SEN06883-01

Shop Manual

HYDRAULIC
EXCAVATOR

PC360LCi-11

SERIAL NUMBERS 91532 and up

KOMATSU

ACTIONS IF FIRE OCCURS

- Turn the starting switch to OFF position to stop the engine.
- Use the handrails and steps to get off the machine.
- Do not jump off the machine. You may fall and suffer serious injury.
- The fumes generated by a fire contain harmful materials which have a bad influence on your body when they are inhaled.
  Do not breathe the fumes.
- After a fire, there may be harmful compounds left. If they touch your skin they may have a bad influence on your body.
  Be sure to wear rubber gloves when handling the materials left after the fire.
  The material of the gloves, which is recommended is polychloroprene (Neoprene) or polyvinyl chloride (in the lower temperature environment).
  When wearing cotton work gloves, wear rubber gloves under them.

EXPLANATION OF TERMS FOR MAINTENANCE STANDARD

The maintenance standard section shows the judgment criteria whether the equipment or parts should be replaced or can be reused when the machine is disassembled for the maintenance. The following terms are the descriptions of the judgment criteria.

Standard dimension and tolerance

- The finished dimension of a part is slightly different from one to another actually.
- A standard dimension of a finished part is set, and an allowable difference from that dimension is set for the part.
- The dimension set as the standard is called the standard dimension and the allowable range of difference from this standard dimension is called “tolerance”.
- An indication example of a standard dimension and tolerance is shown in the following table.
  (The standard dimension is entered on the left side and the tolerance is entered with a positive or negative symbol on the right side)

Example:

Standard dimension	Tolerance
120	-0.022 -0.126

- The tolerance may be indicated in the text and a table as “standard dimension (upper limit of tolerance/ lower limit of tolerance).”
  Example) 120 (-0.022/ -0.126)
- Usually, the dimension of a hole and the dimension of the shaft to be inserted into that hole are indicated by the same standard dimension and different tolerances of the hole and shaft. The tightness of fit is determined by the tolerance.
- A dimension indication example of a shaft and hole is shown in the following table.
  (The standard dimension is entered on the left side and the tolerance of the shaft is entered with a positive or negative symbol at the center and that of the hole on the right side)

Standard dimension	Tolerance	
	Shaft	Hole
60	-0.030 -0.076	+0.046 0

AdBlue/DEF injection function

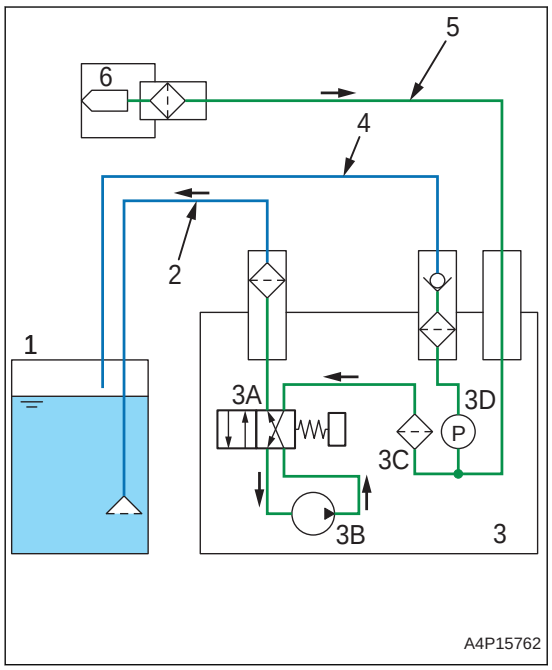
- AdBlue/DEF injection function is a function that injects AdBlue/DEF which is pressurized with AdBlue/DEF pump into mixing tube.
- Engine controller controls the injection volume by using AdBlue/DEF injector.
- Engine controller determines the injection volume by the information from the turbocharger outlet NOx sensor, SCR temperature sensor, and the intake gas flow sensor while correcting it by ammonia sensor and SCR outlet NOx sensor.
- AdBlue/DEF injection is controlled according to the system temperature as well since the urea SCR system does not operate efficiently at low temperature. The temperature sensor is used for this monitoring.
- The engine controller commands to stop injection, and injector does not inject when a failure code is displayed due to an abnormality which is detected by any sensor which determines the injection volume.
- The urea in AdBlue/DEF are deposited in the mixing tube, and it may stick to block the passage if an abnormality occurs.

AdBlue/DEF purge function

- This is a function that purges remaining AdBlue/DEF in AdBlue/DEF system automatically after engine is stopped.
- It purges AdBlue/DEF from inside of injector or pump in order to prevent blocking or sticking by deposited urea in AdBlue/DEF, or defective operation of equipment by frozen AdBlue/DEF in cold weather.
  For this reason, the system operates for few minutes even after engine is stopped, but this is not an abnormality.

NOTICE

Do not turn off the battery disconnect switch while purging AdBlue/DEF.



AdBlue/DEF function of thawing and preventing from freezing

- Thawing control system has the thawing mode and freeze prevention mode.
- Thawing mode is the function to thaw the frozen AdBlue/DEF.
  - After starting engine, if the engine controller judges that AdBlue/DEF must be thawed, this function automatically heats the system.
  - At this time, pressure control of AdBlue/DEF pump and injection of AdBlue/DEF are not performed until the thawing is completed.
- Freeze prevention mode is the function to keep AdBlue/DEF warm to prevent it from freezing.
  - This function automatically heats the system to prevent it from freezing while operating the machine, if engine controller judges that AdBlue/DEF could be frozen.
  - This function stops the pressure control of AdBlue/DEF pump and injection of AdBlue/DEF if it judges that AdBlue/DEF is frozen while operating the machine.
- Thawing and freeze prevention are controlled by sensor, and the control sensors vary by devices which AdBlue/DEF system consists of. The following table shows the relationship between the object devices of thawing control, heating system, and control sensors for each mode.

COMPONENT PARTS OF ENGINE SYSTEM

VGT

VGT

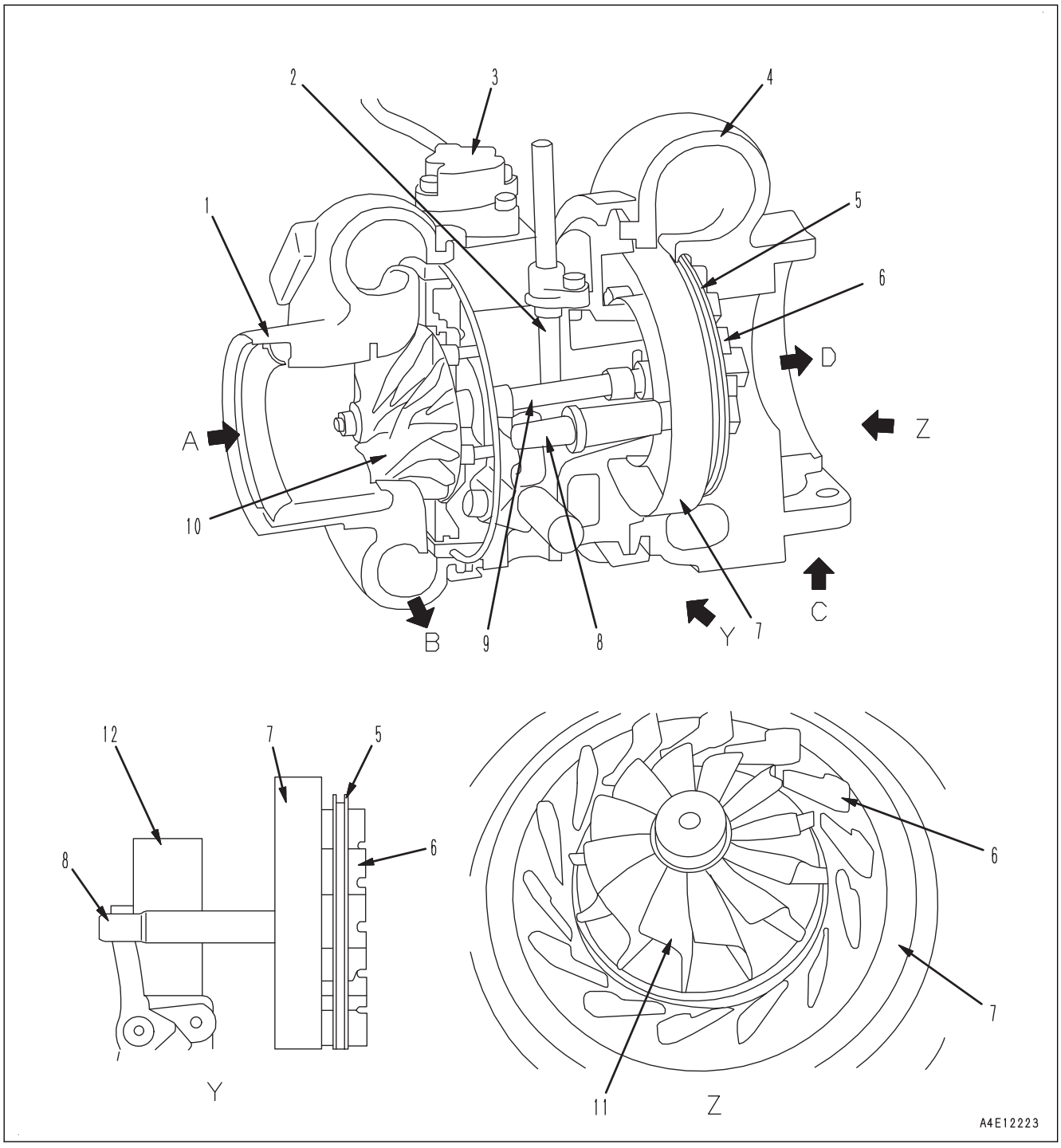
Abbreviation for Variable Geometry Turbocharger

STRUCTURE OF VGT

REMARK

The shape is subject to machine models.

General view, sectional view



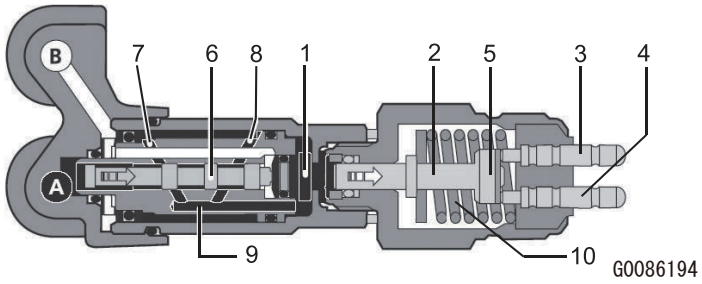


Figure 4.7 Principle of operation of grease pressure switch - second phase

Phase 3 (pumping phase B)

During pumping phase B grease is pressed into channel B (see figure 4.8). While the grease pressure is built up, chamber (11) fills with grease (through channel 12). The grease pressure pushes piston (6) to the left. Because of that the channel (8) is opened, causing the grease to flow to chamber (1) through channel (7) and channel (9).

As soon as the pressure in chamber (1) is greater than the pressure force of the spring (10), the plunger (2) goes to the right. The electrical contact (3 and 4) is closed by the contact plate (5).

As soon as the grease pressure, during the pressure decrease phase, in channel B is lower than the pressure force of the spring, spring (10) pushes plunger (2) back to the left and the connection of the contacts is broken.

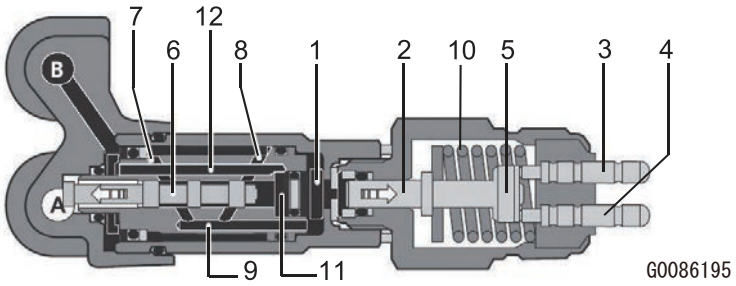


Figure 4.8 Principle of operation of grease pressure switch - third phase

(d) Control unit

Introduction

The greasing system is controlled by an electronic control unit. The sensors that check specific parts or the complete greasing system for malfunctions are connected to the control unit.

The control unit controls the greasing system by:

- The parameters that are saved in the control unit. To recall or change the system parameters requires a laptop and software:
- The signals that the control unit receives from the various sensors and controls applied in the greasing system: e.g., grease pressure switch, grease level switch, test push-button, push-button with signal lamp in the cabin.

The control unit records an automatic log, in which the relevant events are stored. All data in the control unit will always be retained, even when the power is shut off or when the system is turned off. To view the log requires a laptop and software.

In this paragraph the following system parameters are discussed:

- The length of the greasing cycles;
- Maximum length of the pumping phase;
- Length of the re-grease phase and the pressure phase;
- Reaction of the system to grease pressure malfunctions;
- Repeating frequency of the flashing code;
- The log.

Pin No.	Signal name	Input/Output
53	AdBlue/DEF injector (-)	Ground/Shield/ Return
54	GND	Ground/Shield/ Return
55	(*1)	-
56	Ambient temperature sensor	Input
57	GND	Ground/Shield/ Return
58	(*1)	-
59	(*1)	-
60	(*1)	-
61	GND	Ground/Shield/ Return
62	GND	Ground/Shield/ Return
63	(*1)	-
64	(*1)	-
65	Engine room temperature sensor	Input
66	(*1)	-
67	(*1)	-
68	(*1)	-
69	(*1)	-
70	(*1)	-
71	(*1)	-
72	(*1)	-
73	Power GND	Ground/Shield/ Return
74	(*1)	-
75	Intake air heater relay	Output
76	(*1)	-
77	AdBlue/DEF injector (+)	Output
78	(*1)	-
79	AdBlue/DEF pump voltage	Output
80	VGT solenoid (+)	Output
81	AdBlue/DEF FCV	Output
82	AdBlue/DEF tank heating valve	Output
83	AdBlue/DEF pump heater relay	Output
84	(*1)	-
85	(*1)	-
86	(*1)	-
87	(*1)	-

FUNCTION OF HYDRAULIC TANK BREATHER

Prevention of negative pressure in hydraulic tank

Since the hydraulic tank is pressurized and sealed, if the oil level in it decreases, negative pressure is generated in it. At this time, valve assembly (5) is opened by the differential pressure from the ambient pressure, and ambient pressure is transmitted into the tank to prevent generation of negative pressure in the tank

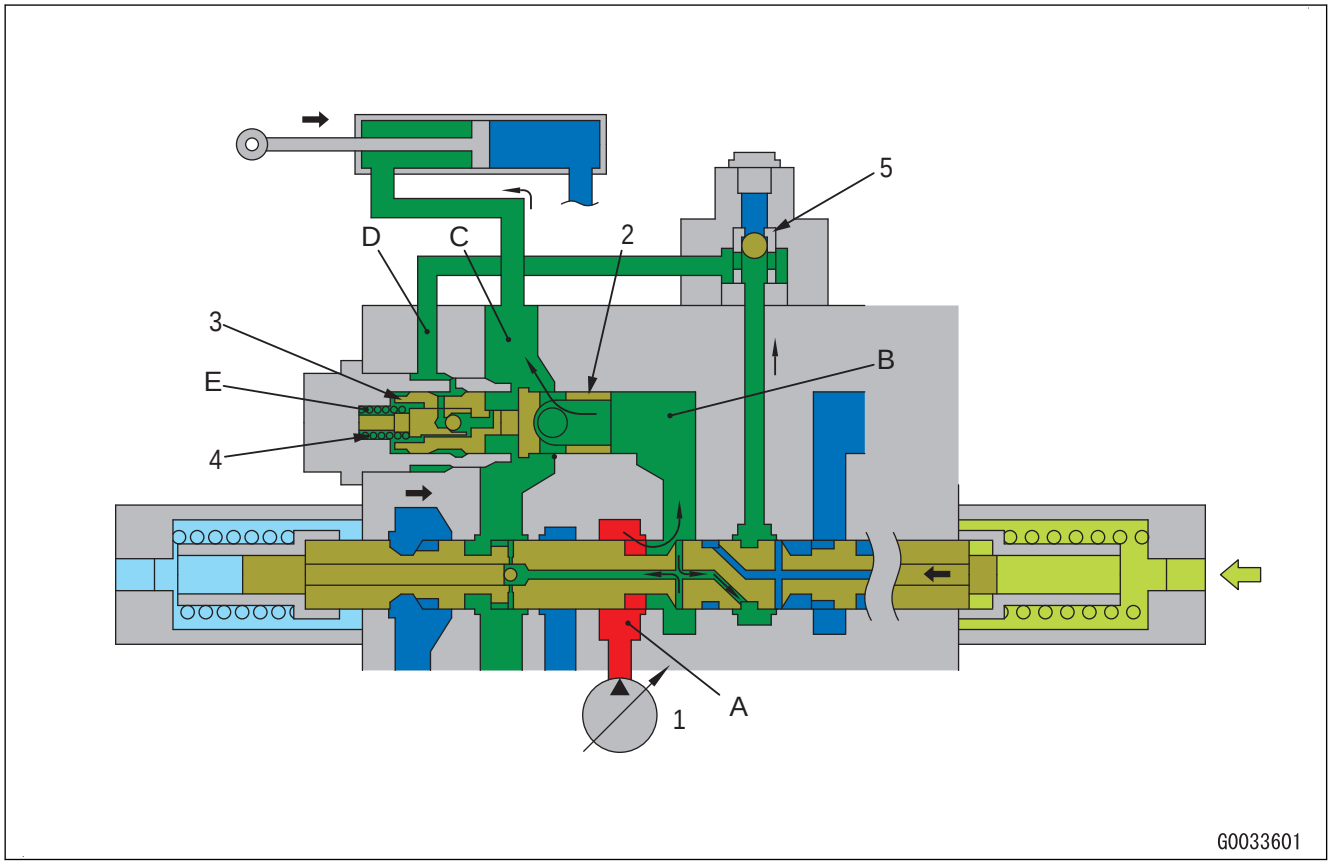
(Set pressure of intake valve: 0.002±0.3 MPa {0.02±0.003 kgf/cm^2})

Prevention of pressure rise in hydraulic tank

While the hydraulic circuit is in operation, the pressure in the hydraulic tank increases as the oil level and the temperature in the hydraulic tank rise corresponding to the operation of the hydraulic cylinders. When the pressure in the tank exceeds the set pressure, valve assembly (5) is pushed up to release the pressure in the tank and prevent pressure rise.

(Set pressure of exhaust valve: 0.1±0.015 MPa {1.0±0.15 kgf/cm^2})

When load pressure is higher than other actuator in combined operation, in single operation, or at maximum load pressure



If the load pressure on the port (C) is higher than the LS pressure on the port (D), the ball in the pressure compensation valve of the shuttle valve (3) moves to the left. The spring chamber (E) and the port (D) are connected. The pressurized oil from the pump flows through the port (A) to the port (B), defeats the force of the spring (4), and the valve (2) pushes the shuttle valve (3) to the left. The opening of the port (B) and the port (C) expands.

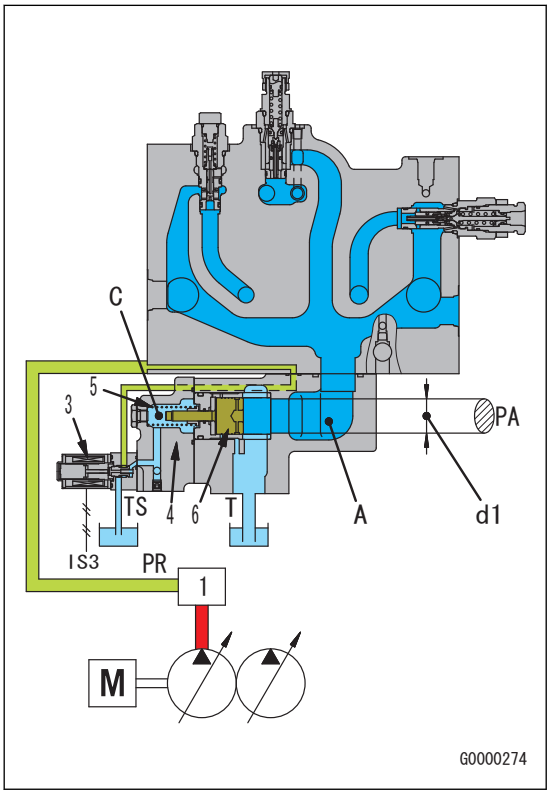
When engine is in operation (other than swing and travel operations)

The pressurized oil (PR) from the self-pressure reducing valve (1) flows to the variable back pressure solenoid valve (3). The drive signal is transmitted to the variable back pressure solenoid valve (3) when you do the operation other than swing or travel operation. The pressurized oil (PR) which is led to the spring chamber (C) of the variable back pressure valve (4), flows through the variable back pressure solenoid valve (3), and return to the tank.

The reaction force of the spring (5) pushes the valve (6) to the right. The pressure (PA) in the drain circuit (A) of the control valve acts on the right end surface (area of diameter “d1”) of the valve (6) and pushes the valve (6) to the left. The force acting to the left balances out the force acting to the right, the valve (6) stops at the position. The back pressure (PA) is obtained with the following formula.

PA = Reaction force of the spring (5)) / Area of diameter “d1”

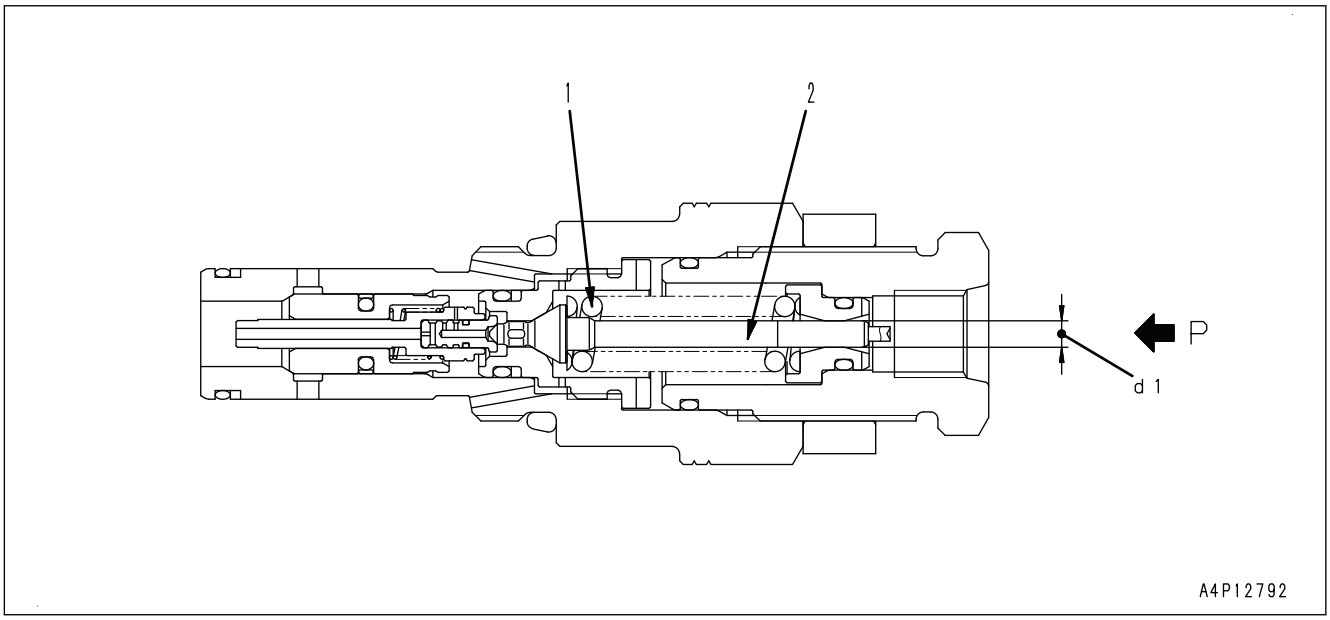
The oil flow from the drain circuit (A) of the control valve to the port (T) is adjusted, and the back pressure (PA) is regulated to the set pressure of the variable back pressure valve (4).



MAIN RELIEF VALVE OF CONTROL VALVE

STRUCTURE OF MAIN RELIEF VALVE OF CONTROL VALVE

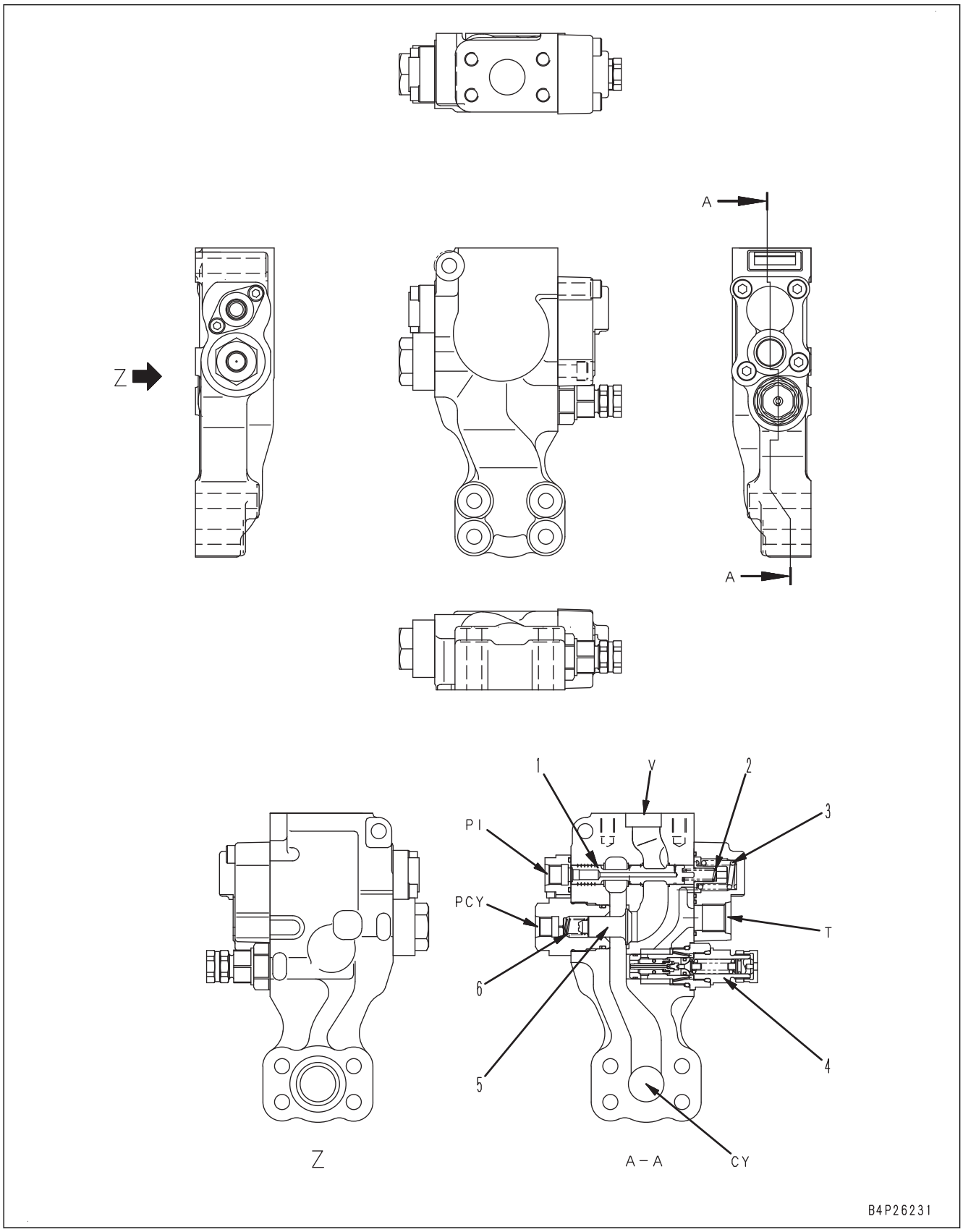
Sectional view



1: Spring 2: Poppet

STRUCTURE OF ANTI-DROP VALVE FOR BOOM

General view



CY: To work equipment cylinder

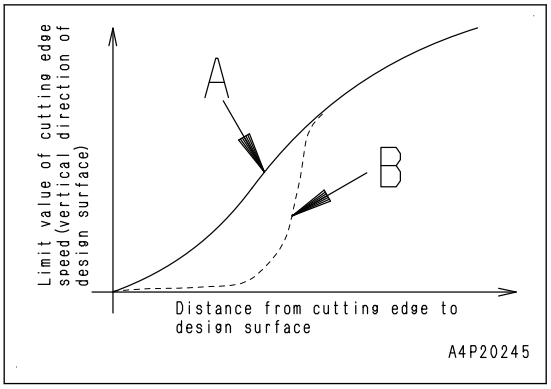
PCY: For pressure pickup and equalize circuit

REMARK

When you operate the boom suddenly while the soil compaction control is enabled, the parameter map below is shifted, and the design surface is compacted with semi-auto mode.

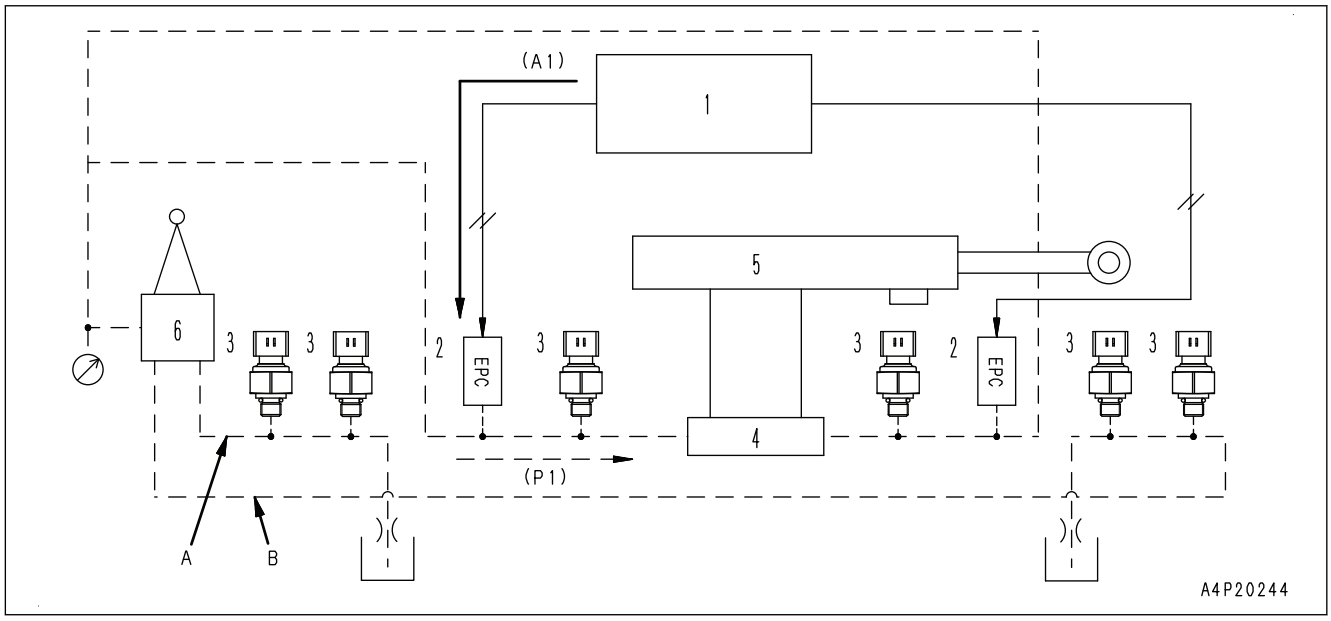
A: When operating slowly

B: When operating suddenly (soil compacting control)



When bucket CURL is operated

Bucket control circuit



A: Bucket CURL PPC circuit

B: Bucket DUMP PPC circuit

1: Work equipment controller

4: Bucket spool (control valve)

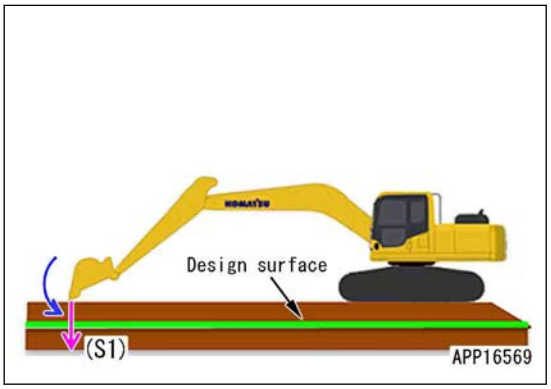
2: EPC valve for PPC

5: Bucket cylinder

3: PPC pressure sensor

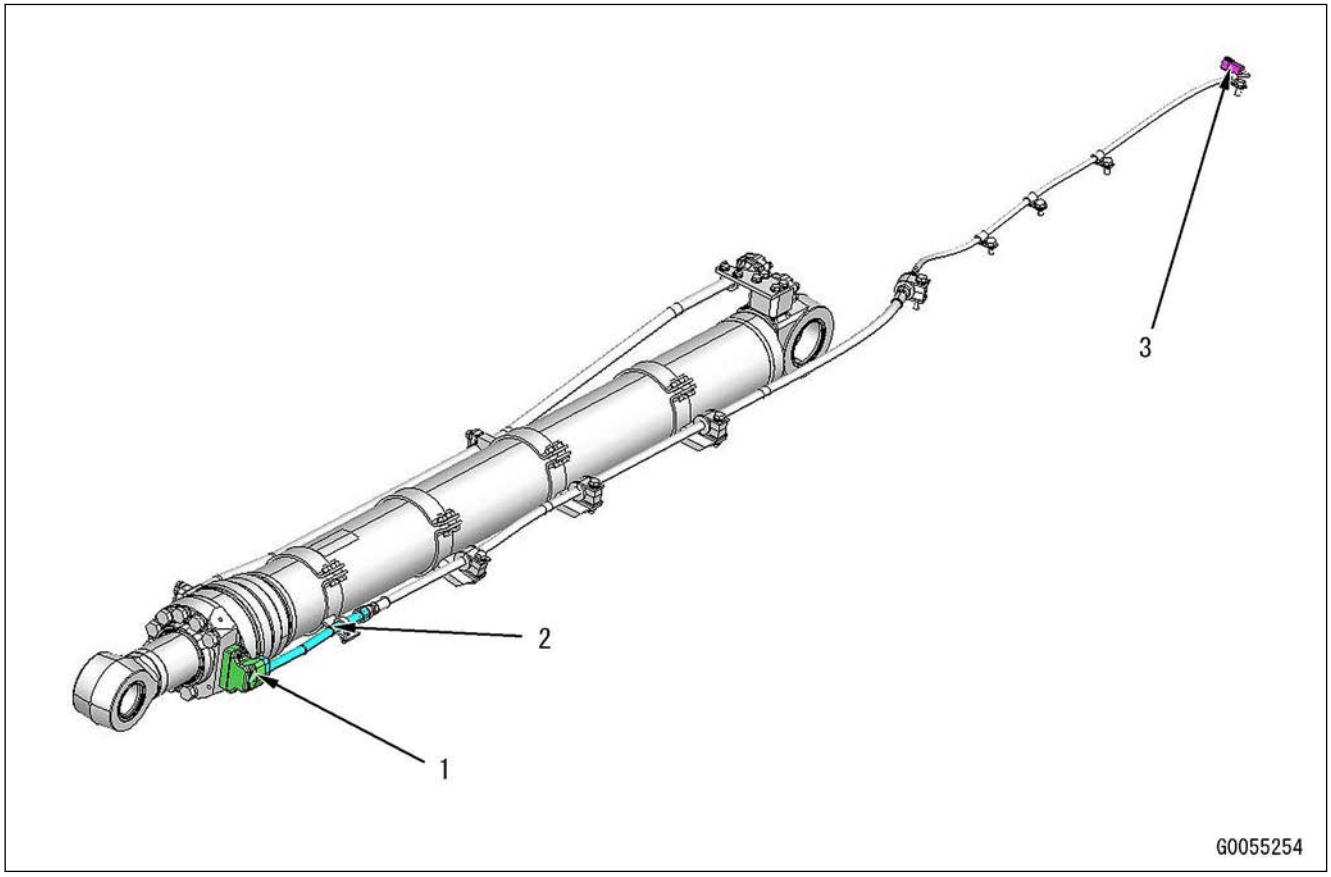
6: Work equipment control lever

1. The bucket blade edge heads to the design surface by operating the bucket CURL. (Bucket blade edge speed (S1))



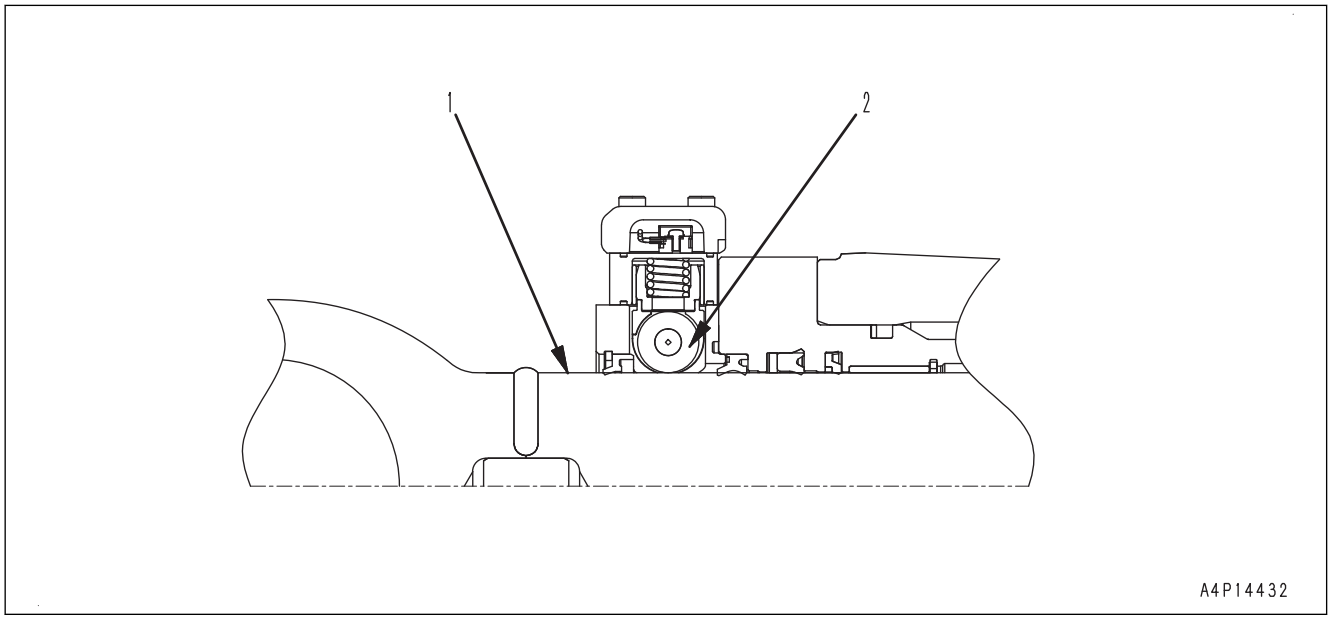
2. The work equipment controller compares the bucket blade edge speed (S1) with the speed limit value which is calculated from the parameter map below, and calculates target blade edge speed (S2).
When the bucket blade edge speed is larger than the map value: Limit value is set as the target speed.
When the bucket blade edge speed is smaller than the map value: No limit value is set and current value is left as it is.

General view



1: Stroke sensor
2: Tube
3: Connector

FUNCTION OF STROKE SENSOR FOR ARM CYLINDER

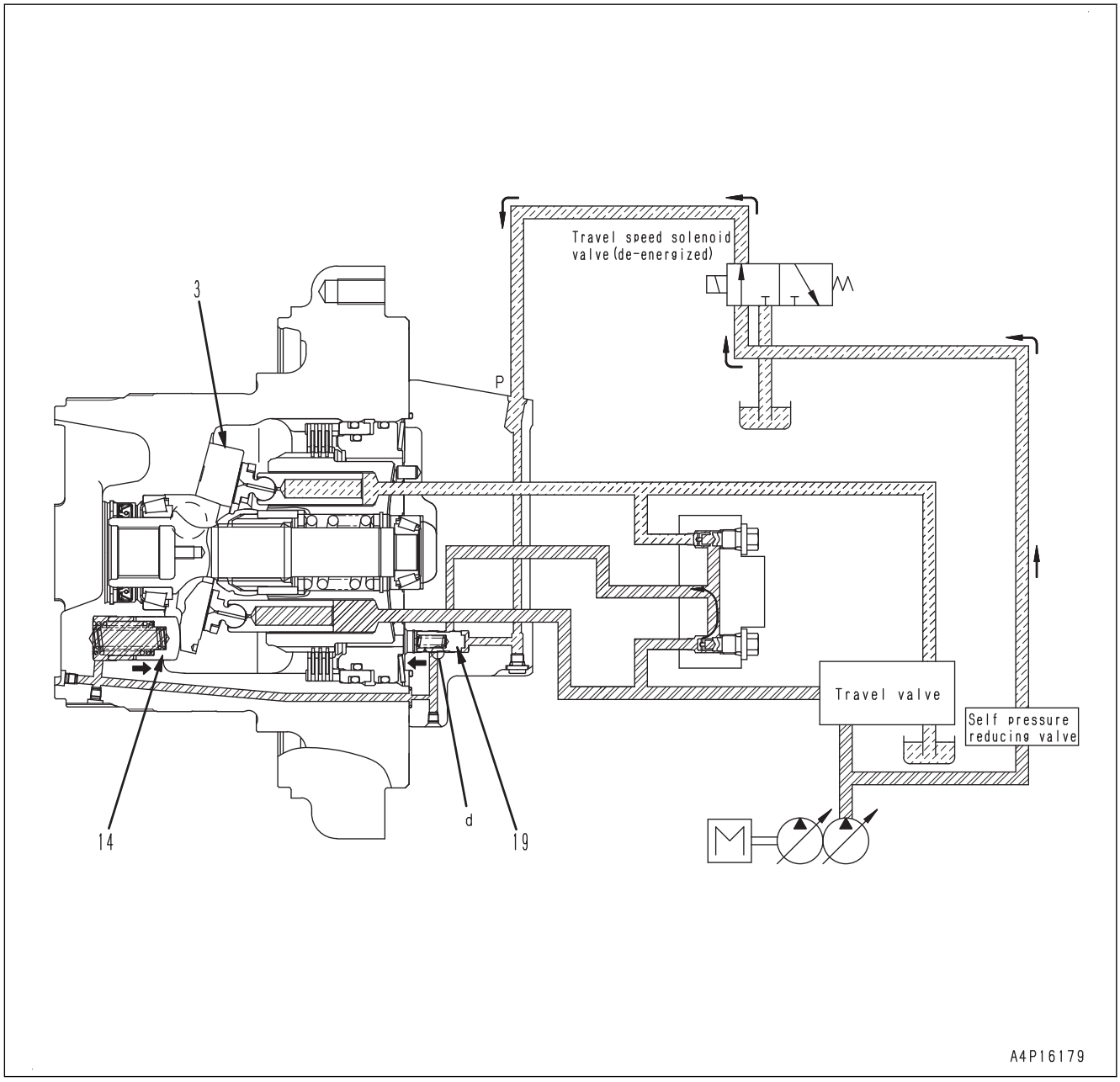


- The stroke sensor part of this sensor detects the stroke amount, and outputs the variable voltage.
- This sensor detects the stroke amount of cylinder rod (1) by the rotation of stroke sensor roller (2) which is pressed onto the surface of cylinder rod (1).

Output characteristics

7. Rocker cam (3) tilts to the direction of maximum swash plate angle, and motor capacity becomes maximum and machine travels at low speed.

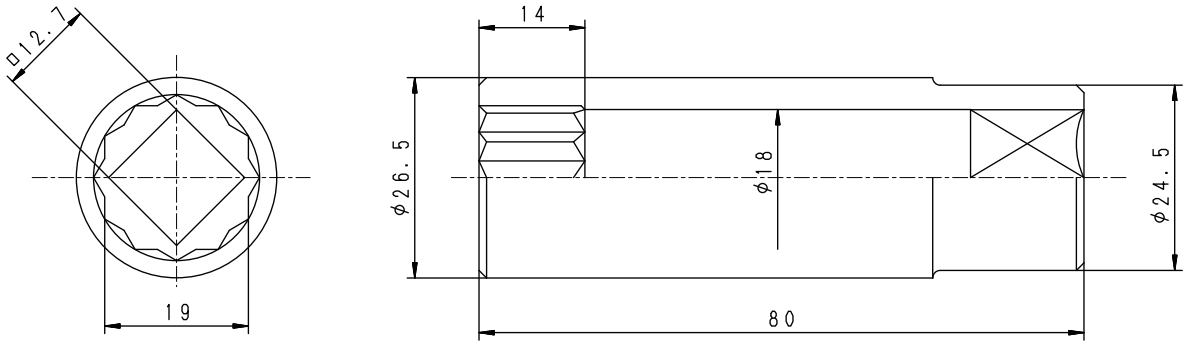
During high-speed travel (motor swash plate angle is minimum)



1. When the solenoid valve is energized, pilot pressure oil flows from the self-pressure reducing valve to port (P).
2. It pushes regulator valve (19) to the left.
3. The pressurized oil from the control valve flows to regulator piston (14) through passage (d) of regulator valve (19).
4. It pushes regulator piston (14) to the right.
5. Rocker cam (3) tilts toward the minimum swash plate angle, and motor capacity becomes minimum and machine travels at high speed.

Applicable machine model				PC360LCI–11	
Engine				SAA6D114E-6	
Item	Test condition		Unit	Standard value for new machine	Repair limit
LS valve outlet pressure (servo piston inlet pressure) (PFC-PENF, PRC-PENR)	• Hydraulic oil temperature: 45 to 55℃ • Fuel control dial: MAX (High idle) position • Working equipment mode: P (Power Mode) • Travel speed: Hi • Travel operation: Running one side track idle off ground	Each control lever, control pedal in NEUTRAL	MPa {kg/cm^2}	3.9±1.0 {40±10}	3.9±1.0 {40±10}
		Travel lever in half stroke		Pump discharged pressure × approx. 0.6	Pump discharged pressure × approx. 0.6
LS-EPC valve outlet pressure (PSIG)	• Hydraulic oil temperature: 45 to 55℃ • Fuel control dial: MAX (High idle) position • Working equipment mode: P (Power Mode) • Travel control lever: Fine control	Travel speed in Lo	MPa {kg/cm^2}	Approx. 1.45 {14.8}	Approx. 1.45 {14.8}
		Travel speed in Hi		0{0}	0{0}
Solenoid valve outlet pressure	• Hydraulic oil temperature: 45 to 55℃ • Fuel control dial: MAX (High idle) position • For the conditions for turning the solenoid ON and OFF, see TESTING AND ADJUSTING, “TEST OUTLET PRESSURE OF SOLENOID VALVE”.	OFF (de-energized)	MPa {kg/cm^2}	0 {0}	0 {0}
		ON (energized)		2.9 {30}	2.9 {30}
PPC valve outlet pressure	• Hydraulic oil temperature: 45 to 55℃ • Fuel control dial: MAX (High idle) position • Control lever in full stroke	Control lever, control pedal in NEUTRAL	MPa {kg/cm^2}	0 {0}	0 {0}
		Control lever, control pedal at full stroke		3.24±0.2 {33±2}	2.84 to 3.43 {29 to 35}

Socket

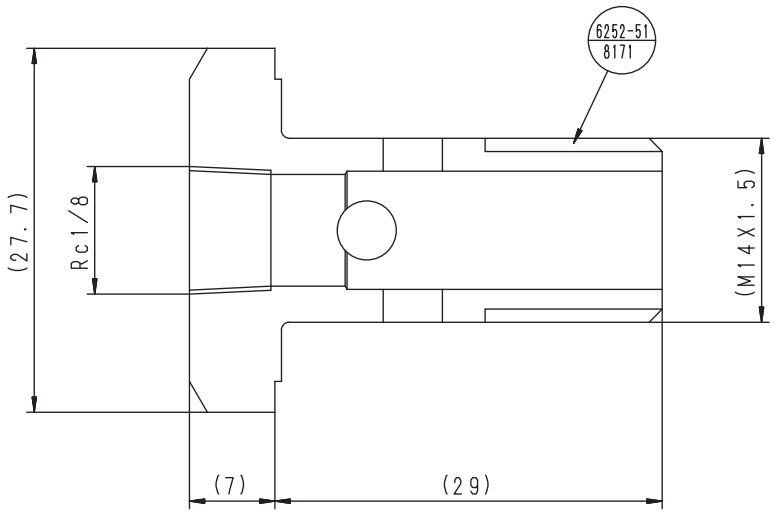


B4E11901

本品は水戸工業製デイープソケット4ML-19の中穴をφ18加工に変更したものである。
This item is a change of a hole the deep socket 4ML-19 made of MITOLOY to the φ18 processing.

HEAT TREATMENT 焼き入れ、焼き戻し Hardeing and tempering	MATERIAL SCM435H
PART NAME SOCKET	Q'TY 1
795T-981-1010 △	

Plug



1. THIS PART IS REWORK ON 6252-51-8171.
2. Rc1/8 TO BE MACHINED AS SHOWN.

B4P25305

HEAT TREATMENT ----	MATERIAL SS400B
PART NAME PLUG	Q'TY 1
795T-401-1110 △	

HANDLE NO-INJECTION CRANKING OPERATION

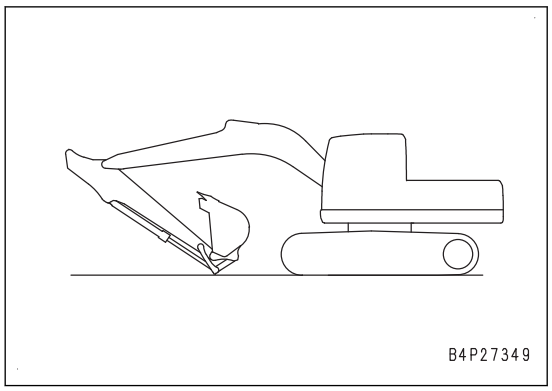
No-injection cranking operation means to crank the engine by using the starting motor while disabling injection in all cylinders electrically. The purpose and effect of this operation are as follows.

No-injection cranking is performed to lubricate the engine parts and to protect them from seizure. It is performed before the engine is started after the machine or engine has been stored for a long period.

3. Extend or retract the arm cylinder and bucket cylinder to the end, lower the work equipment to the ground, and stop the engine.

   REMARK

   Since anti-drop valve is attached to boom cylinder bottom side, hydraulic oil on bottom side of boom cylinder is drained when work equipment is lowered to the ground, and remaining pressure drops.

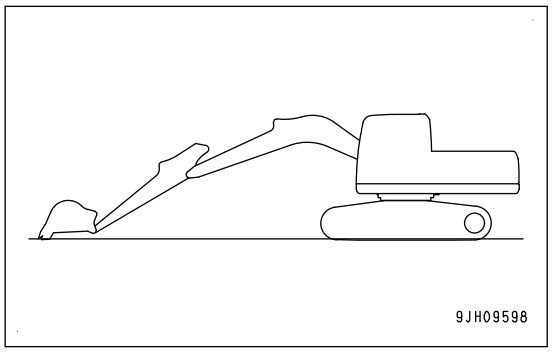


4. Release the remaining pressure in hydraulic cylinder circuit

   1) Turn the starting switch to ON position and set the lock lever in FREE position, and then operate the R.H. and L.H. work equipment control levers from front to back and from side to side.

      REMARK

      The work equipment is operated by the pressure in the accumulator. Pressure in the accumulator is lost by operating the work equipment control levers 2 or 3 times.



   2) Set the lock lever to LOCK position, start the engine, and run it with the fuel control dial at MIN (Low idle) position for approximately 5 seconds to increase the pressure in the accumulator.

5. Repeat Step 1) and Step 2) 4 or 5 times to release the remaining pressure from the cylinders.
6. Loosen the oil filler cap of the hydraulic tank gradually, and release the air in the tank.

NOTICE

When disassembling the anti-drop valve, release remaining pressure in the cylinder circuit and loosen anti-drop valve assembly mounting bolts gradually. Make sure that hydraulic oil pressure is released and then remove the anti-drop valve assembly to disassemble it.

With anti-drop valve of arm

1. Check the function of PPC accumulator.

   Function of PPC accumulator can be checked by performing the same procedure as that of “With anti-drop valve of boom”.

2. Extend or retract the arm cylinder and bucket cylinder to the end.

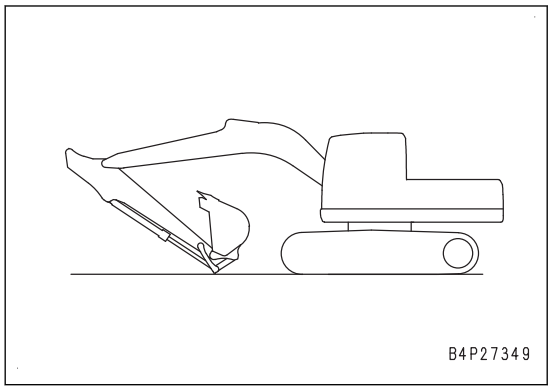
   There are two types methods for releasing remaining pressure.

   - When arm cylinder and bucket cylinder are extended to the end

   1) Extend arm cylinder and bucket cylinder to the end, lower the work equipment to the ground, and stop the engine.

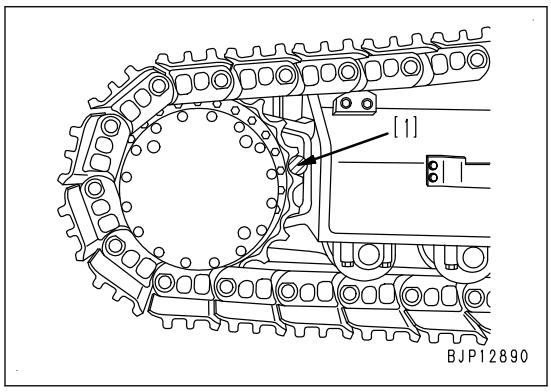
      REMARK

      The anti-drop valve is attached to arm cylinder head side. Hydraulic oil on head side of arm cylinder is drained when work equipment is lowered to the ground, and there is less remaining pressure. Remaining oil on the head side will be also decreased.



METHOD FOR TESTING OIL LEAKAGE FROM TRAVEL MOTOR

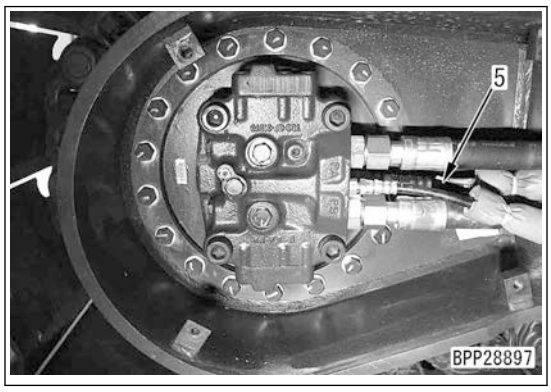
1. Remove the travel motor cover.
2. Start the engine, Insert pin [1] between the sprocket and the track frame to securely lock the track, and stop the engine.



3. Disconnect drain hose (5) of the travel motor and block the hose end by using a plugD.
4. Start the engine, and perform travel relief with the fuel control dial at MAX (High idle) position.

   ⚠ Give clear signals otherwise a mistake in lever operation can cause an accident.

   ⚠ Before operating the travel lever, check the position and direction of locked sprocket again.



5. Measure the amount of leakage for 1 minute in the elapsed time of 30 seconds after starting relief.

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

6. Measure the testing several times by moving the motor a little each time (changing the relative position between the valve plate and cylinder and that between the cylinder and piston).

After finishing the test, restore the machine.

Code	Item		Reference
09	Adjustment	Pump Absorption Torque (F)	Adjustment menu (Pump Absorption Torque (F))
		Pump Absorption Torque (R)	Adjustment menu (Pump Absorption Torque (R))
		Travel Low Speed	Adjustment menu (Low Speed)
		Att Flow Adjust in Combined Ope	Adjustment menu (Att Flow Adjust in Combined Ope)
		Calibrate F Pump Swash Plate Sensor	Adjustment menu (CAL F pump swash plate sensor)
		Calibrate R Pump Swash Plate Sensor	Adjustment menu (CAL R pump swash plate sensor)
		Fan Speed Mode Select	Adjustment menu (Fan Speed Mode Select)
		KomVision Adjustment	Adjustment menu (KomVision Adjustment)
		Attachment EPC Adjustment (*1)	Adjustment menu (ATT EPC Output Current)
		Attachment EPC 2 Adjustment (*2)	Adjustment menu (ATT EPC2 Output Current)
		Attachment EPC 3 Adjustment (*3)	Adjustment menu (ATT EPC3 Output Current)
		Attachment EPC 4 Adjustment (*4)	Adjustment menu (ATT EPC4 Output Current)
		Attachment EPC 5 Adjustment (*5)	Adjustment menu (ATT EPC5 Output Current)
		Attachment EPC 2 Adjustment (Tilt) (*6)	Adjustment menu (ATT EPC2 Output Current (Tilt))
		Attachment EPC 3 Adjustment (Tilt) (*7)	Adjustment menu (ATT EPC3Output Current(Tilt))
		Proportional Lever Adjustment (R)	Adjustment menu (Proportional Lever Adjustment (R))
		Proportional Lever Adjustment (L)	Adjustment menu (Proportional Lever Adjustment (L))
		Matching Speed Check	Adjustment menu (Pump calibration: Matching speed check)
		Matching Speed Calibration	Adjustment menu (Pump calibration: Matching speed calibration)
		Restore to Default Setting	Adjustment menu (Pump calibration: Restore to default setting)
10	No-Injection Cranking		No-Injection cranking operation
11	KOMTRAX Settings	Terminal Status	KOMTRAX settings menu (Terminal Status)
		GPS & Communication State	KOMTRAX settings menu (GPS and Communication Status)
		Modem Information	KOMTRAX Settings Menu (Modem Status)
12	Service Message		Display service message

- *1: For adjustment of Attachment flow selector EPC valve, see “ADJUSTMENT MENU (ATT EPC ATT EPC Output Current)”.
- *2: For adjustment of 1st service L.H. EPC valve, see “ADJUSTMENT MENU (ATT EPC2 Adjustment (Auto Tilt Bucket))”.

3. On “With/Without Quick Coupler” screen, select a setting with the function switch.

   Without: When multi-coupler is not installed

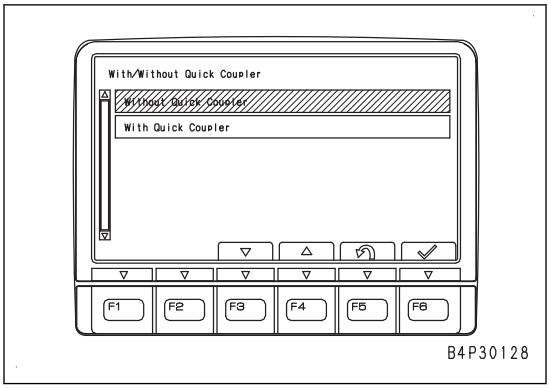
   With: When multi-coupler is installed

   F3: Moves the selection downward

   F4: Moves the selection upward

   F5: Returns to “Default” screen.

   F6: Enters the selection, and the screen returns to “Default” screen



METHOD FOR SETTING WITH DEFAULT SETTING MENU (WITH/WITHOUT KomVision)

NOTICE

Change the settings of KomVision after the installation, otherwise the setting mismatch error (“L03”) occurs.

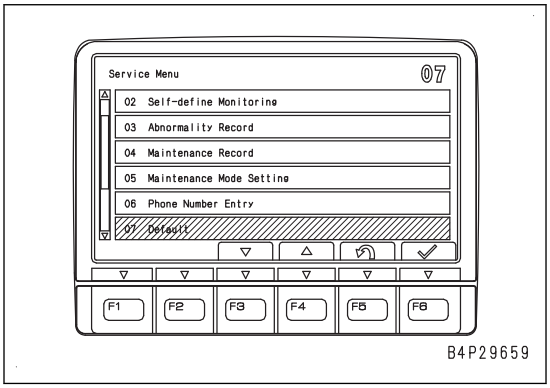
Default menu is used to check or change default values of the machine monitor and machine.

“With/Without KomVision” function enables or disables KomVison function depending on whether KomVision system is installed or not.

1. Select “Default” from the “Service Menu” screen.

   REMARK

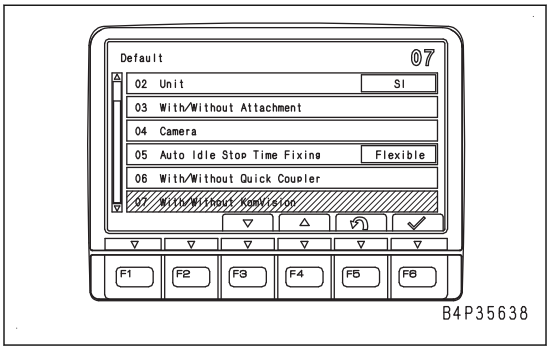
   For selecting method, see “Operating method of service mode” in “SERVICE MODE”.



2. On the “Default” screen, select “With/Without KomVision” with function switches or numeral input switches.

   REMARK

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



3. On the “With/Without KomVision” screen, select a setting with the function switch.

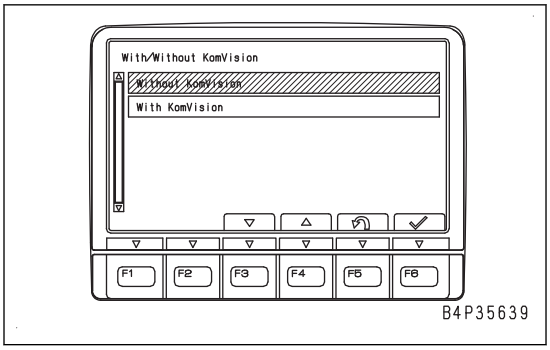
   “Without KomVision”: When KomVison is not installed

   “With KomVision”: When KomVison is installed

   F3: Moves down the selected item

   F4: Moves up the selected item

   F5: Cancels the selection and returns the screen to “Default” screen



Code	Set value	Torque adjustment value
170	016	-17.5 mA
	017	-15.0 mA
	018	-12.5 mA
	019	-10.0 mA
	020	-7.5 mA
	021	-5.0 mA
	022	-2.5 mA
	023	0.0 mA
	024	2.5 mA
	025	5.0 mA
	026	7.5 mA
	027	10.0 mA
	028	12.5 mA
	029	15.0 mA
	030	17.5 mA
	031	20.0 mA
	032	22.5 mA
	033	25.0 mA
	034	27.5 mA
	035	30.0 mA
	036	32.5 mA
	037	35.0 mA
	038	37.5 mA
	039	40.0 mA
	040	42.5 mA
	041	45.0 mA
	042	47.5 mA
	043	50.0 mA
	044	52.5 mA
	045	55.0 mA
	046	57.5 mA

ADJUSTMENT MENU (Proportional Lever Adjustment (R))

Use the adjustment menu to check the various settings of the machine or to adjust the values.

“Proportional Lever Adjustment (R)” is used for adjustment of current variation which is output from proportional lever at RAISE Max position and LOWER Max position.

This section explains the function displayed only on machines equipped with auto-tilt bucket.

15. Match the angle setting calibration marker A and the rotation direction position of the camera marker with the function switches.

    A: Angle setting calibration marker A

    x: Camera marker

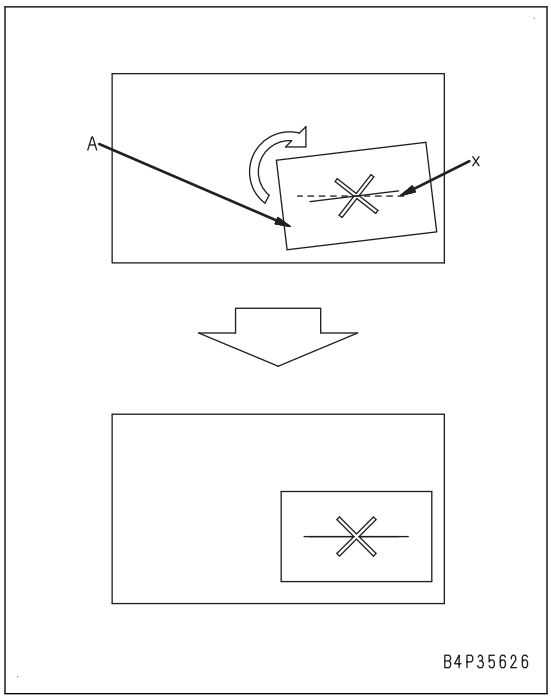
    F1: Goes back to the “Service Menu” screen.

    F3: Rotates the camera image counterclockwise.

    F4: Rotates the camera image clockwise.

    F5: Cancels the calibration item, or cancels the change and goes back to “KomVision Adjustment” screen.

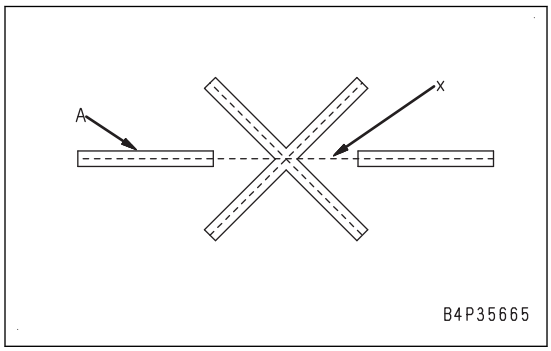
    F6: Enters the calibration item/Enters the change.



- Example of matching

  A: Angle setting calibration marker A

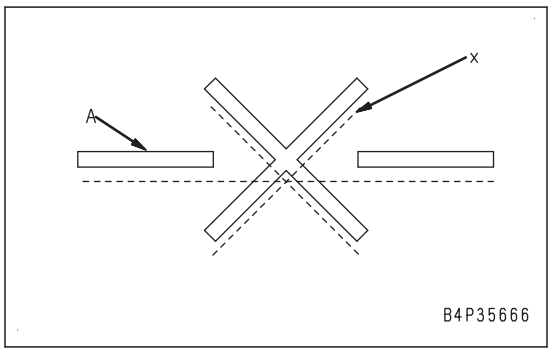
  x: Camera marker



- Example of not matched

  A: Angle setting calibration marker A

  x: Camera marker



16. When the angle calibration marker A and the camera marker match, select “Save” with the function switches. Push F6 to save the setting.

Do Step 1 to Step 16 for each camera.

REMARK

- Do the calibration for all cameras always when the controller is replaced or when the specification is changed.
- Do only the necessary calibrations relevant to the camera which has been replaced.

No.	Monitoring item (screen display)
24	Arm Cylinder Length (mm)
25	Bucket Cylinder Length (mm)
26	Bucket Tilt MS Cylinder Length Ltl_cyl (mm)
27	Tooth Length (mm)
28	Offset Limitation (mm)
29 (*1)	GNSS Status
30	Use GNSS Simulation Mode
31	IMU aiding status
32	Error: Komatsu controller not connected
33	Error: Sensors are invalid
34	Error: High CPU Load
35	TPS System Error and State
36	Blade Edge Position East (m)
37	Blade Edge Position North (m)
38	Blade Edge Position Elevation (m)
39	Inflection Edge X (mm)
40	Inflection Edge Y (mm)
41	Inflection Edge Z (mm)
42	Vehicle travel state
43	Auto Grading Mode Idle Status
44	Semi-auto limited digging mode
45(*2)	Compaction Control
46(*2)	Control Surface Offset suspending
47(*2)	Bucket Angle Hold Control
48(*2)	Auto Boom Down
49	Total Size of Logged Files (KB)

*1: Indicated by digits from 0 to 6. The meaning is as follows.

0: Not Connected

1: Connecting

2: Waiting For Satellites

3: Waiting For Radio

4: Waiting To Initialize

5: Initializing

6: Initialized

*2: The specification of this model do not have this setting.

SET TILT AUTOMATIC CONTROL FUNCTION

You can enable or disable tilt automatic control function.

For the machine with auto tilt bucket control function, see this section to enable the function.

3. 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

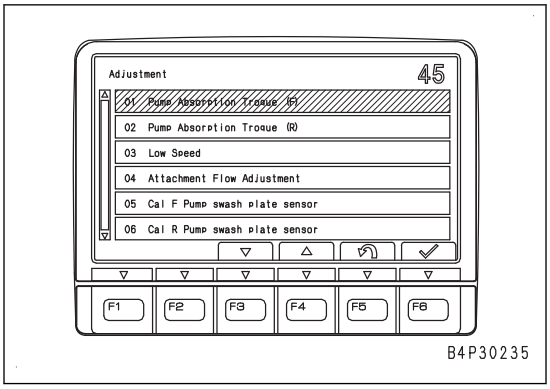
   F4: Moves the selected item up by one item

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

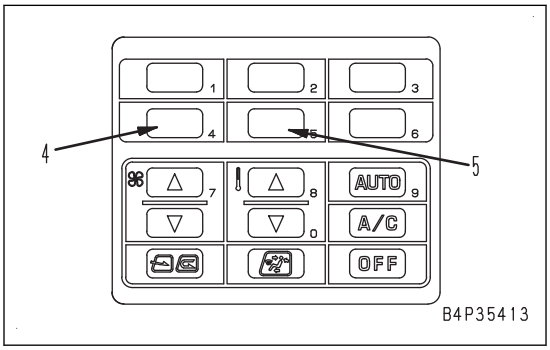
   F6: Enters the input value and moves to the “ICT Control Calibration” screen

   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.



B4P30235



B4P35413

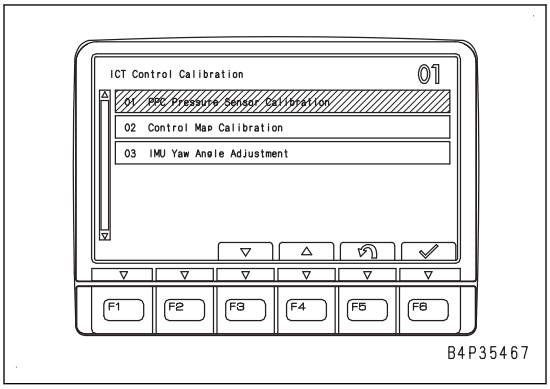
4. On the “ICT Control Calibration” screen, select “PPC Pressure Sensor Calibration” with function switches or numeral input switches.

   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



B4P35467

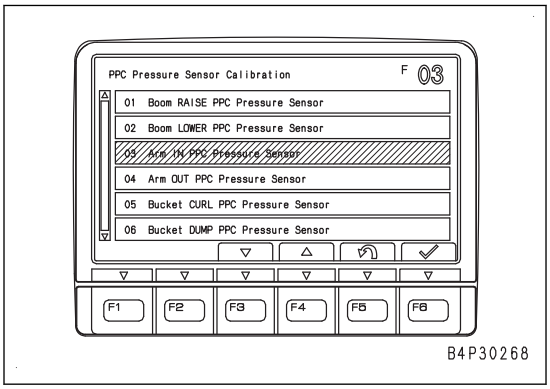
5. On the “PPC Pressure Sensor Calibration” screen, select “Arm IN PPC Pressure Sensor” with function switches or numeral input switches.

   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



B4P30268

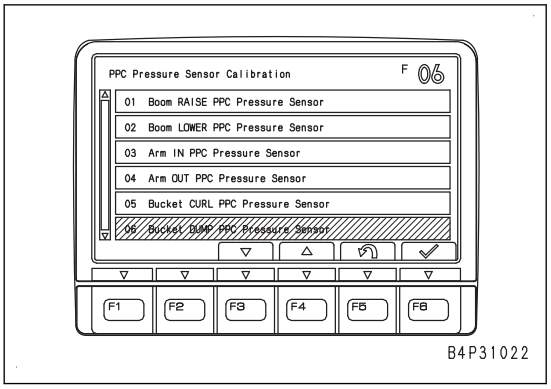
5. On the “PPC Pressure Sensor Calibration” screen, select “Bucket DUMP PPC Pressure Sensor” with function switches or numeral input switches.

   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 “Bucket DUMP PPC Pressure Sensor” screen



6. On the “Bucket DUMP PPC Pressure Sensor” screen, select “PPC Pressure Sensor Calibration” with function switches or numeral input switches.

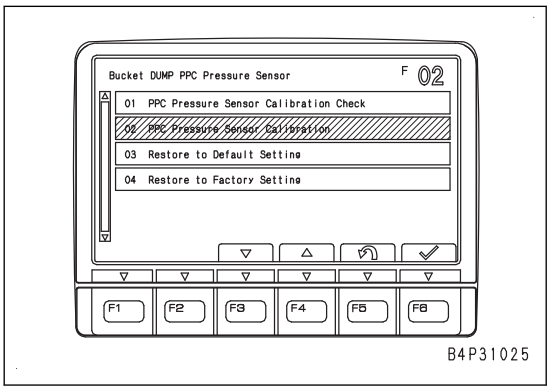
   F3: Moves the selected item down by one item

   F4: Moves the selected item up by one item

   F5: Returns to the “PPC Pressure Sensor Calibration” screen

   F6: Enters the selected item and moves to the “Bucket DUMP PPC Pressure Sensor Calib” screen

7. Set the work equipment lock lever to FREE position.



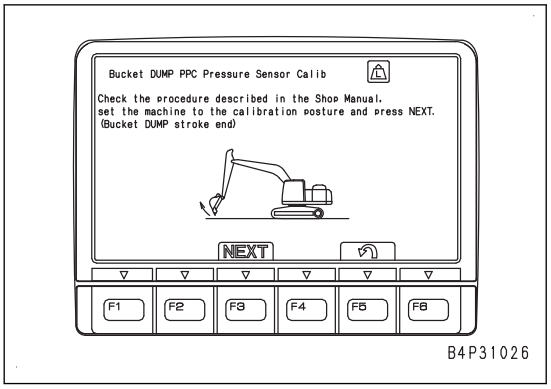
8. When the “Bucket DUMP PPC Pressure Sensor Calib” screen is displayed, fully retract the bucket cylinder, and press F3.

   F3: Moves to the “Bucket DUMP PPC Press Sens Calib 1/2” screen

   F5: Returns to the “Bucket DUMP PPC Pressure Sensor” screen

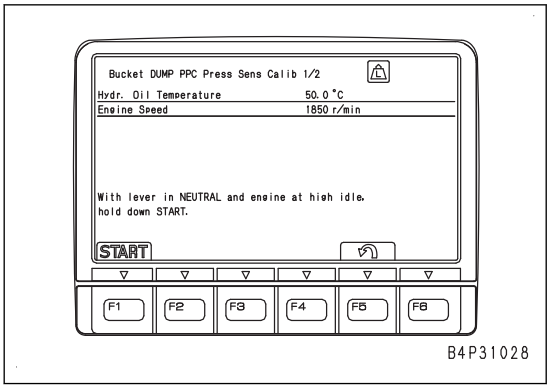
   REMARK

   Without the reference posture displayed on the monitor, you can perform the calibration if the machine is in the posture that allows the bucket DUMP circuit to be relieved safely.



9. Adjust the hydraulic oil temperature within the specified range for the calibration.

10. Turn the fuel control dial to MAX (High idle) position.



11. Set the work equipment control lever to NEUTRAL, and hold down F1 to start calibration.

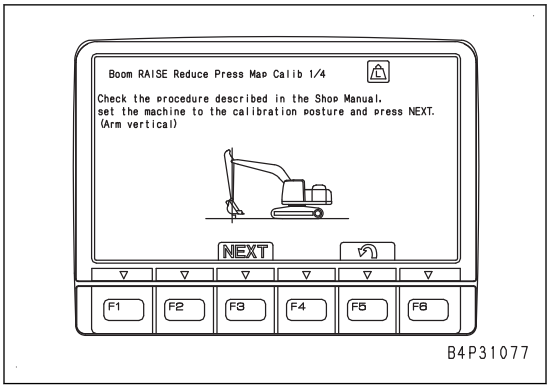
    F3: Stops calibration and returns to the calibration start screen of the “Bucket DUMP PPC Press Sens Calib 1/2”

10. When the “Boom RAISE Reduce Press Map Calib 1/4” screen of the calibration posture preparation screen is displayed, operate the arm to the position vertical to the ground surface, and press F3.

    F3: Moves to the “Boom RAISE Reduce Press Map Calib 1/4” screen of the calibration start screen

    F5: Returns to the “Boom RAISE Reduce Pressure Control Map” screen

11. Turn the fuel control dial to MAX (High idle) position.



12. When the “Boom RAISE Reduce Press Map Calib 1/4”screen of the calibration start screen is displayed, set the work equipment control lever to NEUTRAL, and hold down F1 to start calibration.

    F1: Starts calibration

    F2: Stops calibration and returns to the “Boom RAISE Reduce Press Map Calib 1/4” screen of the calibration start screen

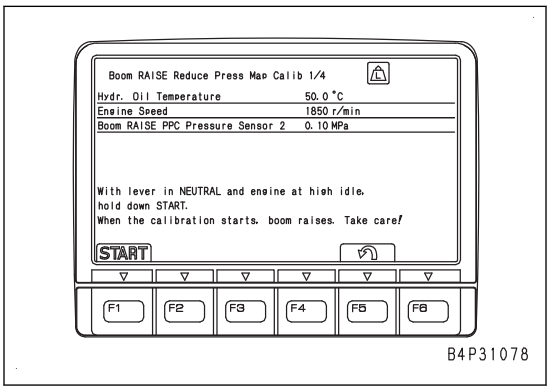
    F5: Returns to the “Boom RAISE Inter Control Map Calib 1/4” screen of the calibration posture preparation screen

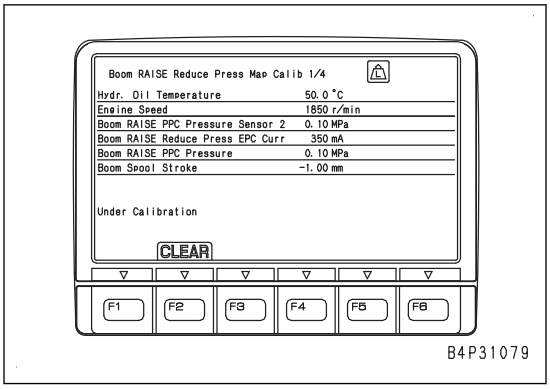
    NOTICE

    Hold the calibration status until the calibration finishes.

    REMARK

    - The work equipment cannot be moved during the calibration.
    - The calibration takes approximately 40 seconds.
    - During the calibration, the values of each item are displayed in real time on the machine monitor screen.



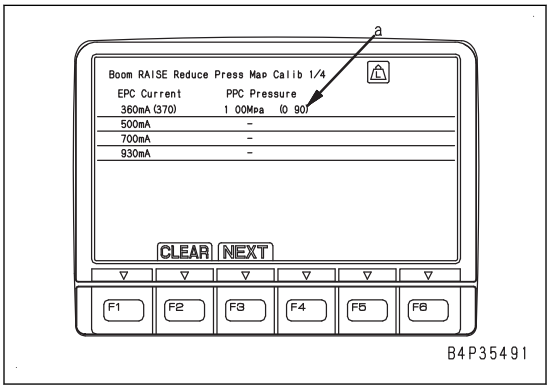


13. When a buzzer sounds and the “Boom RAISE Reduce Press Map Calib 1/4” screen of the calibration result screen is displayed, check the result.

    F2: Stops calibration and returns to the “Boom RAISE Reduce Press Map Calib 1/4” screen of the calibration start screen

    F3: Moves to the “Boom RAISE Reduce Press Map Calib 2/4” screen

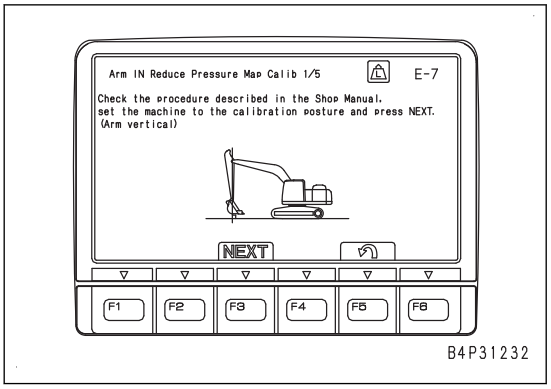
    (a): Value saved in the work equipment controller before calibrating

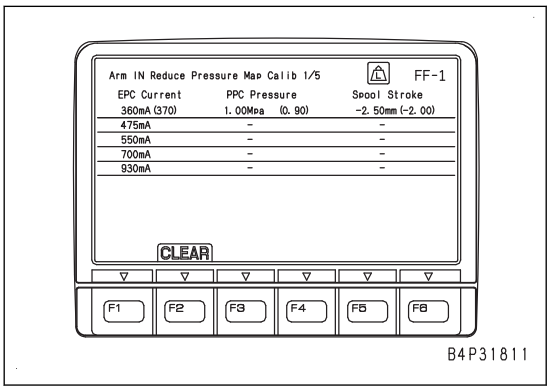


NOTICE

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".

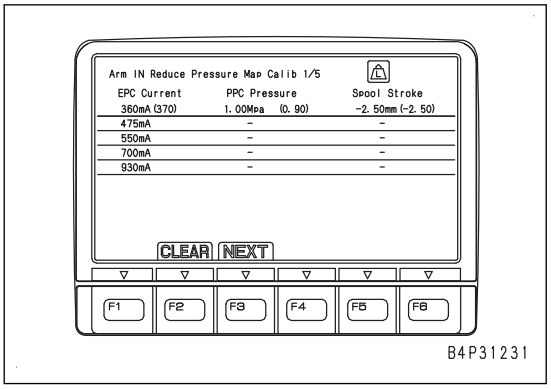




14. After checking the calibration result, press F3.

    F2: Returns to the "Arm IN Reduce Pressure Map Calib 1/5" screen of the calibration start screen

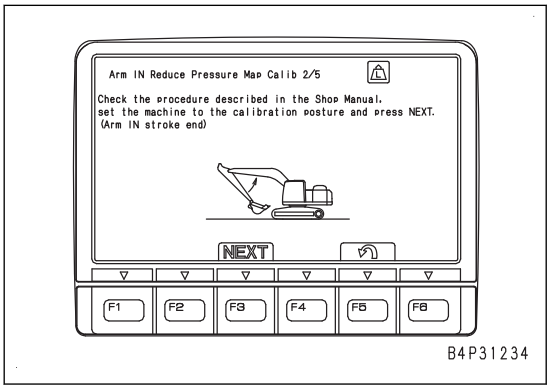
    F3: Moves to the "Arm IN Reduce Pressure Map Calib 2/5" screen



15. When the "Arm IN Reduce Pressure Map Calib 2/5" screen is displayed, press F3.

    F3: Moves to the "Arm IN Reduce Pressure Map Calib 2/5" screen of the calibration start screen

    F5: Returns to the calibration value check screen.



NOTICE

Set the bucket setting in response to the Operation and Maintenance Manual, “Bucket Weight Setting”.

Do the calibration of this item under the condition below.

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

CHECK CALIBRATION STATE OF BUCKET CURL EPC

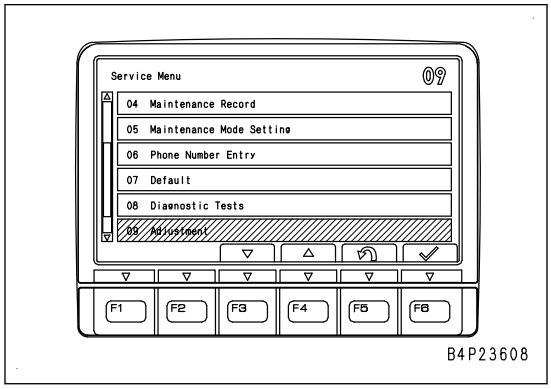
When only the calibration state is checked, the machine state is not restricted at all.

When data cannot be confirmed due to aging or malfunction of automatic control, they can be confirmed according to this section.

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

   REMARK

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



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

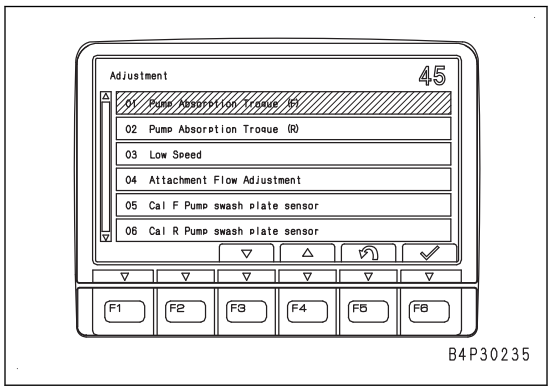
   F3: Moves the selected item up by one item

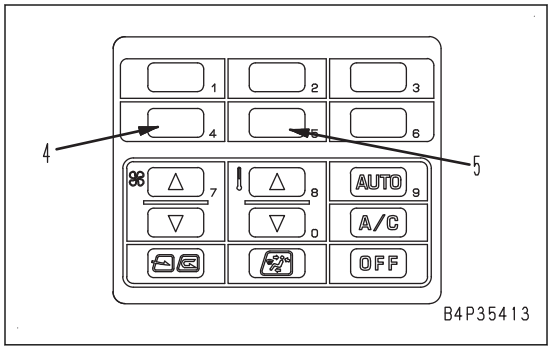
   F5: Returns the display to the “Service Menu” screen

   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.



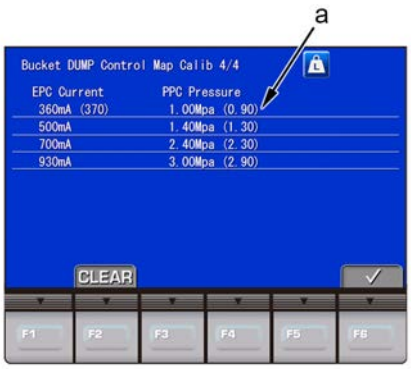


34. When the buzzer sounds and the screen moves to the “Bucket DUMP Control Map 4/ 4” of the calibration result screen, check the calibration results.

F2: Returns to the “Bucket DUMP Control Map Calib 4/ 4” of the calibration start screen

F6: Moves to the “Control Map Calibration”

(a): Value saved in the work equipment controller before calibration



G0086149

NOTICE

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

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

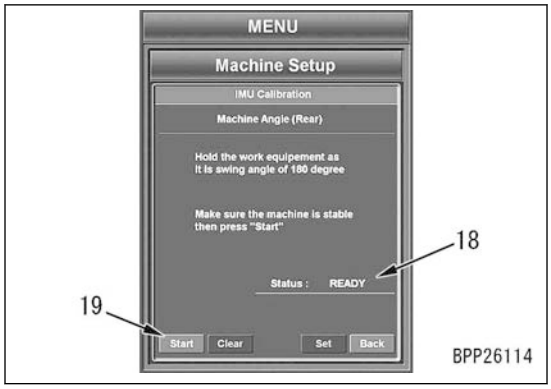
G0086150

G0086151

- When the “Status” is “READY” (18)

  REMARK

  This indicates the calibration has never been performed.



1) Hold down “Start” (19) for 0.5 second or more to start the calibration.

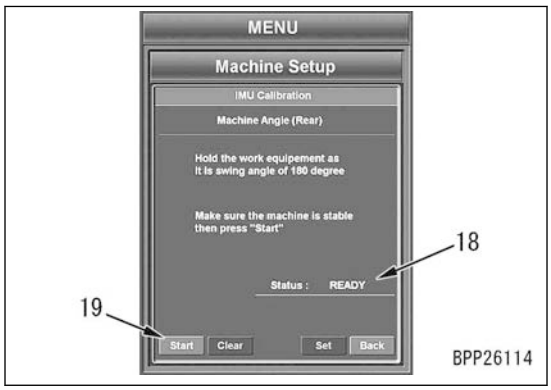
NOTICE

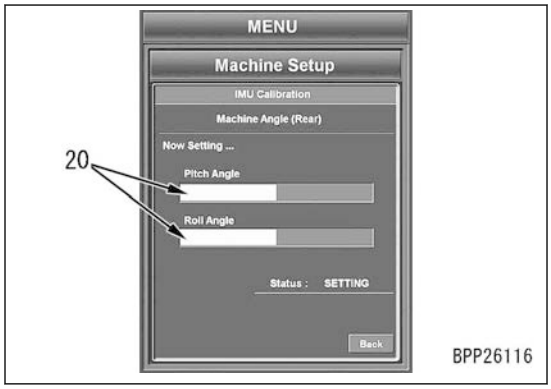
When the progress bar (20) is moving, never operate the work equipment control lever.

REMARK

If an error code appears, take actions by referring to “ACTION TO BE TAKEN IF AN ERROR OCCURS DURING CALIBRATION OF IMU SENSOR”.

When the calibration starts, the progress bar (20) appears and the control box calculates the mean value of leaning of the machine within approximately 20 seconds.

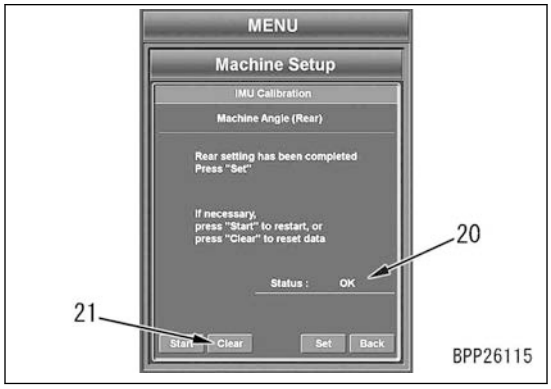




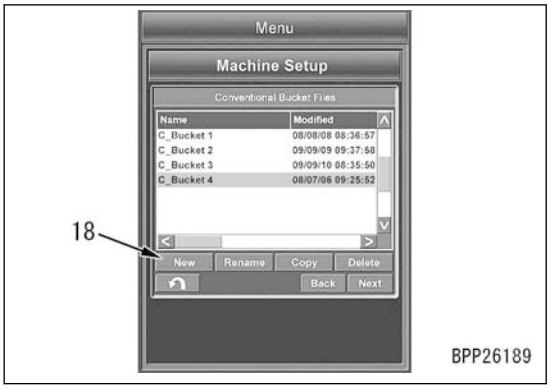
- When the “Status” is “OK” (20)

  REMARK

  This shows the calibration has already been performed.



14) Push “New” (18).



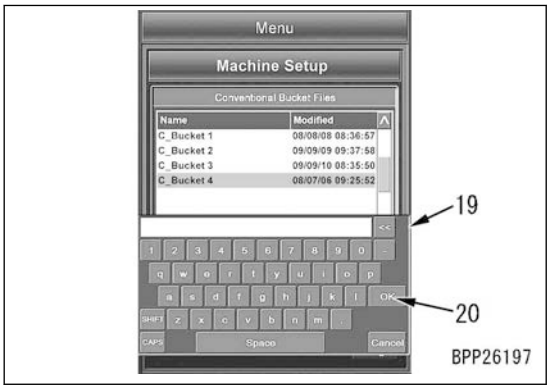
15) The input pad (19) is shown. Enter the name of bucket file which is newly made, and push “OK” (20).

The name of file which is newly made is shown on “Conventional Bucket Files” screen.

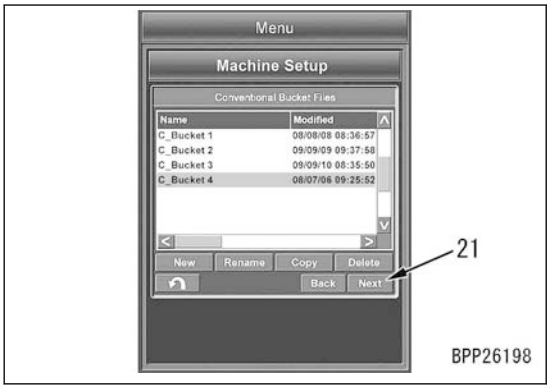
16) Select the new bucket file.

REMARK

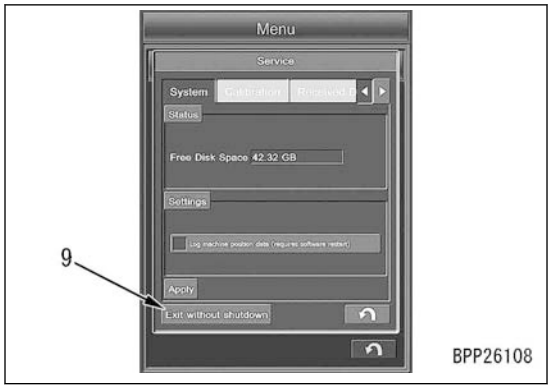
The background color of the selected row changes to yellow.



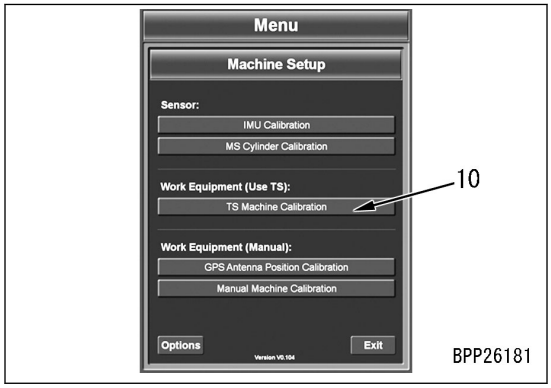
17) Push “Next” (21).



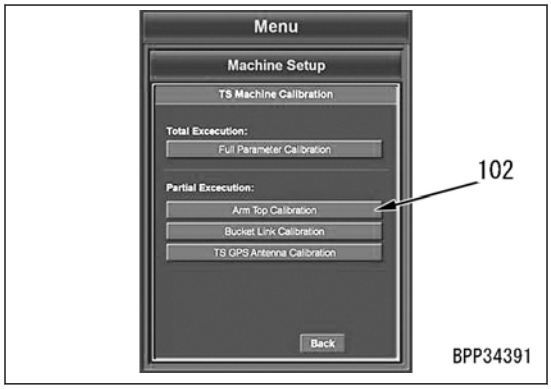
19. After “Service” screen is shown, push “Exit without shut-down” (9).



20. After “KOMATSU” logo mark is shown, if “Machine Setup” screen is shown, push “TS Machine Calibration” (10).



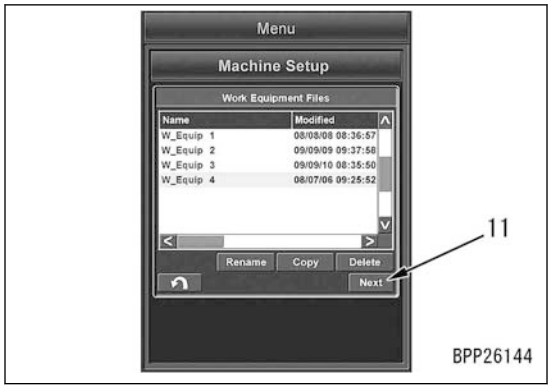
21. After “TS Machine Calibration” screen is shown, push “Arm Top Calibration” (102).
22. After “Work Equipment Files” screen is shown, select the work file of the work equipment which is installed to the machine.



- When the Work Equipment Files are in the list
  1) Select the name of the applicable Work Equipment Files.

     REMARK

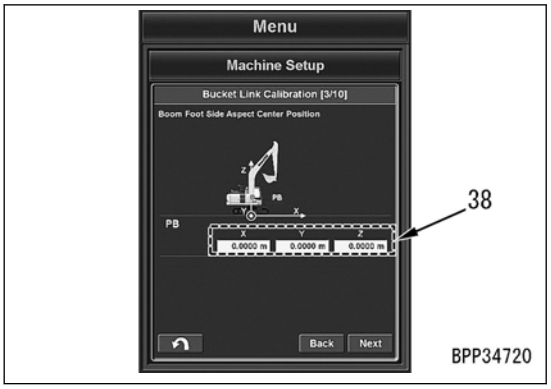
     The background color of the selected row changes to yellow.
  2) Push “Next” (11).

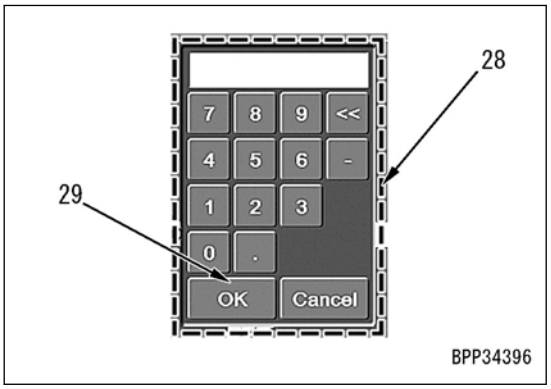


1) Push each input column (38). Enter the value after the numeric keypad (28) is shown.
2) Push “OK” (29).

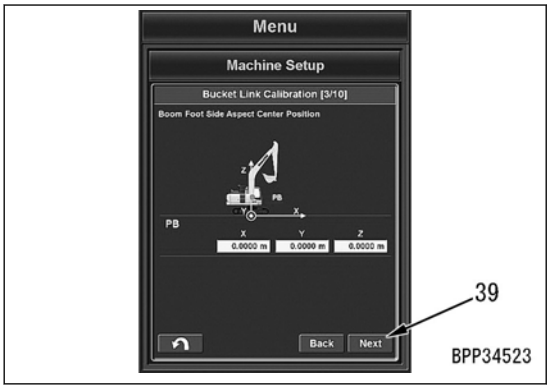
REMARK

For the input range, see “Input range of each measured value”.





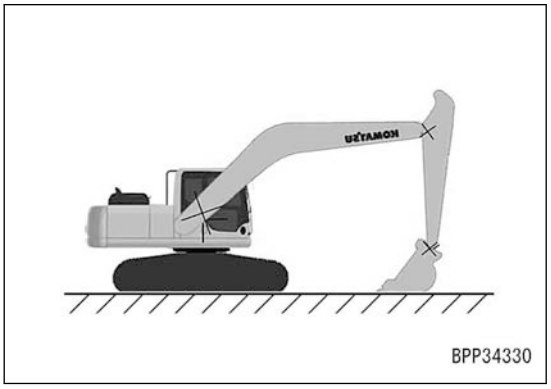
45. Push “Next” (39).
The screen changes to “Bucket Link Calibration [4/10]”.
46. Set the work equipment lock lever to the FREE position.



47. Lower the bucket to the ground slowly not to let the tracks be lifted.

REMARK

Keep the swing lock switch in the ON position.



Monitor display	Input range	Content
A-Length	0.0001 to 5.9999	Distance (m) of shape recognition point A
B-Angle	0.01 to 179.99	Angle (deg) of shape recognition point B
B-Length	0.0001 to 5.9999	Distance (m) of shape recognition point B
C-Angle	0.01 to 179.99	Angle (deg) of shape recognition point C
C-Length	0.0001 to 5.9999	Distance (m) of shape recognition point C
D-Angle	0.01 to 179.99	Angle (deg) of shape recognition point D
D-Length	0.0001 to 5.9999	Distance (m) of shape recognition point D
E-Angle	0.01 to 179.99	Angle (deg) of shape recognition point E
E-Length	0.0001 to 5.9999	Distance (m) of shape recognition point E
PS1-X	-99.999 to 99.999	Coordinates (m) of the special blade edge measuring jig at PS1 position
PS1-Y		
PS1-Z		
PS2-X	-99.999 to 99.999	Coordinates (m) of the special blade edge measuring jig at PS2 position
PS2-Y		
PS2-Z		
PS3-X	-99.999 to 99.999	Coordinates (m) of the special blade edge measuring jig at PS3 position
PS3-Y		
PS3-Z		
PB-X	-99.999 to 99.999	Coordinates (m) of the position of reflector plate (39) pasted to the boom foot pin
PB-Y		
PB-Z		
Loffset2	-5.999 to 8.999	Distance (m) from the mark at the center of the bucket blade tip to the measuring port
PC1-X	-99.999 to 99.999	Coordinates (m) in PC1 posture
PC1-Y		
PC1-Z		
PC2-X	-99.999 to 99.999	Coordinates (m) in PC2 posture
PC2-Y		
PC2-Z		
PC3-X	-99.999 to 99.999	Coordinates (m) in PC3 posture
PC3-Y		
PC3-Z		
PC4-X	-99.999 to 99.999	Coordinates (m) in PC4 posture
PC4-Y		
PC4-Z		
PC5-X	-99.999 to 99.999	Coordinates (m) in PC5 posture
PC5-Y		
PC5-Z		
Ltgt2	0 to 1.9999	Prism height (m)

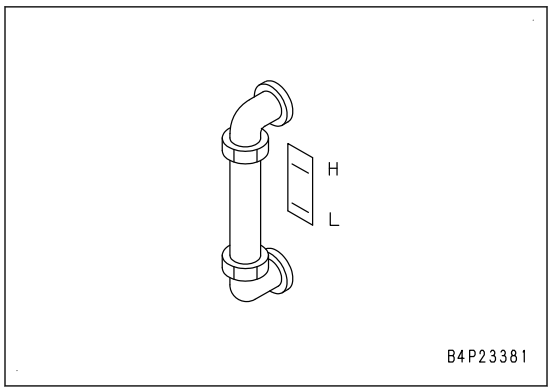
3. Open the cover on the left side of the machine, and check the oil level through the sight gauge. If it is between line H and L, it is appropriate.

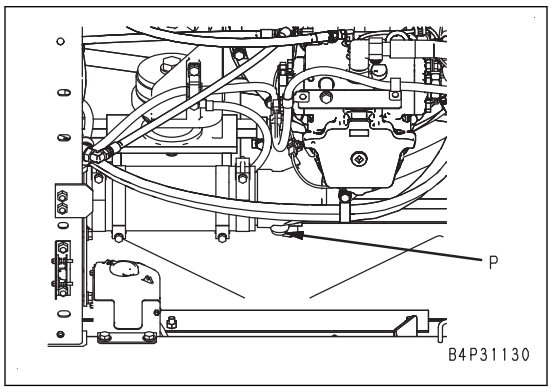
   NOTICE

   - **If the oil level is below line L, add oil through oil filter port.**
   - **Do not add oil above the H line since it can damage the hydraulic circuit or allow spurt of oil.**
   - **If oil is added above line H, stop the engine, wait until the hydraulic oil cools down, discharge excess oil from drain plug (P) under the suction tube.**

   Since the oil level varies according to the oil temperature, use the followings as a guide.

   - Before operation (oil temperature: 10 to 30 °C), the oil level should be at the medium between lines H and L.
   - During normal operation (oil temperature: 50 to 80 °C), the oil level should be near H mark.





CHECK HYDRAULIC OIL STRAINER

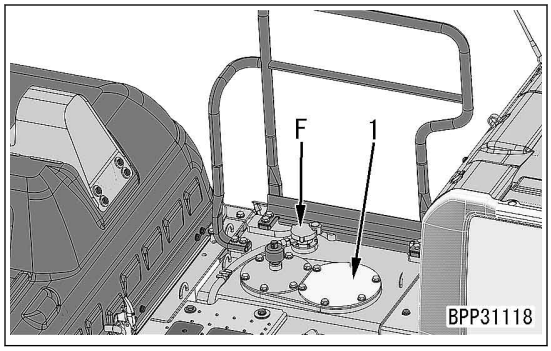
⚠ **Immediately after the engine is stopped, its parts and oil are still very hot, and may cause burn injury. Accordingly, wait until all parts have cooled down before starting the work.**

⚠ **When removing the oil filler cap, the oil may spout out. Turn it slowly to release the internal pressure, then remove it.**

1. Stop the engine and remove oil filler cap (F) of the hydraulic tank to release the internal pressure.

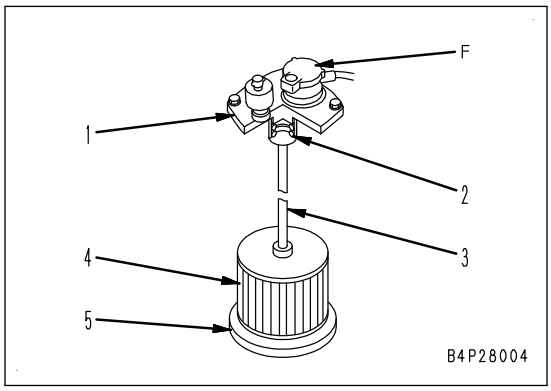
   NOTICE

   When removing the cover, it may jump out under the reaction force of spring. Loosen bolts evenly while holding cover down, and remove it.



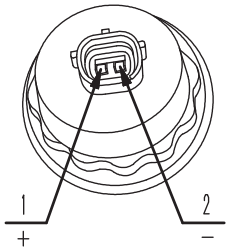
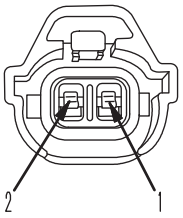
2. Remove the bolts, and remove cover (1).
3. Pull out the top of rod (3) upward and remove spring (2) and strainer (4).
4. Remove any dirt stuck to strainer (4), then wash it in flushing oil. If strainer (4) is damaged, replace it with a new one.
5. Insert and set strainer (4) in projected portion (5) of the tank.
6. Install the bolts while pressing down spring (2) with the projection at the bottom of cover (1).

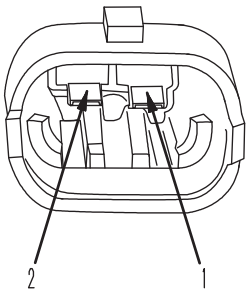
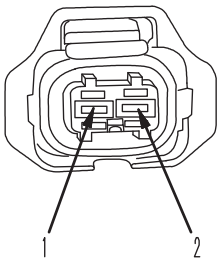
   Tighten the mounting bolts.

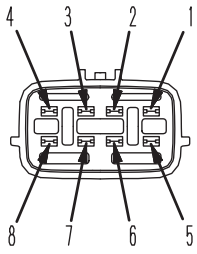
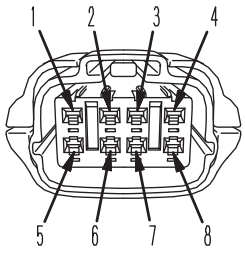


Connector No.	Connector type	Number of pins	Location	Address
S02	SWP	6	Light switch	A-16
S04	SWP	6	Swing lock switch	A-17
S07	SWP	6	Revolving lamp switch (if equipped)	A-17
S10	Y090	2	Right knob switch (horn)	A-16
S11	Y090	2	Left knob switch (one-touch power maximizing)	H-22
S14	M	3	PPC oil pressure lock switch	I-23
S18	SWP	6	Engine shutdown secondary switch	I-19
S19	DT	2	Seat belt monitor switch	A-18
S21	-	12	Pump secondary drive switch	B-28
S22	-	6	Swing parking brake cancel switch	B-27
S23	-	3	Lock lever auto lock release switch	B-27
S23	-	12	Boom secondary drive switch	C-24
S25	090	20	Intermediate connector (secondary switch)	C-26
S30	S	8	Model selection connector	A-21
S31	M	6	Model selection connector	G-24
S54	DT	12	Intermediate connector	D-24
S55	-	6	MG-MC switch	B-14
SB	Terminal	1	Starting motor (terminal B)	E-38
SC	Terminal	1	Starting motor (terminal C)	E-38
SEGR	DT	3	EGR stroke sensor	E-42
SVGT	DT	3	VGT stroke sensor	E-41
T01	Terminal	1	Floor frame ground	H-23
T02	Terminal	1	Cab ground	E-24
T04	Terminal	1	Revolving frame ground	I-17
T05	Terminal	1	Revolving frame ground	I-18
T06	Terminal	1	Revolving frame ground	I-18
T07	Terminal	1	Revolving frame ground	I-18
T08	Terminal	1	Revolving frame ground	H-9
T09	Terminal	1	Revolving frame ground	I-18
T10	Terminal	1	Revolving frame ground	I-18
T11	Terminal	1	Engine body ground	D-40
T12	Terminal	1	Engine mount bracket ground	E-12
T13	Terminal	1	Revolving frame ground	H-9
T14	Terminal	1	Revolving frame ground	G-10
TA01	Terminal	1	Revolving frame ground	I-7
TA02	Terminal	1	Ground	C-14
TERMINATOR PORT	DT	3	CAN terminating resistor	I-41
TOOL PORT	DT	3	CAN terminating resistor	I-39

SUMITOMO connector for engine

No. of pins	PCV (125, 140 engine)		
	Valve side (plug)	Harness side (receptacle)	Testing connection use special tool Part No.
2			799-601-9430 (Socket) (Kit : 799-601-4101) (Kit : 799-601-4201)
	—	—	

No. of pins	Fuel supply pump (95 engine)		
	Valve side (plug)	Harness side (receptacle)	
2			—
	—	—	

No. of pins	Variable flow turbocharger, EGR valve (95 engine)		
	Sensor (motor) side (plug)	Harness side (receptacle)	
8			—
	—	—	

B4W21624

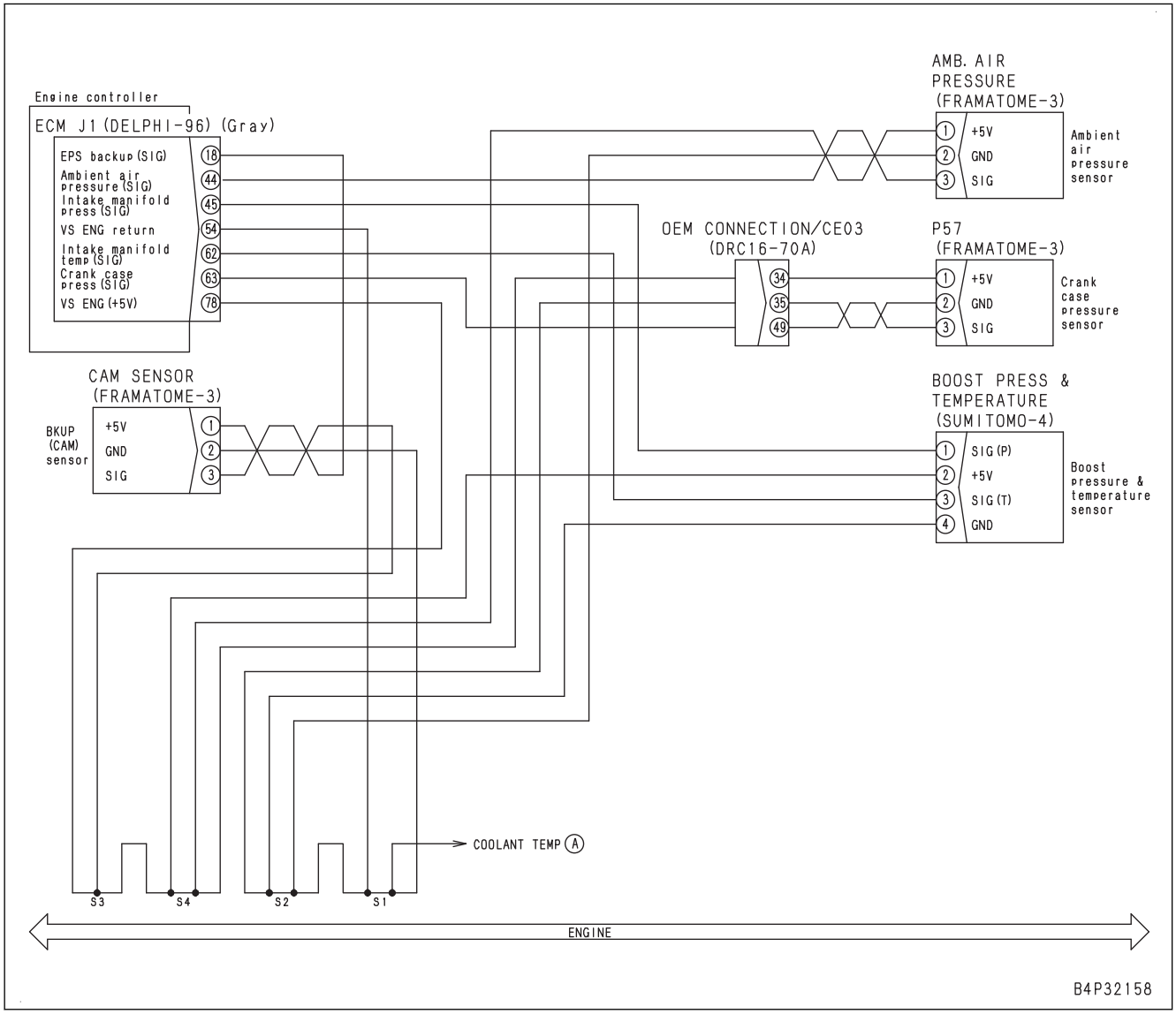
Failure code	Failure (Displayed on screen)	Applicable component	Action level	Category of history	Remarks
DHAAMA	KDPF Differential Pressure Sensor Frozen	ENG		Electrical system	
DHACMA	KDPF Outlet Pressure Sensor Frozen	ENG	—	Electrical system	
DHPAMA	Front Pump Pressure Sensor Defective Function	PUMP	L01	Electrical system	
DHPBMA	Rear Pump Pressure Sensor Defective Function	PUMP	L01	Electrical system	
DHS3MA	Arm IN PPC Pressure Sensor Defective Function	WE	L01	Electrical system	
DHS4MA	Bucket CURL PPC Pressure Sensor Defective Function	WE	L01	Electrical system	
DHS8MA	Boom RAISE PPC Pressure Sensor Defective Function	WE	L01	Electrical system	
DHS9MA	Boom LOWER PPC Pressure Sensor Defective Function	WE	L01	Electrical system	
DHSAMA	Swing Right PPC Pressure Sensor Defective Function	WE	L01	Electrical system	
DHSBMA	Swing Left PPC Pressure Sensor Defective Function	WE	L01	Electrical system	
DHSCMA	Arm OUT PPC Pressure Sensor Defective Function	WE	L01	Electrical system	
DHSDMA	Bucket DUMP PPC Pressure Sensor Defective Function	WE	L01	Electrical system	
DHSFMA	Travel Forward Left PPC Pressure Sensor Defective Function	PUMP	L01	Electrical system	
DHSGMA	Travel Forward Right PPC Pressure Sensor Defective Function	PUMP	L01	Electrical system	
DHSHMA	Travel Reverse Left PPC Pressure Sensor Defective Function	PUMP	L01	Electrical system	
DHSJMA	Travel Reverse Right PPC Pressure Sensor Defective Function	PUMP	L01	Electrical system	
DHZAMA	Service PPC Pressure Sensor Defective Function	PUMP	L03	Electrical system	
DHZCL8	Service PPC Pressure Signal Incompatibility	PUMP	L03	Electrical system	
DK80KM	IMU Calibration Not Completed	ICT	L01	Electrical system	
DK80KR	IMU Defective Communication	ICT	L01	Electrical system	
DK80KT	IMU Internal Failure	ICT	L01	Electrical system	
DKG1KM	Bucket Cylinder Calibration Not Completed	ICT	L01	Electrical system	
DKG1L8	Bucket Cylinder Stroke Sensor In Range Error	ICT	L01	Electrical system	

FAILURE CODE [AQ10N3]

<table>
<tr><td>Action level</td><td>Failure code</td><td rowspan="2">Failure</td><td rowspan="2">Manual Stationary Regeneration Request
(KDOC Face Plugging)
(Engine controller system)</td></tr>
<tr><td>L01</td><td>AQ10N3</td></tr>
<tr><td>Detail of failure</td><td colspan="3">The Manual Stationary Regeneration Request (KDOC) requires the user to perform “manual stationary regeneration” to recover the efficiency effectively because the efficiency of KDOC (catalyst action) (The soot in KCSF does not burn normally because the KDOC inlet temperature in regeneration is normally approximately 250 to 400 °C and the KDOC outlet temperature is normally approximately 450 to 600 °C but the KDOC outlet temperature does not rise).</td></tr>
<tr><td>Action of controller</td><td colspan="3">• EGR valve closed.
• Fuel dosing stops.</td></tr>
<tr><td>Phenomenon on machine</td><td colspan="3">• None</td></tr>
<tr><td>Related information</td><td colspan="3">⚠ KDOC and KDPF become hot (Min. 500 °C). Be careful not to get burned.
• Temperature in KDOC inlet temperature sensor can be checked with monitoring function (Code: 47300(°C))
• Temperature in KDOC outlet temperature sensor can be checked with monitoring function (Code: 47400(°C))
• Temperature in KDPF outlet temperature sensor can be checked with monitoring function (Code: 47200(°C))
• The KDOC inlet temperature sensor, the KDOC outlet temperature sensor, and the KDPF outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller.
• As to procedure for accessing KDPF temperature sensor, see “50 DISASSEMBLY AND ASSEMBLY”, “REMOVE AND INSTALL KDPF ASSEMBLY”.
• After turning starting switch to OFF position, engine controller performs AdBlue/DEF purging (for Max. 6 minutes) and then stops. To restart engine, wait until system operating lamp goes off after turning starting switch to OFF position, and then turn starting switch to ON position.
• All of KDOC inlet temperature, KDOC outlet temperature and KDPF outlet temperature during idle (non-regeneration) are approximately 100 to 250 °C. Each temperature difference is approximately 10 °C (KDOC inlet temperature > KDOC outlet temperature > KDPF outlet temperature).
• During manual stationary regeneration, KDOC inlet temperature is approximately 250 to 400 °C, and both KDOC outlet temperature and KDPF outlet temperature are approximately 450 to 600 °C.
• The manual stationary regeneration (KDOC Face Plugging) does not perform fuel dozing to recover the KDOC efficiently, so all of KDOC inlet temperature, KDOC outlet temperature, and KDPF outlet temperature become approximately 250 to 400 °C.
• The failure code [CA2637] is displayed while this failure code is displayed.
How to perform manual stationary regeneration
1. Start the engine.
2. From service menu of machine monitor, display “Diagnostic Tests” screen, open “02 Active Regeneration for Service”, and then perform “Manual Stationary Regeneration”.
REMARK
The manual stationary regeneration time of the Manual Stationary Regeneration Request (KDOC Face Plugging) is approximately one and a half hours.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="9">2</td><td rowspan="9">Defective charge temperature sensor</td><td colspan="4">1. Turn starting switch to OFF position.
2. Disconnect connector BOOST PRESS & IMT and connect socket to male side.
REMARK
Regard charge temperature sensor as normal if its resistance is 80 Ω to 48 kΩ.</td></tr>
<tr><td rowspan="8">Resistance</td><td rowspan="7">REMARK
Charge thermal characteristics
between BOOST PRESS & IMT (male) (3) and (4)</td><td>-40 °C</td><td>41 to 48 kΩ</td></tr>
<tr><td>-20 °C</td><td>14 to 16 kΩ</td></tr>
<tr><td>0 °C</td><td>5.4 to 6.1 kΩ</td></tr>
<tr><td>30 °C</td><td>1.6 to 1.8 kΩ</td></tr>
<tr><td>60 °C</td><td>500 to 600 Ω</td></tr>
<tr><td>90 °C</td><td>230 to 250 Ω</td></tr>
<tr><td>130 °C</td><td>80 to 90 Ω</td></tr>
<tr><td>Between BOOST PRESS & IMT (male) (3) and ground</td><td>All range</td><td>Min. 100 kΩ</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Ground fault in wiring harness (contact with ground circuit)</td><td colspan="4">1. Turn starting switch to OFF position.
2. Disconnect connector ECM J1, and connect T-adapter to female side.</td></tr>
<tr><td>Resistance</td><td colspan="2">Between ECM J1 (female) (62) and ground</td><td>Min. 100 kΩ</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Short circuit in wiring harness</td><td colspan="4">1. Turn starting switch to OFF position.
2. Disconnect connector ECM J1, and connect T-adapter to female side.</td></tr>
<tr><td>Resistance</td><td colspan="2">REMARK
Use charge temperature sensor resistance characteristics table for check on cause 2 as criteria for resistance
between ECM J1 (female) (62) and (54).</td><td>80 Ω to 48 kΩ</td></tr>
<tr><td>5</td><td>Defective engine controller</td><td colspan="4">If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</td></tr>
</table>

Circuit diagram related to sensor 1 supply circuit



FAILURE CODE [CA689]

Action level	Failure code	Failure	Engine NE Speed Sensor Error (Engine controller system)
L01	CA689		
Detail of failure	Error occurs in the signal from engine NE speed sensor.		
Action of controller	Operates by signal from engine Bkup speed sensor.		
Phenomenon on machine	• Running engine stops (when Bkup (CAM) speed sensor is also defective). • Stopped engine cannot be started (when Bkup (CAM) speed sensor is also defective). • Engine hunts. • Engine startability is poor.		
Related information	• After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine. • Because internal speed sensor consists of hole sensor and electronic circuit instead of coil, whether speed sensor is normal or not cannot be determined even if resistance of speed sensor is measured by using multimeter. • Since output of normal speed sensor is 5 V pulse voltage, it cannot be measured by using multimeter. • Speed sensor detects tooth missing part of rotation speed sensing wheel installed on crankshaft.		

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 NE speed sensor power supply system	If failure code [CA238] or [CA239] is displayed, perform troubleshooting for the code first.			
3	Engine NE speed sensor broken or installed improperly (loosened)	Engine NE speed sensor may be broken or installed improperly (loosened). Check it.			
4	Defective NE speed sensor power supply system	1. Turn starting switch to OFF position. 2. Disconnect connector NE, and connect T-adapter to female side. 3. Turn starting switch to ON position.			
		Voltage	Between CRANK SENSOR (female) (1) and (2)	Power supply	4.75 to 5.25 V

FAILURE CODE [CA1696]

Action level	Failure code	Failure	Sensor 5 Supply Voltage Low Error (Engine controller system)
L03	CA1696		
Detail of failure	Low voltage error is detected in 5 V power supply of the KDPF differential pressure sensor, KDPF outlet pressure sensor and, AdBlue/DEF pump pressure sensor.		
Action of controller	• Operates at estimated value of KDPF outlet pressure sensor. (Operation may be performed at 0 kPa {0 kgf/cm^2} .) • Operates at estimated value of KDPF differential pressure sensor. (Operation may be performed at 0 kPa {0 kgf/cm^2} .) • Operates at fixed value (-100 kPa) of AdBlue/DEF pump pressure. • Closes EGR valve. • Controls engine output for operation. • Stops regeneration control.		
Phenomenon on machine	Engine power deration		
Related information	• KDPF differential pressure sensor and KDPF outlet pressure sensor are provided as a unit. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared (note the engine power deration is not canceled right after the failure code is cleared).		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Defective sensor or wiring harness	1. Starting switch: OFF 2. Disconnect following connectors one by one and turn starting switch to ON position each time. 3. Each time troubleshooting is finished, return to step 1. If this failure code goes out, disconnected sensor is defective. **REMARK** Other failure codes are also displayed. This is because the connector is disconnected. Ignore all failure codes except for [CA1695].		
		Connector	KDPF differential pressure (outlet pressure) sensor	E25
			AdBlue/DEF pump pressure sensor	MB02
3	Ground fault in wiring harness (contact with ground circuit)	1. Starting switch: OFF 2. Disconnect connectors ECM J2, E25, and MB02, and connect T-adapter to either female side.		
		Resistance	Between ECM J2 (female) (8) and ground, or between E25 (female) (4) and ground	Min. 100 kΩ

No.	Cause	Procedure, measuring location, criteria and remarks
8	Defective exhaust gas color	• If failure code [CA1921], or [CA2639] is displayed after manual stationary regeneration is complete, perform the following: • See “TEST EXHAUST GAS COLOR” section in “Chapter 30 TESTING AND ADJUSTING” for checking the exhaust gas color. • Perform regeneration disable on the machine monitor to check the exhaust gas color. 1. Suddenly accelerate the engine from low idle to high idle two times, and then keep the engine running at high idle speed for 5 seconds. If an excess black smoke is seen at high idle speed during acceleration, perform “KDPF GETS CLOGGED IN A SHORT TIME” of S mode. Even excessive black smoke is exhausted during engine acceleration, if it is not at engine high idle, it is not defective. 2. To finish the exhaust gas color check, cancel the regeneration disable. 3. Make sure that the failure code is cleared.

FAILURE CODE [CA2387]

Detail of failure	Servo error occurs in the VGT. (Response from the VGT position sensor is different from the instructed value to the VGT.)
Action level	L03
Action of controller	• Closes the EGR valve, and operates the VGT (failure side) fully. • The engine power is derated. • Stops the regeneration control.
Phenomenon on machine	The engine output lowers.
Related information	**Pre-troubleshooting** • The VGT servo error can be caused by the failure codes that follow. Do each troubleshooting, and check and repair the problem. For details, see “TROUBLESHOOTING FLOWCHART”. • If the failure code [CA187], [CA1921], [CA1922], [CA2381], or [CA2382] is shown at the same time, do the troubleshooting for it first. **Reference information** The engine output deration is canceled when the starting switch is set to the OFF position after “E” goes off on the abnormal record of this failure code. (The engine output deration is not canceled when “E” goes off on the abnormal record of this failure code.)

No.	Cause	Procedures, Measurement, Values, Note	Diagnosis and treatment	
1	Wiring harness and connector	1. Check the wiring harness and connector. For details, see “RELATED INFORMATION FOR TROUBLESHOOTING”, “CHECKS BEFORE TROUBLESHOOTING”, “ELECTRIC EQUIPMENT”. 2. Are the wiring harness and connector in the correct state?	YES	• The wiring harness and connector are in the correct state. • Go to the next check item.
			NO	• The wiring harness or connector is defective. • Repair or replace the defective wiring harness or connector. • Go to “Confirmation of repair”.
2	VGT drive oil pressure	1. Do the troubleshooting. For details, see TESTING AND ADJUSTING, “TEST EGR VALVE AND VGT OIL PRESSURE”. 2. Does the troubleshooting result agree with the standard value?	YES	• The VGT drive oil pressure is in the correct state. • Go to the next check item.
			NO	Go to the check item of the "VGT circuit oil pump".

FAILURE CODE [CA3147]

Action level	Failure code	Failure	SCR Outlet Temperature Sensor Low Error
L01	CA3147		(Engine controller system)
Detail of failure	Ground fault or sensor circuit error in SCR outlet temperature sensor measuring section or probe (+)		
Action of controller	• As the SCR outlet temperature cannot be detected, substitute the SCR temperature for the SCR outlet temperature and run the engine (if the SCR temperature sensor also has an error, use the latest normal value). • Advances to Inducement strategy. • AdBlue/DEF injection stops.		
Phenomenon on machine	• NOx emission increases because AdBlue/DEF injection is disabled. • Engine power deration according to inducement strategy.		
Related information	⚠ **The SCR assembly, sensor fitting piping, and sensor probe become hot (Min. 400 °C). be careful not to get burned.** • 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 outlet temperature sensor measuring section or probe (+) is sent to the engine controller via CAN communication, and this failure code is displayed. • For the replacement procedure of the SCR outlet temperature sensor, see “Disassembly and assembly”, “Remove and install SCR temperature sensor”. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

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

Related information	**⚠ The temperature of KDPF and KDOC becomes hot (Min. 500 °C). Be careful not to get burned.** • The KDOC inlet temperature sensor, the KDOC outlet temperature sensor, and the KDPF outlet temperature sensor are integrated into one sensor controller which provides CAN communication with the engine controller. • Temperature in KDOC inlet temperature sensor can be checked by monitoring function. (Code: 47300 (°C)) • Temperature in KDOC outlet temperature sensor can be checked by monitoring function. (Code: 47400 (°C)) • Temperature in KDPF outlet temperature sensor can be checked by monitoring function. (Code: 47200 (°C)) • 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. • 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 restart becomes necessary. • 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). **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 KDPF outlet temperature sensor	If failure code [CA3319], [CA3321] or [CA3322] is displayed, perform troubleshooting for [CA3319], [CA3321] or [CA3322].
2	Defective intake air system	Check intake air system hoses, clamps, and tubes for damage and loosening. Repair as necessary.

FAILURE CODE [CA3558]

Action level	Failure code	Failure	AdBlue/DEF Pump Voltage High Error (Engine controller system)
L01	CA3558		
Detail of failure	High voltage error occurs in the AdBlue/DEF pump drive circuit.		
Action of controller	• AdBlue/DEF pump stops. • AdBlue/DEF purging stops. • Advances to Inducement strategy.		
Phenomenon on machine	• NOx emission increases because AdBlue/DEF injection is disabled. • Engine output is reduced based on inducement strategy.		
Related information	• If the starting switch is turned ON while the AdBlue/DEF pump connector is removed, this failure code is displayed. • The AdBlue/DEF pump operates120 seconds after starting the engine, or it operates, after starting the engine, if not in AdBlue/DEF thawing process, when the KDPF outlet temperature becomes over 150 °C, or when AdBlue/DEF pump pressure raising test is implemented. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position or operate the AdBlue/DEF pump.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of the failure code “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position. 3. See “SERVICE MODE” and “METHOD FOR SETTING WITH TESTING MENU (SCR SERVICE TEST)” of SETTING AND OPERATION OF MACHINE MONITOR, and perform an AdBlue/DEF Pump Pressure Up Test.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J2 and MB02, and connect T-adapter to either female side.		
		Resistance	Between ECM J2 (female) (54) and MB02 (female) (8)	Max. 10 Ω
			Between ECM J2 (female) (79) and MB02 (female) (9)	Max. 10 Ω
3	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J2 and MB02, and connect T-adapter to female side of ECM J2.		
		Continuity	Between ECM J2 (female) (6) and each pin other than (6)	No continuity
			Between ECM J2 (female) (79) and each pin other than (79)	No continuity
4	Defective AdBlue/DEF pump	If failure code is still displayed after above checks, AdBlue/DEF pump may be defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)		
5	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

No.	Cause	Procedure, measuring location, criteria and remarks
1	CAN communication system error	If failure code [CA3232] is displayed, perform troubleshooting for [CA3232] first.
2	Defective sensor power supply system	If failure code [CA1776] or [CA1777] is displayed, perform troubleshooting for [CA1776] or [CA1777] first.
3	Defective turbocharger outlet NOx sensor system (internal circuit abnormality)	If failure code [CA1885] or [CA3682] or [CA3718] is displayed, perform troubleshooting for these failure codes first.
4	Defective turbocharger outlet NOx sensor	If failure code is still displayed after above checks, the turbocharger outlet NOx sensor may be defective. (Offset/drift due to sulfur-poisoned turbocharger outlet NOx sensor) 1. Turn starting switch to OFF position. 2. NOx sensor fails, therefore, replace the turbocharger outlet NOx sensor. 3. Turn starting switch to ON position. 4. Perform “Loaded Diagnostics Operation To Confirm Failure Correction”.
5	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Loaded Diagnostics Operation to Confirm Failure Correction

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

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

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 47300 “KDOC 1 Inlet Temperature” becomes 150 °C or higher. Check that monitoring code 19203 “Turbo Outlet NOx Sensor State” changes from 0 to 1).
4. Repair is completed if failure code is not displayed after 3 minutes has passed.

REMARK

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

No.	Cause	Procedure, measuring location, criteria and remarks
3	Defective ammonia sensor controller	1. Perform the above checks and “Loaded Diagnostics Operation To Confirm Failure Correction”. 2. If this failure code is displayed in above diagnosis, replace an ammonia sensor controller. 3. Perform “Loaded Diagnostics Operation To Confirm Failure Correction”.
		If the failure code is cleared, the original ammonia sensor controller may be defective.
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:

(Make sure this failure code is not displayed after this 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 to raise the exhaust temperature. (Keep the engine speed so that monitoring code 19300 “SCR temperature” is 150 °C or higher.)
4. Check if this failure code is not displayed after 1 minute.

REMARK

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

<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="5">3</td><td rowspan="5">High battery voltage</td><td colspan="3">1. Turn starting switch to OFF position.
2. Check that system operating lamp is not illuminated, and then turn the battery disconnect switch to OFF position.
3. Disconnect connector R52, and connect T-adapter to female side.
4. Turn the battery disconnect switch to ON position.
5. Turn starting switch to ON position.</td></tr>
<tr><td rowspan="3">Voltage</td><td>Between R52 (female) (1) and (4)</td><td>22 to 30 V</td></tr>
<tr><td>Between R52 (female) (2) and (4)</td><td>22 to 30 V</td></tr>
<tr><td>Between R52 (female) (3) and (4)</td><td>22 to 30 V</td></tr>
<tr><td>4</td><td>Defective engine controller</td><td colspan="3">If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</td></tr>
</table>

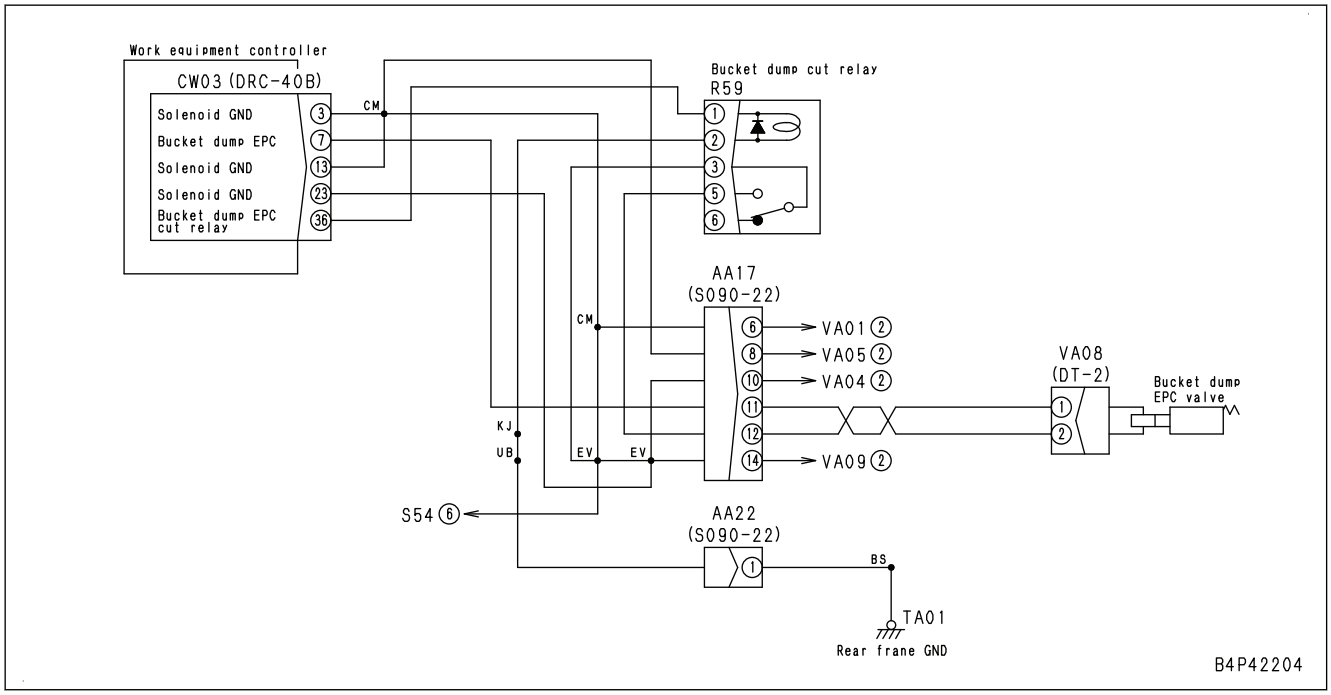
<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Ground fault in wiring harness (contact with ground circuit)</td><td colspan="3">1. Starting switch: OFF
2. Turn the battery disconnect switch to OFF position.
3. Disconnect connectors ECM J2 and R53A, and connect T-adapter to either female side.</td></tr>
<tr><td>Resistance</td><td>Between ground and ECM J2 (female) (7) or R53A (female) (11)</td><td>Min. 100 kΩ</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Short circuit in wiring harness</td><td colspan="3">1. Starting switch: OFF
2. Turn the battery disconnect switch to OFF position.
3. Disconnect connectors ECM J2 and R53A, and connect T-adapter to female side of ECM J2.</td></tr>
<tr><td>Continuity</td><td>Between ECM J2 (female) (7) and each pin other than pin (7)</td><td>No continuity</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Defective AdBlue/DEF heater relay</td><td colspan="3">1. Turn starting switch to OFF position.
2. Check that system operating lamp does not light up, and then turn the battery disconnect switch OFF.
3. Disconnect connector R53A and R53B, and replace AdBlue/DEF heater relay.
4. Turn the battery disconnect switch ON.
5. Turn starting switch to ON position.</td></tr>
<tr><td colspan="3">If this failure code is cleared, the original AdBlue/DEF heater relay is defective.</td></tr>
<tr><td>8</td><td>Defective engine controller</td><td colspan="3">If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</td></tr>
</table>

FAILURE CODE [D1M3MA]

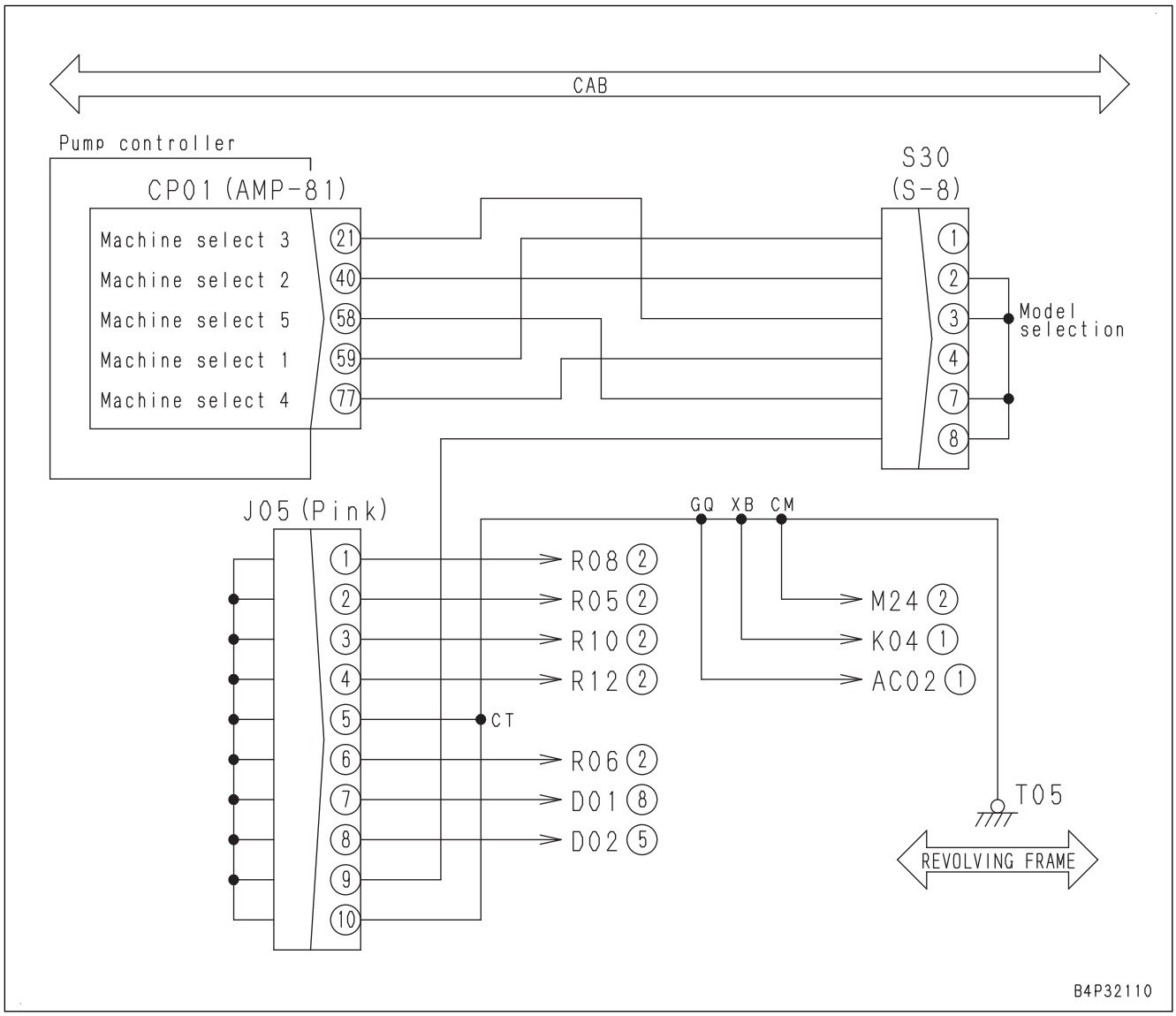
Action level	Failure code	Failure	Bucket DUMP EPC Cut Relay Error (Work equipment controller system)
L01	D1M3MA		
Detail of failure	Bucket DUMP EPC Cut Relay Internal Error		
Action of controller	Stops the output to the bucket DUMP EPC cutoff relay primary side (coil side) circuit.		
Phenomenon on machine	• When there is Bucket DUMP EPC Hot Short Circuit, the bucket DUMP EPC cut relay does not operate correctly, and bucket DUMP does not stop automatically. • Semi-auto mode cannot be selected in manual mode. • Manual mode automatically operates in semi-auto mode.		
Related information	• “Sensors are invalid” is shown in the control box. • Output condition to the primary side (coil side) circuit of bucket DUMP EPC cutoff relay can be checked with monitoring function. (Code: 76006) • This failure code is not shown when failure code [D1M3KA] is shown. • After the repair is done, check that the failure code is not shown with the operation that follows. Procedure: Turn the starting switch to the ON position.		

No.	Cause	Procedure, measurement location, criteria and remarks
1	Abnormal bucket DUMP EPC cutoff relay	Bucket DUMP EPC cutoff relay has an error. (Because this is an internal defect, troubleshooting cannot be done.)
2	Defective work equipment controller	If no failure is found by the previous checks, the work equipment controller is defective. (Because this is an internal defect, troubleshooting cannot be done.)

Circuit diagram of bucket DUMP EPC cutoff relay

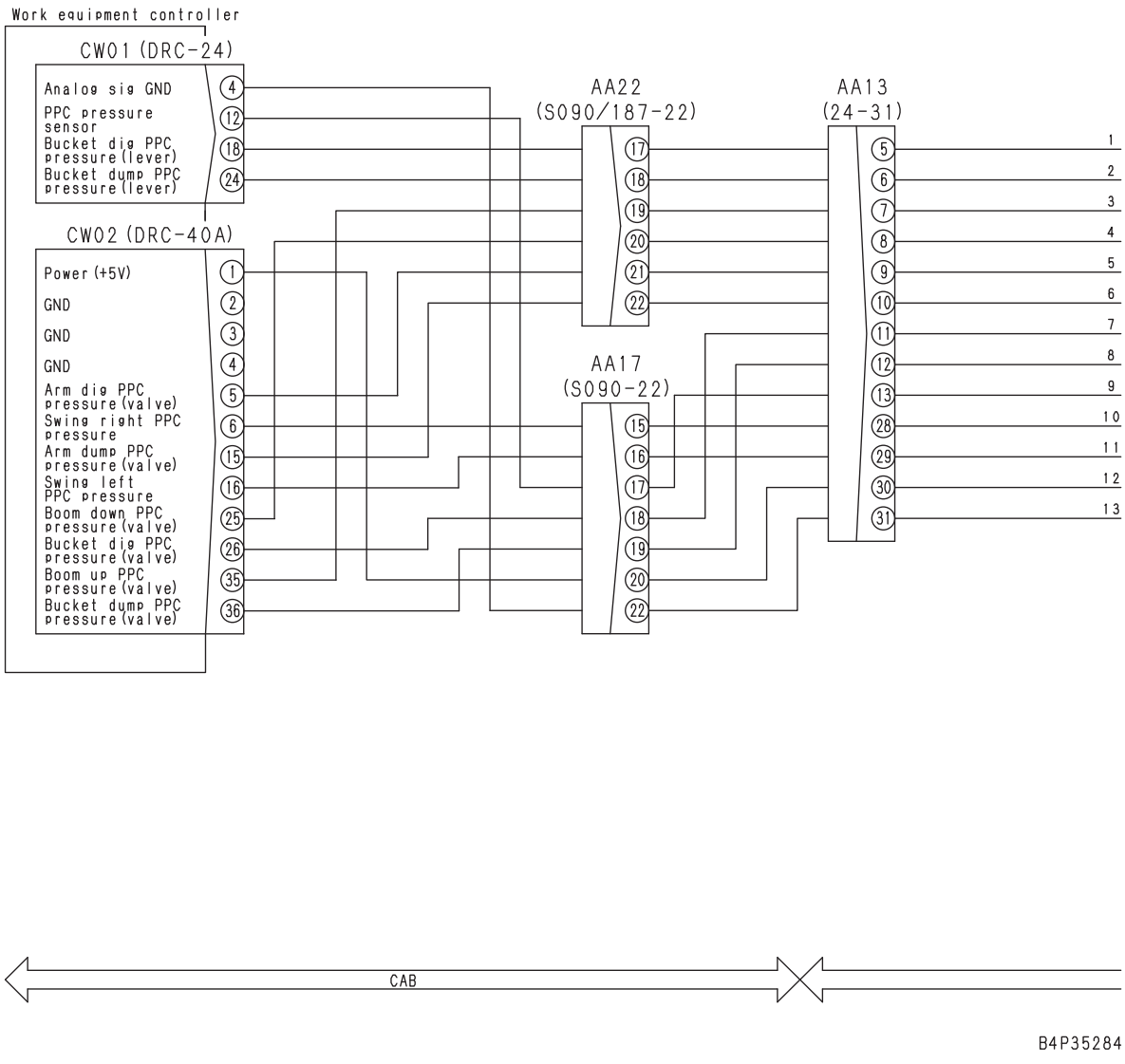


Circuit diagram related to machine model setting system

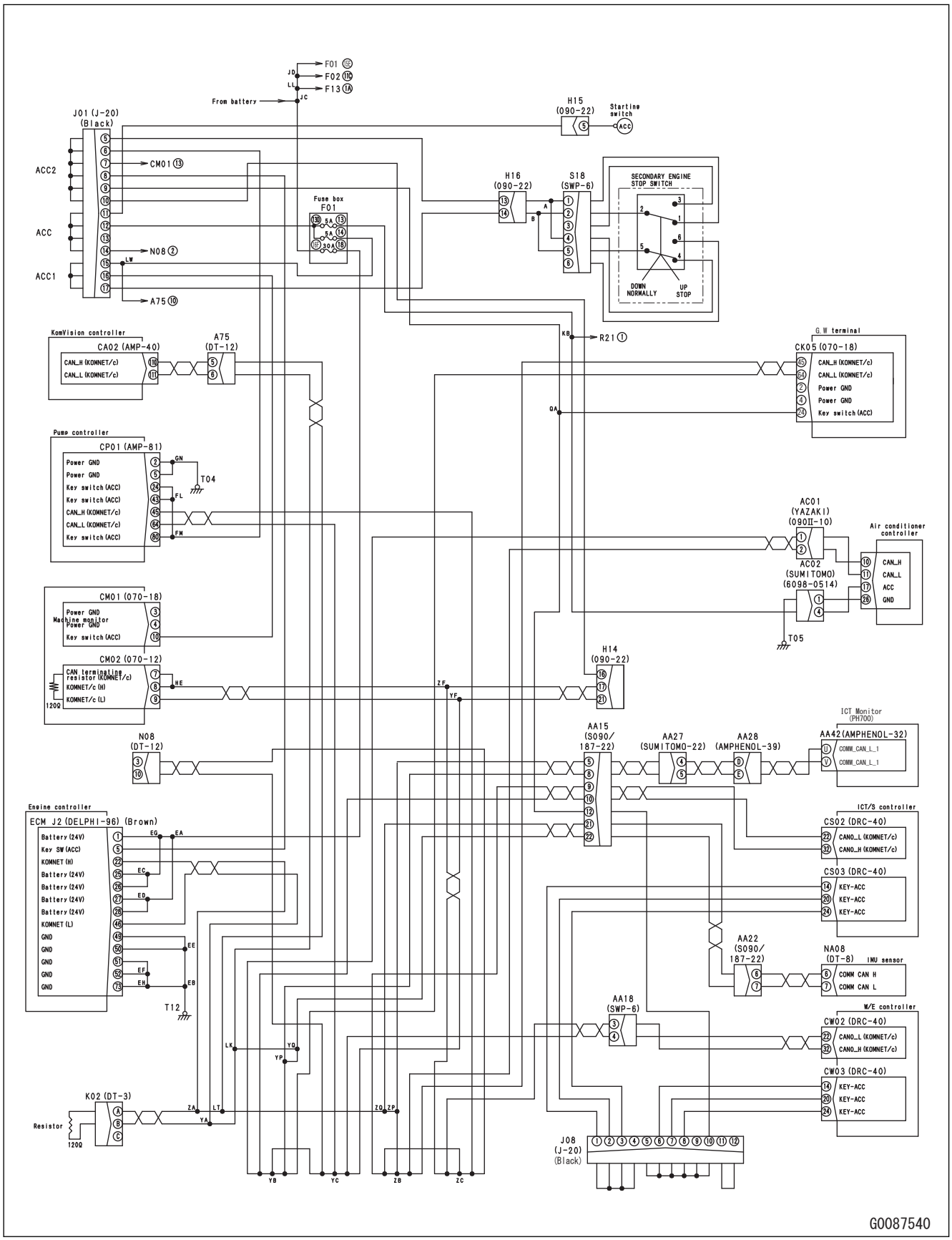


<table>
<tr><th>No.</th><th>Check item</th><th colspan="4">Procedure of troubleshooting</th><th colspan="2">Judgment and remedy</th></tr>
<tr><td rowspan="5">5</td><td rowspan="5">Open circuit in wiring harness (ACC signal circuit of machine monitor)</td><td colspan="4">1. Turn the starting switch to the OFF position.
2. Make sure that the system operating lamp is not lit. Turn the battery disconnect switch to the OFF position.
3. Remove the fuse No.14 in the fuse box F01.
4. Disconnect the connector CM01, and connect the T-adapter to the female side to troubleshoot.
5. Does the troubleshooting result agree with the standard value?</td><td>YES</td><td>• The wiring harness has no open circuit.
• Go to the next check item.</td></tr>
<tr><td>Item</td><td colspan="2">Measurement position/condition</td><td>Standard value</td><td rowspan="4">NO</td><td rowspan="4">• The wiring harness has an open circuit.
• Repair or replace the defective wiring harness.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="3">Resistance</td><td colspan="2">Between F01-14 and CM01 (female) (10)</td><td>Max. 1 Ω</td></tr>
<tr><td colspan="2">Between CM01 (female) (3) and ground</td><td>Max. 1 Ω</td></tr>
<tr><td colspan="2">Between CM01 (female) (4) and ground</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="5">6</td><td rowspan="5">CAN terminating resistor</td><td colspan="4">1. Turn the starting switch to the OFF position.
2. Disconnect the connectors CM02 and K02, and connect the T-adapter to each male side to troubleshoot.
3. Does the troubleshooting result agree with the standard value?</td><td>YES</td><td>• The CAN terminating resistor is normal.
• Go to the next check item.</td></tr>
<tr><td>Item</td><td colspan="2">Measurement position/condition</td><td>Standard value</td><td rowspan="3">NO</td><td rowspan="3">• The CAN terminating resistor is defective.
• Replace the CAN terminating resistor.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="2">Resistance</td><td colspan="2">Between CM02 (male) (7) and (9)</td><td>120 ± 12 Ω</td></tr>
<tr><td colspan="2">Between K02 (male) (A) and (B)</td><td>120 ± 12 Ω</td></tr>
<tr><td rowspan="5">7</td><td rowspan="5">Open circuit in wiring harness (CAN2 communication circuit)</td><td colspan="4">1. Turn the starting switch to the OFF position.
2. Make sure that the system operating lamp is not lit. Turn the battery disconnect switch to the OFF position.
3. Disconnect the connectors CM02 and K02, and connect the T-adapter to the each female side to troubleshoot.
4. Does the troubleshooting result agree with the standard value?</td><td>YES</td><td>• The wiring harness has no open circuit.
• Go to the next check item.</td></tr>
<tr><td>Item</td><td colspan="2">Measurement position/condition</td><td>Standard value</td><td rowspan="4">NO</td><td rowspan="4">• The wiring harness has an open circuit.
• Repair or replace the defective wiring harness.
• Go to “Confirmation of repair”.</td></tr>
<tr><td rowspan="3">Resistance</td><td colspan="2">Between CM02 (female) (7) and K02 (female) (A)</td><td>Max. 1 Ω</td></tr>
<tr><td colspan="2">Between CM02 (female) (8) and K02 (female) (A)</td><td>Max. 1 Ω</td></tr>
<tr><td colspan="2">Between CM02 (female) (9) and K02 (female) (B)</td><td>Max. 1 Ω</td></tr>
</table>

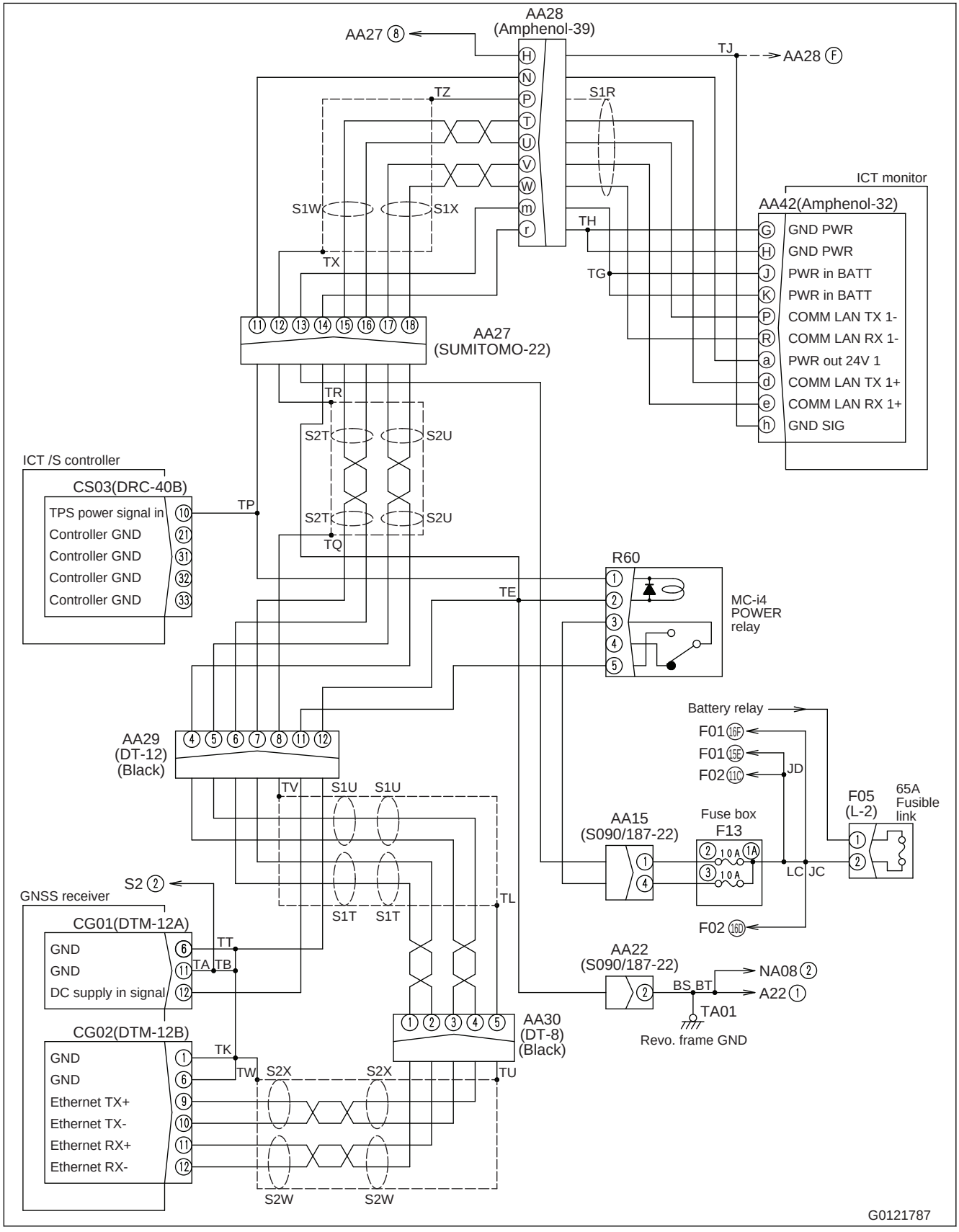
Circuit diagram related to 5 V sensor power supply output (1)



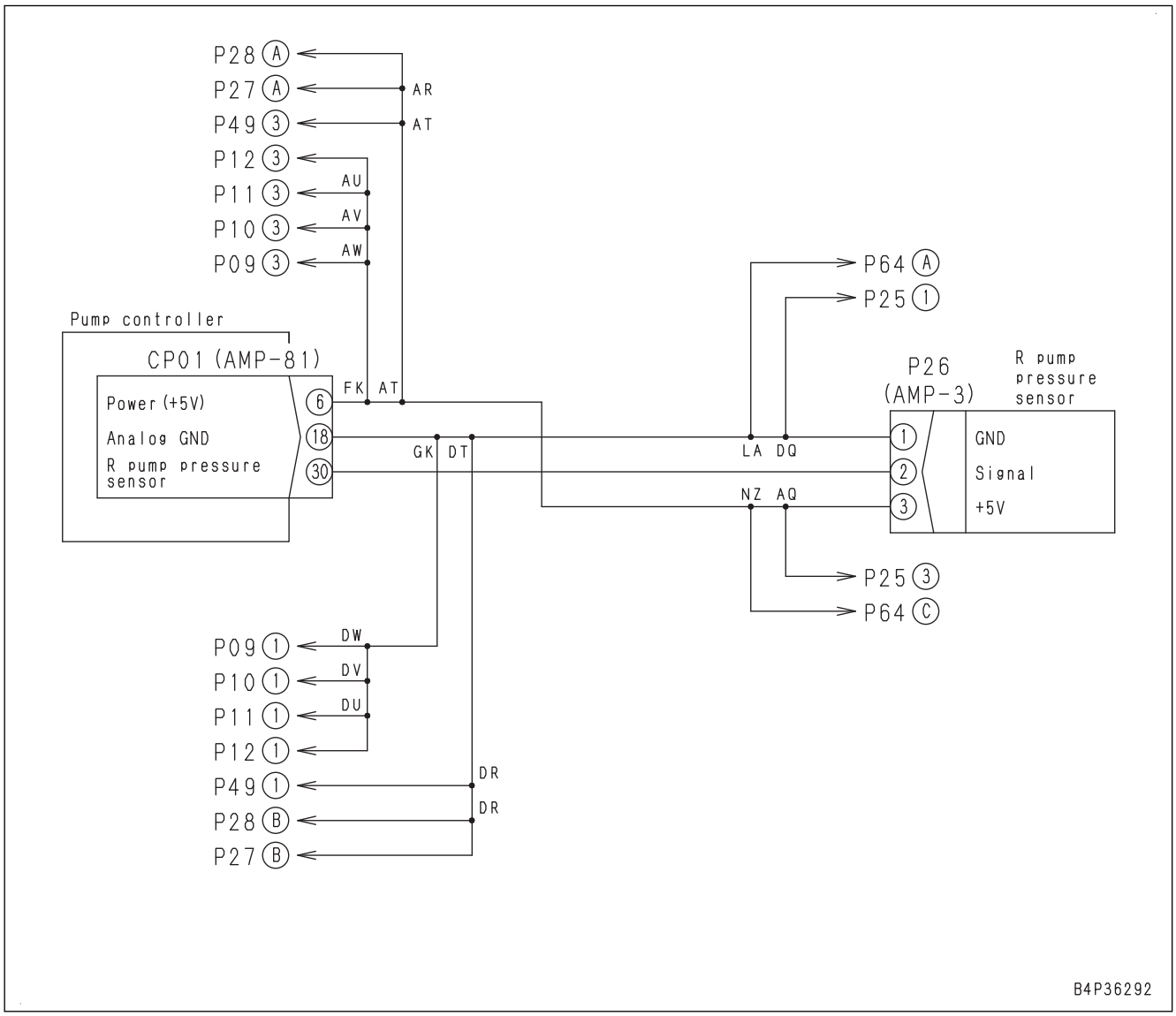
Circuit diagram related to CAN2 communication



Circuit diagram of control box



Circuit diagram related to rear pump pressure sensor

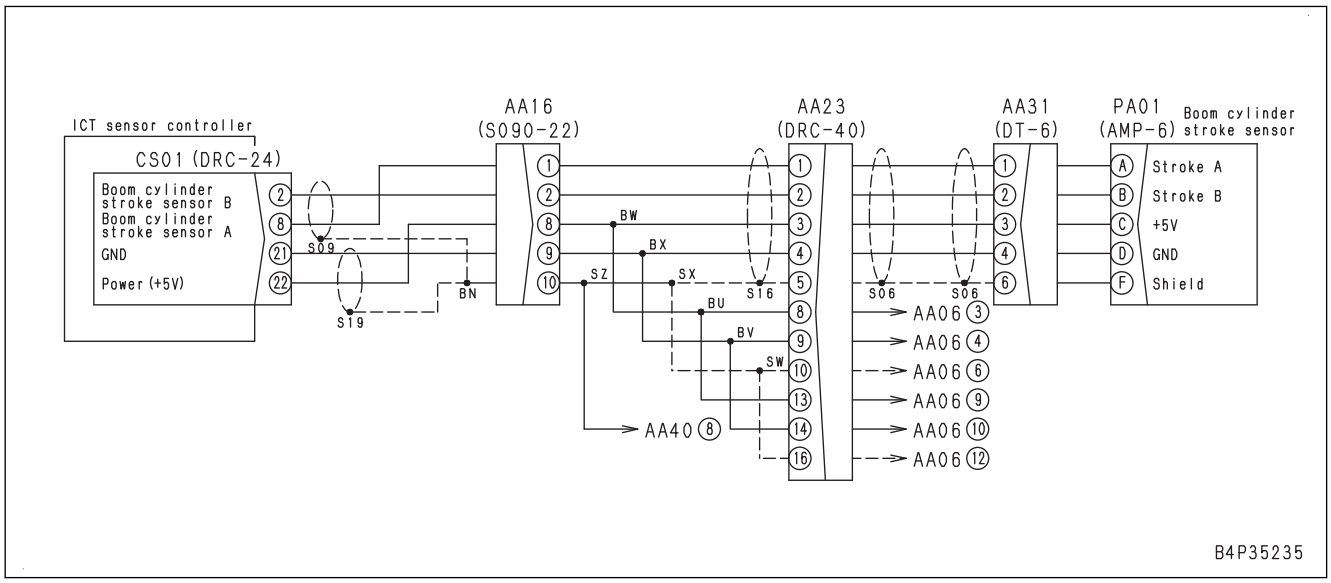


FAILURE CODE [DHUYMA]

Action level	Failure code	Failure	Attachment 1 R.H. PPC Pressure Sensor Defective Function (Pump controller system)
L01	DHUYMA		
Detail of failure	The signal voltage of the ATT1 R.H. PPC pressure sensor circuit is 0.3 V or below, or 4.5 V or above.		
Action of controller	Controls the machine with ATT1 right PPC pressure regarded as 0 MPa.		
Phenomenon on machine	• Pressure of bucket TILT is not shown correctly. • Manual mode cannot be changed to semi-auto mode. • Semi-auto mode is switched to manual mode automatically.		
Related information	**REMARK** If the connection of the 5 V circuit (3) and ground circuit (1) of the pressure sensor are inverted, the pressure sensor will break. Be very careful during the check. • If failure code [DA25KP] is also shown , do the troubleshooting for that code first. • “Sensors are invalid” is shown in the control box. • ATT1 right PPC pressure can be checked with monitoring function. (Code: 76401) • After the repair is done, check that the failure code is not shown with the operation that follows. Procedure: Turn the starting switch to the ON position or start the engine.		

No.	Cause	Procedure, measurement location, criteria and remarks		
1	Open circuit in wiring harness	1. Starting switch: OFF 2. Disconnect the connectors CP01 and PA20. Connect a T-adapter to each female side.		
		Resistance	Between CP01 (female) (6) and PA20 (female) (3)	Max. 1 Ω
			Between CP01 (female) (18) and PA20 (female) (1)	Max. 1 Ω
			Between CP01 (female) (12) and PA20 (female) (2)	Max. 1 Ω
2	Ground fault in wiring harness	1. Starting switch: OFF 2. Disconnect the connectors CP01 and PA20. Connect the T-adapter to one of them on the female side.		
		Resistance	Between ground and one of CP01 (female) (12) and PA20 (female) (2)	Min. 1 MΩ
3	Hot short circuit in wiring harness	1. Starting switch: OFF 2. Disconnect the connector PA20. Connect the T-adapter to the female side. 3. Starting switch: ON		
		Voltage	Between PA20 (female) (2) and (1)	Max. 1 V
4	Short circuit in wiring harness	1. Starting switch: OFF 2. Disconnect the connectors CP01 and PA20. Connect a T-adapter to the female side of CP01.		
		Continuity	Between CP01 (female) (12) and each pin other than (12)	No continuity

Circuit diagram related to stroke sensor for boom cylinder



FAILURE CODE [DKTVKA]

Action level	Failure code	Failure	Bucket Tilt Cylinder Stroke Sensor A Phase Open Circuit (ICT sensor controller system)
L01	DKTVKA		
Detail of failure	Input voltage from the bucket tilt cylinder stroke sensor A phase is 0.3 V or less.		
Action of controller	None in particular		
Phenomenon on machine	• Machine image of auto tilt bucket on the screen of control box stops. • Manual mode can not be switched to semi-auto mode. • Semi-auto mode is switched to manual mode automatically.		
Related information	• If failure code [DBR5KP] is also displayed, perform troubleshooting for it first. • “Sensors are invalid” is displayed on the screen of control box. • It is displayed only when selecting a file of auto tilt bucket. • After completion of repair, check that the failure code is cleared by the following operation. Procedure: Turn the starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Open circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connectors CS01 and AA29, and connect the T-adapter to each female side.		
		Resistance	Between CS01 (female) (9) and AA29 (female) (A)	Max. 1 Ω
			Between CS01 (female) (22) and AA29 (female) (C)	Max. 1 Ω
			Between CS01 (female) (21) and AA29 (female) (D)	Max. 1 Ω
2	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connectors CS01 and AA29, and connect the T-adapter to either female side.		
		Resistance	Between ground and either CS01 (female) (9) or AA29 (female) (A)	Min. 1 MΩ
3	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connectors CS01 and AA29, and connect the T-adapter to female side of CS01.		
		Continuity	Between CS01 (female) (9) and each pin other than (9)	No continuity
4	Defective bucket tilt cylinder stroke sensor A phase	1. Turn the starting switch to OFF position. 2. Insert the T-adapter into connector AA29. 3. Turn the starting switch to ON position.		
		Voltage	Between AA29 (female) (A) and (D)	0.3 to 4.7 V
5	Defective ICT sensor controller	If no failure is found by preceding checks, ICT sensor controller is defective. (Since this is an internal defect, troubleshooting cannot be performed).		

FAILURE CODE [DKV3KA]

Action level	Failure code	Failure	Arm Spool Stroke Sensor 2 Open Circuit (Work equipment controller system)
L01	DKV3KA		
Detail of failure	Input voltage from arm spool stroke sensor 2 is 0.2 V and below.		
Action of controller	None in particular		
Phenomenon on machine	Accuracy of work equipment control is degraded.		
Related information	• Output state of arm spool stroke sensor can be checked with monitoring function. (Code: 75905) • For the detail of power supply and ground circuit, see the circuit diagram of failure code [DB95KP]. • 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 [DB95KP] is also displayed, perform troubleshooting for it first. 1. Turn the starting switch to OFF position. 2. Disconnect the connector PA15, 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 PA15 (female) (1) and (2)	Power supply	2.5 to 6.0 V
2	Defective arm spool stroke sensor 2 (internal open circuit) or ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Insert the T-adapter into connector PA15. 3. Turn the starting switch to ON position. **REMARK** If power supply voltage is normal and sensor output voltage is abnormal (0.2 V and below), it cannot be determined whether ground fault or defective sensor is the cause. In this case, proceed to check on cause 4. If no failure is found by check on cause 4, arm spool stroke sensor 2 is defective.			
		Voltage	Between PA15 (4) and (2)	Power supply	0.2 to 4.8 V
3	Open circuit in wiring harness (wire breakage or defective contact)	1. Turn the starting switch to OFF position. 2. Disconnect the connectors CW01 and PA15, and connect the T-adapter to each female side.			
		Resistance	If power supply voltage on cause 1 is normal, this check is not required. Between CW01 (female) (22) and PA15 (female) (1)		Max. 1 Ω
			If power supply voltage on cause 1 is normal, this check is not required. Between CW01 (female) (21) and PA15 (female) (2)		Max. 1 Ω
			Between CW01 (female) (14) and PA15 (female) (4)		Max. 1 Ω

FAILURE CODE [DKVDKB]

Action level	Failure code	Failure	Boom RAISE EPC Cut Relay Ground Fault (Work equipment controller system)
L01	DKVDKB		
Detail of failure	When auto/manual switch is pressed, abnormal current flows to primary (coil side) circuit of boom RAISE EPC cut-off relay.		
Action of controller	Stops driving boom RAISE EPC cut-off relay primary (coil side) circuit.		
Phenomenon on machine	• Auto grade assist and stop control do not operate normally in semi-auto mode. • Semi-auto mode cannot be selected in manual mode. • Manual mode is automatically selected in semi-auto mode.		
Related information	• “Sensors are invalid” is displayed in control box. • Output state to primary (coil side) circuit of boom RAISE EPC cut-off relay can be checked with monitoring function. (Code: 76002) • After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Turn the starting switch to ON position, and turn on the auto/manual switch.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective boom RAISE EPC cut-off relay (internal open or short circuit)	1. Turn the starting switch to OFF position. 2. Disconnect the connector R51, and connect the T-adapter to male side. **REMARK** If resistance value is 600 Ω and above , wiring harness has an open circuit. If it is 200 Ω and below, wiring harness has a short circuit.		
		Resistance	Between R51 (male) (1) and (2)	200 to 600 Ω
2	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.)		
3	Open circuit or short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connector CW03, and connect the T-adapter to female side. **REMARK** If resistance value is 600 Ω and above , wiring harness has an open circuit. If it is 200 Ω and below, wiring harness has a short circuit.		
		Resistance	Between CW03 (female) (37) and (33)	200 to 600 Ω
4	Ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connectors CW03 and R51, and connect the T-adapter to female side of R51.		
		Continuity	Between R51 (female) (1) and each pin other than (1)	No continuity (no sound is heard)

FAILURE CODE [DUMBKB]

Detail of failure	The machine monitor senses a short circuit because the output voltage does not become low level while the KomVision controller outputs current to the system operating lamp.
Action level	L01
Action of controller	None.
Phenomenon on machine	None.
Related information	**Reference information** • The system operating lamp shows the period that the battery disconnect switch cannot be turned to the OFF position. • If the battery disconnect switch is set to the OFF position while the system operating lamp is lit, the data stored in each controller memory can be lost. • The system operating lamp cannot be lit from the KomVision controller. • Although the system operation lamp cannot be lit from the KomVision controller, no trouble will result unless the battery disconnect switch is turned to the OFF position. • When the system operating lamp is lit, the output voltage is at low level.

<table>
<tr><th>No.</th><th>Check item</th><th colspan="3">Procedure of troubleshooting</th><th colspan="2">Judgment and remedy</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Wiring harness and connector</td><td colspan="3" rowspan="2">1. Check the wiring harnesses and connectors.
REMARK
For details of checking method, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “Electrical equipment”.
2. Are the wiring harness and connectors normal?</td><td>YES</td><td>• The wiring harness and connectors are normal.
• Go to the next check item.</td></tr>
<tr><td>NO</td><td>• The wiring harness or a connector is defective.
• Repair or replace the defective wiring harness or connector.
• Go to Confirmation of repair.</td></tr>
<tr><td rowspan="3">2</td><td rowspan="3">Hot short circuit in wiring harness</td><td colspan="3">1. Turn the starting switch to the OFF position.
2. Disconnect the connector L19.
3. Connect the T-adapter to female side of connector L19.
4. Turn the starting switch to the ON position.
5. Measure the voltage.
6. Does the troubleshooting result agree with the standard value?</td><td>YES</td><td>• The wiring harness has no hot short circuit.
• Go to the next check item.</td></tr>
<tr><td>Item</td><td>Measurement position/condition</td><td>Standard value</td><td rowspan="2">NO</td><td rowspan="2">• The wiring harness has a hot short circuit.
• Repair or replace the defective wiring harness.
• Go to Confirmation of repair.</td></tr>
<tr><td>Voltage</td><td>Between L19 (female) (2) and ground</td><td>Max 1 V</td></tr>
</table>

FAILURE CODE [DW91KA]

Action level	Failure code	Failure	Travel Junction Solenoid Open Circuit (Pump controller system)
L01	DW91KA		
Detail of failure	When output to travel junction solenoid is ON, no current flows in the circuit, so the open circuit is detected.		
Action of controller	None in particular (Since no current flows, solenoid is not energized.) If cause of failure disappears, machine becomes normal by itself.		
Phenomenon on machine	It is hard to steer the machine at travel.		
Related information	• Controller's command (ON/OFF) to travel junction solenoid can be checked with monitoring function. (As long as controller's command to solenoid is “ON”, sensor state displayed on monitoring screen is “ON” even if solenoid is not energized due to open circuit.) (Code: 02300 Solenoid 1) • Setting the solenoid to OFF interconnects travel junction circuit. • After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine and operate left/right travel lever for steering.		

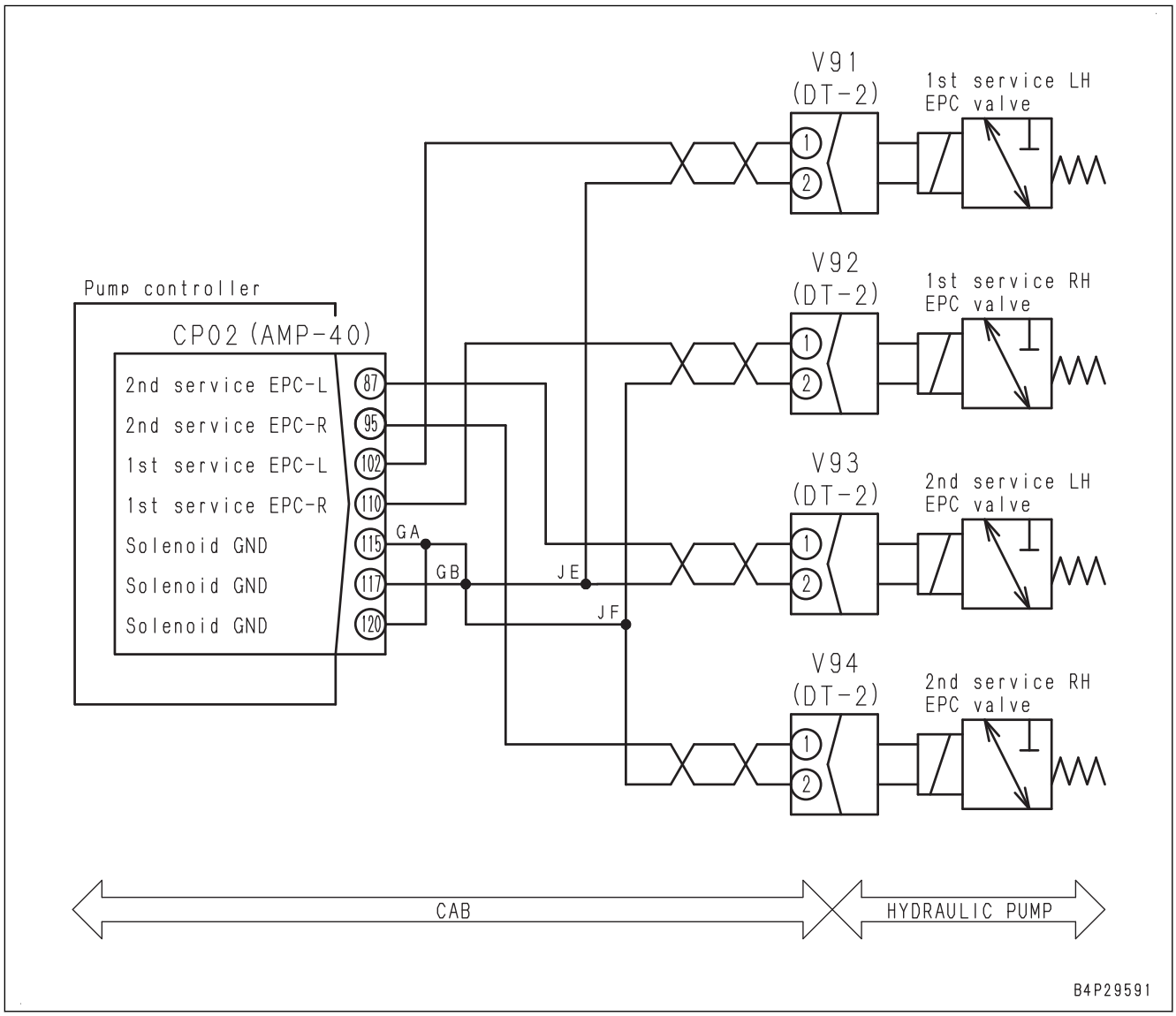
No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective travel junction solenoid (Internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector V03, and connect T-adapter to male side.		
		Resistance	Between V03 (male) (1) and (2)	20 to 60 Ω
2	Open circuit, short circuit, ground fault, hot short circuit of wiring harness, or defective pump controller	1. Turn starting switch to OFF position. 2. Disconnect connector V03, 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 V03 (female) (1) and (2)	1 to 4.5 V
3	Open or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector CP02 and connect T-adapter to female side.		
		Resistance	Between CP02 (female) (85) and each of (115), (117), and (120)	20 to 60 Ω
4	Open circuit in wiring harness (Wire breakage or defective contact of connector)	If failure code is still displayed after above checks, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors CP02 and V03, and connect T-adapters to each female side.		
		Resistance	Between CP02 (female) (85) and V03 (female) (1)	Max. 1 Ω
			Between each of CP02 (female) (115), (117), (120) and V03 (female) (2)	Max. 1 Ω
5	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 [DXA8KB]

Action level	Failure code	Failure	Front Pump PC-EPC Solenoid Short Circuit (Pump controller system)
L03	DXA8KB		
Detail of failure	Abnormal current flows when pump controller drives front pump PC-EPC solenoid, so pump controller determines that short circuit exists in front pump PC-EPC solenoid circuit.		
Action of controller	Stops output to front pump PC-EPC solenoid. Even if cause of failure disappears, machine does not become normal until starting switch is turned to OFF position.		
Phenomenon on machine	If pump load increases, engine speed decreases largely and engine may stop.		
Related information	• When solenoid and wiring harness are normal, engine can be prevented from stopping by setting pump drive secondary switch to ON position. • Drive current of front pump PC-EPC solenoid can be checked with monitoring function. (Code: 01300) • 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 F-PC-EPC solenoid (Internal short circuit or ground fault)	1. Turn starting switch to OFF position. 2. Disconnect connector V11, and connect T-adapter to male side.			
		Resistance	Between V11 (male) (1) and (2)		3 to 14 Ω
			Between V11 (male) (1) and ground		Min. 1 MΩ
2	Defective pump secondary drive switch (internal short circuit, ground fault)	1. Turn starting switch to OFF position. 2. Disconnect connector S25 and connect T-adapter to male side.			
		Resistance	Between S25 (male) (2) and (5), or between S25 (male) (3) and (5)	Switch position: Normal	Min. 1 MΩ
			Between S25 (male) (2) and ground, or between S25 (male) (3) and ground	Switch position: Normal	Min. 1 MΩ
3	Short circuit or ground fault in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector CP02 and connect T-adapter to female side. Check that pump drive secondary switch is in the normal position (lower).			
		Resistance	Between CP02 (female) (96) and each of (115), (117), and (120)		3 to 14 Ω
			Between CP02 (female) (96) and ground		Min. 1 MΩ
4	Ground fault in wiring harness (Contact with ground circuit)	If failure code is still displayed after above checks on cause 3, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors CP02, S25 and V11, and connect T-adapter to any female side.			
		Resistance	Between ground and CP02 (female) (96) or S25 (female) (3)		Min. 1 MΩ
			Between ground and S25 (female) (5) or V11 (female) (2)		Min. 1 MΩ

Circuit diagram related to ATT flow rate adjustment EPC



<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="4">5</td><td rowspan="4">Ground fault in wiring harness
(Contact with ground circuit)</td><td colspan="3">REMARK
If failure code is still displayed after above checks on cause 4, this check is not required.
1. Turn starting switch to OFF position.
2. Remove fuse No. 4 in fuse box F01.
3. Disconnect connectors M06, CP01, and D02, and connect T-adapter to either female side.</td></tr>
<tr><td rowspan="2">Resistance</td><td>Between ground and any one of F01 (4), M06 (female) (2), or D02 (female) (2)</td><td>Min. 1 MΩ</td></tr>
<tr><td>Between ground and any one of CP01 (female) (3), M06 (female) (1), or D02 (female) (6)</td><td>Min. 1 MΩ</td></tr>
<tr><td></td></tr>
<tr><td rowspan="3">6</td><td rowspan="3">Hot short circuit in wiring harness
(Contact with 24 V circuit)</td><td colspan="3">1. Turn starting switch to OFF position.
2. Disconnect connectors CP01 and M06, and connect T-adapter to female side of CP01.
3. Remove fuse No. 4.
4. Turn starting switch to ON position.
REMARK
Ignore failure codes displayed on machine monitor.</td></tr>
<tr><td>Voltage</td><td>Between CP01 (female) (3) and ground</td><td>Max. 1 V</td></tr>
<tr><td></td></tr>
<tr><td>7</td><td>Defective pump controller</td><td colspan="3">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).</td></tr>
</table>

E-3 AUTOMATIC PREHEATING SYSTEM DOES NOT WORK

Failure	Automatic preheating does not operate.
Related information	• Automatic preheating starts when boost temperature is below -4 °C. (monitoring code Charge Temperature: 18500) • If the automatic preheating does not work, check if manual preheating works first. • Engine controller checks primary (coil) side of preheat relay (connector R18) and generates failure code [CA2555] or [CA2556] if it is defective. • Engine controller generates failure codes [CA153] or [CA154] when defective charge (boost) temperature sensor is detected.

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective fuse	If fuse No. 6 in fuse box F01 is blown, circuit may have ground fault.		
2	Defective preheat relay (internal open or short circuit)	1. Turn starting switch to OFF position. 2. Replace preheating relay (connector R18) with, for instance, light relay (connector R05). 3. Turn starting switch to ON position.		
		If automatic preheating functions when boost temperature is below -4 °C, original preheater relay is defective.		
3	Open circuit or ground fault in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connectors CM01, R18, and D02, and connect T-adapter to female side of R18. **REMARK** If resistance value is 1 MΩ or more, wiring harness has an open circuit. If resistance value is 1 Ω or less, wiring harness has a short circuit.		
		Resistance	Between R18 (female) (5) and ground (coil resistance of heater relay)	Approx. 20 Ω
4	Open circuit in wiring harness (Wire breakage or defective contact of connector)	1. Turn the starting switch to OFF position. 2. Disconnect the connectors R18 and CM01, and connect the T-adapter to female side of R18. 3. Remove the fuse No.6 in fuse box F01.		
		Resistance	Between R18 (female) (3) and F01-6	Max. 1 Ω
			Between R18 (female) (5) and heater relay terminal R15	Max. 1 Ω
5	Ground fault in wiring harness	If the fuse is not blown out, this check is not required. 1. Turn the starting switch to OFF position. 2. Disconnect the connector R18, and connect the T-adapter to female side. 3. Remove the fuse No.6 in fuse box F01.		
		Resistance	Between R18 (female) (3) and ground	Min. 1 MΩ

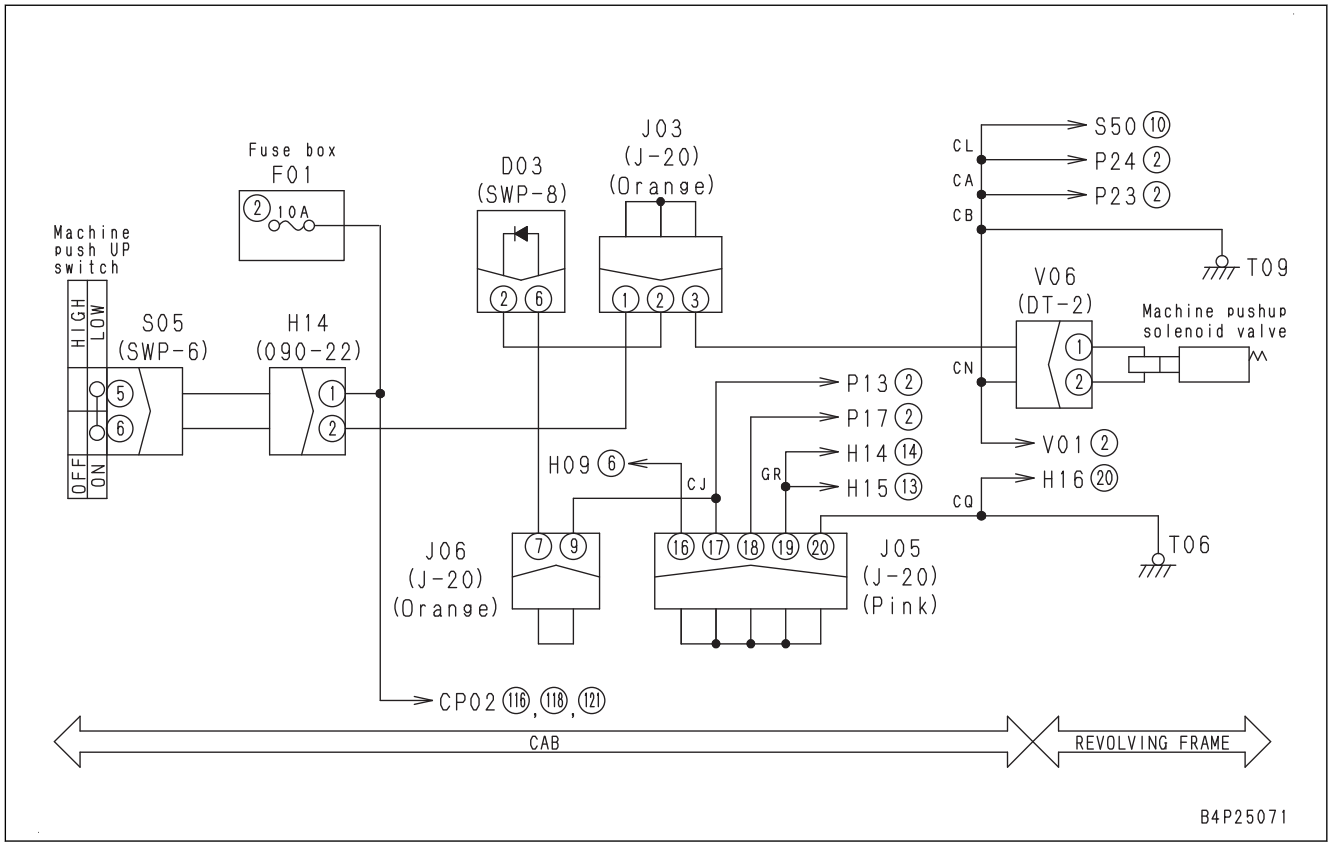
E-35 ALL OF WORK EQUIPMENTS, SWING, AND TRAVEL MECHANISM DO NOT MOVE

Failure	None of work equipment, swing or travel works.
Related information	

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td>1</td><td>Defective fuse</td><td colspan="4">If fuse No. 3 of F01 is burnt out, circuit may have ground fault, etc. (See check on Cause 7.)</td></tr>
<tr><td rowspan="3">2</td><td rowspan="3">Defective lock lever switch
(Internal open circuit)</td><td colspan="4">1. Turn starting switch to OFF position.
2. Disconnect connector S14 and connect T-adapter to female side.
3. Operate lock lever and perform troubleshooting.</td></tr>
<tr><td rowspan="2">Resistance</td><td rowspan="2">Between S14 (female) (1) and (2)</td><td>Lock lever: LOCK</td><td>Min. 1 MΩ</td></tr>
<tr><td>Lock lever: FREE</td><td>Max. 1 Ω</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Defective PPC lock relay (internal open or short circuit)</td><td colspan="4">1. Turn starting switch to OFF position.
2. Replace PPC lock relay (connector: R48) with light relay (connector: R05).
3. Turn starting switch to ON position.
4. Set the lock lever to FREE position.</td></tr>
<tr><td colspan="4">If any of work equipment, swing, and travel is available, the original PPC lock relay is defective.</td></tr>
<tr><td rowspan="3">4</td><td rowspan="3">Defective PPC lock solenoid
(Internal open, short circuit, or ground fault)</td><td colspan="4">1. Turn starting switch to OFF position.
2. Disconnect connector V01 and connect T-adapter to male side.</td></tr>
<tr><td rowspan="2">Resistance</td><td colspan="2">Between V01 (male) (1) and (2)</td><td>20 to 60 Ω</td></tr>
<tr><td colspan="2">Between V01 (male) (1) and ground</td><td>Min. 1 MΩ</td></tr>
<tr><td rowspan="3">5</td><td rowspan="3">Defective diode array D01
(Internal ground fault)</td><td colspan="4">1. Turn starting switch to OFF position.
2. Disconnect connector D01 and connect T-adapter to male side.</td></tr>
<tr><td rowspan="2">Continuity</td><td colspan="2">Between D01 (male) (8) (+) and (4) (-)</td><td>Continuity</td></tr>
<tr><td colspan="2">Between D01 (male) (4) (+) and (8) (-)</td><td>No continuity</td></tr>
<tr><td rowspan="3">6</td><td rowspan="3">Open or short circuit in wiring harness</td><td colspan="4">1. Turn starting switch to OFF position.
2. Disconnect connector R48, and connect T-adapter to female side.
3. Turn starting switch to ON position.
4. Set the lock lever to FREE position.</td></tr>
<tr><td>Resistance</td><td colspan="2">Between R48 (female) (5) and ground
(Resistance of PPC lock solenoid)</td><td>20 to 60 Ω</td></tr>
<tr><td>Voltage</td><td colspan="2">Between R48 (female) (3) and ground</td><td>Min. 20 V</td></tr>
</table>

No.	Cause	Procedure, measurement location, criteria and remarks		
7	Ground fault in wiring harness (contact with GND circuit)	**REMARK** If the fuse is not blown out, this check is not required. 1. Starting switch: OFF 2. Remove the fuse No.2. 3. Disconnect the connectors S05, V06, and D03, and connect the T-adapter to female side of S05, V06 or D03.		
		Resistance	Between ground and outlet F01-2 or S05 (female) (5)	Min. 1 MΩ
			Between ground and one of S05 (female) (6), V06 (female) (1), or D03 (female) (2)	Min. 1 MΩ

Circuit diagram related to machine push-up switch



E-89 BLADE EDGE STOP POSITION IS NOT ACCURATE FOR DESIGN SURFACE WHEN AUTO STOP CONTROL FUNCTION IS ON

Failure	Blade edge stop position is not accurate for design surface when auto stop control function is ON. (It stops in the sky above design surface.) (It stops at deeper position than design surface or does not stop.)
Related information	• Do the troubleshooting outdoors or in an area open to the sky to find a sufficient number of satellites. • If a failure code is shown on the machine monitor, do the troubleshooting for that code first. • Before troubleshooting, check that “PROJECT FILE SETTING” is done correctly as specified in the Operation and Maintenance Manual. • Before you do the troubleshooting, check that no related message is shown in the control box. (If one of the messages below is shown in the control box, do the troubleshooting for it first.) • Before you do this troubleshooting, select the Manual mode and check if the failures that follow are not shown. If a failure is found, do the troubleshooting for that failure first. H-2 All WORK EQUIPMENT, SWING, AND TRAVEL SPEED IS LOW OR POWER IS LOW H-3 FINE CONTROL PERFORMANCE OR RESPONSE IS UNSATISFACTORY H-5 ENGINE SPEED FALLS LARGELY OR ENGINE STOPS H-6 BOOM SPEED OR POWER IS LOW H-7 ARM SPEED IS LOW OR POWER IS LOW H-8 BUCKET SPEED OR POWER IS LOW H-14 TIME LAG OF WORK EQUIPMENT IS LARGE • Before you do this troubleshooting, do the troubleshooting for “WHEN YOU CHECK AND ADJUST BUCKET BLADE EDGE POSITION, VALUE IS DIFFERENT LARGELY” in E-mode. If there is an error, do the troubleshooting for it first. • Before you do this troubleshooting, check the range of blade edge when auto grade assist is ON.

No.	Cause	Procedure, measurement location, criteria and remarks
1	Defective design surface data	Check the design surface data for hole, protrusion and defect.
2	Incorrect setting of bucket weight	Select the bucket setting according to the bucket weight installed to the machine.
3	Defective setting of Semi-auto Adjustment (stop control adjustment)	Do the stop control adjustment in reference to the Operation and Maintenance Manual.
4	Defective receiving condition of GPS	While the failure occurs, check if Initializing... is shown on the control box. When Initializing... is shown, check if there is a failure at the area with good condition at good time. (“CONTROL BOX SHOWS THE MESSAGE [INITIALIZING...]” in E-mode)

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria and remarks</th></tr>
<tr><td rowspan="3">12</td><td rowspan="3">Defective operation of arm control valve (suction valve)
(arm OUT side)</td><td colspan="4">Be ready with engine stopped, then perform troubleshooting with engine at high idle.</td></tr>
<tr><td>Arm relief pressure</td><td>Hydraulic oil temperature: 45 to 55 °C</td><td>• Arm IN relief
• Arm OUT relief</td><td>33.1 to 36.8 MPa {338 to 375 kgf/cm^2}</td></tr>
<tr><td colspan="4">• If only arm OUT relief pressure in the above relief pressures is low, suction safety valve may be defective. Check the safety valve.
• Be careful to prevent foreign materials from entering the valve during restoration.
• Check for damaged sealing materials, etc. by appearance (Be careful to prevent foreign materials from entering during repair).
• When disassembling, replace the suction safety valve assembly with a new one since its relief pressure cannot be adjusted on the machine.</td></tr>
<tr><td rowspan="3">13</td><td rowspan="3">Malfunction of arm control valve (suction safety valve)
(arm IN side)</td><td colspan="4">Be ready with engine stopped, then perform troubleshooting with engine at high idle.</td></tr>
<tr><td>Arm relief pressure</td><td>Hydraulic oil temperature: 45 to 55 °C</td><td>• Arm IN relief
• Arm OUT relief</td><td>33.1 to 36.8 MPa {338 to 375 kgf/cm^2}</td></tr>
<tr><td colspan="4">• If only arm IN relief pressure in the above relief pressures is low, suction safety valve may be defective. Check the safety valve.
• Check for damaged sealing materials, etc. by appearance (Be careful to prevent foreign materials from entering during repair).
• When disassembling, replace the suction safety valve assembly with a new one since its relief pressure cannot be adjusted on the machine.</td></tr>
<tr><td rowspan="4">14</td><td rowspan="4">Malfunction of arm control valve (LS shuttle valve)</td><td colspan="4">Be ready with engine stopped, then perform troubleshooting with engine at high idle.</td></tr>
<tr><td rowspan="2">LS differential pressure</td><td>Hydraulic oil temperature: 45 to 55 °C</td><td>All control levers in NEUTRAL</td><td>3.9±1.0 MPa {40±10 kgf/cm^2}</td></tr>
<tr><td>Hydraulic oil temperature: 45 to 55 °C</td><td>Arm IN, DUMP fine control</td><td>2.45±0.1 MPa {25±1 kgf/cm^2}</td></tr>
<tr><td colspan="4">Among the above measuring points, if LS differential pressure becomes higher than the standard value, LS shuttle valve may be defective. Check for defect of the check valve (ball).</td></tr>
</table>

H-35 SWING DRIFT ON A SLOPE IS LARGE (WHILE SWING PARKING BRAKE IS APPLIED)

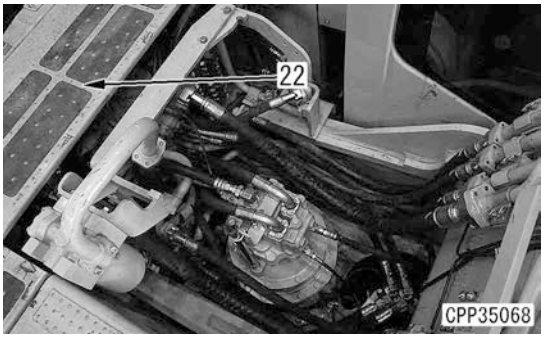
Failure	Swing drift on a slope is large while swing parking brake is applied.
Related information	• When swing lock switch is set to ON position or swing parking brake cancel switch is set to NORMAL position, swing parking brake is applied and swing system is locked by disc brake. • Perform all troubleshooting with working mode set in power mode (P). • If failure codes are displayed, perform troubleshooting for them first. (DW45KA, DW45KB)

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Malfunction of swing parking brake solenoid valve	Be ready with engine stopped, then perform troubleshooting with engine at high idle.			
		Output pressure of solenoid valve	Hydraulic oil temperature: 45 to 55 °C	Swing control lever: NEUTRAL	0 MPa {0 kgf/cm^2}
			Hydraulic oil temperature: 45 to 55 °C	Swing control lever: Left swing, right swing	2.84 to 3.43 MPa {29 to 35 kgf/cm^2}
2	Malfunction of swing motor (swing parking brake)	Since swing parking brake may malfunction, check it.(See chapter 20 “Swing”, “Swing drift on a slope”.)			
3	Defective swing motor	Be ready with engine stopped, then perform troubleshooting with engine at high idle.			
		Swing motor leakage amount	Swing lock switch: ON	Swing control lever: L.H. swing relief and R.H. swing relief	11 ℓ/min
4	Defective swing machinery	Check for unusual noise, unusual heat, and metallic powders in drained oil to make judgment.			

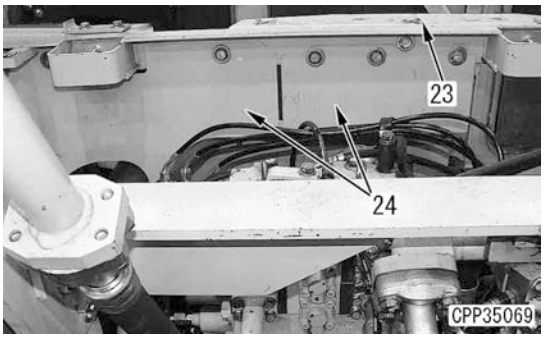
CONTENTS

Cover

22. Remove cover (22).



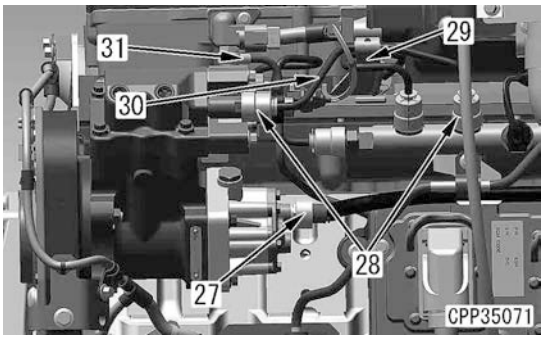
23. Remove frame (23).
24. Remove cover (24).



Fuel hose, tube

25. Disconnect fuel return hose (25) and fuel supply hose (26).

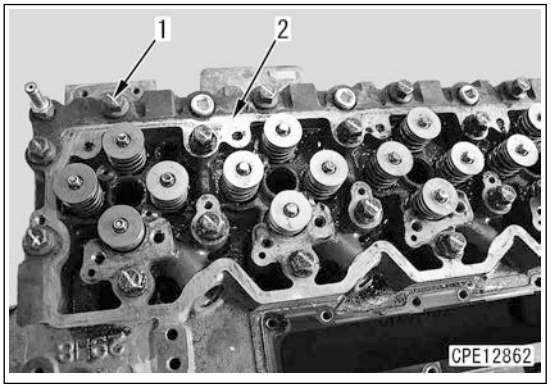
26. Disconnect fuel hose (27).
27. Remove fuel spray prevention caps (28) (2 pieces).
28. Remove sandwich clamp (29).
29. Remove high-pressure pipe (30).
30. Disconnect overflow tube (31).

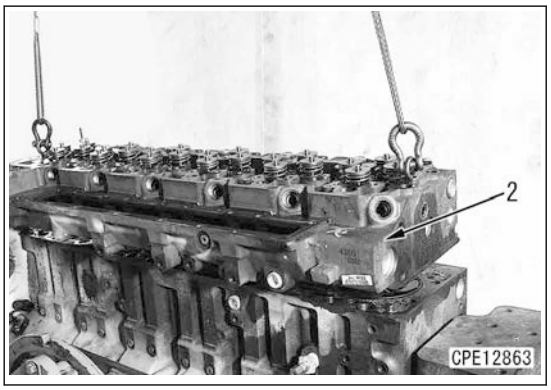


Cylinder head assembly

80. Remove bolts (1) (26 pieces), and remove cylinder head assembly (2).

Cylinder head assembly:
95 kg



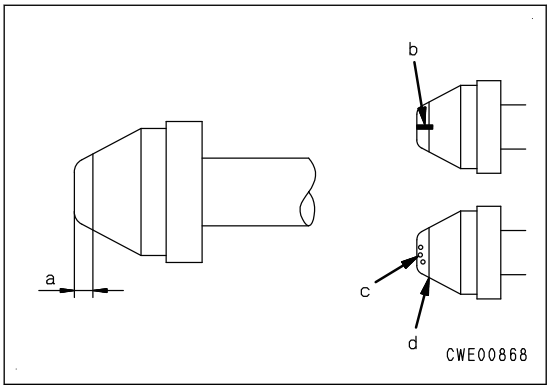


METHOD FOR INSTALLING CYLINDER HEAD ASSEMBLY

⚠ Do not bend the fuel high-pressure pipe to correct before using.

⚠ Check the following conditions, and then install the fuel high-pressure pipe. If it has any defect, replace the fuel high-pressure pipe with a new one since fuel may leak. Visually check that taper seal part (a) of the connection part (2 mm area from the tip-end) is free from longitudinal slits (b) or spotty dents (c).

Make sure that part (d) (end of taper seal: 2 mm from the tip-end) is free from steps you can feel by your fingernail (free from fatigue).



Procedure for checking for fuel leakage after connecting fuel high-pressure pipe

1. In the following case, check for fuel leakage.

NOTICE

When the fuel high-pressure pipe was removed or installed, check for fuel leakage according to the following procedure.

1) Clean the engine and the parts around it, and degrease them in advance so that you can check it easily for fuel leakage.
2) Spray the color checker (developer) over the joint of the fuel supply pump, common rail, fuel injector, and fuel high-pressure pipe.
3) Check for fuel leakage from the fuel piping and devices under the following 4 conditions respectively.

NOTICE

Repair them when the fuel is leaking out and then start the check from the beginning.

Hydraulic oil cooler assembly

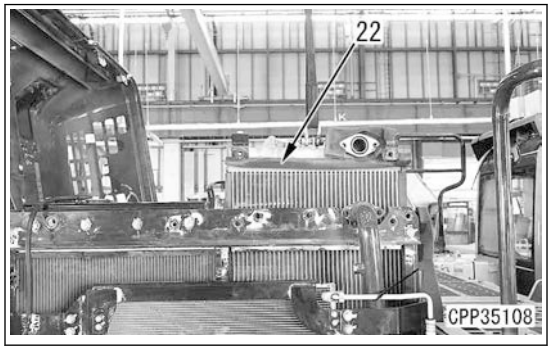
14. Sling hydraulic oil cooler assembly (22), and remove it.

    Hydraulic oil cooler assembly (22):

    30 kg

    REMARK

    - When removing hydraulic oil cooler assembly (22), check that the heat insulation sealant (sponge) on the periphery is not damaged.
    - If the heat insulation sealant (sponge) is damaged, replace it with a new one.



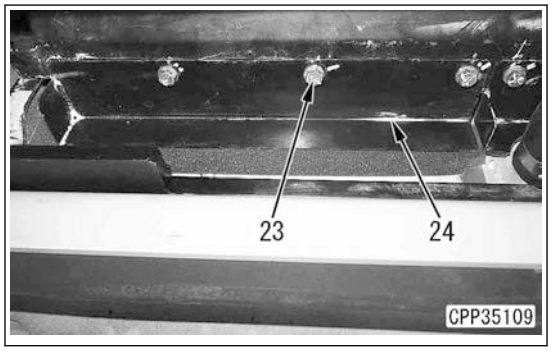
METHOD FOR INSTALLING HYDRAULIC OIL COOLER ASSEMBLY

Hydraulic oil cooler assembly

1. Remove mounting bolts (23) (4 pieces) from bottom of hydraulic oil cooler assembly (22), and remove cover (24).

    REMARK

    When installing hydraulic oil cooler assembly (22), remove cover (24) to check from the bottom side of the machine.



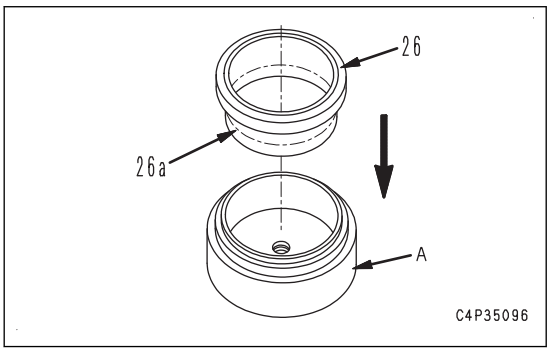
METHOD FOR INSTALLING ENGINE FRONT OIL SEAL

Engine front oil seal

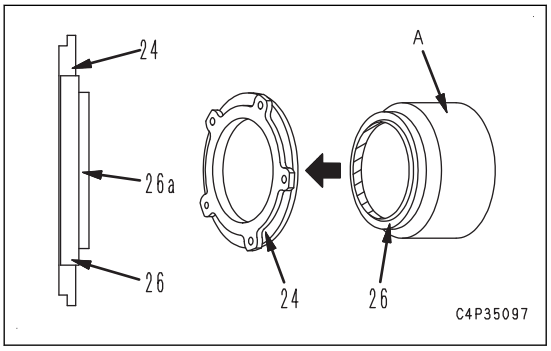
1. Wipe off foreign material sticking to the crankshaft flange with a clean cloth.
2. Set tool A from pilot (26a) side to front oil seal (26).

   REMARK

   Since pilot (26a) is a plastic part on the inside of the front seal and a guide tool for installation of the crankshaft, do not remove it from the front oil seal.

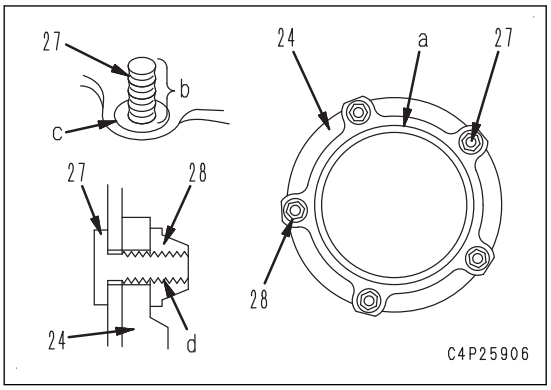


3. Install front oil seal (26) from inside of front oil seal carrier (24).



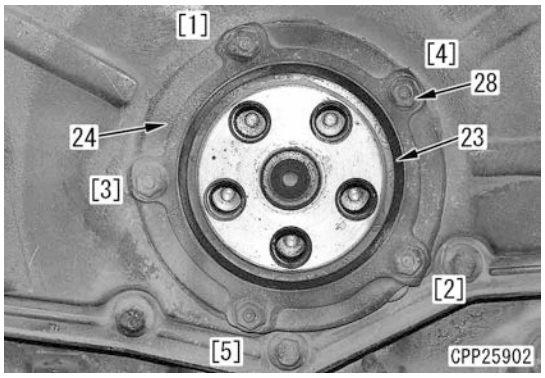
4. Apply and push pilot (26a) into the crankshaft together with front oil seal carrier (24) by hands.
5. Remove pilot (26a).
6. Apply liquid gasket to the following portions and install front oil seal carrier (24).
   - All internal periphery (a) of front oil seal carrier (24)
   - Thread portion (b) of bolt (27), front oil seal carrier contact face (c)
   - Thread portion (d) of nut (28)

   (a), (b), (c), and (d) in figure:
   Liquid gasket (LG-7)



7. Tighten mounting nuts (28) of front oil seal carrier (24) in the numerical order ([1] to [5]) shown in the figure.

   Mounting nut:
   8±1 Nm {0.82±0.1 kg}

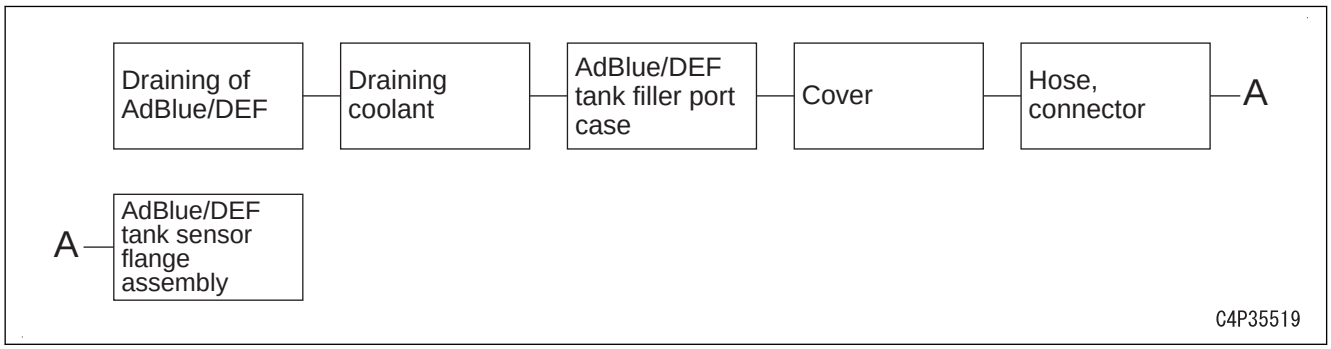


8. Install dust seal (23).

   REMARK

   Push in the dust seal until it touches the front oil seal.

REMOVE AND INSTALL AdBlue/DEF TANK SENSOR FLANGE ASSEMBLY



Removal and installation tools for AdBlue/DEF tank sensor flange assembly

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	-	Lifting tool	●	2			Remove and install AdBlue/DEF tank filler port case
B	-	Vinyl hose	●	1			Disconnection and connection of AdBlue/DEF hose
C	-	Fitting with valve	●	1			
D	600-919-5030	Plug (for 3/8 inch of hose diameter)	■	2	N		
E	6540–71–2720	AdBlue/DEF pump cap kit	■	1	N		

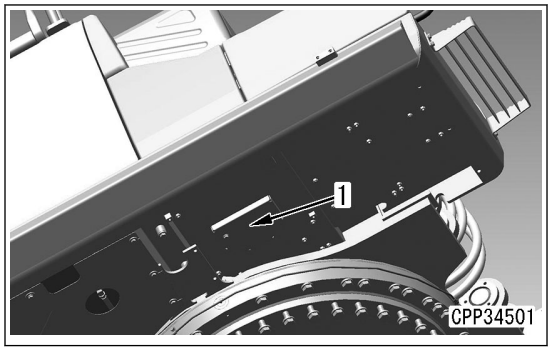
⚠ Place the machine on a level ground, lower the work equipment to the ground in a stable posture, set the lock lever to LOCK position, and stop the engine.

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

METHOD FOR REMOVING AdBlue/DEF TANK SENSOR FLANGE ASSEMBLY

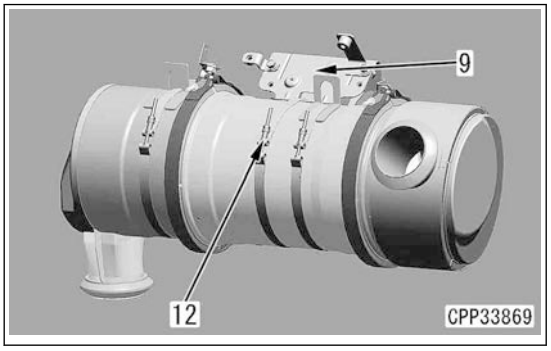
Draining of AdBlue/DEF

1. Remove AdBlue/DEF tank lower cover (1).



Sensor table

7. Tighten sensor table (9) and (9a) lightly with new band (12) by using tool B.



NOTICE

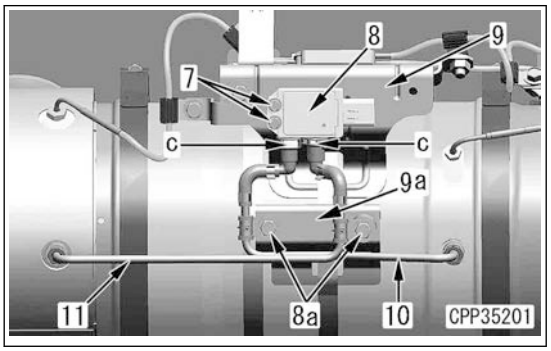
Install sensor table (9) and (9a) to a place where the piping is easy to install, and adjust it when installing the piping.

REMARK

Width across flats of tightening nut of band: 7/16 inch. (11.1 mm)

Differential pressure sensor

8. Install differential pressure sensor (8) with mounting bolt (7).



Mounting bolt (7):
12.4±1.5 Nm {1.3±0.15 kgfm}

NOTICE

- **Band is made of stainless steel, accordingly never use an impact wrench for tightening.**
- **Use a brand new band.**

9. Install differential pressure sensor pipes (10) and (11) horizontally and tighten the nuts lightly.

REMARK

If mounting holes are sealed with plugs at the disassembly, remove them.

10. Adjust the position of sensor table (9) and (9a) so that differential pressure sensor Hi-side pipe (10) and Lo-side pipe (11) are installed easily, and then tighten band (12) by using tool B.

Band (12) tightening nut:
6.3 to 8.3 Nm {0.6 to 0.8 kgfm}

11. Connect connectors of differential pressure sensor Hi-side pipe (10) and Lo-side pipe (11) to differential pressure sensor (8).

REMARK

Insert wiring connector until it clicks.

12. Install differential pressure sensor Hi-side pipe (10) and Lo-side pipe (11).
    - Width across flats of Hi-side piping (10) nut: 11/16 in {17.46 mm}

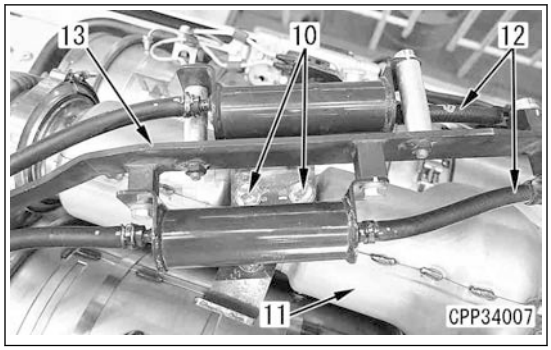
      Hi-side piping (10) mounting nut:
      24.5 to 36.5 Nm {2.5 to 3.7 kgfm}
    - Width across flats of Lo-side pipe (11) nut: 5/8 in {15.88 mm}

      Lo-side piping (11) mounting nut:
      13.6 to 19.0 Nm {1.4 to 1.9 kgfm}

13. Install clamps (8a) (2 places).

Clamps (8a):
10.8 to 26.0 Nm {1.1 to 2.7 kgfm}

4. Move the hose (12) toward AdBlue/DEF mixing tube (11), and install the bracket (13) together with the coolant hose as a unit with the bolt (10).

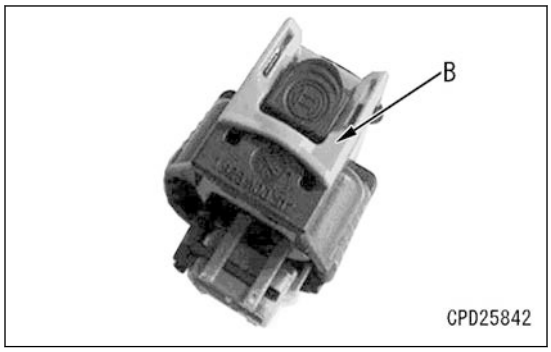


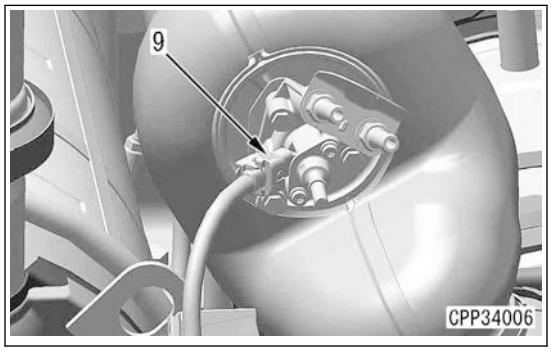
AdBlue/DEF hose, wiring

5. Remove the cover (B) on the electrical connector side of AdBlue/DEF injector, and install the wiring connector MB03 (9).

NOTICE

Install the wiring connector MB03 (9), and then install AdBlue/DEF hose. (In order to prevent AdBlue/DEF from sticking to the wiring connector)

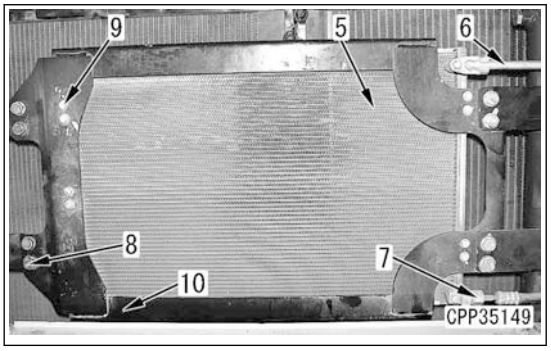




METHOD FOR INSTALLING AIR CONDITIONER CONDENSER ASSEMBLY

Air conditioner condenser assembly

1. Install air conditioner condenser assembly (5) to bracket (10) with mounting bolts (9) (8 pieces).



REMARK

When installing, take care not to damage the core.

2. Install air conditioner condenser assembly (5) to the machine with mounting bolts (8) (8 pieces).
3. Install air conditioner hoses (6) and (7).

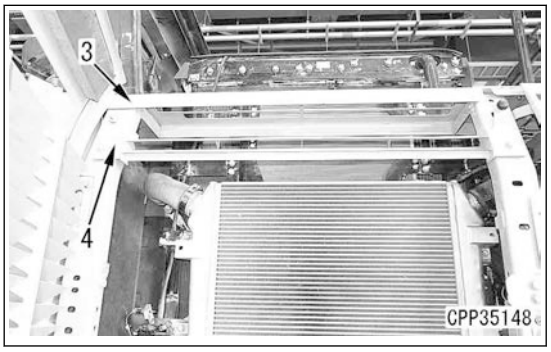
Mounting bolt for air conditioner hoses (6) and (7)::
8 to 1.2 Nm {0.8 to 1.2 kgfm}

NOTICE

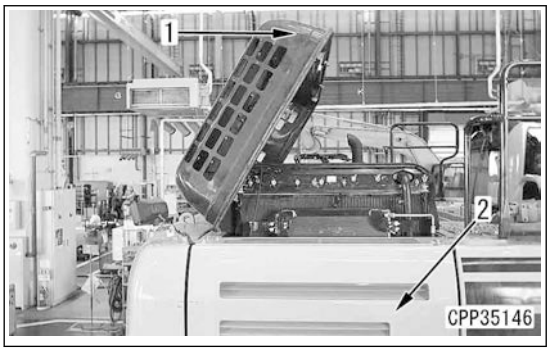
- **When installing the air conditioner piping, be careful so that dirt, dusts and water do not enter into the hose.**
- **Check that the O-rings are fitted to the joints when connecting the air conditioner piping.**
- **Do not reuse an O-ring because it is deformed and deteriorated if used once.**
- **When removing the O-rings, use a soft tool so that the piping is not damaged.**
- **Check that the O-ring is not damaged or deteriorated.**
- **Apply compressor oil (DENSO: ND-OIL8) for refrigerant (R134a) to O-ring.**

Cover

4. Install frame (4).
5. Install cover (3).



6. Close engine hood assembly (1) and side cover (2) on the right side of the machine.



Air conditioner gas, Oil

7. Refill the refrigerant (air conditioner gas: R134a) from the air conditioner circuit.
   Refrigerant quantity: 750±50 g

REMARK

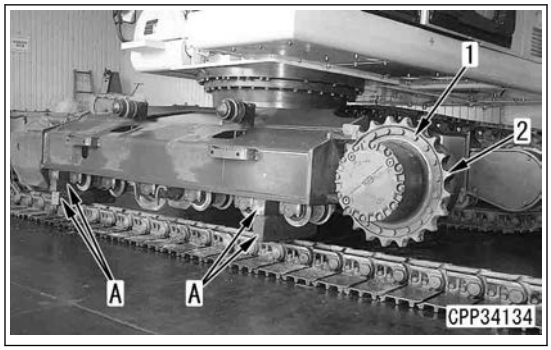
Secure clearance by using tool B before installing mounting bolt (1).

3. Install mounting bolts (1).

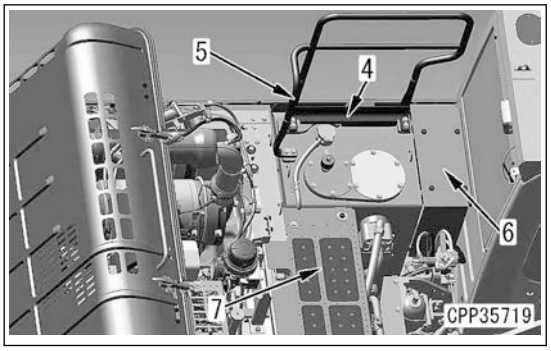
   Threaded portion of sprocket mounting bolt:
   Adhesive (LT-2)

   Sprocket mounting bolt:
   640 to 785 Nm {60 to 80 kgfm}

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

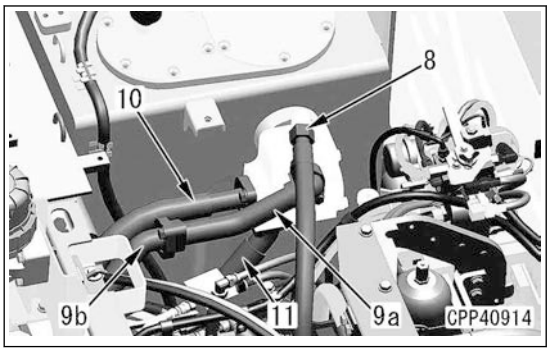


14. Remove the plate (4) and handrail (5).
15. Remove the cover (6).
16. Remove the control valve top cover (7).

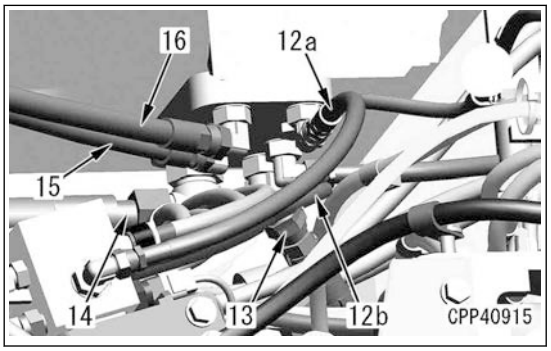


Hose

17. Disconnect the tube (9a), hydraulic hoses (8), (9b), (10), and (11) at the top on the inside of the hydraulic tank.

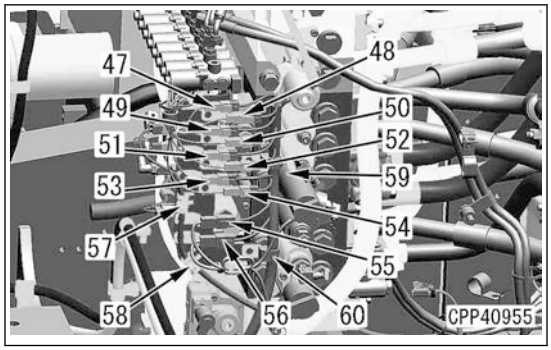


18. Disconnect the hydraulic hoses (12a), (12b), (13), (14), (15), and (16) at the bottom on the inside of the hydraulic tank.

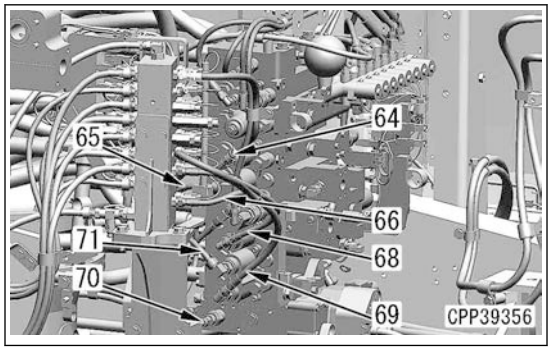


19. Disconnect the hose clamp (17).
20. Remove the bracket (18), and move it so that it does not hinder the work.

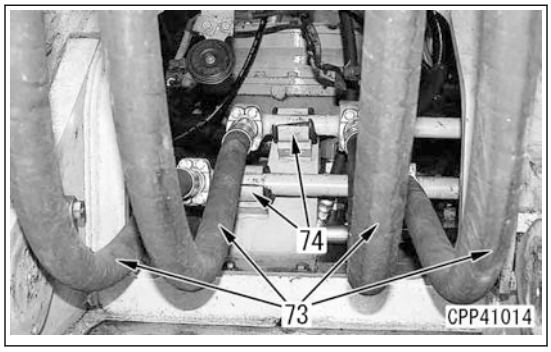
18. Disconnect the connectors on the right side of the control valve.
    - Connector (47): PPC lock solenoid valve (V01)
    - Connector (48): Swing 2-stage relief solenoid valve (V02)
    - Connector (49): Travel junction solenoid valve (V03)
    - Connector (50): Travel speed increase solenoid valve (V04)
    - Connector (51): Swing parking brake solenoid valve (V05)
    - Connector (52): Machine push-up solenoid valve (V06)
    - Connector (53): 2-stage relief solenoid valve (V08)
    - Connector (54): Attachment circuit selector solenoid valve (V07)(1ATT specification only)
    - Connector (55): Boom spool stroke sensor (PA14)
    - Connector (56): Arm spool stroke sensor (PA15)

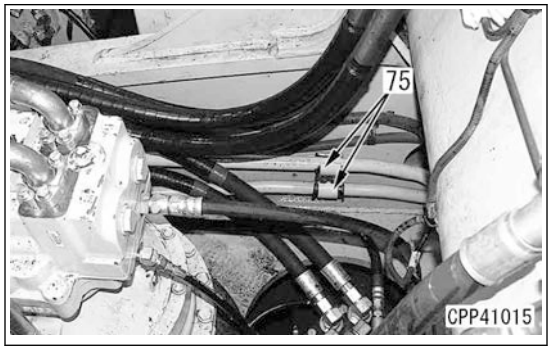


19. Remove the wiring harnesses from the clips (57) and (58).
20. Remove the clips (59) and (60).
21. Disconnect the hoses on the left side of the control valve.
    - Hose (64): Port P1 (bucket)
    - Hose (65): Port P3 (Left travel)
    - Hose (66): Port P5 (from boom and junction block)
    - Hose (68): Port P7 (swing)
    - Hose (69): Port P11 (arm)
    - Hose (70): Port PX2 (2-stage relief solenoid valve)
    - Hose (71): Port P9 (Right travel)



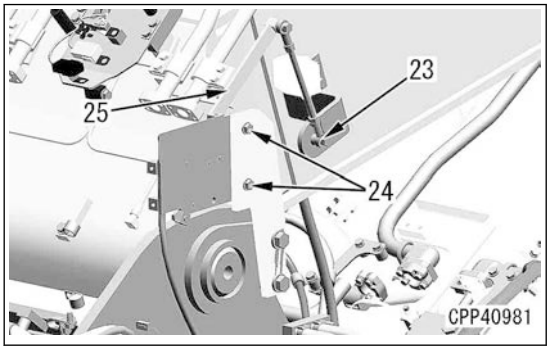
22. Disconnect the boom cylinder hoses (73) (4 pieces).
23. Remove the boom tube mounting clamps (74) and (75).





Boom encoder assembly

6. Install the boom encoder assembly (25) together with the bracket as a unit with the bolt (24).

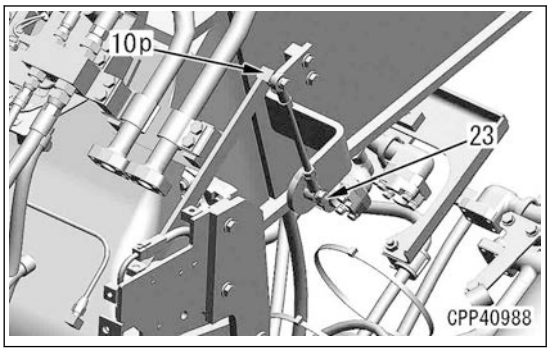


7. Install the bolt (23).

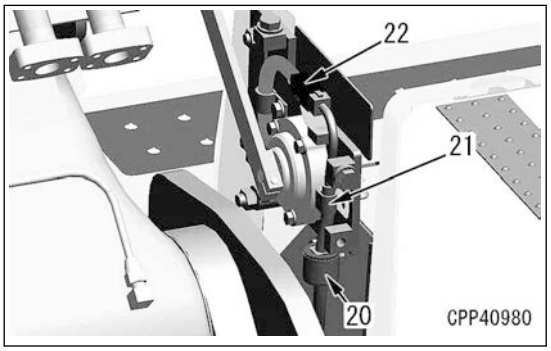
   Bolt (23):
   54 to 106 Nm {5.5 to 10.8 kgfm}

   REMARK

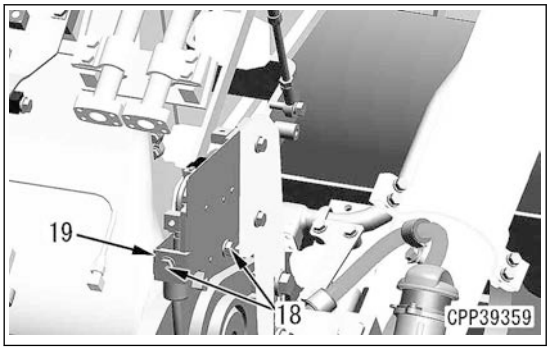
   Fix the sheet (10p) by using a wrench so that no load is applied to the encoder lever, and then install the bolt (23).



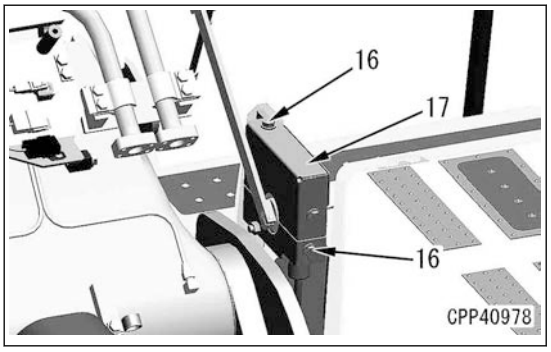
8. Install the clips (20) and (21), and connect the connector PA18 (22).



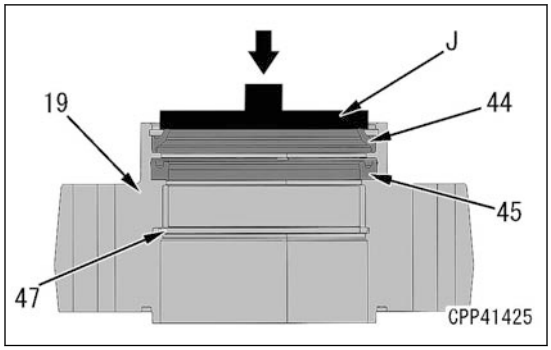
9. Install the cover (19) with the bolt (18).



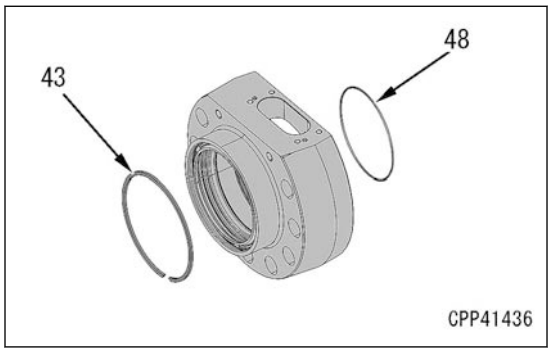
10. Install the cover (2) with the bolts (16) (17 pieces).



2. Install the ring (47).
3. Install the rod packing (45).
4. By using the push tool (J), press fit the dust seal (44) into the housing assembly (19).

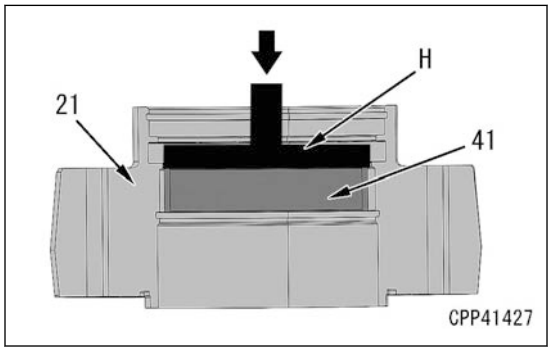


5. Install the ring (43).
6. Install O-ring (48).

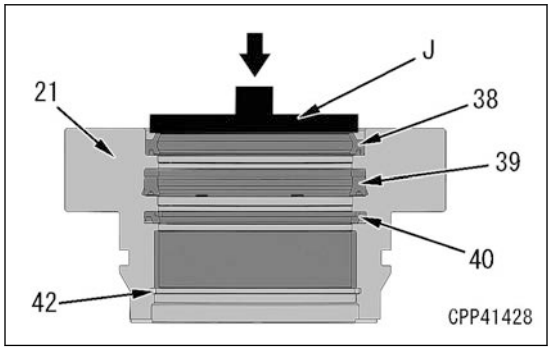


Assembling the cylinder head assembly

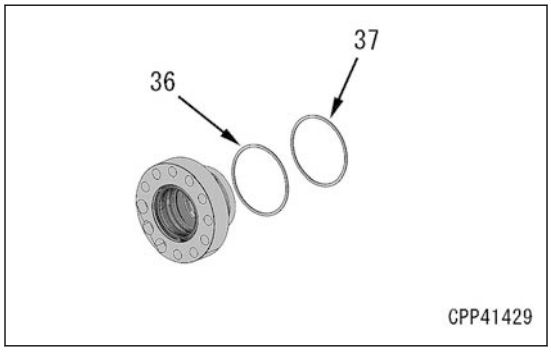
7. By using the push tool (H), install the bushing (41) to the cylinder head assembly (21).



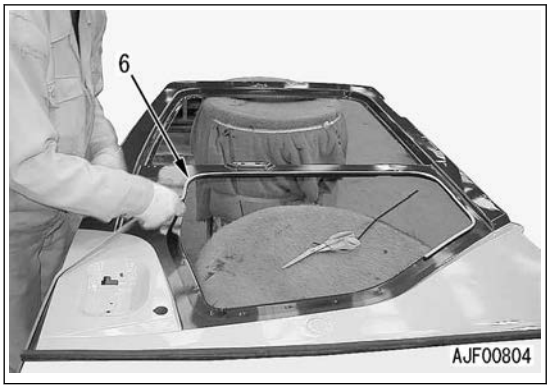
8. Install the snap ring (42).
9. Install the buffer ring (40).
10. Install the rod packing (39).
11. By using the push tool (J), install the dust seal (38) to the cylinder head assembly (21).



12. Install the backup ring (36) and O-ring (37).



3) Install the dam rubber (6) for the door lower window glass (3) to the position shown in the drawing.



REMARK

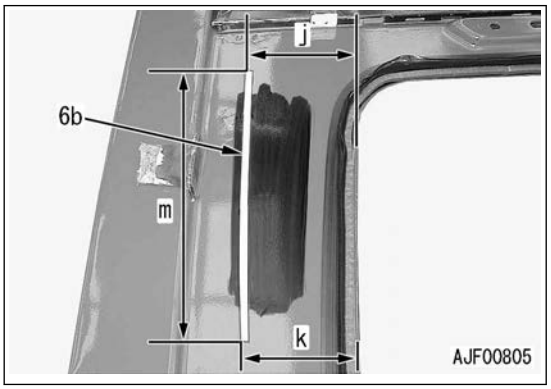
Install the dam rubber (6a) additionally for the door lower window glass (3).

Position to additionally install the dam rubber on the door lower window glass

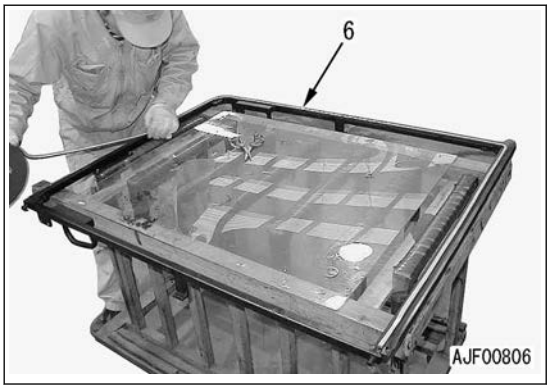
(j): 50 mm

(k): 90 mm

(m): 200 mm

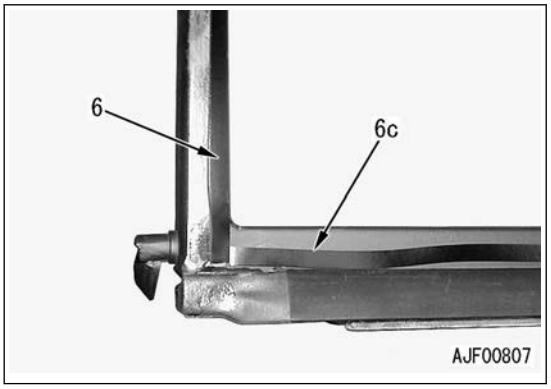


4) Install the dam rubber (6) for the front window glass (4) to the position shown in the drawing.

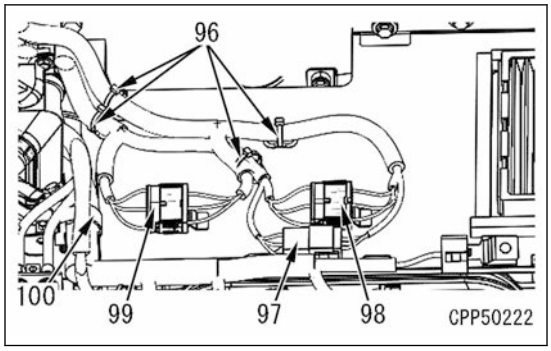


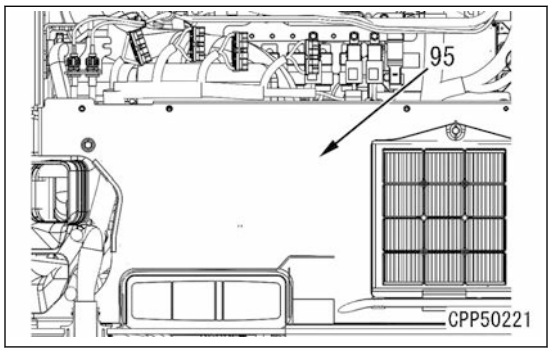
REMARK

Unlike the dam rubber (6) other than the lower dam rubber, install the lower dam rubber (6c) of the front window glass along the outer edge of the lower line. (The dam rubber will be visible through the transparent part of the glass when installed along the inside.)

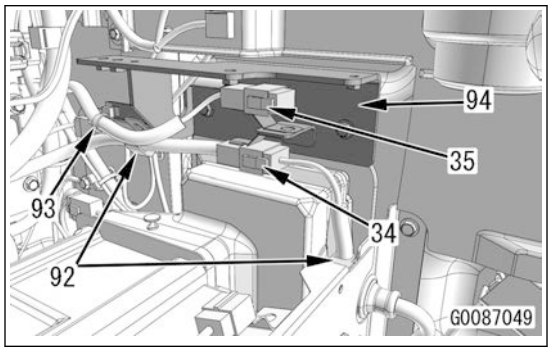


10. Install the resin clip (100).
11. Connect the connectors (97), (98), and (99).
    Connector (97): H28
    Connector (98): H14
    Connector (99): H15
12. Fasten the bands (96) (4 places) at back of the cover (95).
13. Install the cover (95) with the bolts (M8) (3 pieces).

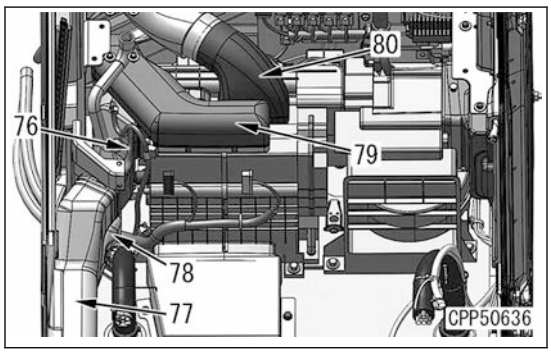




14. Install the bracket (94) with the bolts (M8) (2 pieces).
15. Fasten the band (93).
16. Install the connectors (34) and (35) to the connector stand.
17. Install the resin clips (93a) (2 places).



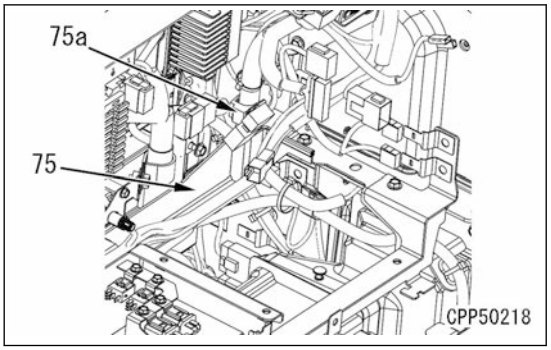
18. Install the ducts (76), (77), (78), (79), and (80), and bind them with the band.

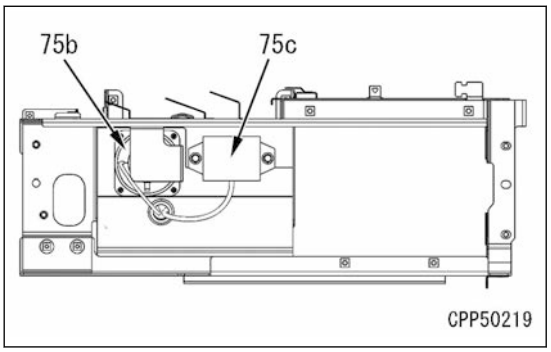


30. Remove the corrugated clip (75a) at the back of the frame (75).
31. Remove the bolts (M8) (4 pieces), and remove the frame (75).

NOTICE

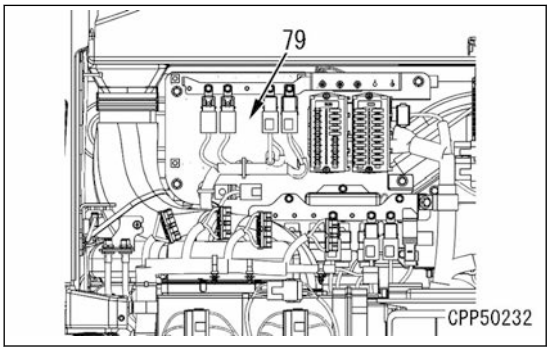
The speaker (75b) and resistor (75c) are installed at the back of the frame (75). When placing the frame (75), be careful not to damage them.





Pump controller assembly

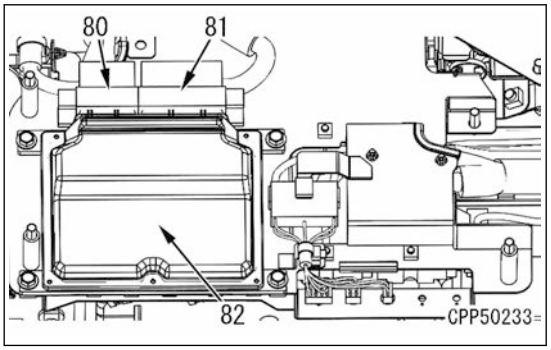
32. Remove the bolts (M8) (4 pieces), and remove the bracket (79) with the electrical parts installed.



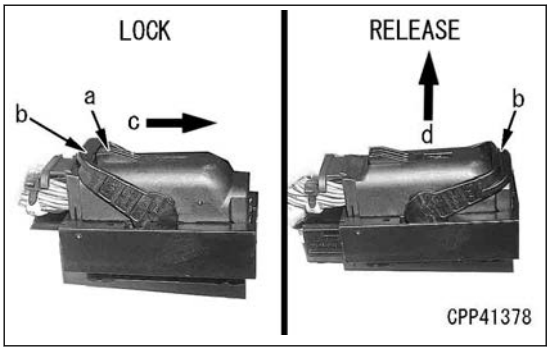
33. Invert the bracket (79), and disconnect the connectors (80) and (81) according to the following procedure.

    Connector (80): CP02

    Connector (81): CP01



    1) Slide the lock lever (b) in the direction of (c) while pressing part (a) of the connector to release the lock.
    2) Disconnect the connector in the direction of (d).

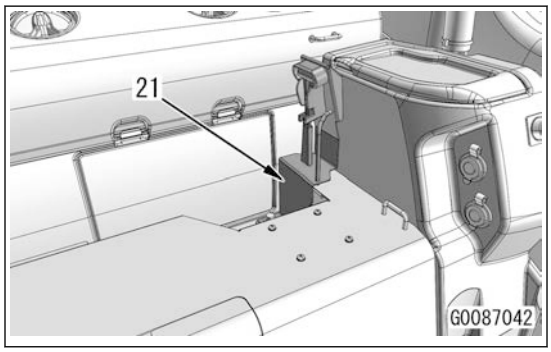


METHOD FOR REMOVING GATEWAY CONTROLLER ASSEMBLY

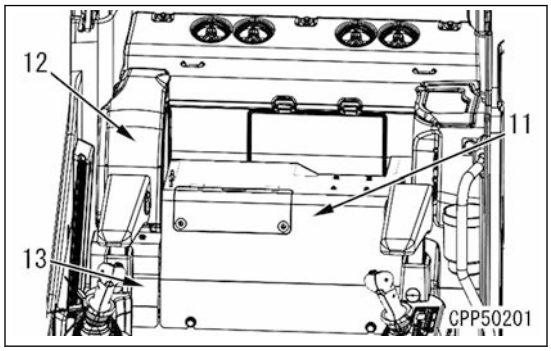
Operator's seat assembly

1. Move the operator's seat assembly forward, and tilt the backrest (1a) forward.

2. Remove the bolt (M8), and remove the hammer bracket (21).

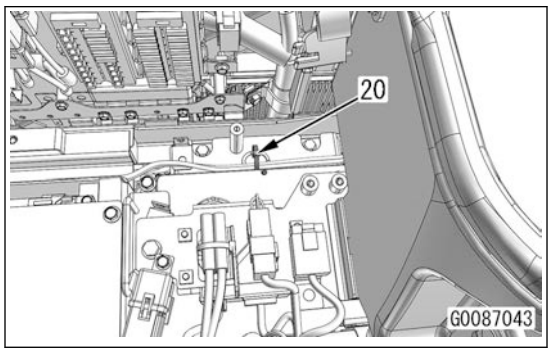


3. Remove the bolts (M8) (4 pieces), and remove the cover (11).
4. Remove the bolts (M6) (5 pieces), and remove the box (12).
5. Remove the bolts (3 pieces: M6 x 2, M8 x 1), and remove the cover (13).



Work equipment and ICT sensor controller assembly

6. Cut the band (20).
   Tool: Nipper



METHOD FOR INSTALLING COMMUNICATION TERMINAL

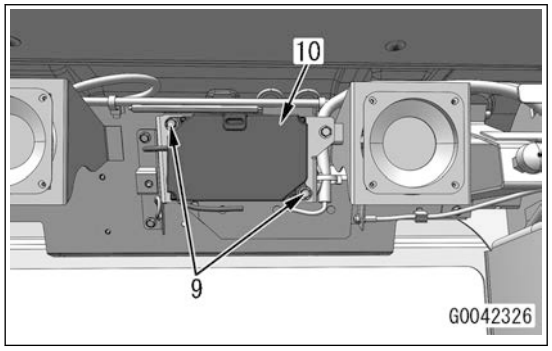
Communication terminal

1. Install the communication terminal (10) with the bolts (9) (2 pieces).

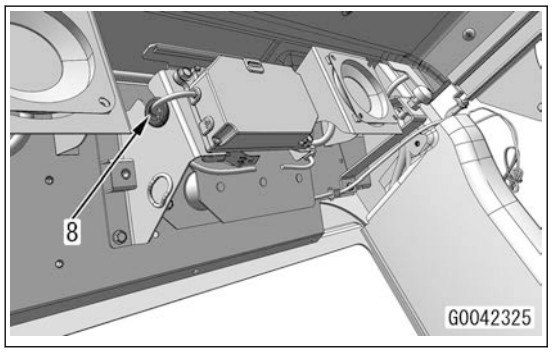
   Tool: Ratchet handle, socket, torque wrench

   Bolt (9): Width across flats 10 mm, M6

   Bolt (9): 5.9 to 9.8 Nm {0.6 to 1.0 kgm}

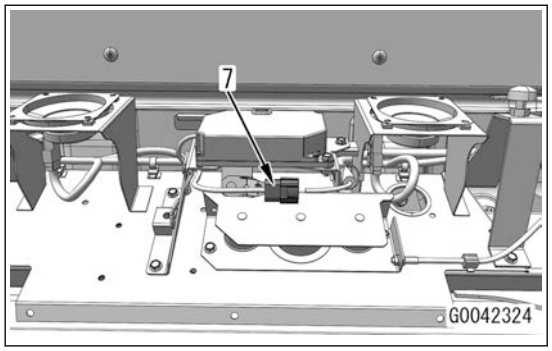


2. Install the grommet (8).



Connector

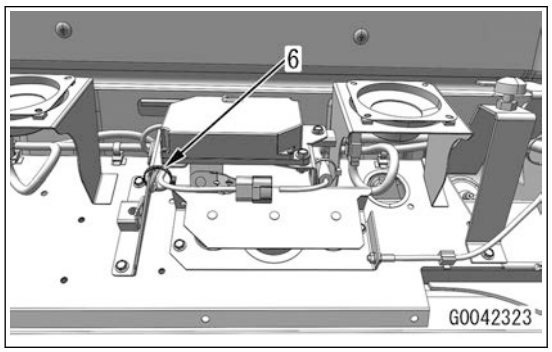
3. Install the connector CK06 (7) to the connector stand.

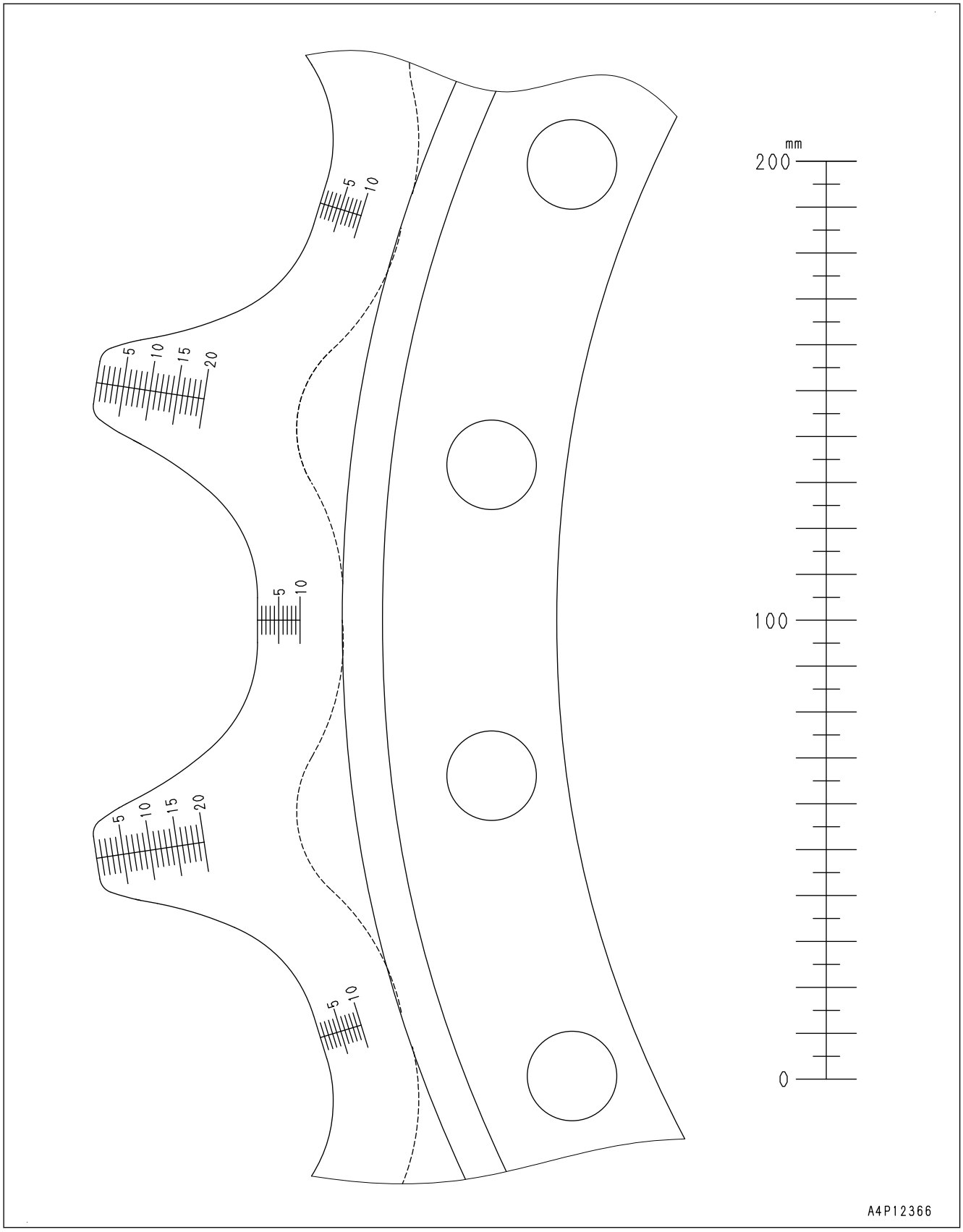


4. Fasten the band (6).

   REMARK

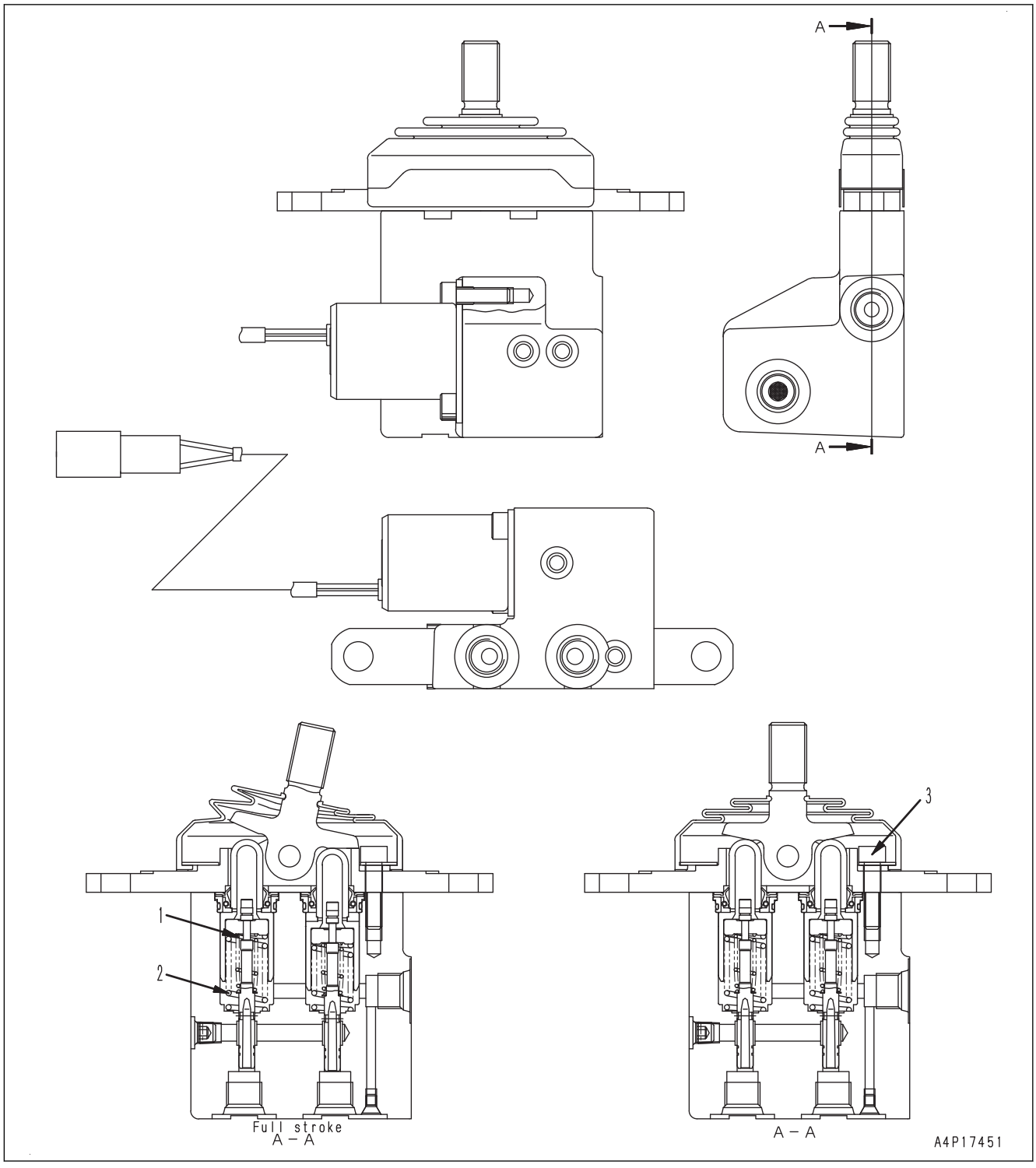
   Use the new band (6).




mm
200
100
0
5
10
15
20
A4P12366

MAINTENANCE STANDARD OF 1ST-LINE ATTACHMENT PPC VALVE (WITH EPC VALVE)

(Machines ready for installation of attachment)



J: Foot vents
1: Evaporator
2: Heater core
3: Expansion valve
4: Blower fan, blower motor
5: Air mix servomotor
6: Air mix door
7: Vent (mode) changeover servomotor
8: Rear door
K: Defroster vents
9: Foot door
10: Defroster door
11: FRESH/RECIRC air changeover servomotor
12: FRESH/RECIRC air changeover door
13: Power transistor
14: Evaporator temperature sensor
15: Recirculation air temperature sensor

REMARK

"Door" may be expressed as "damper".

FUNCTION OF AIR CONDITIONER UNIT

The air conditioner unit consists of evaporator (1) and heater core (2) to heat or cool the air in the operator's cab.

Temperature control

When the temperature control switch on the machine monitor is operated, the temperature setting data is sent to the air conditioner controller at the rear of the operator's seat. The air conditioner controller controls air mix servomotor (5) and changes the angle of air mix door (6) to control the temperature.

Over-cooling (Freezing) prevention

- Evaporator temperature sensor (14) varies the resistance of its resistor corresponding to temperature.
- The air conditioner controller converts the change in resistance of evaporator temperature sensor (14) into the change in voltage to determine the temperature of evaporator (1).
- The air conditioner controller operates the compressor clutch relay *1 to stop the compressor so that evaporator (1) does not freeze.

*1: For the compressor clutch relay, see "INSTALLATION LOCATIONS OF AIR CONDITIONER PARTS AND ARRANGEMENT OF CONNECTORS".

Air flow adjustment

Whenever an air flow control switch is operated on the machine monitor, air flow setting data is sent to the air conditioner controller. The air conditioner controller controls blower motor (4) by using power transistor (13) in order to adjust the air flow.

Vent (mode) changeover

The mode data is sent to the air conditioner controller according to the vent switch operation on the machine monitor. The air conditioner controller controls vent (mode) changeover servomotor (7) to adjust the opening angles of mode changeover doors (8) to (10) and change the vents.

FRESH/RECIRC air changeover

FRESH/RECIRC air changeover setting data is sent to the air conditioner controller according to the operation of FRESH/RECIRC air changeover switch on the machine monitor. The air conditioner controller controls FRESH/RECIRC air changeover servomotor (11) to open/close FRESH/RECIRC air changeover door (12).

Automatic mode of air conditioner

- Inside air temperature sensor (15) senses the inside temperature by the change in resistance. The air conditioner controller converts the change in resistance of inside air temperature sensor (15) into change in voltage and senses the inside temperature by the change in voltage.
- The air conditioner controller checks the voltage of inside air temperature sensor (15) and controls the inside temperature to the temperature set by the machine monitor.

FAILURE CODE [879BKA]

Action level	Failure code	Failure	Air Conditioner Fresh Air Temperature Sensor Open Circuit (Machine monitor system)
-	879BKA		
Details of failure	Air conditioner controller detects open circuit in outside air temperature sensor.		
Action of controller	Air conditioner controller transmits open circuit information of outside air temperature sensor to machine monitor by CAN communication. Ignores data of outside air temperature sensor and continues control of air conditioner in automatic air conditioner mode.		
Phenomenon on machine	Since air conditioner outside air temperature sensor has open circuit, outside air temperature is not considered in automatic air conditioner mode. (Air conditioner is not affected in manual mode.)		
Related information	• After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. • Check if this failure code is displayed on electrical system failure record screen in service mode of machine monitor. • For each connector, see “Installation locations of air conditioner parts and arrangement of connectors”. • Since air conditioner controller connector ACECU has no T-adapter and has small pins, perform troubleshooting by using intermediate connector (although intermediate connector has no T-adapter either, it has large pins). • When replacing air conditioner harness between air conditioner controller connector ACECU and intermediate connector, replace air conditioner unit.		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective fresh air temperature sensor	1. Turn starting switch to OFF position. 2. Disconnect connector P18.			
		Resistance	Between P18 (male) (1) and (2)	25 °C	Approx. 1.7 kΩ
2	Open or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector AC01.			
		Resistance	Between AC01 (female) (7) and (8)	25 °C	Approx. 1.7 kΩ
3	Open circuit in wiring harness (wire breakage or defective contact of connector)	If failure code is still displayed after above checks on cause 2, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors P18 and AC01.			
		Resistance	Between AC01 (female) (7) and P18 (female) (1)		Max. 1 Ω
			Between AC01 (female) (8) and P18 (female) (2)		Max. 1 Ω
4	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.)			
5	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.)			