UENBM00442

Shop Manual

HYDRAULIC EXCAVATOR

PC210LC I-11

SERIAL NUMBERS 500470 and up
K75001 and up

KOMATSU

REMARK

Weight of component whose weight is heavier than 25 kg is shown with symbol  in "DISASSEMBLY AND ASSEMBLY".

- Before starting work, check the wire ropes, brake, clutch, controller, rails, over winding prevention device, ground fault circuit interrupter for electric shock prevention, crane collision prevention device, and energizing caution lamp, and check the following safety items.
  - Observe the signals for sling work.
  - Operate the hoist at a safe place.
  - Be sure to check the directions of the direction indication plate (north, south, east and west) and the operating button.
  - Do not sling a load at an angle. Do not move the crane while the slung load is swinging.
  - Do not raise or lower a load while the crane is moving longitudinally or laterally.
  - Do not drag a sling.
  - When lifting up a load, stop it just after it becomes off the ground, check the safety, and then lift it up.
  - Consider the travel route in advance and lift up a load to a safe height.
  - Place the control switch in a position where it is not an obstacle to work and passage.
  - After operating the hoist, do not swing the control switch.
  - Remember the position of the main switch so that you can turn off the power immediately in an emergency.
  - If the hoist stops because of a power failure, turn off the main switch. When turning on a switch after it is turned off by the ground fault circuit interrupter, check that the devices related to that switch are not in operating condition.
  - If you find an obstacle around the hoist, stop the operation.
  - After finishing the work, stop the hoist at the specified position and raise the hook to at least 2 m above the floor. Do not leave the sling installed to the hook.

Selecting wire ropes

Select adequate ropes depending on the weight of the parts to be hoisted referring to the table below.

REMARK

The allowable load is calculated with one sixth (safety factor 6) of the breaking load of the rope.

Wire rope (JIS G3525 6x37-A type) (Standard Z twist wire ropes without galvanizing)

Nominal diameter of rope (mm)	Allowable load (kN { t})
10	8.8 {0.9}
12	12.7 {1.3}
14	17.3 {1.7}
16	22.6 {2.3}
18	28.6 {2.9}
20	35.3 {3.6}
25	55.3 {5.6}
30	79.6 {8.1}
40	141.6 {14.4}
50	221.6 {22.6}
60	318.3 {32.4}

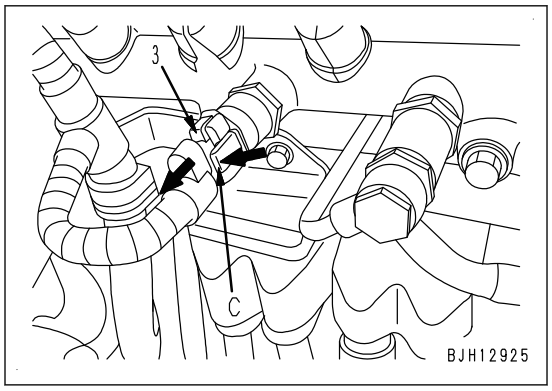
METHOD FOR DISCONNECTING AND CONNECTING CONNECTOR WITH LOCK TO PUSH

(ALL-A-1160-925-30-B)

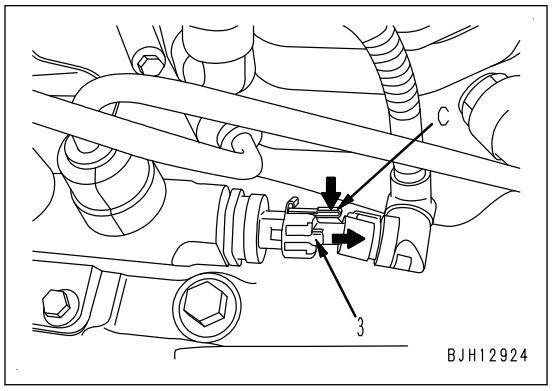
Method for disconnecting connector with lock to push (BOSCH-3)

While pressing lock (C), pull out connector (3) in the direction of the arrow.

- 114 series



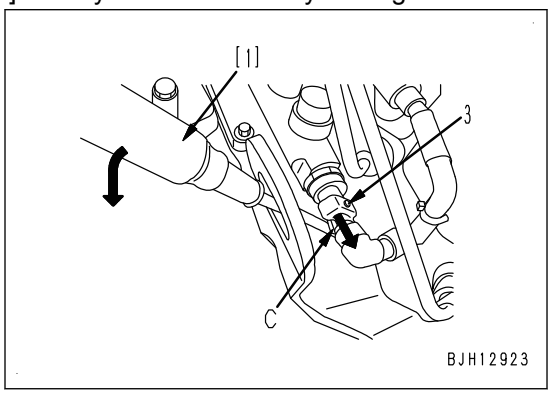
- 107 series



REMARK

If the lock is located on the underside, use flat-head screwdriver [1] since you cannot insert your fingers.

While pushing up lock (C) of the connector with flat-head screwdriver [1], pull out connector (3) in the direction of the arrow.



Method for connecting connector with lock to push (BOSCH-3)

Insert it straight until it clicks.

Unit: kg

Machine model	PC210LCI-11
Stroke sensing boom cylinder assembly	201
Stroke sensing arm cylinder assembly	241
Stroke and reset sensing bucket cylinder assembly	151
Bucket link (large) assembly	83
Bucket link (small) assembly	22 x 2
Boom foot pin	42
Boom cylinder bottom pin	8
Stroke sensing boom cylinder bottom pin	8
Stroke sensing boom cylinder head pin	28
Stroke sensing arm cylinder bottom pin	10
Stroke sensing arm cylinder head pin	12
Boom and arm connecting pin	26
Stroke sensing bucket cylinder bottom pin	8
Bucket pin	20 x 2
Bucket link pin	13 x 2

AdBlue/DEF INJECTOR

(PC400_11-K-AFJ0-001-00-B)

STRUCTURE OF AdBlue/DEF INJECTOR

(PC400_11-K-AFJ0-041-00-B)

A: Pressurized sending from AdBlue/DEF pump

B: Coolant inlet

C: Coolant outlet

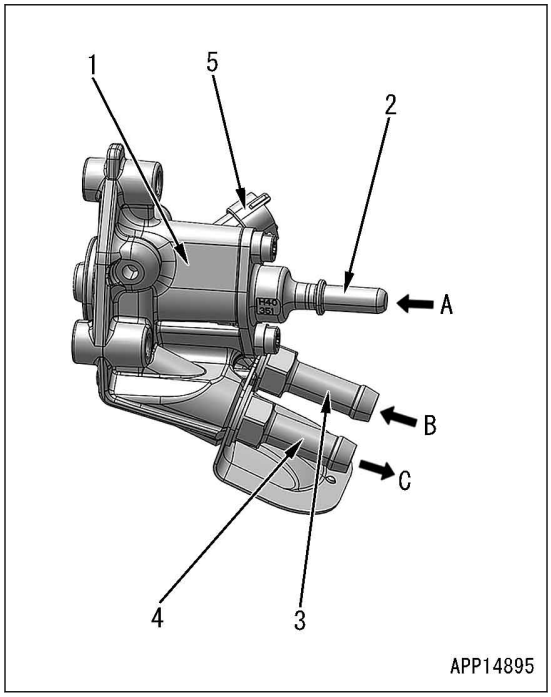
1: AdBlue/DEF injector

2: AdBlue/DEF inlet connector

3: Coolant inlet connector

4: Coolant outlet connector

5: Electric connector



FUNCTION OF AdBlue/DEF INJECTOR

(PC400_11-K-AFJ0-042-00-B)

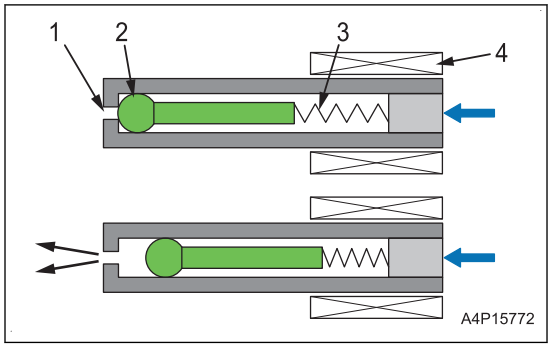
- It injects AdBlue/DEF which is pressurized by AdBlue/DEF pump into AdBlue/DEF mixing tube.
- The injection amount is controlled by the valve opening or closing time while the pressure is constant.
- It circulates the engine coolant to prevent it from being heated by the heat from the exhaust pipe.

OPERATION OF AdBlue/DEF INJECTOR

(PC400_11-K-AFJ0-044-00-B)

Principle of injection of the injector is described. Following figure shows the state of injection.

1. Engine controller sends the electrical signal to control AdBlue/DEF injector.
2. Solenoid (4) moves seal ball (2), and seal ball (2) leaves from injection port (1) to make opening state.
   Pressurized AdBlue/DEF by AdBlue/DEF pump is injected.
3. When the electrical signal is not sent, seal ball (2) closes injection port (1) with spring force (3), so AdBlue/DEF is not injected.



3. The separated oil oozes out from the bottom of the filter (6), and flows to oil drain port (C), and then flows to the engine oil pan.
4. The crankcase pressure sensor (3) senses the crankcase pressure (blowby gas pressure).
   If the engine controller detects filter clogging by detected value of crankcase pressure sensor (3), it displays failure code CA555. If the pressure increases further, it displays failure code CA556.
5. Relief valve (4) is installed in case (1) and operates when filter (6) is blocked.
6. When the crankcase pressure becomes negative, CDR valve (2) operates for it not to become excessively negative.

CDR VALVE

(ENG125_6-K-A18A-001-00-B)

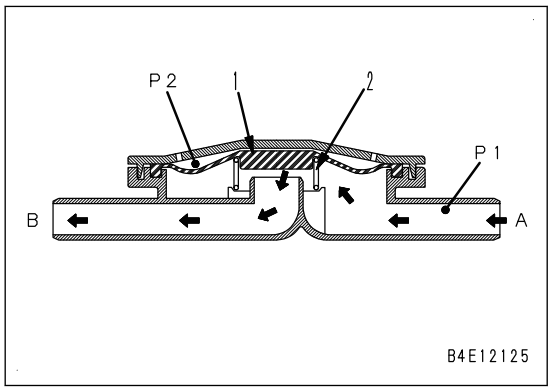
CDR

Abbreviation for Crankcase Depression Regulator

OPERATION OF CDR VALVE

(D155_7-K-A18A-044-00-B)

1. Spring (2) normally pushes up diaphragm (1), and the blowby gas flows from crankcase side (A) into turbocharger side (air intake side) (B).
2. As the intake air at turbochaeger side (air intake side) (B) increases, pressure on crankcase side (P1) decreases.
3. The reaction force of spring (2) is overwhelmed by ambient pressure (P2). Diaphragm (1) shuts the passage and temporarily blocks the flow.
4. When the blowby gas accumulates in the crankcase, pressure (P1) on the crankcase side increases, and it pushes up diaphragm (1) again and blowby gas starts to flow.



KDPF

(ENG125_6-K-A9H0-001-00-B)

KDPF

Abbreviation for KOMATSU Diesel Particulate Filter

STRUCTURE OF KDPF

(ENG107_3-K-A9H0-041-00-B)

REMARK

The shape is subject to machine models.

K3X10024

In the following table an overview is given of the normal signal

Indication	Meaning
The red lamp (6) flashes as soon as the ignition has been switched on.	1. The pump is not powered. Check fuses and connections to earth. Immediate action required. 2. The connection between the in-cab display and pump is defective, replace if necessary.

SENSOR

(PC400_10-P-E700-001-00-B)

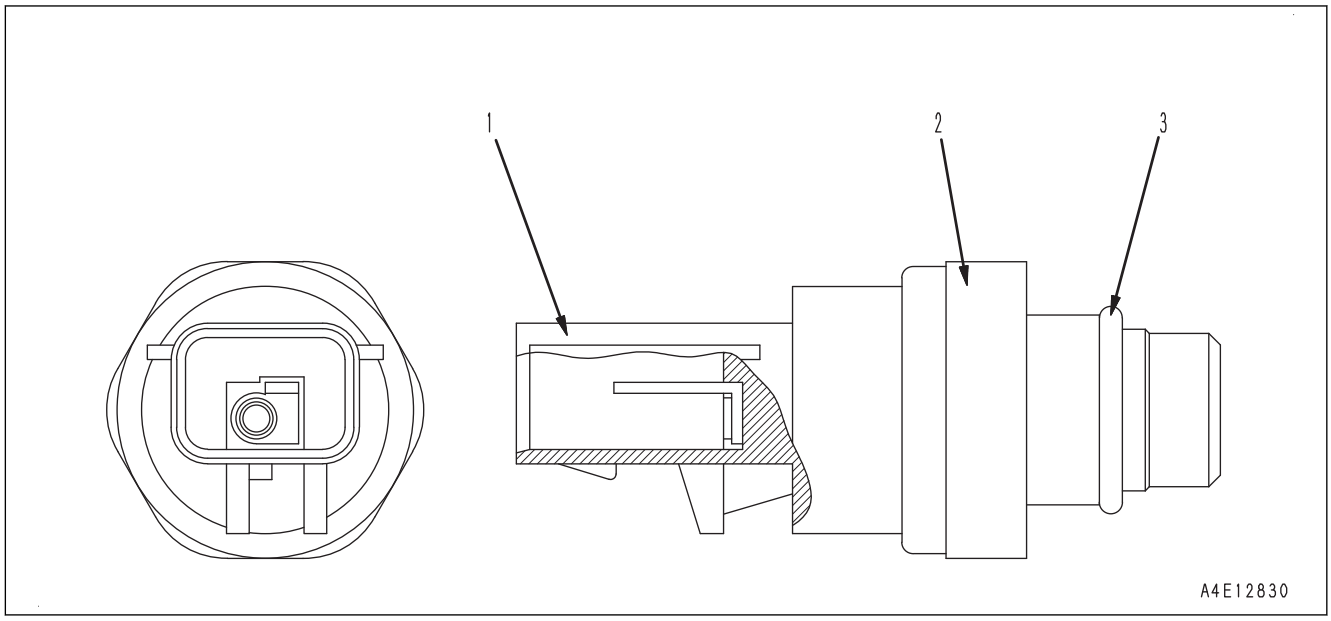
STRUCTURE OF ENGINE OIL PRESSURE SWITCH

(ENG114_6-K-ABK6-041-00-B)

Engine oil pressure switch is installed to the side of the cylinder block.

Type of contact: Normally closed contact

General view



1: Connector (DT-2P)

2: Sensor

3: O-ring

FUNCTION OF ENGINE OIL PRESSURE SWITCH

(ENG114_6-K-ABK6-042-00-B)

This switch senses the engine oil pressure and turns “ON” when the pressure decreases below the specified pressure.

STRUCTURE OF QUICK COUPLER LOW PRESSURE WARNING SWITCH

(PC240_11-K-LGC8-041-00-B)

The quick coupler circuit has one pressure switch.

Operating conditions of 2-stage relief function	Relief pressure
• During travel • When swing lock switch is ON • When boom is lowered • When one-touch power maximizing function operates • In L mode	34.8 MPa {355 kg/cm^2} ↓ 37.2 MPa {380 kg/cm^2}

Variable back pressure function

The set pressure of the back pressure valve varies depending on the operating conditions of the machine.

Operating condition	Setting of back pressure valve
During swinging or travel	High-pressure set
During state other than swinging or travel	Low-pressure set

1: Unload valve
2: Suction safety valve for hydraulic drift prevention valve (boom RAISE and arm OUT)
3: Main relief valve
4: Variable back pressure valve

Arm valve

5: Arm hydraulic drift prevention valve (if equipped)
6: LS shuttle valve
7: Arm quick return valve
8: Pressure compensation valve (arm IN)
9: Spool
10: Suction safety valve (arm IN)
11: Cooler check valve
12: Check valve for regeneration circuit
13: Suction valve (arm OUT)
14: Pressure compensation valve (arm OUT)

R.H. travel valve

15: LS shuttle valve
16: Pressure compensation valve (FORWARD)
17: Spool
18. Suction valve (FORWARD)
19. Suction valve (REVERSE)
20: Pressure compensation valve (REVERSE)

Swing valve

21: LS selector valve
22: Pressure compensation valve (left)
23: Spool
24: Pressure compensation valve (right)

CY: To work equipment cylinder
PCY: For pressure pickup port and equalizer circuit
PI: From PPC valve
T: to tank
V: From control valve

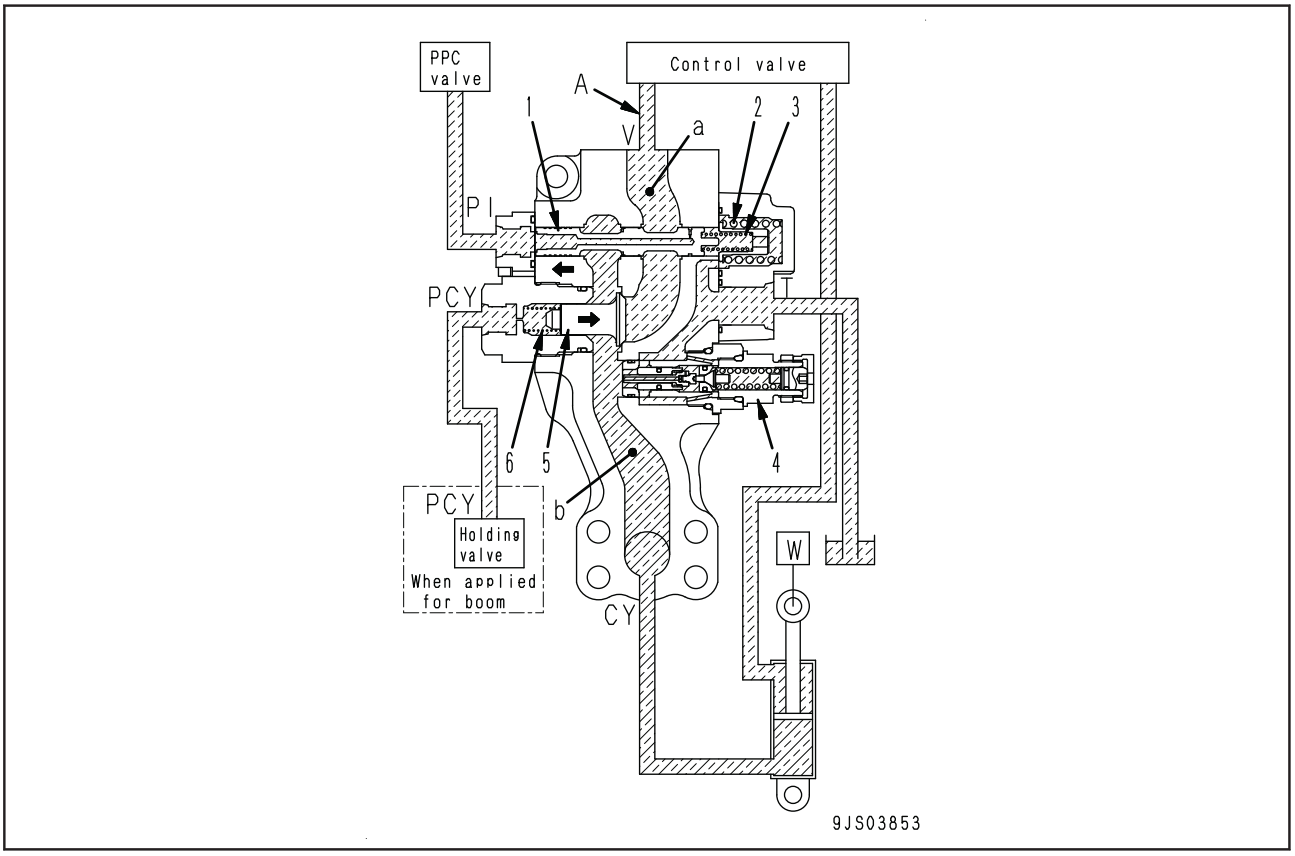
1. Pilot spool
2. Spool (1st stage spool)
3. Spring (2nd stage spool)
4. Safety valve
5. Check valve
6. Spring
7. Check valve spring
8. Spool return spring
9. Spool return spring
10. Spool return spring

FUNCTION OF HYDRAULIC DRIFT PREVENTION VALVE *(PC240_11-K-L6C0-042-00-B)*

Prevents the pressurized oil from reversing from the work equipment cylinder and the latter from a sudden drop if the piping bursts between the control valve and the work equipment cylinder.

OPERATION OF HYDRAULIC DRIFT PREVENTION VALVE *(PC240_11-K-L6C0-044-00-B)*

When the work equipment lever is in “NEUTRAL”



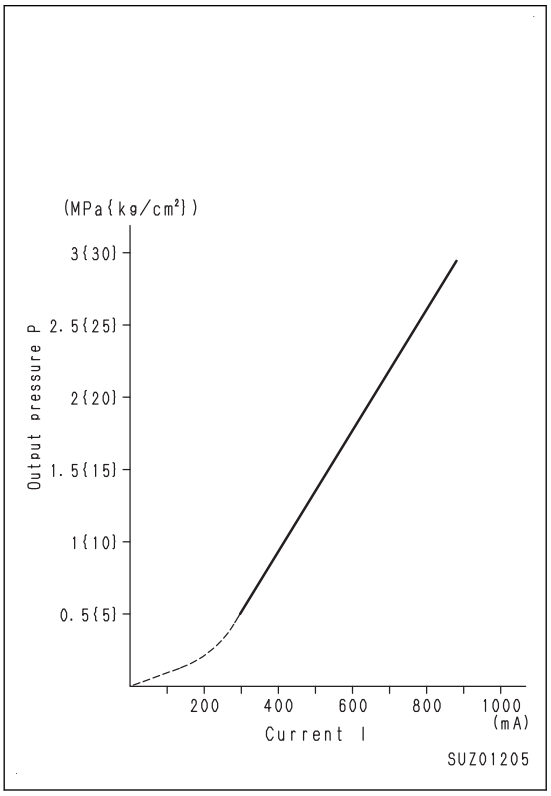
When the piping is free of burst

- Check valve (5) is closed under the holding pressure of the cylinder led from port (CY) to chamber (b).
- Pilot pressure led to port (PI) from the PPC valve when in neutral is 0 kg/cm^2.
- Spool (1) is pressed to the left by the force of springs (2) and (3).
- Chambers (a) and (b) are shut off.
- No pressurized oil flows between the control valve and the work equipment cylinder.
- Accordingly, the work equipment is held in position.
- If the work equipment cylinder has abnormally high pressure, safety valve (4) is actuated by the holding pressure of the work equipment cylinder.

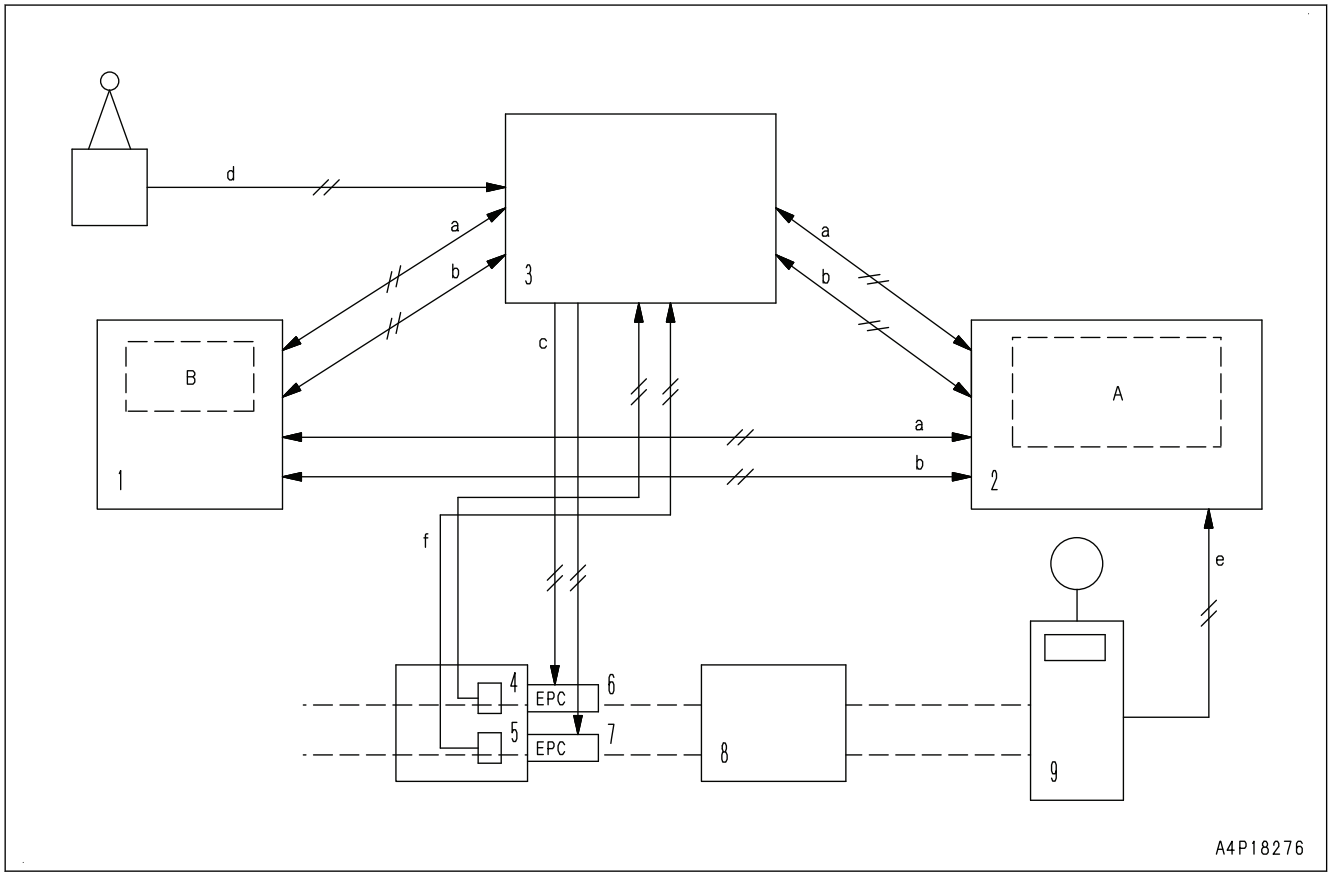
FUNCTION OF EPC VALVE OF 1ST-LINE ATTACHMENT PPC VALVE

(PC400_10-K-PL2B-042-00-B)

Upon receiving signal current (i) from the pump controller, this valve generates EPC output pressure in proportion to that signal current and outputs it to the control valve.



When operating the bucket tilting operation clockwise with auto tilt bucket equipped machine.



A: Figures out the current work equipment posture

B: Figures out EPC valve drive signal

Input signal

a: Control Area Network signal 1 (Komnet/r)

b: Control Area Network signal 2 (Komnet/c)

c: EPC valve drive signal

d: Lever input signal

e: Cylinder stroke signal

f: Pressure sensor signal

1: Work equipment controller

2: ICT sensor controller

3: Pump controller

4: ATT1 left pressure sensor

5: ATT1 right pressure sensor

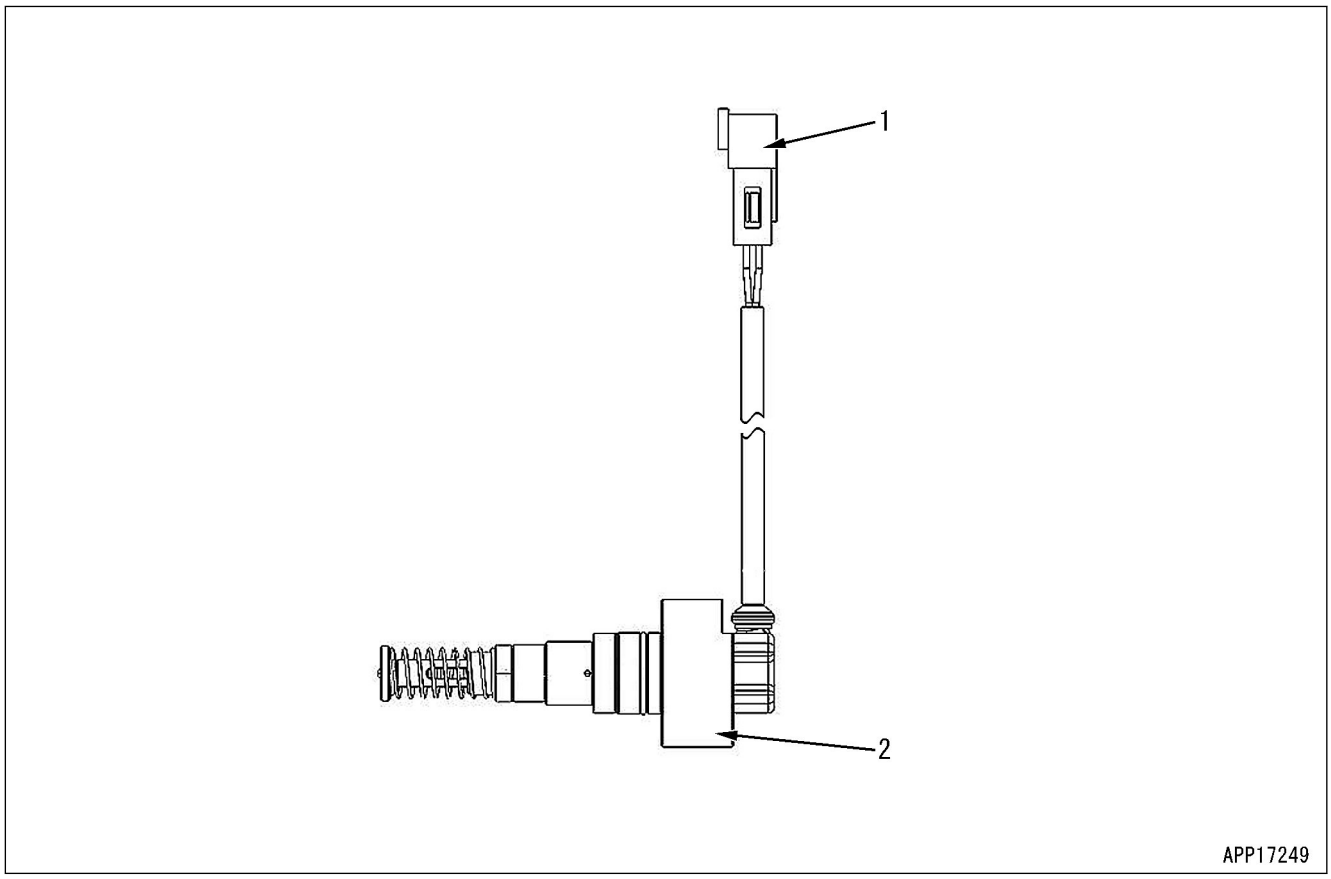
6: Service flow rate adjustment EPC 2

7: Service flow rate adjustment EPC 1

8: Control valve

9: Stroke sensing bucket tilt cylinder

General view



1: Connector 2: Stroke sensor

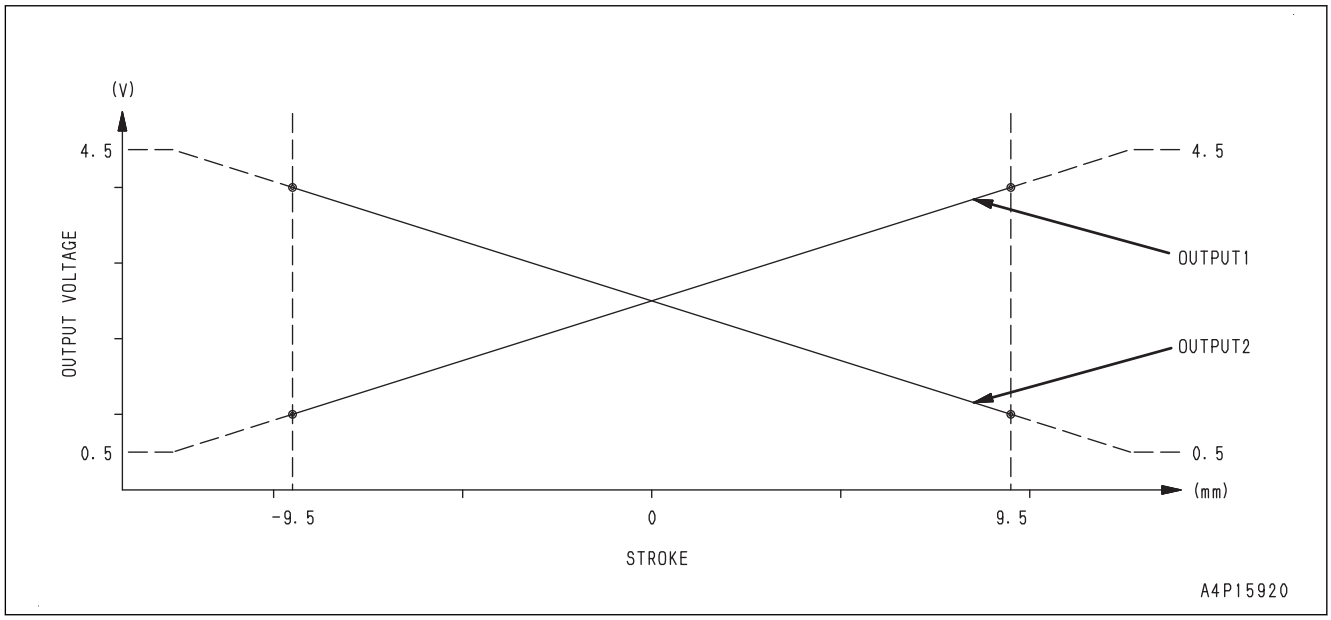
FUNCTION OF BOOM SPOOL STROKE SENSOR

(PC490I_11-K-L611-042-00-B)

- This sensor is installed to the spring case of boom spool of control valve. This sensor is pushed by the terminal of spool. This sensor detects the movement of boom spool stroke.

Output characteristics

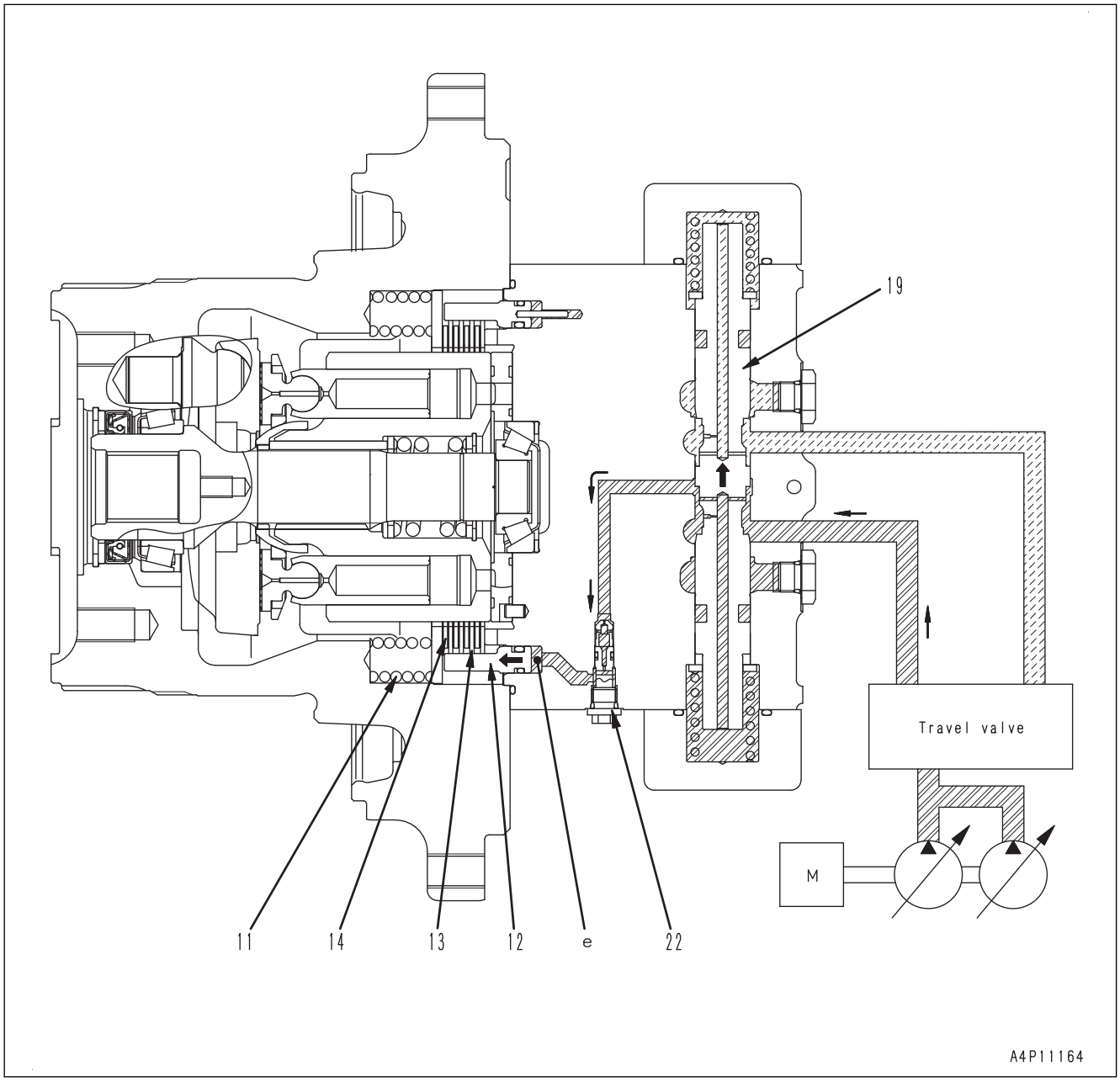
- The relationship between the stroke and the output voltage is shown in the following graph.



PARKING BRAKE OF TRAVEL MOTOR *(PC400_10-K-G000-001-00-B)*

OPERATION OF PARKING BRAKE OF TRAVEL MOTOR *(PC220_11-K-G000-044-00-B)*

When machine starts traveling (parking brake is canceled)



1. When the travel lever is operated, the pressurized oil from the pump operates counterbalance valve spool (19) and opens the parking brake circuit.
2. The oil flows into chamber (e) of brake piston (12) and shortens spring (11) to push piston (12) to the left.
3. Press force to plate (13) and disc (14) is lost, and plate (13) and disc (14) apart each other to release the brake.

Machine model				PC210LCI-11	
Engine				SAA6D107E-3	
Item	Measurement condition		Unit	Standard value for new machine	Repair limit
AdBlue/DEF Pump Heater Relay Test	Within 900 seconds after starting AdBlue/DEF Pump Heater Relay Test		V	24.5±1.5	24.5±1.5
AdBlue/DEF Tank Heater Valve Test	Within 900 seconds after starting AdBlue/DEF Tank Heater Valve Test		V	24.5±1.5	24.5±1.5
SCR Denitration Efficiency Test	Machine monitor display after SCR Denitration Efficiency Test is completed	AdBlue/DEF Injection Test Result	-	1 (Normal)	1 (Normal)
		SCR Efficiency Test Result		1 (Normal)	1 (Normal)

Control valve spool stroke

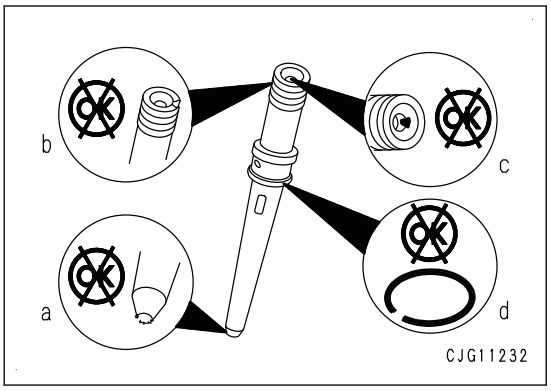
Machine model				PC210LCI-11	
Engine				SAA6D107E-3	
Item	Measurement condition		Unit	Standard value for new machine	Repair limit
Boom control valve	• Stop the engine. • Measuring point: See “MACHINE POSTURE AND PROCEDURE FOR MEASURING PERFORMANCE”, “Control valve”.	RAISE	mm	11.5±0.5	11.5±0.5
		LOWER		9.5±0.5	9.5±0.5
Arm control valve		CURL	mm	11.5±0.5	11.5±0.5
		DUMP		9.5±0.5	9.5±0.5
Bucket control valve		CURL	mm	9.5±0.5	9.5±0.5
		DUMP		9.5±0.5	9.5±0.5
Swing control valve		Swing LEFT	mm	9.5±0.5	9.5±0.5
		Swing RIGHT		9.5±0.5	9.5±0.5
Travel control valve		Forward	mm	9.5±0.5	9.5±0.5
		Reverse		9.5±0.5	9.5±0.5

30 TESTING AND ADJUSTING

NOTICE

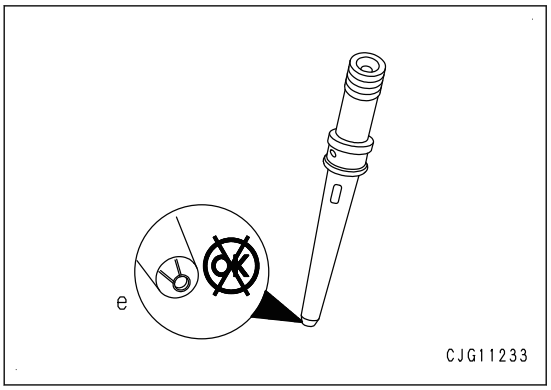
Check the following items, and replace the inlet connector if there is any abnormality.

- **There is a burr or a worn part at front end (a) or rear end (b) of the inlet connector.**
- **When foreign materials are attached to the edge filter at rear end part (c) of the inlet connector**
- **The O-ring at the upper part (d) of inlet connector is cracked or deteriorated.**
- **There is a worn part or an uneven seat contact mark on sealing face (e) at the front end of the inlet connector.**



REMARK

If high-pressure fuel leaks through the inlet connector, the seat surface has fine streaks or cracks.



5. Apply the engine oil to the O-ring and the cylinder head side of the inlet connector (7).

   O-ring and cylinder head side of the inlet connector (7):
   Engine oil

6. Insert the inlet connector (7) into the injector assembly (9) and tighten the retaining nut (6) lightly.

   REMARK

   - Tighten the nut to the specified torque after tightening it lightly. Be sure to tighten the nut to the specified torque each time. If the tightening torque is insufficient or too much, it can cause fuel leakage inside the engine.
   - Install the inlet connector (7) so that its positioning ball fits in guide groove part on the cylinder head side.

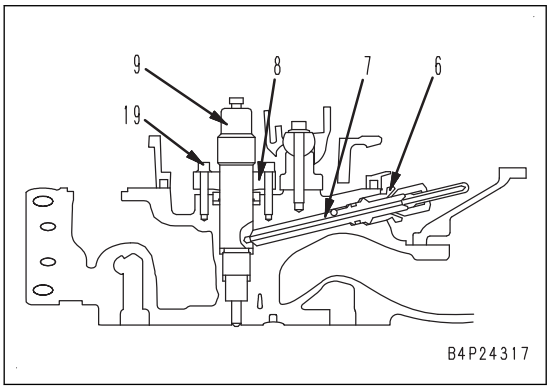
   Retaining nut (6) (lightly tightening):
   15±5 Nm {1.53±0.51 kgm}

7. Tighten the mounting bolts (19) of holder (8) alternately.

   Mounting bolt (19):
   8±0.8 Nm {0.82±0.08 kgm}

8. Tighten the retaining nut (6) of inlet connector (7).

   Retaining nut (6) (tightening to specified torque):
   50±5 Nm {5.1±0.51 kgm}



2) Check the monitoring information of (a) to (d) on "Monitoring" screen.

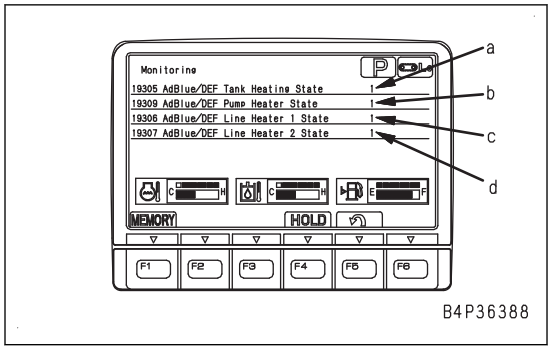
Details of monitoring information are as follows.

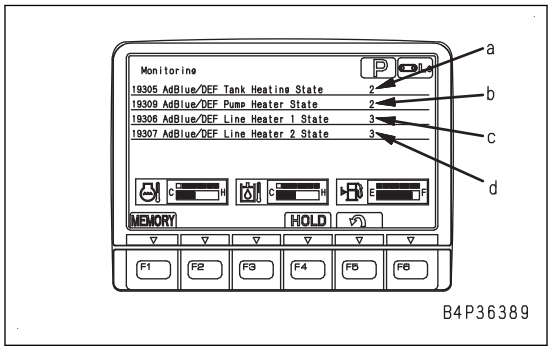
1: Being thawed

2: Being kept warm

3: OFF

- If one of the monitoring information from (a) to (d) is "1"
  AdBlue/DEF is being thawed because it is still frozen. Keep the engine speed at low idle and wait until the status of all the monitoring information from (a) to (d) becomes "2" or "3", and then proceed to step 3.
- The status of the monitoring information from (a) to (d) is "2" or "3":
  AdBlue/DEF is not frozen. Proceed to step 3.

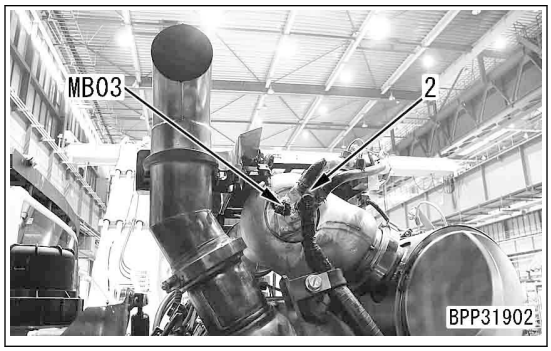




3. Stop the engine.

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

4. Check that the system operating lamp is not lit, turn the battery disconnect switch to OFF position, and remove the key.
5. Open engine hood.
6. Check that there is neither crack nor dissolution on AdBlue/DEF injector (2).

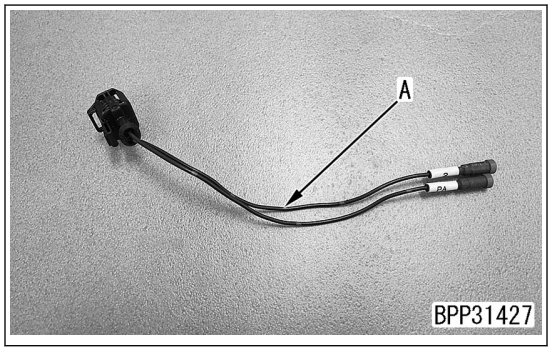


7. Disconnect connector (MB03), connect socket A, and measure the resistance value.

   REMARK

   - The resistance value becomes high when it is at high temperature. Cool it down completely, and perform the measurement.
   - Measure the resistance between pin 1 and pin 2.

   For standard values, see STANDARD VALUE TABLE, STANDARD VALUE TABLE FOR ELECTRICITY.

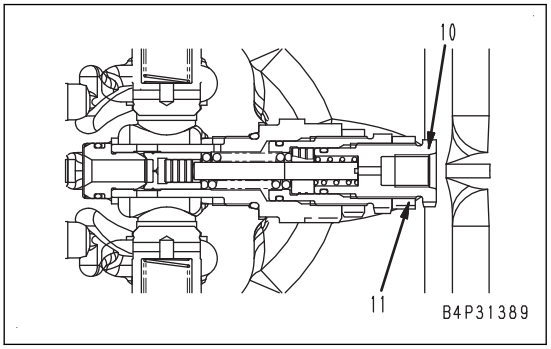


8. After the measurement is completed, remove measuring instrument, and connect connector (MB3).
9. Turn the battery disconnect switch to ON position.
10. Remove AdBlue/DEF injector (2).

1. Disconnect the pilot hose (9).
2. While fixing holder (10), loosen lock nut (11).
3. Turn holder (10) to adjust the pressure.

   REMARK

   - Turn the holder to the right to raise the pressure or turn it to the left to lower the pressure.
   - Quantity of pressure adjustment per turn of 7.68 MPa{78.3 kg/cm^2}



4. While fixing holder (10), tighten lock nut (11).

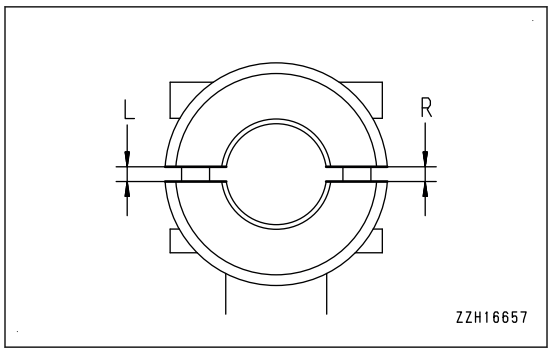
   Locknut :
   58.8 to 78.4 Nm {6 to 8 kgm}

5. Connect the pilot hose (9).

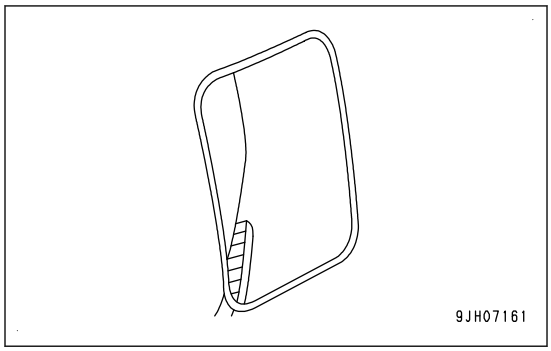
After the adjustment, recheck the oil pressure according to the testing procedure described above.

NOTICE

- **Tighten the right and left bolts of each bracket alternately so that their right and left clearances (R) and (L) become equal.**
- **If the mirror and stay mounting bolts are tightened excessively, the bracket may be damaged. Be sure to tighten bolts to the specified torque.**



Adjust the mirror so that the side of the machine is reflected in the mirror as shown in the figure.



PROCEDURE FOR ADJUSTING MACHINE RIGHT SIDE MIRROR (C)

(PC200_11-K-K810-270-00-B)

⚠ **To prevent the machine from moving during the work, make sure that the following conditions are met before starting the work.**

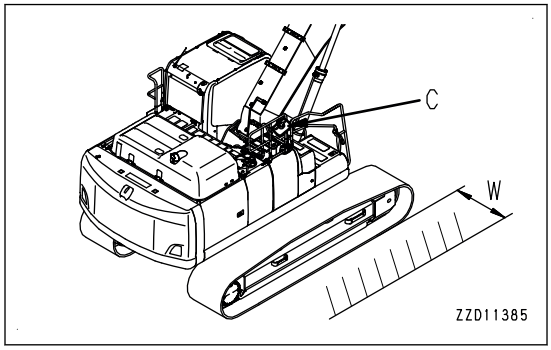
⚠ **The machine is placed on a firm, level ground.**

⚠ **The work equipment is lowered to the ground in secure posture.**

⚠ **The lock lever is in LOCK position.**

⚠ **The engine is stopped.**

- Adjust it so that people within 1 m {3 ft 3 in} around the machine can be seen from the operator's seat.
  (W): 1 m {3 ft 3 in}

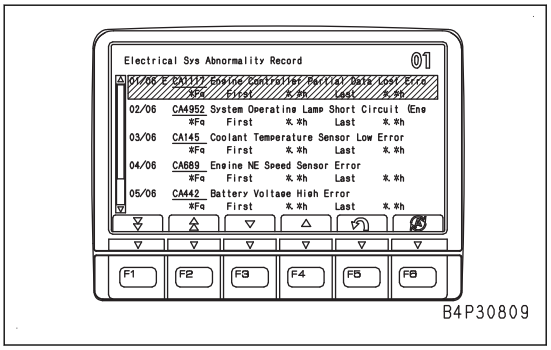


- The regular position of the mirror is as follows:

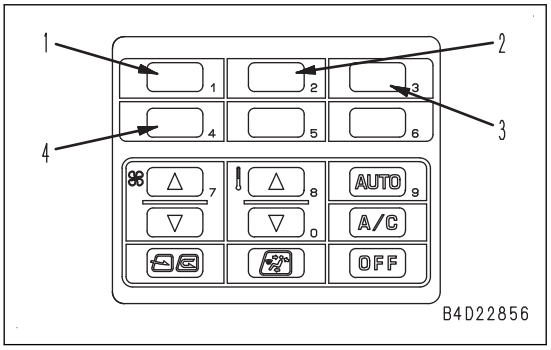
REMARK

- If no abnormality is recorded, “No Abnormality Record” is displayed.
- In Electrical system abnormality record, up to 20 of stored records are displayed. If the 21st record is stored, the oldest record will be deleted and the latest 20 records will be displayed.
- If the number of occurrence is 1 (first occurrence), the service meter reading at the first occurrence and that at the last occurrence are the same.
- If “E” is displayed on the left of a failure code, the abnormality is still occurring or it has not yet been normally restored.
- For all of the failure codes that the machine monitor can record, see TROUBLESHOOTING, “Failure code list”.
- If the characters in the failure are many, the character strings display is scrolled.

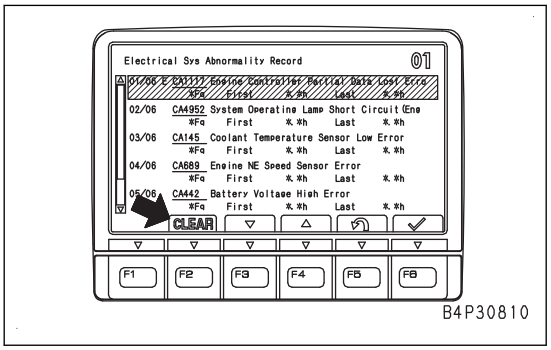
4. To delete a selected abnormality record, perform the following operation while “Electrical Sys Abnormality Record” screen is displayed.



1) Switch operation (While pressing 4, press other switches in order): 4 + 1 → 2 → 3



2) Check that the display on the screen becomes the clear mode, then clear the individual information one by one or all together by using the function switches.



REMARK

The screen is in deleting mode if “CLEAR” is displayed above F2.

F2: Clears all abnormality records.

F3: Moves the selection downward.

F4: Moves the selection upward.

F5: Returns the screen to “Abnormality Record screen”.

F6: Clears the selected abnormality record.

REMARK

- To delete a selected abnormality record, select the abnormality record with F3 or F4, and then press F6 to execute the deletion of abnormality record.
- To clear all abnormality records together, press F2, and then all the records are deleted regardless of the selection.
- If “E” is displayed on the left of a failure code, the clearing operation is received but the information is not cleared.

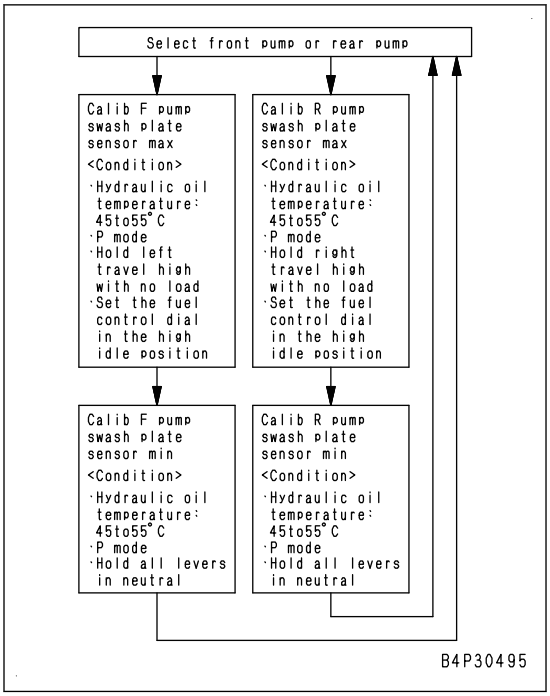
A rough flow of calibration of the pump swash plate sensor is as follows. (Adjustment menu in Service Menu)

Before starting calibration, set the machine under the following condition.

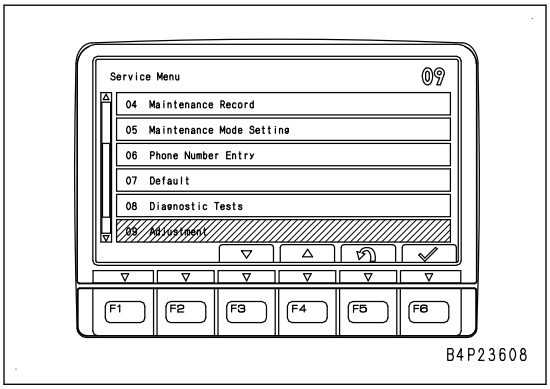
Hydraulic oil temperature: 45 to 55 °C

Working mode: P (“Power Mode”)

Travel speed: Hi



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

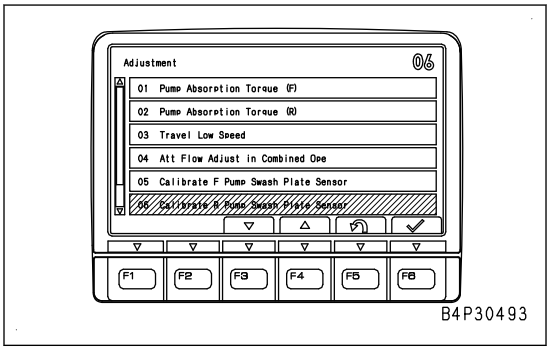


2. On “Adjustment” screen, select “Calibrate R Pump Swash Plate Sensor” by using function switches or numeral input switches.

   REMARK

   Method of selecting is similar to “Service Menu” screen.

3. Perform the subsequent calibration procedure according to “Calibrate F Pump Swash Plate Sensor”.



METHOD FOR ADJUSTING (Fan Rotation Mode Selection) *(PC210_11_E-K-ACN3-100-00-B)*

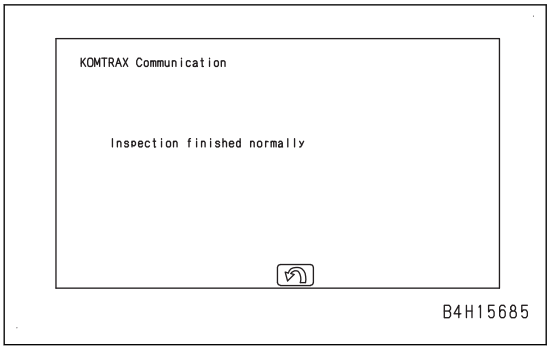
Adjustment menu is used to check the various settings of the machine or to adjust the value.

“Fan Speed Mode Select” is used to select the maximum cooling fan speed to normal control mode, 100 % mode or 70 % mode.

6) When all items are “OK”, “Inspection finished normally.” screen automatically displayed.

Press ENTER switch. “GPS & Communication State” appears, and the KOMTRAX Communication Inspection for machine side is completed.

Other than the above, perform step 3.



3. Troubleshooting when KOMTRAX Communication Inspection is finished unsuccessfully
   - If any of 1) to 5) in step 2 is finished unsuccessfully, perform inspection from 1) in step 2.
   - If 6) in step 2 is finished unsuccessfully, following problems are suspected.

Troubleshooting when the failure occurs

Phenomenon	Cause	Required action
GPS does not become OK.	Something on the cab blocks off GPS satellites acquisition.	Remove the obstacle on the cab.
	GPS antenna cable is not connected to the machine monitor, or they are loose.	Check for the connection. If the connection is loose, secure it.
Modem does not become OK.	The mobile phone is out of communication range.	Check for state of in/out communication range with your mobile phone. If it is out of communication range, move into communication reception range and perform inspection.
	Communication antenna cable is not connected to the KOMTRAX terminal, or they are loose.	Check for the connection. If the connection is loose, secure it.
	KOMTRAX terminal is not connected to machine side wiring harness, or they are loose.	Check for the connection. If the connection is loose, secure it.

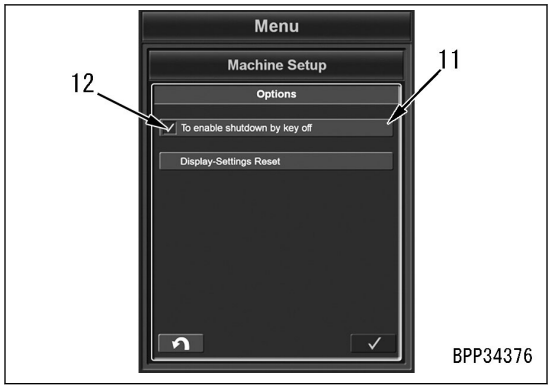
4. After troubleshooting, perform 1) in step 2 again.

When the problems are not solved, contact your KOMTRAX support center.

10. When the “Options” screen is displayed, check the status of the check box (12) of “To enable shutdown by key off” (11).
    - When the check box (12) is checked
      The starting switch interlock function is enabled.

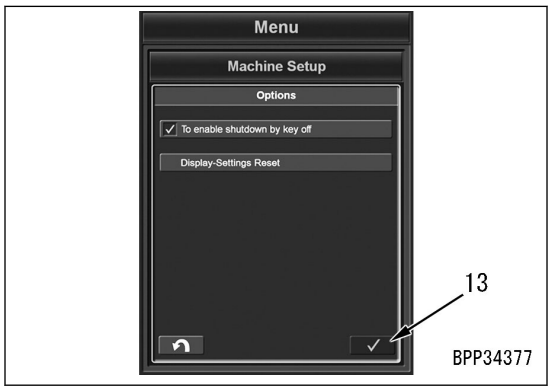
      Unselect the check box (12) and disable the starting switch interlock function by pressing “To enable shutdown by key off” (11).
    - When the check box (12) is unchecked
      The starting switch interlock function is disabled.

      Tick the check box (12) and enable the starting switch interlock function by pressing “To enable shutdown by key off” (11).

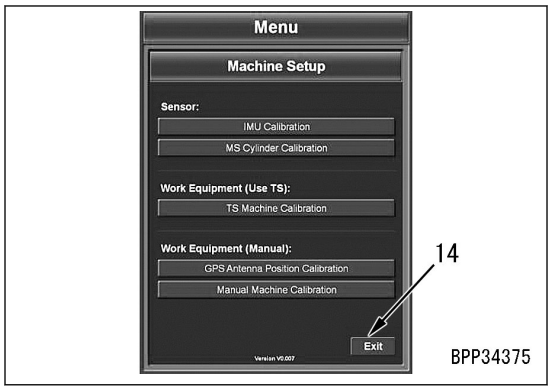


11. Press the enter button (13).

    When pressing the enter button (13), the setting of the starting switch interlock function is saved in the control box.



12. When the “Machine Setup” menu screen is displayed, press “Exit” (14) and return to the standard screen.



METHOD FOR SELECTING EXCAVATOR MODEL AND IN THE CONTROL BOX

(PC490I_11-K-LL82-110-13-B)

When the hydraulic excavator model must be changed or the setting of the control box must be restored, refer to this section.

METHOD FOR SELECTING EXCAVATOR MODEL AND IN THE CONTROL BOX

(PC490I_11_E-K-LL82-110-14-B)

1. Turn the starting switch to ON position.

2. Enter “45” with the numeral input switches after the “Adjustment” screen is displayed, and press F6.

   F3: Moves the selected item down by one item

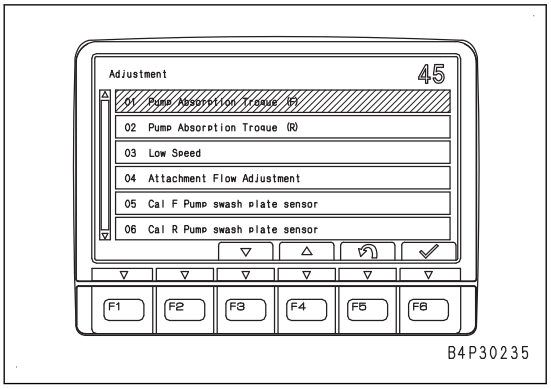
   F4: Moves the selected item up by one item

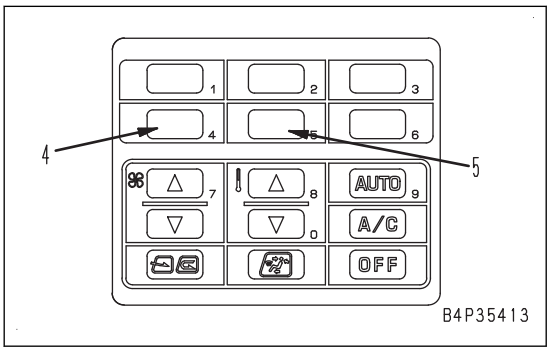
   F5: Returns the display to the “Service Menu” screen

   F6: Enters the input value and moves to the “ICT Control Calibration” screen

   REMARK

   This function is not listed on the menu because it is required only when replacing the PPC pressure sensor, the solenoid valve block, or the work equipment controller.





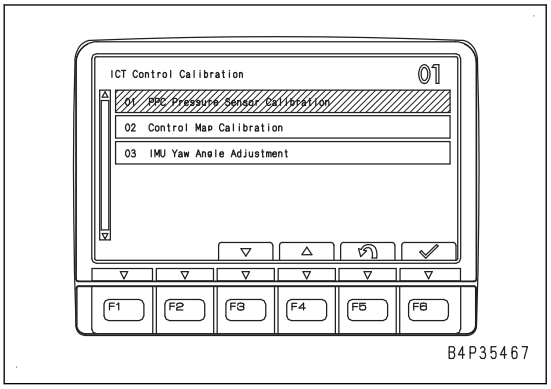
3. On the “ICT Control Calibration” screen, select “PPC Pressure Sensor Calibration” with function switches or numeral input switches.

   F3: Moves the selected item down by one item

   F4: Moves the selected item up by one item

   F5: Returns the screen to the “Adjustment” screen

   F6: Enters the selected item and moves to the “PPC Pressure Sensor Calibration” screen



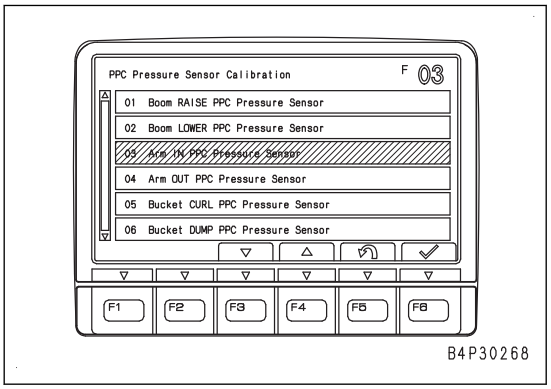
4. On the “PPC Pressure Sensor Calibration” screen, select “Arm IN PPC Pressure Sensor” with function switches or numeral input switches.

   F3: Moves the selected item down by one item

   F4: Moves the selected item up by one item

   F5: Returns to the “ICT Control Calibration” screen

   F6: Enters the selected item and moves to the “Arm IN PPC Pressure Sensor” screen



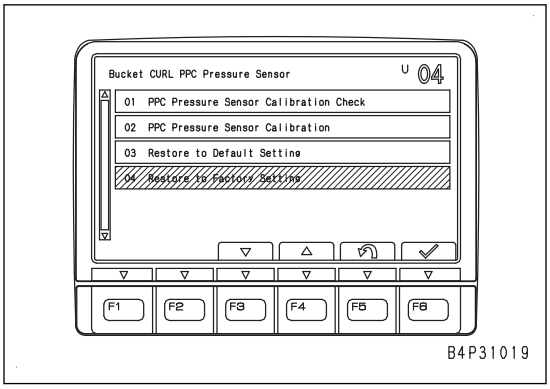
5. On the “Bucket CURL PPC Pressure Sensor” screen, select “Restore to Factory Setting” with function switches or numeral input switches.

   F3: Moves the selected item down by one item

   F4: Moves the selected item up by one item

   F5: Returns to the “ICT Control Calibration” screen

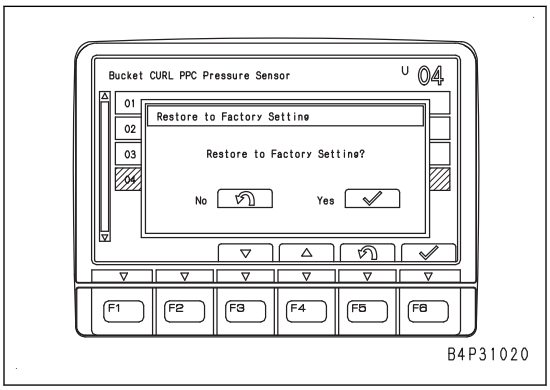
   F6: Enters the selected item, and displays the “Restore to Factory Setting” screen



6. Hold down F6 when “Restore to Factory Setting?” screen is displayed.

   F5: Cancels the setting and returns to “Bucket CURL PPC Pressure Sensor” screen

   F6: Confirm the setting



7. After restoring, check that the alphabet letter at the right top of the “Bucket CURL PPC Pressure Sensor” is “F”.

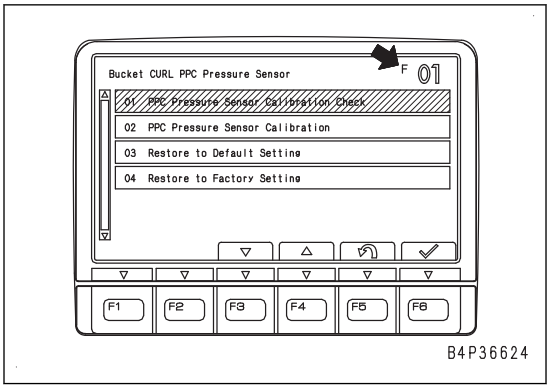
   REMARK

   The alphabet letter at the right top of the screen indicates the value currently saved in the work equipment controller.

   “D”: Default value

   “F”: Factory default value

   “U”: User calibration value (Technician calibration value)



BUCKET DUMP PPC PRESSURE SENSOR CALIBRATION

(PC490I_11-K-LEN1-273-00-B)

⚠ Place the machine on a level ground, lower the work equipment completely to the ground in a stable posture. Set the lock lever to LOCK position, turn the swing lock switch to ON position, and then stop the engine.

⚠ Secure the safety around the machine before starting calibration because the work equipment moves during the calibration.

NOTICE

Change the setting of the mounted bucket by referring to Operation and Maintenance Manual, “Bucket Weight Setting”.

Perform the calibration under the following conditions.

- Hydraulic oil temperature: 40 to 60 °C
- Working mode: P (“Power Mode”)

METHOD FOR CHECKING CALIBRATION STATUS OF BUCKET DUMP PPC PRESSURE SENSOR

(PC490I_11_E-K-LEN1-273-01-B)

The vehicle condition is not restricted only for checking the calibration status.

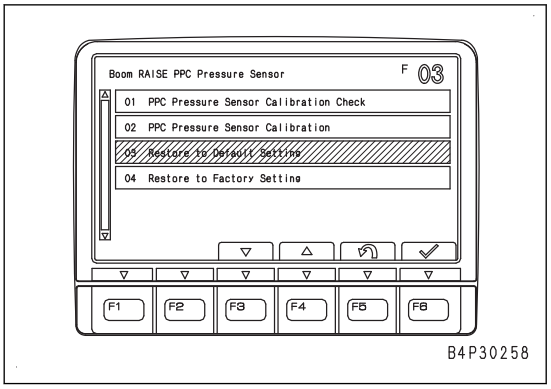
5. On the “Boom RAISE Intervention Control Map” screen, select “Restore to Default Setting” with function switches or numeral input switches.

   F3: Moves the selected item down by one item

   F4: Moves the selected item up by one item

   F5: Returns to the “ICT Control Calibration” screen

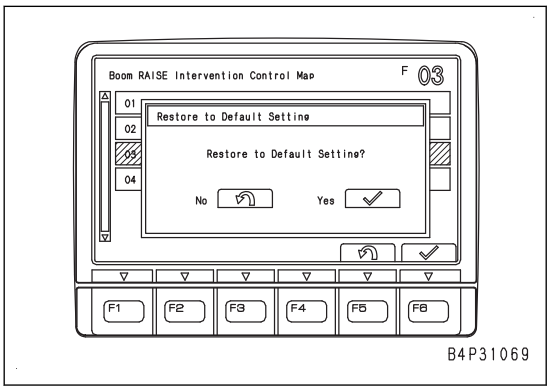
   F6: Enters the selected item, and displays the “Restore to Default Setting” screen



6. When “Restore to Default Setting?” screen is displayed, hold down F6 and restore the setting.

   F5: Cancels the initialization and returns to “Boom RAISE Intervention Control Map” screen

   F6: Executes the initialization



7. After restoring the calibration value, check that the alphabet letter at the right top of the “Boom RAISE Intervention Control Map” is “D”.

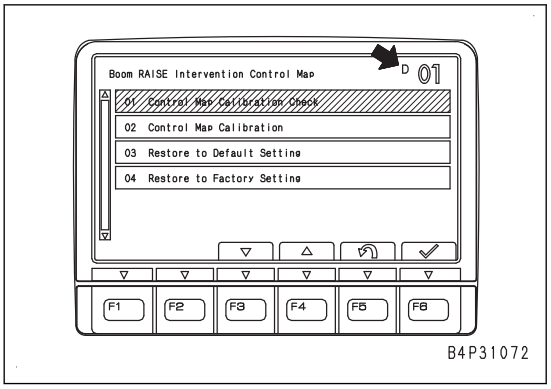
   REMARK

   The alphabet letter at the right top of the screen indicates the value currently saved in the work equipment controller.

   “D”: Default value

   “F”: Factory default value

   “U”: User calibration value (Technician calibration value)



METHOD FOR RESTORING CALIBRATION VALUE OF BOOM RAISE INTERVENING EPC TO ITS FACTORY DEFAULT VALUE

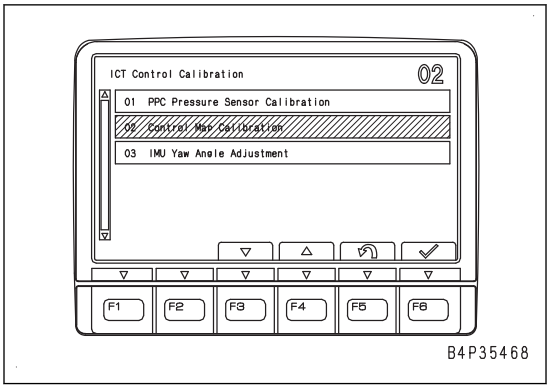
(PC490I_11_E-K-L6W2-270-03-B)

NOTICE

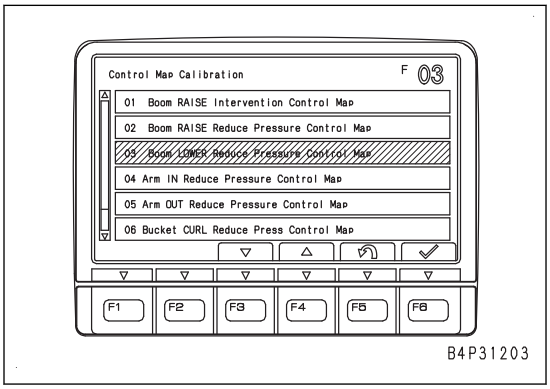
- **After performing the work described in this item, be sure to perform the calibration without using the default value.**
- **If the automatic leveling assist function or automatic stop control function is defective, perform troubleshooting before performing the work described in this item. See “E-83 Blade edge position on design surface is not accurate when automatic leveling assist function is on.” and “E-84 Blade edge stop position is not accurate for design surface when automatic stop control function is on.”**

This function is to restore the parameter of the calibration value to the factory default value.

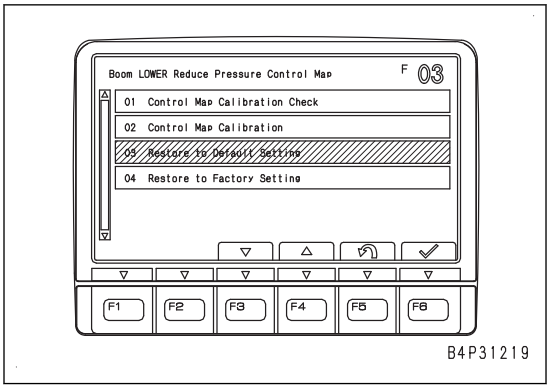
3. On the “ICT Control Calibration” screen, select “Control Map Calibration” with function switches or numeral input switches.
   F3: Moves the selected item down by one item
   F4: Moves the selected item up by one item
   F5: Returns the screen to the “Adjustment” screen
   F6: Enters the selected item and moves to the “Control Map Calibration” screen



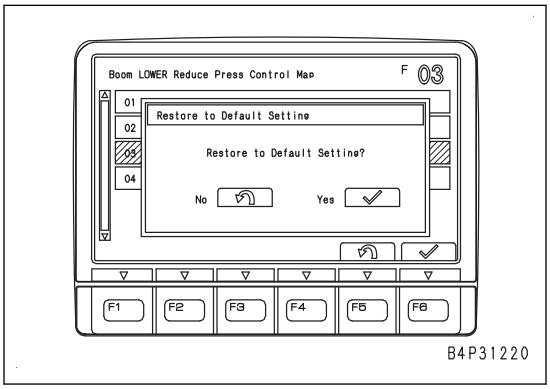
4. On the “Control Map Calibration” screen, select “Boom LOWER Reduce Pressure Control Map” with function switches or numeral input switches.
   F3: Moves the selected item down by one item
   F4: Moves the selected item up by one item
   F5: Returns to the “ICT Control Calibration” screen
   F6: Enters the selected item and moves to the “Boom LOWER Reduce Pressure Control Map” screen



5. On the “Boom LOWER Reduce Pressure Control Map” screen, select “Restore to Default Setting” with function switches or numeral input switches.
   F3: Moves the selected item down by one item
   F4: Moves the selected item up by one item
   F5: Returns to the “ICT Control Calibration” screen
   F6: Enters the selected item, and displays the “Restore to Default Setting” screen



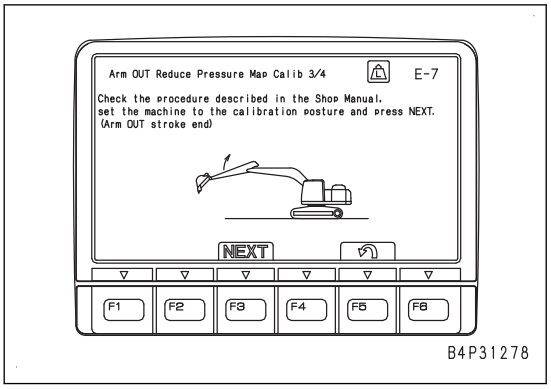
6. When “Restore to Default Setting?” screen is displayed, hold down F6 and restore the setting.
   F5: Cancels the initialization and returns to “Boom LOWER Reduce Pressure Control Map” screen
   F6: Executes the initialization

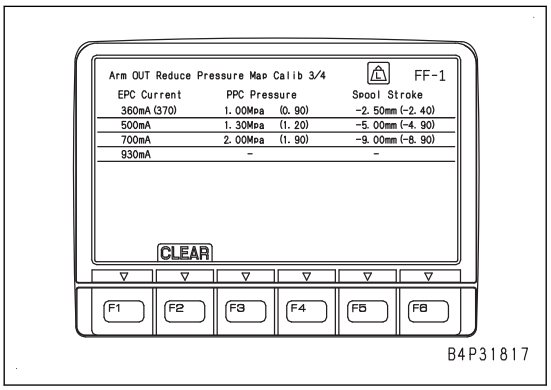


NOTICE

If the calibration finishes abnormally, Failure Cause Code is displayed. Take measures by referring to "Failure Cause Codes". After measures are taken, start the calibration again.

For standard values, see "STANDARD VALUE TABLE, STANDARD VALUE TABLE FOR MACHINE".

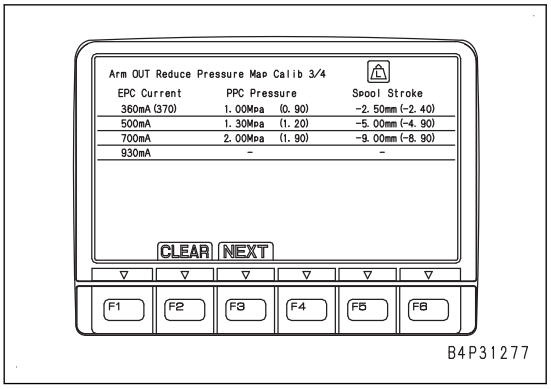




28. After checking the calibration result, press F3.

    F2: Returns to the "Arm OUT Reduce Pressure Map Calib 3/4" screen of the calibration start screen

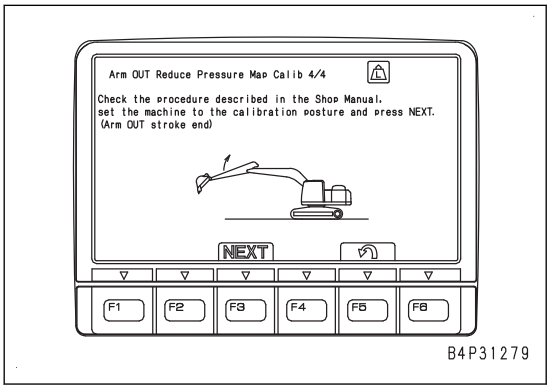
    F3: Moves to the "Arm OUT Reduce Pressure Map Calib 4/4" screen



29. When the "Arm OUT Reduce Pressure Map Calib 4/4" screen is displayed, press F3.

    F3: Moves to the "Arm OUT Reduce Pressure Map Calib 4/4" screen of the calibration start screen

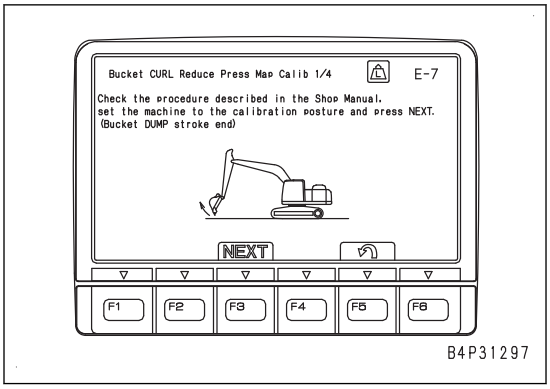
    F5: Returns to the calibration result screen at 700 mA of EPC current

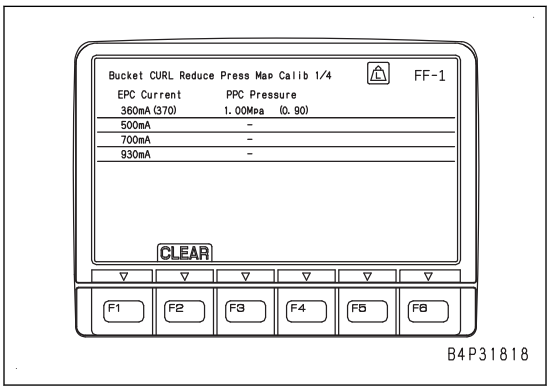


NOTICE

If the calibration finishes abnormally, Failure Cause Code is displayed. Take measures by referring to "Failure Cause Codes". After measures are taken, start the calibration again.

For standard values, see "STANDARD VALUE TABLE, STANDARD VALUE TABLE FOR MACHINE".

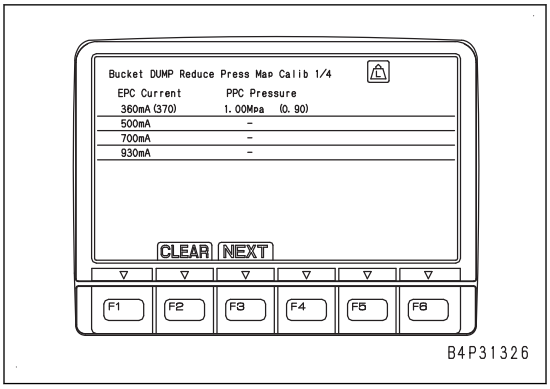




14. After checking the calibration result, press F3.

    F2: Returns to the "Bucket DUMP Reduce Press Map Calib 1/4" screen of the calibration start screen

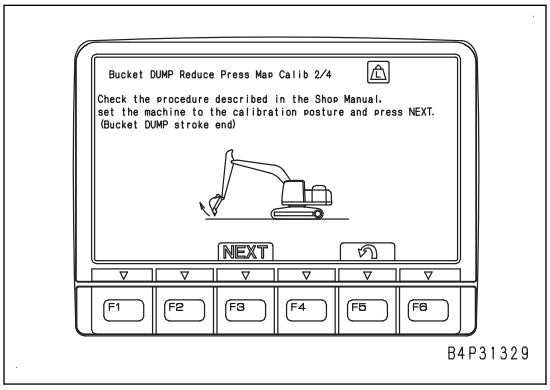
    F3: Moves to the "Bucket DUMP Reduce Press Map Calib 2/4" screen



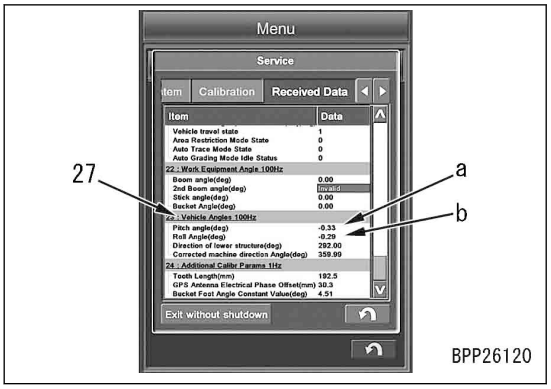
15. When the "Bucket DUMP Reduce Press Map Calib 2/4" screen is displayed, press F3.

    F3: Moves to the "Bucket DUMP Reduce Press Map Calib 2/4" screen of the calibration start screen

    F5: Returns to the calibration value check screen.



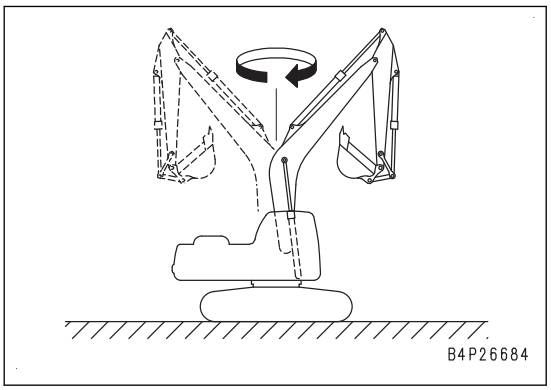
28. When the list of the received data is displayed, record the angle (a) of “Pitch angle(deg)” and angle (b) of “Roll Angle(deg)” in “23: Vehicle Angles 100Hz” (27).
29. Turn the swing lock switch to OFF position.



30. Swing the upper structure 180 ° while keeping the same working posture.

    REMARK

    Set the upper structure so that the cab is in parallel with the track.
31. Turn on the swing lock switch.



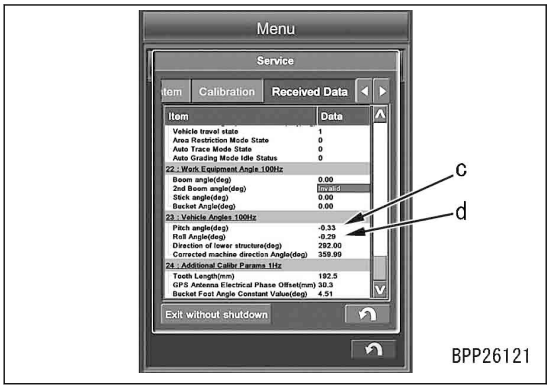
32. Record the angle (c) of “Pitch angle(deg)” and angle (d) of “Roll Angle(deg)” in “23: Vehicle Angles 100Hz” (27).
33. Calculate the angle of the machine before and after swinging the machine in step 28, and in step 33. Check that the values are within the standard value range.

    Pitching angle: pitching angle (a) before swinging + pitching angle (c) after swinging

    Rolling angle: rolling angle (b) before swinging + rolling angle (d) after swinging

    REMARK

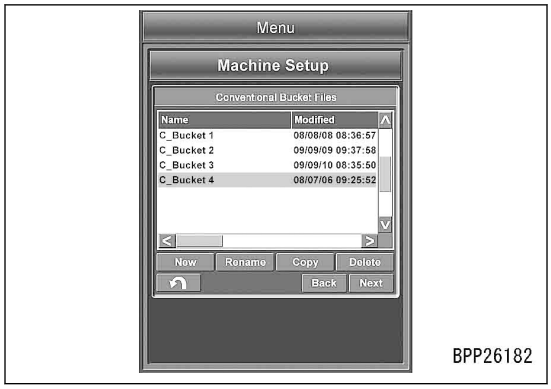
    - If the calculated value is out of the standard value range, installation of IMU sensor may be defective. Check the installation for bolt looseness, etc. and calibrate IMU sensor again.
    - If the calculated value is still out of the standard value range after the calibration is performed again, perform troubleshooting for IMU sensor. For details, see TROUBLESHOOTING, “Failure code [DK80KT] IMU Internal Failure” or “E-86 NG frequently occurs in IMU calculation diagnosis”.



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

- When the selected work equipment file is correct

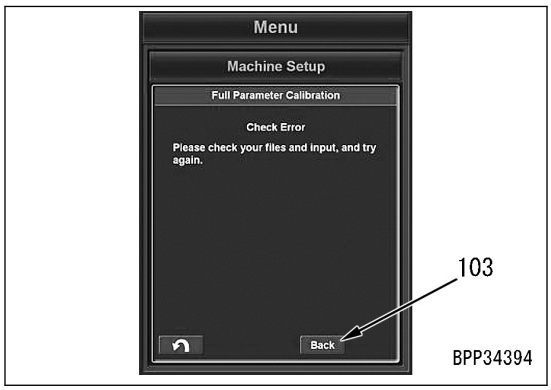
  The “Work Equipment Files” screen is switched to the “Conventional Bucket Files” screen.



- When the selected work equipment file is not correct

  The “Work Equipment Files” screen is switched to the “Check Error” screen.

2) Press “Back” (103) to return to the “Work Equipment Files” screen and select the work equipment file again.



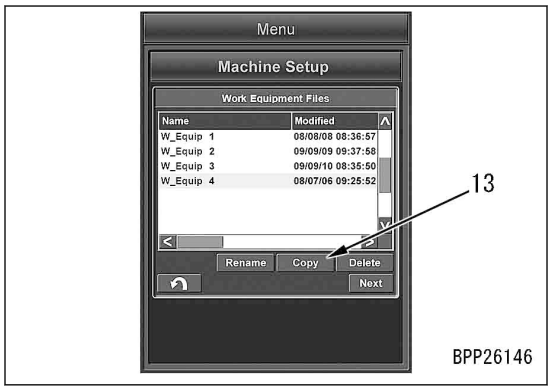
- When the work equipment file is not on the list

1) Insert the USB memory (12) containing the work equipment file of the work equipment currently mounted to the machine into the control box.

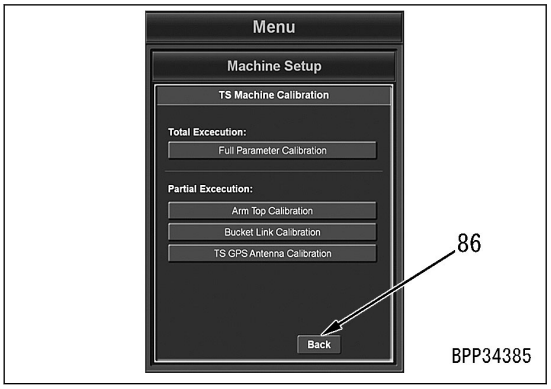
REMARK

- The password which unlocks the USB memory (12) cannot be inputted on the control box, use the USB memory (12) which has no password.
- Be sure to save the work equipment file in the root directory of the USB memory (12).

2) Press “Copy” (13).



108. When the “TS Machine Calibration” menu screen is displayed after calibration is completed, press “Back” (86).

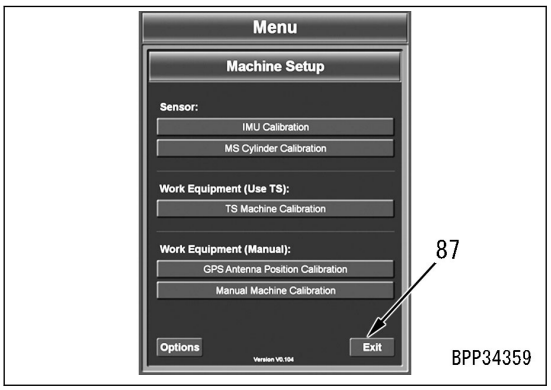


109. When the “Machine Setup” screen is displayed, press “Exit” (87).

110. Turn the starting switch to OFF position.

111. After checking the control box power supply is turned off, turn the starting switch to ON position.

When the starting switch is turned to ON position again, the result of the calibration is reflected to the control box.



112. Check the blade tip precision accuracy.

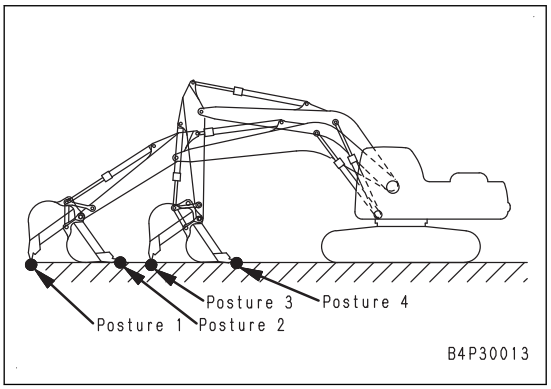
- When the control point (or alignment marker) is not set in the operation site

1) Set the work equipment lock lever to FREE position.

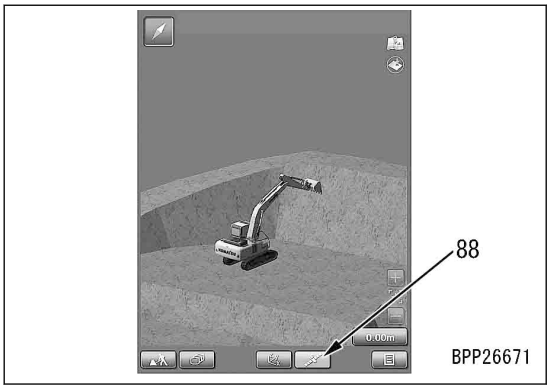
2) Set the work equipment in posture 1, and place the work equipment lock lever to LOCK position.

Arm cylinder: Fully retracted

Bucket: Bottom at an angle of Approx. 90 ° to the ground surface

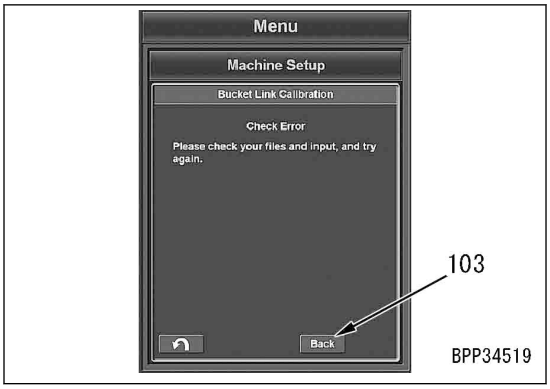


3) Press the satellite receiving status check button (88).



The “Conventional Bucket Files” screen is switched to the “Check Error” screen.

Press “Back” (103) to return to the “Conventional Bucket Files” screen and select the bucket file again.

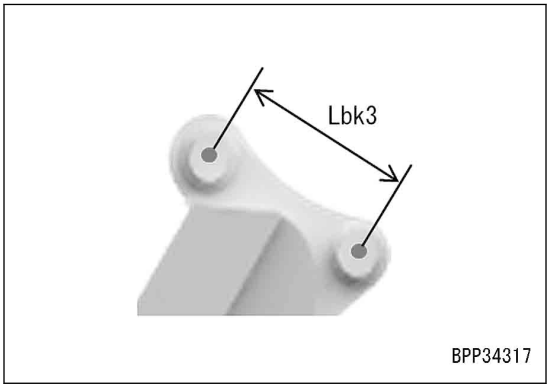


3) Measure dimensions “Lbk3”, “L3”, and “Lbkw” of the bucket.

“Lbk3”: The distance between the center of the arm mounting pin and the bucket mounting pin to the center of the link mounting pin and the bucket mounting pin.

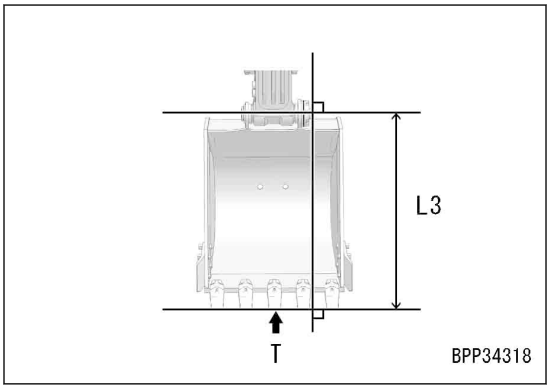
“L3”: The distance between the center of the arm mounting pin and the bucket mounting pin to the bucket tooth tip.

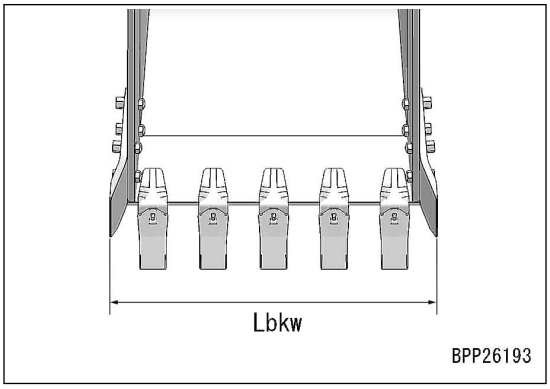
“Lbkw”: The length of the side cutters. (the widest bucket width if the side cutters are not installed)



REMARK

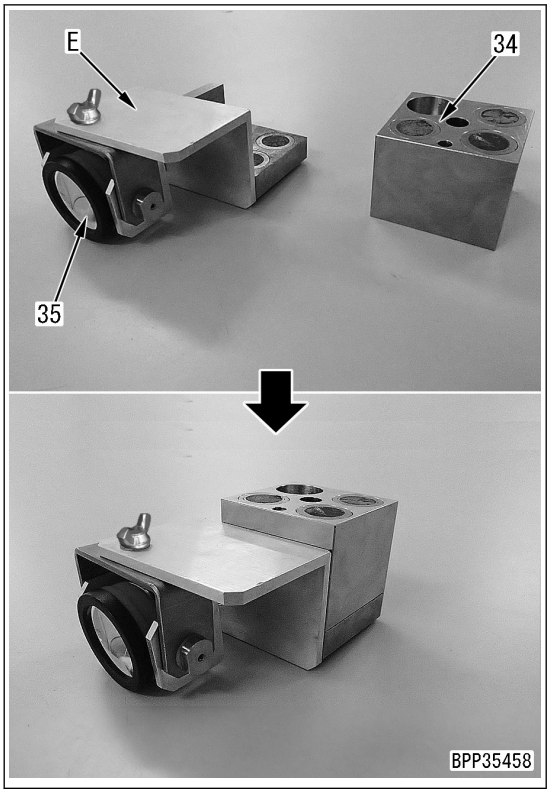
- Measure the dimensions as accurately as possible by using the square D, convex rule R, and magnet stand F on R.H. surface of the bucket.
- Measure the dimensions in 1 mm unit.





25. Install the prism (35) to the special blade edge measuring jig E and combine them with the assisting block (34).

    ⚠ Be careful not to get your fingers in the assisting block (34) while installing it. The assisting block is installed by using the attracting force of a powerful magnet.

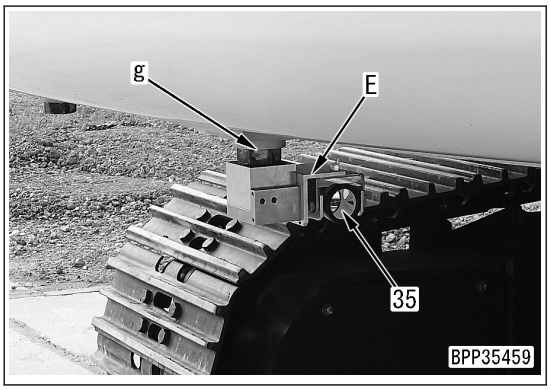


26. Attach the special blade edge measuring jig E assembled in step 23 to the counterweight mounting bolt (g).

    ⚠ Be careful not to get your fingers in the special blade edge measuring jig E while installing it. The jig is installed by using the attracting force of a powerful magnet.

    REMARK

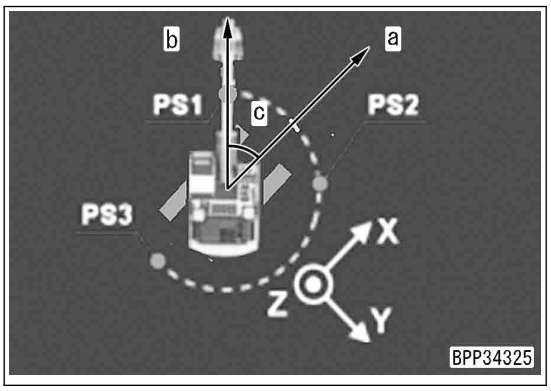
    Install the special blade edge measuring jig E to the counterweight mounting bolt (g) on R.H. of the machine. Direct the prism (35) toward the front of the machine so that the jig can be collimated through the total station A.



27. Swing the upper structure and direct the work equipment toward the “PS1” position on the “TS GPS Antenna Calibration [1/9]” screen.

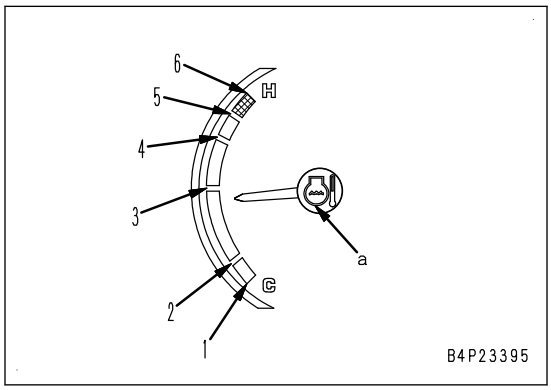
    REMARK

    - Do not move the work equipment or track when swinging the upper structure.
    - Guide for the “PS1” position
      Angle (c) between track direction (a) and work equipment direction (b): Approx. 60±15 °



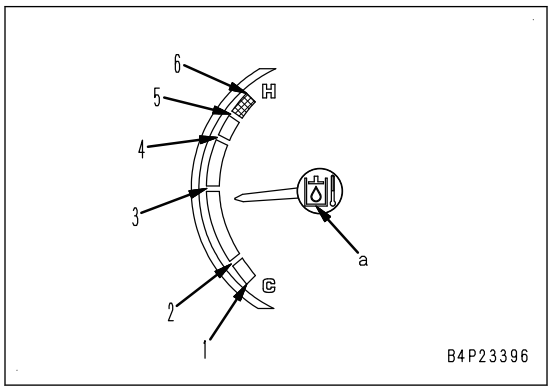
Max. range of engine coolant temperature gauge

Coolant temperature gauge level	Engine coolant temperature	Color of monitor light (a)
6	105 °C	Red
5	102 °C	
4	100 °C	Blue
3	85 °C	
2	60 °C	
1	30 °C	White



Max. range of hydraulic oil temperature gauge

Oil temperature level	hydraulic oil temperature	Color of monitor light (a)
6	105 °C	Red
5	102 °C	
4	100 °C	Blue
3	85 °C	
2	40 °C	
1	20 °C	White



- This operation is performed to confirm if a failure is corrected when the failure code is already cleared (described later) or has been cleared before the failure was corrected.
- After the repair is completed, run the engine and the machine until the exhaust gas temperature and flow rate exceed the specified value. Let the engine controller to activate troubleshooting of the after-treatment devices to determine if the failure is corrected. If the failure is corrected, the failure code will not be displayed.

REMARK

- For failure codes that require “Loaded Diagnostics Operation To Confirm Failure Correction” or “Loaded Diagnostics Operation To Clear Failure Code” after repairing, a “Notice” mark is described in the related information column of each failure code description, and the procedure will be given at the end of each failure code description.
- When performing “Loaded Diagnostics Operation To Confirm Failure Correction” or “Loaded Diagnostics Operation To Clear Failure Code”, confirm that the level of AdBlue/DEF and fuel in the tank are enough to perform. To check the level of AdBlue/DEF and fuel, see to Testing and adjusting chapter, “SETTING AND OPERATING MACHINE MONITOR”, “SERVICE MODE”, “METHOD FOR OPERATING TESTING MENU (SCR SERVICE TEST)”.

3. Loaded Diagnostics Operation To Clear Failure Code
   - This operation is performed to clear a failure code which is not cleared by turning the starting switch to ON position after the failure is corrected.
   - After the repair is completed, run the engine and the machine until the exhaust gas temperature and flow rate exceed the specified value. Let the engine controller to activate troubleshooting of the after-treatment devices to determine if the failure is corrected. If the failure is corrected, the displayed failure code will go out.
4. SCR Service Test
   - This is a function for determining whether there is a failure in the Urea SCR system. Perform this test from the machine monitor.

   REMARK

   If instructed to perform a “SCR Service Test” in the troubleshooting procedure or somewhere else, see Testing and adjusting chapter, “SETTING AND OPERATING MACHINE MONITOR”, “SERVICE MODE”, “METHOD FOR OPERATING TESTING MENU (SCR SERVICE TEST)” and perform “SCR Service Test”.

Clearing Failure Code

“Clearing failure code” refers to manually deleting an “active” failure code from the engine controller. The following two “Clearing Failure Code” functions have been added for Tier4 Final specification.

1. “Engine Controller Active Fault Clear”
   - It is now possible to clear the failure code from the machine monitor without using INSITE.
   - This function is provided as a means to perform troubleshooting when operating conditions for normally activating the troubleshooting cannot be met after the cause of the failure is repaired. If the machine can be operated, always clear failure codes by performing “Loaded Diagnostics Operation To Confirm Failure Correction” or “Loaded Diagnostics Operation To Clear Failure Code”.
   - For details, refer to Testing and adjusting chapter “SETTING AND OPERATING MACHINE MONITOR”, “SERVICE MODE”, “METHOD FOR SETTING WITH TESTING MENU (ENGINE CONTROLLER ACTIVE FAULT CLEAR)”.However, if a failure code that relates to the “Inducement strategies” is displayed (see separated list of failure code), failure codes will not be able to be cleared by this function.
   - In this case, the failure code is cleared by using the “Engine Controller Active Fault Clear”, described below, or by using INSITE.
2. “Engine Con Inducement Fault Clear”
   - This is a function for clearing failure code caused by the Urea SCR system “Inducement”.
   - For the failure code relating to the “Inducement strategy” of the Urea SCR system, which cannot be cleared by “Engine Controller Active Fault Clear”, these can now be cleared from the machine monitor by using a one-time password issued by Komatsu. Also, INSITE can be used for clearing.

AUTOMATIC GREASE SYSTEM *(PC490_11-K-Q810-001-00-B)*

FINDING MALFUNCTIONS *(PC490_11-K-Q810-383-00-B)*

General

The greasing system is equipped as standard with an electronic control unit with a database. All relevant data concerning the functioning of the greasing system are stored in that database. This data can be read with a laptop and software.

Recognising malfunctions

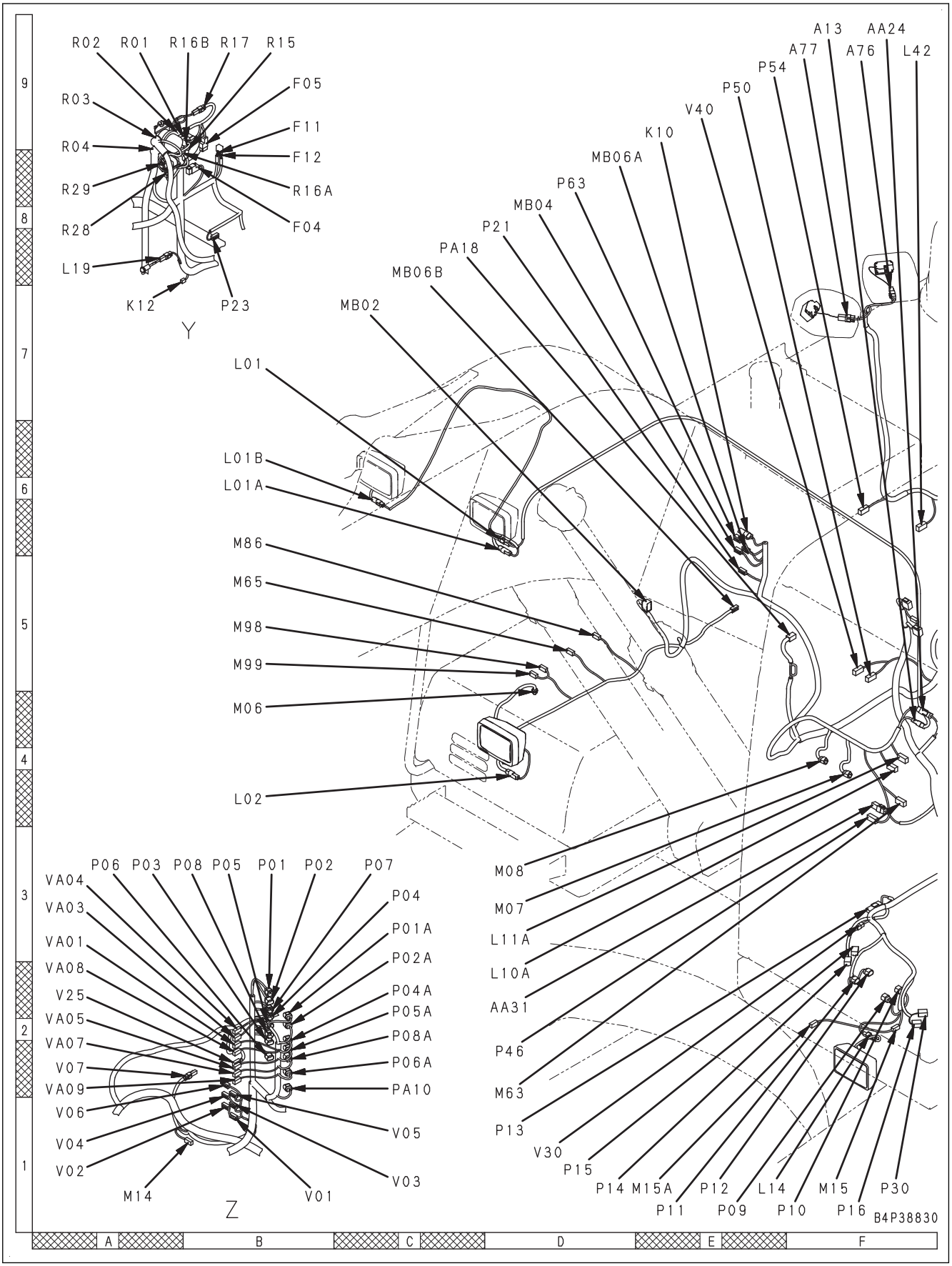
Malfunctions are recognisable or discovered as follows:

- Display shows a malfunction report.
- Reading the malfunction reports saved in the database of the control unit.
- The grease level in the pump no longer decreases.
- When visually checking the bearings, it appears that no fresh grease is present.

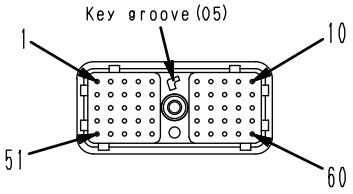
Malfunction reports of the display

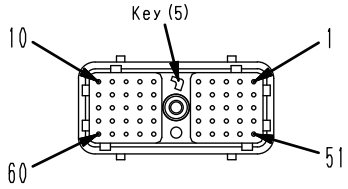
Malfunction	Cause	Solution
1. Signal lamp lights continuously for 2minutes at the end of every pumping phase.	The grease pressure switch did not switch. Probable causes:	
	a. The primary grease line leaks. Because of this, no pressure can be built up.	a. Replace or repair the line and vent the relevant line.
	b. Air in the system. Within the maximum pumping time insufficient pressure is built up.	b. Vent both primary lines and carry out the single-test cycle twice.
	c. Broken grease pressure switch.	c. See malfunction finding procedure for the grease pressure switch.
	d. O-ring damaged or left out when replacing a metering unit, grease pressure switch or blind plug. Because of this it is possible that grease flows from one line to the other.	d. Check and mount a new O-ring if necessary. Also see malfunction finding procedure of internal system leak.
	e. 5/2 valve broken. Because of this, no pressure can be built up.	e. See malfunction finding procedure pump and 5/2 magnetic valve.
	f. Internal leak of metering unit or grease pressure switch.	f. Replace the metering unit or grease pressure switch.
	g. Surrounding temperature too low or grease too viscous.	g. Replace the grease.
	h. Wiring defect or bad contacts.	h. Check the wiring and contacts. Replace if necessary.
	i. Other probable cause.	i. Consult the dealer.
2. Display still gives no signal after 1 minute.	a. No supply voltage on the display	a. Check the fuses and/or feeder connection (grey wire no. 1). Replace or repair it if necessary.
	b. Earth (ground) lead disconnected.	b. Check the earth (ground) wire (grey wire no. 2). Repair it if necessary.
	c. Display broken	c. Replace the display.

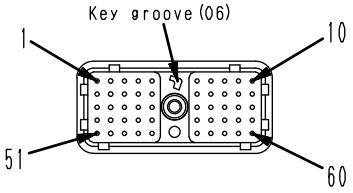
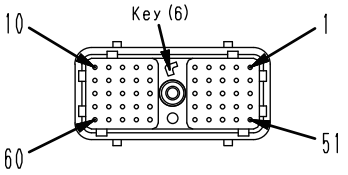
1/12


R02 R01 R16B R17 R15
R03
R04
R29
R28
L19
K12
P23
F05
F11
F12
R16A
F04
Y
A13 AA24
A77 A76 L42
P54
P50
V40
K10
MB06A
P63
MB04
P21
PA18
MB06B
MB02
L01
L01B
L01A
M86
M65
M98
M99
M06
L02
M08
M07
L11A
L10A
AA31
P46
M63
P13
V30
P15
P14 M15A P12 L14 M15 P30
P11 P09 P10 P16
P06 P03 P08 P05 P01 P02 P07
VA04
VA03
VA01
VA08
V25
VA05
VA07
V07
VA09
V06
V04
V02
M14
V01
P04
P01A
P02A
P04A
P05A
P08A
P06A
PA10
V05
V03
Z
B4P38830
9
8
7
6
5
4
3
2
1
A
B
C
D
E
F

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

<table>
<tr><td rowspan="2">No. of pins</td><td colspan="2">DRC26 Series connector</td><td rowspan="2">Testing connection use special tool Part No.</td></tr>
<tr><td>Male pin (female housing)</td><td>Female pin (male housing)</td></tr>
<tr><td rowspan="3">60
-05※</td><td> 

BJD14063</td><td> 

BJD14064</td><td rowspan="3">799-601-4220
(T-adapter)
(Kit:799-601-4101)</td></tr>
<tr><td>–</td><td>Part No. 08194-04104</td></tr>
<tr><td colspan="2">※-05:Key position</td></tr>
<tr><td rowspan="3">60
-06※</td><td> 
</td><td> 
</td><td rowspan="3">799-601-4390
(Socket)</td></tr>
<tr><td>–</td><td>–</td></tr>
<tr><td colspan="2">※-06:Key position</td></tr>
</table>

B4D18415

Failure code	Failure (Displayed on screen)	Applicable component	Action level	History category	Remarks
CA2386	KVGT Solenoid Short Circuit Error	ENG	L03	Electrical system	
CA2387	KVGT Servo Error	ENG	L03	Electrical system	
CA2555	Intake Air Heater Relay Open Circuit Error	ENG	L01	Electrical system	
CA2556	Intake Air Heater Relay Short Circuit Error	ENG	L01	Electrical system	
CA2637	KDOC Face Plugging	ENG	L01	Electrical system	
CA2639	Manual Stationary Regeneration Request	ENG	L01	Electrical system	
CA2771	SCR Outlet NOx Sensor Datalink Timeout Error	ENG	L01	Electrical system	
CA2777	Manual Stationary Regeneration Request but KDPF Regeneration Disable	ENG	-	Electrical system	
CA2976	AdBlue/DEF Pump Temperature Sensor Signal Error	ENG	L01	Electrical system	
CA3133	KDPF Outlet Pressure Sensor High Error	ENG	L03	Electrical system	
CA3134	KDPF Outlet Pressure Sensor Low Error	ENG	L03	Electrical system	
CA3135	KDPF Outlet Pressure Sensor In Range Error	ENG	L03	Electrical system	
CA3142	SCR Temperature Sensor High Error	ENG	L01	Electrical system	
CA3143	SCR Temperature Sensor Low Error	ENG	L01	Electrical system	
CA3144	SCR Temperature Sensor In Range Error	ENG	L01	Electrical system	
CA3146	SCR Outlet Temperature Sensor High Error	ENG	L01	Electrical system	
CA3147	SCR Outlet Temperature Sensor Low Error	ENG	L01	Electrical system	
CA3148	SCR Outlet Temperature Sensor In Range Error	ENG	L01	Electrical system	
CA3151	SCR Catalyst Efficiency Low Error 2	ENG	L01	Electrical system	
CA3165	SCR Outlet Temperature High Error	ENG	L03	Electrical system	
CA3229	SCR Temperature High Error	ENG	L03	Electrical system	
CA3231	SCR Temperature High Error - Non Regeneration	ENG	L03	Electrical system	
CA3232	Turbo Outlet NOx Sensor Datalink Timeout Error	ENG	L01	Electrical system	

FAILURE CODE [A900FR]

(ALL-K-AF87-410-00-B)

Action level	Failure code	Failure	Abrupt Engine Stop by Auto Idle Stop 3 (Machine monitor system)
L03	A900FR		
Detail of failure	Durability of turbocharger is degraded due to high engine speed before the engine is stopped by auto idle stop function and frequent engine stops.		
Action of controller	• Turn the auto-deceleration setting ON. • Auto idle stop sudden stop monitor is displayed in red on machine monitor. • Resets when next auto idle stop countdown starts or starting switch is turned OFF.		
Phenomenon on machine	Turbocharger may get damaged.		
Related information	• This failure code is displayed when activation of failure code [A900N6] exceeds 2000 times. • This failure code will be cleared after replacing the turbocharger assembly and resetting the auto idle stop sudden engine stop counter. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Before resetting the auto idle stop sudden engine stop counter, let the engine stop by auto idle stop function with auto-deceleration turned OFF and fuel dial set at maximum.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective machine monitor	If this repeatedly occurs even when the auto idle stop function is OFF, machine monitor may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)

FAILURE CODE [CA132]

(ALL-K-AEX0-410-10-B)

Action level	Failure code	Failure	Throttle Sensor Low Error (Engine controller system)
L03	CA132		
Detail of failure	Low voltage occurs in signal circuit of fuel dial sensor.		
Action of controller	• If error occurs while starting switch is ON, controller sets to fixed value used before the error has been detected and runs engine. • If starting switch is turned to ON position after the error has occurred, controller uses a value of 100%.		
Phenomenon on machine	Engine speed cannot be controlled by using fuel control dial.		
Related information	• Signal voltage from fuel control dial can be checked with monitoring function. (Code: 03000) • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Defective throttle sensor power supply system	If failure code [CA2185] or [CA2186] are displayed at the same time, perform troubleshooting these first.		
3	Defective fuel dial (throttle sensor)	1. Turn starting switch to OFF position. 2. Disconnect connector P20, and connect T-adapter to male side.		
		Resistance	Between P20 (male) (1) and (3)	4.0 to 6.0 kΩ
			Between P20 (male) (2) and (3)	0.25 to 5.0 kΩ
			Between P20 (male) (1) and (2)	0.25 to 5.0 kΩ
4	Open or short circuit in wiring harness	1. Starting switch: OFF 2. Disconnect connector ECM J2, and connect T-adapter to female side.		
		Resistance	Between ECM J2 (female) (9) and (33)	4.0 to 6.0 kΩ
			Between ECM J2 (female) (10) and (33)	0.25 to 5.0 kΩ
5	Open circuit in wiring harness (wire breakage or defective contact of connector)	If failure code is still displayed after above checks on cause 4, this check is not required. 1. Starting switch: OFF 2. Disconnect connectors ECM J2 and P20, and connect T-adapter to each female side.		
		Resistance	Between ECM J2 (female) (9) and P20 (female) (1)	Max. 10 Ω
			Between ECM J2 (female) (10) and P20 (female) (2)	Max. 10 Ω
			Between ECM J2 (female) (33) and P20 (female) (3)	Max. 10 Ω

FAILURE CODE [CA325]

(ALL-K-AE8A-410-00-B)

Action level	Failure code	Failure	Injector #6 (L#6) Open Circuit Error or Short Circuit Error (Engine controller system)
L03	CA325		
Details of failure	Open or short circuit is detected in #6 injector circuit.		
Action of controller	None in particular		
Phenomenon on machine	• Engine power deration • Engine does not run stably.		
Related information	• After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine. • If ground fault or hot short circuit is detected, failure codes [CA323], [CA325] and [CA332] appear simultaneously. • While engine is running normally, approximately 65 V of pulse voltage is supplied to injector (+) side. Because it is pulse voltage, it cannot be measured by using multimeter.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Start the engine.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Defective injector #6	1. Turn starting switch to OFF position. 2. Disconnect connector INJECTOR CYL 5 & 6, and connect T-adapter to male side.		
		Resistance	Between INJECTOR CYL 5 & 6 (male) (1) and (2)	Max. 2 Ω
			Between INJECTOR CYL 5 & 6 (male) (1) and ground	Min. 100 kΩ
3	Open circuit or ground fault in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector ECM J1, and connect T-adapter to female side.		
		Resistance	Between ECM J1 (female) (51) and (75)	Max. 2 Ω
			Between ECM J1 (female) (51) and ground	Min. 100 kΩ
4	Open circuit in wiring harness (wire breakage or defective contact of connector)	If failure code is still displayed after above checks on cause 3, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and INJECTOR CYL 5 & 6, and connect T-adapter to each female side.		
		Resistance	Between ECM J1 (female) (51) and INJECTOR CYL 5 & 6 (female) (2)	Max. 2 Ω
			Between ECM J1 (female) (75) and INJECTOR CYL 5 & 6 (female) (1)	Max. 2 Ω

FAILURE CODE [CA556]

(ALL-K-A300-410-02-B)

Action level	Failure code	Failure	Crankcase Pressure High Error 3 (Engine controller system)
L03	CA556		
Details of failure	High pressure error (level 2) in crankcase is detected.		
Action of controller	Engine power deration		
Phenomenon on machine	• Engine power deration • Oil may leak from seals or gauge.		
Related information	• Signal voltage from crankcase pressure sensor can be checked by monitoring function. (Code: 48401 (V)) • Pressure in crankcase pressure sensor can be checked by monitoring function. (Code: 48400 (kPa)) • This failure code is cleared when failure code [CA1942] is displayed. • 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	Clogged KCCV filter	Replace the KCCV filter.
2	Blocked KCCV gas piping	If an error persists after replacement of the KCCV filter and emulsions are detected inside KCCV, blocked emulsions may be suspected in KCCV blow by gas piping. Check that there is no coolant leakage.
3	Defective crankcase pressure sensor	Crankcase pressure sensor system may be defective. Perform troubleshooting for failure codes [CA1843] and [CA1844].
4	Increase of blowby gas	The error does not disappear after replacing KCCV filter, and “Crankcase Pressure High Error 1” or “Crankcase Pressure High Error 2” is also displayed, piston ring may be worn or broken, or oil from VGT may be leaked, valve guide and stem seal may be worn or damaged. Perform troubleshooting “TROUBLESHOOTING OF ENGINE (S MODE)”, “Engine oil consumption is excessive”.

FAILURE CODE [CA1691]

(ALL-K-A9H0-410-00-B)

Action level	Failure code	Failure	Defective Regeneration (Engine controller systems)
L03	CA1691		
Details of failure	KDOC efficiency (catalyzer function) is lowered. (Because KDOC outlet temperature does not rise compared with KDOC inlet temperature: 250 to 400 °C as normal, KDOC outlet temperature: 450 to 600 °C as normal during regeneration.)		
Action of controller	• EGR valve closed. • Engine power deration • Fuel dosing stops.		
Phenomenon on machine	Engine power deration		

No.	Cause	Procedure, measuring location, criteria and remarks
3	Defective SCR outlet NOx sensor	If no failure is found by preceding checks, the SCR outlet NOx sensor is defective. 1. Turn starting switch to OFF position. 2. Replace the SCR outlet NOx sensor. 3. Turn starting switch to ON position. 4. Perform “Loaded Diagnostics Operation To Confirm Failure Correction”.
		If this failure code is cleared, the original sensor is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)
4	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Loaded Diagnostics Operation to Confirm Failure Correction

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

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

1. Turn the starting switch to OFF position, and shut down the engine controller.
2. Turn the starting switch to ON position, and start the engine.
3. Run the engine at high idle speed safely to raise the exhaust temperature. (Keep the engine speed so that monitoring code 19302 “SCR Outlet Temperature” becomes 150 °C or higher. Check that monitoring code 19210 “SCR Outlet NOx Sensor State” changes from 0 to 1.)
4. Repair is completed if failure code is cleared after 3 minutes has passed.

REMARK

If the SCR outlet NOx sensor does not activate (that is, 19210 “SCR Outlet NOx Sensor State” remains as 0), return to troubleshooting.

FAILURE CODE [CA2383]

(ALL-K-AAQB-410-00-B)

Action level	Failure code	Failure	VGT Solenoid Open Circuit Error (Engine controller system)
L03	CA2383		
Detail of failure	Open circuit occurs in VGT solenoid drive circuit.		
Action of controller	• Engine power deration. • EGR valve closes and fully opens VGT. • Regeneration control stops.		
Phenomenon on machine	Engine power deration		
Related information	• Signal current to VGT 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 “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 VGT solenoid (internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector VGT-SOL, and connect T-adapter to male side.		
		Resistance	Between VGT-SOL (male) (1) and (2)	5 to 10 Ω
3	Open or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector ECM J2, and connect T-adapter to female side. **REMARK** If resistance is 100 kΩ or higher, wiring harness has open circuit. If resistance is 10 Ω or below, wiring harness has short circuit.		
		Resistance	Between ECM J2 (female) (80) and (2)	5 to 10 Ω
4	Ground fault in wiring harness system (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J2 and VGT-SOL, and connect T-adapters to each female side.		
		Resistance	Between ground and ECM J2 (female) (80) or VGT-SOL (female) (1)	Min. 100 kΩ
			Between ground and ECM J2 (female) (2) or VGT-SOL (female) (2)	Min. 100 kΩ

FAILURE CODE [CA3143]

(ALL-K-AFP0-410-10-B)

Action level	Failure code	Failure	SCR Temperature Sensor Low Error (Engine controller system)
L01	CA3143		
Detail of failure	Ground fault or sensor circuit error in SCR temperature sensor measuring section or probe (+)		
Action of controller	• As the SCR temperature cannot be detected, substitute the SCR outlet temperature for the SCR temperature and run the engine (if the SCR outlet temperature sensor also has an error, use the latest normal value). • Advances to Inducement strategy. • AdBlue/DEF injection stops.		
Phenomenon on machine	• NOx emission increases because AdBlue/DEF injection is disabled. • Engine power deration according to inducement strategy.		
Related information	⚠ **SCR assembly, sensor fitting piping, and sensor probe become hot (Min. 400 °C). Be careful not to get burned.** • The SCR temperature sensor and SCR outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • Ground fault or sensor circuit error in SCR temperature sensor measuring section or probe (+) is sent to the engine controller via CAN communication, and this failure code is displayed. • For the replacement procedure of the SCR temperature sensor, see "Disassembly and assembly," “Remove and install SCR temperature sensor”. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective SCR temperature sensor (internal defect)	1. Turn starting switch to OFF position. 2. Replace SCR temperature sensor. 3. Turn starting switch to ON position. If this failure code is cleared, the original SCR temperature sensor is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)
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.)

Related information	⚠ **The temperature of KDPF and KDOC becomes hot (Min. 500 °C). Be careful not to get burned.** • 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)) • If the engine runs with poor combustion, (poor fuel spray due to troubles in the fuel injectors is one of the examples of root causes but not limited to it), large amount of unburnt fuel slips out with the exhaust gas and will be trapped in the aftertreatment system. The trapped unburnt fuel can start burning in the aftertreatment system once the exhaust gas becomes hot and it can keep burning. 1. Combustion is impaired causing high exhaust temperature. 2. Cylinders other than disabled cylinder may increase their fuel injection in order to compensate for torque drop, causing high exhaust temperature. • As to procedure for accessing KDPF temperature sensor, see “50 DISASSEMBLY AND ASSEMBLY”, “REMOVE AND INSTALL KDPF ASSEMBLY” and “DISASSEMBLE AND ASSEMBLE KDPF ASSEMBLY”. • Engine controller does not shut itself down immediately after turning the starting switch to the OFF position. The AdBlue/DEF purging starts after the starting switch is turned to the OFF position and Engine controller keeps working until the purging is completed. The purging lasts for maximun 6 minutes. Do not re-start the engine until the system operating lamp in the battery box goes out even if quick re-start becomes necessary. • Engine power deration will be restored only after the following two conditions are met. (1) Run “Loaded Diagnostics Operation To Clear failure Code” record in Engine controller. Both Action Level “L03” in the Standard screen and the pop-up window of the failure description in the Current Abnormality screen shall go out if the failure is corrected. (2) the starting switch shall be turned to the OFF position. **NOTICE** **If this failure code is displayed, it indicates that KCSF may be damaged. After completing the repair of the problem, check the following. Replace the KCSF if the black smoke comes out of the exhaust pipe outlet.** • Start the engine, perform the quick acceleration from low idle to high idle two times, and then keep the engine running at high idle for 5 seconds. • Check that the black smoke does not come out of the exhaust pipe outlet during this quick acceleration and high idling. **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.)** • **This failure code is cleared by performing operations indicated in “TESTING AND ADJUSTING”, “SETTING AND OPERATION OF MACHINE MONITOR”, “SERVICE MODE”, “METHOD FOR SETTING WITH TESTING MENU (ENGINE CONTROLLER ACTIVE FAULT CLEAR)”.**

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective KDOC inlet temperature sensor	Perform checks on causes 1 to 7 for failure code [CA3251].

Related information	• SCR catalyst, NOx sensor, ammonia sensor diagnosis. 19203 Turbo Outlet NOx Sensor State 19210 SCR Outlet NOx Sensor State 19202 Turbo Outlet Concentration Corrected 19209 SCR Outlet NOx Corrected 19205 Ammonia Concentration Corrected 19120 AdBlue/DEF Injection Quantity • AdBlue/DEF level, AdBlue/DEF quantity sensor diagnosis 19100 AdBlue/DEF Concentration 19110 AdBlue/DEF Level 19111 AdBlue/DEF Level Corrected 19115 AdBlue/DEF Temperature in Tank 19400 Ambient Temperature 19305 AdBlue/DEF Tank Heating State **NOTICE** **This failure code requires "Loaded Diagnostics Operation To Confirm Failure Correction". After investigating the cause of the problem and completing the repair, perform "Loaded Diagnostics Operation To Confirm Failure Correction" to make sure the failure code is cleared. (Repair completion cannot be judged without raising the exhaust temperature even if this failure code is cleared by turning ON the starting switch)**

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective turbocharger outlet NOx sensor system (Open circuit, internal defect, defective sensor heater)	If failure code [CA1885], [CA3232], [CA3649], [CA3682], [CA3718], [CA3725], or [CA3748] is displayed, perform troubleshooting for these failure codes failure codes first.
2	Defective SCR outlet NOx sensor system (Open circuit, internal defect, defective sensor heater)	If failure code [CA1887], [CA2771], [CA3545], [CA3583], [CA3681], or [CA3717] is displayed, perform troubleshooting for these failure codes first.
3	Defective SCR temperature sensor system (Open circuit, Internal defect)	If failure code [CA3142] or [CA3143] or [CA3144] or [CA3146] or [CA3147] or [CA3148] or [CA3165] or [CA3229] or [CA3231] or [CA3235] or [CA4152] or [CA4159] or [CA4164] or [CA4165] or [CA4166] or [CA4261] is displayed, perform troubleshooting for these failure codes first.
4	Defective ammonia sensor system (Open circuit, internal defect, defective sensor heater)	If failure code [CA3899], [CA3911], [CA3912], [CA3932], [CA3933], [CA3934], [CA3935], [CA3936] or [CA4281] is displayed, perform troubleshooting for these failure codes first.

Related information	• On the Pre-defined Monitoring screen, these 4 diagnosis are displayed. Engine operation state diagnosis, environment state diagnosis, SCR catalyst and NOx sensor and ammonia sensor diagnosis, AdBlue/DEF level and AdBlue/DEF quality sensor diagnosis. (The following numbers are the displayed monitoring codes) • Engine operation state diagnosis 01002 Engine speed 19200 Exhaust gas flow rate 47300 KDOC Inlet Temperature 19300 SCR Temperature 19302 SCR Outlet Temperature • Environmental state diagnosis 37400 Ambient Pressure 19400 Ambient Temperature 18400 Intake Temperature 19133 Engine Room Temperature 19115 AdBlue/DEF Temperature in Tank • SCR catalyst, NOx sensor, ammonia sensor diagnosis. 19203 Turbo Outlet NOx Sensor State 19210 SCR Outlet NOx Sensor State 19202 AFT Intake NOx Corrected 19209 SCR Outlet NOx Corrected 19205 AFT NH3 Sensor Corrected 19120 AdBlue/DEF Injection Quantity • AdBlue/DEF level, AdBlue/DEF quantity sensor diagnosis 19100 AdBlue/DEF Concentration 19110 AdBlue/DEF Level 19111 AdBlue/DEF Level Corrected 19115 AdBlue/DEF Temperature in Tank 19400 Ambient Temperature 19305 AdBlue/DEF Tank Heating State **NOTICE** **This failure code requires “Loaded Diagnostics Operation To Clear Failure Code”. After investigating the cause of the problem and completing the repair, perform “Loaded Diagnostics Operation To Clear Failure Code” to make sure the failure code is cleared. (This failure code is not cleared by only turning ON the starting switch again.)**

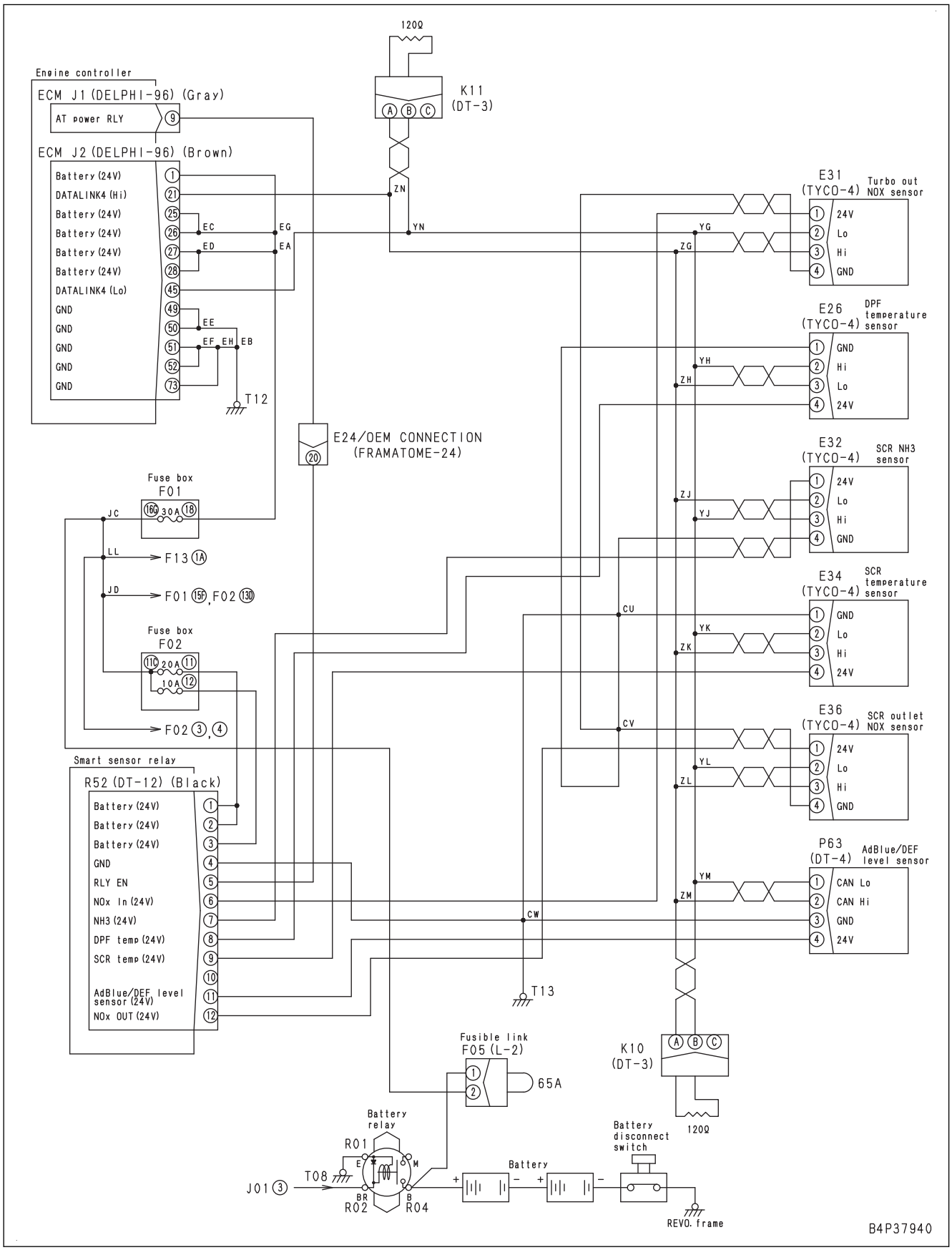
No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective turbocharger outlet NOx sensor system (Open circuit, internal defect, defective sensor heater)	If failure code [CA1885], [CA3232], [CA3649], [CA3682], [CA3718], [CA3725], or [CA3748] is displayed, perform troubleshooting for these failure codes failure codes first.

FAILURE CODE [CA3866]

(ALL-K-AFD0-410-20-B)

Action level	Failure code	Failure	AdBlue/DEF Low Concentration Error 2 (Engine controller system)
L01	CA3866		
Detail of failure	The more NOx emission increases, the lower concentration AdBlue/DEF gets.		
Action of controller	• Advances to Inducement strategy. (*1) • AdBlue/DEF injection stops. (*1) • AdBlue/DEF pump stops. (*1) *1: It corresponds to machines of EU, Japan, and North America specification which equipped with engines compatible with EPA and California regulations since 2017. **REMARK** EPA and California regulations can be checked on the nameplate of the engine serial number.		
Phenomenon on machine	• Engine power deration according to inducement strategy. (*1) • NOx conversion rate is lower. *1: It corresponds to machines of EU, Japan, and North America specification which equipped with engines compatible with EPA and California regulations since 2017. **REMARK** EPA and California regulations can be checked on the nameplate of the engine serial number.		

Circuit diagram related to SCR system CAN communication



FAILURE CODE [CA4261]

(ALL-K-AFP0-410-90-B)

Action level	Failure code	Failure	SCR Temperature Sensor Power Interrupt Error (Engine controller system)
L01	CA4261		
Detail of failure	Interrupted power failure error in SCR temperature sensor is detected. (12 open circuits are detected in the power supply line in 60 seconds.)		
Action of controller	• Holds the SCR temperature and the SCR outlet temperature using the last normal values. • AdBlue/DEF injection stops • Advances to Inducement strategy.		
Phenomenon on machine	• SCR temperature and SCR outlet temperature have detection errors. • NOx emission increases because AdBlue/DEF injection is disabled. • Engine output is reduced based on inducement strategy.		
Related information	⚠ **SCR assembly, the sensor installation piping, and the sensor probe become hot (Min. 400 °C). Be careful not to get burned.** ⚠ **Be careful not to get burned by the sensor probe as it is heated by itself even if the ambient temperature is not high.** • Mostly, momentary power failure is caused by defective contact and visually check a torn harness coating and check for defective contact at the connector. • To detect an incomplete wire breakage, sway the wiring harness as much as possible at the resistance measurement to check if the resistance can change or not. • The SCR temperature sensor and the SCR outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • Note that smart sensor relay connector is energized even if starting switch is turned to OFF position. • For replacement of the SCR outlet temperature sensor, see Disassembly and assembly, “Removal and installation of SCR temperature sensor”. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine and travel (vibrate the machine).		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective sensor power supply relay system	Perform troubleshooting for failure code [CA1776].		
2	Defective sensor power supply relay (defective internal circuit)	1. Turn starting switch to OFF position. 2. Check that system operating lamp does not light up, and then turn battery disconnect switch to OFF position. 3. Insert T-adapter into connector R52. 4. Disconnect connector E34. 5. Turn battery disconnect switch to ON position. 6. Turn starting switch to ON position.		
		Voltage	Between R52 (9) and (4)	Min. 22 V
3	Open circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector E34, and connect T-adapter to female side. 3. Turn starting switch to ON position.		
		Voltage	Between E34 (female) (4) and (1)	Min. 22 V
4	Defective SCR temperature sensor (internal defect)	If failure code is still displayed after above checks, SCR temperature sensor may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)		

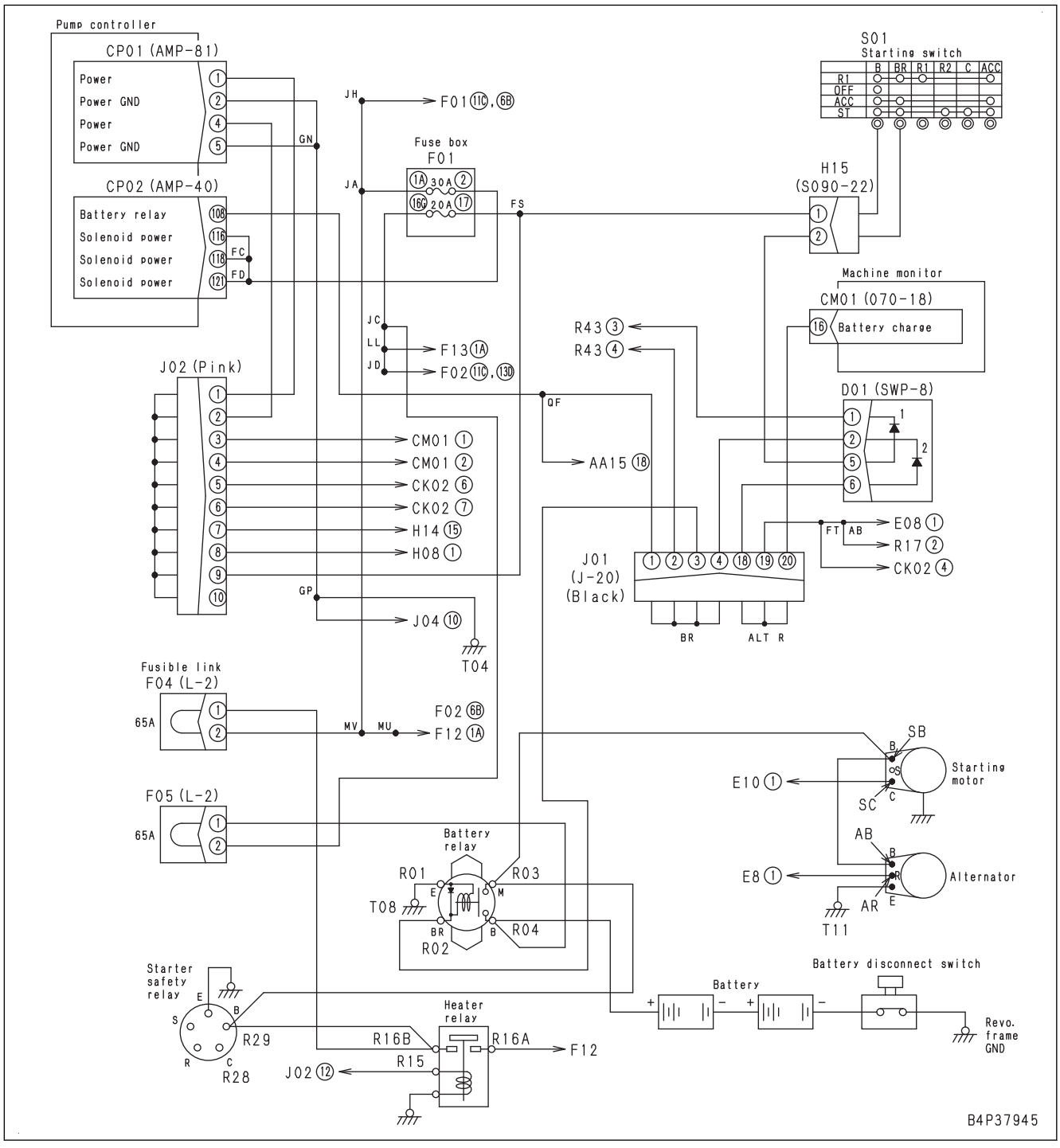
FAILURE CODE [CA5179]

(ALL-K-AFKH-410-00-B)

Action level	Failure code	Failure	Engine Room Temperature Sensor High Error (Engine controller system)
L01	CA5179		
Detail of failure	A high voltage error occurs in signal circuit of engine room temperature sensor.		
Action of controller	Run the engine by using the default value of the engine room temperature (25 °C).		
Phenomenon on machine	• AdBlue/DEF line stops thawing. • NOx emission may increase because AdBlue/DEF line stops thawing.		
Related information	• This failure code is displayed when the engine room temperature sensor connector is removed. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position.			
		If this failure code is cleared, the wiring harness connector is defective.			
2	Defective engine room temperature sensor	1. Turn starting switch to OFF position. 2. Disconnect connector P66 and connect socket to male side. **REMARK** If a resistance value of the engine room temperature sensor ranges from 280 Ω to 382 kΩ, the engine room temperature sensor is considered to be normal.			
		Resistance	Between `P66 (male) (A) and (B)	-40 °C	291 to 382 kΩ
				-20 °C	85 to 109 kΩ
				0 °C	29 to 36 kΩ
				30 °C	7.3 to 8.8 kΩ
				60 °C	2.3 to 2.7 kΩ
				90 °C	860 to 970 Ω
				130 °C	280 to 320 Ω
3	Open or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector ECM J2, and connect T-adapter to female side. **REMARK** Use an engine room temperature sensor resistance characteristics table for check on cause 2 as a resistance value.			
		Resistance	Between ECM J2 (female) (65) and (32)		280 Ω to 382 kΩ

Circuit diagram related to pump controller power supply



FAILURE CODE [DB96KP]

(ALL-K-LU04-410-10-B)

Action level	Failure code	Failure	Work Equipment Controller 5V Sensor 1 Power Voltage Low Error (Work equipment controller system)
L01	DB96KP		
Detail of failure	Voltage of 5 V power supply (1) circuit from work equipment controller to sensors is 2.5 V and below or 6.0 V and above.		
Action of controller	Stops driving power supply.		
Phenomenon on machine	Sensor value of PPC pressure sensor which are connected to this power supply becomes abnormal.		
Related information	• "Sensors are invalid" is displayed in control box. • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective sensors (internal defect)	1. Turn the starting switch to OFF position. 2. Disconnect the following connectors one by one, and turn the 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 device is defective. **REMARK** Other failure codes (many) are also displayed at the same time. This is due to disconnection of connector. Ignore failure codes other than this [DB96KP].		
		Connector	Bucket DUMP lever PPC pressure sensor	P05A
			Bucket CURL lever PPC pressure sensor	P01A
			Boom RAISE PPC pressure sensor	P06
			Boom LOWER PPC pressure sensor	P02
			Arm OUT PPC pressure sensor	P08
			Arm IN PPC pressure sensor	P04
			Bucket DUMP PPC pressure sensor	P05
			Bucket CURL PPC pressure sensor	P01
			Swing LEFT PPC pressure sensor	P03
			Swing RIGHT PPC pressure sensor	P07
			PPC source pressure sensor	PA10
2	Defective work equipment controller	1. Turn the starting switch to OFF position. 2. Disconnect the connector CW02, and connect the T-adapter to male side. 3. Insert the T-adapter into connector CW01. 4. Turn the starting switch to ON position.		
		Voltage	Between CW02 (male) (1) and CW01 (4)	2.5 to 6.0 V

FAILURE CODE [DBR6KP]

(ALL-K-LLA1-410-D0-B)

Action level	Failure code	Failure	ICT Controller 5V Sensor 1 Power Low Error (ICT sensor controller system)
L01	DBR6KP		
Detail of failure	Voltage of 5 V power supply (1) circuit from ICT sensor controller to sensors is 2.5 V and below or 6.0 V and above.		
Action of controller	Stops driving power supply.		
Phenomenon on machine	Sensor value of stroke reset encoder for cylinder which is connected to this power supply becomes abnormal.		
Related information	• "Sensors are invalid" is displayed in control box. • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective stroke reset encoder for arm cylinder or stroke reset encoder for boom cylinder (internal defect)	1. Turn the starting switch to OFF position. 2. Disconnect the following connectors one by one, and turn the 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 device is defective. **REMARK** Other failure codes (many) are also displayed at the same time. This is due to disconnection of connector. Ignore failure codes other than this [DBR6KP].		
		Connector	Stroke reset encoder for boom cylinder	PA18
			Stroke reset encoder for arm cylinder	PA19
2	Defective ICT sensor controller	1. Turn the starting switch to OFF position. 2. Disconnect the connector CS02, and connect the T-adapter to male side. 3. Turn the starting switch to ON position.		
		Voltage	Between CS02 (male) (1) and (29)	2.5 to 6.0 V
3	Ground fault in wiring harness (contact with ground circuit)	1. Turn the starting switch to OFF position. 2. Disconnect all the connectors CS02, PA19 and PA18, and connect the T-adapter to any female side.		
		Resistance	Between ground and each of CS02 (female) (1), PA19 (female) (1) and PA18 (female) (1)	Min. 1 MΩ
4	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect all the connectors PA19 and PA18, and connect the T-adapter to either female side. 3. Turn the starting switch to ON position.		
		Voltage	Between PA19 (female) (1) and (2), and between PA18 (female) (1) and (2)	2.5 to 6.0 V

FAILURE CODE [DDNS00]

(ALL-K-PX11-410-00-B)

Action level	Failure code	Failure	Lock Lever Auto Lock Release Switch Operation (pump controller system)
-	DDNS00		
Details of failure	Lock lever automatic lock release switch operation is detected when lock lever is locked automatically.		
Action of controller	• None in particular • Lock lever automatic lock does not operate.		
Phenomenon on machine	• Lock lever automatic lock function does not operate. • Automatic lock release switch monitor is displayed in red on machine monitor.		
Related information	• Connectors CP01 and S25 do not provide T-adapter for measuring voltage, and use connector D03 for troubleshooting. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position and set PPC lock lever to FREE position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Lock lever automatic lock cancel switch ON	If lock lever automatic lock function operates normally, turn lock lever automatic lock cancel switch OFF.		
2	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Insert T-adapter into connector D03.		
		Voltage	Between D03 (7) and ground	Max. 1 V
3	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 [DHS9MA]

(ALL-K-L6WL-410-00-B)

Action level	Failure code	Failure	Boom LOWER PPC Pressure Sensor Defective Function (Work equipment controller system)
L01	DHS9MA		
Detail of failure	Signal voltage of boom LOWER PPC pressure sensor circuit is 0.3 V and below or 4.5 V and above.		
Action of controller	• Controls machine by regarding boom LOWER PPC pressure as 0 MPa {0 kg/cm^2} . • If cause of failure is eliminated, machine becomes normal by itself.		
Phenomenon on machine	• Auto-deceleration function cannot be reset. • Poor operability of boom LOWER • Semi-auto mode cannot be selected in manual mode. • Manual mode is automatically selected in semi-auto mode.		
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. • “Sensors are invalid” is displayed in control box. • Boom LOWER PPC pressure can be checked with monitoring function. (Code: 75603) • For the detail of power supply and ground circuit, see the circuit diagram of failure code [DB96KP]. • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position or start the engine.		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective 5 V sensor 1 power supply system	If failure code [DB95KP] is also displayed at the same time, perform troubleshooting for it first.			
		1. Turn the starting switch to OFF position. 2. Disconnect the connector P02, and connect the T-adapter to female side. 3. Turn the starting switch to ON position. **REMARK** If power supply voltage is abnormal, go to check on cause 3 and after.			
		Voltage	Between P02 (female) (3) and (1)	Power supply	4.5 to 5.5 V

<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="19">4</td><td rowspan="19">Open circuit in wiring harness
(wire breakage or defective contact of connector)</td><td colspan="3">ACC signal of starting switch (start of CAN communication is not recognized)
1. Turn starting switch to OFF position, and set battery disconnect switch to OFF position.
2. Disconnect connectors to be measured and insert T-adapters.
3. Turn battery disconnect switch to ON position, and turn starting switch to ON position.</td></tr>
<tr><td rowspan="4">Voltage</td><td>Between CM01 (10) and (3)</td><td>20 to 30 V</td></tr>
<tr><td>Between ECM J2 (5) and (49)</td><td>20 to 30 V</td></tr>
<tr><td>Between AC02 (4) and (1)</td><td>20 to 30 V</td></tr>
<tr><td>Between CK02 (3) and (1)</td><td>20 to 30 V</td></tr>
<tr><td colspan="3">If failure code is still displayed after above checks on cause 5, this check is not required.
1. Turn starting switch to OFF position, and set battery disconnect switch to OFF position.
2. Disconnect related connectors, and connect T-adapter to each female side connector to be measured.</td></tr>
<tr><td rowspan="12">Resistance</td><td>Between CM02 (female) (8) and CP01 (female) (45)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between CM02 (female) (9) and CP01 (female) (64)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between CM02 (female) (8) and ECM J2 (female) (22)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between CM02 (female) (9) and ECM J2 (female) (46)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between CM02 (female) (8) and AC01 (female) (2)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between CM02 (female) (9) and AC01 (female) (1)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between CM02 (female) (8) and CK01 (female) (10)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between CM02 (female) (9) and CK01 (female) (11)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between CM02 (female) (8) and H14 (female) (17)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between CM02 (female) (9) and H14 (female) (21)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between ECM J2 (female) (22) and K02 (male) (A)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between ECM J2 (female) (46) and K02 (male) (B)</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="4">5</td><td rowspan="4">Ground fault in wiring harness
(contact with ground circuit)</td><td colspan="3">If no failure (no open circuit) is found by check on cause 5, measure resistance at any one place in each case.
1. Turn starting switch to OFF position, and set battery disconnect switch to OFF position.
2. Disconnect related connectors, and connect T-adapter to each female side connector to be measured.</td></tr>
<tr><td rowspan="2">Resistance</td><td>Between ground and any point in CP01 (female) (45), CM02 (female) (7), (8) or ECM J2 (female) (22)</td><td>Min. 1 MΩ</td></tr>
<tr><td>Between ground and any point in CP01 (female) (64), CM02 (female) (9), or ECM J2 (female) (46)</td><td>Min. 1 MΩ</td></tr>
</table>

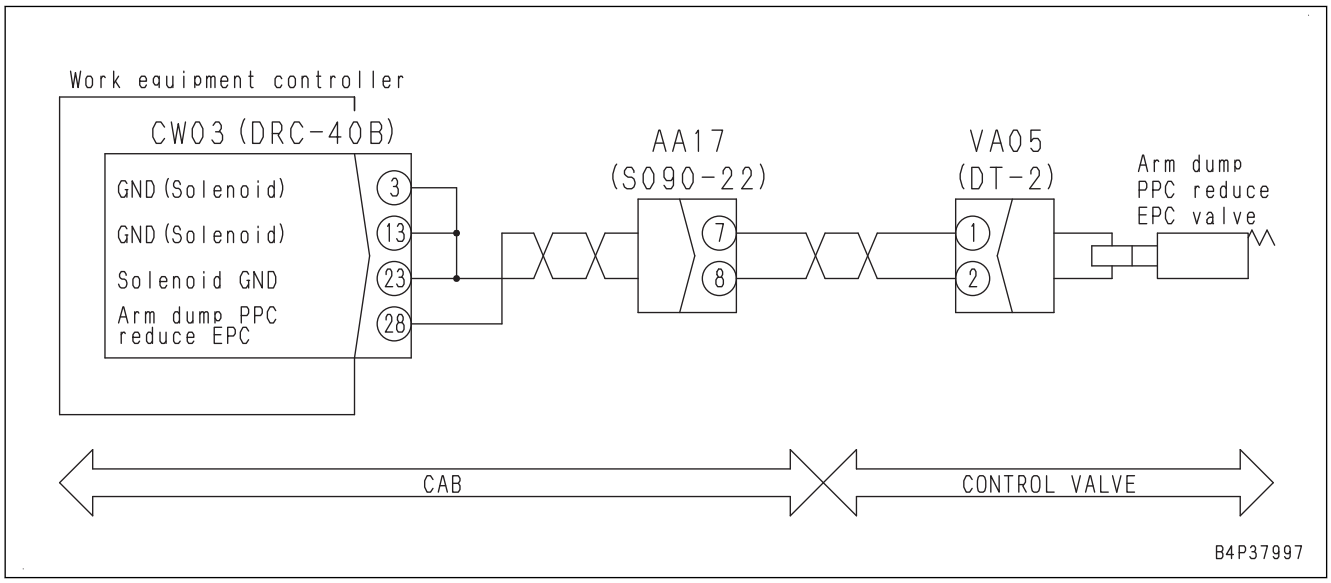
FAILURE CODE [DKT9KB]

(ALL-K-LCVC-410-30-B)

Action level	Failure code	Failure	Bucket Cylinder Stroke Sensor B Phase Hot Short Circuit (ICT sensor controller system)
L01	DKT9KB		
Detail of failure	Input voltage from stroke sensor B phase for bucket cylinder is 4.7 V and above.		
Action of controller	None in particular		
Phenomenon on machine	Bucket of machine image on the screen of control box stops.		
Related information	• “Sensors are invalid” is displayed in control box. • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective sensor 5 V power supply system	If failure code [DBR5KP] is also displayed at the same time, perform troubleshooting for it first.		
2	Defective stroke sensor B phase for bucket cylinder (internal open circuit) or ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connector PA03. 3. Turn the starting switch to ON position.		
		If failure code [DKT9KB] is cleared, stroke sensor for bucket cylinder is defective. (If this failure code is not cleared, wiring harness or ICT sensor controller is defective.) **REMARK** Many other failure codes are displayed because of disconnection of connector PA03. Ignore failure codes other than [DKT9KB].		
3	Hot short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connectors CS01 and PA01, and connect the T-adapter to female side of CS01.		
		Voltage	Between CS01 (female) (8) and (21)	Max. 1 V
4	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connectors CS01 and PA03, and connect the T-adapter to female side of CS01.		
		Continuity	Between CS01 (female) (7) and each pin other than (7)	No continuity (no sound is heard)
5	Defective ICT sensor controller	If no failure is found by preceding checks, ICT sensor controller is defective. Reference 1. Turn the starting switch to OFF position. 2. Insert the T-adapter into connector CS01. 3. Turn the starting switch to ON position.		
		Voltage	Between CS01 (7) and (21)	0.3 to 4.7 V

Circuit diagram related to arm OUT PPC reduce press EPC solenoid



<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="4">2</td><td rowspan="4">Defective bucket DUMP lever PPC pressure sensor (internal defect)</td><td colspan="4">1. Turn the starting switch to OFF position.
2. Insert the T-adapter into connector P05A.
3. Turn the starting switch to ON position.</td></tr>
<tr><td>Voltage</td><td>Between P05A (2) and (1)</td><td>Sensor output</td><td>0.5 to 4.5 V</td></tr>
<tr><td colspan="4">REMARK
If power supply voltage is normal and sensor output voltage is abnormal, it is difficult to determine the failure between ground fault and hot short circuit in wiring harness. Check as follows.
1. Turn the starting switch to OFF position.
2. Exchange the connector P05A with connector of other PPC pressure sensor.
3. Turn the starting switch to ON position, and display the Electrical System Abnormality Record screen of machine monitor.
4. If E mark is not displayed again for this failure code, bucket DUMP lever PPC pressure sensor is defective.
REMARK
After troubleshooting, restore the connector.</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td rowspan="4">3</td><td rowspan="4">Open circuit in wiring harness (wire breakage or defective contact of connector)</td><td colspan="4">If power supply voltage in check on cause 1 is normal, this check is not required.
1. Turn the starting switch to OFF position.
2. Disconnect the connectors CW01, CW02 and P05A, and connect the T-adapter to each female side.</td></tr>
<tr><td rowspan="3">Resistance</td><td>Between CW01 (female) (4) and P05A (female) (1)</td><td colspan="2">Max. 1 Ω</td></tr>
<tr><td>Between CW01 (female) (24) and P05A (female) (2)</td><td colspan="2">Max. 1 Ω</td></tr>
<tr><td>Between CW02 (female) (1) and P05A (female) (3)</td><td colspan="2">Max. 1 Ω</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Ground fault in wiring harness (contact with ground circuit)</td><td colspan="4">1. Turn the starting switch to OFF position.
2. Disconnect the connectors CW01 and P05A, and connect the T-adapter to either female side.</td></tr>
<tr><td>Resistance</td><td>Between ground and CW01 (female) (24) or P05A (female) (2)</td><td colspan="2">Min. 1 MΩ</td></tr>
<tr><td rowspan="3">5</td><td rowspan="3">Hot short circuit in wiring harness (contact with 5 V circuit or 24 V circuit)</td><td colspan="4">1. Turn the starting switch to OFF position.
2. Disconnect the connector P05A, and connect the T-adapter to female side.
3. Turn the starting switch to ON position.</td></tr>
<tr><td>Voltage</td><td>Between P05A (female) (2) and ground</td><td colspan="2">Max. 1 V</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>6</td><td>Defective work equipment controller</td><td colspan="4">If no failure is found by preceding checks, the work equipment controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</td></tr>
</table>

FAILURE CODE [DR31KX]

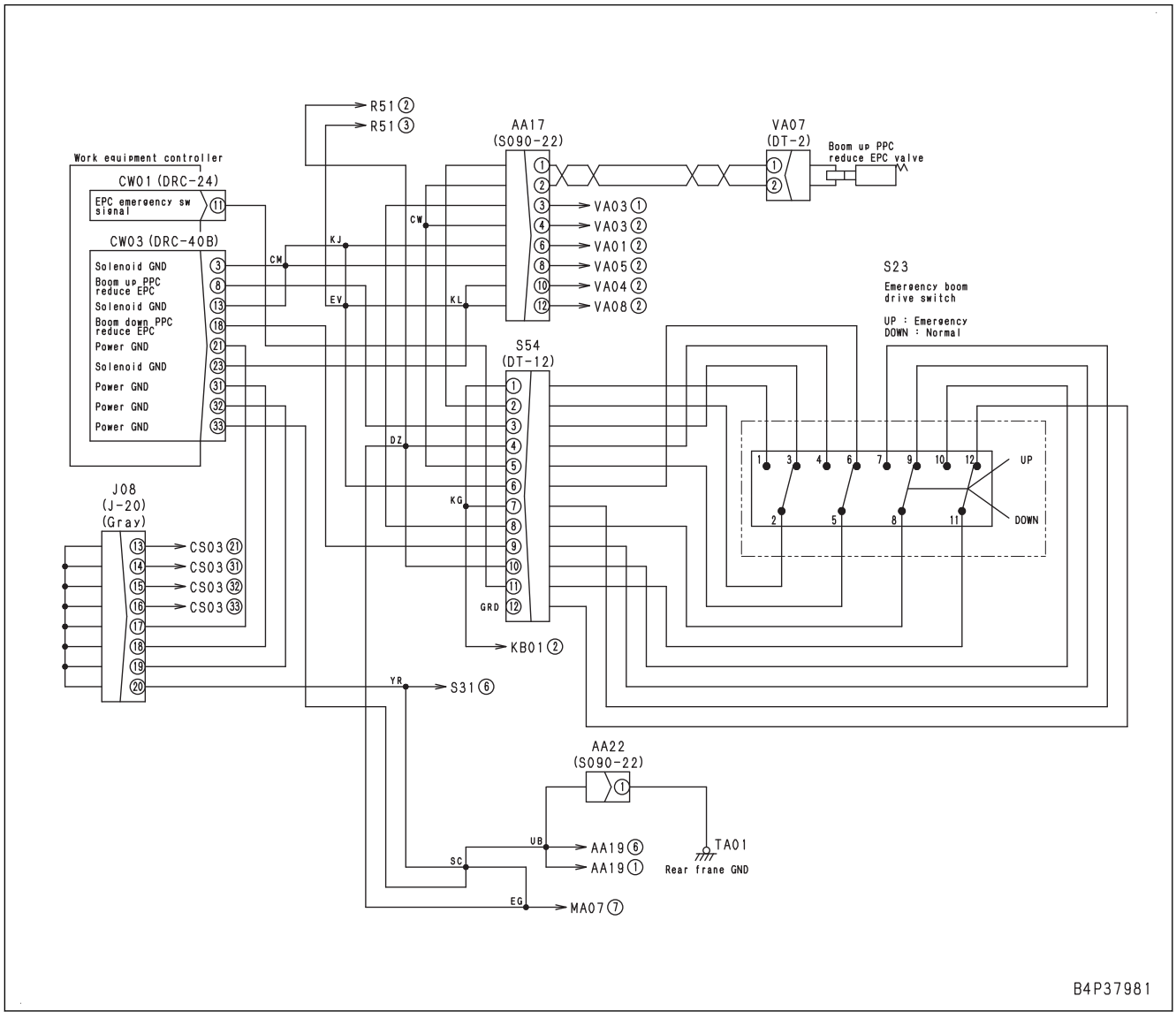
(ALL-K-Q16B-410-10-B)

Action level	Failure code	Failure	Camera 3 Picture Reverse Drive Input Out of Range (Machine monitor system)
L01	DR31KX		
Detail of failure	Voltage that is different from output voltage of machine monitor is detected in camera 3 picture reverse drive circuit (pin 7 of connector CM04).		
Action of controller	Camera 3 picture is not displayed		
Phenomenon on machine	Camera 3 picture is not displayed.		
Related information	• Normal image and mirror image if the camera 3 picture reverse output line (7 pins of connector CM04) is 0 V and 8 V (mirror image command is 8 V because the camera power supply is 8 V). • Since there may be several connectors A46, check connector A42 to identify the camera 3. • 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	Open circuit in wiring harness (Wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connector CM04 and A46, and connect T-adapter to female side.		
		Resistance	Between CM04 (female) (7) and A46 (female) (3)	Max. 1 Ω
			Between CM04 (female) (8) and A46 (female) (4)	Max. 1 Ω
2	Ground fault in wiring harness (Contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors CM04 and A46, and connect T-adapter to either female side.		
		Resistance	Between ground and CM04 (female) (7) or A46 (female) (3)	Min. 1 MΩ
3	Hot short circuit in wiring harness (Contact with 24 V circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector A46, and connect T-adapter to female side. 3. Turn starting switch to ON position. **REMARK** Check that camera 3 setting is normal image.		
		Voltage	Between A46 (female) (3) and (4) or ground	Max. 1 V
4	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector CM04 and connect T-adapter to female side.		
		Resistance	Between CM04 (female) (7) and every pin other than pin (7)	Min. 1 MΩ
5	Defective camera 3	If no failure is found by preceding checks, camera 3 is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)		
6	Defective machine monitor	If no failure is found by above checks, machine monitor is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

No.	Cause	Procedure, measuring location, criteria and remarks		
3	Defective boom secondary drive switch	If no failure is found by check on cause 2, this check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect the connector S54, and connect the T-adapter to male side. 3. Set the boom secondary drive switch at its normal position. **REMARK** Check it by using multimeter in continuity mode. If this is the cause of failure, replace the boom secondary drive switch.		
		Continuity	Between S54 (male) (2) and each of (1), (7), (8) and (9)	No continuity (no sound is heard)
			Between S54 (male) (3) and each of (1), (7), (8) and (9)	No continuity (no sound is heard)
4	Defective work equipment controller	If no failure is found by preceding checks, the work equipment controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to boom RAISE PPC reduce pressure EPC solenoid



FAILURE CODE [DWN5KA]

(ALL-K-ACN5-410-02-B)

Action level	Failure code	Failure	Fan clutch solenoid open circuit (Pump controller system)
L03	DWN5KA		
Detail of failure	Controller detects open circuit in fan clutch solenoid.		
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	Fan speed is not controlled, there by it becomes the maximum rotation speed according to the engine speed.		
Related information	• Fan speed can be checked with monitoring function. (code:10007) • As T-adapter for pump controller connector is “socket-type box”, operating voltage cannot be measured at pump controller connector. • After repair is completed, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective fan clutch solenoid (internal open circuit)	1. Turn the starting switch to OFF position. 2. Disconnect connector M16, and connect T-adapter to male side.		
		Resistance	Between M16 (male) (3) and (4)	20 to 32 Ω
2	Open circuit, short circuit, ground fault, hot short circuit of wiring harness, or defective pump controller	1. Turn the starting switch to OFF position. 2. Disconnect connector M16, and connect T-adapter to female side. 3. Turn the starting switch to ON position. 4. Shake it by hand while measuring the voltage. When the voltage becomes 0 V, wiring harness has open circuit at around this point.		
		Voltage	Between M16 (female) (3) and (4)	Min. 20 V
3	Open circuit in wiring harness (wire breakage or defective contact of connector)	If no failure is found by above checks, this check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect connectors CP02 and M16, and connect T-adapters to each female side.		
		Resistance	Between CP02 (female) (99) and M16 (female) (4)	Max. 1 Ω
			Between M16 (female) (3) 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).		

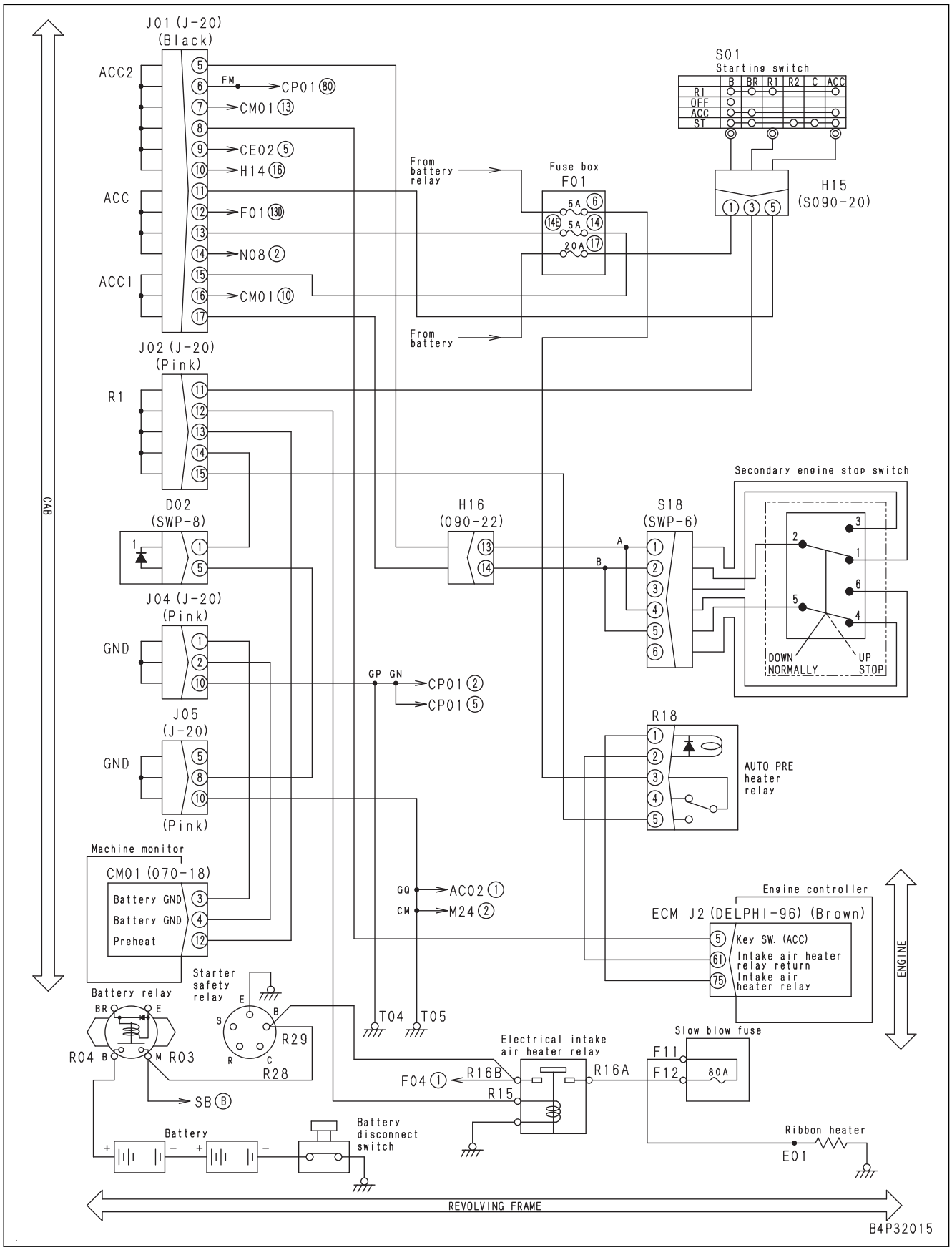
FAILURE CODE [DXE8KA]

(ALL-K-LTB5-410-00-B)

Action level	Failure code	Failure	Attachment Flow Regulating EPC 3 Solenoid Open Circuit (Pump controller system)
-	DXE8KA		
Detail of failure	Controller detects open circuit in attachment flow rate adjustment EPC3 solenoid.		
Action of controller	• Stops driving attachment flow rate adjustment EPC1, EPC2, EPC3, and EPC4 solenoids. • Even if cause of failure disappears, machine does not become normal until starting switch is turned to OFF position.		
Phenomenon on machine	Attachment does not move.		
Related information	• Drive current of attachment flow rate adjustment EPC3 solenoid can be checked with monitoring function (code: 01703). • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position and set machine in attachment mode (ATT).		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective attachment flow rate adjustment EPC 3 (internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector V93, and connect T-adapter to male side.		
		Resistance	Between V93 (male) (1) and (2)	7 to 14 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 V93, 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 V93 (female) (1) and (2)	1 to 4.5 V
3	Open circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors CP02 and V93, and connect T-adapters to each female side.		
		Resistance	Between CP02 (female) (87) and V93 (female) (1)	Max. 1 Ω
			BetweenV93 (female) (2) and CP02 (female) (115), (117), and (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).		

CIRCUIT DIAGRAM (ENGINE PREHEATING SYSTEM)



E-32 ALARM BUZZER CANNOT BE CANCELED

(ALL-K-Q570-410-10-B)

Failure	Alarm buzzer does not stop sounding.
Related information	• Condition of signal of alarm buzzer cancel switch 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.)

E-56 TRAVEL INDICATOR IS NOT DISPLAYED PROPERLY WITH MONITORING FUNCTION

(ALL-K-C6T8-410-00-B)

Failure	"Travel" is not displayed correctly with monitoring function.
Related information	• Monitoring code: 01901

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective travel PPC oil pressure sensor system (Internal open or short circuit)	Perform troubleshooting for failure codes [DHSFMA], [DHSGMA], [DHSHMA], and [DHSJMA].

E-80 SEMI-AUTO MODE IS NOT DISPLAYED WHEN AUTO/MANUAL SWITCH IS PRESSED

(ALL-K-LL80-410-H0-B)

Failure	“Semi-auto mode” is not displayed when auto/manual switch is pressed.
Related information	• Perform troubleshooting outdoors or at a place open to the sky to acquire a sufficient number of satellites. • Before performing troubleshooting, check that “Project File Setting” is performed correctly as specified in the Operation and Maintenance Manual. • If a failure code is displayed on machine monitor, perform troubleshooting for it first. • Before performing troubleshooting, check that any related-message is not displayed in control box. (If any of the following messages is displayed in control box, perform troubleshooting for it first.) E-59 [GPS receiver not connected!] and [Slope sensor not connected!] E-60 [GPS receiver not connected!] E-61 [Waiting for radio link...] E-62 [Tilt Bucket Sensor Offline!] E-64 [Komatsu controller not connected!] E-65 [Sensors are invalid] E-66 [Waiting to initialize...] E-67 [Initializing...] E-68 [No GPS localization...] E-69 [Low precisions...] E-70 [Out of design area...] E-71 [Avoidance Area Breach!] • Turn off the key and then turn on the key again. If the phenomenon of failure is changed, perform troubleshooting for it.

No.	Cause	Procedure, measuring location, criteria and remarks
1	Travel mode selected on control box	Semi-auto mode cannot be used in travel mode. Semi-auto mode can be used in rough digging mode and fine digging mode.
2	Auto/manual switch is pressed in Menu screen.	Semi-auto mode cannot be used in setting screen such as Menu screen, etc. Semi-auto mode can be used in operation screen (excluding travel mode).
3	Working mode is L or B mode.	You cannot move to semi-auto mode unless working mode is P, E, or ATT mode. Check that the mode is above mentioned working mode.
4	Auto/manual switch is pressed while work equipment control lever is operated.	You cannot move to semi-auto mode unless work equipment lever is in NEUTRAL. Check if the work equipment control lever is not tilted (no operation).
5	Auto/manual switch is pressed on the steep slopes.	You may not be able to move to semi-auto mode on the steep slopes. Operate the auto/manual switch on the level ground or gentle slopes to select semi-auto mode.

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="3">4</td><td rowspan="3">Malfunction of merge-divider LS-EPC valve</td><td colspan="4">Be ready with engine stopped, then perform troubleshooting with engine at high idle.</td></tr>
<tr><td rowspan="2">EPC output pressure</td><td>EPC current value: 0 mA</td><td>Work equipment control lever: NEUTRAL</td><td>0 to 0.49 MPa {0 to 5 kg/cm^2}</td></tr>
<tr><td>EPC current value: 800 to 1000 mA</td><td>Work equipment control lever: Arm and Bucket CURL relief</td><td>2.55 to 3.98 MPa {25 to 34 kg/cm^2}</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Malfunction of merge-divider main spool</td><td colspan="4">Release remaining pressure from hydraulic tank and piping, and then perform troubleshooting with engine stopped.</td></tr>
<tr><td colspan="4">• Check for stuck or seized main spool in merge-divider valve body (spool should move smoothly).
• Remove main spool from valve body and check it for defects and dirt.
When restoring, be careful about the dirt, etc. to enter.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Malfunction of merge-divider LS spool</td><td colspan="4">Release remaining pressure from hydraulic tank and piping, and then perform troubleshooting with engine stopped.</td></tr>
<tr><td colspan="4">• Check for stuck or seized LS spool in merge-divider valve body (spool should move smoothly).
• Remove LS spool from valve body and check for defects and dirt.
Be careful to prevent foreign matter from entering the valve during restoration.</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Malfunction of boom control valve (spool)</td><td colspan="4">Release remaining pressure from hydraulic tank and piping, and then perform troubleshooting with engine stopped.</td></tr>
<tr><td colspan="4">• Check for stuck or seized LS spool in merge-divider valve body (spool should move smoothly).
• Remove LS spool from valve body and check for defects and dirt.
Be careful to prevent foreign matter from entering the valve during restoration.</td></tr>
<tr><td rowspan="5">8</td><td rowspan="5">Malfunction of boom control valve (pressure compensation valve)</td><td colspan="4">Be ready with engine stopped, then perform troubleshooting with engine at high idle.</td></tr>
<tr><td>Boom relief pressure</td><td>Hydraulic oil temperature: 45 to 55 °C</td><td>Boom RAISE relief</td><td>33.1 to 37.2 MPa {338 to 380 kg/cm^2}</td></tr>
<tr><td colspan="4">Check hydraulic drift of boom cylinder with engine stopped.
• Hydraulic oil temperature: 45 to 55 °C
• Bucket with rated load, maximum arm IN posture</td></tr>
<tr><td colspan="4">If visible hydraulic drift is observed, it is abnormal.</td></tr>
<tr><td colspan="4">Check whether boom cylinder moves slowly when performing hydraulic relief of other work equipment. (If boom cylinder moves, it is abnormal.)</td></tr>
<tr><td colspan="4">If any failure is found in either of above check items, interchange pressure compensation valves on RAISE and LOWER sides, and check whether failure symptom changes. (Each area ratio is different, so be sure to restore it after checking the symptom.)</td></tr>
</table>

H-29 SWING ACCELERATION OR SWING SPEED IS LOW IN BOTH DIRECTIONS (RIGHT AND LEFT)

(ALL-K-J000-410-02-B)

Failure	Swing acceleration or swing speed is low in both directions (right and left).
Related information	• Perform all troubleshooting with working mode set in power mode (P). • If failure codes are displayed, perform troubleshooting for them first. (DW45KA, DW45KB) • F pump pressure can be checked with monitoring function. (Code: 01100) • R pump pressure can be checked with monitoring function. (Code: 01101)

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Malfunction of control valve (spool)	Swing spool may malfunction. Check for stuck spool, defect, etc.			
2	Malfunction of swing motor (swing parking brake)	Malfunction (dragging) of the swing parking brake is a possibility, so check for seized piston,seizure and defect of the mating surface of the disk and plate, etc.			
3	Malfunction of LS shuttle valve (R.H. travel valve, L.H. travel valve, swing, boom, arm, bucket and service)	• Malfunction of the LS shuttle valve is a possibility. • Check for defect of the shuttle valve (ball), etc. • Remove LS shuttle block to clean check valve.			
4	Defective swing motor (safety valve)	Be ready with engine stopped, then perform troubleshooting with engine at high idle.			
		Swing relief pressure	Swing lock switch: ON	Left work equipment control lever: Swing relief	28.4 to 32.3 MPa {290 to 330 kg/cm^2}
		• 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).			
5	Defective swing motor	Be ready with engine stopped, then perform troubleshooting with engine at high idle.			
		Swing motor leakage amount	Swing lock switch: ON	Left work equipment control lever: Swing relief	Max. 10 ℓ/min
6	Defective swing machinery	Check for unusual noise, unusual heat, and metallic powders in drained oil to make judgment.			

S-14 OIL PRESSURE DROPS

(ALL-K-AB00-410-00-B)

Failure	Oil pressure drops.
Related information	• If any failure code is displayed, perform troubleshooting for that code first. • Check if machine is operated on slopes steeper than angle specified in Operation and Maintenance Manual.

No.	Cause	Point to check, remarks	Remedy
1	Insufficient oil in oil pan	Oil level in oil pan is insufficient. Oil pressure monitor indicates low oil pressure on slopes.	Oil refiling
2	Defective oil pressure switch or wiring harness	Check oil pressure switch, wiring harness, and connectors	Oil pressure switch, wiring harness, and connectors replacement
3	Fuel mixed in oil	• Perform oil analysis and check for mixing of oil • Oil smells of diesel fuel.	If fuel is mixed into oil, perform troubleshooting of “FUEL MIXES INTO ENGINE OIL” in S mode, and take corrective action.
4	Water mixed in oil	• Perform oil analysis and check for mixing of water • Oil is milky.	If water is mixed into oil, perform troubleshooting of “WATER MIXES INTO ENGINE OIL (MILKY)” in S mode, and take corrective action.
5	Clogged oil filter	• Check oil filter. (Reference: Oil filter is used for more than specified period, oil is deteriorated badly, etc.) • Oil filter may be blocked by water.	Oil filter replacement
6	Clogged oil strainer	Check oil strainer.	Oil strainer cleaning
7	Flattened or clogged hydraulic piping	Hydraulic piping is flattened or clogged.	Hydraulic piping replacement
8	Defective oil pump	• Check oil pump (for wear or breakage of gear) • Oil pump is heavy in turning or has play.	Oil pump replacement
9	Defective regulator valve	Check whether the valve spring is deformed and damaged	Regulator valve exchange
10	Defective oil pump relief valve	Valve and spring of oil pump relief valve are weakening and damaged.	Oil pump relief valve exchange
11	Cracking in oil pump suction piping	Check around oil pump suction piping (for cracking ing piping).	Oil pump suction piping replacement
12	Defective seal between oil pump and oil pump suction piping	Check sealing portion.	Seal replacement
13	Defective boost oil pump	Check boost oil pump.	Boost oil pump replacement
14	Defective boost oil pump relief valve	Check valve and spring of boost oil pump relief valve for fatigue and damage.	Boost oil pump relief valve replacement
15	Leakage from EGR hydraulic piping	Check EGR hydraulic piping.	EGR hydraulic piping replacement

SPECIAL TOOLS LIST

(PC220_11-A-3530-061-00-B)

How to read the tool list

- Part No.
  Tools with part number 79*T-***-**** are not supplied (to be locally manufactured).
- Necessity:
  ■: Tools not substituted, must always be equipped (used).
  ●: Tools extremely useful if available or tools that can be substituted with commercially available tool.
- New/Redesign:
  N: Tools with new part numbers, newly developed for this model.
  R: Tools, with advanced part numbers, developed by improving existing tools for other models.
  Blank: Tools already available for other models that can be used without any modification.
- Sketch:
  ○: Tools marked with ○ in the sketch column have the sketches.
  Sketches are introduced in "Sketches of special tools", and all sketches of "79*T-***-***" are described.

Tools for removal and installation of supply pump assembly

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	795-799-6130	Support	■	1			
B	795-101-3000	Push-puller	■	1			
C	-	1/2-inch spinner handle	■	1			

Tools for removal and installation of injector assembly

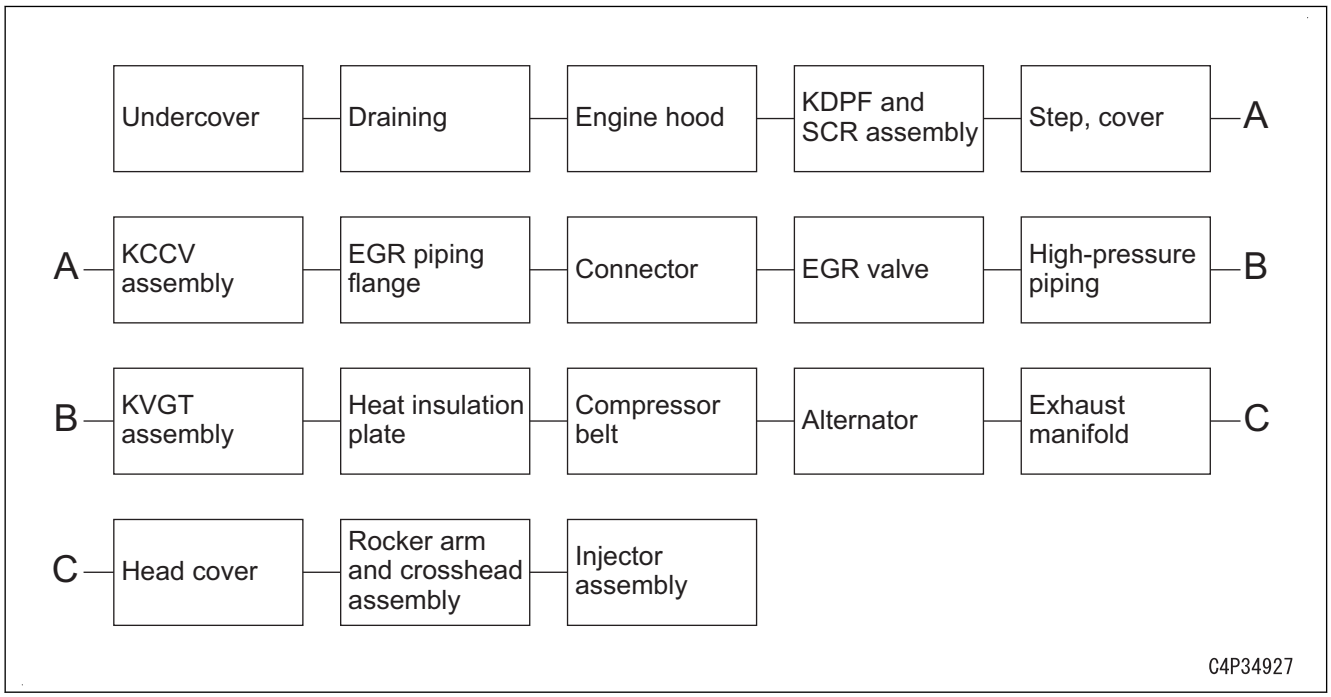
Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	795-799-6700	Puller	■	1			
B	795-799-1131	Gear	■	1			
C	795-199-8150	Remover	●	1			

Tools for removal and installation of cylinder head assembly

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	790-331-1110	Wrench	■	1			
B	795-799-1131	Gear	■	1			
C	795-799-8150	Remover	●	1			
D	790-331-1120	Angle tightening wrench	●	1			
E	795-790-4510	Gauge	●	1			
F	-	Long socket (7/16 inches)	●	1			

REMOVE AND INSTALL CYLINDER HEAD ASSEMBLY

(PC220_11-K-A100-924-00-B)



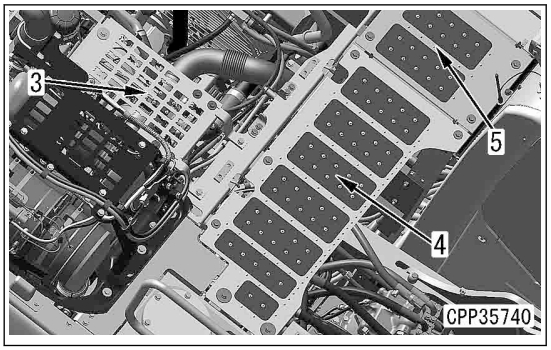
Tools for removal and installation of cylinder head assembly

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	790-331-1110	Wrench	■	1			
B	795-799-1131	Gear	■	1			
C	795-799-8150	Remover	●	1			
D	790-331-1120	Angle tightening wrench	●	1			
E	795-790-4510	Gauge	●	1			
F	-	Long socket (7/16 inches)	●	1			
G	01580-11210	Nut	■	1			
H	-	Ratchet (12.5 angle, number of teeth 20 or more, length approximately 450 mm)	■	1			
J	01011-81210	Bolt (M12x110mm)	■	1			

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

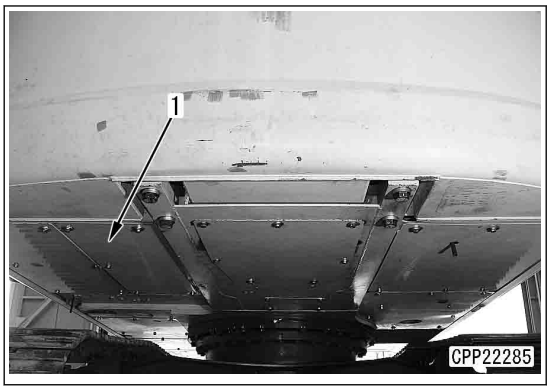
⚠ Turn the battery disconnect switch to OFF position, and remove the key.

30. Install step (3), and covers (4) and (5), and close the engine hood.



Undercover

31. Install undercover (1).



Refilling with coolant

32. Refill the radiator with coolant to the specified level through the coolant filler port. Run the engine to circulate the coolant. Then check the coolant level again. (For details, see STRUCTURE AND FUNCTION, “TABLE OF FUEL, COOLANT, AND LUBRICANTS”.)

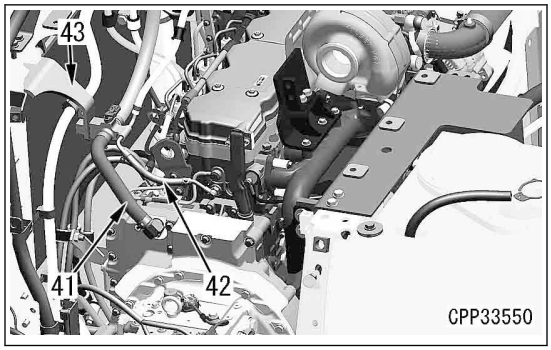
Radiator:

30.7 ℓ

29. Disconnect blowby gas inlet port hose (41).
30. Disconnect coolant outlet hose (42).
31. Remove bracket (43).

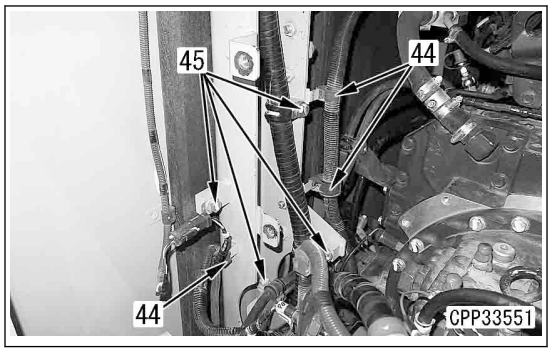
REMARK

The mounting bolts (2 pieces) are installed on the back side of the bracket.

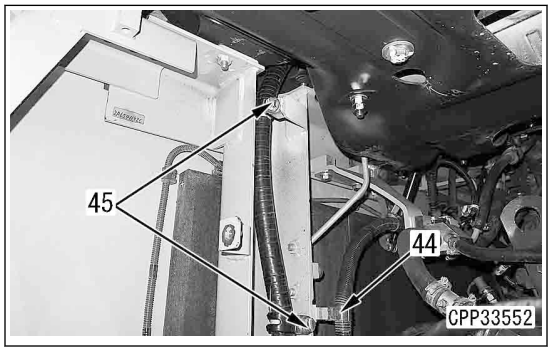


Frame

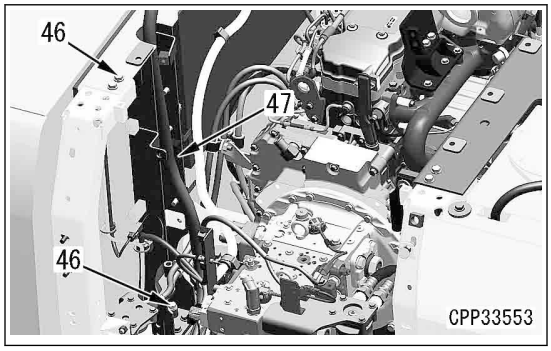
32. Remove clips (44) (3 places).



33. Remove clips (45) (5 places).

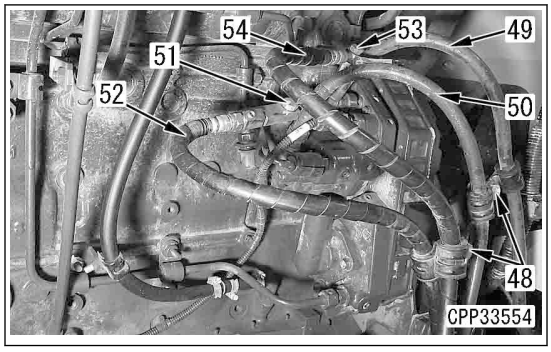


34. Remove mounting bolts (46) (8 pieces), and remove frame (47).



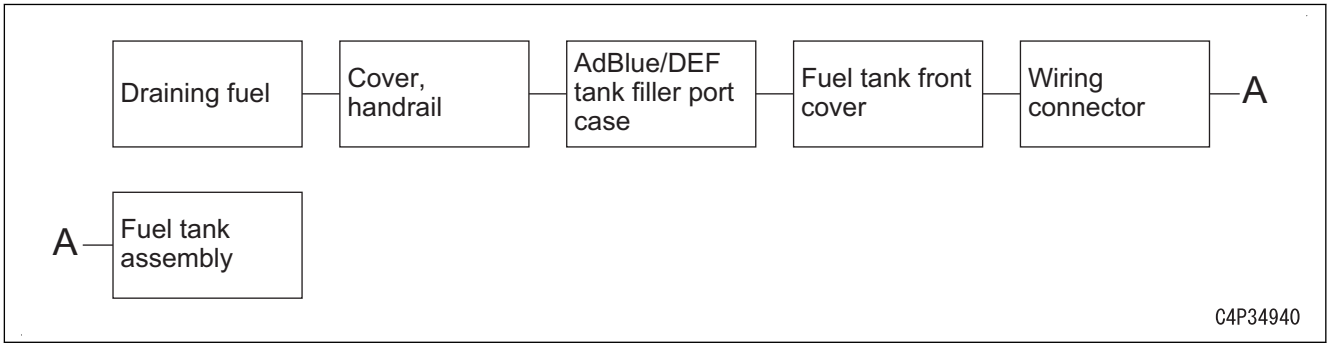
Hose, Clamp

35. Remove clamps (48) (2 places).
36. Disconnect fuel filter hoses (49) and (50).
37. Remove joint bolt (51), and then disconnect fuel supply hose (52).
38. Remove joint bolt (53), and then disconnect fuel return hose (54).



REMOVE AND INSTALL FUEL TANK ASSEMBLY

(PC210I_11-K-AD10-924-00-B)



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

⚠ 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".)

NOTICE

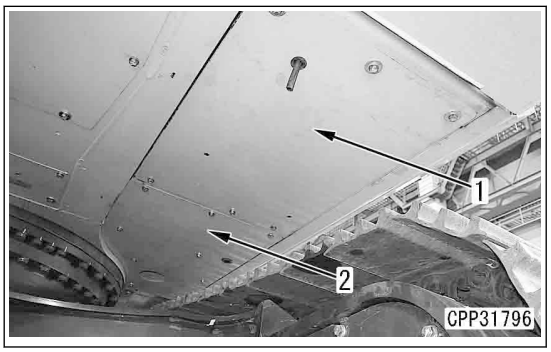
- **Install a plug or flange in the place where a hydraulic hose is disconnected to prevent oil from flowing out.**
- **Check the connector numbers and installed positions before disconnecting wirings and hoses, and write them down.**

METHOD FOR REMOVING FUEL TANK ASSEMBLY

(PC210I_11-K-AD10-520-00-B)

Draining fuel

1. Remove the undercovers (1) and (2).



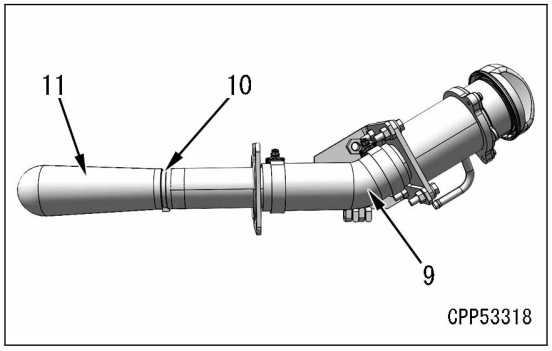
2. Open the side cover on the right side of the machine, open the fuel tank drain valve (3), and drain the fuel.

   Fuel tank:

   400 ℓ (when full)

AdBlue/DEF tank filler port filter

8. Cut band (10), and remove AdBlue/DEF tank filler port filter (11).



METHOD FOR INSTALLING AdBlue/DEF TANK FILLER PORT FILTER

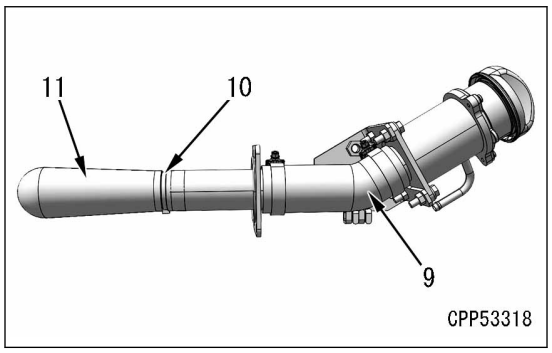
(PC210_11-K-AFF0-720-10-B)

NOTICE

When handling AdBlue/DEF, be sure to wear the vinyl gloves (A).

AdBlue/DEF tank filler port filter

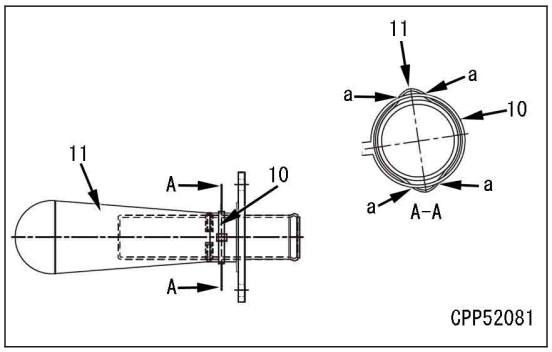
1. Install AdBlue/DEF tank filler port filter (11) and band (10) to AdBlue/DEF tank filler port tube assembly (9) according to the following procedure.



1) Pass band (10) through cut (a) of AdBlue/DEF tank filler port filter (11).

REMARK

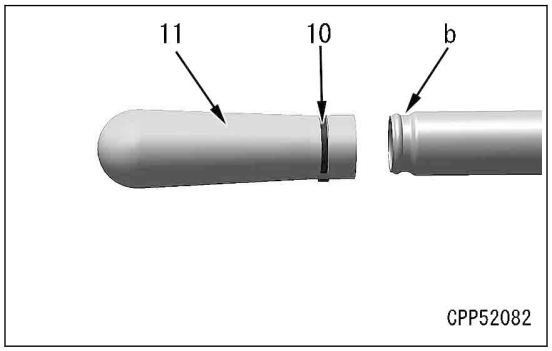
Use brand-new ones of AdBlue/DEF tank filler port filter (11) and band (10).



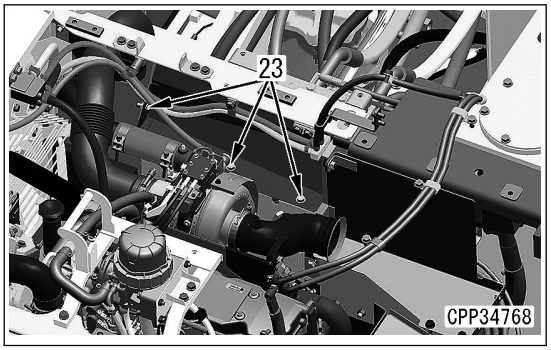
2) Match AdBlue/DEF tank filler port filter (11) with groove (b) of AdBlue/DEF tank filler port tube assembly (9), and fasten band (10).

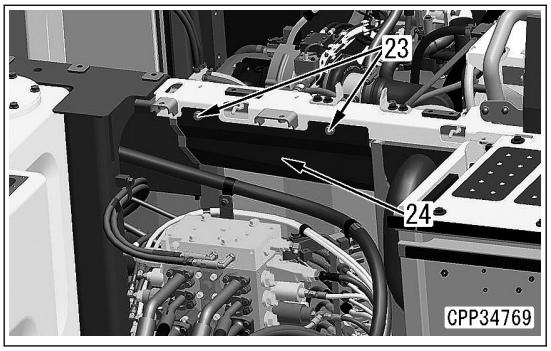
REMARK

- Fasten band (10) securely and fix AdBlue/DEF tank filler port filter (11).
- Cut off the excess of band (10).

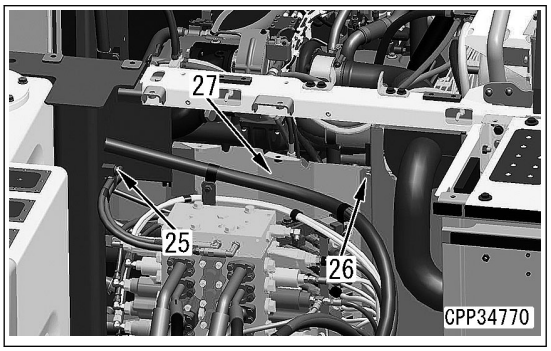


21. Remove mounting bolts (23) (5 pieces), and remove cover (24).

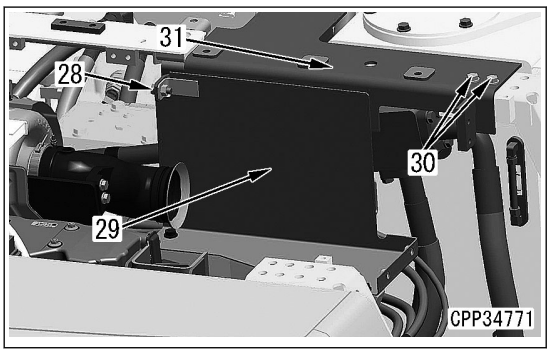




22. Remove clamp (25).
23. Remove mounting bolt (26), and remove cover (27).

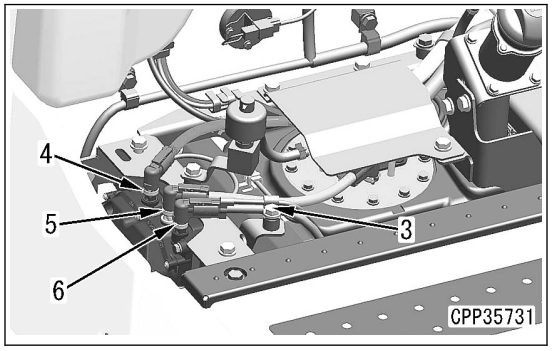


24. Remove mounting bolts (28) (4 pieces), and remove cover (29).
25. Remove mounting bolts (30) (2 pieces), and remove bracket (31).



AdBlue/DEF pump

3. Remove clamp (3).
4. Before removing AdBlue/DEF hoses (4), (5), and (6), wash their connections with clean tap water to remove the sticking materials.



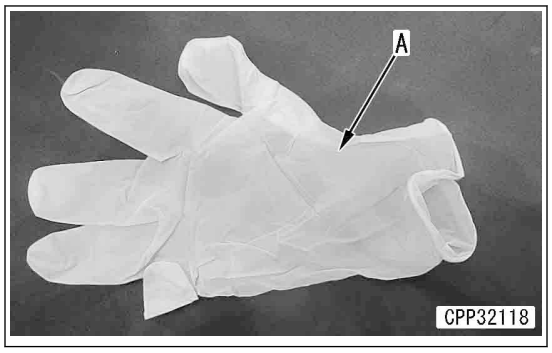
5. Be sure to disconnect AdBlue/DEF hoses (4), (5), and (6) by using tool A.

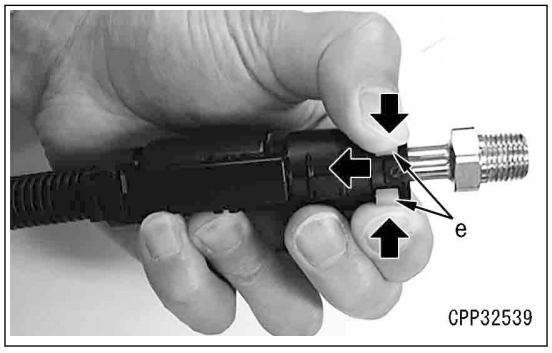
REMARK

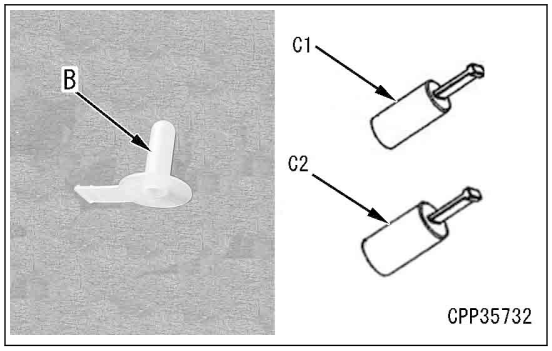
Pinch protruding portions (e) of clip with your fingers, and the lock is released. While they are kept pinched, pull out AdBlue/DEF hoses (4), (5), and (6) in the opposite direction to the AdBlue/DEF tank side, and remove AdBlue/DEF hoses (4), (5), and (6) by pulling them.

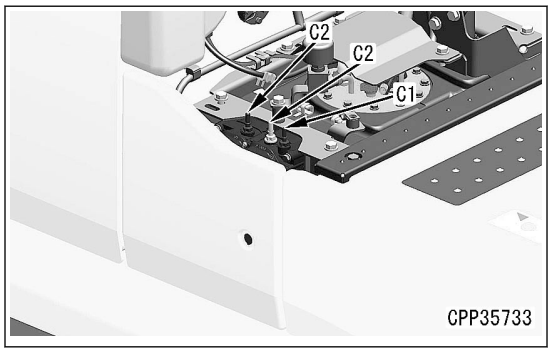
NOTICE

- **When handling AdBlue/DEF hose, be sure to use tool A.**
- **After disconnecting AdBlue/DEF hose, install tool B on the hose side, and tools C1 and C2 on the nipple side to prevent leakage and entering of foreign materials.**
- **Cover the connection with a clean plastic sheet, etc. to prevent entering of dust or sticking of AdBlue/DEF.**





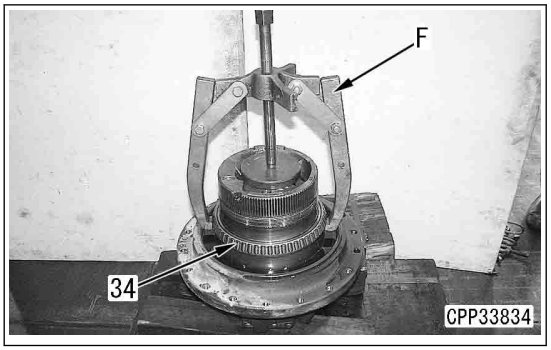




4. Install bearing (34) to travel motor (31).

REMARK

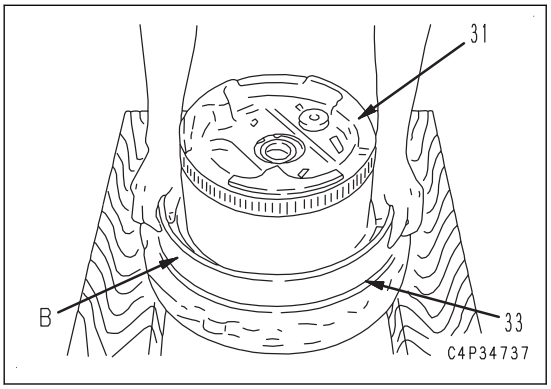
- Heat the inner race of bearing (34) to 50 to 70 °C with a heater.
- After bearing (34) is installed and cooled, hit it with a rod to check by sound that it is inserted to the end.



5. Install floating seal (33) to travel motor (31) by using tool B.

NOTICE

- **Install the floating seal after degreasing and drying the O-ring and O-ring contacting surface completely.**
- **Insert the floating seal by using tool B, and make sure to press the O-ring.**



6. After installing the floating seal, measure protrusion (Ba to Bd) of the floating seal from the housing at the measuring point shown in the figure below.

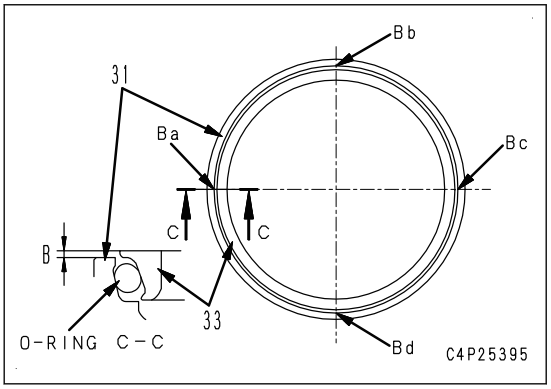
NOTICE

- **Check that the difference between maximum value (B-max) and minimum value (B-min) of the values from Ba to Bd is 1 mm or less.**

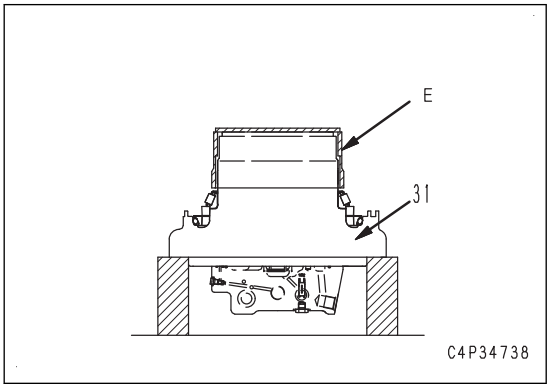
B-max-B-min<1 mm

- After installing the floating seal, thinly apply power line oil to the sliding surface.

Sliding surface:
Power line oil (TO30)



7. Set hub assembly (26) to the travel motor by using tool E as a guide.



Floating seal

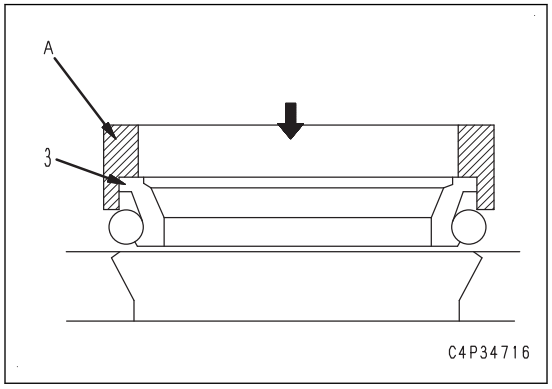
3. Install floating seals (3) to idler (4), shaft (5), and support (2) assembly by using tool A.

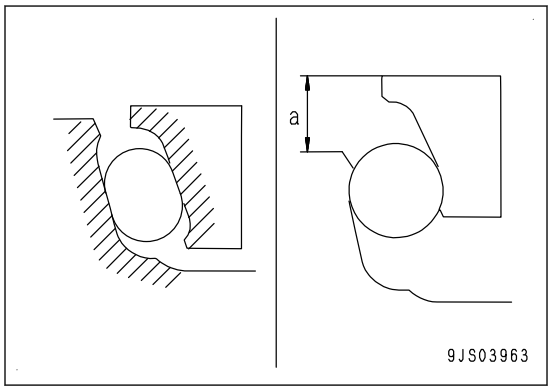
   ⚠ **Clean, completely degrease and dry the floating seal and O-ring contacting surface (hatched area).**

   ⚠ **Apply oil to the sliding surface of the floating seal, and take care to prevent any dirt from sticking.**

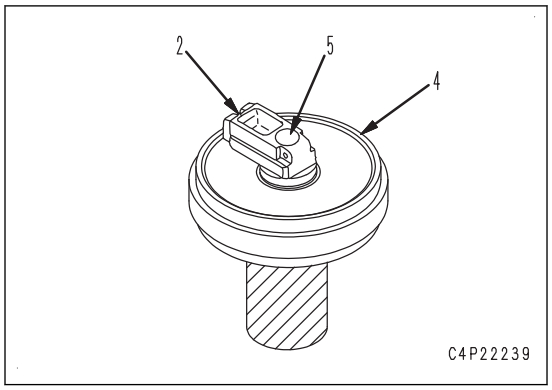
   ⚠ **After inserting the floating seal, check that the tilt of the seal is 1 mmor less and the size of protrusion of the seal is equal to dimension (a).**

   Protrusion of seal (a): 7 to 11 mm





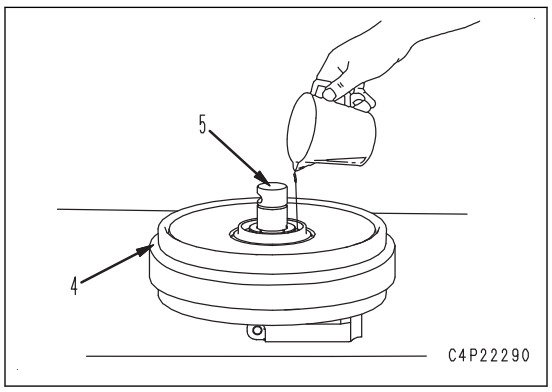
4. Install shaft (5) and support (2) assembly to idler (4).



5. Reverse it and add oil between shaft (5) and idler (4).

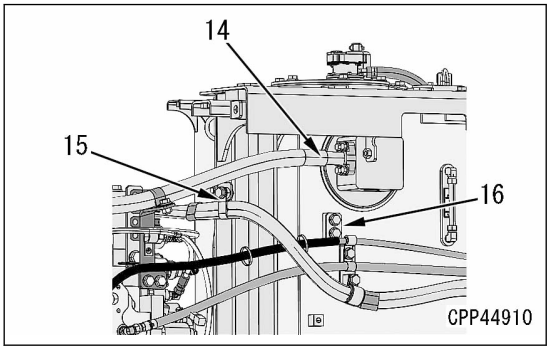
   Idler:

   245 to 255 cc (EO30-DH)



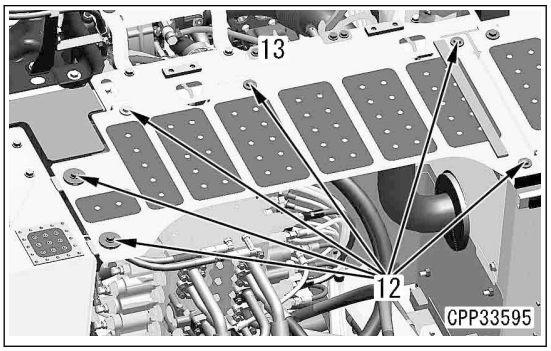
Hose, bracket, clamp

4. Install the bracket (16).
5. Install the clamp (15).
6. Connect the hose (14).
   Hose (14): Between control valves



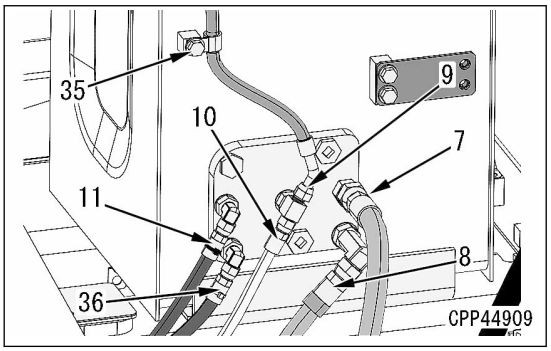
Cover

7. Install the cover (13) with the bolts (12) (6 pieces).

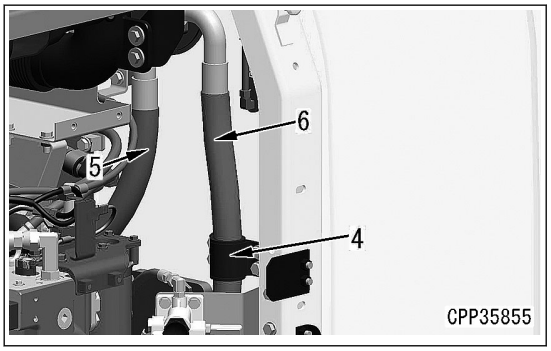


Hose

8. Connect the following hoses.
   Hose (7): Main pump drain hose
   Hose (8): Travel and swing motor drain hose
   Hose (9): EPC block drain hose
   Hose (10): PPC drain hose
   Hose (11): Solenoid valve drain hose
   Hose (36): Main valve drain hose
9. Install the clamp (35).



10. Connect the hoses (5) and (6).
    Hose (5): Between control valves
    Hose (6): Between oil coolers
11. Install the clamp (4).



14. Connect the hose (59).

    Hose (59): Swing motor port (S)

15. Connect the hoses (47), (48), (49), (50), (51), (52), (53), (54), (55), (56), (57), and (58) on the left side of the control valve.

    Hose (47): 2-stage relief solenoid valve

    Hose (48): Attachment PPC valve (Machine with attachment)

    Hose (49): Attachment selector solenoid valve (Machine with attachment)

    Hose (50): Attachment selector solenoid valve (Machine with attachment)

    Hose (51): Junction block (bucket DUMP PPC valve)

    Hose (52): L.H. travel reverse PPC valve

    Hose (53): Junction block (boom RAISE PPC valve)

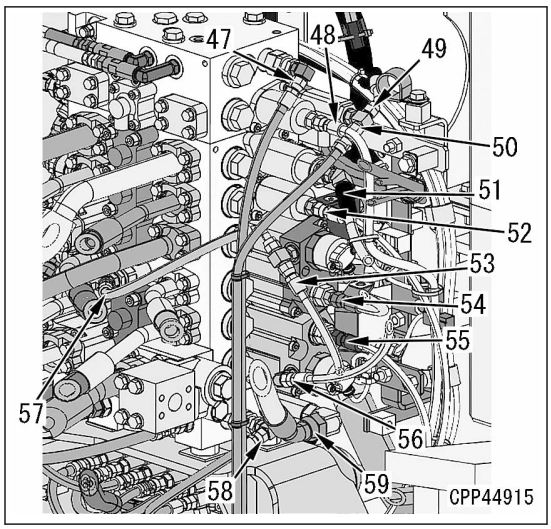
    Hose (54): Junction block (RIGHT swing PPC valve)

    Hose (55): R.H. travel reverse PPC valve

    Hose (56): Junction block (arm OUT PPC valve)

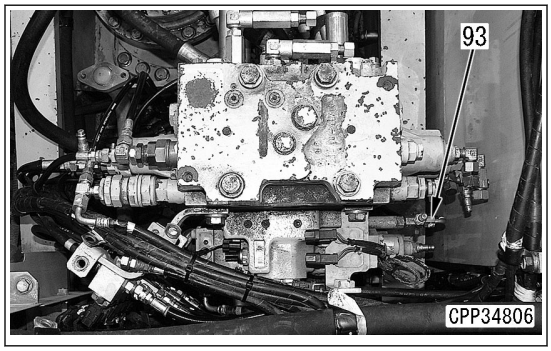
    Hose (57): Control valve port (P5) (boom RAISE PPC valve)

    Hose (58): 2-stage relief solenoid valve



16. Install the hose (93).

    Hose (93): Travel junction solenoid valve



17. Connect the hoses (40), (41), (42), (43), (44), (45), and (46) on the right side of the control valve.

    Hose (40): Attachment PPC valve (Machine with attachment)

    Hose (41): Junction block (bucket CURL PPC valve)

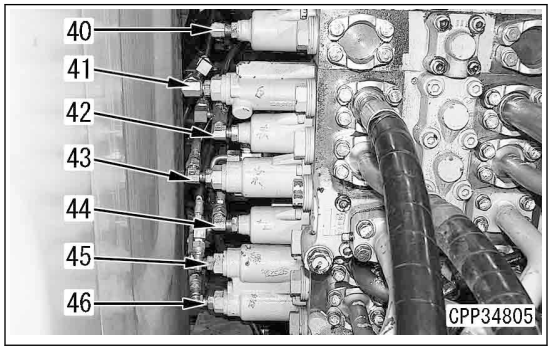
    Hose (42): L.H. travel FORWARD PPC valve

    Hose (43): Junction block (boom LOWER PPC valve)

    Hose (44): Junction block (LEFT swing PPC valve)

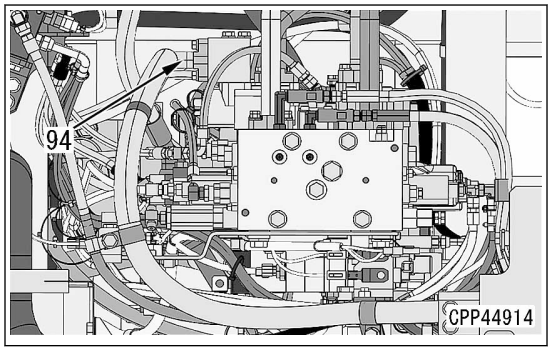
    Hose (45): R.H. travel FORWARD PPC valve

    Hose (46): Junction block (arm IN PPC valve)



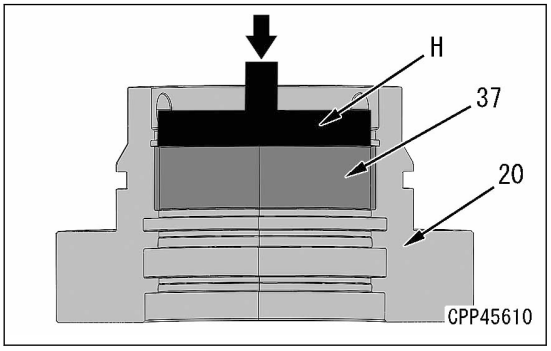
18. Connect the hose (94).

    Hose (94): Port (T1)(between hydraulic oil)

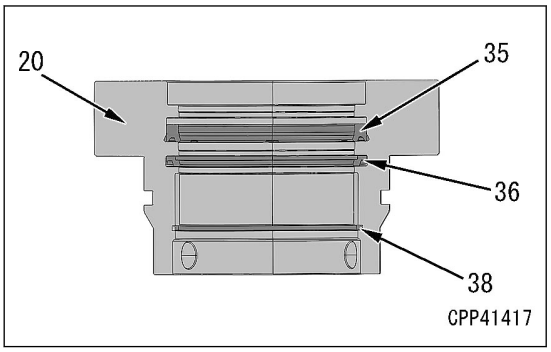


Assembling the cylinder head assembly

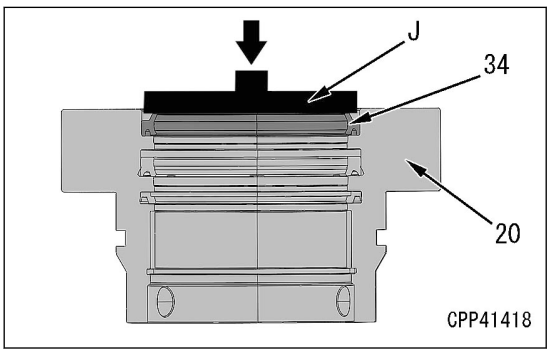
7. By using the push tool (H), install the bushing (37) to the cylinder head assembly (20).

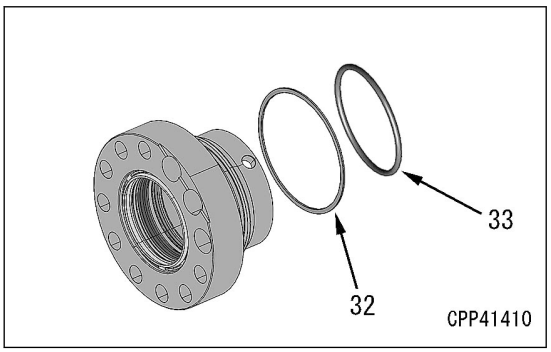


8. Install the snap ring (38) to the cylinder head assembly (20).
9. Install the buffer ring (36).
10. Install the rod packing (35).



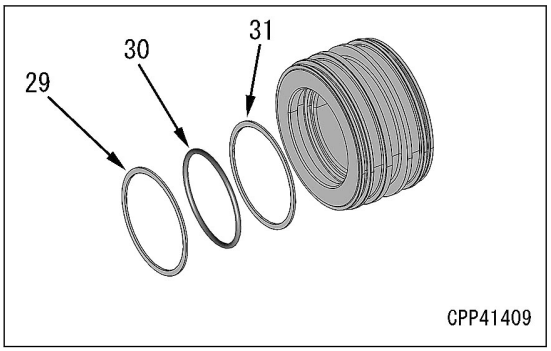
11. Install the dust seal (34) to the cylinder head assembly (20) by using the push tool (J).
12. Install the backup ring (32) and O-ring (33).





Assembling the piston assembly

13. Install the backup rings (29), (31), and O-ring (30).

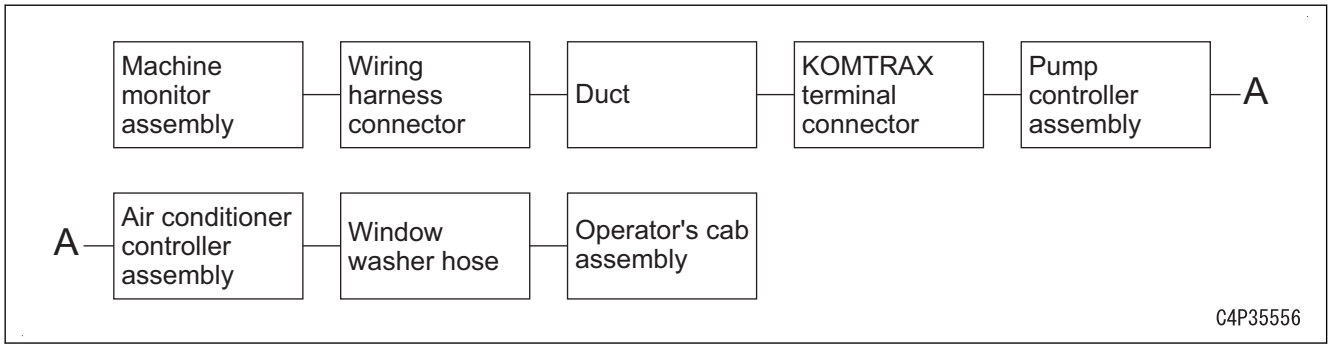


CAB AND ITS ATTACHMENTS

(ALL-K-K000-001-50-B)

REMOVE AND INSTALL OPERATOR'S CAB ASSEMBLY

(PC210I_11-K-K000-924-00-B)



⚠ 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".)

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

NOTICE

Check and write down the connector numbers and installed positions before disconnecting electric wirings and hoses.

METHOD FOR REMOVING OPERATOR'S CAB ASSEMBLY

(PC210I_11-K-K000-520-00-B)

Operator's seat

1. Remove the operator's seat. See "REMOVE AND INSTALL OPERATOR'S SEAT."

Control box assembly

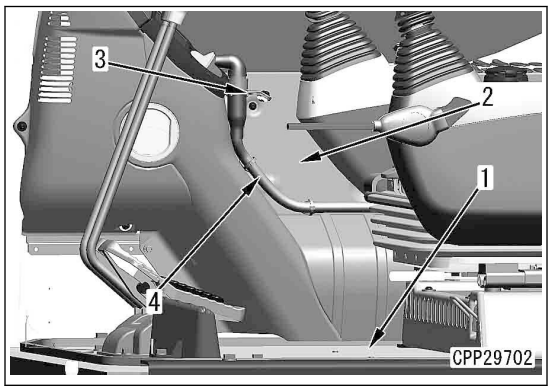
2. Remove the control box assembly. See "REMOVE AND INSTALL CONTROL BOX ASSEMBLY".

Machine monitor assembly

3. Remove the machine monitor assembly. See "REMOVE AND INSTALL MACHINE MONITOR ASSEMBLY".

Cover, connector, duct

4. Remove the floor mat (1).
5. Remove the fixing plate (3) from the cover (2).
6. Disconnect the cable tie and disconnect the cover (2) and wiring harness (4).
7. Remove the cover (2).



REMARK

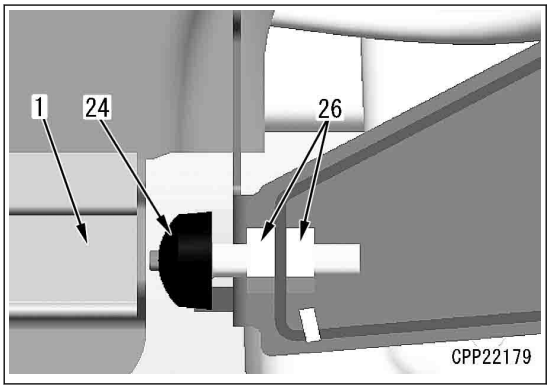
- Because the position of the limit switch (25) cannot be adjusted, “OPEN” position of the front window assembly (1) is determined in the range where this switch functions.
- Limit switch (25) prevents the windshield wiper from operating when the wiper switch is turned ON in “OPEN” state of the front window assembly (1).

⚠ If the windshield wiper operates without the front window assembly (1), the windshield wiper will fall into the cab, causing failure.

NOTICE

To determine if the limit switch (25) is enabled, turn the starting switch to ON position, and check that the windshield wiper does not operate even when the wiper switch is turned on in lock “OPEN” state of the front window assembly (1).

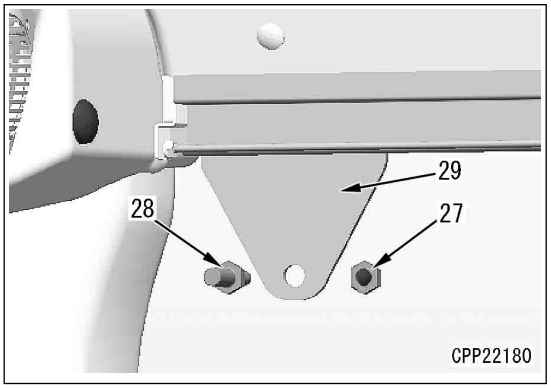
13. After checking step 12, perform the adjustment according to the following procedure as required.
    1) Close the front window assembly (1).
    2) Loosen the lock nuts (26) of R.H. and L.H. rubber stoppers (24), and pull R.H. and L.H. rubber stoppers (24) back to the rear so that the front window assembly (1) does not come into contact with R.H. and L.H. rubber stoppers (24) in lock “OPEN” state of the front window assembly.



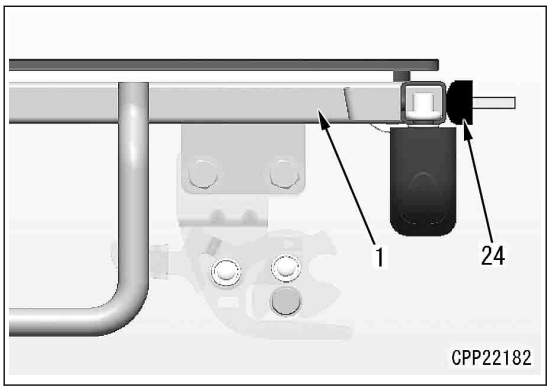
    3) Loosen R.H. and L.H. lock nuts (27), and adjust the positions of R.H. and L.H. striker bolts (28).

       Striker bolt (28): M10

       Hole diameter of plate (29): 14.5 mm

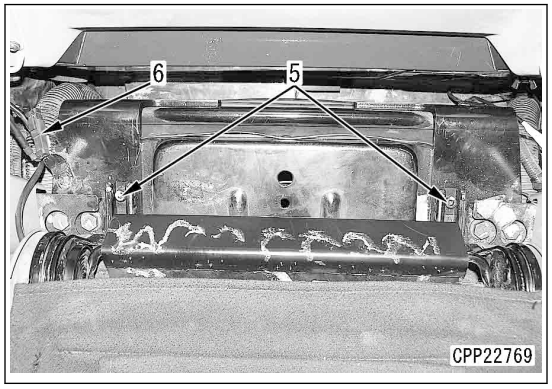


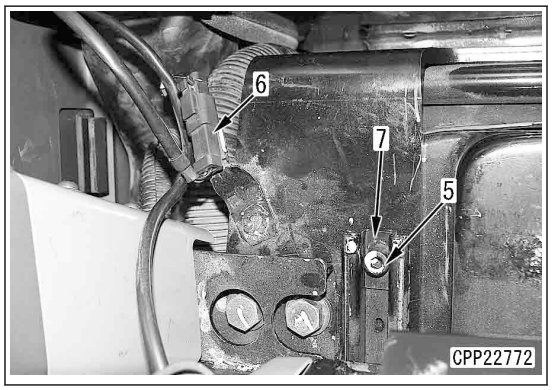
    4) Bring R.H. and L.H. rubber stoppers (24) into contact with the front window assembly (1) (in lock “OPEN” state).
    5) Close the front window assembly (1).



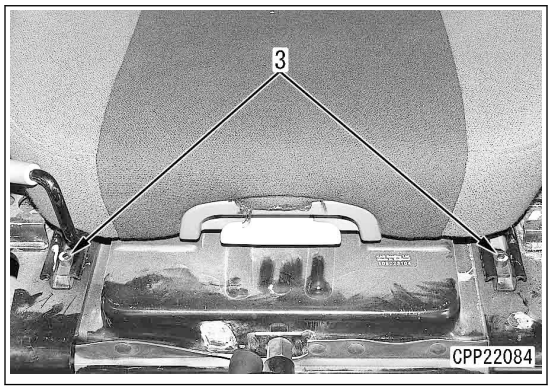
Mounting bolt, connector

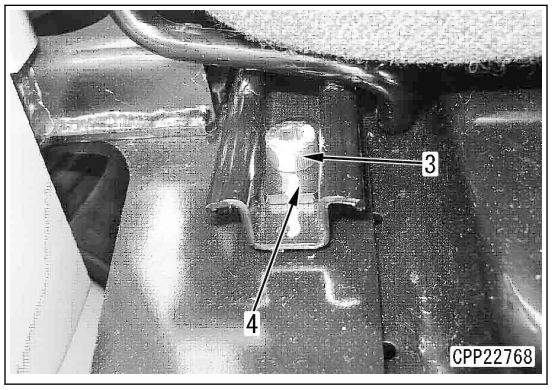
2. Connect the connector (6).
   Connector (6): Seat belt caution switch S19
3. Install the rear hexagonal socket head bolts (5) (2 pieces) on the seat rail and reinforcing plates (7) (2 pieces).
   Bolt (5):
   25.5 Nm {2.6 kgm}





4. Install the front hexagonal socket head bolts (3) (2 pieces) on the seat rail and reinforcing plates (4) (2 pieces).
   Hexagonal socket head bolt (3):
   25.5 Nm {2.6 kgm}





REMOVE AND INSTALL KomVision CONTROLLER ASSEMBLY

(PC360I-11-K-K910-924-00-B)

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

⚠ 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".)

NOTICE

- **Check the connector numbers and installed positions before disconnecting electric wirings and hoses, and record them.**

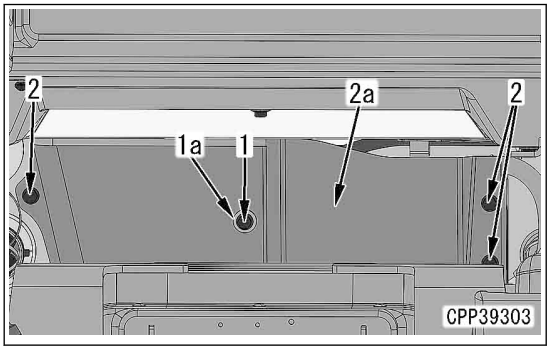
METHOD FOR REMOVING KomVision CONTROLLER ASSEMBLY *(PC360I-11-K-K910-520-00-B)*

KomVision controller assembly

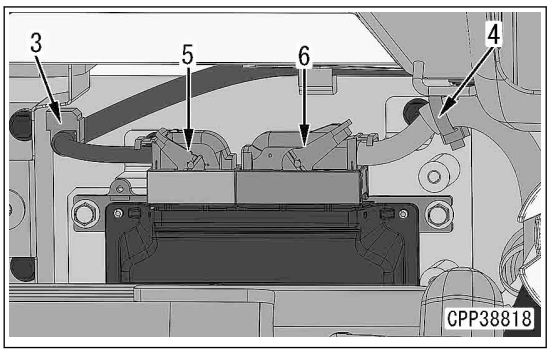
1. Remove the bolt (1) and washer (1a).
2. Remove the bolts (2) (3 pieces), and remove the cover (2a).

   REMARK

   - After removing the cover (2a), be careful not to step on KomVision controller assembly wrongly.
   - KomVision controller assembly may be damaged if it is accidentally stepped on.



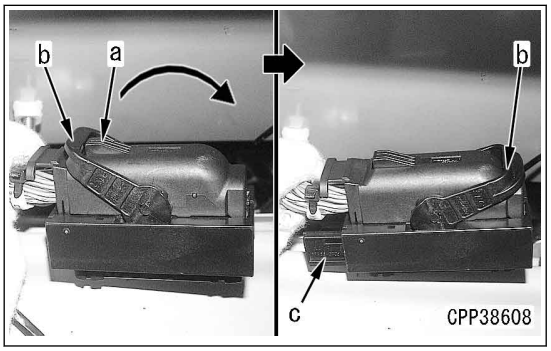
3. Remove the clip (3).
4. Cut the cable tie (4).



5. Disconnect the connectors CA02 (5) and CA01 (6) according to the following procedure.
   1) While pressing the lock (L1), tilt the lock (L2) to the opposite side.
   2) Slider (B) comes out and lock is released.
   3) Disconnect the connectors CA02 (5) and CA01 (6).

      REMARK

      Cure the connection between KomVision controller assembly (16b) and the connectors CA02 (5) and CA01 (6) to prevent dust, dirt, water, etc. from entering.



Operator's seat

15. Return the backrest (1a) of the operator's seat.

MAINTENANCE STANDARD OF SPROCKET TOOTH PROFILE FULL-SCALE DRAWING

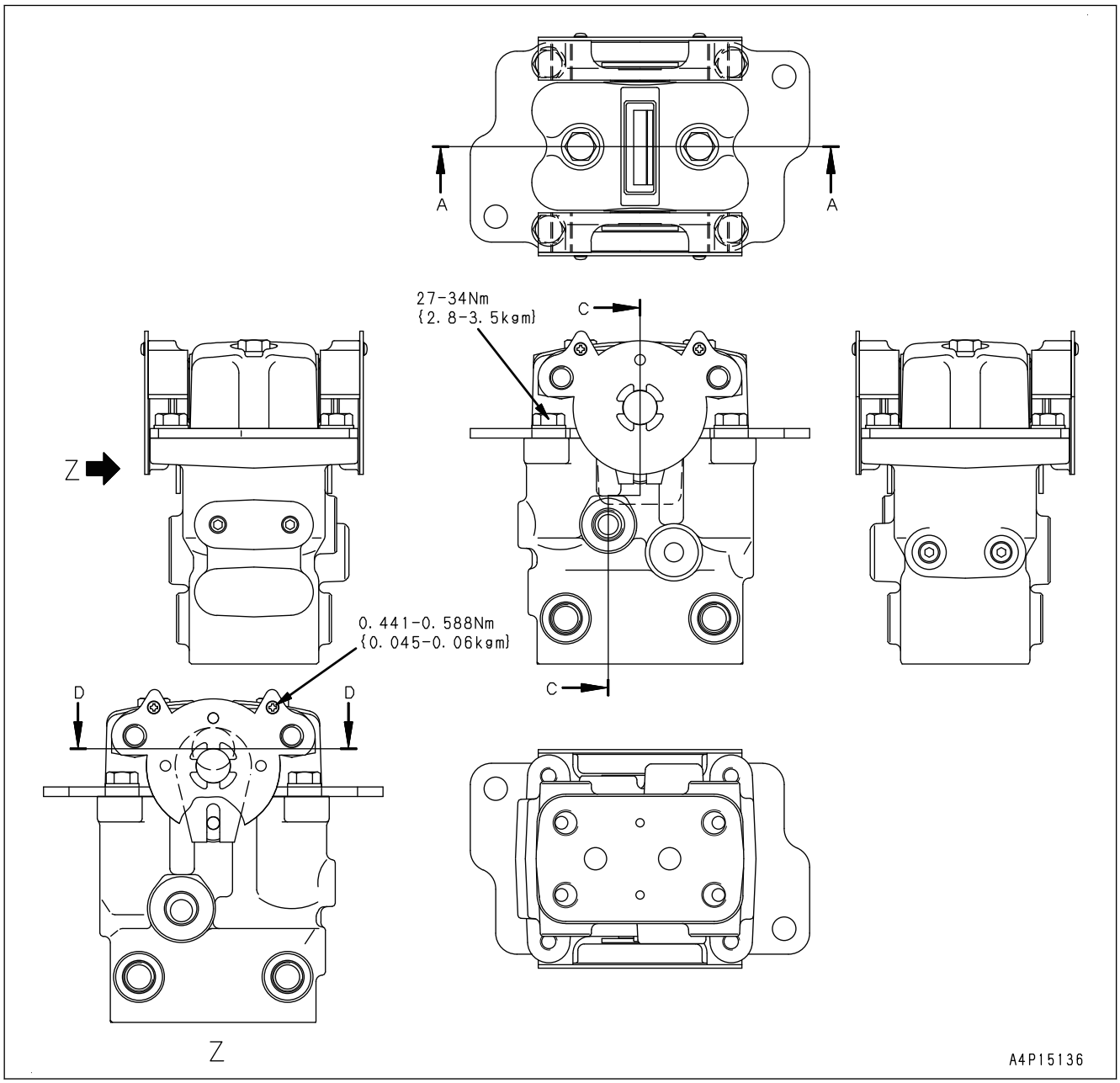
(PC220_11-K-DT60-034-01-B)

REMARK

Make the dimensions of the figure to the full-scale and duplicate the figure onto an OHP sheet, and fit it to sprocket to judge.

MAINTENANCE STANDARD OF TRAVEL PPC VALVE

(PC220_11-K-C6V0-034-00-B)

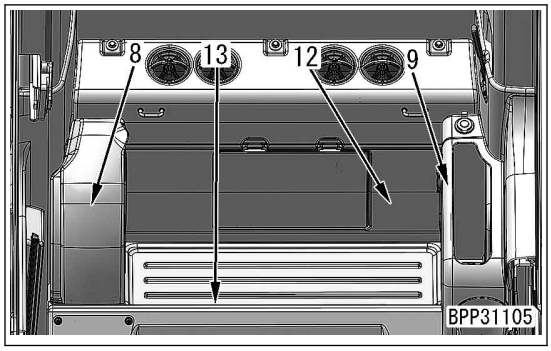


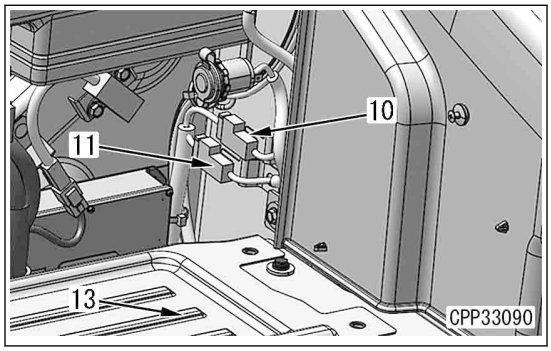
Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*1), or component/system)	Explanation
ICT	Information and Communication Technology	Communication and electronic control	A general term for the engineering and its socially applied technology of information processing and communication.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

9. Remove drink box (8) (5 bolts).
10. Disconnect the hose at the bottom of drink box (8).
11. Remove magazine box (9) (3 bolts) while paying attention to connectors (10) and (11) at the back of magazine box (9).

    Connector (10): 12 V power socket intermediate harness (M13A)

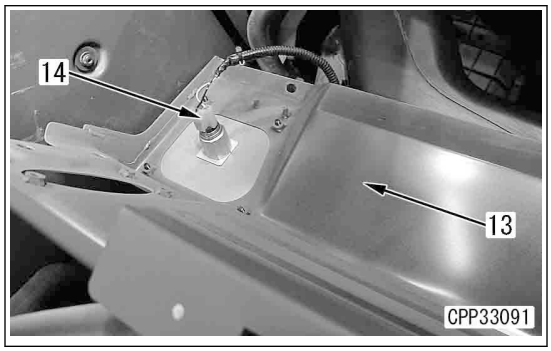
    Connector (11): 12 V power socket intermediate harness (M13B)
12. Pull up and remove cover (12) (2 bolts) from being caught in connectors or wiring harnesses at the back of cover (12).





13. Remove cover (13) (7 bolts) while paying attention to connector (14) at the back of cover (13).

    Connector (14): Cigarette lighter (M04)



14. Check that the following ducts and pin are installed normally.

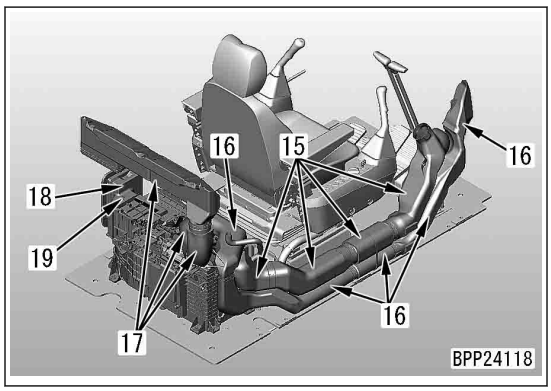
    (15): Front duct

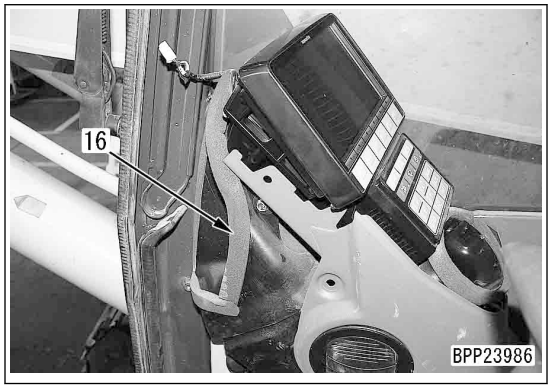
    (16): Defroster duct

    (17): Rear duct

    (18): Fresh air inlet duct

    (19): Pin





No.	Cause	Procedure, measuring location, criteria and remarks
5	Defective air conditioner controller	If failure code is still displayed after above checks, air conditioner controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly Replace whole assembly.)
6	Defective air conditioner unit	If failure code is still displayed after above checks, air conditioner unit may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly Replace whole assembly.)

Circuit diagram related to blower motor system