VENBM27500

Shop Manual

WHEEL LOADER WA320-7

SERIAL NUMBERS H01051 and up
80001 and up

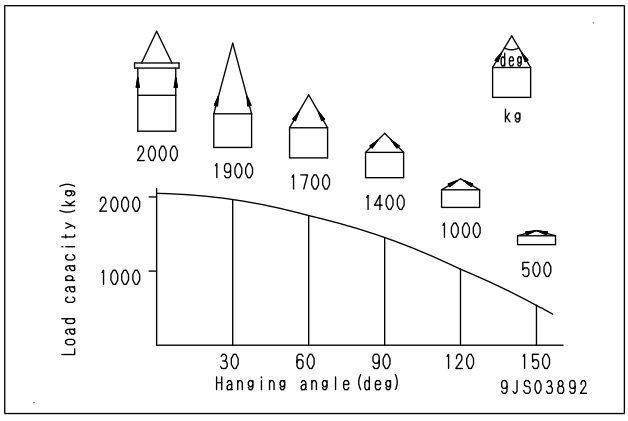
KOMATSU

- Keep putting on the gloves during sling work. (Put on the leather gloves, if available.)
- Measure the weight of the load by the eye and check its center of gravity.
- Use the proper sling according to the weight of the load and method of slinging. If too thick wire ropes are used to sling a light load, the load may slip and fall.
- Do not sling a load with 1 wire rope only. If do so, the load may rotate or the sling gets loose and the sling may slip off. Install 2 or more wire ropes symmetrically.

⚠ Slinging with one rope may cause turning of the load during hoisting, untwisting of the rope, or slipping of the rope from its original slinging position on the load, which can result in a dangerous accident.

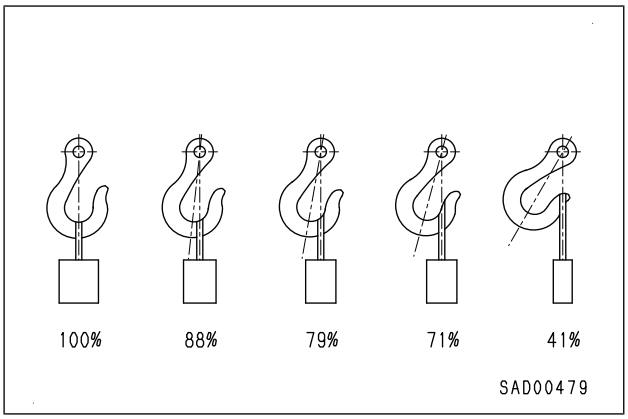
- Hanging angle must be 60 deg. or smaller as a rule.
- When hanging a heavy load (25kg or heavier), the hanging angle of the rope must be narrower than that of the hook.

★ When slinging a load with 2 ropes or more, the larger the hanging angle is, the larger the tension of each rope. The figure bellow shows the variation of allowable load in kg when hoisting is made with 2 ropes, each of which is allowed to sling up to 9.8 kN {1,000kg} a load vertically, at various hanging angles. When the 2 ropes sling a load vertically, up to 2,000 kg of total weight can be suspended. This weight is reduced to 1,000 kg when the 2 ropes make a hanging angle of 120 deg.. If the 2 ropes sling a 2,000 kg load at a hanging angle of 150 deg., each rope is subjected to a force as large as 4,000 kg.



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

★ Slinging near the tip of the hook may cause the rope to slip off the hook during hoisting. The strength of the hook is maximum at its central part.



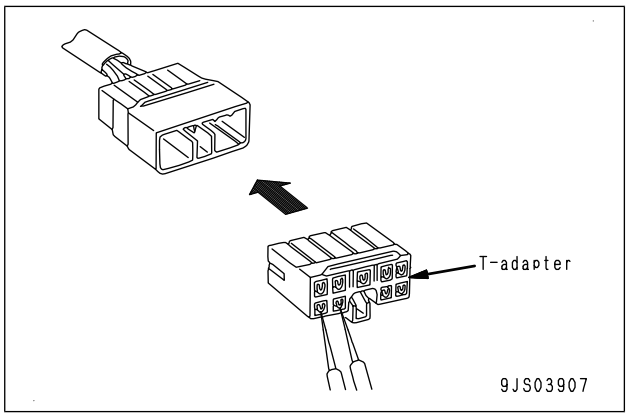
- Do not use twisted or kinked wire ropes.
- When slinging up a load, observe the following.
  1. Wind up the rope slowly until the wire rope tensions. When putting your hands on the wire ropes, do not grasp them but press them down from above. If you grasp them, your fingers may be caught.
  2. After the wire ropes are stretched, stop the crane and check the condition of the slung load, wire ropes, and pads.
  3. If the load is unstable or the wire rope or chains are twisted, lower the load and lift it up again.
  4. Do not lift up the load at an angle.
- When lowering a load, pay attention to the following.
  1. When lifting down a load, stop it temporarily at 30 cm above the floor, and then lower it slowly.
  2. Check that the load is stable, and then remove the sling.
  3. Remove kinks and dirt from the wire ropes and chains used for the sling work, and put them in the specified place.

Precautions for using mobile crane

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

Precautions for using overhead traveling crane

⚠ The hoist or crane must be used to sling the components weighing 25 kg or heavier. A part weighing 25 kg or heavier in "disassembly and assembly" section is indicated with the symbol of ▭.



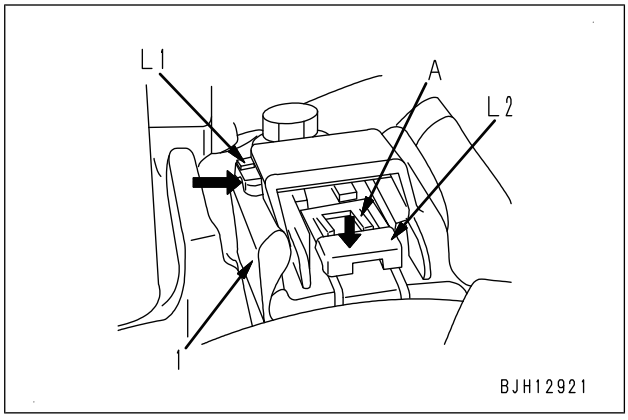
Handling of connectors used on engine

Slide, lock type
(FRAMATOME-3, FRAMATOME-2)

Disconnection

1. Slide lock (L1) to the right.
2. While pressing lock (L2), pull out connector (1) toward you.

   ★ In the case that even if lock (L2) is pressed, connector (1) cannot be pulled out toward you unless part A floats, float part A with a small flat-head screwdriver while pressing lock (L2), and then pull out connector (1) toward you.



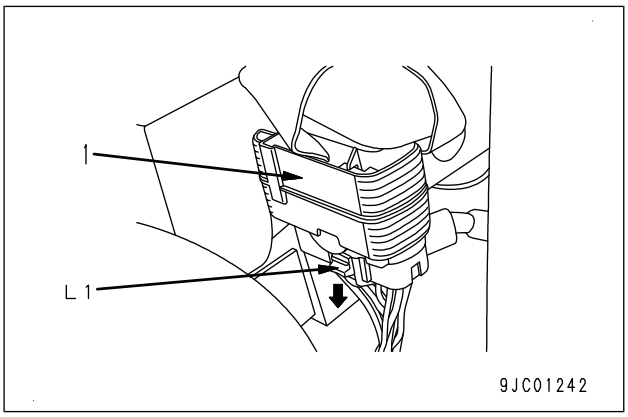
Connection

1. Insert the connector securely until a click is heard.

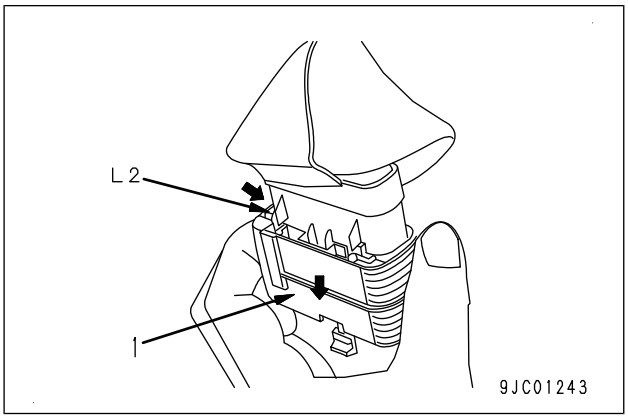
(FRAMATOME-24)

Disconnection

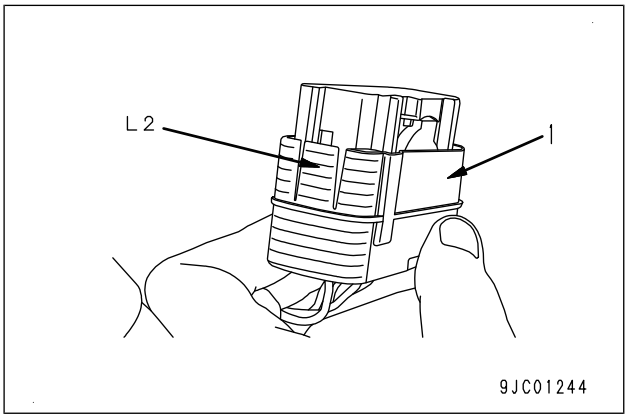
1. Slide down lock (red) (L1).



2. While pressing lock (L2), pull out connector (1).



★ Lock (L2) is located in the back of connector (1).



Connection

1. Insert the connector securely until a click is heard.

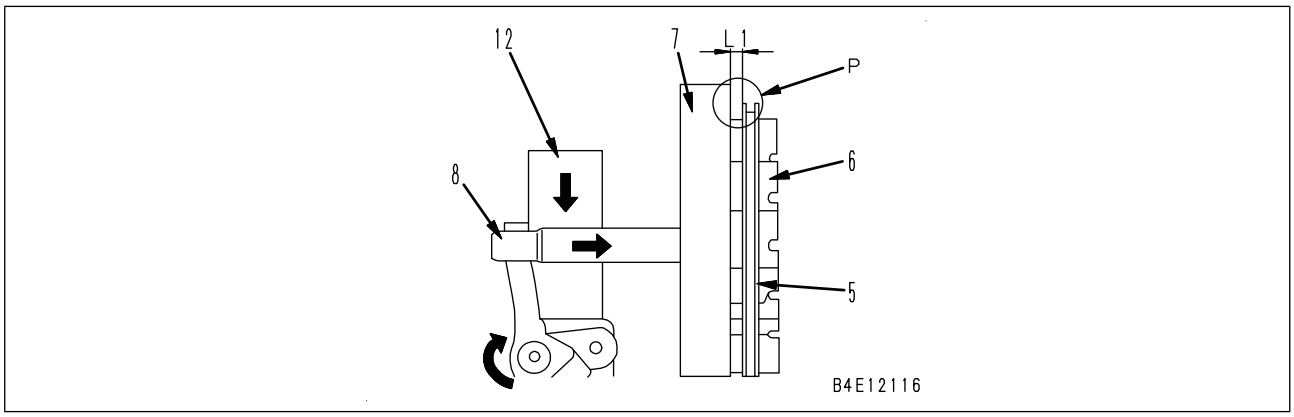
Pull lock type
(PACKARD-2)

Disconnection

1. Disconnect the connector (2) by pulling lock (B) (on the wiring harness side) of connector (2) outward.

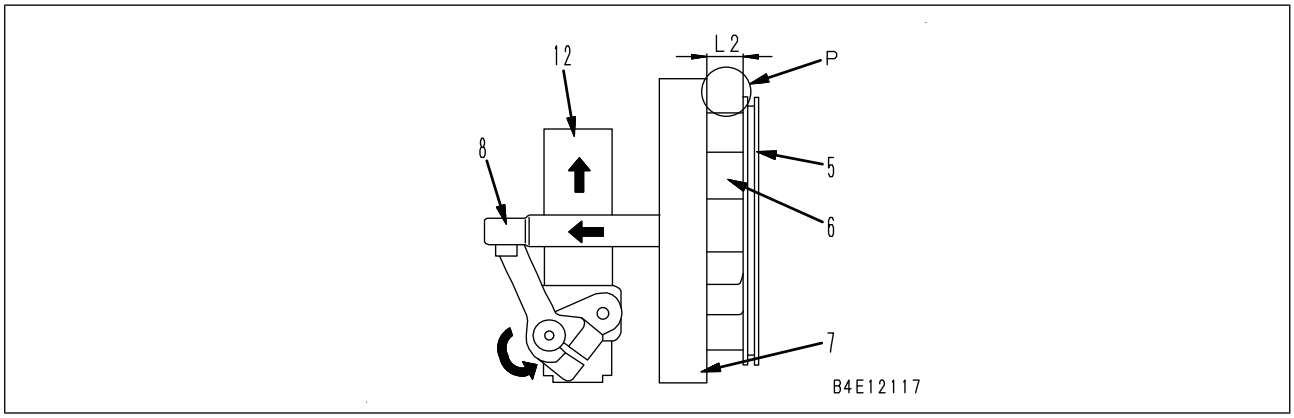
Abbreviation	Actual word spelled out	Purpose of use (major applicable machine (*), or equipment/device)	Explanation
ECMV	Electronic Control Modulation Valve	Transmission (D, HD, WA, etc.)	Proportional electromagnetic valve that gradually increases oil pressure to engage clutch and reduces transmission shock.
ECSS	Electronically Controlled Suspension System	Travel (WA)	This system 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	Electronic control device uses the signals from the sensors on the machine. This signal indicates the optimum actuation to the actuators. (Same as E.C.M.)
EGR	Exhaust Gas Recirculation	Engine	This function recirculates part of exhaust gas to combustion chamber in order to reduce combustion temperature, controls emission of NOx.
EMMS	Equipment Management Monitoring System	Machine monitor	This system allows data (filter, oil replacement interval, malfunctions on machine, failure code, and failure history) from each sensor on the machine to be checked on the monitor.
EPC	Electromagnetic Proportional Control	Hydraulic system	This mechanism allows actuators to be operated in proportion to the current supplied.
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
GNSS	Global Navigation Satellite System	Communication	A general term for positioning system using satellites such as GPS, GALILEO, etc.
GPS	Global Positioning System	Communication (KOMTRAX, KOMTRAX Plus)	This system uses satellites to determine the current location on the earth.
HSS	Hydrostatic Steering System	Steering (D)	This function uses a combination of hydraulic motor and bevel shaft to control difference in travel speed of right and left tracks. Accordingly machine can turn without using steering clutch.
HST	Hydro Static Transmission	Transmission (D, WA)	This function uses a combination of hydraulic pump and hydraulic motor to shift the speed range steplessly without using gears.
ICT	Information and Communication Technology	Intelligent Machine Control	A general term for the engineering and its socially applied technology of information processing and communication.
IMA	Inlet Metering Actuator	Engine	This valve is installed at inlet port of pump, and it adjusts fuel intake amount in order to control fuel discharge of supply pump. Same as I.M.V.
IMU	Inertial Measurement Unit	Intelligent Machine Control	This is a device to detect the angular velocity and acceleration of the 3 axes that control motions.
IMV	Inlet Metering Valve	Engine	This valve is installed at inlet port of pump, and it adjusts fuel intake amount in order to control fuel discharge of supply pump. Same as I.M.V. (I.M.A.)
KCCV	Komatsu Closed Crankcase Ventilation	Engine	This mechanism separates oil in blowby gas and returns it to the intake side to afterburn it there. It primarily consists of filters.

Machine model	Unit	WA320-7
Serial No.		H01051 and up, 80001 and up
Hydraulic system		
Steering cylinder		
Type	—	Double-acting piston type
Cylinder bore	mm	70
Piston rod diameter	mm	40
Stroke	mm	453
Max. distance between pins	mm	1,271
Min. distance between pins	mm	818
Lift cylinder		
Type	—	Double-acting piston type
Cylinder bore	mm	120
Piston rod diameter	mm	75
Stroke	mm	729
Max. distance between pins	mm	2,056
Min. distance between pins	mm	1,327
Bucket cylinder		
Type	—	Double-acting piston type
Cylinder bore	mm	150
Piston rod diameter	mm	110
Stroke	mm	558
Max. distance between pins	mm	1,912
Min. distance between pins	mm	1,354
Work equipment		
Link type	—	PZ-bar link
Shape of bucket cutting edge	—	Straight cutting edge with BOC



When nozzle ring is open

- At high engine speeds, exhaust gas inlet passage (P) is widened (L2).
- As the engine speed and the turbine inlet pressure (exhaust gas pressure) increases, exhaust gas inlet passage (P) widens (L2) to effectively apply the exhaust gas pressure to turbine impeller (11).



★ Nozzle ring (7), vane (6), and push rod (8) are integrated and slide together but do not rotate.

★ KVGT position sensor is installed to hydraulic actuator (3). The KVGT position sensor is calibrated together with the variable mechanism in the KVGT, and values are stored in the memory inside the KVGT position sensor. If any of the hydraulic actuator (3), KVGT position sensor, or KVGT body fails, replace the whole KVGT.

9. Aftercooler inlet hose
10. Condenser
11. Condenser opening and closing bracket
12. Radiator outlet hose
13. Aftercooler outlet hose
14. Transfer oil cooler inlet
15. Transfer oil cooler outlet
16. Reservoir tank
17. Brake accumulator charge valve
18. Strainer
19. Cooling fan motor
20. Fan guard
21. Transfer oil cooler
22. Oil cooler outlet hose
23. Cooling fan

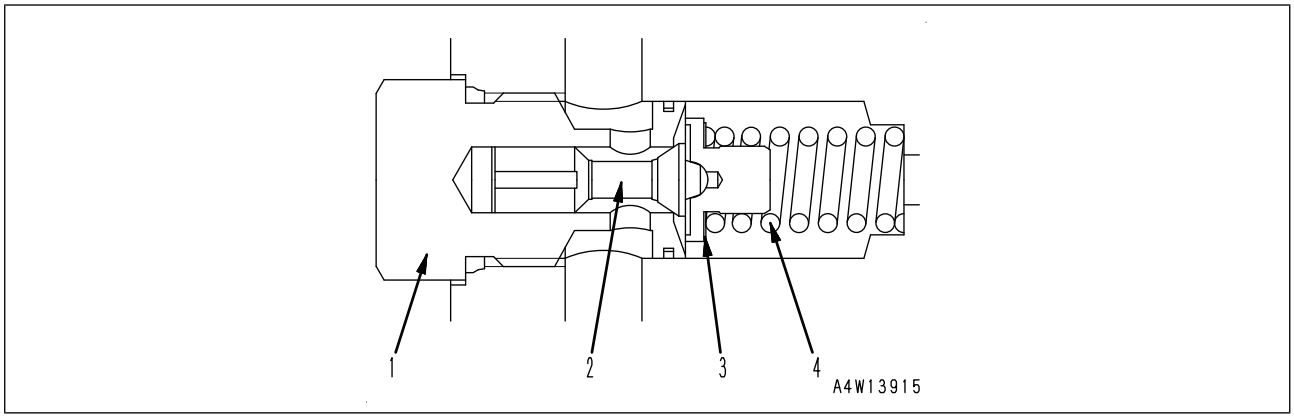
Outline

- Cooling fan motor (19) installed to the rear of the machine is driven by the solenoid valve in the cooling fan motor with oil pressure from brake/ cooling fan pump (2).

Specifications *(WA320-B000-030-K-00-A)*

	Radiator	Oil cooler	Aftercooler
Core type	Rectangle corrugated aluminum	Rectangle corrugated aluminum	Rectangle corrugated aluminum
Fin pitch (mm)	6.0/2	6.0/2	6.0/2
Total heat dissipation area (m^2)	37.1	4.05 x 3	8.19
Pressure valve cracking pressure (kPa {kg/cm^2})	70 ± 15 {0.7 ± 0.15}	-	-
Vacuum valve cracking pressure (kPa {kg/cm^2})	0 to 5 { 0 to 0.05}	-	-

Low pressure oil relief valve *(WA320-C2Y5-041-K-00-A)*

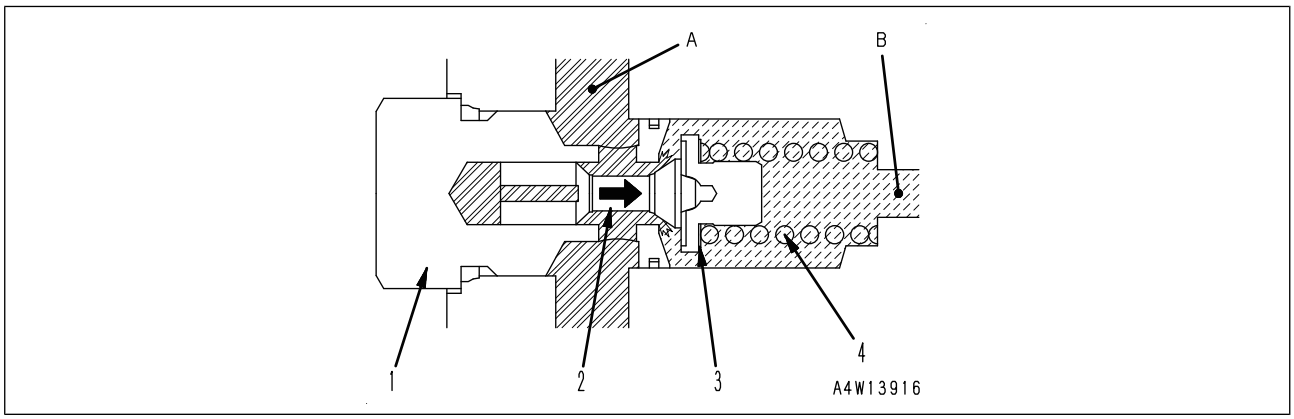


1. Plug
2. Valve Piston
3. Shim
4. Spring

Function *(WA320-C2Y5-042-K-00-A)*

- This valve is installed to the HST pump and drains the oil into the hydraulic tank when the oil pressure in the low-pressure side circuit between the HST pump and HST motor increases above the set pressure. By this operation, the HST pump charge circuit pressure is set for protection of the circuit.

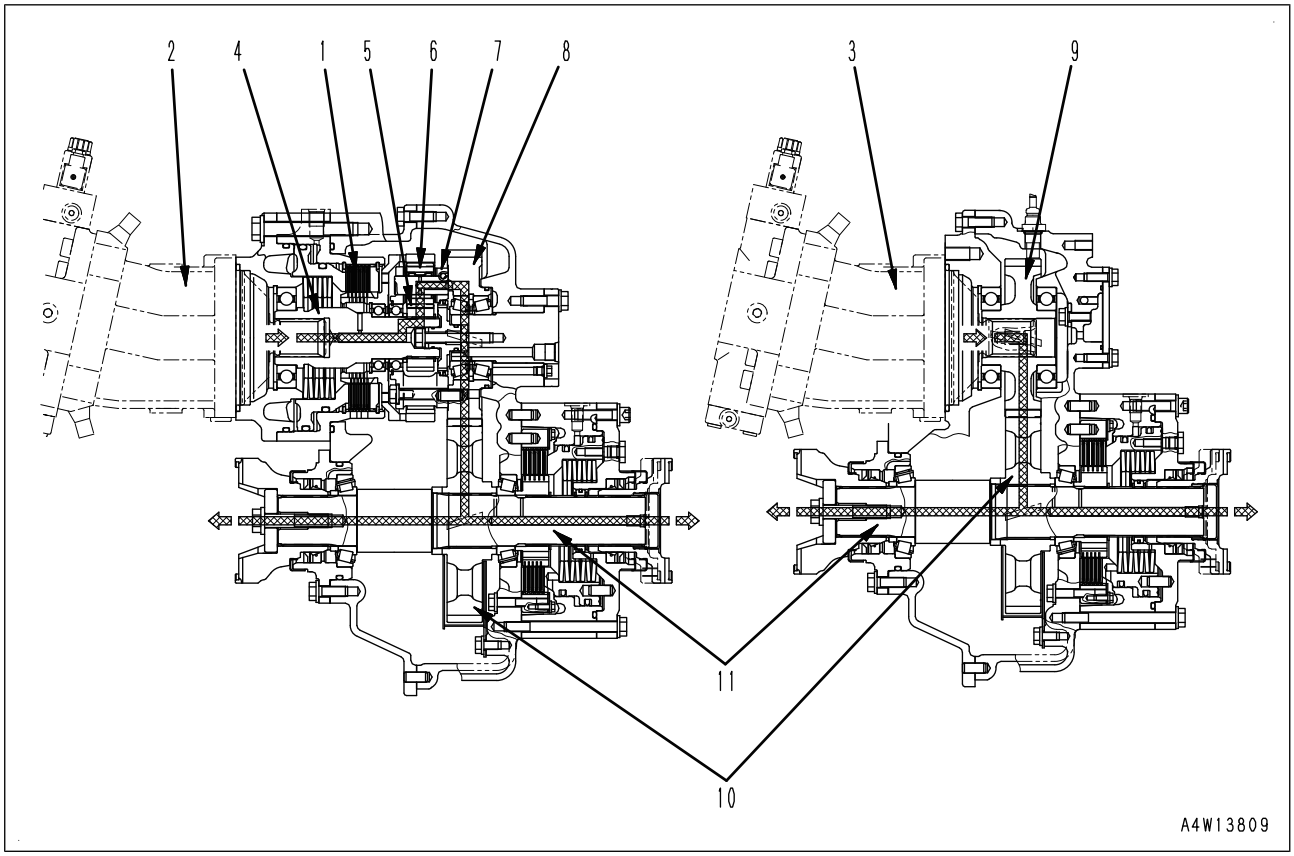
Operation *(WA320-C2Y5-044-K-00-A)*



- Port (A) is connected to HST pump charge circuit and port (B) is connected to the drain circuit.
- When port (A) is below the set pressure, no oil flows into port (B).
- When the oil pressure in port (A) exceeds the set pressure, valve piston (2) is pushed to the right to relieve the oil pressure in chamber (A) to port (B) and decrease the oil pressure in chamber (A).
- The set pressure is adjustable by increasing or decreasing the reaction force of spring (4).
- To change the set pressure, loosen plug (1) and adjust shim (3). If shims are increased, the set pressure rises. If shims are reduced, the set pressure lowers.

Power transmitting route *(HM300-CF60-001-K-01-A)*

Low speed mode *(WA320-CF60-052-K-00-A)*

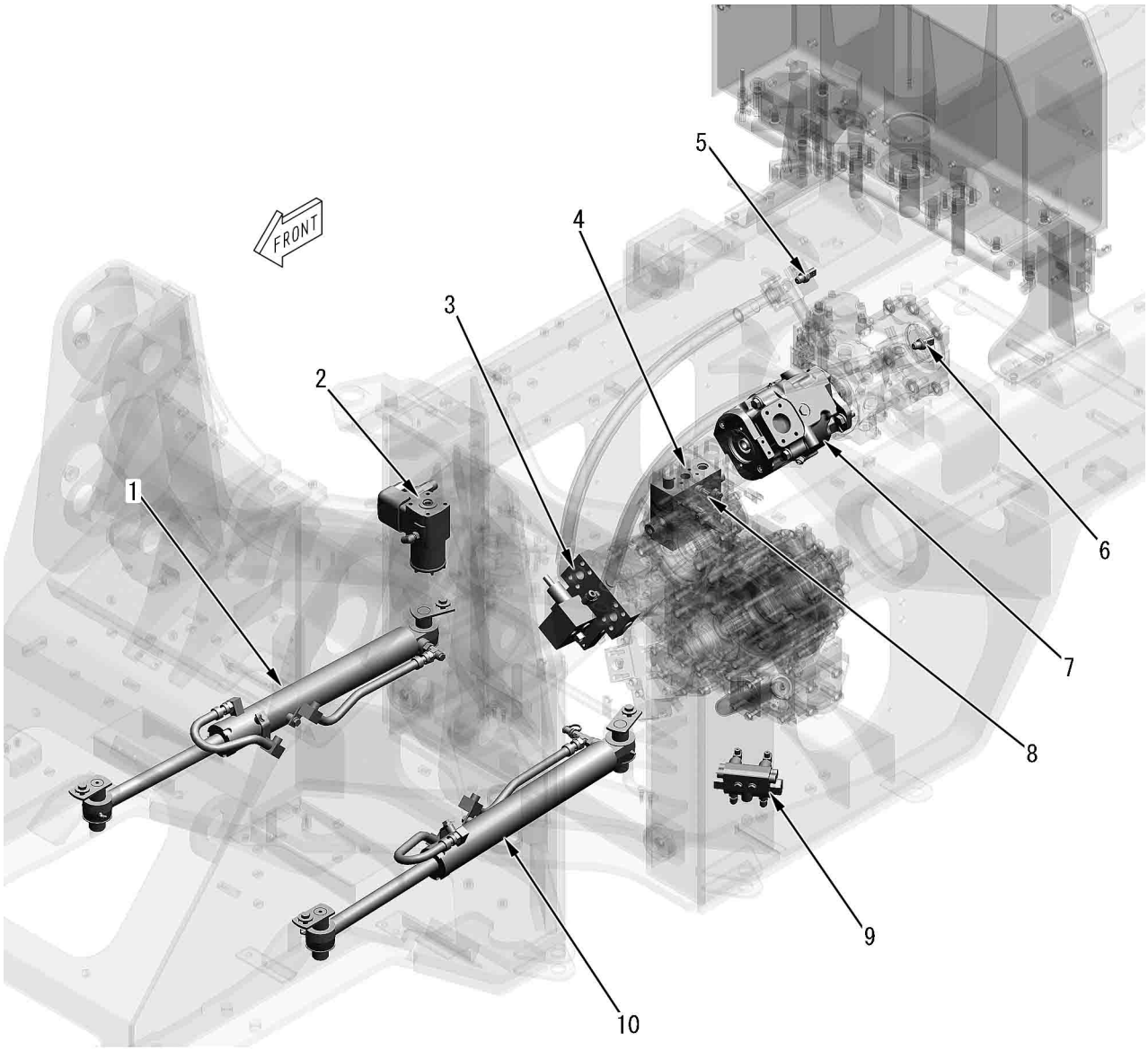


Transfer clutch (1) is engaged to transmit the power of both HST motor 1 (2) and HST motor 2 (3).

Power of HST motor 1 (2)	Power of HST motor 2 (3)
↓	↓
Input shaft (4)	↓
↓	↓
Sun gear (5)	↓
↓	↓
Planetary pinion (6)	↓
↓	↓
Carrier (7)	↓
↓	↓
Motor 1 gear (8)	Motor 2 gear (9)
↓	↓
Output gear (10) ←	←
↓	
Output shaft (11)	

Steering system *(ALL-F000-001-K-00-A)*

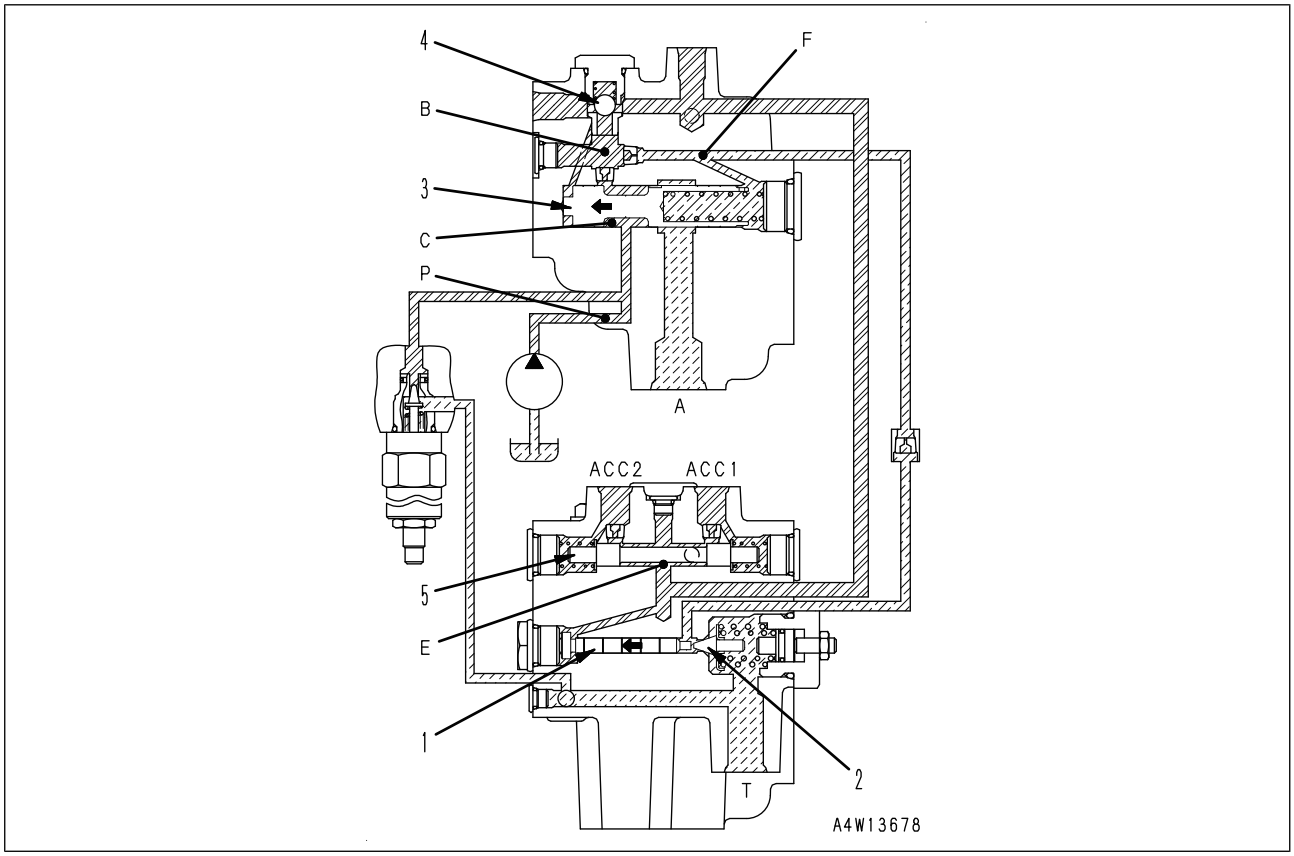
Layout of steering devices *(WA320-DT00-04D-K-00-A)*



APW13671

1. Steering cylinder (R.H.)
2. Orbitrol valve
3. Emergency steering valve (with emergency steering system)
4. Priority valve
5. HST pressure sensor (B)
6. HST pressure sensor (A)
7. Steering and work equipment pump
8. Steering and work equipment pump pressure sensor
9. Cushion valve
10. Steering cylinder (L.H.)

When oil is supplied to accumulator (cut-in state)



- When the accumulator pressure decreases, the pressure in port (E) decreases, plunger (1) moves to the left, and unload relief valve (2) closes the drain circuit.
- The oil pressures in port (F) and spring chamber of unload valve (3) increase and unload valve (3) moves to the left.
- Ports (C) and (B) open and the oil from the pump flows to port (B).
- When the oil pressure in port (B) exceeds the set pressure of check valve (4), check valve (4) is pushed open and the oil flows into the accumulator through port (E). The replenishment pressure to the accumulator is determined by the set pressure of check valve (4).
- The quantity of oil supplied to the accumulator is constant, regardless of the engine speed, and the excess flows through port (A) to the cooling fan motor.
- Shuttle valve (5) supplies oil to the accumulator of lower pressure first.

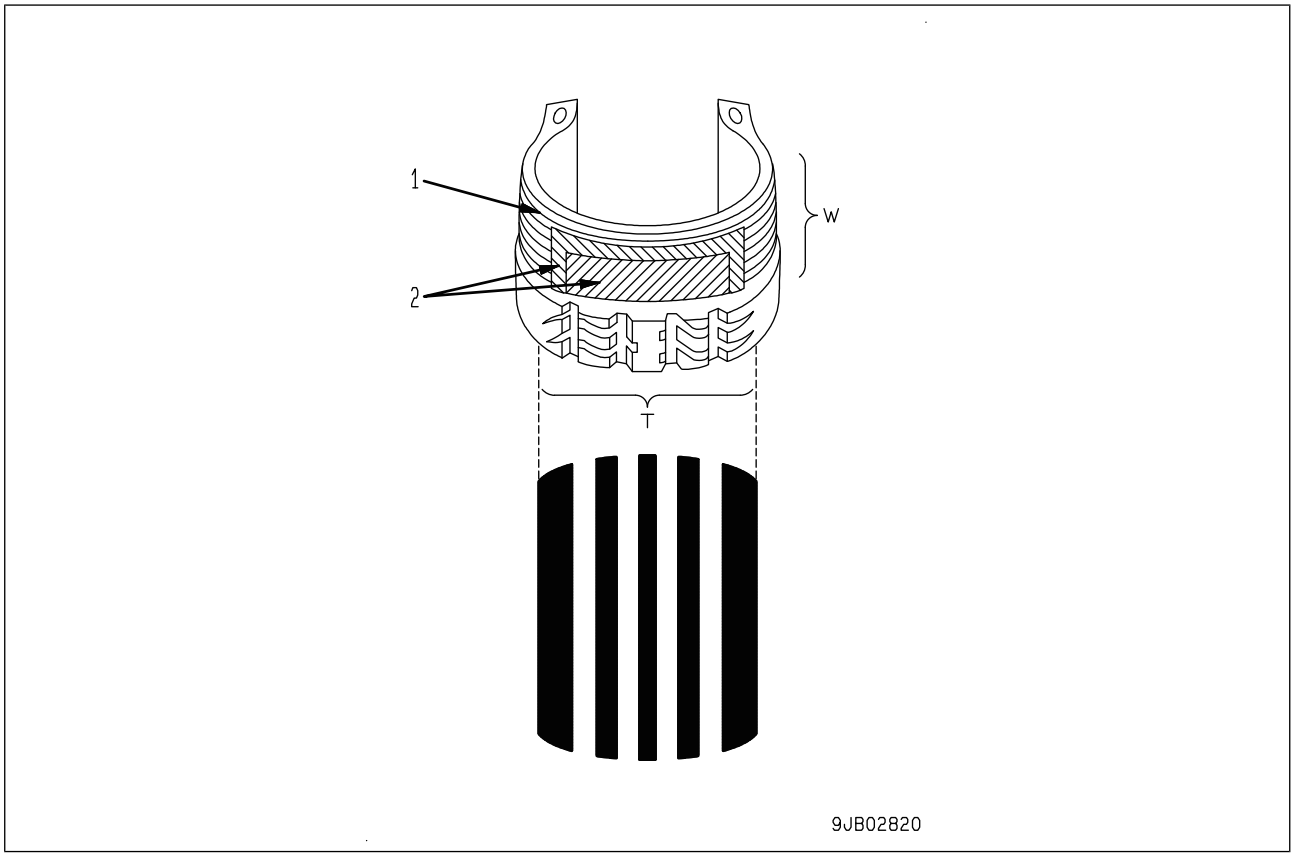
Tire *(WA320-DW60-041-K-00-A)*

This machine has the following features by employing radial tires.

- High grip
- High operator comfort
- Low puncture rate
- Less uneven wear
- Improved fuel economy
- Long life
- Less damage on machine
- Less heat generation

Comparison of structures and characteristics of tires

Radial tire



Structure

- The cords composing carcass (1) are arranged at right angles (radially) to the center line of tread (T).
- Tread (T) is stabilized and protected by several strong belts (2).
- Side wall (W) and tread (T) are independent structurally from each other.

Gripping characteristics

- Even when the tire is deflected by the load, it makes little unnecessary movement and grips the ground stably and securely.

Deflection characteristics

- When the tire is loaded, only its side wall (W) is deflected and tread (T) composed of strong belts (2) maintains independent stability.

When balanced
(Fig. 3)

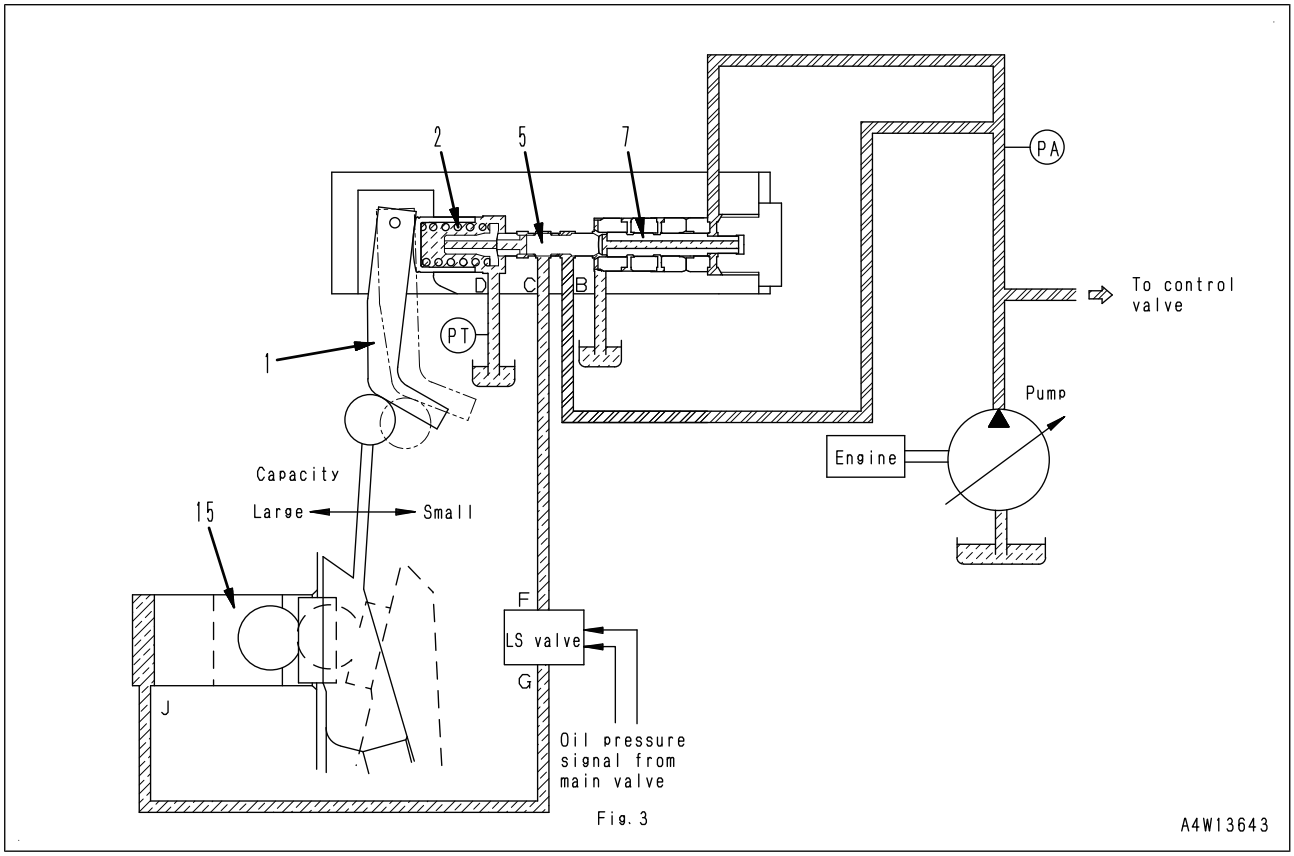
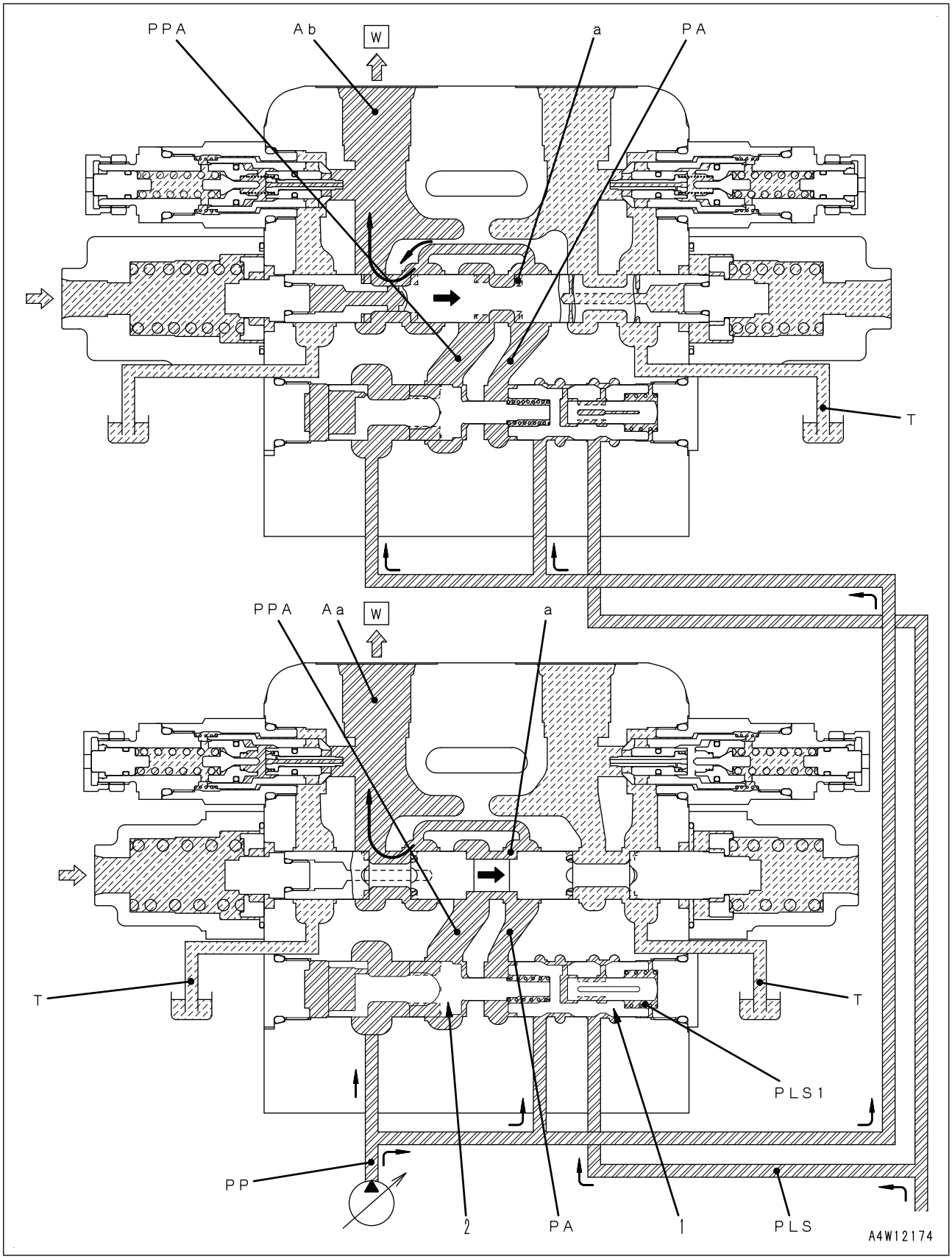


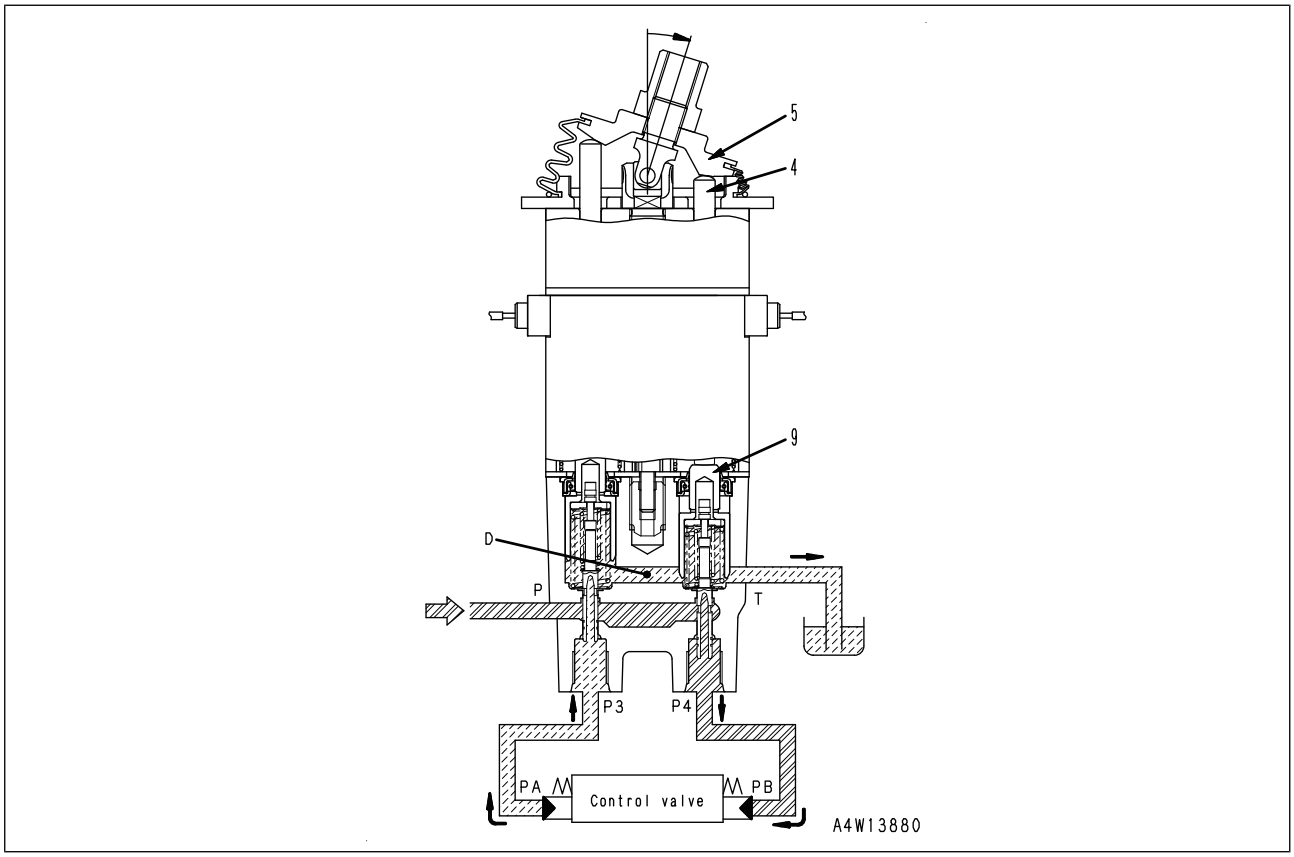
Fig. 3

- As servo piston (15) moves, lever (1) moves to the right and spring (2) is compressed and spring force is increased. Consequently, spool (5) moves to the right and port (C) is disconnected from port (B) and connected to drain pressure port (D).
- As a result, the pressure in port (C) lowers and the piston pressure is decreased and servo piston (15) stops moving to the right.
- Accordingly, the stop position (= pump discharge) of servo piston (15) is determined by the position where the thrust caused by pressure (PA) applied to piston (7) is balanced with the spring force of spring (2) acting through spool (5). (Fig. 3)

Pressure compensation valve *(WA320-C790-040-P-00-A)*



When control lever is at "FLOAT" position

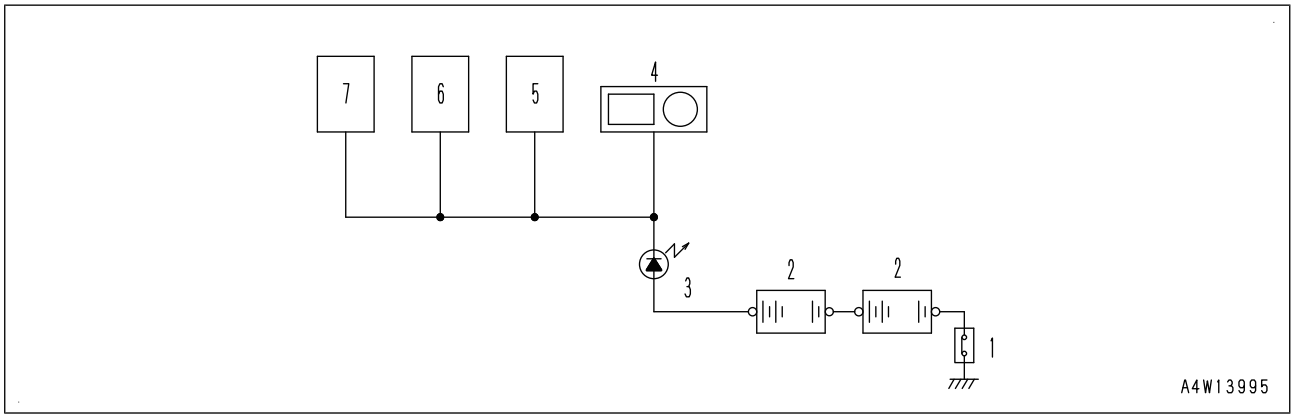


- When rod (4) and piston (9) on "LOWER" side of port (P4) are pushed down with disc (5), detent operation starts before the stroke end. (The operating effort of the lever increases)
- When rod (4) is further pushed down, the detent operates to keep the lever in "FLOAT" state even if it is released.
- At this time, the control valve moves to the "FLOAT" position to float the bucket.

When "FLOAT" state is canceled

- When disc (5) is returned from "FLOAT" position, it is pushed down by a force larger than the pulling force of the solenoid.
- Or when the solenoid current is turned OFF (de-energized), "FLOAT" state is canceled and the lever is returned to "NEUTRAL" position.
- The above operation is also performed when the boom is raised or the bucket is tilted.

System operating lamp function *(WA320-AW1Q-051-K-00-A)*



1. Battery disconnect switch
2. Battery
3. System operating lamp
4. Machine monitor
5. Engine controller
6. HST controller
7. KOMTRAX terminal

Function

- You can prevent an abnormal end due to cut-off of the battery power supply circuit while the controllers are in operation by checking the operating status of machine monitor (4), controllers (5), (6), and (7) with system operating lamp (3).

★ Before cutting off the battery power supply circuit, turn the starting switch to "OFF" position, and check that system operating lamp (3) goes off, then turn battery disconnect switch (1) to "OFF" position.

★ If you turn battery disconnect switch (1) to "OFF" position (battery power supply circuit is cut off) while system operating lamp (3) is ON, data lost error of machine monitor (4), controllers (5), (6), and (7) can occur. Do not operate battery disconnect switch (1) while system operating lamp (3) is ON.

★ System operating lamp (3) goes off in 2 minutes after the starting switch is turned to "OFF" position.

★ System operating lamp (3) may sometimes light up while the starting switch is turned to "OFF" position because KOMTRAX terminal (7) may maintain its communication under this condition.

ON/OFF of system operating lamp

- Voltage of 24 V is always applied to one end of the system operating lamp (LED) (3).
- When any of machine monitor (4), controllers (5), (6), and (7) is in operation, the controller outputs low voltage (0 V), and a current flows in the diode to turn ON system operating lamp (3).
- When all of machine monitor (4), controllers (5), (6), and (7) are stopped, the controller outputs high voltage (24 V), and no current flows in the diode, thus system operating lamp (3) goes off.

★ System operating lamp (3) may look slightly luminous in the dark after it is turned off. It is due to the minute leakage of current and not an abnormal phenomenon.

- KOMTRAX terminal (7) performs communication periodically even if the starting switch is kept in "OFF" position, thus it starts and stops repeatedly.
- The start and stop cycle (sleep cycle) of KOMTRAX terminal (7) varies the conditions including the communication status and machine stop time, and the lamp may keep lighting for up to approximately one hour

★ When you want to cut off the battery circuit for maintenance but system operating lamp (3) keeps on lighting up, turn the starting switch to "ON" position, and then turn it to "OFF" position, and the lamp goes off in 2 minutes.

After system operating lamp (3) goes off, turn battery disconnect switch (1) immediately to "OFF" position.

Fan reverse function *(WA320-B715-042-K-00-A)*

- When the manual fan reverse mode is operated through the machine monitor to clean the radiator core, the fan motor EPC solenoid valve of the cooling fan motor operates to reverse the fan rotation.

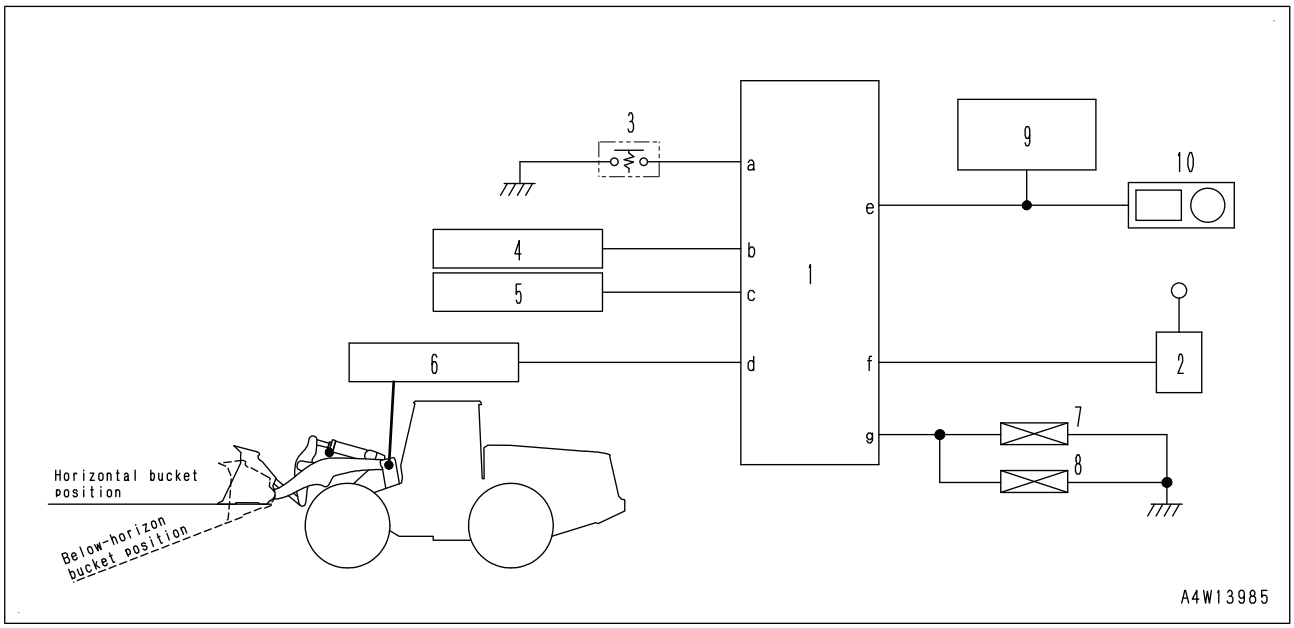
1. Fan rotation manual reverse function
   - The operator can change the fan rotation direction freely by setting the manual fan reverse mode to the "Reverse" or "Default" position.
   - While the fan rotation direction is being changed, the pilot lamp indicating the change is displayed on the standard screen to notify the operator of the operating condition. If the changing condition is not satisfied because of high temperature of the coolant or oil, the pilot lamp which indicates that the satisfaction of the condition is waited lights up.
   - On the standard screen, the cooling fan reverse pilot lamp indicates the fan reverse rotation condition.

   When all the conditions are satisfied, the fan rotation direction is changed from "Default" to "Reverse".

Condition 1	The manual fan reverse rotation mode is set to "Reverse".
Condition 2	The coolant temperature is below 102°C. [for prevention of overheat]
Condition 3	The HST oil temperature is below 100°C. [for prevention of overheat]
Condition 4	The boost temperature is below 119.1°C. [for prevention of overheat]
Condition 5	At least 5 seconds passed after the fan rotation control at the start of the engine is changed to the standard control.
Condition 6	There is no error in the fan speed sensor or engine speed sensor.

When any of the conditions is satisfied, the fan rotation direction is changed from "Reverse" to "Default".

Condition 1	The manual fan reverse rotation mode is set to the "Forward" position while the fan is rotating in reverse.
Condition 2	10 minutes elapse with the fan rotating in reverse.
Condition 3	Abnormality is detected in the fan motor EPC solenoid.
Condition 4	The engine stops.



1. HST controller
2. Work equipment (boom) control lever
3. Remote boom positioner switch
4. Boom RAISE PPC pressure sensor
5. Boom LOWER PPC pressure sensor
6. Boom potentiometer
7. Boom RAISE detent solenoid
8. Boom LOWER detent solenoid
9. Monitor controller
10. Machine monitor

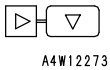
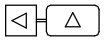
a. Remote positioner switch signal
b. Boom RAISE PPC pressure signal
c. Boom LOWER PPC pressure signal
d. Boom angle signal
e. CAN signal
f. Work equipment (boom) control lever signal
g. Boom detent solenoid output

Function *(WA320-PTL9-042-K-01-A)*

Raising kick-out (When pilot lamp lights up to indicate that raising kick-out is effective)

- When the boom lever is set in RAISE detent position, the boom cancels the raising detent and stops before the set position.
- When the boom is not in the RAISE detent position, it is raised by the operator's operation.
- When RAISE is not selected, the remote positioner does not operate and only the kick-out function operates (the boom stops at the top).

1. Setting stop position
   - The boom stop position when the positioner is operated is changed with the boom positioner switch.

Monitor display	Item	Function (Action that starts when corresponding switch is pressed)	Display location
 A4W12273	Move between items (right)	Moves to right item	• Service menu "Phone number entry" • Service menu "Testing" → "Cylinder cut-out operation" Other items (Adjusting screen)
 A4W12274	Move between items (left)	Moves to left item	• Service menu "Phone number entry" • Service menu "Testing" → "Cylinder cut-out operation" Other items (Adjusting screen)
 A4W12288	Change between plus and minus	Changes plus or minus of input value	• Service menu "Adjusting"
 A4W12289	Input decimal point	Inputs decimal point	• Service menu "Adjusting"

Pin No.	Signal name	Input/output signal
120	(*1)	-
121	(*1)	-

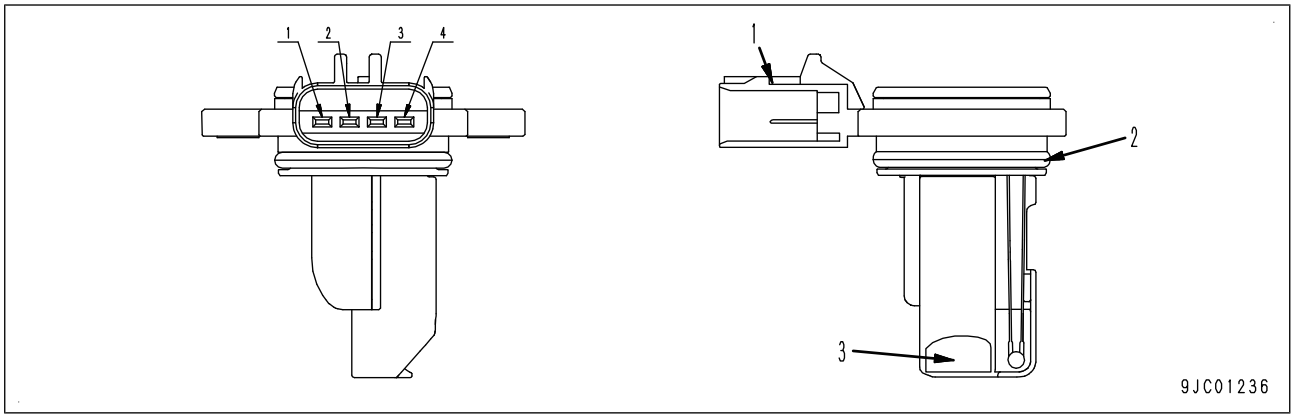
*1: Never connect these pins. Malfunctions or failures may occur.

JAE-8P [CN-MCM2]

Pin No.	Signal name	Input/output signal
1	LC unit LVDS (+)	Output
2	LC unit LVDS (-)	Output
3	LC unit GND (power supply return)	-
4	LC unit backlight adjustment	Output
5	LC unit power supply	Output
6	LC unit ON/OFF control	Output
7	LC unit backlight ON/OFF control	Output
8	LC unit temperature sensor	Output

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

Mass air flow and temperature sensor *(ENG-A96H-041-K-00-A)*



1. Connector
2. O-ring
3. Sensor

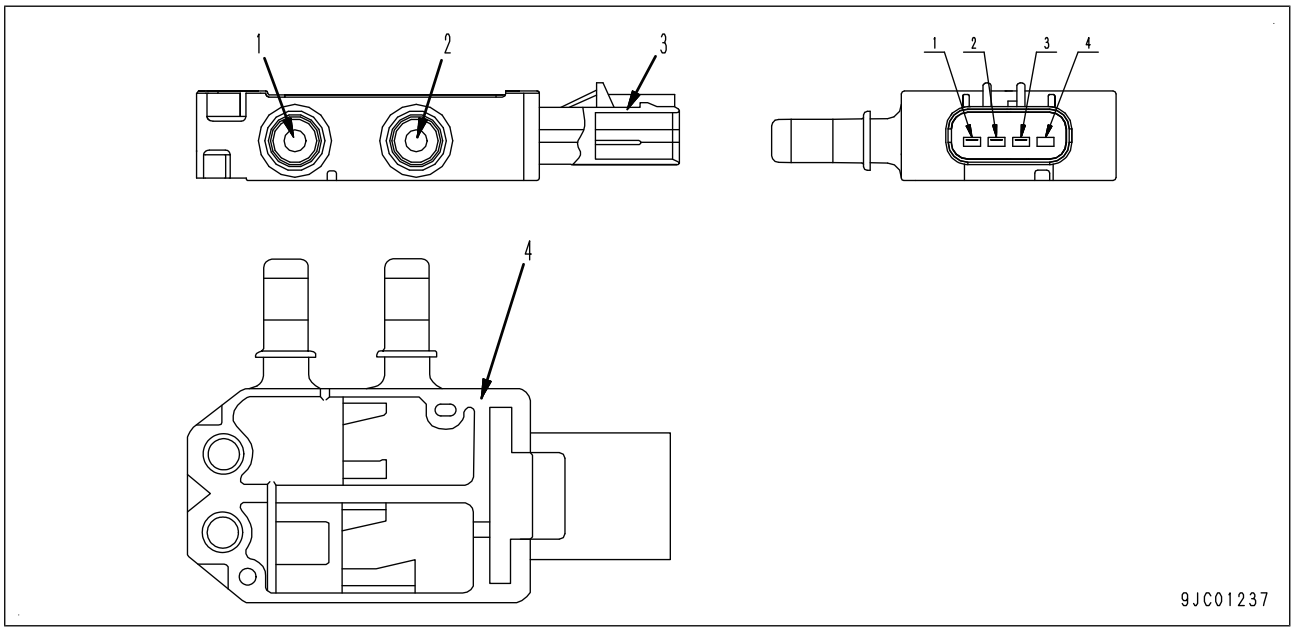
Function *(ENG-A96H-042-K-00-A)*

- This sensor is installed to the outlet side of air cleaner, converts the variations of intake air flow and temperature into the resistance variation, and outputs the corresponding signals.

★ The "MAF (Mass Air Flow)" means the "intake air flow".

KDPF differential pressure and outlet pressure sensor *(ENG-A9HL-041-K-00-A)*

KDPF: Abbreviation for KOMATSU Diesel Particulate Filter

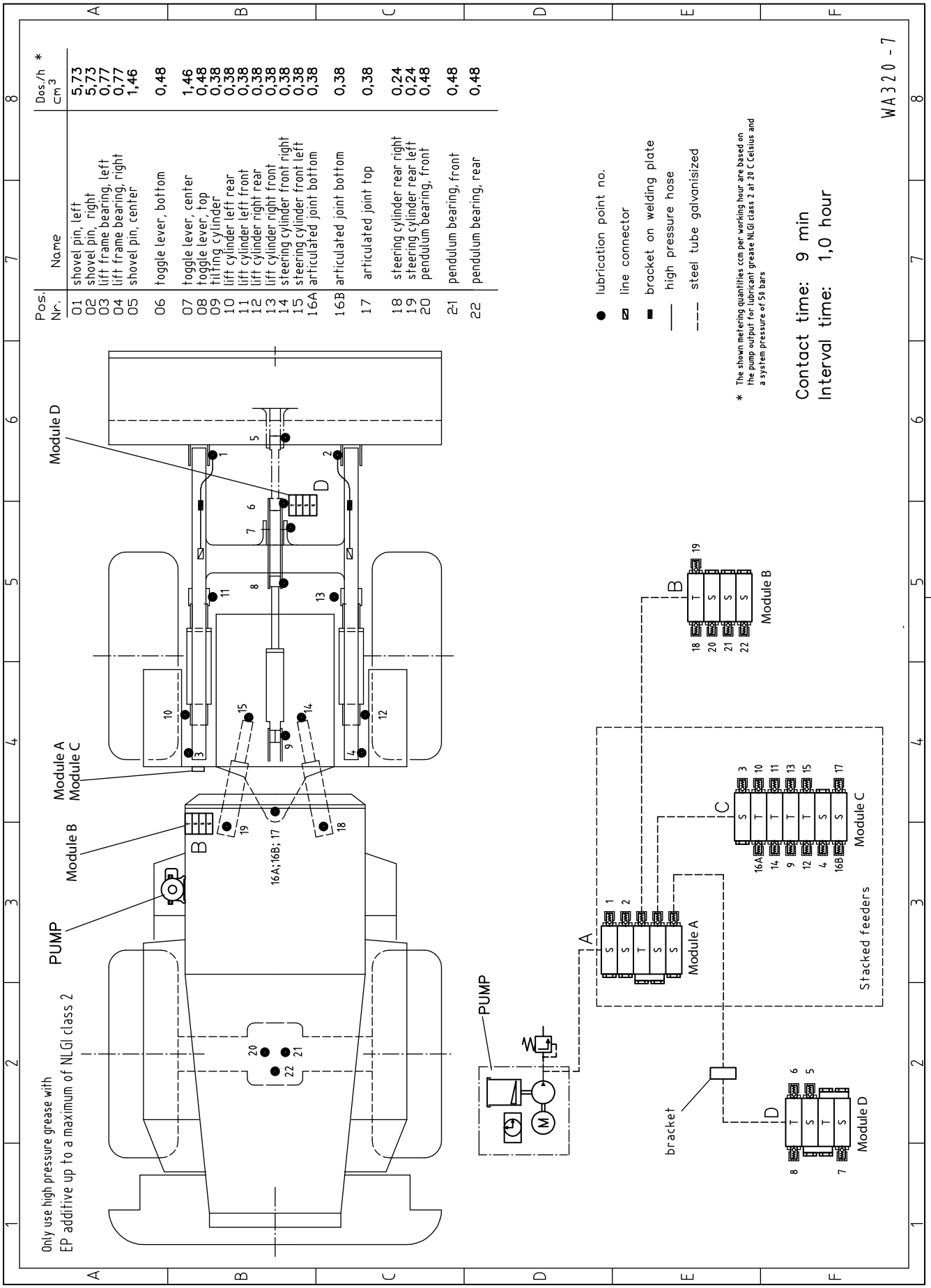


1. High-pressure port
2. Low-pressure port
3. Connector
4. Sensor

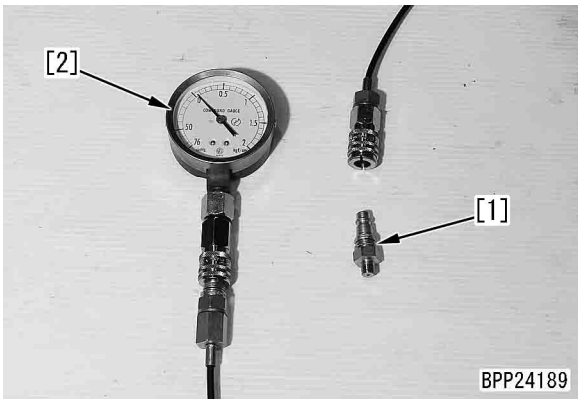
Function *(ENG-A9HL-042-K-00-A)*

- This sensor, installed to KDPF, detects the inlet pressure and outlet pressure of KDPF to output the corresponding variable voltage.
- The output pressure difference is the difference between the KDPF inlet pressure which is detected at high-pressure port (1) and the KDPF outlet pressure which is detected at low-pressure port (2).
- The KDPF outlet pressure is output as a pressure which is detected at low-pressure port (2).

Circuit diagram of Central Lubrication System (CLS)



Equipment name	Procedure, measuring location, criteria and remarks			
Charge (Boost) pressure sensor	1. Turn starting switch to OFF position. 2. Insert T-adapter in connector ECM J1. 3. Turn starting switch to ON position.			
	Voltage	Between ECM J1 (15) and (59)	Sensor output	0.3 to 4.7 V
Ambient pressure sensor	1. Turn starting switch to OFF position. 2. Insert T-adapters in connector ECM J1. 3. Turn starting switch to ON position.			
	Voltage	Between ECM J1 (16) and (59)	Sensor output	0.5 to 4.5 V
Common rail pressure sensor	1. Turn starting switch to OFF position. 2. Insert T-adapters in connector ECM J2. 3. Turn starting switch to ON position.			
	Voltage	Between ECM J2 (21) and (44)	Sensor output	0.2 to 4.8 V
Crankcase pressure sensor	1. Turn starting switch to OFF position. 2. Insert T-adapter into connector ECM J1. 3. Turn starting switch to ON position.			
	Voltage	Between ECM J1 (3) and (59)	Sensor output	0.3 to 4.7 V
Throttle sensor (fuel dial)	1. Turn starting switch to OFF position. 2. Disconnect connectors EC3 and connect T-adapter to female side. 3. Turn starting switch to ON position.			
	Voltage	Between EC3 (42) and (41)		4.75 to 5.25 V
Engine oil pressure switch	1. Turn starting switch to OFF position. 2. Disconnect connector OIL PRESSURE SWITCH and connect T-adapters to male side.			
	Resistance	Between OIL PRESSURE SWITCH (male) (1) and ground		Max. 10 Ω



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

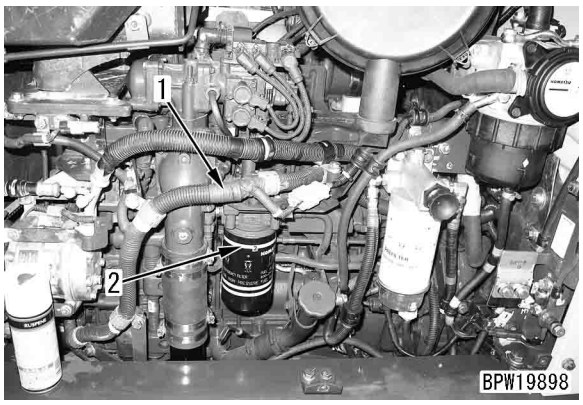
Pickup port plug (1):
2 to 3.9 Nm {0.2 to 0.4 kgm}

Testing *(WA320-AE20-363-K-00-A)*

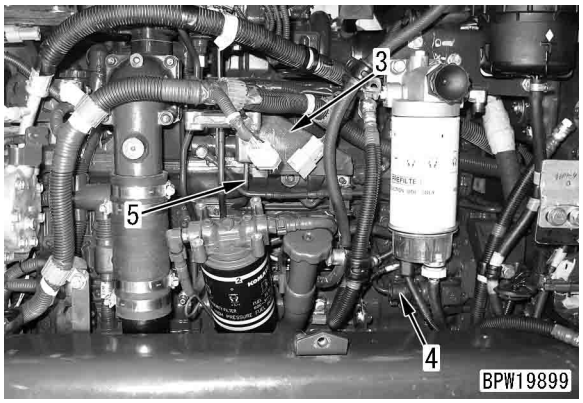
Testing supply pump discharge

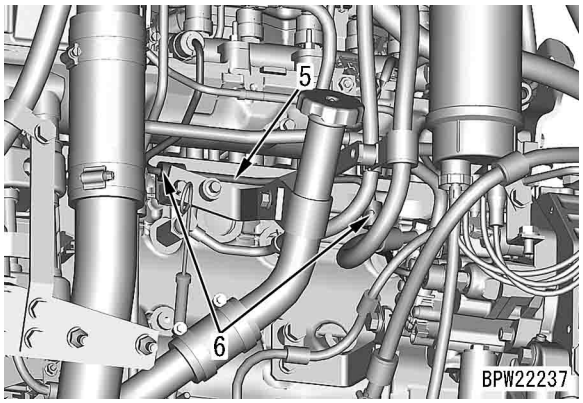
1. Open the engine right side cover, and set wiring harness (1) on the fuel main filter free.

   ★ When disconnecting a connector, be sure to turn the battery disconnect switch to OFF position, and remove the key.
2. Remove fuel main filter (2) from bracket (3).



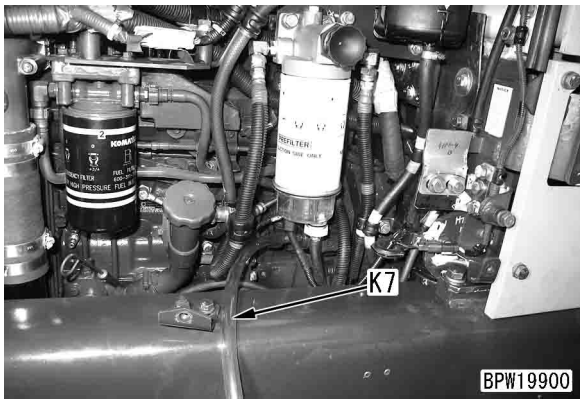
3. Remove bracket (3).
4. Remove fuel spray prevention cap (4).
5. Loosen clamps (6) (2 pieces) for high pressure pipe (5) on the discharge side of the supply pump, and disconnect high pressure pipe (5).





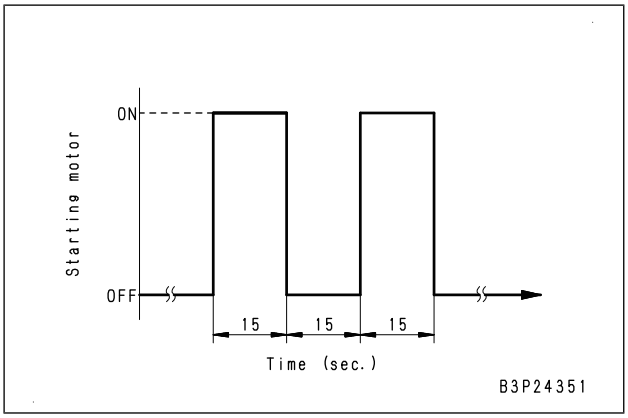
6. Install hose K7 to the connector on the discharge side of the supply pump.

   ★ Hose K7 may be clamped with a hose band to prevent it from coming off.

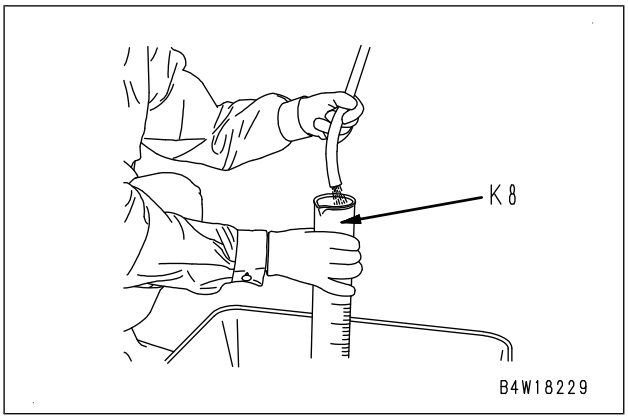


7. Crank the engine for 30 seconds and measure the discharge by using measuring cylinder K8.

   ★ Do not crank the engine for longer than 20 seconds or longer to protect the starting motor. In the measurement, repeat the steps of "cranking of 15 seconds, 15 seconds of rest and cranking of 15 seconds".



   ★ For standard values, see "Standard value for engine".



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

   High-pressure pipe (5) mounting sleeve nut:

   35 ± 3.5 Nm {3.57 ± 0.36 kgm}

Testing transfer clutch control pressure *(WA320-D311-360-K-00-A)*

★ Testing tools

Symbol		Part No.	Part name
O	1	799-101-5002	Hydraulic tester
		790-261-1204	Digital hydraulic tester

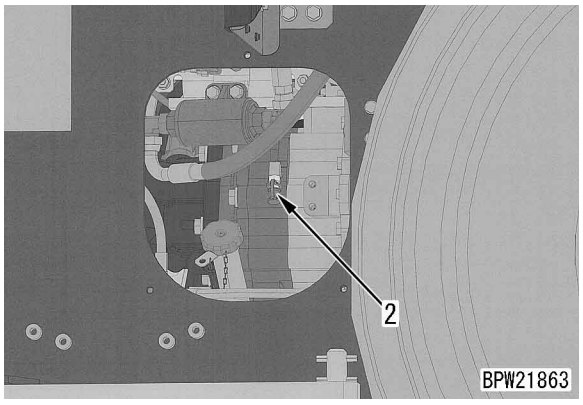
⚠ When removing an oil pressure pickup plug or disconnecting a hose, loosen the oil filler cap of the hydraulic tank to release the pressure inside the hydraulic tank.

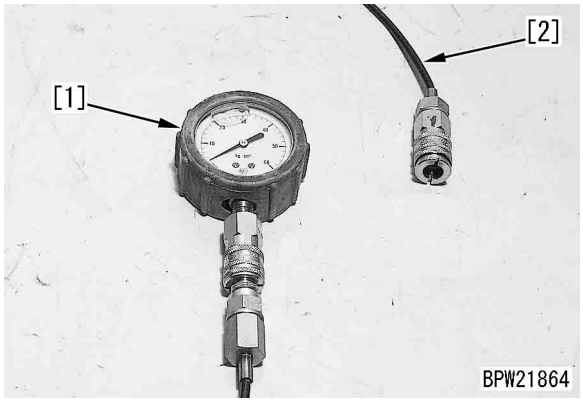
★ Check this item under the following conditions.
- HST oil temperature: 45 to 55 ºC

Testing *(WA320-D311-362-K-00-A)*

1. Remove cover (1) on the left side of the rear frame (at the lower left of the operator's cab).

2. Connect hose [2] of hydraulic tester 1 to transfer clutch control pressure pickup nipple (2) of HST motor 1, and connect gauge [1].





3. Set the speed range selection switch to "3rd" or "4th", travel at speed of 10 km/h or higher, and measure the transfer clutch control pressure.
4. After finishing test, remove the testing tools, and restore the machine.

Testing wear of parking brake disc *(WA380-GJ72-001-K-00-A)*

★ Testing tools

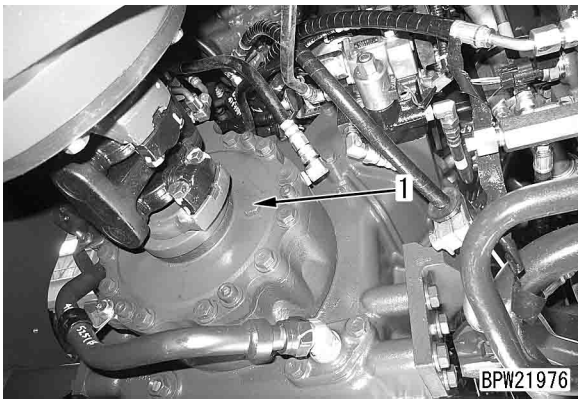
Sym-bol	Part No.	Part name
X	Commercially available	Vernier calipers

⚠ **Place the machine on a level ground, lower the work equipment to the ground, set the parking brake switch and work equipment lock switch in LOCK position, stop the engine, and chock the wheels.**

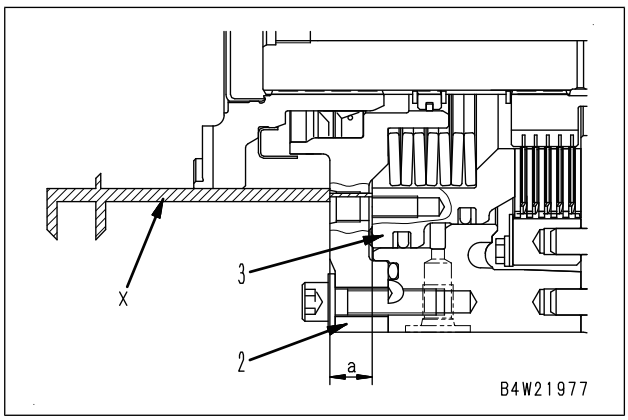
★ If the parking brake does not work effectively, check the parking brake disc for wear according to the following procedure.

Testing *(WA320-GJ72-389-K-00-A)*

1. Remove either one of parking brake switch manual releasing plugs (1) (2 pieces) from the underside of the machine.



2. Measure depth (a) from the end of cover (2) to piston (3) with vernier calipers X.
   - Standard depth (a): Max. 28.5 ± 0.2 mm



3. If depth (a) is above the standard, remove parking brake disc (4) and plate (5) and measure the disc thickness (W), referring to Disassembly and assembly, "Removal of parking brake discs and plates".

Repair limit of disc and plate	See maintenance standard value table.

★ If the thickness and distortion of the parking brake disc or the thickness plate is below the repair limit, replace them.

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

Plug (1):
19.6 to 24.5Nm {2.0 to 2.5 kgm}

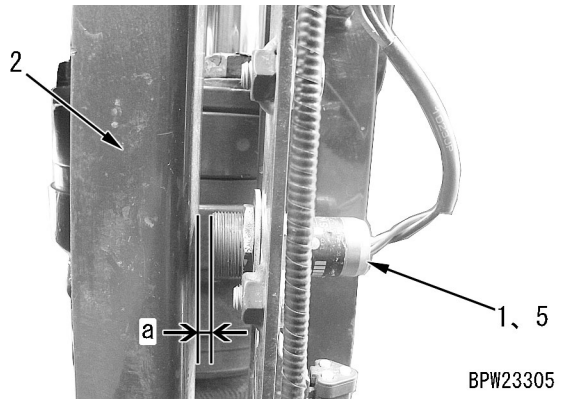
Work equipment (ALL-L000-001-K-00-A)

Testing and adjusting bucket positioner and bucket proximity switch (WA320-LEE0-360-K-00-A)

Testing (WA320-LEE1-365-K-00-A)

1. Check that the clearance between proximity switch (1) and (5) and trip bar (2) is within the standard value range with engine stopped.

   ★ Standard clearance (a): 3 to 5 mm



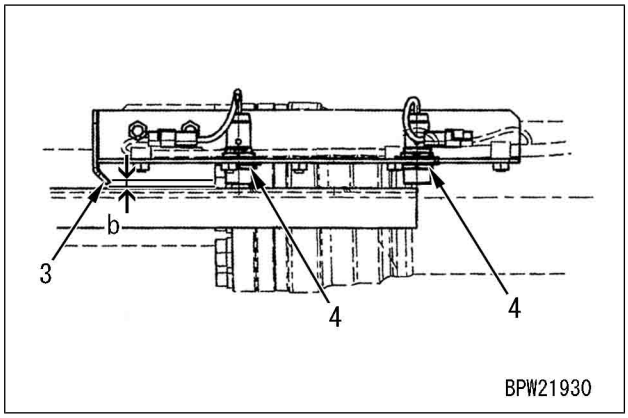
2. Check the operating position with the same state as that of the actual operation. (Obtain the mean value after performing the check 3 times.

Adjusting (WA320-LEE1-270-K-00-A)

1. Clearance adjustment
   1) Adjust nut (4) of the switch so that the clearance (b) between the tip of switch protector (3) and the dominant area of the switch is within the standard value range, and fix it.

      ★ Standard clearance (b): 0.5 to 1.0 mm

      Mounting nut:
      14.7 to 19.6 Nm {1.5 to 2.0 kgm}



   2) Adjust the shim and proximity switch bracket mounting bolt so that the clearance (a) between the dominant area of the proximity switch (1) and (5) and trip bar (2) is within the standard value range, and fix it.

      ★ Standard clearance (a): 3 to 5 mm

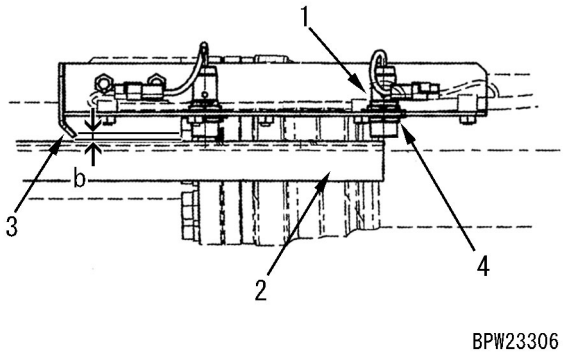
      ★ Adjust the trip bar (2) with the shim so that the clearance (a) is within the standard value range throughout the stroke of trip bar.

2. Adjustment of installed position (stopping position)

   • Adjusting bucket positioner proximity switch

   1) Lower the bucket to the ground, and set it to the desired digging angle, return the lever to HOLD position, and stop the engine.
   2) Adjust the switch mounting nut so that the clearance (b) of the proximity switch (1) and trip bar (2) is within the standard value range, and fix it.

      Switch mounting bolt:
      14.7 to 19.6 Nm {1.5 to 2.0 kgm}



   • Adjusting bucket tilt proximity switch

   1] Lower the boom to the lowest point, tilt the bucket fully until it stops by hitting the stopper, return the lever to HOLD position, and stop the engine.
   2] Adjust the switch mounting nut (4) so that the clearance (c) of the center of proximity switch (5) and the tip of trip bar (2) is within the standard value range, and align the position.

      ★ Standard clearance (c): 15 to 16 mm

   3] Adjust the switch mounting nut (4) so that the clearance (b) of the proximity switch (5) and trip bar (2) is within the standard value range, and fix it.

      14.7 to 19.6 Nm {1.5 to 2.0 kgm}

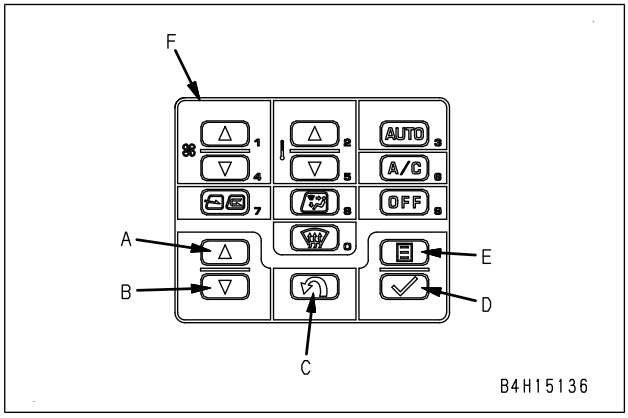
Service mode *(WA320-Q194-100-K-00-A)*

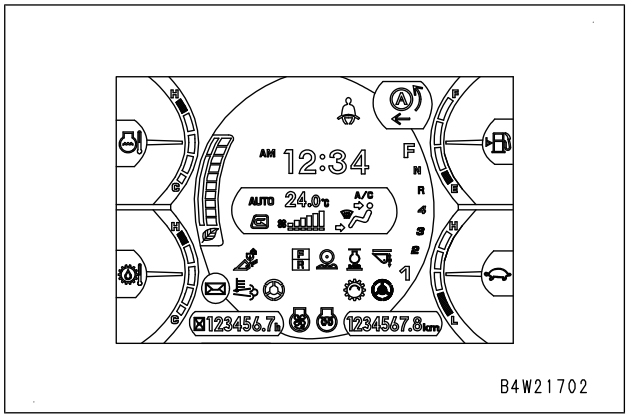
To change the operator mode to Service Mode, perform the following operation.

This operation is always required when you use Service Mode.

1. Checking of display of screen, and switch operation
   While the standard screen is displayed, perform the following switch operations.
   Switch operation: While pressing Down switch (B), press air conditioner/ numeral input switches (F) "1" → "2" → "3" in order.

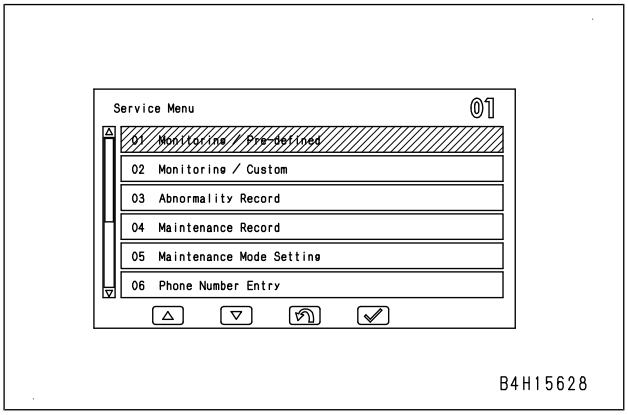
   ★ This switch operation is accepted only while the standard screen is displayed.





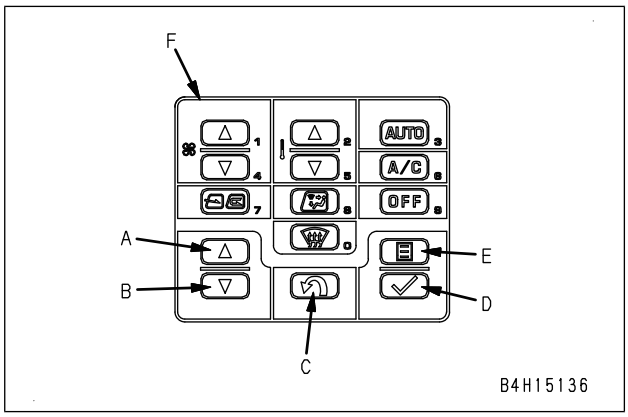
2. Selecting the service menu
   When "Service Menu" screen is displayed, Service Mode is selected. Select a desired service menu.
   Up switch (A): Moves the selection up by one item
   Down switch (B): Moves the selection down by one item
   Return switch (C): Returns the display to the standard screen (operator mode)
   Enter switch (D): Validates the selection

   ★ If you enter a 2-digit item number with the numeral input switches (E), the entered item is directly selected.

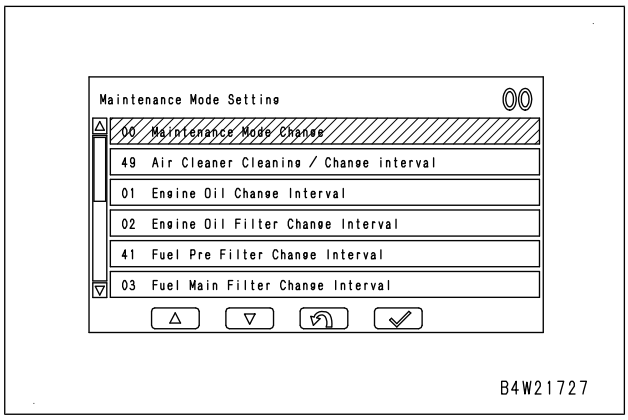


★ The following shows the items selectable on "Service Menu" screen (including some items which need special operations).

No.	Menu items
01	Monitoring/ Pre-defined(PAGE 30-115)
02	Monitoring / Custom(PAGE 30-120)
03	Abnormality record (mechanical systems) (PAGE 30-128)
	Abnormality record (electrical systems)(PAGE 30-129)
04	Maintenance Record(PAGE 30-131)
05	Maintenance mode setting(PAGE 30-132)
06	Phone number entry(PAGE 30-135)
07	Default (Machine Model Select)(PAGE 30-136)
	Default (Option Select)(PAGE 30-138)
	Default (Unit)(PAGE 30-139)
	Default (Rear View Monitor Setting)(PAGE 30-140)
	Default (Auto Idle Stop Timer Setting)(PAGE 30-145)
	Initial adjustment of HST(PAGE 30-145)
	Initial adjustment of fan(PAGE 30-145)
	Initial adjustment of work equipment(PAGE 30-145)
08	Testing (Cylinder Cutout operation)(PAGE 30-145)
	Testing (Regeneration for Service)(PAGE 30-148)
	Testing (KDPF Memory Reset)(PAGE 30-149)
	Adjustment(PAGE 30-150)
09	Adjustment (1st Minimum Speed / Cleep Adjustment)(PAGE 30-150)
	Adjustment (HST Pump Block Curve Adjustment)(PAGE 30-152)
	Adjustment (Fan Maximum Speed EPC Current)(PAGE 30-153)
	Adjustment (Fan Minimum Speed EPC Current)(PAGE 30-154)
	Adjustment (3rd Maximum Travel Speed Adjust)(PAGE 30-155)
	Adjustment (PZ Auto Tilt-in Current Compensation)(PAGE 30-157)



★ If you enter a 2-digit item number with the numeral input switches (E), the entered item is directly selected.



★ Setting for the following items is available in "Maintenance Mode Setting".

No.	Maintenance mode setting items	
00	Maintenance Mode Change	Maintenance Mode On/Off
		Maintenance Notice Time Setting
49	Air Cleaner Cleaning/ Change Interval	OFF/ON Set
		Set Value
01	Engine Oil Change Interval	OFF/ON Set
		Set Value
02	Engine Oil Filter Change Interval	OFF/ON Set
		Set Value
41	Fuel Prefilter Change Interval	OFF/ON Set
		Set Value
03	Fuel Main Filter Change Interval	OFF/ON Set
		Set Value
25	Transfer Oil Change Interval	OFF/ON Set
		Set Value
26	HST Oil Filter Change Interval	OFF/ON Set
		Set Value
04	Hydraulic Oil Filter Change Interval	OFF/ON Set
		Set Value
05	Hydraulic Oil Tank Breather Change Interval	OFF/ON Set
		Set Value
10	Hydraulic Oil Change Interval	OFF/ON Set
		Set Value
15	Axle Oil Change Interval	OFF/ON Set
		Set Value
99	Returns all to Default Values	

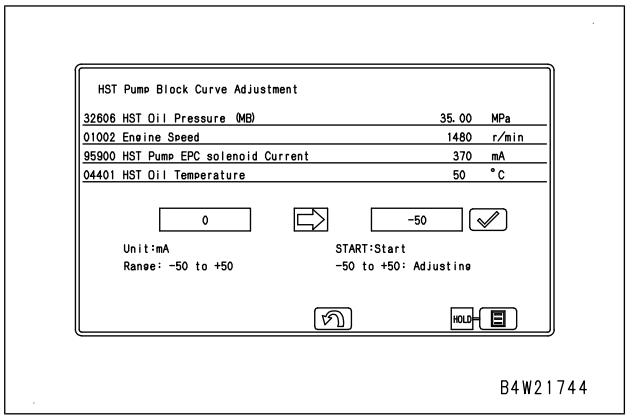
★ You cannot modify the settings on cleaning of KCCV filter and KDPF filter.

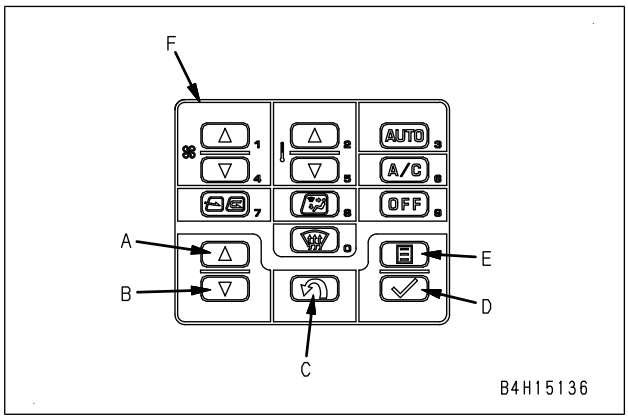
3. Description of maintenance mode change procedure (Maintenance Mode On/Off)
   Select "Maintenance Mode On/Off" in "Maintenance Mode Change" for setting.
   - ON: All of functions of maintenance items become effective in Operator Mode.
   - OFF: All of functions of maintenance items becomes ineffective in Operator Mode.

   Up switch (A): Moves the selection up by one item
   Down switch (B): Moves the selection down by one item
   Return switch (C): Cancels the selection and returns the display to "Maintenance Mode Change" screen.
   Enter switch (D): Validates the selection and returns the display to "Maintenance Mode Change" screen.

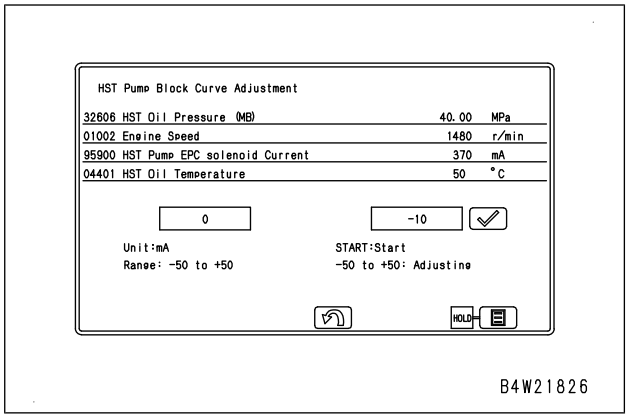
★ Even if ON/OFF of each item has been set, if the above setting is changed, it overrides the individual setting.

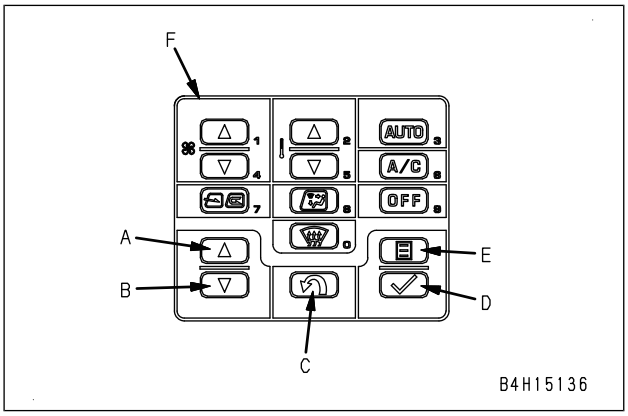
7. Set the travel speed range to 2nd with the speed range selector switch.
8. Depress the brake pedal.
9. Set the directional lever to F position.
10. Depress the accelerator pedal and check that the "Engine Speed" on the monitor screen is 1,460 ± 20 rpm.
11. Press Enter switch (D). (The adjustment value automatically increases from -50 mA.)



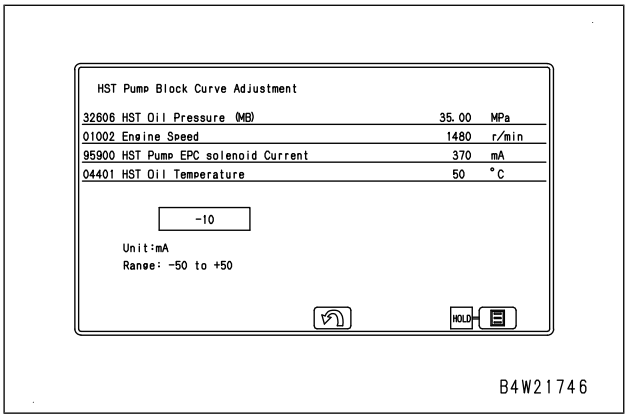


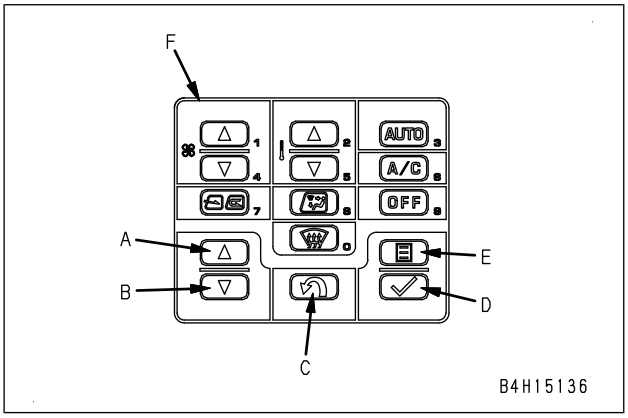
12. When the pressure reaches the specified pressure (35.7 ± 0.5 MPa) (WA270–7), (40 ± 0.5 MPa) (WA320–7), press Enter switch (D) again to move the adjustment confirmation screen.





13. Press Enter switch (D) to enter the adjustment value.





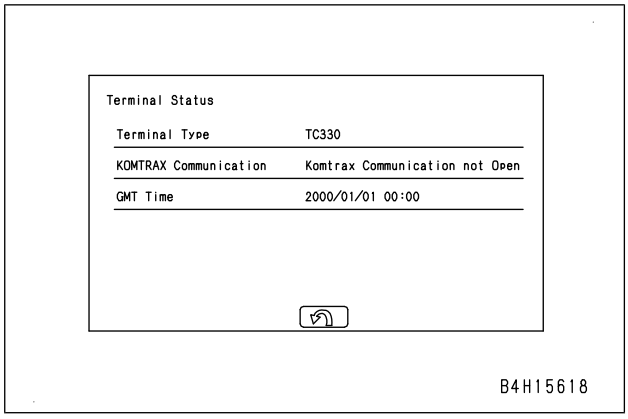
Adjustment (Fan Maximum Speed EPC Current) *(WA320-B71H-270-K-00-A)*

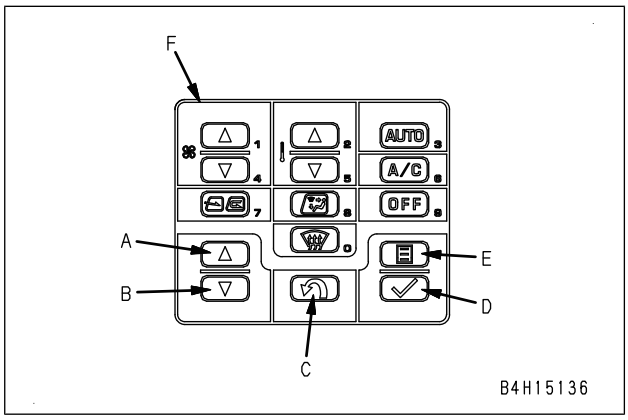
1. Check that the fan is not in reverse rotation.
2. Selecting a menu
   Select "Adjustment" on "Service Menu" screen.

On "Terminal Status" screen, the following items of information are displayed.

- "Terminal Type": Model name of the KOMTRAX communication modem
- "KOMTRAX Communication": Status of radio station establishment underway
- "GMT Time": Greenwich Mean Time (add 9 hours to it for Japan time)

Return switch (C): Returns the display to "KOMTRAX Settings" screen



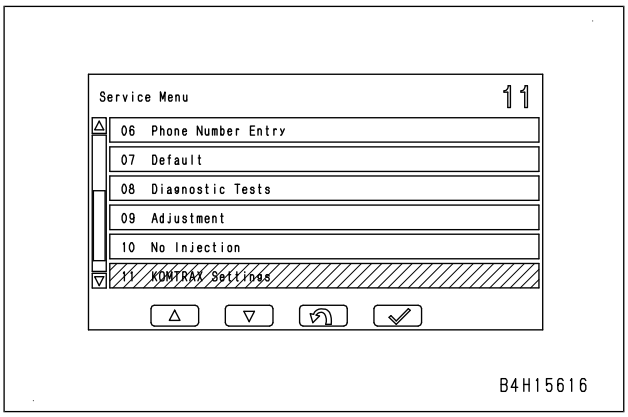


KOMTRAX Settings (GPS and Communication Status) *(HM300-Q210-110-K-01-A)*

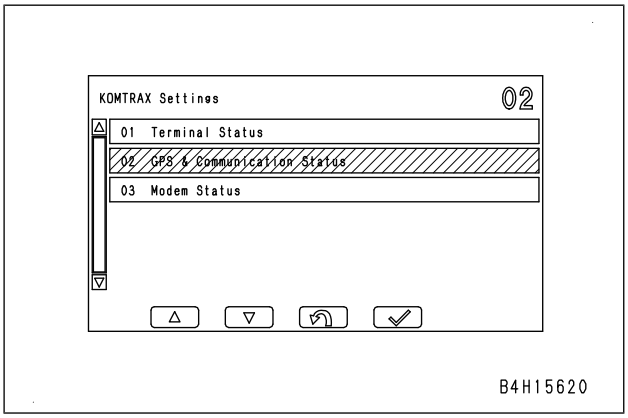
The setting and operating conditions of KOMTRAX can be checked on the display of "KOMTRAX Settings".

GPS & Communication Status is used to check the positioning and communication condition of the KOMTRAX terminal.

1. Selecting a menu
   Select "KOMTRAX Settings" on "Service Menu" screen.

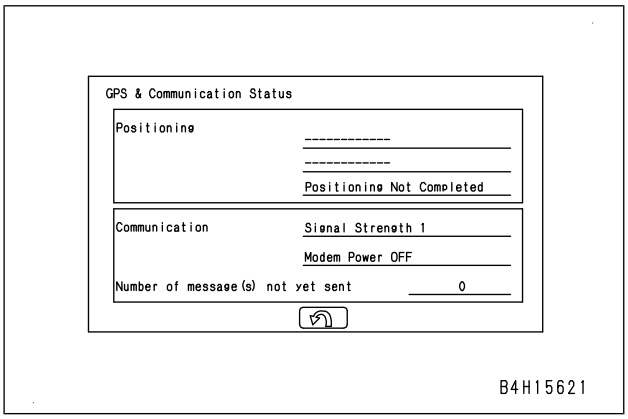


2. Selecting a sub menu
   Select "Modem Status" on "GPS & Communication Status" screen.

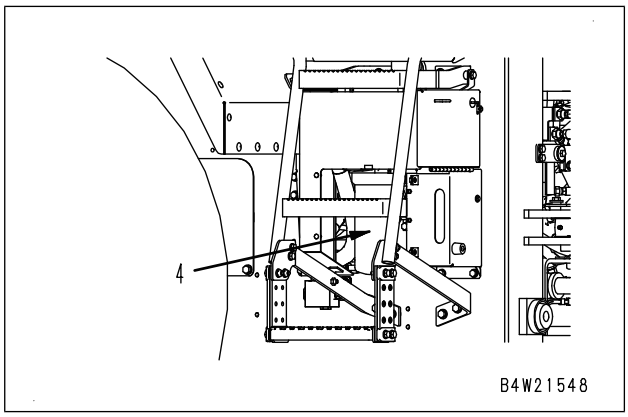


3. Contents of display of GPS & Communication Status
   On "GPS & Communication Status" screen, the following items of information are displayed.
   - "Positioning": GPS positioning status
   - "Communication": Communication environment and connecting condition of the communication modem
   - "Number of message not yet sent": Number of message(s) not yet sent: Number of unsent mails existing in the machine monitor

   Return switch (C): Returns the display to "KOMTRAX Settings" screen



Failure code [DW4BKA] Disconnection of Parking Brake Valve 40-658
Failure code [DW4BKB] Ground Fault of Parking Brake Valve 40-660
Failure code [DW4BKY] Hot Short of Parking Brake Valve 40-662
Failure code [DW4RKA] Disconnection of Bucket EPC Sol. (Tilt) 40-663
Failure code [DW4RKB] Ground Fault of Bucket EPC Solenoid (Tilt) 40-665
Failure code [DW4RKY] Hot Short of Bucket EPC Solenoid (Tilt) 40-667
Failure code [DWM1KA] Disconnection of Neutral Lock Solenoid 40-668
Failure code [DWM1KB] Ground Fault of Neutral Lock Solenoid 40-670
Failure code [DWM1KY] Hot Short of Neutral Lock Solenoid 40-672
Failure code [DWN6KA] Disconnection of Detent Solenoid (Boom) 40-673
Failure code [DWN6KB] Ground Fault of Detent Solenoid (Boom) 40-675
Failure code [DWN6KY] Hot Short of Detent Solenoid (Boom) 40-677
Failure code [DWN8KA] Disconnection of Detent Solenoid (Bucket) 40-679
Failure code [DWN8KB] Ground Fault of Detent Solenoid (Bucket) 40-681
Failure code [DWN8KY] Hot Short of Detent Solenoid (Bucket) 40-683
Failure code [DX19KA] Disconnection of Motor 1 Solenoid 40-684
Failure code [DX19KB] Ground Fault of Motor 1 Solenoid 40-686
Failure code [DX19KY] Hot Short of Motor 1 Solenoid 40-688
Failure code [DX20KA] Disconnection of Clutch Control Solenoid 40-690
Failure code [DX20KB] Ground Fault of Clutch Control Solenoid 40-692
Failure code [DX20KY] Hot Short of Clutch Control Solenoid 40-694
Failure code [DXAWKA] Disconnection of HST Pump EPC Sol. 40-696
Failure code [DXAWKB] Ground Fault of HST Pump EPC Sol. 40-698
Failure code [DXAWKY] Hot Short of HST Pump EPC Sol. 40-700
Failure code [DXH7KA] Disconnection of Reverse Solenoid 40-702
Failure code [DXH7KB] Ground Fault of Reverse Solenoid 40-704
Failure code [DXH7KY] Hot Short of Reverse Solenoid 40-706
Failure code [DXH8KA] Disconnection of Forward Solenoid 40-708
Failure code [DXH8KB] Ground Fault of Forward Solenoid 40-710
Failure code [DXH8KY] Hot Short of Forward Solenoid 40-712
Failure code [DXHJKA] Disconnection of 3rd EPC Solenoid (EXT) 40-714
Failure code [DXHJKB] Ground Fault of 3rd EPC Solenoid (EXT) 40-716
Failure code [DXHJKY] Hot Short of 3rd EPC Solenoid (EXT) 40-718
Failure code [DXHKKA] Disconnection of 3rd EPC Solenoid (RET) 40-719
Failure code [DXHKKB] Ground Fault of 3rd EPC Solenoid (RET) 40-721
Failure code [DXHKKY] Hot Short of 3rd EPC Solenoid (RET) 40-723
Failure code [H2K0KA] Failure of Quick Coupler Lock Signal 40-724
Failure code [H2K0KY] Hot Short of Quick Coupler Lock Signal 40-727
Failure code [J141N1] Steering Pump Over Run 40-729
Failure code [LA00L3] Failure of Fan Reverse 40-730
Failure code [M100N1] HST Pump Over Run 40-731
Failure code [M400N1] HST Motor 1 Over Run 40-732
Troubleshooting of electrical system (E-mode) 40-733
E-1 Engine does not start 40-733
E-2 Manual preheating system does not work 40-740
E-3 Automatic preheating system does not work 40-743
E-4 While preheating is working, preheating monitor does not light up 40-745
E-5 All of LCD unit, LED unit, and meter unit on machine monitor display nothing 40-747
E-6 LCD unit on machine monitor displays nothing 40-750
E-7 Backlight of LCD unit on machine monitor is abnormal (Backlight goes out or flickers) 40-752
E-8 LCD on machine monitor does not display properly 40-754
E-9 Meter unit display on machine monitor is abnormal 40-756
E-10 Night lighting lamp of meter unit on machine monitor is abnormal 40-759
E-11 Caution LED on machine monitor is abnormal 40-762
E-12 LED of switch panel on machine monitor is abnormal or switches does not operate properly 40-764
E-13 Two switches operation of switch panel on machine monitor does not function 40-766
E-14 Switch panel buzzer of machine monitor is abnormal 40-769



b6. Check of axle case oil level (front and rear)

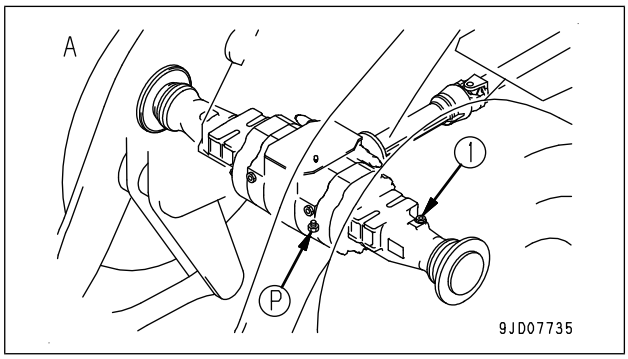
⚠ When changing the oil, apply the parking brake and secure the front and rear frames with the frame lock bar.

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

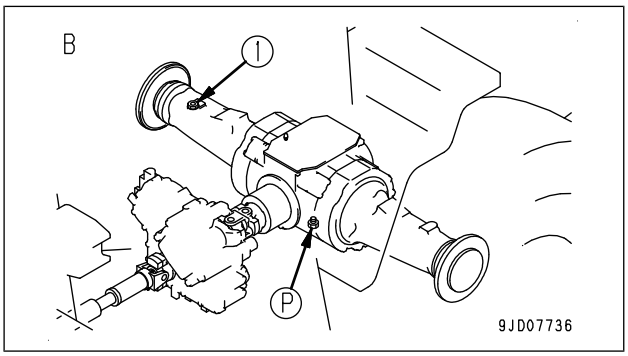
⚠ If the plug is removed, oil may spurt out, so turn it slowly to release the internal pressure, then remove it with care.

1. Place a container under drain plug (P) to catch drained oil.

   Axle oil (front):
   Approx. 27.0 ℓ
   Axle oil (rear):
   Approx. 25.5 ℓ
2. Remove plug (1), then remove drain plug (P) to drain the oil.
   A: Front



B: Rear



★ Remove mud and dirt from around plug (1), then remove plug.

3. After draining the oil, clean and install drain plug (P).
4. Refill with the specified quantity of oil through plug hole (1).

   ★ Be sure to use the specified lubricating oil for the axle with ASD (Anti-Slip Differential).
5. Check that the oil is at the specified level at level plug (1).

   ★ When the given work requires to use the brake more frequently than usual, replace the axle oil earlier than the usual timing.

b7. Bleeding air

- For the bleeding air from the fuel system, see Testing and adjusting, "Bleeding air from fuel circuit".
- For the bleeding air from the hydraulic system, see Testing and adjusting, "Bleeding air from each part".)

c. Electric equipment

c1. Check of battery terminal for looseness and corrosion

- Check battery terminals for looseness and corrosion.
- Check and remove any accumulated dirt and combustibles (dead leaves, twigs, etc.) around the batteries.

c2. Check of alternator terminal for looseness and corrosion

- Open the engine left side cover.
- Check alternator terminals B, R and E for open circuit, loosening and corrosion.

c3. Check of starting motor terminal for looseness and corrosion

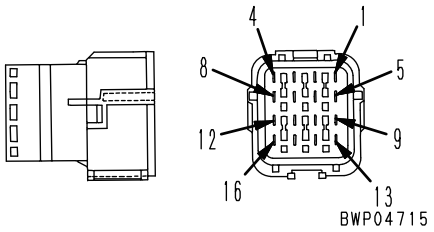
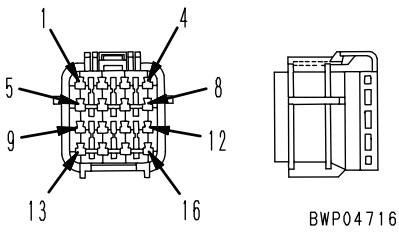
- Check starting motor terminal B (E30) and terminal C (E21) for open circuit, looseness and corrosion.

No.	Cause	Procedure, measuring location, criteria and remarks
7	Defective controller	<Precautions for troubleshooting> (1) Connector number indication method and handling of T-adapter For troubleshooting, insert or connect T-adapters as follows unless otherwise specified. • When "male" or "female" is not indicated with a connector number, disconnect the connector, and insert T-adapter between the male and female connectors. • When "male" or "female" is indicated with a connector number, disconnect the connector, and connect T-adapter to the male or female connector. • "Male and female" means male and female of connector pins, not connector housings. • Male and female of connector pins and housing in DT series, etc, are opposite to those described in this manual. Take care. (2) Pin number description sequence and tester lead handling For troubleshooting, connect the positive (+) and negative (-) leads as shown below unless otherwise specified. • Connect the positive (+) lead to pin or wire indicated first. • Connect the negative (-) lead to a pin or wire indicated second.

Related circuit diagram

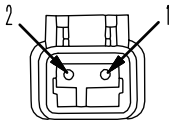
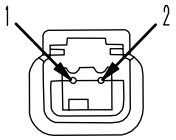
This is the excerpted circuit diagram related to troubleshooting

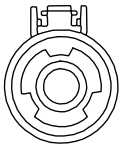
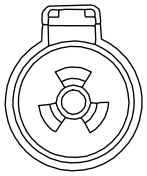
- The circuit diagram contains the connector Nos., pin Nos., and connector colors related to the failure.
- The "/" in a connector number is either:
  1) An abbreviation (of more than three letters)
  Example: T/C (Torque Converter)
  2) Different connector number at male and female sides
  Example: BREAK OUT/E24
- The circuit diagram contains the destination or source of the branch line in a wiring harness.
- The arrow (⟷) indicates a rough installation position on the given machine.
- NO: Normally Open
- NC: Normally Closed
- Signal names such as GND and 24 V are included in addition to connector numbers at junctions, etc. in circuit diagrams.
- Except for GND and 24 V, a signal name indicated at a junction, etc. shows that the wire is connected to another junction or controller at where the same signal name is indicated.

No. of pins	SWP type connector		
	Male (female housing)	Female (male housing)	Testing connection use special tool Part No.
16	 BWP04715	 BWP04716	799-601-7320 (T-adapter)
	Part No. : 08055-11681	Part No. : 08055-11691	
—	Terminal part No. : ·Electric wire size: 0.85 ·Grommet: Black ·Q'ty: 20	Terminal part No. : ·Electric wire size: 0.85 ·Grommet: Black ·Q'ty: 20	—
—	Terminal part No. : ·Electric wire size: 1.25 ·Grommet: Red ·Q'ty: 20	Terminal part No. : ·Electric wire size: 1.25 ·Grommet: Red ·Q'ty: 20	—

B4D18192

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

No. of pins	DTM Series connector		
	Body (plug)	Body (receptacle)	Testing connection use special tool Part No.
2	 BWP05049	 BWP05050	799-601-9010 (T-adapter) 799-601-9890 (T-adapter)
	Part No. :08192-02200	Part No. :08192-02100	

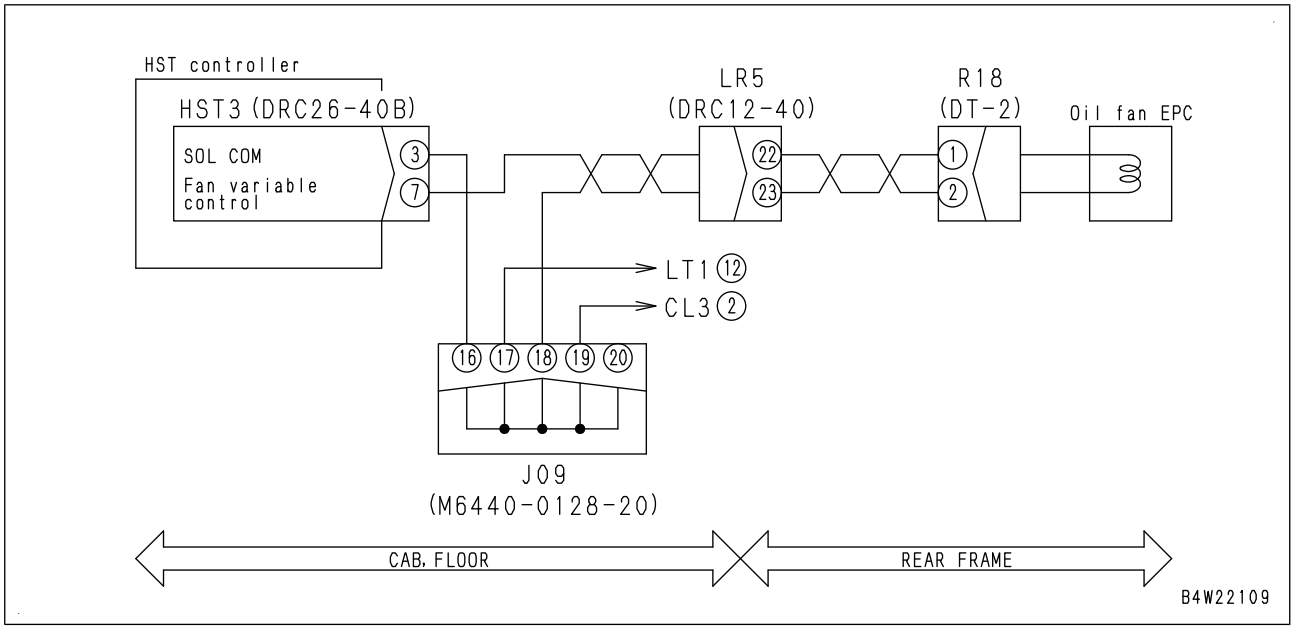
No. of pins	DTHD Series connector		
	Body (plug)	Body (receptacle)	
2	 BWP05051	 BWP05052	—
	Part No. :08192-31200 (Contact size #12) 08192-41200 (Contact size #8) 08192-51200 (Contact size #4)	Part No. :08192-31100 (Contact size #12) 08192-41100 (Contact size #8) 08192-51100 (Contact size #4)	

B4D18412

Part number	Part name	Number of pins	Identification symbol	T-adapter kit						Out of kit
				799-A65-4600						
799-601-4620	Adapter for controller (ENG-T4)	4	799-601-4620	●						
799-601-4630	Adapter for controller (ENG-T4)	2	799-601-4630	●						
799-601-4640	Adapter for controller (ENG-T4)	2	799-601-4640	●						
799-601-4651	Adapter for controller (ENG-T4)	24	799-601-4651	●						
799-601-4660	Adapter for controller (ENG-T4)	3	799-601-4660	●						
799T-601-4611	KDPF delta pressure sensor short connector	4	799T-601-4611	●						
799T-601-4670	KDPF outlet pressure sensor short connector	4	799T-601-4670	●						
799T-601-4680	KDPF dummy temperature sensor	4	799T-601-4680	●						

Failure code	Failure (Displayed on screen)	Controller	Action level	Category history	Remarks
CA2357	Failure code [CA2357] EGR Valve Servo Error (PAGE 40-327)	ENG	L03	Electrical system	
CA2373	Failure code [CA2373] Exhaust Manifold Press Sens High error(PAGE 40-328)	ENG	L03	Electrical system	
CA2374	Failure code [CA2374] Exhaust Manifold Press Sens Low error(PAGE 40-330)	ENG	L03	Electrical system	
CA2375	Failure code [CA2375] EGR Orifice Temp Sens High Error(PAGE 40-332)	ENG	L03	Electrical system	
CA2376	Failure code [CA2376] EGR Orifice Temp Sens Low Error(PAGE 40-334)	ENG	L03	Electrical system	
CA2381	Failure code [CA2381] KVGT Pos Sens High Error(PAGE 40-336)	ENG	L03	Electrical system	
CA2382	Failure code [CA2382] KVGT Pos Sens Low Error(PAGE 40-338)	ENG	L03	Electrical system	
CA2383	Failure code [CA2383] KVGT Solenoid Open Error(PAGE 40-341)	ENG	L03	Electrical system	
CA2386	Failure code [CA2386] KVGT Solenoid Short Error(PAGE 40-343)	ENG	L03	Electrical system	
CA2387	Failure code [CA2387] KVGT Servo Error (PAGE 40-345)	ENG	L03	Electrical system	
CA2554	Failure code [CA2554] Exh Manifold Press Sens In Range Error(PAGE 40-346)	ENG	L03	Electrical system	
CA2555	Failure code [CA2555] Grid Htr Relay Volt Low Error(PAGE 40-347)	ENG	L01	Electrical system	
CA2556	Failure code [CA2556] Grid Htr Relay Volt High Error(PAGE 40-349)	ENG	L01	Electrical system	
CA2637	Failure code [CA2637] KDOC Face Plugging (PAGE 40-351)	ENG	L01	Electrical system	
CA2639	Failure code [CA2639] Manual Stationary Regeneration Request(PAGE 40-353)	ENG	L01	Electrical system	
CA2961	Failure code [CA2961] EGR Orifice Temp High Error 1(PAGE 40-356)	ENG	L03	Electrical system	
CA2973	Failure code [CA2973] Chg Air Press Sensor In Range Error(PAGE 40-357)	ENG	L03	Electrical system	
CA3133	Failure code [CA3133] KDPF Outlet Press Sens High Error(PAGE 40-358)	ENG	L03	Electrical system	
CA3134	Failure code [CA3134] KDPF Outlet Press Sens Low Error(PAGE 40-360)	ENG	L03	Electrical system	
CA3135	Failure code [CA3135] KDPF Outlet Press Sens In Range Error(PAGE 40-362)	ENG	L03	Electrical system	
CA3251	Failure code [CA3251] KDOC Inlet Temp High Error(PAGE 40-366)	ENG	L03	Electrical system	
CA3253	Failure code [CA3253] KDOC Temp Error - Non Regeneration(PAGE 40-369)	ENG	L03	Electrical system	
CA3254	Failure code [CA3254] KDOC Outlet Temp High Error 1(PAGE 40-372)	ENG	L01	Electrical system	
CA3255	Failure code [CA3255] KDPF Temp Error - Non Regeneration(PAGE 40-375)	ENG	L03	Electrical system	
CA3256	Failure code [CA3256] KDPF Outlet Temp High Error 1(PAGE 40-378)	ENG	L01	Electrical system	
CA3311	Failure code [CA3311] KDOC Outlet Temp High Error 2(PAGE 40-381)	ENG	L03	Electrical system	
CA3312	Failure code [CA3312] KDPF Outlet Temp High Error 2(PAGE 40-384)	ENG	L03	Electrical system	
CA3313	Failure code [CA3313] KDOC Inlet Temp Sensor Low Error(PAGE 40-387)	ENG	L03	Electrical system	

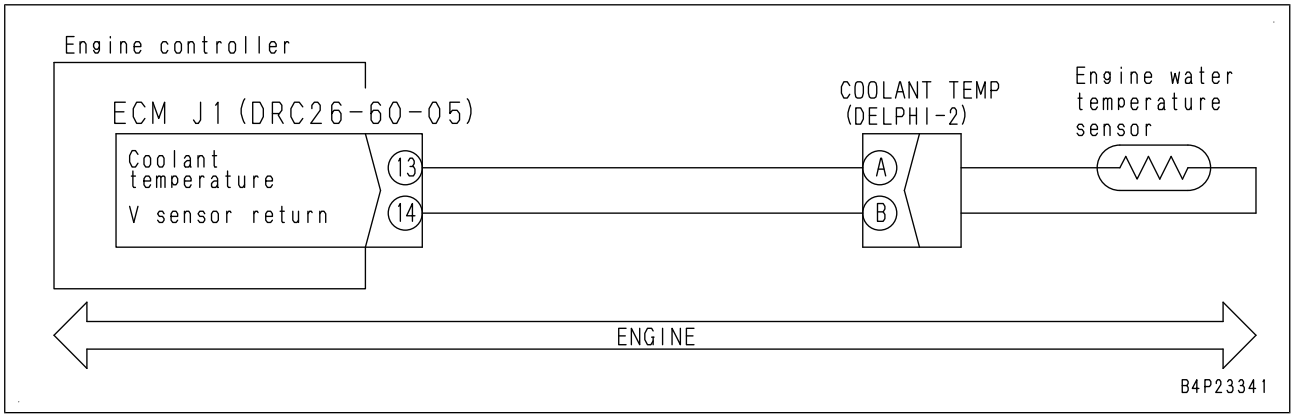
Circuit diagram related to fan motor EPC solenoid



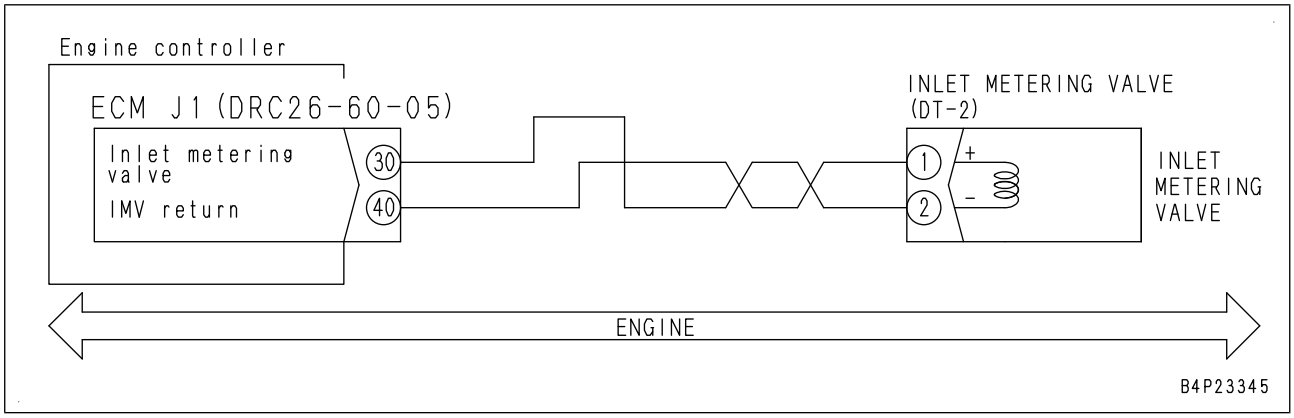
No.	Cause	Procedure, measuring location, criteria and remarks
4	Defective engine controller	1. Turn starting switch to ON position.
		If this failure code appears and no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

★ Turn the starting switch ON and make sure that this failure code and code [A1U0N3] are not displayed.

Circuit diagram related to coolant temperature sensor



Circuit diagram related to IMV/PCV1



Failure code [CA357] Mass Air Flow Sensor Low Error *(WA320_7-CA357-400-A-Z0-A)*

Action level	Failure code	Failure	Mass Air Flow Sensor Low Error (Engine controller system)
L03	CA357		
Detail of failure	• Low frequency occurs in signal circuit of mass air flow sensor.		
Action of controller	• Sets mass air flow to fixed value (10 kg/min) and runs engine. • Closes EGR valve. • Limits engine output and runs engine. • Stops KDPF regeneration control.		
Problem on machine	• Engine output reduces.		
Related information	• Since sensor output is 5 V pulse voltage, it cannot be measured by using multimeter. • Mass air flow sensor and intake air temperature sensor are integrated. • If sensor connector is disconnected, both this failure code and failure code [CA691] are displayed. • Method of reproducing failure code: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria, and remarks			
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in "c: Electrical equipment" in "Checks before troubleshooting" of "Related information on troubleshooting", and check it. 2. Turn starting switch to ON position.			
		If this failure code is not displayed, wiring harness connector is defective. ★ If this failure code is displayed, perform following checks.			
2	Defective sensor power supply system	If failure code [CA3419] or [CA3421] is also displayed, perform troubleshooting for it first.			
3	Defective mass air flow sensor (Internal defect)	1. Turn starting switch to OFF position. 2. Replace mass air flow sensor. 3. Turn starting switch to ON position.			
		If this failure code does not appear, original mass air flow sensor is defective.			
4	Defective sensor power supply system	1. Be ready with starting switch at OFF position. 2. Disconnect connector R93, and connect T-adapter to female side. 3. Turn starting switch to ON position.			
		Voltage	Between R93 (female) (2) and (3)	Power supply	Approx. 12 V
5	Open circuit in wiring harness (wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and R93, and connect T-adapters to each female side.			
		Resis-tance	★ If no failure is found by check on cause 4, this check is not required. Between ECM J1 (female) (21) and R93 (female) (2)		Max. 10 Ω
			★ If no failure is found by check on cause 4, this check is not required. Between ECM J1 (female) (22) and R93 (female) (3)		Max. 10 Ω
			Between ECM J1 (female) (23) and R93 (female) (1)		Max. 10 Ω
6	Ground fault in wiring harness (Contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and R93, and connect T-adapter to either female side.			
		Resis-tance	Between ground and ECM J1 (female) (23) or R93 (female) (1)		Min. 100 kΩ

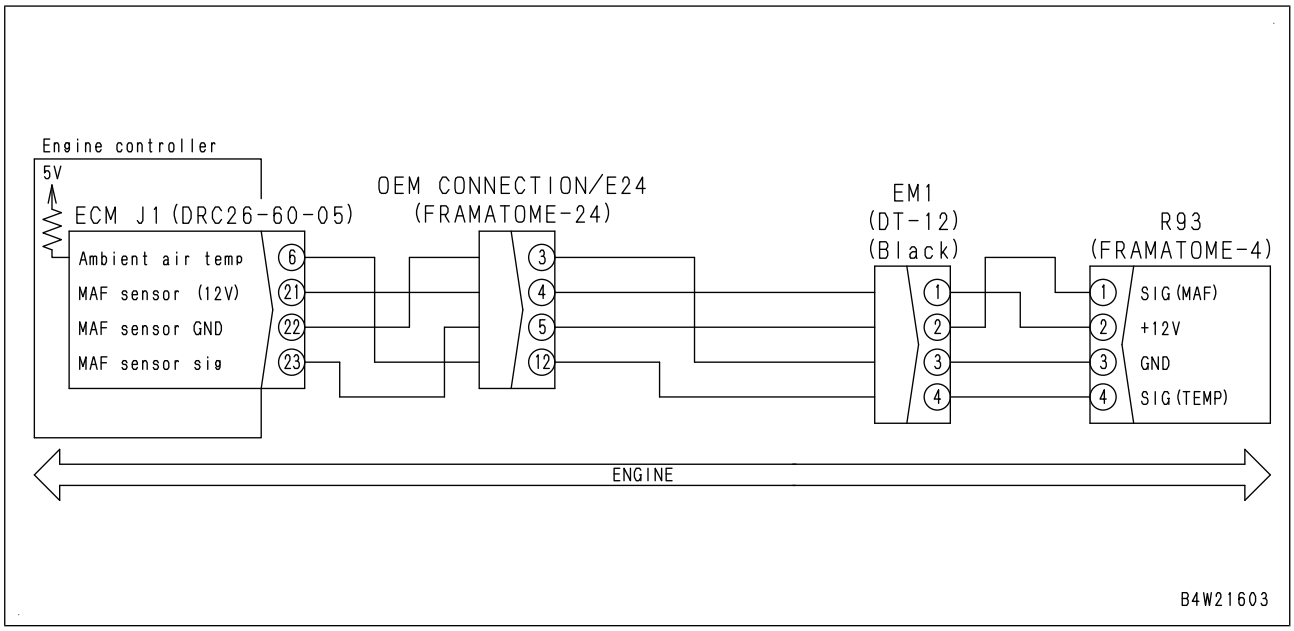
Failure code [CA452] Rail Press Sensor Low Error *(WA380_7-CA452-400-A-Z0-A)*

Action level	Failure code	Failure	Rail Pressure Sensor Low Error (Engine controller system)
L03	CA452		
Detail of failure	• Low voltage appears in signal circuit of common rail pressure sensor.		
Action of controller	• Limits engine output and allows engine to run.		
Problem on machine	• Engine speed or output decreases. • Engine does not start.		
Related information	• Signal voltage from common rail pressure sensor can be checked with monitoring function. (Code: 36401 Common rail pressure sensor voltage) • Pressure sensed by common rail pressure sensor can be checked with monitoring function. (Code: 36400 (MPa)) • Method of reproducing failure code: Turn starting switch to ON position. • If sensor connector is disconnected even in normal condition, failure code [CA451] for "High Error" is generated instead of this code.		

No.	Cause	Procedure, measuring location, criteria and remarks			
1	Defective harness connector	1. See descriptions of wiring harness and connectors in "c: Electrical equipment" in "Checks before troubleshooting" of "General information on troubleshooting", and check it. 2. Turn starting switch to ON position.			
		If this failure code disappears, harness connector is defective. ★ If this failure code appears, perform following checks.			
2	Defective common rail pressure sensor power supply system	If failure code [CA515] or [CA516] is also displayed, perform troubleshooting for it first.			
3	Defective common rail pressure sensor	1. Turn starting switch to OFF position. 2. Disconnect connector FUEL RAIL PRESS. 3. Turn starting switch to ON position.			
		If failure code [CA452] changes to [CA451], sensor is defective.			
		• Reference 1. Turn starting switch to OFF position. 2. Insert T-adapters in connector ECM J2. 3. Turn starting switch to ON position.			
		Voltage	Between ECM J2 (21) and (44)	Sensor output	0.2 to 4.8 V
4	Ground fault in wiring harness (contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J2 and FUEL RAIL PRESS, and connect T-adapters to female side of ECM J2.			
		Resistance	Between ECM J2 (female) (44) and ground		Min. 100 kΩ
5	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors FUEL RAIL PRESS and ECM J2. 3. Connect T-adapters to female side of ECM J2.			
		Resistance	Between ECM J2 (female) (21) and (44)		Min. 100 kΩ
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.)			

No.	Cause	Procedure, measuring location, criteria, and remarks		
5	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and R93, and connect T-adapter to female side of ECM J1. ★ Check by using multimeter in continuity mode.		
		Resis-tance	Between ECM J1 (female) (6) and each pin other than pin (6)	Min. 100 kΩ
6	Defective engine controller	If no failure is found by above checks, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Circuit diagram related to intake air temperature sensor



Failure code [CA1843] Crankcase Press Sens High Error *(WA320_7-CA1843-400-A-Z0-A)*

Action level	Failure code	Failure	Crankcase Pressure Sensor High Error (Engine controller system)
L01	CA1843		
Detail of failure	• High voltage occurs in signal circuit of crankcase pressure sensor.		
Action of controller	• Sets crankcase pressure to fixed value (approximately 0 kPa) and runs engine.		
Problem on machine	• None in particular		
Related information	• Signal voltage from crankcase pressure sensor can be checked with monitoring function. (Code: 48401 (V)) • Pressure sensed by crankcase pressure sensor can be checked with monitoring function. (Code: 48400 (MPa)) • Method of reproducing failure code: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria, and remarks			
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in "c: Electrical equipment" in "Checks before troubleshooting" of "Related information on troubleshooting", and check it. 2. Turn starting switch to ON position.			
		If this failure code is not displayed, wiring harness connector is defective. ★ If this failure code is displayed, perform following checks.			
2	Defective sensor power supply system	If failure code [CA187] or [CA227] is also displayed, perform troubleshooting for [CA187] or [CA227] first.			
3	Defective crankcase pressure sensor (Internal defect)	1. Turn starting switch to OFF position. 2. Disconnect connector R94. 3. Turn starting switch to ON position.			
		If failure code changes from [CA1843] to [CA1844], crankcase pressure sensor is defective.			
4	Open circuit in wiring harness (Wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and R94, and connect T-adapters to each female side. ★ To check open circuit in GND line			
		Resis-tance	Between ECM J1 (female) (59) and R94 (male) (2)		Max. 10 Ω
5	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors ECM J1 and R94, and connect T-adapter to either female side.			
		Resis-tance	Between ECM J1 (female) (3) and (60), or between R94 (female) (1) and (3)		Min. 100 kΩ
6	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector R94 and connect T-adapter to female side. 3. Turn starting switch to ON position.			
		Voltage	Between R94 (female) (3) and (2)		Max. 1 V
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.) • Reference			
		1. Turn starting switch to OFF position. 2. Insert T-adapter into connector ECM J1. 3. Turn starting switch to ON position.			
		Voltage	Between ECM J1 (3) and (59)	Sensor output	0.3 to 4.7 V

Failure code [CA1942] Crankcase Press Sens In Range Error *(PC400-CA1942-400-A-Z0-A)*

Action level	Failure code	Failure	Crankcase Pressure Sensor In Range Error
L01	CA1942		(Engine controller system)
Detail of failure	• Output value from crankcase pressure sensor is out of normal range.		
Action of controller	• None in particular		
Problem on machine			
Related information	• Signal voltage from crankcase pressure sensor can be checked with monitoring function. (Code: 48401 (V)) • Pressure sensed by crankcase pressure sensor can be checked with monitoring function. (Code: 48400 (MPa)) • Method of reproducing failure code: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective crankcase pressure sensor	Crankcase pressure sensor system may be defective. Perform troubleshooting for failure codes [CA1843] and [CA1844].
2	Clogged KCCV filter	Replace KCCV filter.
3	Blocked KCCV gas piping	If error condition is not cleared after KCCV filter is replaced and emulsion is found inside KCCV, emulsion may block KCCV blowby gas piping. Perform troubleshooting for leakage of coolant.
4	Increase of blowby gas	If error condition is not cleared after KCCV filter is replaced and failure code of crankcase pressure high error 2 is generated in short times, engine may be seized or turbocharger may be defective. Perform troubleshooting for mechanical system.

Failure code [CA2357] EGR Valve Servo Error *(D65-CA2357-400-A-Z0-A)*

Action level	Failure code	Failure	EGR Valve Servo Error
L03	**CA2357**		(Engine controller system)
Detail of failure	• EGR valve servo error occurs. (EGR lift sensor sends back EGR valve position value that differs from command value.)		
Action of controller	• Limits engine output and runs engine. • Does not supply current to EGR valve (closes EGR valve). • Stops KDPF regeneration control.		
Problem on machine	• Engine output lowers.		
Related information	• Position of EGR valve can be checked with monitoring function. (Code: 18100 EGR Valve Position (mm)) • Method of reproducing failure code: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective relevant system	If other failure codes are also displayed, perform troubleshooting for them.
2	Insufficient EGR valve drive pressure	★ For testing of EGR valve drive pressure, see Testing and adjusting, "Measuring EGR valve and KVGT oil pressure".
		If EGR valve drive pressure is abnormal, perform checks on causes 3 and 4.
3	Defective engine oil pressure system (main circuit)	★ For check of engine oil pressure, see Testing and adjusting, "Testing engine oil pressure".
		If engine oil pressure is not normal, perform troubleshooting (S mode) for mechanical system. (S-14 Engine oil pressure drops)
4	Defective oil pump for EGR valve	Oil pump or relief valve for EGR valve circuit may be defective. Check them.
5	Defective hydraulic piping for EGR valve	Hydraulic piping of EGR valve circuit may be defective. Check it.
6	Defective return hydraulic piping for EGR valve	Return hydraulic piping for EGR valve circuit may be defective. Check it.
7	Defective EGR valve	EGR valve may have mechanical trouble. Check it.
8	Defective EGR valve lift sensor	Perform troubleshooting for failure codes [CA2271] and [CA2272].
9	Defective engine controller	If no failure is found by checks on causes 1 to 8, engine controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Failure code [CA2555] Grid Htr Relay Volt Low Error *(WA320_7-CA2555-400-A-Z0-A)*

Action level	Failure code	Failure	Grid Heater Relay Voltage Low Error
L01	CA2555		(Engine controller system)
Detail of failure	• Open circuit is in preheat relay drive circuit (primary circuit).		
Action of controller	• None in particular		
Problem 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	• Temperature sensed by engine coolant temperature sensor can be checked with monitoring function. (Code: 04107 (°C)) • Method of reproducing failure code: Turn starting switch to ON position (Engine coolant temperature: Max. -5°C). • Troubleshooting of this failure code covers circuits from engine controller to primary circuit (coil) of preheat relay L130. • For troubleshooting of secondary circuit of heater relay and preheat relay L130, see E-2 in E-mode troubleshooting.		

No.	Cause	Procedure, measuring location, criteria, and remarks		
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in "c: Electrical equipment" in "Checks before troubleshooting" of "Related information on troubleshooting", and check it. 2. Turn starting switch to ON position.		
		If this failure code is not displayed, wiring harness connector is defective. ★ If this failure code is displayed, perform following troubleshooting.		
2	Defective preheat relay L130	1. Turn starting switch to OFF position. 2. Disconnect relay L130 and connect T-adapter to male side.		
		Resistance	Between L130 (male) (1) and (2)	200 to 400 Ω
3	Open or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors EC3 and connect T-adapter to female side.		
		Resistance	Between EC3 (female) (4) and ground ★ Coil resistance of relay L130	200 to 400 Ω
4	Open circuit in wiring harness	★ If no failure is found by check on cause 3, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connector EC3 and relay L130, and connect T-adapters to each female side.		
		Resistance	Between EC3 (female) (4) and L130 (female) (1)	Max. 10 Ω
			Between L130 (female) (2) and ground	Max. 10 Ω
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.)		

<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria, and remarks</th></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Short circuit in wiring harness</td><td colspan="3">1. Turn starting switch to OFF position.
2. Disconnect connectors EC3 and TEMP1 (KDOC inlet temperature sensor), and connect T-adapter to female side of EC3.
★ Check by using multimeter in continuity mode.</td></tr>
<tr><td>Continuity</td><td>Between EC3 (female) (45) and each pin other than pin (45)</td><td>No continuity (no sound is heard)</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Defective KDOC inlet temperature sensor</td><td colspan="3">1. Turn starting switch to ON position.
2. Use monitoring function to display signal voltages and temperatures from KDOC inlet temperature sensor, KDOC outlet temperature sensor, and KDPF outlet temperature sensor on screen.
3. Run engine at idle for 10 minutes.
4. Note temperature values (after checking that they are stabilized).
5. Monitor temperature from each sensor.</td></tr>
<tr><td colspan="3">If temperature of any temperature sensor fluctuates 24°C or greater, regard that temperature sensor as defective.
★ If none of temperature sensor values changes for more than 24°C, no failure is in sensors. Perform troubleshooting for cause 5 and subsequent causes.
★ If another failure code appears with engine running at idle, perform troubleshooting for it first.</td></tr>
<tr><td>5</td><td>Malfunction of intake system</td><td colspan="3">Check the intake system hoses, clamps, and tubes for damages and loosening. Repair as necessary (repair intake air leaks).</td></tr>
<tr><td>6</td><td>Defective injector</td><td colspan="3">Perform cylinder cutout mode operation to identify disabled cylinder (see Testing and adjusting, "Handling of cylinder cutout mode operation).</td></tr>
<tr><td>7</td><td>Oil leak into turbocharger exhaust connector</td><td colspan="3">1. Remove turbocharger exhaust connector.
2. Check inside of turbocharger exhaust connector for adhesion of oil and fuel.
• If oil or fuel is found, visually check for oil leaks from EGR valve and turbocharger. Repair any failure.
★ Wipe off oil and fuel from the piping.</td></tr>
<tr><td>8</td><td>Oil leak into exhaust connector and ducts leading to KDPF</td><td colspan="3">Check exhaust system between turbocharger and KDPF for oil or fuel leaking in.
• Wipe off oil or fuel if found.
★ If a trace of oil or fuel leakage into the KDPF is found, check the KDPF. Clean or replace as necessary.</td></tr>
</table>

B. Machine operation for clearing failure code

<table>
<tr><th>No.</th><th>Cause</th><th>Procedure, measuring location, criteria, and remarks</th></tr>
<tr><td colspan="3">1. Turn starting switch from OFF position to ON position.
2. Start engine and run it at low idle (with no load) for approximately 1 minute.
If failure code is cleared, repair is complete.
★ Every failure code can be cleared by executing "Reset All Faults" command by using service tool "INSITE".
For how to use "INSITE", see "INSITE" operation manual.</td></tr>
<tr><td>9</td><td>Defective engine controller</td><td>If this failure code appears again after above procedures are implemented, engine controller is defective.</td></tr>
</table>

Failure code [CA3313] KDOC Inlet Temp Sensor Low Error *(WA320_7-CA3313-400-A-Z0-A)*

Action level	Failure code	Failure	KDOC Inlet Temperature Sensor Low Error
L03	CA3313		(Engine controller system)
Detail of failure	• Low voltage appears in KDOC inlet temperature sensor circuit.		
Action of controller	• Uses KDOC outlet temperature for KDOC inlet temperature to run engine. (If failure is detected in KDOC outlet temperature sensor as well, controller sets KDOC inlet temperature to default value (250°C) and runs engine.) • Closes EGR valve. • Limits engine output and runs engine. • Stops KDPF regeneration control.		
Problem on machine	• Engine output reduces.		
Related information	⚠ **Since KDPF and KDOC are heated to 500°C or above, take care not to get burn injury.** • Signal voltage from KDOC inlet temperature sensor can be checked with monitoring function. (Code: 47301 (V)) • Temperature sensed by KDOC inlet temperature sensor can be checked with monitoring function. (Code: 47300 (°C)) • Signal voltage from KDOC outlet temperature sensor can be checked with monitoring function. (Code: 47401 (V)) • Temperature sensed by KDOC outlet temperature sensor can be checked with monitoring function. (Code: 47400 (°C)) • Signal voltage from KDPF outlet temperature sensor can be checked with monitoring function. (Code: 47201 (V)) • Temperature sensed by KDPF outlet temperature sensor can be checked with monitoring function. (Code: 47200 (°C)) • If sensor connector is disconnected or open circuit occurs, this failure code does not appear but failure code [CA3314] for "High Error" appears. • KDOC inlet temperature sensor connector label "TEMP1" expressed in black embossed letters is seen on KDPF temperature sensor consolidating box (KDOC outlet temperature sensor connector label "TEMP2" and KDPF outlet temperature sensor connector label "TEMP3" are shown similarly to "TEMP1"). • Method of reproducing failure code: Turn starting switch to ON position. <How to clear failure code> To avoid error due to improper operation, start and run engine at idle for 1 minute. If this failure code is cleared, repair is complete.		

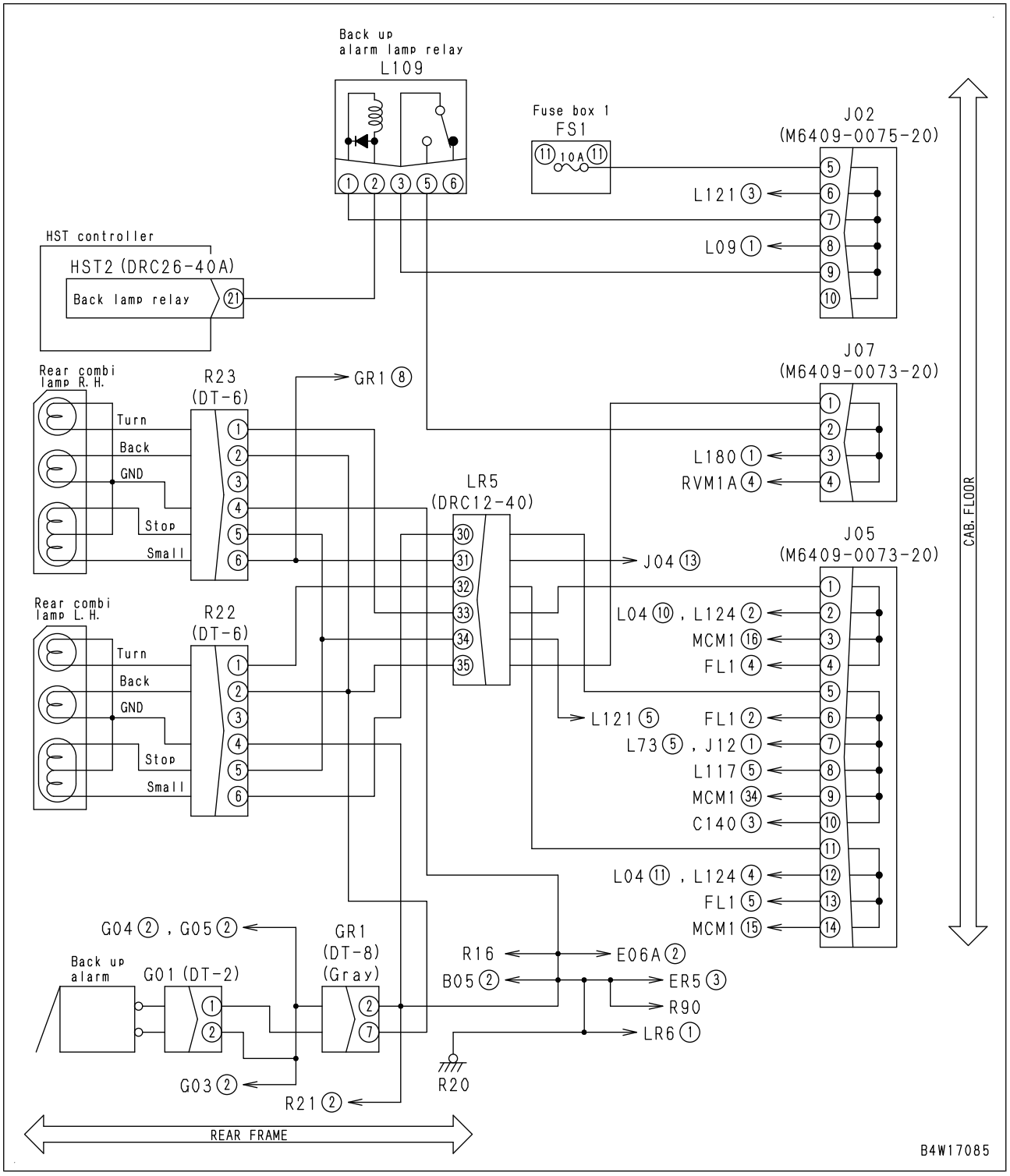
No.	Cause	Procedure, measuring location, criteria, and remarks			
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in "c: Electrical equipment" in "Checks before troubleshooting" of "Related information on troubleshooting", and check it. 2. Turn starting switch to ON position.			
		If this failure code is not displayed, wiring harness connector is defective. ★ If this failure code is displayed, perform following checks.			
2	Defective KDOC inlet temperature sensor	1. Turn starting switch to OFF position. 2. Disconnect TEMP1 (KDOC inlet temperature sensor). 3. Turn starting switch to ON position.			
		If this failure code changes to [CA3314], KDOC inlet temperature sensor is defective. ★ If this failure code still remains displayed, wiring harness or engine controller is defective.			
		• Reference 1. Turn starting switch to OFF position. 2. Disconnect connector TEMP1, and connect T-adapter to female side.			
		Resistance	Between TEMP1 (female) (1) and (2)	-10°C	33 to 65 kΩ
				0°C	25 to 47 kΩ

Failure code [CA3319] KDPF Outlet Temp Sens High Error *(WA320_7-CA3319-400-A-Z0-A)*

Action level	Failure code	Failure	KDPF Outlet Temperature Sensor High Error
L03	CA3319		(Engine controller system)
Detail of failure	• High voltage appears in KDPF outlet temperature sensor circuit.		
Action of controller	• Uses KDOC outlet temperature for KDPF outlet temperature to run engine. (If failure is detected in KDOC outlet temperature sensor as well, controller sets KDPF outlet temperature to default value (250°C) and runs engine.) • Closes EGR valve. • Limits engine output and runs engine. • Stops KDPF regeneration control.		
Problem on machine	• Engine output reduces.		
Related information	⚠ **Since KDPF and KDOC are heated to 500°C or above, take care not to get burn injury.** • Signal voltage from KDOC inlet temperature sensor can be checked with monitoring function. (Code: 47301 (V)) • Temperature sensed by KDOC inlet temperature sensor can be checked with monitoring function. (Code: 47300 (°C)) • Signal voltage from KDOC outlet temperature sensor can be checked with monitoring function. (Code: 47401 (V)) • Temperature sensed by KDOC outlet temperature sensor can be checked with monitoring function. (Code: 47400 (°C)) • Signal voltage from KDPF outlet temperature sensor can be checked with monitoring function. (Code: 47201 (V)) • Temperature sensed by KDPF outlet temperature sensor can be checked with monitoring function. (Code: 47200 (°C)) • This failure code appears if sensor connector is disconnected. • If failure codes [CA3314] and [CA3317] are also displayed, connector in KDPF temperature sensor consolidating box may be disconnected or probably has open circuit (defective contact of connector) in ground line. • KDOC inlet temperature sensor connector label "TEMP1" expressed in black embossed letters is seen on KDPF temperature sensor consolidating box (KDOC outlet temperature sensor connector label "TEMP2" and KDPF outlet temperature sensor connector label "TEMP3" are shown similarly to "TEMP1"). • Method of reproducing failure code: Turn starting switch to ON position. <How to clear failure code> To avoid error due to improper operation, start and run engine at idle for 1 minute. If this failure code is cleared, repair is complete.		

No.	Cause	Procedure, measuring location, criteria, and remarks
1	Defective wiring harness connector	1. See descriptions of wiring harness and connectors in "c: Electrical equipment" in "Checks before troubleshooting" of "Related information on troubleshooting", and check it. 2. Turn starting switch to ON position.
		If this failure code is not displayed, wiring harness connector is defective. ★ If this failure code is displayed, perform following checks.
2	Defective KDPF outlet temperature sensor	1. Turn starting switch to OFF position. 2. Disconnect KDPF outlet temperature sensor (connector TEMP3) and connect T-adapter to female side. 3. Connect T-box to T-adapter and connect pins (1) and (2) of T-box by using jumper cable. ★ Connect ground line to signal line 4. Turn starting switch to ON position.
		If this failure code changes to [CA3321], KDPF outlet temperature sensor is defective.

Circuit diagram related to backup lamp relay



Failure code [D1E6KA] Disconnection of Parking Brake Relay *(WA320_7-D1E6KA-400-A-Z0-A)*

Action level	Failure code	Failure	Disconnection of Parking Brake Relay
L03	D1E6KA		(HST controller system)
Detail of failure	• When controller drives primary circuit (coil) of auto idle stop parking brake relay, no current flows through circuit.		
Action of controller	• Stops driving auto idle stop parking brake relay. • Even if cause of failure disappears, machine does not become normal until starting switch is turned to OFF position.		
Problem on machine	• Auto idle stop function does not operate.		
Related information	• This failure code indicates failure on primary circuit (coil side) of auto idle stop parking brake relay, but not on secondary circuit (contact side). • Output signal (ON/OFF) to auto idle stop parking brake relay can be checked with monitoring function. (Code: 03713) • Method of reproducing failure code: Actuate auto idle stop function.		

No.	Cause	Procedure, measuring location, criteria, and remarks			
1	Defective auto idle stop parking brake relay (L107)	1. Turn starting switch to OFF position. 2. Disconnect connector L107, and connect T-adapter to male side.			
		Resistance	Between connector L107 (male) (1) and (2)		200 to 400 Ω
2	Open or short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector HST3, and connect T-adapter to female side. ★ Relay coil resistance			
		Resistance	Between HST3 (female) (18) and ground		200 to 400 Ω
3	Open circuit in wiring harness	★ If no failure is found by above checks, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connectors HST3 and L107, and connect T-adapters to each female side.			
		Resistance	Between HST3 (female) (18) and L107 (female) (1)		Max. 1 Ω
			Between L107 (female) (2) and ground		Max. 1 Ω
4	Defective HST controller	1. Turn starting switch to OFF position. 2. Connect T-adapter to connector HST3. 3. Turn starting switch to ON position.			
		Voltage	Between HST3 (18) and ground	Auto idle stop: After engine is stopped	20 to 30 V
				Auto idle stop: Before engine is stopped	Max 4.5 V

Failure code [DAF0KT] Abnormality of Non-volatile Memory (MON) *(WA380_7-DAF0KT-400-A-Z0-A)*

Action level	Failure code	Failure	Abnormality of Non-volatile Memory (Monitor) (Machine monitor system)
L03	DAF0KT		
Detail of failure	• Data is not written to or read from non-volatile memory of monitor controller.		
Action of controller			
Problem on machine	• Reading of service meter and odometer and other set values are changed.		
Related information	• Method of reproducing failure code: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria and remarks
1	Defective monitor controller	Monitor controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

Failure code [DAJ2KK] Solenoid Power Source Low (HST) *(WA320_7-DAJ2KK-400-A-Z0-A)*

Action level	Failure code	Failure	Solenoid Power Source Low (Hydrostatic Transmission)
L03	DAJ2KK		(HST controller system)
Detail of failure	• 24 V solenoid power supply voltage (appears at HST controller pins 2, 12, and 22) is 18 V or lower, while controller power supply (continuous power supply voltage from battery) is normal. • Detection conditions: Continuous power supply (battery direct power supply) is 20 V or above and solenoid power supply is 18 V or below. Terminal-C input is OFF.		
Action of controller	• Does not generate failure codes that can be falsely generated due to drop in 24 V solenoid power supply voltage. • Lights up centralized warning lamp and sounds alarm buzzer. • Even if cause of failure disappears, machine does not become normal until directional (FNR) lever or directional selector (FNR) switch is set to N (neutral) position.		
Problem on machine	• Machine cannot travel (HST is left in NEUTRAL). • Fan rotates at its maximum speed. • Fan rotating in reverse changes its direction to normal.		
Related information	• If failure code [DAJ4KB] (Ground Fault of Sol. Self-Holding Relay (HST)) is also displayed, perform troubleshooting for it first. • If fuse-12 of fuse box 1 is blown, failure codes [DF10KA] and [DDK6A] are displayed. • Method of reproducing failure code: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria, and remarks		
1	Defective slow-blow fuse FL (R05 and R06A)	If slow blow fuse is blown, circuit probably has ground fault.		
2	Defective fuse -12 in fuse box 1	If fuse is blown, circuit probably has ground fault.		
3	Defective VIS power supply holding relay	1. Turn starting switch to OFF position. 2. Disconnect connector L102, and connect T-adapter to male side.		
		Resistance	Between L102 (male) (1) and (2)	200 to 400 Ω
			Between L102 (male) (3) and (6)	Max. 1 Ω
		1. Turn starting switch to OFF position. 2. Interchange VIS power supply holding relay L102 with other normal relay.		
		Check if machine becomes normal when VIS power supply holding relay (L102) is replaced.	Machine becomes normal.	Original relay (L102) is defective.
			Machine does not become normal.	Original relay (L102) is normal.
4	Open circuit in wiring harness (Wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Turn the battery disconnect switch to OFF position. 3. Disconnect connectors L102 and HST3, and insert T-adapters into each female side.		
		Resistance	Between battery relay terminal R04 and HST3 (female) (2), (12) and (22)	Max. 1 Ω
			★ Coil resistance of VIS power supply holding relay Between HST3 (4) and ground	200 to 400 Ω
			Between ground and each of HST3 (21) and (31)	Max. 1 Ω

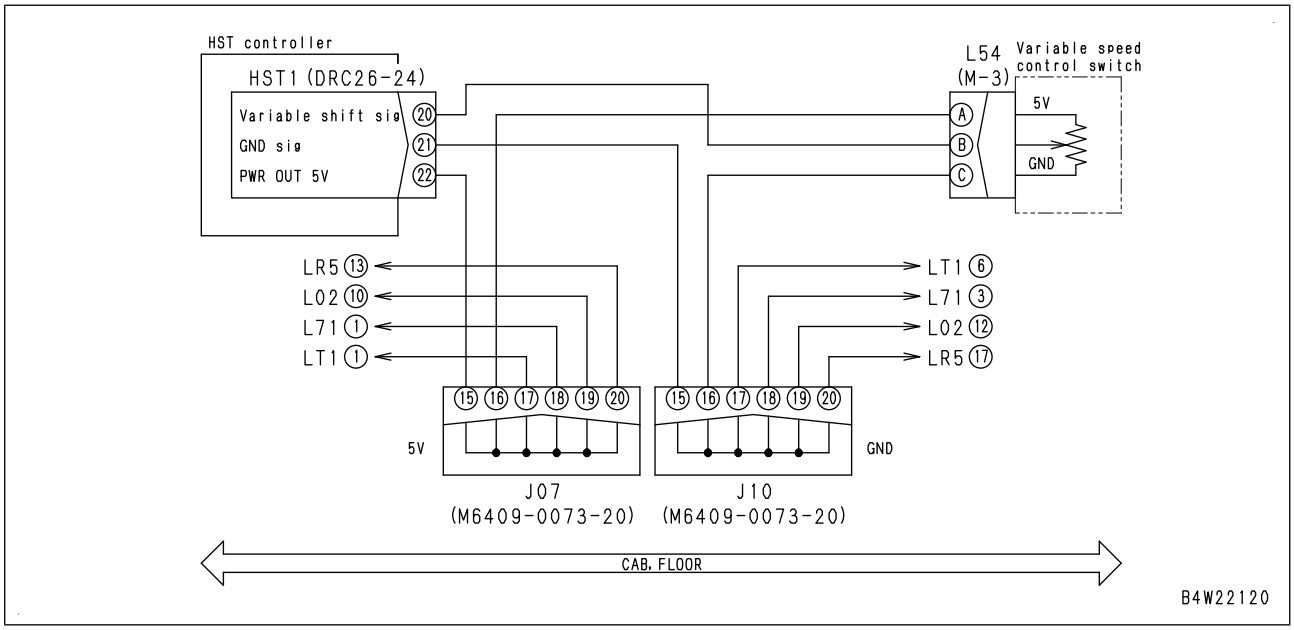
Failure code [DAZQKR] CAN2 Discon (Aircon ECU) *(WA320_7-DAZQKR-400-A-Z0-A)*

Action level	Failure code	Failure	CAN2 Disconnection (Air Conditioner ECU)
L01	DAZQKR		(Detected by monitor controller) (Machine monitor system)
Detail of failure	• Monitor controller does not recognize air conditioner controller over CAN communication-2 line (KOMNET/c).		
Action of controller	• Retains information at time of occurrence of failure. • If cause of failure disappears, machine becomes normal by itself.		
Problem on machine	• Failure codes to be generate by air conditioner controller are not displayed. • Monitoring data for which air conditioner controller is responsible are not updated. • Air conditioner cannot be operated (air does not blow out). • Display of air conditioner operation screen of machine monitor is not correct.		
Related information	• Method of reproducing failure code: Turn starting switch to ON position. • Start of CAN communication is recognized by each controller when ACC signal of starting switch is received. • Monitor controller uses 5 failure codes, [D8AQK4], [D8AQKR], [DAJQKR], [DB2QKR], and [DSJ0KR] to indicate failure in CAN communication through CAN 2 line. When all of these 5 failure codes are displayed simultaneously on screen, ground fault, short circuit, or hot short circuit may occur in wiring harness (CAN communication line). • 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. ★ If fuse-14 in fuse box 2 is blown, machine monitor displays nothing.		

No.	Cause	Procedure, measuring location, criteria, and remarks
1	Defective power supply to air conditioner controller	★ Perform troubleshooting shown in Chapter 80 "Troubleshooting of power supply system".
2	Defective CAN2 communication system	Perform checks on causes 4 to 9 in troubleshooting for failure code [DB2QKR].
3	Defective air conditioner controller	If no failure is found by above checks, air conditioner controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)
4	Defective monitor controller	If no failure is found by above checks, monitor controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)

No.	Cause	Procedure, measuring location, criteria, and remarks			
4	Ground fault in wiring harness (Contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors HST1 and L54, and connect T-adapter to either female side.			
		Resistance	Between ground and HST1 (female) (20) or L54 (female) (B)		Min. 1 MΩ
5	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors HST1 and L54, and connect T-adapter to either female side.			
		Resistance	Between HST1 (female) (20) and (21), or between L54 (female) (C) and (B)		Min. 1 MΩ
6	Defective HST controller	If no failure is found by above checks, HST controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.) • Reference 1. Turn starting switch to OFF position. 2. Insert T-adapter into connector HST1. 3. Turn starting switch to ON position. 4. Start engine.			
		Voltage	Between HST1 (20) and ground	Travel speed control dial: Continuous	0.50 to 4.40 V

Circuit diagram related to travel speed control dial potentiometer



Failure code [DGH1KX] Out of Range of HST Oil Temp. Sensor *(WA320_7-DHG1KX-400-A-Z1-A)*

Action level	Failure code	Failure	HST oil temperature sensor: Out of normal range
L01	DGH1KX		(HST controller system)
Detail of failure	• HST oil temperature sensor detects a temperature of 150°C or higher.		
Action of controller	• Processes while assuming HST oil temperature is 150°C. • Controls fan while ignoring HST oil temperature.		
Problem on machine	• Fan speed may not be set properly, and that causes over-cooling. • Shock may occur when clutch engages.		
Related information	• HST oil temperature can be checked with monitoring function. (Code: 04401) • HST oil temperature sensor voltage can be checked with monitoring function. (Code: 04402) • Method of reproducing failure code: Turn starting switch to ON position. ⚠ **When performing checking and replacement of HSTOil pressure switch, open oil filler port, and check that HST oil temperature cools down enough not to get scalded.**		

No.	Cause	Procedure, measuring location, criteria, and remarks			
1	Defective HST oil temperature sensor	1. Turn starting switch to OFF position. 2. Disconnect connector T10, and connect T-adapter to male side.			
		Resistance	Between T10 (male) (1) and (2)	HST oil temperature: 25°C	42.7 kΩ *
				HST oil temperature: 30°C	35.13 kΩ *
				HST oil temperature: 80°C	6.556 kΩ *
				HST oil temperature: 90°C	4.925 kΩ *
				HST oil temperature: 100°C	3.75 kΩ *
2	Open circuit, short circuit, ground fault, hot short circuit of wiring harness, or defective HST controller	1. Turn starting switch to OFF position. 2. Disconnect connector T10, and connect T-adapter to female side. 3. Turn starting switch to ON position. ★ Voltage of approximately 5 V is applied to temperature sensor signal circuits through resistor in HST controller. ★ Shake the wiring harness by hand while measuring the voltage. If the voltage drops to approximately 0 V during shaking, circuit is open around this point.			
		Voltage	Between T10 (female) (1) and (2)		Approx. 5 V
3	Open or short circuit in wiring harness	★ If no failure is found by check on cause 2, this check is not required. 1. Turn starting switch to OFF position. 2. Disconnect connector HST1 , and connect T-adapter to female side ★ Resistance same check on cause 1.			
		Resistance	Between HST1 (female) (9) and (21)		3.1 to 50kΩ

Failure code [DHPEKA] Failure of Steering & Loader Pump Press. *(WA320_7-DHPEKA-400-A-Z0-A)*

Action level	Failure code	Failure	Failure of Steering and Loader Pump Pressure (HST controller system)
L01	DHPEKA		
Detail of failure	• Due to open circuit or ground fault in pump pressure sensor system, pump pressure signal voltage is lower than the normal range. (HST pump pressure sensor signal voltage: Max. 0.3 V)		
Action of controller	• Assumes pump pressure to be 0 MPa, and performs operation. • If cause of failure disappears, machine becomes normal by itself.		
Problem on machine	• Engine speed and horsepower can be slightly lower than usual, depending on phase of work. • Traction force during digging with auto traction can be higher than usual when traction control is set. • Malfunction of Komatsu SmartLoader Logic • Eco guidance function does not work normally.		
Related information	• Input voltage from steering and work equipment pump pressure sensor can be checked with monitoring function. (Code: 95305) • Steering and work equipment pump pressure can be checked with monitoring function. (Code: 95304) • Method of reproducing failure code: Start engine.		

No.	Cause	Procedure, measuring location, criteria, and remarks			
1	Defective power supply system of pump pressure sensor	★ If failure code [DAJ6KX] is also displayed, perform troubleshooting for it first.			
		1. Turn starting switch to OFF position. 2. Disconnect connector RR03, and connect T-adapter to female side. 3. Turn starting switch to ON position.			
		Voltage	Between RR03 (female) (C) and (A)	Power supply input	4.8 to 5.2 V
2	Defective pump pressure sensor (Internal open or short circuit)	★ Replace sensor and check whether failure code disappears. 1. Turn starting switch to OFF position. 2. Insert T-adapter into connector RR03. 3. Start engine.			
		Voltage	Between RR03 (B) and (A)	Pump pressure: Continuous	0.50 to 4.40 V
				Pump pressure: At Neutral	0.50 to 0.90 V
				Pump pressure: At bucket tilt relief	2.80 to 3.20 V
		Sensor voltage is measured with wiring harness connected. Accordingly, if voltage is abnormal, check harness for failure, and then determine whether sensor is defective or not.			
3	Open circuit in wiring harness (Wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Disconnect connectors HST1, HST2, RR03, and connect T-adapters to each female side.			
		Resistance	★ If no failure is found by check on cause 1, this check is not required. Between HST2 (female) (1) and RR03 (female) (C)		Max. 1 Ω
			Between HST2 (female) (35) and RR03 (female) (B)		Max. 1 Ω
			★ If no failure is found by check on cause 1, this check is not required. Between HST1 (female) (4) and RR03 (female) (A)		Max. 1 Ω

Failure code [DHT8ZG] Steering Oil Pressure Low *(WA320_7-DHT8ZG-400-A-Z0-A)*

Action level	Failure code	Failure	Steering Oil Pressure Low (HST controller system)
L03	DHT8ZG		
Detail of failure	• Steering and work equipment pump pressure is lower than normal range.		
Action of controller	• If cause of failure disappears, machine becomes normal by itself.		
Problem on machine	• Steering may not work. • Work equipment become inoperative. • HST pump swash plate moves to neutral position and machine decelerates until it stops. • Fan speed increases.		
Related information	• Oil pressure sensed by steering and work equipment pump pressure sensor can be checked with monitoring function. (Code: 95304) • Input voltage from steering and work equipment pump pressure sensor can be checked with monitoring function. (Code: 95305) • This failure code is displayed on only machines equipped with emergency steering (optional). • Method of reproducing failure code: Start engine.		

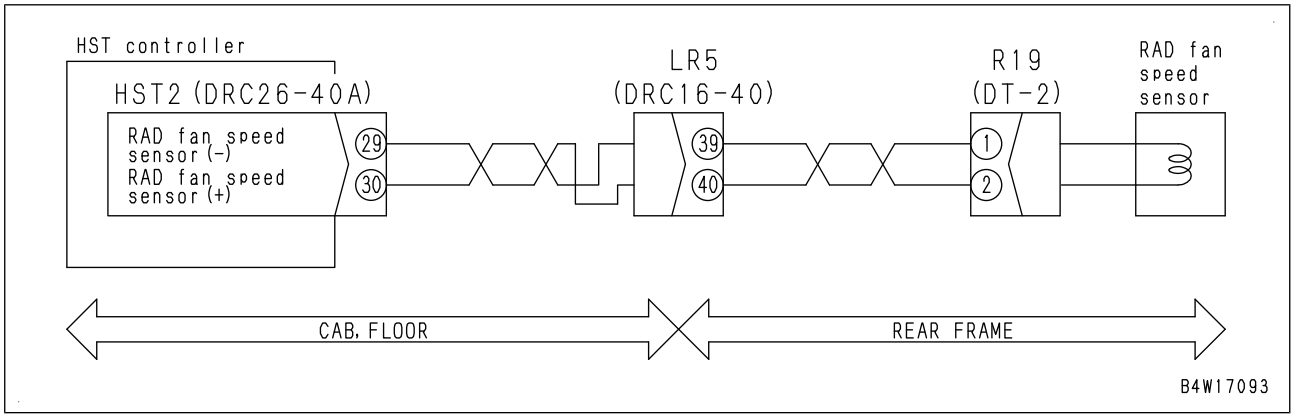
No.	Cause	Procedure, measuring location, criteria, and remarks
1	Defective steering and work equipment pump pressure sensor system	If failure code [DHPEKA] is displayed, perform troubleshooting for that code first.
2	Defective hydraulic system	Perform troubleshooting by referring troubleshooting for hydraulic and mechanical systems (H mode): [H-11, H-12, H-13, H-14]: (Steering wheel is too heavy to turn), (Steering wheel is heavy to turn), (Machine sways or large shocks are made while machine turns), (Machine unintentionally turns when machine travels).

Failure code [DK5EKA] Failure of 3rd Lever Potentio (Sub) *(WA320_7-DK5EKA-400-A-Z0-A)*

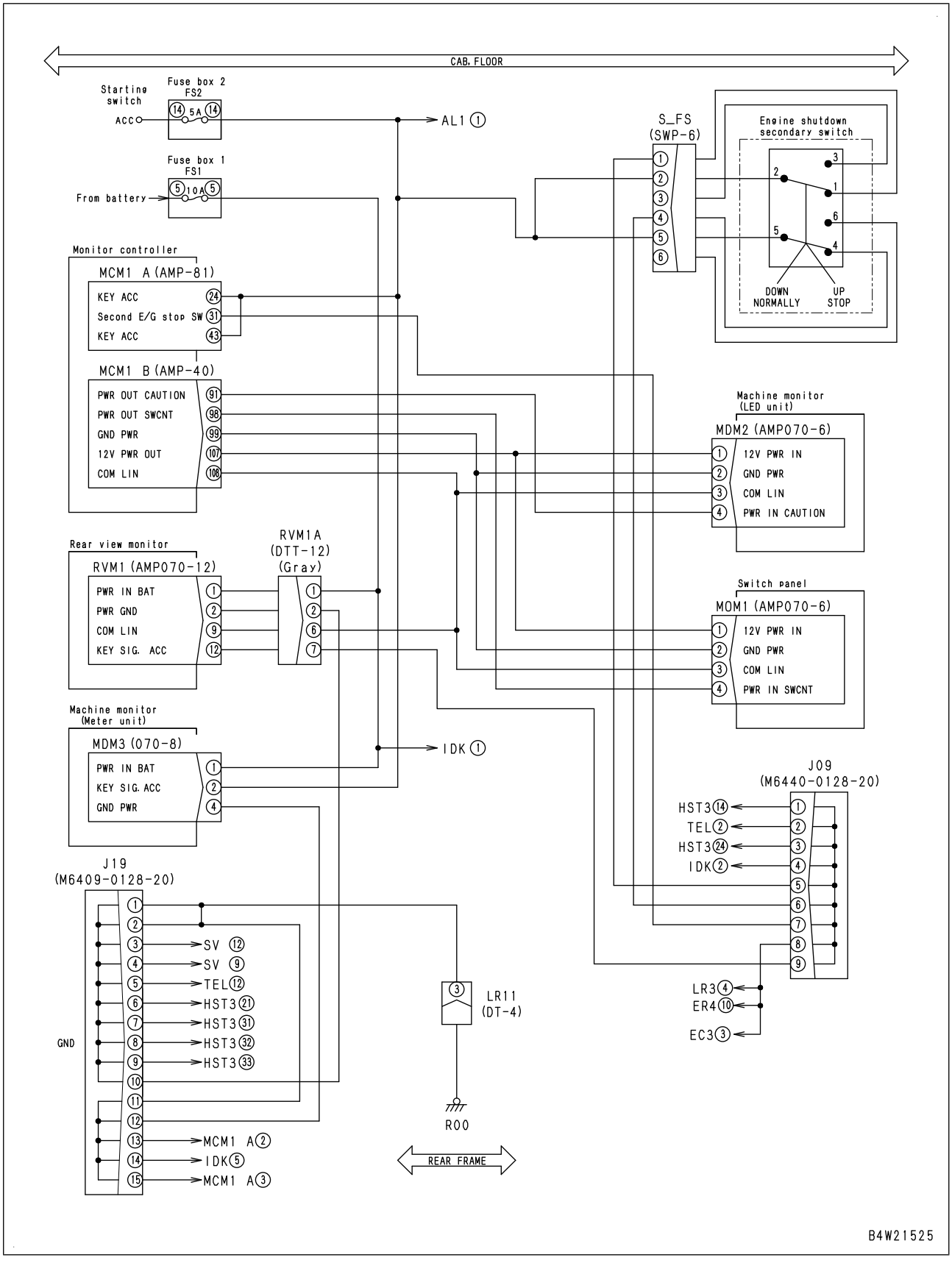
Action level	Failure code	Failure	Failure of 3rd Lever Potentiometer (Sub) (HST controller system)
L03	DK5EKA		
Detail of failure	• Controller determines that 3rd (attachment) lever potentiometer (sub: B line) circuit has open circuit or ground fault because signal voltage from 3rd valve (PCS) potentiometer (sub: B line) is lower than normal range. (Signal voltage from 3rd valve (PCS) potentiometer (sub: B line): Max. 0.3 V)		
Action of controller	• Controls attachment by using signals from 3rd valve (PCS) potentiometer (main: A line) if it is normal. However, in this case, decreases work equipment speed 30%. • Lights up centralized warning lamp and sounds alarm buzzer. • If cause of failure disappears, machine becomes normal by itself.		
Problem on machine	• Work equipment speed decreases 30%.		
Related information	• This failure code does not appear on a machine that is not equipped with 3rd valve (attachment). (If this failure code is displayed on the machine, select "None" for 3rd valve (attachment) setting on option setting screen of machine monitor.) • 3rd valve (PCS) potentiometer input voltage (main: A line) can be checked with monitoring function. (Code: 42018) • 3rd valve (PCS) potentiometer input voltage (sub: B line) can be checked with monitoring function. (Code: 42019) • Method of reproducing failure code: Turn starting switch to ON position.		

No.	Cause	Procedure, measuring location, criteria, and remarks			
1	Defective 5 V sensor power supply system	If failure code [DAJ6KX] is also displayed, perform troubleshooting for it first.			
		1. Turn starting switch to OFF position. 2. Disconnect connector L70, and connect T-adapter to female side. 3. Turn starting switch to ON position. ★ If power supply voltage is abnormal, go to check on cause 3 and after.			
		Voltage	Between L70 (female) (1) and (4)		4.8 to 5.2 V
2	Defective 3rd valve (PCS) potentiometer	1. Turn starting switch to OFF position. 2. Disconnect connector L70, and connect T-adapter to male side.			
		Resistance	Between L70 (male) (1) and ground		Min. 1 MΩ
			Between L70 (male) (2) and ground		
			Between L70 (male) (3) and ground		
			Between L70 (male) (4) and ground		
		3. Turn starting switch to OFF position. 4. Insert T-adapter into connector L70. 5. Set HST lock switch to LOCK position. 6. Turn starting switch to ON position. 7. Operated 3rd valve (PCS) to perform troubleshooting.			
		Voltage	Between L70 (3) and (4)	3rd valve (PCS): NEUTRAL	2.38 to 2.62 V
				3rd valve (PCS): Operated to extend cylinder fully	0.60 to 1.10 V
				3rd valve (PCS): Operated to retract cylinder fully	3.90 to 4.40 V

Circuit diagram related to radiator fan speed sensor



Circuit diagram related to machine monitor power supply

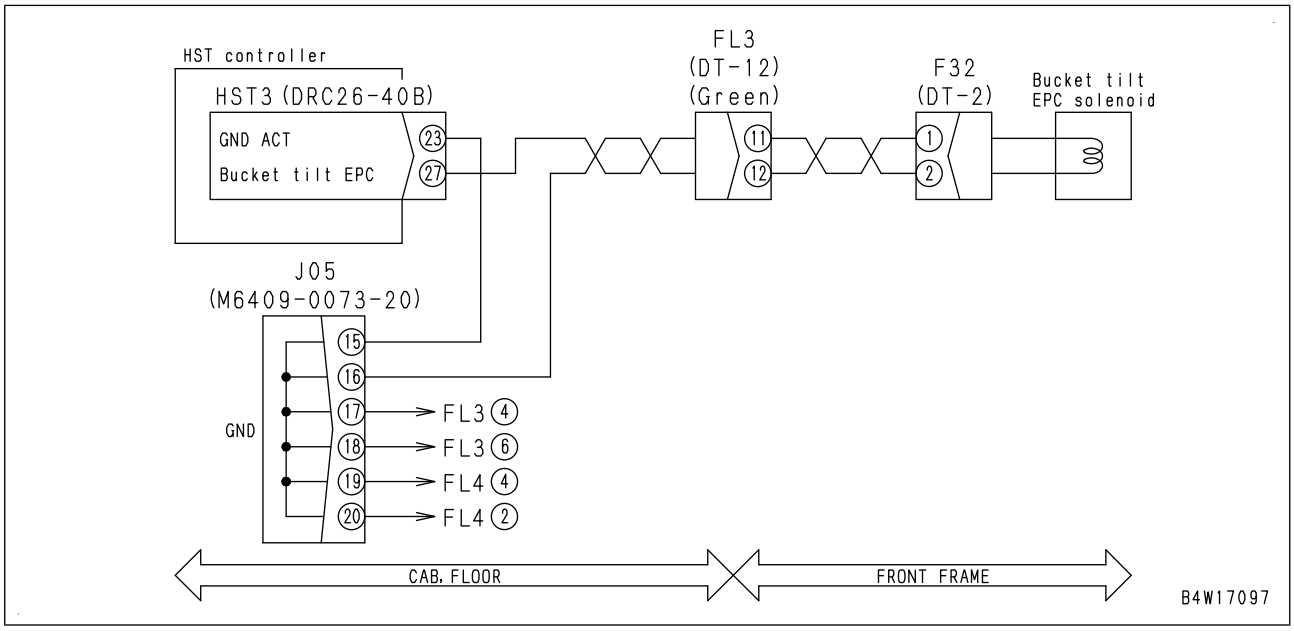


Failure code [DW4RKY] Hot Short of Bucket EPC Solenoid (Tilt) *(WA320_7-DW4RKY-400-A-Z0-A)*

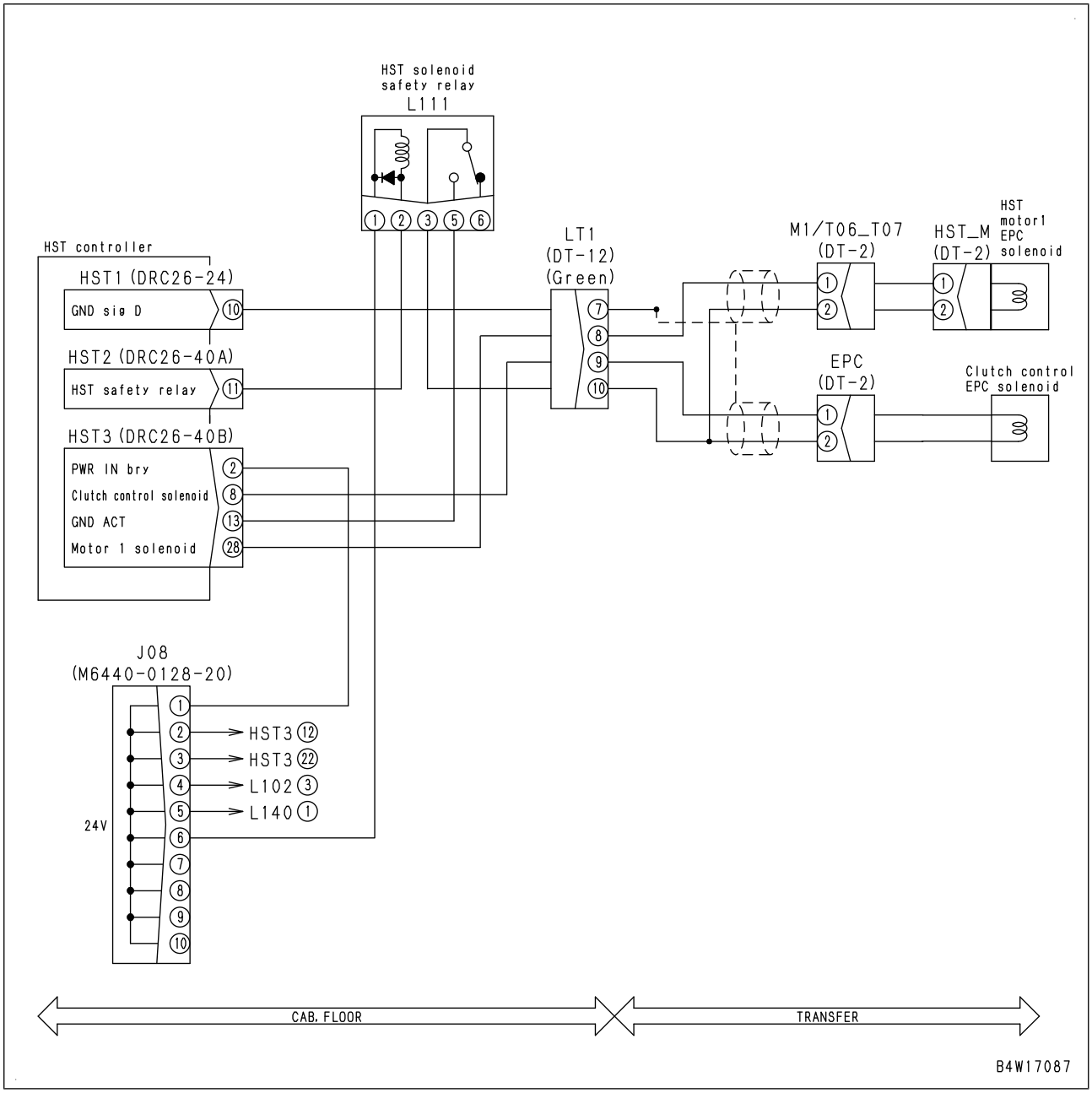
Action level	Failure code	Failure	Hot Short of Bucket EPC Solenoid (Tilt)
L03	DW4RKY		(HST controller system)
Detail of failure	• Due to hot short circuit in signal output circuit to bucket TILT EPC solenoid, abnormal voltage appears when controller does not drive bucket TILT EPC solenoid.		
Action of controller	• Drives work equipment neutral lock solenoid. • Stops driving bucket TILT and 3rd valve (PCS) EXTEND and RETRACT. • Stops driving every work equipment detent. • Lights up centralized warning lamp and sounds alarm buzzer. • Even if cause of failure disappears, machine does not become normal until starting switch is turned to OFF position.		
Problem on machine	• All work equipment do not move because work equipment neutral lock solenoid is energized. • Bucket TILT EPC solenoid may be burnt out.		
Related information	• Output current value to bucket TILT EPC solenoid can be checked with monitoring function. (Code: 41922) • Output current value to 3rd valve (PCS) EXTEND EPC solenoid can be checked with monitoring function. (Code: 41923) • Output current value to 3rd valve (PCS) retract EPC solenoid can be checked with monitoring function. (Code: 41924) • Method of reproducing failure code: Start engine.		

No.	Cause	Procedure, measuring location, criteria, and remarks		
1	Defective bucket TILT EPC solenoid (internal short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector F32, and connect T-adapter to male side.		
		Resistance	Between F32 (male) (1) and (2)	5 to 15 Ω
2	Hot short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector F32, and connect T-adapter to female side. 3. Turn starting switch to ON position.		
		Voltage	Between F32 (female) (1) and (2)	Max. 4.5 V
3	Defective HST controller	If no failure is found by above checks, HST controller may be defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

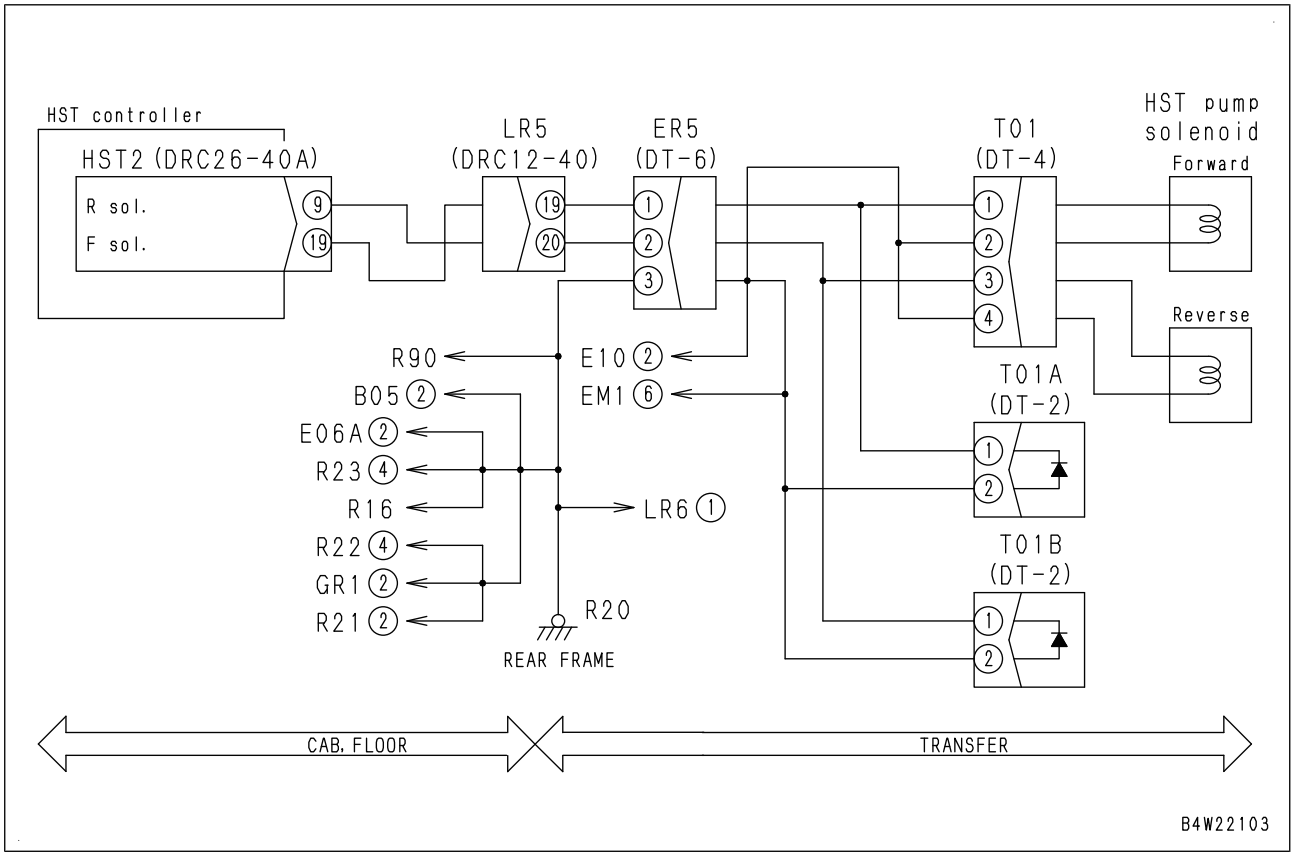
Circuit diagram related to bucket TILT EPC solenoid



Circuit diagram related to HST motor 1 EPC solenoid



Circuit diagram related to HST pump solenoid (reverse)



Failure code [H2K0KY] Hot Short of Quick Coupler Lock Signal *(WA320_7-H2K0KY-400-A-Z0-A)*

Action level	Failure code	Failure	Hot Short of Quick Coupler Lock Signal (Monitor controller system)
L03	H2K0KY		
Detail of failure	• Both ON and OFF signal voltages from quick coupler release switch are abnormal due to hot short circuit in signal circuit of quick coupler release switch.		
Action of controller	• Lights up centralized warning lamp and sounds alarm buzzer. • If cause of failure disappears, machine becomes normal by itself.		
Problem on machine	• Quick coupler release switch does not become OFF. • "Quick coupler lock OFF" indicator lights up while quick coupler release switch is set to OFF position.		
Related information	• Input condition (ON/OFF) from quick coupler release switch can be checked with monitoring function. (Code: 04509) • Input condition from quick coupler release switch OFF can be checked with monitoring function. (Code: 04509) • Applied only to quick coupler specification machines • Since T-adapter for monitor controller connector is "socket-type box", operating voltage cannot be measured at monitor controller connector. • Method of reproducing failure code: Turn starting switch to ON position, or turn starting switch to ON position and turn quick coupler release switch ON.		

No.	Cause	Procedure, measuring location, criteria, and remarks			
1	Defective quick coupler release switch (internal open or short circuit)	1. Turn starting switch to OFF position. 2. Disconnect connector L40, and connect T-adapter to male side.			
		Resistance	Between L40 (male) (A) and (B)	Quick coupler release switch: ON	Max. 1 Ω
				Quick coupler release switch: OFF	Min. 1 MΩ
			Between L40 (male) (C) and (B)	Quick coupler release switch: ON	Min. 1 MΩ
				Quick coupler release switch: OFF	Max. 1 Ω
2	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connector L40, and connect T-adapter to female side. 3. Disconnect connectors MCM1A and F25.			
		Voltage	Between L40 (female) (A) and (B)		Min. 1 MΩ
			Between L40 (female) (A) and (C)		Min. 1 MΩ
3	Hot short circuit in wiring harness (Contact with 24 V circuit)	1. Turn starting switch to OFF position. 2. Insert T-adapter into connector L40. 3. Turn starting switch to ON position.			
		Voltage	Between L40 (B) and ground	Quick coupler release switch: ON	20 to 30 V
				Quick coupler release switch: OFF	Max. 1 V
			Between L40 (C) and ground	Quick coupler release switch: ON	Max. 1 V
				Quick coupler release switch: OFF	20 to 30 V
4	Defective monitor controller	If no failure is found by above checks, monitor controller is defective.			

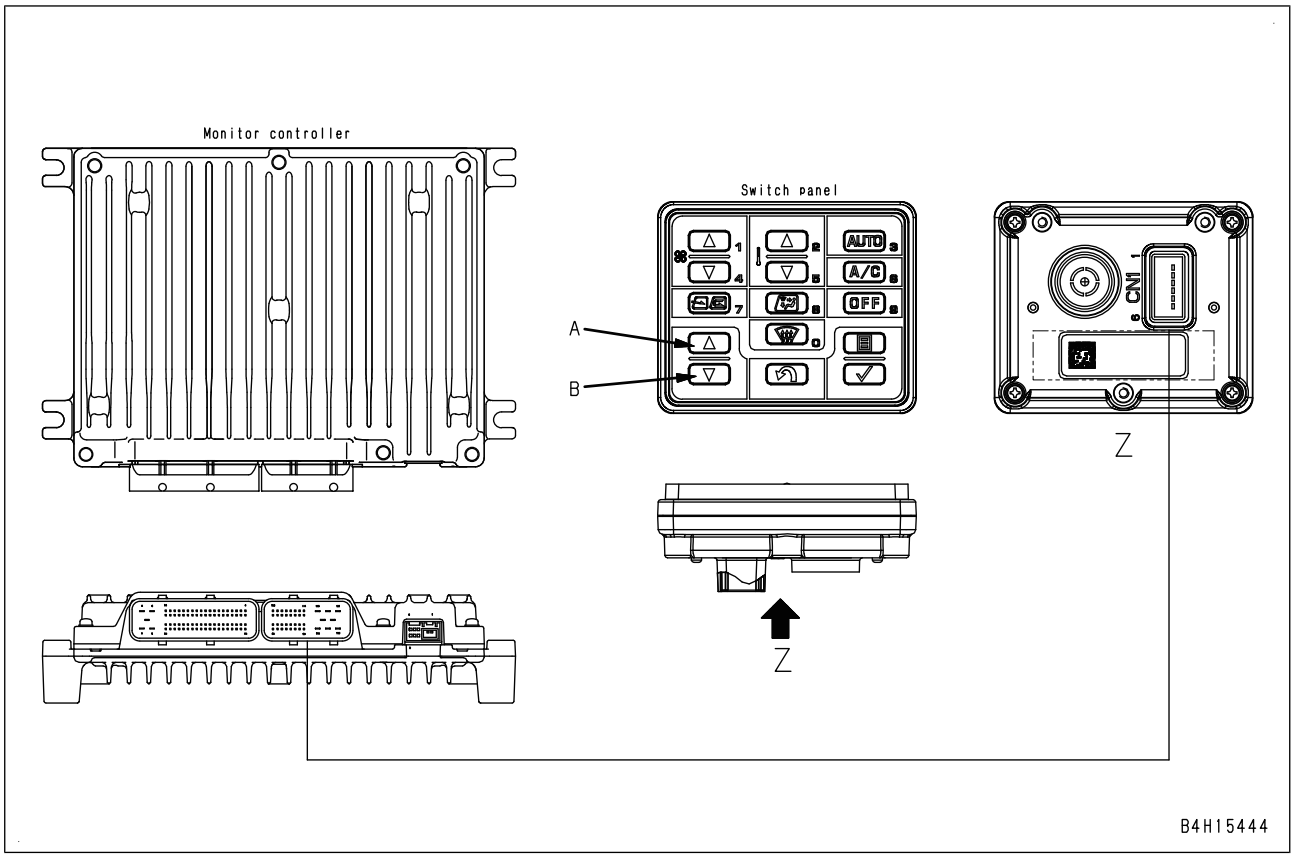
E-5 All of LCD unit, LED unit, and meter unit on machine monitor display nothing *(WA320_7-FH7-400-A-Z0-A)*

Failure	All of LCD unit, LED unit, and meter unit on machine monitor display nothing.
Related information	• Display of rearview monitor is normal. • As T-adapter for monitor controller connector is "socket-type box", operating voltage cannot be measured at monitor controller connector.

No.	Cause	Procedure, measuring location, criteria, and remarks		
1	Incorrect operation of battery disconnect switch	Check that battery disconnect switch is at ON position.		
2	Incorrect operation of engine shutdown secondary switch	Check that engine shutdown secondary switch is at lower (OFF) position.		
3	Defective slow-blow fuse	If slow-blow fuse (50 A fuse) is blown out, circuit may have ground fault. In this case, perform check on cause 8 first.		
4	Defective fuse-1 in fuse box 1 (FS1)	If fuse is blown, circuit may have ground fault, etc. (See check on cause 8.)		
5	Defective fuse-5 in fuse box 1 (FS1) or fuse-14 in fuse box 2 (FS2)	If fuse is blown, circuit may have ground fault. (See check on cause 8.)		
6	Defective continuous power supply system	Perform troubleshooting for failure code [DAF3KK].		
7	Open circuit in wiring harness (Wire breakage or defective contact of connector)	1. Turn starting switch to OFF position. 2. Check that system operating lamp is not lit, and then turn battery disconnect switch to OFF position. 3. Disconnect connector MCM1 A, and connect T-adapter to female side. 4. Turn battery disconnect switch to ON position. 5. Turn starting switch to ON position. ★ Check that engine shutdown secondary switch is at lower (OFF) position.		
		Voltage	Between MCM1 A (female) (43) and (2)	20 to 30 V
			Between MCM1 A (female) (31) and (2)	20 to 30 V
			Between MCM1 A (female) (24) and (3)	20 to 30 V
		★ If no failure is found by above checks, this check is not required. 1. Turn starting switch to OFF position. 2. Check that system operating lamp is not lit, and then turn battery disconnect switch to OFF position. 3. Disconnect connectors MCM1 A, S_FS, and S40, and connect T-adapters to each female side.		
		Resis-tance	Between MCM1 A (female) (24) and (43)	Max. 1 Ω
			Between MCM1 A (female) (24) and S_FS (female) (2)	Max. 1 Ω
			Between MCM1 A (female) (31) and S_FS (female) (1)	Max. 1 Ω
			Between S_FS (female) (1) and (4)	Max. 1 Ω
			Between S_FS (female) (2) and (5)	Max. 1 Ω
			Between S_FS (female) (2) and S40 (female) (4)	Max. 1 Ω
			Between battery (+) terminal and S40 (female) (1)	Max. 1 Ω

No.	Cause	Procedure, measuring location, criteria, and remarks
6	Defective monitor controller	If no failure is found by above checks, monitor controller may be defective.
7	Defective wiring harness	If you cannot perform check on cause 4 for some reason, wiring harness may be defective.

Wiring harness between monitor controller and switch panel of machine monitor



E-21 When brake accumulator oil pressure drops, the brake oil pressure caution lamp does not light *(WA320_7-FP7-400-A-Z0-A)*

Failure	When brake accumulator oil pressure drops, the brake oil pressure caution lamp does not light.
Related information	• Short circuit or ground fault of front brake accumulator oil pressure switch • If normal, brake accumulator oil pressure switch turns OFF when the brake oil pressure drops. • When front brake accumulator oil pressure drops, the brake oil pressure caution lamp does not light. • Input (ON/OFF) from front brake accumulator oil pressure switch can be checked with monitoring function. (Code: 04510)

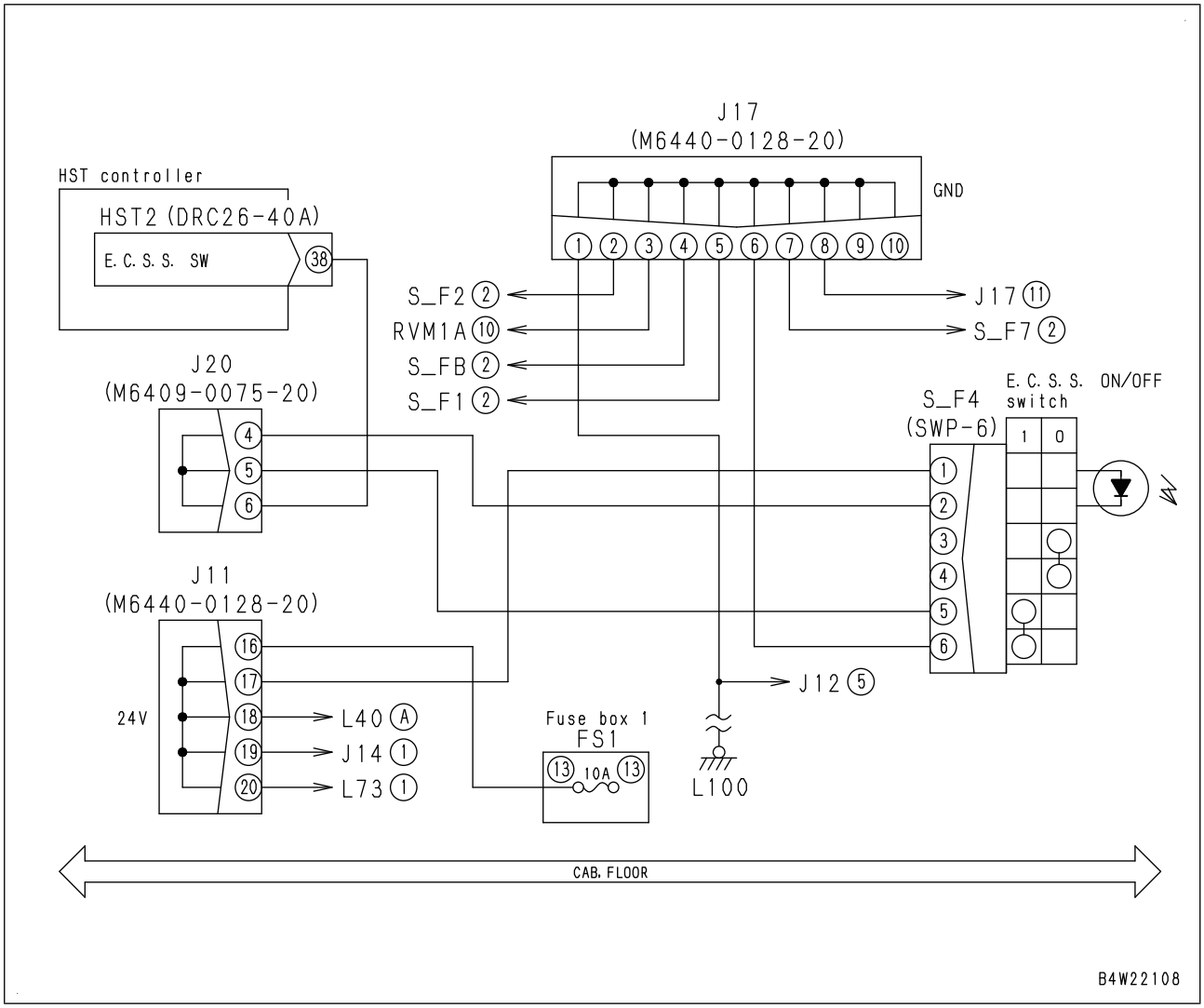
No.	Cause	Procedure, measuring location, criteria, and remarks		
1	Defective front brake accumulator oil pressure switch (internal short circuit)	1. Turn starting switch to OFF position. 2. Make sure that the brake oil pressure is 3.9 MPa {40 kg/cm^2} or lower. 3. Disconnect connector T13, and connect T-adapter to male side.		
		Resistance	Between T13 (male) (1) and (2)	Min. 1 MΩ
			Between T13 (male) (1) and ground	Min. 1 MΩ
2	Ground fault in wiring harness (Contact with ground circuit)	1. Turn starting switch to OFF position. 2. Disconnect connectors MCM1 A and T13, and connect T-adapter to either female side.		
		Resistance	Between ground and MCM1 A (female) (73) or T13 (female) (1)	Min. 1 MΩ
3	Short circuit in wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors MCM1 A and T13, and connect T-adapter to either female side.		
		Resistance	Between ground and MCM1 A (female) (73), or between T13 (female) (1) and (2)	Min. 1 MΩ
4	Defective monitor controller	If no failure is found by above checks, monitor controller is defective. (Since this is an internal defect, troubleshooting cannot be performed).		

E-32 When emergency HST pump drive switch is operated, emergency HST pump does not work or when emergency HST pump drive switch is not operated, emergency HST pump works *(WA320_7-HBL-400-A-Z0-A)*

Failure	When emergency HST pump drive switch is operated, emergency HST pump does not work or when emergency HST pump drive switch is not operated, emergency HST pump works.
Related information	• Since it is difficult to disconnect connector E50, use intermediate connector ER4 for troubleshooting.

No.	Cause	Procedure, measuring location, criteria, and remarks		
1	Defective solenoid system	If failure code [DXAWKA], [DXAWKB] or [DXAWKY] is displayed, perform troubleshooting for [DXAWKA], [DXAWKB] or [DXAWKY] first.		
		• Reference 1. Turn starting switch to OFF position. 2. Disconnect connector ER4, and connect T-adapter to female side.		
		Resistance	Between ER4 (female) (1) and (2)	20 to 30 Ω
2	Defective fuse-15 in fuse box 1	If fuse is blown, circuit may have ground fault, etc.		
3	Defective switch	1. Turn starting switch to OFF position. 2. Disconnect connector C26, and connect T-adapter to male side. 3. Turn emergency HST pump drive switch to OFF position. ★ Check by using multimeter in continuity mode.		
		Continuity	Between C26 (male) (1) and C26 (male) (3)	Continuity
			Between C26 (male) (1) and each pin other than C26 (male) (3)	No continuity
			Between C26 (male) (2) and C26 (male) (4)	Continuity
			Between C26 (male) (2) and each pin other than C26 (male) (4)	No continuity
			Between C26 (male) (8) and each pin other than C26 (male) (8)	No continuity
			Between C26 (male) (9) and C26 (male) (7)	Continuity
			Between C26 (male) (9) and each pin other than C26 (male) (7)	No continuity
		1. Turn starting switch to OFF position. 2. Disconnect connector C26, and connect T-adapter to male side. 3. Turn emergency HST pump drive switch to ON position. ★ Check by using multimeter in continuity mode.		
		Continuity	Between C26 (male) (1) and each pin other than C26 (male) (1)	No continuity
			Between C26 (male) (2) and each pin other than C26 (male) (2)	No continuity
			Between C26 (male) (8) and C26 (male) (5)	Continuity
			Between C26 (male) (8) and each pin other than C26 (male) (5)	No continuity
			Between C26 (male) (9) and C26 (male) (6)	Continuity
			Between C26 (male) (9) and each pin other than C26 (male) (6)	No continuity

Circuit diagram related to ECSS switch



<table>
<tr><th>No.</th><th>Cause</th><th colspan="3">Procedure, measuring location, criteria, and remarks</th></tr>
<tr><td rowspan="11">5</td><td rowspan="11">Open circuit in wiring harness
(Wire breakage or defective contact of connector)</td><td colspan="3">★ If no failure is found by above checks, this check is not required.
• Secondary side input of rear working lamp relay L123
1. Turn starting switch to OFF position.
2. Disconnect connector L123, and connect T-adapter to female side.
3. Turn starting switch to ON position.</td></tr>
<tr><td>Voltage</td><td>Between L123 (female) (3) and (2)</td><td>20 to 30 V</td></tr>
<tr><td colspan="3">★ If no failure is found by above checks, this check is not required.
• Rear working lamp line
1. Turn starting switch to OFF position.
2. Disconnect connector L123, and connect T-adapter to female side.
★ Since the resistance of each working lamp is approximately 8 Ω and 2 lamps are connected in parallel, the standard value is approximately 4 Ω.
★ If the reading is approximately 8 Ω one of the circuits is open. If the reading is above 1 MΩ, both circuits are open.</td></tr>
<tr><td>Resis-tance</td><td>Between L123 (female) (5) and ground</td><td>Approxi-mately 4 Ω</td></tr>
<tr><td colspan="3">★ If no failure is found by above checks, this check is not required.
• Input line of the switch.
1. Turn starting switch to OFF position.
2. Disconnect connector S_F2, and connect T-adapter to female side.
3. Turn starting switch to ON position.</td></tr>
<tr><td>Voltage</td><td>Between S_F2 (female) (6) and ground</td><td>20 to 30 V</td></tr>
<tr><td colspan="3">★ If no failure is found by above checks, this check is not required.
1. Turn starting switch to OFF position.
2. Remove fuse-13 in fuse box 2 (FS2).
3. Disconnect connectors S_F2, L123, G04, and G05, and connect T-adapters to each female side.</td></tr>
<tr><td rowspan="5">Resis-tance</td><td>Between S_F2 (female) (5) and L123 (female) (1)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between L123 (female) (2) and ground</td><td>Max. 1 Ω</td></tr>
<tr><td>Between FS2-13 and L123 (female) (3)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between L123 (female) (5) and G04 (female) (2)</td><td>Max. 1 Ω</td></tr>
<tr><td>Between L123 (female) (5) and G05 (female) (2)</td><td>Max. 1 Ω</td></tr>
</table>

E-54 Front wiper does not operate *(WA320_7-FG1-400-A-Z0-A)*

Failure	Front wiper does not operate.
Related information	• Front wiper does not operate due to the failure of front wiper motor, front wiper switch, interval wiper timer or wiring harness. • If the wiper does not work properly in INT only, try with another interval wiper timer.

No.	Cause	Procedure, measuring location, criteria, and remarks			
1	Defective fuse-14 in fuse box 1 (FS1)	If fuse is blown, circuit may have ground fault, etc. (See check on cause 6.)			
2	Open circuit in wiring harness 1 (wire breakage or defective contact of connector)	• Ground line of front wiper motor 1. Turn starting switch to OFF position. 2. Disconnect connector L57, and connect T-adapter to female side.			
		Resistance	Between L57 (female) (3) and ground		Max. 1 Ω
3	Defective front wiper motor (Internal defect)	• Front wiper motor input voltage 1. Turn starting switch to OFF position. 2. Insert T-adapter into connector L57. 3. Turn starting switch to ON position. 4. Operate the front wiper switch and perform troubleshooting. ★ If the following voltage is normal but front wiper does not operate, front wiper motor is defective. ★ Since intermittent wiper action is created by handshaking signals of front wiper motor and interval wiper timer, repeating pulses will not be available at pin 2 of L57 when front wiper motor connector is disconnected.			
		Voltage	Between L57 (6) and ground	Power supply	20 to 30 V
			Between L57 (2) and ground	Front wiper switch: Lo	20 to 30 V
				Front wiper switch: INT	0 V → 20 to 30 V → 0 V are repeated*
			Between L57 (1) and ground	Front wiper switch: Hi	20 to 30 V
		★ If wiper switch is turned OFF while wiper is operating, voltage is generated between L57 (5) and ground until the wiper motor stops.			
4	Defective front wiper switch (internal defect)	1. Turn starting switch to OFF position. 2. Disconnect connector L21, and connect T-adapter to male side.			
		Resistance	Between L21 (male) (7) and (5)	Front wiper switch: Lo	Max. 1 Ω
				Front wiper switch: INT, Hi	Min. 1 MΩ
			Between L21 (male) (7) and (4)	Front wiper switch: Hi	Max. 1 Ω
				Front wiper switch: INT, Lo	Min. 1 MΩ
			Between L21 (male) (7) and (2)	Front wiper switch: INT	Max. 1 Ω
				Front wiper switch: Lo, Hi	Min. 1 MΩ
			Between L21 (male) (3) and (5)	Front wiper switch: INT	Max. 1 Ω
				Front wiper switch: Lo, Hi	Min. 1 MΩ
			Between ground and L21 (male) (2) or (3) or (4) or (5) or (7)		Min. 1 MΩ

H-1 Machine does not travel forward or backward *(WA320_7-BH0-400-A-Z0-A)*

Failure	Machine travels neither forward nor backward
Related information	• Check whether the level and type of oil in the hydraulic tank is appropriate. • Check the hydraulic hoses, pump and motor for oil leakage. • If any failure code is displayed, perform troubleshooting for that failure code first. (DDB6L4, DXAWKA, DXAWKB, DAJ0KK, DAJ2KK, DAJ1KA, DAJQKR) • Check drive shaft, etc. for abnormalities. • Check that parking brake is surely released. • HST oil pressure (MB) and HST oil pressure (MA) can be checked with monitoring function. (Monitoring code: 32606 (MB), 32608 (MA)) ★ When checking by using the monitor, note that an error within ±0.5 MPa can be included in the reading due to tolerance of the sensor. • Steering and work equipment pump pressure can be checked with monitoring function. (Monitoring code: 95304) ★ When checking by using the monitor, note that an error within ±0.5 MPa can be included in the reading due to tolerance of the sensor. • Engine speed can be checked with monitoring function. (Monitoring code: 01002) • Inching pedal angle sensor voltage can be checked with monitoring function. (Monitoring code: 44107)

No.	Cause	Procedure, measuring location, criteria, and remarks			
1	Defective damper or coupling	When machine travels neither forward nor reverse, and steering, work equipment, and cooling fan also malfunction, damper or coupling may have failure.			
2	Defective steering and work equipment pump	• When machine travels neither forward nor reverse, and steering and work equipment also malfunction,steering and work equipment pump may have failure. • Check return filter and suction strainer for foreign materials such as metal particles. • Disconnect steering and work equipment pump outlet hose, crank engine, and check that oil flows out.			
3	Defective air suction on suction side of steering and work equipment pump	• When machine travels neither forward nor reverse, and steering and work equipment, check for cracks in suction side piping.			
4	Defective strainer of steering and work equipment pump	• When machine travels neither forward nor reverse, and steering and work equipment, steering and work equipment pump strainer may be clogged. Check it.			
5	Defective priority valve (unload valve)	• When machine travels neither forward nor reverse, and steering and work equipment, unload valve may have failure. ★ Be ready with engine stopped, then perform troubleshooting with engine at high idle and machine not traveling.			
		Steering and work equipment pump oil pressure	All control levers	NEUTRAL	3.1 to 4.3 MPa {32 to 44 kg/cm^2}
6	Defective self-pressure reducing valve	• When machine travels neither forward nor reverse, and steering and work equipment, self-pressure reducing valve may have failure. Check it. ★ Be ready with engine stopped, then perform troubleshooting with engine at high idle and machine not traveling.			
		Self-pressure reducing valve output pressure	All control levers	NEUTRAL	2.7 to 3.4 MPa {28 to 35 kg/cm^2}
		• Output pressure becomes source pressure of HST pump EPC valve (EV valve) pilot pressure.			

H-13 Machine sways or large shocks are made while machine turns *(WA320_7-L54-400-A-Z0-A)*

Failure	Machine sways or large shocks are made while machine turns.
Related information	• Check that steering shaft is not damaged. • Check that play of steering wheel is normal. • Check that inflation pressure is normal. • Steering and work equipment pump pressure can be checked with monitoring function. (Monitoring code: 95304)

No.	Cause	Procedure, measuring location, criteria, and remarks			
1	Defective Orbitrol	If machine sways while traveling on an uneven road without turning the steering wheel, Orbitrol may have failure. ★ Be ready with engine stopped, then perform troubleshooting with engine at high idle and machine not traveling.			
		Steering cylinder pressure	Steering wheel	Operation	Pressure must be developed while steering wheel is operated.
2	Defective cushion valve	If machine sways while traveling on an uneven road without turning the steering wheel, and excessive shocks are made at starting, ending or reversing steering wheel rotation, cushion valve may have failure. Check spool for sticking.			
3	Defective Orbitrol (safety valve)	If either of full right and left relief pressures is low, Orbitrol (safety valve) may have failure. Replace the assembly because it cannot be adjusted when it is installed to actual machine. ★ Be ready with engine stopped, then perform troubleshooting with engine at high idle and machine not traveling.			
		Steering relief pressure	Steering cylinder	relief	20.6 (+1.03/-2.06) MPa {210 (+10.5/-21) kg/cm^2}
4	Defective priority valve (main spool)	If machine sways while turning the steering wheel, priority valve (main spool) may have failure. Check that spool moves smoothly and it is not stuck.			
5	Defective priority valve (LS bypass line)	If machine sways while turning the steering wheel, priority valve (LS bypass line) may have failure. Choke LS bypass to check filter for clogging.			
6	Defective steering cylinder	If machine sways while traveling on an uneven road without turning the steering wheel, steering cylinder may have failure. ★ Be ready with engine stopped, then perform troubleshooting with engine at high idle and machine not traveling.			
		Disconnect hydraulic hose from steering cylinder head end, set frame lock bar, and extend the steering cylinder of the disconnected side to relieve it hydraulically. If oil flows out of cylinder, piston ring of steering cylinder is defective.			

H-29 Hydraulic drift of bucket is large *(WA320_7-MS2-400-A-Z0-A)*

Failure	Hydraulic drift of bucket is large.
Related information	• If any failure code is displayed, perform troubleshooting for that failure code first. • Steering and work equipment pump pressure can be checked with monitoring function. (Monitoring code: 95304)

<table>
<tr><th>No.</th><th>Cause</th><th colspan="4">Procedure, measuring location, criteria, and remarks</th></tr>
<tr><td rowspan="3">1</td><td rowspan="3">Defective suction safety valve</td><td colspan="4">★ Be ready with engine stopped, then perform troubleshooting with engine at high idle.</td></tr>
<tr><td>Steering and work equipment pump pressure</td><td>Bucket control lever</td><td>Bucket TILT relief</td><td>30.4 (+1.57/-3.92) MPa
{310 (+16/-40) kg/cm^2}</td></tr>
<tr><td colspan="4">If only relief pressure of bucket tilt side is low, valve seat of suction safety valve in tilt circuit may have failure.</td></tr>
<tr><td>2</td><td>Defective sealing of main spool of bucket control valve</td><td colspan="4">When boom is raised and hydraulic hose is disconnected from bucket cylinder head end, if oil does not flow out of cylinder and bucket cylinder drifts hydraulically, sealing of spool may have failure.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Defective bucket cylinder</td><td colspan="4">★ Raise boom, stop engine, and then perform troubleshooting.</td></tr>
<tr><td colspan="4">If oil flows out of cylinder when boom is raised, and hydraulic hose is disconnected from bucket cylinder head side, piston ring of cylinder is defective.</td></tr>
</table>

S-7 Engine runs rough or is unstable *(WA380_7-A40-400-A-Z0-A)*

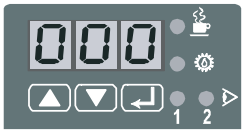
Failure	Engine runs rough or is unstable.
Related information	• If any failure code is displayed, perform troubleshooting for that code first.

No.	Cause	Point to check, remarks	Remedy
1	Insufficient fuel in tank	• Fuel tank is empty.	Add fuel.
2	Clogged air breather hole in fuel tank cap	• Air breather hole in fuel tank cap is clogged.	Flush air breather hole in fuel tank cap and clean surrounding area.
3	Clogged fuel filter element	• Check used hours of fuel filter. If used beyond specified hours, fuel filter element may be clogged.	Replace fuel filter element.
4	Foreign material in fuel	• Rust and water are found in fuel drained from fuel tank.	Replace fuel.
5	Air in fuel piping system	• Air is bled during air bleeding of fuel system. (Reference: See Testing and adjusting, "Bleeding air from fuel system".)	Perform air bleeding. Repair or replace fuel piping.
6	Leakage from fuel piping system	• Fuel leaks from fuel piping. (Reference: See Testing and adjusting, "Checking fuel circuit for leakage".)	Repair or replace fuel piping related parts.
7	Fuel leakage from boost system	• Check boost system (between KVGT outlet and aftercooler, aftercooler and air intake manifold) for fuel leakage.	Repair or replace boost piping related parts.
8	Defective mass air flow and temperature sensor	• Replace sensor and check whether symptom disappears. (Failure code may not be generated if sensor is covered with dust.)	Replace mass air flow and temperature sensor.

Troubleshooting of Central Lubrication System (CLS)

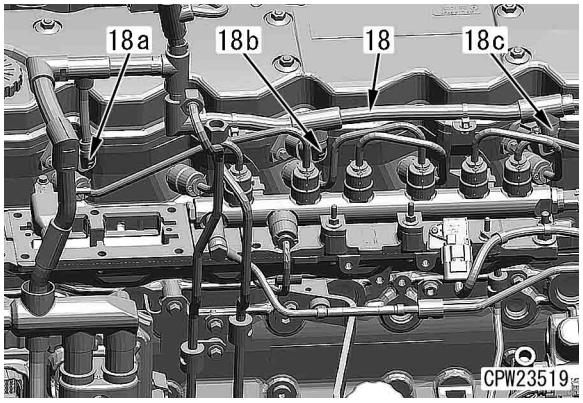
Troubleshooting FPS

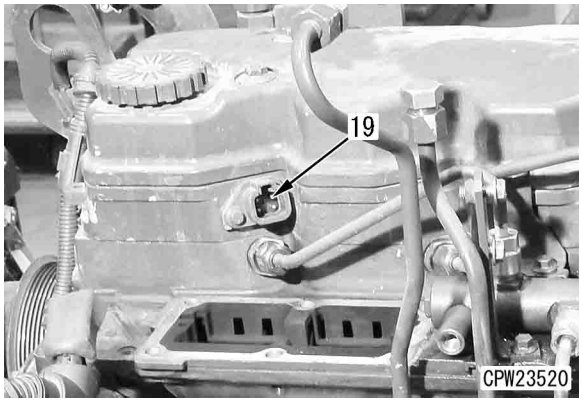
In case FPS is displayed, change the pump system monitoring as shown.

Step	Key	Display	
1	Press for more than 2s		Display flashes (Code 000, factory setting)
2	Press briefly (confirm code)		Automatically indicates first parameter Example: „pause in timer operation“ LED „PAUSE“ flashes
3	Operate keys until		Monitoring menu is displayed
4	Press briefly		Monitoring deactivated (factory setting)
5	Press appropriate key until	 monitoring with cycle switch is active LED „CS“ flashes	 or Is not permissible for progressive systems!
6	Press briefly	Confirm new settings	
7	Press for more than 2s	New settings are written to the memory, and the LED indicators extinguish	

Work	Symbol		Part No.	Part name	Necessity	Q'ty	New/Redesign	Sketch	Contents of work
Disassembly and assembly of axle housing assembly Disassembly and assembly of differential assembly	H	13	799-301-1500	Oil leak tester	■	1			Operation check of clutch piston
		14	797-101-1211	Wrench	■	1			Removal and installation of nut of pinion shaft
		15	793-615-1100	Wrench	■	1			Measurement of the operating torque of limited slip differential under no load
		16	793T-422-1520	Push tool	■	1	N	○	Press-fitting of bearing into pinion shaft
		17	797T-423-1320	Push tool	■	1		○	
		18	792T-413-1130	Push tool	■	1		○	Press-fitting of cage oil seal into pinion shaft
		19	793-520-2202	Installer	●	3			Installation of brake piston and checking brake oil leakage
		20	790-190-1500	Pump assembly	■	1			Checking brake oil leakage
		21	799-101-5210	Nipple	■	1			
		22	793T-422-1611	Plate	■	1		○	
		23	791T-465-1210	Push tool	■	1		○	Removal of shaft
		24	790-201-3280	Bolt (14 x 2.0 mm)	●	4			Removal of cage assembly
		25	790-201-3260	Bolt (12 x 1.75 mm)	●	2			Removal and installation of upper cover and bearing carrier
		26	791-615-2130	Sleeve	■	1			Removal of pinion gear assembly
		27	790-101-3000	Push puller	■	1			Removal of bearing of carrier
		28	79G-05V-1400	Bar	■	1			Removal of bearing outer race of differential case
		29	Commercially available	Depth gauge	●	1			Plate thickness selection
		30	Commercially available	Torque wrench	●	1			Measurement of the operating torque of sun gear shaft under no load
		31	792T-423-1320	Push tool	■	1	N	○	Installation of bearing of carrier
		32	Commercially available	Dial gauge	●	1			Measurement of backlash of bevel gear
		33	790-201-2730	Spacer	■	1			Installation of bearing of long cage shaft
		34	793T-623-1170	Push tool	■	1	N	○	Installation of long cage shaft assembly
		35	793T-422-1510	Spacer	■	1	N	○	Removal of bearing of differential case
		36	790-101-3401	Puller	■	1			
			790-101-3920	Bolt	■	1			
		37	790-201-2760	Spacer	■	1			Installation of bearing of differential case
		38	793T-613-1340	Spacer	■	1	N	○	

★ Do not remove injector harness connector (19) from the rocker housing other than it is required.

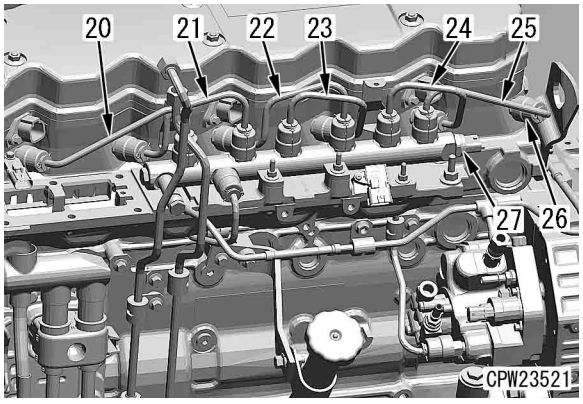




12.Remove the high-pressure pipes in accordance with the following procedure. [*4]
1) Remove fuel spray prevention caps (26) (6 places) of high-pressure pipes (20) to (25).
2) Disconnect high-pressure pipes (20) to (25) from the cylinder head.

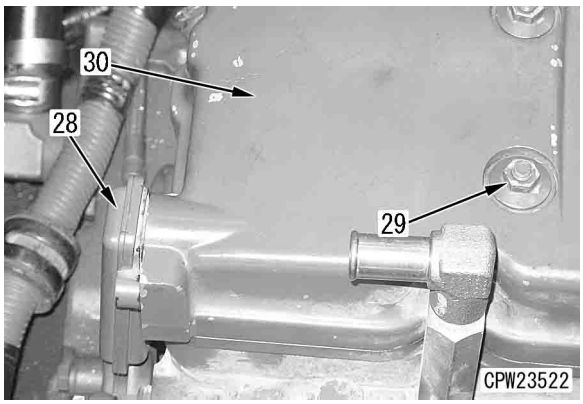
★ Also remove boot on the common rail side, and loosen sleeve nut beforehand.

★ Do not remove common rail pressure sensor (27) for any purpose other than replacement. [*5]



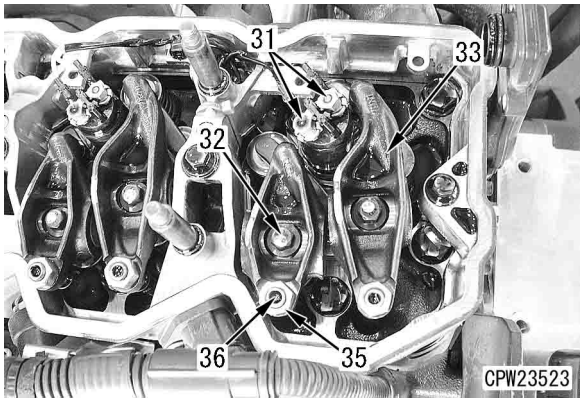
13.Remove blowby duct (28). [*6]
14.Remove mounting nuts (29) (6 pieces), and remove head cover (30). [*7]

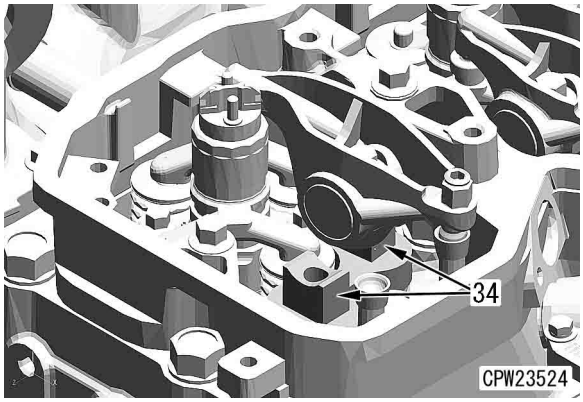
★ Clean the surrounding area in advance to prevent intrusion of mud and dirt.



15.Remove harness nut (31) from the injector assembly.
16.Remove mounting bolts (32) of the rocker arm assembly, and remove rocker arm assembly (33) and rocker arm support (34).

★ Loosen lock nuts (35), and then loosen adjustment screws (36) a few turns each so that excessive force does not apply to the push rods when the rocker arm assembly is installed.





17.Remove crossheads (37).

★ Record the locations and directions of the crossheads (hole shapes of parts "a" and "b"). (Install them in the recorded directions when reassembling.)

Removal and installation of engine hood assembly *(WA320-H540-924-K-00-A)*

⚠ Place the machine on a level ground, and turn the parking brake switch to ON position.

⚠ Set the frame lock bar to LOCK position, and chock the wheels.

⚠ Lower the work equipment to the ground, and set the work equipment lock switch to LOCK.

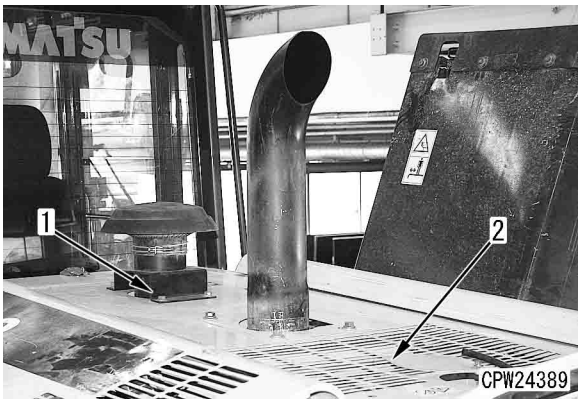
⚠ Turn the starting switch to OFF position and stop the engine.

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

Removal *(WA320-H540-520-K-00-A)*

★ Remove grille assembly. For details, see "Removal and installation of counterweight assembly."

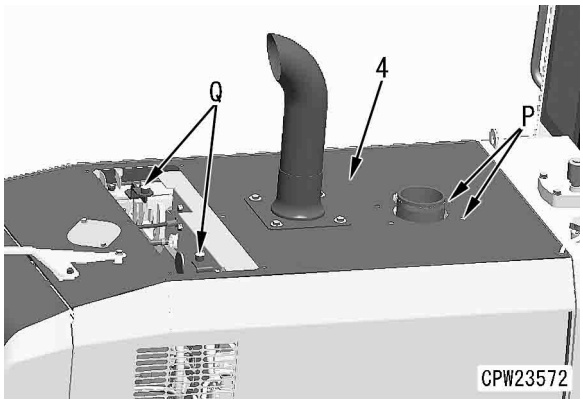
1. Remove rain cap bracket (1).
2. Remove cover (2).

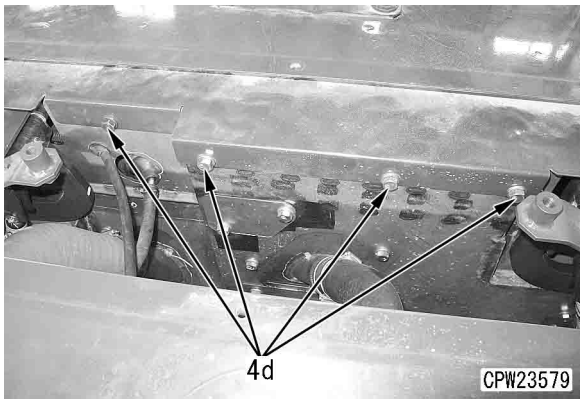


3. Install eyebolt to (P) and (Q) parts, and sling engine hood assembly (4).

   ★ Thread diameter
   Part (P): 12 mm
   Part (Q): 10 mm

4. Remove bolts (4d) (4 pieces), and separate the ceiling and the partition plate.





5. Open engine side cover (3) on each side, and fix them securely.

   ★ Check that they are securely locked.

6. Remove cover (6).
7. Disconnect clamp (8) of radiator overflow hose (7) from engine hood assembly (4). (5 places)
8. Disconnect lock bar (9) from lock bracket (10).

Removal and installation of cooling fan and fan motor assembly *(WA320-B5L0-924-K-00-A)*

⚠ Place the machine on a level ground, and turn the parking brake switch to ON position.

⚠ Set the frame lock bar to LOCK position, and chock the wheels.

⚠ Lower the work equipment to the ground, and set the work equipment lock switch to LOCK.

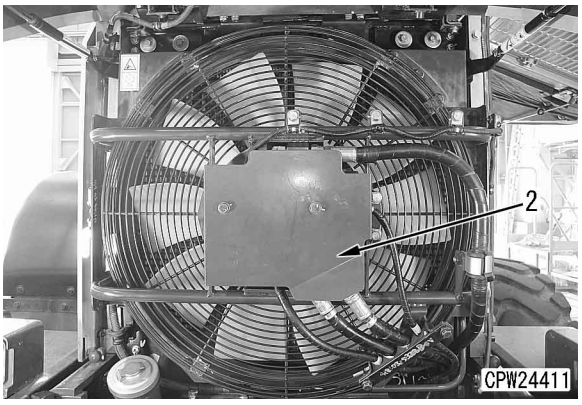
⚠ Turn the starting switch to OFF position and stop the engine.

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

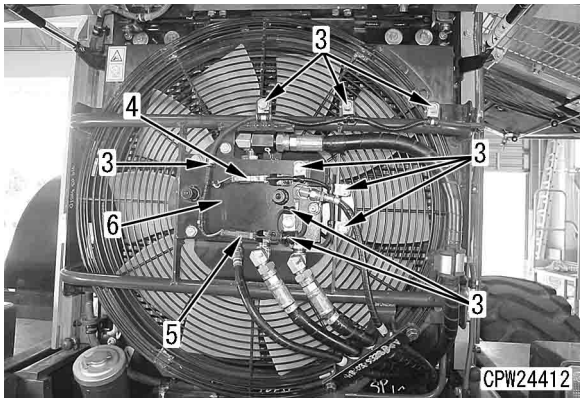
Removal *(WA320-B5L0-520-K-00-A)*

1. Open radiator grille (1).

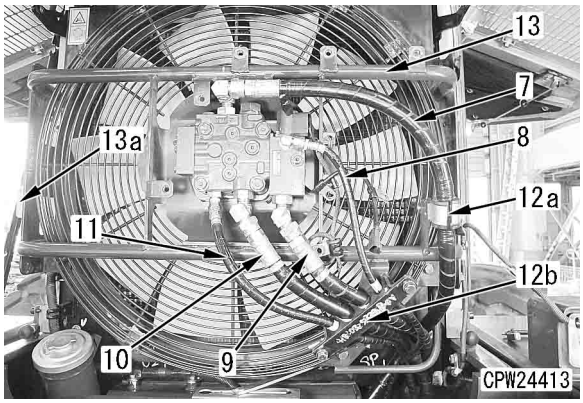
2. Remove cover (2).

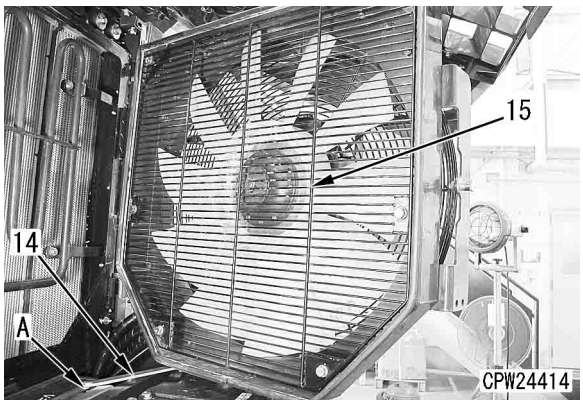


3. Remove clamps (3) (9 pieces).
4. Disconnect connectors CN-R59 (4) and CN-R18 (5).
5. Remove cover (6).



6. Disconnect hoses (7) to (11) (5 pieces).
   ★ Plug the disconnected hoses and ports to prevent oil leakage.
7. Remove clamps (12a) and (12b).
8. Pull lever (13a) downward, and open fan guard assembly (13).
   ★ Securely place stopper ring (14) to LOCK position (A).
9. Remove guard (15).





10. Remove mounting bolt (16a), and remove nut (16) and stopper plate (17). [*1]

Sleeve nut of hose (7):
25 ± 1.5 Nm {2.55 ± 0.15 kgm}

[*2]

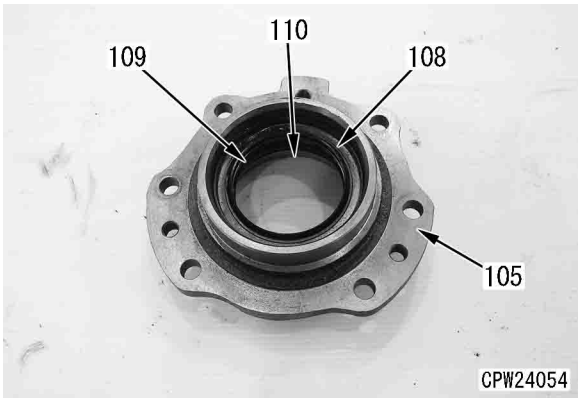
Mounting bolt of tubes (8) and (9):
25 ± 1.5 Nm {2.55 ± 0.15 kgm}

[*3]

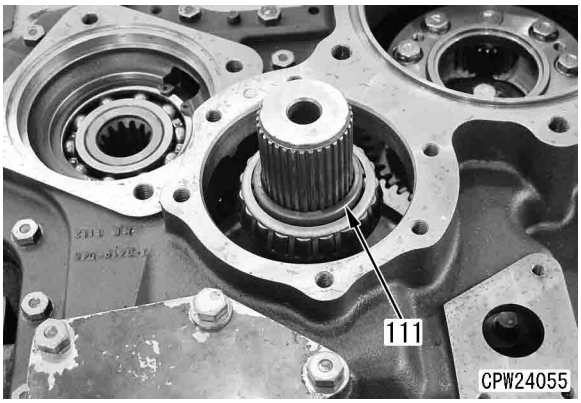
Flange mounting bolt (11a):
24 ± 4 Nm {24 ± 0.41 kgm}

[*4]

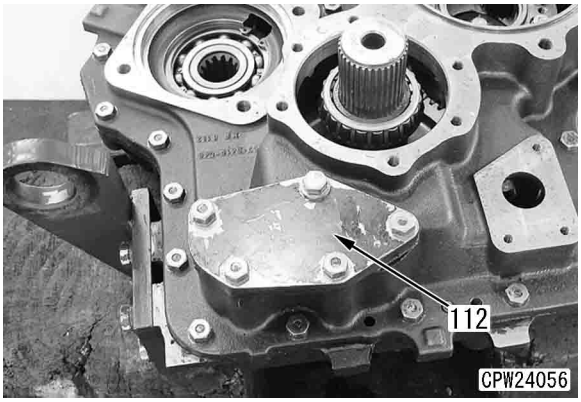
EGR valve assembly mounting bolts (12a) and (12b):
43 ± 6 Nm {4.38 ± 0.61 kgm}



21.Spacer
Remove spacer (111) from the output shaft.



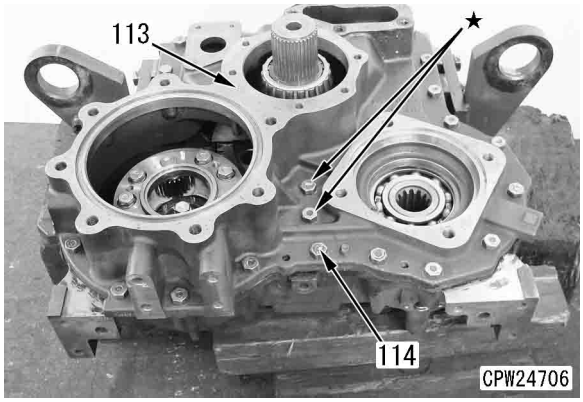
22.Cover
Remove cover (112).



23.Removal of front case

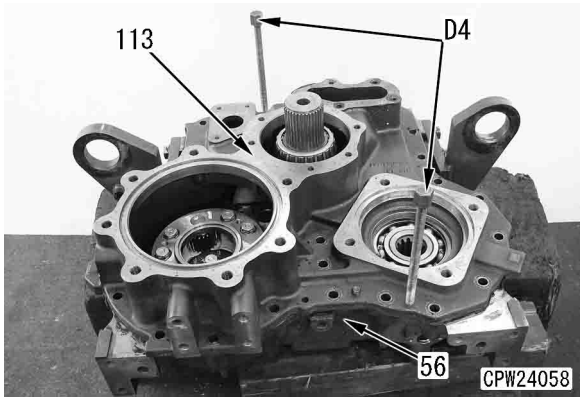
1) Remove front case (113) mounting bolts (114) (24 pieces).

★ Make sure to remove bolts (2 pieces) in the center of front case (marked with ★).



2) Separate front case (113) from rear case (56) by using tool D4.

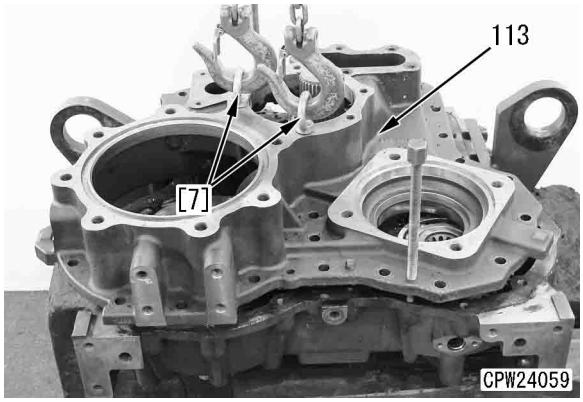
★ Tighten 2 places evenly by using tool D4.



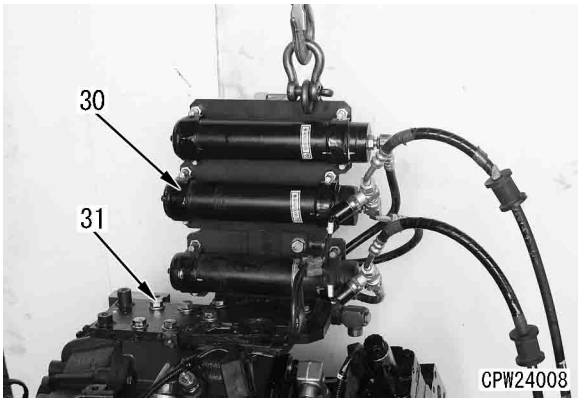
3) Sling front case (113) by using eyebolt [7].

★ Sling front case horizontally to remove.

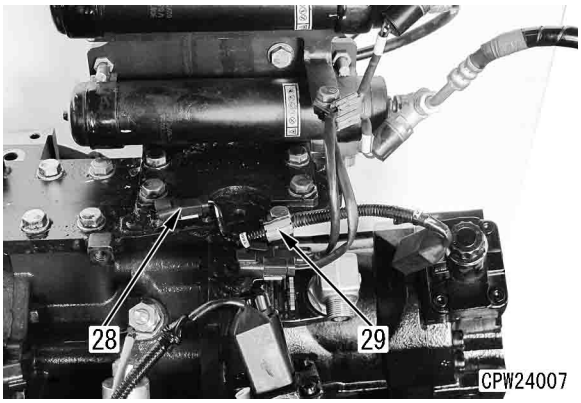
Front case (113):
40 kg



4) Remove snap ring (115) from front case (113).

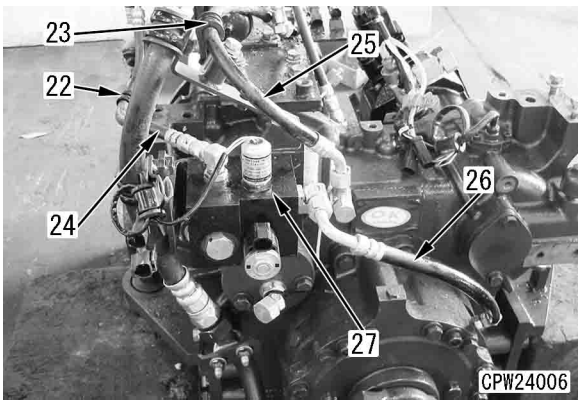


2) Connect connector (28), and install clamp (29).

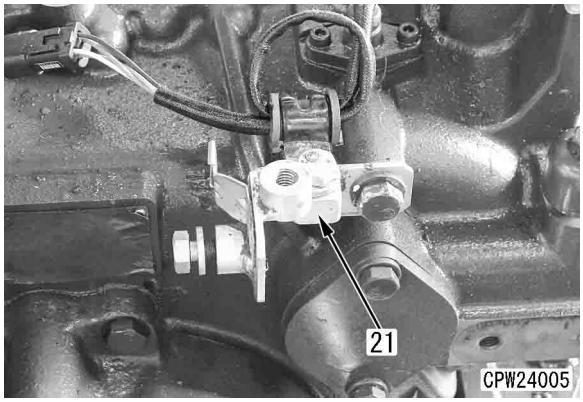


34.Parking brake solenoid assembly

1) Fit parking brake solenoid assembly (27) to the transfer assembly, and tighten the mounting bolts.
2) Install hoses (24), (25) and (26).
3) Install clamps (22) and (23).

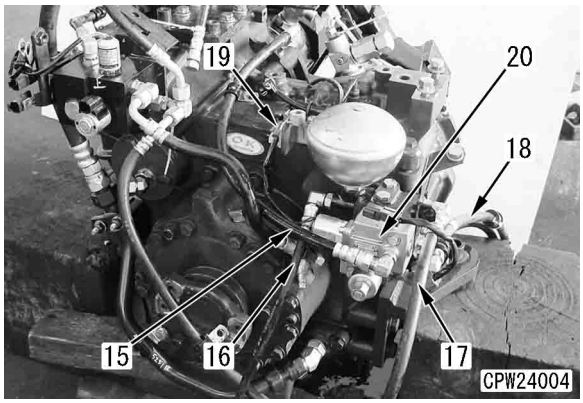


35.Bracket
Install bracket (21).

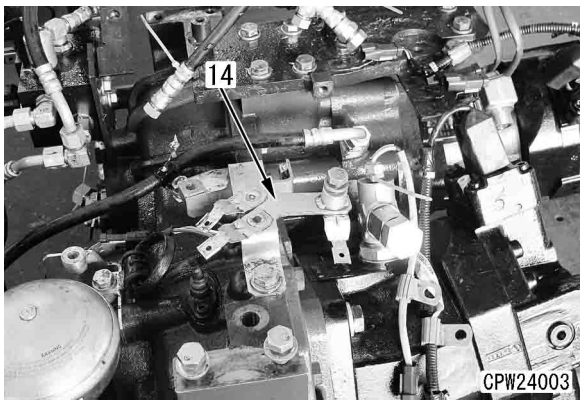


36.Accumulator, clutch solenoid assembly

1) Fit accumulator and clutch solenoid assembly (20) to the transfer assembly and tighten the mounting bolts (2 pieces).
2) Install clamp (19).
3) Install hoses (15), (16), (17) and (18).



37.Bracket
Install wiring bracket (14).

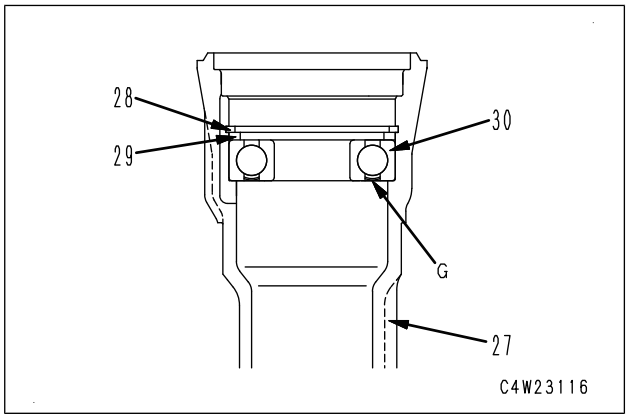


38.Wiring assembly

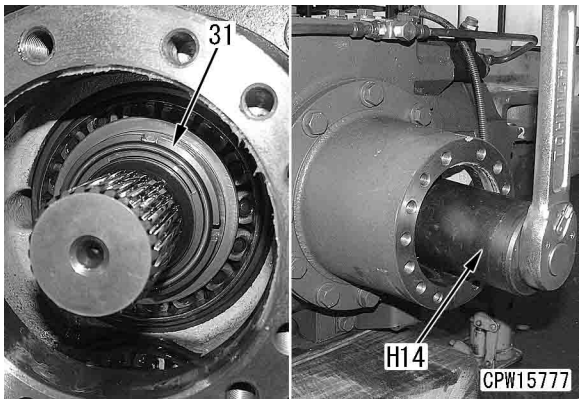
1) Fit clamps (12) (6 pieces), and install wiring assembly (13).
2) Connect connectors T13 (6), T12 (7), T19 (8), T15 (9), T15A (10), and T18 (11).

3) Remove snap ring (28) and ring (29).
4) Remove bearing (30) from long cage (27) by using toll H35.

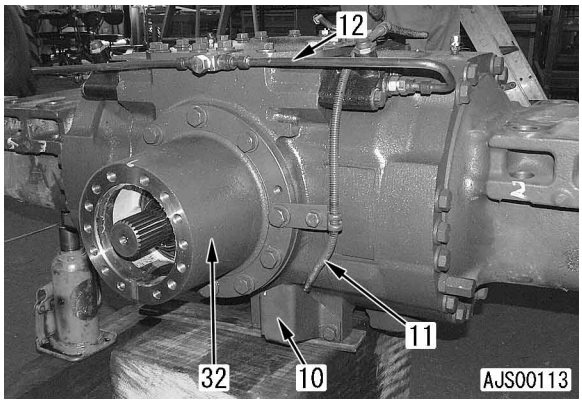
★ Check the mounting position of shield (G) of bearing (30), and record it.



4. Removal of front cage assembly (for front differential)
1) Loosen nut (31) in advance by using H14 before removing cage assembly.

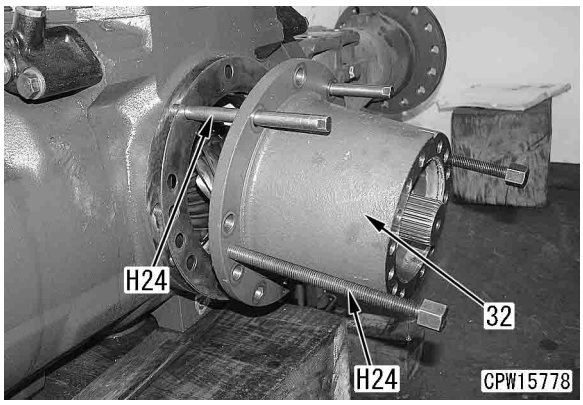


2) Remove cover (10).
3) Remove axle oil temperature sensor (it cannot be seen being hindered by cover (10)) together with harness (11).
4) Remove brake tube assembly (12).
5) Remove the mounting bolts of front cage assembly (32).



6) Remove front cage assembly (32) by using tool H24.

★ Since shims are installed, check their thickness, quantity in advance, and record them.



5. Axle housing

★ Remove the right and left axle housings. For details, see "3. Axle housing assembly" in Disassembly and assembly of axle housing assembly".

6. Differential assembly
1) Place differential assembly on blocks [1] and stabilize it.

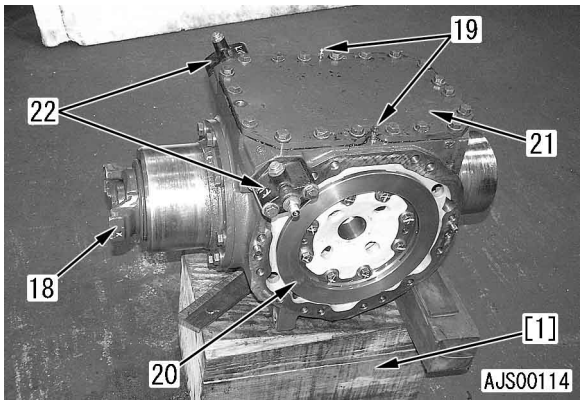
★ This photo shows the rear differential.

★ Remove the right and left according to the same procedure.

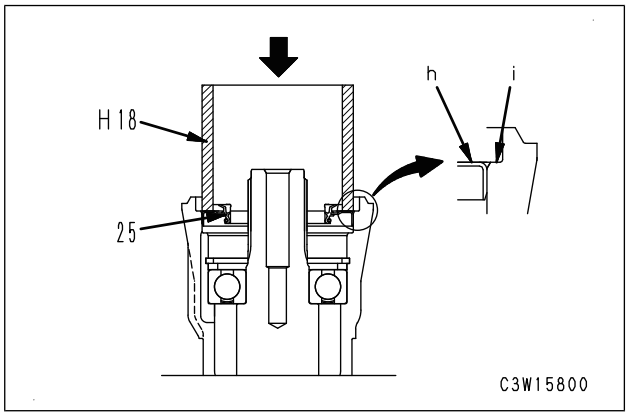
2) Remove slack adjusters (22) (2 pieces).
3) Remove bleeder screw (19) (2 pieces).
4) Remove piston (20).
5) Remove coupling (18).

★ Rear differential only

6) Remove mounting bolts of upper cover (21).



7) Remove upper cover (21) by using tool H25.



18. Installation of long cage assembly (only for front differential)
    1) Sling long cage assembly (24), and install it.

       Mounting bolt:

       98 to 123 Nm {10.0 to 12.5 kgm}
    2) Install coupling (23).

       Contact surface between coupling and bearing:

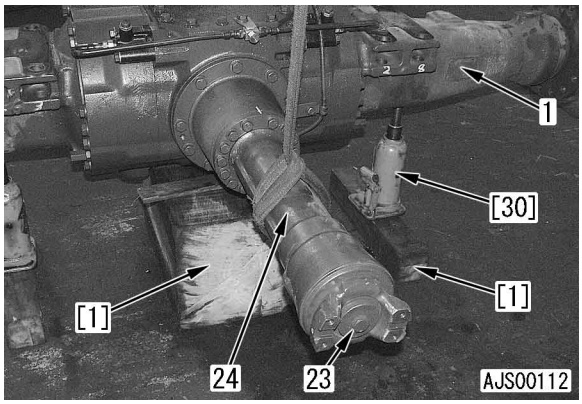
       Molybdenum disulfide lubricant (LM-P or equivalent)

       Mounting bolt:

       Liquid adhesive (LT-2)

       Mounting bolt:

       245 to 309 Nm {25.0 to 31.5 kgm}



- Refilling with oil
  Tighten the drain plug, refill with oil to the specified level through the oil filler port, and check the oil level.

Drain plug:

127.4 to 176.4 Nm {13 to 18 kgm}

Oil filler plug:

93.1 to 122.5 Nm {9.5 to 12.5 kgm}

Front axle housing:

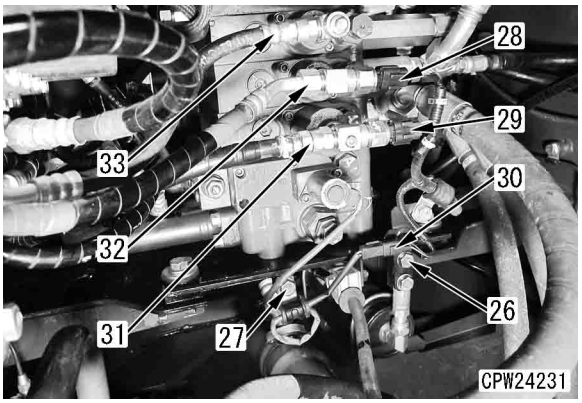
27 ℓ (For details of oil and grease, see "Table of fuel, coolant and lubricants".)

Rear axle housing

25.5 ℓ (For details of oil and grease, see "Table of fuel, coolant and lubricants".)

★ Place an oil container under the hose.

★ Plug the disconnected hose and the mounting port to prevent oil leakage and dust entry.

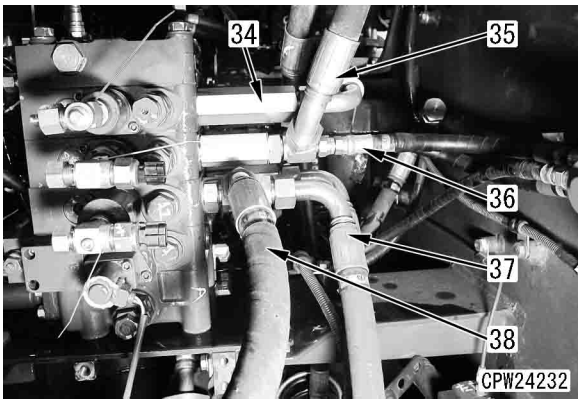


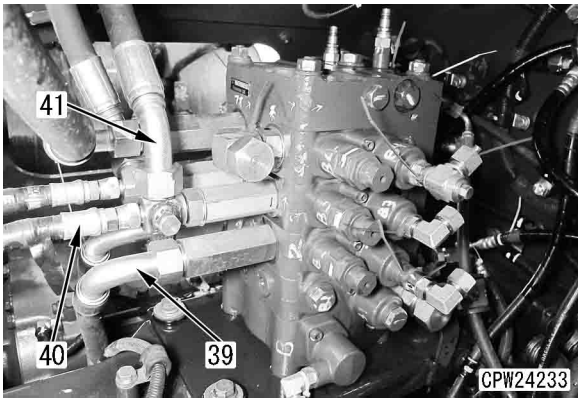
13.Disconnect the next hose from the left of the control valve assembly.

- Hose (34): A4 port
- Hose (35): A3 port
- Hose (36): A3 port
- Hose (37): A2 port
- Hose (38): A2 port
- Hose (39): B2 port
- Hose (40): B3 port
- Hose (41): B3 port

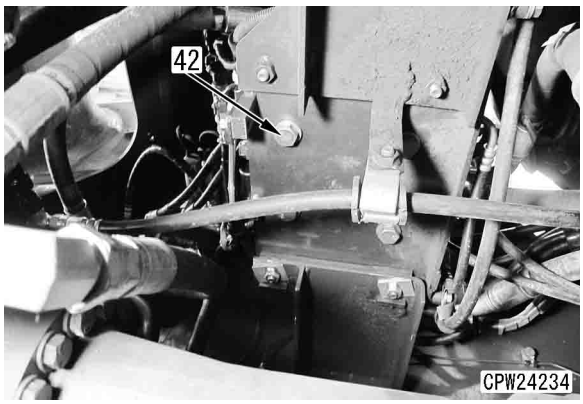
★ Place an oil container under the hose.

★ Plug the disconnected hose and the mounting port to prevent oil leakage and dust entry.





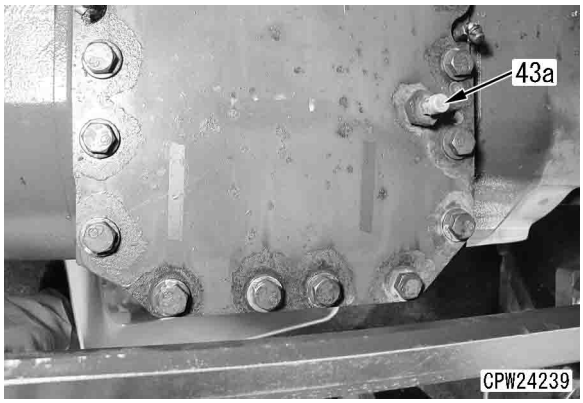
14.Remove mounting bolts (42) (4 pieces) from the bottom of the control valve assembly.

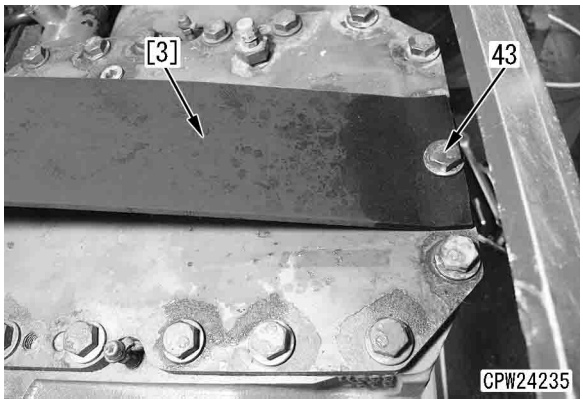


15.Remove breather (43a). [*3]

★ Since it interferes when pulling out the control valve assembly, remove it.

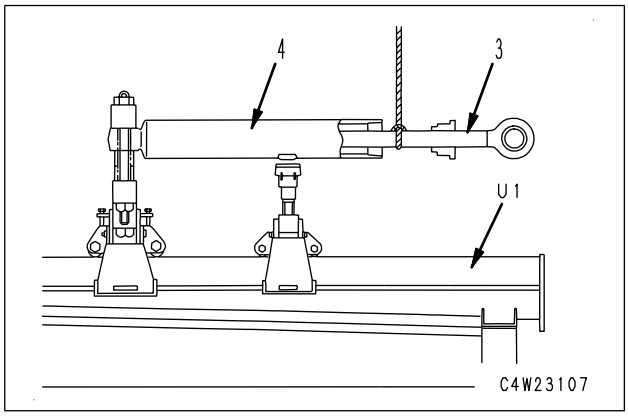
16.With mounting bolt (43) of the fixing bolt top cover, fix plate [3].





17.Place control valve assembly (44) on plate [3], and pull it up to the slinging position.

★ Check that all the wiring and piping are disconnected before removing.

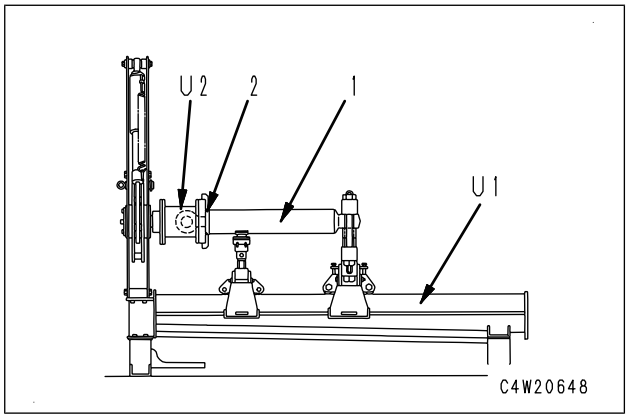


3) Install cylinder head assembly (2) to the cylinder (1) by using tool U2.

Cylinder head:

539 ± 54 Nm {55.0 ± 5.5 kgm}

4) Remove cylinder assembly (1) from tool U1.



- Lift cylinder assembly and bucket cylinder assembly

1) Set cylinder (4) to tool U1.
2) Sling and install cylinder head and piston rod assembly (3) to cylinder (4).
3) Install cylinder head assembly (2) to the cylinder.

Cylinder	Width across flats of bolt (mm)
Lift cylinder head (21)	24
Bucket cylinder head (22)	30

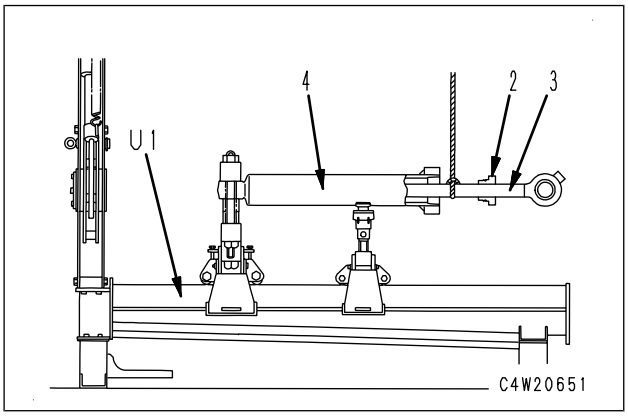
Lift cylinder head (21)

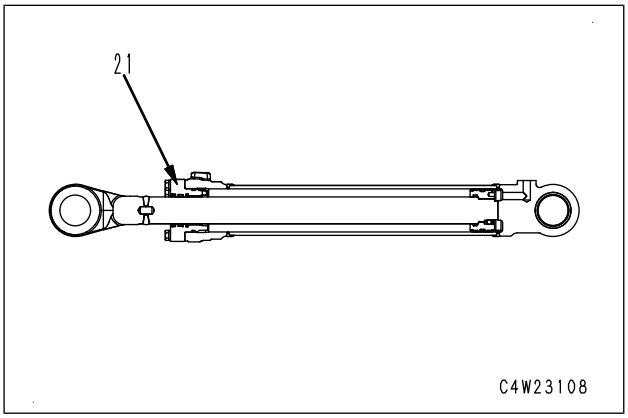
270 ± 39 Nm {27.5 ± 4.0 kgm}

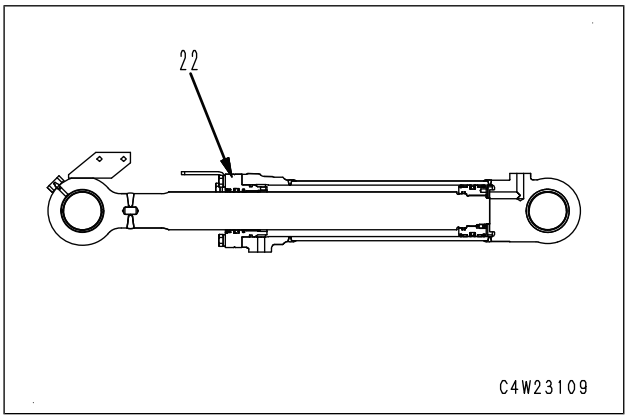
Bucket cylinder head (22)

530 ± 78.5 Nm {54.0 ± 8.0 kgm}

4) Remove the cylinder assembly from tool U1.

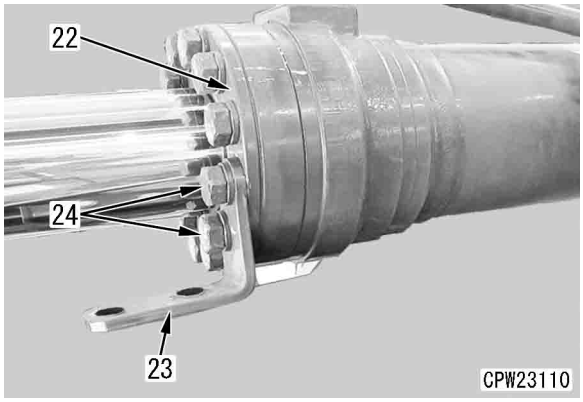






★ Tighten bucket cylinder head (22) together with plate (23).

★ Note that mounting bolts (24) (2pieces) have different stem lengths.



Removal and installation of operator's seat assembly *(WA320-K2Q0-924-K-00-A)*

⚠ Place the machine on a level ground, and turn the parking brake switch to ON position.

⚠ Lower the work equipment to the ground, and set the work equipment lock switch to LOCK position.

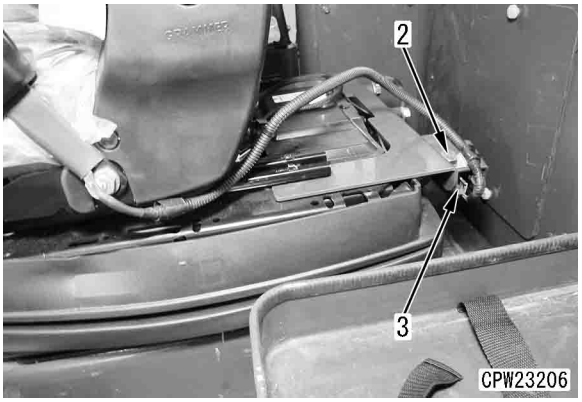
⚠ Turn the starting switch to OFF position, and stop the engine.

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

Removal *(WA320-K2Q0-520-K-00-A)*

1. Fold operator's seat (1) forward, and move it forward.

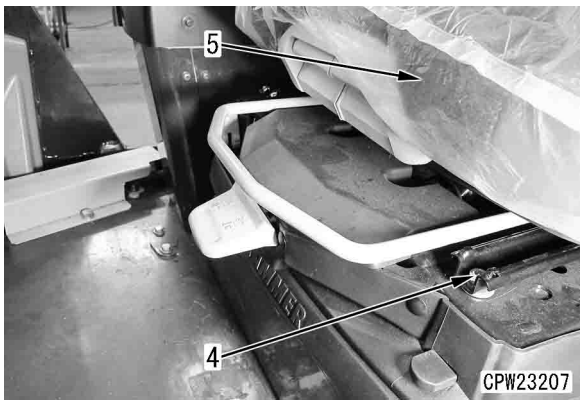
2. Remove clamp (2) at the rear of the operator's seat, and disconnect harness connector SBS (3).

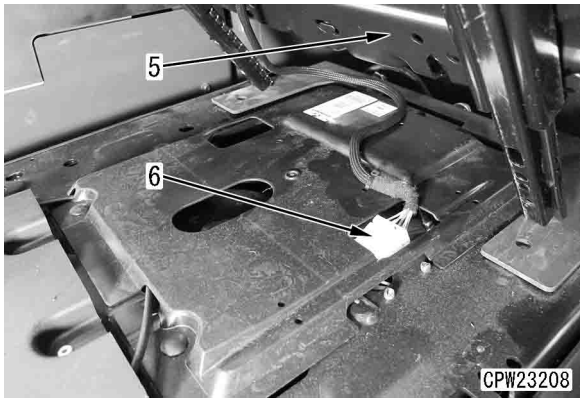


3. Remove hexagonal socket head bolts (6mm) (4) (4 pieces) to lift the front of upper seat assembly (5) off the floor.
4. Disconnect harness connector (6).
5. Remove upper seat assembly (5).

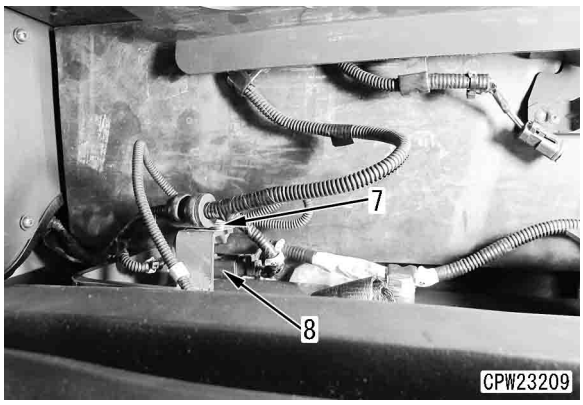
★ Since a crane is not usable in ROPS cab, make up a team with 2 persons when removing upper seat assembly (5).

Upper seat assembly (5): 30 kg





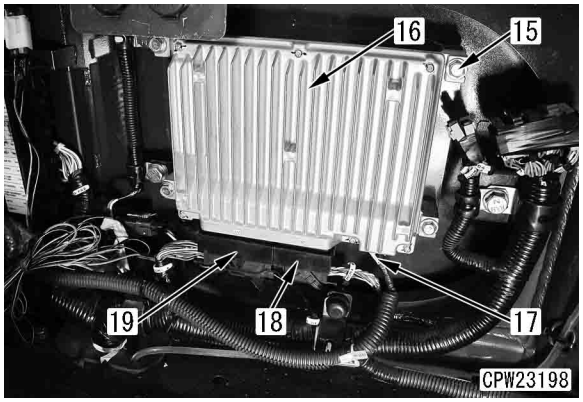
6. Remove clamp (7) at the rear of the operator's seat, and disconnect harness connector L55 (8).

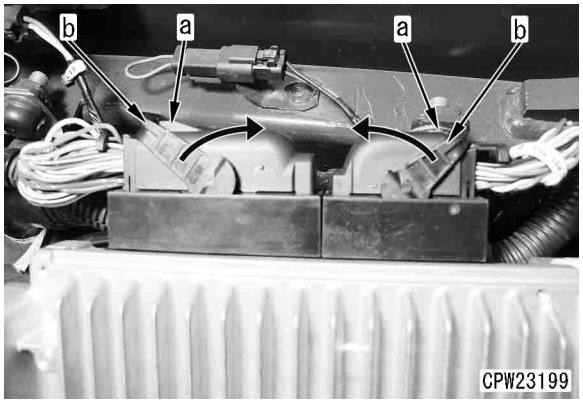


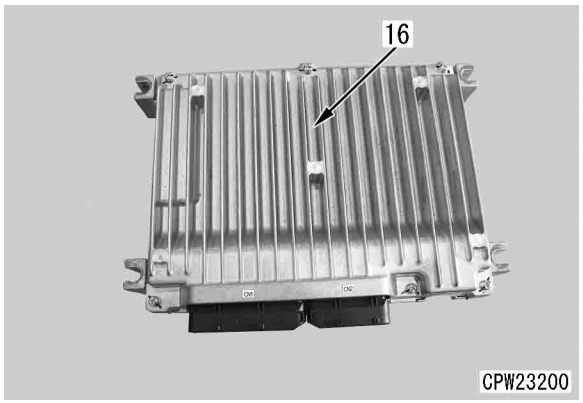
7. Remove mounting bolts (9) (4 pieces), and remove suspension assembly (10).

★ Since a crane is not usable in ROPS cab, make up a team with 2 persons when removing suspension assembly (10).

Suspension assembly (10): 30 kg







Installation *(WA320-Q180-720-K-00-A)*

- Perform installation in the reverse order to removal.

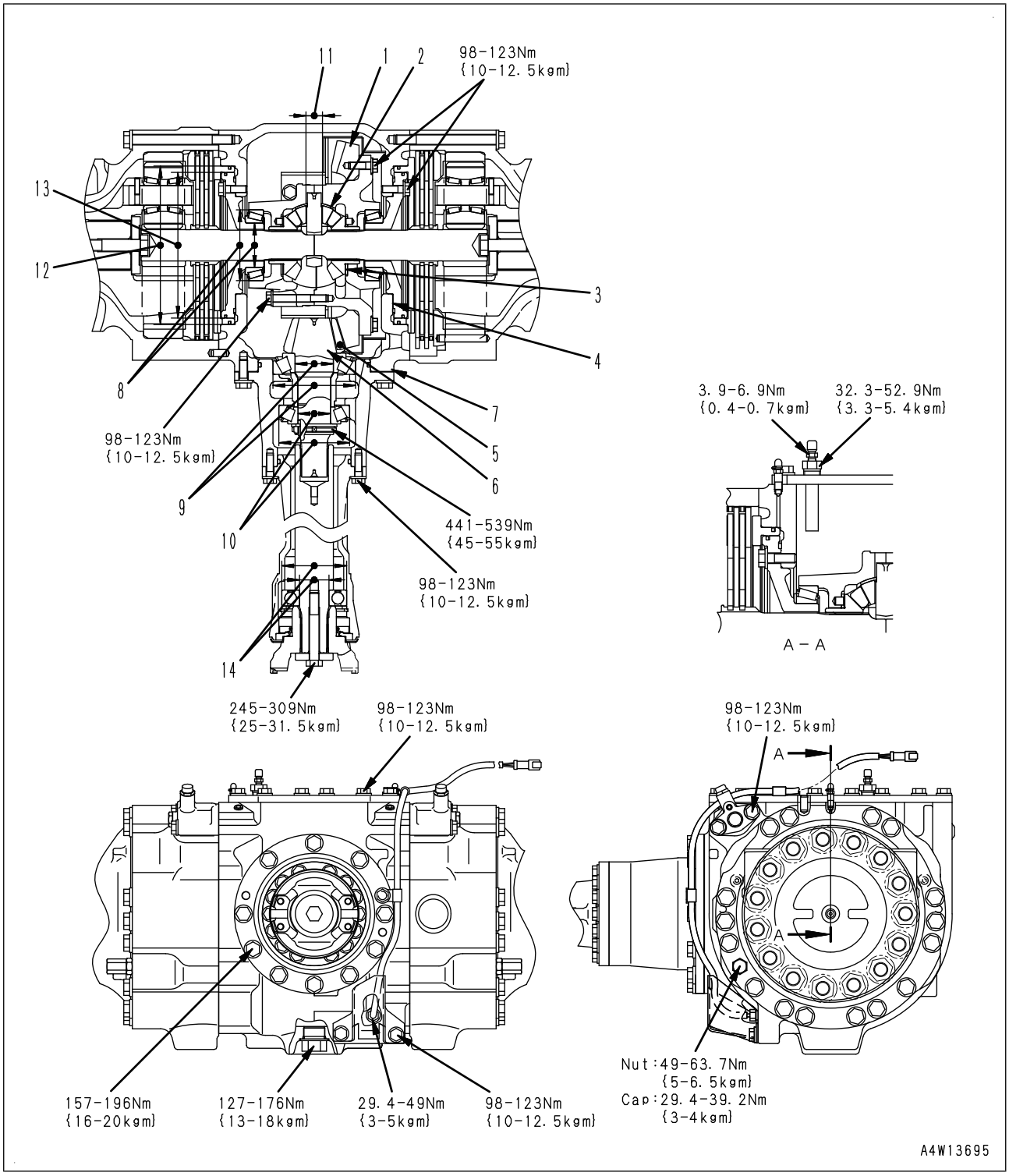
[*1]

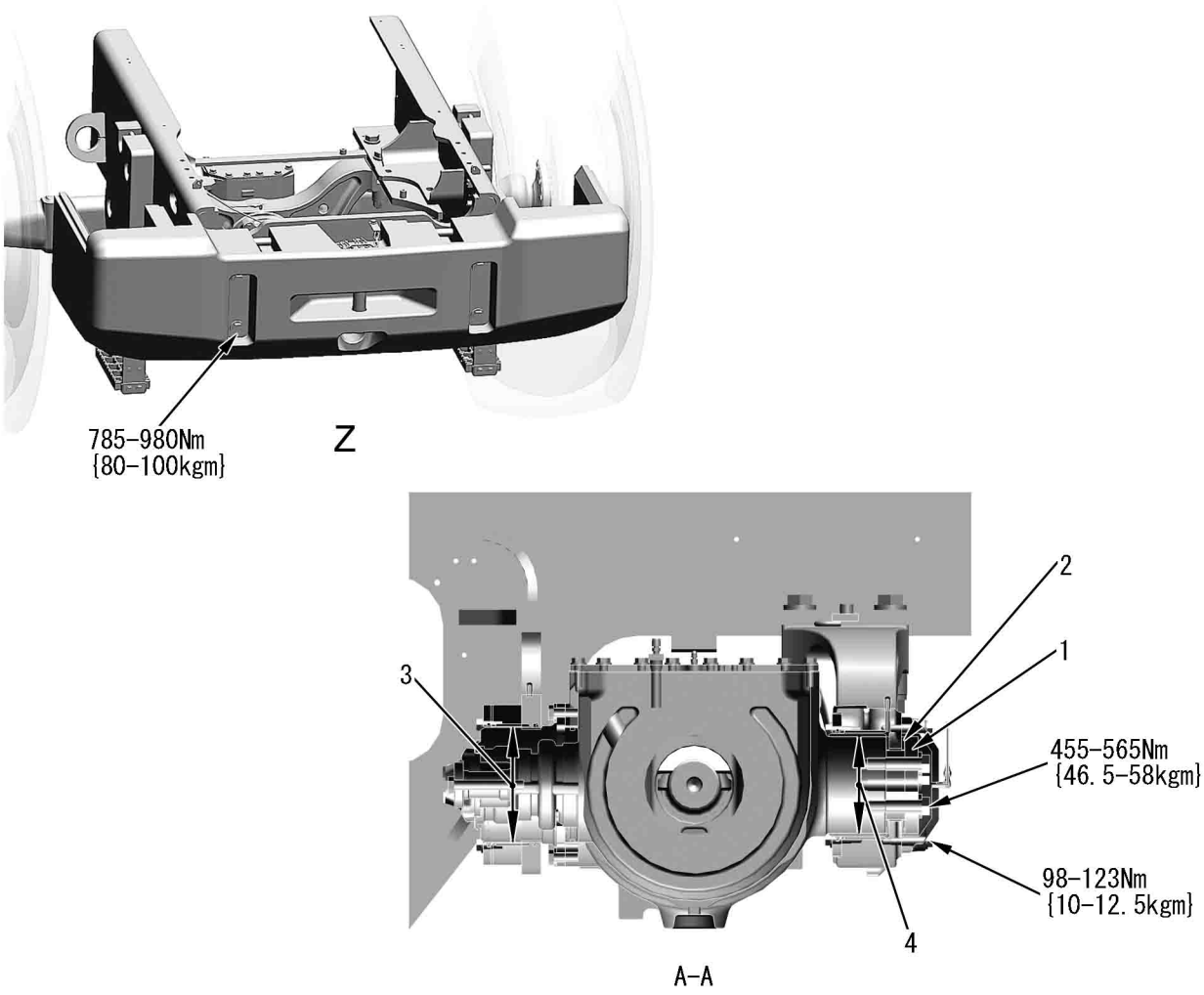
★ For connectors MCM1B (18) and MCM1A (19), securely lock tab (a).

Differential *(HM300-DC10-001-K-00-A)*

Front differential *(WA320-DC70-034-K-00-A)*

Standard: Torque proportional differential

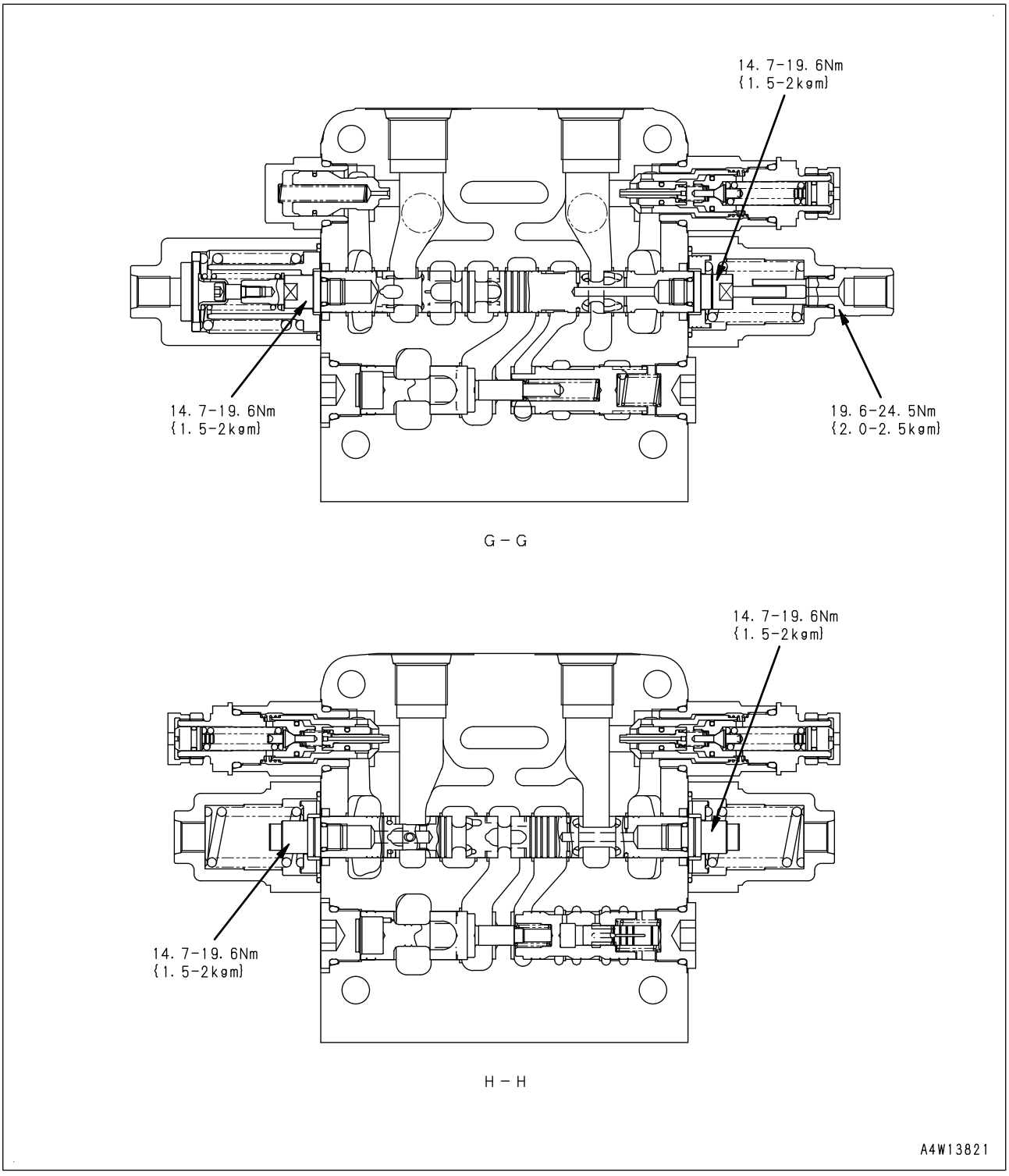




APW13859

Unit: mm

No.	Item	Criteria					Remedy
1	Thickness of thrust plate	Standard dimension		Tolerance		Repair limit	Replace
		22		±0.5		-	
2	Thickness of thrust washer	5		+0.3 –0.1		-	
3	Clearance between shaft and hole on front support side	Standard dimension	Tolerance		Standard clearance	Allowable clearance	
			Shaft	Hole			
		190	–0.050 –0.122	+0.472 0	0.050 to 0.594	-	
4	Clearance between shaft and hole on rear support side	170	–0.005 –0.124	+0.522 +0.050	0.055 to 0.646	-	


14. 7-19. 6Nm
{1. 5-2kgm}
14. 7-19. 6Nm
{1. 5-2kgm}
19. 6-24. 5Nm
{2. 0-2. 5kgm}
G – G
14. 7-19. 6Nm
{1. 5-2kgm}
14. 7-19. 6Nm
{1. 5-2kgm}
H – H
A4W13821

SHOP MANUAL

WHEEL LOADER

WA320-7

Model	Serial Number
WA320-7	H01051 and up 80001 and up

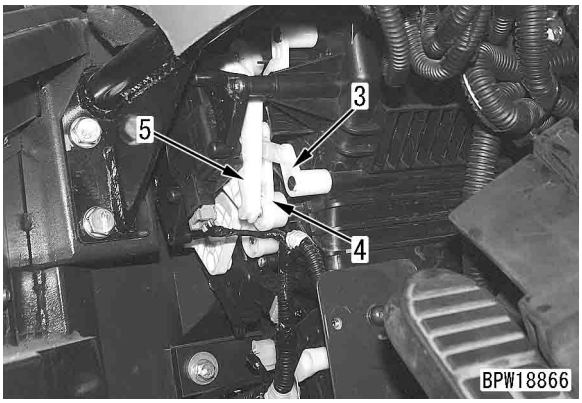
80 Appendix

Outer temperature sensor (outside air temperature sensor) *(WA380-K55C-042-K-00-A)*

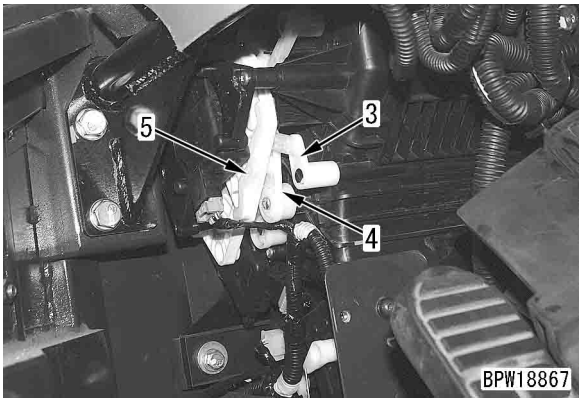
Outline

- The outer sensor (outside air temperature sensor) is installed under the operator's cab.
- The outer sensor varies resistance of its resistor according to temperature.
- The air conditioner controller determines the ambient temperature by converting the changes in the resistance of the outer sensor resistor into voltage changes.
- The air conditioner controller controls the blower motor and the air mix servomotor with the data of the outer sensor in order to adjust the temperature and air flow.
- Resistance value between terminals
  At 0 °C: 6.2 kΩ
  At 25 °C: 2.2 kΩ

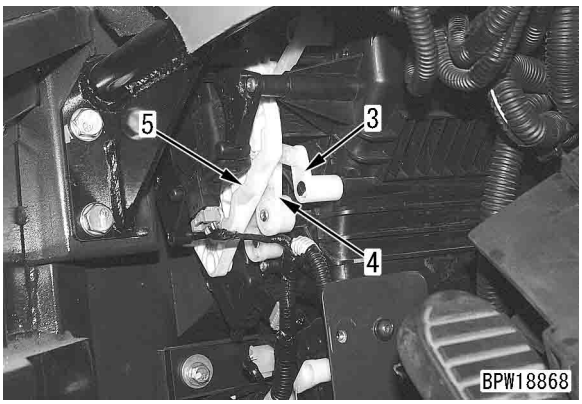
- FACE/FOOT



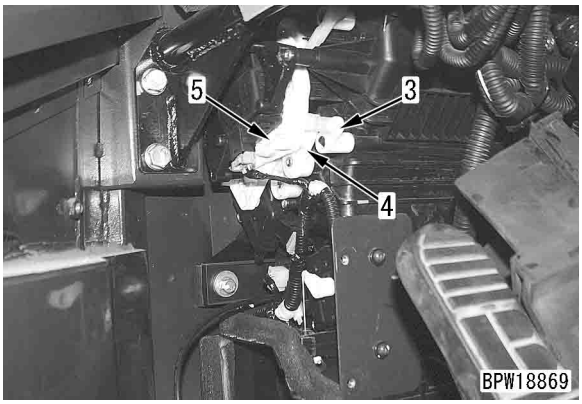
- FOOT



- FOOT/DEF



- DEF



★ For electrical failures, see Troubleshooting, "Failure code [879EMC] Ventilation Damper Abnormality".