

Shop Manual

HYDRAULIC
EXCAVATOR

PC490LC-11E0

SERIAL NUMBERS 86088 and up

KOMATSU

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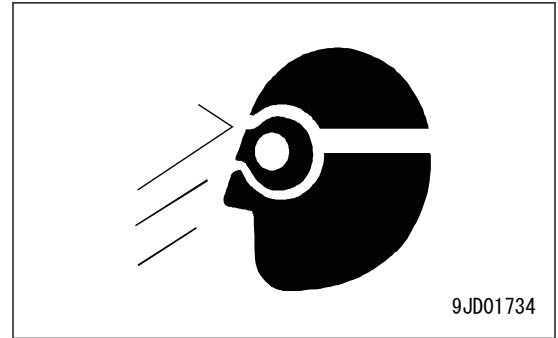
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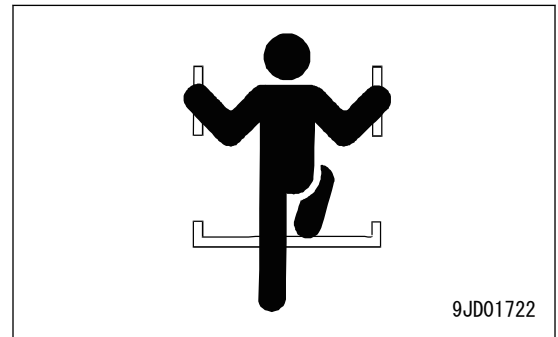
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- Always wear the protective eyeglasses when hitting parts with a hammer.
- Always wear the protective eyeglasses when grinding parts with a grinder, etc.
- When performing any operation with multiple workers, always agree on the operating procedure before starting. Be clear in verbal communication, and observe hand signals. Hang "UNDER REPAIR" warning tag in the operator's compartment Before starting work.
- Work and operation which require license or qualification should be performed by qualified workers.
- Welding repairs should be performed by trained and experienced welders. When performing welding work, always wear welding gloves, apron, welding goggles, cap and other clothes suited for welding work.
- Warm up before starting the work with exercise which increases alertness and the range of motion in order to prevent injury.
- Avoid prolonged work, and take a rest at times to keep up a good condition. Take a rest at designated safe area.



Precautions for preparatory work

- Place the machine on a firm and level ground, and apply the parking brake and chock the wheels or tracks to prevent the machine from moving before adding oil or making any repairs.
- Lower the work equipment (blade, ripper, bucket, etc.) to the ground before starting work. If this is not possible, insert the lock pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang "UNDER REPAIR" warning tag on them.
- When performing the disassembling or assembling work, support the machine securely with blocks, jacks, or stands before starting the work.
- Remove all mud and oil from the steps or other places for going up and down on the machine. Always use the handrails, ladders or steps when for going up and down on the machine. Never jump on or off the machine. When the scaffold is not provided, use steps or stepladder to secure your footing. Do not use handrails, ladders, or steps if they are damaged or deformed. Repair it or replace it immediately.



Precautions during work

- For the machine with the battery disconnect switch, check before starting the work that the system operating lamp is not lit. Then, turn the battery disconnect switch to OFF (○) position.

REMARK

Remove the key after it is turned to OFF (○) position if the battery disconnect switch is a switch key type. For the machine without the battery disconnect switch, turn the starting switch to OFF position, wait for two minutes or more before starting the work. Disconnect the battery cable by starting from the negative (-) terminal first.

- For the machine with the quick release battery terminal (-), check before starting the work that the system operating lamp is not lit. Then, disconnect the quick release battery terminal (-).

REMARK

For the machine without the system operating lamp, turn the starting switch to OFF position, wait for two minutes or more before starting the work. Disconnect the quick release battery terminal (-).

PRACTICAL USE OF KOMTRAX

(ALL-K-Q210-13V-00-B)

Various information which KOMTRAX system transmits by using the radio communication is useful for KOMTRAX operator to provide various services for the customers.

When KOMTRAX system is installed to the machine and it is enabled, machine information can be checked by KOMTRAX system, and it is used for testing and troubleshooting to be performed efficiently.

Large-sized models are equipped with KOMTRAX Plus which can use more detailed information.

REMARK

(KOMTRAX may not be installed to the machine in some countries or areas.)

Merit of using KOMTRAX

- The location where the machine is working at can be checked on the map in a personal computer.
- Operation information such as service meter, operating hours, fuel consumption, and occurred caution as well as failure code can be checked.
- The operator can check the hours used and replacement interval of consumable parts of the machine such as fuel filter, hydraulic oil filter, hydraulic oil and engine oil.
- Information of how machine is operated (idling time, traveling time, digging time, relieving time, etc.) can be checked, and it is used to presume the machine operating condition.
- Various reports such as “Fuel saving operation support”, “Operation summary”, etc. is generated, and it is utilized as an advice tool for the user and operator.
- KOMTRAX Plus can record the data of abnormality record, trend data, snap shot data, etc. to grasp the soundness of machine, in addition to KOMTRAX function described above. These data can be used on personal computer screens.

How to make a full use of KOMTRAX

Making use of KOMTRAX enables the following activities.

- Quick response to a request for immediate repair
 1. To check the displayed caution and failure code, etc. through KOMTRAX upon receiving a repair request from a user.
 2. To immediately arrange necessary tools, replacement parts, etc, immediately in accordance with the displayed failure code.
 3. To find the location of the failed machine by using the map of KOMTRAX, to visit the customer there.
- Proactive maintenance
 1. To check the service summary screen of KOMTRAX, to find the machine which has high priority failure code indicated by a red or yellow flag.
 2. To check the condition of the machine with the customer and to make a plan to visit.
 3. To immediately arrange necessary tools, replacement parts, etc, immediately in accordance with the displayed failure code.
- Practice of periodic maintenance and periodic inspection service
 1. To check the service summary screen of KOMTRAX, and to find the machine of which the usage limits for the consumable parts indicated by red flags are over.
 2. To submit an estimate sheet for the consumable parts to be replaced and the labor cost for the replacement work to the customer.
 3. To propose the periodic inspection (Pm clinic, etc.) according to the service meter reading.

How to operate KOMTRAX

For the operating method of each screen of KOMTRAX, ask KOMTRAX key person in your Komatsu distributor.

CONVERSION TABLE

(ALL-A-2150-931-00-B)

Method of using the conversion table

The conversion table is provided to enable simple conversion of the numerical numbers between the different units. For further details of the method of using the conversion table, see the examples given below.

Examples of using the conversion table to convert a unit from mm to in.

When converting 55 mm to in

1. Locate the number 50 in the leftmost column, take this as (A), and then draw a horizontal line from (A).
2. Locate the number 5 in the top row, take this as (B), then draw a vertical line down from (B).
3. Take the crossover point of the two lines as (C). This point (C) gives the value when converting the unit from mm to in. Accordingly, 55 mm = 2.165 in.

When converting 550 mm to in

1. The number 550 does not appear in the table. Divide it by 10 (move the decimal point one place to the left) to get 55 mm.
2. Convert 55 mm to 2.165 in according to the preceding procedure.
3. The original value (550 mm) has been divided by 10, so multiply 2.165 in by 10 (move the decimal point one place to the right) to restore the target value. This gives 550 mm = 21.65 in

mm to in

							(B)			
							1 mm = 0.03937 in			
	0	1	2	3	4	5	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
(A) 50	1.969	2.008	2.017	2.087	2.126	2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.847	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701		3.780	3.819	3.858	3.898

mm to in

1 mm = 0.03937 in										
	0	1	2	3	4	5	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
50	1.969	2.008	2.047	2.087	2.126	2.165	2.205	2.244	2.283	2.323

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

- If another abnormality/abnormalities is detected within 40 hours after the previous abnormalities were corrected, regardless of the level of the previous Inducement and whether the new abnormality/abnormalities is the same as the previous ones or not, it is judged as a recurrence.
- If a recurrence occurs, the Inducement strategy will be activated.
- Inducement in the recurrence resumes counting time at the time when the previous abnormalities were corrected if the previous Inducement is in "Warning", "Continuous Warning" or "Low-Level Inducement". The alerts resume the previous Inducement.
- If the time the previous abnormalities were corrected is in "Severe Inducement", Inducement in the recurrence starts from "Low-Level Inducement" but the remaining time to "Severe Inducement" is 1 hour or 2 hours depending on abnormalities. If the 1 hour or 2 hours are used up without correcting the new abnormalities, Inducement will advance to "Severe Inducement" and engine power will be derated heavily.

INDUCEMENT STRATEGY FOR ABNORMALITY RECURRENCE WITHIN 40 HOURS ([2] EPA + STAGE V)

(PC400_11-K-AF00-042-14-B)

NOTICE

Different engine types have different Inducement strategies. Inducement is required by the authorities on engine systems that use Urea SCR systems. Inducement is intended for the operator to take prompt actions to maintain and correct inappropriate behaviours of Urea SCR systems by utilizing visible and audible alerts, and engine power derate in addition. Alerts in Inducement of the Komatsu Urea SCR system progresses step by step starting from visual indications on the machine monitor and audible sounds to engine power derate to avoid getting into unsafe conditions. The warning steps for Inducement are different for EU Stage V emission regulation and EPA Tier4 Final emission regulation. To confirm the Inducement strategy which will apply to the machine the engine type must be confirmed.

To confirm machine has engine type [2] EPA + EU Stage V refer to the "METHOD FOR CHECKING ENGINE TYPE" section of this manual.

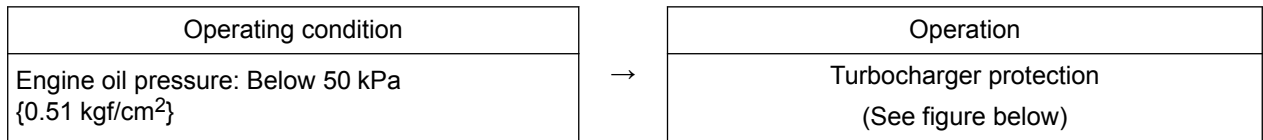
- The Urea SCR system continuously monitors its operation conditions and stores information on inappropriate operations including malfunctions.
- The stored information is utilized to monitor recurrences of abnormalities, "Abnormality Counter". "Abnormality Counter" is required by the authorities. The abnormality counting spans 40 hours and it monitors the abnormalities that trigger Inducement other than the amount of AdBlue/DEF in the tank.
- If another abnormality/abnormalities is detected within 40 hours after the previous abnormalities were corrected, regardless of the level of the previous Inducement and whether the new abnormality/abnormalities is the same as the previous ones or not, it is judged as a recurrence.
- If a recurrence occurs, the Inducement strategy will be activated and starts from "Severe Inducement".
- The duration of "Severe Inducement" in the recurrence is limited to 30 minutes. If the abnormalities are not corrected while Inducement is in "Severe Inducement (30 minutes)", Inducement will advance to "Final Inducement" and engine speed will be fixed to low idle to disable practical machine operation.

- 13: Fuel supply pump
- 14: Various sensors
- 15: Hydraulic oil temperature sensor
- 16: Front pump
- 16a: Servo
- 16b: LS valve
- 16c: PC valve
- 17: Rear pump
- 17a: Servo
- 17b: LS valve
- 17c: PC valve
- 18: Control valve
- 18a: Self-pressure reducing valve
- 18b: Merge-divider valve
- 18c: Travel junction valve
- 19: Front pump PC-EPC valve
- 20: Rear pump PC-EPC valve
- 21: Cooling fan pump
- 21a: EPC valve
- 21b: Servo
- 22: Cooling fan motor

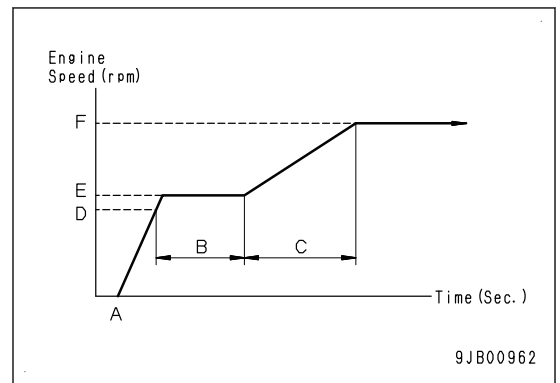
FUNCTION OF TURBOCHARGER PROTECTION SYSTEM

(PC400_10-K-AA09-042-00-B)

This function limits the engine speed to prevent seizure of the turbocharger when the engine speed is increased suddenly just after the engine is started.



- A: Starting of engine
- B: Turbocharger protection time (approximately 0 to 20 seconds)
- C: Modulation time (approximately 1 second)
- D: 500 rpm
- E: Approximately 1000 rpm
- F: 1930 rpm (when working mode is P mode)
- Fuel control dial: High idle (MAX) position with travel lever operated



COMPONENT PARTS OF COOLING SYSTEM

(PC400_11-K-B000-001-00-B)

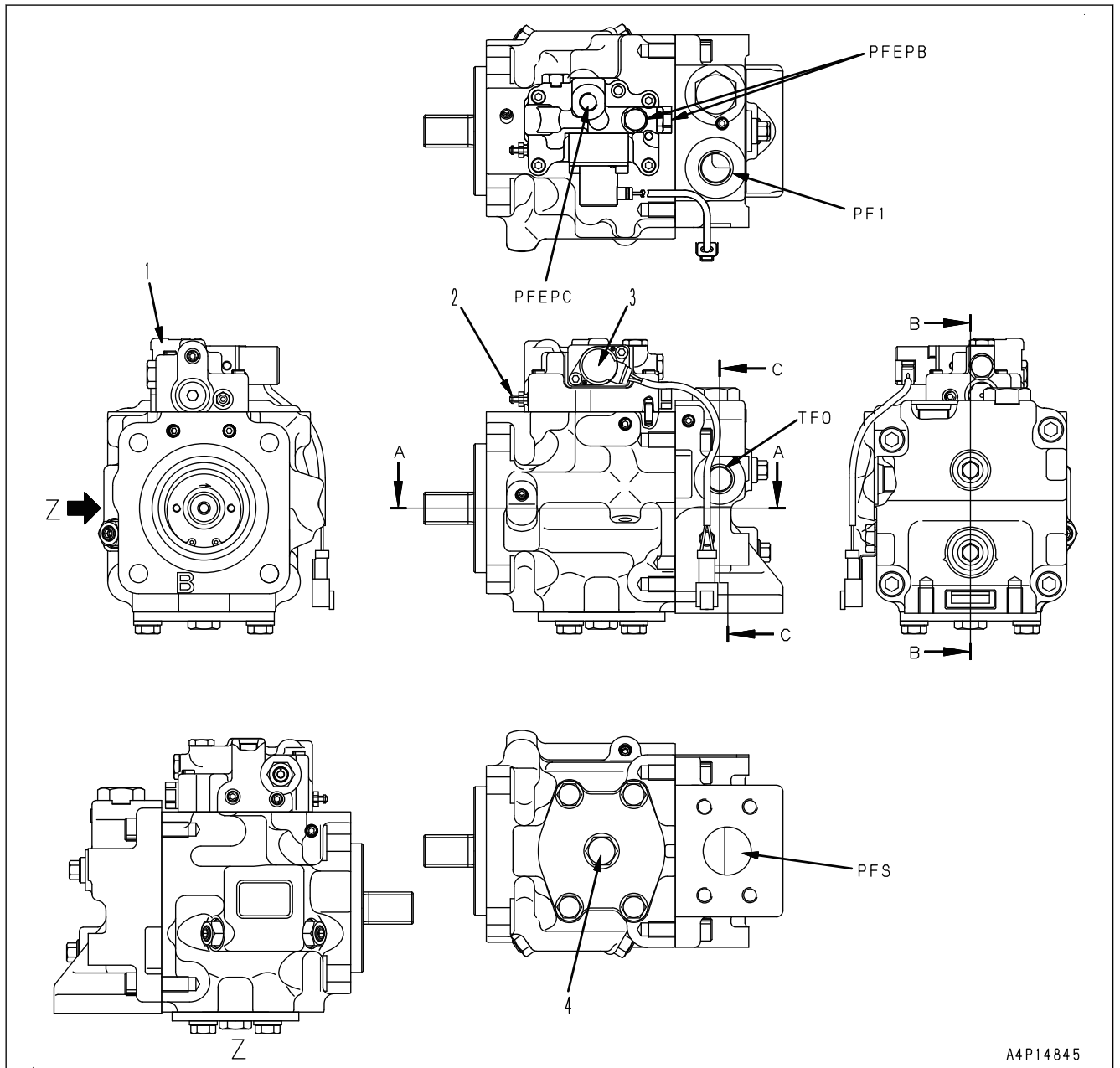
COOLING FAN PUMP

(PC400_10-K-ACH0-001-00-B)

STRUCTURE OF COOLING FAN PUMP

(PC400_10-K-ACH0-041-00-B)

General view



A4P14845

PF1: Pump discharge port

PFS: Pump suction port

PFEPB: EPC output pressure pickup plug

TFO: Drain port








PFEPC: EPC valve source pressure input port

1: Servo valve

3: EPC valve

2: Breather

4: Drain plug

Symbol	Item to be displayed	Range and method for display			Remarks
		Range	Caution lamp display (background color)	Action level	
 9JC01160	(*1) Hydraulic oil temperature	When it exceeds 102 °C	Lit (red)	L02	<ul style="list-style-type: none"> Monitor background color changes depending on the temperature detected. Alarm buzzer sounds when the temperature exceeds 105 °C. If monitor background color is white, warm up the hydraulic components.
		20 °C or higher, and lower than 102 °C	Lit (blue)	-	
		Below 20 °C	Lit (white)	-	
 9JC01161	(*1) Fuel level	Below 41 ℓ	Lit (red)	-	Background color of monitor changes according to the remaining amount.
		When it exceeds 41 ℓ	Lit (blue)	-	
 9JC01162	(*1) Radiator coolant level	For an entire hour (Below specified level)	Lit (red)	L02	<ul style="list-style-type: none"> Caution lamp background color changes depending on the hours detected. When the background color of caution lamp is red, the warning buzzer sounds.
		Below specified level	Lit (yellow)	(*3) L01	
		Normal	Not lit	-	
 9JC01163	(*1) Charge level	When the charging is faulty (charge voltage < battery voltage)	Lit (red)	L03	Caution lamp lights up and alarm buzzer sounds when an abnormality is detected while engine is running.
		Normal	Not lit	-	
 9JC01164	(*1) Engine oil pressure	When it is abnormal (Below specified pressure)	Lit (red)	L03	Caution lamp lights up and alarm buzzer sounds when an abnormality is detected while engine is running.
		Normal	Not lit	-	
 9JC01165	(*1) Engine oil level	When it is abnormal (Below specified level)	Lit (yellow)	(*3) L01	Caution lamp lights up when an abnormality is detected while engine is stopped.
		Normal	Not lit	-	
 9JC01166	(*1) Air cleaner clogged	When it is abnormal (Above specified pressure)	Lit (yellow)	(*3) L01	Caution lamp lights up when an abnormality is detected while engine is running.
		Normal	Not lit	-	

Pin No.	Signal name	Input/Output
87	(*1)	-
88	(*1)	-
89	(*1)	-
90	(*1)	-
91	(*1)	-
92	(*1)	-
93	(*1)	-
94	(*1)	-
95	(*1)	-
96	(*1)	-

*1: Never connect these pins. Malfunctions or failures may occur.

FUEL CONTROL DIAL

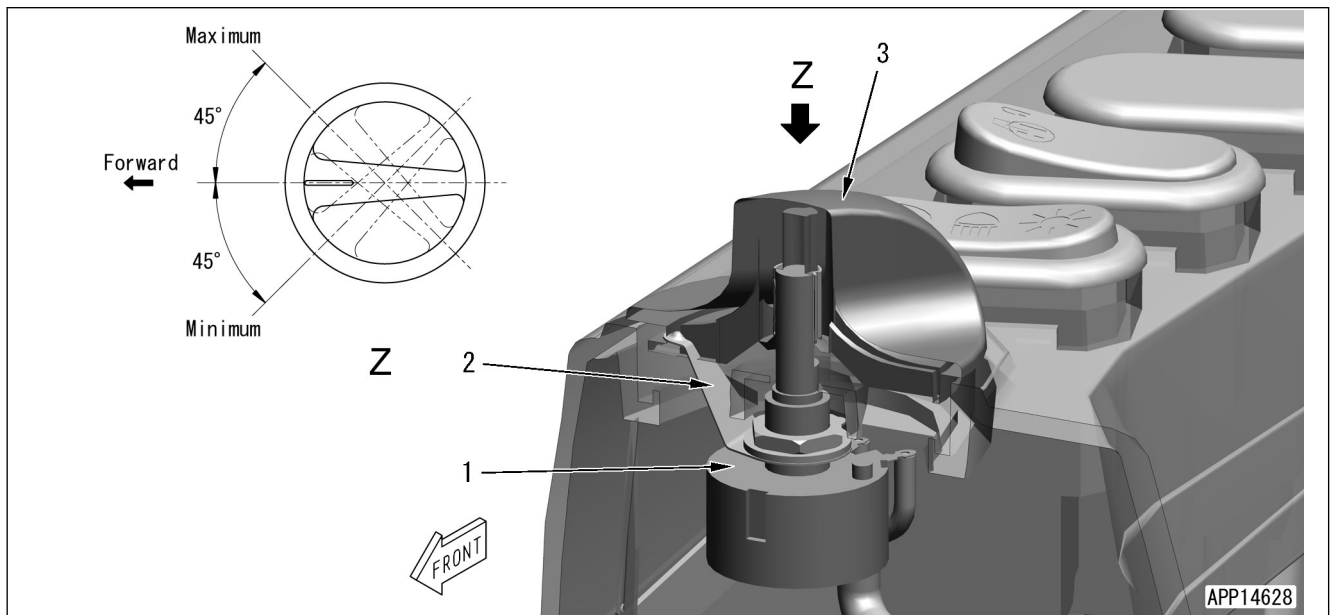
(PC400_10-K-AG22-001-00-B)

STRUCTURE OF FUEL CONTROL DIAL

(PC400_10-K-AG22-041-00-B)

The fuel control dial is installed to R.H. console box.

General view, sectional view



1: Potentiometer

3: Knob

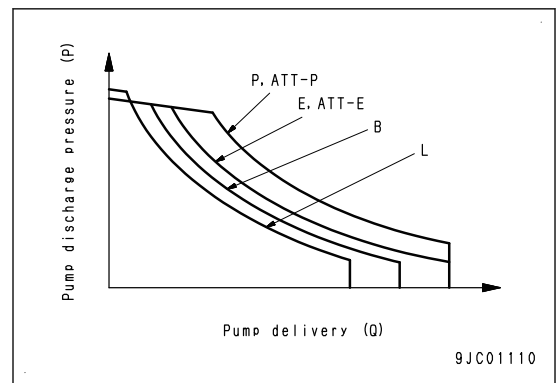
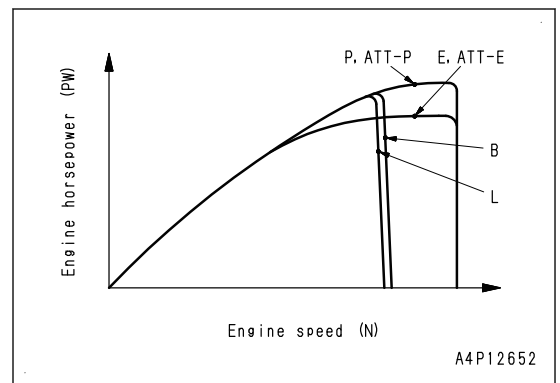
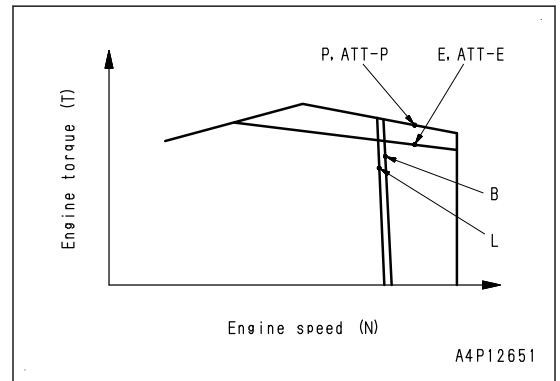
2: Spring

FUNCTION OF ENGINE AND PUMP COMBINED CONTROL SYSTEM

(PC400_10-K-C001-042-00-B)

Working mode selection function

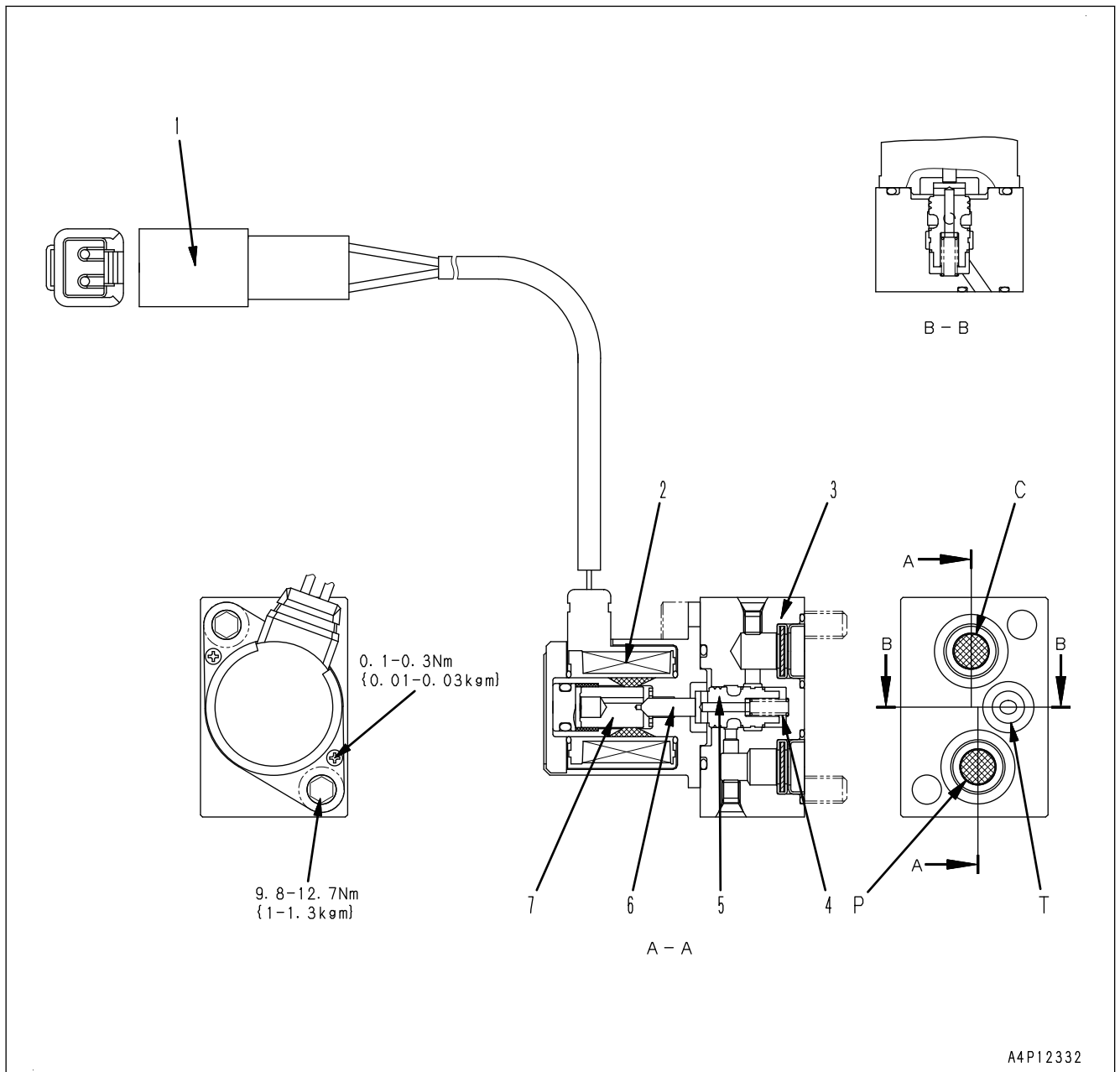
- This function allows the operator to select a working mode with the working mode selector switch on the machine monitor. There are 6 modes of P, E, L, ATT-P, ATT-E, and B prepared. The operator can select the most appropriate engine torque (T) and pump absorption torque for the contents of work. When Without Attachment is set by default of the service mode, the available modes are 3 of P, E, and L.
- The pump controller calculates the pump absorption upper limit torque corresponding to the engine speed set with the working mode and the fuel control dial and the actual engine speed, and controls the pump so that the engine speed is kept around the matching point set in each mode even when heavy load is applied.
- When the engine speed decreases, the pump controller reduces the pump absorption torque to prevent the engine from stalling.



Control method in mode P, E, ATT-P, and ATT-E

Working mode	Matching point
P, ATT-P (at operation)	249 kW/1830 rpm{334 HP/1830 rpm}
E, ATT-E (at operation)	210 kW/1720 rpm{282 HP/1720 rpm}

General view, sectional view



C: To LS valve

T: To hydraulic tank

P: From self-pressure reducing valve

1: Connector

5: Spool

2: Coil

6: Rod

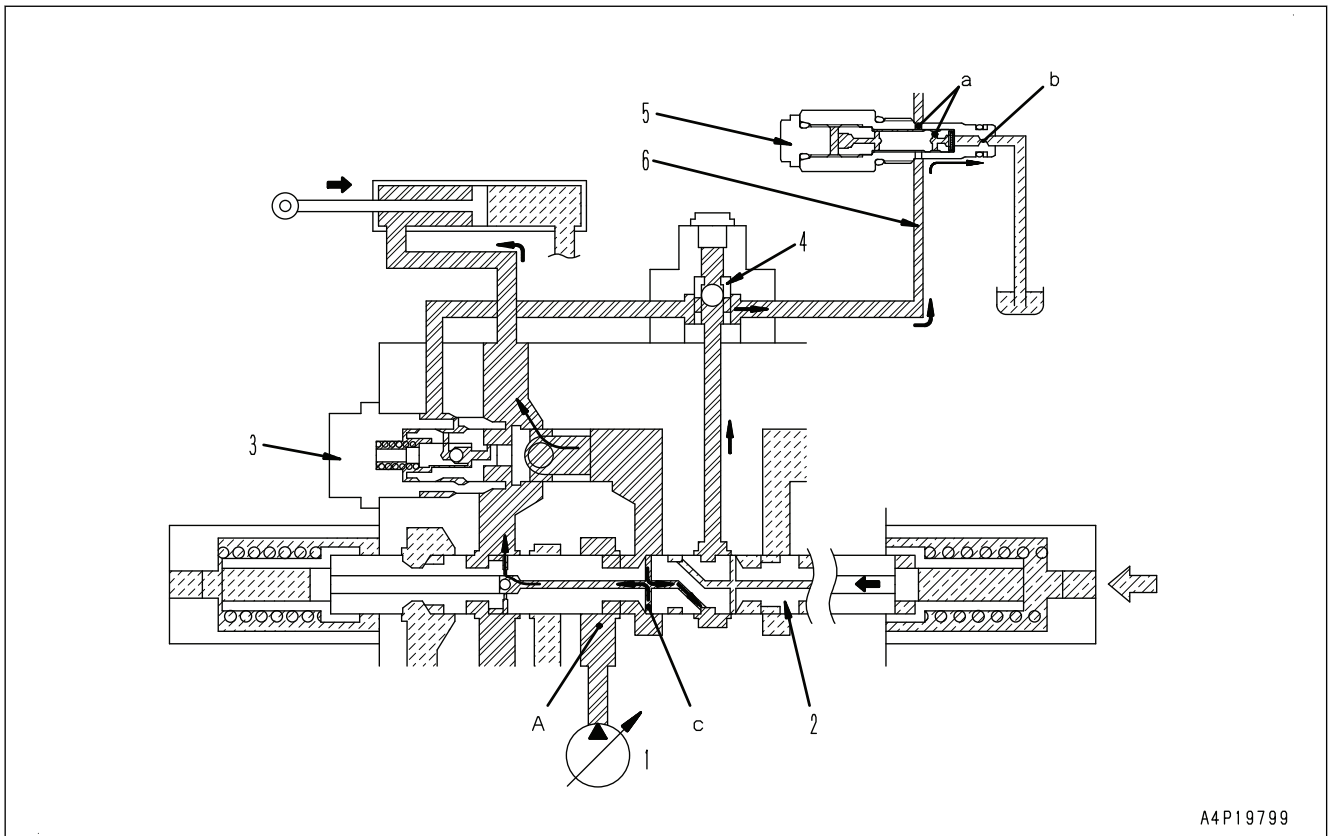
3: Body

7: Plunger

4: Spring

FUNCTION OF LS BYPASS PLUG OF CONTROL VALVE

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



- It releases the remaining pressure in LS pressure circuit (6) through orifices (a) and (b).
- It reduces the LS pressure rising speed and prevents sudden change of the hydraulic pressure.
- When oil bypasses through LS bypass plug (5), pressure loss is generated due to the resistance in the circuit from orifice (c) of main spool (2) to LS shuttle valve (4).
- The effective LS differential pressure decreases, and the dynamic stability of the actuator is improved.

When arm hydraulic drift prevention valve (optional) is installed to the arm cylinder head circuit, the higher one of the boom cylinder bottom circuit pressure and the arm cylinder head circuit pressure pushes open check valve (6) or (6A), and suction safety valve (3) operates.

ARM QUICK RETURN VALVE OF CONTROL VALVE

(PC400_10-K-L9K1-001-00-B)

FUNCTION OF ARM QUICK RETURN VALVE OF CONTROL VALVE

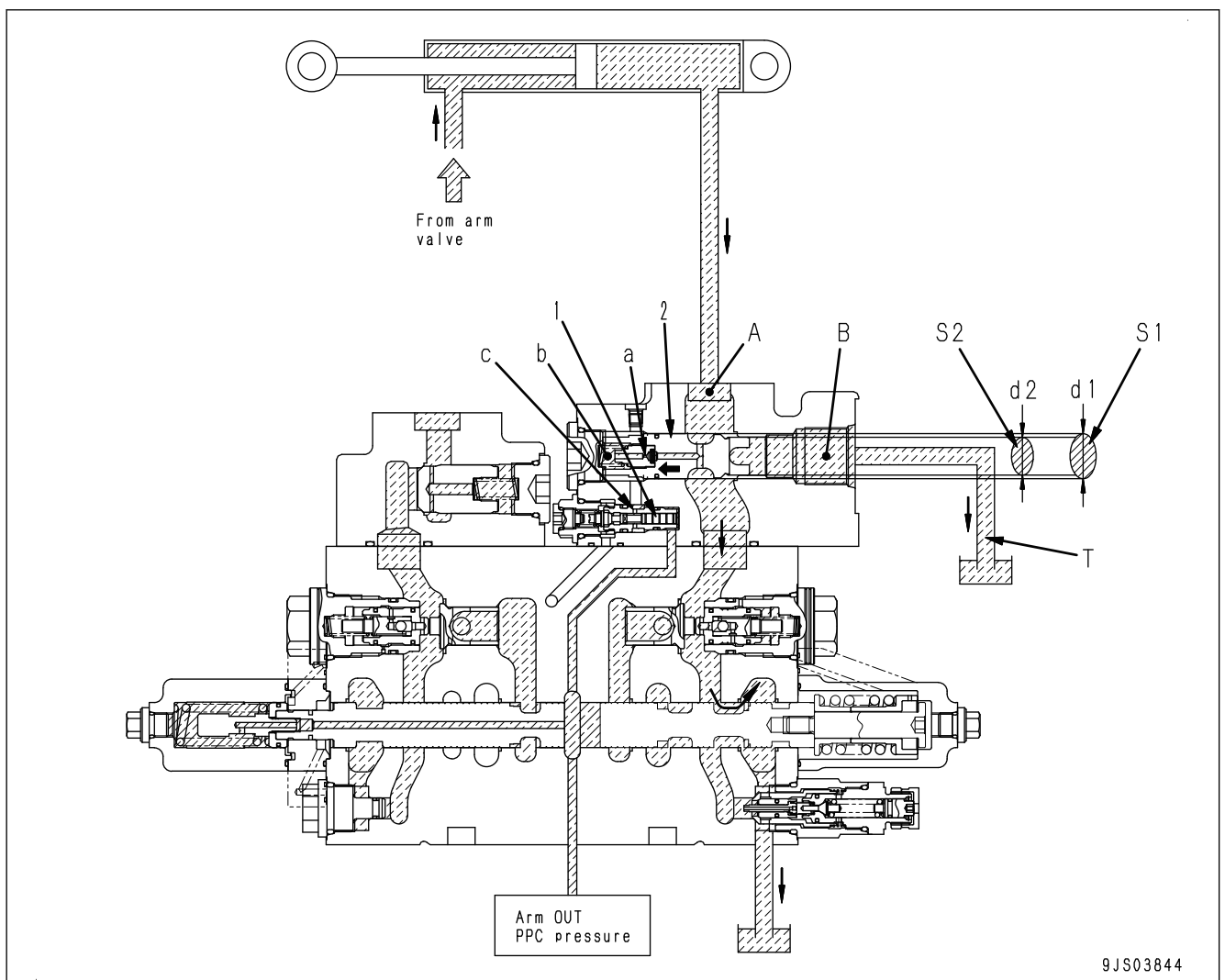
(PC400_10-K-L9K1-042-00-B)

When the arm is moved OUT, much oil returns from the cylinder bottom. This function is used to decrease the pressure loss in this process.

OPERATION OF ARM QUICK RETURN VALVE OF CONTROL VALVE

(PC400_10-K-L9K1-044-00-B)

When arm is moved OUT



1. When arm OUT operation is performed, the pilot pressure from PPC valve pushes pilot piston (1).
2. The pressurized oil in chamber (B) is drained through orifice (c).
3. The pressurized oil in the arm cylinder bottom flows to drain port (T) through orifice (a), chamber (b), and orifice (c).
4. Chamber (b) is connected to drain port (T), and the pressure in chamber (b) decreases.
5. When pressure in chamber (b) decreases below that in port (A), the pressure applied to the pressure receiving portion on port (A) side "area (S2) of diameter d2 (area of seat diameter)" becomes larger than the

EPC VALVE OF 1ST-LINE ATTACHMENT PPC VALVE

(PC400_10-K-PL2B-001-00-B)

PPC

Abbreviation for Proportional Pressure Control

EPC

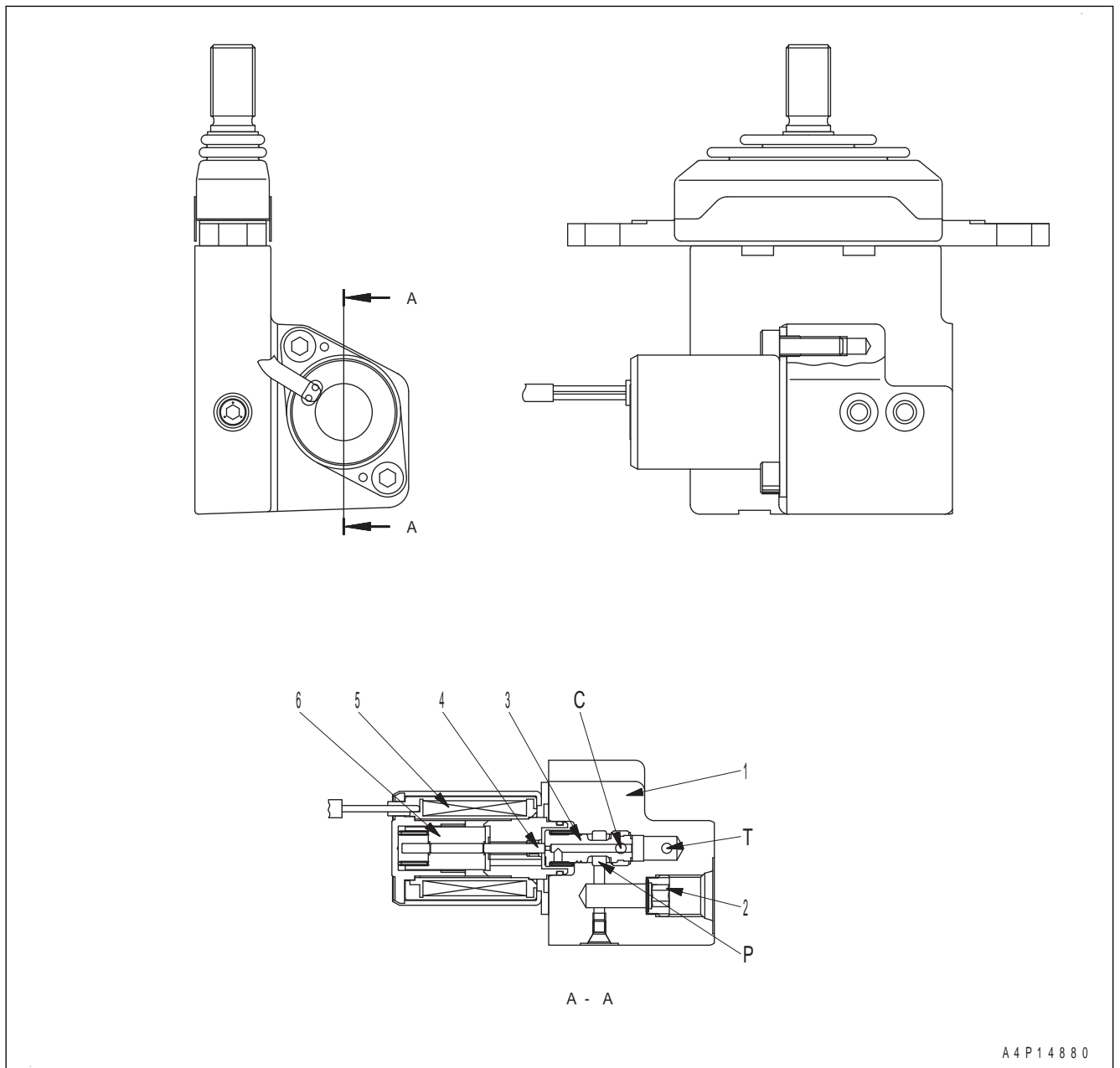
Abbreviation for Electromagnetic Proportional Control

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

(PC400_10-K-PL2B-041-00-B)

(Machines ready for installation of attachment)

General view and sectional view



A 4 P 1 4 8 8 0

P: From self-pressure reducing valve

T: To hydraulic tank

C: To attachment PPC valve (R.H. attachment)

1: Body

3: Spool

2: Plug

4: Push pin

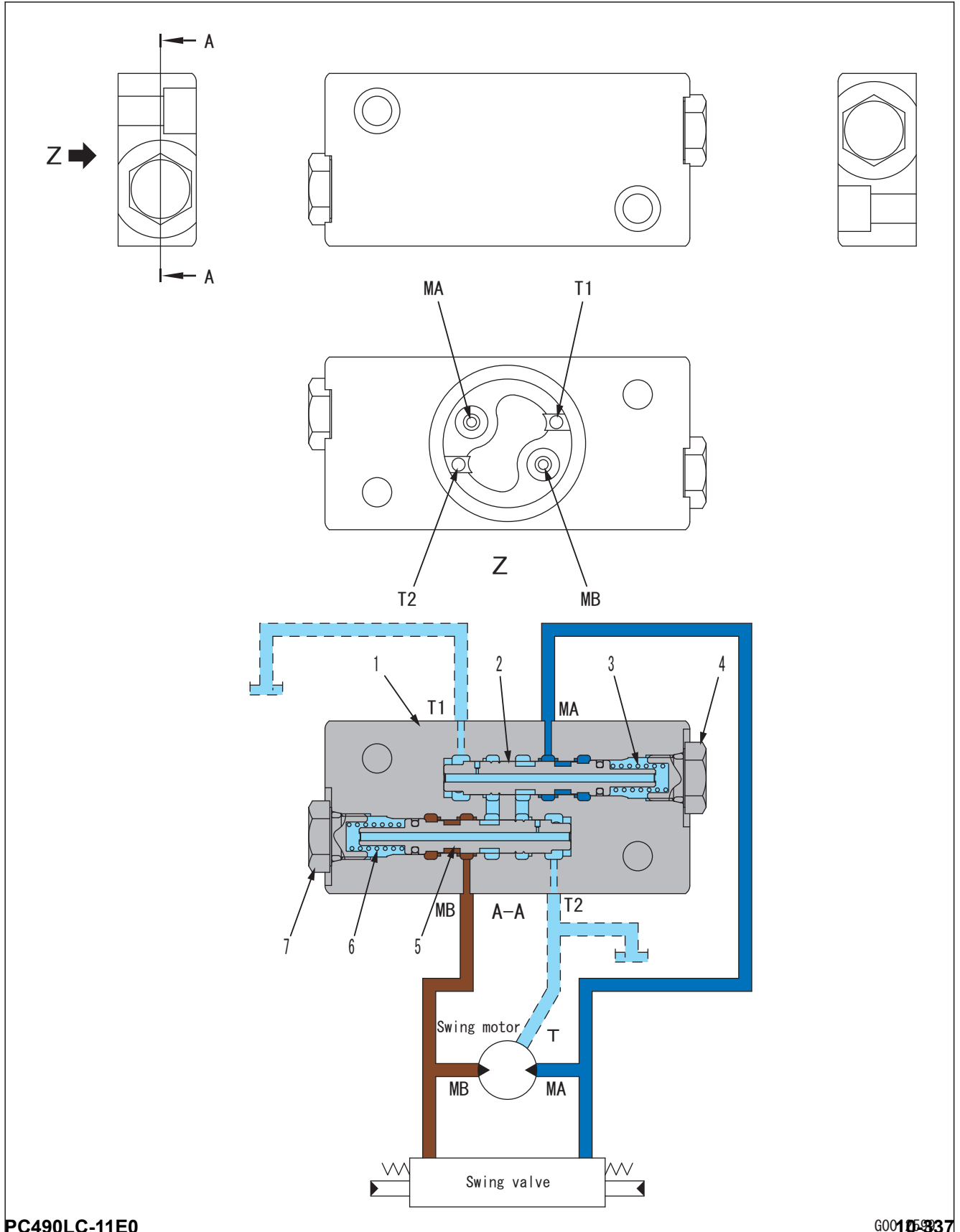
SWING MOTOR REVERSE PREVENTION VALVE

(PC400_10-K-J6B2-001-00-B)

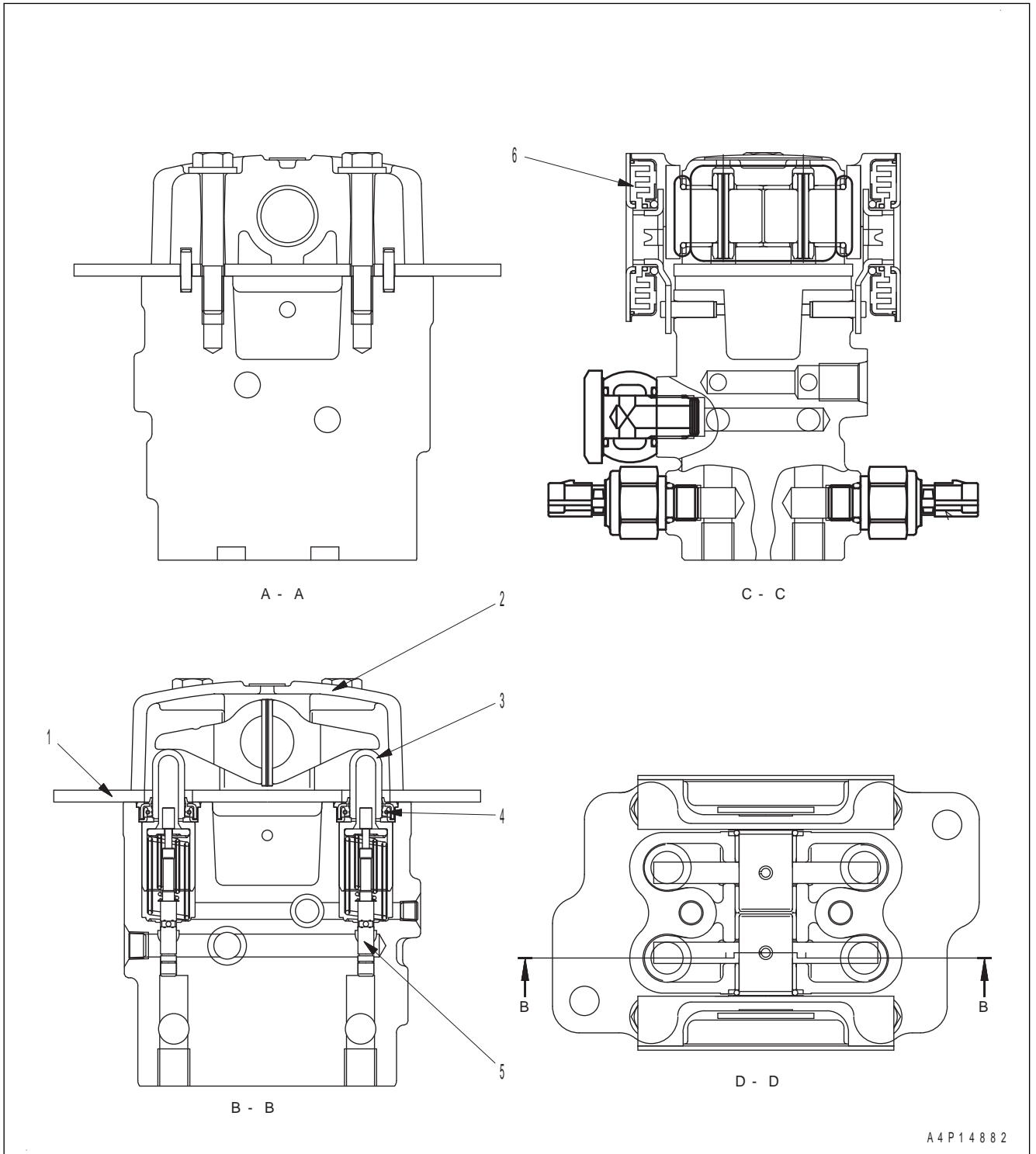
STRUCTURE OF SWING MOTOR REVERSE PREVENTION VALVE

(PC400_10-K-J6B2-041-00-B)

General view and sectional view



Sectional view



A4P14882

- 1: Plate
- 2: Case
- 3: Piston

- 4: Seal
- 5: Spool
- 6: Damper

Machine model			PC490LC-11E0	
Engine			SAA6D125E-7	
Item	Measurement condition	Unit	Standard value for new machine	Repair limit
Outlet pressure of LS-EPC valve (PSIG)	<ul style="list-style-type: none"> Hydraulic oil temperature: 45 to 55 °C Fuel control dial: MAX position(High idle) Working mode: P (Power Mode) Travel control lever: Fine control 	Travel low	Approximately 2.9 {30}	Approximately 2.9 {30}
		Travel high	0 {0}	0 {0}
Solenoid valve outlet pressure	<ul style="list-style-type: none"> Hydraulic oil temperature: 45 to 55 °C Fuel control dial: MAX position(High idle) For ON/OFF conditions of the solenoid, see Testing and adjusting, "Testing outlet pressure of solenoid valve". 	OFF (de-energized)	0 {0}	0 {0}
		ON (energized)	2.84 to 3.43 {29 to 35}	2.84 to 3.43 {29 to 35}
PPC valve output pressure	<ul style="list-style-type: none"> Hydraulic oil temperature: 45 to 55 °C Fuel control dial: MAX position(High idle) Control lever full stroke 	MPa {kgf/cm ² }	2.9 (+0.6/-0.2) {30 (+5.5/-1.5)}	2.9 (+0.6/-0.2) {30 (+5.5/-1.5)}

Swing

Machine model			PC490LC-11E0	
Engine			SAA6D125E-7	
Item	Measurement condition	Unit	Standard value for new machine	Repair limit
Overswing	<ul style="list-style-type: none"> Hydraulic oil temperature: 45 to 55 °C Fuel control dial: MAX position(High idle) Working mode: P (Power Mode) Overswing of swing circle after 1 swing Measurement posture: See "Machine posture and measurement posture for measuring performance", "Swing 1". 	deg. (mm)	Max. 130	Max. 160

ABBREVIATION LIST

(ALL_30-A-0360-005-00-B)

- This list of abbreviations includes the abbreviations used in the text of the shop manual for parts, components, and functions whose meaning is not immediately clear. The spelling is given in full with an outline of the meaning.
- Abbreviations that are used in general society may not be included.
- Special abbreviations which appear infrequently are noted in the text.
- This list of abbreviations consists of two parts. The first part is a list of the abbreviations used in the text of the manual, and the second part is a list of the abbreviations used in the circuit diagrams.

List of abbreviations used in the text

Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*1), or component/system)	Explanation
ABS	Antilock Brake System	Travel and brake (HD, HM)	This is a function that releases the brake when the tires skid (tires are not rotated). This function applies the brake again when the tires rotate.
AISS	Automatic Idling Setting System	Engine	This is a function that automatically sets the idle speed.
AJSS	Advanced Joystick Steering System	Steering (WA)	This is a function that performs the steering operations with a lever instead of using a steering wheel. This function performs gear shifting and changing forward and reverse direction.
ARAC	Automatic Retarder Accelerator Control	Travel and brake (HD, HM)	This is a function that automatically operates the retarder with a constant braking force when letting go of the accelerator pedal on the downhill.
ARSC	Automatic Retarder Speed Control	Travel and brake (HD, HM)	This is a function that automatically operates the retarder to ensure that the machine speed does not accelerate above the speed set by the operator when letting go of the accelerator pedal on the downhill.
ASR	Automatic Spin Regulator	Travel and brake (HD, HM)	This is a function that drives both wheels automatically using the optimum braking force when the tire on one side spins on the soft ground surfaces.
ATT	Attachment	Work equipment	A function or component that can be added to the standard specification.
BCV	Brake cooling oil control valve	BRAKE (HD)	This is a valve that bypasses a part of the brake cooling oil to reduce the load applied to the hydraulic pump when the retarder is not being used.
CAN	Controller Area Network	Communication and electronic control	This is one of communication standards that are used in the network on the machine.
CDR	Crankcase Depression Regulator	Engine	This is a regulator valve that is installed to KCCV ventilator. It is written as CDR valve and is not used independently.
CLSS	Closed-center Load Sensing System	Hydraulic system	This is a system that can actuate multiple actuators simultaneously regardless of the load (provides better combined operation than OLSS).

TEST BLOWBY PRESSURE

(PC400_10-K-A000-304-02-B)

Tools for testing blowby pressure

Symbol	Part No.	Part name	Q'ty	Remarks	
A	-	799-201-1506	Blowby checker	1	
	1	799-201-1591	Gauge	1	Pressure range 0 to 10 kPa
	2	799-201-1511	Tool	1	
	3	799-201-1450	Adapter	1	
	4	07281-00289	Clamp	2	
B	Commercially available	Plug	1	Hose inside diameter 24 mm	
C	Commercially available	Cap	2	Tube inside diameter 25.4 mm	

⚠ 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.

Test this item under the following conditions.

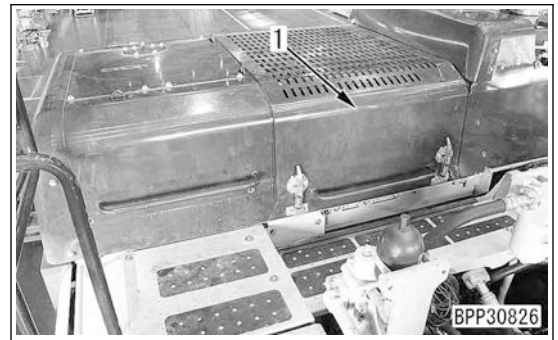
- Engine coolant temperature 60 to 100 °C
- Hydraulic oil temperature 45 to 55 °C
- Perform with after treatment devices regeneration disabled

For testing of blowby pressure to perform troubleshooting or Pm Clinic, or periodic maintenance, etc. refer to this section.

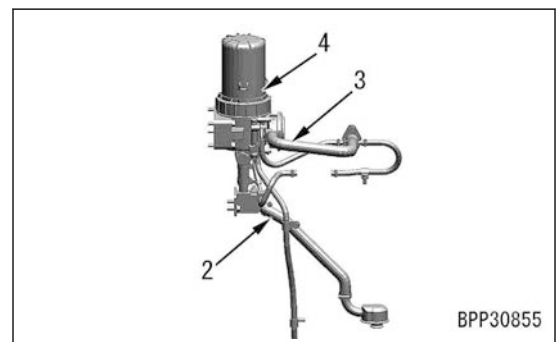
METHOD FOR TESTING BLOWBY PRESSURE

(PC400_10-K-A000-36C-01-B)

1. Open the engine hood (1).



2. Disconnect the KCCV side of the KCCV blowby gas inlet hose (2) and the outlet hose (3).



Test State	Content	Details	Required action
14	SCR temperature is out of specified range	SCR temperature is 450 °C or above or 250 °C or below (temperature range is set by each test level)	The test state is displayed when step is switched during "SCR Denitration Efficiency Test". Wait for several minutes. After "Test State" becomes "10", test restarts automatically.
15	Mass air flow is out of specified range	Exhaust gas flow rate is above 0.65 kg/sec or below 0.05 kg/sec.	Under the condition described on the left, "SCR Denitration Efficiency Test" does not finish successfully. Perform the troubleshooting for the failure code. See "TROUBLESHOOTING".
16	NOx value at turbo-charger outlet is out of specified range	<ul style="list-style-type: none"> Turbo outlet NOx concentration is 100 ppm or below NOx sensor at turbocharger outlet is unmeasurable 	Under the condition described on the left, "SCR Denitration Efficiency Test" does not finish successfully. Perform the troubleshooting for the failure code. See "TROUBLESHOOTING".
17	Injection of AdBlue/DEF is prohibited	The failure code is displayed.	Perform the troubleshooting for the failure code. See "TROUBLESHOOTING".
18	Ambient temperature and ambient pressure are out of specified range	<ul style="list-style-type: none"> Ambient temperature is -30 °C or below Ambient pressure is 60 kPa or below, or 160 kPa or above 	Under the condition described on the left, SCR Denitration Efficiency Test does not finish successfully. Perform the troubleshooting for the failure code. See "TROUBLESHOOTING".
30	Machine state is unsafe	Safety of machine is not secured	<ul style="list-style-type: none"> Operate the work equipment lock lever to LOCK position. Turn the fuel control dial to MIN (Low idle) position.
31	Fuel level has dropped	Fuel low level caution is displayed	Refill with fuel.
32	Test cannot be performed (1)	The error message is displayed to prohibit the regeneration of aftertreatment devices	Perform the troubleshooting for the failure code. See "TROUBLESHOOTING".
33	Within 20 seconds after starting the engine	Within 20 seconds after starting the engine	Start the engine, wait for 20 seconds or more, and then restart the test.
34	Test cannot be performed (2)	The engine is stopped.	Start the engine, and then restart the test.
		Specified error is being displayed	Perform the troubleshooting for the failure code. See "TROUBLESHOOTING".
35	Test cannot be performed (3)	Fuel control dial is not in MIN position	Lower the engine speed, and then restart the test.
		AdBlue/DEF tank temperature is below -1 °C	Start the engine, thaw AdBlue/DEF, and then restart the test.
36	Test cannot be performed (4)	A particular error is being displayed	Perform the troubleshooting for the failure code. See "TROUBLESHOOTING".
		The AdBlue/DEF level is below 10 %.	Refill with AdBlue/DEF, and then restart the test.

HYDRAULIC SYSTEM

(ALL-K-C000-001-30-B)

RELEASE REMAINING PRESSURE FROM HYDRAULIC SYSTEM

(PC400_10-K-C000-304-00-B)

For releasing the remaining pressure from hydraulic system to perform troubleshooting, refer to this section.

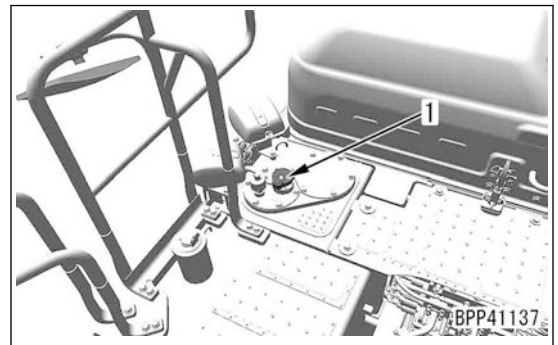
METHOD FOR RELEASING REMAINING PRESSURE FROM HYDRAULIC TANK

(PC220_11-K-C000-22A-01-B)

Release remaining pressure in hydraulic tank

Release the remaining pressure from the hydraulic tank according to the following procedure when removing a hose or a clamp connected to the hydraulic tank. It is because the hydraulic tank is airtight and pressurized.

1. Lower the work equipment to the ground in a stable posture, and stop the engine.
2. Loosen the oil filler cap (1) of the hydraulic tank gradually to release the air in the tank.



Release remaining pressure in swing motor circuit

The remaining pressure can be released by performing the same operation as that described in “Release remaining pressure in hydraulic cylinder” (Operate the lever to SWING direction only, however).

Release remaining pressure in travel motor circuit

The control valve spool of the travel motor circuit is an open type circuit, so the remaining pressure can be released by performing the same operation as that described in “Release remaining pressure in hydraulic tank”.

METHOD FOR RELEASING REMAINING PRESSURE IN HYDRAULIC CYLINDER CIRCUIT

(HB205_3-K-C000-22A-01-B)

When disconnecting a pipe between a hydraulic cylinder and the control valve, release the remaining pressure from the circuit according to the following procedure.

Method for releasing remaining pressure from machine without anti-drop valve

1. Release the remaining pressure in the hydraulic tank. See “METHOD FOR RELEASING REMAINING PRESSURE FROM HYDRAULIC TANK”.

REMARK

Leave the oil filler cap of the hydraulic tank removed.

2. Turn the starting switch to ON position.
3. Set the lock lever to FREE position, and operate the right and left work equipment control levers to back and forth, left to right.

REMARK

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

4. Set the lock lever in LOCK position.

REMARK

For the conditions for turning the solenoid valve ON/OFF, see “OPERATING CONDITION OF SOLENOID VALVE”.

Operating condition of the solenoid valve can be checked with monitoring function of the machine monitor. (For the detail, see “SET AND OPERATE MACHINE MONITOR”.)

Monitoring code: 02300 “Solenoid Valve 1”

Monitoring code: 02301 “Solenoid Valve 2”

Monitoring code: 02302 “Solenoid Valve 3”

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

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

OPERATING CONDITION OF SOLENOID VALVE

(PC400_10-K-C020-04C-00-B)

(1) 2-stage relief solenoid valve operation table

Operating condition of solenoid			Operating status of solenoid
Overheat 1st setting ON			OFF
When overheat 2nd setting is ON			
All signals of work equipment, swing, and travel OFF			
When swing lock switch is ON			ON
When travel signals ON			
In L mode			
Boom LOWER signal ON			
P-mode, E-mode	One-touch power maximizing switch ON	Signals other than swing single operation signal ON	OFF
		Swing single operation signal ON	
Other than the above conditions			

(2) Attachment selector solenoid valve operation table (for the attachment installed specification)

Operating condition of solenoid		Operating status of solenoid
Working mode: Other than B		OFF
Working mode: B		ON

(3) Machine push-up solenoid valve operation table

Operating condition of solenoid		Operating status of solenoid
Machine push-up switch	OFF	ON
	ON	OFF

(4) Swing parking brake solenoid valve operation table

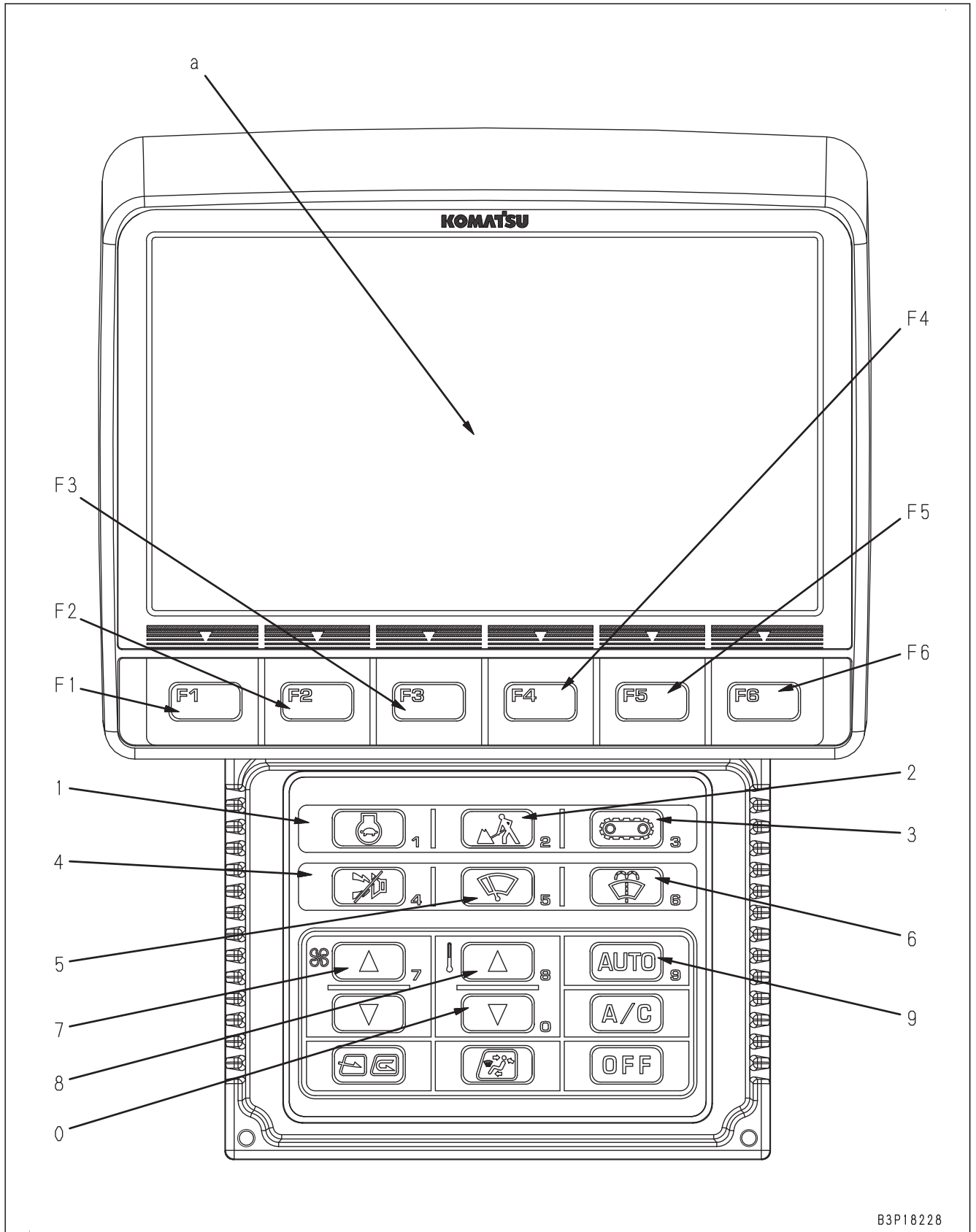
Operating condition of solenoid		Operating status of solenoid
Signal of work equipment and swing (work equipment including services)	All OFF	OFF
	Any one OFF	ON

ELECTRICAL SYSTEM

(PC400_10-K-0H00-001-00-B)

SET AND OPERATE MACHINE MONITOR

(PC400_11-K-Q170-110-00-B)



B3P18228

Code No.	Monitoring item (display on screen)		Unit (default: SI)			Applicable component	Remarks
			SI	Metric	Imperial		
04504	Monitor 1st & 2nd Row SW	SW 1	ON/OFF			MON	
		SW 2	ON/OFF			MON	
		SW 3	ON/OFF			MON	
		SW 4	ON/OFF			MON	
		SW 5	ON/OFF			MON	
		SW 6	ON/OFF			MON	
04505	Monitor 3rd & 4th Row SW	SW 7	ON/OFF			MON	
		SW 8	ON/OFF			MON	
		SW 9	ON/OFF			MON	
		SW 10	ON/OFF			MON	
		SW 11	ON/OFF			MON	
		SW 12	ON/OFF			MON	
04506	Monitor 5th Row SW	SW 13	ON/OFF			MON	
		SW 14	ON/OFF			MON	
		SW 15	ON/OFF			MON	
20227	Monitor Assembly P/N		-			MON	
20402	Monitor S/N		-			MON	
20228	Monitor Program P/N		-			MON	
20200	Monitor Program Version		-			MON	
55300	A/C Compressor State		ON/OFF			MON	
55000	A/C Fresh Air Temp Code		-			MON	
55100	A/C Recirc Air Temp Code		-			MON	
55200	A/C Mode Data (Monitor)		-			MON	
55201	A/C Mode Data (A/C ECU)		-			MON	
20260	KOMTRAX Assembly P/N		-			MON	
20418	KOMTRAX S/N		-			MON	
20261	KOMTRAX Program P/N		-			MON	
20273	KOMTRAX Program Version		-			MON	
20262	ID Key Controller Assembly P/N		-			MON	
20419	ID Key Controller S/N		-			MON	
20263	ID Key Controller Program P/N		-			MON	
01701	Attachment Sol 2 Current		mA	mA	mA	PUMP	
01702	Attachment Sol 3 Current		mA	mA	mA	PUMP	
01703	Attachment Sol 4 Current		mA	mA	mA	PUMP	
01704	Attachment Sol 5 Current		mA	mA	mA	PUMP	
20479	KomVision Cont. Assembly P/N		-			MON	
20480	KomVision Cont. S/N		-			MON	

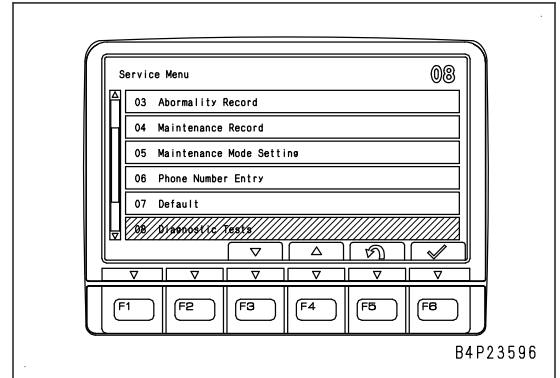
The engine controller detects the occurred in-range error. Failure codes related to occurred error can be cleared on the machine monitor.

The failure codes listed in “FAILURE CODES TABLE” of TROUBLESHOOTING, “PROCEDURE FOR TROUBLESHOOTING” cannot be cleared by “Engine Controller Active Fault Clear”.

1. Select “Diagnostic Tests” from the “Service Menu” screen.

REMARK

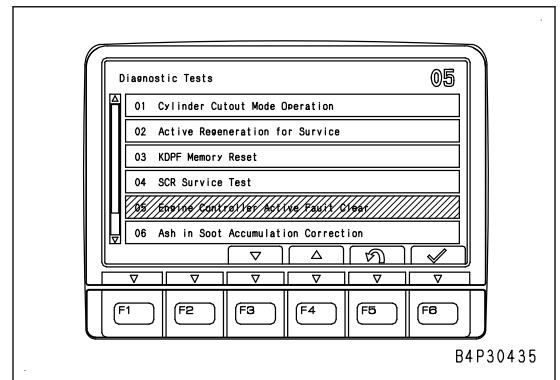
For selecting method, see “Operating method of service mode” in “SERVICE MODE”.



2. On the “Diagnostic Tests” screen, select “Engine Controller Active Fault Clear” with function switches or numeral input switches.

REMARK

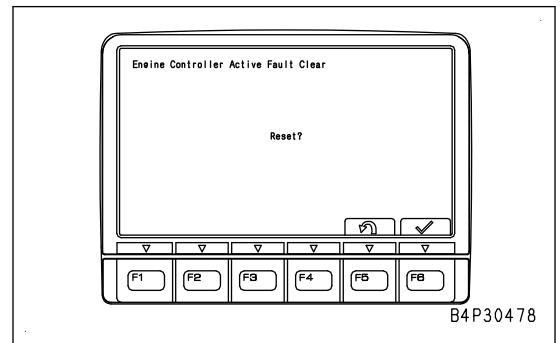
For selecting method, see “Operating method of service mode” in “SERVICE MODE”.



3. On the “Engine Controller Active Fault Clear” screen, select an item to be set by using the function switches.

F5: Returns to the “Diagnostic Tests” screen

F6: Clears the failure code



METHOD FOR OPERATING TESTING MENU (ASH IN SOOT ACCUMULATION CORRECTION)

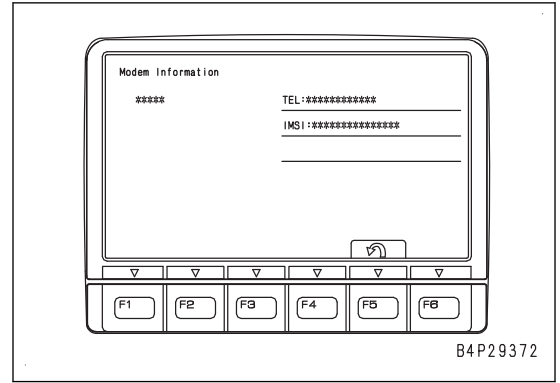
(PC400_11_E-K-A9H0-273-00-B)

Use the testing menu to check the machine or to reset the settings of machine monitor.

You can correct the ash accumulation quantity in the soot accumulation according to the procedures in this section.

1. Perform “KDPF Cleaning”, and then perform “KDPF Change”. See “METHOD FOR OPERATING TESTING MENU (KDPF MEMORY RESET)”.
2. Turn the starting switch to OFF position.
3. Check the system operating lamp is not lit, and turn the starting switch to ON position.

3. Display the phone number and IMSI.
 F5: Returns the screen to "KOMTRAX settings" screen.



B4P29372

METHOD FOR DISPLAYING SERVICE MESSAGE

(PC400_10_E-K-Q210-100-00-B)

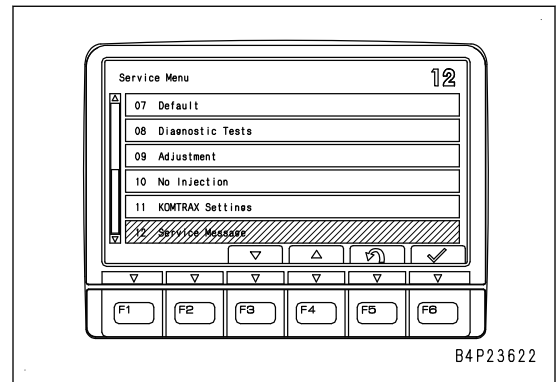
Special messages for the technician sent from the KOMTRAX base station (a distributor, etc.) can be checked with this function.

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

1. Select "Service Message" on "Service Menu" screen.

REMARK

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



B4P23622

2. Displaying message

- Displaying message (read only)

If there is a message, its contents are displayed. If there is no message, "No message." is displayed.

F5: Returns the screen to "Service Menu" screen

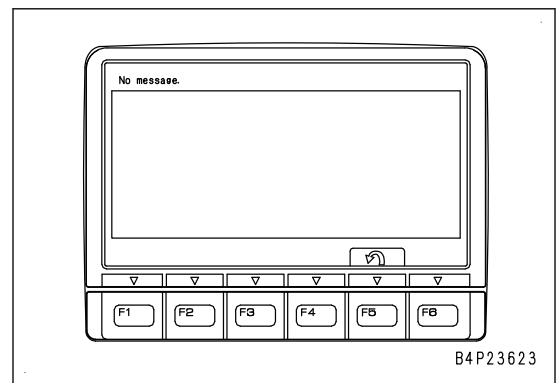
REMARK

- This message is different from that sent to the operator with the machine monitor in the operator mode.
- Since this message is special for the technician, the message monitor is not displayed as it is displayed in the operator mode.
- Display of message (with message return function)

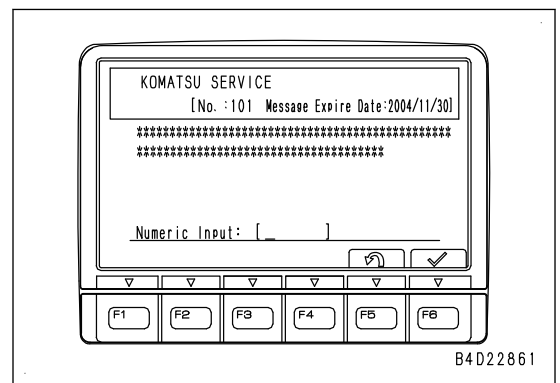
If a message provides the Numeric Input line under the text, input a proper number by using the numeral input switches and enter it by using the function switch, and the information is returned to the KOMTRAX base station.

F5: Returns the screen to "KOMTRAX Settings" screen

F6: Enters and sends the input value.



B4P23623



B4D22861

- 4) Place the traffic cones D at the following positions, and check that they can be seen in the camera image.
- a: 1.0 - 1.5 m from upper structure end
 - b: 1.0 - 1.5 m from counterweight end
 - c: 1.0 - 1.5 m from upper structure end
 - d: Center between 2 cameras

Do "Camera Calibration" again if the object is not seen in the camera image by referring to "SET KomVision (CAMERA CALIBRATION)". Adjust the angles of the camera by referring to "ADJUST KomVision CAMERA ANGLE" when the image quality is still poor after performing "Camera Calibration".

NOTICE

Make sure to perform "Camera Calibration" according to the Table 3 after the camera angle, etc. is adjusted as a result of camera image check.

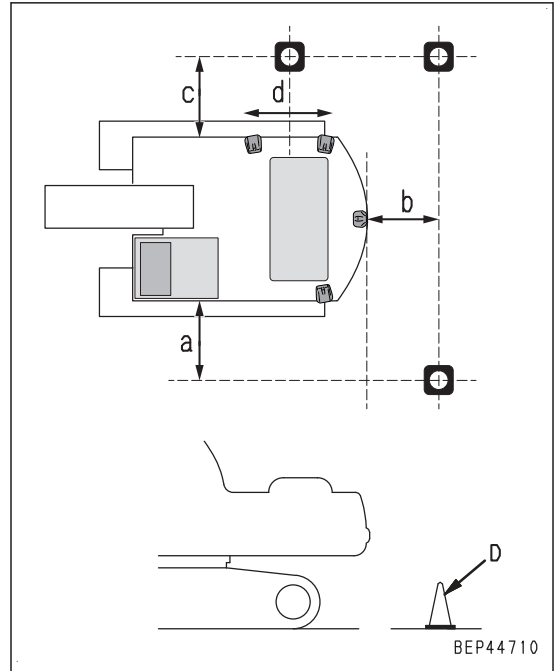


Table 3

Adjusted camera	Item to be performed						
	"Angle Calibration"				"Position Calibration"		
	Rear Camera	Rear R.H. camera	Front R.H. camera	Rear L.H. camera	Rear R.H. camera	Front R.H. camera	Rear L.H. camera
Rear camera	○	-	-	-	○	○	○
Rear R.H. camera	-	○	-	-	○	○	-
Front R.H. camera	-	-	○	-	-	○	-
Rear L.H. camera	-	-	-	○	-	-	○

Hydraulic drift of work equipment

Machine model			PC490LC-11E0			Good	No good
Engine			SAA6D125E-7				
Item	Testing conditions	Unit	Standard value for new machine	Repair limit	Measured item		
Hydraulic drift measured at bucket tip (entire work equipment)	<ul style="list-style-type: none"> • Hydraulic oil temperature: 45 to 55 °C • Engine: Stopped • Load: Bucket soil/sand heap (1:1 slope) or rated load (1.9 m³:3060 kg) • Neutral position of each control lever and control pedal • Measurement posture: Horizontal boom top face, fully retracted arm, and fully extended bucket cylinder on a level and flat ground Measurement posture: Horizontal boom top face, fully retracted arm, and fully extended bucket cylinder See "Standard value table", "Machine posture and measurement posture for measuring performance", "Work equipment 1".	mm	Max. 700	Max. 700			

Case 3 : Functional restrictions caused by other failures

- The failure code may not be able to clear due to functional restrictions (Regeneration control stops, Stops AdBlue/DEF injection, etc.) caused by other failures. Operation and procedure required for clearing the code are given under “Troubleshooting by each failure code”.
- Measures to be taken:
By following the clearing procedure, clear the failure code.
- Examples:
 1. The failure code cannot be cleared because an abnormal high voltage, abnormal low voltage, or communication error (open or short circuit) of failure code is displayed for a related component.
 2. The failure code cannot be cleared because correct values are not input from a sensor (a failure code for a related sensor is displayed).
 3. The failure code cannot be cleared because a failure code that disables auto regeneration or manual stationary regeneration of the aftertreatment devices is displayed.
 4. The failure code cannot be cleared because a failure code that stops the AdBlue/DEF pump or disables AdBlue/DEF injection is displayed.

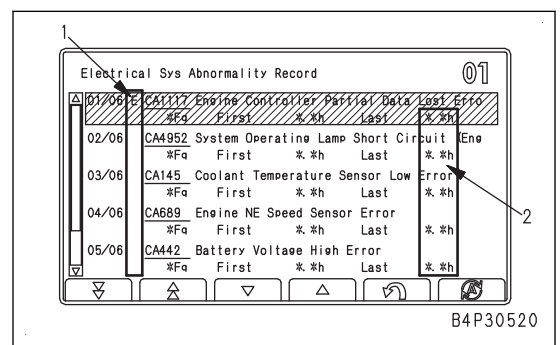
How to identify the failure code to be repaired

Among failure codes displayed on “Abnormality Record” screen of the machine monitor, identify failure codes that have following conditions as a code to be repaired

1. Failure codes displayed with “E” (“E” is displayed on the left of failure code. See the following figure.)
 - Check the “Abnormality Record” screen and identify all failure codes that “E” is currently displayed as a code to be repaired.
 - The failure codes are displayed in the upper row from the “E” on the “Abnormality Record” screen.
2. Failure codes displayed without “E” and their service meter reading (SMR) at last occurrence (at previous working time, etc.) become the most recent time.
 - The failure codes that have detected records most recently and are displayed without “E” may be in the state that their abnormalities are not cleared (*1). Due to that, check the description of “Troubleshooting by failure code” and identify them as a code to be repaired.
 - The failure codes are displayed on “Abnormality Record” screen in ascending order. (See the following figure.)

*1: It corresponds to a failure code that is cleared by turning the starting switch to OFF position, or by stopping the engine though the repair is not completed. Due to this kind of failure code, the failure code to be repaired is not determined only by the existence of “E”. (Failure C pattern in the following REMARK “Display of “E” on the Abnormality Record screen”.)

- 1: Area where “E” is displayed
- 2: Area where the most recent SMR is displayed



REMARK

Display of “E” on the “abnormality record” screen

1. Transition of “E” displayed with failure code has a following pattern.
The table is shown the display of “E” on “Abnormality Record” screen of the machine monitor when turning the starting switch to O N position after turning the starting switch to OFF position and shutting down the engine controller.

- ⚠ **Do not use the battery while its electrolyte level is below LOWER LEVEL. If it is used under that condition, its inside becomes deteriorate, its service life is shortened, and it may lead to an explosion.**
- ⚠ **Since the battery produces combustible gas that can explode, do not bring any open flame near it.**
- ⚠ **Battery electrolyte is dangerous. Take care that it does not come in contact with your eyes or skin. If it does, wash it away with water and contact your doctor.**

REMARK

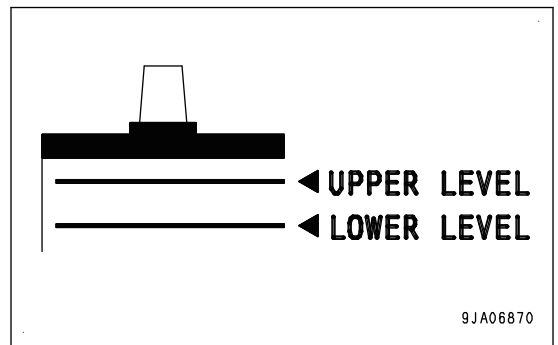
- Do not add the electrolyte to the battery exceeding UPPER LEVEL line. If the electrolyte level is too high, it may leak and cause damage to the paint surface or corrode other parts.
- When adding purified water in cold weather, add it before starting operations in the morning to prevent the purified water from freezing.
- When checking the electrolyte level through the side face of the battery

- 1) Wipe and clean the battery surface, especially around the battery level lines with a wet cloth, and check to see that the battery fluid is between the UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines.

NOTICE

Do not clean the battery with a dry cloth since static electricity may cause an explosion.

- 2) If the electrolyte level is below UPPER LEVEL and LOWER LEVEL lines, remove cap (2) and add the purified water (such as a commercial battery fluid) to UPPER LEVEL line immediately.



REMARK

- After adding the purified water, tighten the cap securely.
- If the purified water is added to above UPPER LEVEL (U.L.) line, remove the fluid by using a syringe to lower the level to UPPER LEVEL (U.L.) line. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water.

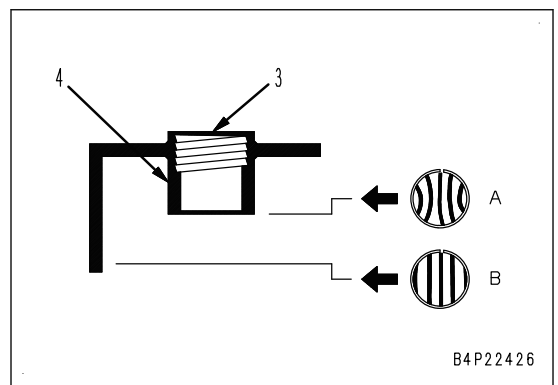
- When electrolyte level cannot be checked through the side face of the battery

- 1) Remove cap (2) on the top of battery. (described previously)
- 2) Look into filler port (3) and check the surface of fluid. If the fluid level is below sleeve (4), always add the purified water (such as a commercial battery fluid) until it reaches the bottom of sleeve (the UPPER LEVEL).

(A) Correct level: Since the electrolyte level reaches to the sleeve bottom, the shape of the electrode plates will appear distorted due to the surface tension.

(B) Low: Since the electrolyte level does not reach the sleeve bottom, the shape of the electrode plates will appear straight.

- 3) After adding fluid, tighten cap (2).



REMARK

If the purified water is added to above UPPER LEVEL (U.L.) line, remove the fluid by using a syringe to lower the level to UPPER LEVEL (U.L.) line. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water.

Check of wiring harness for discoloration, burn and cover peeling

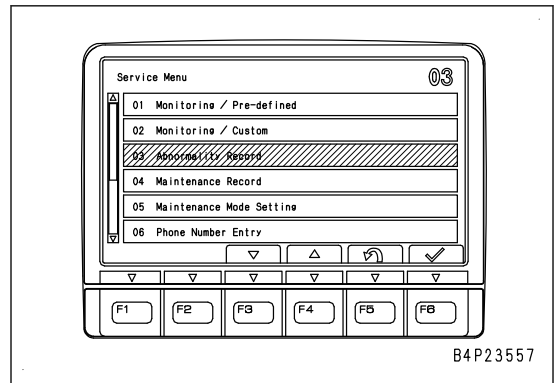
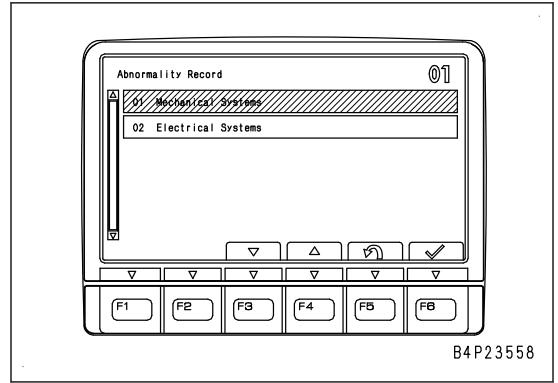
8. Check the wiring harness and cables for discoloration and burn.

- 4) Press switch F6 in the panel switch section to enter the selection, and go to the “Mechanical Systems abnormality record” screen.
- 5) Press switch F3 in the panel switch section to see if the next failure code is displayed and write down all of the failure codes.

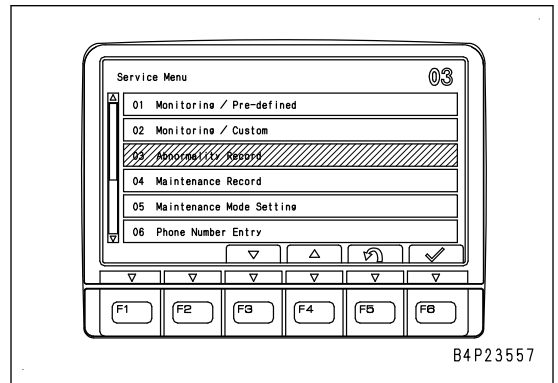
REMARK

A failure code of the mechanical system cannot be deleted.

- 6) Press switch F5 in the panel switch section to return the screen to the “Troubleshooting Record” screen.
- 7) On the service menu screen, press switch F3 twice in the panel switch section, and select “03 Abnormality Record”.



- 8) Press switch F6 in the panel switch section to enter the selection, and go to the “Abnormality Record” screen.

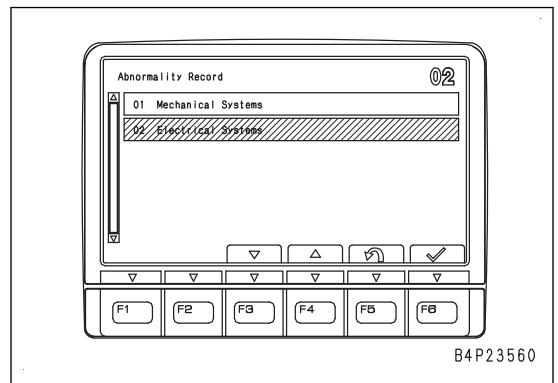


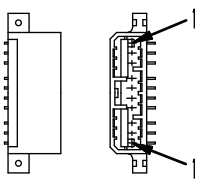
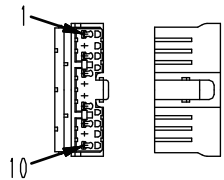
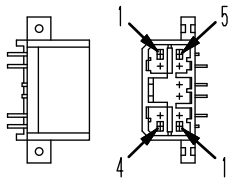
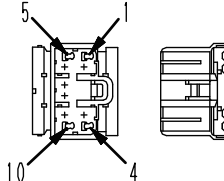
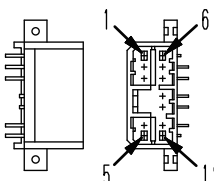
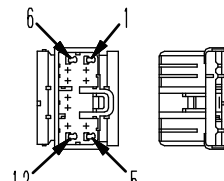
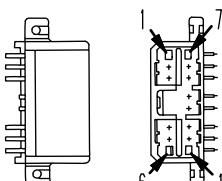
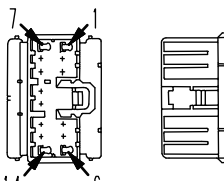
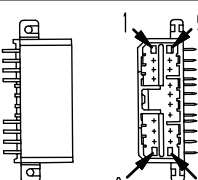
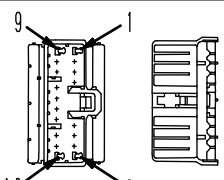
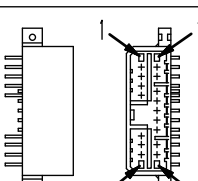
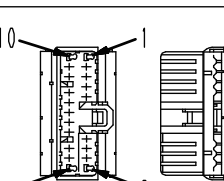
- 9) Press switch F6 in the panel switch section to enter the selection, and go to the “Electrical Sys Abnormality Record” screen.
- 10) Press switch F3 in the panel switch section to see if the next failure code is displayed and write down all of the failure codes.

REMARK

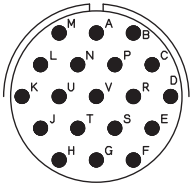
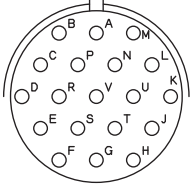
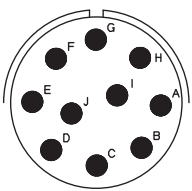
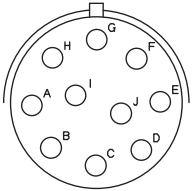
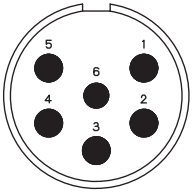
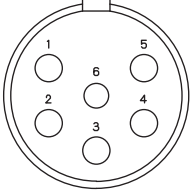
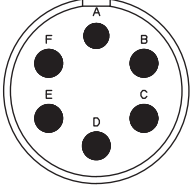
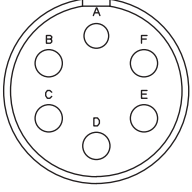
“E” on the left of a failure code indicates that the failure code is “active” (the failure remains or restoration to normal has not been checked). A failure code having no “E” on its left is a “non-active” one. Since it disappears at the clear step mode, be sure to write it down.

- When failure code is recorded
Perform the troubleshooting in “Display of code” corresponding to the failure code.



No. of pins	AMP070 type connector		Testing connection use special tool Part No.
	Male (female housing)	Female (male housing)	
10	 <p>1 10 BWP04759</p>	 <p>1 10 BWP04760</p>	—
10	 <p>1 5 4 10 9JS02245</p>	 <p>5 1 10 4 9JS02246</p>	799-601-7510 (T-adapter)
	—	Part No. : 7821-92-7330	
12	 <p>1 6 5 12 BWP04761</p>	 <p>6 1 12 5 BWP04762</p>	799-601-7520 (T-adapter)
	—	Part No. : 7821-92-7340	
14	 <p>1 7 6 14 BWP04763</p>	 <p>7 1 14 6 BWP04764</p>	799-601-7530 (T-adapter)
	—	Part No. : 7821-92-7350	
18	 <p>1 9 8 18 BWP04765</p>	 <p>9 1 18 8 BWP04766</p>	799-601-7540 (T-adapter)
	—	Part No. : 7821-92-7360	
20	 <p>1 10 9 20 BWP04767</p>	 <p>10 1 20 9 BWP04768</p>	799-601-7550 (T-adapter)
	—	Part No. : 7821-92-7370	

B4D18199

Connector for ICT (Amphenol)			
No. of pins	PT series connector		Testing connection use special tool Part No.
	Male (female housing)	Female (male housing)	
19			799-902-9310 (T-adapter)
	—	—	
No. of pins	AC series connector		799-902-9320 (T-adapter)
	Male (female housing)	Female (male housing)	
10			799-902-9320 (T-adapter)
	—	—	
No. of pins	C091 series connector		799-902-9330 (T-adapter)
	Male (female housing)	Female (male housing)	
6			799-902-9330 (T-adapter)
	—	—	
No. of pins	GT series connector		—
	Male (female housing)	Female (male housing)	
6			—
	—	—	

B4P35254

Failure code	Failure (Shown on screen)	Applicable equipment	Action level	History category	Remarks
DHS9MA	Boom LOWER PPC Pressure Sensor Defective Function	PUMP	L01	Electrical system	
DHSAMA	Swing Right PPC Pressure Sensor Defective Function	PUMP	L01	Electrical system	
DHSBMA	Swing Left PPC Pressure Sensor Defective Function	PUMP	L01	Electrical system	
DHSCMA	Arm OUT PPC Pressure Sensor Defective Function	PUMP	L01	Electrical system	
DHSDMA	Bucket DUMP PPC Pressure Sensor Defective Function	PUMP	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	
DHSVMA	Counterweight Remover Pressure Sensor Open Circuit or Short Circuit	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	
DKR0MA	Front Pump Swash Plate Sensor Defective Function	PUMP	L01	Electrical system	
DKR1MA	Rear Pump Swash Plate Sensor Defective Function	PUMP	L01	Electrical system	
DKULKA	PPC Lock Relay Open Circuit	PUMP	L01	Electrical system	
DKULKB	PPC Lock Relay Short Circuit	PUMP	L01	Electrical system	
DKULKY	PPC Lock Relay Hot Short Circuit	PUMP	L01	Electrical system	
DLM3KA	Fan Speed Sensor Open Circuit	PUMP	L01	Electrical system	
DLM3KB	Fan control:Mismatch	PUMP	L01	Electrical system	
DLM3MB	Fan control: Mismatch	PUMP	L01	Electrical system	
DR10KA	KomVision Camera Open Circuit	KomVision	L01	Electrical system	
DR12KA	Disconnection of Camera 1 NTSC Input	KomVision	L03	Electrical system	
DR20KA	Disconnection of Camera 2 NTSC Input	KomVision	L01	Electrical system	

FAILURE CODE [AA10NX]

(PC490_11E0_WMEA-K-A966-410-00-B)

Action level	Failure code	Failure	Air Cleaner Clogging (Machine monitor system)
L01	AA10NX		
Detail of failure	Air cleaner clogging switch signal voltage is not 1 V and below while engine is running, and machine monitor detects clogging of air cleaner (open of sensor contacts).		
Action of controller	Displays air cleaner clogging monitor in yellow on machine monitor.		
Phenomenon on machine	If machine is used as it is, engine may be damaged.		
Related information	<ul style="list-style-type: none"> Input (ON/OFF) from air cleaner clogging switch can be checked with monitoring function. (Code: 04501) After completion of repair, check that the failure code is cleared by the following procedure. Procedure: Start the engine. 		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Clogged air cleaner (when system works properly)	Air cleaner may be clogged. Check it for clogging and then clean or replace if clogged.		
2	Defective air cleaner clogging switch (internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector P23, and connect T-adaptor to male side.		
		Resistance	Between P23 (male) (1) and (2)	Max. 1 Ω
3	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors CM02 and P23, and insert T-adapters to each female side.		
		Resistance	Between CM02 (female) (4) and P23 (female) (1)	Max. 1 Ω
			Between P23 (female) (2) and ground	Max. 1 Ω
4	Defective machine monitor	If no failure is found by above checks, machine monitor is defective. (Since this is an internal defect, troubleshooting cannot be performed.) Reference 1. Turn the starting switch to OFF position. 2. Install the T-adaptor between connectors CM01 and CM02. 3. Start the engine.		
		Voltage	Between CM02 (4) and CM01 (3)	1 V Max.

FAILURE CODE [CA123]

(PC490_11E0_WMEA-K-AAM0-410-10-B)

Action level	Failure code	Failure	Charge Air Pressure Sensor Low Error (Engine controller system)
L03	CA123		
Details of failure	Low voltage occurs in signal circuit of charge pressure sensor (boost pressure sensor).		
Action of controller	<ul style="list-style-type: none"> Sets charge pressure (boost pressure) to fixed value (400 kPa {4.1 kgf/cm²}) for operation. EGR valve closes and fully opens VGT. Engine power deration Regeneration control stops. 		
Phenomenon on machine	<ul style="list-style-type: none"> Engine acceleration performance is poor. Engine power deration 		
Related information	<ul style="list-style-type: none"> Signal voltage from charge pressure sensor (boost pressure sensor) can be checked by monitoring function. (Code: 36501 (V)) Pressure (boost pressure) by charge pressure sensor (boost pressure sensor) can be checked by monitoring function. (Code: 36500 (kPa)) After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. This failure code is displayed if sensor connector is disconnected. 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	<ol style="list-style-type: none"> See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. Turn starting switch to ON position. 			
		If this failure code is cleared, wiring harness connector is defective.			
2	Defective power supply system of charge pressure sensor (boost pressure sensor)	If failure code [CA352] or [CA386] is also displayed, perform troubleshooting these first.			
		<ol style="list-style-type: none"> Turn starting switch to OFF position. Disconnect connector PIM and connect T-adapter to female side. Switch ON 			
		Voltage	Between PIM (female) (1) and (2)	Power supply input	4.75 to 5.25 V
3	Open circuit in wiring harness (wire breakage or defective contact of connector)	<ol style="list-style-type: none"> Turn starting switch to OFF position. Disconnect connectors J1 and PIM, and connect T-adapters to each female side. 			
		Resistance	Between J1 (female) (78) and PIM (female) (1)		Max. 1 Ω
			Between J1 (female) (45) and PIM (female) (3)		Max. 1 Ω
			Between J1 (female) (54) and PIM (female) (2)		Max. 1 Ω

FAILURE CODE [CA239]

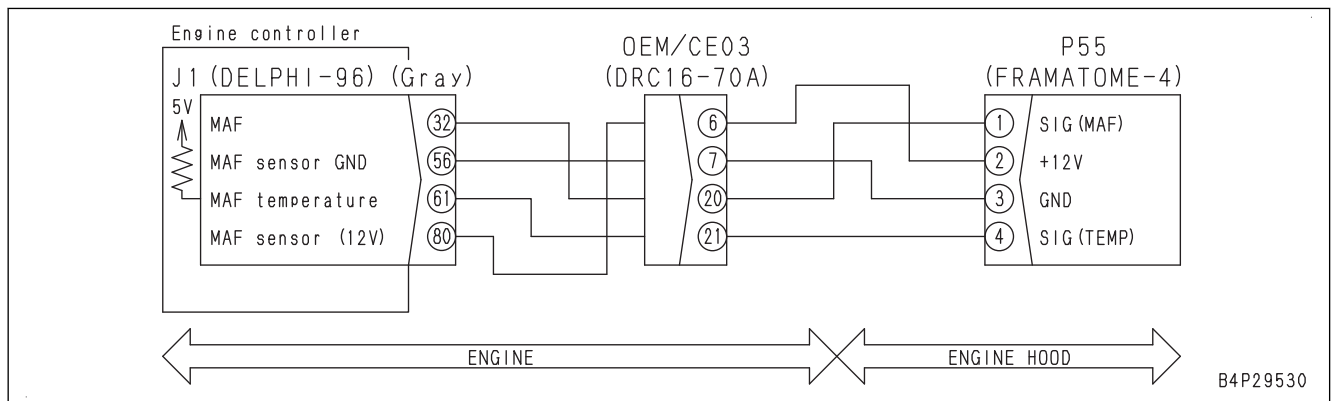
(PC490_11E0_WMEA-K-AG41-410-10-B)

Action level	Failure code	Failure	NE Speed Sensor Supply Voltage High Error (Engine controller system)
L01	CA239		
Details of failure	High voltage occurs in power supply (5 V) circuit of Ne speed sensor.		
Action of controller	Controls by Bkup speed sensor signal.		
Phenomenon on machine	<ul style="list-style-type: none"> Running engine stops (when Bkup (G) speed sensor is also defective). Stopped engine cannot be started (when Bkup (G) speed sensor is also defective). 		
Related information	After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Start the engine.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Defective NE speed sensor	1. Turn starting switch to OFF position. 2. Disconnect connector NE. 3. Turn starting switch to ON position.		
		If this code is cleared, disconnected sensor or engine wiring harness is defective.		
3	Defective wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector J1. 3. Turn starting switch to ON position.		
		If this failure code is cleared, wiring harness is defective. REMARK Many of other failure codes are displayed at the same time. This is because of connector being disconnected. So ignore other codes than this failure code [CA239].		
4	Defective engine controller	1. Turn starting switch to OFF position. 2. Disconnect connector J1, and connect T-adapter to male side. 3. Turn starting switch ON with engine wiring harness disconnected.		
		Voltage	Between J1 (male) (79) and (55)	4.75 to 5.25 V
		If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

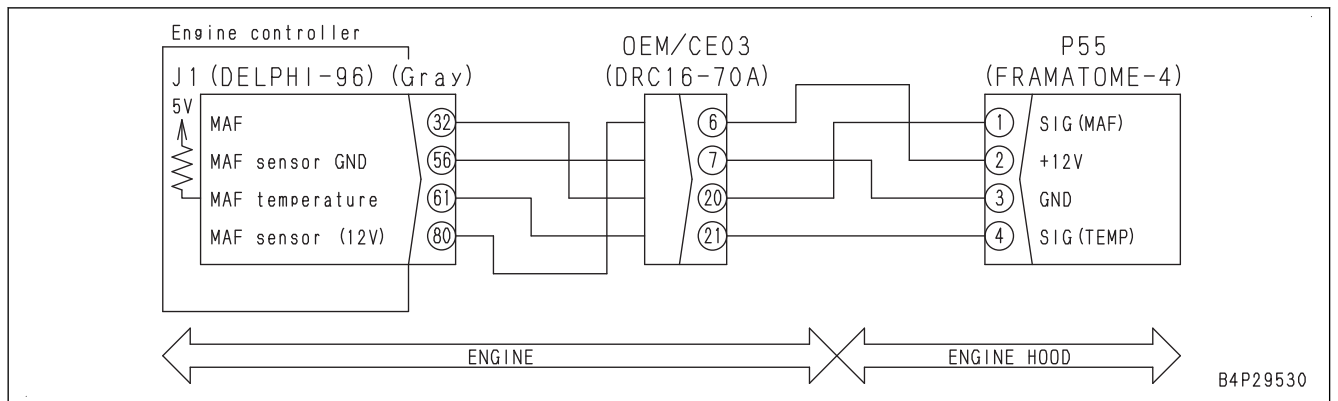
No.	Cause	Procedure, measuring location, criteria and remarks
5	Open circuit in wiring harness (wire breakage of ground line or defective contact of connector)	If failure code is still displayed after above checks on cause 4, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors J1 and P55, and connect T-adapters to each female side. REMARK Open circuit in GND line
		Resistance Between J1 (female) (56) and P55 (female) (3) Max. 1 Ω
6	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)
7	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors J1 and P55, and connect T-adapter to female side of J1.
		Continuity Between J1 (female) (32) and each pin other than pin (32) No continuity

CIRCUIT DIAGRAM (MASS AIR FLOW SENSOR)



No.	Cause	Procedure, measuring location, criteria and remarks		
4	Hot short circuit in wiring harness	1. Perform preparation when starting switch is in OFF position. 2. Disconnect connector P55. 3. Insert T-adaptor into connector J1, or connect T-adaptor to female side of P55.		
		Voltage	Between J1 (61) and (56) or P55 (female) (1) and (3)	Max. 5.25 V
5	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors J1 and P55, and connect T-adaptor to female side of J1. Investigate it by continuity mode of tester.		
		Continuity	Between J1 (female) (61) and each pin other than pin (61)	No continuity
6	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

CIRCUIT DIAGRAM (MASS AIR FLOW SENSOR)



B4P29530

FAILURE CODE [CA1696]

(PC490_11E0_WMEA-K-A9HY-410-10-B)

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	<ul style="list-style-type: none"> Operates at estimated value of KDPF outlet pressure sensor. (Operation may be performed at 0 kPa {0 kgf/cm²} .) Operates at estimated value of KDPF differential pressure sensor. (Operation may be performed at 0 kPa {0 kgf/cm²} .) 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 output lowers.		
Related information	<ul style="list-style-type: none"> 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. Turn starting switch to OFF position. 2. Disconnect following connectors one by one and turn starting switch to ON position each time. 3. Each time troubleshooting is finished, return to step 1. If this failure code is cleared, disconnected sensor is defective.		
		REMARK		
		Other failure codes are also displayed. This is because the connector is disconnected. Ignore all failure codes except.		
	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. Turn starting switch to OFF position. 2. Disconnect connectors J2, E25 and MB02, and connect T-adaptor to either female side.		
		Resistance	Between J2 (female) (8) and ground, or between E25 (female) (4) and ground	Min. 1 MΩ

FAILURE CODE [CA1887]

(PC490_11E0_WMEA-K-AFA0-410-30-B)

Action level	Failure code	Failure	SCR Outlet NOx Sensor Circuit Error (Engine controller system)
L01	CA1887		
Detail of failure	The SCR outlet NOx sensor does not display any values due to an internal circuit error of the SCR outlet NOx sensor.		
Action of controller	<ul style="list-style-type: none"> • Drive at the default NOx emission value (0 ppm) • Advances to Inducement strategy. (EU Specification) 		
Phenomenon on machine	<ul style="list-style-type: none"> • The AdBlue/DEF injection becomes inappropriate, NOx emission increases. • The engine power deration according to inducement strategy. (EU Specification) 		
Related information	<p>⚠ The SCR assembly, sensor fitting piping, and sensor probe become hot (Min. 400 °C). Be careful not to get burned.</p> <p>⚠ Be careful not to get burned by the sensor probe as it is heated by itself even if the ambient temperature is not high.</p> <ul style="list-style-type: none"> • The SCR outlet NOx sensor is a smart sensor which performs CAN communication with the engine controller together with the other sensors. • The SCR outlet NOx sensor operates when SCR outlet temperature is 150 °C or more (19210 SCR outlet NOx sensor measurement state is "1"). • The SCR outlet NOx sensor does not operate when SCR outlet temperature is 150 °C or lower, and correct value is not displayed. • "Pre-defined Monitoring" screen uses the engine operation state diagnosis, SCR catalyst, NOx sensor, and ammonia sensor diagnosis. • Engine operation state diagnosis <ul style="list-style-type: none"> 01002 Engine speed 19200 Exhaust gas flow rate 47300 KDOC Inlet Temperature 19300 SCR Temperature 19302 SCR Outlet Temperature • SCR catalyst, NOx sensor, ammonia sensor diagnosis. <ul style="list-style-type: none"> 19203 Turbo Outlet NOx Sensor State 19210 SCR Outlet NOx Sensor State 19202 Turbo Outlet Concentration Corrected 19209 SCR Outlet NOx Corrected 19205 Ammonia Concentration Corrected 19120 AdBlue/DEF Injection Quantity <p>NOTICE</p> <p>For this failure code, after investigating the cause of the problem and completing the repair, perform "Loaded Diagnostics Operation To Confirm Failure Correction" to make sure repair is completed. (This failure code is not cleared by only turning ON the starting switch.)</p>		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective CAN communication system	If failure code [CA2771] is displayed, perform troubleshooting for [CA2771] first.
2	Defective sensor power supply system	If failure code [CA1776] or [CA1777] is displayed, perform troubleshooting for [CA1776] or [CA1777] first.

FAILURE CODE [CA2185]

(PC490_11E0_WMEA-K-AF4P-410-00-B)

Action level	Failure code	Failure	Throttle Sensor Supply Voltage High Error (Engine controller system)
L03	CA2185		
Detail of failure	A high voltage occurs in throttle sensor power supply (5 V) circuit.		
Action of controller	<ul style="list-style-type: none"> If this failure code is displayed when starting switch is in ON position, set value to that before detecting abnormality and fix it for operation. If turning starting switch to ON in abnormal condition, operation is performed at 100% value. 		
Phenomenon on machine	Engine speed cannot be controlled by fuel dial.		
Related information	After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Turn starting switch to ON position.		
		If this failure code is cleared, wiring harness connector is defective.		
2	Defective fuel dial (throttle sensor)	1. Turn starting switch to OFF position. 2. Disconnect connector P20, and turn starting switch to ON position.		
		If this failure code is cleared, throttle sensor is defective. Other failure codes are displayed as well. This is because connector is disconnected. Ignore failure codes other than this failure code.		
3	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector P20, and connect T-adapter to female side of J2.		
		Continuity	Between J2 (female) (9) and each pin other than J2 (female) (9) pin	No continuity
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.)		

FAILURE CODE [CA2556]

(PC490_11E0_WMEA-K-AM71-410-10-B)

Action level	Failure code	Failure	Intake Air Heater Relay Short Circuit Error (Engine controller system)
L01	CA2556		
Detail of failure	Short circuit is detected in intake heater relay drive circuit (primary circuit).		
Action of controller	None in particular		
Phenomenon on machine	Intake air heater does not work in auto preheating mode (resulting in degraded startability and emission of white smoke at low temperatures).		
Related information	<ul style="list-style-type: none"> The heater relay operation conditions depend on the machine model. Troubleshooting of this failure code covers circuits from engine controller to primary (coil) circuit of pre-heater relay. This failure code is detected only when the relay is ON. After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position (Coolant temperature: Max. -5 °C) 		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in “c: Electrical equipment” in “CHECKS BEFORE TROUBLESHOOTING” of “RELATED INFORMATION ON TROUBLESHOOTING”, and check it. 2. Starting switch ON (Engine coolant: -5 °C or below). If this failure code is cleared, wiring harness connector is defective.		
2	Defective preheating relay	1. Turn starting switch to OFF position. 2. Disconnect relay R18, and connect T-adapter to male side.		
		Resistance	Between R18 (male) (1) and (2)	200 to 400 Ω
		1. Turn starting switch to OFF position. 2. Replace relay R18 with another one. 3. Turn starting switch to ON position. (Engine coolant temperature: -5 °C or below) If this failure code is cleared, original preheat relay R18 is defective.		
3	Ground fault in wiring harness (contact with ground circuit)	1. Turn the starting switch to OFF position. 2. Disconnect the connector J2 and relay R18, and connect the T-adapter to either female side.		
		Resistance	Between ground and J2 (female) (75) or R18 (female) (1)	Min. 1 MΩ
4	Short circuit in wiring harness	1. Turn the starting switch to OFF position. 2. Disconnect the connector J2 and relay R18, and connect the T-adapter to female side of J2.		
		Continuity	Between J2 (female) (75) and each pin other than (75)	No continuity
5	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

FAILURE CODE [CA3133]

(PC490_11E0_WMEA-K-A9HW-410-30-B)

Action level	Failure code	Failure	KDPF outlet pressure sensor high error (Engine controller system)
L03	CA3133		
Detail of failure	High voltage is generated in signal circuit of KDPF outlet pressure sensor.		
Action of controller	Drives KDPF outlet pressure sensor at estimated value (gauge pressure). (Operates at 0 kPa (gauge pressure) if other failure code is displayed at the same time).		
Phenomenon on machine	None		
Related information	<p>⚠ KDPF is heated to 500 °C or higher. Be careful not to get burn injury.</p> <ul style="list-style-type: none"> • KDPF differential pressure sensor and KDPF outlet pressure sensor are provided as a unit. • If failure code [CA1695] is not displayed but failure code [CA1879] is on screen, ground line probably has open circuit (defective contact of connector). • Signal voltage from KDPF outlet pressure sensor can be checked with monitoring function. (Code: 47001 (V)) • Differential pressure detected by KDPF outlet pressure sensor can be checked with monitoring function. (Code: 47000 (kPa)) • 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	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 power supply system	If failure code [CA1695] or [CA1696] is displayed, perform troubleshooting for [CA1695] or [CA1696] first.	
		1. Turn starting switch to OFF position. 2. Disconnect connector E25, and connect T-adapter to female side. 3. Turn starting switch to ON position.	
		Voltage	Between E25 (female) (4) and (1)
3	Defective KDPF outlet pressure sensor	1. Turn starting switch to OFF position. 2. Disconnect connector E25. 3. Turn starting switch to ON position.	
		If this failure code is changed to [CA3134], the KDPF outlet pressure sensor is defective. NOTICE <ul style="list-style-type: none"> • If this failure code is displayed, the wiring harness or engine controller is defective. • Ignore other failure codes displayed. 	

FAILURE CODE [CA3232]

(PC490_11E0_WMEA-K-AFM0-410-00-B)

Action level	Failure code	Failure	Turbocharger Outlet NOx Sensor Datalink Timeout Error (Engine controller system)
L01	CA3232		
Detail of failure	The engine controller cannot receive the data of the turbocharger outlet NOx sensor due to error of communication with the turbocharger outlet NOx sensor.		
Action of controller	<ul style="list-style-type: none"> Operate using the NOx value in the memory. Advances to Inducement strategy. 		
Phenomenon on machine	<ul style="list-style-type: none"> The AdBlue/DEF injection becomes inappropriate, NOx emission increases. Engine power deration according to inducement strategy. Turbocharger Outlet NOx Concentration undetectable 		
Related information	<p>⚠ The turbocharger outlet, sensor fitting piping, KDPF, and KDOC become hot (Min. 500 °C). Be careful not to get burned.</p> <p>⚠ The SCR assembly, sensor fitting piping, and sensor probe become hot (Min. 400 °C). Be careful not to get burned.</p> <p>⚠ Be careful not to get burned by the sensor probe as it is heated by itself even if the ambient temperature is not high.</p> <ul style="list-style-type: none"> The turbocharger outlet NOx sensor is a smart sensor which performs CAN communication with the engine controller together with the other sensors. If the sensor connector or smart sensor (power supply) relay connector is disconnected, this failure code is displayed. The failure codes of the CAN communication related to the engine sensor are [CA2771], [CA3232], [CA3868], [CA3911], [CA4151], and [CA4152]. If all of these failure codes are displayed, the cause may be defect of any of the 6 sensors, defective smart sensor power supply relay, defective relay system, or ground fault, short circuit, or hot short circuit of the harness (CAN communication line). Since signal of active CAN communication line is pulse voltage, it cannot be measured by using multimeter. After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. 		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective wiring harness connector	Perform checks on causes 1 to 10 for failure code [CA2771].		
2	Open circuit and short circuit in wiring harness (broken or short-circuited communication line)	<ul style="list-style-type: none"> Communication line <p>As CAN terminating resistors of 120 ohm are connected in parallel, therefore, when circuit resistance is measured at connector of CAN communication, if combined resistance is 60 ohm, there is no open circuit.</p> <ol style="list-style-type: none"> Turn starting switch to OFF position. Check that system operating lamp does not light up, and then turn battery disconnect switch to OFF position. Disconnect connectors J2 and E31 and connect T-adapters to each female side. 		
		Resistance	Between E31 (female) (3) and (2)	Approx. 60 Ω
			Between J2 (female) (21) and (45)	Approx. 60 Ω

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective KDOC outlet temperature sensor	If failure code [CA3316], [CA3317] or [CA3318] is displayed, perform troubleshooting for [CA3316], [CA3317] or [CA3318].
2	Defective dosing fuel solenoid valve 1	If failure code [CA1925] or [CA1963] is displayed, perform troubleshooting for [CA1925] or [CA1963] first.
3	Defective intake air system	Check intake air system hoses, clamps, and tubes for damage and loosening. Repair as necessary.
4	Defective injector	Perform cylinder cutout mode operation to identify disabled cylinder (see "TESTING AND ADJUSTING", "HANDLING CYLINDER CUTOFF MODE OPERATION").
5	Oil leakage to turbocharger exhaust connector	<ol style="list-style-type: none"> 1. Remove turbocharger exhaust connector. 2. Check inside of turbocharger exhaust connector for adhesion of oil and fuel. <p>NOTICE</p> <ul style="list-style-type: none"> • If oil or fuel is found, visually check for oil leaks from EGR valve and turbocharger. Repair abnormality, if any. • Wipe off oil or fuel sticking to piping.
6	Oil leakage into exhaust connector or duct to KDPF	<p>Check the exhaust system between the turbocharger and KDPF to check for oil or fuel flow into KDPF.</p> <ul style="list-style-type: none"> • Wipe stained oil or fuel off clean, if any. • If there is a trace of oil or fuel flowing into KDPF, check for KDPF and clean or replace it as necessary.
7	KDOC outlet temperature sensor installation error	<p>For details, see "Chapter 50 DISASSEMBLY AND ASSEMBLY", "REMOVE AND INSTALL KDPF ASSEMBLY" and "DISASSEMBLE AND ASSEMBLE OF KDPF ASSEMBLY". Repair as necessary.</p> <p>For details, see "REMOVE AND INSTALL KDPF ASSEMBLY", and "DISASSEMBLE AND ASSEMBLE OF KDPF ASSEMBLY" in Chapter 50 DISASSEMBLY AND ASSEMBLY. Repair as necessary.</p>
8	Defective KDPF temperature sensor	If the failure code is not cleared after performing above-mentioned troubleshooting, replace KDPF temperature sensor.
9	Defective engine controller	If this failure code is kept displayed, or is displayed again after above checks are performed, engine controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)

Loaded Diagnostics Operation To Confirm Failure Correction

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

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

1. Turn the starting switch from OFF to ON.

NOTICE

The failure code is cleared once when starting switch is turned from OFF position to ON position. Check that cleared failure code is not displayed again when engine runs at low idle speed.

2. Start the engine and run it at low idle speed without load for 2 minutes.

NOTICE

If this failure code is displayed when starting switch is turned to ON position but engine is not started, perform troubleshooting for following failure codes, too, after finishing troubleshooting and repair for this code.

- [CA3316] KDOC Outlet Temperature Sensor Low Error
- [CA3317] KDOC Outlet Temperature Sensor High Error

No.	Cause	Procedure, measuring location, criteria and remarks
13	Defective air intake system	<p>If failure code is still displayed after above checks, the intake system may be defective. (Offset/drift due to the deteriorated and aged MAF sensor, distorted intake system, damaged rectifier)</p> <ol style="list-style-type: none"> 1. Check for a defective air intake pipe and repair or replace any damaged or defective rectifier, if any. 2. Replace mass air flow (MAF) sensor. 3. Perform "Loaded Diagnostics Operation To Confirm Failure Correction" to check if this failure code is not cleared. 4. If 19205 "ammonia concentration (compensation value)" shows a normal value (5 to 100ppm) and the failure code is cleared again, the repair has been completed
14	Defective ammonia sensor	<p>If failure code is still displayed after above checks, the ammonia sensor may be defective. (Offset/drift due to the deteriorated and aged ammonia sensor)</p> <ol style="list-style-type: none"> 1. Replace the ammonia sensor. 2. Perform "Loaded Diagnostics Operation To Confirm Failure Correction", then check if this failure code or failure code [CA3582] is displayed. 3. If 19205 "Ammonia concentration (compensation value)" indicates a normal value (5 to 100 ppm) and the failure code is cleared, the repair is completed. 4. If the ammonia concentration indicates an abnormal value or this failure code is not cleared, proceed to the next step.
15	Defective engine controller	<p>If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)</p>

Loaded Diagnostics Operation To Confirm Failure Correction

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

(Make sure that this failure code and failure code [CA3582] are not displayed after this procedure.)

1. Clear this failure code by "Engine Controller Inducement Fault Clear".
2. Turn the starting switch to OFF position, and shut down the engine controller.
3. Turn the starting switch to ON position.
4. Start the engine.
5. Run the engine at low idle speed for approximately 1 minute.
6. After warm-up operation, set the swing lock to ON, the working mode to P, and the fuel control dial to MAX position.
7. Operate for approximately 30 seconds with Arm IN relief.

REMARK

Be careful care not to overheat hydraulic oil temperature.

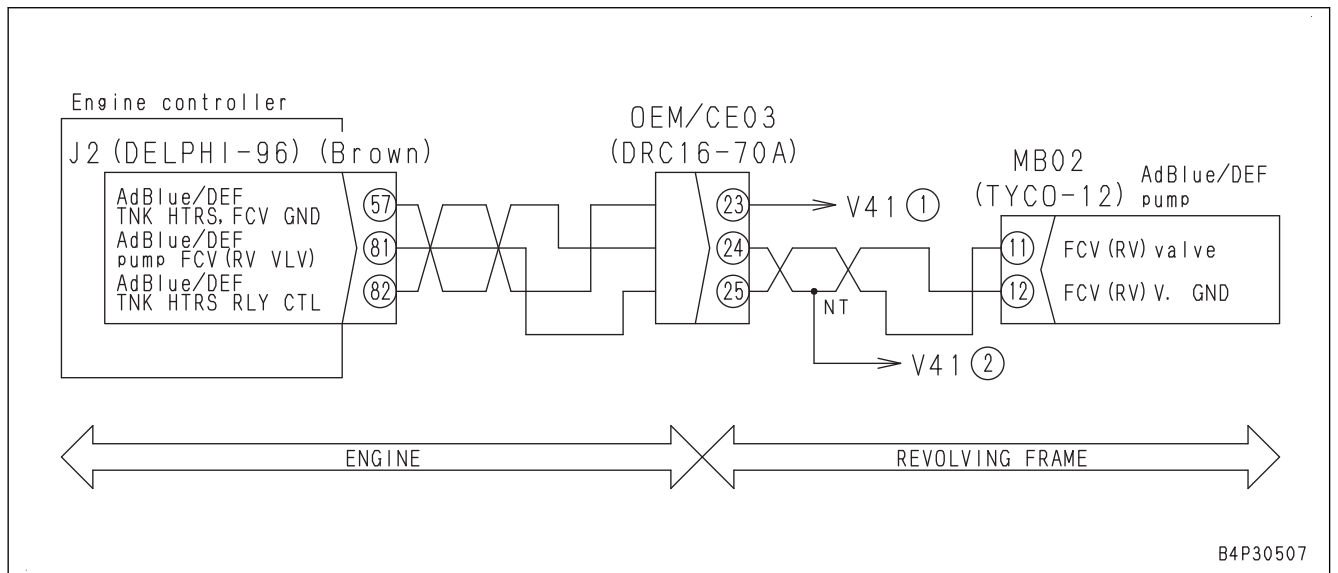
8. Run engine at high idle speed for approximately 30 seconds.
9. Repeat above steps 6. and 7. 20 times.
10. If this failure code and failure code [CA3582] are not displayed, repair is completed

If this failure code or failure code [CA3582] is displayed:

1. Display the SCR temperature and ammonia concentration on the Predefined Monitoring screen.
2. Operate so that the SCR temperature 250 °C or above is kept.

No.	Cause	Procedure, measuring location, criteria and remarks		
5	Hot short circuit in wiring harness (contact with 24 V circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector MB02, and connect T-adapter to female side. 3. Turn starting switch to ON position (with the connector disconnected).		
		Voltage	Between MB02 (female) (11) and (12)	Max. 4.5 V
6	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors J2 and MB02, and connect T-adapter to female side of J2.		
		Continuity	Between J2 (female) (81) and each pin other than (81)	No continuity (no sound)
7	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to AdBlue/DEF FCV



FAILURE CODE [CA3718]

(PC490_11E0_WMEA-K-AFM0-410-30-B)

Action level	Failure code	Failure	Turbocharger Outlet NOx Sensor Voltage Mismatch Error (Engine controller system)
L01	CA3718		
Detail of failure	ne controller voltage setting and turbocharger outlet NOx sensor voltage specifications are not consistent. (The sensor part numbers are different)		
Action of controller	<ul style="list-style-type: none"> Operate using the NOx value in the memory. Advances to Inducement strategy (EU Specification) 		
Phenomenon on machine	<ul style="list-style-type: none"> The AdBlue/DEF injection becomes inappropriate, NOx emission increases. Engine power deration according to inducement strategy. (EU Specification) 		
Related information	<p>⚠ The SCR assembly, sensor fitting piping, and sensor probe become hot (Min. 400 °C). Be careful not to get burned.</p> <p>⚠ Be careful not to get burned by the sensor probe as it is heated by itself even if the ambient temperature is not high.</p> <ul style="list-style-type: none"> A sensor different from genuine spare parts may have been installed when changing this 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	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	<ol style="list-style-type: none"> Turn starting switch to OFF position. Check the Part No. of the NOx sensor. NOx sensor fails, therefore, replace the turbocharger outlet NOx sensor. Turn starting switch to ON position. <p>If this failure code is cleared, the original sensor is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)</p>
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.)

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No.	Cause	Procedure, measuring location, criteria and remarks
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.

FAILURE CODE [CA4162]

(PC490_11E0_WMEA-K-A9KA-410-40-B)

Action level	Failure code	Failure	KDOC and KDPF Temperature Sensor ECU Voltage Low Error (Engine controller system)
L03	CA4162		
Detail of failure	A battery low voltage error is detected in the KDPF temperature sensor controller.		
Action of controller	<ul style="list-style-type: none"> • Run the engine by using the fixed value of the KDOC inlet temperature, KDOC outlet temperature, and the KDPF outlet temperature (250 °C). • Engine power deration • AdBlue/DEF injection stops • EGR valve closed. • Regeneration control stops. • Fuel dosing stops. • Advances to Inducement strategy. 		
Phenomenon on machine	<ul style="list-style-type: none"> • NOx emission increases because AdBlue/DEF injection is disabled. • Defective forcible regeneration control. • KDPF Soot Accumulation High. • All of the KDOC inlet temperature, KDOC outlet temperature, and KDPF outlet temperature cannot be detected. • Engine output is reduced based on inducement strategy. 		
Related information	<p>⚠ Be careful not to get burned as the temperature of KDPF and KDOC rises up over 500 °C.</p> <ul style="list-style-type: none"> • 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. • For replacement of the KDPF temperature sensor, see DISASSEMBLY AND ASSEMBLY, "DISASSEMBLE AND ASSEMBLE KDPF ASSEMBLY". • Engine power deration is canceled by turning starting switch to OFF position after this failure code is cleared (note that the engine power deration is not canceled only by the failure code is cleared). 		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective wiring harness connector	<ol style="list-style-type: none"> 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. <p>If this failure code is cleared, wiring harness connector is defective.</p>
2	Defective KDPF temperature sensor	<ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Replace KDPF temperature sensor. 3. Turn starting switch to ON position. <p>If this failure code is cleared, the original sensor is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)</p>

No.	Cause	Procedure, measuring location, criteria and remarks
2	Low AdBlue/DEF amount	<ol style="list-style-type: none"> 1. Check that the value of AdBlue/DEF level is displayed correctly with monitoring function. <p>REMARK</p> <p>If AdBlue/DEF is empty and AdBlue/DEF level sensor cannot be sensed, 7 % is displayed as the AdBlue/DEF level (compensation value).</p> <ol style="list-style-type: none"> 2. When AdBlue/DEF is empty, refill AdBlue/DEF. 3. After finishing the work, perform "Loaded Diagnostics Operation To Clear Failure Code" and the repair is completed. 4. If this failure code is displayed even if AdBlue/DEF level is displayed correctly, proceed to the next troubleshooting.
3	Contaminated AdBlue/DEF	<ol style="list-style-type: none"> 1. Drain more than 1 ℓ of AdBlue/DEF to check that it is not contaminated with foreign material, etc. 2. If the drained AdBlue/DEF is contaminated, drain all of the AdBlue/DEF and refill with fresh AdBlue/DEF. 3. If it is heavily contaminated with sand, dirt, etc., clean the AdBlue/DEF tank. 4. If the "AdBlue/DEF concentration" is in 29 to 36 % after the work finished, perform "Loaded Diagnostics Operation To Clear Failure Code". 5. If the "AdBlue/DEF concentration" is out of the normal range, proceed to the next troubleshooting.
4	Foreign matter adhered to the sensing part of the AdBlue/DEF tank sensor	<ol style="list-style-type: none"> 1. Remove the AdBlue/DEF level sensor so that you can reach the AdBlue/DEF concentration detection part (end of sensor). 2. Clean up the AdBlue/DEF concentration detection part with dry and clean cloth, and install the AdBlue/DEF level sensor. 3. If AdBlue/DEF concentration is within the range from 29 to 36 % on "Pre-defined Monitoring" screen, perform "Loaded Diagnostics Operation to Clear Failure Code" to complete the repair work. 4. If AdBlue/DEF concentration is out of the normal range, proceed to the next troubleshooting. <p>REMARK</p> <ul style="list-style-type: none"> • If the new AdBlue/DEF has not been added as described in Cause "Contaminated AdBlue/DEF", and if it takes time to remove the sensor, drain the total amount of AdBlue/DEF, refill with new AdBlue/DEF again, and check the sensor output. • For details of removing AdBlue/DEF tank sensor, see DISASSEMBLY AND ASSEMBLY, "REMOVE AND INSTALL AdBlue/DEF TANK SENSOR FLANGE ASSEMBLY".
5	Defective AdBlue/DEF tank sensor (internal defect)	<ol style="list-style-type: none"> 1. Replace the AdBlue/DEF tank sensor. 2. If the "AdBlue/DEF concentration" displayed on the Pre-defined Monitoring screen falls in the range of 29 to 36%, perform "Loaded Diagnostics Operation To Clear Failure Code" topics to complete the repair. 3. If the "AdBlue/DEF concentration" falls outside of this range, proceed to the next troubleshooting.
6	Defective engine controller	<ol style="list-style-type: none"> 1. Replace the engine controller. 2. Perform "Loaded Diagnostics Operation To Clear Failure Code". 3. If this failure code is displayed, perform troubleshooting again.

No.	Cause	Procedure, measuring location, criteria and remarks		
4	Ground fault in wiring harness (contact with ground circuit)	1. Turn the starting switch to OFF position. 2. Disconnect the connectors J2, R53A, MB04, MB05, and MB07, and connect the T-adapter to either female side.		
		Resistance	Between ground and J2 (female) (39) or R53A (female) (8)	Min. 1 MΩ
			Between R53A (female) (5) or MB05 (female) (1) and ground	Min. 1 MΩ
			Between R53A (female) (6) or MB04 (female) (1) and ground	Min. 1 MΩ
			Between R53A (female) (6) or MB07 (female) (1) and ground	Min. 1 MΩ
5	Open circuit or short circuit in wiring harness (line heater relay output side)	1. Turn the starting switch to OFF position. 2. Disconnect the connector R53A, and connect the T-adapter to female side. REMARK Resistance is the value of above-mentioned AdBlue/DEF line heater.		
		Resistance	Between R53A (female) (5) and (12)	5 to 40 Ω
			REMARK Value for two parallel arranged AdBlue/DEF line heaters	2 to 20 Ω
6	Defective AdBlue/DEF heater relay	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. Perform the “AdBlue/DEF Line Heater Relay 1 Test” by starting the engine in low ambient temperature (5 °C or below), or by referring “SERVICE MODE” of setting and operating machine monitor, “METHOD FOR OPERATING TESTING MENU (SCR SERVICE TEST)”.		
		If this failure code is cleared, the original AdBlue/DEF heater relay is defective.		
7	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

FAILURE CODE [DA20MC]*(PC490_11E0_WMEA-K-C3V1-410-00-B)*

Action level	Failure code	Failure	Pump Controller Malfunction (Pump controller system)
—	DA20MC		
Detail of failure	Malfunction of pump controller operation		
Action of controller			
Phenomenon on machine	The work equipment, traveling, and turning operations cannot be performed normally.		
Related information	<ul style="list-style-type: none"> 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	Mulfunction pump controller	Defective pump controller (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly.)	

FAILURE CODE [DAFGMC]*(PC490_11E0_WMEA-K-Q290-410-00-B)*

Action level	Failure code	Failure	GPS Module Malfunction (KOMTRAX system)
-	DAFGMC		
Details of failure	No position data is sent from GPS module (inside of machine monitor) to KOMTRAX communication modem more than 50 seconds since the startup of KOMTRAX.		
Action of controller	<ul style="list-style-type: none"> • None in particular • If cause of failure disappears, machine becomes normal by itself. 		
Phenomenon on machine	None in particular		
Related information	After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. (Wait for more than 50 seconds after the switch is turned ON.)		
No.	Cause	Procedure, measuring location, criteria and remarks	
1	Defective machine monitor	GPS module of machine monitor may be defective. (Because this is an internal defect, troubleshooting cannot be performed.)	

FAILURE CODE [DB2RKR]

(PC490_11E0_WMEA-K-AP71-410-00-B)

Action level	Failure code	Failure	CAN 1 Defective Communication (Engine Controller) (Machine monitor system)
L03	DB2RKR		
Detail of failure	Machine monitor does not recognize engine controller over CAN communication-1 line (KOMNET/r).		
Action of controller	Retains current working mode. Retains current selection of auto-deceleration. Retains information at time of occurrence of failure.		
Phenomenon on machine	Information to be obtained from engine controller is not displayed and special functions that need information do not work. Or update of received data is stopped. Engine is uncontrollable. Engine speed and coolant temperature are undetectable. A gauge pointer for engine coolant temperature and hydraulic oil temperature disappears on machine monitor screen.		
Related information	<ul style="list-style-type: none"> After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position. Start of CAN communication is recognized by each controller when ACC signal of starting switch is received. If failure code [DB2QKR] is also displayed, defective engine controller (cause 1) is a possible cause. Machine monitor uses failure code [DA2RKR] to indicate failure in CAN communication over CAN1 line. When failure code [DA2RKR] is displayed simultaneously on screen, there may be a ground fault, short circuit, or hot short circuit in wiring harness (CAN communication line). CAN1 terminating resistor is located in machine monitor on operator's cab side and connector "B_RES" is located on engine side (CAN communication-1 circuit (KOMNET/r) is not provided. It is output from connector "J2"). Since each controller and machine monitor are connected directly to battery, they are supplied with power even after starting switch is turned to OFF position. Since signal of active CAN communication line is pulse voltage, it cannot be measured by using multimeter. 		

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

FAILURE CODE [DGH2KB]

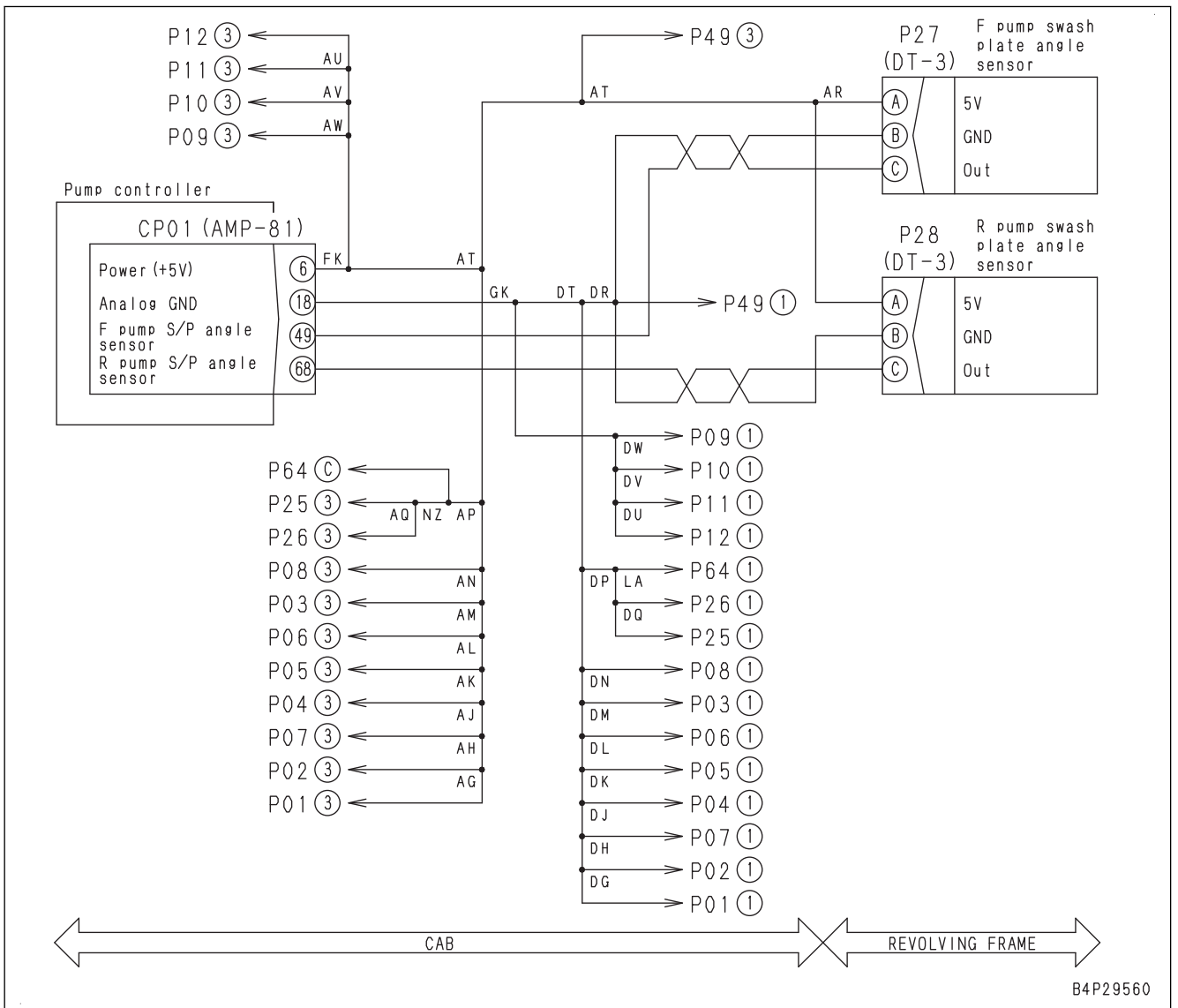
(PC490_11E0_WMEA-K-L2A0-410-30-B)

Action level	Failure code	Failure	Hydraulic Oil Temperature Sensor Ground Fault (Pump controller system)
L01	DGH2KB		
Detail of failure	Controller detects ground fault in Hydraulic Oil Temperature Sensor.		
Action of controller	If cause of failure disappears, machine becomes normal by itself.		
Phenomenon on machine	Hydraulic oil temperature gauge is equivalent to 50 °C.		
Related information	<ul style="list-style-type: none"> Signal voltage from the hydraulic oil temperature sensor can be checked with monitoring function. (Code: 04402: Hydraulic Oil Temp Sensor Volt) After repairing, check if the failure code is cleared by the following procedure. Procedure: Start the engine. 		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective hydraulic oil temperature sensor (Internal open or short circuit)	1. Turn starting switch to OFF position.			
		2. Disconnect connector P22 and connect T-adaptor to male side.			
		Resistance	Between P22 (male) (1) and (2) REMARK Temperature of oil temperature sensor - Resistance characteristics	10 °C	Approx. 90 kΩ
				30 °C	Approx. 35 kΩ
				80 °C	Approx. 6.5 kΩ
100 °C	Approx. 3.5 kΩ				
	Between P22 (male) (2) and ground	Min. 1 MΩ			
2	Open circuit, short circuit, ground fault, or hot short circuit in wiring harness	1. Turn starting switch to OFF position.			
		2. Disconnect connector P22, and connect T-adaptor to female side.			
		3. Turn starting switch to ON position.			
		REMARK If voltage is 0 V an open circuit, ground fault, or short circuit exists, if 24 V a hot short circuit exists. A voltage of approximately 5 V is applied to temperature			
		REMARK sensor signal wires through a resistor in the pump controller.			
	Voltage	Between P22 (female) (1) and (2)	Approx. 5 V		

No.	Cause	Procedure, measuring location, criteria and remarks		
3	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors CP01 and P03, and connect T-adapters to each female side.		
		Resistance	REMARK If power supply voltage in check on cause 1 is normal, this check is not required. Between CP01 (female) (18) and P03 (female) (1)	Max. 1 Ω
			REMARK If power supply voltage in check on cause 1 is normal, this check is not required. Between CP01 (female) (31) and P03 (female) (2)	Max. 1 Ω
4	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors CP01 and P03, and connect T-adapter to either female side.		
		Resistance	Between ground and CP01 (female) (31) or P03 (female) (2)	Min. 1 MΩ
5	Hot short circuit in wiring harness (contact with 5 V circuit or 24 V circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector P03. 3. Connect T-adapter to female side of connector P03. 4. Turn starting switch to ON position.		
		Voltage	Between P03 (female) (2) and ground	Max. 1 V
6	Defective pump controller	If no failure is found by preceding checks, pump controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly).		

Circuit diagram related to F and R pump swash plate sensors



FAILURE CODE [DUMBKB]

(PC200_11_MI-K-AW1T-410-0B-B)

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	<p>Reference information</p> <ul style="list-style-type: none"> 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.

No.	Check item	Procedure of troubleshooting			Judgment and remedy			
1	Wiring harness and connector	1. Check the wiring harnesses and connectors.			YES	<ul style="list-style-type: none"> The wiring harness and connectors are normal. Go to the next check item. 		
		<p>REMARK</p> <p>For details of checking method, see “RELATED INFORMATION TO TROUBLESHOOT”, “CHECKS BEFORE TROUBLESHOOTING”, “Electrical equipment”.</p>						
2	Hot short circuit in wiring harness	2. Are the wiring harness and connectors normal?			NO	<ul style="list-style-type: none"> The wiring harness or a connector is defective. Repair or replace the defective wiring harness or connector. Go to Confirmation of repair. 		
		<ol style="list-style-type: none"> Turn the starting switch to the OFF position. Disconnect the connector L19. Connect the T-adapter to female side of connector L19. Turn the starting switch to the ON position. Measure the voltage. Does the troubleshooting result agree with the standard value? 					YES	<ul style="list-style-type: none"> The wiring harness has no hot short circuit. Go to the next check item.
		Item	Measurement position/condition	Standard value				
	Voltage	Between L19 (female) (2) and ground	Max 1 V					

FAILURE CODE [DW91KY]

(PC490_11E0_WMEA-K-C6TA-410-20-B)

Action level	Failure code	Failure	Travel Junction Solenoid Hot Short Circuit (Pump controller system)
L01	DW91KY		
Detail of failure	Current flows when driving travel junction solenoid circuit stops.		
Action of controller	Stops driving travel junction solenoid.		
Phenomenon on machine	It is hard to steer the machine at travel.		
Related information	<ul style="list-style-type: none"> Controller's command (ON/OFF) to travel junction solenoid can be checked with monitoring function. (As long as controller's command to solenoid is OFF, sensor state displayed on monitoring screen is OFF even if solenoid is not energized due to hot short circuit.) (Code: 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	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector V03, and connect T-adaptor to female side. 3. Turn starting switch to ON position.	
		Voltage	Between V03 (female) (1) and ground Max. 4.5 V
2	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 [DWPUKY]

(PC200_11_M-K-PNSH-410-02-B)

Action level	Failure code	Failure	Attachment Bypass Solenoid Hot Short Circuit (Pump controller system)
L03	DWPUKY		
Detail of failure	When output to the Attachment bypass solenoid circuit is turned off, electric current is flowing.		
Action of controller	<ul style="list-style-type: none"> • Turn off the output to the ATT bypass solenoid. • Even if the cause of the failure no longer exists, the machine does not become normal until the starting switch is turned to the OFF position one time. 		
Phenomenon on machine	When the attachment is operated, ATT hold pressure drops quickly at shifting of the lever switch (or pedal) to the NEUTRAL.		
Related information	<ul style="list-style-type: none"> • The state of ATT bypass solenoid by controller can be read with the monitoring function. (Code: 02333) • After completion of repair, check that the failure code is cleared with the operation that follows. Procedure: Turn the starting switch to the ON position. 		

No.	Cause	Procedure, measurement location, criteria and remarks		
1	Hot short circuit in wiring harness	1. Starting switch: OFF 2. Disconnect the connector V81. Connect the T-adaptor to the female side. 3. Starting switch: ON		
		Voltage	Between V81 (female) (1) and (2)	Max. 4.5 V
2	Defective pump controller	If no failure is found by above checks, the pump controller is defective. (Since this is an internal defect, troubleshooting cannot be done.)		

FAILURE CODE [DXE6KB]

(PC490_11E0_WMEA-K-C087-410-10-B)

Action level	Failure code	Failure	Merge-divider LS solenoid short circuit (Pump controller system)
L01	DXE6KB		
Detail of failure	Abnormal current flows when pump controller drives merge-divider (LS) EPC solenoid, so pump controller determines that short circuit exists in merge-divider (LS) EPC solenoid circuit.		
Action of controller	Stops output command to merge-divider main solenoid and merge-divider SL solenoid to put pump in merging condition constantly. Even if cause of failure disappears, machine does not become normal until starting switch is turned to OFF position.		
Phenomenon on machine	Sole operation speed of work equipment and swing is high in fine control mode (L). It is hard to steer the machine at travel.		
Related information	<ul style="list-style-type: none"> Drive current to merge-divider (LS) EPC solenoid can be checked with monitoring function. (Code: 08001 Merge-divider LS solenoid current) After repairing, check if the failure code is cleared by the following procedure. Procedure: Start engine and travel lever is operated independently. 		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective merge-divider (LS) EPC solenoid (internal short circuit or ground fault)	1. Turn starting switch to OFF position. 2. Disconnect connector V24, and connect T-adapter to male side.		
		Resistance	Between V24 (male) (1) and (2)	3 to 14 Ω
			Between V24 (male) (1) and ground	Min. 1 MΩ
2	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.		
		Resistance	Between CP02 (female) (89) and each of (115), (117), and (120)	3 to 14 Ω
			Between CP02 (female) (89) and ground	Min. 1 MΩ
3	Ground fault in wiring harness (Contact with ground circuit)	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 V24, and connect T-adapter to either female side.		
		Resistance	Between ground and CP02 (female) (89) or V24 (female) (1) and ground	Min. 1 MΩ
4	Defective pump controller	If no failure is found by preceding checks, pump controller is defective. (In case of an internal defect, troubleshooting is impossible as an assembly. Replace whole assembly).		

FAILURE CODE [DY20MA]

(PC490_11E0_WMEA-K-K730-410-10-B)

Action level	Failure code	Failure	Wiper Motor Defective Function (Pump controller system)
—	DY20MA		
Detail of failure	A P signal in wiper motor stowage area is not input at the stowage of the windshield wiper.		
Action of controller	Stops output for resting to wiper motor. If cause of failure disappears, machine becomes normal by itself.		
Phenomenon on machine	Windshield wiper is not stowed.		
Related information	<ul style="list-style-type: none"> Condition of P contact signal of wiper stowage area can be checked with monitoring function. (Code: 02204 Switch input 5) As T-adapter for pump controller connector is "socket-type box", operating voltage cannot be measured at pump controller connector. After repairing, check if the failure code is cleared by the following procedure. Procedure: Turn starting switch to ON position and turn wiper switch from INT/ON to OFF position. 		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective wiper motor (Internal open circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector M05, and connect T-adapter to female side.			
		Resistance	Between M05 (female) (4) and (5)	Windshield wiper position: Stowage area	Max. 1 Ω
				Windshield wiper position: Working area	Min. 1 MΩ
			Between M05 (female) (1) and (3)	Windshield wiper position: Entire area	Max. 20 Ω
2	Open or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors CP01 and CP02, and connect T-adapter to each female side.			
		Resistance	Between CP01 (female) (75) and ground	Wiper position: Resting area	Max. 1 Ω
				Windshield wiper position: Working area	Min. 1 MΩ
			Between CP02 (female) (114) and (119)	Wiper position: Entire area	Max. 20 Ω
3	Open circuit in wiring harness (Wire breakage or defective contact of connector)	If failure code still displays after above checks on cause 2, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors CP01, CP02, and M05. 3. Connect T-adapter to connectors CP01 female side, CP02 female side, and M05 male side.			
		Resistance	Between CP01 (female) (75) and M05 (male) (4)	Max. 1 Ω	
			Between M05 (male) (5) and ground (T01)	Max. 1 Ω	
			Between CP02 (female) (114) and M05 (male) (1)	Max. 1 Ω	
			Between CP02 (female) (119) and M05 (male) (3)	Max. 1 Ω	

FAILURE CODE [F316KB]

Detail of failure	Because the voltage of the 3rd party component start-up signal output line from the gateway function controller is 2.5V or less while the command is ON, a short circuit is found.
Action level	-
Action of controller	<ul style="list-style-type: none"> • 3rd party component start-up signal is turned OFF. • Even if the cause of the abnormality is removed, the machine will not go back to the correct condition until the starting switch is turned to the OFF position one time.
Phenomenon on machine	KOMTRAX system does not operate correctly.
Related information	

No.	Check item	Procedure of troubleshooting			Judgment and remedy	
1	Wiring harness and connector	1. Do the check in accordance with the descriptions of wiring harnesses and connectors in RELATED INFORMATION FOR TROUBLESHOOTING, CHECKS BEFORE TROUBLESHOOTING, ELECTRICAL EQUIPMENT. 2. Are the wiring harnesses and connectors in the correct state?			YES	<ul style="list-style-type: none"> • The wiring harnesses and connectors are in the correct state. • Go to the next check item.
					NO	<ul style="list-style-type: none"> • A wiring harness or a connector is defective. • Repair or replace the defective wiring harness or connector. • Go to "Confirmation of repair".
2	Ground fault in wiring harness	1. Turn the starting switch to the OFF position. 2. Disconnect the connectors CK05, CK07, and CK08. Connect a T-adaptor to one of the female side of CK05, male side of CK07, or male side of CK08. 3. Measure the resistance. 4. Does the troubleshooting result agree with the standard value?			YES	<ul style="list-style-type: none"> • The wiring harness does not have a ground fault. • Go to the next check item.
					Item	Measurement position, condition
		Resistance	Between ground and one of CK05 (female) (77), CK07 (male) (10), or CK08 (male) (4)	Min. 1MΩ		

No.	Cause	Procedure, measuring location, criteria and remarks			
8	Defective starting switch, lock lever switch, starting motor cut relay, personal code relay, battery relay, and BR cut relay, harness	<ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Remove fuse No. 18 in fuse box F01 (to prevent engine from starting during check). 3. Insert T-adaptor into connector M17. 4. Turn starting switch to START position and hold it (two persons required for this check). 			
		Voltage	Between M17 (1) and ground	20 to 30 V	
		If voltage is abnormal, go to check on cause 13.			
9	Defective fusible link F04	<ul style="list-style-type: none"> • If no failure is found on cause 7, this check is not required. If fusible link is burnt out, circuit may have ground fault. In this case, perform troubleshooting for cause 6 first. • Fuses No. 1 to 12 are connected to fusible link F04. • Connected circuit is large in scale. Accordingly, if failure code still displays after above checks on cause 6, reproduce trouble and find out ground fault position by sound and burning smell. 			
10	Defective starting switch (internal open circuit)	<p>If check on cause 8 is normal, this check is not required.</p> <ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Disconnect connector H15. 3. After the diagnosis, troubleshoot again with starting switch set to ON and START. 			
		Resistance	Between starting switch terminal B and terminal BR	Turn starting switch to OFF position.	Min. 1 MΩ
				Turn starting switch to ON position.	Max. 1 Ω
			Between starting switch terminal B and terminal ACC	Turn starting switch to OFF position.	Min. 1 MΩ
				Turn starting switch to ON position.	Max. 1 Ω
			Between starting switch terminal B and terminal C	Turn starting switch to OFF position.	Min. 1 MΩ
Turn starting switch to START position.	Max. 1 Ω				
11	Defective lock lever switch (Internal open circuit)	<p>If no failure is found on cause 8, this check is not required.</p> <ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Disconnect connector S14 and connect T-adaptor to female side. 			
Resistance	Between S14 (female) (1) and (3)	Lock lever: FREE	Min. 1 MΩ		
		Lock lever: LOCK	Max. 1 Ω		
12	Defective starting motor cut-off relay	<p>If check on cause 8 is normal, this check is not required.</p> <ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Replace the starting motor cut-off relay R06 with the light relay R05. 3. Turn starting switch to ON position. 			
		If the engine can be started, the original starting motor cut-off relay R06 is defective.			

E-20 HYDRAULIC OIL TEMPERATURE GAUGE DISPLAY DOES NOT MOVE FROM MINIMUM OR MAXIMUM

(PC490_11E0_WMEA-K-L200-410-40-B)

Failure	Hydraulic oil temperature gauge display does not move from minimum or maximum.
Related information	<ul style="list-style-type: none"> Signal from hydraulic oil temperature sensor is input to pump controller and then data is transmitted to machine monitor through CAN communication system. Hydraulic oil temperature can be checked with monitoring function. (Code: 04401)

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective hydraulic oil temperature sensor (Internal open or short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector P22 and connect T-adaptor to male side.			
		Resistance	Between P22 (male) (1) and (2)	10 °C	Approx. 90 kΩ
			REMARK Temperature of oil temperature sensor - Resistance characteristics	30 °C	Approx. 35 kΩ
				80 °C	Approx. 6.5 kΩ
				100 °C	Approx. 3.5 kΩ
Between P22 (male) (2) and ground		Min. 1 MΩ			
2	Open or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector CP01 and connect T-adaptor to female side.			
		Resistance	Between CP01 (female) (28) and (46)	3.5 to 90 kΩ	
			REMARK Resistance accords with thermal characteristics table in cause 1.		
Between CP01 (female) (28) and ground	Min. 1 MΩ				
3	Open circuit in wiring harness (Wire breakage or defective contact of connector)	If failure code still displays after above checks on cause 2, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors CP01 and P22 and connect T-adaptors to each female side.			
		Resistance	Between CP01 (female) (28) and P22 (female) (2)	Max. 1 Ω	
			Between CP01 (female) (46) and P22 (female) (1)	Max. 1 Ω	
4	Ground fault in wiring harness (Contact with ground circuit)	If failure code still displays after above checks on cause 2, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors CP01 and P13, and connect T-adaptor to either female side.			
		Resistance	Between ground and CP01 (female) (28) or P22 (female) (2)	Min. 1 MΩ	

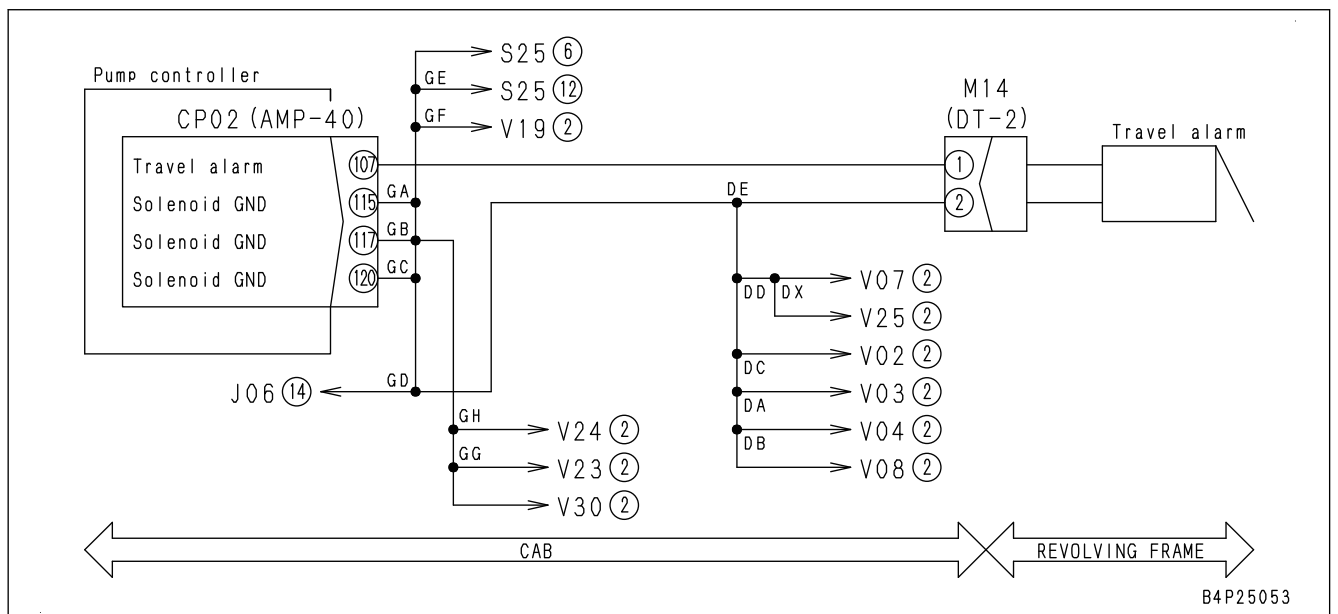
E-41 ALARM DOES NOT STOP SOUNDING WHILE MACHINE IS STOPPED

(PC490_11E0_WMEA-K-Q520-410-10-B)

Failure	Alarm does not stop sounding while machine is stopped.
Related information	

No.	Cause	Procedure, measuring location, criteria and remarks
1	Hot short circuit in wiring harness (Contact with 24 V circuit)	<ol style="list-style-type: none"> 1. Turn starting switch to OFF position. 2. Disconnect connector M14, and connect T-adapter to female side. 3. Turn starting switch to ON position.
	Voltage	Between M14 (female) (1) and ground Max. 1 V

Circuit related to travel signal system



Failure mode	Component causing failure																																					
	Tank				Hydraulic pump				Control valve																													
	Engine system	Damper	Hydraulic oil	Cap	Strainer	Piston pump (work equipment, swing, travel)	Servo piston	Pump swash plate sensor	PC-EPC VALVE	PC VALVE	LS-EPC valve	LS VALVE	Fan pump (including EPC valve)	Spool	Unload valve	Main relief valve	Pressure compensation valve	Self-pressure reducing valve	LS line orifice	Merge-divider main EPC valve	Merge-divider LS-EPC valve	Merge-divider main valve	Merge-divider LS valve	Boom regeneration valve	Boom lock valve													
Swing + Boom	In combined operations of swing and boom RAISE, boom rising speed is low																																					
Swing + travel	In combined operation of swing and travel, travel speed drops largely.																																					
Travel	Machine does not travel straight.																																					
	Travel speed is slow.																																					
	Machine is not steered well or steering power is low.																																					
	Travel speed does not change, or travel speed is too slow or fast.																																					
	One of tracks does not run.																																					

No.	Cause	Procedure, measuring location, criteria and remarks			
4	Malfunction of boom control valve (suction safety valve) (LOWER side)	Be ready with engine stopped, then perform troubleshooting with engine at high idle.			
			Hydraulic oil temperature: 45 to 55 °C	Boom RAISE relief	33.1 to 36.8 MPa {338 to 375 kgf/cm ² }
		Boom relief pressure	Hydraulic oil temperature: 45 to 55 °C	Boom LOWER relief (at low pressure)	16.47 to 19.6 MPa {168 to 200 kgf/cm ² }
			Hydraulic oil temperature: 45 to 55 °C	Boom LOWER relief (at high pressure)	29.2 to 33.3 MPa {298 to 340 kgf/cm ² }
		<p>If only boom LOWER relief pressure in the above relief pressures is low, suction safety valve may be defective. Check the safety valve.</p> <p>Check for damaged sealing material, etc. by appearance (Be careful to prevent foreign matter from entering during repair).</p> <p>When disassembling, replace the suction safety valve assembly with a new one since its relief pressure cannot be adjusted on the machine.</p> <ul style="list-style-type: none"> • Check that suction valve is seated on body of safety valve in position (it is not stuck halfway). • If suction valve is pushed and external force is removed, check whether it returns smoothly and seats on valve body. <p>Boom LOWER safety valve has machine push-up function, so 2-stage relief is set.</p>			
5	Malfunction of boom control valve (spool)	<p>Release remaining pressure from hydraulic tank and piping, and then perform troubleshooting with engine stopped.</p> <ul style="list-style-type: none"> • Check for stuck or seized LS spool in merge-divider valve body (spool should move smoothly). • Remove LS spool from valve body and check for defects and dirt. <p>Be careful to prevent foreign matter from entering the valve during restoration.</p>			
6	Malfunction of boom control valve (pressure compensation valve)	<p>Check whether boom cylinder moves slowly when performing hydraulic relief of other work equipment. (If boom cylinder moves, it is abnormal.)</p> <p>If any failure is found in either of above check items, interchange pressure compensation valves on RAISE and LOWER sides, and check whether failure symptom changes. (Each area ratio is different, so be sure to restore it after checking the symptom.)</p>			

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

(PC490_11E0_WMEA-K-J000-410-08-B)

Failure	Swing drift on a slope is large while swing parking brake is applied.
Related information	<ul style="list-style-type: none"> 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.			

S-18 UNUSUAL NOISE IS HEARD

(PC490_11E0_WMEA-K-A000-410-90-B)

Failure	Unusual noise is heard.
Related information	<ul style="list-style-type: none"> • Check place of sound source, inside or outside, then perform troubleshooting. • While engine is not warmed up sufficiently, it is operated in warm-up mode and it generates a little larger sound. This is not abnormal. • When engine is accelerated, it is set in acceleration mode and it generates a little larger sound for approximately 3 to 5 seconds. This is not abnormal. • If any failure code is displayed, perform troubleshooting for that code first.

No.	Cause	Point to check, remarks	Remedy
1	Gas leakage from each part of the piping	<ul style="list-style-type: none"> • Gas leakage from following parts; between cylinder head and exhaust manifold, piping between exhaust manifold and VGT, piping between VGT outlet and KDPF • Gas leakage from EGR piping or air intake piping 	Problematic portions repair or replacement
2	Vibration of exhaust piping and exhaust bellows	Confirm the presence of vibration by visual check	Check and retighten piping fixed bracket
3	Seizure, damage, and unusual noise from VGT	Check if VGT shaft can rotate (by manually moving the VGT's blade axially and vertically).	VGT replacement
4	KDPF broken internally	Check internal KDPF.	KDPF cleaning or replacement
5	Defective injector	<ul style="list-style-type: none"> • Some cylinder is found to be cool when exhaust manifolds are touched by hand immediately after engine is started. • Perform cylinder cutout mode operation to identify cylinder that does not change in speed (see "TESTING AND ADJUSTING", "HANDLING CYLINDER CUTOFF MODE OPERATION"). 	Replace injector.
6	Defective valve clearance	Check valve clearance (Reference: See Testing and adjusting, "Testing and adjusting valve clearance").	Valve clearance adjustment
7	Seizure of pin bushing, front bearing, or main bearing	Check inside of oil pan for metallic powder.	Damaged parts repair or replacement
8	Worn piston ring or cylinder liner	<ol style="list-style-type: none"> 1. If metal particles are found in oil pan or oil filter, overhaul engine and check piston rings and cylinder liners. 2. Measure pressure (See Standard value table) (Reference: See Testing and adjusting, "Testing compression pressure") 	Replace piston ring or cylinder liner.
9	Broken valve or rocker arm	Overhaul engine and check valve and rocker arm parts.	Valve or rocker arm replacement
10	Broken peripheral parts of idler gear	Overhaul engine and inspect idler gear parts.	Idler gear replacement

SPECIAL TOOLS LIST

(PC400_10-A-3530-061-00-B)

How to read the tools list

- Part Number:
tools with part number 79*T-**-**** are not supplied (to be locally manufactured).
- Necessity:
 - : Tools are not substituted ,must always be equipped(used)
 - : Tools extremely useful if available .
- New/Redesign:
 - N: Tools with new part numbers, newly developed for this model.
 - R: Tools, with advanced part numbers, developed by improving existing tools for other models.
 - Blank: Tools already available for other models that can be used without any modification.
- Sketch:
 - : Tools marked with ○ in the sketch column have the sketches.
 Sketches are introduced in“Sketches of special tools”,and all sketches of“79*T-**-****”are described

Tools for removal and installation of supply pump assembly

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	795-799-1131	Gear	■	1			
B	795-630-5500	Standard puller	■	1			
C	01010-81090	Bolt	■	2			
D	01643-31032	Washer	■	2			

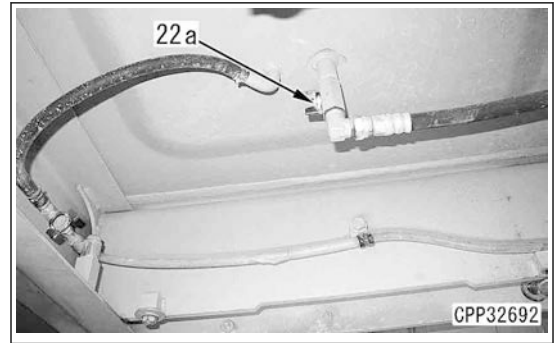
Tools for removal and installation of injector assembly

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	—	Flat-head screwdriver	●	1			Disconnect of wiring harness connector
B	—	L-shaped bar	■	1			Disconnect of wiring harness connector

Tools for removal and installation of cylinder head assembly

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	—	Lifting tool	■	2			
B	790-331-1110	Wrench	●	1			

43. Open fuel valve (22a) at the bottom of the fuel tank.

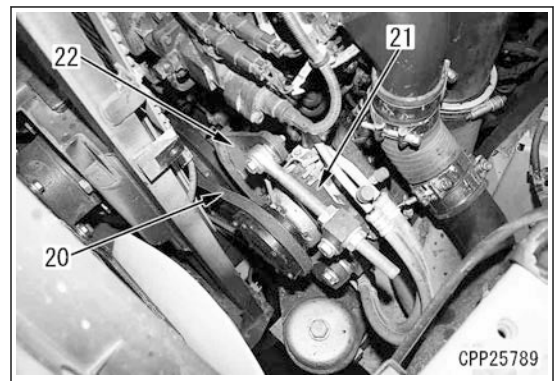


Air conditioner compressor assembly

44. Install bracket (22).
 45. Install air conditioner compressor assembly (21).
 46. Install air conditioner compressor belt (20).


NOTICE

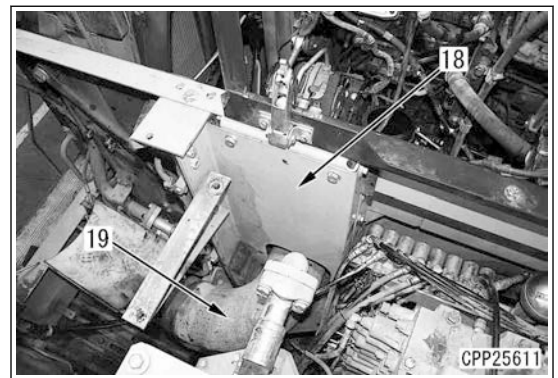
Adjust the air conditioner compressor belt tension. For details, see “Testing and adjusting”, “TEST AND ADJUST AIR CONDITIONER COMPRESSOR BELT TENSION”.



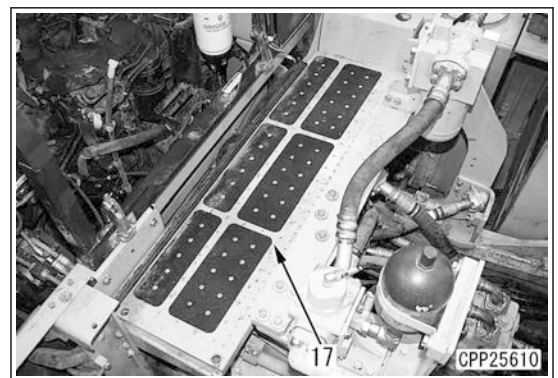
Hose, tube

47. Install plate (18) and hose (19).

 Hose (19) clamp fastening bolt :
 10.0 to 10.9 Nm {1.02 to 1.12 kgfm}

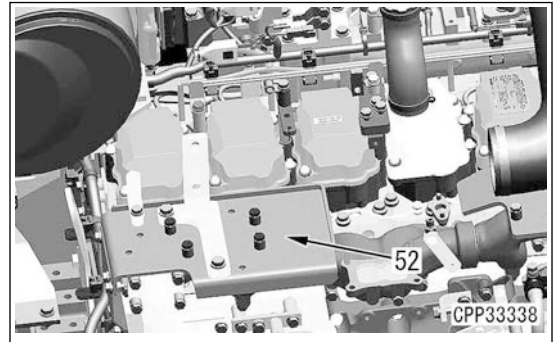


48. Install step plate (17).



Bracket

- 40. Remove bracket (52).

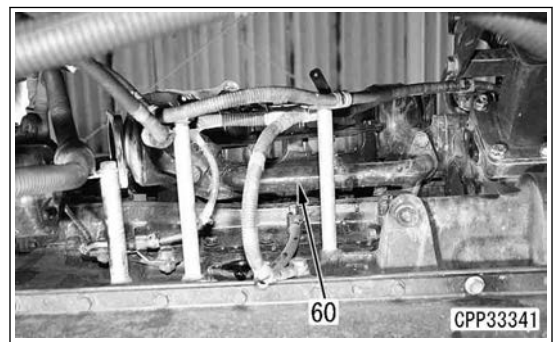
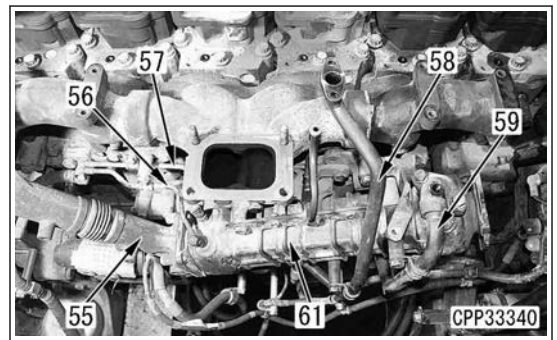


EGR cooler

- 41. Remove tubes (53) and (54).



- 42. Remove tubes (55), (56), (57), (58), and (59).
- 43. Remove the bolt at the bottom of EGR cooler of tube (60).
- 44. Remove EGR cooler (61).

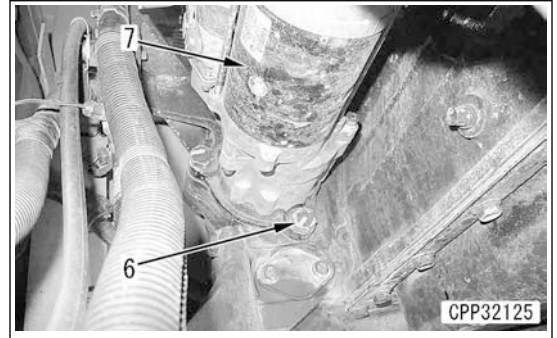


METHOD FOR INSTALLING STARTING MOTOR ASSEMBLY


(PC400_11-K-AK70-720-00-B)

Starting motor assembly

1. Install starting motor assembly (7), and install mounting bolts (6) (3 pieces).



2. Install wiring K11 (4) and K02 (5) to the starting motor assembly.

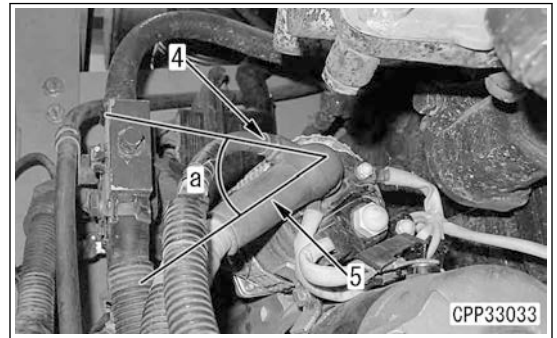
 Mounting nuts of wiring K11 (4) and K02 (5):
19.6 to 25.5 Nm {2.0 to 2.6 kgfm}



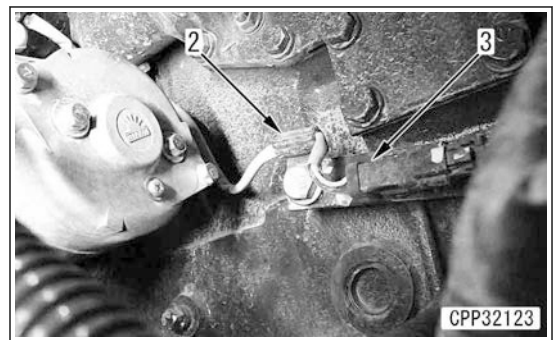
NOTICE

When installing wiring K11 (4) and K02 (5), check that the starting motor terminal mounting angle (a) is the following value.

Starting motor terminal mounting angle (a): 45 °



3. Connect wiring connector MB02 (3) from the bottom of the engine, and install clamp (2).



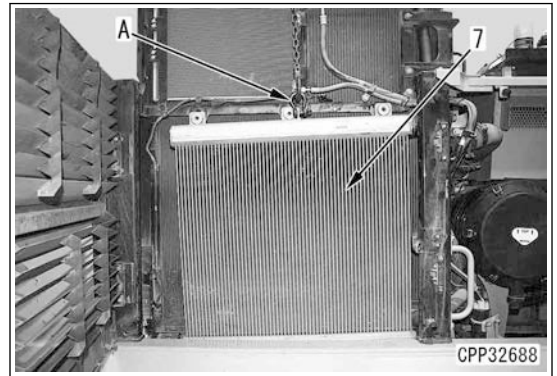
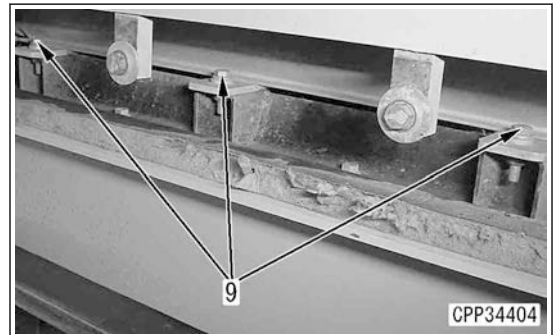
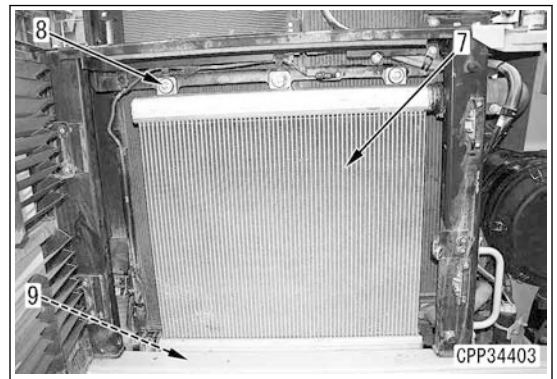
Aftercooler assembly

7. Sling aftercooler assembly (7), and hold it.
8. Remove upper mounting bolts (8) (3 pieces) and lower mounting bolts (9) (3 pieces).
9. Sling aftercooler assembly (7) by using tool A, and remove it.



Aftercooler assembly (7):

30 kg



METHOD FOR INSTALLING AFTERCOOLER ASSEMBLY

(PC400_10-K-A9A0-720-00-B)

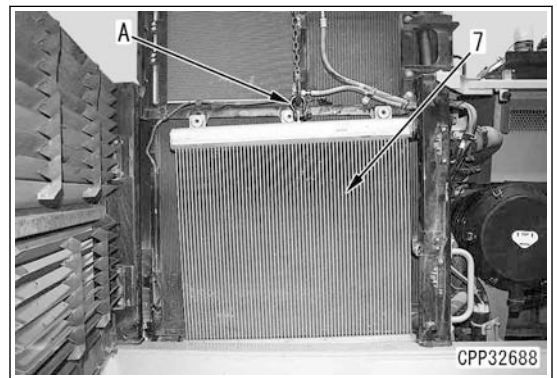
Aftercooler assembly

1. Sling aftercooler assembly (7) by using tool A to set it at the mounting position, and hold it suspended.



Aftercooler assembly (7):


30 kg




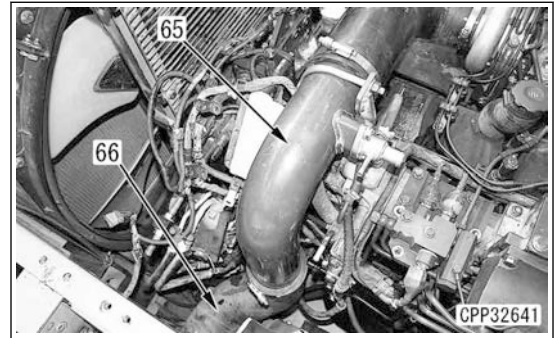
34. Connect connector E27 (67) at the left side of the engine.



35. Install hose (66) to tube (65) between the turbocharger and the air cleaner.

 Air hose (66) mounting clamp (10):
10 to 11 Nm {1.02 to 1.12 kgfm}

 U-bolt mounting nut of tube (65) :
14.7 to 44.1 Nm {1.5 to 4.5 kgfm}



36. Install hose (64) to intake connector (63).

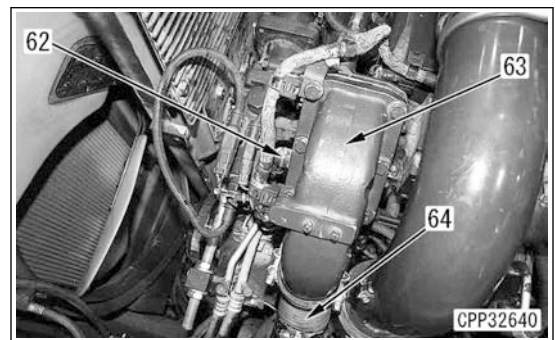
37. Connect the connector M37 (62) on the left side of the engine.

38. Align hose to the original position (marked) to install MIKALOR clamp.

NOTICE

Use new MIKALOR clamps.

Air hose insertion depth: 80 mm(both sides)




39. With bridge (BR) set under the clamp bolt, tighten the bolt so that bridge (BR) laps over with the band by dimension (b) indicated below.


NOTICE

Impact wrench is not allowed to use.

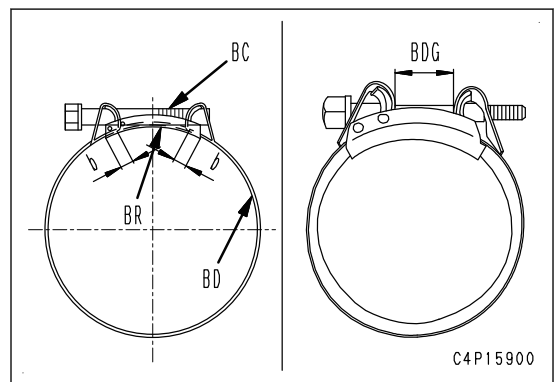
Dimension (b), min. : 5 mm

 Clamp fastening bolt threaded part (BC):
Lubricating oil (THREEBOND PANDO18B or equivalent)

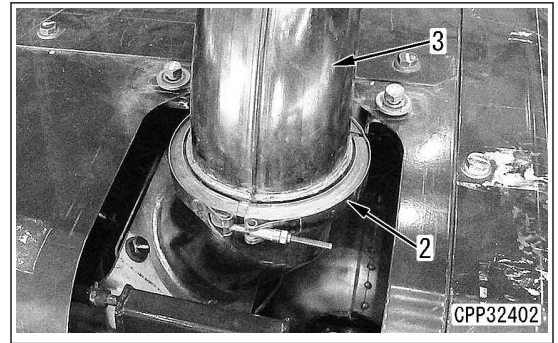
- When reusing the hose
Align the clamp position to the trace of clamp left on the hose.

 Clamp fastening bolt, min.:
16 to 17 Nm {1.6 to 1.7 kgfm}

- When using a new hose
Tighten it until dimension (BDG) becomes as shown below.
Dimension (b): 4 to 7 mm

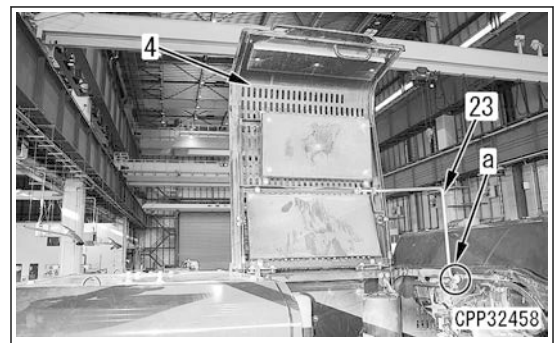


2. Remove clamp (2), and disconnect exhaust pipe (3).



Wiring

3. Open the central engine hood assembly (4) to the middle position.

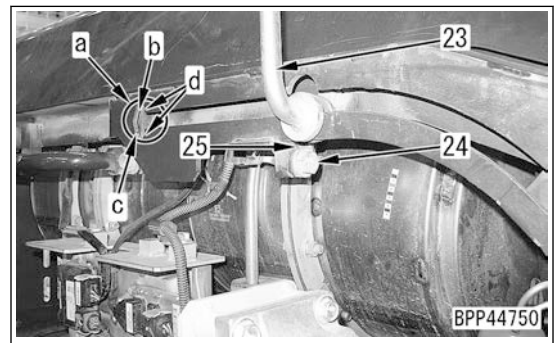


4. Loosen the bolt (24), and release the stopper (25).

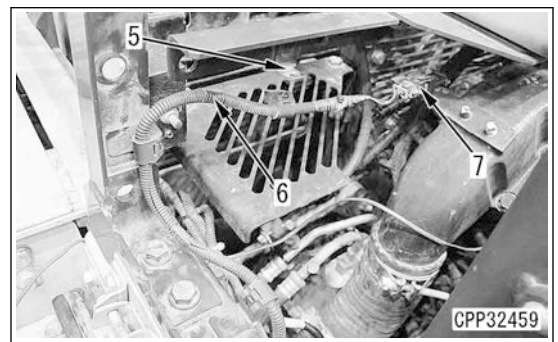
REMARK

The stoppers are provided at the positions (d) of the guide groove so as not to let the stay moving back to the closing direction when the central hood is fully opened.

- a: Position of the stay when the hood is fully opened
- b: Position of the stay when the hood is about to be opened against the wind
- c: Position of the stay when the hood is about to be closed with the tailwind



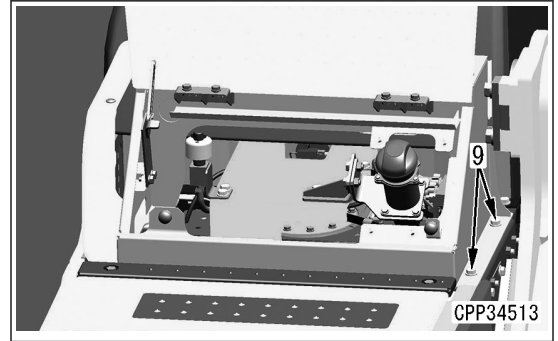
5. Open the engine hood assembly (4) to the last part, and fix the lock bar (fixing rod) (23) at the position (a).
6. Disconnect wiring harness (6) from clips (5) (3 pieces).
7. Disconnect connector P24 (7).



18. Remove mounting bolts (9) (4 pieces).

REMARK


Bolts on the left side of the machine are at the outside of the case, and right side bolts are at the inside.

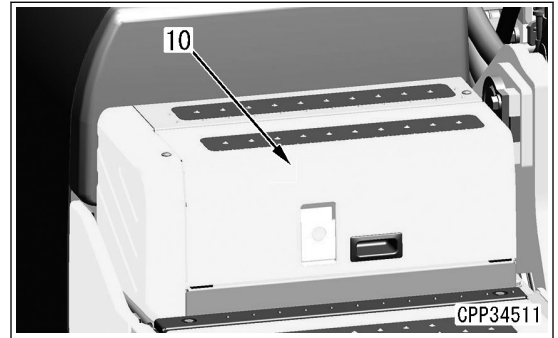


19. Sling AdBlue/DEF tank filler port case (10) by using tool A, and remove it.

REMARK

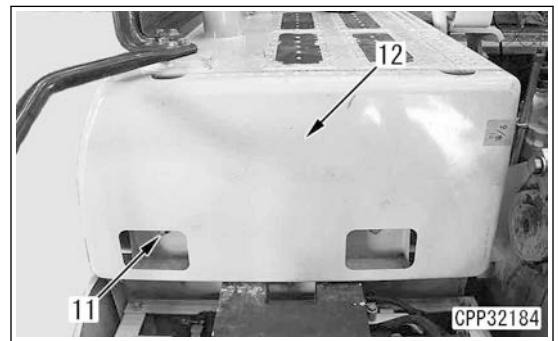
Remove cap on the top of AdBlue/DEF tank filler port case (10), and install tool A to it.

 AdBlue/DEF tank filler port case (10):
30 kg

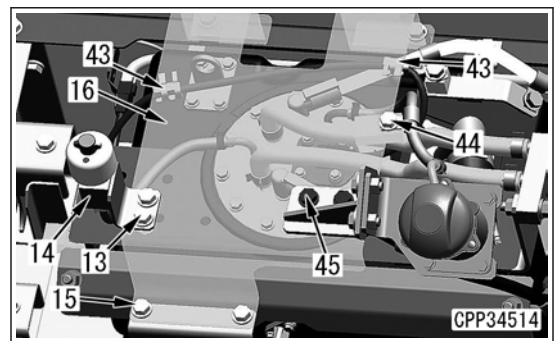


Cover

20. Remove mounting bolts (11) (4 pieces), and remove fuel tank front cover (12).

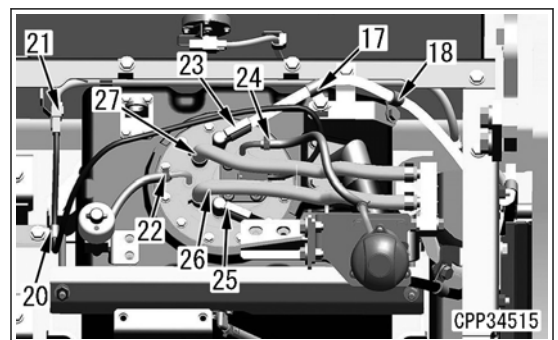


21. Remove mounting bolts (13), and remove breather joint (14).
22. Remove mounting bolts (15) (4 pieces).
23. Remove clamps (43) (2 places) at the back of cover (16).
24. Remove exhaust hose clip (44) of filler port.
25. Remove bolts (45) (2 pieces), and remove cover (16).




Hose, Connector

26. Remove clamps (17), (18), and (20).
27. Disconnect connector P63 (21).

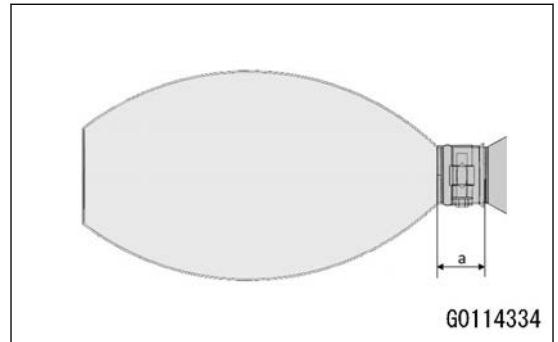
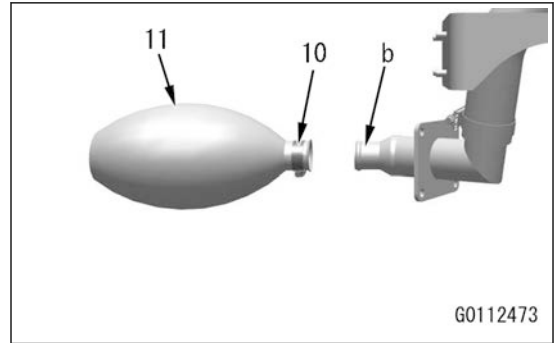


- 1) Match AdBlue/DEF tank filler port filter (11) with groove (b) of AdBlue/DEF tank filler port tube assembly (9), and tighten Jubilee clamp (10).

 Jubilee clamp (10):
3.91 to 4.89 Nm {40 to 50 kgfm}

NOTICE

- AdBlue/DEF tank filler port filter (11) insertion depth (a) : 28mm

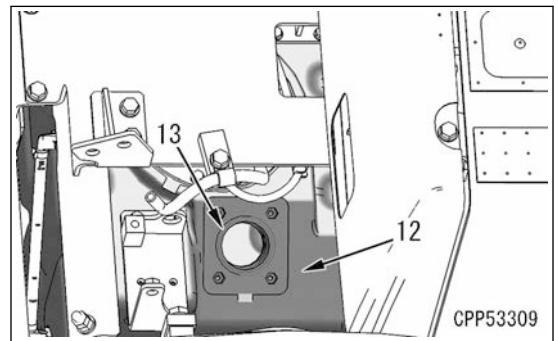


AdBlue/DEF tank filler port tube assembly

2. Install O-ring (13) to AdBlue/DEF tank (12).

REMARK

- Use a brand-new one of O-ring (13).
- Remove dirt, etc. from O-ring (13) with distilled water.



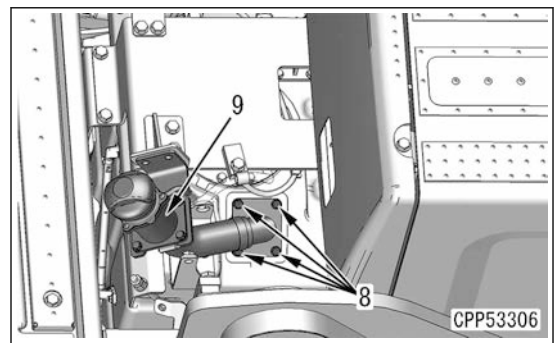
3. Set AdBlue/DEF tank filler port tube assembly (9) in the installing position.

REMARK


Take care not to catch O-ring (13).

NOTICE

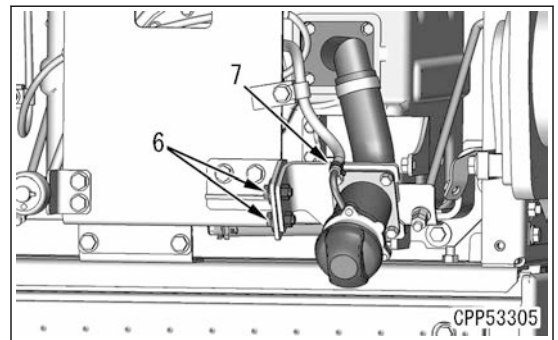
Set AdBlue/DEF tank filler port tube assembly (9) in the installing position, and install it straight without turning it while preventing O-ring (13) from falling of or twisting.



4. Lightly install AdBlue/DEF tank filler port tube assembly (9) with bolts (8) (4 pieces) and (6) (2 pieces).
5. Connect the hose, and install clip (7).
6. Tighten bolts (8) (4 pieces) to the specified torque.

 Bolts (8):
9.5 to 10.5 Nm {0.97 to 1.07 kgfm}

7. Tighten bolts (6) (2 pieces) to the specified torque.

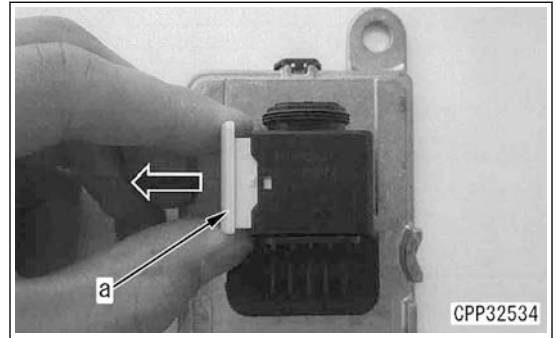
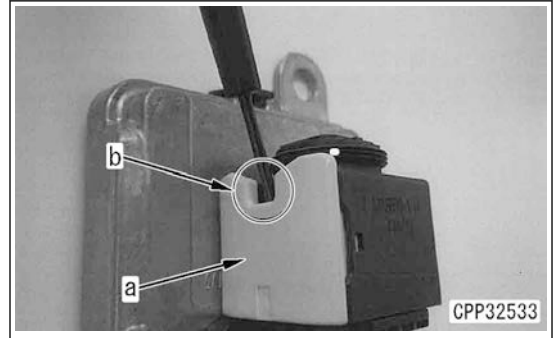


- 1) Insert a flat-head screwdriver or such into the latch part (b) of the yellow lever (a) of the connector to release the lock.
- 2) Pinch the yellow lever (a) with your fingers to slide it.

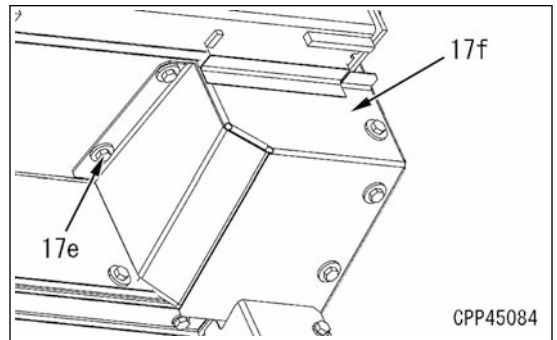
REMARK

Do not remove the yellow lever (a).

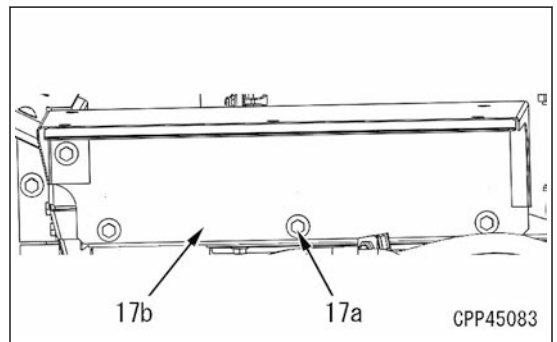
- 3) Disconnect the connector E26 (17) while you pull it to the opposite side of the sensor.



16. Remove the mounting bolt (17e), and remove the cover (17f).



17. Remove the mounting bolts (17a) (5 pieces), and remove the partition plate (17b).

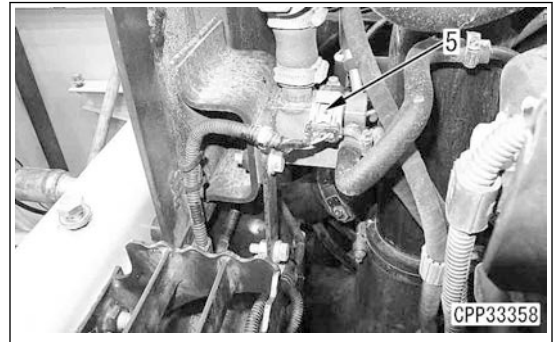


Connector

8. Install connector P57 (5).

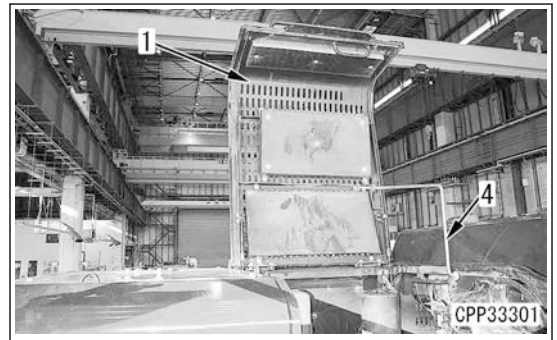
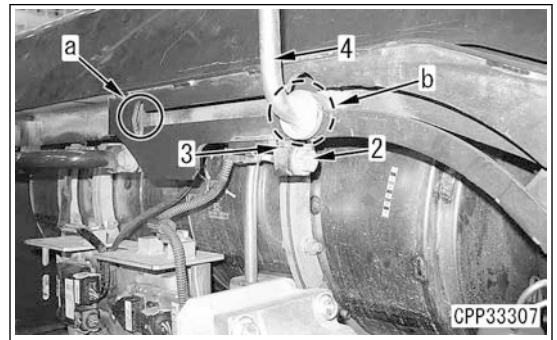
NOTICE

Check that the connector is free from dust, and then install it.

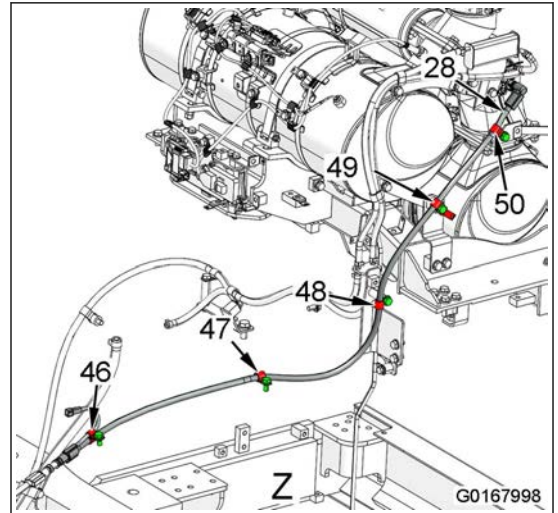


Engine hood

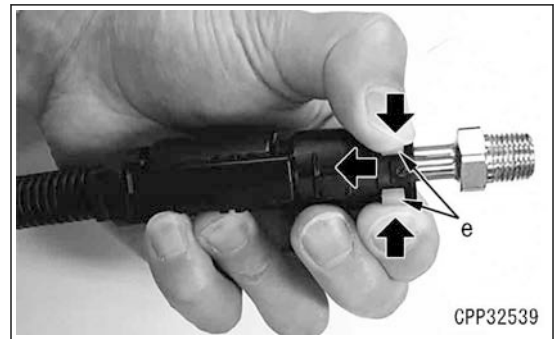
9. Open engine hood (1) to the last part, return lock bar (fixing rod) (4) from (a) to (b), and lock it with bolt (2).
10. Push up stopper (3) in the direction of the arrow, and tighten bolt (2).
11. Close engine hood (1).



- 8) Remove the clamps (46) to (50) of the AdBlue/DEF hose (28).

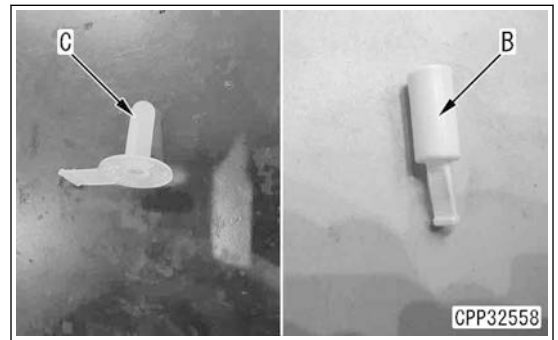


- 9) Before you disconnect the AdBlue/DEF hose (28), wash the connection part of the AdBlue/DEF hose with clean tap water to remove materials attached.
- 10) Pinch the protrusion part (e) of the clip with your fingers to release the lock. In that state, pull out the AdBlue/DEF hose (28) to the opposite side of the AdBlue/DEF injector to remove it.



NOTICE

After you disconnect the AdBlue/DEF hose (28), install the tool E on the hose side, and tool B on the AdBlue/DEF injector side to prevent leakage of AdBlue/DEF.

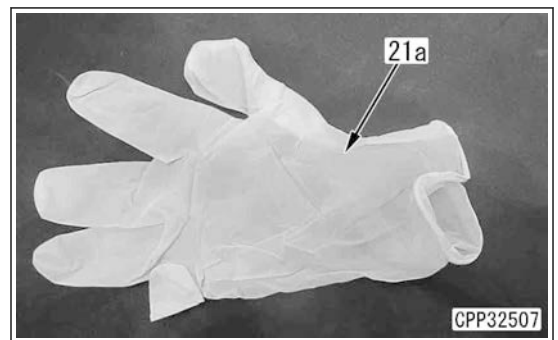


INSTALL AdBlue/DEF HOSE

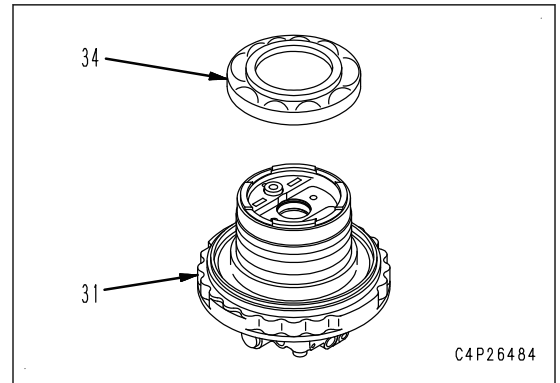
(PC400_11-K-AFF4-720-00-B)

AdBlue/DEF hose

1. Always use vinyl gloves (21a) when you handle AdBlue/DEF hoses. Install AdBlue/DEF hoses as follows.




8. Install bearing (34) to travel motor (31).
9. Heat the inner race of bearing (34) to 50 to 70 °C with a heater.
10. After bearing (34) is installed and cooled, hit it with a rod to check by sound that it is inserted to the end.

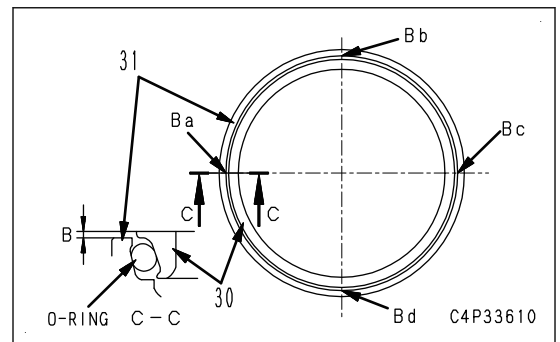
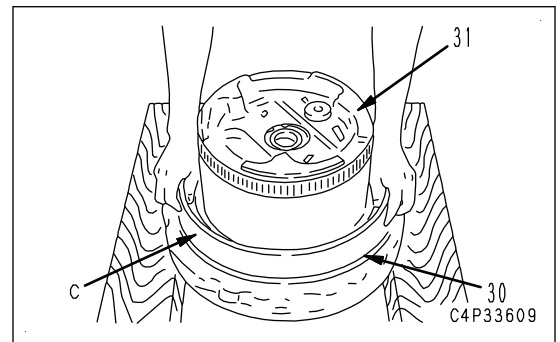


11. Install floating seal (30) to travel motor (31) by using tool C.
12. Install the floating seal after degreasing and drying the O-ring and O-ring contacting surface completely.
13. After installing the floating seal, measure protrusion (Ba to Bd) of the floating seal from the housing at the measuring point shown in the figure below.
14. Check that the difference between maximum value (B-max) and minimum value (B-min) of the values from Ba to Bd is 1 mm or less.

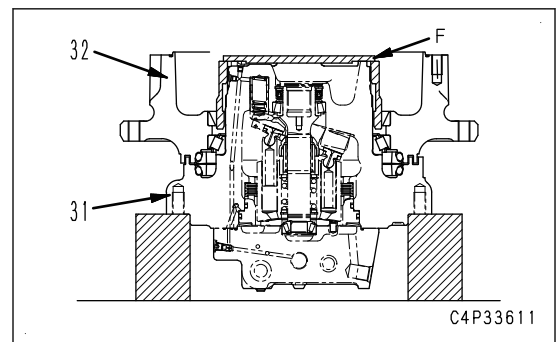
$$B\text{-max}-B\text{-min} < 1 \text{ mm}$$

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

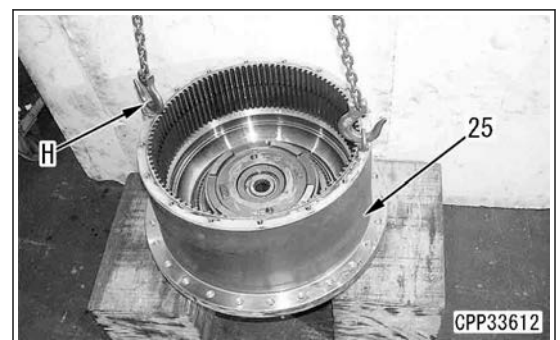
 Sliding surface:
Power line oil (TO30)



16. Set tool F to travel motor (31).

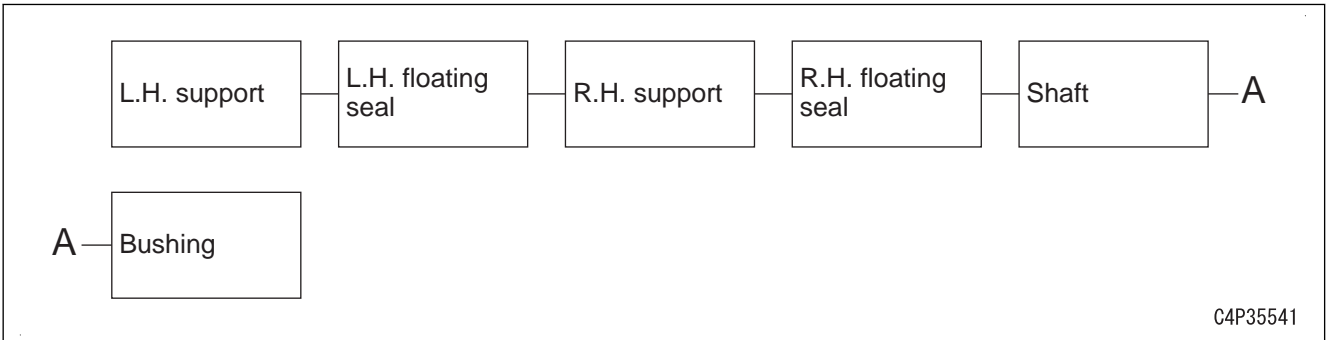


17. Set hub assembly (25) to the travel motor by using tool H, and lightly tap the bearing by using a push tool, and press-fit it.



DISASSEMBLE AND ASSEMBLE IDLER ASSEMBLY

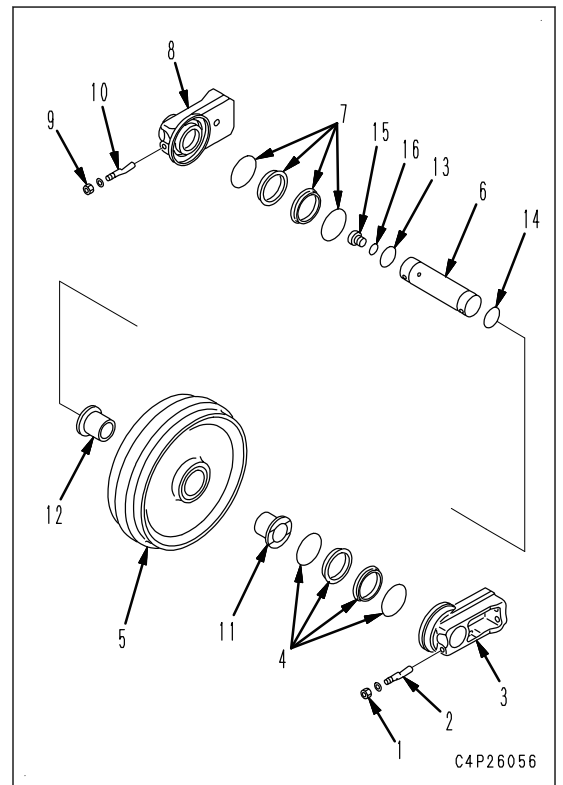
(PC400_10-K-DT90-926-00-B)



Tools for disassembly and assembly of idler assembly

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	791-575-1520	Installer	■	1			Installation of floating seal
B	791-601-1000	Oil pump assembly	■	1			Check for air leakage of floating seal

Overall structure figure



METHOD FOR DISASSEMBLING IDLER ASSEMBLY

(PC400_10-K-DT90-530-00-B)

L.H. support

1. Remove nut (1), and remove bolt (2)
2. Remove support (3) from shaft (6).

L.H. floating seal

3. Remove floating seals (4) from support (3) and idler (5).

REMOVE AND INSTALL COUNTERWEIGHT ASSEMBLY

(PC400_10-K-H700-924-00-B)

Tools for removal and installation of counterweight assembly

Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	-	Lifting tool	•	1			

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

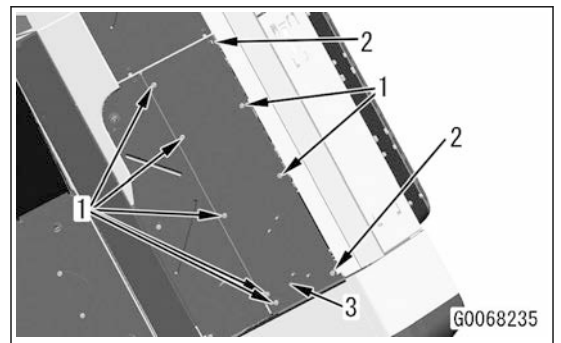
⚠ Stop the engine, turn the battery disconnect switch to OFF position, and remove the key. (For details, see Testing and adjusting, "Handling of battery disconnect switch".)

METHOD FOR REMOVING COUNTERWEIGHT ASSEMBLY

(PC400_11_J-K-H700-520-00-B)

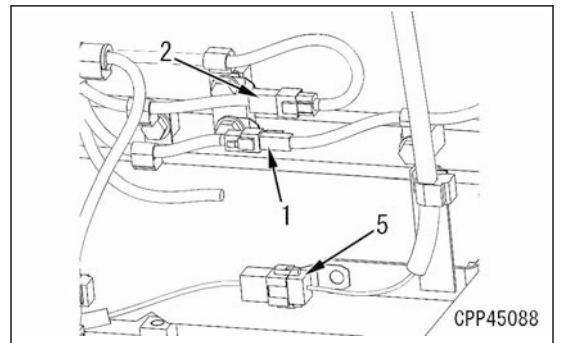
Under cover

1. Remove the bolt (1) (7 pieces).
2. Loosen the bolt (2) (2 pieces), and remove the cover (3).



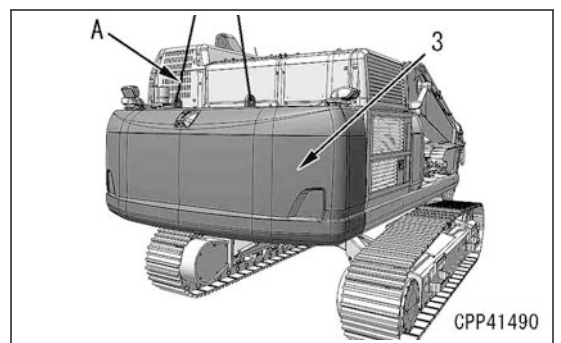
Connector

3. Disconnect the connectors (1), (2), and (5).
 - (1): A15 Rear working lamp connector
 - (2): A40 Camera connector
 - (5): A80 KomVision relay connector



Counterweight assembly

4. Lift the counterweight assembly (3) with the tool A, and hold it.



Add power train oil

20. Add Komatsu genuine oil to the specified level through the oil filler port of the damper case. Run the engine to supply the oil through the piping. And then examine the oil level again. (For details, see STRUCTURE AND FUNCTION, "TABLE OF FUEL, COOLANT, AND LUBRICANTS".)



Damper case:

1.6 ℓ

Bleed air

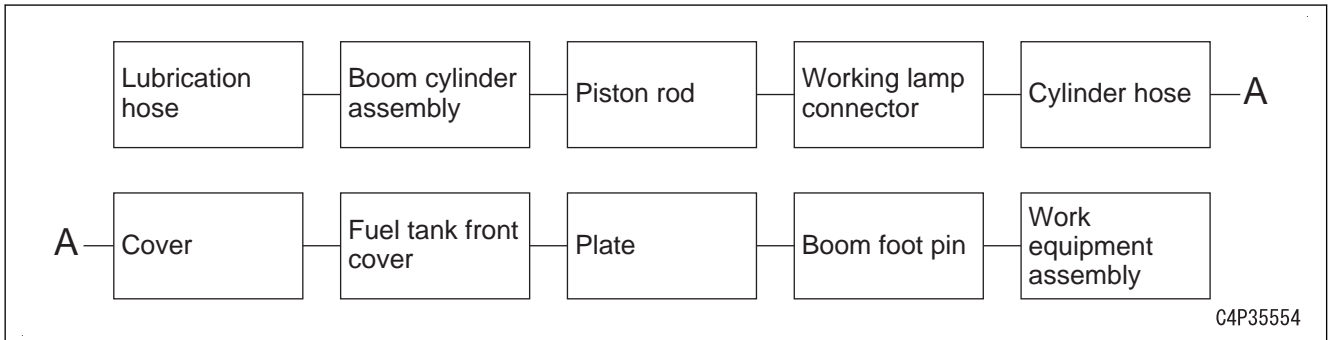
21. Bleed air from the hydraulic circuit. See TESTING AND ADJUSTING, "BLEED AIR FROM HYDRAULIC CIRCUIT".

WORK EQUIPMENT

(ALL-K-L000-001-50-B)

REMOVE AND INSTALL WORK EQUIPMENT ASSEMBLY

(PC400_10-K-L400-924-00-B)



Tools to be used when removing and installing the work equipment assembly

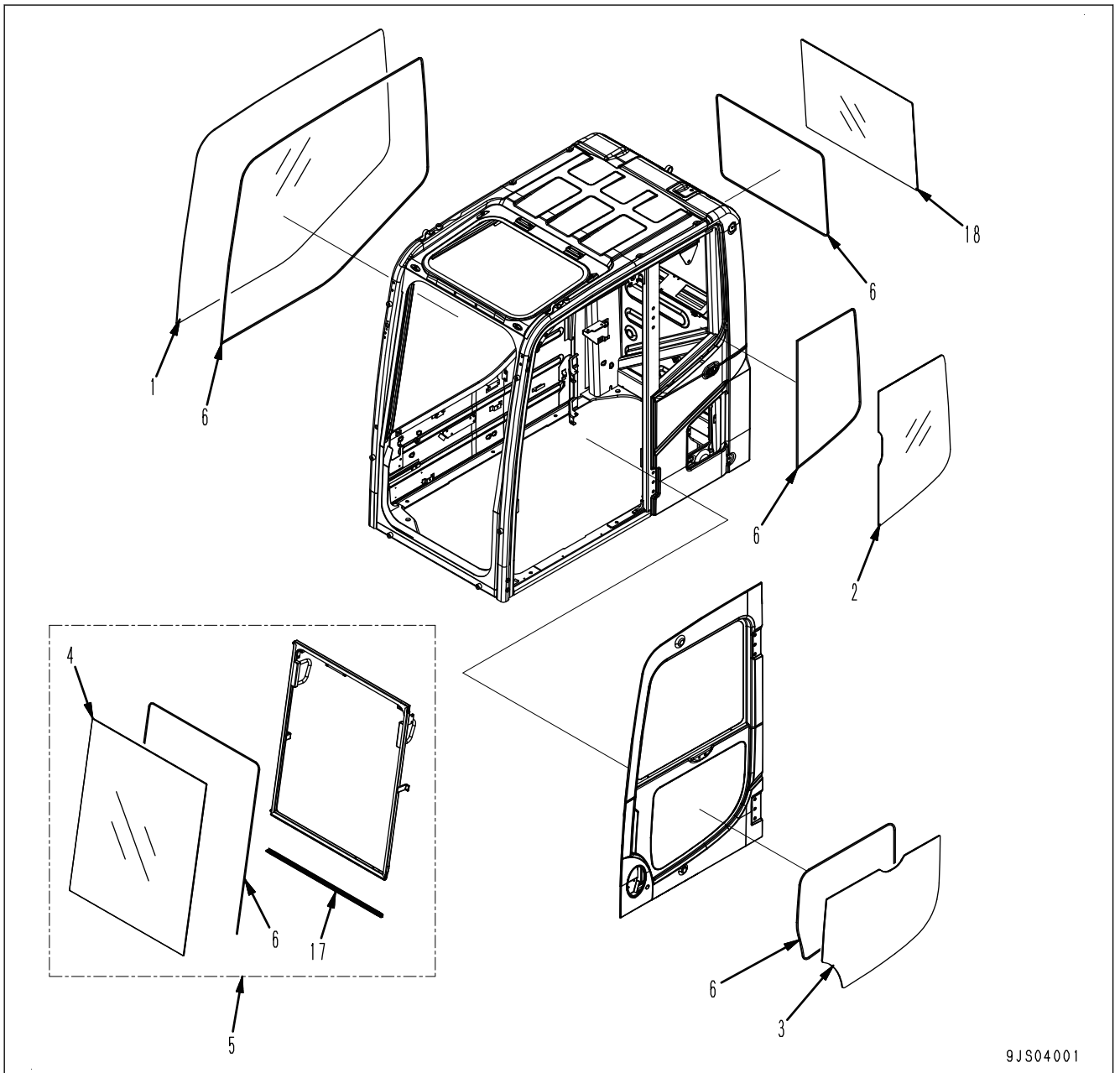
Symbol	Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Remarks
A	796-670-1100	Remover	•	1			
	796-670-1110	• Sleeve		1			
	796-670-1120	• Plate		1			
	796-670-1130	• Screw		1			
	01643-33080	• Washer		1			
	01803-13034	• Nut		1			
	796-870-1110	• Adapter	•	1			
	790-101-4000	Puller (long) (490 kN {50 t})	•	1			
	790-101-1102	Pump (294 kN {30 t})	•	1			

- ⚠ Stop the engine, turn the battery disconnect switch to OFF position, and remove the key. (For details, see TESTING AND ADJUSTING, “HANDLE BATTERY DISCONNECT SWITCH”.)
- ⚠ Place the machine on a level ground, fully extend the arm and bucket, lower the work equipment to the ground so that it is stable, set the lock lever to LOCK position, and then stop the engine.
- ⚠ Release the remaining pressure in the hydraulic circuit. See TESTING AND ADJUSTING, “RELEASE REMAINING PRESSURE FROM HYDRAULIC SYSTEM”.
- ⚠ Check the connector numbers and installed positions before disconnecting wirings and hoses, and write them down.
- ⚠ Install a plug or flange in the place where a hydraulic hose is disconnected to prevent oil from flowing out.

NOTICE

When plugging the cylinder to prevent oil leakage, be sure to use the plug with bleeder for releasing remaining pressure.

Figure of structure



(1): R.H. window glass

(2): L.H. rear window glass

(3): Lower door window glass


(4): Front window glass

(5): Front window assembly (front window glass + front frame)

(6): Dam rubber

(17): Center trim seal

(18): Rear window glass

 Hose clamp (M6 bolt) :
8 to 12 Nm {0.8 to 1.2 kgfm}

16. Install connector (36).
(36): Dual pressure switch (P17) of air conditioner

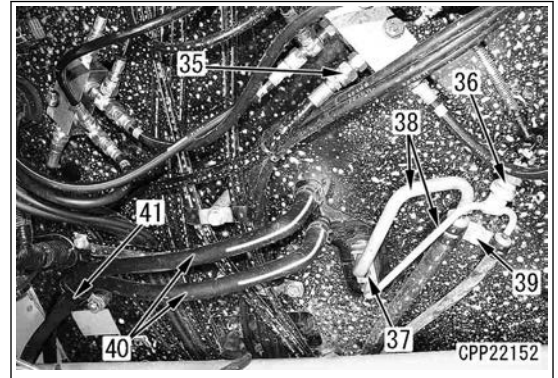
NOTICE

Install all the cable ties that are fixing the wiring harness and floor frame.

17. Install hose (35).
(35): Port (T) (Drain circuit to hydraulic tank)
18. Install hose (34).
(34): Port (P) (Circuit from PPC oil pressure lock solenoid valve)

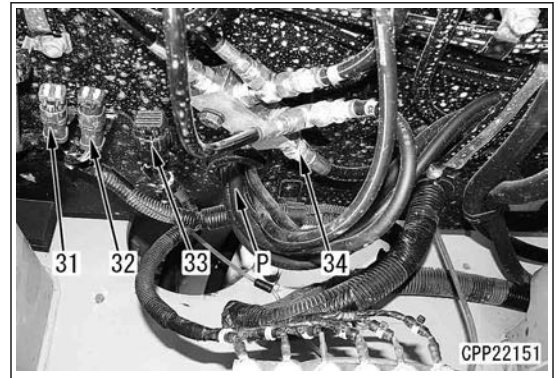
REMARK

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



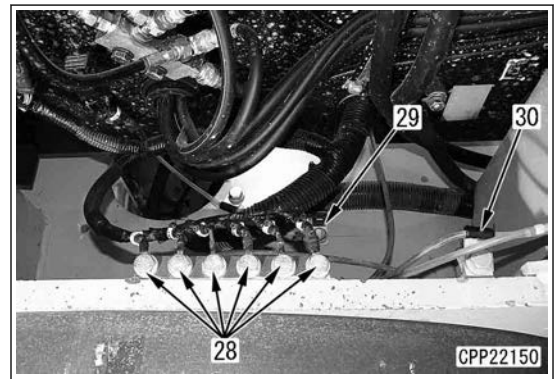
Connector

19. Install connectors (31) and (33) to the clip.
(31): Intermediate connector (A41) (Machine equipped with camera 2)
(32): Intermediate connector (A42) (Machine equipped with camera 3)
(33): Intermediate connector (A08) (Machines equipped with attachment)



Clamp

20. Install clamps (29) and (30).



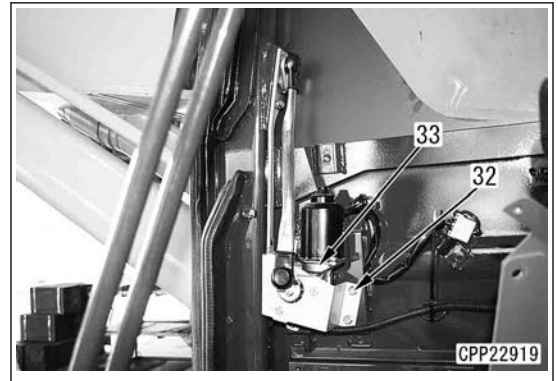
Ground cable

21. Install ground cable (28).

REMARK

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

- Remove mounting bolts (32) (6 pieces), and remove wiper motor assembly (33).



METHOD FOR INSTALLING FRONT WIPER ASSEMBLY

(PC400_10-K-K710-720-00-B)

Wiper motor assembly

- Install wiper motor assembly (33).


 Mounting bolt (32):
Adhesive (LT-2)

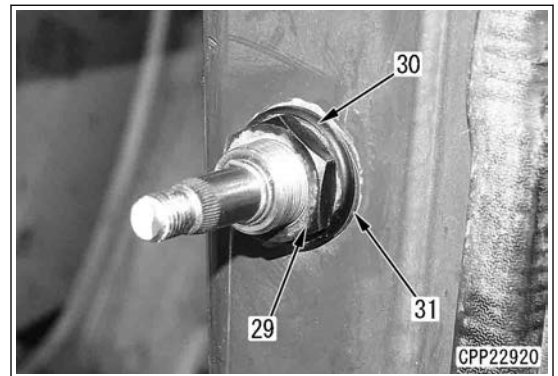


- Install packing (31) and washer (30), and tighten nut (29).

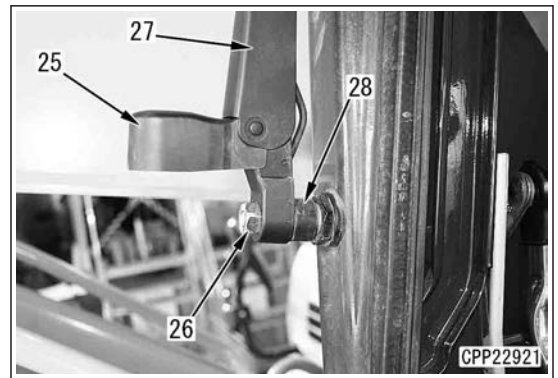
REMARK

Install washer (30) so that the chamfered side faces to the front of the cab.

 Nut (29) :
10.8 to 12.7 Nm {1.10 to 1.30 kgfm}



- Install the cap (28) and wiper arm (27).




INSTALL PUMP SWASH PLATE SENSOR

(PC400_11_J-K-C3WG-720-00-B)

Pump swash plate sensor

1. Install the front pump swash plate sensor (8) and rear pump swash plate sensor (9).

 Mounting bolt for pump swash plate sensor:
11.8 to 14.7 Nm {1.2 to 1.5 kgfm}

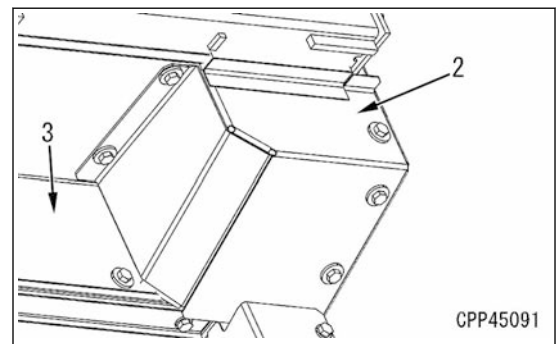
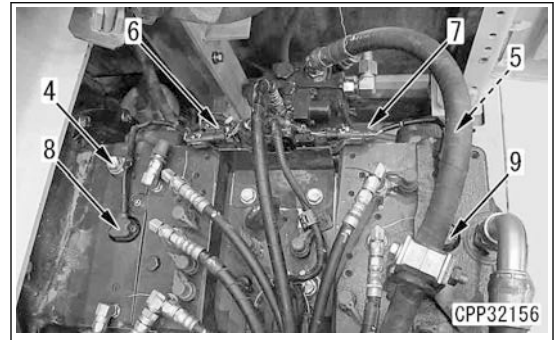
NOTICE

Adjust the pump swash plate sensor. For details, see TESTING AND ADJUSTING, "ADJUSTMENT MENU (CAL F PUMP SWASH PLATE SENSOR)" and "ADJUSTMENT MENU (CAL R PUMP SWASH PLATE SENSOR)" in "ADJUSTMENT MENU".

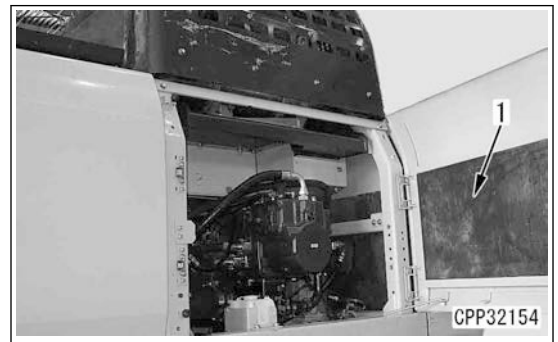
2. Connect the wiring connectors that follow.
 - (6): P27 front pump swash plate angle sensor
 - (7): P28 rear pump swash plate angle sensor
3. Install the clamps (4) and (5).

Cover

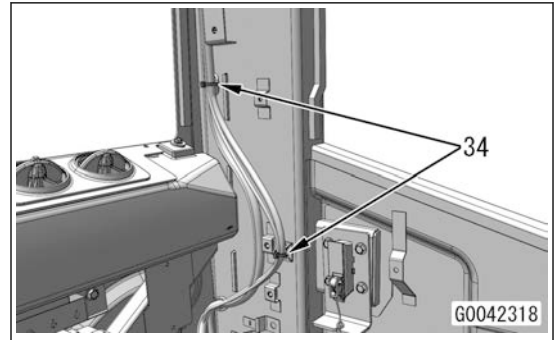
4. Install the cover (2) and partition plate (3).



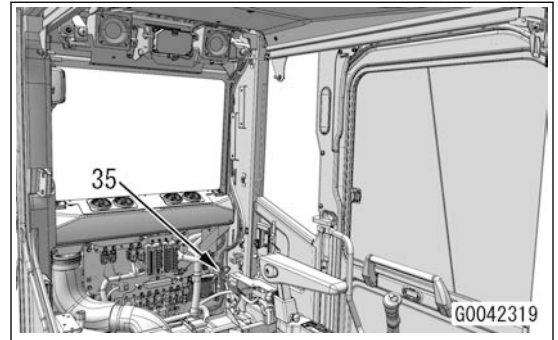
5. Close the L.H. side cover (1).



29. Cut the bands (34) (2 pieces).
Tool: Nippers

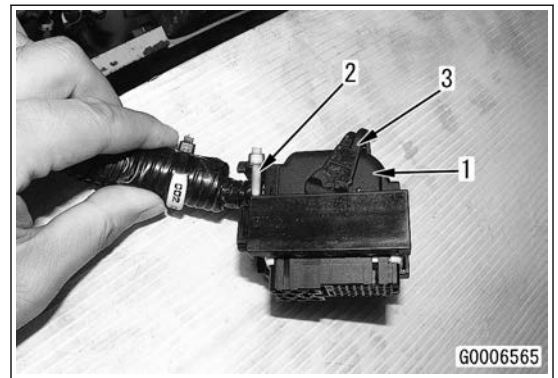


30. Remove the gateway controller wiring harness (35).

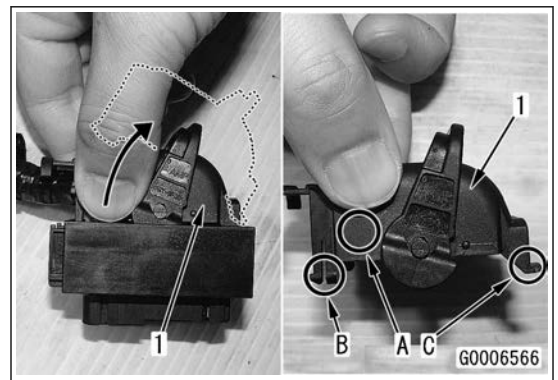


Reference: Procedure for removing the connector cover (1)

1. Cut the band (2).
2. Move the lever (3) upward.

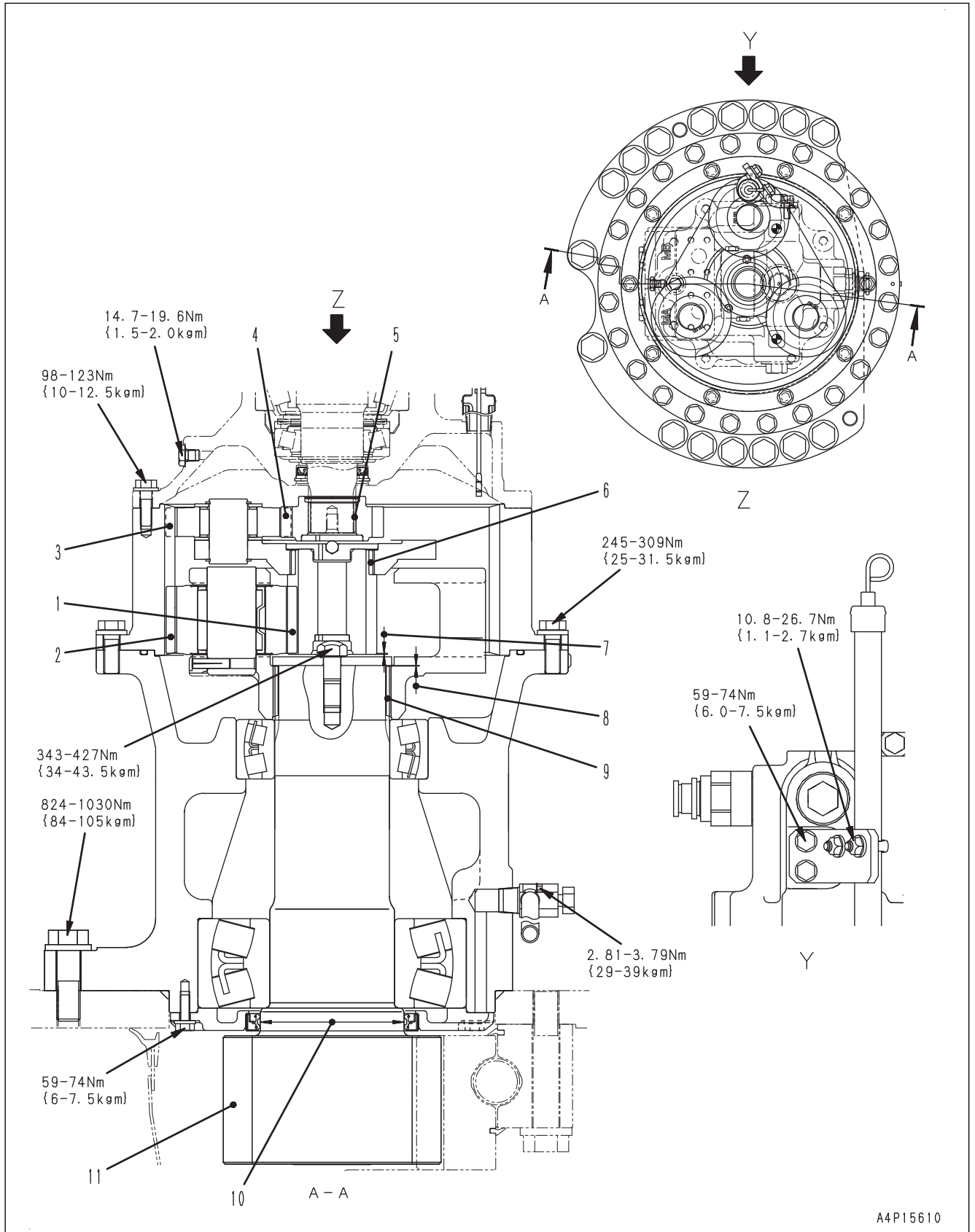


3. Lightly press the part (A) on both sides of the connector cover (1) to release the claw (B).
4. Remove the connector cover (1) around the claw (C) along the arc line.



MAINTENANCE STANDARD OF SWING MACHINERY

(PC400_10-K-J130-034-00-B)

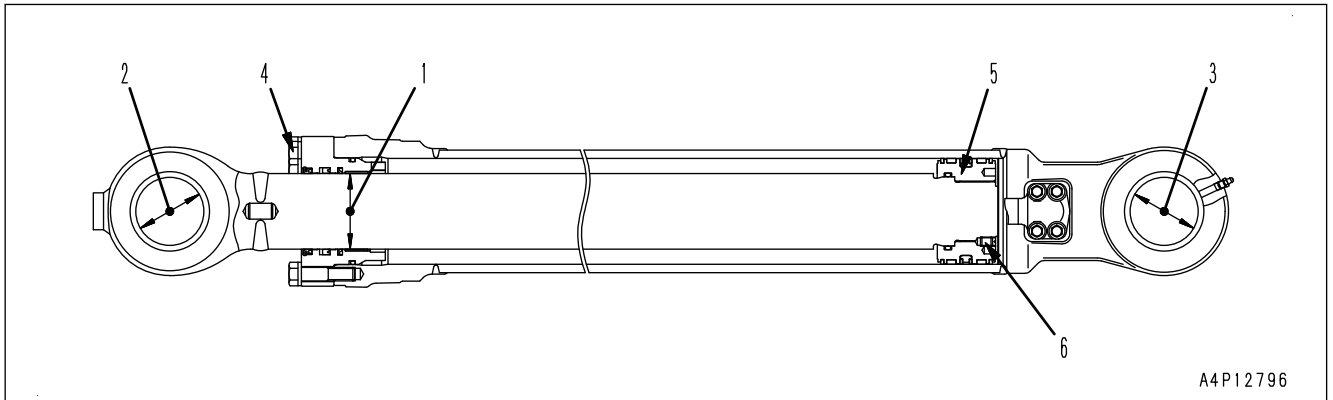


Unit: mm

No.	Item	Criteria					Remedy
		Standard dimension			Repair limit		
1	Suction valve spring	Free height x outside di- ameter	Installed height	Load at in- stalled height	Free height	Load at in- stalled height	Replace spring if damaged or deformed
		46.8x 7.5	40.6	5.5 N {0.56 kg}	-	4.4 N {0.45 kg}	
2	Check valve spring	11.5 x 4.6	8.5	1.47 N {0.15 kg}	-	1.2 N {0.12 kg}	

MAINTENANCE STANDARD OF BUCKET CYLINDER

(PC400_10-K-LCD0-034-00-B)



A4P12796

Unit: mm

No.	Item	Criteria				Remedy	
		Standard dimension	Tolerance		Clearance		Allowable clearance
Shaft	Hole						
1	Clearance between piston rod and bushing	110	-0.036 -0.090	+0.261 +0.047	0.083 to 0.351	0.451	Replace bushing
2	Clearance between piston rod support shaft and bushing	100	-0.036 -0.090	(+0.457) (+0.370)	(0.406 to 0.547)	1.0	Replace pin and bushing
3	Clearance between cylinder bottom support shaft and bushing	100	-0.036 -0.090	(+0.190) (+0.070)	(0.106 to 0.280)	1.0	
4	Tightening torque of cylinder head bolt	530±78.5 Nm {54.0±8.0 kgfm}				Retighten	
5	Tightening torque of cylinder piston	294±29.4 Nm {30.0±3.0 kgfm}					
6	Tightening torque of cylinder piston fixing screw	58.9 to 73.6 Nm {6.0 to 7.5 kgfm}					

():Reference dimension

SENSORS FOR AIR CONDITIONER SYSTEM

(D155AX_7-K-K5SI-001-00-B)

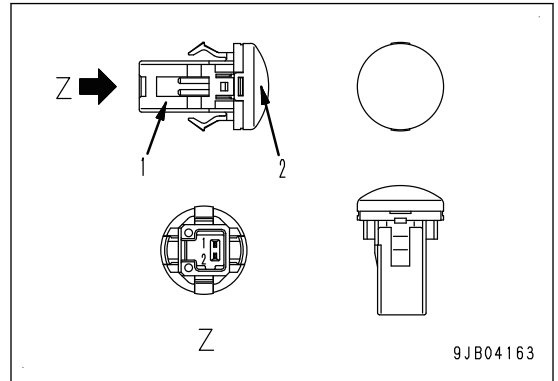
STRUCTURE OF SUNLIGHT SENSOR

(PC400_10-K-K5FH-041-00-B)

The sunlight sensor is installed to the top of the machine monitor.

General view

- 1: Connector
- 2: Sensor

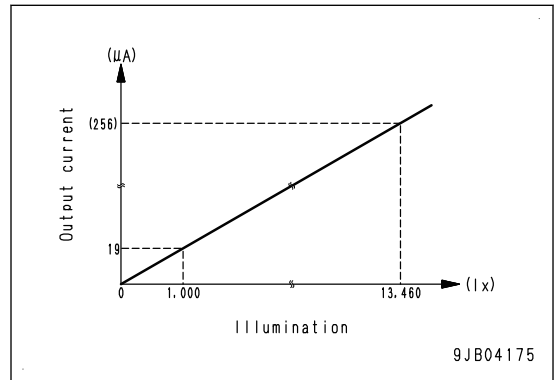


FUNCTION OF SUNLIGHT SENSOR

(PC400_10-K-K5FH-042-00-B)

- The sunlight sensor senses the sunlight intensity and sends signals to the air conditioner controller.
- Only in the automatic air conditioner mode, the air conditioner controller controls the blower motor and air mix servomotor to adjust the air temperature and flow rate by using the data of the sunlight sensor.

Output characteristics



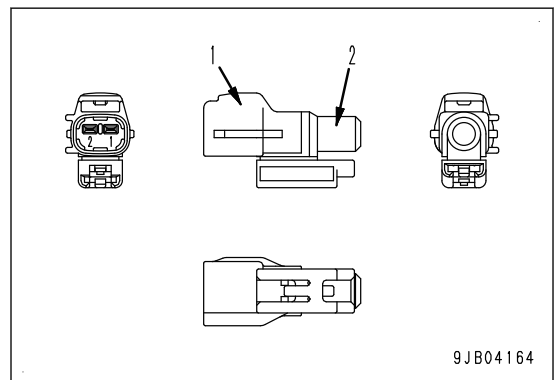
STRUCTURE OF AMBIENT TEMPERATURE SENSOR

(PC400_10-K-K55C-041-00-B)

The outside air temperature sensor is installed to the cooling unit.

General view

- 1: Connector
- 2: Sensor



FUNCTION OF AMBIENT TEMPERATURE SENSOR

(PC400_10-K-K55C-042-00-B)

- The resistance of the sensor changes according to the temperature, and the sensor senses the outside air temperature.
- The air conditioner controller converts the change in resistance of the outside air temperature sensor into the change in voltage to determine the outside air temperature.

Related circuit diagram

This is the excerpted circuit diagram related to troubleshooting

- Connector numbers and pin numbers are shown.
- Size of wire is shown. When there is a number in front of color, it shows size.
W: White, B: Black, R: Red, G: Green, Y: Yellow, L: Blue, V: Purple, P: Pink, O: Orange, Br: Brown, Gr: Gray, Sb: Sky blue, Lg: Light green, Dg: Dark green, Ch: Dark brown
 - When there are two colors
Example) WY: Yellow line on white background
 - When there is a number in front of color, it shows size.
- NC: Normally closed (Normally ON)
- [1] and [2] are numbers of unlabeled connectors.
- Arrow (←→): Roughly indicates their mounting place on the machine.

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