SMEW480800-00

Shop Manual

WHEEL LOADER **WA480-8**

SERIAL NUMBERS DZCT0001 and up

KOMATSU

Nominal diameter of rope (mm)	Allowable load (kN {t})
50	221.6 {22.6}
60	318.3 {32.4}

Precautions for disconnecting air conditioner piping

NOTICE

When replacing the air conditioner unit, air conditioner compressor, condenser or receiver drier, etc., collect the refrigerant (air conditioner gas: R134a) from the air conditioner circuit before disconnecting the air conditioner hoses.

REMARK

- 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.

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

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

Precautions for air conditioner piping

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

  REMARK

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

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

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

Nominal No.			0.5f	0.5	0.75f	0.85	1.25f	1.25
Coating D	CAVS	Standard	-	1.6	-	1.8	-	2.1

Nominal No.			0.5f	0.75f	1.25f	2f
Conductor		Number of strands	19	19	37	37
		Diameter of strand	0.19	0.23	0.21	0.26
		Cross-sectional area (mm^2)	0.54	0.79	1.28	2
		d (approx.)	1	1.2	1.5	1.8
Coating D	AVSS	Standard	1.6	1.8	2.1	2.6

Nominal No.			0.5f	0.75f	1.25f	2f
Conductor		Number of strands	19	19	37	37
		Diameter of strand	0.19	0.23	0.21	0.26
		Cross-sectional area (mm^2)	0.5387	0.7894	1.282	1.964
		d (approx.)	1	1.2	1.5	1.8
Coating D	AESSX	Standard	1.6	1.8	2.1	2.6

REMARK

“f” of nominal No. denotes “flexible”.

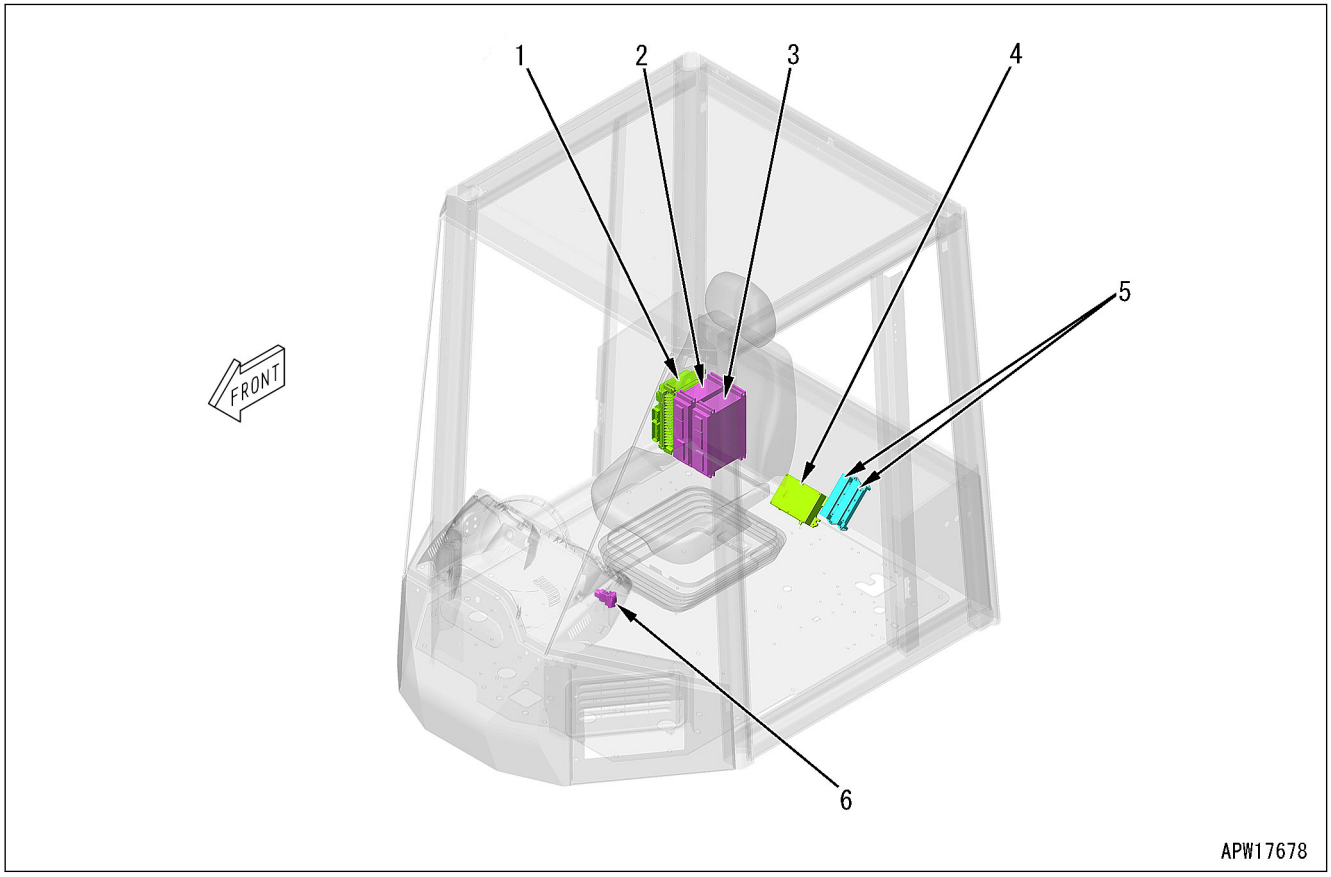
Color codes table

(Table 3)

Color Code	Color of wire	Color Code	Color of wire
B	Black	LgW	Light green and White
Br	Brown	LgY	Light green and Yellow
BrB	Brown and Black	LR	Blue and Red
BrR	Brown and Red	LW	Blue and White
BrW	Brown and White	LY	Blue and Yellow
BrY	Brown and Yellow	O	Orange
Ch	Charcoal	P	Pink
Dg	Dark green	R	Red
G	Green	RB	Red and Black
GB	Green and Black	RG	Red and Green
GL	Green and Blue	RL	Red and Blue
Gr	Gray	RW	Red and White
GR	Green and Red	RY	Red and Yellow

CONTENTS

Around the cab and floor



1: Monitor controller
2: Transmission controller
3: Work equipment controller
4: KOMTRAX terminal
5: Fuse box
6: Engine shutdown secondary switch

- Normal fan control based on “COOLING FAN SPEED CONTROL FUNCTION BY TEMPERATURE” is performed.

COOLING FAN SPEED CONTROL FUNCTION AT CHARGING BRAKE CIRCUIT ACCUMULATOR

- Fan pump is used for charging the brake accumulator as well.
- This function controls fan speed differently from the normal control when temperature is normal when the brake accumulator is being charged to prevent the fan from stopping during the charge, and the charge time is shortened.
- For 10 seconds after the brake accumulator pressure drop signal goes off, the minimum fan speed is set to 750 rpm.
- If the brake accumulator pressure signal has already gone off, and the control at starting of the engine is finished, minimum fan speed is 750 rpm for 10 seconds at starting of the engine.

COOLING FAN REVERSE ROTATION FUNCTION

- When “Manual Fan Reverse Mode”is operated on the user menu of the machine monitor to clean the radiator core, the cooling fan reverse solenoid valve of the cooling fan motor operates to reverse the fan rotation.

Fan automatic reverse rotation function

1. Fan manual reverse rotation function
   - Operator can change the fan rotation direction freely by setting “Manual Fan Reverse Mode” to “Reverse” or “Normal”.
   - Pilot lamp is displayed on the standard screen to notify the operator of the operating condition while the fan rotation direction is being changed. If the changing condition is not met because of high temperature of the coolant or oil, the change condition waiting pilot lamp lights up.
   - On the standard screen, there is a cooling fan reverse pilot lamp which indicates the fan reverse rotation condition.

   The fan rotation is switched from “Normal” to “Reverse” when all of the following condition are met.

Condition 1	Manual Fan Reverse Mode is set to Reverse.
Condition 2	Coolant temperature is below 102 °C. (In order to prevent overheat.)
Condition 3	Hydraulic oil temperature is below 97 °C. (In order to prevent overheat.)
Condition 4	Torque converter oil temperature is below 120 °C. (In order to prevent overheat.)
Condition 5	At least 10 seconds have elapsed after going off of the brake accumulator pressure drop signal. At least 10 seconds have elapsed after starting of the engine even if the accumulator pressure drop signal was already off at starting of the engine. (In order to ensure that enough oil is fed to the brake accumulator.)
Condition 6	Neither in fan speed sensor nor in engine speed sensor error has occurred.

   The fan rotation is switched from Reverse to Normal when any of the following conditions is met.

Condition 1	Manual Fan Reverse Mode is set to Normal while the fan is rotating in reverse.
Condition 2	Fan has been rotating in reverse for 10 minutes.
Condition 3	An error is detected in the fan reverse solenoid or fan pump EPC solenoid.
Condition 4	Engine has stopped.

2. Fan automatic reverse rotation function

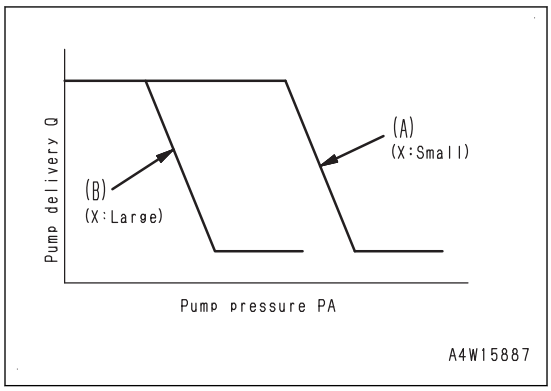
Symbol	Item to be shown	Range and method to show			Remarks
		Range	Warning lamp display (background colour)	Action level display	
 9JC01170	Engine system (*1)	When the action level L04, L03 is detected	Lights up (red)	L04, L03	• When there is an abnormality in the engine system, the caution lamp lights up. • When the background colour of the caution lamp is red, the centralized warning lamp lights up. Alarm buzzer sounds continuously at action level L04, and alarm buzzer sounds intermittently at action level L03.
		When action level L01 is detected	Lights up (yellow)	L01 (*2)	
 9JC01172	KDPF system (*1)	When the action level L04, L03 is detected	Lights up (red)	L04, L03	• When there is an abnormality in the KDPF system, the caution lamp lights up. • When the background colour of the caution lamp is red, the centralized warning lamp lights up. Alarm buzzer sounds continuously at action level L04, and alarm buzzer sounds intermittently at action level L03.
		When action level L01 is detected	Lights up (yellow)	L01 (*2)	
 9JC01173	KDPF soot accumulation (*1)	When action level L03 is detected	Lights up (red)	L03	• When soot is largely accumulated in KDPF or there is a system error such as deterioration of the regeneration function, the alarm buzzer lights up. • When the background colour of the caution lamp is red, the centralized warning lamp lights up. Alarm buzzer sounds intermittently.
		When action level L01 is detected	Lights up (yellow)	L01 (*2)	
 9JC01174	Engine Overrun (*1)	When engine speed is Min. 2525 rpm	Lights up (red)	L02	Centralized warning lamp lights up and alarm buzzer sounds intermittently.
		When engine speed is Min. 2425 rpm	Lights up (yellow)	-	
 9JC01164	Engine oil pressure (*1)	When there is abnormality (below specified value)	Lights up (red)	L03	When there is abnormality during engine running, centralized warning lamp lights up and alarm buzzer sounds intermittently.

Pin No.	Signal name	Input/Output
18	(*1)	-
19	(*1)	-
20	(*1)	-
21	Datalink4 (+) (Sensor controller)	Communication
22	Datalink4 (+) (KOMNET/c)	Communication
23	(*1)	-
24	(*1)	-
25	Power supply (+24 V, continuous)	Power supply
26	Power supply (+24 V, continuous)	Power supply
27	Power supply (+24 V, continuous)	Power supply
28	Power supply (+24 V, continuous)	Power supply
29	(*1)	-
30	(*1)	-
31	(*1)	-
32	GND	Ground/Shield/ Return
33	GND	Ground/Shield/ Return
34	(*1)	-
35	(*1)	-
36	(*1)	-
37	(*1)	-
38	AdBlue/DEF line heater 2	Input
39	AdBlue/DEF line heater 1	Input
40	(*1)	-
41	KDPF differential pressure sensor	Input
42	KDPF outlet pressure sensor	Input
43	(*1): Machine equipped with fuel control dial Idle validation switch 2: Machine with accelerator pedal	-
44	(*1): Machine equipped with fuel control dial Idle validation switch 1: Machine with accelerator pedal	-
45	Datalink4 (-) (Sensor controller)	Communication
46	Datalink4 (-) (KOMNET/c)	Communication
47	(*1)	-
48	System operating lamp	Output
49	Power GND	Ground/Shield/ Return
50	Power GND	Ground/Shield/ Return
51	Power GND	Ground/Shield/ Return

1: Lever
2: Spring
3: Retainer
4: Seat
5: Spool
6: Sleeve
7. Piston
8: Seal
9. Piston

FUNCTION OF PC VALVE OF STEERING PUMP

- PC valve controls the oil flow to be constant depending on the discharged pressure even if the travel of the control valve is increased extremely, so that the horsepower absorbed by the pump does not exceed the engine horsepower when pump discharged pressure (PA) is high.
- In other words, it decreases the pump discharged volume when the actuator load is increased and the pump discharged pressure (PA) rises, and it increases pump discharged volume when the pump discharged pressure (PA) lowers.
- If command current (X) sent to EPC valve increases, the relation between pump discharged pressure (PA) and pump discharged volume (Q) is shifted parallel in proportion to the thrust of EPC valve solenoid.
- That is, since the thrust of EPC valve solenoid is added to the left thrust caused by the pump discharged pressure (PA) applied to spool (6), the relation between pump discharged pressure (PA) and (Q) is shifted from (A) to (B) as (X) increases.



OPERATION OF PC VALVE OF STEERING PUMP

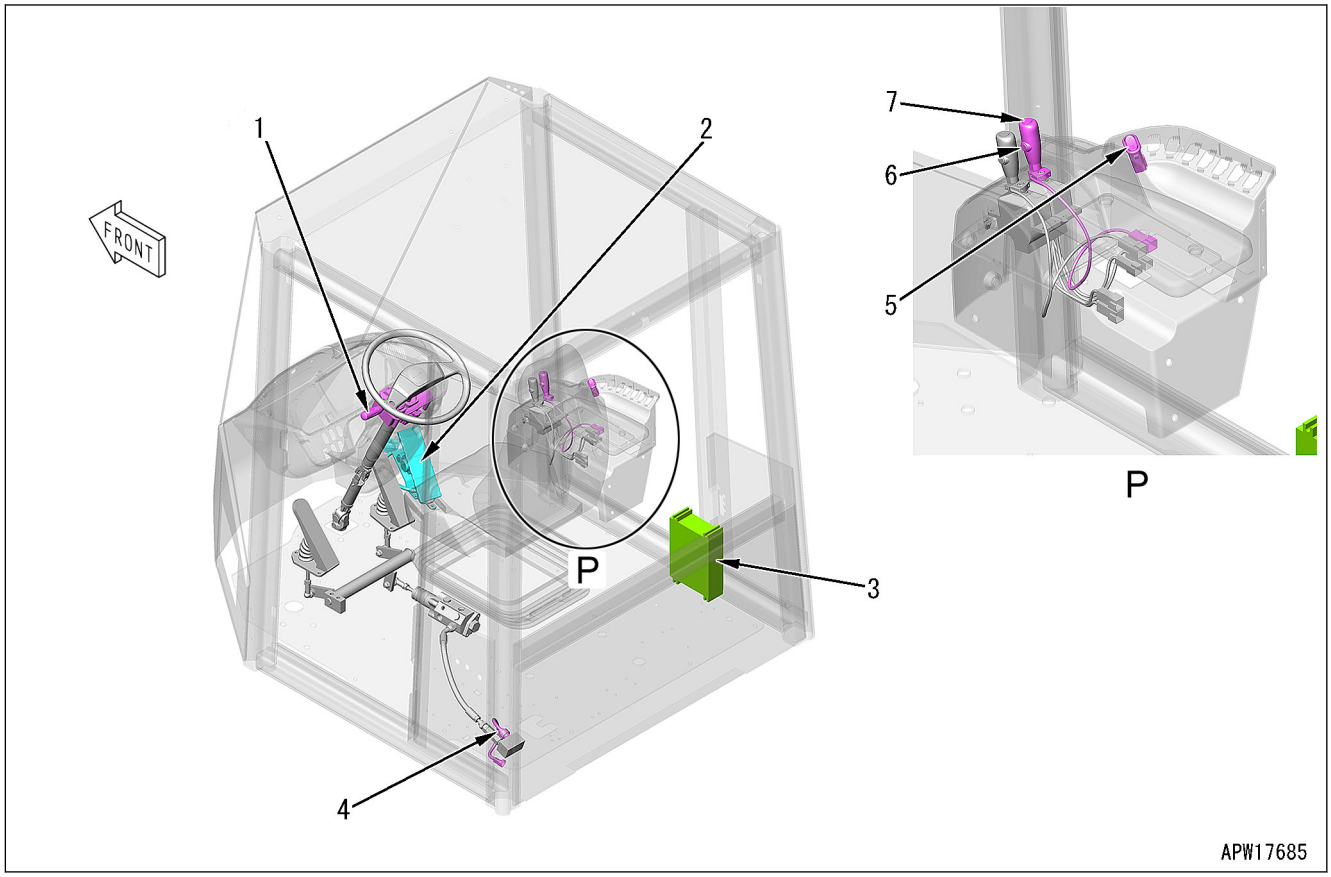
Action of spring

1. The spring force of spring (3) in PC valve is determined by the angle of swash plate.
2. If servo piston (9) moves to the right, spring (3) is compressed through lever (2) and the spring force changes.

11: Front axle
12: Torque converter outlet pressure sensor
13: Transmission output shaft speed sensor
14: Transmission control valve (R.H. valve assembly)
15: Rear drive shaft
16: Transmission lubrication oil temperature sensor
17: Torque converter outlet oil temperature sensor
18: Torque converter inlet pressure sensor
19: Transmission input shaft speed sensor

Around cab and floor

(Steering wheel specification)



1: Combination switch
2: Accelerator pedal
3: Transmission controller
4: Transmission cut oil pressure sensor
5: Transmission cut-off switch and transmission cut-off set switch
6: Shift hold switch
7: Kickdown switch

F, 1st cylinder (7)

↓

R, 2nd cylinder (8)

↓

4th gear (18)

↓

4th clutch (19)

↓

4th cylinder (20)

↓

Lower shaft (21)

↓

Transfer shaft 2 (22)

↓

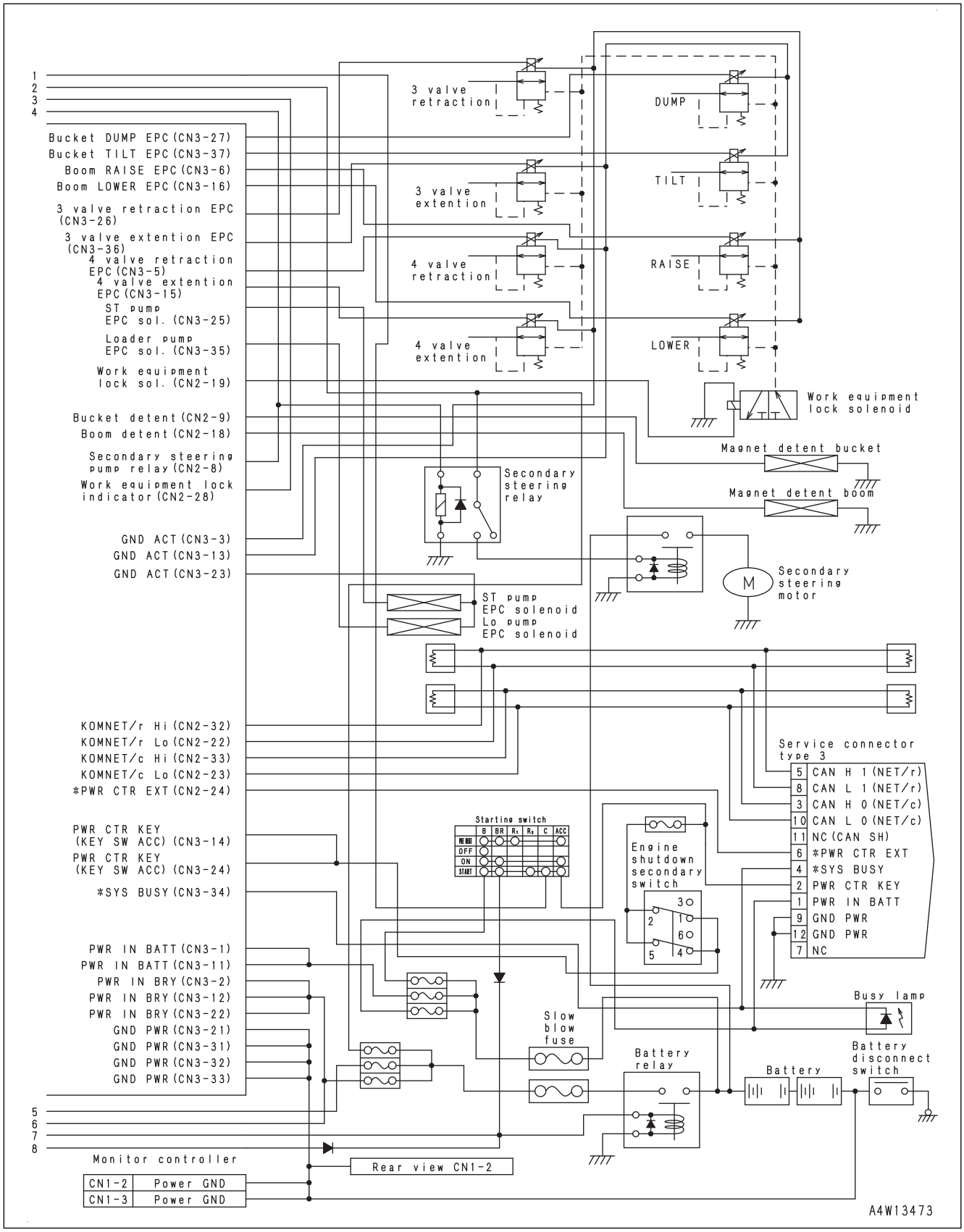
Transfer gear 2 (23)

↓

Output gear (24)

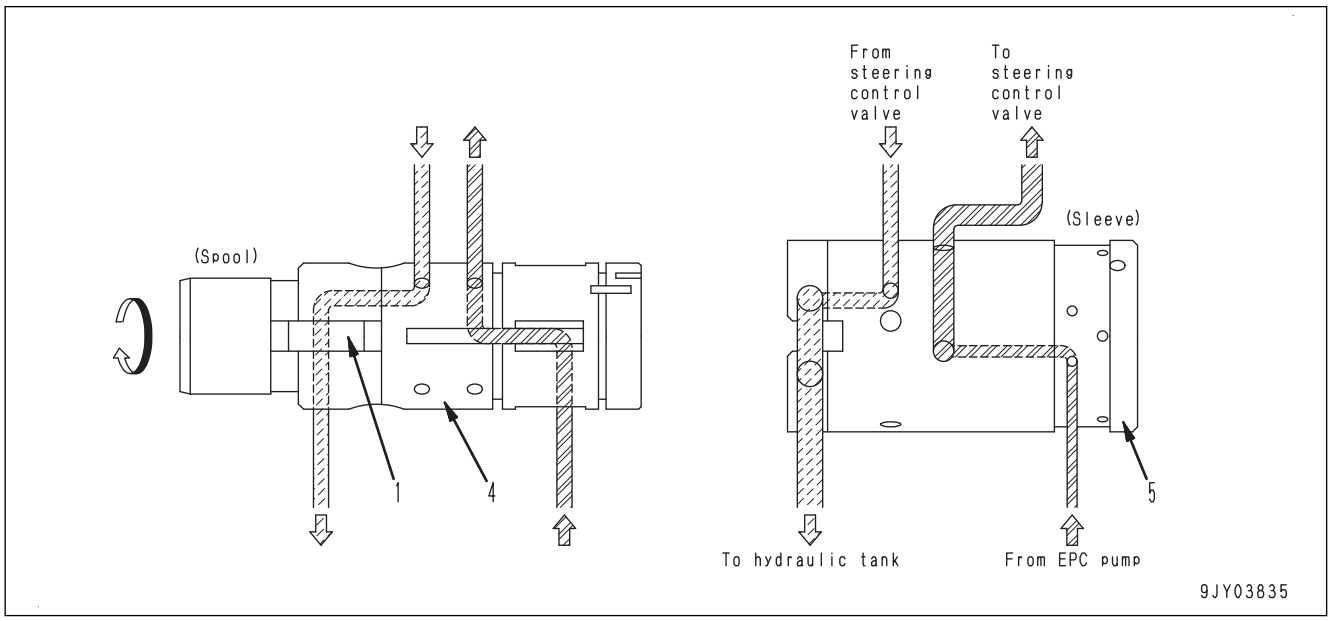
↓

Output shaft (25)


1
2
3
4
Bucket DUMP EPC (CN3-27)
Bucket TILT EPC (CN3-37)
Boom RAISE EPC (CN3-6)
Boom LOWER EPC (CN3-16)
3 valve retraction EPC (CN3-26)
3 valve extention EPC (CN3-36)
4 valve retraction EPC (CN3-5)
4 valve extention EPC (CN3-15)
ST pump EPC sol. (CN3-25)
Loader pump EPC sol. (CN3-35)
Work equipment lock sol. (CN2-19)
Bucket detent (CN2-9)
Boom detent (CN2-18)
Secondary steering pump relay (CN2-8)
Work equipment lock indicator (CN2-28)
GND ACT (CN3-3)
GND ACT (CN3-13)
GND ACT (CN3-23)
KOMNET/r Hi (CN2-32)
KOMNET/r Lo (CN2-22)
KOMNET/c Hi (CN2-33)
KOMNET/c Lo (CN2-23)
*PWR CTR EXT (CN2-24)
PWR CTR KEY (KEY SW ACC) (CN3-14)
PWR CTR KEY (KEY SW ACC) (CN3-24)
*SYS BUSY (CN3-34)
PWR IN BATT (CN3-1)
PWR IN BATT (CN3-11)
PWR IN BRY (CN3-2)
PWR IN BRY (CN3-12)
PWR IN BRY (CN3-22)
GND PWR (CN3-21)
GND PWR (CN3-31)
GND PWR (CN3-32)
GND PWR (CN3-33)
5
6
7
8
Monitor controller
CN1-2 Power GND
CN1-3 Power GND
Rear view CN1-2
3 valve retraction
3 valve extention
4 valve retraction
4 valve extention
DUMP
TILT
RAISE
LOWER
Work equipment lock solenoid
Magnet detent bucket
Magnet detent boom
Secondary steering relay
Secondary steering motor
ST pump EPC solenoid
Lo pump EPC solenoid
Starting switch
B BR R1 R2 C ACC
RE-KEY
OFF
ON
START
Engine shutdown secondary switch
Service connector type 3
5 CAN H 1 (NET/r)
8 CAN L 1 (NET/r)
3 CAN H 0 (NET/c)
10 CAN L 0 (NET/c)
11 NC (CAN SH)
6 *PWR CTR EXT
4 *SYS BUSY
2 PWR CTR KEY
1 PWR IN BATT
9 GND PWR
12 GND PWR
7 NC
Busy lamp
Slow blow fuse
Battery relay
Battery
Battery disconnect switch
A4W13473

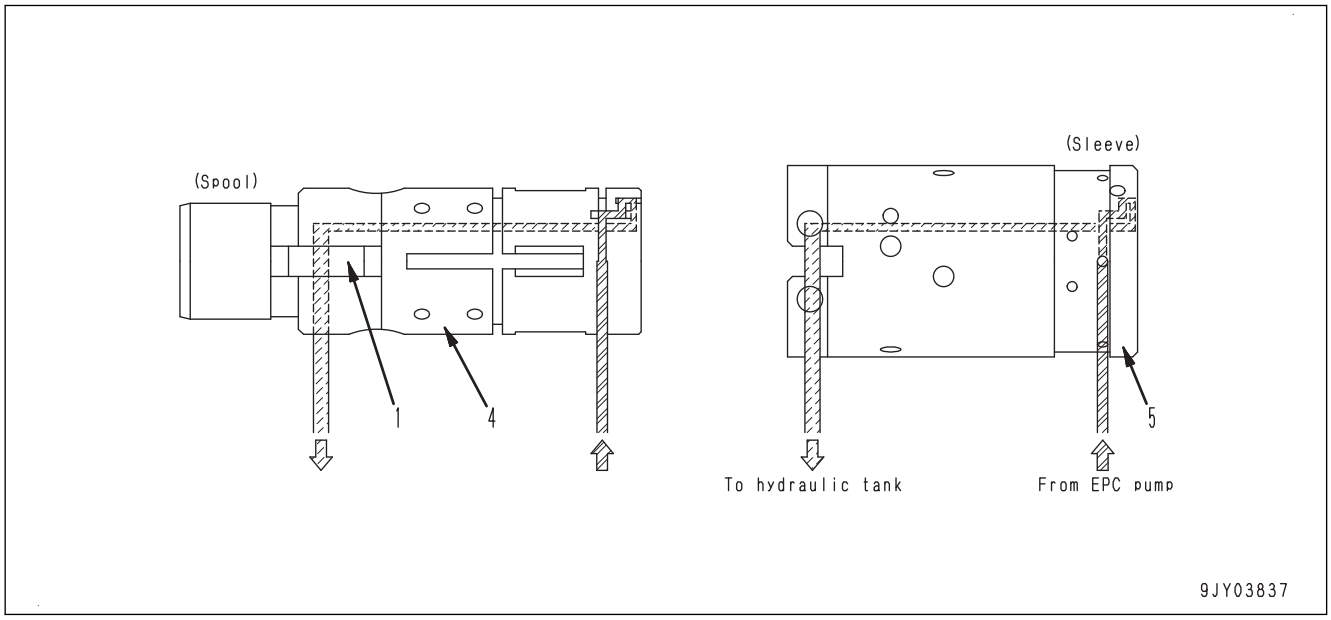
OPERATION OF ROTARY VALVE

Operation when machine turns (steering lever is operated)



1. When the steering lever is operated, spool (4) overcomes the force of neutral position spring (1) and slightly turns in relation to sleeve (5).
2. Because of this rotation, the ports in spool (4) and sleeve (5) align, and a passage for the oil is formed. As a result, the oil flows to the steering valve, and the steering operation is performed.

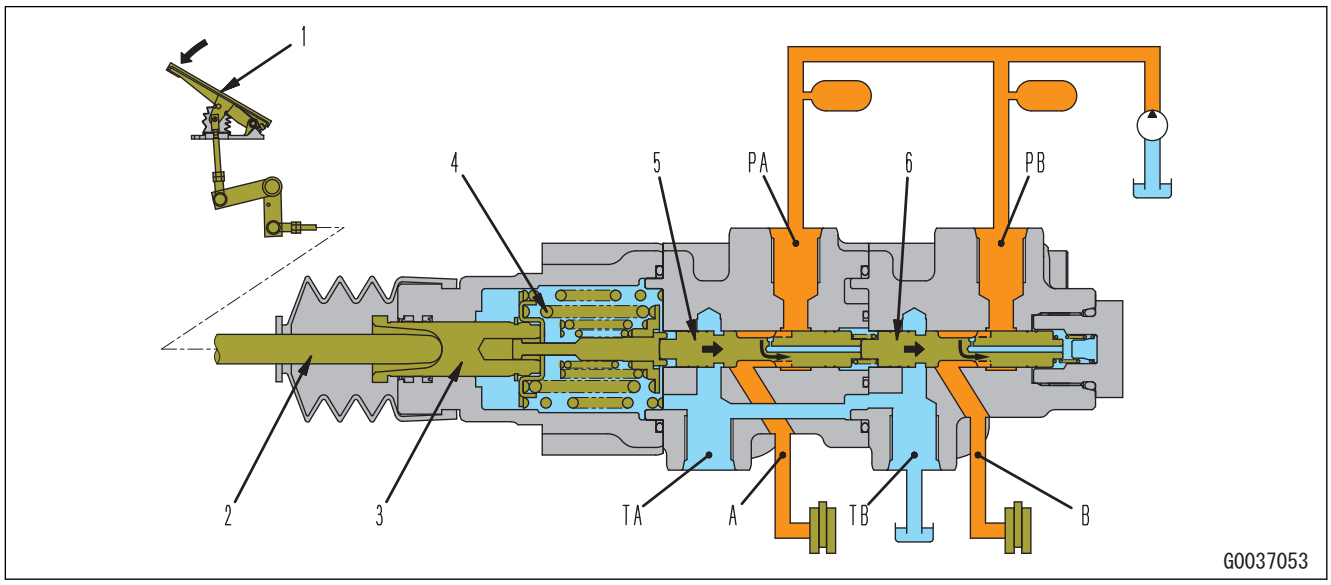
Operation when machine is in neutral (steering lever is held at a certain angle)



1. When the operating effort to the steering lever is stopped, the return force of neutral position spring (1) returns spool (4) and sleeve (5) to the neutral position. The oil flow passage is shut off and the oil stops flowing.
2. When the steering lever is held at a certain angle, the machine turns and the turning angle reaches the angle equivalent to the operating angle of the steering lever (since sleeve (5) turns according to the steering angle of the machine), spool (4) and sleeve (5) are also returned to the neutral position. The oil stops flowing.

OPERATION OF BRAKE VALVE

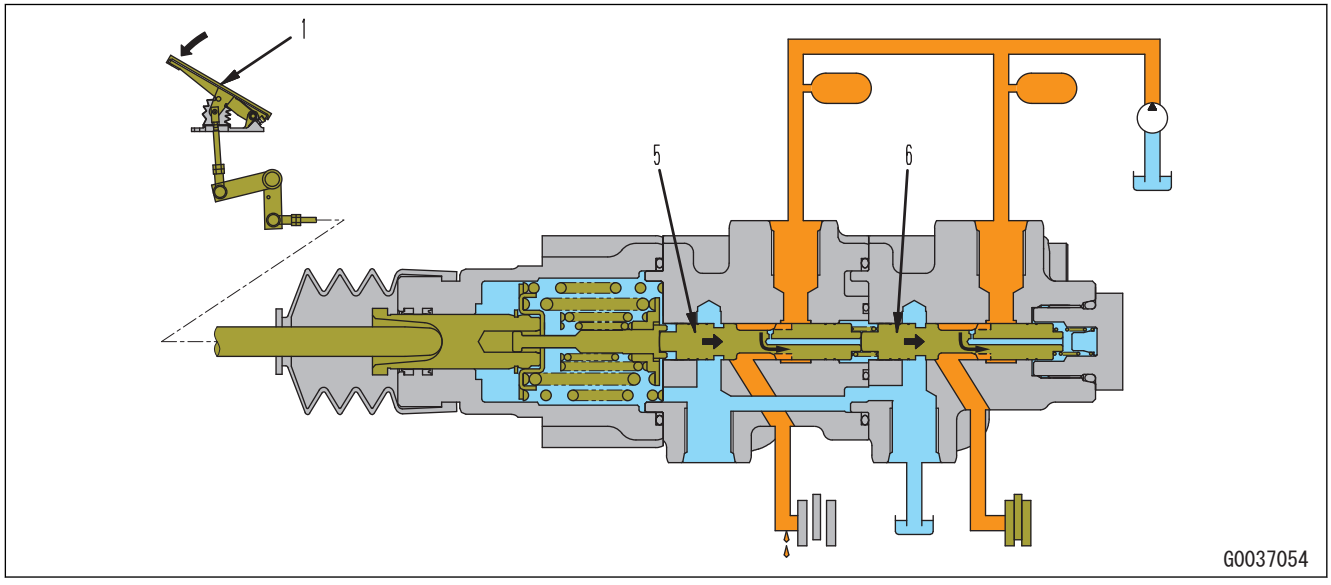
When brake pedal is depressed



1. Brake pedal (1) depressing effort is transmitted to spool (5) through rod (2), piston (3) and spring (4).
2. When spool (5) is pushed to the right, it closes the connection between port (TA) and (A), the oil from the pump flows through the accumulator into port (PA), it further flows through port (A) into rear brake piston, and operates the rear brake.
3. At the same time when spool (5) is moved to the right, spool (6) is also moved to the right to close port (TB). Then, the oil from the pump flows through the accumulator to port (PB) and further flows through port (B) to the front piston and operates the front brake.

When brake is operated on one side

(When 1 brake has trouble)



1. Even if the front brake or rear brake systems has trouble such as oil leakage and only either of them operates, the depressing force of brake pedal (1) mechanically moves spools (5) and (6) to the right.
   Thus, the oil from the pump is normally supplied to the brake piston working normally, enabling it to continue the operation. The brake, therefore, is capable of stopping the machine as needed to ensure the intended safety level.

STANDARD VALUE TABLE FOR ENGINE

STANDARD VALUE TABLE FOR ENGINE: WA480-8

Performance

Machine model			WA480-8	
Engine			SAA6D125E-7	
Item	Measurement condition	Unit	Standard value for new machine	Repair limit
Engine speed at high idle	• Engine coolant temperature:60 to 100 °C • Hydraulic oil temperature:45 to 55 °C • Torque converter oil temperature:60 to 80 °C • Power mode: P mode • Accelerator pedal: Depress to stroke end	rpm	2190 ± 50	2190 ± 50
Engine low idle speed	• Engine coolant temperature:60 to 100 °C • Hydraulic oil temperature:45 to 55 °C • Torque converter oil temperature:60 to 80 °C • Power mode: P mode • Accelerator pedal: Release	rpm	800(+50/0)	800(+50/0)

Air intake and exhaust system

Machine model			WA480-8	
Engine			SAA6D125E-7	
Item	Measurement condition	Unit	Standard value for new machine	Repair limit
Boost pressure	• Engine coolant temperature:60 to 100 °C • Torque converter oil temperature:60 to 80 °C • Power mode: P mode • With torque converter stalled	kPa {mmHg}	Min. 127 {Min. 950}	Min. 100 {Min. 750}
Exhaust temperature	• Engine coolant temperature:60 to 100 °C • Torque converter oil temperature:60 to 80 °C • Power mode: P mode • Whole speed range (ambient temperature 20 °C) • With torque converter stalled	°C	Max. 650	Max. 650

Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*1), or component/system)	Explanation
ICT	Information and Communication Technology	Communication and electronic control	A general term for the engineering and its socially applied technology of information processing and communication.
IMA	Inlet Metering Actuator	Engine	This is a valve that adjusts the fuel intake amount at the pump inlet in order to control the supply pump fuel discharged volume. (Same as IMV)
IMU	Inertial Measurement Unit	Engine	This is a device to detect the angle (or angular velocity) and acceleration of the 3 axes that control motions.
IMV	Inlet Metering Valve	Engine	This is a valve that adjusts the fuel intake amount at the pump inlet in order to control the supply pump combustion discharged volume. (Same as IMA)
KCCV	Komatsu Closed Crankcase Ventilation	Engine	This is a mechanism that burns the blowby gas again by separating oil from blowby gas and returning it to the intake side. It primarily consists of filters.
KCSF	Komatsu Catalyzed Soot Filter	Engine	This is a filter that captures soot in exhaust gas. It is built in to KDPF.
KDOC	Komatsu Diesel Oxidation Catalyst	Engine	This is a catalyst that is used for purifying exhaust gas. It is built in to KDPF or assembled with the muffler.
KDPF	Komatsu Diesel Particulate Filter	Engine	This is a component that is used to purify the exhaust gas. KDOC (catalyst) and KCSF (filter to capture soot) are built-in it. It is installed instead of the conventional muffler.
KTCS	Komatsu Traction Control System	Travel and brake (HM)	This is a function that performs braking with the optimum force and recovers the driving force of the wheels by actuating the inter-axle differential lock when the wheels runs idle while the machine travels on the soft ground.
LCD	Liquid Crystal Display	Machine monitor	This is an image display equipment such as a monitor in which the liquid crystal elements are assembled.
LED	Light Emitting Diode	Electronic parts	This is a semiconductor element that emits light when the voltage is applied in forward direction.
LIN	Local Interconnect Network	Communication and electronic control	This is one of communication standards that are used in the network on the machine.
LS	Load Sensing	Hydraulic system	This is a function that detects differential pressure of pump, and controls discharged volume corresponding to load.
LVDS	Low Voltage Differential Signaling	Communication and electronic control	This is one of communication standards that are used in the network on the machine.
MAF	Mass Air Flow	Engine	This indicates engine intake air flow. This is not used independently but is used as combined with sensor. Mass air flow sensor can be called as MAF sensor.

TEST ENGINE OIL PRESSURE

Tools for testing engine oil pressure

Symbol		Part No.	Part name	Q'ty	Remarks
A	-	799-101-5002	Hydraulic tester	1	
	1	799-101-5160	Nipple	1	Size: R1/8
B		799-401-2320	Gauge	1	Pressure range1 MPa

⚠ Place the machine on a level ground, lower the work equipment to the ground, set the parking brake switch in PARKING (P) position and work equipment lock switch in LOCK position, 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. Accordingly, wait until all parts have cooled down before starting the work.

Check this item under the following conditions.

Engine coolant temperature: Min. 60 °C

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

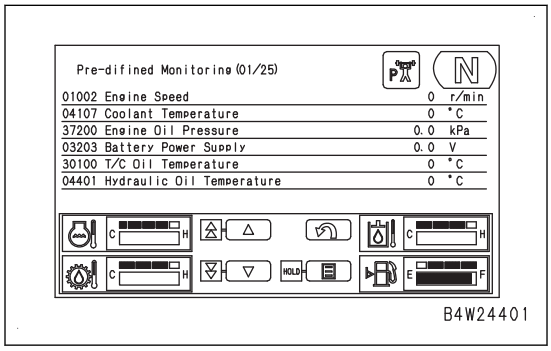
METHOD FOR TESTING ENGINE OIL PRESSURE BY MACHINE MONITOR

1. Start the engine.
2. Select “Pre-defined Monitoring” (01/25) or the next monitoring item, and display it. For details, see “SET AND OPERATE MACHINE MONITOR”.

   Monitoring code: 04107 “Coolant Temperature”

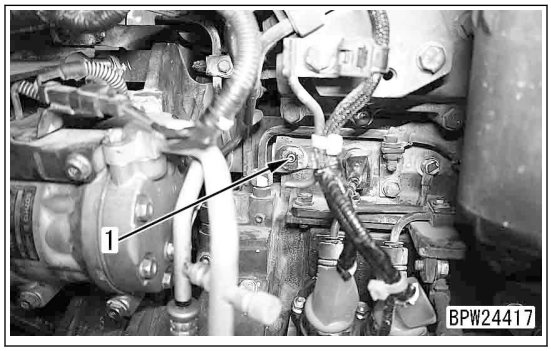
   Monitoring code: 37200 “Engine Oil Pressure Sensor”
3. Change the coolant temperature to the specified range.
4. Set the power mode to P mode.
5. Measure the engine oil pressure when depressing the accelerator pedal to the full stroke (high idle) and when the accelerator pedal is not depressed (low idle).

   For standard values, see STANDARD VALUE TABLE, “STANDARD VALUE TABLE FOR ENGINE”.



METHOD FOR TESTING ENGINE OIL PRESSURE BY TESTING TOOL

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



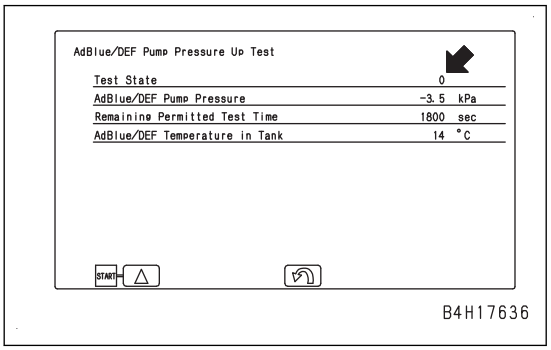
REMARK

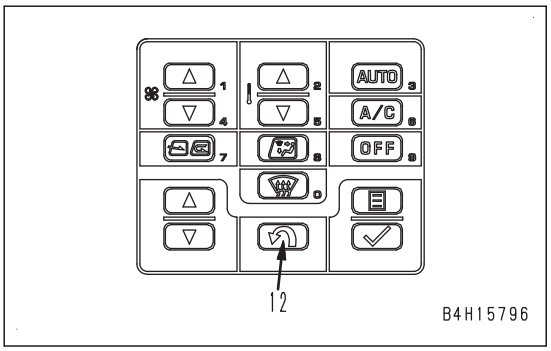
- Display of “Test State” changes to flashing of “10”, and value of “AdBlue/DEF Pump Pressure” increases. While the pressure is increasing, display of “Remaining Permitted Test Time” is counted down from “1800 to 0 sec”, and when it reaches to “0 sec”, the test will be finished automatically.
- When the display of “Test State” shows the number between “11” to “41”, follow “Parameter list of test state”.
- When the value of “AdBlue/DEF Pump Pressure” exceeds “900 kPa” within 1800 seconds of “Remaining Permitted Test Time”, AdBlue/DEF pump and AdBlue/DEF supply line are normal. Press DOWN switch (11) to complete the test.
- If the value of “AdBlue/DEF Pump Pressure” does not increase, check each part of AdBlue/DEF supply line for leakage, or check by sound and vibration that AdBlue/DEF pump operates. However, check for AdBlue/DEF leakage and check the operation of AdBlue/DEF pump before “Remaining Permitted Test Time” becomes “0sec”.
- If the value of “AdBlue/DEF Pump Pressure” does not exceeds 800 kPa after approximately 200 seconds are elapsed, AdBlue/DEF stops operation automatically and failure code [CA1682] is displayed. If the failure code appears, perform troubleshooting.

9. When the display of “Test State” changes from flashing of “20” to flashing of “0”, press RETURN switch (12).

REMARK

- The display of “20” of “Test State” indicates that AdBlue/DEF purge is in progress, and it starts automatically and stops in 5 minutes at maximum.
- The display of “0” of “Test State” indicates “Waiting for the start (default)”, and it is ready for test again.





5. Select “Pre-defined Monitoring” (09/25) or the following monitoring items to display it by referring to “SET AND OPERATE MACHINE MONITOR”.

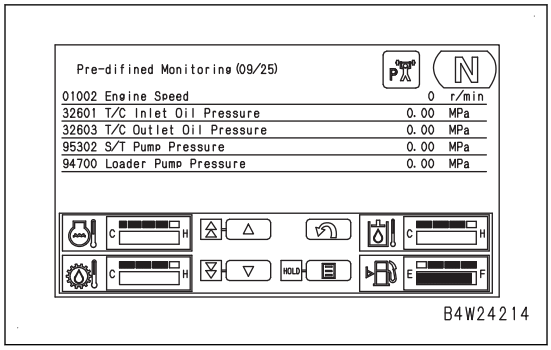
   Monitoring code: 01002 “Engine Speed”

   Monitoring code: 32601 “T/C Inlet Oil Pressure”

6. Test “T/C Inlet Oil Pressure” when the engine speed is set to 2000 rpm (target value).

   REMARK

   - Measure it while the directional lever or directional selector switch is in NEUTRAL (N) position.
   - When measuring the torque converter inlet pressure accurately for troubleshooting, etc., see “Method for testing torque converter relief pressure (inlet pressure) by testing tools”.

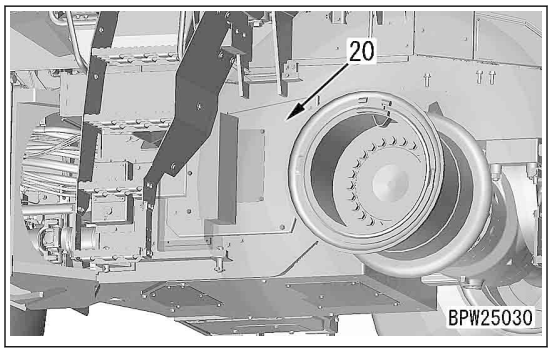


See STANDARD VALUE TABLE, “STANDARD VALUE TABLE FOR MACHINE” for standard values.

Method for testing torque converter relief pressure (inlet pressure) by testing tools

1. Remove the cover (20) on the left side of the machine.
   - (North America specification)

   - (EU specification)



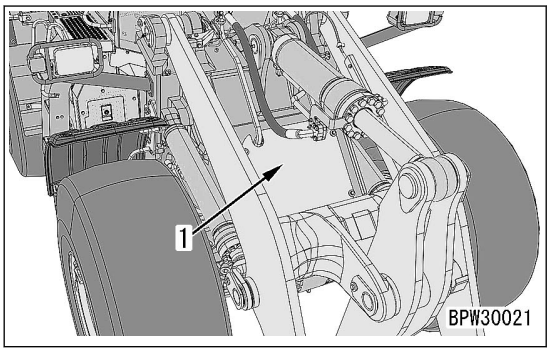
See STANDARD VALUE TABLE, “STANDARD VALUE TABLE FOR MACHINE” for standard values.

Method for testing the wheel brake by the testing tool

1. (Front side) Remove the cover (1) on the front side of the machine.

   (Rear side) Perform testing on the slack adjuster part on the left side of the rear frame.

   ⚠ **Place the blocking tool under the boom to provide a secure support for the boom if raising the boom to remove the inspection cover.**

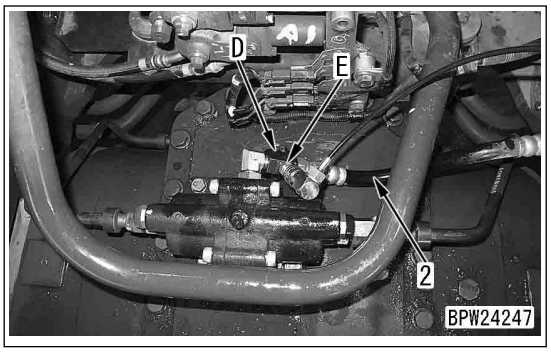


2. Disconnect the hose (2), install the adapter, install the nipple, and connect the gauge A1 in the hydraulic tester A.

   REMARK

   Gauge in digital hydraulic tester B can also be used instead of gauge A1.

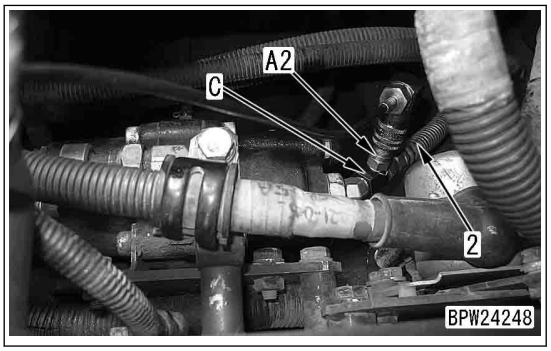
   The figure shows the front side.

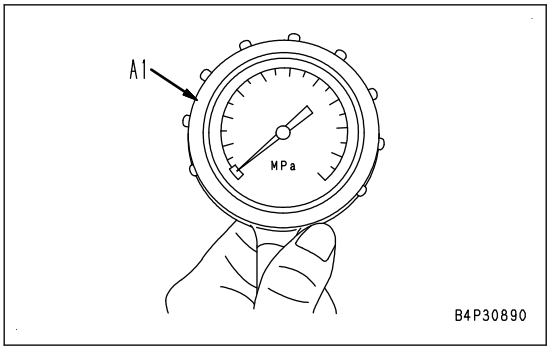


   The figure shows the rear side.

3. Bleed air from the brake circuit by referring to “BLEED AIR FROM BRAKE CIRCUIT”.
4. Start the engine.
5. Select and display “Pre-defined Monitoring” (01/25) by referring to “SET AND OPERATE MACHINE MONITOR”.
6. Raise the coolant temperature and each oil temperature so that they are within the specified range.
7. Depress the L.H. brake pedal, and measure the wheel brake oil pressure.

   See STANDARD VALUE TABLE, “STANDARD VALUE TABLE FOR MACHINE” for standard values.



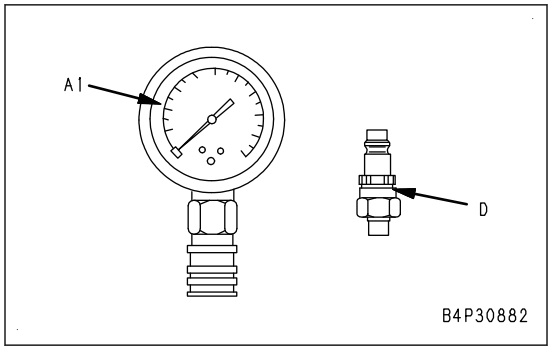


Remove the testing tools and restore the machine after the test is finished.

4. Install the nipple D, and connect the gauge A1 in the hydraulic tester A.

   REMARK

   Gauge in digital hydraulic tester B can also be used instead of gauge A1.



5. Start the engine.
6. Select and display “Pre-defined Monitoring” (01/25) by referring to “SET AND OPERATE MACHINE MONITOR”.
7. Adjust the hydraulic oil temperature so that it is within the specified range.
8. Test the oil pressure when the accelerator pedal is depressed fully to the stroke end.

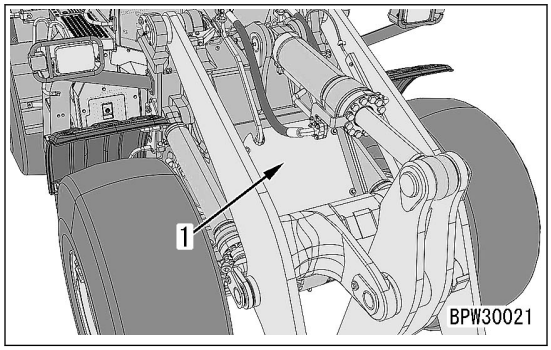
   See STANDARD VALUE TABLE, “STANDARD VALUE TABLE FOR MACHINE” for standard values.

Remove the testing tools and restore the machine after the test is finished.

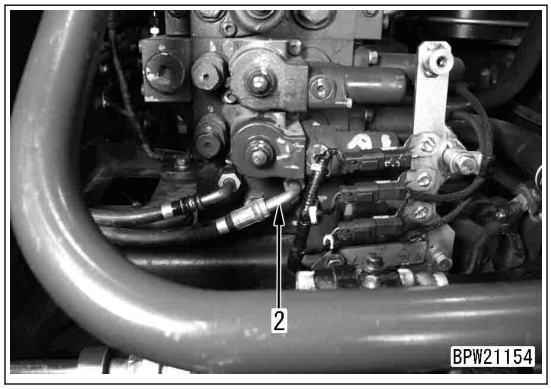
Method for testing shut off valve outlet pressure

1. Release the remaining pressure in the circuit by referring to “RELEASE REMAINING PRESSURE FROM WORK EQUIPMENT CIRCUIT”.
2. Remove the cover (1) on the front side of the machine.

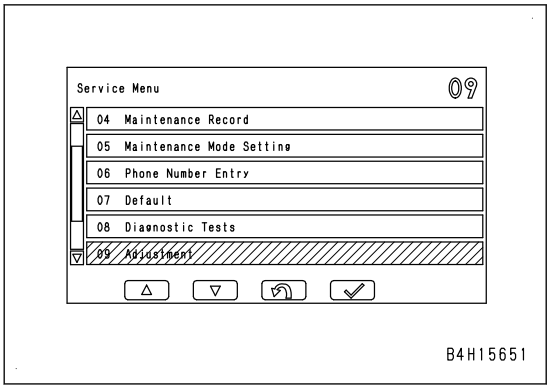
   ⚠ **Place the blocking tool under the boom to provide a secure support for the boom if raising the boom to remove the inspection cover.**



3. Disconnect the EPC circuit hose (2).



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



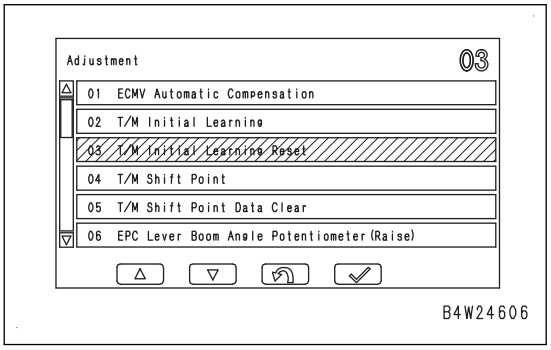
3. When the “Adjustment” screen is displayed, use a switch on the switch panel to select “T/M Initial Learning Reset”.

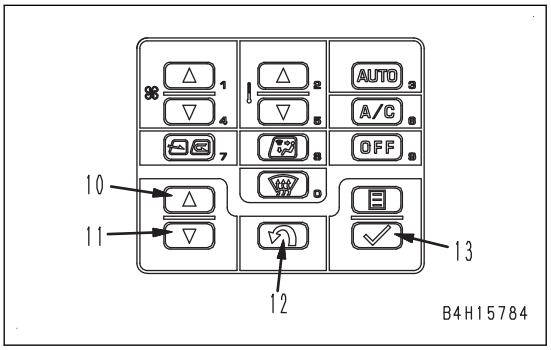
   UP switch (10): Moves the selection up by one item

   DOWN switch (11): Moves the selection down by one item

   RETURN switch (12): Cancels the selection and returns the display to “Service Menu” screen

   ENTER switch (13): Validates the selection

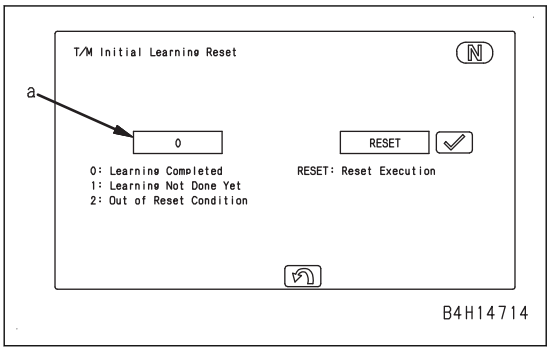


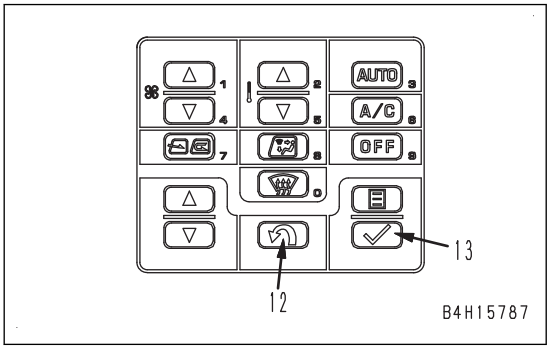


4. After “T/M Initial Learning Reset” screen is displayed, check initialization condition (a).
   - When “0: Learning Completed” is displayed, press the enter switch (13) to proceed to step 5.

     REMARK

     When the gear shift lever is any position other than N, “2: Out of Reset Condition” is displayed and cannot reset the screen.
   - When “1: Learning Not Done Yet” is displayed, press RETURN switch (12) to proceed to step 6.



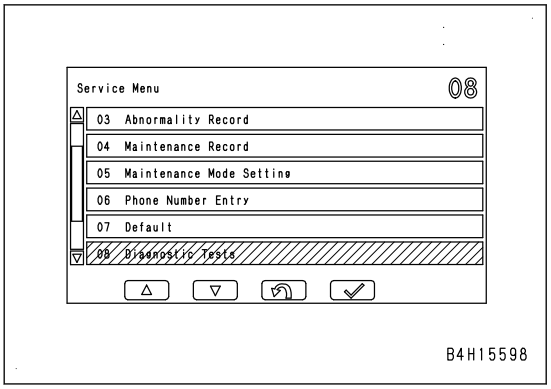


Code No.	Self-define Monitoring items (screen display)		Unit		Applicable component	Remarks
			SI	Non-SI		
02212	T/M Controller SW Input 2	Shift Lever 1	ON/OFF	ON/OFF	T/M	
		Shift Lever 2	ON/OFF	ON/OFF	T/M	
		Shift Lever 3	ON/OFF	ON/OFF	T/M	
		Shift Lever 4	ON/OFF	ON/OFF	T/M	
		Kickdown SW	ON/OFF	ON/OFF	T/M	
		Hold SW	ON/OFF	ON/OFF	T/M	
02213	T/M Controller SW Input 3	Shift Up SW NO	ON/OFF	ON/OFF	T/M	The monitoring item appears only when the option setting is valid.
		Shift Down SW NO	ON/OFF	ON/OFF	T/M	The monitoring item appears only when the option setting is valid.
		Shift Mode SW Manual	ON/OFF	ON/OFF	T/M	
		Shift Mode SW Auto H	ON/OFF	ON/OFF	T/M	
02214	T/M Controller SW Input 4	Starting Motor State	ON/OFF	ON/OFF	T/M	
		ECSS SW	ON/OFF	ON/OFF	T/M	The monitoring item appears only when the option setting is valid.
		Lockup SW	ON/OFF	ON/OFF	T/M	The monitoring item appears only when the option setting is valid.
		T/M Cut Off SW	ON/OFF	ON/OFF	T/M	
		T/M Cut Off Set SW	ON/OFF	ON/OFF	T/M	
		Option Directional SW	ON/OFF	ON/OFF	T/M	The monitoring item appears only when the option setting is valid.
02215	T/M Controller SW Input 5	Parking Brake SW	ON/OFF	ON/OFF	T/M	
		S/T Lock SW	ON/OFF	ON/OFF	T/M	
03705	T/M Controller SW Output 1	Neutral Safety Relay	ON/OFF	ON/OFF	T/M	
		T/M Cut Off Indicator	ON/OFF	ON/OFF	T/M	
		Backup Lamp Relay	ON/OFF	ON/OFF	T/M	
03706	T/M Controller SW Output 2	Parking Brake Relay	ON/OFF	ON/OFF	T/M	
20414	T/M Controller Assembly P/N		-	-	T/M	
20413	T/M Controller S/N		-	-	T/M	

1. Select “Diagnostic Tests” on “Service Menu” screen.

   REMARK

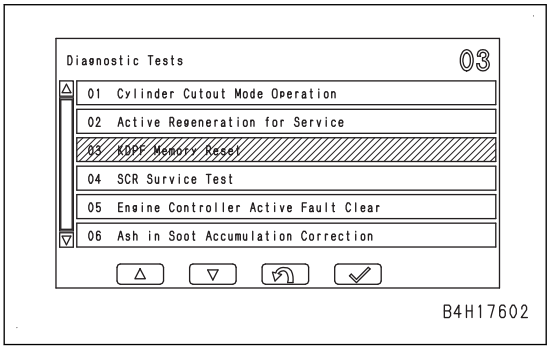
   For selecting method, see “METHOD FOR OPERATING SERVISE MODE” in “SERVICE MODE”.



2. When “Diagnostic Tests” screen is displayed, use a switch on the switch panel to select “KDPF Memory Reset”.

   REMARK

   For selecting method, see “METHOD FOR OPERATING SERVISE MODE” in “SERVICE MODE”.



3. On “KDPF Memory Reset” screen, select an item to be reset.

   Up switch (10): Moves the selection mark up by one item

   Down switch (11): Moves the selection mark down by one item

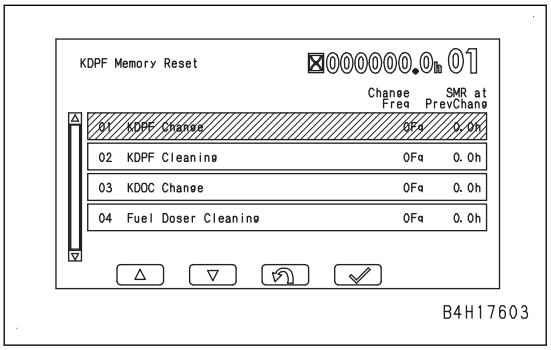
   Return switch (12): Returns the display to “Diagnostic Tests” screen

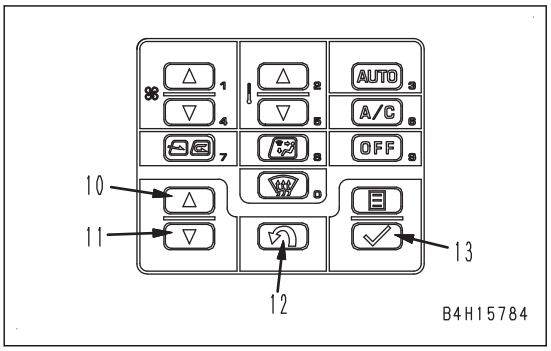
   Enter switch (13): Validates the selection

   - Perform both “KDPF Cleaning” reset and “KDPF Change” reset after cleaning or replacing KCSF.
   - After cleaning or replacing KDOC, perform “KDOC Change” reset.
   - After cleaning or replacing the fuel doser, perform “Fuel Doser Cleaning” reset.

   REMARK

   Perform the applicable operation. For details, see TROUBLESHOOTING, “PRECAUTIONS FOR CLEANING AND REPLACING KDPF (KCSF and KDOC)”.

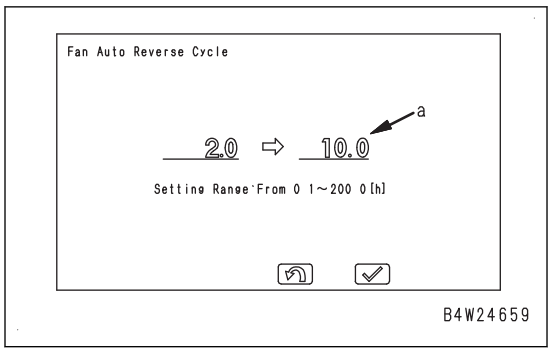


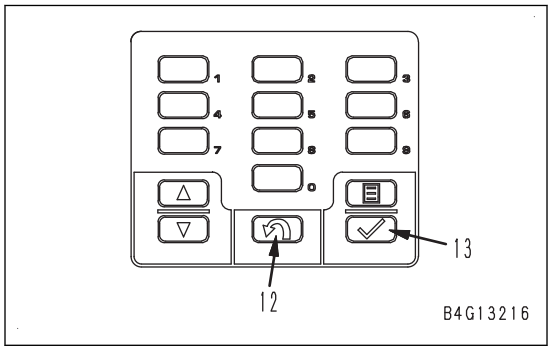


5. The input value is displayed in portion (a). If it is OK, press ENTER switch (13).

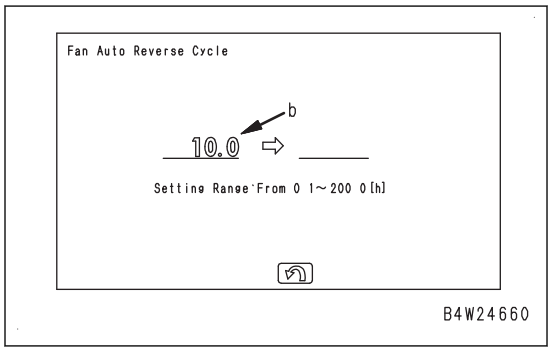
   REMARK

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





   If the input value is displayed in portion (b), setting is completed.



METHOD FOR ADJUSTING WITH ADJUSTMENT MENU (FAN AUTO REVERSE DURATION)

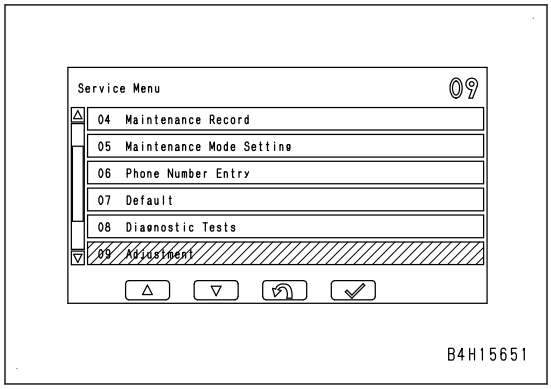
- The value adjusted by this function is applied to “Mode D” of “Automatic Fan Reverse Mode” of “Machine Setting and Information” in the user mode.
- Adjust “Fan Auto Reverse Duration” to be applied to “Mode D” similarly.

Adjustment menu is used to check the various settings of the machine or to adjust the value.

1. From “Service Menu” screen, select “Adjustment”.

   REMARK

   For selecting method, see “METHOD FOR OPERATING SERVISE MODE” in “SERVICE MODE”.



CHANGING OF LUBRICATION TIME AND LUBRICATION INTERVAL TIMES

⚠ **Place the machine on a level ground, and lower the work equipment to the ground.**

⚠ **Set the parking brake switch in PARKING (P) position and work equipment lock switch in LOCK position, and then stop the engine.**

⚠ **Chock the tires to prevent the machine from moving.**

For information about the lubrication time and lubrication interval time change, refer to this section.

Parameter list

Display	Symbol	Explanation
 B4W24925	000	“000” flashes.
 9JD17889	t = TIMER PA = PAUSE	The control unit operates as a time controlled contact maker (TIMER) and is in the PAUSE state
 9JD17890	c = COUNTER PA = PAUSE	Not used. This mode causes a malfunction.
 9JD17891	t = TIMER CO = CONTACT	The control unit operates as a time controlled contact maker (TIMER) and is in the pump running time (CONTACT)
 9JD17892	c = COUNTER CO = CONTACT	Not used. This mode causes a malfunction.
 9JD17893	C = CYCLE O = OFF P = PRESSURE	Display of beginning of menu “Configurations”
 9JD17894	Mounting OFF	Disabling monitoring function PS (progressive system) and CS (cycle switch)
 9JD17895	C = CYCLE S = SWITCH	Cycle switch monitoring is activated
 9JD17896	F = FAULT L = LOW L = LEVEL	Grease in the grease tank has reached the minimum level.
 9JD17897	F = FAULT C = CYCLE S = SWITCH	No signal from cycle switch during pump running time.

- For the failure code relating to the “Inducement strategy” of the Urea SCR system, which cannot be cleared by “Engine Controller Active Fault Clear”, these can now be cleared from the machine monitor by using a one-time password issued by Komatsu. Also, INSITE can be used for clearing.

In case failure codes cannot be cleared

- The relevant failure code may not be able to clear due to derated engine power caused by “Inducement strategy”, environmental conditions or other functional restrictions. Details and the measures to be taken are as shown below.

Case 1 : Derated engine power caused by “Inducement strategy”

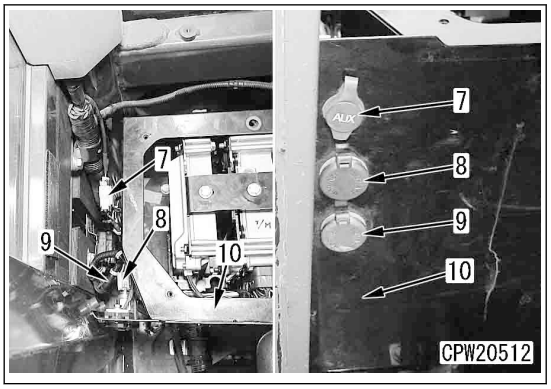
- The failure code may not be able to be cleared because it is a failure code caused by an “Inducement strategy”, which derates the engine power. (Detail of “Inducement strategy”, see Structure and function chapter “UREA SCR SYSTEM”.)
- Failure codes, which are caused by “Inducement strategy”, and be cleared by turning the starting switch to ON position or operating the engine at low idle, are cleared in the same manner as before.
- However, some failure codes caused by “Inducement strategy” and require “Loaded Diagnostics Operation To Clear Failure Code” may not let the machine move to activate troubleshooting. (The “Inducement status” advances to derate engine power.) For the applicable codes, see separate sheet. Applicable codes are also identified at their descriptions of “Troubleshooting by failure code”.
- Measures to be taken:
  When the repair is completed, perform “Engine Con Inducement Fault Clear” and then “Loaded Diagnostics Operation To Confirm Failure Correction” or “Loaded Diagnostics Operation To Clear Failure Code” to confirm that the failure code is cleared.

Case 2 : Environmental conditions

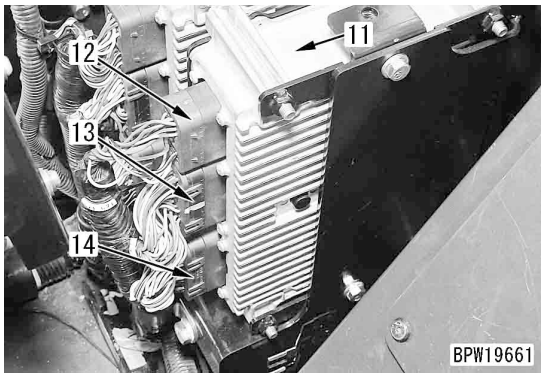
- Depending on environmental conditions (altitude, ambient temperature and etc.) when performing “Loaded Diagnostics Operation To Confirm Failure Correction” or “Loaded Diagnostics Operation To Clear Failure Code”, or when AdBlue/DEF freeze prevention mode is activated, the failure code may not be able to be cleared.
  (Applicable codes are identified by including the conditions that prevent clearing in “Related information” of each “Troubleshooting by failure code”.)
- Measures to be taken:
  1. When the repair is completed, perform “Loaded Diagnostics Operation To Confirm Failure Correction” or “Loaded Diagnostics Operation To Clear Failure Code” under appropriate environmental conditions.

     (See the description of each “Troubleshooting by failure code”.)
  2. If the measure mentioned above is difficult to take after the repair is completed, perform “Engine Controller Active Fault Clear”, or “Engine Con Inducement Fault Clear” and then confirm that the failure code is cleared.
- Examples:
  - Some failure codes cannot be cleared under certain environmental conditions (altitude, ambient temperature, etc.)
    1. Some failure codes cannot be cleared at high altitudes (ambient pressure 80 kPa or less).
    2. Some failure codes cannot be cleared at low temperatures (ambient temperature -7 °C or below).
    3. Some failure codes indicate failures only when AdBlue/DEF freeze prevention mode is activated.
    4. Some failure codes do not indicate a failure when AdBlue/DEF freeze prevention mode is activated.
  - Code cannot be cleared because AdBlue/DEF pump stops or AdBlue/DEF injection stops
  - Condition that stops the AdBlue/DEF pump or AdBlue/DEF injection is shown below.
    1. Ambient temperature: -24 °C or below
    2. Thaw mode activated

6. Remove cover (10).

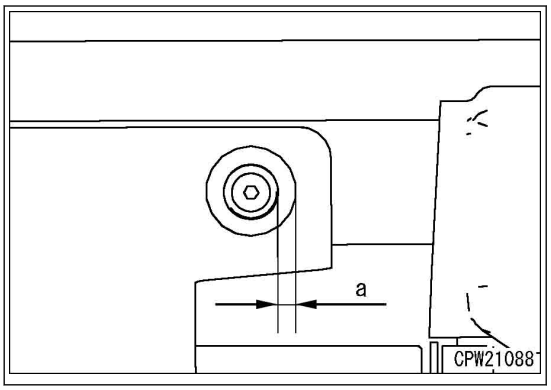


7. Disconnect connectors L71 (12), L72 (13), and L73 (14) of work equipment controller (11), and insert or connect T-adapters for troubleshooting.



REMARK

Install top cover (4) so that clearance (a) becomes 2 mm and above for the whole circumference.



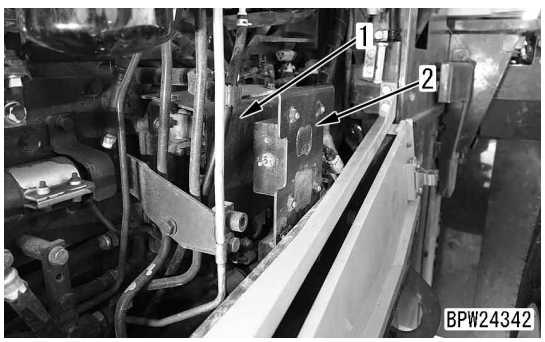
Engine controller

1. Open the right engine side cover.

REMARK

The engine controller is mounted on the engine (front of the machine).

2. Remove cover (1) and fuel feed pump switch (2).

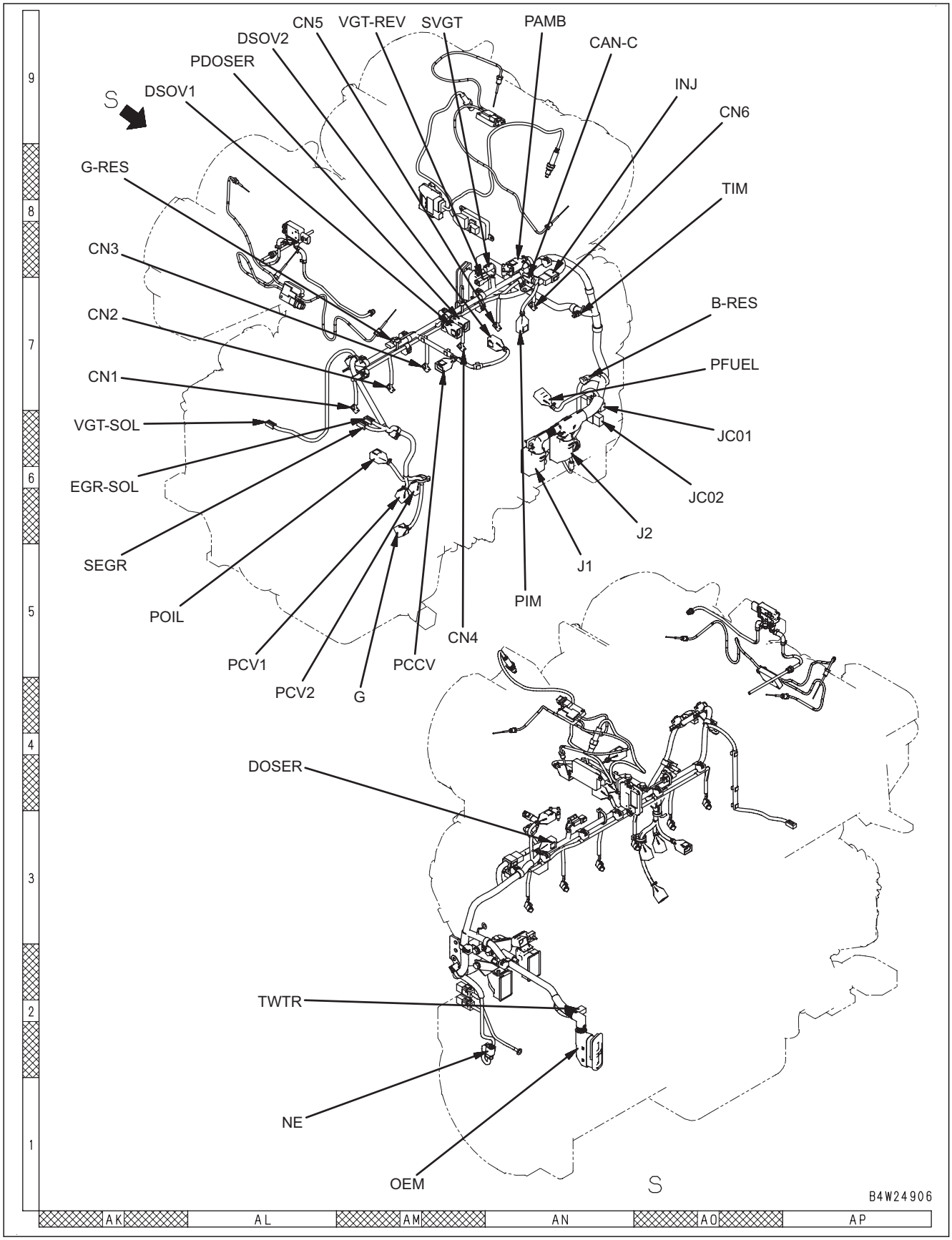


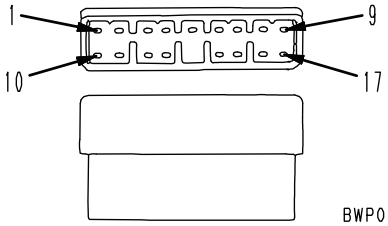
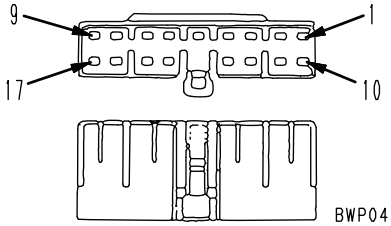
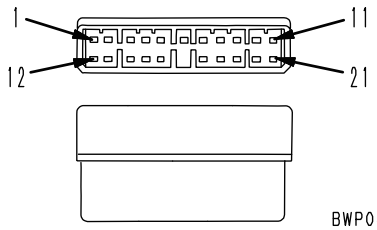
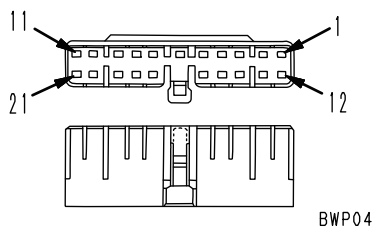
3. Connect or insert T-adapters for troubleshooting to connectors J1, and J2 of engine controller (3).

REMARK

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

7/13


CN5
VGT-REV
SVGT
PAMB
DSOV2
CAN-C
PDOSER
INJ
DSOV1
CN6
S
G-RES
TIM
CN3
B-RES
CN2
PFUEL
CN1
JC01
VGT-SOL
JC02
EGR-SOL
J2
J1
SEGR
PIM
POIL
CN4
PCV1
PCCV
PCV2
G
DOSER
TWTR
NE
OEM
S
B4W24906
9
8
7
6
5
4
3
2
1
AK
AL
AM
AN
AO
AP

No. of pins	MIC type connector		
	Male (female housing)	Female (male housing)	Testing connection use special tool Part No.
17	 BWP04747	 BWP04748	799-601-2730 (T-adapter)
	Body part No. : 79A-222-2730 (Q'ty:2)	Body part No. : 79A-222-2720 (Q'ty:2)	
21	 BWP04749	 BWP04750	799-601-2740 (T-adapter)
	Body part No. : 79A-222-2750 (Q'ty:2)	Body part No. : 79A-222-2740 (Q'ty:2)	
	Terminal part No. : 79A-222-2770 (Q'ty:50)	Terminal part No. : 79A-222-2760 (Q'ty:50)	

B4D18197

- Connection table of fuse box3 (FS10)

Type of power supply	Fuse No. (Pin No.)	Fuse capacity	Destination of power
Continuous power supply	1	20 A	Smart sensor 1
	2	10 A	Smart sensor 2
	3	-	
	4	10 A	AdBlue/DEF heater 1
	5	20 A	AdBlue/DEF heater 2
	6	10 A	Heated mirror (Note 2)

- Connection table of slow-blow fuse

Type of power supply	Fuse No. (Pin No.)	Fuse capacity	Destination of power
Continuous power supply	2	80 A	Spare 1, engine controller circuit, transmission controller circuit, work equipment controller circuit, room lamp circuit, machine monitor circuit, KOMTRAX circuit, hazard lamp circuit, starting switch B-terminal circuit
Switched power supply	3	50 A	Main lamp circuit, machine monitor circuit, air conditioner circuit, wiper and washer circuit, backup lamp and brake lamp circuit, work equipment positioner circuit, work equipment controller circuit, emergency steering circuit, parking brake circuit, transmission controller circuit, horn circuit
	4	50 A	Rear heated wire glass circuit, air suspension seat and yellow revolving warning lamp circuit, turn signal lamp circuit, radio circuit, 12V converter circuit, rear working lamp circuit, front working lamp circuit
	5	120 A	Heater relay circuit

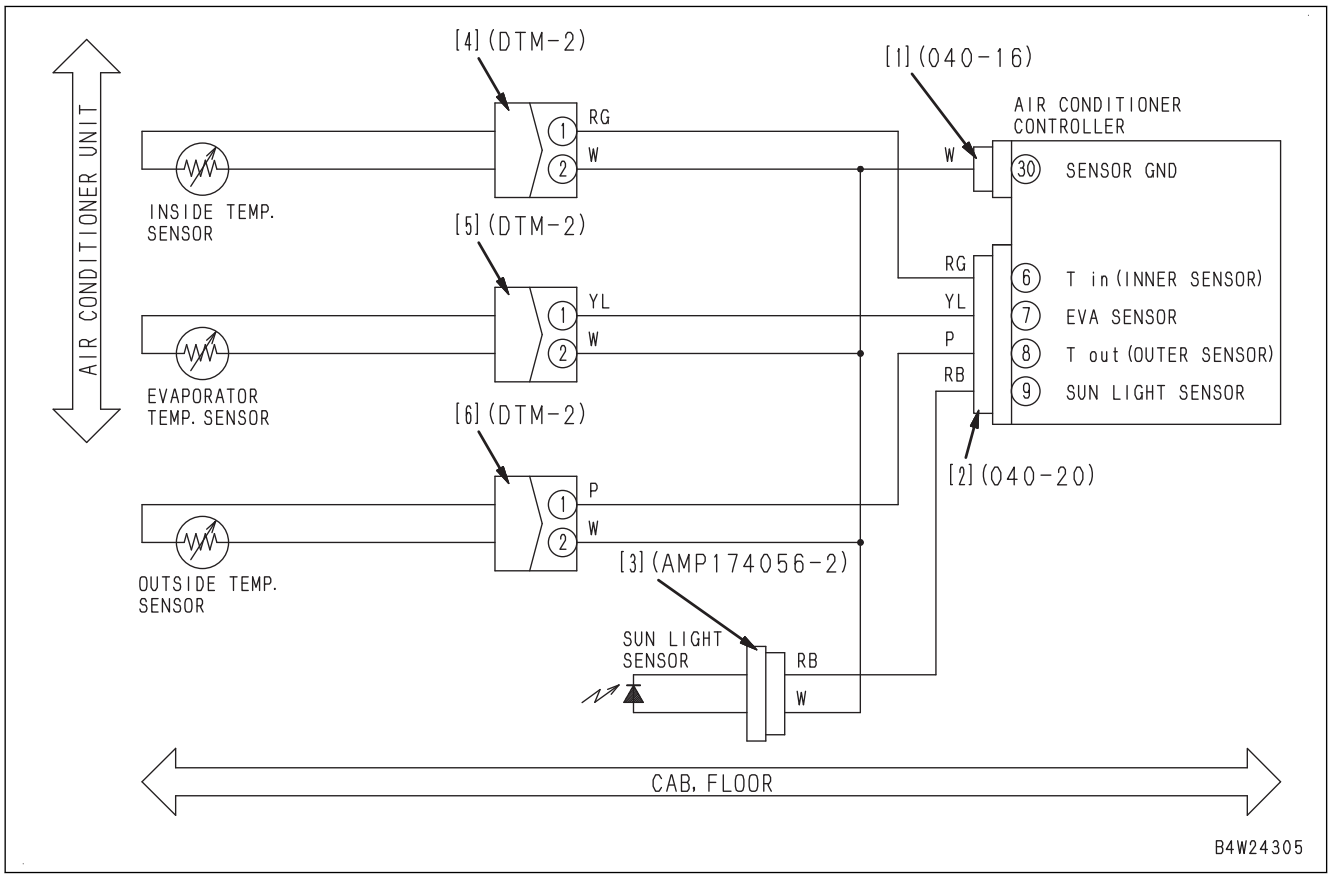
Note 1. Japan specification and European Union specification : 20 A

Note 2. Mirrors with heater : only for Japan specification

- Location of slow-blow fuse

Failure code	Failure (Displayed on screen)	Applicable component	Action level	Category of history	Remarks
DXF0KY	AJSS EPC Solenoid Hot Short Circuit	WE	L03	Electrical system	
DXH1KA	ECMV Solenoid Open Circuit (Lockup Clutch)	TM	L03	Electrical system	
DXH1KB	ECMV Solenoid Ground Fault (Lockup Clutch)	TM	L03	Electrical system	
DXH1KY	ECMV Solenoid Hot Short Circuit (Lockup Clutch)	TM	L03	Electrical system	
DXH4KA	ECMV Solenoid Open Circuit (1st Clutch)	TM	L03	Electrical system	
DXH4KB	ECMV Solenoid Ground Fault (1st Clutch)	TM	L03	Electrical system	
DXH4KY	ECMV Solenoid Hot Short Circuit (1st Clutch)	TM	L03	Electrical system	
DXH5KA	ECMV Solenoid Open Circuit (2nd Clutch)	TM	L03	Electrical system	
DXH5KB	ECMV Solenoid Ground Fault (2nd Clutch)	TM	L03	Electrical system	
DXH5KY	ECMV Solenoid Hot Short Circuit (2nd Clutch)	TM	L03	Electrical system	
DXH6KA	ECMV Solenoid Open Circuit (3rd Clutch)	TM	L03	Electrical system	
DXH6KB	ECMV Solenoid Ground Fault (3rd Clutch)	TM	L03	Electrical system	
DXH6KY	ECMV Solenoid Hot Short Circuit (3rd Clutch)	TM	L03	Electrical system	
DXH7KA	ECMV Solenoid Open Circuit (Reverse Clutch)	TM	L03	Electrical system	
DXH7KB	ECMV Solenoid Ground Fault (Reverse Clutch)	TM	L03	Electrical system	
DXH7KY	ECMV Solenoid Hot Short Circuit (Reverse Clutch)	TM	L03	Electrical system	
DXH8KA	ECMV Solenoid Open Circuit (Forward Clutch)	TM	L03	Electrical system	
DXH8KB	ECMV Solenoid Ground Fault (Forward Clutch)	TM	L03	Electrical system	
DXH8KY	ECMV Solenoid Hot Short Circuit (Forward Clutch)	TM	L03	Electrical system	
DXHHKA	ECMV Solenoid Open Circuit (4th Clutch)	TM	L03	Electrical system	
DXHHKB	ECMV Solenoid Ground Fault (4th Clutch)	TM	L03	Electrical system	
DXHHKY	ECMV Solenoid Hot Short Circuit (4th Clutch)	TM	L03	Electrical system	
DXHJKA	3rd Spool Extend EPC Solenoid Open Circuit	WE	L03	Electrical system	

Circuit diagram related to inside air temperature sensor electrical circuit



FAILURE CODE [AS00R6]

Action level	Failure code	Failure	Temporary Recovery of Inducement (Engine controller system)
-	AS00R6		
Detail of failure	• Temporary recovery of inducement is implemented from the machine monitor while engine deration.		
Action of controller	• Restore engine power temporarily • The information related to this failure code is displayed on the monitor screen.		
Phenomenon on machine	• Engine power recovered temporarily.		
Related information	• This failure code is not failure but caution to display that temporary restoration from inducement has been performed on Abnormality Record screen and KOMTRAX on the machine monitor. • After performing “Temporary restoration from inducement”, “E” of this failure code that is active currently is displayed for 20 second on the “Abnormality record” screen.		

FAILURE CODE [CA187]

Action level	Failure code	Failure	Sensor 2 Supply Voltage Low Error (Engine controller system)
L03	CA187		
Details of failure	Low voltage occurs in sensor 2 supply (5 V) circuit.		
Action of controller	• Ignores signals from EGR valve lift sensor and VGT position sensor, and fixes values before detecting error for operation. • Ignores signal from doser fuel pressure sensor, and fixes values before detecting error for operation. • Engine power deration.		
Phenomenon on machine	Engine power deration.		
Related information	• After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared (note that the control is not released right after the failure code is cleared).		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “c: Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Defective sensor or wiring harness	1. Turn starting switch to OFF position. 2. Disconnect following connectors one by one and turn starting switch to ON position each time. 3. Each time troubleshooting is finished, return to step 1. If this failure code is cleared, disconnected sensor or engine wiring harness is defective. **REMARK** Other failure codes are also displayed. This is because connector is disconnected. Ignore all failure codes except for [CA187].		
		Connector	Dosing fuel pressure sensor	PDOSER
			EGR valve lift sensor	SEGR
			VGT position sensor	SVGT
			Engine wiring harness	J1
3	Defective engine controller	1. Turn starting switch to OFF position. 2. Disconnect connector J1, and connect T-adapter to male side. 3. Turn starting switch ON with connector J1 disconnected. If no failure is found by this check, perform troubleshooting again from cause 1 before replacing the engine controller.		
		Voltage	Between J1 (male) (78) and (54)	4.75 to 5.25 V
		If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

FAILURE CODE [CA357]

Action level	Failure code	Failure	Mass Air Flow Sensor Low Error (Engine controller system)
L03	CA357		
Details of failure	Low frequency input error is detected in signal circuit of mass air flow sensor.		
Action of controller	• Sets mass air flow sensor to fixed value (10 kg/min) for operation. • EGR valve closed. • Engine power deration • Regeneration control stops.		
Phenomenon on machine	Engine power deration		
Related information	• Because sensor output is approximately. 5 V of pulse waveform, it is not measured by using multimeter. • Mass air flow sensor and intake air temperature sensor are provided as a unit. • This failure code and failure code [CA691] are displayed simultaneously if sensor connector is removed. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared (note the engine power deration is not canceled right after the failure code is cleared).		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective wiring harness connector	1. Perform checkup referring to descriptions of wiring harness and connectors in “c Electric equipment ”of “CHECKS BEFORE TROUBLESHOOTING” in “RELATED INFORMATION ON TROUBLESHOOTING”. 2. Turn starting switch to ON position.			
		If this failure code is cleared, wiring harness connector is defective.			
2	Defective sensor power supply system	If failure code [CA3419] or [CA3421] are displayed at the same time, perform troubleshooting these first.			
3	Defective mass air flow sensor (internal defect)	1. Turn starting switch to OFF position. 2. Replace mass air flow sensor. 3. Turn starting switch to ON position.			
		If this failure code is cleared, originally-provided mass air flow sensor is defective.			
4	Defective sensor power supply system	1. Perform preparation when starting switch is in OFF position. 2. Disconnect connector MAF and connect T-adapter to female side. 3. Turn starting switch to ON position.			
		Voltage	Between MAF (female) (2) and (3)	Power supply	Approx. 12 V

FAILURE CODE [CA731]

Action level	Failure code	Failure	Engine Backup Speed Sensor Phase Error (Engine controller system)
L01	CA731		
Details of failure	Engine controller detects phase error by signal from engine Bkup speed sensor. (Compared with signal from Ne speed sensor, phase does not fit.)		
Action of controller	Controls by Ne speed sensor signal.		
Phenomenon on machine	• Running engine stops (when Ne speed sensor is also defective). • Stopped engine cannot be started (when Ne speed sensor is also defective).		
Related information	• After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine. • For replacing Bkup speed sensor, replace fuel supply pump (For details, see “DISASSEMBLY AND ASSEMBLY”“REMOVE AND INSTALL SUPPLY PUMP ASSEMBLY”.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective engine Ne speed sensor system	Engine Ne speed sensor may be defective. Perform troubleshooting for failure code [CA689].
2	Defective engine Bkup speed sensor circuit	Engine Bkup speed sensor may be defective. Perform troubleshooting for failure code [CA778].
3	Defective installation of supply pump	Check that supply pump shaft is installed at correct angle. See DISASSEMBLY AND ASSEMBLY, “REMOVE AND INSTALL SUPPLY PUMP ASSEMBLY”.

<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="7">5</td><td rowspan="7">Open circuit in wiring harness (wire breakage or defective contact of connector)</td><td colspan="3">REMARK
If failure code still displays after above checks, this check is not required.
1. Turn starting switch to OFF position.
2. Check that system operating lamp does not light up, and then turn battery disconnect switch to OFF position.
3. Disconnect connectors J1 and SSR and connect T-adapters to each female side.
4. Remove fuses No. 1 and 2 from fuse box FS10.</td></tr>
<tr><td rowspan="5">Resistance</td><td>Between J1 (female) (9) and SSR (female) (5)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between SSR (female) (4) and ground</td><td>Max. 1 Ω</td></tr>
<tr><td>Between fuse box FS10-1 and SSR (female) (1)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between fuse box FS10-1 and SSR (female) (2)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between fuse box FS10-2 and SSR (female) (3)</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Ground fault in wiring harness (contact with GND circuit)</td><td colspan="3">1. Turn starting switch to OFF position.
2. Check that system operating lamp does not light up, and then turn battery disconnect switch to OFF position.
3. Disconnect connectors J1 and SSR and connect T-adapters to each female side.</td></tr>
<tr><td>Resistance</td><td>Between J1 (female) (9) or SSR (female) (5) and ground</td><td>Max. 1 Ω</td></tr>
<tr><td>7</td><td>Defective engine controller</td><td colspan="3">If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</td></tr>
</table>

No.	Cause	Procedure, measuring location, criteria and remarks
12	Defective dosing fuel solenoid valve 1 (shut-off valve)	Replace dosing fuel solenoid valve 1 (shut-off valve).
13	Defective engine controller	1. Start the engine, and leave it for approximately 3 minutes. 2. If this failure code are displayed, perform troubleshooting for Related information, “Method of clearing failure code”.
		If this failure code is still displayed and no failure is found by preceding checks, engine controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)

Diagram related to fuel doser

A: From refueling pump

B: Fuel return

C: To fuel supply pump

D: From cooling plate of the engine controller

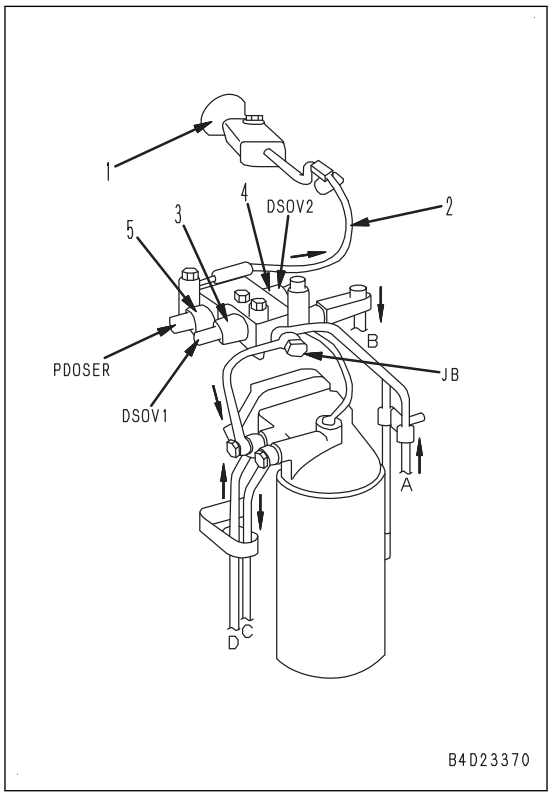
JB: Fuel tube joint bolt

PDOSER: Dosing fuel pressure sensor connector

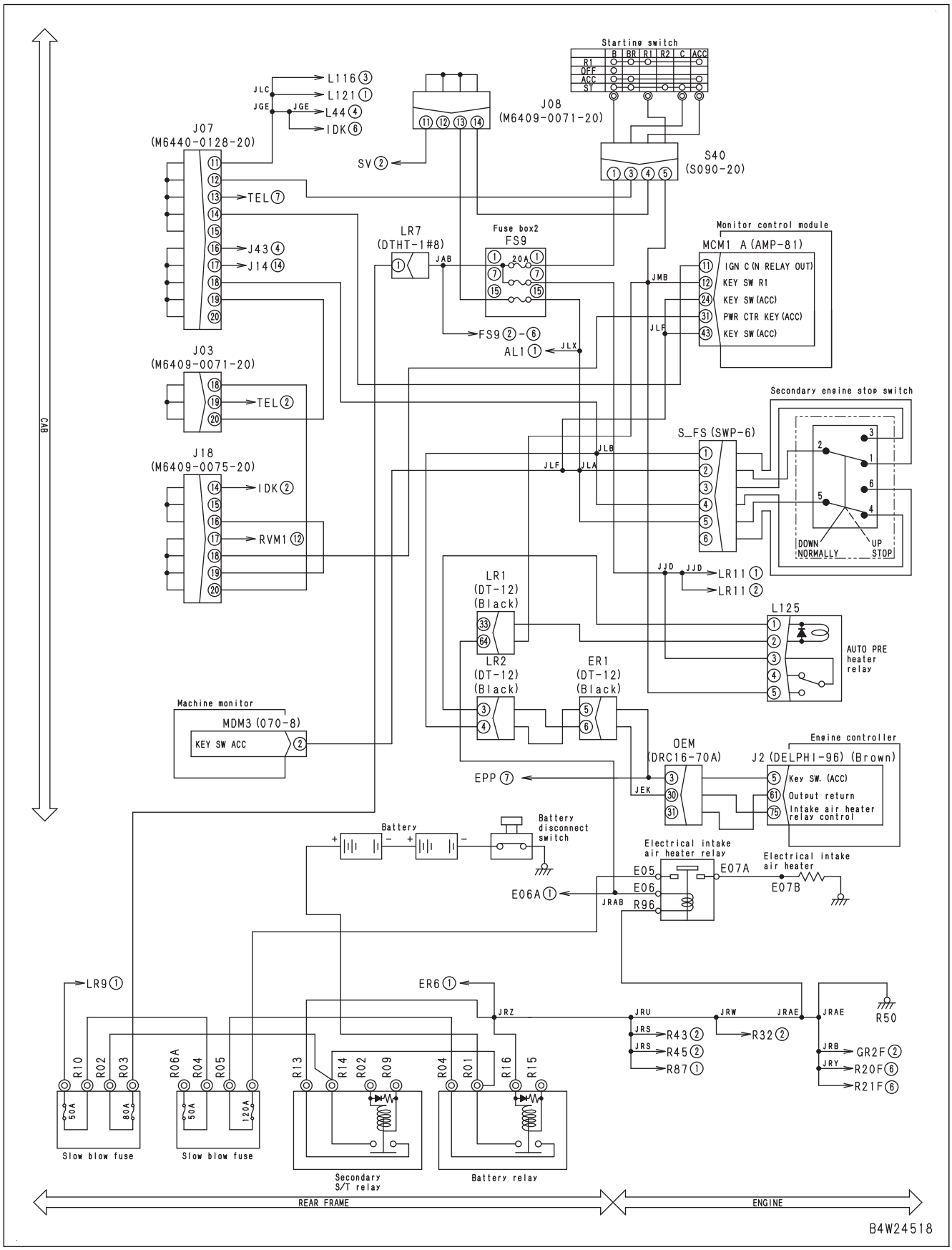
DSOV1: Dosing fuel solenoid valve 1 (shut-off valve) connector

DSOV2: Dosing fuel solenoid valve 2 (drain valve) connector

1. Fuel doser
2. Fuel supply line
3. Dosing fuel solenoid valve 1 (shut-off valve)
4. Dosing fuel solenoid valve 2 (drain valve)
5. Dosing fuel pressure sensor



CIRCUIT DIAGRAM (INTAKE AIR HEATER RELAY)



FAILURE CODE [CA3144]

Action level	Failure code	Failure	SCR Temperature Sensor In Range Error (Engine controller system)
L01	CA3144		
Detail of failure	Temperature difference between SCR temperature sensor and SCR outlet temperature sensor is not the same as the expected value.		
Action of controller	• Advances to Inducement strategy. • AdBlue/DEF injection stops.		
Phenomenon on machine	• NOx emission increases because AdBlue/DEF injection is disabled. • Engine power deration according to inducement strategy.		
Related information	⚠ **Since KDPF, KDOC, and SCR are heated to 500 °C or above, be careful not to get burned.** • The SCR temperature sensor and SCR outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • For the replacement procedure of the SCR temperature sensor, see “Disassembly and assembly”, “Removal and installation of SCR temperature sensor”. • After turning starting switch to OFF position, engine controller performs AdBlue/DEF purging (for Max. 6 minutes) and then stops. To restart engine, wait until system operating lamp goes off after turning starting switch to OFF position, and then turn starting switch to ON position. • The temperature detected by the SCR temperature sensor can be confirmed from the Pre-defined Monitoring screen. • Use engine operation state diagnosis, AdBlue/DEF level, or AdBlue/DEF quality sensor diagnosis on the Pre-defined Monitoring screen. (The following numbers are the monitoring codes) • Engine operation state diagnosis 01002 Engine speed 19200 Exhaust gas flow rate 47300 KDOC Inlet Temperature 19300 SCR Temperature 19302 SCR Outlet Temperature • Troubleshooting for AdBlue/DEF level and AdBlue/DEF quality sensors 19100 AdBlue/DEF Concentration 19110 AdBlue/DEF Level 19111 AdBlue/DEF Level Corrected 19115 AdBlue/DEF Temperature in Tank 19400 Ambient Temperature 19305 AdBlue/DEF Tank Heating State **NOTICE** **For this failure code, after investigating the cause of the problem and completing the repair, perform “Loaded Diagnostics Operation To Confirm Failure Correction” to make sure that the failure code is cleared. (Repair completion cannot be judged without raising the exhaust temperature even if this failure code is cleared by turning ON the starting switch)**		

No.	Cause	Procedure, measuring location, criteria and remarks
2	Defective KDOC outlet temperature sensor	Perform checks on causes 1 and 8 for failure code [CA3254].
3	Defective KDOC	1. Remove KDPF. 2. Remove KDOC. **NOTICE** • **Check if KDOC has any cracks (change KDOC if any).** • **If KDOC of KDPF is changed, perform the reset after KDOC change, then troubleshooting is complete without performing manual stationary regeneration. (See cause 7 for failure code [CA2637].)** • **Check if KDOC inlet surface is clogged with soot 50 % or more.** **(Clean KDOC if it is clogged with soot.)**
4	Defective KDPF temperature sensor	If the failure code is not cleared after performing above-mentioned troubleshooting, replace KDPF temperature sensor.
5	Defective engine controller	If this failure code is kept displayed, or is displayed again after above checks are performed, engine controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)

Loaded Diagnostics Operation To Clear Failure Code

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

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

⚠ **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, and start the engine.
2. Run the engine at low idle speed for approximately 15 minutes.
   If the failure code is cleared, repair work is completed. If the failure code is not cleared, perform the following.

   NOTICE

   If failure code is not cleared after steps 1 and 2 are performed, following temperature requirement needs to be satisfied for clearing. Steps 5 and 6 are the operation to satisfy the temperature requirements.

   - **KDOC inlet temperature Min. 200 °C.**
   - **KDOC outlet temperature Min. 200 °C.**
3. Display KDOC inlet and outlet temperatures with monitoring function.
4. Set “Power Mode” to “P”.
5. Depress the brake pedal, and run the engine at high idle continuously for 15 minutes.
6. When KDOC inlet temperature or KDOC outlet temperature does not reach Min. 200 °C, perform “Loaded Diagnostics Operation To Clear Failure Code” for failure code [CA1883].
7. Check that this failure code is cleared.

   REMARK

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

No.	Cause	Procedure, measuring location, criteria and remarks
9	Defective urea SCR system (inspection with SCR REMOVAL EFFICIENCY TEST)	1. See “TESTING AND ADJUSTING”, “SERVICE MODE” and “METHOD FOR SETTING WITH TESTING MENU (SCR SERVICE TEST)” of “SETTING AND OPERATION OF MACHINE MONITOR”, and perform an “SCR Denitration Efficiency Test”. 2. If the “SCR Denitration Efficiency Test” has not been completed successfully, proceed to cause 10. 3. If failure code [CA1694], [CA3751], or [CA3755] is displayed after the “SCR Denitration Efficiency Test”, perform troubleshooting for relevant failure code first. 4. After the failure code in the above 3 is cleared, perform “Loaded Diagnostics Operation To Clear Failure Code” to check if this failure code is not cleared. 5. If 19205 “Ammonia concentration (compensation value)” indicates a normal value (5 to 100 ppm) and the failure code is cleared, the repair is completed. 6. If the ammonia concentration indicates an abnormal value or this failure code is not cleared, proceed to cause 13. 7. Even if the SCR REMOVAL EFFICIENCY TEST has been completed successfully and any of failure code [CA1694], [CA3751], or [CA3755] is not displayed, proceed to cause 13.
10	Defective AdBlue/DEF injector	1. Refer to “TESTING AND ADJUSTING”, “SETTING AND OPERATION OF MACHINE MONITOR”, “SERVICE MODE”, “METHOD FOR SETTING WITH TESTING MENU (SCR SERVICE TEST)” to perform an “AdBlue/DEF Injection Quantity Test” to judge the injector. 2. From the test results, confirm that the AdBlue/DEF injection amount is within the values specified in “TESTING AND ADJUSTING”. 3. If the AdBlue/DEF injection amount is out of the range specified in “TESTING AND ADJUSTING”, replace the AdBlue/DEF injector. 4. If the AdBlue/DEF injector has been replaced, perform the “AdBlue/DEF Injection Quantity Test” again. After confirming that the AdBlue/DEF injection amount is within the range specified in “TESTING AND ADJUSTING”, proceed to the next cause. (The purpose of this test for two times is to check accumulated urea deposits in the AdBlue/DEF mixing tube) 5. Proceed to the next troubleshooting, even if the “AdBlue/DEF Injection Quantity Test” results were normal.
11	Accumulation of urea deposits in AdBlue/DEF mixing tube	1. Check if urea deposits are accumulated in the AdBlue/DEF mixing tube and the AdBlue/DEF injector mount. 2. If deposits are accumulated, remove the AdBlue/DEF mixing tube to remove deposits and clean the tube. 3. Check if urea deposits are accumulated in the SCR inlet case. If accumulated, perform the next item.
12	Accumulated urea deposit in SCR assembly	1. If urea deposit is accumulated inside the SCR inlet case, remove the urea deposit as much as possible. 2. Repair AdBlue/DEF mixing tube back to normal.

No.	Cause	Procedure, measuring location, criteria and remarks
14	Improper AdBlue/DEF quality	1. Check the mounting of the AdBlue/DEF quality sensor is secured and the wiring harness connections are not loosen Repair if any abnormality is found. 2. Turn starting switch to ON position. 3. Check if failure code [CA3866] or [CA3867] is displayed. 4. Read 19100 “AdBlue/DEF concentration” on the display and confirm that the concentration is appropriate (29 to 36 %). 5. If failure code [CA3866] or [CA3867] is displayed and the 19100 “AdBlue/DEF concentration” reading is inappropriate, drain the AdBlue /DEF tank, clean the tank, and refill with genuine AdBlue/DEF. 6. Perform “Loaded Diagnostics Operation To Confirm Failure Correction” to check if this failure code is not cleared. 7. If the 19205 “Ammonia concentration (compensation value)” reading is normal (5 to 100 ppm) and the failure code is not redisplayed, the repair is completed. 8. If the ammonia concentration indicates an abnormal value or this failure code recurs, proceed to the next step.
15	Defective urea SCR system (inspection with SCR REMOVAL EFFICIENCY TEST)	1. See “TESTING AND ADJUSTING”, “SERVICE MODE” and “METHOD FOR SETTING WITH TESTING MENU (SCR SERVICE TEST)” of “SETTING AND OPERATION OF MACHINE MONITOR”, and perform an “SCR Denitration Efficiency Test”. 2. If the “SCR Denitration Efficiency Test” has not been completed successfully, proceed to cause 10. 3. If failure code [CA1694], [CA3751], or [CA3755] is displayed after the “SCR Denitration Efficiency Test”, perform troubleshooting for relevant failure code first. 4. After the failure code in the above 3 is cleared, perform “Loaded Diagnostics Operation To Clear Failure Code” to check if this failure code is not cleared. 5. If 19205 “Ammonia concentration (compensation value)” indicates a normal value (5 to 100 ppm) and the failure code is cleared, the repair is completed. 6. If the ammonia concentration indicates an abnormal value or this failure code is not cleared, proceed to cause 13. 7. Even if the SCR REMOVAL EFFICIENCY TEST has been completed successfully and any of failure code [CA1694], [CA3751], or [CA3755] is not displayed, proceed to cause 13.

FAILURE CODE [CA3867]

<table>
<tr><td>Action level</td><td>Failure code</td><td rowspan="2">Failure</td><td rowspan="2">AdBlue/DEF Low Concentration Error 1
(Engine controller system)</td></tr>
<tr><td>—</td><td>CA3867</td></tr>
<tr><td>Detail of failure</td><td colspan="3">AdBlue/DEF low concentration (25 % or below) is detected.</td></tr>
<tr><td>Action of controller</td><td colspan="3">None in particular</td></tr>
<tr><td>Phenomenon on machine</td><td colspan="3">AdBlue/DEF is consumed largely</td></tr>
<tr><td>Related information</td><td colspan="3">No error is displayed on the machine monitor.
A surface in AdBlue/DEF fluctuates more in work on slopes or travel on uneven ground, possibly disabling to detect the correct level or concentration.
If AdBlue/DEF level monitor is illuminated in red or a warning on the concentration is displayed, move to a flat place as soon as possible and refill AdBlue/DEF. If this phenomenon persists, refill AdBlue/DEF extra in AdBlue/DEF tank.
• If AdBlue/DEF tank temperature is 0 °C or below, the engine controller does not troubleshoot this failure code (“Loaded Diagnostics Operation To Clear Failure Code” does not clear this failure code).
• Make sure that AdBlue/DEF tank temperature is 0 °C or above on the “Pre-defined Monitoring” screen before troubleshooting this failure code.
• When AdBlue/DEF level is 0 %, the engine controller does not troubleshoot this failure code (“Loaded Diagnostics Operation To Clear Failure Code” does not clear this failure code).
• Make sure that AdBlue/DEF tank temperature is 20 % or above on the “Pre-defined Monitoring” screen before troubleshooting this failure code.
• For draining and cleaning procedures of AdBlue/DEF tank, see Testing and adjusting, “CLEAN AdBlue/DEF TANK”.
• For the replacement procedure of AdBlue/DEF/level sensor, see Disassembly and assembly, “Disassembly and assembly of AdBlue/DEF/level sensor”.
• On the “Pre-defined Monitoring” screen troubleshooting for AdBlue/DEF level and AdBlue/DEF quality sensors are used.
• Troubleshooting for AdBlue/DEF level and AdBlue/DEF quality sensors
19100 AdBlue/DEF Concentration
19110 AdBlue/DEF Level
19111 AdBlue/DEF Level Corrected
19115 AdBlue/DEF Temperature in Tank
19400 Ambient Temperature
19305 AdBlue/DEF Tank Heating State
NOTICE
This failure code requires “Loaded Diagnostics Operation To Clear Failure Code”. After investigating the cause of the problem and completing the repair, perform “Loaded Diagnostics Operation To Clear Failure Code” to make sure the failure code is cleared.</td></tr>
</table>

FAILURE CODE [CA4158]

Action level	Failure code	Failure	KDOC and KDPF Temperature Sensor Internal Circuit Error (Engine controller system)
L03	CA4158		
Detail of failure	An abnormality was detected in any of the sensor circuits: KDOC inlet temperature sensor, KDOC outlet temperature sensor, and KDPF outlet temperature sensor.		
Action of controller	• Operate with the KDOC inlet temperature, KDOC outlet temperature, and KDPF outlet temperature set to the default value (250 °C). • Engine power deration • AdBlue/DEF injection stops • EGR valve closed. • Regeneration control stops. • Fuel dosing stops. • Advances to Inducement strategy.		
Phenomenon on machine	• NOx emission increases because AdBlue/DEF injection is disabled. • Defective forcible regeneration control. • KDPF Soot Accumulation High. • Any of the KDOC inlet temperature, KDOC outlet temperature, and KDPF outlet temperature cannot be detected. • Engine power deration according to inducement strategy.		
Related information	⚠ **Be careful not to get burned as the temperature of KDPF and KDOC rises up over 500 °C.** • The KDPF temperature sensor is composed of the KDOC inlet temperature sensor, the KDOC outlet temperature sensor, and the KDPF outlet temperature sensor and provides CAN communication with the engine controller integrated into one sensor controller. • For the replacement procedure of the KDPF temperature sensor, see “DISASSEMBLY AND ASSEMBLY”, “DISASSEMBLE AND ASSEMBLE KDPF ASSEMBLY”. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared (note that the engine power deration is not canceled only by the failure code is cleared).		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position. If this failure code is cleared, wiring harness connector is defective.
2	Defective KDPF temperature sensor	1. Turn starting switch to OFF position. 2. Replace KDPF temperature sensor. 3. Turn starting switch to ON position.
		If this failure code is cleared, the original sensor is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)
3	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

FAILURE CODE [CA4459]

Action level	Failure code	Failure	AdBlue/DEF line heater relay 2 voltage high error (Engine controller system)
L01	CA4459		
Detail of failure	High voltage error occurs in AdBlue/DEF line heater relay 2 circuit.		
Action of controller	None in particular		
Phenomenon on machine	AdBlue/DEF line stops thawing NOx emission increases because AdBlue/DEF injection is disabled at low temperature.		
Related information	• AdBlue/DEF line heater relay 2 is driven at AdBlue/DEF supply system thawing/thermal insulation or “AdBlue/DEF Line Heater Relay 2 Test”. • AdBlue/DEF line heater relay 2 is built in AdBlue/DEF heater relay. • Troubleshooting of this failure code covers circuits from engine controller through AdBlue/DEF heater relay to power supply. • This failure code is detected only when AdBlue/DEF line heater 2 is turned ON. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Start the engine in low temperature (engine room temperature is Max. 12 °C) or perform AdBlue/DEF line heater 2 test. (See “service modes” of “SET AND OPERATE MACHINE MONITOR”, and “METHOD FOR OPERATING TESTING MENU (SCR SERVICE TEST)”.)		

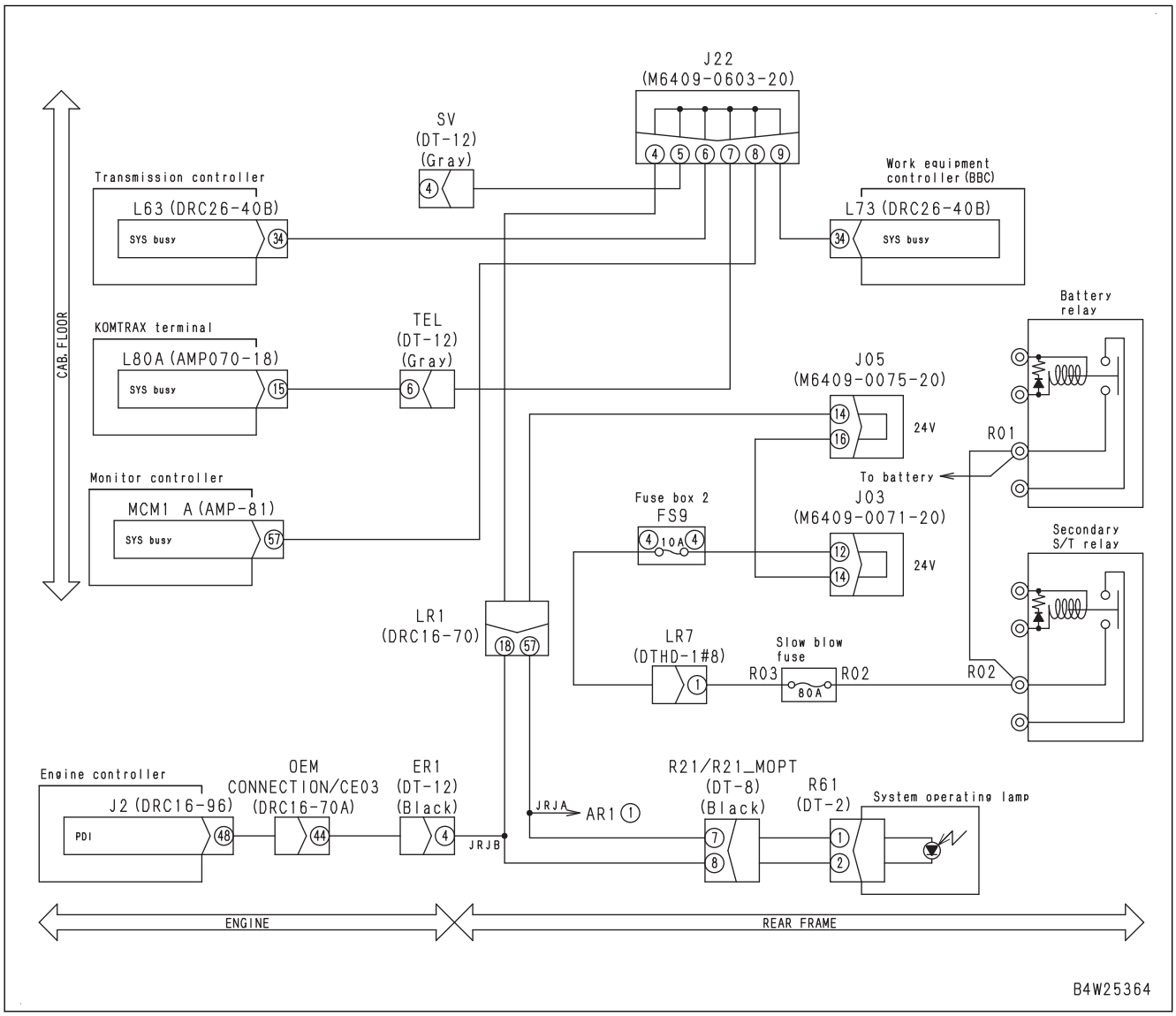
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check them. 2. Start the engine in low temperature (engine room temperature of 12 °C or lower) or perform “AdBlue/DEF Line Heater Relay 2 Test”. For details, see SET AND OPERATE MACHINE MONITOR, “SERVICE MODE” and “METHOD FOR SETTING WITH TESTING MENU (SCR SERVICE TEST)”.		
		If this failure code is displayed, the wiring harness connector is defective.		
2	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Turn the battery disconnect switch to OFF position. 3. Disconnect connector UHR1, and connect T-adapter to female side. 4. Turn the battery disconnect switch to ON position. 5. Turn starting switch to ON position (with connector UHR1 disconnected).		
		Voltage	Between UHR1 (female) (11) and (12)	Max. 3 V

FAILURE CODE [D160KA]

Action level	Failure code	Failure	Backup Lamp Relay Output Open Circuit (Transmission controller system)
L01	D160KA		
Detail of failure	When controller drives primary circuit (coil side) of backup lamp relay, no current flows due to open circuit in backup lamp relay output system.		
Action of controller	• Stops driving primary circuit (coil) of backup lamp relay. • Even if cause of failure disappears, machine does not become normal until starting switch is turned to OFF position.		
Phenomenon on machine	• Backup lamp does not light up. • Backup buzzer does not sound.		
Related information	• Output state (ON/OFF) to backup lamp relay can be checked with monitoring function. (Code: 03705) • This failure code detects failure in primary (coil) circuit of backup lamp relay, but does not detects failure in secondary (contact) circuit. • After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position, and operate directional (FNR) lever to R (reverse).		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective backup lamp relay (internal short circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connector L117, and connect T-adapter to male side.			
		Resistance	Between L117 (male) (1) and (2)		200 to 400 Ω
2	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn the starting switch to OFF position. 2. Disconnect connectors L62 and L117 and connect T-adapters to each female side.			
		Resistance	Between L62 (female) (19) and L117 (female) (1)		Max. 1 Ω
			Between L117 (female) (2) and ground		Max. 1 Ω
3	Defective transmission controller	1. Turn the starting switch to OFF position. 2. Insert T-adapter into the connector L62. 3. Turn the starting switch to ON position.			
		Voltage	Between L62 (19) and ground	Directional (FNR) lever: R (reverse)	20 to 30 V
				Directional (FNR) lever: Other than R	Max. 4.5 V

Circuit diagram related to system operating lamp



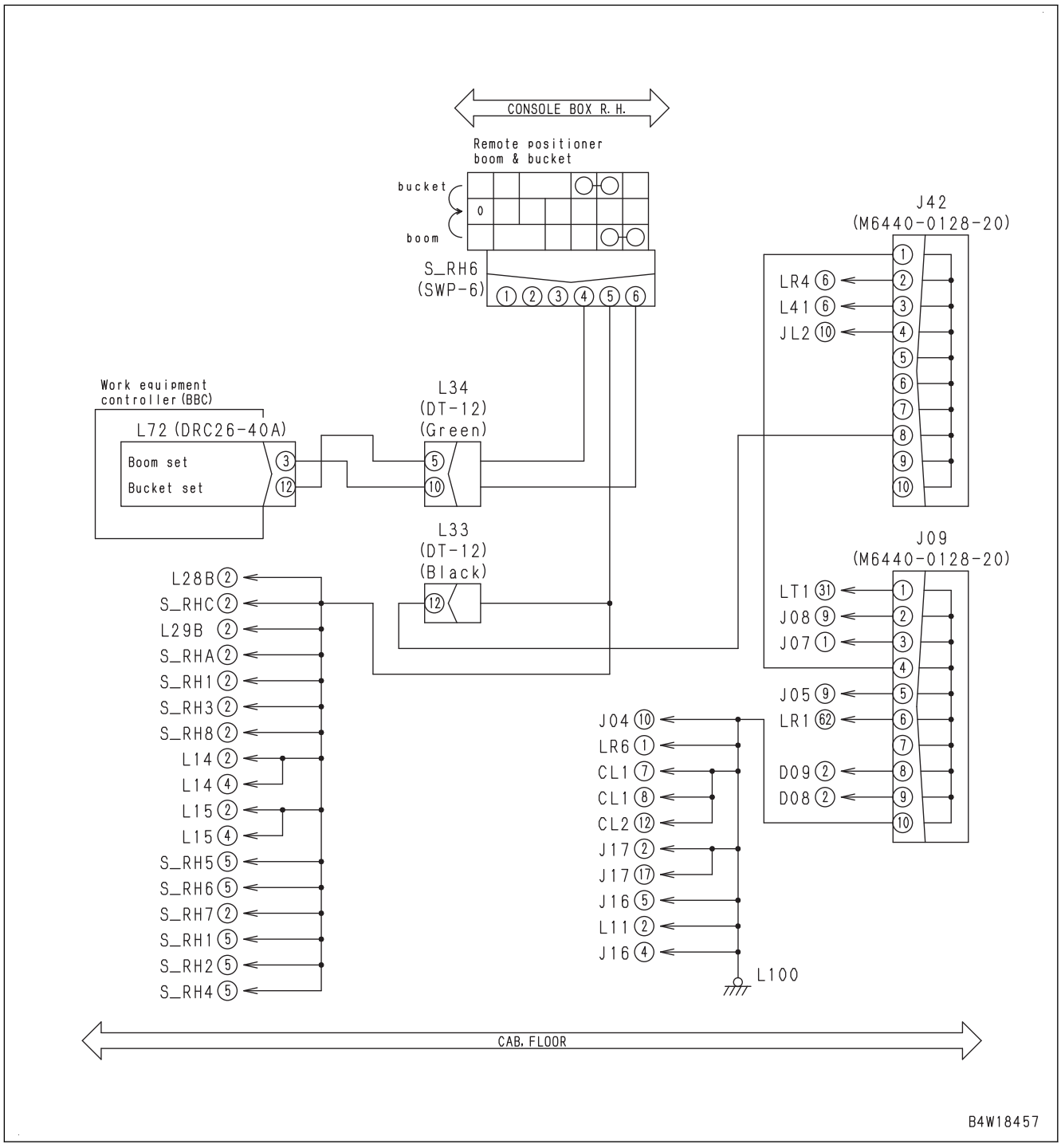
FAILURE CODE [DAQ1KA]

Action level	Failure code	Failure	Key Switch ACC Signal Open Circuit (Transmission controller) (Transmission controller system)
L03	DAQ1KA		
Detail of failure	While engine is running, key switch ACC signal is not entered in transmission controller.		
Action of controller	Perform a remedy of Key off.		
Phenomenon on machine	• Machine travels normally although lockup clutch is not engaged until engine is stopped. • If ACC signal lines of both work equipment controller and engine controller have open circuit, machine comes into the same state as when engine shutdown secondary switch is operated. • Shift mode cannot be changed.		
Related information	• If fuse No. 1 or No. 15 in fuse box 2 is blown out, the machine monitor displays nothing. • When the engine is rotating, power is supplied other than the line between terminal ACC of starting switch and transmission controller. • After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Start the engine.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Open circuit in wiring harness (wire breakage or defective contact)	1. Turn the starting switch to OFF position. 2. Turn the battery disconnect switch to OFF position. 3. Disconnect connector L63, and connect T-adapter to female side. 4. Turn the battery disconnect switch to ON position. 5. Turn the starting switch to ON position.		
		Voltage	Between L63 (female) (14) and (21)	20 to 30 V
			Between L63 (female) (24) and (31)	20 to 30 V
		If no failure is found by above checks, this check is not required. 1. Turn the starting switch to OFF position. 2. Turn the battery disconnect switch to OFF position. 3. Disconnect connectors L63 and S40, and connect T-adapters to each female side.		
		Resistance	Between L63 (female) (14) and S40 (female) (4)	Max. 1 Ω
			Between L63 (female) (24) and S40 (female) (4)	Max. 1 Ω
2	Defective transmission controller	1. Turn the starting switch to OFF position. 2. Turn the battery disconnect switch to OFF position. 3. Insert T-adapter into the connector L63. 4. Turn the battery disconnect switch to ON position. 5. Turn the starting switch to ON position.		
		Voltage	Between L63 (14) and (21)	20 to 30 V
			Between L63 (24) and (31)	20 to 30 V

<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="6">4</td><td rowspan="6">Open circuit in wiring harness (wire breakage or defective contact)</td><td colspan="3">1. Turn the starting switch to OFF position.
2. Turn the battery disconnect switch to OFF position.
3. Disconnect connector L73, and connect T-adapter to female side.
4. Turn the battery disconnect switch to ON position.
REMARK
If voltage is generated between battery (+) terminal and ground but not between ground and each of L73 (1) and (11), wiring harness or fuse has open circuit.</td></tr>
<tr><td rowspan="2">Voltage</td><td>Between battery (+) terminal and ground</td><td>20 to 30 V</td></tr>
<tr><td>Between ground and each of L73 (female) (1) and (11)</td><td>20 to 30 V</td></tr>
<tr><td colspan="3">REMARK
If no failure is found by above checks, this check is not required.
1. Turn the starting switch to OFF position.
2. Turn the battery disconnect switch to OFF position.
3. Disconnect connector L73, and connect T-adapter to female side.</td></tr>
<tr><td rowspan="2">Resistance</td><td>Between ground and each of L73 (female) (21), (31), (32), and (33)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between battery (+) terminal and each of L73 (female) (1) and (11)</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="4">5</td><td rowspan="4">Ground fault in wiring harness (contact with ground circuit)</td><td colspan="3">REMARK
Replace slow-blow fuse or fuse if it is blown out.
1. Turn the battery disconnect switch to OFF position.
2. Turn the starting switch to OFF position.
3. Remove all fuses in fuse box 2.
4. Disconnect connector L73, and connect T-adapter to female side of L73.</td></tr>
<tr><td rowspan="2">Resistance</td><td>Between battery (+) terminal and ground</td><td>Min. 1 MΩ</td></tr>
<tr><td>Between ground and L73 (female) (1) or (11)</td><td>Min. 1 MΩ</td></tr>
<tr><td rowspan="3">6</td><td rowspan="3">Defective work equipment controller</td><td colspan="3">1. Turn the starting switch to OFF position.
2. Turn the battery disconnect switch to OFF position.
3. Insert T-adapter into connector L73.
4. Turn the battery disconnect switch to ON position.
5. Turn the starting switch to ON position.</td></tr>
<tr><td>Voltage</td><td>Between L73 (1), (11) and each of (21), (31), (32), and (33)</td><td>20 to 30 V</td></tr>
</table>

Circuit diagram related to remote positioner system



FAILURE CODE [DF10KA]

Action level	Failure code	Failure	Transmission Shift Lever Input Signal Open Circuit (Transmission controller system)
L03	DF10KA		
Detail of failure	Due to open circuit or ground fault in input signal system of transmission shift lever switch, transmission shift lever switch signal is not inputted.		
Action of controller	• Fixes shift range to that before occurrence of failure. • If cause of failure disappears, machine becomes normal by itself.		
Phenomenon on machine	• Transmission is not set to selected gear speed. • Shift indicator indicates shift range before occurrence of failure.		
Related information	• Input state (ON/OFF) from each shift switch can be checked with monitoring function. (Code: 02212) • After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position, and operate shift lever.		

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td>1</td><td>Defective operation of shift lever</td><td colspan="4">• Force may be applied in addition to the force by operating shift lever, and it depresses the lever.
• Shift lever is stopped intermediate point between 2 positions.</td></tr>
<tr><td>2</td><td>Defective fuse</td><td colspan="4">If fuse-2 in fuse box 1 is blown out, circuit probably has ground fault. (See check on cause 5.)</td></tr>
<tr><td rowspan="12">3</td><td rowspan="12">Defective gear shift lever</td><td colspan="4">REMARK
• 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 shift lever is defective or not.
1. Turn the starting switch to OFF position.
2. Insert T-adapter into connector L02.
3. Turn the starting switch to ON position.
4. Move shift lever to perform troubleshooting.</td></tr>
<tr><td rowspan="11">Voltage</td><td>Between L02 (1) and (9)</td><td>Always</td><td>20 to 30 V</td></tr>
<tr><td rowspan="2">Between L02 (5) and (9)</td><td>Shift range: 1st</td><td>20 to 30 V</td></tr>
<tr><td>Shift range: Other than 1st</td><td>Max. 1 V</td></tr>
<tr><td rowspan="2">Between L02 (6) and (9)</td><td>Shift range: 2nd</td><td>20 to 30 V</td></tr>
<tr><td>Shift range: Other than 2nd</td><td>Max. 1 V</td></tr>
<tr><td rowspan="2">Between L02 (7) and (9)</td><td>Shift range: 3rd</td><td>20 to 30 V</td></tr>
<tr><td>Shift range: Other than 3rd</td><td>Max. 1 V</td></tr>
<tr><td rowspan="2">Between L02 (8) and (9)</td><td>Shift range: 4th</td><td>20 to 30 V</td></tr>
<tr><td>Shift range: Other than 4th</td><td>Max. 1 V</td></tr>
<tr><td colspan="4">If harness is normal and voltage in each selected range is below standard value, shift lever power supply or ground circuit is defective.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="4">5</td><td rowspan="4">Open circuit in wiring harness (wire breakage or defective contact)</td><td colspan="3">1. Turn the starting switch to OFF position.
2. Disconnect connectors L61 and TCIN.P, and connect T-adapters to each female side.</td></tr>
<tr><td rowspan="3">Resistance</td><td>If power supply voltage is normal, this check is not required.
Between L61 (female) (16) and TCIN.P (female) (B)</td><td>Max. 1 Ω</td></tr>
<tr><td>If power supply voltage is normal, this check is not required.
Between L61 (female) (4) and TCIN.P (female) (A)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between L61 (female) (7) and TCIN.P (female) (C)</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="4">6</td><td rowspan="4">Defective transmission controller</td><td colspan="3">If no failure is found by preceding checks, transmission controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</td></tr>
<tr><td colspan="3">Reference
1. Turn the starting switch to OFF position.
2. Insert T-adapter into the connector L61.
3. Turn the starting switch to ON position.</td></tr>
<tr><td rowspan="2">Voltage</td><td>Between L61 (16) and (4)</td><td>20 to 30 V</td></tr>
<tr><td>Between L61 (7) and (4)</td><td>0.9 to 5.1 V</td></tr>
</table>

FAILURE CODE [DK5AKA]

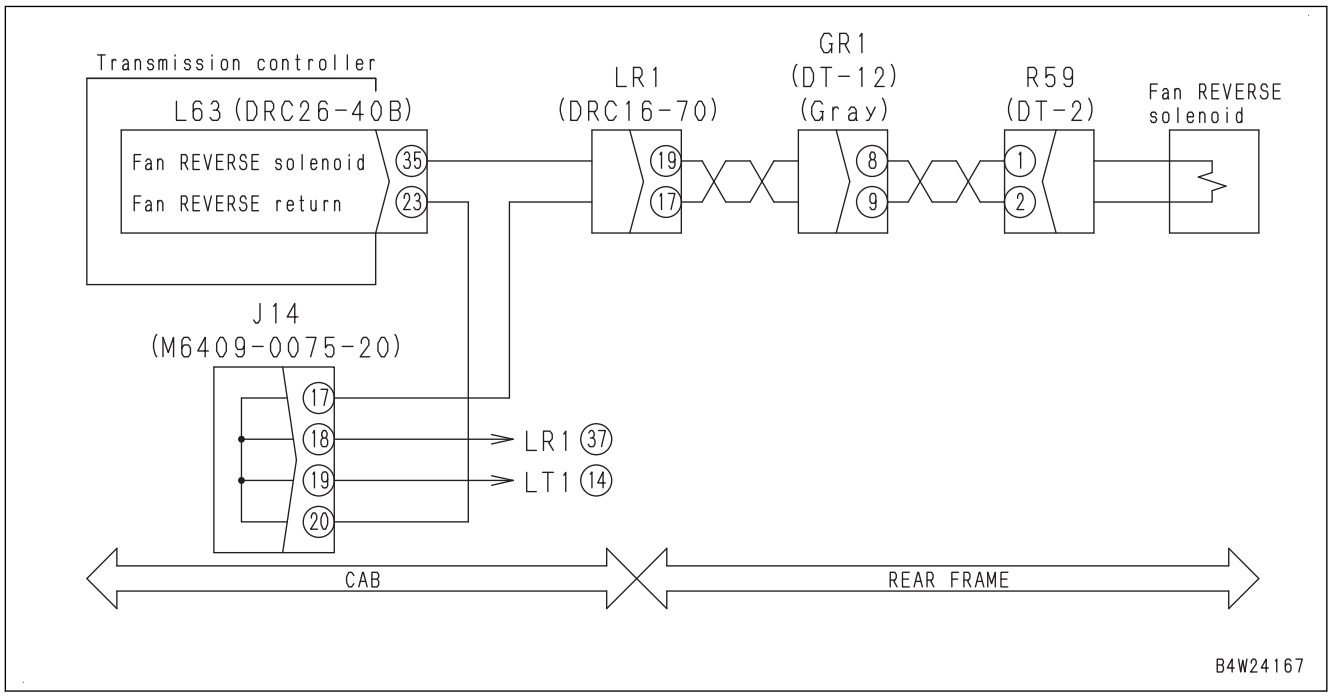
Action level	Failure code	Failure	Boom Lever Potentiometer Open Circuit Or Ground Fault (Sub) (Work equipment controller system)
L03	DK5AKA		
Detail of failure	Due to open circuit or ground fault in boom lever potentiometer (sub: B line) system, boom lever potentiometer (sub: B line) signal voltage is lower than the normal range. (Boom lever potentiometer (sub: B line) signal voltage: 0.3 V and below)		
Action of controller	• Controls boom by using signal voltage from boom lever potentiometer (main: A line) if signal voltage from boom lever potentiometer (main: A line) is normal. However, in this case, boom detent control does not work, and work equipment speed decreases to 30 % of normal speed. • Recognizes that the lever stroke signal of boom lever potentiometer (sub) is 0 %. • Makes centralized warning lamp light up and alarm buzzer sound. • If cause of failure disappears, machine becomes normal by itself.		
Phenomenon on machine	Boom detent control does not work. Work equipment speed decreases to 30 % of normal speed.		
Related information	• Input voltage from boom lever potentiometer (main: A line) can be checked with monitoring function. (Code: 42000) • Input voltage from boom lever potentiometer (sub: B line) can be checked with monitoring function. (Code: 42001) • 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 5 V sensor power supply system	If failure code [DB95KX] is also displayed, perform troubleshooting for failure code [DB95KX] first. If failure code [DB95KX] is not displayed, perform followings.		
		1. Turn the starting switch to OFF position. 2. Disconnect connector L28A, and connect T-adapter to female side. 3. Turn the starting switch to ON position. **REMARK** If power supply voltage is abnormal, proceed to check on cause 3 and after (to locate the wiring harness open circuit).		
		Voltage	Between L28A (female) (1) and (2)	4.8 to 5.2 V

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="9">2</td><td rowspan="9">Defective 3rd spool (for attachment) lever potentiometer (internal open circuit or short circuit)</td><td colspan="4">1. Turn the starting switch to OFF position.
2. Disconnect connector L30, and connect T-adapter to male side.</td></tr>
<tr><td rowspan="4">Resistance</td><td colspan="2">Between L30 (male) (1) and ground</td><td>Min. 1 MΩ</td></tr>
<tr><td colspan="2">Between L30 (male) (2) and ground</td><td>Min. 1 MΩ</td></tr>
<tr><td colspan="2">Between L30 (male) (3) and ground</td><td>Min. 1 MΩ</td></tr>
<tr><td colspan="2">Between L30 (male) (4) and ground</td><td>Min. 1 MΩ</td></tr>
<tr><td colspan="4">REMARK
• 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.
1. Turn the starting switch to OFF position.
2. Insert T-adapter into connector L30.
3. Set work equipment lock switch to LOCK position.
4. Turn the starting switch to ON position.
5. Operate 3rd spool (for attachment) lever to perform troubleshooting.</td></tr>
<tr><td rowspan="3">Voltage</td><td rowspan="3">Between L30 (4) and (2)</td><td>3rd spool (for attachment) lever: NEUTRAL</td><td>2.38 to 2.62 V</td></tr>
<tr><td>3rd spool (for attachment) lever: EXTEND operation to stroke end</td><td>0.60 to 1.10 V</td></tr>
<tr><td>3rd spool (for attachment) lever: RETRACT operation to stroke end</td><td>3.90 to 4.40 V</td></tr>
<tr><td rowspan="4">3</td><td rowspan="4">Open circuit in wiring harness (wire breakage or defective contact of connector)</td><td colspan="4">1. Turn the starting switch to OFF position.
2. Disconnect connectors L71, L72, and L30, and connect T-adapters to each female side.</td></tr>
<tr><td rowspan="3">Resistance</td><td colspan="2">REMARK
If power supply voltage in check on cause 1 is normal, this check is not required.
Between L71 (female) (22) and L30 (female) (1)</td><td>Max. 1 Ω</td></tr>
<tr><td colspan="2">REMARK
If power supply voltage in check on cause 1 is normal, this check is not required.
Between L71 (female) (4) and L30 (female) (2)</td><td>Max. 1 Ω</td></tr>
<tr><td colspan="2">Between L72 (female) (25) and L30 (female) (4)</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Ground fault in wiring harness (contact with ground circuit)</td><td colspan="4">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 connectors L72 and L30, and connect T-adapter to either female side.</td></tr>
<tr><td>Resistance</td><td colspan="2">Between L72 (female) (25) and ground, or between L30 (female) (4) and ground</td><td>Min. 1 MΩ</td></tr>
</table>

<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Ground fault in wiring harness (contact with ground circuit)</td><td colspan="3">• Perform the following troubleshooting when failure code [DPQ1KR] and [DPQ3KR] are displayed at the same time.
• If no failure is found by check on cause 4, this check is not required.
1. Turn the starting switch to OFF position.
2. Disconnect connectors MCM1 B, MDM2, MOM1, and RVM1, and connect T-adapter to any female side.</td></tr>
<tr><td>Resistance</td><td>Between ground and each of MCM1 B (female) (108), MDM2 (female) (3), MOM1 (female) (3), and RVM1 (female) (9)</td><td>Min. 1 MΩ</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Defective switch panel (operation switches of machine monitor)</td><td colspan="3">Perform the following troubleshooting when failure code [DPQ1KR] and [DPQ3KR] are displayed at the same time.
1. Turn the starting switch to OFF position.
2. Disconnect connector MOM1.
3. Turn the starting switch to ON position.</td></tr>
<tr><td colspan="3">If failure codes [DPQ2KR] and [DPQ3KR] disappear, switch panel is defective.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Defective LED unit (display unit of machine monitor)</td><td colspan="3">Perform the following troubleshooting when failure code [DPQ1KR] and [DPQ3KR] are displayed at the same time.
1. Turn the starting switch to OFF position.
2. Disconnect connector MDM2.
3. Turn the starting switch to ON position.</td></tr>
<tr><td colspan="3">If failure code [DPQ1KR] and [DPQ3KR] are cleared, LED unit is defective.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">Defective rearview monitor</td><td colspan="3">Perform the following troubleshooting when failure code [DPQ1KR] and [DPQ3KR] are displayed at the same time.
1. Turn the starting switch to OFF position.
2. Disconnect connector RVM1.
3. Turn the starting switch to ON position.</td></tr>
<tr><td colspan="3">If failure codes [DPQ1KR] and [DPQ2KR] disappear, rearview monitor is defective.</td></tr>
<tr><td>9</td><td>Defective monitor controller</td><td colspan="3">If no failure is found by preceding checks, monitor controller is defective. (Since this is an internal defect, troubleshooting cannot be performed).</td></tr>
</table>

Circuit diagram related to radiator fan reverse rotation solenoid

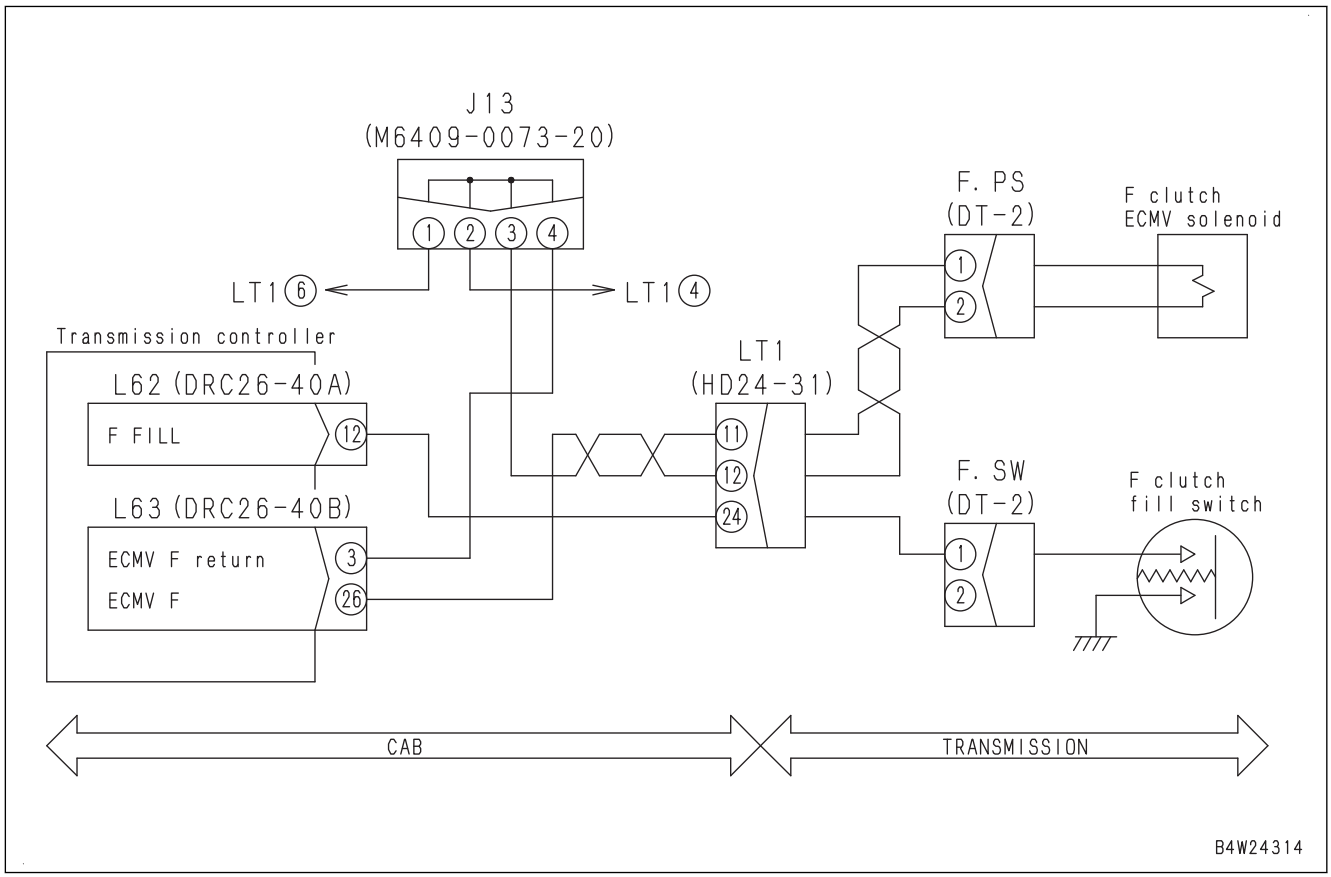


FAILURE CODE [DXF0KA]

Action level	Failure code	Failure	AJSS EPC solenoid open circuit (Work equipment controller system)
L03	DXF0KA		
Detail of failure	Due to open circuit in AJSS EPC solenoid output signal, no current flows when controller drives AJSS EPC solenoid.		
Action of controller	• Stops driving AJSS EPC solenoid. • Makes centralized warning lamp light up and alarm buzzer sound. • Even if cause of failure is eliminated, machine does not become normal until starting switch is turned to OFF position.		
Phenomenon on machine	Steering does not move smoothly due to AJSS operation.		
Related information	• Output current to AJSS EPC solenoid can be checked with monitoring. (Code: 41908) • This failure code is displayed only when AJSS specifications is set. • After completion of repair, check that the failure code is cleared by the following procedure. Method: Start the engine.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective AJSS EPC solenoid (internal open circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connector AJ4, and connect T-adapter to male side		
		Resistance	Between AJ4 (male) (1) and (2)	5 to 15 Ω
2	Open circuit, short circuit, ground fault, hot short circuit of wiring harness, or defective work equipment controller	1. Turn the starting switch to OFF position. 2. Disconnect connector AJ4, and connect T-adapter to female side. 3. Turn the starting switch to ON position. **REMARK** Shake wiring harness by hand while measuring the voltage. If the voltage becomes 0 V while shaking, wiring harness has open circuit at around this point.		
		Voltage	Between AJ4 (female) (1) and (2)	1 to 4.5 V
3	Open circuit or short circuit in wiring harness	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 L73, and connect T-adapter to female side. **REMARK** If resistance value is Min. 1 MΩ, open circuit occurs. If resistance value is Max. 1 Ω, short circuit occurs.		
		Resistance	Between L73 (female) (13) and (38)	5 to 15 Ω
4	Open circuit in wiring harness (Wire breakage or defective contact of connector)	If no failure is found by check on cause 3, this check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect connectors L73 and AJ4, and connect T-adapter to each female side.		
		Resistance	Between L73 (female) (13) and AJ4 (female) (1)	Max. 1 Ω
			Between L73 (female) (38) and AJ4 (female) (2)	Max. 1 Ω
5	Defective work equipment controller	If no failure is found by preceding checks, work equipment controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to travel forward clutch ECMV



FAILURE CODE [F316KB]

Detail of failure	Because the voltage of the 3rd party component start-up signal output line from the gateway function controller is 2.5V or less while the command is ON, a short circuit is found.
Action level	-
Action of controller	• 3rd party component start-up signal is turned OFF. • Even if the cause of the abnormality is removed, the machine will not go back to the correct condition until the starting switch is turned to the OFF position one time.
Phenomenon on machine	KOMTRAX system does not operate correctly.
Related information	

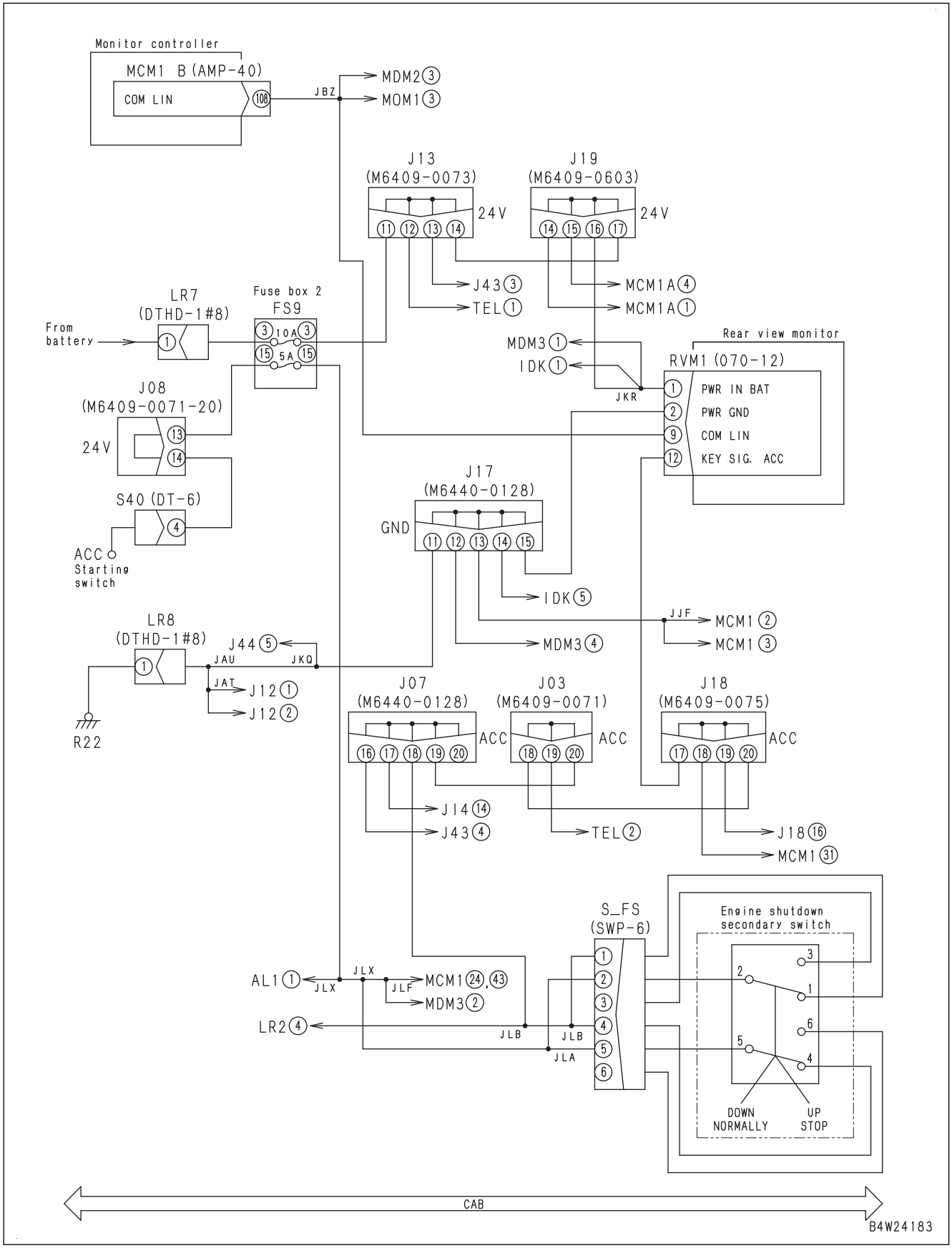
<table>
<tr><th>No.</th><th>Check item</th><th colspan="4">Procedure of troubleshooting</th><th colspan="2">Judgment and remedy</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Wiring harness and connector</td><td colspan="4" rowspan="2">1. Do the check in accordance with the descriptions of wiring harnesses and connectors in RELATED INFORMATION FOR TROUBLESHOOTING, CHECKS BEFORE TROUBLESHOOTING, ELECTRICAL EQUIPMENT.
2. Are the wiring harnesses and connectors in the correct state?</td><td>YES</td><td>• The wiring harnesses and connectors are in the correct state.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• A wiring harness or a connector is defective.
• Repair or replace the defective wiring harness or connector.
• Go to "Confirmation of repair".</td></tr>
<tr><td rowspan="4">2</td><td rowspan="4">Ground fault in wiring harness</td><td colspan="4">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors L80, L81, and L82. Connect a T-adapter to one of the female side of L80, male side of L81, or male side of L82.
3. Measure the resistance.
4. Does the troubleshooting result agree with the standard value?</td><td>YES</td><td>• The wiring harness does not have a ground fault.
• Go to the next check item.</td></tr>
<tr><td>Item</td><td colspan="2">Measurement position, condition</td><td>Standard value</td><td rowspan="2">NO</td><td rowspan="2">• The wiring harness has a ground fault.
• Repair or replace the defective wiring harness.
• Go to "Confirmation of repair".</td></tr>
<tr><td>Resistance</td><td colspan="2">Between ground and one of L80 (female) (77), L81 (male) (10), or L82 (male) (4)</td><td>Min. 1MΩ</td></tr>
</table>

E-3 AUTOMATIC PREHEATING SYSTEM DOES NOT WORK

Failure	Automatic preheating system does not work
Related information	• Automatic preheating function starts when the engine coolant temperature is -5 °C and below. (Monitoring code: 04107) • If the automatic preheating function does not work, check if manual preheating function works first. • Engine controller diagnosis primary (coil) side of preheat relay (connector R07) with failure codes [CA2555] and [CA2556]. • Engine controller generates failure code [CA144] or [CA145] if the engine coolant temperature sensor is defective.

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective slow-blow fuse	If slow-blow fuse is blown out, circuit probably has ground fault. In this case, perform troubleshooting for ground fault in wiring harness (contact to ground circuit) first.		
2	Defective fuse	If fuse No.6 in fuse box FS9 is blown out, circuit probably has ground fault. In this case, perform troubleshooting for ground fault in wiring harness (contact to ground circuit) first.		
3	Defective preheating relay (internal open circuit or short circuit)	1. Turn the starting switch to OFF position. 2. Replace preheating relay L125 with horn relay L129. 3. Turn the starting switch to ON position.		
		If automatic preheating starts when coolant temperature is Max. -5 °C, preheating relay is defective.		
4	Open or short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors MCM1 A and L125, and connect T-adapter to female side of L125. **REMARK** • If resistance value is 1 MΩ and above , wiring harness has an open circuit. If it is 1 Ω and below, wiring harness has a short circuit. • Coil resistance of heater relay		
		Resistance	Between L125 (female) (5) and ground	Approx. 20 Ω
5	Open circuit in wiring harness (wire breakage or defective contact)	1. Replace slow-blow fuse if it is burnt out. 2. Turn the starting switch to OFF position. 3. Turn the battery disconnect switch to OFF position. 4. Disconnect connectors L125 and MCM1 A, and connect T-adapter to female side of L125.		
		Resistance	Between L125 (female) (3) and battery relay terminal R01	Max. 1 Ω
		Resistance	**REMARK** If no failure is found by check on cause 4, this check is not required. Between L125 (female) (5) and heater relay terminal E06	Max. 1 Ω

Circuit diagram related to rearview monitor power supply

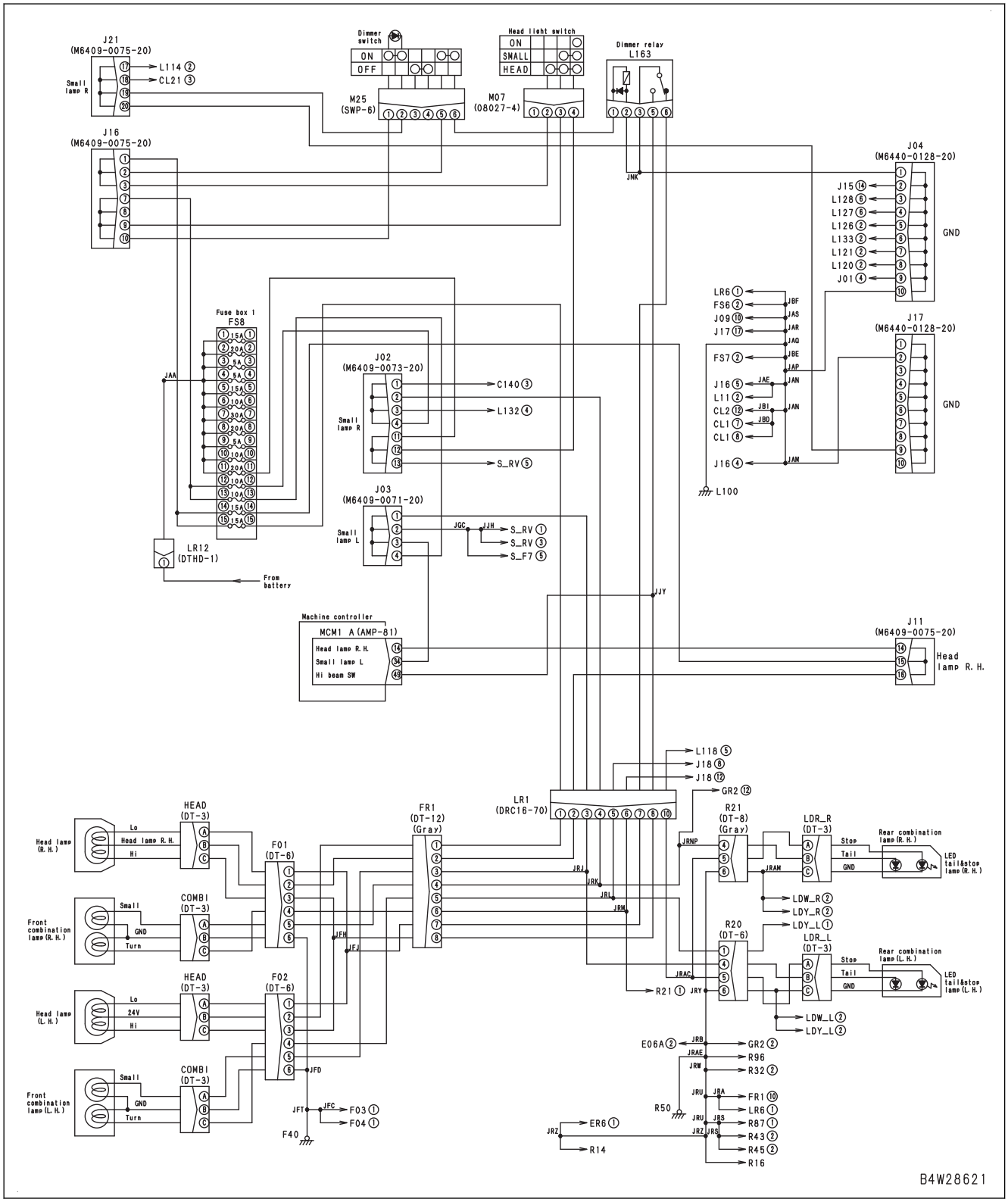


E-37 DIRECTIONAL SELECTOR (FNR) SWITCH MODE IS NOT SELECTED OR NOT RELEASED

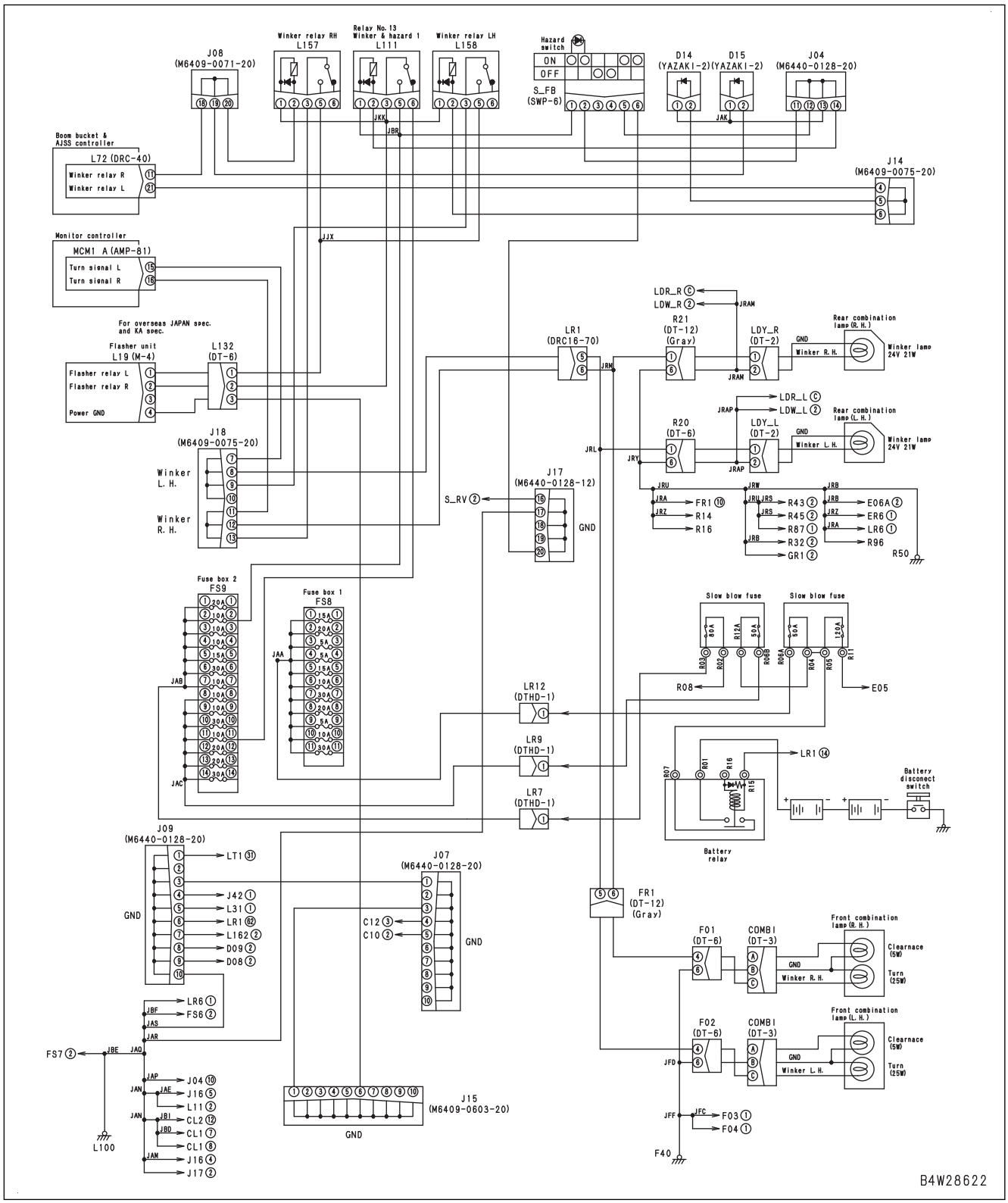
Failure	Directional selector (FNR) switch mode is not selected or not released.
Related information	• Directional selector (FNR) switch actuation switch system is defective. (Directional selector (FNR) switch mode is not selected (due to ground fault), or the handle mode is not selected (due to open circuit).) • The ON/OFF state of directional selector (FNR) switch actuation switch can be checked with monitoring function. (Code: 02214) • The mounting of R.H. directional selector (FNR) switch can be checked in the service mode of the monitor.

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective directional selector (FNR) enable switch (internal open circuit or short circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connector S_RH5, and connect T-adapter to male side.			
		Resistance	Between S_RH5 (male) (5) and (6)	Switch: OFF	Min. 1 MΩ
				Switch: ON	Max. 1 Ω
2	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn the starting switch to OFF position. 2. Disconnect connectors L62 and S_RH5, and connect T-adapters to each female side.			
		Resistance	Between L62 (female) (27) and S_RH5 (female) (6)		Max. 1 Ω
			Between S_RH5 (female) (5) and ground		Max. 1 Ω
3	Ground fault in wiring harness (contact with ground circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connectors L62 and S_RH5, and connect T-adapter to either female side.			
		Resistance	Between ground and L62 (female) (27) or S_RH5 (female) (6)		Min. 1 MΩ
4	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector S_RH5, and connect T-adapter to female side. 3. Turn the starting switch to ON position.			
		Voltage	Between S_RH5 (female) (6) and ground		7 to 9 V
5	Defective transmission controller	1. Turn the starting switch to OFF position. 2. Insert T-adapter into the connector L62. 3. Turn the starting switch to ON position.			
		Voltage	Between L62 (27) and ground	Switch: OFF	7 to 9 V
				Switch: ON	Max. 1 V

Circuit diagram related to headlamp, clearance lamp, and tail lamp (for AJSS spec)



Circuit diagram related to turn signal lamp and emergency lamp (for AJSS spec)



<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="9">5</td><td rowspan="9">Open circuit 2 in wiring harness (wire breakage or defective contact of connector)</td><td colspan="3">Front wiper motor related
If no failure is found by check of each input voltage on cause 2, this check is not required.
1. Turn the starting switch to OFF position.
2. Disconnect connectors C15, L161 and M10, and connect T-adapters to each female side.
3. Remove fuse No.7 in fuse box 1 (FS8).</td></tr>
<tr><td rowspan="8">Resistance</td><td>Between FS8-7 and C15 (female) (1)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between M10 (female) (3) and C15 (female) (1)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between L161 (female) (6) and C15 (female) (3)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between L161 (female) (3) and C15 (female) (2)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between L161 (female) (1) and M10(female) (2)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between ground and L161 (female) (2)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between L161 (female) (5) and C15 (female) (1)</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="4">6</td><td rowspan="4">Ground fault in wiring harness (contact with GND circuit)</td><td colspan="3">1. Turn the starting switch to OFF position.
2. Disconnect connectors C12, C15, L161, L31, and CL27, and connect T-adapter to any female side of L161 or C15.
3. Remove fuse No.7 in fuse box 1 (FS8).</td></tr>
<tr><td rowspan="3">Resistance</td><td>Between ground and either L161 (female) (6) or C15 (female) (3)</td><td>Min. 1 MΩ</td></tr>
<tr><td>Between ground and either L161 (female) (3) or C15 (female) (2)</td><td>Min. 1 MΩ</td></tr>
<tr><td colspan="2">Between ground and L161 (female) (1)</td></tr>
</table>

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="4">5</td><td rowspan="4">Defective torque converter relief valve</td><td colspan="4">Be ready with engine stopped, then perform troubleshooting with engine at 2000 rpm.</td></tr>
<tr><td>Torque converter input oil pressure</td><td>Brake</td><td>OFF</td><td>0.1 to 0.88 MPa {1.0 to 9.0 kgf/cm^2}</td></tr>
<tr><td>Torque converter output oil pressure</td><td>Brake</td><td>OFF</td><td>0.06 to 0.71 MPa {0.6 to 7.1 kgf/cm^2}</td></tr>
<tr><td colspan="4">• If toil 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 broken.</td></tr>
<tr><td rowspan="3">6</td><td rowspan="3">Defective torque converter</td><td colspan="4">Be ready with engine stopped, then perform troubleshooting with torque converter stalled.</td></tr>
<tr><td rowspan="2">Stall speed</td><td>Economy mode switch</td><td>ON</td><td>1710 ± 100 rpm</td></tr>
<tr><td>Power mode switch</td><td>ON</td><td>1785 ± 100 rpm</td></tr>
</table>

No.	Cause	Procedure, measuring location, criteria and remarks	
7	Defective work equipment main relief valve	Measure it referring to TESTING AND ADJUSTING.	
		Work equipment main relief pressure	34.3 (+1.8/-4.4) MPa {350 (+18/-45) kgf/cm^2}
		If relief pressure does not rise even after main relief valve is adjusted, unload valve may remain opened. Check unload valve.	
8	Defective accumulator charge valve for ECSS	If no failure is found by check on work equipment main relief valve, and relief pressures of boom and bucket are low, ECSS charge valve may be defective. Check the ECSS charge valve.	
9	Malfunction of spool in boom control valve	• If no failure is found by check on malfunction of boom RAISE EPC valve and defect of unload valve of work equipment valve, and main circuit oil pressure is not higher than relief pressure of unload valve during boom RAISE operation, malfunction of work equipment spool is suspected. • Check that the spool is not stuck.	
10	Boom control valve Malfunction of load check valve	When no failure is found by checks on work equipment main relief valve, check load check valve for sticking.	
11	Malfunction of PC valve	Check PC valve for sticking of spool and fatigue of spring. If any failure is found, replace it.	
12	Malfunction of LS valve	Check LS valve for sticking of spool and fatigue of spring. If any failure is found, replace it.	
13	Defective lift cylinder	Measure it referring to TESTING AND ADJUSTING.	
		• If relief oil pressure of work equipment main relief valve is low, lift cylinder may be defective. • Disconnect hydraulic hose at cylinder head side. If oil flows out from cylinder when cylinder is relieved at its stroke end, lift cylinder piston ring may be defective. Disassemble the lift cylinder and check it.	
14	Defective work equipment pump	• If measured oil pressure is abnormal in check on defective work equipment main relief valve, and work equipment main relief valve is normal, disconnect work equipment pump outlet hose, crank the engine, and check if oil flows out. • Check that no foreign materials such as metal particles, etc. is stuck to the return filter and the suction strainer.	
15	Defective cooling fan pump	Perform measurement by referring to TESTING AND ADJUSTING. • If the fan speed is below the standard value, perform troubleshooting for “FAN SPEED IS ABNORMAL (TOO HIGH OR LOW, OR STATIONARY)” in H mode.	
		Maximum fan speed	1300±50 rpm

S-11 OIL BECOMES CONTAMINATED QUICKLY

Failure	Oil becomes contaminated quickly
Related information	If any failure code is displayed, perform troubleshooting for that code first.

No.	Cause	Point to check, remarks	Remedy
1	Unspecified fuel is used.	Unspecified fuel is used.	Use recommended fuel described in Operation and Maintenance Manual.
2	Use of oil out of specification	Oil out of specification is used	Use recommended oil described in Operation and Maintenance Manual.
3	Exhaust gas color in front of KDPF is black.	Check exhaust gas color in front of KDPF. (See standard value table.) (Reference: See Testing and adjusting, “Exhaust gas color”). (Exhaust gas color in front of KDPF is black.)	Perform troubleshooting of “exhaust gas color is black”
4	Much blowby gas	1. Measured blowby pressure is higher than standard value. 2. Blowby pressure is still high after KCCV filter element is replaced.	Perform troubleshooting cause 5 to 10 sequentially.
5	Defective seal on turbine side of VGT	Check if VGT shaft is not loose when rotated (by manually moving the VGT's blade axially and vertically).	VGT replacement
6	Addition of too much oil	Check for high oil level (If oil is added too much, it becomes high temperature and is deteriorated rapidly).	Lower oil level to appropriate level.
7	Dirt on oil cooler element	Visually check oil cooler element for dirt (temperature rise caused by dirt of oil cooler element)	Oil cooler element repair or replacement
8	Wear in the EGR valve guide	• Disconnect the EGR valve to check a stem seal, guide, and system. • Outlet port is stained with oil after the EGR valve is disconnected.	EGR valve replacement
9	Breakage or wear of piston ring	• Measured blowby pressure is above standard value. • After KCCV filter element is replaced, blowby pressure is still high. • Measure compression pressure (See standard value table). (Reference: See “TESTING AND ADJUSTING”, “Testing compression pressure”.)	Piston ring replacement or repair
10	Wear or damage of valve guide or stem seal	• Check valve guide and stem seal. • Remove cylinder head and check guide internal surface and stem seal for damage (Reference: See Maintenance standard).	Valve guide and stem seal replacement

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

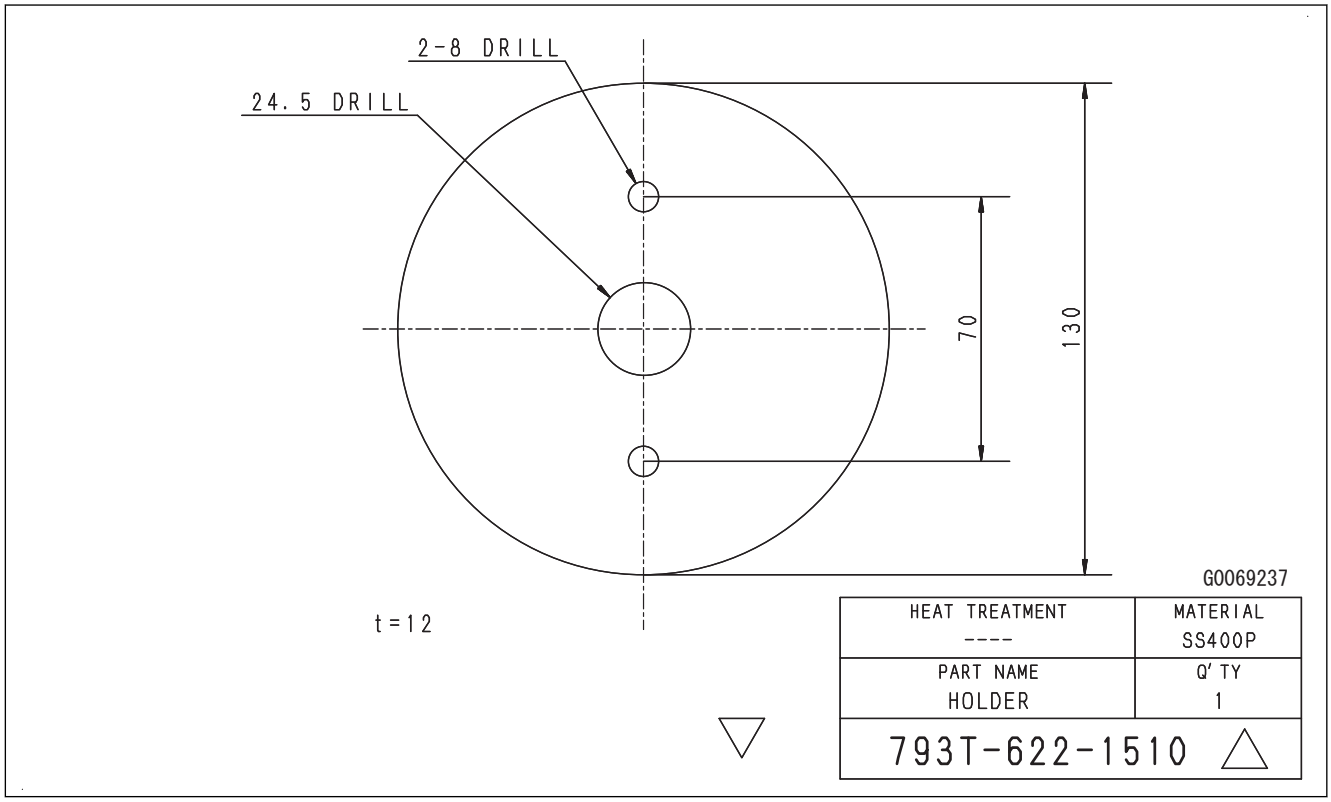
PC: Hydraulic excavator

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

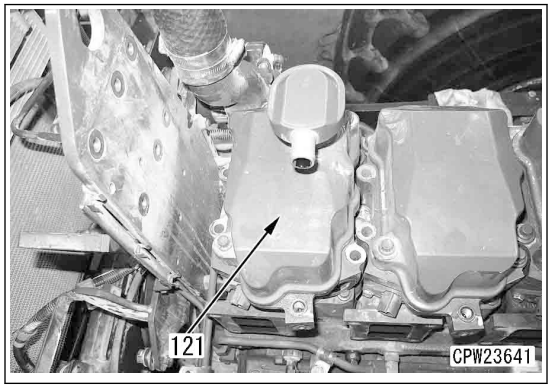
793T-622-1510 : Holder



Head cover

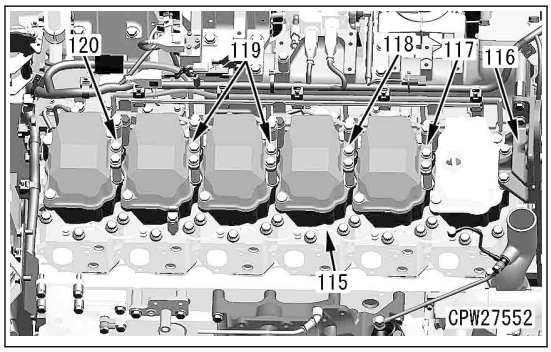
14. Install head cover (121).

    Head cover (121):
    9.8±1 Nm {1.0±0.1 kgfm}



15. Install brackets (116) to (120).
16. Install tube (115).

    Joint bolt of tube (115):
    9.8 to 12.7 Nm {1.0 to 1.3 kgfm}



Exhaust manifold

17. Install ring (114-4) to intermediate manifold (114-1).

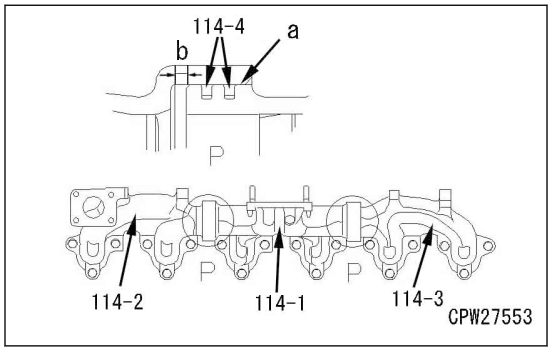
    Both ends (a) of intermediate manifold (114-1):
    Heat-resistant seal (Holts MH705 or equivalent)

18. Install manifolds (114-2) and (114-3) to intermediate manifold (114-1).

    Install them so that dimension (b) at the insertion part is as follows.

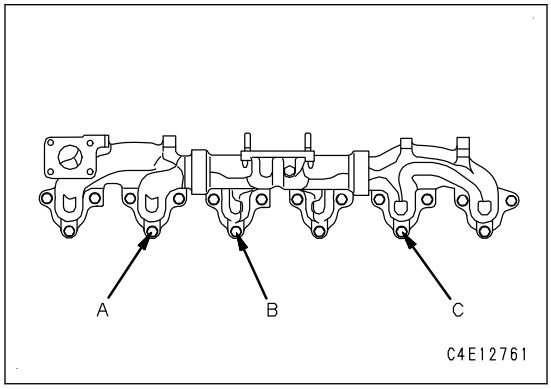
    Dimension (b) at insertion part5 mm

19. Install the gasket, set the exhaust manifold, and then finger-tighten all mounting bolts by 2 or 3 threads.



20. Tighten mounting bolts (A), (B), and (C) to the specified torque, and then tighten other mounting bolts.

    Mounting bolts (A), (B), and (C):
    58.8 to 73.5 Nm {6.0 to 7.5 kgfm}

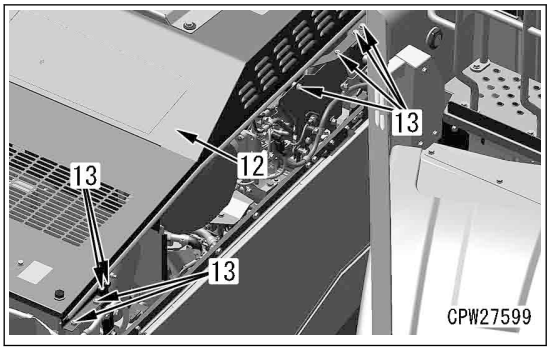


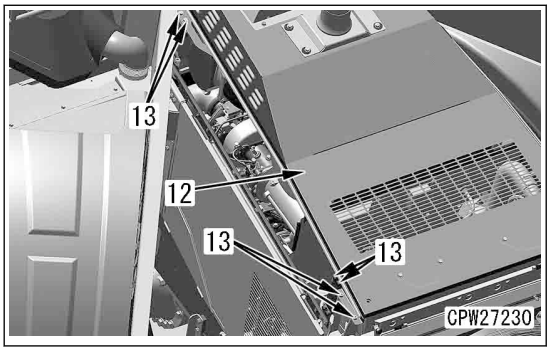
VGT assembly

21. Sling VGT assembly (113), and install it with mounting nuts (113a) (4 pieces).

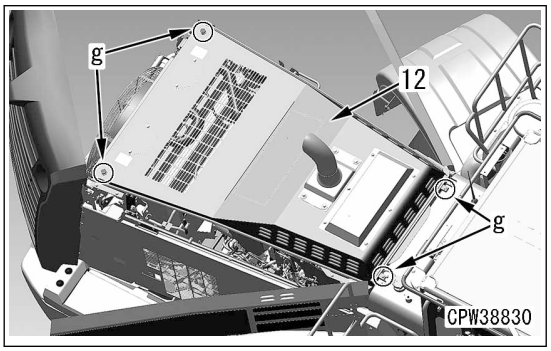
    VGT assembly (113):
    45 kg

7. Install top cover (12) with mounting bolts (13) (14 pieces).

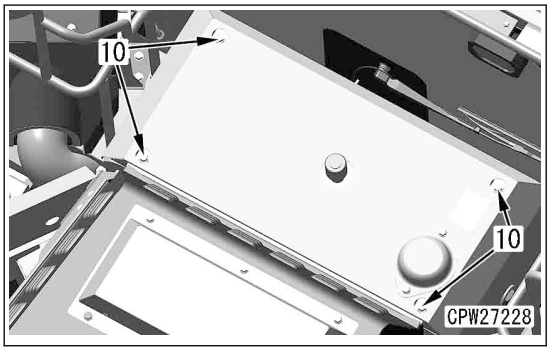


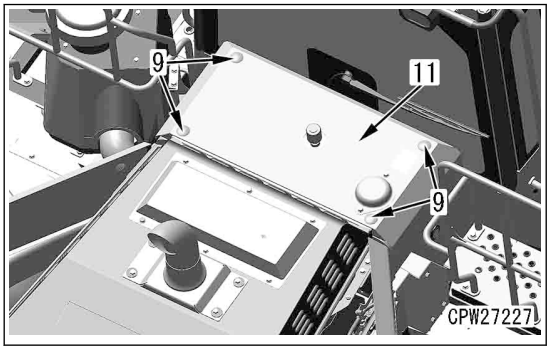


8. Remove tool B from slinging position (g), and install bolts (4 pieces) of slinging position (g).

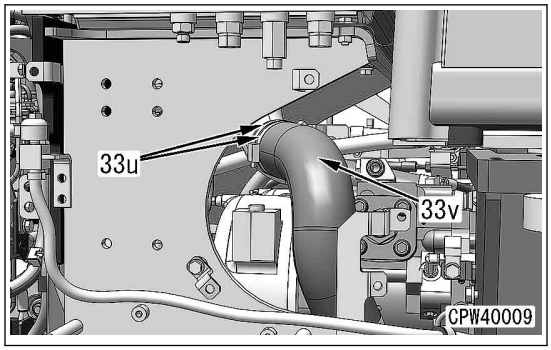


9. Install hydraulic tank cover (11) with mounting bolts (10) (4 pieces), and install caps (9) (4 places).

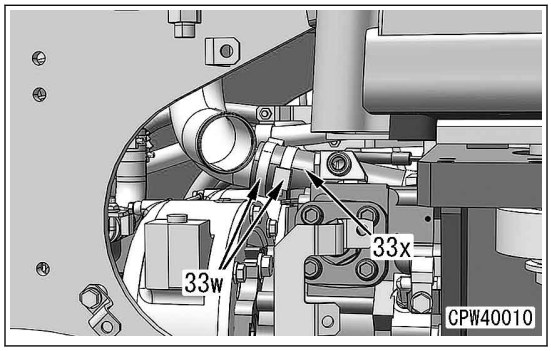




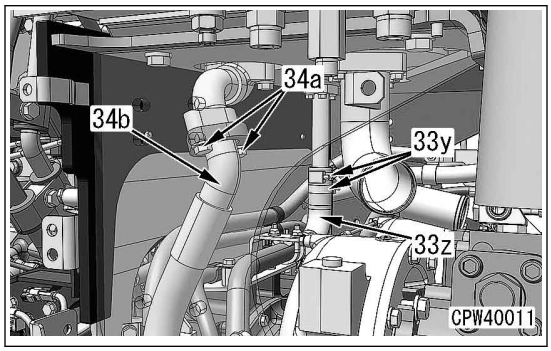
32. Remove the clamps (33u) (2 places), and disconnect the hose (33v).



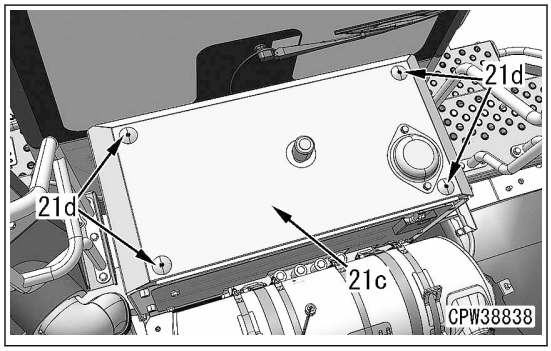
33. Remove the clamps (33w) (2 places), and disconnect the hose (33x).



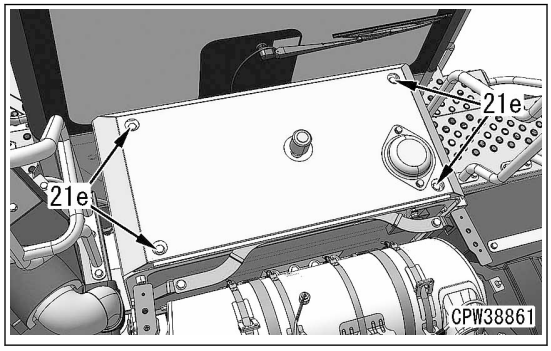
34. Remove the clamps (33y) (2 places), and disconnect the hose (33z).
35. Remove the bolts (34a) (2 pieces), and disconnect the hose (34b).



36. Remove the caps (21d) (4 places) of the hydraulic tank cover (21c).



37. Remove the bolts (21e) (4 pieces).



REMOVE AND INSTALL ENGINE HOOD ASSEMBLY

Special tools for removal and installation of engine hood assembly

Symbol	Part No.	Part name	Q'ty	Sketch	Remarks
B	600-919-5030	Plug (for 3/8 inch hose diameter)	2		
C	6540-71-2720	AdBlue/DEF pump cap kit	2		

⚠ 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.

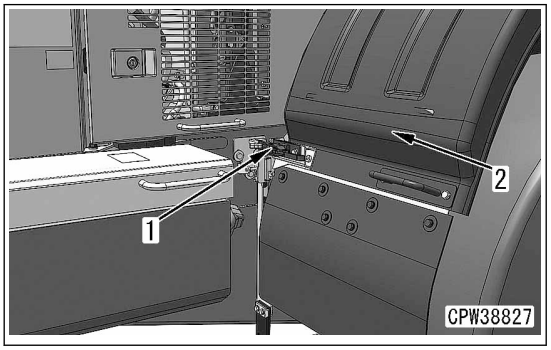
⚠ Turn the starting switch to OFF position to stop the engine.

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

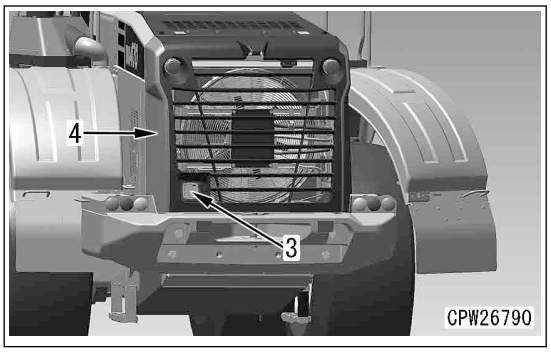
METHOD FOR REMOVING ENGINE HOOD ASSEMBLY

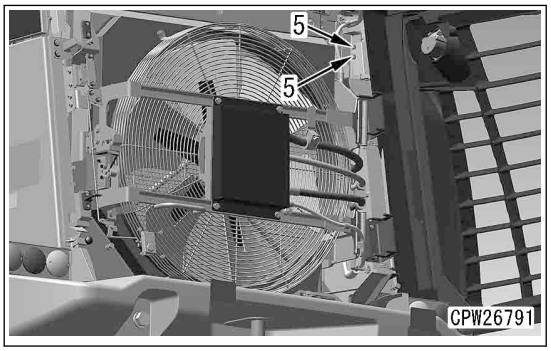
Cover

1. Release fender lock (1), and open right and left rear fenders (2).



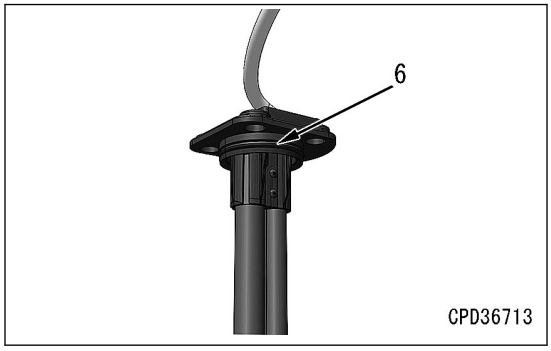
2. Release grille lock (3), open grille cover (4), and remove right and left mounting bolts (5) (2 places).





AdBlue/DEF tank sensor

1. Apply distilled water on the O-ring (6) for lubrication.



REMARK

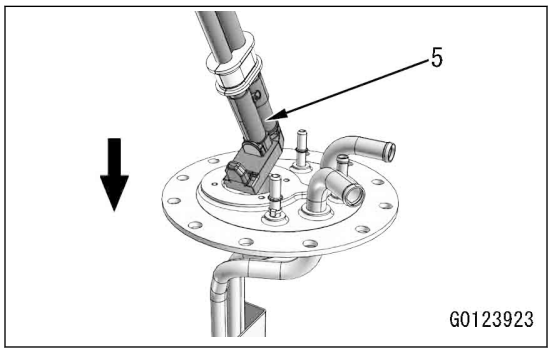
- Use the new O-ring (6).
- If foreign material is mixed into the AdBlue/DEF tank, it can cause failures. Do not use lubricating oil, grease, or such.

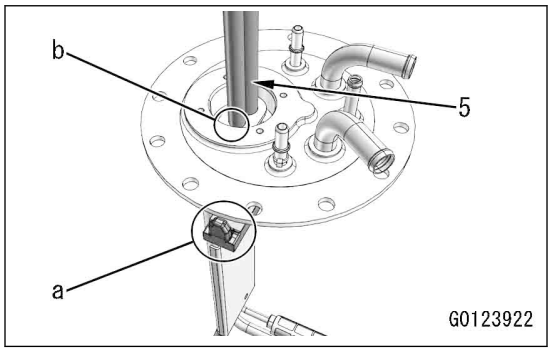
O-ring (6): Distilled water

2. Insert the AdBlue/DEF tank sensor (5) in the direction of the arrow.

NOTICE

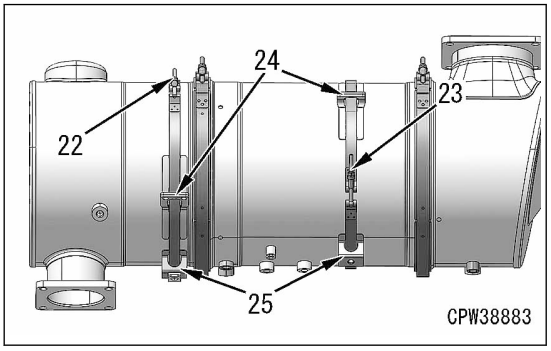
- **When you insert the AdBlue/DEF tank sensor (5), be careful that the front end (a) of the AdBlue/DEF tank sensor does not interfere with the edge (b) of the AdBlue/DEF tank sensor flange assembly.**
- **Do not turn the AdBlue/DEF tank sensor (5) to prevent drop and distortion of the O-ring (6) during installation.**
- **Push the top of the AdBlue/DEF tank sensor (5) carefully by hand not to get the O-ring (6) caught, and install the mounting face on the flange.**





KDPF filter assembly

14. By using the long socket (B), remove the bands (22) and (23), and remove the brackets (24) (2 places) and (25) (2 places).



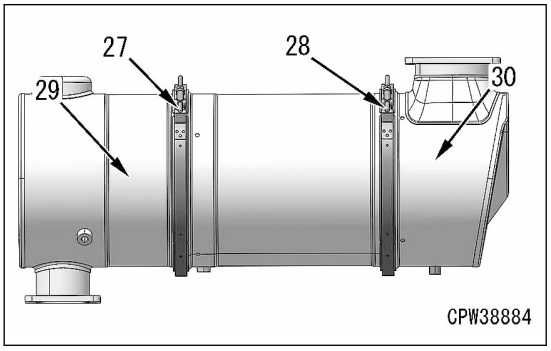
NOTICE

- **The bands (22) and (23) is made of stainless steel, accordingly never use an impact wrench.**
- **Since reuse of the bands (22) and (23) is not allowed, discard the removed band.**

REMARK

Nuts of the bands (22) and (23) (width across flats): 7/16 inch (11.1 mm)

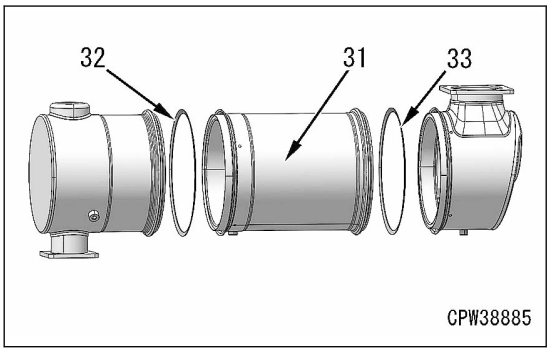
15. By using the long socket (C), remove V-clamps (27) and (28), and remove the inlet body (29) and outlet body (30).



REMARK

Nuts of V-clamps (27) and (28) (width across flats): 1/2 inch (12.7 mm)

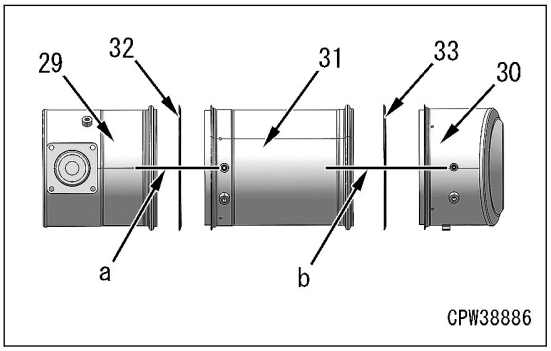
16. Remove the gaskets (32) and (33) from KDPF filter assembly (31).



METHOD FOR ASSEMBLING KDPF ASSEMBLY

KDPF filter assembly

1. Securely fix the block (A) that is used for disassembling under the each body.
2. Set the inlet body (29), outlet body (30), and KDPF filter assembly (31).
3. Securely align the positions (a) and (b) (3 places in the circumferential direction), which are marked during disassembly, with connection of each body.



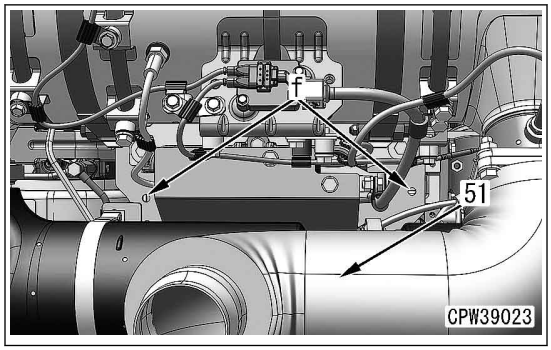
NOTICE

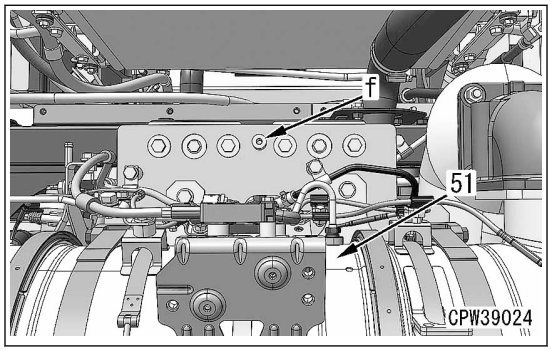
- **If they are assembled with marks displaced, the flanges of KDPF inlet and outlet are installed at wrong angle causing improper installation of exhaust pipe at its inlet and outlet.**
- **When replacing KCSF, align the marks (a) and (b) of the inlet (29) and outlet (30) with the differential pressure sensor boss of KCSF (31).**

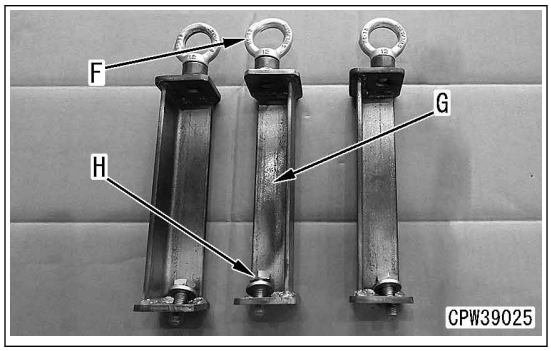
4. Install the new gaskets (32) and (33) to the area between the bodies.

33. Install the eyebolts (F), brackets (G), and bolts (H) to the slinging positions (f) (3 places).
34. Sling KDPF and SCR assembly (51) by using the lifting tool (J), and hold it.

    KDPF and SCR assembly (51):
    250 kg



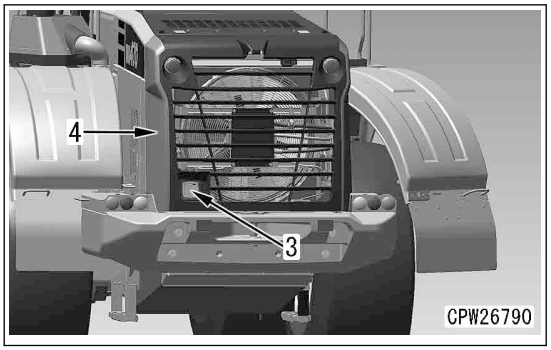


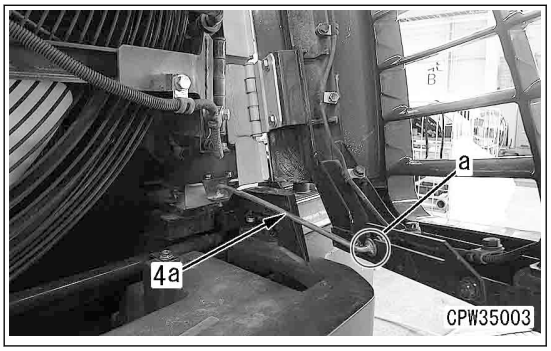


2. Release the grille lock (3), and open the grille cover (4).

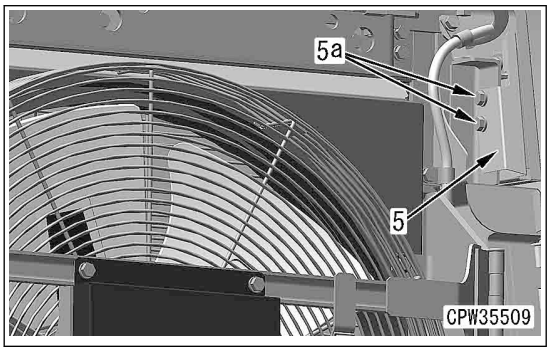
REMARK

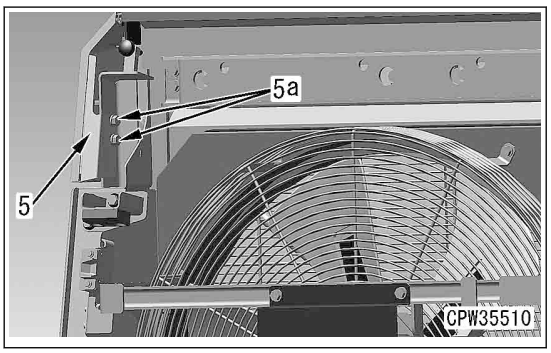
Check that the stopper (4a) is securely locked at the lock portion (a).





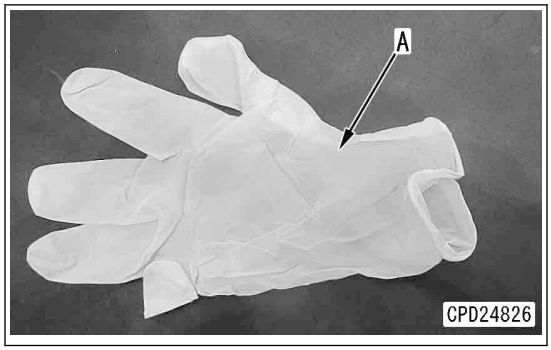
3. Remove the bolts (5a) (2 pieces each on the right and left sides), and remove the bracket (5).

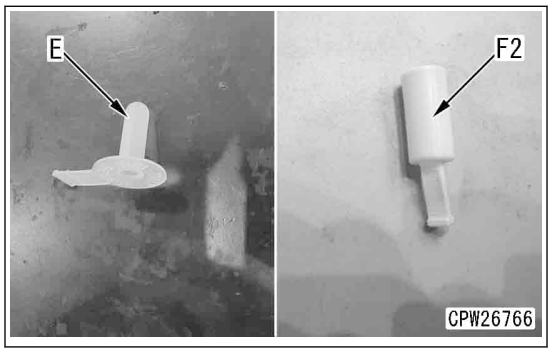




NOTICE

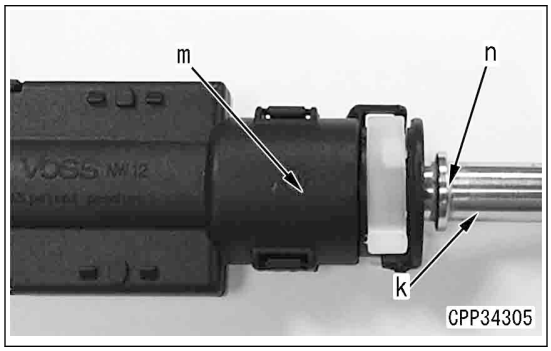
- **When handling AdBlue/DEF, be sure to use tool A.**
- **Before connecting AdBlue/DEF hose (40), wash their connections with distilled water to remove the sticking materials.**
- **Remove tools E and F2 before connecting AdBlue/DEF hose (40).**



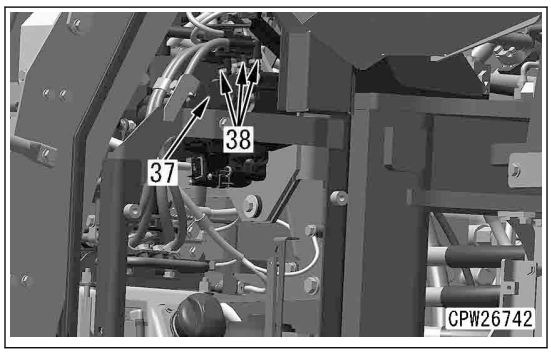


REMARK

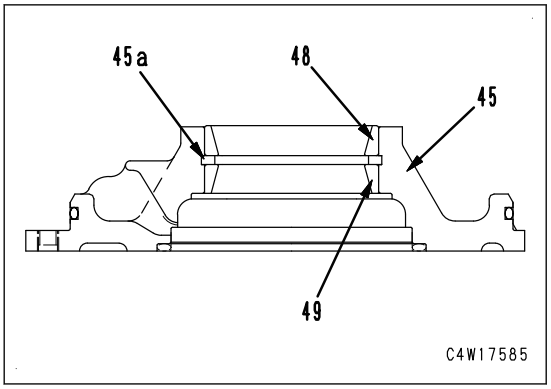
- Insert connector (m) of AdBlue/DEF hose (40) into pin (k) on the injector side until click sound is heard to connect it.
- When convex part (n) of pin (k) passes the convex part inside the clip, lock it by using the clip.



2. Connect AdBlue/DEF hoses (38) (3 places) to AdBlue/DEF pump assembly (37).



44. Remove the outer race (48) and (49) and the snap ring (45a) from the cage (45).

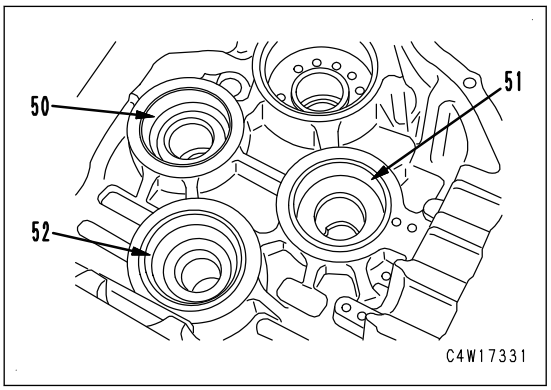


Rear case

45. Remove the outer race (50), (51), and (52) from the rear case.

NOTICE

Be careful not to damage the case when removing the bearing outer race from the front and rear case.
If any portion is scratched, repair it smoothly.

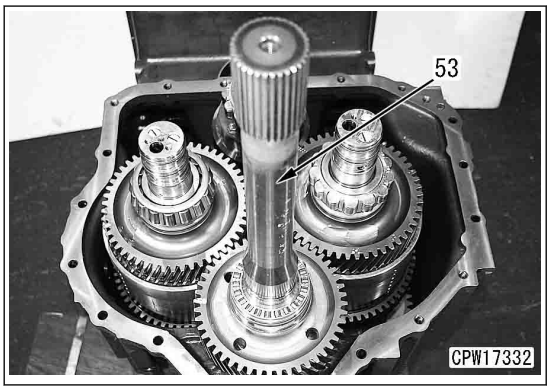


Input shaft, gear

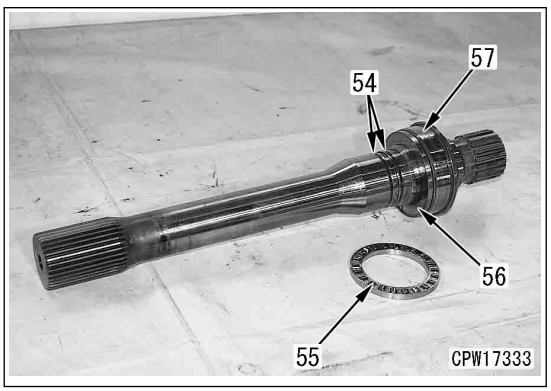
REMARK

The actual shape of the input shaft may be different from the figure.

46. Remove the input shaft (53).

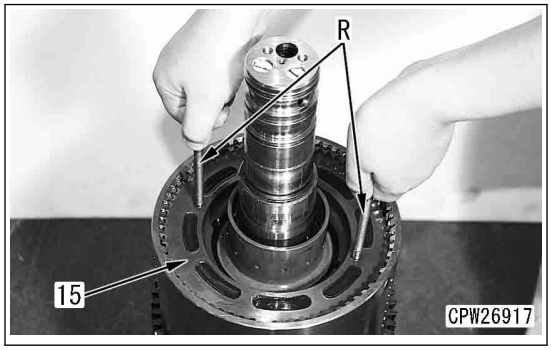


47. Remove the seal ring (54), thrust bearing (55), thrust plate (56), and inner race (57) from the input shaft (53).

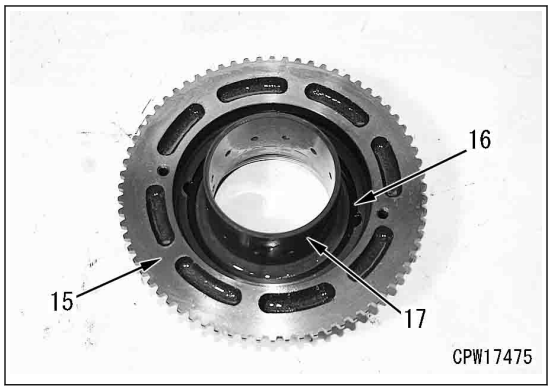


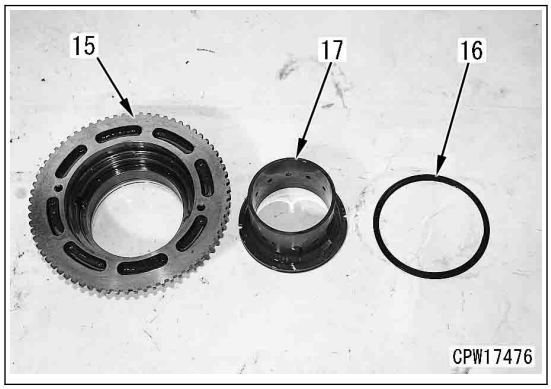
[F clutch] piston

12. By using the tool R (M8×1.25), remove the piston (15).

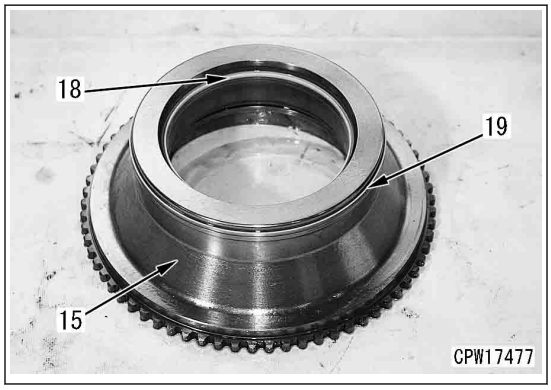


13. Remove the snap ring (16), and remove the lubrication piston (17) from the piston (15).

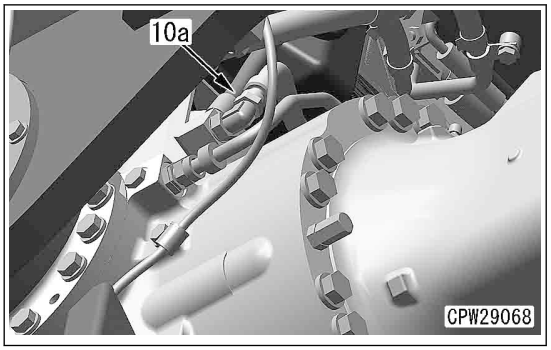


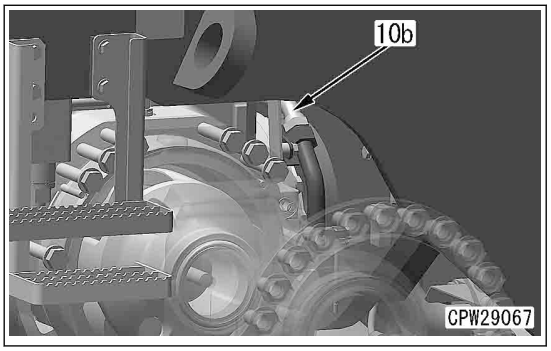


14. Remove the seal rings (18) and (19) from the piston (15).



14. Disconnect hoses (10a) and (10b). (European Union specifications)



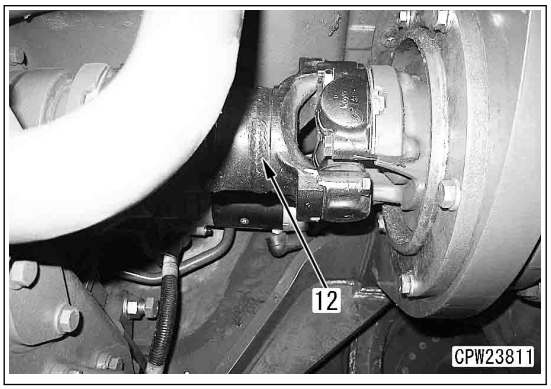


15. Separate rear drive shaft (12).

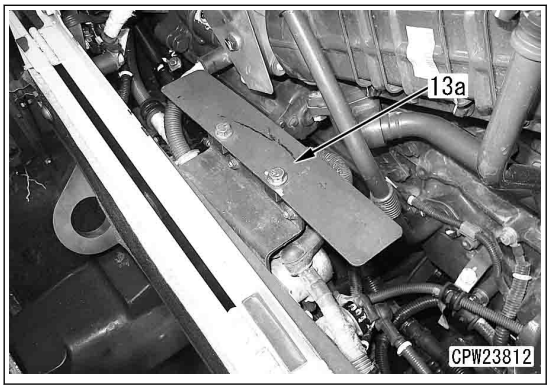
REMARK

Put matchmarks on the coupling and drive shaft, and then remove them.

Rear drive shaft mounting bolt: Width across flats 19 mm

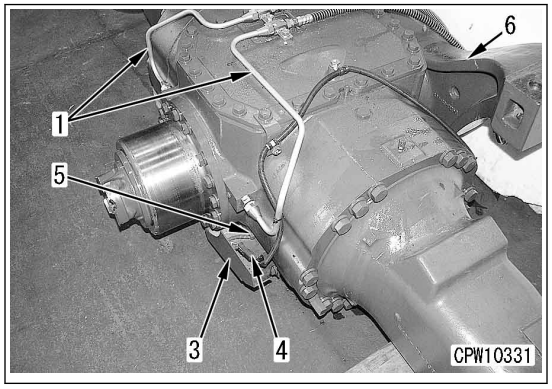


16. Remove cover (13a).

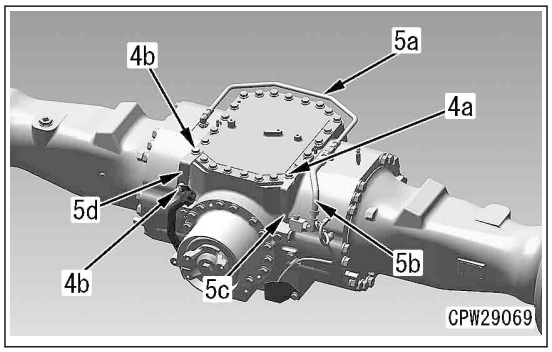


Oil temperature sensor (rear differential)

3. Remove cover (3).
   Mounting bolt: Width across flats 19 mm
4. Disconnect connector (4), and remove oil temperature sensor (5).
   Oil temperature sensor: Width across flats 17 mm



5. Remove bolts (4a) and (4b) (2 pieces), and remove brackets (5c) and (5d). (Machine with brake cooling system)
6. Disconnect tubes (5a) and (5b). (Machine with brake cooling system)



Rear support (rear differential)

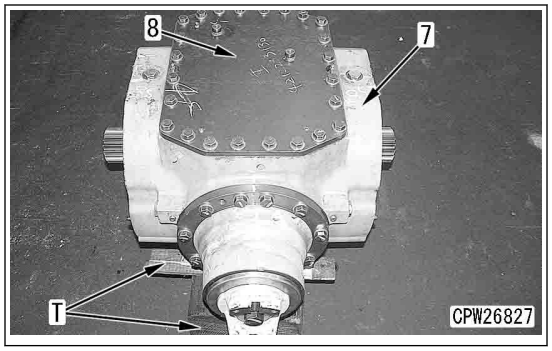
7. Remove rear support (6). For details, see “REMOVE AND INSTALL REAR AXLE ASSEMBLY”.

Axle housing assembly

8. Remove right and left axle housing assemblies. For details, see “DISASSEMBLE AND ASSEMBLE AXLE HOUSING ASSEMBLY”.

Differential assembly

9. Place differential assembly (7) on tools T, and stabilize it. (Otherwise, install it to tool A.)
   When using tool A, remove the cage assembly referring to step 13.



Cover

10. Remove cover (8).
    Mounting bolt: Width across flats 22 mm

Coupling

24. Install the coupling (19), O-ring (19a), shim (45a), and holder (17a) to the pinion (45), and tighten the bolt (17).

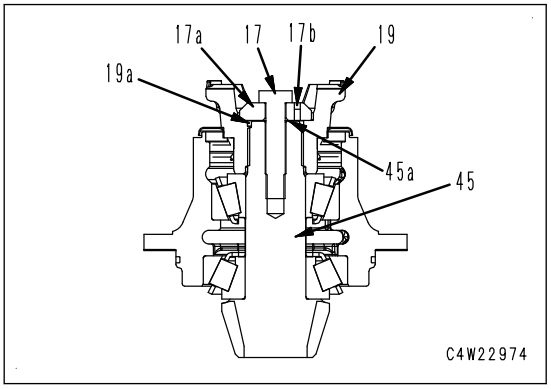
    REMARK

    Be careful not to damage the seal when you insert the coupling (19).

    End surface at bearing side of coupling (19):
    Molybdenum disulfide lubricant (LM-S or LM-P)

    Bolt (17):
    Liquid adhesive (LT-2)

    Bolt (17):
    824 to 1030 Nm {84 to 105 kgfm}



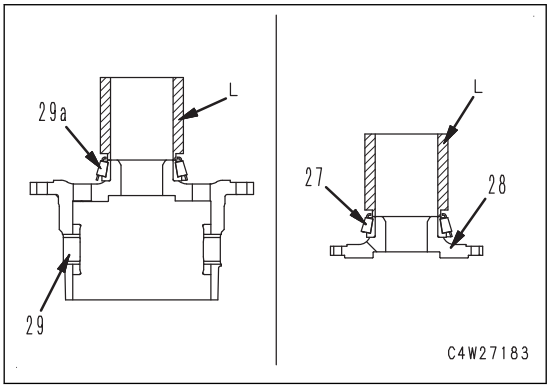
25. Install the plug (17b).

Assemble differential carrier assembly (Limited slip differential specifications)

REMARK

Assemble the right and left parts based on the identification during disassembly.

26. Press fit the bearing (29a) to the case (29) with the tool L.
27. Press fit the bearing (27) to the cover (28) with the tool L.



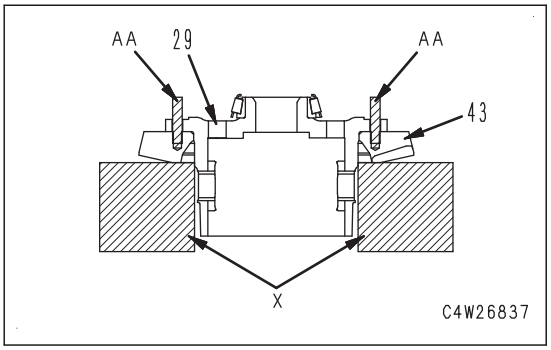
28. Put the bevel gear (43) on the tool X with the gear side down.
29. Install the tool AA to the bevel gear (43).
30. Lower the case (29), install it to the bevel gear (43), and tighten the bevel gear mounting bolt (42).

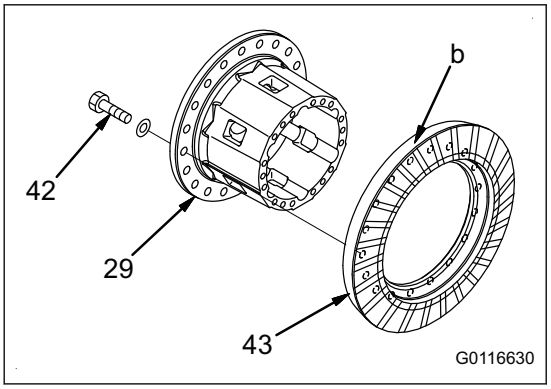
    REMARK

    Check the quantity of the identification grooves (b) before assembly.
    For rear: 3 grooves
    For front: 2 grooves

    Mounting bolt:
    Liquid adhesive (LT-2)

    Mounting bolt:
    245 to 309 Nm {25 to 31.5 kgfm}





Drive shaft

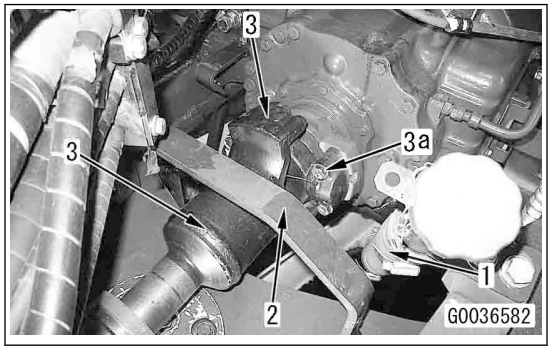
14. Check that the mating coupling and the seat surface of the drive shaft spider are free from rust, foreign material (masking material), or bruise, etc.
15. Set the coupling key slot in the vertical position, place the drive shaft (3) on the lower part of the coupling faucet joint portion, and insert the key (3b) into the key slot (3c).
16. Tighten the bolts (3a) (4 pieces) lightly until the seat surface of the spider and that of the coupling adhere firmly.

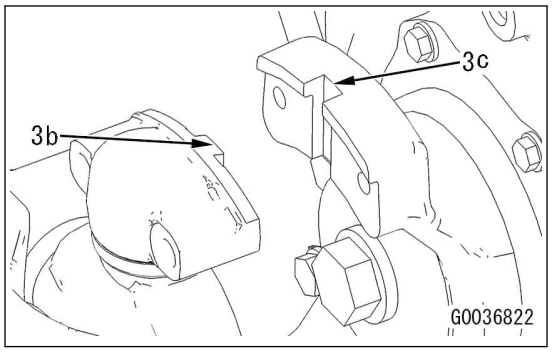
    REMARK

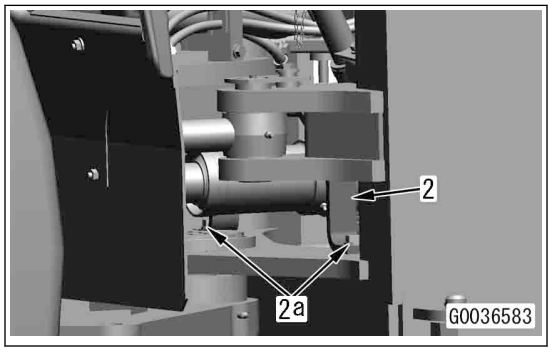
    If fit of keyway portion and faucet joint is hard, tap them for contacting by using a plastic (or copper) hammer. (To prevent damaging the cross bearing, do not use the metal hammer.)
    Tighten completely after confirming the seat surface of the spider and that of the coupling adhere firmly.

    Bolt (3a): Width across flats 19 mm

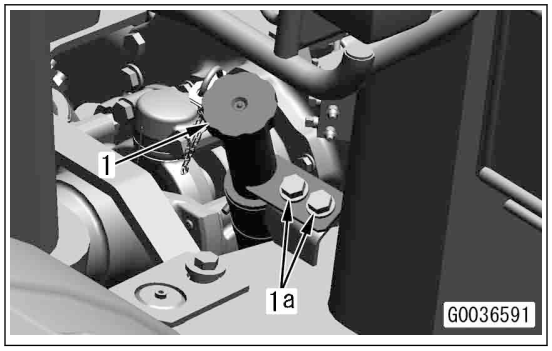
    Bolt (3a) :
    98.1 to 122.6 Nm {10.0 to 12.5 kgfm}
17. Install the guard (2) with the bolts (2a) (2 pieces).

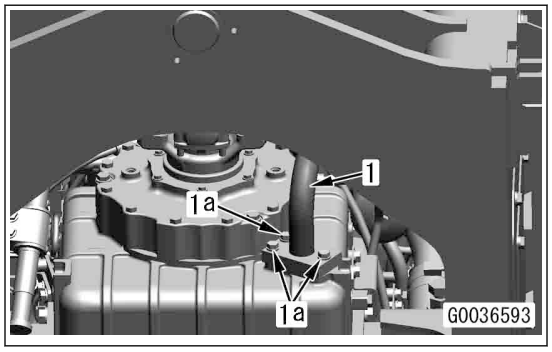




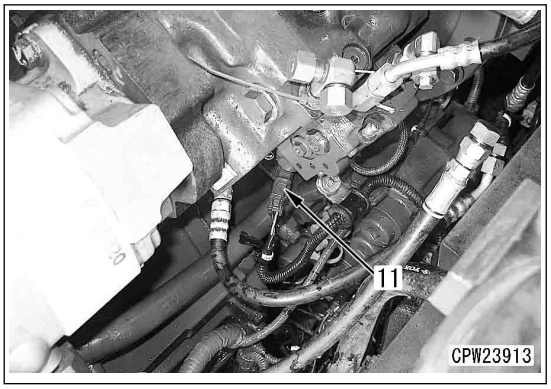


18. Install the oil filler pipe (1) with the bolts (1a) (5 pieces).





15. Disconnect the connector R90 (11).



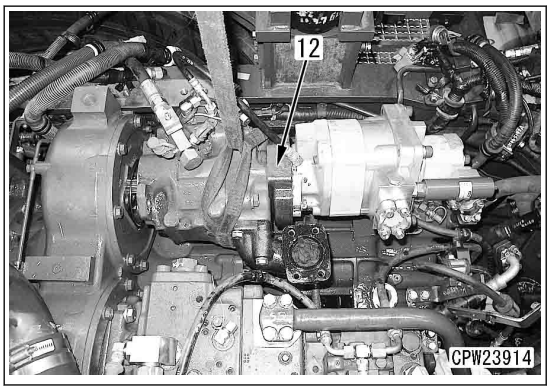
Steering pump, power train pump assembly

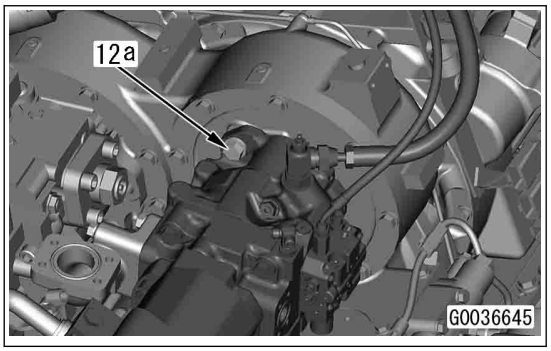
16. Sling the steering pump and power train pump assembly (12), and hold them.

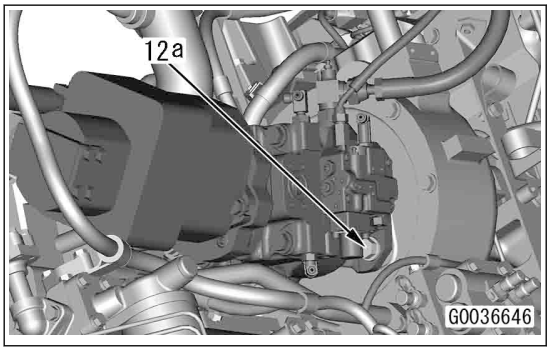
    Steering pump and power train pump assembly (12) :
    80 kg

17. Remove the bolts (12a) (2 pieces), sling the steering pump and power train pump assembly (12), and remove them.

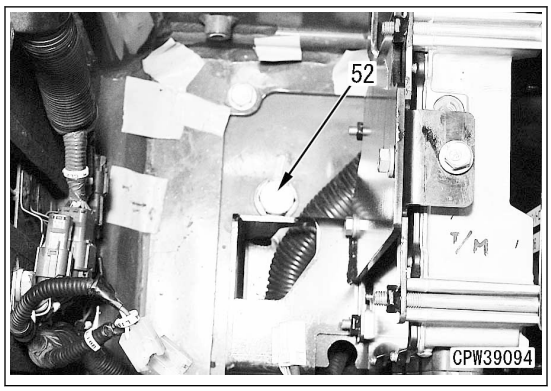
    Bolt (12a): Width across flats 24 mm



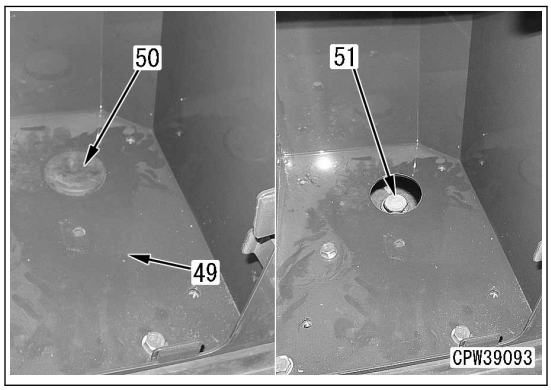




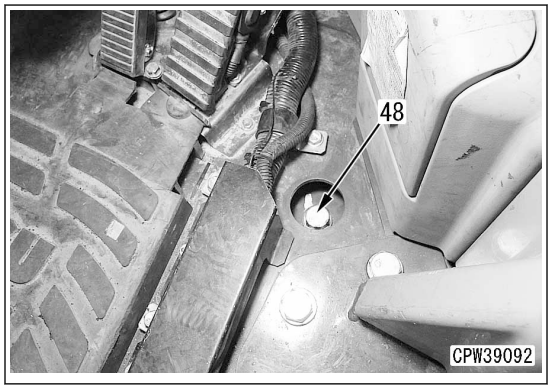
6. Install the bolt (52).
7. Install the monitor controller assembly. See “REMOVE AND INSTALL MONITOR CONTROLLER ASSEMBLY”.



8. Tighten the bolt (51), and install the grommet (50) inside the shoes box (49).



9. Tighten the bolt (48), and install the floor mat.



REMOVE AND INSTALL SEAT BELT

⚠ **Place the machine on a level ground, and set the parking brake.**

⚠ **Set the frame lock bar, and chock the tires.**

⚠ **Set the work equipment on the ground.**

⚠ **Chock the tires.**

⚠ **Stop the engine, set the battery disconnect switch to OFF position, and remove the key.**

METHOD FOR REMOVING SEAT BELT

Seat belt

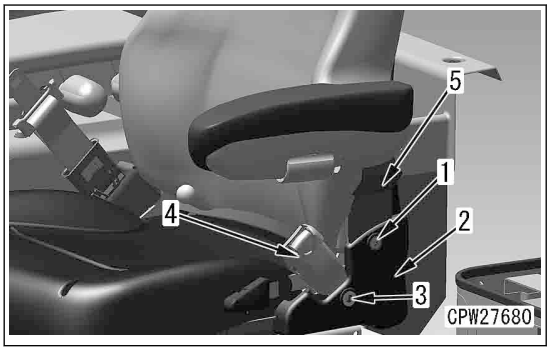
1. Remove the hexagonal socket head bolt (1) and hex lobe head bolt (3), and remove the cover (2) and left seat belt (4).

   REMARK

   Since the hexagonal socket head bolt (1) and hex lobe head bolt (3) are tighten together, the armrest (5) is removed together when removing cover (2).

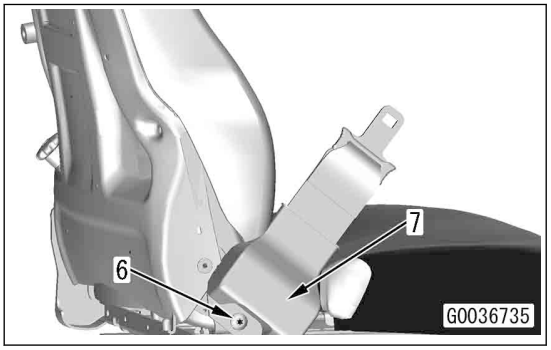
   Hexagonal socket head bolt (1): Width across flats 5 mm

   Hex lobe head bolt (3): Width across flats T50 (8.8 mm)



2. Remove the hex lobe head bolt (6), and remove the right seat belt (7).

   Hex lobe head bolt (6): Width across flats T50 (8.8 mm)



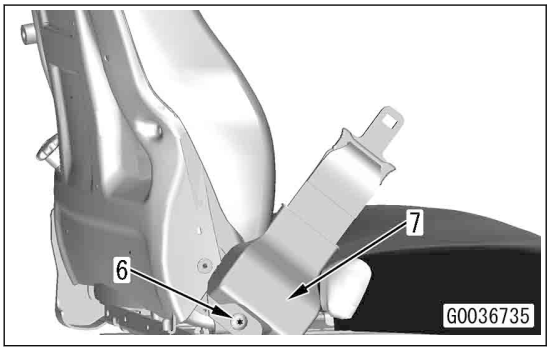
METHOD FOR INSTALLING SEAT BELT

Seat belt

1. Install the right seat belt (7) with the hex lobe head bolt (6).

   Hex lobe head bolt (6): Width across flats T50 (8.8 mm)

   ⊕ Hex lobe head bolt (6):
   37.3 to 41.2 Nm {3.8 to 4.2 kgfm}



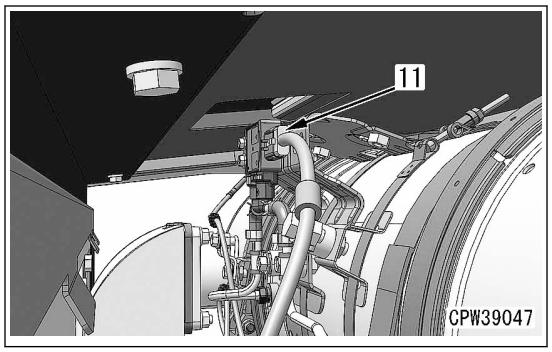
7. Tighten the clamps (12) and (13) to the specified torque.

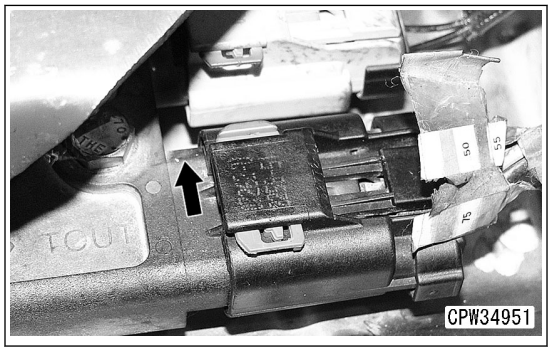
   Clamps (12), (13):
   10.8 to 26.0 Nm {1.1 to 2.7 kgfm}

8. Connect the connector PDPF (11).

   REMARK

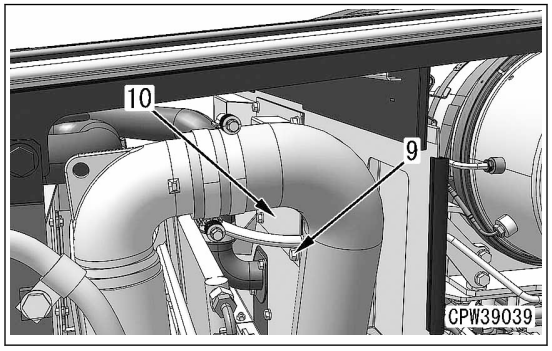
   Slide the lever (red) in the direction of the arrow, insert the connector PDPF (11) with the lock unlocked, and slide the lever in the opposite direction of the arrow to lock it.



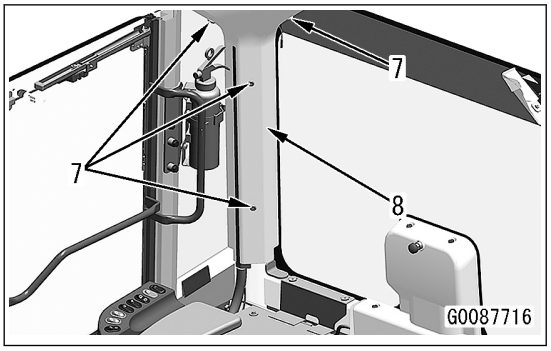


Cover

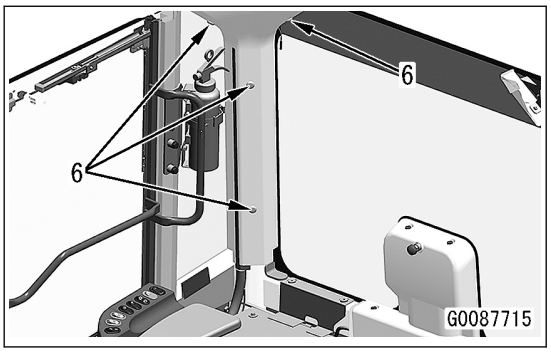
9. Install the cover (10) with the bolts (9) (4 pieces).



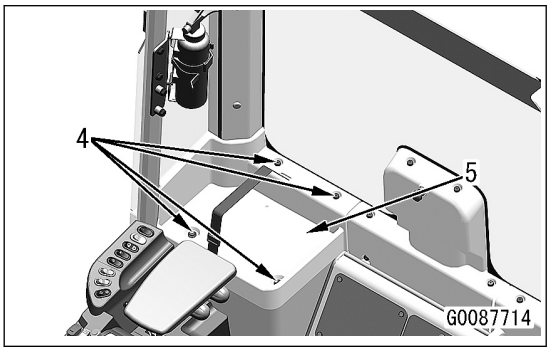
27. Install the cover (9) with the hexagonal socket head bolts (7) (4 pieces).



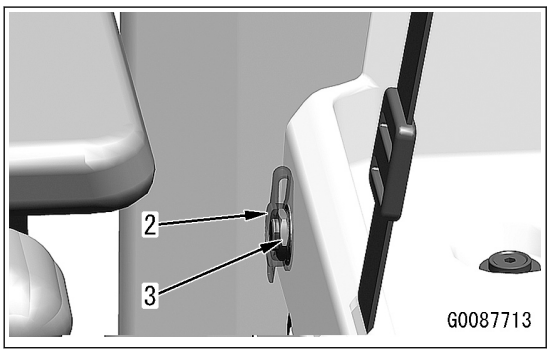
28. Install the caps (6) (4 pieces).



29. Install the cover (3) with the hexagonal socket head bolts (4) (4 pieces).

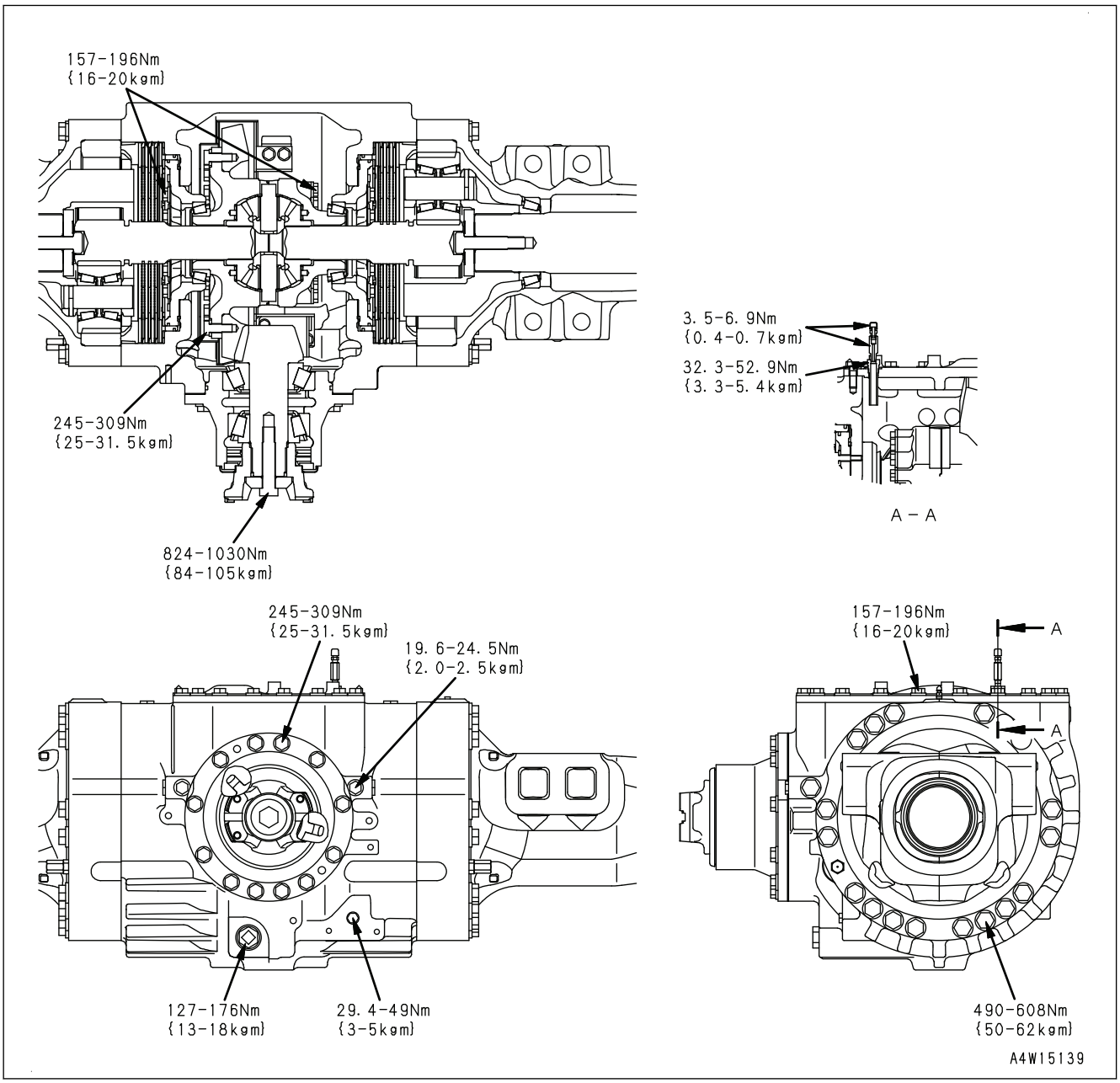


30. Install the nut (3).
31. Install the cover (2).

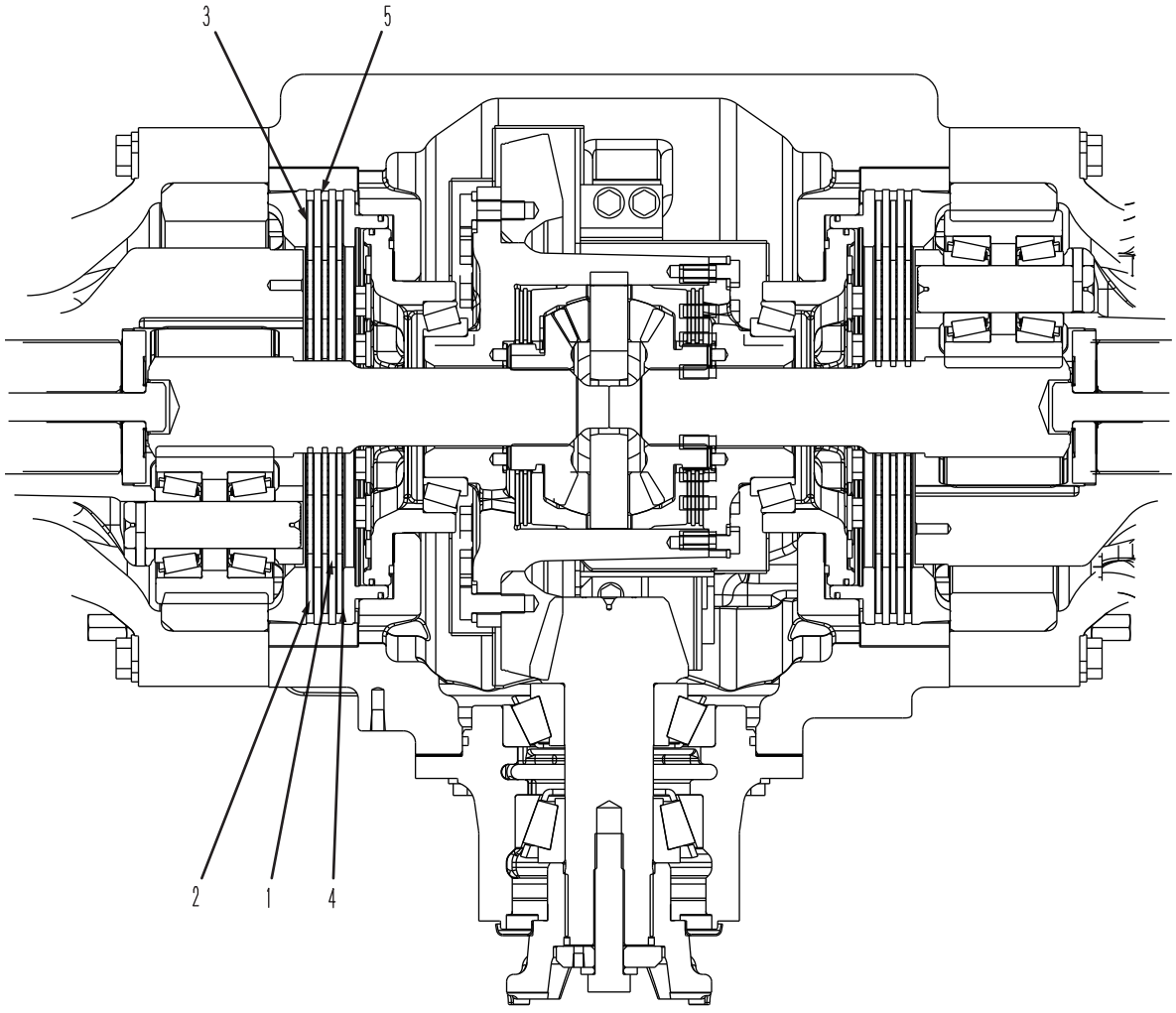


32. Set the operator's seat (1) back to its initial position.

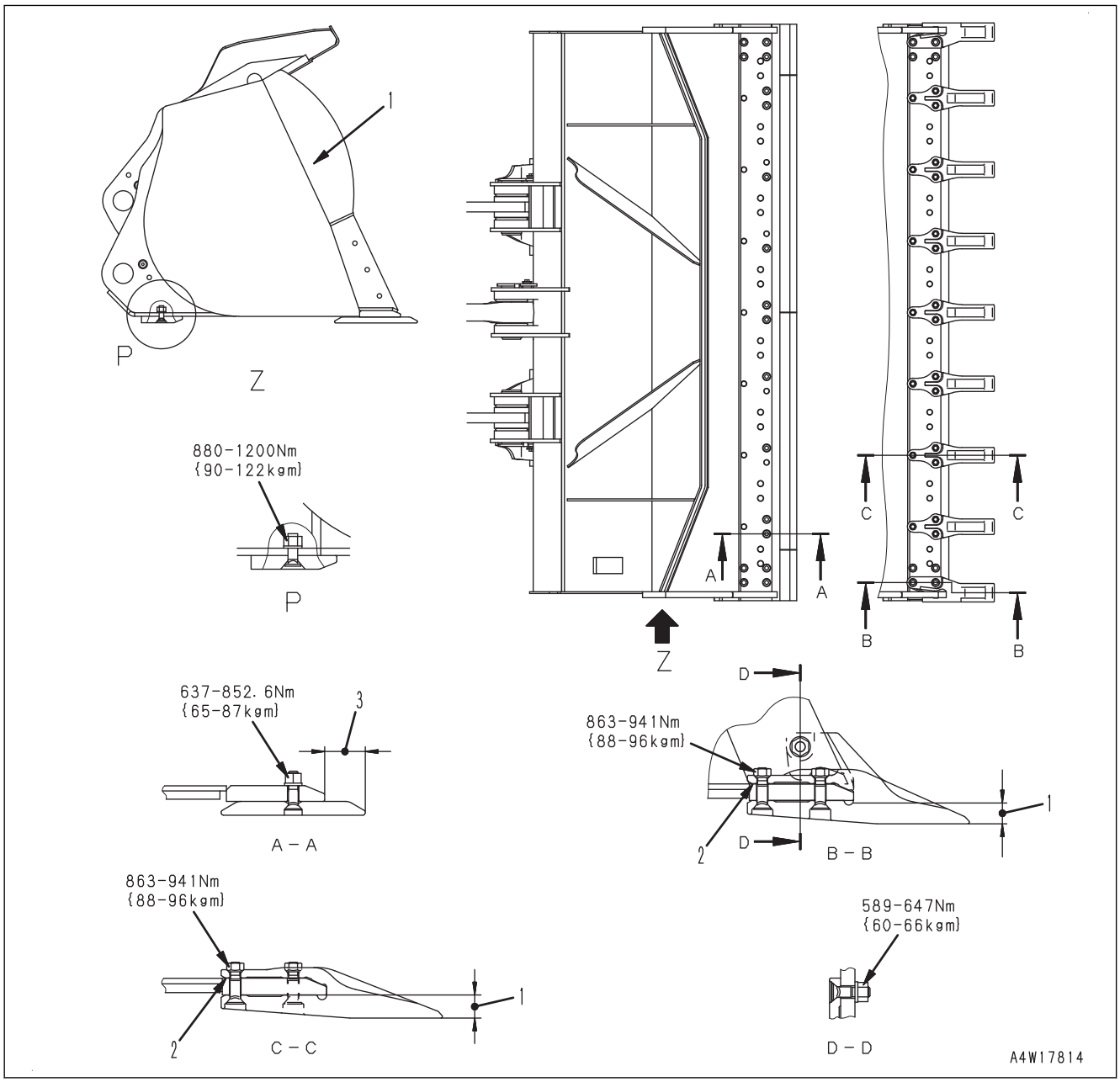
MAINTENANCE STANDARD OF FRONT CONVENTIONAL DIFFERENTIAL



Machines with 5.5m^3 bucket



MAINTENANCE STANDARD OF BUCKET



Unit: mm

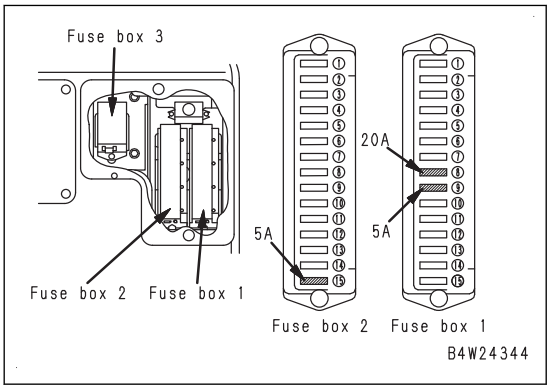
No.	Item	Judgment criteria		Remedy
1	Wear of bucket tooth (if equipped)	Standard dimension	Repair limit	Replace
		50	18.5	
2	Clearance in mounting portion of bucket tooth (if equipped)	Max. 0.5	-	Adjust or replace
3	Wear of bolt-on cutting edge	93	-	Turn 180 deg. or replace

[6]: Outside air temperature sensor connector
[7]: Air mix actuator connector
[8]: Vent mode actuator connector
[9]: FRESH/RECIC air changeover actuator connector
[11]: Pressure switch connector
[12]: Blower OFF relay
[13] Blower amplifier connector
[14] Compressor clutch relay

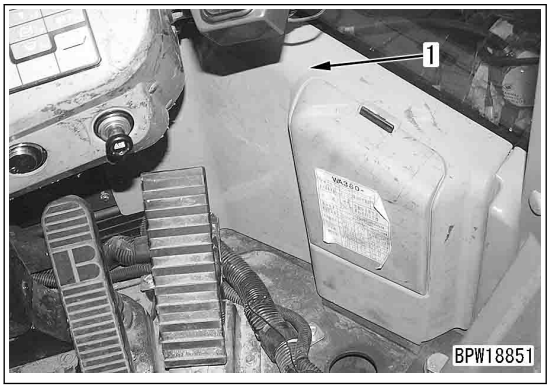
REMARK

Fuses are provided at 2 locations; inside the air conditioner unit (harness) and the fuse box at rear left of operator's seat (double arrangement).

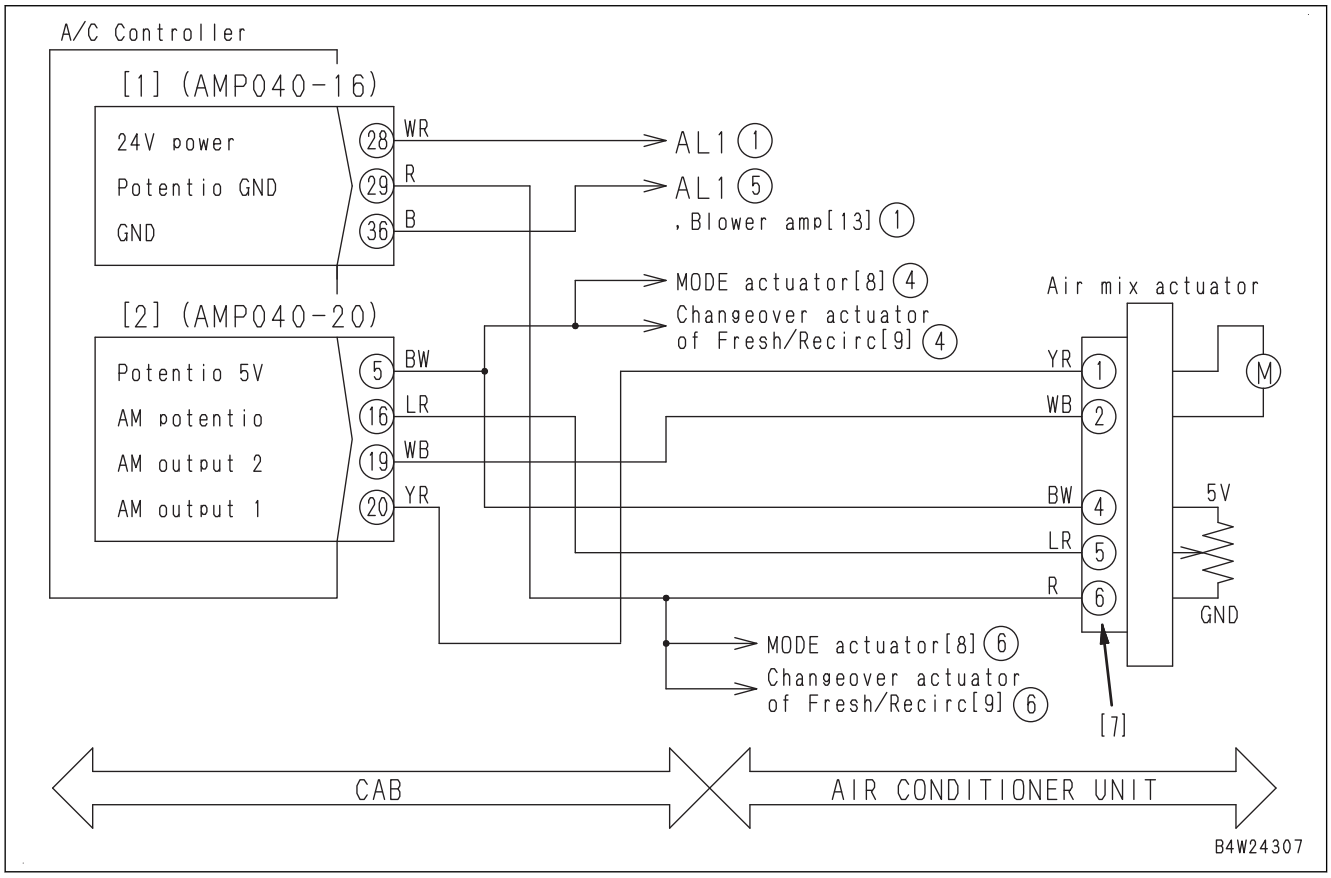
1. Open the cover of fuse box at the rear left of the operator's seat. (See TROUBLESHOOTING, “LOCATION OF FUSES”.)
   - Fuse No. 8 in fuse box 120: 20 A
     For power supply of blower (fan)
   - Fuse No. 9 in fuse box 15: 5 A
     For air conditioner compressor
   - Fuse No. 15 in fuse box 25: 5 A
     For power supply of air conditioner unit
   - Part No. of fuse
     5 A*08041: -00500
     20 A*08041: -02000

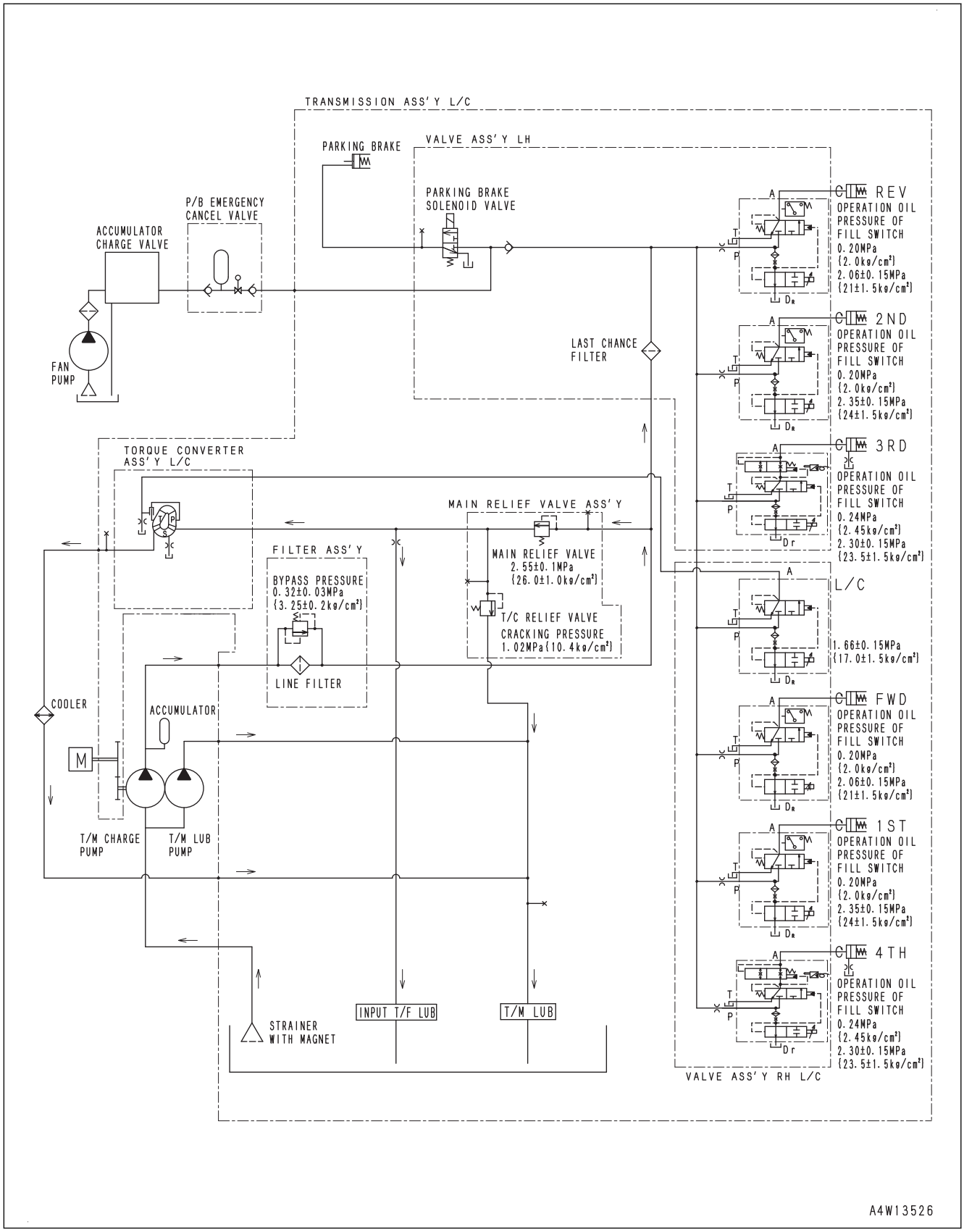


2. Remove cover (1).



Circuit diagram related to temperature control (A/M)




TRANSMISSION ASS'Y L/C
PARKING BRAKE
VALVE ASS'Y LH
PARKING BRAKE SOLENOID VALVE
P/B EMERGENCY CANCEL VALVE
ACCUMULATOR CHARGE VALVE
FAN PUMP
LAST CHANCE FILTER
TORQUE CONVERTER ASS'Y L/C
MAIN RELIEF VALVE ASS'Y
FILTER ASS'Y
BYPASS PRESSURE 0.32±0.03MPa {3.25±0.2kg/cm²}
MAIN RELIEF VALVE 2.55±0.1MPa {26.0±1.0kg/cm²}
T/C RELIEF VALVE CRACKING PRESSURE 1.02MPa{10.4kg/cm²}
LINE FILTER
COOLER
ACCUMULATOR
M
T/M CHARGE PUMP
T/M LUB PUMP
STRAINER WITH MAGNET
INPUT T/F LUB
T/M LUB
C REV
OPERATION OIL PRESSURE OF FILL SWITCH
0.20MPa {2.0kg/cm²}
2.06±0.15MPa {21±1.5kg/cm²}
C 2ND
OPERATION OIL PRESSURE OF FILL SWITCH
0.20MPa {2.0kg/cm²}
2.35±0.15MPa {24±1.5kg/cm²}
C 3RD
OPERATION OIL PRESSURE OF FILL SWITCH
0.24MPa {2.45kg/cm²}
2.30±0.15MPa {23.5±1.5kg/cm²}
C L/C
1.66±0.15MPa {17.0±1.5kg/cm²}
C FWD
OPERATION OIL PRESSURE OF FILL SWITCH
0.20MPa {2.0kg/cm²}
2.06±0.15MPa {21±1.5kg/cm²}
C 1ST
OPERATION OIL PRESSURE OF FILL SWITCH
0.20MPa {2.0kg/cm²}
2.35±0.15MPa {24±1.5kg/cm²}
C 4TH
OPERATION OIL PRESSURE OF FILL SWITCH
0.24MPa {2.45kg/cm²}
2.30±0.15MPa {23.5±1.5kg/cm²}
VALVE ASS'Y RH L/C
A4W13526

ELECTRICAL CIRCUIT DIAGRAM OF FLOOR (FOR AJSS SPEC) (MACHINE WITH KOMTRAX TERMINAL) (4/9)

WA480-8

REMARK

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