UENBM00360

Shop Manual

HYDRAULIC
EXCAVATOR

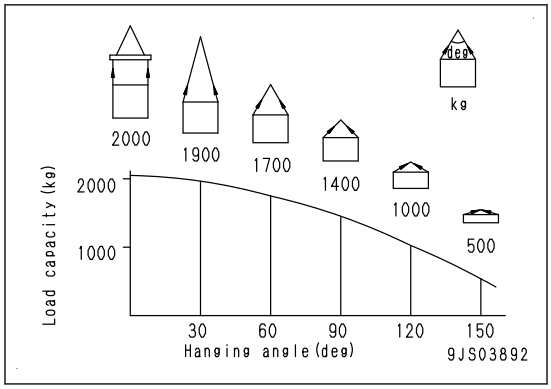
PC210 -11
PC210LC -11

SERIAL NUMBERS 500007 and up
K70001 and up

KOMATSU

REMARK

When slinging a load with 2 or more ropes, the force subjected to each rope increases with the hanging angle. The figure below shows the variation of allowable load in kN {kg} when slinging is made with 2 ropes, each of which is allowed to sling up to 9.8 kN {1000 kg} vertically, at various hanging angles. When the 2 ropes sling a load vertically, they can sling up to 2000 kg of total weight. This weight is reduced to 1000 kg when the 2 ropes make a hanging angle of 120 °. If the 2 ropes sling a 2000 kg load at a hanging angle of 150 °, each rope is subjected to a force as large as 39.2 kN {4000 kg} .



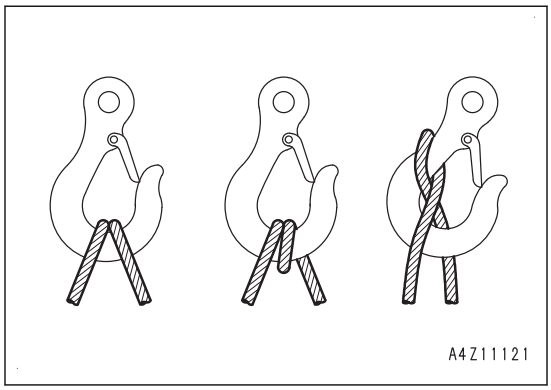
- When installing wire ropes to an angular load, apply pads to protect the wire ropes. If the load is slippery, apply proper material to prevent the wire rope from slipping.
- Use the specified eye bolts and fix wire ropes, chains, etc. to them with shackles, etc.
- Apply wire ropes to the middle part of the hook.

  ⚠ Do not use hooks if it does not have a latch system.

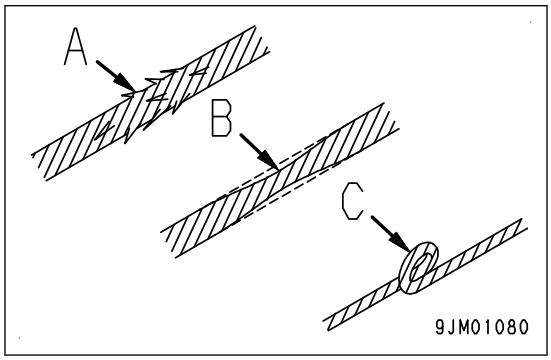
  ⚠ Slinging near the tip of the hook may cause the rope to slip off the hook during hoisting.

  REMARK

  The strength of the hook is maximum at its central part.



- Never use a wire rope which has breaks in strands (A), reduced diameter (B), or kinks (C). There is a danger that the rope may break during the towing operation.



Precautions for slinging up

- Wind in the crane slowly until wire ropes are stretched. When settling the wire ropes with the hand, do not grasp them but press them from above. If you grasp them, your fingers may be caught.
- After the wire ropes are stretched, stop the crane and check the condition of the slung load, wire ropes, and pads.
- If the load is unstable or the wire rope or chains are twisted, lower the load and lift it up again.
- Do not lift up the load at an angle.

Precautions for slinging down

- When slinging down a load, stop it temporarily at 30 cm above the floor, and then lower it slowly.
- Check that the load is stable, and then remove the sling.
- Remove kinks and dirt from the wire ropes and chains used for the sling work, and put them in the specified place.

Precautions for using mobile crane

REMARK

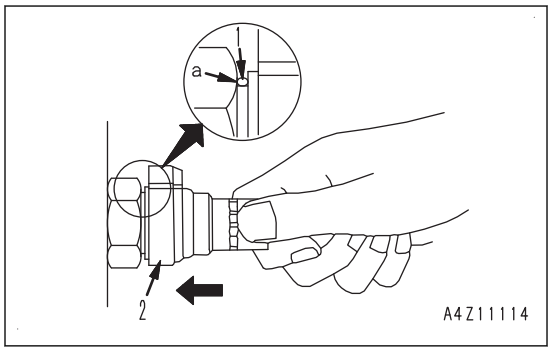
Read Operation and Maintenance Manual of the crane carefully in advance and operate the crane safely.

Precautions for using overhead traveling crane

⚠ When raising a heavy component (heavier than 25 kg), use a hoist or crane.

Connection

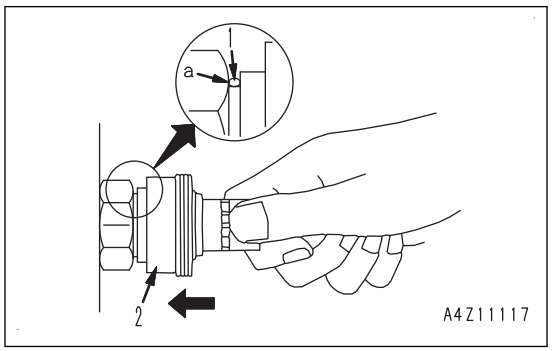
Hold the tightening adapter part, and push body (2) straight until sliding prevention ring (1) contacts contact surface (a) of the hexagonal part at the male end.



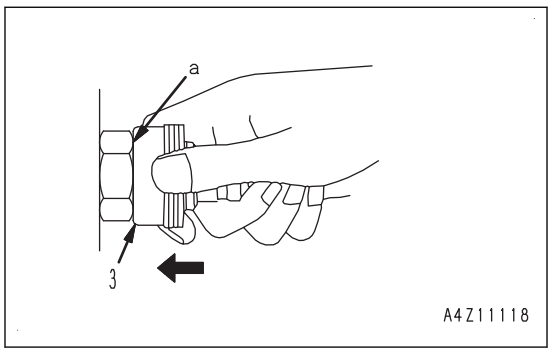
METHOD FOR DISCONNECTING AND CONNECTING TYPE 3 PUSH-PULL TYPE COUPLER

Disconnection

1. Hold the tightening adapter part and push body (2) straight until sliding prevention ring (1) contacts contact surface (a) of the hexagonal part at the male end.



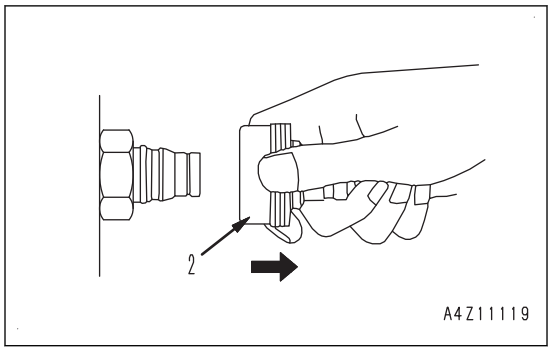
2. While keeping the condition of step 1, push cover (3) straight until it contacts contact surface (a) of the hexagonal portion on the male side.

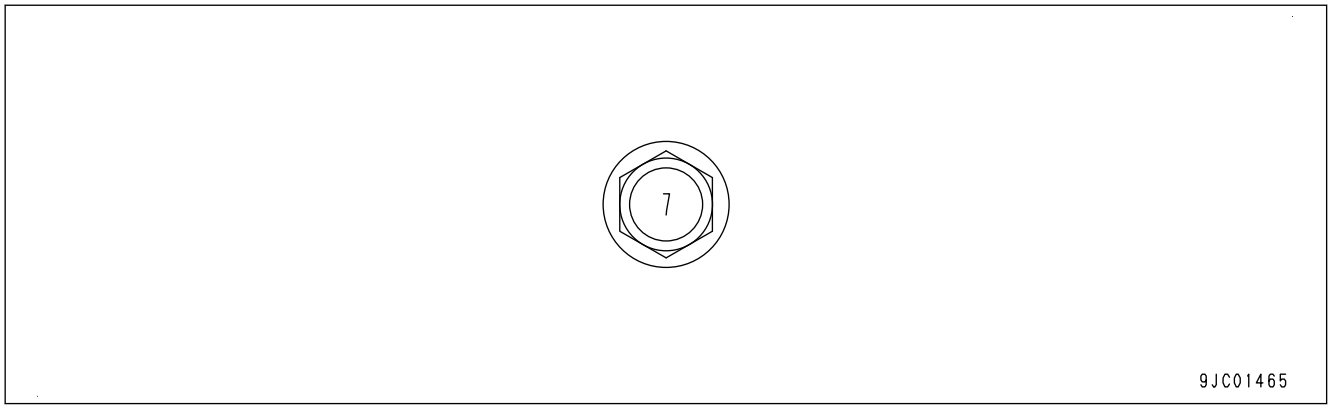


3. While keeping the conditions of steps 1 and 2, pull out whole body (2) to disconnect it.

   REMARK

   Provide an container to receive a quantity of hydraulic oil which may flow out.

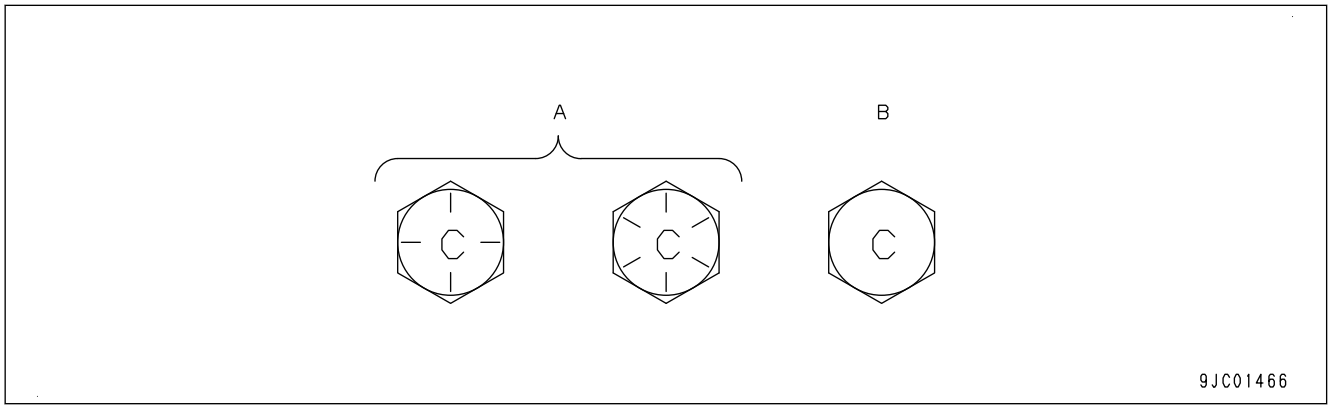




Thread diameter (mm)	Width across flats (mm)	Tightening torque (Nm { kgm})
6	10	5.9 to 9.8 {0.6 to 1.0}
8	12	13.7 to 23.5 {1.4 to 2.4}
10	14	34.3 to 46.1 {3.5 to 4.7}
12	17	74.5 to 90.2 {7.6 to 9.2}

REMARK

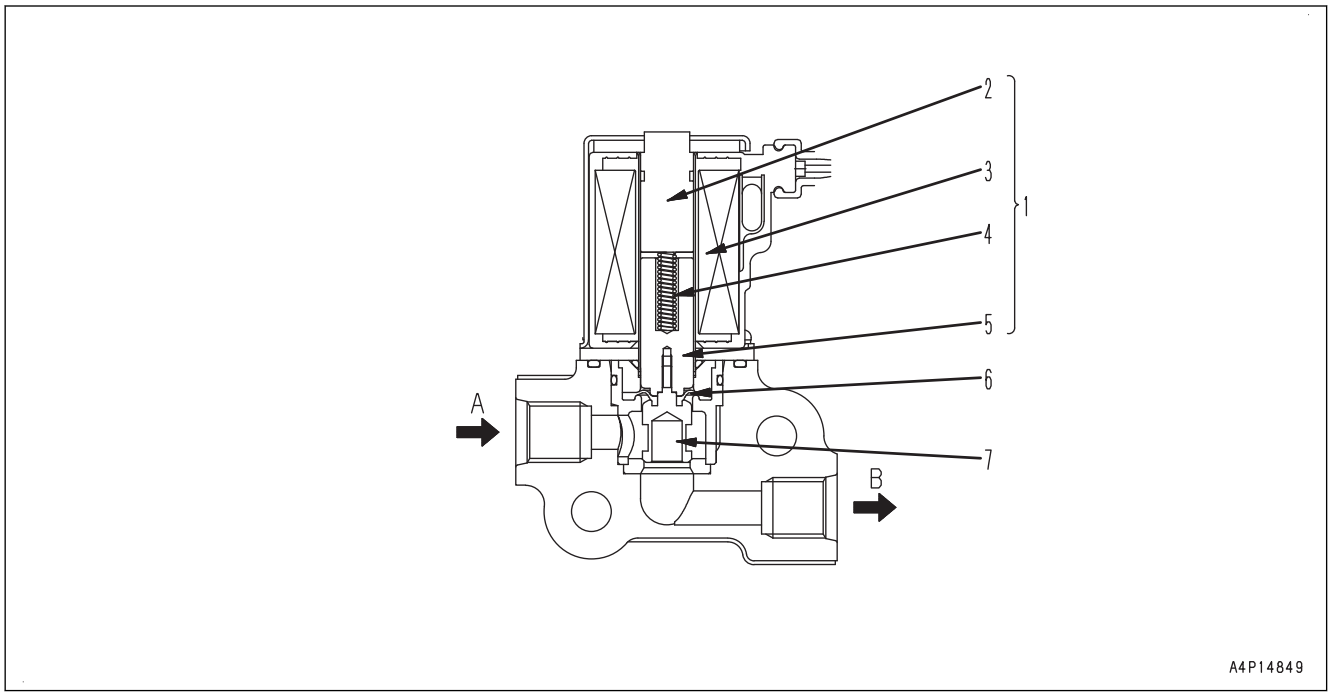
Tighten the unified coarse threaded bolts and nuts to the torque shown in the table below unless otherwise specified.



Type of bolt	A		B	
Nominal size - threads per inch	Tightening torque (Nm { kgm})		Tightening torque (Nm { kgm})	
	Range	Target	Range	Target
$^{1}/_{4}$-20UNC	9.8 to 14.7 {1 to 1.5}	12.7 {1.3}	2.9 to 3.9 {0.3 to 0.4}	3.43 {0.35}
$^{5}/_{16}$-18UNC	24.5 to 34.3 {2.5 to 3.5}	29.4 {3}	6.9 to 8.8 {0.7 to 0.9}	7.8 {0.8}
$^{3}/_{8}$-16UNC	44.1 to 58.8 {4.5 to 6}	52.0 {5.3}	9.8 to 14.7 {1 to 1.5}	11.8 {1.2}
$^{7}/_{16}$-14UNC	73.5 to 98.1 {7.5 to 10}	86.3 {8.8}	19.6 to 24.5 {2 to 2.5}	21.6 {2.2}
$^{1}/_{2}$-13UNC	108 to 147 {11 to 15}	127 {13}	29.4 to 39.2 {3 to 4}	34.3 {3.5}
$^{9}/_{16}$-12UNC	157 to 216 {16 to 22}	186 {19}	44.1 to 58.8 {4.5 to 6}	51.0 {5.2}
$^{5}/_{8}$-11UNC	226 to 294 {23 to 30}	265 {27}	63.7 to 83.4 {6.5 to 8.5}	68.6 {7}
$^{3}/_{4}$-10UNC	392 to 530 {40 to 54}	461 {47}	108 to 147 {11 to 15}	127 {13}
$^{7}/_{8}$-9UNC	637 to 853 {65 to 87}	745 {76}	177 to 235 {18 to 24}	206 {21}

AdBlue/DEF TANK HEATING VALVE

STRUCTURE OF AdBlue/DEF TANK HEATING VALVE



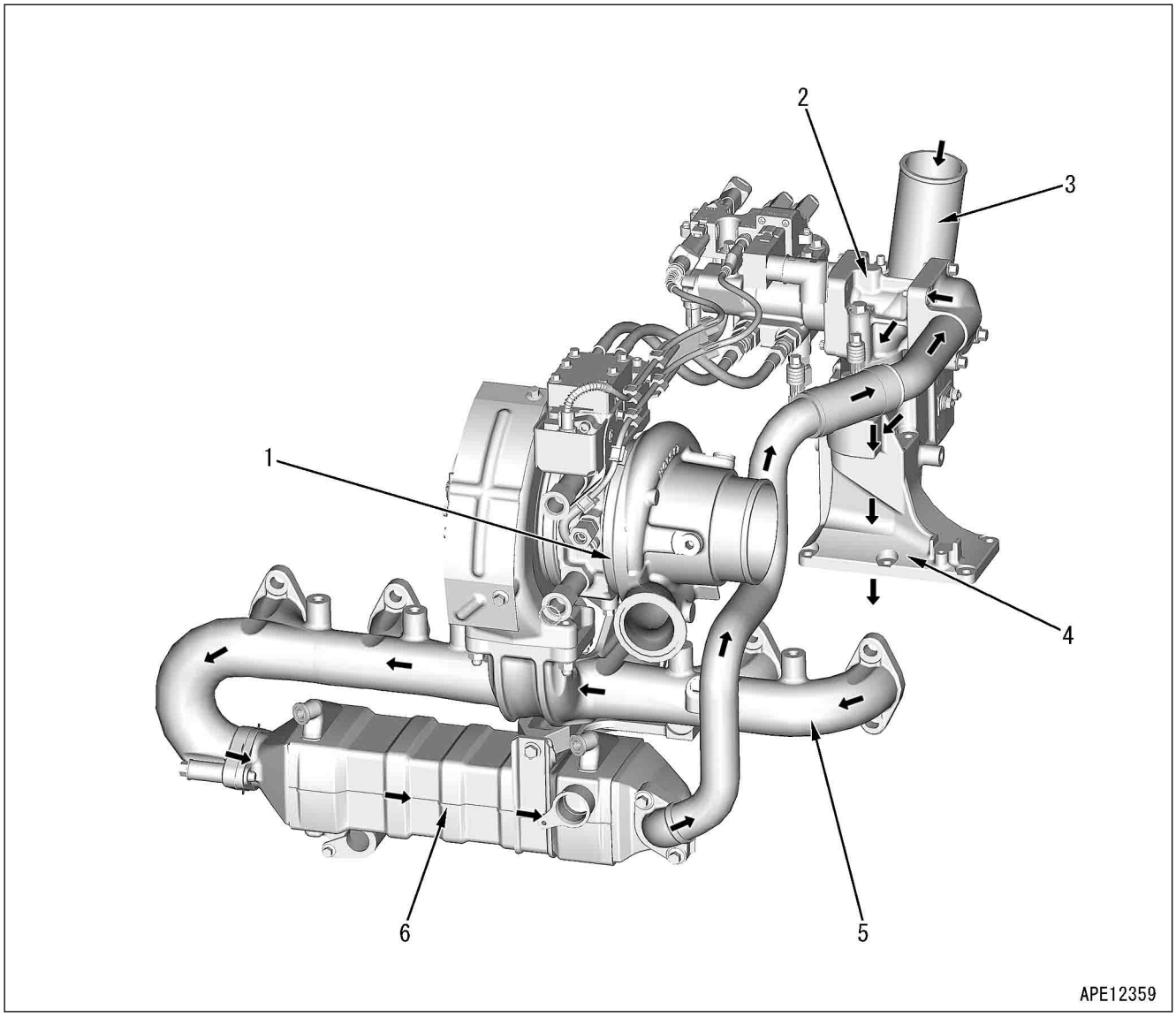
A: Engine coolant inlet
B: Engine coolant outlet
1: Solenoid
5: Plunger
2: Solenoid core
6: Diaphragm
3: Solenoid coil
7: Valve
4: Spring

FUNCTION OF AdBlue/DEF TANK HEATING VALVE

- AdBlue/DEF tank heating valve thaws AdBlue/DEF tank, and opening/closing of the valve (7) is done by solenoid (1).
- The opening position of valve is fixed and the control is only for opening/closing. When the solenoid (1) is de-energized, the valve is closed.
- Diaphragm (6) prevents entering of engine coolant into solenoid (1).

OPERATION OF AdBlue/DEF TANK HEATING VALVE

1. When solenoid coil (3) is energized, solenoid core (2) is magnetized and pull plunger (5) to open valve (7) which is directly connected to plunger (5).
2. When solenoid coil (3) is de-energized, solenoid core (2) loses pulling force and plunger (5) is pushed down by spring (4) and valve (7) is closed.

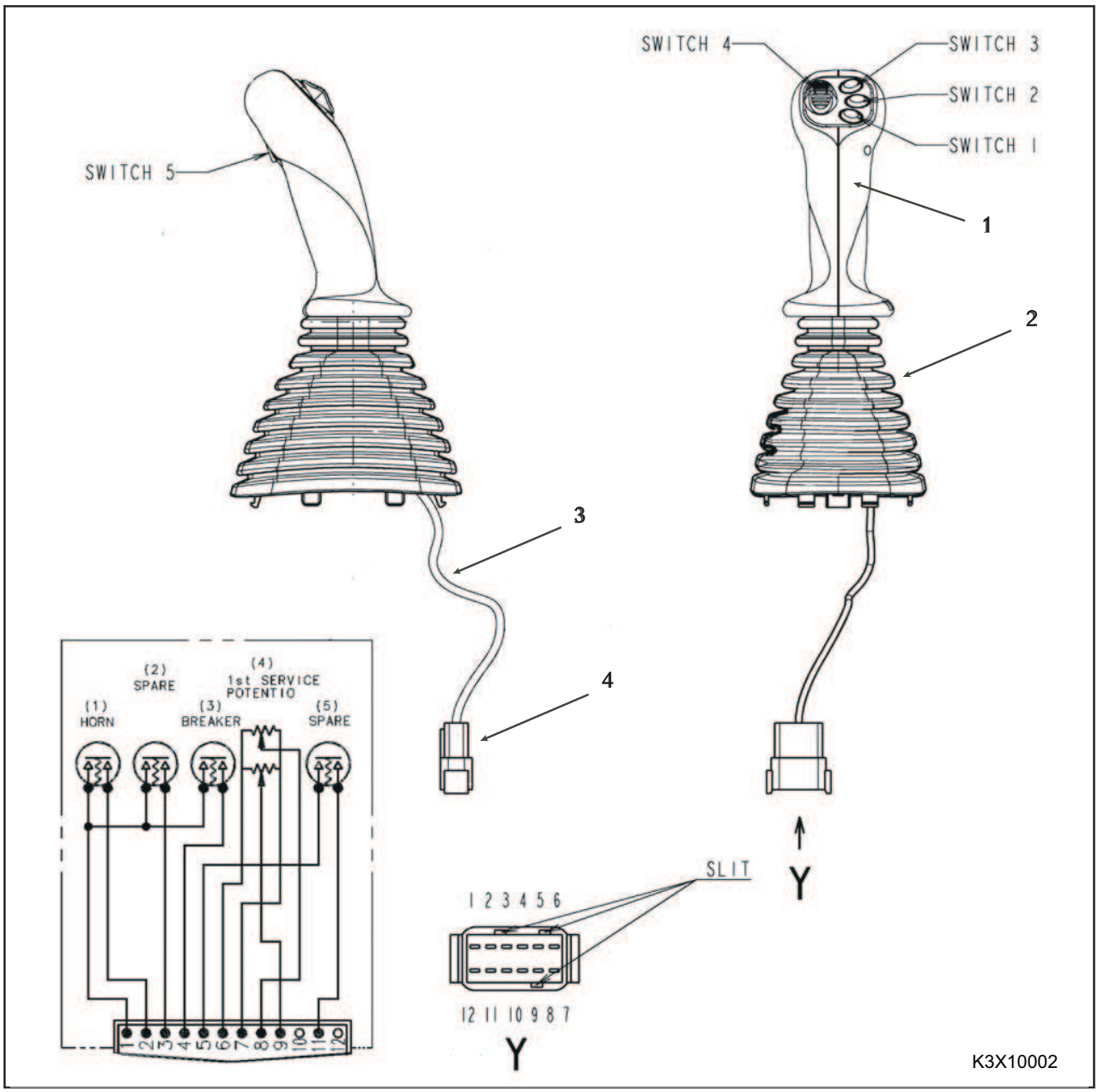


1: KVGT
2: EGR valve
3: Intake pipe
4: Intake connector
5: Exhaust manifold
6: EGR cooler

FUNCTION OF EGR SYSTEM

- EGR valve (hydraulically driven type) (2) controls the gas flowing from the exhaust section to the intake section.
  Since the exhaust pressure is higher than the boost pressure, the exhaust gas flows to the intake side.
- EGR cooler (6) cools down the exhaust gas.
  Engine coolant is used for cooling.
- It controls EGR circuit on the basis of the information from the sensors installed to various parts so that clean exhaust gas is always discharged to obtain EGR ratio corresponding to the operating condition. (EGR ratio means the ratio of EGR gas contained in the intake gas.)
- It monitors EGR circuit for troubleshooting with sensor installed to each part to prevent a serious failure from occurring.

RH PPC LEVER



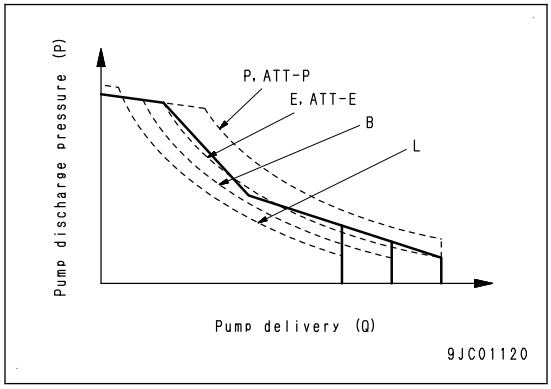
1. Lever
2. Gaiter
3. Harness
4. Connector

Symbol	Item displayed	Description	Remarks
 9JC01183	Aftertreatment devices regeneration	Lights up: Aftertreatment devices regeneration in progress Lights off: Aftertreatment devices regeneration completed	Indicates regeneration state of aftertreatment devices.
 9JC01184	Aftertreatment devices regeneration disable	Lights up: Aftertreatment devices regeneration disabled Lights off: When aftertreatment devices regeneration disable is canceled	• Indicates regeneration state of aftertreatment devices. • When manual stationary regeneration is necessary, KDPF soot accumulation caution lamp lights up.
 9JC01185	Message (Unread)	Lights up: There is unread message. Lights off: No message.	Displays the state of message.
 9JC01186	Message (No return message, already-read message)	Lights up: There is already-read message but return message for it is not sent yet. Lights off: No message.	Displays the state of message.
 9JC01187	Auto-deceleration	Lights up: ON Lights off: OFF	Displays operation state of auto-deceleration function.
 9JC01188	Working mode	P: Heavy-duty operation E: Low-fuel consumption operation L: Fine control operation B: Breaker operation ATT/P: 2-way attachment operation ATT/E: 2-way attachment operation with low fuel consumption	Displays the set working mode.
 9JC01189	Travel speed	Lo: Low-speed travel Mi: Middle-speed travel Hi: High-speed travel	Displays the set mode of travel speed.
 A4P16001	Lock lever	Lights up: Lock position Lights off: FREE position	Displays position state of lock lever.
 9JC01190	ECO guidance	• Idle stop guidance • Deterrence guidance of hydraulic relief • Economy mode recommended guidance • Travel at reduced engine speed recommended guidance • Low fuel level guidance	Displays the guidance to support operation of the machine.

19: Bucket CURL sensor
20: Boom LOWER sensor
21: Swing RIGHT sensor
22: Arm IN sensor
23: Bucket DUMP sensor
24: Boom RAISE sensor
25: Swing LEFT sensor
26: Arm OUT sensor

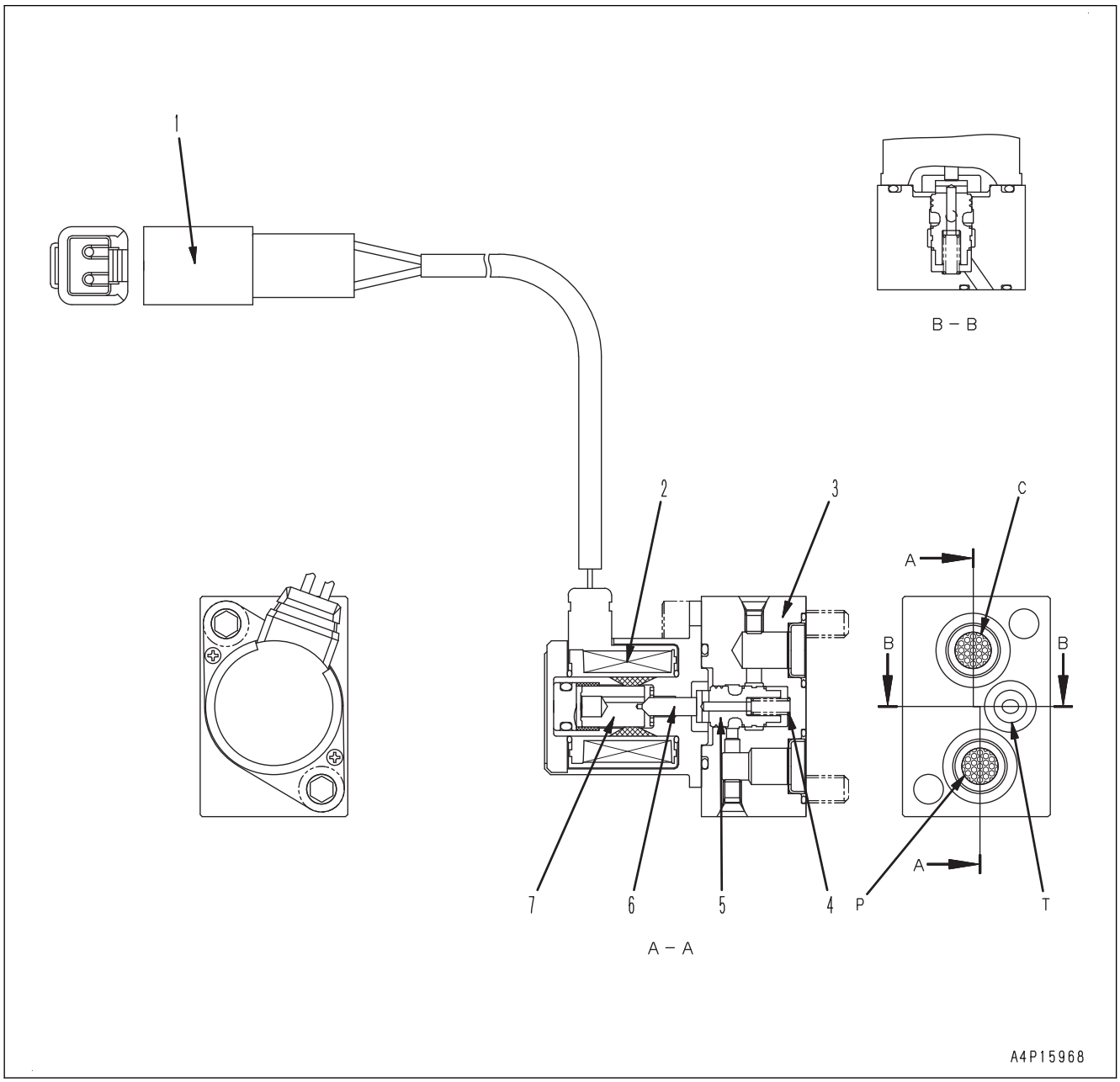
a: Emergency (when abnormal)

b: Normal (when normal)



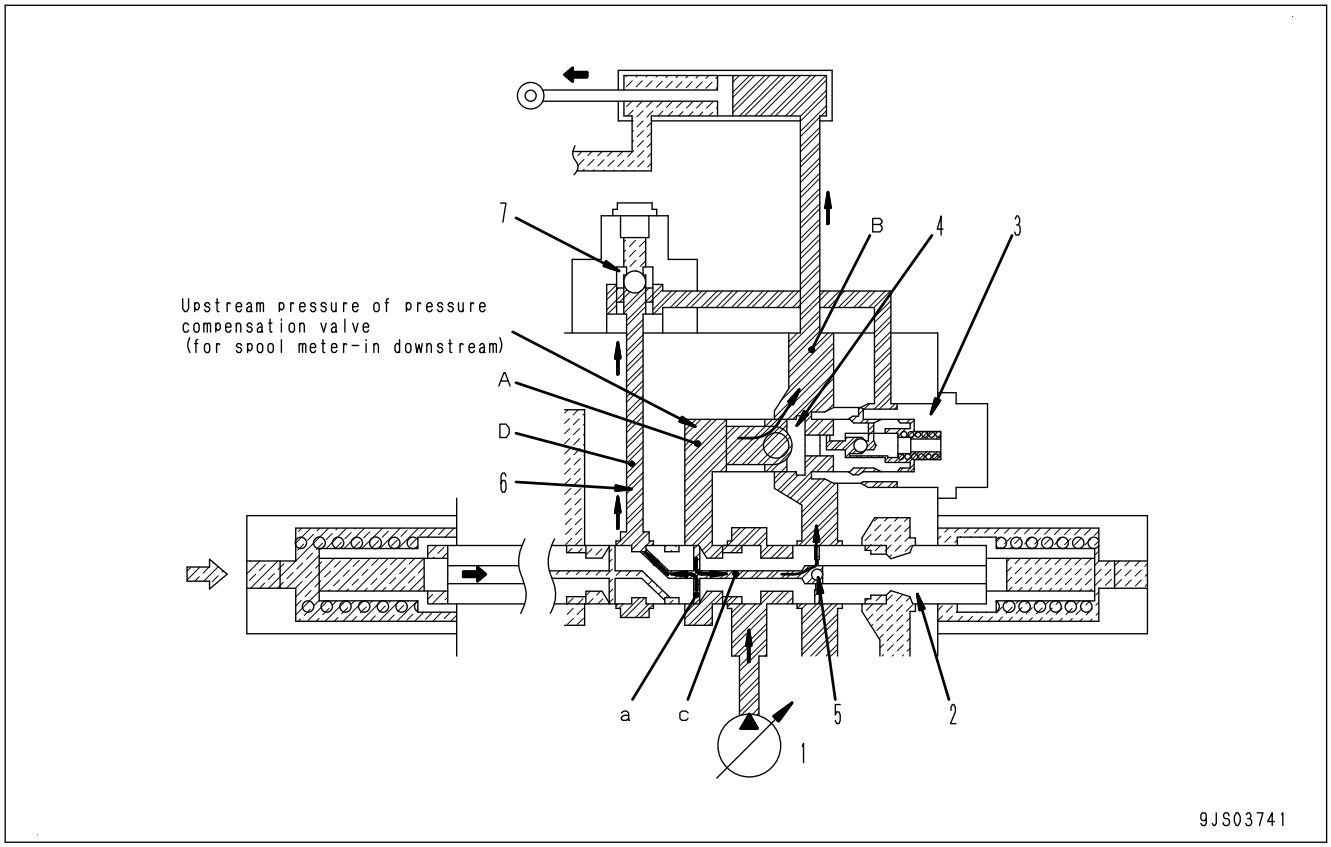
STRUCTURE OF MAIN PUMP LS-EPC VALVE

General view and sectional view



C: To LS valve
P: From self-pressure reducing valve
1: Connector
2: Coil
3: Body
4: Spring
T: To hydraulic tank
5: Spool
6: Rod
7: Plunger

FUNCTION OF INTRODUCTION OF LS PRESSURE IN CONTROL VALVE



1: Main pump
2: Main spool
3: Pressure compensation valve
4: Valve
5: Check valve
6: LS circuit
7: LS shuttle valve

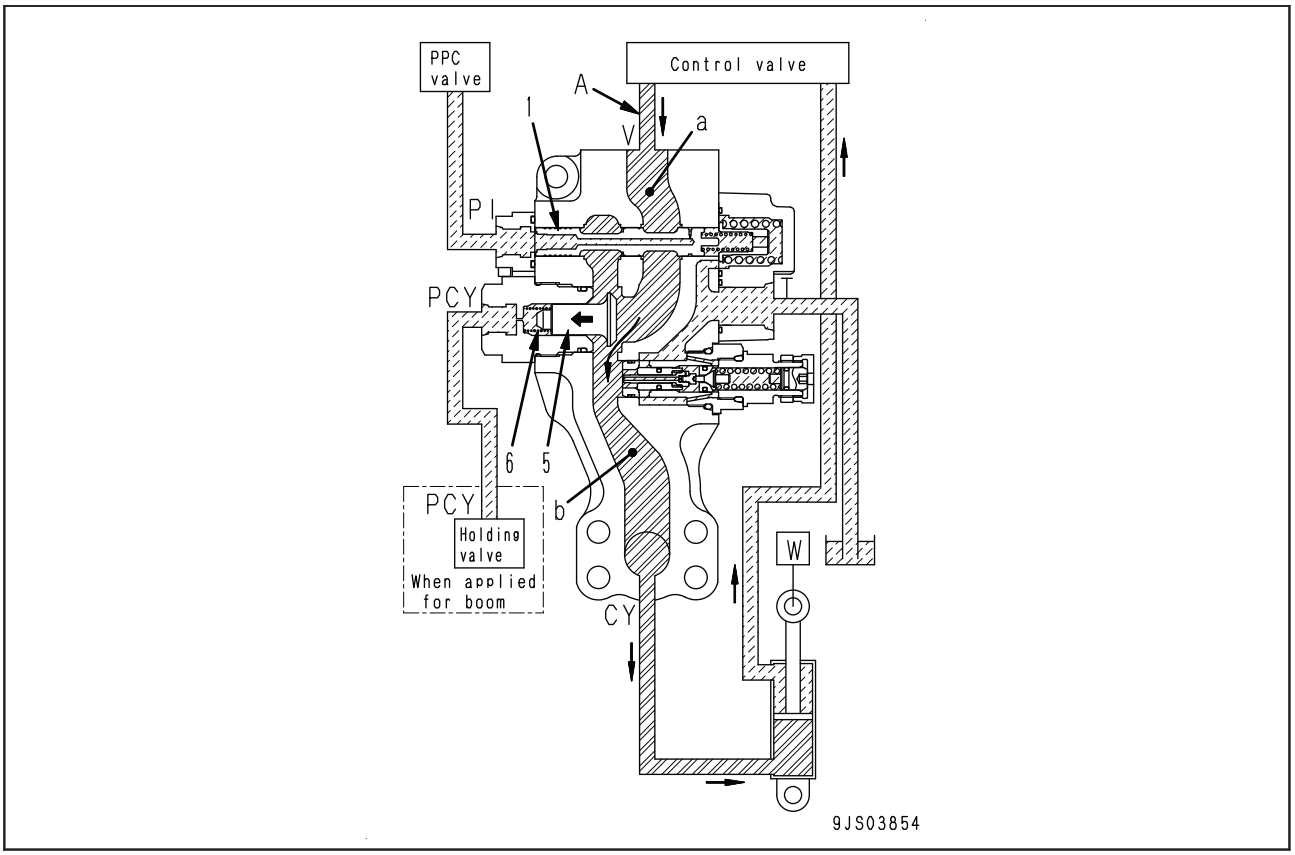
- The upstream pressure of pressure compensation valve (3) (spool meter-in downstream pressure) is introduced as LS pressure into LS shuttle valve (7).
- Then, this pressure is connected to port (B) of the actuator through valve (4), and LS pressure ≒ Actuator load pressure.
- Introduction hole (a) in main spool (2) is small in diameter and used as an orifice.
- LS pressure is used as source pressure for closing the unload valve and as operating pressure when the pressure compensation valve is compensated.

- Chambers (b) of L.H. and R.H. hydraulic drift prevention valve for the boom are interconnected by port (PCY).
- Chambers (b) will have the same pressure if the L.H. and R.H. hydraulic drift prevention valves have a difference in leakage.

If the piping is bursted

- If piping (A) bursts between the control valve and the work equipment cylinder, chambers (a) and (b) are shut off same as when the piping has no burst.
- Pressure for the work equipment cylinder is held to prevent a sudden drop of the work equipment.

2. When pressurized oil flows from the main valve to the cylinder



When the piping is free of burst

- Pressurized oil led to chamber (a) from the control valve becomes higher than the combined force of pressure from work equipment cylinder circuit chamber (b) and spring (6).
- Check valve (5) opens and chambers (a) and (b) are interconnected.
- Pressurized oil flows from the control valve to the work equipment cylinder.

If the piping is bursted

- If piping (A) bursts between the control valve and the work equipment cylinder, pressurized oil in chamber (a) flows outside from the bursted portion.
- Pressure force in chamber (a) drops.
- Pressure force in chamber (a) drops lower than the combined pressure force of chamber (b) and spring (6).
- Check valve (5) closes and chambers (a) and (b) are cut off.
- Pressure for the work equipment cylinder is held to prevent a sudden drop of the work equipment.

COMPONENT PARTS OF WORK EQUIPMENT SYSTEM

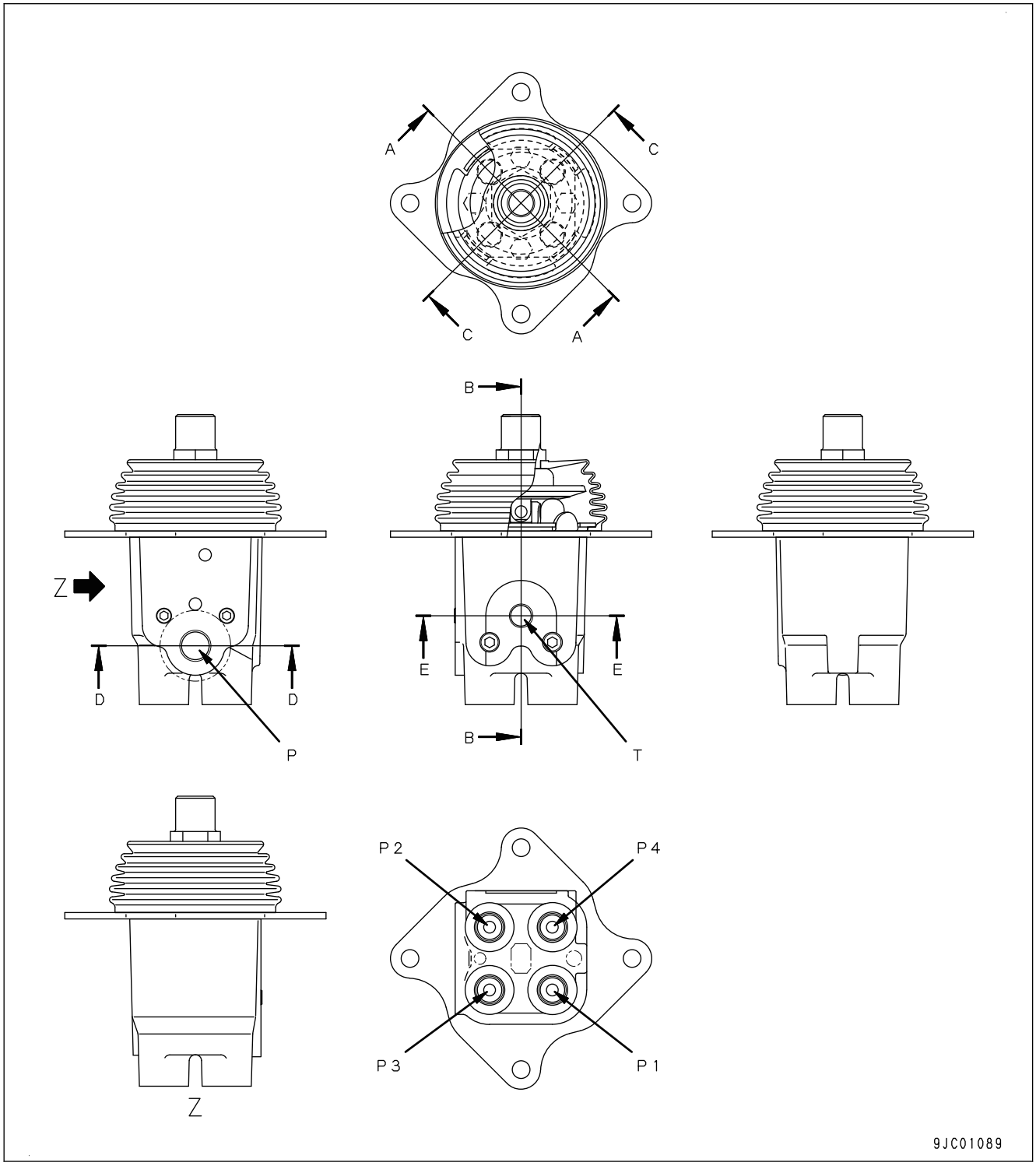
WORK EQUIPMENT AND SWING PPC VALVE

PPC

Abbreviation for Proportional Pressure Control

STRUCTURE OF WORK EQUIPMENT AND SWING PPC VALVE

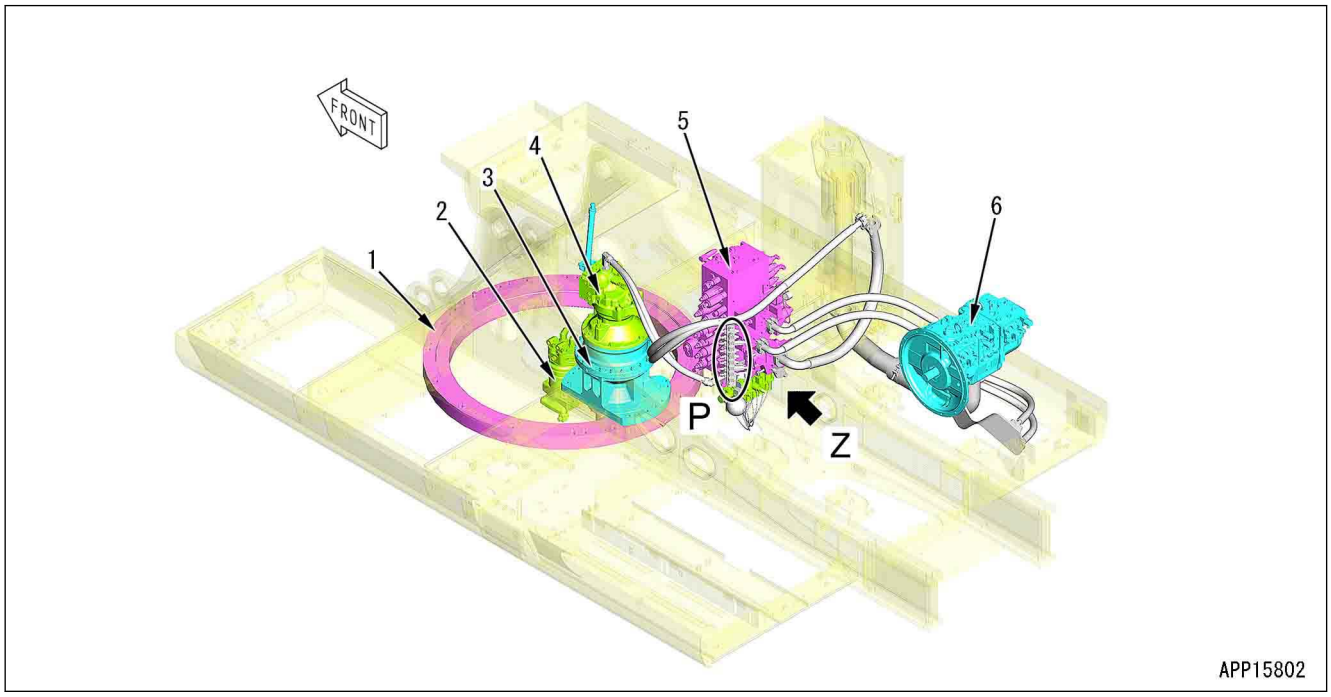
General view



SWING SYSTEM

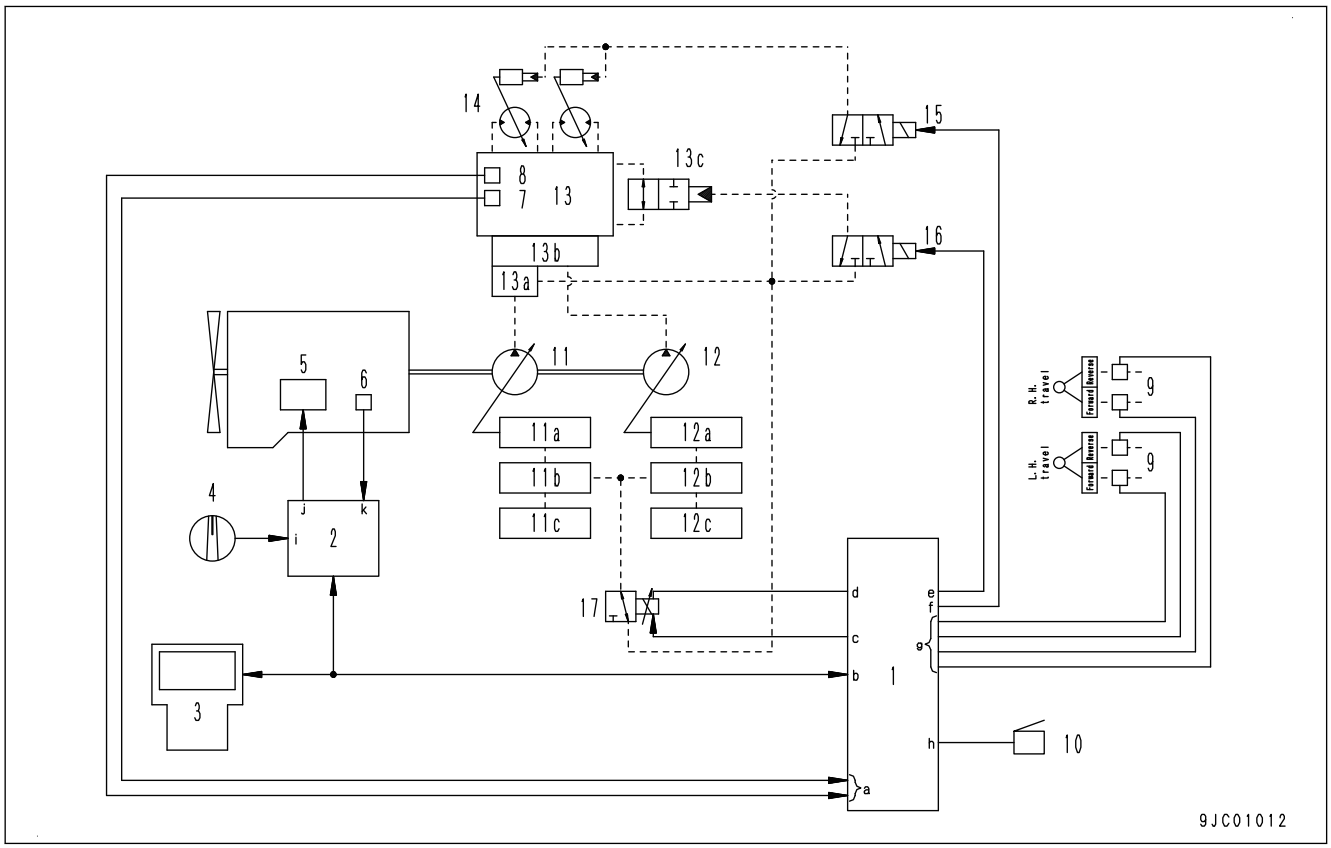
LAYOUT DRAWING OF SWING SYSTEM

Chassis part



1: Swing circle
2: Center swivel joint
3: Swing machinery
4: Swing motor
5: Control valve
6: Main pump

TRAVEL CONTROL SYSTEM DIAGRAM



a: Oil pressure sensor signal
b: CAN signal
c: LS-EPC valve drive signal
d: Solenoid valve GND
e: Travel junction solenoid valve drive signal
f: Travel speed increase solenoid valve drive signal
g: Oil pressure sensor signal
h: Travel alarm operation signal
i: 1st throttle signal
j: Fuel supply pump control signal
k: Various sensor signals

1: Pump controller
2: Engine controller
3: Machine monitor
4: Fuel control dial
5: Fuel supply pump
6: Various sensors
7: Front pump oil pressure sensor
8: Rear pump oil pressure sensor
9: Oil pressure sensor
10: Travel alarm
11: Front pump
11a: Servo
11b: LS valve
11c: PC valve
12: Rear pump
12a: Servo
12b: LS valve
12c: PC valve
13: Control valve
13a: Self-pressure reducing valve
13b: Merge-divider valve
13c: Travel junction valve
14: Travel motor
15: Travel speed increase solenoid valve
16: Travel junction solenoid valve
17: LS-EPC valve

FUNCTION OF TRAVEL CONTROL SYSTEM

Travel speed selector function

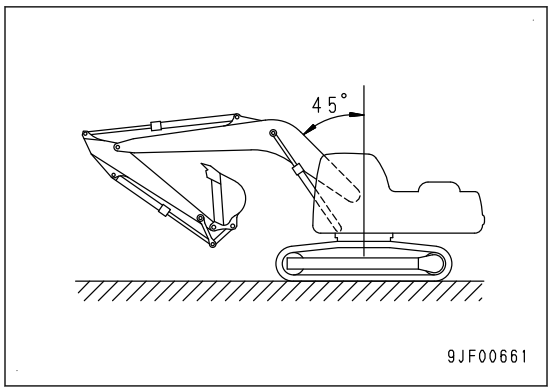
Manual change of travel speed

FUNCTION OF WORK EQUIPMENT

- The boom is operated by the boom cylinder, and moves the whole work equipment up and down.
- The arm is operated by the arm cylinder, and pulls in or pushes out the bucket.
- The bucket is operated by the bucket cylinder.
- The bucket link increases the moving range of the bucket.

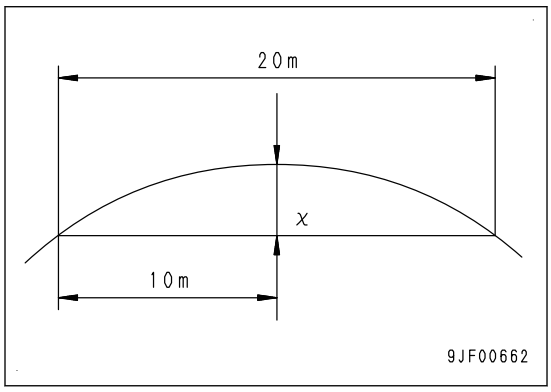
Travel 2

Travel speed (actual travel) and travel deviation



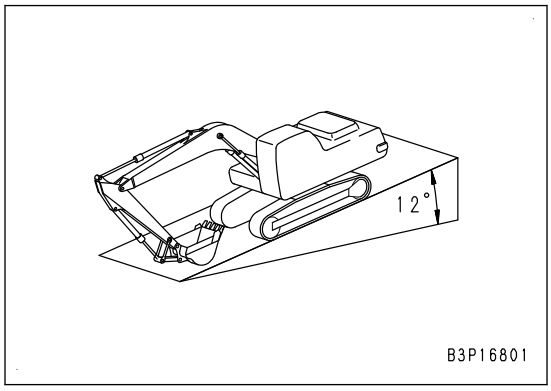
Travel 3

Travel deviation



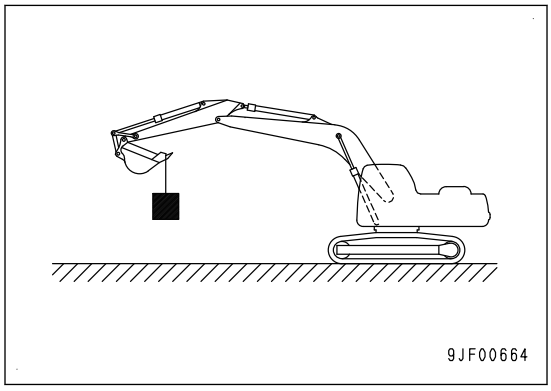
Travel 4

Machine drift on a slope



Work equipment 1

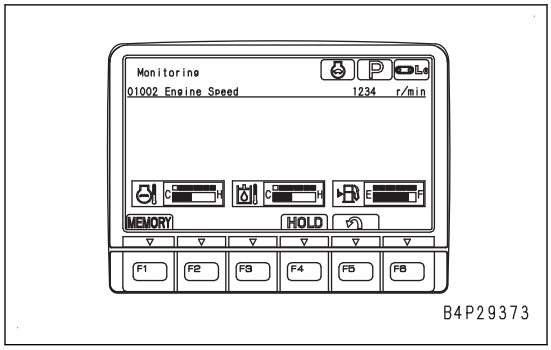
Hydraulic drift of work equipment



The drawing is an example of a Monitoring code: 01002 “Engine Speed” screen displayed.

2. Start the engine, and set the fuel control dial to MIN (Low idle) position.
3. Check the engine speed when all control levers and control pedals are in NEUTRAL position.

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

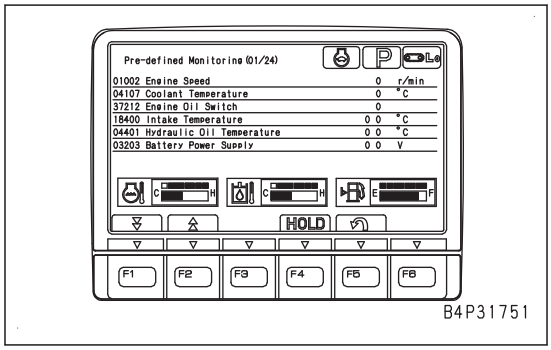


Engine speed test at 2-pump relief

1. Select “Engine Speed” on “Pre-defined Monitoring” (01/24), or from “Monitoring Selection Menu” to display. For details, see “SET AND OPERATE MACHINE MONITOR”.

   Monitoring code: 01002 “Engine Speed”

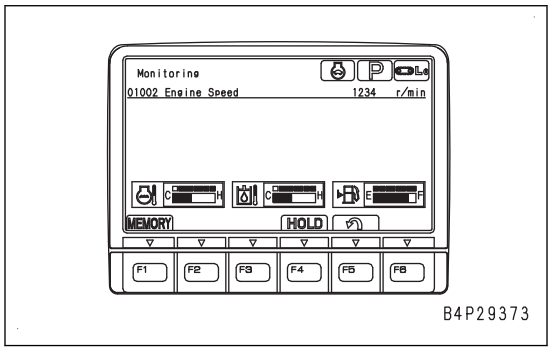
   The drawing is an example of a “Pre-defined Monitoring” (01/24) screen displayed.



The drawing is an example of a Monitoring code: 01002 “Engine Speed” screen displayed.

2. Turn swing lock switch ON.
3. Start the engine and operate the arm to IN side stroke end.
4. Set the fuel control dial to MAX (High idle) position, change working mode to P (“Power Mode”).
5. Operate left work equipment control lever to check the engine speed when arm IN relief is performed.

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

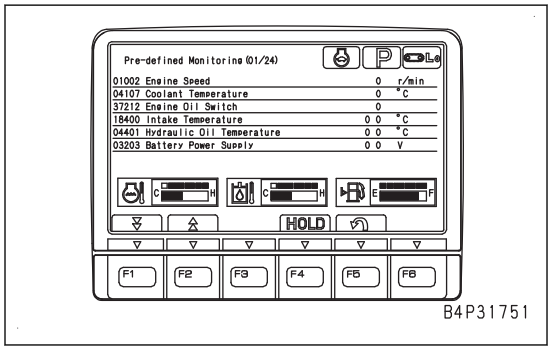


Testing the engine speed (Engine rated speed) when 2-pump relief and one-touch power maximizing are operating

1. Select “Engine Speed” on “Pre-defined Monitoring” (01/24), or from “Monitoring Selection Menu” to display. For details, see “SET AND OPERATE MACHINE MONITOR”.

   Monitoring code: 01002 “Engine Speed”

   The drawing is an example of a “Pre-defined Monitoring” (01/24) screen displayed.

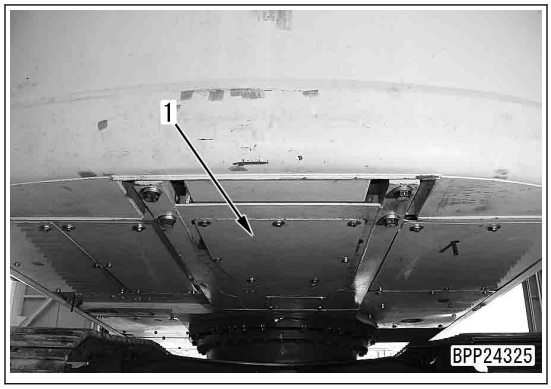


For testing of fuel discharged volume, return rate and leakage to perform troubleshooting or PM Clinic, refer to this section.

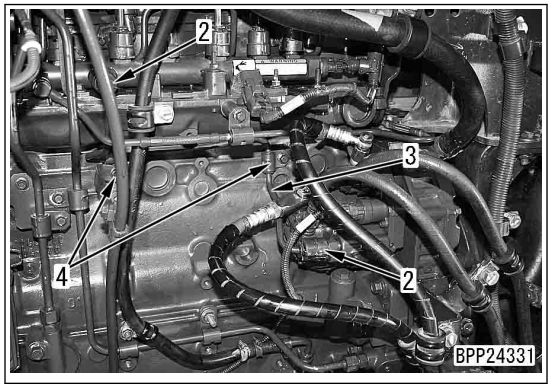
METHOD FOR TESTING FUEL DISCHARGE, RETURN AND LEAKAGE

Testing supply pump discharged volume

1. Remove cover (1).



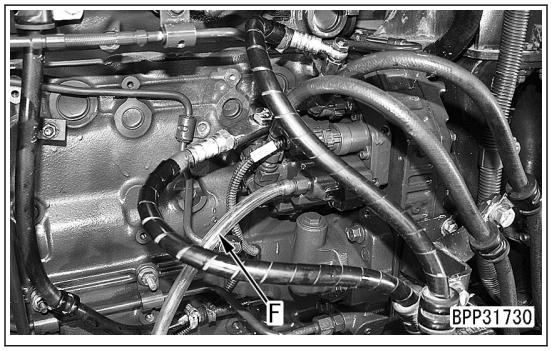
2. Remove fuel spray prevention cap (2).
3. Loosen clamp (4) fixing high-pressure pipe (3) on discharge side of supply pump.



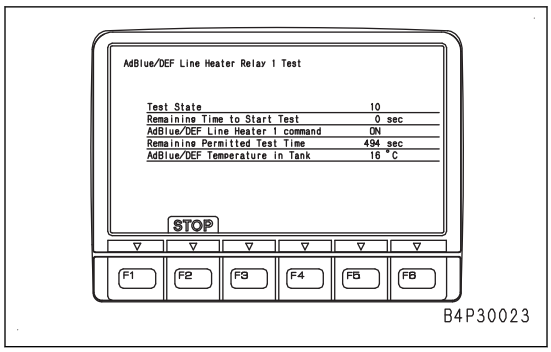
4. Install hose F to the connector on the discharge side of the supply pump.

   REMARK

   - Clamp hose F with a hose band to prevent it from coming off.
   - Adjust the route of hose F so that it does not become slack, and put its end in measuring cylinder G.



11. When the voltage of 24.5±1.5 V is measured, press F2.
    The display of “Test State” returns to flashing of “0”.



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

REMARK

When disconnecting connector, always turn the battery disconnect switch to OFF position.

TEST AdBlue/DEF LINE HEATER RELAY 2

Testing tools for AdBlue/DEF line heater relay 2

Symbol	Part No.	Part name	Q'ty	Remarks
A	799-601-9020	T-adapter	1	
B	799-601-2600	T-box	1	
C	Commercially available	Multimeter	1	

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

NOTICE

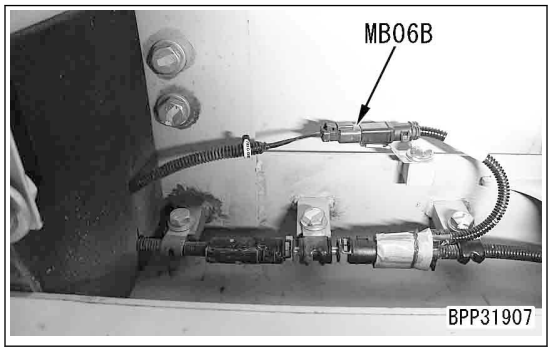
If KOMNET communication error remains less than 1 second, engine controller is unable to detect it, and the test may be continued while the machine monitor does not continue (standard screen). In that case, turn the starting switch to OFF position once, and then system operating lamp goes out, and the engine controller shuts down to reset the test.

“AdBlue/DEF Line Heater 2 Relay Test” function can actuate AdBlue/DEF line heater 2 at any timing, and can check electrical action.

For testing of AdBlue/DEF pressure circuit relay to perform troubleshooting or Pm Clinic, etc. refer to this section.

METHOD FOR TESTING AdBlue/DEF LINE HEATER RELAY 2

1. After checking that the system operating lamp is off, turn the battery disconnect switch to OFF position, and remove the key.
2. Open the cover on the right side of the machine.
3. Disconnect the connector to be tested.
   When testing the low temperature pressure line heater relay of AdBlue/DEF: Connector (MB06B)



Method for testing swing relief pressure by testing tools

1. Open the cover on the right side of the machine, install nipple C to pickup ports (PFC), (PRC) and connect it to gauge A1 of hydraulic tester A.

   REMARK

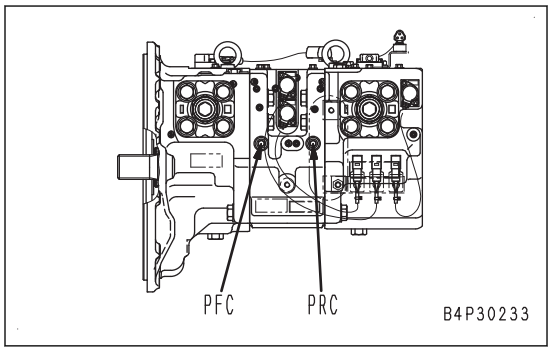
   Gauge in digital hydraulic tester B can also be used in place of gauge A1.

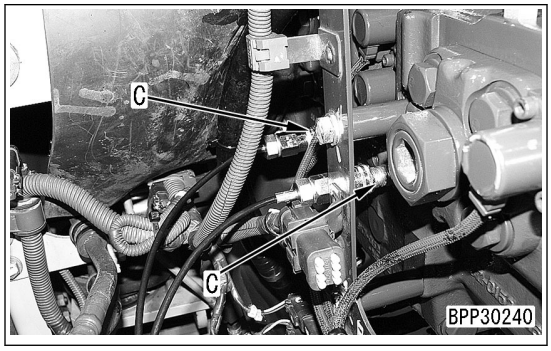
   (PFC): Front pump discharge pressure pickup port

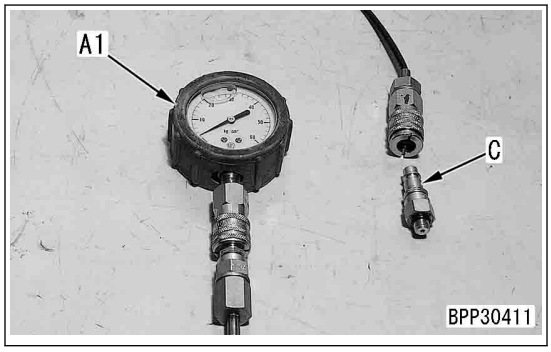
   (PRC): Rear pump discharge pressure pickup port

2. Start the engine to increase the hydraulic oil temperature to 45 to 55 °C.
3. Set the working mode to P (“Power Mode”), and turn the swing lock switch ON.
4. Set the fuel control dial in MAX (High idle) position and measure the oil pressure when relieving the swing circuit.
   - Hydraulic oil pressure relieved by the swing motor is displayed.
   - The swing motor relief pressure is lower than that of the main relief valve.

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







METHOD FOR TESTING TRAVEL RELIEF PRESSURE

⚠ **Lower the work equipment to the ground, and stop the engine. Operate the control levers several times to release the remaining pressure in the piping, and then loosen the oil filler cap of the hydraulic tank slowly to release the pressure in the tank.**

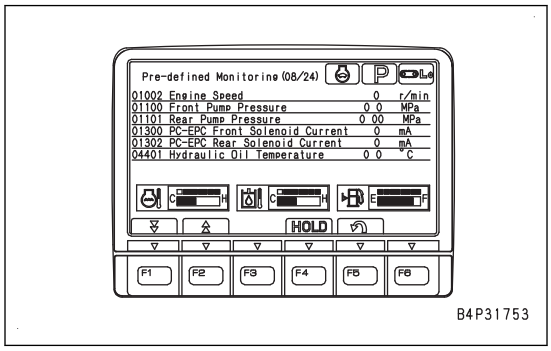
Method for testing travel relief pressure by machine monitor

1. Start the engine, select and display Charge Pressure and Ambient Pressure in either “Pre-defined Monitoring” (08/24) or “Self-define Monitoring” by referring “SET AND OPERATE MACHINE MONITOR”.

   Monitoring code: 01100 “Front Pump Pressure”

   Monitoring code: 01101 “Rear Pump Pressure”

   The drawing is an example of a “Pre-defined Monitoring” (08/24) screen displayed.



TEST PUMP SWASH PLATE SENSOR

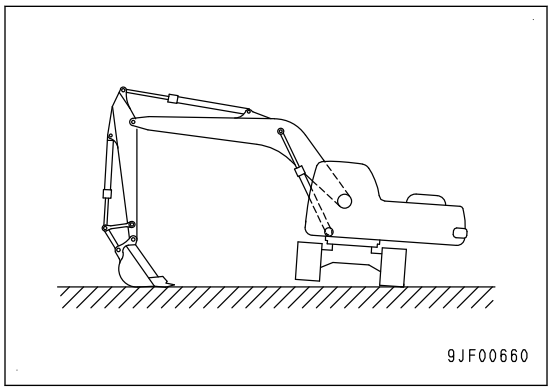
Before testing pump swash plate sensor, check that oil pressure in work equipment, swing, travel, control circuits, and travel speed at running track idle off ground are correct.

Test this item under the following conditions.

- Hydraulic oil temperature : 45 to 55 °C
- Working mode: P mode

For testing of pump swash plate sensor to perform troubleshooting or Pm Clinic, or periodic maintenance, etc. refer to this section.

METHOD FOR TESTING PUMP SWASH PLATE SENSOR



1. Start the engine, push the ground to raise the track to be tested off the ground by using the work equipment, and prepare for running track idle off the ground.

   When testing front pump: R.H. track

   When testing rear pump: L.H. track

   ⚠ Provide enough work space to run the raised track idle off the ground for testing.
2. Set the working mode to P (“Power Mode”) and set the travel speed to Hi.
3. Set the swing lock switch to ON position.
4. Set the fuel control dial to MAX (High idle) position, set all the control levers and pedals to NEUTRAL, and then set the travel lever to stroke end in order to run a track idle off ground, and measure the voltage.

   The output voltage of the pump swash plate sensor can be checked with monitoring function of the machine monitor. (For the operation method, see “SET AND OPERATE MACHINE MONITOR”.)

   Monitoring code: 01138 “F Pump Swash Plate Sensor volt”

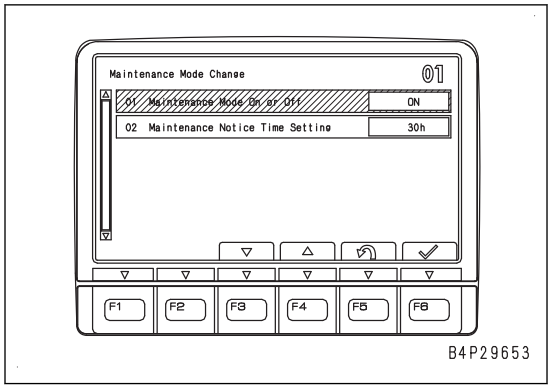
   Monitoring code: 01140 “R Pump Swash Plate Sensor volt”

   ⚠ Run the raised track idle off the ground paying attention to the surroundings for safety.

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

Code	Item		Reference page
07	Default	Key-on Mode	METHOD FOR SETTING DEFAULT (KEY-ON MODE) (30-172)
		Unit	METHOD FOR SETTING DEFAULT (UNIT) (30-173)
		With/Without Attachment	METHOD FOR SETTING DEFAULT (WITH/WITHOUT ATTACHMENT) (30-174)
		Camera	METHOD FOR SETTING DEFAULT (CAMERA) (30-175)
		Auto Idle Stop Time Fixing	METHOD FOR OPERATING TESTING MENU (AUTO IDLE STOP TIME FIXING) (30-177)
		With/Without Quick Coupler	METHOD FOR SETTING WITH DEFAULT SETTING MENU (WITH/WITHOUT QUICK COUPLER) (30-178)
08	Diagnostic Tests	Cylinder Cutout Mode Operation	METHOD FOR OPERATING TESTING MENU (CYLINDER CUT-OUT OPERATION) (30-179)
		Active Regeneration for Service	METHOD FOR OPERATING TESTING MENU (REGENERATION FOR SERVICE) (30-181)
		KDPF Memory Reset	METHOD FOR OPERATING TESTING MENU (KDPF MEMORY RESET) (30-183)
		SCR Service Test	METHOD FOR OPERATING TESTING MENU (SCR SERVICE TEST) (30-184)
		Engine Controller Active Fault Clear	METHOD FOR OPERATING TESTING MENU (ENGINE CONTROLLER ACTIVE FAULT CLEAR) (30-185)
		Ash in Soot Accumulation Correction	METHOD FOR OPERATING TESTING MENU (ASH IN SOOT ACCUMULATION CORRECTION) (30-185)
		Reset Number of Abrupt Engine Stop by AIS	METHOD FOR OPERATING TESTING MENU (RESET NUMBER OF ABRUPT ENGINE STOP BY AIS) (30-187)
		Engine Stop at AdBlue/DEF Inj Overheat Count Reset	METHOD FOR OPERATING TESTING MENU (ENGINE STOP AdBlue/DEF INJ OVERHEAT COUNT RESET) (30-187)
09	Adjustment	Pump Absorption Torque (F)	METHOD FOR ADJUSTING (Pump Absorption Torque (F)) (30-188)
		Pump Absorption Torque (R)	METHOD FOR ADJUSTING (Pump Absorption Torque (R)) (30-189)
		Travel Low Speed	METHOD FOR ADJUSTING (Low Speed) (30-190)
		Att Flow Adjust in Combined Ope	METHOD FOR ADJUSTING (Attachment Flow Adjustment) (30-191)
		Calibrate F Pump Swash Plate Sensor	METHOD FOR ADJUSTING (CAL F pump swash plate sensor) (30-196)
		Calibrate R Pump Swash Plate Sensor	METHOD FOR ADJUSTING (CAL R pump swash plate sensor) (30-201)
		Pump Calibration:Matching Speed Check	METHOD FOR ADJUSTING (Pump calibration: Matching speed check) (30-202)
		Pump Calibration:Matching Speed Calibration	METHOD FOR ADJUSTING (Pump calibration: Matching speed calibration) (30-207)
		Pump Calibration:Restore to Default Setting	METHOD FOR ADJUSTING MENU (RESTORE TO DEFAULT SETTING) (30-208)
		Fan Speed Mode Select	METHOD FOR ADJUSTING (Fan Rotation Mode Selection) (30-209)

3. Select “Maintenance Mode Change”. When the screen is displayed, turn "ON" or "OFF" the maintenance mode with function switch and enter.



ON: Functions of all maintenance items become effective in operator mode

OFF: Functions of all maintenance items become ineffective in operator mode

F3: Moves the selection downward

F4: Moves the selection upward

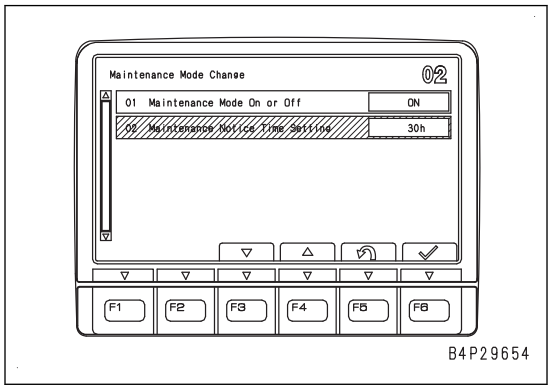
F5: Cancels the selection and returns the screen to “Maintenance Mode Change” screen.

F6: Enters the selection and returns the screen to “Maintenance Mode Change” screen.

REMARK

Even if ON/OFF of each item has been set, if the above setting is changed, it overrides the individual setting.

4. Select “Maintenance Notice Time Setting” and when “Maintenance Notice Time Setting” screen is displayed, perform the setting with the function switches.



Default value: Maintenance notice time set on the machine monitor (Recommended by the manufacturer and not changeable).

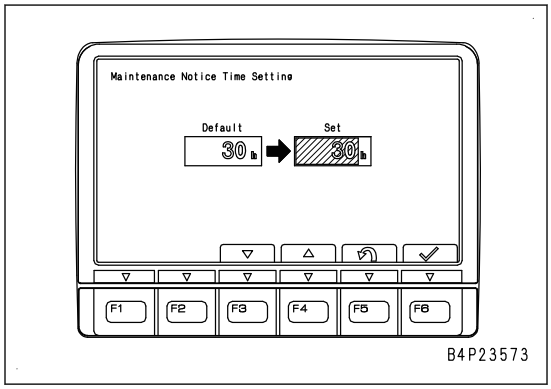
Set value: Maintenance time that can be freely set. Maintenance reminder function works according to this set time in operator mode (the time increases or decreases in multiples of 10 hours).

F3: Decreases the set value

F4: Increases the set value

F5: Cancels the selection and returns the screen to the “Maintenance Mode Setting” screen

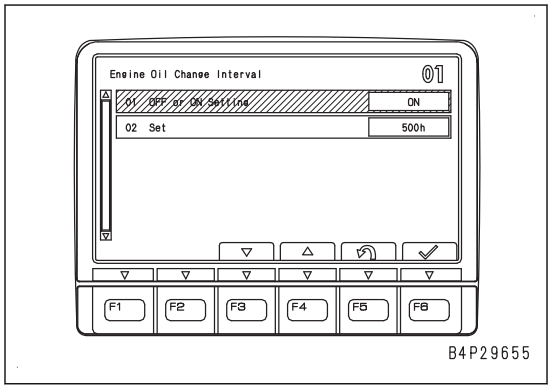
F6: Enters the setting and returns the screen to “Maintenance Mode Change” screen



REMARK

- The setting becomes effective after you enter it with F6 and return the screen to “Maintenance Mode Setting”.
- If the value of an item which is set to “ON” is changed after one operating hour or more from the setup, the change is recognized as a reset operation.

5. Select one of each maintenance item and when the each maintenance item screen is displayed, select “On or Off Setting”.



F3: Moves the selection downward

F4: Moves the selection upward

F5: Cancels the selection and returns the screen to “Maintenance Mode Change” screen.

F6: Enter the selection and proceed to “ON” or “OFF” setting of each maintenance item.

REMARK

- Displayed screen is an example of “Engine Oil Change Interval”.

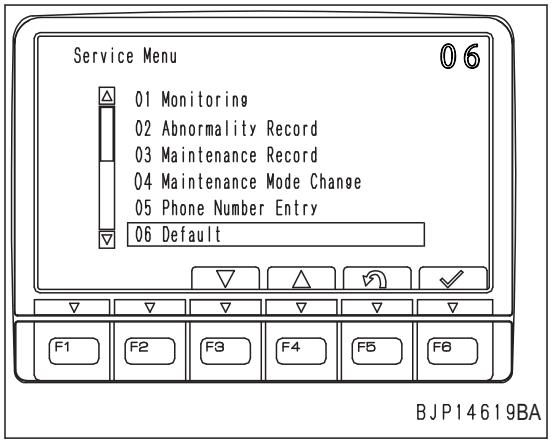
Code	Set Value	Distribution of flow to attachment
049 048 165 164	0	-100 mA
	1	-90 mA
	2	-80 mA
	3	-70 mA
	4	-60 mA
	5	-50 mA
	6	-40 mA
	7	-30 mA
	8	-20 mA
	9	-10 mA
	10	0 mA (default)
	11	+10 mA
	12	+20 mA
	13	+30 mA
	14	+40 mA
	15	+50 mA
	16	+60 mA
	17	+70 mA
	18	+80 mA
	19	+90 mA
	20	+100 mA

Default (Proportional Spec.)

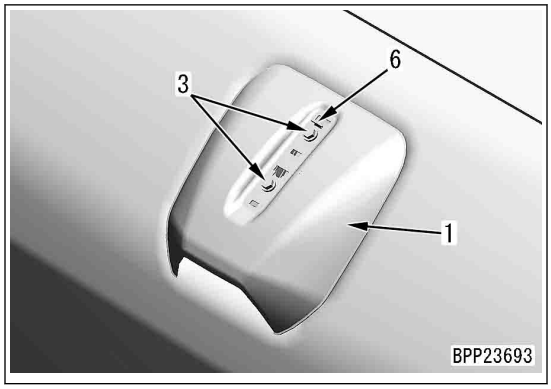
Every machine is defaulted to “Proportional Spec” before it leaves the factory. If a new monitor is installed follow the procedure below.

1. Selecting menu

   Select “Default” on the service menu screen.



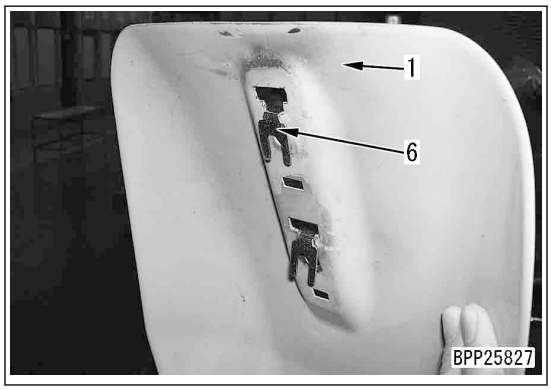
2. Remove bolts (3) (2 places).



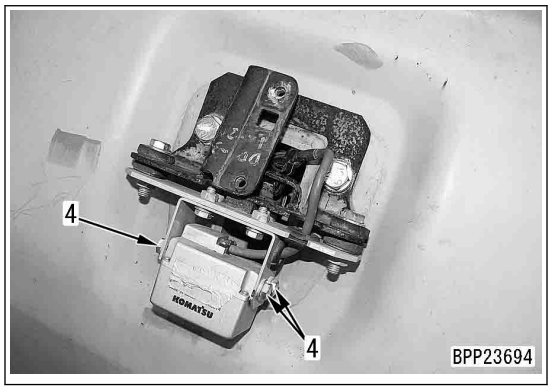
3. Remove cover (1).

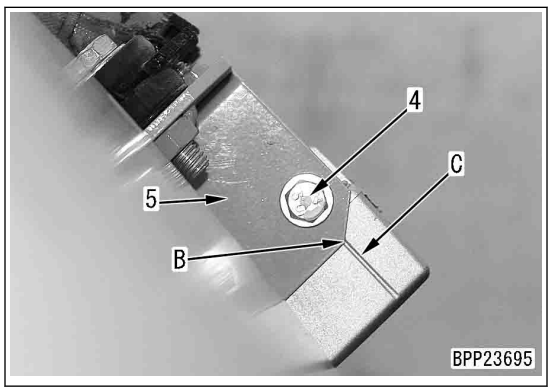
REMARK

- Check where and how many shims (6) have been used.
- Be careful of shim (6), since it comes off together with cover (1).

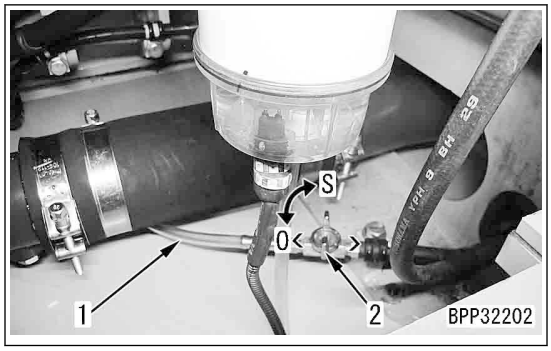


4. Loosen camera mounting bolts (4) (3 places) and adjust the camera mounting angle so that corner (B) of mounting bracket (5) is aligned with horizontal line (C) of the camera.





2. Prepare a container below drain hose (1) to receive the drained fuel.
3. Turn drain valve (2) to open position (O) to discharge the sediment and water in the bottom together with the fuel.
4. When only the clean fuel flows out, turn drain valve (2) to close position (S).
5. Close the side cover.



CHECK FUEL PREFILTER

⚠ **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until all parts have cooled down before starting the work.**

⚠ **High pressure is generated inside the engine fuel piping system when the engine is running. Stop the engine and wait at least 30 seconds until the inner pressure is released and then replace the filter.**

⚠ **Keep open flame away.**

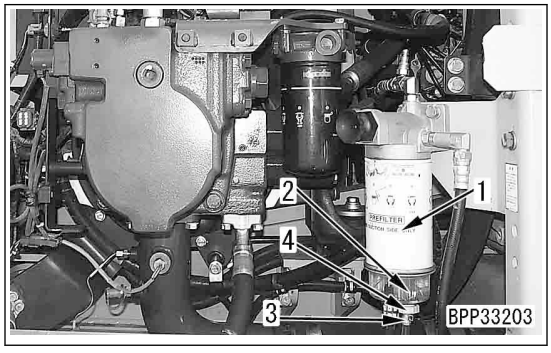
NOTICE

- **Komatsu genuine fuel filter cartridges adopt a special filter with high-efficiency filtering properties. Be sure to use Komatsu genuine parts when replacing.**
- **The common rail fuel injection system used on this machine consists of more precise parts than those in the conventional injection pump and nozzles. If any cartridge other than a Komatsu genuine fuel filter cartridge is used, foreign materials may enter and problem may occur in the injection system. Do not use substitute parts.**
- **During testing or maintenance of the fuel system, be sure that any foreign material does not enter the fuel system. If any dust or other material sticks to any part, wash the part thoroughly with clean fuel.**
- Prepare a container to receive the drained fuel.
- Prepare a filter wrench.

WATER SEPARATOR - CHECK / DRAIN WATER AND SEDIMENT

1. Open the side cover.

   The water separator is integrated with fuel prefilter (1).
2. Through the transparent cup (2), water quantity or sediments can be visually checked. If they are accumulated, place a container to receive water under the drain hose (3).
   - This machine is equipped with sensor which detects water accumulated in transparent cup (2).
   - Drain the water when the water separator monitor lights up in red on machine monitor, since it shows water accumulated in transparent cup (2).
   - If the water in transparent cup (2) is frozen, the water separator monitor may not light up. After the engine is started, when the frozen water is melted because of the increase of the temperature around fuel prefilter (1), water separator monitor may light up suddenly. Accordingly, drain the water frequently in the cold weather even if water separator monitor is not lit.
   - If water in transparent cup (2) is frozen, drain water only after confirming that it has completely melted.
   - If you cannot visually identify the presence of water due to stains on transparent cup (2), clean transparent cup (2) when replacing fuel prefilter cartridge (1).
3. Loosen drain valve (4) and drain the water.

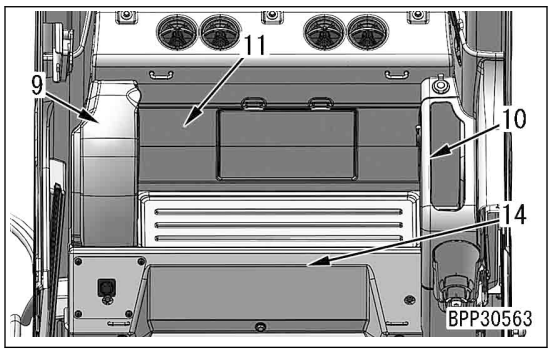


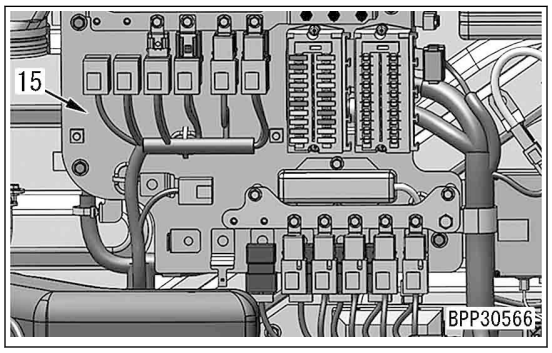
Pump controller

1. Slide the operator's seat and seat stand to the forward end.
2. Remove mounting bolts (5 pieces), and remove cool and hot box (9).

   REMARK

   While removing it, disconnect the drain hose.
3. Remove mounting bolts (2 pieces) and fastener (1 piece), and remove magazine box (10).
4. Remove the mounting bolts (3 pieces), and remove cover (11).
5. Remove the mounting bolts (7 pieces), and remove cover (14).
6. Remove bracket (15).

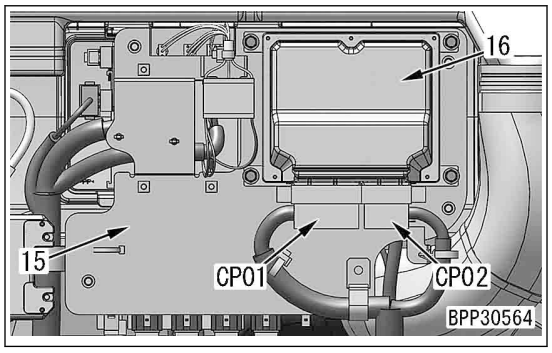




7. Connect test adapters to connectors CP01 and CP02 of pump controller (16) from the back side of bracket (15).

   REMARK

   Since no T-adapter is installed, the operating voltage cannot be measured by inserting a T-adapter.

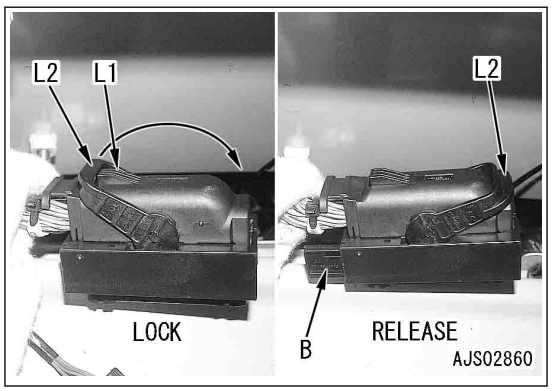


How to disconnect connectors CP01 and CP02

While pressing lock (L1), turn lock (L2) inward.

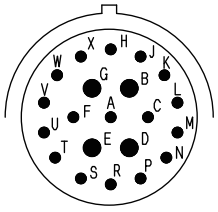
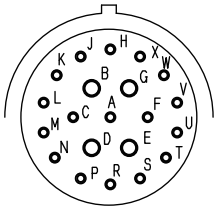
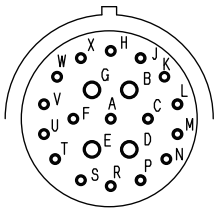
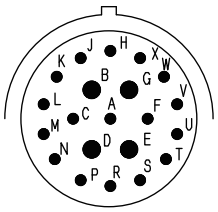
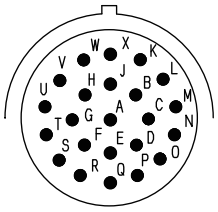
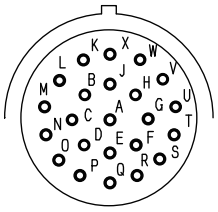
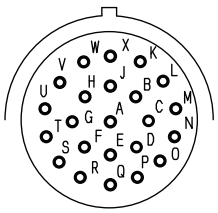
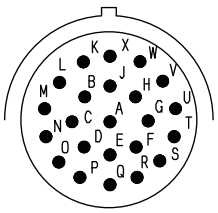
REMARK

Bar (B) comes out and the lock is released.



Connector No.	Connector type	Number of pins	Location	Address
R21	Relay	5	Compressor clutch relay	X-6
R28	Terminal	1	Starting motor safety relay (terminal C)	A-8
R29	Terminal	1	Starting motor safety relay (terminal B)	A-8
R43	Relay	5	BR cut-off relay	W-8
R48	Relay	5	PPC Lock Relay	W-8
R52	DT-D	12	Sensor power supply relay	L-3
R53A	DT-C	12	AdBlue/DEF line heater relay	K-1
R53B	DT	6	AdBlue/DEF line heater relay	J-1
S01	-	6	Starting switch	P-8
S02	SWP	6	Light switch	Q-8
S04	SWP	6	Swing lock switch	Q-8
S07	SWP	6	Revolving lamp switch (if equipped)	Q-9
S10	Y090	2	R.H. knob switch (horn)	P-8
S11	Y090	2	One-touch power max. switch	S-1
S14	M	3	PPC oil pressure lock switch	T-1
S18	SWP	6	Engine shutdown secondary switch	S-1
S19	DT	2	Seat belt monitor switch	R-9
S21	-	12	Pump drive secondary switch	N-9
S22	-	6	Swing parking brake cancel switch	M-9
S23	-	3	Lock lever auto lock cancel switch	M-9
S25	090	20	Intermediate connector (secondary switch)	O-9
S30	S	8	Model selection connector	V-9
SB	Terminal	1	Starting motor (terminal B)	AG-5
SC	Terminal	1	Starting motor (terminal C)	AF-5
SEGR	DT	3	EGR stroke sensor	AJ-5
SVGT	DT	3	KVGT stroke sensor	AI-5
T01	Terminal	1	Floor frame ground	W-2
T02	Terminal	1	CAB ground	X-5,AD-3
T04	Terminal	1	Revolving frame ground	G-1
T05	Terminal	1	Revolving frame ground	H-1
T06	Terminal	1	Revolving frame ground	H-1
T07	Terminal	1	Revolving frame ground	H-1
T08	Terminal	1	Revolving frame ground	K-1
T09	Terminal	1	Revolving frame ground	I-1
T10	Terminal	1	Revolving frame ground	I-1
T11	Terminal	1	Engine body ground	AI-6
T12	Terminal	1	Engine controller ground	L-6
T13	Terminal	1	Revolving frame ground	K-2
T14	Terminal	1	Revolving frame ground	L-2

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

Type (shell size code)	HD30 Series connector		
	Body (plug)	Body (receptacle)	Testing connection use special tool Part No.
24-21 (7)	Pin (male terminal)	Socket (female terminal)	799-601-9270 (T-adapter)
	 BWP05025	 BWP05026	
	Part No. :08191-71201, 08191-71202, 08191-71205, 08191-71206	Part No. :08191-74101, 08191-74102, 08191-74105, 08191-74106	
	Socket (female terminal)	Pin (male termial)	799-601-9270 (T-adapter)
	 BWP05027	 BWP05028	
	Part No. :08191-72201, 08191-72202, 08191-72205, 08191-72206	Part No. :08191-73101, 08191-73102, 08191-73105, 08191-73106	
24-23 (8)	Pin (male terminal)	Socket (female terminal)	799-601-9280 (T-adapter)
	 BWP05029	 BWP05030	
	Part No. :08191-81201, 08191-81202, 08191-81203, 08191-81204, 08191-81205, 08191-80206	Part No. :08191-84101, 08191-84102, 08191-84103, 08191-84104, 08191-84105, 08191-84106	
	Socket (female terminal)	Pin (male termial)	799-601-9280 (T-adapter)
	 BWP05031	 BWP05032	
	Part No. :08191-82201, 08191-82202, 08191-82203, 08191-82204, 08191-82205, 08191-82206	Part No. :08191-83101, 08191-83102, 08191-83103, 08191-83104, 08191-83105, 08191-83106	

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Part No.	Part name	Number of pins	ID marking	T-adapter kit													Non-kit part
				799-601-2500	799-601-2700	799-601-2800	799-601-7000	799-601-7100	799-601-7400	799-601-7500	799-601-8000	799-601-9000	799-601-9100	799-601-9200	799-601-9300	799-601-4101	799-601-4201	
799-601-4340*	Socket for engine (CRI-T3) Pump actuator	2	2, PA													●	●	
799-601-4380*	Socket for engine (CRI-T3) (95) Intake pressure/temperature	4	1, 2, 3, 4T															●
799-601-4260	Adapter for controller (ENG)	4	DTP4													●	●	
799-601-4211	Adapter for controller (ENG)	50	DRC50													●		
799-601-4220	Adapter for controller (ENG)	60	DRC60													●		
799-601-4390*	Socket for controller (95ENG)	60																●
799-601-4280*	Box for controller (PUMP)	121																●
799-601-9720	Adapter for controller (HST)	16	HST16A															●
799-601-9710	Adapter for controller (HST)	16	HST16B															●
799-601-9730	Adapter for controller (HST)	26	HST26A															●
799-601-9890	Multi-adapter for DT 2 to 4, DTM 2 pins	2, 3, 4																●
799-902-9600	T-adapter for ICT control box	26																●
799-902-9700	T-box	26																●

*: These are not T-adapters but sockets.

Failure code	Failure (Displayed on screen)	Applicable component	Action level	Category of history	Remarks
DWK0KY	FAILURE CODE [DWK0KY] 2-Stage Relief Solenoid Hot Short Circuit (40-897)	PUMP	L01	Electrical system	
DWK2KA	FAILURE CODE [DWK2KA] Variable Back Pressure Solenoid Open Circuit (40-899)	PUMP	L01	Electrical system	
DWK2KB	FAILURE CODE [DWK2KB] Variable Back Pressure Solenoid Short Circuit (40-901)	PUMP	L01	Electrical system	
DWK2KY	FAILURE CODE [DWK2KY] Variable Back Pressure Solenoid Hot Short Circuit (40-903)	PUMP	L01	Electrical system	
DWK8KA	FAILURE CODE [DWK8KA] Swing Pressure Cutoff Solenoid Open Circuit (40-905)	PUMP	L01	Electrical system	
DWK8KB	FAILURE CODE [DWK8KB] Swing Pressure Cutoff Solenoid Short Circuit (40-907)	PUMP	L01	Electrical system	
DWK8KY	FAILURE CODE [DWK8KY] Swing Pressure Cutoff Solenoid Hot Short Circuit (40-909)	PUMP	L01	Electrical system	
DWN5KA	FAILURE CODE [DWN5KA] Fan Clutch Solenoid Open Circuit (40-911)	PUMP	L03	Electrical system	
DWN5KB	FAILURE CODE [DWN5KB] Fan Clutch Solenoid short Circuit (40-913)	PUMP	L03	Electrical system	
DWN5KY	FAILURE CODE [DWN5KY] Fan Clutch Solenoid Hot Short Circuit (40-915)	PUMP	L03	Electrical system	
DXA8KA	FAILURE CODE [DXA8KA] Front Pump PC-EPC Solenoid Open Circuit (40-917)	PUMP	L03	Electrical system	
DXA8KB	FAILURE CODE [DXA8KB] Front Pump PC-EPC Solenoid Short Circuit (40-919)	PUMP	L03	Electrical system	
DXA9KA	FAILURE CODE [DXA9KA] Rear Pump PC-EPC Solenoid Open Circuit (40-921)	PUMP	L03	Electrical system	
DXA9KB	FAILURE CODE [DXA9KB] Rear Pump PC-EPC Solenoid Short Circuit (40-923)	PUMP	L03	Electrical system	
DXE0KA	FAILURE CODE [DXE0KA] LS-EPC Solenoid Open Circuit (40-925)	PUMP	L01	Electrical system	
DXE0KB	FAILURE CODE [DXE0KB] LS-EPC Solenoid Short Circuit (40-926)	PUMP	L01	Electrical system	
DXE4KA	FAILURE CODE [DXE4KA] Attachment Flow Regulating EPC Solenoid Open Circuit (40-928)	PUMP	—	Electrical system	
DXE4KB	FAILURE CODE [DXE4KB] Attachment Flow Regulating EPC Solenoid Short Circuit (40-930)	PUMP	—	Electrical system	
DXE4KY	FAILURE CODE [DXE4KY] Attachment Flow EPC Hot Short Circuit (40-932)	PUMP	—	Electrical system	
DXE5KA	FAILURE CODE [DXE5KA] Merge-divider Main Solenoid Open Circuit (40-934)	PUMP	L01	Electrical system	
DXE5KB	FAILURE CODE [DXE5KB] Merge-divider Main Solenoid Short Circuit (40-936)	PUMP	L01	Electrical system	
DXE6KA	FAILURE CODE [DXE6KA] Merge-divider LS Solenoid Open Circuit (40-938)	PUMP	L01	Electrical system	
DXE6KB	FAILURE CODE [DXE6KB] Merge-divider LS Solenoid Short Circuit (40-940)	PUMP	L01	Electrical system	

FAILURE CODE [AA10NX] Air Cleaner Clogging

Action level	Failure code	Failure	Air Cleaner Clogging (Machine monitor system)
L01	AA10NX		
Detail of failure	Air cleaner clogging switch signal voltage is not 1 V and below while engine is running, and machine monitor detects clogging of air cleaner (open of sensor contacts).		
Action of machine monitor	Displays air cleaner clogging monitor in yellow on machine monitor.		
Phenomenon on machine	If machine is used as it is, engine may be damaged.		
Related information	• Input (ON/OFF) from air cleaner clogging switch can be checked with monitoring function. (Code: 04501) • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Start the engine.		

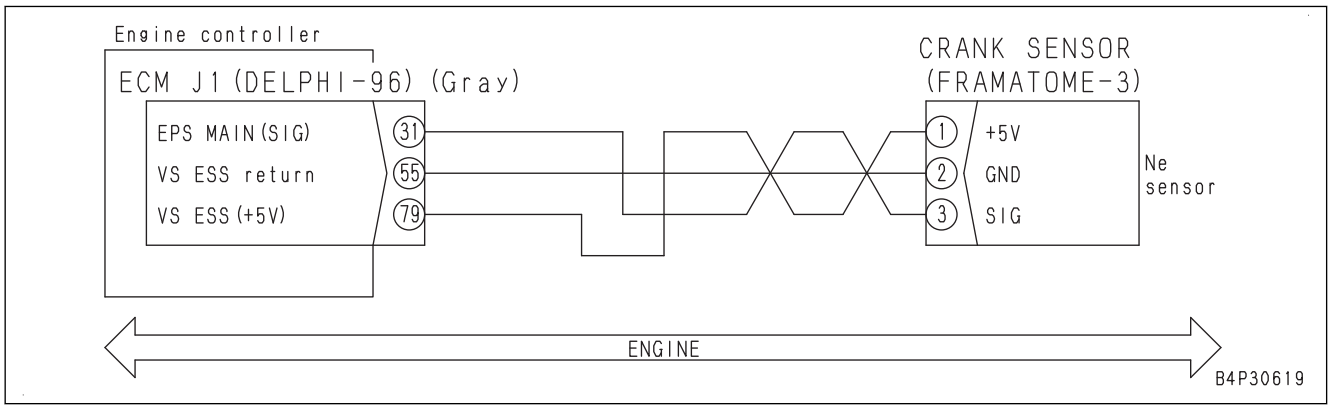
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Clogged air cleaner (when system works properly)	Air cleaner may be clogged. Check it for clogging and then clean or replace if clogged.		
2	Defective air cleaner clogging switch (internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector P23, and connect T-adapter to male side.		
		Resistance	Between P23 (male) (1) and (2)	Max. 1 Ω
3	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors CM02 and P23, and insert T-adapters to each female side.		
		Resistance	Between CM02 (female) (4) and P23 (female) (1)	Max. 1 Ω
			Between P23 (female) (2) and ground	Max. 1 Ω
4	Defective machine monitor	If failure code is still displayed after above checks, machine monitor is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.) Reference 1. Turn starting switch to OFF position. 2. Insert T-adapters into connectors CM01 and CM02. 3. Start engine.		
		Voltage	Between CM02 (4) and CM01 (3)	Max. 1 V

FAILURE CODE [CA122] Charge Air Pressure Sensor High Error

Action level	Failure code	Failure	Charge Air Pressure Sensor High Error (Engine controller system)
L03	CA122		
Details of failure	High voltage occurs in signal circuit of charge pressure sensor (boost pressure sensor).		
Action of controller	• Sets charge pressure (boost pressure) to fixed value (400 kPa {4.1 kg/cm^2}) for operation. • EGR valve closes and fully opens KVGT. • Engine power deration • Regeneration control stops.		
Phenomenon on machine	• Engine acceleration performance is poor. • Engine power deration		
Related information	• Signal voltage from charge pressure sensor (boost pressure sensor) can be checked by monitoring function. (Code: 36501 (V)) • Pressure (boost pressure) by charge pressure sensor (boost pressure sensor) can be checked by monitoring function. (Code: 36500 (kPa)) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared (note the engine power deration is not canceled right after the failure code is cleared).		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “c: Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position.			
		If this failure code is cleared, wiring harness connector is defective.			
2	Defective sensor power supply system	If failure code [CA352] or [CA386] is also displayed, perform troubleshooting these first.			
3	Defective charge (boost) pressure sensor	1. Turn starting switch to OFF position. 2. Disconnect connector BOOST PRESS & IMT. 3. Turn starting switch to ON position.			
		If failure code changes from [CA122] to [CA123], charge pressure (boost pressure) sensor is defective.			
		Reference 1. Turn starting switch to OFF position. 2. Insert T-adapter into connector ECM J1 or BOOST PRESS & IMT. 3. Turn starting switch to ON position.			
		Voltage	Between ECM J1 (45) and (54), or between BOOST PRESS & IMT (1) and (4)	Sensor output	0.3 to 4.7 V
4	Open circuit in wiring harness (ground line breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and BOOST PRESS & IMT, and connect T-adapters to each female side.			
		Resistance	Between ECM J1 (female) (54) and BOOST PRESS & IMT (female) (4)		Max. 10 Ω

CIRCUIT DIAGRAM (Ne SPEED SENSOR)



<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="7">2</td><td rowspan="7">Defective sensor or wiring harness</td><td colspan="3">1. Starting switch: OFF
2. Disconnect following connectors one by one and turn starting switch to ON position each time.
3. Each time troubleshooting is finished, return to step 1.
If this failure code is cleared, disconnected sensor or engine wiring harness is defective.
REMARK
Other failure codes are also displayed. This is because connector is disconnected. Ignore all failure codes except for [CA352].</td></tr>
<tr><td rowspan="6">Connector</td><td>Bkup speed sensor</td><td>CAM SENSOR</td></tr>
<tr><td>Charge (Boost) pressure sensor</td><td>BOOST PRESS & TEMPERATURE</td></tr>
<tr><td>Ambient pressure sensor</td><td>AMB.AIR PRESSURE</td></tr>
<tr><td>Crank case pressure sensor</td><td>P57</td></tr>
<tr><td>Engine wiring harness</td><td>ECM J1</td></tr>
<tr><td rowspan="3">3</td><td rowspan="3">Defective engine controller</td><td colspan="3">1. Turn starting switch to OFF position.
2. Disconnect connector ECM J1, and connect T-adapter to male side.
3. Turn starting switch ON with connector ECM J1 disconnected.
4. If no failure is found by this check, perform troubleshooting again from cause 1 before replacing the engine controller.</td></tr>
<tr><td>Voltage</td><td>Between ECM J1 (male) (78) and (54)</td><td>4.75 to 5.25 V</td></tr>
<tr><td colspan="3">If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</td></tr>
</table>

FAILURE CODE [CA553] Common Rail Pressure High Error 1

Action level	Failure code	Failure	Common Rail Pressure High Error 1 (Engine controller system)
L01	CA553		
Details of failure	Common rail pressure high error 1 (indicated pressure is higher than that which is assumed)		
Action of controller	None in particular		
Phenomenon on machine	Engine power deration		
Related information	• Signal voltage from common rail pressure sensor can be checked by monitoring function. (Code: 36401 (V)) • Common rail pressure in common rail pressure sensor can be checked by monitoring function. (Code: 36400 (MPa)) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective relevant system	If other failure codes are also displayed, perform troubleshooting for them.
2	Improper fuel is used.	Fuel used may be improper. Check it.
3	Defective connection of ground terminal	Ground terminal may be connected defectively. Check following terminals directly. • Ground terminal of machine ((-) terminal of battery) • Ground terminal of engine • Ground terminal of engine controller • Ground terminal of starting motor
4	Defective electrical system of common rail pressure sensor	Since common rail pressure sensor may have electrical defect, perform troubleshooting for following failure codes. [CA451], [CA452]
5	Defective mechanical system of common rail pressure sensor	Common rail pressure sensor may have mechanical trouble. Check it.
6	Defective overflow valve	Overflow valve spring may be broken, seat may be worn, and ball may be stuck. Check them.
7	Clogged overflow piping	Overflow piping may be clogged. Check it.
8	Defective pressure limiter	Pressure limiter may be defective mechanically. Check it.

FAILURE CODE [CA1664] KDOC Abnormality

Action level	Failure code	Failure	KDOC Abnormality (Engine controller system)
L03	CA1664		
Details of failure	During regeneration, KDOC inlet temperature sensor and KDOC outlet temperature sensor indicate similar values (temperature difference is approximately within 10°C).		
Action of controller	• EGR valve closed. • Engine power deration • Regeneration control stops. • Fuel dosing stops.		
Phenomenon on machine	Engine power deration		
Related information	**⚠ The temperature of KDPF and KDOC becomes hot (Min. 500 °C). Be careful not to get burned.** • The KDOC inlet temperature sensor, the KDOC outlet temperature sensor, and the KDPF outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • Temperature in KDOC inlet temperature sensor can be checked by monitoring function. (Code: 47300 (°C)) • Temperature in KDOC outlet temperature sensor can be checked by monitoring function. (Code: 47400 (°C)) • Temperature in KDPF outlet temperature sensor can be checked by monitoring function. (Code: 47200 (°C)) • KDOC inlet temperature, KDOC outlet temperature, and KDPF outlet temperature when at low idle speed (KDPF regeneration is not executed) are 100 to 250 °C, and difference between these temperatures is approximately 10 °C. (KDOC inlet temperature > KDOC outlet temperature > KDPF outlet temperature) • When manual stationary regeneration is in progress, KDOC inlet temperature is 250 to 400 °C, and KDOC outlet temperature and KDPF outlet temperature are 450 to 600 °C. • As to procedure for accessing KDPF temperature sensor, see “50 Disassembly and assembly”, “Removal and installation of KDPF assembly” and “Disassembly and assembly of KDPF assembly”. • Engine controller stops after starting switch is turned to OFF position and AdBlue/DEF is retracted (for up to 6 minutes). So when you restart engine, wait until the system operating lamp goes out after starting switch is turned OFF, and then turn the starting switch to ON position. • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared (note that the engine power deration is not canceled only by the failure code is cleared). **NOTICE** • **This failure code requires “Loaded Diagnostics Operation To Clear Failure Code”. After investigating the cause of the problem and completing the repair, perform “Loaded Diagnostics Operation To Clear Failure Code” to make sure the failure code is cleared. (This failure code is not cleared by only turning ON the starting switch again.)** • **Before performing “Loaded Diagnostics Operation To Confirm Failure Correction”, firstly “Setting and operating machine monitor”, Service mode, Testing menu (Engine Controller Active Fault Clear) to be performed to clearer this failure code.**		

No.	Cause	Procedure, measuring location, criteria and remarks
3	Mechanical failure of AdBlue/DEF tank heating valve	See Testing and adjusting, “service modes” of “setting and operating machine monitor”, “operating method of testing menu (SCR service test)” to perform an “AdBlue/DEF tank heater relay test” and check if the AdBlue/DEF tank heater valve is driven normally. Confirm that the AdBlue/DEF tank heating valve operates in response to 19102 “AdBlue/DEF Tank HtrValve Command” (switches between 0 and 1). 1. Remove the coolant hose from the outlet side of the AdBlue/DEF tank heating valve, and plug the removed hose. 2. Start the engine. 3. Perform an “AdBlue/DEF tank heater relay test” to drive the AdBlue/DEF tank heating valve. 4. Make sure that coolant flows out in response to valve open and close commands. If coolant flows out regardless of valve open and close commands, replace the AdBlue/DEF tank heating valve. **REMARK** If coolant flows out in response to valve operation, the AdBlue/DEF tank heating valve is normal.
4	Defective AdBlue/DEF tank temperature sensor	Perform “Loaded Diagnostics Operation To Confirm Failure Correction”. If the AdBlue/DEF tank temperature does not rise correctly, replace the AdBlue/DEF tank sensor.
5	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Loaded Diagnostics Operation to Confirm Failure Correction

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

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

1. Turn the starting switch to OFF position, and shut down the engine controller.
2. Turn the starting switch to ON position.
3. Check if monitoring code 19102 “AdBlue/DEF Tank HtrValve Command” is not issued (0) on “Pre-defined Monitoring” screen.
4. Start the engine and check the monitoring code 19115 “AdBlue/DEF Temperature in Tank”.
5. Raise monitoring code 04107 “Coolant Temperature” to the degree 10 °C or more than AdBlue/DEF tank temperature.
6. Check again if the monitoring code 19102 “AdBlue/DEF Tank HtrValve Command” is not issued (0) on the “Pre-defined Monitoring” screen.
7. Check if monitoring code 19115 “AdBlue/DEF Temperature in Tank” is 1 °C or less after a lapse of 5 minutes after starting the engine.
8. After the repair is completed, see “CLASSIFICATION AND PROCEDURES OF TROUBLESHOOTING” to clear the failure code and make sure that the failure code has been cleared from the Abnormality Record screen.

REMARK

If the monitoring code 19115 “AdBlue/DEF Temperature in Tank” is 2 °C or more, return to troubleshooting.

Related information	⚠ **Since KDOC and KDPF are heated to 500 °C or above, be careful not to get burned.** • Temperature detected by KDOC inlet temperature sensor can be checked with monitoring function. (Code: 47300 (°C)) • Temperature detected by KDOC outlet temperature sensor can be checked with monitoring function. (Code: 47400 (°C)) • Temperature detected by KDPF outlet temperature sensor can be checked with monitoring function. (Code: 47200 (°C)) • Signal voltage from KDPF differential pressure sensor can be checked by monitoring function. (Code: 47101 (V)) • Differential pressure in KDPF differential pressure sensor can be checked by monitoring function. (Code: 47100 (kPa)) • KDOC inlet temperature, KDOC outlet temperature, and KDPF outlet temperature when at low idle speed (KDPF regeneration is not executed) are approximately 100 to 250 °C, and difference between these temperatures is approximately 10 °C. (KDOC inlet temperature > KDOC outlet temperature > KDPF outlet temperature) • When manual stationary regeneration is in progress, KDOC inlet temperature is approximately 250 to 400 °C, and KDOC outlet temperature and KDPF outlet temperature are approximately 450 to 550 °C. • The KDOC inlet temperature sensor, the KDOC outlet temperature sensor, and the KDPF outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • Test exhaust gas color. For details, see “TESTING AND ADJUSTING”, “TEST EXHAUST GAS COLOR”. • Soot accumulation amount in KDPF is classified into 8 levels. Current soot accumulation level can be checked in 02 Active Regeneration for Service screen of machine monitor. • Manual stationary regeneration downs soot accumulation level 7 from level 8 by removing soot. • If soot accumulation level is 8, failure code [CA1922] is displayed. At this time, KDPF is completely clogged with soot and inspection, cleaning or replacement is required. • If another failure code is displayed (including when manual stationary regeneration is in progress), perform troubleshooting for these failure codes first. • If failure code [CA1922] is originally displayed, failure code changes from [CA1922] to [CA1921] in troubleshooting process. In this case, see failure code [CA1922]. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared (note the engine power deration is not canceled right after the failure code is cleared). Time required for the manual stationary regeneration depends on the accumulated soot in KCSF, however, it is estimated as follows. • If soot accumulation is level 4: Approximately 40 minutes to 1 hour • If soot accumulation is level 5: Approximately 1 to 2 hours • If soot accumulation is level 6 or 7: Approximately 2 to 3 hours • If soot accumulation is level 8: Manual stationary regeneration cannot be performed. Cause for excessive soot accumulation

FAILURE CODE [CA2353] EGR Valve Solenoid Short Circuit Error

Action level	Failure code	Failure	EGR Valve Solenoid Short Circuit Error (Engine controller system)
L03	CA2353		
Detail of failure	Short circuit occurs in EGR valve solenoid drive circuit.		
Action of controller	• Engine power deration. • EGR valve closed. • Regeneration control stops. • Advances to Inducement strategy. (EU Specification)		
Phenomenon on machine	• Engine power deration • Engine output is reduced based on inducement strategy. (EU Specification).		
Related information	• Signal current to EGR valve solenoid can be checked with monitoring function. (Code: 48600 (mA)) • Engine power deration is canceled when the failure code is cleared and the starting switch is turned OFF (not canceled only by deactivation of the failure code). • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “c: Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Defective EGR valve solenoid (internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector EGR-SOL, and connect T-adapter to male side.		
		Resistance	Between EGR-SOL (male) (1) and (2)	5 to 10 Ω
			Between EGR-SOL (male) (1) and ground	Min. 100 MΩ
3	Short circuit of connector box	1. Turn starting switch to OFF position. 2. Disconnect connectors INTER-CONNECT and EGR-SOL, and connect T-adapters to male side of INTER-CONNECT.		
		Continuity	Between INTER-CONNECT (male) (1) and each pin other than pin (1)	No continuity
4	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector INTER-CONNECT, and connect T-adapter to female side. 3. Turn starting switch to ON position (with connector INTER-CONNECT disconnected). **REMARK** hot short circuit in negative line		
		Voltage	BetweenINTER-CONNECT (female) (2) and ground	Max. 3 V
5	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

FAILURE CODE [CA2771] SCR Outlet NOx Sensor Datalink Timeout Error

Action level	Failure code	Failure	SCR Outlet NOx Sensor Datalink Timeout Error (Engine controller system)
L01	CA2771		
Detail of failure	The engine controller does not receive SCR outlet NOx sensor data due to a communication error with the SCR outlet NOx sensor.		
Action of controller	• Runs the controller using the default NOx emission value (0 ppm). • Advances to Inducement strategy.		
Phenomenon on machine	• NOx emission may increase or ammonia may be exhausted because AdBlue/DEF injection works inappropriately. • Engine output is reduced based on inducement strategy. • SCR outlet NOx concentration detection error		
Related information	⚠ **The turbocharger outlet, the sensor installation piping, KDPF, and KDOC become hot (Min. 500 °C). Be careful not to get burned.** ⚠ **SCR assembly, the sensor installation piping, and the sensor probe become hot (Min. 400 °C). Be careful not to get burned.** ⚠ **Be careful not to get burned by the sensor probe as it is heated by itself even if the ambient temperature is not high.** • SCR outlet NOx sensor is a smart sensor which communicates with the engine controller via CAN along with other sensors. • This failure code is displayed if the sensor connector or a smart sensor (power supply) relay connector is removed. • CAN communication failure codes related to engine sensors include [CA2771], [CA3232], [CA3868], [CA3911], [CA4151], and [CA4152]. If all of these failure codes are displayed, a defect in any of the 6 sensors, a defective smart sensor power supply relay/relay system or a ground fault or short circuit or hot short circuit in wiring harness (CAN communication line) can be suspected. • Since signal of active CAN communication line is pulse voltage, it cannot be measured by using multimeter. • AdBlue/DEF tank sensor consists of the AdBlue/DEF level sensor, AdBlue/DEF temperature sensor, and AdBlue/DEF quality sensor and is integrated into one sensor controller which provides CAN communication with the engine controller. • The KDPF temperature sensor consists of the KDOC inlet temperature sensor, the KDOC outlet temperature sensor, and the KDPF outlet temperature sensor and is integrated into one sensor controller which provides CAN communication with the engine controller. • For replacement of the KDPF temperature sensor, see DISASSEMBLY AND ASSEMBLY, “DISASSEMBLE AND ASSEMBLE KDPF ASSEMBLY”. • The SCR temperature sensor and the SCR outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • For replacement of the SCR temperature sensor, see DISASSEMBLY AND ASSEMBLY, “Remove and install SCR temperature sensor”. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “C Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position. If this failure code is cleared, wiring harness connector is defective.

No.	Cause	Procedure, measuring location, criteria and remarks
2	Defective KDPF system (Abnormal exhaust gas temperature to SCR)	1. If failure code [CA3251] is displayed, perform troubleshooting for [CA3251]. 2. If failure code [CA3253], [CA3254], or [CA3311] is displayed, perform troubleshooting for [CA3253], [CA3254], or [CA3311]. 3. If failure code [CA3255], [CA3256], or [CA3312] is displayed, perform troubleshooting for [CA3255], [CA3256], or [CA3312].
3	Defective SCR temperature sensor (installation error or malfunction)	See “Chapter 50 DISASSEMBLY AND ASSEMBLY”, “REMOVE AND INSTALL SCR ASSEMBLY” and fix installation error, if any.
4	Improper AdBlue/DEF quality	1. Turn starting switch to ON position. 2. If failure code [CA4277] is displayed or failure code [CA4277] is logged on the abnormality record screen, perform troubleshooting these first. 3. Confirm the “AdBlue/DEF concentration” on the Pre-defined Monitoring screen (normal value: 29 to 36 %). 4. If failure code is still displayed after above checks, it may be contaminated. Replace the AdBlue/DEF in the tank. 5. Replace the AdBlue/DEF injector. 6. Perform “Loaded Diagnostics Operation To Confirm Failure Correction”.
5	Defective SCR outlet temperature sensor (internal defect)	1. If the failure code persists after the above checks, replace the SCR temperature sensor. 2. Perform “Loaded Diagnostics Operation To Confirm Failure Correction”.
		If the failure code is cleared, the SCR temperature sensor may be defective.
6	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Loaded Diagnostics Operation To Confirm Failure Correction

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

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

REMARK

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

1. Clear this failure code by “Engine Controller Inducement Fault Clear”.
2. Turn the starting switch to OFF position, and shut down the engine controller.
3. Turn starting switch to ON position, and start the engine.
4. Run the engine at low idle speed for approximately 1 minute.
5. After warm-up operation, set the swing lock to ON, the working mode to P, and set fuel control dial to MAX position.
6. Run the engine at high idle speed for 15 minutes.
7. If this failure code is not displayed, repair is completed.

No.	Cause	Procedure, measuring location, criteria and remarks
3	Mechanical failure of AdBlue/DEF tank heating valve	See “TESTING AND ADJUSTING”, “SERVICE MODE” of “SETTING AND OPERATION MACHINE MONITOR”, “METHOD FOR SETTING WITH TESTING MENU (SCR SERVICE TEST)” to perform an “AdBlue/DEF TANK HEATER RELAY TEST” and check if the AdBlue/DEF tank heater valve is driven normally. Confirm that the AdBlue/DEF tank heating valve operates in response to 19102 “AdBlue/DEF Tank HtrValve Command” (switches between 0 and 1). 1. Remove the coolant hose from the outlet side of the AdBlue/DEF tank heating valve, and plug the removed hose. 2. Start the engine. 3. Perform an “AdBlue/DEF TANK HEATER RELAY TEST” to drive the AdBlue/DEF tank heating valve. 4. Make sure that coolant flows out in response to valve open and close commands. **REMARK** If coolant flows out in response to valve operation, the AdBlue/DEF tank heating valve is normal. If coolant does not flow out: Increase the temperature of the inlet side coolant hose to make sure that the coolant flows out. 1. If coolant flows out from the inlet side coolant hose, replace the AdBlue/DEF tank heating valve. 2. If coolant does not flow out from the inlet side coolant hose, clogging of the coolant circuit is suspected.
4	Failure of engine coolant circuit	• Check if the engine coolant circuit in the engine or AdBlue/DEF tank is leaking or clogged. • Also check whether amount of engine coolant is appropriate. If there are some problems, repair the relevant portions.
5	Defective AdBlue/DEF tank temperature sensor	Perform “Loaded Diagnostics Operation To Confirm Failure Correction”. If the AdBlue/DEF tank temperature does not rise correctly, replace the AdBlue/DEF tank sensor.
6	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Loaded Diagnostics Operation To Confirm Failure Correction

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

1. Turn the starting switch to OFF position, and shut down the engine controller.
2. Start the engine and confirm 19115“AdBlue/DEF tank temperature” on the Pre-defined Monitoring screen.
3. Conduct warm-up operation and raise the 4107 “engine coolant temperature” to 20 °C or more.
   1) When the 19115 “AdBlue/DEF tank temperature” is less than 1 °C

      If the 4107 “ engine coolant temperature” becomes 0 °C or more, the 19102 “AdBlue/DEF Tank HtrValve Command” is issued (0 to 1).

      Confirmation will be completed if the AdBlue/DEF tank temperature becomes 4 °C or more within an hour after the AdBlue/DEF tank heating valve open and close command is issued.
   2) When the 19115 “AdBlue/DEF tank temperature” is 1 °C or more

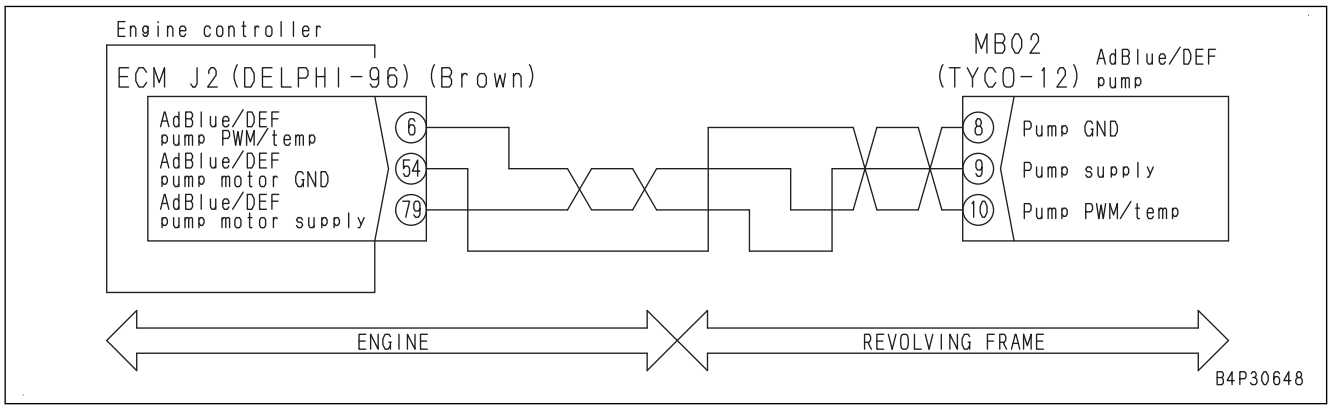
      Conduct warm-up operation and raise the 4107 “engine coolant temperature” to ambient temperature + 20 °C or more.
   3) See “TESTING AND ADJUSTING”, “Service mode” and “Inspection menu (SCR Service Test)” in “SETTING AND OPERATION OF MACHINE MONITOR” to perform “AdBlue/DEF tank heater relay test”.

FAILURE CODE [CA3316] KDOC Outlet Temperature Sensor Low Error

Action level	Failure code	Failure	KDOC Outlet Temperature Sensor Low Error (Engine controller system)
L03	CA3316		
Detail of failure	Ground fault or sensor circuit error in KDOC outlet temperature sensor measuring section or probe (+)		
Action of controller	• As the KDOC outlet temperature cannot be detected, substitute the KDOC inlet temperature for the KDOC outlet temperature and run the engine (if the KDOC inlet temperature sensor also has an error, use a fixed value (250 °C). • Engine power deration • AdBlue/DEF injection stops • EGR valve closed. • Regeneration control stops. • Fuel dosing stops.		
Phenomenon on machine	• NOx emission increases because AdBlue/DEF injection is disabled. • Defective forcible regeneration control. • KDPF Soot Accumulation High. • Engine power deration.		
Related information	⚠ **Be careful not to get burned as the temperature of KDPF and KDOC rises up over 500 °C.** • The KDOC inlet temperature sensor, the KDOC outlet temperature sensor, and the KDPF outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • Ground fault or sensor circuit error in KDOC outlet temperature sensor measuring section or probe (+) is sent to the engine controller via CAN communication, and this failure code is displayed. • For details of access to the KDOC inlet temperature sensor, the KDOC outlet temperature sensor, and the KDPF outlet temperature sensor, see “Chapter 50 Disassembly and assembly”, “Removal and installation of KDPF assembly” and “Disassembly and assembly of KDPF assembly”. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared (note that the engine power deration is not canceled only by the failure code is cleared).		

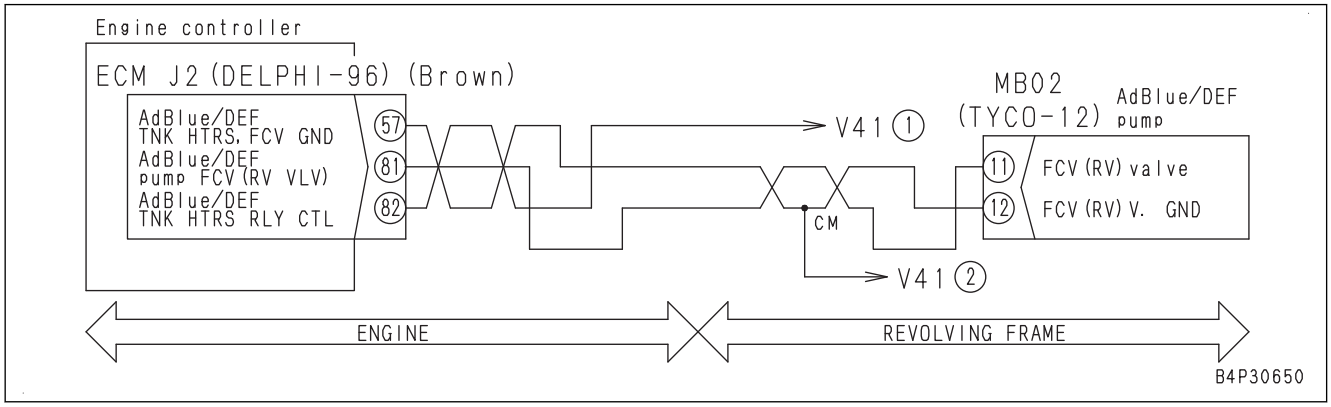
No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “c: Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position.
		If this failure code is cleared, wiring harness connector is defective.
2	Defective KDOC outlet temperature sensor	1. Check the sensor connector for contamination and damage. 2. Turn starting switch to OFF position. 3. Replace KDPF temperature sensor. 4. Turn starting switch to ON position.
		If this failure code is cleared, the original KDOC outlet temperature sensor is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)

Circuit diagram related to AdBlue/DEF pump

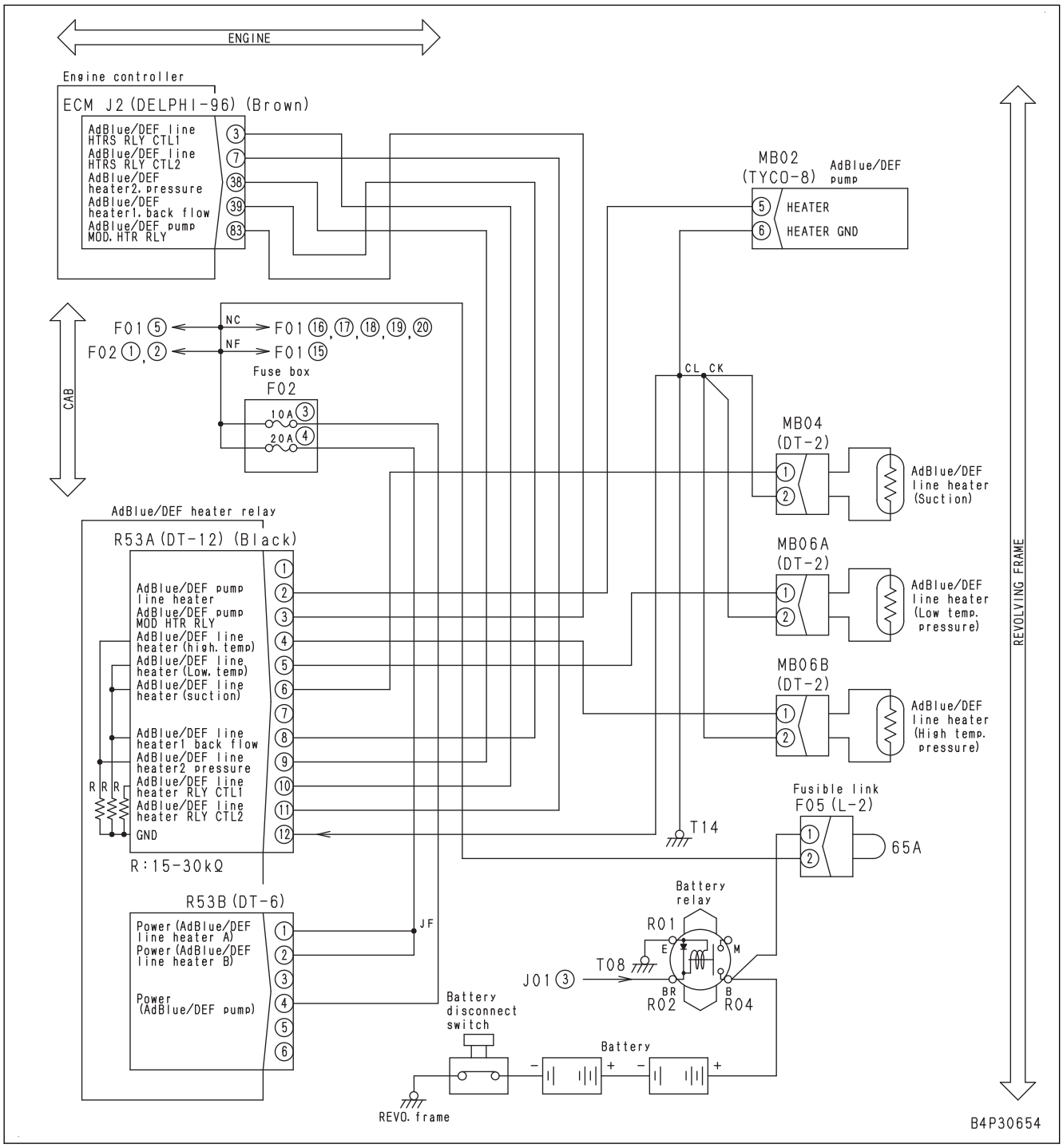


No.	Cause	Procedure, measuring location, criteria and remarks			
3	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J2 and MB02, and connect T-adapter to female side of ECM J2.			
		Continuity	Between ECM J2 (female) (81) and each pin other than (81)		No continuity (no sound)
4	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J2 and MB02 and connect T-adapters to each female side. Open circuit in GND line			
		Resistance	Between ECM J2 (female) (32) and MB02 (female) (4)		Max. 10 Ω
5	Defective AdBlue/DEF FCV	1. Turn starting switch to OFF position. 2. Disconnect connector MB02, and connect T-adapter to male side.			
		Resistance	Between MB02 (male) (11) and (12)	Temperature 23±5 °C	21.1±3 Ω
6	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)			

Circuit diagram related to AdBlue/DEF FCV

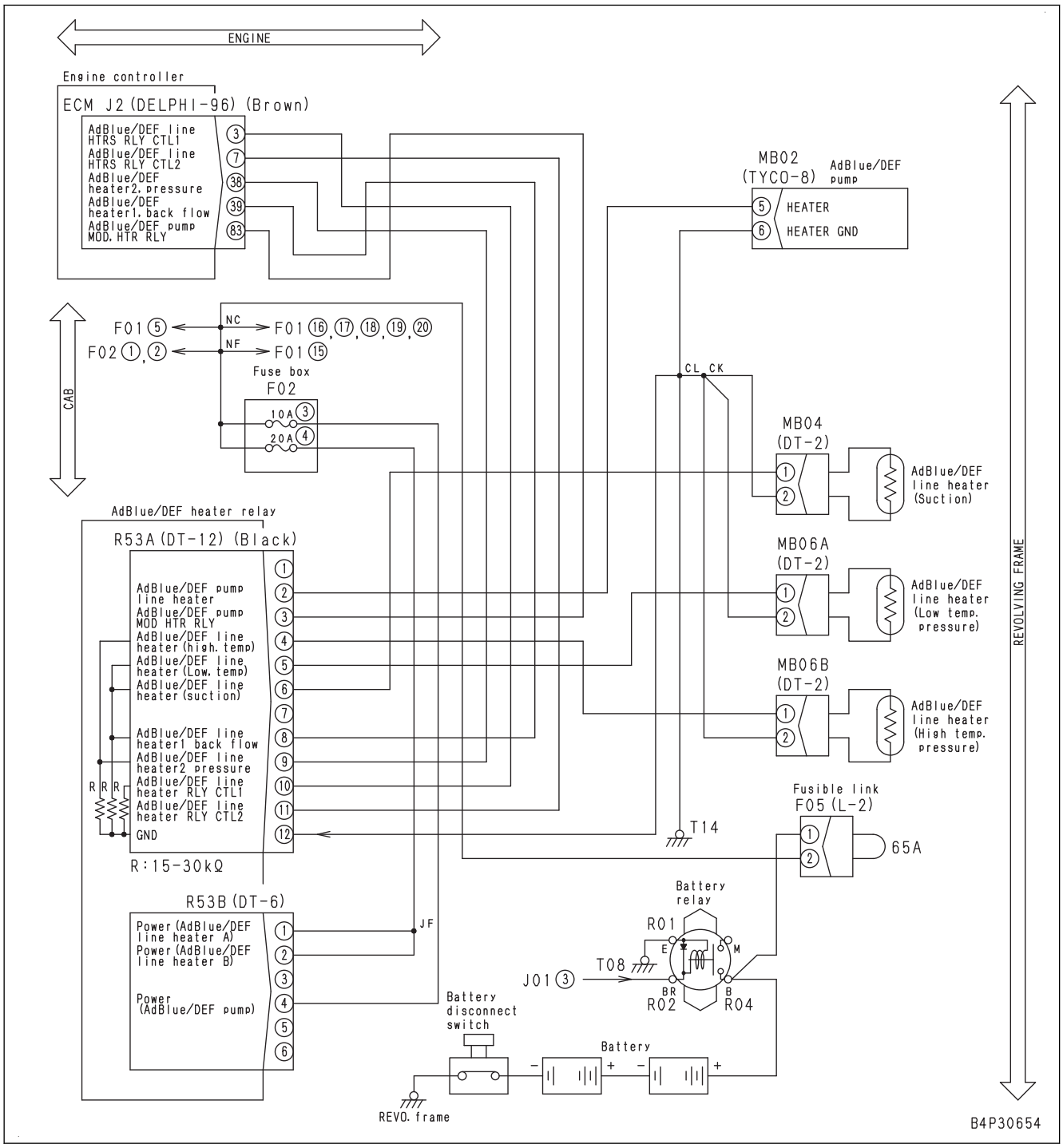


Circuit diagram related to AdBlue/DEF line heater



<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="3">3</td><td rowspan="3">Open circuit in wiring harness (wire breakage or defective contact of connector) (broken power line)</td><td colspan="3">If no failure is found by above results, this check is not required.
1. Turn starting switch to OFF position.
2. Disconnect connectors R52 and E32 and connect T-adapters to each female side.</td></tr>
<tr><td rowspan="2">Resistance</td><td>Between R52 (female) (7) and E32 (female) (1)</td><td>Max. 10 Ω</td></tr>
<tr><td>Between E32 (female) (4) and ground</td><td>Max. 10 Ω</td></tr>
<tr><td rowspan="7">4</td><td rowspan="7">Open circuit in wiring harness (wire breakage or defective contact of connector) (broken communication line)</td><td colspan="3">• Communication line
If failure code (no open circuit) is still displayed after above checks in cause 2, this check is not required.
1. Turn starting switch to OFF position.
2. Check that system operating lamp does not light up, and then turn battery disconnect switch to OFF position.
3. Disconnect connectors ECM J2, E26, K10, and K11 and connect T-adapters to each female side.</td></tr>
<tr><td rowspan="6">Resistance</td><td>Between ECM J2 (female) (21) and E32 (female) (2)</td><td>Max. 10 Ω</td></tr>
<tr><td>Between ECM J2 (female) (45) and E32 (female) (3)</td><td>Max. 10 Ω</td></tr>
<tr><td>Between K10 (female) (A) and E32 (female) (2)</td><td>Max. 10 Ω</td></tr>
<tr><td>Between K10 (female) (B) and E32 (female) (3)</td><td>Max. 10 Ω</td></tr>
<tr><td>Between K11 (female) (A) and E32 (female) (2)</td><td>Max. 10 Ω</td></tr>
<tr><td>Between K11 (female) (B) and E32 (female) (3)</td><td>Max. 10 Ω</td></tr>
<tr><td rowspan="3">5</td><td rowspan="3">Ground fault in wiring harness (contact with ground circuit)</td><td colspan="3">f failure code (no open circuit) is still displayed after above checks in cause 2, measure resistance at any one place in Hi line and Lo line.
1. Turn starting switch to OFF position.
2. Check that system operating lamp does not light up, and then turn battery disconnect switch to OFF position.
3. Disconnect all related connectors, and connect T-adapter to the female side of the connector to be measured.</td></tr>
<tr><td rowspan="2">Resistance</td><td>Between one of ECM J2(female)(21),K10(female)(A),K11(female)(A),E31(female)(3),E32(female)(2),E26(female)(3),E34(female)(3),E36(female)(3),P63(female)(2) and ground</td><td>Min.100 kΩ</td></tr>
<tr><td>Between one of ECM J2(female)(45), K10(female)(B), K11(female)(B), E31(female)(2), E32(female)(3), E26(female)(2), E34(female)(2), E36(female)(2), P63(female)(1) and ground</td><td>Min.100 kΩ</td></tr>
<tr><td rowspan="3">6</td><td rowspan="3">Hot short circuit in wiring harness</td><td colspan="3">f failure code (no open circuit) is still displayed after above checks in cause 11, measure resistance at any one place in Hi line and Lo line.
1. Turn starting switch to OFF position.
2. Check that system operating lamp does not light up, and then turn battery disconnect switch to OFF position.
3. Insert T-adapter into one of the related connectors.
4. Set battery disconnect switch to ON position.
5. Turn starting switch to ON position.</td></tr>
<tr><td rowspan="2">Voltage</td><td>Between one of ECM J2(21), K10(A), K11(A), E31(3), E32(2), E26(3), E34(3), E36(3), or P63(2) and ground</td><td>1 to 4 V</td></tr>
<tr><td>Between one of ECM J2(45), K10(B), K11(B), E31(2), E32(3), E26(2), E34(2), E36(2), or P63(1) and ground</td><td>1 to 4 V</td></tr>
</table>

Electrical circuit diagram related to AdBlue/DEF heater relay



Loaded Diagnostics Operation to Confirm Failure Correction

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

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

1. Turn the starting switch to ON position (Do not start the engine).
2. Check if monitoring code 19136 “AdBlue/DEF Pump Temperature” is 45 °C or below (If not, wait until monitoring code 19136 “AdBlue/DEF Pump Temperature” falls down to below 45 °C).
3. See “TESTING AND ADJUSTING”, “Service mode” and “Inspection menu (SCR Service Test)” in “SETTING AND OPERATION OF MACHINE MONITOR” to perform “AdBlue/DEF Pump Heater Relay Test”.
4. When the increase of monitoring code 19136“AdBlue/DEF Pump Temperature” is 5 °C or more from the start of testing within 30 minutes, repair is completed.
5. After the repair is completed, see “CLASSIFICATION AND PROCEDURES OF TROUBLESHOOTING” to clear the failure code and make sure that the failure code has been cleared from the Abnormality Record screen.

REMARK

When the increase of “AdBlue/DEF Pump Temperature is not ” 5 °C or more from the start of testing after 30 minutes, return to troubleshooting.

FAILURE CODE [CA4658] AdBlue/DEF Flow Low Error

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

FAILURE CODE [D110KB] Battery Relay Output Short Circuit

Action level	Failure code	Failure	Battery Relay Output Short Circuit (Pump controller system)
L01	D110KB		
Detail of failure	Abnormal current flows when outputting 24 V to battery relay primary circuit (coil side).		
Action of controller	Stops 24 V output to battery relay primary circuit (coil side). Even if cause of failure disappears, machine does not become normal until starting switch is turned to OFF position.		
Phenomenon on machine	Each controller may fail in writing of data into its ROM (non-volatile memory).		
Related information	• As T-adapter for pump controller connector is “socket-type box”, operating voltage cannot be measured at pump controller connector. • Output (ON/OFF) to battery relay can be checked with monitoring function. (Code: 03700 Controller output 1) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch from ON to OFF position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective battery relay (internal short circuit)	1. Turn starting switch to OFF position.		
		Continuity	Between terminals R01 and R02	Continuity
2	Ground fault in wiring harness (Contact with ground circuit)	1. Turn starting switch to OFF position. 2. Turn battery disconnect switch to OFF position (to prevent short circuit during work). 3. Disconnect terminals R01 and R02, and disconnect connectors D01, H15, and CP02.		
		Resistance	Between terminal R02 (BR) and ground	Min. 1 MΩ
			Between ground and terminal CP02 (female) (108), R02 (harness side), D01 (female) (1) or (2)	Min. 1 MΩ
3	Defective pump controller	If no failure is found by preceding checks, pump controller is defective. • Reference 1. Turn starting switch to OFF position. 2. Insert T-adapter to connector D01. 3. Turn starting switch to ON position. 4. Measure voltage within several seconds after turning staring switch to OFF position from ON position.		
		Voltage	Between D01 (1) and ground	20 to 30 V

FAILURE CODE [DA2QKR] Controller Area Network 2 Defective Communication (Pump Controller)

Action level	Failure code	Failure	Controller Area Network 2 Defective Communication (Pump Controller) (Machine monitor system)
L03	DA2QKR		
Detail of failure	Machine monitor does not recognize pump controller through CAN communication 2 line (KOMNET/c).		
Action of controller	Retains information at time of occurrence of failure.		
Phenomenon on machine	Information to be obtained from pump controller is not displayed and special functions that need information do not work. Or update of received data is stopped (such as failure codes and monitoring codes sent from the pump controller).		
Related information	• After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • Start of CAN communication is recognized by each controller when ACC signal of starting switch is received. • 4 different failure codes, [DA2QKR], [DB2QKR], [D8AQKR], and [DAZQKR], are used for defective CAN communication by CAN2 when it is detected by machine monitor. When all of these 4 failure codes are displayed, ground fault, short circuit or hot short in wiring harness (CAN communication circuit) can be suspected. Since air conditioner is also operated through CAN communication, you must, in such case, check on air conditioner screen whether air conditioner is operable (ON/OFF and air flow of air conditioner). • This may occur even when power is not supplied to pump controller. **REMARK** Air conditioner can be controlled even when failure code is displayed on screen. If air conditioner is controlled, wiring harness (CAN communication line) does not have ground fault, short circuit, or hot short circuit. • Since each controller and machine monitor are connected directly to battery, they are supplied with power even after starting switch is turned to OFF position. • Since signal of active CAN communication line is pulse voltage, it cannot be measured by using multimeter.		

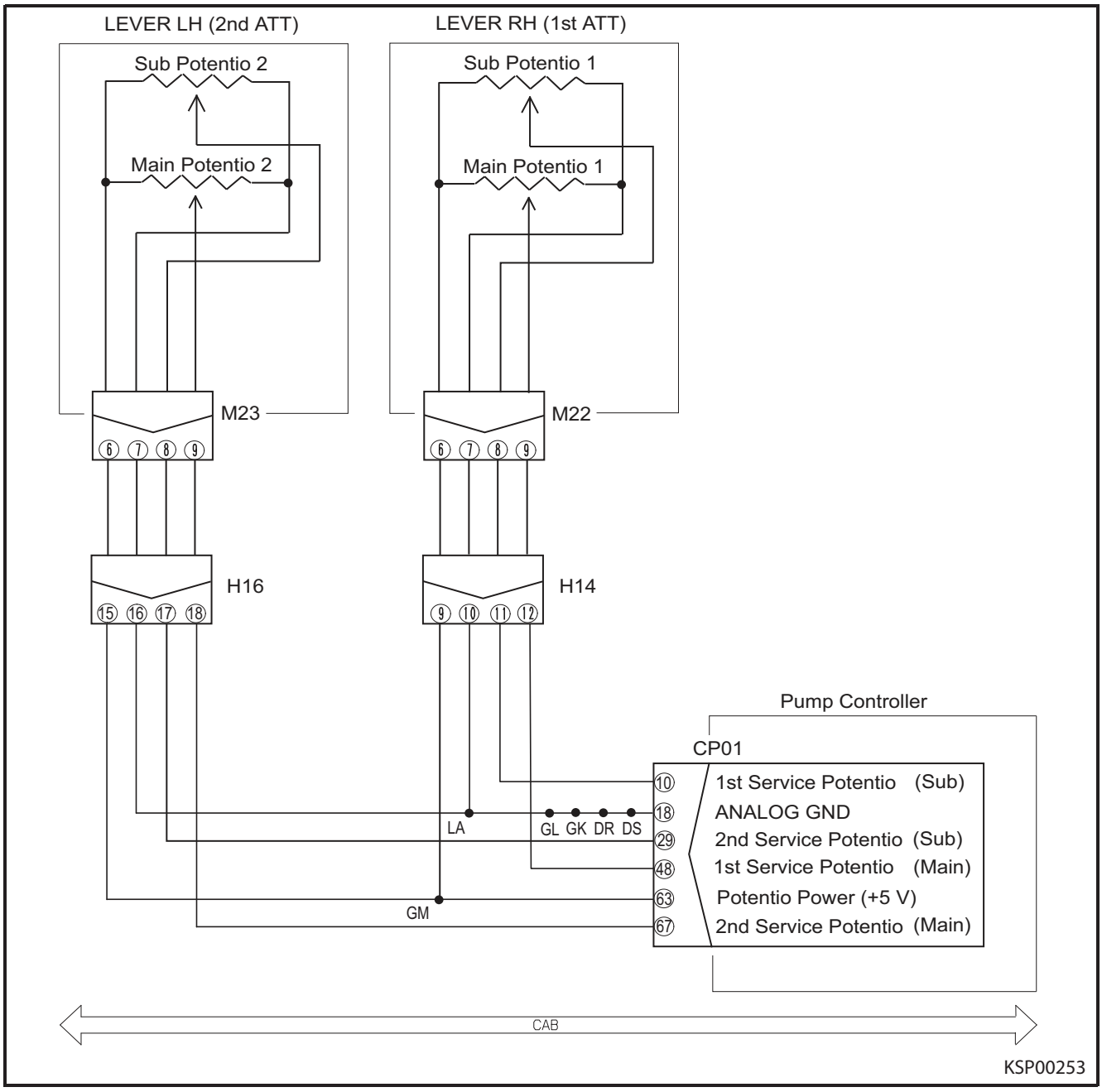
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective fusible link F05	1. Turn starting switch to OFF position. 2. Disconnect fusible link F05 and connect T-adapter to female side.		
		Resistance	Between F05 (female) (1) and (2)	Max. 1 Ω
		REMARK If fusible link is blown, circuit may have ground fault.		
2	Defective fuse No. 17 in fuse box F01.	1. Turn starting switch to OFF position. 2. Remove fuse No. 17 in fuse box F01. If fuse is blown, circuit probably has ground fault.		

FAILURE CODE [DB2RKR] CAN 1 Defective Communication (Engine Controller)

Action level	Failure code	Failure	CAN 1 Defective Communication (Engine Controller) (Machine monitor system)
L04	DB2RKR		
Detail of failure	Machine monitor does not recognize engine controller over CAN communication-1 line (KOMNET/r).		
Action of controller	Retains current working mode. Retains current selection of auto-deceleration. Retains information at time of occurrence of failure.		
Phenomenon on machine	Information to be obtained from engine controller is not displayed and special functions that need information do not work. Or update of received data is stopped. Engine is uncontrollable. Engine speed and coolant temperature are undetectable. A gauge pointer for engine coolant temperature and hydraulic oil temperature disappears on machine monitor screen.		
Related information	• After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • Start of CAN communication is recognized by each controller when ACC signal of starting switch is received. • If failure code [DB2QKR] is also displayed, defective engine controller (cause 1) is a possible cause. • Machine monitor uses failure code [DA2RKR] to indicate failure in CAN communication over CAN1 line. When failure code [DA2RKR] is displayed simultaneously on screen, there may be a ground fault, short circuit, or hot short circuit in wiring harness (CAN communication line). • CAN1 terminating resistor is located in the center of the machine monitor on operator's side. • Since each controller and machine monitor are connected directly to battery, they are supplied with power even after starting switch is turned to OFF position. • Since signal of active CAN communication line is pulse voltage, it cannot be measured by using multimeter.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective engine controller system	Perform checks on causes 1 to 3 in troubleshooting for failure code [DB2QKR].		
2	Defective CAN terminating resistor (internal open or short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors CM02 and TERMINATOR PORT, and connect T-adapters to male side.		
		Resistance	Between TERMINATOR PORT (male) (A) and (B)	120±12 Ω
			Between CM02 (male) (10) and (12)	120±12 Ω

Related circuit diagram

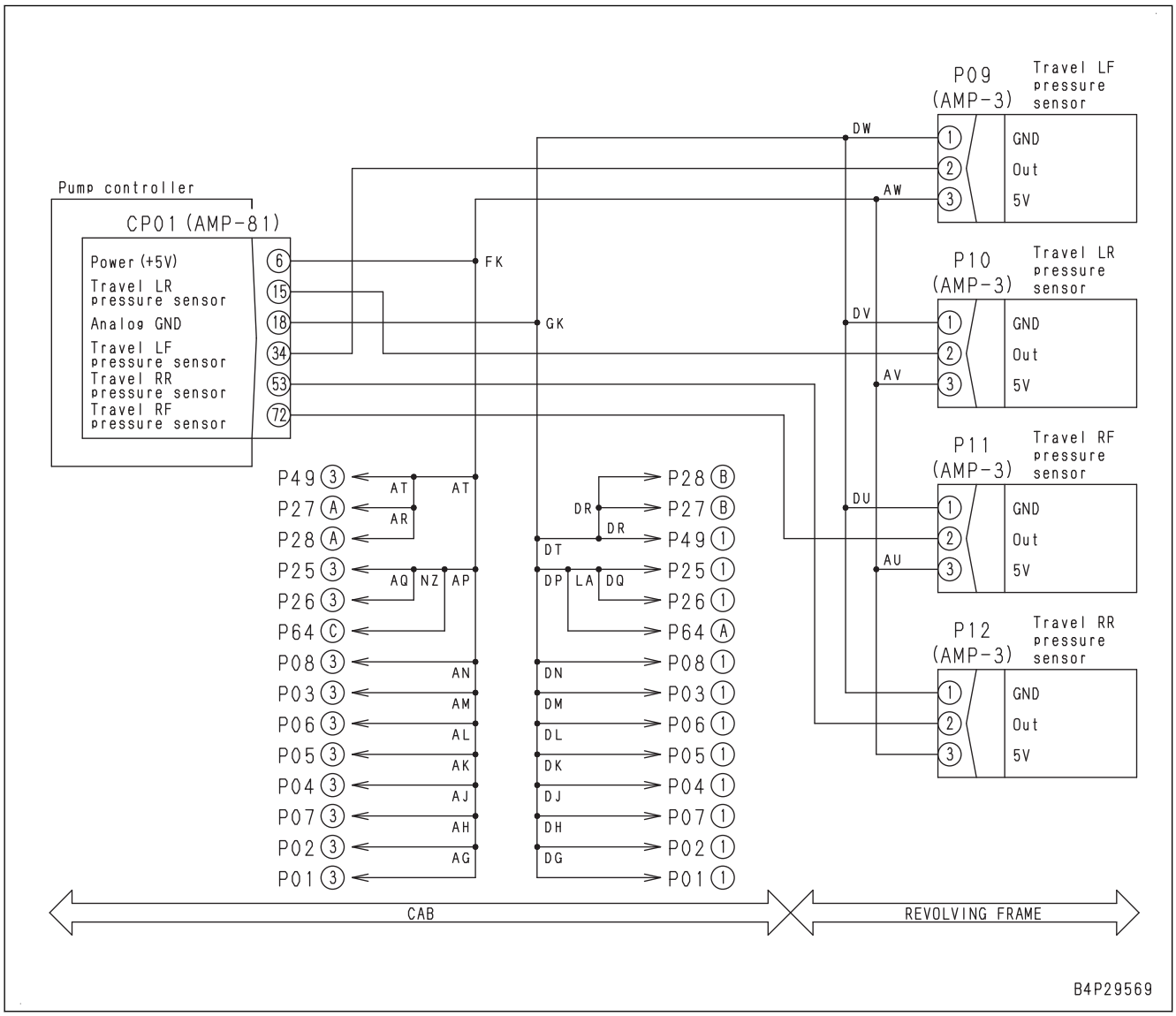


FAILURE CODE [DHS9MA] Boom LOWER PPC Pressure Sensor Defective Function

Action level	Failure code	Failure	Boom LOWER PPC Pressure Sensor Defective Function (Pump controller system)
L01	DHS9MA		
Detail of failure	Signal voltage of boom LOWER pressure sensor circuit is 0.3 V or less or 4.5 V or above.		
Action of controller	If cause of failure disappears, machine becomes normal by itself.		
Phenomenon on machine	Auto-deceleration function cannot be reset. Poor operability of boom LOWER operation		
Related information	**REMARK** If 5 V circuit (3) and ground circuit (1) of pressure sensor are connected inversely, pressure sensor will break. Accordingly, take extreme care when checking. • As T-adapter for pump controller connector is “socket-type box”, operating voltage cannot be measured at pump controller connector. • Boom LOWER PPC pressure can be checked with monitoring function. (Code: 07500 Boom lower PPC pressure) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position or start engine.		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective 5 V sensor power supply 2 system	If failure code [DA25KP] is also displayed, perform troubleshooting these first.			
		1. Turn starting switch to OFF position. 2. Disconnect connector P02, and connect T-adapter to female side. 3. Turn starting switch to ON position. **REMARK** If power supply voltage is abnormal, proceed to check on cause 3.			
		Voltage	Between P02 (female) (3) and (1)	Power supply	4.5 to 5.5 V

Circuit diagram related to travel PPC pressure sensor



FAILURE CODE [DW43KA] Travel Speed Solenoid Open Circuit

Action level	Failure code	Failure	Travel Speed Solenoid Open Circuit (Pump controller system)
L01	DW43KA		
Detail of failure	No current flows when pump controller drives travel speed selector solenoid, so pump controller determines that open circuit exists in travel speed selector solenoid circuit.		
Action of controller	None in particular (Since no current flows, solenoid is not energized.) If cause of failure disappears, machine becomes normal by itself.		
Phenomenon on machine	Machine travels slow in Hi travel speed setting (machine monitor shows Hi setting but the speed is kept at around Lo).		
Related information	• Controller's command (ON/OFF) to travel speed selector solenoid can be checked with monitoring function. (As long as controller's command to solenoid is "ON", sensor state displayed on monitoring screen is "ON" even if solenoid is not energized due to short circuit.) (Code: 02300 Solenoid 1) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine, set travel speed to Hi, and operate travel lever.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective travel speed selector solenoid (Internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector V04, and connect T-adapter to male side.		
		Resistance	Between V04 (male) (1) and (2)	20 to 60 Ω
2	Open circuit, short circuit, ground fault, hot short circuit of wiring harness, or defective pump controller	1. Turn starting switch to OFF position. 2. Disconnect connector V04, and connect T-adapter to female side. 3. Turn starting switch to ON position. 4. Shake the wiring harness by hand while measuring the voltage. If the voltage becomes 0 V while shaking, wiring harness is open.		
		Voltage	Between V04 (female) (1) and (2)	1 to 4.5 V
3	Open circuit in wiring harness (Wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connector CP02 and connect T-adapter to female side.		
		Resistance	Between CP02 (female) (93) and each of (115), (117), and (120)	20 to 60 Ω
		If failure code is still displayed after above checks, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors CP02 and V04, and connect T-adapters to each female side.		
		Resistance	Between CP02 (female) (93) and V04 (female) (1)	Max. 1 Ω
			Between V04 (female) (2) and each of CP02 (female) (115), (117), (120)	Max. 1 Ω
4	Defective pump controller	If no failure is found by preceding checks, pump controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly).		

FAILURE CODE [DWA2KY] Attachment Single or 2-Way Change Solenoid Hot Short Circuit

Action level	Failure code	Failure	Attachment Single or 2-Way Change Solenoid Hot Short Circuit (Pump controller system)
L03	DWA2KY		
Detail of failure	Current flows when driving attachment return selector solenoid circuit stops.		
Action of controller	• None in particular • Even if cause of failure disappears, machine does not become normal until starting switch is turned to OFF position.		
Phenomenon on machine	Hydraulic circuit for attachment is not 2–way-acting circuit.		
Related information	• Controller's command (ON/OFF) to attachment return selector solenoid can be checked with monitoring function. (As long as controller's command to solenoid is OFF, sensor state displayed on monitoring screen is OFF even if solenoid is not energized due to hot short circuit.) (Code: 02301 Solenoid 2) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position and set machine in breaker mode (B).		

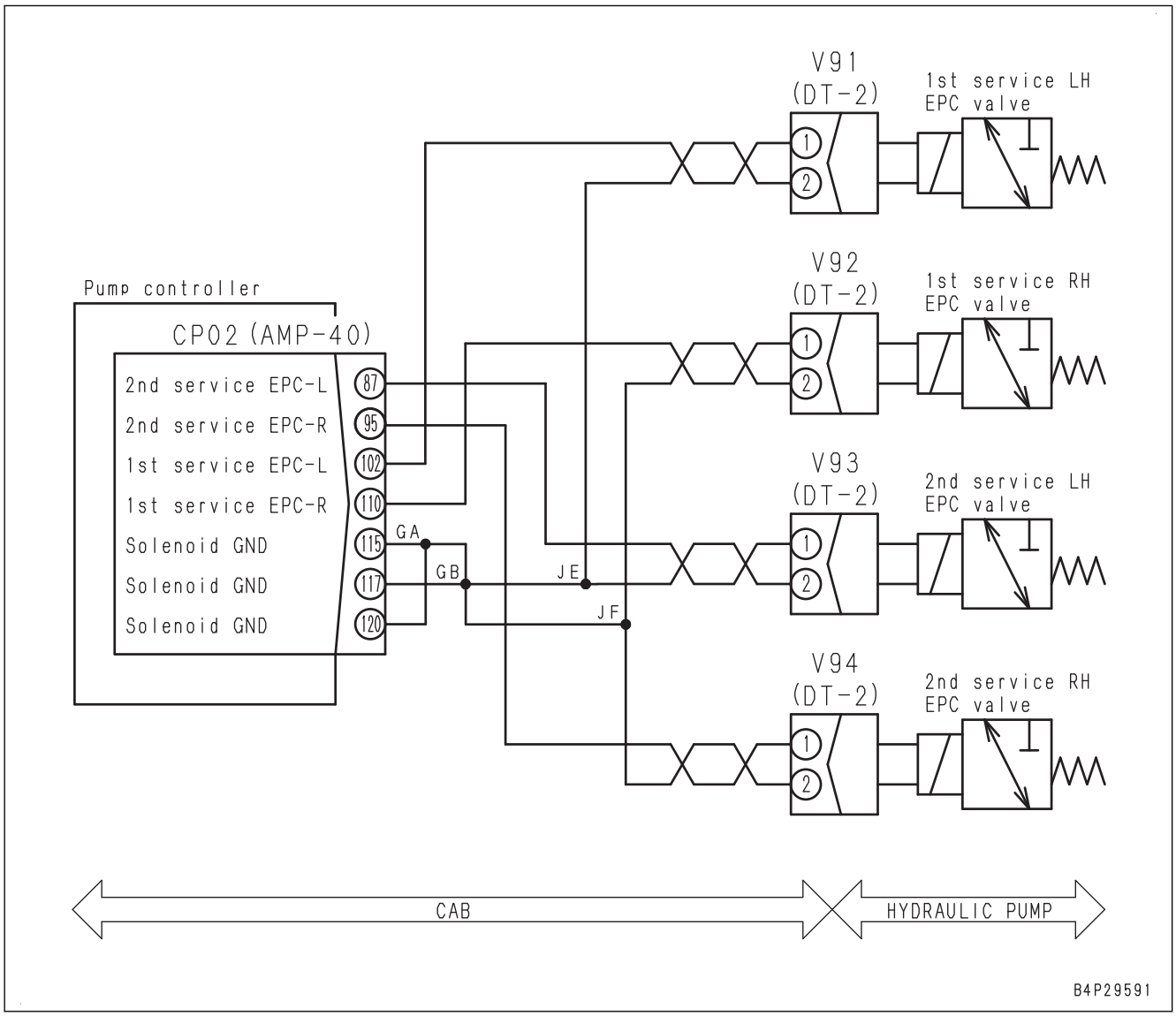
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector V07 and connect T-adapter to female side. 3. Turn starting switch to ON position.		
		Voltage	Between V07 (female) (1) and ground	Max. 4.5 V
2	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

FAILURE CODE [DXA8KA] Front Pump PC-EPC Solenoid Open Circuit

Action level	Failure code	Failure	Front Pump PC-EPC Solenoid Open Circuit (Pump controller system)
L03	DXA8KA		
Detail of failure	No current flows when pump controller drives front pump PC-EPC solenoid, so pump controller determines that open circuit exists in front pump PC-EPC solenoid circuit.		
Action of controller	None in particular (Since no current flows, solenoid is not energized.) If cause of failure disappears, machine becomes normal by itself.		
Phenomenon on machine	If pump load increases, engine speed decreases largely and engine may stop.		
Related information	• When solenoid and wiring harness are normal, engine can be prevented from stopping by setting pump drive secondary switch to ON position. • Drive current of front pump PC-EPC solenoid can be checked with monitoring function. (Code: 01300 PC-EPC front solenoid current) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

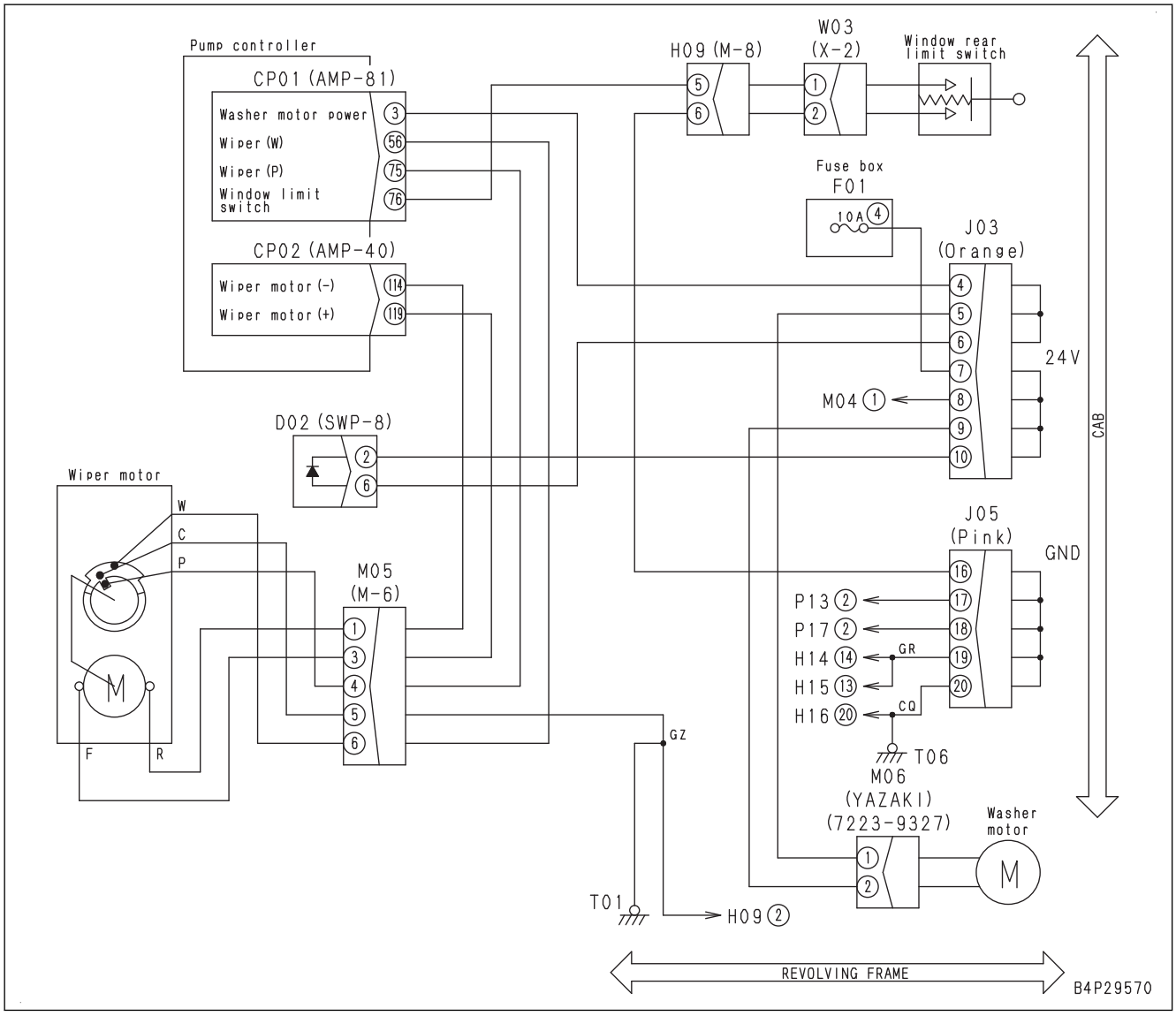
No.	Cause	Procedure, measuring location, criteria and remarks			
1	Pump drive secondary switch misoperation	Toggle the pump drive secondary switch to normal (lower) position.			
2	Defective F-PC-EPC solenoid (Internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector V11, and connect T-adapter to male side.			
		Resistance	Between V11 (male) (1) and (2)		3 to 14 Ω
3	Open circuit, short circuit, ground fault, hot short circuit of wiring harness, or defective pump controller	1. Turn starting switch to OFF position. 2. Disconnect connector V11, and connect T-adapter to female side. 3. Turn starting switch to ON position. 4. Shake the wiring harness by hand while measuring the voltage. If the voltage becomes 0 V while shaking, wiring harness is open.			
		Voltage	Between V11 (female) (1) and (2)		Min. 20 V
4	Defective pump drive secondary switch (Internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector S25 and connect T-adapter to male side.			
		Resistance	Between S25 (male) (3) and (2)	Switch position: Normal	Max. 1 Ω
				Switch position: Drive	Min. 1 MΩ
			Between S25 (male) (6) and (5)	Switch position: Normal	Max. 1 Ω
				Switch position: Drive	Min. 1 MΩ
5	Open or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector CP02 and connect T-adapter to female side. Check that pump drive secondary switch is in the normal position (lower).			
		Resistance	Between CP02 (female) (96) and each of (115), (117), and (120)		3 to 14 Ω

Circuit diagram related to ATT flow rate adjustment EPC



No.	Cause	Procedure, measuring location, criteria and remarks
4	Defective pump controller	If no failure is found by preceding checks, pump controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly).

Circuit diagram related to wiper

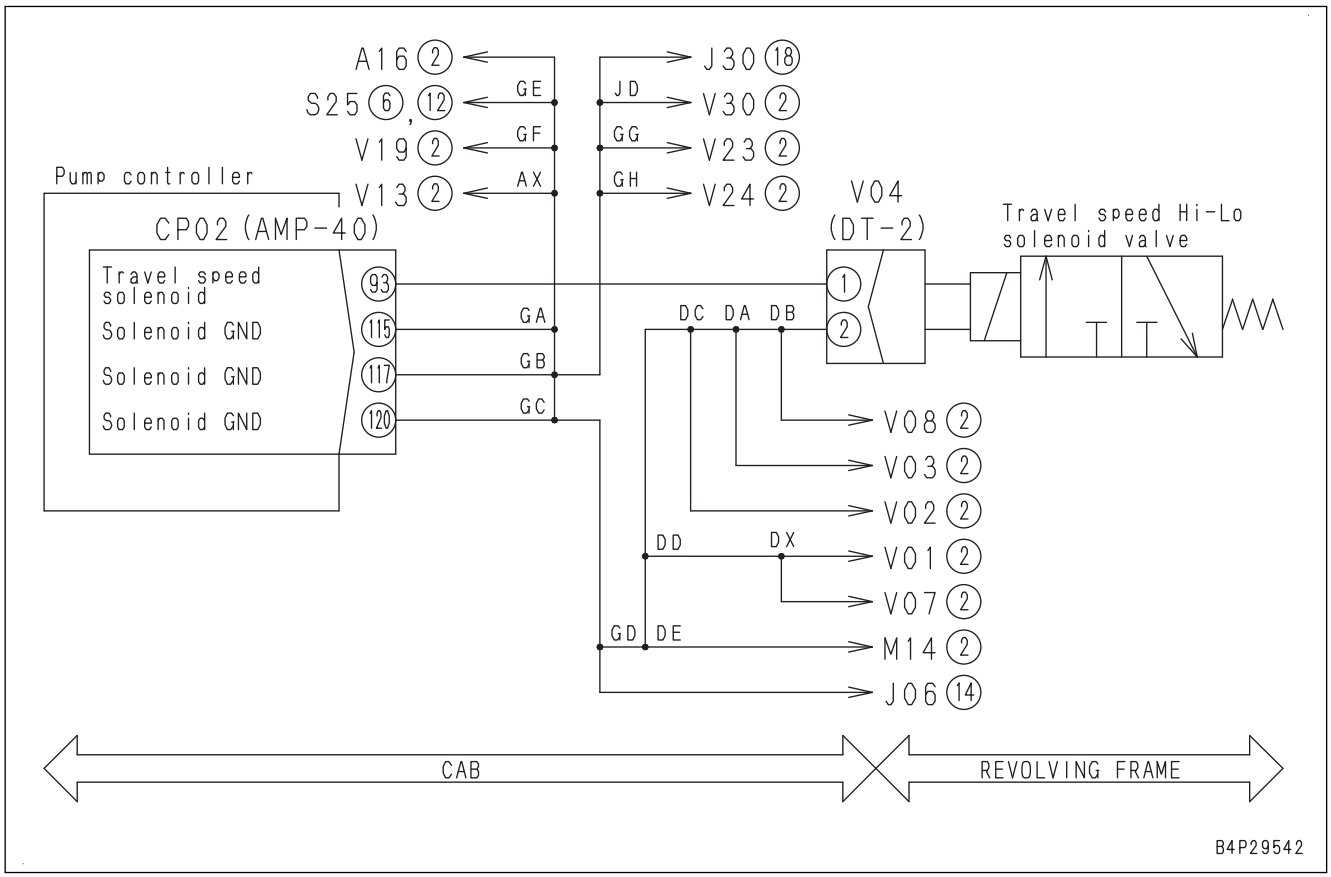


E-8 ENGINE COOLANT TEMPERATURE MONITOR LIGHTS UP IN WHITE WHILE ENGINE IS RUNNING

Failure	Coolant temperature monitor lights up in white while engine is running.
Related information	• Signal of coolant temperature sensor is input to engine controller, and then it is transmitted to machine monitor through CAN communication system. • Coolant temperature can be checked with monitoring function. (Code: 04107)

No.	Cause	Procedure, measuring location, criteria and remarks
1	Insufficient warm-up operation of machine (When system works properly)	If monitor is lit in white, engine coolant temperature may be low (approximately 30°C and below). Warm up engine. • Lights up in white: Engine coolant temperature is low. • Lights up in blue: Coolant temperature is proper.
2	Defective engine coolant temperature gauge system	If no failure is found by preceding checks, engine coolant temperature gauge system may be defective. Perform following troubleshooting. • E-mode “ENGINE COOLANT TEMPERATURE GAUGE DISPLAY DOES NOT MOVE FROM MINIMUM OR MAXIMUM” • E-mode “DISPLAY OF ENGINE COOLANT TEMPERATURE GAUGE DIFFERS FROM ACTUAL COOLANT TEMPERATURE”(indicates neither full nor empty)

Circuit diagram related to travel speed solenoid



E-45 WHEN WIPER SWITCH IS OPERATED, WIPER MONITOR DOES NOT LIGHT UP OR GO OFF

Failure	Wiper monitor does not light up, or does not go out, while wiper switch is operated.
Related information	• Condition of wiper switch signal can be checked with monitoring function. (Code: 04504)

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective machine monitor	Machine monitor may be defective. (Because this is an internal defect, troubleshooting cannot be performed.)

Failure mode			Component causing failure: PPC valve (Right lever)	PPC valve (Left lever)	PPC valve (Travel lever)	PPC valve (Service)	Swing PPC slow return valve	ATT oil flow adjustment EPC valve	Solenoid valve: Work equipment lock solenoid	2-stage relief solenoid	Travel junction solenoid	Travel speed selector solenoid	Swing parking brake solenoid	ATT return selector solenoid
Travel	Machine does not travel straight.				○						○			
	Travel speed is slow.				○									
	Machine is not steered well or steering power is low.				○						○			
	Travel speed does not change, or travel speed is too slow or fast.											○		
	One of tracks does not run.													
Swing	Machine does not swing.	Upper structure does not swing to the right or left.											○	
		Upper structure swing only to the right or left.		○										
	Swing acceleration or swing speed is low.	In both directions (right and left)												
		In only one direction		○										
	Upper structure overruns excessively when it stops swinging.	(Both right and left)												
		(Either right or left)		○			○							
	Shock is large when upper structure stops swinging.			○			○							
	Large unusual noise is heard when upper structure stops swinging.													
	Swing drift on a slope is large.	When parking brake is ON.											○	
		When parking brake is OFF.												
Attachment	Attachment circuit cannot be changed.													○
	Oil flow in attachment circuit cannot be changed.					○		○						

H-10 HYDRAULIC DRIFT OF BOOM IS LARGE

Failure	Hydraulic drift of boom is large.
Related information	Perform all troubleshooting with working mode set in power mode (P).

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="4">1</td><td rowspan="4">Defective boom cylinder</td><td colspan="4">Check hydraulic drift of boom cylinder with engine stopped.
• Hydraulic oil temperature: 45 to 55 °C
• Bucket with rated load, boom horizontal, arm cylinder fully retracted and arm cylinder fully extended, machine body lifted</td></tr>
<tr><td colspan="4">If visible hydraulic drift is observed, it is abnormal.</td></tr>
<tr><td colspan="4">• If any failure is found in above check items, check the leakage amount of boom cylinder when boom RAISE is relieved.
• Be ready with engine stopped, then perform troubleshooting with engine at high idle.</td></tr>
<tr><td>Boom cylinder leakage amount</td><td colspan="2">Boom RAISE relief</td><td>Max.
20 cc/min</td></tr>
<tr><td rowspan="3">2</td><td rowspan="3">Malfunction of safety valve for boom lock valve and malfunction of lock valve (OPT)</td><td colspan="4">Be ready with engine stopped, then perform troubleshooting with engine at high idle.</td></tr>
<tr><td>Arm and boom relief pressure</td><td>Hydraulic oil temperature: 45 to 55 °C</td><td>• Arm IN relief
• Arm OUT relief
• Boom RAISE relief
• Boom LOWER relief</td><td>33.1 to 37.2 MPa {338 to 380 kg/cm^2}</td></tr>
<tr><td colspan="4">• Among above relief pressures, if either of boom RAISE and LOWER relief pressures is low, suction valve may be defective. Check suction valve.
• Since the safety valve circuit is connected to both of the boom RAISE and arm OUT circuits through a check valve, the arm lock valve is judged to be defective if the boom circuit is normal.
• Check lock valve if there are no abnormalities in safety valve. (see “SPEED OR POWER OF ARM IS LOW IN H-MODE” in MALFUNCTION OF SAFETY VALVE FOR BOOM LOCK VALVE AND MALFUNCTION OF LOCK VALVE)
Be careful to prevent foreign matter from entering the valve during restoration.</td></tr>
<tr><td>3</td><td>Defective seal of safety valve for boom lock valve</td><td colspan="4">Seal of safety valve for boom lock valve may be defective. Check it.</td></tr>
</table>

H-30 OVERRUN OF UPPER STRUCTURE IS LARGE IN BOTH RIGHT AND LEFT DIRECTIONS

Failure	Upper structure overruns excessively when it stops swinging (both right and left).
Related information	• Perform all troubleshooting with working mode set in power mode (P). • F pump pressure can be checked with monitoring function. (Code: 01100) • R pump pressure can be checked with monitoring function. (Code: 01101) • If failure code [DWK0KA] or [DWK0KB] is also displayed, perform troubleshooting for it first.

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="3">1</td><td rowspan="3">Defective swing motor (safety valve)</td><td colspan="4">Be ready with engine stopped, then perform troubleshooting with engine at high idle.</td></tr>
<tr><td>Swing relief pressure</td><td>Swing lock switch: ON</td><td>Left work equipment control lever: Swing relief</td><td>28.4 to 32.3 MPa {290 to 330 kg/cm^2}</td></tr>
<tr><td colspan="4">• If both right and left swings are lower than the standard value at the same pressure, sealing of safety valve may be defective.
• The safety valve is featured with a 2-stage relief function, however, its Hi and Lo pressure settings are the same (the relief flow differs).</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Defective swing motor</td><td colspan="4">Be ready with engine stopped, then perform troubleshooting with engine at high idle.</td></tr>
<tr><td>Swing motor leakage amount</td><td>Swing lock switch: ON</td><td>Left work equipment control lever: Swing relief</td><td>Max. 10 ℓ/min</td></tr>
</table>

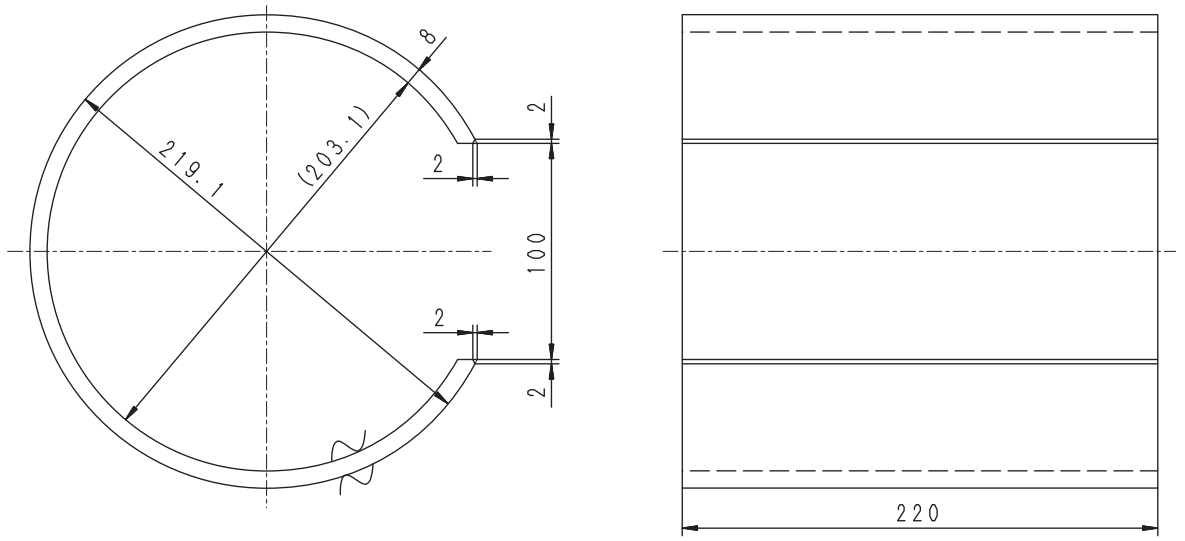
S-7 ENGINE RUNS ROUGH OR IS UNSTABLE

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

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

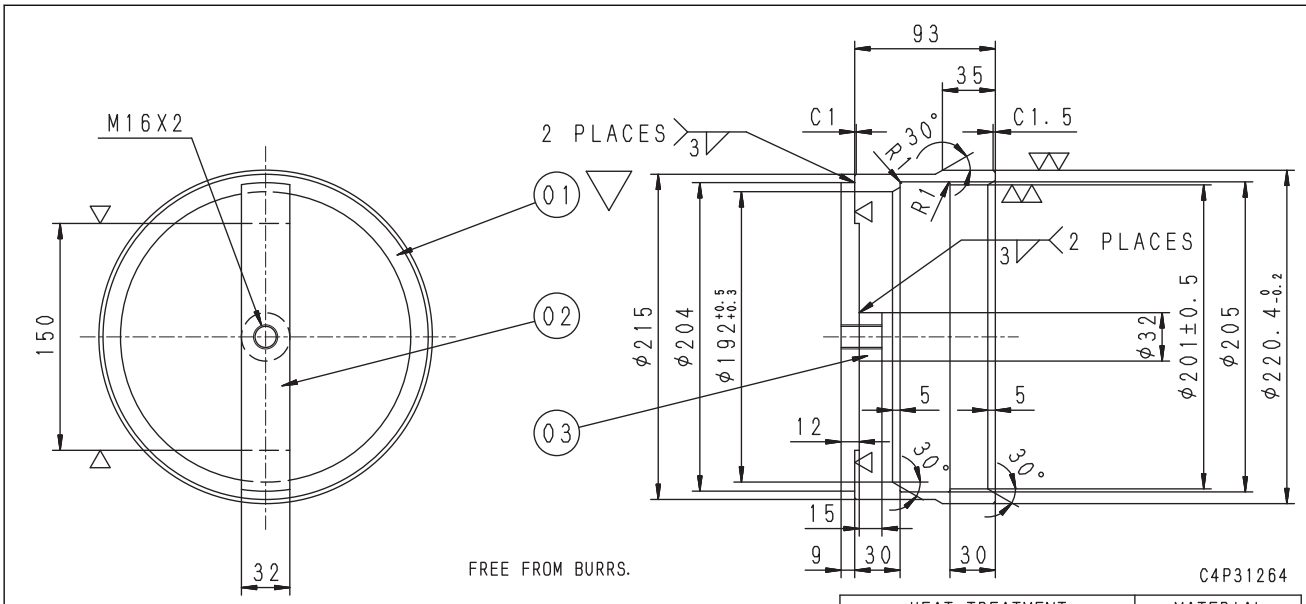
50 DISASSEMBLY AND ASSEMBLY

Push tool



HEAT TREATMENT	MATERIAL
---	STKM13A
PART NAME	Q'TY
PUSH TOOL	---
796T-427-1510 △	

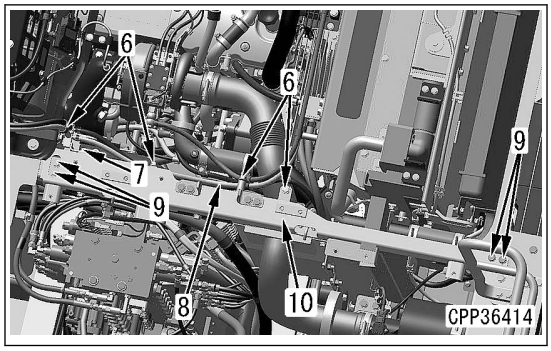
Guide

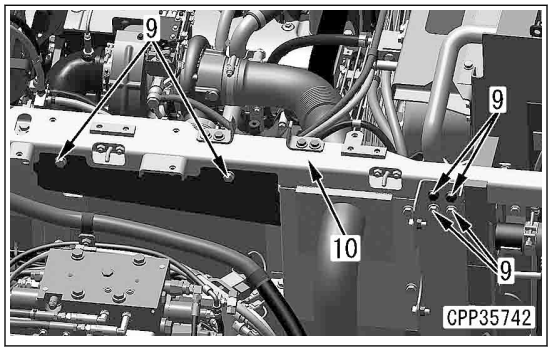


SYM.	PART NAME	MATERIAL	QTY/SET	MASS (kg)	REMARKS
03	BAR	SS400B	1	0.06	φ32
02	PLATE	SS400F	1	0.57	t12X32
01	TUBE	STKM13A	1	4.17	φ230Xt20

HEAT TREATMENT	MATERIAL
----	WELD
PART NAME	Q'TY
GUIDE	1
796T-427-1710 △	

6. Remove clips (6) (4 places).
7. Remove bracket (7), and move AdBlue/DEF hose (8) aside so that it does not hinder the work.
8. Remove mounting bolts (9) (10 pieces), and remove frame (10).





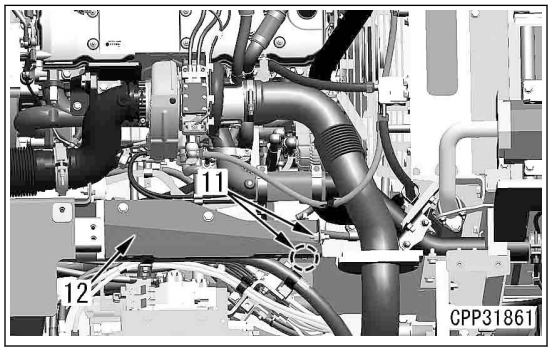
Cover

9. Remove mounting bolts (11) (2 pieces), and remove cover (12).

   ⚠ Be careful not to be caught by the wiring harness or hose.

   REMARK

   Cover (12) consists of 2 stages (upper and lower). However, it is not required to separate them since the cover can be removed as a unit.

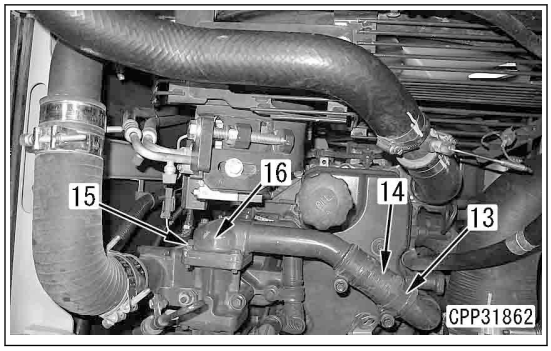


KCCV assembly

10. Remove KCCV assembly and bracket. For details, see “REMOVE AND INSTALL KCCV ASSEMBLY”.

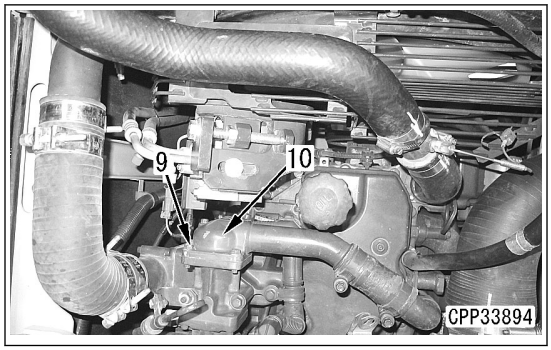
EGR piping flange

11. Loosen hose clamp (13) and disconnect hose (14).
12. Remove mounting bolts (15) (4 pieces), and remove EGR piping flange (16).



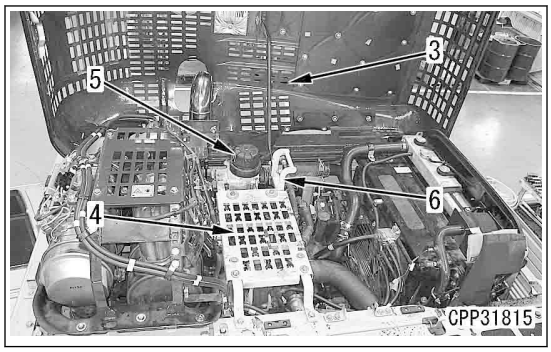
7. Install gasket and install EGR piping flange (10) with mounting bolts (9) (4 pieces).

   Mounting bolt:
   24 ± 4 Nm {2.45 ± 0.41 kgm}



KCCV assembly

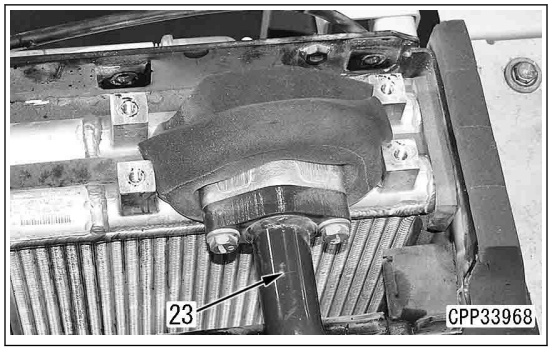
8. Install bracket (6).
9. Install KCCV assembly (5). For details, see “REMOVE AND INSTALL KCCV ASSEMBLY”.
10. Install step (4).
11. Close engine hood (3).



18. Disconnect hydraulic oil cooler inlet tube (23), and slide it so that it does not hit against the hydraulic oil cooler.
19. Install tool D and tool E to the hydraulic oil cooler assembly.

    NOTICE

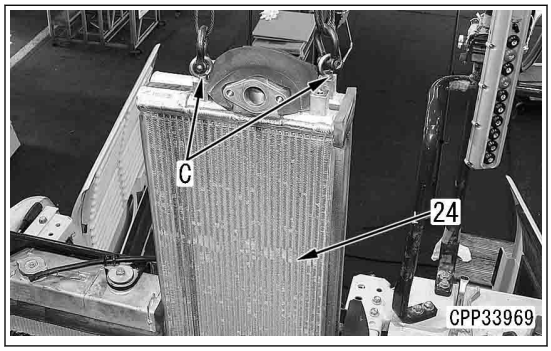
    This is to prevent dust, etc. from entering.



20. Sling it by using tool C while taking care not to catch the bottom of hydraulic oil cooler assembly (24).

    Hydraulic oil cooler assembly:

    17 kg



METHOD FOR INSTALLING HYDRAULIC OIL COOLER ASSEMBLY

Hydraulic oil cooler assembly

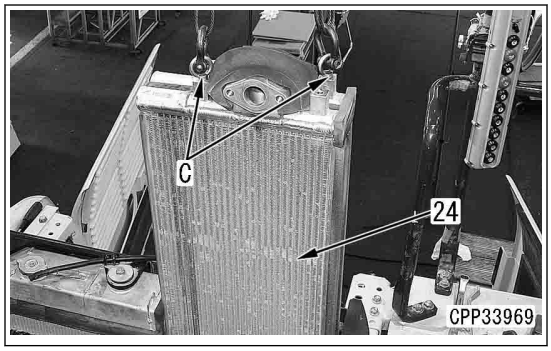
1. Sling hydraulic oil cooler assembly (24) by using tool C, and install it.

    NOTICE

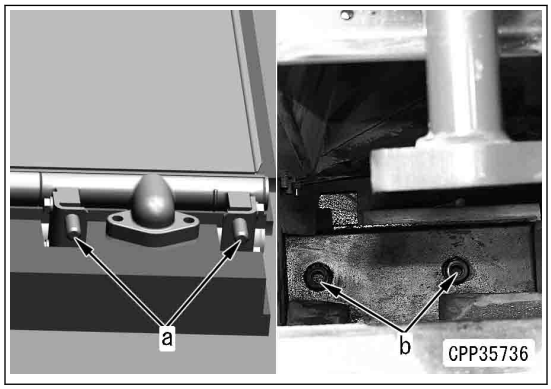
    - **Check that the heat insulation sealant (sponge) on the periphery of the hydraulic oil cooler is not damaged.**
    - **If the heat insulation sealant (sponge) is damaged, replace it with a new one.**
    - **When installing the hydraulic oil cooler assembly, be careful not to damage the heat insulation sealant (sponge) on the periphery while lowering it.**
    - **Check from the bottom side that convex parts (a) at the bottom of the hydraulic oil cooler properly fits with concave parts (b) of the machine.**

    Hydraulic oil cooler assembly:

    17 kg



2. Remove tool D and tool E of the hydraulic oil cooler assembly.



Engine mount

2. Install engine mount bolts (94) (4 pieces).

REMARK

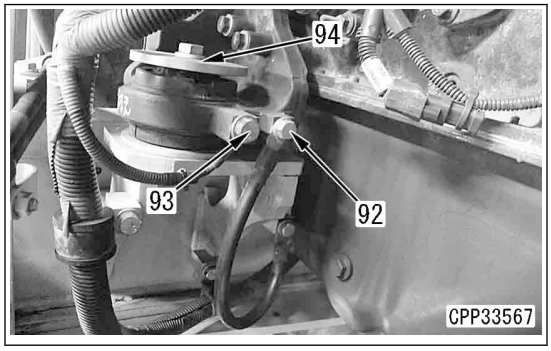
- The bolt on the engine front side is shorter than the one on the rear side.
- The engine mount rubber on the engine front side is smaller than that on the rear side.
- Nuts are not welded except for the alternator mounting side. Therefore, fix tool A with bolt (B) to prevent nut (95) from rotating, and then install engine mount bolt (94).

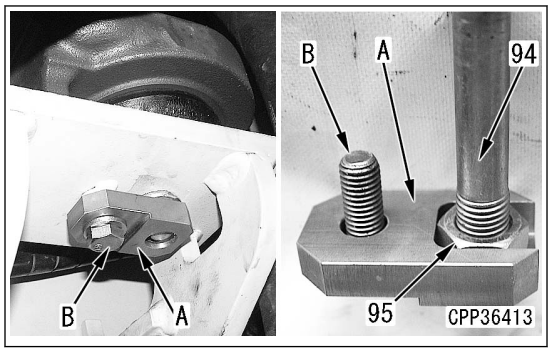
Engine mount mounting bolt (4 places):
245 to 308.9 Nm {25 to 31.5 kgm}

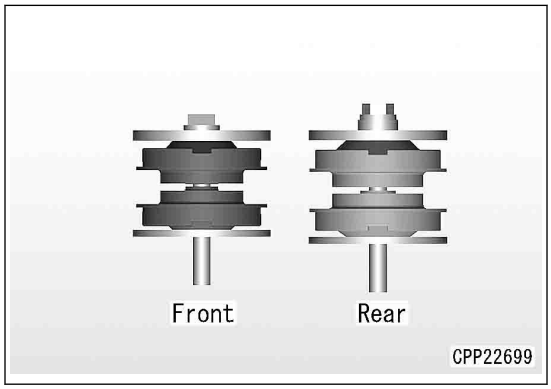
- When engine mount bracket is removed

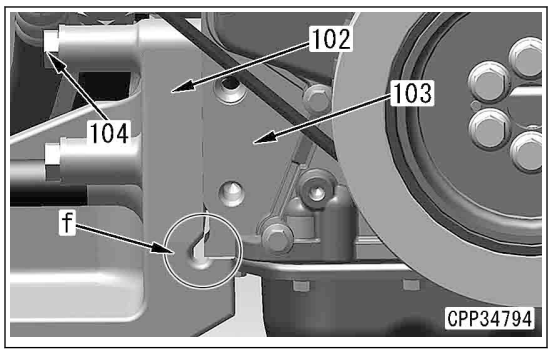
Install mount bracket (102) on the engine front side so that the surface (f) comes to contact to the bottom surface of engine cylinder block (103).

Engine mount bracket mounting bolt (104):
122.5 to 147 Nm {12.5 to 15 kgm}



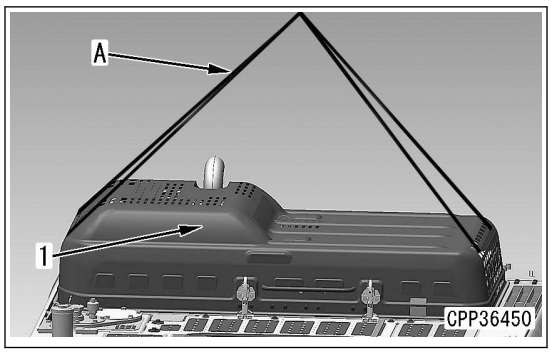






8. Sling engine hood assembly (1), and remove it by using tool A.

   Engine hood:
   105 kg

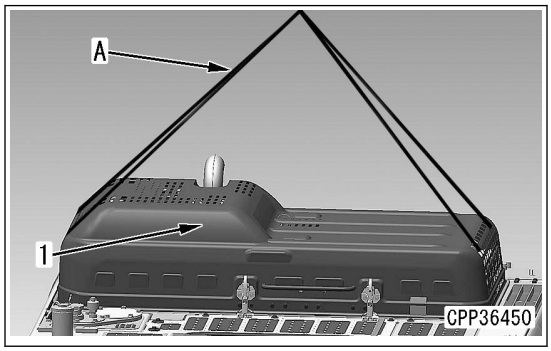


METHOD FOR INSTALLING ENGINE HOOD ASSEMBLY

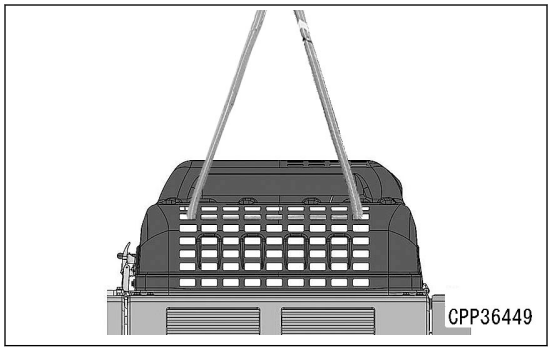
Engine hood assembly

1. Sling engine hood assembly (1) by using tool A, and install it.

   ⚠ **Since engine hood assembly (1) is deformed by slinging at 1 point, remove it by slinging at 4 points.**

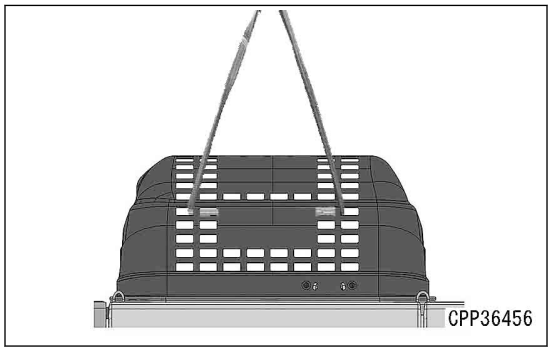


   Slinging position on the left side of the machine



   Slinging position on the right side of the machine

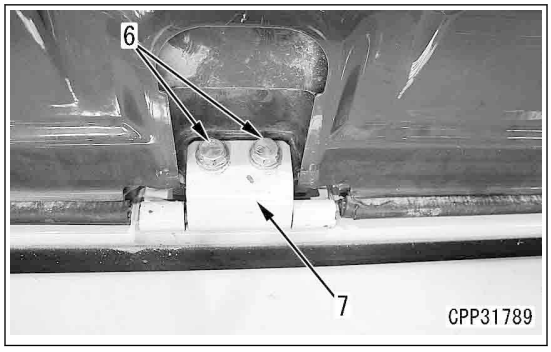
   Engine hood assembly:
   105 kg



2. Install hinge (7) of engine hood assembly (1) with mounting bolts (6) (4 pieces).
3. Lightly tighten the bolts until the engine hood does not move in all directions when opening/closing it.

   REMARK

   After installing the engine hood, sling it, and hold it for adjustment.



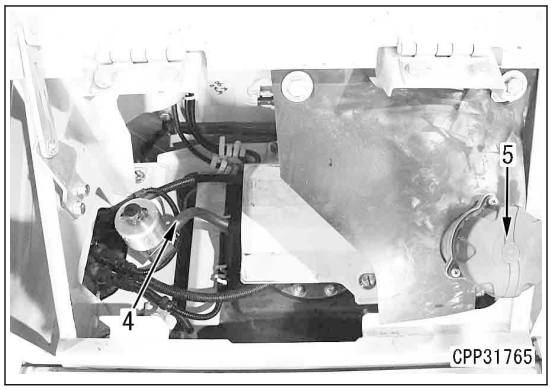
Draining

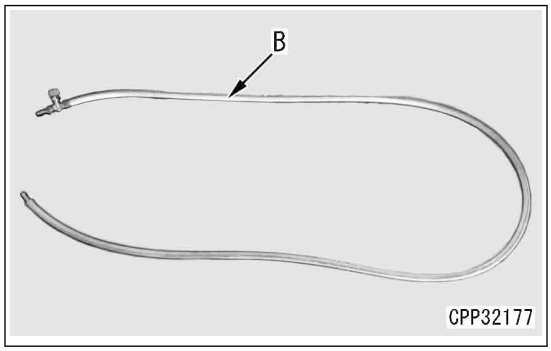
2. Open AdBlue/DEF tank filler port cover (3).

3. Disconnect breather hose (4), and connect tool B.

NOTICE

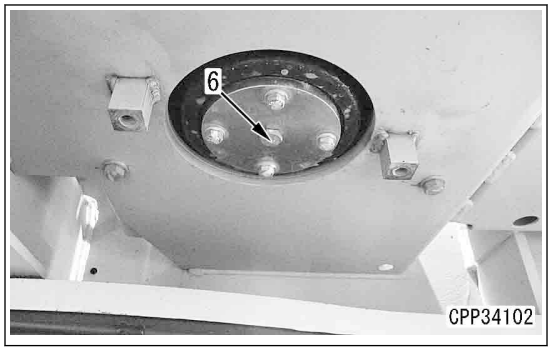
Close cap (5) securely so that no dust enters AdBlue/DEF tank.





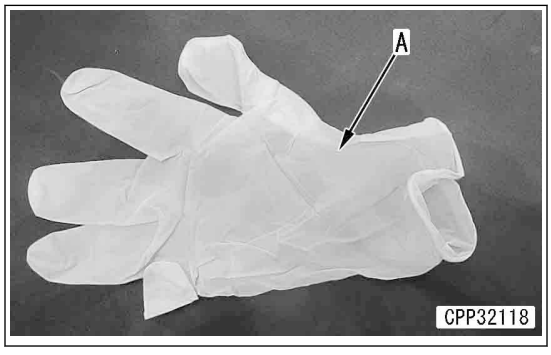
4. Loosen drain plug (6), and drain AdBlue/DEF.

AdBlue/DEF tank:
39 ℓ



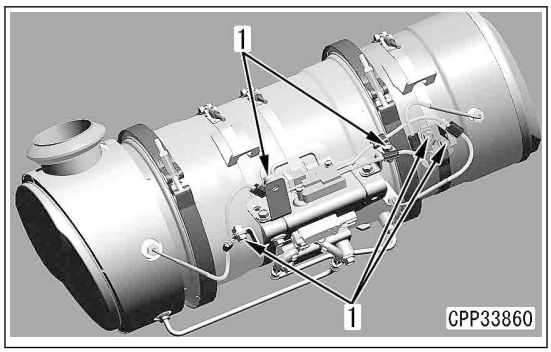
NOTICE

When handling AdBlue/DEF, be sure to use tool A.



17. Align clamps (1) (5 places) with positions marked during disassembly, and install them.

    Clamp (1):
    10.8 to 26.0 Nm {1.1 to 2.7 kgm}

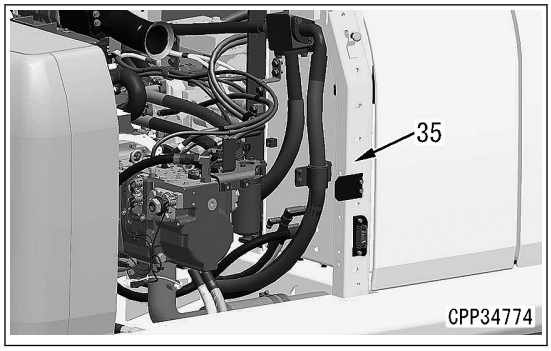


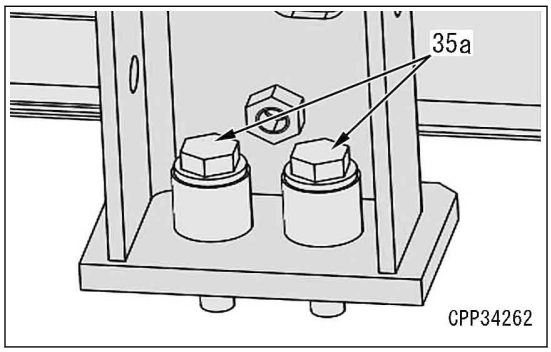
3. Install bracket (35) with mounting bolts (35a).

REMARK

Fix mounting bolts (2 pieces) inside bracket (35).

Mounting bolt:
98 to 123 Nm {10 to 12.5 kgm}



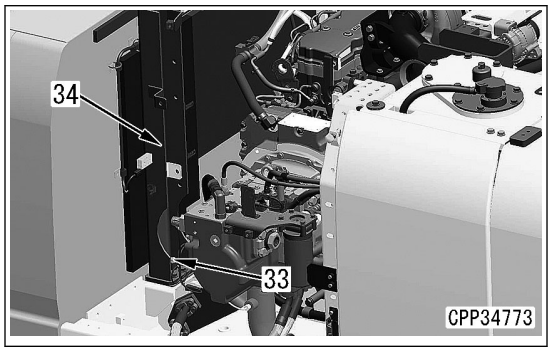


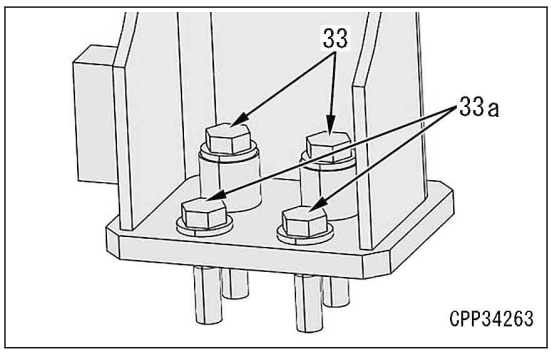
4. Install bracket (34) with mounting bolts (33) and (33a) (2 pieces each).

REMARK

- Mounting bolts (33)M12x75 mm
- Mounting bolts (33a)M12x50 mm

Mounting bolts (33) and (33a):
98 to 123 Nm {10 to 12.5 kgm}





REMOVE AND INSTALL AdBlue/DEF INJECTOR

Tools for removal and installation of AdBlue/DEF injector

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	6540-71-1720	AdBlue/DEF injector cap kit	●	1	N		Removal and installation of AdBlue/DEF injector
B	600-919-5050	Plug (for 5/16 inch hose diameter)	●	1	N		Removal and installation of AdBlue/DEF injector
C	6540-71-1310	Cover for AdBlue/DEF injector electric connector	●	1	N		Removal and installation of AdBlue/DEF injector
D	-	Vinyl gloves	●	1	N		Disconnection and connection of AdBlue/DEF hose
E	-	Injector side cap	●	1	N		Removal and installation of AdBlue/DEF injector

⚠ Place the machine on a level ground, lower the work equipment to the ground so that it is stable, set the lock lever to LOCK position, and stop the engine.

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

METHOD FOR REMOVING AdBlue/DEF INJECTOR

Engine hood

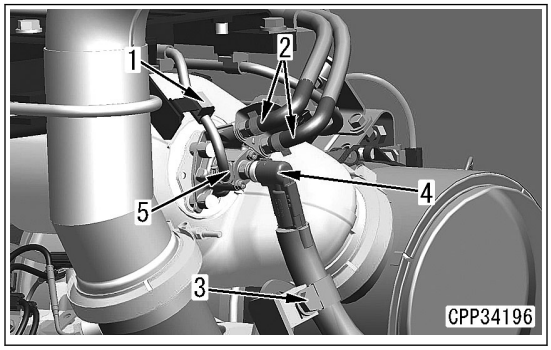
1. Open engine hood (1a).

Wiring, hose

2. Remove clip (1).
3. Disconnect hoses (2) (2 pieces).

   REMARK

   After disconnecting coolant hoses (2), prevent the coolant from leaking.
4. Remove clamp (3).



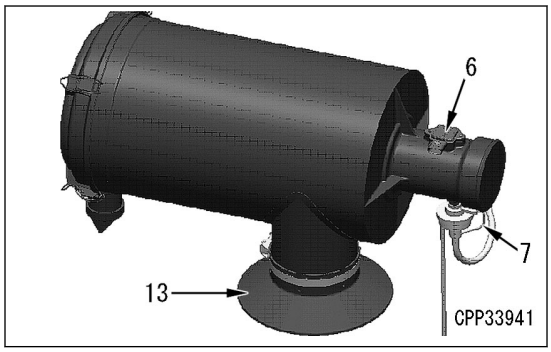
NOTICE

If dirt enters air intake piping, it may cause an engine trouble.

METHOD FOR INSTALLING AIR CLEANER ASSEMBLY

Method for replacing air cleaner

1. Remove mass air flow and temperature sensor (6), air cleaner clogging sensor (7), and cover (13), and install them to the air cleaner to be replaced.



NOTICE

Mass air flow and temperature sensor (6) is a precision part. Do not blow with compressed air or spray the detergent liquid.

Mass air flow and temperature sensor (6) screw:
0.98 to 1.27 Nm {0.1 to 0.13 kgm}

2. Apply liquid gasket to the threaded portion of air cleaner clogging sensor (7).

Air cleaner clogging sensor (7):
Liquid gasket (LG-5)

Air cleaner clogging sensor (7):
1.96 to 3.92 Nm {0.2 to 0.4 kgm}

3. Insert cover (13) until its bottom contacts the air cleaner.

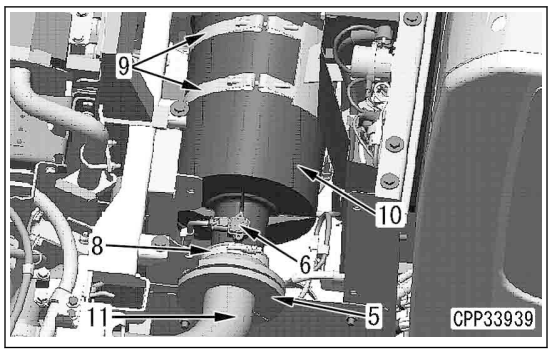
Cover (13) mounting clamp fastening bolt:
3.4 to 4.4 Nm {0.35 to 0.45 kgm}

NOTICE

Keep the opening of the air cleaner covered with a plastic film, etc. until just before it is installed to prevent from entry of dirt.

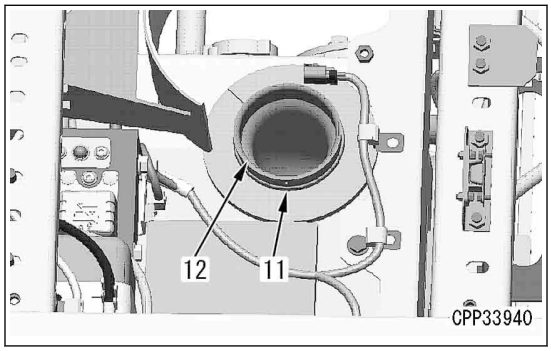
Method for installing air cleaner assembly

4. Insert air cleaner assembly (10) into tube (11), and install bands (8) and (9).



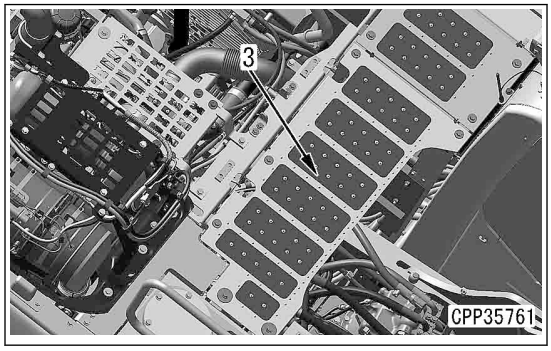
NOTICE

- **When rubber ring (12) comes off, install it to tube (11) in advance.**
- **Take care not to tear sponge (5).**
- **If lubricating oil enters air cleaner clogging sensor (7), a failure may occur. Do not use lubricating oil when inserting air cleaner assembly (10) into tube (11).**
- **If dirt enters air intake piping, it may cause an engine trouble.**



Swing motor hose

3. Open the engine hood and remove cover (3) (6 bolts).



4. Remove the return filter and accumulator mounting bracket assembly according to the following procedure (machine with attachment).

1) Disconnect hoses (4) and (6) (4 bolts), and hose (5) (2 bolts) on the relay block side, disconnect hoses (7) and (8) (4 bolts) on the control valve side, and disconnect hose (9) (2 bolts) on the tube side.

   Hose (4): Between attachment and work equipment

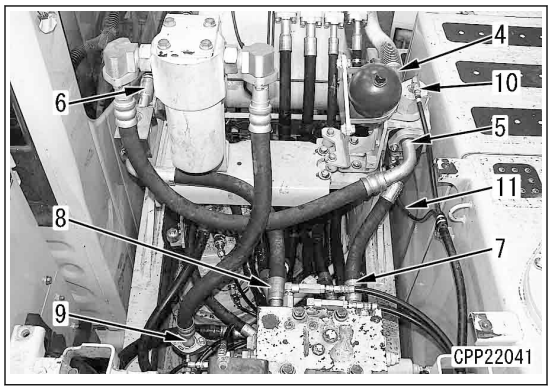
   Hose (5): Between return filters

   Hose (6): Between attachment and work equipment

   Hose (7): Between control valves (port (A-1))

   Hose (8): Between control valves (port (B-1))

   Hose (9): Between control valves (port (ATT))



2) Disconnect hoses (10) and (11) on the relay block side.

   Hose (10): Between hydraulic tanks

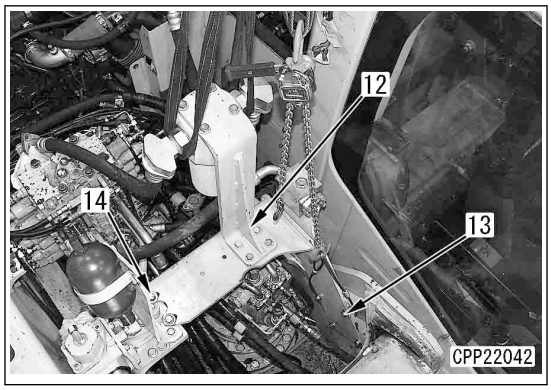
   Hose (11): Between control valves (port (BP5))

3) Sling return filter and mounting bracket assembly (12), and hold it.

4) Remove bolts (13) (4 pieces) and bolt (14), sling return filter mounting assembly (12), and remove it.

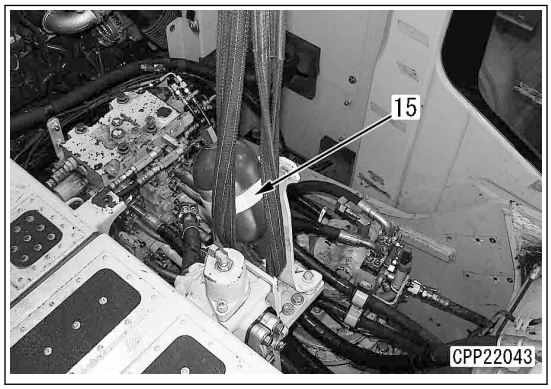
   REMARK

   Sling at 3 points and keep return filter mounting assembly (12) horizontally since it is difficult to find the center of gravity of the assembly and to sling it horizontally.



5) Sling accumulator mounting bracket assembly (15), and hold it.

6) Remove mounting bolts (4 pieces), sling accumulator mounting bracket assembly (15), and remove it.



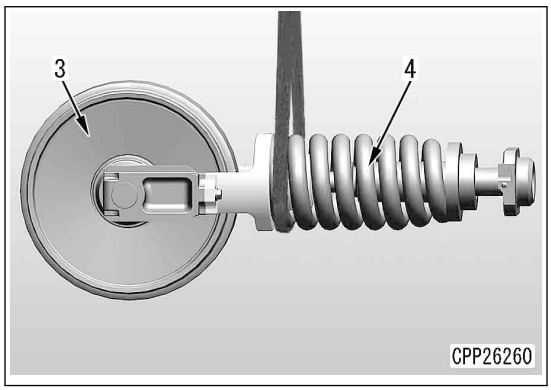
METHOD FOR INSTALLING IDLER AND IDLER CUSHION ASSEMBLY

Idler and idler cushion assembly

1. Install idler cushion assembly (4) to idler assembly (3).

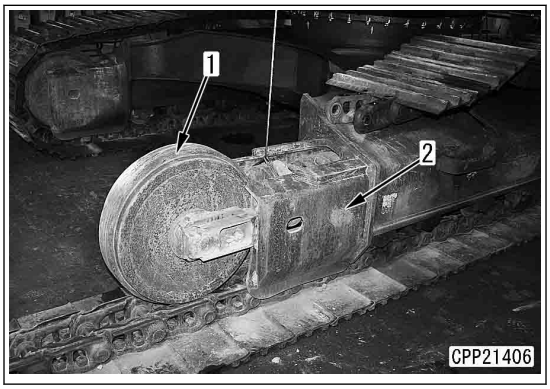
   Idler assembly:
   105 kg

   Idler cushion assembly:
   120 kg

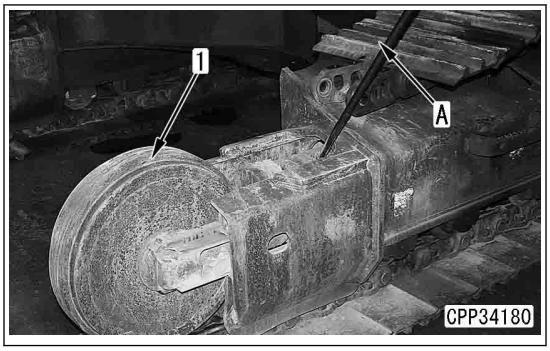


2. While slinging idler and idle cushion assembly (1), install it to track frame (2).

   Idler and idler cushion assembly:
   225 kg



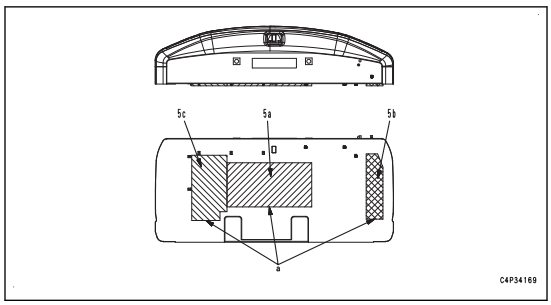
3. Press in the idler and idler cushion assembly backward by using tool A.



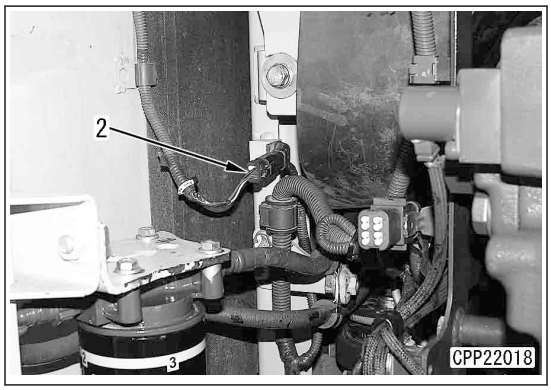
Track shoe

4. Install the track shoe assembly. For details, see “SEPARATION AND CONNECTION OF TRACK ASSEMBLY”.

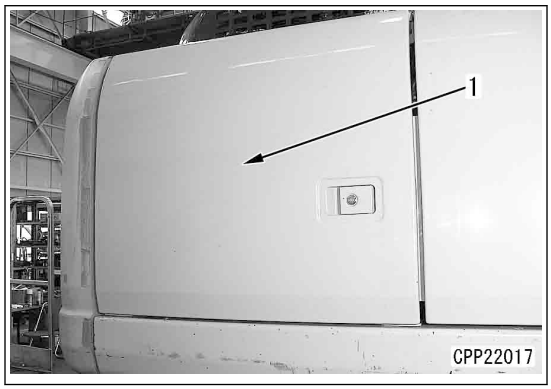
2) Paste soundproof sheets so that surfaces (a) without SG sheet (black surface) face downward.



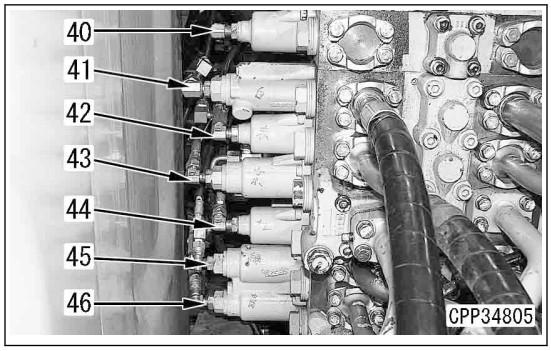
5. Connect connector A40 (2).



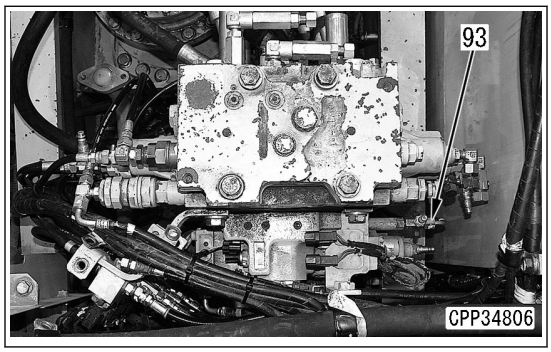
6. Close side cover (1) on the right side of the machine.



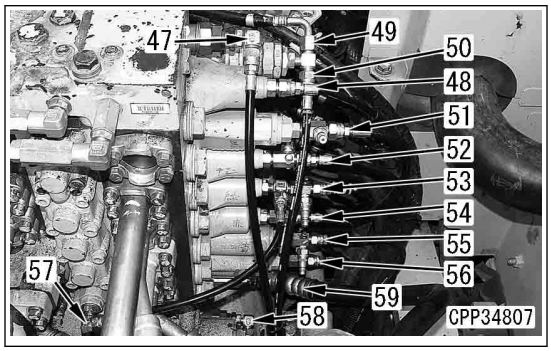
19. Disconnect hoses (40) to (46) of the right control valve.
    The band colors are as shown below.
    Hose (40): No band (Port (P-2))(Machines with attachment)
    Hose (41): White (Port (P2))
    Hose (42): Red (Port (P4))
    Hose (43): Brown (Port (P6))
    Hose (44): No band (Port (P8))
    Hose (45): Green (Port (P10))
    Hose (46): Blue (Port (P12))



20. Disconnect hose (93).
    The band color of the hoses are as shown below.
    Hose (93): Brown (Port (PST))



21. Disconnect hoses (47) to (58) of the left control valve.
    The band color of the hoses are as shown below.
    Hose (47): No band (Port (PX1))
    Hose (48): No band (Port (P-1))
    Hose (49): No band (Port (PB5))(Machines with attachment)
    Hose (50): No band (Port (PB5))(Machines with attachment)
    Hose (51): Black (Port (P1))
    Hose (52): No band (Port (P3))
    Hose (53): Green (Port (P5))
    Hose (54): Red (Port (P7))
    Hose (55): Blue (Port (P9))
    Hose (56): Yellow (Port (P11))
    Hose (57): No band (Port (PB1))
    Hose (58): No band (Port (PX2))



    REMARK
    Disconnect hose (57) at the front side of the control valve.

22. Disconnect hose (59).
    Hose (59): Port (TSW)

    REMARK
    Disconnection of hose is difficult. Hose (59) must be disconnected at the swing motor side.

Work equipment assembly

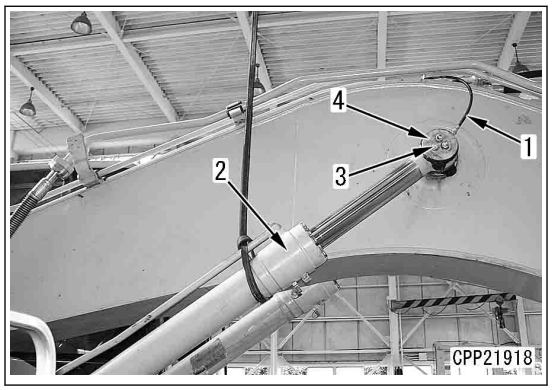
14. Remove work equipment assembly (13).

    Work equipment assembly:
    4500 kg
    Arm + Bucket + Boom = 4500 kg

Method for replacing boom cylinder assembly

Lubrication hose

1. Disconnect lubrication hose (1).



Boom cylinder head pin

2. Sling boom cylinder assembly (2), and hold it.
3. Remove lock bolt (3).
4. Remove plate (4), and remove the boom cylinder head pin.

   NOTICE

   Check the quantity and installing positions of installed shims in advance.

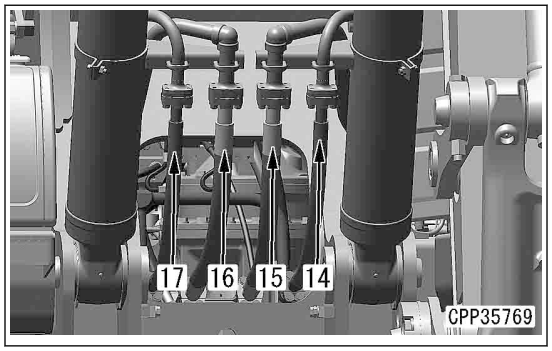
   Boom cylinder head pin:
   40 kg

Hose

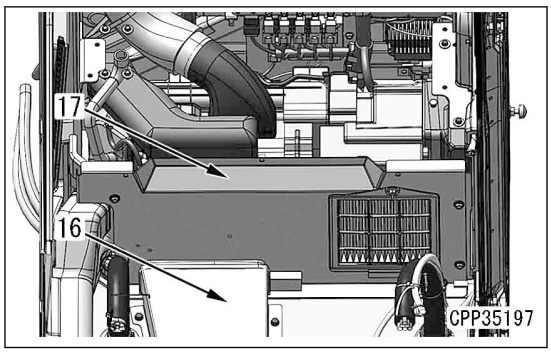
5. Disconnect hoses (14), (15), (16), and (17).

   REMARK

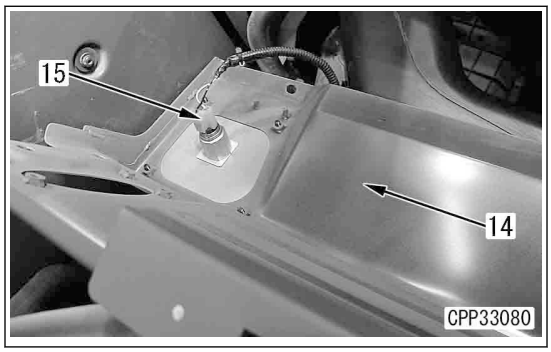
   Keep the disconnected hoses out of the way of lowering the cylinder assembly.



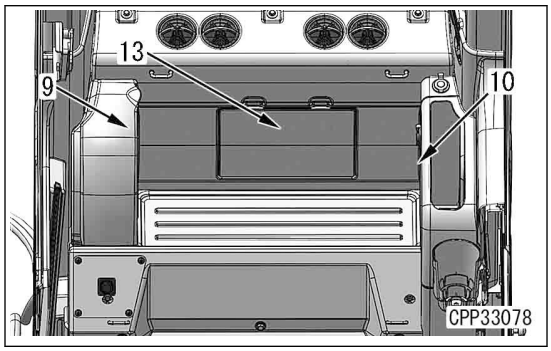
26. Install cover (17).
27. Install duct (16).

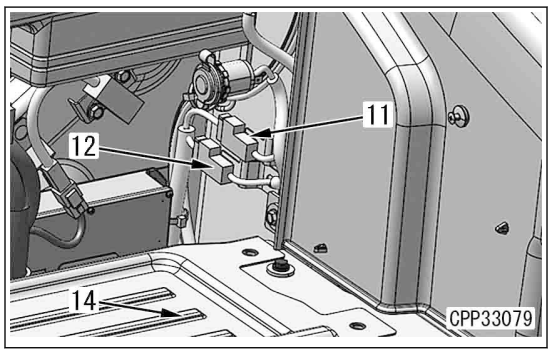


28. Connect connector (15) to the back of cover (14).
    Connector (15): Cigarette lighter M04
29. Install cover (14) (7 bolts).

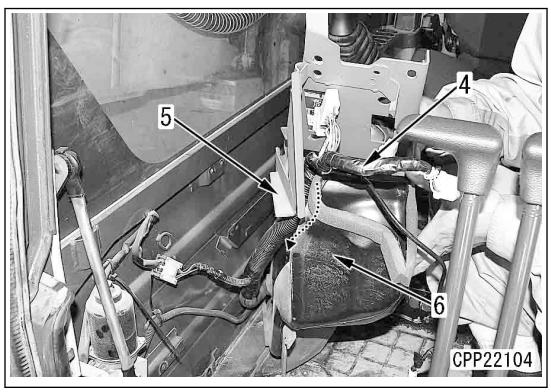


30. Install cover (13) (3 bolts).
31. Install box (10) (3 bolts) while paying attention to connectors (11) and (12) which are connected to the back side of box (10).
    Connector (11): 12 V power socket intermediate harness M13A
    Connector (12): 12 V power socket intermediate harness M13B
32. Connect the hose at the bottom of box (9).
33. Install box (9) (5 bolts).





34. Install wiring harness (4) through the space between cover (5) and duct (6).



Clamp

14. Disconnect clamp (27) (2 bolts).

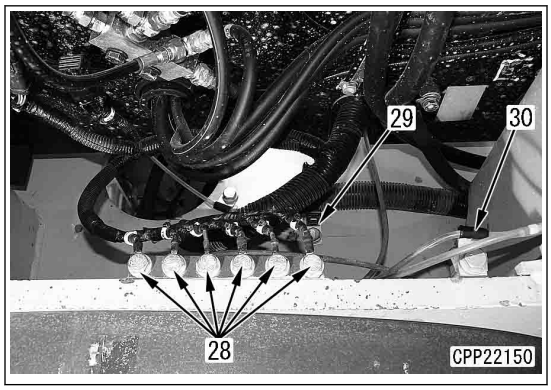
Ground cable

15. Disconnect ground cable (28).

    REMARK

    The ground cables are named as (T04), (T05), (T06), (T07), (T09), and (T10) from the left.

16. Disconnect clamps (29) and (30).



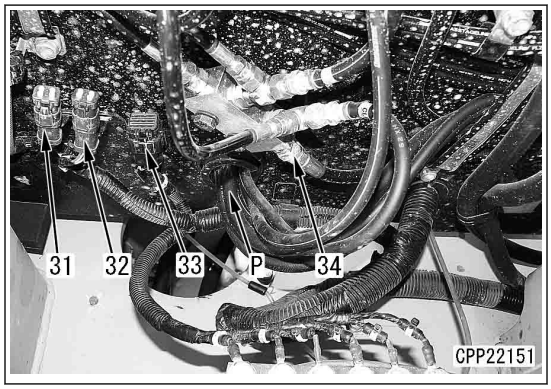
Connector

17. Pull out connectors (31) to (33) from the clips.

    (31): Intermediate connector (A41) (Machine equipped with camera 2)

    (32): Intermediate connector (A42) (Machine equipped with camera 3)

    (33): Intermediate connector (A08) (Machines equipped with attachment)



Hose, Tube

18. Disconnect hose (34).

    (34): Port (P) (Circuit from PPC oil pressure lock solenoid valve)

    REMARK

    Disconnect hoses (P) of the work equipment PPC valve on the junction block side.

Assembly and adjustment procedure of operator's seat adjuster (reference)

6. Tighten adjusters (11) and (12) lightly on frame (10) with bolts (13) (4 pieces).
7. Simultaneously, install unlock wires (14) (2 pieces).

   REMARK

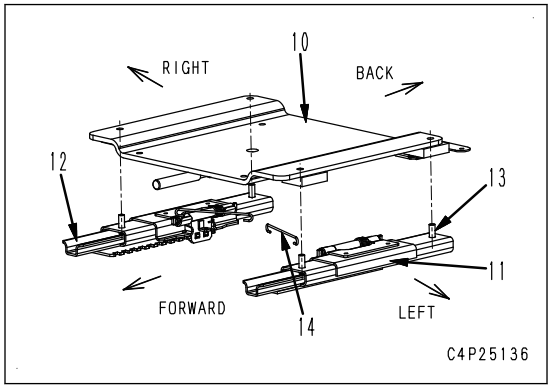
   Check that the right and left locks are securely engaged.
8. Slide adjusters (11) and (12) backward, put washers (17) between adjusters (11) or (12) and seat (16), and tighten them lightly on seat (16) with bolts (15) (2 pieces).
9. Slide adjusters (11) and (12) forward, and install them to seat (16) with bolts (15) (2 pieces).

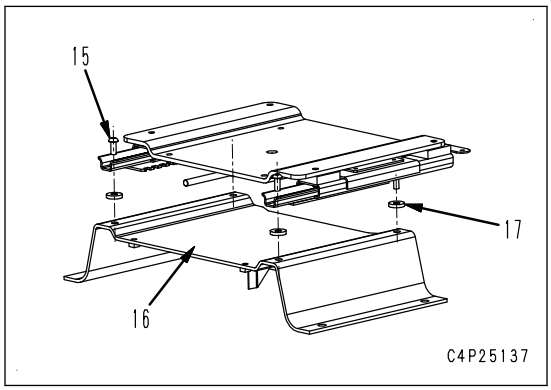
   Mounting bolt (15):
   49 Nm {5.0 kgm}
10. Slide adjusters (11) and (12) forward and backward 3 times, and check that they slide smoothly.
11. Check that adjusters (11) and (12) are locked at the center position of sliding, and tighten bolts (13) (4 pieces).

    Mounting bolt (13):
    49 Nm {5.0 kgm}
12. Slide the seat assembly forward and backward 3 times, check the lock at the rear end, and tighten front bolts (15) (2 pieces).

    Front mounting bolt (15):
    49 Nm {5.0 kgm}
13. Slide the seat assembly forward and backward 3 times again, check the lock at the front end, and tighten rear bolts (15) (2 pieces).

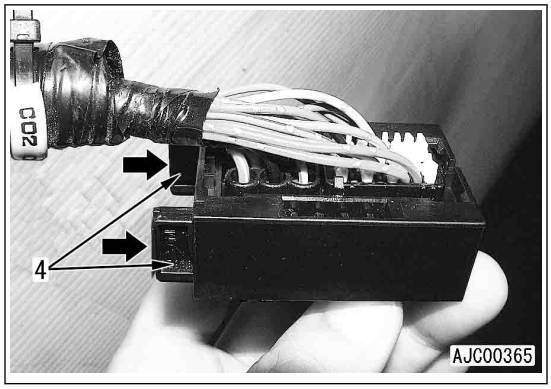
    Rear mounting bolt (15):
    49 Nm {5.0 kgm}
14. In case of greater operating effort (Target147.1 N {15 kg} or less), perform readjustment and check that right and left locks are engaged in the positions.





1. Push in right and left sliders (4) to the end.

   Right and left sliders (4) fully pushed in (on the left in the following figure)

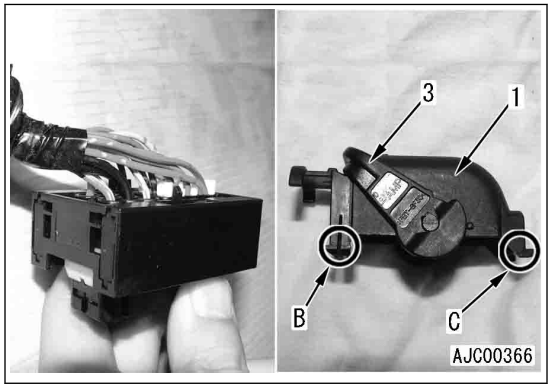


2. Move lever (3) of connector cover (1) from above to the left (LOCK state) as shown in the figure.

   (B), (C): Claws

   NOTICE

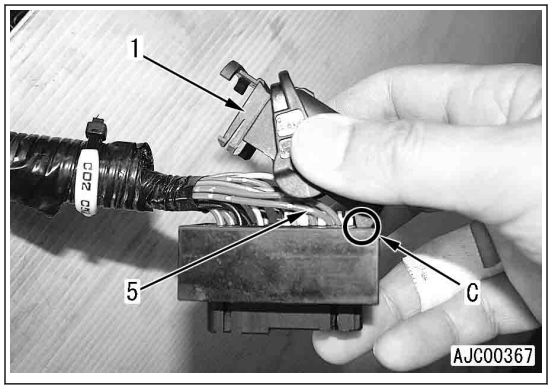
   If the sliders and lever are not set as shown in the following figure, the connector is not disconnected or locked securely with the lever. Accordingly, check their positions again.



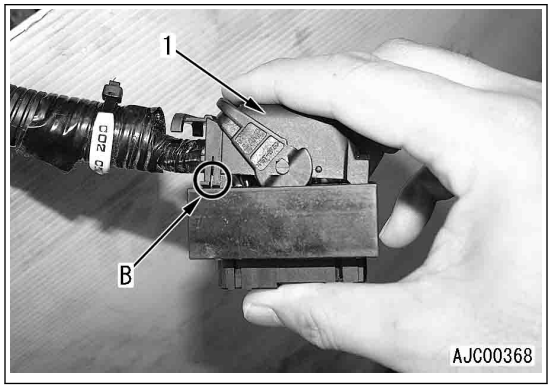
3. Set claw (C) to the connector, and place connector cover (1).

   NOTICE

   Take care not to catch wiring harness (5).

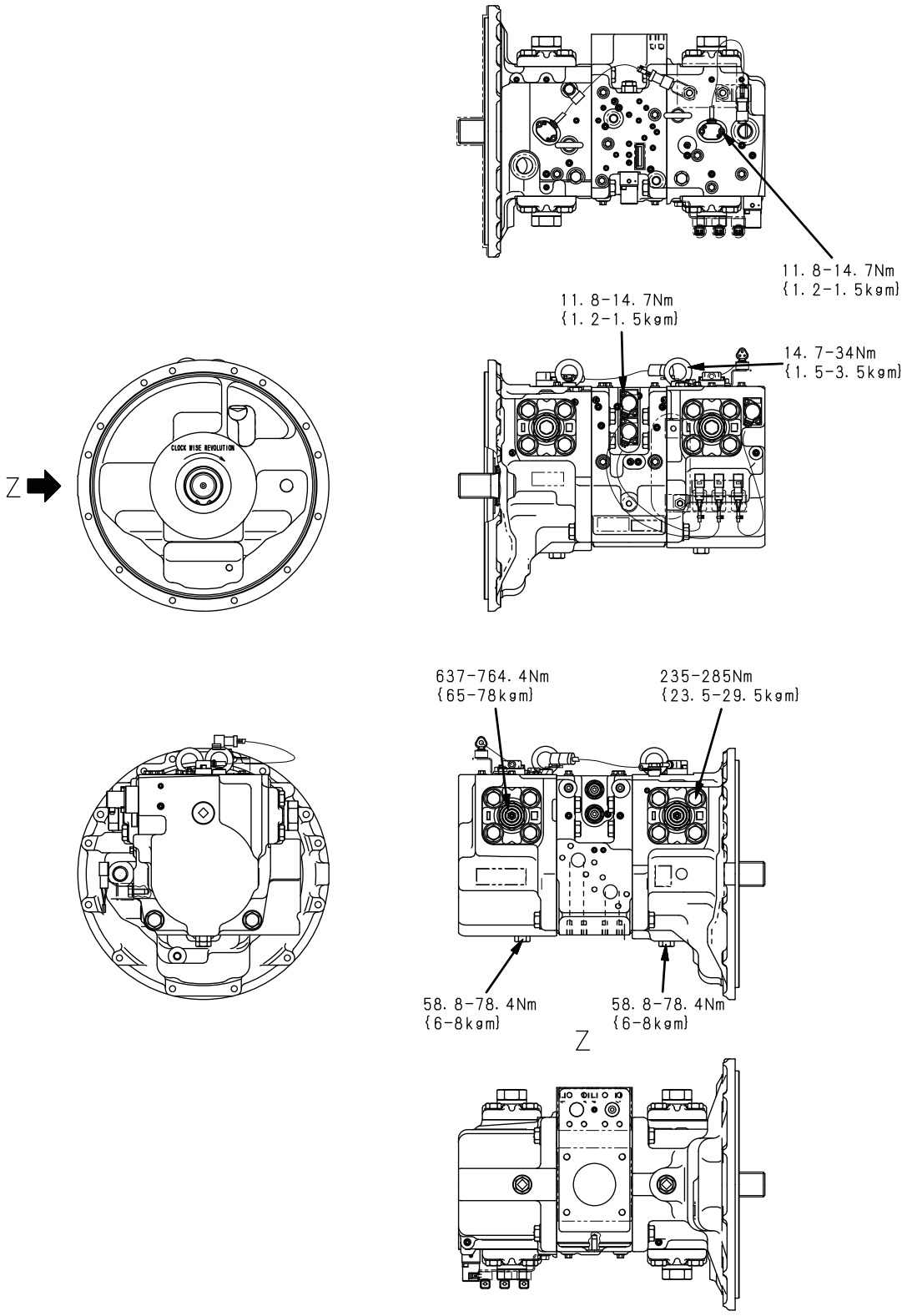


4. Put in claw (B) to install connector cover (1).



60 MAINTENANCE STANDARD

MAINTENANCE STANDARD OF MAIN PUMP

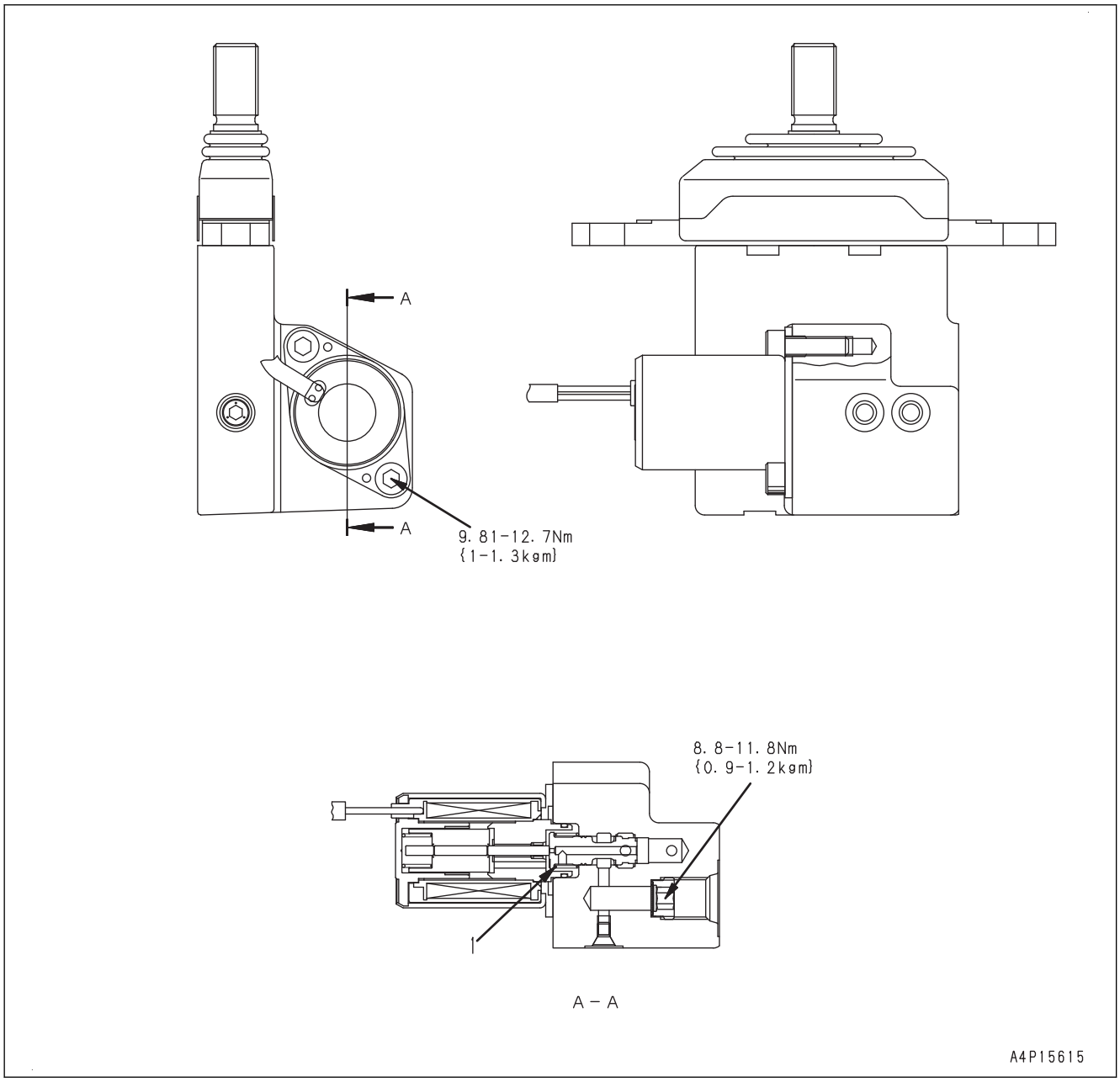


Unit: mm

No.	Item	Criteria					Remedy
		Standard dimension			Repair limit		
1	Centering spring	Free height x outside diameter	Installed height	Load at installed height	Free height	Load at installed height	Replace spring if damaged or deformed
		33.9 x 15.3	28.4	125 N {12.7 kg}	-	100 N {10.2 kg}	
2	Metering spring	22.7 x 8.10	22.0	16.7 N {1.70 kg}	-	13.3 N {1.36 kg}	

MAINTENANCE STANDARD OF EPC VALVE OF 1ST-LINE ATTACHMENT PPC VALVE

(Machines ready for installation of attachment)



SPECIFICATIONS OF AIR CONDITIONER

Refrigerant: R134a

Refrigerant quantity: : 930±50 g

INSTALLATION LOCATIONS OF AIR CONDITIONER PARTS AND ARRANGEMENT OF CONNECTORS

⚠ **Park the machine on a level ground, swing the upper structure 90 °, lower the work equipment perfectly to the ground in a stable posture, set the lock lever to LOCK position, and stop the engine.**

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

- Write down the connector numbers and installed positions of the wiring harnesses and hoses before disconnecting them.
- When disconnecting the dual pressure switch connector, swing the upper structure 90 ° and remove the cab undercover.
- The 3 fuses related to the air conditioner are located in the fuse box at the rear of the operator's seat.
- The air conditioner unit is mounted inside the rear cover at the rear of the operator's seat.

Locations of fuse boxes and connectors

Connector No.	Remarks	Location	Reference
AC01	Intermediate connector	Rear right of operator's seat	Air conditioner controller and connectors layout
AC02	Intermediate connector	Rear right of operator's seat	Air conditioner controller and connectors layout
AC03	Air conditioner compressor	Engine	Air conditioner compressor connectors layout
ACECU	Air conditioner controller	Rear of operator's seat	Air conditioner controller and connectors layout
CM01*1	Machine monitor	Front of operator's seat	Machine monitor connectors layout
CM02	Machine monitor	Front of operator's seat	Machine monitor connectors layout
CM03*1	Machine monitor	Front of operator's seat	Machine monitor connectors layout
CM04*1	Machine monitor	Front of operator's seat	Machine monitor connectors layout
F01	Fuse box	Inside of fuse box at rear right of operator's seat	Fuses layout in fuse box F01
P17	Dual pressure switch	Under operator's seat	Dual pressure switch connectors layout
P18	Outside air temperature sensor	Cooling unit	Outside air temperature sensor connectors layout
P31	Sunlight sensor	Machine monitor	Sunlight sensor connectors layout
R21	Relay	Rear of operator's seat	Air conditioner controller and connectors layout
[2]	Power transistor	Air conditioner unit	Air conditioner unit and connectors layout
[5]*1	FRESH/RECIRC air changeover servomotor	Air conditioner unit	Air conditioner unit and connectors layout
[6]*1	Inside air temperature sensor	Air conditioner unit	Air conditioner unit and connectors layout
[7]*1	Evaporator temperature sensor (frost sensor)	Air conditioner unit	Air conditioner unit and connectors layout

*1: Connectors which do not appear in troubleshooting.

Fuses layout in fuse box F01

Open the cover of fuse box at the rear right of the operator's seat.

FAILURE CODE [879CKA] Ventilating Sensor Open Circuit

Action level	Failure code	Failure	Ventilating sensor Open Circuit (Machine monitor system)
-	879CKA		
Details of failure	Air conditioner controller detects open circuit in evaporator temperature (frost) sensor.		
Action of controller	• Air conditioner controller transmits open circuit information of evaporator temperature (frost) sensor to machine monitor by CAN communication. • Stops air conditioner.		
Phenomenon on machine	Air conditioner does not operate because of open circuit in evaporator temperature (frost) sensor.		
Related information	• After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • Check if this failure code is displayed on electrical system failure record screen in service mode of machine monitor. • Since connector of air conditioner evaporator temperature (frost) sensor cannot be checked when it is mounted on machine, troubleshooting cannot be performed.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective air conditioner controller	Air conditioner controller may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)
2	Defective air conditioner unit	Air conditioner unit may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)