

Shop Manual

BULLDOZER

D65EX -18E0

D65PX -18E0

D65WX -18E0

SERIAL NUMBERS D65EX- 96001
 D65PX- 96001 and up
 D65WX-96001

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

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

Precautions for Air Conditioner Piping

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

REMARK

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

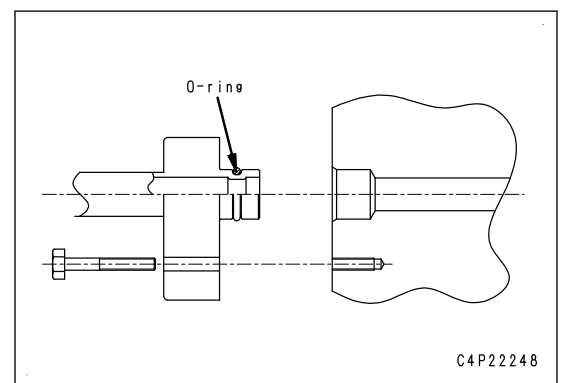
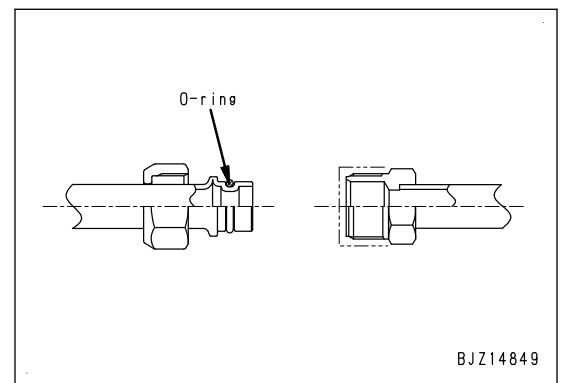
Manufacturer	Part name
DENSO	ND-OIL8
VALEO THERMAL SYSTEMS	ZXL100PG (PAG46 or equivalent)
SANDEN	SP-10

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

REMARK

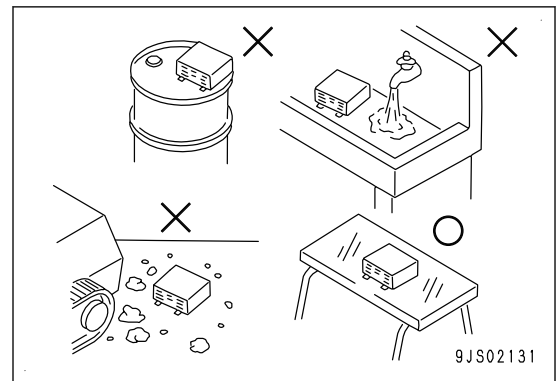
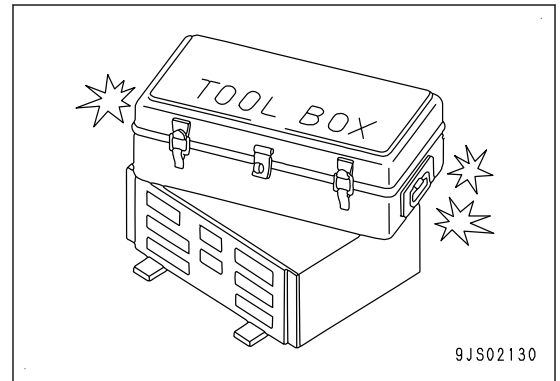
- The figure shows an example of fitting of O-ring.
- An O-ring is fitted to every joint of the air conditioner piping.

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



NOTICE

- Controller has been assembled with electronic circuits for control including microcomputers. These electronic circuits inside of the controller must be handled with care since they control the machine.
- Do not leave things on the controller.
- Cover the connector portion of the controller with a tape and a plastic bag. Do not touch the connecting portion of connector.
- Do not leave the controller in a place where it is exposed to rain.
- Do not place the controller on oil, water, soil or any places where the temperature is likely to be high even for a short period of time (Place it on a suitable dry stand).

**Precautions for Troubleshooting Electrical Circuits**

- Be sure to turn the starting switch to OFF position before disconnecting or connecting the connectors.
- Before performing troubleshooting, check all the related connectors for loose connection.

REMARK

Check the related connectors for their performance by disconnecting and connecting them several times.

- Be sure to connect all the disconnected connectors before proceeding to the next step.

NOTICE

If the starting switch is turned to ON position while the connectors are disconnected, an unrelated failure beside the actual failed part may be displayed.

- When performing the troubleshooting for the circuit (measurement of voltage, resistance, continuity, current, etc.), shake the related wiring harnesses and connectors several times and check that the multimeter reading does not change.

NOTICE

If the value changes on the multimeter, there may be a defective contact in the circuit.

01 Specifications

Weight Table: D65PX-18E0

⚠ This weight table is for your reference when you handle or transport the components.

⚠ This weight table shows the dry weight.

Unit: kg

Item	D65PX-18E0
Engine, damper assembly	1322
• Engine assembly (includes KDPF, DEF mixing tube, SCR assembly)	1240
• Damper assembly	32
• Engine related parts (wiring, mount)	50
Universal joint	23
Cooling assembly	117
• Radiator assembly	22+11
• Aftercooler assembly	15
• Expansion tank assembly	25
Hydraulic oil cooler	4
Power train oil cooler	9
Cooling fan pump	30
Cooling fan motor	13
Fuel tank assembly (when empty)	274
Power train unit assembly	1460
• Torque converter, PTO assembly	340
• Transmission assembly	370
• Transmission control valve assembly	26
• Main relief valve and torque converter relief valve assembly	5
• HSS unit assembly	680
• Brake valve assembly	5
HSS motor	41
HSS pump	75
Steering lubrication pump and power train pump	14
Scavenging pump	5
Quick drop valve	7
Hydraulic tank	88
Control valve	
3-spool valve	45
5-spool valve	
• Straight tilt power pitch dozer	55
Blade PPC valve	3
Steering electric lever	4
Main frame assembly	2760

*2: These failure codes are displayed on “Current Abnormality” in the operator mode, or “Abnormality Record” in the service mode. The failure code shown here is an example of failure code which is displayed on the machine monitor when an abnormality occurs. For the failure codes, see TROUBLESHOOTING, “Troubleshooting Points for Urea SCR System”.

*3: The failure code which starts with CB may be displayed for the machine equipped with aftertreatment devices branching off to 2 lines.

*4: These failure codes are displayed on “Current Abnormality” in the operator mode, or “Abnormality Record” in the service mode.






*5: These percentages show a torque reduction ratio from the full torque curve, and a speed reduction ratio from the rated speed.

*6: Construction equipment with crawler

*7: Construction equipment with wheel

Inducement Strategy When Abnormality is Found in the KDPF System by the Urea SCR System Devices (For European Union)

- The Inducement strategy is different if Inducement is triggered by abnormalities in KDPF. It has 4 levels totally which is the same as that, but it has different display on the machine monitor, and engine power deration (torque lowering ratio is 25% or more) and alarm starts from “Warning”.
- The table shows warning indications and engine power derations by each Inducement strategy status.

Status	Elapsed time (*1)	Machine monitor					Engine de-ration (*5)
		Message of SCR Infor-mation	Caution lamp (Action lev-el)	Tone of au-dible alert	Failure code for abnormali-ty (*2),(*3)	Failure code for Induce-ment strategy status (*4)	
1 Warning	5 hours	1: Please inspect and maintain SCR sys-tem.	Red  APP14418 Red  APP14414	Long inter-mittently	CA4151 CB4151	No indication	Torque: over 25%
2 Continuous Warning (Warning 2)	10 hours	2: Without treatment, engine power will be derated.	Red  APP14418 Yellow  APP14417 Red  APP14414	Triplet (*6) Short inter-mittently (*7)	CA4151 CB4151	AS00R2 (Warning 2 (SCR Device Abnormality))	Torque: over 25%

- Engine is running.
- Parking brake lever is in “LOCK” position.
- Work equipment lock lever is in “LOCK” position.
- Engine automatic warm-up function is not in “Normal warm-up” mode.
- Engine coolant temperature is below 95 °C.
- Hydraulic oil temperature is below 95 °C.
- Torque converter oil temperature is below 120 °C.
- Hydraulic fan is not turning in reverse.
- After-treatment devices is not being regenerated.
- Auto idle stop time on machine monitor is not reset. (*1)
- Machine monitor is not in service mode.
- None of following failure codes is occurring.

*1: See “Setting time”.

Corresponding failure codes are as follows.

Failure code	Failure (displayed on screen)
B@BCNS	Engine Coolant Overheat
B@HANS	Hydraulic Oil Overheat
B@CENS	T/C Oil Temperature Overheat
CA144	Coolant Temperature Sensor High Error
CA145	Coolant Temperature Sensor Low Error
D8AQKR	CAN 2 Defective Communication (KOMTRAX)
DBERKR	CAN 1 Defective Communication (P/T Controller)
DBEQKR	CAN 2 Defective Communication (P/T Controller)
DAFQKR	CAN 2 Defective Communication (Monitor)
DB2RKR	CAN 1 Defective Communication (Engine Controller)
DB2QKR	CAN 2 Defective Communication (Engine Controller)
DGT1KA	T/C Oil Temperature Sensor Open Circuit
DGS1KA	Hydraulic Oil Temperature Sensor Open Circuit

Setting Time

The set time for the auto idle stop function is set in the following menus.

For setting of each menu, see Testing and adjusting.

“Fixing auto idle stop time” (service menu)

Setting	Contents of setting
Variable	In Auto Idle Stop Timer Setting (user menu), operator can select OFF or minimum set time in auto idle stop setting to maximum time of 60 minutes. (Default)
OFF	The auto idle stop function does not operate, and Auto Idle Stop Time Setting (user menu) is not displayed.
Fix to x min.	Operator can select from the set time in Auto Idle Stop Timer Setting (user menu) to x minutes (set time at left). (Cannot select OFF)

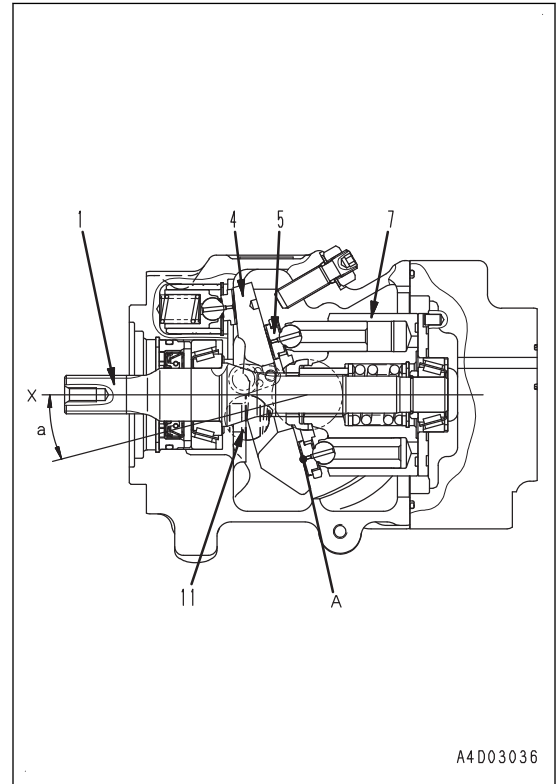
Function of Cooling Fan Pump

- This pump converts the rotation and torque of the engine transmitted to its shaft into hydraulic energy and discharges pressurized oil corresponding to the load.
- It is possible to change the discharged volume by changing the swash plate angle.









Operation of Cooling Fan Pump

Selection of Discharged Volume (Selection of Swash Plate Angle)

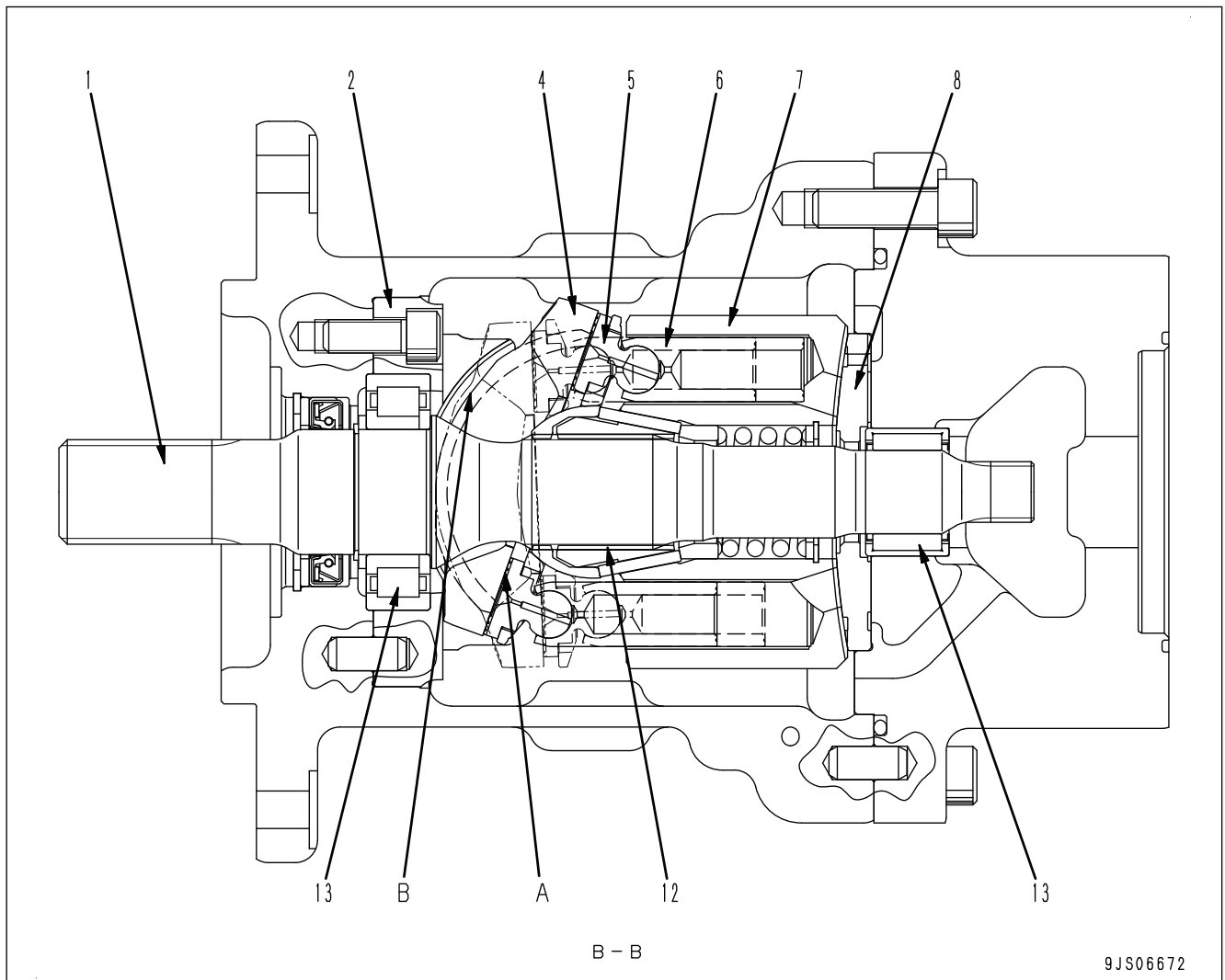
1. Cylinder block (7) rotates together with shaft (1) and shoe (5) slides on plane (A).
2. Rocker cam (4) pivots on ball retainer (11), and accordingly angle (a) between center line (X) of rocker cam (4) and the axial direction of cylinder block (7) changes.
(a): Swash plate angle



TYPES OF PILOT LAMPS DISPLAYED ON MACHINE MONITOR

Symbol	Item displayed	Description		Remarks	
 9JC01177	Preheating	Automatic preheating	<ul style="list-style-type: none"> Operates automatically at low temperature. (Lights up for approximately 45 sec. at maximum.) Goes off after engine is started. 	Displays operation state of preheating.	
		Manual preheating	Elapsed time after turning starting switch to HEAT (pre-heat)		Monitor display
			0 to 30 seconds		Lights up
			30 to 40 seconds		Flashes
40 seconds or longer	Lights off				
 9JC01436	Work equipment lock	Lights up: Lock Flashes: When it is necessary to lock Lights off: Free		Indicates state of work equipment lock lever.	
 9JC01437	Parking brake	Lights up: Lock Flashes: When it is necessary to lock Lights off: Free		Indicates state of parking brake lever.	
 9JC01175	Blow	Lights up: ON Lights off: OFF		Shows the operation states of the blower function.	
 9JC01181	Seat belt	Lights up: Not fastened Lights off: Fastened		Indicates whether seat belt is fastened.	
 9JC01182	Engine stopped	Lights up: When engine is stopped Lights off: While engine is running		Indicates the operation status of engine.	
 G0174580	Auto-deceleration (*1)	The lamp is lit: ON The lamp is not lit: OFF		Displays the operation of auto-deceleration function	
 9JC01187	Auto-deceleration (*1)	The lamp is lit: ON The lamp is not lit: OFF		Displays the operation of auto-deceleration function	

Structure



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

Specifications of Work Equipment and HSS Pump

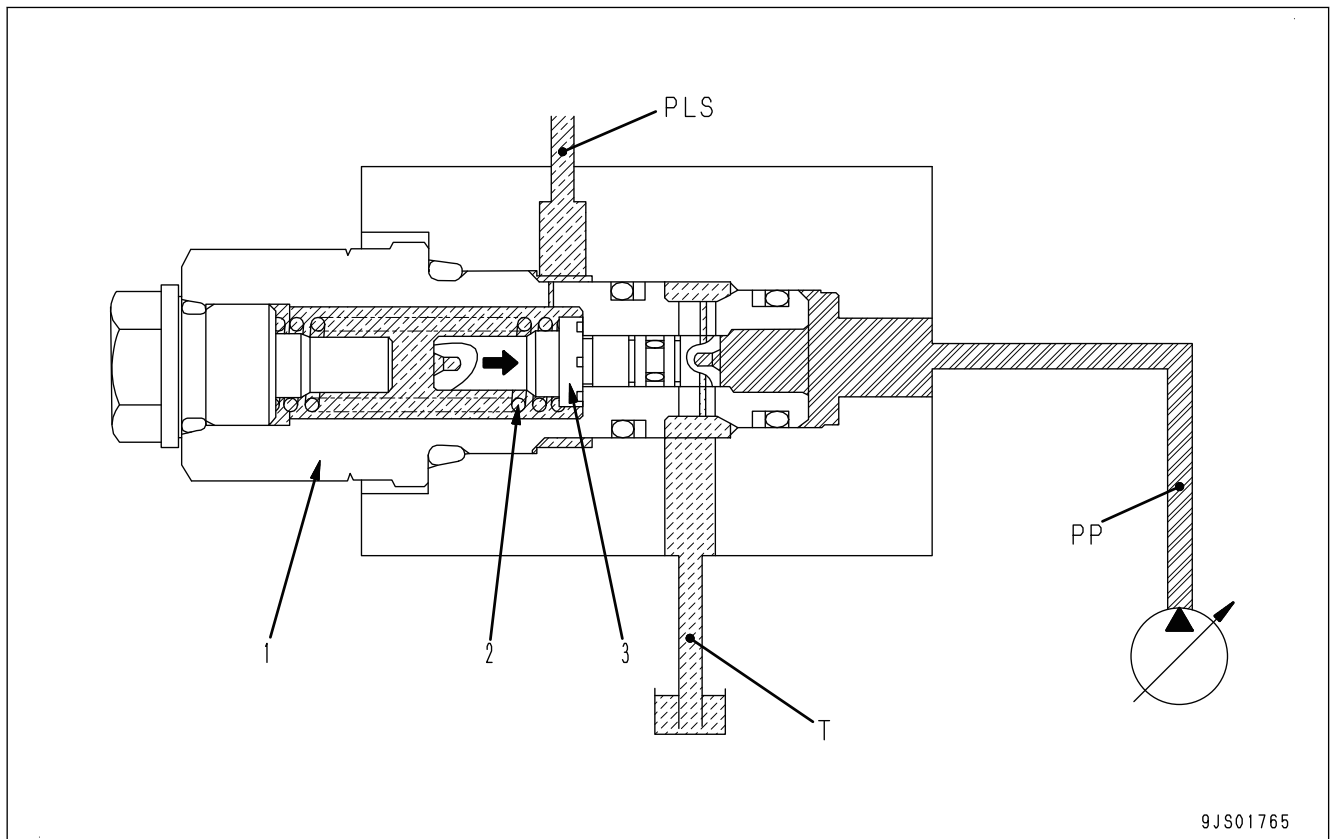
Model: HPV95 (112)

Type: Variable displacement swash plate type piston pump

Theoretical discharged volume: 112 cm³/rev

Rated discharged pressure: 41.2 MPa {420 kgf/cm²}

When Control Valve is Operated



1. When the control valve is operated largely, LS pressure (PLS) is generated and applied to the left end surface of spool (3). At this time, the difference of LS differential pressure (ΔPLS) from pump discharged pressure (PP) is little, since the open area of the control valve spool is large.
2. Since the differential pressure between discharged pressure (PP) and LS pressure (PLS) does not reach spring load 3.4 MPa $\{35 \text{ kgf/cm}^2\}$ of spring (2), spool (3) is pushed to the right by spring (2).
3. Pump circuit (PP) is disconnected from tank circuit (T) and all of pump discharged volume (Q) flows to the actuator circuit.

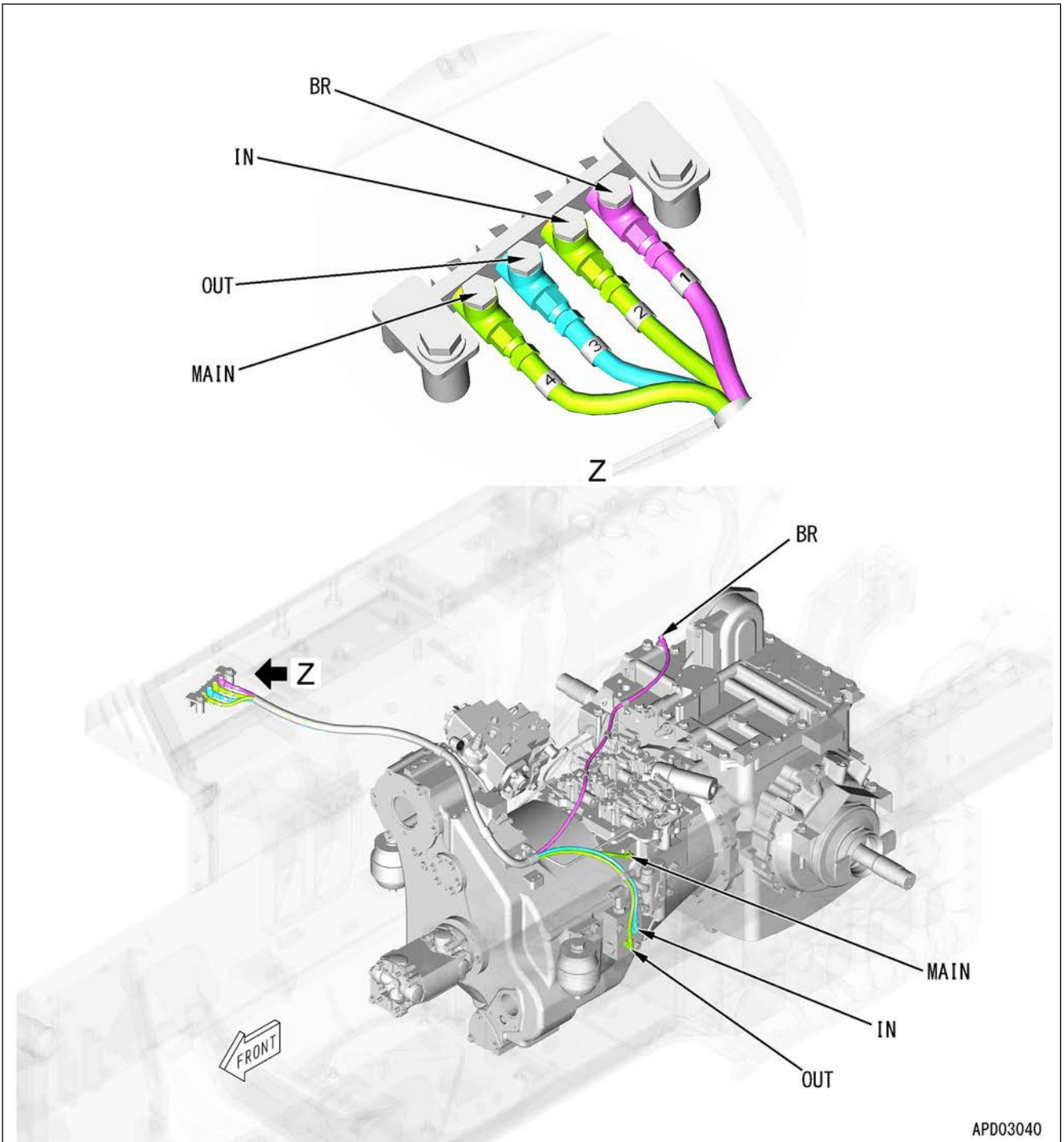
Main Relief Valve, Work Equipment Relief Valve, and Centralized Safety Valve of Control Valve

Function of Main Relief Valve, Work Equipment Relief Valve, and Centralized Safety Valve of Control Valve

When the oil exceeds the specified pressure, it is drained into the tank. The maximum pressure applied to the work equipment circuit is limited by this function to protect the circuit.

Centralized Pressure Pickup Port

Layout Drawing of Centralized Pressure Pickup Port



BR: Brake pressure pickup port

IN: Torque converter inlet oil pressure pickup port

OUT: Torque converter outlet oil pressure pickup port

MAIN: Transmission relief pressure pickup port

Function of Centralized Pressure Pickup Port

Oil pressure pickup ports to be used for Pm clinic are centralized inside the step cover at the right of the cab in order to improve the serviceability.

↓

Carrier (6)

↓

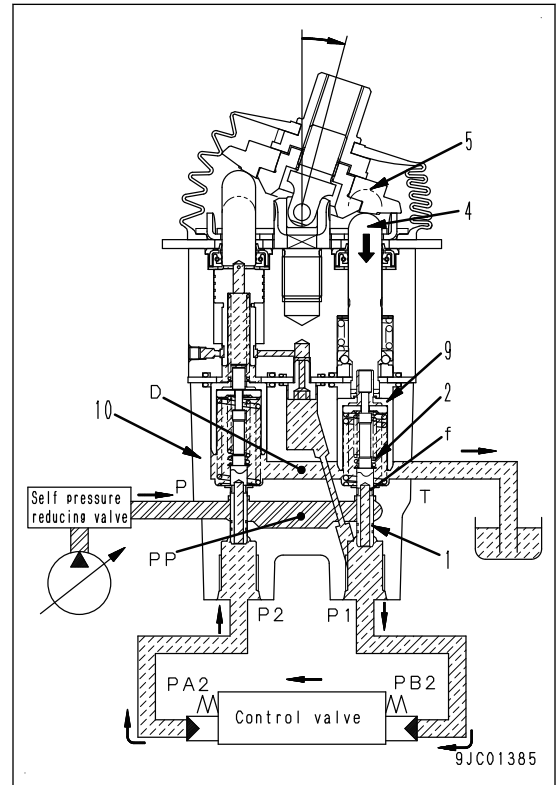
Sprocket hub (7)

↓

Sprocket teeth (8)

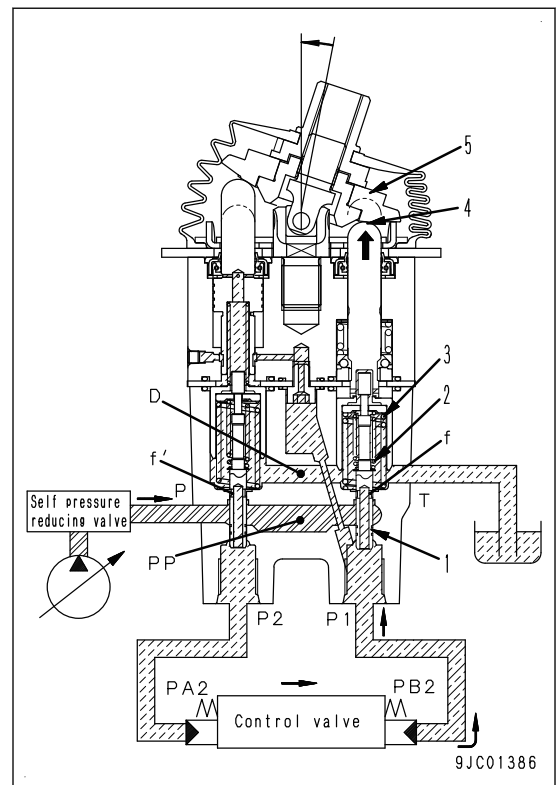
In Fine Control (When Fine Control is Started from Neutral State)

1. When piston (4) is pushed by disc (5), retainer (9) is pushed and spool (1) is also pushed and moved down through metering spring (2).
2. When fine control hole (f) is disconnected from drain chamber (D), it is connected to pump pressure chamber (PP) at almost the same time. The pilot pressure is transmitted from port (P1) to port (PB2) through the fine control hole (f).
3. When the pressure in port (P1) increases, spool (1) is pushed back. Almost at the same time when fine control hole (f) is disconnected from pump pressure chamber (PP), it is connected to drain chamber (D), and the pressure in port (P1) is released.
4. Spool (1) moves up and down until the force of metering spring (2) is balanced with the force exerted by pressure in port (P1). The positional relationship between spool (1) and valve body (10) (where fine control hole (f) is located between drain chamber (D) and pump pressure chamber (PP)) does not change until retainer (9) comes in contact with spool (1).
5. Since metering spring (2) is compressed in proportion to the stroke of the control lever, the pressure in port (P1) increases in proportion to the stroke of the control lever.
6. Accordingly, the control valve spool moves to a position at which the pressure in chamber (PB2) (equal to the pressure in port (P1)) is balanced with the reaction force of the return spring of the control valve spool.



In Fine Control (When Control Lever is Gone Back)

1. When disc (5) starts being returned, spool (1) is pushed up by the force of centering spring (3) and the pressure in port (P1).
2. Fine control hole (f) is connected to drain chamber (D), and the pressurized oil in port (P1) is released.
3. If the pressure in port (P1) is excessively reduced, spool (1) is depressed by metering spring (2) and fine control hole (f) is disconnected from drain chamber (D), and at almost the same time it is connected to pump pressure chamber (PP). Then, the pump pressure is supplied until the pressure in port (P1) recovers to the level corresponding to the lever position.
4. When the spool of control valve returns, the pressurized oil in drain chamber (D) flows in through fine control hole (f') in the valve on the side that is not operated. The oil passes through port (P2) and flows into chamber (PA2) to replenish the port with pressurized oil.



Fuel System

Machine model			D65EX-18E0		
Engine			SAA6D114E-6		
Item	Measurement condition		Unit	Standard value for new machine	Repair limit
Fuel pressure (Low-pressure circuit)	<ul style="list-style-type: none"> Coolant temperature:75 to 85°C Hydraulic oil temperature:45 to 55°C Operating Mode: P (Power mode) Joystick (steering, directional, and gear shift lever) (PCCS lever): NEUTRAL-Fuel control dial:MAX (High idle) position 		kPa {kgf/cm ² }	Min.480 {Min.4.9}	Min.480 {Min.4.9}
		Cranking	kPa {kgf/cm ² }	Min.105 {Min.1.07}	Min.105 {Min.1.07}
Fuel pressure Fuel control dial:MAX (High idle)(Low-pressure circuit (pressure difference))		Fuel control dial:MAX (High idle) position	kPa {kgf/cm ² }	Max.80 {Max.0.82}	Max.80 {Max.0.82}
Fuel pressure (Return circuit)		Fuel control dial:MAX (High idle) position	kPa {kgf/cm ² }	Max.18.6 {Max.0.19}	Max.18.6 {Max.0.19}
		Cranking	kPa {kgf/cm ² }	Max.18.6 {Max.0.19}	Max.18.6 {Max.0.19}
Fuel pressure (Negative pressure circuit (fuel supply connector))		Fuel control dial:MAX (High idle) position		kPa {mmHg}	-27.1 to 0 {-203 to 0}
Fuel pressure (Negative pressure circuit (supply pump))			kPa {mmHg}	-33.9 to 0 {-254 to 0}	-33.9 to 0 {-254 to 0}
Fuel pressure (Fuel feed pump outlet pressure)			kPa {mmHg}	Min.34 {Min.255}	Min.34 {Min.255}

Travel of Control Lever and Pedal Stroke

Applicable machine model			D65PX-18E0		
Engine			SAA6D114E-6		
Item	Test condition	Unit	Standard value for new machine	Failure judgment criteria	
FORWARD/ REVERSE side of PCCS lever (steering, direc- tional, and gear shift lever)	<ul style="list-style-type: none"> • Engine is stopped • Measurement point: Center of the lever grip (knob) 	NEUTRAL to FORWARD	mm	30±10	30±10
		NEUTRAL to REVERSE	mm	30±10	30±10
Steering side of PCCS lever (steering, direc- tional, and gear shift lever)		NEUTRAL to LEFT	mm	40±15 (Play: Max. 3)	40±15 (Play: Max. 3)
		NEUTRAL to RIGHT	mm	40±15 (Play: Max. 3)	40±15 (Play: Max. 3)
Decelerator ped- al	<ul style="list-style-type: none"> • Engine is stopped • Measurement point: Pedal center 	mm	55±11	55±11	
Brake pedal	<ul style="list-style-type: none"> • Fuel control dial: MIN (Low idle) posi- tion • Measurement point: Pedal center 	Full stroke	mm	68±11	68±11
Blade control lever	<ul style="list-style-type: none"> • Fuel control dial: MIN (Low idle) posi- tion • Hydraulic oil temper- ature: 45 to 55°C • Measurement point: Center of the lever grip (knob) 	NEUTRAL to RAISE/ LOWER	mm	63±10	63±10
		NEUTRAL to FLOAT	mm	88±13	88±13
		NEUTRAL to RIGHT/LEFT tilt	mm	53±8	53±8
Ripper control lever (option)	<ul style="list-style-type: none"> • Fuel control dial: MIN (Low idle) posi- tion • Hydraulic oil temper- ature: 45 to 55°C • Measurement point: Center of the lever grip (knob) 	NEUTRAL to RAISE/ LOWER	mm	-	-

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Examine Engine Oil Pressure

Tools to Examine Engine Oil Pressure

Symbol	Part No.	Part name	Q'ty	Remarks
A	-	799-101-5002	Hydraulic tester	1
	1	799-101-5160	Nipple	1
B	799-401-2320	Gauge	1	Pressure range 1 MPa
C	6732-81-3170	Nipple	1	Size: M10×1.0mm
D	6215-81-9710	O-ring	1	

⚠ 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.

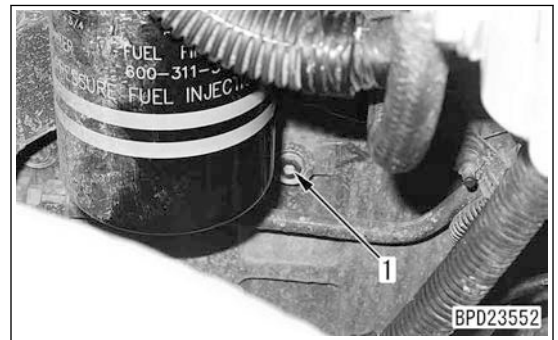
Check this item under the following conditions.

Engine coolant temperature: 75 to 85 °C

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

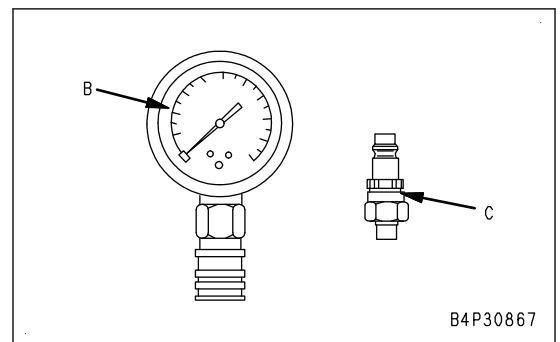
How to Examine Engine Oil Pressure

1. Open side cover on the right of engine
2. Remove engine oil pressure pickup plug (1) of the cylinder block.



3. Install nipple C, and connect it to gauge B.
4. Start the engine and measure the engine oil pressure with fuel control dial at MIN (Low idle) position and MAX (High idle) position.

For standard values, see Standard Value Table, "Standard Value Table for Engine".



After finishing the test, remove the testing tools and restore the machine.

Test State	Content	Details	Required action
100	Key OFF/ECU shut down is necessary or exceed specified time	<ul style="list-style-type: none"> • Engine is running. • Elapsed time exceeds specified time. 	<ul style="list-style-type: none"> • Shut down the engine controller for re-setting the key. (*1) • “SCR Denitration Efficiency Test” does not finish successfully. Perform the troubleshooting for the failure code. For details, see “40 Troubleshooting”.

*1: Shut down of engine controller will be completed when system operating lamp goes out 1 to 6 minutes after the starting switch is turned to OFF position.

Clean DEF Pump

Tools to Clean DEF Pump

Symbol	Part No.	Part name	Q'ty	Remarks
A	790-361-1000	DEF pump cleaning kit	1	
A1	6540-71-2720	Cap	3	
B	Commercially available	Resin container	1	<ul style="list-style-type: none"> • Made with polypropylene/polyethylene • Capacity: Approx. 1ℓ
C	600-919-5030	Plug	3	

⚠ 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 the tires to prevent the machine from moving.

⚠ For handling of DEF, see Operation and Maintenance Manual, "PRECAUTIONS FOR DEF".

⚠ When holding DEF pump with your hands, be sure to put on safety glasses and rubber gloves.

⚠ Toxic gas or corroded material may be generated by a chemical reaction if an iron or aluminum container is used to catch the draining fluid waste of DEF from the machine. Use a container made of resin (PP, PE) or stainless steel to catch the draining fluid waste of DEF.

NOTICE

- If a KOMNET communication error which cannot be sensed by the engine controller occurs within 1 second, the machine monitor continues the test in some cases even though the test is not continued (standard screen). In such a case, turn the starting switch to the OFF position. The system operating lamp goes off, and the engine controller shuts down. Then the test is reset.
- DEF can freeze when the ambient temperature is low. Before you clean the DEF pump, make sure that the DEF is thawed. If you clean the DEF pump while DEF is frozen, devices can be damaged.

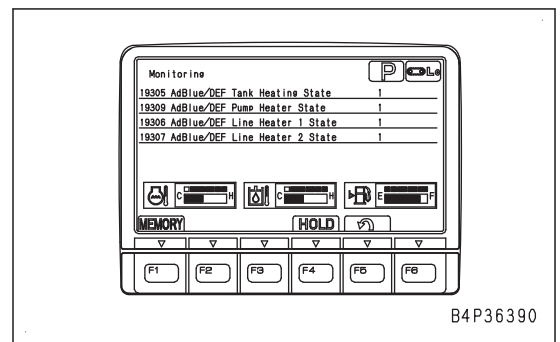
REMARK

See "Clean DEF Tank" and prepare a cleaning equipment to clean the DEF tank.

How to Clean DEF Pump

Preparation for cleaning

1. Start the engine.
2. Check the DEF state.
 - 1) Select and show the monitoring items that follow. For details, see "Set and Operate Machine Monitor".
 - Monitoring code: 19305 "DEF Tank Heating State"
 - Monitoring code: 19309 "DEF Pump Heater State"
 - Monitoring code: 19306 "DEF Line Heater 1 State"
 - Monitoring code: 19307 "DEF Line Heater 2 State"



Undercarriage and Frame

Adjust Idler Clearance

Tools to Adjust Idler Clearance

Symbol	Part No.	Part name	Q'ty	Remarks
A	Commercially available	Feeler gauge	1	

⚠ 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.

For adjusting of the idler clearance to perform troubleshooting, refer to this section.

When the R.H., L.H., upper, and lower guide plates are worn and the idler runs out sideways or tilts, adjust the guide plates according to the following procedure.

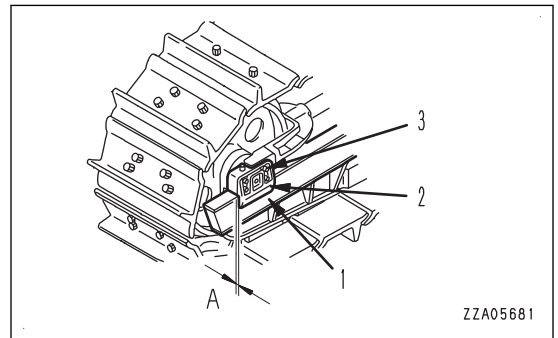
How to Adjust Idler Clearance

Since the idlers are forced to move forward and backward by an external force, guide plates will be worn out.

Wear of guide plates will cause the vibration of idlers from side to side or inclination of the idlers, and running off of track links from the idlers or unevenly worn idler and links may result.

Adjust as follows.

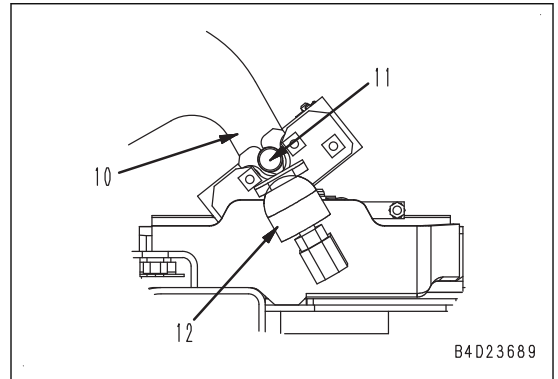
1. Drive the machine by 1 to 2 m (3 ft 3 in to 6 ft 7 in) on a flat place.
2. Measure clearance (A) between track frame (1) and guide plate (2) (4 places on the right and left, and inside and outside).
 - When clearance (A) is less than 4 mm (0.16 in).
The clearance of the idler does not need to be adjusted.
 - When clearance (A) is 4 mm (0.16 in) or more
Adjust the clearance of the idler.
 - 1) Loosen bolt (3).
 - 2) Remove some shims and adjust the clearance on each side to 0.5 to 1 mm (0.02 to 0.04 in).
Thickness of 1 shim is 1 mm (0.04 in).



Adjust Open Lock (Stopper Rubber)

Check the relationship between the cab and door (stopper rubber) while the door is locked open. If it is abnormal, adjust it.

1. Loosen the upper lock nut of stopper rubber (12).

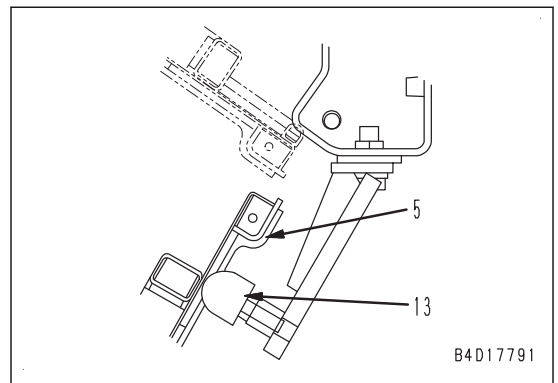


2. Loosen the lower lock nut of stopper rubber (13).
3. Repair the trouble by adjusting the heights of stopper rubbers (12) and (13).

REMARK

- If there is play, protrude (heighten) the stopper rubber until the play is eliminated.
- If the door is not locked easily or the operating effort of the unlock lever is heavy, return (lower) the stopper rubber to a degree that the door has no play.

4. While fixing stopper rubbers (12) and (13), tighten the lock nuts.



F5: Returns the screen to “Abnormality Record screen”.

F6: Clears the selected abnormality record.

REMARK

- To delete a selected abnormality record, select the abnormality record with F3 or F4, and then press F6 to execute the deletion of abnormality record.
- To clear all abnormality records together, press F2, and then all the records are deleted regardless of the selection.
- If “E” is displayed on the left of a failure code, the clearing operation is received but the information is not cleared.

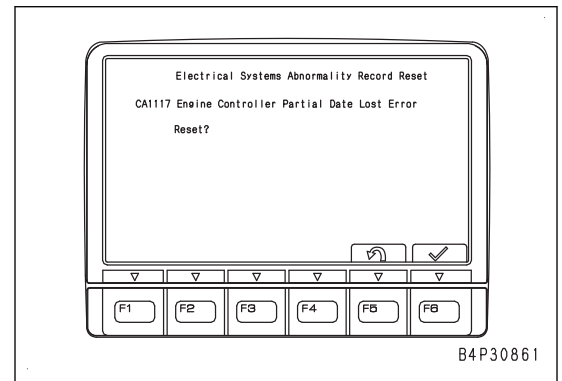
- 3) After the “Electrical Sys Abnormality Rec Reset” screen is displayed, operate the function switches to delete all the records.

F5: Returns the screen to “Electrical Sys Abnormality Record” screen (deleting mode).

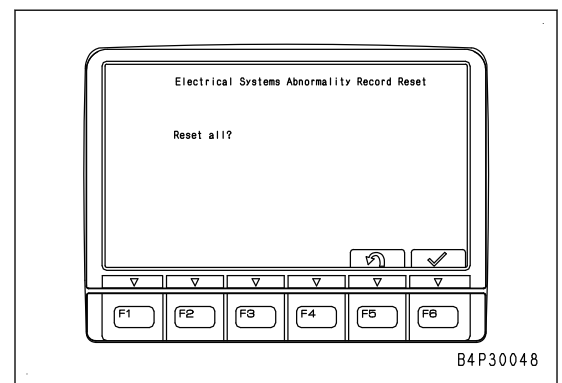
F6: Executes the deletion

REMARK

- This is the screen when a selected abnormality record is going to be deleted.



- This is the screen when all the abnormality records are going to be deleted.



- 4) When the screen to notify the completion of the deletion is displayed and then “Electrical Sys Abnormality Record” (deleting mode) screen is displayed, the deletion of the selected abnormality record is completed.

3. On “Adjustment” screen, perform adjustment of “Setting Pitch Angle Sensor Standard Value” with function switches.

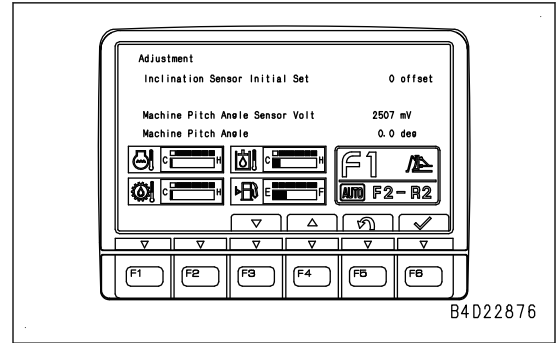
F3: Not used.

F4: Not used.

F5: Returns the screen to the adjustment item selection screen.

F6: Saves the compensation value.

- 1) Check that the machine remains horizontal.
- 2) Press F6, and check that warning buzzer sounds.



REMARK

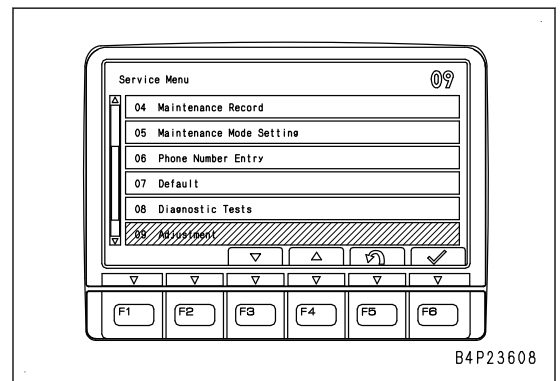
- By performing this adjustment, the display item “Machine Pitch Angle” changes to 0.0 deg.
- By performing this adjustment, the saved compensation values are effective even while the starting switch is turned to OFF position.

Adjustment Menu (S/T Lever N Position Setting)

By “S/T Lever Neutral Position Set”, the power train controller recognizes the neutral position of the steering potentiometer of the joystick (steering, directional and gear shift lever) (PCCS lever).

When the power train controller or joystick (steering, directional and gear shift lever) (PCCS lever) was replaced, be sure to perform this adjustment.

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



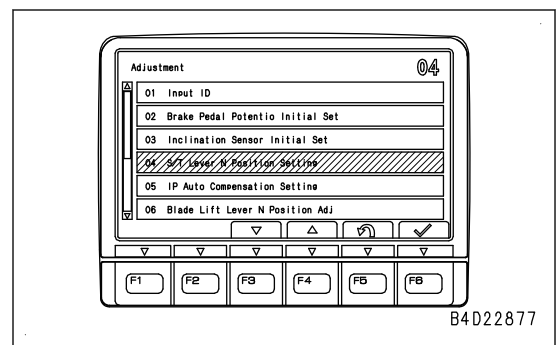
2. On “Adjustment” menu screen, select “S/T Lever N Position Setting” with function switches or numeral input switches.

F3: Moves the selection downward.

F4: Moves the selection upward.

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

F6: Enters the selected adjustment items and moves the screen to the next “Adjustment” screen.



REMARK

- For details of adjustment items, see “Adjustment Item Table”.
- Adjustment item can be selected similarly to “Service Menu” screen.

How to Start Up KOMTRAX System

How to Start Up KOMTRAX System

Do as follows when you start the use of KOMTRAX.

1. KOMTRAX administrator do the “Machine Registration” with KOMTRAX client personal computer.
2. Do the “Radio station establishment on machine side”.
 - For procedures, see “Global KOMTRAX Web Reference Manual (For Key Person)”.
 - To operate the KOMTRAX client personal computer, administrative authority of operation of KOMTRAX is required. Consult the KOMTRAX administrator.

When the Gateway Function Controller is Replaced

When you replaced the gateway function controller, do as follows to start the use of it again.

1. Technician prepares the new terminal, and writes the product number and serial number.
2. Technician replaces the terminal, and do the “Radio station establishment on machine side”. Tell the KOMTRAX administrator about that the work has been done, and the information of the new terminal.

Communication Inspection on the Machine Side

- If you start up the KOMTRAX system, and if you have replaced the gateway function controller, do the radio station establishment to check that the terminal can communicate normally.
- After you have done this inspection, KOMTRAX starts up the communication.
- In the radio station establishment, park the machine outdoors in the open sky where radio waves are not blocked to check GPS and data communication. The radio station establishment may not be completed when the machine is placed indoor where radio wave from the satellite is blocked.

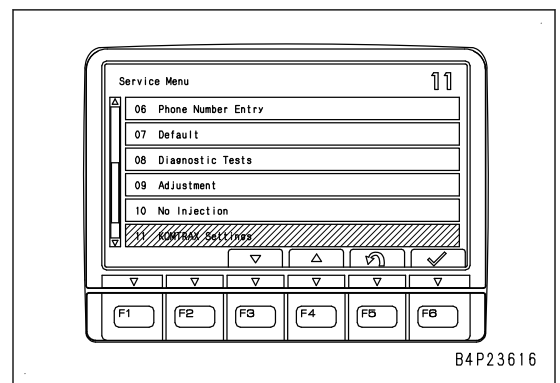
1. Confirmation of the applicable machine for radio station establishment

Check to see if the radio station establishment is necessary for your machine as follows.

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

REMARK

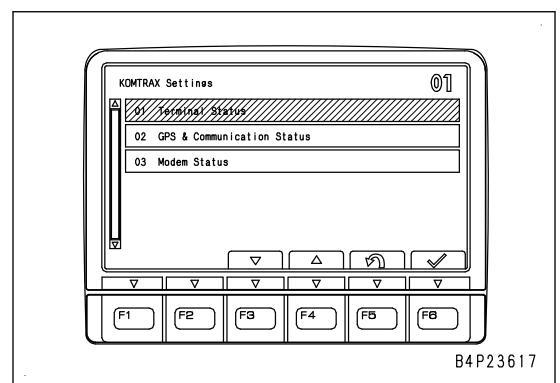
For selecting method, see “How to Operate Service Mode” in “SERVICE MODE”.



- 2) On the “KOMTRAX Settings” screen, select “Terminal Status” with function switches or numerical input switches.

REMARK

For selecting method, see “How to Operate Service Mode” in “SERVICE MODE”.



Pm Clinic Check Sheet: D65PX-18E0

NOTICE

Do the test after sufficient warm-up operation of the engine.

Machine model	Machine serial number	Service meter	User name	Date of test	Tester
				//	

Engine

Applicable machine model			D65PX-18E0			Good	No good
Engine			SAA6D114E-6				
Item	Test condition	Unit	Standard value for new machine	Failure judgment criteria	Measured value		
Engine high idle speed (when decelerator cutting function is turned on) (*1)	<ul style="list-style-type: none"> 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) Adjustment ID: 0007 (decelerator cutting mode) Joystick (steering, directional, and gear shift lever) (PCCS lever): NEUTRAL position Fuel control dial: MAX (High idle) position 	min ⁻¹ {r/min}	2050 to 2150 {2050 to 2150}	2050 to 2150 {2050 to 2150}			
Engine speed at low idle (*1)	<ul style="list-style-type: none"> 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) Joystick (steering, directional, and gear shift lever) (PCCS lever): NEUTRAL position Fuel control dial: MIN (Low idle) position 	min ⁻¹ {r/min}	800 to 850 {800 to 850}	800 to 850 {800 to 850}			

Undercarriage Diagnosis Report (Normal) PLUS Specification (Program Form No.: NJLA195001)

Komatsu Undercarriage Inspection		Customer name:								
		Address:								
Model	D65EX, PX, WX-18	Serial No	Equip No							
Location		SMR								
Soil condition		Dealer								
Working condition		Inspector								
Insp.Date(yy/mm/dd)		Work Order No								
		Wet,AR,HD or Dry								
		Shoe width (mm)								
		Shoe type								
		Wear type								
		Comments/Observation								
		Hours on Parts: (yyyy/m/d)								
		New	100% Wear	Measured mm	Wear %	SMR		Hours on Parts:	Comments/Observation	
						New	Rebuilt			
<p>LINK PITCH</p>	R	LH	813.8	825.8						
		RH	813.8	825.8						
	M	LH	203.45	206.45						
		RH	203.45	206.45						
<p>LINK HEIGHT</p>	LH	137.0	119.0							
	RH	137.0	119.0							
<p>BUSHIN G</p>	LH	73.0	64.0			New	Turned			
	RH	73.0	64.0			New	Turned			
<p>GROUSER HIGHT</p>	LH	65.0	25.0							
	RH	65.0	25.0							
<p>CARRIER</p>	Front	LH	200.0	160.0						
		RH	200.0	160.0						
	Rear	LH	200.0	160.0						
		RH	200.0	160.0						
<p>IDLER</p>	Front	LH	20.0	30.0						
		RH	20.0	30.0						
	Rear	LH	20.0	30.0						
		RH	20.0	30.0						
<p>TRACK ROLLER</p>	1	LH	210.0	174.0						
	2	LH	210.0	174.0						
	3	LH	210.0	174.0						
	4	LH	210.0	174.0						
	5	LH	210.0	174.0						
	6	LH	210.0	174.0						
	7	LH	210.0	174.0						
	8	LH	210.0	174.0						
	9	LH	210.0	174.0						
	10	LH	210.0	174.0						
<p>SPROCKET</p>	1	RH	210.0	174.0						
	2	RH	210.0	174.0						
	3	RH	210.0	174.0						
	4	RH	210.0	174.0						
	5	RH	210.0	174.0						
	6	RH	210.0	174.0						
	7	RH	210.0	174.0						
	8	RH	210.0	174.0						
	9	RH	210.0	174.0						
	10	RH	210.0	174.0						
		LH	0.0	9.0						
		RH	0.0	9.0						
Remarks:										

BPD23682

- Measures to be taken:
By following the clearing procedure, clear the failure code.
- Examples:
 1. The failure code cannot be cleared because an abnormal high voltage, abnormal low voltage, or communication error (open or short circuit) of failure code is displayed for a related component.
 2. The failure code cannot be cleared because correct values are not input from a sensor (a failure code for a related sensor is displayed).
 3. The failure code cannot be cleared because a failure code that disables auto regeneration or manual stationary regeneration of the aftertreatment devices is displayed.
 4. The failure code cannot be cleared because a failure code that stops the DEF pump or disables DEF injection is displayed.

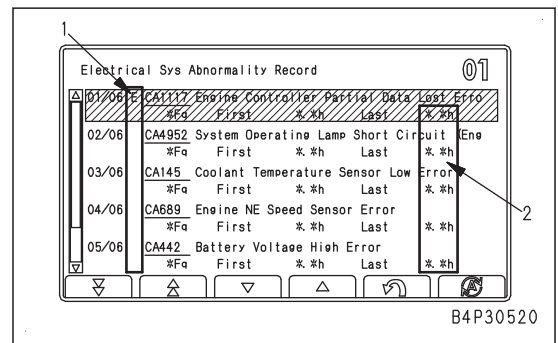
How to Identify the Failure Code to be Repaired

Among failure codes displayed on “Abnormality Record” screen of the machine monitor, identify failure codes that have following conditions as a code to be repaired

1. Failure codes displayed with “E” (“E” is displayed on the left of failure code. See the following figure.)
 - Check the “Abnormality Record” screen and identify all failure codes that “E” is currently displayed as a code to be repaired.
 - The failure codes are displayed in the upper row from the “E” on the “Abnormality Record” screen.
2. Failure codes displayed without “E” and their service meter reading (SMR) at last occurrence (at previous working time, etc.) become the most recent time.
 - The failure codes that have detected records most recently and are displayed without “E” may be in the state that their abnormalities are not cleared (*1). Due to that, check the description of “Troubleshooting by failure code” and identify them as a code to be repaired.
 - The failure codes are displayed on “Abnormality Record” screen in ascending order. (See the following figure.)

*1: It corresponds to a failure code that is cleared by turning the starting switch to OFF position, or by stopping the engine though the repair is not completed. Due to this kind of failure code, the failure code to be repaired is not determined only by the existence of “E”. (Failure C pattern in the following REMARK “Display of “E” on the “Abnormality Record” screen”.)

- 1: Area where “E” is displayed
2: Area where the most recent SMR is displayed

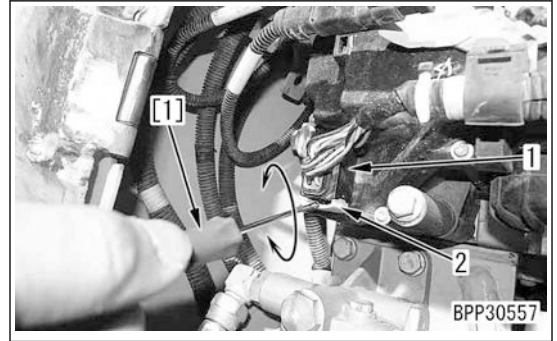


REMARK

Display of “E” on the “abnormality record” screen

1. Transition of “E” displayed with failure code has a following pattern.
The table is shown the display of “E” on “Abnormality Record” screen of the machine monitor when turning the starting switch to O N position after turning the starting switch to OFF position and shutting down the engine controller.

2. Turn the small flat-head screwdriver [1] clockwise and counterclockwise to slowly release the lock part (2).



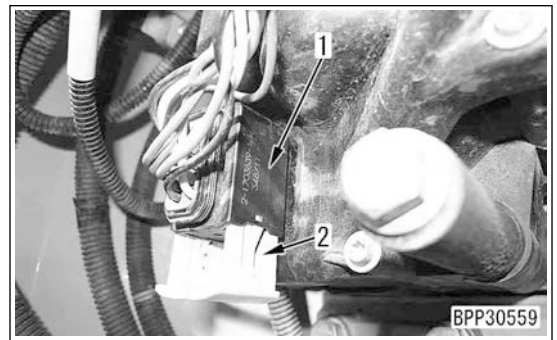
3. When the yellow lock part (2) is released to some degree, lightly hold the lock part (2) by hand not to let it come off, and then release the lock fully.

REMARK

When you release the lock, if you apply too much force on the yellow lock part (2), it will come off. Take precaution.

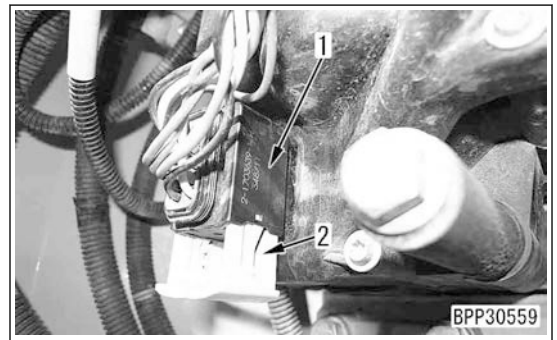


4. Disconnect the connector (1) with the lock part (2) released fully.

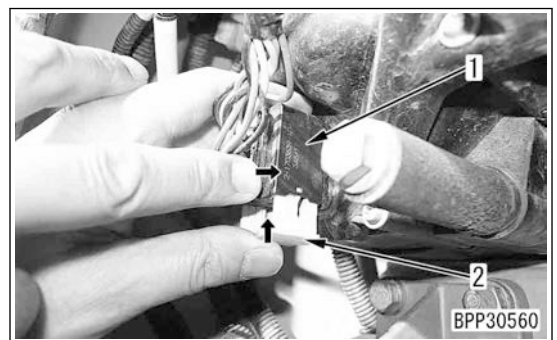


• Procedure of connection of connectors

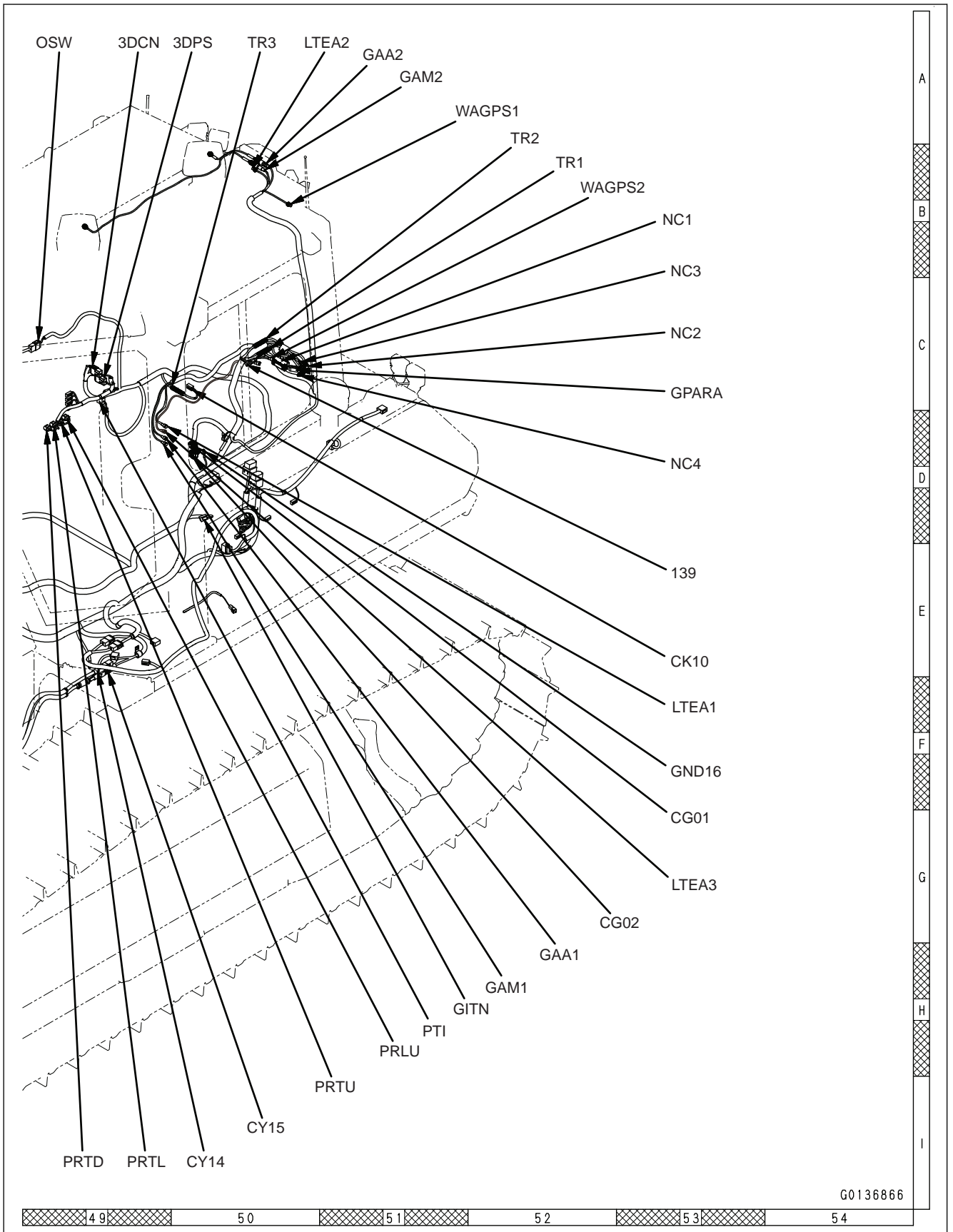
1. Release the yellow lock part (2) fully, align the mating surface, and install the connector (1) straight.

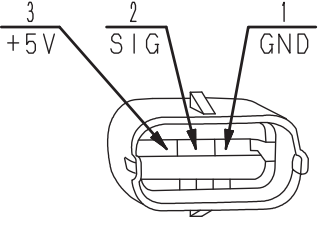
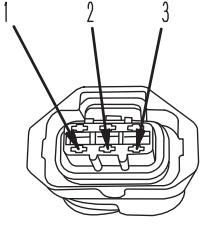
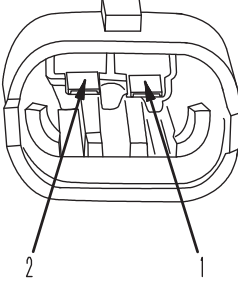
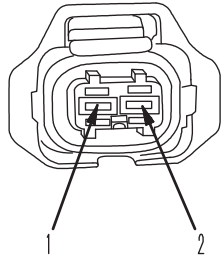


2. While you push the yellow lock part (2), install the connector (1) gradually.



9/10

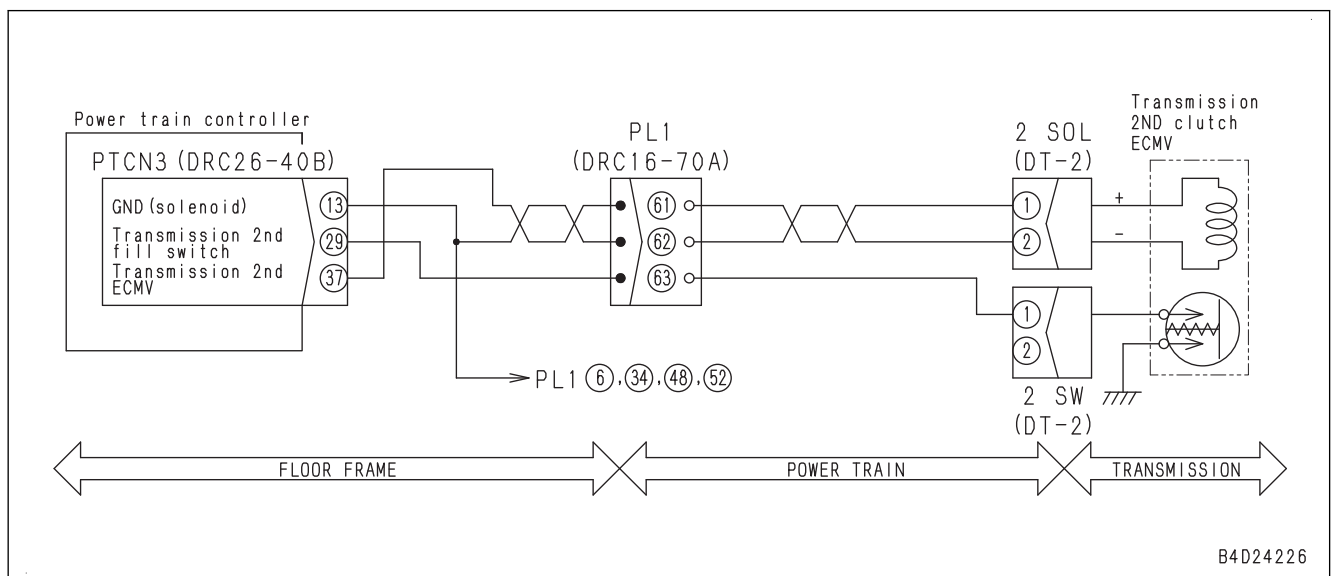


BOSCH connector for engine (BDK series)		
No. of pins	Common rail (fuel) pressure sensor (107 engine)	
	Sensor side (plug)	Harness side (receptacle)
3		
	—	—
No. of pins	Fuel supply pump (107 engine), AdBlue/DEF injector	
	Valve side (plug)	Harness side (receptacle)
2		
	—	—
B4P29599		

Failure code	Failure (Shown on screen)	Applicable equipment	Action level	History category	Remarks
CA256	Ambient Air Temp Sensor Low Error	ENG	L01	Electrical system	
CA271	IMV or PCV 1 Short Circuit Error	ENG	L03	Electrical system	
CA272	IMV or PCV 1 Open Circuit Error	ENG	L03	Electrical system	
CA281	Supply Pump Pressure Balance Error	ENG	L03	Electrical system	
CA322	Injector #1 (L#1) Open Circuit Error or Short Circuit Error	ENG	L03	Electrical system	
CA323	Injector #5 (L#5) Open Circuit Error or Short Circuit Error	ENG	L03	Electrical system	
CA324	Injector #3 (L#3) Open Circuit Error or Short Circuit Error	ENG	L03	Electrical system	
CA325	Injector #6 (L#6) Open Circuit Error or Short Circuit Error	ENG	L03	Electrical system	
CA331	Injector #2 (L#2) Open Circuit Error or Short Circuit Error	ENG	L03	Electrical system	
CA332	Injector #4 (L#4) Open Circuit Error or Short Circuit Error	ENG	L03	Electrical system	
CA343	Engine Controller Internal Failure	ENG	L04	Electrical system	
CA351	Injectors Drive Circuit Error	ENG	L03	Electrical system	
CA352	Sensor 1 Supply Voltage Low Error	ENG	L03	Electrical system	
CA356	MAF Sensor High Error	ENG	L03	Electrical system	
CA357	MAF Sensor Low Error	ENG	L03	Electrical system	
CA386	Sensor 1 Supply Voltage High Error	ENG	L03	Electrical system	
CA428	Water in Fuel Sensor High Error	ENG	L01	Electrical system	
CA429	Water in Fuel Sensor Low Error	ENG	L01	Electrical system	
CA435	Engine Oil Pressure SW Error	ENG	L01	Electrical system	
CA441	Power Voltage Low Error	ENG	L04	Electrical system	
CA442	Power Voltage High Error	ENG	L04	Electrical system	
CA449	Common Rail Pressure High Error 2	ENG	L03	Electrical system	
CA451	Common Rail Pressure Sensor High Error	ENG	L03	Electrical system	

No.	Cause	Procedure, measuring location, criteria and remarks		
4	Defective power train controller	If any failure is found by check on Cause 2 and failure code is still displayed after above checks on Cause 3, power train controller is defective. <ul style="list-style-type: none"> Reference 		
		<ol style="list-style-type: none"> Turn starting switch to OFF position. Insert T-adapter into connector PTCN3. Start engine. 		
		REMARK Keep joystick (steering, directional and gear shift lever) in N.		
		Voltage	Between PTCN3 (29) and ground	7 to 11 V
<ol style="list-style-type: none"> Turn starting switch to OFF position. Insert T-adapter into connector PTCN3. Start engine. While depressing brake, operate joystick (steering, directional and gear shift lever) to perform troubleshooting. 				
Voltage	Between PTCN3 (29) and ground	F2/R2	Max. 1 V	

Circuit Diagram of 2nd Clutch ECMV



B4D24226

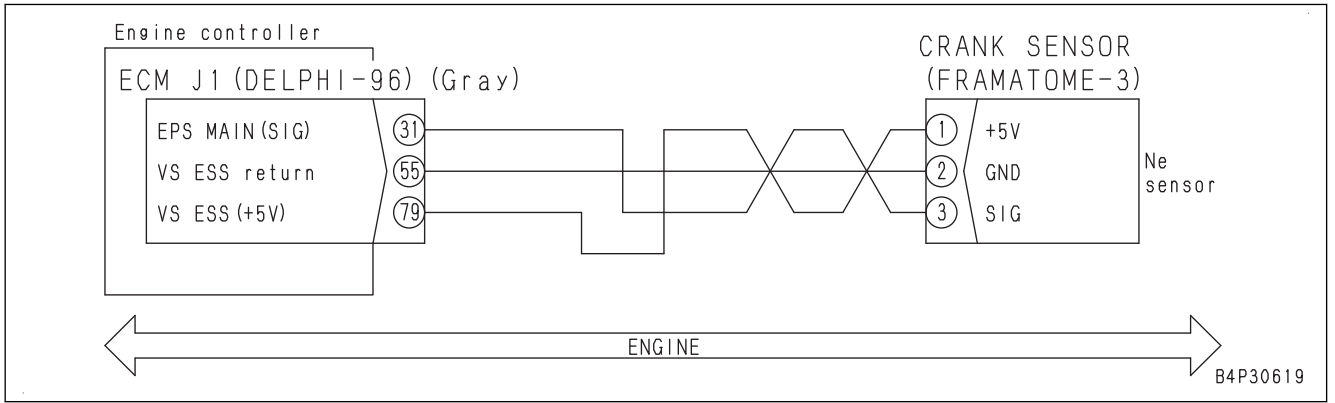
No.	Cause	Procedure, measuring location, criteria and remarks
3	Defective KDOC inlet temperature sensor	If failure code [CA3313], [CA3314] or [CA3315] is displayed, perform troubleshooting for [CA3313], [CA3314] or [CA3315].
4	Defective KDOC inlet temperature sensor	After temperature is cooled down sufficiently, 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.
5	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.
6	Defective engine controller	Turn starting switch to ON position. If this failure code is still displayed and no failure is found by preceding checks, engine controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)

Failure Code [B@HANS]

Action level	Failure code	Failure	Hydraulic Oil Overheat (Power train controller system)
L02	B@HANS		
Details of failure	Power train controller detects overheating of hydraulic oil temperature by voltage drop of hydraulic oil temperature sensor while engine is running.		
Action of controller	Displays hydraulic oil temperature monitor on machine monitor in red.		
Phenomenon on machine	If machine is used as it is, work equipment and HSS circuit may be damaged.		
Related information	<ul style="list-style-type: none"> Signal voltage from hydraulic oil temperature sensor is input to power train controller and then data is transmitted to machine monitor through CAN communication system. Hydraulic oil temperature can be checked with monitoring function. (Code: 04401) After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine. 		

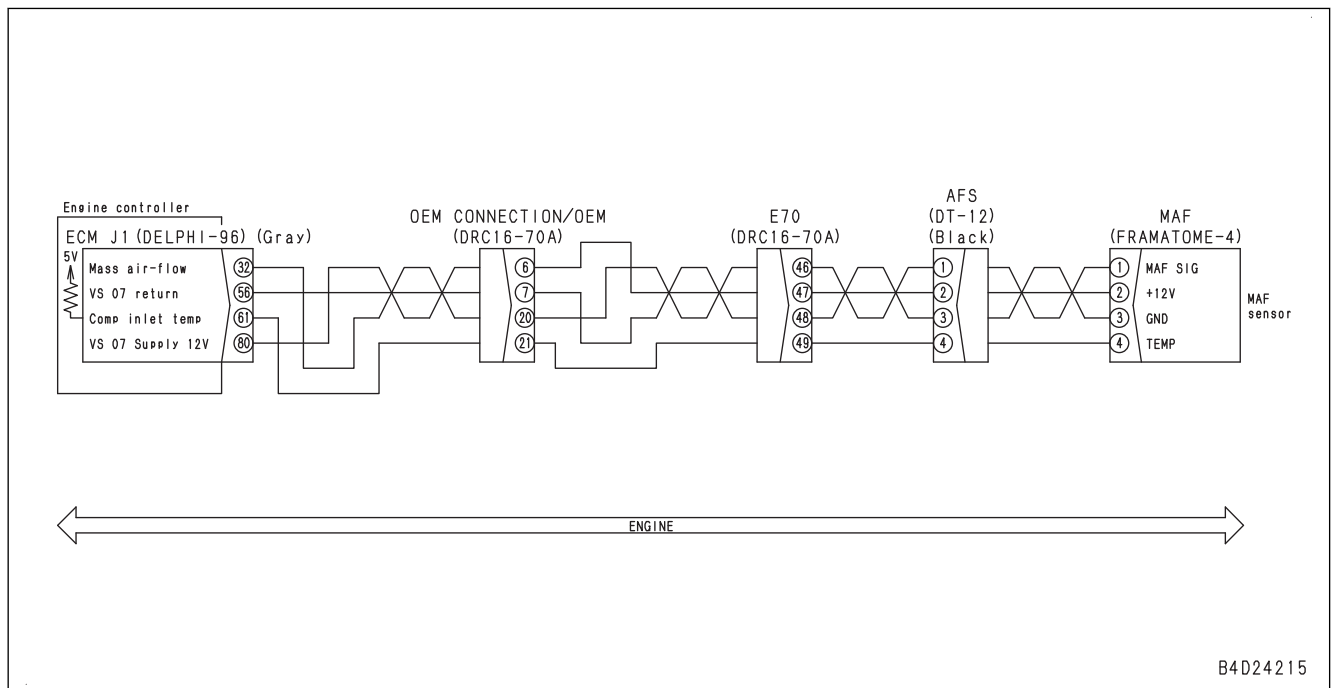
No.	Cause	Procedure, measuring location, criteria and remarks
1	Overheating of hydraulic oil (when system is normal)	Hydraulic oil may overheat. Check hydraulic oil temperature, and remove cause of failure if hydraulic oil overheats.
2	Defective hydraulic oil temperature gauge system	Defective hydraulic oil temperature gauge system is suspected, perform troubleshooting for failure codes [DGS1KA] and [DGS1KX] or E mode "HYDRAULIC OIL TEMPERATURE GAUGE DOES NOT INDICATE CORRECT TEMPERATURE".

Circuit Diagram of Ne Speed Sensor



No.	Cause	Procedure, measuring location, criteria and remarks	
5	Open circuit in wiring harness (wire breakage of ground line or defective contact of connector)	If failure code is still displayed after above checks on cause 4, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and MAF, and connect T-adapters to each female side. REMARK Open circuit in ground circuit	
		<table border="1"> <tr> <td>Resistance</td> <td>Between ECM J1 (female) (56) and MAF (female) (3)</td> <td>Max. 10 Ω</td> </tr> </table>	Resistance
Resistance	Between ECM J1 (female) (56) and MAF (female) (3)	Max. 10 Ω	
6	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and MAF, and connect T-adapters to female side of ECM J1.	
		<table border="1"> <tr> <td>Continuity</td> <td>Between ECM J1 (female) (32) and each pin other than ECM J1 (32) pin.</td> <td>No continuity</td> </tr> </table>	Continuity
Continuity	Between ECM J1 (female) (32) and each pin other than ECM J1 (32) pin.	No continuity	
7	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)	

Circuit Diagram of Intake Air Temperature Sensor



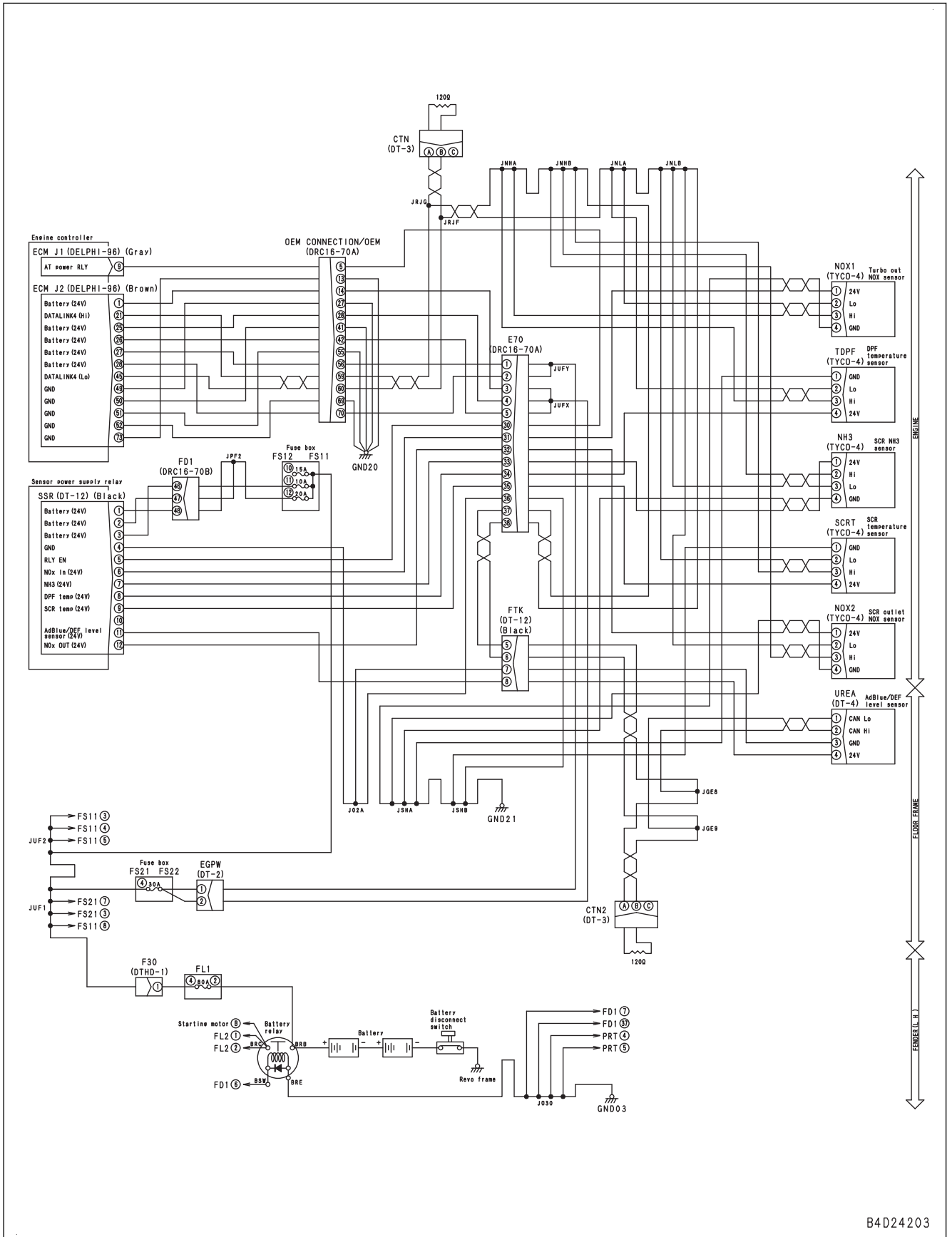
No.	Cause	Procedure, measuring location, criteria and remarks		
5	Defective low-pressure circuit component	<ul style="list-style-type: none"> For check of pressure in fuel low pressure circuit, see Testing and Adjusting, "Examine Fuel Pressure". Measure at fuel filter inlet side. Cranking speed: Min.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

Failure Code [CA1677]

Action level	Failure code	Failure	DEF Temperature Sensor Low Error (Engine controller system)
L01	CA1677		
Detail of failure	Failure of DEF temperature sensor (Short circuit of thermistor for temperature measurement)		
Action of controller	Advances to Inducement strategy.		
Phenomenon on machine	<ul style="list-style-type: none"> • Failure to measure DEF level. • Engine power deration according to inducement strategy. 		
Related information	<ul style="list-style-type: none"> • For the inducement failure codes, refer “List of failure codes related to Inducement” of “Troubleshooting Points for Urea SCR System”. • The DEF temperature sensor is one of the DEF tank sensors integrated with the DEF level sensor and DEF quality sensor performs CAN communication with the engine controller. • If the thermistor for temperature measurement shorts, this failure code is sent to the engine controller via CAN communication and displayed. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. 		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective wiring harness connector	<ol style="list-style-type: none"> 1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position.
		If this failure code is cleared, wiring harness connector is defective.
2	Defective DEF tank sensor	<ol style="list-style-type: none"> 1. Check the sensor connector for contamination and damage. 2. Turn starting switch to OFF position. 3. Replace the DEF tank sensor. 4. Turn starting switch to ON position.
		If this failure code is cleared, any internal parts in the original DEF tank sensor is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)
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.)

Circuit Diagram of Sensor Power Supply Relay



B4D24203

No.	Cause	Procedure, measuring location, criteria and remarks
8	Defective exhaust gas color	<ul style="list-style-type: none"> • If failure code [CA1921], or [CA2639] is displayed after manual stationary regeneration is complete, perform the following: • See “Examine Exhaust Gas Color” section in “Chapter 30 TESTING AND ADJUSTING” for checking the exhaust gas color. • Perform regeneration disable on the machine monitor to check the exhaust gas color. <ol style="list-style-type: none"> 1. Suddenly accelerate the engine from low idle to high idle two times, and then keep the engine running at high idle speed for 5 seconds. If an excess black smoke is seen at high idle speed during acceleration, perform “KDPF GETS CLOGGED IN A SHORT TIME” of S mode. Even excessive black smoke is exhausted during engine acceleration, if it is not at engine high idle, it is not defective. 2. To finish the exhaust gas color check, cancel the regeneration disable. 3. Make sure that the failure code is cleared.

Failure Code [CA2382]

Action level	Failure code	Failure	VGT Position Sensor Low Error (Engine controller system)
L03	CA2382		
Detail of failure	Low voltage is generated in VGT position sensor signal circuit.		
Action of controller	<ul style="list-style-type: none"> • Engine power deration. • EGR valve closes and fully opens VGT. • Regeneration control stops. 		
Phenomenon on machine	Engine power deration		
Related information	<ul style="list-style-type: none"> • Signal voltage from VGT position sensor can be checked with monitoring function. (Code: 48701 (V)) • Position (mm) detected by VGT position sensor can be checked with monitoring function. (Code: 48700 (mm)) • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared (note that the engine power deration is not canceled right after the failure code is cleared). • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • This failure code is displayed if sensor connector is disconnected. 		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective wiring harness connector	<ol style="list-style-type: none"> 1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position. 			
		If this failure code is cleared, wiring harness connector is defective.			
2	Defective sensor power supply system	If failure code [CA187] or [CA227] is also displayed, perform troubleshooting these first.			
		<ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Disconnect connector SVGT and connect T-adapter to female side. 3. Turn starting switch to ON position. 			
		Voltage	Between SVGT (female) (A) and (B)	Power supply	4.75 to 5.25 V
3	Open circuit of connector box (wire breakage or defective contact of connector)	<ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Disconnect connectors INTER-CONNECT and SVGT, and connect T-adapter to male side of INTER-CONNECT or female side of SVGT. 			
		Resistance	If failure code is still displayed after above checks on cause 2, this check is not required. Between INTER-CONNECT (male) (8) and SVGT (female) (A)	Max. 10 Ω	
			If failure code is still displayed after above checks on cause 2, this check is not required. Between INTER-CONNECT (male) (9) and SVGT (female) (B)	Max. 10 Ω	
			Between INTER-CONNECT (male) (10) and SVGT (female) (C)	Max. 10 Ω	

Failure Code [CA2777]

Action level	Failure code	Failure	Manual Stationary Regeneration Request but KDPF Regeneration Disable (Engine controller system)
-	CA2777		
Detail of failure	<ul style="list-style-type: none"> The Manual Stationary Regeneration Request prompts operator to forcibly perform "Manual Stationary Regeneration", which is more effective to remove soot, because soot accumulation in the KCSF of KDPF has exceeded the level for automatic regeneration. However, the operator is pressing Regeneration Disable, so regeneration is disabled. Soot accumulation reaches level 4 or 5. 		
Action of controller	None in particular		
Phenomenon on machine	None		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective SCR temperature sensor (internal open or short circuit to ground)	If failure code [CA3142] or [CA3143] is displayed, perform troubleshooting for [CA3142] or [CA3143].
2	Defective KDPF system (Abnormal exhaust gas temperature to SCR)	<ol style="list-style-type: none"> 1. If failure code [CA3251] is displayed, perform troubleshooting for [CA3251]. 2. If failure code [CA3253], [CA3254], or [CA3311] is displayed, perform troubleshooting for [CA3253], [CA3254], or [CA3311]. 3. If failure code [CA3255], [CA3256], or [CA3312] is displayed, perform troubleshooting for [CA3255], [CA3256], or [CA3312].
3	Defective SCR temperature sensor (installation error)	See "DISASSEMBLY AND ASSEMBLY", "REMOVE AND INSTALL SCR ASSEMBLY" and fix installation error, if any.
4	Improper DEF quality	<ol style="list-style-type: none"> 1. Turn starting switch to ON position. 2. If failure code [CA4277] is displayed or failure code [CA4277] is logged on the abnormality record screen, perform troubleshooting these first. 3. Check the "DEF concentration" on the troubleshooting assistance screen (normal value: 29 to 36 %). 4. If a failure is found by above checks, it may be contaminated. Replace the DEF in the tank. 5. Replace the DEF injector. 6. Perform "Loaded Diagnostics Operation To Confirm Failure Correction".
5	Defective SCR temperature sensor (internal defect)	<ol style="list-style-type: none"> 1. If the failure code persists after the above checks, replace the SCR temperature sensor. 2. Perform "Loaded Diagnostics Operation To Confirm Failure Correction".
		If the failure code is cleared, the SCR temperature sensor may be defective.
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.)

Loaded Diagnostics Operation to Confirm Failure Correction

REMARK

If this failure code is displayed during "Loaded Diagnostics Operation To Confirm Failure Correction", return to troubleshooting.

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

1. Turn the starting switch to OFF position, and shut down the engine controller.
2. Turn the starting switch to the ON position, and check the failure code is cleared. If this failure code is displayed, return to troubleshooting.
3. Start the engine.
4. Run the engine at low idle speed for 10 minutes.
5. Run the engine at high idle speed for 10 minutes.
6. If this failure code is cleared, repair is completed.

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"> 1. Remove turbocharger exhaust connector. 2. Check inside of turbocharger exhaust connector for adhesion of oil and fuel. <p>NOTICE</p> <ul style="list-style-type: none"> • If oil or fuel is found, visually check for oil leaks from EGR valve and turbocharger. Repair abnormality, if any. • Wipe off oil or fuel sticking to piping.
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"> • Wipe stained oil or fuel off clean, if any. • If there is a trace of oil or fuel flowing into KDPF, check for KDPF and clean or replace it as necessary.
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 Clear Failure Code

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

(Make sure this failure code is cleared after this procedure.)

1. Turn the starting switch to OFF position, and shut down the engine controller.
2. Turn the starting switch to ON position.
3. Run the engine at low idle speed for approximately 1 minute.
4. Choose "Manual Stationary Regeneration for Service" by "Active Regeneration for Service" screen on the "Service Menu" screen of the machine monitor.
5. End "Active Regeneration for Service".

NOTICE

- Perform "Active Regeneration for Service" for 15 minutes minimum from its start.
- After "Active Regeneration for Service" is ended and if failure code is cleared, repair is completed.

Related information	<ul style="list-style-type: none"> • SCR catalyst, NOx sensor, ammonia sensor diagnosis. 19203 Turbo Outlet NOx Sensor State 19210 SCR Outlet NOx Sensor State 19202 Turbo Outlet Concentration Corrected 19209 SCR Outlet NOx Corrected 19205 Ammonia Concentration Corrected 19120 DEF Injection Quantity • DEF level, DEF quantity sensor diagnosis 19100 DEF Concentration 19110 DEF Level 19111 DEF Level Corrected 19115 DEF Temperature in Tank 19400 Ambient Temperature 19305 DEF Tank Heating State <p>NOTICE This failure code requires “Loaded Diagnostics Operation To Confirm Failure Correction”. After investigating the cause of the problem and completing the repair, perform “Loaded Diagnostics Operation To Confirm Failure Correction” to make sure 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)</p>
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No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective turbocharger outlet NOx sensor system (Open circuit, internal defect, defective sensor heater)	If failure code [CA1885], [CA3232], [CA3649], [CA3682], [CA3718], [CA3725], or [CA3748] is displayed, perform troubleshooting for these failure codes first.
2	Defective SCR outlet NOx sensor system (Open circuit, internal defect, defective sensor heater)	If failure code [CA1887], [CA2771], [CA3545], [CA3583], [CA3681], or [CA3717] is displayed, perform troubleshooting for these failure codes first.
3	Defective SCR temperature sensor system (Open circuit, Internal defect)	If failure code [CA3142] or [CA3143] or [CA3144] or [CA3146] or [CA3147] or [CA3148] or [CA3165] or [CA3229] or [CA3231] or [CA3235] or [CA4152] or [CA4159] or [CA4164] or [CA4165] or [CA4166] or [CA4261] is displayed, perform troubleshooting for these failure codes first.
4	Defective ammonia sensor system (Open circuit, internal defect, defective sensor heater)	If failure code [CA3899], [CA3911], [CA3912], [CA3932], [CA3933], [CA3934], [CA3935], [CA3936] or [CA4281] is displayed, perform troubleshooting for these failure codes first.

Failure Code [CA3574]

Action level	Failure code	Failure	DEF Pump Pressure Too Low Error (Engine controller system)
L01	CA3574		
Detail of failure	Failure of the DEF pump, or clogging or rupture of the DEF channel from the DEF tank filter to the DEF pump.		
Action of controller	<ul style="list-style-type: none"> • Raise the DEF pump pressure again. • Advances to Inducement strategy. 		
Phenomenon on machine	<ul style="list-style-type: none"> • DEF injection becomes insufficient and NOx emission increases. • Engine power deration according to inducement strategy. 		
Related information	<ul style="list-style-type: none"> • For the inducement failure codes, refer “List of failure codes related to Inducement” of “Troubleshooting Points for Urea SCR System”. • The engine controller does not display this failure code during thawing control of the DEF supply system (DEF injection is disabled, which disables judgment). • Make sure that the value of the following 4 states are other than 1 (Thawing) 3 minutes after the engine is started. (This failure cannot be repaired until thawing control is completed) • The state of each heater is 1: Thawing, 2: Warming, or 0: OFF. (Enter the numbers directly and confirm the values on the monitoring code screen.) 19305 DEF Tank Heating State 19306 DEF suction and purge line heater state 19307 DEF pressure line heater state 19309 DEF pump heater state • This failure code is cleared if the DEF pump pressure rises to around 900 kPa on the DEF pump “ Pre-defined Monitoring screen ”. • The “ Pre-defined Monitoring screen ” uses the DEF pump diagnosis. (The following numbers are the monitoring codes) • DEF pump diagnosis 19304 DEF pump state 19108 DEF Pump Pressure 19136 DEF Pump Temperature 19109 DEF Pump Pressure Sensor Voltage 19120 DEF Injection Quantity <p>NOTICE This failure code requires a inducement error and “Loaded Diagnostics Operation To Clear Failure Code”. After investigating the cause of the problem and completing the repair, perform “Loaded Diagnostics Operation To Clear Failure Code” to make sure the failure code is cleared.(This failure code is not cleared by only turning starting switch to ON position.)</p>		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective DEF pump system	If failure code [CA3558] or [CA3559] or [CA3571] or [CA3572] is displayed on the abnormality record screen, perform troubleshooting these first.
2	Open circuit or short circuit in DEF line heater 1	If failure code [CA3713] or [CA5115] is displayed on the abnormality record screen, perform troubleshooting these first.
3	Defective DEF pump temperature sensor system	If failure code [CA2976] is also displayed, perform checks on causes 2 and after in troubleshooting for this failure code.

Failure Code [CA3713]

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

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	<ol style="list-style-type: none"> See descriptions of wiring harness and connectors in "Electrical equipment" in "CHECKS BEFORE TROUBLESHOOTING" of "RELATED INFORMATION ON TROUBLESHOOTING", and check them. Turn the starting switch to ON position. 		
		If this failure code is not displayed, the wiring harness connector is defective.		
2	Open circuit in wiring harness	<ol style="list-style-type: none"> Turn the starting switch to OFF position. Disconnect the connectors ECM J2,UHR1,UHB and UHC, and connect the T-adaptor to each female side. 		
		Resistance	Between ECM J2 (female) (39) and UHR1 (female) (8)	Max. 10 Ω
			Between UHR1 (female) (12) and ground	Max. 10 Ω
			Between UHB (female) (1) and UHR1 (female) (5)	Max. 10 Ω
			Between UHB (female) (2) and ground	Max. 10 Ω
			Between UHC (female) (1) and UHR1 (female) (6)	Max. 10 Ω
Between UHC (female) (2) and ground	Max. 10 Ω			
3	Hot short circuit in wiring harness	<ol style="list-style-type: none"> Turn the starting switch to OFF position. Disconnect the connectors ECM J2,UHR1,UHB and UHC, and connect the T-adaptor to each female side. Turn the starting switch to ON position. 		
		Voltage	Between ground and ECM J2 (female) (39) or UHR1 (female) (8)	Max. 3 V
			Between ground and UHR1 (female) (5) or UHB (female) (1)	Max. 3 V
			Between ground and UHR1 (female) (6) or UHC (female) (1)	Max. 3 V

No.	Cause	Procedure, measuring location, criteria and remarks		
3	Open circuit in wiring harness (wire breakage or defective contact of connector) (broken power line)	<ul style="list-style-type: none"> • Power line <ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Disconnect connector NH3, and connect T-adapter to female side. 3. Turn starting switch to ON position. 		
		Voltage	Between NH3 (female) (1) and (4)	Min. 22 V
		If no failure is found by above results, this check is not required. <ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Disconnect connectors SSR and NH3 and connect T-adapters to each female side. 		
		Resistance	Between SSR (female) (7) and NH3 (female) (1)	Max. 10 Ω
Between NH3 (female) (4) and ground	Max. 10 Ω			
4	Open circuit in wiring harness (wire breakage or defective contact of connector) (broken communication line)	<ul style="list-style-type: none"> • Communication line If failure code is still displayed after above checks on cause 2, this check is not required. <ol style="list-style-type: none"> 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, TDPF, CTN2, and CTN and connect T-adapters to each female side. 		
		Resistance	Between ECM J2 (female) (21) and NH3 (female) (2)	Max. 10 Ω
			Between ECM J2 (female) (45) and NH3 (female) (3)	Max. 10 Ω
			Between CTN2 (female) (A) and NH3 (female) (2)	Max. 10 Ω
			Between CTN2 (female) (B) and NH3 (female) (3)	Max. 10 Ω
			Between CTN (female) (A) and NH3 (female) (2)	Max. 10 Ω
			Between CTN (female) (B) and NH3 (female) (3)	Max. 10 Ω
5	Ground fault in wiring harness (contact with ground circuit)	If failure code (no open circuit) is still displayed after above checks in cause 2, measure resistance at any one place in Hi line and Lo line. <ol style="list-style-type: none"> 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 all related connectors, and connect T-adapter to the female side of the connector to be measured. 		
		Resistance	Between one of ECM J2 (female) (21), CTN2 (female) (A), CTN (female) (A), NOX1 (female) (3), NH3 (female) (2), TDPF (female) (3), SCRT (female) (3), NOX2 (female) (3), or UREA (female) (2) and ground	Min. 100 kΩ
			Between one of ECM J2 (female) (45), CTN2 (female) (B), CTN (female) (B), NOX1 (female) (2), NH3 (female) (3), TDPF (female) (2), SCRT (female) (2), NOX2 (female) (2), or UREA (female) (3) and ground	Min. 100 kΩ

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Failure Code [CA4157]

Action level	Failure code	Failure	DEF FCV Malfunction (Engine controller system)
L01	CA4157		
Detail of failure	A FCV (valve for purge) valve inside the DEF pump may be defective.		
Action of controller	DEF intake is inhibited.		
Phenomenon on machine	Pump may break when it is frozen and it may result in failure of DEF injection.		
Related information	<ul style="list-style-type: none"> The engine controller does not display this failure code when controlling thawing of the DEF supply system (because DEF injection is disabled and no judgment cannot be made). 3 minutes after engine started, make sure that the value of the following 4 state is other than 1 (Thawing). (This failure cannot be repaired until thawing control is complete.) State of each heater is either 1: Thawing 2: Heating 3 or 0: OFF. (Check the value by entering a figure directly on the monitoring code screen). 19305 DEF Tank Heating State 19306 DEF intake return line heater state 19307 DEF pressure line heater state 19309 DEF Pump Heater State The Pre-defined Monitoring screen troubleshooting for DEF pump and aftertreatment system are used (the figures below denote monitoring codes). Troubleshooting for DEF pump 19304 DEF Pump State 19108 DEF Pump Pressure 19136 DEF Pump Temperature 19109 DEF Pump PressSensor Volt 19120 DEF Injection Quantity Aftertreatment system 47000 KDPF outlet differential pressure 47100 KDPF Differential Pressure 47200 KDPF outlet temperature 1 47300 KDOC inlet temperature 1 47400 KDOC outlet temperature 1 19305 Dosing Fuel Pressure <p>NOTICE After inspecting cause of failure and performing repair, perform “Loaded Diagnostics Operation To Clear Failure Code”, and check that this failure code is canceled. (Display of this failure code is not canceled by simply turning starting switch to ON position)</p>		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective DEF pump system	If failure code [CA2976] or [CA3558] or [CA3559] or [CA3571] or [CA3572] or [CA3577] or [CA3578] is displayed on the abnormality record screen, perform troubleshooting these first.
2	Defective DEF pump	If the cause is not determined by above checks, replace the DEF pump.
3	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Failure Code [CA4259]

Action level	Failure code	Failure	KDOC and KDPF Temperature Sensor Power Interrupt Error (Engine controller system)
L03	CA4259		
Detail of failure	KDPF temperature sensor interrupt power failure error (12 open circuits are detected in the power supply line in 60 seconds.)		
Action of controller	<p>Normal control</p> <ul style="list-style-type: none"> • Default value of the KDOC inlet temperature, KDOC outlet temperature, and the KDPF outlet temperature (250 °C). • Engine power deration • DEF injection stops • EGR valve closed. • Regeneration control stops. • Fuel dosing stops. • Advances to Inducement strategy. 		
Phenomenon on machine	<ul style="list-style-type: none"> • KDOC inlet temperature, KDOC outlet temperature, and KDPF outlet temperature detection error. • Defective regeneration control. • NOx emission increases because DEF injection is disabled. • KDPF accumulated soot level is high. • Engine output is reduced based on inducement strategy. 		
Related information	<ul style="list-style-type: none"> • For the inducement failure codes, refer “List of failure codes related to Inducement” of “Troubleshooting Points for Urea SCR System”. • Mostly, momentary power failure is caused by defective contact and visually check a torn harness coating and check for defective contact at the connector. • To detect an incomplete wire breakage, sway the wiring harness as much as possible at the resistance measurement to check if the resistance can change or not. • The KDPF temperature sensor consists of the KDOC inlet temperature sensor, the KDOC outlet temperature sensor, and the KDPF outlet temperature sensor and is integrated into one sensor controller which provides CAN communication with the engine controller. • Note that sensor power supply relay connector is energized even if starting switch is turned to OFF position. • For replacement of the KDPF temperature sensor, see Disassembly and assembly, “Disassembly and assembly of KDPF assembly”. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine and travel (vibrate the machine). • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared (note that the engine power deration is not canceled only by the failure code is cleared). 		
No.	Cause	Procedure, measuring location, criteria and remarks	
1	Defective sensor power supply relay system	Perform troubleshooting for failure code [CA1776].	

No.	Cause	Procedure, measuring location, criteria and remarks
1	DEF tank remaining amount check	<ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Check the sight gauge to confirm that there is sufficient amount of DEF in the DEF tank. 3. If there is no DEF, or DEF level is low. <ol style="list-style-type: none"> 1) Refill with DEF. 2) Turn starting switch to OFF position. 3) If the value of DEF level is displayed correctly on machine monitor, perform "Loaded Diagnostics Operation To Clear Failure Code" and repair is completed. 4) If DEF level is not sensed and the color of DEF icon remains changed even after DEF has been refilled, proceed to cause 2. 4. If DEF level is normal <ol style="list-style-type: none"> 1) Turn starting switch to OFF position. 2) If DEF level is not sensed and the color of DEF icon remains changed even after DEF has been refilled, proceed to cause 2. 3) If the value of DEF level is displayed correctly on machine monitor, perform "Loaded Diagnostics Operation To Clear Failure Code" and repair is completed.
2	Check inside conditions of DEF tank	<ol style="list-style-type: none"> 1. Turn starting switch OFF, and confirm the following. <ol style="list-style-type: none"> 1) There is no foreign material such as dirt in DEF tank. 2) There is not a problem in quality and concentration of DEF. 3) There is no foreign material such as dirt attached to DEF sensor. 4) DEF float is not stuck. 2. Repair, or replace to solve if any of these failures are found. 3. Turn starting switch to ON position. 4. If the value of DEF level is displayed correctly on machine monitor, perform "Loaded Diagnostics Operation To Clear Failure Code" and repair is completed. 5. If DEF level is not sensed and the color of DEF icon remains changed even after performing remedy for these, proceed to cause 3.
3	Defective DEF tank sensor	<ul style="list-style-type: none"> • Check the sensor connector for contamination and damage. • Make sure that DEF tank contains 15 % or more of DEF. <ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Replace the DEF tank sensor. 3. Turn starting switch to ON position. 4. If the value of DEF level is displayed correctly on machine monitor, perform "Loaded Diagnostics Operation To Clear Failure Code" and repair is completed.
4	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

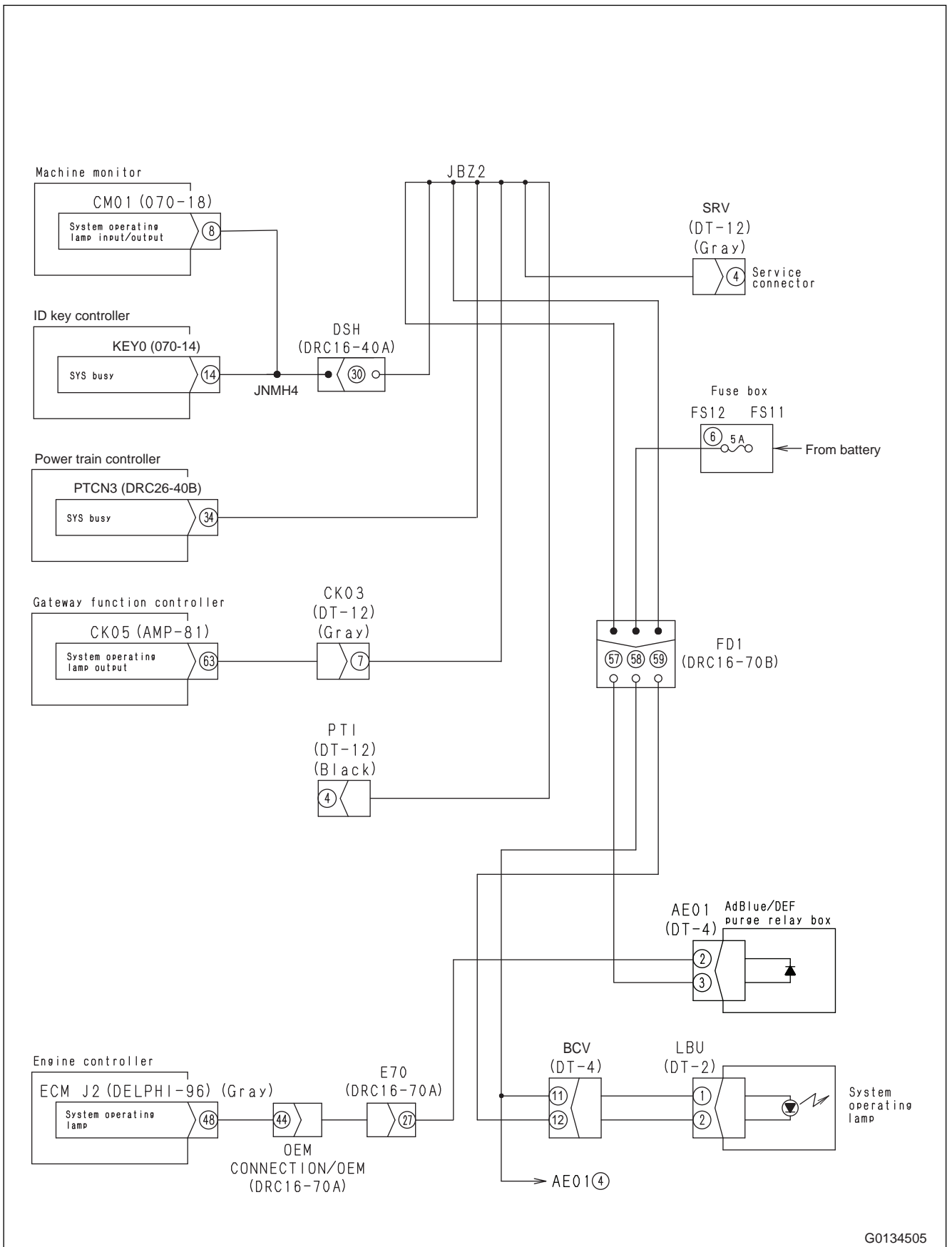
Loaded Diagnostics Operation to Clear Failure Code

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

(Make sure this failure code is cleared after this procedure.)

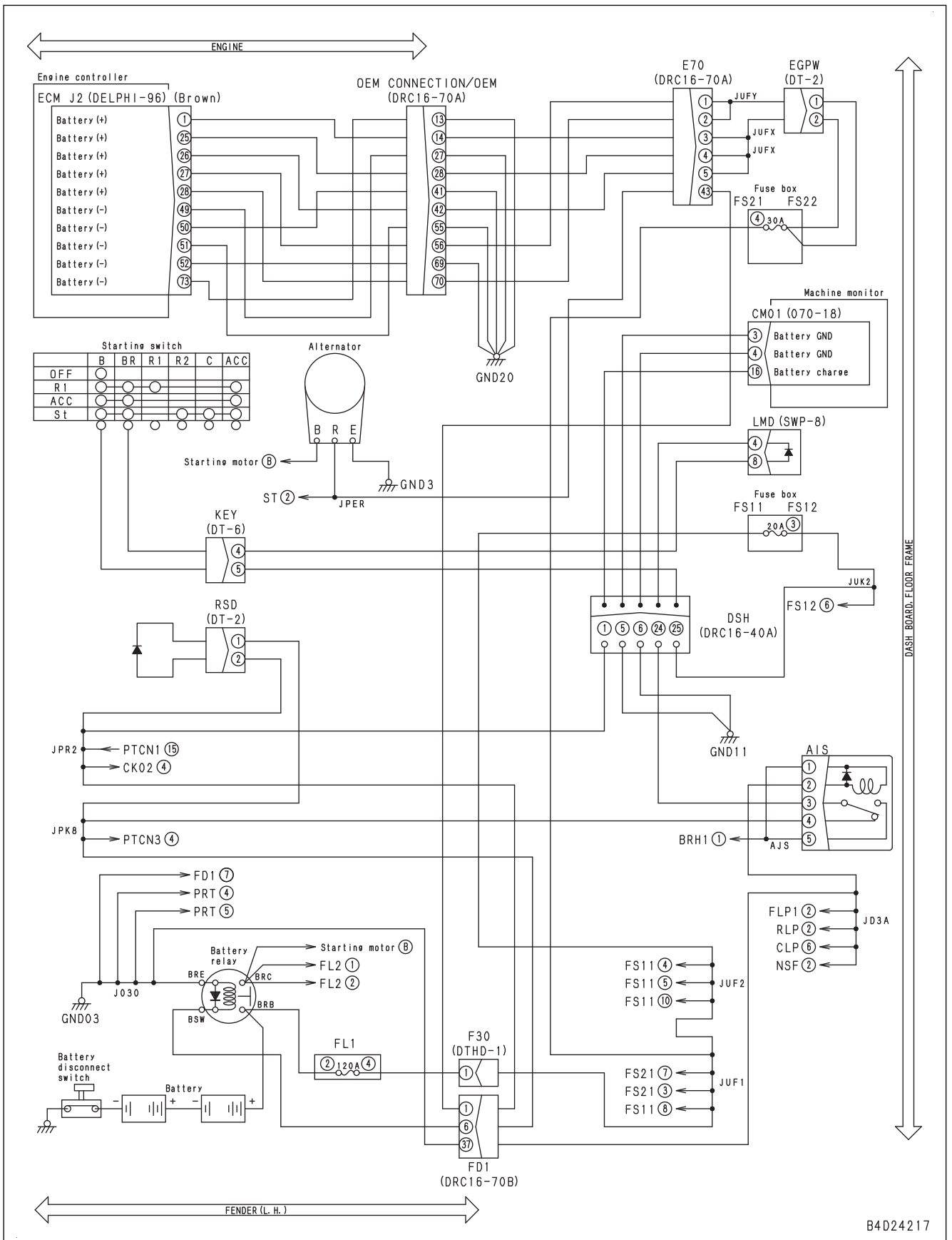
1. Turn the starting switch to OFF position, and shut down the engine controller.
2. Turn the starting switch to ON position.
3. Display monitoring code 19115 "DEF Temperature in Tank" on "Pre-defined Monitoring" screen.

Circuit Diagram of System Operating Lamp



G0134505

Circuit Diagram of Engine Controller Power Supply

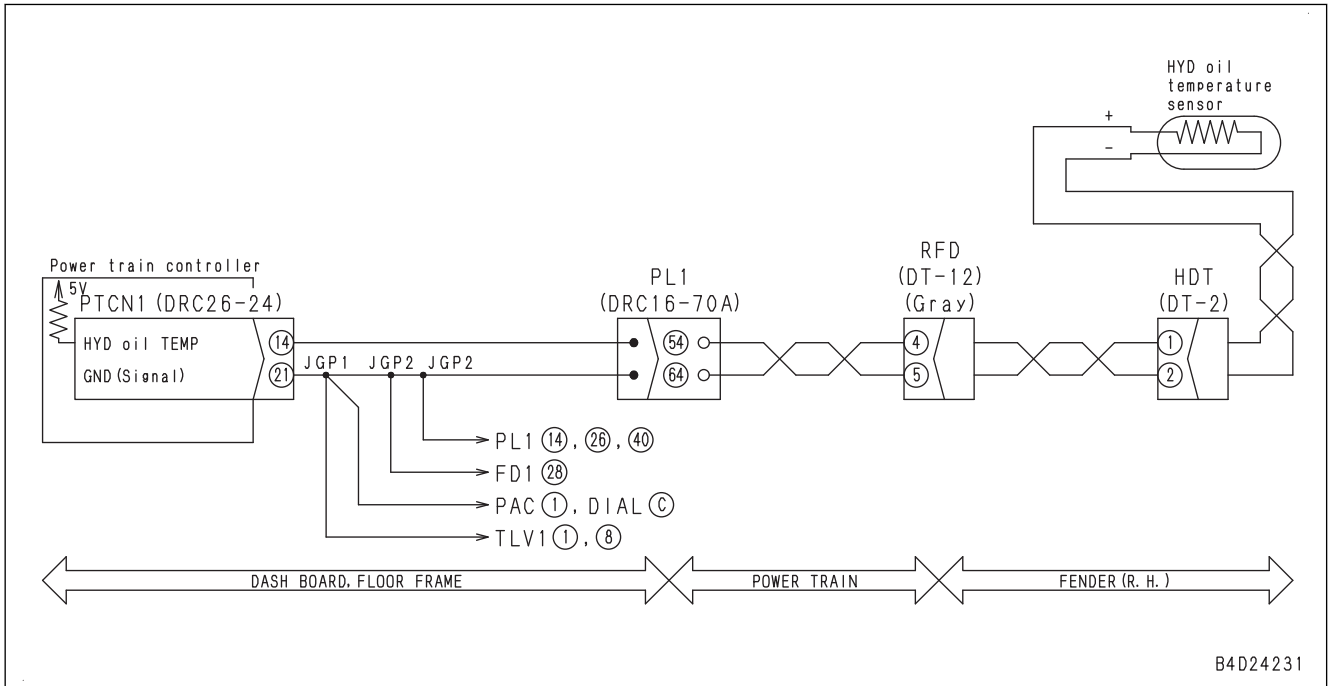


Failure Code [DBERKR]

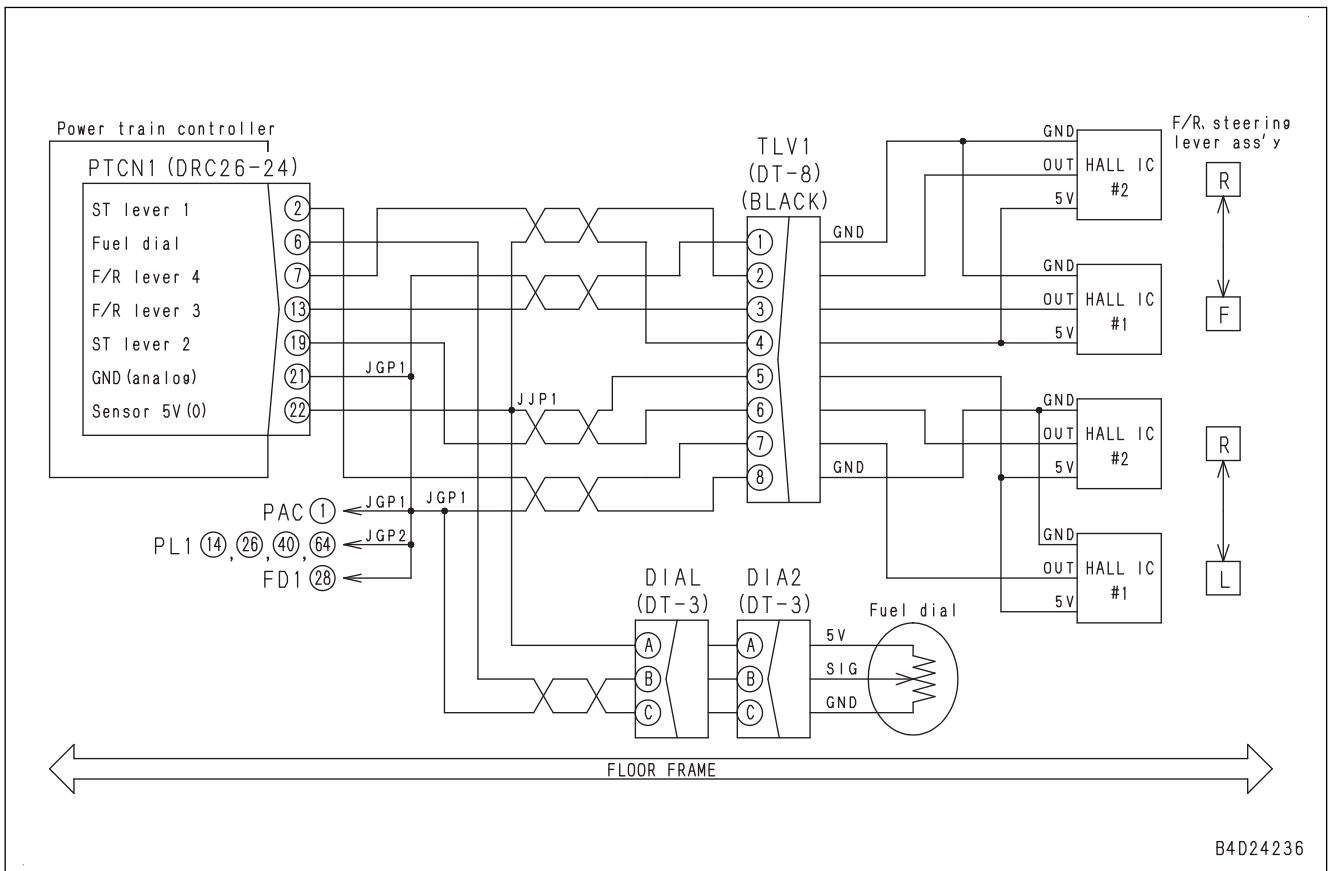
Action level	Failure code	Failure	CAN1 Defective Communication (P/T Controller) (Machine monitor system)
L03	DBERKR		
Detail of failure	Machine monitor does not recognize power train controller on CAN1 communication line (KOMNET/r).		
Action of controller	<ul style="list-style-type: none"> Does not update CAN communication-1 line information. After the cause of failure is corrected, the machine will go back to normal. 		
Phenomenon on machine	<ul style="list-style-type: none"> Information and failure code to be obtained from power train controller are not displayed. Or update of received data is stopped. Pointer for power train (torque converter) oil temperature disappears. The adjustment function is not available. Hydraulic oil temperature gauge pointer disappears. 		
Related information	<ul style="list-style-type: none"> After the repair is done, check that the failure code is not shown with the operation that follows. Procedure: Starting switch ON Start of CAN communication is recognized by each controller when ACC signal of starting switch is received. 2 different failure codes, [DB2RKR] and [DBERKR] are used for defective CAN communication by CAN 1 when it is sensed by machine monitor. If all of these failure codes are shown, it is possible that there is a ground fault, short circuit or hot short circuit in the wiring harness (CAN communication line). CAN1 terminating resistor is located in the center of the machine monitor on operator's side. Because each controller is directly connected to the battery, power supply voltage is continuously provided even when the starting switch is turned to the OFF position. Because the signal of active CAN communication line is pulse voltage, it cannot be measured with multimeter. 		

No.	Cause	Procedure, measurement location, criteria and remarks
1	Defective electric power supply to power train controller	Do the troubleshooting for [DBE1KK].
2	Defective CAN1 communication system	Do the checks on causes 2 to 7 in troubleshooting for failure code [DB2RKR].
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.)
4	Defective machine monitor	If no failure is found by the previous checks, the machine monitor is defective. (Because this is an internal defect, troubleshooting cannot be done.)

Circuit Diagram of Hydraulic Oil Temperature Sensor



Circuit Diagram of Steering Potentiometer



B4D24236

Failure Code [DLM3MB]

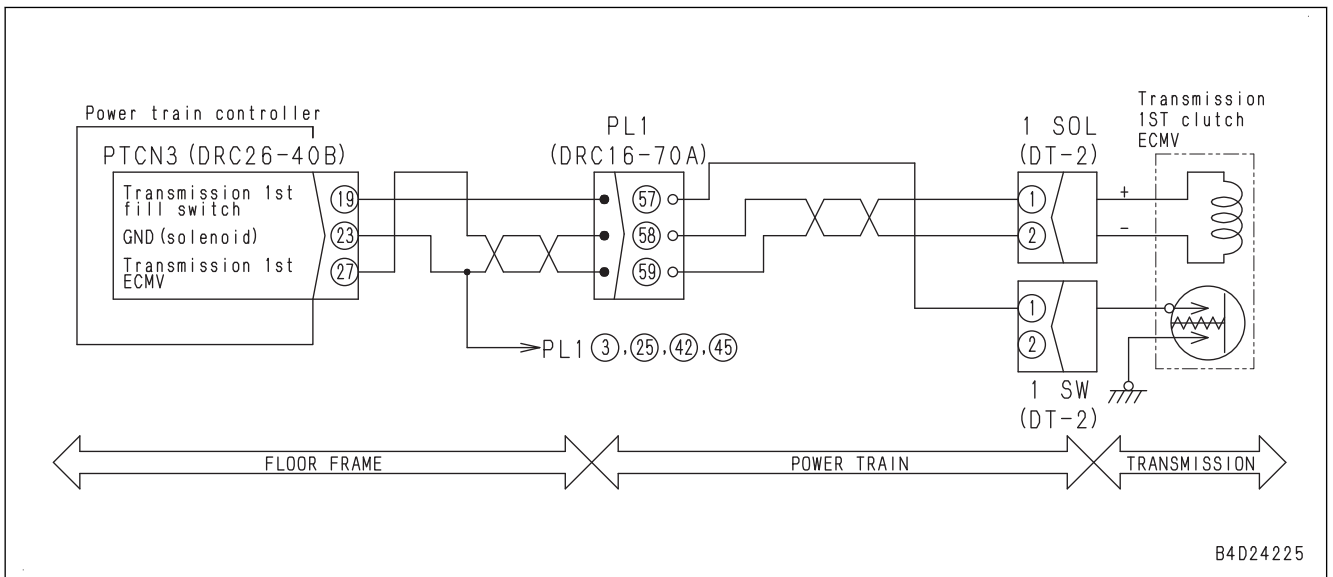
Action level	Failure code	Failure	Fan Speed Sensor Function Deterioration (Power train controller system)
L01	DLM3MB		
Detail of failure	Difference between fan speed value specified by power train controller and actual speed sensed by fan speed sensor exceeds 100 rpm.		
Action of controller	Does not perform PID control on fan.		
Phenomenon on machine	Fan speed control does not function normally.		
Related information	<ul style="list-style-type: none"> Fan speed specified by power train controller can be checked with monitoring function. (Code: 10000) Fan speed can be checked with monitoring function. (code:10007) This code is conditioned that fan solenoid is normal and fan speed sensor is also normal (it means normal electrically). 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 hydraulic fan hydraulic circuit	Perform "TESTING AND ADJUSTING", "METHOD FOR TESTING OIL PRESSURE IN FAN PUMP CIRCUIT"	

Failure Code [DWN1KY] (Applicable Machine: 96604 and Up)

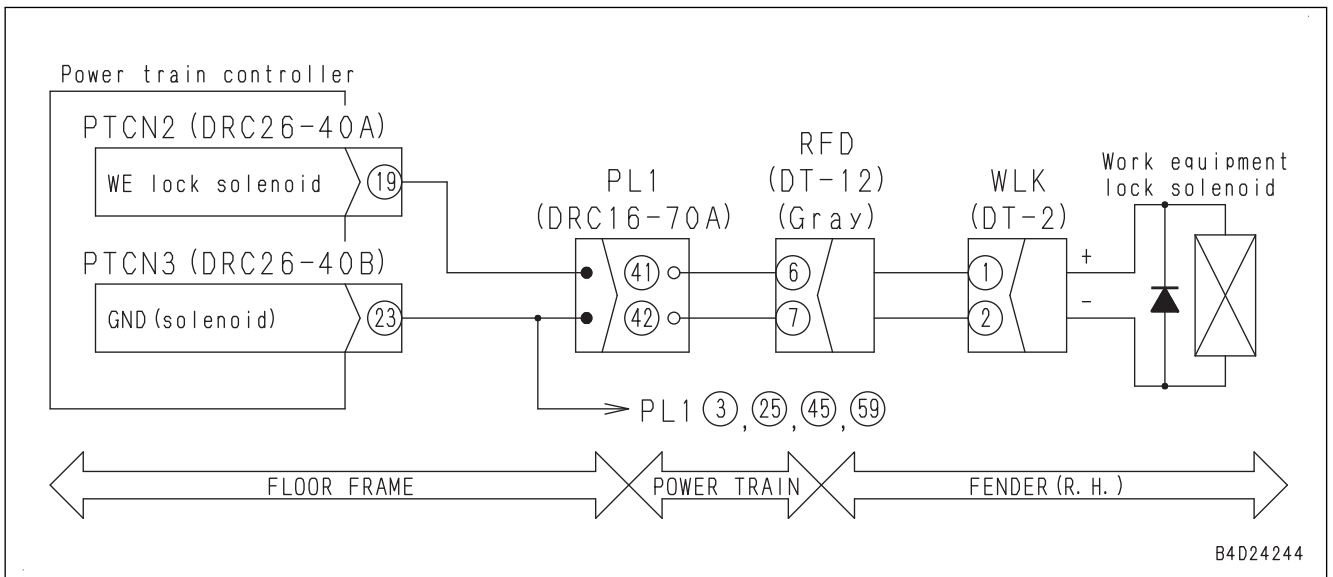
Action level	Failure code	Failure	Steering Control Valve Right EPC Solenoid Hot Short Circuit (power train controller system)
L04	DWN1KY		
Details of failure	Current flows constantly to HSS right EPC solenoid circuit.		
Action of controller	<ul style="list-style-type: none"> Stops driving HSS right EPC solenoid. Restricts operation of engine and transmission. 		
Phenomenon on machine	<ul style="list-style-type: none"> Once machine stops, engine speed is restricted to medium (half) speed. Once machine stops, it cannot travel at all. Keeps turning to the right. 		
Related information	<ul style="list-style-type: none"> Output condition to HSS right EPC solenoid can be checked with monitoring function. (Code: 50601 Right HSS EPC Solenoid Current (F/B)) After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. 		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Hot short circuit in wiring harness	<ol style="list-style-type: none"> Turn starting switch to OFF position. Disconnect connector HSR and connect T-adapter to female side. Turn starting switch to ON position. 		
		Voltage	Between HSR (female) (1) and ground	Max. 4.5 V
2	Short circuit in wiring harness	<ol style="list-style-type: none"> Turn starting switch to OFF position. Disconnect connectors PTCN3 and HSR, and connect T-adapter to female side of PTCN3. <p>REMARK Check it by using multimeter in continuity mode.</p>		
		Continuity	Between PTCN3 (female) (15) and each pin other than (15)	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.)		

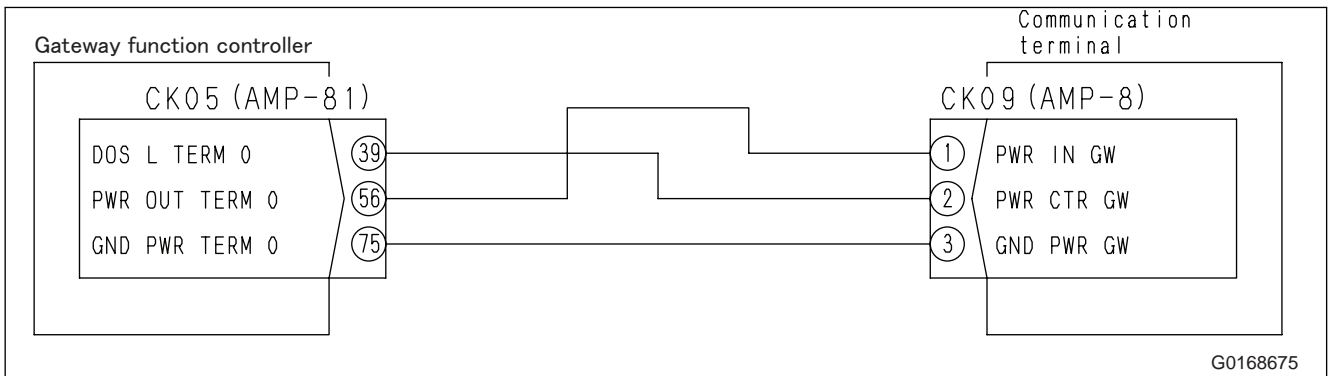
Circuit Diagram Related to Transmission 1st Clutch ECMV Solenoid



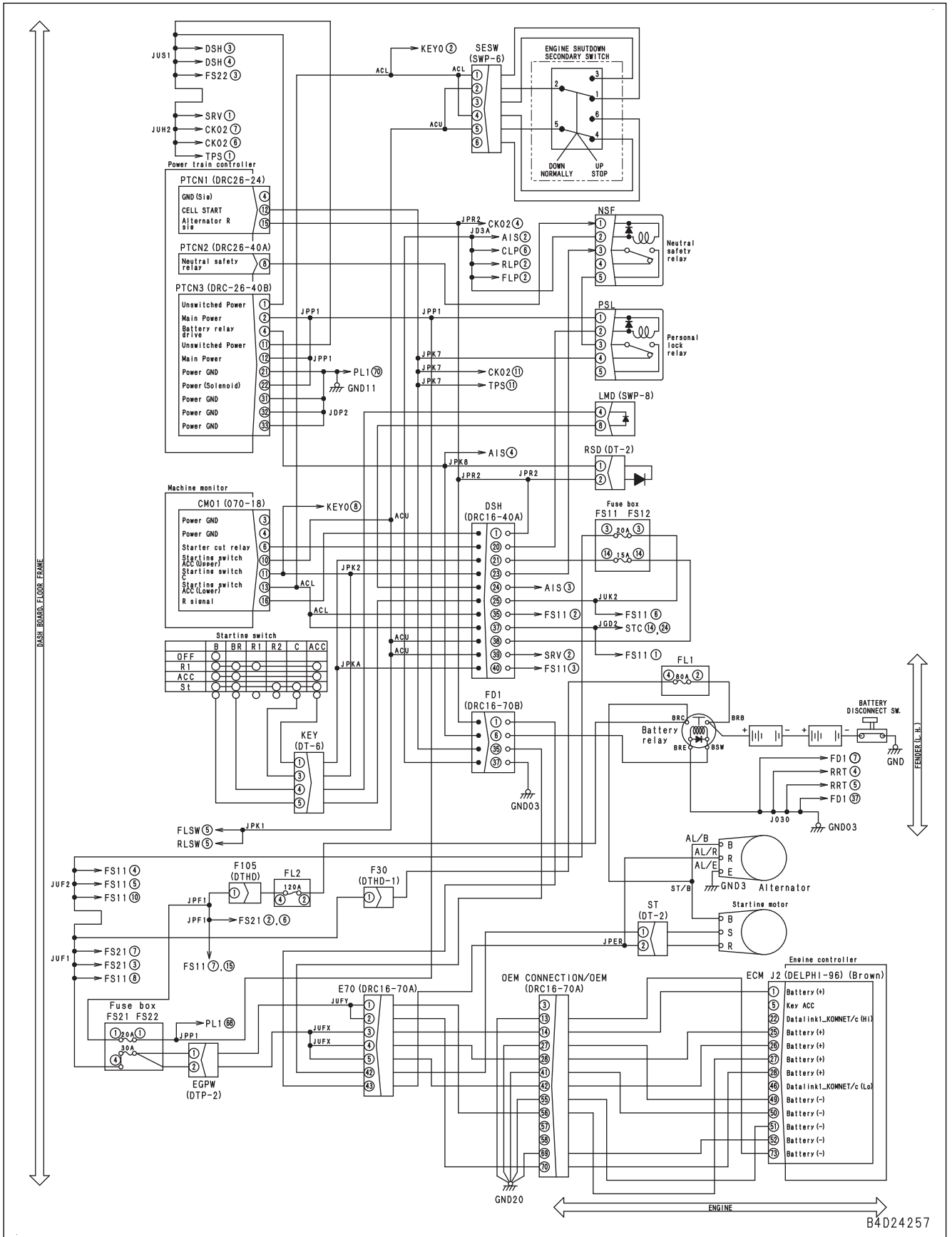
Circuit Diagram of Work Equipment Lock Lever Solenoid



Circuit Diagram of Gateway Function Controller



Circuit Diagram of Engine Starting System



E-20 When You Operate Customize Switch Does Not Show Customize Screen

Failure	Operating customize switch does not display customize screen.	
Related information		
No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective machine monitor	Machine monitor may be defective. (Because this is an internal defect, troubleshooting cannot be performed.)

E-36 Left Door Wiper Does Not Operate

Failure	Left door wiper does not operate (failed in continuous and intermittent operations)
Related information	<ul style="list-style-type: none"> • If right door wiper also does not operate, see “No Wiper Operates” in E mode. • Power is supplied from left door and right door (LH, RH) wiper intermittent unit CB27, and wiper motor operates even in continuous operation. • Wiper motor detects stop position and converts 24 V supplied from fuse into pulse signal. • Left door and right door (LH, RH) wiper intermittent unit CB27 and 24 V voltage pulse is received/delivered, and wiper motor operates in intermittent operation. • Pins which are associated with this failure in wiper intermittent unit CB 27 are as follows. <p>(1): GND1 (2): Relay output 1 (power supply 1 to wiper motor) (3): Continuous (24 V) input (4): Intermittent (24 V) input (6): 24 V common input (8): 24 V pulse input 1 from wiper motor</p> <p>Check an open circuit in wiring harness in pins 2 and 8 of wiper intermittent unit CB27 in this troubleshooting. See “No wiper operates continuously or intermittently” for an open circuit in other pins.</p>

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective left door wiper motor (internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector CB24 and connect T-adaptor to male side.			
		Continuity	Between CB24 (3) and (1)	Continuity	
2	Defective L.H. and R.H. door wiper intermittent unit (internal open circuit)	REMARK Check that front and rear wipers operate normally.			
		1. Turn starting switch to OFF position. 2. Disconnect connectors CB26 and 27, and interchange wiper intermittent units with each other. 3. Turn starting switch to ON position. 4. Turn on left door wiper switch.			
		If left door wiper operates normally, original L.H. and R.H. door wiper intermittent unit is defective.			
		Resistance	Reference: Between CB27 (male) (2) and (8)	Max. 1 Ω	
		Reference: Between CB27 (male) (2) and (6)	Min. 1 MΩ		
3	Defective left door wiper switch	1. Turn starting switch to OFF position. 2. Turn battery disconnect switch to OFF position. 3. Disconnect connector CB15, and connect T-adaptor to male side. 4. Turn on and off switch to perform troubleshooting.			
		Resistance	Between CB15 (male) (2) and (3)	OFF	Min. 1 MΩ
			Between CB15 (male) (2) and (3)	ON	Max. 1 Ω

No.	Cause	Procedure, measuring location, criteria and remarks			
4	Defective brake valve	Move the machine to the level ground, then perform troubleshooting with engine at high idle. <ul style="list-style-type: none"> • Check T/M main relief pressure is normal in advance. • Run the engine high idle in deceleration cut mode (Adjustment: 0007). 			
		Brake pressure (Right and left)	Brake pedal	Release	2.55 to 2.94 MPa {26 to 30 kgf/cm ² }
			Brake pedal	Depress	0 MPa {0 kgf/cm ² }
		If oil pressure is abnormal, perform troubleshooting for H mode "BRAKE DOES NOT WORK".			
5	Internal defect of transmission	If failure code is still displayed after above checks on causes 1 to 4, check the magnet plug for metallic matter.			

S-5 Engine Does Not Pick Up Smoothly

Failure	Engine does not pick-up smoothly.		
Related information	If any failure code is displayed, perform troubleshooting for that code first.		
No.	Cause	Point to check, remarks	Remedy
1	Fuel level is low.	If fuel tank is checked, it is empty.	Refueling
2	Clogging fuel tank cap air bleeding hole	Fuel tank cap air bleeding hole is clogged.	Flush air breather hole in fuel tank cap surrounding area.
3	Clogged fuel filter element	Check used hours of fuel filter element. If it is used over specified time, fuel filter element may be clogged.	Fuel filter element replacement
4	Foreign materials are mixed into fuel.	If drain fuel from fuel tank, rust or water comes out.	Fuel replacement
5	Air mixed in fuel piping system	When performing bleeding air from the fuel system, air comes out. (For details, see Testing and Adjusting, "Bleed Air from Fuel System").	<ul style="list-style-type: none"> Perform air bleeding operation Correct or replace fuel piping
6	Leakage from fuel piping system	Fuel leaks from fuel piping. (For details, see Testing and Adjusting, "Examine Fuel Circuit for Leakage").	Correct or replace fuel piping related parts
7	Fuel leakage at injector and inlet connector	Return rate from injector is high. (See Testing and Adjusting, "Examine Fuel Discharge, Return and Leakage")	Tighten or replace inlet connector
8	Defective common rail	Check leakage from common rail pressure limiter. For details, see Testing and adjusting, "Examine Fuel Discharge, Return and Leakage".	Common rail replacement
9	Defective supply pump	<p>NOTICE</p> <p>Be sure to check for above "Defective common rail".</p> <p>Check common rail pressure with machine monitor. If it does not increase even during cranking, supply pump is defective.</p> <p>REMARK</p> <p>Common rail pressure can be checked with monitoring function (Code: 36400 (MPa)).</p>	Supply pump replacement
10	Seizure of check valve of cooling plate	Seizure of check valve	Clean or replace check valve
11	Crankcase pressure high error	When crankcase pressure high error (failure code: CA555) is still displayed even after KCCV filter is replaced, blowby pressure is probably high (see Testing and adjusting, "Testing blowby pressure"). In this case, VGT may be seized or damaged.	Perform troubleshooting for cause 12 and subsequent causes.
12	Defective injector	<ul style="list-style-type: none"> Some cylinder is found to be cool when exhaust manifolds are touched by hand immediately after engine is started. Perform cylinder cutout mode operation to identify cylinder that does not change in speed (see Testing and Adjusting, "Handle Cylinder Cut-out Mode Operation"). 	Replace injector.

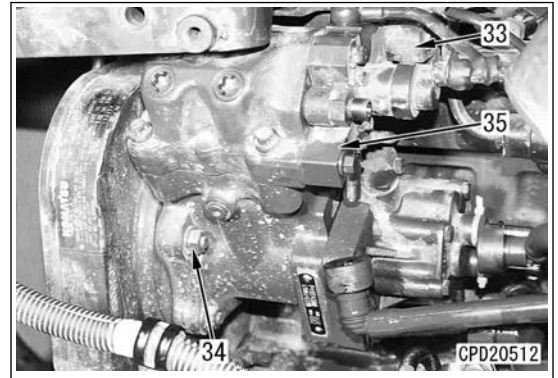
50 Disassembly and Assembly

Tools for Disassembly and Assembly of One Link of Track Shoe Assembly on the Field

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	791-432-1110	Push tool	■	1			Installation of track link pin plug (for large plug)
B	791-932-1110	Push tool	■	1			Installation of track link pin plug (for small plug)
C	791-432-1120	Installer	■	1			Installation of track link seal
D	791-601-1000	Oil pump	■	1			Refilling of track link oil
E	791-635-3110	Frame	■	1			Removal of pin
	791-635-3160	Extension	■	1			
	791-635-3170	Nut	■	4			
	791-635-3180	Screw	■	2			
	791-635-3190	Screw	■	1			
	791-645-3510	Adapter	■	1			
	791-646-3260	Pusher	■	1			
F	790-101-1102	Pump	■	1			
	790-101-1300	Cylinder	■	1			
G	790-105-2300	Jack 196 kN {20 t}	■	1			Connection of link
	790-101-1102	Pump	■	1			
H	791-645-3550	Pusher	■	1			Press fit of bushing
	791-645-3530	Pusher	■	1			
J	791-645-3540	Guide	■	1			
K	791-635-3110	Frame	■	1			Press fitting of pin
	791-635-3160	Extension	■	1			
	791-635-3170	Nut	■	1			
	791-635-3180	Screw	■	1			
	791-635-3190	Screw	■	1			
	791-645-3510	Adapter	■	1			
M	791-635-3110	Frame	■	1			Press fit of bushing
	791-635-3160	Extension	■	1			
	791-635-3170	Nut	■	4			
	791-635-3180	Screw	■	2			
	791-635-3190	Screw	■	1			
	791-645-3520	Adapter	■	1			
	791-645-3530	Guide	■	1			
	791-432-1210	Spacer	■	1			
791-432-1220	Spacer	■	1				

Supply pump assembly

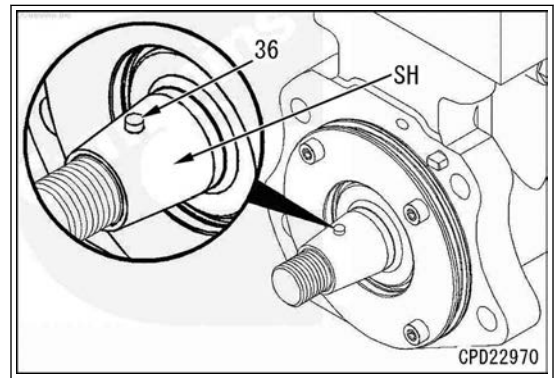
25. Remove bracket (33).
26. Remove mounting nuts (34) (4 pieces), and remove fuel supply pump assembly (35).

**How to Install Supply Pump Assembly****Advance preparation**


1. Before installing the supply pump, check dowel pin (36) of the supply pump shaft (SH) to check the damages.

REMARK


If the dowel pin is damaged, replace the supply pump and supply pump gear (GY).

**Supply pump shaft**

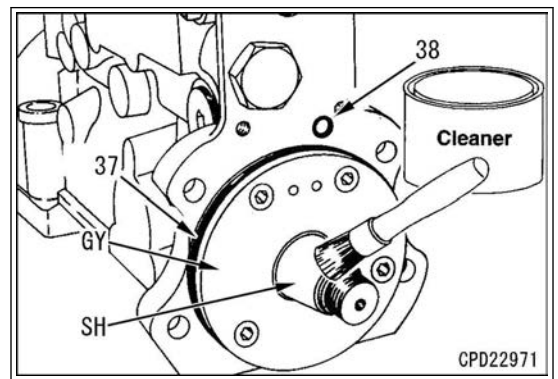
2. Fit brand-new O-ring (37) to the flange of the supply pump assembly.

 O-ring (37):
Engine oil (EO15W-40)

3. Fit brand-new O-ring (38) to the lubrication port of the supply pump.

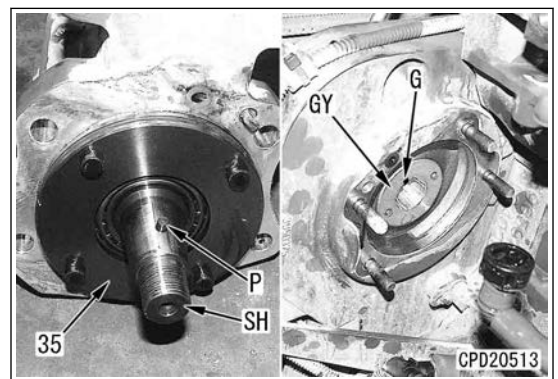
 O-ring (38):
Engine oil (EO15W-40)

4. Clean the outside surface of the supply pump shaft (SH) and the inside contact surface of the supply pump gear (GY) by using contact cleaner.



5. Before installing the supply pump assembly, check that the outside surface of the supply pump shaft (SH) and the inside contact surface of the supply pump gear (GY) are free from foreign material and dry.

6. Align convex portion (P) provided at shaft (SH) of supply pump assembly (35) with groove (G) of gear (GY), and install it.

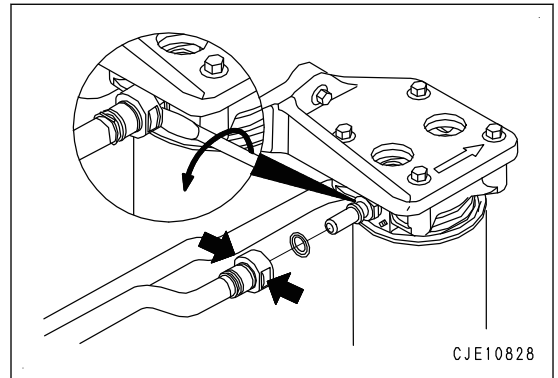
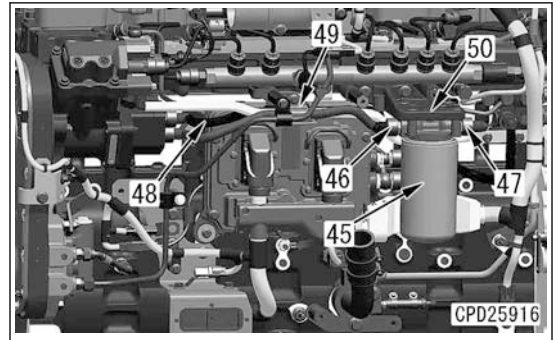


45. Disconnect fuel hoses (46) and (47) from fuel filter (45).

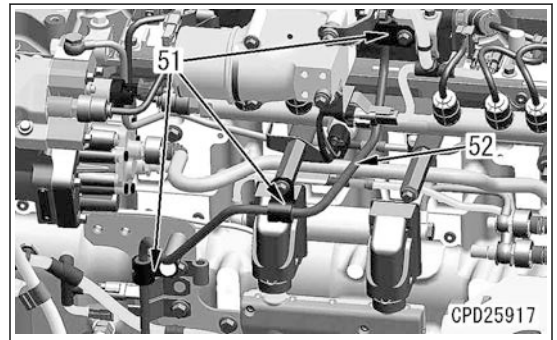
REMARK

Pry the hose end by using a screwdriver, etc. while pressing the fitting portions (right and left) of the hose end to disconnect the fuel hose.

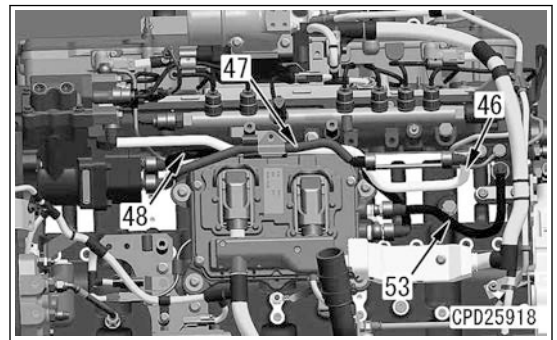
46. Disconnect clamp (49) that ties fuel hoses (46), (47) and (48) together.
47. Remove fuel filter (45) together with bracket (50).



48. Remove clamp (51), and remove tube (52).

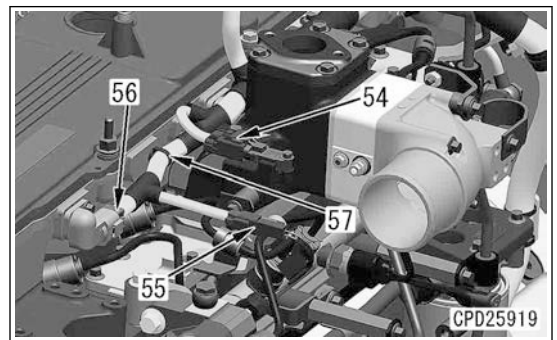


49. Remove fuel hose (46).
50. Remove fuel hose (47).
51. Remove fuel hose (48).
52. Remove fuel hose (53).



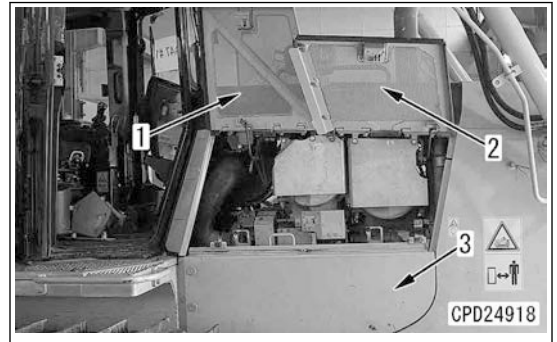
Wiring harness assembly

53. Disconnect ambient pressure sensor connector (54).
54. Disconnect supply pump connector (55).
55. Disconnect wiring harness connectors (56) (3 places).
56. Disconnect bands (57).



Cover

8. Install cover (3) to the bottom of the engine side cover.
9. Unlock and close engine side covers (1) and (2).



How to Install Aftercooler Assembly

Aftercooler assembly

1. Sling aftercooler assembly (8), and install it.

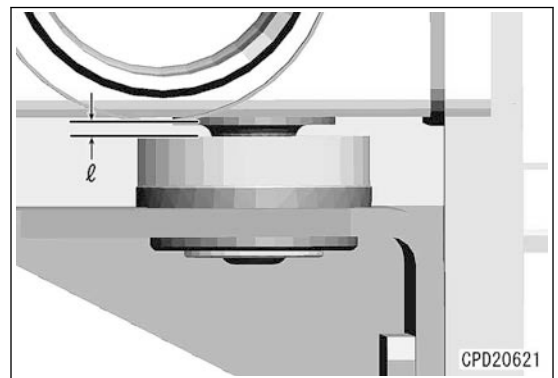
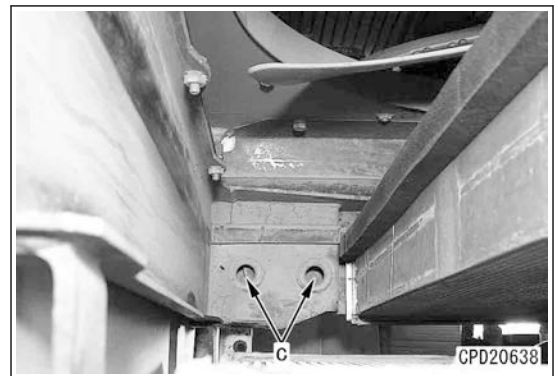
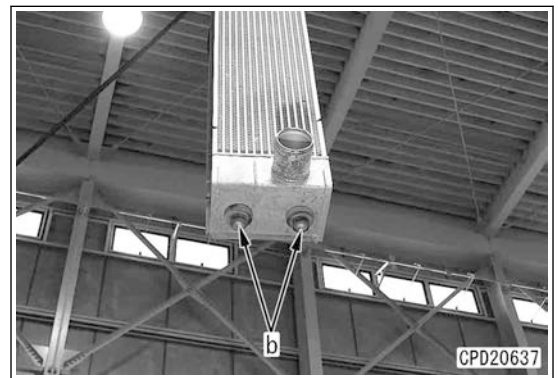
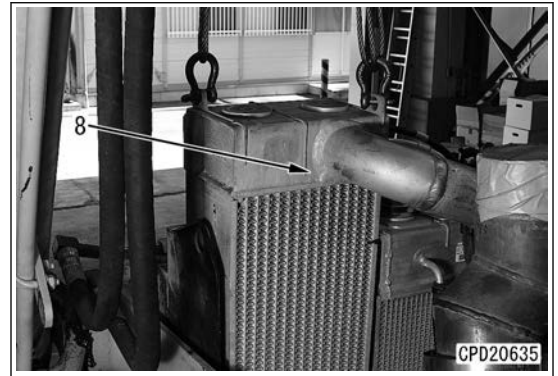


Aftercooler assembly:

15 kg

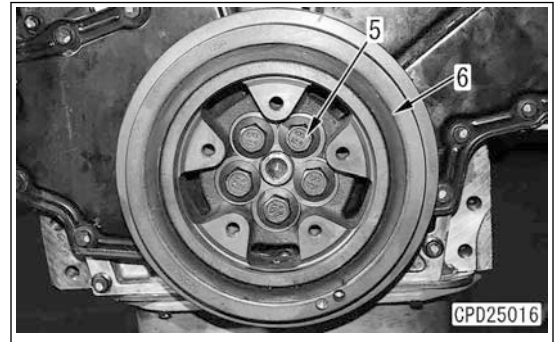
NOTICE

- Check that projection (b) at the bottom of the aftercooler is securely fitted in mounting hole (c).
- Clearance (ℓ) between the aftercooler bottom itself and rubber 2.5(+0.5/-0) mm

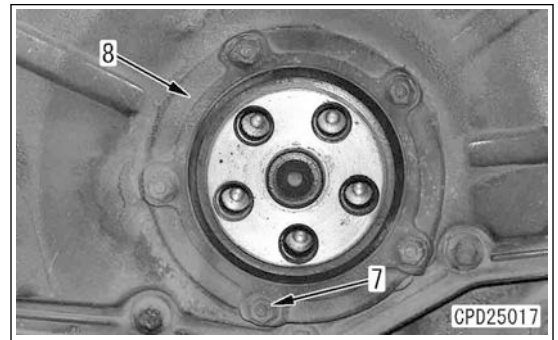


Vibration damper

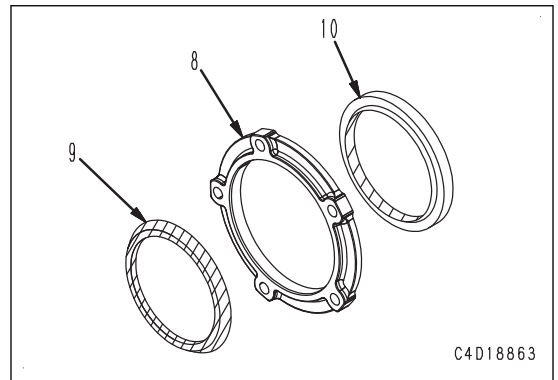
11. Remove bolts (5) (5 pieces), and remove vibration damper (6).

**Front oil seal carrier assembly**

12. Remove mounting nuts (7) (6 pieces), and remove oil seal carrier (8).

**Engine front oil seal**

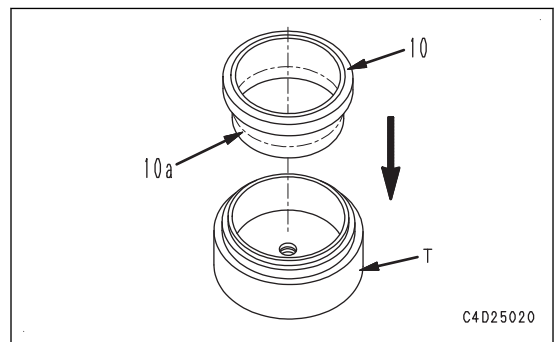
13. Remove dust seal (9) and engine front oil seal (10) from oil seal carrier (8).

**How to Install Engine Front Oil Seal****Front oil seal**

1. Wipe off foreign material sticking to the crankshaft flange with a clean cloth.
2. Set tool T from pilot (10a) side to front oil seal (10).

NOTICE

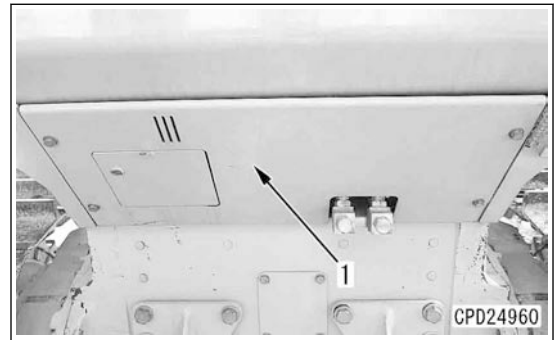
Pilot (10a) is a plastic part on the inside of the front seal and a guide tool for installation of the crankshaft, you must not remove it from the rear oil seal.



10. Install fuel outlet hose (3).
11. Open fuel valve (2).



12. Install cover (1) at the bottom of the fuel tank.



Refilling fuel tank

13. Refill with fuel to the specified level through the fuel filler port.



Fuel tank: 415ℓ

Testing fuel circuit for leakage

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

Bleeding air from fuel circuit

15. Bleed air from the fuel circuit. For details, see Testing and Adjusting, "Bleed Air from Fuel System".

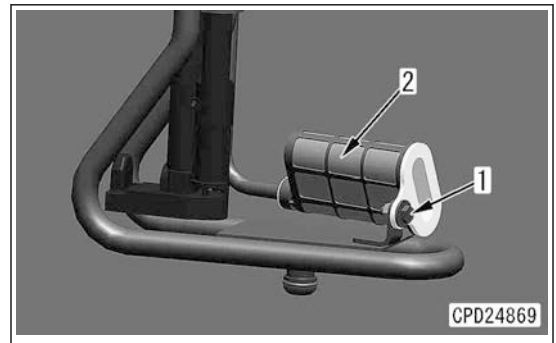
Remove and Install DEF Tank Strainer

- ⚠ 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”).

How to Remove DEF Tank Strainer

DEF tank sensor flange assembly

1. Remove DEF tank sensor flange assembly. For details, see “Remove and Install DEF Tank Sensor Flange Assembly”.




DEF tank strainer

2. Remove mounting bolt (1), and remove DEF tank strainer (2).

How to Install DEF Tank Strainer

DEF tank strainer


1. Apply distilled water for lubricating O-ring (4).

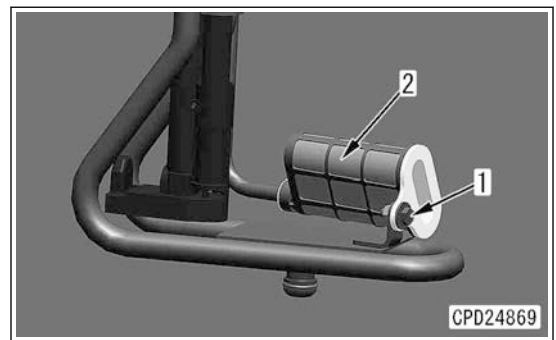
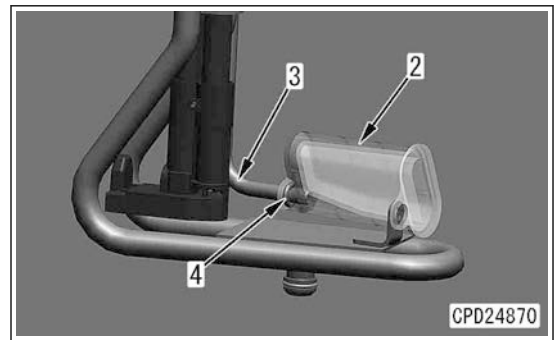
 O-ring (4):
Distilled water

REMARK

If any foreign material is mixed into DEF tank, it may cause failures. Do not use grease, lubricating oil or any lubricating substance.

2. Install DEF tank strainer (2) to tube (3).
3. Install DEF tank strainer (2) with mounting bolt (1).

 Mounting bolt (1):
4.9 to 5.9 Nm {0.5 to 0.6 kgfm}



DEF tank sensor flange assembly

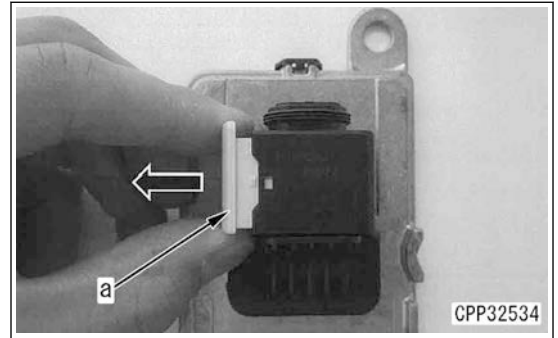
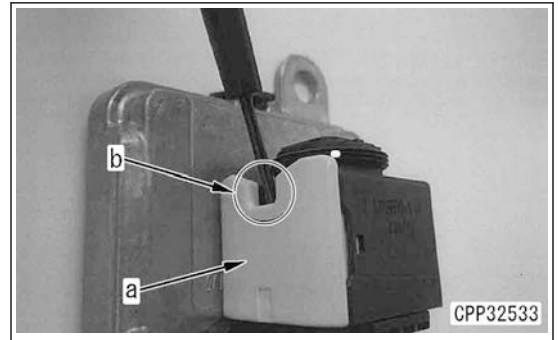
4. Install DEF tank sensor flange assembly. For details, see “Remove and Install DEF Tank Sensor Flange Assembly”.

- 1) Insert a flat-head screwdriver, etc. into the claw part (b) of connector lever (yellow) (a), and unlock it.
- 2) Slide lever (yellow) (a) while pinching it with your fingers.

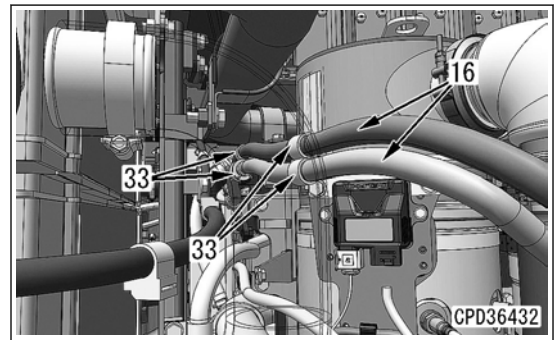
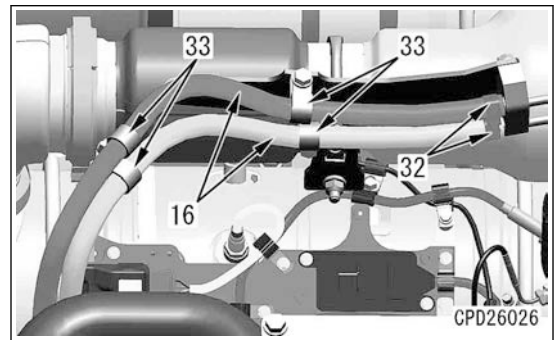
REMARK

Do not remove lever (yellow) (a).


- 3) Disconnect connectors NH3 (29), NOx2 (30), and SCRT (31) while pulling them in the direction opposite to the sensor side.

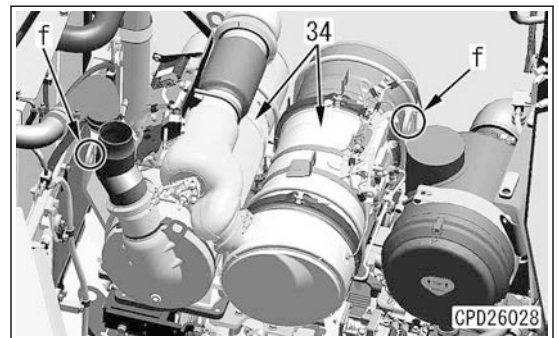


23. Loosen clip (32), and disconnect coolant hose (16).
24. Remove clamp (33) of coolant hose (16), and move coolant hose (16) out of the way.

**KDPF and SCR assembly**

25. Install the lifting tool to slinging position (f) of KDPF and SCR assembly (34), sling KDPF and SCR assembly (34) together with the base bracket (37), and hold them.

 KDPF and SCR assembly (34), base bracket (37):
200 kg



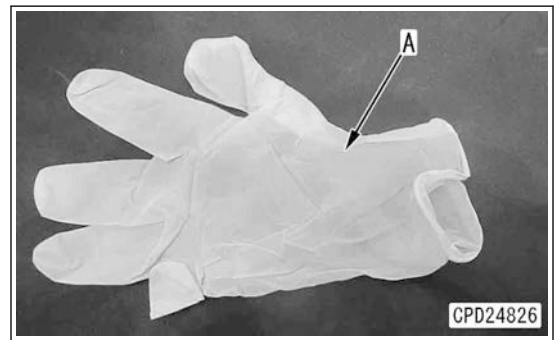
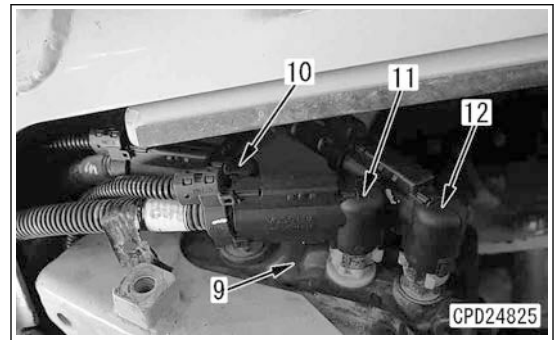
How to Install DEF Pump

DEF pump


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

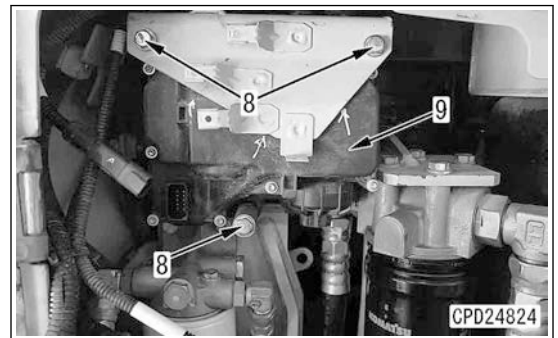
NOTICE

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



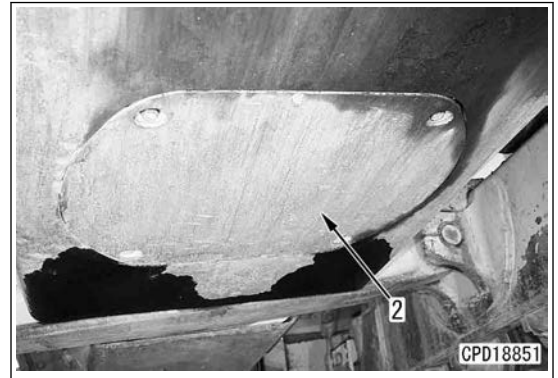
3. Install DEF pump (9) with mounting bolts (8) (3 pieces).

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



Undercover

6. Install undercover (2) at the bottom of the power train.

**Power train pump and steering lubrication pump assembly**

7. Remove the power train pump and steering lubrication pump assembly. For details, see "POWER TRAIN PUMP, STEERING LUBRICATION PUMP ASSEMBLY".

Operator's cab assembly

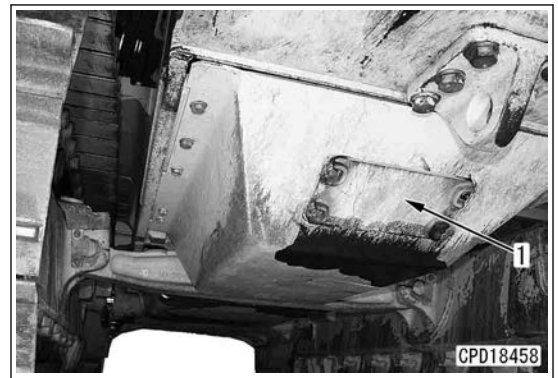
8. Install the operator's cab assembly. For details, see "Remove and Install Operator Cab Assembly".

Fuel tank assembly

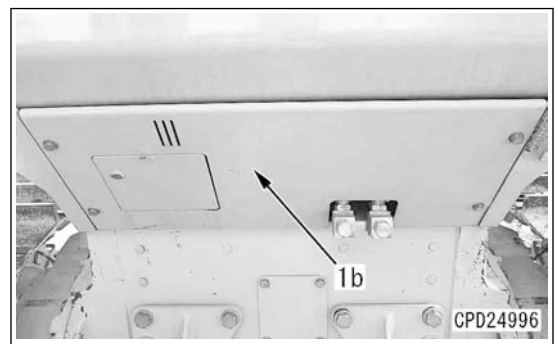
9. Install the fuel tank assembly. For details, see "Remove and Install Fuel Tank Assembly".

Engine undercover

10. Install inspection cover (1) of the engine undercover.



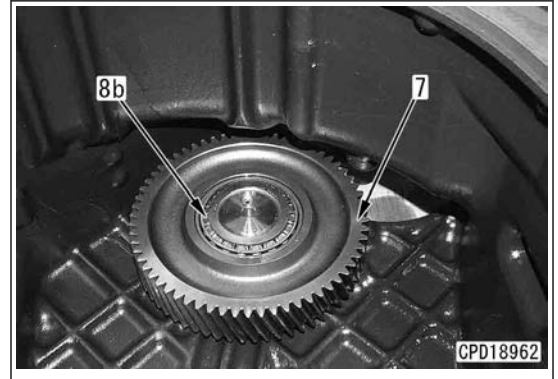
11. Install cover (1b) at the bottom of the fuel tank.



9. Install gear (7) and bearing (8b).

REMARK

- For reusing, do not change the combination of the bearings and outer races (10a) and (10b). (See the above.)
- Press-fit the inner race side of bearing (8b).



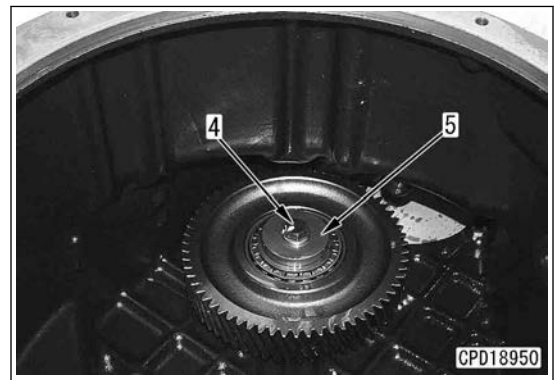
10. Install plate (5), and install mounting bolt (4).



Mounting bolt (4):
Liquid adhesive (LT-2)



Mounting bolt (4):
156.9 to 196.1 Nm {16.0 to 20.0 kgfm}



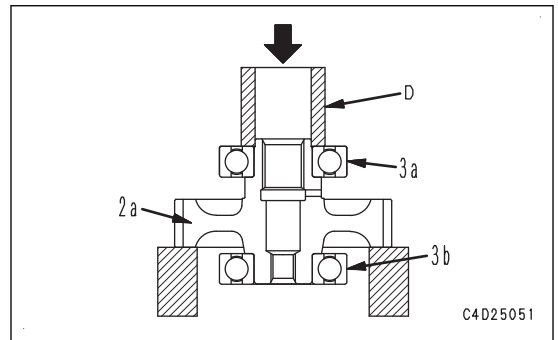
Cover assembly

11. Install bearings (3a) and (3b) to gear (2a) by using tool D.

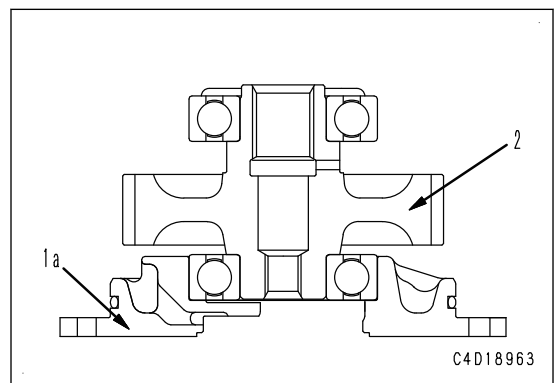
12. Install O-ring to cover (1a).



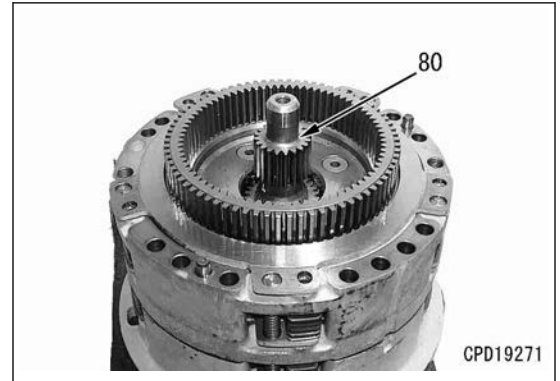
O-ring:
Grease (G2-LI)



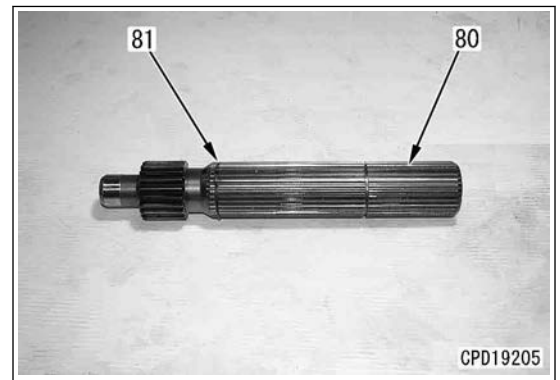
13. Install gear assembly (2) to cover (1a).



48. Remove output shaft (80).



49. Remove snap ring (81) from output shaft (80).



Disassembly of No.3 carrier assembly

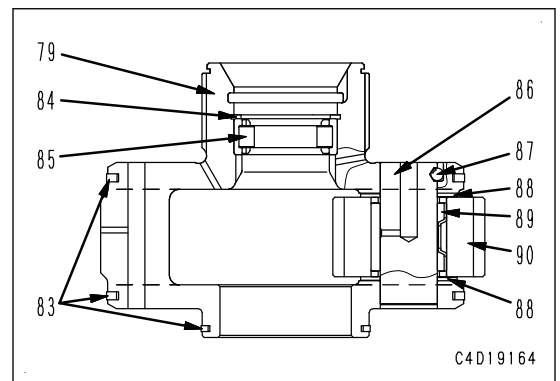
50. Remove seal rings (83) (3 pieces) from No.3 carrier assembly (79).

51. Remove snap ring (84), and remove bearing (85).

52. Remove shafts (86) (4 places), ball (87), thrust washers (88) (2 pieces), bearing (89), and planetary gear (90) from No.3 carrier assembly (79).

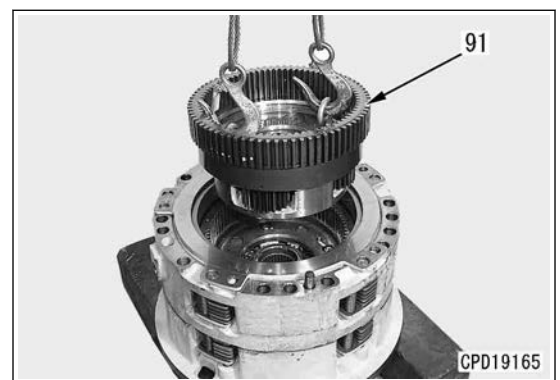
REMARK

Be careful not to lose ball (87).



No.3 ring gear and No.4 carrier assembly

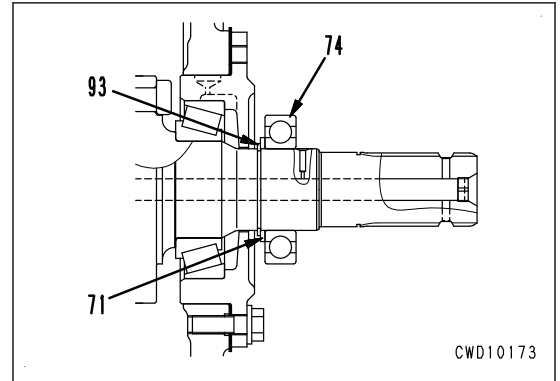
53. Sling No.3 ring gear and No.4 carrier assembly (91), and remove it.



41. Remove bearing (74).
42. Remove collar (71).
43. Remove snap ring (93).

REMARK

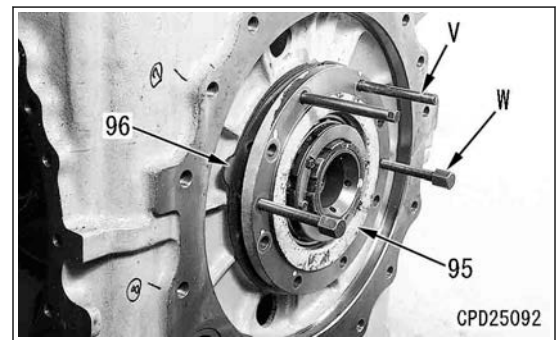
(Only for machine right side)

**Bevel pinion assembly**

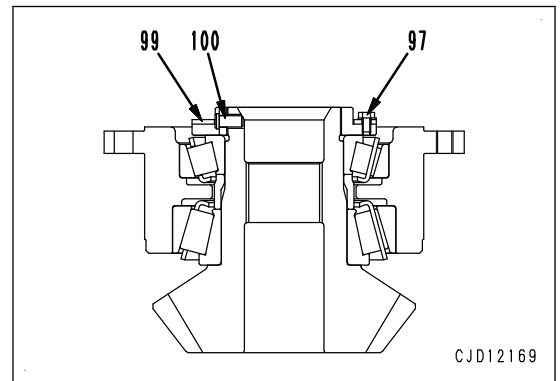
44. Remove the mounting bolt.
45. By using tools V and W, remove bevel pinion assembly (95) and shim (96).

REMARK

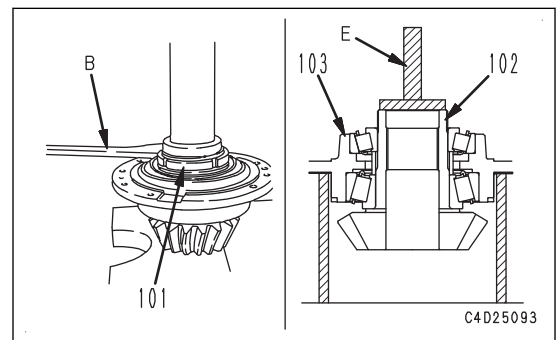
Check the thickness and number of shims, and store shims.



46. Remove bolt (97), and remove plate (99) and pin (100).



47. Press and fix the pinion by using press, and remove nut (101) by using tool B.
48. By using tool E, remove bevel pinion (102) from cage (103).





Final drive case (D65EX-18E0):

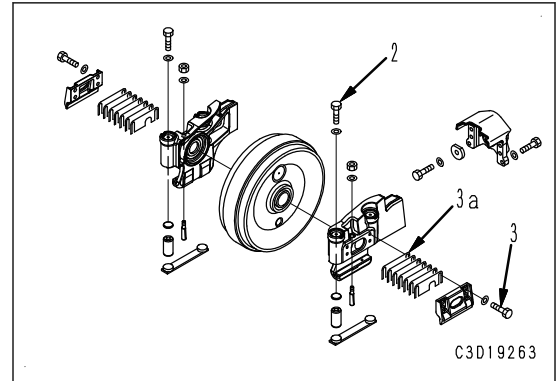
24 ℓ



Final drive case (D65EX-18E0 PAT, D65PX-18E0, D65WX-18E0, D65PX-18E0 WIDE PAT):

27 ℓ

12. Install shims (3a), and install support mounting bolt (3).
13. Install spring seat lock bolt (2).



When refilling with oil normally

14. Remove plug (20) from shaft (17), refill with oil through the oil filler port, and install plug (20) after refilling with oil.



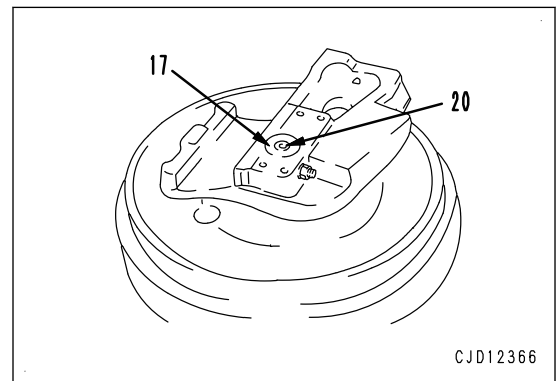
Idler:

0.24 to 0.26 l



Oil filler plug:

98.0 to 137.2 Nm {10 to 14 kgfm}



When refilling with oil by evacuation

15. Remove plug (20) from shaft (17).
16. By using tool B, refilling with oil through the oil filler port, and install plug (20) after refilling with oil.



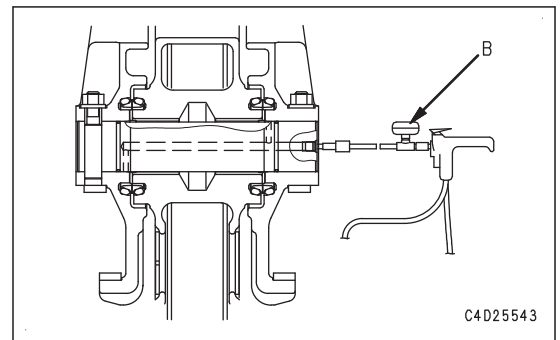
Idler:

0.24 to 0.26 l



Oil filler plug:

98.0 to 137.2 Nm {10 to 14 kgfm}



Disassemble and Assemble Track Assembly Generally

Tools for General Disassembly and Assembly of Track Shoe Assembly

Symbol	Part No.	Part name	Necessity	Qty	New/Redesign	Sketch	Remarks
A	791-646-7531	Remover	■	1			Removal of track link pin plug
B	791-660-7460	Brush	■	1			Cleaning of track link pin
C	791-432-1110	Push tool	■	1			Installation of track link pin (for large plug)
D	791-932-1110	Push tool	■	1			Installation of track link pin (for small plug)
E	791-601-1000	Oil pump	■	1			Sealing check of track link
F	791-432-1120	Installer	■	1			Installation of track link seal
G	791-601-1000	Oil pump	■	1			Refilling of track link oil
H	-	disassemble jig	●	1			Disassembly of link
J	-	disassemble jig	●	1			
K	-	Spacer	●	1			

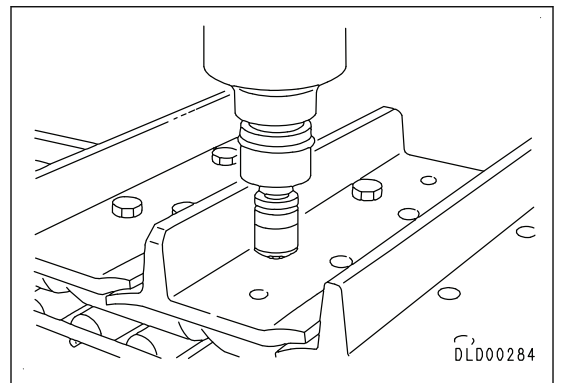
How to Disassemble Full Track Shoes Assembly

Removal of shoe

1. Sling the shoe assembly, set it on the floor with the shoe facing upward, and remove the shoe bolt by using an impact wrench.

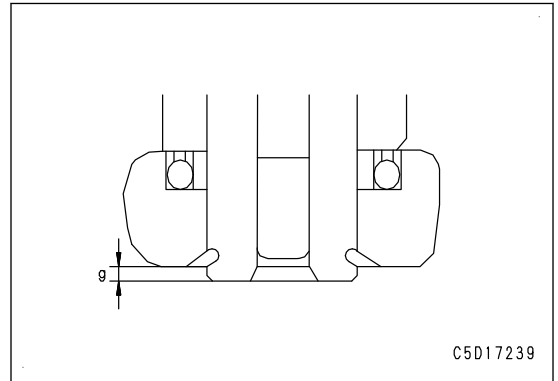
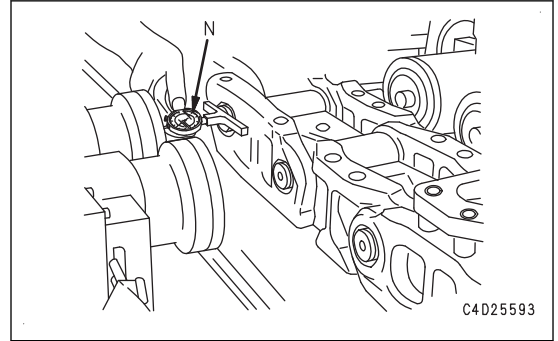
REMARK

- If the shoe bolt is not loosened (if its rotational torque is not reduced to zero) even after it is loosened by 1 turn, loosen other bolts so that the bolt can be loosened smoothly.
- If the bolt is rotated forcibly when the torque is not zero, the bolt and link are deformed and become adhesive, and the maintenance work is required.
- When moving the shoe assembly, be careful not to damage the master link.
- If the gas cut of the shoe nut is performed to remove it by necessity, keep the seal temperature 80 °C or less to prevent seal deterioration due to heat, and take measures to prevent flame-cutting droplet from entering the clearance between links.



53. Measure pin protrusion dimension (g) by using tool N, and adjust the dimension to the following value, and then press-fit the pin.

Protrusion dimension (g): 4.7 ± 0.2 mm



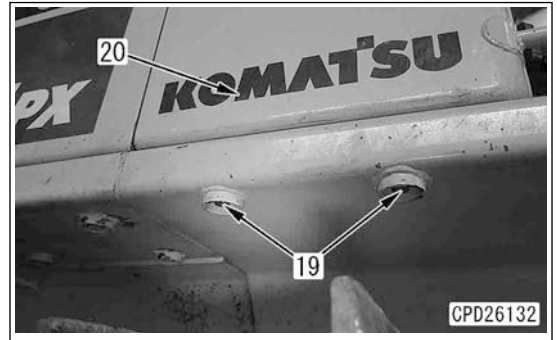
54. Perform the procedures in steps 38 to 45.
55. Perform the procedures in steps 46 to 50.
56. Assemble the master link on the roller tread side as the final link.

REMARK

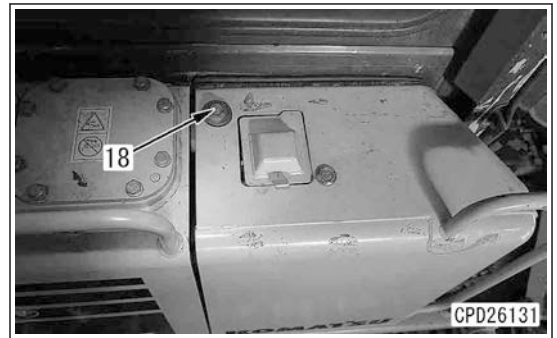
Check that right and left master links are press-fitted parallel.

Cover

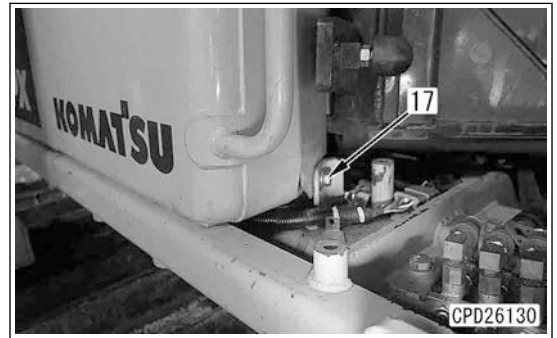
13. Install cover (20) with mounting bolts (19) (2 pieces).



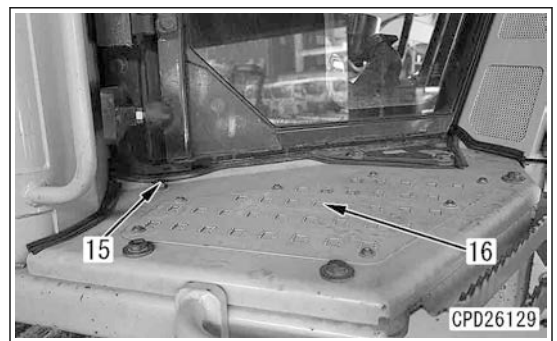
14. Install mounting bolts (18).



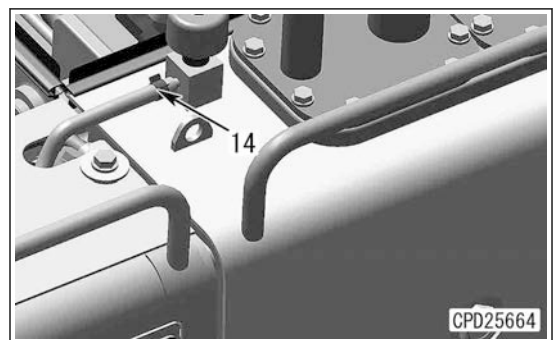
15. Install mounting bolts (17).



16. Install cover (16) with mounting bolts (15) (4 pieces).

**Breather hose**

17. Install breather hose (14).



- Remove cap (2) from blade lift cylinder rod (1).

REMARK

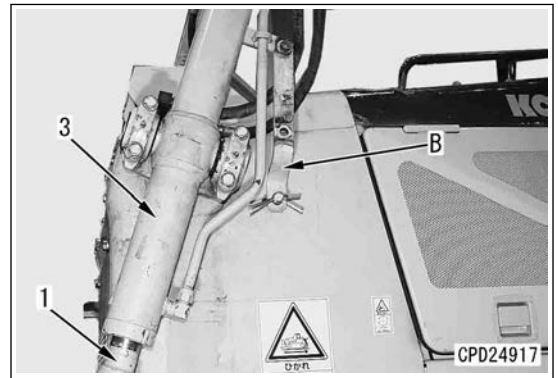
Check thickness and quantity of shim, and write down them.



- Sling blade lift cylinder assembly (3), and hold it. Start the engine, and fully retract blade cylinder rod (1).
- Fix blade lift cylinder assembly (3) on the machine by using tool B.

NOTICE

Fix the assembly with wire, etc. so that blade lift cylinder rod (1) does not come off.

**Blade lift cylinder**

- Disconnect the right blade lift cylinder from the blade similarly.
- Remove steps (4) and trunnion covers (5) on the right and left sides.



- Disconnect hydraulic hoses (6) (2 pieces each on the right and left sides).

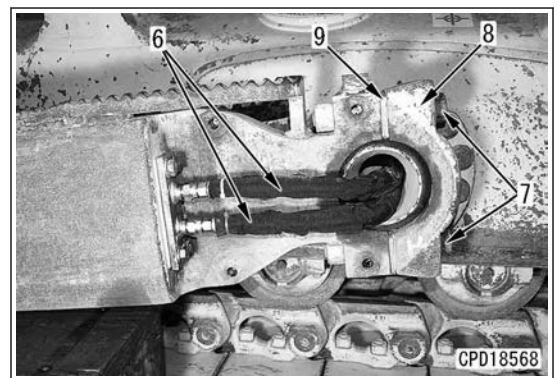
NOTICE

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


- Remove mounting bolts (7) (2 pieces each on the right and left side), and remove trunnion cap (8) and shims (9).

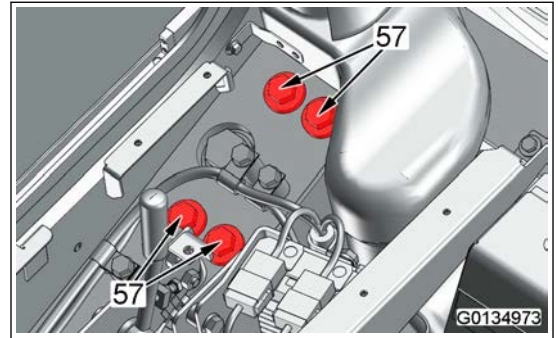
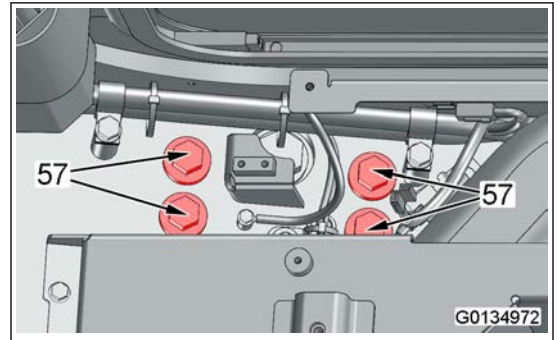
REMARK

Check thickness and quantity of shim, and record them.

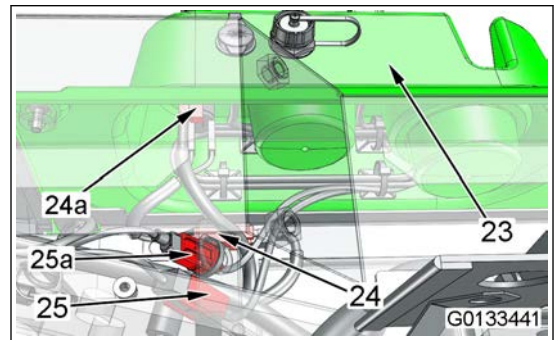


10. Install the bolts (57) (8 pieces).

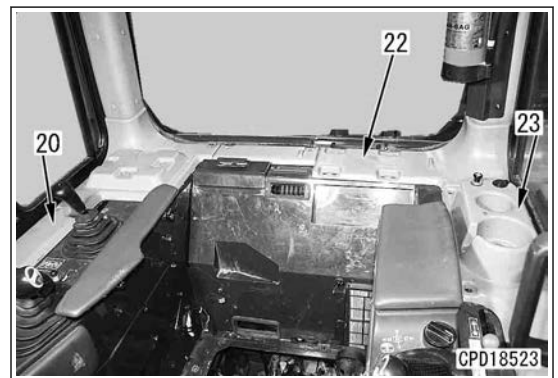
 Bolt (57):
245 to 309 Nm {25.0 to 31.5 kgfm}



11. Connect the connectors CBACC1 (24) and CBCIG (24a), AUX terminal wiring connector M01B (25), and connector (25a).



12. Install the covers (20), (22), and (23) from inside the cab.



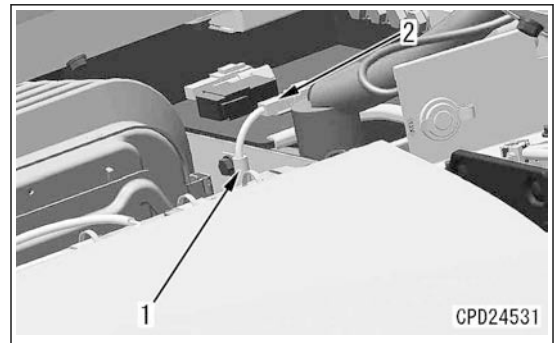
How to Remove and Install Seat Belt

- ⚠ 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, “HANDLING OF BATTERY DISCONNECT SWITCH”.)

How to Remove Seat Belt

Clamp

1. Remove clamp (1).

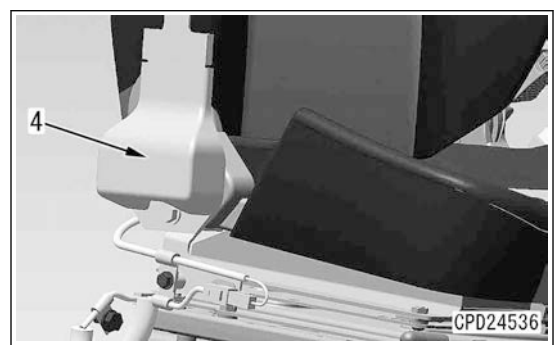
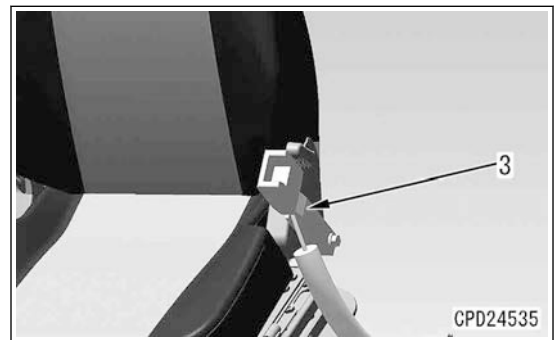


Connector

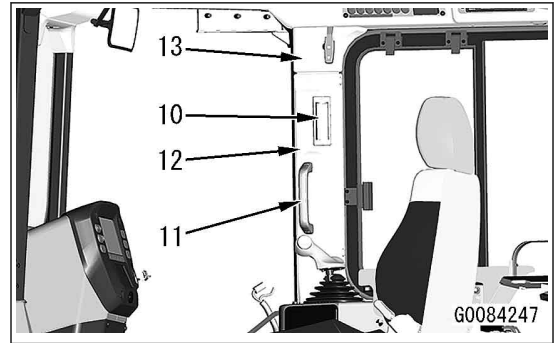
2. Disconnect connector SBC (2).

Seat belt

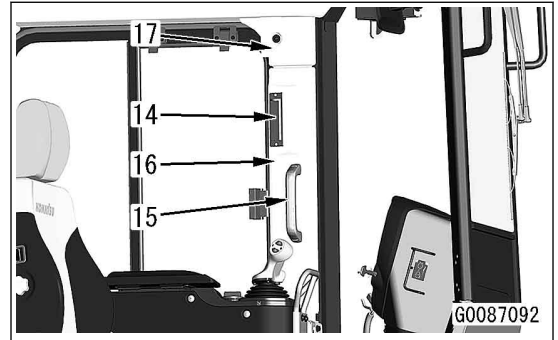
3. Remove the mounting bolts (1 piece each on right and left sides) of seat belt (4), and remove seat belts (3) and (4).



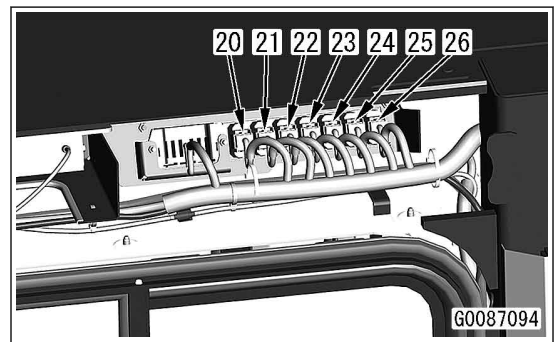
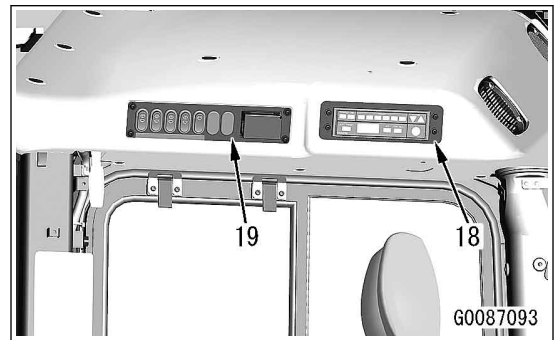
9. Remove the vent (10).
10. Remove the handrail (11).
11. Remove the cover (12).
12. Remove the cover (13).



13. Remove the vent (14).
14. Remove the handrail (15).
15. Remove the cover (16).
16. Remove the cover (17).



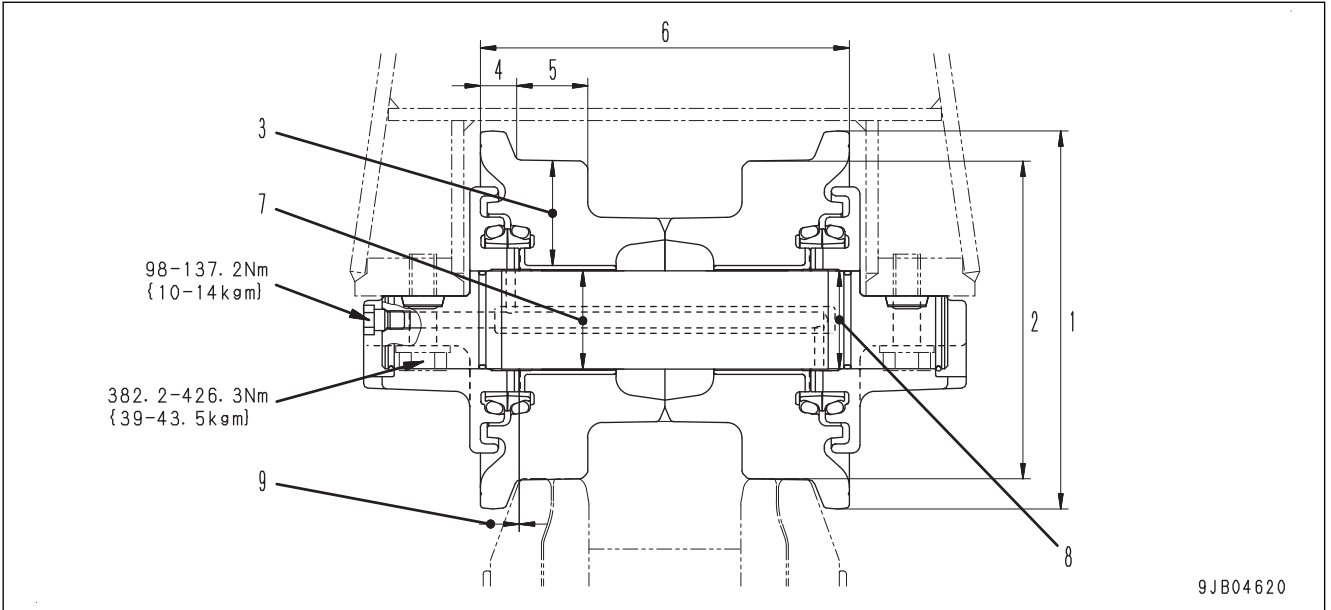
17. Remove the cover (18).
18. Remove the cover (19) together with the switch, and disconnect the connectors CB34 (20), CB10 (21), CB11 (22), CB12 (23), CB13 (24), CB14 (25), and CB15 (26).



Unit: mm

No.	Item	Criteria					Remedy
		Standard dimension			Repair limit		
1	R clutch spring (5 pieces)	Free height	Installed height	Load at installed height	Free height	Load at installed height	Replace
		69.5	60.7	190.2 N {19.4 kg}	65.3	161.7 N {16.5 kg}	
		77.0	63.6	95.2 N {9.7 kg}	72.4	81 N {8.2 kg}	
3	3rd clutch spring (5 pieces)	59.0	44.6	141.2 N {14.4 kg}	55.5	120.0 N {12.2 kg}	
4	2nd clutch spring (5 pieces)	59.0	44.6	141.2 N {14.4 kg}	55.5	120.0 N {12.2 kg}	
5	1st clutch spring (5 pieces)	59.0	47.3	114.7 N {11.7 kg}	55.5	97.5 N {9.9 kg}	
6	Total assembly thickness of 5 discs and 6 plates for R clutch	Standard dimension		Tolerance	Repair limit		
		36.2		±0.33	32.2		
7	Total assembly thickness of 7 discs and 8 plates for F clutch	49.4		±0.39	43.8		
8	Total assembly thickness of 4 discs and 5 plates for 3rd clutch	29.6		±0.30	26.4		
9	Total assembly thickness of 4 discs and 5 plates for 2nd clutch	29.6		±0.30	26.4		
10	Total assembly thickness of 4 discs and 5 plates for 1st clutch	29.6		±0.30	26.4		
11	Thickness of clutch disc	3.4		±0.1	2.6		
12	Thickness of clutch plate	3.2		±0.1	2.9		
13	Wear of seal ring of 3rd carrier and 1st carrier cover	Width	4		-0.01 -0.03	3.6	
		Thickness	5		±0.15	4.85	

Maintenance Standard for Track Roller for PLUS Type Track Shoes (Single Flange Type)

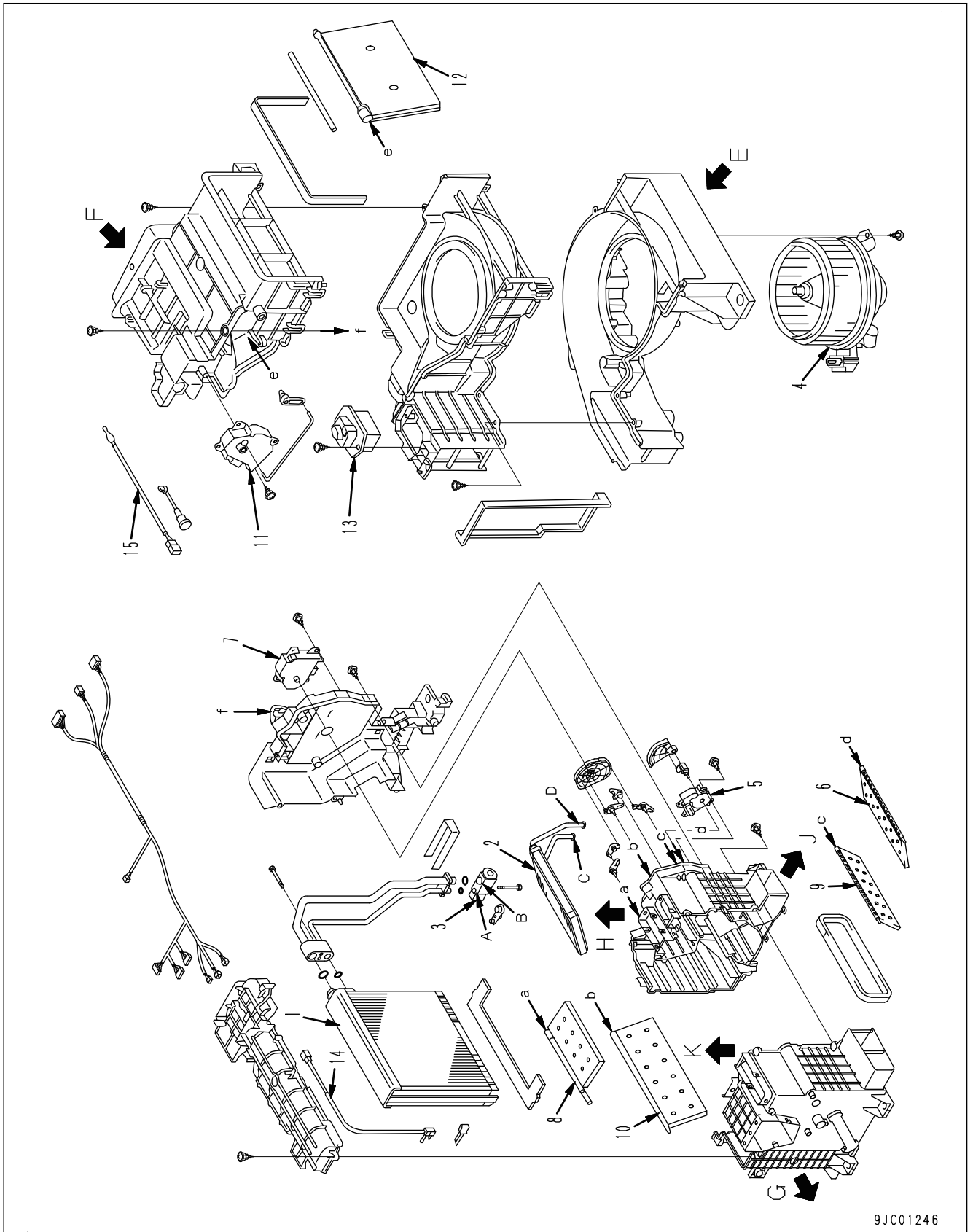


Unit: mm

No.	Item	Criteria				Remedy	
		Standard dimension		Repair limit			
1	Outside diameter of flange (outside)	250		-		Repair by build-up welding or replace	
2	Outside diameter of tread	210		174			
3	Thickness of tread	69		51			
4	Width of flange (outside)	24		13.5			
5	Width of tread	47		-			
6	Overall width	244		-			
7	Clearance between shaft and bushing	Standard dimension	Tolerance		Standard clearance	Allowable clearance	Replace
		65	Shaft	Hole	0.243 to 0.493	-	
-0.250	+0.143						
8	Clearance between shaft and collar	64.7	-0.250	-0.100	0.100 to 0.250	-	
			-0.350	-0.150			
9	Axial play of roller	Standard clearance		Allowable clearance			
		0.26 to 0.66		-			

Unit: mm

No.	Item	Criteria					Remedy
		Standard dimension			Repair limit		
1	Piston spring	Free height x outside diameter	Installed height	Load at in- stalled height	Free height	Load at in- stalled height	Replace (Re- place if dam- aged or de- formed as well)
		27.3 × 12	25.9	4.8 N {0.49 kg}	-	3.48 N {0.39 kg}	
		53.24 x 34.8	18	46.1 N {4.7 kg}	-	36.9 N {3.76 kg}	
2	Valve spring	26.35 x 23	25	52.7 N {5.37 kg}	-	42.2 N {4.30 kg}	
3	Valve spring						



9JC01246

- A: Refrigerant inlet (from condenser)
- B: Refrigerant outlet (to compressor)
- C: Hot water inlet
- D: Hot water outlet

- E: Recirculation air inlet
- F: Fresh air inlet
- G: Front vents
- H: Rear vents

Examine Air Leakage (Duct)

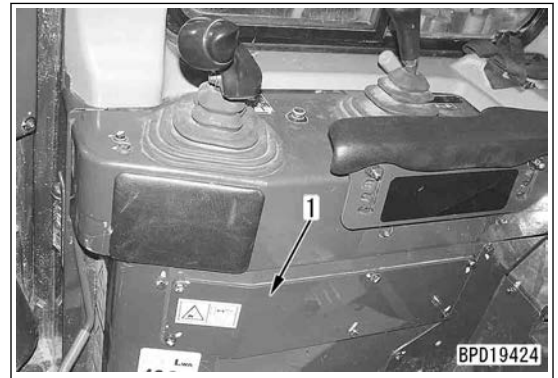
⚠ Park the machine on a level ground, lower the work equipment to the ground in a stable posture, set the lock lever to LOCK position, and stop the engine.

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

Write down the connector numbers and installed positions before disconnecting wiring harnesses and hoses.

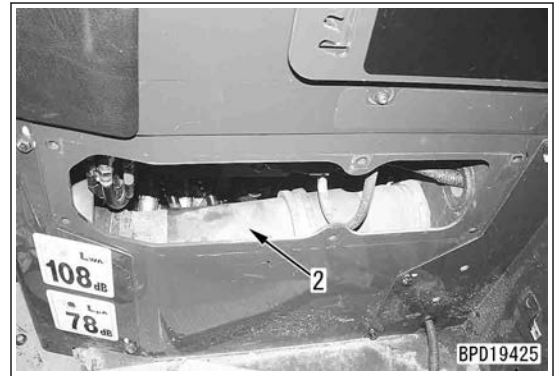
How to Examine Air Leakage (Duct)

1. Referring to items “Air conditioner unit, air conditioner controller” of “INSTALLATION LOCATIONS OF AIR CONDITIONER PARTS AND ARRANGEMENT OF CONNECTORS”, remove the operator's seat rear cover.
2. Remove cover (1).



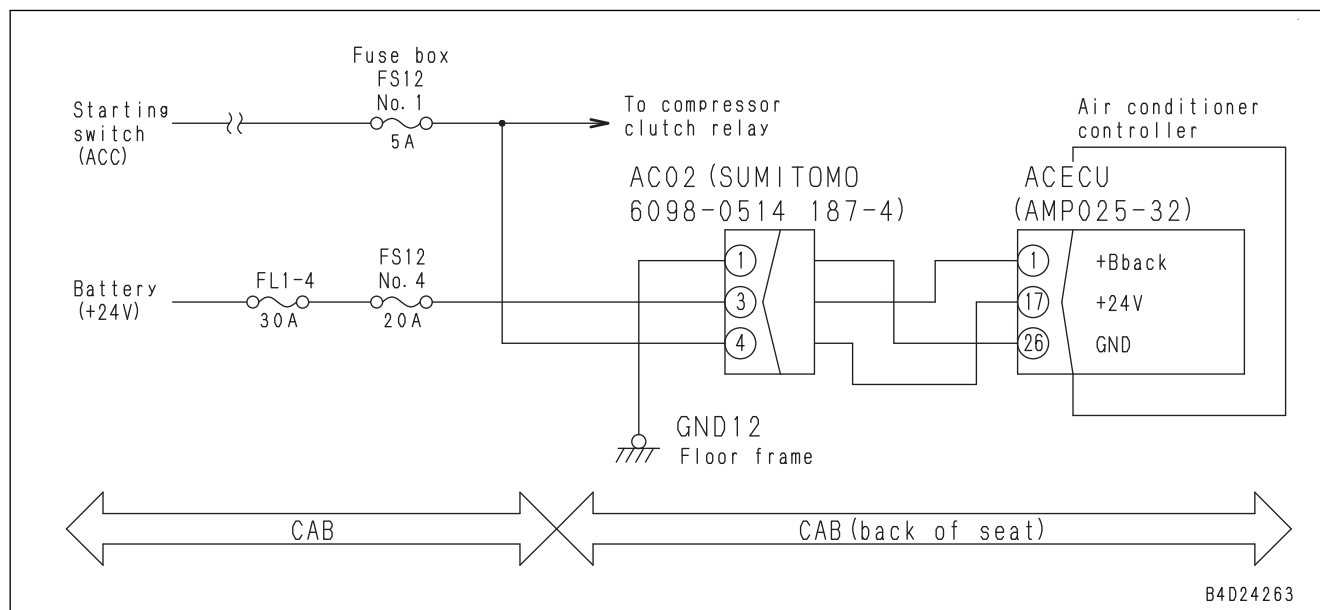
3. Check whether any of the following ducts are disconnected.

Front right duct (2)



No.	Cause	Procedure, measuring location, criteria and remarks	
3	Defective wiring harness	If fuse is blown, replace it. 1. Turn starting switch to OFF position. 2. Turn battery disconnect switch OFF. 3. Disconnect connector AC02. 4. Turn battery disconnect switch ON. 5. Turn starting switch to ON position.	
		<table border="1"> <tr> <td>Voltage</td> <td>Between AC02 (female) (4) (brown) and (1) (black)</td> <td>20 to 30 V</td> </tr> </table>	Voltage
Voltage	Between AC02 (female) (4) (brown) and (1) (black)	20 to 30 V	
4	Open circuit in wiring harness	1. Turn starting switch to OFF position. 2. Turn battery disconnect switch OFF. 3. Disconnect connector AC02. 4. Remove fuse No. 1 of fuse box F12.	
		<table border="1"> <tr> <td>Resistance</td> <td>Between AC02 (female) (4) (brown) and FS12-1.</td> <td>Max. 1 Ω</td> </tr> </table>	Resistance
Resistance	Between AC02 (female) (4) (brown) and FS12-1.	Max. 1 Ω	
5	Ground fault in wiring harness (contact with ground circuit)	If fuse is blown again in above test, perform following procedure. 1. Turn starting switch to OFF position. 2. Turn battery disconnect switch OFF. 3. Disconnect connector AC02. 4. Remove fuse No. 1 from fuse box FS12.	
		<table border="1"> <tr> <td>Resistance</td> <td>Between ground and AC02 (female) (4) (brown) or FS12-1.</td> <td>Min. 1 MΩ</td> </tr> </table>	Resistance
Resistance	Between ground and AC02 (female) (4) (brown) or FS12-1.	Min. 1 MΩ	
6	Defective air conditioner controller	If failure code is still displayed after above checks, air conditioner controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly Replace whole assembly.)	
7	Defective air conditioner unit	If failure code is still displayed after above checks, air conditioner unit may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly Replace whole assembly.)	
8	Defective machine monitor	If no failure is found by above checks, machine monitor is defective. (Since this is an internal defect, troubleshooting cannot be performed.)	

Circuit Diagram Related to Air Conditioner Power Supply

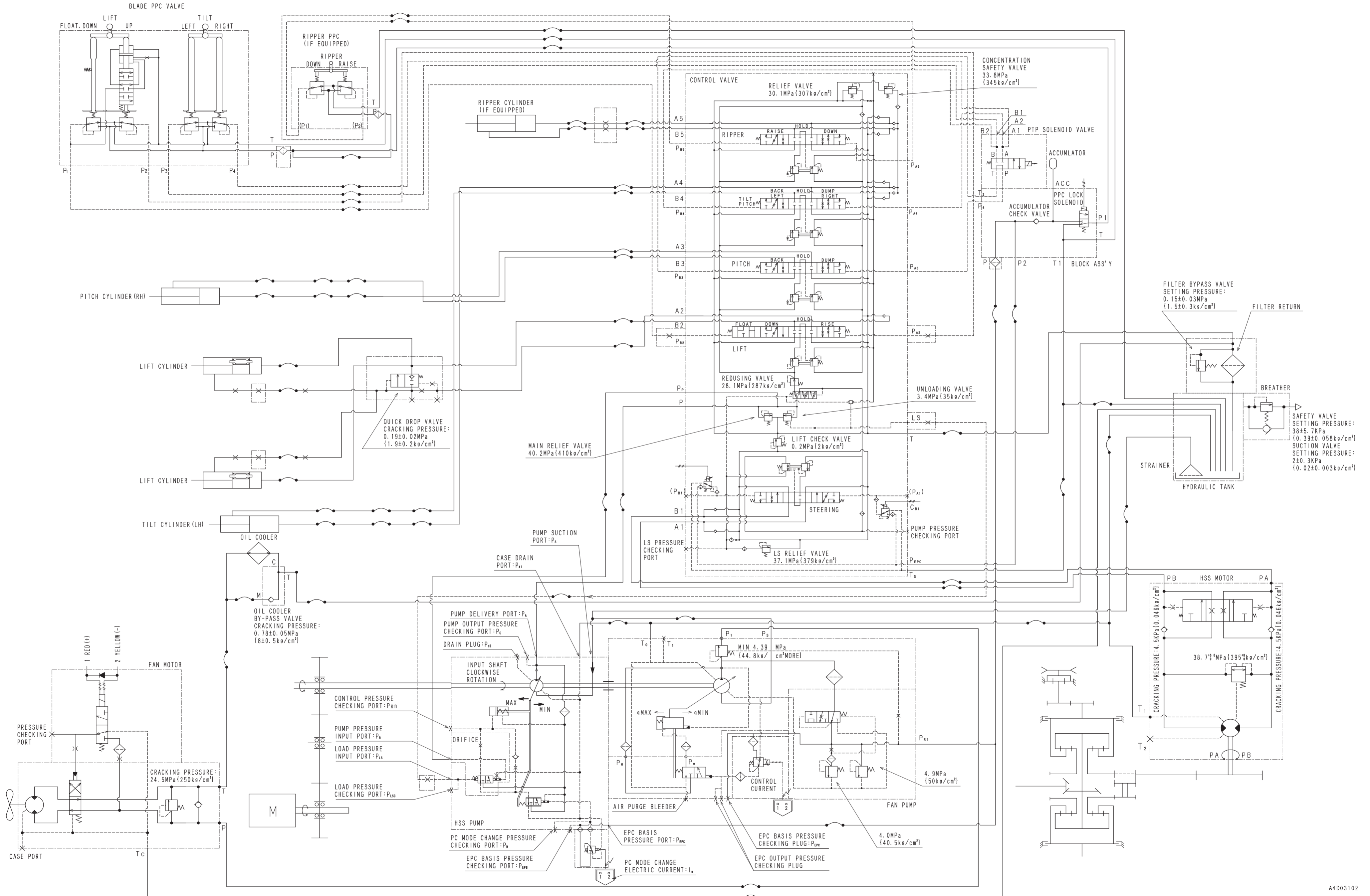


Hydraulic Circuit Diagram (For Straight Tilt Power Pitch Dozer)

D65EX-18E0, D65PX-18E0, D65WX-18E0

REMARK

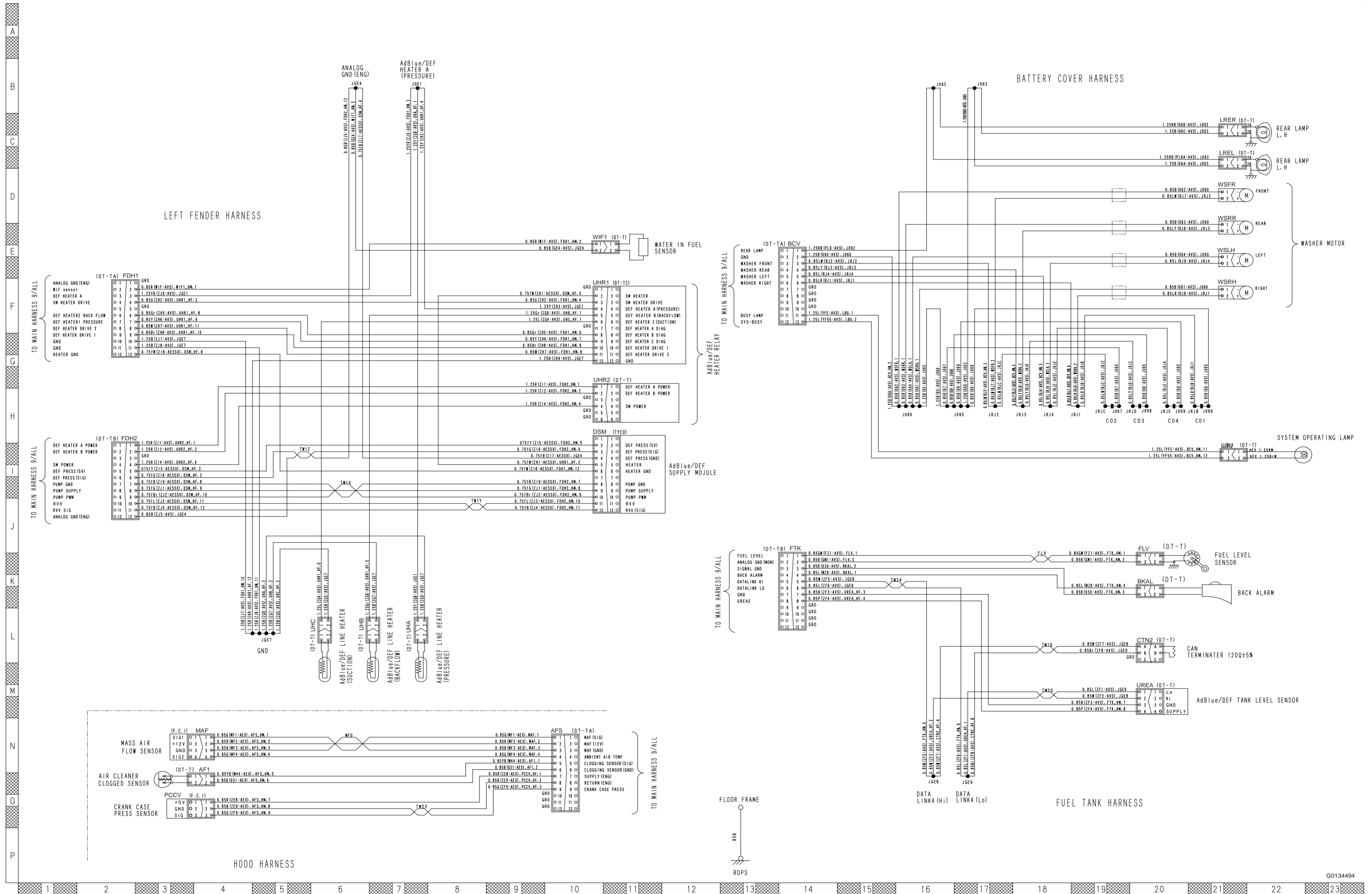
This figure covers the equipment and devices that are unavailable as optional items in some areas.



Electrical Circuit Diagram (Applicable Machine: 96001 to 96603) (10/18)

REMARK

This figure includes the equipment and device that are not available as optional items in some areas.



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