SEN06745-10

Shop Manual

DUMP TRUCK

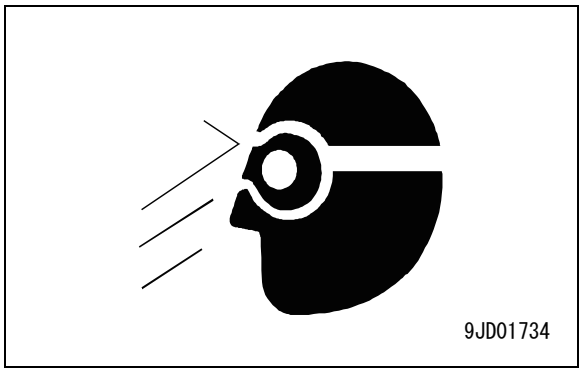
HD325-8E0
HD405-8E0

SERIAL NUMBERS

HD325-55001 and up
HD405-55001 and up

KOMATSU

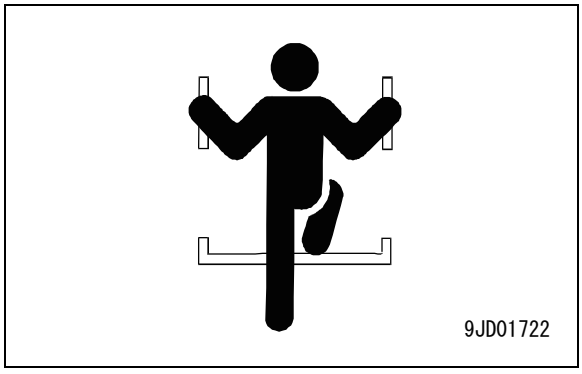
- Always wear the protective eyeglasses when hitting parts with a hammer.
- Always wear the protective eyeglasses when grinding parts with a grinder, etc.
- When performing any operation with multiple workers, always agree on the operating procedure before starting. Be clear in verbal communication, and observe hand signals. Hang "UNDER REPAIR" warning tag in the operator's compartment before starting work.
- Only the approved personnel can do the work in a closed environment or in a prohibited area.


9JD01734

- Work and operation which require license or qualification should be performed by qualified workers.
- Welding repairs should be performed by trained and experienced welders. When performing welding work, always wear welding gloves, apron, welding goggles, cap and other clothes suited for welding work.
- Warm up before starting the work with exercise which increases alertness and the range of motion in order to prevent injury.
- Avoid prolonged work, and take a rest at times to keep up a good condition. Take a rest at designated safe area.
- When you work in high places, use a platform.
- Before you start the work, use the personal fall-arrest equipment to prevent falling. There is a danger of personal accident that you fall by slipping.
- Always do the work correctly. If you find the unsafe behavior of co-worker, give him/her a notice and stop it.
- Because there is a danger that you are caught, be very careful when the work is done in dangerous areas such as: when you go in the range where the lifted load possibly falls, or when you stand directly in front of tire, or when you are near the sliding parts.
- When you handle chemical materials (such as nitrogen gas), see the MSDS (safety data sheet) and local guidelines, and get the important information (such as a safe handling method). Also, put on applicable protective equipment (such as protective goggles, gloves, and masks).
- If necessary, cut out all the power sources (electricity, oil pressure, compressed air, etc.) before you start the work. If the machine has a lock mechanism, set it to the LOCK position and install the warning tag in a position where it is easy to see. Do not release the lock until the work is completed.

Precautions for preparatory work

- Place the machine on a firm and level ground, and apply the parking brake and chock the wheels or tracks to prevent the machine from moving before adding oil or making any repairs.
- Lower the work equipment (blade, ripper, bucket, etc.) to the ground before starting work. If this is not possible, insert the lock pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang "UNDER REPAIR" warning tag on them.
- When performing the disassembling or assembling work, support the machine securely with blocks, jacks, or stands before starting the work.
- Remove all mud and oil from the steps or other places for going up and down on the machine. Always use the handrails, ladders or steps when for going up and down on the machine. Never jump on or off the machine. When the scaffold is not provided, use steps or stepladder to secure your footing. Do not use handrails, ladders, or steps if they are damaged or deformed. Repair it or replace it immediately.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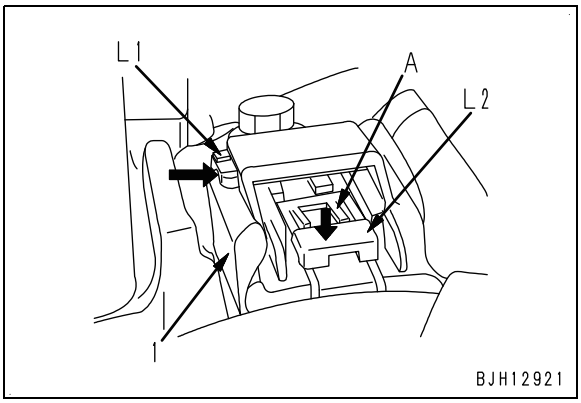
METHOD FOR DISCONNECTING AND CONNECTING SLIDE LOCK TYPE CONNECTOR

Method for disconnecting slide lock type connector (FRAMATOME-3, FRAMATOME- 2)

1. Slide lock (L1) to the right.
2. While pressing lock (L2), pull out connector (1) toward you.

REMARK

If portion A does not float when lock (L2) is pressed, and if connector (1) does not come out when it is pulled toward you, push up portion A with a small flat-head screwdriver while pressing lock (L2), and then pull out connector (1) toward you.

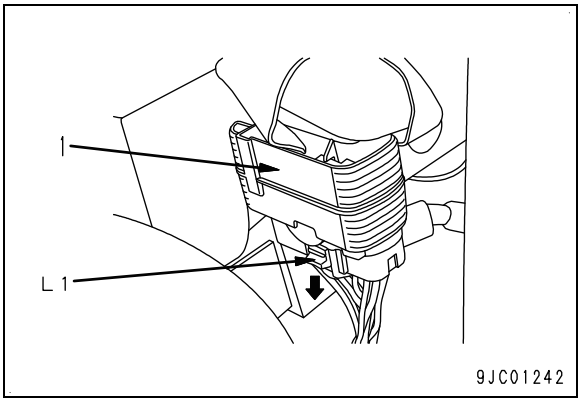


Method for connecting slide lock type connector (FRAMATOME-3, FRAMATOME- 2)

Insert it straight until it clicks.

Method for disconnecting slide lock type connector (FRAMATOME-24)

1. Slide down lock (red) (L1).



	Item	Unit	HD405-8E0
	Travel speed	km/h	
	● Forward		
	1st		9.8
	2nd		15.0
	3rd		20.1
	4th		27.2
	5th		36.4
	6th		49.6
	7th		66.2
	● Reverse		
	1st		10.2
	Operating temperature range	°C	-20 to 45

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

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

REMARK

The engine rated horsepower is indicated in the net value and gross value. Gross denotes the rated horsepower measured on the basic engine unit while net denotes the value measured of an engine under the condition nearly the same as that when it is installed on a machine.

- The rated horsepower (net) at the maximum cooling fan speed is the following value.
  372 kW {499 HP}/2000 min^{-1} {2000 rpm}

Status		DEF level (*1) (DEF level gauge)	Machine monitor				Engine deration (*3)
			Message of SCR Information	DEF level caution lamp (Action level)	Tone of audible alert	Activated failure code (*2)	
3	Low-Level Inducement (Inducement 1)	2.5% (The gradation of the end of the bottom lights on)	3: Engine power is under deration.	Red  APP14419 Red  APP14414	Long intermittently	CA1673 (DEF level low error 3)	Torque: over 25%
4	Severe Inducement (Inducement 2)	0% (All gradations lights off)	4: Engine power is under heavy deration.	Red  APP14419 Red  APP14413	Continuously	CA1673 CA3547 (DEF level low error 4)	Torque: over 50% and RPM: over 40%

*1: It is shown the value of Monitoring ID 19111: “DEF Level Corrected”.

*2: These failure codes are displayed on “Current Abnormality” in the operator mode, or “Abnormality Record” in the service mode. For the failure codes, see TROUBLESHOOTING, “TROUBLESHOOTING POINTS FOR UREA SCR SYSTEM”.

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

*4: Construction equipment with crawler

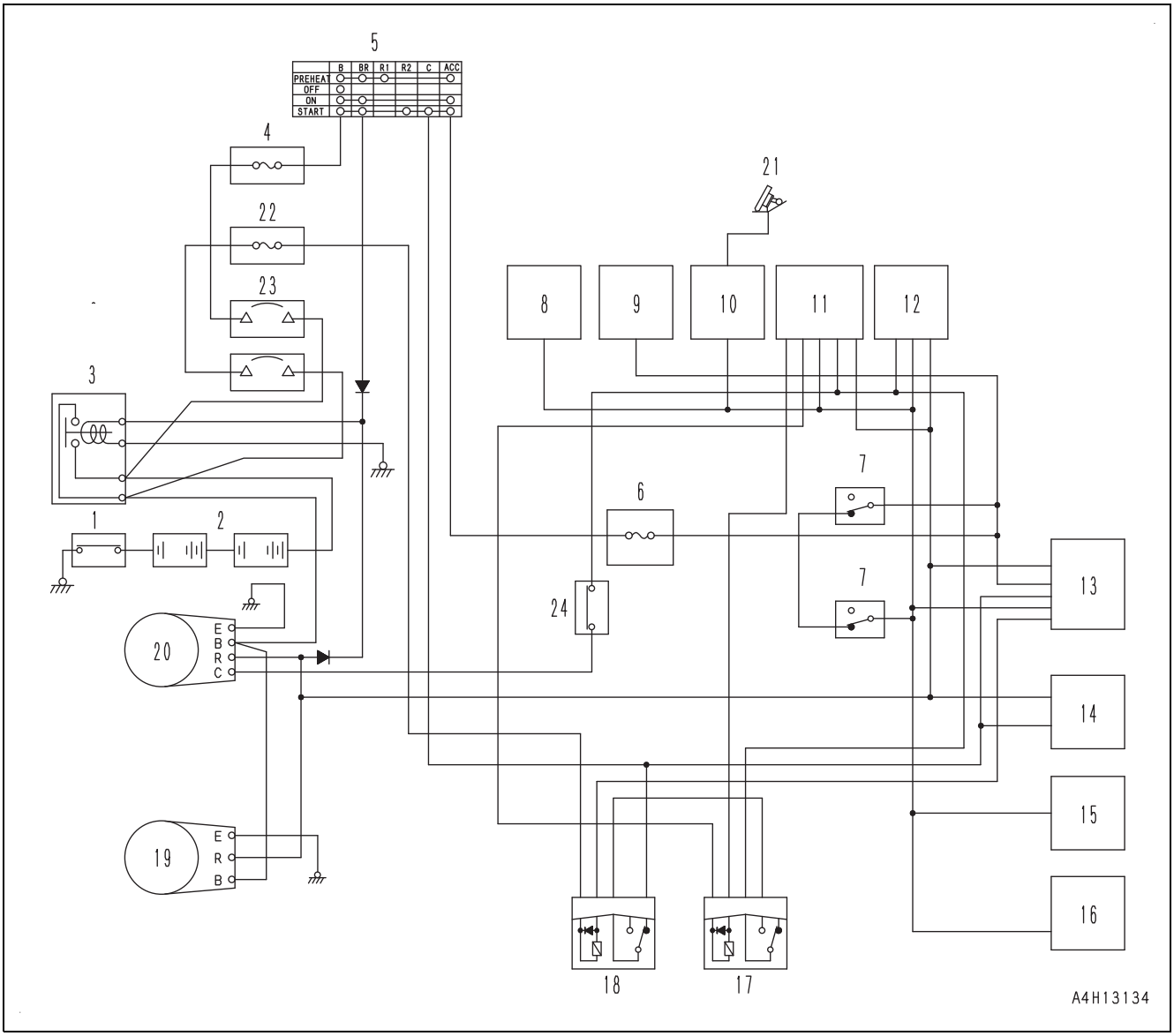
*5: Construction equipment with wheel

INDUCEMENT STRATEGY WHEN ABNORMALITY IS FOUND IN THE DEF QUALITY OR IN THE UREA SCR SYSTEM DEVICES (FOR EUROPEAN UNION)

- When any abnormality is found in the DEF quality or in the Urea SCR system tampering or fault, DEF caution lamp on the machine monitor lights up, and an action level is displayed. If time has elapsed after any abnormality is generated, not only the warning by DEF caution lamp on the machine monitor, but also the Audible alert sounds, Inducement strategy is activated and then the engine output is reduced.
- The Inducement strategy status and the categories of abnormalities can be checked on the “SCR Information” screen of the machine monitor.
- The table shows warning indications and engine power derations by each Inducement strategy status.

ENGINE CONTROL SYSTEM

ENGINE CONTROL SYSTEM DIAGRAM (For machines equipped with KOMTRAX terminal)

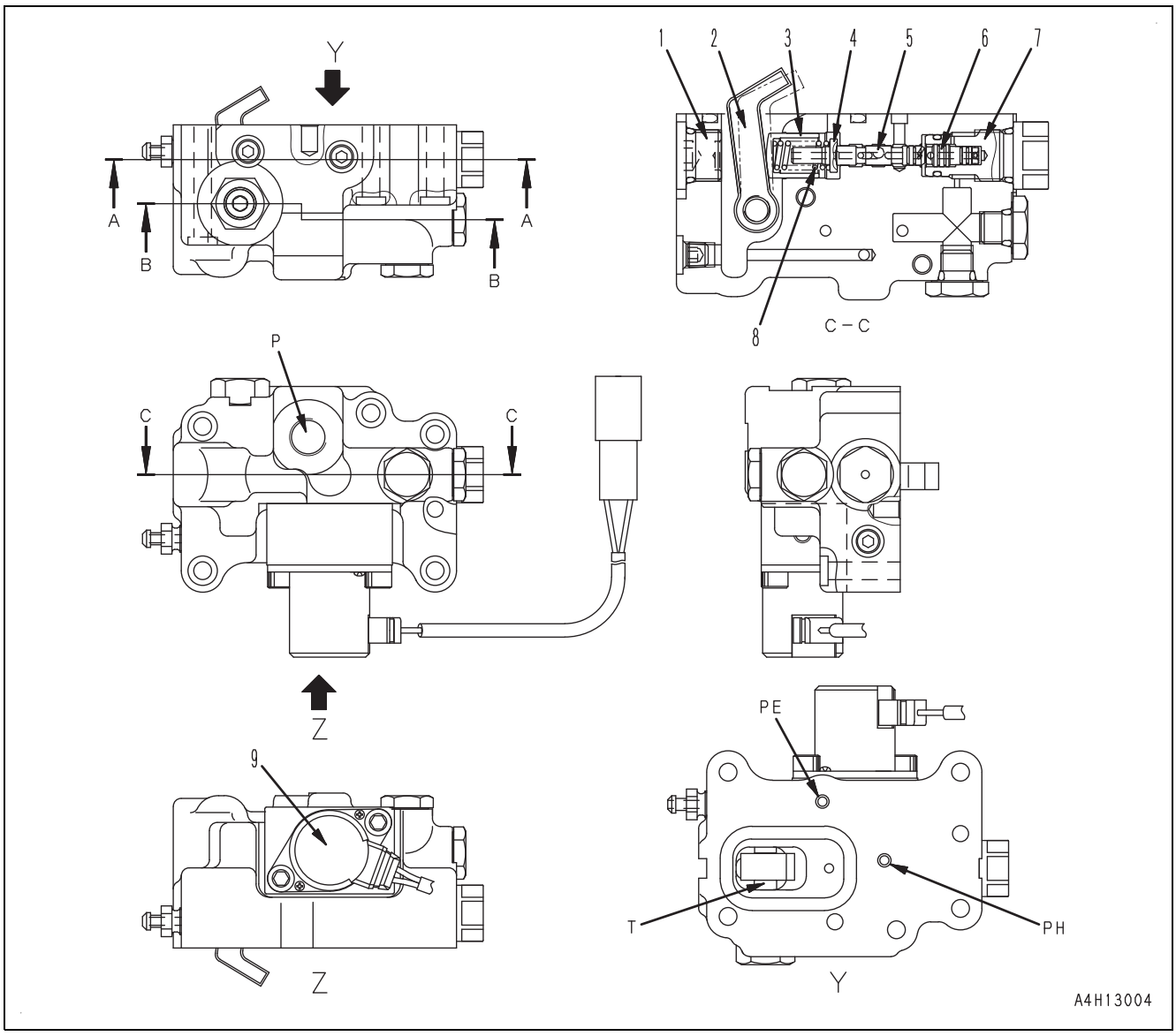


1: Battery disconnect switch
2: Battery
3: Battery relay
4: Fuse box
5: Starting switch
6: Fuse box
7: Engine shutdown secondary switch
8: Payload meter controller
9: Machine monitor
10: Engine controller
11: Transmission controller
12: Retarder controller
13: Monitor controller
14: KOMTRAX terminal
15: Rearview monitor
16: Priming pump timer
17: Engine start relay
18: Personal code relay
19: Alternator
20: Starting motor
21: Accelerator pedal
22: Fuse
23: Circuit breaker
24: Starter disconnect switch (*1)

*1: For machines with starter disconnect switch equipped

SERVO VALVE OF COOLING FAN AND HOIST PUMP
STRUCTURE OF SERVO VALVE OF COOLING FAN AND HOIST PUMP

General view, section view



P: EPC valve source pressure port
PE: Control piston pressure port
PH: Pump discharged pressure port
T: Drain port

1: Plug
2: Lever
3: Retainer
4: Seat
5: Spool
6: Piston
7: Sleeve
8: Spring
9: EPC valve

Answer (Payload meter controller →)

STX (02h)	ACK (06h)	ETX (03h)	BCC

or

STX (02h)	NAK (15h)	ETX (03h)	BCC

INPUT AND OUTPUT SIGNALS OF TRANSMISSION CONTROLLER

DEUTSCH-24P [ATC1]

Pin No.	Signal name	Input/output signal
1	Torque converter oil pressure sensor	Input
2	Main pressure variable valve operation pressure sensor	Input
3	Transmission oil temperature sensor	Input
4	GND (pulse)	-
5	(*1)	-
6	Gear shift lever position N signal	Input
7	(*1)	-
8	(*1)	-
9	Torque converter oil temperature sensor	Input
10	GND (pulse)	-
11	Secondary steering operation signal	Input
12	Engine mode selector switch	Input
13	(*1)	-
14	(*1)	-
15	Alternator terminal R	Input
16	Sensor power supply (24 V)	Output
17	(*1)	-
18	AISS switch	Input
19	(*1)	-
20	(*1)	-
21	GND (analog)	-
22	Sensor power supply output (5 V)	Output
23	Engine starter operation signal	Input
24	(*1)	-

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

DEUTSCH-40P(1) [ATC2]

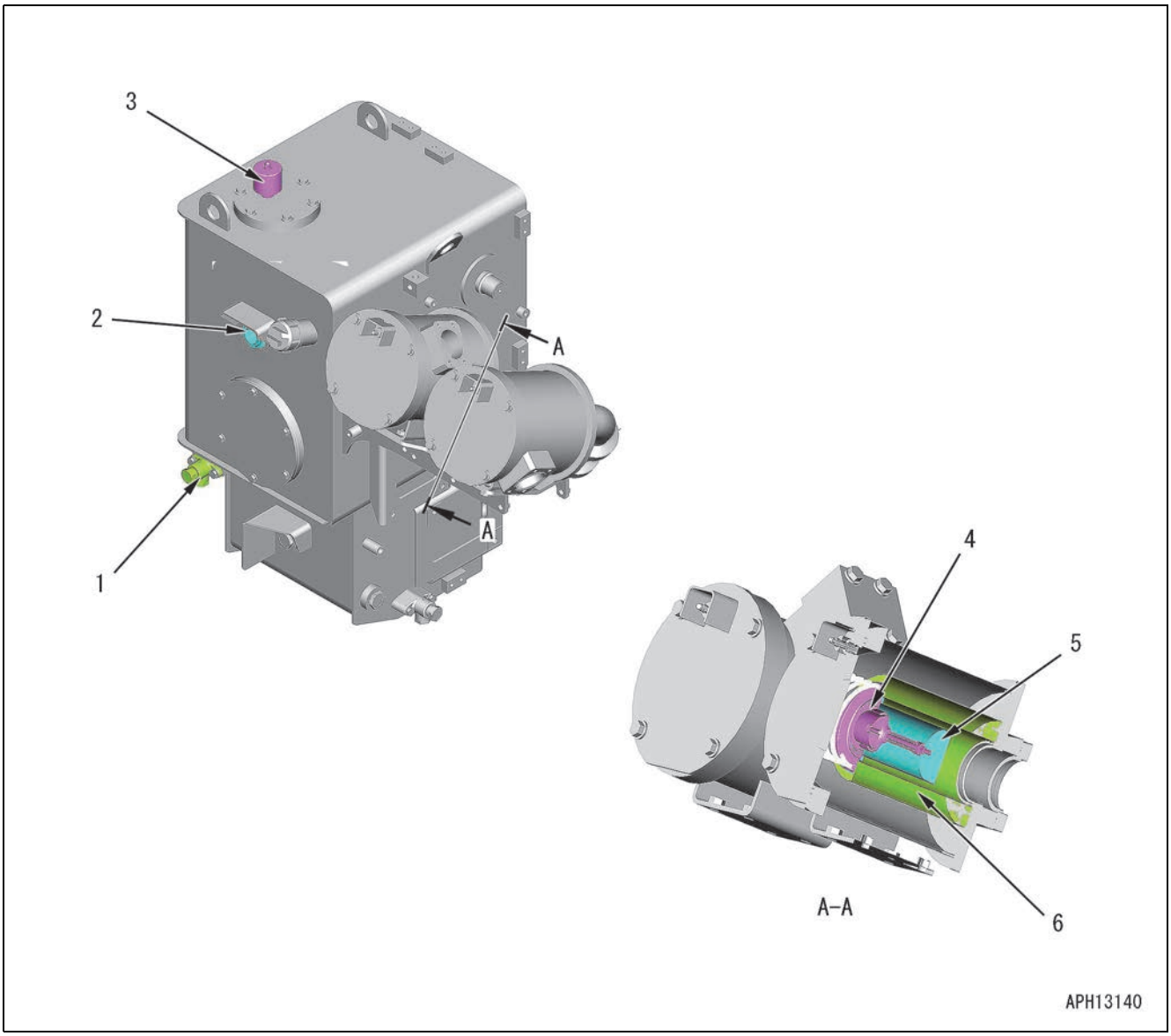
Pin No.	Signal name	Input/output signal
1	(*1)	-
2	Fill switch 2nd	Input
3	Limp-home switch	Input
4	(*1)	-
5	Gear shift lever position 5 signal	Input
6	Gear shift lever position 1 signal	Input
7	Transmission oil filter	Input
8	(*1)	-
9	(*1)	-

COMPONENT PARTS OF HYDRAULIC SYSTEM

HYDRAULIC TANK

STRUCTURE OF HYDRAULIC TANK

General view



1: Drain plug
2: Oil level gauge
3: Breather
4: Bypass valve
5: Strainer
6: Element

SPECIFICATIONS OF HYDRAULIC TANK

Hydraulic tank capacity: 172 ℓ

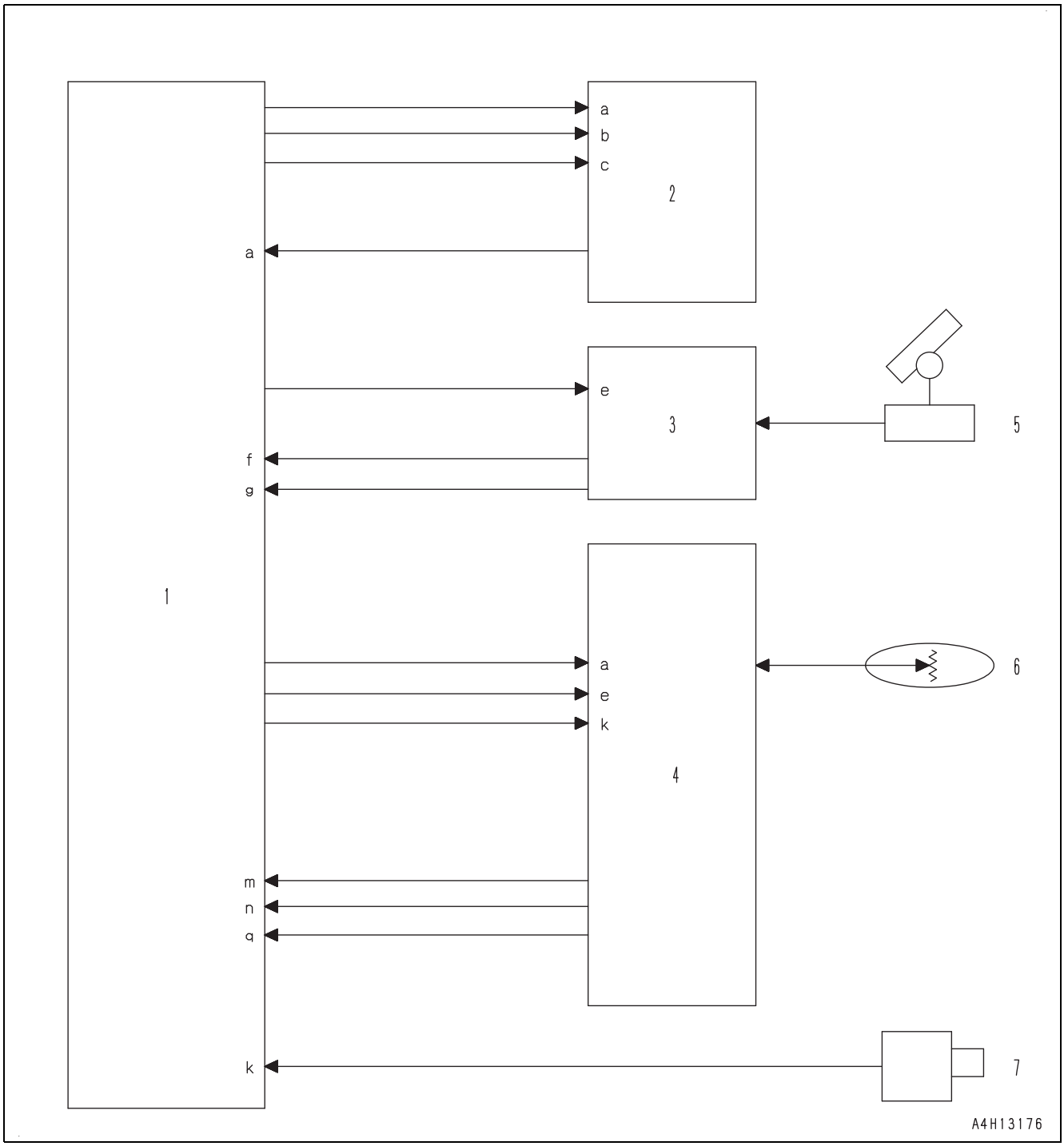
Hydraulic tank refill capacity: 113 ℓ

Bypass valve set pressure: 0.15±0.03 MPa {1.53±0.31 kg/cm^2}

TRAVEL SPEED LIMITATION SYSTEM

(For machine with travel speed limitation system)

SYSTEM DIAGRAM OF TRAVEL SPEED LIMITATION SYSTEM



Input/output signal

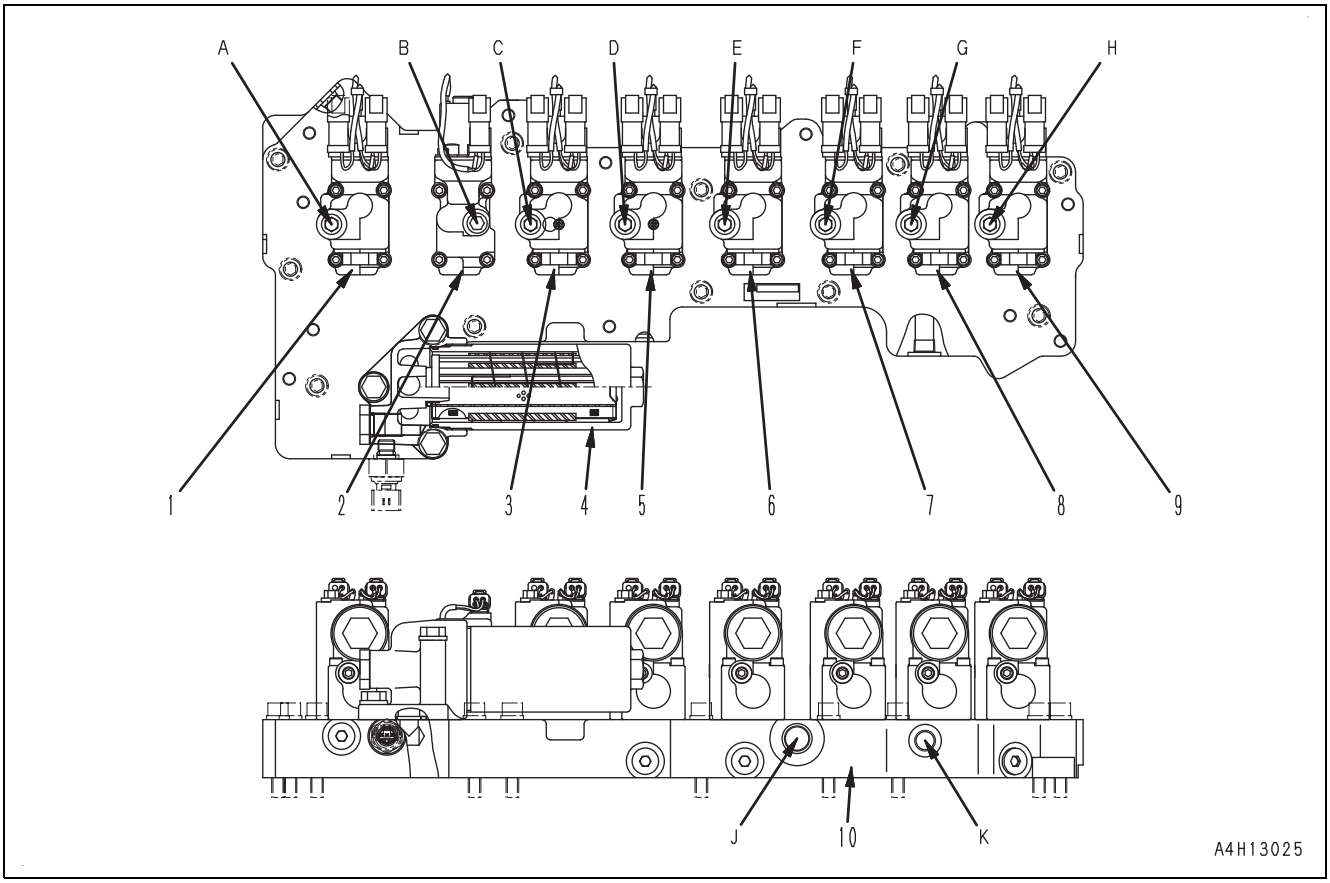
a: Limiting speed signal
b: Maximum speed limit indicator lamp signal
c: Overspeed caution signal
e: Engine throttle correction signal
f: Accelerator pedal signal
g: Accelerator pedal sensor error signal
k: Transmission output shaft speed signal
m: Empty/Load status signal
n: Brake control ON/OFF signal
q: Suspension pressure sensor error signal

1: Transmission controller
2: Monitor controller
3: Engine controller
4: Retarder and hoist controller

TRANSMISSION CONTROL VALVE

STRUCTURE OF TRANSMISSION CONTROL VALVE

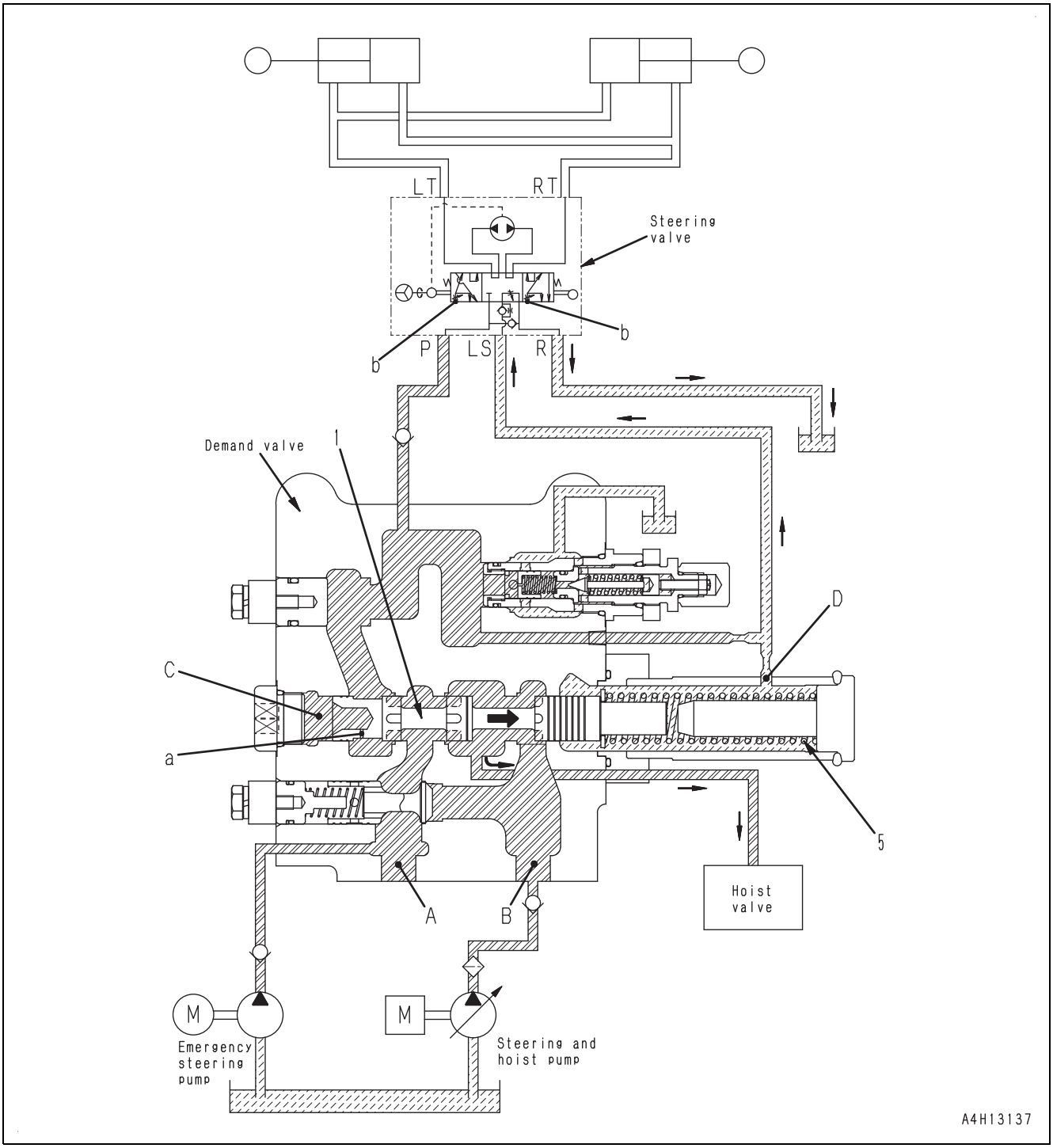
General view



A: H clutch oil pressure pickup port
B: Lockup clutch oil pressure pickup port
C: L clutch oil pressure pickup port
D: 4th clutch oil pressure pickup port
E: 3rd clutch oil pressure pickup port
F: R clutch oil pressure pickup port
G: 2nd clutch oil pressure pickup port
H: 1st clutch oil pressure pickup port
J: To torque converter valve (pilot circuit of main relief oil pressure selector valve)
K: To breather

1: H clutch ECMV
2: Lockup clutch ECMV
3: L clutch ECMV
4: Last chance filter
5: 4th clutch ECMV
6: 3rd clutch ECMV
7: R clutch ECMV
8: 2nd clutch ECMV
9: 1st clutch ECMV
10: Valve seat

OPERATION OF DEMAND VALVE



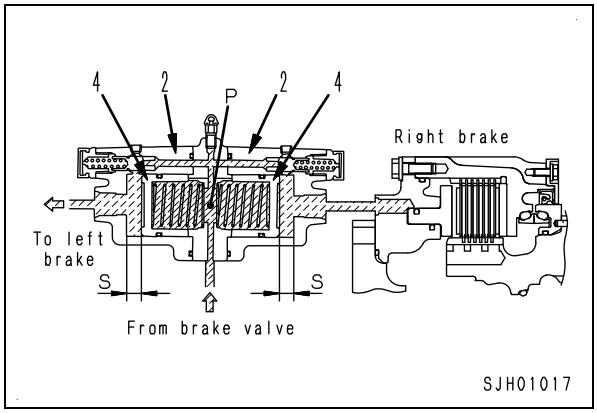
When orbitrol valve is at neutral

- The pressurized oil from the steering and hoist pump enters at port B, push open the check valve, and then enters port A.
- When the orbitrol valve is at neutral, the pressure in port (P) increases because the port (P) of the orbitrol valve is closed.
- The pressurized oil from port (A) passes through orifice (a), enters the chamber (C), and moves spool (1) to the right.
- Port (LS) and chamber (D) are connected to the tank, and the force moving spool (1) to the left is only the force of spool return spring (5).
- The pressure in chamber (C) rises until it overcomes the set pressure of spool return spring (5).
- Spool (1) stops in the position shown in figure, and all the pressurized oil from the steering pump and hoist pump flows to the hoist valve.

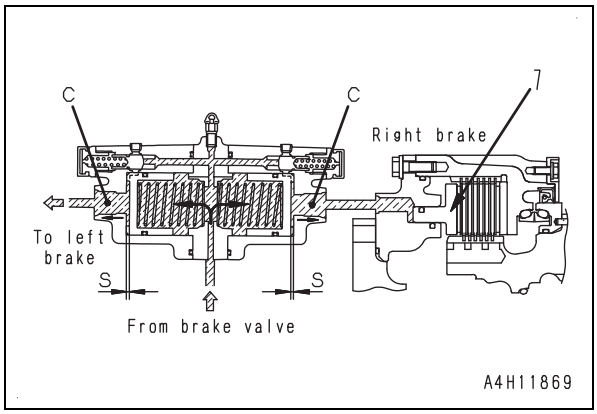
OPERATION OF SLACK ADJUSTER

Operation when brake pedal is depressed

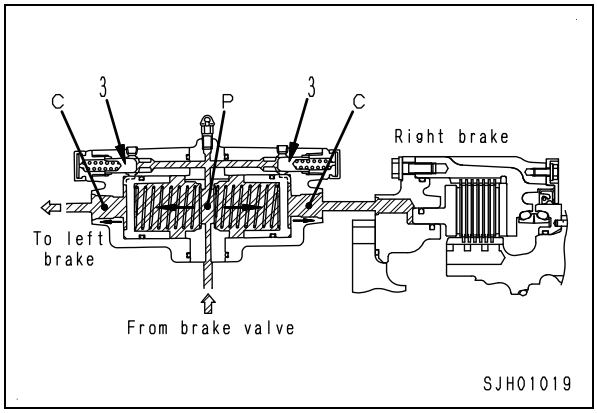
1. Before the brake is depressed, pistons (4) are returned by strokes (S) (all strokes). When the brake pedal is depressed, oil discharged from the brake valve branches into right and left cylinders (2) through port (P) of the slack adjuster and move pistons (4) by stroke (S) to the right and the left.



2. As a result, brake pistons (7) move by strokes (S). At this time, the clearance between each piston and the disc is reduced to zero, but no braking force is generated.



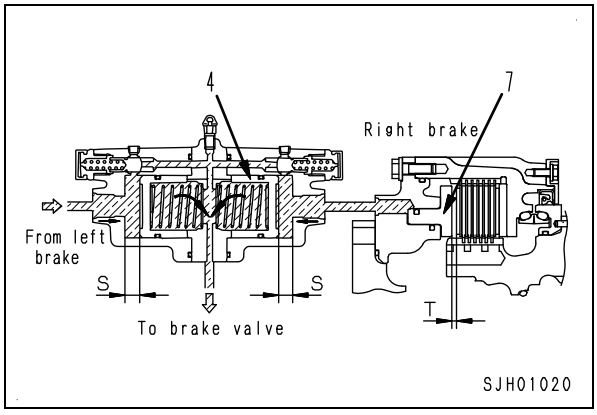
3. When the brake pedal is depressed further and the oil pressure from the brake valve exceeds the specified pressure, check valve (3) opens and pressure is applied to port (C) to generate braking force.
   Thus, the time lag when the brake is applied is maintained constant.



Operation when brake pedal is released

When the brake pedal is released, pistons (4) are returned by the brake cooling oil pressure by the oil volume for stroke (S), and the brake is released.

That is, return stroke (T) of brake pistons (7) is decided by the oil volume for stroke (S) of the slack adjuster and the time lag in braking is constant, regardless of wear of the brake disc.



Engine speed at torque converter lockup actuation

Machine model				HD325-8E0	
Engine				SAA6D140E-7	
Item	Measurement condition		Unit	Standard value for new machine	Repair limit
Operated (ON)	• Engine coolant temperature: 65 to 100 °C • Transmission oil temperature: 60 to 80 °C • Hydraulic oil temperature: 45 to 55 °C	Gear speed: F1, F2	rpm	1300 to 1475	1300 to 1475
		Gear speed: F3, F4, F5, F6, F7		1250 to 1475	1250 to 1475
Released (OFF)	• Engine coolant temperature: 65 to 100 °C • Transmission oil temperature: 60 to 80 °C • Hydraulic oil temperature: 45 to 55 °C	Gear speed: F1, F2	rpm	1100	1100
		Gear speed: F3, F4, F5, F6, F7		1100	1100

Engine speed at overrun prevention actuation

Machine model				HD325-8E0	
Engine				SAA6D140E-7	
Item	Measurement condition		Unit	Standard value for new machine	Repair limit
Actuation at low speed mode 1 (ON)	• Engine coolant temperature: 65 to 100 °C • Transmission oil temperature: 60 to 80 °C • Hydraulic oil temperature: 45 to 55 °C	Gear speed: F1, F2, F3, F4, F5, R	rpm	2300	2300
		Gear speed: F6, F7		2400	2400
Cancellation at low speed mode 1 (OFF)		Gear speed: F1, F2, F3, F4, F5, F6, F7, R		2300	2300
Actuation at low speed mode 2 (ON)	• Engine coolant temperature: 65 to 100 °C • Transmission oil temperature: 60 to 80 °C • Hydraulic oil temperature: 45 to 55 °C	Gear speed: F1, F2, F3, F4	rpm	2450	2450
		Gear speed: F5, F6, F7, R		2450	2450
Cancellation at low speed mode 2 (OFF)		Gear speed: F1, F2, F3, F4, F5, F6, F7, R		2300	2300
Actuation at high speed mode (ON)	• Coolant temperature: 65 to 100 °C • Transmission oil temperature: 60 to 80 °C • Hydraulic oil temperature: 45 to 55 °C	Gear speed: F1, F2, F7, R	rpm	2600	2600
		Gear speed: F3		2600	2600
		Gear speed: F4		2600	2600
		Gear speed: F5		2600	2600
		Gear speed: F6		2600	2600
Cancellation at high speed mode (OFF)		Gear speed: F1, F2, F3, F4, F5, F6, F7, R		2350	2350

Abbreviation	Terms shown completely	Function (major applicable machine (*), or component and system)	Explanation
ECMV	Electronic Control Modulation Valve	Transmission (D, HD, WA, etc)	Electromagnetic valve that gradually proportions oil pressure to engage clutches and decrease transmission shock.
ECSS	Electronically Controlled Suspension System	Travel (WA)	This system absorbs machine vibration during high speed to ensure smooth travel, using hydraulic spring effect of the accumulator.
ECU	Electronic Control Unit	Electronic control system	Electronic control device which uses the signals from the sensors on the machine. These signals indicate the actuators to function for the best operation. (Same as ECM)
EGR	Exhaust Gas Recirculation	Engine	This function recirculates part of exhaust gas back to the combustion chamber to reduce temperature and control NOx emissions.
EMMS	Equipment Management Monitoring System	Machine monitor	This system allows monitor check of each sensor of the machine. (Data includes oil and filter replacement intervals, machine malfunctions, failure codes, and failure records)
EPC	Electromagnetic Proportional Control	Hydraulic system	This mechanism allows actuators to be operated in proportion to the current supplied.
FOPS	Falling Object Protection Structure	Cab and canopy	This structure protects the operator from objects that fall. This performance is standardized as ISO 3449.
F-N-R	Forward-Neutral-Reverse	Operation	Forward - Neutral - Reverse
GPS	Global Positioning System	Communication (KOMTRAX, KOMTRAX Plus)	Global Positioning System: This system uses satellites to determine the machine’s present location.
GNSS	Global Navigation Satellite System	Communication (KOMTRAX, KOMTRAX Plus)	Global Navigation Satellite System: This system uses satellites to determine the present machine location.
HSS	Hydrostatic Steering System	Steering (D)	This function uses the hydraulic motor and bevel shaft to control the difference in travel speed of right and left tracks. Therefore the machine can turn without using steering clutches.
HST	Hydro Static Transmission	Transmission (D, WA)	This function uses the hydraulic pump and motor together, to shift the speed range without using gears.
ICT	Information and Communication Technology	Communication and electronic control	A generally accepted term for engineered and applied technology of information procedures and communication.
IMA	Inlet Metering Actuator	Engine	This valve is installed at the inlet port of the pump, and adjusts fuel intake quantity to control fuel volume of the supply pump. (Same as IMV)
IMU	Inertial Measurement Unit	Engine	This is a device to detect the angle and speed of the 3 pivot points that control movements.
IMV	Inlet Metering Valve	Engine	This valve is installed at the inlet port of the pump, and it adjusts fuel intake quantity to control fuel release volume of supply pump. (Same as IMA)

TEST BLOWBY PRESSURE

Tools to test blowby pressure

Symbol		Part number	Part name	Q'ty	Remarks
A	-	799-201-1506	Blowby checker	1	
	1	799-201-1591	Gauge	1	Pressure range: 0 to 10 kPa
	2	799-201-1511	Tool	1	
	3	799-201-1450	Pipe	1	
	4	07281-00289	Clamp	2	
B		Commercially available	Plug	2	Hose inside diameter: 24 mm
C		Commercially available	Cap	1	Pipe outside diameter: 25.4 mm

⚠ Park the machine on level ground, set the parking brake switch to park (P), and stop the engine.

⚠ Block the tires to prevent machine movement.

⚠ 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.

- Coolant temperature: 60 to 100 °C
- Torque converter oil temperature: 60 to 80 °C
- Output mode: Power mode
- With torque converter stalled

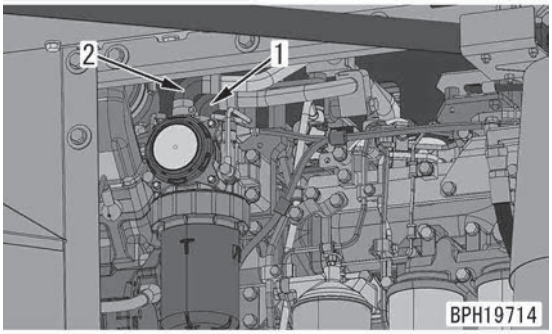
For testing of blowby pressure to perform troubleshooting, refer to this section.

PROCEDURE TO TEST BLOWBY PRESSURE

1. Remove the clamps and disconnect KCCV blowby gas inlet side hoses (1) and outlet side hose (2).

   REMARK

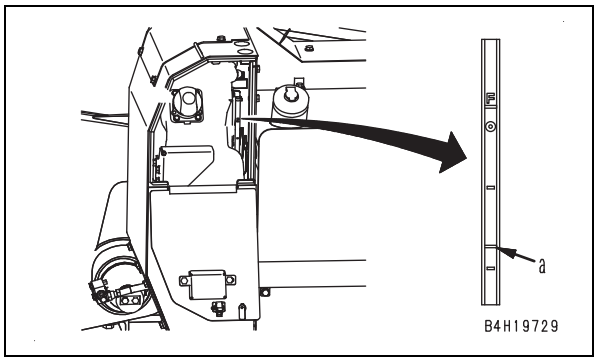
   When the cover at the engine side is installed, remove it.



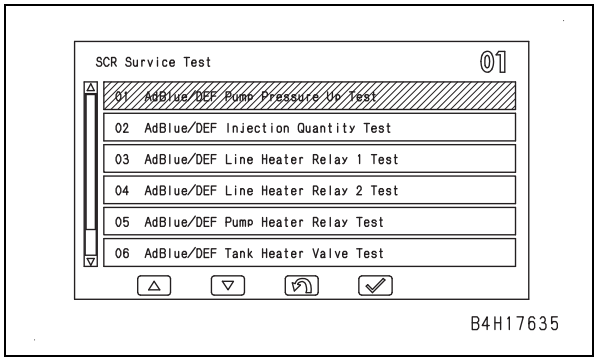
5. Make sure that DEF level is higher than level (a) of the sight gauge of DEF tank.

   REMARK

   When DEF level is below level (a), the DEF level is low. Refill DEF.



6. Select “DEF Pump Pressure Up Test”. For details, see “PROCEDURE TO OPERATE TESTING MENU (SCR SERVICE TEST)” in “SET AND OPERATE MACHINE MONITOR”.



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

   REMARK

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

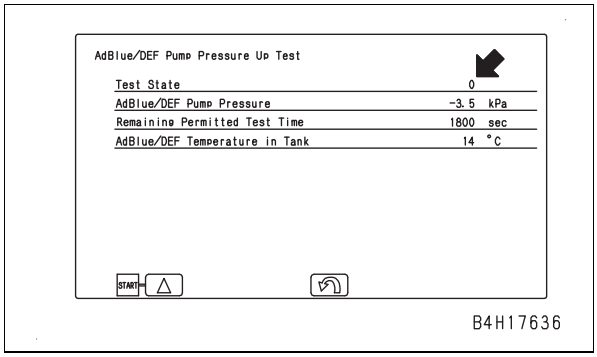
8. Press UP switch (10) to start “DEF Pump Pressure Up Test”.
   UP switch (10): Starts “DEF Pump Pressure Up Test”.
   DOWN switch (11): Stops “DEF Pump Pressure Up Test”. (When “STOP” is displayed.)
   RETURN switch (12): Returns the display to “SCR Service Test” screen

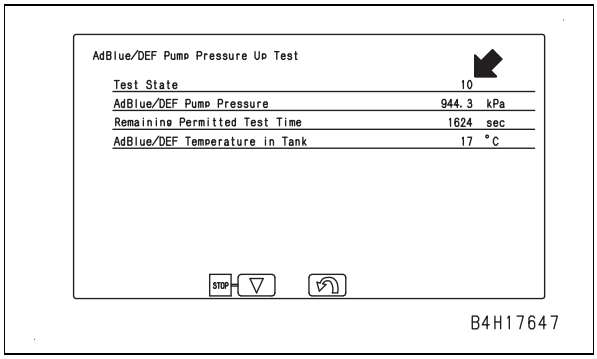
   NOTICE

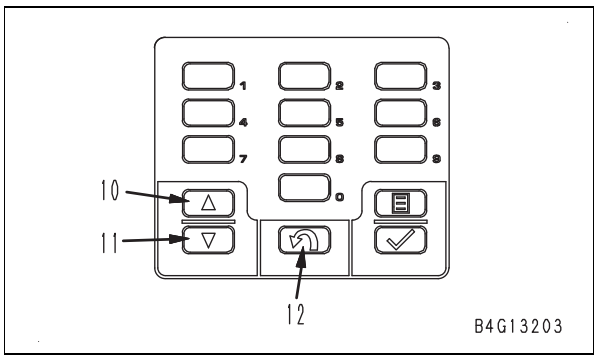
   If “Test State” does not change to “10” and test does not start even by pressing UP switch (10), turn starting switch to OFF position once, and repeat the testing procedure from step 1.

   REMARK

   - Display of “Test State” changes to flashing of “10”, and value of “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” and “41”, follow “Parameter list of test state”.
   - When the value of “DEF Pump Pressure” exceeds “900 kPa” within 1800 seconds of “Remaining Permitted Test Time”, DEF pump and DEF supply line are normal. Press DOWN switch (11) to complete the test.



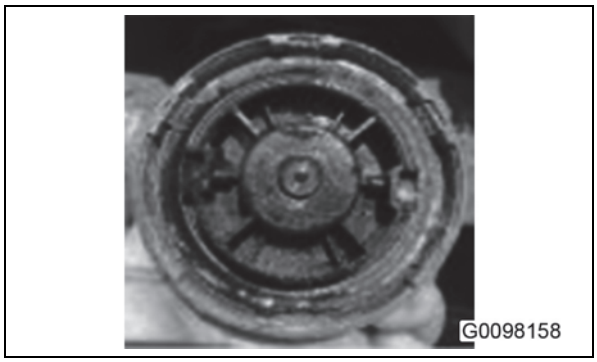




1) Clean dirts on the surface of the DEF pump.

2) Clean dirts around the DEF filler port.

3) Clean soils inside the DEF tank cap.



8. Replace the DEF filler port filter with a new one. For details, see the Operation and Maintenance Manual, “METHOD FOR REPLACING DEF TANK FILLER PORT FILTER”.

NOTICE

Be sure not to use the DEF filler port filter again. Even it is cleaned or repaired, the filtering performance degrades, and it can damage the DEF pump.

9. Clean the DEF tank. For details, see “PROCEDURE TO CLEAN DEF TANK”.

NOTICE

If the raised pressure cannot be tested, change DEF only, and go to Step 10.

Cleaning

10. Turn the starting switch to the OFF position.
11. Make sure that the purge action of the DEF pump is completed.

REMARK

- Make sure that the no operation sound of the DEF pump is heard.
- The purge action of the DEF pump completes in 1 to 6 minutes after the starting switch is turned to the OFF position.
- When the system operating lamp is not lit, the purge action of the DEF pump is completed.

TEST SUPPLY PRESSURE OF ORBITROL VALVE

Tools to test orbitrol valve supply pressure

Symbol		Part number	Part name	Q'ty	Remarks
A	-	799-101-5002	Hydraulic tester	1	
	1	799-101-5120	Gauge	1	Pressure range: 40 MPa
B		790-261-1205	Digital hydraulic tester	1	Pressure range: 70 MPa
C		799-101-5220	Fitting	1	Size: M10×1.25 mm
D		07002-11023	O-ring	1	

⚠ **Park the machine on level ground, set the parking brake switch to park (P), and stop the engine.**

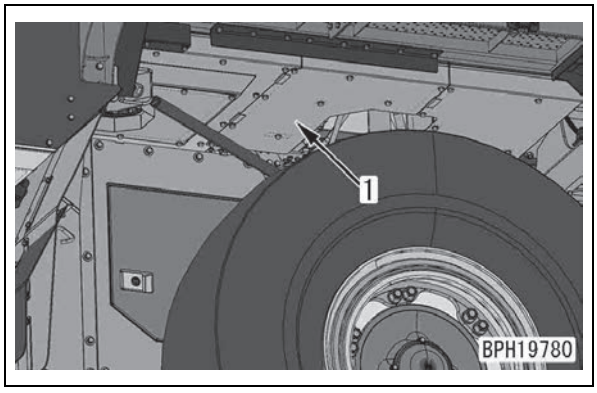
Check this item under the following conditions.

Hydraulic oil temperature: 45 to 55 °C

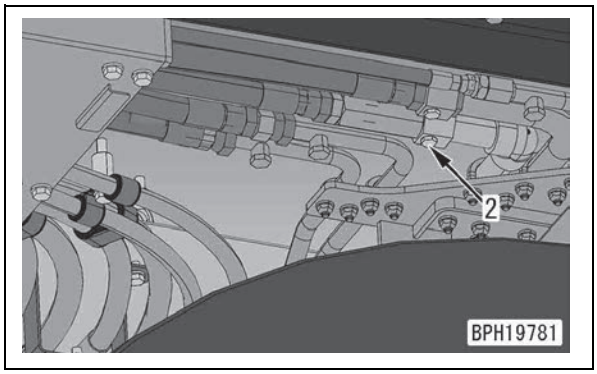
For testing of orbitrol valve supply pressure to perform troubleshooting, refer to this section.

PROCEDURE TO TEST SUPPLY PRESSURE OF ORBITROL VALVE

1. Remove the hydraulic tank oil filling cap to release remaining pressure inside the circuit.
2. Remove the cover (1).



3. Remove the plug (2).



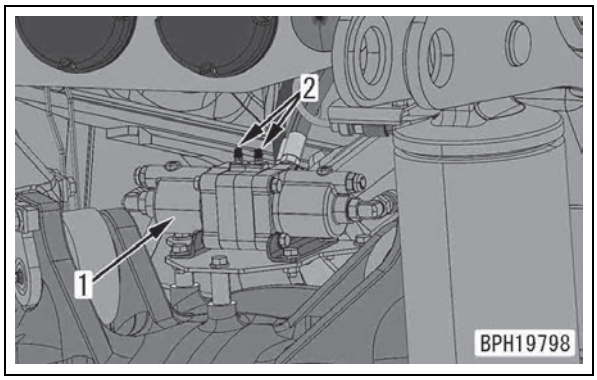
3. Perform the air bleeding of slack adjuster (1).
   1) Remove the cap of either one of air bleeder (2).
   2) Connect the air bleeding hose A to air bleeder (2) and put one side of hose A into the oil container B.
   3) Depress the brake pedal to the stroke end and keep it.
   4) Loosen the air bleeder (2) by three-forth rotation and drain oil in which air is mixed.
   5) If the oil in which air is not mixed drains, tighten air bleeder (2).
   6) Return the brake pedal slowly.
   7) Pull the retarder control lever to the full extent and keep it.
   8) Loosen the air bleeder (2) by three-forth rotation and drain oil in which air is mixed.
   9) If the oil in which air is not mixed drains, tighten air bleeder (2).
   10) Put the retarder control lever to the original position.
   11) Fix the KTCS valve. For details, see "SET AND OPERATE OF MACHINE MONITOR", "PROCEDURE TO ADJUST WITH ADJUSTMENT MENU (KTCS VALVE FIXING)".

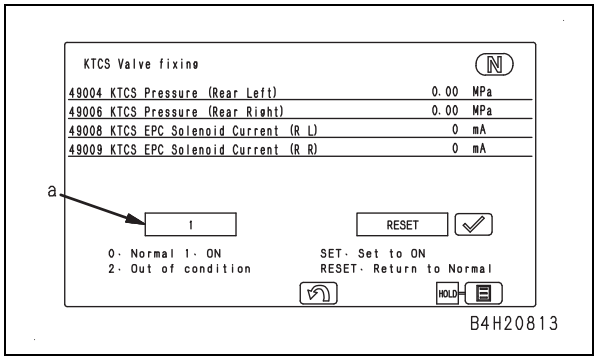
       REMARK
       - When the KTCS valve is fixed, "1" is displayed in (a), and KTCS will be in the state of operation.
       - The operation state of KTCS keeps until the display returns to normal.

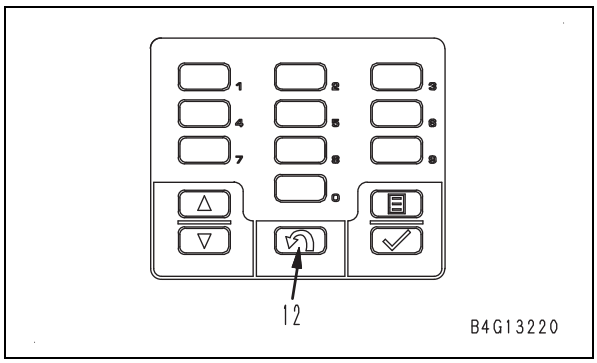
   12) Loosen the air bleeder (2) by three-forth rotation and drain oil in which air is mixed.
   13) If the oil in which air is not mixed drains, tighten air bleeder (2).
   14) Press RETURN switch (12) several times to return to the standard screen.

       REMARK

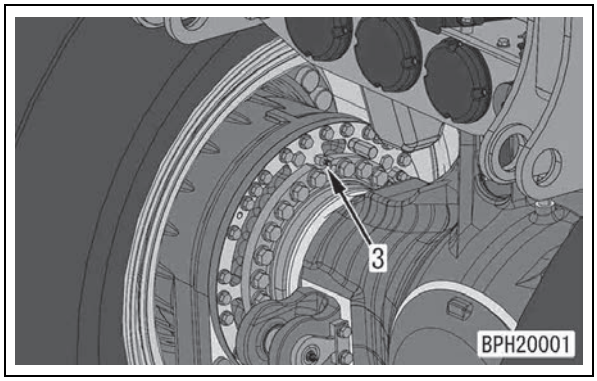
       When the standard screen is displayed, KTCS operation is canceled.







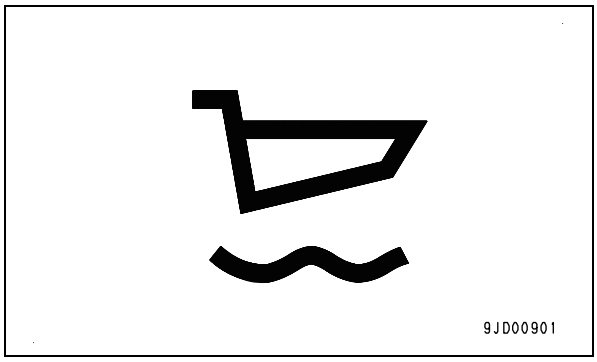
4. Perform the air bleeding of the rear wheel part.
   1) Remove the cap of air bleeder (3).
   2) Connect the air bleeding hose A to air bleeder (3) and put one side of hose A into the oil container B.
   3) Depress the brake pedal to the stroke end and keep it.
   4) Loosen the air bleeder (3) by three-forth rotation and drain oil in which air is mixed.
   5) If the oil in which air is not mixed drains, tighten air bleeder (3).
   6) Return the brake pedal slowly.
   7) Pull the retarder control lever to the full extent and keep it.
   8) Loosen the air bleeder (3) by three-forth rotation and drain oil in which air is mixed.



4. Seat the body with the accelerator pedal not depressed (low idle), set the dump lever to "Float" position, and then hold it for 5 seconds or longer.

   REMARK

   Check that the dump body float caution lamp is OFF.



5. Raise the body to the stroke end with the accelerator pedal not depressed (low idle), set the dump lever to "RAISE" position, and then hold it for 5 seconds or longer.
6. Seat the body with the accelerator pedal not depressed (low idle).
7. Depress the accelerator pedal to the stroke end (high idle), and raise the body to the stroke end.
8. Return the accelerator pedal (low idle), and then set the dump lever to "Down" position. When the body starts lowering, return the lever to "Float" position to seat the body.
9. Repeat above steps 4 to 8, 5 to 10 times.
10. Depress the accelerator pedal to the stroke end (high idle), and raise the body to the stroke end.
11. Set the dump lever to "Down" position with the accelerator pedal depressed to the stroke end. When the body starts lowering, return the lever to "Float" position to seat the body.
12. Repeat above steps 10 to 11, 5 to 10 times.

Pre-defined Monitoring (21/29), Operation basics

No.	Self-define monitoring code	Table of self-define monitoring (Displayed on screen)	Unit		Applicable equipment
			SI	Non-SI	
1	01002	Engine Speed	r/min	rpm	ENG
2	18600	Inject Fueling Command	mg/st	mg/st	ENG
3	19200	Exhaust Gas Flow Rate	kL/h	kgal/h	SCR
4	47300	KDOC 1 Inlet Temperature	°C	°F	KDPF
5	19300	SCR Temperature	°C	°F	SCR
6	19302	SCR Outlet Temperature	°C	°F	SCR

Pre-defined Monitoring (22/29), DEF injector

No.	Self-define monitoring code	Table of self-define monitoring (Displayed on screen)	Unit		Applicable equipment
			SI	Non-SI	
1	47200	KDPF 1 Outlet Temperature	°C	°F	KDPF
2	19304	DEF Pump State	-	-	SCR
3	19120	DEF Injection Quantity	ml/sec	gal/sec	SCR
4	19205	SCR NH3 Concentration Corrected	ppm	ppm	SCR
5	19202	Turbo Outlet NOx Corrected	ppm	ppm	SCR
6	19209	SCR Outlet NOx Corrected	ppm	ppm	SCR

Pre-defined Monitoring (23/29), DEF pump

No.	Self-define monitoring code	Table of self-define monitoring (Displayed on screen)	Unit		Applicable equipment
			SI	Non-SI	
1	19120	DEF Injection Quantity	ml/sec	gal/sec	SCR
2	19108	DEF Pump Pressure	kPa	psi	SCR
3	19109	DEF Pump Press Sensor Volt	V	V	SCR
4	19304	DEF Pump State	-	-	SCR
5	19136	DEF Pump Temperature	°C	°F	SCR
6	19114	DEF Reverting Valve Cmd	-	-	SCR

Pre-defined Monitoring (24/29), SCR sensor

No.	Self-define monitoring code	Table of self-define monitoring (Displayed on screen)	Unit		Applicable equipment
			SI	Non-SI	
1	19120	DEF Injection Quantity	ml/sec	gal/sec	SCR
2	19205	SCR NH3 Concentration Corrected	ppm	ppm	SCR
3	19202	Turbo Outlet NOx Corrected	ppm	ppm	SCR
4	19209	SCR Outlet NOx Corrected	ppm	ppm	SCR
5	19203	Turbo Outlet NOx Sensor State	-	-	SCR
6	19210	SCR Outlet NOx Sensor State	-	-	SCR

DEFAULT MENU
PROCEDURE TO SET WITH DEFAULT SETTING MENU (MACHINE MODEL SELECT)

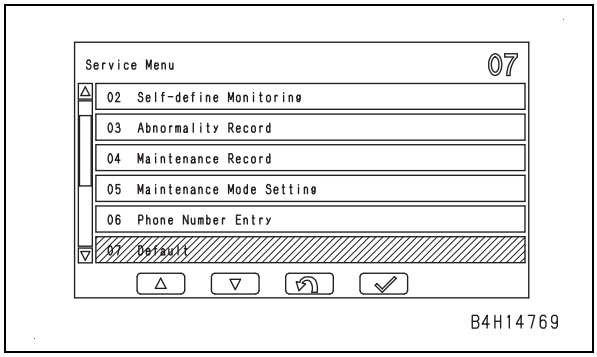
Default menu is used to check or change default values of the machine monitor and machine.

"Machine Model Selection" function is used to make the controller recognize the current machine model.

1. Select "Default" from the "Service Menu" screen.

   REMARK

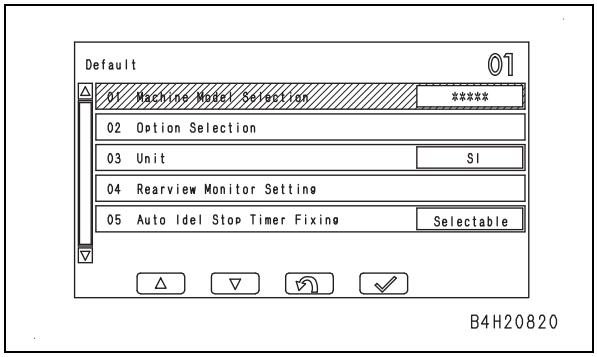
   For details about how to select, see "PROCEDURE TO OPERATE SERVICE MODE" in "SERVICE MODE".



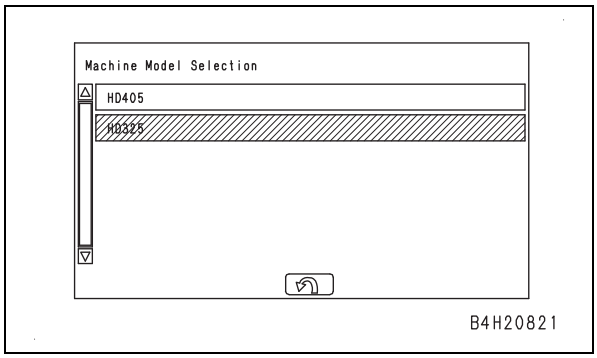
2. Select "Machine Model Selection" after "Default" screen appears.

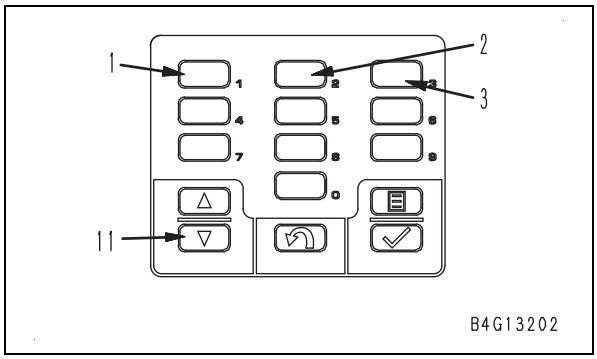
   REMARK

   For details about how to select, see "PROCEDURE TO OPERATE SERVICE MODE" in "SERVICE MODE".

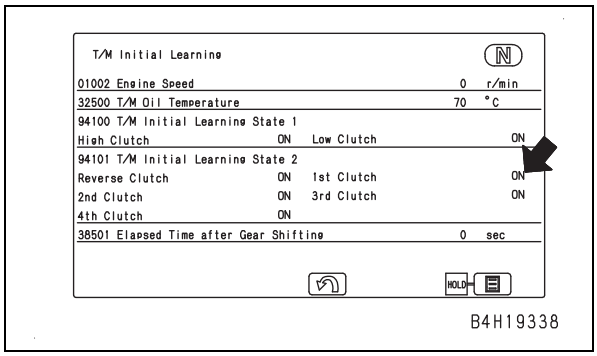


3. While the "Machine Model Selection" screen is displayed, use switches on the switch panel to perform the following operation.
   Switch operation: While pressing DOWN switch (11), sequentially press (1), (2), and (3) of numeral input switches.

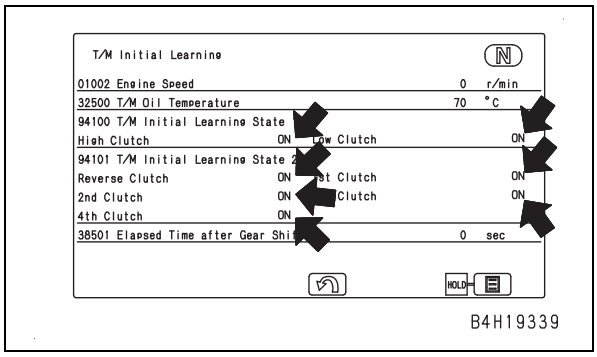


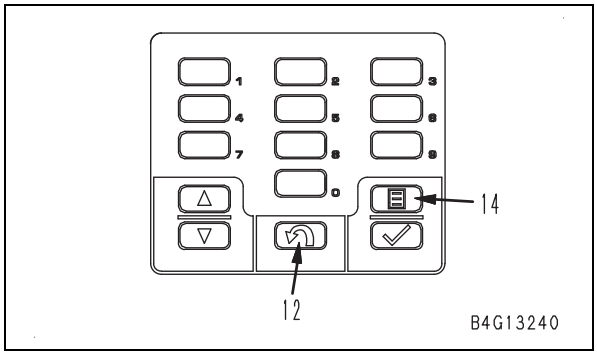


26. Stop the machine and check the learning state of "1st Clutch" in the "T/M Initial Learning" screen.
    - When the display of "T/M Initial Learning" is "ON", proceed to next step.
    - When the display of "T/M Initial Learning" is "OFF", repeat steps 24 to 25 for it to be "OK".



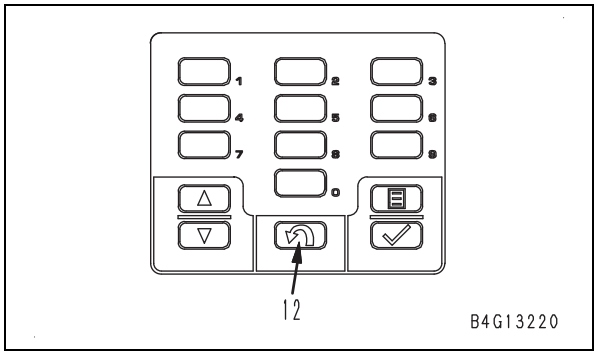
27. Check that all learning states are "ON".





When all learning states are "OK", the initial learning is finished correctly.

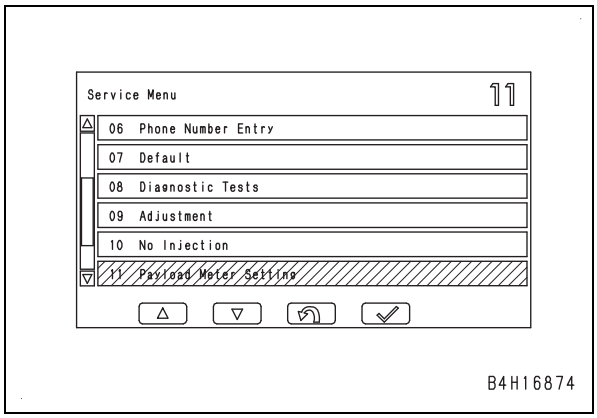
When "T/M Initial Learning" is finished correctly, press RETURN switch (12) several times to return to the standard screen and then set set the starting switch to the ON position.



2. Select "Payload Meter Setting" on "Service Menu" screen.

   REMARK

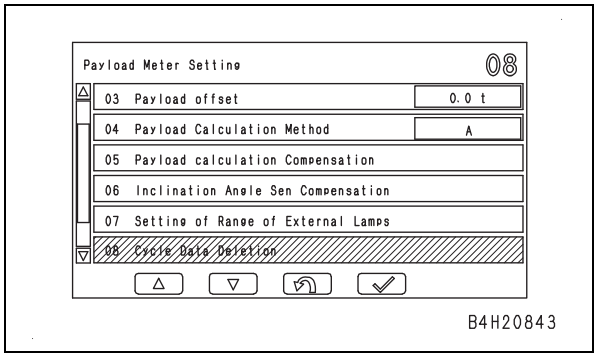
   For details about how to select, see "PROCEDURE TO OPERATE SERVICE MODE" in "SERVICE MODE".



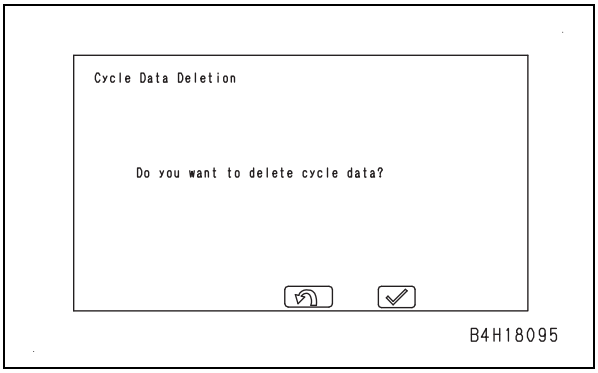
3. When the "Payload Meter Setting" screen is displayed, use a switch on the switch panel to select "Cycle Data Deletion".

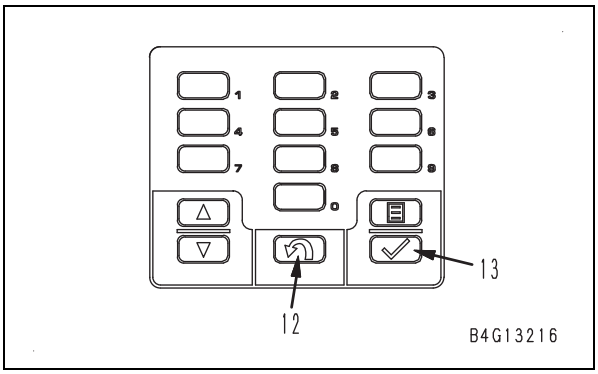
   REMARK

   For details about how to select, see "PROCEDURE TO OPERATE SERVICE MODE" in "SERVICE MODE".



4. When the "Do you want to delete cycle data ?" is displayed, press the ENTER switch.
   RETURN switch (12): Returns the display to the "Payload Meter Setting" screen
   ENTER switch (13): Deletes all cycle data

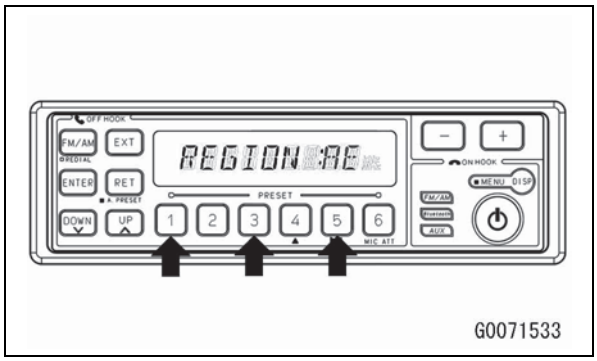




5. Check that the “REGION:AE” is shown.
6. While the “REGION:AE” is shown, push “Preset/audio” switch in order of “3”, “1”, “5”.

   REMARK

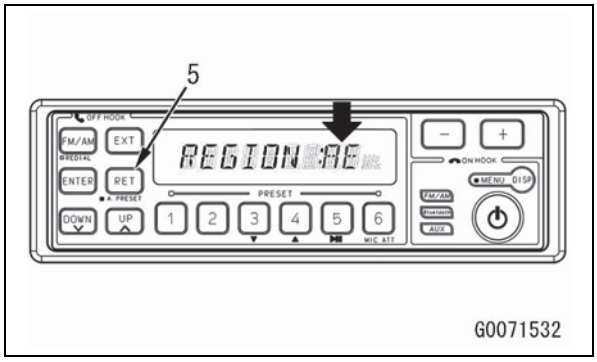
   Push “3”, “1”, “5” in 2 seconds.



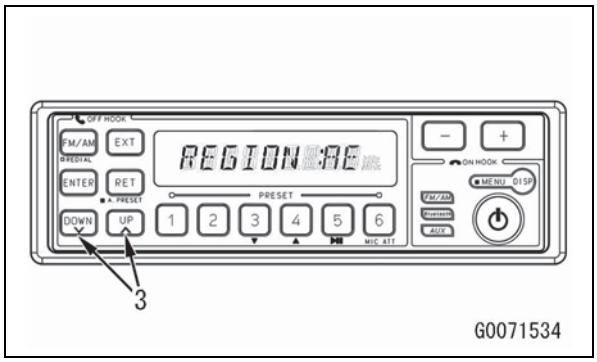
7. Check that the “AE” is flashing.

   REMARK

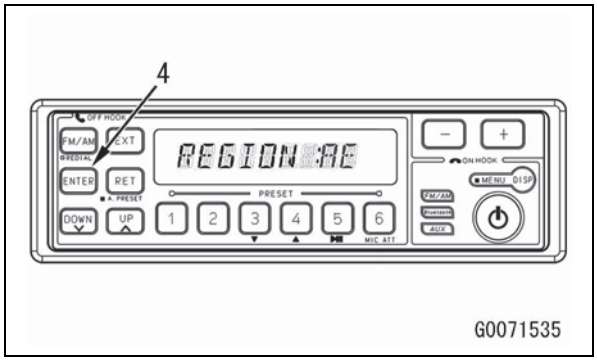
   If it is not flashing, push the “RET” switch (5), and do the steps again from step 4.



8. Push the “Tuning/time adjustment” switch (3). Select the REGION.
   JP: Japan
   US: Not use
   AE: Europe, Asia, Oceania
   SA: North America, Central and South America
   BO: Not use



9. Push the “ENTER” switch (4).
   The selection of the region is confirmed and reset.



- Set the Time again after the resetting.
- Do the pairing again after the resetting. See the Operation and Maintenance Manual, “Operate Radio”.

TESTING IN ACCORDANCE WITH TESTING PROCEDURE

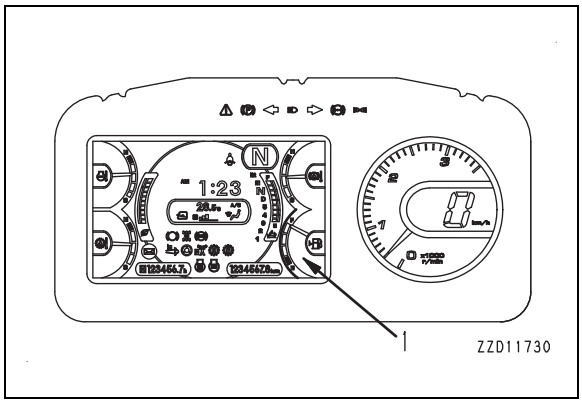
CHECK FUEL LEVEL AND TYPE

⚠ Fuel is highly flammable and dangerous. Keep fire away.

⚠ When adding fuel, be careful not to overflow it.

⚠ Wipe off any spilled fuel. If fuel spills over soil or sand, remove all the fuel and soil or sand together.

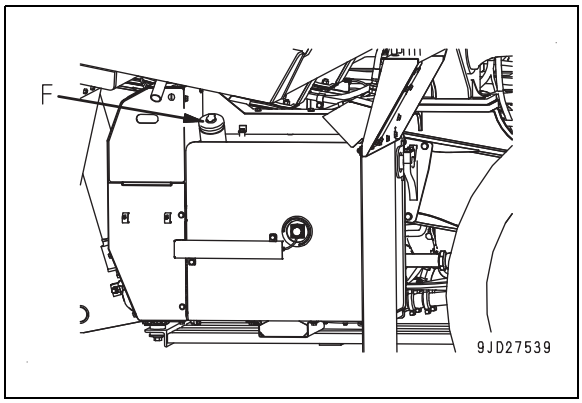
1. Turn the engine starting switch to ON position and check the fuel level with the fuel gauge (1) on the monitor panel.
   After checking, turn the switch back to OFF position.



2. If it is insufficient, open the fuel filler cap (F) of fuel tank, and add fuel through the filler port.

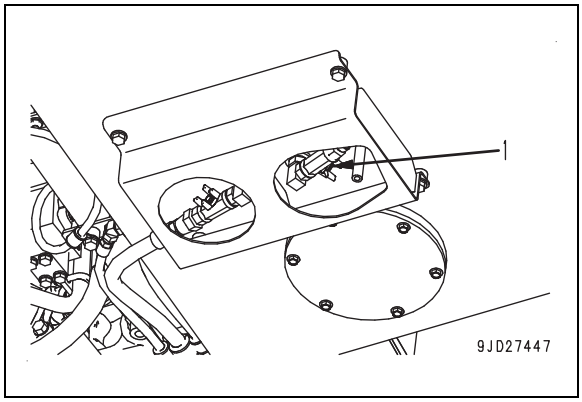
   REMARK

   If the breather hole in the cap is clogged, the pressure inside the tank will go down and this may cause the fuel to stop flowing. To prevent this, clean the breather hole from time to time.



CHECK IMPURE INGREDIENT IN FUEL

1. Prepare a container to receive the drained fuel. Place it under the drain valve (1) below the fuel tank.
2. Loose the drain valve (1) to discharge the sediment and water in the bottom together with the fuel.
3. When only the clean fuel flows out, close the drain valve.



CHECK DEF LEVEL AND TYPE

⚠ Do not pour anything besides DEF to the DEF tank. Pouring especially diesel oil or gasoline can cause fires. Pouring especially diesel oil or gasoline can cause fires. Furthermore, toxic gas may develop by pouring additive.

⚠ When opening the DEF tank cap, harmful ammonia gas may be exhausted from the tank. Keep your face away from the filler port while opening the tank cap or refiling.

⚠ Foreign matter mixed in DEF results in a short service life of DEF injector and DEF pump.
Before removing the filler port cap, clean foreign matter around the cap. . Refiling nozzle also needs to be cleaned before the refiling.

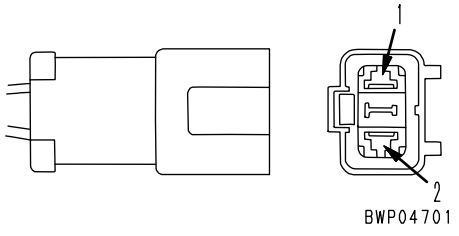
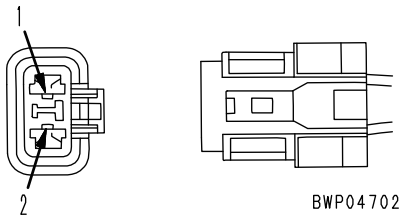
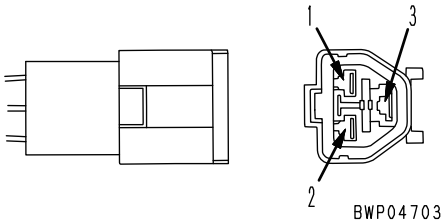
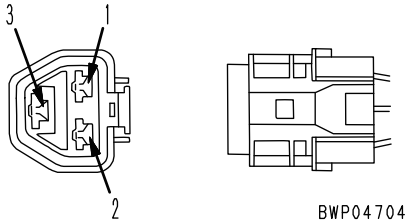
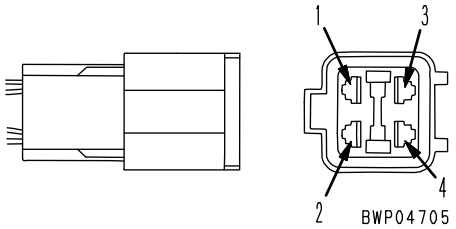
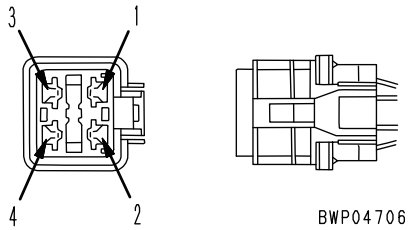
⚠ If DEF is spilled, immediately wipe and wash the area with water. If spilled DEF is left unattended, toxic gas or corrosive substance may be produced by chemical reactions.

No.	Symptom of failure	Troubleshooting
		Index
28	Consumption of DEF is excessive.	S-24
29	There is unusual smell (irritating odor).	S-25
30	Foreign materials enter DEF (DEF increases).	S-26
31	Manual preheating system does not work.	E-2
32	Automatic preheating system does not work.	E-3
33	While preheating is working, preheating monitor does not light up.	E-4
34	Engine mode selector function does not operate properly	E-29
35	AISS function does not operate properly.	E-30
36	Fuel feed pump does not operate or does not stop automatically.	E-32
Symptom related to travel		
37	Machine does not start.	H-1
38	Machine does not travel smoothly (engine hunts).	H-2
39	Lockup clutch is not disengaged.	H-3
40	Abnormally large shocks result from starting of machine and gear shifting.	H-4
41	Gear is not shifted up.	H-5
42	Machine lacks travel speed or power when traveling in lockup drive mode at all gear speeds.	H-6
43	Machine lacks travel speed or power when traveling in torque converter drive mode.	H-7
44	Machine lacks travel speed or power when traveling at some gear speed.	H-8
45	Large time lag is observed when machine starts and gear is shifted.	H-9
46	Oil temperature of torque converter is high.	H-10
47	Oil pressure of torque converter is low.	H-11
48	Steering wheel is heavy to operate.	H-12
49	Steering wheel cannot be operated.	H-13
50	Steering wheel waggles.	H-14
Symptom related to work equipment		
51	Hoist lever does not operate properly.	E-31
52	Dump body rising speed is low.	H-17
53	Hydraulic drift of dump body is large.	H-18
54	Dump body does not move.	H-19
Brake component		
55	Front brake does not work enough.	H-15

CONNECTOR CONTACT IDENTIFICATION

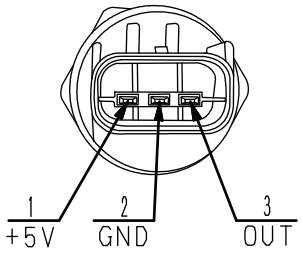
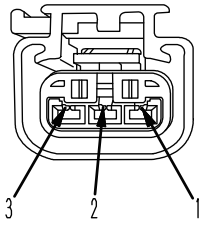
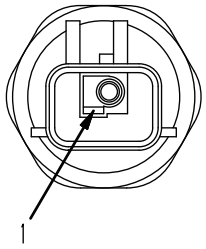
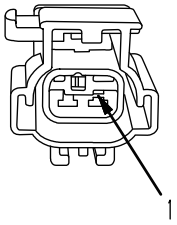
(Rev.2014.11)

The male or female is for pin, and the convex or concave is for fitting (housing).

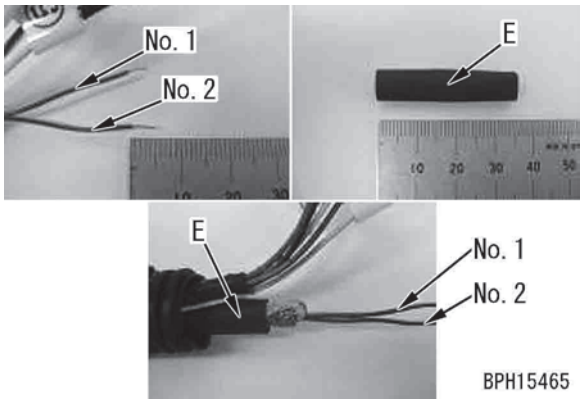
No. of pins	X type connector		
	Male (female housing)	Female (male housing)	Testing connection use special tool Part No.
1	Part No. : 08055-00181	Part No. : 08055-00191	99-601-7010 (T-adapter)
2	 BWP04701	 BWP04702	799-601-7020 (T-adapter)
	Part No. : 08055-00282	Part No. : 08055-00292	
3	 BWP04703	 BWP04704	799-601-7030 (T-adapter)
	Part No. : 08055-00381	Part No. : 08055-00391	
4	 BWP04705	 BWP04706	799-601-7040 (T-adapter)
	Part No. : 08055-00481	Part No. : 08055-00491	
—	Terminal part No. : 79A-222-3370 ·Electric wire size: 0.85 ·Grommet: Black ·Q'ty: 20	Terminal part No. : 79A-222-3390 ·Electric wire size: 0.85 ·Grommet: Black ·Q'ty: 20	—
—	Terminal part No. : 79A-222-3380 ·Electric wire size: 2.0 ·Grommet: Red ·Q'ty: 20	Terminal part No. : 79A-222-3410 ·Electric wire size: 2.0 ·Grommet: Red ·Q'ty: 20	—

B4D18190

FRAMATOME connector for engine

No. of pins	Lubricating oil pressure sensor (125, 140 engine)		
	Sensor side (plug)	Harness side (receptacle)	Testing connection use special tool Part No.
3			799-601-4150 (T-adapter) (Kit : 799-601-4101) (Kit : 799-601-4201)
	-	-	
No. of pins	Hydraulic switch (95, 107, 114 engine)		
	Switch side (plug)	Harness side (receptacle)	
2			799-601-4160 (T-adapter) (Kit : 799-601-4101) (Kit : 799-601-4201)
	☆ Without pin (2)	☆ Without pin (2)	

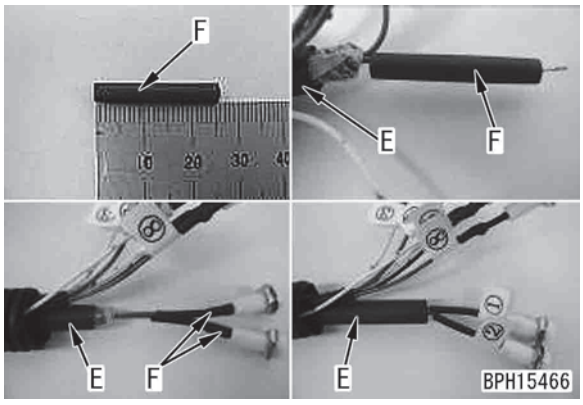
B4W21629



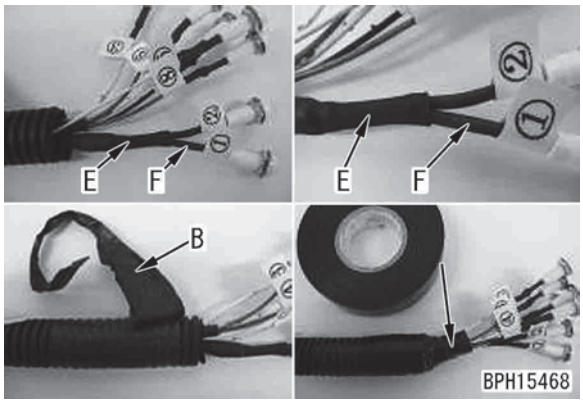
7) Prepare heat shrink tube φ3.5 mm (2 pieces) which has been cut to a length of 25 mm (F).
8) Insert the cable of pins No. 1 and No. 2 through heat shrink tube (F).
9) Solder the check pin to cables of pins No. 1 and No. 2.
10) Slide the heat shrink tube (F) of the cable to the position where the check pin is hidden in it.
11) Attach the sticker with number for the pin number of the cable to be identified.

REMARK

Pin number of check pin corresponds to the color of Q portion in Fig. 1 or depends on which pin on opposite side is connected to.



12) Slide the heat shrink tube (E) of φ5 mm to the position where the heat shrink tube (F) of φ3.5 mm at pins No. 1 and No. 2 is overlapped. Heat the heat shrink tube (E) with a dryer so that it shrinks.
13) Cut off the tape (B) which has been removed off from the conduit tube at an appropriate position. Wrap vinyl tape around the cables of pins No. 3 to No. 8 to bind them.



14) Work of creating harness checker has been done.

FAILURE CODE [15F0MB]

Action level	Failure code	Failure	Gear Shifting from R to F Abuse 2 (Transmission controller system)
-	15F0MB		
Details of failure	A total of 5 reverse-to-forward shifts are detected at output shaft speed of 300 rpm (approximately 7 km/h).		
Action of controller	None in particular		
Phenomenon on machine	• If operations described in Details of failure are repeated, machine may be damaged. • Only logged in Abnormality Record.		
Related information			

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective operation of gear shift lever	• Always stop machine completely and release accelerator pedal before performing directional selection. (Instruct operator on correct operation of machine.) • The gear shift lever may be depressed when not operated due to some force applied. • Gear shift lever is stopped intermediate point between 2 positions.
2	Defective transmission controller	If no failure is found by the above checks, the transmission controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Circuit diagram related to 3rd clutch

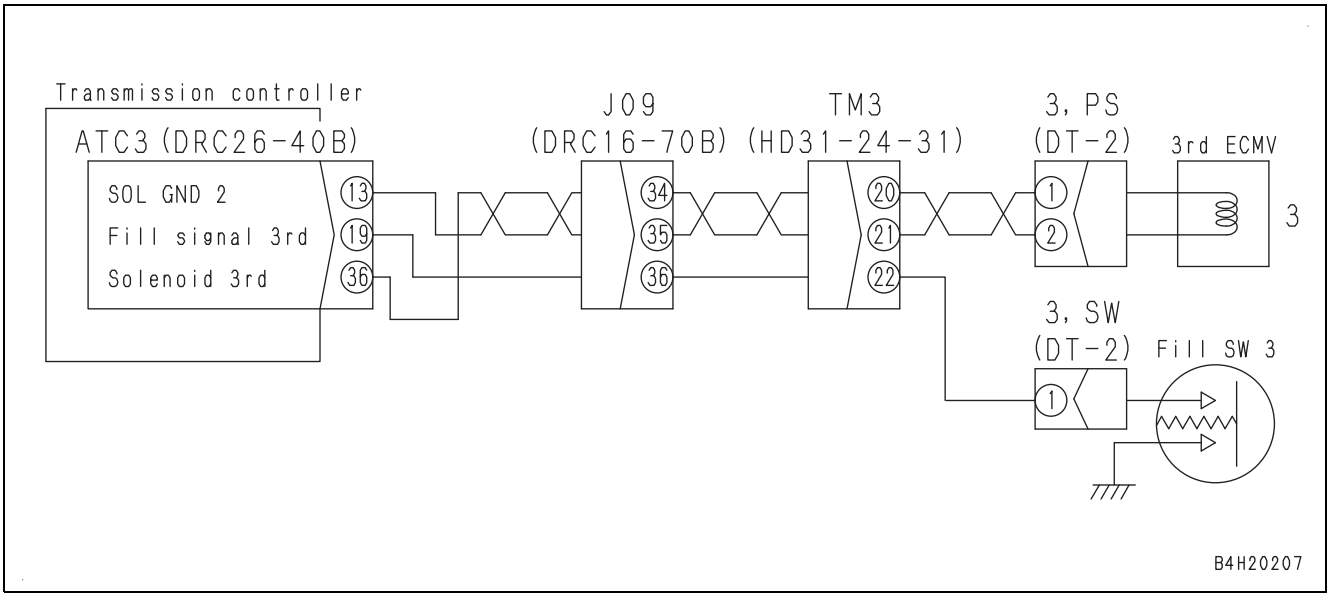


Table 2

Gear speed when failure is detected		Abnormal clutch	Remedy when failure is detected		
			Action of controller (Selected clutch, gear speed)		ON/OFF state of lockup clutch
F7	4th High	3rd	OFF	NEUTRAL	OFF
		2nd	OFF	NEUTRAL	OFF
		1st	OFF	NEUTRAL	OFF
		Reverse	OFF	NEUTRAL	OFF
		Low	OFF	NEUTRAL	OFF
F6	4th Low	3rd	OFF	NEUTRAL	OFF
		2nd	OFF	NEUTRAL	OFF
		1st	OFF	NEUTRAL	OFF
		Reverse	OFF	NEUTRAL	OFF
		High	4H	F7	OFF
F5	3rd High	4th	4L	F6	OFF
		2nd	OFF	NEUTRAL	OFF
		1st	OFF	NEUTRAL	OFF
		Reverse	OFF	NEUTRAL	OFF
		Low	4L	F6	OFF
F4	3rd Low	4th	4L	F6	OFF
		2nd	OFF	NEUTRAL	OFF
		1st	OFF	NEUTRAL	OFF
		Reverse	OFF	NEUTRAL	OFF
		High	3H	F5	OFF

FAILURE CODE [98A500]

Details of failure	The translator controller senses that the operator looks away to the left.
Action level	-
Action of controller	Operates the alarm notification sound.
Phenomenon on machine	None
Related information	-

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
1	Detection of drowsiness	1. The translator controller senses that the operator looks away to the left. 2. Instructs the operator to concentrate on the operation in the correct posture.	-	The work is done.

FAILURE CODE [CA123]

Action level	Failure code	Failure	Charge Air Pressure Sensor Low Error (Engine controller system)
L03	CA123		
Details of failure	A low voltage is generated in the signal circuit of the charge air pressure sensor (boost pressure sensor).		
Action of controller	• Sets charge air pressure (boost pressure) to fixed value (400.0 kPa {4.1 kg/cm^2}) for operation. • Closes EGR valve and fully opens VGT. • Derates the engine power for operation. • Stops regeneration control.		
Phenomenon on machine	• Engine acceleration performance is poor. • Engine power decreases.		
Related information	• If failure code [CA352] or [CA386] is also displayed, the sensor power supply system may be defective. Perform troubleshooting for it first. • This failure code is displayed if sensor connector is disconnected. • Signal voltage from the charge air pressure sensor (boost pressure sensor) can be checked by the monitoring function. (Code: 36501) • Pressure (boost pressure) detected by the charge air pressure sensor (boost pressure sensor) can be checked by the monitoring function. (Code: 36500) • Engine power derate is canceled by turning the starting switch to OFF position after this failure code is cleared. (This derate is not canceled only by clearing the failure code.) • After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

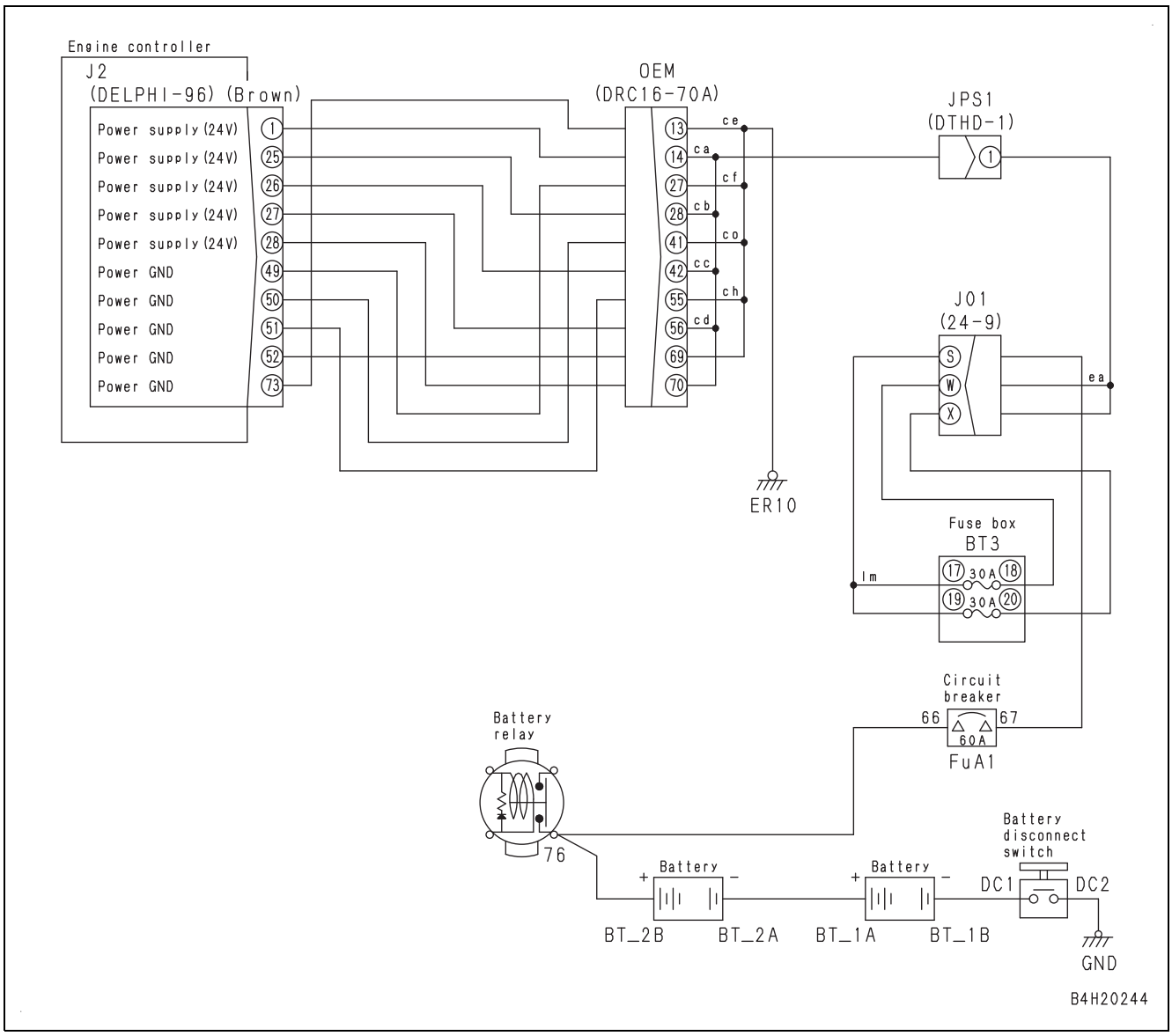
No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective wiring harness connector	This failure code is displayed if the connectors of electrical parts around the engine are defective, disconnected, or loosened due to heat and vibration. See descriptions of wiring harnesses and connectors in the table "Electric equipment" in "CHECKS BEFORE TROUBLESHOOTING" under "RELATED INFORMATION ON TROUBLESHOOTING", and check the connectors.			
2	Defective power supply system of charge (Boost) pressure sensor	1. Turn the starting switch to OFF position. 2. Disconnect connector PIM, and connect T-adapter to female side. 3. Switch: ON			
		Voltage	Between PIM (female) (1) and (2)	Power supply input	4.75 to 5.25 V
3	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors J1 and PIM, and connect T-adapter to each female side.			
		Resistance	Between J1 (female) (78) and PIM (female) (1)		Max. 1 Ω
			Between J1 (female) (45) and PIM (female) (3)		Max. 1 Ω
			Between J1 (female) (54) and PIM (female) (2)		Max. 1 Ω
4	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors J1 and PIM, and connect T-adapter to either female side.			
		Resistance	Between J1 (female) (45) and (54), or between PIM (female) (3) and (2)		Min. 1 MΩ
5	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors J1 and PIM, and connect T-adapter to either female side.			
		Resistance	Between ground and J1 (female) (45) or PIM (female) (3)		Min. 1 MΩ

FAILURE CODE [CA271]

Action level	Failure code	Failure	PCV 1 Short Circuit Error (Engine controller system)
L03	CA271		
Details of failure	Short circuit is detected in the supply pump PCV1 circuit.		
Action of controller	Stops driving PCV1.		
Phenomenon on machine	• Engine power decreases. • Engine startability is poor.		
Related information	• When the engine is running normally, pulse voltage of approximately 24 V is provided to PCV1 (1). Pulse voltage cannot be measured with a multimeter. • After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Start the engine.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	This failure code is displayed if the connectors of electrical parts around the engine are defective, disconnected, or loosened due to heat and vibration. See descriptions of wiring harnesses and connectors in the table "Electric equipment" in "CHECKS BEFORE TROUBLESHOOTING" under "RELATED INFORMATION ON TROUBLESHOOTING", and check the connectors.		
2	Defective Supply pump PCV1 (internal short circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connector PCV1, and connect the socket to male side.		
		Resistance	Between PCV1 (male) (1) and (2)	2.3 to 5.3 Ω
			Between PCV1 (male) (1) and ground	Min. 1 MΩ
3	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector J1, and connect T-adapter to female side.		
		Resistance	Between J1 (female) (23) and (24) (PCV1 resistor)	2.3 to 5.3 Ω
4	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors J1 and PCV1, and connect T-adapter to female side of J1.		
		Resistance	Between J1 (female) (23) and ground	Min. 1 MΩ
			Between J1 (female) (24) and ground	Min. 1 MΩ
5	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Insert T-adapter into connector J1. 3. Turn the starting switch to ON position.		
		Voltage	Between J1 (24) and ground	Max. 1 V
6	Defective engine controller	If no failure is found by the above checks, the engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to engine controller power supply



FAILURE CODE [CA1117]

Action level	Failure code	Failure	Engine Controller Partial Data Lost Error (Engine controller system)
L04	CA1117		
Details of failure	Internal defect is detected in engine controller.		
Action of controller	None in particular		
Phenomenon on machine	• Engine continues operation normally, however, the engine may stop while running or not able to start while it is stopped. • Engine controller cannot store the internal data correctly.		
Related information	• Power supply voltage of the engine controller can be checked by the monitoring function. (Code: 03203) • Engine controller internal data (KDPF related, DEF level related, etc.) may be lost. Proper remedy is required after resetting the error. **NOTICE** **Actions after resetting error:** **Perform "Active Regeneration for Service". For details, see TEST AND ADJUST, "SERVICE MODE", "METHOD FOR SETTING WITH TESTING MENU (ACTIVE REGENERATION FOR SERVICE)" under "SETTING AND OPERATION OF MACHINE MONITOR".** • After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective wiring harness connector	This failure code is displayed if the connectors of electrical parts around the engine are defective, disconnected, or loosened due to heat and vibration. See descriptions of wiring harnesses and connectors in the table "Electric equipment" in "CHECKS BEFORE TROUBLESHOOTING" under "RELATED INFORMATION ON TROUBLESHOOTING", and check the connectors.
2	Defective power supply circuit system	Since the power supply circuit may be defective, perform troubleshooting for failure code [CA441].
3	Defective battery disconnect switch by incorrect operation	The battery disconnect switch may be operated incorrectly. **REMARK** This failure code is displayed when the power supply is shut down by using the battery disconnect switch before the engine controller is normally shut down.
4	Defective engine controller	If no failure is found by the above checks, the engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

No.	Cause	Procedure, measuring location, criteria and remarks		
6	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Check that system operating lamp is not lit, and then turn the battery disconnect switch to OFF position. 3. Disconnect connectors J1 and SSR, and connect T-adapter to each female side.		
		Resistance	Between ground and J1 (female) (9) or SSR (female) (5)	Min. 1 MΩ
7	Defective engine controller	If no failure is found by the above checks, the engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

<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</td><td colspan="3">1. Turn starting switch to OFF position.
2. Check that system operating lamp is not lit, and then turn battery disconnect switch to OFF position.
3. Disconnect connector EPTS, and connect T-adapter to female side.
4. Remove fuse No.8 in fuse box BT2.</td></tr>
<tr><td>Resistance</td><td>Between ground and EPTS (female) (3)</td><td>Min. 1 MΩ</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Defective fuel feed pump</td><td colspan="3">1. Turn the starting switch to OFF position.
2. Loosen the fuel tube joint bolt (JB).
3. Tilt the switch for the fuel feed pump to ON position while the starting switch is in OFF position.
⚠ Fuel may spurt out. So be careful.
4. Set the switch for the fuel feed pump to OFF position and finish the test.</td></tr>
<tr><td colspan="3">If fuel does not come out from the joint bolt (JB) of fuel tube, perform troubleshooting for “FUEL FEED PUMP DOES NOT OPERATE OR DOES NOT STOP AUTOMATICALLY” in E-mode.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Defective doser fuel pressure sensor</td><td colspan="3">1. Turn starting switch to OFF position.
2. Disconnect fuel supply line (2) from fuel doser (1).
3. Turn starting switch to ON position.
4. See Related information, and display dosing fuel pressure and ambient pressure on the machine monitor at the same time.</td></tr>
<tr><td colspan="3">If the dosing fuel pressure is clearly different from ambient pressure, the dosing fuel pressure sensor is defective.
REMARK
Doser fuel pressure should read atmospheric pressure.</td></tr>
<tr><td>8</td><td>Defective dosing fuel solenoid valve 1 (shut-off valve)</td><td colspan="3">Replace dosing fuel solenoid valve 1 (shut-off valve).</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">Defective engine controller</td><td colspan="3">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”.</td></tr>
<tr><td colspan="3">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.)</td></tr>
</table>

FAILURE CODE [CA2555]

Action level	Failure code	Failure	Intake Air Heater Relay Open Circuit Error (Engine controller system)
L01	CA2555		
Details of failure	Open circuit is detected in preheating relay drive circuit (primary side).		
Action of controller	None in particular		
Phenomenon on machine	Intake air heater does not work in automatic preheating mode (resulting in degraded startability and emission of white smoke at low temperature).		
Related information	• This failure code is detected only when the relay is OFF. • After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position (engine coolant temperature: -4 °C and above).		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	This failure code is displayed if the connectors of electrical parts around the engine are defective, disconnected, or loosened due to heat and vibration. See descriptions of wiring harnesses and connectors in the table "Electric equipment" in "CHECKS BEFORE TROUBLESHOOTING" under "RELATED INFORMATION ON TROUBLESHOOTING", and check the connectors.		
2	Defective preheating relay	1. Turn the starting switch to OFF position. 2. Disconnect connector R19, and connect T-adapter to male side.		
		Resistance	Between R19 (male) (1) and (2)	200 to 400 Ω
		1. Turn the starting switch to OFF position. 2. Replace relay R19 with another one. 3. Turn the starting switch to ON position (engine coolant temperature: -4 °C and above).		
		If this failure code is cleared, the original preheating relay R19 is defective.		
3	Open or short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector J2, and connect T-adapter to female side.		
		Resistance	Between J2 (female) (75) and (61) Relay R19 coil resistance	200 to 400 Ω
4	Open circuit in wiring harness	If no failure is found by check on cause 3, the following check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect connector J2 and relay R19, and connect T-adapter to each female side.		
		Resistance	Between J2 (female) (75) and R19 (female) (1)	Max. 1 Ω
			Between J2 (female) (61) and R19 (female) (2)	Max. 1 Ω
5	Hot short circuit in wiring harness	Perform under conditions where preheating does not work (engine coolant temperature: -4 °C or above). 1. Turn the starting switch to OFF position. 2. Insert T-adapter into connector J2. 3. Turn the starting switch to ON position.		
		Voltage	Between J2 (75) and (61)	Max. 1 V
6	Defective engine controller	If no failure is found by the above checks, the engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

No.	Cause	Procedure, measuring location, criteria and remarks
3	Defective wiring harness or engine controller	1. Turn the starting switch to OFF position. 2. Disconnect connector DPFP. 3. Turn the starting switch to ON position.
		If the failure code [CA3134] is not displayed, the wiring harness or engine controller is defective. **REMARK** Disregard other failure codes displayed on the screen.
		1. Turn the starting switch to OFF position. 2. Disconnect connector DPFP1, and connect the short circuit electrical connector to female side. Connect 5 V to the signal line. (Short-circuit pins (4) and (3) of connector DPFP1.) 3. Turn the starting switch to ON position. **REMARK** Prepare the short circuit electrical connector, referring to "RELATED INFORMATION ON TROUBLESHOOTING", "PREPARATION OF SHORT CIRCUIT ELECTRICAL CONNECTOR (FOR FAILURE CODES [CA1883] AND [CA3135])".
		If the failure code [CA3133] is not displayed, the wiring harness or engine controller is defective. **REMARK** Disregard other failure codes displayed on the screen.
4	Defective KDPF outlet pressure sensor	If the failure codes [CA3134] and [CA3133] are displayed by the above checks, KDPF outlet pressure sensor is defective.
5	Defective engine controller	If no failure is found by the above checks, the engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Loaded Diagnostics Operation To Confirm Failure Correction

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

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

REMARK

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

⚠ **Place the machine on a level ground, set the parking brake switch to PARKING position, and chock the tires.**

1. Turn the starting switch to ON position.
2. Clear this failure code by Engine Controller in Engine Controller Active Fault Clear from the service mode of the machine monitor.
3. Turn the starting switch to OFF position, and shut down the engine controller.
4. Turn the starting switch to ON position, and start the engine.
5. Run the engine at low idle speed for approximately 1 minute.
6. Stall torque converter continuously for approximately 1 minute as described below with accelerator pedal open position 100%.
   1) Check that the parking brake switch is set to PARKING position, and be sure to set the gear shift lever to D position while depressing the brake pedal.
      ⚠ **Be sure to set the gear shift lever to D position, because the machine may start even with the brake pedal depressed if the gear shift lever is set to a position other than D.**
      ⚠ **Be sure to set the gear shift lever to D position while the torque converter is stalled to avoid internal damage to the transmission controller.**
   2) Stall the torque converter by gradually depressing the accelerator pedal with the brake pedal depressed.

      NOTICE

      Be sure that the torque converter oil does not overheat.

<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="3">6</td><td rowspan="3">Ground fault or short circuit in wiring harness (line heater relay output side)</td><td colspan="3">1. Turn starting switch to OFF position.
2. Disconnect connector UHR2, and connect T-adapter to female side.
REMARK
Resistance value is the value of above DEF line heater.</td></tr>
<tr><td>Resistance</td><td>Between UHR2 (female) (4) and (12)</td><td>5 to 40 Ω</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Defective DEF heater relay</td><td colspan="3">1. Turn the starting switch to OFF position.
2. Check that system operating lamp is not lit, and then turn the battery disconnect switch to OFF position.
3. Disconnect connectors UHR1 and UHR2, and replace the DEF heater relay.
4. Turn the battery disconnect switch to ON position.
5. Start the engine in low temperature (Engine room temperature: 12 °C or below), or perform DEF Line Heater Relay 2 Test referring to TEST AND ADJUST, "SERVICE MODE", "METHOD FOR OPERATING TESTING MENU (SCR SERVICE TEST)" under "SET AND OPERATE MACHINE MONITOR".</td></tr>
<tr><td colspan="3">If this failure code is not displayed, the original DEF heater relay is defective.</td></tr>
<tr><td>8</td><td>Defective engine controller</td><td colspan="3">If no failure is found by the above checks, the engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</td></tr>
</table>

FAILURE CODE [CA3419]

Action level	Failure code	Failure	MAF Sensor Supply Voltage High Error (Engine controller system)
L03	CA3419		
Details of failure	High voltage is generated in mass air flow sensor power supply (12 V) circuit.		
Action of controller	None in particular		
Phenomenon on machine	Engine power decreases.		
Related information	• If failure code [CA356] or [CA357] is displayed, remedy described in Action of controller of their failure code is performed. • Engine power derate is canceled by turning the starting switch to OFF position after this failure code is cleared. (This derate is not canceled only by clearing the failure code.) • After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	This failure code is displayed if the connectors of electrical parts around the engine are defective, disconnected, or loosened due to heat and vibration. See descriptions of wiring harnesses and connectors in the table "Electric equipment" in "CHECKS BEFORE TROUBLESHOOTING" under "RELATED INFORMATION ON TROUBLESHOOTING", and check the connectors.		
2	Defective mass air flow sensor (internal defect)	1. Turn the starting switch to OFF position. 2. Disconnect connector MAF. 3. Turn the starting switch to ON position.		
		If this failure code is not displayed, the MAF sensor is defective. **REMARK** Many other failure codes appear at the same time. Disregard other failure codes as they are displayed due to disconnecting the connector.		
3	Defective wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector J1. 3. Turn the starting switch to ON position.		
		If this failure code is not displayed, wiring harness is defective. **REMARK** Many other failure codes appear at the same time. Disregard other failure codes as they are displayed due to disconnecting the connector.		
4	Defective engine controller	1. Turn the starting switch to OFF position. 2. Disconnect connector J1, and connect T-adapter to male side. 3. Turn the starting switch to ON position. If no failure is found by this check, perform troubleshooting again from cause 1.		
		Voltage	Between J1 (male) (80) and (56)	Approx. 12 V
		If no failure is found by the above checks, the engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective wiring harness connector	This failure code is displayed if the connectors of electrical parts around the engine are defective, disconnected, or loosened due to heat and vibration. See descriptions of wiring harnesses and connectors in the table "Electric equipment" in "CHECKS BEFORE TROUBLESHOOTING" under "RELATED INFORMATION ON TROUBLESHOOTING", and check the connectors.
2	Damaged DEF hose, DEF leakage at connection	If crystallized DEF is adhered to the surrounding of DEF hose (including DEF tank, DEF pump, or engine compartment), DEF may be leaking. See TEST AND ADJUST, "SERVICE MODE", "METHOD FOR OPERATING TESTING MENU (SCR SERVICE TEST)" under "SET AND OPERATE MACHINE MONITOR" to perform DEF Pump Pressure Up Test and find the location of the DEF leakage. Replace parts as necessary.
3	Clogged DEF suction hose	Check the DEF suction hose for entry of foreign material or clogging due to frozen DEF. Blow air or send DEF through each DEF hose, and repair or replace the hose if clogged.
4	Clogged DEF tank strainer	Check the DEF tank for entry of foreign material. Check the DEF tank strainer for clogging. Repair or replace the part if any abnormality is found. Use DEF for cleaning.
5	Suction tube clogged or torn apart in the DEF tank	1. Remove the flange from the DEF tank. 2. Check if a suction tube in the DEF tank is torn apart. 3. See TEST AND ADJUST, "SERVICE MODE", "METHOD FOR OPERATING TESTING MENU (SCR SERVICE TEST)" under "SET AND OPERATE MACHINE MONITOR" to perform DEF Pump Pressure Up Test to check if DEF is not leaking from the suction tube in the DEF tank visually.
6	Clogged DEF pump filter	Replace the DEF pump filter when the predefined time of use specified in the Operation and Maintenance Manual has elapsed since the last replacement of the DEF pump filter, or if foreign materials are found in the DEF tank strainer. (See "METHOD FOR REPLACING DEF FILTER" in the Operation and Maintenance Manual.)
7	Mixing of foreign materials into DEF pump	Clean the DEF pump. For details, see “TESTING AND ADJUSTING”, “CLEAN DEF PUMP”.
8	Clogged DEF tank breather hose	Frozen or crystalized DEF in DEF tank breather hose could cause pressure trouble. Remove the breather hose from the sensor flange and do the DEF Pump Pressure Up Test For details, see “TESTING AND ADJUSTING”, “PROCEDURE TO TEST DEF PUMP RAISED PRESSURE”.
9	Defective DEF pump	If the cause is not determined by the above checks, replace the DEF pump. **REMARK** If the DEF pump cause was replaced in the above troubleshooting, go to the next troubleshooting.
10	Defective engine controller	If no failure is found by the above checks, the engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Loaded Diagnostics Operation To Confirm Failure Correction

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

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

1. Turn the starting switch to OFF position, and shut down the engine controller.
2. Turn the starting switch to ON position, and start the engine.
3. Run the engine at low idle speed.
4. Check if monitoring code 19108 DEF Pump Pressure rises up to 900±100 kPa within 5 minutes.

REMARK

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

FAILURE CODE [CA3725]

<table>
<tr><td>Action level</td><td>Failure code</td><td rowspan="2">Failure</td><td rowspan="2">Turbo Outlet NOx Sensor Unstable Error
(Engine controller system)</td></tr>
<tr><td>L01</td><td>CA3725</td></tr>
<tr><td>Details of failure</td><td colspan="3">Turbocharger outlet NOx sensor does not become measurable status.</td></tr>
<tr><td>Action of controller</td><td colspan="3">• Runs the engine, referring to the model NOx value.
• Activates Inducement strategy (EU Specification only).</td></tr>
<tr><td>Phenomenon on machine</td><td colspan="3">• NOx emission may increase or ammonia may be exhausted because DEF injection works inappropriately.
• Engine power decreases according to inducement strategy (EU specification).</td></tr>
<tr><td>Related information</td><td colspan="3">⚠ KDPF, sensor installation piping, and sensor probe become hot (Min. 500°C). Be careful not to get burned.
⚠ SCR assembly, sensor fitting piping, and sensor probe become hot (Min. 400°C). Be careful not to get burned.
⚠ Be careful not to get burned by the sensor probe as it is heated by itself even if the ambient temperature is not high.
• If failure code [CA3232] is displayed, "Defective CAN communication system" has occurred. Perform troubleshooting for it first.
• If the failure code [CA1879], [CA1881], or [CA1883] is displayed, the KDPF differential pressure sensor system is defective. Perform troubleshooting for it first.
• If the failure code [CA3133], [CA3134], or [CA3135] is displayed, the KDPF outlet pressure sensor system is defective. Perform troubleshooting for it first.
• If the failure code [CA1885], [CA3649], [CA3682], or [CA3718] is displayed, the turbocharger outlet NOx sensor system is defective. Perform troubleshooting for it first.
• The turbocharger outlet NOx sensor operates when 47300 KDOC 1 Inlet Temperature is 150°C or above (when the value of 19203 Turbo Outlet NOx Sensor State is 1).
• The turbocharger outlet NOx sensor does not operate when KDOC inlet temperature is 150 °C or below, and correct value is not displayed. (Just turning the starting switch to ON position does not operate the sensor, even if it is normal.)
• The engine controller refers to the fluctuation of KDPF differential pressure sensor and KDPF outlet pressure sensor to determine the error of this failure code only when the exhaust gas pressure is stable.
• If this failure code is cleared immediately after it is displayed, the detection of the turbocharger outlet NOx sensor may be unstable temporarily (such as when long-time load at low idle is repeatedly applied).
REMARK
The turbocharger outlet NOx sensor is not defective, and it has no problems as long as this failure code is not displayed repeatedly or displayed continuously.
• On the Pre-defined Monitoring screen, use the items of SCR catalyst related (1) and SCR sensor related (1) diagnoses. (The following numbers are the displayed monitoring codes.)
• SCR catalyst related (1)
01002 Engine Speed
18600 Inject Fueling Command
19200 Exhaust Gas Flow Rate
47300 KDOC 1 Inlet Temperature
19300 SCR Temperature
19302 SCR Outlet Temperature
• SCR sensor related (1)
19120 DEF Injection Quantity
19205 SCR NH3 Concentration Corrected
19202 Turbo Outlet NOx Corrected
19209 SCR Outlet NOx Corrected
19203 Turbo Outlet NOx Sensor State
19210 SCR Outlet NOx Sensor State
NOTICE
This failure code requires Loaded Diagnostics Operation To Confirm Failure Correction. After investigating the cause of the problem and completing the repair, perform Loaded Diagnostics Operation To Confirm Failure Correction to make sure the failure code is cleared. (Even if this failure code is not displayed with the starting switch turned to ON position, high exhaust temperature is required to confirm that the repair is completed.)</td></tr>
</table>

Loaded Diagnostics Operation To Confirm Failure Correction

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

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

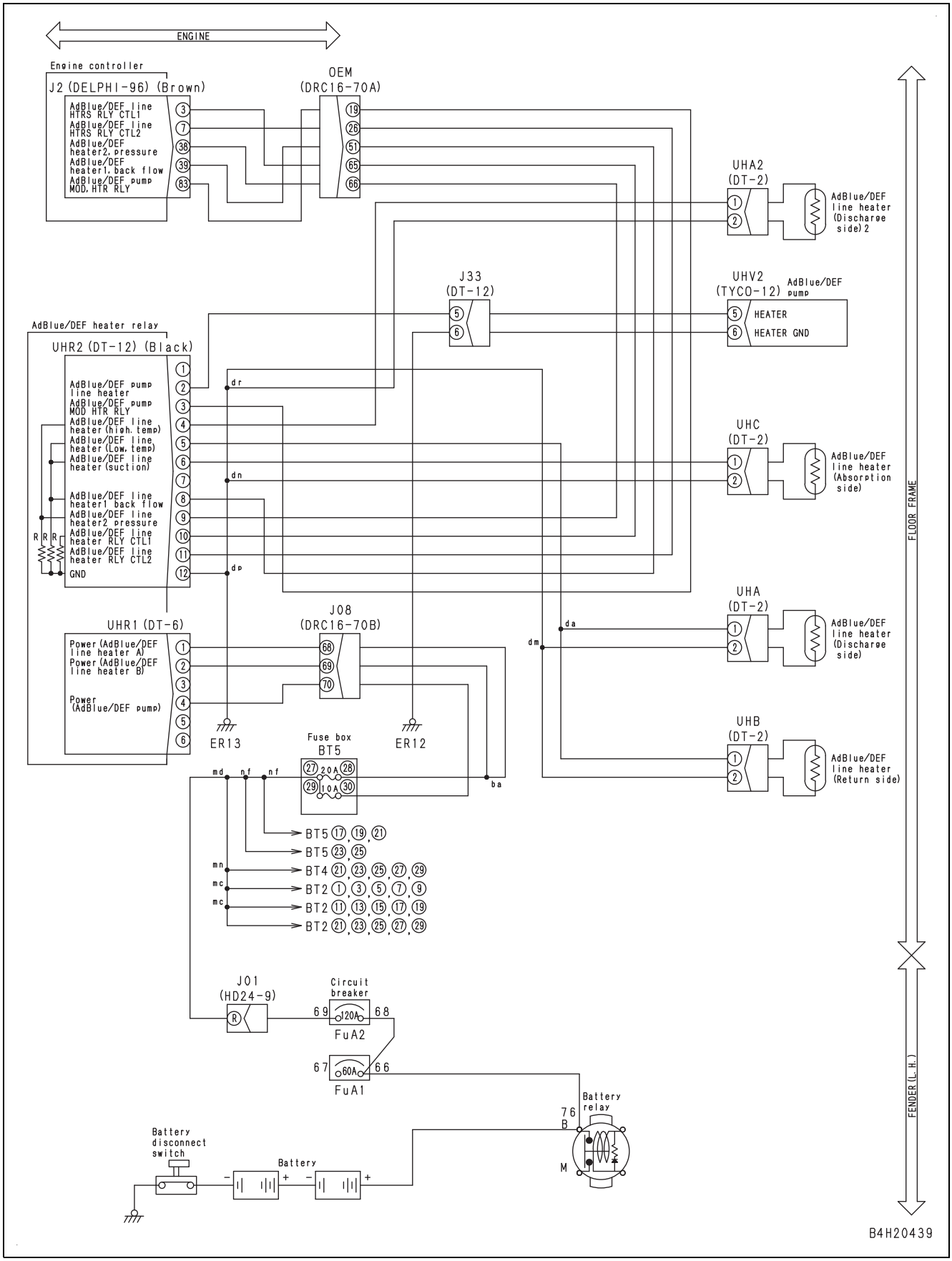
Clear this failure code by Engine Con Inducement Fault Clear before step 1. (EU Specification)

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

REMARK

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

Circuit diagram related to DEF pump heater



FAILURE CODE [CA4739]

Action level	Failure code	Failure	DEF Level Sensor Internal Circuit Error (Engine controller system)
L01	CA4739		
Details of failure	DEF level sensor is defective (abnormality in the circuit for the level measurement).		
Action of controller	Activates Inducement strategy (EU Specification only).		
Phenomenon on machine	• DEF level cannot be measured. • Engine power decreases according to inducement strategy (EU specification only).		
Related information	• The DEF level sensor is one of the DEF tank sensors integrated with the DEF temperature sensor and DEF quality sensor performs CAN communication with the engine controller. • If the engine controller receives information that the level measurement circuit is abnormal, this failure code is displayed. • After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective wiring harness connector	This failure code is displayed if the connectors of electrical parts around the engine are defective, disconnected, or loosened due to heat and vibration. See descriptions of wiring harnesses and connectors in the table "Electric equipment" in "CHECKS BEFORE TROUBLESHOOTING" under "RELATED INFORMATION ON TROUBLESHOOTING", and check the connectors.
2	Defective DEF tank sensor	1. Check the sensor connector for any stain or damage 2. Turn the starting switch to OFF position. 3. Replace the DEF tank sensor. 4. Turn the starting switch to ON position.
		If this failure code is not displayed, the original DEF tank sensor is defective. (Since this is an internal defect, troubleshooting cannot be performed.)
3	Defective engine controller	If no failure is found by the above checks, the engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

FAILURE CODE [D19QKZ]

Action level	Failure code	Failure	Stop Lamp (Center) Output System Abnormality (Retarder and hoist controller system)
L01	D19QKZ		
Details of failure	• When the controller drives primary circuit (coil) of the brake lamp operation relay, no current flows or excessive current flows through the circuit. • When the controller does not drive primary circuit (coil) of the brake lamp operation relay, the current flows through the circuit.		
Action of controller	Stops driving the stop lamp output circuit if the cause of failure is a ground fault.		
Phenomenon on machine	Stop lamp does not light up or stays lit.		
Related information	After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position and depress the brake pedal.		

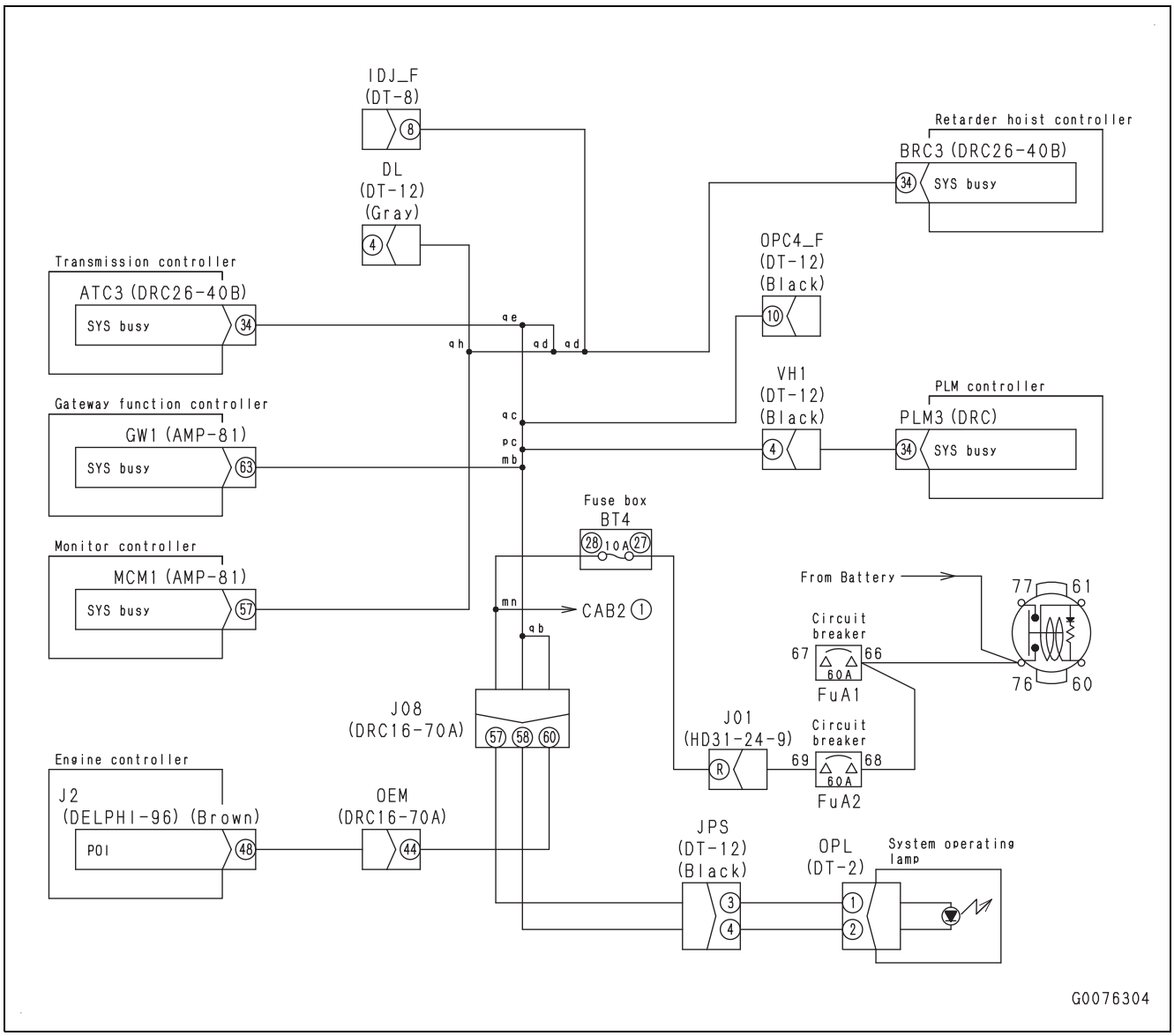
No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective brake lamp operation relay	1. Turn the starting switch to OFF position. 2. Disconnect connector R05, and connect T-adapter to male side.			
		Resistance	Between the connectors R05 (male) (1) and (2)		290±30 Ω
2	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors BRC3 and R05, and connect T-adapter to each female side.			
		Resistance	Between BRC3 (female) (15) and R05 (female) (1)		Max. 1 Ω
			Between BRC3 (female) (13) and R05 (female) (2)		Max. 1 Ω
3	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors BRC3 and R05, and connect T-adapter to either female side.			
		Resistance	Between ground and BRC3 (female) (15) or R05 (female) (1)		Min. 1 MΩ
4	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors BRC3 and R05, and connect T-adapter to either female side.			
		Resistance	Between BRC3 (female) (15) and (13), or between R05 (female) (1) and (2)		Min. 1 MΩ
5	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector R05, and connect T-adapter to female side. 3. Turn the starting switch to ON position. **REMARK** Do not depress the brake pedal and secondary brake pedal.			
		Voltage	Between R05 (female) (1) and (2), or between grounds		Max. 4.5 V
6	Defective retarder and hoist controller	1. Turn the starting switch to OFF position. 2. Insert T-adapter into connector BRC3. 3. Turn the starting switch to ON position.			
		Voltage	Between BRC3 (15) and (13)	Foot brake: OFF	Max. 4.5 V
			Between BRC3 (15) and (13)	Foot brake: ON	20 to 30 V
		If no failure is found by the above checks, the retarder and hoist controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)			

FAILURE CODE [DAF0MB]

Action level	Failure code	Failure	Monitor ROM Abnormality (Machine monitor system)
-	DAF0MB		
Details of failure	Machine monitor program is rewritten (program error).		
Action of controller	• None in particular • Even if the cause of failure is eliminated, the machine does not return to normal until the starting switch is turned to OFF position.		
Phenomenon on machine	• Machine monitor display is unreliable. • Data cannot be transmitted to or received from each controller normally.		
Related information	After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective monitor controller	Monitor controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Circuit diagram related to system operating lamp



FAILURE CODE [DB1LKB] (For machines equipped with gateway function controller)

Action level	Failure code	Failure	System Operating Lamp Short Circuit (RHC) (Retarder and hoist controller system)
-	DB1LKB		
Details of failure	Retarder and hoist controller detects short circuit, because voltage of output circuit does not become low level even if the retarder and hoist controller outputs current to system operating lamp.		
Action of controller	• Stops driving the system operating lamp. • Even if the cause of failure is eliminated, the machine does not return to normal until the starting switch is turned to OFF position.		
Phenomenon on machine	System operating lamp may not light up.		
Related information	• Do not turn the battery disconnect switch to OFF position while the system operating lamp is lit. If the battery disconnect switch is set to OFF position, the data stored in the retarder and hoist controller memory may be destroyed. • Although the retarder and hoist controller cannot light up the system operating lamp, no trouble will result unless the battery disconnect switch is turned to OFF position. • Since the voltage between pin (2) of female side and ground becomes 20 V or above after turning starting switch to ON position when connector OPL is open, the check of hot short circuit cannot be performed. • After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. While this failure code is displayed, whether the system operating lamp is turned off cannot be checked. Turn the battery disconnect switch to OFF position 8 minutes or later after turning the starting switch to OFF position. 3. Remove the fuse No.14 in fuse box BT4. 4. Disconnect connectors MCM1, ATC3, GW1, J2, BRC3, PLM3, and OPL, and connect T-adapter to female side of OPL.		
		Resistance	Between OPL (female) (1) and (2)	Min. 1 MΩ
		1. Turn the starting switch to OFF position. 2. While this failure code is displayed, whether the system operating lamp is turned off cannot be checked. Turn the battery disconnect switch to OFF position 8 minutes or later after turning the starting switch to OFF position. 3. Disconnect connector OPL. 4. Disconnect connectors MCM1, ATC3, GW1, J2, PLM3, and BRC3, and connect T-adapter to each female side.		
		Continuity	Between ATC3 (female) (34) and each pin other than pin (34)	No continuity
			Between BRC3 (female) (34) and each pin other than pin (34)	No continuity
			Between GW1 (female) (63) and each pin other than pin (63)	No continuity
			Between MCM1 (female) (57) and each pin other than pin (57)	No continuity
			Between J2 (female) (48) and each pin other than pin (48)	No continuity
			Between PLM3 (34) and each pin other than pin (34)	No continuity
2	Defective retarder and hoist controller	If no failure is found by the above checks, the retarder and hoist controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

FAILURE CODE [DB2RKR] (For machines equipped with Drowsiness Detection system)

Action level	Failure code	Failure	CAN 1 Defective Communication (Engine Controller) (Detected by monitor controller) (Machine monitor system)
L03	DB2RKR		
Details of failure	Monitor controller does not recognize the engine controller on CAN1 communication line (KOMNET/r).		
Action of controller	• Hides pointer of the engine coolant temperature gauge on the screen. • Sets pointer of the engine speed meter to zero point.		
Phenomenon on machine	• Information to be obtained from the engine controller and special functions are not displayed, and they do not work, or received data is not updated. • Engine control is disabled. • Engine coolant temperature is undetectable. • Engine speed is displayed at 0 rpm.		
Related information	• ACC signal from the starting switch informs each controller of the start of CAN communication. • The failure codes of the defective CAN communication by CAN 1, detected by the monitor controller are [DAQRKR], [DB1RKR], [DB2RKR], [DBSRKR], and [DCRRKR]. • CAN1 terminating resistors are located in the monitor controller on operator's cab side. • Since each controller is connected directly to battery, it is supplied with power even after starting switch is turned to OFF position. • After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective engine controller system	Perform checks on causes 1 to 3 for failure code [DB2QKR].		
2	Defective CAN terminating resistor	1. Turn the starting switch to OFF position. 2. Disconnect connectors MCM2 and KOM/r_RES, and connect T-adapter to each male side.		
		Resistance	Between KOM/r_RES (male) (A) and (B)	120±12 Ω
			Between MCM2 (male) (105) and (112)	120±12 Ω

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="4">12</td><td rowspan="4">CAN terminating resistor</td><td colspan="4">1. Turn the starting switch to the OFF position.
2. Make sure that the system operating lamp is off, and then turn the battery disconnect switch to the OFF position.
3. Disconnect the connectors DPC3 and CANC. Connect a T-adapter to the male side to do the troubleshooting.
4. Does the measurement result agree with the standard value?</td><td>YES</td><td>• The CAN terminating resistor is correct.
• 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="3">NO</td><td rowspan="3">• The CAN terminating resistor is defective.
• Replace the CAN terminating resistor.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">Resistance</td><td colspan="2">Between DPC3 (male) (7) and (8)</td><td>120±12Ω</td></tr>
<tr><td colspan="2">Between CANC (male) (B) and (A)</td><td>120±12Ω</td></tr>
<tr><td rowspan="10">13</td><td rowspan="10">Open circuit in wiring harness (CAN2 communication circuit)</td><td colspan="4">1. Turn the starting switch to the OFF position.
2. Make sure that the system operating lamp is off, and then turn the battery disconnect switch to the OFF position.
3. Disconnect the connectors MCM2, DPC3, CANC, and TLC2. Connect a T-adapter to each female side to do the troubleshooting.
4. Does the measurement result agree with the standard value?</td><td>YES</td><td>• The wiring harness does not have an open circuit.
• 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="9">NO</td><td rowspan="9">• The wiring harness has an open circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="8">Resistance</td><td colspan="2">Between TLC2 (female) (32) and DPC3 (female) (3)</td><td>Max. 1Ω</td></tr>
<tr><td colspan="2">Between TLC2 (female) (32) and DPC3 (female) (7)</td><td>Max. 1Ω</td></tr>
<tr><td colspan="2">Between TLC2 (female) (22) and DPC3 (female) (8)</td><td>Max. 1Ω</td></tr>
<tr><td colspan="2">Between TLC2 (female) (32) and CANC (female) (B)</td><td>Max. 1Ω</td></tr>
<tr><td colspan="2">Between TLC2 (female) (22) and CANC (female) (A)</td><td>Max. 1Ω</td></tr>
<tr><td colspan="2">Between TLC2 (female) (32) and MCM2 (female) (97)</td><td>Max. 1Ω</td></tr>
<tr><td colspan="2">Between TLC2 (female) (22) and MCM2 (female) (89)</td><td>Max. 1Ω</td></tr>
</table>

FAILURE CODE [DDTPKA]

Action level	Failure code	Failure	Fill Switch Open Circuit (4th Clutch) (Transmission controller system)
L01	DDTPKA		
Details of failure	When 4th clutch ECMV is energized, the clutch engages but the signal from the fill switch is not turned to ON.		
Action of controller	Stops driving the main pressure variable solenoid.		
Phenomenon on machine	Main pressure variable solenoid does not function and fuel consumption may decrease.		
Related information	● Fill switch input signal can be checked by the monitoring function. (Code: 02229) ● After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Start the engine and drive the machine in F6.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective 4th clutch ECMV fill switch	1. Start the engine. 2. Shift the gear shift lever to D and gear speed to F2 (Lo: 2nd) while the brake pedal is depressed, and check that failure code [DDTJKA] is not displayed. 3. Turn the starting switch to OFF position. 4. Replace the connectors 4th clutch with L clutch. ● 4,SP ←→ L,PS ● 4,SW ←→ L,SW 5. Start the engine. 6. Shift the gear shift lever to D and gear speed to F2 (Lo: 2nd) while the brake pedal is depressed.		
		● If the failure code [DDTJKA] appears, check the clutch oil pressure. If the oil pressure is normal, 4th clutch fill switch is defective. ● If failure code [DDTJKA] is not displayed, the wiring harness has an open circuit or the transmission controller is defective. Restore the connector after finishing the test.		
2	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors ATC2 and 4,SW, and connect T-adapter to each female side.		
		Resistance	Between ATC2 (female) (38) and 4,SW (female) (1)	Max. 1 Ω
3	Defective transmission controller	If no failure is found by the above checks, the transmission controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

FAILURE CODE [DHP6KX]

Action level	Failure code	Failure	Suspension Pressure Sensor Signal Out of Range (rear right) (When ARSC is set, and ARSC system is set in ON.) (Retarder and hoist controller system)
L03	DHP6KX		
Details of failure	Voltage of signal circuit of the suspension pressure sensor (rear right) becomes 0.5 V and below or 4.7 V and above.		
Action of controller	• Releases the brake gradually when ARSC is operating. • Fixes the judgment value whether the machine is empty or loaded to LOAD. • Cancels automatic suspension control.		
Phenomenon on machine	• ARSC does not work. • The judgment value whether the machine is empty or loaded is LOAD. • The automatic suspension is in medium mode.		
Related information	Suspension pressure sensor (rear right) can be checked by the monitoring function. (Code: 32816 (MPa), 32817 (V))		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective sensor power supply system	If failure code [DBV6KB] is displayed, perform troubleshooting for it first.		
		1. Turn the starting switch to OFF position. 2. Disconnect connector SURR, and connect T-adapter to female side. 3. Turn the starting switch to ON position.		
		Voltage	Between SURR (female) (B) and (A)	20 to 30 V
2	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors BRC1, SURR, PLM1, and PLM3, and connect T-adapter to each female side.		
		Resistance	Between BRC1 (female) (12) and SURR (female) (C)	Max. 1 Ω
			If power supply voltage is normal, the following check is not required. Between PLM1 (female) (1) and SURR (female) (A)	Max. 1 Ω
			If power supply voltage is normal, the following check is not required. Between PLM3 (female) (49) and SURR (female) (B)	Max. 1 Ω
3	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors BRC1, SURR, PLM1, and PLM3. 3. Connect T-adapter to female side of BRC1 or SURR.		
		Resistance	Between ground and BRC1 (female) (12) or SURRL (female) (C)	Min. 1 MΩ
4	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector SURR, and connect T-adapter to female side. 3. Turn the starting switch to ON position.		
		Voltage	Between SURR (female) (C) and (A)	Max. 1 V
5	Defective suspension pressure sensor (RR)	1. Turn the starting switch to OFF position. 2. Insert T-adapter into connector SURR. 3. Turn the starting switch to ON position.		
		Voltage	Between SURR (C) and (A)	0.5 to 4.7 V
6	Defective KOMTRAX Plus controller	1. Turn the starting switch to OFF position. 2. Insert T-adapter into connector PLM1. 3. Turn the starting switch to ON position.		
		Voltage	Between PLM1 (1) and (23)	20 to 30 V

FAILURE CODE [DHULKX]

Action level	Failure code	Failure	KTCS Pressure Sensor Signal Out of Range (Rear Right) (Retarder and hoist controller system)
L01	DHULKX		
Details of failure	Voltage of signal circuit of the KTCS oil pressure sensor (rear right) becomes 0.3 V and below or 4.7 V and above.		
Action of controller	None in particular		
Phenomenon on machine	None in particular		
Related information	• Signal from pressure sensor can be checked by the monitoring function. (Code: 49006 (MPa), 49007 (V)) • After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective sensor power supply system	1. Turn the starting switch to OFF position. 2. Disconnect connector TCS5, and connect T-adapter to female side. 3. Turn the starting switch to ON position.			
		Voltage	Between TCS5 (female) (3) and (1)		4.6 to 5.4 V
2	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors BRC1, BRC2, and TCS5, and connect T-adapter to each female side.			
		Resistance	Between BRC1 (female) (13) and TCS5 (female) (2)		Max. 1 Ω
			If power supply voltage is normal, the following check is not required. Between BRC1 (female) (4) and TCS5 (female) (1)		Max. 1 Ω
			If power supply voltage is normal, the following check is not required. Between BRC2 (female) (1) and TCS5 (female) (3)		Max. 1 Ω
3	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors BRC1, BRC2, TCS5, HSL, EG, RLB, and TCS6, and connect T-adapter to female side of TCS5.			
		Resistance	Between TCS5 (female) (2) and ground		Min. 1 MΩ
			Between TCS5 (female) (3) and ground		Min. 1 MΩ
4	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector TCS5, and connect T-adapter to female side. 3. Turn the starting switch to ON position.			
		Voltage	Between TCS5 (female) (2) and (1)		Max. 1 V
5	Defective KTCS oil pressure Sensor (rear right)	1. Turn the starting switch to OFF position. 2. Insert T-adapter into connector TCS5. 3. Start the engine. **REMARK** For details of KTCS valve fixing mode, see "METHOD FOR ADJUSTING WITH ADJUSTMENT MENU (KTCS VALVE FIXING)".			
		Voltage	Between TCS5 (1) and (2)	KTCS: OFF	0.30 to 0.56 V
				KTCS: ON (When set to ON with KTCS Valve Fixing mode)	0.94 to 1.02 V

FAILURE CODE [DLF8KA]

Action level	Failure code	Failure	Wheel Speed Sensor Open Circuit (Rear Right) (Retarder and hoist controller system)
L01	DLF8KA		
Details of failure	No signal is input from the wheel speed sensor (rear right).		
Action of controller	• Cancels KTCS control. • Even if the cause of failure is eliminated, the machine does not return to normal until the starting switch is turned to OFF position.		
Phenomenon on machine	KTCS does not work.		
Related information	After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Start the engine and drive the machine.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors BRC1, BRC2, and WSRR, and connect T-adapter to each female side.		
		Resistance	Between BRC2 (female) (20) and WSRR (female) (1)	Max. 1 Ω
			Between BRC1 (female) (10) and WSRR (female) (2)	Max. 1 Ω
2	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors BRC2 and WSRR, and connect T-adapter to either female side.		
		Resistance	Between ground and BRC2 (female) (20) or WSRR (female) (1)	Min. 1 MΩ
3	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors BRC1, BRC2, and WSRR, and connect T-adapter to any female side.		
		Resistance	Between BRC2 (female) (20) and BRC1 (female) (10) or between WSRR (female) (2) and (1)	Min. 1 MΩ
4	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector WSRR, and connect T-adapter to female side. 3. Turn the starting switch to ON position.		
		Voltage	Between WSRR (female) (2) and (1)	1.0 to 4.5 V
5	Defective wheel speed sensor (rear right)	• Check the speed measured by the wheel speed sensor (rear right) when the unloaded machine is traveling on a dry road with monitoring function. (Code: 39704) • Start the engine and drive the machine.		
		Speed detected by wheel speed sensor (rear right)	When stopped	0 rpm
			When traveling at 10 km/h	13 to 43 rpm
6	Defective retarder and hoist controller	If no failure is found by the above checks, the retarder and hoist controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

FAILURE CODE [DSJ0KR]

Action level	Failure code	Failure	CAN 2 Defective Communication (Meter Unit) (Detected by monitor controller) (Machine monitor system)
L03	DSJ0KR		
Details of failure	Monitor controller does not recognize meter unit of machine monitor over CAN 2 communication line (KOMNET/c).		
Action of controller	None in particular		
Phenomenon on machine	• Engine tachometer indicates 0. • Speedometer displays 00.		
Related information	• ACC signal from the starting switch informs each controller of the start of CAN communication. • Failure codes, [D8AQK*], [DAQQKR], [DAZQKR], [DB1QKR], [DB2QKR], [DBSQKR], and [DSJ0KR] are used for defective CAN communication by CAN2 detected by the monitor controller. When these failure codes are displayed, ground fault, short circuit or hot short circuit in wiring harness (CAN communication line) can be suspected. In such case, since the air conditioner is also operated through CAN communication, check whether the air conditioner is operable (ON/OFF and the air flow adjustment) on the air conditioner screen. **REMARK** Machine with Drowsiness Detection system also displays failure code [DCRQKR]. • If air conditioner is operable, wiring harness (CAN communication line) does not have ground fault, short circuit, or hot short circuit. • Since each controller and the machine monitor (meter unit) are connected directly to the battery, they are supplied with power even after the starting switch is turned to OFF position. • After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

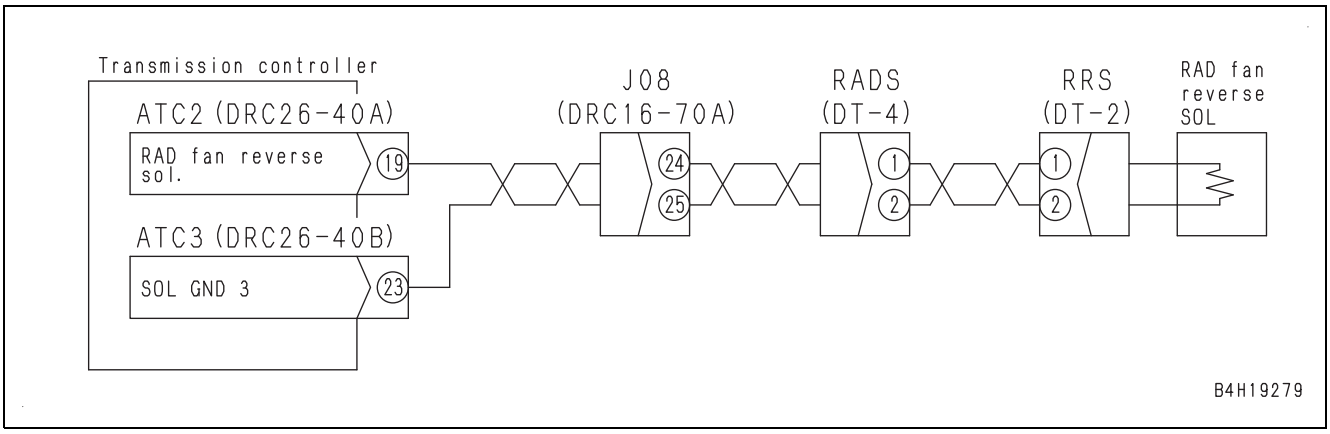
No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective power supply to meter unit of machine monitor	Perform troubleshooting "METER UNIT DISPLAY ON MACHINE MONITOR IS ABNORMAL" in E mode.
2	Defective CAN2 communication line	Perform checks on causes 4 to 9 for failure code [DB2QKR].
3	Defective meter unit of machine monitor	If no failure is found by the above checks, the meter unit of machine monitor is defective. (Since this is an internal defect, troubleshooting cannot be performed.)
4	Defective monitor controller	If no failure is found by the above checks, the monitor controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

FAILURE CODE [DW7BKZ]

Action level	Failure code	Failure	Radiator Fan Reverse Solenoid Open Circuit or Hot Short Circuit (Transmission controller system)
L01	DW7BKZ		
Details of failure	When the controller does not drive the radiator fan reverse solenoid circuit, voltage is 2.5 V and above or below 7.0 V.		
Action of controller	None in particular		
Phenomenon on machine	Radiator fan does not rotate in reverse direction.		
Related information	• Check the output state to radiator fan reverse solenoid with monitoring function. (Code: 03705) • After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective radiator fan reverse solenoid	1. Turn the starting switch to OFF position. 2. Disconnect connector RRS, and connect T-adapter to male side.		
		Resistance	Between RRS (male) (1) and (2)	35 to 45 Ω
			Between ground and RRS (male) (1) or (2)	Min. 1 MΩ
2	Open or short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors ATC2 and ATC3, and connect T-adapter to each female side.		
		Resistance	Between ATC2 (female) (19) and ATC3 (female) (23) Solenoid coil resistance	35 to 45 Ω
3	Open circuit in wiring harness	If no failure is found by check on cause 2, the following check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect connectors ATC2, ATC3, and RRS, and connect T-adapter to each female side.		
		Resistance	Between ATC2 (female) (19) and RRS (female) (1)	Max. 1 Ω
			Between ATC3 (female) (23) and RRS (female) (2)	Max. 1 Ω
4	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector RRS, and connect T-adapter to female side. 3. Turn the starting switch to ON position.		
		Voltage	Between RRS (female) (1) and (2)	Max. 4.5 V
5	Defective transmission controller	If no failure is found by the above checks, the transmission controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to radiator fan reverse rotation solenoid

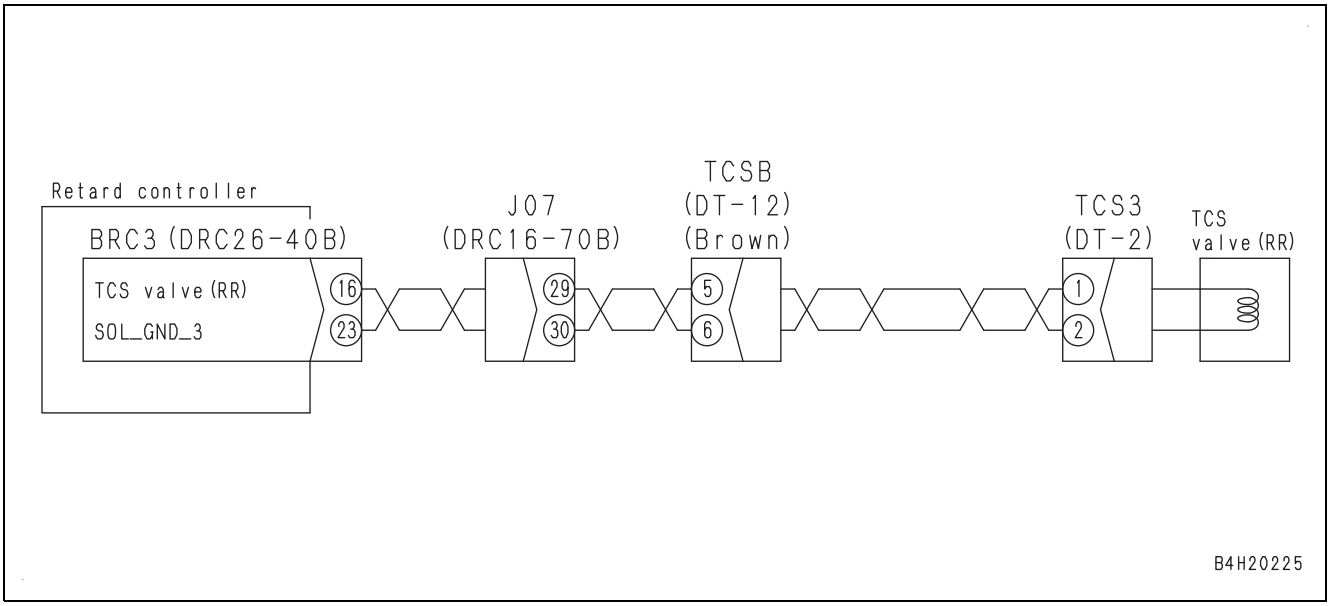


FAILURE CODE [DX37KY]

Action level	Failure code	Failure	KTCS EPC Solenoid Output Hot Short Circuit (Rear Right) (Retarder and hoist controller system)
L01	DX37KY		
Details of failure	When the controller does not drive the KTCS EPC valve (rear right) circuit, current flows through the circuit.		
Action of controller	Cancels KTCS control.		
Phenomenon on machine	KTCS does not work.		
Related information	After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Start the engine.		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector TSC3, and connect T-adapter to female side. 3. Turn the starting switch to ON position.			
		Voltage	Between TSC3 (female) (1) and (2)		Max. 4.5 V
2	Defective retarder and hoist controller	1. Turn the starting switch to OFF position. 2. Insert T-adapter into connector BRC3. 3. Turn the starting switch to ON position. **REMARK** For details of KTCS valve fixing mode, see "METHOD FOR ADJUSTING WITH ADJUSTMENT MENU (KTCS VALVE FIXING)".			
		Voltage	Between BRC3 (16) and (23)	KTCS: OFF	Max. 4.5 V
				KTCS: ON (When set to ON with KTCS Valve Fixing mode)	20 to 30 V
		If no failure is found by the above checks, the retarder and hoist controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)			

Circuit diagram related to KTCS EPC valve (rear right)



FAILURE CODE [DXH4KB]

Action level	Failure code	Failure	ECMV Solenoid Ground Fault (1st) (Transmission controller system)
L03	DXH4KB		
Details of failure	When the controller drives 1st clutch ECMV, excessive current flows through the circuit.		
Action of controller	• Shifts up the gear according to gear speed when failure is detected as shown in Table 1 and holds that gear speed. • Disengages lockup clutch. • Even if the cause of failure is eliminated, the machine does not return to normal until the starting switch is turned to OFF position.		
Phenomenon on machine	• Machine travels in gear speed that does not use 1st clutch. • If the gear shift lever is set to N during traveling, even if the gear shift lever is moved to a position other than N, gear shifting cannot be performed until the machine is stopped. • After the machine stops, it can move forward when the gear speed is set to F2 by setting the gear shift lever to a position between D and L, and the machine can move backward when the gear speed is set to R by setting the gear shift lever to R position.		
Related information	⚠ **Before performing the following procedure, raise the body to the maximum height, be sure to set the hoist lever to HOLD position, set the lock knob to LOCK position, and also insert the body pivot pin.** • Output current to 1st clutch ECMV can be checked by the monitoring function. (Code: 31602 (mA)) • After the repair is completed, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position and wait for 5 seconds (after 5 seconds after starting switch is turned to ON position, the controller drives solenoid and performs self check).		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective 1st clutch ECMV	1. Turn the starting switch to OFF position. 2. Disconnect connector 1,PS, and connect T-adapter to male side.		
		Resistance	Between 1,PS (male) (1) and (2)	5 to 15 Ω
			Between ground and 1,PS (male) (1) or (2)	Min. 1 MΩ
2	Open or short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector ATC3, and connect T-adapter to female side.		
		Resistance	Between ATC3 (female) (16) and (3)	5 to 15 Ω
3	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connector ATC3, and connect T-adapter to female side. 3. Disconnect connector 1,PS, and connect T-adapter to female side.		
		Resistance	Between ground and ATC3 (female) (16) or 1,PS (female) (1)	Min. 1 MΩ
4	Short circuit in wiring harness	If no failure is found by check on cause 2, the following check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect connector ATC3, and connect T-adapter to female side. 3. Disconnect connector 1,PS, and connect T-adapter to female side.		
		Resistance	Between ATC3 (female) (16) and (3), or between 1,PS (female) (1) and (2)	Min. 1 MΩ
5	Defective transmission controller	If no failure is found by the above checks, the transmission controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

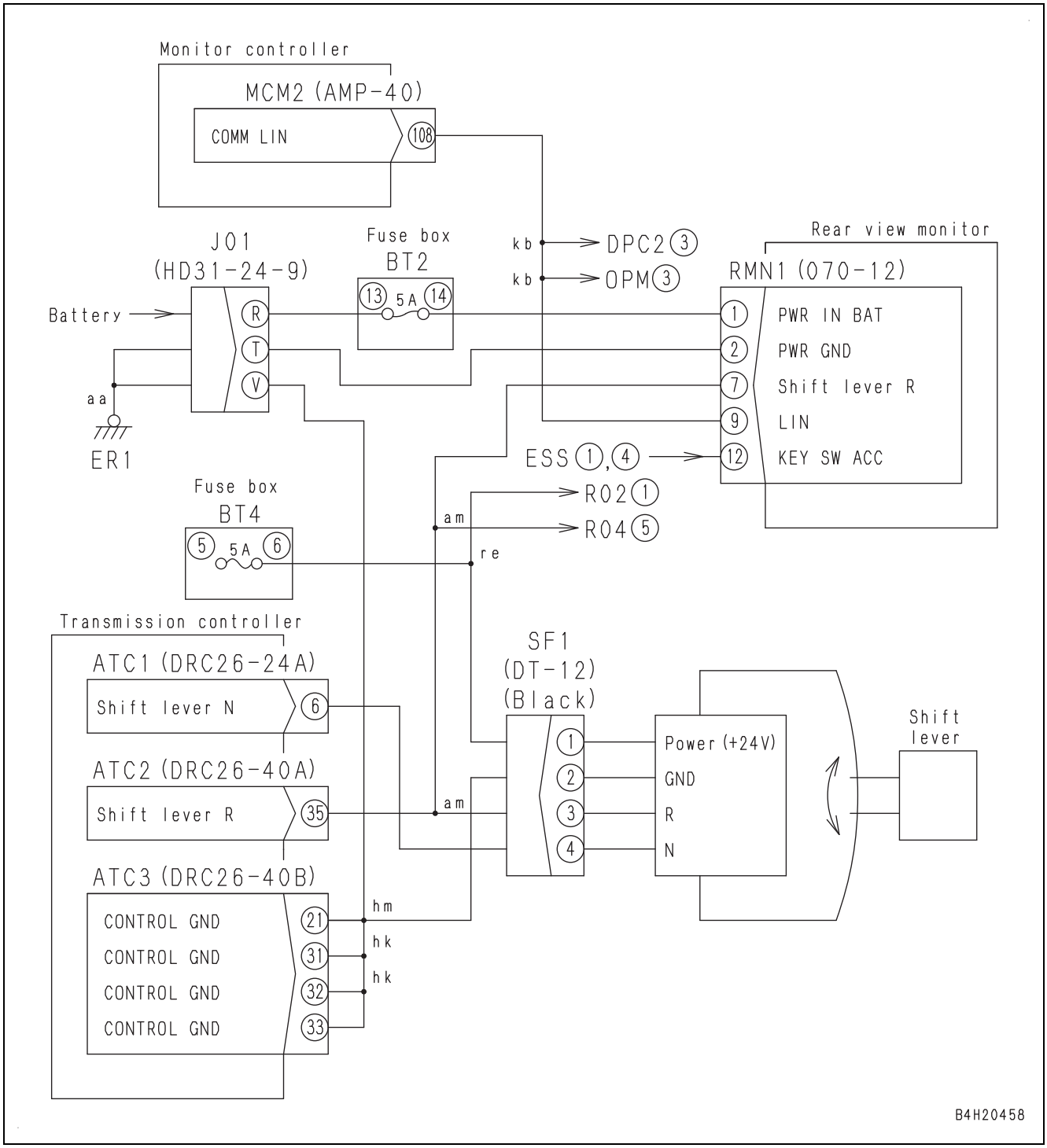
<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Ground fault in wiring harness</td><td colspan="4">1. Turn the starting switch to OFF position.
2. Disconnect connectors R17, EST, and D12, and connect T-adapter to female side of R17.</td></tr>
<tr><td>Resistance</td><td colspan="2">Between R17 (female) (3) or secondary steering relay terminal 56 (+) and ground</td><td>Min. 1 MΩ</td></tr>
<tr><td rowspan="3">6</td><td rowspan="3">Defective secondary steering oil pressure sensor</td><td colspan="4">1. Check that machine is in straight travel posture.
2. Turn the starting switch to OFF position.
3. Insert T-adapter into connector H02.
4. Turn the starting switch to ON position.</td></tr>
<tr><td rowspan="2">Voltage</td><td rowspan="2">Between H02 (C) and (A)</td><td>Secondary steering: OFF</td><td>0.30 to 0.56 V</td></tr>
<tr><td>Secondary steering: ON</td><td>2.0 to 2.3 V</td></tr>
<tr><td rowspan="3">7</td><td rowspan="3">Defective secondary steering motor</td><td colspan="4">Be ready with starting switch at OFF, then perform troubleshooting with starting switch set to ON position.</td></tr>
<tr><td rowspan="2">Voltage</td><td rowspan="2">Between secondary steering motor terminal M and terminal E</td><td>Secondary steering switch: OFF</td><td>Max. 1 V</td></tr>
<tr><td>Secondary steering switch: ON</td><td>20 to 30 V</td></tr>
<tr><td>8</td><td>Defective retarder and hoist controller</td><td colspan="4">If no failure is found by the above checks, the retarder and hoist controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</td></tr>
</table>

E-10 METER UNIT DISPLAY ON MACHINE MONITOR IS ABNORMAL

Failure	Meter unit display on machine monitor is abnormal.
Related information	

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. Turn the starting switch to OFF position. 2. Check that system operating lamp is not lit, and then turn the battery disconnect switch to OFF position. 3. Visually check connector connected to the wiring harness between meter unit of machine monitor and monitor controller, and repeat connection and disconnection of connector. 4. Turn the battery disconnect switch to ON position. 5. Turn the starting switch to ON position.		
		If normal state is restored, the cause of failure is defective contact of connector.		
2	Defective CAN communication system	Display Abnormality Record in the service mode of machine monitor. If the failure code [DSJ0KR] is logged, perform troubleshooting for failure code [DSJ0KR].		
3	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Check that system operating lamp is not lit, and then turn the battery disconnect switch to OFF position. 3. Disconnect connector DPC3, 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 DPC3 (female) (1) and (4)	20 to 30 V
			Between DPC3 (female) (2) and (4)	20 to 30 V
			Between DPC3 (female) (3) and (4) CAN communication line	1 to 4 V
			Between DPC3 (female) (8) and (4) CAN communication line	1 to 4 V
4	Defective liquid crystal unit of machine monitor	If no failure is found by the above checks, check if display of LED unit and meter unit is normal. 1. Turn the starting switch to ON position.		
		If display of LED unit and meter unit is normal, LCD unit is defective.		
5	Defective monitor controller	If no failure is found by the above checks, the monitor controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to rearview monitor reverse-interlock



E-37 (LOW BEAM) HEAD LAMP DOES NOT LIGHT UP

Failure	"Low beam" headlamp does not light up.
Related information	• When the high beam headlamp lights up normally, check ground terminal ER1 for looseness and corrosion. • If the clearance lamp and tail lamp do not light up, perform troubleshooting for E-35 or E-36 first.

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective fuse	1. Turn the starting switch to OFF position. 2. Remove fuse No.3 in fuse box BT1, and visually check if it is blown out. 3. If the fuse is not blown out, perform a continuity test to check if it is broken.		
		• If the fuse is blown out, perform troubleshooting for "Ground fault in wiring harness". • If the fuse is not blown out but has no continuity, replace the fuse.		
2	Defective lamp (bulb)	If lamp (bulb) seems to be defective, visually check it or replace bulb for judgment.		
3	Defective headlamp relay (Lo)	1. Turn the starting switch to OFF position. 2. Replace headlamp relay R08 (Lo) with horn relay R09. 3. Turn the starting switch to ON position. 4. Sound horn.		
		If the horn does not sound, headlamp relay R08 (Lo) is defective.		
4	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Remove fuse No.3 in fuse box BT-1. 3. Disconnect connectors PR02, PL02, CM, and R08, and connect T-adapter to each female side.		
		Resistance	Between PR02 (female) (1) and R08 (female) (3)	Max. 1 Ω
			Between PR02 (female) (2) and ground	Max. 1 Ω
			Between PL02 (female) (1) and R08 (female) (3)	Max. 1 Ω
			Between PL02 (female) (2) and ground	Max. 1 Ω
			Between fuse BT1-6 and R08 (female) (5)	Max. 1 Ω
			Between CM (female) (3) and R08 (female) (1)	Max. 1 Ω
			Between R08 (female) (2) and ground	Max. 1 Ω
5	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Remove fuse No.3 in fuse box BT1. 3. Disconnect connectors CM, MCM1, R08, PR02, and PL02, and connect T-adapter to female sides of connectors R08, PR02, and PL02.		
		Resistance	Between ground and PR02 (female) (1), PL02 (female) (1), or R08 (female) (3)	Min. 1 MΩ
			Between ground and BT1-6 or R08 (female) (5)	Min. 1 MΩ

H-8 MACHINE LACKS TRAVEL SPEED OR POWER WHEN TRAVELING AT SOME GEAR SPEED

Failure	Machine lacks travel speed or power when traveling at some gear speed.
Related information	If any failure code is displayed, perform troubleshooting for that failure code first. ([15B0NX], [15SJMA], [DXH1KA], [DXH1KB], or [DXH1KY])

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective gear speed clutch ECMV	Perform the troubleshooting referring to TEST AND ADJUST, "METHOD FOR TESTING POWER TRAIN OIL PRESSURE" under "TEST POWER TRAIN OIL PRESSURE".			
		Operation pressure of transmission L clutch	Gear shift lever	2 position	1.62±0.20 MPa {16.5±2.0 kg/cm^2}
		Operation pressure of transmission H clutch	Gear shift lever	3 position	1.62±0.20 MPa {16.5±2.0 kg/cm^2}
		Transmission 1st clutch operation pressure	Gear shift lever	L position	2.94±0.20 MPa {30±2 kg/cm^2}
		Transmission 2nd clutch operation pressure	Gear shift lever	2 position	2.94±0.20 MPa {30±2 kg/cm^2}
		Transmission 3rd clutch operation pressure	Gear shift lever	4 position	1.62±0.20 MPa {16.5±2.0 kg/cm^2}
		Transmission 4th clutch operation pressure	Gear shift lever	6 position	1.62±0.20 MPa {16.5±2.0 kg/cm^2}
		Transmission R clutch operation pressure	Gear shift lever	R position	2.94±0.20 MPa {30±2 kg/cm^2}
		• You may replace ECMV with another ECMV for judgment. • Combination of 2 gear speed clutches determines gear speed. Check combination of 2 clutches by referring to table 1.			
2	Defective gear speed clutch	• If measured oil pressure is low by check on cause 1, seal ring of the gear speed clutch piston or ring groove may be worn. • If oil pressure is found normal by check on cause 1, the clutch may be slipping.			

S-10 ENGINE OIL CONSUMPTION IS EXCESSIVE

Failure	Engine oil consumption is excessive.
Related information	If any failure code is displayed, perform troubleshooting for that code first.

No.	Cause	Point to check, remarks	Remedy
1	Dust intake from air intake system	If air intake piping between air cleaner and engine is removed, dust enters in piping.	Air intake piping cleaning or replacement
2	Breakage or wear of piston ring	● Measured blowby pressure is higher than standard value. ● Blowby pressure is still high after KCCV filter element is replaced. ● Measure compression pressure. (See STANDARD VALUE TABLE.) (Reference: See TEST AND ADJUST, "TEST COMPRESSION PRESSURE".)	Piston ring replacement or repair
3	Oil leakage from KCCV oil return piping.	Check for oil leakage from KCCV oil return piping.	Oil piping repair or replacement
4	Oil leakage out of engine	Check for oil leakage.	Oil leakage part repair
5	Oil leakage from oil filter	Check for oil leakage from oil filter.	Oil filter re installation or replacement
6	Oil leakage from oil piping	Check for oil leakage from oil piping.	Oil piping repair or replacement
7	Oil leakage from oil drain plug	Check oil leakage from oil drain plug.	Retighten oil drain plug
8	Oil leakage from oil pan	Check for oil leakage from oil pan.	Oil pan repair or replacement
9	Oil leakage from cylinder head	Check for oil leakage from cylinder head.	Cylinder head repair or replacement
10	Wear or damage of rear oil seal	Oil in clutch chamber or damper chamber on mounted machine side is increased.	Rear oil seal repair or replacement
11	Oil leakage from VGT	● Inlet/outlet of blower or outlet of turbine in VGT is stained with oil. ● Check if VGT shaft can rotate (by manually moving the VGT's blade axially and vertically).	VGT replacement
12	Oil leakage from oil cooler	● Oil is mixed in coolant. ● Remove oil cooler, and visually check for oil leakage from the oil cooler surface. ● Check oil cooler for leakage by air pressure test.	Oil cooler replacement
13	Oil leakage from EGR valve system	Outlet port is stained with oil after the EGR valve is disconnected.	EGR valve replacement
14	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

Read the signal word

Signal word for a notification described as follows.

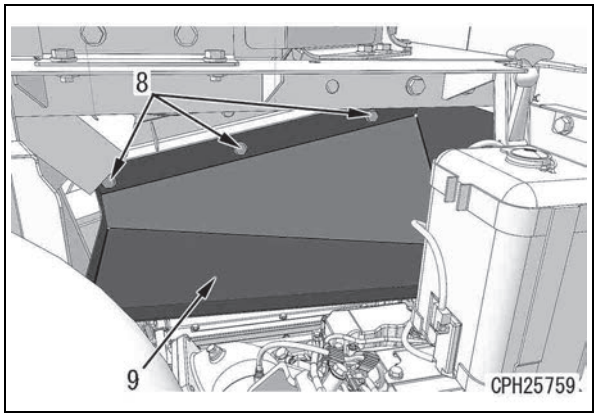
Symbol	Item	Remark
NOTICE	NOTICE	If the precaution of this signal word is not observed, machine damage or shorter service life may occur.
REMARK	REMARK	This signal word contains useful information to know.

Read the unit

International System of Units (SI) is used in this manual. Units used in the past are given in { }.

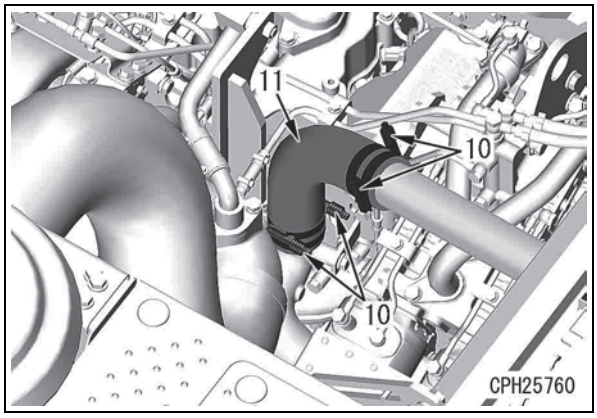
Duct

11. Remove the bolts (8) (3 pieces), and remove the duct (9).

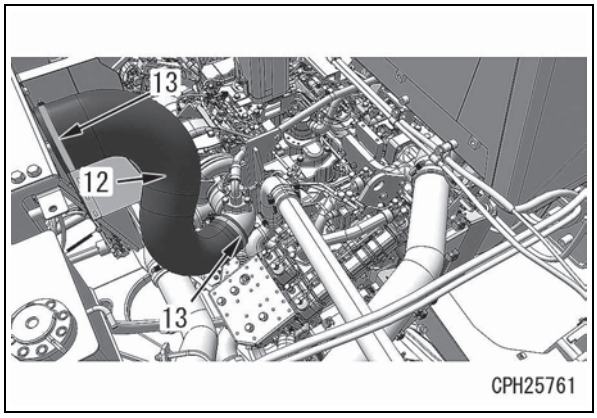


Hose, Clamp

12. Remove the clamps (10) (2 pieces), and remove the hose (11).

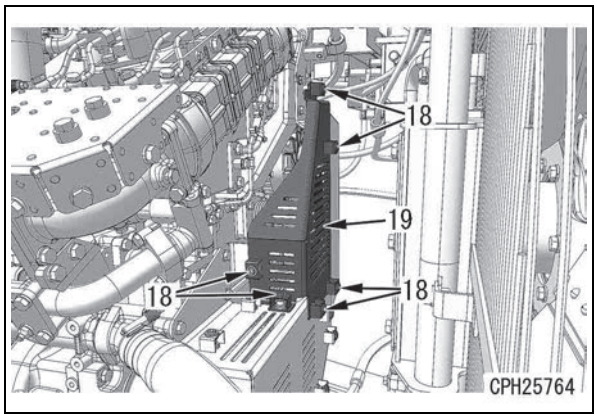


13. Loosen the clamps (13) (2 pieces), and remove the intake air hose (12).

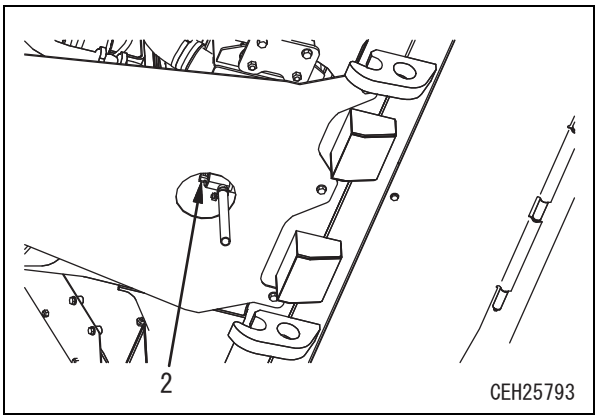


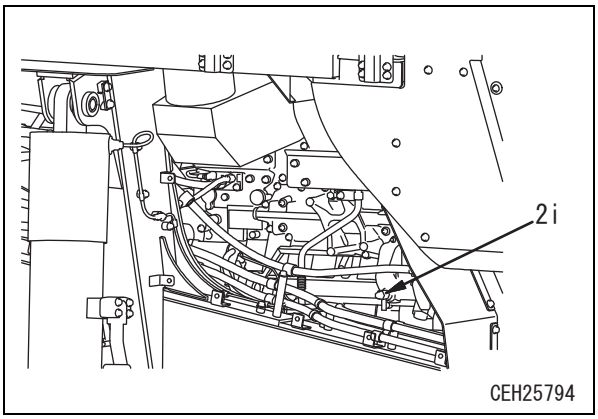
Belt guard

14. Remove the bolts (18) (6 pieces), and remove the belt guard (19).



3. Open the drain valve (2) and drain plug (2i), and drain the coolant.
   Radiator:
   186 ℓ
4. After draining, close the drain valve (2) and drain plug (2i).

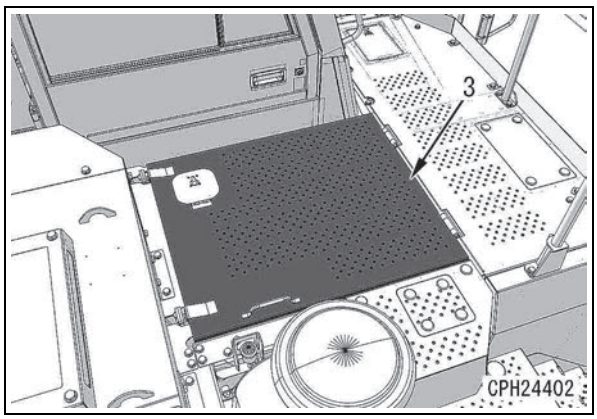




Engine cover assembly

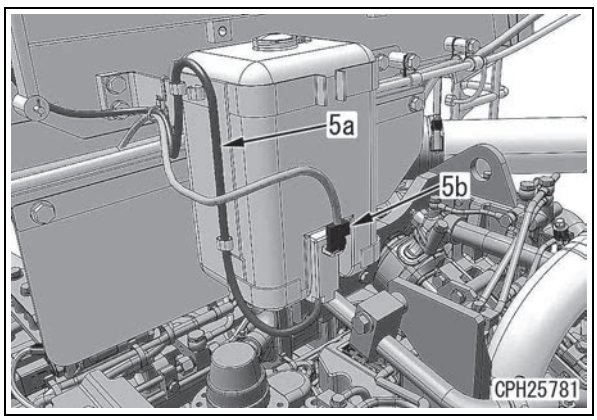
5. Open the engine cover assembly (3).

   NOTICE
   Check that the locks are securely fixed.



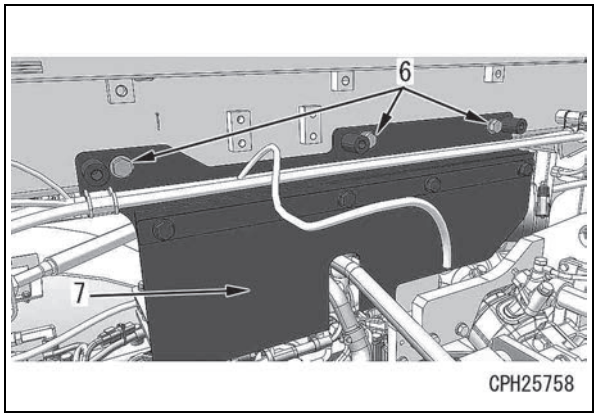
Window wiper fluid tank

6. Disconnect the hose (5a) and connector FL04 (5b).

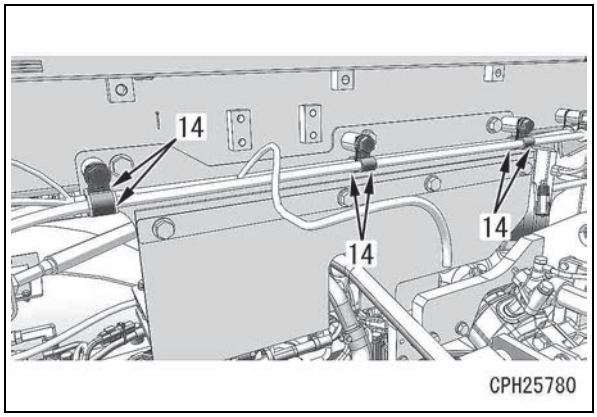


Cover

103.Install the cover (7) with the bolts (6) (3 pieces).

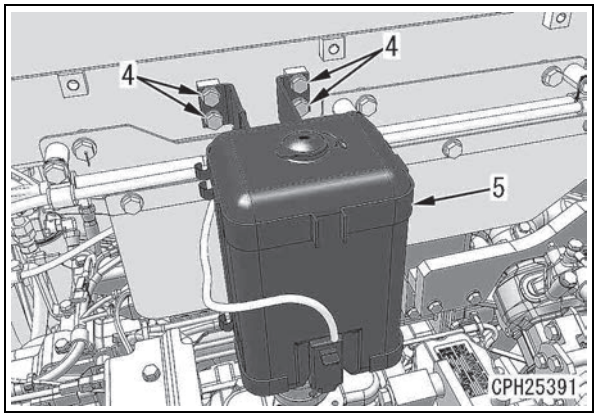


104.Install the clamps (14) (6 pieces).

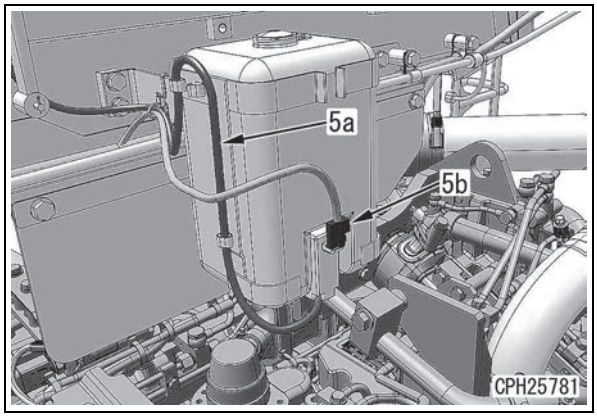


Window wiper fluid tank

105.Install the window wiper fluid tank (5) with the bolts (4) (4 pieces).

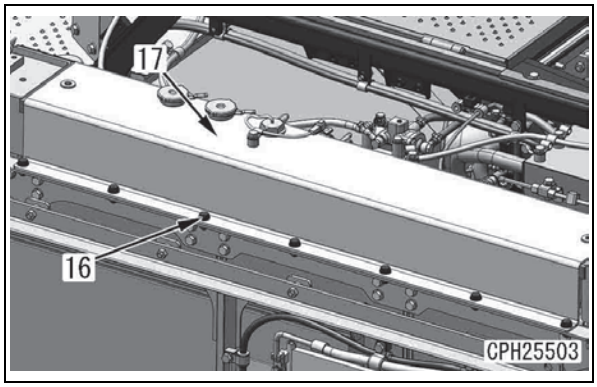


106.Connect the hose (5a) and connector FL04 (5b).



Upper tank

6. Using the lifting tool (A), sling the upper tank (17), and install it with the bolts (16) (14 pieces).
   Upper tank (17):
   65 kg

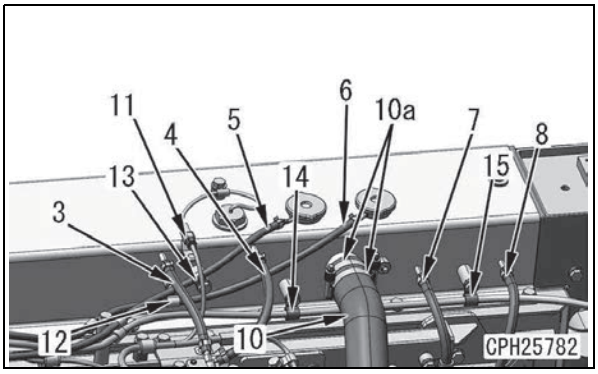


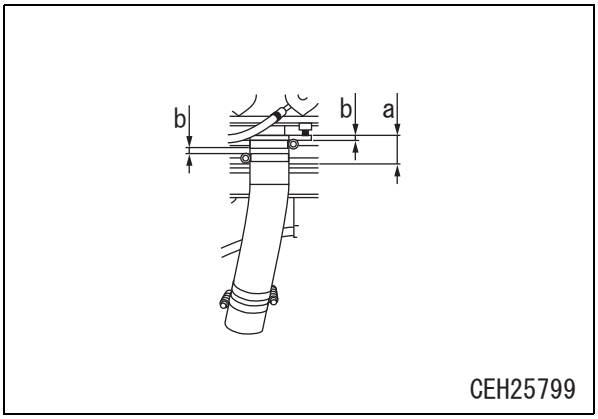
Hose

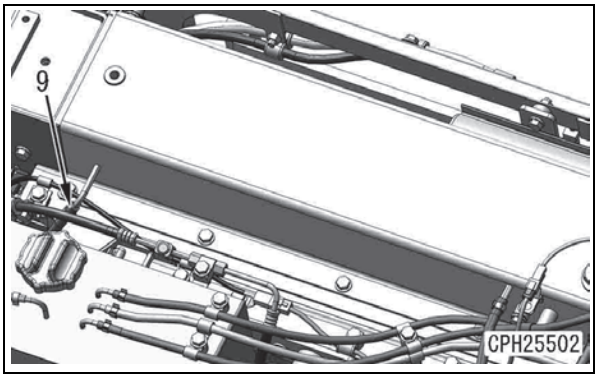
7. Install the clamps (12), (13), (14), and (15).
8. Connect the connector (11).
9. Connect the hose (10), and install the clamps (10a) (2 pieces).

   REMARK
   - Position fastening parts of clamps (2 pieces) so that they are 180° apart from each other.
   - Position fastening parts of clamps (2 pieces) so that the clamps can be fastened from the same direction.
   - Mount dimension for the hose and clamp are as follows.
     Hose: a = 56 mm, b = 5 mm

   Clamp (10a):
   10.5±0.5 Nm {1.07±0.05 kgm}
10. Connect the pipes (3), (4), (5), (6), (7), (8), and (9).







REMOVE AND INSTALL AFTERCOOLER ASSEMBLY

⚠ **Park the machine on level ground, set the parking brake switch to park (P), and stop the engine.**

⚠ **Block the tires to prevent machine movement.**

⚠ **If you drain the coolant when it is hot, this could cause a burn injury. Wait for the coolant temperature to decrease before you drain.**

PROCEDURE TO REMOVE AFTERCOOLER ASSEMBLY

Grille guard assembly

1. Remove the grille guard assembly. For details, see "REMOVE AND INSTALL GRILLE GUARD ASSEMBLY".

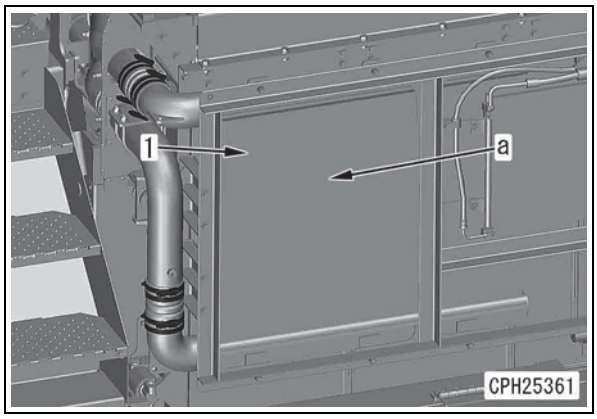
Aftercooler

2. Using the lifting tool, sling the aftercooler assembly (1), and hold it.

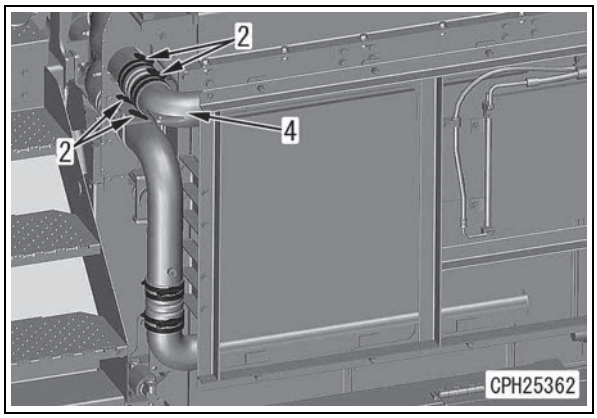
   NOTICE

   Protect the fin portion (a) of the aftercooler assembly (1) by placing cloth on it.

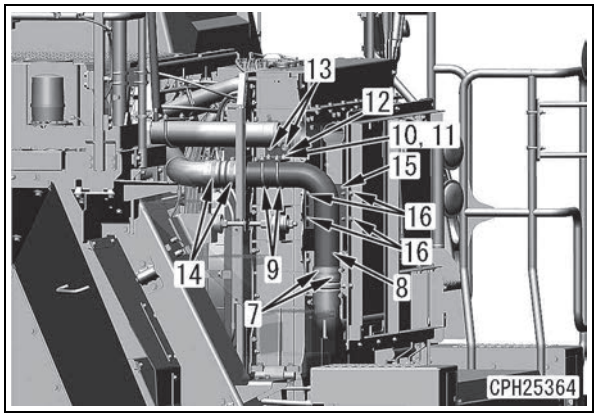
   Aftercooler assembly (1):
   25 kg



3. Loosen the clamps (2) (4 pieces), and disconnect the hose (4).



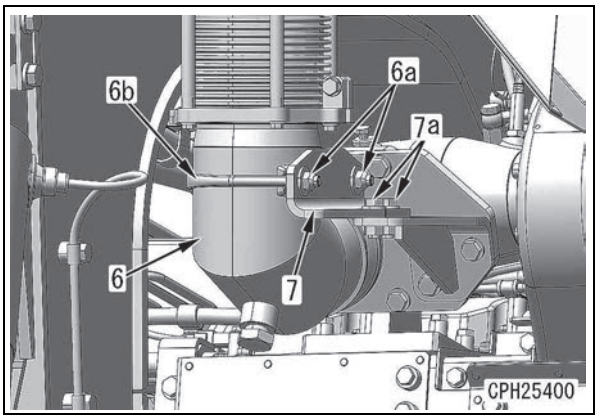
4. Remove the nuts (11) (4 pieces), washers (10) (4 pieces), and remove the U-bolts (9) (2 pieces).
5. Remove the clamps (7) (2 pieces) and (14) (2 pieces), and remove the pipe (8).
6. Remove the bolts (13) (2 pieces), and remove the bracket (12).
7. Remove the bolts (16) (4 pieces), and remove the bracket (15).

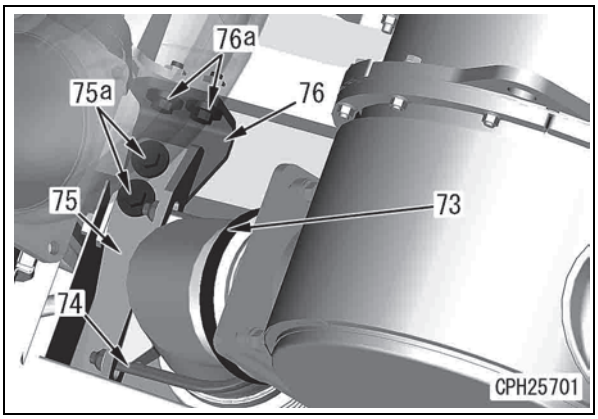


40. Install the bellows pipe bracket (7) temporarily with the mount surface aligned. Secure it to the bellows pipe (6) with the bolts (7a) (2 pieces).
    Bolt (7a):
    98 to 123 Nm {10.0 to 12.5 kgm}
41. Install the U-bolt (6b) with the nuts (6a) (2 pieces).
42. Secure the brackets (75) and (76) with the bolts (75a) (2 pieces) and (76a) (2 pieces) in such a way that the loosened bracket (75) is aligned with the bellows pipe (6).
43. Tighten the U-bolt (74).

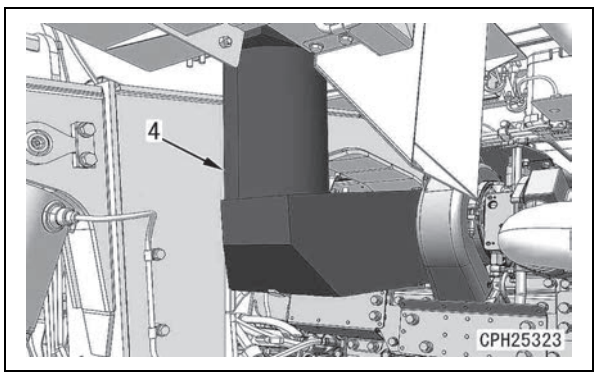
NOTICE

After you install the U-bolt (74), remove the fixing tool from the bellows pipe.



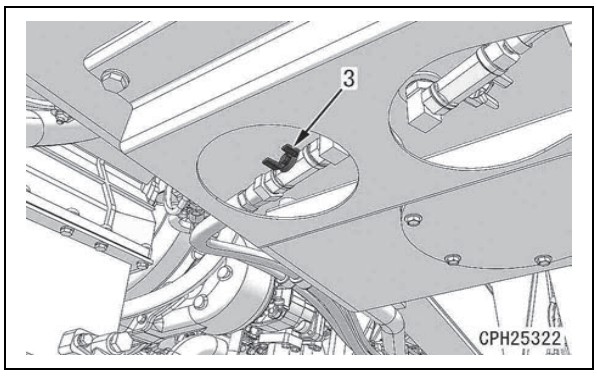


44. Install the heat insulation cover (4).



Fuel tank

45. Open the valve (3).



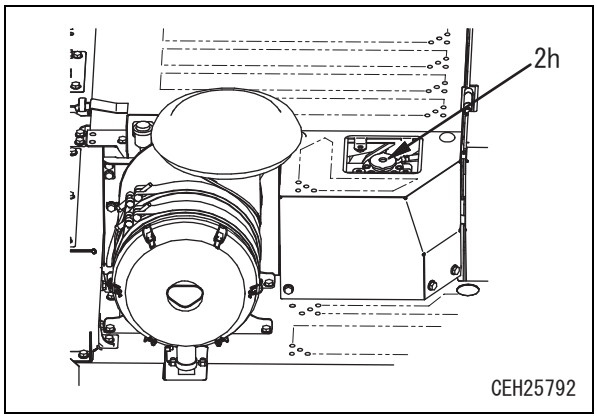
Air cleaner assembly

46. Install the air cleaner assembly. For details, see "REMOVE AND INSTALL AIR CLEANER ASSEMBLY".

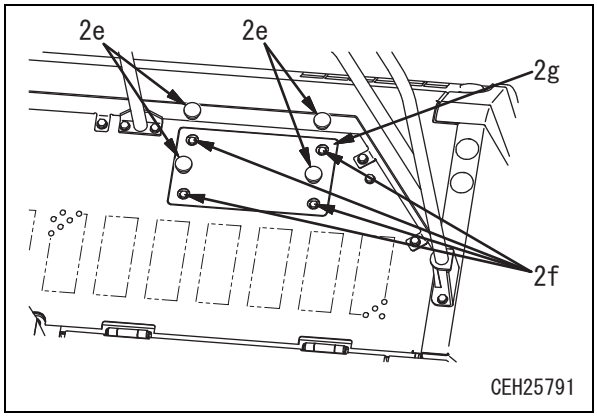
Cooler assembly

47. Install the cooler assembly. For details, see "REMOVE AND INSTALL COOLER ASSEMBLY".

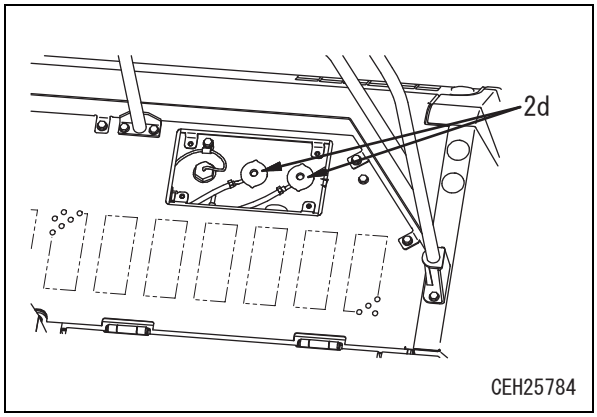
3) Loosen the radiator cap (2h) at the reserve tank.



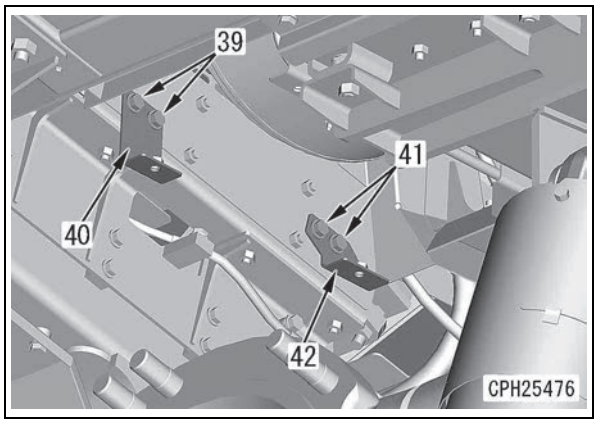
4) Remove the caps (2e) (4 pieces).
5) Remove the bolts (2f) (4 pieces), and remove the cover (2g).



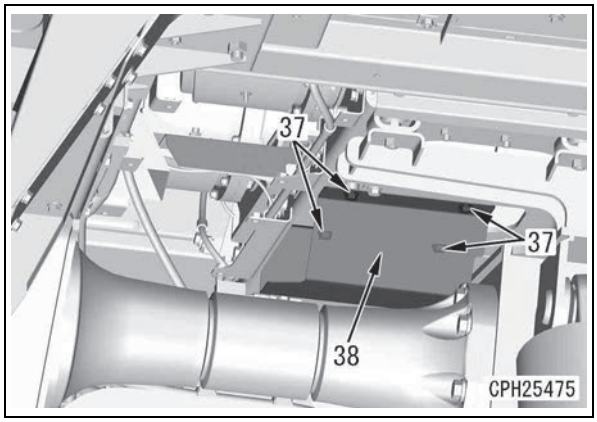
6) Loosen the radiator caps (2d) (2 pieces) at the top of the radiator.



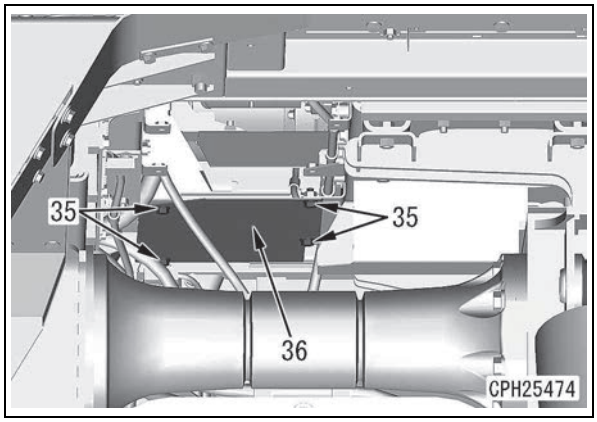
27. Install the bracket (42) with the bolts (41) (2 pieces).
28. Install the bracket (40) with the bolts (39) (2 pieces).



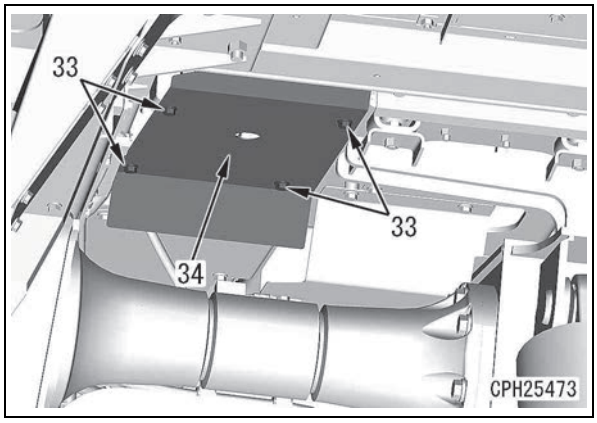
29. Install the cover (38) with the bolts (37) (4 pieces).



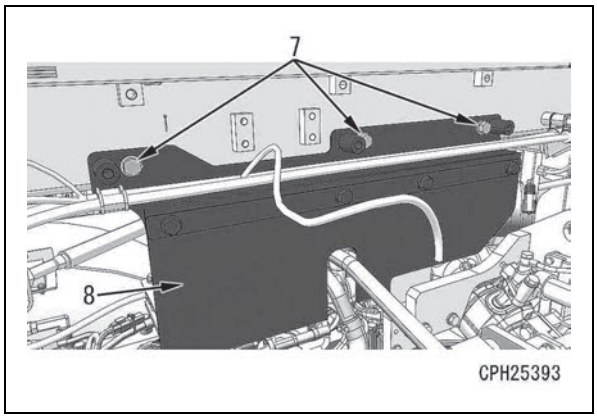
30. Install the cover (36) with the bolts (35) (4 pieces).



31. Install the cover (34) with the bolts (33) (4 pieces).

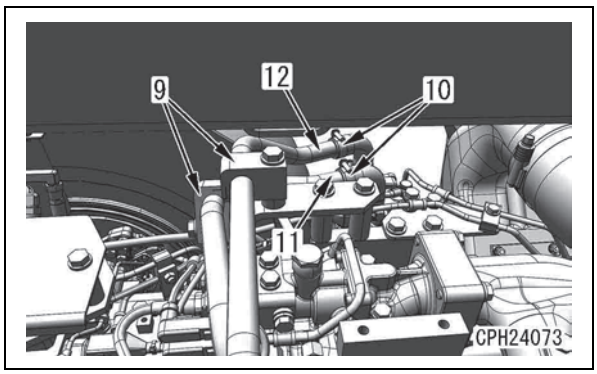


9. Remove the bolts (7) (3 pieces), and remove the cover (8).

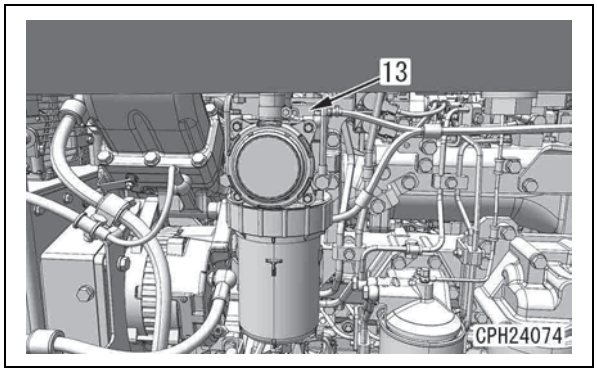


KCCV assembly

10. Remove the clamps (9) (2 pieces).
11. Remove the clamps (10) (2 pieces), and disconnect the blowby inlet hose (11) and blowby outlet hose (12).



12. Disconnect the connector P57 (13) according to the following procedure.

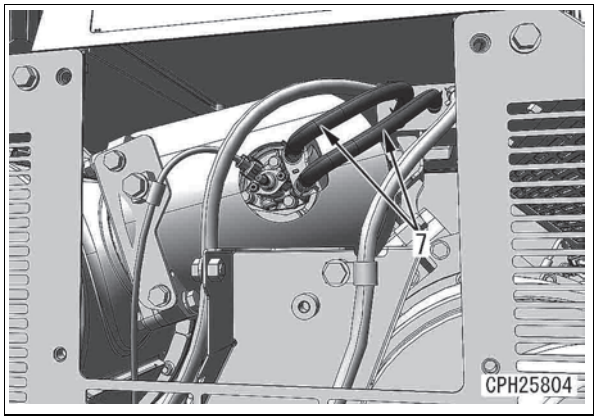


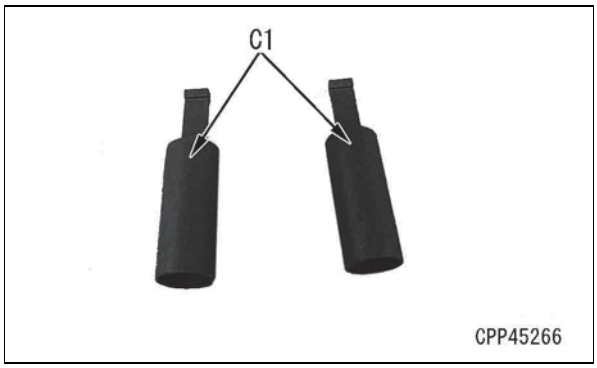
Coolant hose

4. Remove the cap (C1) , and connect the coolant hoses (7) (2 pieces).

   NOTICE

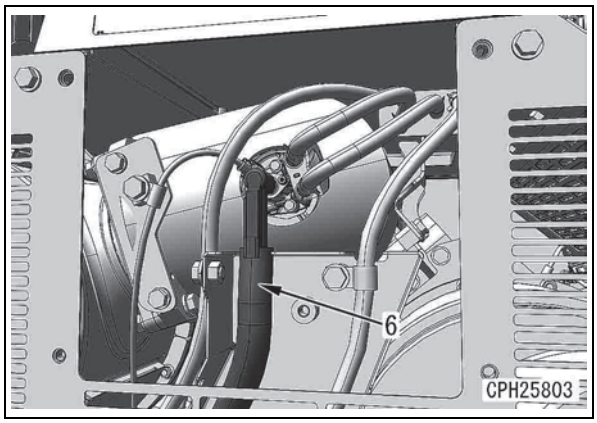
   Be sure that coolant does not splash over KDPF and SCR assembly when you connect the coolant hoses (7) (2 pieces).



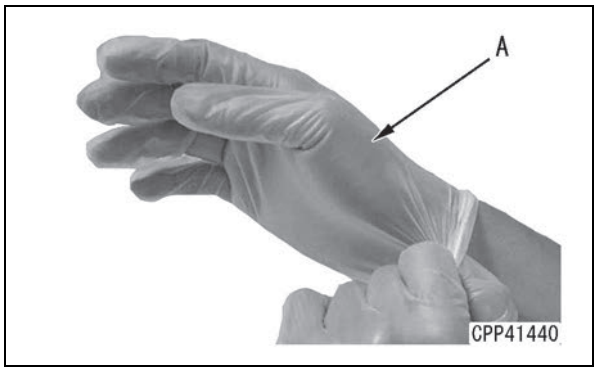


DEF hose

5. Connect the DEF hose (6) according to the following procedure.
   1) Before you connect the DEF hose, wash the connection part of DEF hoses with clean tap water to remove the sticking materials.

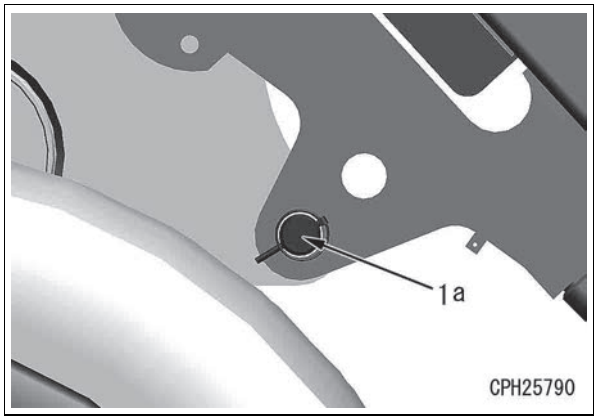


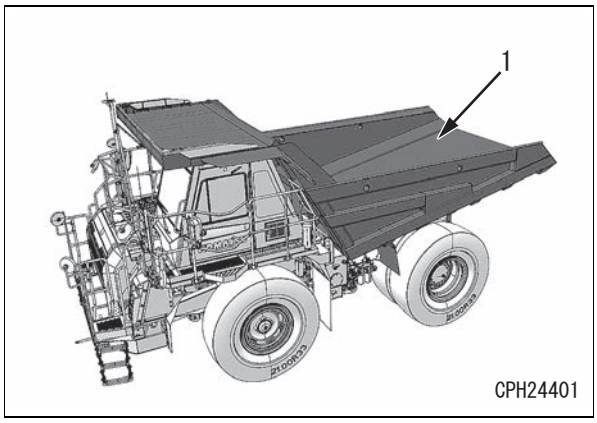
   2) Wear the gloves (A).



Dump body

30. Remove the body pivot pins (1a) and unlock, then lower the dump body (1).



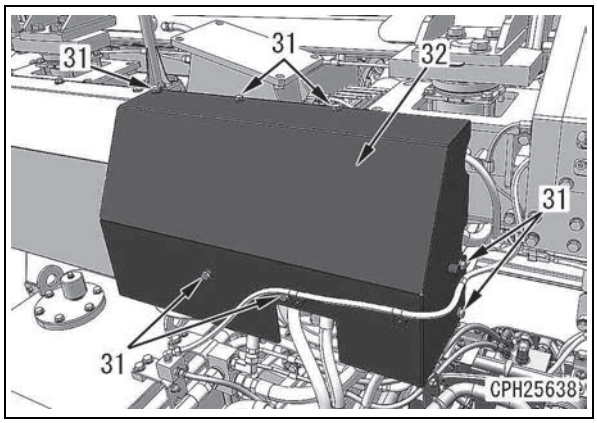


Fill DEF

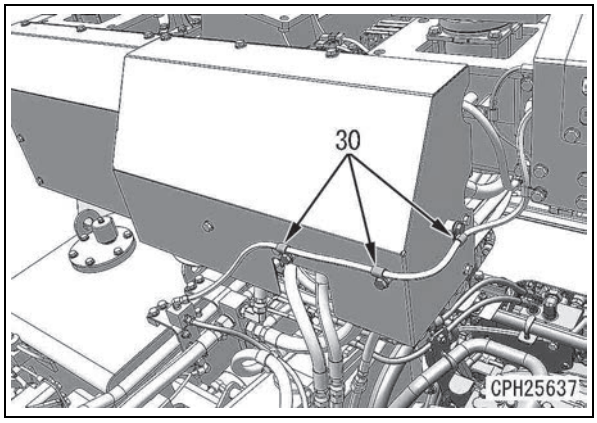
31. Fill with DEF to the specified level through the oil filler port of the DEF tank.

DEF tank:
30 ℓ

48. Install the cover (32) with the bolts (31) (9 pieces).



49. Install the clamps (30) (3 pieces).



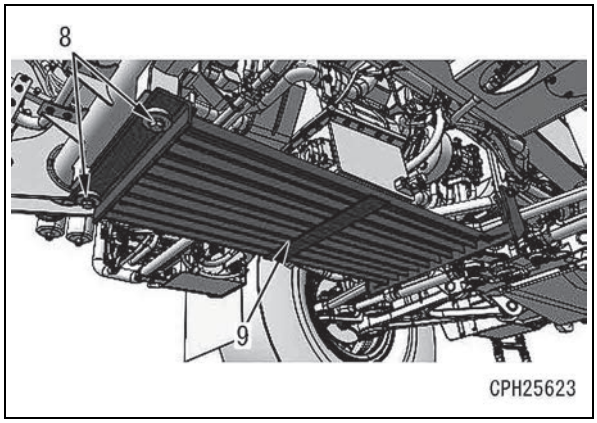
Underguard

50. Install the underguard (9) with the bolts (8) (4 pieces).

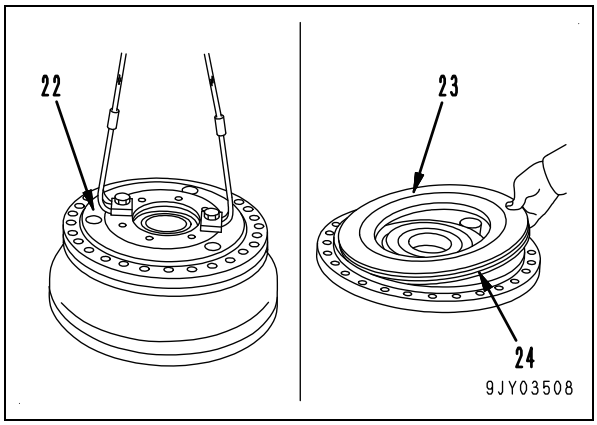
REMARK

Set the hydraulic lifter (C) below the underguard (9).

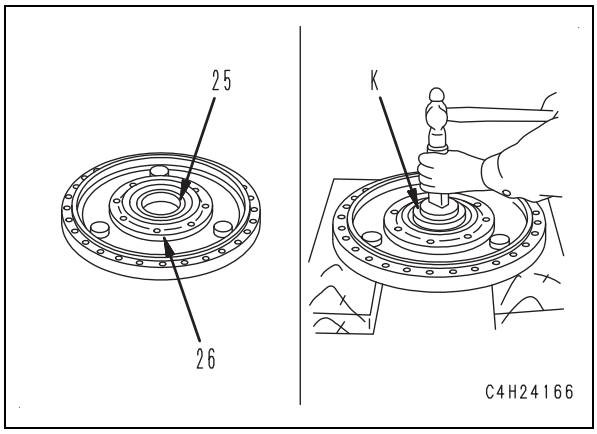
- Underguard (9):
  90 kg
- Bolt (8):
  Liquid adhesive (LT-2)



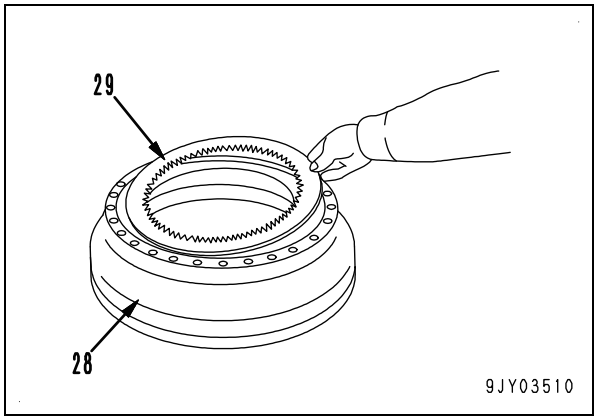
30. Remove the bolt, sling the housing assembly (22), and remove it.
31. Remove the piston (23) from the housing assembly, and remove the seal ring (24).



32. Using the plate (K), remove the bearing (25) from the housing.
33. Remove the seal ring (26).

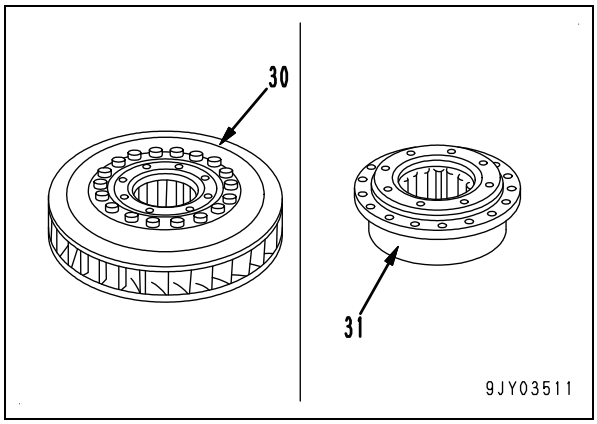


34. Remove the disc (29) from the case (28).



Disassembly of stator assembly

35. Remove the bolt, and remove the stator (30).



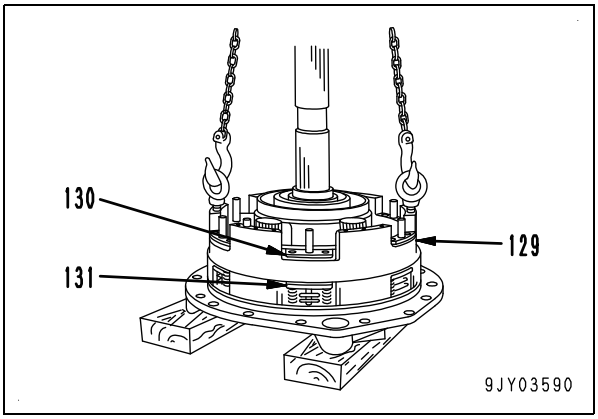
No. 6 and 7 housing, No. 6 and 7 piston

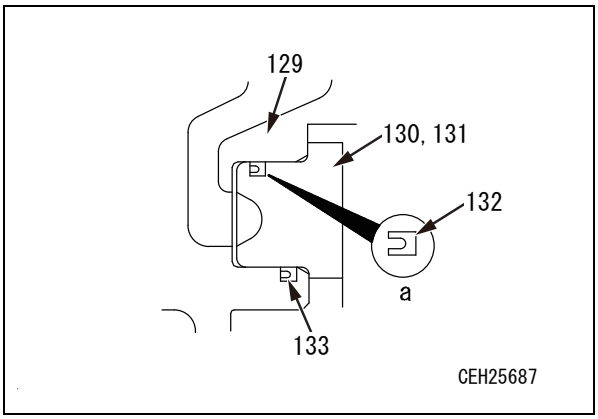
20. Install the seal ring (132) to the pistons (130) and (131), and install the seal ring (133) to the housing (129).
21. Install the pistons (130) and (131) to the housing (129).

    REMARK

    Install the seal ring with the groove part facing the pressure-receiving side.

    (a): Pressure side

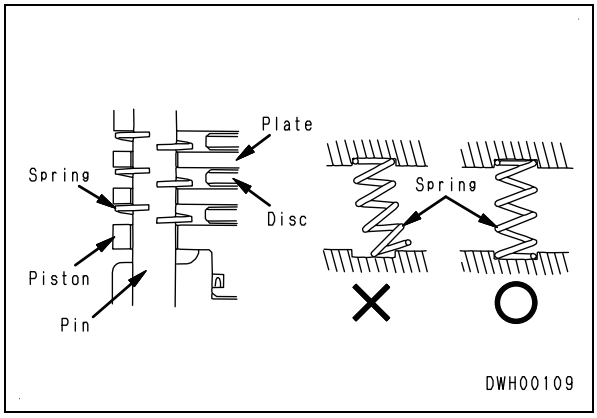




22. Using the eye bolt, install the housing (129) with matching to the spring.

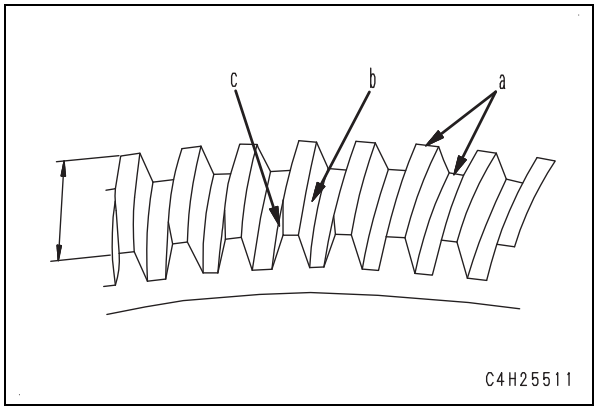
    REMARK

    - Drive it into the dowel pin with a plastic hammer.
    - Check that the spring is fitted to the seats of the piston and housing.
    - Be careful not drop the No.7 piston (131).



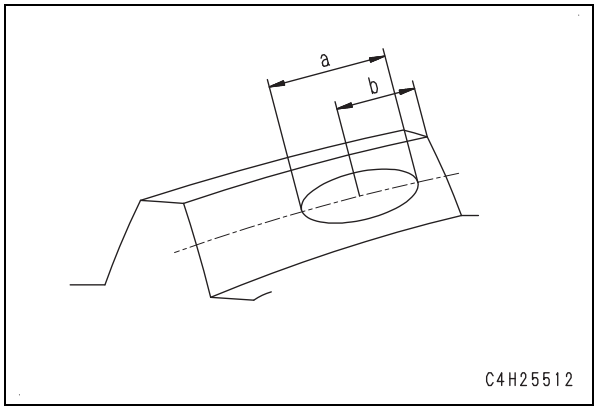
Testing tooth contact

41. Apply the red lead to the surfaces of bevel gear. Turn the bevel gear in the forward and opposite directions. Then examine the tooth contact pattern on the bevel gear.
    (a): Addendum
    (b): Tooth surface on backward side
    (c): Tooth surface on forward side



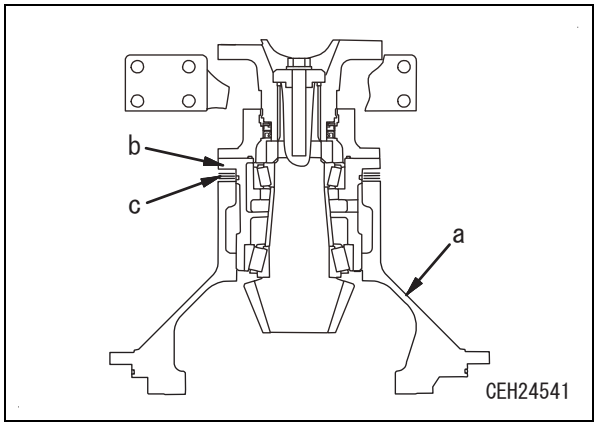
NOTICE

- **The center of tooth contact must be at the middle of the tooth height, and be at the position of 33% (b) of the tooth length from the small end. The width of the tooth contact must be 30 to 60 % of the tooth length. Make sure that there is not a strong contact at point, bottom, small end, or large end.**
- **If it is adjusted this way, proper tooth contact is obtained when load is applied.**
  (a): Width of tooth contact
  (b): Center of tooth contact



42. If the tooth contact pattern is not proper, adjust the tooth contact according to the following procedure.

    REMARK
    - Perform the travel of bevel pinion using the shim (c) between the differential case (a) and bearing cage (b).
    - Use the shim that was removed at disassembly.

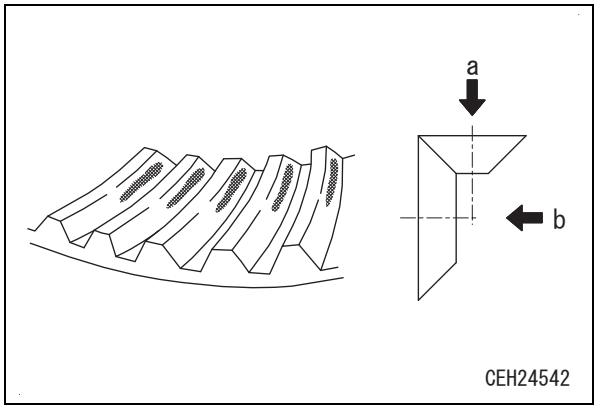


Adjusting tooth contact

When the bevel pinion is too far from the bevel gear

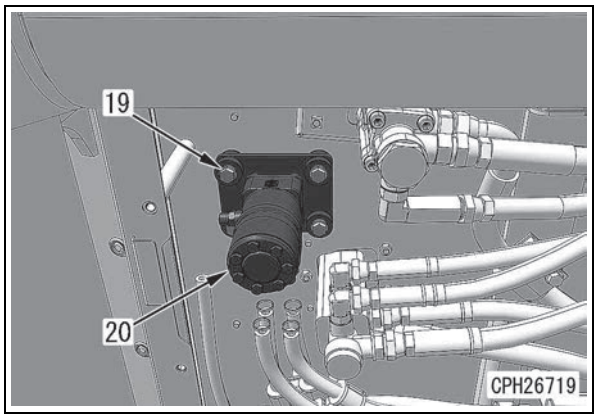
43. If the bevel pinion is too far from the center line of the bevel gear, adjust the shim on the bevel pinion side and advance the bevel pinion to the (a) direction. Also, check the tooth contact pattern and backlash again: Adjust the adjustment nut of the horizontal shaft bearing cage or adjust the shim, and advance the bevel gear to the (b) direction.

    REMARK
    When the bevel pinion is too far from the center line of the bevel gear, the tooth contact patterns appear on the tooth tips of the bevel gear, which indicate the contact of the tooth surface on the small end side that is bent outward and the tooth surface on the large end side that is bent inward.



13. Remove the bolts (19) (4 pieces), and remove the steering valve assembly (20).

REMARK
Hang it down with a rope. Be careful not to drop it.

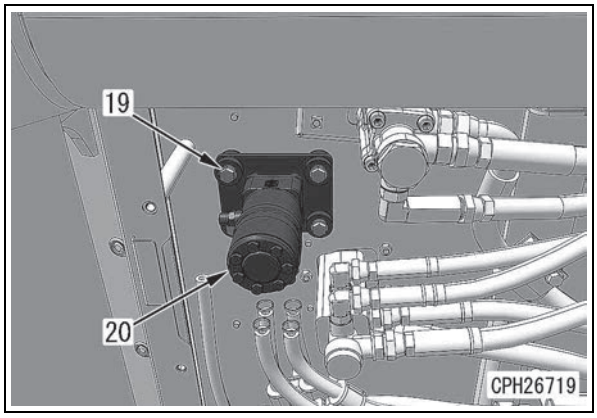


PROCEDURE TO INSTALL STEERING VALVE ASSEMBLY

Steering valve assembly

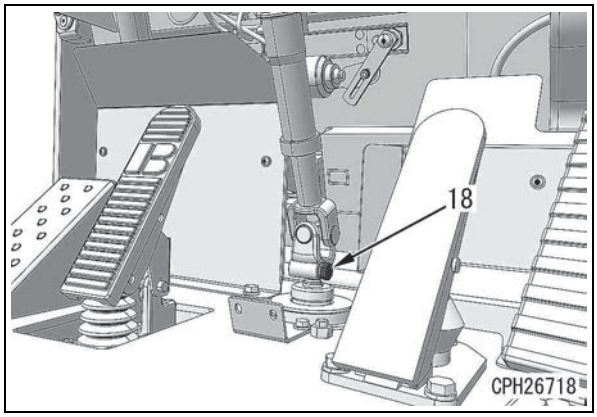
1. Install the steering valve assembly (20) with the bolts (19) (4 pieces).

REMARK
Hang it down with a rope. Be careful not to drop it.
Bolt (19):
98 to 123 Nm {10.0 to 12.5 kgm}



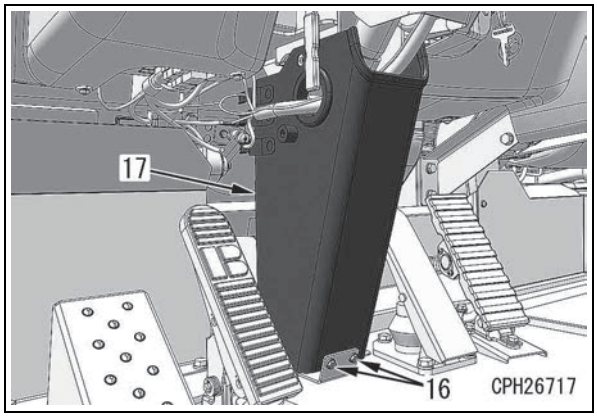
2. Connect the yoke and the input shaft spline of the steering valve assembly (19) and install them with the bolt (18).

REMARK
Apply the grease (LM-G) on the connection part of the yoke and the input shaft spline of the steering valve assembly (19).
Spline connection part:
Molybdenum disulfide grease (LM-G)
Bolt (18):
48.1 to 61.8 Nm {4.9 to 6.3 kgm}

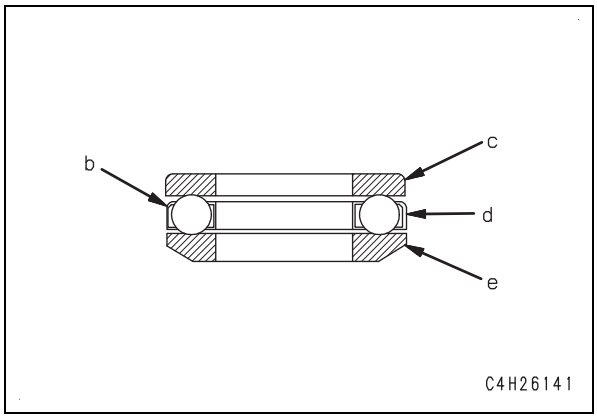


3. Install the cover (17) with the bolts (16) (2 pieces).

REMARK
Pass the horn SW wiring harness and column SW wiring harness through the hole of the cover (17), and then install it.



5. Install the orifice plate assembly (20) to the valve body (7).
   (b): Flange part
   (c): Outer race (fixing ring)
   (d): Retainer
   (e): Inner race (rotating ring)



Shaft assembly

6. Assemble the shaft assembly (17).
   Using the installation tool (42 mm in diameter), install the bearing (19) to the shaft (18).

   REMARK
   Press fit the bearing (19) outer race (fixing ring), and install the flange part of the retainer toward the outer race side.
7. Install the shaft assembly (17).

Flange assembly

8. Install the ring (16), O-ring (15), and U-ring (14) to the flange (13).
9. Install the flange assembly (12).

Retainer assembly

10. Using the installation tool (20 mm in diameter), press fit the bushing (11) to the retainer (9), and install the dust seal (10).
11. Install the retainer assembly (8) to the valve body (7).

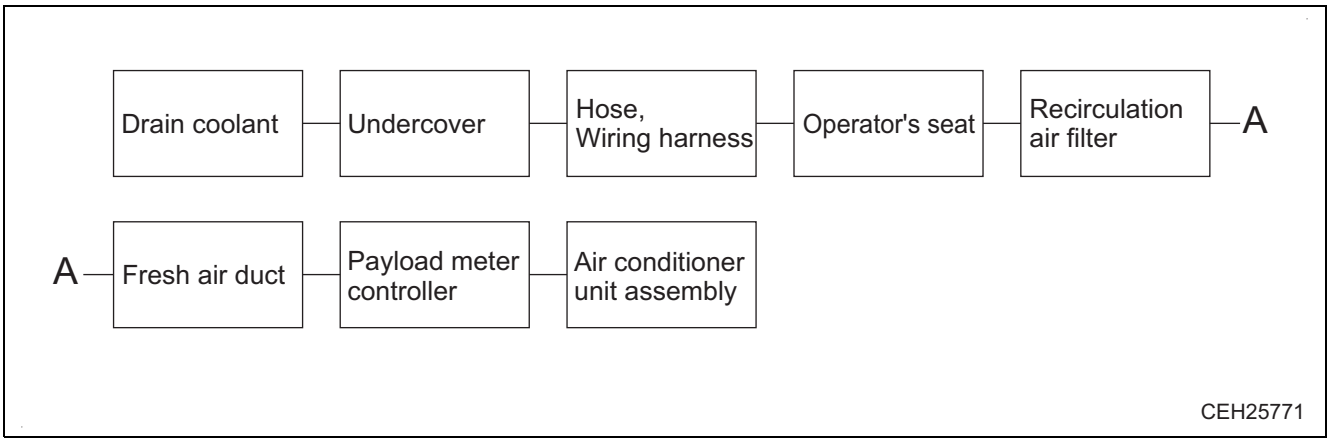
Valve body assembly

12. Install the O-ring, and install the bracket (4) with the bolts (32) (4 pieces).
    Bolt (32):
    Liquid adhesive (LT-2)
    Bolt (32):
    245.2 to 308.9 Nm {25.0 to 31.5 kgm}
13. Install the O-ring, and install the pipe (5) with the bolts (5a) and (5b).
14. Install the bracket (4) with the bolts (32) (2 pieces).
    Bolt (32):
    Liquid adhesive (LT-2)
    Bolt (32):
    245.2 to 308.9 Nm {25.0 to 31.5 kgm}
15. Attach the key (3) to the shaft assembly (17), and install the lever (2).
16. Install the bracket (1) with the bolts (1a) (2 pieces).
17. Fill the oil and charge the nitrogen gas. For details, see TEST AND ADJUST, "TEST AND ADJUST FRONT SUSPENSION CYLINDER".
    Front suspension cylinder:
    13.8 ℓ (one side)
18. Tighten the valve assembly (6) mount bolts (32) (6 pieces).
    Mount bolt (32):
    245.2 to 308.9 Nm {25.0 to 31.5 kgm}

Front suspension cylinder assembly

19. Install the front suspension cylinder assembly. For details, see "REMOVE AND INSTALL FRONT SUSPENSION CYLINDER ASSEMBLY".

CAB AND ITS ATTACHMENTS
REMOVE AND INSTALL AIR CONDITIONER ASSEMBLY



⚠ **Park the machine on level ground, set the parking brake switch to park (P), and stop the engine.**

⚠ **Block the tires to prevent machine movement.**

⚠ **Turn the battery disconnect switch to OFF position, and remove the key. (For details, see TEST AND ADJUST, "BATTERY DISCONNECT SWITCH WORK".)**

⚠ **If you disconnect the heater hose when the coolant in the radiator is still hot, you may be scalded. Accordingly, wait for the coolant temperature to drop before disconnecting.**

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

⚠ **If refrigerant gas gets in your eyes, you may lose your vision. If it touches your skins, it may cause injury. Accordingly, put on the protective eyeglasses, gloves, and working clothes with long sleeves while you are collecting or filling the refrigerant.**

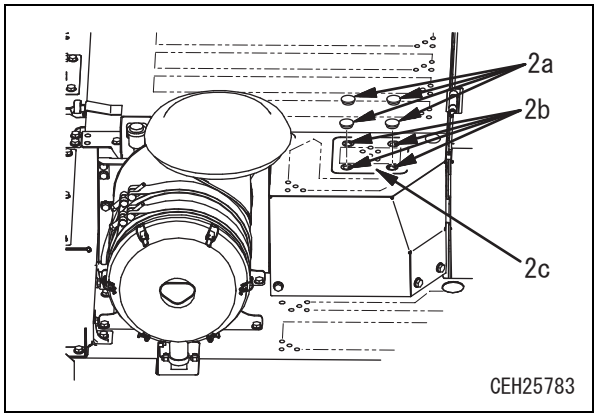
NOTICE

- Never release the refrigerant to the atmosphere.
- Ask a qualified person for collecting, adding, and filling operations of the refrigerant.
- When working on the air conditioner pipe, take measures to prevent the entry of dirt, dust, water, etc. into the hoses.

PROCEDURE TO REMOVE AIR CONDITIONER ASSEMBLY

Drain coolant

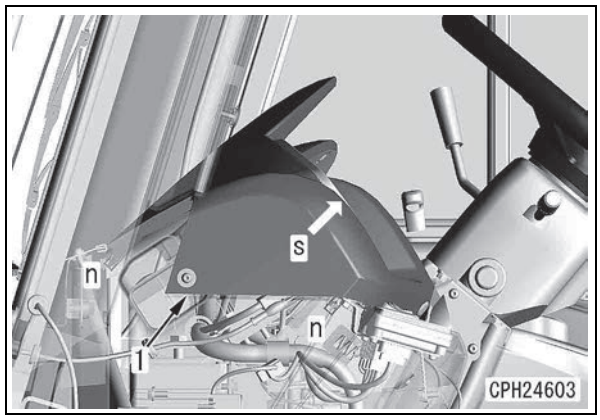
1. Prepare a container under the drain hose to receive the coolant.
2. Release the internal pressure with these procedures.
   1) Remove the caps (2a) (4 pieces).
   2) Remove the bolts (2b) (4 pieces), and remove the cover (2c).

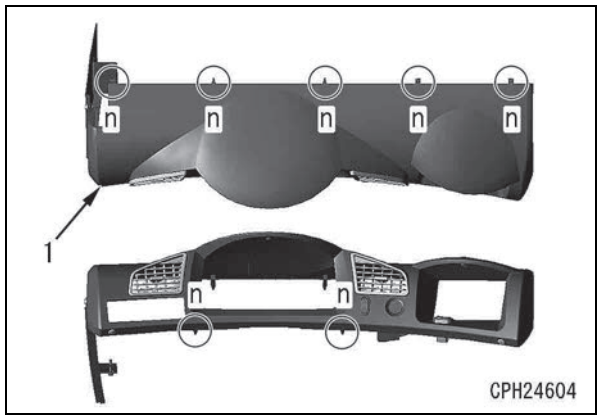


2) Install the cover (1) in the opposite direction to arrow (s) while paying attention to tabs (n) (7 places).

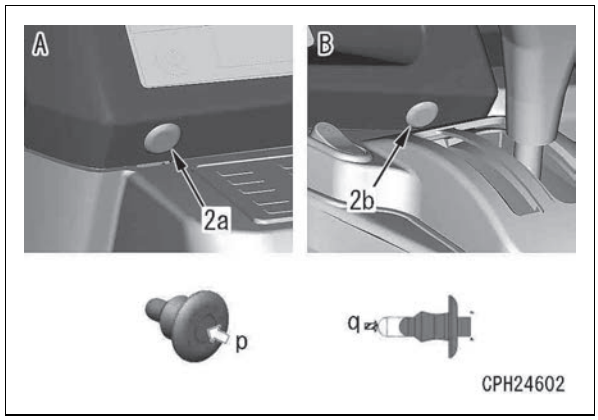
REMARK

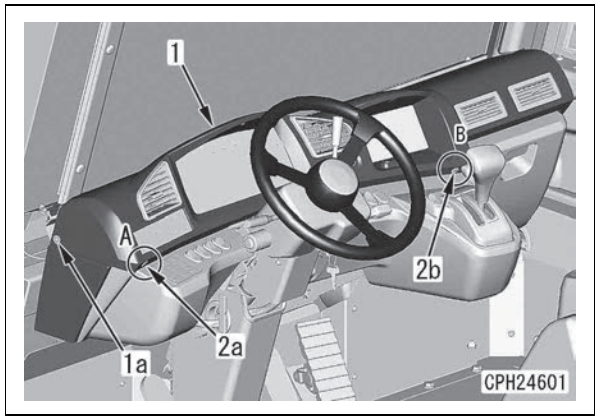
Since the wiring harnesses of switches (3), (4), and (5) are connected to the rear side of cover (1), install them in the cover with care.





3) Install the clips (2a) and (2b) on right and left sides.
4) Install the screw (1a) on left side.

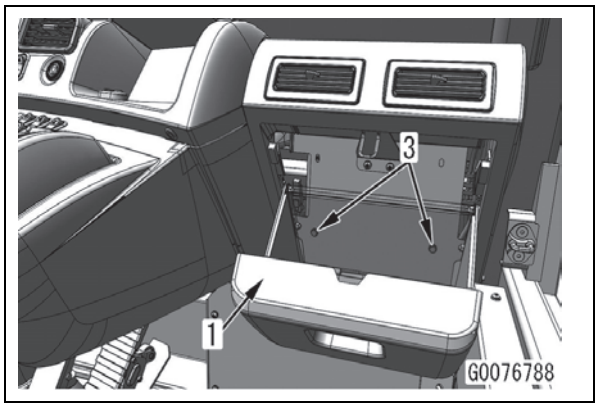


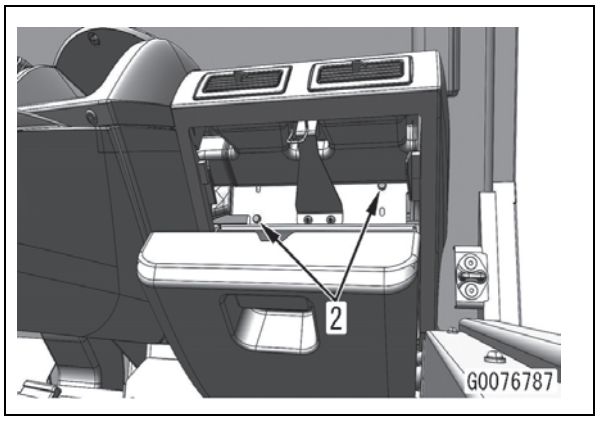


25. Install the glove box (1) with the bolts (2) and (3) (4 pieces).

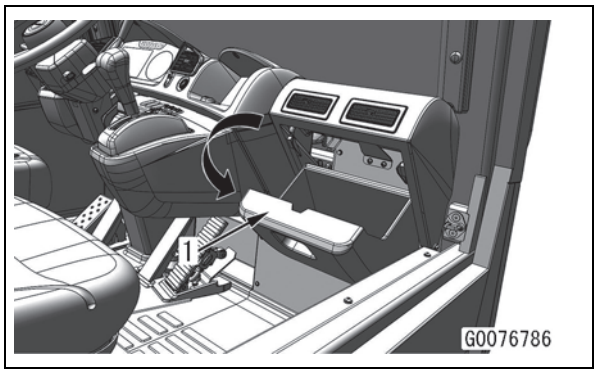
REMARK

The bolts (3) (2 pieces) are installed at the back of the glove box (1).



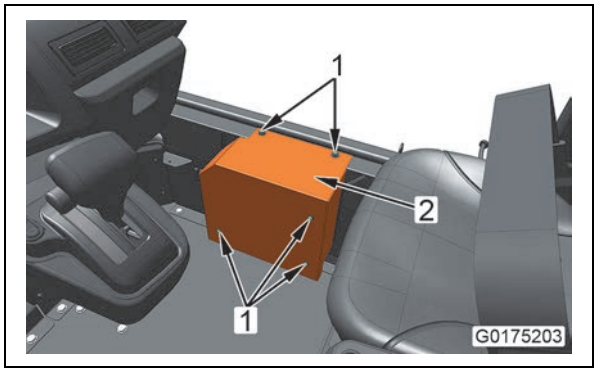


26. Close the glove box (1).

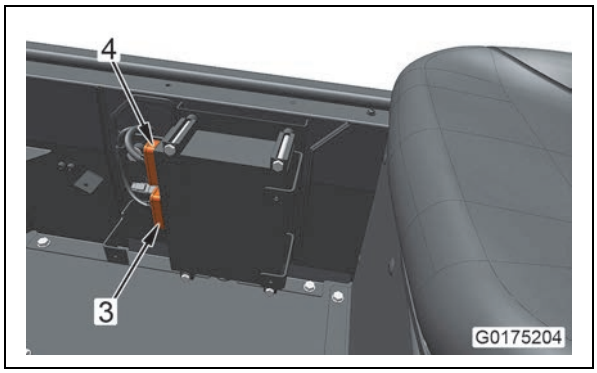


Translator controller connector

17. Remove the screws (1) (5 pieces), and remove the cover (2).

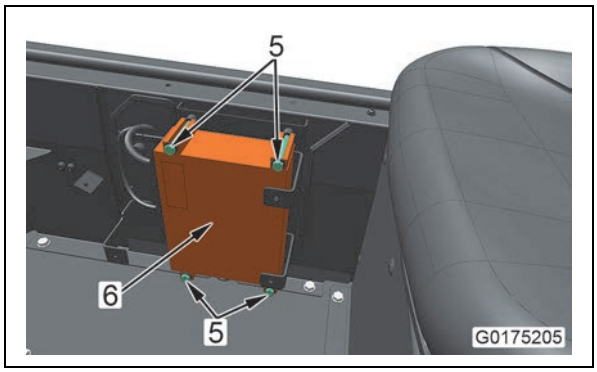


18. Loosen the hexagonal socket head bolt at the center of each connector of the translator controller connection wiring harness, and disconnect the connectors TLC2 (3) and TLC3 (4).



19. Remove the bolts (5) (4 pieces), and remove the translator controller (6).

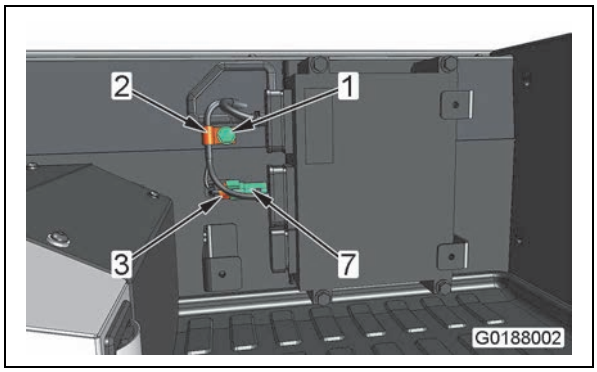
    REMARK
    Be careful not to lose the washer.



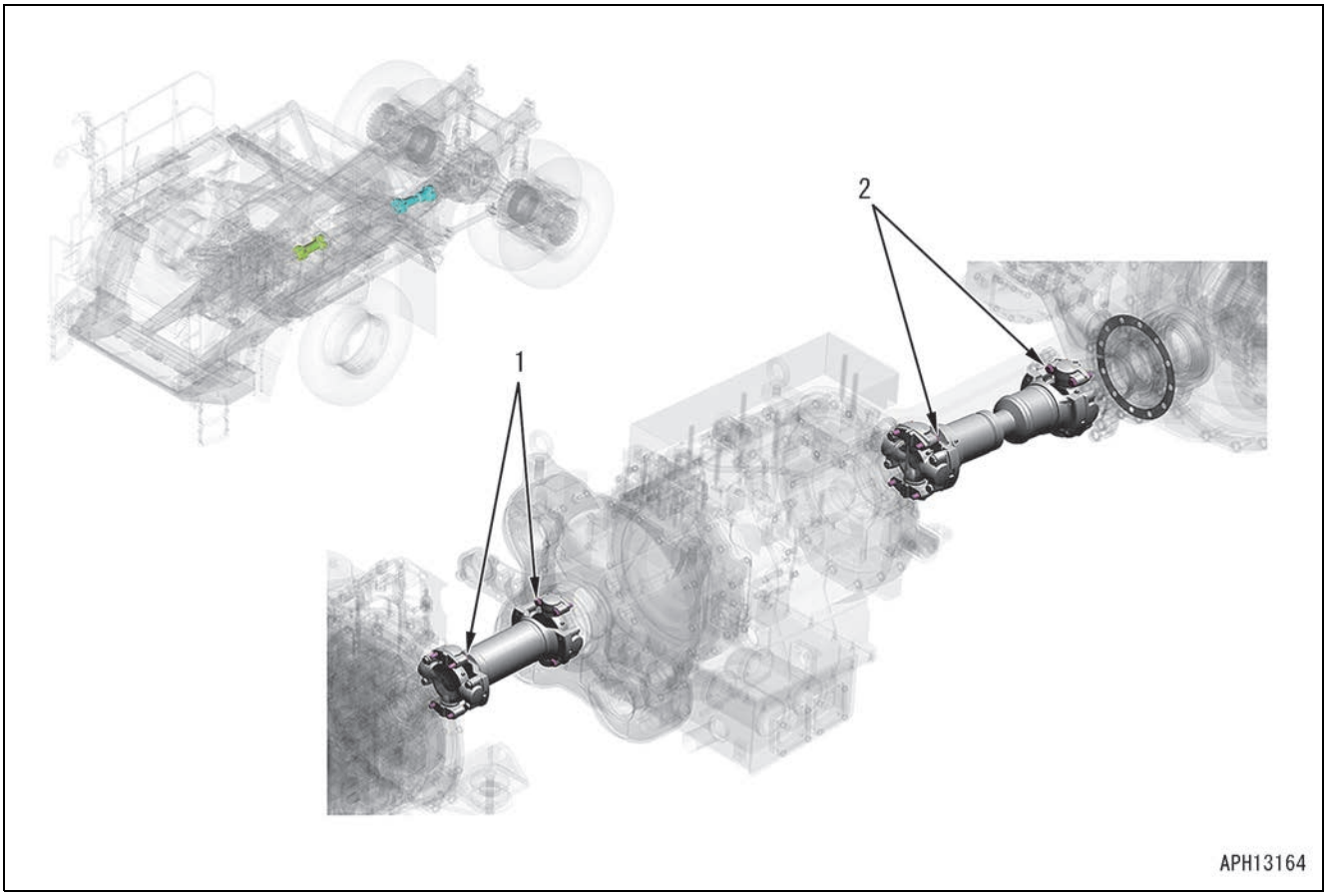
Cover

20. Remove the bolt (1), and remove the clip (2).
21. Remove the connector (3) from the termination resistor (7).

    REMARK
    Keep the termination resistor (7) installed to the Z clip.

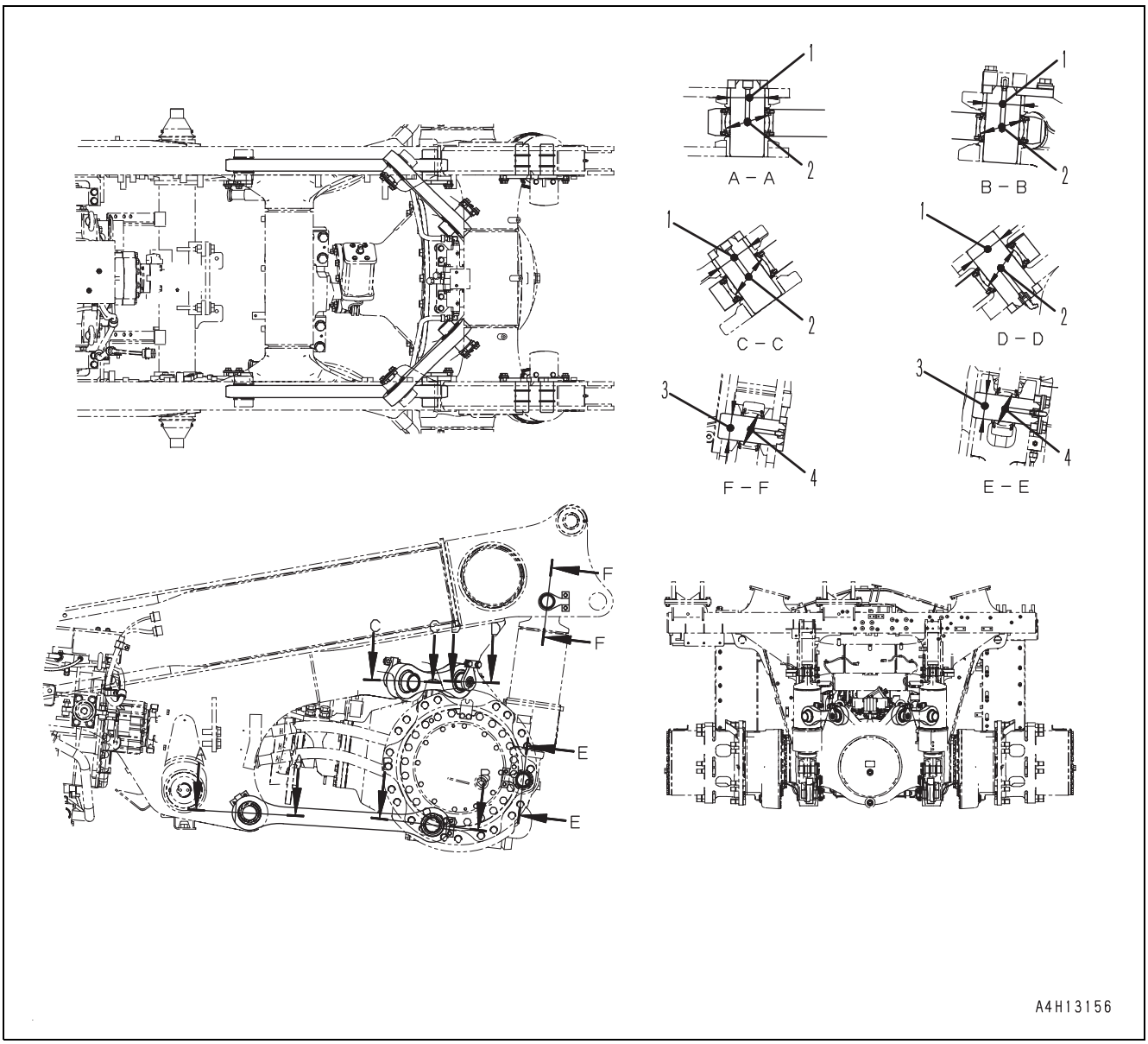


POWER TRAIN
MAINTENANCE STANDARD OF DRIVE SHAFT



No.	Item	Decision standards	Correction
1	Bolt torque	98 to 123 Nm {10 to 12.5 kgm}	Tighten
2	Bolt torque	157 to 196 Nm {16 to 20 kgm}	Tighten

MAINTENANCE STANDARD OF REAR AXLE SUPPORT



Unit: mm

No.	Item	Decision standards					Correction
		Standard dimension	Tolerance		Standard clearance	Permitted clearance	
			Shaft	Hole			
1	Clearance between rod mount pin and boss	70	-0.030 -0.076	0 0.015	0.015 to 0.076	0.6	Replace
2	Clearance between the spherical bushing inner and outer rings	-	-	-	0.12 to 0.25	0.6	
3	Clearance between suspension cylinder mount pin and frame or axle	60	-0.030 -0.076	+0.046 0	0.030 to 0.122	0.6	
4	Clearance between the spherical bushing inner and outer rings	-	-	-	0.12 to 0.25	0.6	

When evaporator (3) outlet temperature is high

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

When evaporator (3) outlet temperature is low

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

FUNCTION OF DUAL PRESSURE SWITCH

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

Below LA: Abnormally low pressure

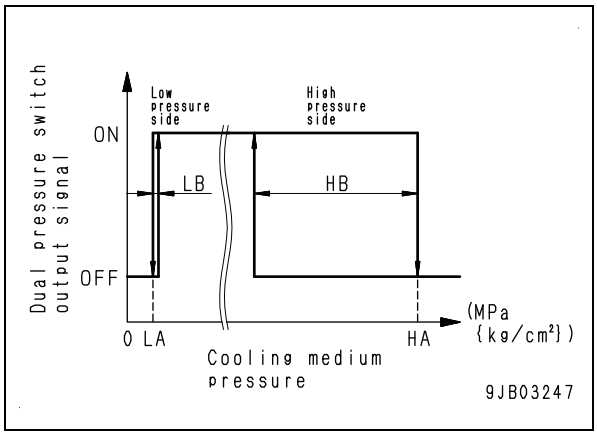
Above HA: Abnormally high pressure

LA: 0.20 MPa {2 kg/cm^2}

LB: 0.02 MPa {0.2 kg/cm^2}

HA: 3.14 MPa {32 kg/cm^2}

HB: 0.59 MPa {6 kg/cm^2}



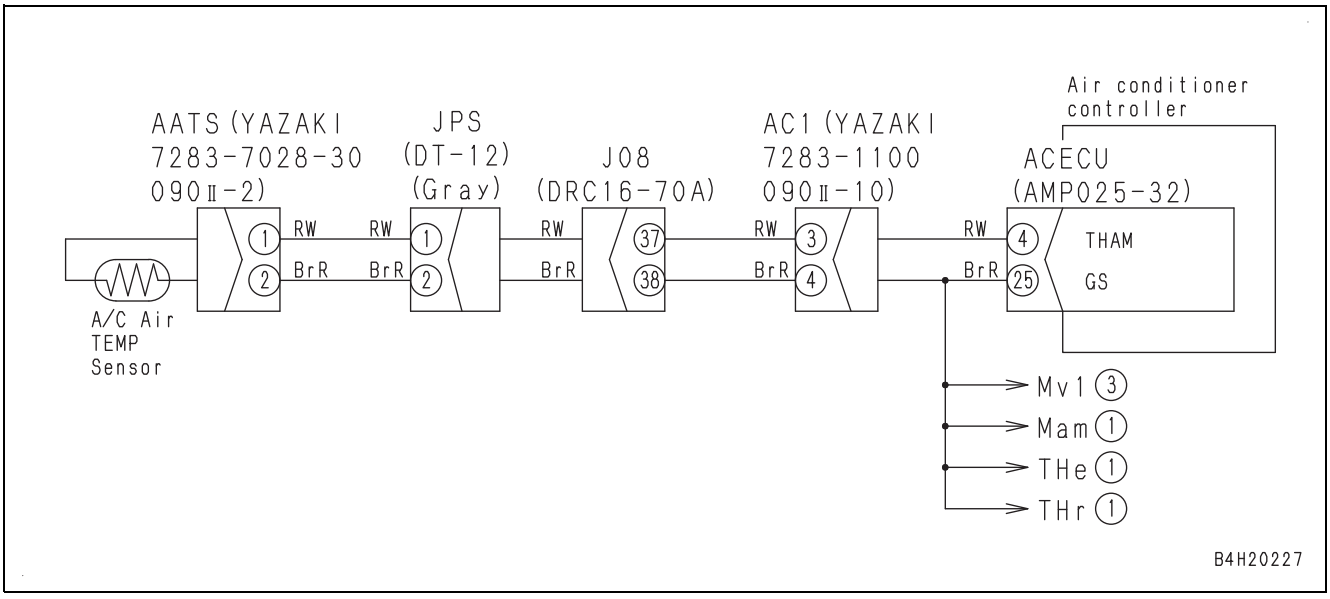
- The dual pressure switch turns "OFF" when it detects abnormally low refrigerant pressure in low-pressure line or abnormally high refrigerant pressure in high-pressure line.
- When the dual pressure switch turns "OFF", the air conditioner controller turns the compressor clutch relay "OFF". As a result,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

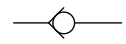
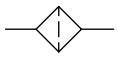
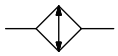
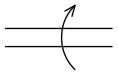
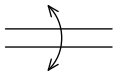
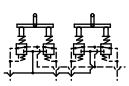
FAILURE CODE [879BKA]

Action level	Failure code	Failure	Air Conditioner Fresh Air Temperature Sensor Open Circuit (Machine monitor system)
L01	879BKA		
Details of failure	Air conditioner controller detects open circuit in ambient temperature sensor.		
Action of controller	• Air conditioner controller transmits open circuit information of ambient temperature sensor to monitor controller by CAN communication. • Ignores data of ambient temperature sensor and continues control of air conditioner in automatic air conditioner mode.		
Phenomenon on machine	Since air conditioner ambient temperature sensor has open circuit, outside air temperature is not considered in automatic air conditioner mode. (Air conditioner is not affected in manual mode.)		
Related information	After repairing, 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 ambient temperature sensor	1. Turn the starting switch to OFF position. 2. Disconnect the connector AATS, and measure it at the male side.			
		Resistance	Between AATS (male) (1) and (2)	Temperature: 25 °C	Approx. 1.7 kΩ
2	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connectors AC1 and AATS, and measure it at each female side.			
		Resistance	Between AC1 (female) (3) and AATS (female) (1)		Max. 1 Ω
			Between AC1 (female) (4) and AATS (female) (2)		Max. 1 Ω
3	Defective air conditioner controller	If failure code is still displayed after above checks, air conditioner controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)			
4	Defective air conditioner unit	If failure code is still displayed after above checks, air conditioner unit may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)			

Circuit diagram related to air conditioner ambient temperature sensor



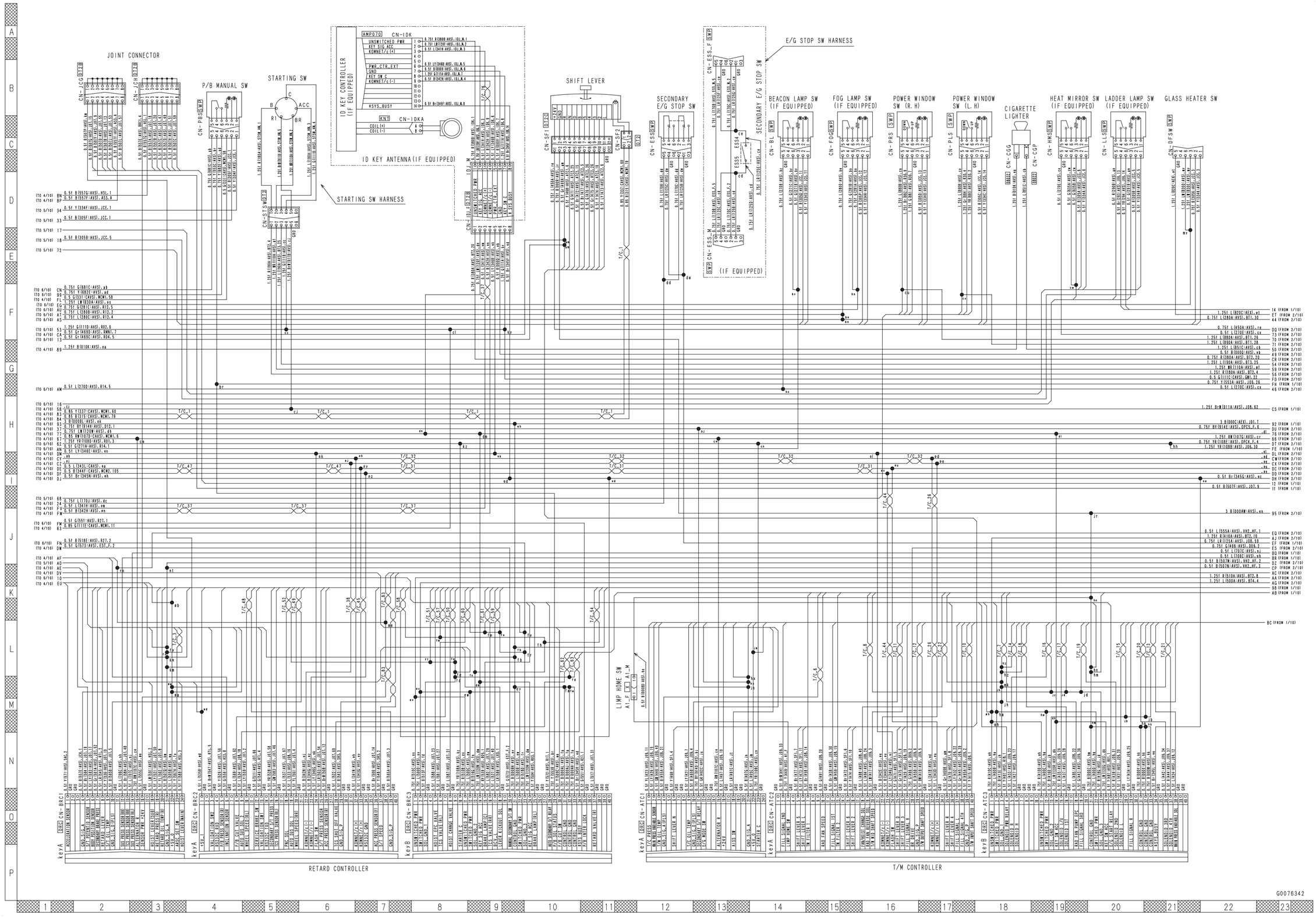
Symbol	Content
 9JC01485	Check valve
 9JC01486	Intake port (with strainer)
 9JC01487	Tank and return piping
 9JC01488	Filter
 9JC01489	Oil cooler
 9JC01490	Stop valve
 9JC01491	Drive shaft (1 way)
 9JC01492	Drive shaft (reversible)
 9JC01493	Hydraulic pump Reference: ▲ in the figure shows outlet
 9JC01494	Variable displacement hydraulic pump
 9JC01495	Hydraulic motor Reference: ▲ and ▼ in the figure show the direction of oil flow into hydraulic motor, and as direction changes, the rotation of motor is reversed.
 9JC01496	Servo piston
 9JC01497	PPC valve

INTERNAL CAB ELECTRICAL DIAGRAM (For machines equipped with gateway function controller) (3/10)

HD325-8E0, HD405-8E0

REMARK

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



EXTERNAL CAB ELECTRICAL DIAGRAM (For machines equipped with gateway function controller) (2/8)

HD325-8E0, HD405-8E0

REMARK

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