SEN06892-04

Shop Manual

BULLDOZER

D475A-8R

SERIAL NUMBERS 55001 and up

KOMATSU

Fuel system

Check that there is no damage on the pipings, no looseness on mounting bolts, nuts and clamps, and no fuel leak from connecting portion.

If there is any looseness, damage, or fuel leak, retighten or repair the part.

Check the exhaust equipment and its installation portion for looseness and damage.

REMARK

When an equipment is described as an exhaust equipment, it is one of the followings. (The applications or components of equipment are different depending on its models or specifications.)

- KDPF
- KDOC muffler
- Muffler
- Exhaust pipe
- Parts which connects the above, or etc.

Visually check that there is no crack or no damage on the exhaust equipment and its installation portion. If there is any damage, replace the part.

Check that there is no looseness on the exhaust equipment and mounting bolts, nuts, and clamps on the installation portion.

If there is any looseness, retighten the part.

Check of function of muffler in exhaust system

REMARK

When an equipment is described as an muffler in exhaust system, it is one of the followings. (The applications or components of equipment are different depending on its models or specifications.)

- KDPF
- KDOC muffler
- Muffler
- Exhaust pipe
- Parts which connects the above, or etc.

Check that there is no unusual noise by comparing to it of the time when the machine was new.

If there is any unusual noise, repair KDPF or muffler, referring to “Troubleshooting” and “Disassembly and Assembly”.

Hydraulic System

Item	Unit	D475A-8R
Work equipment pump		
Type	-	Variable swash plate type : 2 pieces (HPV140+140)
Rated discharged pressure	MPa {kgf/cm^2}	27.4{280}
Theoretical discharged volume	cm^3/rev	280
Power train pump + lubrication pump (tandem)		
Type	-	Gear type (BAL160 + 160 + 112)
Maximum discharged pressure	MPa {kgf/cm^2}	3.0{30}
Theoretical discharged volume	cm^3/rev	162(lubrication pump) 162(T/C charge) 115(Powertrain operation)
Scavenging pump		
Type	-	Gear type(BAR63+320)
Maximum discharged pressure	MPa {kgf/cm^2}	0.15{1.5}
Theoretical discharged volume	cm^3/rev	382.7
Cooling fan pump		
Type	-	Variable swash plate type (LPV90+45)
Maximum discharged pressure	MPa {kgf/cm^2}	20.9{214}
Theoretical discharged volume	cm^3/rev	135
Cooling fan motor		
Type	-	Fixed swash plate type (LMF180)
Rated pressure	MPa {kgf/cm^2}	20.9{214}
Rated flow rate	ℓ/min	190

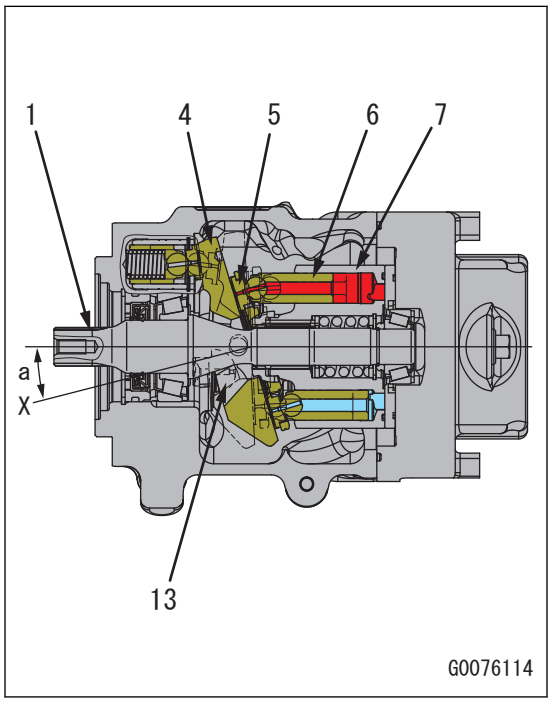
Suction and Discharge of Pressurized Oil

When the cylinder block (7) rotates, the piston (6) moves back and forth in the cylinder through the shoe (5).

When the piston (6) is pulled by the cylinder block (7), hydraulic oil is sucked, and when the piston (6) is pushed by the cylinder block (7), hydraulic oil is discharged.

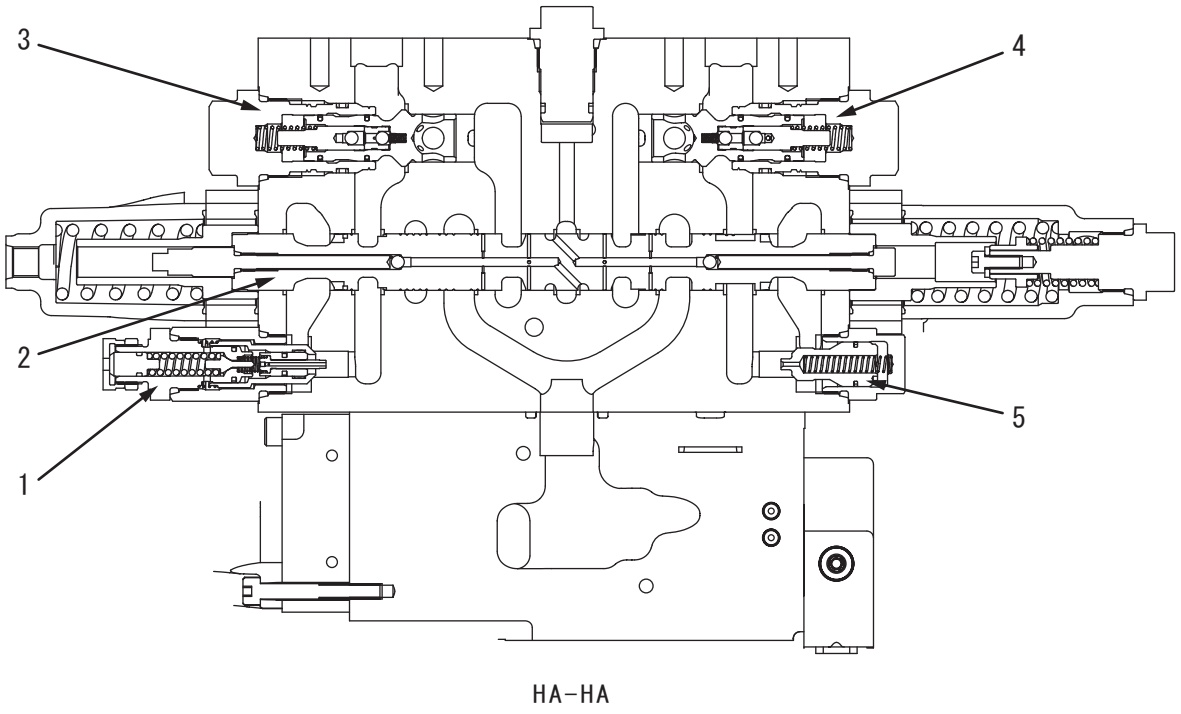
The rocker cam (4) slides by use of the ball retainer (13) as a pivot, and the swash plate angle (a) changes in response to the back and forth linear movement of the servo piston (10). When the back and forth distance of the piston (6) changes in response to the swash plate angle (a), the pump discharged volume increases or decreases.

Since the swash plate angle (a) does not become 0, the pump discharged volume does not become 0.



Pin No.	Signal name	Input and output
4	(*1)	-
5	(*1)	-
6	(*1)	-
7	(*1)	-
8	(*1)	-
9	(*1)	-
10	(*1)	-
11	(*1)	-
12	(*1)	-
13	(*1)	-
14	PCV2(+)	Output
15	(*1)	-
16	(*1)	-
17	(*1)	-
18	Speed sensor (engine Bkup)	Input
19	(*1)	-
20	(*1)	-
21	(*1)	-
22	(*1)	-
23	PCV1(+)	Output
24	PCV1(-)	Ground/Shield/ Return
25	Injector #1 (+)	Output
26	Injector #2 (+)	Output
27	Injector #3 (+)	Output
28	(*1)	-
29	(*1)	-
30	(*1)	-
31	Speed sensor (engine)	Input
32	Intake air temperature sensor	Input
33	(*1)	-
34	(*1)	-
35	(*1)	-
36	(*1)	-
37	(*1)	-
38	(*1)	-
39	(*1)	-
40	(*1)	-
41	(*1)	-

Sectional Views (HA-HA) (Blade Lift Valve) (U Dozer and Semi-U Dozer Spec)



1: Suction safety valve (cylinder head)
2: Spool
3: Pressure compensation valve (cylinder head)
4: Pressure compensation valve (cylinder bottom)
5: Suction valve (cylinder bottom)

18: Stator
19: Pump
20: Stator shaft
21: Guide
22: Retainer
23: Pump shaft
24: Transmission input shaft
25: Stator clutch hub gear
26: Stator clutch housing
27: Return spring
28: Stator clutch plate
29: Stator clutch disc
30: Stator clutch piston
31: Turbine boss
32: Lockup clutch plate
33: Lockup clutch disc
34: Lockup clutch piston
35: PTO gear (number of teeth: 65)
36: Sleeve
37: Bearing race
38: Bushing
39: PTO gear (number of teeth: 61)
40: Cover
41: Cover
42: PTO gear (number of teeth: 61)
43: Cover
44: Strainer

Structure

The torque converter is integrated with the transmission. The torque converter consists of pump (19), turbine (16), stator (18), lockup clutch, stator clutch, and PTO.

When you do dozing work or levelling work of light load, the machine operates the lockup of the torque converter to improve fuel consumption rate and work efficiency, and reduce the consumption of engine horsepower. When the lockup is operated, the lockup clutch is engaged, and the stator clutch is released. Engine rotation is transmitted from the pump (19) through the lockup clutch to the turbine (16). The stator (18) becomes free and rotates together with the rotation of the pump (19) and turbine (16). When the lockup is not operated, the lockup clutch is released, and the stator clutch is engaged. The engine rotation is transmitted from the pump (19) to the turbine (16) while oil is used as a medium. The stator (18) is fixed by the stator clutch.

The pump (19) is integrated with the drive case (15), lockup clutch housing (14), and input shaft (10). The input shaft (10) is splined to the coupling (8).

The turbine (16) is integrated with the turbine boss (31). The turbine boss (31) is splined to the transmission input shaft (24).

The stator (18) is splined to the stator shaft (20). The stator shaft (20) is splined to the stator clutch hub gear (25).

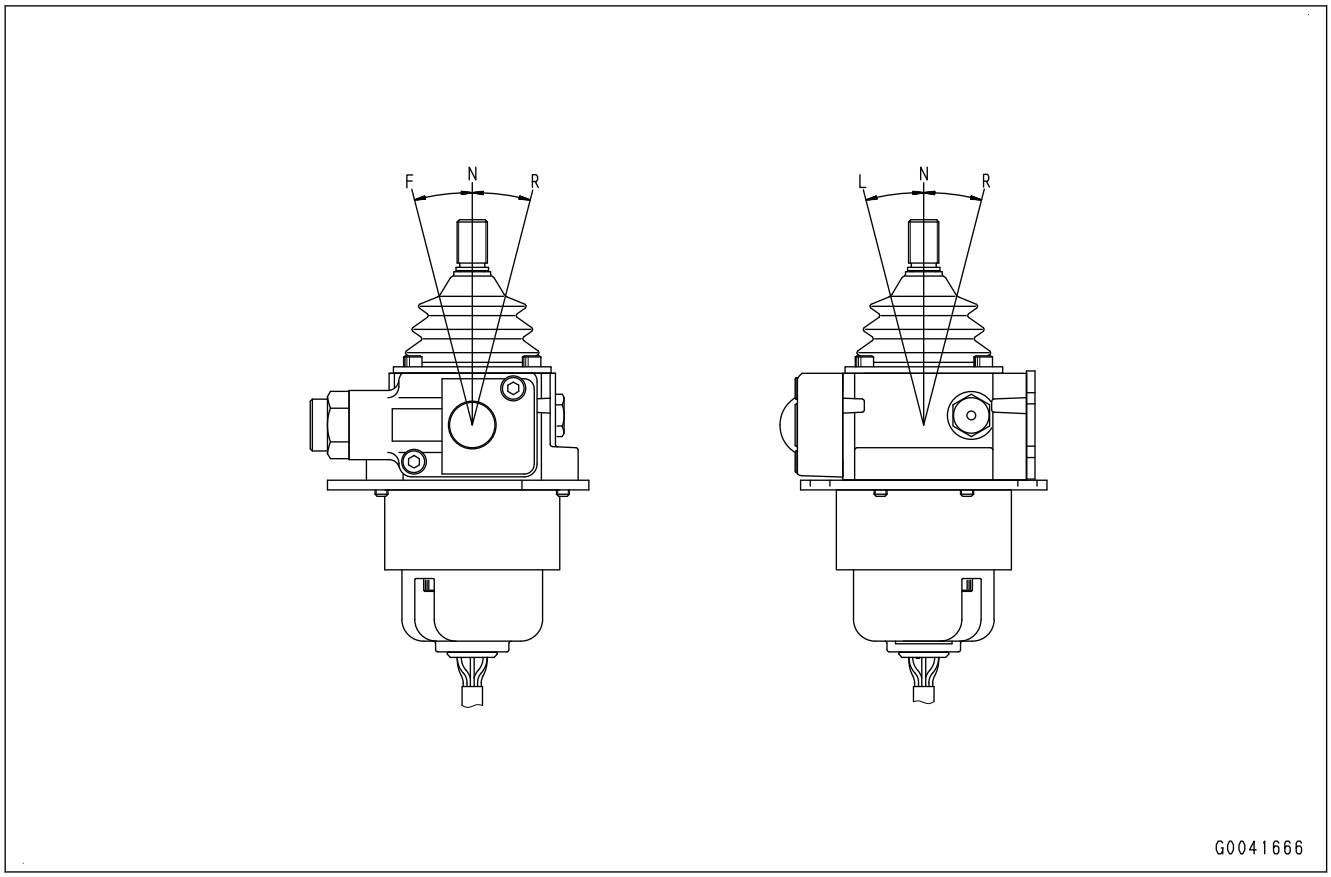
The lockup clutch consists of components such as clutch plate (32), clutch disc (33), and clutch piston (34). The external teeth of clutch plate (32) is splined to the internal teeth of drive case (15). The internal teeth of the disc (33) is splined to the external teeth of the turbine boss (31). The clutch piston (34) slides hydraulically in the clutch housing (14) and pushes the clutch plate (32) and clutch disc (33).

The stator clutch consists of components such as clutch plate (28), clutch disc (29), and clutch piston (30). The clutch plate (28) is supported by pins on the stator clutch housing (26) and rear housing (17). The internal teeth of the clutch disc (29) are splined to the external teeth of the stator clutch hub gear (25). The clutch piston (30) slides hydraulically in the rear housing (17) and pushes the clutch plate (28) and clutch disc (29).

The PTO consists of components such as input shaft (10), PTO idler gear (12), PTO gear (35), (39), and (42). The pumps are driven by PTO gear (35), (39), and (42).

Function of Steering Electric Lever

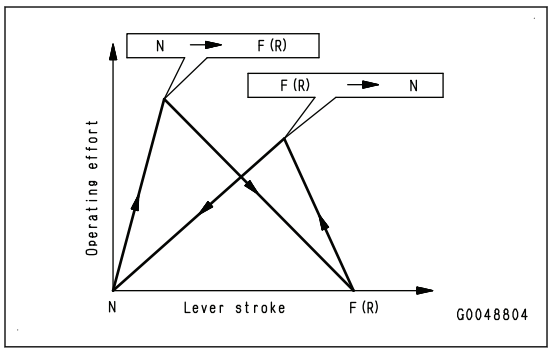
The steering electric lever outputs a voltage signal to the power train controller in response to the lever operation angle (stroke). The operation angle is sensed with the hall element sensors for directional operation and steering operation.



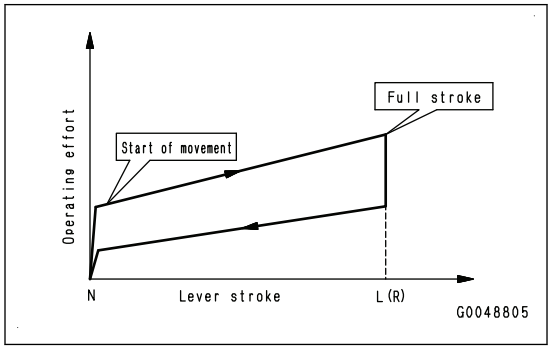
Properties of Operating Force

The graph shows the returning force of the lever.

- Directional operation
  The lever is held in the FORWARD (F), NEUTRAL (N), and REVERSE (R) positions.



- Steering operation
  The lever goes back to the NEUTRAL (N) position (free return) even when it is set at the full stroke position of LEFT (L) or RIGHT (R).



AWPHENOL RJFTV6MN“PORT5”

Pin No.	Signal name	Input and output signals
1	TX+	Output
2	TX-	Output
3	RX+	Input
4	(*1)	-
5	(*1)	-
6	RX-	Input
7	(*1)	-
8	(*1)	-

*1: Never connect these pins, otherwise it may cause malfunctions or failures.

AWPHENOL RJFTV6MN“5”

Pin No.	Signal name	Input and output signals
1	Send+	Output
2	Send-	Output
3	Receive+	Input
4	Power supply	Input
5	Power supply	Input
6	Receive-	Input
7	GND	-
8	GND	-

*1: Never connect these pins, otherwise it may cause malfunctions or failures.

IMU Sensor

IMU

Abbreviation for Inertial Measurement Unit

Item	Test condition		Unit	Standard value for new machine	Failure criterion
Torque converter inlet pressure (IN) (*1) Standard specifications	• Engine coolant temperature: 60 to 100 °C • Power train oil temperature: 70 to 120 °C • Hydraulic oil temperature: 45 to 100 °C • Operation mode: P (power mode) • Joystick (steering, directional, and gear shift lever) (PCCS lever): NEUTRAL	Fuel control dial MAX (High idle)	MPa {kg/cm^2}	0.78 to 1.05 {8.0 to 10.7}	0.78 to 1.05 {8.0 to 10.7}
		Fuel control dial MIN (Low idle)		0.03 to 0.2 {0.3 to 2.0}	0.03 to 0.2 {0.3 to 2.0}
Torque converter inlet pressure (IN) (*1) T / C bypassless specification	• Engine coolant temperature: 60 to 100 °C • Power train oil temperature: 70 to 120 °C • Hydraulic oil temperature: 45 to 100 °C • Operation mode: P (power mode) • Joystick (steering, directional, and gear shift lever) (PCCS lever): NEUTRAL • When measuring a highland operating machine (elevation 3800-4000m) in the lowland.	Fuel control dial MAX (High idle)		0.84 to 1.12 {8.6 to 11.4}	0.84 to 1.12 {8.6 to 11.4}
		Fuel control dial MIN (Low idle)		0.07 to 0.25 {0.71 to 2.56}	0.07 to 0.25 {0.71 to 2.56}
Torque converter outlet pressure (*1)	• Engine coolant temperature: 60 to 100 °C • Power train oil temperature: 70 to 120 °C • Hydraulic oil temperature: 45 to 100 °C • Operation mode: P (power mode) • Joystick (steering, directional, and gear shift lever) (PCCS lever): NEUTRAL	Fuel control dial MAX (High idle)	MPa {kg/cm^2}	0.39 to 0.64 {4.0 to 6.5}	0.39 to 0.64 {4.0 to 6.5}
		Fuel control dial MIN (Low idle)		0.03 to 0.15 {0.3 to 1.5}	0.03 to 0.15 {0.3 to 1.5}
Transmission lubrication pressure	• Engine coolant temperature: 60 to 100 °C • Power train oil temperature: 70 to 120 °C • Hydraulic oil temperature: 45 to 100 °C • Operation mode: P (power mode) • Fuel control dial MAX (High idle) • Joystick (steering, directional, and gear shift lever) (PCCS lever): NEUTRAL		MPa {kg/cm^2}	0.15 to 0.29 {1.5 to 3.0}	0.15 to 0.29 {1.5 to 3.0}

*1: Item that you can check with monitoring function of the machine monitor

REMARK

Hold the steering of the joystick (steering, directional and gear shift lever) (PCCS lever) in NEUTRAL.

Check that “F3” is shown in the gear speed display section (at the right bottom of the screen).

Do the checks (right bank side)

33. Push the decelerator pedal and turn the fuel control dial to the MAX (High idle) position.
34. Move back the decelerator pedal slowly. Check the boost pressure at torque converter stall.

⚠ Keep pushing the brake pedal fully with left foot. Put your right foot on the decelerator pedal for safety until you finish the work.

NOTICE

Immediately after the power train oil temperature indicates 118 to 120 °C, move the joystick (steering, directional and gear shift lever) (PCCS lever) directional selection back to the NEUTRAL position. Turn the fuel control dial to the MAX position (High idle), to cool down the power train oil temperature.

REMARK

- Normally, the boost pressure is measured while the engine is operated at the rated output. But in the field, an approximate value can be obtained by the torque converter stall.
- The absolute pressure includes the atmospheric pressure. Check the atmospheric pressure because it changes with altitude.
- The relationship between the absolute pressure and the gauge pressure is as follows.
  Absolute pressure = Gauge pressure + Ambient pressure

Restoration

35. Stop the engine.

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

36. Remove the gauge A1 and hose A2.
37. Remove the nipple B (on the left bank side and right bank side).
38. Install the pickup plugs (3) and (4), and restore the machine.

Pickup plugs (3) and (4): 2.9 to 3.9 Nm {0.3 to 0.4 kgm}

Write Injector Compensation Value to Engine Controller

Obey procedure that follows to program the injector compensation value to engine controller after injector or engine controller is replaced.

Device to write compensation value to injector and controller

Symbol	Part No.	Part name	Number	Remark
A	Commercially available	Notebook computer	1	Windows® 8 (32 bits)
B	Cu3886388	INSITE	1	
C	795-799-5732	INLINE 5 Kit	1	
D	Commercially available or 795-799-5742	Cable (USB)	1	
E	795-799-5721	Cable	1	
F	799-601-4510	Cable (12P)	1	

⚠ Park the machine on a level ground. Lower the work equipment to the ground in a stable attitude. Set the parking brake switch to the PARK position. Set the work equipment lock switch to the lock position. Stop the engine.

NOTICE

If a problem (shutdown or disconnection) is found in the computer or cable, there can be a serious error in the engine controller. Check the connection of the cable and make sure that it is correctly connected.

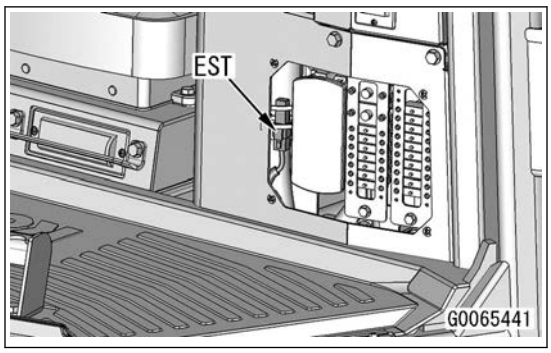
Check the maintenance record for the replacement record of the injector and engine controller. When there is a replacement record of the injector, write down its No. and compensation value.

If there is no replacement record of the injector but there is a replacement record of the engine controller, load the current injector compensation value from the injector. For details, see “Write Injector Compensation Value”.

Write Injector Compensation Value

1. Record the injector compensation value.

7. Remove the connector (EST), and connect the wiring harness E.



⚠ **Start the engine with this method only when the machine needs to be moved for the safety. In any other case where the engine does not start, always do the troubleshooting and repair the failed parts, and then start the engine.**

⚠ **When the engine is started with this method, the neutral safety relay function does not work. Therefore, before starting the engine, set the parking brake switch to the LOCK position and all joystick (steering, directional and gear shift lever) (PCCS lever) functions to the NEUTRAL position.**

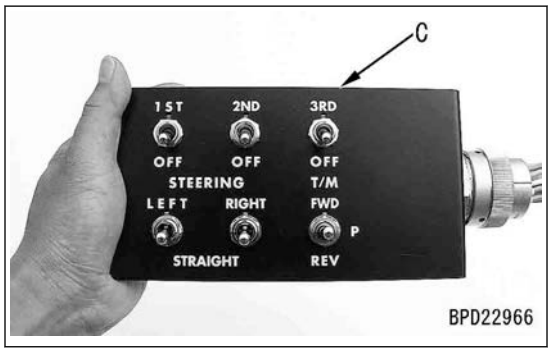
Move procedure

8. Start the engine.

REMARK

The failure of L04 occurs due to the connector being removed when installing the wiring harness D and F.

9. Operate the switch assembly C and move the machine to a safe place.



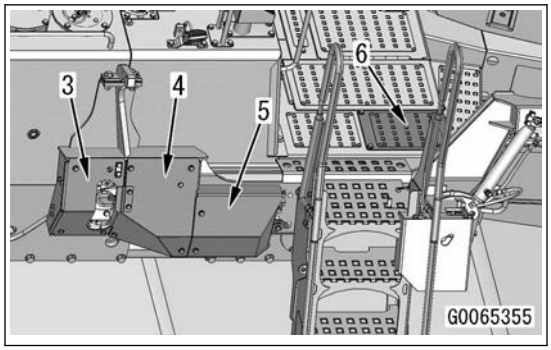
REMARK

- The gear speed switch has an electric circuit that gives priority to operation of the low speed switch.
- Be careful that the right and left steering direction becomes opposite when you travel reverse.

Restoration

10. Disconnect all the wiring harnesses from switch assembly C.
11. Fix connector (EST) to its original position.
12. Connect connectors (FD4), (FD5), and (FD6).
13. Close the covers (1) and (2). Get the machine state back to the original state.

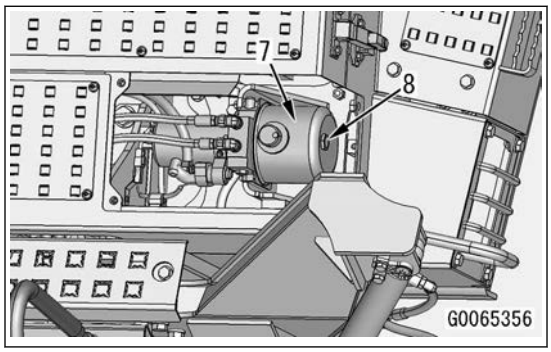
1. Remove the covers (3), (4), (5) and (6).



2. Check that the oil level satisfies the specified capacity from the sight gauge (8) of the ladder pump (7).

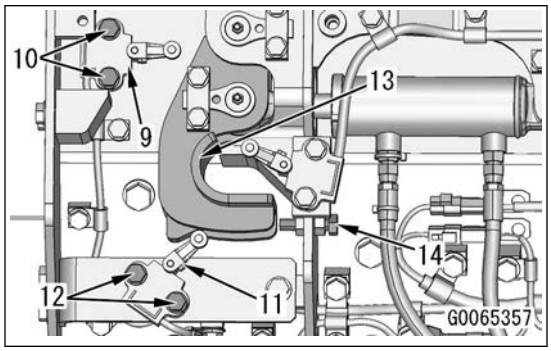
   REMARK

   If the oil level is less than the specified capacity, refill with oil.



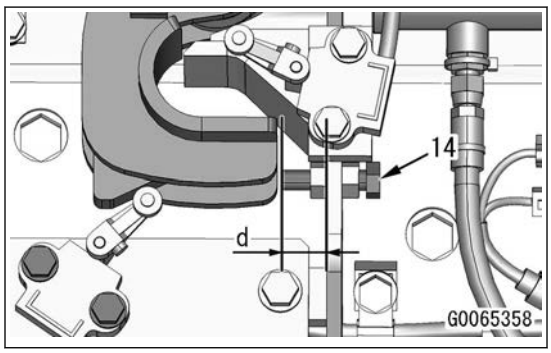
3. Remove the bolt (10) of the power ladder limit switch (clamp open) (9) and the bolt (12) of the power ladder limit switch (clamp close) (11).

   Put the power ladder limit switch (clamp open) (9) and the power ladder limit switch (clamp close) (11) at safe locations so that the switches do not interfere with the clamp (13) when the clamp opens or closes.



4. Adjust the protrusion (d) of the stopper bolt (14).

   Protrusion (d): 30 mm



Monitoring code	Table of monitoring items (shown on screen)		Unit (Default: SI)			Applicable component	Remark
			SI	Metric	Imperial		
42657	Exhaust Temperature LBR		℃	℃	°F	KOMTRAX	
42658	Exhaust Temp. Sensor Volt(LBF)		V	V	V	KOMTRAX	
42659	Exhaust Temperature RBR		℃	℃	°F	KOMTRAX	
42660	Exhaust Temp. Sensor Volt(RBR)		V	V	V	KOMTRAX	
42801	Blowby Pressure		kPa	km/cm2	psi	KOMTRAX	
99701	T/M Main Oil Pressure		MPa	kg/cm^2	psi	KOMTRAX	
99702	T/M Main Oil Pressure Sens Volt		V	V	V	KOMTRAX	
20274	(Option cntlr) Assy P/N		-	-	-	OPT	
20275	(Option cntlr) program P/N		-	-	-	OPT	
20422	(Option cntlr) Serial No.		-	-	-	OPT	
20276	(Option cntlr) App ver		-	-	-	OPT	
20277	(Option cntlr) Data Ver		-	-	-	OPT	
02710	(Option cntlr) SW Input 1	(Option cntlr) ACC Start	ON/OFF	ON/OFF	ON/OFF	OPT	
		C Signal	ON/OFF	ON/OFF	ON/OFF	OPT	
		Ladder Raise Limit SW NC	ON/OFF	ON/OFF	ON/OFF	OPT	
		Ladder Raise Limit SW NO	ON/OFF	ON/OFF	ON/OFF	OPT	
		Ladder Down Limit SW NC	ON/OFF	ON/OFF	ON/OFF	OPT	
		Ladder Down Limit SW NO	ON/OFF	ON/OFF	ON/OFF	OPT	
02711	(Option cntlr) SW Input 2	Clamp Open Limit SW NC	ON/OFF	ON/OFF	ON/OFF	OPT	
		Clamp Open Limit SW NO	ON/OFF	ON/OFF	ON/OFF	OPT	
		Clamp Close Limit SW NC	ON/OFF	ON/OFF	ON/OFF	OPT	
		Clamp Close Limit SW NO	ON/OFF	ON/OFF	ON/OFF	OPT	
02712	(Option cntlr) SW Input 3	Ladder Raise SW (Main)NC	ON/OFF	ON/OFF	ON/OFF	OPT	
		Ladder Raise SW (Main)NO	ON/OFF	ON/OFF	ON/OFF	OPT	
		Ladder Down SW (Main) NC	ON/OFF	ON/OFF	ON/OFF	OPT	
		Ladder Down SW (Main) NO	ON/OFF	ON/OFF	ON/OFF	OPT	
		Ladder Raise SW (GND)	ON/OFF	ON/OFF	ON/OFF	OPT	
		Ladder Down SW (GND)	ON/OFF	ON/OFF	ON/OFF	OPT	
03727	(Option cntlr) SW Output 1	Ladder Indicator LED	ON/OFF	ON/OFF	ON/OFF	OPT	
		Ladder Pump Relay	ON/OFF	ON/OFF	ON/OFF	OPT	

3. On the “Corr. of Right Tilt Limit (2/2)” screen, obey the instructions on the screen.

   F5: The screen goes back to the “Corr. of Right Tilt Limit (1/2)” screen.

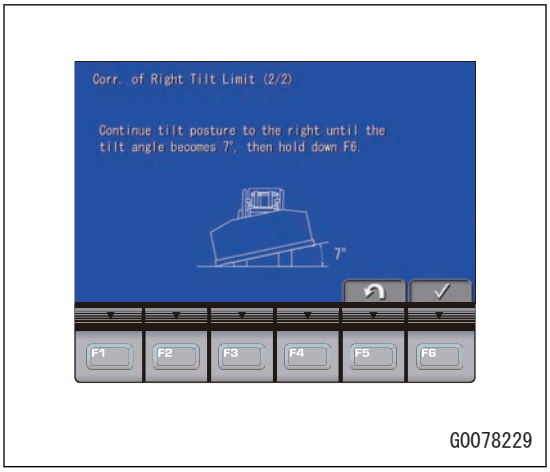
   F6: Records the work equipment position.

   1) Set the right tilt angle to 7°.

      REMARK

      Measure the left tilt angle with the angle gauge A.

   2) Press and hold F6, and make sure that the alarm buzzer sounds.



4. Completely lower the work equipment to the ground, and stop the engine.
5. Start the engine.
6. Make sure that the left and right tilt operations do not cause any interference with the track shoe regardless of the blade position.

Adjustment ID: 0002 (Power Train Controller Initialization)

Check and adjust the various settings of the machine with the adjustment ID.

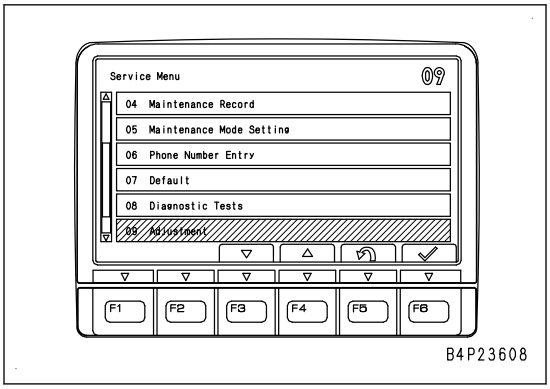
“Power train controller initialization” initializes the recognized specification codes and set values of the memory in the controller.

Make sure to do this adjustment when the power train controller is replaced.

1. On the “Service Menu” screen, select the “Adjustment”.

   REMARK

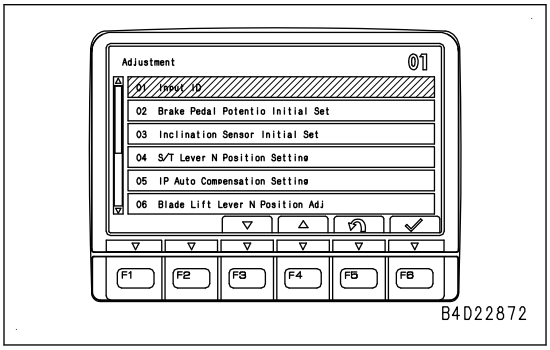
   For details about how to select, see “How to Operate Service Mode”.



2. On the “Adjustment” screen, select “Input ID” with function switches or numeral input switches.

   REMARK

   For details about how to select, see “How to Operate Service Mode”.



REMARK

- You do not need to move the blade during the adjustment. After the adjustment, operate the blade lift RAISE to check that there is no problem in the actual operation feeling. (Set the Blade Fine Control mode to OFF before checking.)
- The recorded adjustment value is effective even when the starting switch is turned OFF after the adjustment.

Adjustment ID: 8023 (Blade Lift Lower Current Value Correction (Fine Control Mode))

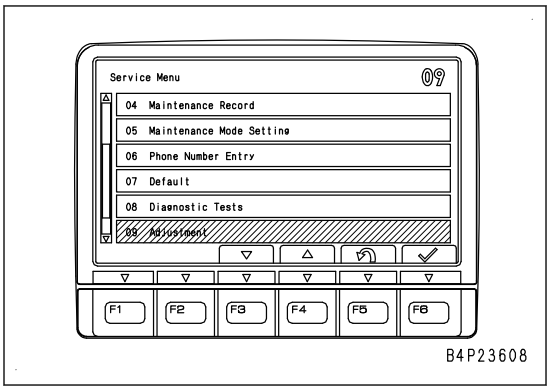
Check and adjust the various settings of the machine with the adjustment ID.

“Blade lift lower current value correction (fine control mode)” is a setting for when the Blade Fine Control is ON. It adjusts the sensitivity at the start of the move of the blade when the blade control lever is operated in the lift LOWER direction.

1. On the “Service Menu” screen, select the “Adjustment”.

   REMARK

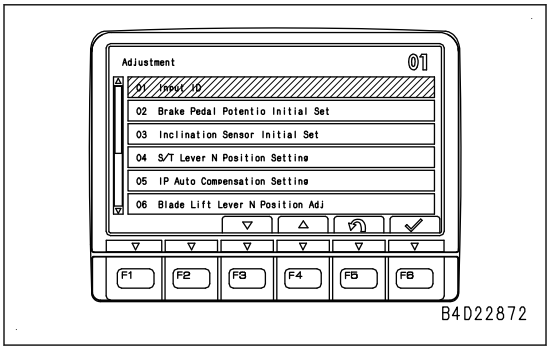
   For details about how to select, see “How to Operate Service Mode”.



2. On the “Adjustment” screen, select “Input ID” with function switches or numeral input switches.

   REMARK

   For details about how to select, see “How to Operate Service Mode”.



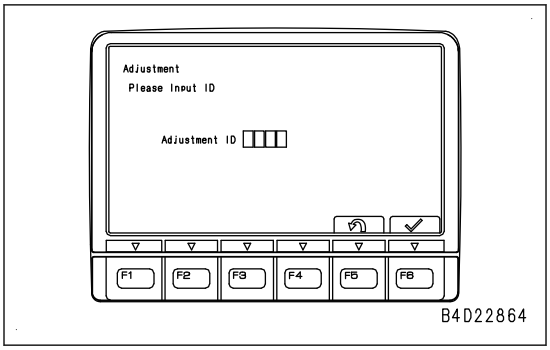
3. On the “Input ID” screen, input adjustment ID “8023” with the numeral input switches.

   F5: The screen moves back to the “Adjustment” screen.

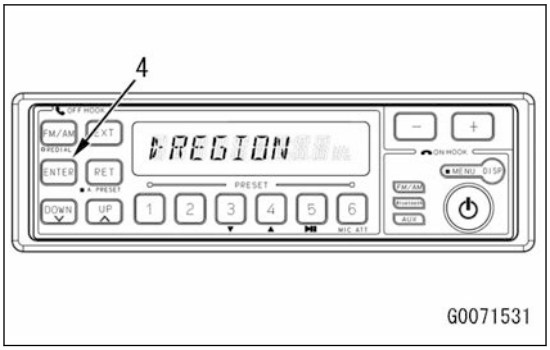
   F6: Validates the input adjustment ID.

   REMARK

   - For information on adjustment IDs and adjustment items, see “Adjustment Item Table”.
   - If the input adjustment ID is incorrect, “Incorrect ID” is shown and the screen cannot move to the next screen from the “Input ID” screen. (You can input an adjustment ID again in this screen display state.)



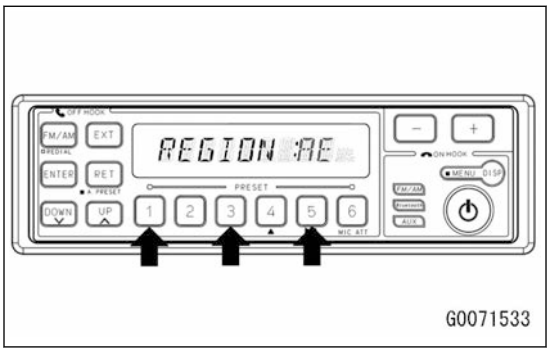
4. Check that the “REGION”is shown, and push the “ENTER” switch (4).



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

   REMARK

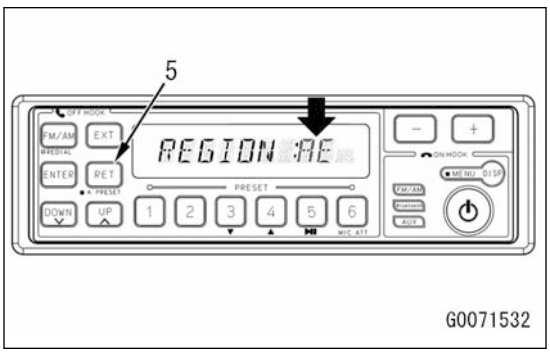
   Push “3”, “1”, “5” in 2 seconds.



7. Check that the “AE” is flashing.

   REMARK

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



8. Push the “Tuning/time adjustment” switch (3). Select the REGION.

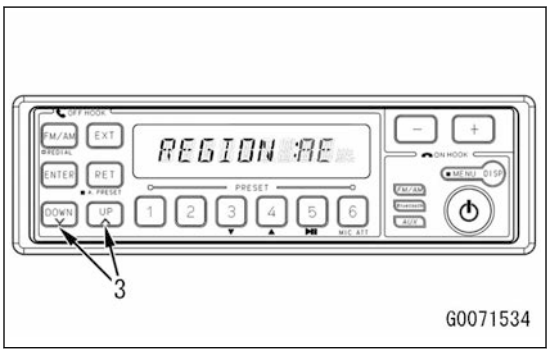
   JP: Japan

   US: Not use

   AE: Europe, Asia, Oceania

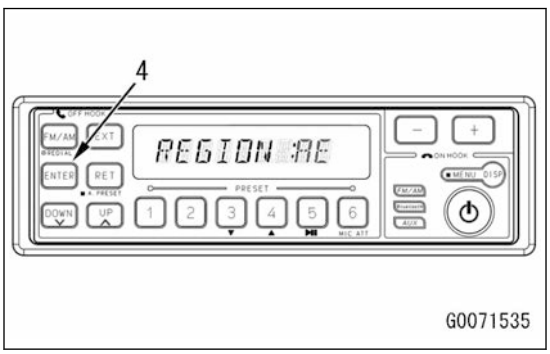
   SA: North America, Central and South America

   BO: Not use



9. Push the “ENTER” switch (4).

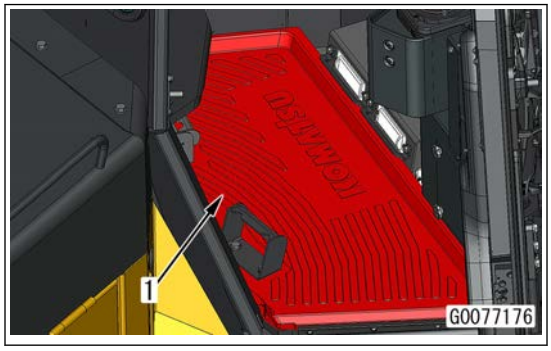
   The selection of the region is confirmed and reset.



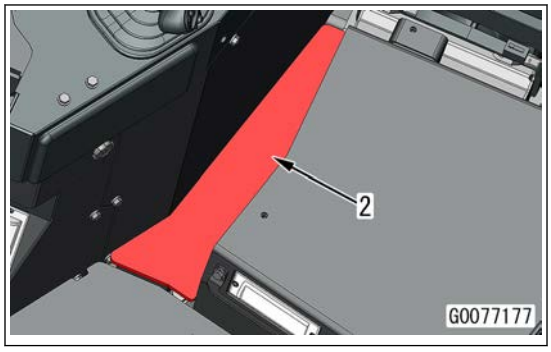
- Set the Time again after the resetting.
- Do the pairing again after the resetting. See the Operation and Maintenance Manual, “Operate Radio”.

Floor mat

2. Lift up the floor mat (1).



3. Remove the cushion material (2).

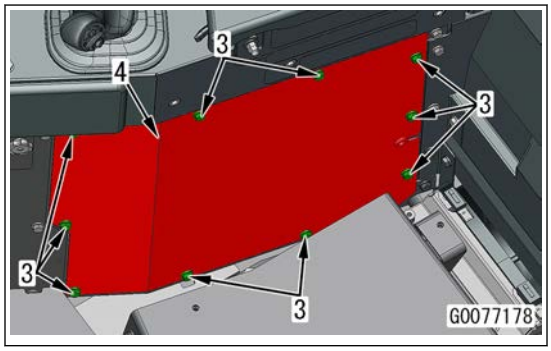


Cover

4. Remove the bolts (3) (10 pieces), and remove the cover (4).

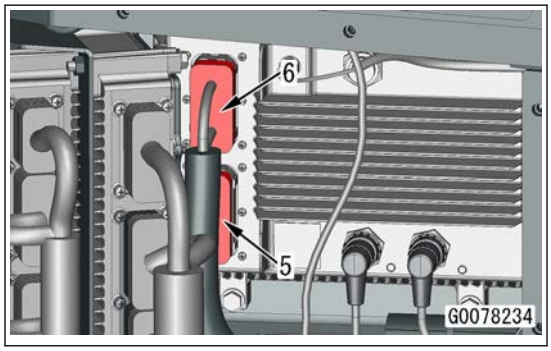
   Tool: Ratchet handle, socket

   Bolt (3): Width across flats 13 mm, M8



Connector

5. Connect the adapter for troubleshooting to connectors C30A (5) and C30B (6).



Connect Adapter for Troubleshooting of Option Controller

Operator's seat

1. Remove the operator's seat.

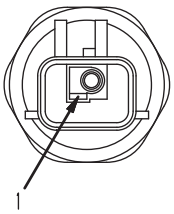
   For how to remove, see “Remove Operator's Seat Assembly”.

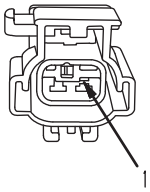
Connector from						Connector to		Nominal No., color
Connector (terminal) No.	Address / CONNECTOR LAY-OUT	Equipment name	Model	Number of pins	Pin No.	Connector (terminal) No.	Pin No.	
ECM_R_J2	G37	Engine controller	DRC	96	1	PWR_R (male)	A	1.25R
					5	SIG_R (male)	K	0.5R
					8	SIG_R (male)	A	0.5R
					13	SIG_R (male)	P	0.5R
					22	JC04_R	6	0.5R/B
					25	PWR_R (male)	B	1.25R/B
					26	PWR_R (male)	C	1.25R
					27	PWR_R (male)	D	1.25R/B
					28	PWR_R (male)	E	1.25R
					29	SIG_R (male)	V	0.5R
					32	SIG_R (male)	Q	0.5B
					46	JC04_R	5	0.5B
					48	J1939_R1	8	0.5R
					49	PWR_R (male)	G	1.25B
					50	PWR_R (male)	H	1.25B
					51	PWR_R (male)	J	1.25B
					52	PWR_R (male)	K	1.25B
					62	ECM_R_J2	90	0.5B
					73	PWR_R (male)	F	1.25B
					90	ECM_R_J2	62	0.5B
EG1 (male)	H7	Intermediate connector	DT-T	8	1	PDPF	1	0.75fB
					2	PDPF	2	0.75fGr
					3	PDPF	3	0.75fG
					4	PDPF	4	0.75fR
					5	PDPF_2	1	0.75fB
					6	PDPF_2	2	0.75fGr
					7	PDPF_2	3	0.75fG
					8	PDPF_2	4	0.75fR

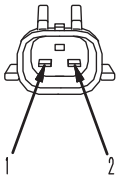
Connector from						Connector to		Nominal No., color
Connector (terminal) No.	Address / CONNECTOR LAY-OUT	Equipment name	Model	Number of pins	Pin No.	Connector (terminal) No.	Pin No.	
GND21	G2	Ground (engine body)	Terminal	1	-	EG3 (male)	6	1.25B
						EG3 (male)	7	1.25B
						EG3 (male)	8	1.25B
						EG3 (male)	9	1.25B
						EG3 (male)	10	1.25B
GND_L	B42	Ground	Terminal	1	-	CM2350_GND_L	-	2.0B
GND_R	G48	Ground	Terminal	1	-	CM2350_GND_R	-	2.0B
GNDB	I12	Ground (battery relay - L.H.)	Terminal	1	-	BRE	-	8B
GNDB	I12	Ground (battery relay - R.H.)	Terminal	1	-	BRE	-	8B
GNDC1	C27	Ground	Terminal	1	-	JXJA	-	3B
GNDC2	C28	Ground	Terminal	1	-	CB07	7	2B
GNDC3	D25	Ground	Terminal	1	-	JXKA	-	3B
GNDC4	C27	Ground	Terminal	1	-	JXKG	-	0.85B
GNDR	B1	Ground	Terminal	1	-	BI4	-	100B
GPARA	H53	Radio (if equipped)	DE-9	9	2	MMS2	10	0.5fG
					3	MMS2	3	0.5fW
					5	MMS2	8	0.5fB
GPSPW	G54	Radio (if equipped)	DT-T	2	1	JPV3	-	0.85R
					2	JPV4	-	0.85B
GRL	B13	Green light relay	-	5	1	OPTCN3	36	0.85Gr
					2	JYAD	-	0.85B
					3	JYAC	-	0.85P
					5	PTL (female)	4	0.85G
HDT	B32	Hydraulic oil temperature sensor	DT	2	1	FD4 (female)	1	1.25Y
					2	FD4 (female)	2	1.25B
HEAT2	C23	Seat heater (if equipped)	DT	2	1	OPS2 (male)	1	0.75W
					2	OPS2 (male)	2	0.75B

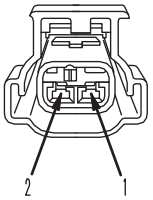
Connector from						Connector to		Nominal No., color
Connector (terminal) No.	Address / CONNECTOR LAY-OUT	Equipment name	Model	Number of pins	Pin No.	Connector (terminal) No.	Pin No.	
MVC2 (male)	H23	Intermediate connector	DT-B	12	1	JOW2	-	1.25R
					2	JOW4	-	1.25B
					3	JOW5	-	1.25B
					4	FD8 (female)	13	1.25W
					5	FD8 (female)	14	1.25Y
					6	FD8 (female)	17	1.25G
					7	FD8 (female)	19	1.25W
					8	FD8 (female)	20	1.25Y
					9	FD8 (female)	23	1.25G
MVC2 (female)	H23	Intermediate connector	DT-B	12	1	JW1	-	0.75fP
					2	JGW2	-	0.75fB
					3	GND10	-	0.75fB
					4	WECN1	8	0.75fY
					5	WECN1	2	0.75fY
					6	WECN1	19	0.75fG
					7	WECN1	13	0.75fGr
					8	WECN1	7	0.75fGr
					9	WECN1	1	0.75fBr
					10	WECN1	24	0.75fO
					11	WECN1	18	0.75fY
					12	WECN1	11	0.75fG
NAV1 (male)	H53	Intermediate connector	DT	12	1	NVCN2	3	0.85V
					2	NVCN2	4	0.85Br
					3	NVCN2	5	0.85Br
					4	NVCN2	6	0.85B
					5	NVCN2	7	0.85R
					6	NVCN2	8	0.85B
					7	NVCN2	9	0.85R
					8	NVCN2	10	0.85L
					9	NVCN2	17	0.85B
					10	NVCN2	20	0.85Y
					11	NVCN2	21	0.85B
					12	NVCN2	22	0.85W

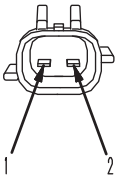
Connector from						Connector to		Nominal No., color
Connector (terminal) No.	Address / CONNECTOR LAY-OUT	Equipment name	Model	Number of pins	Pin No.	Connector (terminal) No.	Pin No.	
WECN1	I16	Work equipment controller	DRC26-24	24	1	MVC2 (female)	9	0.75fBr
					2	MVC2 (female)	5	0.75fY
					3	FDR (male)	66	0.85Y
					4	JWG	-	0.85B
					5	ESD	C	0.85P
					7	MVC2 (female)	8	0.75fGr
					8	MVC2 (female)	4	0.75fY
					9	FDR (male)	1	0.85Y
					10	JTPW	-	0.85B
					11	MVC2 (female)	12	0.75fG
					12	JPKE	-	0.85P
					13	MVC2 (female)	7	0.75fGr
					14	PL1 (male)	66	0.85Y
					15	JPER	-	0.85Gr
					17	JPK7	-	0.85G
					18	MVC2 (female)	11	0.75fY
					19	MVC2 (female)	6	0.75fG
					21	JGW1	-	0.85B
					22	JJW	-	0.85P
					24	MVC2 (female)	10	0.75fO

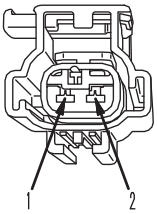
<table>
<tr><td colspan="4">FRAMATOME connector (for engine)</td></tr>
<tr><td rowspan="2">Total number of pins</td><td colspan="2">Oil pressure switch (95, 107, 114 engines)</td><td rowspan="3"></td></tr>
<tr><td>Switch side (plug)</td><td>Harness side (receptacle)</td></tr>
<tr><td rowspan="2">2</td><td> 

G0042607</td><td> 

G0042608</td><td rowspan="2">799-601-4160 (T-branch)
(Kit: 799-601-4101)
(Kit: 799-601-4201)</td></tr>
<tr><td>☆ Without pin 2</td><td>☆ Without pin 2</td></tr>
<tr><td rowspan="2">Total number of pins</td><td colspan="2">Fuel doser solenoid valve 1, 2 and fuel doser injector (125, 140 engines)
KDOC inlet temperature sensor (TEMP1) (107, 114, 125, 140 engines)</td><td rowspan="3"></td></tr>
<tr><td>Sensor side (plug)</td><td>Harness side (receptacle)</td></tr>
<tr><td rowspan="2">2</td><td> 

G0042609</td><td> 

G0042610</td><td rowspan="2">799-601-4640 (T-branch)
(Kit: 799-601-4101)
(Kit: 799-601-4201)</td></tr>
<tr><td>-</td><td>-</td></tr>
<tr><td rowspan="2">Total number of pins</td><td colspan="2">KDOC outlet temperature sensor (TEMP2), KDPF outlet temperature sensor (TEMP3) (107, 114, 125, 140 engines)
EGR orifice temperature sensor (107, 114 engines)</td><td rowspan="3"></td></tr>
<tr><td>Switch side (plug)</td><td>Harness side (receptacle)</td></tr>
<tr><td rowspan="2">2</td><td> 

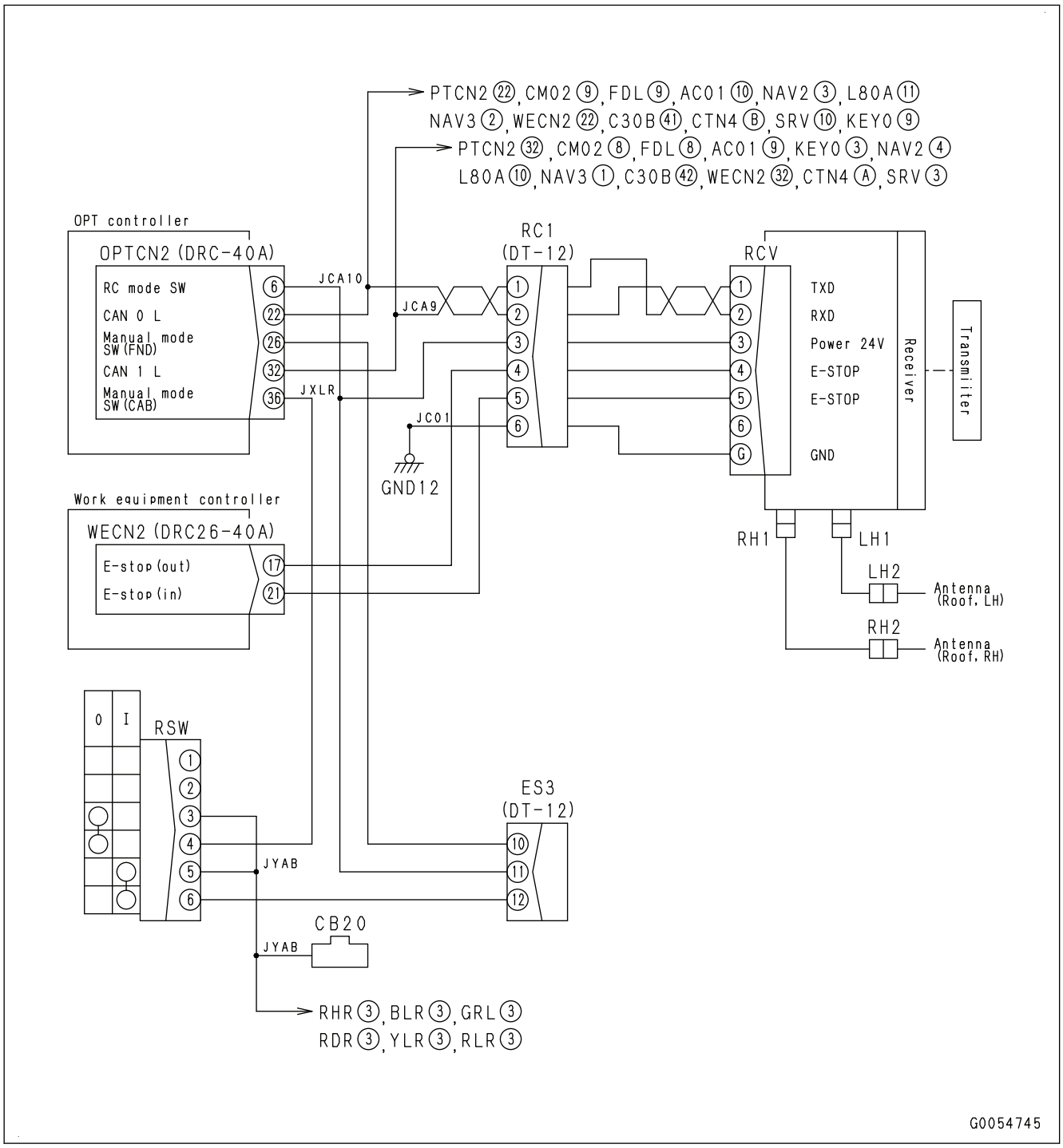
G0042611</td><td> 

G0042612</td><td rowspan="2">799-601-4630 (T-branch)
(Kit: 799-A65-4600)</td></tr>
<tr><td>-</td><td>-</td></tr>
</table>

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
2	Confirmation of check results	1. Do the troubleshooting above again. 2. Can you find the cause by the check?	YES	The repair is completed.
			NO	• The power train controller can be defective. • Replace the power train controller. • Go to “Confirmation of repair”.
3	Confirmation of repair	1. Turn the starting switch to the OFF position. 2. Connect all the component parts. 3. Start the engine. 4. Let the machine travel to do the troubleshooting. 5. Check the abnormality record. 6. Is “E” shown in the abnormality record of this failure code?	YES	Go back to the first check item.
			NO	The repair is completed.

<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Left steering clutch ECMV fill switch</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connector FLC. Connect the T-adapter to the male side to do the troubleshooting.
3. Start the engine.
4. While operating the brake pedal, operate the joystick (steering, directional and gear shift lever) to do the troubleshooting.
5. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td>Resistance</td><td>Between FLC (male) (1) and ground</td><td>Max. 1 Ω</td></tr></table></td><td>YES</td><td>• The left steering clutch ECMV fill switch is in the correct condition.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The left steering clutch ECMV fill switch is defective.
• Replace the left steering clutch ECMV fill switch.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Open circuit in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors PTCN2 and FLC. Connect the T-adapter to each female side to do the troubleshooting.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td>Resistance</td><td>Between PTCN2 (female) (26) and FLC (female) (1)</td><td>Max. 1 Ω</td></tr></table></td><td>YES</td><td>• Open circuit in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has an open circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Hot short circuit in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connector FLC. Connect the T-adapter to the female side.
3. Turn the starting switch to the ON position, then do the troubleshooting.
4. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td>Voltage</td><td>Between FLC (female) (1) and ground</td><td>Max. 9 V</td></tr></table></td><td>YES</td><td>• Hot short circuit in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has a hot short circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
</table>

Circuit Diagram of Radio Control/On-board Selector System

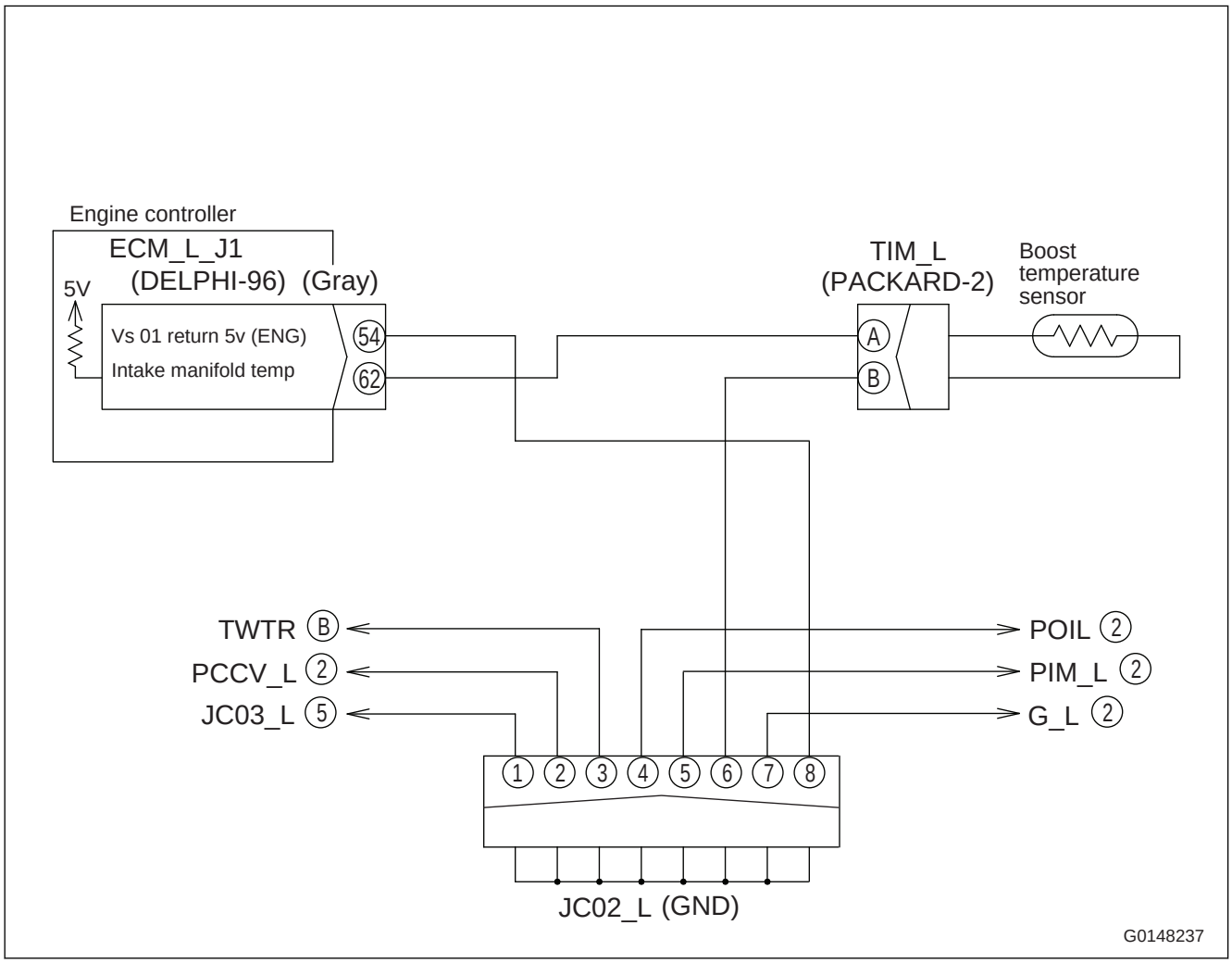


Failure Code [B@BCZK]

Detail of failure	A drop of the radiator level is sensed.
Action level	L01
Action of controller	• Lights up the radiator level caution lamp. • After the cause of the failure is removed, the machine will go back to the correct condition.
Phenomenon on machine	If the coolant level is low, the engine can be overheated when the machine is used as it is.
Related information	**Monitoring code** You can check the ON/OFF state of “Engine Coolant Level” with the monitoring function. (Code: 04500) **REMARK** When in correct condition: ON / When clogged: OFF

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
1	Wiring harness and connector	1. Check the wiring harness and connector. For details, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”. 2. Are the wiring harness and connectors in the correct condition?	YES	• The wiring harness and connectors are in the correct condition. • Go to the next check item.
			NO	• The wiring harness or a connector is defective. • Repair or replace the defective wiring harness or connector. • Go to “Confirmation of repair”.
2	Coolant level	1. Check the coolant level and leakage. 2. Is the coolant level between FULL and LOW of the sub-tank?	YES	• The coolant level is correct. • Go to the next check item.
			NO	• The coolant level is not correct. • Add coolant to the specified level. • Go to “Confirmation of repair”.

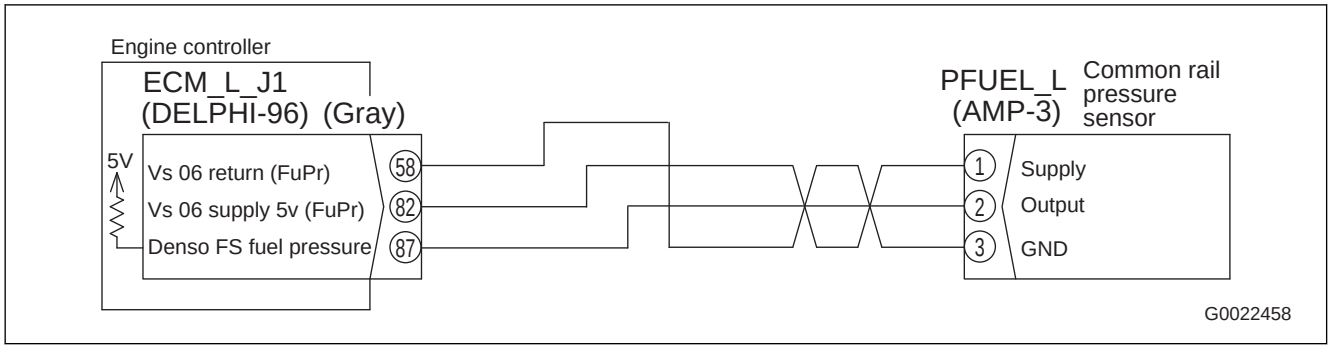
Circuit Diagram of Charge Temperature Sensor



<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Open circuit in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors ECM_L_J1 and INJ4_L, and connect the T-adapter to the each female side to troubleshoot.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position/condition</th><th>Standard value</th></tr><tr><td rowspan="2">Resistance</td><td>Between ECM_L_J1 (female) (49) and INJ4_L (female) (1)</td><td>Max. 1 Ω</td></tr><tr><td>Between ECM_L_J1 (female) (73) and INJ4_L (female) (2)</td><td>Max. 1 Ω</td></tr></table></td><td>YES</td><td>• Open circuit in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• Open circuit in wiring harness occurs.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Ground fault in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors ECM_L_J1 and INJ4_L, and connect the T-adapter to the female side of one of them to troubleshoot.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position/condition</th><th>Standard value</th></tr><tr><td rowspan="2">Resistance</td><td>Between ground and ECM_L_J1 (female) (49) or INJ4_L (female) (1)</td><td>Min. 1 MΩ</td></tr><tr><td>Between ground and ECM_L_J1 (female) (73) or INJ4_L (female) (2)</td><td>Min. 1 MΩ</td></tr></table></td><td>YES</td><td>• Ground fault in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• Ground fault in wiring harness occurs.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Short circuit in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors ECM_L_J1 and INJ4_L, and connect the T-adapter to the female side of ECM_L_J1 to troubleshoot.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position/condition</th><th>Standard value</th></tr><tr><td rowspan="2">Resistance</td><td>Between ECM_L_J1 (female) (49) and each pin other than pin (49)</td><td>Min. 1 MΩ</td></tr><tr><td>Between ECM_L_J1 (female) (73) and each pin other than pin (73)</td><td>Min. 1 MΩ</td></tr></table></td><td>YES</td><td>• Short circuit in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• Short circuit in wiring harness occurs.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
</table>

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
3	Common rail pressure sensor	1. Turn the starting switch to the OFF position. 2. Disconnect the connector PFUEL_L. 3. Turn the starting switch to the ON position. 4. Check the abnormality record. 5. Is “E” shown in the abnormality record of this failure code? **REMARK** As the connector is disconnected, the failure code of the disconnected device is shown.	YES	• The common rail pressure sensor is normal. • Go to the next check item.
			NO	• The common rail pressure sensor is defective. • Replace the common rail. **REMARK** Replace the common rail to replace the common rail pressure sensor. (For details, see the DISASSEMBLY AND ASSEMBLY in the shop manual Engine 12V140E-7 series.) • Go to “Confirmation of repair”.
4	Confirmation of check results	1. Do the troubleshooting above again. 2. Can you identify the cause by the check?	YES	The repair is completed.
			NO	• The engine controller can be defective. • Replace the engine controller. • Go to “Confirmation of repair”.
5	Confirmation of repair	1. Turn the starting switch to the OFF position. 2. Connect all the component parts. 3. Turn the starting switch to the ON position. 4. Check the abnormality record. 5. Is “E” shown in the abnormality record of this failure code?	YES	Go to the first check item.
			NO	The repair is completed.

Circuit Diagram of Common Rail Pressure Sensor



<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Open circuit in wiring harness (Power supply circuit of the engine controller (right bank side))</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Make sure that the system operating lamp is off, and then turn the battery disconnect switch to the OFF position.
3. Disconnect the circuit breaker CB8 terminal B8L.
4. Disconnect the connector ECM_R_J2 and connect the T-adapter to the female side to do the troubleshooting.
5. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td rowspan="12">Resistance</td><td>Between ECM_R_J2 (female) (1) and terminal B8L of circuit breaker CB8</td><td>Max. 1Ω</td></tr><tr><td>Between ECM_R_J2 (female) (25) and terminal B8L of circuit breaker CB8</td><td>Max. 1Ω</td></tr><tr><td>Between ECM_R_J2 (female) (26) and terminal B8L of circuit breaker CB8</td><td>Max. 1Ω</td></tr><tr><td>Between ECM_R_J2 (female) (27) and terminal B8L of circuit breaker CB8</td><td>Max. 1Ω</td></tr><tr><td>Between ECM_R_J2 (female) (28) and terminal B8L of circuit breaker CB8</td><td>Max. 1Ω</td></tr><tr><td>Between ECM_R_J2 (female) (49) and ground END21</td><td>Max. 1Ω</td></tr><tr><td>Between ECM_R_J2 (female) (50) and ground END21</td><td>Max. 1Ω</td></tr><tr><td>Between ECM_R_J2 (female) (51) and ground END21</td><td>Max. 1Ω</td></tr><tr><td>Between ECM_R_J2 (female) (52) and ground END21</td><td>Max. 1Ω</td></tr><tr><td>Between ECM_R_J2 (female) (73) and ground END21</td><td>Max. 1Ω</td></tr></table></td><td>YES</td><td>• Open circuit in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has an open circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
</table>

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
5	Bkup (camshaft) speed sensor (right bank side) installed state	1. Examine the installed state of the Bkup (camshaft) speed sensor (right bank side). Examine for damage and looseness. 2. Is the Bkup (camshaft) speed sensor (right bank side) installed correctly? **REMARK** If there is damage or looseness on the Bkup (camshaft) speed sensor (right bank side), it is a failure.	YES	• The Bkup (camshaft) speed sensor (right bank side) is installed correctly. • Go to the next check item.
			NO	• The Bkup (camshaft) speed sensor (right bank side) is not installed correctly. • Install the Bkup (camshaft) speed sensor (right bank side) again. • If damage is found, replace the Bkup (camshaft) speed sensor (right bank side). **REMARK** Replace the supply pump (right bank side) to replace the Bkup (camshaft) speed sensor (right bank side). (For details, see Disassembly and Assembly, “Remove and Install Supply Pump Assembly (Right Bank)”.) • Go to “Confirmation of repair”.
6	Bkup (camshaft) speed sensor (right bank side)	1. Turn the starting switch to the OFF position. 2. Disconnect the connector G_R, and replace with the same type sensor. 3. Start the engine. 4. Examine the abnormality record. 5. Is “E” shown in the abnormality record of this failure code? **REMARK** Replace the supply pump (right bank side) to replace the Bkup (camshaft) speed sensor (right bank side). (For details, see Disassembly and Assembly, “Remove and Install Supply Pump Assembly (Right Bank)”.)	YES	• The removed Bkup (camshaft) speed sensor (right bank side) is normal. • Restore the removed Bkup (camshaft) speed sensor (right bank side) to its initial position. • Go to the next check item.
			NO	• The removed Bkup (camshaft) speed sensor (right bank side) is defective. • The repair is done.

<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Ground fault in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors ECM_R_J1, PIM_R and G_R, and connect the T-adapter to one of them on the female side to do the troubleshooting.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td>Resistance</td><td>Between ground and one of ECM_R_J1 (female) (78), G_R (female) (1), or PIM_R (female) (1)</td><td>Min. 1MΩ</td></tr></table></td><td>YES</td><td>• Ground fault in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has a ground fault.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Short circuit in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors ECM_R_J1, PIM_R and G_R, and connect the T-adapter to the female side of ECM_R_J1 to do the troubleshooting.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td>Resistance</td><td>Between ECM_R_J1 (female) (78) and each pin other than pin (78)</td><td>Min. 1MΩ</td></tr></table></td><td>YES</td><td>• Short circuit in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has a short circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Sensor</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors PIM_R and G_R.
3. Install one of the disconnected connectors.
4. Turn the starting switch to the ON position. Then, do the troubleshooting.
5. See if this failure code is shown.
6. Do the procedure from step 1 to 5 until all the connectors are connected.
7. Is the installed connector normal?
REMARK
Because the connector is disconnected, the failure code of the disconnected device is shown.
<table><tr><th>Sensor</th><th>Connector</th><th>Shown failure code</th></tr><tr><td>Bkup (camshaft) speed sensor</td><td>G_R</td><td>-</td></tr><tr><td>Charge (boost) pressure sensor</td><td>PIM_R</td><td>CB123</td></tr></table></td><td>YES</td><td>• The equipment connected to each connector is normal.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The device that is connected to the connector shown by this failure code is defective.
• Replace the device that is connected to the connector shown in this failure code.
• Go to “Confirmation of repair”.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Intake air temperature sensor</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect connector MAF2. Connect the T-adapter to the male side to do the troubleshooting.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th colspan="2">Measurement position, condition</th><th>Standard value</th></tr><tr><td rowspan="5">Resistance</td><td rowspan="5">Between MAF2 (male) (4) and (3)
(thermal characteristics of intake air temperature sensor)</td><td>-30°C</td><td>25 to 28 kΩ</td></tr><tr><td>0°C</td><td>5.5 to 6.1 kΩ</td></tr><tr><td>25°C</td><td>1.9 to 2.1 kΩ</td></tr><tr><td>40°C</td><td>1.1 to 1.2 kΩ</td></tr><tr><td>100°C</td><td>180 to 185 Ω</td></tr></table></td><td>YES</td><td>• The intake air temperature sensor is normal.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The intake air temperature sensor is defective.
• Replace the intake air temperature sensor.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Open circuit in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect connectors ECM_R_J1 and MAF2. Connect the T-adapter to each female side to do the troubleshooting.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td rowspan="2">Resistance</td><td>Between ECM_R_J1 (female) (61) and MAF2 (female) (4)</td><td>Max. 1 Ω</td></tr><tr><td>Between ECM_R_J1 (female) (56) and MAF2 (female) (3)</td><td>Max. 1 Ω</td></tr></table></td><td>YES</td><td>• The wiring harness does not have an open circuit.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has an open circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Hot short circuit in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect connector MAF2. Connect the T-adapter to the female side.
3. Turn the starting switch to the ON position, then do the troubleshooting.
4. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td>Voltage</td><td>Between MAF2 (female) (4) and (3)</td><td>Max. 5.25 V</td></tr></table></td><td>YES</td><td>• The wiring harness does not have a hot short circuit.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has a hot short circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
</table>

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
4	Fuel tank breather	1. Check the inside fuel tank breather for clogging. 2. Is the fuel tank breather normal? **REMARK** If the inside fuel tank breather is clogged, it is a failure.	YES	• The fuel tank breather is normal. • Go to the next check item.
			NO	• The fuel tank breather is defective. • Clean or replace the fuel tank breather. • Go to “Confirmation of repair”.
5	Fuel system piping	1. Check the fuel leakage from the fuel system piping. For details, see Testing and Adjusting, “How to Examine Fuel System for Leakage”, “TEST FUEL CIRCUIT FOR LEAKAGE”. 2. Is the fuel system piping normal? **REMARK** If fuel leaks from the fuel system, it is a failure.	YES	• The fuel system piping is normal. • Go to the next check item.
			NO	• The fuel system piping is defective. • Repair or replace the fuel system piping. • Go to “Confirmation of repair”.
6	Fuel low-pressure circuit device	1. Do the troubleshooting. For details, see Testing and Adjusting, “Examine Low Pressure Fuel Circuit Devices”. 2. Does the troubleshooting result agree with the standard value?	YES	• The fuel low-pressure circuit device is normal. • Go to the next check item.
			NO	• The fuel low-tension circuit pressure is defective. • Repair or replace the fuel low-tension circuit pressure. • Go to “Confirmation of repair”.
7	Fuel filter and strainer	1. Do the troubleshooting. For details, see Testing and Adjusting, “Examine Low Pressure Fuel Circuit Devices”. 2. Does the troubleshooting result agree with the standard value?	YES	• The fuel filter and the strainer are normal. • Go to the next check item.
			NO	• The fuel filter and the strainer are defective. • Repair or replace the fuel filter and the strainer. • Go to “Confirmation of repair”.

Failure Code [D182KZ]

Detail of failure	• When the primary (coil) circuit of the preheat relay is connected to the ground, an abnormal current flows. • Or, when the primary (coil) circuit of the preheat relay is not connected to the ground, no current flows.
Action level	L01
Action of controller	Disconnects the primary (coil) circuit of the preheat relay from the ground.
Phenomenon on machine	• Auto preheating does not operate. • Or, the preheating does not stop to operate. • Preheating can be operated manually.
Related information	**Monitoring code** You can check the ON/OFF state of “Preheater” with the monitoring function. (Code: 40909) **Reference information** This failure code shows a failure in the primary (coil) circuit of the preheat relay, but does not show a failure in the secondary (contact side) circuit.

<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Wiring harness and connector</td><td rowspan="2">1. Check the wiring harness and connector. For details, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”.
2. Are the wiring harness and connectors in the correct condition?</td><td>YES</td><td>• The wiring harness and connectors are in the correct condition.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness or a connector is defective.
• Repair or replace the defective wiring harness or connector.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Preheating relay</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connector PHR. Connect the T-adapter to the male side to do the troubleshooting.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td>Resistance</td><td>Between PHR (male) (1) and (2)</td><td>200 to 400 Ω</td></tr></table></td><td>YES</td><td>• The preheat relay is in the correct condition.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The preheat relay is defective.
• Replace the preheat relay.
• Go to “Confirmation of repair”.</td></tr>
</table>

Failure Code [D1D5KY]

Detail of failure	A current continuously flows to the primary (coil) circuit of the engine cut/hold relay.
Action level	L03
Action of controller	• Stops to energize the primary (coil) circuit of the engine cut/hold relay. • Restricts engine and transmission operations.
Phenomenon on machine	• When a turbo timer is installed, the turbo timer does not operate. • The engine does not stop even if the key is turned to the OFF position. • The automatic transmission function does not operate. • When the machine is stopped, the engine speed is restricted to medium speed. • When the machine is stopped, selectable gear speeds are restricted to F1 and R1.
Related information	**Monitoring code** You can check the ON/OFF state of “Engine Shut Down or Hold” with the monitoring function. (Code: 40983) **Reference information** This failure code shows a failure in the primary (coil) circuit of the engine cut/hold relay, but does not show a failure in the secondary (contact side) circuit.

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
1	Wiring harness and connector	1. Check the wiring harness and connector. For details, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”. 2. Are the wiring harness and connectors in the correct condition?	YES	• The wiring harness and connectors are in the correct condition. • Go to the next check item.
			NO	• The wiring harness or a connector is defective. • Repair or replace the defective wiring harness or connector. • Go to “Confirmation of repair”.
2	Engine cut/hold relay	1. Turn the starting switch to the OFF position. 2. Disconnect the connector ACT. Connect the T-adapter to the male side to do the troubleshooting. 3. Does the troubleshooting result agree with the standard value?	YES	• The engine cut/hold relay is in the correct condition. • Go to the next check item.
			NO	• The engine cut/hold relay is defective. • Replace the engine cut/hold relay. • Go to “Confirmation of repair”.

Item	Measurement position, condition	Standard value
Resistance	Between ACT (male) (1) and (2)	200 to 400 Ω

Failure Code [DAZQKR]

Detail of failure	The machine monitor cannot recognize the air conditioner controller on the CAN 2 communication line (KOMNET/c).
Action level	L03
Action of controller	The machine monitor does not update the communication information with the air conditioner controller.
Phenomenon on machine	• The air conditioner controller settings or operations cannot be operated on the machine monitor. • Failure codes are not shown even if other failures occur on the air conditioner controller.
Related information	**Reference information** • The starting switch transmits the ACC signal to each controller to tell that CAN communication is started. • There are 8 failure codes of [DAFQKR], [DAZQKR], [DB2QKR], [DB9QKR], [DBEQKR], [DBVQKR], [F7AQKR], and [F9AQKR] for CAN2 communication errors that the machine monitor senses. When all of these failure codes are shown, there can be a ground fault, short circuit, or hot short circuit in the wiring harness (CAN communication line). • The air conditioner is also operated through CAN communication. Make sure that the ON/OFF selection and air flow control can be done on the air conditioner screen. If the air conditioner can be operated, no ground fault, short circuit, or hot short circuit occurs in wiring harness (CAN communication line). • Each controller and the machine monitor (meter unit) are connected directly to the battery. They are supplied with power even after the starting switch is turned to the OFF position. • Because the signals passing an active CAN communication line are pulse voltages, they cannot be measured by using a multimeter.

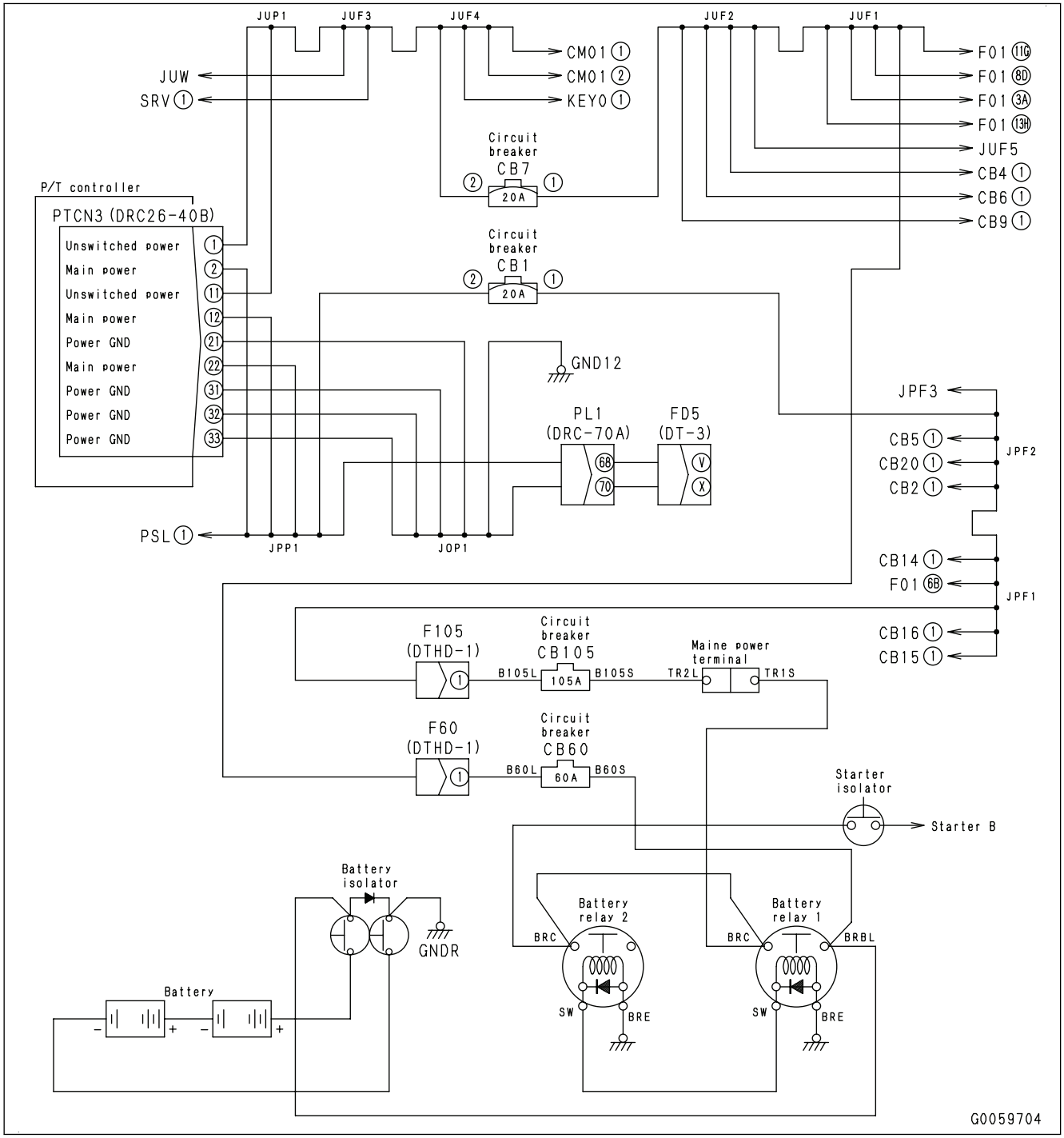
No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
1	Wiring harness and connector	1. Check the wiring harness and connector. For details, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”. 2. Are the wiring harness and connectors in the correct condition?	YES	• The wiring harness and connectors are in the correct condition. • Go to the next check item.
			NO	• The wiring harness or a connector is defective. • Repair or replace the defective wiring harness or connector. • Go to “Confirmation of repair”.

Failure Code [DB92KK]

Detail of failure	The battery direct power supply voltage for work equipment decreased to 17 V or less.
Action level	L04
Action of controller	Limits the operation of the engine, transmission, brakes, and work equipment.
Phenomenon on machine	• Relays and solenoids are not started and the system does not operate correctly in some occasions. • When the machine is stopped, the engine speed is restricted to medium (half) speed. • When the machine is stopped, it cannot travel at all.
Related information	“Power supply voltage of work equipment controller” can be checked with the adjusting function. (Code: 2022)

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
1	Wiring harness and connector	1. Check the wiring harnesses and connectors. **REMARK** For details of checking method, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “Electrical equipment”. 2. Are the wiring harness and connectors in the correct condition?	YES	• The wiring harness and connectors are in the correct condition. • Go to the next check item.
			NO	• The wiring harness or a connector is defective. • Repair or replace the defective wiring harness or connector. • Go to “Confirmation of repair”.
2	Circuit breaker	1. Turn the starting switch to the OFF position. 2. Check that the system operating lamp is not lit, and then turn the battery disconnect switch to the OFF position. 3. Make sure that circuit breaker CB2 is not open in the circuit. 4. Is the circuit breaker in the correct condition?	YES	• The circuit breaker is in the correct condition. • Go to the next check item.
			NO	• Check “Ground fault in wiring harness” if the circuit breaker is cut off. • If the wiring harness has no ground fault, and if the circuit breaker does not reset correctly, the circuit breaker is defective. Replace it. • Go to “Confirmation of repair”.

Circuit Diagram of Power Train Controller Power Source



Failure Code [DBUTKA]

Action level	Failure code	Failure	GNSS Receiver Antenna :Open (Navigation controller system)
L01	DBUTKA		
Detail of failure	Open circuit is detected in GNSS receiver antenna circuit.		
Action of controller	• Displays the failure to PTX-C. • Inhibits the automatic control of blade.		
Problem on machine	• Automatic control of blade is turned OFF. • Automatic control of blade does not turn ON even when auto/manual switch is pressed.		
Related information			

No.	Cause	Procedure, measuring location, criteria and remarks
1	Looseness of GNSS antenna wiring harness	1. Check the connection part of GNSS antenna and antenna wiring harness for looseness. 2. Check the connection part of AuxBox and antenna wiring harness for looseness.
2	Defective GNSS antenna	If no failure is found by preceding checks, GNSS antenna is defective. (Since this is an internal defect, troubleshooting cannot be performed.)
3	Defective AUX box	If no failure is found by preceding checks, AUX box is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Failure Code [DD12KB]

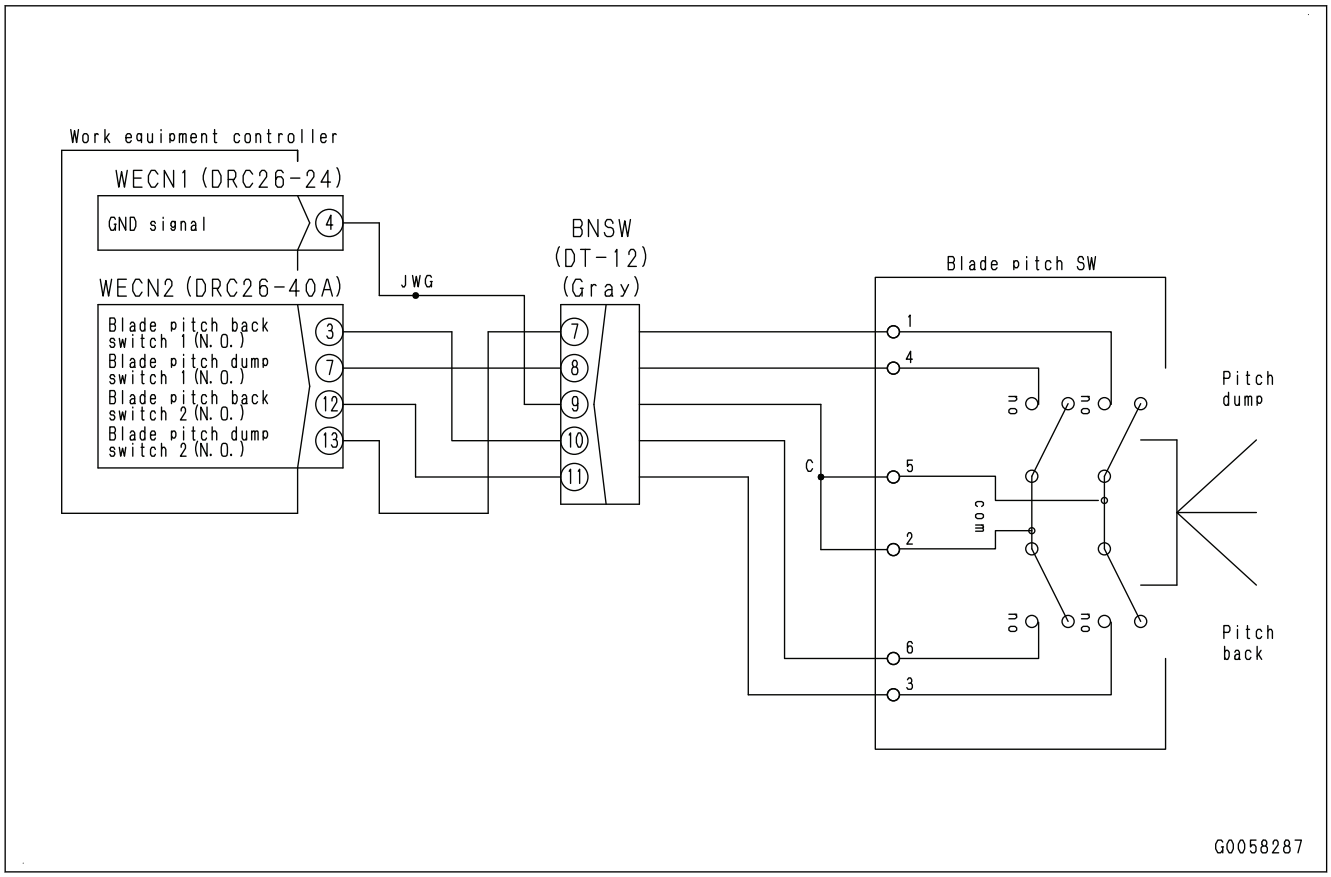
Detail of failure	The power train controller found a short circuit in the upshift switch.
Action level	L03
Action of controller	• Limits travel. • Reads that the upshift switch is not pushed.
Phenomenon on machine	Gears do not shift up.
Related information	**Monitoring code** You can check the signal state of the “Upshift Switch” with the monitoring function. (Code: 40905) **Reference information** The NO line is for operation detection. The NC line is for error detection.

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
1	Wiring harness and connector	1. Check the wiring harness and connector. For details, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”. 2. Are the wiring harness and connectors in the correct condition?	YES	• The wiring harness and connectors are in the correct condition. • Go to the next check item.
			NO	• The wiring harness or a connector is defective. • Repair or replace the defective wiring harness or connector. • Go to “Confirmation of repair”.

<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Hot short circuit in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors PTCN1 and TL3. Connect the T-adapter to the female side of TL3.
3. Turn the starting switch to the ON position, then do the troubleshooting.
4. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td rowspan="3">Voltage</td><td>Between TL3 (female) (1) and (5)</td><td>Max. 1 V</td></tr><tr><td>Between TL3 (female) (3) and (5)</td><td>Max. 1 V</td></tr><tr><td>Between TL3 (female) (4) and (5)</td><td>Max. 1 V</td></tr></table></td><td>YES</td><td>• Hot short circuit in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has a hot short circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Short circuit in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect connectors PTCN1 and TL3. Connect the T-adapter to the female side of PTCN1 to do the troubleshooting.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td rowspan="3">Resistance</td><td>Between PTCN1 (female) (5) and each pin other than pin (5)</td><td>Min. 1 MΩ</td></tr><tr><td>Between PTCN1 (female) (18) and each pin other than pin (18)</td><td>Min. 1 MΩ</td></tr><tr><td>Between PTCN1 (female) (24) and each pin other than pin (24)</td><td>Min. 1 MΩ</td></tr></table></td><td>YES</td><td>• Short circuit in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has a short circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
</table>

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
6	Confirmation of check results	1. Do the troubleshooting above again. 2. Can you find the cause by the check?	YES	The repair is completed.
			NO	• The work equipment controller can be defective. • Replace the work equipment controller. • Go to “Confirmation of repair”.
7	Confirmation of repair	1. Turn the starting switch to the OFF position. 2. Connect all the component parts. 3. Turn the starting switch to the ON position. 4. Operate the blade control lever in the pitch dump direction to do the troubleshooting. 5. Check the abnormality record. 6. Is “E” shown in the abnormality record of this failure code?	YES	Go back to the first check item.
			NO	The repair is completed.

Circuit Diagram of Blade Pitch Back Lever



<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Ground fault in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors WECN2 and WLV1. Connect the T-adapter to the female side on one of them.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td>Resistance</td><td>Between ground and one of WECN2 (female) (26) and WLV1 (female) (6)</td><td>Min. 1 MΩ</td></tr></table></td><td>YES</td><td>• Ground fault in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has a ground fault.
• Repair or replace the defective wiring harness.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Blade tilt lever potentiometer 2</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connector WLV1. Insert the T-adapter.
3. Turn the starting switch to the ON position.
4. Operate the blade control lever in the tilt direction to do the troubleshooting.
5. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td>Voltage</td><td>Between WLV1 (6) and (5)</td><td>0.96 to 4.04 V</td></tr></table></td><td>YES</td><td>• The blade tilt lever potentiometer 2 is in the correct condition.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The blade tilt lever potentiometer 2 can be defective.
• Replace the blade tilt lever potentiometer 2
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Confirmation of check results</td><td rowspan="2">1. Do the troubleshooting above again.
2. Can you find the cause by the check?</td><td>YES</td><td>The repair is completed.</td></tr>
<tr><td>NO</td><td>• The work equipment controller can be defective.
• Replace the work equipment controller.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Confirmation of repair</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Connect all the component parts.
3. Turn the starting switch to the ON position.
4. Operate the blade control lever in the tilt direction.
5. Check the abnormality record.
6. Is “E” shown in the abnormality record of this failure code?</td><td>YES</td><td>Go back to the first check item.</td></tr>
<tr><td>NO</td><td>The repair is completed.</td></tr>
</table>

Failure Code [DGTWKZ]

Detail of failure	The KOMTRAX Plus controller senses an open circuit or ground fault in the exhaust temperature sensor LR (left rear exhaust).
Action level	-
Action of controller	None.
Phenomenon on machine	None.
Related information	**Monitoring code** • You can see “Exhaust Temp. Sensor Volt(LBR)” with the monitoring function. (Code: 42658) • You can see “Exhaust Temperature LBR” with the monitoring function. (Code: 42657)

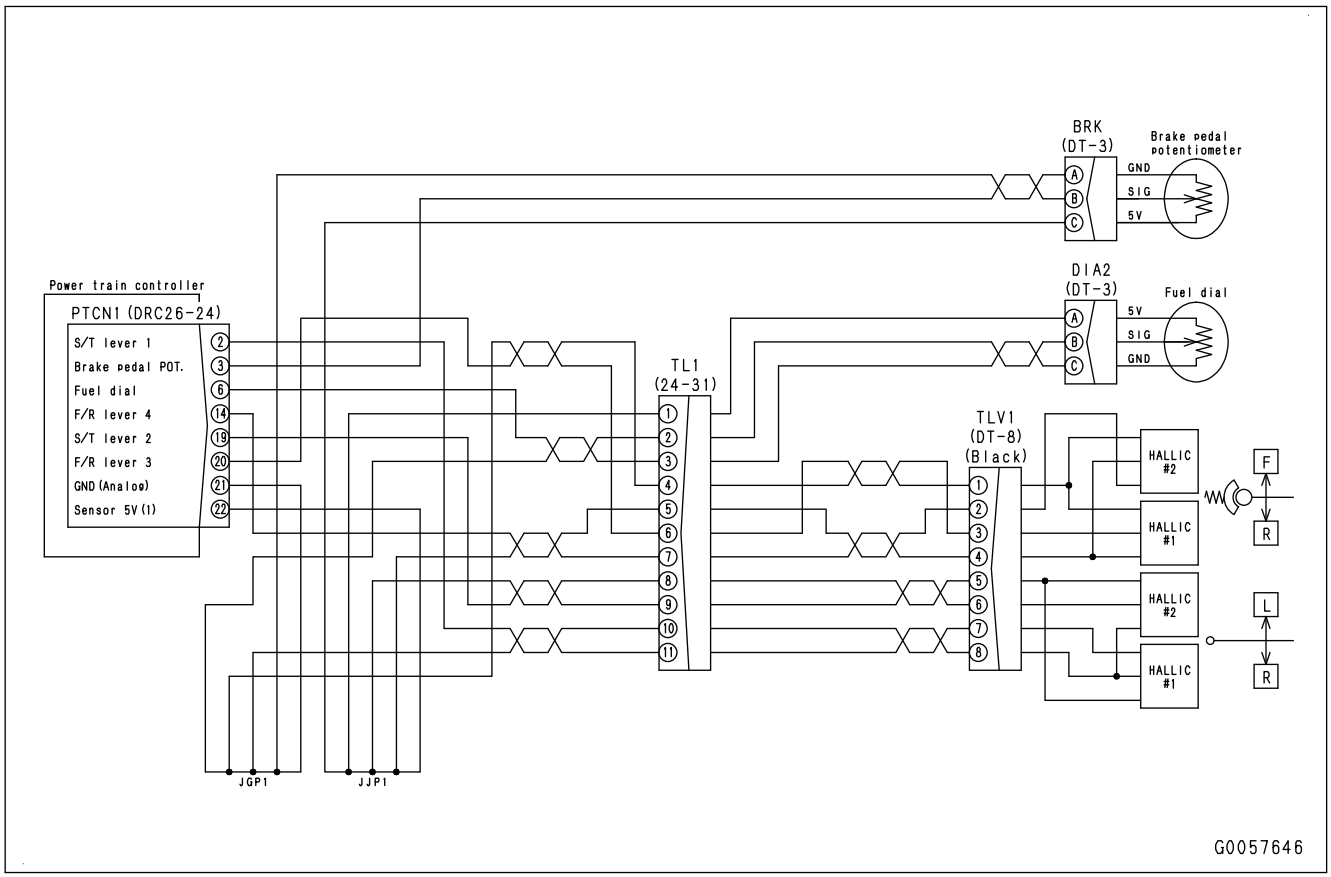
<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Wiring harness and connector</td><td rowspan="2">1. Examine the wiring harnesses and connectors. For details, see the descriptions of wiring harnesses and connectors in the “Electrical equipment” in the “CHECKS BEFORE TROUBLESHOOTING” of the “RELATED INFORMATION FOR TROUBLESHOOTING”.
2. Are the wiring harness and connectors in the correct state?</td><td>YES</td><td>• The wiring harness and connectors are in the correct state.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness or a connector is defective.
• Repair or replace the defective wiring harness or connector.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Open circuit in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors C30A, C30B, and EXA6. Connect the T-adapter to each female side to do the troubleshooting.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td rowspan="3">Resistance</td><td>Between C30B (female) (49) and EXA6 (female) (A)</td><td>Max. 1Ω</td></tr><tr><td>Between C30A (female) (3) and EXA6 (female) (B)</td><td>Max. 1Ω</td></tr><tr><td>Between C30A (female) (1) and EXA6 (female) (C)</td><td>Max. 1Ω</td></tr></table></td><td>YES</td><td>• Open circuit in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has an open circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
</table>

Failure Code [DK10KA]

Detail of failure	The signal voltage of the fuel dial circuit is 0.5 V or below.
Action level	L03
Action of controller	• Continues control by using the signals from the decelerator pedal potentiometer. • Restricts engine and transmission operation.
Phenomenon on machine	• The automatic gear shift function does not operate. • When the machine is stopped, the engine speed is restricted to medium (half) speed. • When the machine is stopped, selectable gear speeds are restricted to F1 and R1.
Related information	**Monitoring code** You can check the ON/OFF state of “Fuel Dial Sensor Voltage” with the monitoring function. (Code: 03000)

<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Wiring harness and connector</td><td rowspan="2">1. Check the wiring harness and connector. For details, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”.
2. Are the wiring harness and connectors in the correct condition?</td><td>YES</td><td>• The wiring harness and connectors are in the correct condition.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness or a connector is defective.
• Repair or replace the defective wiring harness or connector.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Fuel control dial</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connector DIA2. Connect the T-adapter to the male side.
3. Turn the fuel control dial.
4. Does the troubleshooting result agree with the standard value?
<table>
<tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr>
<tr><td rowspan="4">Resistance</td><td>Between DIA2 (male) (A) and (C)</td><td>Approx. 5 kΩ</td></tr>
<tr><td>Between DIA2 (male) (B) and (C)</td><td>0.5 to 4.5 kΩ</td></tr>
<tr><td>Between DIA2 (male) (A) and (B)</td><td>0.5 to 4.5 kΩ</td></tr>
<tr><td>Between DIA2 (male) (B) and ground</td><td>Min. 1 MΩ</td></tr>
</table></td><td>YES</td><td>• The fuel control dial is in the correct condition.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The fuel control dial can be defective.
• Replace the fuel control dial.
• Go to “Confirmation of repair”.</td></tr>
</table>

Circuit Diagram of Travel Lever Potentiometer



Failure Code [DKSMKB]

Action level	Failure code	Failure	Left lift Stroke sensor A:Hot Short (Work equipment controller system)
L01	DKSMKB		
Detail of failure	Input voltage from phase A of the stroke and reset sensor for L.H. blade lift cylinder is 4.5V or above.		
Action of controller	Prevents the automatic control of the blade.		
Phenomenon on machine	• Automatic control of blade is turned OFF. • Automatic control of the blade is not turned ON even when the auto/manual switch is pushed.		
Related information	• After the repair is done, check that the failure code is not shown with the operation that follows. Procedure: Starting switch ON • “Cylinder stroke measured value error” is displayed in “Slope control key” on the control box screen. • The device name of “L.H. blade lift cylinder stroke sensor” (which is displayed with failure code on the machine monitor) is written as “Stroke and reset sensor for L.H. blade lift cylinder” in the troubleshooting table and other chapter.		

No.	Cause	Procedure, measurement location, criteria and remarks		
1	Defective 5V sensor power supply system	If failure code [DB97KK] is also shown at the same time, do the troubleshooting for that code first.		
2	Defective stroke and reset sensor phase A for L.H. blade lift cylinder (internal open circuit) or hot short circuit in the wiring harness	1. Starting switch: OFF 2. Disconnect the connector CY43. 3. Starting switch is in the ON position.		
		When failure code [DKSMKB] is cleared, stroke and reset sensor for L.H. blade lift cylinder is defective. (When this failure code is not cleared, wiring harness or working equipment controller is defective.) **REMARK** Because the connector CY43 is disconnected, many failure codes are shown. Ignore failure codes other than [DKSMKB].		
3	Hot short circuit in wiring harness	1. Starting switch: OFF 2. Disconnect the connectors WECN1, WECN2 and CY43. Connect a T-adapter to each female side.		
		Voltage	Between CY43 (female) (A) and (D) or ground	Max. 1 V
4	Short circuit in wiring harness	1. Starting switch: OFF 2. Disconnect the connectors WECN1, WECN2 and CY43, and connect a T-adapter to the female sides of WECN1 and WECN2.		
		Continuity	Between WECN1 (female) (8) and each pin other than (8)	No continuity
			Between WECN1 (female) (8) and each pin of WECN2 (female)	No continuity

Failure Code [DKW3L8]

Detail of failure	The total measured value of the left steering lever potentiometer 1 and 2 systems exceeds the specified range.
Action level	L03
Action of controller	• Limits travel. • Enables the brake-linked auto-deceleration function.
Phenomenon on machine	• The left lever can be operated until the brake pedal is operated or the gear speed is changed to N. • After the brake pedal is operated or the gear speed is changed to N, only right turns can be made. • When the brake pedal is operated, the auto-deceleration operates in conjunction.
Related information	

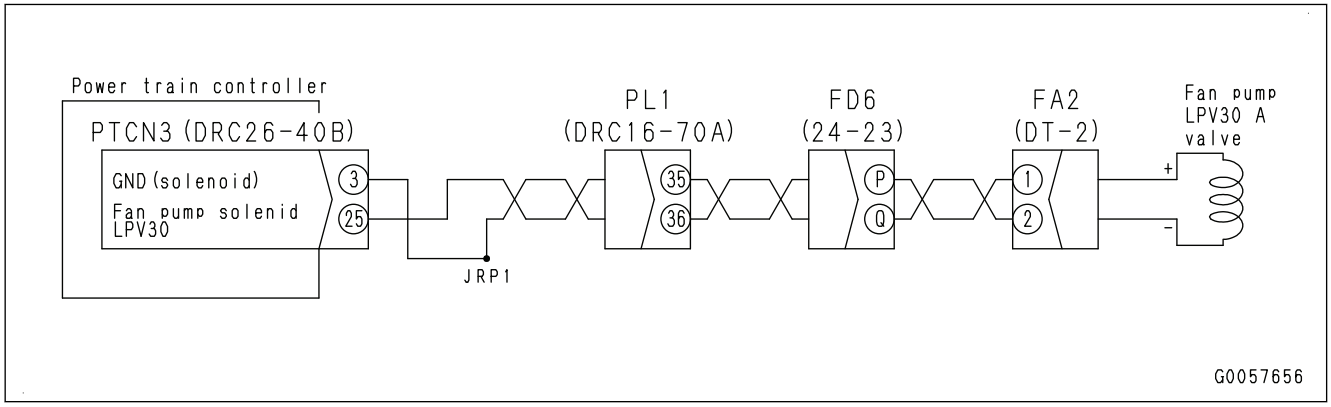
<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Wiring harness and connector</td><td rowspan="2">1. Check the wiring harness and connector. For details, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”.
2. Are the wiring harness and connectors in the correct condition?</td><td>YES</td><td>• The wiring harness and connectors are in the correct condition.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness or a connector is defective.
• Repair or replace the defective wiring harness or connector.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Open circuit in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors PTCN1 and TLV1. Connect the T-adapter to each female side to do the troubleshooting.
3. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td rowspan="4">Resistance</td><td>Between PTCN1 (female) (22) and TLV1 (female) (4)</td><td>Max. 1 Ω</td></tr><tr><td>Between PTCN1 (female) (14) and TLV1 (female) (2)</td><td>Max. 1 Ω</td></tr><tr><td>Between PTCN1 (female) (20) and TLV1 (female) (3)</td><td>Max. 1 Ω</td></tr><tr><td>Between PTCN1 (female) (21) and TLV1 (female) (1)</td><td>Max. 1 Ω</td></tr></table></td><td>YES</td><td>• Open circuit in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has an open circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
</table>

Failure Code [DNDDKB]

Detail of failure	The NO* and NC* lines of the power ladder clamp open limit switch circuit are closed (switch: ON) at the same time. (Recognizes as normally closed (ON))
Action level	L01
Action of controller	• Keeps the last time information of the power ladder clamp open limit switch. • Stops ladder operation.
Phenomenon on machine	Ladder control is disabled.
Related information	**Monitoring code** You can check the ON/OFF state of “(Option cntlr) SW Input 2” with the monitoring function. (Code: 02711) **Reference information** The NO* line is for operation detection. The NC* line is for error detection.

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
1	Wiring harness and connector	1. Check the wiring harness and connector. For details, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”. 2. Are the wiring harness and connectors in the correct condition?	YES	• The wiring harness and connectors are in the correct condition. • Go to the next check item.
			NO	• The wiring harness or a connector is defective. • Repair or replace the defective wiring harness or connector. • Go to “Confirmation of repair”.

Circuit Diagram of Fan Control Solenoid 1

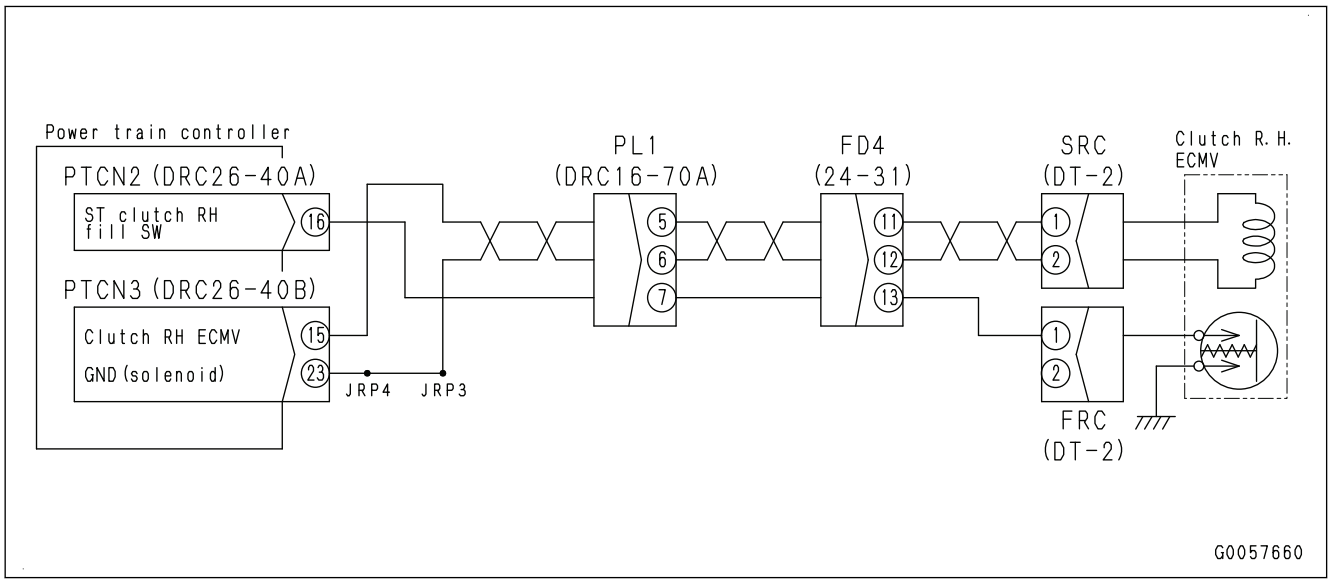


Failure Code [DXH1KY]

Detail of failure	A current continuously flows to the torque converter lockup clutch ECMV solenoid because there is a hot short circuit in the torque converter lockup clutch ECMV solenoid system.
Action level	L03
Action of controller	• Stops to energize the torque converter lockup clutch ECMV solenoid circuit. • Restricts engine and transmission operations.
Phenomenon on machine	• The lockup function of the torque converter operates continuously. • The engine stops during travel in some occasions. • When the machine is stopped, the engine speed is restricted to medium speed. • When the machine is stopped, selectable gear speeds are restricted to F1 and R1. • The automatic gear shift function does not operate.
Related information	**Monitoring code** You can check the ON/OFF state of “Lockup ECMV Current” with the monitoring function. (Code: 31642)

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
1	Wiring harness and connector	1. Check the wiring harness and connector. For details, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”. 2. Are the wiring harness and connectors in the correct condition?	YES	• The wiring harness and connectors are in the correct condition. • Go to the next check item.
			NO	• The wiring harness or a connector is defective. • Repair or replace the defective wiring harness or connector. • Go to “Confirmation of repair”.

Circuit Diagram of Right Clutch ECMV



Failure Code [DXHUKA]

Detail of failure	When the controller energizes the blade tilt RIGHT bottom EPC solenoid circuit, no current flows.
Action level	L01
Action of controller	Stops to energize the blade tilt right bottom EPC solenoid circuit.
Phenomenon on machine	The right cylinder for blade tilt or pitch cannot be extended.
Related information	**Monitoring code** You can check the ON/OFF state of “RH Blade Tilt Cyl Bottom EPC Sol” with the monitoring function. (Code: 90801)

<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Wiring harness and connector</td><td rowspan="2">1. Check the wiring harness and connector. For details, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”.
2. Are the wiring harness and connectors in the correct condition?</td><td>YES</td><td>• The wiring harness and connectors are in the correct condition.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness or a connector is defective.
• Repair or replace the defective wiring harness or connector.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Blade tilt right bottom EPC solenoid</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connector WEP6. Connect the T-adapter to the male side.
3. Does the troubleshooting result agree with the standard value?
<table>
<tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr>
<tr><td rowspan="2">Resistance</td><td>Between WEP6 (male) (1) and (2)</td><td>2 to 12 Ω</td></tr>
<tr><td>Between WEP6 (male) (1) and ground</td><td>Min. 1 MΩ</td></tr>
</table></td><td>YES</td><td>• The blade tilt right bottom EPC solenoid is in the correct condition.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The blade tilt right bottom EPC solenoid can be defective.
• Replace the blade tilt right bottom EPC solenoid.
• Go to “Confirmation of repair”.</td></tr>
</table>

Failure Code [DXJ9KA]

Detail of failure	When the controller energizes the blade tilt LEFT head EPC solenoid circuit, no current flows.
Action level	L01
Action of controller	Stops to energize the blade tilt left head EPC solenoid circuit.
Phenomenon on machine	The left cylinder for blade tilt or pitch cannot be retracted.
Related information	**Monitoring code** You can check the ON/OFF state of “LH Blade Tilt Cyl Head EPC Sol” with the monitoring function. (Code: 71005)

<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Wiring harness and connector</td><td rowspan="2">1. Check the wiring harness and connector. For details, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”.
2. Are the wiring harness and connectors in the correct condition?</td><td>YES</td><td>• The wiring harness and connectors are in the correct condition.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness or a connector is defective.
• Repair or replace the defective wiring harness or connector.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Blade tilt left head EPC solenoid</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Disconnect the connector WEP3. Connect the T-adapter to the male side.
3. Does the troubleshooting result agree with the standard value?
<table>
<tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr>
<tr><td rowspan="2">Resistance</td><td>Between WEP3 (male) (1) and (2)</td><td>2 to 12 Ω</td></tr>
<tr><td>Between WEP3 (male) (1) and ground</td><td>Min. 1 MΩ</td></tr>
</table></td><td>YES</td><td>• The blade tilt left head EPC solenoid is in the correct condition.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The blade tilt left head EPC solenoid can be defective.
• Replace the blade tilt left head EPC solenoid.
• Go to “Confirmation of repair”.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">12</td><td rowspan="2">CAN terminating resistor</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Check that the system operating lamp is not lit, and then turn the battery disconnect switch to the OFF position.
3. Disconnect the connectors CTN2 and KOM/c_RES. Connect the T-adapter to each male side to do the troubleshooting.
4. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td rowspan="2">Resistance</td><td>Between KOM/r_RES (male) (A) and (B)</td><td>108 to 132 Ω</td></tr><tr><td>Between CTN2 (male) (A) and (B)</td><td>108 to 132 Ω</td></tr></table></td><td>YES</td><td>• The CAN terminating resistor is in the correct condition.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The CAN terminating resistor is defective.
• Replace the CAN terminating resistor.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">13</td><td rowspan="2">Open circuit in wiring harness (CAN1 communication circuit)</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Check that the system operating lamp is not lit, and then turn the battery disconnect switch to the OFF position.
3. Disconnect the connectors NVCN2 and CM02. Connect the T-adapter to each female side to do the troubleshooting.
4. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td rowspan="4">Resistance</td><td>Between NVCN2 (female) (13) and CM02 (female) (12)</td><td>Max. 1 Ω</td></tr><tr><td>Between NVCN2 (female) (14) and CM02 (female) (11)</td><td>Max. 1 Ω</td></tr><tr><td>Between NVCN2 (female) (31) and CM02 (female) (12)</td><td>Max. 1 Ω</td></tr><tr><td>Between NVCN2 (female) (32) and CM02 (female) (11)</td><td>Max. 1 Ω</td></tr></table></td><td>YES</td><td>• Open circuit in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has an open circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Open circuit in wiring harness (Power supply circuit of option controller)</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Check that the system operating lamp is not lit, and then turn the battery disconnect switch to the OFF position.
3. Remove circuit breaker CB9.
4. Disconnect the connector OPTCN3. Connect the T-adapter to the female side to do the troubleshooting.
5. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td rowspan="6">Resistance</td><td>Between CB9-2 and OPTCN3 (female) (1)</td><td>Max. 1 Ω</td></tr><tr><td>Between CB9-2 and OPTCN3 (female) (11)</td><td>Max. 1 Ω</td></tr><tr><td>Between OPTCN3 (female) (21) and ground</td><td>Max. 1 Ω</td></tr><tr><td>Between OPTCN3 (female) (31) and ground</td><td>Max. 1 Ω</td></tr><tr><td>Between OPTCN3 (female) (32) and ground</td><td>Max. 1 Ω</td></tr><tr><td>Between OPTCN3 (female) (33) and ground</td><td>Max. 1 Ω</td></tr></table></td><td>YES</td><td>• Open circuit in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has an open circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Ground fault in wiring harness (Power supply circuit of option controller)</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Check that the system operating lamp is not lit, and then turn the battery disconnect switch to the OFF position.
3. Remove circuit breaker CB9.
4. Disconnect the connectors OPTCN3, ES1 and LS1. Connect the T-adapter to the female side of OPTCN3 to do the troubleshooting.
5. Does the troubleshooting result agree with the standard value?
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td>Resistance</td><td>Between ground and one of CB9-2, OPTCN3 (female) (1), and (11)</td><td>Min. 1 MΩ</td></tr></table></td><td>YES</td><td>• Ground fault in wiring harness does not occur.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has a ground fault.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
</table>

E-5 Automatic Preheating System Does Not Operate

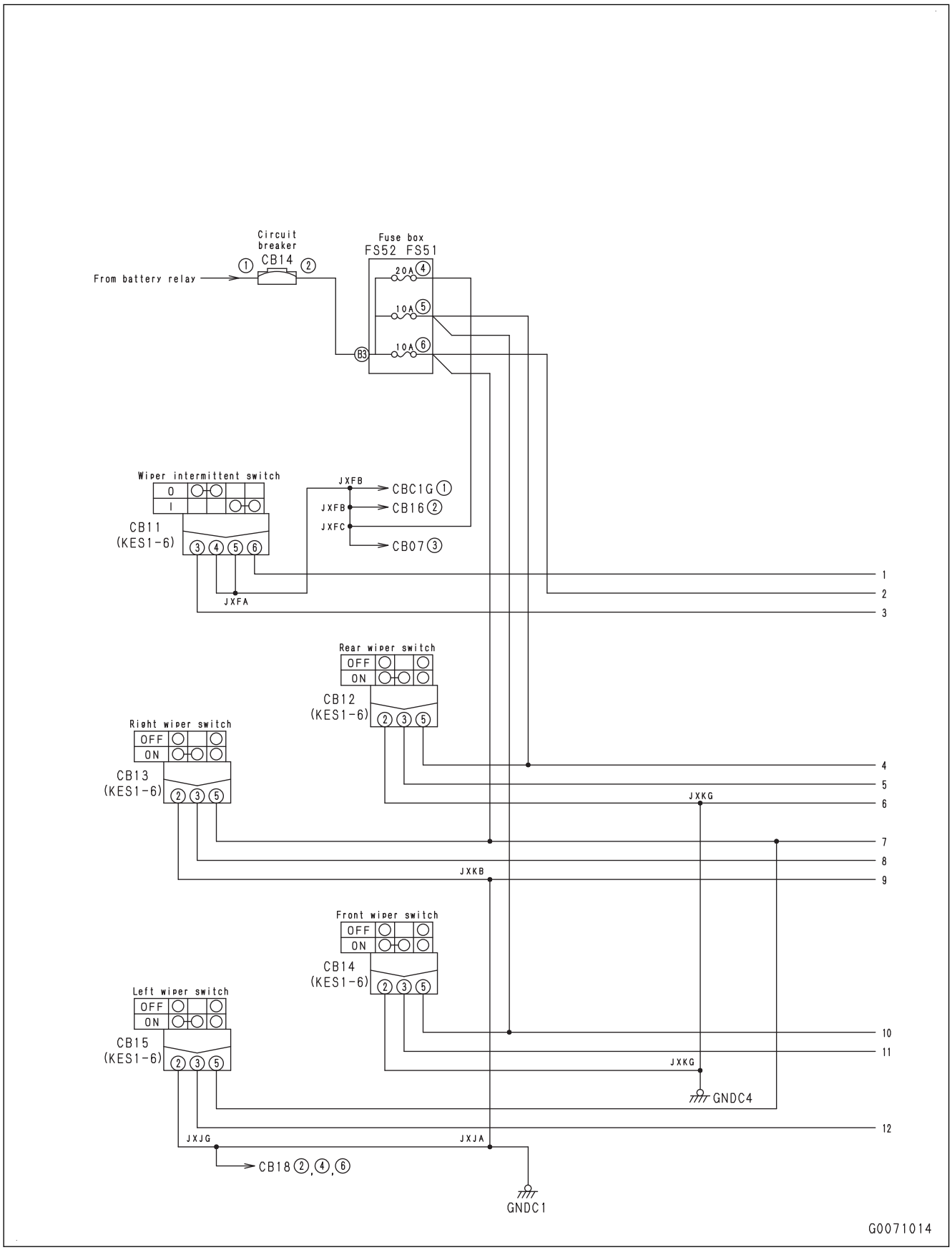
Detail of failure	The automatic preheating system does not operate.
Related information	**Pre-troubleshooting** If a failure code is shown, do the troubleshooting for that code first. • The automatic preheating function activates when the engine coolant temperature is -5°C or below. • If the automatic preheating system does not work, make sure that the manual preheating can be activated in advance. • The engine controller troubleshoots the primary (coil) side of the pre-heat relay (connector PHR) and shows failure code [CA2555] or [CA2556]. • The engine controller troubleshoot the engine coolant temperature sensor and shows failure code [CA144] or [CA145]. **Monitoring code** You can check “Coolant Temperature” with the monitoring function. (Code: 04107)

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
1	Wiring harness and connector	1. Check the wiring harness and connector. For details, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”. 2. Are the wiring harness and connectors in the correct condition?	YES	• The wiring harness and connectors are in the correct condition. • Go to the next check item.
			NO	• The wiring harness or a connector is defective. • Repair or replace the defective wiring harness or connector. • Go to “Confirmation of repair”.
2	Fuse	1. Turn the starting switch to the OFF position. 2. Check that the system operating lamp is not lit, and then turn the battery disconnect switch to the OFF position. 3. Remove the fuse No.6 in the fuse box F01, and visually check it for blown out, then do the continuity test. 4. Is the fuse in the correct condition?	YES	• The fuse is in the correct condition. • Go to the next check item.
			NO	• The fuse is defective. • If burnt out, go to “Ground fault in wiring harness”. • If the fuse is not blown out but has no continuity, replace it. • Go to “Confirmation of repair”.

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
3	Radio disturbance	1. Move the machine by the operator's control. 2. Then operate by radio control. 3. Can the machine be operated by radio control?	YES	• There is a radio disturbance. • Go to "Confirmation of repair".
			NO	• The problem is not caused by radio disturbance. • Go to the next check item.
4	Radio control transmitter	1. Turn the starting switch to the OFF position. 2. Replace the radio control transmitter. 3. Turn the starting switch to the ON position. 4. Is this problem resolved?	YES	• The removed radio control transmitter is defective. • Go to "Confirmation of repair".
			NO	• The removed radio control transmitter is in the correct condition. • Restore the removed radio control transmitter to its initial position. • Go to the next check item.
5	Radio control/on-board operation selector switch	1. Do the troubleshooting for "RADIO CONTROL/ON-BOARD MODE CAN NOT BE CHANGED" in E mode. 2. Can the radio control/on-board operation modes be changed? **REMARK** When the radio control/on-board selector switch is changed during engine start, the engine stops. Check that radio control/on-board selector switch is not changed.	YES	• The radio control/on-board selector switch is in the correct condition. • Go to the next check item.
			NO	• The radio control/on-board selector switch is defective. • Replace the radio control/on-board selector switch. • Go to "Confirmation of repair".

<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Red revolving lamp relay</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Set the radio control/on-board selector switch to “Radio control side”, and turn the starting switch to the ON position.
3. Check the revolving lamps that have been lit for 7 seconds after the starting switch is turned to the ON position.
4. Turn the starting switch to the OFF position.
5. Replace the red revolving lamp relay with a yellow, blue, or green revolving lamp in the correct condition.
6. Set the radio control/on-board selector switch to the “Radio control side”.
7. Turn the starting switch to the ON position.
8. Is this problem resolved?</td><td>YES</td><td>• The removed red revolving lamp relay is defective.
• Go to “Confirmation of repair”.</td></tr>
<tr><td>NO</td><td>• The removed red revolving lamp relay is in the correct condition.
• Restore the removed red revolving lamp relay to its initial position.
• Go to the next check item.</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Open or short circuit in wiring harness</td><td rowspan="2">1. Turn the starting switch to the OFF position.
2. Check that the system operating lamp is not lit, and then turn the battery disconnect switch to the OFF position.
3. Disconnect the connector P5. Connect the T-adapter to the female side.
4. Set the radio control/on-board selector switch to the “Radio control side”.
5. Set the battery disconnect switch to the ON position.
6. Turn the starting switch to the ON position.
7. Does the troubleshooting result agree with the standard value?
REMARK
The voltage occurs only for 7 seconds after the starting switch is turned to the ON position. If you cannot check within this period, turn the starting switch to OFF position. Then turn it to the ON position again.
<table><tr><th>Item</th><th>Measurement position, condition</th><th>Standard value</th></tr><tr><td>Voltage</td><td>Between P5 (female) (1) and (2)</td><td>20 to 30 V</td></tr></table></td><td>YES</td><td>• The wiring harness has no open or short circuit.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness has an open or short circuit.
• Repair or replace the wiring harness.
• Go to “Confirmation of repair”.</td></tr>
</table>

Circuit Diagram of Windshield Wiper



<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Item</th><th colspan="2">Measurement position, condition</th><th>Standard value</th></tr>
<tr><td rowspan="4">Steering left brake operating pressure</td><td rowspan="2">• Engine coolant temperature: 60 to 100℃
• Power train oil temperature: 70 to 120℃
• Hydraulic oil temperature: 45 to 100℃
• Operating mode: P (power mode)
• Gear shift mode: Manual gear shift mode
• Parking brake switch: Free position
• Joystick (steering, directional, and gear shift lever) (PCCS lever): Neutral</td><td>Fuel control dial: MAX (high idle)</td><td>2.45 to 3.18MPa
{25.0 to 32.4kg/cm^2}</td></tr>
<tr><td>Fuel control dial: MIN (low idle)</td><td>2.25 to 3.04MPa
{23.0 to 31.5kg/cm^2}</td></tr>
<tr><td rowspan="2">• Engine coolant temperature: 60 to 100℃
• Power train oil temperature: 70 to 120℃
• Hydraulic oil temperature: 45 to 100℃
• Operating mode: P (power mode)
• Gear shift mode: Manual gear shift mode
• Parking brake switch: Free position
• Joystick (steering, directional, and gear shift lever) (PCCS lever): Left stroke end</td><td>Fuel control dial: MAX (high idle)</td><td>0.27 to 0.57MPa
{2.8 to 5.8kg/cm^2}</td></tr>
<tr><td>Fuel control dial: MIN (low idle)</td><td>0.27 to 0.57MPa
{2.8 to 5.8kg/cm^2}</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
4	Confirmation of check results	1. Do the troubleshooting above again. 2. Can you find the cause by the check?	YES	The repair is completed.
			NO	• There can be an internal defect of brakes. • Repair or replace the brake. • Go to “Confirmation of repair”.
5	Confirmation of repair	1. Turn the starting switch to the OFF position. 2. Connect all the component parts. 3. Start the engine. 4. Let the machine travel to do the troubleshooting. 5. Is this problem resolved?	YES	The repair is completed.
			NO	Go back to the first check item.

<table>
<tr><th>No.</th><th>Cause</th><th>Procedures, Measurement, Values, Note</th><th colspan="2">Diagnosis and treatment</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Item</th><th colspan="2">Measurement position, condition</th><th>Standard value</th></tr>
<tr><td rowspan="2">Blade tilt relief pressure (For full-U, semi-U)</td><td rowspan="3">• Engine coolant temperature: 60 to 100℃
• Power train oil temperature: 70 to 120℃
• Hydraulic oil temperature: 45 to 55℃
• Operating mode: P (power mode)
• Fuel control dial: MAX (high idle)
• Blade control lever: Pitch DUMP</td><td>Work equipment pump outlet pressure (F)</td><td>24.5±1.4MPa {250±14kg/cm^2}</td></tr>
<tr><td>Work equipment pump outlet pressure (R)</td><td>24.5±1.4MPa {250±14kg/cm^2}</td></tr>
<tr><td rowspan="2">Blade tilt relief pressure (For super dozer)</td><td>Work equipment pump outlet pressure (F)</td><td>25.0±1.4MPa {255±14kg/cm^2}</td></tr>
<tr><td>Work equipment pump outlet pressure (R)</td><td>25.0±1.4MPa {255±14kg/cm^2}</td></tr>
</table>
</td><td></td><td>• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">Blade tilt control valve spool</td><td rowspan="2">1. Check the oil pressure of the main circuit during blade tilt operation.
2. Does the pressure become the relief pressure of the unload valve or above?
REMARK
If the “set pressure of the self-pressure reducing valve” and the “work equipment main relief valve” are correct, do the troubleshooting in this section.</td><td>YES</td><td>• The blade tilt control valve spool is in the correct state.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The blade tilt control valve spool is defective.
• Check the blade tilt control valve spool for seizure.
• Go to “Confirmation of repair”.</td></tr>
</table>

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
11	Fuel low-pressure side piping	1. Bleed air from the fuel system circuit and check the fuel low-pressure side piping for fuel leakage. For details, see Testing and Adjusting, “Bleed Air from Fuel System”. 2. Is the fuel low-pressure side piping normal? **REMARK** • If fuel leaks from the fuel low-pressure side piping, it is a failure. • To check the leakage from the fuel low-pressure side piping, spray the color checker over the part.	YES	• The fuel low-pressure side piping is normal. • Go to the next check item.
			NO	• The fuel low-pressure side piping is defective. • Repair or replace the fuel low-pressure side piping. • Go to “Confirmation of repair”.
12	Feed pump gauze filter	1. Check the feed pump gauze filter for clogging. 2. Is the feed pump gauze filter normal? **REMARK** If the feed pump gauze filter is clogged, it is a failure.	YES	• The feed pump gauze filter is normal. • Go to the next check item.
			NO	• The feed pump gauze filter is defective. • Clean or replace the feed pump gauze filter. (failure side) • Go to “Confirmation of repair”.
13	Common rail	1. Turn the starting switch to the STRAT position, and check the common rail pressure limiter for leakage while the engine cranks. 2. Is there leakage from the common rail pressure limiter? **REMARK** • If there is leakage from the common rail pressure limiter, it is a failure. • Prepare to check the leakage from the common rail pressure limiter. For details, see Testing and Adjusting, “How to Examine Fuel Return Rate and Leakage”, “TEST FUEL RETURN RATE AND LEAKAGE”.	YES	• The common rail is defective. • Replace the common rail. (failure side) • Go to “Confirmation of repair”.
			NO	• The common rail is normal. • Go to the next check item.

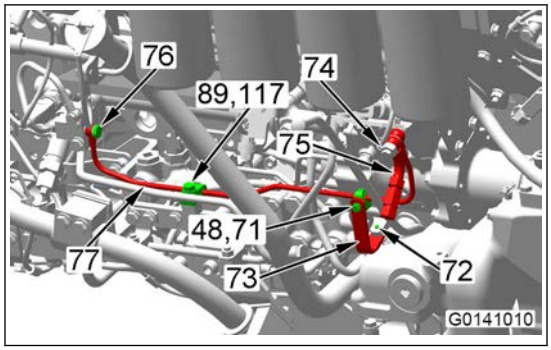
No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
4	Engine oil (water mixed)	1. Drain engine oil from the engine oil pan, and check if water is mixed into engine oil. 2. Is engine oil normal? **REMARK** • If engine oil becomes milky, water can be mixed into engine oil. • If water is mixed into engine oil, it is a failure.	YES	• Engine oil is normal. • Go to the next check item.
			NO	• Defective engine oil can be a cause of the failure. • Failure can be occurred inside the engine. • Do the troubleshooting of S MODE, “WATER MIXES INTO ENGINE OIL (MILKY)”. • Change engine oil to the specified one. • Go to “Confirmation of repair”.
5	Engine oil (Wear of bearing)	1. Drain engine oil from the engine oil pan, and check if metallic powder is mixed into engine oil. 2. Is engine oil normal? **REMARK** • If the main journal or pin journal is worn, metallic powder can be mixed into engine oil. • If metallic powder is mixed into engine oil, it is a failure.	YES	• Engine oil is normal. • Go to the next check item.
			NO	• Failure can be occurred inside the engine. • Remove the engine assembly. For details, see Disassembly and Assembly, “Remove and Install Engine Assembly”. And disassemble the engine assembly. For details, see the DISASSEMBLY AND ASSEMBLY in the shop manual Engine 12V140E-7 series. Then check further, and repair or replace the defective part. • Go to “Confirmation of repair”. **REMARK** This troubleshooting cannot be done on some working jobsites.

Symbol		Part No.	Part name	Q'ty	Sketch	Remarks
J		Commercially available	Eyebolt	3		M30
K		Commercially available	Chain sling	1		For 3-point sling
L		Commercially available	Puller	1		Removal of bearing inner race
M	1	790-431-1230	Remover and installer	1		Removal and installation of planetary gear shaft
	2	790-101-2102	Puller (294 kN {30 t})	1		
	3	790-101-1102	Pump	1		
N	1	790-431-1220	Remover assembly	1		Removal of hub assembly
	2	790-101-2102	Puller (294 kN {30 t})	1		
	3	790-101-1102	Pump	1		
O		Commercially available	Push tool	1		Installation of oil seal and bearing
P	1	790-431-1210	Installer assembly	1		Installation of hub assembly
	2	790-101-2102	Puller (294 kN {30 t})	1		
	3	790-101-1102	Pump	1		
Q	1	790-431-1101	Installer assembly	1		Installation of bearing inner race
	2	790-101-2102	Puller (294 kN {30 t})	1		
	3	790-101-1102	Pump	1		
R		791-140-2100	Installer	1		Installation of floating seal
S		Commercially available	Forcing screw	1		M16
T		Commercially available	Wire lifting tool	1		For 1-point sling

Special Tools to be Used When You Remove and Install the Track Frame Assembly

Sym-bol	Part No.	Part name	Q'ty	Sketch	Remarks
A	Commercially available	Webbing sling	4		Width 25 mm x length 3 m

31. Remove the bolt (48), and remove the clamp (71).
    Tool: Ratchet handle, socket
    Bolt (48): Width across flats 10mm, M6
32. Remove the bolt (89), and remove the clamp (117).
    Tool: Ratchet handle, socket
    Bolt (89): Width across flats 13mm, M8
33. Remove the bolt (72), and remove the bracket (73).
    Tool: Ratchet handle, socket
    Bolt (72): Width across flats 10mm, M6



34. Remove the joint bolt (74), and disconnect the tube (77) and joint (75).

    REMARK

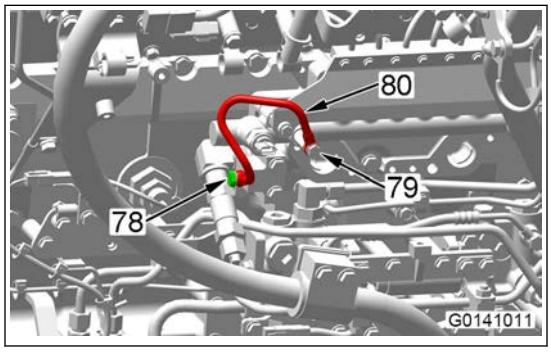
    - The joint bolt (74) is supplied with the supply pump.
    - Tighten the joint bolt (74) lightly to the supply pump, and store it not to lose when assembled again.
    - Move the joint (75) to a safe place not to interfere with the work.

    Tool: Ratchet handle, socket
    Joint bolt (74): Width across flats 22mm, M14
35. Remove the joint bolt (76), and remove the tube (77).
    Tool: Ratchet handle, socket
    Joint bolt (76): Width across flats 17mm, M12
36. Remove the joint bolts (78) and (79), and remove the tube (80).

    REMARK

    - The joint bolt (79) is supplied with the common rail.
    - Tighten the joint bolt (79) lightly to the common rail, and store it not to lose when assembled again.

    Tool: Ratchet handle, socket
    Joint bolt (78): Width across flats 17mm, M12
    Joint bolt (79): Width across flats 14mm, M10

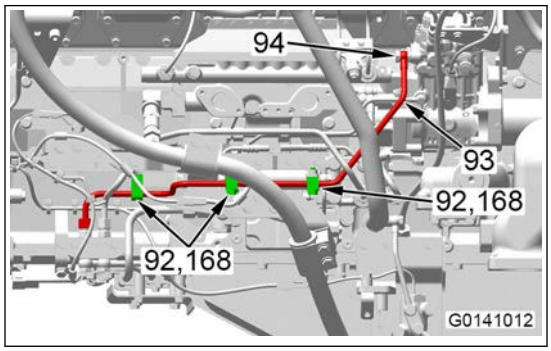


37. Remove the 3 bolts (92), and remove the 3 clamps (168).
    Tool: Ratchet handle, socket
    Bolt (92): Width across flats 17mm, M10
38. Loosen the sleeve nut, and disconnect the tube (93).
    Tool: Open-end wrench
    Tube (93): Width across flats 24mm
39. Remove the joint bolt (94), and remove the tube (93).

    REMARK

    - The joint bolt (94) is supplied with the supply pump.
    - Tighten the joint bolt (94) lightly to the supply pump, and store it not to lose when assembled again.

    Tool: Ratchet handle, socket
    Joint bolt (94): Width across flats 22mm, M14



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

⚠ Make sure that the system operating lamp is not lit, and set the battery isolator switch to the OFF position.

REMARK

For details, see Testing and Adjusting, "Handle Battery Isolator and Starting Motor Isolator".

Obey the items that follow before you start the work.

⚠ Immediately after the engine stops, the temperature of the coolant, oil, and parts around the engine are very hot and they can cause burn injury. Wait until the temperature decreases, and then start the work.

⚠ The remaining pressure in the hydraulic tank can cause an accident. Release the remaining pressure carefully.

REMARK

For details, see Testing and Adjusting, "How to Release Remained Pressure from Hydraulic Tank".

⚠ Check for flammable materials such as dry leaves and twigs stuck to the high temperature area. If dirt or flammable materials are found, remove them.

Obey the items that follow when you handle the wirings and hoses.

⚠ Check the connector numbers and installation positions before you disconnect the wirings, hoses, and clamps, and write them down.

⚠ If the wirings and hoses can be deformed or damaged, remove the clips and clamps before the work.

⚠ Prepare a container to receive oil before you disconnect the hoses.

⚠ Install a plug or flange to the parts where a hydraulic hose is disconnected not to let oil flow out.

⚠ Replace the O-ring, seal washer, and gasket with new ones.

How to Remove Injector Assembly (Right Bank)

Drain coolant

1. Drain coolant.

   For the procedure to drain coolant, see "How to Drain Coolant".

Engine hood assembly

2. Remove the engine hood assembly.

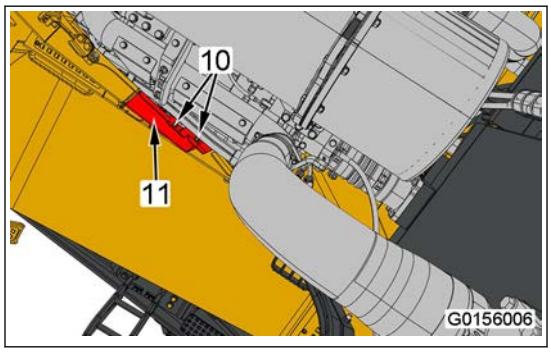
   For removal, see "How to Remove Engine Hood Assembly".

Cover

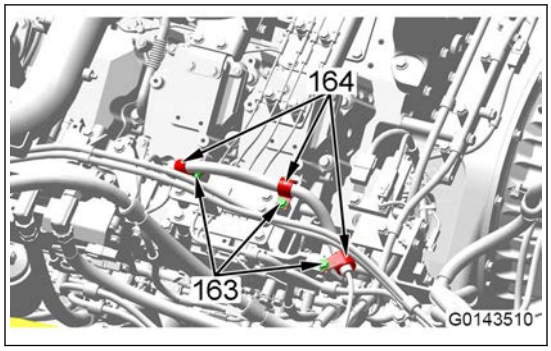
3. Remove the 2 bolts (10), and remove the cover (11).

   Tool: Ratchet handle, socket

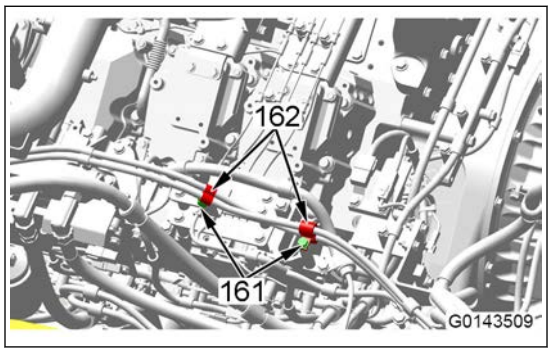
   Bolt (10): Width across flats 19mm, M12



20. Install the 3 clamps (164) with the 3 bolts (163).
    Tool: Ratchet handle, socket, torque wrench
    Bolt (163): Width across flats 17 mm, M10

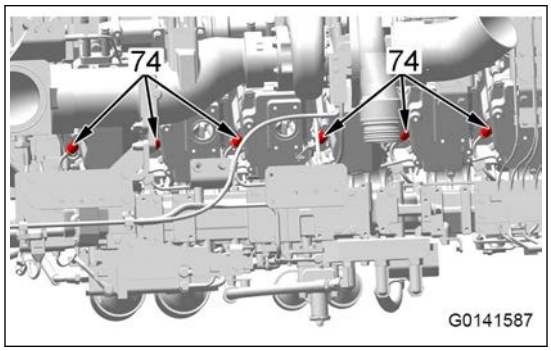


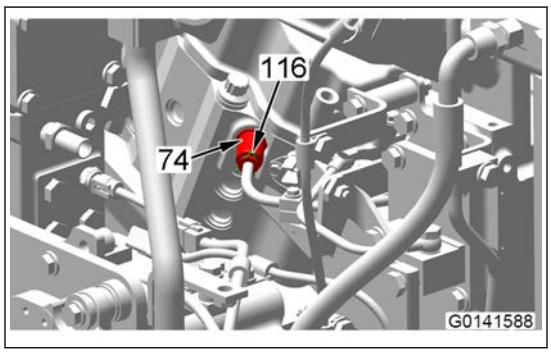
21. Install the 2 clamps (162) with the 2 bolts (161).
    Tool: Ratchet handle, socket, torque wrench
    Bolt (161): Width across flats 17 mm, M10



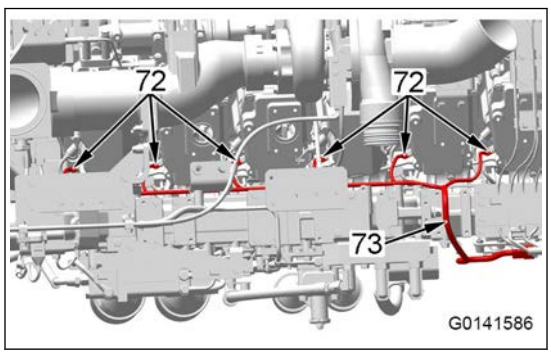
22. Install the 6 fuel spray prevention caps (74).
    REMARK
    Install the fuel spray prevention cap (74) with the slit part side down.

23. Install the 6 clips (116).
    REMARK
    Install the clip (116) from the top.
    Tool: Needle-nose pliers





24. Set the injector harness (73) to the installation position, and install the 6 connectors (72).
    REMARK
    Insert the connector (72) until it is locked.



3) Install the 2 cylinder head covers (541) with the 2 bolts (539) and 4 bolts (676).

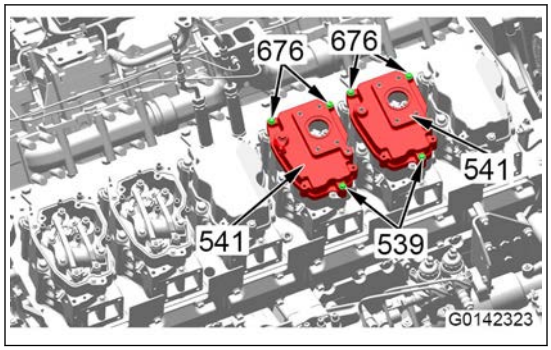
REMARK

Each bolt has a different length. Be sure to handle the correct one.

Tool: Ratchet handle, socket, torque wrench

Bolt (539), (676): Width across flats 12 mm, M8

Bolt (539), (676):
29.4 to 34.3 Nm {3.0 to 3.5 kgfm}



4) Install the 2 cylinder head covers (540) with the 2 bolts (539) and 4 bolts (676).

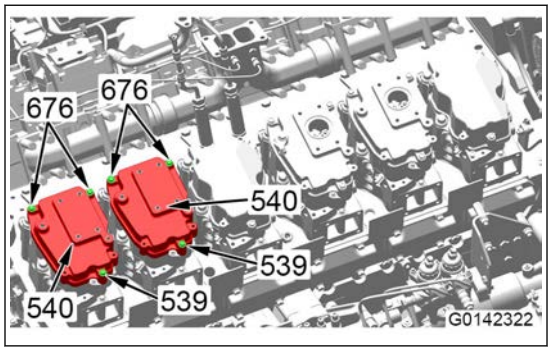
REMARK

Each bolt has a different length. Be sure to handle the correct one.

Tool: Ratchet handle, socket, torque wrench

Bolt (539), (676): Width across flats 12 mm, M8

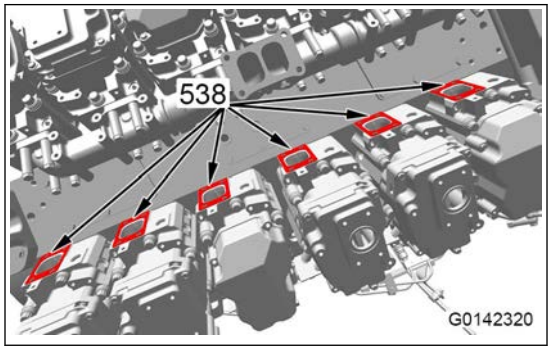
Bolt (539), (676):
29.4 to 34.3 Nm {3.0 to 3.5 kgfm}



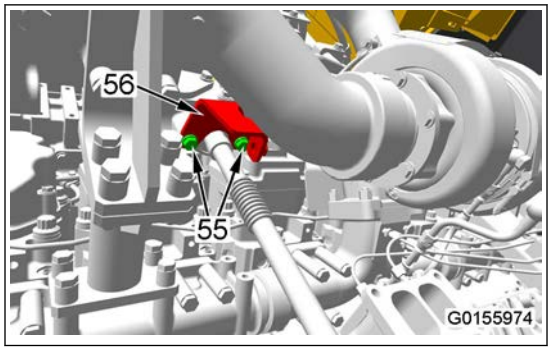
18. Set the 6 exhaust manifold gaskets (538) to the installation positions.

REMARK

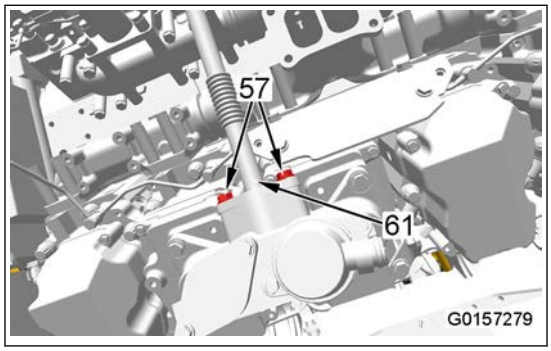
Put the identification mark “OUT” of the gasket (538) to the exhaust manifold.



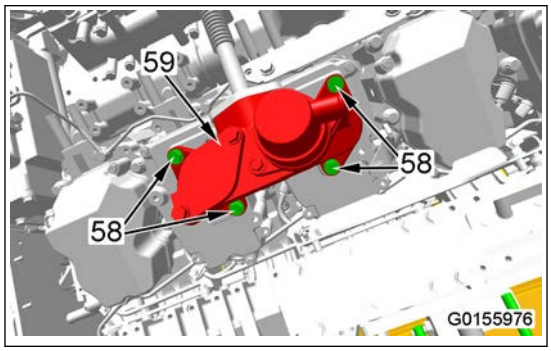
95. Remove the 2 bolts (55), and remove the bracket (56).
Tool: Ratchet handle, socket
Bolt (55): Width across flats 17 mm, M10



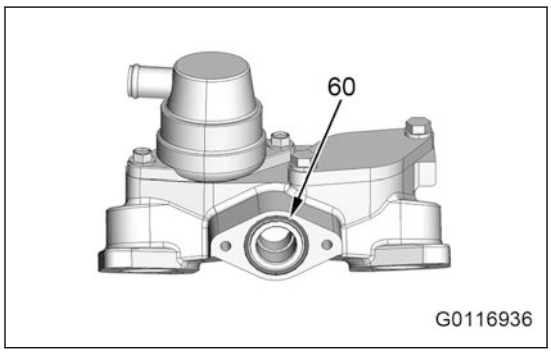
96. Remove the 2 bolts (57).
Tool: Ratchet handle, socket
Bolt (57): Width across flats 17 mm, M10



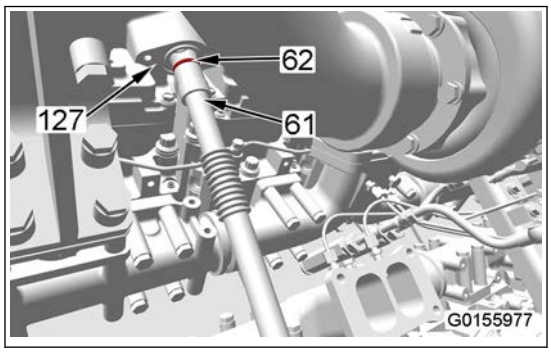
97. Remove the bolts (58) (4 pieces), and remove the connector (59).
Tool: Ratchet handle, socket
Bolt (58): Width across flats 17 mm, M10



98. Remove the O-ring (60).



99. Remove the tube (61) and O-ring (62) from the connector (127).



150. Tighten the joint bolts (178) and (181) and tube (180) to the specified torque.

Tool: Ratchet handle, socket, open-end wrench, torque wrench, torque wrench (open-end)

Joint bolt (178): Width across flats 17mm, M12

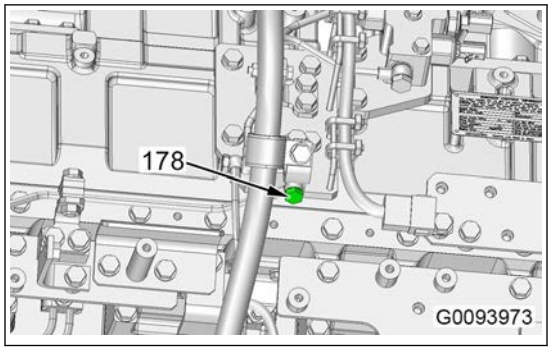
Joint bolt (181): Width across flats 19mm, M14

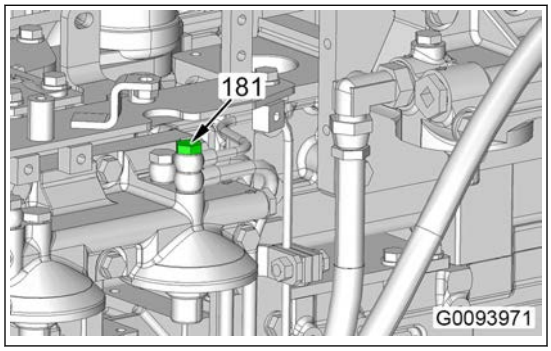
Tube (180): Width across flats 24mm

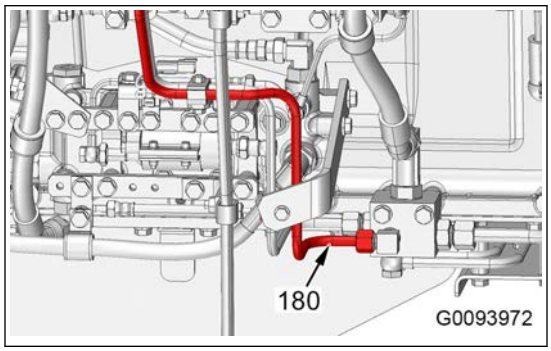
Joint bolt (178): 19.6 to 29.4Nm{2 to 3kgm}

Joint bolt (181): 24.5 to 34.3Nm{2.5 to 3.5kgm}

Tube (180): 43 to 47Nm{4.4 to 4.8kgm}







151. Tighten the 3 bolts (122) to the specified torque.

Tool: Ratchet handle, socket, torque wrench

Bolt (122): Width across flats 17mm, M10

Bolt (122): 59 to 74Nm{6 to 7.5kgm}

152. Tighten the bolt (123) to the specified torque.

Tool: Ratchet handle, socket, torque wrench

Bolt (123): Width across flats 13mm, M8

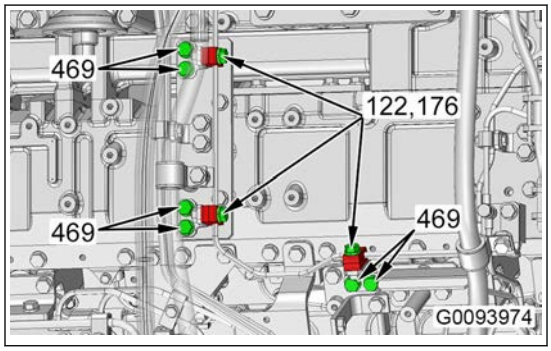
Bolt (123): 27 to 34Nm{2.8 to 3.5kgm}

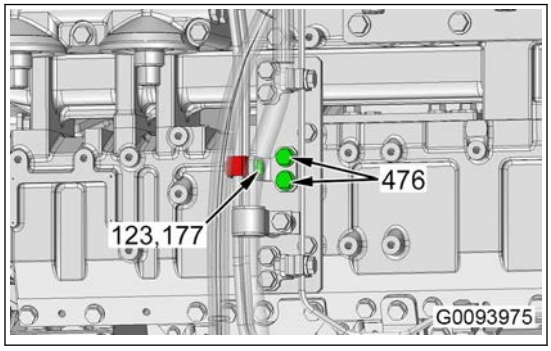
153. Tighten the 6 bolts (469) and 2 bolts (476).

Tool: Ratchet handle, socket, torque wrench

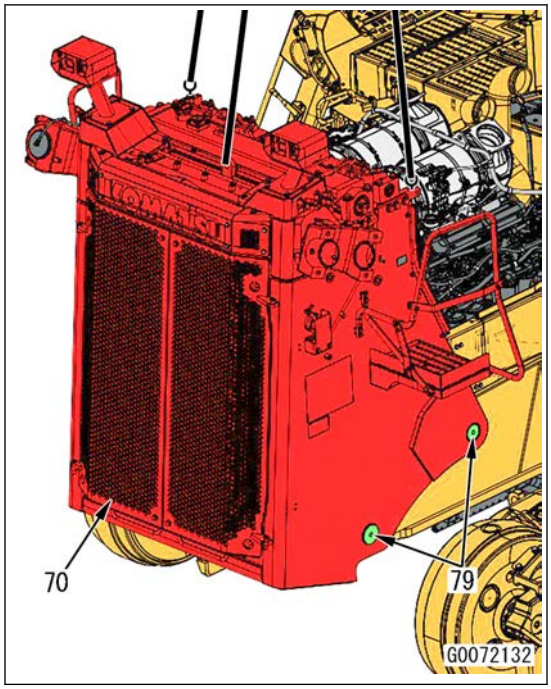
Bolt (469), (476): Width across flats 17mm, M10

Bolt (469), (476): 59 to 74Nm{6 to 7.5kgm}

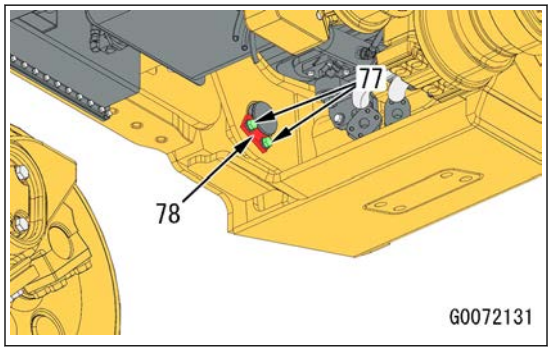




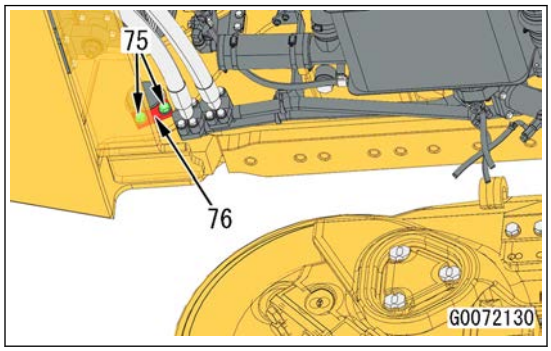
2. Install the radiator guard assembly (70) with the 4 pins (79).



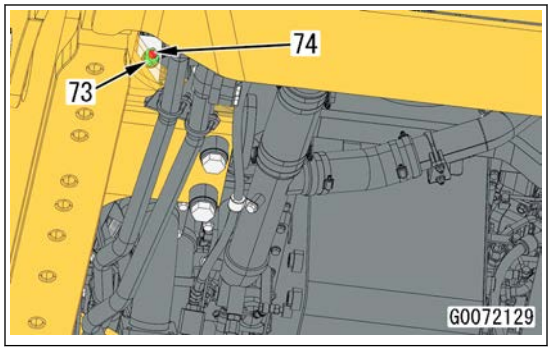
3. Install the plate (78) with the 2 bolts (77).
   Tool: Ratchet handle, socket, torque wrench
   Bolt (77): Width across flats 30 mm, M20
   Bolt (77): 128 to 186 Nm {13.0 to 19.0 kgm}



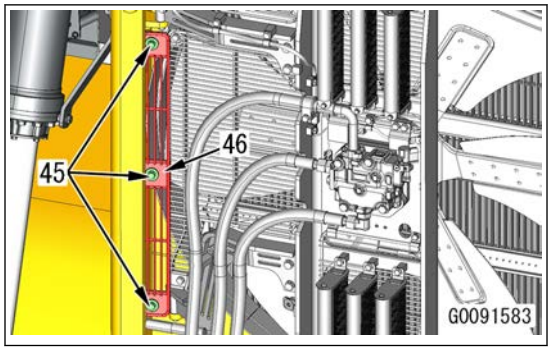
4. Install the plate (76) with the 2 bolts (75).
   Tool: Ratchet handle, socket, torque wrench
   Bolt (75): Width across flats 30 mm, M20
   Bolt (75): 128 to 186 Nm {13.0 to 19.0 kgm}



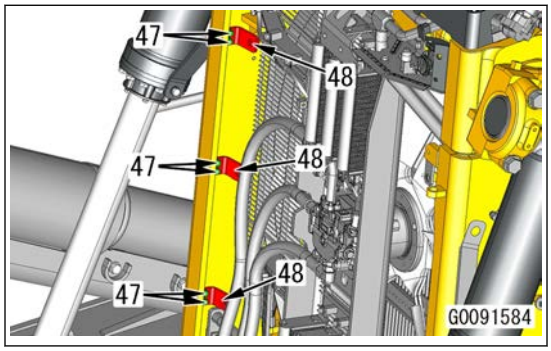
5. Install the bolt (74) with the 2 nuts (73).
   Tool: Ratchet handle, socket, torque wrench
   Nut (73): Width across flats 30 mm
   Nut (73): 490 to 608 Nm {50 to 62 kgm}



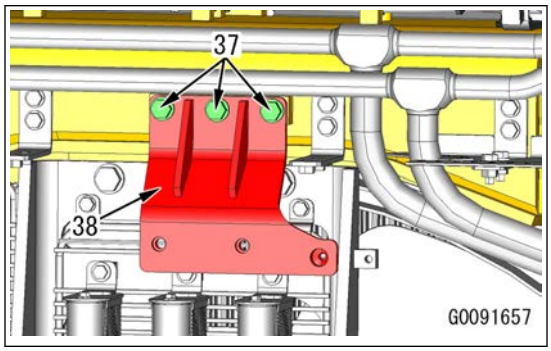
13. Remove the 3 bolts (45), and remove the fixing net (46).
    Tool: Ratchet handle, socket
    Bolt (45): Width across flats 19 mm, M12



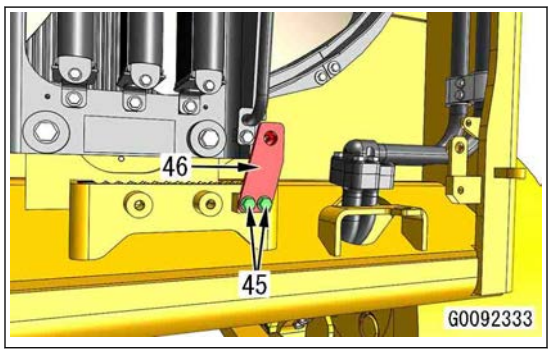
14. Remove the 6 bolts (47), and remove the 3 brackets (48).
    Tool: Ratchet handle, socket
    Bolt (47): Width across flats 19 mm, M12



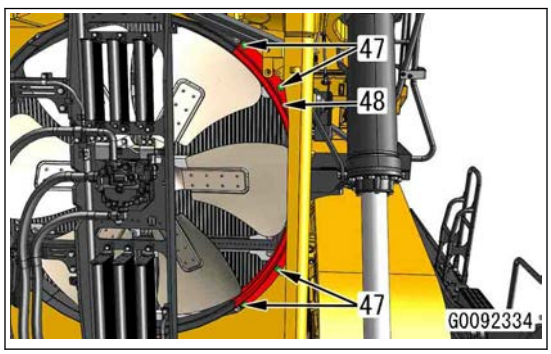
15. Remove the 3 bolts (37), and remove the bracket (38).
    Tool: Ratchet handle, socket
    Bolt (37): Width across flats 19 mm, M12



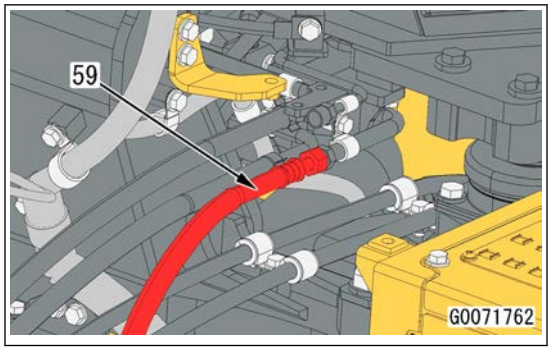
16. Remove the 2 bolts (45), and remove the plate (46).
    Tool: Ratchet handle, socket
    Bolt (45): Width across flats 19 mm, M12



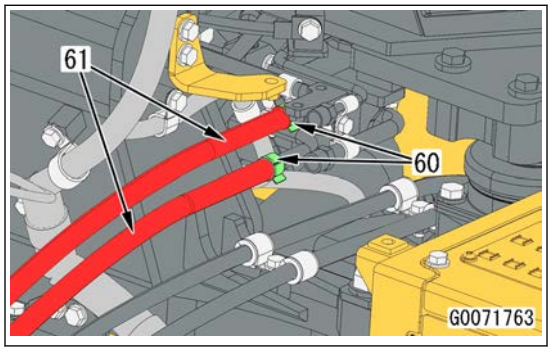
17. Remove the 4 bolts (47), and remove the shroud (48).
    Tool: Ratchet handle, socket
    Bolt (47): Width across flats 19 mm, M12



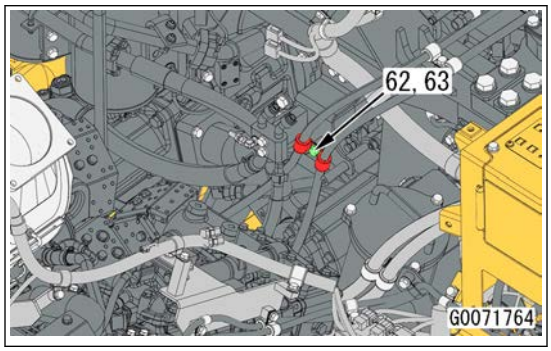
43. Disconnect the hose (59).
Tool: Open-end wrench, plug (D1), cap (D2), O-ring (D3)
Hose (59): Width across flats 27 mm, #04 size



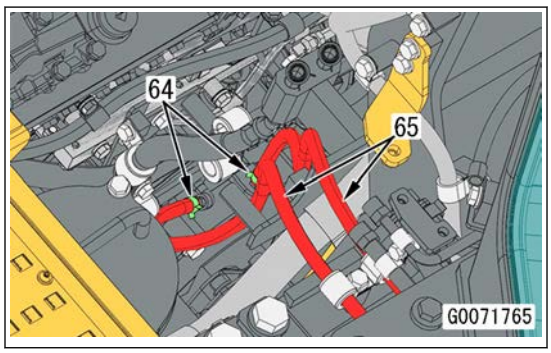
44. Remove the 2 clips (60), and disconnect the 2 hoses (61).
Tool: Needle-nose pliers



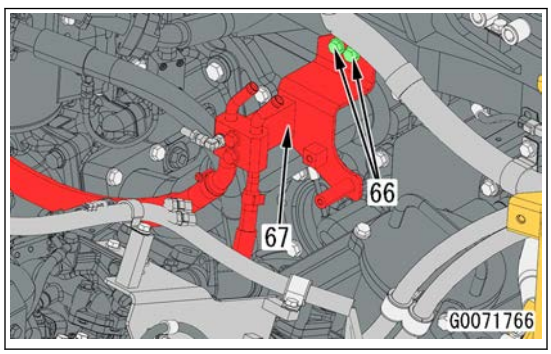
45. Remove the bolt (62), and remove the 2 clamps (63).
Tool: Ratchet handle, socket
Bolt (62): Width across flats 19 mm, M12



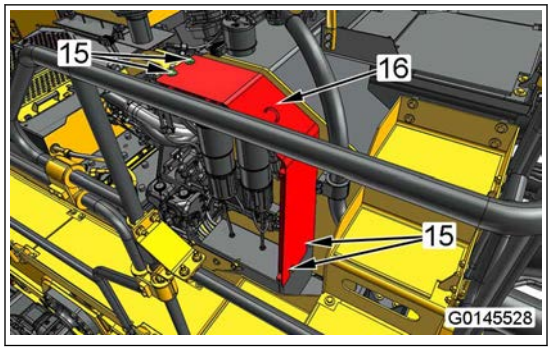
46. Remove the 2 clips (64), and disconnect the 2 hoses (65).
Tool: Needle-nose pliers



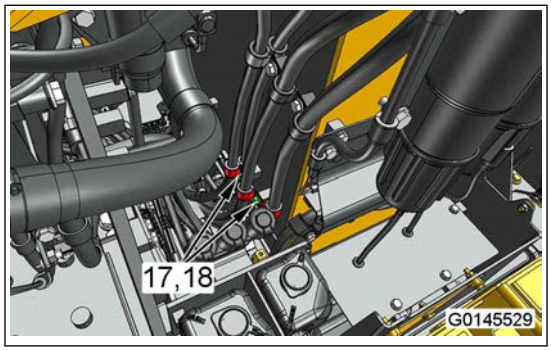
47. Remove the 2 bolts (66), and remove the bracket (67).
Tool: Ratchet handle, socket
Bolt (66): Width across flats 17 mm, M10



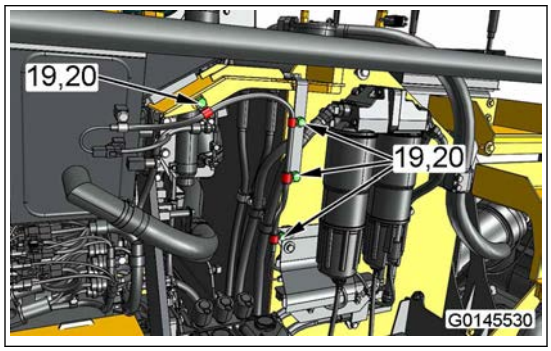
12. Remove the 4 bolts (15), and remove the cover (16).
    Tool: Ratchet handle, socket
    Bolt (15): Width across flats 19 mm, M12



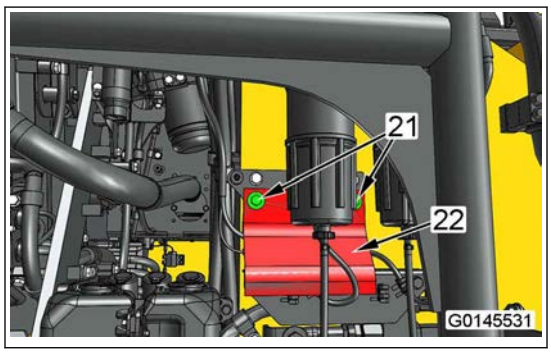
13. Remove the 2 bolts (17), and remove the 4 clamps (18).
    Tool: Ratchet handle, socket
    Bolt (17): Width across flats 19 mm, M12



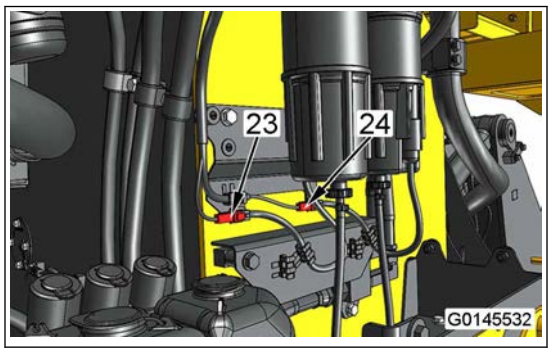
14. Remove the 3 bolts (19), and remove the 3 clamps (20).
    Tool: Ratchet handle, socket
    Bolt (19): Width across flats 19 mm, M12



15. Remove the 2 bolts (21), and remove the cover (22).
    Tool: Ratchet handle, socket
    Bolt (21): Width across flats 19 mm, M12



16. Disconnect the connectors (23) and (24).



19. Tighten the bolts (103) (4 pieces) and nuts (107) (4 pieces) to the specified torque.

REMARK

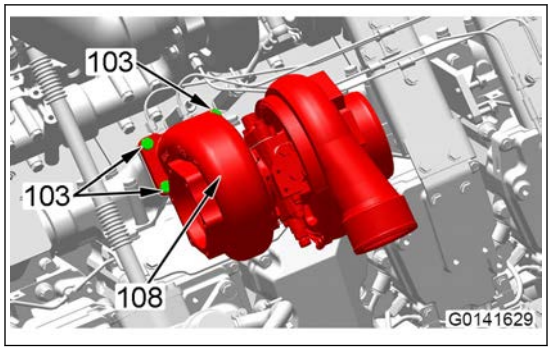
Tighten the bolt (103) and nut (107) as follows.
1st time: (a), (b), (c), (d)
2nd time: (a), (c), (b), (d)

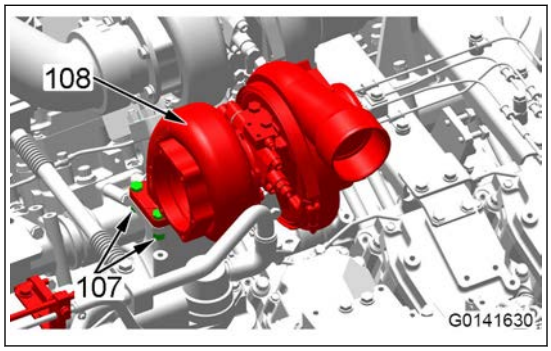
Tool: Ratchet handle, socket, open-end wrench, torque wrench

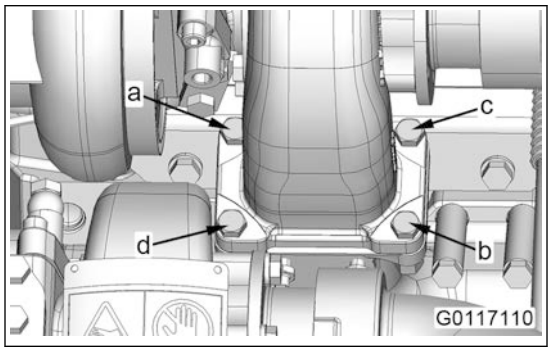
Bolt (103): Width across flats 17 mm, M10

Nut (107): Width across flats 17 mm

Bolt (103), nut (107):
44.1 to 53.9 Nm {4.5 to 5.5 kgfm}







20. Connect the tube (105) with the 2 bolts (104).

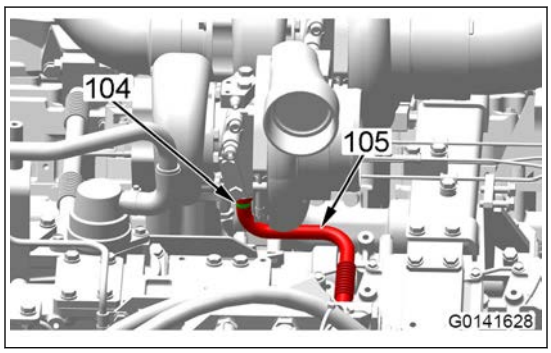
REMARK

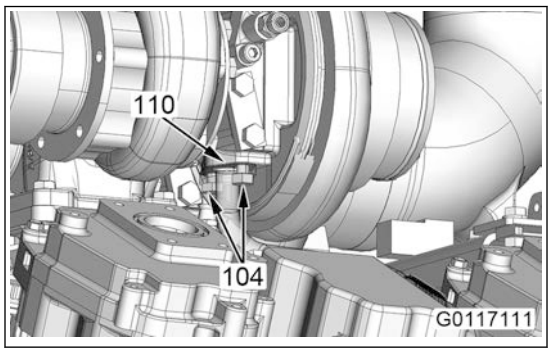
Be sure to install the gasket (110) correctly.

Tool: Ratchet handle, socket, torque wrench

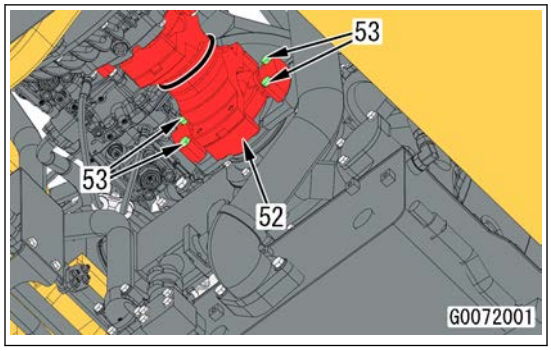
Bolt (104): Width across flats 17 mm, M10

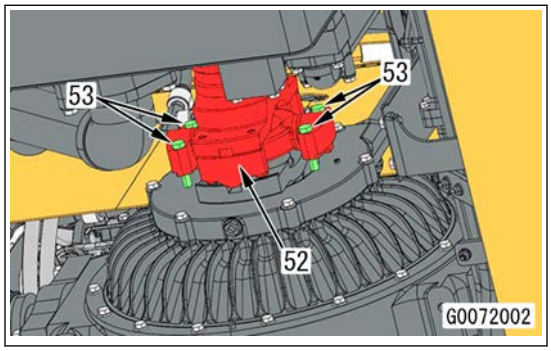
Bolt (104):
59 to 74 Nm {6.0 to 7.5 kgfm}



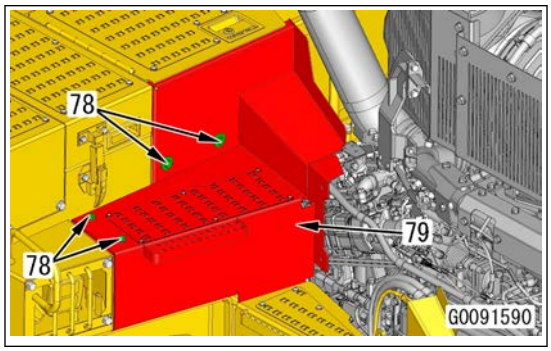


26. Install the universal joint (52) with the 8 bolts (53).
Tool: Ratchet handle, socket, torque wrench
Bolt (53): Width across flats 22 mm, M14
Bolt (53): 54 to 93 Nm {5.5 to 9.5 kgm}

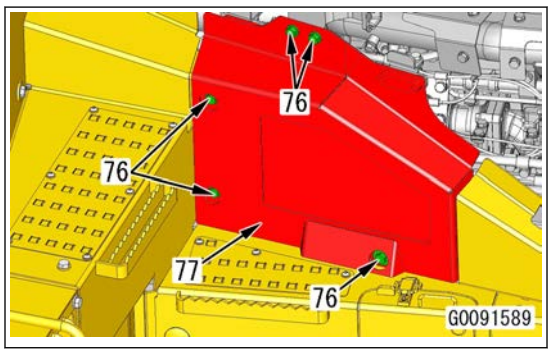




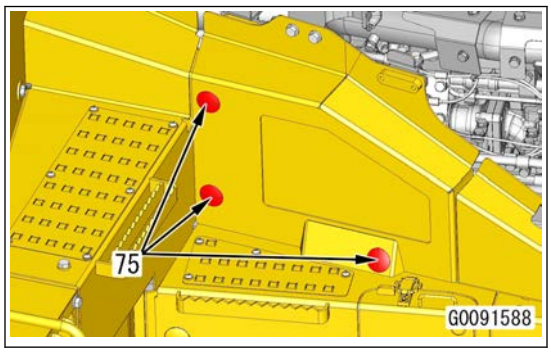
27. Install the cover (79) with the 4 bolts (78).
Tool: Ratchet handle, socket, torque wrench
Bolt (78): Width across flats 19 mm, M12
Bolt (78): 98 to 123 Nm {10.0 to 12.5 kgm}



28. Install the cover (77) with the 5 bolts (76).
Tool: Ratchet handle, socket, torque wrench
Bolt (76): Width across flats 19 mm, M12
Bolt (76): 98 to 123 Nm {10.0 to 12.5 kgm}



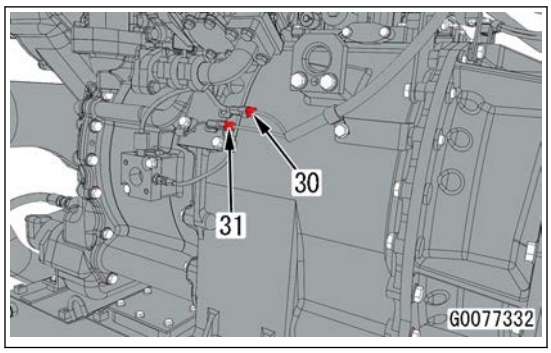
29. Install the 3 caps (75).



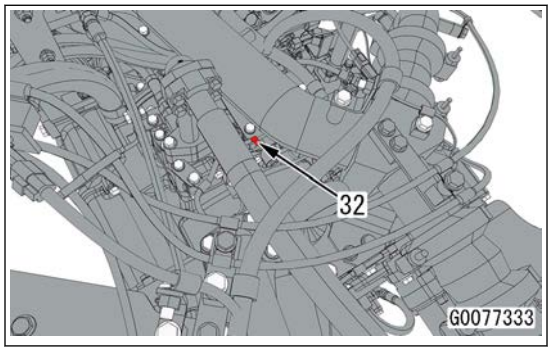
6) Connector TOP (30), 453 (31)

TOP (30): Pressure sensor (torque converter outlet oil pressure)

453 (31): Oil temperature sensor (torque converter oil temperature)



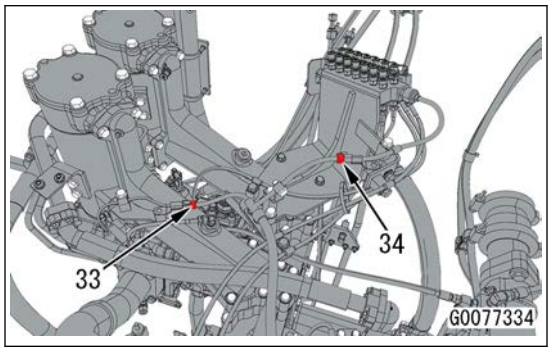
7) Connector TIP (32): Pressure sensor (torque converter inlet oil pressure)



8) Connector PFC (33), TMMD (34)

PFC (33): Clogging sensor (transmission filter)

TMMD (34): Oil pressure sensor (transmission main oil pressure)

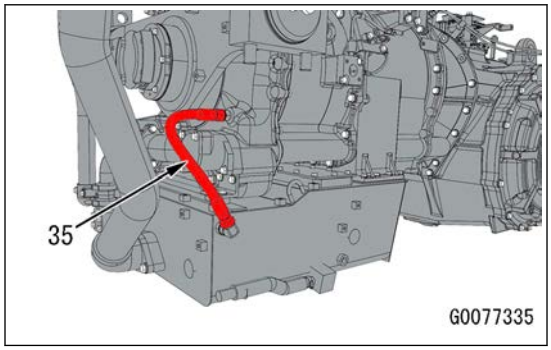


Hose

6. Disconnect the hose (35).

Tool: Open-end wrench, plug (D1), cap (D2), O-ring (D3)

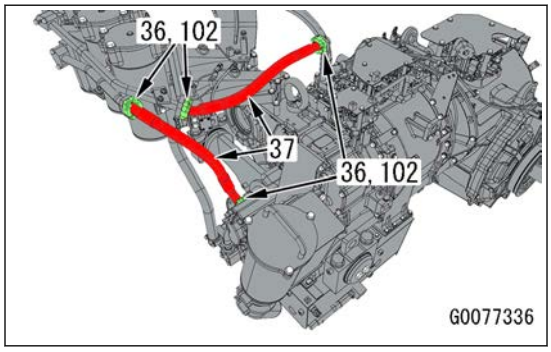
Hose (35): Width across flats 36 mm, #06 size



7. Remove the 16 bolts (36) and 8 flanges (102), and remove the 2 hoses (37).

Tool: Ratchet handle, socket

Bolt (36): Width across flats 17 mm, M10



Symbol	Part No.	Part name	Q'ty	Sketch	Remarks
D	Commercially available	Eyebolt	3		Disassembly and assembly of transmission assembly
E	Commercially available	Forcing screw	1		
F	Commercially available	Eyebolt	2		
G	Commercially available	Chain sling	1		For 2-point sling
H	Commercially available	Forcing screw	1		Disassembly and assembly of transmission assembly
I	Commercially available	Push tool	1		
J	Commercially available	Puller	1		
K	Commercially available	Wire lifting tool	1		For 1-point sling
L	Commercially available	Guide bolt	1		Disassembly and assembly of transmission assembly
M	Commercially available	Support block	1		Assembly of transmission assembly
N	Commercially available	Punch	1		
O	Commercially available	Oil leak tester	1		

How to Disassemble Transmission Assembly

Control valve assembly

1. Set the transmission assembly on the block (A).

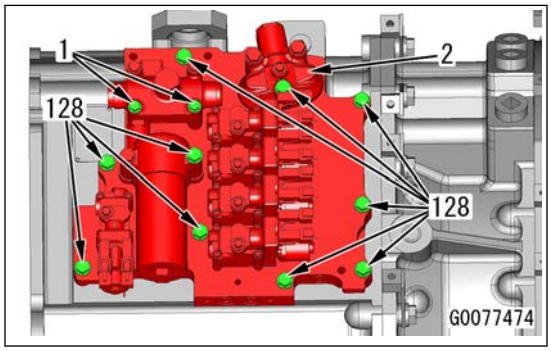
   Tool: Block (A)

2. Remove the 2 bolts (1) and 10 bolts (128), and remove the control valve assembly (2) and seat together.

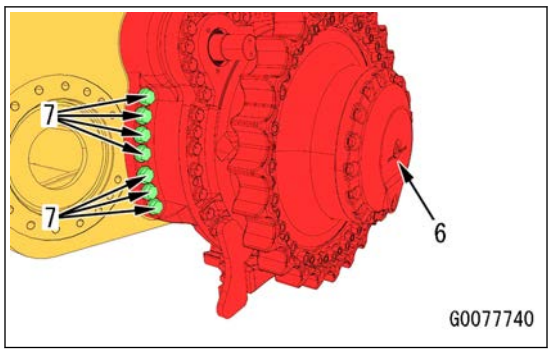
   Tool: Ratchet handle, socket, extension bar

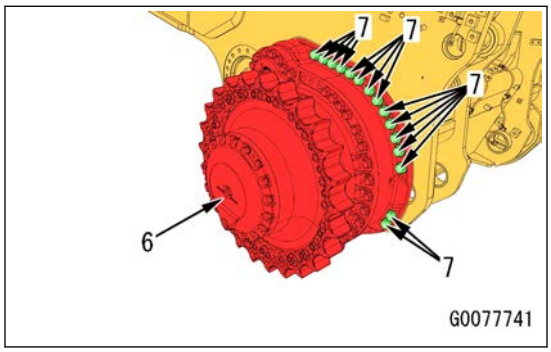
   Bolt (1): Width across flats 13 mm, M8

   Bolt (128): Width across flats 17 mm, M10



12. Remove the 22 bolts (7), and remove the final drive assembly (6).
    Tool: Ratchet handle, socket
    Bolt (7): Width across flats 50 mm, M33



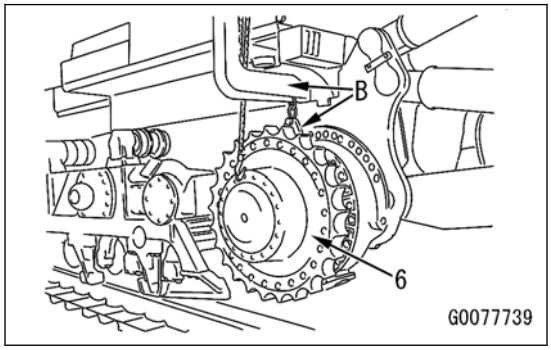


How to Install Final Drive Assembly

Final drive assembly

1. Install the lifting tool (B), lift the final drive assembly (6), and set it to the installation position.
    Tool: Lifting tool (B)

    Final drive assembly (6): 3600 kg

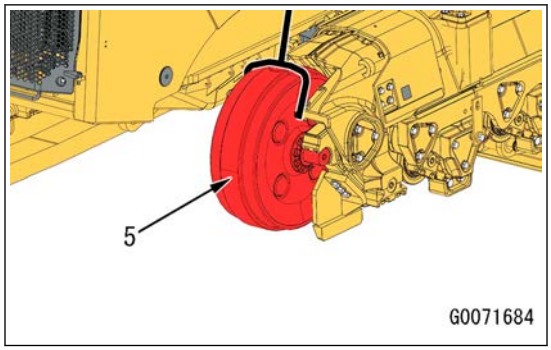


Add oil to the pivot shaft case

24. Tighten the drain plug of the pivot shaft case, and add oil through the oil filler port.

Pivot shaft case: 26 ℓ

8. Remove the idler assembly (5).



How to Install Idler Assembly

Idler assembly

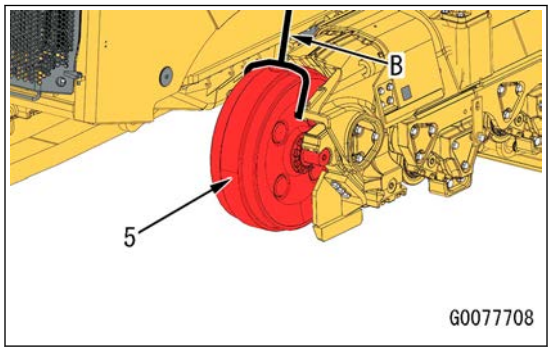
1. Lift the idler assembly (5), and set it to the installation position.

   REMARK

   Install each right and left idler assembly with the oil filler port pulg toward the left side of the machine.

   Tool: Webbing sling (B)

   Idler assembly (5): 720 kg



2. Install the 2 idler caps (7) as follows.
   1) Install the 2 bolts (6) at the (a) side.

      Tool: Ratchet handle, socket, torque wrench

      Bolt (6): Width across flats 50 mm, M33

      Bolt (6): Liquid adhesive (LT-2)

      Bolt (6): 2450 to 2695 Nm {250 to 275 kgm}

   2) Install the 2 bolts (6) at the (b) side.

      Tool: Ratchet handle, socket, torque wrench

      Bolt (6): Width across flats 50 mm, M33

      Bolt (6): Liquid adhesive (LT-2)

      Bolt (6): 2450 to 2695 Nm {250 to 275 kgm}

   3) Tighten the 2 bolts (6) at the (a) side again.

      Tool: Ratchet handle, socket, torque wrench

      Bolt (6): Width across flats 50 mm, M33

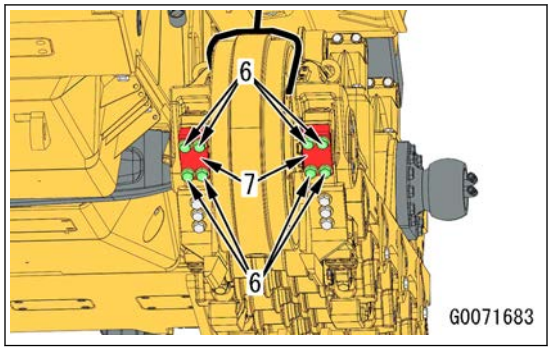
      Bolt (6): 2450 to 2695 Nm {250 to 275 kgm}

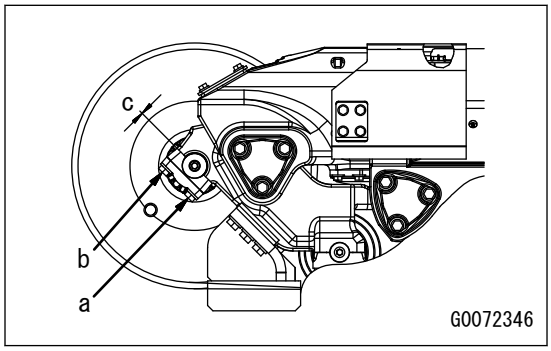
   4) Make sure that the 4 bolts (6) are tightened to the specified torque.

      Tool: Ratchet handle, socket, torque wrench

      Bolt (6): Width across flats 50 mm, M33

      Bolt (6): 2450 to 2695 Nm {250 to 275 kgm}





   5) Make sure that the clearance (c) between the lower side of the idler cap and yoke is 0 mm.

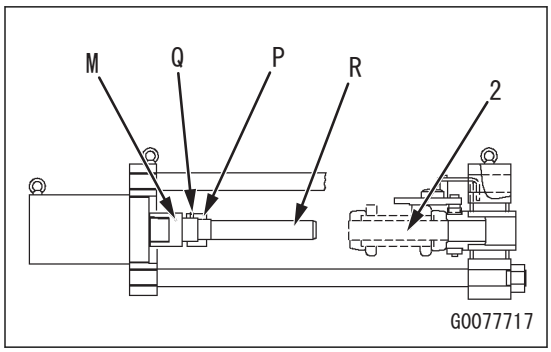
8. Remove the pin (2) as follows.

1) Install the guide (P), screw (Q), and pusher (R) to the adapter (M), and push the pin (2).

REMARK

Push the pin until the cylinder reaches the stroke end.

Tool: Guide (P), screw (Q), pusher (R)

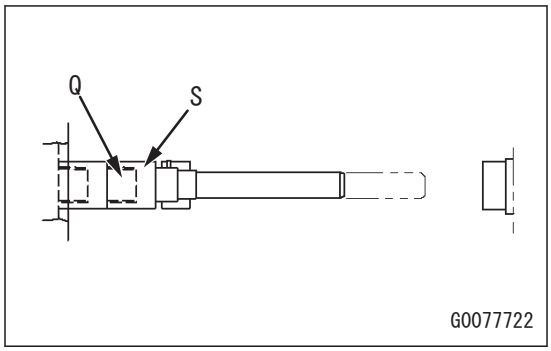


2) Add the screw (Q) and extension (S), and push the pin (2).

REMARK

Push the pin until the cylinder reaches the stroke end.

Tool: Screw (Q), extension (S)

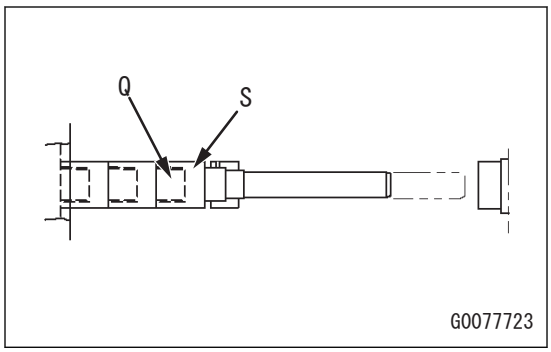


3) Add the screw (Q) and extension (S) again, and push the pin (2).

REMARK

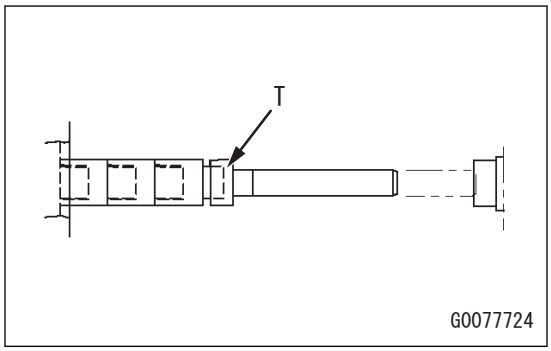
Push the pin until the cylinder reaches the stroke end.

Tool: Screw (Q), extension (S)



4) Remove the guide (P), install the pusher (T), and remove the pin (2).

Tool: Pusher (T)



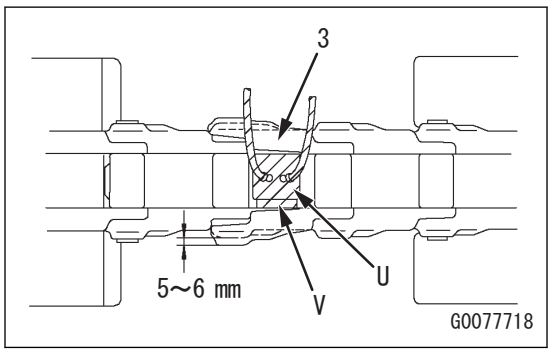
9. Disconnect the link (3) as follows.

1) Install the puller (U) and spacer (V) to the roller tread side of the link (3).

Tool: Puller (U), spacer (V)

2) Install the pump (W), and expand the link (3) by 5 to 6 mm to disconnect it.

Tool: Pump (W)

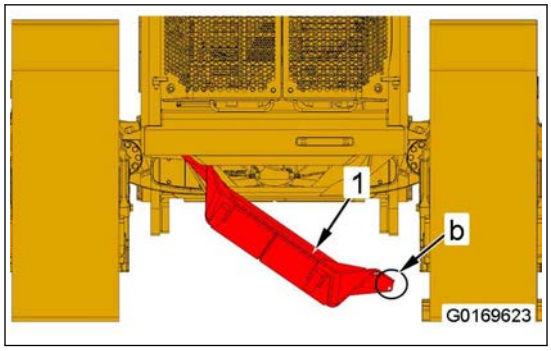


1) Install the shackle (B) and lifting tool (C) to the underguard (1).

Underguard: 340kg

NOTICE

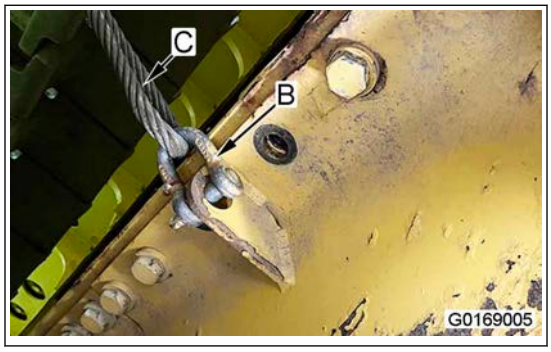
- **It is possible that the weight of the underguard is increased by sediment such as soil and sand.**
  Select the lifting tool to be used in consideration of the weight of the sediment.

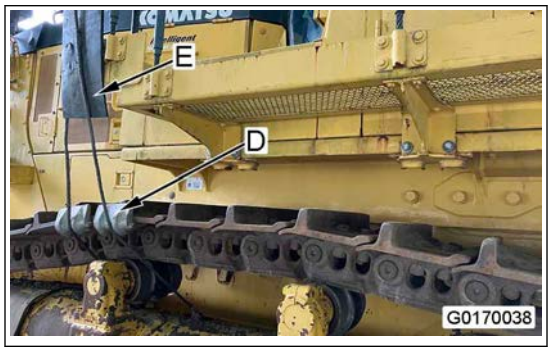


2) Wind up the wire and lift the underguard (1) slowly.

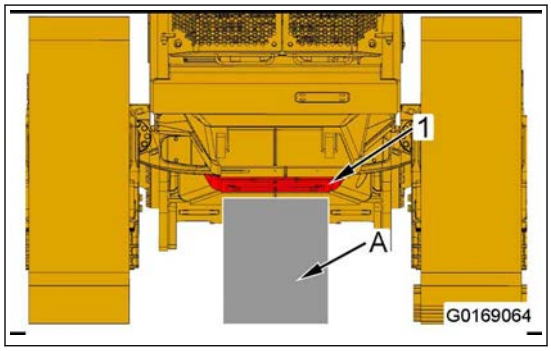
NOTICE

- **Use the corner pad (D) to make sure that a corner of the track does not cause damage to the lifting tool.**
- **If the wire comes in contact with the frame, protect it with sheet (E).**

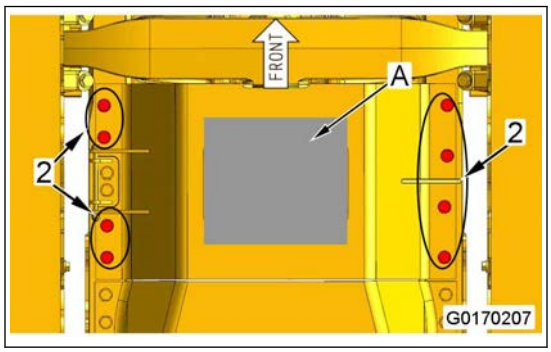




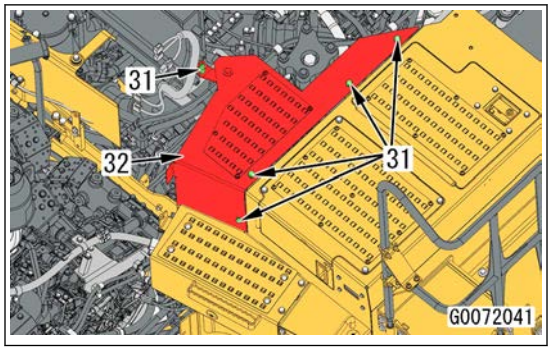
3) Set the heavy object stand or steel block (A) under the underguard (1).



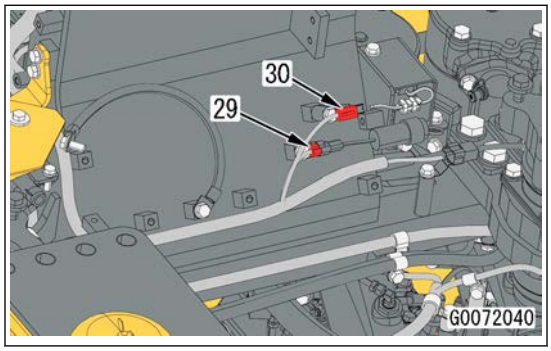
4) Install the 8 bolts (2).



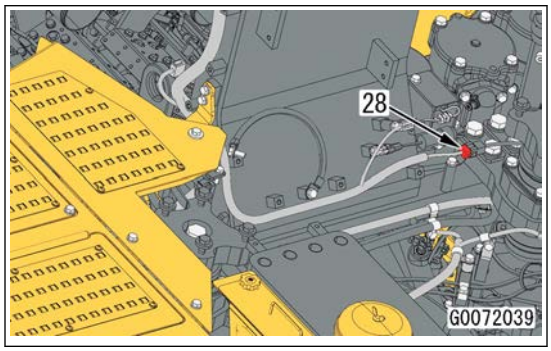
22. Install the cover (32) with the 6 bolts (31).
    Tool: Ratchet handle, socket, torque wrench
    Bolt (31): Width across flats 19 mm, M12
    Bolt (31): 98 to 123 Nm {10.0 to 12.5 kgm}



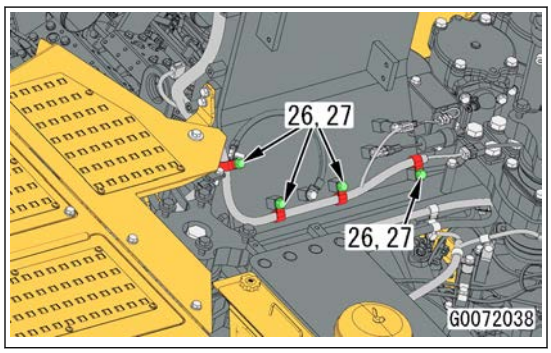
23. Connect the connectors SSA (29) and PT1 (30).



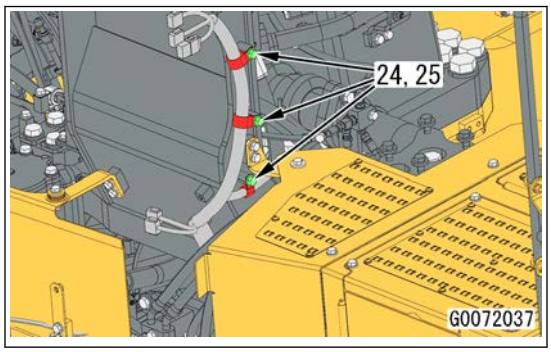
24. Connect the connector IMU1 (28).



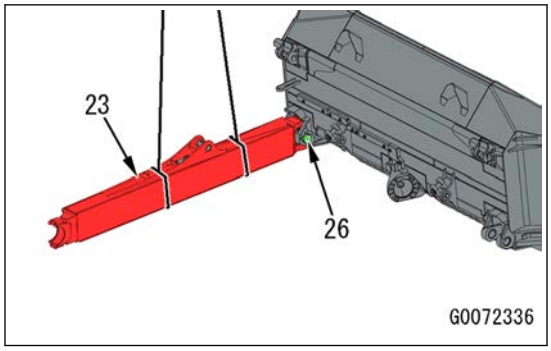
25. Install the 4 clamps (27) with the 4 bolts (26).
    Tool: Ratchet handle, socket, torque wrench
    Bolt (26): Width across flats 19 mm, M12
    Bolt (26): 98 to 123 Nm {10.0 to 12.5 kgm}



26. Install the 3 clamps (25) with the 3 bolts (24).
    Tool: Ratchet handle, socket, torque wrench
    Bolt (24): Width across flats 19 mm, M12
    Bolt (24): 98 to 123 Nm {10.0 to 12.5 kgm}



22. Remove the pin (26), and remove the L.H. straight frame assembly (23).



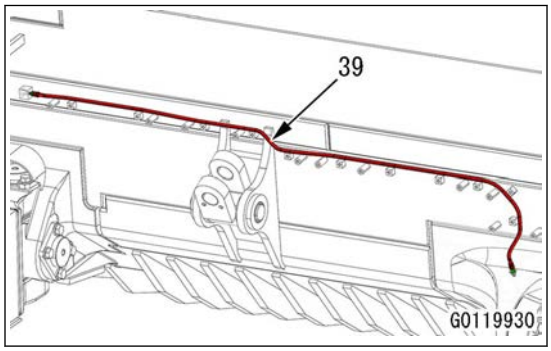
Assemble Blade Assembly (U dozer and Semi-U dozer spec)

Assemble remote lubrication tube

1. Install the lubrication tube (39).

   Tool: Wrench, torque wrench (open-end)

   Tube (39): 13.2 to 16.2Nm{1.3 to 1.7kgfm}



2. Install the 11 clamps (38) with the 11 bolts (37).

   REMARK

   Carefully install the clamps (38) (11 places) to the position that follows.

   To upper side: 9 places

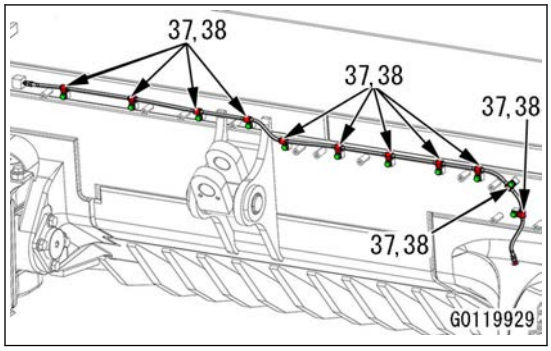
   To lower left side: 1 place

   To right side: 1 place

   Tool: Ratchet handle, socket, torque wrench

   Bolt (37): Width across flats 19mm, M12

   Bolt (37): 98 to 123Nm{10 to 12.5kgfm}



3. Install the cover (36) with the 3 bolts (35).

   Tool: Ratchet handle, socket, torque wrench

   Bolt (35): Width across flats 19mm, M12

   Bolt (35): 98 to 123Nm{10 to 12.5kgfm}

4. Install the cover (34) with the 2 bolts (33).

   Tool: Ratchet handle, socket, torque wrench

   Bolt (33): Width across flats 19mm, M12

   Bolt (33): 98 to 123Nm{10 to 12.5kgfm}

5. Install the cover (32) with the 2 bolts (31).

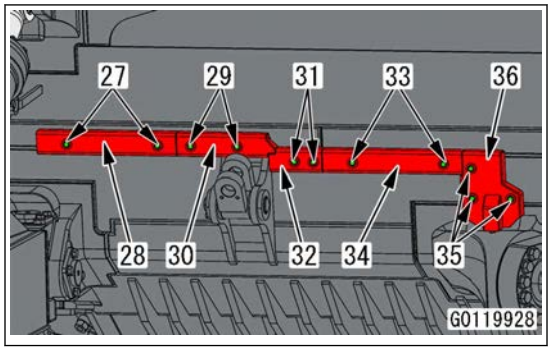
   Tool: Ratchet handle, socket, torque wrench

   Bolt (31): Width across flats 19mm, M12

   Bolt (31): 98 to 123Nm{10 to 12.5kgfm}

6. Install the cover (30) with the 2 bolts (29).

   Tool: Ratchet handle, socket, torque wrench



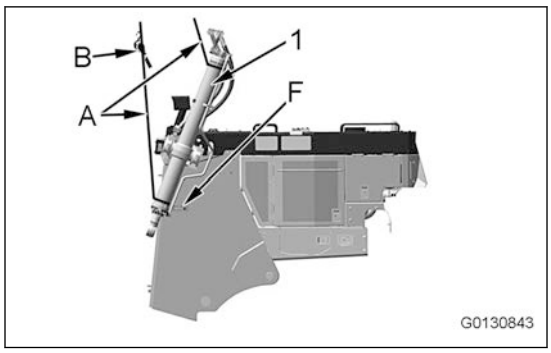
6. Lift the blade lift cylinder assembly (1), and set it to the installation position.

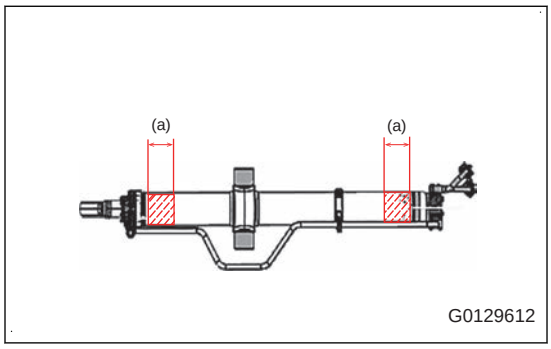
NOTICE

- **Lift it at the lifting points (a). (a)= Approx. 300mm**
- **Set the lever block (B) at the one side of the webbing sling (A) to adjust the angle.**

Tool: Webbing sling (A), lever block (B)

Blade lift cylinder assembly (1): 550 kg

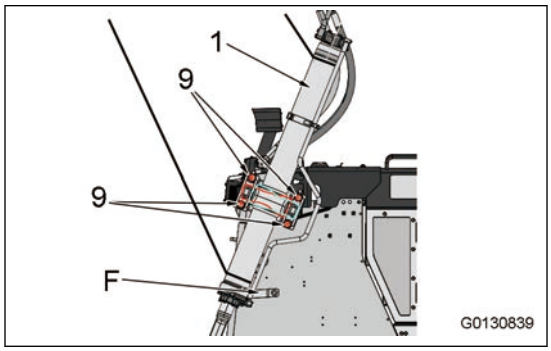


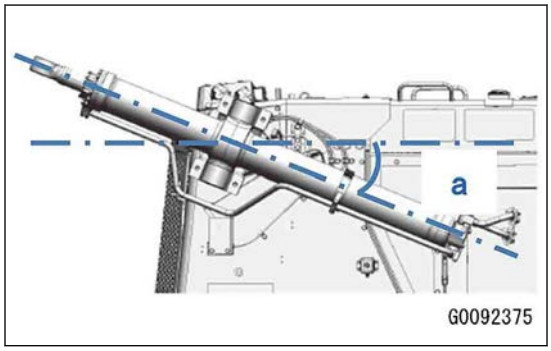


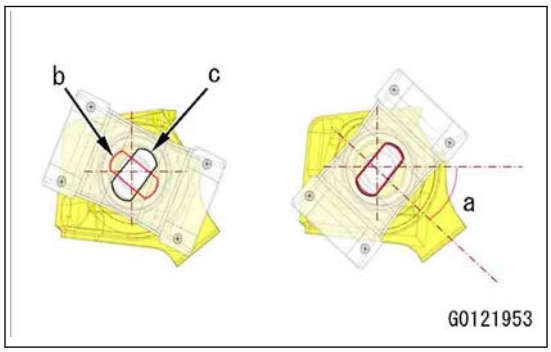
7. Install the blade lift cylinder assembly (1) with the 4 bolts (9).

NOTICE

- **Do not rotate the blade lift cylinder assembly (1) to the angle above the horizontal. If the angle becomes (a) shown in the figure, there is a danger that the yoke is removed from the radiator guard.**
- **Angle (a): 28±5°**
- **(b) and (c) in the figure show the parts with the key structure.**
- **(b): Line of yoke**
- **(c): Line of radiator guard**







CAB Related Parts

Remove and Install ROPS Guard

Standard tools to be used when you remove and install the ROPS guard

The listed parts are for reference only. You can use the part that is not listed if it is applicable.

No.	Part name	Specifications	Q'ty	Remarks
1	Socket	50 mm	1	
3	Ratchet handle		1	
5	Torque wrench		1	

Special Tools to be Used When You Remove and Install the ROPS Guard

Sym-bol	Part No.	Part name	Q'ty	Sketch	Remarks
A	Commercially available	Webbing sling	2		Width 50 mm x length 10 m

Obey the items that follow when you make the machine stable.

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

⚠ Set the parking brake switch to the LOCK position.

⚠ Set the work equipment lock switch to the LOCK position.

Obey the items that follow when you stop the engine.

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

⚠ Make sure that the system operating lamp is not lit, and set the battery isolator switch to the OFF position.

REMARK

For details, see Testing and Adjusting, “Handle Battery Isolator and Starting Motor Isolator”.

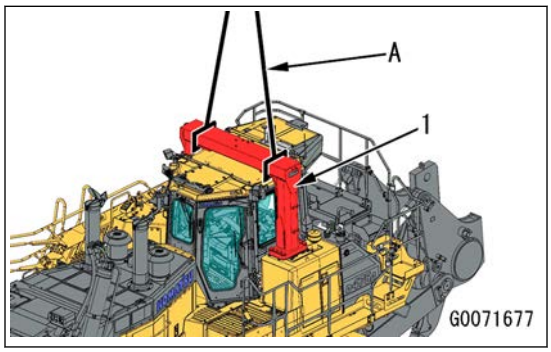
Remove ROPS Guard

ROPS guard

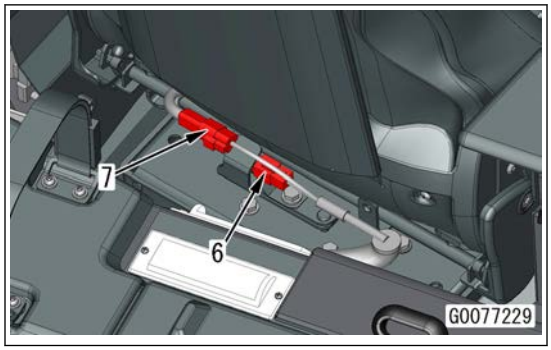
1. Lift the ROPS guard (1), and hold it.

   Tool: Webbing sling (A)

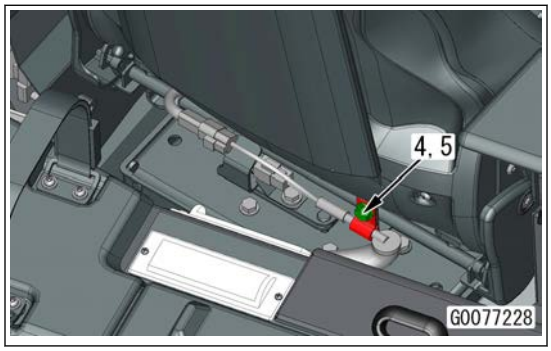
   ROPS guard (1): 770 kg



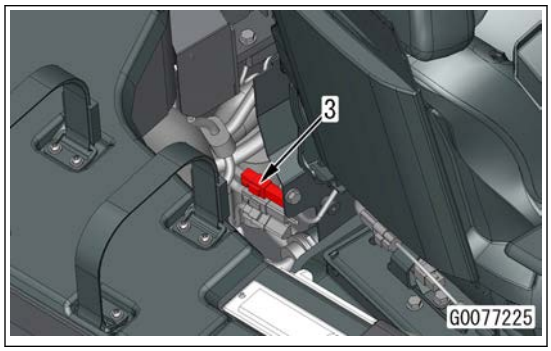
4. Connect the connectors OPS1 (6) and HEAT2 (7).



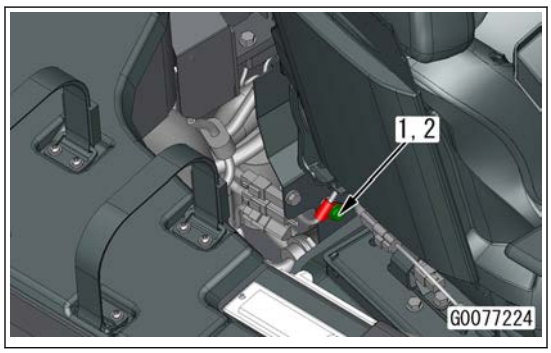
5. Install the clamp (5) with the bolt (4).
   Tool: Ratchet handle, socket, torque wrench
   Bolt (4): Width across flats 13 mm, M8
   Bolt (4): 27 to 34 Nm {2.8 to 3.5 kgm}



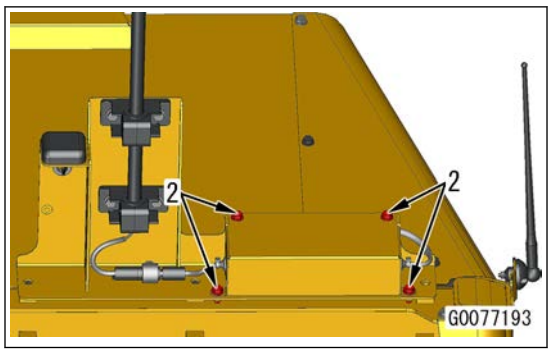
6. Connect the connector SBC (3).



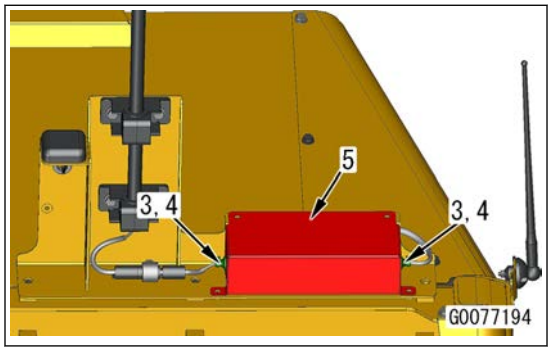
7. Install the clamp (2) with the bolt (1).
   Tool: Ratchet handle, socket, torque wrench
   Bolt (1): Width across flats 13 mm, M8
   Bolt (1): 27 to 34 Nm {2.8 to 3.5 kgm}



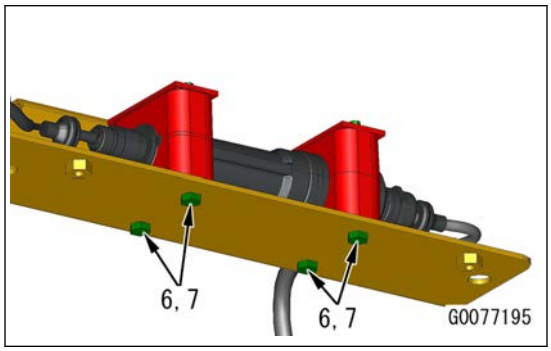
2. Remove the 4 bolts (2).
   Tool: Ratchet handle, socket
   Bolt (2): Width across flats 13 mm, M8



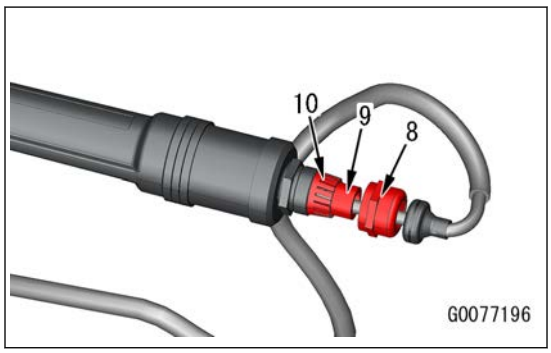
3. Remove the 2 bands (3) and 2 grommets (4), and remove the cover (5).
   Tool: Diagonal pliers



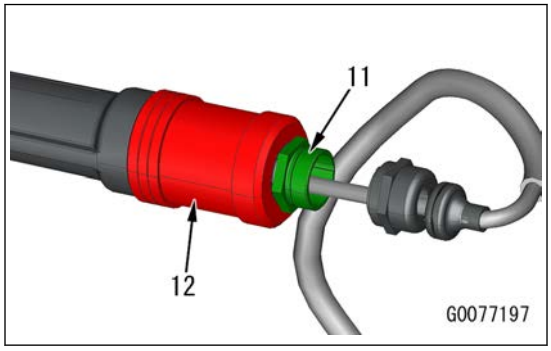
4. Remove the 4 bolts (6), and remove the 2 clamps (7).
   Tool: Ratchet handle, socket
   Bolt (6): Width across flats 7/16 inch (11.1 mm), 1/4 inch (6.35 mm)



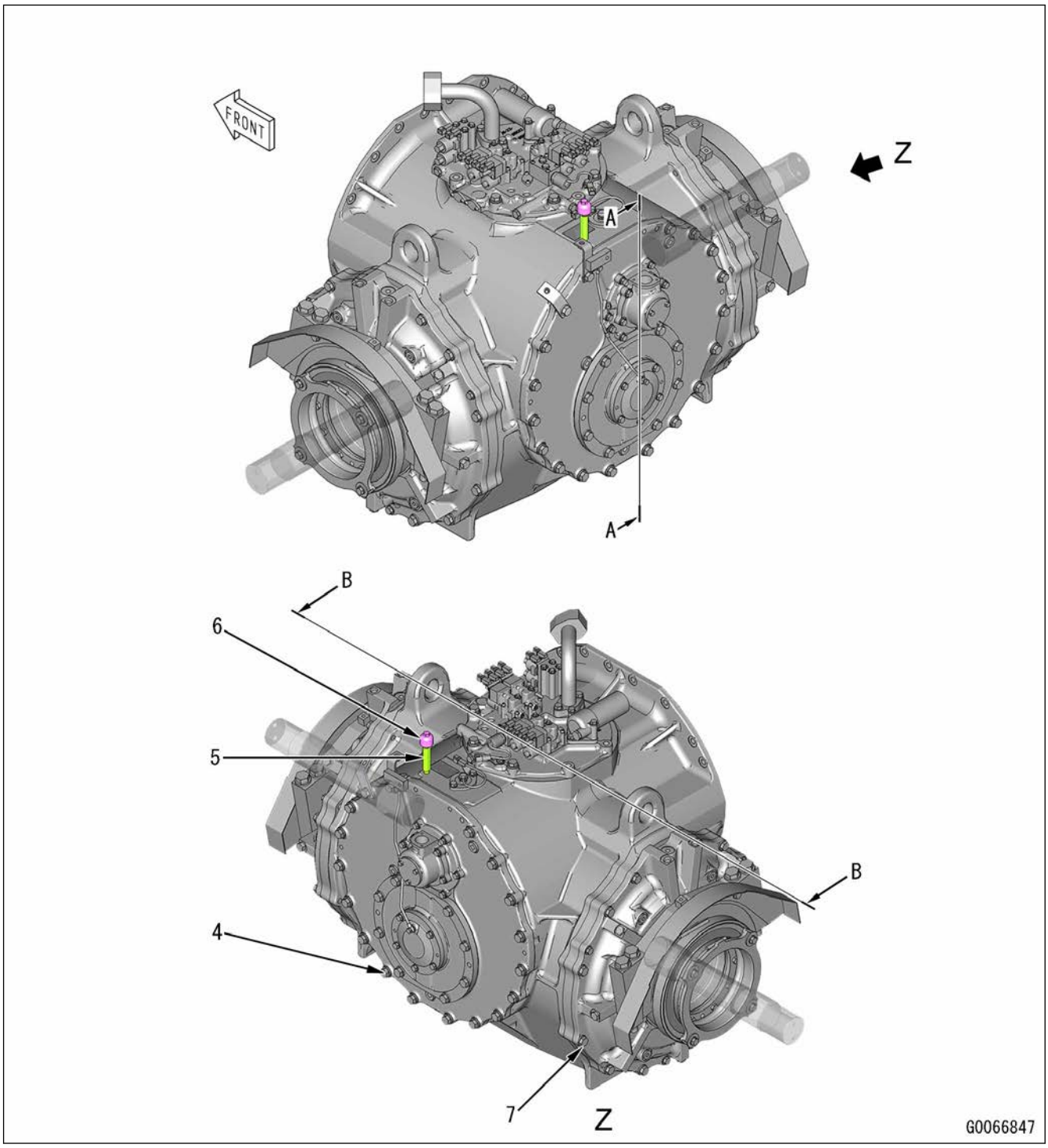
5. Remove the cap nut (8), and remove the bushing (9) and insert (10).
   Tool: Open-end wrench
   Cap nut (8): Width across flats 24 mm



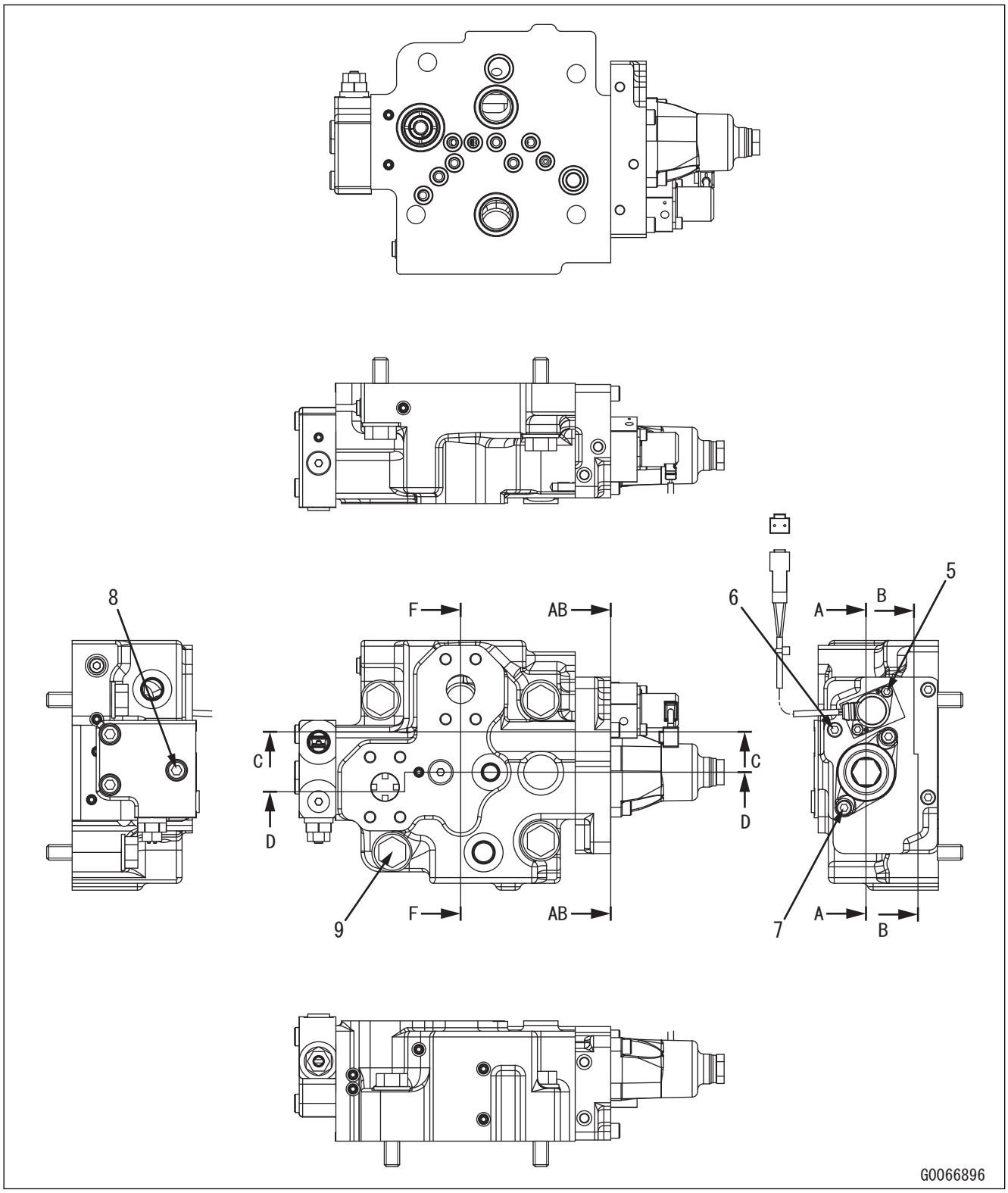
6. Remove the nut (11), and remove the end cap (12).
   NOTICE
   Remove the cap nut, bushing, and insert before you remove the nut and end cap. If it is removed by force in the incorrect procedure, the parts can be damaged.
   Tool: Open-end wrench
   Nut (11): Width across flats 24 mm



Maintenance Standard for Transfer, Bevel Gear Shaft, and Steering



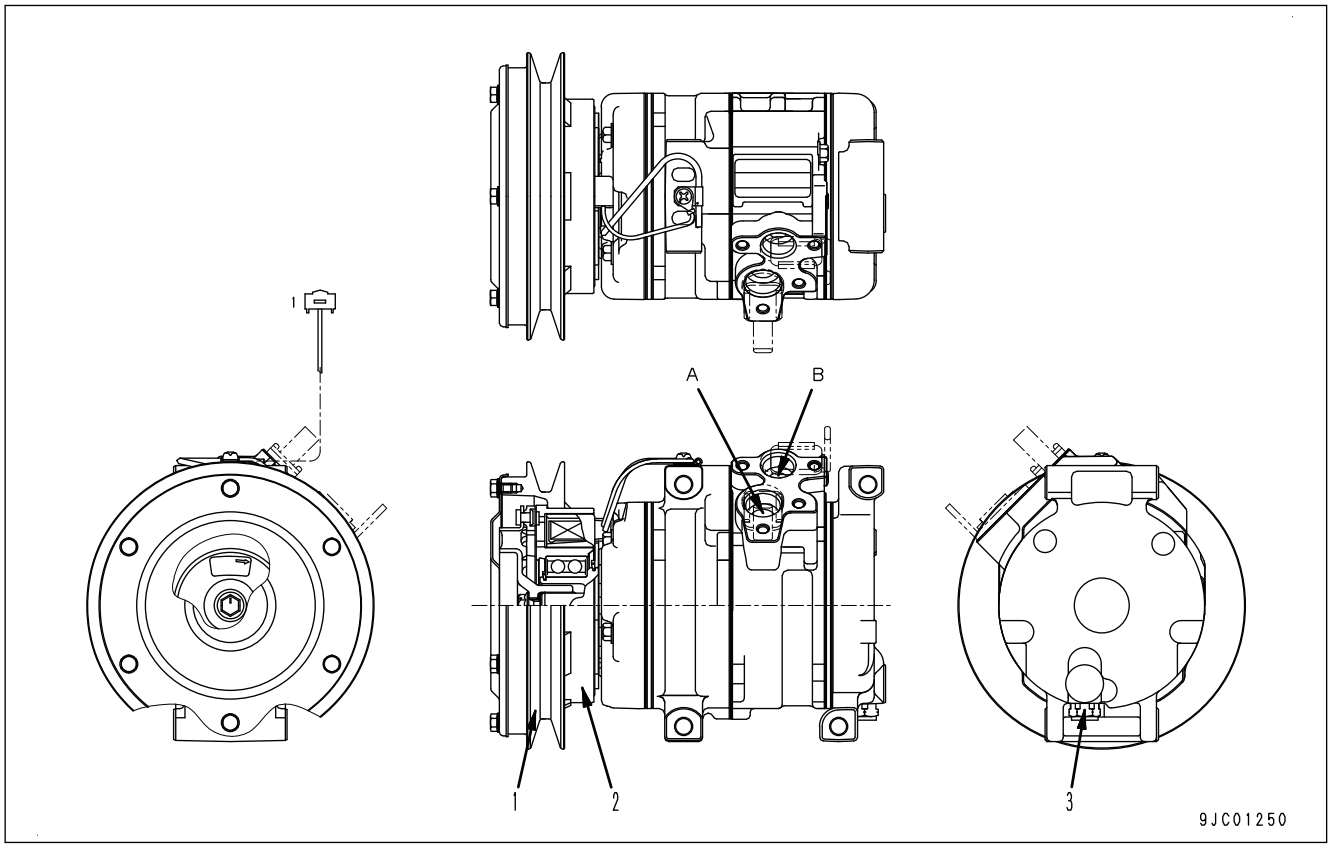
Maintenance Standard for Self-Pressure Reducing Valve



Compressor

Structure of Compressor

General View



A: Refrigerant inlet (from air conditioner unit)
B: Refrigerant outlet (to condenser)
1: Pulley
3: Relief valve
2: Magnetic clutch

Specifications of Compressor

Number of cylinders - Cylinder bore x Stroke: : 10 - 32x20.8 mm

Delivery: : 157.3 cc/rev

Allowable max. speed: : 6000 rpm

Compressor oil: DENSO: ND-OIL8 (for R134a)

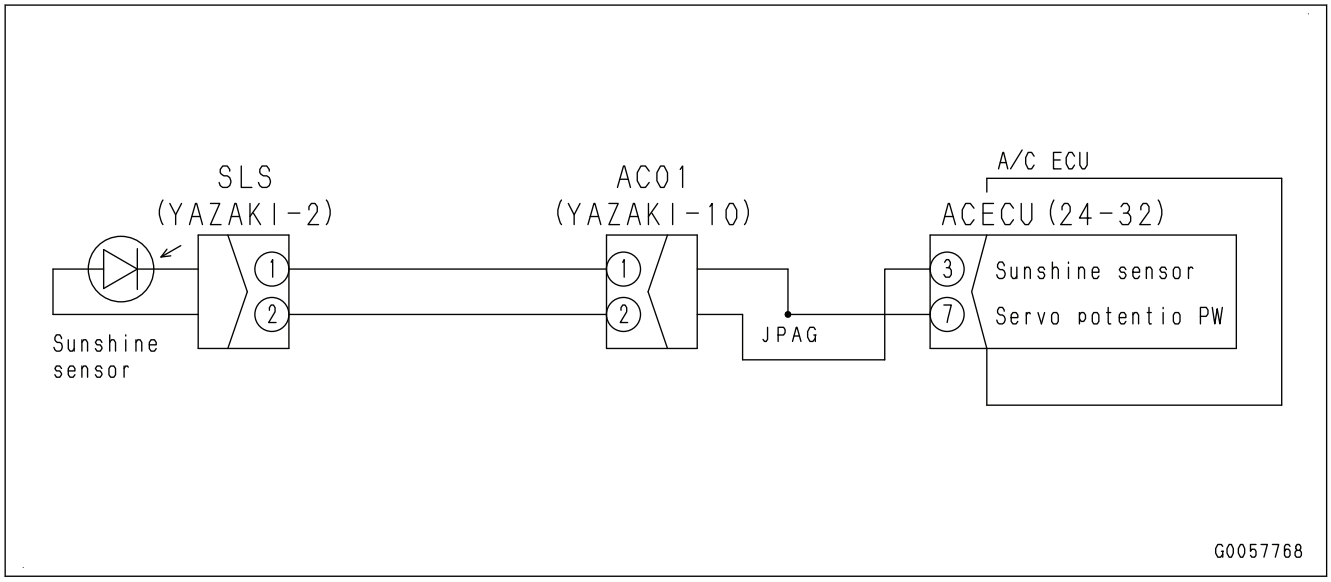
Compressor oil quantity: : 180 cc

Function of Compressor

- The compressor circulates the refrigerant and compresses the gaseous refrigerant from the evaporator into a misty refrigerant at high pressure and high temperature so that it is easily regenerated (liquefied) at the normal temperature.
- The air conditioner controller operates magnetic clutch (2) inside the compressor, according to the evaporator temperature and refrigerant pressure.
- When magnetic clutch (2) is engaged, the compressor shaft is turned together with pulley (1) by the engine power, and the compressor is driven.

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
5	Confirmation of check results	1. Do the troubleshooting above again. 2. Can you find the cause by the check?	YES	The repair is completed.
			NO	• The air conditioner unit can be defective. • Replace the air conditioner unit. • Go to “Confirmation of repair”.
6	Confirmation of repair	1. Turn the starting switch to the OFF position. 2. Connect all the component parts. 3. Turn the starting switch to the ON position. 4. Check the abnormality record. 5. Is “E” shown in the abnormality record of this failure code?	YES	Go back to the first check item.
			NO	The repair is completed.

Circuit Diagram of Sunlight Sensor



How to Read the Codes for Electric Cable

In the electric circuit diagram, the type, size and color of electric wires are shown by symbols. This symbol is called a electric wire cord and it is useful for understanding the electric circuit diagram.

Example) AEX 0.85 L: It shows the blue cable with the electrical wire number 0.85 for heat resistant low voltage electric wire for automobiles.

AEX	The type of electric wire is shown by a symbol. The types, symbols and materials of the wires are as shown in (Table 1). (For AV and AVS, it can be distinguished by size (electrical wire number), so they are not shown on the electric circuit diagram)
0.85	The wire size are shown by the electrical wire number. The wire size and electrical wire number are as shown in (Table 2).
L	The color of electric wire is shown by color code. Color codes are as shown in (Table 3).

Type, Symbol, and Material

(Table 1)

Type	symbol	Conductor materials	Insulator materials	Operating temperature range (℃)	Application example
Low voltage electric wire for automobiles	AV	Annealed copper wires for electrical purposes	Soft vinyl chloride	-30 to +60	For high current wiring (electrical wire number 5 or more)
Thin low voltage electric wire for automobiles (Type 1)	AVS				For general wiring (electrical wire number 3 or less)
Thin low voltage electric wire for automobiles (Type 2)	CAVS				For medium and small excavators (electrical wire number 1.25 or less)
Heat resistant low voltage electric wire	AEX		Heat resistant crosslinked polyethylene	-50 to +110	For general wiring of extreme cold weather specification For wiring for high ambient temperature

- The difference between AV and AVS is only the coating thickness and the coating outside diameter.
- CAVS uses a circular compression conductor for the conductor.
- CAVS is different from AV and AVS in conductor outside diameter and coating thickness.
- AEX is different from AV and AVS in coating material.