maintenance Manual for total station A.

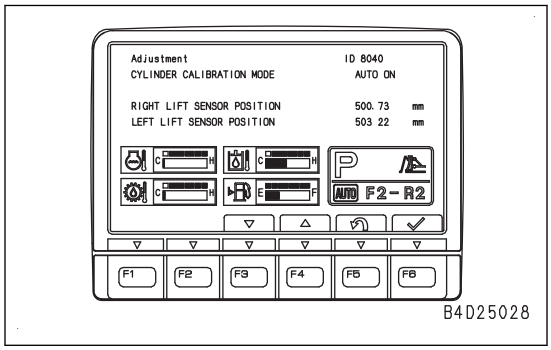




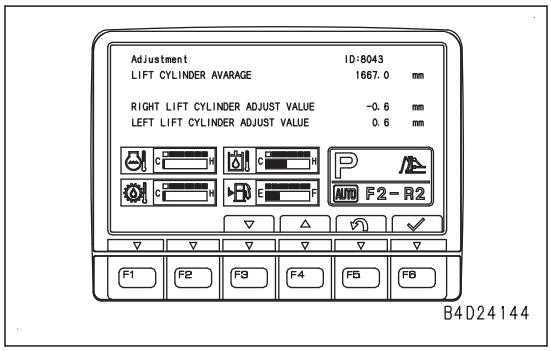
5. Adjust the control valve by referring to “Adjustment ID: 8042 (Automatic Adjustment of Control Valve)”.



6. Adjust the reset sensor. See “Adjustment ID: 8040 (Automatic Adjustment of Cylinder Reset Sensor)”.



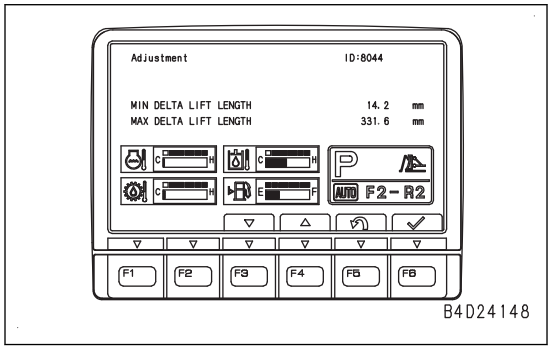
7. Adjust the lift cylinder by referring to “METHOD FOR PERFORMING ADJUSTMENT ID: 8043 (LH AND RH LIFT CYLINDER INSTALLATION LENGTH ADJUSTMENT)”.



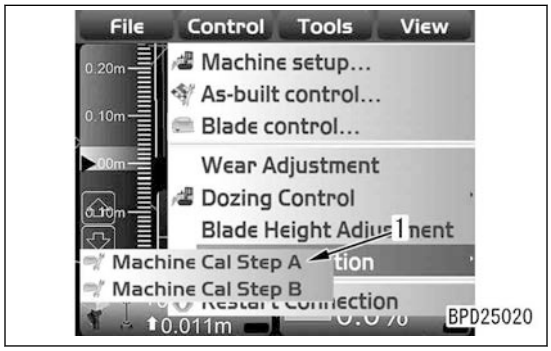
8. Adjust the tilt cylinder by referring to “Adjustment ID: 8044 (LH Tilt Cylinder Position Automatic Adjustment)”.

NOTICE

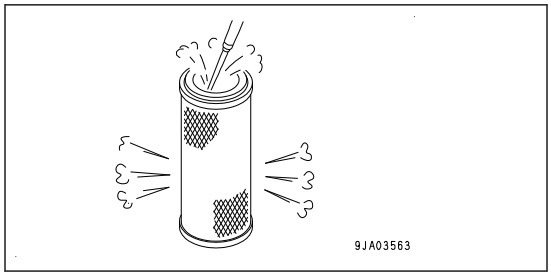
Perform this adjustment only for Dual Tilt specification machines.



9. Perform “Machine Cal Step A”(1) by referring to “Calibrate Blade Edge Position”.



5. Blow dry compressed air (Max. 196 kPa {2 kgf/cm^2}) from the inside of the outer element along the pleats.

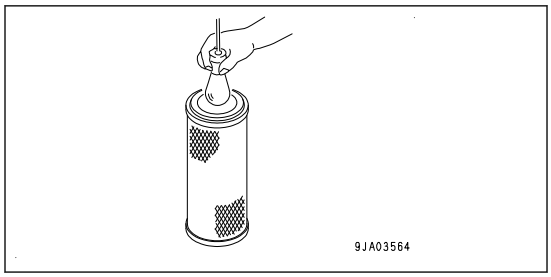


6. Then blow it from outside along the pleats, and finally blow it from the inside again.

   After clearing the element, throw light on its inside by using a light bulb to check it. If it has a small hole or thin part, replace it.

7. Remove the cover of cloth or tape attached to inner element (6).

8. Check the seal of the cleaned or new element for adhesion of dusts and oil and wipe them off, if any.



REMARK

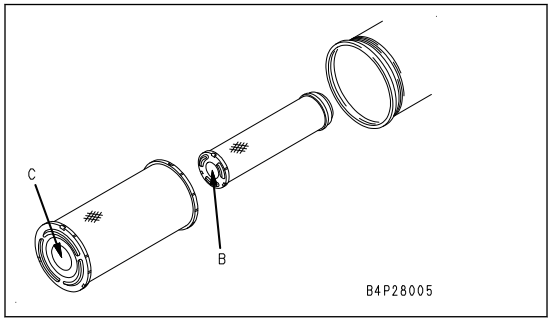
Do not use the element if its pleats or gasket or seal are damaged.

9. Push the outer element straight backward into the air cleaner body with your hands while moving it up and down, right and left.

   When installing the air cleaner element, set it in such that its cylinder bottom (side without a hole) B and C come to cover (3) side.

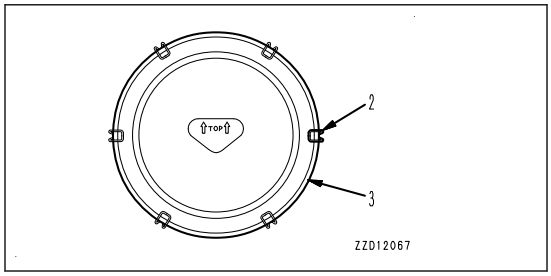
REMARK

If they are installed in the opposite direction, serious troubles including damage on the air cleaner elements and engine may occur.



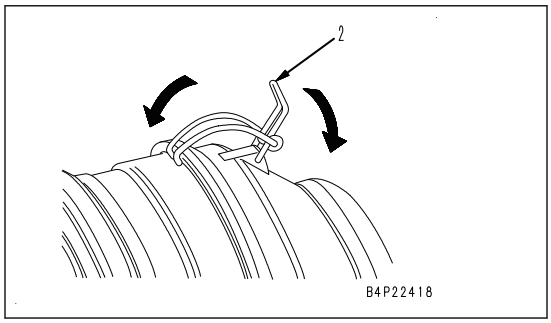
10. Align cover (3) with the element.

11. Lock the tip of hook (2) on the protrusion of the air cleaner body.



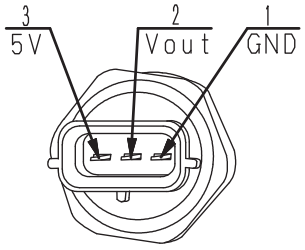
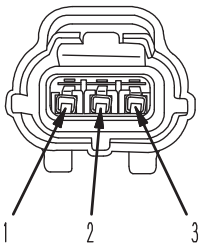
12. Install hooks (2) in the diagonal positions (top and bottom, or right and left), and lock them.

13. After installing cover (3), check that there is no clearance between the air cleaner body and cover (3). If any, install the cover again.

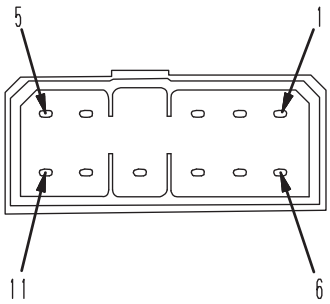
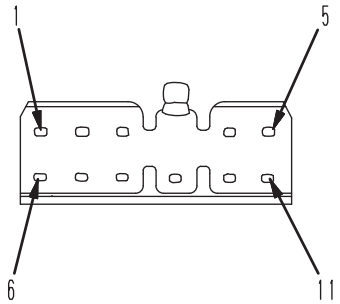


Connector No.	Connector type	Number of pins	Location	Address
WLK	DT	2	Work equipment lock solenoid	AG-5
WLV1	DT	8	Blade lever assembly	Q-9
WLV2	DT	4	Ripper lever assembly	P-9
WPNL	DT	2	Diode	—
WSFR	YAZAKI	2	Front washer tank	K-2
WSH1	DT	6	Intermediate connector	K-5
WSLH	YAZAKI	2	LH-side washer tank	K-4
WSRH	YAZAKI	2	RH-side washer tank	K-4
WSRR	YAZAKI	2	Rear washer tank	K-3

AMP/EJ2 connetor

No. of pins	Oil pressure sensor		
	Sensor side (plue)	Harness side (receptacle)	Testing connection use special tool Part No.
3			799-601-9420 (T-adapter) (kit:799-601 -4101) (kit:799-601 -4201)
	—	—	

YAZAKI connector

No. of pins	WIPER INTERMITTENT UNIT		
	Male pin (female housing)	Female pin (male housing)	
11			—
	—	—	

B4D18200

Fuse Location Table

Connection Table of Circuit Breaker and Fuse Box

REMARK

- This connection table shows the circuit breaker, fuse box and the devices which receive the power from the fuse box (A switched power supply is the power which is supplied while the starting switch is in ON position and an unswitched power supply is the power which is supplied while the starting switch is in OFF and ON positions).
- When performing troubleshooting related to the electrical system, the breaker and fuse should be checked if the power is supplied normally.

Circuit Breaker CB1 to 10, 28 to 31

Power supply breaker (type of power supplies)	Breaker No.	Capacity of breaker	Destination of power
CB105 (main power supply)	CB1	20 A	Power train controller power supply
	CB2	20 A	Work equipment controller power supply
	CB3	20 A	Air conditioner
	CB4	20 A	Headlamp
	CB5	20 A	Rear lamp
	CB8	20 A	(if equipped)
	CB10	20 A	Additional heater
CB105	CB28	5 A	Compressor
	CB29	20 A	Condenser motor 1
	CB30	20 A	Condenser motor 2
	CB31	30 A	Cab main power
CB60 (cab continuous power supply)	CB6	20 A	Starting switch
	CB7	20 A	Continuous power supply
	CB9	30 A	Engine controller power supply
CB105H (main power supply)	-	105 A	Engine ribbon heater

Fuse Box I (FS11 (Input Side), FS12 (Output Side))

Power supply breaker (type of power supplies)	Fuse No.	Fuse capacity	Destination of power
CB60 (cab continuous power supply)	1	5 A	Brake pedal switch
	2	20 A	Operator's cab
	3	20 A	Air conditioner continuous power supply
	7	20 A	System operating lamp
	11	20 A	Smart sensor relay 1
CB60	12	10 A	Smart sensor relay 3
	13	15 A	Fuel feed pump power supply
	15	20 A	DEF heater
	16	10 A	DEF SUPPLY MODULE

Failure code	Failure (Displayed on screen)	Applicable component	Action level	Category of history	Remarks
CA449	Common Rail Pressure High Error 2	ENG	L03	Electrical System	*
CA451	Common Rail Pressure Sensor High Error	ENG	L03	Electrical System	*
CA452	Common Rail Pressure Sensor Low Error	ENG	L03	Electrical System	*
CA515	Common Rail Pressure Sensor Supply Voltage High Error	ENG	L03	Electrical System	*
CA516	Common Rail Pressure Sensor Supply Voltage Low Error	ENG	L03	Electrical System	*
CA553	Common Rail Pressure High Error 1	ENG	L01	Electrical System	
CA555	Crankcase Pressure High Error 2	ENG	L01	Electrical System	
CA556	Crankcase Pressure High Error 3	ENG	L03	Electrical System	*
CA559	Common Rail Pressure Low Error 1	ENG	L01	Electrical System	
CA595	Turbocharger Speed High Error 2	ENG	L01	Electrical System	
CA687	Turbocharger Speed Low Error	ENG	L01	Electrical System	
CA689	Engine NE Speed Sensor Error	ENG	L01	Electrical System	
CA691	Intake Air Temperature Sensor High Error	ENG	L01	Electrical System	
CA692	Intake Air Temperature Sensor Low Error	ENG	L01	Electrical System	
CA697	Engine Controller Internal Temperature Sensor High Error	ENG	L01	Electrical System	
CA698	Engine Controller Internal Temperature Sensor Low Error	ENG	L01	Electrical System	
CA731	Engine Backup Speed Sensor Phase Error	ENG	L01	Electrical System	
CA778	Engine Backup Speed Sensor Error	ENG	L01	Electrical System	
CA1117	Engine Controller Partial Data Lost Error	ENG	L04	Electrical System	*
CA1664	KDOC Abnormality	ENG	L03	Electrical System	*
CA1669	DEF Level Sensor Voltage High Error	ENG	L01	Electrical System	
CA1673	DEF Level Low Error 3	ENG	L03	Electrical System	
CA1677	DEF Temperature Sensor Low Error	ENG	L01	Electrical System	

Failure Code [15SFLH]

Action level	Failure code	Failure	ECMV Engage Trouble (2nd clutch) (Power train controller system)
L03	15SFLH		
Detail of failure	Fill switch signal is OFF even when outputting to solenoid circuit of the transmission 2nd clutch ECMV.		
Action of controller	Restricts operations of engine and transmission.		
Phenomenon on machine	• Once machine stops, engine speed is restricted to medium (half) speed. • Once machine stops, travel is restricted to F1 and R1. • Automatic gear shift function does not work.		
Related information	• Fill switch signal state (ON/OFF) of 2nd clutch ECMV can be checked with monitoring code. (Code: 40906) • After completion of repair, check that the failure code is cleared by the following operation. Method: Start the engine and drive the machine in F2 or R2 • Remove operator's seat (approximately 50 kg) and cover under the seat. • First, check for defects such as clogged power train oil filter. • Then, check that clutch pressure is normal by referring to TESTING AND ADJUSTING, “TEST POWER TRAIN OIL PRESSURE”.		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	2nd clutch ECMV fill switch (It is not turned to ON)	1. Turn starting switch to OFF position. 2. Disconnect connector F2T, and connect T-adapter to male side. 3. Start engine. **REMARK** Joystick (steering, directional and gear shift lever) is in NEUTARL.			
		Resistance	Between F2T (male) (1) and ground		Min. 1 MΩ
		1. Turn starting switch to OFF position. 2. Disconnect connector F2T, and connect T-adapter to male side. 3. Start engine. 4. Perform troubleshooting by operating joystick (steering, directional and gear shift lever) while depressing the brake pedal.			
		Resistance	Between F2T (male) (1) and ground	F2/R2	Max. 1 Ω
2	Open circuit in wiring harness (Wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN2 and F2T, and connect T-adapters to each female side.			
		Resistance	Between PTCN2 (female) (25) and F2T (female) (1)		Max. 1 Ω

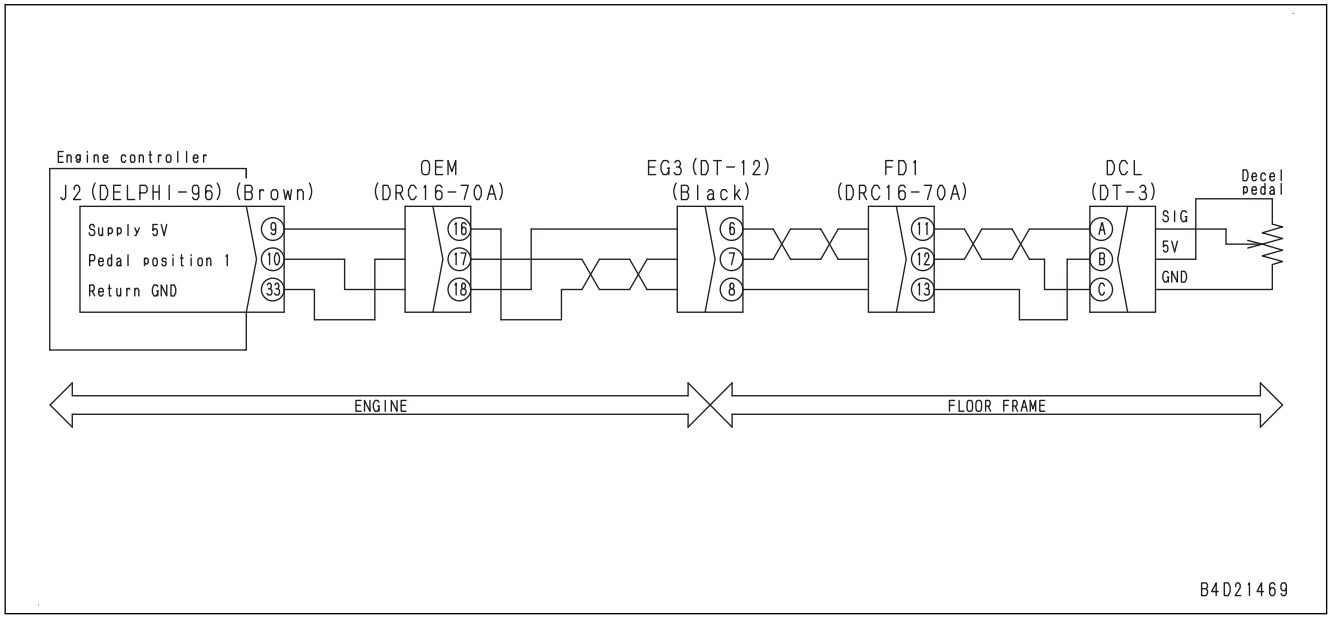
Failure Code [989N00]

Action level	Failure code	Failure	Engine Controller Lock Caution 3 (Machine monitor system)
-	989N00		
Details of failure	Machine monitor detects engine controller lock (Factor 3).		
Action of controller	• Tries automatic recovery. • If cause of failure disappears, machine becomes normal by itself.		
Phenomenon on machine	Engine does not start.		
Related information	After repairing, check if the failure code is cleared by the following procedure. Procedure: Failure code cannot be reproduced since machine recovers when cause of failure disappears.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective engine controller	If this repeatedly occurs, engine controller may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)

No.	Cause	Procedure, measuring location, criteria and remarks			
6	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector DCL and connect T-adapter to female side. 3. Turn starting switch to ON position.			
		Voltage	Between DCL (female) (A) and ground		Max. 1 V
7	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)			
		Reference 1. Turn starting switch to OFF position. 2. Insert T-adapter into connector J2. 3. Turn starting switch to ON position. 4. Depress the decelerator pedal and perform troubleshooting.			
		Voltage	Between J2 (9) and (33)	Power supply	4.75 to 5.25 V
			Between J2 (10) and (33)	Depress the decelerator pedal.	Approx. 3.5 V
				Release the decelerator pedal.	Approx. 2 V

Circuit Diagram Related to Throttle Sensor



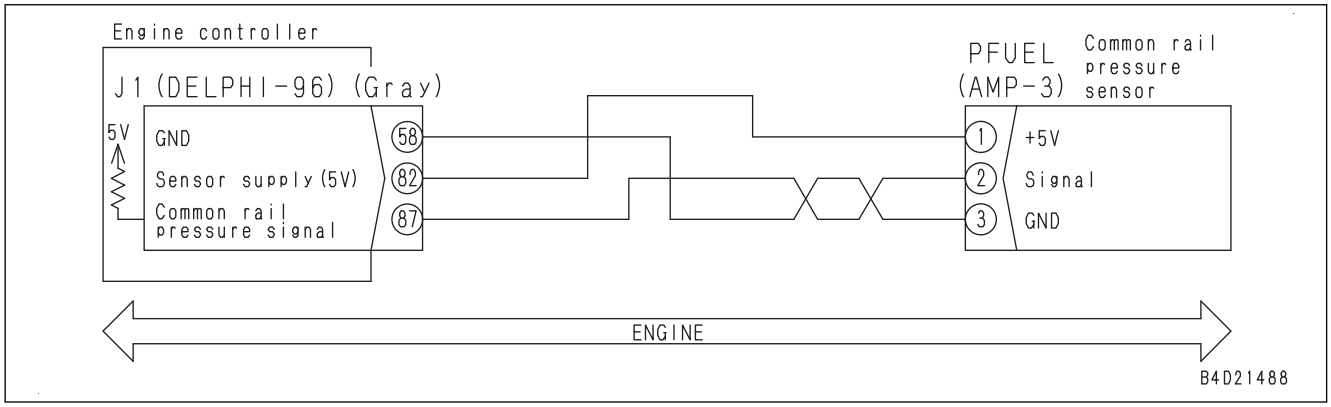
Failure Code [CA273]

Action level	Failure code	Failure	PCV 2 Short Circuit Error (Engine controller system)
L03	CA273		
Details of failure	Short circuit is detected in supply pump PCV2 circuit.		
Action of controller	Stops PCV2 drive.		
Phenomenon on machine	• Engine power deration. • Engine startability becomes poor.		
Related information	• After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine. • While engine is running normally, approx. 24 V of pulse voltage is supplied to PCV2 (1). Because it is pulse voltage, it cannot be measured by using multimeter. • If ground fault or hot short circuit is detected in line on minus side when starting switch is in ON position. Failure codes [CA271] and [CA273] appear simultaneously.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. Check according to sections related to wiring harnesses and connectors in “TROUBLESHOOTING-RELATED INFORMATION”, “CHECKS BEFORE TROUBLESHOOTING”, “c Electrical equipment”. 2. Start engine.		
		If this failure code goes out, wiring harness connector is defective.		
2	Defective supply pump PCV2 (internal short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector PCV2, and connect T-adapter to male side.		
		Resistance	Between PCV2 (male) (1) and (2)	2.3 to 5.3 Ω
			Between PCV2 (male) (1) and ground	Min. 1 MΩ
3	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector J1, and connect T-adapter to female side.		
		Resistance	Between J1 (female) (14) and (48) (PCV2 resistance)	2.3 to 5.3 Ω
4	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors J1 and PCV2, and connect T-adapter to female side of J1.		
		Resistance	Between J1 (female) (14) and ground	Min. 1 MΩ
			Between J1 (female) (48) and ground	Min. 1 MΩ
5	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Insert T-adapter into connector J1. 3. Turn starting switch to ON position.		
		Voltage	Between J1 (48) and ground	Max. 1 V
6	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

No.	Cause	Procedure, measuring location, criteria and remarks		
5	Defective engine controller	1. Turn starting switch to OFF position. 2. Disconnect connector J1, and connect T-adapter to male side. 3. Turn starting switch to ON position. If no failure is found by this check, perform troubleshooting again from cause 1 before replacing the engine controller.		
		Voltage	Between J1 (male) (82) and (58)	4.75 to 5.25 V
		If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit Diagram of Common Rail Pressure Sensor



Failure Code [CA1683]

Action level	Failure code	Failure	DEF Tank Heating Valve Voltage High Error (Engine controller system)
L01	CA1683		
Detail of failure	High voltage error is detected in signal circuit of DEF tank heating valve.		
Action of controller	Advances to Inducement strategy.		
Phenomenon on machine	• Failure to thaw DEF. • Engine power deration according to inducement strategy.		
Related information	• This failure code is displayed when DEF tank heating valve connector is disconnected. • DEF tank heating valve is driven when DEF is thawed and engine starts with the temperature of engine coolant 45 °C or below. • DEF tank heating value can also be driven at “DEF tank heater valve test”. • This failure code is detected only when DEF tank heating value stops. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Start engine (engine coolant temperature: Max. 45 °C) or perform “DEF tank heater valve test”.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Defective DEF tank heating valve	1. Turn starting switch to OFF position. 2. Disconnect connector UHV1, and connect T-adapter to male side.		
		Resistance	Between UHV1 (male) (1) and (2)	15 to 30 Ω
3	Open or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector J2, and connect T-adapter to female side.		
		Resistance	Between J2 (female) (82) and (57) **REMARK** The resistance value is the same as the value for an DEF tank heating valve	15 to 30 Ω
4	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. If failure code is still displayed after above checks on cause 3, this check is not required. 2. Turn starting switch to OFF position. 3. Disconnect connectors J2 and UHV1 and connect T-adapters to each female side.		
		Resistance	Between J2 (female) (82) and UHV1 (female) (1)	Max. 1 Ω
			Between J2 (female) (57) and UHV (female) (2)	Max. 1 Ω

Failure Code [CA1883]

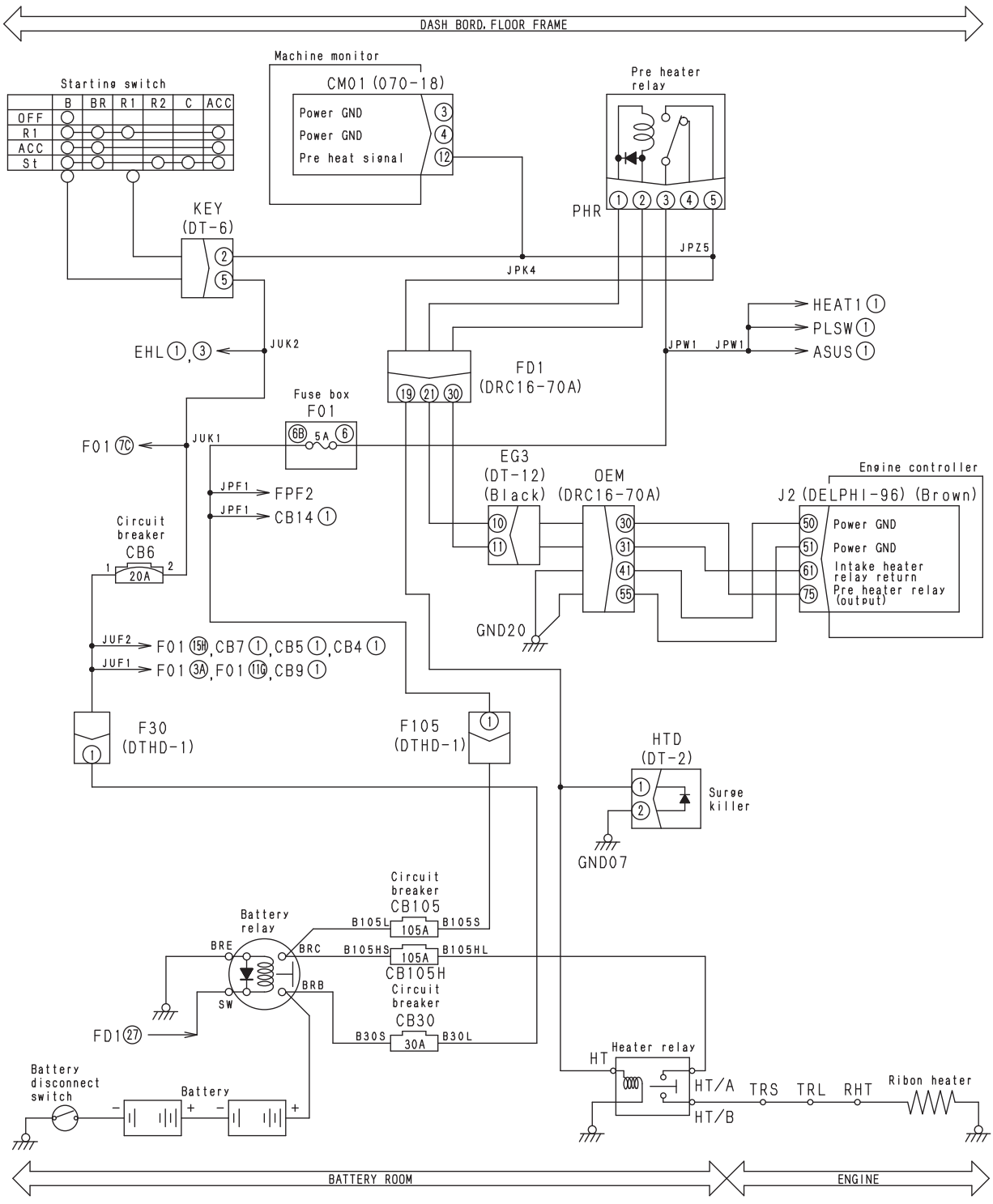
<table>
<tr><td>Action level</td><td>Failure code</td><td rowspan="2">Failure</td><td rowspan="2">KDPF Differential Pressure Sensor In Range Error
(Engine controller system)</td></tr>
<tr><td>L03</td><td>CA1883</td></tr>
<tr><td>Details of failure</td><td colspan="3">Signal voltage from KDPF differential pressure sensor does not show correct value. (Signal voltage is within use range.)</td></tr>
<tr><td>Action of controller</td><td colspan="3">• Operates at estimated value of KDPF differential pressure sensor. (If other failure code also appears, operation may be performed at 0 kPa.)
• EGR valve closes and fully opens VGT.
• Engine power deration
• Regeneration control stops.
• Fuel dosing stops.</td></tr>
<tr><td>Phenomenon on machine</td><td colspan="3">Engine power deration</td></tr>
<tr><td>Related information</td><td colspan="3">⚠ KDPF becomes hot (Min. 500 °C). Be careful not to get burned.
• KDPF differential pressure sensor and KDPF outlet pressure sensor are integrated.
• Signal voltage from KDPF differential pressure sensor can be checked by monitoring function. (Code: 47101 (V))
• Differential pressure in KDPF differential pressure sensor can be checked by monitoring function. (Code: 47100 (kPa))
• Temperature in KDOC inlet temperature sensor can be checked by monitoring function. (Code: 47300 (°C))
• Temperature in KDOC outlet temperature sensor can be checked by monitoring function. (Code: 47400 (°C))
• Temperature in KDPF outlet temperature sensor can be checked by monitoring function. (Code: 47200 (°C))
• Temperature in torque converter oil temperature sensor can be checked by monitoring function. (Code: 30100 (°C))
Use “Short socket adapter: 799T-601-4611”.
• For details of access to KDPF differential pressure sensor, wiring harness and tube, see “50 Disassembly and Assembly”, “REMOVE AND INSTALL KDPF ASSEMBLY” and “DISASSEMBLE AND ASSEMBLE KDPF ASSEMBLY”.
• After turning starting switch to OFF position, engine controller performs DEF purging (for Max. 6 minutes) and then stops. To restart engine, wait until system operating lamp goes off after turning starting switch to OFF position, and then turn starting switch to ON position.
• “Loaded Diagnostics Operation To Clear Failure Code”.
NOTICE
• This failure code requires “Loaded Diagnostics Operation To Clear Failure Code”. After investigating the cause of the problem and completing the repair, perform “Loaded Diagnostics Operation To Clear Failure Code” to make sure the failure code is cleared. (This failure code is not cleared by only turning ON the starting switch again.)
• This failure code is cleared by performing operations indicated in TESTING AND ADJUSTING, “SETTING AND OPERATION OF MACHINE MONITOR”, “SERVICE MODE”, “METHOD FOR SETTING WITH TESTING MENU (ENGINE CONTROLLER ACTIVE FAULT CLEAR)”.</td></tr>
</table>

Failure Code [CA2185]

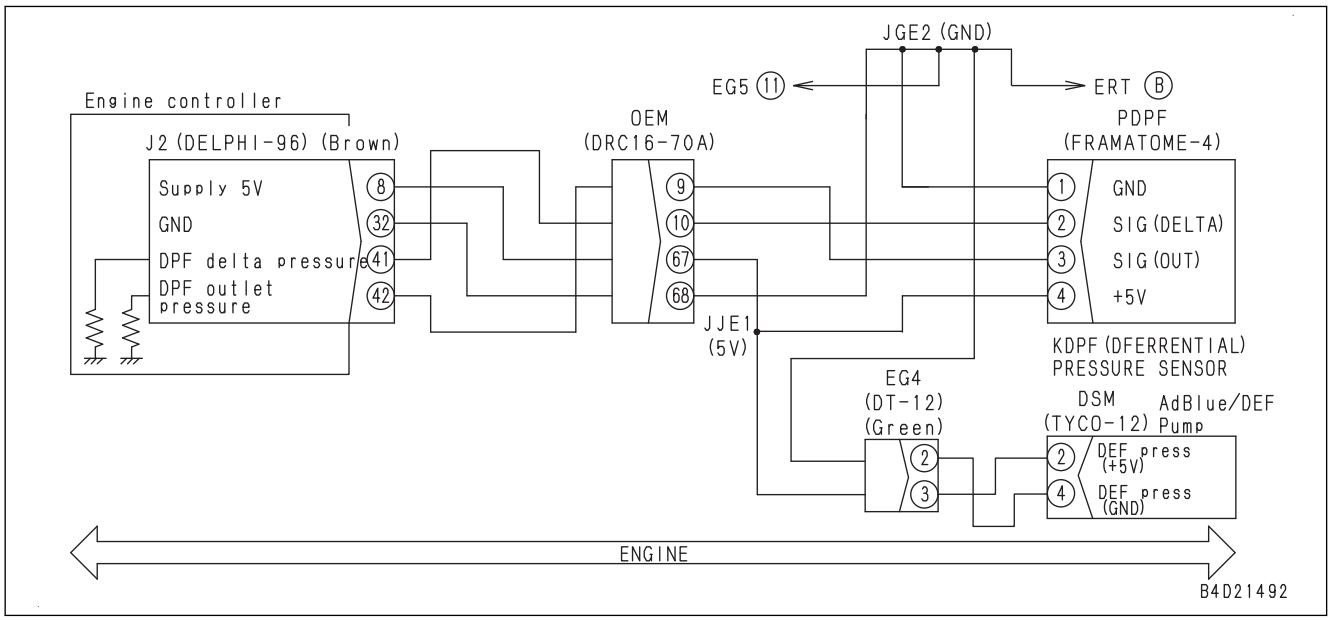
Action level	Failure code	Failure	Throttle Sensor Supply Voltage High Error (Engine controller system)
L03	CA2185		
Details of failure	High voltage is detected in throttle sensor power supply (5 V) circuit.		
Action of controller	Signal from decelerator pedal (throttle sensor) is ignored, and engine controller runs at fixed value by decelerator pedal position.		
Phenomenon on machine	Engine speed cannot be controlled by decelerator pedal.		
Related information	After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. Perform checkup referring to descriptions of wiring harness and connectors in “c Electric equipment” of “Checks before troubleshooting” in “General information on troubleshooting”. 2. Turn starting switch to ON position.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Defective throttle sensor (decelerator pedal)	1. Turn starting switch to OFF position. 2. Disconnect connector DCL, and turn starting switch to ON position.		
		If this failure code is cleared, throttle sensor is defective. **NOTICE** **Other failure codes are displayed as well. This is because the connector is disconnected. Ignore failure codes besides this failure code [CA2185].**		
3	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors J2 and DCL, and connect T-adapters to female side of J2.		
		Continuity	Between J2 (female) (9) and each pin besides J2 (female) (9) pin.	No continuity
4	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit Diagram of Intake Air Heater Relay



Circuit Diagram Related to KDPF Outlet Pressure Sensor



Failure Code [CA3242]

Action level	Failure code	Failure	DEF Tank Heating Error
L01	CA3242		(Engine controller system)
Detail of failure	DEF tank heating valve or engine coolant circuit, or both are clogging. (The temperature of the DEF tank does not rise though the engine controller turns ON (“1”) 19102 “DEF Tank HtrValve Command” and opens the DEF tank heating valve.)		
Action of controller	None in particular		
Phenomenon on machine	• DEF line stops thawing. • NOx emission increases because DEF injection is disabled at low temperature.		
Related information	• The engine controller judges whether this failure code is displayed only during thawing control of the DEF tank (The value of 19305 DEF Tank Heating State is “1”). • 19305 DEF Tank Heating State, 1: Thawing, 2: Warming, or 0: OFF. • The “Pre-defined Monitoring” screen uses the DEF tank thawing control diagnosis. (The following numbers are the monitoring codes) • DEF tank thawing control diagnosis 19305 DEF Tank Heating State 19102 DEF Tank HtrValve Command 19115 DEF Temperature in Tank 4107 Coolant Temperature 19400 Ambient Temperature 19133 Engine Room Temperature **NOTICE** **After investigating the cause of the problem and completing the repair, perform “Loaded Diagnostics Operation To Confirm Failure Correction” to make sure this failure code is not redisplayed. (Turning the starting switch to ON position does not confirm the completion of repair.)**		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective DEF tank heating valve system	If failure code [CA1683] or [CA1684] is displayed on the abnormality record screen, perform troubleshooting these first.
2	Defective DEF tank temperature sensor system	If failure code [CA1677] or [CA1678] is displayed on the abnormality record screen, perform troubleshooting these first.

No.	Cause	Procedure, measuring location, criteria and remarks
3	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Failure Code [CA3571]

Action level	Failure code	Failure	DEF Pump Pressure Sensor High Error (Engine controller system)
L01	CA3571		
Detail of failure	High voltage error is detected in signal circuit of DEF pump pressure sensor.		
Action of controller	Operates at fixed value (1300 kPa) of DEF pump pressure. DEF pump stop DEF purging stops Advances to Inducement strategy.		
Phenomenon on machine	• NOx emission increases because DEF injection is disabled due to DEF pump stop. • Because DEF purge is impossible, DEF in DEF line may be frozen at low temperature. • Engine power deration according to inducement strategy.		
Related information	• DEF pump pressure sensor is built in the DEF pump. • If DEF pump pressure sensor is defective, see “Disassembly and assembly,” “Disassembly and assembly of DEF pump” to change the DEF itself. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of the failure code “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Defective power supply system of DEF pump pressure sensor	If failure code [CA1695] or [CA1696] is also displayed, perform troubleshooting these first.		
3	Defective DEF pressure sensor	1. Turn starting switch to OFF position. 2. Disconnect connector DSM. 3. Turn starting switch to ON position.		
		If the displayed failure code changes from [CA3571] to [CA3572], the DEF pump pressure sensor is defective.		
4	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors J2 and DSM and connect T-adapters to each female side. Open circuit in GND line		
		Resistance	Between J2 (female) (32) and DSM (female) (4)	Max. 1 Ω
5	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors J2 and DSM, and connect T-adapter to female side of J2.		
		Resistance	Between J2 (female) (16) and (8)	Min. 1 MΩ

Failure Code [CA3713]

Action level	Failure code	Failure	DEF Line Heater 1 Voltage High Error (Engine controller system)
L01	CA3713		
Detail of failure	High voltage error is detected in signal circuit of DEF line heater 1 (on low-temperature pressure, intake, and purge).		
Action of controller	None in particular		
Phenomenon on machine	DEF line stops thawing. NOx emission increases because DEF injection is disabled at low temperature.		
Related information	• The DEF line heater 1 operates in DEF supply system thawing, warning, or implementation of DEF line heater relay 1 test. • The DEF line heater 1 is operated by the DEF line heater relay 1 in the DEF heater relay. • This failure code is detected only when the DEF line heater 1 is OFF. • If the connectors of all heaters connected to the DEF line heater 1 are disconnected, this failure code is displayed. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check them. 2. Turn the starting switch to ON position.		
		If this failure code is not displayed, the wiring harness connector is defective.		
2	Open circuit in wiring harness (wire breakage or defective contact of connector)	If failure code is still displayed after above checks, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors J2 and UHR1 and connect T-adapters to each female side.		
		Resistance	Between J2 (female) (39) and UHR1 (female) (8)	Max. 1 Ω
		Resistance	Between UHR1 (female) (12) and ground	Max. 1 Ω
3	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector UHR1, and connect T-adapter to female side. 3. Turn starting switch to ON position (with connector UHR1 disconnected).		
		Voltage	Between UHR1 (female) (8) and (12)	Approximately 5 V
4	Defective DEF line heater	1. Turn starting switch to OFF position. 2. Disconnect connectors UHC, and UHA, and connect T-adapters to each male side.		
		Resistance	Between UHC (male) (1) and (2)	5 to 40 Ω
		Resistance	Between UHA (male) (1) and (2)	5 to 40 Ω

Failure Code [CA3933]

Action level	Failure code	Failure	SCR NH3 Sensor Heater Voltage Low Error
L01	CA3933		(Engine controller system)
Detail of failure	The ammonia sensor controller is determined as having heater control under-voltage.		
Action of controller	• Uses DEF injection control without using the ammonia sensor. • Advances to Inducement strategy (EU Specification).		
Phenomenon on machine	• NOx emission may increase or ammonia may be exhausted because DEF injection works inappropriately. • Engine output is reduced based on inducement strategy (EU Specification).		
Related information	⚠ **SCR assembly, the sensor installation piping, and the sensor probe become hot (Min. 400 °C). Be careful not to get burned.** ⚠ **Be careful not to get burned by the sensor probe as it is heated by itself even if the ambient temperature is not high.** • If the ammonia sensor controller detects a circuit error of the ammonia sensor, the error is sent to the engine controller via CAN communication, and this failure code is displayed. • On the Pre-defined Monitoring screen troubleshooting for the engine operation state is used (the figures below denote monitoring codes). Engine operation state troubleshooting 01002 Engine Speed 19200 Exhaust Gas Flow Rate 47300 KDOC Inlet Temperature 19300 SCR Temperature 19302 SCR Outlet Temperature **NOTICE** **After investigating the cause of the problem and completing the repair, perform "Loaded Diagnostics Operation To Confirm Failure Correction" to make sure that the failure code is cleared.**		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in "Electrical equipment" in "CHECKS BEFORE TROUBLESHOOTING" of "RELATED INFORMATION ON TROUBLESHOOTING", and check it. 2. Perform "Loaded Diagnostics Operation To Confirm Failure Correction".
		If this failure code is cleared, wiring harness connector is defective.
2	Defective ammonia sensor	If the failure code persists after the above checks, the sensor may be defective. 1. Turn starting switch to OFF position. 2. Replace the ammonia sensor. 3. Perform "Loaded Diagnostics Operation To Confirm Failure Correction".
		If the failure code is cleared, the original ammonia sensor may be defective.
3	Defective ammonia sensor controller	1. Turn starting switch to OFF position. 2. If this failure code is displayed in above diagnosis, replace an ammonia sensor controller. 3. Perform "Loaded Diagnostics Operation To Confirm Failure Correction".
		If the failure code is cleared, the original ammonia sensor controller may be defective.

Failure Code [CA4165]

Action level	Failure code	Failure	SCR Temperature Sensor ECU Voltage Low Error (Engine controller system)
L01	CA4165		
Detail of failure	Low voltage error is detected in power supply voltage of SCR temperature sensor controller.		
Action of controller	• The SCR temperature and SCR outlet temperature are the latest normal value for operation. • Advances to Inducement strategy. • DEF injection stops		
Phenomenon on machine	• Defective detection of SCR temperature and SCR outlet temperature. • NOx emission increases because DEF injection is disabled. • Engine power deration according to inducement strategy.		
Related information	⚠ **The SCR assembly, sensor fitting piping, and sensor probe become hot (Min. 400 °C). Be careful not to get burned.** • The SCR temperature sensor and SCR outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • For the replacement procedure of the SCR temperature sensor, see “50 Disassembly and Assembly”, “REMOVE AND INSTALL SCR TEMPERATURE SENSOR”. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position. If this failure code is cleared, wiring harness connector is defective.		
2	Low battery voltage	1. Check that system operating lamp is not lit, and then turn the battery disconnect switch to OFF position. 2. Turn starting switch to OFF position. 3. Disconnect connector SSR and connect T-adapter to female side. 4. Turn the battery disconnect switch to ON position 5. Starting switch: ON		
		Voltage	Between SSR (female) (1) and (4)	22 to 30 V
			Between SSR (female) (2) and (4)	22 to 30 V
			Between SSR (female) (3) and (4)	22 to 30 V
3	Defective SCR temperature sensor (internal defect)	1. Turn starting switch to OFF position. 2. Replace SCR temperature sensor. 3. Turn starting switch to ON position. If this failure code is cleared, the original SCR temperature sensor is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)		
4	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Failure Code [CA4658]

Action level	Failure code	Failure	DEF Flow Low Error (Engine controller system)
-	CA4658		
Detail of failure	Clogged DEF injector and DEF pressure hose		
Action of controller	• None in particular		
Phenomenon on machine	• NOx emission increases because DEF injection is disabled.		

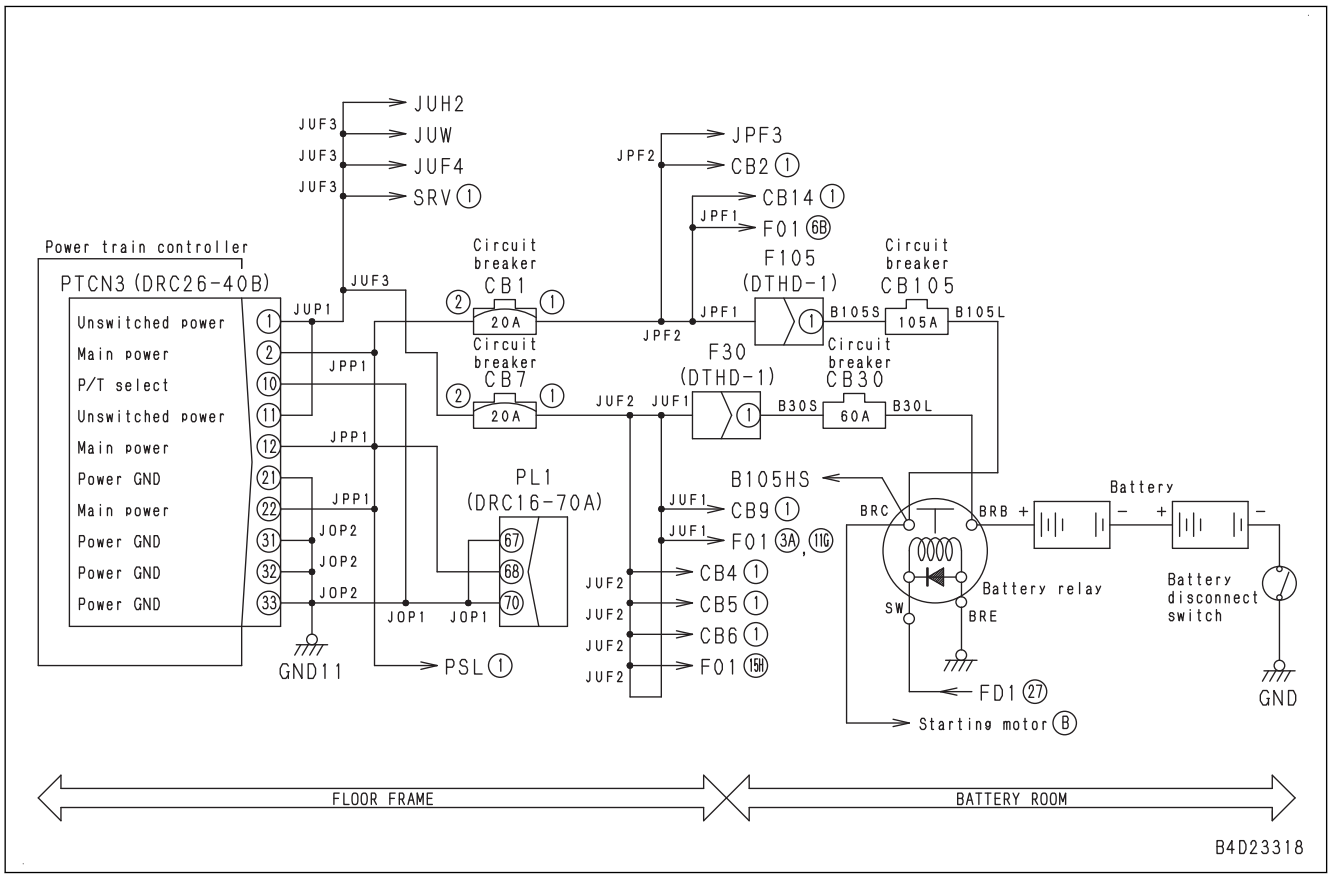
Failure Code [D811MC] (Machine with Gateway Function Controller)

Action level	Failure code	Failure phenomenon	KOMTRAX Malfunction (Gateway function controller system)
-	D811MC		
Detail of failure	Malfunction of gateway function controller		
Action of controller	None		
Phenomenon on machine	KOMTRAX system does not operate correctly.		
Related information	After the repair is done, make sure that the failure code is not shown by the operation that follows. Procedure: Starting switch ON		

No.	Cause	Procedure, measurement location, criteria and remarks
1	Malfunction of gateway function controller	The gateway function controller is defective. (Because this is an internal defect, troubleshooting cannot be done.)

No.	Cause	Procedure, measuring location, criteria and remarks
12	Defective machine monitor	If no failure is found by above checks, machine monitor is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Circuit Diagram of Power Train Controller Power Source



Failure Code [DDDDKX]

Action level	Failure code	Failure	Brake Pedal SW Signal Mismatch (Power train controller system)
L03	DDDDKX		
Detail of failure	Brake pedal potentiometer signals do not agree with brake pedal switch signals.		
Action of controller	Restricts operation of engine and transmission.		
Phenomenon on machine	• Backup brake may not operate. • Once machine stops, engine speed is restricted to medium (half) speed. • Once machine stops, selectable gear speeds are restricted to F1 and R1. • Automatic gear shift function does not work.		
Related information	• State of brake pedal potentiometer signal can be checked with monitoring function. (Code: 50400 Brake Pedal Potentio) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position and operate brake pedal.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective brake pedal switch system	If [DDDDKA] or [DDDDKB] is also displayed, perform troubleshooting these first.
2	Defective adjustment of brake pedal switch	Adjust brake pedal and perform reproducing method. If failure code mark E goes out, system is normal. Testing and adjusting item: Adjustment of brake pedal
3	Defective power train controller	If failure code is still displayed after above checkss on causes 1 and 2, power train controller may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)

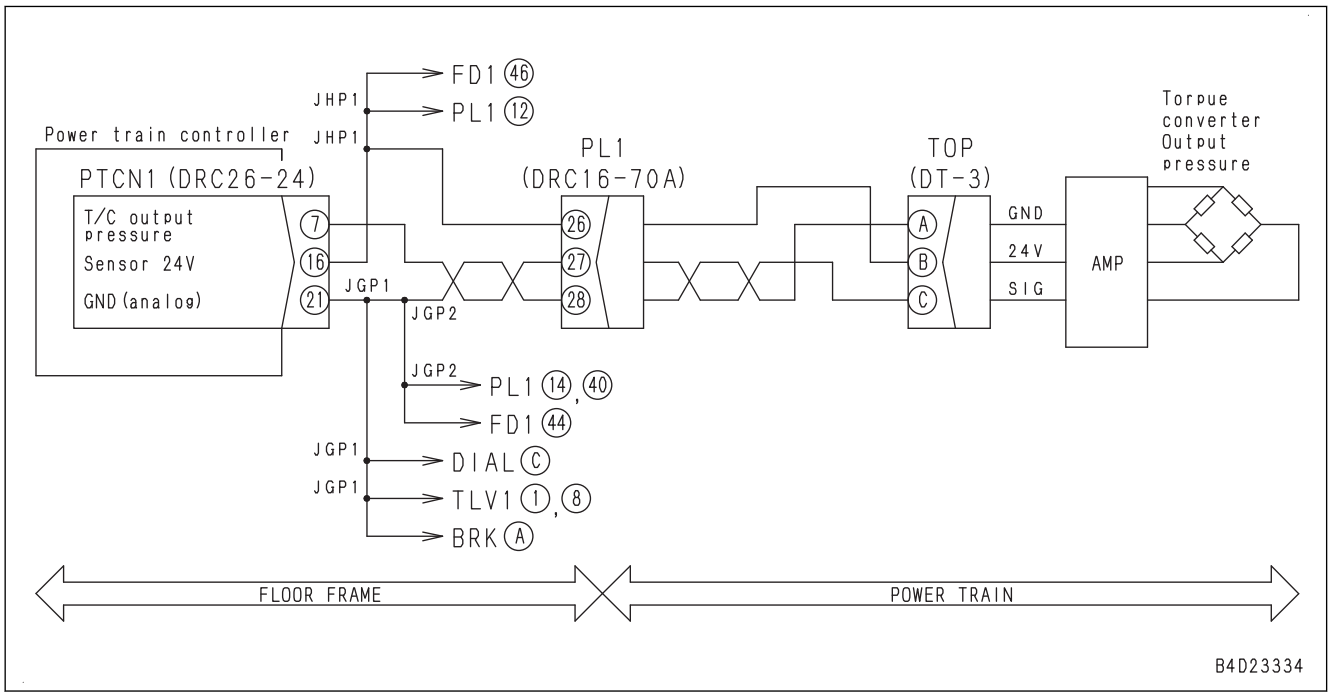
Failure Code [DDNLKB]

Action level	Failure code	Failure	Work Equipment Lock SW Short Circuit (Work equipment controller system)
L03	DDNLKB		
Detail of failure	• NO(Normally Open) and NC(Normally Close) lines of work equipment lock lever switch circuit becomes 0 V (switch: ON) simultaneously.		
Action of controller	• Assumes that work equipment lock lever is in LOCK position. • Restricts operation of engine and transmission.		
Phenomenon on machine	• Automatic gear shift function does not work. • Once machine stops, engine speed is restricted to medium (half) speed. • Once machine stops, selectable gear speeds are restricted to F1 and R1. • Work equipment control is disabled. • Engine does not start.		
Related information	• NC line is for detecting operation, and NO line is for detecting errors. • State of work equipment lock lever switch signal can be checked with monitoring function. (Code: 70300 Blade knob switch input 1) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position and operate work equipment lock lever. • When work equipment lock lever is in LOCK position, the work equipment lock lever switch is ON (diagram indicates LOCK state).		

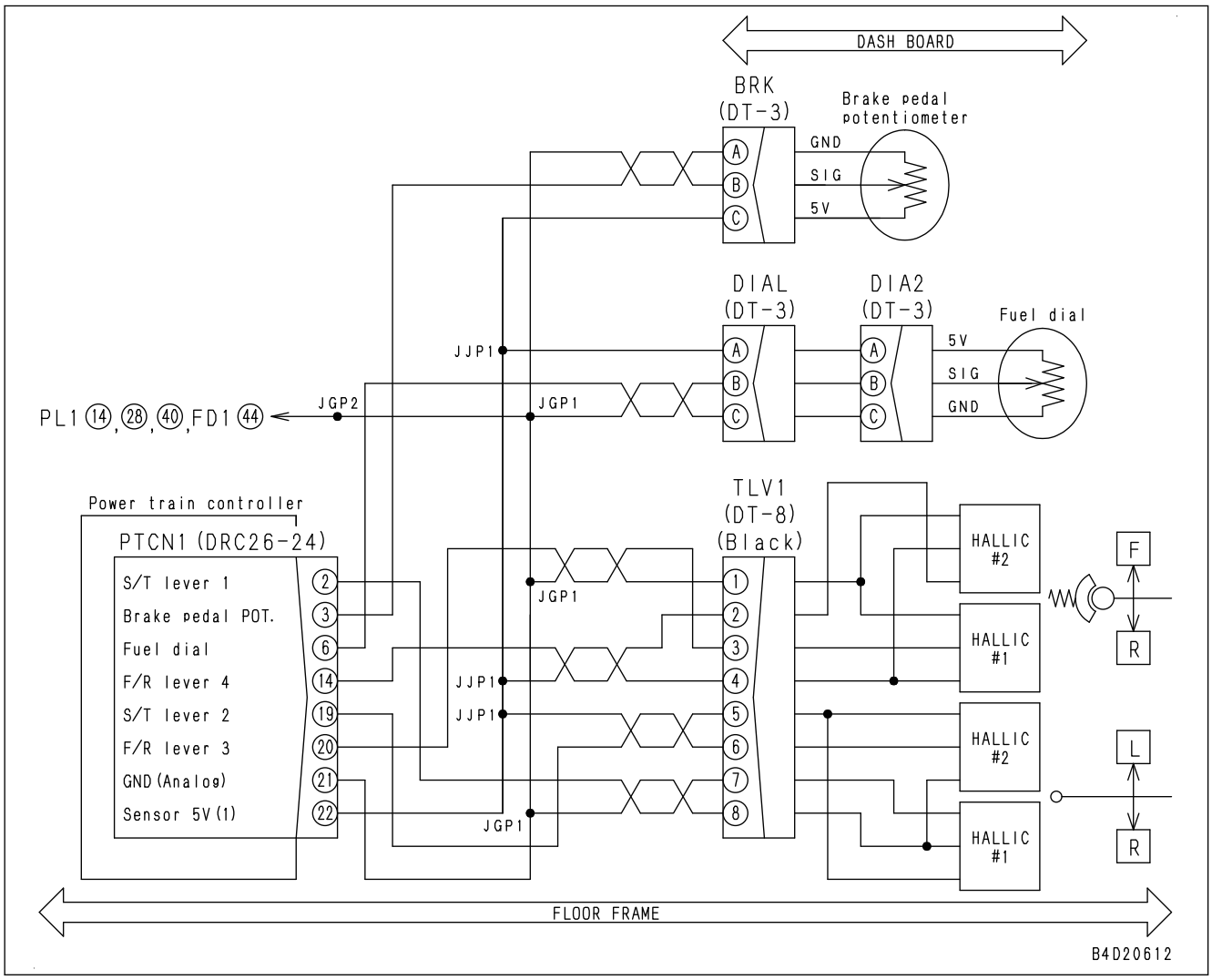
No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective work equipment lock lever switch (internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector WELK and connect T-adapter to male side. 3. Operate work equipment lock lever to perform troubleshooting.			
		Resistance	Between WELK (male) (A) and (B)	LOCK	Min. 1 MΩ
				Free	Max. 1 Ω
			Between WELK (male) (A) and (C)	LOCK	Max. 1 Ω
				Free	Min. 1 MΩ
2	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors WECN1, WECN2, and WELK, and connect T-adapter to any female side.			
		Resistance	Between ground and WELK (female) (B) or WECN2 (female) (37)		Min. 1 MΩ
			Between ground and WELK (female) (C) or WECN2 (female) (27)		Min. 1 MΩ

<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="5">3</td><td rowspan="5">Open circuit in wiring harness (wire breakage or defective contact)</td><td colspan="3">1. 1. Turn starting switch to OFF position.
2. 2. Disconnect connectors WECN1 and WLV2 and connect T-adapters to each female side.</td></tr>
<tr><td rowspan="3">Resistance</td><td>REMARK
If battery voltage is normal in cause 1, this check is not required.
Between WECN1 (female) (22) and WLV2 (female) (4)</td><td>Max. 1 Ω</td></tr>
<tr><td>REMARK
If battery voltage is normal in cause 1, this check is not required.
Between WECN1 (female) (21) and WLV2 (female) (1)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between WECN1 (female) (7) and WLV2 (female) (3)</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="3">4</td><td rowspan="3">Ground fault in wiring harness (contact with ground circuit)</td><td colspan="3">REMARK
If failure code is still displayed after above checks on cause 2, this check is not required.
1. 1. Turn starting switch to OFF position.
2. 2. Disconnect connectors WECN1 and WLV2 and connect T-adapter to either female side.</td></tr>
<tr><td rowspan="2">Resistance</td><td>Between WECN1 (female) (7) and (21) or WLV2 (female) (1) and (3)</td><td>Min. 1 MΩ</td></tr>
<tr><td>Between WECN1 (female) (7) and ground or WLV2 (female) (3) and ground</td><td>Min. 1 MΩ</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Defective work equipment controller</td><td colspan="3">If no failure is found by above checks, work equipment controller is defective.
• Reference
1. Turn the starting switch to OFF position
2. Insert T-adapter into connector WECN1.
3. Turn the starting switch to ON position.
4. Operate ripper control lever (in RAISE/LOWER direction) to perform troubleshooting.</td></tr>
<tr><td>Voltage</td><td>Between WECN1 (21) and (7)</td><td>0.96 to 4.04 V</td></tr>
</table>

Circuit Diagram of Torque Converter Outlet Oil Pressure Sensor

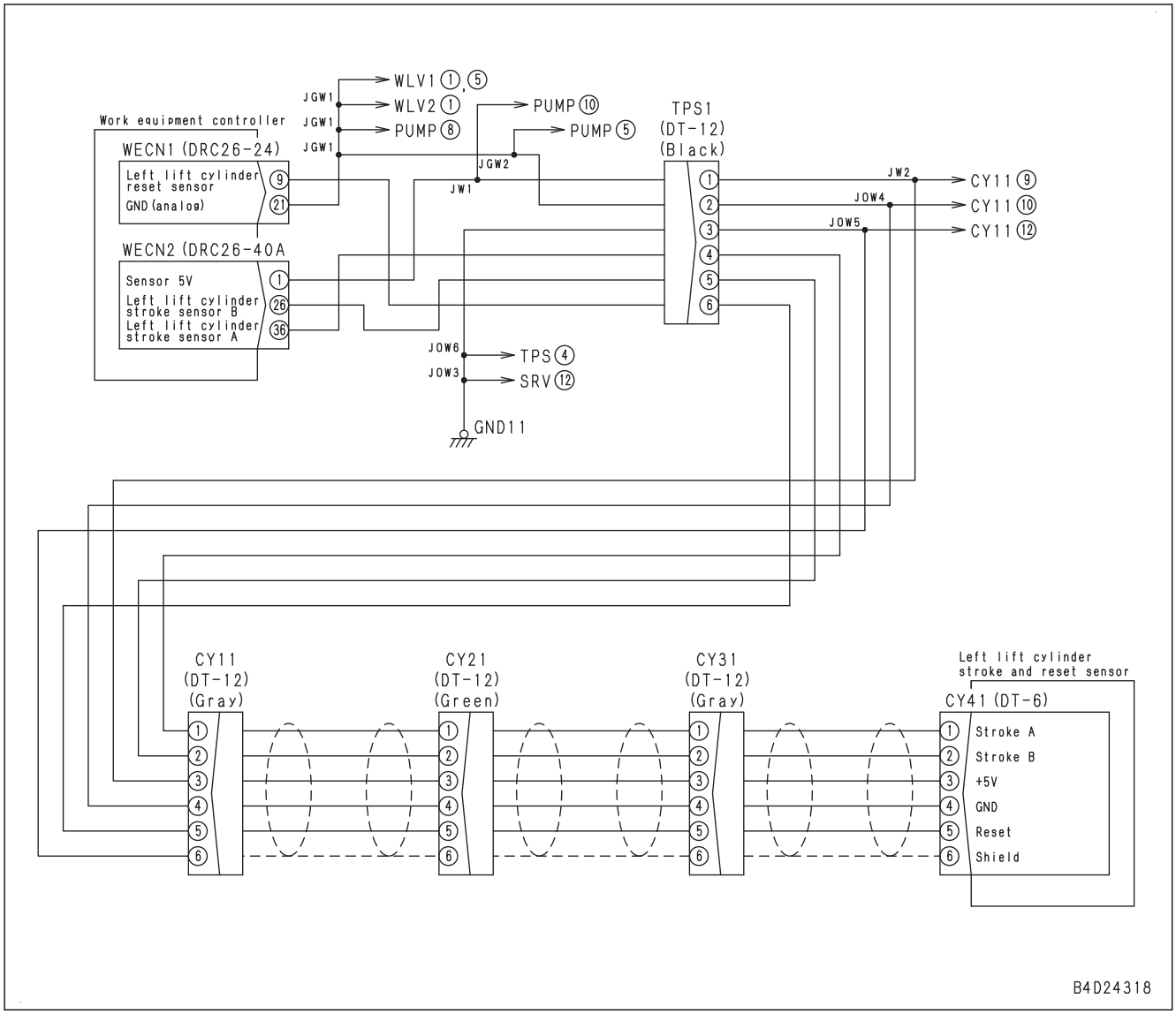


Circuit Diagram of Travel Lever Potentiometer



No.	Cause	Procedure, measuring location, criteria and remarks		
5	Defective work equipment controller	If no failure is found by above checks, work equipment controller is defective.		
		1. Turn the starting switch to OFF position 2. Insert T-adapters into connectors WECN1 and WECN2. 3. Turn the starting switch to ON position.		
		Voltage	Between WECN2 (26) and WECN1 (21)	0.5 to 4.5 V

Circuit Diagram Related to Stroke Reset Sensor for L.H. Blade Lift Cylinder



Failure Code [DWN3KY]

Action level	Failure code	Failure	Sudden Stop Prevention Valve Solenoid Hot Short Circuit (power train controller system)
L04	DWN3KY		
Detail of failure	Current flows constantly to S.S.P. solenoid circuit.		
Action of controller	• Stops driving S.S.P. solenoid. • Restricts operations of engine, transmission, and brake.		
Phenomenon on machine	• Sudden stop prevention function does not work. • Automatic gear shift function does not work. • Once machine stops, engine speed is restricted to medium (half) speed. • Once machine stops, it cannot travel at all.		
Related information	• Output condition to S.S.P. solenoid can be checked with monitoring function. (Code: 31628 Sudden Stop Prevention Valve Cur) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective sudden stop prevention solenoid (internal short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector SSP, and connect T-adapter to male side.		
		Resistance	Between SSP (male) (1) and (2)	5 to 15 Ω
			Between SSP (male) (1) and ground	Min. 1 MΩ
2	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector SSP and connect T-adapter to female side. 3. Turn starting switch to ON position.		
		Voltage	Between SSP (female) (1) and ground	Max. 4.5 V
3	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN3 and SSP, and connect T-adapters to female side of PTCN3. **REMARK** Check it by using multimeter in continuity mode.		
		Continuity	Between PTCN3 (female) (8) and each pin other than (8)	No continuity (no sound is heard)
4	Defective power train controller	If failure code is still displayed after above checks, power train controller may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)		

Failure Code [DXH7KB]

Action level	Failure code	Failure	Transmission Reverse Clutch ECMV Solenoid Short Circuit (power train controller system)
L03	DXH7KB		
Detail of failure	• When controller drives transmission R clutch ECMV solenoid, unusual current flows through circuit.		
Action of controller	• Restricts operation of engine and transmission.		
Phenomenon on machine	• Automatic gear shift function does not work. • Once machine stops, engine speed is restricted to medium (half) speed. • Once machine stops, selectable gear speed is restricted to F1.		
Related information	• Output condition to R clutch ECMV solenoid can be checked with monitoring function. (Code: 31616 T/M Reverse Clutch ECMV Current (F/B)) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine and travel in reverse.		

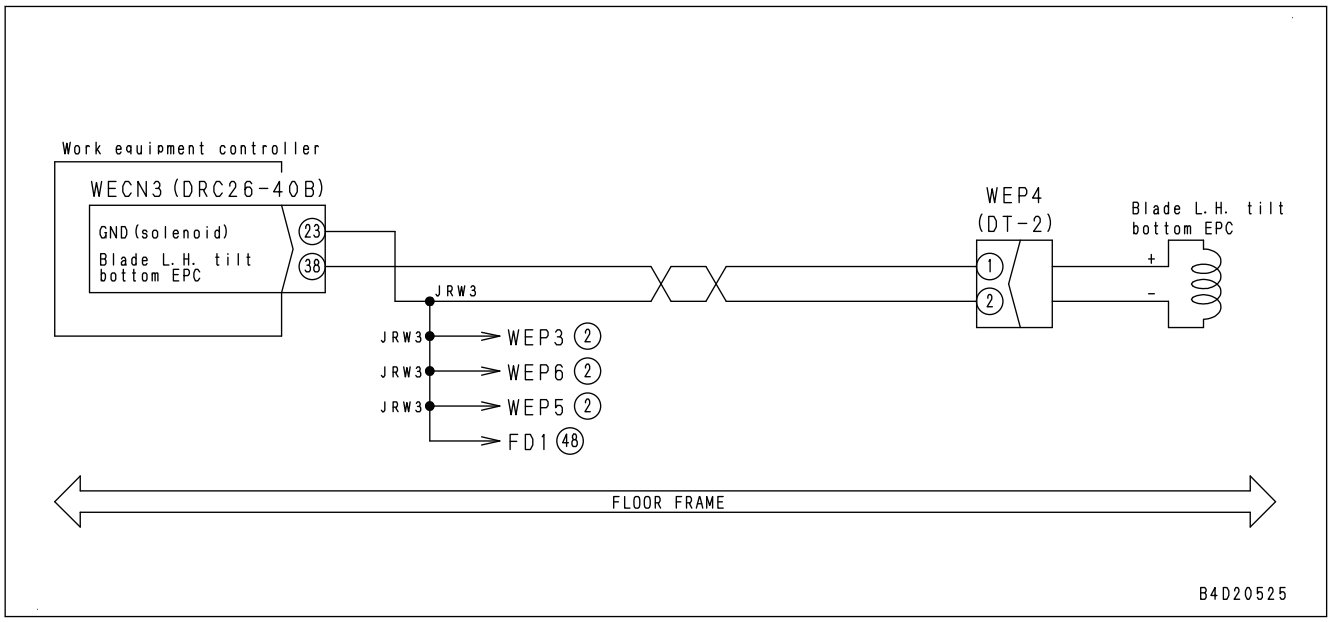
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective R clutch ECMV solenoid (internal short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector SRT, and connect T-adapter to male side.		
		Resistance	Between SRT (male) (1) and (2)	3 to 13 Ω
			Between SRT (male) (1) and ground	Min. 1 MΩ
2	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN3 and SRT, and connect T-adapter to either female side.		
		Resistance	Between ground and PTCN3 (female) (28) or SRT (female) (1)	Min. 1 MΩ
3	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN3 and SRT, and connect T-adapter to either female side.		
		Resistance	Between PTCN3 (female) (3) and (28) or between SRT (female) (1) and (2)	Min. 1 MΩ
4	Defective power train controller	If failure code is still displayed after above checks, power train controller may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)		

Failure Code [DXHTKY]

Action level	Failure code	Failure	Blade Tilt Right Head EPC Solenoid Hot Short Circuit (Work equipment controller system)
L03	DXHTKY		
Detail of failure	Current flows constantly to blade tilt right head EPC solenoid circuit.		
Action of controller	• Stops driving blade tilt right head EPC solenoid. • Restricts operation of engine and transmission.		
Phenomenon on machine	• Right cylinder for blade tilt or pitch continues to be retracted. • Once machine stops, engine speed is restricted to medium (half) speed. • Once machine stops, selectable gear speeds are restricted to F1 and R1. • Automatic gear shift function does not work.		
Related information	• Output condition to blade tilt right head EPC solenoid can be checked with monitoring function. (Code: 90800 RH Blade Tilt Cyl Head EPC Sol (F/B)) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective blade tilt R.H. head EPC solenoid (internal hot short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector WEP5, and connect T-adapter to male side.		
		Resistance	Between WEP5 (male) (1) and (2)	2 to 12 Ω
			Between WEP5 (male) (1) and ground	Min. 1 MΩ
2	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector WEP5 and connect T-adapter to female side. 3. Turn starting switch to ON position.		
		Voltage	Between WEP5 (female) (1) and (2)	Max. 4.5 V
3	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors WECN3 and WEP5, and connect T-adapters to female side of WECN3. **REMARK** Check with multimeter in continuity mode.		
		Continuity	Between WECN3 (female) (27) and each pin other than (27)	No continuity (no sound is heard)
4	Defective work equipment controller	If no failure is found by above checks, work equipment controller may be defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit Diagram of Blade Tilt LEFT Bottom EPC Solenoid



Failure Code [F315KB]

Detail of failure	Because the voltage of the engine controller rewrite power supply output line from the gateway function controller is 2.5V or less while the command is ON, a short circuit is found.
Action level	-
Action of controller	• The engine controller rewrite power supply output is turned OFF. • Even if the cause of the abnormality is removed, the machine will not go back to the correct condition until the starting switch is turned to the OFF position one time.
Phenomenon on machine	KOMTRAX system does not operate correctly.
Related information	

<table>
<tr><th>No.</th><th>Check item</th><th colspan="3">Procedure of troubleshooting</th><th colspan="2">Judgment and remedy</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Wiring harness and connector</td><td colspan="3" rowspan="2">1. Do the check in accordance with the descriptions of wiring harnesses and connectors in RELATED INFORMATION FOR TROUBLESHOOTING, CHECKS BEFORE TROUBLESHOOTING, ELECTRICAL EQUIPMENT.
2. Are the wiring harnesses and connectors in the correct state?</td><td>YES</td><td>• The wiring harnesses and connectors are in the correct state.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• A wiring harness or a connector is defective.
• Repair or replace the defective wiring harness or connector.
• Go to "Confirmation of repair".</td></tr>
<tr><td rowspan="4">2</td><td rowspan="4">Ground fault in wiring harness</td><td colspan="3">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors CK05 and J2. Connect a T-adapter to the female side on one of them.
3. Measure the resistance.
4. Does the troubleshooting result agree with the standard value?</td><td>YES</td><td>• The wiring harness does not have a ground fault.
• Go to the next check item.</td></tr>
<tr><td>Item</td><td>Measurement position, condition</td><td>Standard value</td><td rowspan="2">NO</td><td rowspan="2">• The wiring harness has a ground fault.
• Repair or replace the defective wiring harness.
• Go to "Confirmation of repair".</td></tr>
<tr><td>Resistance</td><td>Between ground and one of CK05 (female) (58) or J2 (female) (36)</td><td>Min. 1MΩ</td></tr>
</table>

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="4">16</td><td rowspan="4">Defective diode RSD (internal open circuit or short circuit)</td><td colspan="4">1. Turn starting switch to OFF position.
2. Remove connector RSD and connect T-adapter to diode.
REMARK
Measure it with diode range of multimeter.</td></tr>
<tr><td rowspan="2">Continuity</td><td colspan="2">Between RSD (male) (1) (+) and (2) (-)</td><td>No continuity</td></tr>
<tr><td colspan="2">Between RSD (male) (2) (+) and (1) (-)</td><td>Continuity</td></tr>
<tr><td rowspan="3">17</td><td rowspan="3">Open circuit in wiring harness 1 (wire breakage or defective contact of connector)</td><td colspan="4">REMARK
If failure code is still displayed after above checks on cause 10, this check is not required.
1. Turn the starting switch to OFF position and turn the battery disconnect switch to OFF position (to prevent short circuit during check).
2. Disconnect connector KEY and connect T-adapter to female side.
3. Disconnect fuse No. 19 of fuse box F01.</td></tr>
<tr><td rowspan="2">Resistance</td><td colspan="2">Between battery (+) terminal and KEY (female) (5)</td><td>Max. 1 Ω</td></tr>
<tr><td colspan="2">Between KEY (female) (1) and F01-19</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="3">18</td><td rowspan="3">Ground fault in wiring harness 1 (contact with ground circuit)</td><td colspan="4">REMARK
If failure code is still displayed after above checks on cause 10, this check is not required.
1. Turn starting switch to OFF position, and turn battery disconnect switch to OFF position.
2. Disconnect fuses No. 9, No. 15 and No. 19 of fuse box F01.</td></tr>
<tr><td rowspan="2">Resistance</td><td colspan="2">Between battery (+) terminal and ground</td><td>Max. 1 Ω</td></tr>
<tr><td colspan="2">Between F01-19 and ground</td><td>Min. 1 MΩ</td></tr>
<tr><td rowspan="2">19</td><td rowspan="2">Defective alternator (internal short circuit)</td><td colspan="4">1. Turn starting switch to ON position.</td></tr>
<tr><td>Voltage</td><td>Between terminal AL/R and ground</td><td>Input for generation</td><td>Max. 1 V</td></tr>
<tr><td rowspan="4">20</td><td rowspan="4">Defective starting motor (internal defect)</td><td colspan="4">1. Turn starting switch to OFF position.
2. Remove fuse No. 8 (5 A) in fuse box F01 (to prevent engine from starting during check).
3. Insert T-adapter into connector ST.
4. Turn starting switch to START position to perform troubleshooting.</td></tr>
<tr><td rowspan="3">Voltage</td><td>Between starting motor terminal B and ground</td><td>Power supply</td><td>20 to 30 V</td></tr>
<tr><td>Between ST (1) and ground</td><td>Input for starting</td><td>20 to 30 V</td></tr>
<tr><td>Between ST (2) and ground</td><td>Input for charging</td><td>Max. 1 V</td></tr>
</table>

E-24 Machine Does Not Change to Service Mode

Failure	Service mode cannot be selected.
Related information	See “TESTING AND ADJUSTING”, “SERVICE MODE”

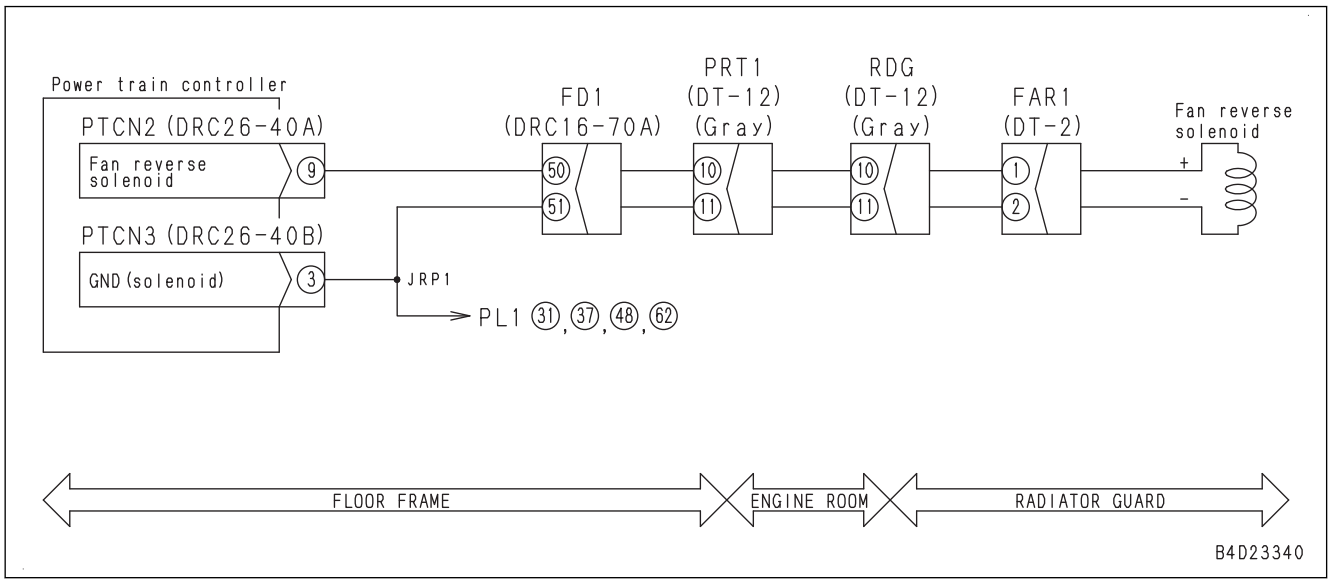
No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective machine monitor	Machine monitor may be defective. (Because this is an internal defect, troubleshooting cannot be performed.)

E-37 Fan Does Not Rotate in Reverse

Failure	Fan does not rotate in reverse.
Related information	See “Fan Reverse” in Structure, Operation, Machine monitor.

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective fan reverse solenoid	Perform troubleshooting for failure codes [DW7BKA] and [DW7BKB].

Circuit Diagram of Fan

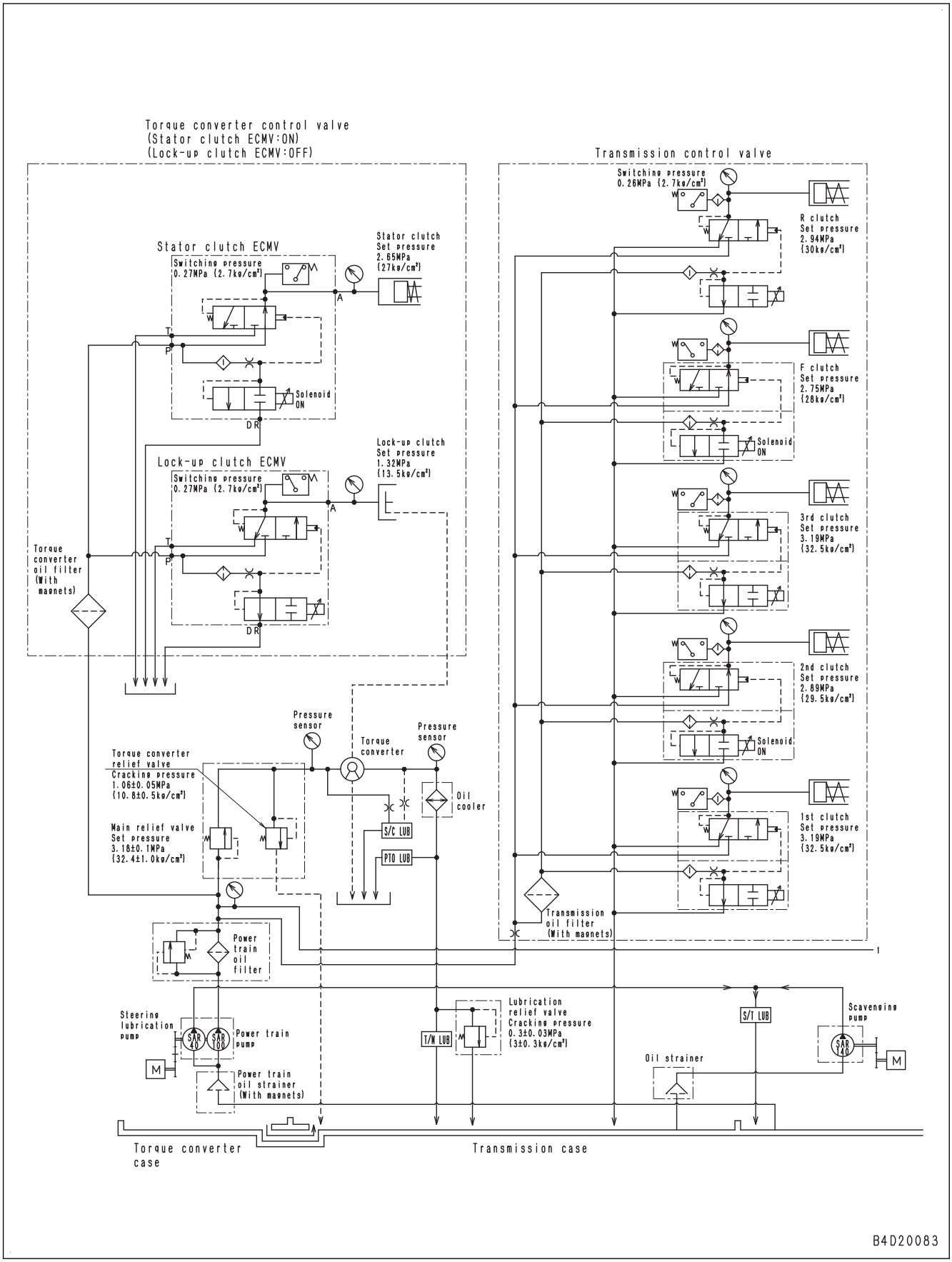


E-58 Control Box Shows Message [No GPS Localization...]

Failure	Control box displays “No GPS localization...”.
Related information	• Perform troubleshooting outdoors or at a place open to the sky to acquire a sufficient number of satellites. • Before performing troubleshooting, check that “MACHINE SETTING” is performed correctly as specified in the “Machine Setting” section of the Operation and Maintenance Manual. • Before performing troubleshooting, check that “PROJECT FILE” is set correctly as specified in the “Project File Setting” section of the Operation and Maintenance Manual. • A description about this message is also found in the “Actions to be taken when a message is displayed on the control box” section of the Operation and Maintenance Manual. **NOTICE** **Message display location** **“No GPS localization...” (green): Elavation Control Key**

No.	Cause	Procedure, measuring location, criteria and remarks
1	Control point files are localized	Check if the control point files are not localized.
2	Insufficient number of control points for localization	Check that the number of reference points for localization is at least 3 or more.

System Chart of Power Train System



H-15 Blade Tilt Speed or Power is Low

Failure	Blade tilt speed or power is low
Related information	• Check that the oil level in hydraulic tank is correct. • If failure codes are displayed, perform troubleshooting for them first. (DXA2KA, DXA2KB, DXA2KY, DXA3KA, DXA3KB, DXA3KY) • Check if the blade is modified. • Check that engine high idle speed is normal on the monitor. (Monitoring code: 01002) • Work equipment pump pressure can also be checked on monitor. (Monitoring code: 70700) • If hydraulic drift of blade tilt is also large, perform troubleshooting for H mode “HYDRAULIC DRIFT OF BLADE LIFT IS LARGE” first.

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective strainer of work equipment pump	Check strainer for clogging.			
2	Air sucked in on suction side of work equipment pump	Check suction piping for cracks, looseness, etc.			
3	Improper set pressure or malfunction of self-pressure reducing valve	**REMARK** Be ready with engine stopped, then perform troubleshooting with engine at high idle.			
		Control circuit source pressure	All control levers	NEUTRAL	Min. 2.50 MPa {25.5 kgf/cm^2}
		Relief valve of self-pressure reducing valve cannot be adjusted on-board. Replace the assembly if out of standards.			
4	Defective operation of EPC valve for blade tilt	**REMARK** Be ready with engine stopped, then perform troubleshooting with engine at high idle.			
		EPC valve output pressure (reference)	Blade tilt control lever	Tilting control	3.43 MPa {35 kgf/cm^2}
5	Defective unload valve of work equipment valve	**REMARK** Be ready with engine stopped, then perform troubleshooting with engine at high idle.			
		Unload valve relief pressure	Work equipment control levers	NEUTRAL	2.45(+1.37/0) MPa {25(+14/0) kgf/cm^2}

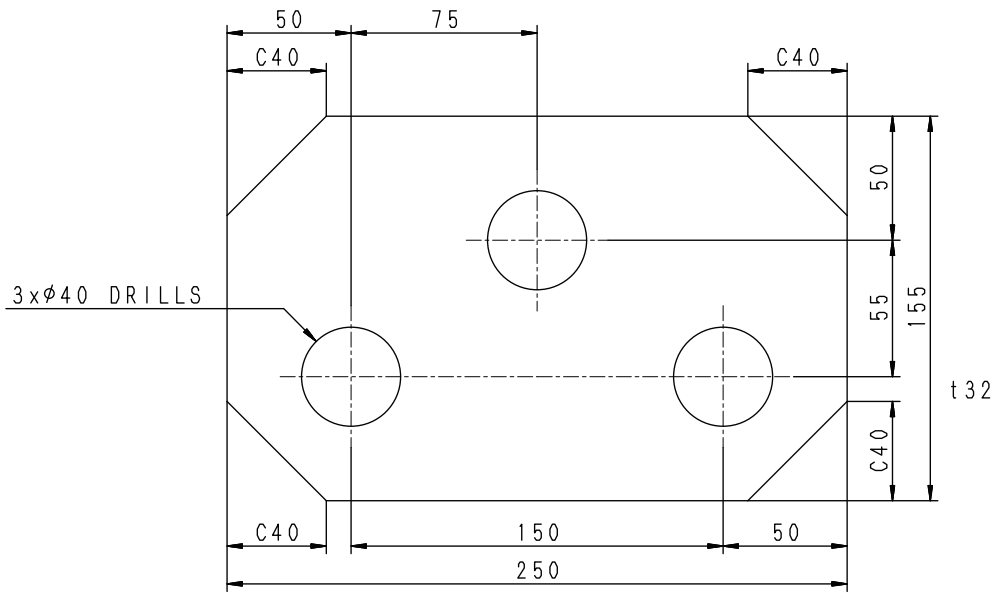
S-17 Coolant Temperature Increases Too High (Overheating)

Failure	Coolant temperature rises too high (overheating)
Related information	If any failure code is displayed, perform troubleshooting for that code first.

No.	Cause	Point to check, remarks	Remedy
1	Clogged radiator core	Check for clogging of radiator core and crushing of fin.	Cleaning of radiator core
2	Malfunction of thermostat	Thermostat does not open at cracking temperature. **REMARK** For thermostat opening temperature, see Engine Shop Manual	Thermostat replacement
3	Defective coolant temperature gauge	The error is detected in coolant temperature gauge system, but measured coolant temperature in radiator is normal.	Coolant temperature sensor, monitor or wiring harness replacement
4	Increase of fuel injection amount	Fuel injection amount is excessive.	Perform troubleshooting of “FUEL CONSUMPTION IS EXCESSIVE” in S mode, and take corrective action.
5	Low coolant level	Check coolant level for decrease.	Refilling with coolant
6	Coolant leakage	Check coolant piping for coolant leakage.	Coolant piping replacement
7	Broken water pump	Visually check water pump (check of water leakage through shaft seal, breakage of impeller, breakage of shaft)	Water pump replacement
8	Overheat due to increase in EGR ratio (EGR amount against fresh air intake amount) caused by defective mass air flow and temperature sensor	Check for defective mass air flow and temperature sensor.	Mass air flow and temperature sensor replacement
9	Overheat caused by increase of EGR ratio (quantity of EGR to fresh intake air) caused by deformation of air cleaner	Check air cleaner and rectifying wire net for deformation.	Air cleaner repair or replacement
10	Defective cylinder head or head gasket	Check if there are many bubbles in radiator and if coolant blows back.	Perform troubleshooting of “OIL IS IN COOLANT” in S mode, and take corrective action.
11	Defective piston ring	• Remove plug of bore for measuring the exhaust gas color in front of KDPF, and check color of the exhaust gas coming out of the bore. (Reference: See Testing and Adjusting “Examine Exhaust Gas Color”) • Measure compression pressure (See standard value table). (Reference: See “TESTING AND ADJUSTING”, “Testing compression pressure”.) • Check piston ring and piston ring groove.	Piston ring and piston replacement

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
B	790-431-1031	Block	■	1			Pulling out the hub assembly
	791-520-4140	Screw	■	2			
	790-101-2360	Plate	■	4			
	791-112-1180	Nut	■	2			
	790-101-2420	Adapter	■	2			
	796-430-1110	Push tool	■	1			
	790-101-2102	Puller	■	1			
	790-101-1102	Hydraulic pump	■	1			
C	791-627-1280	Installer	■	1			Press fitting the floating seal
D	790-101-5401	Push tool kit	■	1			Press fitting the oil seal
	790-101-5441	• Plate	■	1			
	790-101-5421	• Grip	■	1			
	01010-51240	• Bolt	■	1			
E	790-101-5401	Push tool kit	■	1			Press fitting the bearing
	790-101-5451	• Plate		1			
	790-101-5421	• Grip		1			
	01010-51240	• Bolt		1			
F	790-201-1500	Push tool kit	■	1			
	790-201-1680	• Plate		1			
	790-101-5021	• Grip		1			
	01010-50816	• Bolt		1			
G	791-520-4140	Screw	■	1			Press fitting the bearing
	790-101-2420	Adapter	■	1			
	791-112-1180	Nut	■	1			
	01643-22460	Washer	■	1			
	793T-417-1130	Push tool	■	1		○	
	790-101-2102	Puller	■	1			
	790-101-1102	Hydraulic pump	■	1			
H	791T-627-1950	Plate	■	1		○	
	790-101-5421	Grip	■	1			
	01010-51240	Bolt	■	1			
J	791T-627-1940	Push tool	■	1		○	

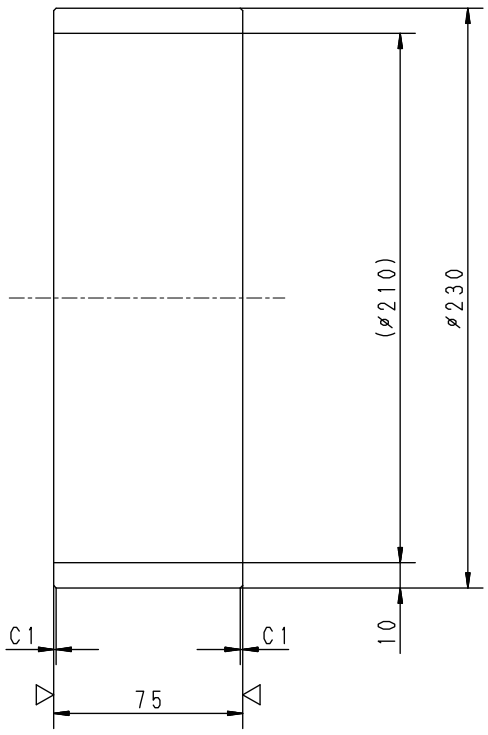
791T-685-1410: Lifting Tool



C4D21800

HEAT TREATMENT	MATERIAL
----	SS400
PART NAME	Q'TY
LIFTING TOOL	1
791T-685-1410 △	

791T-630-2610: Spacer



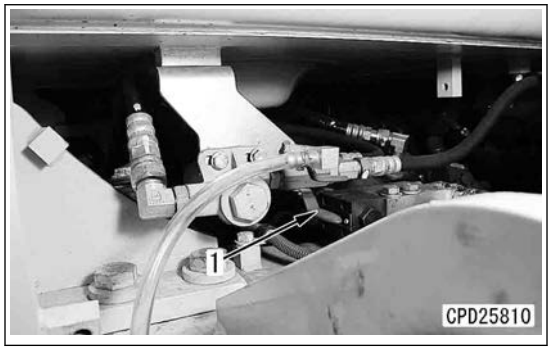
CJD15369

HEAT TREATMENT	MATERIAL
----	STKM13A
PART NAME	Q'TY
SPACER	1
791T-630-2610 △	

How to Remove Cylinder Head Assembly

Exterior

1. Close fuel valve lever (1).

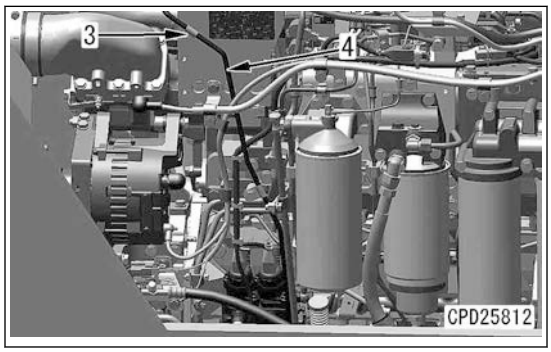


2. Support engine underguard (2) by using a lifting tool or floor jack, remove the mounting bolts (12 pieces), and remove engine underguard (2).

   Engine underguard (2):

   270 kg

3. Remove engine hood assembly. For details, see “Remove and Install Engine Hood Assembly”.
4. Remove KDPF and SCR assembly. For details, see “Remove and Install KDPF and SCR Assembly”.
5. Remove clamps (3) (4 pieces), and remove DEF/SCR drain tube (4).
6. Remove the hydraulic oil cooler assembly. For details, see “Remove and Install Hydraulic Oil Cooler Assembly”.
7. Remove the aftercooler assembly. For details, see “Remove and Install Aftercooler Assembly”.



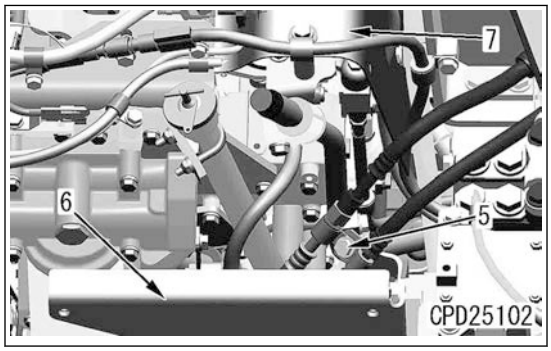
Bracket, Cover

8. Remove piping clip (5).
9. Remove mounting bolts (3 pieces), and remove bracket (6).

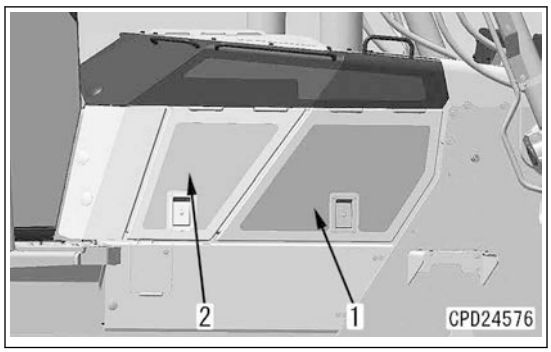
   REMARK

   - After removing bracket (6), move air conditioner hose aside so that it does not hinder the work.

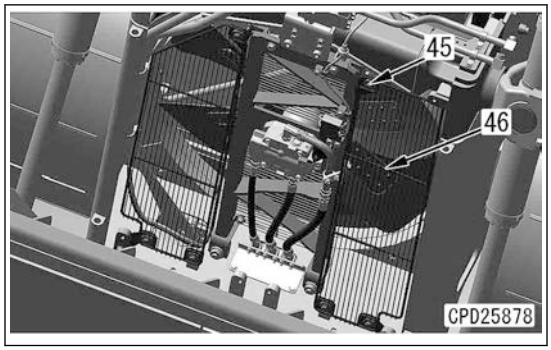
10. Remove mounting bolts (2 pieces) and seat (7).



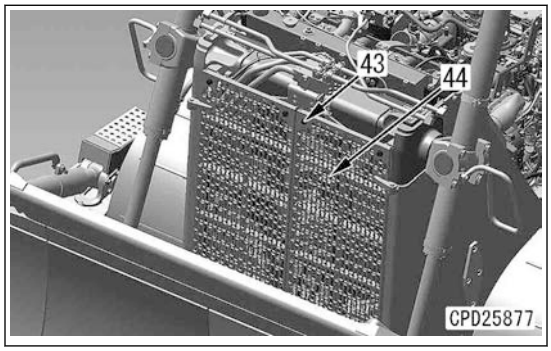
9. Unlock the engine right side cover (1) and (2), and close them.



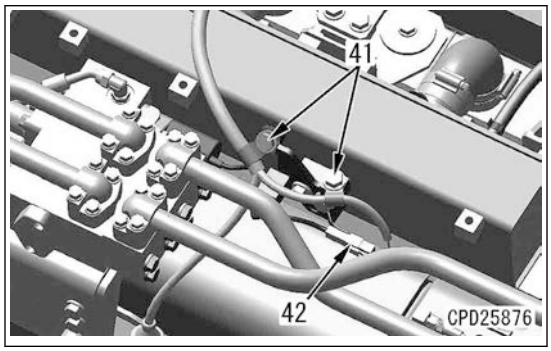
22. Install both sides of fan guards (46) with mounting bolts (45) (6 pieces).



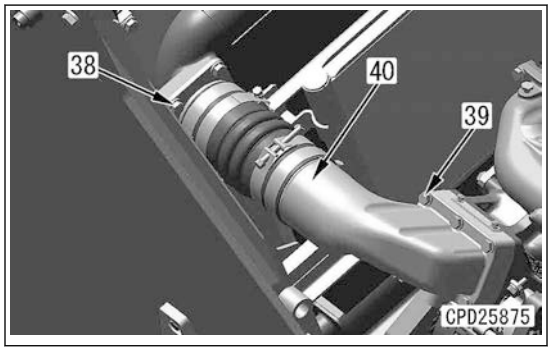
23. Close both sides of radiator mask (44) and install it with bolts (43) (8 pieces).
24. Install connector (42) to the clip.



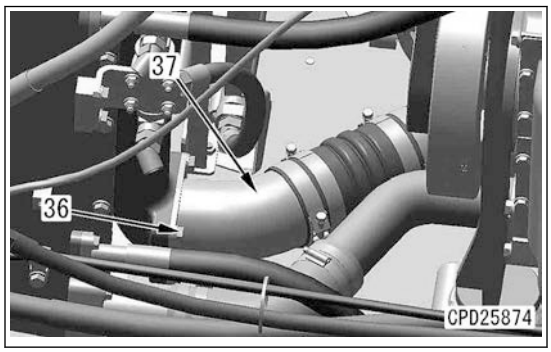
25. Install clamps (41) (2 places).



26. Install aftercooler outlet flange (40) with bolts (38) (4 pieces) and (39) (6 pieces).

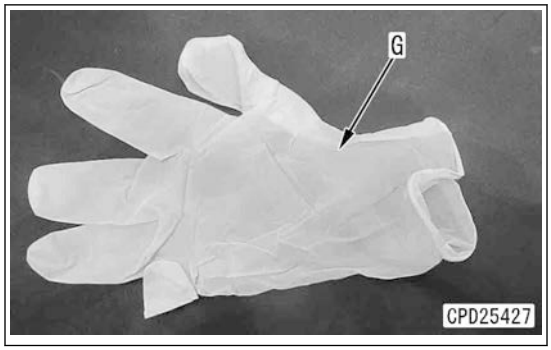


27. Install aftercooler inlet flange (37) with bolts (36) (4 pieces).

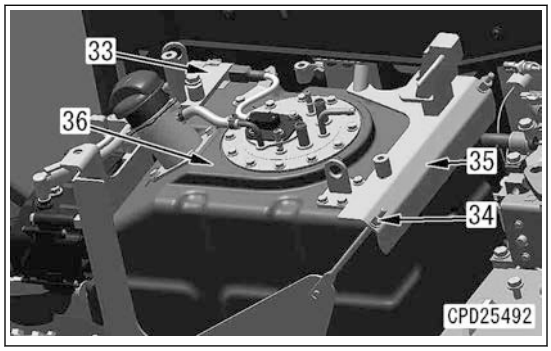


NOTICE

When handling DEF, be sure to use tool G.



1. Install DEF tank assembly (36).
2. Install holder (35) with nut (34).
3. Install bracket (33).

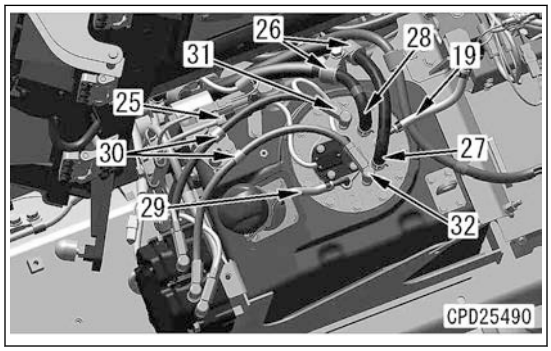


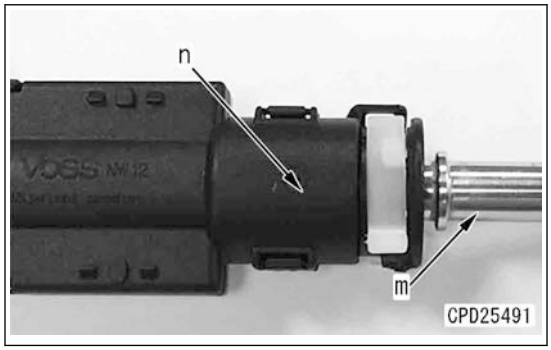
Hose, connector

4. Wash the connection of DEF hoses (31), (32), and pin (m) with clean city water to remove the sticking materials. Check the DEF hoses and pin (m) are not damaged.
5. Insert connectors (n) of DEF hoses (31) and (32) into pin (m) on the injector side until click sound is heard to install them.

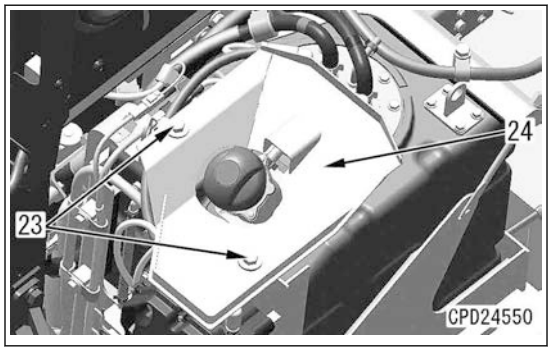
   REMARK

   When it is inserted until the convex part of pin (m) passes the convex part inside the clip, it can be locked by the clip.
6. Install clamp (30).
7. Install hose (29).
8. Install coolant inlet port hose (28).
9. Install coolant outlet hose (27).
10. Install clamp (26).
11. Install breather hose (19).
12. Install connector UHV2 (25).





13. Install cover (24) with bolts (23) (2 pieces).



REMARK

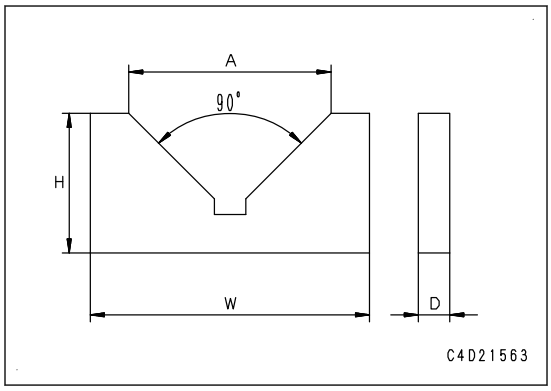
- For details of tool A, see the following dimension drawing.

  Dimension (W): Approximately 500 mm

  Dimension (H): Approximately 275 mm

  Dimension (D): Approximately 100 mm

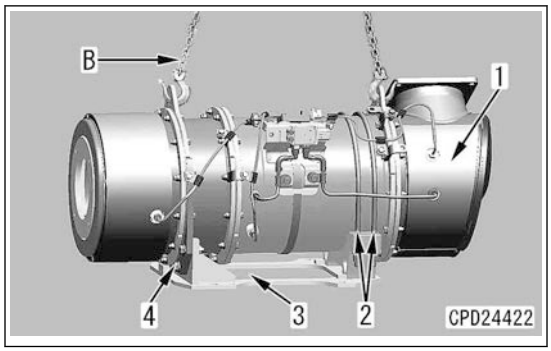
  Dimension (A): Approximately 400 mm



2. Install tool B, sling KDPF assembly (1), and hold it.
3. Remove U-bolts (2) (2 pieces).
4. Remove bolts (3) (4 pieces), and remove KDPF assembly (1) from bracket (4).
5. Set KDPF assembly (1) on tool A so that it does not touch piping or band, and securely fix it.

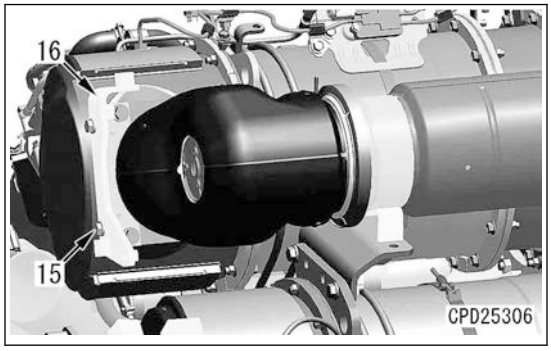
   KDPF assembly (1):

   75 kg



DEF mixing tube

7. Remove mounting bolts (15) (2 pieces), and remove bracket (16).



8. Use a lifting tool and sling DEF mixing tube (17) together with connector and tube and keep holding it.

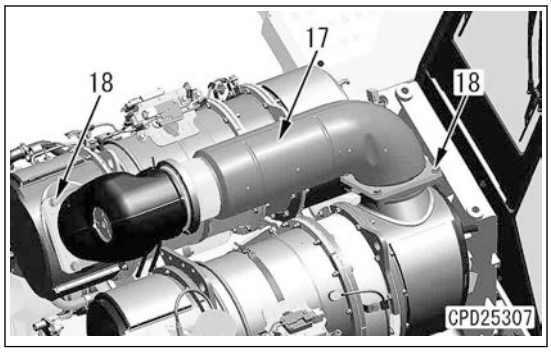
   DEF mixing tube:

   30 kg

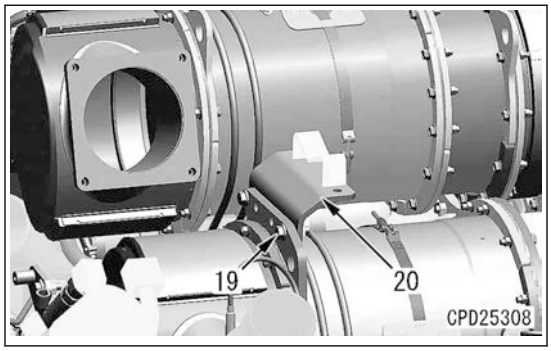
9. Remove mounting bolts (18) (4 pieces each at front and rear).
10. Sling DEF mixing tube (17) by using a lifting tool, and remove it.

    DEF mixing tube:

    30 kg



11. Remove mounting bolts (19) (2 pieces), and remove bracket (20).

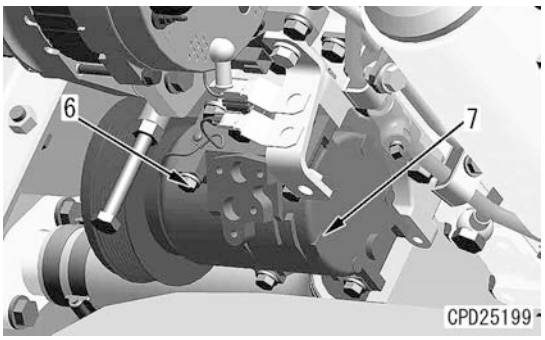


How to Install Air Conditioner Compressor Assembly

Air conditioner compressor

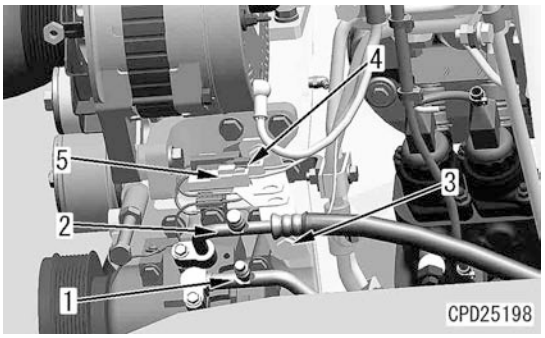
1. Remove mounting bolts (6) (8 pieces), and install air conditioner compressor assembly (7).

   Mounting bolt (8)24.5 to 29.4 Nm {2.5 to 3.0 kgfm}



Hose, connector

2. Install ground cable (3), connectors A/C (4) and (5).
3. Install air conditioner hoses (1) and (2).



REMARK

When connecting the air conditioner circuit piping, observe the following:

- Do not remove the plug from the fitting before connecting the pipe.
- Be careful that dirt, dust, water, etc. do not enter the air conditioner piping.
- Check that the O-rings are fitted to the joints when connecting the air conditioner piping.
- Check that the O-ring is not damaged or deteriorated.
- When connecting air conditioner piping, apply compressor oil for new refrigerant (R134a) to the O-rings and threaded portions.
- When connecting the air conditioner pipes, tighten by using 2 wrenches.

O-ring and threaded portion:
Compressor oil (DENSO: ND-OIL8)

Screw size (M6 x 1.0) (width across flats: 10 mm)8 to 12 Nm {0.8 to 1.2 kgfm}

Alternator belt

4. Install the alternator belt. For details, see “Remove and Install Alternator Belt”.

Refilling with refrigerant

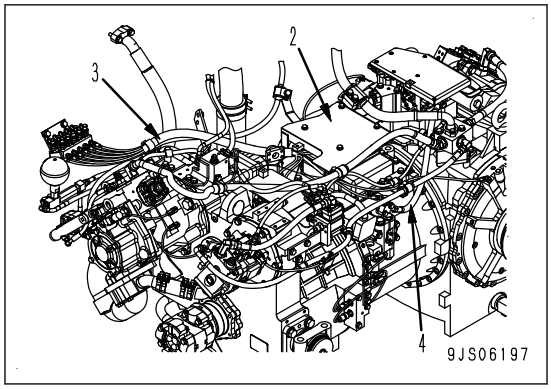
5. Refill with refrigerant (air conditioner gas: R134a).

   Filling quantity: 900 ± 50 g

21. Remove cover (2), and install detection hose assembly (3).

REMARK

Connect power train unit side (10 places) of the detection hose.



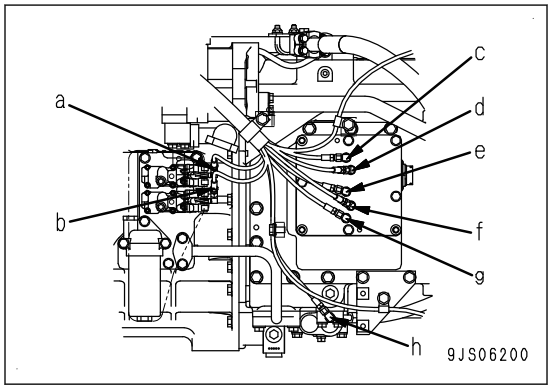
Connector

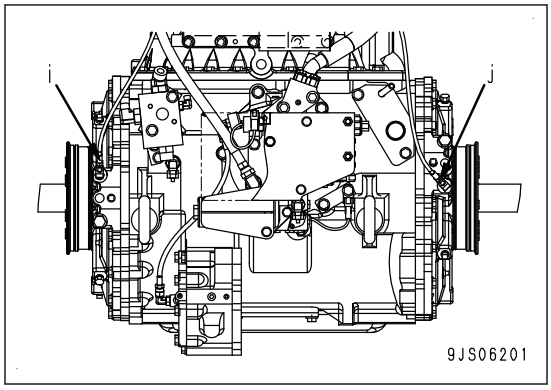
22. Connect all the connectors and install the wiring harness from the power train unit referring to Troubleshooting, “CONNECTOR LAYOUT DRAWING” and Circuit diagrams, “ELECTRICAL CIRCUIT DIAGRAM”.

REMARK

Color band is attached to the detection hose fitting. Connect the hose to the power train unit referring to the following table.

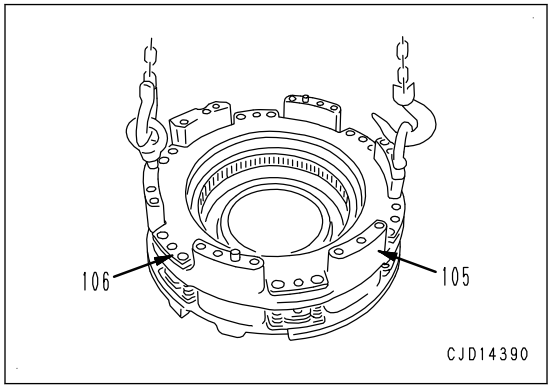
Symbol	Detecting place	Band colors
a	Torque converter lockup clutch pressure	Yellow/Red
b	Torque converter stator clutch pressure	Yellow/Blue
c	Transmission 1st clutch pressure	Red
d	Transmission 3rd clutch pressure	Yellow/Black
e	Transmission R clutch pressure	Red/Blue
f	Transmission 2nd clutch pressure	White/Yellow
g	Transmission F clutch pressure	White/Blue
h	Transmission main relief pressure	Colorless
i	Left brake pressure	White
j	Right brake pressure	Yellow





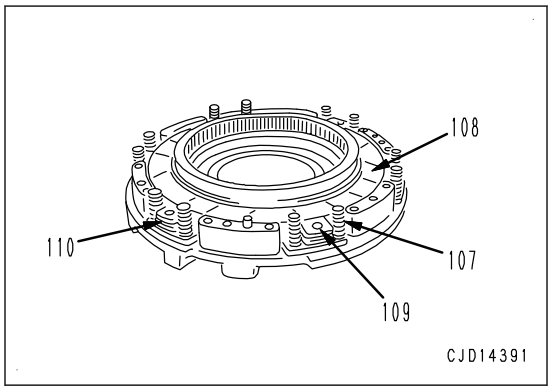
No.4 housing assembly

64. Remove No.4 housing assembly (105).
65. Remove No.4 piston (106).



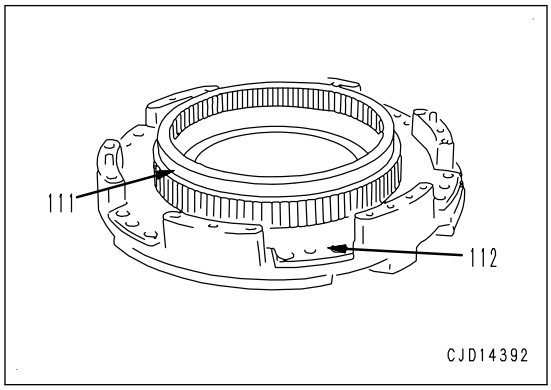
No.5 disc, plate, spring

66. Remove spring (107).
67. Remove disc (108), plate (109), and spring (110).



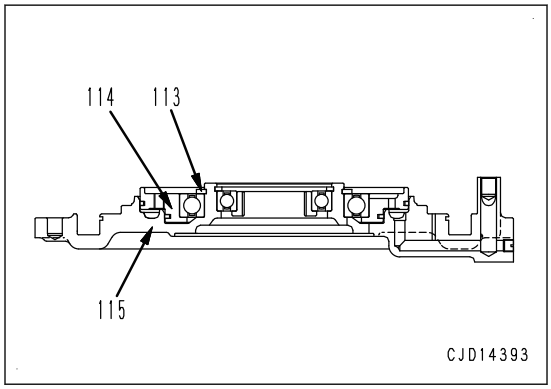
No.5 ring gear, piston

68. Remove No.5 ring gear (111).
69. Remove No.5 piston (112).



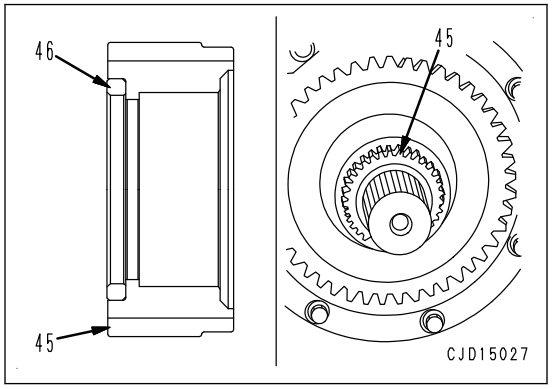
Cover assembly

70. Remove snap ring (113), and remove cover assembly (114) from output housing assembly (115) by using tool I.



Sun gear

56. Install thrust washer (46) to sun gear (45).
57. Install sun gear (45).

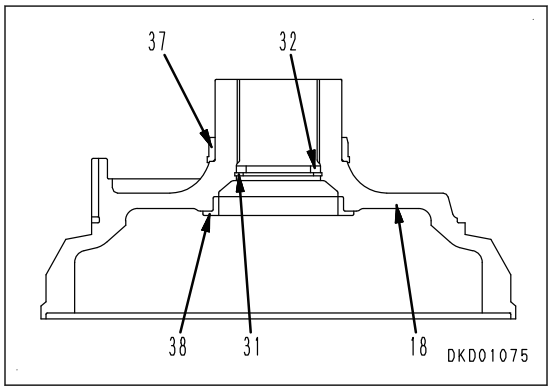


Brake and carrier assembly

58. Install stopper (32) to hub (18), and install snap ring (31).
59. Install bushing (38).
60. By using tool L, press-fit inner race (37).

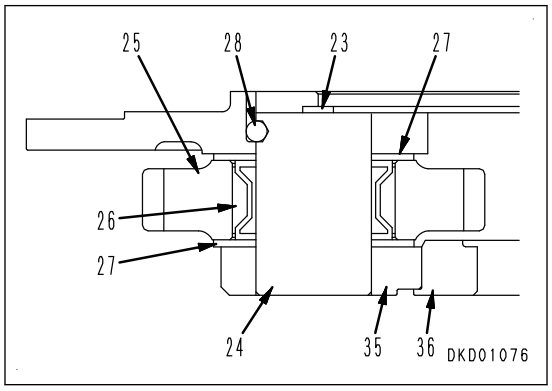
    REMARK

    Make 2 assemblies according to the same procedure.

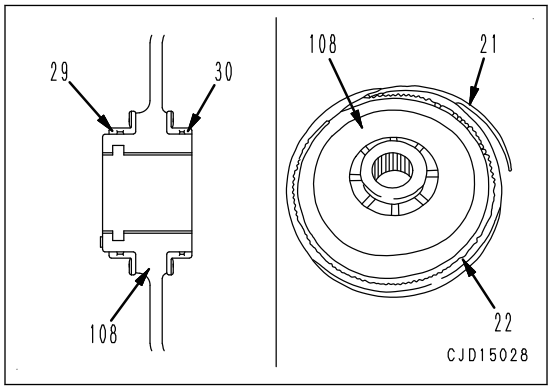


Carrier assembly

61. Install bearing (26) to gear (25), fit thrust washers (27) to both sides, and set it to carrier.
62. Fit ball (28), and install shaft (24).
63. Install snap ring (23).
64. Install sleeve (36) to carrier (35).



65. Install bushings (29) and (30) to gear (108) by using tool Y.
66. Set gear (108) to ring gear (22), fit ring (21), and install the ring gear to the gear.



Track frame assembly

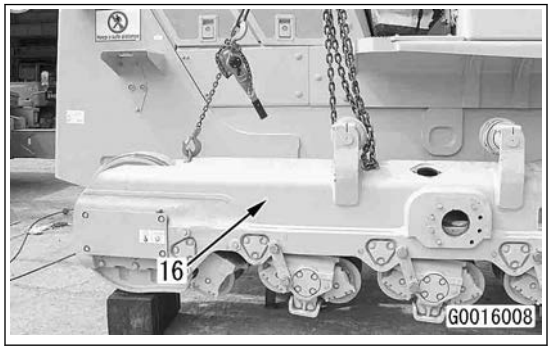
19. Lift the track frame assembly (16), and remove it.

    REMARK

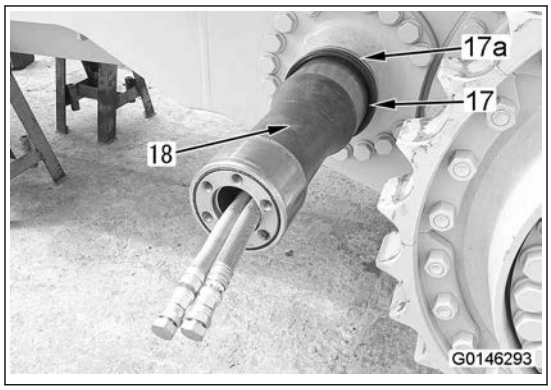
    Be careful not to hit the step.

    Tool: Lifting tool

    Track frame assembly (16): 3825 kg



20. Remove the seal (17) from the pivot shaft (18).
21. Remove the seal (1), and remove the ring (2).



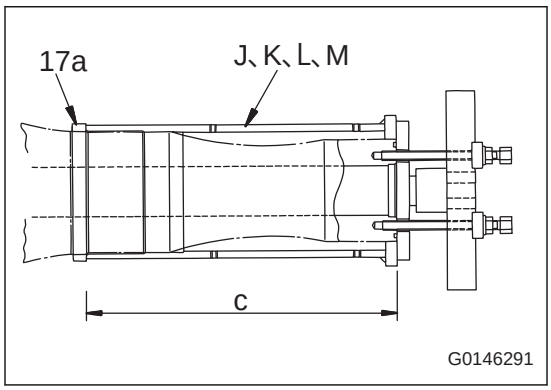
How to Install Track Frame Assembly

Track frame assembly

1. Press-fit the ring (17a) to the pivot shaft (18) with the installer (J), jack (K), hydraulic pump (L), and spacer (M).

   Tool: Installer (J),jack (K), hydraulic pump (L),spacer (M)

   Press-fit surface of seal: Liquid gasket (LG-6)



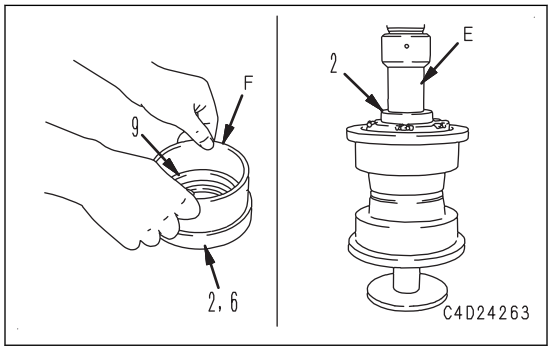
4. Fit O-ring, and install the roller to retainers (3), (7), plate (4) and (8).

REMARK

Check that the plate can be rotated smoothly by hand.

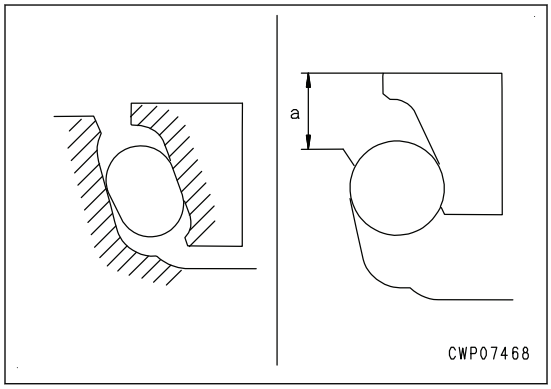
5. By using tool F, install floating seal (9) to seal guides (2) and (6).

Press fitting force of ring: 39 to 69 kN {4 to 7 t}



REMARK

- When installing the floating seal, clean, degrease and completely dry the contact faces of O-ring and floating seal (hatched area). Be careful not to allow dirt and foreign matter to attach on the contact surface of the floating seal.
- After inserting the floating seal, check that the tilt of the seal is 1 mm or less and the projection dimension (a) of the seal is in the range of 7 to 11 mm.



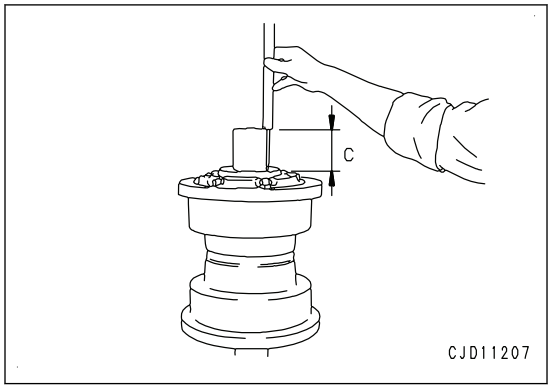
Ring

6. Press-fit ring (2) to the shaft by using tool E.

REMARK

- Press-fit the ring so that press-fitting dimension (c) between the shaft end and ring upper surface is as following.
- Reverse the track roller assembly, and press-fit ring (6) on the opposite side according to the same procedure.

Press-fitting dimension (c): 48.5±0.2 mm



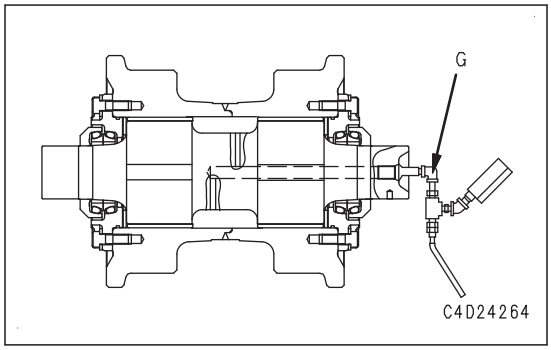
Check for leakage

7. By using tool G, apply the standard pressure to the oil filler port of the track roller assembly to check for air leakage from the seal.

REMARK

Apply the standard pressure for 10 seconds, and check that the pointer of gauge does not drop down.

Standard pressure: 0.1 MPa {1 kgf/cm^2}



Refilling with oil

8. Fill the track roller assembly with oil (GO140) by using tool G.

Separate and Connect PLUS Type Track Assembly

⚠ **Park the machine on a level ground, and set parking brake lever to LOCK position.**

⚠ **Lower the work equipment to the ground, and set the work equipment lock lever to LOCK position.**

⚠ **Stop the engine, turn the battery disconnect switch to OFF position, and remove the key. (For details, see Testing and Adjusting, "Handle Battery Disconnect Switch".)**

Separate PLUS Type Track Assembly Generally

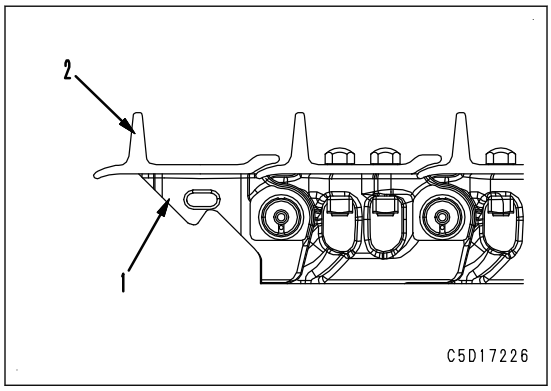
REMARK

The details of separation and connection of PLUS type track shoe assembly are the same as those of the standard type track shoe. Therefore, see "Separate and Connect Track Assembly".

Install PLUS Type Track Assembly

Shoe

1. Set the shoe so that master link (1) on the shoe side and shoe grouser (2) are positioned as shown in the drawing, and install the shoe.



Shoe bolt

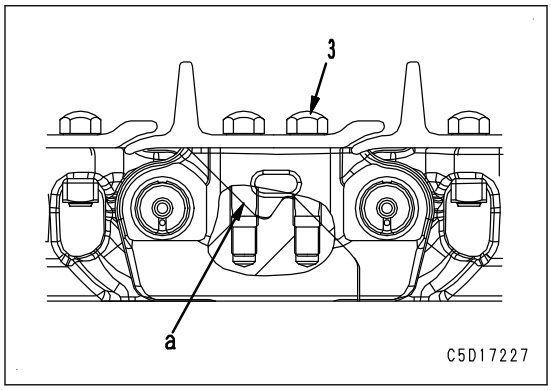
2. Finger-tighten shoe bolts (3) (4 pieces) until the mating faces of the master link (a) are fitted.

   REMARK

   If shoe bolts (3) are tightened forcibly when the master link mating faces (a) are not fitted, the threaded portion of shoe bolts and master link may be damaged.

3. Apply lubricant to the shoe bolt (master link).

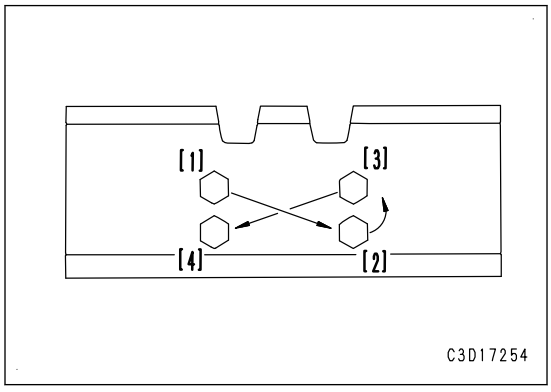
   Shoe bolt (master link):
   Molybdenum disulfide lubricant (LM-P)



4. Tighten shoe bolts (3) (4 pieces) in the order shown in the drawing.

   Shoe bolt (master link) initial torque:
   490±49 Nm {50±5 kgfm}

   Retightening angle:
   180±10 °

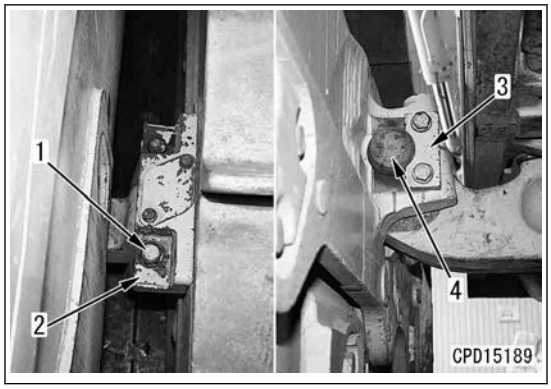


4. Remove lock plate (3), and remove side pin (4).
5. Repeat steps 3 and 4 to remove the pin on the opposite side.

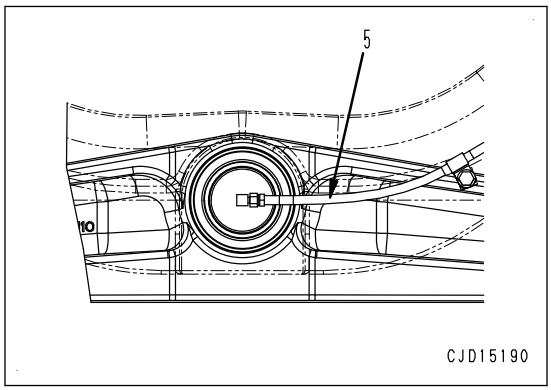
REMARK

If the track frame assembly on the opposite side is lifted before removing the pin, support it by block, etc.

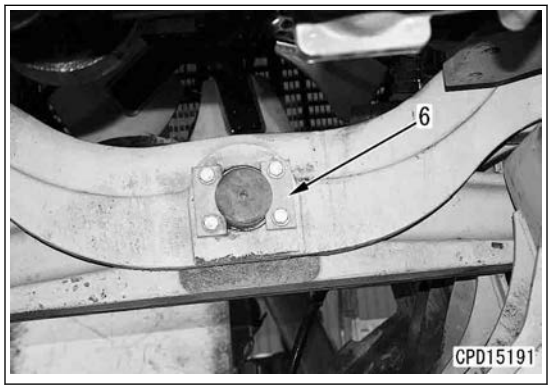
6. Operate tool B slowly to lower the machine to the position where the equalizer bar contacts right and left track frames.



7. Disconnect grease hose (5).



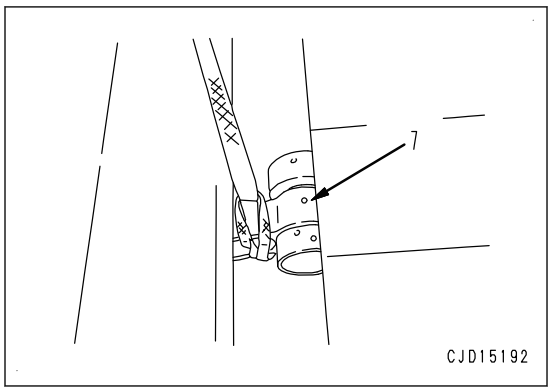
8. Remove lock plate (6).



9. Sling equalizer bar assembly (7) by using the crane and chain block, and hold it.

REMARK

To easily remove and install the joint parts, adjust them by using lifting tools so that the joint is kept parallel.



Remove and Install Scavenging Pump Assembly

⚠ Park the machine on a level ground, and set parking brake lever to the LOCK position.

⚠ Lower the work equipment to the ground, and set the work equipment lock lever to LOCK position.

⚠ Turn the starting switch to OFF position to stop the engine.

⚠ Turn the battery disconnect switch to OFF position, and remove the key.

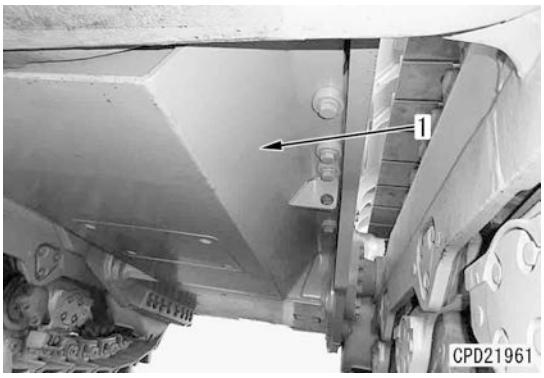
⚠ If you drain the radiator coolant when it is still hot, you may be scalded. Wait until the coolant temperature drops before draining.

How to Remove Scavenging Pump Assembly

Underguard

1. Remove underguard (1) under the power train.

   Underguard:
   300 kg



Draining

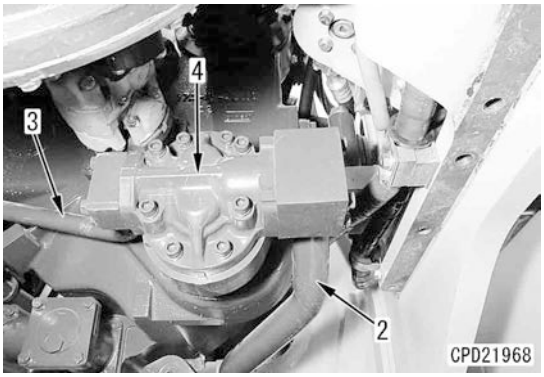
2. Drain oil from the power train case.

   Power train case:
   90 ℓ

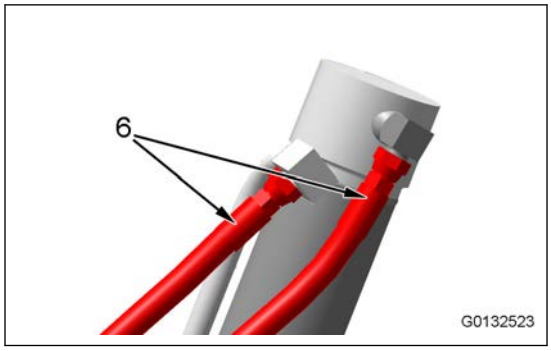
Scavenging pump assembly

3. Remove suction tube (2).
4. Disconnect outlet tube (3).
5. Remove the mounting bolts (2 pieces), and remove scavenging pump assembly (4).

   Scavenging pump assembly (4):
   20 kg



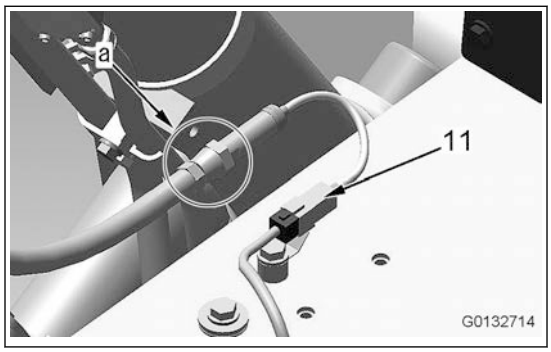
10. Connect the 2 hoses (6).
    Tool: Open-end wrench, oil pan, cap
    Hose: Width across flats 36mm, #06 size



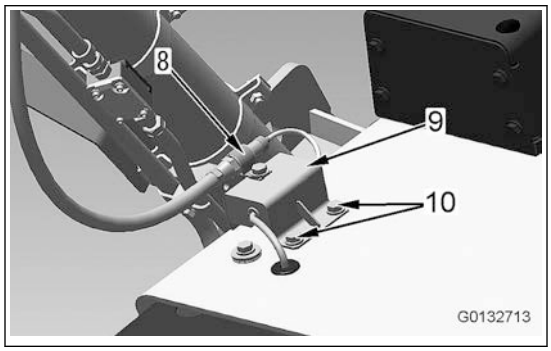
11. Connect the connector CY41 (11).

    REMARK

    The connector number of the R.H. stroke and reset sensing blade lift cylinder is CY42.



12. Install the cover (9) with the 2 bolts (10).
13. Install the clamp (8).

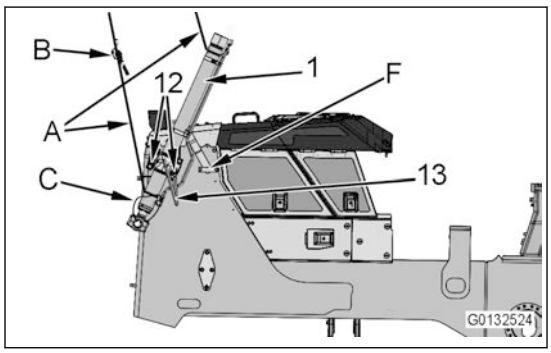


14. Cut the wire (C) that fixes the part.

    NOTICE

    Be sure to cut the wire (C) that fixes the stroke and reset sensing blade lift cylinder assembly (1) before you extend it.

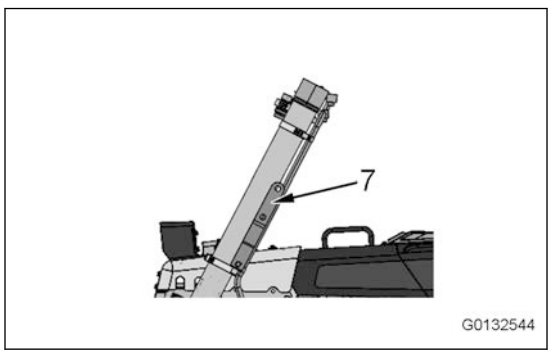
15. Start the engine, release the work equipment lock lever, and slowly extend and retract the stroke and reset sensing blade lift cylinder assembly (1) 1 to 5 times to bleed air.



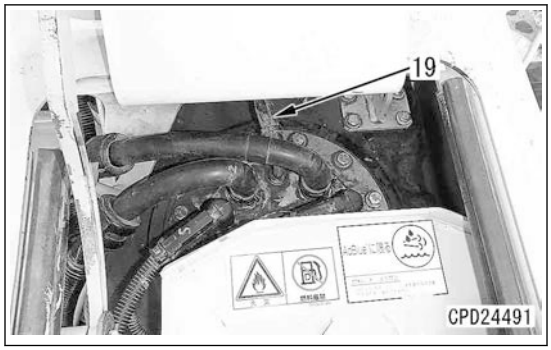
16. Remove the fixing tool (F).

    NOTICE

    - **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 stroke and reset sensing blade lift cylinder assembly (1) rotates by its own weight when the fixing tool (F) is removed. It is very dangerous.**
    - **Install the plate (7) of the removed fixing tool (F) to the stroke and reset sensing blade lift cylinder assembly (1) as shown in the figure.**

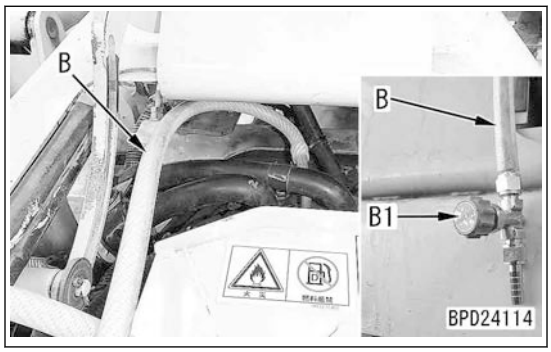


20. Disconnect breather hose (19), and connect tool B.



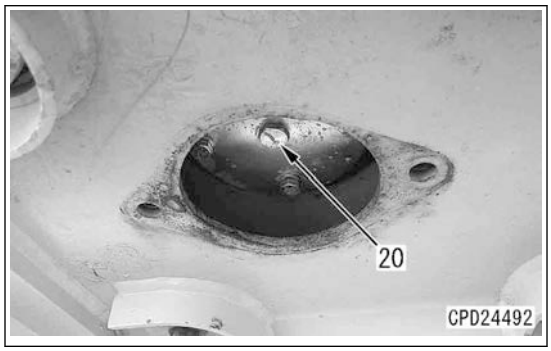
REMARK

When connecting tool B, be sure to close valve B1 of tool B.



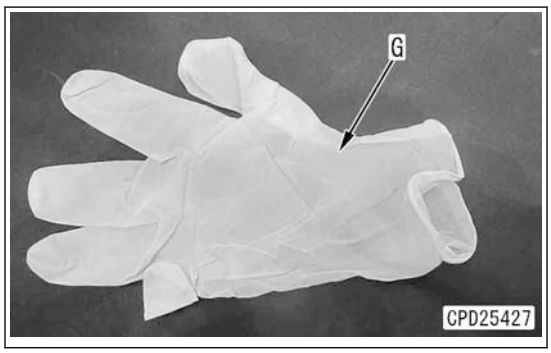
21. Loosen drain plug (20) 6 turns, and drain DEF into tool A.

DEF tank:
73 ℓ



NOTICE

When handling DEF, be sure to use tool G.



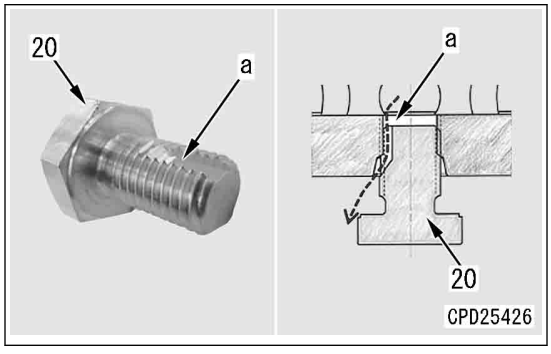
REMARK

There is a slit (a) at threaded part of drain plug (20) so that DEF is not drained too much and splashed.

22. Draining amount decreases in 3 or 4 minutes, and then remove drain plug (20).

REMARK

The guide until draining is weakened is approximately 1.8 ℓ.



Remove and Install Operator Seat

⚠ Park the machine on a level ground, and set parking brake lever to the LOCK position.

⚠ Lower the work equipment to the ground, and set the work equipment lock lever to LOCK position.

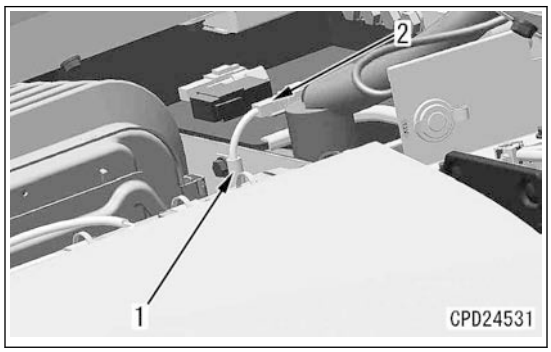
⚠ Turn the starting switch to OFF position to stop the engine.

⚠ Turn the battery disconnect switch to OFF position, and remove the key. (For details, see TESTING AND ADJUSTING, "HANDLING BATTERY DISCONNECT SWITCH".)

How to Remove Operator Seat

Seat cushion

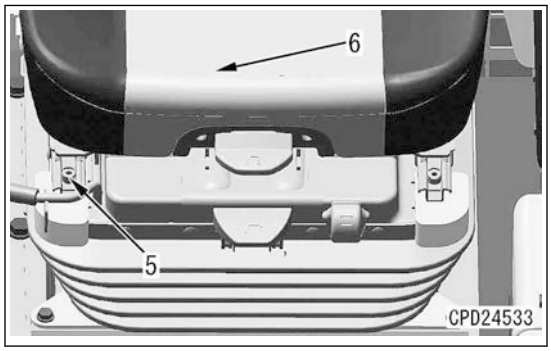
1. Remove clamp (1).
2. Disconnect connector SBC (2).



3. Remove clamp (3), and disconnect connector HEAT1 (4).

4. Remove bolts (5) (4 pieces), and remove seat cushion (6).

   Seat cushion:
   25 kg

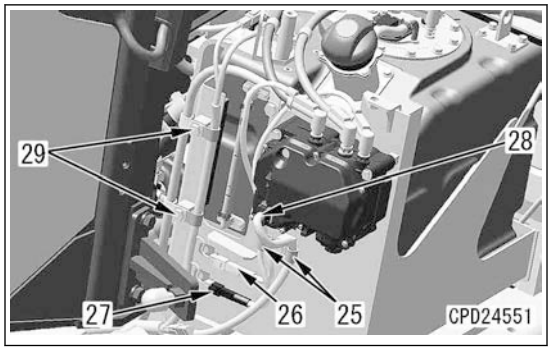


Suspension assembly

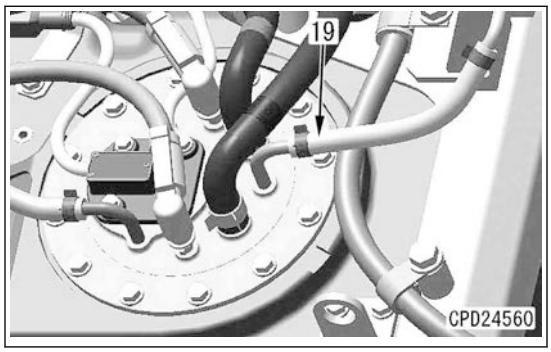
5. Remove bolt (7), and remove suspension assembly (8).

   Suspension assembly:
   25 kg

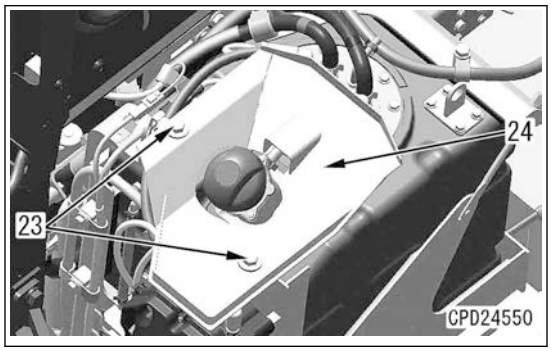
21. Install clamp (25).



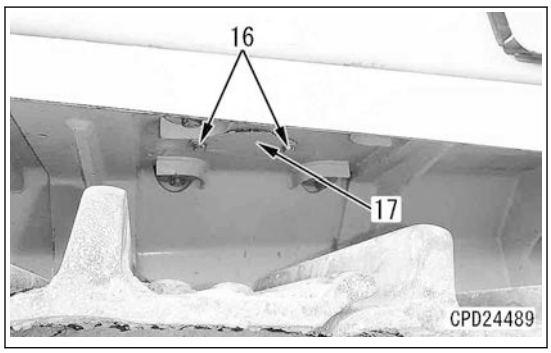
22. Install breather hose (19).



23. Install cover (24) with bolts (23) (2 pieces).



24. Install cover (17) with bolts (16) (2 pieces).

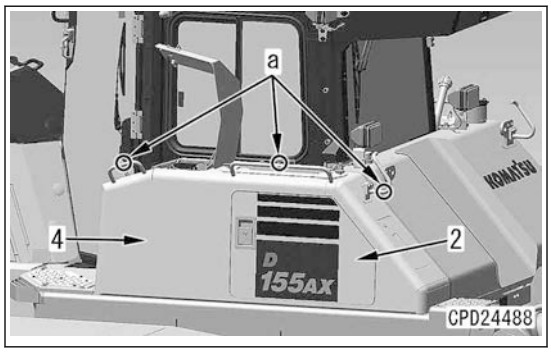


Battery cover

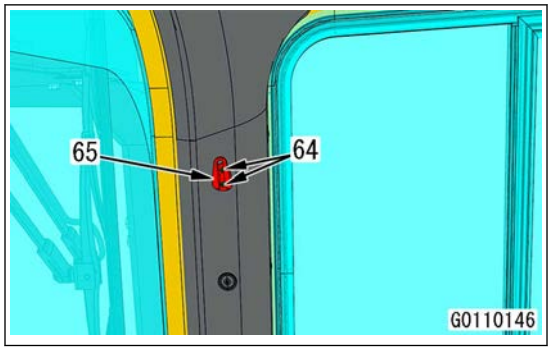
25. Close cover (2), and install it to parts (a) (3 places) of battery cover (4) by using the nylon sling.

    REMARK

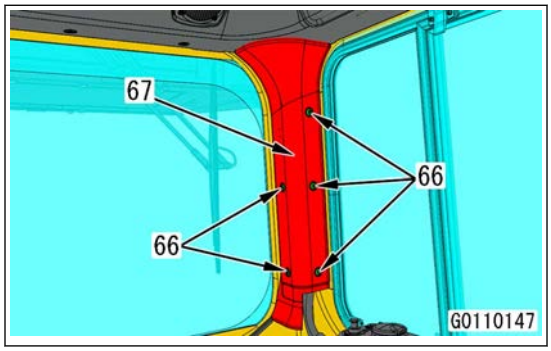
    Place it on the fender, and then slightly open cover (2) to check the position.



35. Remove the 2 screws (64), and remove the hook (65).
    Tool: Phillips screwdriver



36. Remove the 5 rivets (66), and remove the cover (67) (at the rear left of the operator cab).
    Tool: Phillips screwdriver



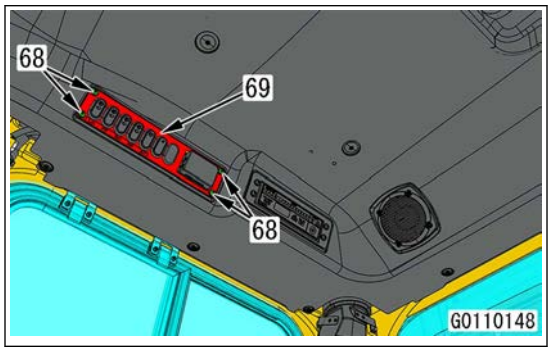
37. Remove the 4 hexagonal socket head bolts (68), and remove the plate (69) for fixation of the control panel.

    REMARK

    Push the control panel all the way to make sure that it does not interfere with the work.

    Tool: Ratchet handle, hexagonal socket

    Hexagonal socket head bolt (68): Width across flats 4mm, M6



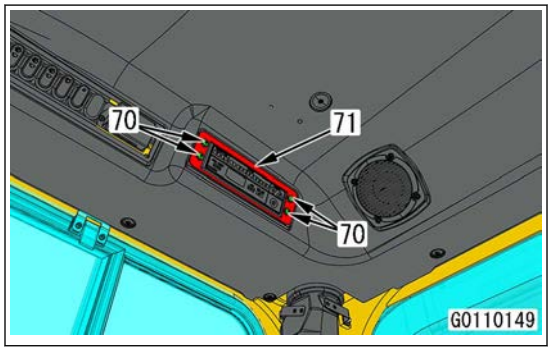
38. Remove the 4 hexagonal socket head bolts (70), and remove the plate (71) for fixation of the control panel.

    REMARK

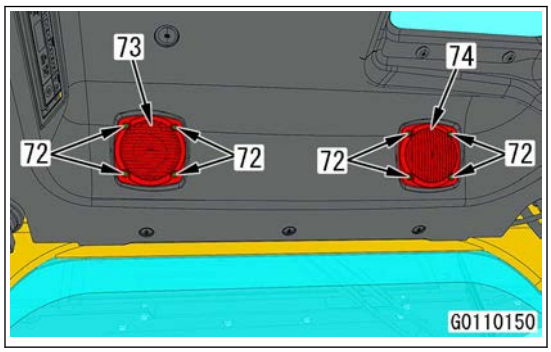
    Push the radio all the way to make sure that it does not interfere with the work.

    Tool: Ratchet handle, hexagonal socket

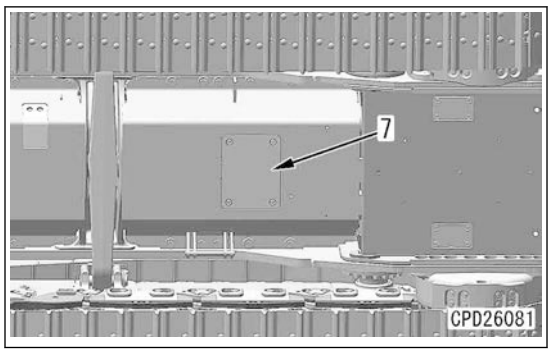
    Hexagonal socket head bolt (70): Width across flats 4mm, M6



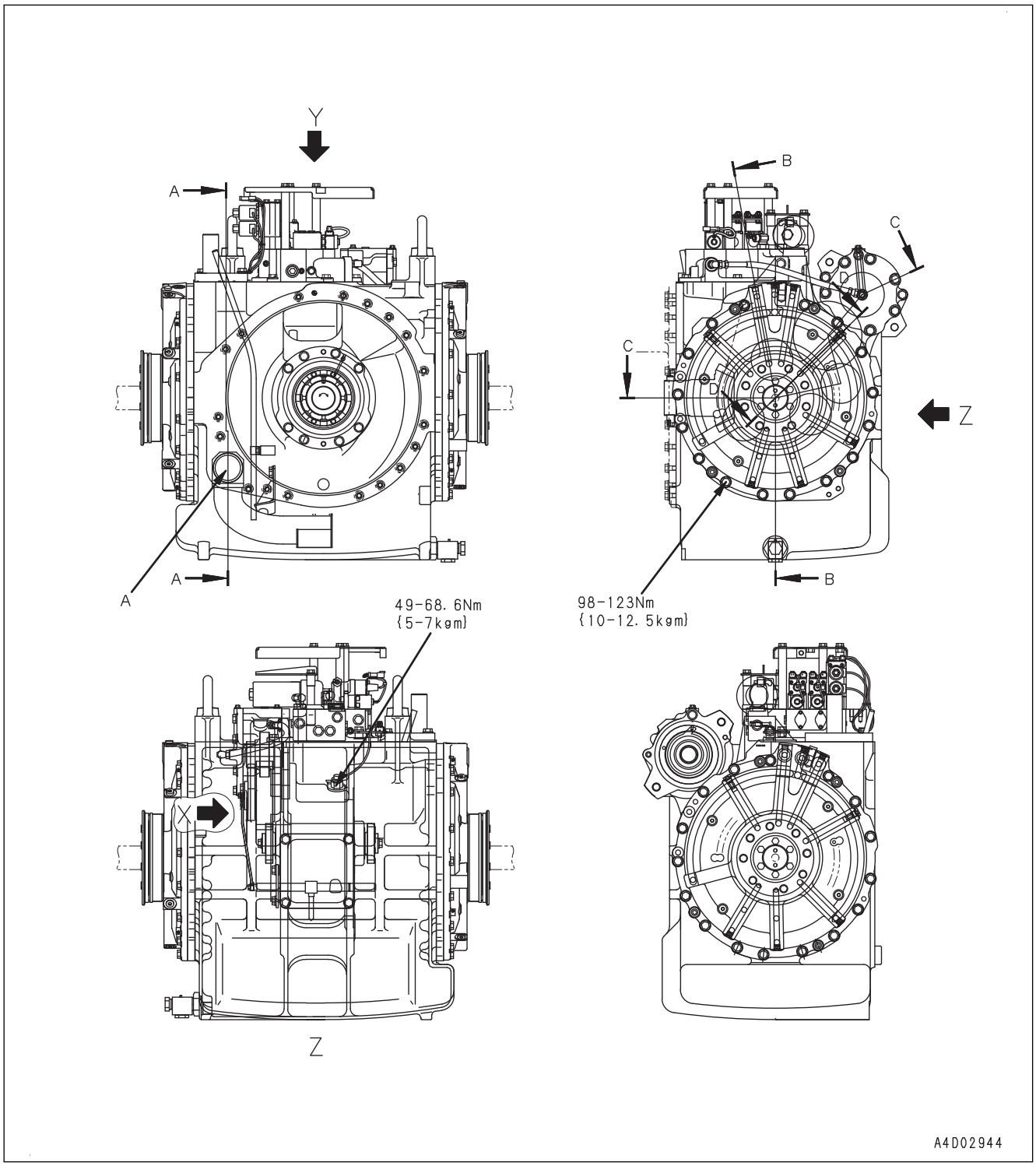
39. Remove the 8 screws (72).
    Tool: Phillips screwdriver



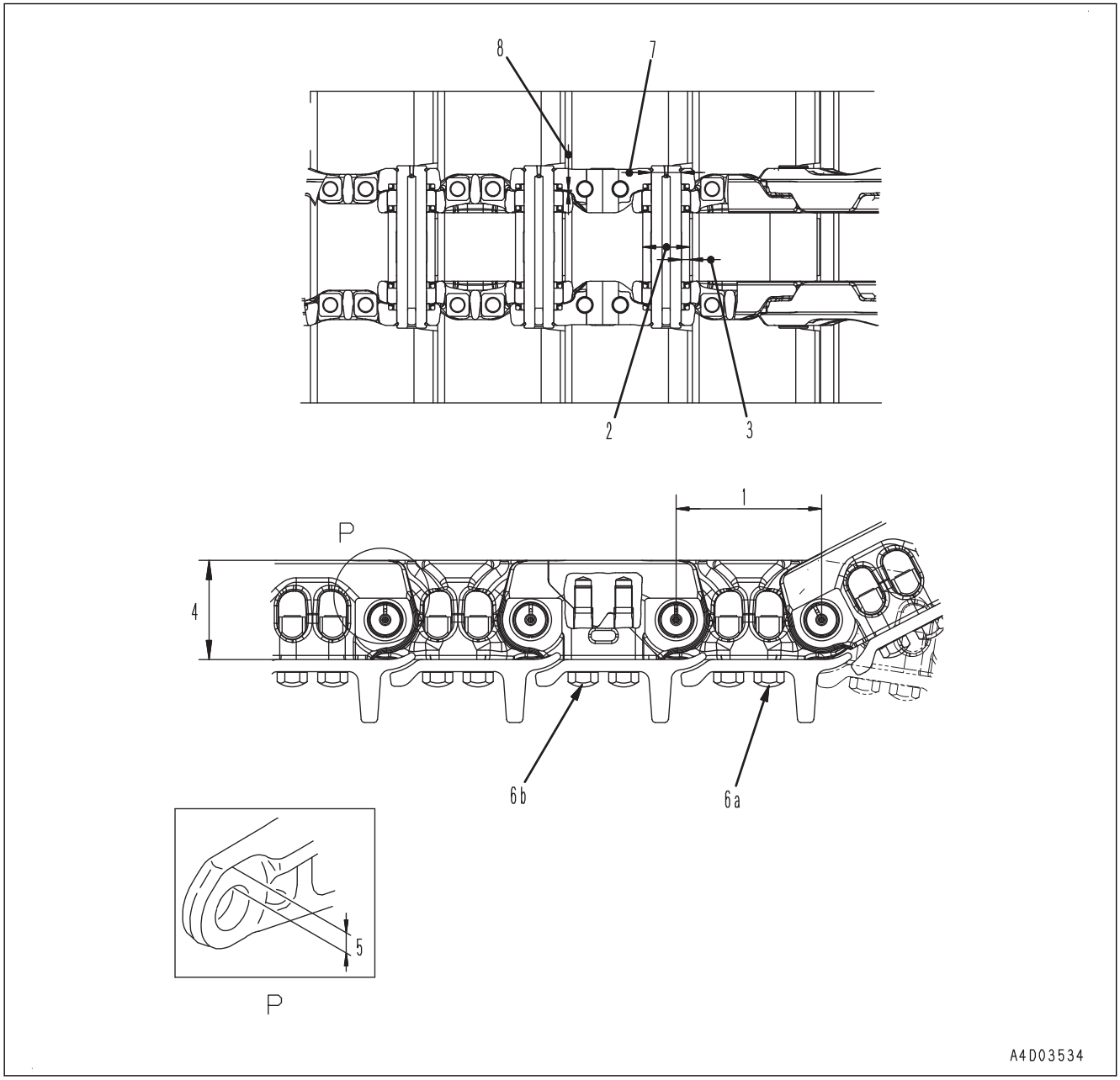
9. Install inspection cover (7) from the bottom side of the machine.



Maintenance Standard for Bevel Gear Shaft, HSS, and Brake

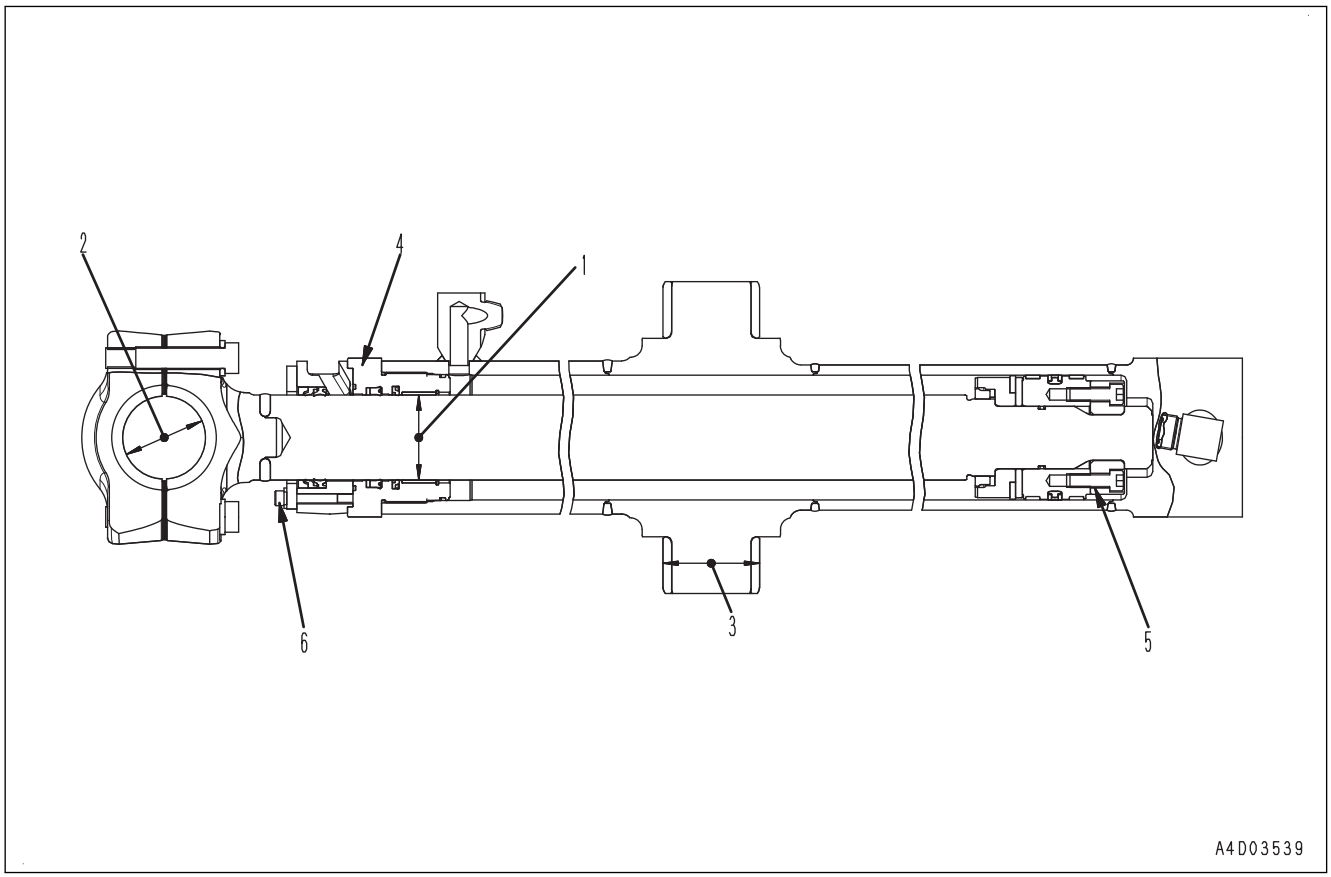


Maintenance Standard for PLUS Type Track Shoes



Portion P shows the link in which the bushing is press fitted.

Maintenance Standard for Stroke and Reset Sensing Blade Lift Cylinder



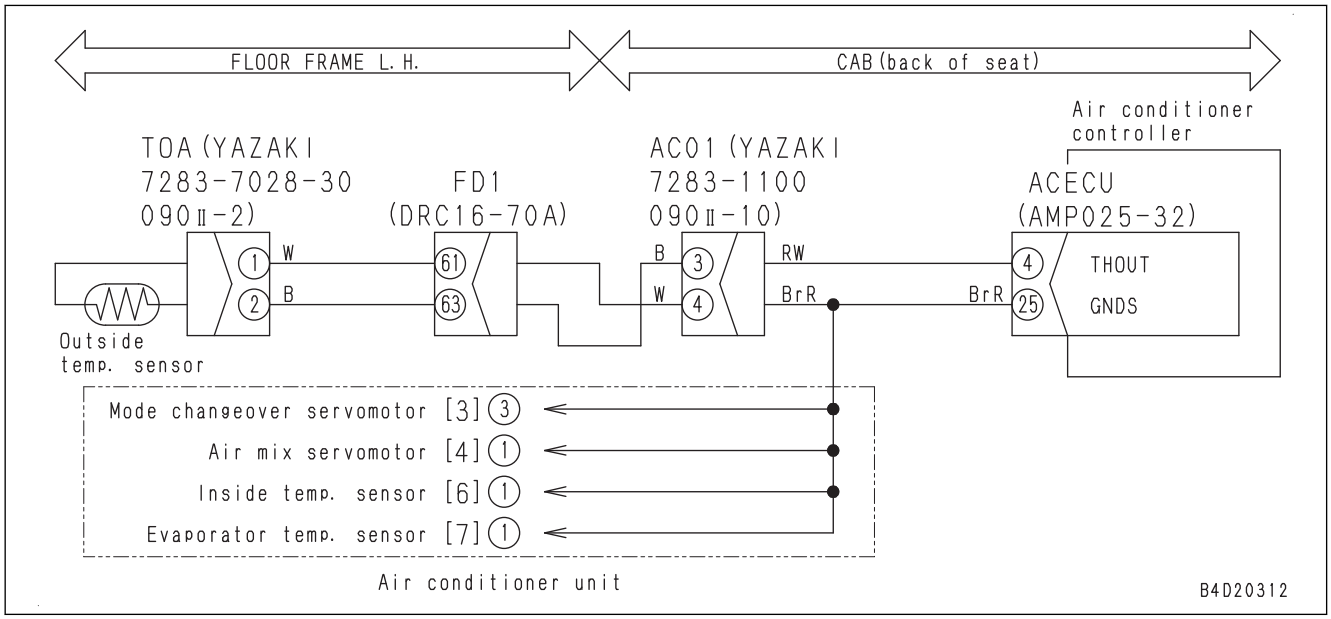
Unit: mm

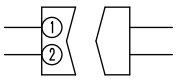
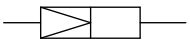
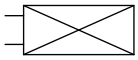
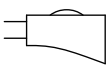
No.	Item	Judgment criteria					Remedy
		Standard dimension	Tolerance		Standard clearance	Allowable clearance	
			Shaft	Hole			
1	Clearance between piston rod and bushing	75	-0.030 -0.076	+0.279 +0.065	0.095 to 0.355	0.655	Replace
2	Clearance between piston rod support shaft and blade ball	85	-0.2 -0.3	+0.3 0	0.2 to 0.6	1.0	
3	Clearance between cylinder support shaft and bushing	85	-0.120 -0.207	+0.054 0	0.120 to 0.261	0.5	
4	Tightening torque of cylinder head	1373±137 Nm {140±14 kgfm}					Retighten
5	Tightening torque of spacer lock lock bolt	98 to 123 Nm {10 to 12.5 kgfm}					
6	Tightening torque of housing clamping bolt	27 to 34 Nm {2.8 to 3.5 kgfm}					

- Only in the automatic air conditioner mode, the air conditioner controller controls the blower motor and air mix servomotor to adjust the air temperature and flow rate by using the data of the outside air temperature sensor.

No.	Cause	Procedure, measuring location, criteria and remarks
6	Defective air conditioner unit	If failure code is still displayed after above checks, air conditioner unit may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly Replace whole assembly.)

Circuit Diagram of Air Conditioner Outside Air Temperature Sensor



Symbol	Content
 9JC01533	Connector Reference: • Concave side of contact face (left in the figure): Female • Convex side of contact face (right in the figure): Male **REMARK** Figure shows the disconnected state.
 9JC01534	Plug type connector (left: male, right: female) **REMARK** Figure shows the connected state.
 9JC01535	Solenoid
 9JC01536	Motor
 9JC01537	Lamp
 9JC01538	Pressure switch (N.O. type) N.O.: Normally Open
 9JC01539	Pressure switch (N.C. type) N.C.: Normally Closed
 9JC01540	Potentiometer, fuel control dial
 9JC01541	Temperature sensor
 9JC01542	Starting switch
 9JC01543	Backup alarm
 9JC01544	Horn