

Shop Manual

WHEEL LOADER

WA600-8

SERIAL NUMBERS 80001 and up

KOMATSU

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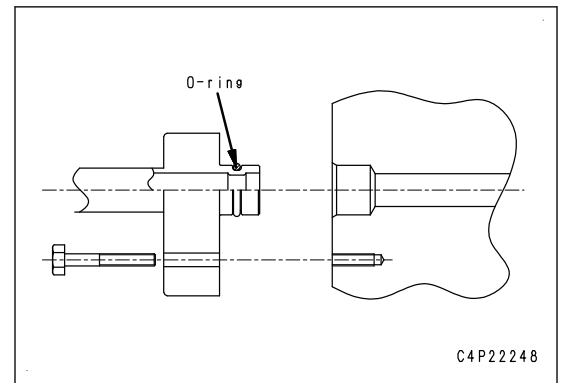
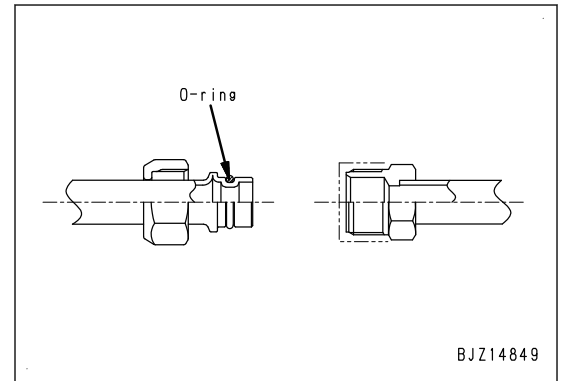
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REMARK

- 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 THE OTHER INFORMATION, "Precautions for disconnection and connection of air conditioner piping".

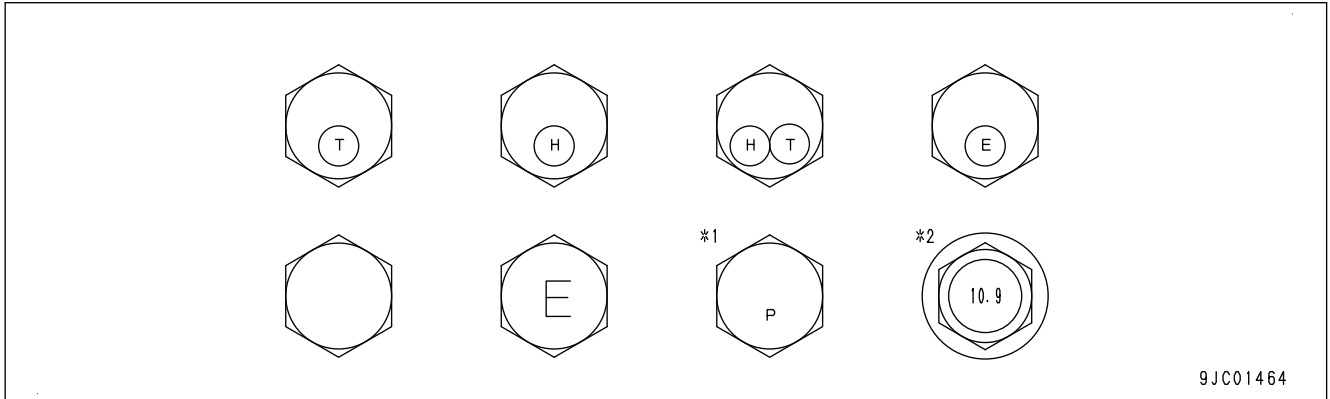


STANDARD TIGHTENING TORQUE TABLE

Table of tightening torque for bolts and nuts

REMARK

Tighten the metric nuts and bolts to the torque shown in the table below unless otherwise specified.



Thread diameter (mm)	Width across flats (mm)	Tightening torque (Nm {kgfm})
6	10 (*2) 10	11.8 to 14.7 {1.2 to 1.5}
8	13 (*2) 12	27 to 34 {2.8 to 3.5}
10	17 (*1, *2) 14	59 to 74 {6 to 7.5}
12	19 (*1, *2) 17	98 to 123 {10 to 12.5}
14	22	153 to 190 {15.5 to 19.5}
16	24 (*1) 22	235 to 285 {23.5 to 29.5}
18	27	320 to 400 {33 to 41}
20	30	455 to 565 {46.5 to 58}
22	32	610 to 765 {62.5 to 78}
24	36	785 to 980 {80 to 100}
27	41	1150 to 1440 {118 to 147}
30	46	1520 to 1910 {155 to 195}
33	50	1960 to 2450 {200 to 250}
36	55	2450 to 3040 {250 to 310}
39	60	2890 to 3630 {295 to 370}

*1: Split flange bolt

*2: Flanged bolt

REMARK

Tighten the flanged bolt marked with "7" on the head as shown in the following to the tightening torque shown in the table below.

Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*1), or component/system)	Explanation
TOPS	Tip-Over Protective Structure	Cab and canopy	This is a protective structure that intended to protect the operator wearing seat belt from suffering injury which may be caused if the cab is crushed when the machine tips over. (Roll-over protective structure of hydraulic excavator) This performance is standardized as ISO 12117.
TWV	2-Way Valve	Hydraulic system	This is a solenoid valve that switches over direction of flow.
VGT	Variable Geometry Turbocharger	Engine	This is a turbocharger on which the cross-section area of the exhaust passage is variable.
VHPC	Variable Horse Power Control	Engine control	This is a function that finely controls the maximum output of the machine so that high work efficiency and low fuel consumption rate are both achieved.

*1: Code for applicable machine model

D: Bulldozer

HD: Dump truck

HM: Articulate dump truck

PC: Hydraulic excavator

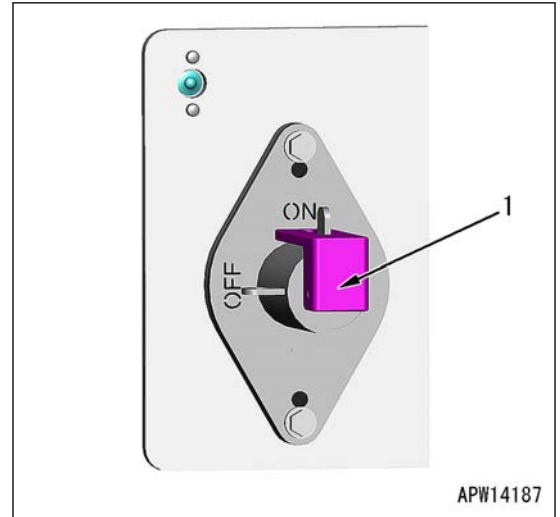
WA: Wheel loader

List of abbreviations used in the circuit diagrams

Abbreviation	Actual word spelled out
A/C	Air Conditioner
A/D	Analogue-to-Digital
A/M	Air Mix Damper
ACC	Accessory
ADD	Additional
AUX	Auxiliary
BR	Battery Relay
CW	Clockwise
CCW	Counter Clockwise
ECU	Electronic Control Unit
ECM	Electronic Control Module
ENG	Engine
EXGND	External Ground
F.G.	Frame Ground
GND	Ground
IMA	Inlet Metering Actuator
NC	No Connection

ON position

- Battery disconnect switch (1) is usually used in the following cases in the same purpose of disconnecting the cable from the negative terminal of the battery.
 - When storing the machine for a long period (1 month or longer)
 - When servicing or repairing the electrical system
 - When performing electric welding
- When the battery disconnect switch (1) at OFF position and the electric current does not flow (the contact is opened), all the continuous power supplies for the components including the starting switch B terminal and controllers are all cut out. It is the same state as the time when the battery is not connected, and all the electrical system of the machine are out of operation.



APW14187

NOTICE

- **Do not turn the battery disconnect switch (1) to “OFF” position while the system operating lamp is lit.**
When the controller is in operation, or AdBlue/DEF pump is in operation, or KOMTRAX is performing communication, the system operating lamp is lit even if the starting switch is in “OFF” position. If battery disconnect switch (1) is turned “OFF” while the system operating lamp is lit, it may erase the data in the controller, and damage the controller seriously.
- **Do not turn the battery disconnect switch (1) to “OFF” position while the engine is running or immediately after the engine is stopped.**
If battery disconnect switch (1) is turned to “OFF” position while the alternator is generating power, the generated current has nowhere to go. It leads to over-voltage in the electrical system of the machine, which may cause serious damage to the electrical system including the electric devices and controllers.

REMARK

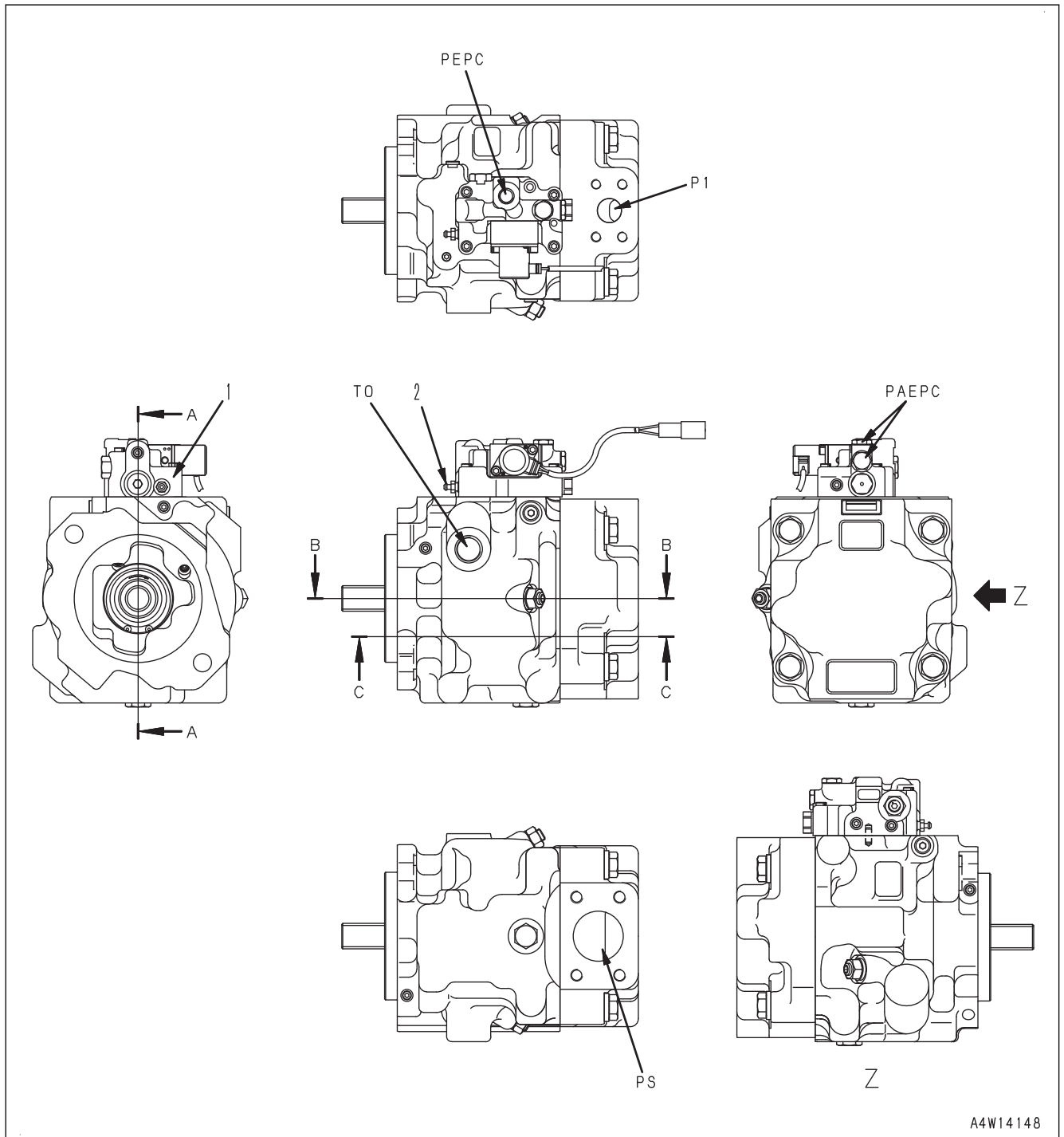
If battery disconnect switch (1) has been at “OFF” position for a long period, the machine monitor and the clock of the radio may return to the initial state. In this case, resetting is required.

COMPONENT PARTS OF COOLING SYSTEM

BRAKE AND COOLING FAN PUMP

STRUCTURE OF BRAKE AND COOLING FAN PUMP

General view



P1: Pump discharge port

PAEPC: EPC output pressure pickup plug

PEPC: EPC valve source pressure input port







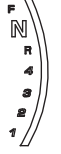



1: Servo valve

PS: Pump suction port

TO: Drain port

2: Bleeder

TYPES OF PILOT LAMPS DISPLAYED ON MACHINE MONITOR

Symbol	Item to be displayed	Range and method for display	Remarks
 A4H10436	Parking brake	Lit: Lock Not lit: Free	Displays the operating state of parking brake.
 A4H10437	Turn signal lamp (L.H.)	Flash: When L.H. turn signal is given and when hazard lamp switch is turned ON	
 A4H10438	Headlamp (high beam)	Lit: When headlamp is lit upward	
 A4H10439	Turn signal lamp (R.H.)	Flash: When R.H. turn signal is given and when hazard lamp switch is turned ON	
 A4H10440	Clearance lamp	Lit: When clearance lamps are lit	
 A4H10441	Shift indicator	Display: Gear speed (F1, F2, F3, F4, N, R1, R2, R3, R4)	
 A4W15873	Gear shift position	Highlighting: Gear shift position (1, 2, 3, 4, R, N, F)	<ul style="list-style-type: none"> When the starting switch is turned to "ON" position while shift lever is not in "N", the character of current shift lever position flashes, the centralized warning lamp lights up, and the alarm buzzer sounds. (Neutral safety alarm) When all signals from the shift lever and switches are "OFF", the character of current shift lever position flashes, centralized warning lamp lights up, and alarm buzzer sounds.
 A4H10443	Message (unread)	Lit: There is an unread message Not lit: No message	Indicates the state of messages.
 A4H10444	Message (read, unreplied)	Lit: There is a read and unreplied message. Not lit: No message	Indicates the state of messages.
 A4W12230	Auto digging	Lit: Auto-digging is enabled.	

Pin No.	Signal name	Input/Output
72	(*1)	-
73	Power GND	Ground/Shield/ Return
74	(*1)	-
75	Intake air heater relay	Output
76	(*1)	-
77	AdBlue/DEF injector (+)	Output
78	(*1)	-
79	AdBlue/DEF pump voltage	Output
80	VGT solenoid (+)	Output
81	AdBlue/DEF FCV	Output
82	AdBlue/DEF tank heating valve	Output
83	AdBlue/DEF pump heater relay	Output
84	(*1)	-
85	(*1)	-
86	(*1)	-
87	(*1)	-
88	(*1)	-
89	HARNESS KEY1	Input
90	(*1)	-
91	(*1)	-
92	(*1)	-
93	(*1)	-
94	(*1)	-
95	(*1)	-
96	(*1)	-

*1: Never connect these pins. Malfunctions or failures may occur.

Theoretical discharged volume: 90 cm³/rev

Rated discharged pressure: 34.3 MPa {350 kgf/cm²}

Rated speed: 1906 rpm (*1)

*1: Value at engine rated speed 1800 rpm.

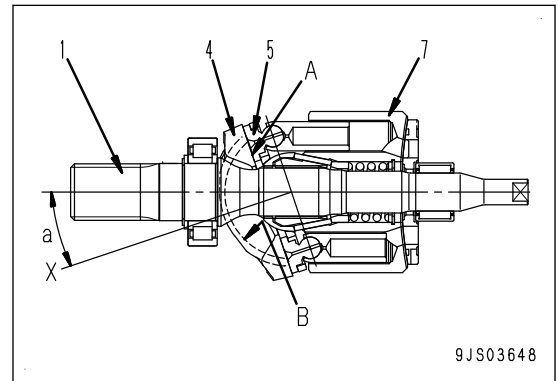
FUNCTION OF STEERING PUMP

- 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.
- Discharged volume can be changed by changing the swash plate angle.

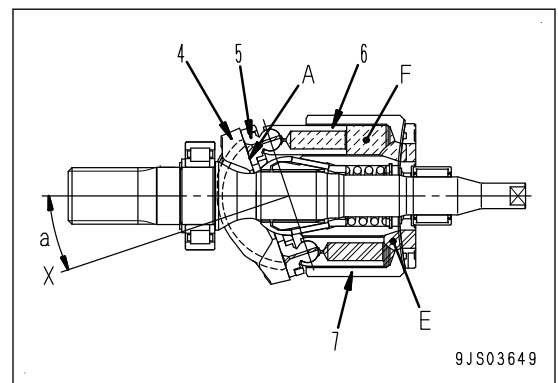
OPERATION OF STEERING PUMP

Operation of pump

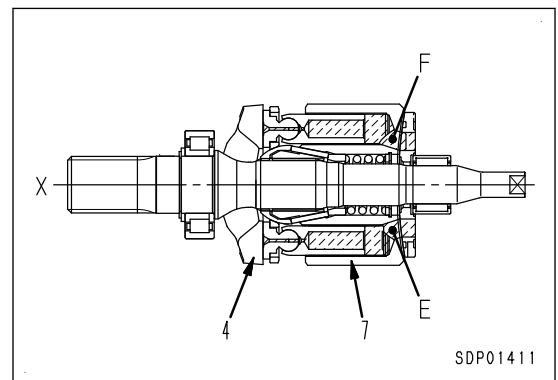
1. Cylinder block (7) rotates together with shaft (1), and shoe (5) slides on plane (A).
2. Rocker cam (4) pivots on cylindrical surface (B), and accordingly swash plate angle (a) between center line (X) of rocker cam (4) and the axis of cylinder block (7) changes.



3. While angle (a) is made between center line (X) of rocker cam (4) and the axis of cylinder block (7), flat surface (A) works as a cam for shoe (5).
4. Piston (6) slides inside cylinder block (7) and a difference is made between volumes (E) and (F) in cylinder block (7).
5. The oil in amount of (F) minus (E) per each piston (6) is sucked in and discharged from.
6. As cylinder block (7) rotates and the volume of chamber (E) decreases, pressurized oil is discharged on the process.
7. As the volume of chamber (F) increases, pressurized oil is sucked on the process.



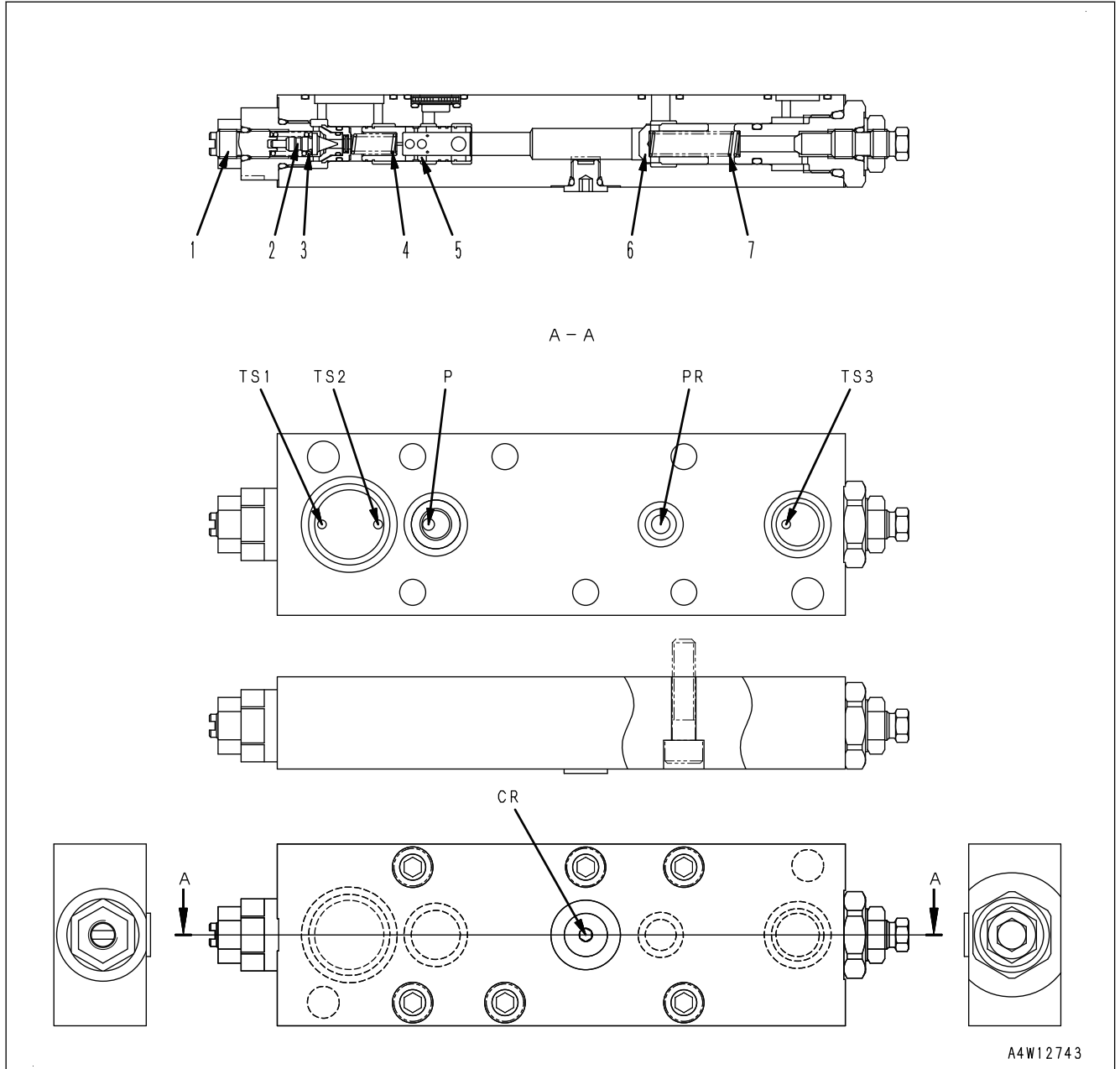
8. In the figure, chamber (F) is at the end of the suction stroke and chamber (E) is at the end of the discharge stroke.
9. The difference between volumes (E) and (F) inside cylinder block (7) is zero when center line (X) of rocker cam (4) matches the axis of cylinder block (7) (the swash plate angle is zero).
10. Suction and discharge of pressurized oil is not performed in this stage. In fact, pumping action is not performed (Angle of swash plate never becomes zero actually).
11. The pump discharged volume is in proportion to swash plate angle (a).



ACCUMULATOR CHARGE VALVE

STRUCTURE OF ACCUMULATOR CHARGE VALVE

General view and sectional view



A4W12743

CR: Accumulator charge pressure pickup port

P: From main pump

PR: To accumulator through ECSS spool

1: Screw

2: Poppet (relief valve)

3: Spring (relief valve)

4: Spring (main pressure reducing valve)

TS1: To tank

TS2: To tank

TS3: To tank

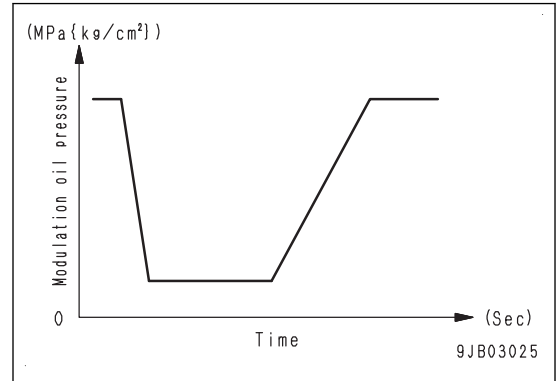
5: Pressure reducing valve spool

6: Check valve

7: Spring (check valve)

- The thrust is changed by controlling the command current to operate the pressure control valve and control the oil pressure.

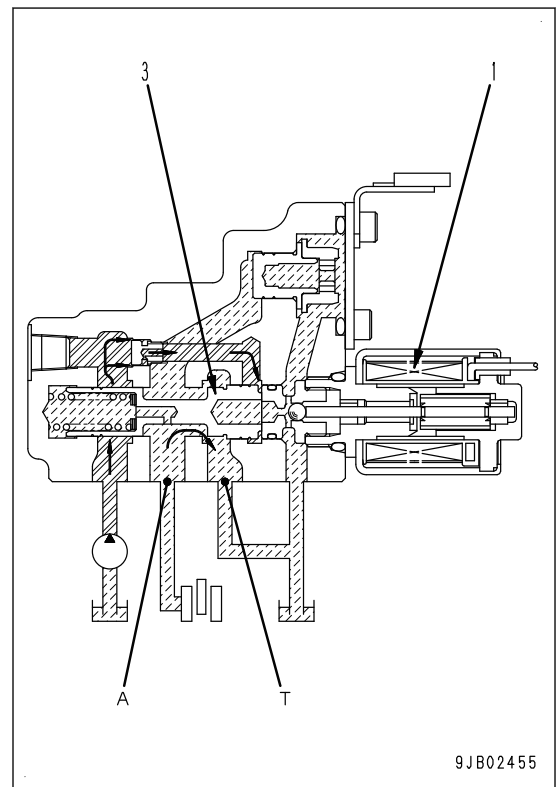
Control of modulation clutch oil pressure

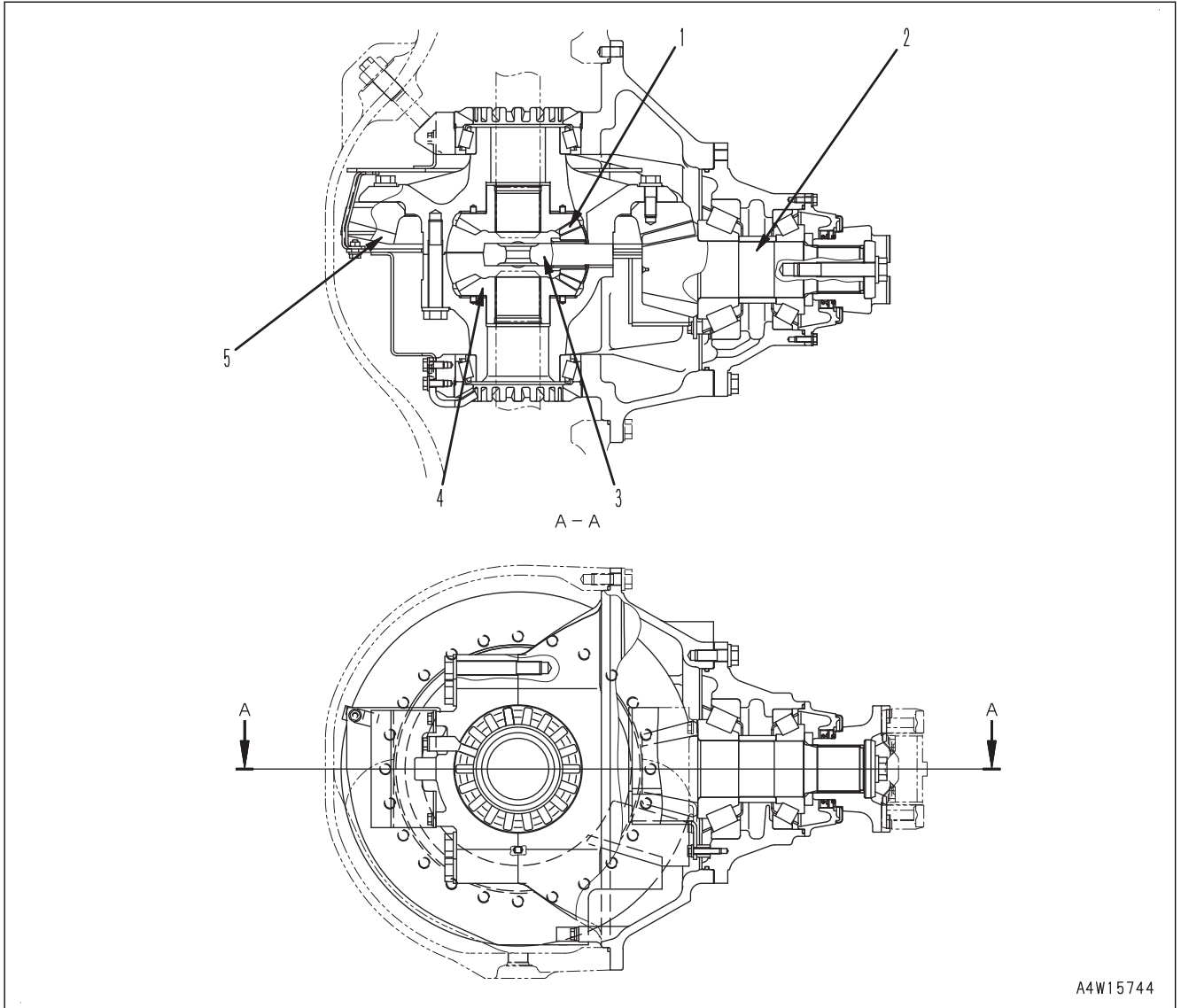


OPERATION OF MODULATION CLUTCH ECMV

Operation when clutch is “disengaged” (released)

While no current is flowing to the proportional solenoid (1), pressure control valve (3) drains the oil from clutch port (A) through drain port (T).



DIFFERENTIAL**STRUCTURE OF FRONT DIFFERENTIAL****General view and sectional view**

1: Pinion gear (number of teeth: 12)

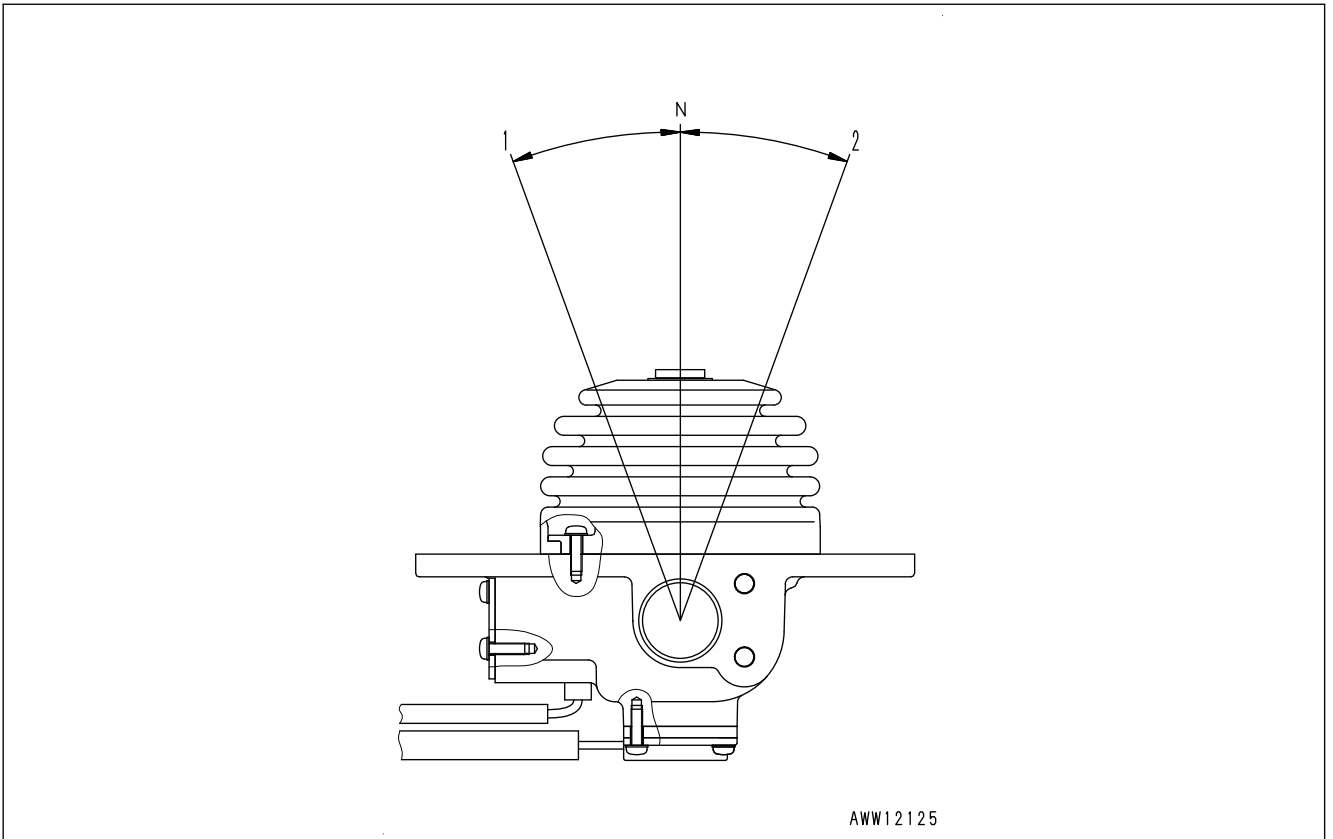
2: Bevel pinion (number of teeth: 9)

3: Shaft

4: Side gear (number of teeth: 24)

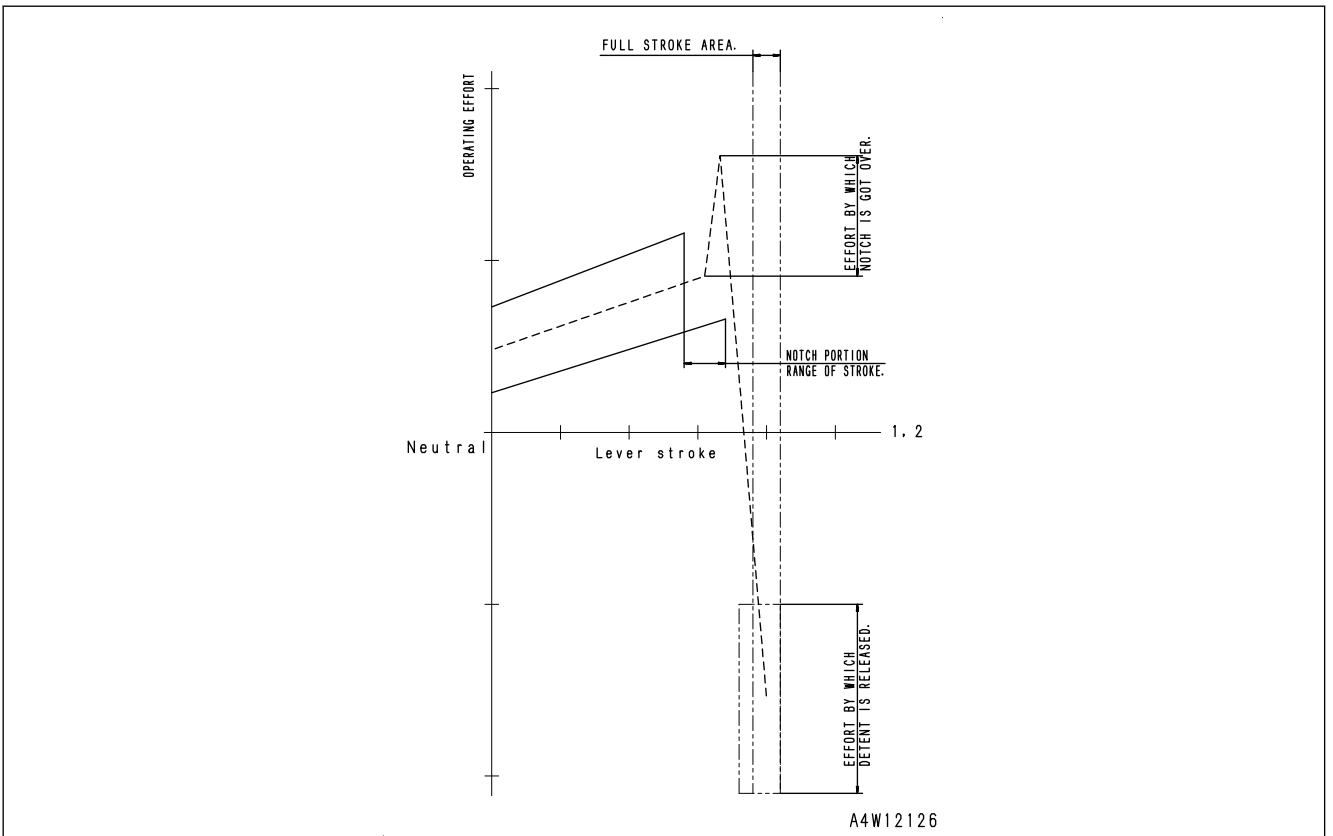
5: Bevel gear (number of teeth: 42)

FUNCTION OF WORK EQUIPMENT ELECTRIC LEVER



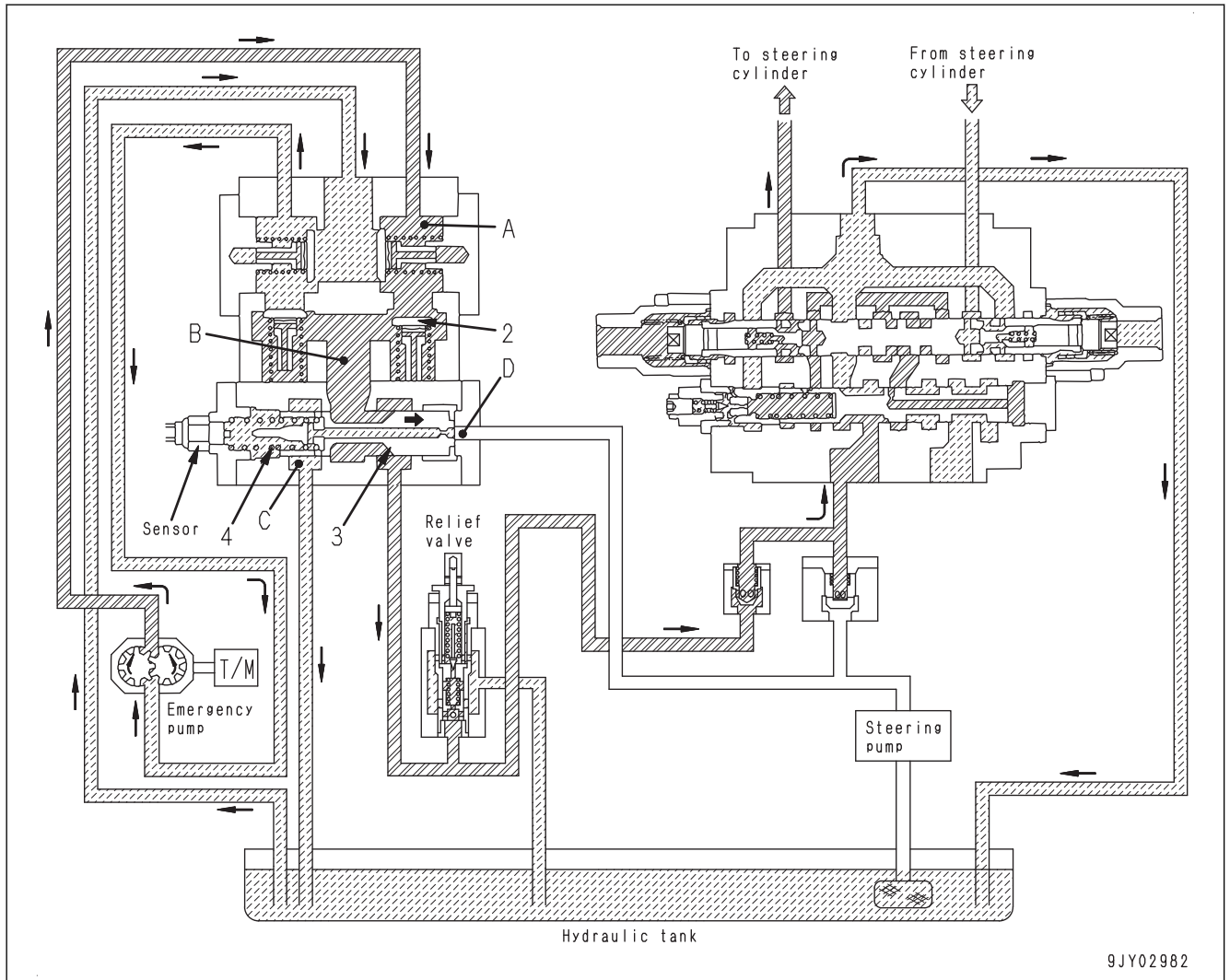
Operating effort characteristics

“Boom LOWER”, “Boom RAISE”, and “Bucket TILT” operations



When machine is traveling and pump or engine has trouble

(Steering wheel specification)

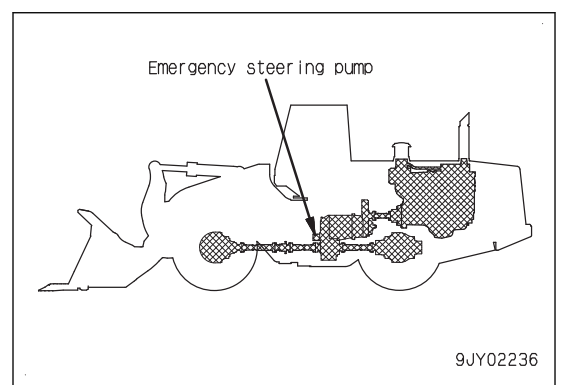


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1. When the pump or engine has trouble while the machine is traveling, the rotation of the wheels drives the secondary steering pump through the transmission.
2. Since the steering pump is not rotating, no pressure of the oil is generated in port (D). Accordingly, spool (3) is pushed to the right by spring (4).
3. Accordingly, spool (3) is pushed to the right by spring (4).
4. The oil from the secondary steering pump flows through port (A) and port (B), and then flows to the steering valve, and enables steering.

REMARK

The secondary steering pump can rotate in the normal and reverse directions.



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20 STANDARD VALUE TABLE

Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*1), or component/system)	Explanation
MMS	Multimedia Messaging Service	Communication	This is a service that allows transmission and reception of short messages consisting of characters or voice or images between cell phones.
NC	Normally Closed	Electrical system, hydraulic system	This is a characteristic of electrical or hydraulic circuits. Circuit is normally closed if it is not actuated, and it opens when it is actuated.
NO	Normally Open	Electrical system, hydraulic system	This is a characteristic of electrical or hydraulic circuits. Circuit is normally open if it is not actuated, and it closes when it is actuated.
OLSS	Open-center Load Sensing System	Hydraulic system	This is a hydraulic system that can operate multiple actuators at the same time regardless of the load.
PC	Pressure Compensation	Hydraulic system	This is a function that corrects the oil pressure.
PCCS	Palm command control system	Steering (D Series)	This is a function that electrically controls the engine and transmission in an optimal way with the controller instantly analyzing data from levers, pedals, and dials.
PCV	Pre-stroke Control Valve	Engine	This is a valve that adjusts the fuel intake amount at the pump inlet in order to control fuel discharged volume of supply pump.
PPC	Proportional Pressure Control	Hydraulic system	This is a system that operates actuators in proportion to the oil pressure.
PPM	Piston Pump and Motor	Hydraulic system (D, PC, etc)	Piston type hydraulic pump and motor.
PTO	Power Take Off	Power train system	Power take-off mechanism
PTP	Power Tilt and power Pitch dozer	Work equipment (D Series)	This is a function that performs hydraulic control of the tilt and pitch of the dozer blade of the bulldozer.
ROPS	Roll-Over Protective Structure	Cab and canopy	ROPS is a protective structure that intended to protect the operator wearing seat belt from suffering injury which may be caused if the cab is crushed when the machine rolls over. (Roll-over protective structure) This performance is standardized as ISO 3471 or ISO 12117-2.
SCR	Selective Catalytic Reduction	Urea SCR system	This is an exhaust gas purifier using urea water that converts nitrogen oxides (NOx) into harmless nitrogen and water by oxidation-reduction reaction. It may also be mentioned as exhaust gas purification catalyst or part of the name of related devices.
SI	Le Systeme International d' Unites (International unit system)	Unit	Abbreviation for "International System of Units" It is the universal unit system and "a single unit for a single quantity" is the basic principle applied.
SOL	Solenoid	Electrical system	This is an actuator that consists of a solenoid and an iron core that is operated by the magnetic force when the solenoid is energized.

TEST EGR VALVE AND VGT OIL PRESSURE

Tools for testing EGR valve and VGT oil pressure

Symbol	Part No.	Part name	Q'ty	Remarks	
A	-	799-101-5002	Hydraulic tester	1	
	1	799-101-5140	Gauge	1	Pressure range 2.5 MPa

⚠ Place the machine on a level ground, lower the work equipment to the ground, set the parking brake switch in (P) position and lock the work equipment lock switch, and stop the engine.

⚠ Chock the tires to prevent the machine from moving.

⚠ Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.

Check this item under the following conditions.

- Engine coolant temperature 60 to 100 °C

For testing of EGR valve and VGT oil pressures to perform troubleshooting or Pm Clinic, periodic maintenance, refer to this section.

METHOD FOR TESTING EGR VALVE AND VGT OIL PRESSURE

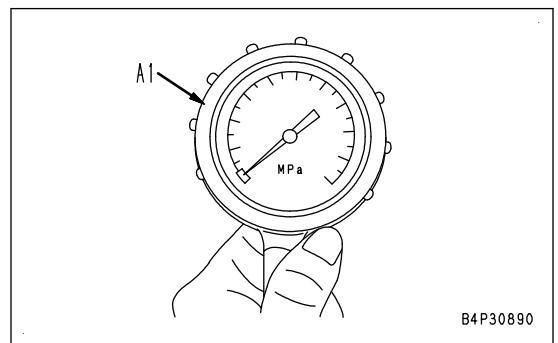
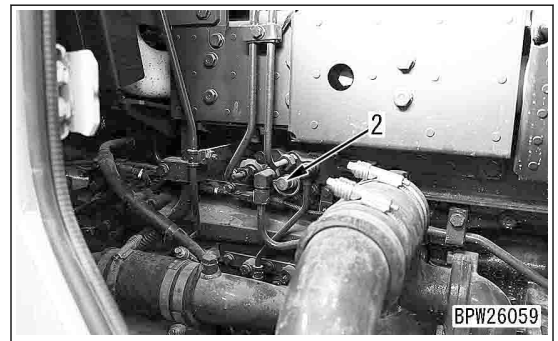
1. Open cover (1).



2. Connect gauge A1 of hydraulic tester A to nipple (2).
3. Start the engine.
4. Check that RPM set pilot lamp is not lit.

REMARK

- if the RPM set pilot lamp is lit, the engine speed at low idle is higher than standard speed at low idle. RPM set pilot lamp must not be lit when running the engine at low idle.
- Remove the speed limits of engine while RPM set pilot lamp is lit.



2. Check the AdBlue/DEF conditions.

- 1) Select the following monitoring items on “Monitoring Selection Menu”. See “SET AND OPERATE MACHINE MONITOR”.

Monitoring code 19305: “AdBlue/DEF Tank Heating State”

Monitoring code 19309: “AdBlue/DEF Pump Heater State”

Monitoring code 19306: “AdBlue/DEF Line Heater 1 State”

Monitoring code 19307: “AdBlue/DEF Line Heater 2 State”

- 2) Check the monitoring information of (a) to (d) on “Monitoring” screen.

Details of monitoring information are as follows.

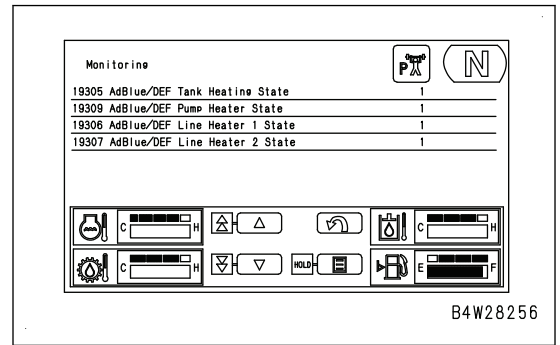
- 1: Being thawed
- 2: Being kept warm
- 3: OFF

- When the status of the monitoring information (a) to (d) is “1”
AdBlue/DEF is being thawed because it is still frozen. Keep the engine speed at low idle and wait until the status of the monitoring information becomes “2” or “3”, and then proceed to step 3.
- The status of the monitoring information (a) to (b) is “2” or “3”:
AdBlue/DEF is not frozen. Proceed to step 3.

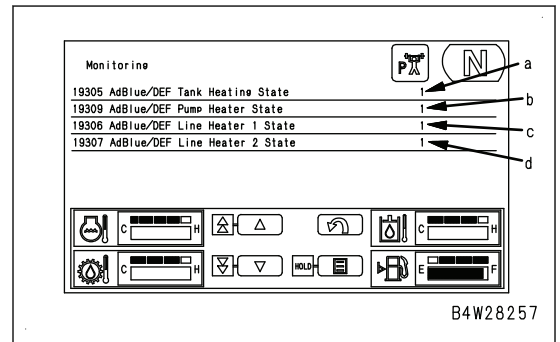
3. Stop the engine.

⚠ Immediately after the engine is stopped, its parts and oil are still very hot and may cause burn injury. Wait for the temperature to go down, and then start the work.

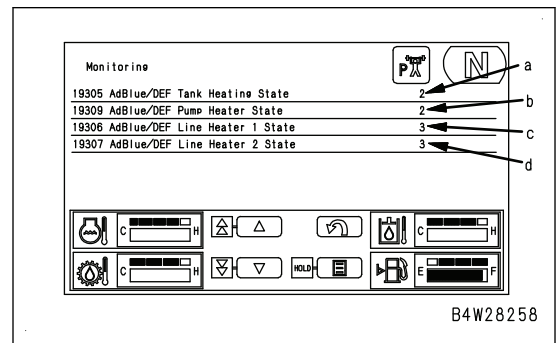
4. Remove muffler stack (1).
5. Remove cover (2).
6. Check that the system operating lamp is off, and turn the battery disconnect switch to OFF position.



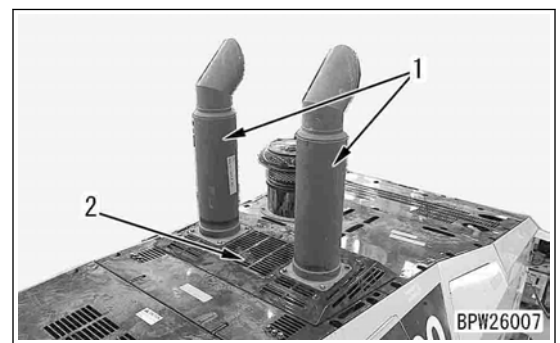
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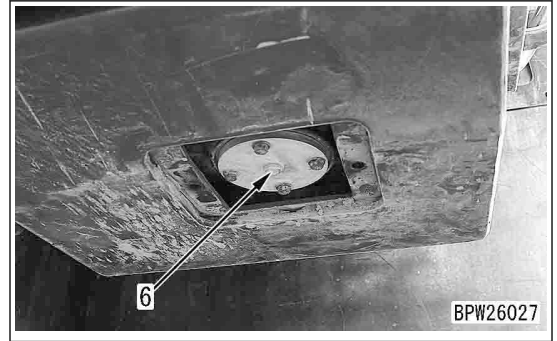


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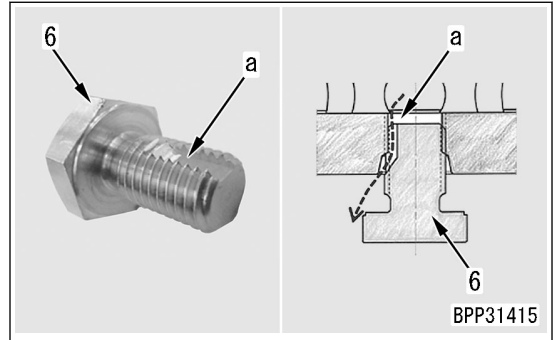
- 10) Loosen drain plug (6) by 6 turns and drain AdBlue/DEF into oil container A.



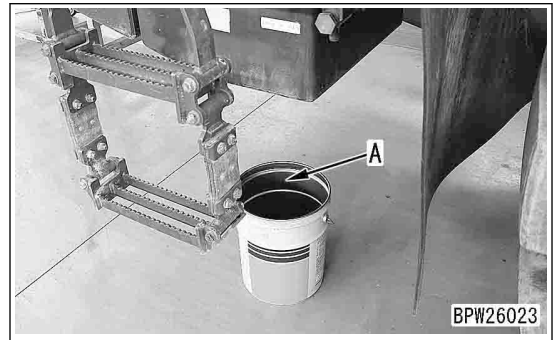
REMARK

Slit (a) is made at threaded portion of drain plug (6) so that AdBlue/DEF is not drained too much and splashed.

- 11) Draining amount decreases in approximately 2 minutes, remove drain plug (6).
- 12) Fully open valve B1 of remote breather hose B.



- 13) When container A is almost filled up, close valve B1 of remote breather hose B securely.
- 14) Draining amount decreases in approximately 15 seconds, change oil container A.
- 15) Repeat steps 12) to 14). When AdBlue/DEF tank becomes empty, install drain plug (6) securely.




- 6. Clean AdBlue/DEF tank according to the following procedure.

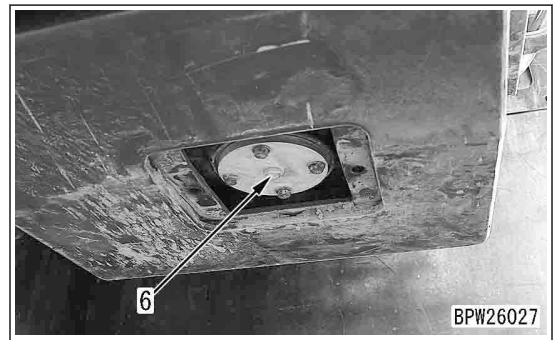
- 1) Check that drain plug (6) is closed securely.
- 2) Refill AdBlue/DEF tank with the new AdBlue/DEF.

 AdBlue/DEF tank:
30 ℓ

- 3) Repeat steps 10) to 15) of procedure 5, and drain AdBlue/DEF.

 AdBlue/DEF tank:
30 ℓ

Cleaning of AdBlue/DEF tank is completed.

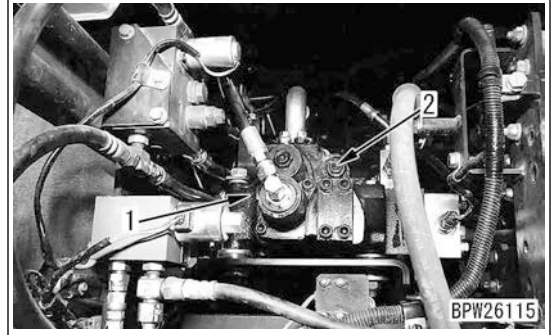


METHOD FOR ADJUSTING STEERING CIRCUIT OIL PRESSURE

Method for adjusting steering relief pressure

⚠ The engine must be stopped before adjusting the oil pressure.

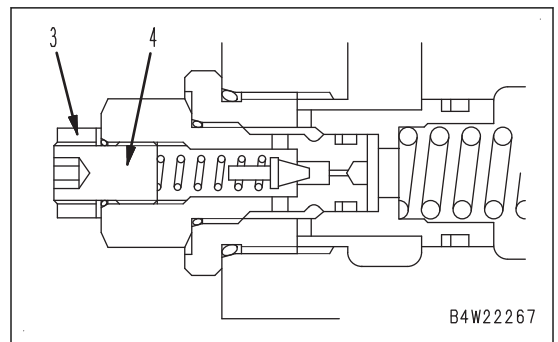
If the steering relief pressure is abnormal, adjust main relief valve (2) of steering valve (1), according to the following procedure.



Loosen locknut (3), and turn adjustment screw (4).

REMARK

- Turn adjustment screw (4) to the right to increase the pressure or turn it to the left to decrease the pressure.
- Pressure adjustment for 1 turn of adjustment screw 17.9 MPa {183 kgf/cm²}



Method for testing work equipment LS differential pressure

NOTICE

Before starting the following test, check that the work equipment relief pressure and work equipment EPC oil pressure are normal.

REMARK

To obtain the LS differential pressure, measure the pump discharged pressure and LS pressure (actuator load pressure) simultaneously, and calculate the difference.

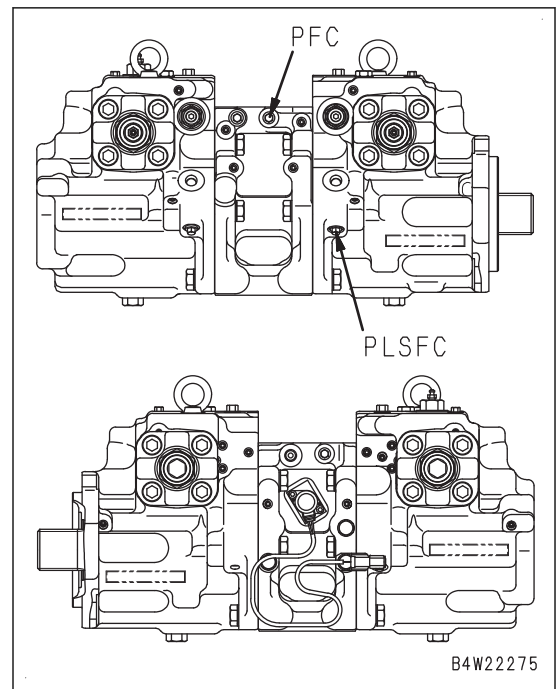
1. Release the remaining pressure in the circuit. For details, see "RELEASE REMAINING PRESSURE FROM WORK EQUIPMENT CIRCUIT".
2. Remove cover (1).
3. Open the rear cover of the operator's cab.



4. Remove the plugs of work equipment ports (PFC) and (PLSFC) of the work equipment pump.

PFC: Front pump discharged pressure pickup port

PLSFC: Front pump LS pressure pickup port



Details of work	Required setting/adjustment	Reference page
Replacement of the boom	Adjustment of work equipment controller boom angle	METHOD FOR ADJUSTING WITH ADJUSTMENT MENU (EPC LEVER BOOM ANGLE POTENTIOMETER (RAISE))
		METHOD FOR ADJUSTING WITH ADJUSTMENT MENU (EPC LEVER BOOM ANGLE POTENTIOMETER (LOWER))
	Choose the boom specifications	METHOD FOR SETTING WITH DEFAULT SETTING MENU (OPTION SELECTION)
	Calibration of the load meter (*1)	See Operation and Maintenance Manual, "HANDLE LOAD METER".
	Bucket positioner setting	See Operation and Maintenance Manual, "REMOTE POSITIONER".
Method for replacing the bucket	Bucket positioner setting	See Operation and Maintenance Manual, "REMOTE POSITIONER".
	Calibration of the load meter (*1)	See Operation and Maintenance Manual, "HANDLE LOAD METER".
Replacement or assembly/disassembly work of AJSS follow up link	AJSS neutral position adjustment (*2)	METHOD FOR ADJUSTING WITH ADJUSTMENT MENU (AJSS NEUTRAL POSITION)
Replacement or assembly/disassembly work of AJSS frame angle sensor		
Replacement or assembly/disassembly work of AJSS lever angle sensor		
Replacement or assembly/disassembly work of AJSS rotary valve		
Removal or additional installation of option components	Option selection setting	METHOD FOR SETTING WITH DEFAULT SETTING MENU (OPTION SELECTION)
Replacement of the rearview monitor	Initialization of the rearview monitor	METHOD FOR SETTING WITH DEFAULT SETTING MENU (REARVIEW MONITOR SETTING)
	Guide line position adjustment	
Replacement of the rearview camera	Guide line position adjustment	METHOD FOR SETTING WITH DEFAULT SETTING MENU (REARVIEW MONITOR SETTING)

*1: When the machine is equipped with load meter

*2: In the case of AJSS specification

If the user points out or requests any of the following, set or adjust the following with the machine monitor.

User reviews	Setting/adjustment	Reference page
Change the unit displayed on speedometer	Unit setting	METHOD FOR SETTING WITH DEFAULT SETTING MENU (UNIT)
Prevent hunting	Adjust transmission shift point	METHOD FOR ADJUSTING WITH ADJUSTMENT MENU (T/M SHIFT POINT)
Change shift travel speed of auto shift function	Adjust transmission shift point	METHOD FOR ADJUSTING WITH ADJUSTMENT MENU (T/M SHIFT POINT)

The unit of display can be either "SI" or "Non-SI". (The display unit can be changed on "Service Menu". Select "Unit Selection" of "Default".)

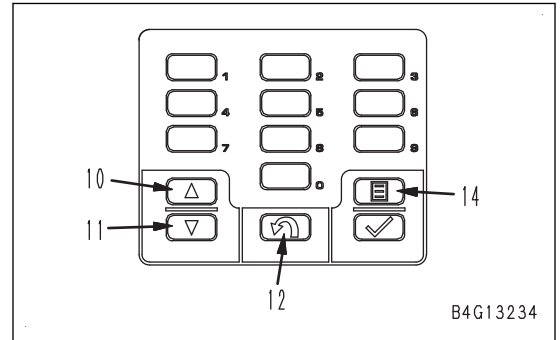
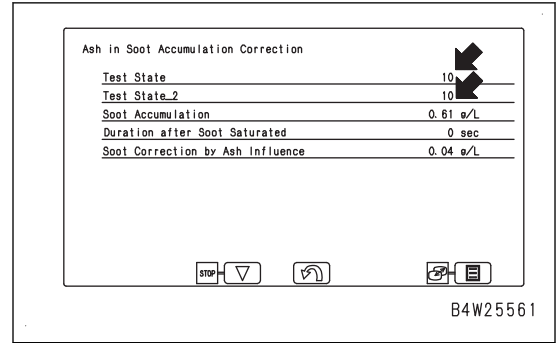
"mg/st" in the display unit is an abbreviation for milligram/stroke.

- Applicable component
 - ENG: The engine controller detects the monitoring information.
 - KDPF: The engine controller detects the monitoring information via KDPF.
 - SCR: The engine controller detects the monitoring information via SCR.
 - T/M: The transmission controller is in charge of detecting the monitoring information.
 - BBC: The work equipment controller detects monitoring information.
 - MON: The monitor controller detects the monitoring information.
 - KOM PLS: KOMTRAX Plus controller detects the monitoring information.

- Start the correction by pressing UP switch (10).
DOWN switch (11): Stops correction
RETURN switch (12): Returns the display to "Diagnostic Tests" screen
Menu switch (14): Switches to other screen

REMARK

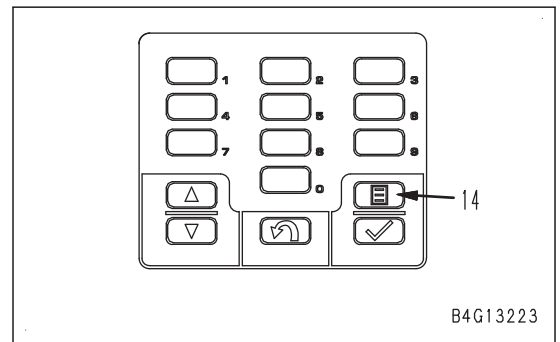
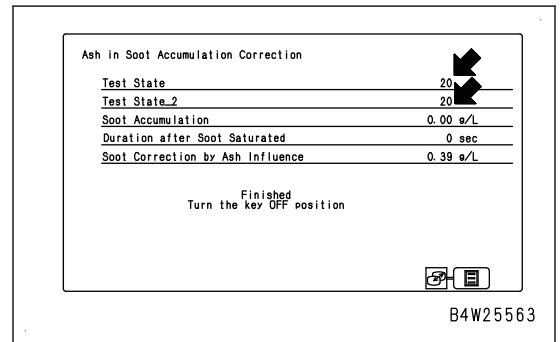
- When the status value "10" of "Test State" and "Test State_2" starts flashing, "Ash in Soot Accumulation Correction" will start.
- "Ash in Soot Accumulation Correction" is completed in approximately 2 hours.
- Pressing the menu switch (14) changes the screens and displays the correction status of KDPF-A (1) on "Ash in Soot Accumulation Correction screen", and KDPF-B (2) on "Ash in Soot Accumulation Correction_2" screen.



- When "20" of "Test State" and "Test State_2" flash, check the test result by pressing the menu switch.
Menu switch (14): Switches to other screen
- After confirming the result, turn the starting switch to OFF position.

REMARK

By turning the starting switch to OFF position once, the correction value is written in the engine controller.



METHOD FOR OPERATING TESTING MENU (ENGINE STOP AdBlue/DEF INJ OVERHEAT COUNT RESET)

NOTICE

When performing this item, see TROUBLESHOOTING, Failure code [AS10NT] "AdBlue/DEF Injector Overheat Caution" or Failure code [AS10KM]"AdBlue/DEF Injector Overheat Warning" and instruct an operator about operation.

Default menu is used to check or change default values of the machine monitor and machine.

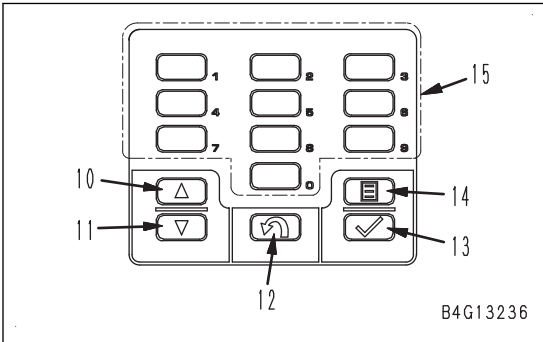
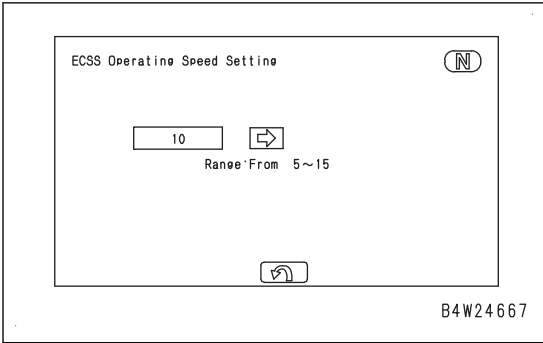
This function is used to reset the number saved in the machine, the number which engine stop performed when the temperature of exhaust gas and coolant is high.

You can reset "Engine Stop at AdBlue/DEF Inj Overheat Count Reset" according to the procedures in this section.

- When "ECSS Operating Speed Setting" screen is displayed, press numeral input switch (15) of switch panel, and display "Numeric Input of New Value" screen.

REMARK

When any of numeral input switches 0 to 9 is pressed, "Numeric Input of New Value" screen is displayed.



- When "Numeric Input of New Value" screen is displayed, input the travel speed with the switches on the switch panel.

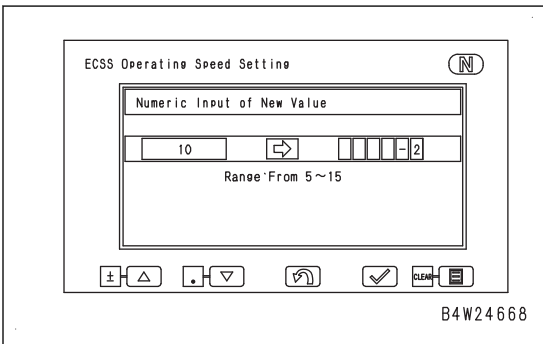
UP switch (10): Switches + and -

DOWN switch (11): Enters the decimal point

RETURN switch (12): Returns the display to "Adjustment" screen

ENTER switch (13): Enters the travel speed

Menu switch (14): Sets the entered value to "0"



REMARK

The setting range of the travel speed is 5 to 15 km/h.

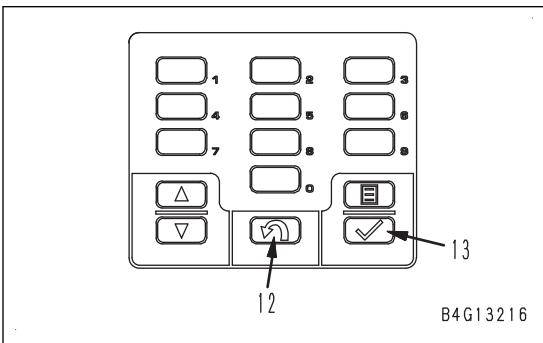
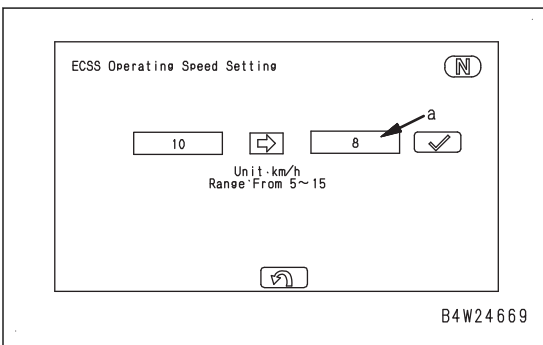
- The input value is displayed in portion (a). If it is OK, press ENTER switch (13).

RETURN switch (12): Returns the display to "Adjustment" screen

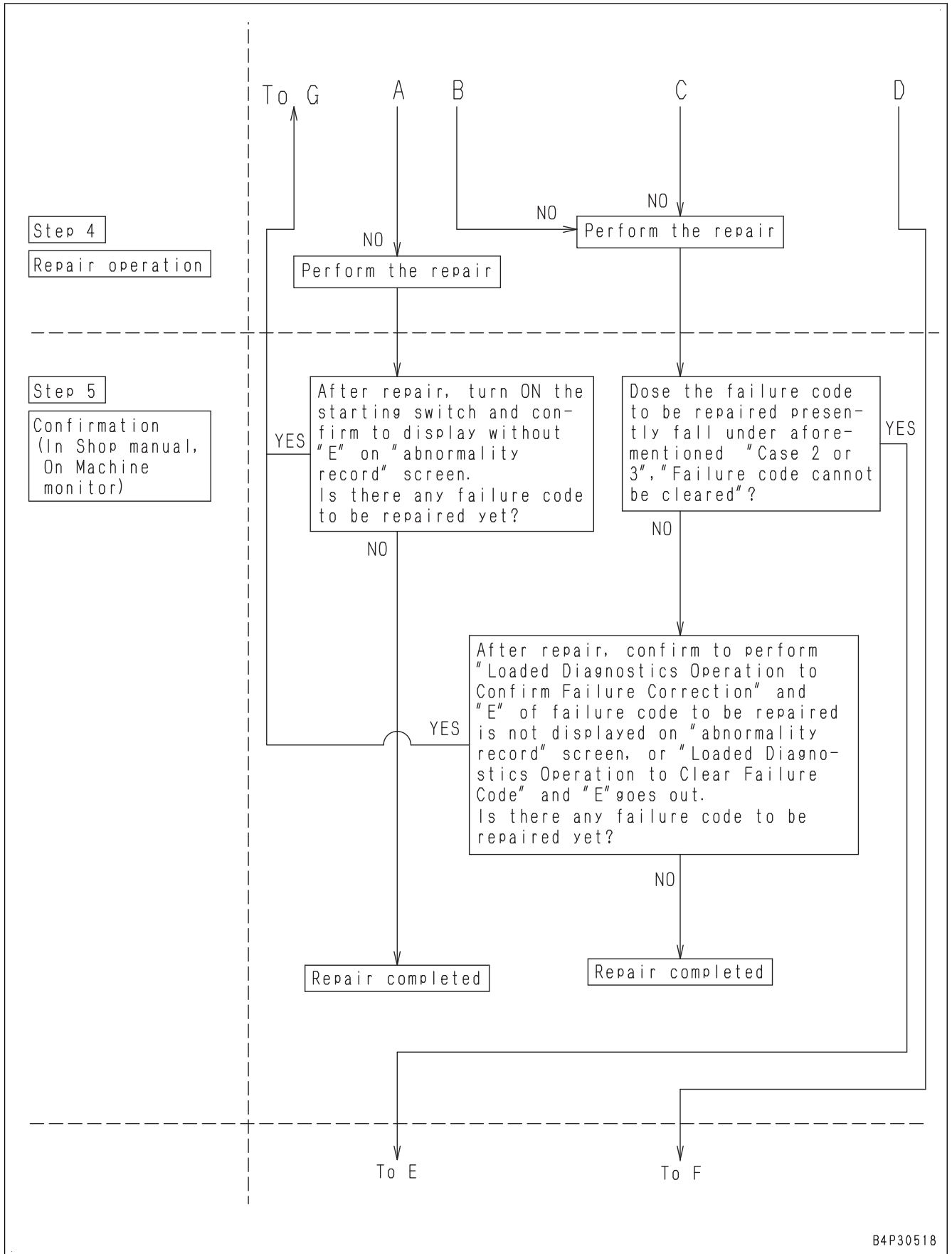
ENTER switch (13): Enters the setting

REMARK

If RETURN (12) switch is pressed, setting will not be completed.



Machine model			WA600-8				
Engine			SAA6D170E-7				
Item	Testing conditions	Unit	Standard value for new machine	Repair limit	Measured value	Good	No good
Torque converter relief pressure (inlet pressure) (*1)	<ul style="list-style-type: none"> Torque converter oil temperature 60 to 80 °C Power mode: P mode Set the directional lever or directional selector switch to a position: NEUTRAL (N) position Accelerator pedal: Depress to stroke end (High idle) 	MPa {kg/cm ² }	Min. 1.33 {Min. 13.6 }	Min. 1.33 {Min. 13.6 }			
Torque converter outlet pressure (*1)	<ul style="list-style-type: none"> Torque converter oil temperature 60 to 80 °C Power mode: P mode Set the directional lever or directional selector switch to a position: NEUTRAL (N) position Accelerator pedal: Depress to stroke end (High idle) 	MPa {kg/cm ² }	0.44 to 0.83 {4.5 to 8.5 }	0.44 to 0.83 {4.5 to 8.5 }			
Modulation clutch pressure	<ul style="list-style-type: none"> Torque converter oil temperature 60 to 80 °C Power mode: P mode With torque converter stalled 	MPa {kg/cm ² }	2.28 to 2.68 {23.3 to 27.3 }	2.28 to 2.68 {23.3 to 27.3 }			
Torque converter lock-up clutch pressure	<ul style="list-style-type: none"> Torque converter oil temperature 60 to 80 °C Torque converter lockup switch: ON Torque converter lockup pilot lamp: ON Power mode: P mode Set the directional lever or directional selector switch: FORWARD (F) position or REVERSE (R) position Gear speed switch: 2nd position Accelerator pedal: Depress to stroke end (High idle) 	MPa {kg/cm ² }	1.62 to 2.02 {16.5 to 20.6 }	1.62 to 2.02 {16.5 to 20.6 }			




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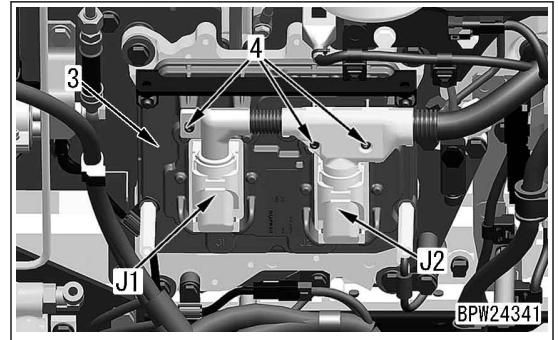
- Connect or insert T-adapters for troubleshooting to connectors ECM1 J1, and ECM1 J2 of engine controller (3).

REMARK

Use a hexagonal wrench with 5 mm width across flats for lock screw (4).

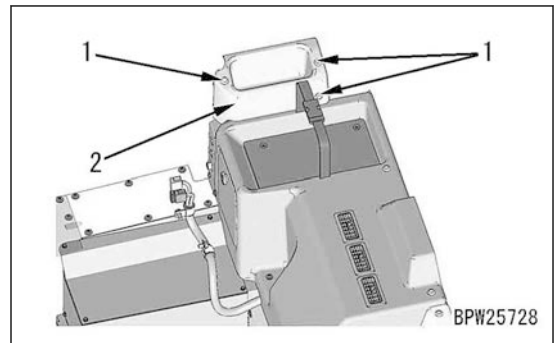
 Lock screw:
9±1 Nm {0.9±0.1 kgfm}

For details of engine intermediate connector, see “Engine intermediate connector”.

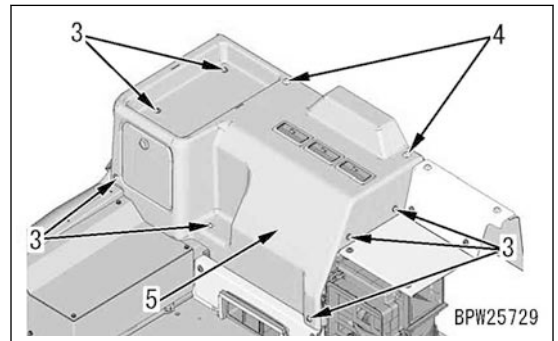


Transmission controller

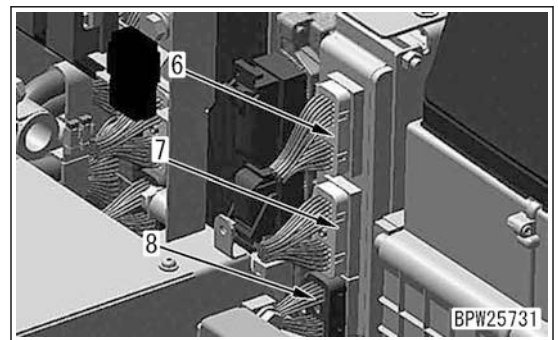
- Tilt operator's seat forward, and move R.H. console forward.
- Remove box mounting screw (1) (3 pieces), and remove the box (2).

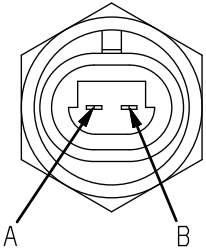
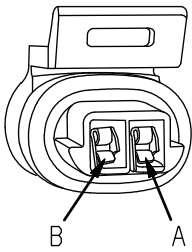
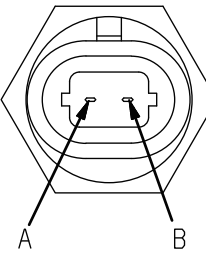
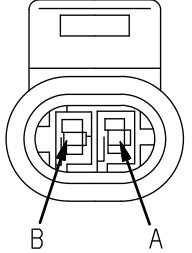


- Remove top cover mounting screw (3) (7 pieces) and (4) (2 pieces), and remove top cover (5).



- Disconnect transmission controllers TM1(6), TM(7), TM3(8), and insert or connect T-adapters for troubleshooting.



PACKARD conncetor for engine		
No. of pins	Temperature sensor of coolant, fuel and lubricating oil (95, 107, 114, 125, 140 engine)	
	Sensor side (plug)	Harness side (receptacle)
2		
	☆ Non-polarity	—
No. of pins	Boost (air intake) temperature sensor (125, 140 engine)	
	Sensor side (plug)	Harness side (receptacle)
2		
	☆ Non-polarity	—
		Testing connection use special tool Part No. 795-799-5530 (Socket) (Kit : 799-601-4101) (Kit : 799-601-4201)
		795-799-5540 (Socket) (Kit : 799-601-4101) (Kit : 799-601-4201)

B4W21630

Failure code	Failure (Displayed on screen)	Applicable component	Action level	History category	Remarks
CB2637	KDOC Face Plugging_2	ENG	L01	Electrical system	
CB2639	Manual Stationary Regeneration Request_2	ENG	L01	Electrical system	
CB2732	Fuel Doser Solenoid_2 High Error_2	ENG	L03	Electrical system	
CB2733	Fuel Doser Solenoid_2 Low Error_2	ENG	L03	Electrical system	
CB2741	Fuel Dozer Solenoid Valve Swap Error_2	ENG	L03	Electrical system	
CB2771	SCR Outlet NOx Sensor Datalink Timeout Error_2	ENG	L01	Electrical system	
CB2777	Manual Stationary Regeneration Request but KDPF Regeneration Disable_2	ENG	-	Electrical system	
CB2878	Fuel Doser Solenoid_2 Servo Error_2	ENG	L03	Electrical system	
CB2881	Dosing Fuel Pressure Low Error 1_2	ENG	L03	Electrical system	
CB2976	AdBlue/DEF Pump Temp Sensor Signal Error_2	ENG	L01	Electrical system	
CB3133	KDPF Outlet Pressure Sensor High Error_2	ENG	L03	Electrical system	
CB3134	KDPF Outlet Pressure Sensor Low Error_2	ENG	L03	Electrical system	
CB3135	KDPF Outlet Pressure Sensor In Range Error_2	ENG	L03	Electrical system	
CB3142	SCR Temperature Sensor High Error_2	ENG	L03	Electrical system	
CB3143	SCR Temperature Sensor Low Error_2	ENG	L03	Electrical system	
CB3144	SCR Temperature Sensor In Range Error_2	ENG	L03	Electrical system	
CB3146	SCR Outlet Temp Sensor Volt High Error_2	ENG	L03	Electrical system	
CB3147	SCR Outlet Temp Sensor Volt Low Error_2	ENG	L03	Electrical system	
CB3148	SCR Outlet Temp Sensor In Range Error_2	ENG	L03	Electrical system	
CB3151	SCR Catalyst Efficiency Low 2 Error_2	ENG	L01	Electrical system	
CB3165	SCR Outlet Temp High Error_2	ENG	L03	Electrical system	
CB3167	Fuel Doser Degradation_2	ENG	-	Electrical system	
CB3229	SCR Temp High Error_2	ENG	L03	Electrical system	

FAILURE CODE [2F00MA]

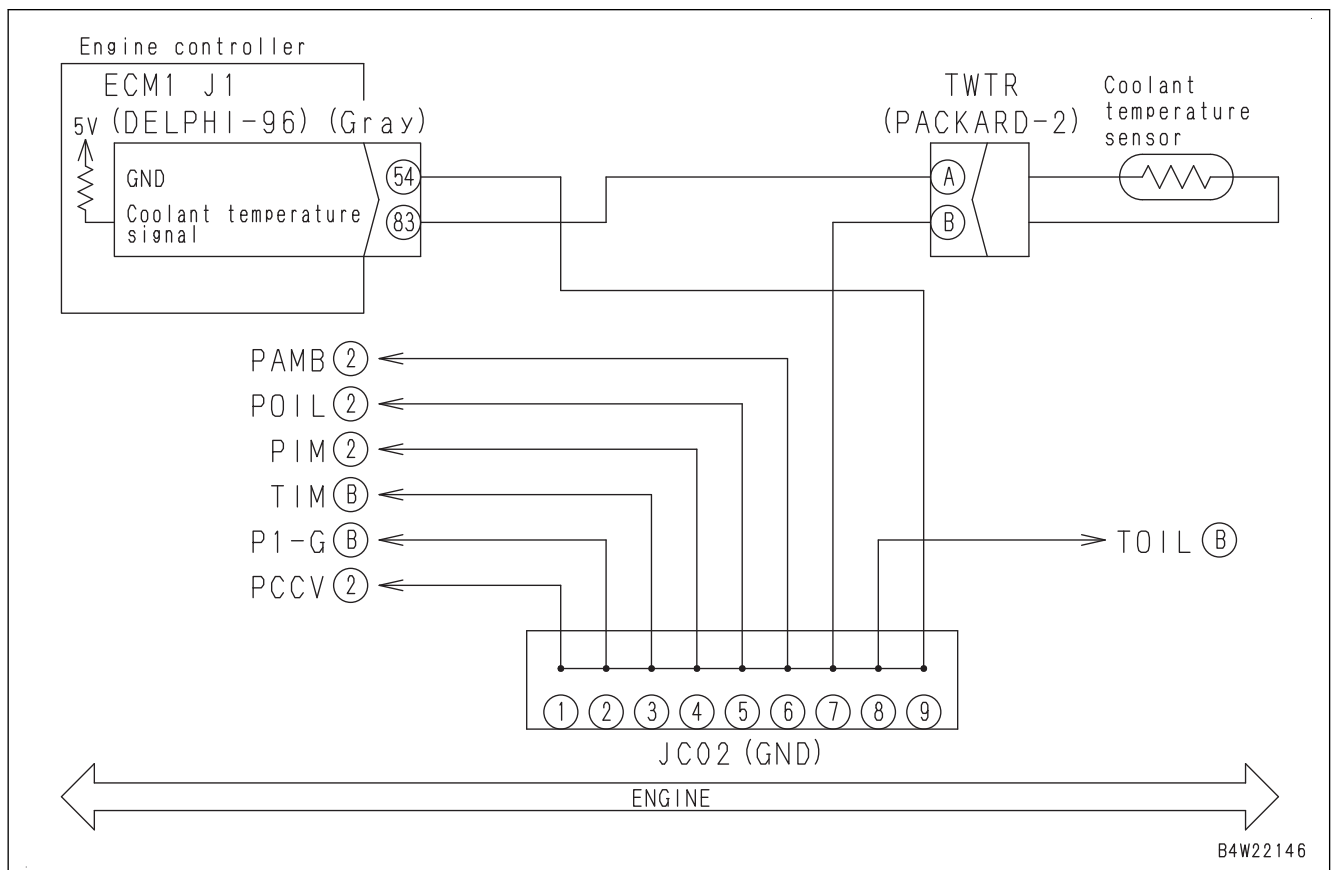
Action level	Failure code	Failure	Parking Brake Defective Function (Machine monitor system)
L03	2F00MA		
Detail of failure	Parking brake pressure switch remains off (parking brake is applied) for 20 seconds during travel. (Monitor controller cannot correctly recognize parking brake oil pressure: ON (release).)		
Action of controller	<ul style="list-style-type: none"> Makes centralized warning lamp light up and alarm buzzer sound. If cause of failure disappears, machine becomes normal by itself. 		
Phenomenon on machine	If machine is used as it is, parking brake may be damaged.		
Related information	<p>⚠ When performing troubleshooting while releasing parking brake, be sure to do the work in pairs and always chock the tires. Perform troubleshooting while one worker keeps depressing the brake pedal.</p> <ul style="list-style-type: none"> Apply 24 V to parking brake solenoid, and parking brake is released. Since T-adaptor for monitor controller connector is "socket-type box", operating voltage cannot be measured at monitor controller connector. Parking brake relay (L159) is self-holding type. <ol style="list-style-type: none"> When parking brake switch is operated, pins 5 and 6 of parking brake switch are connected. Parking brake relay operates and L159 is self-holding type. When parking brake switch is turned off, pin 3 and 4 of parking brake switch are connected. Since L159 keeps operation, power is supplied to pin 4 of parking brake switch, and TMC2 (6) pin of transmission controller. If voltage of TMC2 (6) pin is 20 V and above, transmission controller turns on TMC3 (18) pin output, and parking brake solenoid operates (parking brake is released). After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Start the engine, and actual gear speed is other than NEUTRAL. 		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Inappropriate operation of parking brake switch	<ul style="list-style-type: none"> Check that the parking brake switch is in "RELEASE" position. While driving machine, do not use parking brake. 		
2	Defective parking brake relay	<ol style="list-style-type: none"> Turn the starting switch to OFF position. Replace relay L124 with horn relay L149. Start the engine and drive the machine. 		
		Judge by replacing parking brake relay (L124)	Machine becomes normal.	Original relay L124 is defective.
			Machine does not become normal.	Original relay L124 is normal.

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective engine controller	If this failure code is displayed on the machine monitor for several hours after manual stationary regeneration has been performed, engine controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)

No.	Cause	Procedure, measuring location, criteria and remarks		
3	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors ECM1 J1 and TWTR, and connect T-adapter to female side of ECM1 J1.		
		Continuity	Between ECM1 J1 (female) (83) and each pin other than pin (83)	No continuity
4	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

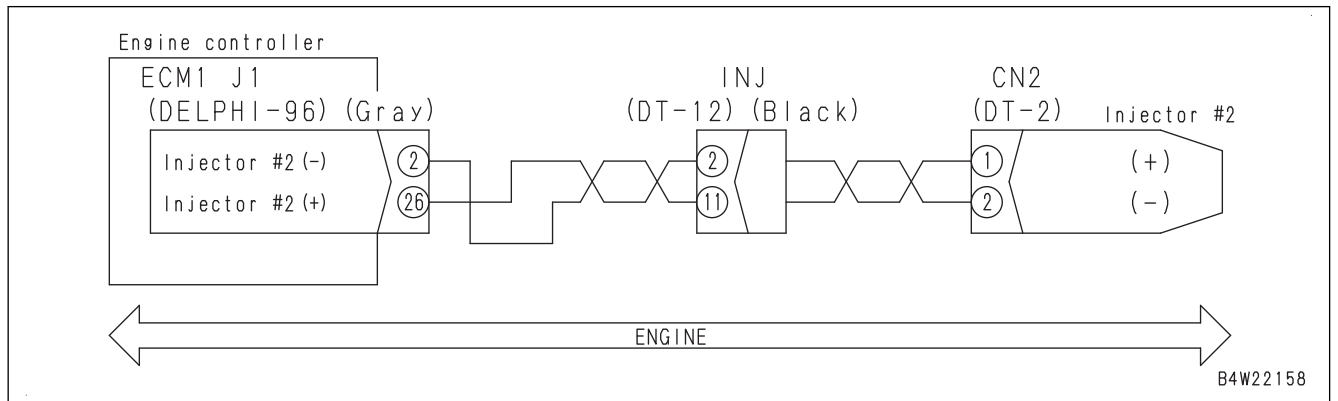
Electrical circuit diagram related to coolant temperature sensor



B4W22146

No.	Cause	Procedure, measuring location, criteria and remarks		
5	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector ECM1 J1, and connect T-adapter to female side.		
		Continuity	Between ECM1 J1 (female) (26) and each pin other than pin (26)	No continuity
			Between ECM1 J1 (female) (2) and each pin other than pin (2)	No continuity
6	Defective other cylinder injectors or wiring harness	If the failure code for abnormalities of the more than one injector is displayed, perform the troubleshooting for this failure code as well.		
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 related to injector #2



B. Check with machine monitor (02 Failure record, 01 Monitoring, 09 Cylinder Cutout mode operation)							Go od	No go od
3	Check of failure code							
4	Check of monitoring information							
	Code	Item to be displayed	Testing conditions	ISO unit	Standard value (reference value)	Measured value	Go od	No go od
	01002	Engine speed	Low idle	r/min	800(±50)			
			High idle	r/min	2000(±50)			
			Torque converter stall (E mode)	r/min	1730(±100)			
			Torque converter stall (P mode)	r/min	1800(±100)			
	31701	Throttle Position	Low idle	%	0			
			High idle	%	100			
	18600	Inject Fueling Command	Torque converter stall	mg/st	-		-	-
	36200	Rail Pressure Command	Torque converter stall	MPa	-			
	36400	Common rail pressure	Torque converter stall	MPa	-			
36500	Charge Pressure	Torque converter stall	kPa	-		-	-	
04107	Engine coolant temperature	Low idle	°C	-		-	-	
5	Check of Cylinder Cutout Mode Operation (engine speed)							
	Function	Cutout cylinder	Testing conditions	ISO unit	Standard value (reference value)	Measured value	Go od	No go od
	Set cutout to each cylinder	No. 1 cylinder	Low idle	r/min	-		-	-
		No. 2 cylinder	Low idle	r/min	-		-	-
		No. 3 cylinder	Low idle	r/min	-		-	-
		No. 4 cylinder	Low idle	r/min	-		-	-
		No. 5 cylinder	Low idle	r/min	-		-	-
No. 6 cylinder		Low idle	r/min	-		-	-	
C. Check of fuel circuit pressure			Testing conditions	Unit	Standard value (reference value)	Measured value	Go od	No go od
6	Leakage from pressure limiter	High idle or under load equivalent to rated operation (at stall)	MPa {kg/cm ² }	0.15 to 0.3 {1.5 to 3.0}				

FAILURE CODE [CA1691]

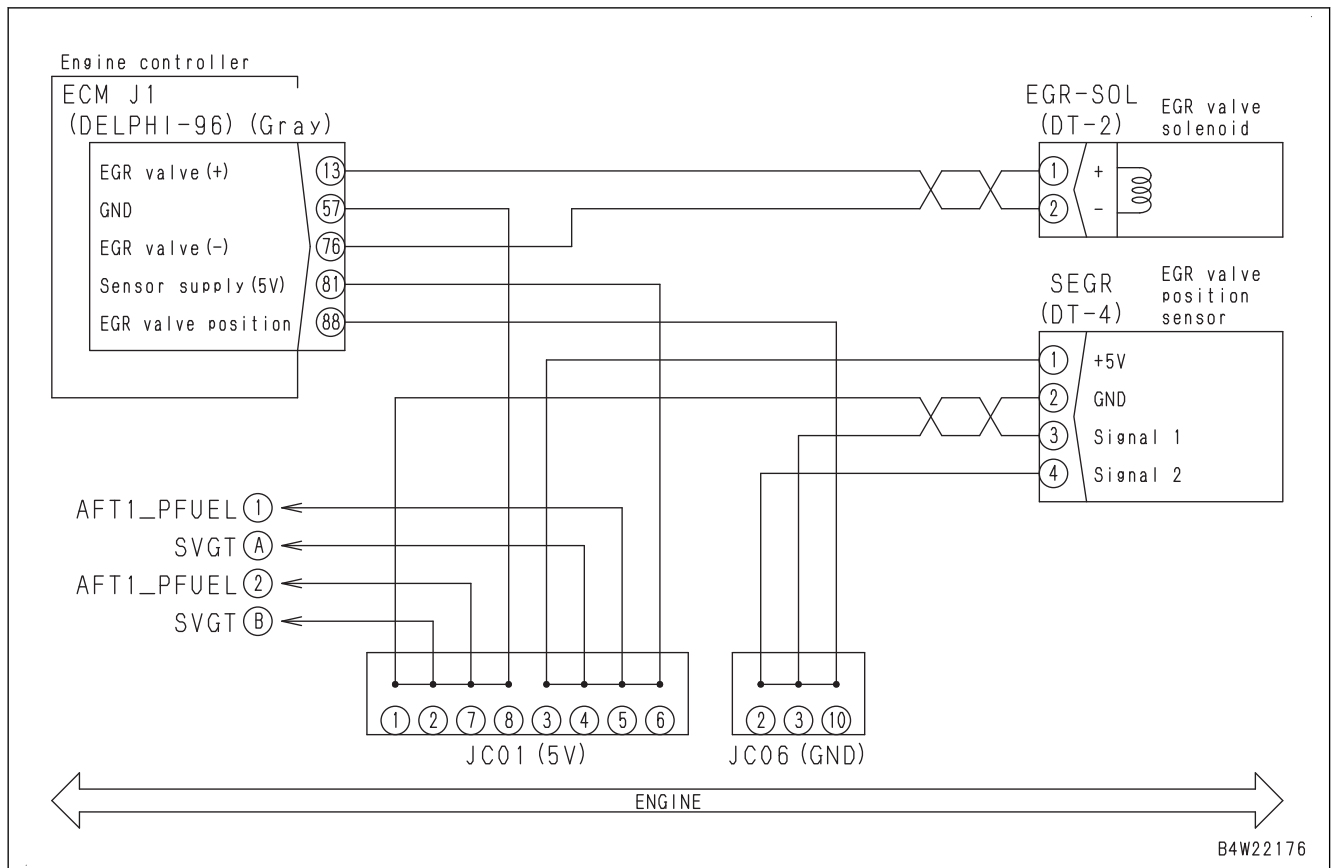
Action level	Failure code	Failure	Defective Regeneration (Engine controller system)
L03	CA1691		
Detail of failure	KDOC efficiency (catalysis) is lowered. (Because KDOC outlet temperature does not rise compared with KDOC inlet temperature: 250 to 400 °C as normal, KDOC outlet temperature: 450 to 600 °C as normal during regeneration, soot in KCSF does not burn normally.)		
Action of controller	<ul style="list-style-type: none"> EGR valve closed. Engine power deration. Fuel dosing stops. 		
Phenomenon on machine	Engine output lowers.		
Related information	<p>⚠ KDPF and KDOC are heated to 500 °C or above. Be careful not to get burn injury.</p> <ul style="list-style-type: none"> Temperature detected by KDOC inlet temperature sensor can be checked with monitoring. (Code: 47300) Temperature detected by KDOC outlet temperature sensor can be checked with monitoring. (Code: 47400) Temperature detected by KDPF outlet temperature sensor can be checked with monitoring. (Code: 47200) All of KDOC inlet temperature, KDOC outlet temperature, and KDPF outlet temperature during idle (non-regeneration) are 100 to 250 °C. Each temperature difference is approximately 10 °C (KDOC inlet temperature > KDOC outlet temperature > KDPF outlet temperature). During manual stationary regeneration (normal), KDOC inlet temperature is 250 to 400 °C, and both KDOC outlet temperature and KDPF outlet temperature are 450 to 600 °C. During manual stationary regeneration without dosing fuel injection (dry KDOC), all of KDOC inlet temperature, KDOC outlet temperature, and KDPF outlet temperature are 250 to 400 °C. The KDOC inlet temperature sensor, KDOC outlet temperature sensor, and KDPF outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. Test exhaust gas color. For details, see TESTING AND ADJUSTING, "TEST EXHAUST GAS COLOR". Failure code [CA2637] may also be displayed simultaneously, perform troubleshooting for this failure code first. When soot accumulation level is 3 and below, manual stationary regeneration can be performed only from active regeneration for service. Repair completion check method: When KDOC is not replaced, start the engine and perform the manual stationary regeneration. <p>NOTICE</p> <ul style="list-style-type: none"> When KDOC is replaced, repair completion check is not required. If KDOC or KDPF is replaced, perform the reset after KDOC change, then repair is completed. 		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective KDOC outlet temperature sensor	When KDPF cooled down sufficiently or there are significant differences between KDOC outlet temperature and KDOC inlet temperature or KDPF outlet temperature at idle (non-regeneration), replace KDPF temperature sensor.

<p style="text-align: center;">Related information</p>	<p>⚠ KDOC and KDPF are heated to 500 °C and above. Be careful not to get burn injury.</p> <ul style="list-style-type: none"> • If failure code [CA3313] or [CA3314] or [CA3315] is displayed, KDOC inlet temperature sensor may be defective. Perform troubleshooting for [CA3313] or [CA3314] or [CA3315] first. • If failure code [CA3316] or [CA3317] or [CA3318] is displayed, KDOC outlet temperature sensor may be defective. Perform troubleshooting for [CA3316] or [CA3317] or [CA3318] first. • If failure code [CA3319] or [CA3321] or [CA3322] is displayed, KDOC inlet temperature sensor may be defective. Perform troubleshooting for [CA3319] or [CA3321] or [CA3322] first. • Temperature detected by KDOC inlet temperature sensor can be checked with monitoring. (Code: 47300) • Temperature detected by KDOC outlet temperature sensor can be checked with monitoring. (Code: 47400) • Temperature detected by KDPF outlet temperature sensor can be checked with monitoring. (Code: 47200) • Signal voltage from KDPF differential pressure sensor can be checked with monitoring. (Code: 47101) • Differential pressure detected by KDPF differential pressure sensor can be checked with monitoring. (Code: 47100) • All of KDOC inlet temperature, KDOC outlet temperature, and KDPF outlet temperature during idle (non-regeneration) are approximately 100 to 250 °C. Each temperature difference is approximately 10 °C (KDOC inlet temperature > KDOC outlet temperature > KDPF outlet temperature). • During manual stationary regeneration, KDOC inlet temperature is approximately 250 to 400 °C, and both KDOC outlet temperature and KDPF outlet temperature are approximately 450 to 600 °C. • The KDOC inlet temperature sensor, KDOC outlet temperature sensor, and KDPF outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • Test exhaust gas color. For details, see TESTING AND ADJUSTING, "TEST EXHAUST GAS COLOR". • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared. (This deration is not canceled by failure code being cleared only.) • Soot accumulation amount of KDPF is classified in 8 levels. Current level of accumulated soot can be checked on Active Regeneration for Service screen of machine monitor. • Manual stationary regeneration can be performed up to soot accumulation level 7, and soot can be removed. • If the soot accumulation level is 8, failure code [CA1922] is displayed. KDPF is completely clogged with soot, and you need to check, clean or replace it. <p>Time required for manual stationary regeneration varies depending on soot accumulation amount in KCSF. Rough guide is described below.</p> <ul style="list-style-type: none"> • Soot accumulation level 4: Approximately 40 minutes to 1 hour • Soot accumulation level 5: Approximately 1 hour to 2 hours • Soot accumulation level 6 or 7: Approximately 2 to 3 hours • Soot accumulation level 8: Manual stationary regeneration cannot be performed.
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No.	Cause	Procedure, measuring location, criteria and remarks
4	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors ECM1 J1 and EGR_SOL, and connect T-adapter to either female side.
		Resistance Between ground and ECM1 J1 (female) (13) or EGR_SOL (female) (1) Min. 1 MΩ
		Between ground and ECM1 J1 (female) (76) or EGR_SOL (female) (2) Min. 1 MΩ
5	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors ECM1 J1 and EGR_SOL, and connect T-adapter to either female side.
		Resistance Between ECM1 J1 (female) (13) and (76) or between EGR_SOL (female) (1) and (2). Min. 1 MΩ
6	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

CIRCUIT DIAGRAM (EGR VALVE SOLENOID)



No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective dosing fuel solenoid valve 2	<ol style="list-style-type: none"> Turn the starting switch to OFF position. Disconnect connectors AFT1_SOV1 and AFT1_SOV2. Replace fuel doser solenoid valve 1 and fuel doser solenoid valve 2. <p>REMARK Do not replace connectors AFT1_SOV1 and AFT1_SOV2.</p> <ol style="list-style-type: none"> Turn the starting switch to ON position.
		If this failure code changes to failure code [CA1963], original fuel doser solenoid valve 2 is defective.
2	Clogged fuel return tube	Remove the fuel return tube, and check it for clogging.
3	Defective fuel system	Perform TESTING AND ADJUSTING, "METHOD FOR TESTING FUEL PRESSURE".
4	Defective fuel shut-off manifold	Remove the fuel tube, and check if the fuel connector of the fuel shut-off manifold is not clogged.
5	Defective dosing fuel pressure sensor	<ol style="list-style-type: none"> Turn the starting switch to OFF position. Disconnect fuel supply line (2A) from fuel doser (1A). Turn the starting switch to ON position. Display the dosing fuel pressure and ambient pressure simultaneously by referring to the related information.
		If the dosing fuel pressure and ambient pressure are clearly different, the dosing fuel pressure sensor is 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.)

Diagram related to fuel doser

1A. Fuel doser-A

1B. Fuel doser-B

2A. Fuel supply line-A

2B. Fuel supply line-B

3A. Dosing fuel solenoid valve 1-A (shut-off valve)

3B. Dosing fuel solenoid valve 1-B (shut-off valve)

4A. Dosing fuel solenoid valve 2-A (drain valve)

4B. Dosing fuel solenoid valve 2-B (drain valve)

5A. Dosing fuel pressure sensor-A

5B. Dosing fuel pressure sensor-B

a: From refueling pump-A

b: From refueling pump-B

c: Fuel return

d: To fuel supply pump

e: From cooling plate of the engine controller

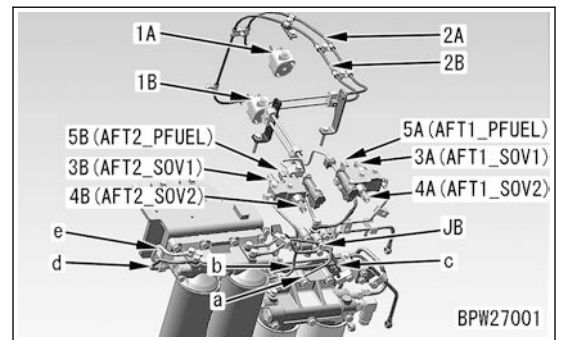
JB: Fuel tube joint bolt

AFT1_PFUUEL: Dosing fuel pressure sensor -A connector

AFT1_SOV1: Dosing fuel solenoid valve 1-A (shut-off valve) connector

AFT1_SOV2: Dosing fuel solenoid valve 2-A (drain valve) connector

AFT2_PFUUEL: Dosing fuel pressure sensor -B connector



No.	Cause	Procedure, measuring location, criteria and remarks
2	Incorrect AdBlue/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 "AdBlue/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 AdBlue/DEF in the tank. 5. Replace the AdBlue/DEF injector. 6. Perform "Loaded Diagnostics Operation To Confirm Failure Correction".
3	Defective SCR temperature sensor	<ol style="list-style-type: none"> 1. If this failure code appears again after the above checks, replace SCR temperature sensor. 2. Implement operation for judging the repair result. <p>If the failure code is not displayed, original SCR outlet temperature sensor is defective.</p>
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 Confirm Failure Correction

Perform the procedure below to check that the repair is completed.

(Check that failure code [CA3582] or this failure code is cleared surely after this procedure.)

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.

FAILURE CODE [CA3314]

Action level	Failure code	Failure	KDOC Inlet Temperature Sensor High Error (Engine controller system)
L03	CA3314		
Detail of failure	Open circuit, hot short-circuit, or sensor circuit error in KDOC inlet temperature sensor measuring section or probe (+) side		
Action of controller	<ul style="list-style-type: none"> • Uses KDOC outlet temperature for KDOC inlet temperature to run engine. (If failure is detected in KDOC outlet temperature sensor, too, controller takes it that KDOC inlet temperature is at default value (250 °C) and allows engine to run.) • Derates engine power for operation. • Closes EGR valve. • Stops regeneration control. • Stops fuel dosing. 		
Phenomenon on machine	<ul style="list-style-type: none"> • Control of active regeneration is defective. • Soot accumulation is high. • Engine output lowers. 		
Related information	<p>⚠ KDPF and KDOC are heated to 500 °C and above. Be careful not to get burn injury.</p> <ul style="list-style-type: none"> • Connectors of electrical parts around engine may be defective due to heat and vibration. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. • The KDOC inlet temperature sensor, KDOC outlet temperature sensor, and KDPF outlet temperature sensor are integrated into one KDPF temperature sensor controller which provides CAN communication with the engine controller. • If ground fault or hot short circuit or sensor circuit error in KDOC inlet temperature sensor measuring section or probe (+) side occurs, the information is sent to the engine controller through CAN communication, and this failure code is displayed. • As to procedure for accessing KDOC inlet temperature sensor, KDOC outlet temperature sensor, and KDPF outlet temperature sensor, see DISASSEMBLY AND ASSEMBLY, “REMOVE AND INSTALL KDPF ASSEMBLY” and “DISASSEMBLE AND ASSEMBLE OF KDPF ASSEMBLY”. • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position. • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared. (This deration is not canceled by simply failure code being cleared.) 		
No.	Cause	Procedure, measuring location, criteria and remarks	
1	Defective KDOC inlet temperature sensor	When KDPF cooled down sufficiently or there are significant differences between KDOC inlet temperature and KDOC outlet temperature or KDPF outlet temperature at idle (non-regeneration), change the sensor.	
2	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)	

No.	Cause	Procedure, measuring location, criteria and remarks		
2	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector ECM1 J2, and connect T-adapter to female side. REMARK The resistance value is the same as the AdBlue/DEF injector value.		
		Resistance	Between ECM1 J2 (female) (77) and (53)	20 °C
3	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors ECM1 J2 and UDM, and connect T-adapter to female side of ECM1 J2.		
		Resistance	Between ground and ECM1 J2 (female) (77)	Min. 1 MΩ
			Between ground and ECM1 J2 (female) (53)	Min. 1 MΩ
4	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector UDM. 3. Insert T-adapter into connector ECM1 J2. 4. Turn the starting switch to ON position (with the injector disconnected).		
		Voltage	Between ground and ECM1 J2 (female) (53)	Max. 3 V
5	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors ECM1 J2 and UDM, and connect T-adapter to female side of ECM1 J2.		
		Continuity	Between ECM1 J2 (female) (77) and each pin other than (77)	No continuity
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 Clear Failure Code

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 starting switch to ON position.
3. Start engine.
4. Check if 19108“AdBlue/DEF pump pressure” is 900±100 kPa after running the engine at low idle speed (with no load) for 2 minutes.
5. Turn the starting switch to OFF position, and shut down the engine controller.
6. Turn starting switch to ON position.

REMARK

If this failure code is cleared at this point, repair is completed, but if not, return to troubleshooting.

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Open circuit in wiring harness (power supply circuit)	1. Turn the starting switch to OFF position. 2. Check that system operating lamp is turned off, and then turn the battery disconnect switch to OFF position. 3. Disconnect connectors SSR and NOX2 and connect T-adapter to each female side.		
		Resistance	Between SSR (female) (12) and NOX2 (female) (1)	Max. 1 Ω
			Between NOX2 (female) (4) and ground	Max. 1 Ω
2	Defective battery	Check battery voltage and specific gravity of battery electrolyte.		
		Battery Voltage (1 battery)	Min. 12 V	
		Battery Voltage (2 batteries in series)	Min. 24 V	
		Specific gravity of battery electrolyte	Min. 1.26	
3	Defective alternator	1. Turn the starting switch to OFF position. 2. Start the engine.		
		Voltage	Between ground and alternator terminal E02	Engine speed in medium or above
4	Defective sensor power supply relay	1. Turn the starting switch to OFF position. 2. Check that system operating lamp is not lit, and then turn battery disconnect switch to OFF position. 3. Disconnect connector SSR, and replace the sensor power supply relay. 4. Turn the battery disconnect switch to ON position. 5. Turn the starting switch to ON position.		
		If this failure code is cleared, the original sensor power supply relay is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		
5	Defective turbocharger outlet NOx sensor	1. Turn the starting switch to OFF position. 2. Replace turbocharger outlet NOx sensor since NOx sensor is irreparable. 3. Turn the starting switch to ON position. 4. Implement operation for judging the repair result.		
		REMARK		
		Offset/drift may occur due to sulfur-poisoned turbocharger outlet NOx sensor. If this failure code is cleared, the original turbocharger outlet NOx sensor is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		
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

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

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

Clear this failure code by “Engine Controller” of “Engine Con Inducement Fault Clear” before step 1. (EU Specification)

1. Turn the starting switch to OFF position, and shut down the engine controller.
2. Turn the starting switch to ON position, and start the engine.
3. Run the engine at high idle speed safely to raise the exhaust temperature. (Keep the engine speed so that both monitoring code 47300 “KDOC 1 Inlet Temperature” becomes 150 °C or higher. Check that monitoring code 19203 “Turbo Outlet NOx Sensor State” changes from 0 to 1).

No.	Cause	Procedure, measuring location, criteria and remarks		
2	Defective sensor power supply relay	<ol style="list-style-type: none"> 1. Turn the starting switch to OFF position. 2. Check that system operating lamp is not lit, and then turn battery disconnect switch to OFF position. 3. Disconnect connector SSR, and replace the sensor power supply relay. 4. Turn the battery disconnect switch to ON position. 5. Turn the starting switch to ON position. 		
		If this failure code is cleared, the original sensor power supply relay is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		
3	Open circuit in wiring harness (ammonia sensor circuit)	<ol style="list-style-type: none"> 1. Turn the starting switch to OFF position. 2. Check that system operating lamp is turned off, and then turn the battery disconnect switch to OFF position. 3. Disconnect connectors SSR and NH3, and connect T-adapter to each female side. 		
		Resistance	Between SSR (female) (7) and NH3 (female) (1)	Max. 1 Ω
			Between ground and NH3 (female) (4)	Max. 1 Ω
4	Defective ammonia sensor controller	<ol style="list-style-type: none"> 1. Turn the starting switch to OFF position. 2. Replace the ammonia sensor controller 3. Implement operation for judging the repair result. 		
		If the failure code is no longer displayed, the original ammonia sensor controller may be defective.		
5	Defective engine wiring harness	<ol style="list-style-type: none"> 1. Turn the starting switch to OFF position. 2. Check that system operating lamp is not lit, and then turn battery disconnect switch to OFF position 3. Replace the engine wiring harness. 4. Implement operation for judging the repair result. 		
		If the failure code is no longer displayed, the original engine wiring harness is 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

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

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

Clear this failure code by “Engine Controller” of “Engine Con Inducement Fault Clear” before step 1. (EU Specification)

1. Turn the starting switch to OFF position, and shut down the engine controller.
2. Turn the starting switch to ON position, and start the engine.
3. Run the engine at high idle speed to raise the exhaust temperature. (Keep the engine speed so that monitoring code 19300 “SCR temperature” is 150 °C or higher.)
4. Check if this failure code is not displayed after 1 minute.

REMARK

- If this failure code is not displayed, repair is completed.
- In case it is displayed, return to troubleshooting.

No.	Cause	Procedure, measuring location, criteria and remarks			
8	Defective AdBlue/DEF heater relay	<ol style="list-style-type: none"> 1. Turn the starting switch to OFF position. 2. Check that system operating lamp is not lit, and then turn battery disconnect switch to OFF position 3. Disconnect connectors UHR1 and UHR2 and replace AdBlue/DEF heater relay. 4. Turn the battery disconnect switch to ON position. 5. Start the engine in low temperature (engine room temperature of 12 °C or below) or perform "AdBlue/DEF Line Heater Relay 2 Test". For details, see "SET AND OPERATE MACHINE MONITOR", "SERVICE MODE", "METHOD FOR OPERATING TESTING MENU (SCR SERVICE TEST)". <p>If this failure code is no longer displayed, AdBlue/DEF heater relay is defective.</p>			
9	Hot short circuit in wiring harness (AdBlue/DEF pump heater circuit)	<ol style="list-style-type: none"> 1. Turn the starting switch to OFF position. 2. Disconnect connector DSM and connect T-adapter to female side. 3. Turn the starting switch to ON position. <p>REMARK Check for ambient temperature of 10 °C or above (condition under which AdBlue/DEF pump heater is not working).</p> <table border="1"> <tr> <td>Voltage</td> <td>Between DSM (female) (5) and (6)</td> <td>Max. 1 V</td> </tr> </table>	Voltage	Between DSM (female) (5) and (6)	Max. 1 V
Voltage	Between DSM (female) (5) and (6)	Max. 1 V			
10	Defective AdBlue/DEF pump	If no failure is found by above checks, AdBlue/DEF pump is defective. (Since this is an internal defect, troubleshooting cannot be performed.)			
11	Defective AdBlue/DEF pump temperature sensor	If no failure is found by above checks, AdBlue/DEF pump temperature sensor is defective. (Since this is an internal defect, troubleshooting cannot be performed.)			
12	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

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

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

1. Turn the starting switch to ON position (Do not start the engine).
2. Check if monitoring code 19136 "AdBlue/DEF Pump Temperature" is 42 °C or less and 19107 "AdBlue/DEF Pump Heater 1 Command" is "0" on the "Pre-defined Monitoring" screen.
3. Wait for 10 minutes.
4. If the AdBlue/DEF Pump Temperature rises 12 °C or less after the starting switch is turned to ON, repair will be completed.
5. After the repair is completed, see "PROCEDURES OF TROUBLESHOOTING" to clear the failure code and make sure that the failure code has been cleared from the Abnormality Record screen.

REMARK

If the increase of "AdBlue/DEF Pump Temperature" is 12 °C or more after the starting switch is turned to ON, return to troubleshooting.

FAILURE CODE [CA4658]

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

FAILURE CODE [CB343]

Action level	Failure code	Failure	Engine Controller Internal Abnormality_2 (Engine controller system)
L04	CB343		
Detail of failure	Internal defect is detected in engine controller.		
Action of controller	None in particular		
Phenomenon on machine	Engine continues operation normally, however, engine may stop while running or not able to start while it is stopped.		
Related information	<ul style="list-style-type: none"> Connectors of electrical parts around engine may be defective due to heat and vibration. See descriptions of wiring harness and connectors in "Electrical equipment" in "CHECKS BEFORE TROUBLESHOOTING" of "RELATED INFORMATION ON TROUBLESHOOTING", and check it. Power supply voltage of engine controller can be checked with monitoring. (Code: 03205) After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position. 		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective battery	Check battery voltage and specific gravity of battery electrolyte.		
		Battery Voltage (1 battery)	Min. 12 V	
		Battery Voltage (2 batteries in series)	Min. 24 V	
		Specific gravity of battery electrolyte	Min. 1.26	
2	Defective alternator	1. Turn the starting switch to OFF position. 2. Start the engine.		
		Voltage	Between ground and E09_R terminal	Engine speed in medium or above
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 [CB1879]

Action level	Failure code	Failure	KDPF Differential Pressure Sensor High Error_2 (Engine controller system)
L03	CB1879		
Detail of failure	High voltage error is detected in signal circuit of KDPF differential pressure sensor.		
Action of controller	<ul style="list-style-type: none"> • Sets KDPF differential pressure sensor value to a estimated value and continues operation (may operate at 0 kPa if other failure codes are displayed at the same time). • Closes EGR valve. • Derates engine power. • Regeneration control stops. 		
Phenomenon on machine	Engine output lowers.		
Related information	<p>⚠ KDPF is heated to 500 °C and above. Be careful not to get burn injury.</p> <ul style="list-style-type: none"> • If failure code [CB1695] or [CB1696] is also displayed, sensor power supply system may be defective. Perform troubleshooting for it first. • Connectors of electrical parts around engine may be defective due to heat and vibration. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. • KDPF differential pressure sensor and KDPF outlet pressure sensor are provided as a unit. • If failure code [CB1695] is not displayed but failure code [CB3133] is on screen, ground line probably has open circuit (defective contact of connector). • Signal voltage from KDPF differential pressure sensor can be checked with monitoring. (Code: 47103) • Differential pressure detected by KDPF differential pressure sensor can be checked with monitoring. (Code: 47102) • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared. (This deration is not canceled by failure code being cleared only.) • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position. 		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective KDPF differential pressure sensor	1. Turn the starting switch to OFF position. 2. Disconnect connector PDPF_2. 3. Turn the starting switch to ON position.		
		If this failure code is changed from [CB1879] to [CB1881], KDPF differential pressure sensor is defective.		
2	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors ECM2 J2 and PDPF_2, and connect T-adaptor to each female side.		
		Resistance	Between ECM2 J2 (female) (32) and PDPF_2 (female) (1)	Max. 1 Ω

FAILURE CODE [CB2639]

Action level	Failure code	Failure	Manual Stationary Regeneration Request_2 (Engine controller system)
L01	CB2639		
Details of failure	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. Soot accumulation reaches level 4 or 5.		
Action of controller	Normal control		
Phenomenon on machine	None in particular		
Related information	<p>NOTICE</p> <ul style="list-style-type: none"> • If this failure code [CB2639] is displayed, perform manual stationary regeneration. • This failure code is displayed during Manual Stationary Regeneration, but it is normal. • If this failure code is still displayed after several hours have passed after the manual stationary regeneration, perform the following troubleshooting procedures. <p>⚠ Since KDOC and KDPF are heated to 500 °C or above, be careful not to get burn injury.</p> <ul style="list-style-type: none"> • If KDOC inlet temperature is below approximately 250 °C, fuel dosing is disabled, so actually regeneration does not start when engine controller started manual stationary regeneration. • Temperature detected by KDOC inlet temperature sensor can be checked with monitoring function. (Code: 47302)) • VGT solenoid current can be checked with monitoring function. (Code: 48800) • Temperature detected by KDOC outlet temperature sensor can be checked with monitoring function. (Code: 47402) • Temperature detected by KDPF outlet temperature sensor can be checked with monitoring function. (Code: 47202) • KDOC inlet temperature, KDOC outlet temperature, and KDPF outlet temperature when at low idle speed (KDPF regeneration is not executed) are approximately 100 to 250 °C, and difference between these temperatures is approximately 10 °C. (KDOC inlet temperature > KDOC outlet temperature > KDPF outlet temperature) • When manual stationary regeneration is in progress, KDOC inlet temperature is approximately 250 to 400 °C, and KDOC outlet temperature and KDPF outlet temperature are approximately 450 to 600 °C. • The KDOC inlet temperature sensor, the KDOC outlet temperature sensor, and the KDPF outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • For check of the exhaust gas color, see "30 TESTING AND ADJUSTING", "TEST EXHAUST GAS COLOR". 		

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No.	Cause	Procedure, measuring location, criteria and remarks
2	Improper AdBlue/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 "AdBlue/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 AdBlue/DEF in the tank. 5. Replace the AdBlue/DEF injector. 6. Perform "Loaded Diagnostics Operation To Confirm Failure Correction".
3	Defective SCR outlet temperature sensor	<ol style="list-style-type: none"> 1. Turn the starting switch to OFF position. 2. Replace SCR temperature sensor. 3. Turn the starting switch to ON position. 4. Perform "Loaded Diagnostics Operation To Confirm Failure Correction". <p>If this failure code is cleared, the original SCR outlet temperature sensor is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</p>
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 Confirm Failure Correction

Perform the procedure below to check that the repair is completed.

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

REMARK

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

▲ Place the machine on a level ground, set the parking brake switch to "ON" position, and chock the tires.

1. Turn the starting switch to ON position.
2. Clear this failure code by "Engine Controller_2" of "Engine Con Inducement Fault Clear" before step 1. (EU Specification)
3. Turn the starting switch to OFF position, and shut down the engine controller.
4. Turn the starting switch to ON position, and start the engine.
5. Run the engine at low idle speed for approximately 1 minute.
6. Set "Power Mode" to "P".
7. Run the engine at high idle with accelerator pedal at 100 % for 15 minutes.
8. Make sure that this failure code is cleared.

REMARK

- If this failure code is cleared, repair is completed.
- If this failure code is displayed, return to troubleshooting.

FAILURE CODE [CB3256]

Action level	Failure code	Failure	KDPF Outlet Temperature High Error 1_2 (Engine controller system)
L01	CB3256		
Detail of failure	KDPF outlet temperature remains at high level.		
Action of controller	None in particular		
Phenomenon on machine	None in particular		

FAILURE CODE [CB3568]

Action level	Failure code	Failure	AdBlue/DEF Injector Malfunction_2 (Engine controller system)
L01	CB3568		
Detail of failure	The AdBlue/DEF injector or AdBlue/DEF pressure hose is clogged or the AdBlue/DEF injector nozzle is sticking open.		
Action of controller	<ul style="list-style-type: none"> • Activates Inducement strategy. • Stops AdBlue/DEF pump when AdBlue/DEF injector is stick open. 		
Phenomenon on machine	<ul style="list-style-type: none"> • NOx emission increases because AdBlue/DEF injection is disabled. • Engine output is reduced based on Inducement strategy. 		

No.	Cause	Procedure, measuring location, criteria and remarks
3	Defective turbocharger outlet NOx sensor	<ol style="list-style-type: none"> 1. Turn the starting switch to OFF position. 2. Replace turbocharger outlet NOx sensor since NOx sensor is irreparable. 3. Turn the starting switch to ON position. 4. Implement operation for "Loaded Diagnostics Operation To Clear Failure Code". <p>REMARK Offset/drift may occur due to sulfur-poisoned turbocharger outlet NOx sensor.</p> <p>If this failure code is cleared, the original turbocharger outlet NOx sensor is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</p>
4	Defective SCR outlet NOx sensor	<p>If no failure is found by preceding checks, the SCR outlet NOx sensor is defective. (Offset/drift due to sulfur-poisoned SCR outlet NOx sensor)</p> <ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Replace the SCR outlet NOx sensor. 3. Turn starting switch to ON position. 4. Perform "Loaded Diagnostics Operation To Clear Failure Code".
5	Abnormal intake system	<ol style="list-style-type: none"> 1. Check for a defective air intake pipe and repair or replace any damaged or defective rectifier, if any. 2. Replace mass air flow (MAF) sensor. 3. Perform "Operation for clearing the failure code" to check if this failure code is redisplayed. <p>REMARK Offset/drift due to the deteriorated and aged MAF sensor, distorted intake system, damaged rectifier</p>
6	Defective engine controller	<p>If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</p>

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.)

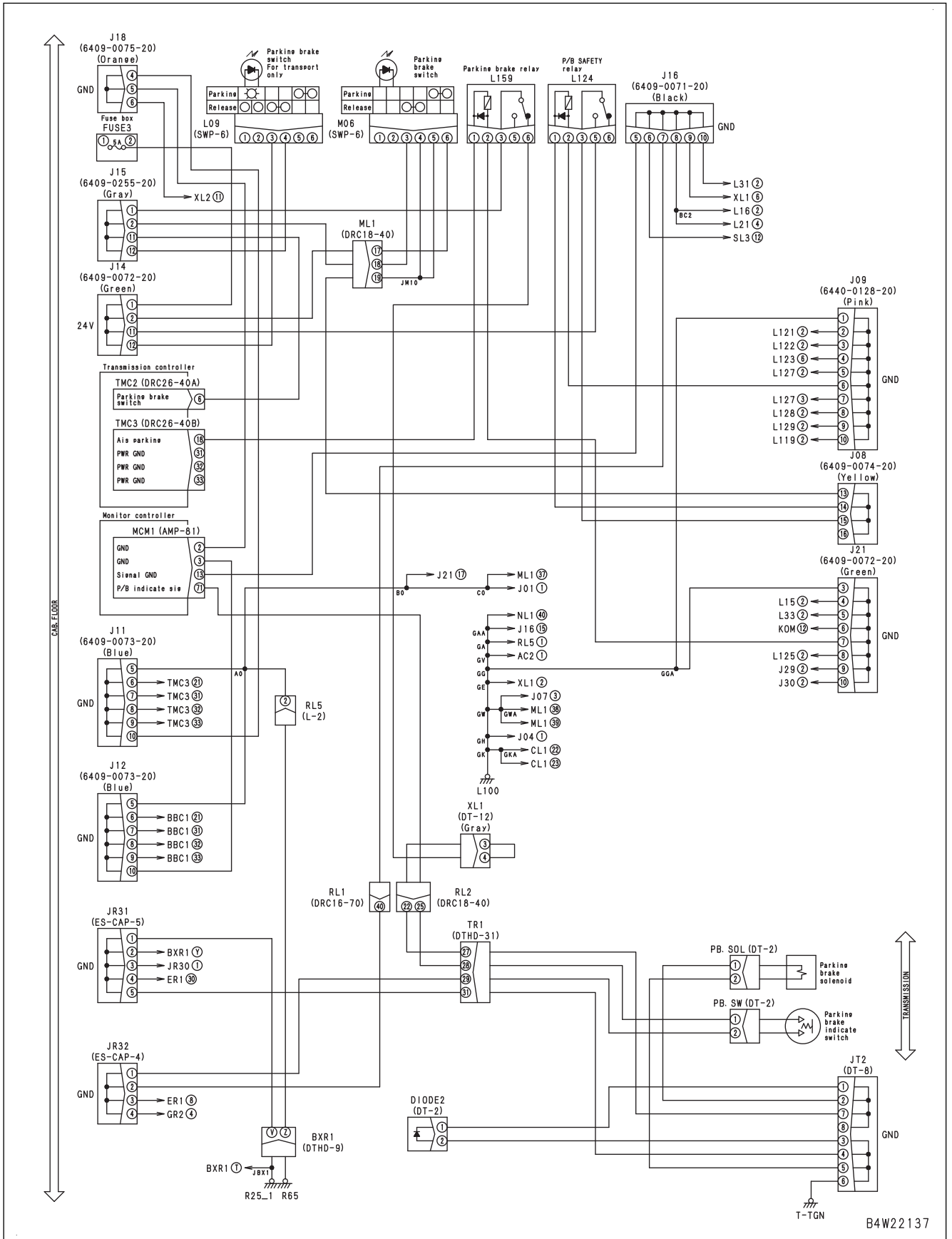
1. Turn the starting switch to OFF position, and shut down the engine controller.
2. Turn the starting switch to ON position, and start engine.
3. Run the engine at low idle speed for approximately 1 minute.
4. See "TESTING AND ADJUSTING", "Service mode" and "Test menu (SCR Service Test)" in "SETTING AND OPERATION OF MACHINE MONITOR" to perform "SCR removal efficiency test" (maximum duration of the removal efficiency: 1.5 h).
5. The test condition and the test condition 2 on the monitor changes from "0" to "10", then to "20". ("14" may be shown during few minutes due to temperature transition)
6. When the test is completed after the test condition and the test condition 2 on the monitor shows "20", stop the engine and shut down the engine controller (wait for a few minutes after the shutdown, then the starting switch to OFF position).
7. Turn the starting switch to ON position again to check if this failure code is cleared. If the failure code is cleared, repair work is completed.

REMARK

- If this failure code is cleared, repair is completed.
- In case it is not cleared, return to troubleshooting.

<p style="text-align: center;">Related information</p>	<p>⚠ AdBlue/DEF injector part is heated to 400 °C and above. Be careful not to get burn injury.</p> <ul style="list-style-type: none"> • If failure code [CB3558] or [CB3559] or [CB3571] or [CB3572] is displayed, or if it is logged in the abnormality record, AdBlue/DEF pump system is defective. Perform troubleshooting for it first. • If failure code [CB3567] is displayed, or if it is logged in the abnormality record, AdBlue/DEF injector system is defective. Perform troubleshooting for it first. • This failure code is displayed together with failure codes whose possible cause is clogging of AdBlue/DEF injector or AdBlue/DEF hose. This is the failure code to identify the failure place, and need not to be treated individually. • This failure code is displayed for the purpose of monitoring for cause identification of the failure codes [CA3151] and [CA3543]. It is not necessary to troubleshoot and replace parts when this failure code is displayed alone. • Even if cause of failure is eliminated, it takes time to detect that the cause has been eliminated, so the failure code may be displayed continuously, but no action is required. • Engine controller does not display this failure code while AdBlue/DEF supply system is under thawing control. (It cannot judge because AdBlue/DEF injection is disabled.) • Start the engine, wait for 3 minutes, and then check that the number showing 4 conditions below is other than 1 (Thawing). (You cannot troubleshoot this failure until thawing is completed.) • The state of each heater is 1: Thawing, 2: Warming, 3 or 0: OFF. On the monitoring code screen, input following number directly to check the value. 19305 AdBlue/DEF Tank Heating State 19316 AdBlue/DEF Line Heater 1 State_2 19317 AdBlue/DEF Line Heater 2 State_2 19319 AdBlue/DEF Pump Heater State_2 • On “Pre-defined Monitoring” screen, items related to AdBlue/DEF injector(2) and AdBlue/DEF pump(2) are used. (The numbers below denote monitoring codes). • AdBlue/DEF injector related(2) 47202 KDPF 1 Outlet Temperature_2 19202 Turbo Outlet NOx Corrected 19212 NH3 Concentration Corrected_2 19216 SCR Outlet NOx Corrected_2 19314 AdBlue/DEF Pump State_2 19129 AdBlue/DEF Injection Quantity_2 • AdBlue/DEF pump related(2) 19129 AdBlue/DEF Injection Quantity_2 19123 AdBlue/DEF Pump Pressure_2 19124 AdBlue/DEF Pump Press Sensor Volt_2 19126 AdBlue/DEF Reverting Valve Cmd_2 19140 AdBlue/DEF Pump Temperature_2 19314 AdBlue/DEF Pump State_2 <p>NOTICE</p> <p>This failure code requires “Loaded Diagnostics Operation To Clear Failure Code”. After investigating the cause of the problem and completing the repair, perform “Loaded Diagnostics Operation To Clear Failure Code” to make sure the failure code is cleared. (This failure code is not cleared by simply turning the starting switch to ON position.)</p>
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Circuit diagram related to parking brake relay

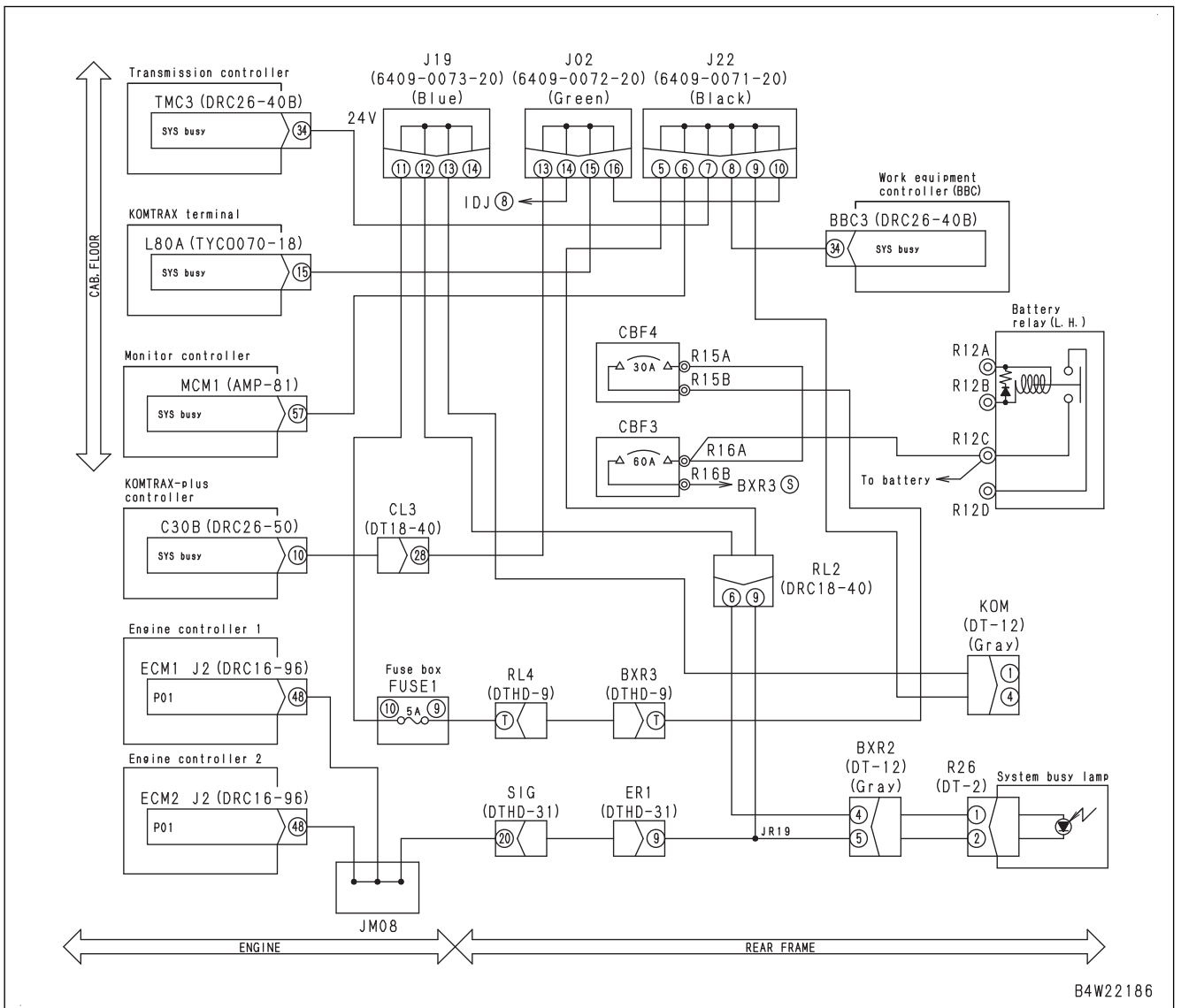


FAILURE CODE [DAQ9KQ]

Action level	Failure code	Failure	Model Selection Mismatch (Transmission) (Transmission controller)
L03	DAQ9KQ		
Detail of failure	Model selection information sent from machine monitor differs from that stored in transmission controller.		
Action of controller	<ul style="list-style-type: none"> Continues to operate by regarding machine model is same as the one before this failure code is generated. Makes centralized warning lamp light up and alarm buzzer sound. Does not generate failure codes that can be falsely detected due to this error. 		
Phenomenon on machine	If machine travels as it is, transmission may be damaged.		
Related information	<ul style="list-style-type: none"> Part number of transmission controller can be checked with monitoring function. (Code: 20414) Machine model selected on machine monitor can be checked with monitoring function. (Code: 00205). After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position. 		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Incorrect model setting on machine monitor	The machine model setting of machine monitor is probably incorrect. After replacing the machine monitor or transmission controller, set the model correctly. For details, see TESTING AND ADJUSTING.
2	Incorrect transmission controller installed	Incorrect transmission controller may be installed. Check part No. and install correct transmission controller.
3	Defective machine monitor or transmission controller	If no failure is found by preceding checks, machine monitor or transmission controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Circuit diagram related to system operating lamp

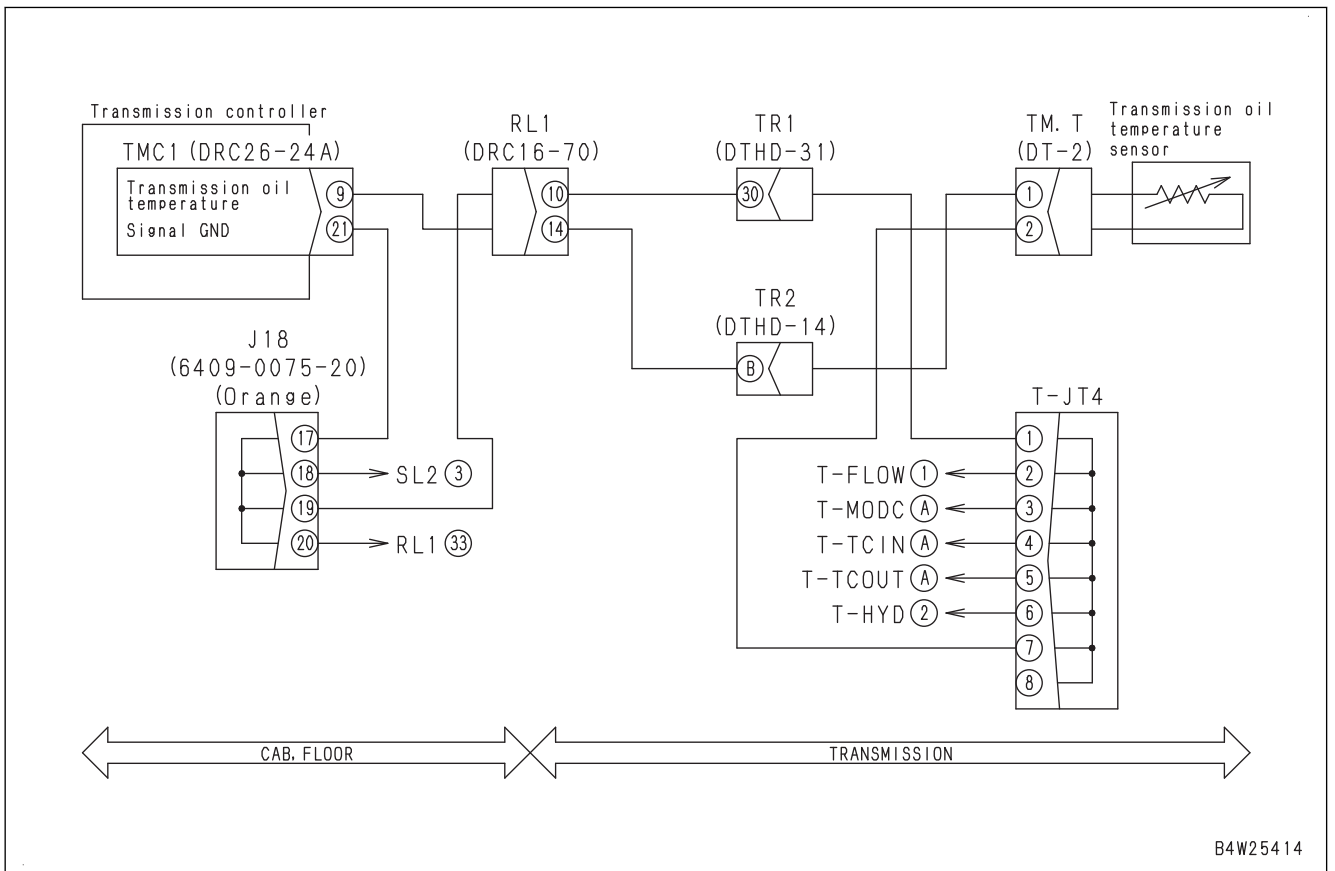


FAILURE CODE [DDD1LD]

Action level	Failure code	Failure	Bucket Positioner Set Switch Ground Fault (Work equipment controller system)
L01	DDD1LD		
Detail of failure	<ul style="list-style-type: none"> • Due to ground fault in remote positioner set switch (bucket) circuit, bucket stop angle cannot be set to desired angle. • Continuous operation for 30 seconds is detected on remote positioner bucket angle set switch. 		
Action of controller	<ul style="list-style-type: none"> • Judges that remote positioner bucket angle set switch is ON. • Changes setting to default (stopping at level position) after 1 sec second. • If cause of failure disappears, machine becomes normal by itself. 		
Phenomenon on machine	<ul style="list-style-type: none"> • Remote positioner (bucket) set is turned to default (level position). • Setting cannot be changed upward or downward direction. 		
Related information	<ul style="list-style-type: none"> • Input state (ON/OFF) from remote positioner set switch can be checked with monitoring function. (Code: 02218) • After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position. 		

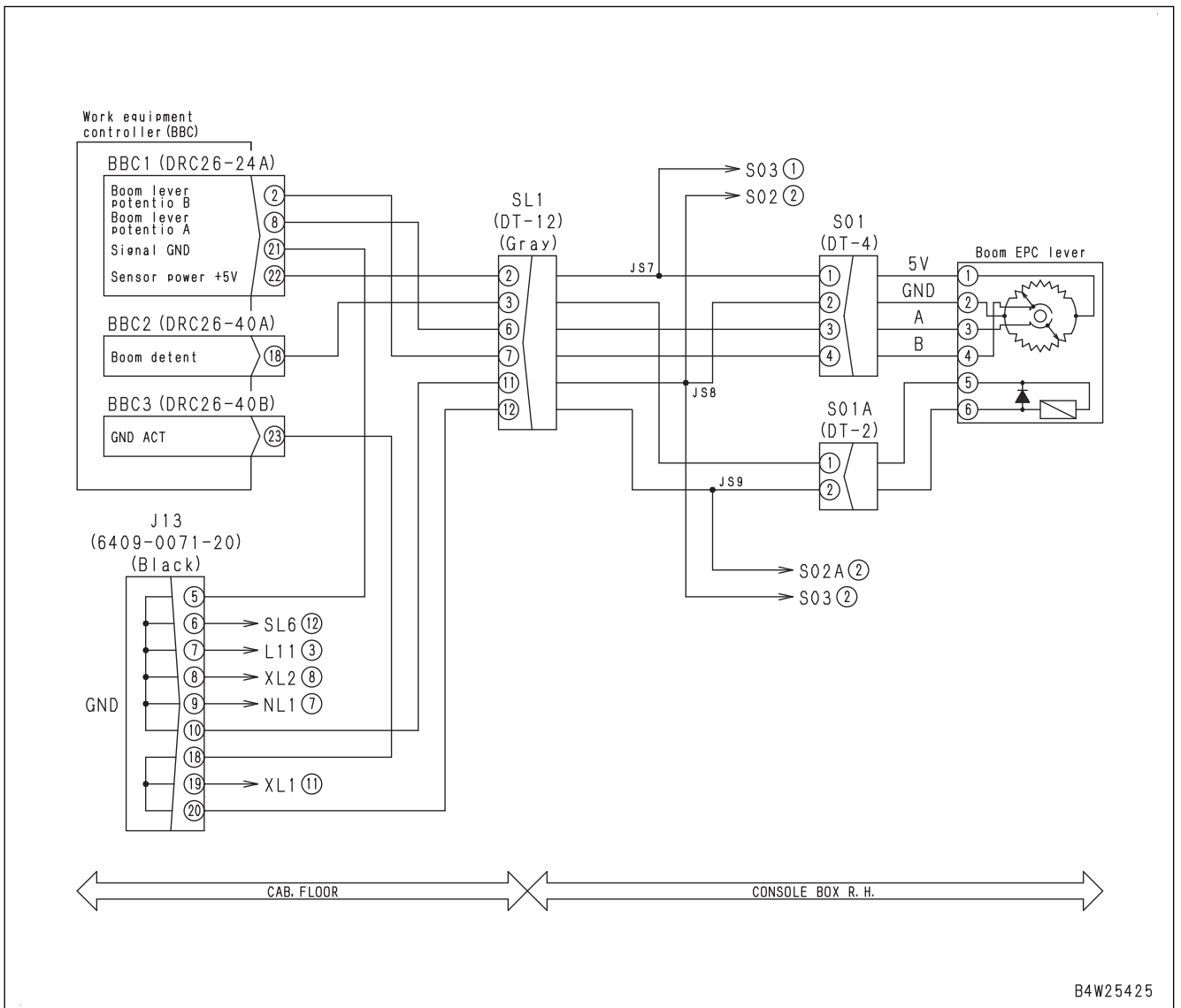
No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective remote positioner set switch (bucket)	1. Turn the starting switch to OFF position. 2. Disconnect connector S_RH6, and connect T-adapter to male side.			
		Resistance	Between S_RH6 (male) (4) and (5)	Remote positioner set switch: Bucket angle set ON	Max. 1 Ω
				Remote positioner set switch: Other than bucket angle set ON	Min. 1 MΩ
Between ground and each of S_RH6 (male) (4) and (5)	Min. 1 MΩ				
2	Ground fault in wiring harness (contact with ground circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connectors BBC2 and S_RH6, and connect T-adapter to either female side.			
		Resistance	Between ground and BBC2 (female) (3) or S_RH6 (female) (6)	Min. 1 MΩ	
			Between ground and BBC2 (female) (12) or S_RH6 (female) (4)	Min. 1 MΩ	
3	Defective work equipment controller	1. Turn the starting switch to OFF position. 2. Insert T-adapter into connector BBC2. 3. Turn the starting switch to ON position.			
		Voltage	Between BBC2 (12) and ground	Remote positioner set switch: Bucket angle set ON	Max. 1 V
				Remote positioner set switch: Other than bucket angle set ON	7 to 10 V

Circuit diagram related to transmission oil temperature sensor



No.	Cause	Procedure, measuring location, criteria and remarks		
5	Open circuit in wiring harness (wire breakage or defective contact)	1. Turn the starting switch to OFF position. 2. Disconnect connectors TMC1 and TCIN.P, and connect T-adapter to each female side.		
		Resistance	If power supply voltage is normal, this check is not required. Between TMC1 (female) (16) and TCIN.P (female) (B)	Max. 1 Ω
			If power supply voltage is normal, this check is not required. Between TMC1 (female) (21) and TCIN.P (female) (A)	Max. 1 Ω
			Between TMC1 (female) (7) and TCIN.P (female) (C)	Max. 1 Ω
6	Defective transmission controller	Reference 1. Turn the starting switch to OFF position. 2. Insert T-adapter into connector TMC1. 3. Turn the starting switch to ON position.		
		Voltage	Between TMC1 (16) and (21)	20 to 30 V
			Between TMC1 (7) and (21)	0.9 to 5.1 V

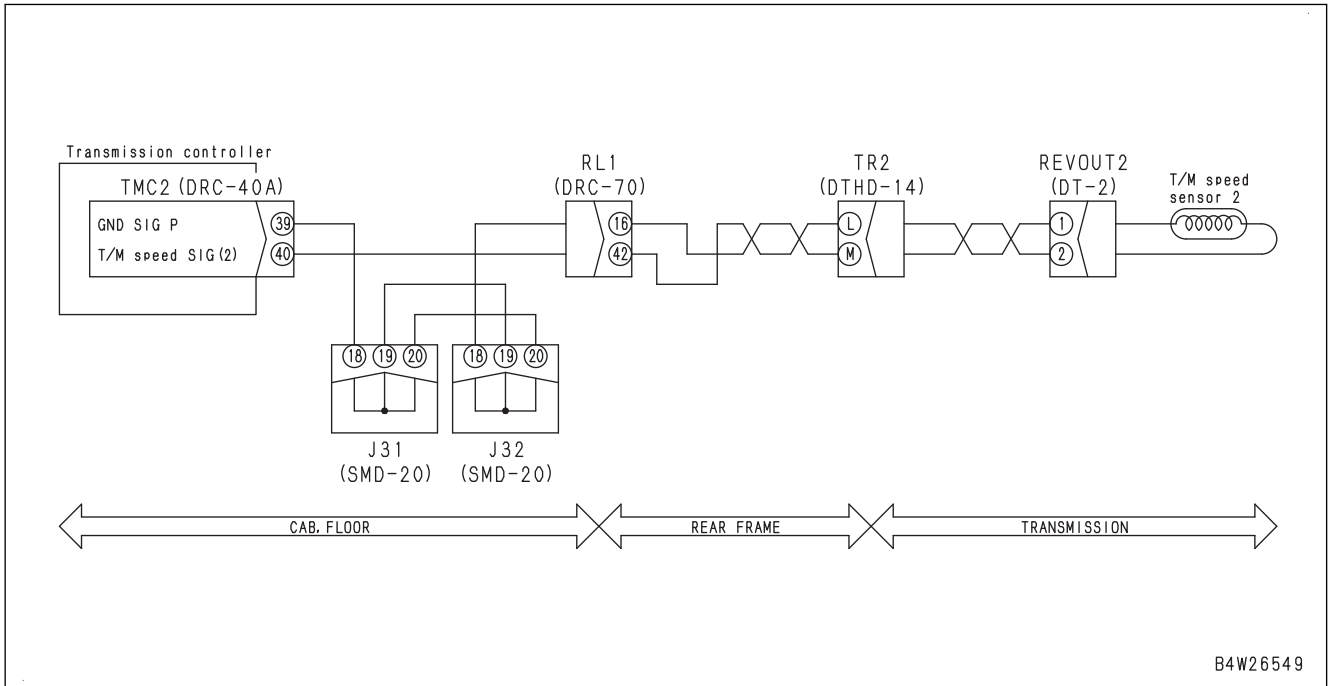
Circuit diagram related to boom lever potentiometer



B4W25425

No.	Cause	Procedure, measuring location, criteria and remarks				
2	Defective 3rd spool (for attachment) lever potentiometer (internal open circuit or short circuit)	<ol style="list-style-type: none"> Turn the starting switch to OFF position. Disconnect connector S03, and connect T-adapter to male side. 				
		Resistance	Between S03 (male) (1) and ground	Min. 1 MΩ		
			Between S03 (male) (2) and ground	Min. 1 MΩ		
			Between S03 (male) (3) and ground	Min. 1 MΩ		
			Between S03 (male) (4) and ground	Min. 1 MΩ		
		<p>REMARK</p> <ul style="list-style-type: none"> Voltage is measured with wiring harness connected. Accordingly, if the voltage is abnormal, the wiring harness may be defective. Check that the wiring harness is not defective, and then judge whether the potentiometer is defective or not. <ol style="list-style-type: none"> Turn the starting switch to OFF position. Insert T-adapter into connector S03. Set work equipment lock switch to LOCK position. Turn the starting switch to ON position. Perform troubleshooting while operating 3rd spool control lever. 				
		Voltage	Between S03 (3) and (2)		3rd spool (for attachment) lever: NEUTRAL	2.38 to 2.62 V
					3rd spool (for attachment) lever: EXTEND operation to stroke end	3.90 to 4.40 V
					3rd spool (for attachment) lever: RETRACT operation to stroke end	0.60 to 1.10 V
			Between S03 (4) and (2)		3rd spool (for attachment) lever: NEUTRAL	2.38 to 2.62 V
					3rd spool (for attachment) lever: EXTEND operation to stroke end	0.60 to 1.10 V
					3rd spool (for attachment) lever: RETRACT operation to stroke end	3.90 to 4.40 V

Circuit diagram related to transmission output shaft speed sensor



FAILURE CODE [DW4RKA]

Action level	Failure code	Failure	Bucket TILT EPC Solenoid Open Circuit (Work equipment controller system)
L03	DW4RKA		
Detail of failure	Due to open circuit in output signal circuit to bucket TILT EPC solenoid, no current flows when controller drives bucket TILT EPC solenoid.		
Action of controller	<ul style="list-style-type: none"> Disables bucket TILT EPC command. Disables bucket detent. Makes centralized warning lamp light up and alarm buzzer sound. Even if cause of failure disappears, machine does not become normal until starting switch is turned to OFF position. 		
Phenomenon on machine	Bucket does not tilt.		
Related information	<ul style="list-style-type: none"> Output current value to bucket TILT EPC solenoid can be checked with monitoring function. (Code: 41902) After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Start the engine, and perform bucket TILT operation. 		

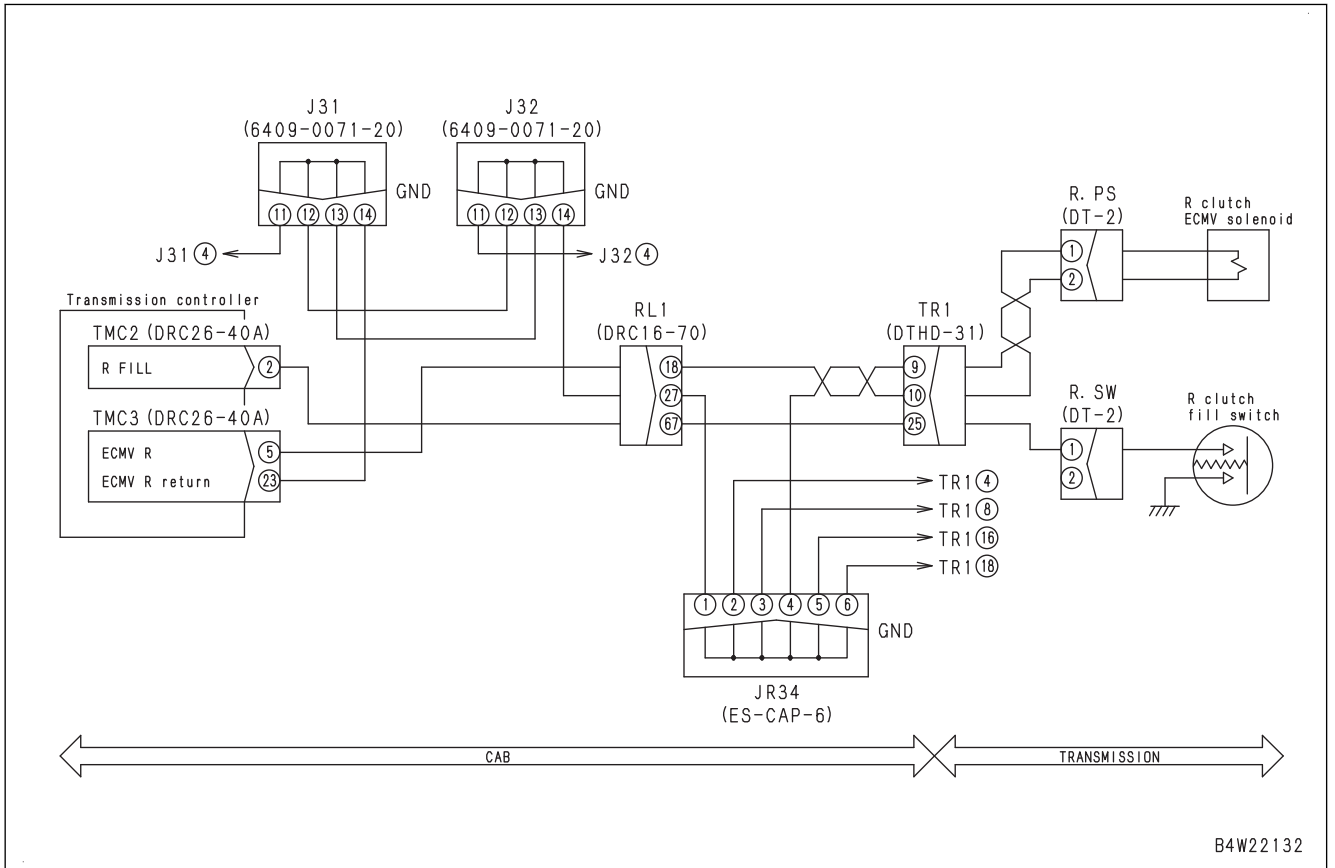
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective bucket TILT EPC solenoid (internal open circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connector N10, and connect T-adaptor to male side		
		Resistance	Between N10 (male) (1) and (2)	5 to 15 Ω
2	Open circuit, short circuit, ground fault, hot short circuit in wiring harness, or defective transmission controller	1. Turn the starting switch to OFF position. 2. Disconnect connector N10, and connect T-adaptor to female side. 3. Turn the starting switch to ON position. REMARK Shake the wiring harness by hand while measuring the voltage. If the voltage becomes 0 V at certain place while shaking, wiring harness has open circuit near that place.		
		Voltage	Between N10 (female) (1) and (2)	1 to 4.5 V
3	Open or short circuit in wiring harness	REMARK If no failure is found by check on cause 2, this check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect connector BBC3, and connect T-adaptor to female side. REMARK If resistance value is 1 MΩ and above, wiring harness has open circuit. If it is 1 Ω and below, wiring harness has short circuit.		
		Resistance	Between BBC3 (female) (37) and (3)	5 to 15 Ω
4	Open circuit in wiring harness (wire breakage or defective contact of connector)	REMARK If no failure is found by check on cause 3, this check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect connectors BBC3 and N10 and connect T-adaptors to each female side.		
		Resistance	Between BBC3 (female) (3) and N10 (female) (2)	Max. 1 Ω
			Between BBC3 (female) (37) and N10 (female) (1)	Max. 1 Ω

FAILURE CODE [DX16KA]

Action level	Failure code	Failure	Radiator Fan Pump EPC Solenoid Open Circuit (Transmission controller system)
L03	DX16KA		
Detail of failure	Due to open circuit in fan pump EPC solenoid system, no current flows through circuit when controller drives fan pump EPC solenoid.		
Action of controller	<ul style="list-style-type: none"> Disables fan to rotate in reverse direction. Even if cause of failure disappears, machine does not become normal until starting switch is turned to OFF position. 		
Phenomenon on machine	<ul style="list-style-type: none"> Fan speed becomes maximum. Fan cannot rotate in reverse direction. When this failure occurs with fan rotating in reverse direction, fan rotation direction switches to normal direction. 		
Related information	<ul style="list-style-type: none"> Output current value to fan pump EPC solenoid can be checked with monitoring function. (Code: 41400) After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position. 		

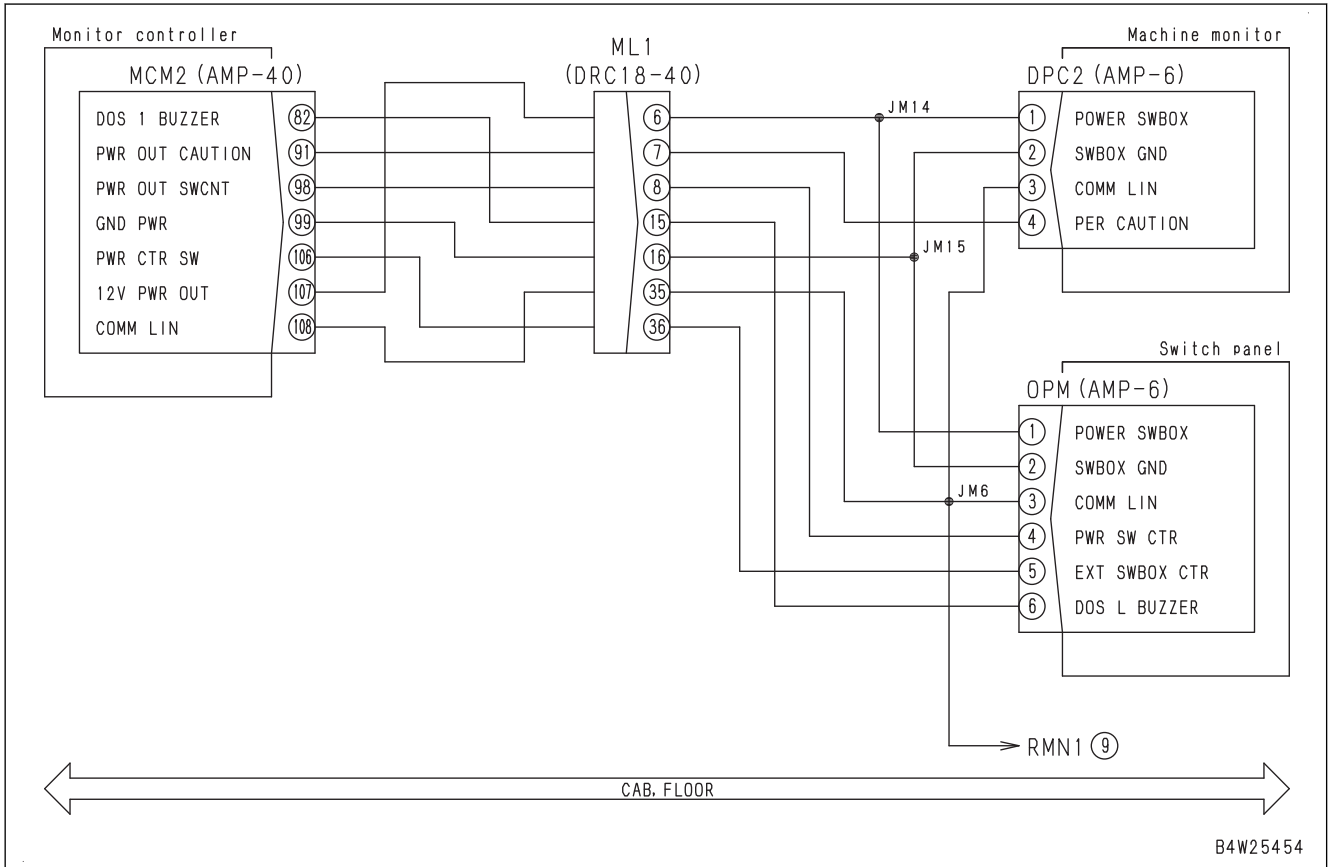
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective radiator fan pump EPC solenoid	1. Turn the starting switch to OFF position. 2. Disconnect connector R75, and connect T-adapter to male side.		
		Resistance	Between R75 (male) (1) and (2)	5 to 10 Ω
2	Open circuit, short circuit, ground fault, hot short circuit in wiring harness, or defective transmission controller	1. Turn the starting switch to OFF position. 2. Disconnect connector R75, and connect T-adapter to female side. 3. Turn the starting switch to ON position.		
		REMARK Shake the wiring harness by hand while measuring the voltage. If the voltage becomes 0 V at certain place while shaking, wiring harness has open circuit near that place.		
3	Open or short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector TMC3, and connect T-adapter to female side.		
		REMARK If it is Min. 1 MΩ, wiring harness has open circuit. If it is Max. 1 Ω, wiring harness has short circuit.		
4	Open circuit in wiring harness (wire breakage or defective contact)	If no failure is found by check on cause 3, this check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect connectors TMC3 and R75, and connect T-adapters to each female side.		
		Resistance	Between TMC3 (female) (25) and R75 (female) (1)	Max. 1 Ω
			Between TMC3 (female) (3) and R75 (female) (2)	Max. 1 Ω
5	Defective transmission controller	If no failure is found by preceding checks, transmission controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to R clutch



No.	Cause	Procedure, measuring location, criteria and remarks			
18	Defective starting switch (internal open circuit)	If no failure is found by check on cause 9, this check is not required. 1. Turn the starting switch to OFF position. 2. Check that system operating lamp is not lit, and then turn the battery disconnect switch to OFF position. 3. Disconnect terminal the starting switch L03. 4. Turn the starting switch to ON and START positions to perform troubleshooting again.			
		Resistance	Between L03 B terminal and BR terminal (BR terminal)	Starting switch: OFF	Min. 1 MΩ
			Starting switch: ON	Max. 1 Ω	
			Between L03 B terminal and ACC terminal (ACC terminal)	Starting switch: OFF	Min. 1 MΩ
			Starting switch: START	Max. 1 Ω	
		Between L03 B terminal and C terminal (C terminal)	Starting switch: OFF	Min. 1 MΩ	
Starting switch: START	Max. 1 Ω				

Circuit diagram between monitor controller and switch panel of machine monitor



E-35 ENGINE MODE SELECTOR FUNCTION DOES NOT OPERATE NORMALLY WHEN ENGINE POWER MODE SELECTOR SWITCH IS OPERATED

Failure	When operating engine power mode selector switch, engine mode selector function does not operate properly.
Related information	If any failure code is displayed, perform troubleshooting for that failure code first. ([15B0NX], [2F00MA], [2F00MB], [2G42ZG], [2G43ZG], [989A00], [AA10NX], [B@BAZK], [B@BCQA], [B@BCZK], [B@CENS], [B@HANS], [CA234], [LA00L3])

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective engine mode selector switch	1. Turn the starting switch to OFF position. 2. Disconnect connector S_RH2, and connect T-adapter to male side.		
		Resistance	Between S_RH2 (male) (5) and (6)	switch: OFF switch: ON
2	Open circuit in wiring harness (wire breakage or defective contact)	1. Turn the starting switch to OFF position 2. Disconnect connectors TMC3 and S_RH2 and connect T-adapters to each female side.		
		Resistance	Between TMC3 (female) (29) and S_RH2 (female) (6) Between S_RH2 (female) (5) and ground	
3	Ground fault in wiring harness (contact with ground circuit)	1. Turn the starting switch to OFF position 2. Disconnect connectors TMC3 and S_RH2, and connect T-adapter to either female side.		
		Resistance	Between ground and TMC3 (female) (29) or S_RH2 (female) (6)	
4	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position 2. Disconnect connector S_RH2, and connect T-adapter to female side. 3. Turn the starting switch to ON position		
		Voltage	Between S_RH2 (female) (6) and ground	
5	Defective transmission controller	1. Turn the starting switch to OFF position. 2. Insert T-adapter into connector TMC3. 3. Turn the starting switch to ON position.		
		Voltage	Between TMC3 (29) and ground	Boom lever: OFF Boom lever: ON

No.	Cause	Procedure, measuring location, criteria and remarks		
6	Ground fault in wiring harness (contact with GND circuit)	1. Turn the starting switch to OFF position. 2. Turn the battery disconnect switch to OFF position. 3. Disconnect connectors L10, L123, L138, G30, and G30L, and connect T-adaptor to either female side. 4. Remove fuse14 in fuse box 2.		
		Resistance	Between ground and L10 (female) (1) or L138 (female) (2)	Min. 1 MΩ
			Between ground and L10 (female) (2) or L138 (female) (5)	Min. 1 MΩ
			Between ground and L138 (female) (1), G30 (female) (A) or G30L (female) (A)	Min. 1 MΩ
7	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors L10, L123, L138, G30, and G30L, and connect T-adaptor to either female side. 3. Remove fuse14 in fuse box 2. 4. Turn the starting switch to ON position.		
		Voltage	Between ground and L10 (female) (1) or L138 (female) (2)	Max. 1 V
			Between ground and L10 (female) (2) or L138 (female) (5)	Max. 1 V
			Between ground and L138 (female) (1), G30 (female) (A) or G30L (female) (A)	Max. 1 V

H-1 MACHINE DOES NOT START

Failure	Machine does not start.
Related information	<ul style="list-style-type: none"> • Check that transmission oil level is normal. • If any failure code is displayed, perform troubleshooting for that failure code first. ([15SAL1],[15SALH],[15SBL1],[15SBLH],[15SEL1],[15SELH],[15SFL1],[15SFLH],[15SGL1],[15SGLH],[15SHL1],[15SHLH]) • Check that drive shaft, etc. are normal. • Check that parking brake is surely released. • Torque converter oil pressure can be checked with monitoring. (Code: 32601 (inlet pressure), 32603 (outlet pressure)) • Engine speed can be checked with monitoring. (Code: 01002)

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective PTO	If machine turns neither right nor left and there are malfunction of work equipment or cooling fan, power take off may be defective. Disassemble the power take off and check it.			
2	Defective strainer of transmission charge pump	Check strainer for clogging.			
3	Air sucked in on suction side of transmission charge pump	Check suction piping for cracks, etc.			
4	Defective main relief valve of transmission charge pump	Perform measurement by referring to TESTING AND ADJUSTING.			
		Transmission main relief pressure	Engine speed	Low idle	3.46±0.20 MPa {35.3±2.0 kgf/cm ² }
		High idle		Min. 3.09 MPa {Min. 31.5 kgf/cm ² }	
When pressure cannot be adjusted to normal level, main relief valve may malfunction. Check for malfunction of the main relief valve (fatigue of spring), internal defect (defective valve seat), etc.					
5	Defective transmission charge pump	<ul style="list-style-type: none"> • If measured oil pressure is unusual in check on defective transmission charge pump main relief valve, and relief pressure is abnormal even after main relief valve is adjusted or replaced, disconnect transmission charge pump outlet hose, crank the engine, and check if oil flows out. • Check line filter for sticking foreign material such as metal chips. 			
6	Defective torque converter relief valve	Perform measurement by referring to TESTING AND ADJUSTING.			
		T/C Inlet Oil Pressure	Max. 1.33 MPa {Max. 13.6 kgf/cm ² }		
		T/C Outlet Oil Pressure	0.44 to 0.83 MPa {4.5 to 8.5 kgf/cm ² }		
<ul style="list-style-type: none"> • If oil pressure does not become normal after adjustment, check relief valve for malfunction (fatigued spring), internal defect (defective valve seat), etc. • If torque converter outlet pressure is low, oil cooler may be damaged. Check it. 					

H-24 HYDRAULIC DRIFT OF BOOM IS LARGE

Failure	Hydraulic drift of boom is large.
Related information	<p>⚠ Release remaining pressure from the work equipment circuit. For details, see TESTING AND ADJUSTING, “METHOD FOR RELEASING REMAINING PRESSURE FROM WORK EQUIPMENT CIRCUIT”.</p> <p>⚠ Pressure may not be released even if releasing pressure from the work equipment circuit is performed, so be careful.</p> <ul style="list-style-type: none"> If any failure code is displayed, perform troubleshooting for that failure code first. ([DK59KA],[DK59L8],[DW4QKY]) Work equipment pump pressure can be checked with monitoring. (Code: 94700)

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective sealing of main spool in boom control valve	Raise the boom and disconnect hydraulic hose at head side of lift cylinder. If oil does not flow out of cylinder and cylinder drifts hydraulically, sealing of spool may be defective. Check the main spool in boom control valve.
2	Defective seating of load check valve at bottom side	Raise the boom and disconnect hydraulic hose at head side of lift cylinder. If oil does not flow out of cylinder and cylinder drifts hydraulically, defective sealing of load check valve at bottom side of lift cylinder is suspected. Check the load check valve at bottom side of lift cylinder.
3	Defective lift cylinder	Measure it referring to TESTING AND ADJUSTING.
		Raise the boom and disconnect hydraulic hose at the lift cylinder head side. If oil flows out from cylinder, cylinder piston ring may be defective. Disassemble the lift cylinder and check it.

S-18 UNUSUAL NOISE IS HEARD

Failure	Unusual noise is heard.
Related information	<ul style="list-style-type: none"> • Check place of sound source, inside or outside, then perform troubleshooting. • While engine is not warmed up sufficiently, it is operated in warm-up mode and it generates a little larger sound. This is not abnormal. • When engine is accelerated, it is set in acceleration mode and it generates a little larger sound for approximately 3 to 5 seconds. This is not abnormal. • If any failure code is displayed, perform troubleshooting for that code first.

No.	Cause	Point to check, remarks	Remedy
1	Gas leakage from each part of the piping	<ul style="list-style-type: none"> • Gas leakage from following parts; between cylinder head and exhaust manifold, piping between exhaust manifold and VGT, piping between VGT outlet and KDPF • Gas leakage from EGR piping or air intake piping 	Problematic portions repair or replacement
2	Vibration of exhaust piping and exhaust bellows	Confirm the presence of vibration by visual check	Check and retighten piping fixed bracket
3	Seizure, damage, and unusual noise from VGT	Check if VGT shaft can rotate (by manually moving the VGT's blade axially and vertically).	VGT replacement
4	KDPF broken internally	Check internal KDPF.	KDPF cleaning or replacement
5	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", "HANDLING CYLINDER CUTOFF MODE OPERATION"). 	Replace injector.
6	Defective valve clearance	Check valve clearance (Reference: See Testing and adjusting, "Testing and adjusting valve clearance").	Valve clearance adjustment
7	Seizure of pin bushing, front bearing, or main bearing	Check inside of oil pan for metallic powder.	Damaged parts repair or replacement
8	Worn piston ring or cylinder liner	<ol style="list-style-type: none"> 1. If metal particles are found in oil pan or oil filter, overhaul engine and check piston rings and cylinder liners. 2. Measure pressure (See Standard value table) (Reference: See Testing and adjusting, "Testing compression pressure") 	Replace piston ring or cylinder liner.
9	Broken valve or rocker arm	Overhaul engine and check valve and rocker arm parts.	Valve or rocker arm replacement
10	Broken peripheral parts of idler gear	Overhaul engine and inspect idler gear parts.	Idler gear replacement

Tools to be used when removing and installing the final drive carrier assembly

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	Commercially available	Stand	•	2			Removing and installing the final drive carrier assembly
B	Commercially available	Eyebolt	•	1			Removing and installing the final drive carrier assembly
C	Commercially available	Lifting tool	•	1			Removing and installing the final drive carrier assembly

Tools to be used when removing and installing the front final drive and brake assembly

	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	Commercially available	Lifting tool	•	1			Removing and installing the front final drive and brake assembly

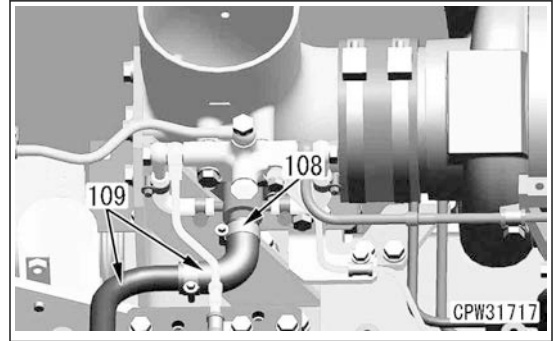
Tools to be used when disassembling and assembling the brake assembly

Sym- bol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	Commercially available	Lifting tool	•	1			Removing and installing the brake assembly

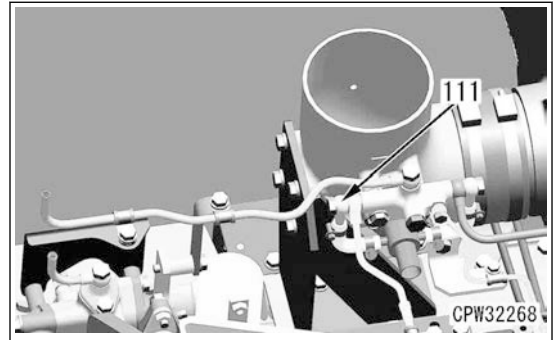
Tools to be used when removing and installing the center hinge pin

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	Commercially available	Jack	•	3			Removing and installing the center hinge pin
B	Commercially available	Block	•	2			Removing and installing the center hinge pin

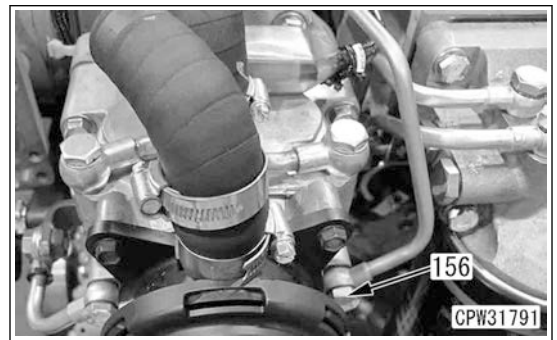
36. Remove the clamp (108), and remove the hose (109).



37. Remove the joint bolt (111).

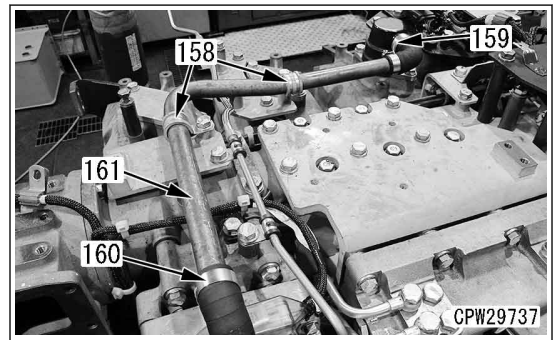


38. Remove the joint bolt (156).

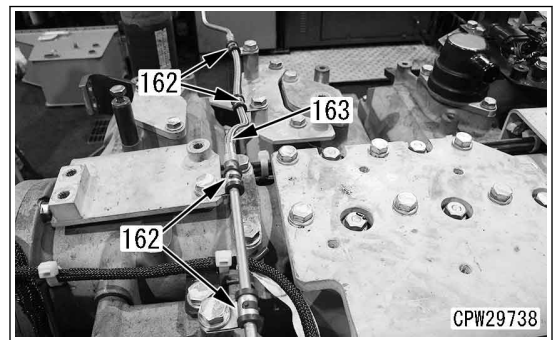


39. Remove the clamps (158) (2 places).

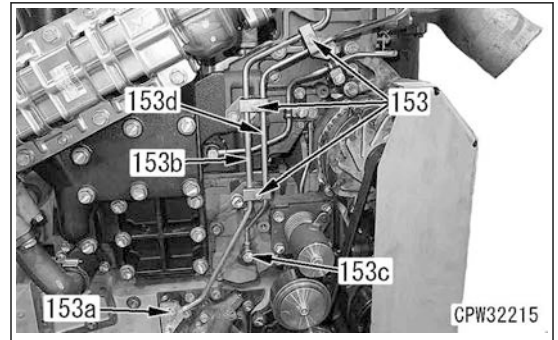
40. Remove the clamps (159) and (160), and disconnect the tube (161).



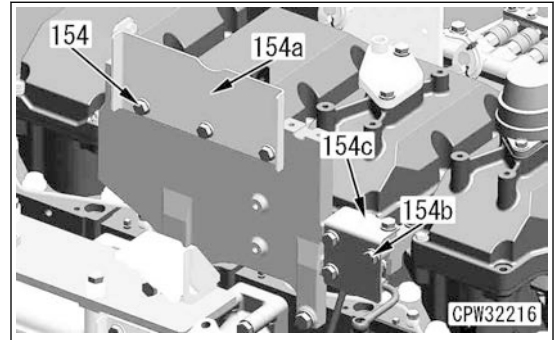
41. Remove the clamps (162) (4 places), and disconnect the tube (163).



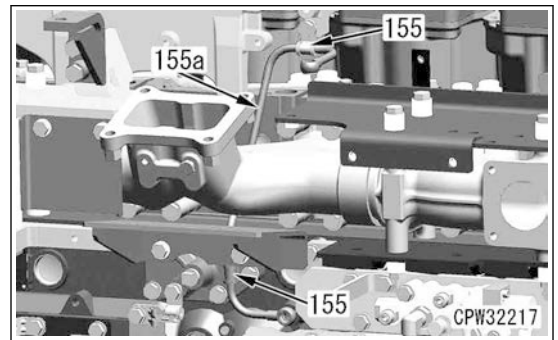
- 139. Remove the clamp (153).
- 140. Remove the bolts (153a) (2 pieces), and remove the tube (153b).
- 141. Remove the joint bolt (153c), and remove the tube (153d).



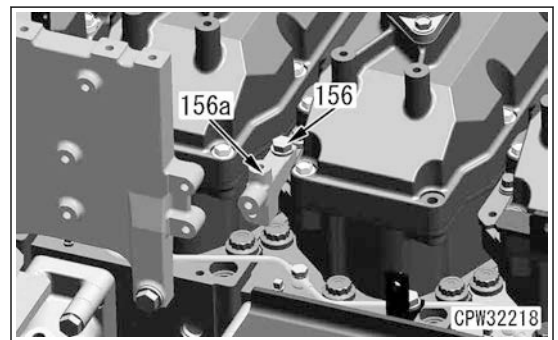
- 142. Remove the bolts (154) (3 pieces), and remove the covers (154a).
- 143. Remove the bolts (154b) (4 pieces), and remove the cover (154c).



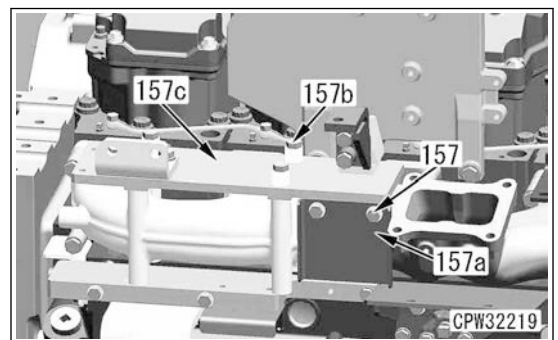
- 144. Remove the clamps (155).
- 145. Remove the tube (155a).




- 146. Remove the bolt (156), and remove the block (156a).



- 147. Remove the bolts (157) (2 pieces), and remove the covers (157a).
- 148. Remove the bolts (157b) (4 pieces), and remove the cover (157c) together with the bracket as a unit.

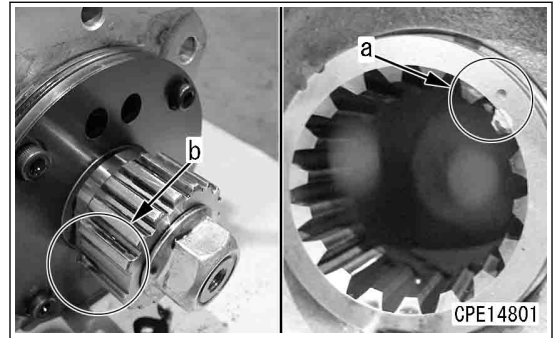
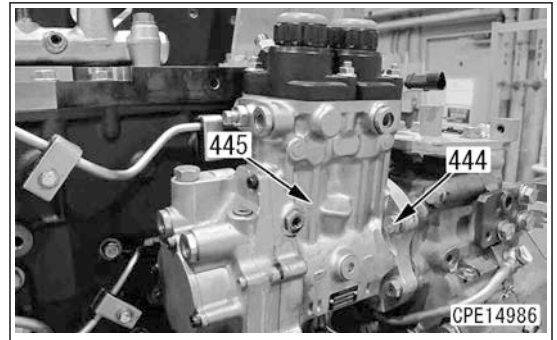


59. Install O-ring, and install the supply pump assembly (445) with the bolts (444) (4 pieces).


 Bolt (444):
59 to 74 Nm {6 to 7.5 kgfm}

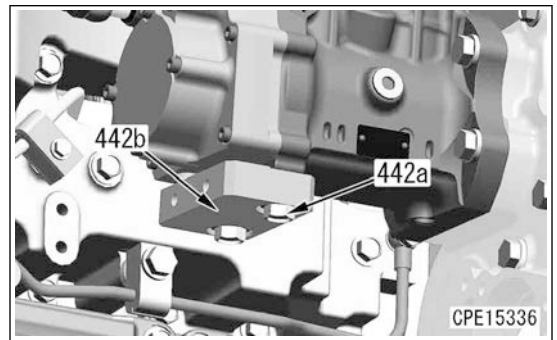
NOTICE

Install it so that the part (a) of the spline is aligned with the part (b).

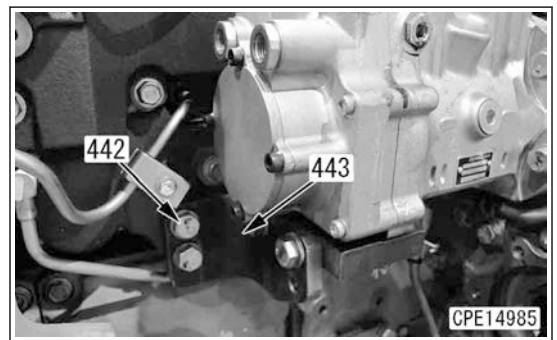


60. Install the bracket (442b) with the bolt (442a).


 Bolt (442a):
19.6 to 29.4 Nm {2.0 to 3.0 kgfm}



61. Install the bracket (443) with the bolts (442) (4 pieces).



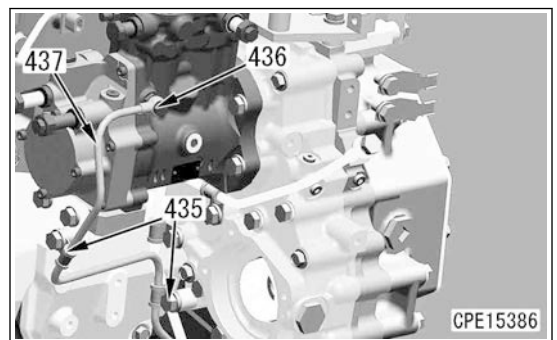
62. Install the tube (437) with the joint bolt (436).

 Joint bolt (436):
7.9 to 12.7 Nm {0.8 to 1.29 kgfm}

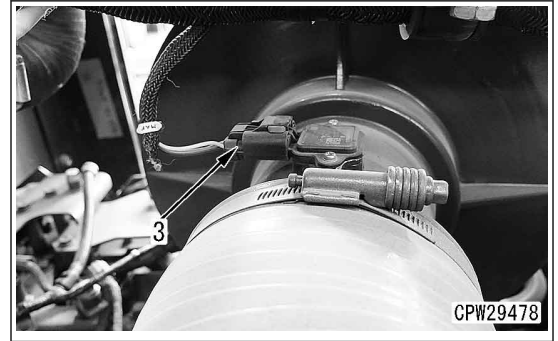
63. Install the clamps (435).

REMARK

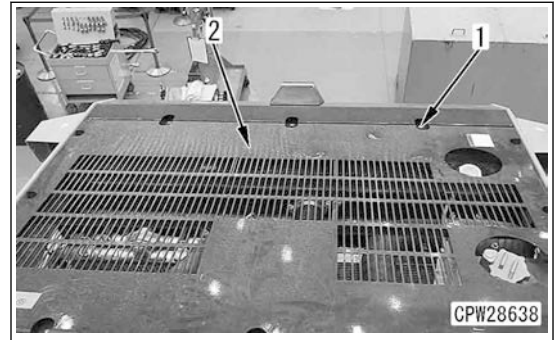
Tighten the clamps (435) together with the spacers.



384. Connect the connector MAF (3).



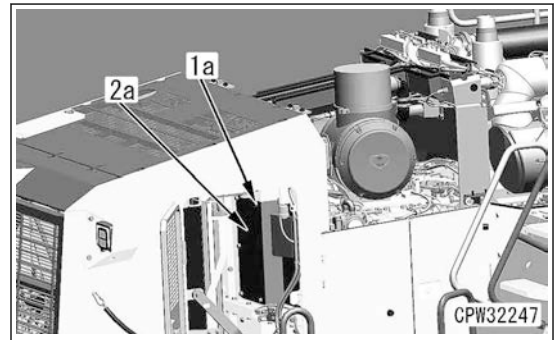
385. Install the guard (2) with the bolts (1) (12 pieces).



KDPF, SCR assembly

386. Install KDPF and SCR assembly. For details, see “REMOVE AND INSTALL KDPF, SCR ASSEMBLY”.

387. Install the inspection cover (2a) with the bolts (1a) (8 pieces).



Engine hood assembly

388. Install engine hood assembly. For details, see “REMOVE AND INSTALL ENGINE HOOD ASSEMBLY”.

Adjustment of valve clearance

389. Adjust the valve clearance. For details, see TESTING AND ADJUSTING, “TEST AND ADJUST VALVE CLEARANCE”.

Coolant

390. Refill with coolant.



Radiator:

150 ℓ

REMARK

Run the engine at low idle for approximately 3 minutes. Then stop the engine and check the water for leakage.

REMOVE AND INSTALL POWER TRAIN OIL COOLER ASSEMBLY

- ⚠ Place the machine on a level ground, and set the parking brake switch to ON position.
- ⚠ Set the frame lock bar to LOCK position, and chock the tires.
- ⚠ Lower the work equipment to the ground, and set the work equipment lock switch to LOCK position.
- ⚠ Turn the starting switch to OFF position to stop the engine.
- ⚠ Turn the battery disconnect switch to OFF position. (For details, see TESTING AND ADJUSTING, "HANDLE BATTERY DISCONNECT SWITCH".)
- ⚠ If you drain the radiator coolant when it is still hot, you may be scalded. Accordingly, wait for the coolant temperature to drop before draining.


METHOD FOR REMOVING POWER TRAIN OIL COOLER ASSEMBLY

Draining coolant

1. Drain the coolant.

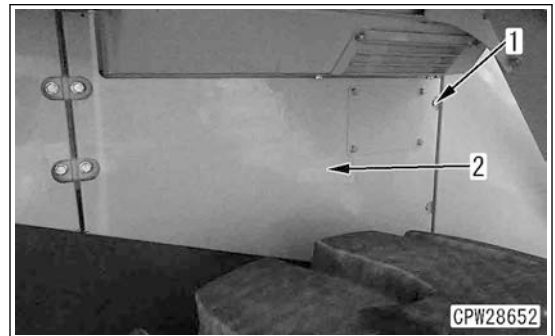
 Radiator:
175 ℓ

2. Drain the power train oil.

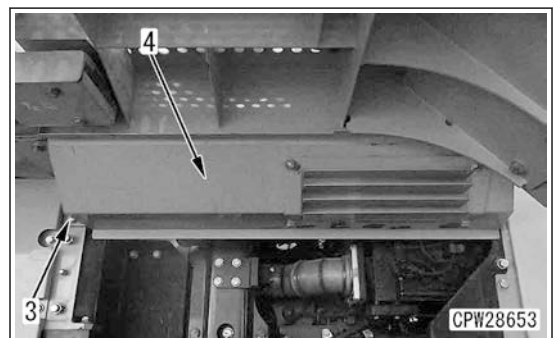
 Transmission case:
83 ℓ

Cover

3. Remove the bolts (1) (4 pieces), and remove the cover (2).



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



5. Remove the bolts (6 pieces), and remove the door (5).



3. Install the bolts (1) (10 pieces) according to the following procedure.



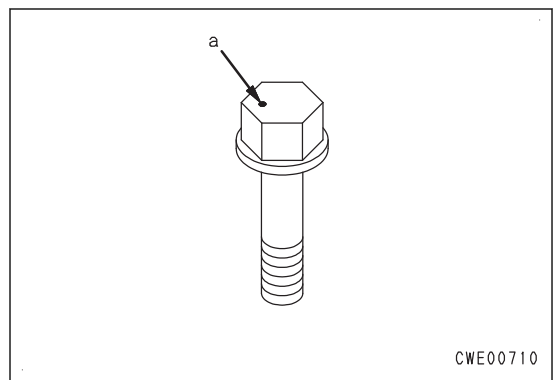
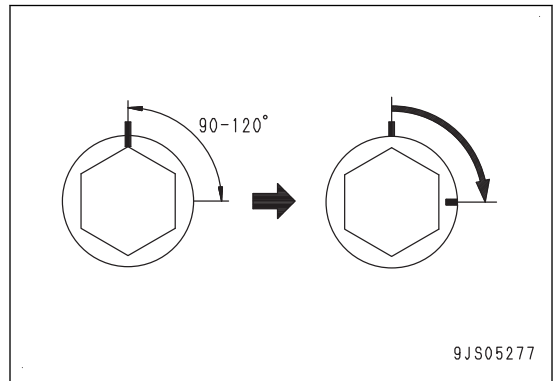
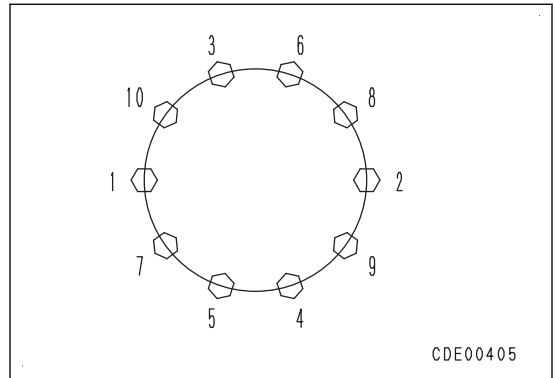
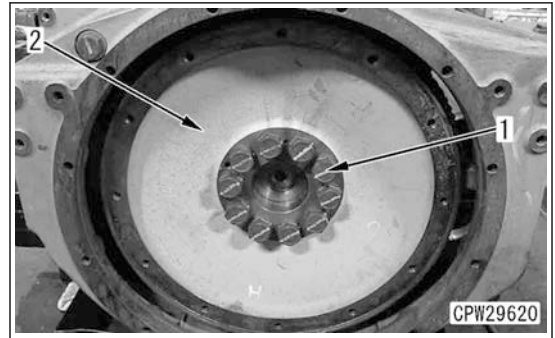
Bolt (1):

Engine oil (EO30)

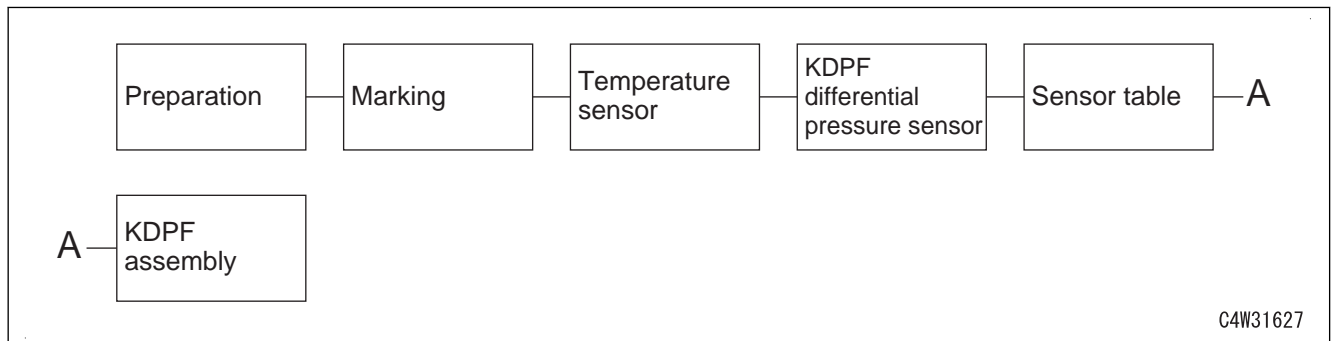
- 1) Bolt (1) (1st time) $196.1 \pm 19.6 \text{ Nm}$ { $20 \pm 2 \text{ kgfm}$ }
- 2) Bolt (1) (2nd time) $460.9 \pm 19.6 \text{ Nm}$ { $47 \pm 2 \text{ kgfm}$ }
- 3) Bolt (1) (3rd time): Retighten it to 90 to 120° .

REMARK

- Install the bolts (1) in the order shown in the figure.
- The bolt which has 5 punch marks must be replaced without reusing.
- After tightening, put a punch mark (a) on each bolt head to indicate the number of tightening times.
- When a new bolt is used, do not put a punch mark on its head.



DISASSEMBLE AND ASSEMBLE OF KDPF ASSEMBLY



Tools to be used when disassembling and assembling KDPF assembly

Symbol	Part No.	Part name	Necessity	Qty	New/Redesign	Sketch	Remarks
A	Commercially available	Block	•	4			Disassembling and assembling KDPF assembly
B	Commercially available	Lifting tool	•	2			Disassembling and assembling KDPF assembly
C	Commercially available	Long socket	•	1			Disassembling and assembling KDPF assembly
D	Commercially available	Angle gauge	•	1			Assembling KDPF assembly

- ⚠ Since KDPF and KDOC are heated to 500 °C or above, take care not to get burn injury.
- ⚠ Stop the engine, wait for the piping around the engine to be cooled down, and then remove KDPF.
- ⚠ Wear anti-dust masks since soot, ash, mat material, and metallic powder accumulated in KDPF may be inhaled when cleaning, replacing, and disposing KDPF and KCSF.
- ⚠ Install KCSF with care about installing direction.
- ⚠ Since KDPF is fragile against shock such as falling, handle it with care, and never reuse it if it is damaged.
- ⚠ Keep the record for each KDPF unit to manage the service life, and never use KDPF exceeding its service life.
- ⚠ The V-clamp and band used for KDPF are made of stainless steel, accordingly never use an impact wrench for removal and installation of nuts to avoid damage on the threaded portion.

REMARK

- When removing gasket and band, prepare a new gasket and band.
- In the following procedures, the size of some tools to be used is expressed in both units of mm and inch, however, general tools are available for them.
- After cleaning or replacing KDPF, be sure to perform the following works.
 - Clean and degrease KDPF body and around it.
 - After installing it to the machine, start the engine and check for fuel leakage and sticking soot.

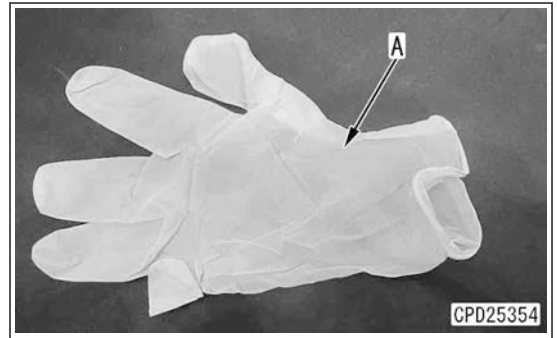
METHOD FOR DISASSEMBLING KDPF ASSEMBLY

Preparation

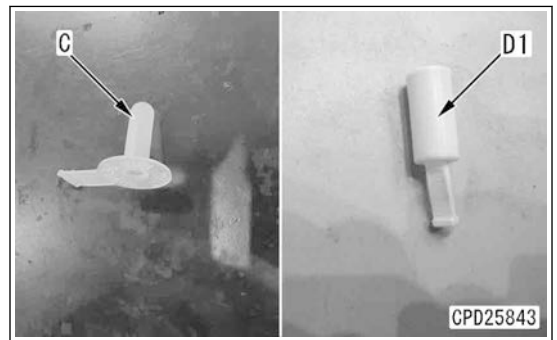
1. Prepare the blocks (A) according to the dimensions shown in the right figure.

NOTICE

- When handling AdBlue/DEF hose, be sure to use the vinyl gloves (A).



- After disconnecting AdBlue/DEF hose, install the cap (C) to the hose side, and the cap (D1) to AdBlue/DEF injector side to prevent leakage.

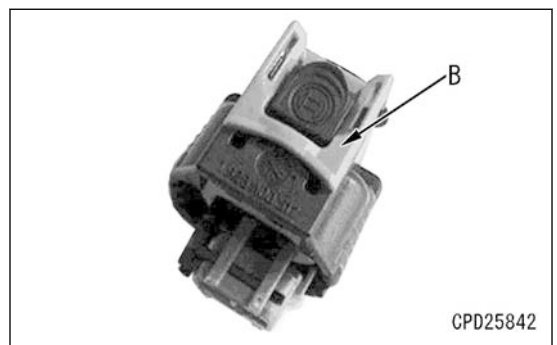
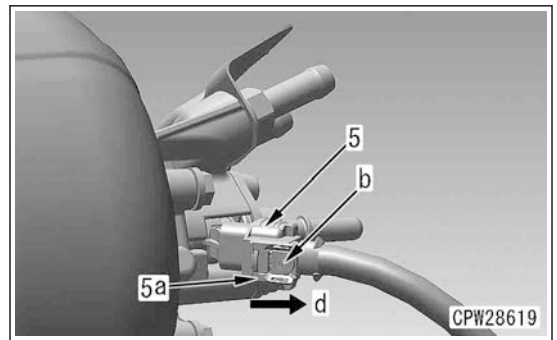


7. Disconnect the connector UDM (5) according to the following procedure.

- 1) Slide the red lever (5a) toward the unlock position (d).
- 2) While pressing the knob (b) with your fingers, disconnect the connector UDM (5).

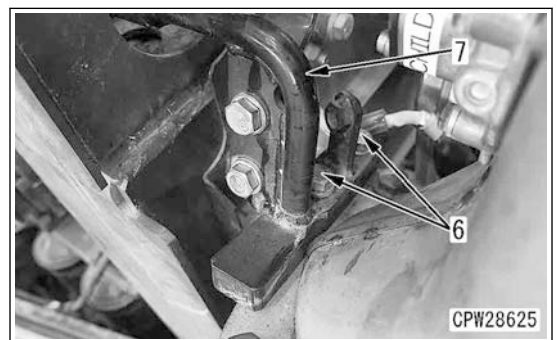
NOTICE

- Disconnect AdBlue/DEF hose (4), and then disconnect the connector UDM (5). (In order to prevent AdBlue/DEF from sticking to the wiring connector)
- After disconnecting the connector UDM (5), install the cap (B) to the electrical connector side of AdBlue/DEF injector. (In order to prevent entry of the foreign materials)



AdBlue/DEF mixing tube

8. Remove the bolts (6) (2 pieces), and remove the bracket (7).



REMOVE AND INSTALL AIR CONDITIONER COMPRESSOR ASSEMBLY

- ⚠ Place the machine on a level ground, and set the parking brake switch to ON position.
- ⚠ Set the frame lock bar to LOCK position, and chock the tires.
- ⚠ Lower the work equipment to the ground, and set the work equipment lock switch to LOCK position.
- ⚠ Turn the starting switch to OFF position to stop the engine.
- ⚠ Turn the battery disconnect switch to OFF position. (For details, see TESTING AND ADJUSTING, "HANDLE BATTERY DISCONNECT SWITCH".)
- ⚠ Collect the air conditioner refrigerant (air conditioner gas: R134a) from the air conditioner circuit before disconnecting the air conditioner hose.
- ⚠ If refrigerant gas (air conditioner gas: R134a) gets in your eyes, you may lose your sight. If it touches your skin, you may suffer from frostbite. Accordingly, put on the protective eyeglasses, gloves, and working clothes with long sleeves while you are collecting or filling the refrigerant.
- ⚠ Ask a qualified person for collecting, adding, and filling operations of the refrigerant (air conditioner gas: R134a).
- ⚠ Never release the refrigerant (air conditioner gas: R134a) to the atmosphere.

METHOD FOR REMOVING AIR CONDITIONER COMPRESSOR ASSEMBLY

Alternator belt

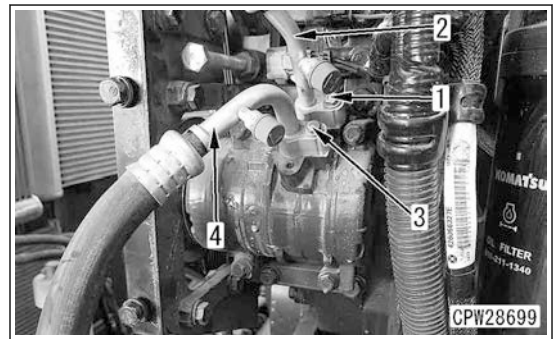
1. Remove the alternator belt. For details, see "REMOVE AND INSTALL ALTERNATOR BELT".

Air conditioner gas

2. Collect refrigerant (air conditioner gas: R134a).
Quantity of refrigerant to be collected: 850±50 g

Hose, clamp, connector

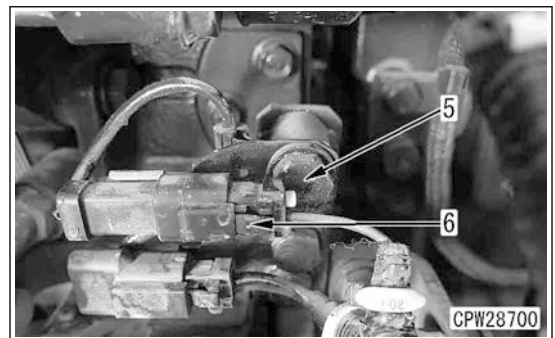
3. Remove the bolt (1), and disconnect the air conditioner hose (2).
4. Remove the bolt (3), and disconnect the air conditioner hose (4).



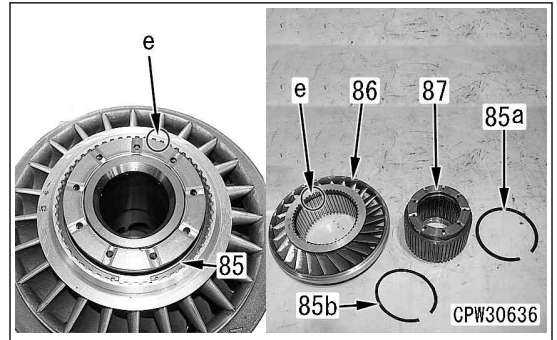
REMARK

When disconnecting the air conditioner circuit piping, be careful of the following points.

- Be careful that dirt, dust, water, etc. do not enter the air conditioner piping.
 - Plug the fittings.
 - Do not remove the plugs that have been installed to the fittings until just before connecting the pipe.
 - Check that the O-rings are fitted to the joints of the air conditioner piping.
 - Check that O-ring is not damaged or deteriorated.
5. Disconnect the connector E08 (6), and remove the clamp (5).



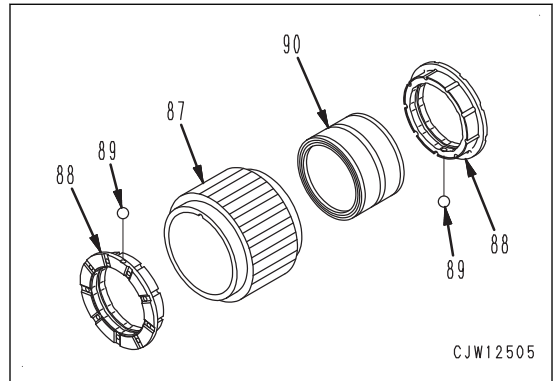
- 81. Remove upper snap ring (85a).
- 82. Remove the race (87) from the stator (86).
- 83. Remove lower snap ring (85b).



- 84. Remove the bushings (88), the balls (89) and the free wheel (90) from the race (87).

REMARK

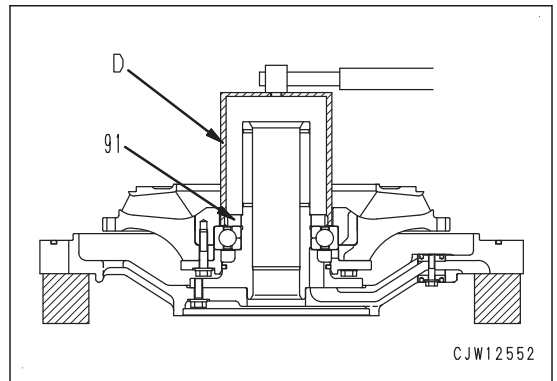
Be careful not to lose the balls.



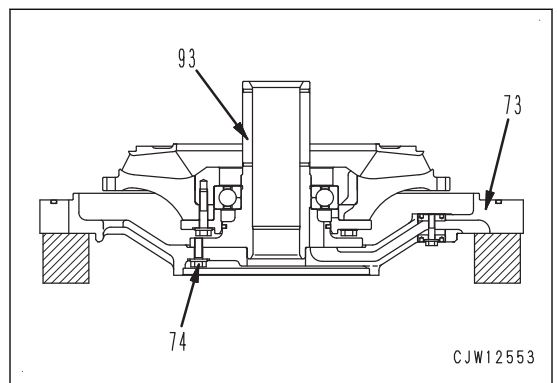
- 85. Remove the lock nut (91) by using the wrench (D).

REMARK

Be careful that the lock nut (91) is a left-hand screw.

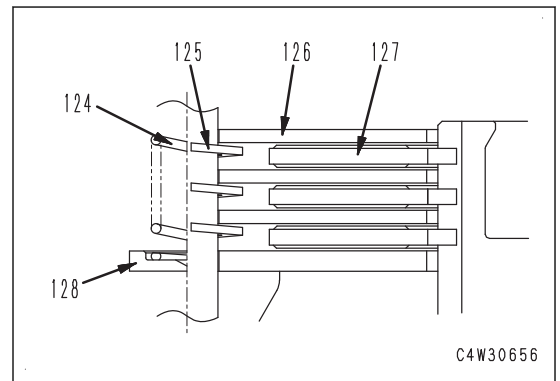
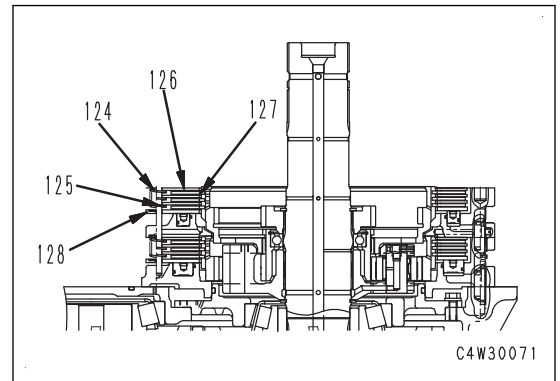


- 86. Remove the bolts (74) (14 pieces).
- 87. Remove the stator shaft assembly (93) from the housing (73).



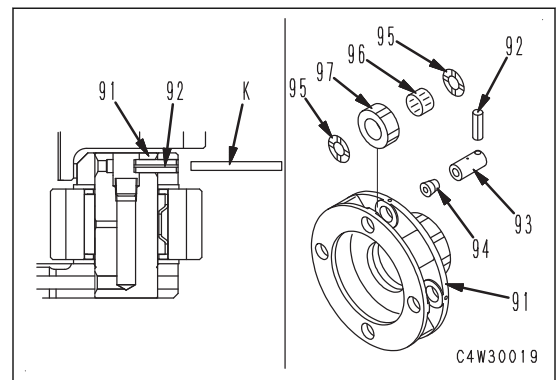
Disc, plate, spring

27. Install the bottom plate (128).
28. Install the discs (127) (3 pieces), the spring (125), and the plates (126) (3 pieces) alternately.
29. Install the spring (124).





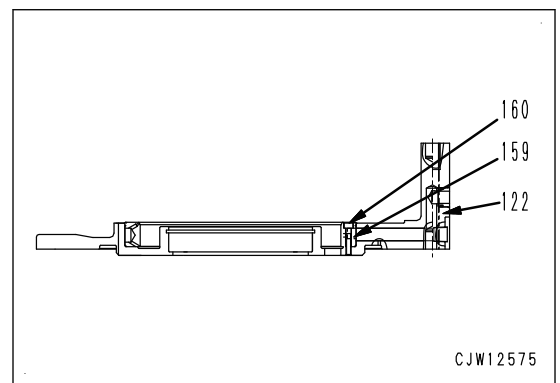
Assembling No.5 carrier assembly

30. Install the thrust washers (95), the bearing (96), the planetary gear (97), the plug (94), and the shaft (93) to No.5 carrier (91).
31. Drive in the roll pin (92) by using the push tool (K).



32. Install the spacer (159) to No.4 housing (122), and tighten the bolts (160) (2 pieces).

-  Bolt (160):
Liquid adhesive (LT-2)
-  Bolt (160):
11.8 to 14.7 Nm {1.2 to 1.5 kgfm}

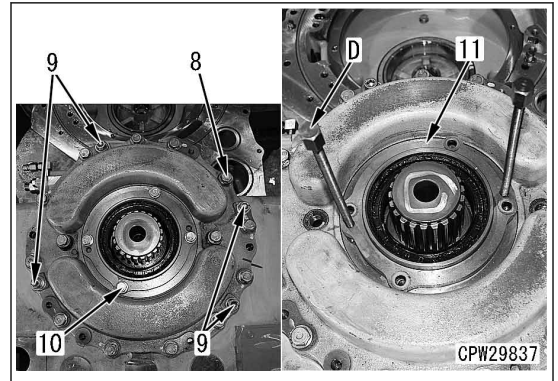


- Remove the bolts (8) (12 pieces).

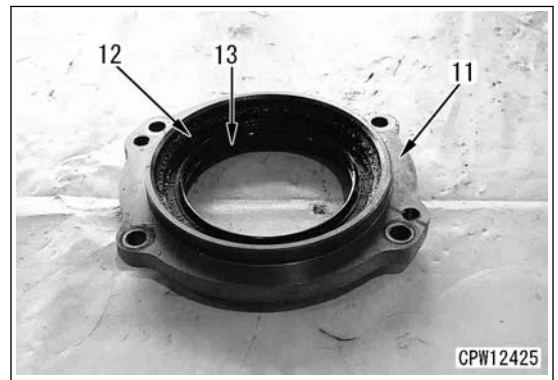
REMARK

Do not remove the hexagonal socket head bolts (4 pieces).

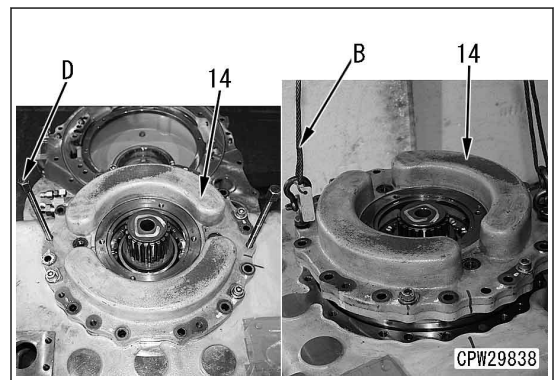
- Remove the bolts (10) (4 pieces).
- Remove the seal cage (11) by using the guide bolts (D).



- Remove the oil seal (12) and the dust seal (13) from the seal cage (11).



- Disconnect the parking brake assembly (14) by using the guide bolts (D).
- Remove the parking brake assembly (14) by using the lifting tool (B).



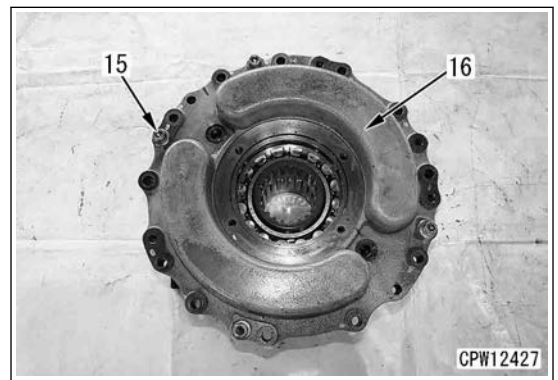
Cover assembly

- Remove the hexagonal socket head bolts (15) (4 pieces) from the cover (16).

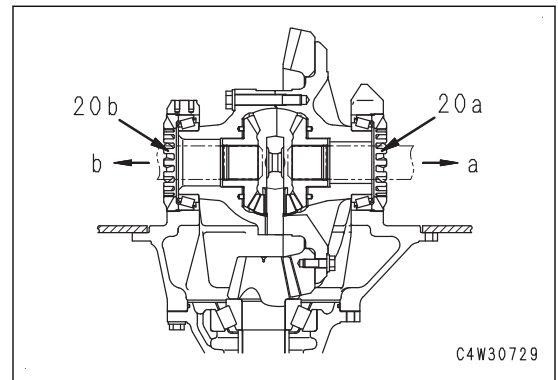
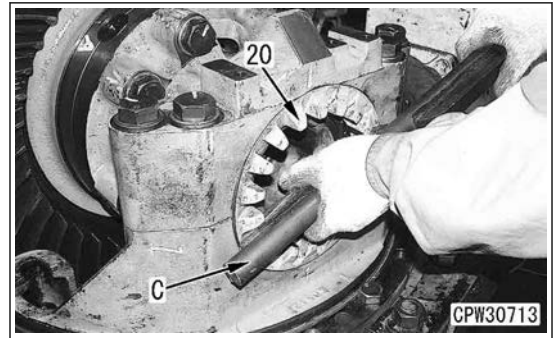
REMARK

Since the springs floats the cover, loosen the hexagonal socket head bolts evenly and gradually.

- By using the lifting tool (B), sling the cover (16), and remove it.



41. If the backlash is out of the standard value, move the bevel gear with the adjustment nuts (20) by using the wrench (C) for adjustment..
42. Rotate both sides of the nuts by the same amount and direction not to change the preload applied to the bearing (24).
43. If the backlash is below the standard value, loosen the adjustment nut (20a) on the bevel gear side, and tighten the the adjustment nut (20b). (Direction a)
44. If the backlash is above the standard value, loosen the adjustment nut (20b) on the opposite side of the bevel gear, and tighten the the adjustment nut (20a). (Direction b)

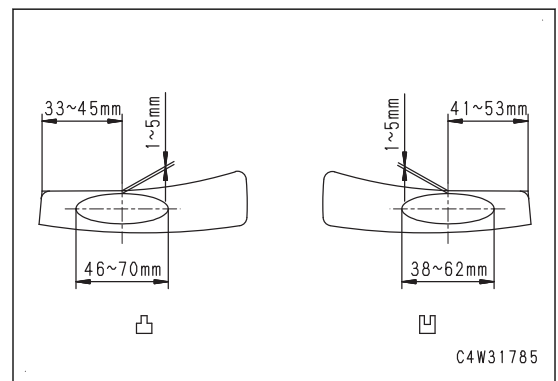


Checking the tooth contact

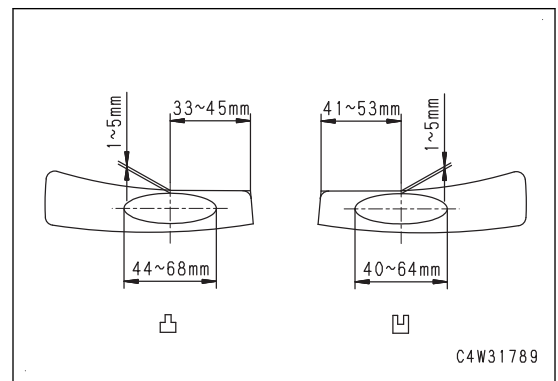
45. Thinly apply some red lead on the bevel gear tooth surface, rotate the bevel gear back and forth, and check the tooth contact pattern on the bevel gear.

REMARK

Check that the each concave and convex surface is within the range shown in the figure.
Bevel gear for the front



Bevel gear for the rear



Adjusting the tooth contact

46. If no right pattern of tooth contact is obtained as a result of checking, adjust it.
 - 1) Adjustment is done by moving the bevel gear and increasing or decreasing the shims of the cage assembly (to move the bevel pinion).
Thickness of shim: 0.05, 0.2, 0.3, 1.0 mm

41. Install O-ring (31), and install the pin (7).
42. When replacing the dust seal (D), install it so that the lips (L) and (LL) of the dust seal face outward.



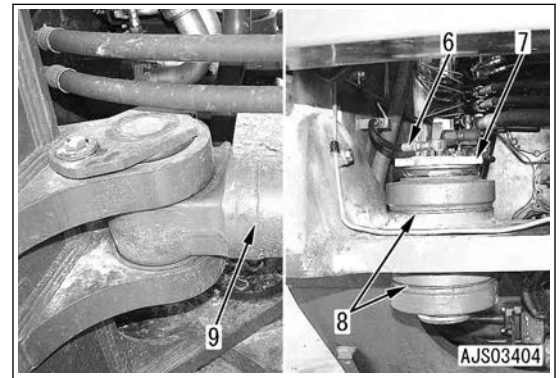
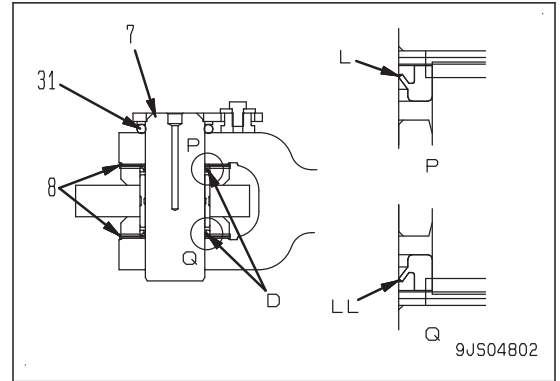
Lip of the dust seal:
Lubricant (LM-P)

Thickness of shim (8): 0.2, 0.5, 1.5, 3 mm

43. Connect the hose (6).

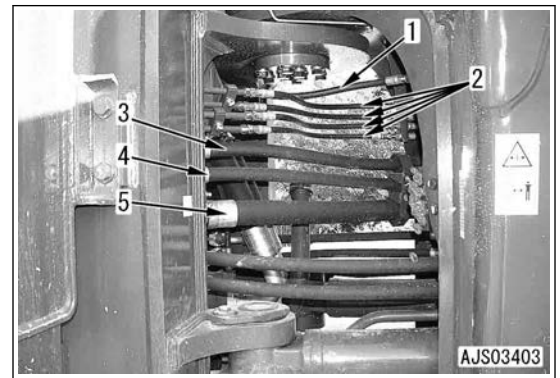
REMARK

Perform the same work also on the opposite side.



Hose

44. Connect the hoses (3), (4), and (5).
45. Connect the hoses (2) (4 pieces).
46. Connect the hose (1).



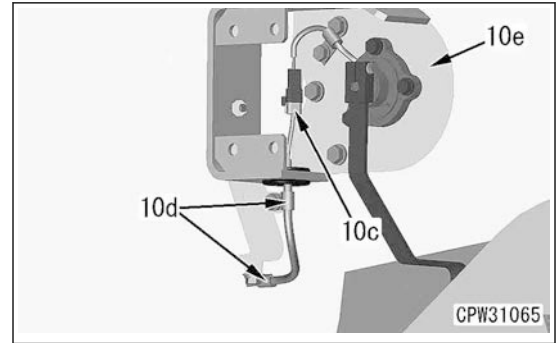
Floor frame assembly

47. Install the floor frame assembly. For details, see "REMOVE AND INSTALL FLOOR FRAME ASSEMBLY".

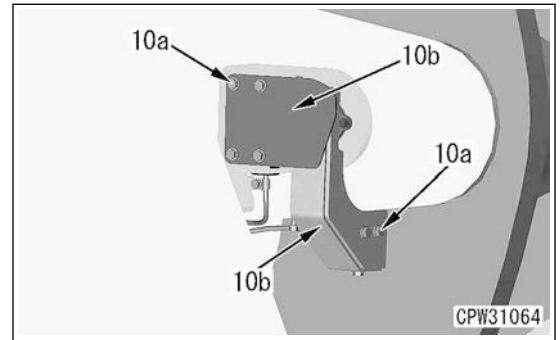
Work equipment assembly

48. Install the work equipment assembly. For details, see "REMOVE AND INSTALL WORK EQUIPMENT ASSEMBLY".

15. Install the clamps (10d) (2 places), and connect the connector NO5 (10c).




16. Install the covers (10b) (2 places) with the bolts (10a) (7 pieces).



17. Connect the pin greasing hose (3).

18. Sling the bucket, and hold it.

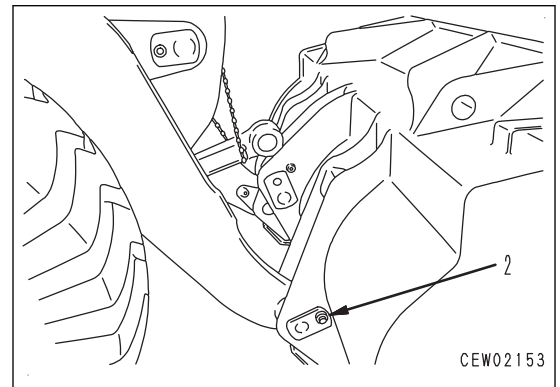
- 1) Operate the control lever, align the holes of the bucket hinge pin (2), and install the cord ring (25).

 Groove of the cord ring (25):
Molybdenum disulfide lubricant (LM-G)


- 2) Insert the shim into the clearance (b).

Clearance (b): 1.5 mm or less

Type of shim thickness: 1.5 mm




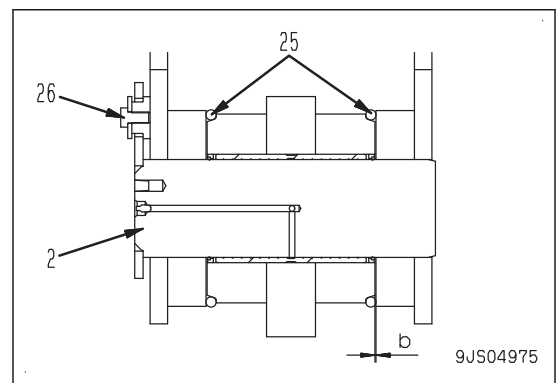
- 3) Install the pin (2), and lock it with the bolt (26).

 Bucket hinge pin (2):
55 kg

REMARK

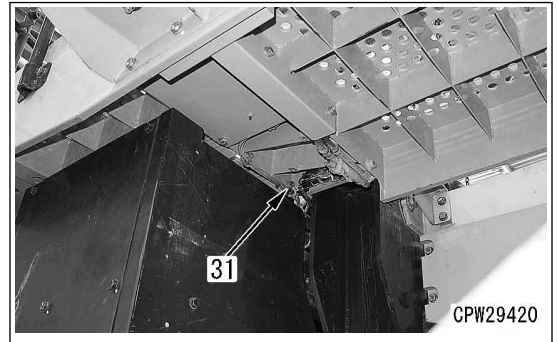
- Take care not to damage the pin and the seal.
- After installing the pin, grease it.

 Greasing:
Molybdenum disulfide lubricant (LM-G)

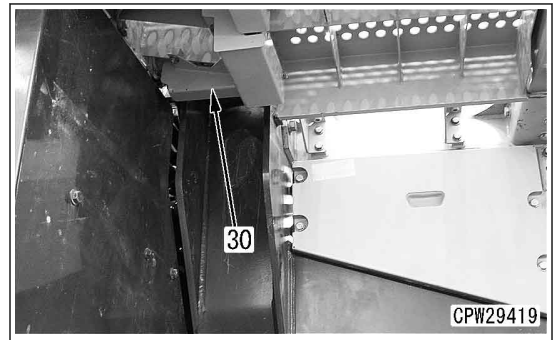


Hose, connector

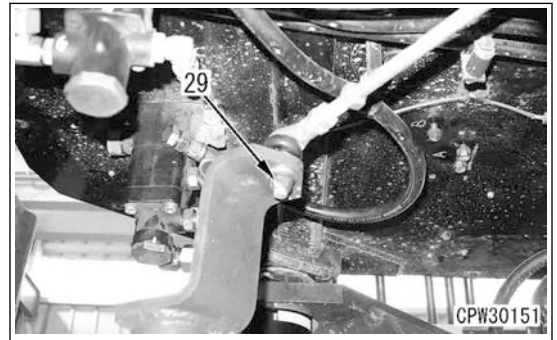
3. Connect the hoses (31) (2 pieces).



4. Install the frame (30).



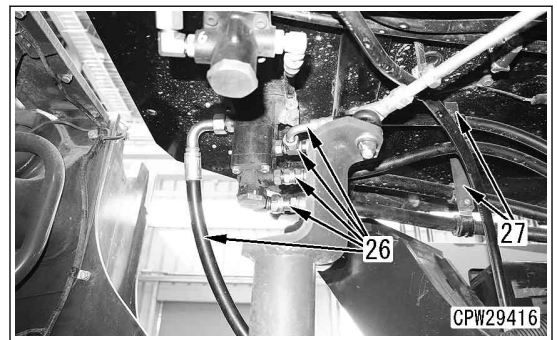
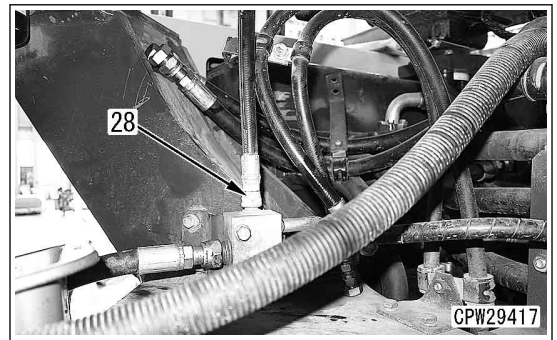
5. Install the nut (29).



6. Connect the hose (28).

7. Install the brackets (27) (2 places).

8. Connect the hoses (26) (5 pieces).



REMOVE AND INSTALL MONITOR CONTROLLER ASSEMBLY

- ⚠ Place the machine on a level ground, and set the parking brake switch to ON position.
- ⚠ Set the frame lock bar to LOCK position, and chock the tires.
- ⚠ Lower the work equipment to the ground, and set the work equipment lock switch to ON position.
- ⚠ Turn the starting switch to OFF position to stop the engine.
- ⚠ Turn the battery disconnect switch to OFF position. (For details, see TESTING AND ADJUSTING, "HANDLE BATTERY DISCONNECT SWITCH".)

METHOD FOR REMOVING MONITOR CONTROLLER ASSEMBLY

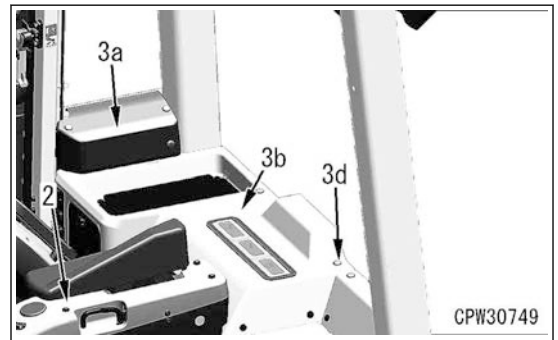
Operator's seat

1. Tilt the operator's seat (1) forward.
2. Move AJSS console (2) to the forward end.



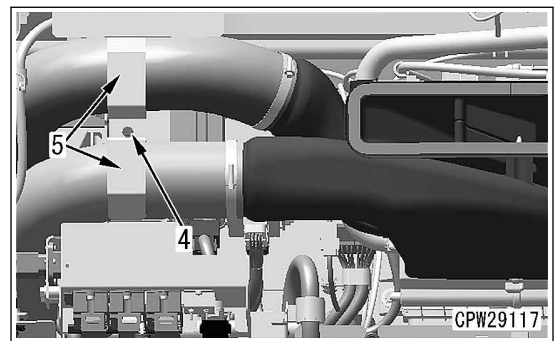
Cover

3. Remove the bolts (3d) (12 pieces), and remove the covers (3a) and (3b).

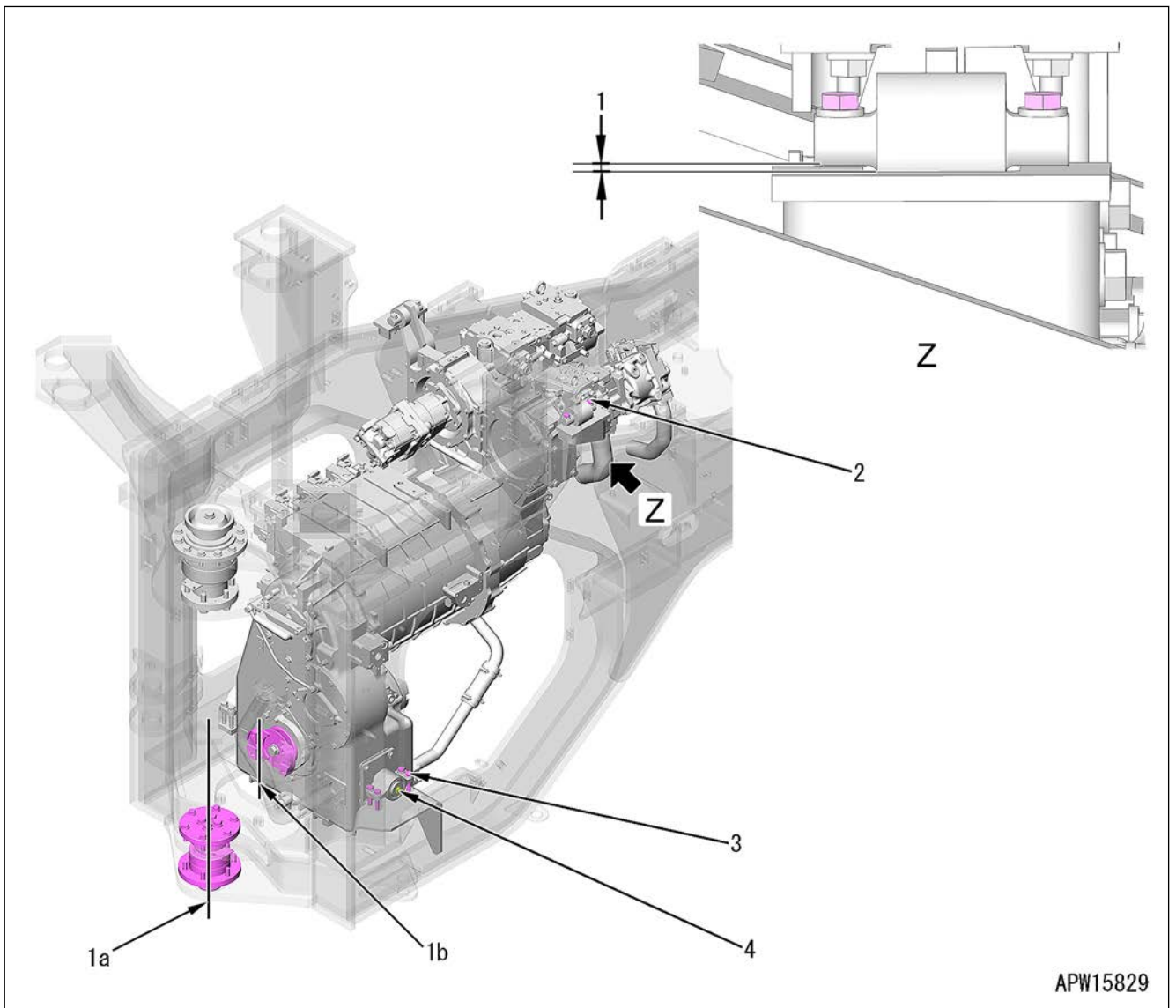


Air conditioner duct

4. Remove the bolts (4), and remove the bracket (5).



MAINTENANCE STANDARD OF TRANSMISSION MOUNT



APW15829

No.	Item	Judgment criteria	Remedy
1	Standard thickness of transmission mount shim	Parallelism of center pin center (1a) and transmission output yoke mating face (1b) is 0.1 mm or less	Adjustment
2	Tightening torque of bolt	157 to 196 Nm {16 to 20 kgfm}	Retighten
3	Tightening torque of bolt	245 to 309 Nm {25.0 to 31.5 kgfm}	
4	Tightening torque of bolt	245 to 309 Nm {25.0 to 31.5 kgfm}	

Unit: mm

No.	Item		Judgment criteria				Remedy
			Standard dimensions	Tolerance		Standard clearance	
	Shaft	Hole					
1	Clearance between planetary shaft and bearing		60	+0.015	0	-0.030 to -0.002	
				+0.002	-0.015		
2	Clearance between ring gear hub and bearing		266.7	+0.066	+0.025	-0.066 to -0.009	
				+0.034	0		
3	Thickness of ring gear hub mounting retainer		Standard dimensions	Tolerance		Repair limit	Replace
			22	±0.1		21.6	
4	Backlash between planetary gear and ring gear		0.19				
5	Backlash between planetary gear and ring gear		0.20				
6	Wheel hub standard shim thickness		2.35				
7	Tightening torque of mounting bolt	1st time	62.8±4.9 Nm {6.4±0.5 kgfm} (Preload: 7845 to 23544 N {800 to 2400 kg})				Retighten
		2nd time	279±29.4 Nm {28.5±3.0 kgfm}				
8	Clearance between wheel hub and bearing		Standard dimensions	Tolerance		Standard clearance	Allowable clearance
				Shaft	Hole		
			355.6	+0.051 0	-0.042 -0.078	-0.129 to -0.042	-
9	Clearance between tube and bearing		240.0	+0.033	0	-0.063 to -0.004	
				+0.004	-0.030		
10	Clearance between wheel hub and bearing		320.0	0	-0.077	-0.109 to -0.037	
				-0.040	-0.109		
11	Tightening torque of plug		58.8 to 78.4 Nm {6.0 to 8.0 kgfm}				Retighten
12	Tightening torque of bolt		98 to 123 Nm {10.0 to 12.5 kgfm}				
13	Tightening torque of bolt		27 to 34 Nm {2.8 to 3.5 kgfm}				
14	Tightening torque of bolt		98 to 123 Nm {10.0 to 12.5 kgfm}				
15	Tightening torque of bolt		59 to 74 Nm {6.0 to 7.5 kgfm}				
16	Tightening torque of bolt		98 to 123 Nm {10.0 to 12.5 kgfm}				

No.	Item	Judgment criteria	Remedy
1	Tightening torque of plug	19.6 to 24.5 Nm {2.0 to 2.5 kgfm}	Retighten
2	Tightening torque of plug	65.7 to 82.3 Nm {6.7 to 8.4 kgfm}	
3	Tightening torque of valve	49 to 58.5 Nm {5 to 6 kgfm}	
4	Tightening torque of plug	34.3 to 44.1 Nm {3.5 to 4.5 kgfm}	
5	Tightening torque of valve	147.1 to 186.3 Nm {15 to 19 kgfm}	

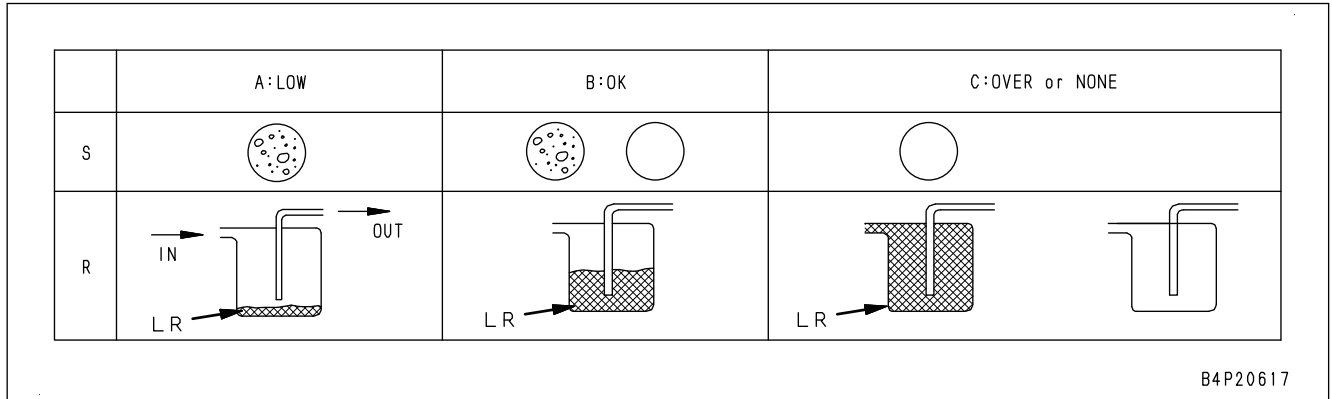
*3: If refrigerant leakage is spotted, compressor oil circulating in the air conditioner circuit definitely leaks from that point.

In such a case, retighten according to the tightening torque table in "Precautions for disconnecting and connecting air conditioner piping".

*4: Start the engine, turn the air conditioner switch ON, and check.

Simple check of refrigerant amount through sight glass

Start the engine and turn the air conditioner switch ON, and check after 5 minutes.



S: Condition viewed through sight glass

LR: Liquid refrigerant

R: State of refrigerant volume

A: When bubbles are continuously seen, the quantity of refrigerant is insufficient

B: When bubbles are seen intermittently, the quantity of refrigerant is proper

C: When bubbles cannot be seen (i.e., the liquid is clear), the system has too much refrigerant or no refrigerant

The above is a generally known method. However, use it for reference only, since there are exceptions.

Referring to "Troubleshooting by gauge pressure", judge by the gauge pressure.

A-2 TROUBLESHOOTING FOR COMPRESSOR AND REFRIGERANT SYSTEM (AIR IS NOT COOLED)

Failure	Air is not cooled because of compressor or refrigerant system failure
Phenomenon on machine	When engine is started and air conditioner switch is pressed on air conditioner screen of machine monitor, air is not cooled as displayed on screen. Air conditioner compressor does not operate.
Related information	<ul style="list-style-type: none"> Referring to inspection by self-diagnosis function, display electrical system abnormality record screen, and check if refrigerant is abnormal by display of [879GKX]. If refrigerant is abnormal, compressor is not turned ON, thus air is not cooled. Abnormal refrigerant pressure indicates that signal ((21) of connector ACECU) from the dual pressure switch is not grounded. Air conditioner may not turn ON at 3 °C or below (normal). When air does not come out, see “Troubleshooting of blower motor system”. For each connector and fuse, see “Installation locations of air conditioner parts and arrangement of connectors”. Connectors, except E08, have no T-adapter Since air conditioner controller connector ACECU has no T-adapter and has small pins, perform troubleshooting by using intermediate connector (although intermediate connector has no T-adapter either, it has large pins). When replacing air conditioner harness between air conditioner controller connector ACECU and intermediate connector, replace air conditioner unit.

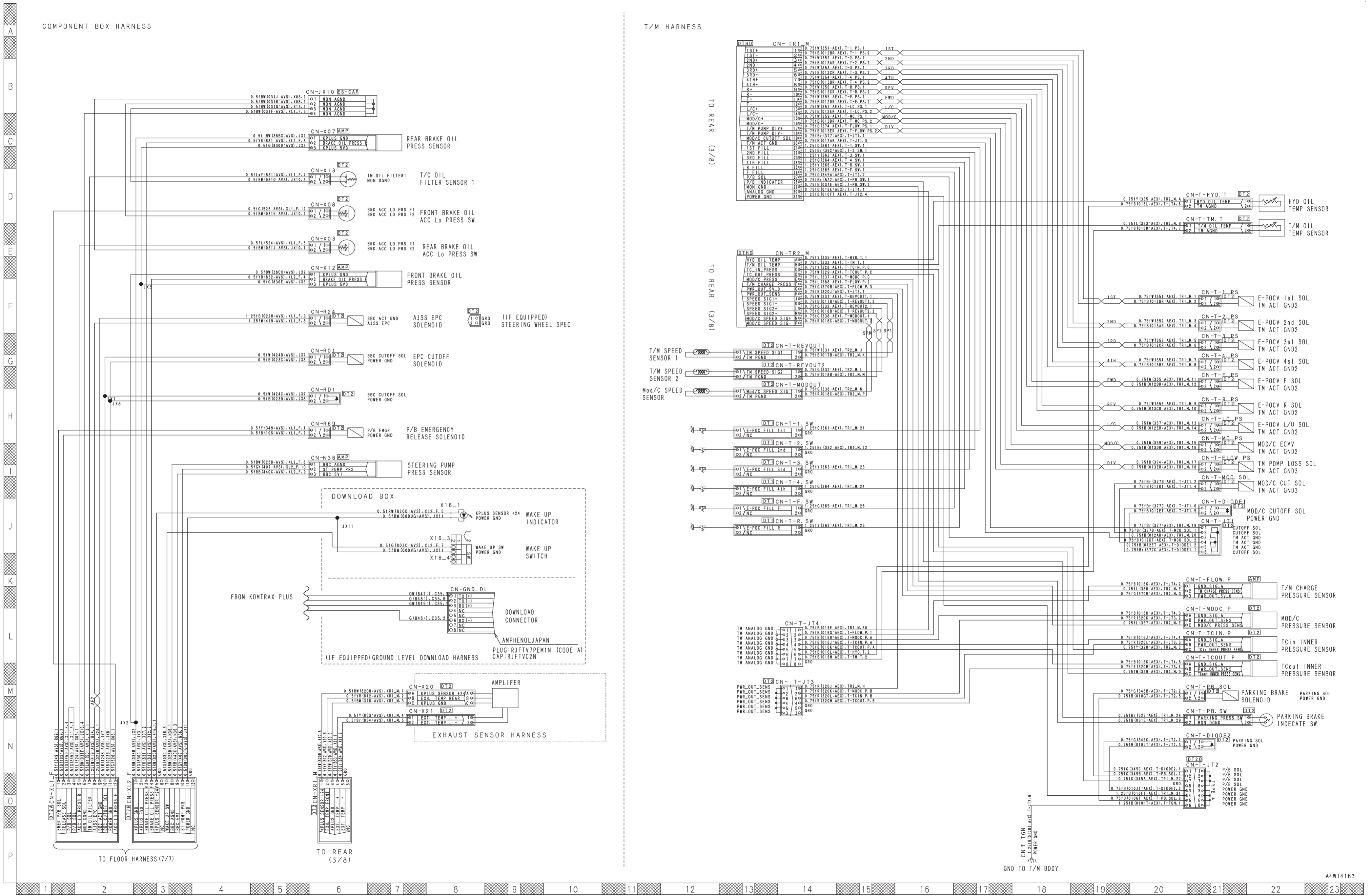
No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective dual pressure switch system	<ul style="list-style-type: none"> Perform this procedure when failure code [879GKX] is displayed on electrical system failure record screen of machine monitor. See 80 APPENDIX, “TEST (DUSL) PRESSURE SWITCH FOR REFRIGERANT”. In certain cases, the dual pressure switch may be operating normally and set to OFF position, therefore, if abnormality is indicated (i.e., switch OFF), attach a pressure gauge to the air conditioner compressor and check the refrigerant pressure. (See “Troubleshooting with gauge pressure”.) <p>⚠ Before replacing dual pressure switch, collect refrigerant. See 80 APPENDIX, “PRECAUTIONS FOR REFRIGERANT”.</p>			
2	Defective air conditioner compressor	<p>Check the connection of ground cable of the air conditioner compressor.</p> <ol style="list-style-type: none"> Turn starting switch to OFF position. Disconnect connector E08 from the air conditioner compressor and connect T-adapter to the male side. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Resistance</td> <td style="width: 60%;">Between connector E08 (male) (1) and ground (resistance of air conditioner compressor coil)</td> <td style="width: 20%;">Approx. 15 Ω</td> </tr> </table>	Resistance	Between connector E08 (male) (1) and ground (resistance of air conditioner compressor coil)	Approx. 15 Ω
Resistance	Between connector E08 (male) (1) and ground (resistance of air conditioner compressor coil)	Approx. 15 Ω			
3	Defective compressor clutch relay (it is not turned ON)	Referring to “METHOD FOR TESTING RELAYS”, check compressor clutch relay.			

ELECTRICAL CIRCUIT DIAGRAM OF MACHINE (2/8)

WA600-8

REMARK

This figure includes the equipment and device that are unavailable as optional items in some areas.

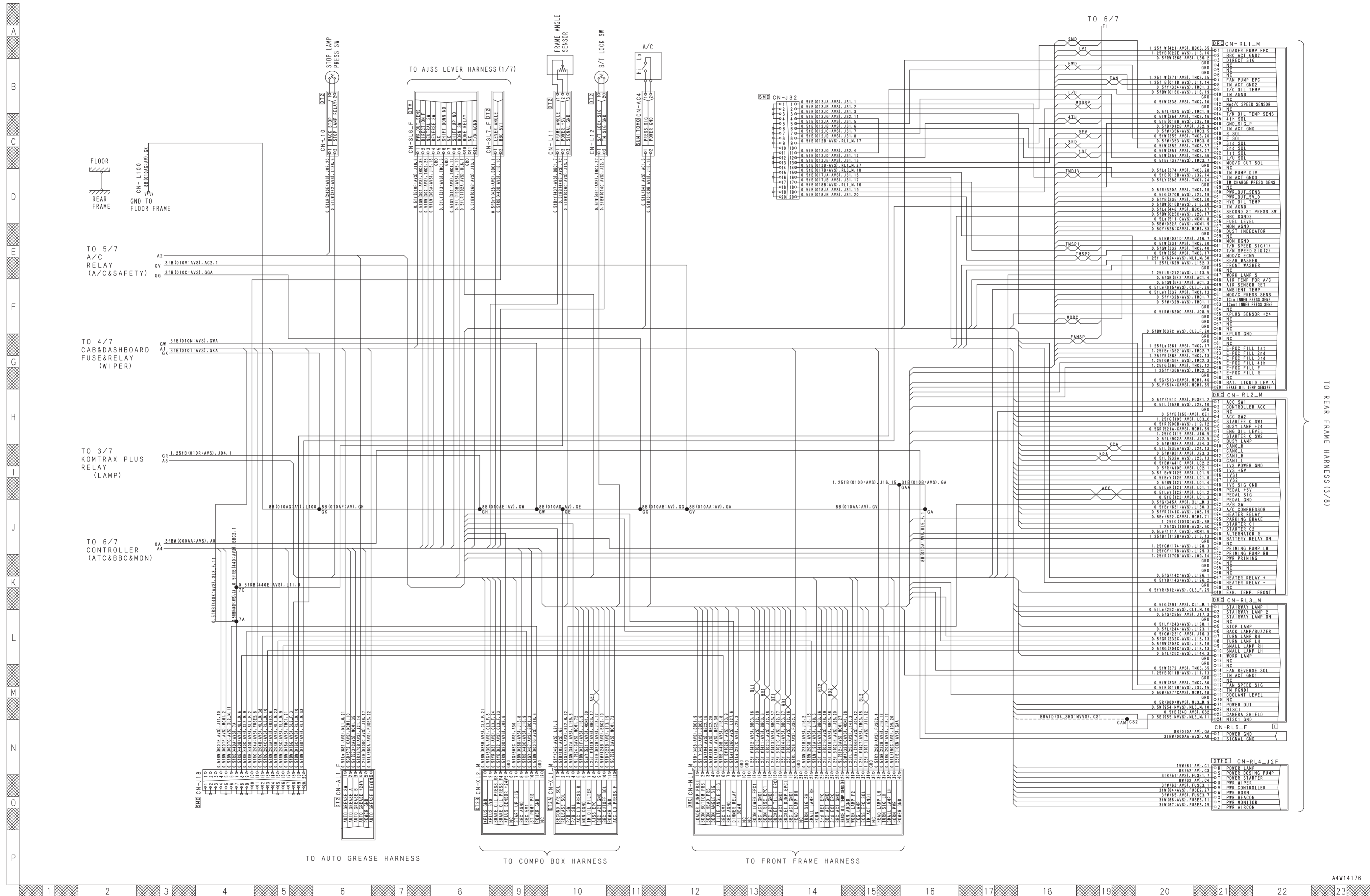


ELECTRICAL CIRCUIT DIAGRAM OF FLOOR (FOR AJSS SPEC) (7/7)

WA600-8

REMARK

This figure includes the equipment and device that are unavailable as optional items in some areas.



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