

# Shop Manual

BULLDOZER

***D65EXi -18***  
***D65PXi -18***

SERIAL NUMBERS    D65EXi-91310    and up  
                                 D65PXi-91310

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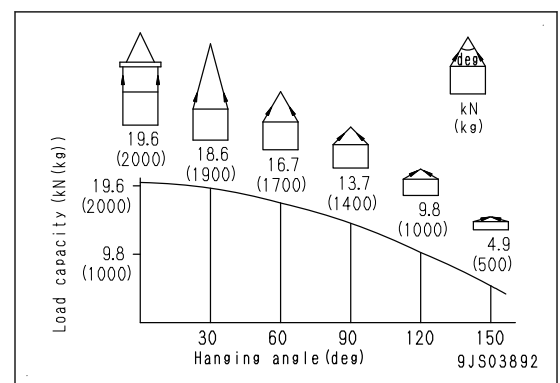
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## Precautions for Slings Work and When You Make Signals

- Only one appointed worker must make signals and co-workers must communicate with each other frequently. The appointed signaler must make specified signals clearly at a place where he is well seen from the operator's seat and where he can see the working condition easily. The signaler must always stand in front of the load and guide the operator safely.
  - ⚠ **Do not do the work while the lifted load is in the range where it possibly falls. It is not allowed to go in the range where the lifted load possibly falls.**
  - ⚠ **Do not move a load over a person.**
  - ⚠ **Never step on the load.**
  - ⚠ **Do not prevent the load from swinging or falling down by holding it simply with the hands.**
  - ⚠ **The sling workers and assistant workers other than the guide must move to a place where they are not caught between the load and materials or equipment on the ground or hit by the load even if the crane starts abruptly.**
- When you lift or fix the machine, see “Operation and Maintenance Manual” or “Field Assembly Instruction”.
  - ⚠ **Do not lift or fix the machine by the positions where the name plate is not attached.**
- When you lift the machine for the disassembly and assembly, follow the instructions on the Disassembly and Assembly.
- Check the slings before starting sling work.
- Keep putting on gloves during sling work. (Put on leather gloves, if available.)
- Measure the weight of the load by the eye and check its center of gravity.
- Use proper sling corresponding to the weight of the load and method of slinging. If too thick wire ropes are used to sling a light load, the load may slip and fall.
- Do not sling a load with 1 wire rope alone. If it is slung so, it may rotate and may slip out of the rope. Install 2 or more wire ropes symmetrically.
  - ⚠ **Slings with one rope may cause turning of the load during hoisting, untwisting of the rope, or slipping of the rope from its original slinging position on the load, which can result in a dangerous accident.**
- Hanging angle must be 60 ° or smaller as a rule.
- When slinging a heavy load (20kg or heavier), the hanging angle of the rope must be narrower than that of the hook.

### REMARK

When slinging a load with 2 or more ropes, the force subjected to each rope increases with the hanging angle. The figure below shows the variation of allowable load in kN {kg} when slinging is made with 2 ropes, each of which is allowed to sling up to 9.8 kN {1000 kgf} vertically, at various hanging angles. When the 2 ropes sling a load vertically, they can sling up to 2000 kg of total weight. This weight is reduced to 1000 kg when the 2 ropes make a hanging angle of 120 °. If the 2 ropes sling a 2000 kg load at a hanging angle of 150 °, each rope is subjected to a force as large as 39.2 kN {4000kgf} .

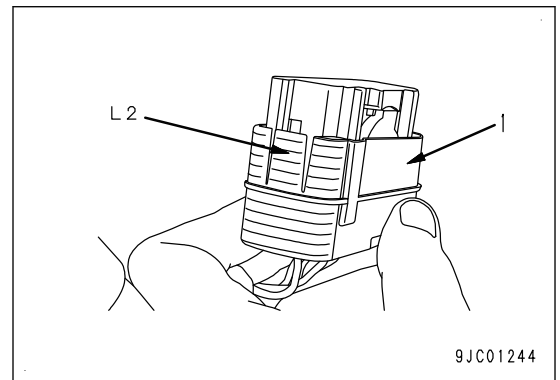
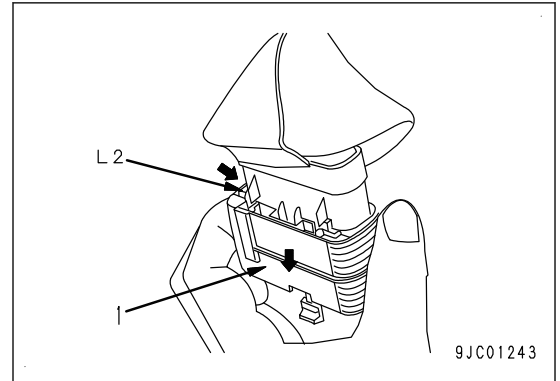


- When installing wire ropes to an angular load, apply pads to protect the wire ropes. If the load is slippery, apply proper material to prevent the wire rope from slipping.
- Use the specified eye bolts and fix wire ropes, chains, etc. to them with shackles, etc.

2. While pressing lock (L2), pull out connector (1).

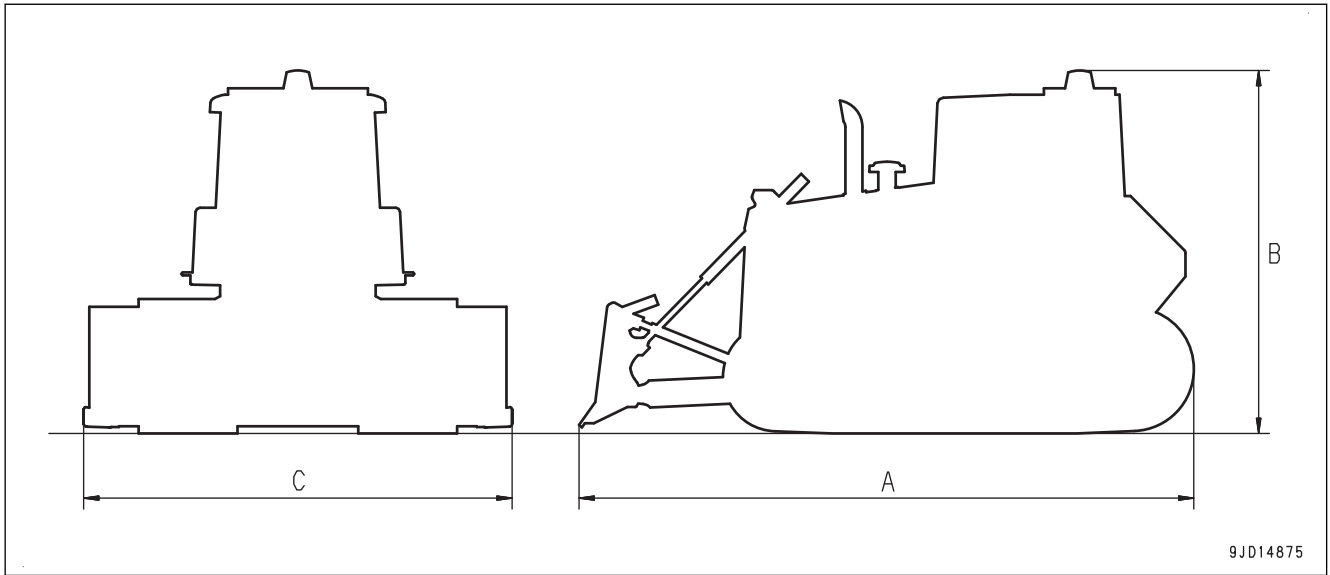
**REMARK**

Lock (L2) is located behind connector (1) in the figure.

**How to Connect Slide Lock Type Connector (FRAMATOME-24)**

Insert it straight until it clicks.

### Specification Drawing: D65PXI-18 (Wide Gauge Specification)



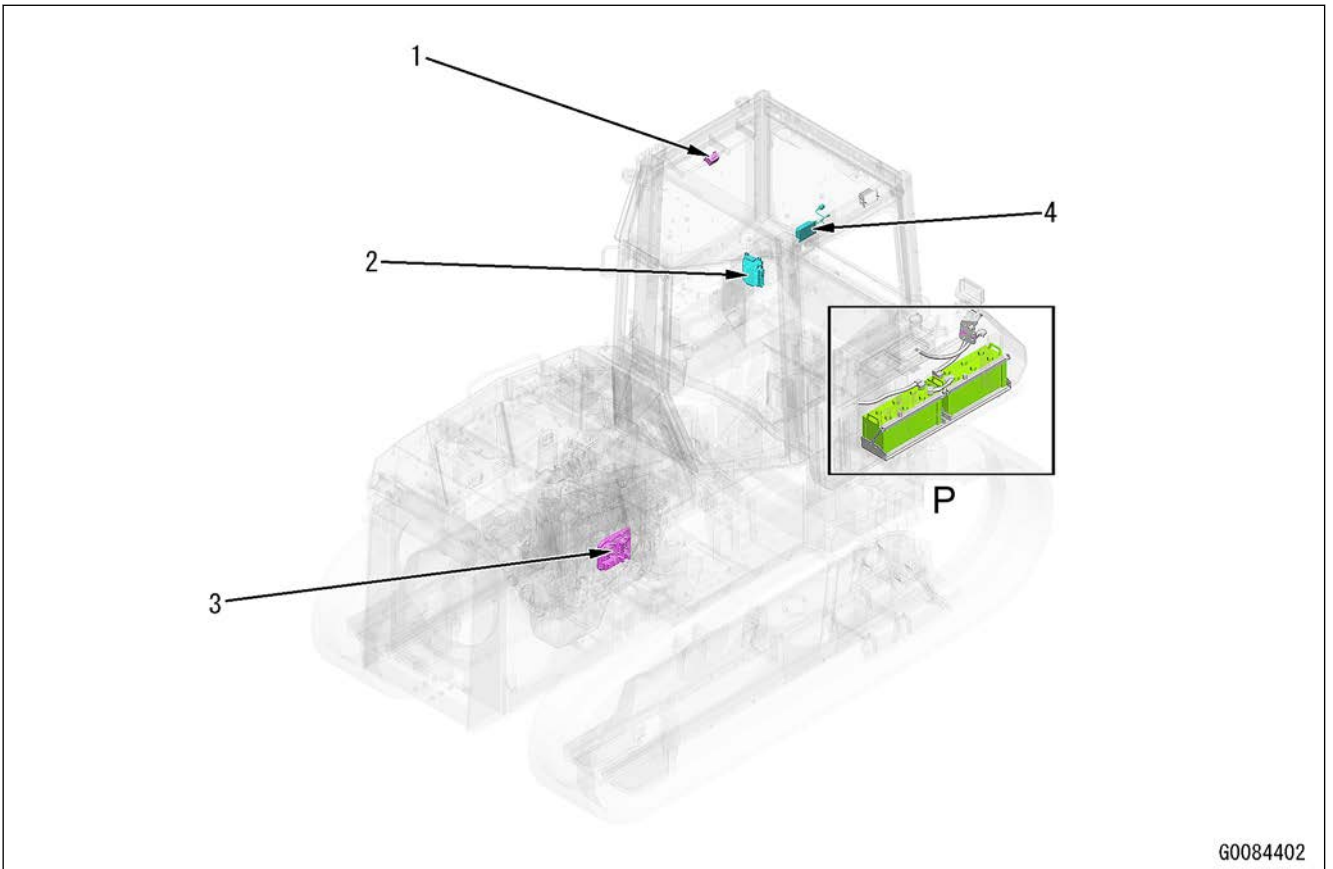
Item	Unit	D65PXI-18 (Wide gauge specification)	
		Power angle power tilt dozer	
Machine weight	kg	24570	
Engine model	-	Komatsu SAA6D114E-6 diesel engine	
Engine rated horsepower	kW {HP}/ min <sup>-1</sup> {rpm}	164 {220}/ 1950 {1950}	
• Gross [SAE J1995] (*1)		164 {220}/ 1950 {1950}	
• ISO 14396		162 {217}/ 1950 {1950}	
• Net [ISO 9249/ SAE J1349] (*2)			
A Overall length	mm	5830	
B Overall height (excluding antenna)	mm	3160	
C Overall width	mm	4295	
Travel speed	km/h	3.6/ 5.5/ 7.2/ 11.2	
Forward (1st/ 2nd/ 3rd (Low)/ 3rd) Reverse (1st/ 2nd/ 3rd (Low)/ 3rd)		4.4/ 6.6/ 8.6/ 13.4	
Track shoe	-	Single grouser	
Type		915	
Width	mm		
Rear work equipment	-	Long drawbar	

\*1: Indicates the value of the basic engine (without cooling fan).

\*2: Indicates the value at the minimum cooling fan speed.

Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*1), or component/system)	Explanation
CRI	Common Rail Injection	Engine	This is a function that maintains optimum fuel injection amount and fuel injection timing. This is performed the engine controller which electronically controls supply pump, common rail, and injector.
ECM	Electronic Control Module	Electronic control system	This is an electronic control device that send the command to actuators using the signals from the sensors on the machine so that the optimum actuation is performed. (Same as ECU)
ECMV	Electronic Control Modulation Valve	Transmission (D, HD, WA, etc)	This is a proportional electromagnetic valve that decreases the transmission shock by gradually increasing oil pressure for engaging clutch.
ECSS	Electronically Controlled Suspension System	Travel (WA)	This is a device that ensures smooth high-speed travel by absorbing vibration of machine during travel with hydraulic spring effect of accumulator.
ECU	Electronic Control Unit	Electronic control system	This is an electronic control device that send the command to actuators using the signals from the sensors on the machine so that the optimum actuation is performed. (Same as ECM)
EGR	Exhaust Gas Recirculation	Engine	This is a function that recirculates a part of exhaust gas to combustion chamber, so that it reduces combustion temperature, and reduces emission of NOx.
EMMS	Equipment Management Monitoring System	Machine monitor	This is a function with which operator can check information from each sensor on the machine (filter, oil replacement interval, malfunctions on machine, failure code, and failure history).
EPC	Electromagnetic Proportional Control	Hydraulic system	Electromagnetic proportional control This is a mechanism with which actuators operate in proportion to the current.
FOPS	Falling Object Protective Structure	Cab and canopy	This structure protects the operator's head from falling objects. (Falling object protective structure)  This performance is standardized as ISO 3449.
F-N-R	Forward-Neutral-Reverse	Operation	Forward - Neutral - Reverse
GPS	Global Positioning System	Communication (KOMTRAX, KOMTRAX Plus)	This system uses satellites to determine the current location on the earth.
GNSS	Global Navigation Satellite System	Communication (KOMTRAX, KOMTRAX Plus)	This is a general term for system uses satellites such as GPS, GALILEO, etc.
HSS	Hydrostatic Steering System	Steering (D Series)	This is a function that enables the machine to turn without steering clutch by controlling a difference in travel speed of right and left tracks with a combination of hydraulic motor and bevel shaft.
HST	Hydro Static Transmission	Transmission (D, WA)	Hydraulic transmission system that uses a combination of hydraulic pump and hydraulic motor without using gears for stepless gear shifting.

Layout Drawing of Boot-up System (Machine with Gateway Function Controller)



1: Fuse box

2: Gateway Function Controller

3: Engine controller

4: Communication terminal

## KCCV System

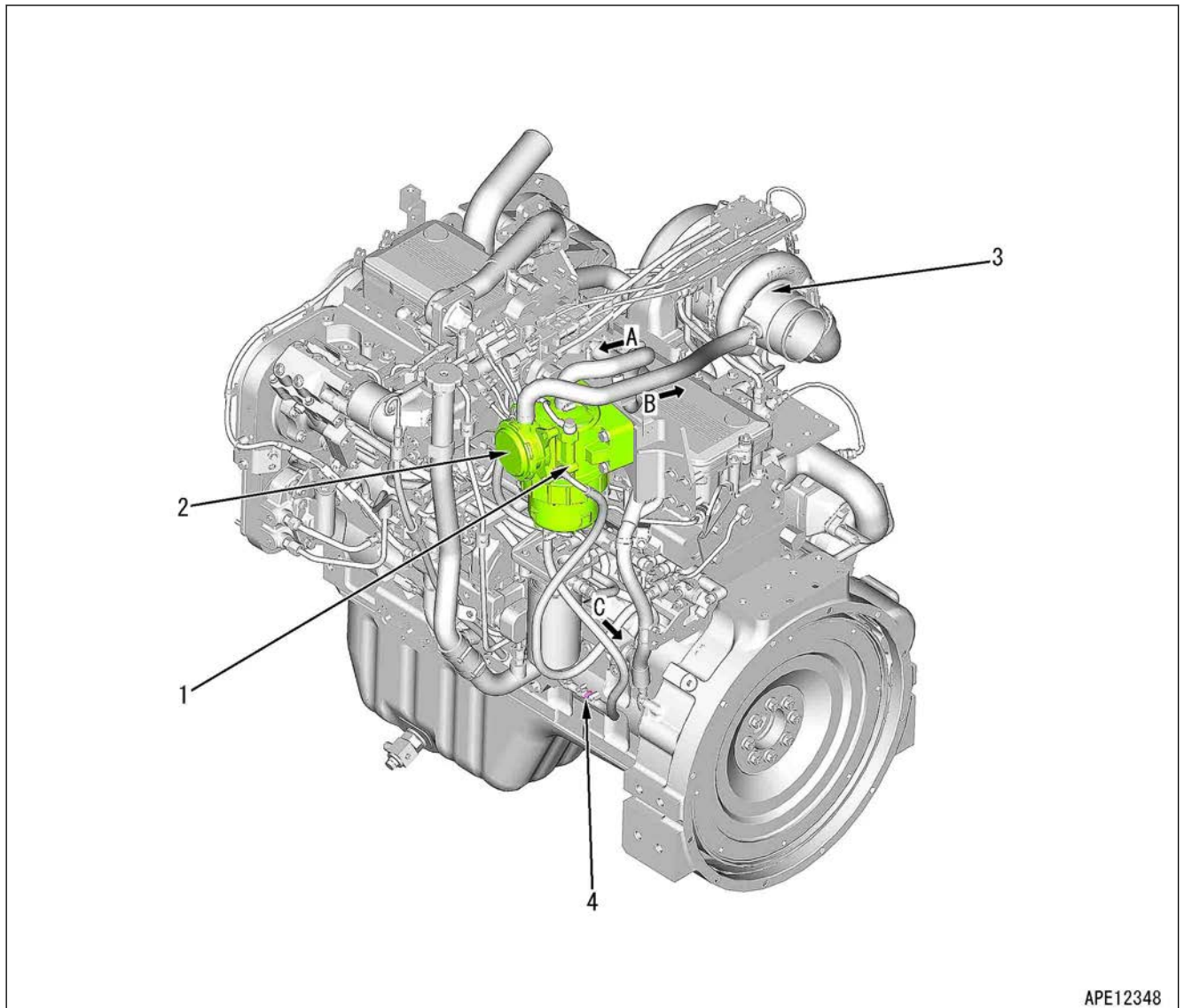
### KCCV

Abbreviation for KOMATSU Closed Crankcase Ventilation

### Layout Drawing of KCCV System

#### REMARK

The shape is subject to machine models.



A: Blowby gas

C: Removed engine oil (to engine oil pan)

B: Blowby gas from which engine oil is removed (to VGT)

1: KCCV ventilator

3: VGT

2: CDR valve

4: Check valve

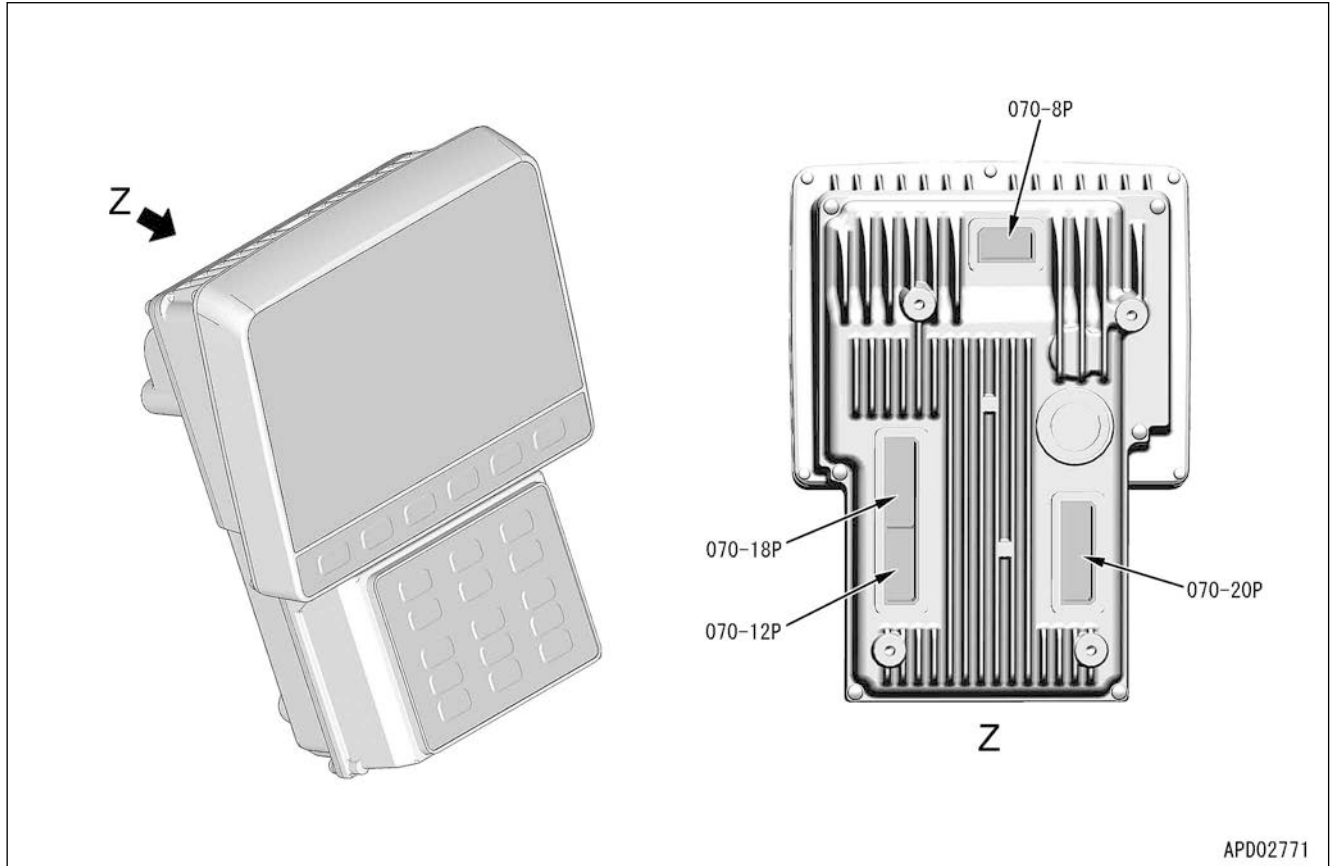
### Function of KCCV System

- In the past, blowby gas (A) was allowed to be released into the atmosphere in the past, but now it is restricted by emission regulations.
- Blowby gas (A) contains ingredients of the engine oil. A filter is installed to KCCV ventilator (1) to remove the engine oil to prevent the following possible problems if it is recirculated to VGT (3) as it is.

## Component Parts of Control System

### Machine Monitor

#### Function of Machine Monitor



- The machine monitor has the monitor display function, mode selection function, and function of switching the electrical components, etc. It also has the built-in alarm buzzer.
- CPU (Central Processing Unit) is mounted inside, and it processes, displays, and outputs information.
- The machine monitor consists of the display and switch section. The display is LCD (Liquid Crystal Display), and the switch section consists of flat sheet switches.
- If there is abnormality in the machine monitor, controller, or wiring between the machine monitor and controller, the display does not display normally.

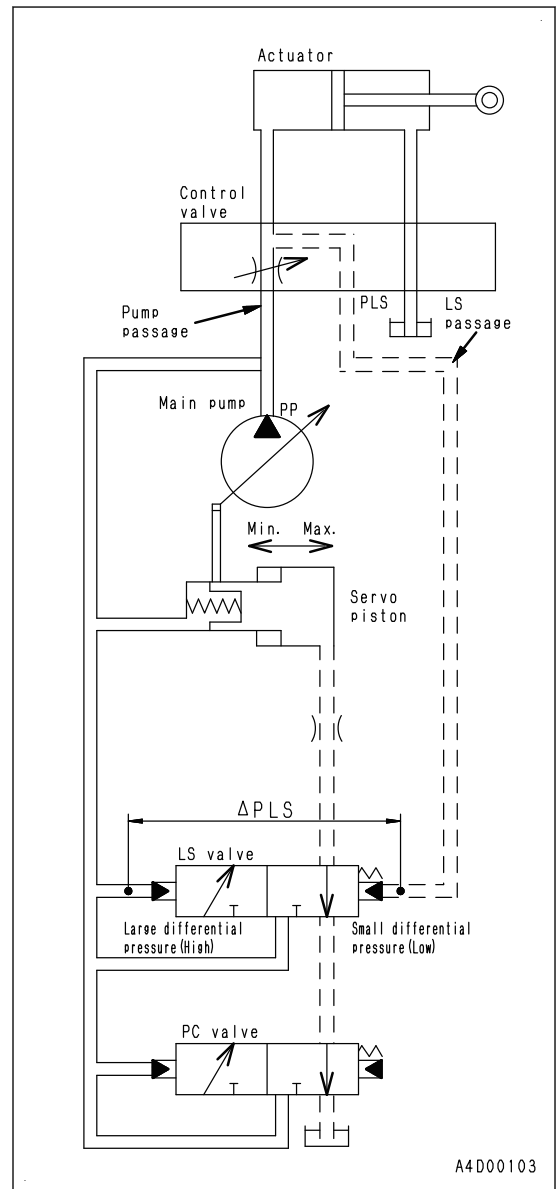
#### REMARK

- The battery voltage may drop sharply when the engine is started, depending on the ambient temperature and battery condition. In this case, the display may disappear a while, but it is not an abnormal phenomenon.
- If environmental temperature of the machine monitor is high, brightness may be automatically reduced to protect the liquid crystal.
- Intensity or color of the objects may change because of the automatic adjustment function of the camera.
- For details of the following, see "Operation and Maintenance Manual".
  - Display
  - Switch part
  - Guidance icons and function switches

## Function of CLSS

### Pump Swash Plate Angle Control

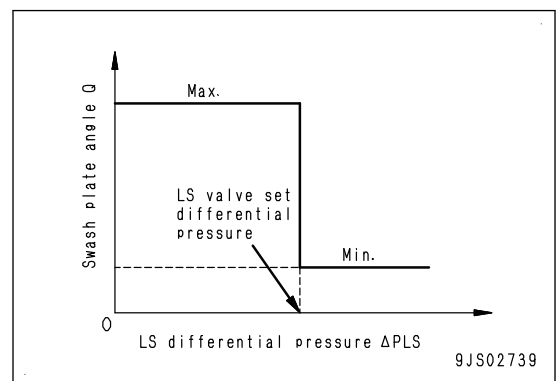
- The pump swash plate angle (pump discharged volume) is so controlled that LS differential pressure ( $\Delta PLS$ ), which is the differential pressure between pump discharge pressure (PP) and control valve outlet LS pressure (PLS) (actuator load pressure), is constant.  
 “LS differential pressure ( $\Delta PLS$ ) = Pump discharge pressure (PP) - LS pressure (PLS)”
- The pump swash plate angle shifts toward the maximum position if LS differential pressure ( $\Delta PLS$ ) is lower than the set pressure of the LS valve (when the actuator load pressure is high). The pump swash plate angle shifts toward the minimum position if LS differential pressure is higher than the set pressure (when the actuator load pressure is low).



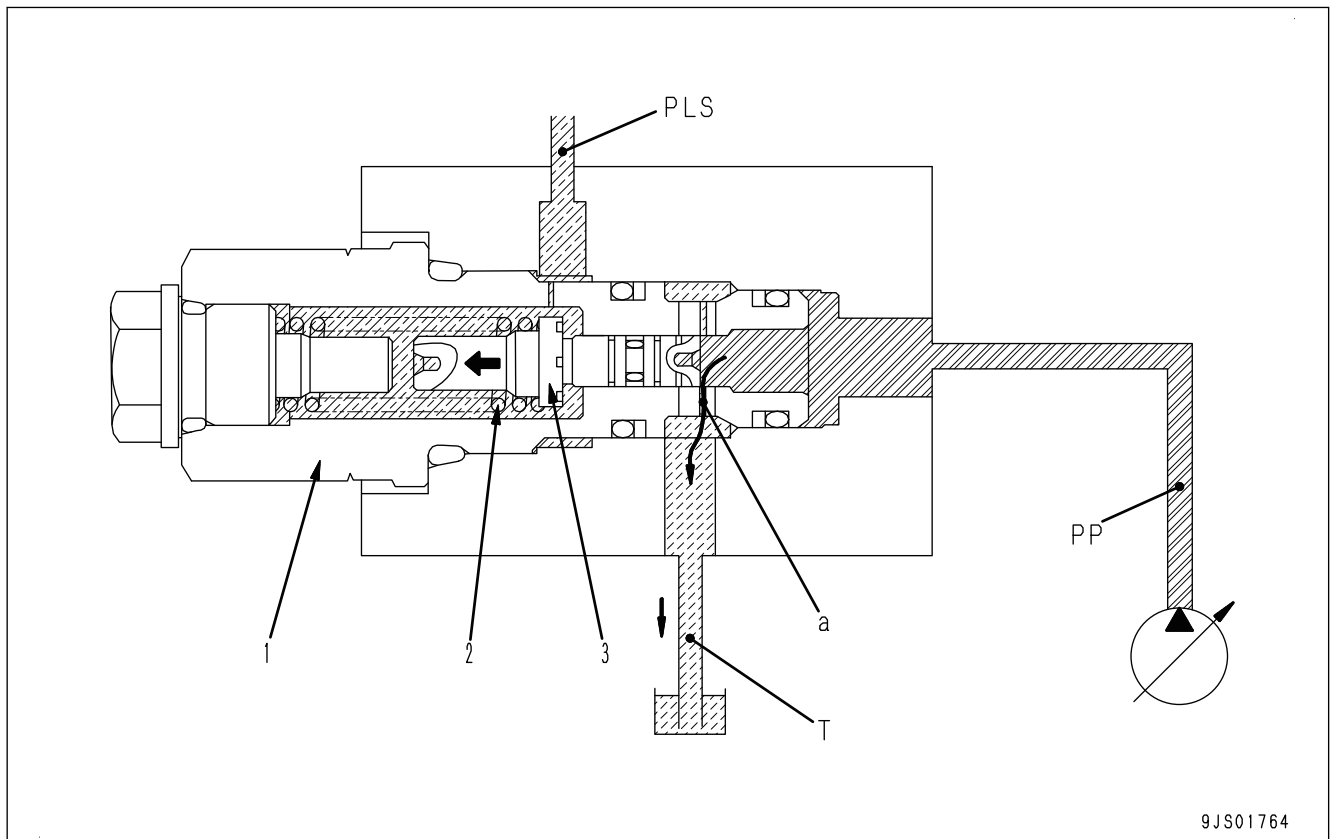
### LS Differential Pressure ( $\Delta PLS$ ) and Pump Swash Plate Angle

**REMARK**

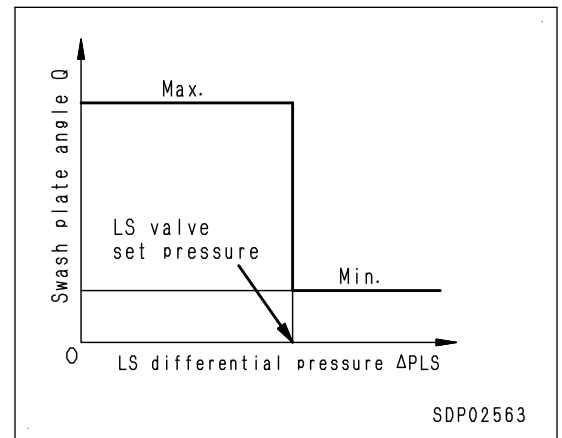
See “Work Equipment and HSS Pump” for the explanation of the operation.



### When the Control Valve is Operated with Fine Control

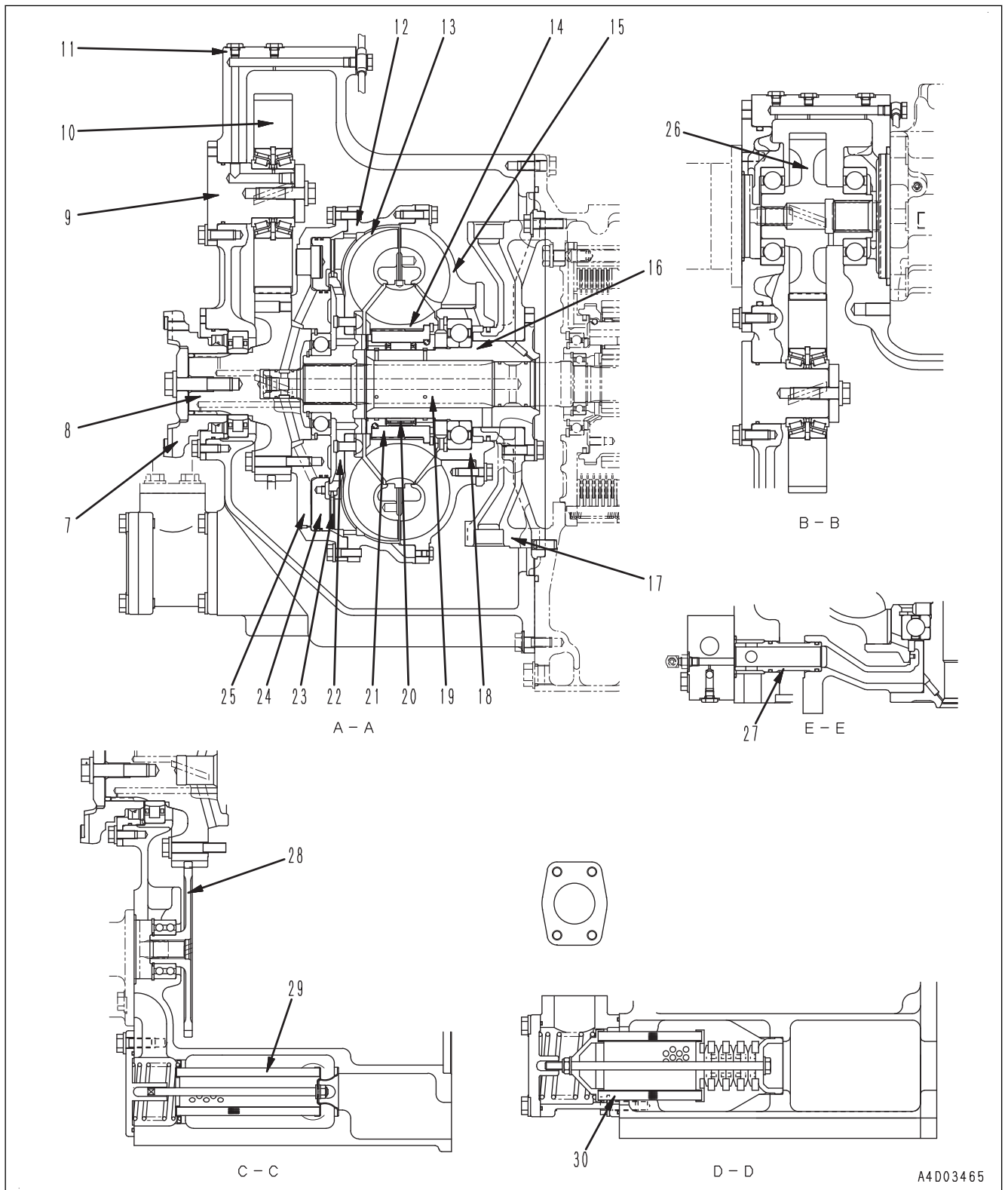


1. When the actuator is controlled at a flow equal or less than the pump discharge with the swash plate at the minimum angle ((Q) min. or below in the chart below), if the control valve spool is selected, the LS pressure ((PLS) = load pressure) is detected, and acts on the left end of spool (3).
2. As the system tries to let full flow of (Q) min. pass through the narrow opening of the control valve spool, the pump discharged pressure (PP) increases. As a result, the differential pressure between pump discharged pressure (PP) and LS pressure (PLS) becomes larger.
3. When the differential pressure between discharged pressure (PP) and LS pressure (PLS) reaches the spring load 3.4 MPa {35 kgf/cm<sup>2</sup>} of spring (2), spool (3) moves to the left and pump circuit (PP) is interconnected to tank circuit (T).



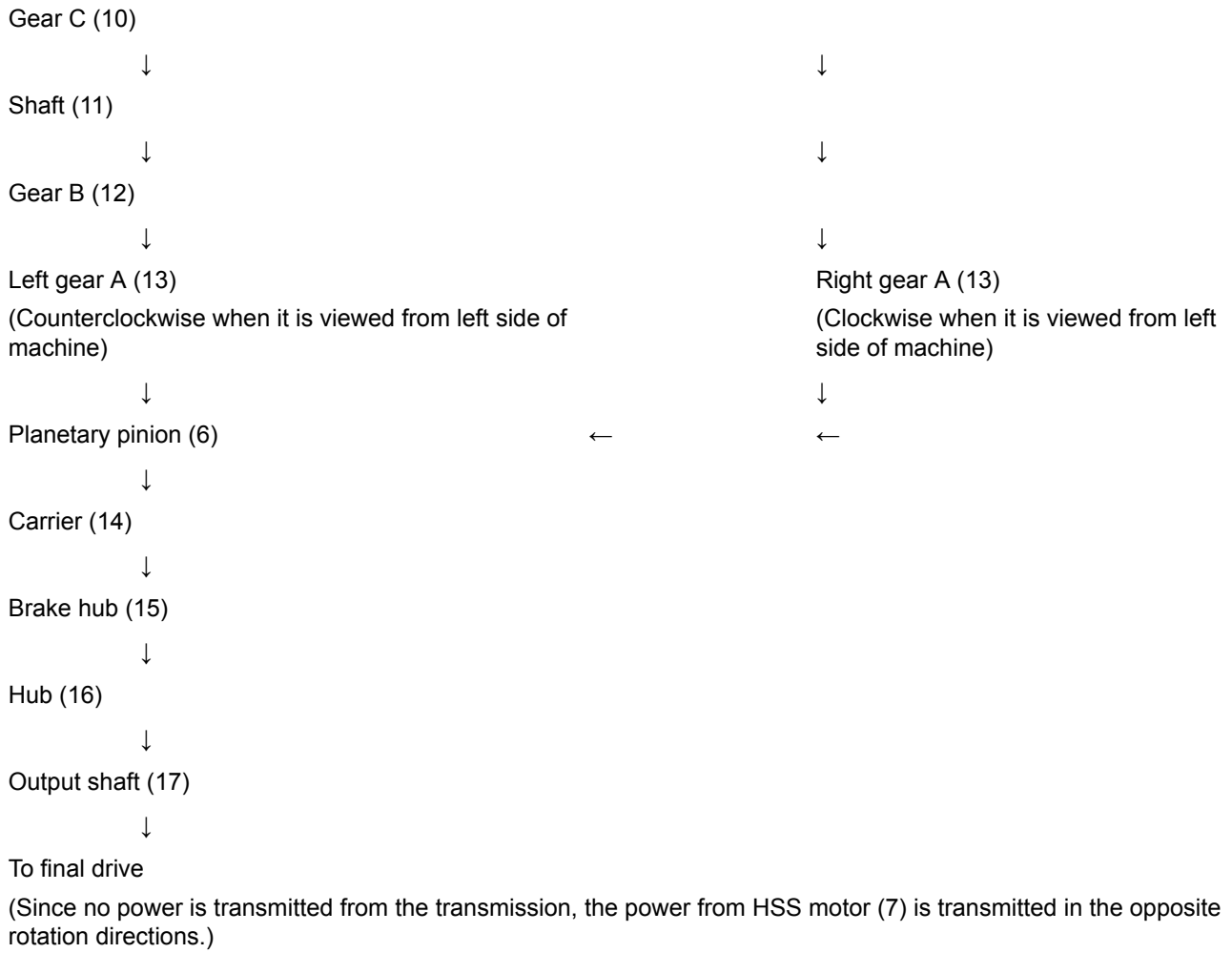
4. Pump discharged pressure (PP) is set to pressure of spring force 3.4 MPa {35 kgf/cm<sup>2</sup>} + LS pressure (PLS), and flow control differential pressure ( $\Delta$ PLS) below the minimum swash plate angle is 3.4 MPa {35 kgf/cm<sup>2</sup>}.

Sectional View



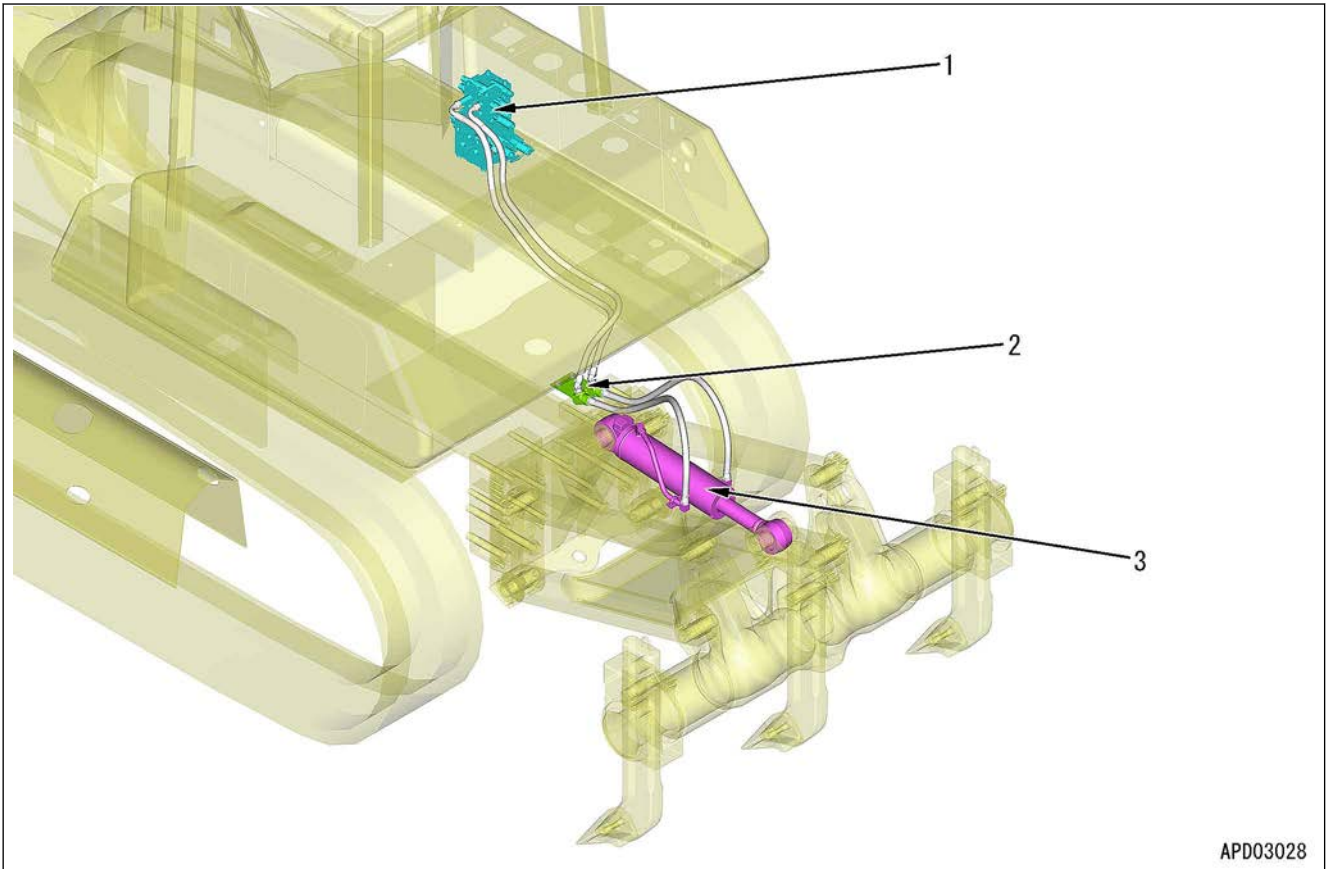
- A: From transmission case (to power train and lubrication pump)
- B: To transmission case (drain)
- C: From transmission case (to scavenging pump)
- D: From transmission case assembly (to torque converter)

- E: Torque converter outlet oil pressure pickup port
- F: Torque converter inlet oil pressure pickup port
- G: To power train oil cooler



### Layout Drawing of Fixed Multi-Shank Ripper

(if equipped)



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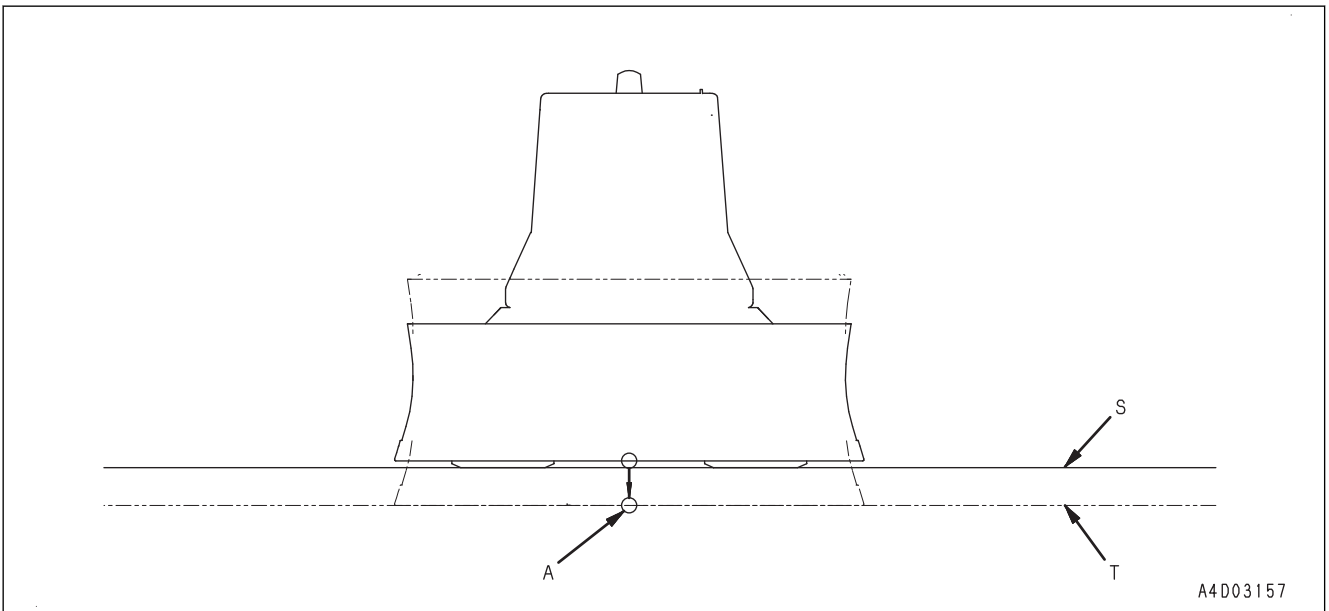
1: Control valve

2: Branch block

3: Ripper lift cylinder

### Blade Height Adjustment Function

The blade control system adjusts the blade height by operating the lift cylinder. It controls the center position (A) of blade edge to follow the earthmoving operation design surface (T) as shown in the following figure.



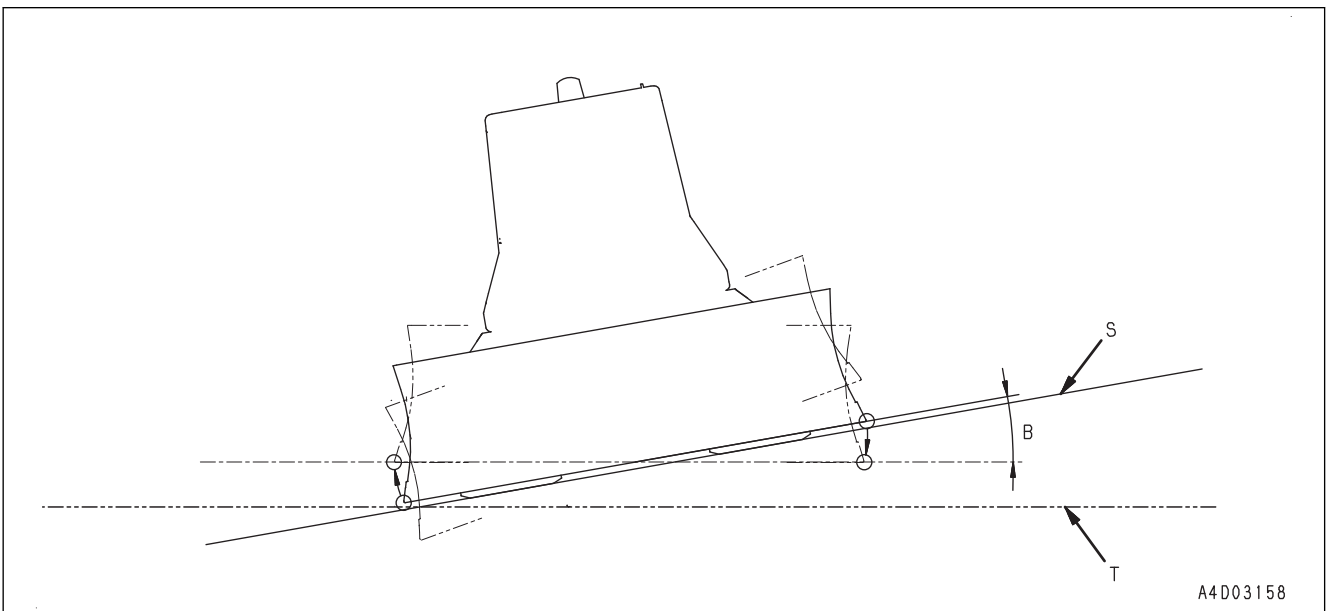
A: The center position of blade edge

T: Earthmoving operation design surface

S: Current surface

### Blade Angle Adjustment Function

The blade control system adjusts the blade angle by operating the tilt cylinder. It controls the blade angle (B) to follow the earthmoving operation design surface (T) as shown in the following figure.



B: Blade angle

T: Earthmoving operation design surface

S: Current surface

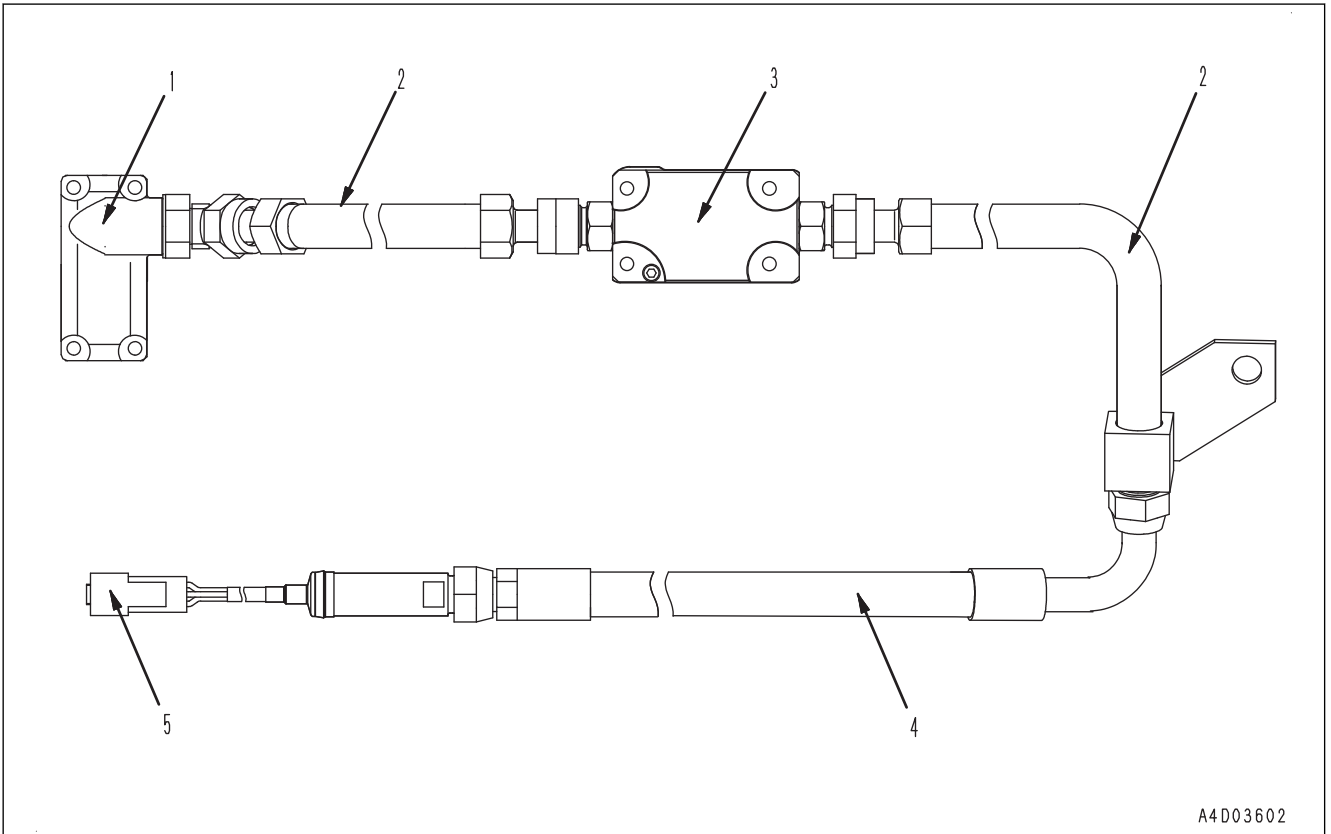
## Stroke and Reset Sensor for Blade Lift Cylinder

### Structure of Stroke and Reset Sensor for Blade Lift Cylinder

#### NOTICE

Do not disassemble. It will require adjustment to obtain optimum performance.

#### General View



1: Stroke sensor

2: Tube

3: Reset sensor

4: Hose

5: Connector

### Function of Stroke and Reset Sensor for Blade Lift Cylinder

- This sensor detects the stroke amount at stroke sensor part (1) and outputs the variable voltage.
- This sensor corrects a difference from the actual stroke amount at reset sensor part (3).

Machine model			D65PXI-18		
Engine			SAA6D114E-6		
Item	Measurement condition	Unit	Standard value for new machine	Repair limit	
Exhaust temperature (Turbine outlet)	<ul style="list-style-type: none"> <li>Coolant temperature:75 to 85°C</li> <li>Power train oil temperature:70 to 80°C</li> <li>Hydraulic oil temperature:45 to 55°C</li> <li>Whole speed range (ambient temperature:20 °C)</li> </ul>	°C	Max.650	Max.700	
Exhaust gas color	<ul style="list-style-type: none"> <li>Coolant temperature:75 to 85°C</li> <li>After keep stalling the torque converter at normal condition for 5 seconds</li> </ul>	Engine outlet (Between turbocharger and KDPF inlet)	Bosch index	Max.1.5	Max.2.0
		SCR outlet (Exhaust pipe outlet)	Bosch index	-	Max.0.5
Valve clearance	Engine coolant temperature: Normal temperature	Intake valve	mm	0.22 to 0.38	0.22 to 0.38
		Exhaust valve	mm	0.48 to 0.64	0.48 to 0.64
EGR valve, VGT driving oil pressure	<ul style="list-style-type: none"> <li>Engine coolant temperature:75 to 85°C</li> <li>Hydraulic oil temperature:45 to 55°C</li> </ul>	Fuel control dial: MIN (Low idle) position	MPa {kgf/cm <sup>2</sup> }	Min.1.2 {Min.12}	Min.1.2 {Min.12}
VGT control oil pressure		Whole speed range Oil pressure fluctuation range	MPa {kgf/cm <sup>2</sup> }	0.3 to 1.0 {3 to 10}	0.3 to 1.0 {3 to 10}

**Main Body**

Machine model			D65PXI-18	
Engine			SAA6D114E-6	
Item	Measurement condition	Unit	Standard value for new machine	Repair limit
Compression pressure	<ul style="list-style-type: none"> <li>Engine coolant temperature:40 to 60°C</li> <li>At cranking (engine speed) :Min. 170r/min(reference)</li> </ul>	MPa {kgf/cm <sup>2</sup> }	Min.2.6 {Min.26.5}	Min.2.1 {Min.21.4}
Blowby pressure	<ul style="list-style-type: none"> <li>Coolant temperature:75 to 85°C</li> <li>Power train oil temperature:70 to 80°C</li> <li>Hydraulic oil temperature:45 to 55°C</li> <li>Operating Mode: P (Power mode)</li> <li>With torque converter stalled</li> </ul>	kPa {mmH <sub>2</sub> O}	Max.1.96 {Max.200}	Max.2.94 {Max.300}

Machine model			D65PXI-18	
Engine			SAA6D114E-6	
Item	Measurement condition	Unit	Standard value for new machine	Repair limit
Accuracy of stroke sensor for lift cylinder	Work equipment: Perform blade raise stroke end operation	Before resetting	0±3	0±3
		After resetting	0	0
	Work equipment: Perform blade lower stroke end operation	Before resetting	1078±5	1078±5
		After resetting	1078	1078
Accuracy of stroke sensor for tilt cylinder	Work equipment: Perform left tilt stroke end operation	Before resetting	0±3	0±3
		After resetting	0	0
	Work equipment: Perform right tilt stroke end operation	Before resetting	160±3	160±3
		After resetting	160	160
Accuracy of stroke sensor for angle cylinder	Work equipment: Perform left angle stroke end operation	Before resetting	0±3	0±3
		After resetting	0	0
	Work equipment: Perform right angle stroke end operation	Before resetting	555±3	555±3
		After resetting	555	555
Accuracy of reset sensor for lift cylinder	<ul style="list-style-type: none"> <li>Work equipment: Perform blade raise stroke end operation</li> <li>Lift cylinder stroke: Before resetting</li> </ul>	mm	0±3	0±3

# Engine and Cooling System

## Examine Engine Speed

**⚠** Place the machine on a level ground, lower the work equipment to the ground, stop the engine, and set the parking brake lever and work equipment lock lever to LOCK position.

Check this item under the following conditions.

- Engine coolant temperature 75 to 85 °C
- Power train oil temperature 70 to 80 °C
- Hydraulic oil temperature 45 to 55 °C
- Operating Mode: P (Power mode)
- Gear shift mode: Either auto or manual mode.

For testing of engine speed to perform troubleshooting or Pm Clinic, refer to this section.

## How to Examine Engine Speed

Check the engine speed with the monitoring function of the machine monitor.

## Examine Engine High Idle Speed

1. Display the screen of Adjustment ID "0007". For details, see "Set and Operate Machine Monitor".

Adjustment ID: 0007 "ENGINE DECELERATOR CUTTING"

### REMARK

When the transmission is in NEUTRAL, high idle speed is limited (by the neutral deceleration function). Be sure to display Adjustment ID "0007" to disable the limiting.

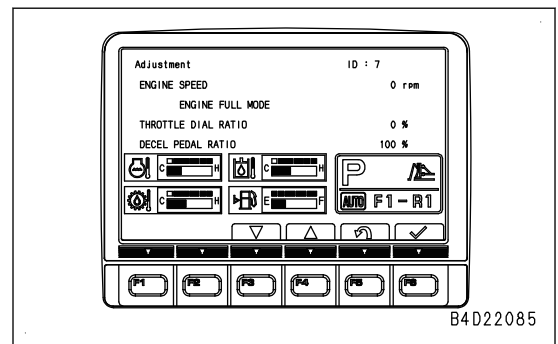
2. Shift the joystick (steering, directional and gearshift lever) (PCCS lever), blade control lever, and ripper control lever in their NEUTRAL position.

### REMARK

The parking brake lever and work equipment lock lever can be tested in LOCK position.

3. Start the engine, and set the fuel control dial to MIN (Low idle) position.
4. Set the fuel control dial to MAX (High idle) position, and measure the engine speed.

For standard values, see STANDARD VALUE TABLE, "STANDARD VALUE FOR ENGINE".



## Examine Engine Low Idle Speed

The engine low idle speed is high and cannot be measured correctly if the aftertreatment devices regeneration is performed. If the aftertreatment devices regeneration is displayed, perform the measurement after aftertreatment devices regeneration is finished.

### REMARK

When aftertreatment devices regeneration is finished, aftertreatment devices regeneration pilot lamp goes off



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Lift pump automatically operates for 60 seconds.

7. Put the starting switch back to OFF position and keep it there for approximately 10 seconds.
8. Repeat above steps 6 to 7 for 4 times.
9. Start the engine by cranking it with the starter.

Do not run the starter continuously for more than 20 seconds. Leave the starting motor for approximately 2 minutes before restarting.

10. Engine does not start after completing steps 6 to 9.

Turn the starting switch to OFF position and wait for approximately 10 minutes (if outside air temperature is lower than 5 °C, wait for approximately 15 minutes and then repeat steps 6 to 9.

**REMARK**

- The air in the high-pressure circuit is bled automatically by cranking the engine.
- If the engine does not start, there still may be air in the low-pressure circuit. In this case, repeat the above procedure from step 5.
- If the machine is used with air remaining in the fuel system, fuel system errors (CA559 and CA2249) may be issued.

In this case, perform the above procedures before starting the engine and set the fuel control dial to MIN (Low idle) position for approximately 3 minutes. When air is eliminated from the fuel system, the engine rotation stabilizes and errors are cleared.

5. Check that “0” of “Test State” is flashing.

#### REMARK

Flashing of “0” indicates “Waiting for the start (default)”, and test can be performed. Screen other than “0” is displayed, follow instructions according to “Parameter list of test state”.

6. Press F1 to start “SCR Denitration Efficiency Test”.

F1: Starts “SCR Denitration Efficiency Test”.

F2: Stops “SCR Denitration Efficiency Test”. (When “STOP” is displayed)

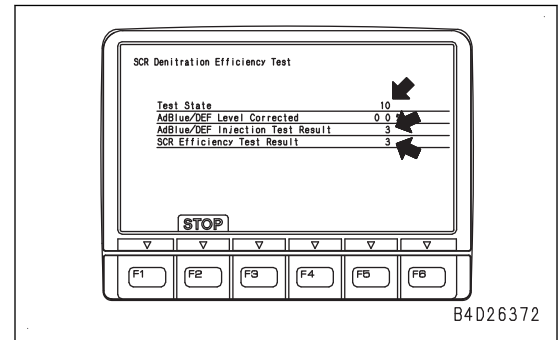
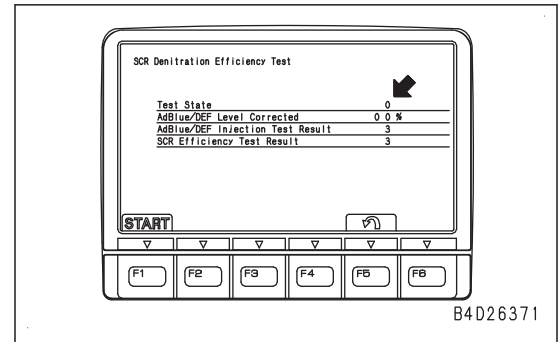
F5: Returns the display to “SCR Service Test” screen

#### NOTICE

- “Test State” does not change to “10” and test does not start even if F1 is pressed, turn starting switch to OFF position once, and repeat the procedure from step 1.
- When the test is stopped by pressing F2, “0” in “Test State” flashes. The test cannot be restarted by pressing F1. To restart the test, turn the starting switch to OFF position once. System operating lamp goes out, and engine controller shuts down.
- If the starting switch is mistakenly turned to OFF position during test, do not turn starting switch to ON position immediately. Check that system operating lamp is off, and turn starting switch to ON position again after engine controller shuts down.
- If KOMNET communication error remains less than 1 second, engine controller is unable to detect it. The test may be continued while the machine monitor does not continue the test (standard screen). In that case, once the starting switch is turned to OFF position, system operating lamp goes out, and the engine controller shuts down to reset the test.

#### REMARK

- The display of “Test State” changes to the flashing of “10”, and “SCR Denitration Efficiency Test” starts.
- “SCR Denitration Efficiency Test” will be normally completed in approximately 30 minutes, however it may take approximately 90 minutes at maximum depending on the test state.
- When the display of “Test State” is “11” to “41” or “100”, follow “Parameter list of test state”.
- The test results of “DEF Injection Test Result” and “SCR Efficiency Test Result” are displayed as “3” during test.
- When the display of “Test State” changes from flashing of “10” to flashing of “20”, the test is completed.
- “Test State” becomes “14” temporarily at the half way of the test. This state means the temperature is in transition and is not abnormal. Resume the test. (The display changes to “10” in a few minutes.)
- If the test needs to be stopped at halfway, press F2 to return the screen to the standard screen.
- If F2 is pressed and the operation stops halfway through the test, “DEF Injection Test Result” and “SCR Efficiency Test Result” are displayed as “3”.
- The test results of “DEF Injection Test Result” and “SCR Efficiency Test Result” are displayed as “0”, “1” or “4” after the test.



3. Brake oil pressure pickup plug (BR) is inside the cover. Remove the pickup plug from outside on the right of operator's cab.

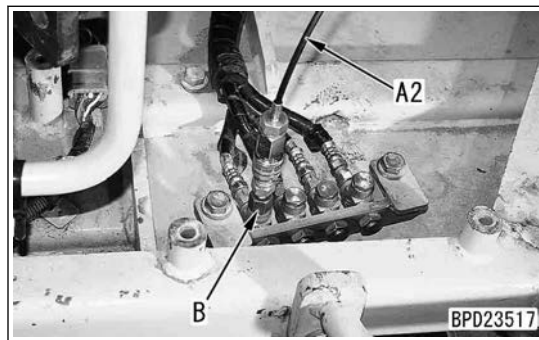


4. Install nipple B and connect hose A2 of pump assembly.
5. Turn the starting switch ON position and set the parking brake lever in FREE position (F).
6. Operate pump A1 to raise the brake releasing oil pressure to the initial pressure.

Initial pressure: 2.74 MPa {28 kgf/cm<sup>2</sup>}

**REMARK**

- Since an accumulator is installed in the circuit, the handle must be operated 30 to 50 times until the oil pressure rises.
- If the oil pressure does not rise above a certain level, the relief valve may be set to low pressure. In this case, adjust the set pressure of the relief valve.



7. Tow the machine to a safe place.

**REMARK**

- The brake releasing oil pressure lowers gradually because of internal leakage and the brake is applied again approximately one minute after. Therefore, work quickly.
- When the brake release oil pressure drops to approximately 1.57 MPa {approximately 16 kgf/cm<sup>2</sup>}, the brake is applied. In such a case, increase the brake release oil pressure to its initial level by operating the volume pump again.

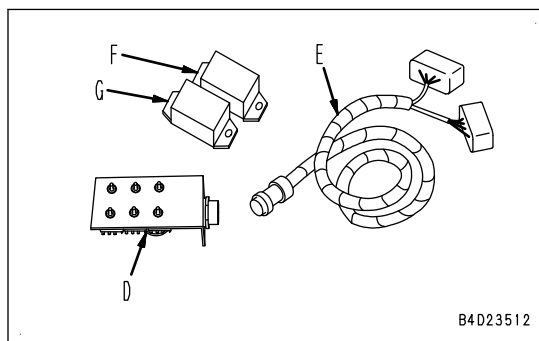
**Move Machine with Electric Type Parking Brake Release System**

- When any trouble occurs in the electrical system of the power train control (forward and reverse travels, gear speed, steering) and the machine does not move, move the machine according to the following procedure.
- Capable of starting the engine is the essential requisites for moving the electrical machine.
- When you cannot start the engine, see "METHOD FOR MOVING THE MACHINE BY OIL PRESSURE".

**⚠ Do not turn the starting switch to ON position or start the engine until mobile testing tools D to G is prepared.**

1. Connect switch assembly D or resistors F and G to the wiring harness E of escape device.

**⚠ To prevent the machine from moving suddenly, set all the gear speeds of switch assembly D to OFF position, and set the directional switch to P position.**



Operator mode
Display of warning after "Checks Before You Start"
Display of maintenance due time over
Display of checking preset
Display of standard screen
Display of warning when the remaining DEF level gauge lowers
Display of end screen
Display of operation screen for engine shutdown secondary switch
Selection of Operating mode
Selection of gear shift mode
Selection of reverse slow mode
Operation of customizing
Selection of customize memory
Operation to cancel alarm buzzer
Operation of air conditioner
Operation to display camera mode
Operation to display clock and service meter
Check of maintenance information
Setting and display of user mode (including KOMTRAX messages for users)
Display of ECO guidance
Operation of machine setting (fan reverse mode)
Display of caution lamp
Display of aftertreatment devices regeneration
Display of SCR information
Display function of action level and failure code

Following functions become operational by performing special operations.

DISPLAY FUNCTION OF TECHNICIAN IDENTIFICATION STATUS SCREEN
DISPLAY FUNCTION OF OPERATOR IDENTIFICATION INPUT SCREEN
CHECKING FUNCTION BY LCD (LIQUID CRYSTAL DISPLAY)
CHECKING FUNCTION OF SERVICE METER
METHOD FOR SETTING USAGE LIMITATION AND CHANGING MAINTENANCE PASSWORD

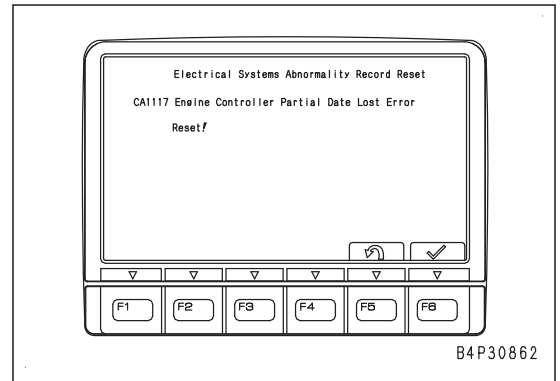
- Service Mode

The information items in this mode are not ordinarily displayed. Technicians can change display and settings by operating the switches specially. This mode is used for testing, adjusting, or troubleshooting.

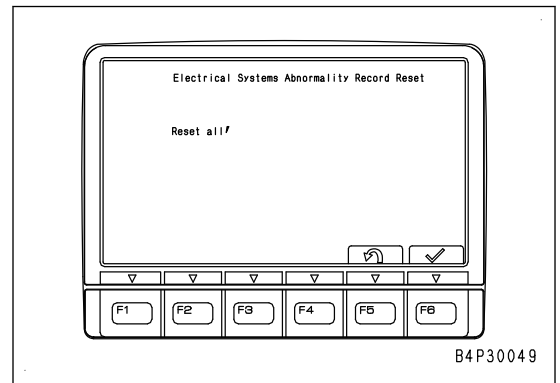
Service Mode
METHOD FOR CHECKING PRE-DEFINED MONITORING INFORMATION
METHOD FOR CHECKING SELF-DEFINE MONITORING INFORMATION
METHOD FOR CONFIRMING ABNORMALITY RECORD (MECHANICAL SYSTEMS)
METHOD FOR CONFIRMING ABNORMALITY RECORD (ELECTRICAL SYSTEMS)

**REMARK**

- This is the screen displayed when the deletion of a selected abnormality record is completed.



- This is the screen displayed when the deletion of all abnormality records is completed.

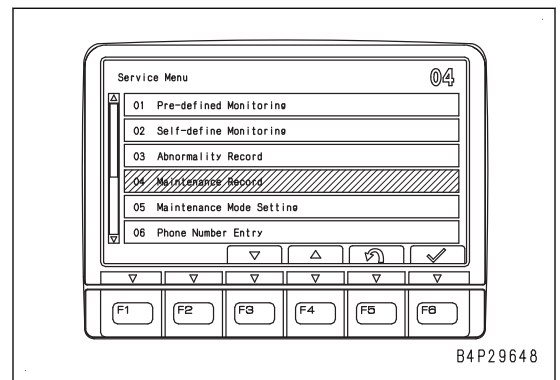


**How to See Maintenance Record**

The machine monitor records the maintenance information of the filters, oils, etc., which are displayed and checked by the following operations.

When the maintenance is performed, if the data are reset in the operator mode, the number of the times of maintenance is recorded here.

1. Select "Maintenance Record" on "Service Menu" screen.



2. On "Maintenance Record" screen, select an item to be checked with the function switches or numeral input switches.

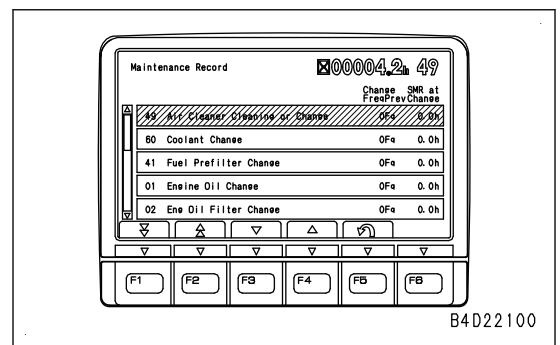
F1: Moves the selection to next page (screen).

F2: Moves the selection to previous page (screen).

F3: Moves the selection downward.

F4: Moves the selection upward.

F5: Returns the screen to "Service Menu" screen.



### Adjustment ID: 0530 (Stall Mode)

To perform the torque converter stall, “Stall Mode” automatically sets the fan speed to 100% mode and allows “F3-R3” to be set as the preset (moving-off gear speed).

**REMARK**

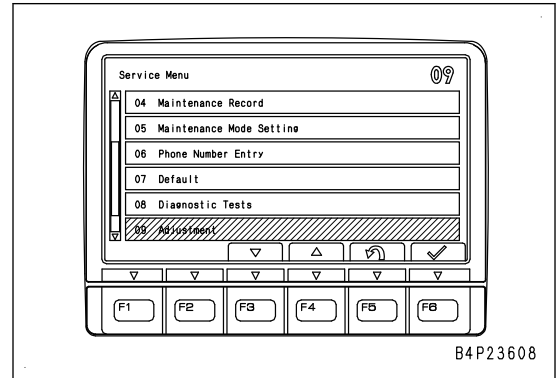
In the Stall Mode, the torque converter stall is not performed automatically. See “Examine Engine Speed” for the procedure for stalling the torque converter.

Perform this adjustment item under the following conditions.

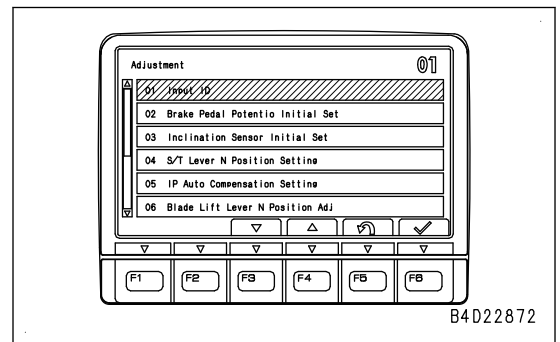
Hydraulic oil temperature: Min. 45°C

It performs testing, adjusting, troubleshooting, etc. as required.

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



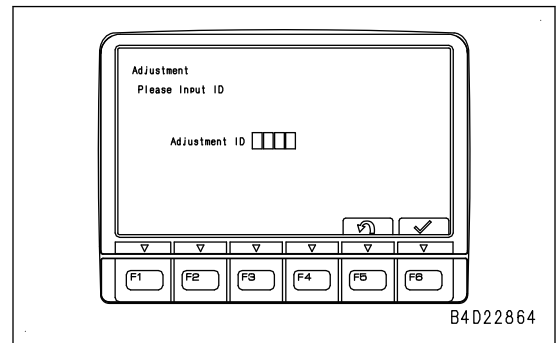
2. On “Adjustment”, select “Input ID” to be set.
  - F3: Not used.
  - F4: Not used.
  - F5: Cancels the adjustment and returns the screen to “Service Menu” screen.
  - F6: Enters the input Adjustment ID and goes to “Adjustment” screen.



3. Directly input Adjustment ID (4 digits) of the adjustment item to be used “0530” by using the numeral input switches.
  - F5: Returns the screen to “Adjustment” screen.
  - F6: Not used

**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 does not proceed from “Input ID” screen (you can input Adjustment ID again when this screen is displayed).



12. If the blade stops on the ground and “Press F6 - Caution Blade Moves” is displayed on the machine monitor screen during the automatic adjustment, press F6 again and re-start the automatic adjustment.

F3: Not used

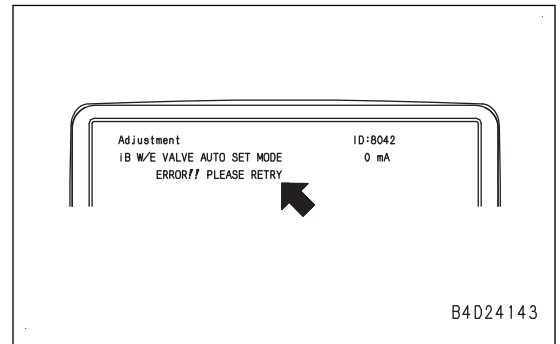
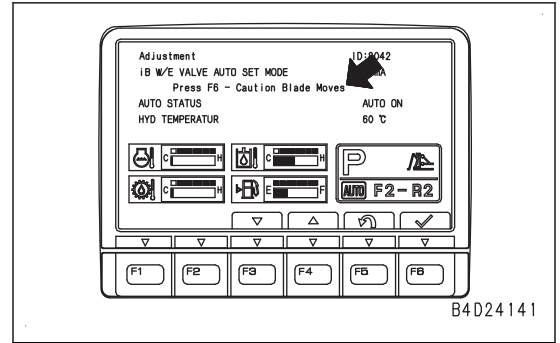
F4: Not used

F5: Cancels the adjustment and returns the screen to “Input ID” screen

F6: Performs the automatic adjustment

**REMARK**

- Blade operation stops 3 times while automatic adjustment.
- If the the conditions of this adjustment are unsatisfied during the automatic adjustment, “ERROR!! PLEASE RETRY” is displayed on the machine monitor screen, and the blade stops. When “ERROR!! PLEASE RETRY” is displayed, press F5 to return to “Input ID” screen, then repeat the adjustment.
- Even if F3 or F4 is pressed, switches do not work.

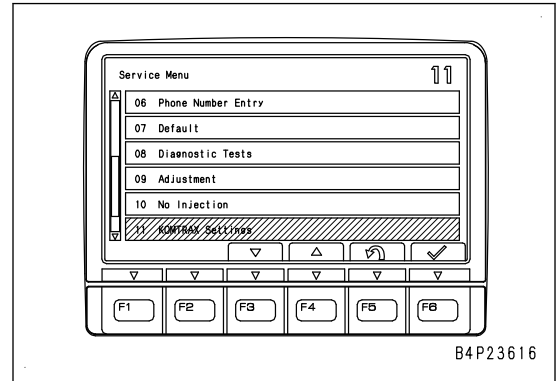


**Work Equipment Operation Order and Machine Monitor Display**

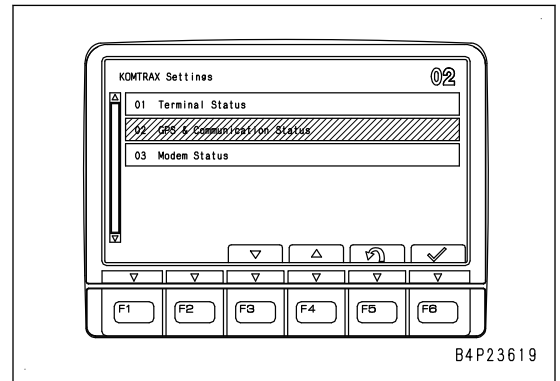
Order	Work equipment operation	Display on machine monitor
1/14	Lift RAISE	LIFT UP (1/14)
2/14	Lift LOWER	LIFT DOWN (2/14)
-	Blade stops	Press F6 - Caution Blade Moves
3/14	Lift RAISE	LIFT UP (3/14)
4/14	Right tilt	TILT RIGHT (4/14)
5/14	Left tilt	TILT LEFT (5/14)
6/14	Horizontal tilt	TILT HORIZONTAL (6/14)
7/14	Lift LOWER	LIFT DOWN (7/14)
-	Blade stops	Press F6 - Caution Blade Moves
8/14	Lift RAISE	LIFT UP (8/14)
9/14	Lift LOWER	LIFT DOWN (9/14)
-	Blade stops	Press F6 - Caution Blade Moves
10/14	Lift RAISE	LIFT UP (10/14)
11/14	Right tilt	TILT RIGHT (11/14)
12/14	Left tilt	TILT LEFT (12/14)
13/14	Horizontal tilt	TILT HORIZONTAL (13/14)
14/14	Lift LOWER	LIFT DOWN (14/14)
-	Blade stops	CALIBRATION FINISHED

- If you have replaced the communication terminal, do the work that follow to check that the terminal has been replaced correctly.

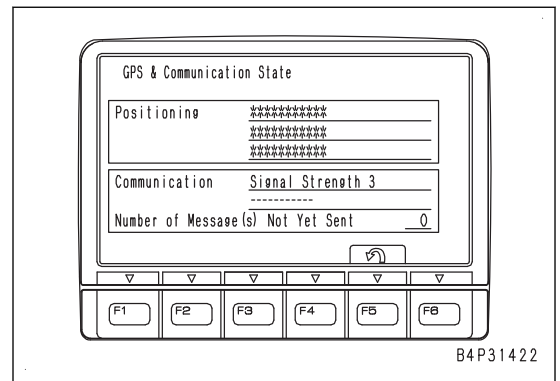
1) On the “Service Menu” screen, select “KOMTRAX Settings” with function switches or numeral input switches.



2) On the “KOMTRAX Settings” screen, select the “GPS & Communication State” with function switches or numeral input switches.



3) Check that the items of “Communication” are Signal Strength 1 or more.



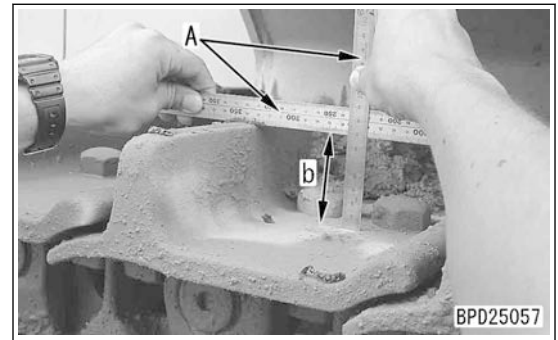
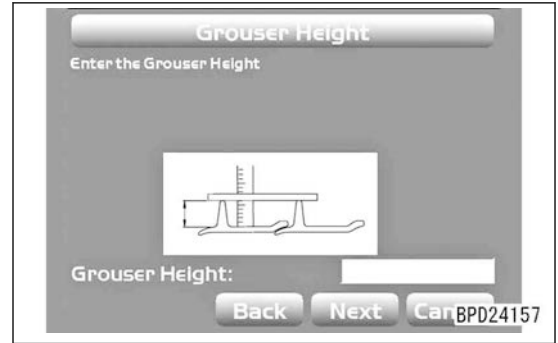
- When “Grouser Height” is displayed, measure grouser height (b) with Steel rule A, and record it.

**NOTICE**

**Measure grouser height (b) in 1 mm unit.**

**REMARK**

- This measurement of grouser height (b) is to calculate the difference between the heights from ground when calibration is performed (when machine is on a firm ground) and when it is actually operated (when the grousers are buried in the mud).
- Measure grouser height (b) at the center of the track shoe while the track is not slack.

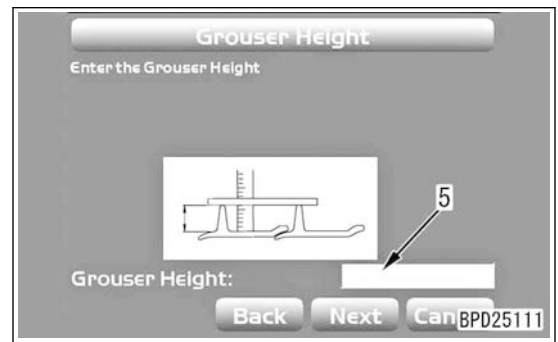


- Press input column (5) on the “Grouser Height” screen.

“Back”: Returns to the previous screen.

“Next”: Moves to next screen.

“Cancel”: Cancels “Machine Cal Step A”, and moves to the main screen.



- Numeric keypad (6) is displayed. Input the recorded grouser height (b) in step 5, and press “Ok” (7).

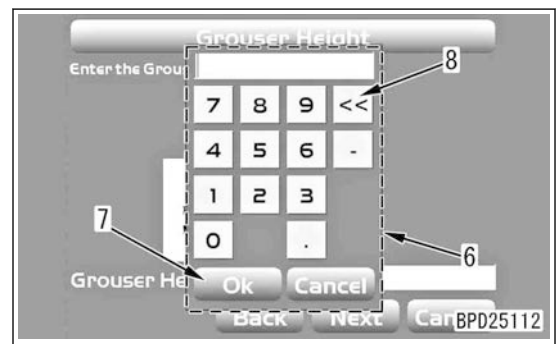
“Ok” (7): Enters the input, and clears numeric keyboard (6)

Back space key (8): Deletes an input value for each character

“Cancel”: Cancels the input, and clears numeric keyboard (6)

**REMARK**

The value can be corrected before pressing “Ok” (7). To change the value, press back space key (8), delete the value, and enter the correct value.

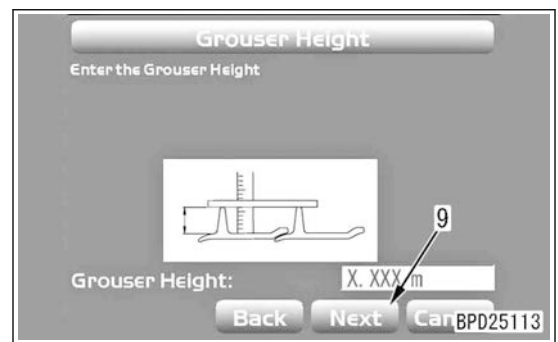


- After checking that grouser height (b) is input, press “Next” (9).

“Back”: Returns to the previous screen

“Next” (9): Moves to the next screen

“Cancel”: Cancels “Machine Cal Step A”, and returns to main screen



**NOTICE**

- **Accurate measurement may not be obtained if amount of light is insufficient in non-prism mode. In that case, restart the measurement from step 1 after moving to somewhere brighter than the current location or use a reflection sheet.**
- **Measure the coordinate in 1 mm unit.**

25. When the “Left Track Frame Position” screen is displayed, press input column (28).

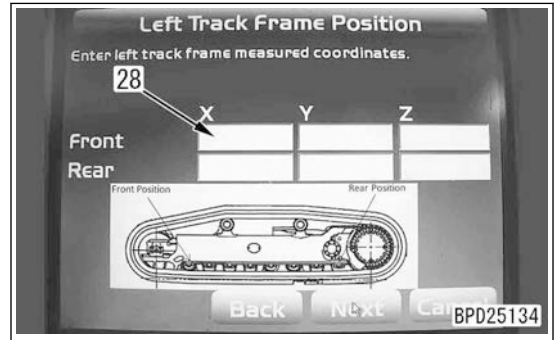
“Back”: Returns to the previous screen

“Next”: Moves to next screen

“Cancel”: Cancels “Machine Cal Step B”, and returns to the main screen

**REMARK**

Input the coordinates of center position of the 1st track roller in “Front”, and input the coordinate of center position of the final track roller in “Rear”.



26. When numeric keypad (29) is displayed, input the recorded coordinate, and press “Ok” (30).

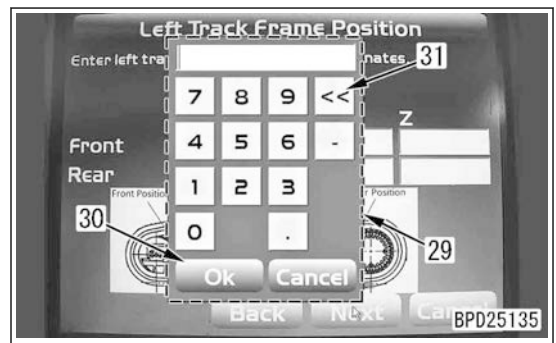
“Ok” (30): Enters the input, and numeric keypad (29) disappears.

Back space key (31): Deletes an input value

“Cancel”: Cancels the input, and numeric keypad (29) disappears

**REMARK**

The value can be corrected before pressing “Ok” (30). To change the value, press back space key (31), delete the value, and enter the correct value.

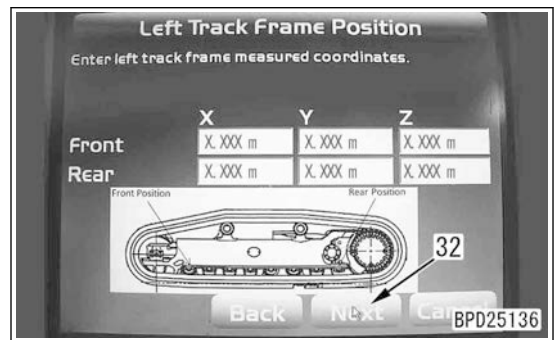


27. Check that the coordinates of the track roller center positions are input, and then press “Next” (32).

“Back”: Returns to the previous screen

“Next”: Moves to next screen

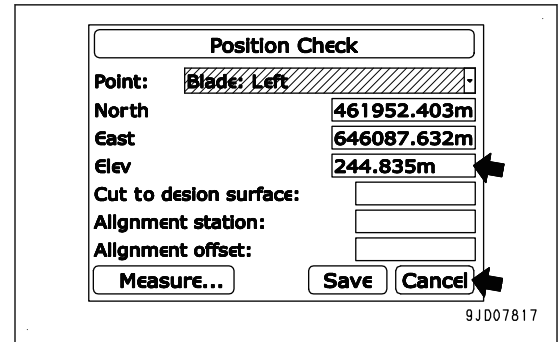
“Cancel”: Cancels “Machine Cal Step B”, and returns to the main screen



- The elevation recognized by the machine is displayed in "Elev".

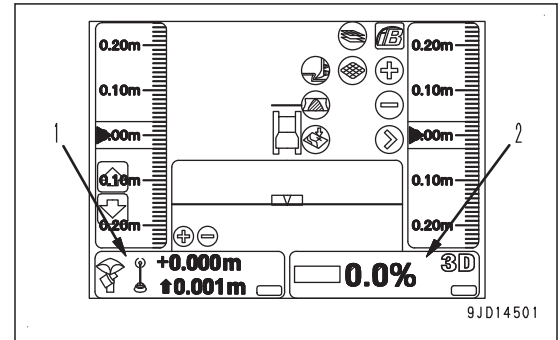
16. Check the elevation recognized by the machine, and press "Cancel".

The screen returns to the main window.

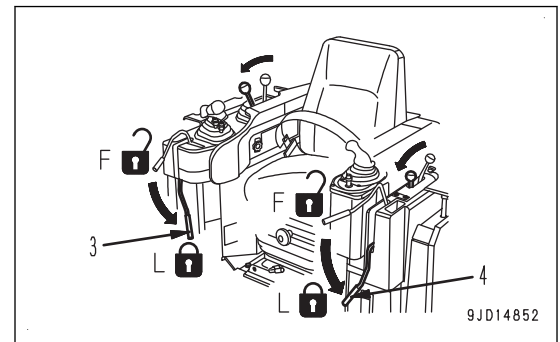


17. Check that "elevation control key" (1) and "slope control key" (2) are green and the machine direction on the control box screen is the same as the actual machine direction.

- If the machine direction on the control box screen does not match with the actual machine direction, repeat the procedure from step 8.

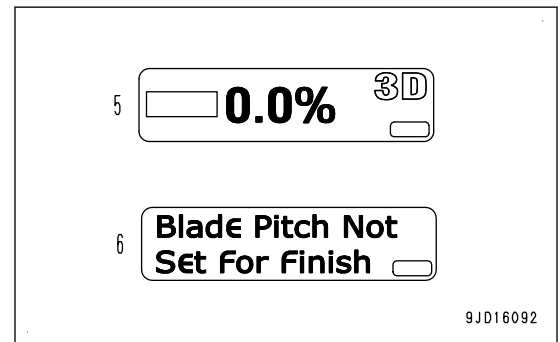


18. Set work equipment lock lever (3) and parking brake lever (4) to LOCK positions (L).



**REMARK**

When work equipment lock lever (3) is set to LOCK position (L), "slope control key" (2) becomes yellow, and screens (5) and (6) are displayed alternately, however, it does not indicate abnormality.



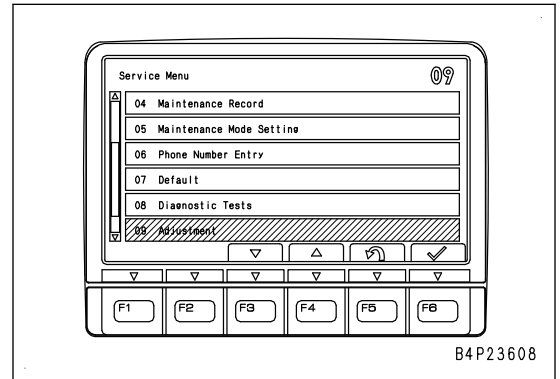
19. Stop the engine.

**REMARK**

Do not turn off the control box power supply.

## How to Adjust When ICT Sensor Controller is Replaced (Power Angle Power Tilt Dozer)

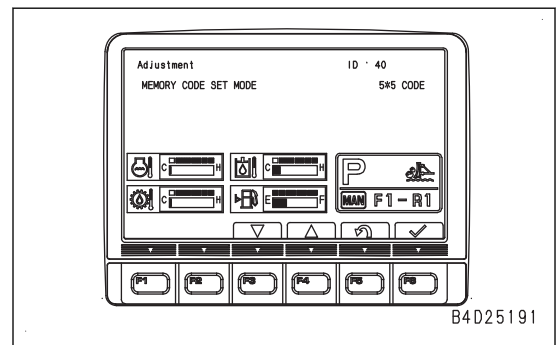
1. Turn the battery disconnect switch to ON position.
2. Turn the starting switch to ON position, see “Set and Operate Machine Monitor”, or “VARIOUS SETTING OF MACHINE” to change the screen to the “Adjustment” screen.



3. Perform the ICT sensor controller initialization according to the following procedure.

Display the screen of Adjustment ID “0040” to perform adjustment by referring to “SETTING AND OPERATING MACHINE MONITOR”.

Adjustment ID: 0040 “ICT Sensor Controller Initialization”



4. Turn the starting switch to OFF position and turn it back to ON position to change the screen to “Adjustment” screen. See “Set and Operate Machine Monitor”, or “VARIOUS SETTING OF MACHINE”.

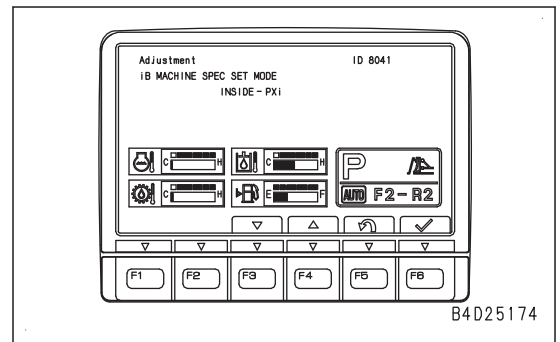
5. Perform the iB machine specification settings. For details, see “Adjustment ID: 8041 (iB Machine Spec Set Mode)”.

**NOTICE**

Set the specification by referring to the adjustment values which were recorded before replacing the ICT sensor controller.

**REMARK**

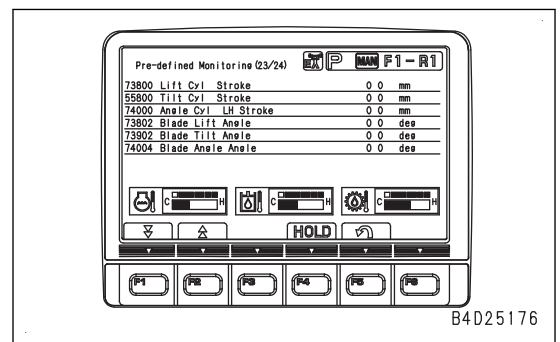
For the details of “METHOD FOR PREFORMING WITH ADJUSTMENT ID: 8041 (iB MACHINE SPEC SET MODE)”, see “How to do Settings of Machine” of “SET AND OPERATE MACHINE MONITOR”.



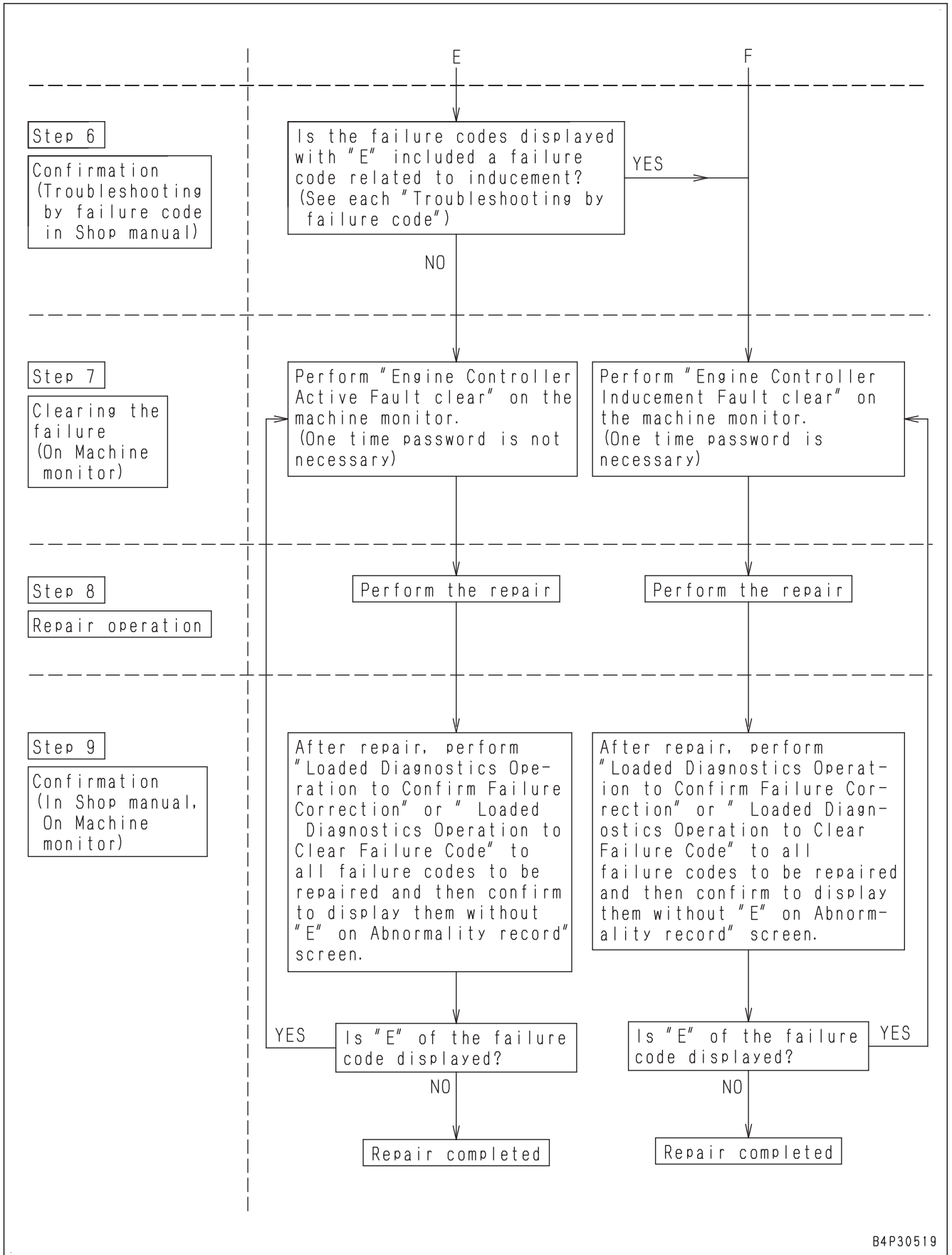
6. Test the stroke sensor. For details, see “Examine Stroke Sensor for Lift Cylinder”.

**REMARK**

For details of the method for testing, see “How to Examine Stroke Sensor for Lift Cylinder (Power Angle Power Tilt Dozer)”.



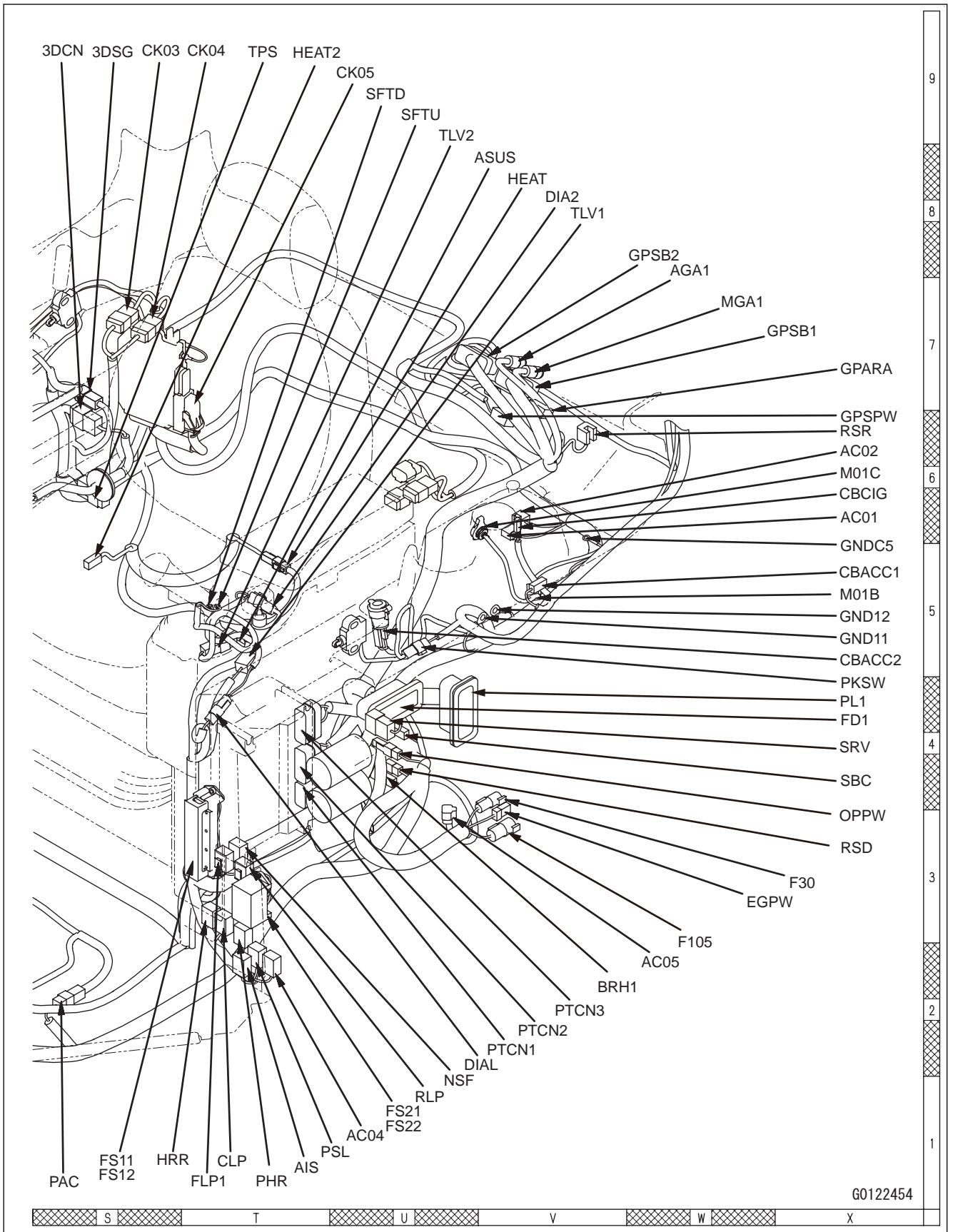
Machine model			D65PXI-18			Good	No good
Engine			SAA6D114E-6				
Item	Measurement condition	Unit	Standard value for new machine	Repair limit	Measured value		
Blade tilt (LEFT → RIGHT)	<ul style="list-style-type: none"> <li>Hydraulic oil temperature 45 to 55 °C</li> <li>Operating mode: P (Power Mode)</li> <li>Fuel control dial: MAX (High idle) position</li> <li>No load on blade</li> <li>From blade right tilt end to left tilt end</li> <li>For details, see Standard Value Table, "Machine Posture and Procedures to Measure Performance", "Fig. 2".</li> </ul>	Straight tilt dozer	sec	1.3 to 1.9	Max. 2.1		
		Power angle power tilt dozer		1.4 to 2.0	Max. 2.2		
Blade angle (LEFT → RIGHT)	<ul style="list-style-type: none"> <li>Hydraulic oil temperature 45 to 55 °C</li> <li>Operating mode: P (Power Mode)</li> <li>Fuel control dial: MAX (High idle) position</li> <li>No load on blade</li> <li>From blade left angle end to right angle end</li> <li>For details, see Standard Value Table, "Machine Posture and Procedures to Measure Performance", "Fig. 3".</li> </ul>		sec	3.3 to 4.7	Max. 5.0		
Ripper RAISE (if equipped)	<ul style="list-style-type: none"> <li>Hydraulic oil temperature 45 to 55 °C</li> <li>Operating mode: P (Power Mode)</li> <li>Fuel control dial: MAX (High idle) position</li> <li>No load on ripper</li> <li>Moving ripper from the ground to RAISE end</li> <li>For details, see Standard Value Table, "Machine Posture and Procedures to Measure Performance", "Fig. 4".</li> </ul>		sec	-	-		



B4P30519

No.	Symptom of failure	Troubleshooting
		Index
128	MACHINE SPEED DOES NOT INCREASE WHILE BLADE AUTOMATIC CONTROL IS ACTIVATED	E-76
129	BLADE TILT ANGLE DOES NOT COINCIDE WITH DESIGN SURFACE	E-77
130	BLADE TILTS BACK WHILE BLADE AUTOMATIC CONTROL IS ACTIVATED	E-78

4/10



SUMITOMO connector for engine			
No. of pins	Boost (air intake) pressure and temperature sensor (95.107.114 engine)		
	Sensor side (plug)	Harness side (receptacle)	Testing connection use special tool Part No.
4			799-601-4230 (Socket) (Kit:799-601-4101) (Kit:799-601-4201)
-	-	-	-
No. of pins	Boost (air intake) pressure sensor (125.140 engine)		
	Sensor side (plug)	Harness side (receptacle)	Testing connection use special tool Part No.
3			799-601-4250 (Socket) (Kit:799-601-4101) (Kit:799-601-4201)
-	-	-	-
No. of pins	G sensor (fuel supply pump speed sensor) (125.140 engine)		
	Sensor side (plug)	Harness side (receptacle)	Testing connection use special tool Part No.
3			799-601-4330 (Socket) (Kit:799-601-4101) (Kit:799-601-4201)
-	-	-	-

B4W21631

Failure code	Failure (Displayed on screen)	Applicable component	Action level	Category of history	Remarks
CA2771	SCR Outlet NOx Sensor Datalink Timeout Error	ENG	L01	Electrical system	
CA2777	Manual Stationary Regeneration Request but KDPF Regeneration Disable	ENG	-	Electrical system	
CA2976	DEF Pump Temperature Sensor Signal Error	ENG	L01	Electrical system	
CA3133	KDPF Outlet Pressure Sensor High Error	ENG	L03	Electrical system	*
CA3134	KDPF Outlet Pressure Sensor Low Error	ENG	L03	Electrical system	*
CA3135	KDPF Outlet Pressure Sensor In Range Error	ENG	L03	Electrical system	*
CA3142	SCR Temperature Sensor High Error	ENG	L01	Electrical system	
CA3143	SCR Temperature Sensor Low Error	ENG	L01	Electrical system	
CA3144	SCR Temperature Sensor In Range Error	ENG	L01	Electrical system	
CA3146	SCR Outlet Temperature Sensor High Error	ENG	L01	Electrical system	
CA3147	SCR Outlet Temperature Sensor Low Error	ENG	L01	Electrical system	
CA3148	SCR Outlet Temperature Sensor In Range Error	ENG	L01	Electrical system	
CA3151	SCR Catalyst Efficiency Low Error 2	ENG	L01	Electrical system	
CA3165	SCR Outlet Temperature High Error	ENG	L03	Electrical system	
CA3229	SCR Temperature High Error	ENG	L03	Electrical system	
CA3231	SCR Temperature High Error - Non Regeneration	ENG	L03	Electrical system	
CA3232	Turbo Outlet NOx Sensor Datalink Timeout Error	ENG	L01	Electrical system	
CA3235	SCR Outlet Temperature High Error - Non Regeneration	ENG	L03	Electrical system	
CA3239	DEF Line Heater 2 Voltage High Error	ENG	L01	Electrical system	
CA3241	DEF Line Heater 2 Voltage Low Error	ENG	L01	Electrical system	
CA3242	DEF Tank Heating Error	ENG	L01	Electrical system	
CA3251	KDOC Inlet Temperature High Error	ENG	L03	Electrical system	*
CA3253	KDOC Temperature Error - Non Regeneration	ENG	L03	Electrical system	*

**Failure Code [15SJL1]**

Action level	Failure code	Failure	ECMV Release Trouble (Lock Up Clutch) (Power train controller system)
L03	15SJL1		
Details of failure	<ul style="list-style-type: none"> <li>Fill switch signal is ON even when output to solenoid circuit of torque converter lockup clutch ECMV is stopped.</li> </ul>		
Action of controller	<ul style="list-style-type: none"> <li>Forbids lockup.</li> </ul>		
Phenomenon on machine	<ul style="list-style-type: none"> <li>Engine may stall during travel operation.</li> <li>Lockup function of torque converter does not operate.</li> <li>Once machine stops, engine speed is restricted to medium speed (half).</li> <li>Once machine stops, travel is restricted to F1 and R1.</li> <li>Automatic transmission function does not work.</li> </ul>		
Related information	<ul style="list-style-type: none"> <li>Fill switch signal status of lockup clutch ECMV can be checked by monitoring function. (Code: 31520 Transmission fill switch input 2)</li> <li>After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine and perform travel R (REVERSE) (automatic gear shift mode).</li> <li>Seat (Approx. 50 kg), remove cover under seat.</li> <li>First, check for any failure such as clogged power train oil filter.</li> <li>Next, check that clutch pressure is normal. For details, see Testing and adjusting "Testing power train oil pressure".</li> </ul>		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Lockup clutch ECMV fill switch (internal short circuit)	<ol style="list-style-type: none"> <li>Turn starting switch to OFF position.</li> <li>Disconnect connector L_SW, and connect T-adapter to male side.</li> </ol>		
		Resistance	Between L_SW (male) (1) and ground (Turn fill switch to OFF position.)	Min. 1 MΩ
2	Ground fault in wiring harness or defective power train controller	<ol style="list-style-type: none"> <li>Turn starting switch to OFF position.</li> <li>Disconnect connector L_SW.</li> <li>Start engine.</li> </ol> <p><b>REMARK</b> Keep joystick (steering, directional and gear shift lever) in N.</p>		
		If failure code [15SJL1] is still displayed, wiring harness has ground fault or power train controller is defective (If failure code [15SJL1] goes out, lockup clutch fill switch is defective).		
3	Ground fault in wiring harness (contact with ground circuit)	<p>If failure code is still displayed after above checks on cause 2, this check is not required.</p> <ol style="list-style-type: none"> <li>Turn starting switch to OFF position.</li> <li>Disconnect connectors PTCN2 and L_SW, and connect T-adapter to either female side.</li> </ol>		
		Resistance	Between ground and PTCN2 (female) (36) or L_SW (female) (1)	Min. 1 MΩ

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective KDOC inlet temperature sensor	After temperature is cooled down sufficiently, run engine at low idle speed and check if temperature differences between the KDOC inlet temperature and the KDOC outlet temperature, or KDPF outlet temperature is not large. If it is large difference, try to change KDOC inlet temperature sensor.
2	Defective VGT	If the KDOC inlet temperature is approximately 250 °C or below during manual stationary regeneration and if the VGT solenoid current remains approximately 1000 mA even when several hours have passed and the manual stationary regeneration does not complete, the VGT is defective.
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.)

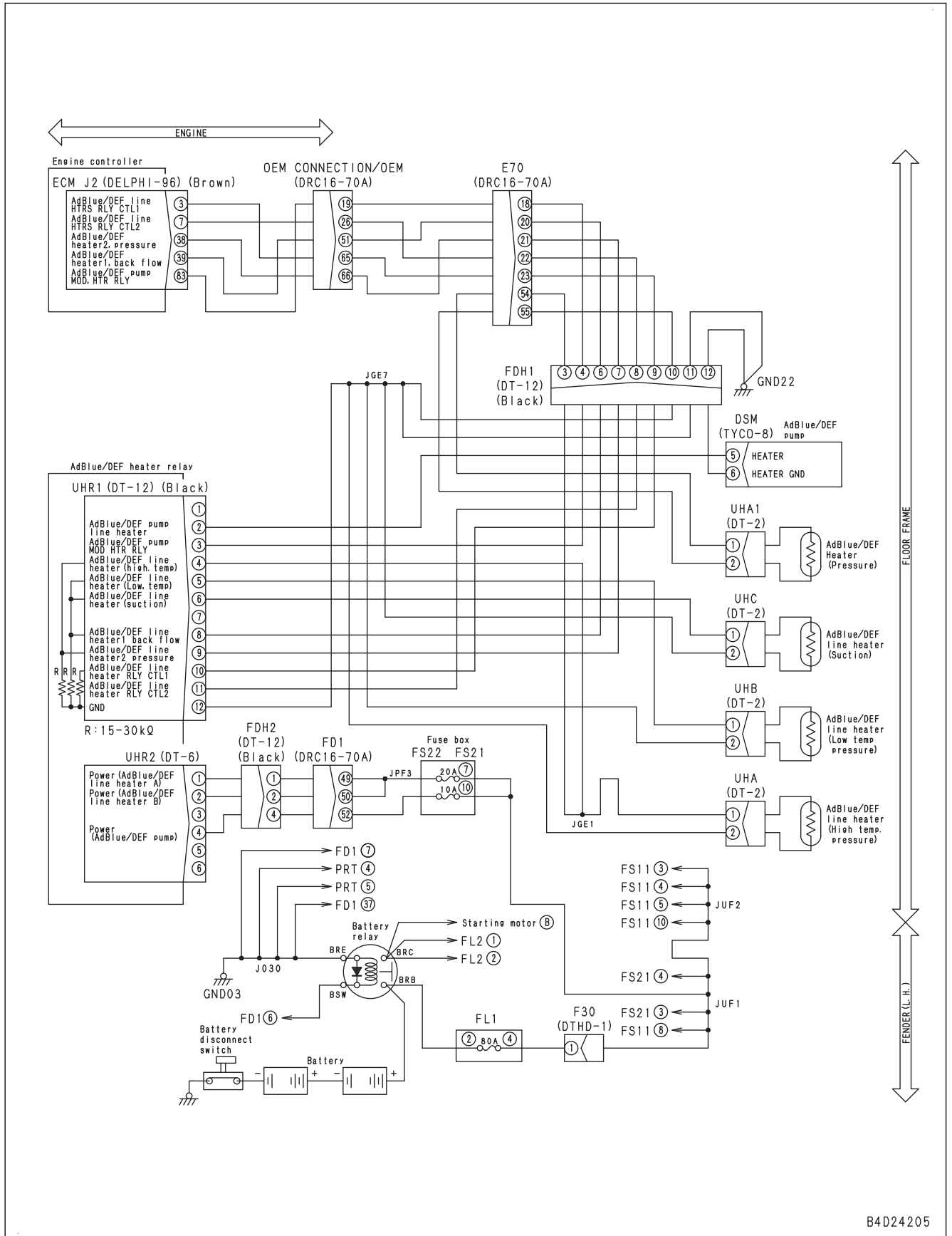
No.	Cause	Procedure, measuring location, criteria and remarks			
2	Defective charge temperature sensor	1. Turn starting switch to OFF position. 2. Disconnect connector BOOST PRESS & IMT and connect socket to male side.			
		<b>REMARK</b> Regard charge temperature sensor as normal if its resistance is 80 Ω to 48 kΩ.			
		Resistance	<b>REMARK</b> Charge thermal characteristics between BOOST PRESS & IMT (male) (3) and (4)	-40 °C	41 to 48 kΩ
				-20 °C	14 to 16 kΩ
				0 °C	5.4 to 6.1 kΩ
				30 °C	1.6 to 1.8 kΩ
				60 °C	500 to 600 Ω
				90 °C	230 to 250 Ω
130 °C	80 to 90 Ω				
Between BOOST PRESS & IMT (male) (3) and ground	All range	Min. 100 kΩ			
3	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector ECM J1, and connect T-adaptor to female side.			
		Resistance	Between ECM J1 (female) (62) and ground	Min. 100 kΩ	
4	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector ECM J1, and connect T-adaptor to female side.			
		Resistance	<b>REMARK</b> Use charge temperature sensor resistance characteristics table for check on cause 2 as criteria for resistance between ECM J1 (female) (62) and (54).	80 Ω to 48 kΩ	
5	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 [CA351]**

Action level	Failure code	Failure	Injectors Drive Circuit Error (Engine controller system)
L03	CA351		
Details of failure	Error occurs in injector drive circuit		
Action of controller	Restricts engine output for operation (restricts common rail pressure).		
Phenomenon on machine	Engine power deration		
Related information	After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine.		
No.	Cause	Procedure, measuring location, criteria and remarks	
1	Defective relevant system	If other failure codes (for injector system) are also displayed, perform troubleshooting for them.	
2	Defective engine controller system	Perform troubleshooting for failure code [CA441].	

No.	Cause	Procedure, measuring location, criteria and remarks		
5	Defective low-pressure circuit component	<ul style="list-style-type: none"> <li>For check of pressure in fuel low pressure circuit, see Testing and Adjusting, "Examine Fuel Pressure".</li> <li>Measure at fuel filter inlet side.</li> <li>Cranking speed: Min. 150 rpm</li> </ul>		
		Pressure of fuel low pressure circuit	At cranking	Min. 0.105 MPa {Min. 1.07 kgf/cm <sup>2</sup> }
		<ul style="list-style-type: none"> <li>For check of pressure in fuel low pressure circuit, see Testing and Adjusting, "Examine Fuel Pressure".</li> <li>Measured at fuel filter outlet side.</li> </ul>		
		Pressure of fuel low pressure circuit	At high idle	Min. 0.48 MPa {Min. 4.9 kgf/cm <sup>2</sup> }
		<ul style="list-style-type: none"> <li>For check of pressure in fuel low pressure circuit, see Testing and Adjusting, "Examine Fuel Pressure".</li> <li>Measured at fuel filter inlet and outlet sides.</li> <li>Pressure drop in fuel low-pressure circuit = Fuel filter inlet pressure - Fuel filter outlet pressure</li> </ul>		
		Pressure drop in fuel low-pressure circuit	At high idle	Max. 0.08 MPa {Max. 0.8 kgf/cm <sup>2</sup> }
		<ul style="list-style-type: none"> <li>For check of pressure in fuel low pressure circuit, see Testing and Adjusting, "Examine Fuel Pressure".</li> <li>Measure at gear pump fuel inlet side of supply pump.</li> </ul>		
		Fuel suction circuit pressure (gear pump side)	At high idle	Min. -33.9 kPa {Min. -254 mmHg}
		<ul style="list-style-type: none"> <li>For check of pressure in fuel low pressure circuit, see Testing and Adjusting, "Examine Fuel Pressure".</li> <li>Measure at fuel connector side.</li> </ul>		
Fuel suction circuit pressure (fuel connector side)	At high idle	Min. -27.1 kPa {Min. -203 mmHg}		

### Circuit diagram related to DEF line heater



B4D24205

**Failure Code [CA1881]**

Action level	Failure code	Failure	KDPF Differential Pressure Sensor Low Error (Engine controller system)
L03	CA1881		
Details of failure	Low voltage error is detected in signal circuit of KDPF differential pressure sensor.		
Action of controller	<ul style="list-style-type: none"> <li>Operates at estimated value of KDPF differential pressure sensor. (If other failure code also is displayed, operation may be performed at 0 kPa.)</li> <li>EGR valve closes and VGT opens fully.</li> <li>Engine power deration</li> <li>Regeneration control stops.</li> </ul>		
Phenomenon on machine	Engine power deration		
Related information	<p><b>⚠ KDPF becomes hot (Min. 500 °C). Be careful not to get burned.</b></p> <ul style="list-style-type: none"> <li>KDPF differential pressure sensor and KDPF outlet pressure sensor are provided as a unit.</li> <li>If failure code [CA3134] is also displayed instead of failure code [CA1696], it is highly possible that sensor connector is removed or wire breakage (defective contact of connector) occurs in 5 V line.</li> <li>This failure code is displayed if sensor connector is disconnected.</li> <li>Signal voltage from KDPF differential pressure sensor can be checked by monitoring function. (Code: 47101 (V))</li> <li>Differential pressure in KDPF differential pressure sensor can be checked by monitoring function. (Code: 47100 (kPa))</li> <li>Engine power deration is canceled when the failure code is cleared and the starting switch is turned OFF (not canceled only by deactivation of the failure code).</li> <li>After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.</li> </ul>		

No.	Cause	Procedure, measuring location, criteria and remarks	
1	Defective wiring harness connector	<ol style="list-style-type: none"> <li>See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it.</li> <li>Turn starting switch to ON position.</li> </ol>	
		If this failure code is cleared, wiring harness connector is defective.	
2	Defective sensor power supply system	If failure code [CA1695] or [CA1696] is displayed, perform troubleshooting for [CA1695] or [CA1696] first.	
		<ol style="list-style-type: none"> <li>Turn starting switch to OFF position.</li> <li>Disconnect connector PDPF and connect T-adaptor to female side.</li> <li>Turn starting switch to ON position.</li> </ol>	
		Voltage	Between PDPF (female) (4) and (1)

No.	Cause	Procedure, measuring location, criteria and remarks		
3	Open circuit of connector box (wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors INTER-CONNECT and SEGR, and connect T-adaptor to male side of INTER-CONNECT and female side of SEGR.		
		Resistance	If power supply voltage in check on cause 2 is normal, this check is not required. Between INTER-CONNECT (male) (3) and SEGR (female) (A)	Max. 10 Ω
			If power supply voltage in check on cause 2 is normal, this check is not required. Between INTER-CONNECT (male) (4) and SEGR (female) (B)	Max. 10 Ω
			Between INTER-CONNECT (male) (5) and SEGR (female) (C)	Max. 10 Ω
4	Ground fault of connector box (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors INTER-CONNECT and SEGR, and connect T-adaptor to male side of INTER-CONNECT and female side of SEGR.		
		Resistance	Between ground and INTER-CONNECT (male) (5) or SEGR (female) (C)	Min. 100 kΩ
			Between ground and INTER-CONNECT (male) (3) or SEGR (female) (A)	Min. 100 kΩ
5	Short circuit of connector box (internal short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors INTER-CONNECT and SEGR, and connect T-adaptor to male side of INTER-CONNECT or female side of SEGR.		
		Resistance	Between INTER-CONNECT (male) (4) and (5), or between SEGR (female) (B) and (C)	Min. 100 kΩ
6	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors INTER-CONNECT and ECM J1, and connect T-adapters to each female side.		
		Resistance	If power supply voltage in check on cause 2 is normal, this check is not required. Between ECM J1 (female) (81) and INTER-CONNECT (female) (3)	Max. 10 Ω
			If power supply voltage in check on cause 2 is normal, this check is not required. Between ECM J1 (female) (57) and INTER-CONNECT (female) (4)	Max. 10 Ω
			Between ECM J1 (female) (88) and INTER-CONNECT (female) (5) (sensor output)	Max. 10 Ω
7	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and INTER-CONNECT, and connect T-adaptor to either female side.		
		Resistance	Between ECM J1 (female) (88) and ground, or between INTER-CONNECT (female) (5) and ground	Min. 100 kΩ

No.	Cause	Procedure, measuring location, criteria and remarks
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.)

**Failure Code [CA3229]**

Action level	Failure code	Failure	SCR Temperature High Error (Engine controller system)
L03	CA3229		
Detail of failure	The SCR temperature is been high (800 °C or more).		
Action of controller	<ul style="list-style-type: none"> <li>• Advances to Inducement strategy.</li> <li>• DEF injection stops.</li> </ul>		
Phenomenon on machine	<ul style="list-style-type: none"> <li>• NOx emission increases because DEF injection is disabled.</li> <li>• Engine power deration according to inducement strategy.</li> </ul>		
Related information	<p><b>⚠ Since KDPF, KDOC, and SCR are heated to 500 °C or above, be careful not to get burned.</b></p> <ul style="list-style-type: none"> <li>• For the inducement failure codes, refer “List of failure codes related to Inducement” of “Troubleshooting Points for Urea SCR System”.</li> <li>• The SCR temperature sensor and SCR outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller.</li> <li>• For the replacement procedure of the SCR temperature sensor, see “50 Disassembly and Assembly”, “Removal and installation of SCR temperature sensor”.</li> <li>• 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.</li> <li>• If regeneration is not implemented, the failure code [CA3231] may be displayed.</li> <li>• The temperature detected by the SCR temperature sensor can be confirmed from the Pre-defined Monitoring screen.</li> <li>• Use engine operation state diagnosis, DEF level, or DEF quality sensor diagnosis on the Pre-defined Monitoring screen. (The following numbers are the monitoring codes)</li> <li>• Engine operation state diagnosis                     <ul style="list-style-type: none"> <li>01002 Engine speed</li> <li>19200 Exhaust gas flow rate</li> <li>47300 KDOC Inlet Temperature</li> <li>19300 SCR Temperature</li> <li>19302 SCR Outlet Temperature</li> </ul> </li> <li>• DEF level, DEF quantity sensor diagnosis                     <ul style="list-style-type: none"> <li>19100 DEF Concentration</li> <li>19110 DEF Level</li> <li>19111 DEF Level Corrected</li> <li>19115 DEF Temperature in Tank</li> <li>19400 Ambient Temperature</li> <li>19305 DEF Tank Heating State</li> </ul> </li> </ul> <p><b>NOTICE</b>  <b>For this failure code, 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. (Repair completion cannot be judged without raising the exhaust temperature even if this failure code is cleared by turning ON the starting switch)</b></p>		

No.	Cause	Procedure, measuring location, criteria and remarks
2	Defective intake air system	Check intake air system hoses, clamps, and tubes for damage and loosening. Repair as necessary.
3	Defective injector	Perform cylinder cutout mode operation to identify disabled cylinder (see "30 Testing and Adjusting", "HANDLING CYLINDER CUTOUT MODE OPERATION").
4	Oil leakage to turbocharger exhaust connector	<ol style="list-style-type: none"> <li>1. Remove turbocharger exhaust connector.</li> <li>2. Check inside of turbocharger exhaust connector for adhesion of oil and fuel.</li> </ol> <p><b>NOTICE</b></p> <ul style="list-style-type: none"> <li>• If oil or fuel is found, visually check for oil leaks from EGR valve and turbocharger. Repair abnormality, if any.</li> <li>• Wipe off oil or fuel sticking to piping.</li> </ul>
5	Oil leakage into exhaust connector or duct to KDPF	<p>Check the exhaust system between the turbocharger and KDPF to check for oil or fuel flow into KDPF.</p> <ul style="list-style-type: none"> <li>• Wipe stained oil or fuel off clean, if any.</li> <li>• If there is a trace of oil or fuel flowing into KDPF, check for KDPF and clean or replace it as necessary.</li> </ul>
6	KDPF outlet temperature sensor installation error	<p>For details, see "50 Disassembly and Assembly", "REMOVE AND INSTALL KDPF ASSEMBLY" and "DISASSEMBLE AND ASSEMBLE OF KDPF ASSEMBLY". Repair as necessary.</p> <p>For details, see "Remove and Install KDPF Assembly", and "DISASSEMBLE AND ASSEMBLE OF KDPF ASSEMBLY" in Chapter 50 DISASSEMBLY AND ASSEMBLY. Repair as necessary.</p>
7	Defective KDPF temperature sensor	If the failure code is not cleared after performing above-mentioned troubleshooting, replace KDPF temperature sensor.
8	Defective engine controller	If this failure code is kept displayed, or is displayed again after above checks are performed, engine controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)

### Loaded Diagnostics Operation to Confirm Failure Correction

Check if the repair has been completed with the following procedure:

(Make sure this failure code is not displayed after this procedure.)

1. Turn the starting switch from OFF to ON.

**NOTICE**

**The failure code is cleared once when starting switch is turned from OFF position to ON position. Check that cleared failure code is not displayed again when engine runs at low idle speed.**

2. Start the engine and run it at low idle speed for 2 minutes.

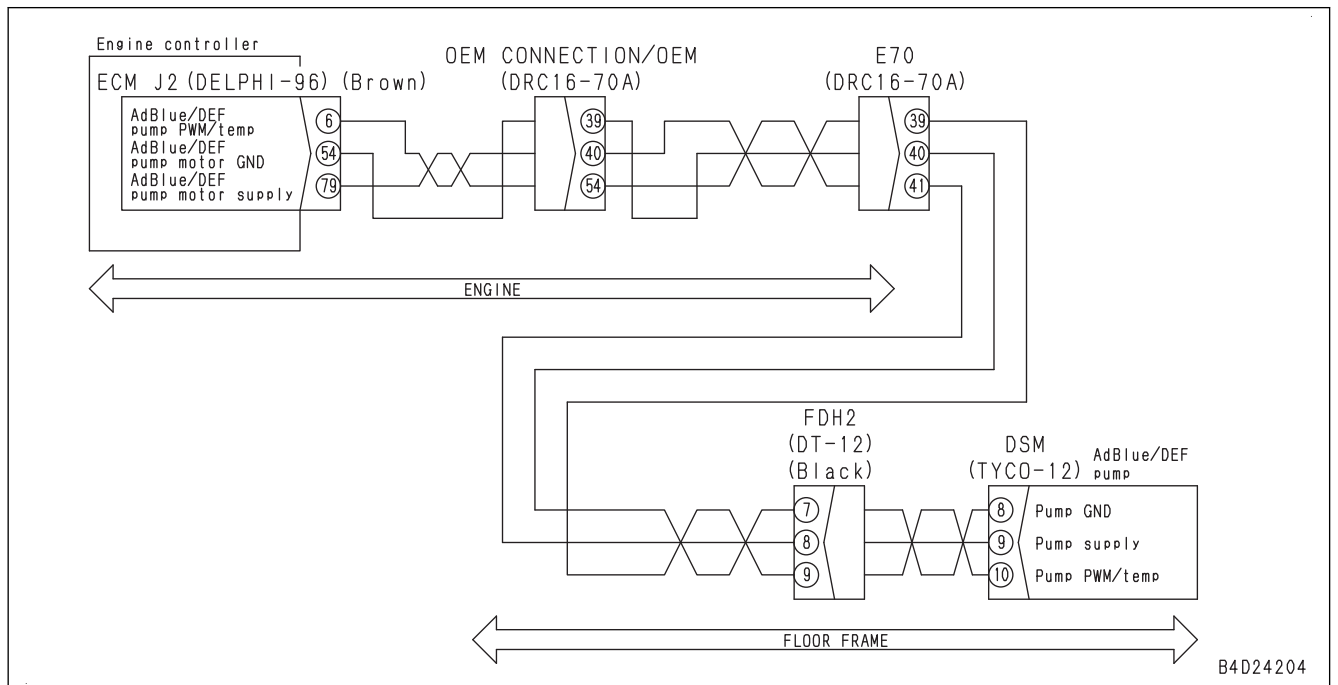
**NOTICE**

**If this failure code is displayed when starting switch is turned to ON position but engine is not started, perform troubleshooting for following failure codes as well after finishing troubleshooting and repair for this code.**

- [CA3319] KDPF Outlet Temperature Sensor Low Error
- [CA3321] KDPF Outlet Temperature Sensor High Error

No.	Cause	Procedure, measuring location, criteria and remarks	
4	Ground fault in wiring harness (contact with GND circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J2 and DSM, and connect T-adaptor to either female side.	
		Resistance Between ECM J2 (female) (6) or DSM (female) (10) and ground	Min. 100 kΩ
		Between ECM J2 (female) (79) or DSM (female) (9) and ground	Min. 100 kΩ
5	Defective DEF pump	If failure code is still displayed after above checks, DEF pump may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)	
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.)	

**Circuit diagram related to DEF pump**





**Failure Code [CA3868]**

Action level	Failure code	Failure	DEF Tank Sensor Datalink Timeout Error (Engine controller system)
L01	CA3868		
Detail of failure	The engine controller cannot receive the data of the DEF tank sensor due to error of communication with the DEF tank sensor.		
Action of controller	Advances to Inducement strategy.		
Phenomenon on machine	<ul style="list-style-type: none"> <li>The DEF level, quality, and temperature cannot be measured.</li> <li>NOx emission may increase or ammonia may be exhausted because DEF injection works inappropriately.</li> <li>Engine power deration according to inducement strategy.</li> </ul>		
Related information	<ul style="list-style-type: none"> <li>For the inducement failure codes, refer “List of failure codes related to Inducement” of “Troubleshooting Points for Urea SCR System”.</li> <li>The DEF tank is a smart sensor which performs CAN communication with the engine controller together with the other sensors.</li> <li>If the sensor connector or smart sensor (power supply) relay connector is disconnected, this failure code is displayed.</li> <li>The failure codes of the CAN communication related to the engine sensor are [CA2771], [CA3232], [CA3868], [CA3911], [CA4151], and [CA4152]. If all of these failure codes are displayed, the cause may be defective smart sensor power supply relay, defective relay system, or ground fault, short circuit, or hot short circuit of the harness (CAN communication line).</li> <li>Since signal of active CAN communication line is pulse voltage, it cannot be measured by using multimeter.</li> <li>The DEF tank sensor is composed of the DEF level sensor, DEF temperature sensor, and DEF quality sensor and provides CAN communication with the engine controller integrated into one sensor controller.</li> <li>After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.</li> </ul>		

No.	Cause	Procedure, measuring location, criteria and remarks	
1	Defective wiring harness connector	Perform checks on causes 1 to 10 for failure code [CA2771].	
2	Open circuit and short circuit in wiring harness (broken or short-circuited communication line)	<ul style="list-style-type: none"> <li>Communication line</li> </ul> As CAN terminating resistors of 120 ohm are connected in parallel, therefore, when circuit resistance is measured at connector of CAN communication, if combined resistance is 60 ohm, there is no open circuit.	
		1. Turn starting switch to OFF position. 2. Check that system operating lamp does not light up, and then turn battery disconnect switch to OFF position. 3. Disconnect connectors ECM J2 and UREA and connect T-adapters to each female side.	
		Resistance	Between UREA (female) (2) and (1)
		Between ECM J2 (female) (21) and (45)	ΩApprox. 60 Ω

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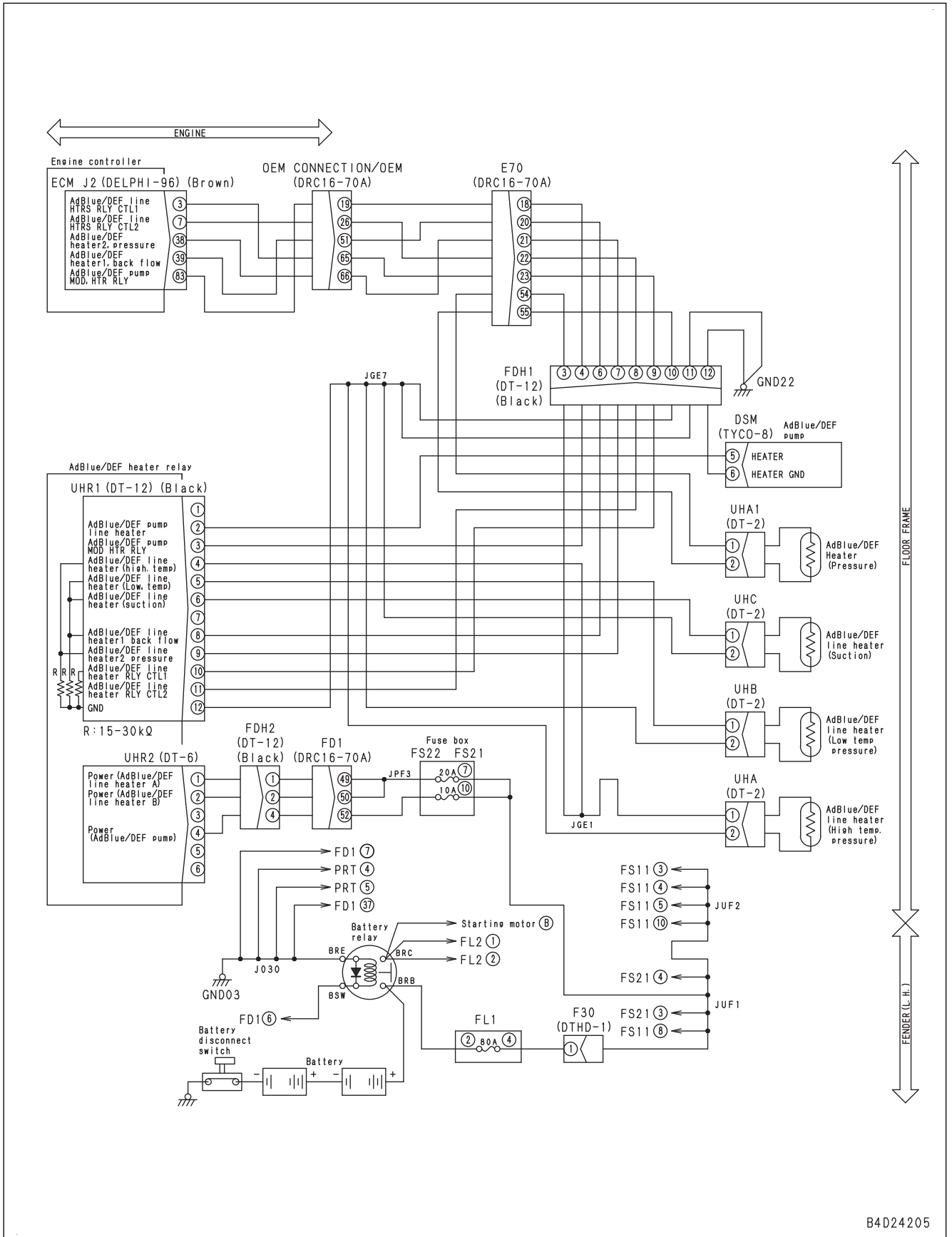
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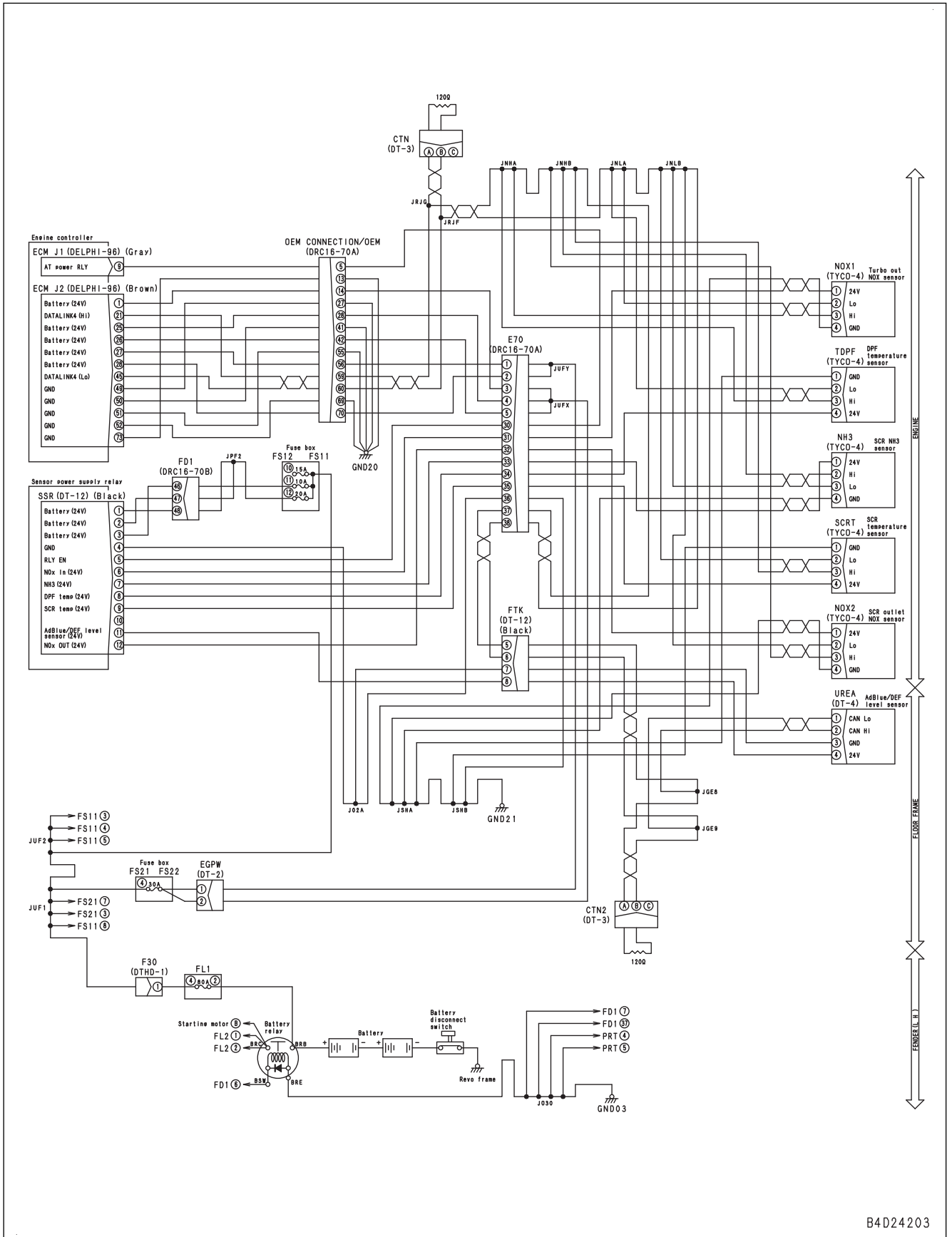
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### Electrical Circuit Diagram of DEF Heater Relay



B4D24205

### Electrical circuit diagram related to SCR temperature sensor



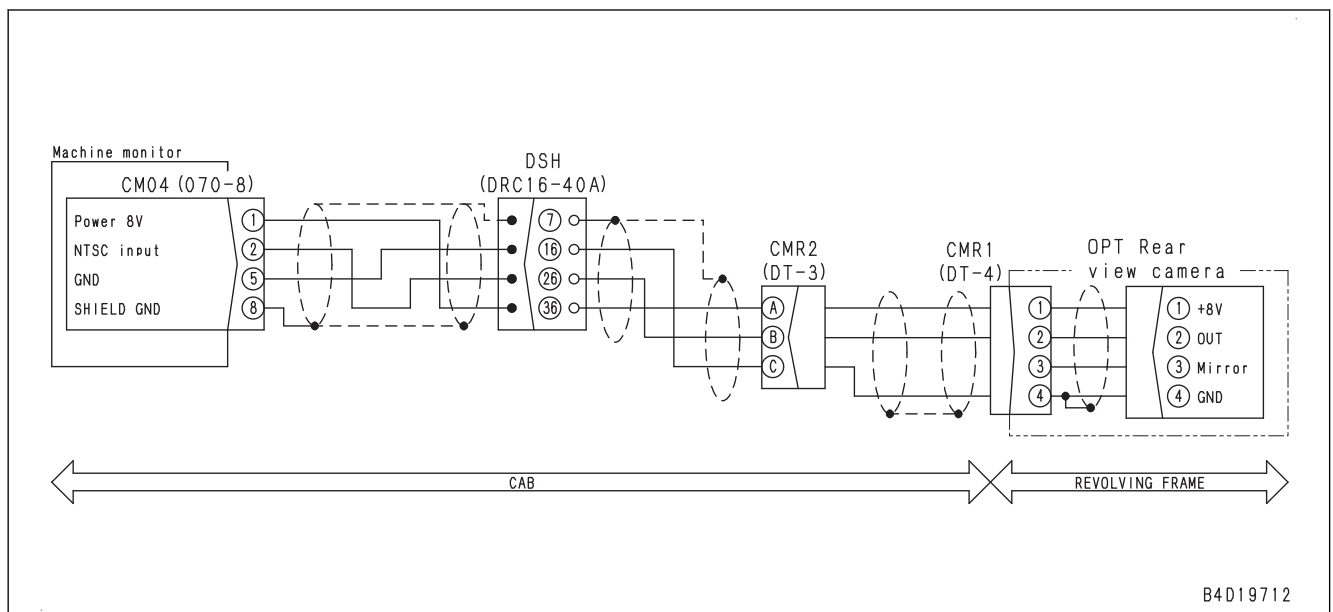
No.	Cause	Procedure, measuring location, criteria and remarks		
4	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors ECM J2 and UHR1, and connect T-adapter to female side of ECM J2.		
		Continuity	Between ECM J2 (female) (39) and each pin other than pin (39)	No continuity
5	Defective DEF line heater	1. Turn starting switch to OFF position. 2. Disconnect the connectors UHB and UHC, and connect the T-adapter to each male side.		
		Resistance	Between UHB (male) (1) and (2)	5 to 40 Ω
			Between UHC (male) (1) and (2)	5 to 40 Ω
6	Ground fault in DEF line heater	1. Turn the starting switch to OFF position. 2. Disconnect the connectors UHB and UHC, and connect the T-adapter to each male side.		
		Resistance	Between UHB (male) (1) and ground	Min. 1 MΩ
			Between UHC (male) (1) and ground	Min. 1 MΩ
7	Defective power supply to DEF line heater	1. Turn the starting switch to OFF position. 2. Disconnect connectors UHR2, and connect T-adapter to female side of UHR2. 3. Turn the starting switch to ON position.		
		Voltage	Between UHR2 (female) (1) and ground	20 to 30 V
			Between UHR2 (female) (2) and ground	20 to 30 V
8	Defective DEF heater relay	1. Turn starting switch to OFF position. 2. Check that system operating lamp does not light up, and then turn the battery disconnect switch OFF. 3. Disconnect connector UHR1 and UHR2, and replace DEF heater relay. 4. Turn the battery disconnect switch ON. 5. Perform the "DEF Line Heater Relay 1 Test" by starting the engine in low ambient temperature (5 °C or below), or by referring "Service Mode" of setting and operating machine monitor, "METHOD FOR OPERATING TESTING MENU (SCR SERVICE TEST)".		
		If this failure code is cleared, the original DEF heater relay is defective.		
9	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 [DAF8KB]

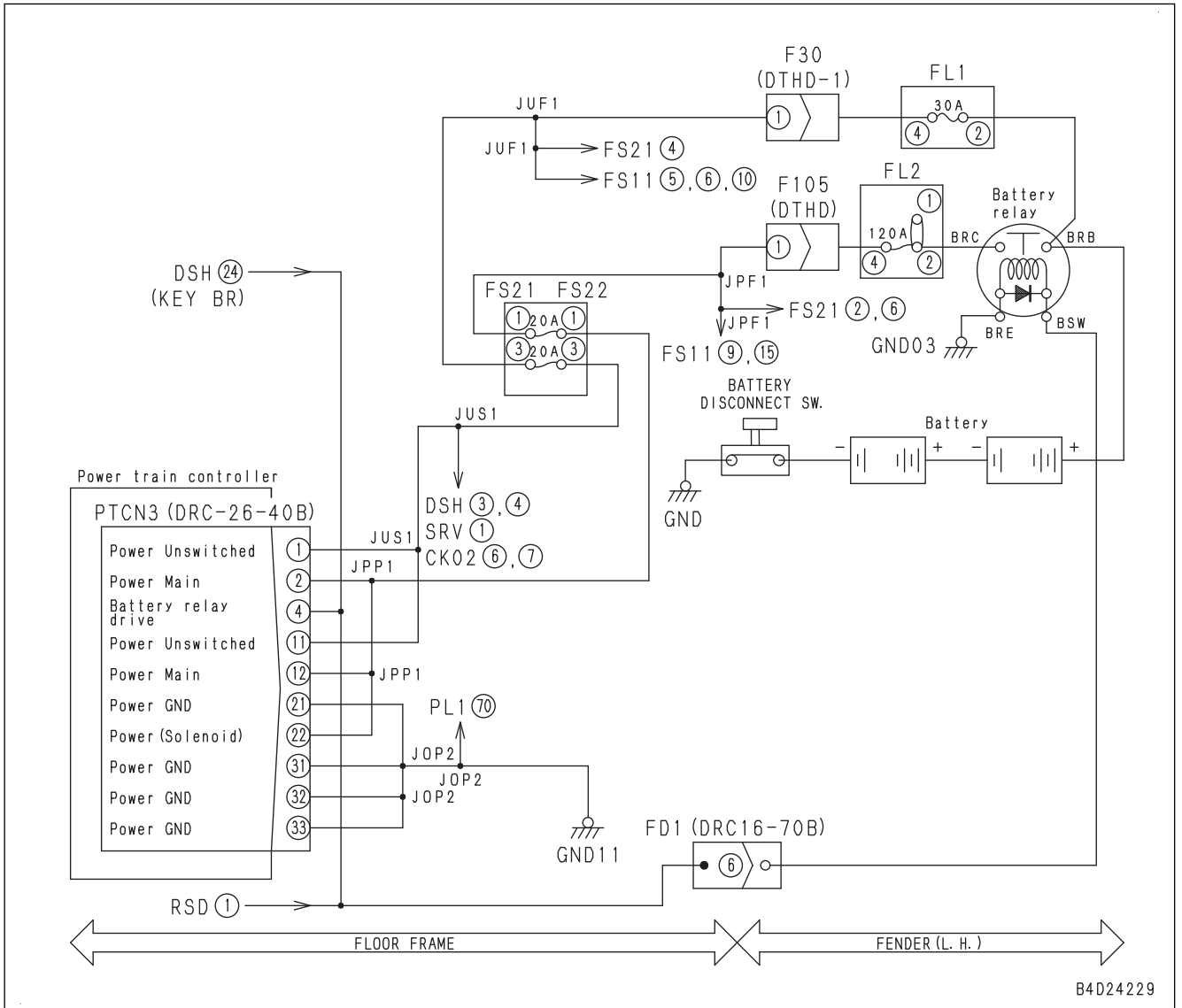
Action level	Failure code	Failure	Camera Power Supply Short Circuit (Machine monitor system)
L03	DAF8KB		
Detail of failure	Output power supply voltage (rating: 8 V) from machine monitor to camera is 10 V and above when no current is outputted.		
Action of controller	<ul style="list-style-type: none"> <li>Stops output power supply voltage to camera.</li> <li>Even if cause of failure disappears, machine does not become normal until starting switch is turned to OFF position.</li> </ul>		
Phenomenon on machine	Camera image is not displayed on machine monitor.		
Related information	After repair is completed, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective rearview camera (internal short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector CMR1 of rearview camera, and turn starting switch to ON position. If the failure code is cleared after disconnecting rearview camera to perform operation of reproducing procedure, internal defect of rearview camera is detected.		
2	Defective rearview monitor	1. Turn starting switch to OFF position. 2. Disconnect connector CM04, and connect T-adapter to male side. 3. Turn starting switch to ON position.		
		Voltage	Between CM04 (male) (1) and ground	6 to 10 V
3	Hot short circuit in wiring harness (contact with 24 V circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector CMR1 and connect T-adapter to female side. 3. Turn starting switch to ON position. (Disconnect rear view camera and check that it is normal, in advance.)		
		Voltage	Between CM04 (female) (1) and (8)	Max. 10 V

### Circuit Diagram of Camera Power Supply



### Circuit Diagram Related to Power Train Controller Power Source



**Failure Code [DBRLKB] (Machine with Gateway Function Controller)**

Action level	Failure code	Failure	Operating Lamp short circuit (ICT controller) (ICT Sensor Controller System)
-	DBRLKB		
Detail of failure	ICT sensor controller determines that system operating lamp circuit shorts because voltage of output circuit does not become Low level while ICT sensor controller outputs current to system operating lamp.		
Action of controller	None in particular		
Phenomenon on machine	Do not turn the battery disconnect switch to OFF position while the system operating lamp is lit. If the battery disconnect switch is turned to OFF position, the memory data stored in ICT sensor controller terminal may be destroyed.		
Related information	<ul style="list-style-type: none"> <li>After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.</li> <li>Although ICT sensor controller is not able to light up system operating lamp, no trouble will result unless battery disconnect switch is turned to OFF position.</li> <li>When controller lights up system operating lamp, output circuit voltage is at low level.</li> </ul>		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Remove fuse No.6 in fuse box FS12. 3. Disconnect connectors CM05, ST3, CK01, CE03, IB3, and LBU, and connect T-adapter to female side of LBU.		
		Resistance	Between LBU (female) (1) and (2)	Min. 1 MΩ
2	Defective ICT sensor controller	If no failure is found by preceding checks, ICT sensor controller is defective. (Since this is an internal defect, troubleshooting cannot be performed).		

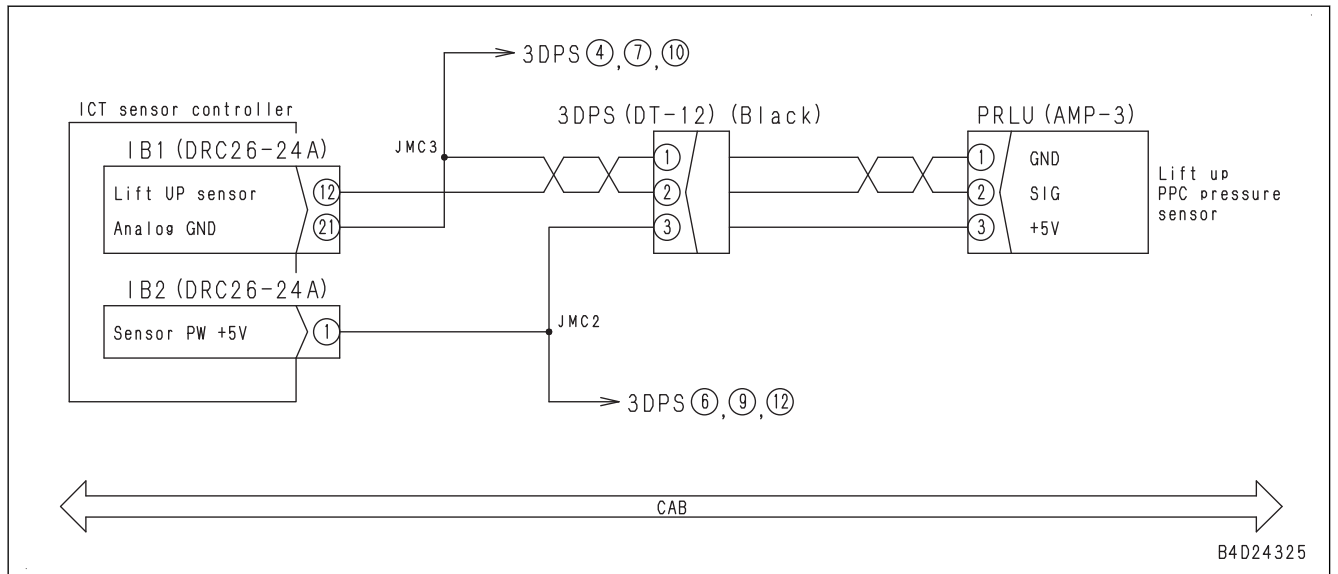
**Failure Code [DDKRKB]**

Action level	Failure code	Failure	Offset Switch DOWN:Short (ICT Sensor Controller System)
L01	DDKRKB		
Detail of failure	Both 2 line of NO (Normally Open) and NC (Normally Close) of cut/fill offsets switch DOWN circuit are close (switch is turned on).		
Action of controller	Judges that cut/fill offsets switch is not pressed.		
Phenomenon on machine	When cut/fill offsets switch (LOWER) is pressed, design surface does not lower.		
Related information	<ul style="list-style-type: none"> <li>Before performing troubleshooting, check that no related failure code is displayed. (If failure code [DBRQKR] is displayed on the machine monitor, perform troubleshooting for it first.)</li> <li>Device name of "offset switch" is displayed on the machine monitor with failure code. It is described as "cut/fill offsets switch" in the table of troubleshooting and other chapter.</li> </ul>		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective cut/fill offsets switch (LOWER)	1. Turn the starting switch to OFF position. 2. Disconnect connector OFS2, and connect T-adapter to male side. 3. Turn cut/fill offsets switch (LOWER) ON/OFF to perform troubleshooting.  <b>REMARK</b> "Switch OFF": Release, "Switch ON": Press			
		Resistance	Between OFS2 (male) (3) and (2)	Switch: OFF	Max. 1 Ω
				Switch: ON	Min. 1 MΩ
			Between OFS2 (male) (1) and (2)	Switch: OFF	Min. 1 MΩ
				Switch: ON	Max. 1 Ω
2	Ground fault in wiring harness (contact with ground circuit)	If there is no failure in check on cause 2, this check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect connectors OFS1 and IB2, and connect T-adapter to either female side.			
		Resistance	Between ground and OFS2 (female) (1) or IB2 (female) (15)	Min. 1 MΩ	
			Between ground and OFS2 (female) (3) or IB2 (female) (5)	Min. 1 MΩ	
3	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors OFS2 and IB2, and connect T-adapter to female side of IB2.			
		Continuity	Between IB2 (female) (15) and each pin other than (15)	No continuity (No sound is heard.)	
			Between IB2 (female) (5) and each pin other than (5)	No continuity (No sound is heard.)	

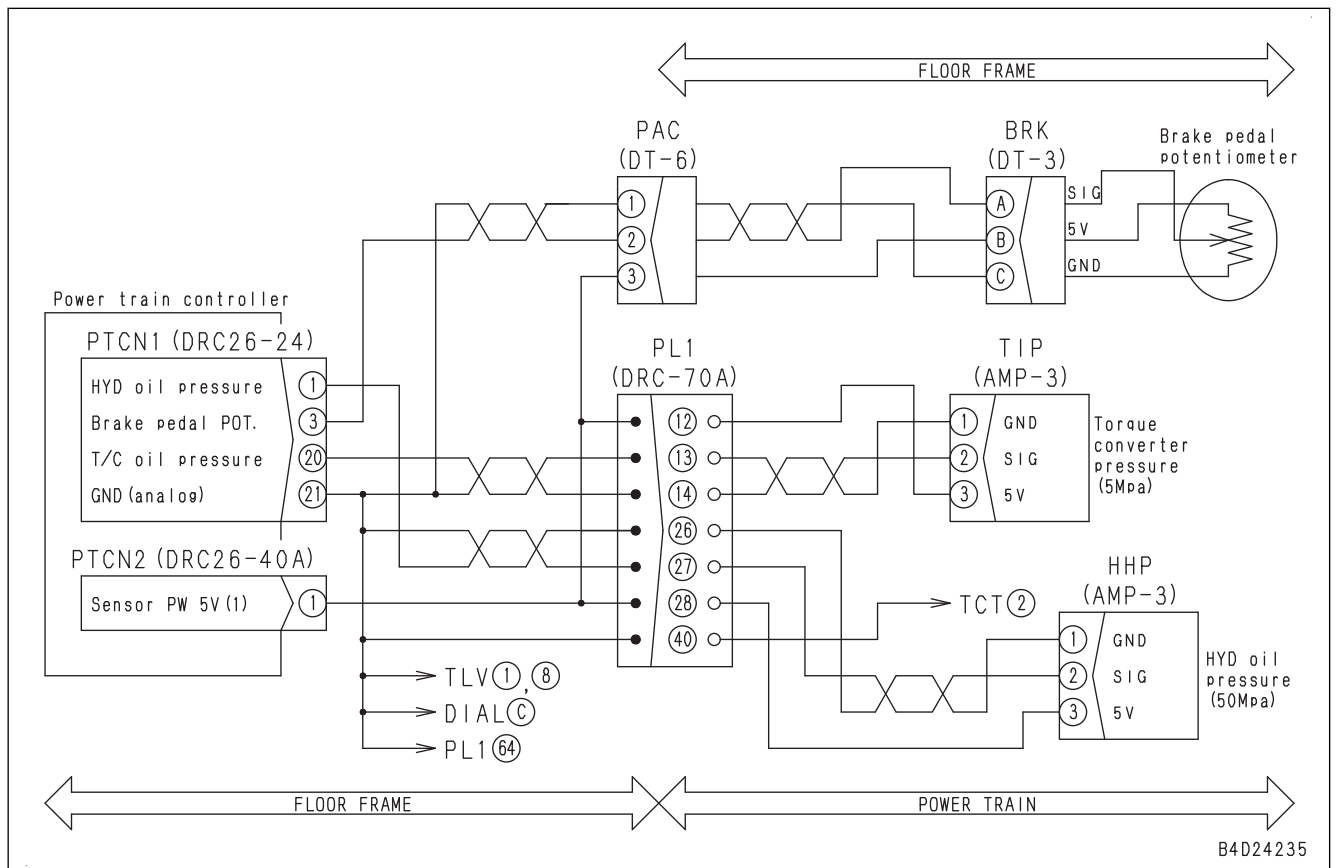
No.	Cause	Procedure, measuring location, criteria and remarks	
5	Defective ICT sensor controller	If no failure is found by preceding checks, ICT sensor controller is defective. Reference 1. Turn the starting switch to OFF position. 2. Insert T-adapter into connector IB1. 3. Turn the starting switch to ON position.	
Voltage		Between IB1 (12) and (21)	0.5 to 4.5 V

**Circuit Diagram Related to Blade RAISE PPC Oil Pressure Sensor**



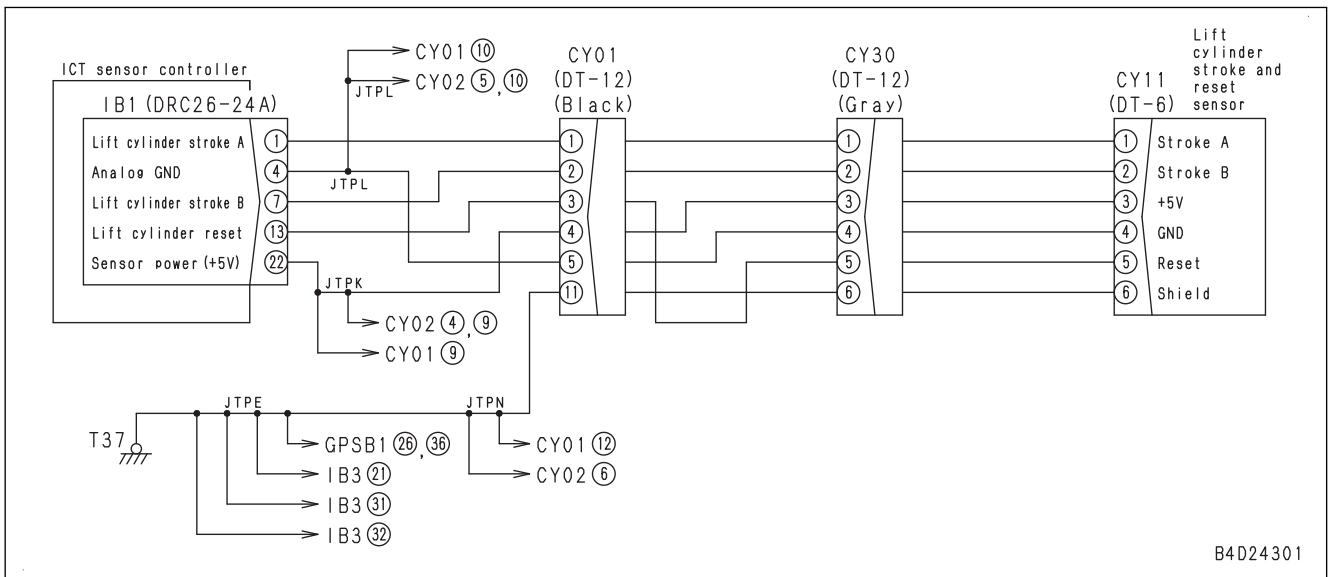
No.	Cause	Procedure, measuring location, criteria and remarks		
4	Open circuit in wiring harness (wire breakage or defective contact)	1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN1, PTCN2 and BRK, and connect T-adapters to each female side.		
			If power supply voltage in check on Cause 1 is normal or failure code is still displayed after above checks on Cause 3, this check is not required. Between PTCN1 (female) (21) and BRK (female) (C)	Max. 1 Ω
		Resistance	If power supply voltage in check on Cause 1 is normal or failure code is still displayed after above checks on Cause 3, this check is not required. Between PTCN2 (female) (1) and BRK (female) (B)	Max. 1 Ω
			If failure code is still displayed after above checks on Cause 3, this check is not required. Between PTCN1 (female) (3) and BRK (female) (A)	Max. 1 Ω
5	Defective power train controller	If failure code is still displayed after above checks, power train controller is defective. • Reference 1. Turn starting switch to OFF position. 2. Insert T-adapter into connector PTCN1. 3. Turn starting switch to ON position. 4. Depress brake pedal to perform troubleshooting.		
		Voltage	Between PTCN1 (3) and (21)	0.5 to 4.5 V

**Circuit Diagram of Brake Pedal Potentiometer**



B4D24235

### Circuit Diagram of Stroke Reset Sensor for Blade Lift Cylinder

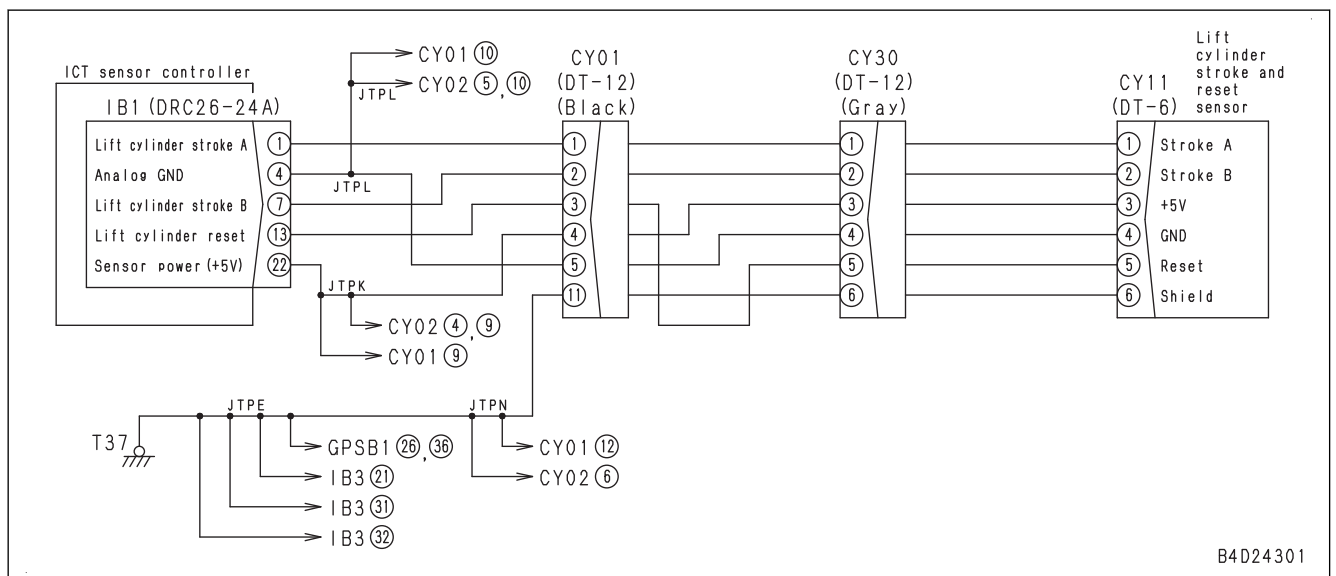


**Failure Code [DKSLL8]**

Action level	Failure code	Failure	Left lift Stroke sensor :Signal mismatch (ICT Sensor Controller System)
L01	DKSLL8		
Detail of failure	Rotating angles calculated from phase A and B outputs of stroke and reset sensor for L.H. blade lift cylinder do not match.		
Action of controller	Stops automatic control of blade.		
Phenomenon on machine	<ul style="list-style-type: none"> <li>Automatic control of blade is turned OFF.</li> <li>Automatic control of blade is not turned ON even when auto/manual switch is pressed.</li> </ul>		
Related information	<ul style="list-style-type: none"> <li>After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.</li> <li>“Cylinder stroke reading error” is displayed in “Slope control key” of control box.</li> <li>Device name of “LH blade lift cylinder stroke sensor” is displayed on the machine monitor with failure code. It is described as “Stroke and reset sensor for L.H. blade lift cylinder” in the table of troubleshooting and other chapter.</li> </ul>		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Stroke and reset sensor for L.H. blade lift cylinder	If the problem is not solved after disconnecting and reconnecting each connector in the circuit 10 times, stroke reset sensor for L.H. blade lift cylinder is defective.

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



B4D24301

## Failure Code [DW7BKA]

Action level	Failure code	Failure	Fan Reverse Solenoid Open Circuit (Power train controller system)
L01	DW7BKA		
Details of failure	When controller drives fan reverse solenoid, no current flows through circuit.		
Action of controller	Stops driving fan reverse solenoid.		
Phenomenon on machine	Fan reverse function cannot be used.		
Related information	<ul style="list-style-type: none"> <li>Output condition to fan reverse solenoid can be checked with monitoring function. (Code: 40909)</li> <li>After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position and select fan reverse mode.</li> </ul>		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective fan reverse solenoid (internal open circuit)	1. Turn the starting switch to OFF position. 2. Disconnect the connector FAR, and connect T-adapter to male side.		
		Resistance	Between FAR (male) (1) and (2)	34 to 44 Ω
2	Open circuit, short circuit, ground fault, hot short circuit of wiring harness, or defective power train controller	1. Turn starting switch to OFF position. 2. Disconnect connector FAR and connect T-adapter to female side. 3. Turn starting switch to ON position. 4. Shake the wiring harness by hand while measuring the voltage. If the voltage becomes 0 V while shaking, wiring harness has open circuit.		
		Voltage	Between FAR (female) (1) and (2)	Max. 4.5 V
3	Open or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector PTCN3 and connect T-adapter to female side.		
		<b>REMARK</b> If resistance value is Min. 1 MΩ, wiring harness has open circuit. If resistance value is Max. 1 Ω, wiring harness has short circuit.		
4	Open circuit in wiring harness (wire breakage or defective contact of connector)	Resistance		
		Between PTCN3 (female) (17) and FAR (female) (1)	Max. 1 Ω	
5	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector FAR and connect T-adapter to female side. 3. Turn starting switch to ON position.		
		Voltage	Between FAR (female) (1) and ground	Max. 4.5 V
6	Defective power train controller	If failure code is still displayed after above checks on open or short circuit in wiring harness, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN3, and FAR, and connect T-adapters to each female side.		
		Resistance	Between PTCN3 (female) (3) and FAR (female) (2)	Max. 1 Ω

**Failure Code [DXH4KY]**

Action level	Failure code	Failure	T/M 1st Clutch ECMV Solenoid Hot Short Circuit (Power train controller system)
L03	DXH4KY		
Detail of failure	Current flows constantly when controller drives solenoid circuit of the transmission 1st clutch ECMV solenoid.		
Action of controller	<ul style="list-style-type: none"> <li>Stops driving solenoid circuit of the transmission 1st clutch ECMV.</li> <li>Restricts operations of engine and transmission.</li> </ul>		
Phenomenon on machine	<ul style="list-style-type: none"> <li>Automatic gear shift function of travel does not work.</li> <li>Once machine stops, engine speed is restricted to medium (half) speed.</li> <li>Once machine stops, selectable gear speeds are restricted to F1 and R1.</li> </ul>		
Related information	<ul style="list-style-type: none"> <li>Output state to 1st clutch ECMV solenoid can be checked with monitoring code. (Code: 31612)</li> <li>After completion of repair, check that the failure code is cleared by the following operation. Method: Start the engine + drive the machine in F1 or R1</li> </ul>		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector 1_SOL, and connect T-adapter to female side. 3. Turn starting switch to ON position.		
		Voltage	Between 1_SOL (female) (1) and ground	Max. 4.5 V
2	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN3 and 1_SOL, and connect T-adapter to female side of PTCN3.		
		<b>REMARK</b> Check it by using multimeter in continuity mode.		
		Continuity	Between PTCN3 (female) (27) and each pin other than (27)	No continuity (no sound is heard)
		1. Turn starting switch to OFF position. 2. Disconnect connectors PTCN1 to 3 and 1_SOL, and connect T-adapters to female sides of PTCN3.		
		<b>REMARK</b> Check it by using multimeter in continuity mode.		
		Continuity	Between each pin of PTCN3 (female) (27) to PTCN1 (female).	No continuity (no sound is heard)
			Between each pin of PTCN3 (female) (27) to PTCN2 (female).	No continuity (no sound is heard)
3	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 [DXHTKA]**

Action level	Failure code	Failure	Blade Tilt Right Head EPC Solenoid Open Circuit (ICT Sensor Controller System)
L01	DXHTKA		
Detail of failure	When controller drives blade tilt RIGHT head EPC solenoid, no current flows through circuit.		
Action of controller	Stops driving blade tilt RIGHT head EPC solenoid.		
Phenomenon on machine	R.H. cylinder for blade tilt or pitch cannot be retracted.		
Related information	<ul style="list-style-type: none"> <li>Output state to blade tilt RIGHT head EPC solenoid can be checked with monitoring function. (Code: 90800 RH Cylinder Head EPC Current (F/B))</li> <li>After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position, and operate blade control lever (pitch backward).</li> </ul>		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective blade tilt R.H. head EPC solenoid (internal open circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connector TRHE, and connect T-adapter to male side.		
		Resistance	Between TRHE (male) (1) and (2)	2 to 12 Ω
2	Open circuit, short circuit, ground fault, hot short circuit of wiring harness, or defective ICT sensor controller	1. Turn the starting switch to OFF position. 2. Disconnect connector TRHE, and connect T-adapter to female side. 3. Turn the starting switch to ON position. 4. Shake the wiring harness by hand while measuring the voltage. If the voltage becomes 0 V while shaking, wiring harness has open circuit at around this point.		
		Voltage	Between TRHE (female) (1) and (2)	Max. 4.5 V
3	Open or short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector GPSB2, and connect T-adapter to female side.		
		<b>REMARK</b> If resistance value is 1 MΩ and above, wiring harness has open circuit. If it is 1 Ω and below, wiring harness has short circuit.		
4	Open circuit in wiring harness (wire breakage or defective contact of connector)	If no failure is found by check on cause 3, this check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect connectors GPSB2 and TRHE, and connect T-adapter to each female side.		
		Resistance	Between GPSB2 (female) (40) and TRHE (female) (1)	Max. 1 Ω
	Between GPSB2 (female) (39) and TRHE (female) (2)		Max. 1 Ω	
5	Defective GNSS receiver	If no failure is found by preceding checks, GNSS receiver is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

No.	Cause	Procedure, measuring location, criteria and remarks						
4	Defective diode HTD (internal open circuit or short circuit)	<p><b>REMARK</b></p> <p>If no failure is found in primary side by check on cause 3, this check is not required.</p> <ol style="list-style-type: none"> <li>Turn starting switch to OFF position.</li> <li>Disconnect connector HTD, and connect T-adaptor to diode.</li> </ol> <p><b>REMARK</b></p> <p>Measure it with diode range of multimeter.</p>						
		Continuity	Between HTD (male) (1) (+) and (2) (-)	No continuity				
			Between HTD (male) (2) (+) and (1) (-)	Continuity				
5	Defective starting switch	<p><b>REMARK</b></p> <p>If no failure is found in primary side by check on cause 3, this check is not required.</p> <ol style="list-style-type: none"> <li>Turn starting switch to OFF position.</li> <li>Turn disconnect switch to OFF position.</li> <li>Disconnect connector KEY, and connect T-adaptor to male side.</li> <li>Turn starting switch to OFF and the HEAT positions to perform troubleshooting.</li> </ol>						
		Resistance	KEY (male) (2) to (5)	<table border="1"> <tr> <td>OFF</td> <td>Min. 1 MΩ</td> </tr> <tr> <td>HEAT</td> <td>Max. 1 Ω</td> </tr> </table>	OFF	Min. 1 MΩ	HEAT	Max. 1 Ω
		OFF	Min. 1 MΩ					
HEAT	Max. 1 Ω							
6	Defective intake air heater (internal open circuit)	<ol style="list-style-type: none"> <li>Turn starting switch to OFF position.</li> <li>Disconnect HT/A terminal.</li> </ol>						
		Continuity	Between HT/A wiring harness and ground	Continuity				
7	Defective heater relay (does not turn ON) (terminal HT/A)	If failure code is still displayed after above checks on cause 3 and heater relay operation sound is not heard, the heater relay is defective.						
8	Ground fault in wiring harness (contact with ground circuit)	<p>If failure code is still displayed after above checks on cause 3, this check is not required.</p> <ol style="list-style-type: none"> <li>Turn starting switch to OFF position.</li> <li>Turn battery disconnect switch to OFF position.</li> <li>Disconnect connector KEY, CM01, HTD, terminal HT/C, HT/B, and BRC terminal.</li> </ol>						
		Resistance	Between heater relay HT/C terminal (wiring harness side) and ground	Min. 1 MΩ				
			Between HT/B (input terminal on contact side of heater relay) and ground	Min. 1 MΩ				



### E-42 KOMTRAX System Does Not Operate Correctly

Failure	KOMTRAX system does not operate normally.
Related information	<ul style="list-style-type: none"> <li>Perform following troubleshooting if administrator of KOMTRAX system requests to check whether failure occurs in system on machine.</li> <li>Even when KOMTRAX system is defective, no problem is displayed on machine.</li> <li>All troubleshooting can be checked on the service menu of the machine monitor.</li> <li>For checking of Terminal Status, see Testing and Adjusting, "Examine KOMTRAX Settings (Terminal State)".</li> <li>For checking of GPS &amp; Communication State, see Testing and Adjusting, "Examine KOMTRAX Settings (GPS &amp; Communication State)".</li> </ul>

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Transmitting error 1	1. Turn starting switch to ON position. 2. Display Terminal Status screen.		
		Monitoring display	Check item: KOMTRAX Communication	State of radio station establishment
2	Defective GPS positioning	1. Turn starting switch to ON position. 2. Display GPS & Communication Status screen.		
		Monitoring display	Check item: Positioning	N ###.##.## (Latitude)
				E ###.##.## (Longitude)
				Positioning in Progress
If the latitude and longitude are not displayed within 5 minutes in an open-sky area, call the KOMTRAX service hot-line for advice.				
3	Defective communication environment	1. Turn starting switch to ON position. 2. Display GPS & Communication Status screen.		
		Monitoring display	Check item: Communication	Communication reception range level 1 to 3
		Contact KOMTRAX service hot-line if communication reception range is not within level 1 to 3.		
4	Transmitting error 2	1. Turn starting switch to ON position. 2. Display GPS & Communication Status screen.		
		Monitoring display	Check item: Number of message(s) not yet sent	0 to 100 (normally 0)

**E-72 Finished Surface is Inaccurate (The Average Height of Finished Surface is Lower Than Designed Surface or Blade Does Not Touch the Surface)**

Failure	Finished surface is inaccurate (The average elevation of finished surface is lower than designed surface or blade does not touch the surface).
Related information	<ul style="list-style-type: none"> <li>• Perform troubleshooting outdoors or at a place open to the sky to acquire a sufficient number of satellites.</li> <li>• Before performing troubleshooting, check that “PROJECT FILE” is set correctly as specified in the “Project File Setting” section of the Operation and Maintenance Manual.</li> <li>• Before performing troubleshooting, check that “Elevation Control Key” and “Slope Control Key” are green on the control box screen.</li> </ul>

No.	Cause	Procedure, measuring location, criteria and remarks
1	Improper adjustment amount of blade elevation	<ol style="list-style-type: none"> <li>1. Check the blade elevation and its adjustment amount. For details, see “CHECK AND ADJUST BLADE ELEVATION” in the Operation and Maintenance Manual.</li> <li>2. If the calculated adjustment amount exceeds 50 mm, perform troubleshooting for “WHEN CHECKING AND ADJUSTING THE BLADE ELEVATION, THE VALUE IS DIFFERENT FROM ACTUAL MACHINE” in E mode.</li> </ol>
2	Incorrect setting of dozing mode	When “Cutting & Carry” is selected, the load becomes heavy, and once blade is raised, blade is not lowered below that height. In this case, travel in reverse and restart.
3	Sharp turning on slope	After machine is turned sharp on slope or its direction is changed by stumbling over rocks, etc., the accuracy may become worse.
4	Defective IMU sensor	If the accuracy becomes worse only on a slope and it cannot be improved even after calibrating IMU sensor, IMU sensor is defective.

## H-12 All Work Equipment Operate Slowly

Failure	All work equipments operate slowly.			
Related information	<ul style="list-style-type: none"> <li>• Check that oil level in hydraulic tank is normal before performing troubleshooting.</li> <li>• Hydraulic pump pressure can be checked on the monitor. (Monitoring code: 70700)</li> </ul>			
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective PTO	Check the spline part of drive shaft.		
2	Defective steering main relief valve	Be ready with starting switch turned OFF, then perform troubleshooting with engine at high idle.		
		Steering main relief pressure	PCCS lever	Left or right stroke end
3	Defective unload valve of work equipment valve	Be ready with starting switch turned OFF, then perform troubleshooting with engine at high idle.		
		Unload pressure	Work equipment control lever	NEUTRAL
4	Defective work equipment main relief valve	Be ready with starting switch to OFF position, run the engine at high idle to perform troubleshooting		
		<b>REMARK</b> If main relief pressure is abnormal, reducing pressure valve may be defective.		
5	Defective pressure reducing valve	Be ready with starting switch to OFF position, run the engine at high idle to perform troubleshooting		
		<b>REMARK</b> Work equipment main relief valve may be defective.		
6	Improper set pressure or malfunction of self-pressure reducing valve	Be ready with starting switch turned OFF, then perform troubleshooting with engine at high idle.		
		Tilt relief pressure	Work equipment control lever	Tilt cylinder Stroke end
7	Defective HSS pump	Be ready with starting switch turned OFF, then perform troubleshooting with engine at high idle.		
		Control circuit source pressure	Work equipment control lever	NEUTRAL
8	Internal defect of PPC valve	When the troubleshooting result of cause 7 is not normal, PPC valve may have internal defect. Check it.		

## S-17 Coolant Temperature Increases Too High (Overheat)

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. <b>REMARK</b> Cracking temperature of thermostat: $70 \pm 2$ °C (Full open temperature: 83 °C)	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	<ul style="list-style-type: none"> <li>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")</li> <li>Measure compression pressure (See standard value table). (Reference: See "TESTING AND ADJUSTING", "Testing compression pressure".)</li> <li>Check piston ring and piston ring groove.</li> </ul>	Piston ring and piston replacement

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
C	-	6540-71-2720	DEF injector cap kit	■	1		Removing and installing the injector
	1	-	DEF cap	■	1		Disconnection and connection of DEF hose
	2	-	Coolant side cap	■	2		Removing and installing the coolant hose
	3	-	Injector side cap	■	1		Removing and installing the injector
D	600-919-5050	Plug (for 5/16 inch of hose diameter)	■	1		Disconnection and connection of DEF hose	
E	-	Lifting tool	●	1		Removal and installation of DEF mixing tube	

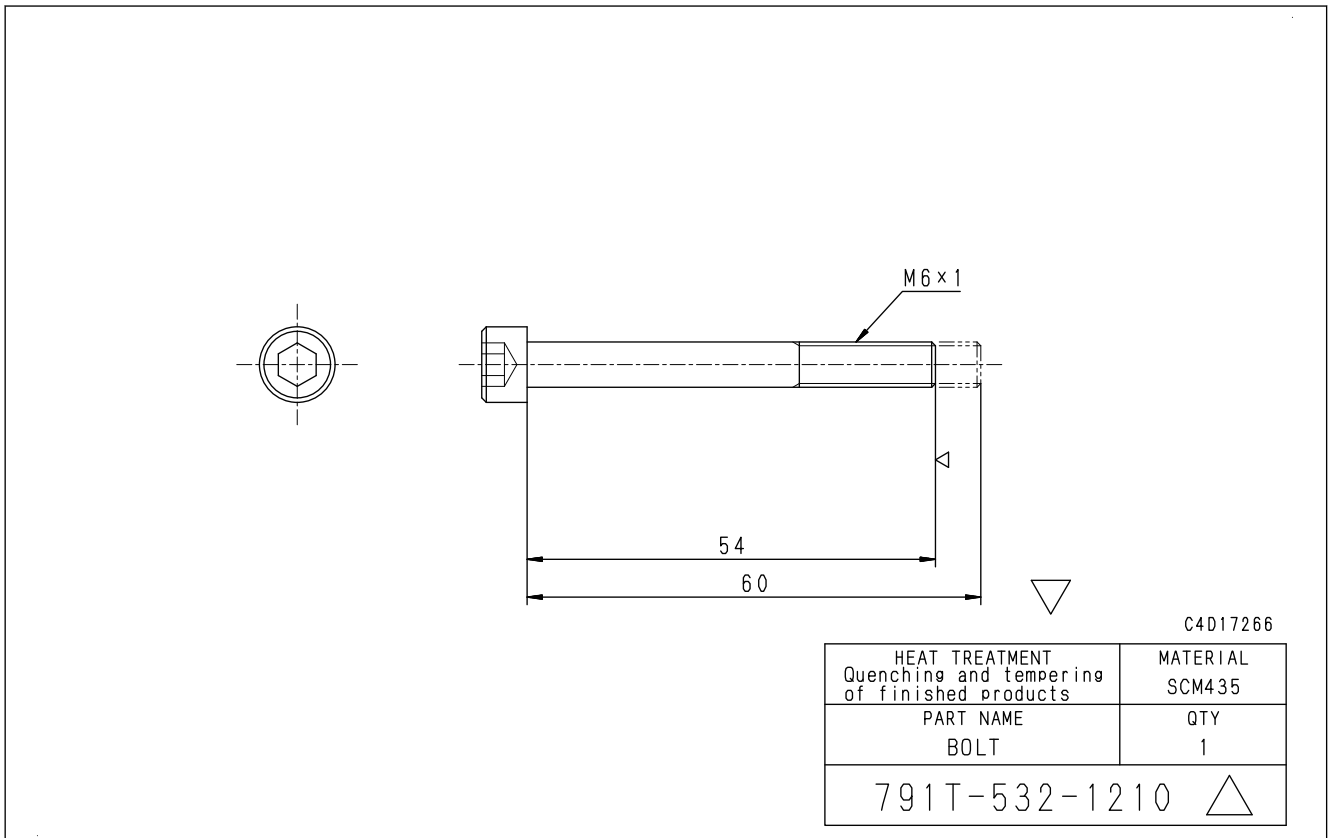
**Tools for Removal and Installation of DEF Injector**

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	-	Vinyl gloves	●	1			Disconnection and connection of DEF hose
B	6540-71-1310	Cover for DEF injector electric connector	■	1			
C	-	6540-71-2720	DEF injector cap kit	■	1		Removing and installing the injector
	1	-	DEF cap	■	1		Disconnection and connection of DEF hose
	2	-	Coolant side cap	■	2		Removing and installing the coolant hose
	3	-	Injector side cap	■	1		Removing and installing the injector
D	600-919-5050	Plug (for 5/16 inch of hose diameter)	■	1		Disconnection and connection of DEF hose	

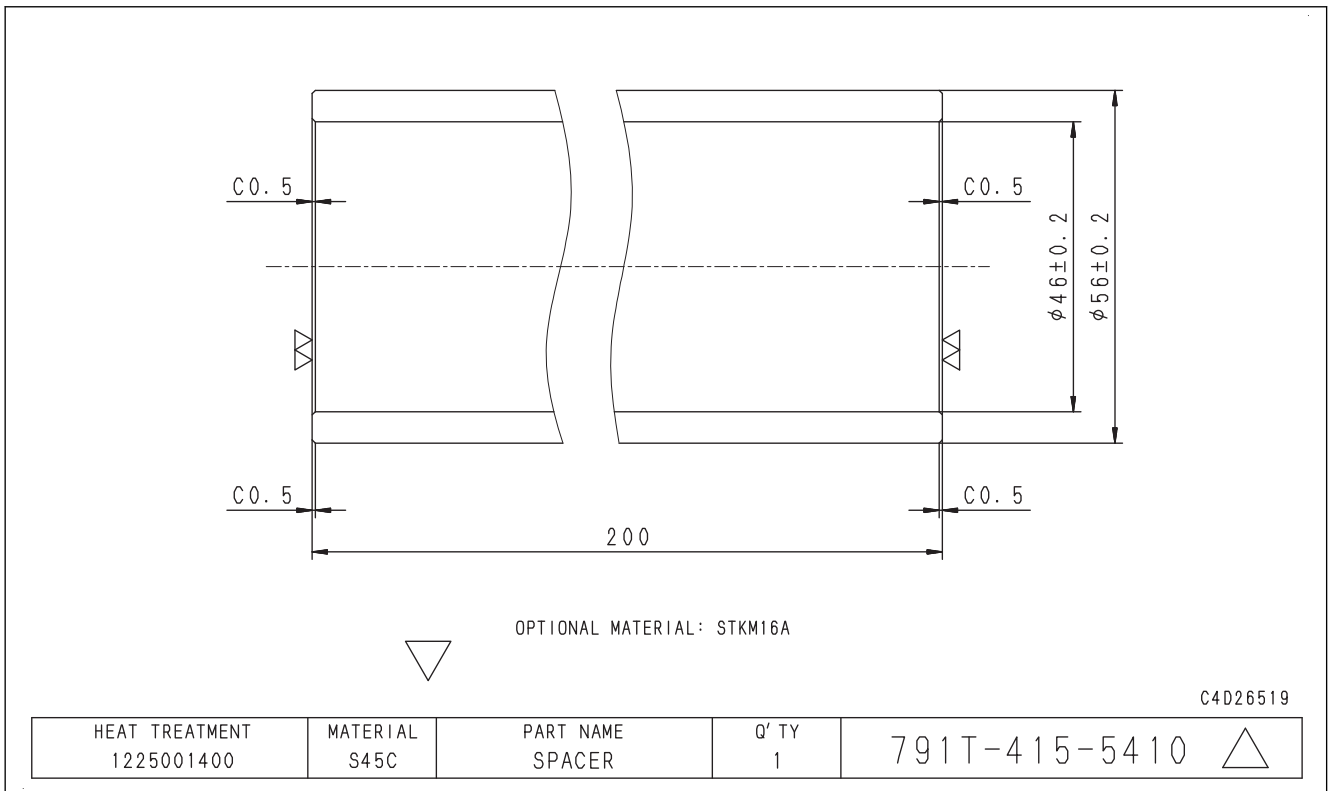
**Tools for Removal and Installation of DEF Pump**

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	-	Vinyl gloves	●	1			Disconnection and connection of DEF hose
B	600-919-5030	Plug (for 3/8 inch of hose diameter)	■	3			
C	6540-71-2720	DEF pump cap kit	■	1			

791T-532-1210: Bolt

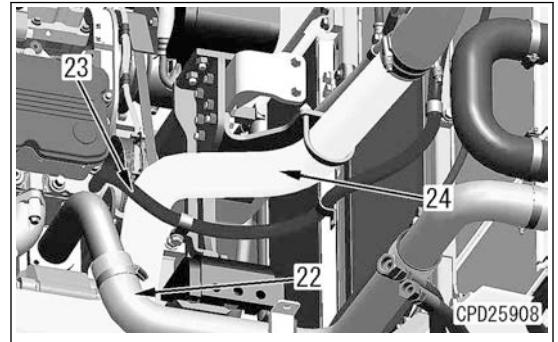


791T-415-5410: Spacer

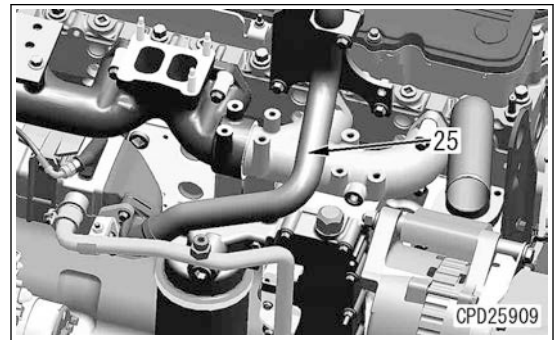


**Hose**

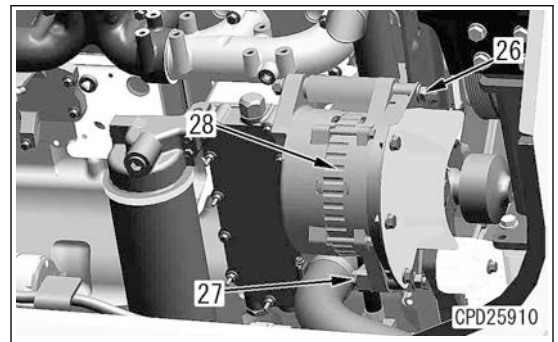
26. Remove the clamp, and disconnect radiator upper hose (22).
27. Disconnect tube (23).
28. Remove the U-bolt, remove the clamp, remove aftercooler upper tube (24) from the hose.

**EGR cooler assembly**

29. Remove EGR cooler assembly. For details, see "Remove and Install EGR Cooler Assembly".
30. Remove mounting bolts (2 pieces), and remove tube (25) together with the bracket as a unit.

**Alternator**

31. Remove the alternator belt. For details, see "Remove and Install Alternator Belt".
32. Remove connecting bolts (26) and (27), and remove alternator (28).

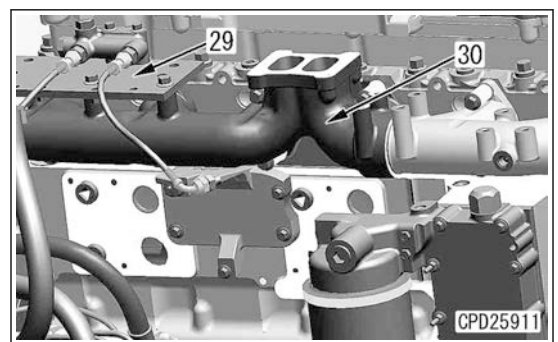
**Exhaust manifold**

33. Remove mounting bolts (2 pieces), and remove bracket (29).

**REMARK**

When disconnecting, be careful not to drop the gasket.

34. Remove the mounting bolts (24 pieces), sling exhaust manifold (30), and remove it.

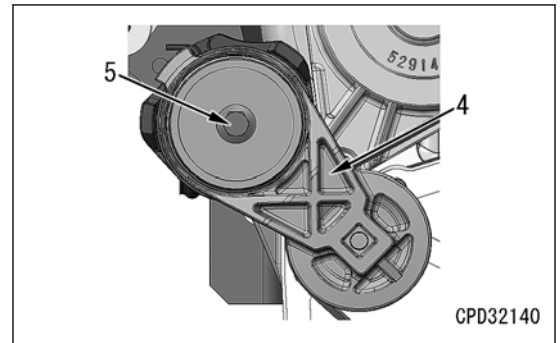


## Remove and Install Automatic Tensioner

- ⚠ 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.

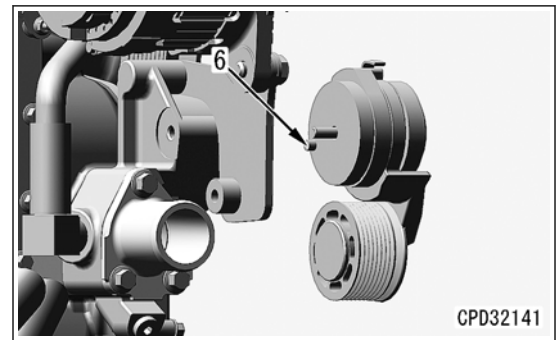
### Remove Automatic Tensioner

1. Remove alternator belt. For details, see "Remove and Install Alternator Belt"
2. Remove the bolt (5), and remove the tensioner assembly (8).




### Install Automatic Tensioner

1. Set the dowel pin (6) of the new tensioner assembly (4) to be aligned with the groove (7) of the cylinder block.



2. Install the bolt (5).

Bolt (5): Width across flats of 14 mm

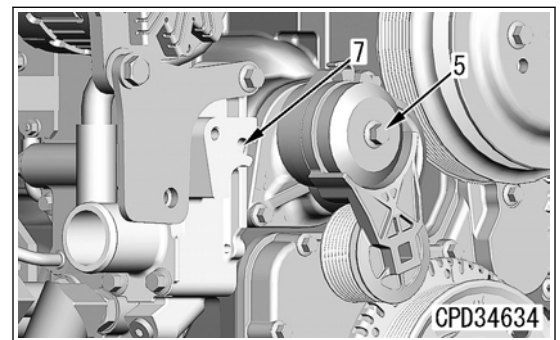
 Bolt (5):

$50 \pm 5 \text{ Nm} \{5.1 \pm 0.5 \text{ kgfm}\}$

3. After exchanging, install alternator belt. For details, see "Remove and Install Alternator Belt"

#### REMARK

The auto-tensioner is provided for the alternator belt. Thus, checking and adjusting the belt tension is usually not necessary.



**Refilling power train case with oil**

9. Refill the power train case with Komatsu genuine oil to the specified level through the oil filler port. Start the engine to circulate the oil through the piping, and check the oil level again. (For details, see Specifications, "Table of Fuel, Coolant, and Lubricants".)

**Hydraulic oil cooler assembly**

52. Install the hydraulic oil cooler assembly. For details, see “Remove and Install Hydraulic Oil Cooler Assembly”.

**Expansion tank assembly**

53. Install the expansion tank assembly. For details, see “Remove and Install Expansion Tank Assembly”.

**Engine hood assembly**

54. Install the engine hood assembly. For details, see “Remove and Install Engine Hood Assembly”.

**Refilling with refrigerant**

55. Fill the air conditioner circuit with refrigerant.

Filling quantity (Standard core condenser): 900±50 g

Filling quantity (Wide core condenser): 1120±50 g

**Refilling with air conditioner compressor oil**

56. Refill with air conditioner compressor oil. For details, see “Handle Compressor Oil”.

**Refilling with coolant**

57. Refill the expansion tank with coolant to the specified level through the coolant filler port. Run the engine to circulate the coolant. Then check the coolant level again. (For details, see SPECIFICATIONS, “TABLE OF FUEL, COOLANT, AND LUBRICANTS”.)



Coolant:

59 ℓ

**Refilling hydraulic tank with oil**

58. Refill the hydraulic tank with Komatsu genuine oil to the specified level through the oil filler port. Start the engine to circulate the oil through the piping, and check the oil level again. (For details, see Specifications, “Table of Fuel, Coolant, and Lubricants”.)



Engine oil pan:

30 ℓ

**Refilling damper case with oil**

59. Refill the damper case with Komatsu genuine oil to the specified level through the oil filler port. Start the engine to circulate the oil through the piping, and check the oil level again. (For details, see Specifications, “Table of Fuel, Coolant, and Lubricants”.)



Damper case:

1.7 ℓ

**Refilling hydraulic tank with oil**

60. Refill the hydraulic tank with Komatsu genuine oil to the specified level through the oil filler port. Start the engine to circulate the oil through the piping, and check the oil level again. (For details, see Specifications, “Table of Fuel, Coolant, and Lubricants”.)



Hydraulic tank:

62 ℓ

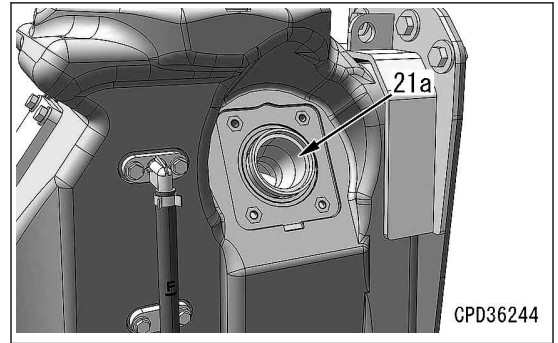
**Bleeding air**

61. Bleed air from the fuel circuit. For details, see Testing and adjusting, “Bleed Air from Hydraulic System”.

**Check for fuel leakage**

62. Check the fuel system for leakage. For details, see Testing and Adjusting, “Examine Fuel Circuit for Leakage”.

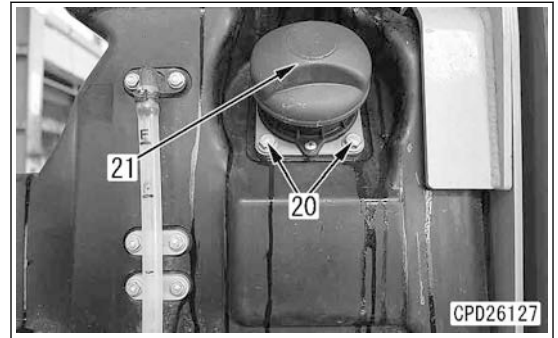
11. Install the filter assembly (21a).



12. Align filler port tube assembly (21) with the installing position.

**NOTICE**


- Align filler port tube assembly (21) with the installing position, and install it straight without turning to prevent O-ring (22b) from falling off or twisting.
- When installing the tank filler port assembly (21), make sure that the direction of the protrusion (c) is appropriate.

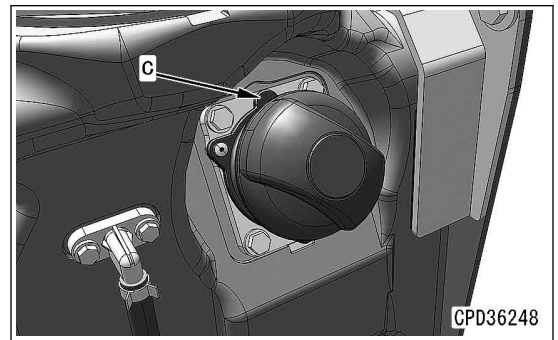


**REMARK**

Take care not to get O-ring (22b) caught when installing it.

13. Install the bolts (20) (4 pieces).

-  Bolts (20):  
9.5 to 10.5 Nm {0.97 to 1.07 kgfm}



## Remove and Install KDPF and SCR Assembly

### Tools for Removal and Installation of KDPF and SCR Assembly

Symbol	Part No.	Part name	Necessity	Qty	New/Redesign	Sketch	Remarks
A	6540-71-1720	Injector cap kit	■	1			Disconnection and connection of DEF hose
B	600-919-5050	Plug (for 5/16 inch of hose diameter)	■	1			
C	-	Vinyl gloves	●	1			
D	6540-71-1310	Cover for DEF injector electric connector	■	1			

- ⚠ 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.
- ⚠ 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”).
- ⚠ Since KDPF and SCR assembly is heated to 500 °C or above, take care not to get burn injury.
- ⚠ If KDPF and SCR assembly is hot, wait until it has cooled down before starting any work.
- ⚠ Check that no combustible materials (dry leaves, twigs, etc.) accumulated around KDPF and DEF mixing tube. If any dirt or combustible materials are found, remove them.
- ⚠ Since KDPF, DEF mixing, and SCR is fragile against shock such as falling, handle it with care, and never use damaged part.

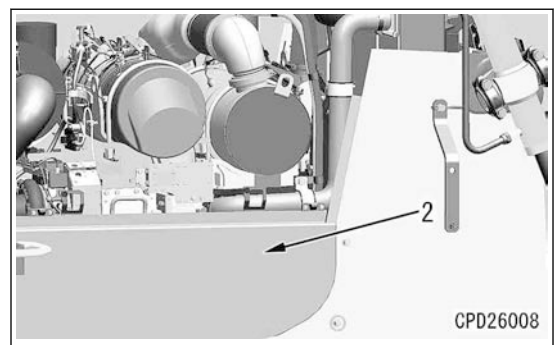
### How to Remove KDPF and SCR Assembly

#### Engine hood

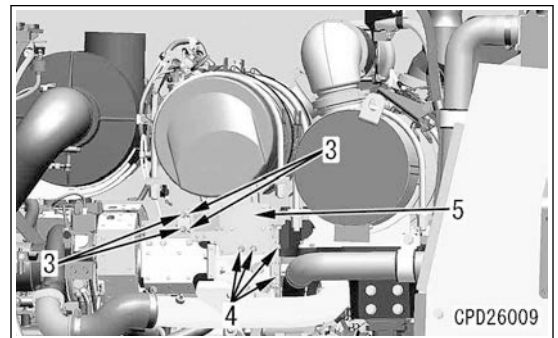
1. Remove engine hood. For details, see “Remove and Install Engine Hood Assembly”.

#### Wiring, hose

2. Remove covers (2) on both sides of the machine.



3. Remove mounting bolts (3) (4 pieces) and (4) (4 pieces), and remove cover (5).



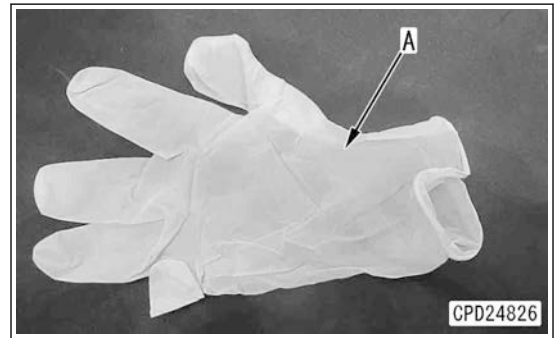
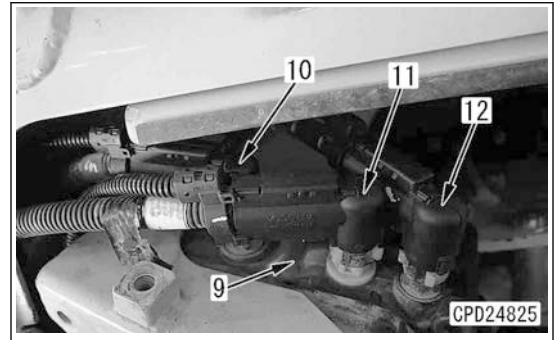
## Install DEF Pump

### DEF pump


1. Set DEF pump (9) on the machine.
2. Install DEF hoses (10), (11) and (12).

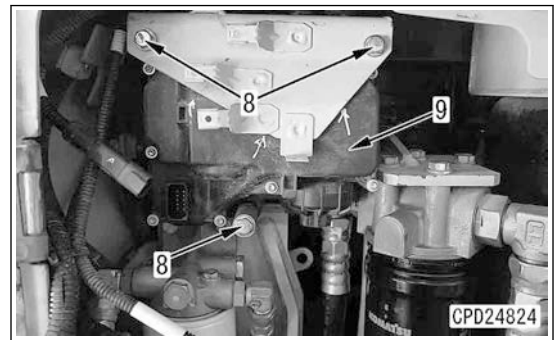
#### NOTICE

- Always use tool A when handling DEF.
- Check that DEF hoses are fitted securely.



3. Install DEF pump (9) with mounting bolts (8) (3 pieces).

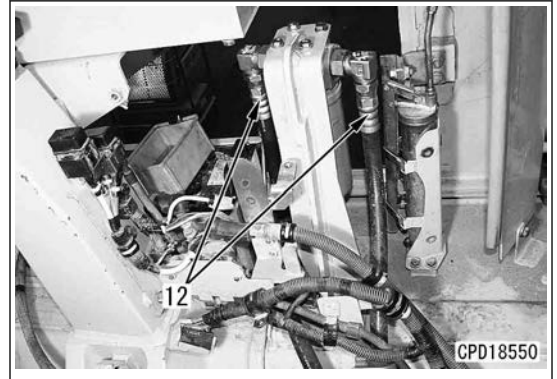
 Mounting bolt (8):  
15.2 to 2.3 Nm {1.5 to 2.3 kgfm}



18. Disconnect power train oil filler hoses (12) (2 pieces).

**REMARK**

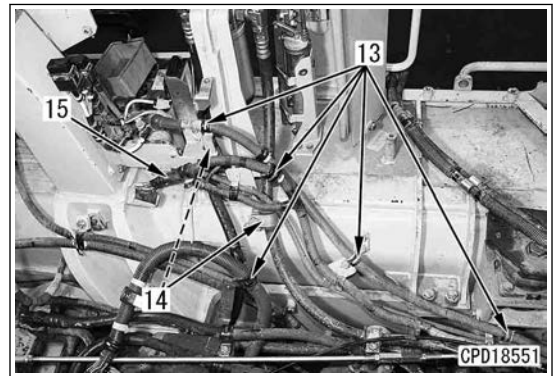
In order to prevent oil from flowing out, install the plugs to the hose and fitting.



19. Remove wiring harness clamps (13) (5 pieces).  
20. Remove hose clamps (14) (2 pieces).

**REMARK**

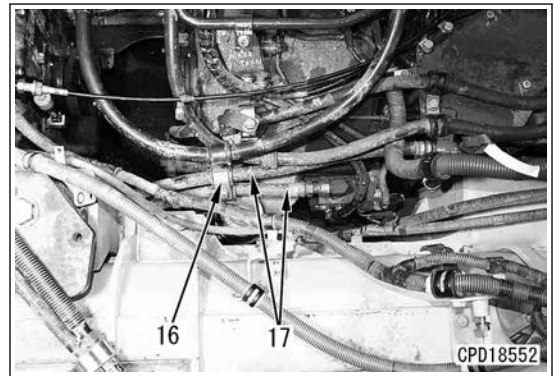
Fix harness (15) on the machine.



21. Remove hose clamp (16) from left side of the transmission.  
22. Disconnect hydraulic hoses (17) (2 pieces).

**REMARK**

In order to prevent oil from flowing out, install the plugs to the hose and fitting.



**Cover**

23. Remove right and left covers (18) from inside of the sprocket.



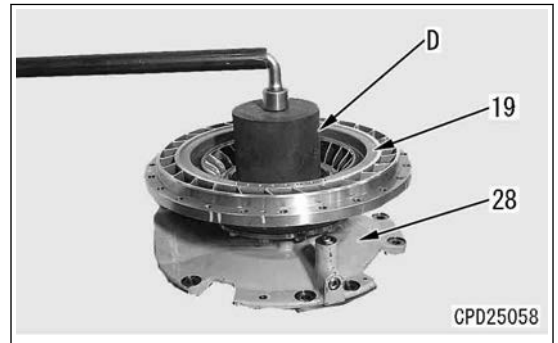
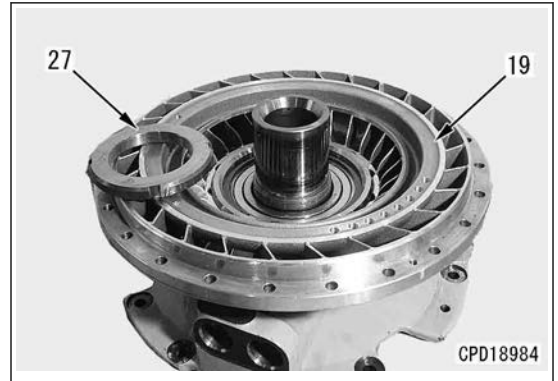
9. Install nut (27) to pump and stator shaft assembly (19), and tighten them by using tool D.




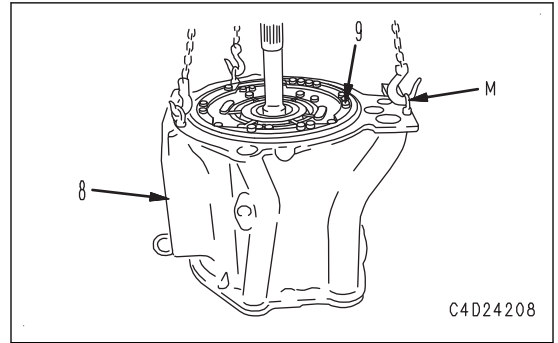
Nut (27):

441.3 to 490.3 Nm {45 to 50 kgfm}

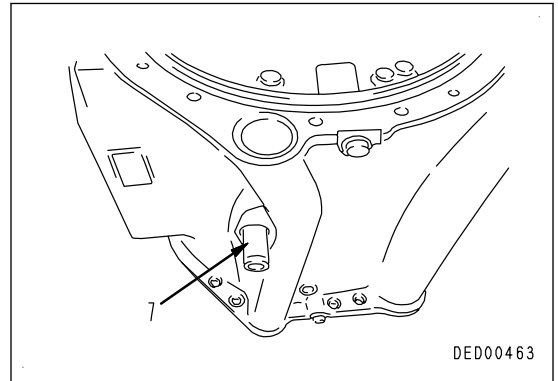
Lock housing (28) from turning by using a bar.



 Tie bolts (9):  
166.7±9.8 Nm {17±1 kgfm}




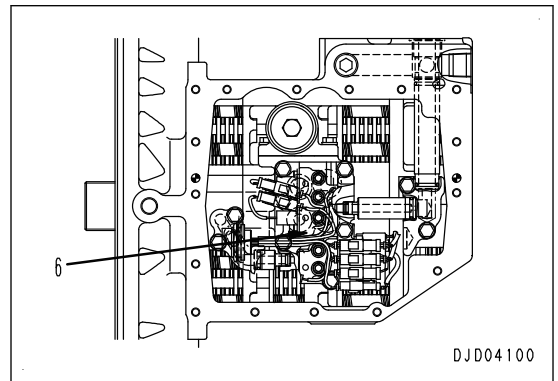
81. Install sleeve (7).



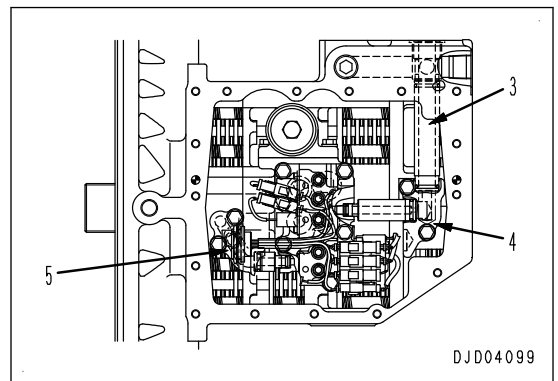
**Valve assembly**

82. Install control valve assembly (6).

 Mounting bolt:  
49.1±4.9 Nm {5.0±0.5 kgfm}



83. Install flanges (4) and (5) and sleeve (3).





Hydraulic tank:

62 ℓ

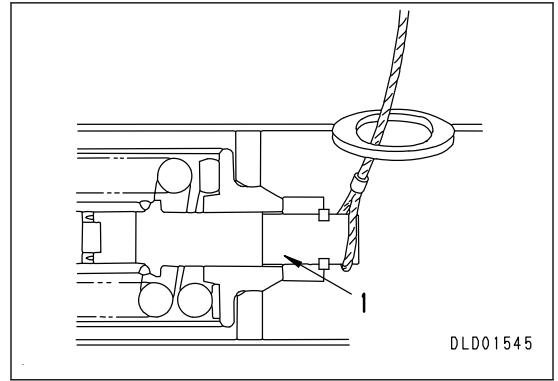
**Bleeding air**

13. Bleed air from the fuel circuit. For details, see Testing and adjusting, “Bleed Air from Hydraulic System”.

**Check for fuel leakage**

14. Check the fuel system for leakage. For details, see Testing and Adjusting, “Examine Fuel Circuit for Leakage”.

2. Push in recoil spring assembly (1), and set it on the track frame.



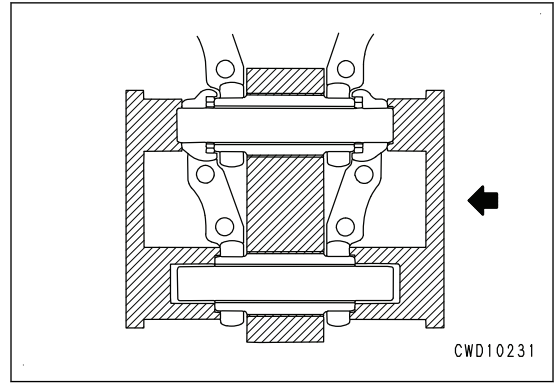
#### Idler assembly

3. Remove the idler assembly. For details, see "Remove and Install Idler Assembly".

20. Press-fit the link until the link, spacer and bushing closely contact each other.

**REMARK**

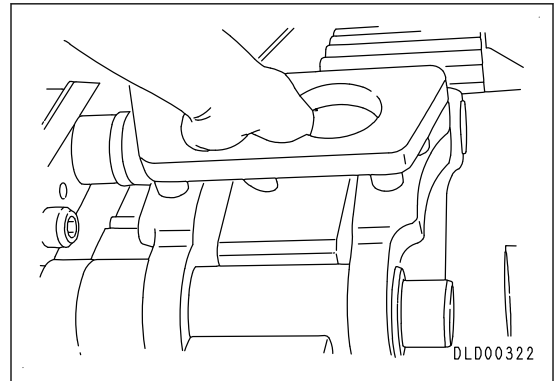
- You cannot visually check whether the parts are closely contacted or not. Therefore, manage it by the oil pressure of the link press. Set the relief pressure to the fixed value, and apply the oil pressure up to the specified pressure.
- For details of setting the relief pressure, see "PREPARATORY WORK".
- Check that adjacent links are rotated each other.



21. Check that the distance between the shoe bolt holes is within the standard range by using the shoe bolt pitch gauge.

**REMARK**

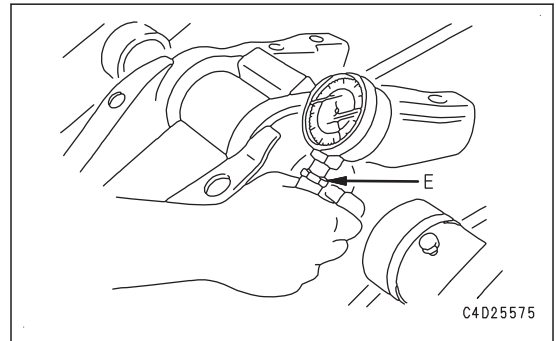
- If the shoe bolt hole distance extremely exceeds the specified value, disassemble it to check for any failure, and then perform press-fitting again.
- If the shoe bolt hole distance is extremely shorter than the specified value and the shoe cannot be installed, wear on of the spacer, bushing end surface, etc. may exceed the allowable limit. Therefore, disassemble it to replace the parts.



22. Remove the air from inside of the pin for each link assembly by using tool E, and check the sealing performance.

**REMARK**

Hold the space inside the pin at 91 to 95 kPa {680 to 710 mmHg} of vacuum for 5 seconds, and check that the pressure does not change. If the pressure is changed, disassemble the link to check the seal. If no failure is found, reassemble it.



h. Pulling margin: 25 mm

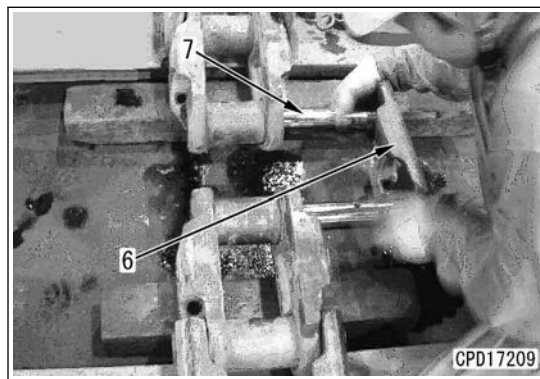
Arrow: Direction of tool C-2 cylinder operation

(3) Outer link

(6) Outer link

**Pin, bushing**

17. Remove outer link (6) and 2 pins (7).

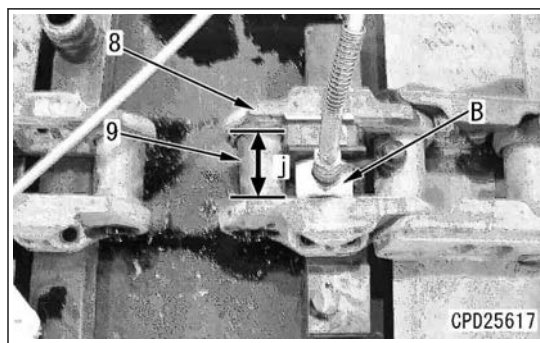


18. Increase dimension (j) of inner link (8) slightly by using tool B.

**REMARK**

Increase dimension (j) of inner link (8) so that bushing (9) is lightly pulled out. If the dimension (j) is excessively distanced, the oil seal not to be disassembled may be damaged.

19. Remove bushing (9).



**Oil seal, Ring**

20. Remove the oil seal and spacer from the removed link, and thoroughly clean it.

**Assemble One Track Link Assembly in Field (PLUS Type Track Assembly)**

**Oil seal, spacer**

1. Install the oil seal and spacer to the link.

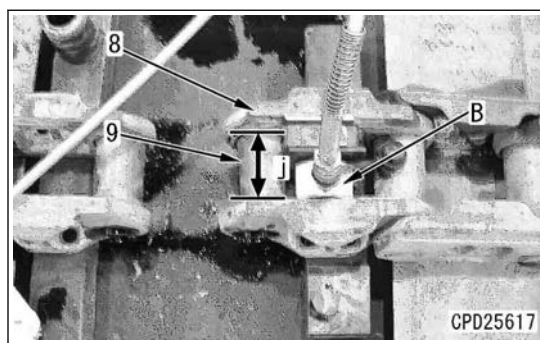
**Bushing**

2. Increase dimension (j) of inner link (8) slightly by using tool B.

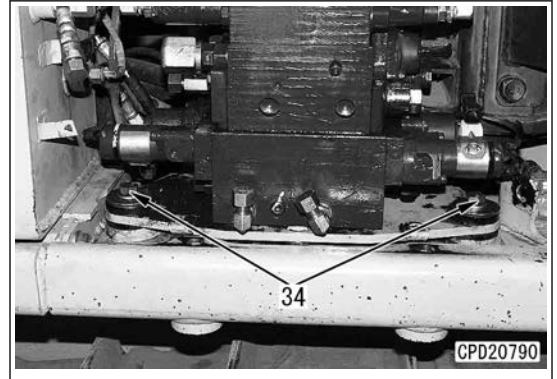
**REMARK**

Increase dimension (j) of inner link (8) so that bushing is lightly inserted. If the dimension is excessively distanced, the oil seal not to be disassembled may be damaged.

3. Install bushing (9) to inner link (8).

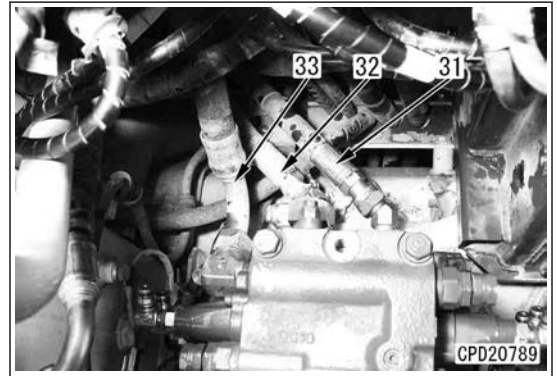


2. Install control valve mounting bolts (34) (4 pieces).

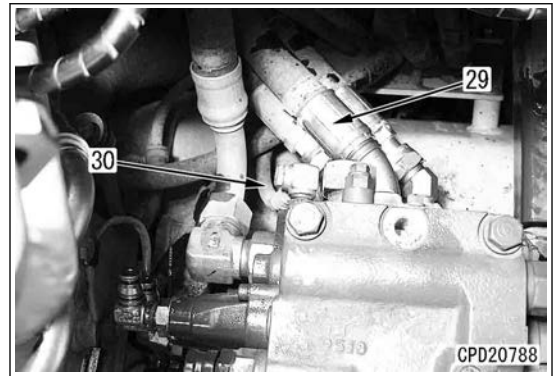


#### Wiring harness connector, Hydraulic hose

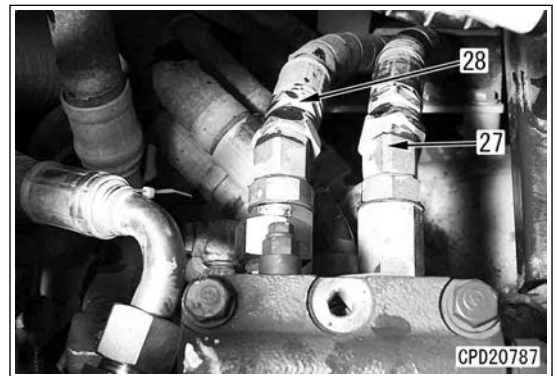
3. Install hoses (31), (32), and (33).



4. Install hoses (29) and (30).



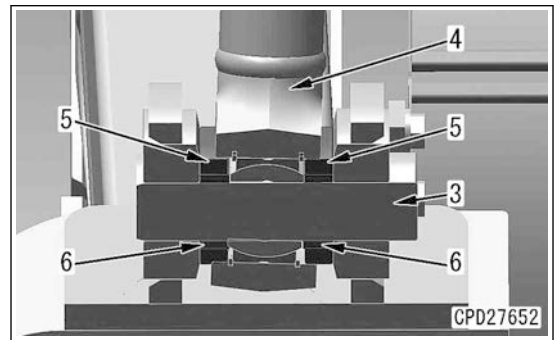
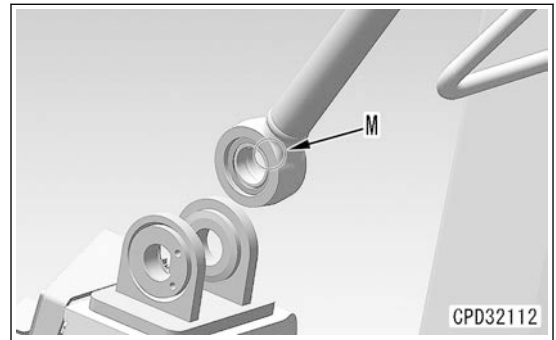
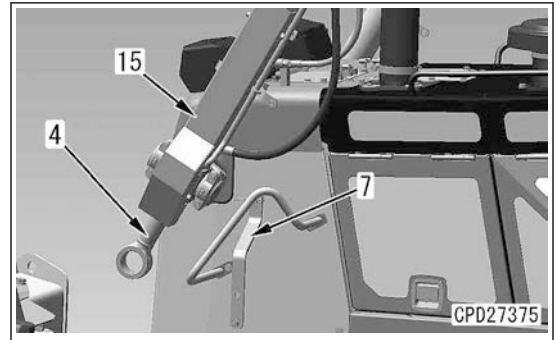
5. Install hoses (27) and (28).



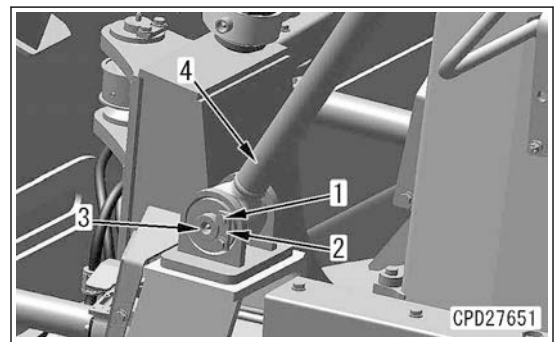
9. Install plate (7) to its original position.
10. Start the engine, and extend piston rod (4) to the mounting portion of pin (3). Extend it to just before the blade.

**NOTICE**

- If piston rod (4) is rotated without extending or retracting, it may damage the internal parts of piston rod or blade lift cylinder assembly (15). When rotating the piston rod (4), fully retract the piston rod (4) once, and then rotate the piston rod (4) as it is extended.
- Direct the piston rod (4) face to which the letter “M” is stamped toward the machine outside (reset sensor side) and install it. (L.H. blade lift cylinder only)
- Be careful not to get your hand caught in between blade and piston rod when extending the piston rod.



11. Move piston rod (4) forward, and install spacer (6) and cushion (5).
12. Return piston rod (4) to pin (3) mounting position, and install pin (3).
13. Set plate (2), and install it with mounting bolts (1) (2 pieces).
14. Install the R.H. blade lift cylinder assembly according to the same procedure.

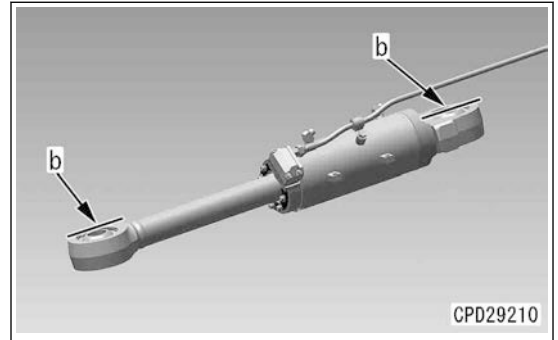
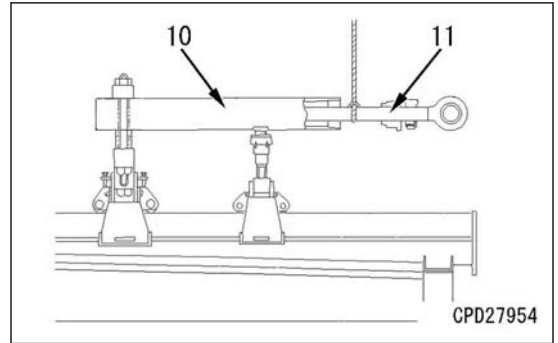


15. Refill the hydraulic tank with Komatsu genuine oil to the specified level through the oil filler port. Start the engine to circulate the oil through the piping, and check the oil level again. (For details, see Structure and Function, “Table of Fuel, Coolant, and Lubricants”.)
16. Bleed air from the work equipment cylinder. For details, see Testing and Adjusting, “Bleed Air from Work Equipment Cylinders”.
17. Perform calibration. For details, see Testing and Adjusting, “How to Adjust When ICT Related Devices are Repaired or Replaced”.
18. Perform this work by referring to TESTING AND ADJUSTING, “METHOD FOR PERFORMING WITH ADJUSTMENT ID: 8040 (CYLINDER CALIBRATION MODE)”.


19. Insert piston rod assembly (11) into tube (10).

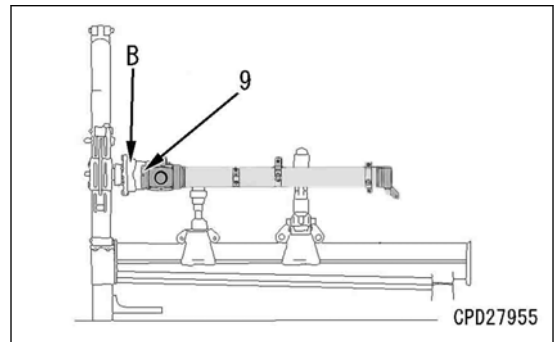
**REMARK**

Set rod head direction (b) parallel to bottom side (b) (direction when it is installed to the machine).



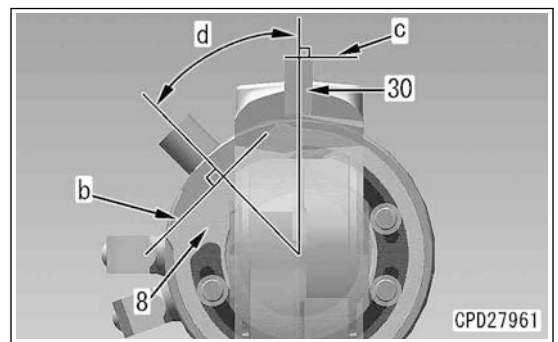
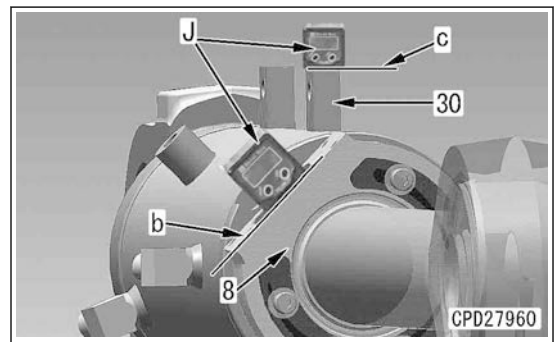
20. Tighten head assembly (9) by using tool B.

 Head assembly:  
 $1.03 \pm 0.10 \text{ kNm} \{105 \pm 10.5 \text{ kgfm}\}$



21. Adjust angle of end surface (b) of housing assembly (8) and end surface (c) of seat (30) by using tool J.

Mounting angle (d) made by end surface (b) of housing assembly (8) and end surface (c) of seat (30):  $45^\circ \{\pm 2^\circ\}$



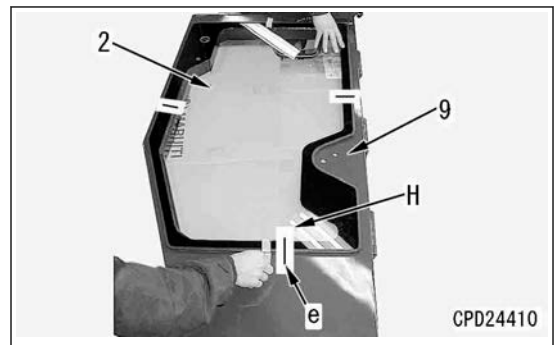
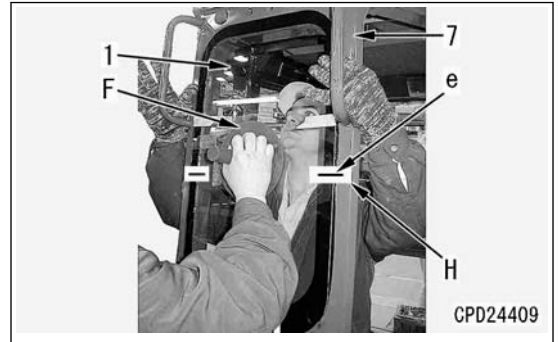
### Glass position alignment

- Set the glass to the mounting position by using tool F, check the clearance between the glass and operator's cab from all directions, and adjust the glass so that the clearance is even.

#### REMARK

- Position front window glass (1) from inside of operator's cab (7), and adjust the front window glass so that the gaps between black coating (black ceramic) part and sheet metal of operator's cab (7) is even from all directions.
- To position right and left door glasses (2), adjust the door glasses so that the glass and door sheet metal are positioned evenly in all directions.

- After positioning, stick tool F to the following areas (between front window glass (1) and operator's cab (7), and at 3 positions of the right, left, and bottom of right and left door glasses (2) and right and left doors (9)). Draw positioning line (e) on each tape.
- Cut tool H among glasses (1), (2) and operator's cab (7), and then remove the glass.



#### REMARK

Do not remove the tapes left on the glasses and the operator's cab until the glasses are installed.

### Application of adhesive

- Break aluminum dehumidification membrane (11) at the mouth of adhesive cartridge (10) and attach there the dedicated nozzle.



Adhesive:  
Sika Japan (Sikaflex 256HV)

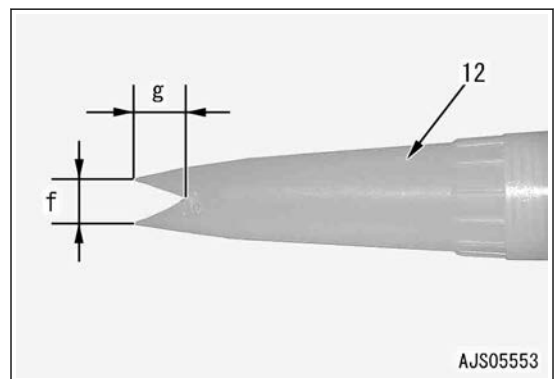
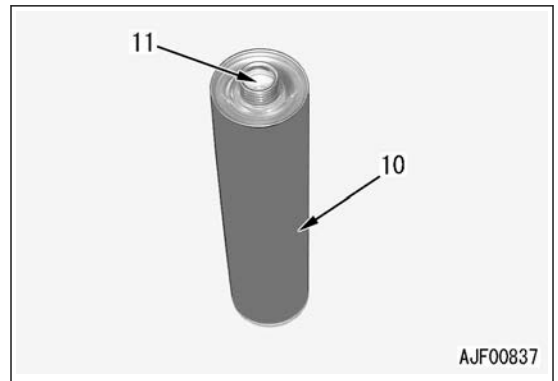
#### REMARK

- Do not use a primer.
- The use limit of adhesive is 6 months after its production. Do not use the adhesive after this limit.
- Adhesives must be stored at 25 °C or lower in a dark and cool place.
- Do not heat the adhesive higher than 30 °C.
- When reusing the adhesive, remove the hardened adhesive at the nozzle tip completely.

- Cut the tip of adhesive nozzle (12) to dimensions (f) and (g) as shown in the figure.

Dimension (f): 10 mm

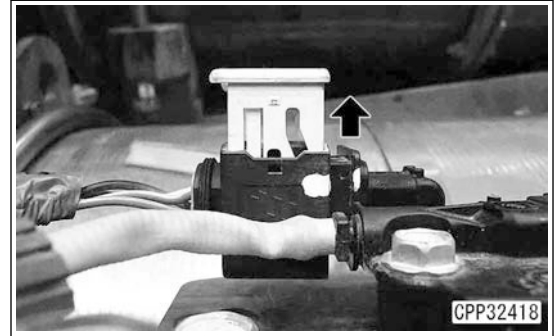
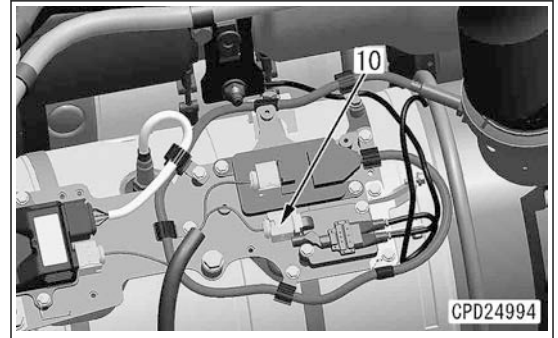
Dimension (g): 15 mm



5. Disconnect connector E34 (10).

**REMARK**

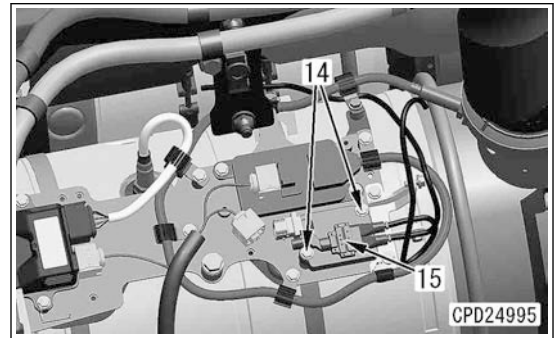
Slide the lever (yellow) in the direction of the arrow, release the lock, and then disconnect the connector E34 (14).



6. Remove bolts (14) (2 pieces), and remove temperature sensor controller (15).

**REMARK**


Mounting bolt (width across flats): 10 mm




## Install SCR Temperature Sensor

### Temperature sensor

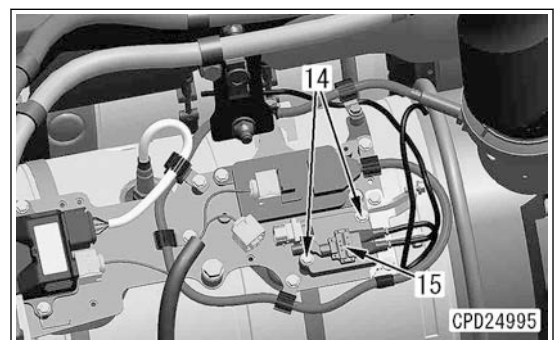
1. Install SCR temperature sensor controller (15) with bolts (14) (2 pieces).

 Threaded part of bolt:  
Seizure prevention compound (LC-G)

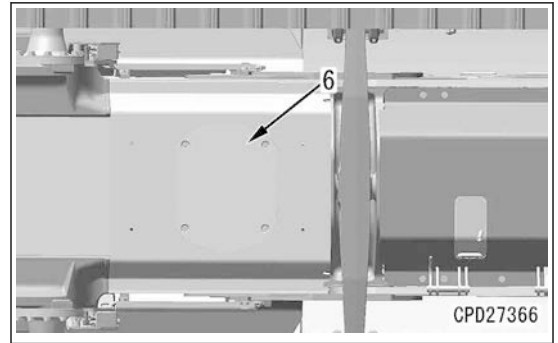
 Bolt (14):  
11.8 to 14.7 Nm{1.2 to 1.5 kgfm}

**REMARK**

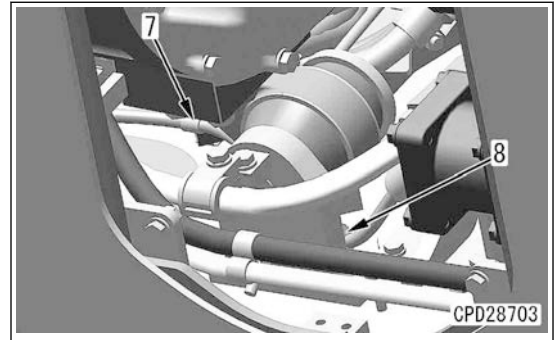
Mounting bolt (14) (width across flats): 10 mm



4. Remove inspection cover (6) from the bottom side of the machine.

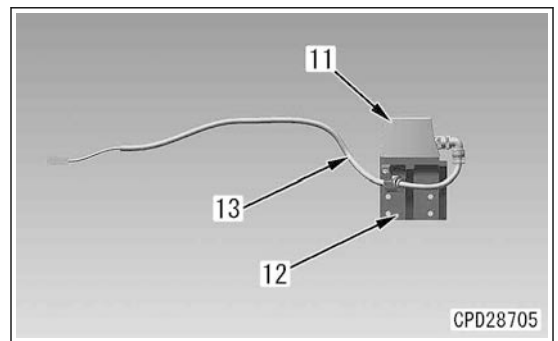
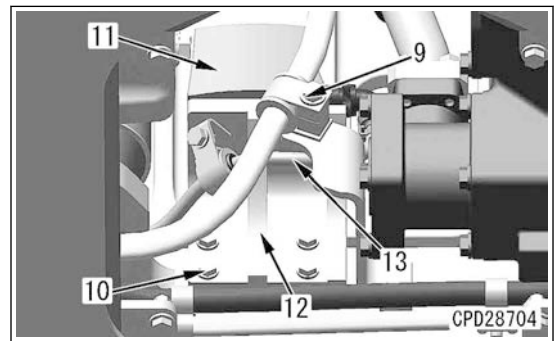


5. Remove clamps (7) and (8).

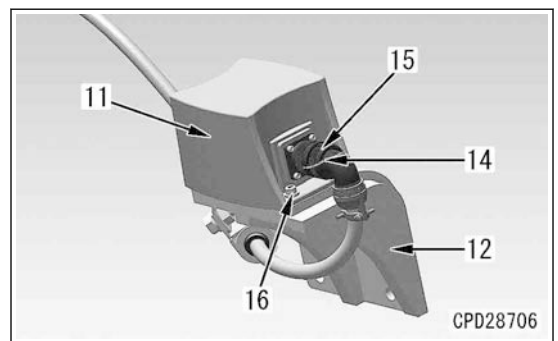


#### IMU sensor

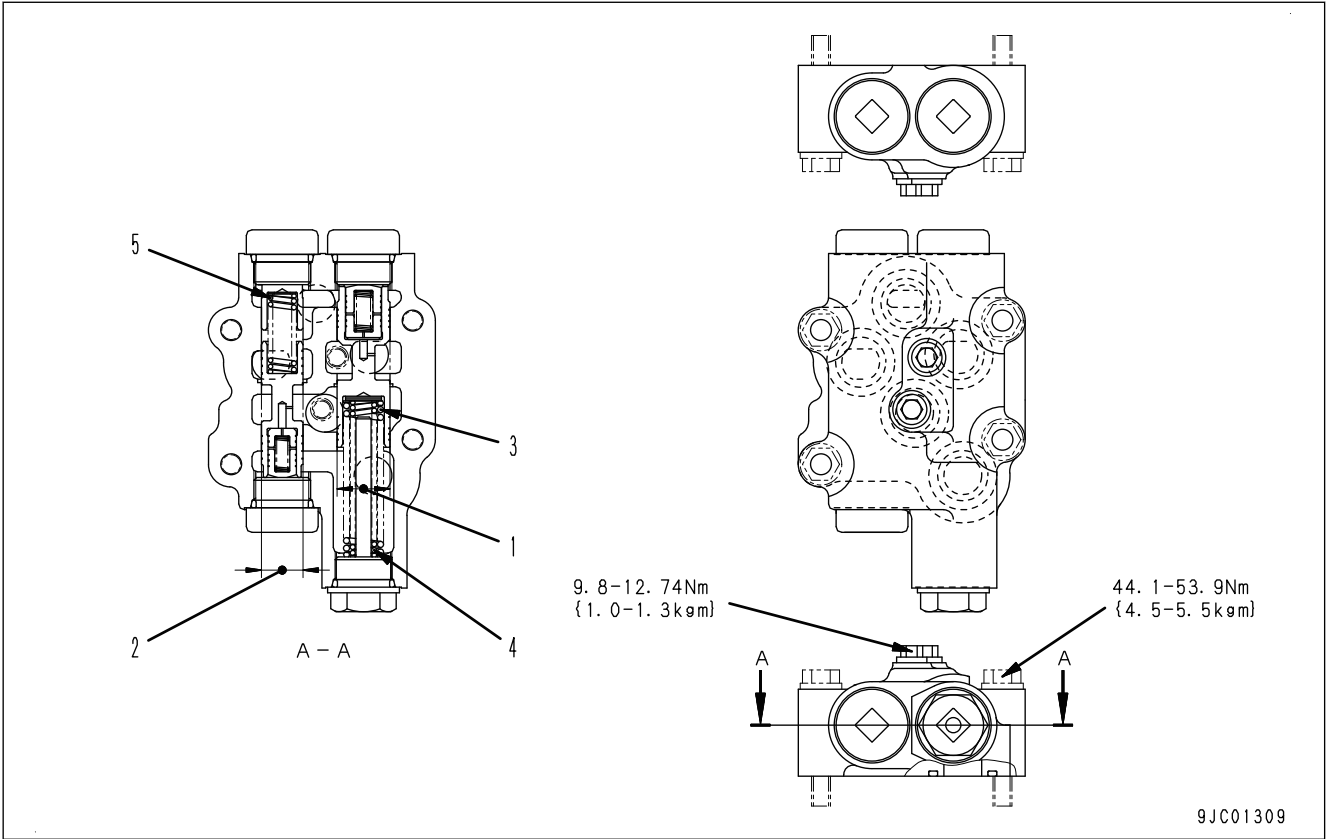
6. Remove clamp (9).
7. Remove mounting bolts (10) (4 pieces), and remove IMU sensor (11) together with bracket (12) and wiring harness (13) as a unit from the machine.



8. Remove wire (14), and disconnect harness connector IMU1 (15).
9. Remove hexagonal socket head bolt (width across flats 5 mm) (16) (3 pieces), and remove IMU sensor (11) from bracket (12).



Maintenance Standard for Main Relief Valve and Torque Converter Relief Valve



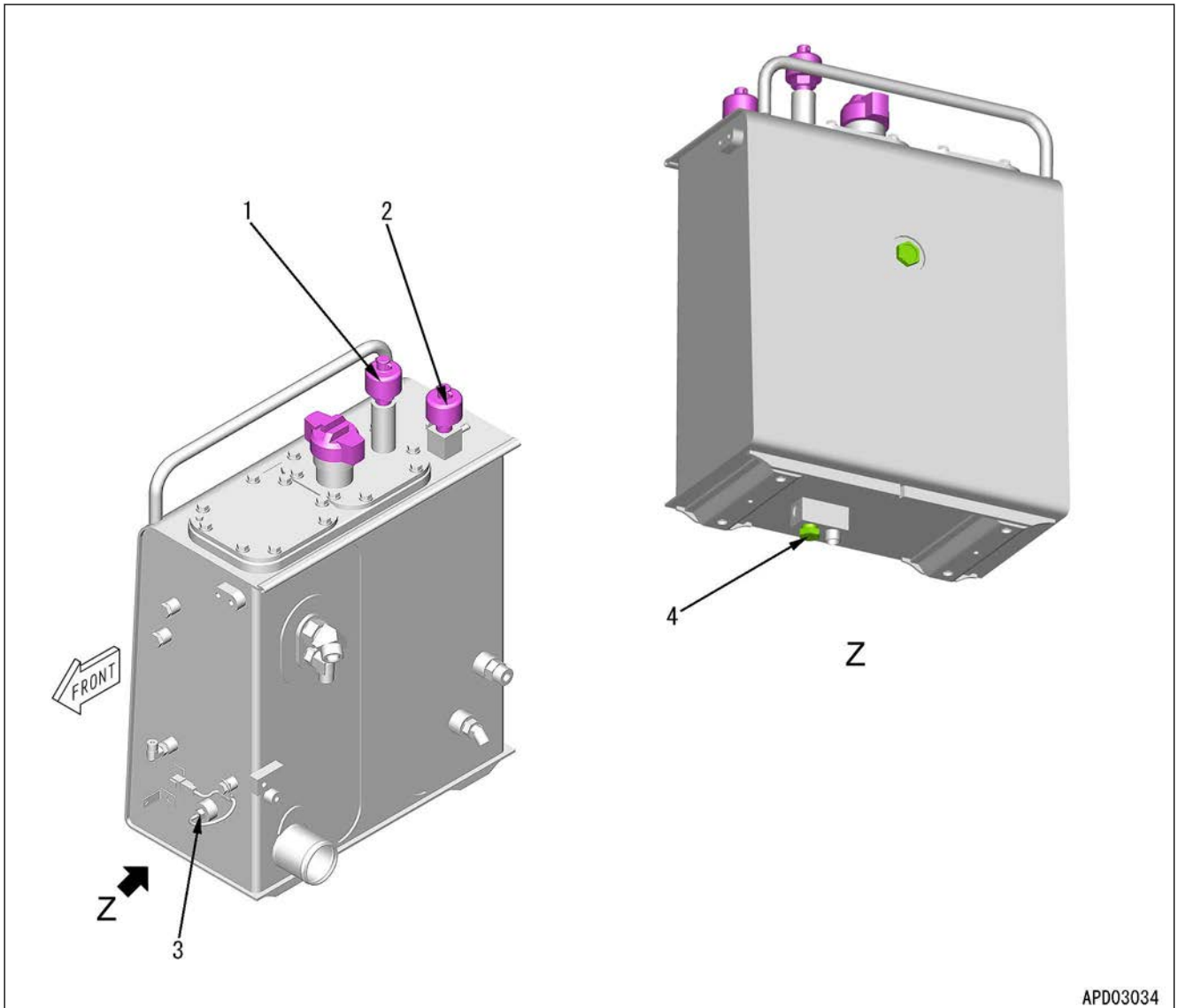
9JC01309

Unit: mm

No.	Item	Criteria					Remedy
		Standard dimension	Tolerance		Standard clearance	Allowable clearance	
Shaft	Hole						
1	Clearance between main relief valve and valve body	28	-0.035 -0.045	+0.013 0	0.035 to 0.058	0.078	Replace
2	Clearance between torque converter relief valve and valve body	22	-0.035 -0.045	+0.013 0	0.035 to 0.058	0.078	
3	Main relief valve spring (outside)	Standard dimension			Repair limit		
		Free height	Installed height	Load at installed height	Free height	Load at installed height	
		128	78.3	479.1 N {48.9 kg}	124.2	456 N {46.5 kg}	
4	Main relief valve spring (inside)	108	78.3	365.5 N {37.3 kg}	104.8	347 N {35.4 kg}	
5	Torque converter relief valve spring	50	41.5	162.5 N {16.5 kg}	48.5	154 N {15.7 kg}	

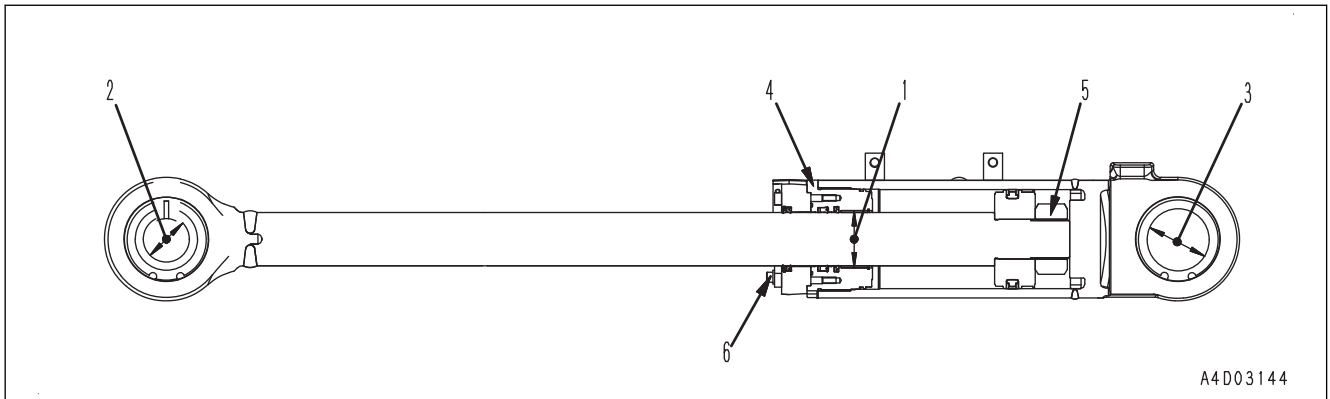
# Hydraulic System

## Maintenance Standard for Hydraulic Tank



No.	Item	Criteria	Remedy
1	Tightening torque of breather	31.4 to 52.9 Nm {3.2 to 5.4 kgfm}	Retighten
2	Tightening torque of breather	6.5 to 8.5 Nm {0.66 to 0.87 kgfm}	
3	Tightening torque of sensor	29.4 to 49.0 Nm {3 to 5 kgfm}	
4	Tightening torque of plug	58.8 to 78.4 Nm {6.0 to 8.0 kgfm}	

## Maintenance Standard for Stroke Sensing Blade Tilt Cylinder (For Power Angle Power Tilt Dozer Series)



A4D03144

Unit: mm

No.	Item	Criteria				Remedy	
		Standard dimension	Tolerance		Standard clearance		Allowable clearance
Shaft	Hole						
1	Clearance between piston rod and bushing	70	-0.030 -0.076	+0.259 +0.063	0.093 to 0.335	0.635	Replace bushing
2	Clearance between piston rod support shaft and bushing	50	-0.025 -0.064	+0.039 0	0.025 to 0.103	1.0	Replace pin and bushing
3	Clearance between cylinder bottom support shaft and bushing	50	-0.025 -0.064	+0.039 0	0.025 to 0.103	1.0	
4	Cylinder head tightening torque	1.03±0.10kNm {105± 0.5 kgfm}				Retighten	
5	Nut tightening torque	3.97±0.40kNm {405±40.5 kgfm}					
6	Tightening torque of housing clamping bolt	27 to 34 Nm {2.8 to 3.5 kgfm}					

- When refrigerant gas (2) sealed in the diaphragm chamber (hatched portion) receives the temperature change from thermoprobe (1a-2), its pressure varies, and accordingly force ( $F_g$ ) to press needle valve (1a) varies.
- The position of needle valve (1a) is determined by the balance between the rightward reaction force of spring (1b) and force ( $F_g$ ) of refrigerant gas (2) to push needle valve (1a) to the left through diaphragm (1a-1).
- The position of needle valve (1a) determines the flow rate of the refrigerant from the receiver drier to evaporator (3).

### When Evaporator (3) Outlet Temperature is High

- The pressure of refrigerant gas (2) in the diaphragm chamber (hatched portion) increases and the volume increases.
- Force ( $F_g$ ) of refrigerant gas (2) to push needle valve (1a) increases, and needle valve (1a) moves to the left.
- Needle valve (1a) opens wider to increase the refrigerant flow rate to evaporator (3), and the cooling performance increases. (State (A) in the above figure)

### When Evaporator (3) Outlet Temperature is Low

- The pressure of refrigerant gas (2) in the diaphragm chamber (hatched portion) decreases, and accordingly the volume decreases.
- Force ( $F_g$ ) of refrigerant gas (2) to push needle valve (1a) decreases, and needle valve (1a) moves to the right.
- Needle valve (1a) opens smaller to decrease the refrigerant flow rate to evaporator (3), and the cooling capacity decreases. (State (B) in the above figure)

### Function of Dual Pressure Switch

The dual pressure switch is installed to the air conditioner hose under the floor.

Below LA: Abnormally low pressure

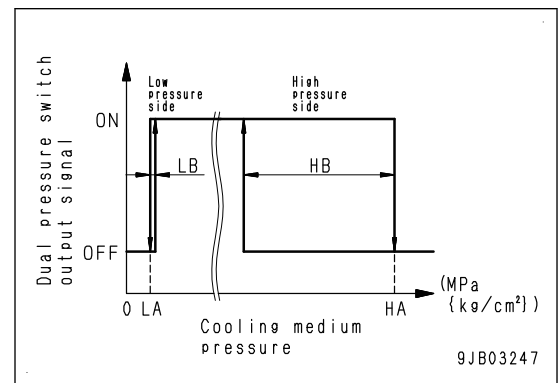
Above HA: Abnormally high pressure

LA: 0.20 MPa {2 kgf/cm<sup>2</sup>}

LB: 0.02 MPa {0.2 kgf/cm<sup>2</sup>}

HA: 3.14 MPa {32 kgf/cm<sup>2</sup>}

HB: 0.59 MPa {6 kgf/cm<sup>2</sup>}



- The dual pressure switch turns "OFF" when it detects abnormally low refrigerant pressure in low-pressure line or abnormally high refrigerant pressure in high-pressure line.
- When the dual pressure switch turns "OFF", the air conditioner controller turns the compressor clutch relay "OFF". As a result, the compressor's magnet clutch is released and air conditioner components are protected.

Failed part	Probable cause	Check method	Remedy
Compressor belt	Loose belt	Belt deflection is large. See Shop Manual, 30, Testing and adjusting, "TEST AND ADJUST AIR CONDITIONER COMPRESSOR BELT TENSION".	Adjust tension
Compressor	Internal defect of compressor	Slip of belt	Replacement or repair
	Insufficient compressor oil Seized compressor	Overheating of compressor	See "Handle Compressor Oil".
Magnetic clutch	Low battery voltage	Slip during rotation	Battery charge
	Open circuit or short circuit in coil	Check with multimeter (10 to 20 $\Omega$ ).	Replacement
	Open circuit in wiring or defective connection of ground cable	Check ground cable and connection part See "Troubleshooting for compressor and refrigerant system".	Repair
Relay	Defective compressor clutch relay Defective condenser motor relay	See "Examine Relay".	Replacement
Refrigerant pressure	Abnormal pressure (pressure switch is actuated)	See "Troubleshooting by Gauge Pressure".	See "Troubleshooting by Gauge Pressure".
Pressure switch	Defective pressure switch	See "Troubleshooting for compressor and refrigerant system". See "Testing refrigerant (dual) pressure switch".	Replacement

### Blower Fan Motor is Normal but Air Flow is Not Sufficient in Heat Mode.

Probable cause	Check method	Remedy
Draft resistance is high.	Check for clogging of filter and for crushing and clogging of duct.	Repair
Air leakage through connection part of duct	Check connection part of duct. See "Examine Air Leakage (Duct)".	Repair
Clogging of heater core fins	Check for clogging of heater core fins.	Cleaning

### Abnormality of Temperature or Quantity of Engine Coolant in Heating Mode

Probable cause	Check method	Remedy
Engine coolant temperature is low.	Check engine coolant temperature after warm-up operation.	Investigation of the cause
Engine coolant level is low.	Check coolant level in radiator.	Add coolant.
Circulation rate of engine coolant is low.	Check for clogging of engine coolant piping (hose, pipe, core).	Bleeding and repair of air.

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# 90 Circuit Diagrams

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