KEBM657710

Shop Manual

BULLDOZER

D61EX-24
D61PX-24

SERIAL NUMBERS D61EX-B 60001 and up
D61PX-B 60001

KOMATSU

Symbols

Important safety and quality portions are marked with the following symbols so that shop manual is used effectively.

Symbol	Item	Remark
	Danger	This signal indicates an extremely hazardous situation which will result in death or serious injury if it is not avoided.
	Warning	This signal indicates a potentially hazardous situation which will result in death or serious injury if it is not avoided.
	Caution	This signal indicates a potentially hazardous situation which will result in injury or property damage around the machine if it is not avoided.
	Weight	This signal indicates the weight of parts and components, and items which requires great attention to a selection of wires and working posture for slinging work.
	Tightening torque	This signal indicates the tightening torque for portions which requires special care in assembling work.
	Coat	This signal indicates a place to be coated with adhesive, grease, etc. in assembling work.
	Oil and coolant	This signal indicates a place to supply oil, coolant, etc. and the quantity.
	Draining	This signal indicates a place to drain oil, coolant, etc. and the quantity.

Signal word

Signal word for notice and remark describes the following.

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

Unit

International System of Units (SI) is used in this manual. For reference, units that have been used in the past are given in { }.

PRECAUTIONS FOR HANDLING FUEL SYSTEM EQUIPMENT

The machines equipped with common rail fuel injection system (CRI) consists of more precise parts than the parts used in the conventional fuel injection pump and nozzle. If foreign material enters this system, it may cause a failure. Use special care to prevent entry of the foreign material when servicing the fuel system.

Select an appropriate workplace

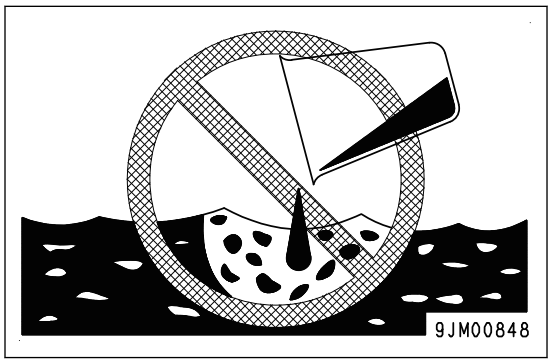
Avoid the work of adding hydraulic oil, replacing filters, or repairing the machine in rainy or windy weather, or in dusty environment.

Sealing the opening

Plug the removed pipes and the openings of the removed components with the caps, tapes, plastic bags, etc. to prevent foreign material from entering.

NOTICE

Do not expose the openings or stuff it, otherwise foreign material may enter or leaked oil may pollute the environment.
Do not discard the oil inconsiderately. Ask the customer for disposal or bring it back to dispose it appropriately.



How to clean parts when dirt is stuck

If any dirt or dust sticks the parts of the fuel system, clean it off thoroughly with clean fuel.

Precautions for replacing fuel filter cartridge

Be sure to use the Komatsu genuine fuel filter cartridge.

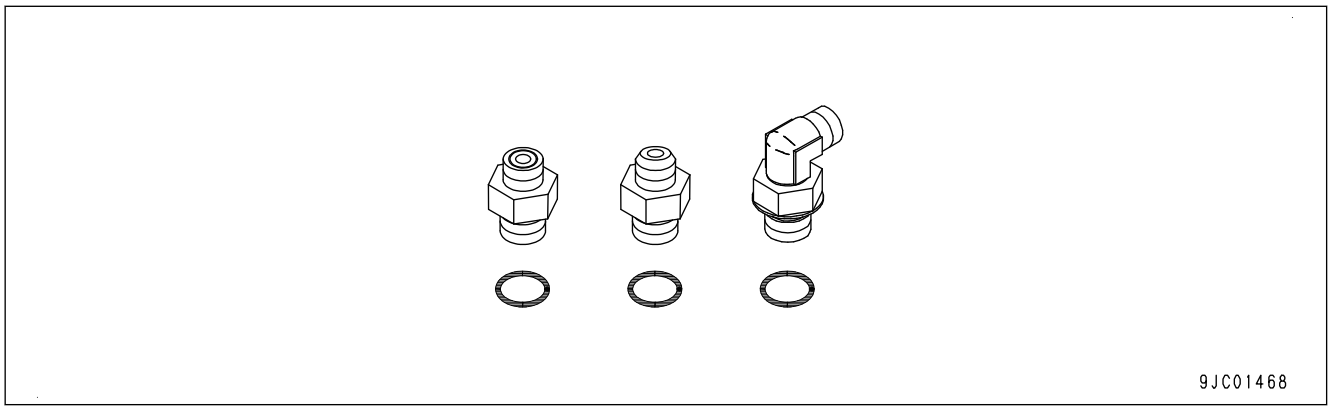
NOTICE

The machine equipped with common rail fuel injection system (CRI) consists of more precise parts than the parts used in the conventional fuel injection pump and nozzle. In order to prevent foreign material from entering this system, the filter employs a specially high performance of filter element. If a filter other than a Komatsu genuine filter is used, fuel system contamination and damage may occur. Therefore Komatsu recommends using only Komatsu fuel filters and install them following the procedures in the shop manual.

Table of tightening torque for O-ring boss piping joints

REMARK

Tighten the pipe joint for O-ring boss to the torque shown in the table below unless otherwise specified.

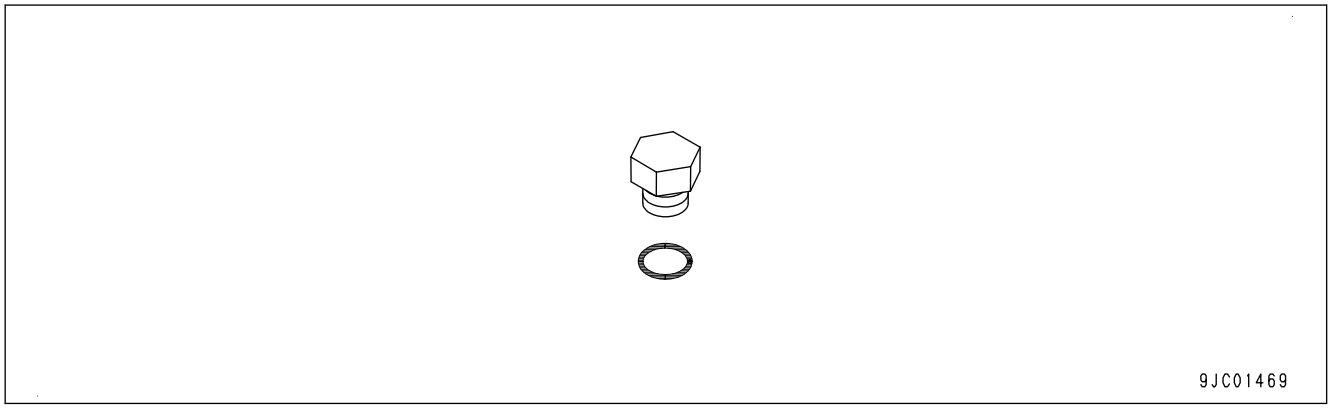


Nominal No.	Thread diameter (mm)	Width across flats (mm)	Tightening torque (Nm {kgfm})	
			Range	Target
02	14	Varies depending on type of connector.	35 to 63 {3.5 to 6.5}	44 {4.5}
-	18		59 to 98 {6.0 to 10.0}	78 {8.0}
03, 04	20		84 to 132 {8.5 to 13.5}	103 {10.5}
05, 06	24		128 to 186 {13.0 to 19.0}	157 {16.0}
10, 12	33		363 to 480 {37.0 to 49.0}	422 {43.0}
14	42		746 to 1010 {76.0 to 103}	883 {90.0}

Table of tightening torque for O-ring boss plugs

REMARK

Tighten the plug for O-ring boss to the torque shown in the table below unless otherwise specified.



Nominal No.	Thread diameter (mm)	Width across flats (mm)	Tightening torque (Nm {kgfm})	
			Range	Target
08	8	14	5.88 to 8.82 {0.6 to 0.9}	7.35 {0.75}
10	10	17	9.8 to 12.74 {1.0 to 1.3}	11.27 {1.15}
12	12	19	14.7 to 19.6 {1.5 to 2.0}	17.64 {1.8}
14	14	22	19.6 to 24.5 {2.0 to 2.5}	22.54 {2.3}
16	16	24	24.5 to 34.3 {2.5 to 3.5}	29.4 {3.0}

Item	Unit	D61PX-24
Overall height When ROPS cab is installed (including KOMTRAX antenna)	mm	3180
Track gauge	mm	2130
Length of track on ground		3165
Shoe width (standard)		860
Minimum ground clearance		390
Engine		
Model	-	SAA6D107E-3
Type	-	4-cycle, water-cooled, in-line, vertical, and common rail type with turbocharger and air-cooled aftercooler
No. of cylinders - bore x stroke	mm	6-107 x 124
Total piston displacement	ℓ {cc}	6.69 {6690}
Performance Engine rated horsepower • SAE J1995 (gross)(*1)	kW {HP} / min^{-1} {rpm}	127 {170}/2200 {2200}
• ISO14396		126 {169}/2200 {2200}
• ISO9249/SAE J1349 (net)(*2)		125 {168}/2200 {2200}
Maximum torque (*2)	Nm {kgfm} / min^{-1} {rpm}	753/1400 {76.8/1400}
Maximum speed with no load	min^{-1} {rpm}	2280 {2280}
Minimum speed with no load		975 {975}
Fuel consumption ratio at rated horsepower	g/kWh {g/HPh}	216 {159}
Starting motor	-	24 V, 5.5 kW
Alternator	-	24 V, 90 A
Battery (*3)	-	12 V, 140 Ah x 2
Radiator core type	-	Corrugated aluminum

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

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

*3: The battery capacity (Ah) is indicated in the 5-hour rate.

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.
  113 kW {152 HP} /2200 min^{-1} {2200 rpm}
- The maximum engine gross horsepower is the following value.
  127 kW {170 HP} /2200 min^{-1} {2200 rpm}

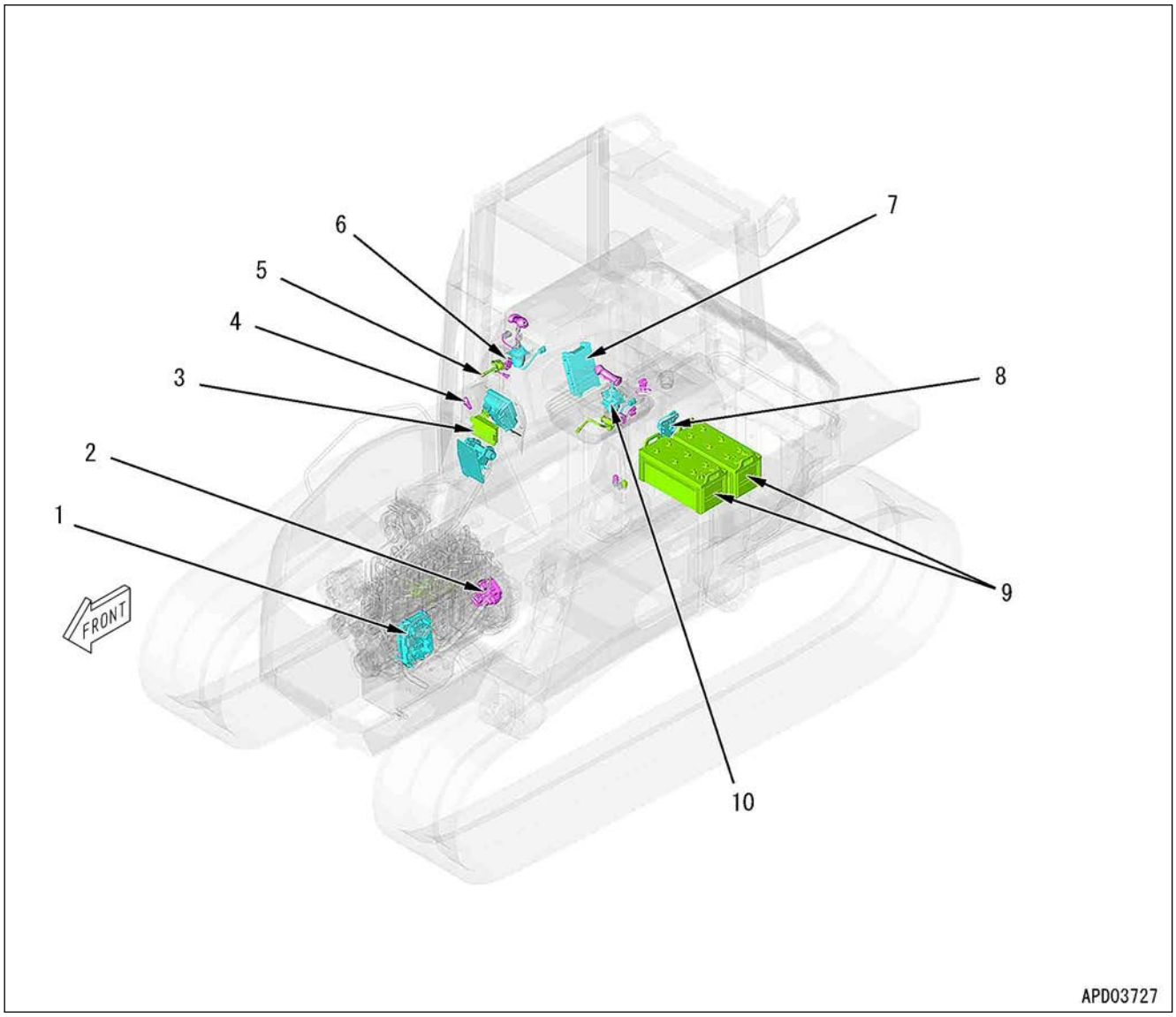
Power train

HST pump		

Status		Elapsed time (*1)	Machine monitor					Engine deration (*5)
			Message of SCR Information	Caution lamp (Action level)	Tone of audible alert	Failure code for abnormality (*2),(*3)	Failure code for Inducement strategy status (*4)	
1	Warning	1 hour	1: Please inspect and maintain SCR system.	Red  APP14418 Red  APP14414	Long intermittently	CA4151 CB4151	No indication	Torque: over 25%
2	Escalated Warning (Warning 2)	2 hours	2: Without treatment, engine power will be derated.	Red  APP14418 Yellow  APP14417 Red  APP14414	Triplet (*6) Short intermittently (*7)	CA4151 CB4151	AS00R2 (Warning 2 (SCR Device Abnormality))	Torque: over 25%
3	Mild Inducement (Inducement 1)	3 hours	3: Engine power is under deration.	Red  APP14418 Red  APP14415 Red  APP14414	Long intermittently	CA4151 CB4151	AS00R3 (Inducement 1 (SCR Device Abnormality))	Torque: over 25%

ENGINE CONTROL SYSTEM

LAYOUT OF ENGINE CONTROL SYSTEM (MACHINE WITH KOMTRAX TERMINAL)



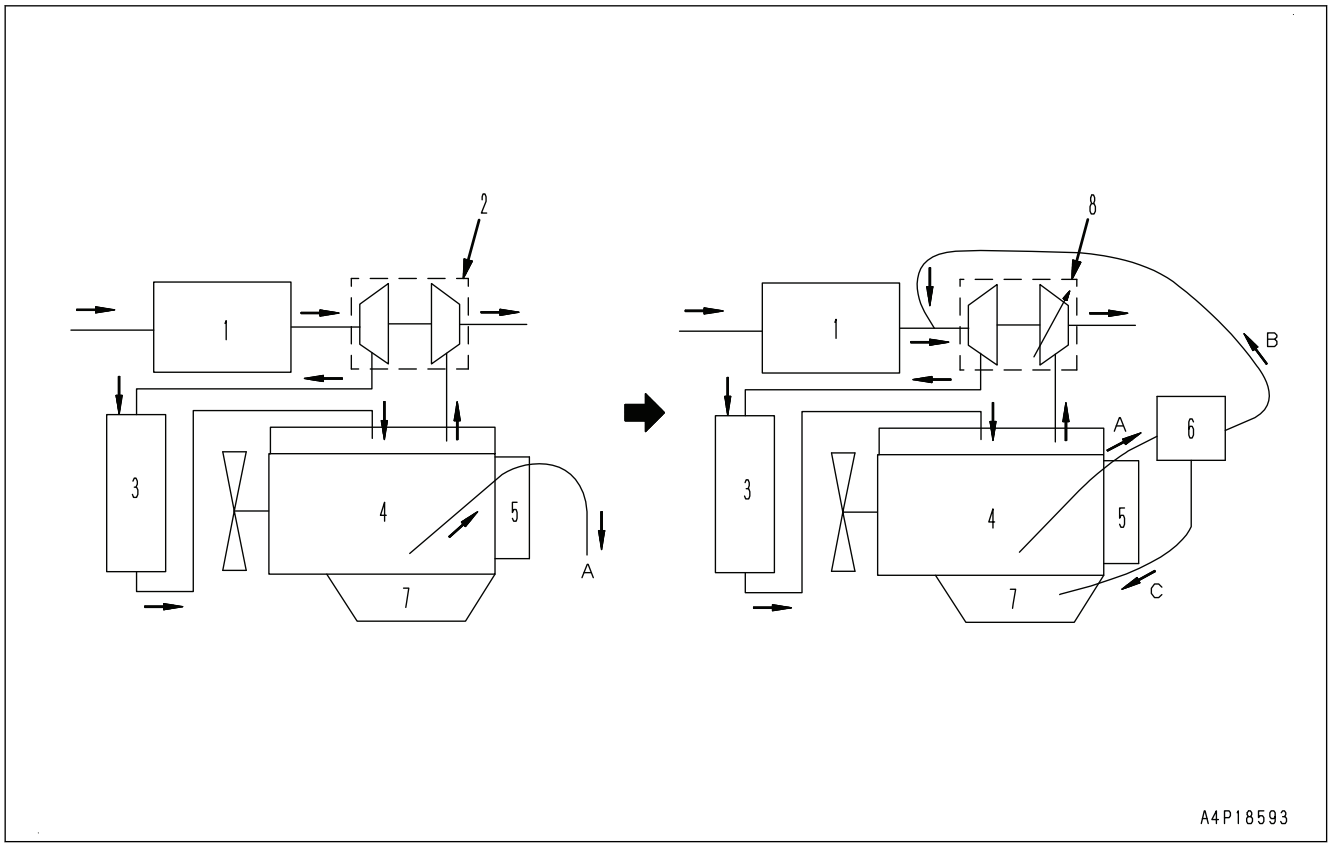
1: Engine controller
2: Fuel supply pump
3: KOMTRAX terminal
4: Engine shutdown secondary switch
5: Work equipment lock lever
6: Work equipment lock limit switch
7: HST controller
8: Battery disconnect switch
9: Battery
10: Electric steering control lever

FUNCTION OF KCCV SYSTEM

- In the past, blowby gas (A) was allowed to be released into the atmosphere in the past, but now it is restricted by emission regulations.
- Blowby gas (A) contains ingredients of the engine oil. A filter is installed to KCCV ventilator (1) to remove the engine oil to prevent the following possible problems if it is recirculated to VGT (2) as it is.
  - Deterioration of turbocharger and aftercooler performance caused by sticking engine oil
  - Abnormal combustion in engine
  - Malfunction of each sensor caused by sticking engine oil

OPERATION OF KCCV SYSTEM

Drawing on the left shows the conventional flow of blowby gas. Drawing on the right shows the flow of blowby gas which is sucked in KCCV ventilator and recirculated.



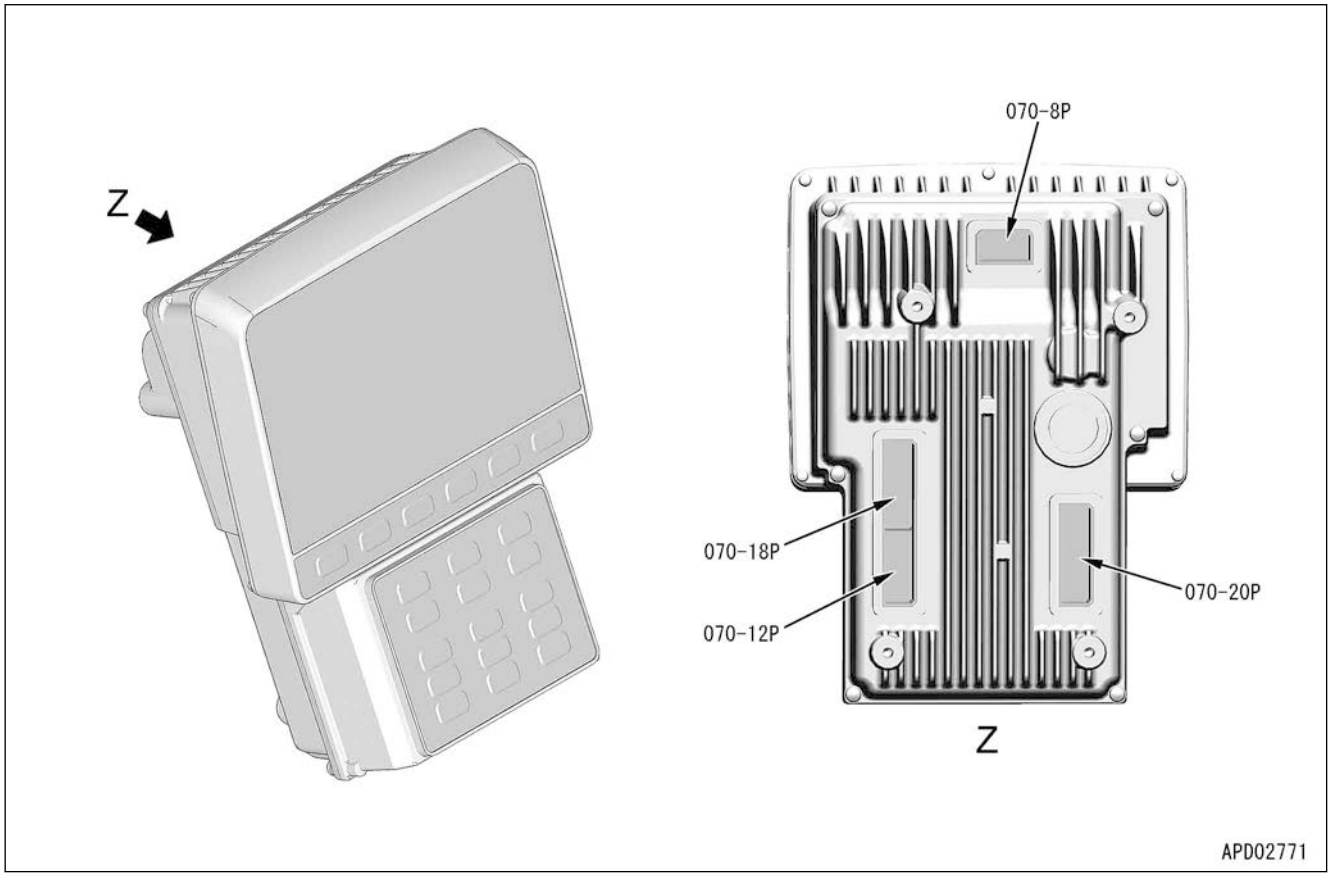
A: Blowby gas
B: Clean gas
1: Air cleaner
2: Turbocharger
3: Aftercooler
4: Cylinder block (crankcase)
C: Engine oil
5: Breather
6: KCCV ventilator
7: Engine oil pan
8: VGT

1. This system removes engine oil (C) from blowby gas (A) in cylinder block (4) by using the filter in KCCV ventilator (6), and recirculate clean gas (B) to the air intake side of VGT (8).
2. Separated engine oil (C) is drained to engine oil pan (7) through the check valve.

COMPONENT PARTS OF CONTROL SYSTEM

MACHINE MONITOR

FUNCTION OF MACHINE MONITOR



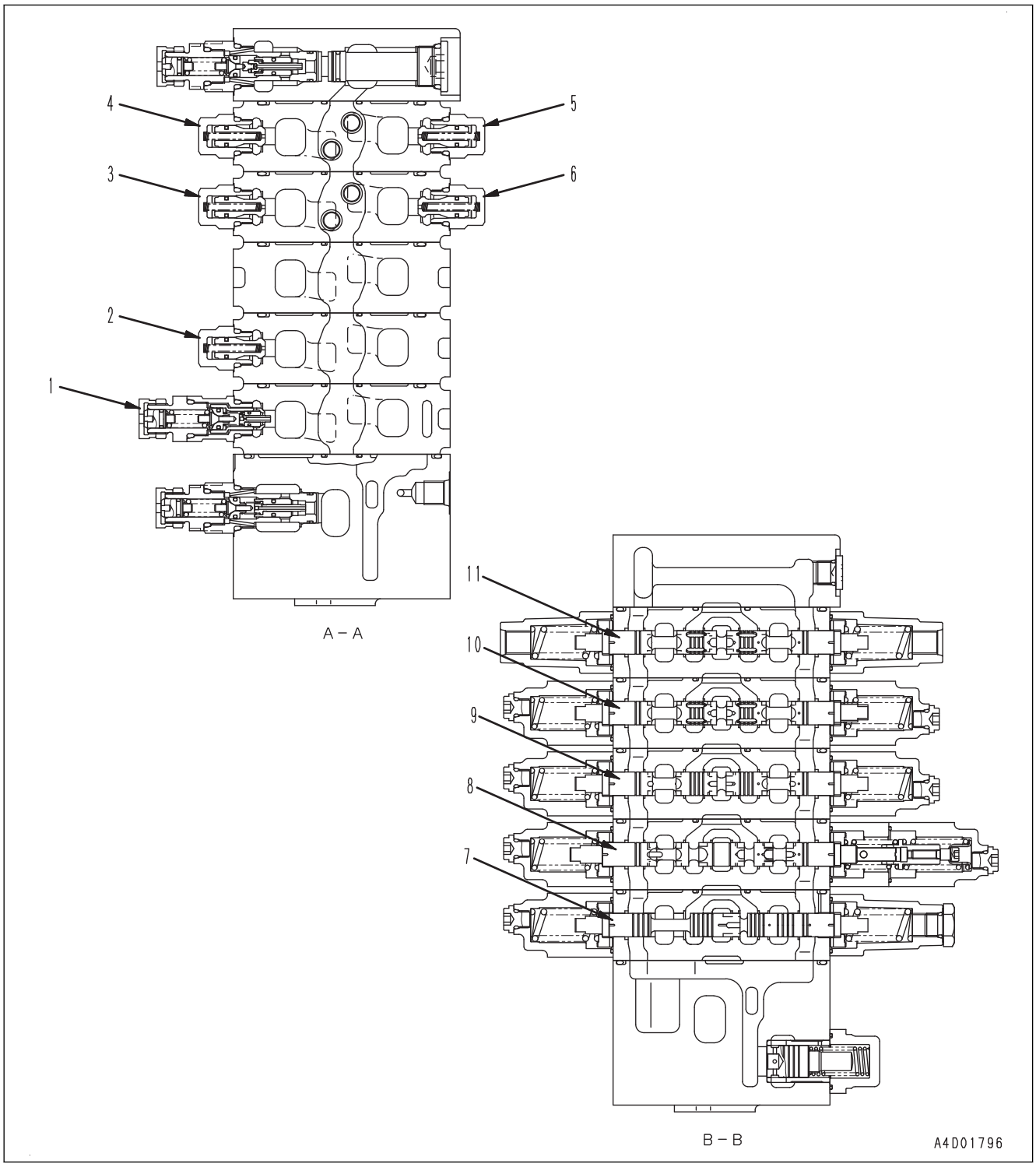
- The machine monitor has the monitor display function, mode selection function, and function of switching the electrical components, etc. It also has the built-in alarm buzzer.
- CPU (Central Processing Unit) is mounted inside, and it processes, displays, and outputs information.
- The machine monitor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

REMARK

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

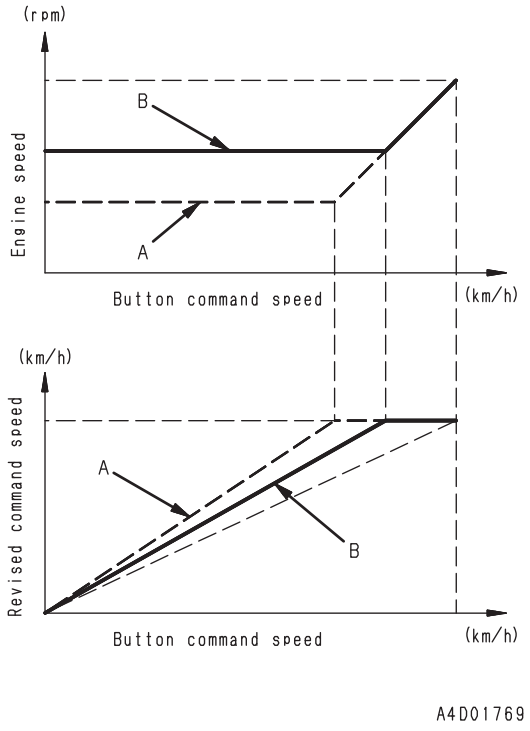
Pin No.	Signal name	Input/output signal
49	Injector #4 (+)	Output
50	Injector #5 (+)	Output
51	Injector #6 (+)	Output
52	Engine oil pressure switch	Input
53	(*1)	-
54	GND	Ground/Shield/ Return
55	GND	Ground/Shield/ Return
56	GND	Ground/Shield/ Return
57	GND	Ground/Shield/ Return
58	GND	Ground/Shield/ Return
59	(*1)	-
60	(*1)	-
61	Mass air flow and temperature sensor	Input
62	Charge temperature sensor	Input
63	Crank case pressure sensor	Input
64	(*1)	-
65	(*1)	-
66	(*1)	-
67	VGT position sensor	Input
68	(*1)	-
69	CAN_C (+)	Communication
70	Datalink3 (+) (KOMNET/r)	Communication
71	(*1)	-
72	(*1)	-
73	Injector #4 (-)	Ground/Shield/ Return
74	Injector #5 (-)	Ground/Shield/ Return
75	Injector #6 (-)	Ground/Shield/ Return
76	EGR valve solenoid (-)	Ground/Shield/ Return
77	(*1)	-
78	Sensor 5V power supply	Power supply
79	Sensor 5V power supply	Power supply
80	Sensor 12V power supply	Power supply
81	Sensor 5V power supply	Power supply

Sectional views (A-A, B-B)



1: Suction safety valve (cooling fan)
2: Suction valve (lift LOWER)
3: Suction valve (angle LEFT)
4: Suction valve (ripper RAISE)
5: Suction valve (ripper LOWER)
6: Suction valve (angle RIGHT)
7: Spool (cooling fan)
8: Spool (lift)
9: Spool (tilt)
10: Spool (angle)
11: Spool (ripper)

ENGINE LOW SPEED MATCHING CONTROL FUNCTION



A: E mode B: P mode

- This reduces the fuel consumption by reducing the engine speed according to the set travel speed and operating mode.
- When the set travel speed is low, this reduces the engine speed as shown in the figure above.
  This corrects the set travel speed by the decrease of engine speed for the travel speed to be constant.
- When the operating mode is set to E mode (A), the engine speed decreases for better fuel economy than in P mode (B).
- When the set travel speed is high, this increases the engine speed and keep the maximum travel speed as shown in the figure above.

HST PUMP AND MOTOR SEQUENCE CONTROL FUNCTION

HST

Abbreviation for Hydro Static Transmission

1: Speed sensor
2: Charge relief valve

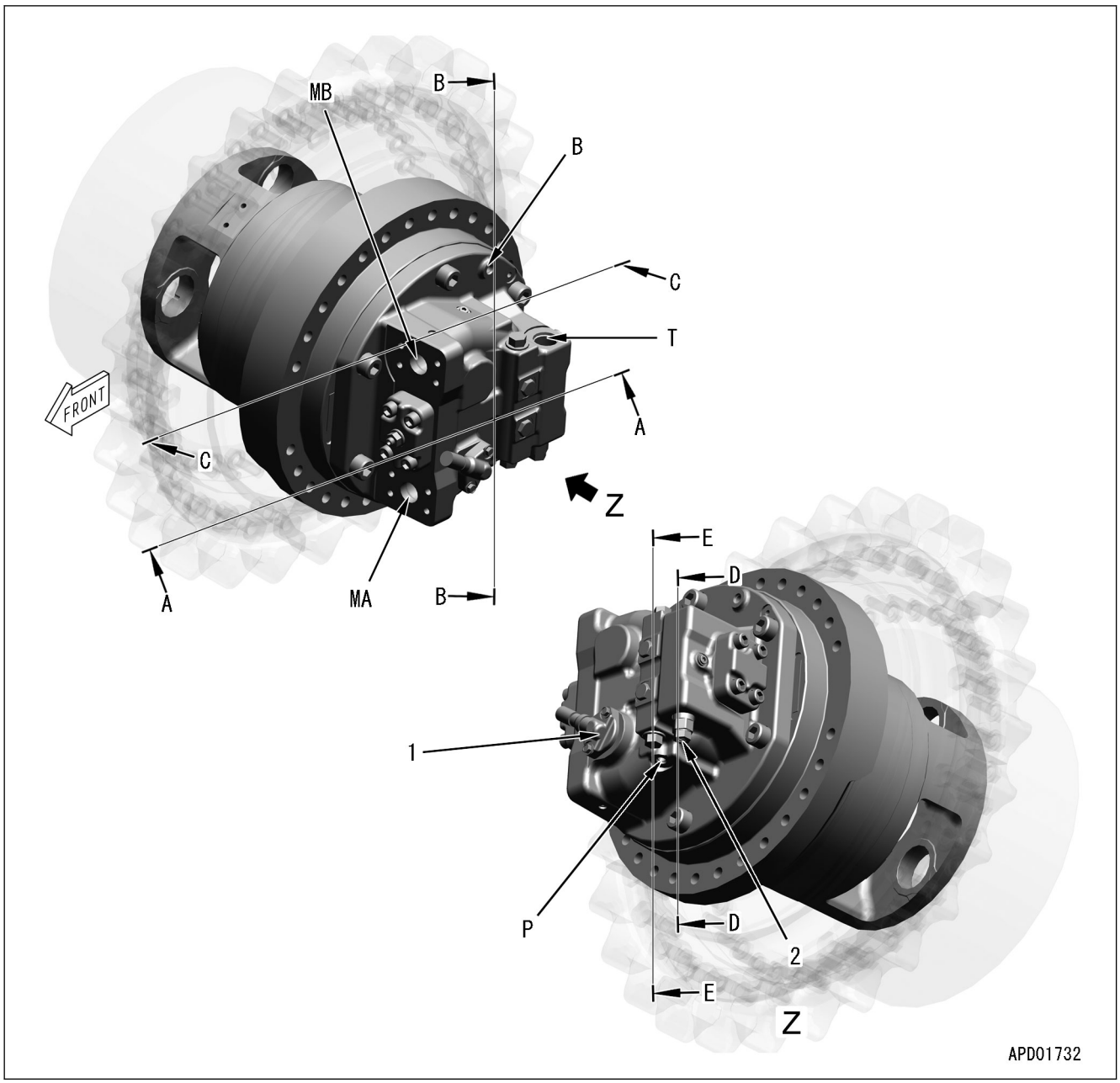
General view

R.H. HST motor

Rotation direction (facing the drive shaft)

Inflow from MA: Counterclockwise rotation

Inflow from MB: Clockwise rotation



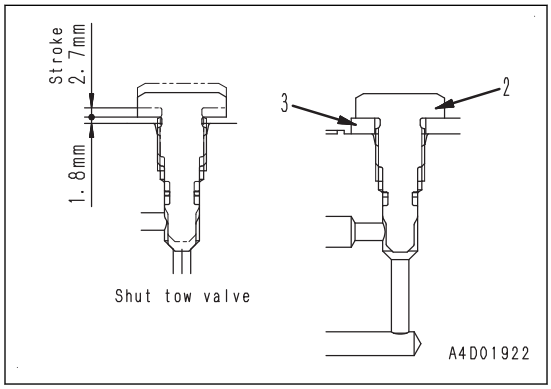
B: Parking brake release signal port
MA: (High pressure during forward travel) Discharge port
MB: (High pressure during reverse travel) Discharge port
P: Capacity control signal port
T: Drain
1: Speed sensor
2: Charge relief valve

10: Brake pressure sensor

Three solenoid valves (5), (8), and (9), two EPC valves (6) and (7), tow receiving valve (2), and brake pressure sensor (10) are installed in block (1).

FUNCTION OF 5-PORT VALVE OF EPC AND SOLENOID

- When parking brake solenoid valve (9) receives the parking brake actuation signal from HST controller, it drains the selector oil pressure and actuates the parking brake built in HST motor.
- The limit switch signals which operates when the brake pedal is fully depressed or operates together with the parking brake lever are not sent to slow brake solenoid valve (8) when the machine is stopped. Then slow brake solenoid valve (8) gradually drains the selector oil pressure, and actuates the parking brake built in HST motor.
- When R.H. HST motor EPC valve (6) and L.H. HST motor EPC valve (7) receive the signal of joystick (steering, directional and gear shift lever), they output oil pressure according to that signal in order to increase or decrease HST motor capacity.
- Work equipment lock solenoid valve (5) is installed between the charge filter outlet and work equipment PPC valve.
- When the work equipment lock lever is set in “FREE” position, work equipment lock solenoid valve (5) actuates as it links with work equipment lock switch to open the work equipment control circuit, then the work equipment becomes operable.
- Tow receiving valve (2) is installed between parking brake solenoid valve (9) and HST motor.
- When the parking brake cannot be released because of engine failure, the operator can release it by removing tow receiving plate (3), screw in tow receiving valve (2), and applying parking brake release pressure from outside.

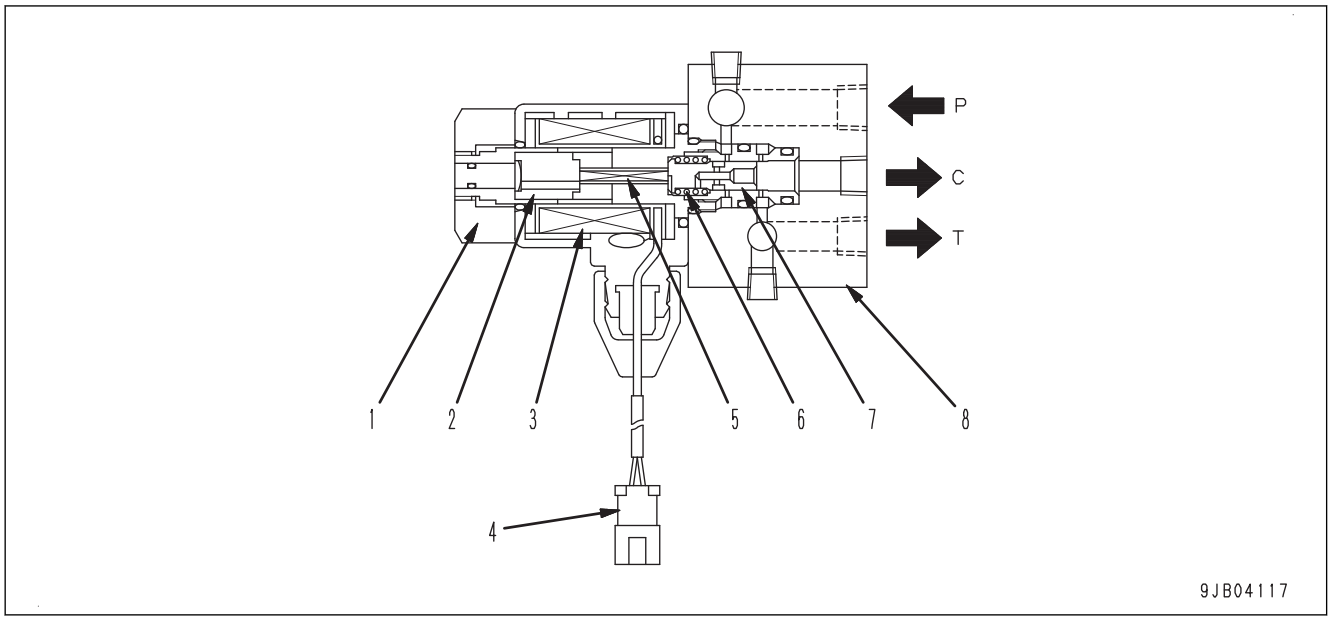


REMARK

For the procedure for releasing the parking brake, see TESTING AND ADJUSTING, “PROCEDURE FOR RELEASING PARKING BRAKE”.

STRUCTURE OF SOLENOID VALVE

General view and sectional view



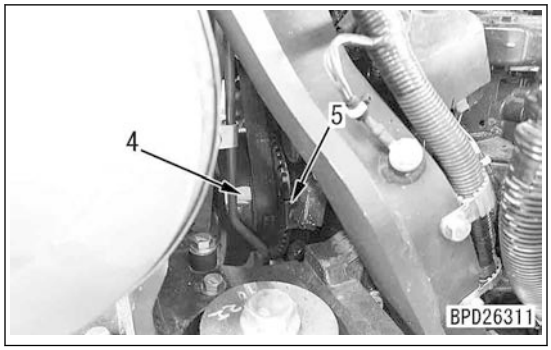
C: To work equipment PPC valve P: From charge filter outlet

20 STANDARD VALUE TABLE

Machine model			D61EX-24	
Engine			SAA6D107E-3	
Item	Measurement condition	Unit	Standard value for new machine	Repair limit
Blade LOWER	• HST oil temperature (hydraulic oil temperature)40 to 60 °C • Operating Mode: P (Power mode) • Fuel control dial: MAX (High idle) position • Time required to move the blade between rising end and the ground • See “MACHINE POSTURE AND PROCEDURE FOR MEASURING PERFORMANCE”, Fig. 3.	Sec.	1.7±0.3	Max. 2.4
Blade LEFT tilt	• HST oil temperature (hydraulic oil temperature)40 to 60 °C • Operating Mode: P (Power mode) • Fuel control dial: MAX (High idle) position • Time required to move blade between RIGHT tilt stroke end and LEFT tilt stroke end • See “MACHINE POSTURE AND PROCEDURE FOR MEASURING PERFORMANCE”, Fig. 4.	Sec.	1.9±0.2	Max. 2.4
Blade right tilt	• HST oil temperature (hydraulic oil temperature)40 to 60 °C • Operating Mode: P (Power mode) • Fuel control dial: MAX (High idle) position • Time required to move blade between LEFT tilt stroke end and RIGHT tilt stroke end • See “MACHINE POSTURE AND PROCEDURE FOR MEASURING PERFORMANCE”, Fig. 4.	Sec.	1.9±0.2	Max. 2.4
Blade left angle	• HST oil temperature (hydraulic oil temperature)40 to 60 °C • Operating Mode: P (Power mode) • Fuel control dial: MAX (High idle) position • Time required to move blade between RIGHT angle stroke end and LEFT angle stroke end • See “MACHINE POSTURE AND PROCEDURE FOR MEASURING PERFORMANCE”, Fig. 5.	Sec.	3.8±0.3	Max. 4.7

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

4. Rotate the crankshaft forward with ratchet B, and align the yellow paint (line) of vibration damper (4) with bracket (5) of engine speed sensor.



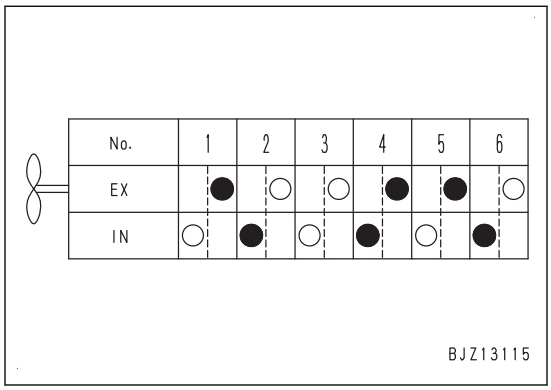
REMARK

This alignment is not an alignment to obtain the compression top dead center of No. 1 cylinder and No. 6 cylinder. (it will be 76 to 88 deg. before the compression top dead center.)

5. Check the valve clearance by confirming the movement of rocker arm of No. 1 cylinder.

REMARK

- If you can move the rocker arm of air intake side (IN) with the hand by the valve clearance amount, check the valve clearance marked with ○ in the valve layout drawing.
- If you can move the rocker arm of exhaust side (EX) with the hand by the valve clearance amount, check the valve clearance marked with ● in the valve layout drawing.



6. Rotate the crankshaft in the normal direction by 1 turn and check other valve clearance.

REMARK

For alignment method, see step 4.

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

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

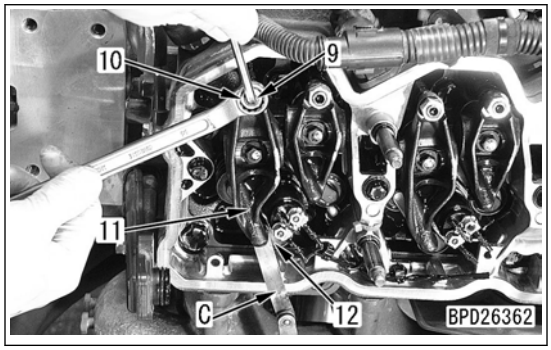
NOTICE

Be sure to remove gear A.

METHOD FOR ADJUSTING VALVE CLEARANCE

After testing, adjust the valve clearance according to the following procedure, if necessary.

1. While fixing adjustment screw (9), loosen lock nut (10).
2. Insert feeler gauge C in the clearance between rocker arm (11) and crosshead (12), and adjust the valve clearance with adjustment screw (9).



Turn adjustment screw (9) with feeler gauge C inserted, and adjust it with adjustment screw (9) until the feeler gauge C can move lightly.

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

3. With adjustment screw (9) fixed, tighten lock nut (10).

Lock nut (10):
24±4 Nm {2.45±0.41 kgfm}

Tighten lock nut (10), and check the valve clearance again.

After finishing the adjustment, restore the machine.

HANDLE CYLINDER CUT-OUT MODE OPERATION

The cylinder cutout mode operation means to run the engine with the fuel injectors of one or more cylinders disabled electrically to reduce the number of active cylinders. The purposes and effects of cylinder cutout mode operation are as follows.

- Cylinder cutout mode operation is used to find out a cylinder which does not output power normally (or, combustion in it is abnormal).
- If the engine speed and output do not change from the normal operation (all-cylinder operation) when a cylinder is cutout with the cylinder cutout mode operation, that cylinder has a failure.
  The possible failures are as follows.
  - Compression gas leakage from cylinder head gasket area
  - Defective injection
  - Defective piston, piston ring or cylinder liner
  - Defective valve mechanism (valve operating system)
  - Defective electrical system
- Common rail fuel injection system individually controls the injector of each cylinder electronically , so the cylinder cutout test can be performed easily by the simple operations of the switches compared with the mechanical fuel injection system. So, the defective cylinder can be found out easily.

TEST AdBlue/DEF PUMP HEATER RELAY

Tools for testing AdBlue/DEF pump heater relay

Symbol	Part No.	Part name	Q'ty	Remarks
A	799-601-9130	T-adapter	1	
B	799-601-2600	T-box	1	
C	Commercially available	Multimeter	1	

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

NOTICE

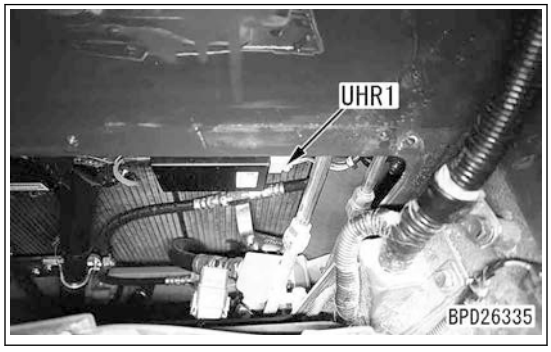
- **If KOMNET communication error remains less than 1 second, engine controller is unable to detect it, and the test may be continued while the machine monitor does not continue (standard screen). In that case, turn the starting switch to OFF position once, and then system operating lamp goes out, and the engine controller shuts down to reset the test.**
- **In this pump heater relay test, when the starting switch is turned to OFF position while testing (energizing), and turned to ON position again before system operating lamp goes out, then energizing restarts. If, by mistake, the starting switch is turned to ON position while testing (energizing) without waiting that system lamp goes out, immediately turn the starting switch to OFF position regardless of the display of machine monitor, and wait the system operating lamp goes out.**

“AdBlue/DEF Pump Heater Relay Test” function can actuate AdBlue/DEF pump heater at any timing, and can check electrical action.

For testing of AdBlue/DEF pump heater relay to perform troubleshooting or others, refer to this section.

METHOD FOR TESTING AdBlue/DEF PUMP HEATER RELAY

1. Check that the system operating lamp is off, turn the battery disconnect switch to OFF position, and remove the key.
2. Remove the inspection cover at the rear of operator's seat.
3. Disconnect the connector (UHR1) to be tested.



4. Press the reverse travel speed setting switch (2) once.

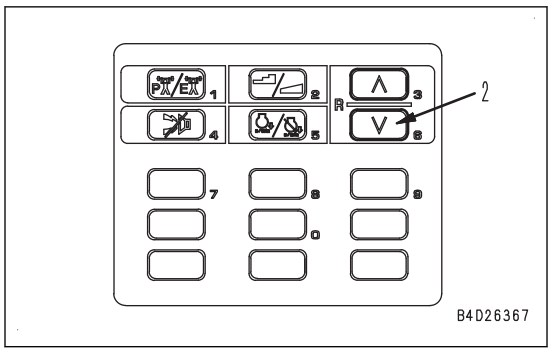
   Advancing or backing speed of the machine will be the same.

5. Set the parking brake lever to FREE position.

6. Perform forward and reverse operation over 20 times and bleed air.

   REMARK

   Operate the machine to “Forward → NEUTRAL → Reverse → NEUTRAL” as one cycle. Repeat the operation over 20 times.



4. Install the nipple C and connect it to gauge A1 of hydraulic tester A.

   REMARK

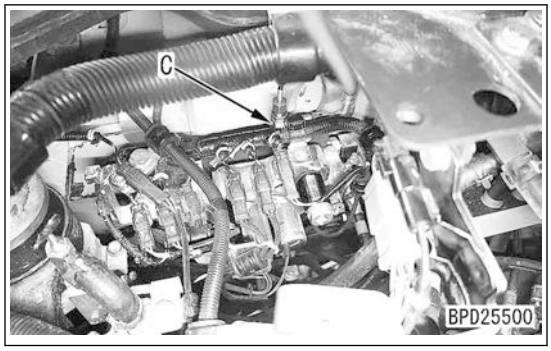
   Gauge in digital hydraulic tester B can also be used in place of gauge A1.

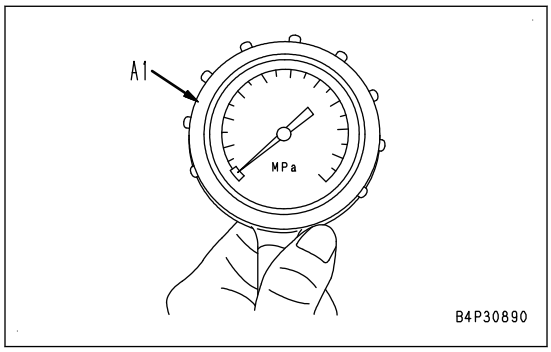
5. Start the engine and set the parking brake lever to FREE position.
6. Measure the oil pressure when all the control levers are in neutral.

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

   REMARK

   The control circuit oil pressure is the same as HST charge circuit pressure when joystick (steering, directional and gear shift lever) (PCCS lever) is in neutral.





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

METHOD FOR ADJUSTING OIL PRESSURE OF CONTROL CIRCUIT

REMARK

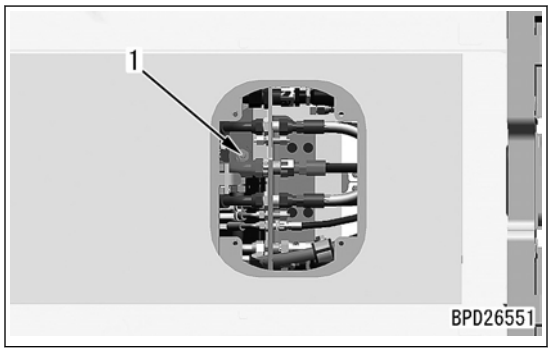
The adjustment method is the same as “Method for adjusting HST charge circuit pressure (in neutral)”.

1. Remove the cover from the bottom of the radiator.
2. While fixing adjustment screw (2) of charge safety valve (1) of hydraulic oil cooler bypass/ HST charge safety valve (made in one), loosen lock nut (3).
3. Turn adjustment screw (2) to adjust oil pressure.

   REMARK

   - If adjustment screw (2) is turned clockwise, the pressure increases.
   - If adjustment screw (2) is turned counterclockwise, the pressure decreases.

   Quantity of pressure adjustment per turn of adjustment screw (2): Approximately 1.55 MPa {15.38 kgf/cm^2}

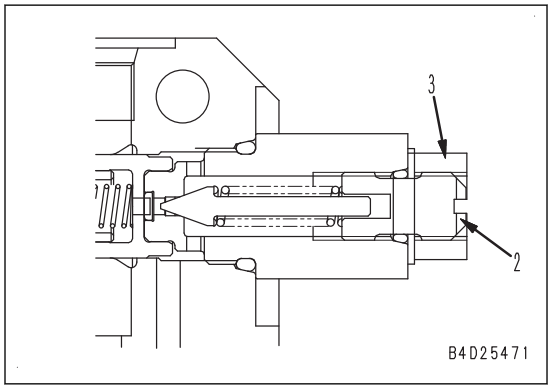


4. With adjustment screw (2) fixed, tighten lock nut (3).

   Lock nut (3):
   58.8 to 78.5 Nm {6 to 8 kgfm}

   REMARK

   After adjustment, check that the control circuit pressure is normal. For details, see “METHOD FOR TESTING OIL PRESSURE OF CONTROL CIRCUIT”.



Service Mode
METHOD FOR CONFIRMING MAINTENANCE RECORD
METHOD FOR OPERATING MAINTENANCE MODE SETTING
METHOD FOR OPERATING PHONE NUMBER ENTRY SETTING
METHOD FOR SETTING WITH DEFAULT SETTING MENU (KEY-ON MODE)
METHOD FOR SETTING WITH DEFAULT SETTING MENU (UNIT)
METHOD FOR SETTING WITH DEFAULT SETTING MENU (CAMERA)
METHOD FOR SETTING WITH DEFAULT SETTING MENU (FLOAT BUZZER)
METHOD FOR SETTING WITH DEFAULT SETTING MENU (AUTO IDLE STOP TIMER FIXING)
METHOD FOR OPERATING TESTING MENU (CYLINDER CUT-OUT OPERATION)
METHOD FOR OPERATING TESTING MENU (REGENERATION FOR SERVICE)
METHOD FOR OPERATING TESTING MENU (KDPF MEMORY RESET)
METHOD FOR OPERATING TESTING MENU (SCR SERVICE TEST)
METHOD FOR OPERATING TESTING MENU (ENGINE CONTROLLER ACTIVE FAULT CLEAR)
METHOD FOR OPERATING TESTING MENU (ASH IN SOOT ACCUMULATION CORRECTION)
METHOD FOR OPERATING TESTING MENU (RESET NUMBER OF ABRUPT ENGINE STOP BY AIS)
METHOD FOR OPERATING TESTING MENU (ENGINE STOP AdBlue/DEF INJ OVERHEAT COUNT RESET)
VARIOUS SETTINGS OF MACHINE
METHOD FOR PERFORMING NO-INJECTION CRANKING
METHOD FOR CONFIRMING KOMTRAX SETTINGS (TERMINAL STATUS)
METHOD FOR CONFIRMING KOMTRAX SETTINGS (GPS AND COMMUNICATION STATUS)
METHOD FOR CONFIRMING KOMTRAX SETTINGS (MODEM STATUS)
METHOD FOR DISPLAYING SERVICE MESSAGE

REMARK

Input a code (2-digit) with the numeral input switches to directly select the item.

Items selectable in maintenance record

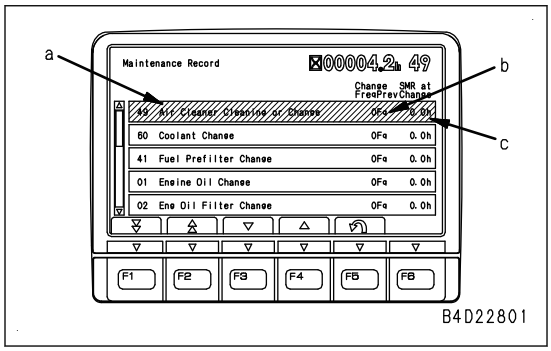
Code	Item
49	Air Cleaner Cleaning or Change
60	Coolant Change
41	Fuel Prefilter Change
01	Engine Oil Change
02	Engine Oil Filter Change
03	Fuel Main Filter Change
08	Final Drive Case Oil Change
05	Hyd Oil Tank Breather Change
44	Fuel Tank Breather Change
59	DEF Tank Breather Change
04	Hydraulic Oil Filter Change
10	Hydraulic Oil Change
26	HST Oil Filter Change
47	KCCV Filter Change
58	DEF Filter Change
48	KDPF Filter Cleaning
67	DEF Tank Washing

Information displayed on “Maintenance Record” screen

a: Maintenance items

b: Number of replacements up to now

c: Service meter reading (SMR) at the last replacement



METHOD FOR OPERATING MAINTENANCE MODE SETTING

The actuating condition of the maintenance function in the operator mode can be set and changed by this menus.

- To enable or disable the function
- To change the replacement interval setting (by item)
- To initialize all of the replacement interval setting.

3. On “Adjustment” screen, perform “Brake Pedal Potentio Detent Set” with the function switches.

   F3: Not used

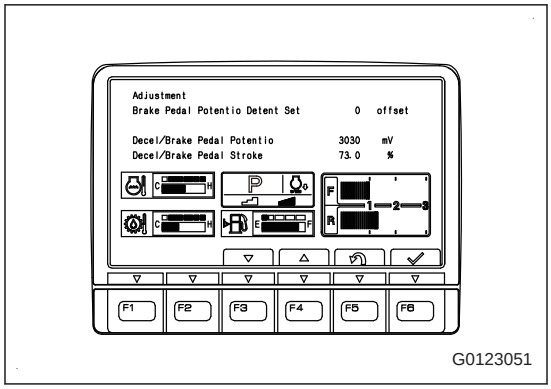
   F4: Not used

   F5: Returns to adjustment item selection screen

   F6: Saves the compensation value.

   1) Keep the decelerator/brake pedal at the detect position (Depress it to the operating position of the 2-stage spring, and keep it there (“Decelerator/brake ratio”: “73%”)).

   2) Press F6, and check that warning buzzer sounds.



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REMARK

- This adjustment does not change the displayed values other than the compensation value.
- In this adjustment, saved compensation values are effective even when the starting switch is turned to OFF position after the adjustment is completed.
- “Brake Pedal Potentio Detent Set” does not adjust the braking performance.
- Even if F3 or F4 is pressed, switches do not work.

METHOD FOR ADJUSTING WITH ADJUSTMENT MENU (BRAKE PEDAL POTENTIO FULL SET)

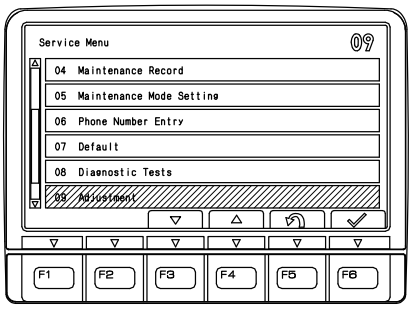
“Brake Pedal Potentio Full Set” makes the HST controller recognize and save the voltage of decelerator/brake pedal potentiometer at the full stroke position (“Decelerator/brake ratio”: “100%”).

When HST controller or decelerator/brake pedal potentiometer is replaced, or when decelerator/brake pedal linkage is adjusted, always perform this adjustment.

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

REMARK

For selecting method, see “Operating method of service mode” in “SERVICE MODE”.

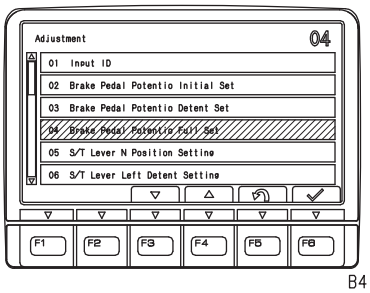


B4P23608

2. On “Adjustment” menu screen, select “Brake Pedal Potentio Full Set” with function switches or numeral input switches.

REMARK

- For details of adjustment items, see “ADJUSTMENT ITEMS TABLE”.
- For selecting method, see “Operating method of service mode” in “SERVICE MODE”.



B4D25420

REMARK

- The alarm buzzer keeps sounding during adjustment.
- After the adjustment starts, display (a) of adjustment changes from “1/5” to “5/5” automatically.
- When the machine stops and “5/5” is displayed (a), the adjustment is completed.
- If joystick (steering, directional and gear shift lever), decelerator/brake pedal, or fuel control dial is operated, the machine operates correctly as instructed, and interrupts the adjustment work.
- When the adjustment is interrupted, the travel speed at the time of interruption is maintained.
- When restarting the adjustment after an interruption, repeat the procedure from step 5.
- If the adjustment is interrupted automatically and “ERR1” is displayed in display (a), check the following devices. (An error message appears when the track shoe does not move even if HST pump EPC current increases.)

  When track shoe does not move: HST pump

  When track shoe moves: HST motor speed sensor

9. After the adjustment is completed, set the steering, directional and gear shift levers to NEUTRAL position and the parking brake lever to LOCK position.

REMARK

In this adjustment mode, the save adjustment values are effective even when the starting switch is turned to OFF position after the adjustment is completed.

METHOD FOR PERFORMING WITH ADJUSTMENT ID: 3424 (HST PUMP REVERSE ADJUSTMENT SELF-PROPELLED1)

- “HST Pump Reverse Adjustment Self-propelled 1” makes HST controller recognize and save the starting position and maximum capacity position in the relationship between the reverse EPC current and capacity of HST pump while the machine is traveling.
- Perform this adjustment when the track shoe cannot run idle and it is required to travel the machine for adjustment. When the track shoe can run idle, perform “F HST Pump Setting” and “R HST Pump Setting”, and this adjustment is unnecessary.

⚠ **Before selecting this adjustment, move the machine to a flat ground where there is no obstacle, and the machine can travel for more than 30 m.**

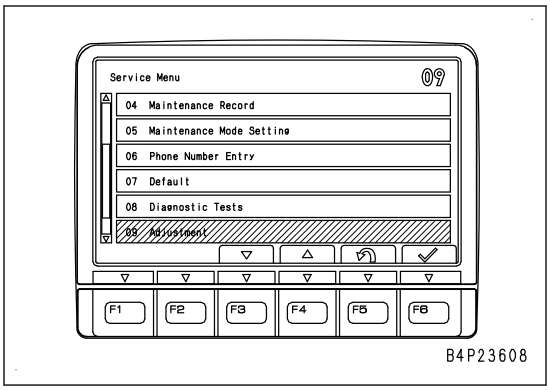
⚠ **Place the machine on a level ground, lower the work equipment completely to the ground, stop the engine, and set the parking brake lever and work equipment lock lever to LOCK position.**

When HST controller, HST pump assembly, or HST pump EPC valve is replaced, perform this adjustment as necessary.

1. Start the engine.
2. Select “Adjustment” on “Service Menu” screen.

REMARK

For selecting method, see “Operating method of service mode” in “SERVICE MODE”.



CHECK KOMTRAX Settings (Modem Information) (MACHINE WITH GATEWAY FUNCTION CONTROLLER)

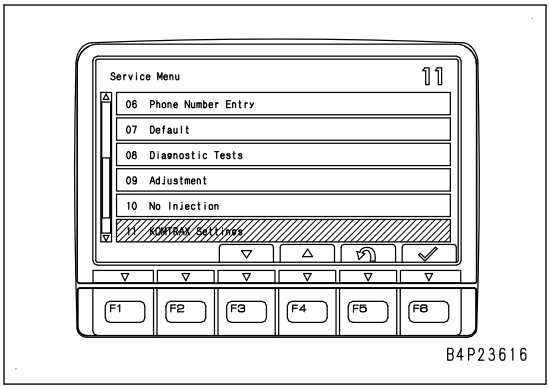
You can check the settings and operating state of KOMTRAX with the "KOMTRAX Settings".

“Modem Information” is used to check the telephone number and IMSI of KOMTRAX communication modem.

1. On the “Service Menu” screen, select the “KOMTRAX Settings”.

   REMARK

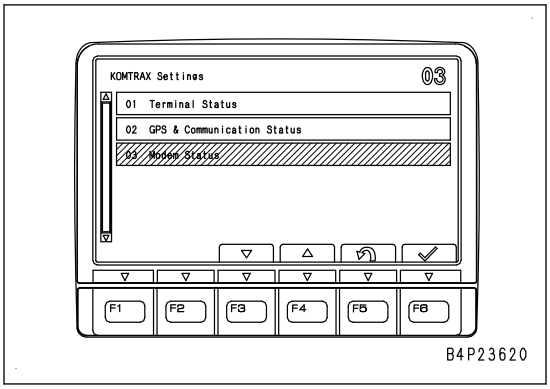
   For how to select, see “SERVICE MODE” in “SERVICE MODE”.



2. On the “KOMTRAX Settings” screen, select the “Modem Information” with function switches or numeral input switches.

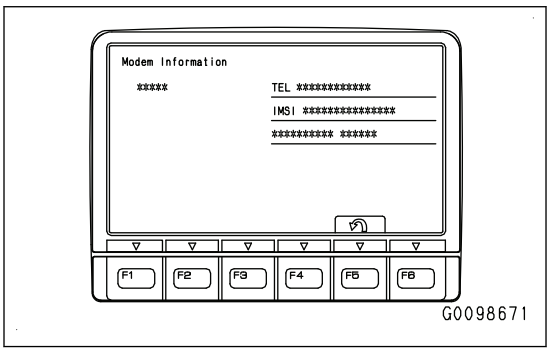
   REMARK

   For how to select, see “SERVICE MODE” in “SERVICE MODE”.



3. Telephone number, serial number of the IMSI and the communication terminal assembly, and serial code are displayed.

   F5: The screen goes back to “KOMTRAX Settings” screen.



METHOD FOR DISPLAYING SERVICE MESSAGE

Special messages for the technician sent from the KOMTRAX base station (a distributor, etc.) can be checked with this function.

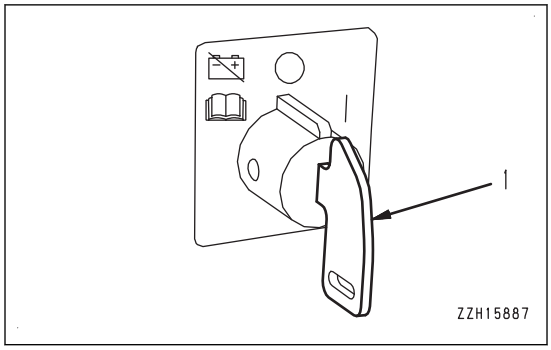
If a received message includes a setting operation, a return mail can be sent by using the numeral input switches as well.

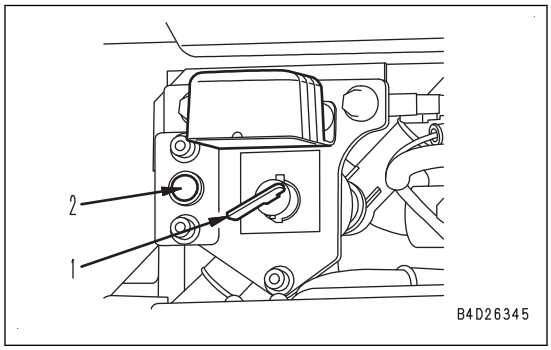
HANDLE BATTERY DISCONNECT SWITCH (MACHINE WITH GATEWAY FUNCTION CONTROLLER)

⚠ If battery disconnect switch (1) is turned to ON position by unauthorized person, it is extremely dangerous.

(O): OFF position

(I): ON position





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

NOTICE

When turning the battery disconnect switch (1) to OFF position, always remove the key.

- The operating condition of each controller can be checked with the system operating lamp (2) to prevent the abnormal end of the disconnection of the battery power supply circuit while the controllers are in operation.
- Before shutting off the battery power supply circuit, turn the starting switch to OFF position, and check that system operating lamp (2) goes out, then turn the battery disconnect switch (1) to OFF position.
- If the battery disconnect switch (1) is turned to OFF position (battery power supply circuit is OFF) while the system operating lamp (2) is lit, data loss error of controller may occur. Never operate the battery disconnect switch (1) while the system operating lamp (2) is lit.
- The system operating lamp (2) goes out in maximum. 6 minutes after the starting switch is turned to OFF position.
- System operating lamp (2) may sometimes light up while the starting switch is turned to OFF position because KOMTRAX terminal may maintain its communication under this condition.
- Even if system operating lamp (2) is not lit, it may seem to be lit slightly because of a very little leakage current inside the controller. This phenomenon does not indicate abnormality.
  - The KOMTRAX terminal performs communication periodically even if the starting switch is kept in OFF position, thus it repeats starting and stopping.
  - The start and stop cycle (sleep cycle) of KOMTRAX terminal varies depending on the factors including the communication state and machine stop time. It may be lit for a maximum of approximately 1 hour.
- When you want to open the battery circuit for maintenance but the system operating lamp (2) is lit, turn the starting switch to ON position once, turn it to OFF position, and then the lamp goes out in 6 minutes. After system operating lamp (2) goes out, turn the battery disconnect switch (1) to OFF position immediately.

List of failure codes is related to Inducement and cannot be cleared when freezing AdBlue/DEF (All territory)

Failure code	Detail of failure
CA1673	AdBlue/DEF Level Low Error 3
CA1682	AdBlue/DEF Pump Priming Error
CA3567	AdBlue/DEF Injector Open Circuit Error or Short Circuit Error
CA3574	AdBlue/DEF Pump Pressure Too Low Error
CA3575	AdBlue/DEF Pump Pressure Too High Error
CA3578	AdBlue/DEF FCV Voltage Low Error
CA3596	AdBlue/DEF Pump Pressure Unstable Error
CA3866	AdBlue/DEF Low Concentration Error 2
CA4277	AdBlue/DEF Quality Sensor Liquid Distinction Impossible Error
CA4768	Fuel in AdBlue/DEF Tank Error
CA4769	AdBlue/DEF Level Measurement Impossible
CA4842	AdBlue/DEF High Concentration Error

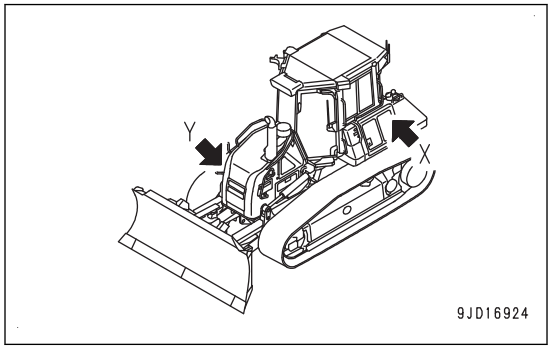
Check of fusible link for blowing out and corrosion

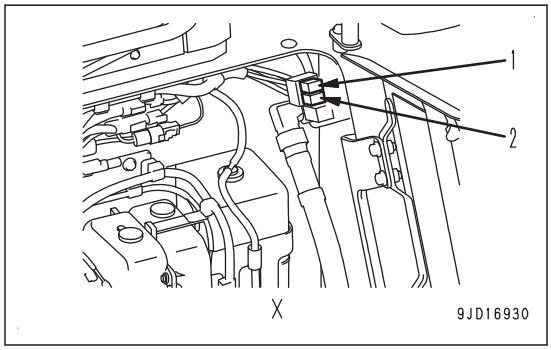
22. When the starting switch is turned to ON position, if the power supply is not turned on, the fusible link probably has an open circuit. Check it and replace it if needed.

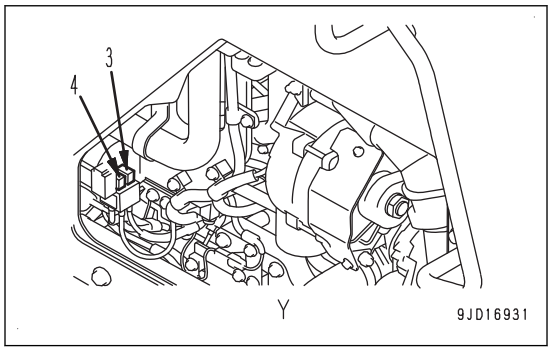
    REMARK

    - Make sure to turn off the power supply (starting switch in OFF position) before performing replacement of the fusible link.
    - A fusible link is a large-capacity fuse installed in the circuit where large current flows.
    - The fusible link protects electrical component and wiring from burning due to abnormal current.
    - Replace each fusible link with the same capacity ones.
    - Open the hydraulic tank inspection cover at the left side of machine, and open the fusible link case cover, and you will see fusible links (1) and (2).
    - Open the engine side cover at the right side of machine, and open the fusible link case cover, and you will see fusible links (3) and (4).

    Fusible link
    - For main power supply (1)
    - For continuous power supply (2)
    - For intake air heater (3)
    - For alternator (4)

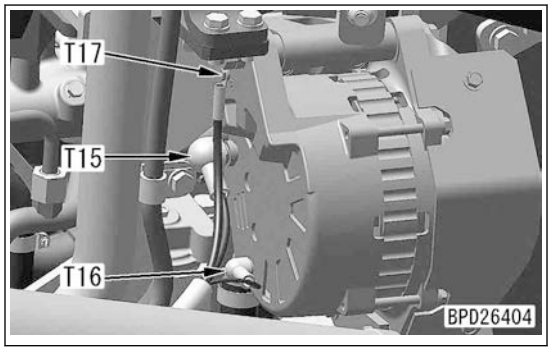






Check of alternator voltage (when engine speed is medium or higher)

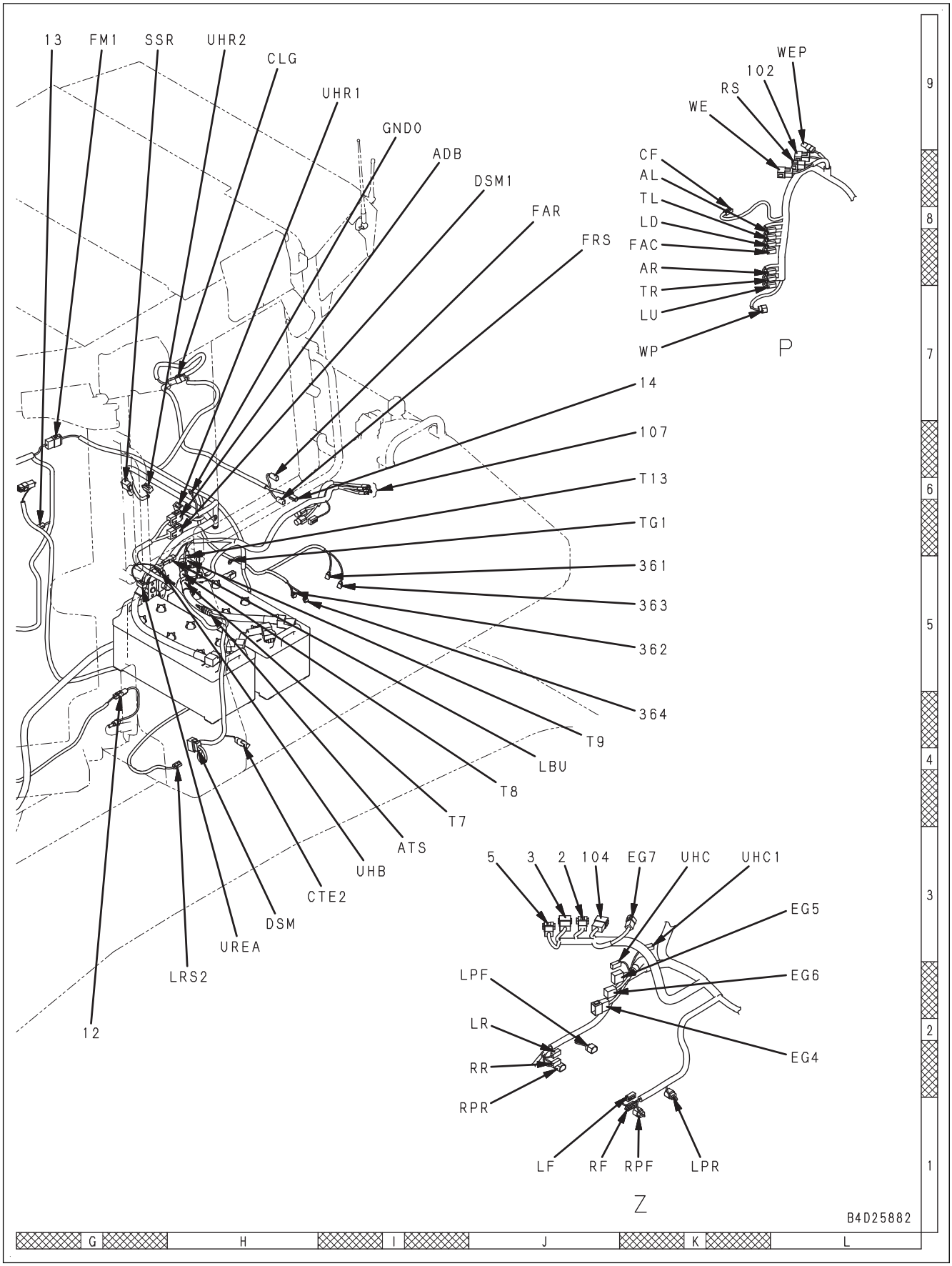
23. Open the engine hood.
24. Connect the positive (+) lead of the multimeter to alternator B terminal (T15) and connect the negative (-) lead to the chassis ground.
25. Start the engine and warm it up, and measure the voltage while running the engine at a medium or a higher speed.
    - If the voltage is abnormal, repair or replace the alternator.



Check of battery relay operation sound

26. Open the battery cover.
27. Turn the starting switch to ON and OFF positions, and check whether the battery relay operation sound is heard or not.
    - If the operation sound is not heard, see “ENGINE DOES NOT START (ENGINE DOES NOT CRANK)” in E mode.
    - If the relating circuit is normal, replace the battery relay.

2/6


13
FM1
SSR
UHR2
CLG
UHR1
GND0
ADB
DSM1
FAR
FRS
14
107
T13
TG1
361
363
362
364
T9
LBU
T8
T7
ATS
UHB
CTE2
DSM
UREA
LRS2
12
WEP
102
RS
WE
CF
AL
TL
LD
FAC
AR
TR
LU
WP
P
5
3
2
104
EG7
UHC
UHC1
EG5
EG6
EG4
LPF
LR
RR
RPR
LF
RF
RPF
LPR
Z
B4D25882
9
8
7
6
5
4
3
2
1
G
H
I
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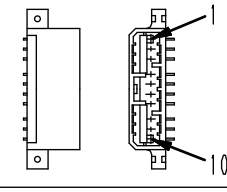
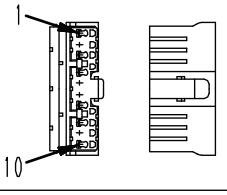
K
L

No. of pins	AMP070 type connector		
	Male (female housing)	Female (male housing)	Testing connection use special tool Part No.
10			—
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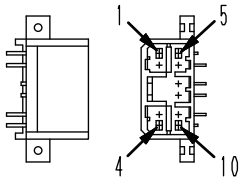
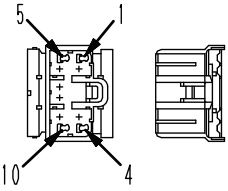
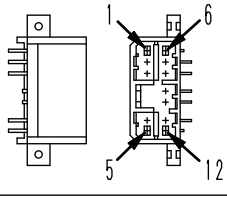
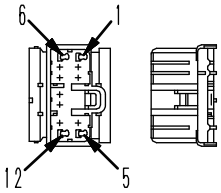
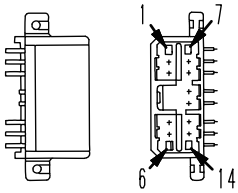
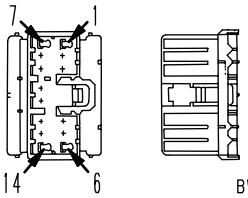
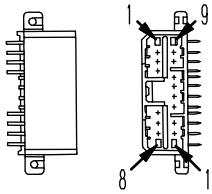
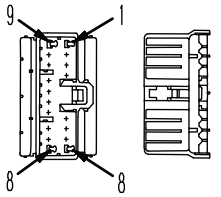
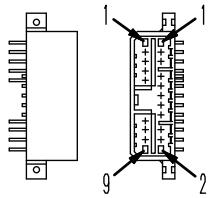
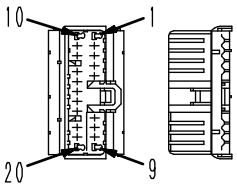
10			799-601-7510 (T-adapter)
	—	Part No. :7821-92-7330	
12			799-601-7520 (T-adapter)
	—	Part No. :7821-92-7340	
14			799-601-7530 (T-adapter)
	—	Part No. :7821-92-7350	
18			799-601-7540 (T-adapter)
	—	Part No. :7821-92-7360	
20			799-601-7550 (T-adapter)
	—	Part No. :7821-92-7370	

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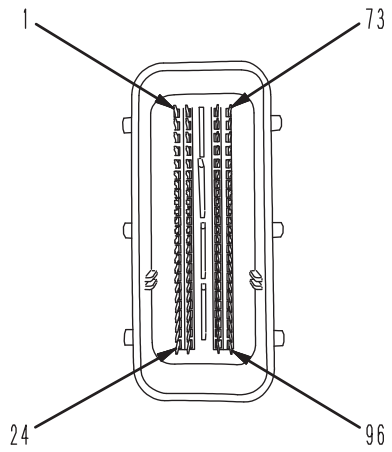
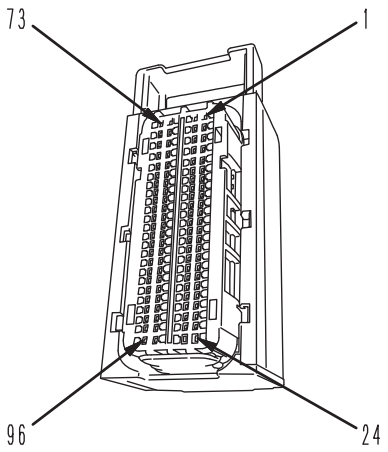
[The pin No. is also marked on the connector (electric wire insertion end)]

No. of pins	DELPHI connector for engine controller		
	Engine side (plug)	Harness side (receptacle)	Testing connection use special tool Part No.
96 (Brown) (Gray)			—
	—	—	

B4D24293

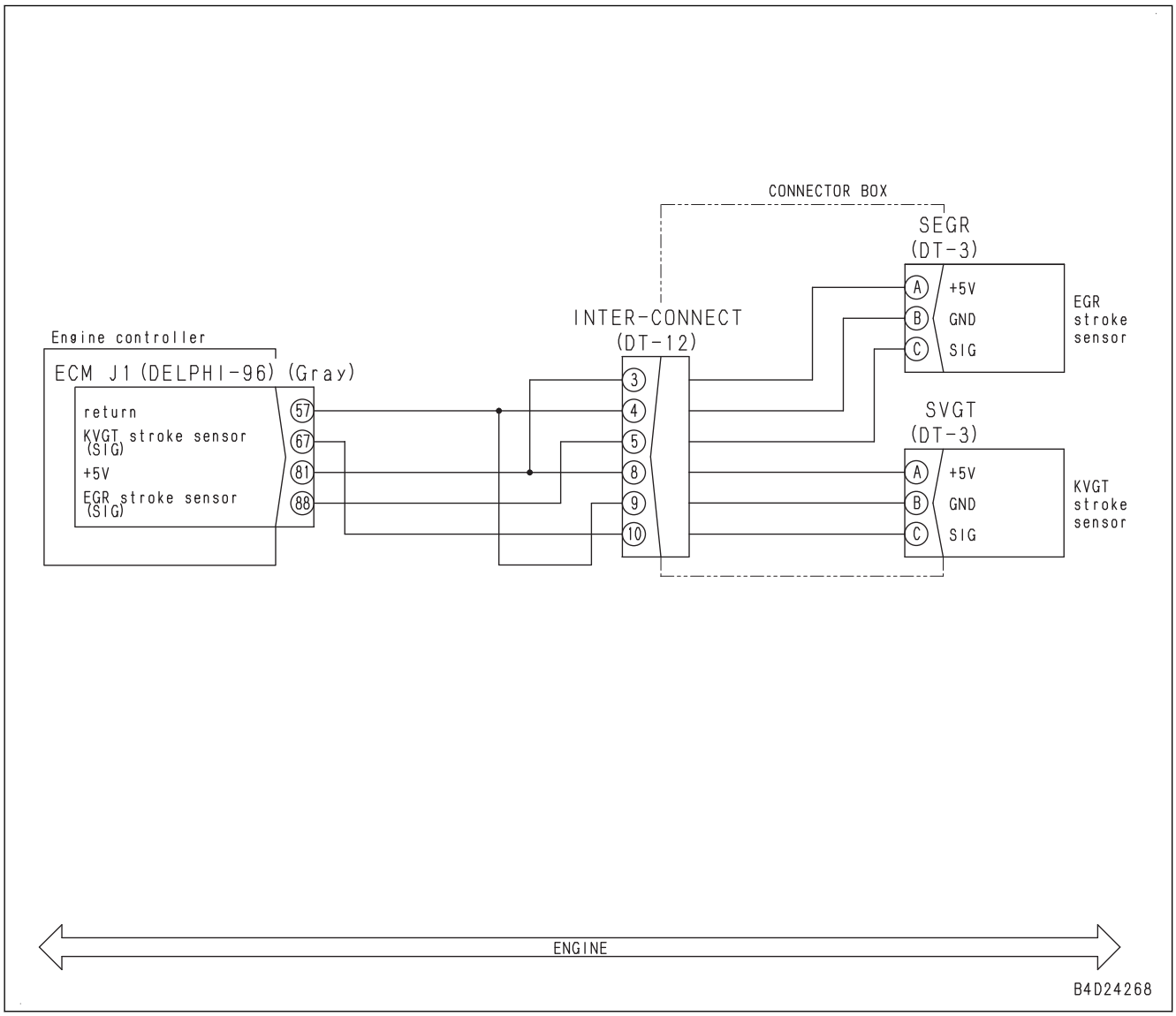
Failure code	Failure (Displayed on screen)	Applicable component	Action level	History category	Remarks
CA2186	Throttle Sensor Supply Voltage Low Error	ENG	L03	Electrical system	
CA2249	Common Rail Pressure Low Error 2	ENG	L03	Electrical system	
CA2271	EGR Valve Position Sensor High Error	ENG	L03	Electrical system	
CA2272	EGR Valve Position Sensor Low Error	ENG	L03	Electrical system	
CA2288	Turbocharger Speed High Error 1	ENG	L01	Electrical system	
CA2311	IMV Solenoid Error	ENG	L03	Electrical system	
CA2349	EGR Valve Solenoid Open Circuit Error	ENG	L03	Electrical system	
CA2353	EGR Valve Solenoid Short Circuit Error	ENG	L03	Electrical system	
CA2357	EGR Valve Servo Error	ENG	L03	Electrical system	
CA2381	KVGT Position Sensor High Error	ENG	L03	Electrical system	
CA2382	KVGT Position Sensor Low Error	ENG	L03	Electrical system	
CA2383	KVGT Solenoid Open Circuit Error	ENG	L03	Electrical system	
CA2386	KVGT Solenoid Short Circuit Error	ENG	L03	Electrical system	
CA2387	KVGT Servo Error	ENG	L03	Electrical system	
CA2555	Intake Air Heater Relay Open Circuit Error	ENG	L01	Electrical system	
CA2556	Intake Air Heater Relay Short Circuit Error	ENG	L01	Electrical system	
CA2637	KDOC Face Plugging	ENG	L01	Electrical system	
CA2639	Manual Stationary Regeneration Request	ENG	L01	Electrical system	
CA2771	SCR Outlet NOx Sensor Datalink Timeout Error	ENG	L01	Electrical system	
CA2777	Manual Stationary Regeneration Request but KDPF Regeneration Disable	ENG	-	Electrical system	
CA2976	AdBlue/DEF Pump Temperature Sensor Signal Error	ENG	L01	Electrical system	
CA3133	KDPF Outlet Pressure Sensor High Error	ENG	L03	Electrical system	
CA3134	KDPF Outlet Pressure Sensor Low Error	ENG	L03	Electrical system	

Failure code	Failure (Displayed on screen)	Applicable component	Action level	History category	Remarks
DK57KB	Travel Lever Potentiometer 4 Hot Short Circuit	HST	L03	Electrical system	
DLM0KX	HST Motor Speed Sensor Left or Right Error	HST	L03	Electrical system	
DLM1KA	Left HST Motor Speed Sensor Open Circuit	HST	L01	Electrical system	
DLM1KB	Left HST Motor Speed Sensor Ground Fault	HST	-	Electrical system	
DLM1MA	Left HST Motor Speed Sensor Malfunction	HST	-	Electrical system	
DLM2KA	Right HST Motor Speed Sensor Open Circuit	HST	L01	Electrical system	
DLM2KA	Right HST Motor Speed Sensor Ground Fault	HST	-	Electrical system	
DLM2MA	Right HST Motor Speed Sensor Malfunction	HST	-	Electrical system	
DLM3KA	Fan Speed Sensor Open Circuit	HST	L01	Electrical system	
DLM3KB	Fan Speed Sensor Ground Fault	HST	L01	Electrical system	
DLM3MB	Fan Speed Sensor Function Deterioration	HST	L01	Electrical system	
DN21FS	Decelerator or Brake Pedal SW Signal Mismatch	HST	L03	Electrical system	
DR21KX	Camera 2 Picture Reverse Drive Input Out of Range	MON	L01	Electrical system	
DR31KX	Camera 3 Picture Reverse Drive Input Out of Range	MON	L01	Electrical system	
DV20KB	Back Alarm Buzzer Short Circuit	HST	L01	Electrical system	
DW4BKA	Parking Brake Solenoid Open Circuit	HST	L03	Electrical system	
DW4BKB	Parking Brake Solenoid Short Circuit	HST	L04	Electrical system	
DW4BKY	Parking Brake Solenoid Hot Short Circuit	HST	L03	Electrical system	
DW7BKA	Fan Reverse Solenoid Open Circuit	HST	L01	Electrical system	
DW7BKB	Fan Reverse Solenoid Short Circuit	HST	L01	Electrical system	
DW7EKA	Slow Brake Solenoid Open Circuit	HST	L04	Electrical system	
DW7EKB	Slow Brake Solenoid Short Circuit	HST	L04	Electrical system	
DW7EKY	Slow Brake Solenoid Hot Short Circuit	HST	L03	Electrical system	

FAILURE CODE [AS00R6]

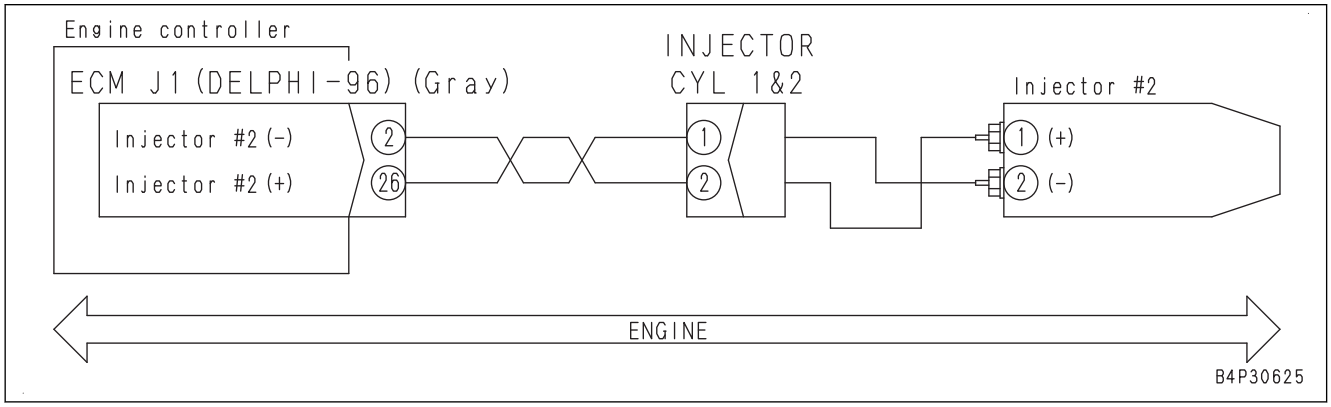
Action level	Failure code	Failure	Temporary Recovery of Inducement (Engine controller system)
-	AS00R6		
Detail of failure	• Temporary recovery of inducement is implemented from the machine monitor while engine deration.		
Action of controller	• Restore engine power temporarily • The information related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

Circuit diagram related to sensor 2 supply circuit



No.	Cause	Procedure, measuring location, criteria and remarks		
5	Ground fault in wiring harness (contact with ground circuit)	If failure code is still displayed after above checks on cause 3, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and INJECTOR CYL 1 & 2, and connect T-adapter to either female side.		
		Resistance	Between ground and ECM J1 (female) (26) or INJECTOR CYL 1 & 2 (female) (1)	Min. 100 kΩ
			Between ground and ECM J1 (female) (2) or INJECTOR CYL 1 & 2 (female) (2)	Min. 100 kΩ
6	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and INJECTOR CYL 1 & 2, and connect T-adapter to female side of ECM J1.		
		Continuity	Between ECM J1 (female) (26) and each pin other than pin (26)	No continuity (no sound is heard)
			Between ECM J1 (female) (2) and each pin other than pin (2)	No continuity (no sound is heard)
7	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Insert T-adapter to connector ECM J1. 3. Turn starting switch to ON position.		
		Voltage	Between ECM J1 (26) and ground	Max. 6 V
		If measured voltage is abnormal, disconnect connector INJECTOR CYL 1 & 2 and measure the voltage at the same point again. If the abnormality persists, a positive (+) line is defective. If the voltage is restored back to a normal range, a negative (-) line is defective.		
8	Defective another cylinder's injector or wiring harness	When failure code for abnormality in multiple injectors is displayed, perform troubleshooting these first.		
9	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to injector #2

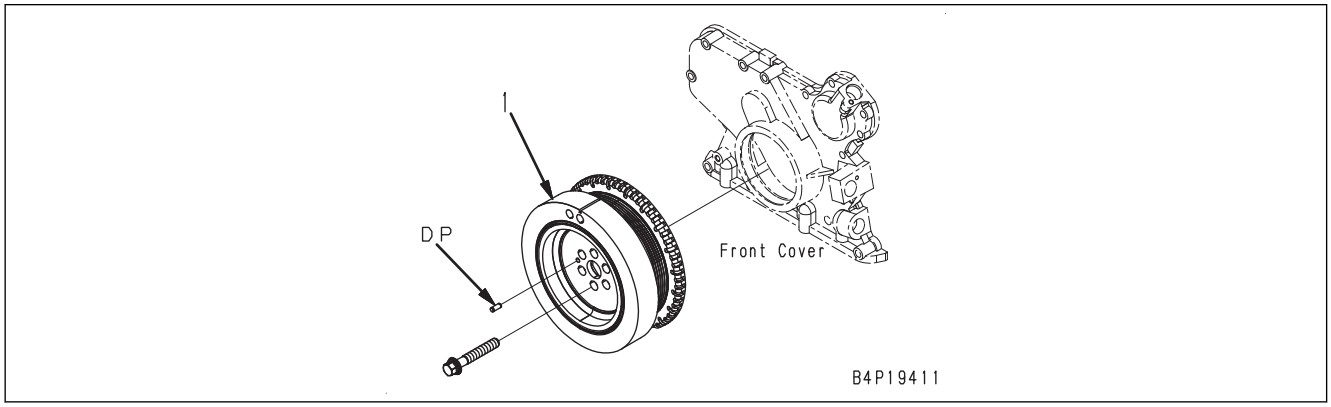


FAILURE CODE [CA488]

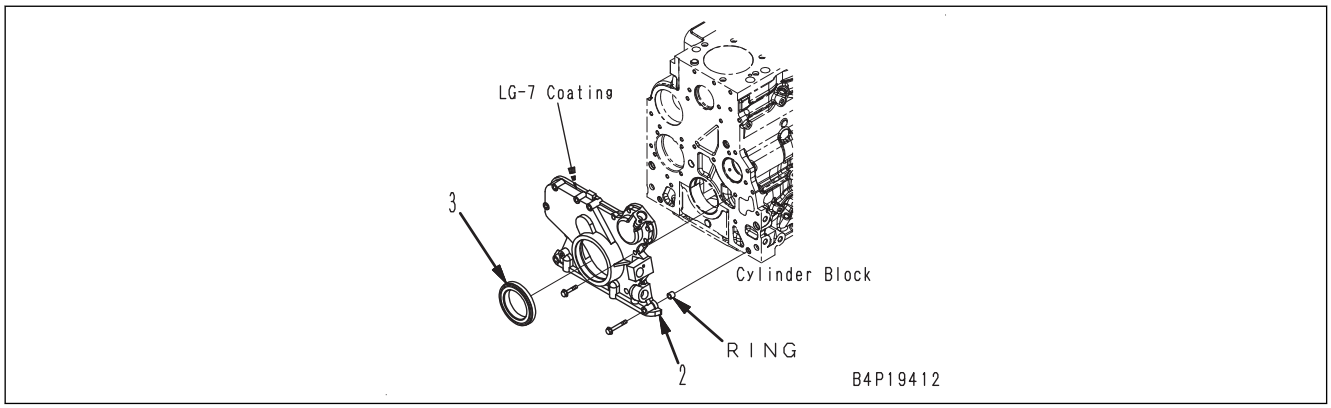
Action level	Failure code	Failure	Charge Air Temperature High Torque Derate (Engine controller system)
L03	CA488		
Details of failure	Temperature signal from boost pressure & temperature sensor exceeds upper limit of control temperature.		
Action of controller	Restricts engine output and allows engine to run.		
Phenomenon on machine	Engine power deration		
Related information	• Boost temperature can be checked with monitoring function. (Code: 18500) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Drop of cooling performance of aftercooler	Aftercooler cooling performance may be degraded. Check for following points: • Defective fan rotation • Insufficient cooling air • Clogged aftercooler fins
2	Unusual rise of turbocharger outlet temperature	Outlet temperature of turbocharger may be unusually high. Check related parts.
3	Defective boost temperature sensor system	Perform troubleshooting for failure codes [CA153] and [CA154].

(DP): Dowel pin

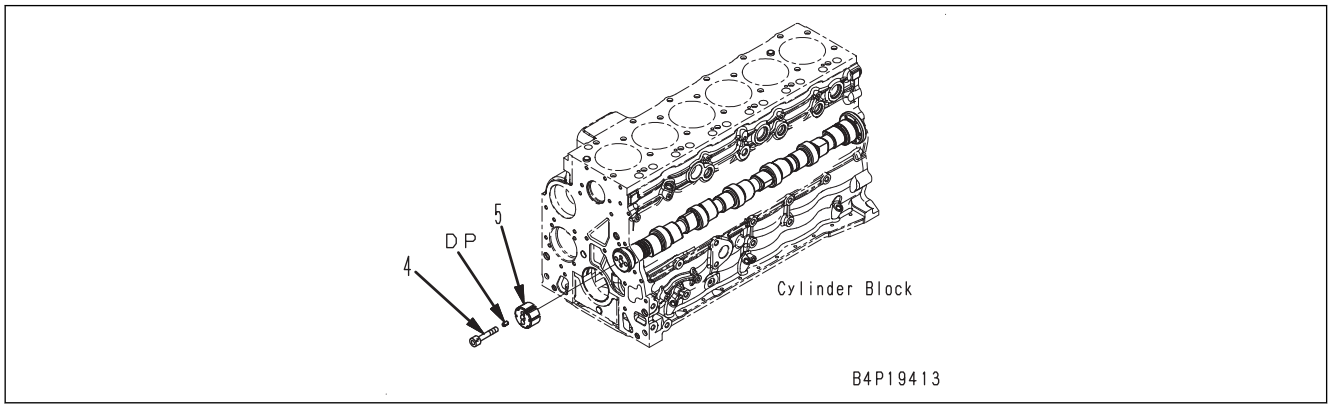


4. Remove front cover (2).
5. Remove front seal (3).
   (RING): Ring



6. Check mounting bolt (4) of camshaft ring (5) for looseness.

   Mounting bolt (4):
   10±2 Nm {0.98±0.2 kgfm}



Installation

REMARK

For the figure, see Removal.

1. Install front cover (2).
   Housing:
   Liquid gasket LG-7
2. See DISASSEMBLY AND ASSEMBLY, “REMOVE AND INSTALL ENGINE FRONT OIL SEAL” and,.
   1) Install front seal (3).

FAILURE CODE [CA1712]

Action level	Failure code	Failure	AdBlue/DEF Tank Thawing Error (Engine controller system)
L01	CA1712		
Detail of failure	Thawing of the AdBlue/DEF tank cannot be completed due to failure of the AdBlue/DEF tank heating valve, failure of the engine coolant circuit, etc.		
Action of controller	None in particular		
Phenomenon on machine	NOx emission increases because AdBlue/DEF injection is disabled.		
Related information	• The engine controller judges whether this failure code is displayed only during thawing control of the AdBlue/DEF tank (The value of 19305 AdBlue/DEF Tank Heating State is “1”). • 19305 AdBlue/DEF Tank Heating State, 1: Thawing, 2: Warming, or 0: OFF. • The Pre-defined Monitoring screen uses the AdBlue/DEF tank thawing control diagnosis. (The following numbers are the monitoring codes) • AdBlue/DEF injector diagnosis 19305 AdBlue/DEF Tank Heating State 19102 AdBlue/DEF Tank HtrValve Command 19115 AdBlue/DEF Temperature in Tank 4107 Coolant Temperature 19400 Ambient Temperature 19133 Engine Room Temperature **NOTICE** **After investigating the cause of the problem and completing the repair, perform “Loaded Diagnostics Operation To Confirm Failure Correction” to make sure this failure code is not redisplayed. (Turning the starting switch to ON position does not confirm the completion of repair.)**		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective AdBlue/DEF tank heating valve system	If failure code [CA1683] or [CA1684] is displayed on the abnormality record screen, perform troubleshooting these first.
2	Defective AdBlue/DEF tank temperature sensor system	If failure code [CA1677] or [CA1678] is displayed on the abnormality record screen, perform troubleshooting these first.

No.	Cause	Procedure, measuring location, criteria and remarks
2	Defective sensor power supply system	If failure code [CA1776] or [CA1777] is displayed, perform troubleshooting for [CA1776] or [CA1777] first.
3	Defective turbocharger outlet NOx sensor	If failure code is still displayed after above checks, the turbocharger outlet NOx sensor may be defective. 1. Turn starting switch to OFF position. 2. NOx sensor fails, therefore, replace the turbocharger outlet NOx sensor. 3. Perform “Loaded Diagnostics Operation To Confirm Failure Correction”.
		If this failure code is cleared, the original sensor is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)
4	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Loaded Diagnostics Operation to Confirm Failure Correction

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

Clear this failure code by “ Engine Controller Inducement Fault Clear ” before step 1.

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 47300 “ KDOC 1 Inlet Temperature ” becomes 150 °C or higher °C. Check that monitoring code 19203 “ Turbo Outlet NOx Sensor State ” changes from 0 to 1).
4. Repair is completed if failure code is cleared after 3 minutes has passed.

REMARK

If the turbocharger outlet NOx sensor does not activate (that is, 19203 “ Turbo Outlet NOx Sensor State ” remains as 0), return to troubleshooting.

FAILURE CODE [CA2349]

Action level	Failure code	Failure	EGR Valve Solenoid Open Circuit Error (Engine controller system)
L03	CA2349		
Detail of failure	Open circuit occurs in EGR valve solenoid drive circuit.		
Action of controller	• Engine power deration. • EGR valve closed. • Regeneration control stops. • Advances to Inducement strategy.		
Phenomenon on machine	• Engine power deration • Engine output is reduced based on inducement strategy.		
Related information	• For the inducement failure codes, refer “List of failure codes related to Inducement” of “ TROUBLESHOOTING POINTS FOR UREA SCR SYSTEM ”. • Signal current to EGR valve solenoid can be checked with monitoring function. (Code: 48600 (mA)) • Engine power deration is canceled when the failure code is cleared and the starting switch is turned OFF (not canceled only by deactivation of the failure code). • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “c: Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Defective EGR valve solenoid (internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector EGR-SOL, and connect T-adapter to male side.		
		Resistance	Between EGR-SOL (male) (1) and (2)	5 to 10 Ω
3	Open or short circuit in wiring harness system	1. Turn starting switch to OFF position. 2. Disconnect connector ECM J1 and connect T-adapter to female side. **REMARK** If resistance is 100 kΩ or higher, wiring harness has open circuit. If resistance is 10 Ω or below, wiring harness has short circuit.		
		Resistance	Between ECM J1 (female) (13) and (76)	5 to 10 Ω
4	Ground fault in wiring harness system (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and EGR-SOL, and connect T-adapter to either female side.		
		Resistance	Between ground and ECM J1 (female) (13) or EGR-SOL (female) (1)	Min. 100 kΩ
			Between ground and ECM J1 (female) (76) or EGR-SOL (female) (2)	Min. 100 kΩ

FAILURE CODE [CA2637]

Action level	Failure code	Failure	KDOC Face Plugging (Engine controller system)
L01	CA2637		
Details of failure	KDOC face is plugged. 1. The KDOC surface is contaminated due to the operating conditions, and the catalytic efficiency has dropped (clean the DOC). 2. Deteriorated KDOC due to high temperature, dropped efficiency due to deposit, or dropped efficiency due to damage (Replace KDOC with a new or used one.)		
Action of controller	Fuel dosing stops.		
Phenomenon on machine	None		
Related information	⚠ **Since temperature of the turbocharger exhaust connector, KDOC and KDPF exceeds 500°C, be careful not to get burned.** When KDOC in KDPF is changed, perform reset procedure for KDOC change and then finish repair. Procedure of performing the manual stationary regeneration from the “active regeneration for service”. When soot accumulation is at level 3 or lower, manual stationary regeneration can be performed only from Active Regeneration for Service. 1. Start engine. 2. Make sure that machine is in safe condition. 3. From service menu of machine monitor, display Diagnostic Tests screen, open Active Regeneration for Service, and then perform “Manual Stationary Regeneration”. When operation efficiency of KDOC is decreasing, failure code [AQ10N3] may appear after failure code [CA2637] is displayed repeatedly. If operation efficiency of KDOC is low, failure code [CA1691] of regeneration ineffective may appear. For check of the exhaust gas color, see “30 TESTING AND ADJUSTING”, “TEST EXHAUST GAS COLOR”. [Method of clearing failure code] Start the engine, perform warm-up operation, and operate the machine in normal work for approximately 3 hours. (The time required for clearing codes will be reduced by high exhaust temperature conditions.) **NOTICE** **Operate the machine approximately 3 hours and check that this failure code is cleared.**		

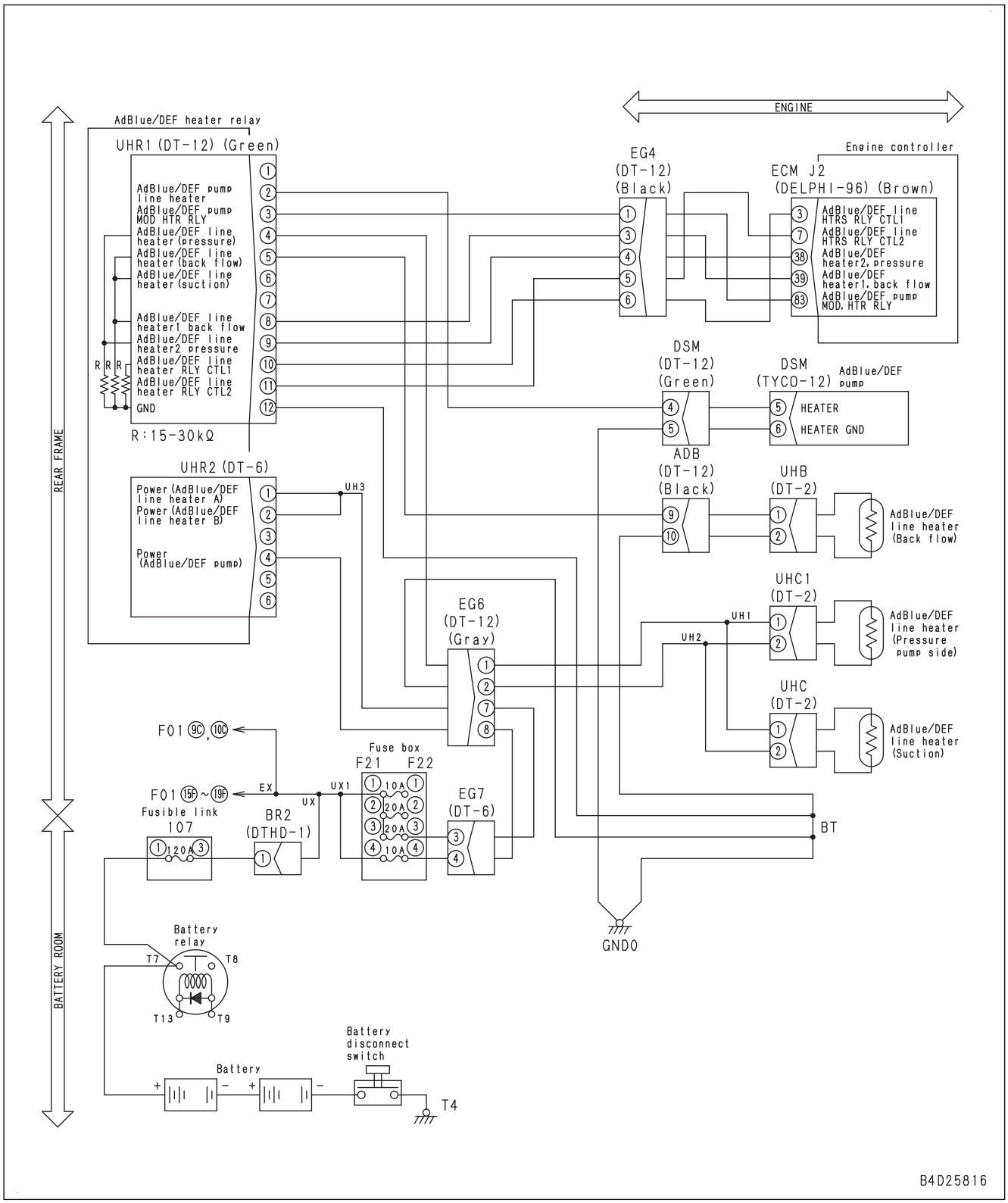
No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective VGT	If failure code [CA238*] is displayed, perform troubleshooting for the code first.
2	Defective EGR valve	If failure code [CA227*] or [CA23**] is displayed, perform troubleshooting for those codes first.
3	Defective turbocharger exhaust connector	1. Remove turbocharger exhaust connector 2. Check inside of turbocharger exhaust connector for adhesion of oil and fuel. If there is any, perform troubleshooting for failure codes [CA227*], [CA23**], etc. which are related to EGR valve and VGT.
4	Defective exhaust connector or duct to KDPF	Check the exhaust system between the turbocharger and KDPF for damages in connectors or ducts or loose connections.

FAILURE CODE [CA3146]

Action level	Failure code	Failure	SCR Outlet Temperature Sensor High Error
L01	CA3146		(Engine controller system)
Detail of failure	Open circuit , hot short circuit, or sensor circuit error in SCR outlet temperature sensor measuring section or probe (+)		
Action of controller	• As the SCR outlet temperature cannot be detected, substitute the SCR temperature for the SCR outlet temperature and run the engine (if the SCR temperature sensor also has an error, use the latest normal value). • Advances to Inducement strategy. • AdBlue/DEF injection stops		
Phenomenon on machine	• NOx emission increases because AdBlue/DEF injection is disabled. • Engine power deration according to inducement strategy.		
Related information	⚠ **The SCR assembly, sensor fitting piping, and sensor probe become hot (Min. 400 °C). Be careful not to get burned.** • For the inducement failure codes, refer “List of failure codes related to Inducement” of “ TROUBLESHOOTING POINTS FOR UREA SCR SYSTEM ”. • The SCR temperature sensor and SCR outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • Open circuit , hot short circuit, or sensor circuit error in SCR outlet temperature sensor measuring section or probe (+) is sent to the engine controller via CAN communication, and this failure code is displayed. • For the replacement procedure of the SCR outlet temperature sensor, see “Disassembly and assembly,” “Remove and install SCR temperature sensor”. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective SCR outlet temperature sensor	1. Turn starting switch to OFF position. 2. Replace SCR temperature sensor. 3. Turn starting switch to ON position. If this failure code is cleared, the original sensor is defective. (Troubleshooting of sensor is impossible.)
2	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Circuit diagram related to AdBlue/DEF line heater



FAILURE CODE [CA3317]

Action level	Failure code	Failure	KDOC Outlet Temperature Sensor High Error (Engine controller system)
L03	CA3317		
Detail of failure	Open circuit, hot short circuit, or sensor circuit error in KDOC outlet temperature sensor measuring section or probe (+).		
Action of controller	• As the KDOC outlet temperature cannot be detected, substitute the KDOC inlet temperature for the KDOC outlet temperature and run the engine (if the KDOC inlet temperature sensor also has an error, use a fixed value (250 °C)). • Engine power deration. • EGR valve closed. • Regeneration control stops. • Fuel dosing stops.		
Phenomenon on machine	• Defective forcible regeneration control. • KDPF Soot Accumulation High. • Engine power deration		
Related information	⚠ **Be careful not to get burned as the temperature of KDPF and KDOC rises up over 500 °C.** • The KDOC inlet temperature sensor, the KDOC outlet temperature sensor, and the KDPF outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • Open circuit, hot short circuit, or sensor circuit error in KDOC outlet temperature sensor measuring section or probe (+) is sent to the engine controller via CAN communication, and this failure code is displayed. • For details of access to the KDOC inlet temperature sensor, the KDOC outlet temperature sensor, and the KDPF outlet temperature sensor, see “Chapter 50 Disassembly and assembly”, “Removal and installation of KDPF assembly” and “Disassembly and assembly of KDPF assembly”. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared (note the engine power deration is not canceled only by the failure code is cleared).		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective KDOC outlet temperature sensor system	Perform troubleshooting for failure code [CA3316].

FAILURE CODE [CA3559]

Action level	Failure code	Failure	AdBlue/DEF Pump Voltage Low Error (Engine controller system)
L01	CA3559		
Detail of failure	Low voltage error occurs in the AdBlue/DEF pump drive circuit.		
Action of controller	• AdBlue/DEF pump stops. • AdBlue/DEF purging stops. • Advances to Inducement strategy.		
Phenomenon on machine	• NOx emission increases because AdBlue/DEF injection is disabled. • Engine output is reduced based on inducement strategy.		
Related information	• For the inducement failure codes, refer “List of failure codes related to Inducement” of “ TROUBLESHOOTING POINTS FOR UREA SCR SYSTEM ”. • If the AdBlue/DEF pump connector is removed while the starting switch is ON, this failure code is displayed. • The AdBlue/DEF pump operates 120 seconds after starting the engine, or it operates, after starting the engine, if not in AdBlue/DEF thawing process, when the KDPF outlet temperature becomes over 150 °C, or when AdBlue/DEF pump pressure raising test is implemented. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position or operate the AdBlue/DEF pump.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of the failure code “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position. 3. See “SERVICE MODE” and “METHOD FOR SETTING WITH TESTING MENU (SCR SERVICE TEST)” of SETTING AND OPERATION OF MACHINE MONITOR, and perform an AdBlue/DEF Pump Pressure Up Test.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Open circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J2 and DSM and connect T-adapters to each female side.		
		Resistance	Between ECM J2 (female) (79) and DSM (female) (9)	Max. 10 Ω
			Between ECM J2 (female) (6) and DSM (female) (10)	Max. 10 Ω
3	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J2 and DSM, and connect T-adapter to either female side.		
		Resistance	Between ECM J2 (female) (6) and (54), or between DSM (female) (10) and (8)	Min. 100 kΩ
			Between ECM J2 (female) (54) and (79), or between DSM (female) (8) and (9)	Min. 100 kΩ

FAILURE CODE [CA3578]

Action level	Failure code	Failure	AdBlue/DEF FCV Voltage Low Error (Engine controller system)
L01	CA3578		
Detail of failure	Low voltage error is detected in signal circuit of FCV (valve for purge) of AdBlue/DEF pump.		
Action of controller	AdBlue/DEF pump stop AdBlue/DEF purge stop Advances to Inducement strategy.		
Phenomenon on machine	• NOx emission increases because AdBlue/DEF injection is disabled due to AdBlue/DEF pump stop. • Because AdBlue/DEF purge is impossible, AdBlue/DEF in AdBlue/DEF line may be frozen at low temperature. • Engine power deration according to inducement strategy.		
Related information	• For the inducement failure codes, refer “List of failure codes related to Inducement” of “ TROUBLESHOOTING POINTS FOR UREA SCR SYSTEM ”. • AdBlue/DEF FCV is built in the AdBlue/DEF pump. • Short circuit is detected in both ends of the connector between (+) and (-) and this failure code is displayed when driving the AdBlue/DEF FCV. • This failure code is cleared after implementing AdBlue/DEF FCV drive again turning the starting switch from OFF to ON after abnormality repair. • AdBlue/DEF FCV operated at the time of AdBlue/DEF purge. • AdBlue/DEF FCV operates at the end when implementing a AdBlue/DEF pump pressure raise test. • If AdBlue/DEF FCV is defective, see “DISASSEMBLY AND ASSEMBLY”, “Disassembly and assembly of AdBlue/DEF pump” to change the AdBlue/DEF itself. • This failure code is detected only when the AdBlue/DEF FCV operates. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Operating AdBlue/DEF FCV		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of the failure code “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position. 3. See “SERVICE MODE” and “METHOD FOR SETTING WITH TESTING MENU (SCR SERVICE TEST)” of SETTING AND OPERATION OF MACHINE MONITOR, and perform an AdBlue/DEF Pump Pressure Up Test.			
		If this failure code is cleared, wiring harness connector is defective.			
2	Defective AdBlue/DEF FCV	1. Turn starting switch to OFF position. 2. Disconnect connector DSM, and connect T-adapter to male side.			
		Resistance	Between DSM (male) (11) and (12)	Temperature 23±5 °C	21.1±3 Ω

FAILURE CODE [CA3713]

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

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check them. 2. Turn the starting switch to ON position.		
		If this failure code is not displayed, the wiring harness connector is defective.		
2	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connectors ECM J2,UHR1, and UHB and connect the T-adapter to each female side.		
		Resistance	Between ECM J2 (female) (39) and UHR1 (female) (8)	Max. 10 Ω
			Between UHR1 (female) (12) and ground	Max. 10 Ω
			Between UHB (female) (1) and UHR1 (female) (5)	Max. 10 Ω
			Between UHB (female) (2) and ground	Max. 10 Ω
3	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connectors ECM J2,UHR1, and UHB and connect the T-adapter to each female side. 3. Turn the starting switch to ON position.		
		Voltage	Between ground and ECM J2 (female) (39) or UHR1 (female) (8)	Max. 3 V
			Between ground and UHR1 (female) (5) or UHB (female) (1)	Max. 3 V
4	Defective AdBlue/DEF line heater	1. Turn starting switch to OFF position. 2. Disconnect connectors UHB, and connect T-adapter to male side of UHB.		
		Resistance	Between UHB (male) (1) and (2)	5 to 40 Ω

FAILURE CODE [CA3911]

Action level	Failure code	Failure	SCR NH3 Sensor Datalink Timeout Error (Engine controller system)
L01	CA3911		
Detail of failure	The engine controller does not receive ammonia sensor data due to a communication error with the ammonia sensor.		
Action of controller	• Uses AdBlue/DEF injection control without using the ammonia sensor. • Advances to Inducement strategy.		
Phenomenon on machine	• NOx emission may increase or ammonia may be exhausted because AdBlue/DEF injection works inappropriately. • Engine output is reduced based on inducement strategy. • Ammonia concentration is undetectable.		
Related information	⚠ **SCR assembly, the sensor installation piping, and the 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.** • For the inducement failure codes, refer “List of failure codes related to Inducement” of “ TROUBLESHOOTING POINTS FOR UREA SCR SYSTEM ”. • The ammonia sensor is separated from the sensor controller and communicated via CAN with the engine controller along with other sensors. • This failure code is displayed if the sensor controller's connector or a smart sensor (power supply) relay connector is disconnected. • CAN communication failure codes related to engine sensors include [CA2771], [CA3232], [CA3868], [CA3911], [CA4151], and [CA4152]. If all of these failure codes are displayed, a defect in any of the 6 sensors, a defective smart sensor power supply relay/relay system, or a ground fault, short circuit, or hot short circuit in wiring harness (CAN communication line) can be suspected. • Since signal of active CAN communication line is pulse voltage, it cannot be measured by using multimeter. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

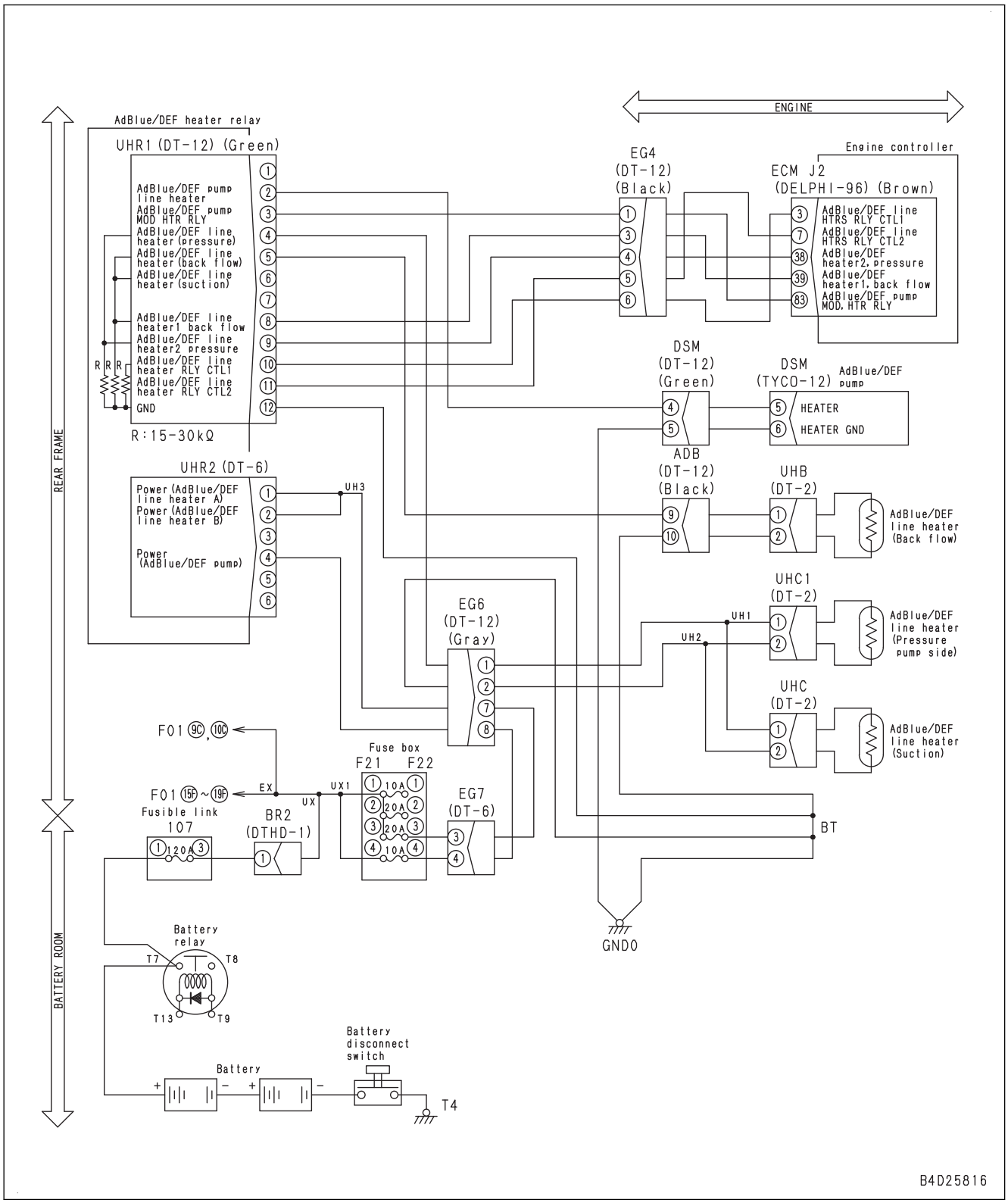
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	Perform checks on causes 1 to 10 for failure code [CA2771].		
2	Open circuit and short circuit in wiring harness (broken or short-circuited communication line)	• Communication line As CAN terminating resistors of 120 ohm are connected in parallel, therefore, when circuit resistance is measured at connector of CAN communication, if combined resistance is 60 ohm, there is no open circuit. 1. Turn starting switch to OFF position. 2. Check that system operating lamp does not light up, and then turn battery disconnect switch to OFF position. 3. Disconnect connectors ECM J2 and NH3 and connect T-adapters to each female side.		
		Resistance	Between NH3 (female) (2) and (3)	ΩApprox. 60 Ω
			Between ECM J2 (female) (21) and (45)	ΩApprox. 60 Ω

FAILURE CODE [CA4156]

Action level	Failure code	Failure	AdBlue/DEF Pump Heater Relay Voltage Low Error (Engine controller system)
L01	CA4156		
Detail of failure	A low voltage error is detected in AdBlue/DEF pump heater relay circuit.		
Action of controller	None in particular		
Phenomenon on machine	• AdBlue/DEF thawing defective. • NOx emission increases because AdBlue/DEF injection is disabled at low temperature.		
Related information	• AdBlue/DEF pump heater relay is driven at AdBlue/DEF supply system thawing/thermal insulation or “a AdBlue/DEF pump heater relay test”. • AdBlue/DEF pump heater relay is integrated in the AdBlue/DEF heater relay. • Troubleshooting of this failure code covers circuits from engine controller through AdBlue/DEF heater relay to ground. • This failure code is detected only when the AdBlue/DEF pump heater relay is turned ON. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Start the engine in low temperature (ambient temperature of 5 °C or below) or see “service modes” of “setting and operating machine monitor”, and “explanation of operating method of testing menu (SCR service test)” to perform “AdBlue/DEF pump heater relay test”.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. See “service modes” of “setting and operating machine monitor”, “operating method of testing menu (SCR service test)” to perform an “AdBlue/DEF pump heater relay test”.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Defective fuse No.4 in fuse box F21	Check if fuse No.4 in fuse box F21 is blown out. **REMARK** If blown out, perform troubleshooting for ground fault in wiring harness for it first.		
3	Open circuit in wiring harness (Wire breakage or defective contact of connector)	1. Turn the starting switch to OFF position. 2. Disconnect connectors ECM J2 and UHR1, and connect T-adapter to each female side.		
		Resistance	Between UHR1 (female) (12) and ground	Max. 10 Ω
			Between ECM J2 (female) (83) and UHR1 (female) (3)	Max. 10 Ω
4	Ground fault in wiring harness (Contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J2 and UHR1, and connect T-adapter to any of female sides.		
		Resistance	Between ECM J2 (female) (83) and ground, or between UHR1 (female) (3) and ground	Min. 100 kΩ

Electrical circuit diagram related to AdBlue/DEF pump heater



FAILURE CODE [CA4731]

Action level	Failure code	Failure	AdBlue/DEF Temperature Sensor Transmission Data Error (Engine controller system)
L01	CA4731		
Detail of failure	Temperature data sent by AdBlue/DEF sensor is abnormal.		
Action of controller	Advances to Inducement strategy.		
Phenomenon on machine	• AdBlue/DEF temperature cannot be measured. • Engine output is reduced based on inducement strategy.		
Related information	• For the inducement failure codes, refer “List of failure codes related to Inducement” of “ TROUBLESHOOTING POINTS FOR UREA SCR SYSTEM ”. • AdBlue/DEF level sensor is one of AdBlue/DEF tank sensors and is integrated with AdBlue/DEF temperature sensor and AdBlue/DEF quality sensor, providing CAN communication with the engine controller. • This failure code is displayed unless an approved sensor is installed. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position.
		If this failure code is cleared, wiring harness connector is defective.
2	Defective AdBlue/DEF tank sensor	1. Check the sensor connector for contamination and damage. 2. Turn starting switch to OFF position. 3. Replace the AdBlue/DEF tank sensor. 4. Turn starting switch to ON position.
		If this failure code is cleared, any internal parts in the original AdBlue/DEF tank sensor is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)
3	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

FAILURE CODE [D19JKZ]

Action level	Failure code	Failure	Personal Code Relay Open Circuit Or Short Circuit (Machine monitor system)
L03	D19JKZ		
Detail of failure	Open circuit or short circuit is detected in primary circuit (coil side) of personal code relay.		
Action of controller	• None in particular (when open circuit occurred) • Stops driving personal code relay (when short circuit occurred). • If cause of failure is eliminated, machine becomes normal by itself (when open circuit occurred). • Even if cause of failure is eliminated, machine does not become normal until starting switch is turned to OFF position (when short circuit occurred).		
Phenomenon on machine	None in particular		
Related information	• This failure code is displayed only when engine lock function is enabled. • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position (when open circuit occurred). Failure code cannot be reproduced on the machine (when short circuit occurred). • Troubleshooting for this failure code covers circuits from fuse No.5 in fuse box F01 through primary (coil) side of personal code relay RLR to machine monitor.		

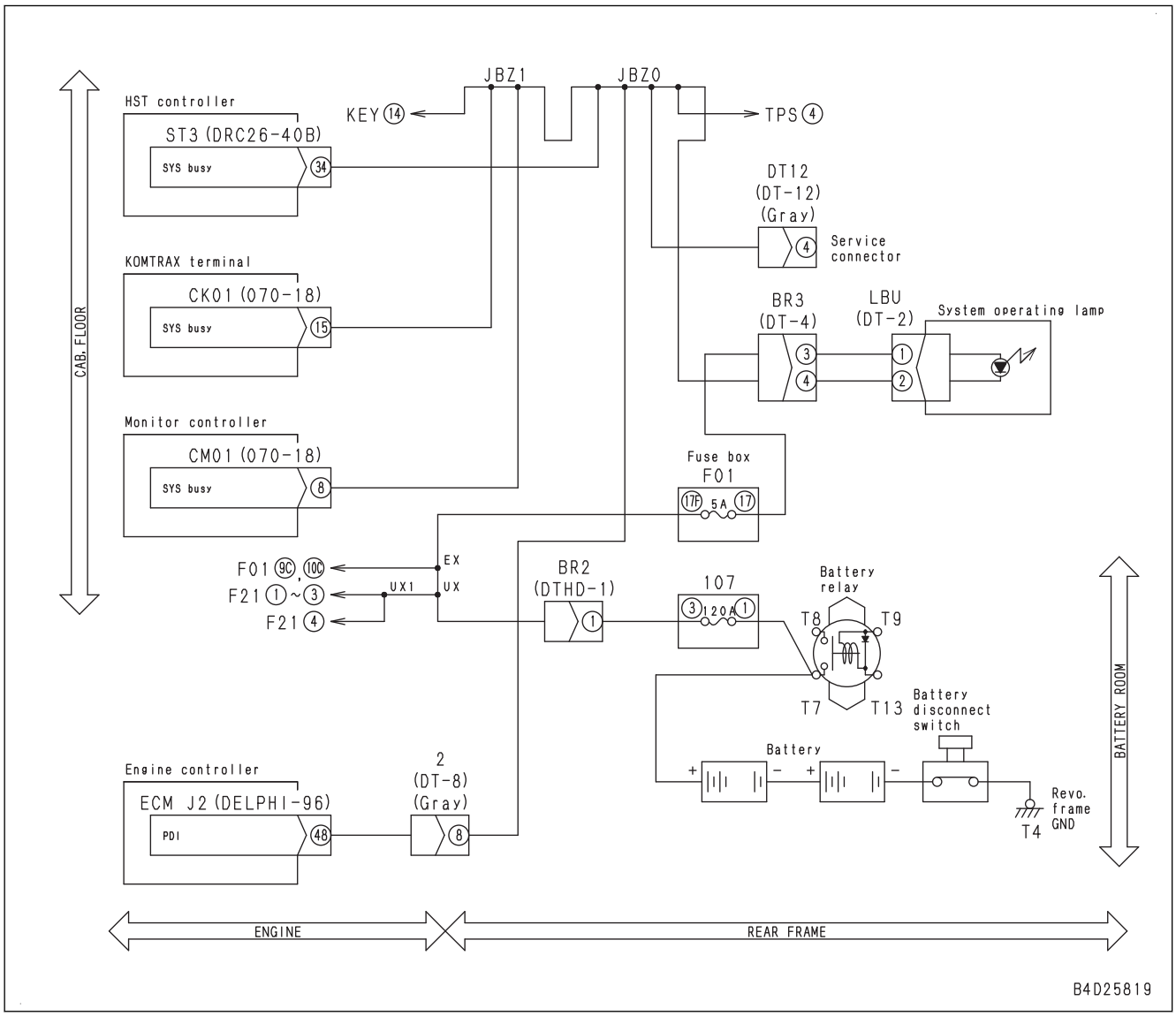
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective fuse	If fuse No.5 in fuse box F01 is blown out, circuit probably has ground fault, etc.		
2	Defective personal code relay	1. Turn the starting switch to OFF position. 2. Disconnect relay PLR, and connect T-adapter to male side.		
		Resistance	Between PLR (male) (1) and (2)	200 to 600 Ω
		1. Turn the starting switch to OFF position. 2. Replace relay PLR with preheat relay PHR. 3. Turn the starting switch to ON position.		
		If this failure code is cleared, original personal code relay PLR is defective.		
3	Open or short circuit or ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Remove fuse No.5 in fuse box F01. 3. Disconnect connector CM01 and connect T-adapter to female side.		
		Resistance	Between F01-5 and CM01 (female) (6)	200 to 600 Ω
			Between ground and F01-5 or CM01 (female) (6)	Min. 1 MΩ
4	Open circuit in wiring harness	If no failure is found by check on cause 3, this check is not required. 1. Turn the starting switch to OFF position. 2. Remove fuse No.5 in fuse box F01. 3. Disconnect connector CM01 and relay PLR, and connect T-adapter to each female side.		
		Resistance	Between F01-5 and PLR (female) (1)	Max. 1 Ω
			Between PLR (female) (2) and CM01 (female) (6)	Max. 1 Ω

FAILURE CODE [DAFLKA] (MACHINE WITH KOMTRAX TERMINAL)

Action level	Failure code	Failure	System Operating Lamp Open Circuit (Monitor) (Machine monitor system)
-	DAFLKA		
Detail of failure	Machine monitor determines that system operating lamp circuit is open because voltage of output circuit remains at approximately 5 V or less for approximately 3 seconds after starting switch is turned to ON position, during which machine monitor outputs no current to system operating lamp.		
Action of controller	None in particular		
Phenomenon on machine	While system operating lamp is lit, battery disconnect switch must not be turned to OFF position. Turning battery disconnect switch to OFF position may destroy data stored in machine monitor memory.		
Related information	• After completion of repair, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position. • Although machine monitor is not able to light up system operating lamp, no trouble will result unless battery disconnect switch is turned to OFF position. • When controller lights up system operating lamp, output circuit voltage is at low level. • Since no controller drives system operating lamp for approximately 3 seconds after starting switch is turned to ON position, open circuit can be detected.		

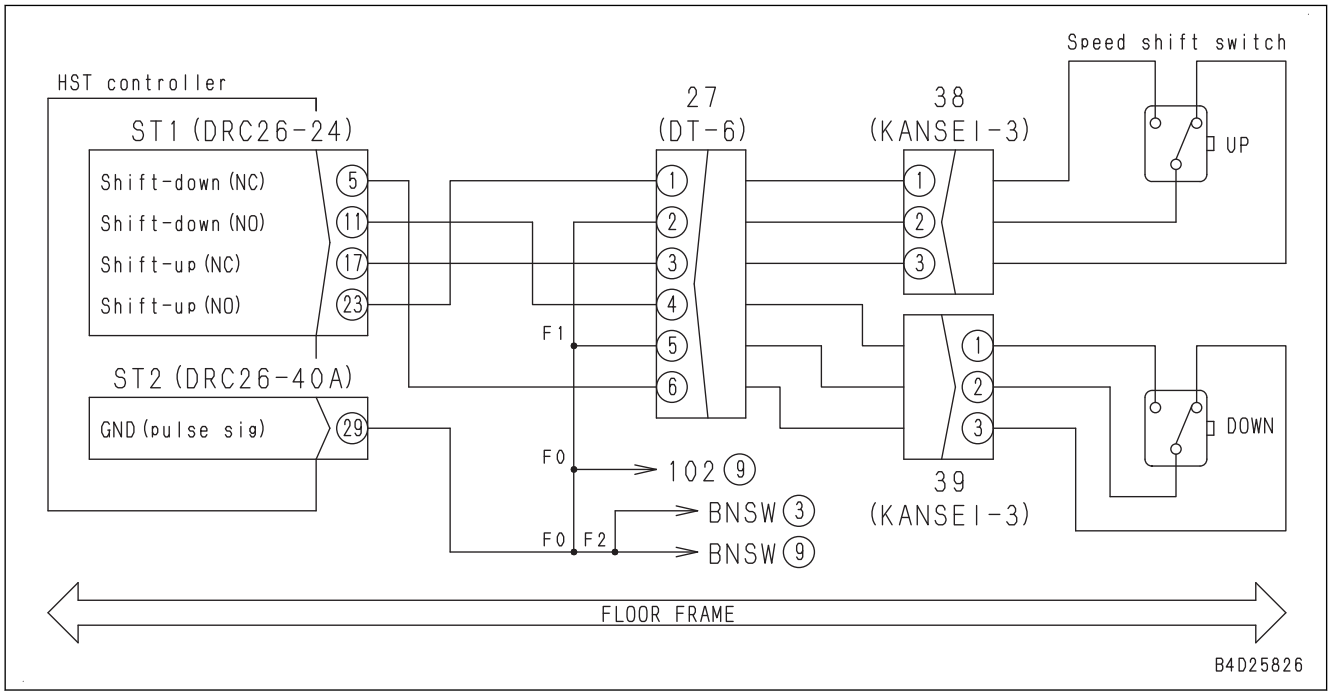
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective fuse	If fuse No.17 in fuse box F01 is blown out, circuit probably has ground fault.		
2	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn the starting switch to OFF position. 2. Turn the battery disconnect switch to OFF position 3. Remove fuse No.17 in fuse box F01. 4. Disconnect connectors CM01 and LBU, and connect T-adapter to each female side.		
		Resistance	Between CM01 (female) (8) and LBU (female) (2)	Max. 1 Ω
			Between LBU (female) (1) and F01-17	Max. 1 Ω
3	Defective machine monitor	If no failure is found by above checks, machine monitor is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to system operating lamp



<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="3">3</td><td rowspan="3">Open circuit in wiring harness (wire breakage or defective contact of connector)</td><td colspan="4">1. Turn the starting switch to OFF position.
2. Disconnect connectors ST1 and ST2, and connect T-adapter to each female side.
3. Turn on and off the upshift switch to perform troubleshooting.</td></tr>
<tr><td rowspan="2">Resistance</td><td>Between ST1 (female) (17) and ST2 (female) (29)</td><td>Switch OFF</td><td>Max. 1 Ω</td></tr>
<tr><td>Between ST1 (female) (23) and ST2 (female) (29)</td><td>Turn on the switch.</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="5">4</td><td rowspan="5">Defective HST controller</td><td colspan="4">If no failure is found by preceding checks, HST controller is defective.
Reference
1. Turn the starting switch to OFF position.
2. Insert T-adapter into connector ST1 and ST2.
3. Turn the starting switch to ON position.
4. Turn on and off the upshift switch to perform troubleshooting.
REMARK
Voltage of approximately 9 V is applied to ST1 pin (17) and pin (23) through resistor in HST controller.</td></tr>
<tr><td rowspan="4">Voltage</td><td rowspan="2">Between ST1 (17) and ST2 (29)</td><td>Turn off the switch.</td><td>Max. 1 V</td></tr>
<tr><td>Turn on the switch.</td><td>7 to 11 V</td></tr>
<tr><td rowspan="2">Between ST1 (23) and ST2 (29)</td><td>Turn off the switch.</td><td>7 to 11 V</td></tr>
<tr><td>Turn on the switch.</td><td>Max. 1 V</td></tr>
</table>

Circuit diagram related to shift up switch and shift down switch



<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="3">3</td><td rowspan="3">Open circuit in wiring harness (wire breakage or defective contact of connector)</td><td colspan="3">1. Turn the starting switch to OFF position.
2. Disconnect connectors ST1 and BS, and connect T-adapter to each female side.</td></tr>
<tr><td rowspan="2">Resistance</td><td>If power supply voltage in check on cause 1 is normal, this check is not required.
Between ST1 (female) (21) and BS (female) (1)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between ST1 (female) (8) and BS (female) (2)</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="3">4</td><td rowspan="3">Ground fault in wiring harness (contact with ground circuit)</td><td colspan="3">If no failure is found by check on cause 2, this check is not required.
1. Turn the starting switch to OFF position.
2. Disconnect connectors ST1 and BS, and connect T-adapter to either female side.</td></tr>
<tr><td rowspan="2">Resistance</td><td>Between ST1 (female) (8) and (21), or between BS (female) (1) and (2)</td><td>Min. 1 MΩ</td></tr>
<tr><td>Between ST1 (female) (8) and ground, or between BS (female) (2) and ground</td><td>Min. 1 MΩ</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Defective HST controller</td><td colspan="3">If no failure is found by preceding checks, HST controller is defective.
Reference
1. Turn the starting switch to OFF position.
2. Insert T-adapter into connector ST1.
3. Turn the starting switch to ON position.</td></tr>
<tr><td>Voltage</td><td>Between ST1 (8) and (21)</td><td>0.5 to 4.5 V</td></tr>
</table>

FAILURE CODE [DFA7KX]

Action level	Failure code	Failure	Blade Tilt Lever Potentiometer 1 and 2 Open Circuit or Hot Short Circuit (HST controller system)
L01	DFA7KX		
Detail of failure	In blade tilt lever potentiometer 1 and 2 systems, either failure code [DFA8KA] or [DFA8KB] is displayed with either failure code [DFA9KA] or [DFA9KB] at the same time.		
Action of controller	Recognizes that blade tilt lever is in NEUTRAL.		
Phenomenon on machine	Blade tilt control is disabled.		
Related information	• Signal state of blade tilt lever potentiometer can be checked with monitoring function. (Code: 73500), (Code: 73501) • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position, and operate the blade control lever (tilt direction).		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective blade tilt lever potentiometer	Perform troubleshooting for failure codes [DFA8KA], [DFA8KB], [DFA9KA], and [DFA9KB].

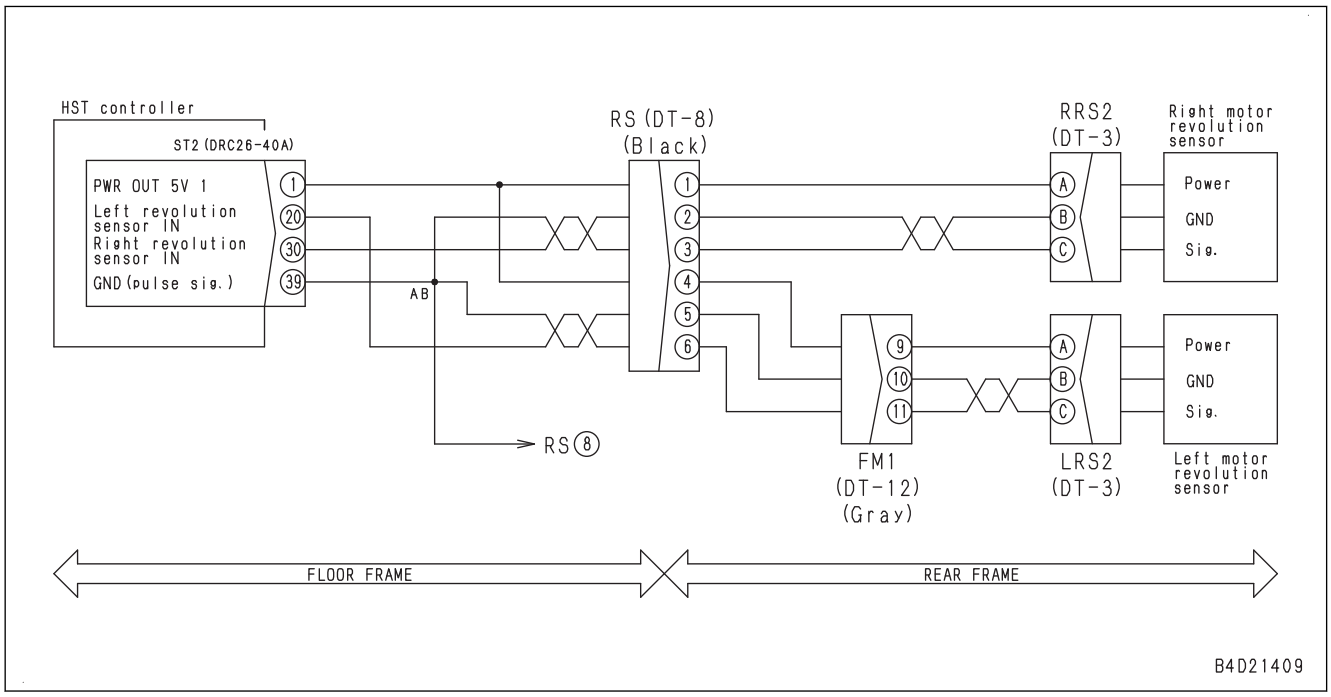
No.	Cause	Procedure, measuring location, criteria and remarks
4	Defective engine controller	If this failure code displays when the ambient temperature is high, the engine controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)

FAILURE CODE [DK30L8]

Action level	Failure code	Failure	Steering Potentiometer 1 or 2 Signal Abnormality (HST controller system)
L03	DK30L8		
Detail of failure	In steering potentiometer 1 (ST lever 1) and 2 (ST lever 2) of joystick (steering, directional and gear shift lever), total of both signal voltages is 4.41 V and below or 5.59 V and above.		
Action of controller	• Continues control with signal of normal one of steering potentiometer 1 (ST lever 1) and 2 (ST lever 2) of joystick (steering, directional and gear shift lever). • Restricts operations of engine.		
Phenomenon on machine	• Once machine stops, engine speed is restricted to medium (half) speed. • Once machine stops, selectable speed ranges are restricted to F1 and R1.		
Related information	• Signal voltage of steering potentiometer of joystick (steering, directional and gear shift lever) can be checked with monitoring function. (Code: 50300), (Code: 50301) • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the stsring switch to the ON podion, and operate the joystick (steering, directional and gear shift lever) (steering direction).		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Failure of steering potentiometer system	Perform troubleshooting for failure codes [DK30KA], [DK30KB], [DK31KA], and [DK31KB].

Circuit diagram related to L.H. HST motor speed sensor



FAILURE CODE [DW7EKA]

Action level	Failure code	Failure	Slow Brake Solenoid Open Circuit (HST controller system)
L04	DW7EKA		
Detail of failure	Even if travel lock switch 1 signal is in free position, and decelerator/brake pedal is depressed, no current flows through slow brake solenoid valve circuit.		
Action of controller	• Displays parking brake system state monitor on machine monitor. • Stops driving slow brake solenoid valve circuit. • Restricts a part of functions. • Even if cause of failure is eliminated, machine does not become normal until starting switch is turned to OFF position.		
Phenomenon on machine	• The machine stops during travel. • Once machine stops, it cannot move off. • Once machine stops, engine speed is restricted to medium (half) speed.		
Related information	• Input state (ON/OFF) from travel lock switch 1 and 2 can be checked with monitoring function. (Code: 40984) • Input stroke and voltage from brake pedal can be checked with monitoring function. (Code: 50401), (Code: 50400) • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position, operate the parking brake lever (free), and operate the decelerator/brake pedal.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective slow brake solenoid	1. Turn the starting switch to OFF position. 2. Disconnect connector S3, and connect T-adapter to male side.		
		Resistance	Between S3 (male) (1) and (2)	34 to 44 Ω
2	Open circuit, short circuit, ground fault, hot short circuit of wiring harness, or defective HST controller	1. Turn the starting switch to OFF position. 2. Disconnect connector S3, and connect T-adapter to female side. 3. Turn the starting switch to ON position. 4. Shake the wiring harness by hand while measuring the voltage. If the voltage becomes approximately 0 V while shaking, wiring harness has open circuit at around this point.		
		Voltage	Between S3 (female) (1) and (2)	1 to 4.5 V
3	Open circuit or short circuit in wiring harness	If no failure is found by check on cause 2, this check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect connector ST3, and connect T-adapter to female side.		
		Resistance	Between ST3 (female) (35) and (3)	34 to 44 Ω
4	Open circuit in wiring harness (wire breakage or defective contact of connector)	If no failure is found by check on cause 2, this check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect connectors ST3 and S3, and connect T-adapter to each female side.		
		Resistance	Between ST3 (female) (35) and S3 (female) (1)	Max. 1 Ω
			Between ST3 (female) (3) and S3 (female) (2)	Max. 1 Ω
5	Defective HST controller	If no failure is found by preceding checks, HST controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

FAILURE CODE [DXA6KY]

Action level	Failure code	Failure	Right Forward Hydrostatic Transmission Pump Electromagnetic Proportional Control Hot Short Circuit (HST controller system)
L04	DXA6KY		
Detail of failure	When controller stops driving RF HST pump EPC solenoid valve circuit, abnormal current flows through circuit.		
Action of controller	• Restricts a part of functions. • Even if cause of failure is eliminated, machine does not become normal until starting switch is turned to OFF position.		
Phenomenon on machine	• Right track continues to rotate forward. • Once machine stops, engine speed is restricted to medium (half) speed. • Once machine stops, it cannot restart.		
Related information	• Output current to RF HST pump EPC solenoid valve can be checked with monitoring function. (Code: 52408) • After completion of repair, 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 RF, and connect T-adapter to female side. 3. Turn the starting switch to ON position.		
		Voltage	Between RF (female) (1) and (2)	Max. 4.5 V
2	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors ST3 and RF, and connect T-adapter to female side of ST3. **REMARK** Check it by using multimeter in continuity mode.		
		Continuity	Between ST3 (female) (15) and each pin other than pin (15)	No continuity (no sound is heard)
		1. Turn the starting switch to OFF position. 2. Disconnect connectors ST3, 3, and RF, and connect T-adapter to either female side or male side of 3. **REMARK** Check it by using multimeter in continuity mode.		
		Continuity	Between 3 (female) (6) and each pin other than pin (6)	No continuity (no sound is heard)
			Between 3 (male) (6) and each pin other than pin (6)	No continuity (no sound is heard)
3	Defective HST controller	If no failure is found by preceding checks, HST controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

FAILURE CODE [DXHUKB]

Action level	Failure code	Failure	Blade Tilt Right Bottom Electromagnetic Proportional Control Solenoid Short Circuit (HST controller system)
L01	DXHUKB		
Detail of failure	When controller drives blade tilt RIGHT EPC solenoid circuit, abnormal current flows through circuit.		
Action of controller	Stops outputting to blade tilt RIGHT EPC solenoid circuit.		
Phenomenon on machine	Blade tilt RIGHT control is disabled.		
Related information	• Output state to blade tilt RIGHT EPC solenoid can be checked with monitoring function. (Code: 71007) • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position, and operate the blade control lever (tilt RIGHT).		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective blade tilt R.H. bottom EPC solenoid (internal open circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connector TR, and connect T-adapter to male side.		
		Resistance	Between TR (male) (1) and (2)	2 to 12 Ω
			Between TR (male) (1) and ground	Min. 1 MΩ
2	Ground fault in wiring harness (contact with ground circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connectors ST3 and TR, and connect T-adapter to either female side.		
		Resistance	Between ground and ST3 (female) (38) or TR (female) (1)	Min. 1 MΩ
3	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors ST3 and TR, and connect T-adapter to either female side.		
		Resistance	Between ST3 (female) (38) and (23), or between TR (female) (1) and (2)	Min. 1 MΩ
4	Defective HST controller	If no failure is found by preceding checks, HST controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

FAILURE CODE [DXK2KB]

Action level	Failure code	Failure	Right Hydrostatic Transmission Motor Electromagnetic Proportional Control Short Circuit (HST controller system)
L03	DXK2KB		
Detail of failure	When controller drives right HST motor EPC solenoid valve circuit, abnormal current flows through circuit.		
Action of controller	• Stops driving right HST motor EPC solenoid valve circuit. • Stops driving left HST motor EPC solenoid valve circuit as well. • Even if cause of failure is eliminated, machine does not become normal until starting switch is turned to OFF position.		
Phenomenon on machine	• Machine decelerates during high-speed travel. • Machine cannot travel at high speed.		
Related information	• Output current to right HST motor EPC solenoid valve can be checked with monitoring function. (Code: 52303) • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position, and travel at high speed.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective R.H. HST motor EPC solenoid (internal open circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connector RME, and connect T-adapter to male side.		
		Resistance	Between RME (male) (1) and (2)	5 to 15 Ω
			Between RME (male) (1) and ground	Min. 1 MΩ
2	Ground fault in wiring harness (contact with ground circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connectors ST3 and RME, and connect T-adapter to either female side.		
		Resistance	Between ground and ST3 (female) (36) or RME (female) (1)	Min. 1 MΩ
3	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect connectors ST3 and RME, and connect T-adapter to either female side.		
		Resistance	Between ST3 (female) (36) and (3), or between RME (female) (1) and (2)	Min. 1 MΩ
4	Defective HST controller	If no failure is found by preceding checks, HST controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

E-8 CHARGE LEVEL MONITOR LIGHTS UP IN RED WHILE ENGINE IS RUNNING

Failure	Charge level monitor lights up in red while engine is running.
Related information	Generated signal condition of alternator can be checked with monitoring function (Code: 04300)

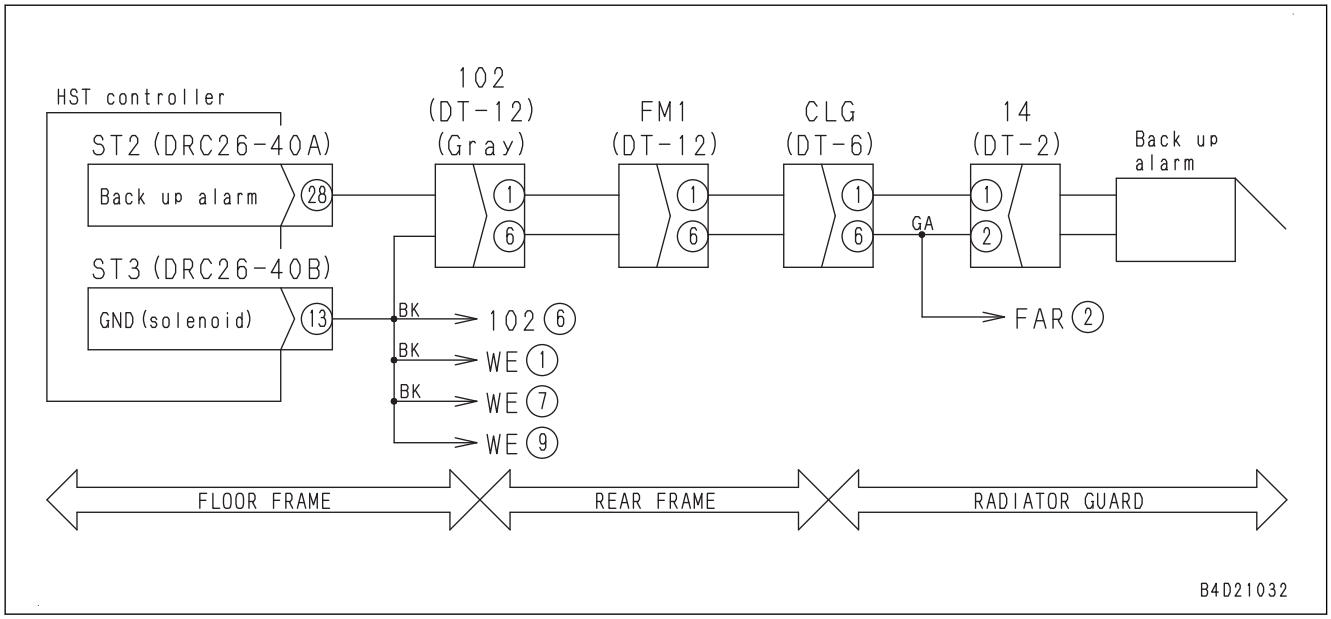
No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective alternator system	Perform troubleshooting for failure code [AB00KE].

E-27 BACKUP ALARM DOES NOT STOP SOUNDING

Failure	Backup alarm does not stop sounding.
Related information	

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 14, and connect T-adapter to female side. 3. Turn the starting switch to ON position.		
		Voltage	Between 14 (female) (1) and (2)	Max. 4.5 V
			Between 14 (female) (1) and ground	Max. 4.5 V
2	Defective back-up alarm (Internal defect)	If no failure is found by above checks, backup alarm may be defective.		

CIRCUIT DIAGRAM (BACK-UP ALARM)



E-38 RIGHT DOOR WASHER DOES NOT OPERATE

Failure	Right door washer does not operate
Related information	• If fuse No.6 in fuse box FUSE (in cab) is blown out, all of right door wiper, left door wiper, right door washer, and left door washer do not operate. • If wiper also does not operate, see “Right door wiper does not operate”. • T-adapter is not provided to the connector of a washer motor (check without a T-adapter).

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective right door washer motor (internal open circuit)	Check that left door washer fluid comes out. 1. Turn the starting switch to OFF position. 2. Replace connector 361 with 363. 3. Turn the starting switch to ON position. 4. Turn right door washer switch to ON position.			
		If left door washer fluid comes out, originally provided right door washer motor is defective.			
2	Defective right door wiper switch	1. Turn the starting switch to OFF position. 2. Disconnect connector CB13, and connect T-adapter to male side. 3. Turn right door wiper switch to ON and OFF positions, and perform troubleshooting.			
		Resistance	Between CB13 (male) (5) and (6)	Right door wiper switch: OFF	Min. 1 MΩ
				Right door wiper switch: Wash position	Max. 1 Ω
3	Open circuit in wiring harness (wire breakage or defective contact)	1. Turn the starting switch to OFF position. 2. Disconnect connector CB13 and connect T-adapter to female side.			
		Continuity	Between CB13 (female) (6) and ground		Continuity
		1. Turn the starting switch to OFF position. 2. Remove fuse No.6 in fuse box FUSE (in cab). 3. Disconnect connector CB13 and connect T-adapter to female side.			
		Resistance	Between CB13 (female) (5) and FUSE-6		Max. 1 Ω
4	Ground fault in wiring harness (contact with ground circuit)	1. Turn the starting switch to OFF position. 2. Remove fuse No.6 in fuse box FUSE (in cab). 3. Disconnect connectors 363 and CB13, and connect T-adapter to female side.			
		Resistance	Between CB13 (female) (6) and ground		Min. 1 MΩ

No.	Cause	Procedure, measuring location, criteria and remarks			
8	Defective adjustment or malfunction of R.H. HST motor (charge relief valve)	Be ready with engine stopped, set the machine monitor to Code 91902: “Brake Pressure” by monitoring function with engine at high idle, and then perform trouble-shooting by traveling.			
		HST charge circuit pressure	Joystick (steering, directional and gear shift lever)	In FORWARD or REVERSE	3.04 ± 0.49 MPa {31 ± 5 kgf/cm^2}
		If oil pressure cannot be adjusted to normal level, charge relief valve of L.H. HST motor may malfunction or has internal defect. Check spring for deterioration and valve seat for defect.			
9	Insufficient air bleeding from HST pump	Since air is possibly remaining in servo valve of HST pump, perform air bleeding again.			
10	Internal defect of HST pump (pump body)	If no failure is found by checks on causes 1 to 9, internal defect of HST pump body is suspected.			
11	Internal defect of HST motor (motor body)	If no failure is found by checks on causes 1 to 10, internal defect of HST motor body is suspected.			

S-7 ENGINE RUNS ROUGH OR IS UNSTABLE

Failure	Engine runs rough or is unstable.
Related information	If any failure code is displayed, perform troubleshooting for that code first.

No.	Cause	Point to check, remarks	Remedy
1	Fuel level is low.	If fuel tank is checked, it is empty.	Refueling
2	Clogging fuel tank cap air bleeding hole	Fuel tank cap air bleeding hole is clogged.	Flush air breather hole in fuel tank cap surrounding area.
3	Clogged fuel filter element	Check used hours of fuel filter element. If it is used over specified time, fuel filter element may be clogged.	Fuel filter element replacement
4	Foreign materials are mixed into fuel.	If drain fuel from fuel tank, rust or water comes out.	Fuel replacement
5	Air mixed in fuel piping system	When performing bleeding air from the fuel system, air comes out. (For details, see Testing and adjusting, “Bleeding air from fuel system”).	• Perform air bleeding operation • Correct or replace fuel piping
6	Leakage from fuel piping system	Fuel leaks from fuel piping. (For details, see Testing and adjusting, “Test fuel circuit for leakage”).	Correct or replace fuel piping related parts
7	Fuel leakage at Injector and inlet connector	Return rate from injector is high. (See TESTING AND ADJUSTING, “METHOD FOR TESTING FUEL DISCHARGE, RETURN AND LEAKAGE”)	Tighten or replace inlet connector
8	Leakage from boost system	Check boost system (between VGT outlet and aftercooler, aftercooler and between aftercooler and air intake manifold) for leakage.	Boost piping repair or replacement
9	Defective mass air flow and temperature sensor	Replace a sensor, and check if it operates normally (failure code may be displayed due to dust attached to sensor).	Mass air flow and temperature sensor replacement

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
E	793T-B32-1300	Push tool assembly	■	1			Installation of wedge ring (for small plug side)
	793T-B32-1310	• Adapter		1			
	793T-B32-1240	• Ring		1			
	793T-B32-1250	• Plate		1			
	793T-B32-1260	• Plate		1			
	793T-B32-1210	• Push tool		1			
	793T-B32-1220	• Adapter		1			
	793T-B32-1280	• Spring		1			
	793T-B32-1270	• Bolt		1			
	793T-B32-1030	• Bar		1			
	01580-11210	• Nut		1			
	01252-10612	• Bolt		4			
F	793T-B32-1100	Push tool assembly	■	2			Press-fit of wedge ring
	793T-B32-1010	• Holder		1			
	793T-B32-1110	• Push tool		2			
	793T-B32-1030	• Bar		2			
	01580-11210	• Nut		2			
G	791T-B32-1030	Push tool	■	1			Press-fit of oil seal
H	Commercially available	Disassembly jig	●	1			Press-fit of seal assembly
J	Commercially available	Disassembly jig	●	1			Track press
K	Commercially available	Spacer	●	1			
M	Commercially available	Thick cloth	●	1			
N	Commercially available	Depth gauge	●	1			Press-fit of pin
P	Commercially available	Pitch gauge for shoe bolt	●	1			Pitch gauge for shoe bolt
Q	Commercially available	Wear plate	●	1			Link press
R	Commercially available	Jaw clutch	●	1			

10. Finger-tighten the sleeve nut (21b) of the fuel high-pressure pipe (21). (Both sides)
11. Tighten the sleeve nut (21b) on the supply pump side first, and then tighten the nut on the common rail side. (Both sides)

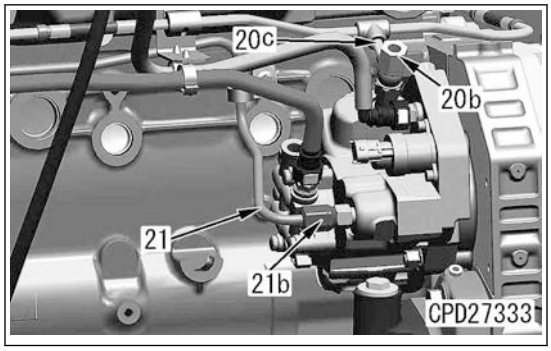
    Sleeve nut (21b):
    35±3.5 Nm {3.57±0.36 kgfm}
12. Install the fuel spray prevention caps (21a). (Both sides)

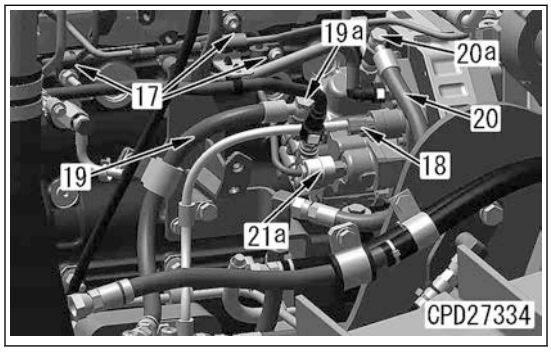
    REMARK
    - Direct the slit of the fuel spray prevention cap outward or downward when installing it.
    - The fuel spray prevention caps are installed so that fuel will not spout over the hot part of the engine and catch fire when it leaks by any chance.
13. Connect the tube (20c), and tighten the nut (20b).
14. Connect the fuel return tube (20), and tighten the joint bolt (20a).

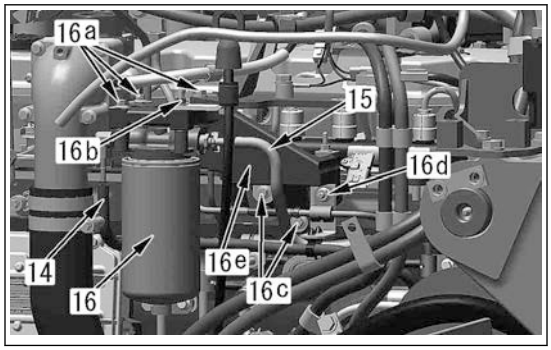
    Joint bolt (20a):
    24±4 Nm {2.5±0.4 kgfm}
15. Connect the fuel supply hose (19), and tighten the joint bolt (19a).

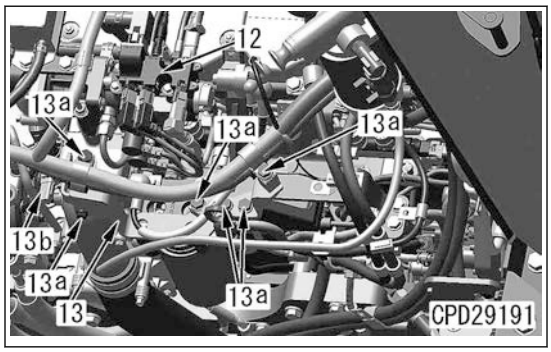
    Joint bolt (19a):
    25.4 to 34.3 Nm {2.6 to 3.5 kgfm}
16. Connect the connector (18).
17. Install the clamps (17) (3 pieces).

    Clamp (17):
    24±4 Nm {2.45±0.41 kgfm}
18. Install the bracket (16e) with the bolts (16c) and the nut (16d).
19. Install the fuel filter (16) with the bolts (16a) and (16b) (4 pieces).
20. Connect the fuel hoses (15) and (14).
21. Install the bracket (13) with bolts (13a) (6 pieces).
22. Connect the connector (13b).









EGR valve assembly

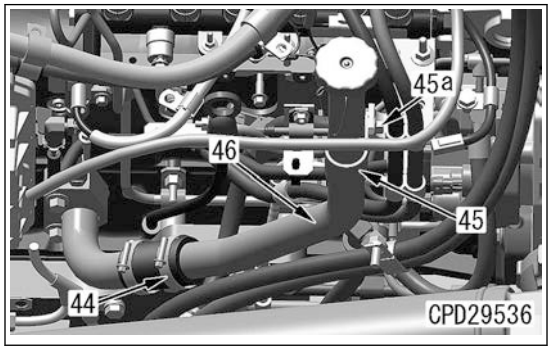
23. Install EGR valve assembly (12). For details, see “REMOVE AND INSTALL EGR VALVE ASSEMBLY”.

Air conditioner compressor assembly

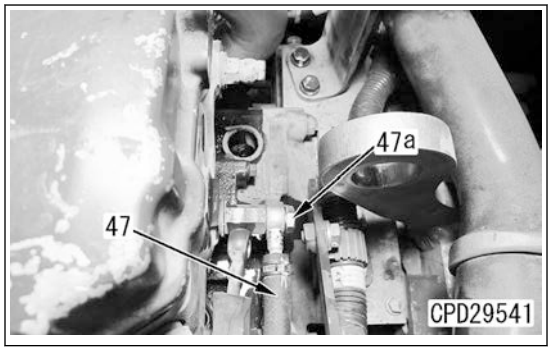
32. Remove the air conditioner compressor assembly (42). For details, see “REMOVE AND INSTALL AIR CONDITIONER COMPRESSOR ASSEMBLY”.
33. Remove the bracket (43).

Hose, tube, connector

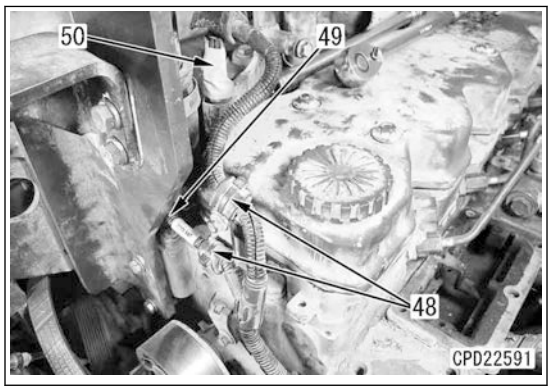
34. Loosen the clamp (44), remove the bolt (45a), and remove the clamp (45).
35. Remove the oil filler tube (46).



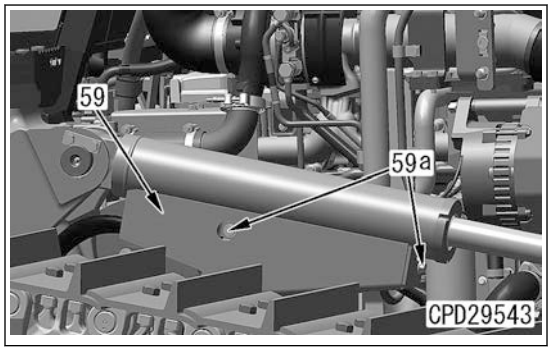
36. Remove the joint bolt (47a) of the fuel return hose (47).



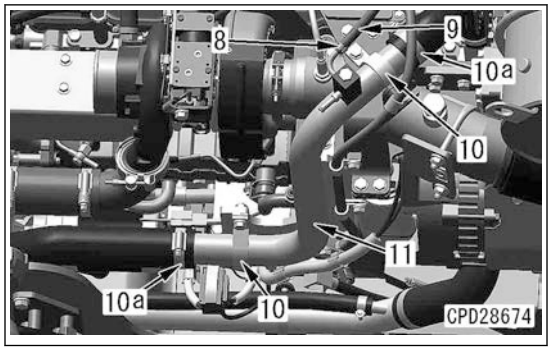
37. Remove the clamps (48) (2 pieces).
38. Disconnect the connector (49) and the exhaust manifold pressure sensor connector (50).



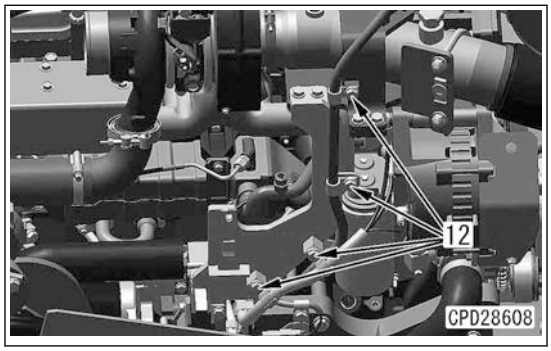
39. Remove the bolts (59a) (2 pieces), and remove the cover (59) of R.H. blade lift cylinder.



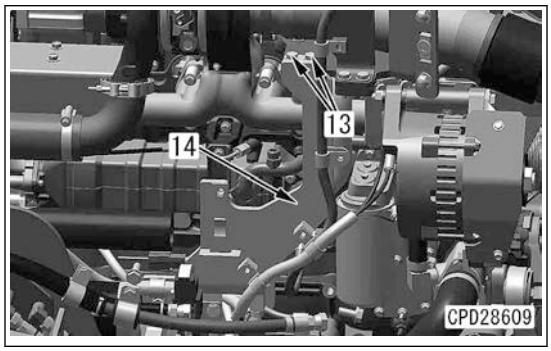
7. Remove the clamp (8), and disconnect the hose (9).
8. Remove the clamps (10) (2 places), loosen the clamps (10a) (2 places), and remove the tube (11).



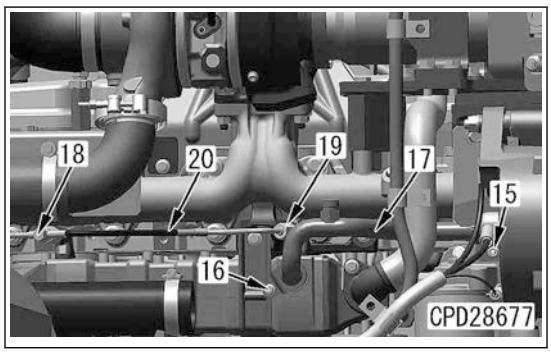
9. Remove the clamps (12) (4 places).



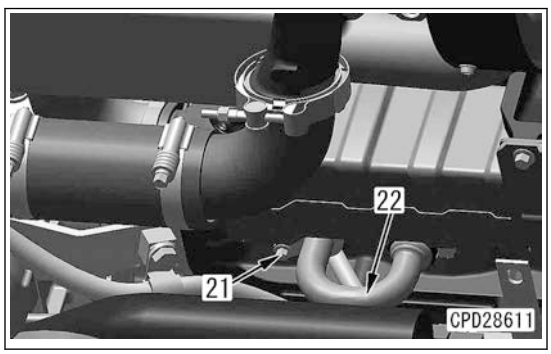
10. Remove the bolts (13) (4 pieces), and remove the bracket (14).



11. Remove the clamp (15).
12. Remove the bolt (16), and disconnect the tube (17).
13. Remove the joint bolt (18), loosen the sleeve nut (19), and remove the tube (20).



14. Remove the bolt (21), and disconnect the tube (22).



METHOD FOR INSTALLING AFTERCOOLER ASSEMBLY

Aftercooler assembly

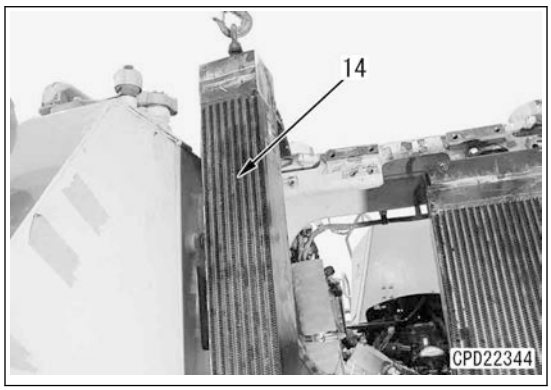
1. Sling aftercooler assembly (14), and set it on the installing position.

   Aftercooler assembly (14):

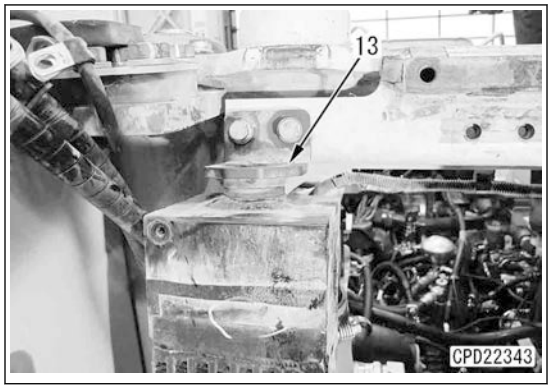
   20 kg

   REMARK

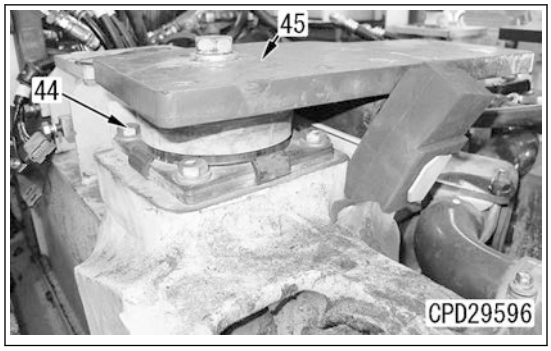
   Check that protrusion (a) at the bottom of the aftercooler securely fits in mount rubber (b), and that mount rubber (b) securely fits in the mount rubber receiving side.



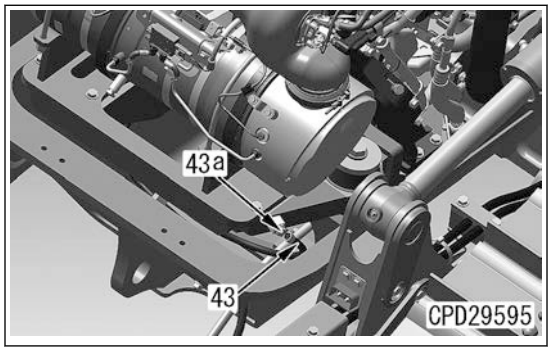
2. Install the bracket (13).
3. Connect the aftercooler lower hose (12).



4. Install right and left plate (45) together with the cushions with the bolts (44) (4 pieces each on the right and left sides).



5. Connect the ground terminal (43) at the left front of the engine, and remove the bolt (43a).

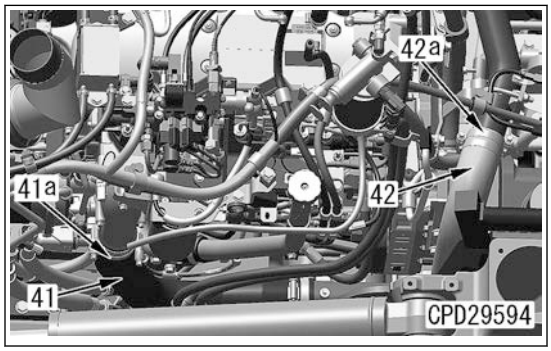


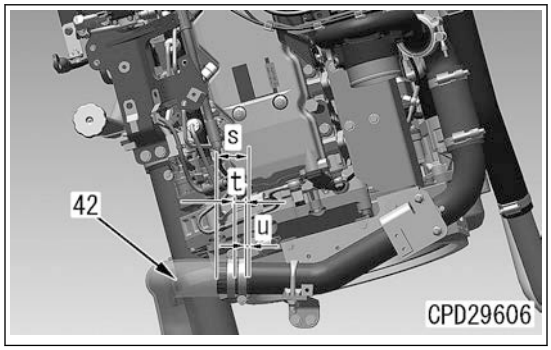
Hose, connector

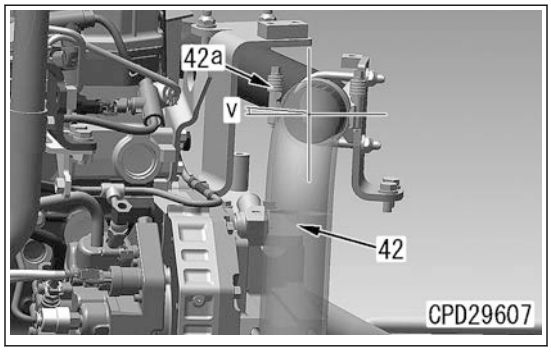
6. Connect the hose (42) on the VGT side at the positions of the following dimensions (s) to (u), and fasten the clamp (42a) at the position at angle (v).

   Clamp (42a):
   10.5±0.5 Nm {1.0±0.05 kgfm}

   - Dimension (s): 63 mm
   - Dimension (t): 22 mm
   - Dimension (u): 5 mm
   - Angle (v): 2 °5’



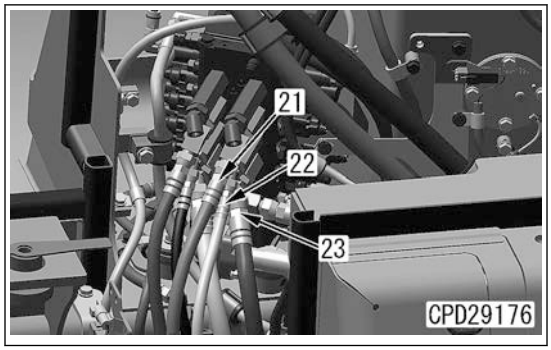




16. Disconnect the hoses (21), (22), and (23).

REMARK

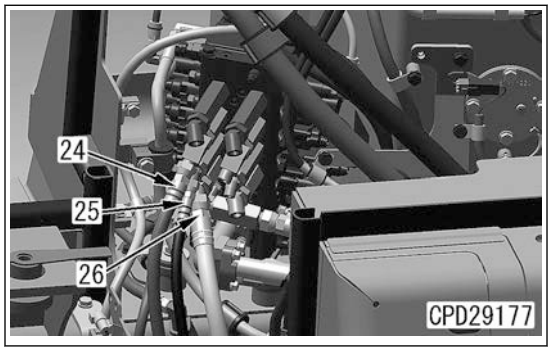
Plug the disconnected hoses and install the fitting to prevent oil from flowing out.



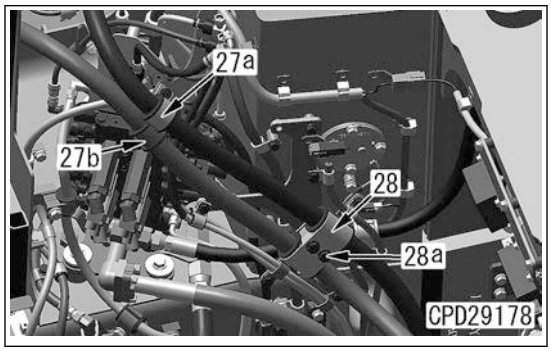
17. Disconnect hoses (24), (25), and (26).

REMARK

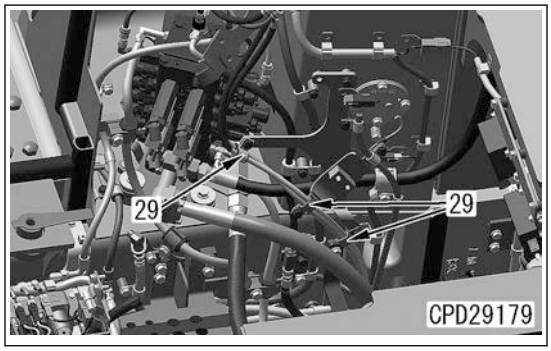
Plug the disconnected hoses and install the fitting to prevent oil from flowing out.



18. Remove the clamps (27a) and (27b).
19. Remove the bolts (28a) (2 pieces), and remove the clamp (28).



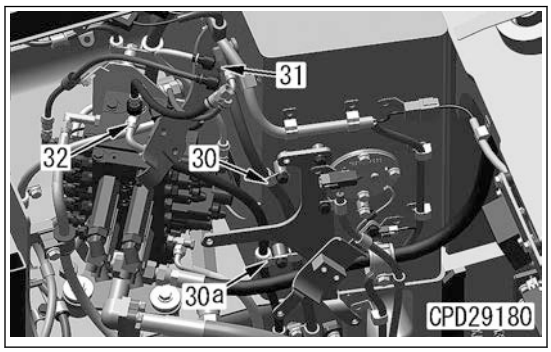
20. Remove the clamps (29) (3 places).



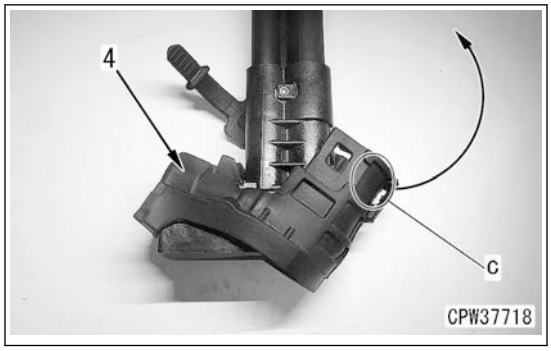
21. Remove the clamps (30) and (30a), and disconnect the fuel return hose (31) and hose (32).

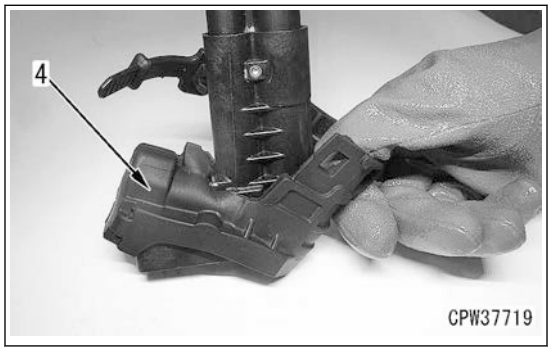
REMARK

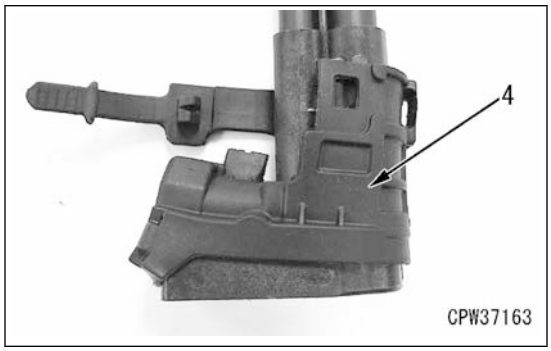
Plug the disconnected hoses and install the fitting to prevent fuel and oil from flowing out.



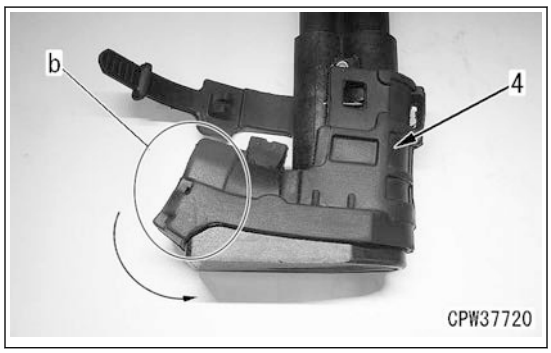
3) Hold the (c) part of the boot (4), and pull it up in the direction of the arrow.

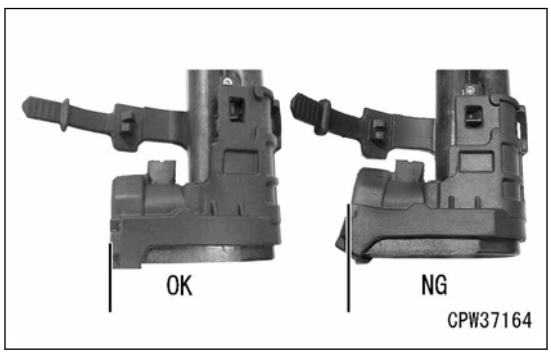






4) Set the boot (4) to the sensor top part (b) by moving it in the direction of the arrow.





REMOVE AND INSTALL SCR ASSEMBLY

Engine hood – AdBlue/DEF mixing tube – Connector, clamp – Exhaust pipe – SCR assembly

⚠ Place the machine on a level ground, and lower the work equipment to the ground in a stable posture.

⚠ Set the work equipment lock lever to LOCK position.

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

⚠ Turn the battery disconnect switch to OFF position, and remove the key. (For details, see TESTING AND ADJUSTING, "HANDLE BATTERY DISCONNECT SWITCH".)

⚠ Since SCR assembly and around it are heated to 500 °C or above, take care not to get burn injury.

⚠ If SCR assembly and around it are hot, wait until they have cooled down before starting any work.

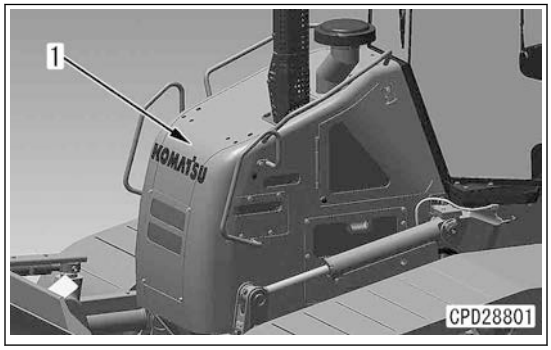
⚠ Check that no combustible material (dry leaves, twigs, etc.) is accumulated in SCR assembly and around it. If any dusts or combustible materials are found, remove them.

⚠ Since SCR assembly is fragile against shock such as falling, handle it with care, and do not reuse it if it is damaged.

METHOD FOR REMOVING SCR ASSEMBLY

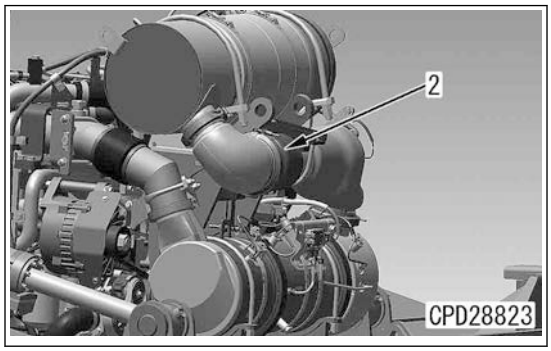
Engine hood

1. Remove the engine hood (1). For details, see "REMOVE AND INSTALL ENGINE HOOD ASSEMBLY".



AdBlue/DEF mixing tube

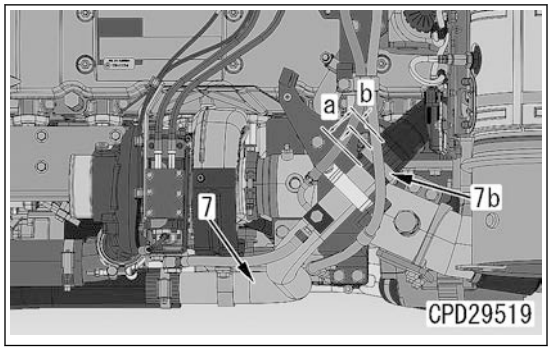
2. Remove AdBlue/DEF mixing tube (2). For details, see "REMOVE AND INSTALL AdBlue/DEF MIXING TUBE".

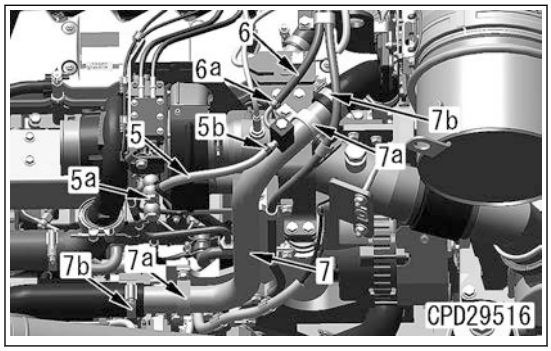


9. Attach the tube (7), and install the clamps (7a) (2 places).
10. Fasten the clamps (7b) at the installing position shown in the figure.

    Clamp (7b):
    8.8±0.5 Nm {0.9±0.05 kgfm}

    - Dimension (a): 44.5 mm
    - Dimension (b): 15 mm
11. Connect the hose (6), and install the clip (6a).
12. Attach the hose (5), and install the clip (5b).
13. Install the joint bolt (5a).



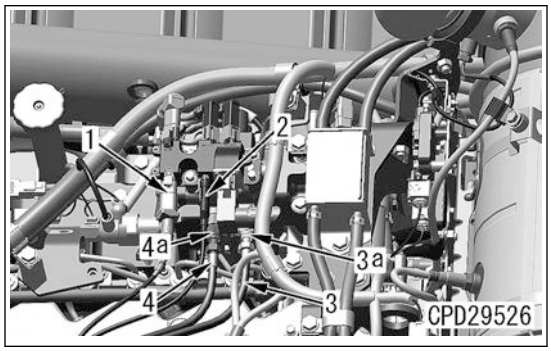


14. Connect the connectors (2) and (1).
15. Connect the hoses (4) and (3), and tighten the sleeve nuts (4a) and (3a).

    Sleeve nut (4a):
    25±1.5 Nm {2.6±0.15 kgfm}

    Sleeve nut (3a):
    15±1 Nm {1.5±0.1 kgfm}

    - Hose (4): VGT control hydraulic circuit
    - Hose (3): VGT drive hydraulic circuit



NOTICE

When connecting the hoses (4) and (3), be careful not to allow oil to splash to the high temperature area which causes fire.

Engine hood assembly

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

Refilling radiator with coolant

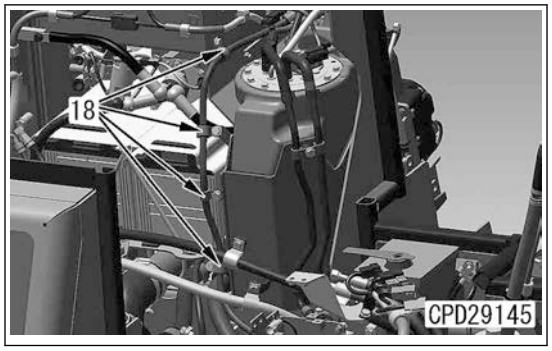
17. Refill the radiator with coolant to the specified level through the coolant filler port. Run the engine to circulate the coolant, and then check the coolant level again.

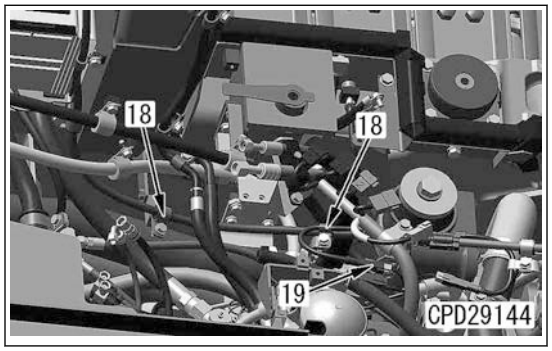
    Radiator:
    45 ℓ

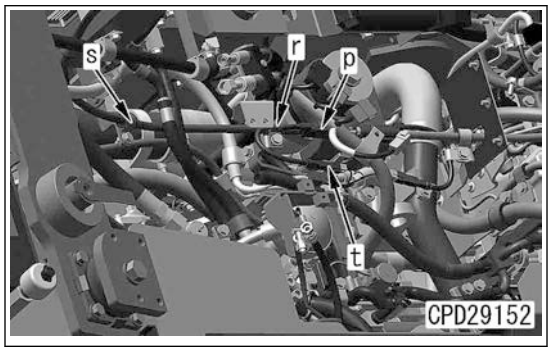
6. Install AdBlue/DEF hose (19a), the connector (19) and the clamps (18) (6 places) in order of (p) to (x).

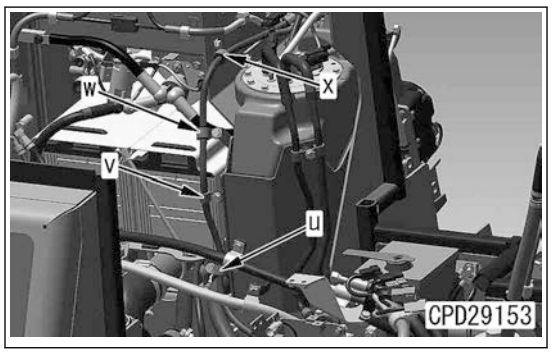
REMARK

- Insert the connector (h) of AdBlue/DEF hose (19a) into the pin (m) on the injector side until click sound is heard to install it. (Install AdBlue/DEF hose on the opposite side to the joint side.)
- When it is inserted so that the convex part (n) of the pin (k) passes the convex part inside of the clip, it can be locked by the clip.

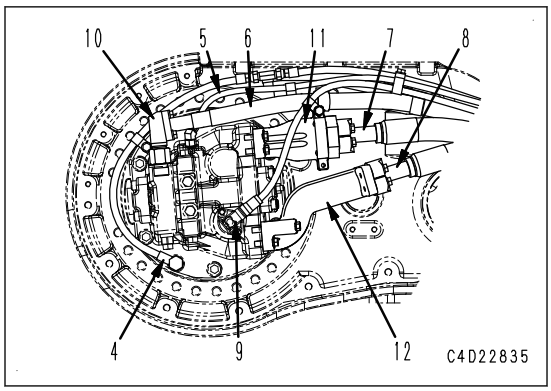






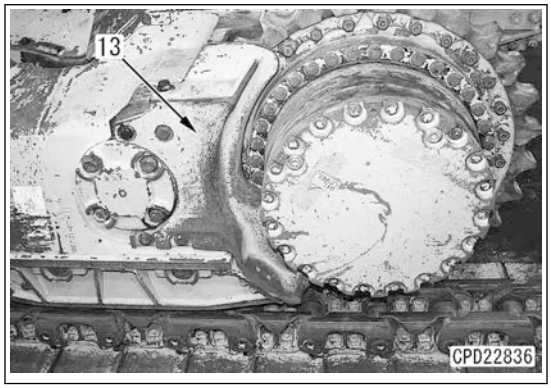


4. Disconnect the hoses (4) to (8).
5. Disconnect the sensor (9).
6. Remove the elbows (10) to (12).

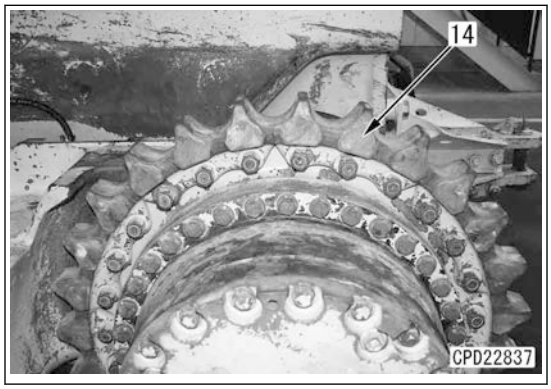


7. Sling the guard (13) by using the eyebolt (M12 x 1.75), and remove it.

   Guard (13):
   30 kg



8. Remove the sprocket teeth (14).



9. Sling the final drive assembly (15) by using the lifting tool (B), and hold it.

REMOVE AND INSTALL IDLER ASSEMBLY

Tools for removal and installation of idler assembly

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	Commercially available	Chain block	●	1			Removal of idler assembly

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

⚠ **Set the work equipment lock lever to LOCK position.**

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

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

⚠ **For hazard prevention, never let anyone stand at the front of the idler assembly.**

METHOD FOR REMOVING IDLER ASSEMBLY

Track shoe assembly

1. Separate the track shoe assembly. For details, see "SEPARATION AND CONNECTION OF TRACK ASSEMBLY".

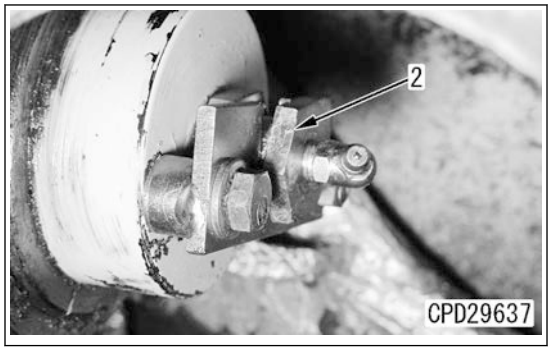
Grease

2. Loosen the lubricator (2), and drain the grease.

   REMARK

   Do not loosen the lubricator (2) by more than 1 turn.

   ⚠ **If the pressure inside of the recoil spring cylinder becomes negative, the yoke cannot be pulled out.**

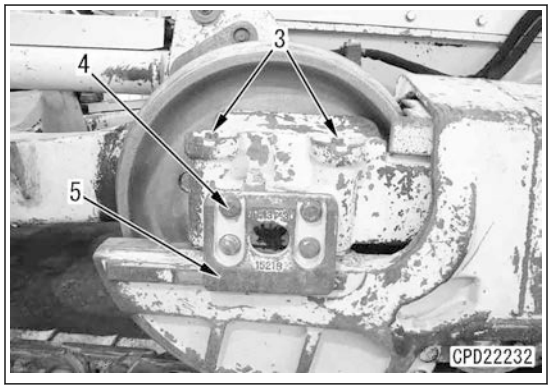


Support

3. Remove right and left bolts (3) (2 pieces).
4. Remove right and left bolts (4) (4 pieces), and remove the side support (5).

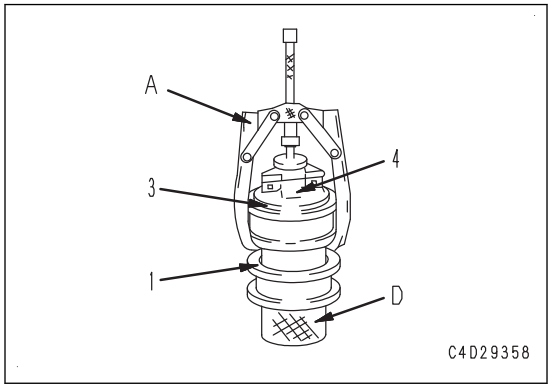
   REMARK

   The side support (5) has shims. Check the thickness and quantity of shims, and write them down.



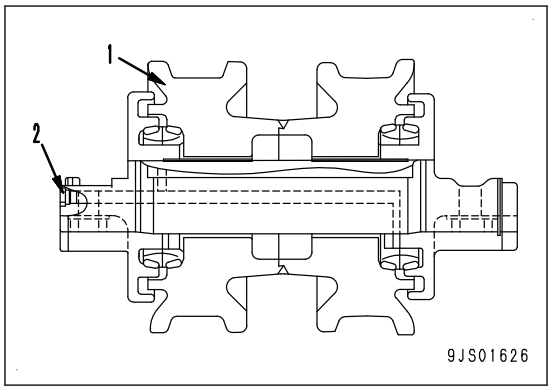
Track roller assembly

11. Set the track roller assembly (1) on the block (D).
12. Push in the collar (3) by using the puller (A), and install the lock (4).



13. Check the oil level, and tighten the plug (2) to the roller assembly (1).

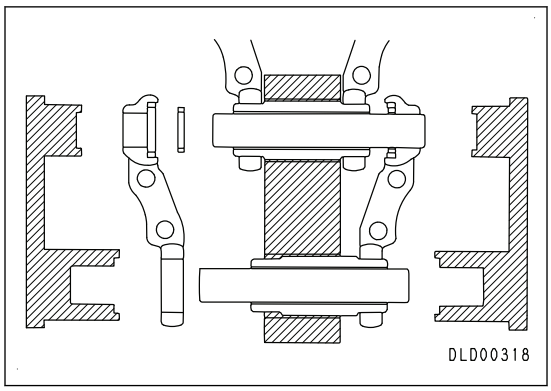
    Plug (2):
    98.0 to 137.2 Nm {10 to 14 kgfm}



19. Set the L.H. link, and install the spacer to the pin.

    REMARK

    Similarly to the R.H. link, apply oil.

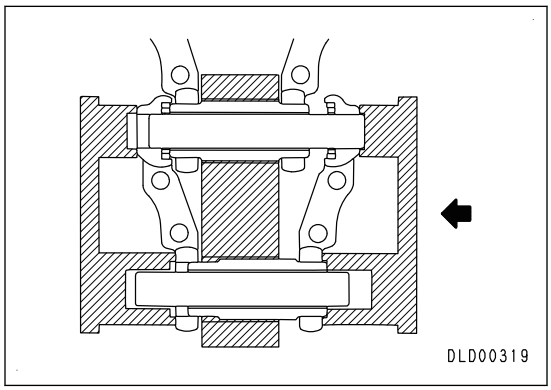


20. Set the right side jig on the pressing side and the left side jig on the receiving side, and press-fit the left side link.

    REMARK

    - Press fit the link carefully to avoid removal of right and left seals and spacers.
    - Secure the escaping space at the L.H. jig so that the pin end surface does not interfere with the jig bottom.

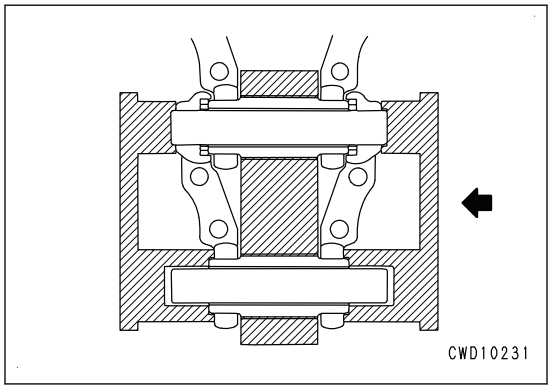
    Link press-fitting force: 196 to 392 kN {20 to 40 t}



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

    REMARK

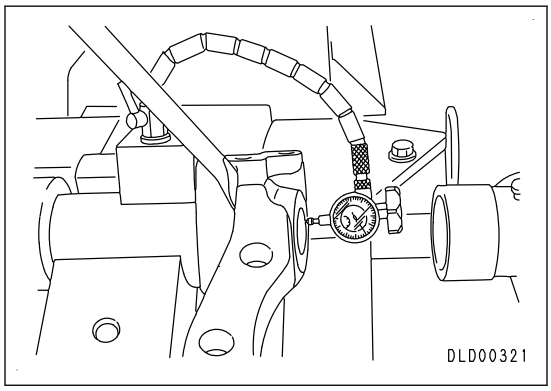
    - Whether the parts are closely contacted or not is not visible on the surface. Therefore, manage it by the oil pressure of the link press. Set the relief pressure to the fixed value, apply the oil pressure and press fit fully until it reaches the pressure.
    - For details of setting the relief pressure, see “Preparatory work”.
    - Check that adjacent links are rotated each other.



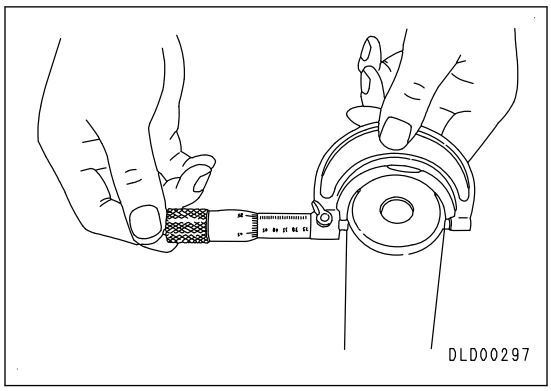
22. Measure the end play between the link having just been assembled and the one assembled last time by using a dial gauge, pinch bar, etc. each time the link is assembled, and check that the links are assembled within the specified range.

    REMARK

    - If the end play is not within 0 to 0.13 mm even by fully pushing until the relief valve operates, increase the relief pressure setting gradually to adjust the end play.
    - Set the relief pressure slowly to prevent the pressing force of the link press from increasing unnecessarily.



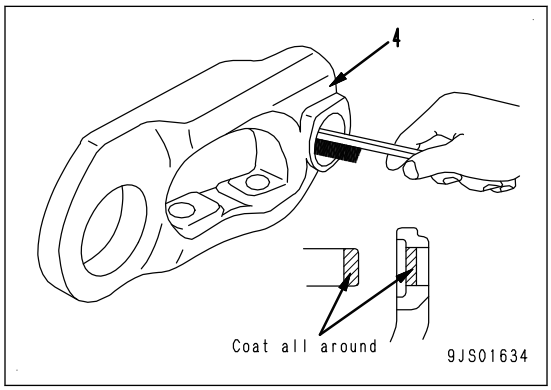
3. To determine the pushing force for final assembly, measure the outside diameter of the pin by using the micrometer, and record it.



4. Apply liquid gasket (198-32-19890) to the pin press-fitting hole of the link (4).

   REMARK

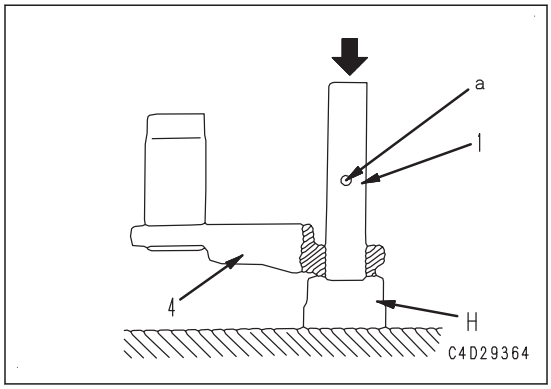
   When reusing the removed link, smoothly finish the pin press-fitting hole by using the sandpaper, etc.



5. Apply the pusher (H) to the end surface of the link (4), and press fit the pin (1) by using the press or the remover.

   REMARK

   - Press fit the pin so that the side hole (a) of the pin comes to the link tread side.
   - Be sure to use a new pin.
     Pin press-fitting force: 147 to 245 kN {15 to 25 t}

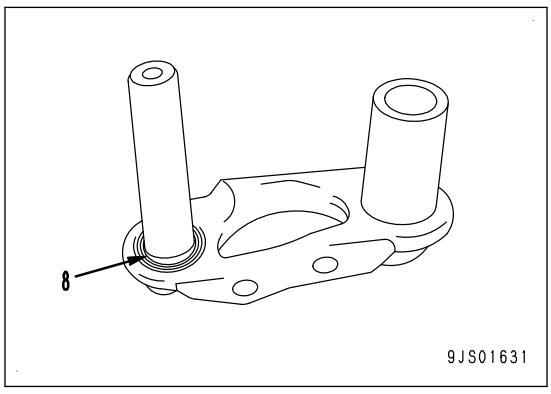


Seal

6. Install the seal (8).

   REMARK

   Check that the oil is not attached to the contact faces of the link and the seal.



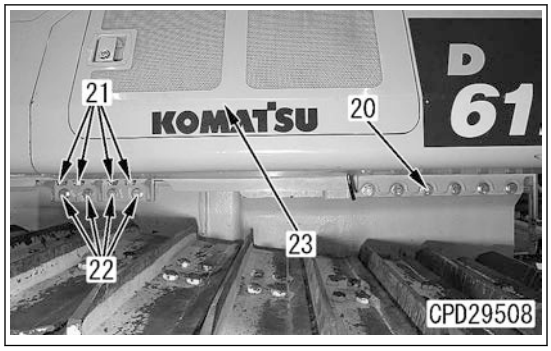
2. Sling the hydraulic tank assembly (23), hold the assembly, and install it with the mounting bolts (22) (4 pieces), (21) (4 pieces), (20) (6 pieces), (19) (4 pieces), and (19a) (2 pieces).

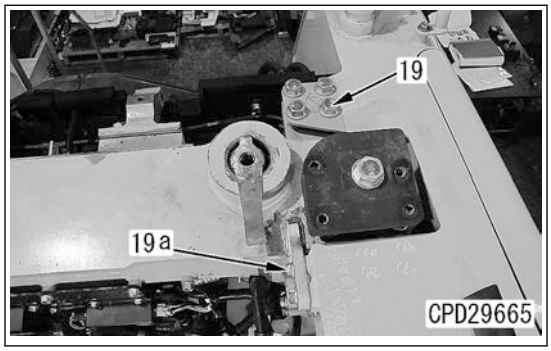
   REMARK

   Tighten the mounting bolts (19) (4 pieces) to (22) (4 pieces) and (19a) (2 pieces) in this order to prevent the hydraulic tank from being distorted when installing the main frame.

   Mounting bolts (19), (20), (21), and (22):
   490 to 565 Nm {50 to 58 kgfm}

   Mounting bolts (19a):
   98 to 123 Nm {10 to 12.5 kgfm}





Connector, hose

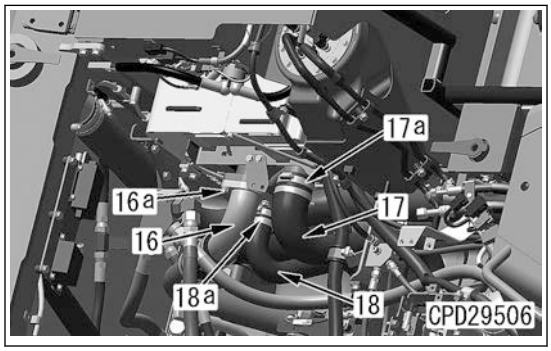
3. Connect the hydraulic hose (18), and fasten the clamp (18a).

   Clamp (18a):
   8.8±0.5 Nm {0.9±0.05 kgfm}

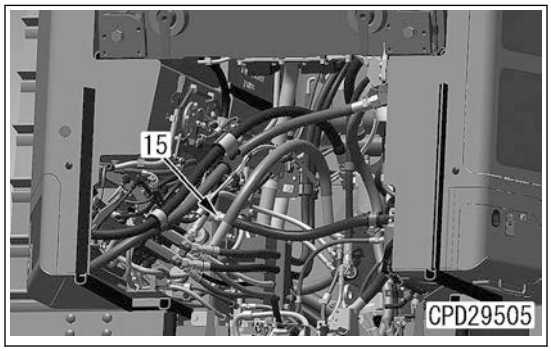
4. Connect the hydraulic hose (17), and fasten the clamp (17a).

   Clamp (17a):
   8.8±0.5 Nm {0.9±0.05 kgfm}

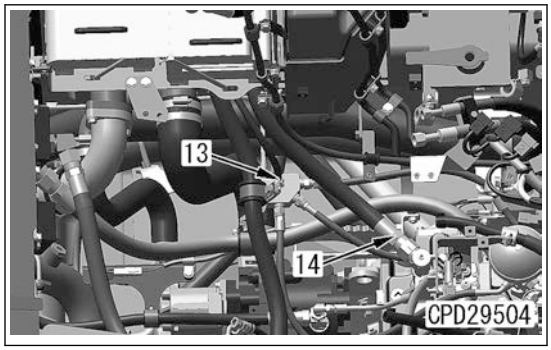
5. Connect the hydraulic hose (16) with the bolts (16a) (2 pieces).



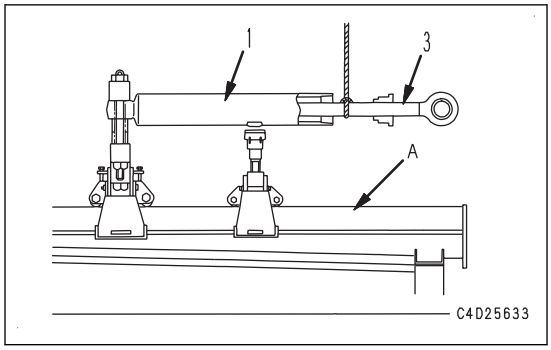
6. Connect the hydraulic hose (15).



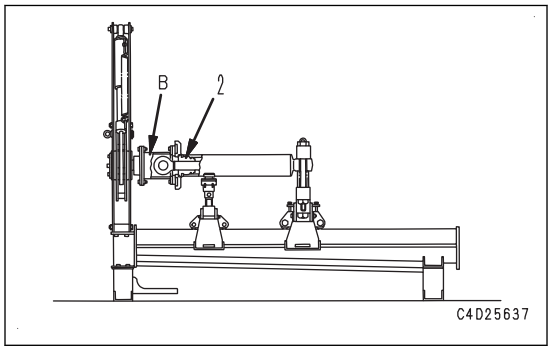
7. Connect the hydraulic hoses (14) and (13).



17. Set the cylinder assembly (1) on the repair stand (A), sling the piston rod assembly (3), and install it to the cylinder (1).



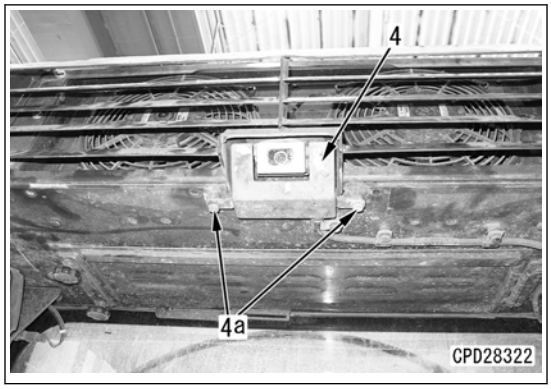
18. Tighten the cylinder head assembly (2) by using the wrench assembly (B) and a hydraulic pump or a torque multiplier wrench.



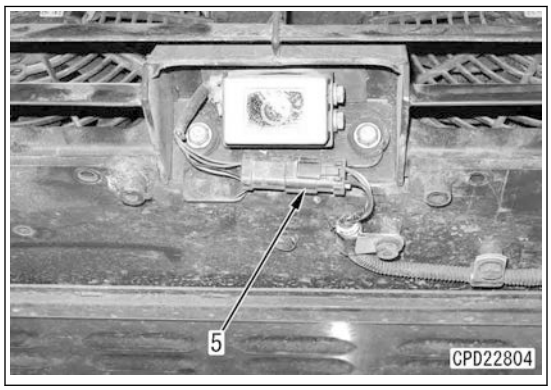
Cylinder head assembly (2)

Cylinder name	Cylinder head tightening torque
Blade lift	785±78.5 Nm {80±8.0 kgfm}
Blade angle	932±93 Nm {95±9.5 kgfm}
Blade tilt	981±98.0 Nm {100±10.0 kgfm}
Ripper lift	1.01±0.10 kNm {103±10.3 kgfm}

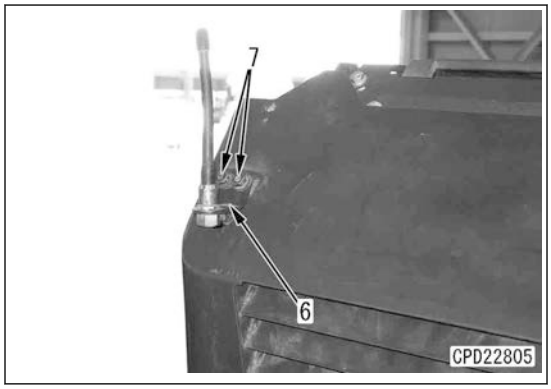
4. Remove the bolts (4a) (2 pieces), and remove the cover (4).



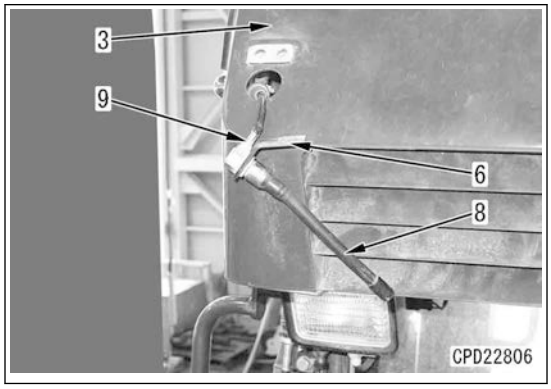
5. Disconnect the connector RVC (5).



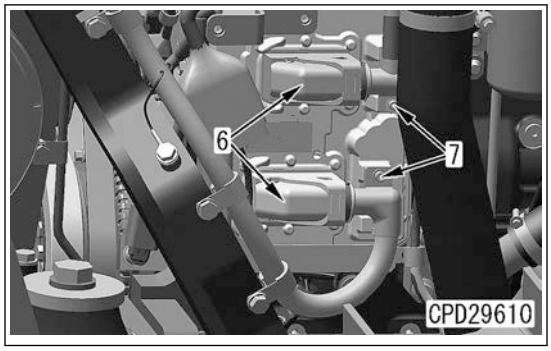
6. Remove the bolts (7) of the bracket (6).



7. Remove KOMTRAX antenna (8) and the bracket (6), and pull out the wiring harness (9) toward the inside of the cover (3).



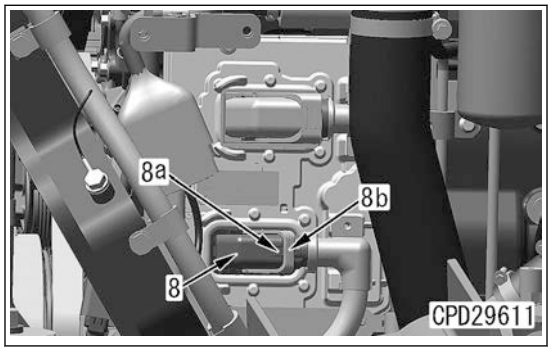
5. Remove the cover (6).
6. Remove the hexagonal socket head bolts (7) (5 mm) (2 pieces).



7. Press the protruding portion (8a) of the connector J2 (8), raise the lever (8b), and disconnect the connector J2 (8).

   REMARK

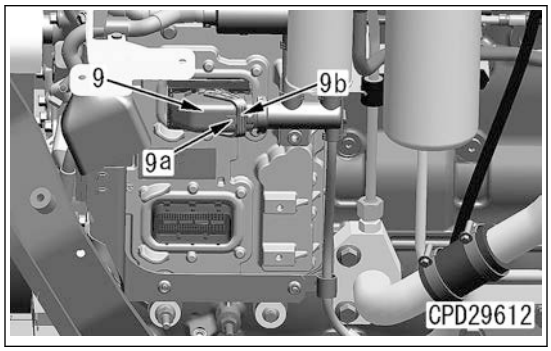
   Securely remove dusts, etc. from the connector J2 (8).



8. Press the protruding portion (9a) of the connector J1 (9), raise the lever (9b), and disconnect the connector J1 (9).

   REMARK

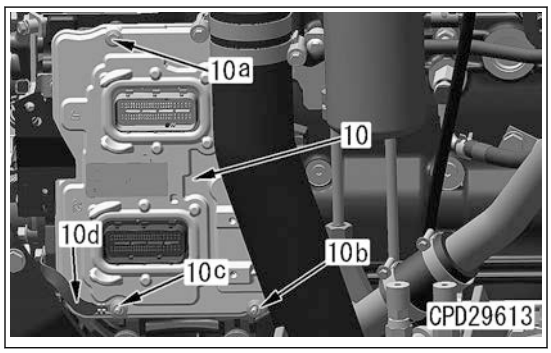
   Securely remove dusts, etc. from the connector J1 (9).



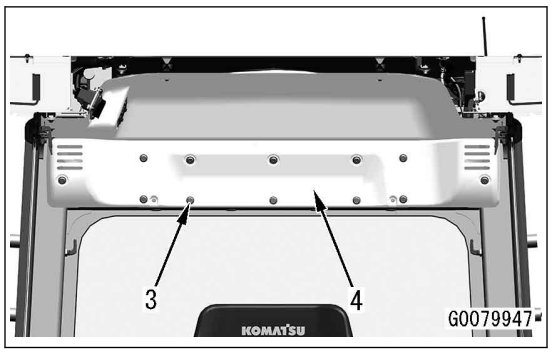
9. Remove the bolts (10a) (2 pieces), the stud bolts (10b) and (10c), and remove the engine controller assembly (10).

   REMARK

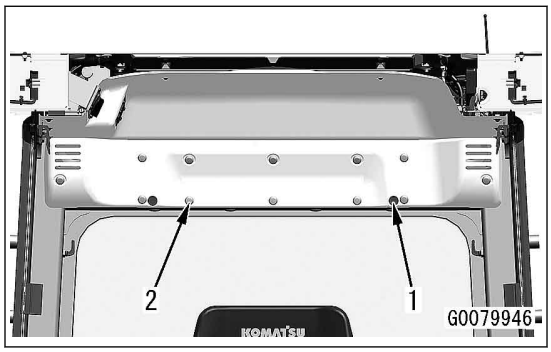
   - The stud bolt (10c) is tightened together with the ground cable (10d).
   - Be careful that the engine controller assembly (10) does not fall off during removal.

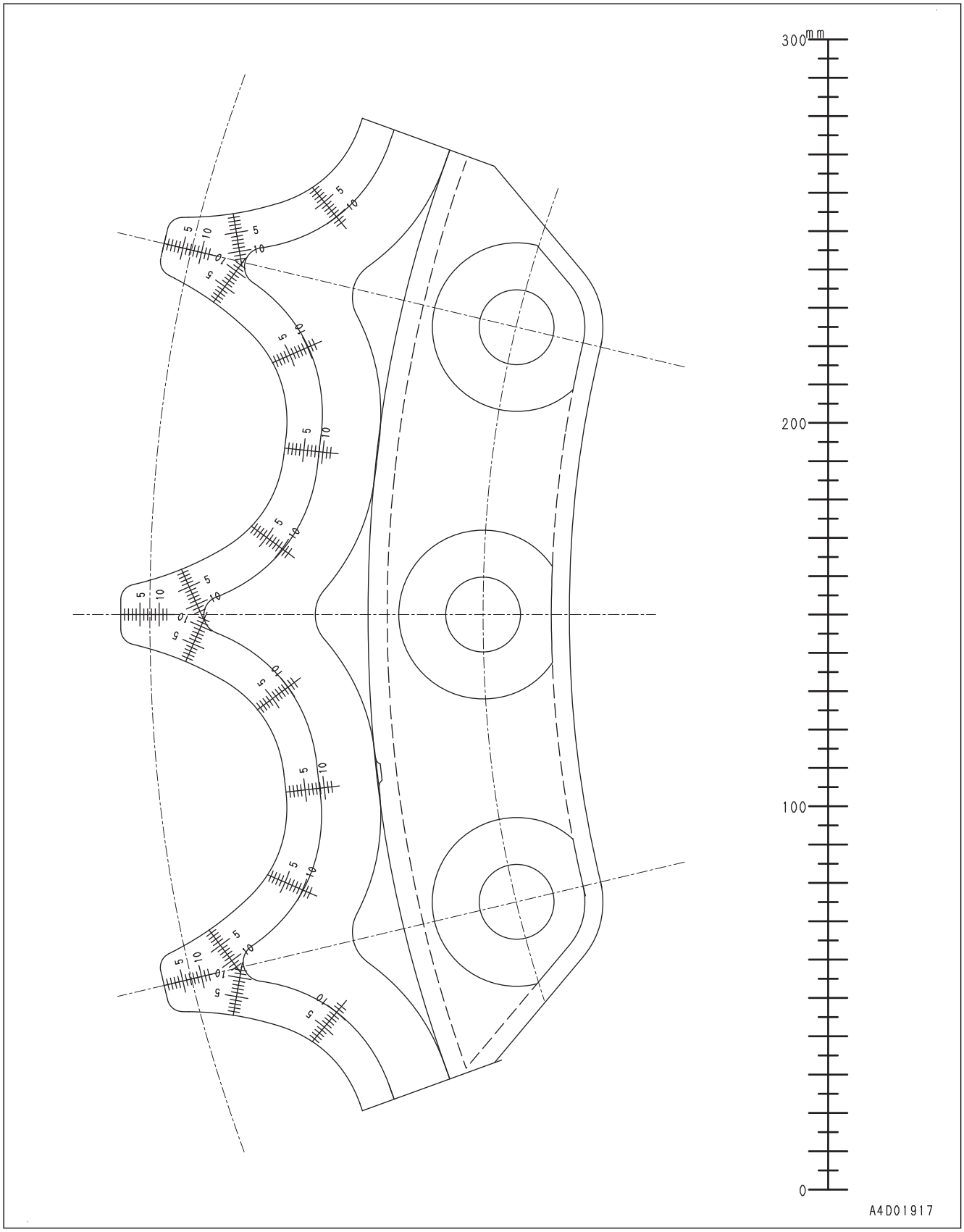


13. Install the cover (4) with the bolts (3) (12 pieces).



14. Install the caps (2) (12 pieces).
15. Install the clips (1) (2 pieces).




mm
300
200
100
0
A4D01917

Unit: mm

No.	Item	Judgment criteria					Remedy
		Standard dimension			Repair limit		
1	Suction valve spring	Free length x outside diameter	Installed length	Load at installed height	Free length	Load at installed height	Replace the spring if damaged or deformed
		39.2 x 4.45	33.5	5.10 N {0.52 kg}	-	4.12 N {0.42 kg}	
2	Spool return spring (fan, ripper)	41.1 x 19.3	40.5	34.3 N {3.50 kg}	-	27.4 N {2.80 kg}	
3	Spool return spring (lift)	41.5 x 19.3	40.5	44.2 N {4.51 kg}	-	35.4 N {3.61 kg}	
4	Spool return spring (lift)	35.2 x 17.4	32.3	80.4 N {8.20 kg}	-	64.3 N {6.56 kg}	
5	Spool return spring (lift)	58.2 x 18.1	39.5	313.6 N {32.0 kg}	-	250.9 N {25.6 kg}	
6	Spool return spring (tilt, angle)	41.9 x 18.6	40.5	52.9 N {5.39 kg}	-	42.3 N {4.31 kg}	
7	Back pressure valve spring	58.3 x 17	36	56.9 N {5.80 kg}	-	45.5 N {4.64 kg}	

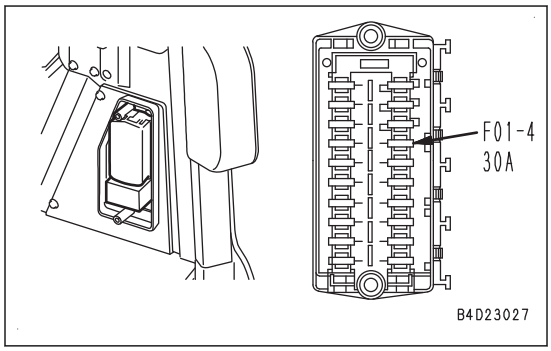
Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*1), or component/system)	Explanation
ICT	Information and Communication Technology	Communication and electronic control	A general term for the engineering and its socially applied technology of information processing and communication.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

INSTALLATION LOCATIONS OF AIR CONDITIONER PARTS AND ARRANGEMENT OF CONNECTORS

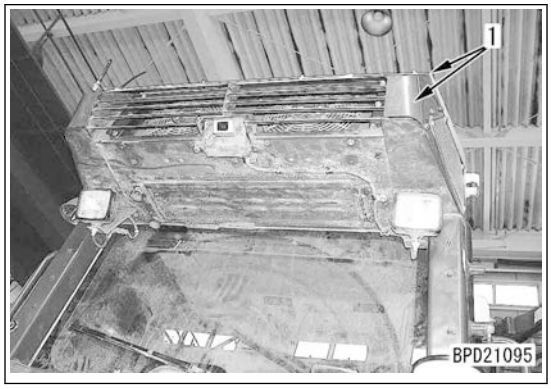
- Air conditioner unit, fan, condenser, relays and blower are provided in the rear outside of the cab.
- Hot water valve is located under the seat.

1. Open the cover under left part of floor, and open the fuse box cover.

   Fuse for air conditioner: F01-4 (30A)

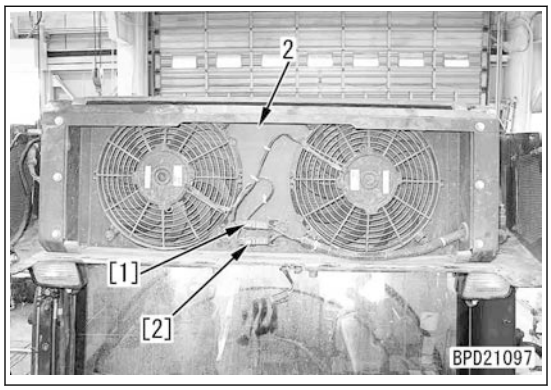


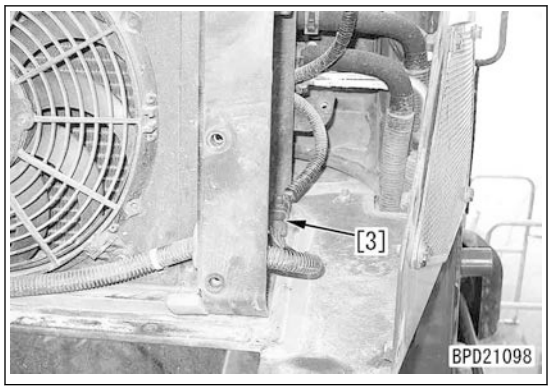
2. Remove cover (1). For details, see DISASSEMBLY AND ASSEMBLY, “REMOVAL AND INSTALLATION OF AIR CONDITIONER UNIT”.



- Remove cover (1) and you will see condenser assembly (2).

  [1], [2], and [3]: Condenser fan connectors





CONNECTION OF SERVICE TOOL

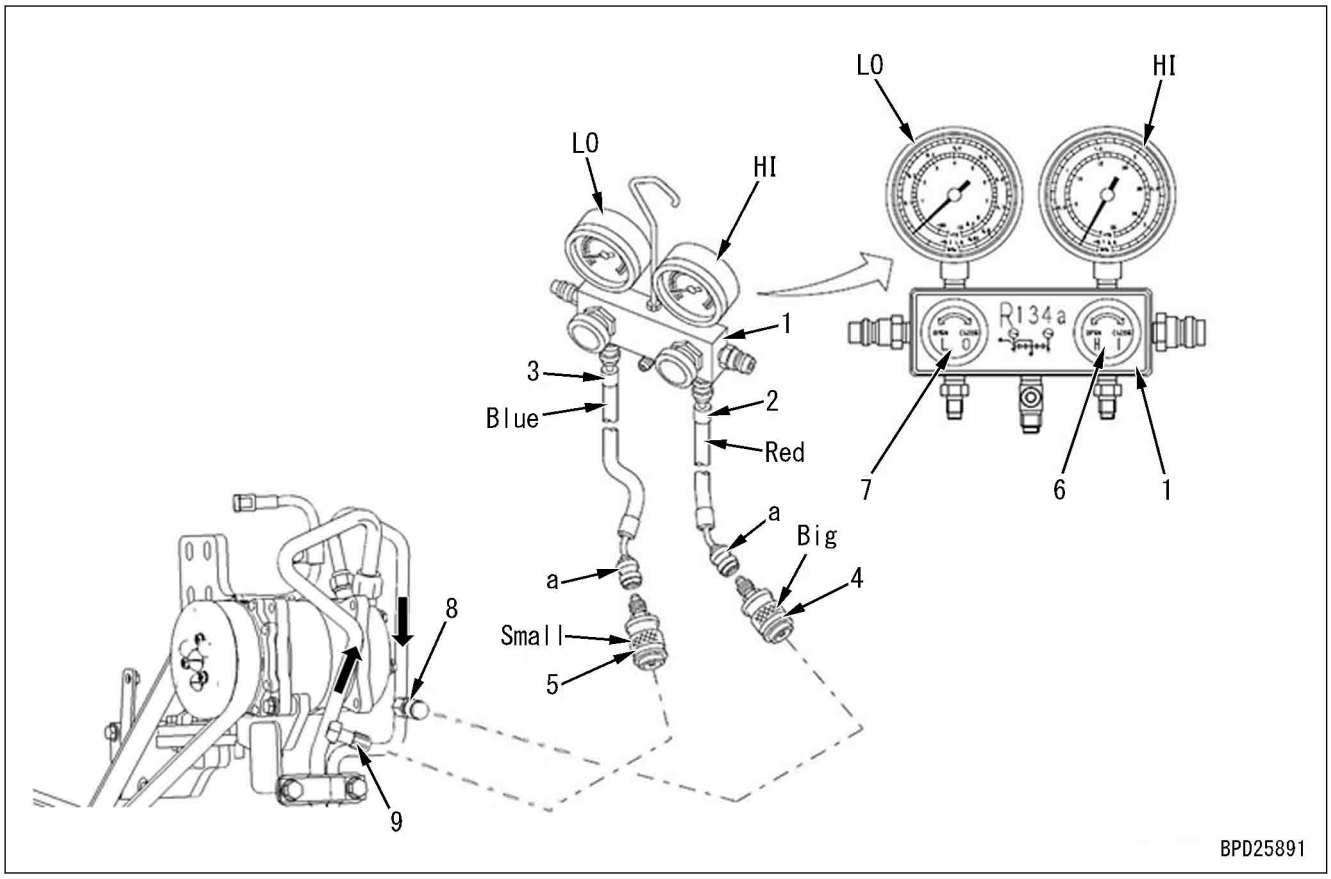
⚠ **Place the machine on a level ground, lower the work equipment completely to the ground in a stable posture, set the lock lever to LOCK position, and then stop the engine.**

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

Use the following service tool kit for R134a.

Symbol	Part No.	Part name
-	799-703-1200	Service tool kit

Service tool kit



1: Gauge manifold
2: Red high-pressure line charging hose
3: Blue low-pressure line charging hose
4: Large diameter quick joint (for high-pressure line)
5: Small diameter quick joint (for low-pressure line)
6. High-pressure valve
7. Low-pressure valve
8. Service valve (high-pressure)
9. Service valve (low-pressure)

⚠ **a: Note that the threads are coarse and the hoses are relatively easy to loosen.**

METHOD FOR CONNECTING SERVICE TOOL

1. Close high-pressure line valve (6) and low-pressure line valve (7) of gauge manifold (1).
2. Connect red high-pressure line charging hose (2) to the gauge manifold (1) (HI side) .
3. Connect blue low-pressure line charging hose (3) to the gauge manifold (1) (LO side).
4. Connect quick joints (4) and (5) to each hose.
5. Connect quick joint (4) to service valve (8) of high-pressure piping.
6. Connect quick joint (5) to service valve (9) of low-pressure piping.