SEN01274-41

Shop Manual

DUMP TRUCK

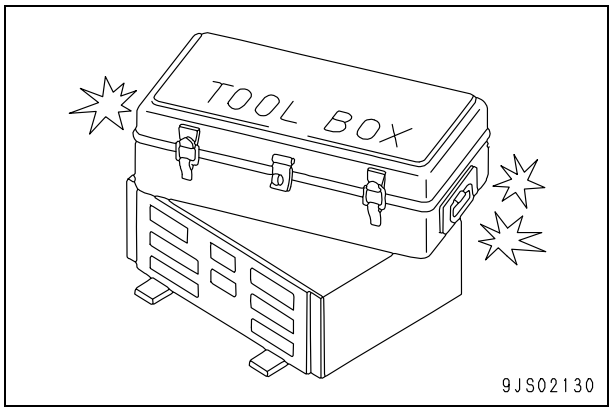
HD785-7

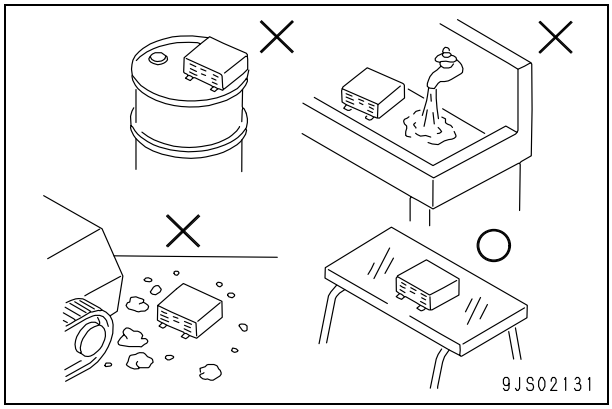
SERIAL NUMBERS 7001 and up

KOMATSU

4. Handling controller

1) The controller contains a microcomputer and electronic control circuits. These control all of the electronic circuits on the machine, so be extremely careful when handling the controller.
2) Do not place objects on top of the controller.
3) Cover the control connectors with tape or a vinyl bag. Never touch the connector contacts with your hand.
4) During rainy weather, do not leave the controller in a place where it is exposed to rain.
5) Do not place the controller on oil, water, or soil, or in any hot place, even for a short time. (Place it on a suitable dry stand).
6) Precautions when carrying out arc welding
When carrying out arc welding on the body, disconnect all wiring harness connectors connected to the controller. Fit an arc welding ground close to the welding point.





5. Points to remember when troubleshooting electric circuits

1) Always turn the power OFF before disconnecting or connecting connectors.
2) Before carrying out troubleshooting, check that all the related connectors are properly inserted.
   ★ Disconnect and connect the related connectors several times to check.
3) Always connect any disconnected connectors before going on to the next step.
   ★ If the power is turned ON with the connectors still disconnected, unnecessary abnormality displays will be generated.
4) When carrying out troubleshooting of circuits (measuring the voltage, resistance, continuity, or current), move the related wiring and connectors several times and check that there is no change in the reading of the tester.
   ★ If there is any change, there is probably defective contact in that circuit.

Millimeters to inches

1 mm = 0.03937 in

	0	1	2	3	4	5	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
50	1.969	2.008	2.047	2.087	2.126	2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Kilogram to pound

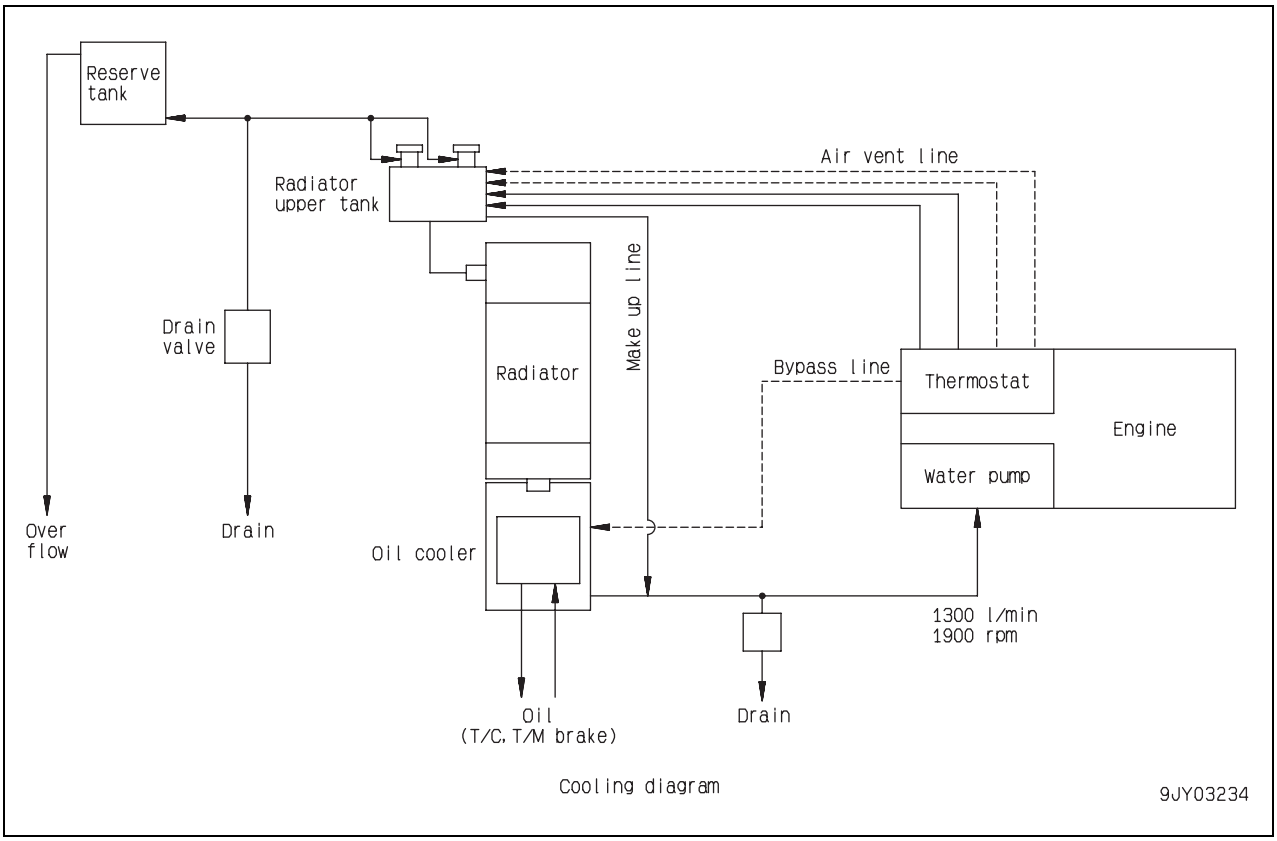
1 kg = 2.2046 lb

	0	1	2	3	4	5	6	7	8	9
0	0	2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	51.91	55.12	57.32	59.53	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.78	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	101.41	103.62	105.82	108.03
50	110.23	112.44	114.64	116.85	119.05	121.25	123.46	125.66	127.87	130.07
60	132.28	134.48	136.69	138.89	141.10	143.30	145.51	147.71	149.91	152.12
70	154.32	156.53	158.73	160.94	163.14	165.35	167.55	169.76	171.96	174.17
80	176.37	178.57	180.78	182.98	185.19	187.39	189.60	191.80	194.01	196.21
90	198.42	200.62	202.83	205.03	207.24	209.44	211.64	213.85	216.05	218.26

Liters to U.S. Gallons

1 ℓ = 0.2642 U.S.Gal

	0	1	2	3	4	5	6	7	8	9
0	0	0.264	0.528	0.793	1.057	1.321	1.585	1.849	2.113	2.378
10	2.642	2.906	3.170	3.434	3.698	3.963	4.227	4.491	4.755	5.019
20	5.283	5.548	5.812	6.076	6.340	6.604	6.869	7.133	7.397	7.661
30	7.925	8.189	8.454	8.718	8.982	9.246	9.510	9.774	10.039	10.303
40	10.567	10.831	11.095	11.359	11.624	11.888	12.152	12.416	12.680	12.944
50	13.209	13.473	13.737	14.001	14.265	14.529	14.795	15.058	15.322	15.586
60	15.850	16.115	16.379	16.643	16.907	17.171	17.435	17.700	17.964	18.228
70	18.492	18.756	19.020	19.285	19.549	19.813	20.077	20.341	20.605	20.870
80	21.134	21.398	21.662	21.926	22.190	22.455	22.719	22.983	23.247	23.511
90	23.775	24.040	24.304	24.568	24.832	25.096	25.361	25.625	25.889	26.153



1. Pick up for radiator coolant level sensor
2. Upper tank
3. Radiator core
4. Oil cooler (brake, torque converter)
5. Reservoir tank
6. Aftercooler (engine intake air)
7. Air conditioner condenser
8. Steering hoist oil cooler

A: Coolant inlet port (From engine)
B: Aftercooler inlet port (From turbocharger)
C: Aftercooler outlet port
(To engine air intake manifold)
D: Coolant bypass inlet port (From engine)
E: Coolant outlet port (To water pump)
F: Oil inlet port (From rear and front brakes)
G: Oil outlet port (To transmission)

Specifications

Radiator
Core type: 5 lines of aluminum waved tube
Total radiation surface: 334.8 m^2

Torque converter, transmission, brake oil cooler
Core type: PTO-LS
Total radiation surface: 16.26 m^2

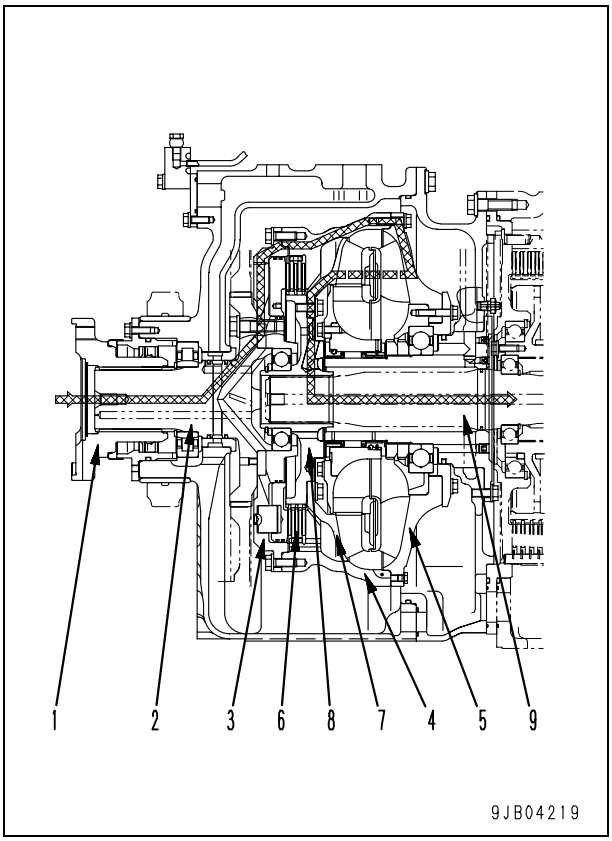
Steering hoist oil cooler
Core type: CF40-1
Total radiation surface: 5.18 m^2

Aftercooler
Total radiation surface: 85.8 m^2

Air conditioner
Gas charge weight (HFC-134a): 900 ± 50 g

Power transmitting route

When lockup clutch is "disengaged"

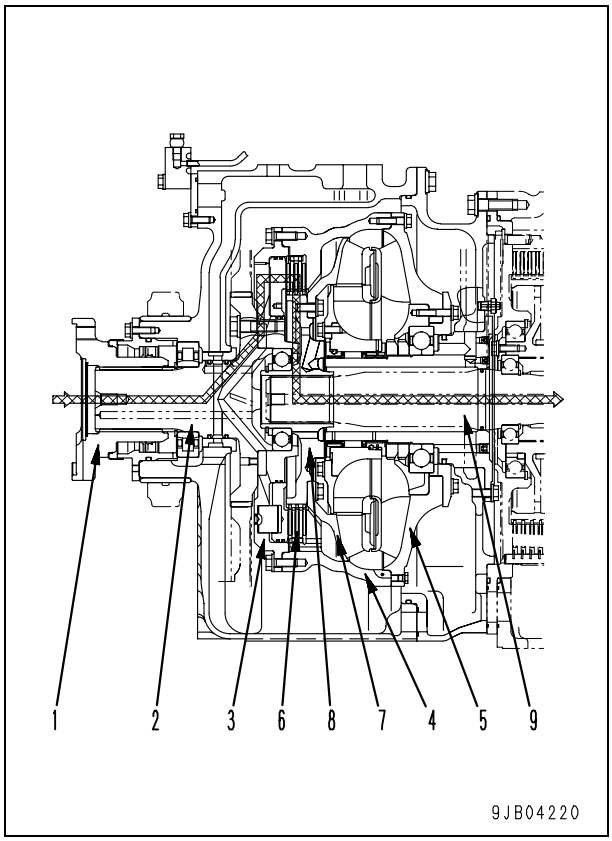


Drive case (4) is disconnected from boss (8) and turbine (7) and lockup torque converter works as an ordinary torque converter.

The power from engine
↓
Output shaft
↓
Front drive shaft
↓
Coupling (1)
↓
Input shaft (2), clutch housing (3), drive case (4) and pump (5) rotate together
↓
Oil is used as medium
↓
Turbine (7) and boss (8)
↓
Transmission input shaft (9)

- The power transmitted to input shaft (2) is also used as power for driving the pump after being transmitted through PTO gear.

When lockup clutch is "engaged"



Drive case (4) is connected to boss (8) and turbine(7) and lockup torque converter is locked up.

The power from engine
↓
Output shaft
↓
Front drive shaft
↓
Coupling (1)
↓
Input shaft (2), clutch housing (3), drive case (4) and pump (5) rotate together
↓
Lockup clutch (6)
↓
Boss (8)
↓
Transmission input shaft (9)

- The power transmitted to input shaft (2) is also used as power for driving the pump after being transmitted through PTO gear.

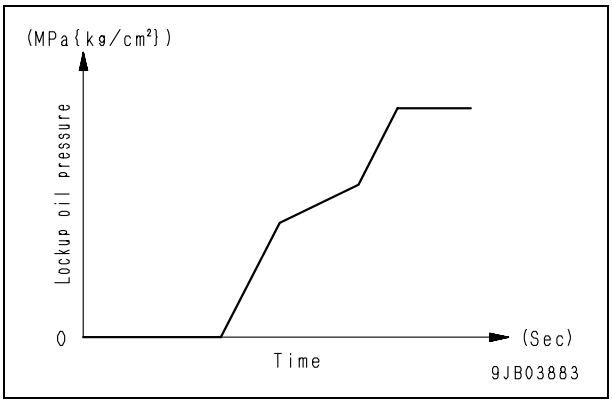
H sun gear (4) of the H clutch and 2nd ring gear (18) of the 2nd clutch are fixed hydraulically.

Power from torque converter
↓
Input shaft (1)
↓
H carrier (2)
↓
H planetary pinion (5)
↓
H ring gear (7)
↓
L clutch housing (8)
↓
Intermediate shaft (9)
↓
2nd sun gear (19)
↓
2nd planetary pinion (20)
↓
1st, 2nd carrier (23)
↓
Output shaft (29)

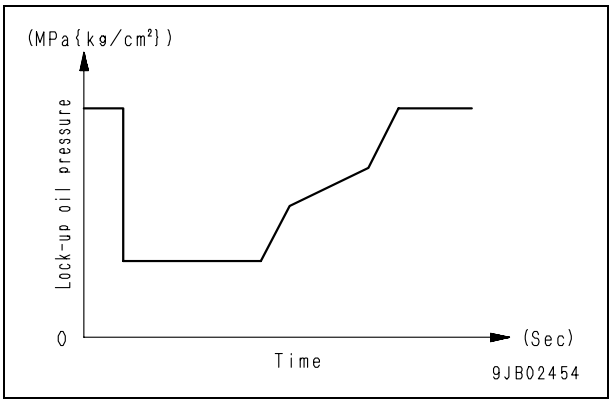
Outline

- This valve is used to switch the clutch in order to regulate the clutch oil pressure to the set pressure.
  Since the modulation waveform is used for the pressure application characteristics to the clutch, ECMV is capable of connecting the lockup clutch smoothly, thereby reducing shocks resulting from gear shift. Above also prevents generation of peak torque in the power train. These arrangements make the machine comfortable to operator and enhance durability of the power train.

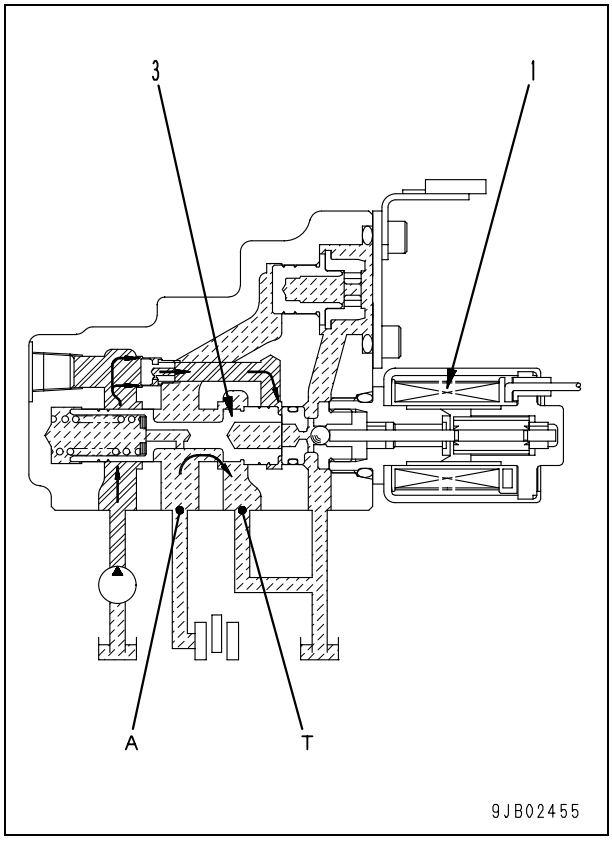
When changing from torque converter travel to direct travel



At gear shift (in direct travel)



Operation
When traveling in torque converter range



- While no current is flowing into proportional solenoid (1), pressure control valve (3) drains the oil from clutch port (A) through drain port (T).

DUMP TRUCK

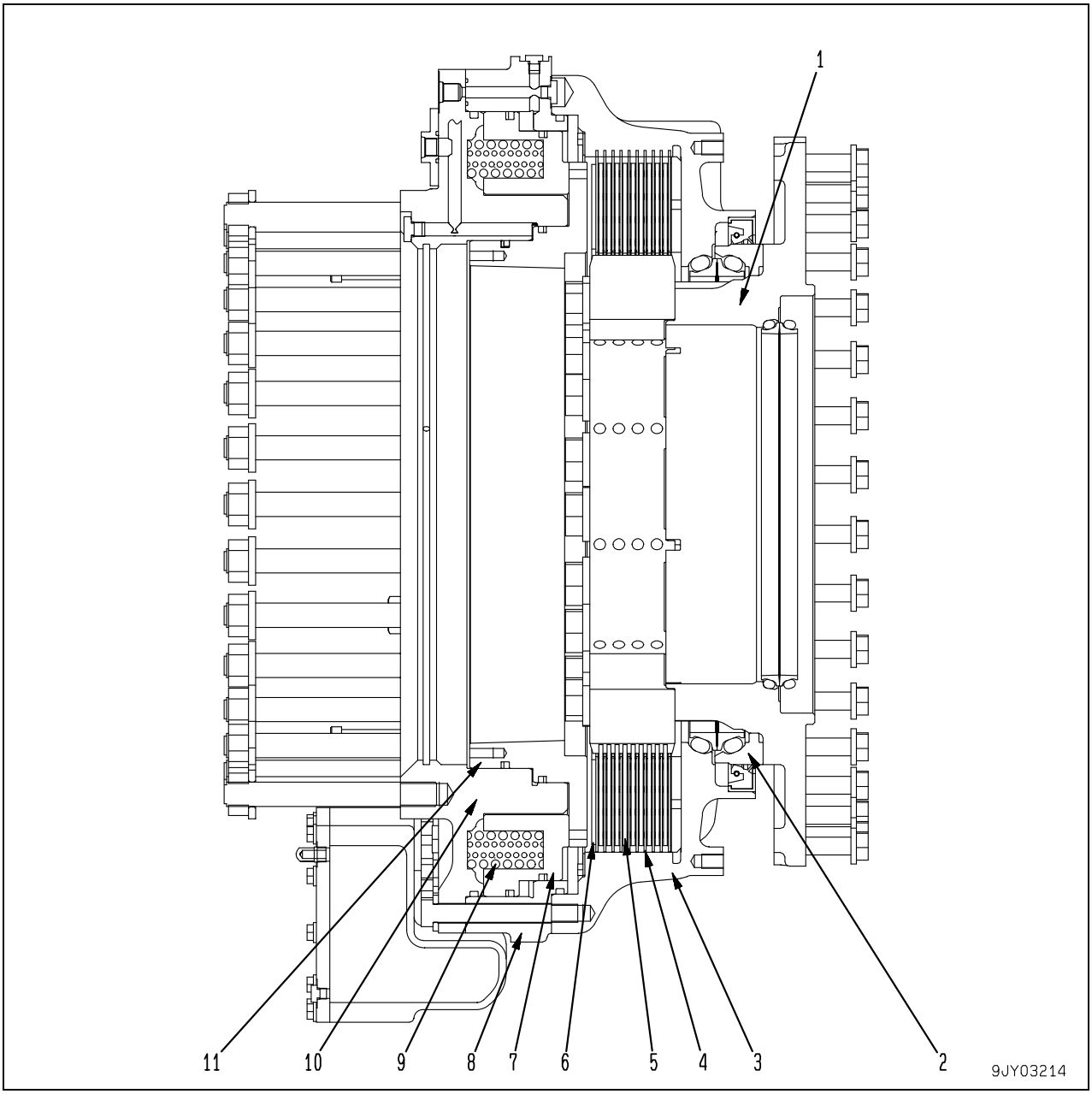
HD785-7

Machine model	Serial number
HD785-7	7001 and up

10 Structure, function and maintenance standard

Brake system

Rear

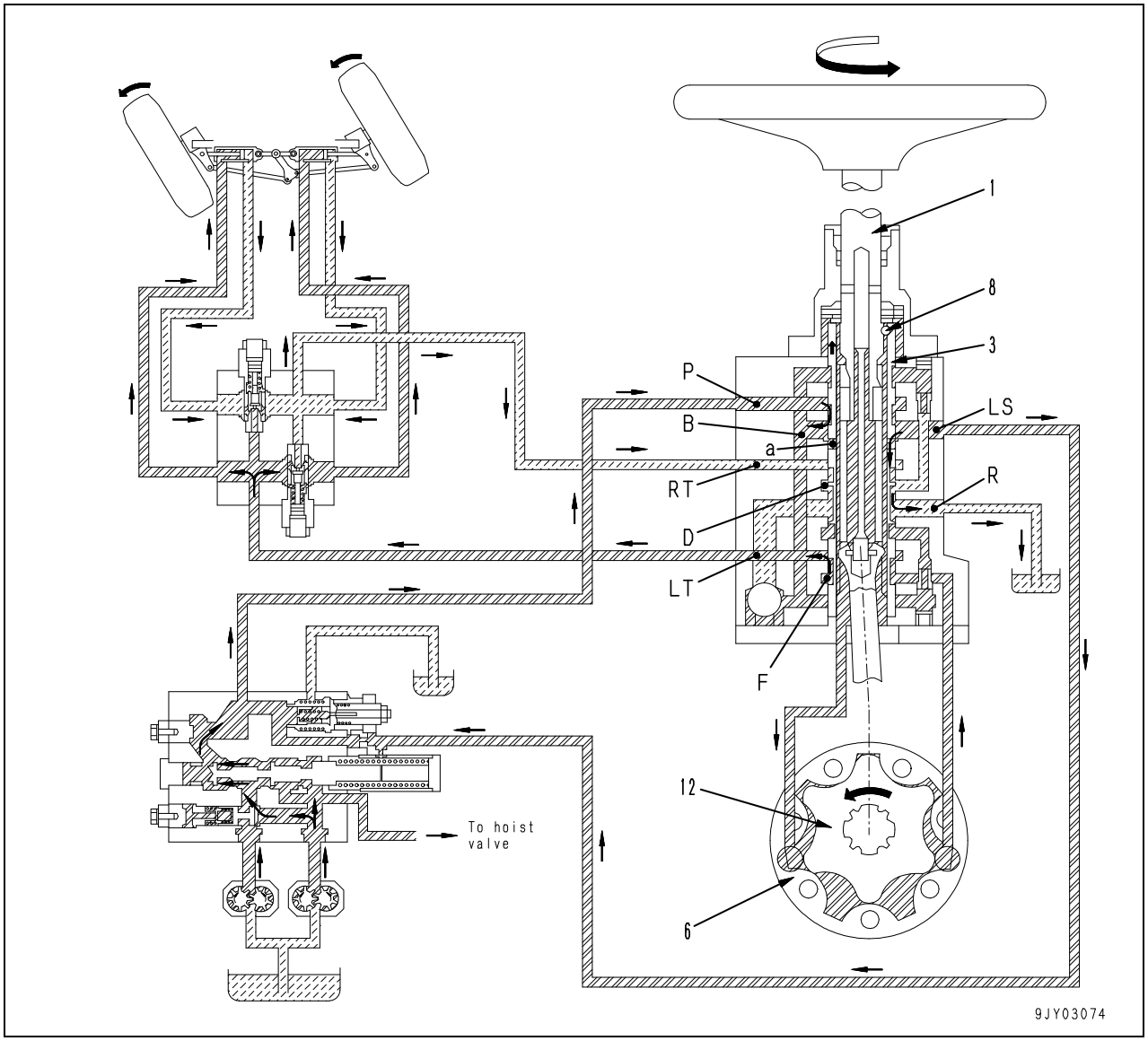


1. Inner gear
2. Retainer
3. Outer gear
4. Plate
5. Disc
6. Damper
7. Piston (for parking brake)
8. Cylinder (for parking brake)
9. Spring (for parking brake)
10. Cylinder
11. Piston

Unit: mm

No.	Check item	Criteria					Remedy
		Standard size	Tolerance		Standard clearance	Clearance limit	
			Shaft	Hole			
5	Clearance between rod mounting pin and bushing	90	–0.030 –0.060	+0.091 +0.045	0.075 – 0.970	1.1	Replace
6	Clearance between inner and outer bushing	130	—	—	0.120 – 0.190	0.3	
7	Clearance between suspension cylinder mounting pin and frame or axle	90	–0.030 –0.060	+0.091 +0.045	0.075 – 0.970	1.1	
8	Clearance between inner and outer bushing	130	—	—	0.120 – 0.190	0.3	

3. Steering to left
(When the steering wheel is turned to the left.)



- When steering wheel is turned (to the left), input shaft (1) rotates. When this happens, valve spool (3) moves up.
- The oil from the steering control valve flows from port (P) enters port (B) passes trough drill hole (a) in valve spool (3), and enters the inside of the valve spool.
- The oil inside valve spool (3) passes between stator (6) and rotor (12) in metering portion. After the amount of oil flowing to the steering cylinder is measured here, it flows to port (F).
- The oil at port (F) passes trough port (LT) and flows to steering cylinder.
- In this way, the two cylinders are actuated and the wheels turn to the left.
- The oil returning from the steering cylinder flows from port (RT) trough port (D) and port (R) and goes back to the tank.
- At the same time, the oil pressure at port (P) is restricted by valve spool (3), so a lower oil pressure than the pressure at port (P) is applied to port (LS).
- The steering control valve spool is actuated by the difference in pressure between the oil pressure at port (P) end and the oil pressure at the port (LS) end. As a result, only the necessary amount of oil flows to steering circuit, and remaining oil flows from the steering control valve to the hoist valve.

1. Manual operation button
2. Solenoid assembly (Solenoid a)
3. Relief valve (R)
4. Solenoid assembly (Solenoid b)
5. Strainer

A: To hoist valve (RAISE side)
B: To hoist valve (LOWER side)
P1: From hydraulic tank
P2: Pick up port
T1: To hydraulic tank
T2: To hydraulic tank

Function

- The EPC valve sends the oil from the hydraulic pump to the hoist valve spool to change the pilot pressure and control the hoist valve.

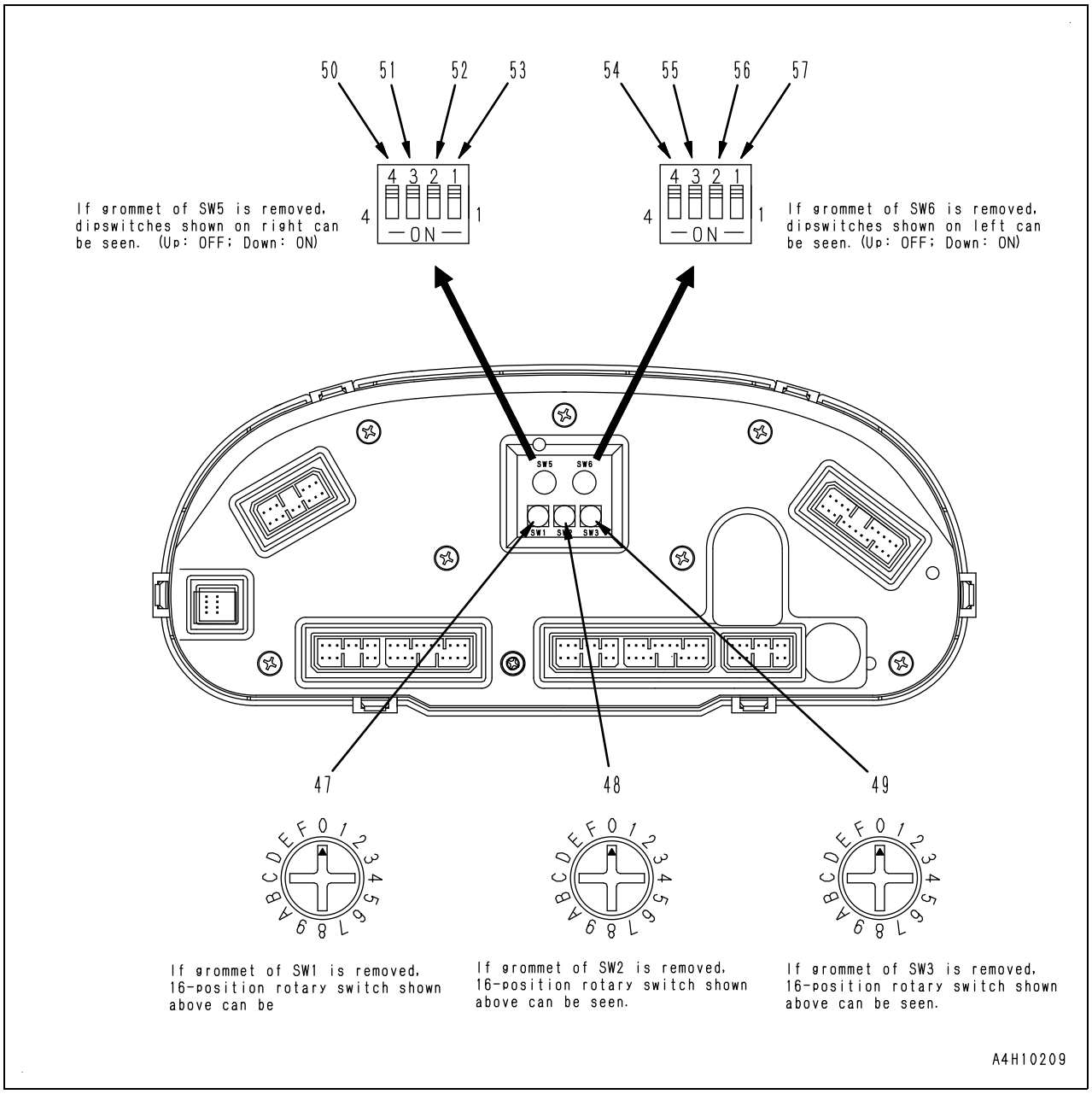
DUMP TRUCK

HD785-7

Machine model	Serial number
HD785-7	7001 and up

10 Structure, function and maintenance standard

Cab and its attachments



47. Rotary switch [SW1]
48. Rotary switch [SW2]
49. Rotary switch [SW3]
50. Dipswitch [SW5-4]
51. Dipswitch [SW5-3]
52. Dipswitch [SW5-2]
53. SI Spec, Non-SI Spec selection switch [SW5-1]
54. Dipswitch [SW6-4]
55. Dipswitch [SW6-3]
56. Dipswitch [SW6-2]
57. Dipswitch [SW6-1]

★ Setting do not change them.

Signal name	Model name				Remarks
	HD325-7 HD405-7	HD465-7E0 HD605-7E0	HD465-7R HD605-7R	HD785-7	
–	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	
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–	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	
ON: SI specification OFF: Non-SI specification	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	
–	–	–	–	–	

Data range	Remarks
Hexadecimal numbers show below Display of 8 characters AABBCCDD AA: Low temperature correction value [x10msec] BB: Medium temperature correction value [x10msec] CC: Normal temperature correction value [x10msec] DD: High temperature correction value [x10msec] 00000000 – FFFFFFFF [00000000 – FFFFFFFF] (Each range: -1.28 (80) – +1.27 (7F) [sec]) 7F=127 (MAX) 01=1 00=0 FF=-1 FE=-2 80=-128 (MIN)	
Hexadecimal numbers show below Display of 8 characters AABBCCDD AA: Low temperature correction value [x10msec] BB: Medium temperature correction value [x10msec] CC: Normal temperature correction value [x10msec] DD: High temperature correction value [x10msec] 00000000 – FFFFFFFF [00000000 – FFFFFFFF] (Each range: -1.28 (80) – +1.27 (7F) [sec]) 7F=127 (MAX) 01=1 00=0 FF=-1 FE=-2 80=-128 (MIN)	
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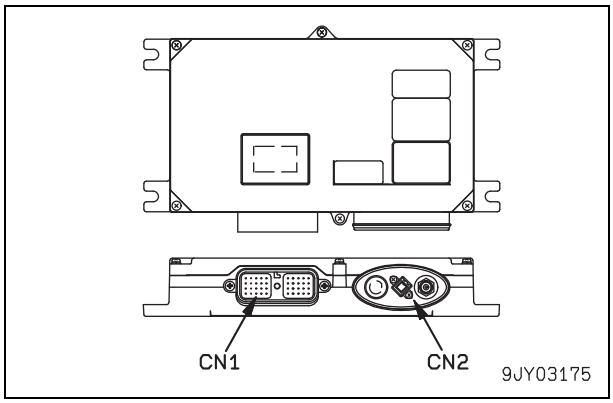
Corresponding data is displayed by [1 (ON), 0 (OFF)] just under HLR1234R. Example 0110000: when in F1 0001001: when in R2 0000000: when in N 1000010: when in F4	H: H Fill switch recognition [1:ON, 0:OFF] L: L Fill switch recognition [1:ON, 0:OFF] 1: One Fill switch recognition [1:ON, 0:OFF] 2: Two Fill switch recognition [1:ON, 0:OFF] 3: Three Fill switch recognition [1:ON, 0:OFF] 4: FOUR Fill SW recognition [1:ON, 0:OFF] R: R Fill switch recognition [1:ON, 0:OFF]

Data range	Remarks
01010101 [1.0 is displayed under corresponding display (number)] Input signal ON[1], Input signal OFF[0], 0 is displayed on unused part.	Unit is not displayed.
01010101 [1.0 is displayed under corresponding display (number)] Input signal ON[1], Input signal OFF[0], 0 is displayed on unused part.	Unit is not displayed.

Communications (ORB: Orbcomm) Controller/Antenna (If equipped)

Controller



Specifications

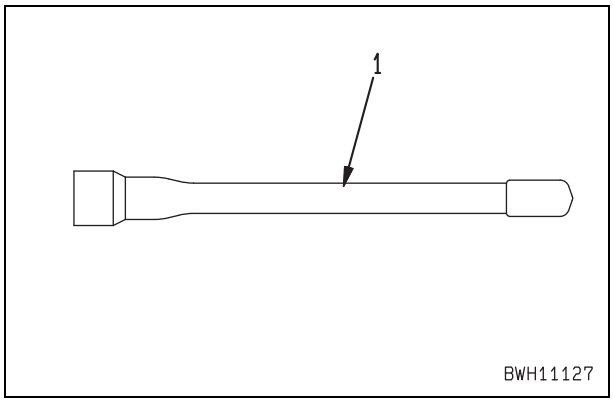
1. Power supply voltage: DC12V – DC30V
2. Size: W306 x D177 x H50 (mm)

Installation location

Install the controller to rear right bottom of operator's cab.

Connector portion

CN1: DRC23-40PA
CN2: Communications antenna cable connector

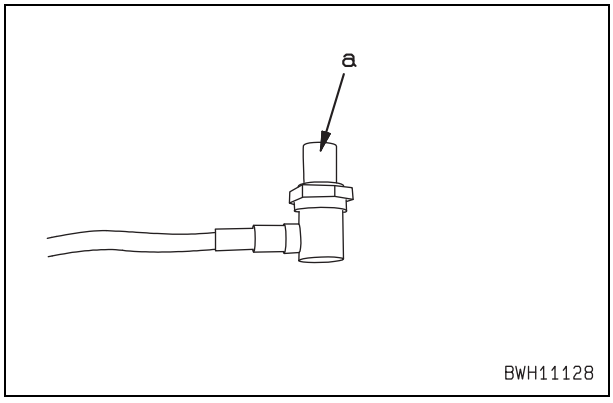


Antenna

Specifications

1. Type : Helical whip antenna
2. Impedance : 50 Ω
3. Input terminal: M-P type
4. Length : 165 ± 20 mm

a : Communications antenna mount

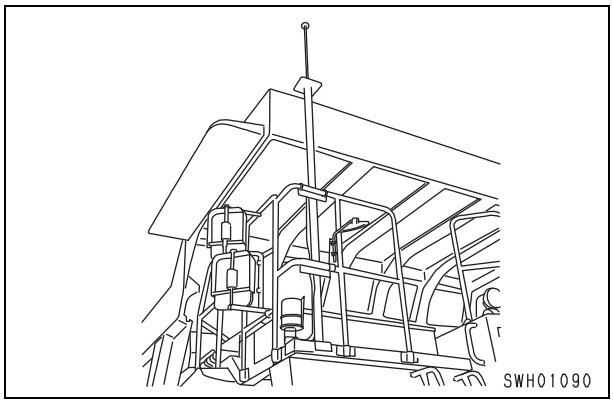


Installation location

Install pole at right front of machine and set antenna on top of it.

Function

The antenna transmits the data collected and accumulated by the VHMS controller through the communications satellite to the computer center.



(b) Contents of communication
Format (VHMS controller)

STX (02h)	[1]	[2]	[3]	[4]	[5]	[6]	ETX (03h)	BCC

[1]: M (ASCII) fixed
[2]: 4 (ASCII) fixed
[3]: 02 (h) fixed (Unit classification [HEX])
[4]: Load mass (B) [HEX] (2 BYTES) (Unit: Metric ton, 10-time value, 1 decimal place)
[5]: Estimated load mass (C) [HEX] (2 BYTES) (Unit: Metric ton, 10-time value, 1 decimal place)
[6]: (B) Calculated suspension pressure [HEX] [8 BYTES]
From head

Signal name	Position	Name	HEX
P FL	(Lower position) (Upper position)	Front left suspension pressure (kg/cm^2)	[10-time value] 0 – 6553.5
P FR	(Lower position) (Upper position)	Front right suspension pressure (kg/cm^2)	[10-time value] 0 – 6553.5
P RL	(Lower position) (Upper position)	Rear left suspension pressure (kg/cm^2)	[10-time value] 0 – 6553.5
P RR	(Lower position) (Upper position)	Rear right suspension pressure (kg/cm^2)	[10-time value] 0 – 6553.5

[BCC]: EX-OR of each bit from STX to ETX
Answer (→ VHMS controller)

STX (02h)	ACK (06h)	31H (ASCII 1)	ETX (03h)	BCC

or

STX (02h)	NAK (15h)	31H (ASCII 1)	ETX (03h)	BCC

Action that VHMS controller takes when answer is abnormal
If "NAK" is returned or either of "ACK" and "NAK" is not returned in 3 seconds, the VHMS controller transmits up to 2 more times. If an answer is still not returned, the VHMS controller stops transmission.

Transmission of final load mass
(a) Timing of transmission
When the concerned cycle data are entered (When dumping is finished), the final load mass (= the load mass to be saved as the hauled load mass of the concerned cycle in the memory) is transmitted automatically.
(b) Contents of communication
Format (VHMS controller)

STX (02h)	[1]	[2]	[3]	[4]	ETX (03h)	BCC

[1]: P (ASCII) fixed
[2]: 4 (ASCII) fixed
[3]: 02h fixed for unit identification
[4]: Load mass [HEX] (2 BYTES) (Unit: Metric ton, 10-time value, 1 decimal place)
Order: Lower position→ upper position from the head byte of [4]
[BCC]: EX-OR of each bit from STX to ETX

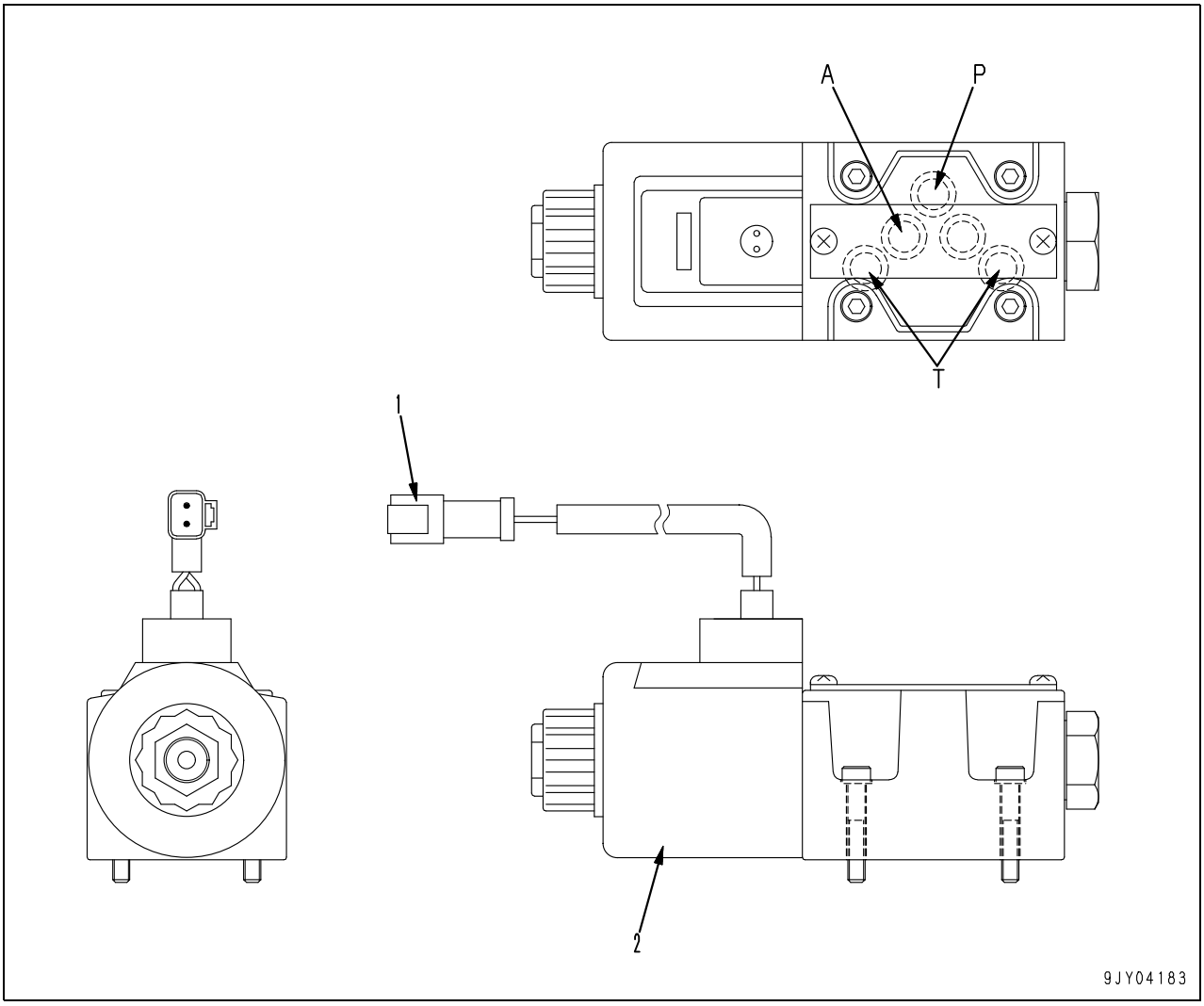
Answer (→ VHMS controller)

STX (02h)	ACK (06h)	31H (ASCII 1)	ETX (03h)	BCC

or

STX (02h)	NAK (15h)	31H (ASCII 1)	ETX (03h)	BCC

ABS ON/OFF valve



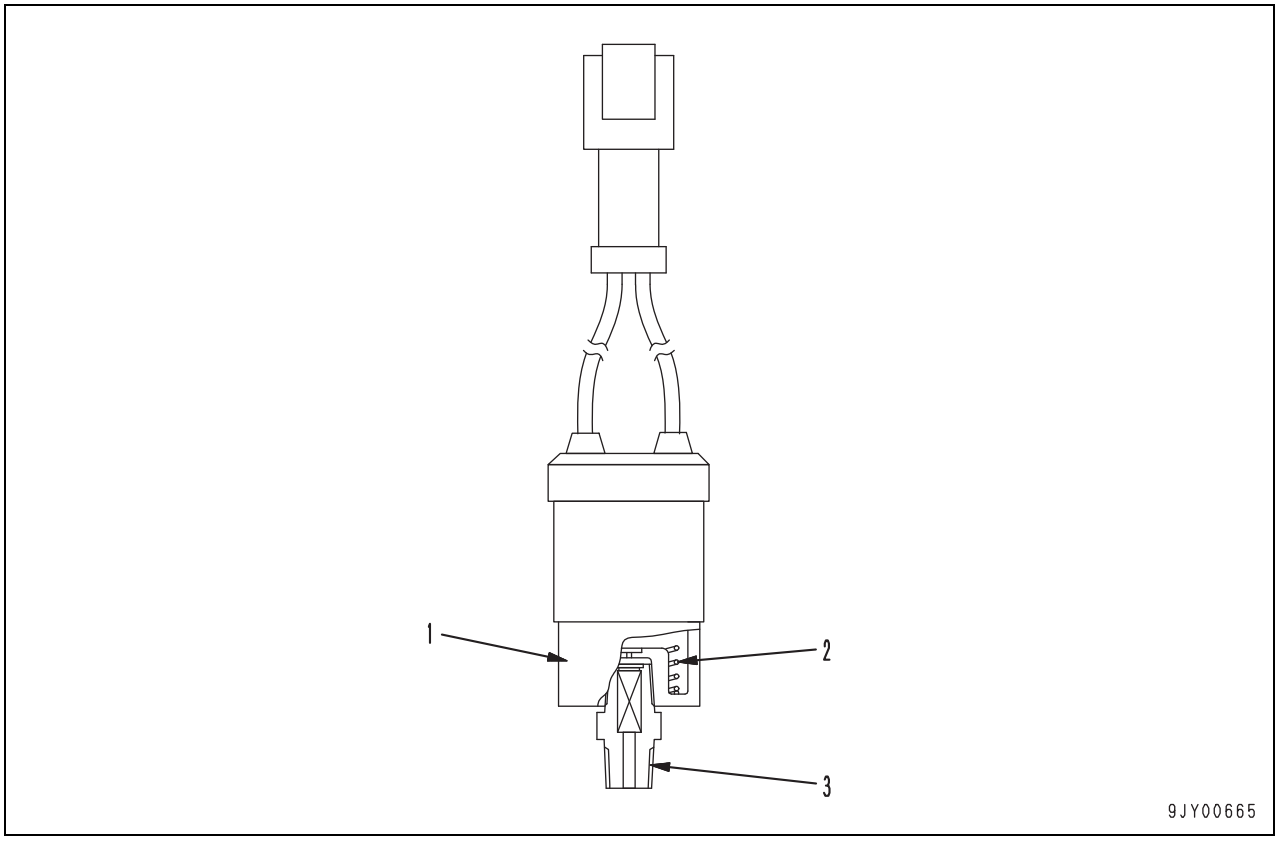
1. Connector
2. Solenid

A: To slack adjuster
P: From brake valve
T: To brake system tank

Function

- The ABS ON/OFF valve is installed between the brake valve and slack adjuster.
- If the ABS switch is turned ON, the solenoid valve is energized to make the ABS hydraulic circuit effective.
- If the ABS switch is turned OFF, the solenoid valve is de-energized and the ABS control valve output is minimized to make the ABS hydraulic circuit ineffective.

Air cleaner clogging sensor



1. Indicator
2. Spring
3. Adapter

Function

- The air cleaner clogging sensor is installed to the outward port of the air cleaner. If the air cleaner becomes clogged and reaches the set pressure (negative pressure), the maintenance caution lamp lights up and character display shows message to warn of the abnormality.

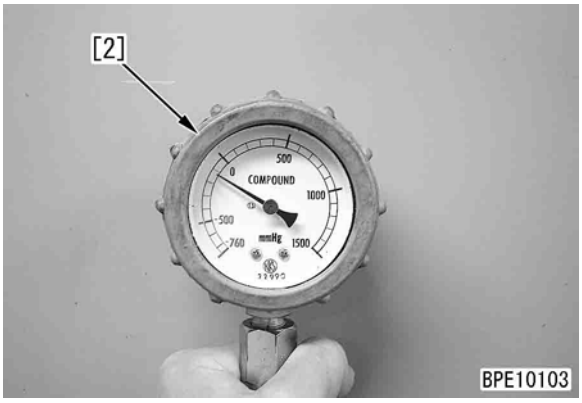
Machine model						HD785-7	
Check item			Measurement conditions		Unit	Standard value for new machine	Permissible value
Operating force and stroke	Accelerator pedal	Operating farce	• Point at 150 mm from fulcrum of pedal	Starting to depress	N {kg}	29.3 (+13.0/0) {3.0 (+1.4/0)}	29.3 (+13.0/0) {3.0 (+1.4/0)}
				Full		58.7 (0/-13.3) {6.0 (0/-1.4)}	58.7 (0/-13.3) {6.0 (0/-1.4)}
		Stroke		Starting to depress → Full	mm	45 ± 5	45 ± 5
	Shift lever	Operating farce	• At center of knob		N {kg}	Max. 29.4 {3.0}	Max. 29.4 {3.0}
		Stroke			mm	24.5 ± 1	24.5 ± 2

*5: Means that the dump truck is unloaded (Rear suspension gas pressure is below 10.8 MPa {110 kg/cm^2}).
*6: Means that the dump truck is loaded (Rear suspension gas pressure is 10.8 MPa {110 kg/cm^2} or higher).
*7: Detail of each mode (Setting is changed as follows, depending on selection of modes A – D)

	Mode setting	Condition (*8)	Rated output	High idle speed
Mode A	Power mode	High load (Loaded)	895 kW {1,200 HP} /1,900 rpm	2,250 rpm
Mode B	Power mode	Low load (Unloaded)	809 kW {1,080 HP} /1,900 rpm	2,250 rpm
Mode C	Economy mode	High load (Loaded)	750 kW {1,010 HP} /1,900 rpm	2,250 rpm
Mode D	Economy mode	Low load (Unloaded)	699 kW {937 HP} /1,900 rpm	2,100 rpm

*8: Remarks
- High load (When loaded): The load (dump truck) is judged high (loaded) when the rear suspension gas pressure is confirmed to be 10.8 MPa {110 kg/cm^2} or higher.
- Low load (When unloaded): The load (dump truck) is judged low (unloaded) when the rear suspension gas pressure is confirmed to be below 10.8 MPa {110 kg/cm^2}.

5. Run the engine at high idle to stall the torque converter, and test the air supply pressure (boost pressure).
   ★ For details of the procedure for stalling the torque converter, see "Testing torque converter stall speed".
   ★ If "TO 2350" is not selected in the high altitude setting selection of the optional setting, the high idle speed is decreased while the body is not seated. Accordingly, perform the test with the body seated.



6. After completing the testing, rermove the testing equipment and set to the original condition.

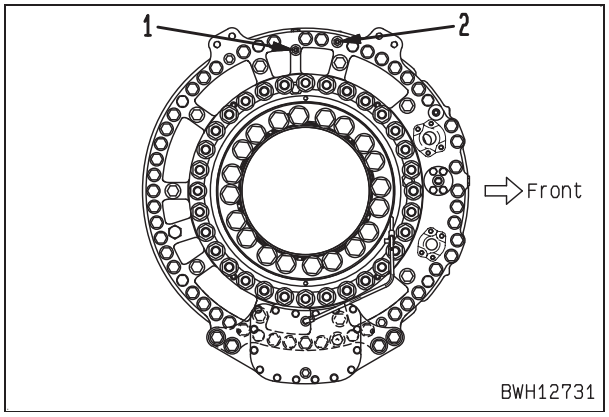
9. Start the engine with the starting motor.
   ★ Do not operate the starting motor continuously for more than 20 seconds.
      ● After starting the engine, run it at low idle for about 5 minutes to bleed all air from the fuel circuit.
      ● Stop the engine and check that the air bleeding valve is closed.
10. If the engine does not start, try to start it again according to the following procedure.

⚠ **When starting the engine, check that there is no person around it.**

   ★ Carry out the work with the air bleeding valve closed. (Do not open the air bleeding valve after step 7.)
   ★ After the engine fails to start, wait for about 2 minutes before trying to start again.
   1) Turn the electric priming pump switch ON.
   2) While the electric priming pump is operating, crank the engine.
   ● If the engine does not start, repeat the above operation.
   ★ Do not operate the starting motor continuously for more than 20 seconds.
   ★ If the engine fails to start, wait for about 2 minutes and try to start again.
   3) After starting the engine, run it at low idle for about 5 minutes to bleed all air from the fuel circuit.
   4) Stop the engine and check that the air bleeding valve is closed.
   5) After the above operation, start the engine normally.

3. Testing parking brake on rear brake side releasing pressure

1) Remove air bleeder (2) and install Oil pressure gauge **K1** [40 MPa {400 kg/cm²}].
   ★ The figure shows the left side.
2) Turn OFF the parking brake switch (Release the parking brake) and measure the oil pressure.
   ★ After finishing testing, bleed air, referring to "Bleeding air from brake circuit".

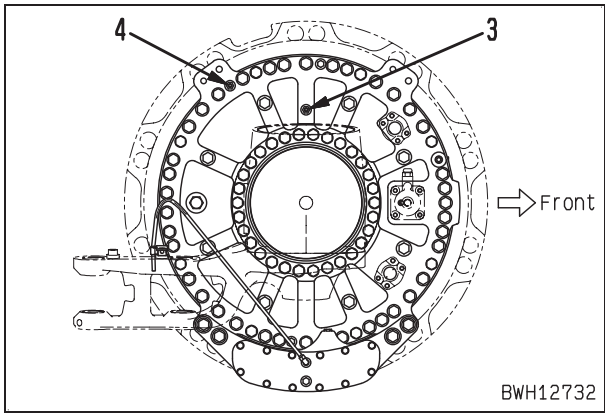


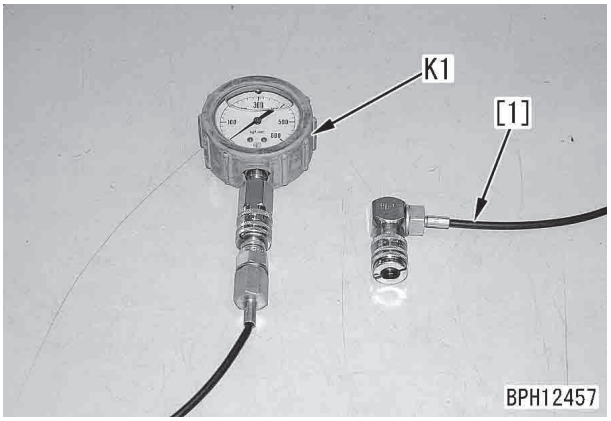
4. Testing parking brake on front brake side releasing pressure

1) Remove air bleeder (4) and install Oil pressure gauge **K1** [40 MPa {400 kg/cm²}].
   ★ The figure shows the left side.
2) Turn OFF the parking brake switch (Release the parking brake) and measure the oil pressure.
   ★ After finishing testing, bleed air, referring to "Bleeding air from brake circuit".

5. Testing front brake operating pressure

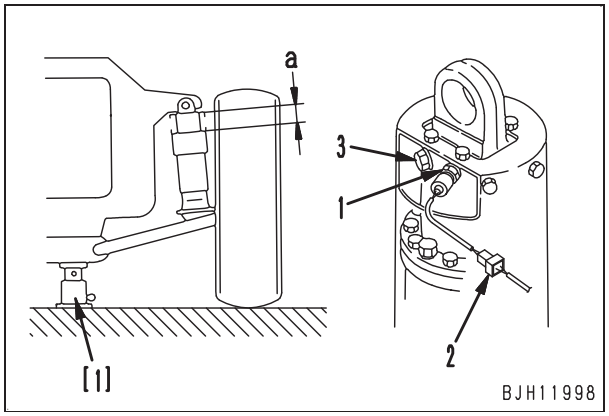
1) Remove air bleeder (3) and install Oil pressure gauge (C1) [40 MPa {400 kg/cm²}].
   ★ The figure shows the left side.
2) Operate the brake pedal and retarder control lever and measure the oil pressure.
   ★ After finishing esting, bleed air, referring to "Bleeding air from brake circuit".

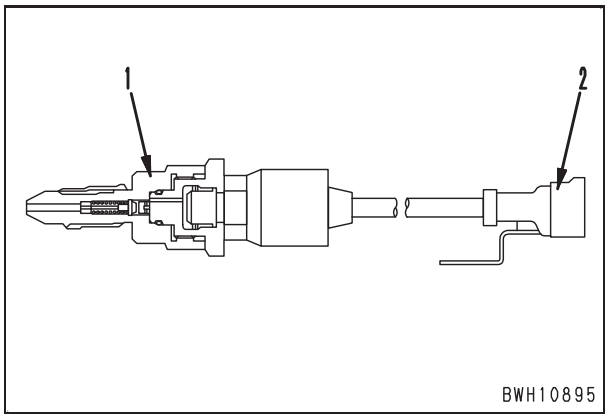




2. Bleeding nitrogen gas

1) Set hydraulic jack [1] (490 kN {50 t}) under the main frame.
2) Remove the cover from the suspension cylinder.
3) Disconnect pressure sensor connector (2) of oil level valve (1) and loosen oil level valve (1) by 2 – 3 turns.
   - ★ The machine equipped with the pressure sensor is shown in the figure. If your machine is not equipped with the pressure sensor, ignore the description on the pressure sensor.
   - ★ If the nitrogen gas is bled through intake valve (3), the valve core may be damaged. Accordingly, bleed through oil level valve (1).
   - ★ Loosen only the oil level valve. Do not loosen the pressure sensor and nipple.
   - ★ When the oil level valve is loosened, if both of the oil and gas spout out, close the valve a little to bleed the gas slowly.
4) Operate the hydraulic jack so that dimension (a) of the cylinder is the specified dimension for the oil level.
   Dimension(a): **82 ± 3 mm**

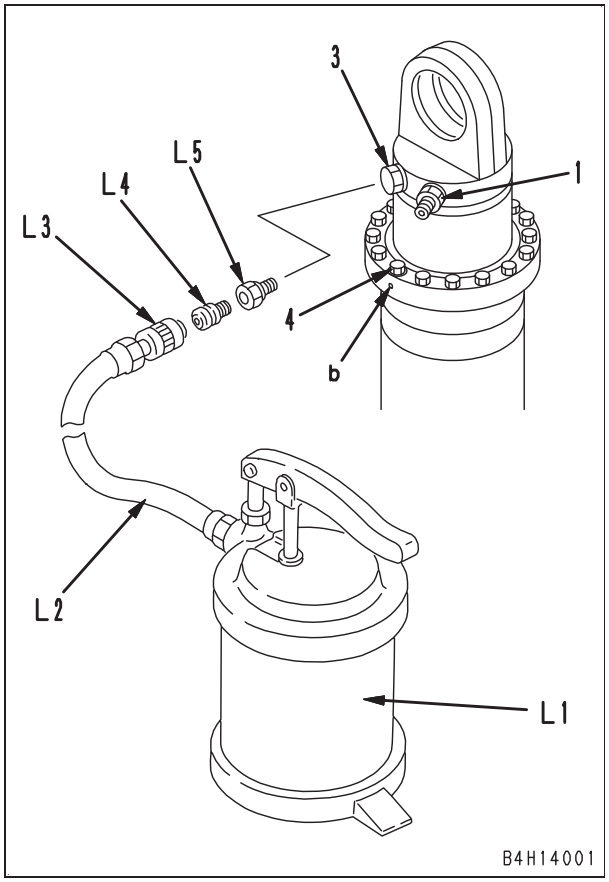




3. Adjusting of oil level

★ Release the nitrogen gas before adjusting the oil level.

1) Remove feed vavle (3), and install joint **L5**.
2) Install fitting **L4** to joint **L3**, then connect hose **L2** and volume pump **L1**.
3) Loosen air bleeding valve (4), then operate volume pump **L1** until no more bubbles come out with the oil from air bleed side hole (b).
4) When no more bubbles come out with the oil, tighten air bleeding valve (4).
   - Tightening torque of air bleeding valve: **39.2 – 49.0 Nm {4 – 5 kgm}**
5) Remove valve (1), then operate volume pump **L1** until no more bubbles come out with the oil from the valve (1) mount.
6) When no more bubbles come out with the oil, tighten the valve (1).
   - Tightening torque of oil level valve: **39.2 – 49.0 Nm {4 – 5 kgm}**
7) After completion of supplying the oil, remove the volume pump, then install feed valve (3).
   - Tightening torque of feed valve: **39.2 – 49.0 Nm {4 – 5 kgm}**

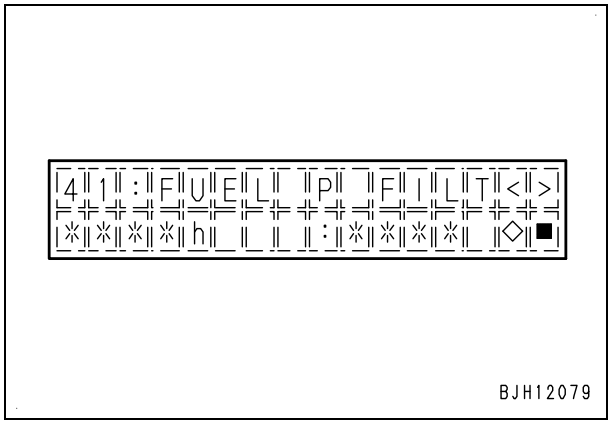


2. When transmission control system has a trouble and machine cannot start

★ Check the failure code and select a proper escape procedure from the following table.

★ For the method of checking the failure code, see "Special functions of machine monitor".

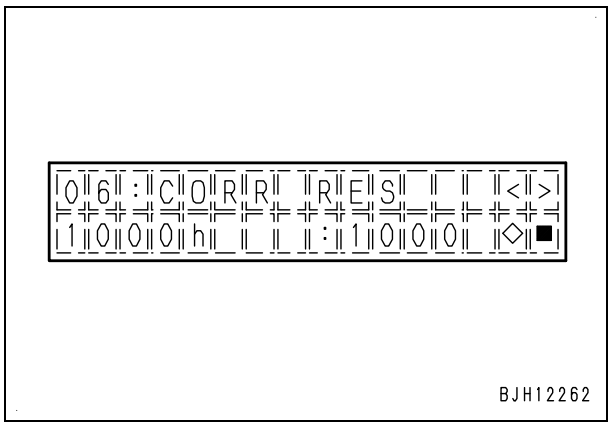
Failure code	Condition whentrouble occurred	Escape method	Starting gear speed set with lever position after escape operation	Remarks
1500L0	Occurrence condition 2	Escape procedure 2	—	ccurrence condition 1 Gear speed is kept fixed and gear is not shifted from fixed gear after machine restarts. If lever is set to N position, gear is set in neutral. Occurrence condition 2 Gear is set in neutral suddenly during travel. Once machine stops travel, gear is kept in neutral and machine does start when lever is operated. Occurrence condition 3 Gear is set in neutral suddenly during travel. Occurrence condition 4 After engine is started, gear is kept in neutral and machine does not start when lever is operated. Occurrence condition 5 Lever responds abnormally and does not work. If lever is operated, gear is set in neutral. Occurrence condition 6 Gear speed is kept fixed and gear is not shifted from fixed gear after machine restarts. If lever is set to N position, gear is set in neutral but cannot be shifted any more. Occurrence condition 7 Proper clutch for travel is used and gear speed is fixed. If there is not proper clutch, gear is set in neutral. If lever is set to N position, gear is set in neutral. Note 1 Even if trouble disappears, gear is kept in neutral until lever is set to N position once
15G0MW	Occurrence condition 2	Escape procedure 3	D – L: F2	
15H0MW	Occurrence condition 7	Escape procedure 1	D – L: F2, R: RL	
15J0MW	Occurrence condition 7	Escape procedure 1	D – L: F2, R: RH	
15K0MW	Occurrence condition 7	Escape procedure 3	D – L: F2, R: RH	
15L0MW	Occurrence condition 7	Escape procedure 3	D – L: F2, R: RH	
15M0MW	Occurrence condition 7	Escape procedure 3	D – L: F2, R: RH	
15N0MW	Occurrence condition 7	Escape procedure 3	D – L: F2, R: RH	
15SBL1	Occurrence condition 7	Escape procedure 1	R: RH	
15SBMA	Occurrence condition 2	Escape procedure 1	D – L: F2	
15SCL1	Occurrence condition 7	Escape procedure 1	D – L: F2, R: RH	
15SCMA	Occurrence condition 7	Escape procedure 1	D – L: F2, R: RL	
15SDL1	Occurrence condition 7	Escape procedure 1	D – L: F2, R: RL	
15SDMA	Occurrence condition 7	Escape procedure 1	D – L: F2, R: RH	
15SEL1	Occurrence condition 7	Escape procedure 1	D – L: F1	
15SEMA	Occurrence condition 7	Escape procedure 1	D – L: F2, R: RH	
15SFL1	Occurrence condition 7	Escape procedure 1	D – L: F2	
15SFMA	Occurrence condition 7	Escape procedure 1	D – L: F1, R: RH	
15SGL1	Occurrence condition 7	Escape procedure 1	D – L: F4	
15SGMA	Occurrence condition 7	Escape procedure 1	D – L: F2, R: RH	
15SHL1	Occurrence condition 7	Escape procedure 1	D – L: F6	
15SHMA	Occurrence condition 7	Escape procedure 1	D – L: F2, R: RH	
15SJMA	Occurrence condition 1	Escape procedure 1	D – L: F2, R: RH	
DAQ0KK	Occurrence condition 1	Escape procedure 5	If display becomes normal, machine can travel normally (Note 1).	
DAQ2KK	Occurrence condition 1	Escape procedure 4	If display becomes normal, machine can travel normally (Note 1).	
DAQ9KQ	Occurrence condition 4	Escape procedure 6	—	
DAQRKR	Occurrence condition 2	Escape procedure 5	If display becomes normal, machine can travel normally (Note 1).	
DAQRMA	Occurrence condition 4	Escape procedure 1	D – L: F2, R: RH	
DB2RKR	Occurrence condition 1	Escape procedure 1	D – L: F2, R: RH	
DDTHKA	Occurrence condition 1	Escape procedure 1	D – L: F2, R: RH	
DDTJKA	Occurrence condition 1	Escape procedure 1	D – L: F2, R: RL	
DDTKKA	Occurrence condition 1	Escape procedure 1	D – L: F1	
DDTLKA	Occurrence condition 1	Escape procedure 1	D – L: F2	
DDTMKA	Occurrence condition 1	Escape procedure 1	D – L: F4	
DDTNKA	Occurrence condition 1	Escape procedure 1	R: RH	
DDTPKA	Occurrence condition 1	Escape procedure 1	D – L: F6	



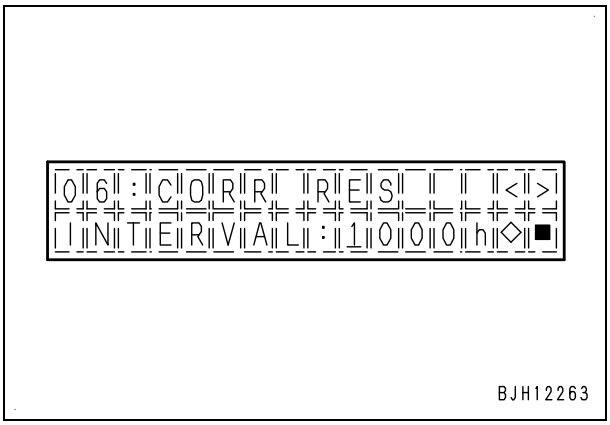
2) When pressing the [>] switch or [<] switch in the maintenance item selection screen, the maintenance item is displayed endlessly in the order shown in the below table, so select the corrosion register (06: CORR RES).
   - [>]: To proceed to next maintenance item.
   - [<]: To return to previous maintenance item.
   - ★ Displayed maintenance items:

Display	Maintenance items and functions
41: FUEL P FILT	Fuel pre filter
01: ENG OIL	Engine oil
02: ENG FILT	Engine oil filter
13: TM FILT	Transmission oil filter
03: FUEL FILT	Fuel main filter
06: CORR RES	Corrosion resistor
24: TC/TM/BK OIL	Torque convertor/Transmission/ Brake oil
14: BK OIL FILT	Brake oil filter
16: BK C FILT	Brake cooling oil filter
04: HYD FILT	Hydraulic oil filter
11: DIFF OIL	Differential oil
08: FNL OIL	Final drive oil
10: HYD OIL	Hydraulic oil
INTIALIZE	Setting default value for all items
ALL ITEMS	Setting validity or invalidity for all items

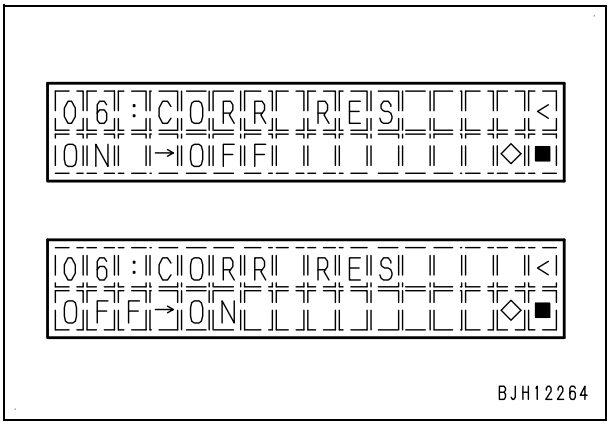
   ★ As for the use of maintenance items besides the corrosion register, refer to the section "Special function of machine monitor".



4. OFF setting of corrosion register item
   1) With the corrosion register selected, press the [◇] switch and display the interval change screen.
      - [◇]: To carry out interval change.



   2) After displaying the interval change screen, press the [>] or [<] switch further and display the setting screen for validity or invalidity.
      - [>]: Change the displayed screen
      - [<]: Change the displayed screen
      - ★ If the present setting is ON, the screen displays as above, and if the present setting is OFF, it displays as below.
      - ★ The default setting of the machine monitor is ON (above).
      - ★ If the present setting is ON (above), carry out the further operation to change the setting to OFF.
      - ★ If the present setting is OFF (below), press the [■] switch to complete the setting.



   3) In order to change the present setting from ON to OFF, press the [◇] switch to display the setting change screen.
      - [◇]: Change setting.

Failure codes	Failure contents	Applicable equipment	Action code	History classification
DBC0KT	Non-volatile memory abnormality	ABS	**E01**	Electrical system
DBC2KK	Trouble in solenoid power supply system	ABS	**E03**	Electrical system
DBC2KK	Solenoid power supply: Low voltage	PLC	**E03**	Electrical system
DBC3KK	Lowering of battery direct power supply voltage	ABS	**E03**	Electrical system
DBC3KK	Controller power supply: Low voltage	PLC	**E03**	Electrical system
(DBC9KQ)	Disagreement of model selection signals (ABS)	MON	**E03**	—
DBCRKR	Abnormality in CAN communication (ABS)	TM	**E03**	Electrical system
(DBCRMA)	Disagreement of option setting (ABS)	MON	**E03**	—
DBG2KK	Solenoid power supply: Low voltage	PLC	**E03**	Electrical system
DBG3KK	Battery direct power supply: Low voltage	PLC	**E03**	Electrical system
DBG9KQ	Model selection signal: Abnormal	PLC	**E01**	Electrical system
DDD7KX	Trouble in travel speed setting switch system	BK	**E03**	Electrical system
DDD8KA	Disconnection in ARSC system switch	BK	**E03**	Electrical system
DDD8KB	Short circuit in ARSC system switch	BK	**E03**	Electrical system
DDD9KA	Disconnection in ABS system switch	ABS	**E03**	Electrical system
DDD9KB	Short circuit in ABS system switch	ABS	**E03**	Electrical system
DDDAKA	Disconnection in ASR system switch	BK	**E01**	Electrical system
DDDAKB	Short circuit in ASR system switch	BK	**E01**	Electrical system
DDDGL4	Failure of ladder manual operation switch CH1 (inside cab) system	ABS	**E01**	Electrical system
DDDHL4	Failure of ladder manual operation switch CH2 (outside of cab) system	ABS	**E01**	Electrical system
DDE2KB	Engine oil pressure switch error: Grounding fault	PLC	**E01**	Electrical system
DDE2L6	Engine oil pressure switch error: Disconnection or hot short circuit	PLC	**E01**	Electrical system
DDP6L4	Trouble in service brake pressure switch	ABS	**E03**	Electrical system
DDTHKA	Trouble in high clutch flow sensor valve (command holding pressure, fill OFF, no slip)	TM	**E03**	Electrical system
DDTJKA	Trouble in low clutch flow sensor valve (command holding pressure, fill OFF, no slip)	TM	**E03**	Electrical system
DDTKKA	Trouble in 1st clutch flow sensor valve (command holding pressure, fill OFF, no slip)	TM	**E03**	Electrical system
DDTLKA	Trouble in 2nd clutch flow sensor valve (command holding pressure, fill OFF, no slip)	TM	**E03**	Electrical system
DDTMKA	Trouble in 3rd clutch flow sensor valve (command holding pressure, fill OFF, no slip)	TM	**E03**	Electrical system
DDTNKA	Trouble in reverse clutch flow sensor valve (command holding pressure, fill OFF, no slip)	TM	**E03**	Electrical system
DDTPKA	Trouble in 4th clutch flow sensor valve (command holding pressure, fill OFF, no slip)	TM	**E03**	Electrical system
DDU1KA	Open circuit in parking brake operation input circuit	ABS	**E03**	Electrical system
DF10KA	Input of no lever signal	TM	**E03**	Electrical system
DF10KB	Input of multiple lever signal	TM	**E03**	Electrical system
DGE5KX	Atmospheric temperature sensor: Out of input signal range	VHMS (Display: PLM)	—	Electrical system

Detailed information of 40905 (D-IN--0------7)
[0]: (Unused)
[1]: Transmission filter switch 1
[2]: Transmission filter switch 2
[3]: Emergency escape switch (ON: 1)
[4]: Starting switch C terminal signal (Start of engine: 1)
[5]: (Unused)
[6]: Emergency steering relay 1 (Driving: 1)
[7]: Gearshift lever (N position: 1)

Detailed information of 40906 (D-IN--8-----15)
[8]: Low clutch fill switch (ON: 1)
[9]: 4th clutch fill switch (ON: 1)
[10]: High clutch fill switch (ON: 1)
[11]: 1st clutch fill switch (ON: 1)
[12]: 2nd clutch fill switch (ON: 1)
[13]: 3rd clutch fill switch (ON: 1)
[14]: Reverse clutch fill switch (ON: 1)
[15]: (Unused)

Detailed information of 40907 (D-IN--16----23)
[16]: Gearshift lever (R position: 1)
[17]: Gearshift lever (D position: 1)
[18]: Gearshift lever (6 position: 1)
[19]: Gearshift lever (5 position: 1)
[20]: Gearshift lever (4 position: 1)
[21]: Gearshift lever (3 position: 1)
[22]: Gearshift lever (2 position: 1)
[23]: Gearshift lever (L position: 1)

Detailed information of 40908 (D-IN--24----31)
[24]: (Unused)
[25]: Coolant level
[26]: Air cleaner switch
[27]: Main pressure variable valve pressure switch
[28]: Main flow rate selector valve pressure switch
[29]: Lubricating oil quantity variable valve pressure switch
[30]: (Unused)
[31]: (Unused)

Detailed information of 40942 (D-IN--32----39)
[32]: (Unused)

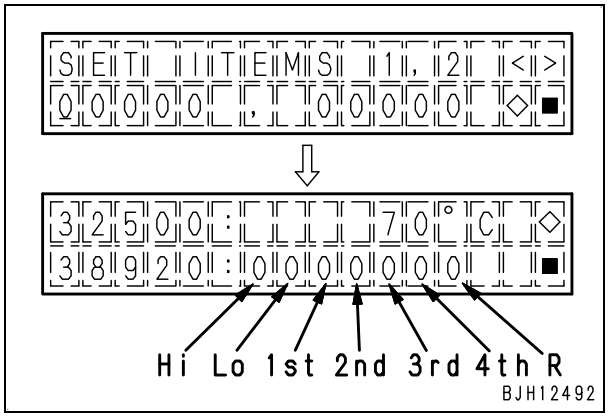
Detailed information of 40949 (D-OUT--0------7)
[0]: (Unused)
[1]: (Unused)
[2]: (Unused)
[3]: (Unused)
[4]: (Unused)
[5]: (Unused)
[6]: (Unused)
[7]: (Unused)

Detailed information of 40950 (D-OUT--8-----15)
[8]: (Unused)
[9]: (Unused)
[10]: (Unused)
[11]: (Unused)
[12]: (Unused)
[13]: (Unused)
[14]: (Unused)
[15]: (Unused)

Detailed information of 40951 (D-OUT--16-----23)
[16]: (Unused)
[17]: (Unused)
[18]: (Unused)
[19]: (Unused)
[20]: (Unused)
[21]: (Unused)
[22]: (Unused)
[23]: (Unused)

10) With 2 items simultaneous monitoring selected, press the [◇] switch and display the monitoring code input screen.
- [◇]: Execute monitoring system and function.

11) In the monitoring code input screen, operate each of the switches [>], [<], [◇] and [■], and directly input 2-digit monitoring codes.
- [>]: Number at the cursor increases.
- [<]: Number at the cursor decreases
- [◇]: Number at the cursor is determined
- [■]: Cursor moves to the left end / To return to the monitoring system and function selection screen.
- Monitoring code: **32500** and **38920**
- ★ Indicate the transmission oil temperature in the upper row (**32500**) and study condition of clutch trigger in the lower row (**38920**) (0: not learned yet, 1: already learned).

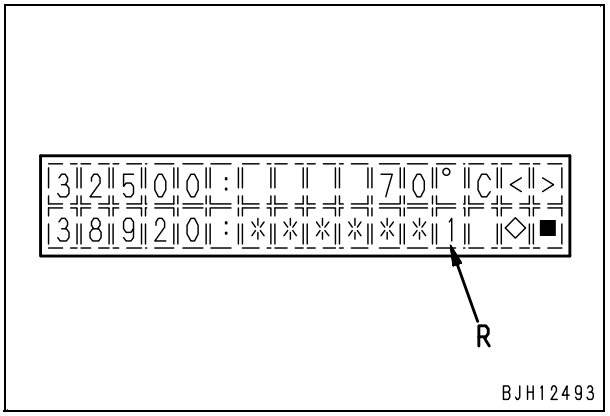


12) Set AISS LOW switch to LOW.

13) Start the engine, keep the gear shift lever at N position for 10 seconds at the low idle, then operate the gear shift lever as follows.
- ★ Gear shift lever operation:

N→R→N

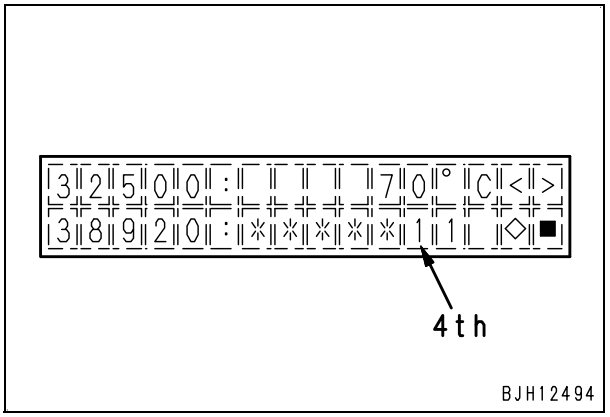
14) Confirm the trigger learning display of R clutch in the monitoring display.
- ★ Proceed to the next step if the display is "1".
- ★ If the display is "0", repeat procedure 13) until it becomes "1".
- ★ If "1" is not displayed after repeating the steps 4 times, the ECMV may be defective. In this case, replace the ECMV.
- ★ The * marked clutch display can be either "0" or "1".



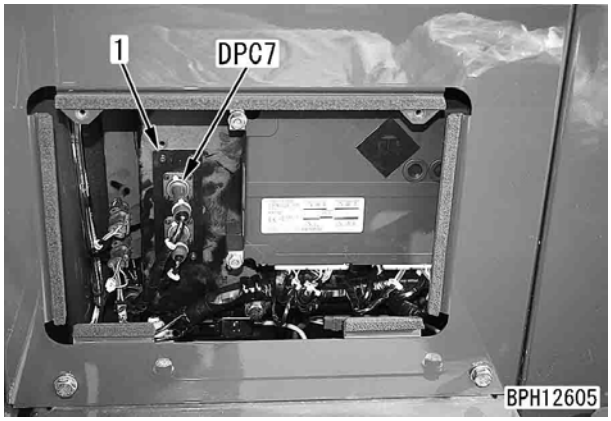
15) Set the gearshift lever in the 6 position and press the accelerator pedal fully to run the truck and shift up the gear to F6.
- ★ Shifting up: F1 → F2 → F3 → F4 →F5 → F6

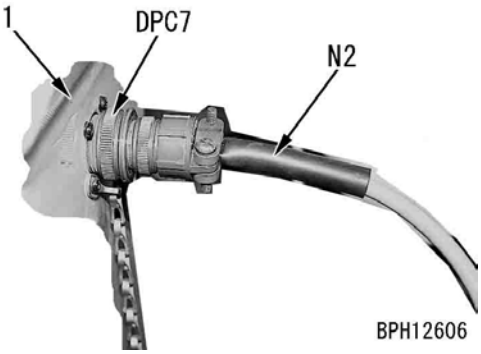
16) After the gear is shifted up to F6, release the accelerator pedal and shift down the gear to F1 by coasting run.
- ★ Shift down: F6 → F5 → F4 → F3 → F2 → F1
- ★ Do not apply the brake during coasting run.

17) Check that the trigger learning of the 4th clutch is displayed on the monitor.
- ★ If "1" is displayed, go to the next step.
- ★ If the display is "0", repeat procedure 15) – 16) until it becomes "1".
- ★ If "1" is not displayed after repeating the steps 4 times, the ECMV may be defective. In this case, replace the ECMV.
- ★ The * marked clutch display can be either "0" or "1".

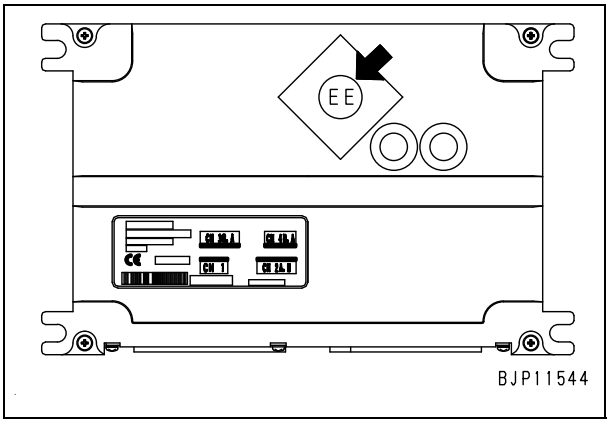


★ Download connector **DPC7** is installed to box (1) in the cover at the rear of the operator's seat.

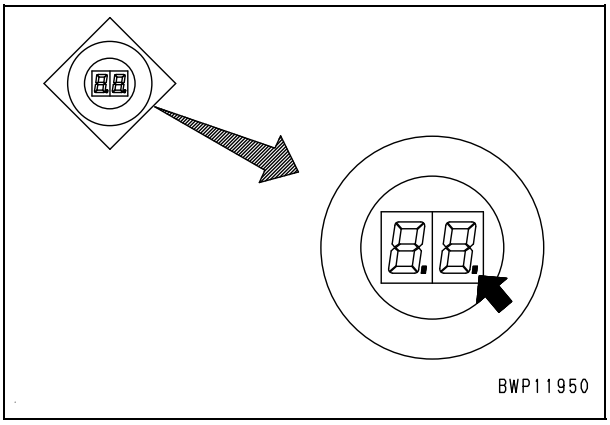




3. **Confirming VHMS controller operation and confirming satellite capturing state**
   ★ This work is done inside the cab.
   ★ Confirmation of capturing of the satellite is done for [ORBCOMM installation specification].
   1) Turn the starting switch ON.
   2) Check the controller for normal operation referencing 7-segment LED of VHMS controller.
      ★ The VHMS controller is powered with the accessory power supply. Accordingly, when the starting switch is turned ON, the 7-segment LED must blink to display rotation and then count up in hexadecimal notation. If the LED operates in this way, the VHMS controller is operating normally.



   3) Among the 7-segment LED situated in the right side of VHMS controller, refer to the one that represents the decimal point to check whether or not ORBCOMM terminal has captured the communication satellite. [ORBCOMM installation specification]
      ★ Check whether or not ORBCOMM terminal is capturing the communication satellite from VHMS controller.
      ★ Perform this check within 3 minutes after the VHMS starts.
      ★ If the decimal point LED of the right-hand 7-segment LED blinks, the ORBCOMM terminal has captured the satelite and is operating normally.
      ★ The ORBCOMM terminal may take time to capture the satelite, depending on the strengh of the signals from the satelite.



2. Application for starting to use

1) Notify the KOMTRAX operations administrator of the following information of the machine which has completed the sign-up test.

1. Information of machine which has completed sign-up test (Model,Model No., Serial No.)

2. Part No. and serial No. of ORBCOMM terminal

3. Reading of service meter when sign-up test was completed (0.1h unit)

2) Fill in the"VHMS/WebCARE setting notification form" and enter "Use" in the column of "Use of KOMTRAX Service".

3) Send the "VHMS/WebCARE setting notification form" to VHMS/WebCARE SUPPORT in KOMATSU HEAD OFFICE.

Komatsu VHMS/WebCARE Support

2-3-6, Akasaka Minato-Ku Tokyo, Japan

FAX: 81-3-5561-4738 (from outside of Japan)
FAX: 03-5561-4738 (Domestic user)

E-mail: JP00MB_webcare@global.komatsu

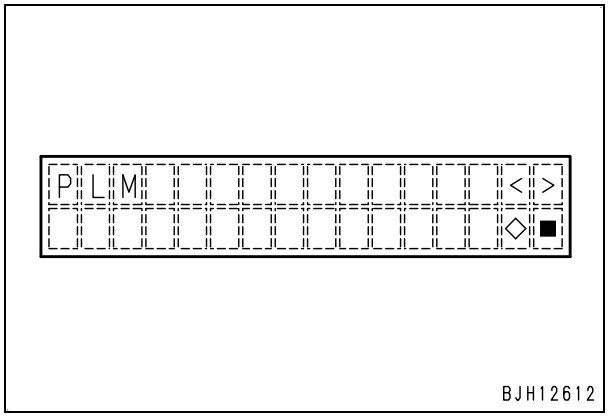
4) The KOMTRAX operations administrator registers the machine using the KOMTRAX client personal computer.

★ For the procedure, see the following.

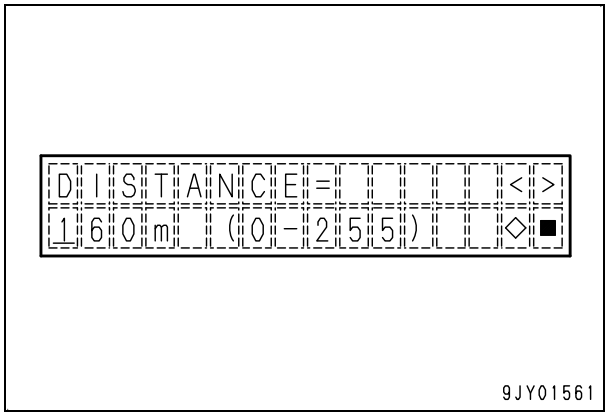
[Global KOMTRAX Web Reference Manual (For Key Person)]

Set various items of the payload meter (PLM) with the machine monitor.

1. Selection of service menu
   While the service menu selection screen is displayed, select the PLM setting function (PLM).



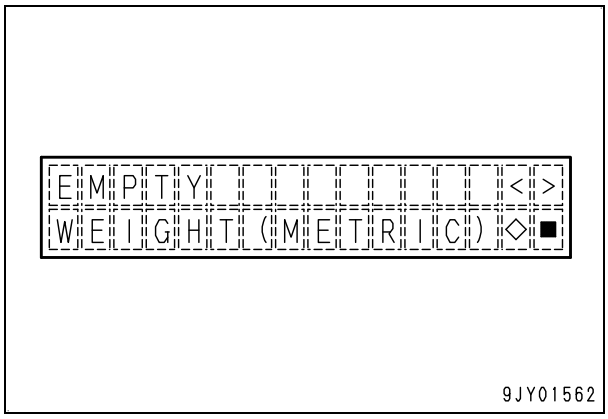
2. Setting of travel distance to recognize completion of loading



   Input a travel distance to recognize completion of loading by pressing the following buttons.
   The setting range is 0 – 255 m (0.0 – 0.158 miles).
   - [>] button: Number at cursor moves forward
   - [<] button: Number at cursor moves backward
   - [◇] button: Enter number at cursor
   - [■] button: Stop inputting number

   ★ If the set value is too small, the system may recognize that loading is completed while the machine is still being loaded.

3. Correction of calculation of load weight
   ★ Since this function affects the accuracy directly, execute the following procedure securely.
   ★ Be sure to measure the weight of the empty machine and that of the fully loaded machine as a set in order according to the following procedure.
   ★ The machine must travel for about 3 minutes each after its empty weight and its fully loaded weight are measured. Accordingly, secure a road for this purpose.
   ★ The relationship between the suspension pressure and load weight corrected with this function cannot be returned to the condition at the time of shipment. Accordingly, perform the following procedure very carefully.
   1) Measure the weight of the empty machine with the load meter and record it (Write it on a sheet of paper, etc.)
   2) Input the measured weight of the empty machine and drive the machine for about 3 minutes.
      1] Select "EMPTY WEIGHT".



      - [>], [<] buttons: Select "EMPTY WEIGHT" or "LOADED WEIGHT"
      - [◇] button: Enter the selection
      - [■] button: Return to the previous screen

      If the weight of the empty machine has been input and the machine has been driven for about 3 minutes, "LOADED WEIGHT" is displayed when the menu is selected.Check the unit of the input value. The unit is indicated in the ( ) on the right side of WEIGHT.
      (METRIC): metric ton
      (SHORT): short ton

Failure codes	Failure contents	Applicable equipment	Action code	History classification	Reference manual
DLF6KA	Disconnection in wheel speed sensor (front right)	ABS	E03	Electrical system	Troubleshooting by failure code, Part 8 SEN01945-**
DLF6L3	Trouble in wheel speed sensor (front right)	ABS	E03	Electrical system	
DLF7KA	Disconnection in wheel speed sensor (front left)	ABS	E03	Electrical system	
DLF7L3	Trouble in wheel speed sensor (front left)	ABS	E03	Electrical system	
DLF8KA	Disconnection in wheel speed sensor (rear right)	BK	E01	Electrical system	
DLF8L3	Trouble in wheel speed sensor (rear right)	ABS	E03	Electrical system	
DLF8LC	Trouble in wheel speed sensor system (rear right)	BK	E01	Electrical system	
DLF8MA	Disconnection in wheel speed sensor (rear right)	ABS	E03	Electrical system	
DLF9KA	Disconnection in wheel speed sensor (rear left)	BK	E01	Electrical system	
DLF9L3	Trouble in wheel speed sensor (rear left)	ABS	E03	Electrical system	
DLF9LC	Trouble in wheel speed sensor system (rear left)	BK	E01	Electrical system	
DLF9MA	Disconnection in wheel speed sensor (rear left)	ABS	E03	Electrical system	
DLT3KA	Disconnection in transmission output shaft speed sensor system	TM	E03	Electrical system	
DLT3LC	Trouble in transmission output shaft sensor	BK	E01	Electrical system	
DLT4KA	Disconnection in transmission output shaft speed sensor	BK	E01	Electrical system	
DLT4MA	Disconnection in transmission output shaft speed sensor	BK	E03	Electrical system	
DUM7KY	Pre-lubrication operation lamp output abnormality: Hot short circuit	PLC	E01	Electrical system	
DUM7KZ	Pre-lubrication operation lamp output abnormality: Disconnection or grounding fault	PLC	E01	Electrical system	
DUM9KZ	Failure of power ladder indicator system	ABS	E01	Electrical system	
DV00KB	Short circuit in buzzer output	MON	E01	Electrical system	
DW2AKA	Disconnection in main pressure variable valve output	TM	E01	Electrical system	
DW2AKB	Ground fault in main pressure variable valve output circuit	TM	E01	Electrical system	
DW2AKY	Hot short in main pressure variable valve output circuit	TM	E01	Electrical system	
DW2AL1	Defective reset of main pressure variable valve	TM	E01	Electrical system	
DW2ALH	Malfunction of main pressure variable valve	TM	E01	Electrical system	
DW2BKA	Main oil level selector valve output disconnection	TM	E01	Electrical system	
DW2BKB	Main oil level selector valve output circuit GND short circuit	TM	E01	Electrical system	

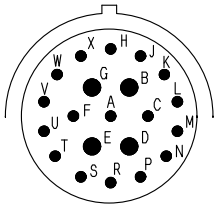
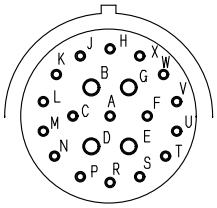
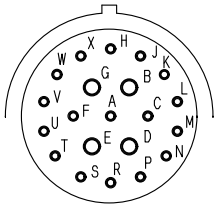
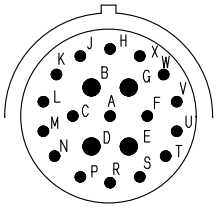
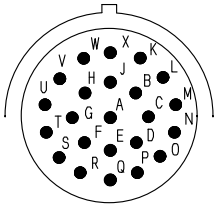
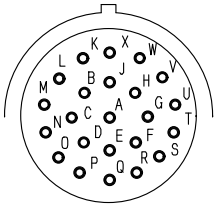
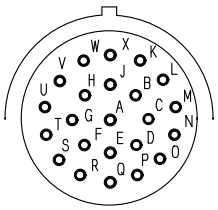
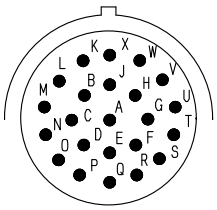
Contents of troubleshooting table

★ The following information is summarized in the troubleshooting table and the related electrical circuit diagram. Before carrying out troubleshooting, understand that information fully.

Action code	Failure code	Trouble	
Machine monitor display	**Machine monitor display**	Trouble	**Names of the failure symptoms displayed in the failure history on the machine monitor**
Contents of trouble	**State where the machine monitor or controller detects the trouble**		
Action of machine monitor or controller	**Action to be taken to protect the system and equipment when the machine monitor or controller detects a trouble**		
Problem that appears on machine	**Problem that appears as an abnormality in the machine by the action (above) taken by monitor or controller**		
Related information	**Information related to troubles occurred or troubleshooting**		

	Cause		Standard value in normal state/Remarks on troubleshooting
Possible causes and standard value in normal state	1 2 3 4	Cause by which a trouble is assumed to be detected (The order number indicates a serial number, not a priority sequence.)	**<Described contents>** **• Standard value when normal required to judge the possible cause** **• Remarks required to judge whether any cause is right or not** **<Symptoms of defective harness>** **• Disconnection in wiring** **The connector connection is defective or the wiring harness is disconnected.** **• Defective grounding** **A harness not connected to GND (ground) circuit comes into contact with the GND (ground) circuit.** **• Hot short defect** **A harness not connected to the electric power supply (24V) circuit comes into contact with the electric power supply (24V) circuit.** **• Short circuit** **A harness abnormally comes into contact with a harness of separate circuit.** **<Points to remember when troubleshooting>** **(1) Method of indicating connector numbers and handling T-adapter** **For troubleshooting, insert or connect the T- adapter as described below unless especially specified.** **• When "male"or "female" is not indicated for a connector number, disconnect the connector, and insert the T-adapter in both the male and female.** **• When "male"or "female" is indicated for a connector number, disconnect the connector, and insert the T-adapter in only either the male or female.** **(2) Pin number description sequence and tester lead handling** **For troubleshooting, connect the plus (+) and minus (-) leads of the tester as described below unless especially specified.** **• Connect the plus (+) lead to a pin number or harness indicated in the front.** **• Connect the minus (-) lead to a pin number or harness indicated in the rear.**

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

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

B4D18408

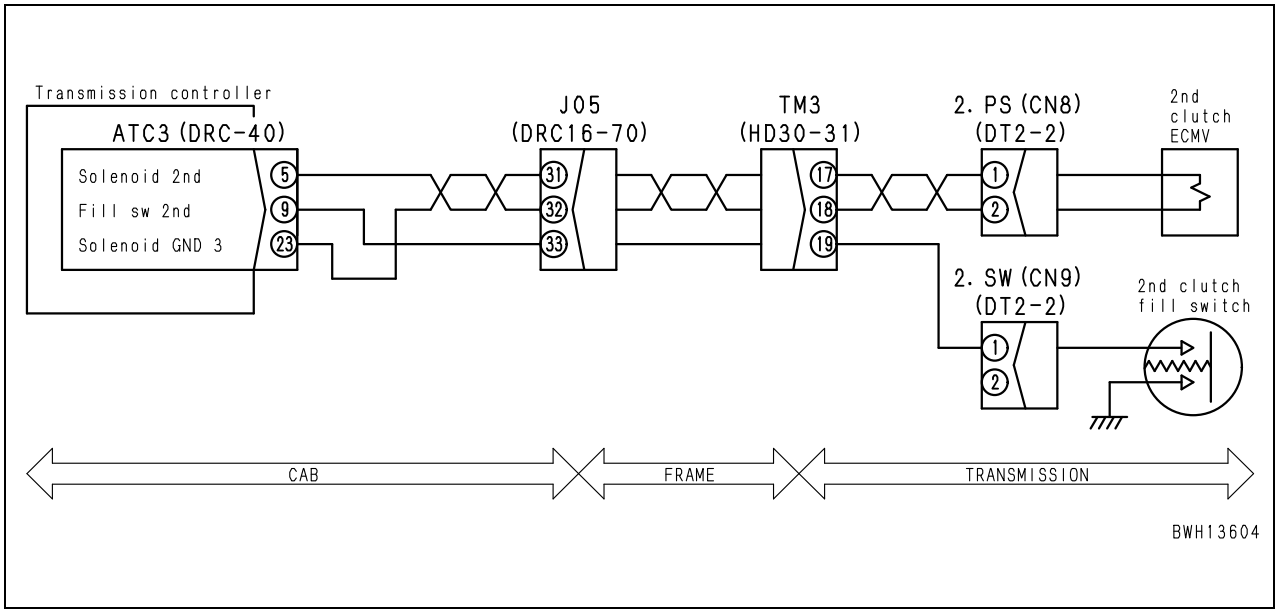
Part No.	Part name	Number of pins	Identification symbol	T-adapter kit														Out of kit
				799-601-2500	799-601-2700	799-601-2800	799-601-7000	799-601-7100	799-601-7400	799-601-7500	799-601-8000	799-601-9000	799-601-9100	799-601-9200	799-601-9300	799-601-4101	799-601-4201	
799-601-9330	Case											●						
799-601-9340	Case												●					
799-601-9350	Adapter for DRC	40	DRC-40												●			
799-601-9360	Adapter for DRC	24	DRC-24												●			
799-601-9410*	Socket for engine (CRI-T2)	2	G															●
799-601-9420	Adapter for engine (CRI-T2) Adapter for engine (CRI-T3) PFUEL Oil pressure sensor	3	A3													●	●	
799-601-9430*	Socket for engine (CRI-T2) Socket for engine (CRI-T3) PCV	2	P													●	●	
799-601-9440*	Socket for engine (CRI-T2)	3	1,2,3															●
795-799-5520*	Socket for engine (HPI-T2)	2	S															●
795-799-5530*	Socket for engine (HPI-T2) Socket for engine (CRI-T3) Temperature sensor	2	C													●	●	
795-799-5540*	Socket for engine (HPI-T2) Socket for engine (CRI-T3) TIM	2	A													●	●	
795-799-5460	Cable for engine (HPI-T2)	3	—															●
795-799-5470	Cable for engine (HPI-T2)	3	—															●
795-799-5480	Cable for engine (HPI-T2)	3	—															●
799-601-4110	Adapter for engine (140-T3) PIM	4	ITT3N													●	●	
799-601-4130	Adapter for engine (CRI-T3) NE, CAM	3	FCIN													●	●	
799-601-4140	Adapter for engine (CRI-T3) Atomosphere pressure	3	FCIG													●	●	
799-601-4150	Adapter for engine (CRI-T3) POIL	3	FCIB													●	●	
799-601-4160	Adapter for engine (CRI-T3) Oil pressure switch	2	4160													●	●	
799-601-4180	Adapter for engine (CRI-T3) PEVA	3	4180													●	●	
799-601-4190*	Socket for engine (CRI-T3) Commonrail pressure	3	1,2,3L													●	●	
799-601-4230*	Socket for engine (CRI-T3) Air intake pressure/temperature	4	1,2,3,4C													●	●	
799-601-4240*	Socket for engine (CRI-T3) PAMB	3	1,2,3A													●	●	
799-601-4250*	Socket for engine (CRI-T3) PIM	3	1,2,3B													●	●	
799-601-4330*	Socket for engine (CRI-T3) G	3	1,2,3,G													●	●	
799-601-4340*	Socket for engine (CRI-T3) Pump actuator	2	2,PA													●	●	
799-601-4380*	Socket for engine (CRI-T3)(95) Air intake pressure/temperature	4	1,2,3,4T															●
799-601-4260	Adapter for controller (ENG)	4	DTP4													●	●	
799-601-4211	Adapter for controller (ENG)	50	DRC50													●		
799-601-4220	Adapter for controller (ENG)	60	DRC60													●		
799-601-4390*	Socket for controller (95 ENG)	60	—															●
799-601-4280*	Box for controller (PUMP)	121	—															●
799-601-9720	Adapter for controller (HST)	16	HST16A															●
799-601-9710	Adapter for controller (HST)	16	HST16B															●
799-601-9730	Adapter for controller (HST)	26	HST26A															●
799-601-9890	Multi-adapter for DT2 – 4 and DTM2	2, 3, 4	—															●

"*" Shows not T-adapter but socket.

Table 1

Speed when trouble was detected		Failed clutch	Remedy against trouble		
			Action of controller (Selected clutch, gear speed)		ON/OFF state of lockup clutch
F7	4th High	4th	OFF	NEUTRAL	OFF
		High	OFF	NEUTRAL	OFF
F6	4th Low	4th	OFF	NEUTRAL	OFF
		Low	4H	F7	OFF
F5	3rd High	3rd	4L	F6	OFF
		High	4L	F6	OFF
F4	3rd Low	3rd	4L	F6	OFF
		Low	3H	F5	OFF
F3	2nd High	2nd	3L	F4	OFF
		High	3L	F4	OFF
F2	2nd Low	2nd	3L	F4	OFF
		Low	2H	F3	OFF
F1	1st Low	1st	2L	F2	OFF
		Low	2H	F3	OFF
RH	Reverse High	Reverse	OFF	NEUTRAL	OFF
		High	OFF	NEUTRAL	OFF
RL	Reverse Low	Reverse	OFF	NEUTRAL	OFF
		Low	RH	RH	OFF

Circuit diagram related



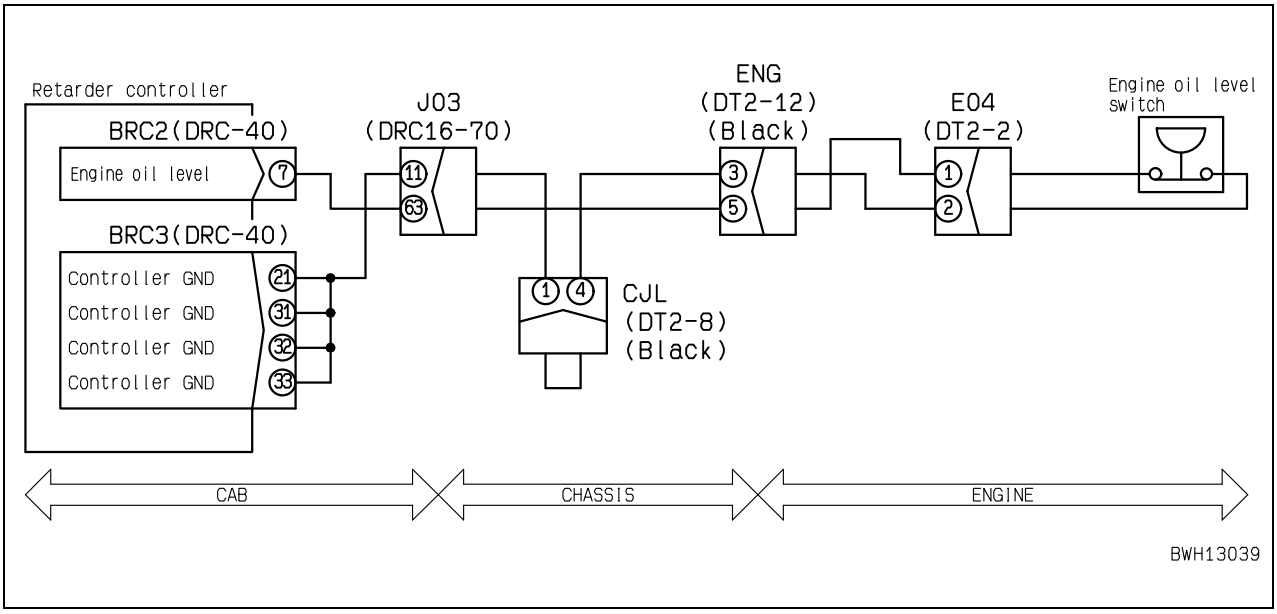
Failure code [15SEMA] 1st clutch solenoid: Malfunction

Action code	Failure code		
E03	**15SEMA**	Trouble	1st clutch solenoid: Malfunction (1st command holding pressure, 1st clutch fill switch OFF, slipping detected) (Transmission controller system)
Contents of trouble	• The signal from the fill switch stays "OFF" during an output to the 1st clutch ECMV solenoid and an abnormality exists in the value calculated from the signals of transmission input shaft speed sensor, transmission intermediate shaft speed sensor and transmission output shaft speed sensor.		
Action of controller	• Shifts up and holds the gear speed as shown in **Table 1** depending on the gear speed before failure. (See failure code [**15K0MW**].) • Turns lock up to OFF.		
Problem that appears on machine	• Machine travels at gear speeds which do not use 1st clutch.		
Related information	• Electric output current to ECMV solenoid can be checked by monitoring function (code: **31602 (mA)**) • At first, check mechanical system for failure such as defective 1st clutch, clogged oil filter of hydraulic pressure control valve, etc. ⚠ **Raise the body at the highest position, and set damp lever to "Hold", and install body lock pin to right and left.**		

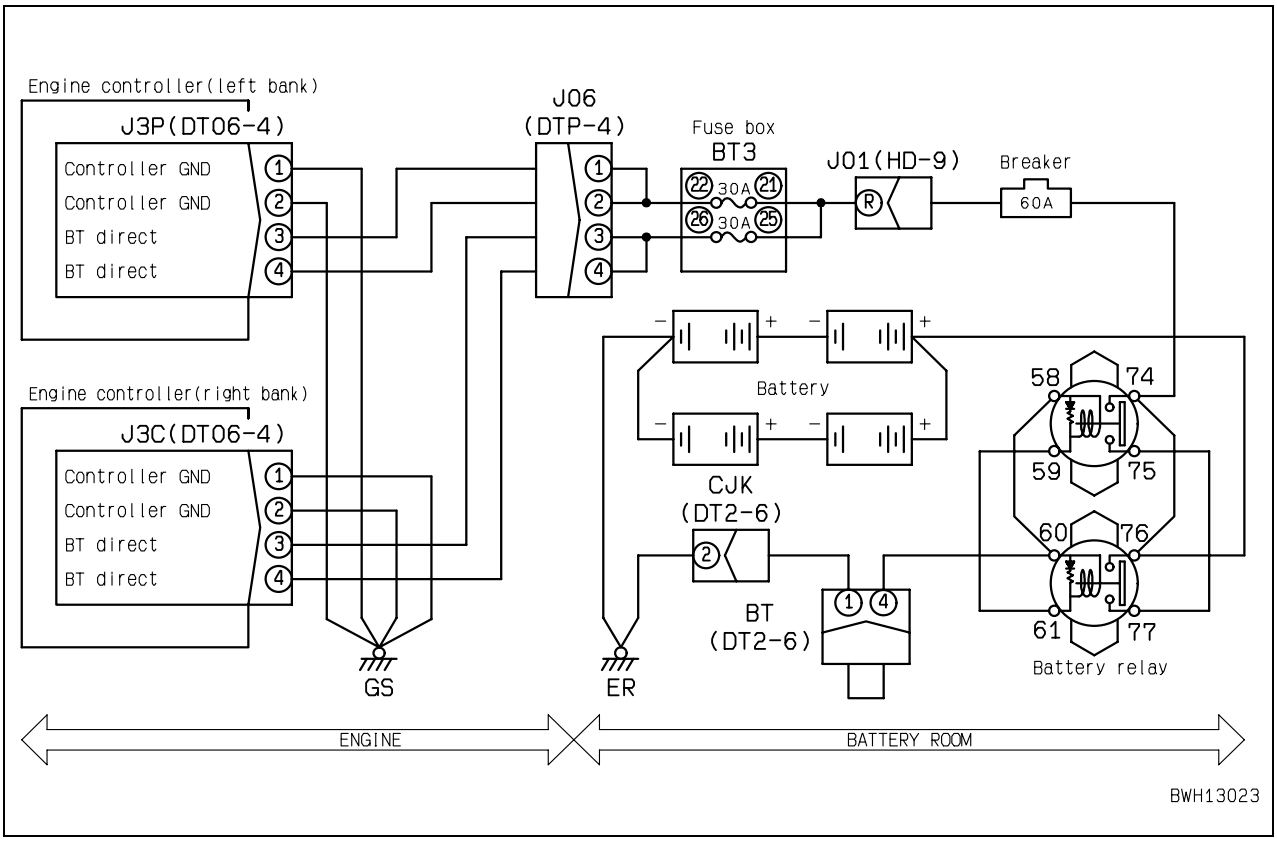
Possible causes and standard value in normal state	Cause	Standard value in normal state/Remarks on troubleshooting
	Troubleshooting by failure code [**15K0MW**].	

<table>
<tr><td rowspan="6">Possible causes and standard value in normal state</td><td colspan="2">Cause</td><td colspan="4">Standard value in normal state/Remarks on troubleshooting</td></tr>
<tr><td rowspan="3">6</td><td rowspan="3">Defective parking brake oil pressure switch (rear)</td><td colspan="4">★ For safety, measure inside the cab (P / B relay: R03) instead of checking at parking brake oil pressure switch connector PSWR.
1) Turn the starting switch to OFF position.
2) Disconnect the connector PSWF (to eliminate the influence of the front oil pressure switch)
3) Insert T-branch into connector R03.
4) Start the engine.</td></tr>
<tr><td rowspan="2">Between R03 (1) and (2)</td><td>Set parking brake switch in FREE position</td><td>Voltage</td><td>Min. 20 V</td></tr>
<tr><td>Set parking brake switch in PARK position</td><td>Voltage</td><td>Max. 1 V</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Ground fault in wiring harness (Contact with GND circuit)</td><td colspan="4">1) Turn the starting switch to OFF position.
2) Disconnect connectors BRC3 and R03, and connect T-adapter to either female side.</td></tr>
<tr><td colspan="2">Between BRC3 (female) (9) or R03 (female) (3) and ground</td><td>Resistance</td><td>Min. 1 MΩ</td></tr>
<tr><td rowspan="3">8</td><td rowspan="3">Defective retarder controller</td><td colspan="4">1) Turn the starting switch to OFF position.
2) Insert T-adapter into connector BRC3.
3) Start the engine.</td></tr>
<tr><td rowspan="2">Between BRC3 (9) and (21)</td><td>Set parking brake switch in FREE position</td><td>Voltage</td><td>6 to 12 V</td></tr>
<tr><td>Set parking brake switch in PARK position</td><td>Voltage</td><td>Max. 1 V</td></tr>
</table>

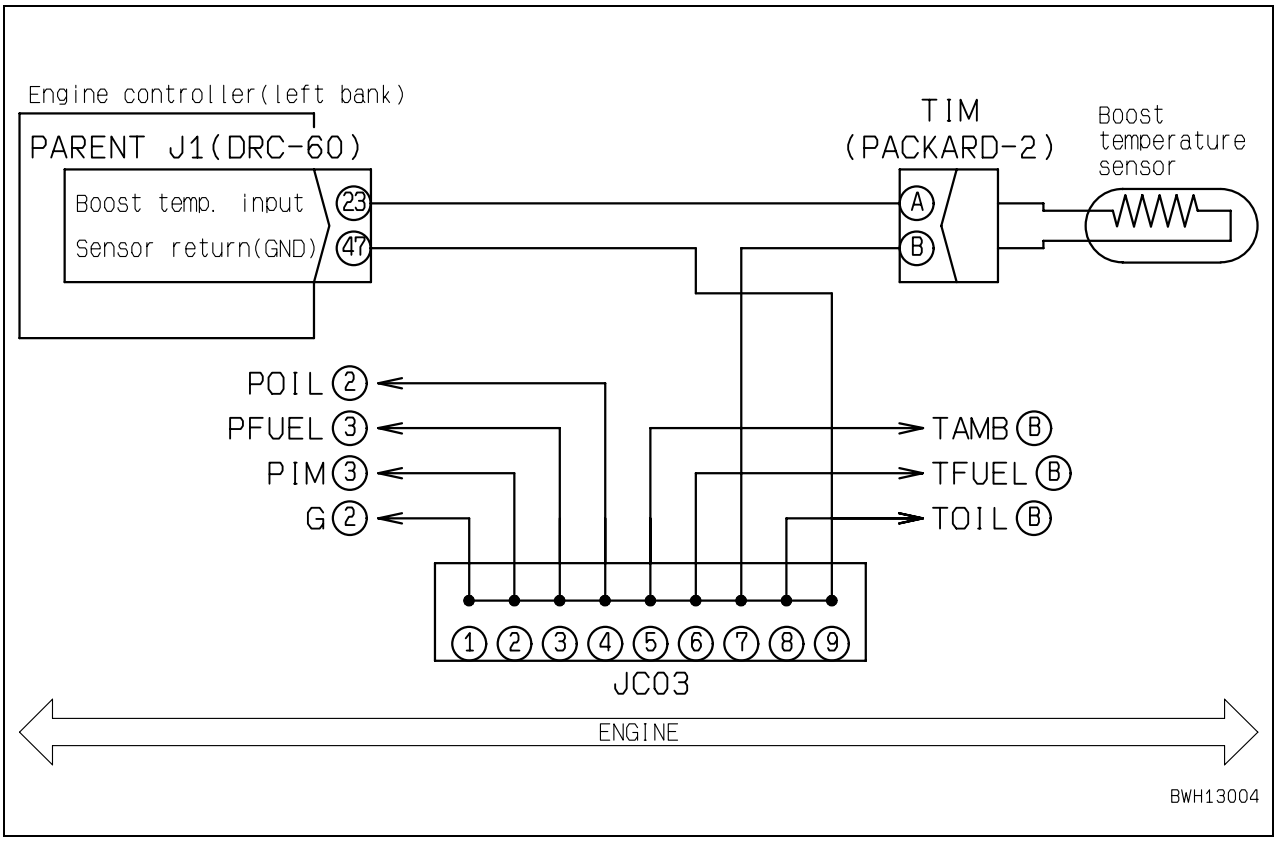
Circuit diagram related



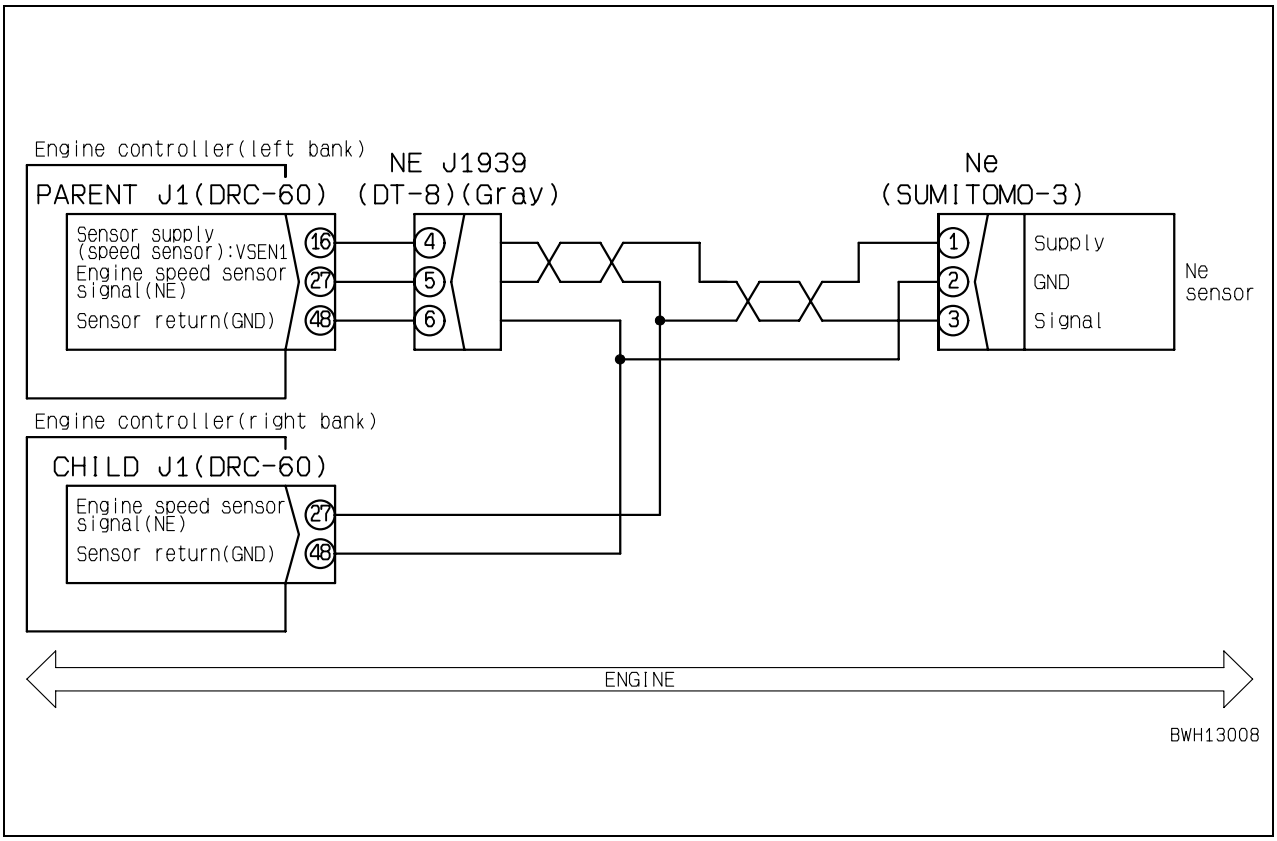
Circuit diagram related



Circuit diagram related



Circuit diagram related



Failure code [CA554] In-range error in common rail pressure sensor (Left bank): In-range error

Action code	Failure code	Trouble	In-range error in common rail pressure sensor (Left bank): In-range error occurred (Engine controller system)
E03	**CA554**		
Contents of trouble	• In-range error has occurred in common rail pressure sensor circuit.		
Action of controller	• Operates with limited output.(Limits common rail pressure.) • Flashes warning lamp and turns on alarm buzzer.		
Problem that appears on machine	• Output decreases.		
Related information			

Possible causes and standard value in normal state	Cause	Standard value in normal state/Remarks on troubleshooting
	Carry out troubleshooting of [**CA451**].	

Failure code [CB554] In-range error in common rail pressure sensor (Right bank): In-range error

Action code	Failure code	Trouble	In-range error in common rail pressure sensor (Right bank): In-range error occurred (Engine controller system)
E03	**CB554**		
Contents of trouble	• In-range error has occurred in common rail pressure sensor circuit.		
Action of controller	• Operates with limited output.(Limits common rail pressure.) • Flashes warning lamp and turns on alarm buzzer.		
Problem that appears on machine	• Output decreases.		
Related information			

Possible causes and standard value in normal state	Cause	Standard value in normal state/Remarks on troubleshooting
	Carry out troubleshooting of [**CB451**].	

Failure code [CA757] Loss of all engine controller data (Left bank): Loss of all data

Action code	Failure code	Trouble	Loss of all engine controller data (Left bank): Loss of all data (Engine controller system)
E03	**CA757**		
Contents of trouble	• Loss of all data in engine controller has been detected.		
Action of controller	• Flashes warning lamp and turns on alarm buzzer.		
Problem that appears on machine	• The engine cannot be started, or cannot be operated.		
Related information			

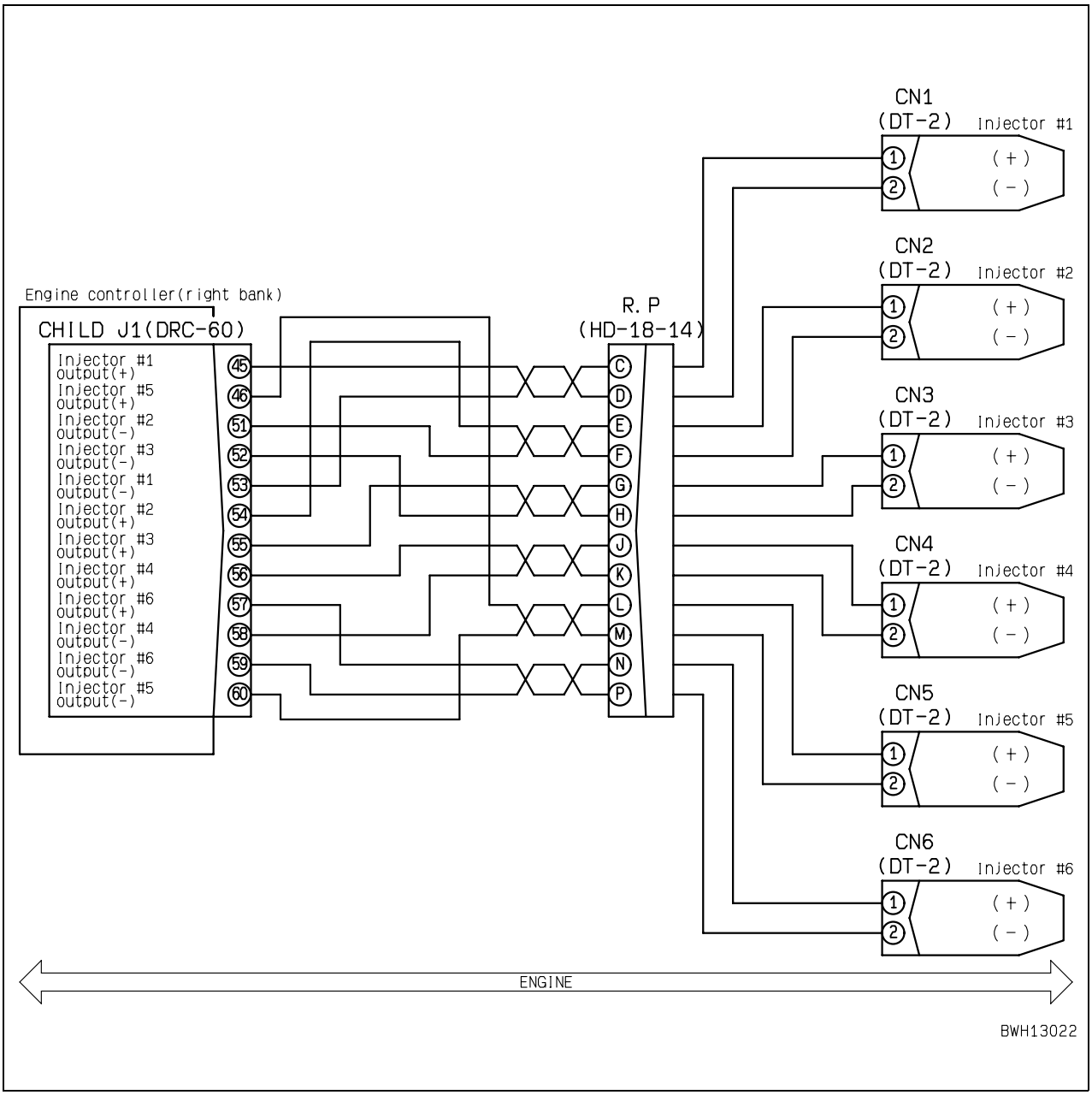
Possible causes and standard value in normal state	Cause	Standard value in normal state/Remarks on troubleshooting
	Carry out troubleshooting of [**CA111**].	

Failure code [CB757] Loss of all engine controller data (Right bank): Loss of all data

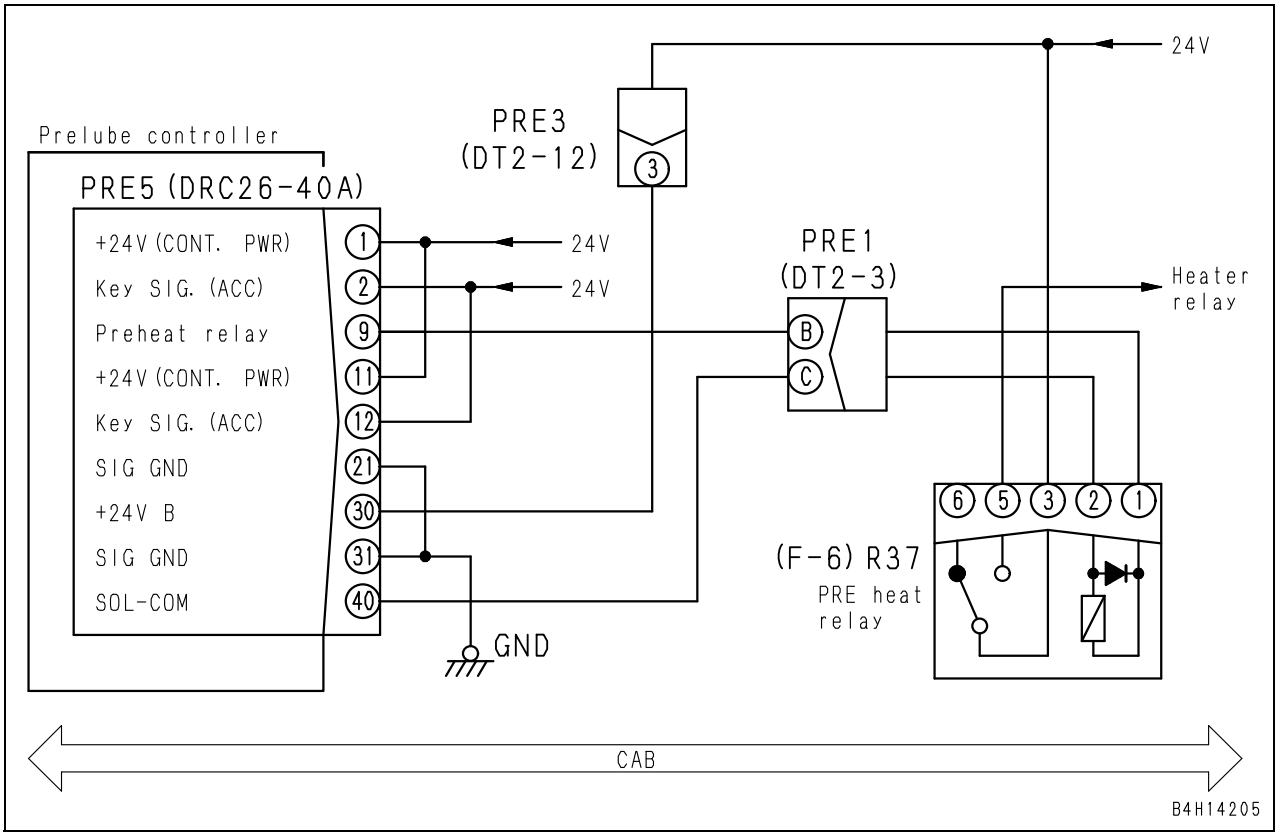
Action code	Failure code	Trouble	Loss of all engine controller data (Right bank): Loss of all data (Engine controller system)
E03	**CB757**		
Contents of trouble	• Loss of all data in engine controller has been detected.		
Action of controller	• Flashes warning lamp and turns on alarm buzzer.		
Problem that appears on machine	• The engine cannot be started, or cannot be operated.		
Related information			

Possible causes and standard value in normal state	Cause	Standard value in normal state/Remarks on troubleshooting
	Carry out troubleshooting of [**CB111**].	

Circuit diagram related



Related electrical circuit diagram



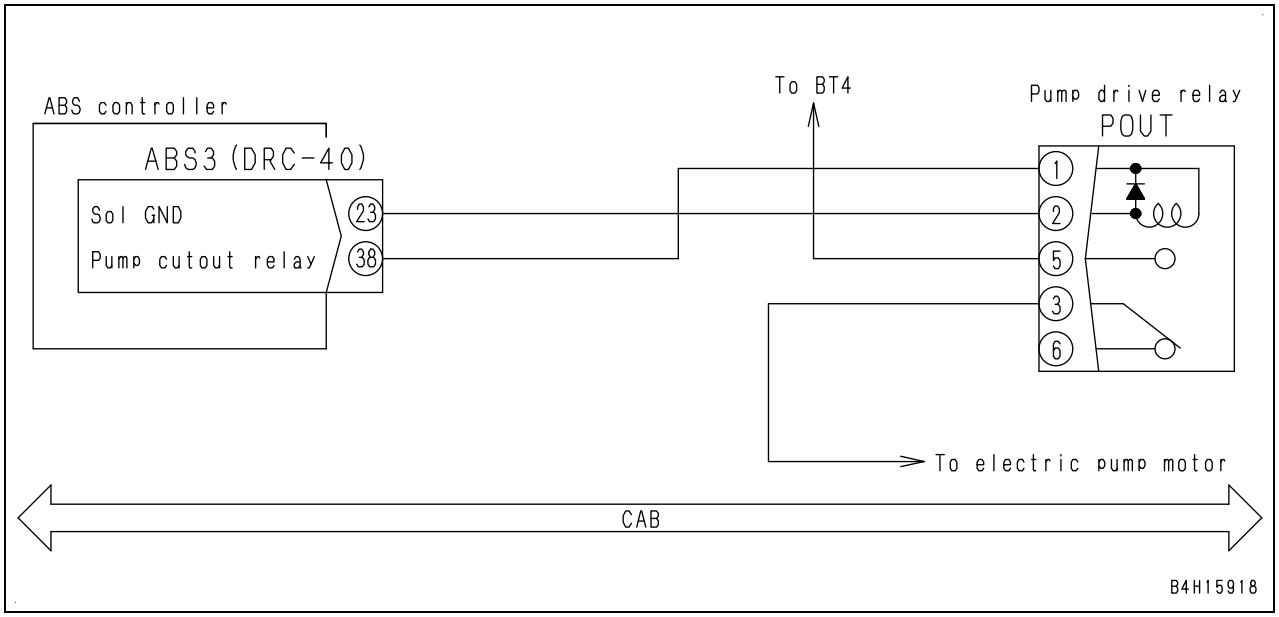
★ Prelube controller is the same as pre-lubrication controller.

Failure code [D1EPKB] Ground Fault of Power Ladder Pump Drive Relay Output Circuit

Action code	Failure code	Failure	Ground fault of power ladder pump drive relay output circuit (ABS controller system)
E01	**D1EPKB**		
Detail of failure	● When output to power ladder pump circuit is turned ON, excessive current flows.		
Action of controller	● Turns output OFF.		
Problem on machine	● Ladder cannot be raised.		
Related information	● Can be checked with monitoring function (code: 40958) (0: Pump drive output OFF, 1: ON).		

No.	Cause	Procedure, measuring location, criteria and remarks		
1	Defective relay (POUT)	1. Turn starting switch to OFF position. 2. Disconnect connector POUT and connect T-adapter to male side.		
		Resistance	Between connector POUT (male) (1) and (2)	230 ± 30 Ω
		Relay may be judged by replacing it with another relay (5-pole relay).		
2	Ground fault of short circuit of wiring harness	1. Turn starting switch to OFF position. 2. Disconnect connectors POUT and ABS3, and connect T-adapter to female side of ABS3.		
		Resistance	Between ABS3 (female) (38) and ground	Min. 1 MΩ
			Between ABS3 (female) (23) and (38)	Min. 1 MΩ
3	Defective ABS controller	If no failure is found by checks on causes 1 and 2, ABS controller may be defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

Related electrical circuit diagram

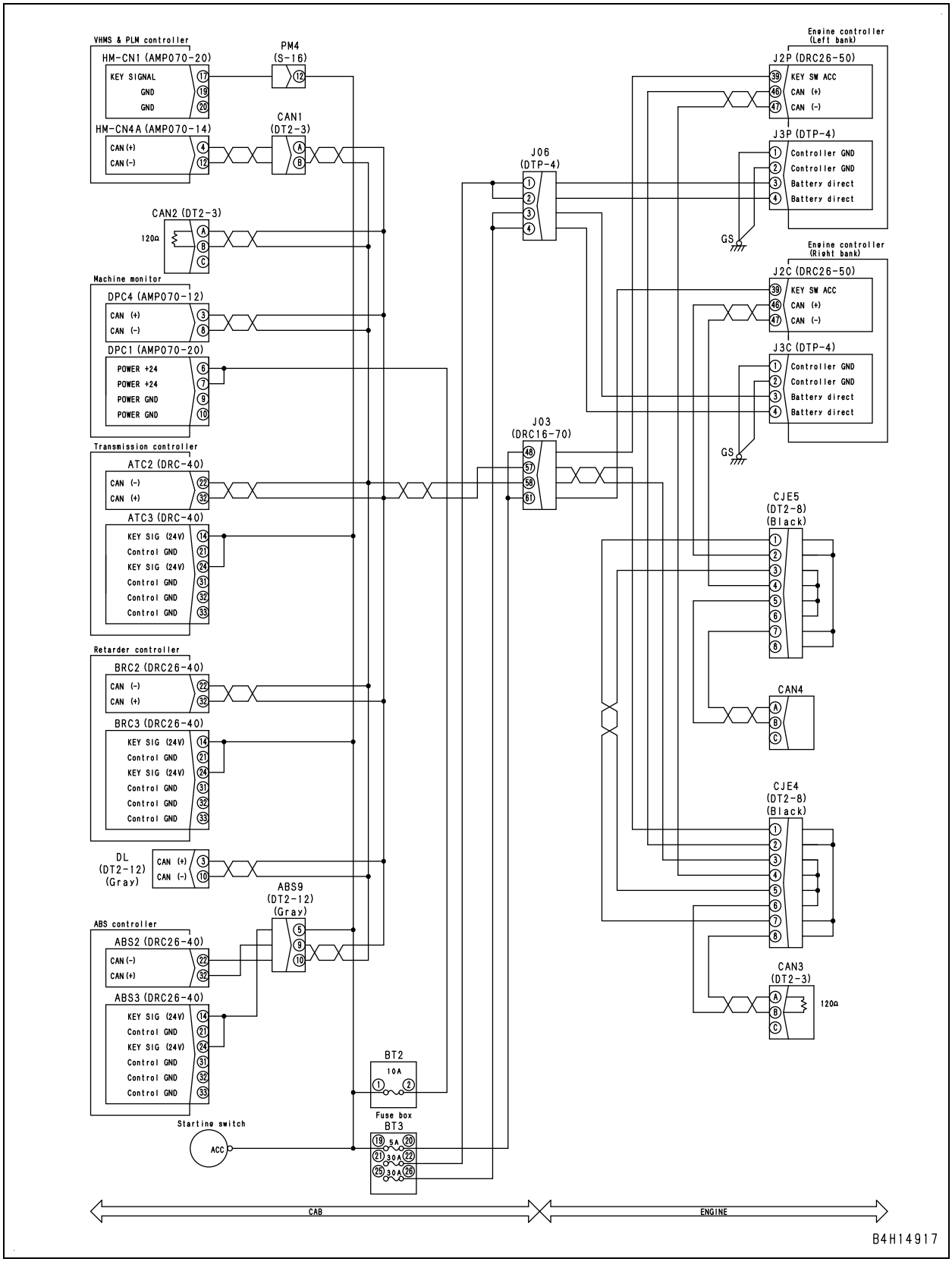


Failure code [DAQRKR] Abnormality in CAN communication (Transmission)

Action code	Failure code	Trouble	Abnormality in CAN communication (Transmission) (Machine monitor system)
E03	**DAQRKR**		
Contents of trouble	• Machine monitor cannot obtain information from transmission controller through CAN communication circuit.		
Action of controller	• Keeps information at time of occurrence of abnormality.		
Problem that appears on machine	• System may not operate normally. • Information from transmission controller is not displayed on machine monitor.		
Related information	• Method of reproducing failure code: Turn the starting switch to ON position. • Start of CAN communication is recognized by each controller when the ACC signal of the starting switch is received. • If a failure code for [**DBBQKR**] is additionally displayed, CAN communication is established between the machine monitor and at least VHMS controller. Therefore, there is no short circuit, ground fault or hot short circuit in the CAN communication line. • If [**DAQRKR**] is the only failure code displayed and [**DBBQKR**] is not displayed, CAN communication may not be established with any controller. Namely, a short circuit, ground fault or hot short circuit may have occurred in the CAN communication line. • Since this is the only CAN communication error able to be recognized by the machine monitor, display of this code does not necessarily mean that the transmission controller is defective. • A certain defective controller can make the entire CAN communication impossible. • Since power to each controller and machine monitor is supplied directly from the battery, their power is supplied even when the starting switch is turned OFF. • Since the signals in operation are constructed with pulse voltage, they cannot be measured by using a multimeter.		

	Cause		Standard value in normal state/Remarks on troubleshooting		
Possible causes and standard value in normal state	1	Defective power supply to the transmission controller	Perform troubleshooting for failure code [**DAQ0KK**].		
	2	Defective CAN terminating resistor (Internal open or short circuit)	1) Turn the starting switch to OFF position. 2) Disconnect connector CAN2 and CAN3, and connect the T-adapter to male side.		
			Between CAN3 (male) (A) and (B) (engine side)	Resistance	120 ± 12 Ω
			Between CAN2 (male) (A) and (B) (inside cab)	Resistance	120 ± 12 Ω

Related electrical circuit diagram



Failure code [DBBQKR] (or VHMS_LED display: "n8" → "02") VHMS controller CAN communication: Defective communication (Abnormality in target component system)

Action code	Failure code	Trouble	VHMS controller CAN communication: Defective communication (Abnormality in target component system) (VHMS controller system) (Display: PLM)
–	**DBBQKR**		
Contents of trouble	• CAN communication information from each controller cannot be received.		
Action of machine monitor	• None in particular.		
Problem that appears on machine	• The system may not work properly.		
Related information	• The machine monitor does not display any failure code (the relevant failure code can be checked by downloading data stored in the VHMS controller). • The LED of the VHMS controller displays "n8" → "02". • Method of reproducing failure code: Turn the starting switch ON.		

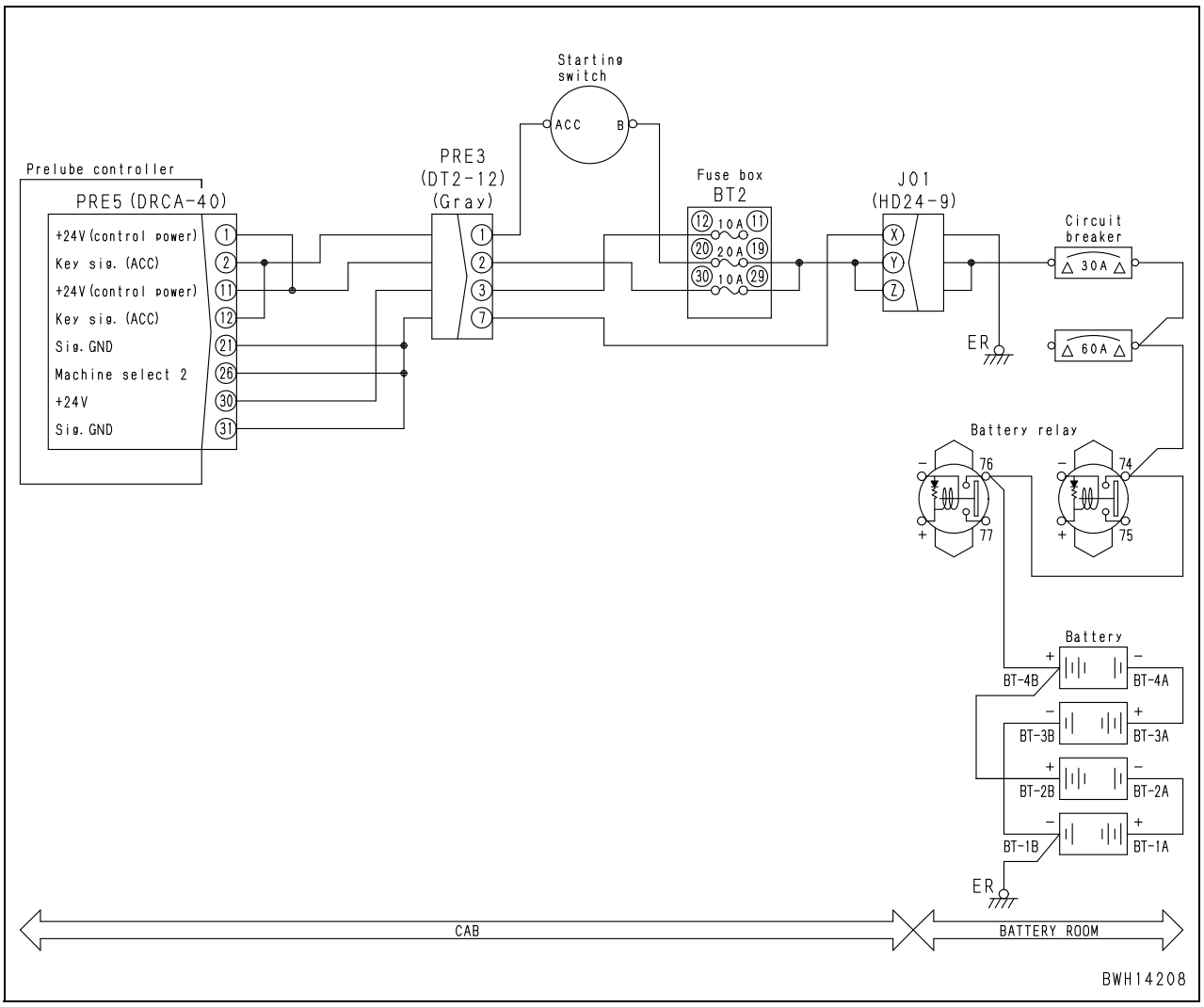
Possible causes and standard value in normal state	Cause	Standard value in normal state/Remarks on troubleshooting
	Carry out troubleshooting for failure code [**DAQRKR**], [**DB1RKR**], [**DB2RKR**] or [**DBCRKR**].	

Failure code [DBBRKR] Abnormality in CAN communication (VHMS)

Action code	Failure code	Trouble	Abnormality in CAN communication (VHMS) (Machine monitor system)
E03	**DBBRKR**		
Contents of trouble	• Machine monitor cannot obtain information from VHMS controller through CAN communication circuit.		
Action of machine monitor	• Keeps information at time of occurrence of abnormality.		
Problem that appears on machine	• System may not operate normally. • Information from VHMS controller is not displayed.		
Related information	• Method of reproducing failure code: Turn starting switch ON.		

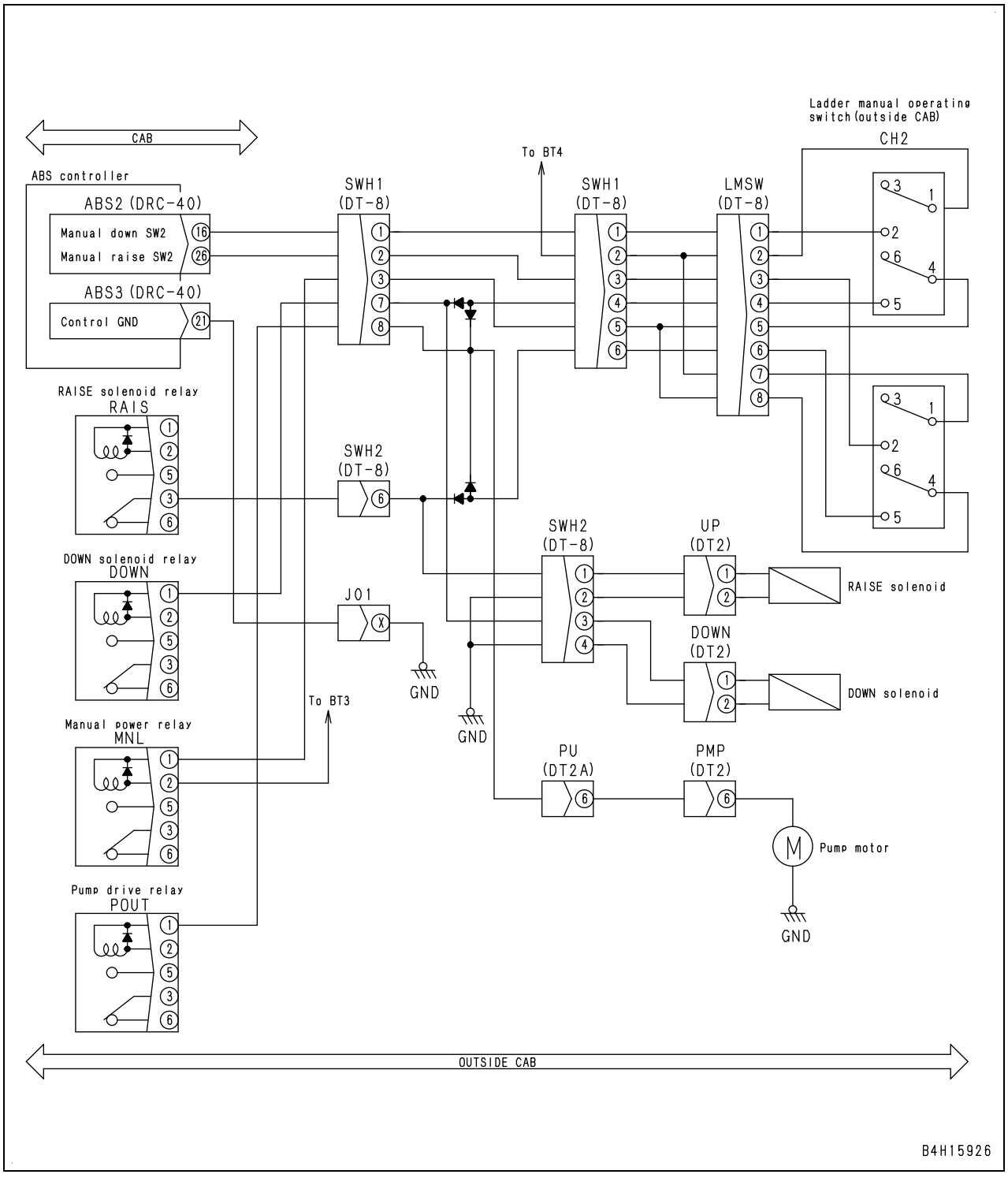
Possible causes and standard value in normal state		Cause	Standard value in normal state/Remarks on troubleshooting
	1	Defetive power supply for VHMS controller	Carry out troubleshooting for failure code [**DBB0KK**] and [**DBB3KK**].
	2	Carry out troubleshooting for failure code [**DAQRKR**] (Cause 2 and after)	

Related electrical circuit diagram



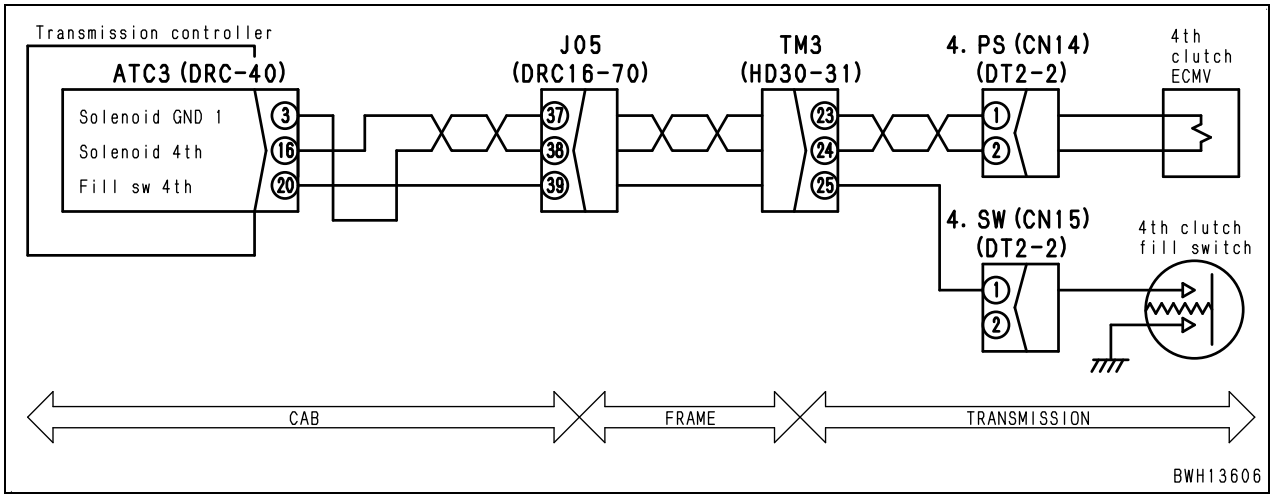
★ Prelube controller is the same as pre-lubrication controller.

Related electrical circuit diagram



Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting		
	2	Disconnection in wiring harness (Disconnection or defective contact)	1) Turn the starting switch OFF. 2) Disconnect connectors ATC3 and 4.SW (CN15). 3) Connect T-adapters (female).		
			Between ATC3 (female) (20) and 4.SW (CN15) (female) (1)	Resistance	Max. 1 Ω
	3	Defective transmission controller	If no abnormality is found in the above troubleshooting, the transmission controller is defective. (Since this is an internal defect, troubleshooting cannot be performed.)		

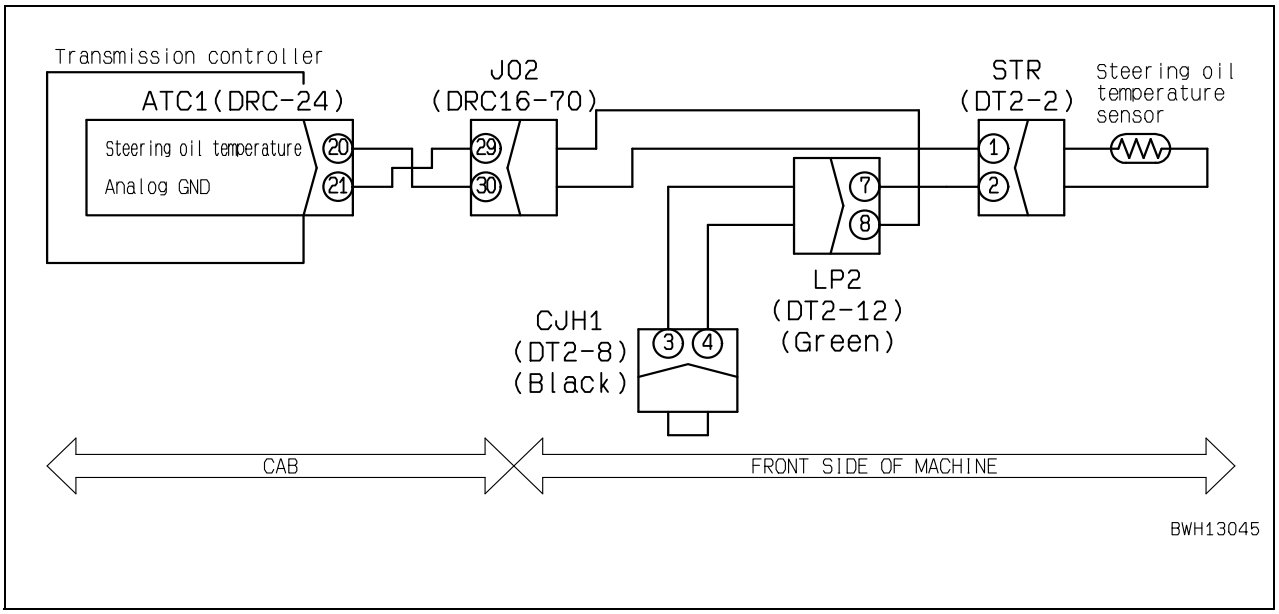
Related electrical circuit diagram



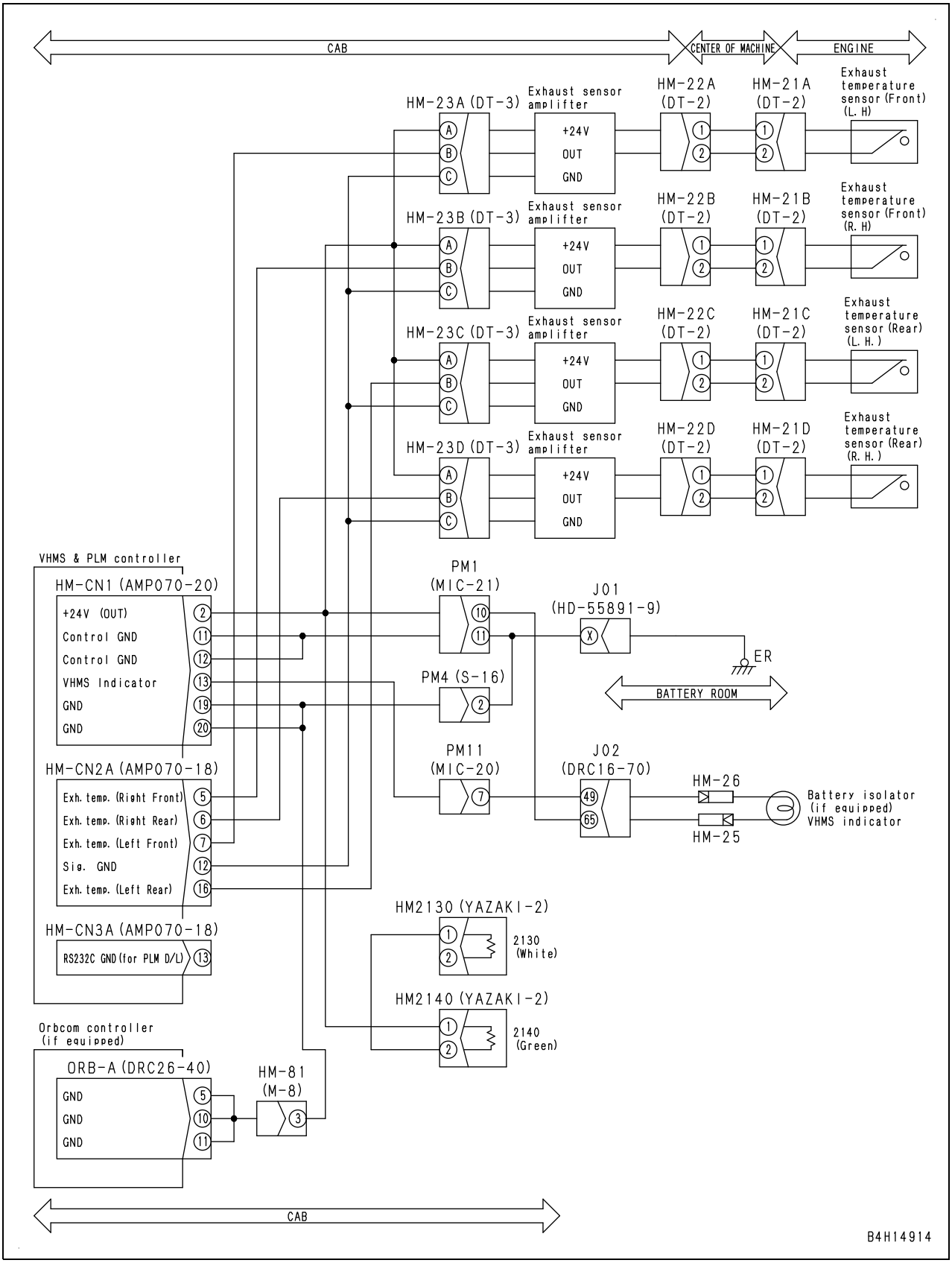
Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting
	6	Defective transmission controller	If causes are not found by above checks, transmission controller is defective. (Since this is an internal failure, troubleshooting can not be performed.)

*: For the average resistance values of sensor at each temperature level, see [**DGR2KZ**] (the same as retarder oil temperature sensor).

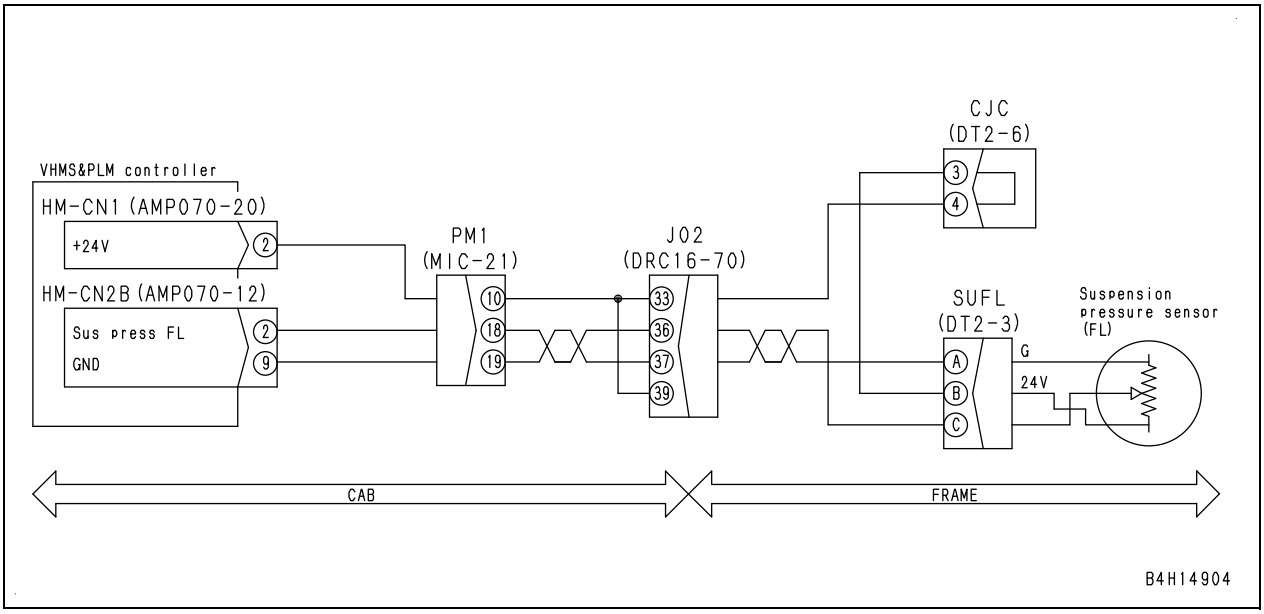
Related electrical circuit diagram



Circuit diagram related

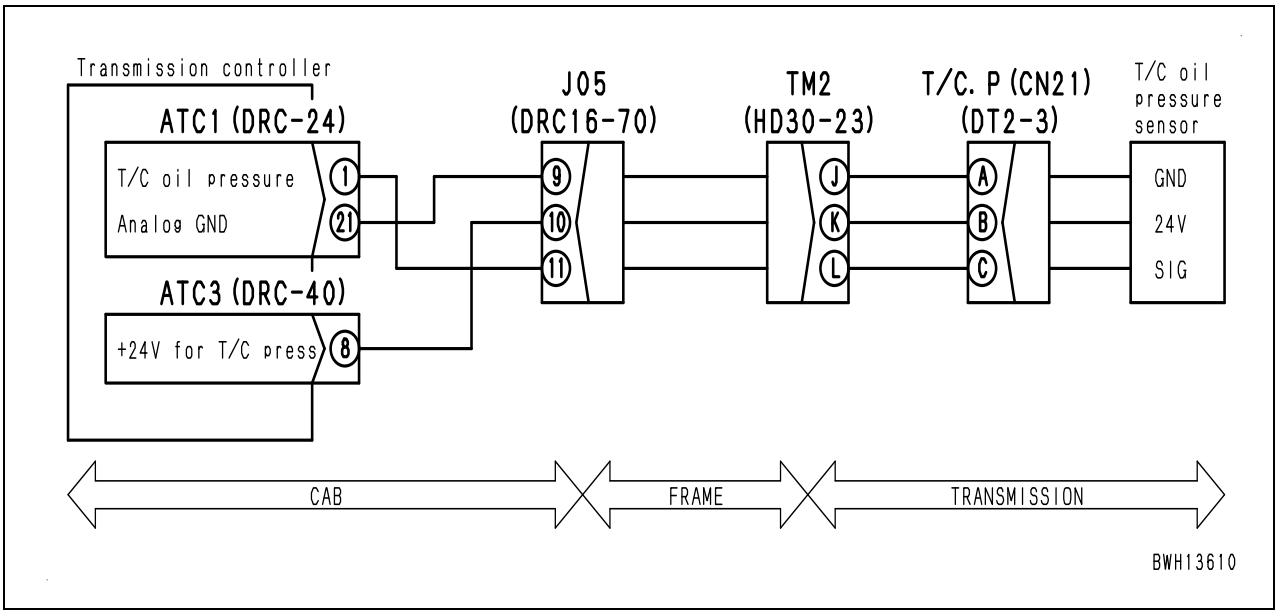


Circuit diagram related



	Cause		Standard value in normal state/Remarks on troubleshooting		
Possible causes and standard value in normal state	5	Disconnection in wiring harness (Disconnection or defective contact)	1) Turn the starting switch OFF. 2) Disconnect connectors ATC1, ATC3, and CN21. 3) Connect T-adapters (female)		
			★ If no failure is found by check on cause 3, this check is not required. Between ATC3(female) (8) and T/C.P(CN21) (female) (B)	Resistance	Max. 1 Ω
			★ If no failure is found by check on cause 3, this check is not required. Between ATC1(female) (21) and T/C.P(CN21) (female) (A)	Resistance	Max. 1 Ω
			Between ATC1 (female) (1) and T/C.P(CN21) (female) (C)	Resistance	Max. 1 Ω
	6	Defective transmission controller	If no abnormality is found in the above troubleshooting, the transmission controller may be defective. (Since this is an internal defect, troubleshooting cannot be performed.)		
			★ Reference 1) Turn the starting switch to OFF position. 2) Insert the T-adapter into connectors ATC1 and ATC3. 3) Turn the starting switch to ON position.		
			Between ATC1 (1) and (21)	Voltage	20 – 30 V
			Between ATC3 (8) and ATC1 (21)	Voltage	0.8 – 2.0 V

Circuit diagram related



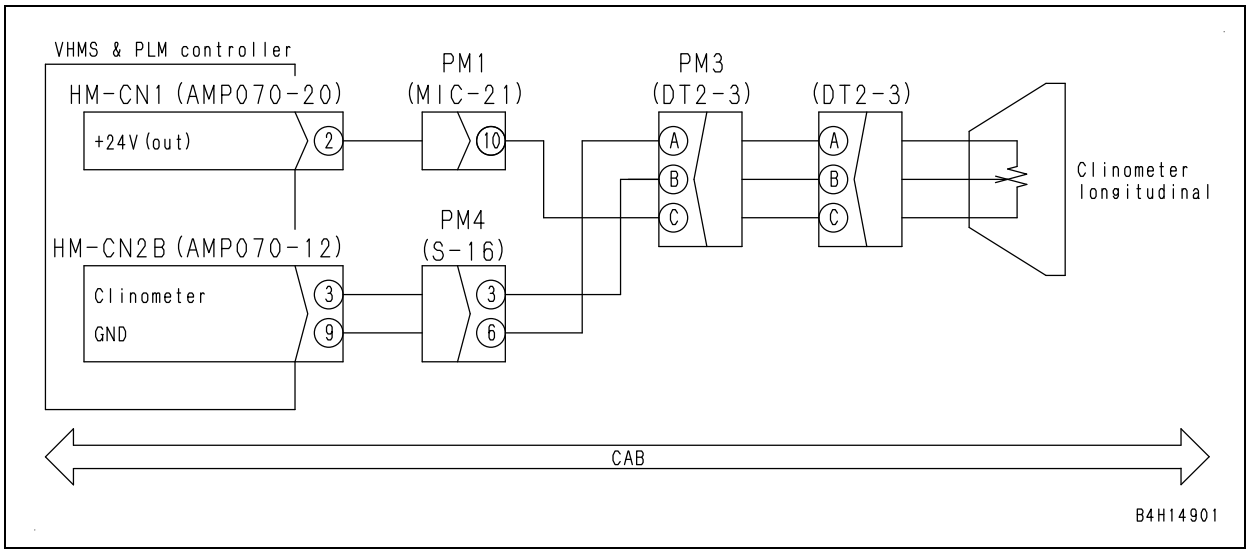
Failure code [DK51L5] Retarder lever potentiometer: Potentiometer signal is inconsistent with swich signal

Action code	Failure code	Trouble	Retarder lever potentiometer: Potentiometer signal is inconsistent with swich signal (Retarder controller system)
E03	**DK51L5**		
Contents of trouble	• The signal voltage of the potentiometer of the retarder lever circuit is below 0.3 V or above 4.7 V. Or, the potentiometer signal does not agree with the switch signal.		
Action of controller	The controller acts as follows, depending on the condition of the failure. • Controls with the potentiometer signal. • Limits the output for the solenoid to 70%. • Turns the output for the solenoid OFF.		
Problem that appears on machine	The following appear, depending on the action of the controller. • This failure does not have a serious effect on the machine. • The retarder cannot control finely. • The retarder does not operate (The foot brake operates, however).		
Related information	• This failure can be checked in the monitoring function (Code: **33900 (V)**).		

	Cause		Standard value in normal state/Remarks on troubleshooting		
Possible causes and standard value in normal state	1	Disconnection in wiring harness (Disconnection or defective contact)	1) Turn the starting switch OFF. 2) Disconnect connectors BRC1, BRC3, RE1, and RTL. 3) Connect T-adapter to them (female).		
			Between BRC1 (female) (22) and RE1 (female) (1)	Resistance	Max. 1 Ω
			Between RE1 (female) (2) and RTL (female) (1)	Resistance	Max. 1 Ω
			Between BRC1 (female) (21) and RTL (female) (3)	Resistance	Max. 1 Ω
			Between BRC1 (female) (14) and RTL (female) (2)	Resistance	Max. 1 Ω
			Between BRC1 (female) (24) and RTL (female) (4)	Resistance	Max. 1 Ω
			Between BRC1 (female) (18) and RTL (female) (5)	Resistance	Max. 1 Ω
			Between RTL (female) (6) and BRC3 (female) (21), (31), (32), (33)	Resistance	Max. 1 Ω
	2	Grounding fault in wiring harness (Contact with ground circuit)	1) Turn the starting switch OFF. 2) Disconnect connectors BRC1, RE1, and RTL. 3) Connect T-adapter to BRC1 (female).		
			Between ground and BRC1 (female) (22) or RE1 (female) (1)	Resistance	Min. 1 MΩ
			Between ground and RE1 (female) (2) or RTL (female) (1)	Resistance	Min. 1 MΩ
			Between ground and BRC1 (female) (14) or RTL (female) (2)	Resistance	Min. 1 MΩ

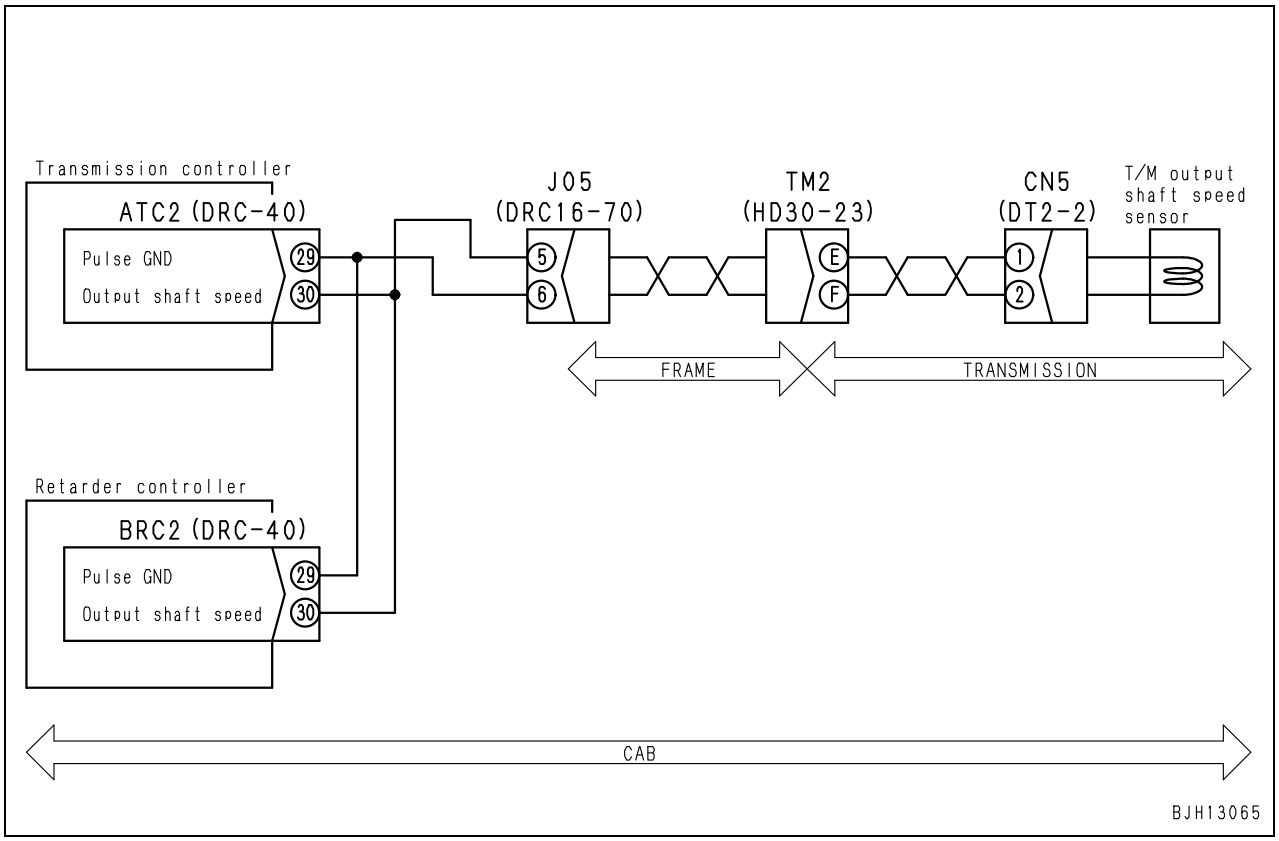
Possible causes and standard value in normal state	5	Defective clinometer sensor	1) Turn starting switch OFF. 2) Insert T-adapter into connector PM3. 3) Turn starting switch ON.		
			Between PM3 (B) and (A) ★ Approximately 2.6 V in horizontal	Voltage	0.5 - 4.5 V
	6	Defective VHMS & PLM controller	If no abnormality is found in the above troubleshooting, the VHMS & PLM controller may be defective. (Since this is an internal defect, troubleshooting cannot be performed.)		
			★ Reference 1) Turn starting switch OFF. 2) Insert T-adapter into HM-CN1, HM-CN2B. 3) Turn starting switch ON.		
			Between HM-CN1 (2) and HM-CN2B (9)	Voltage	20 - 30 V
			Between HM-CN2B (3) and HM-CN2B (9) ★ Approximately 2.6 V in horizontal	Voltage	0.5 - 4.5 V

Circuit diagram related

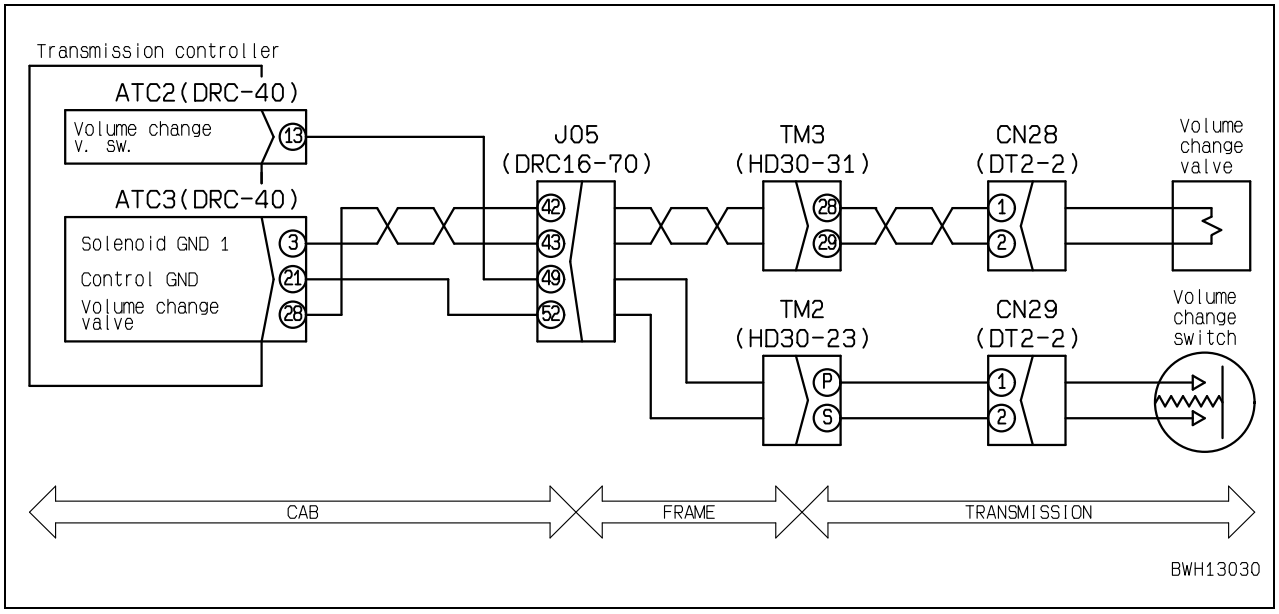


Possible causes and standard value in normal state	Cause		Standard value in normal state/Remarks on troubleshooting		
	6	Defective reterder controller	1) Turn the starting switch OFF. 2) Disconnect connector BRC2 and ATC2. 3) Connect T-adapter.		
			Between BRC2 (female) (30) – (29)	Resis-tance	500 – 1,000 Ω

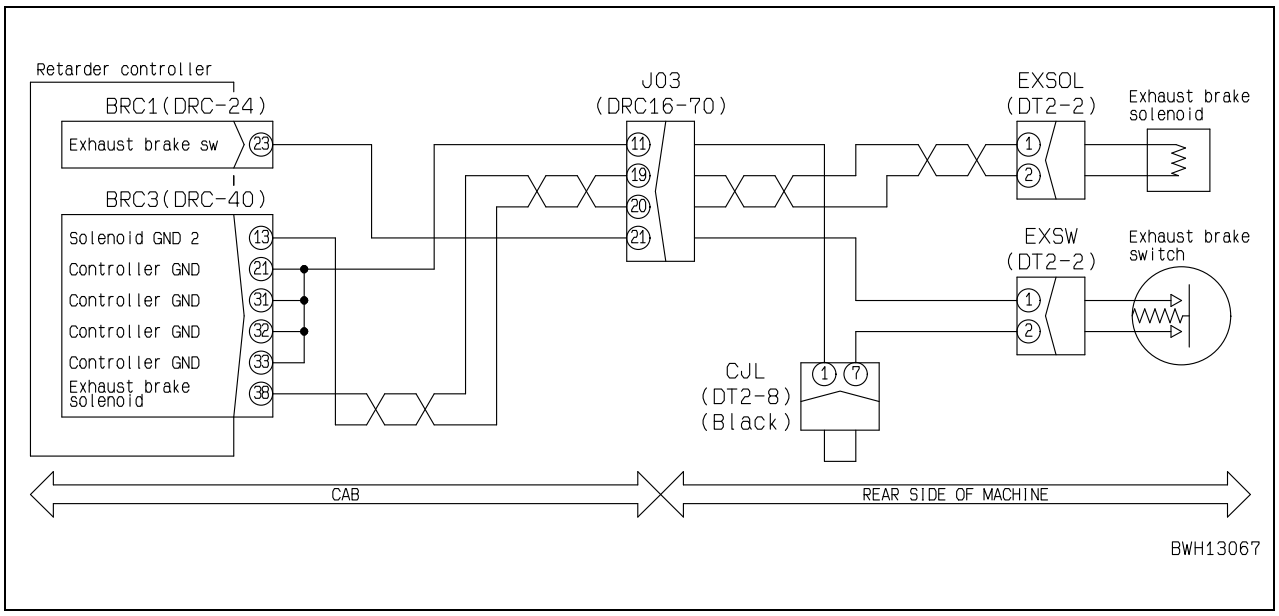
Circuit diagram related



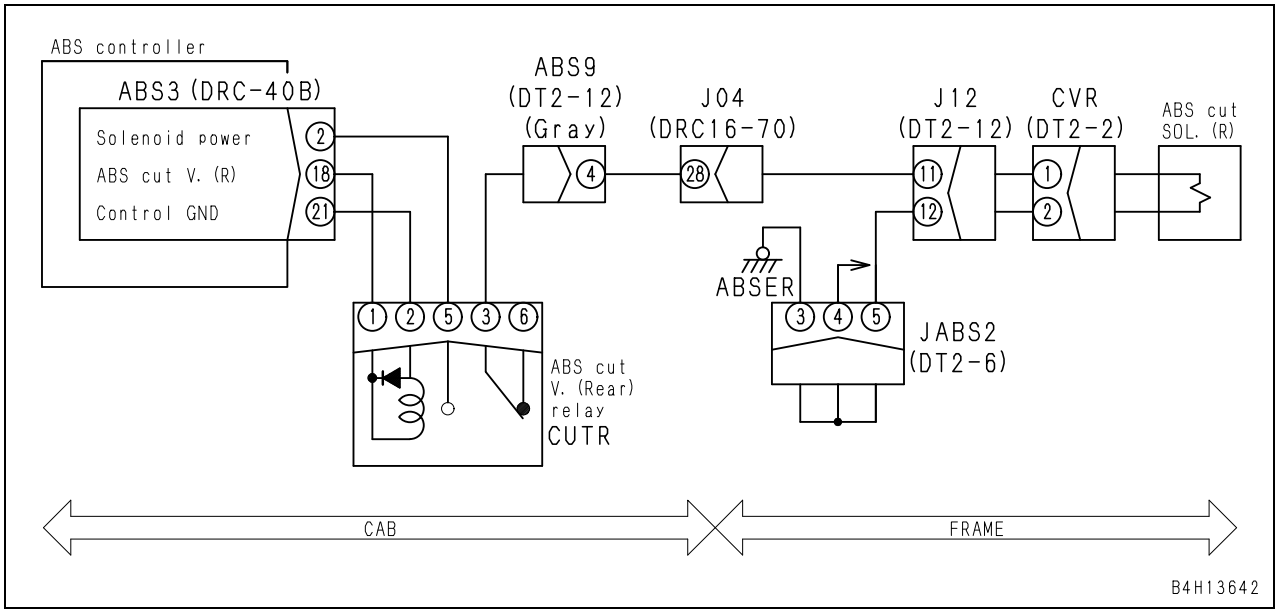
Circuit diagram related



Circuit diagram related



Circuit diagram related

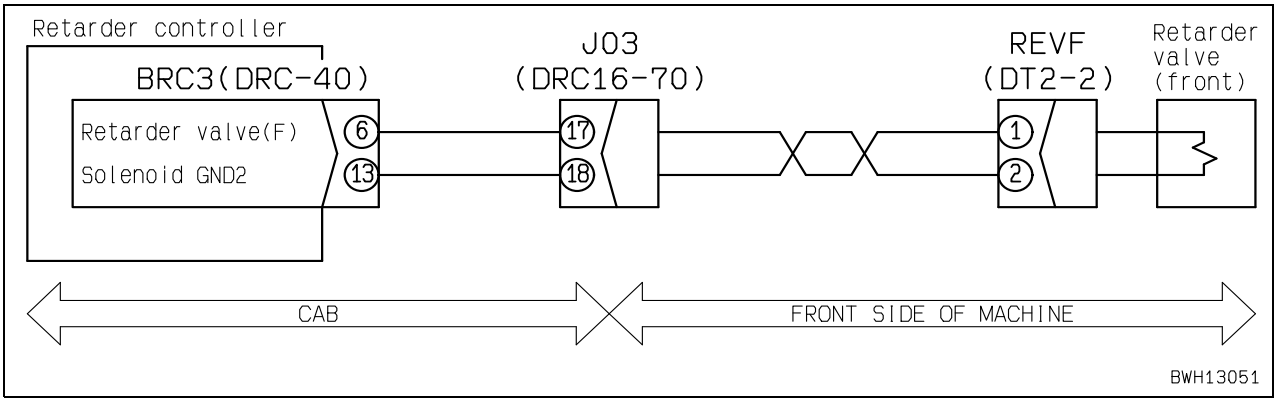


Failure code [DX12KB] Front brake proportional pressure reducing solenoid valve: Short circuit

Action code	Failure code	Trouble	Front brake proportional pressure reducing solenoid valve: Short circuit (Retarder controller system)
E03	**DX12KB**		
Contents of trouble	• When output to solenoid circuit of front brake proportional pressure reducing valve is turned ON, much current flows.		
Action of controller	• Turns output to solenoid circuit of front brake proportional pressure reducing valve OFF.		
Problem that appears on machine	• Retarder (front brake) does not operate.		
Related information			

	Cause		Standard value in normal state/Remarks on troubleshooting		
Possible causes and standard value in normal state	1	Defective rear brake proportional pressure reducing solenoid valve	1) Turn starting switch OFF. 2) Disconnect connector REVF, and connect T-adapter to male side.		
			Between REVF (male) (1) – (2)	Resistance	10 – 30 Ω
			Between REVF (male) (1) or (2) and ground	Resistance	Min. 1 MΩ
	2	Disconnection or short circuit in wiring harness	1) Turn starting switch OFF. 2) Disconnect connector BRC3 and connect T-adapter to female side.		
			Between BRC3 (female) (16) – (13)	Resistance	10 – 30 Ω
	3	Short circuit of harness (Contact with ground circuit or contact between harnesses)	1) Turn starting switch OFF. 2) Disconnect connectors BRC3 and REVF, and connect T-adapter to either female side.		
			Between ground and BRC3 (female) (6) or REVF (female) (1)	Resistance	Min. 1 MΩ
			Between BRC3 (female) (6) and (13) or between REVF (female) (1) and (2)	Resistance	Min. 1 MΩ
	4	Defective retarder controller	If no abnormality is found in the above troubleshooting, the retarder controller may be defective. (Since trouble is in the controller, troubleshooting cannot be carried out.)		

Circuit diagram related



Failure code [DX24MA] Defective ABS control valve (Rear left)

Action code	Failure code	Trouble	Defective ABS control valve (Rear left) (ABS controller system)
E03	**DX24MA**		
Contents of trouble	• Command to ABS control valve (Rear left) does not match response from ABS control valve pressure sensor.		
Action of controller	• Stop outputting to ABS control valve (Rear left) solenoid circuit. (Stop ABS control.)		
Problem that appears on machine	• ABS does not work. • Ordinary brake operation can be carried out.		
Related information	• Troubleshooting for ABS control valve (Rear left) solenoid circuit is carried out with [**DX24KA**], [**DX24KB**] and [**DX24KY**]. • Troubleshooting for ABS control valve (Rear left) solenoid circuit is carried out with [**DHU9KX**]. • Output to ABS control valve (Rear left) solenoid can be checked with the monitoring function. (Code: **43310**, output current **(0 – 1000 (mA)**) • No signal is output to ABS control valve solenoid until starting switch is turned OFF.		

	Cause		Standard value in normal state/Remarks on troubleshooting
Possible causes and standard value in normal state	1	If failure codes [**DX24KA**], [**DX24KB**], [**DX24KY**] and [**DHU9KX**] are displayed, carry out troubleshooting for them.	
	2	Defective ABS control valve (Rear left)	Main pressure variable valve may be damaged mechanically. Check it directly.
	3	Defective hydraulic piping	Hydraulic piping may be defective. Check it directly.
	4	Defective ABS controller	If causes 1 – 3 are not detected, ABS controller may be defective. (Since trouble is in system, troubleshooting is disabled.)

Circuit diagram related

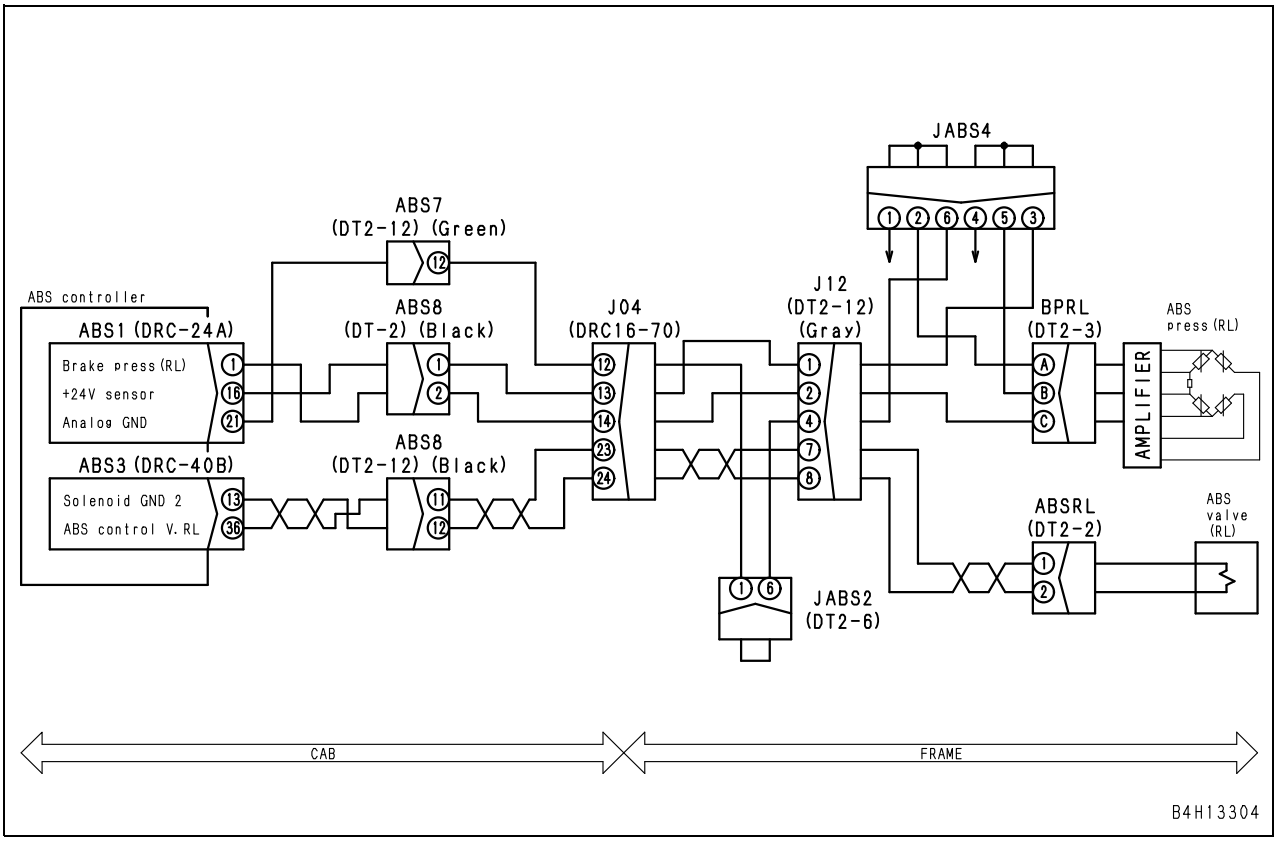
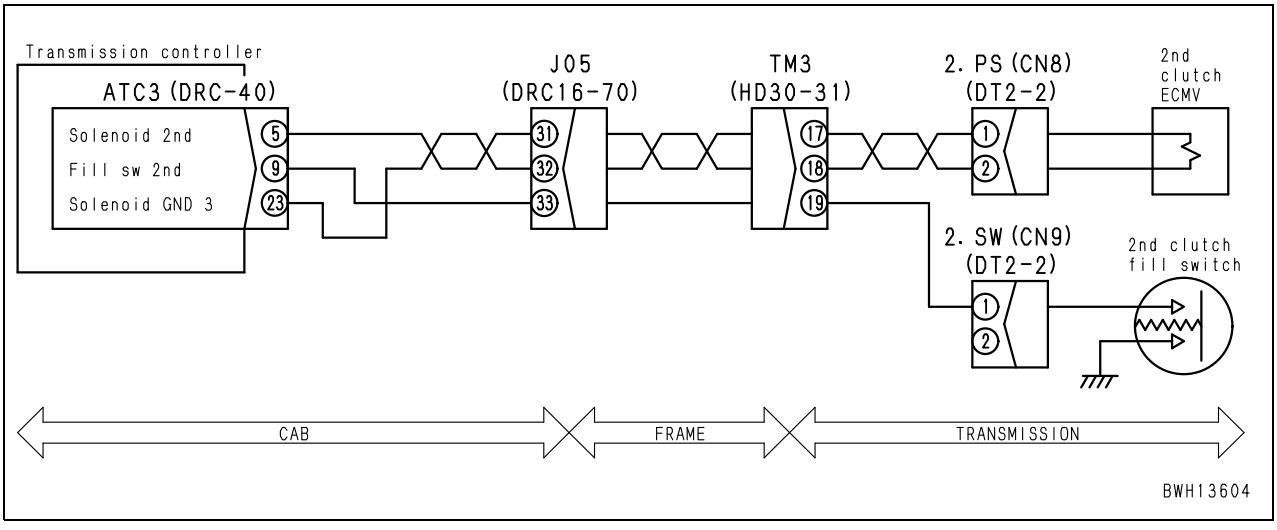


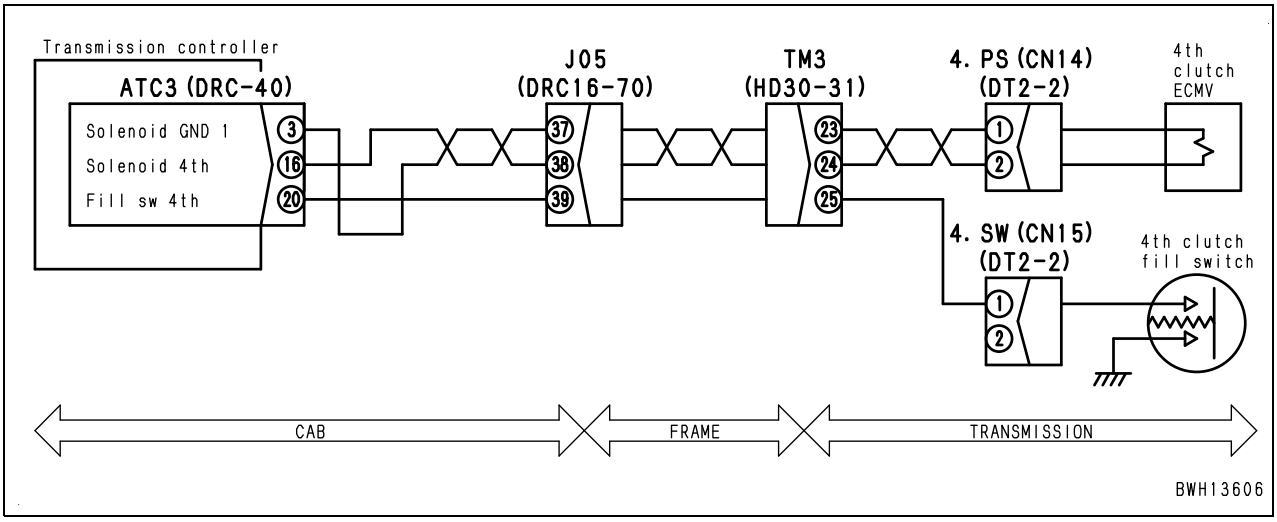
Table 1

Speed when trouble was detected		Failed clutch	Remedy against trouble		
			Action of controller (Selected clutch, gear speed)		ON/OFF state of lockup clutch
F7	4th High	4th	OFF	NEUTRAL	OFF
		High	OFF	NEUTRAL	OFF
F6	4th Low	4th	OFF	NEUTRAL	OFF
		Low	4H	F7	OFF
F5	3rd High	3rd	4L	F6	OFF
		High	4L	F6	OFF
F4	3rd Low	3rd	4L	F6	OFF
		Low	3H	F5	OFF
F3	2nd High	2nd	3L	F4	OFF
		High	3L	F4	OFF
F2	2nd Low	2nd	3L	F4	OFF
		Low	2H	F3	OFF
F1	1st Low	1st	2L	F2	OFF
		Low	2H	F3	OFF
RH	Reverse High	Reverse	OFF	NEUTRAL	OFF
		High	OFF	NEUTRAL	OFF
RL	Reverse Low	Reverse	OFF	NEUTRAL	OFF
		Low	RH	RH	OFF

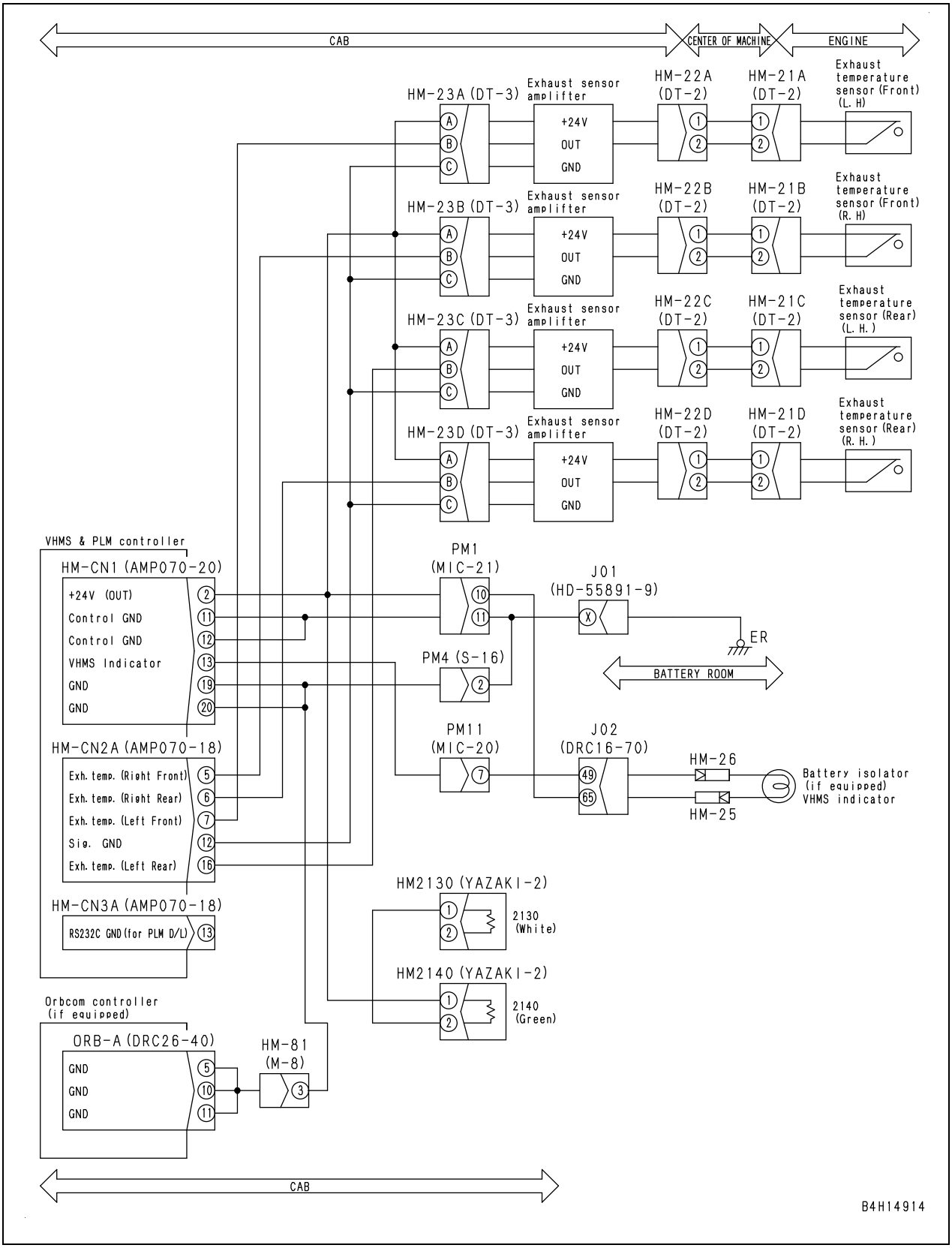
Circuit diagram related



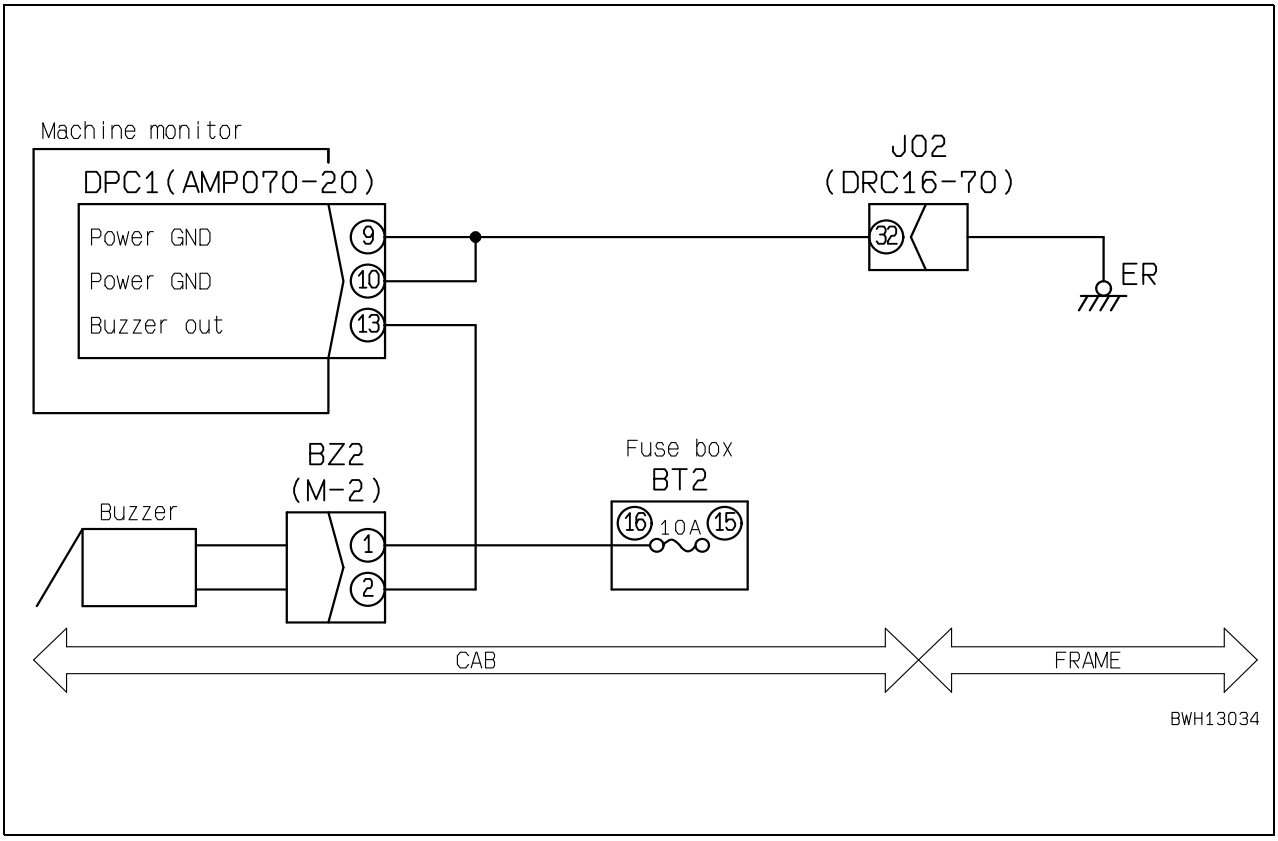
Circuit diagram related



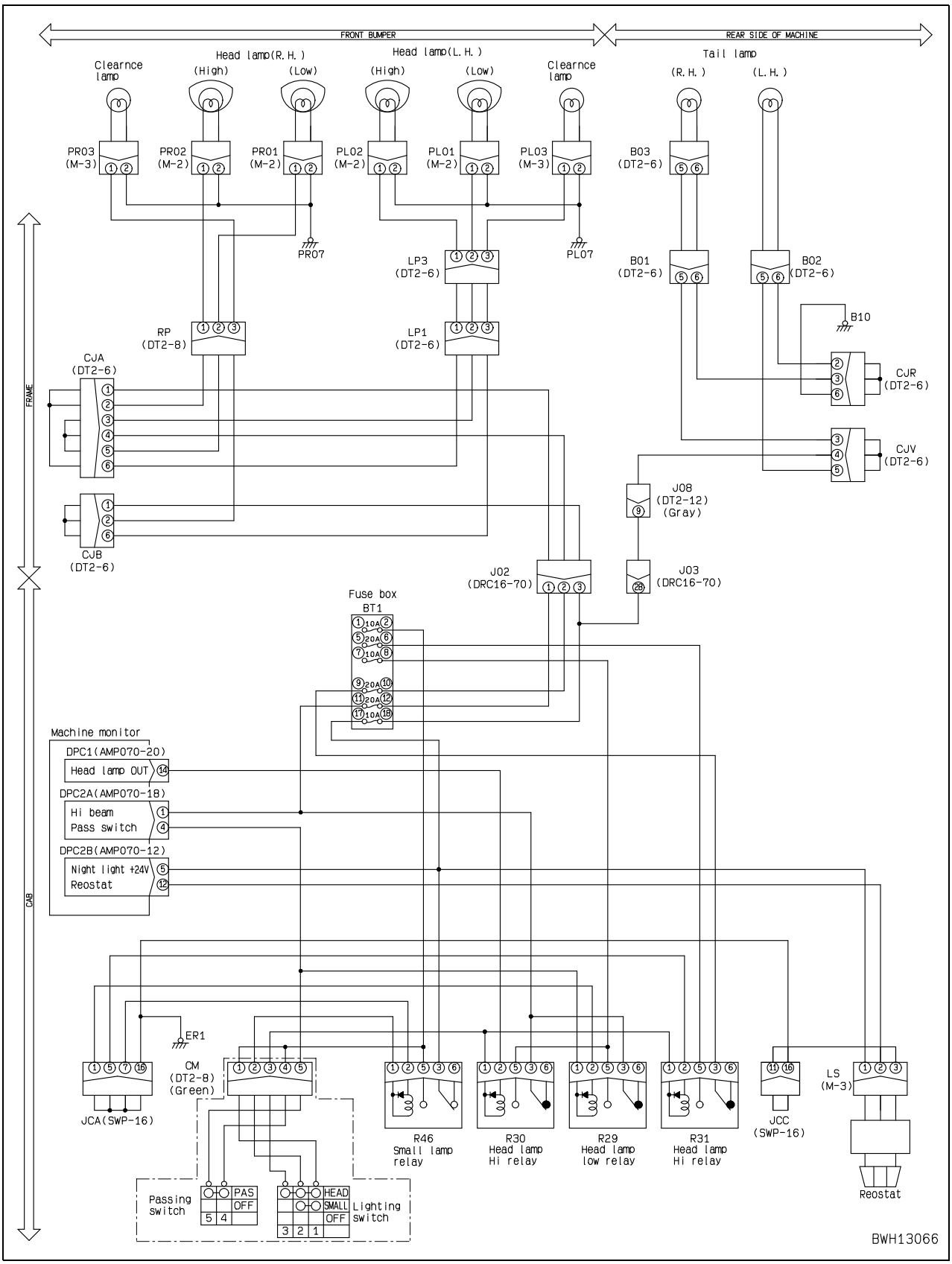
Circuit diagram related



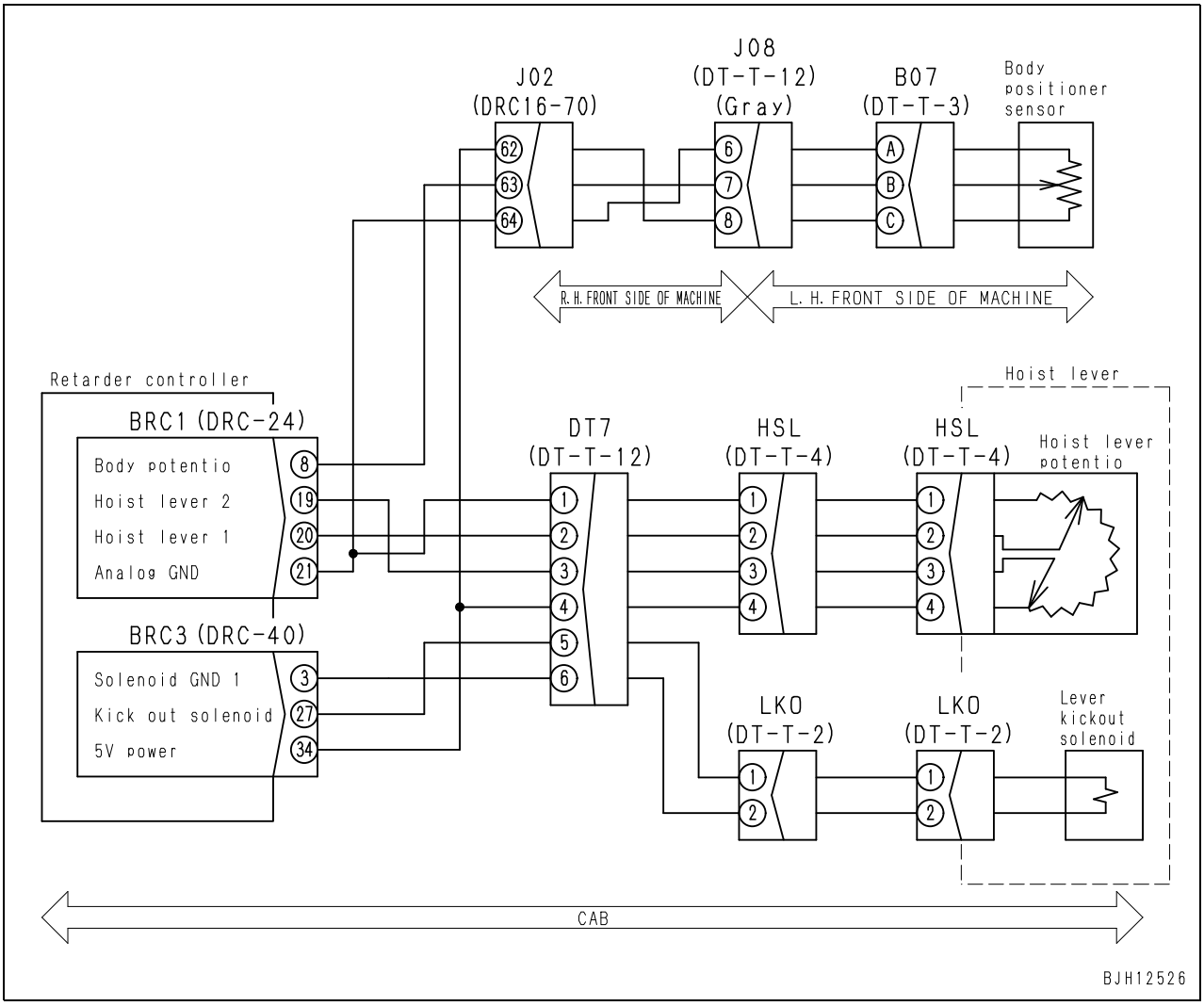
Circuit diagram related



Circuit diagram related



Circuit diagram related



	Cause		Standard value in normal state/Remarks on troubleshooting
Possible causes and standard value in normal state	7	Defective gear speed clutch	• If oil pressure checked in Cause 6 is low, oil may be leaking through clutch seal ring. • If oil pressure checked in Cause 6 is normal, clutch may be slipping.
	8	Defective power train pump	• If check result of Cause 3 is abnormal, disconnect power train pump outlet hose and crank engine to see if oil flows out. • Check line filter for foreign matter to judge.
	9	Internal defect in transmission	Transmission may have defect in it. Check it directly.

Table 1

		Operated clutches						
		Lo	Hi	1st	2nd	3rd	4th	R
Gear speed	F1	●		●				
	F2	●			●			
	F3		●		●			
	F4	●				●		
	F5		●			●		
	F6	●					●	
	F7		●				●	
	N							
	RH		●					●
	RL	●						●

H-17 Excessive hydraulic drift of dump body

Trouble	Hydraulic drift of dump body is excessive.
Related information	• If a failure code related to the machine is displayed, firstly troubleshooting the displayed code.

	Cause		Standard value in normal state/Remarks on troubleshooting
Possible causes and standard value in normal state			★ Raise the dump body and troubleshooting with the engine stopped.
	1	Defective oil tightness of hoist valve main spool	Raise the dump body and disconnect the hydraulic hose in the dump cylinder head side. If the oil flows out from the cylinder side, the oil tightness of the spool is defective.
	2	Defective dump cylinder	Raise the dump body and disconnect the hydraulic hose in the dump cylinder head side. If the oil does not flow out from the cylinder side, the cylinder piston ring is defective.

S-9 Oil becomes contaminated quickly

General causes why oil becomes contaminated

- Entry of exhaust gas into oil due to internal wear
- Clogging of lubrication passage
- Use of improper fuel
- Use of improper oil
- Operation under excessive load

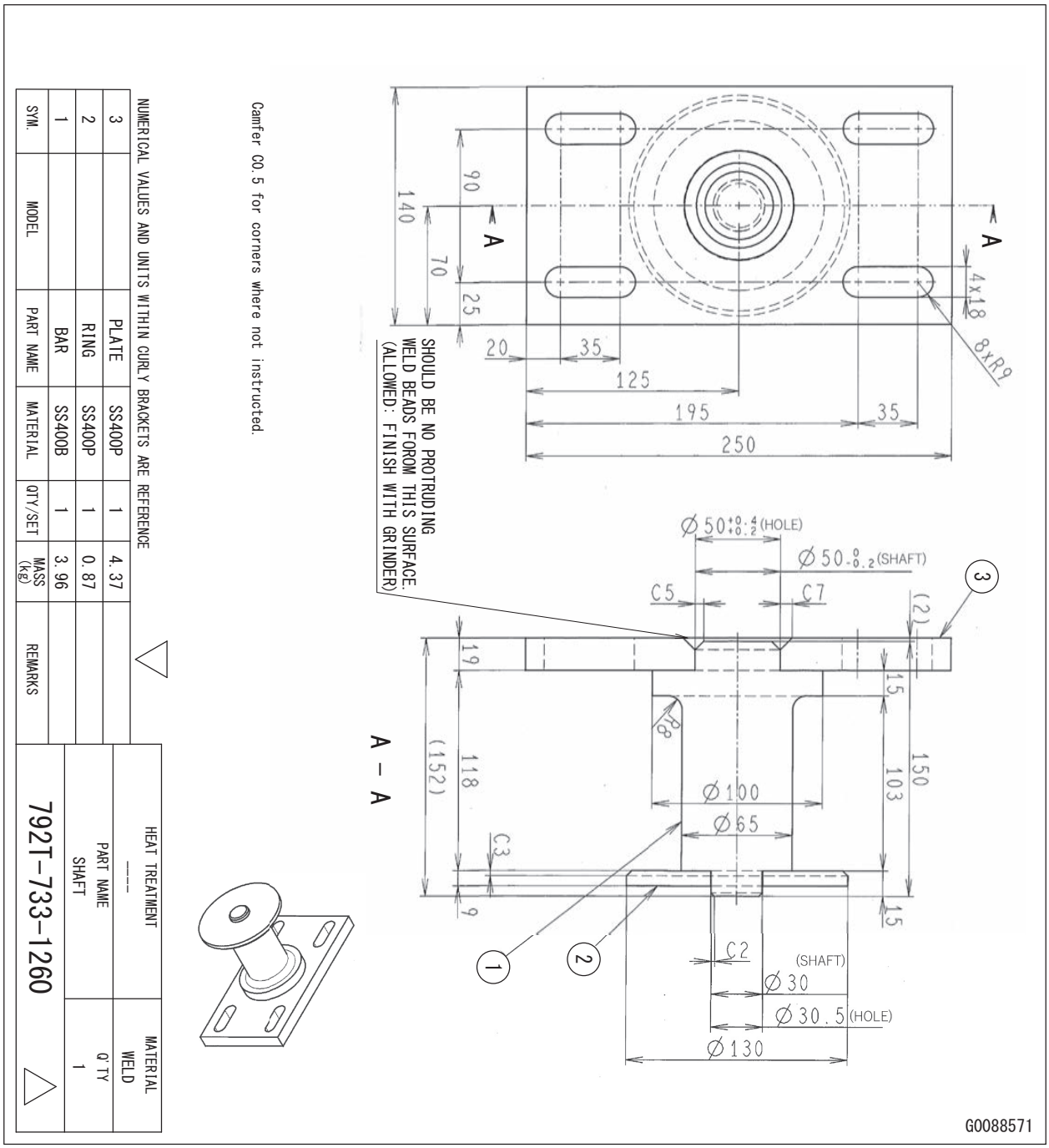
			Causes									
			Defective seal at turbocharger turbine end	Worn valve and/or valve guide	Worn piston ring and/or cylinder liner	Clogged breather and/or breather hose	Clogged oil cooler	Clogged oil filter	Defective oil filter safety valve	Clogged turbocharger lubrication drain tube	Exhaust smoke is bad
Questions	Confirm recent repair history										
Questions	Degree of machine operation	Operated for long period	△	△	△						
Questions	Non-specified fuel is being used							○			
Questions	Engine oil replenished more frequently				◎						
Questions	Even when engine oil temperature rises, oil filter clogging monitor indicates clogging (if monitor is installed)							◎	○		
Check items	Metal particles are found when oil filter is drained			○	○			◎			
Check items	Inside of exhaust pipe is contaminated with oil			◎							
Check items	Engine oil temperature rises quickly						◎				
Check items	Color of exhaust gas	Blue under light load			◎						
Check items	Color of exhaust gas	Black									◎
Check items	Amount of blow-by gas	Excessive	○	○	◎					○	
Check items	Amount of blow-by gas	None				◎					

Troubleshooting	Excessive play of turbocharger shaft		●								See S-7
Troubleshooting	When compression pressure is measured, it is found to be low			●	●						See S-7
Troubleshooting	Inspect breather and breather hose directly					●					See S-7
Troubleshooting	Inspect oil cooler directly						●				See S-7
Troubleshooting	Inspect oil filter directly							●			See S-7
Troubleshooting	Spring of oil filter safety valve is hitched or broken								●		See S-7
Troubleshooting	Inspect turbocharger lubrication drain tube directly									●	See S-7
		Remedy	Replace	Replace	Replace	Clean	Clean	Replace	Replace	Clean	—

Component	Symbol		Part No.	Part Name	Necessity	Q'ty	New/remodel	Sketch	Nature of work, remarks
Removal and installation of front wheel hub and brake assembly	J	1	01011-61670	Bolt	■	3			Fixing of front wheel hub and brake assembly
			01643-31645	Washer	■	3			
		30	790-101-1102	Hydraulic pump	■	1			Parking brake releasing
			790-101-1430	Coupler assembly	■	1			
			391-40-11560	Nipple	■	1			
Disassembly and assembly of front wheel hub and brake assembly		1	01011-61670	Bolt	■	3			Fixing of front wheel hub and brake assembly
			01643-31645	Washer	■	3			
		2	01017-51620	Bolt	■	8			Parking brake manual releasing
			01580-31613	Nut	■	8			
			01643-31645	Washer	■	8			
Disassembly and assembly of final drive and rear brake assembly		1	792T-422-1610	Spacer	■	3	N	○	Fixing of outer gear and retainer assembly
			01011-61615	Bolt	■	3			
			01643-31645	Washer	■	3			
		2	01017-51620	Bolt	■	9			Parking brake manual releasing
			01580-31613	Nut	■	9			
			01643-31645	Washer	■	9			
			792T-733-1610	Bolt assembly	●	9	N	○	
		3	790T-953-1000	Work bench	■	1	N	○	Disassembly and assembly of final drive and brake assembly
		4	792T-733-1300	Inverted lifting tool	■	1	N	○	
		5	792T-733-1270	Balance lifting tool	■	1	N	○	Disassembly and assembly of final drive and brake assembly
		6	792T-733-1700	Puller	●	1	N	○	Removal of outer race on hub wheel
		7	-	Rubber band	■	2			Holding of backup ring
		8	792-733-1010	Installer	■	1	N		Installation of floating seal assembly
		9	792-733-1020	Installer	■	1	N		
		10	792T-733-1200	Inverted lifting tool	■	1	N	○	90° rotation of final drive and brake assembly without carrier
		11	790T-953-2010	Stand	■	1	N	○	Bearing preload adjustment
		12	792T-733-1500	Clamp	■	3	N	○	• 90° rotation of final drive and brake assembly without carrier • Bearing preload adjustment
		13	792T-733-1030	Push tool	■	1	N	○	Installation of floating seal
		14	792T-733-1400	Inverted lifting tool	■	1	N	○	Inverting of brake assembly
		15	792T-733-1100	Lifting tool for carrier	●	1	N	○	Installation of final drive carrier assembly
		16	790-101-3800	Puller	■	1			Removal of outer race on hub wheel
		17	792T-733-2000	Inverted lifting tool	■	1	N	○	Inverting of hub wheel

Note: Komatsu cannot accept any responsibility for special tools manufactured according to these sketches.

J4 (3/4) Inverted lifting tool



Caution

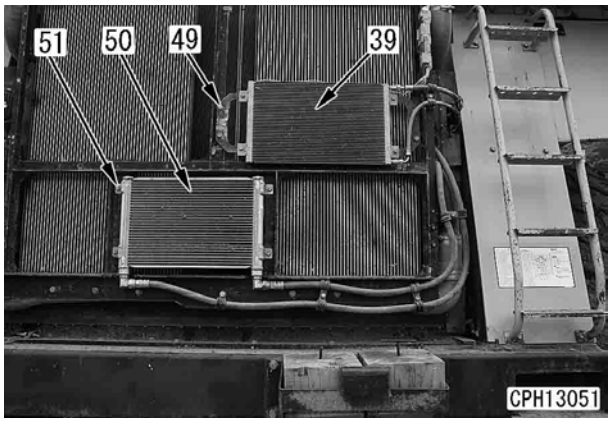
1. Fillet weld the entire circumference in 80% length of thinner plate's thickness for joint part.
2. Hand welding: Use JIS Z 3211-E4319 (ilminite) welding rod.
3. Semi-Automatic welding: Use JIS Z 3312-YGW11 ~ YGW15 solid wire.
4. Stress relief annealing after welding.
5. Material inspection - Attach the mill sheet.
6. Welding inspection - X-ray, color check or equivalent method.
7. Conduct a pre-use check.

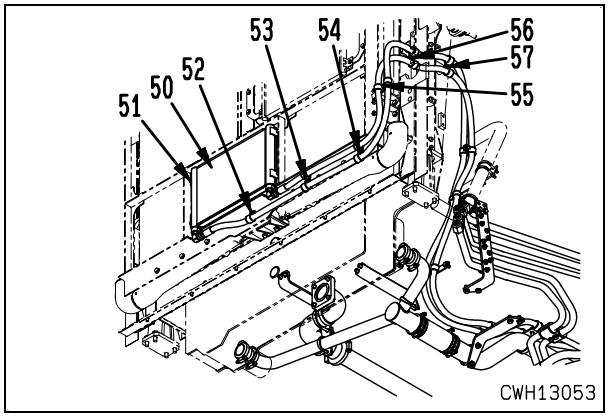
DUMP TRUCK
HD785-7

Machine model	Serial number
HD785-7	7001 and up

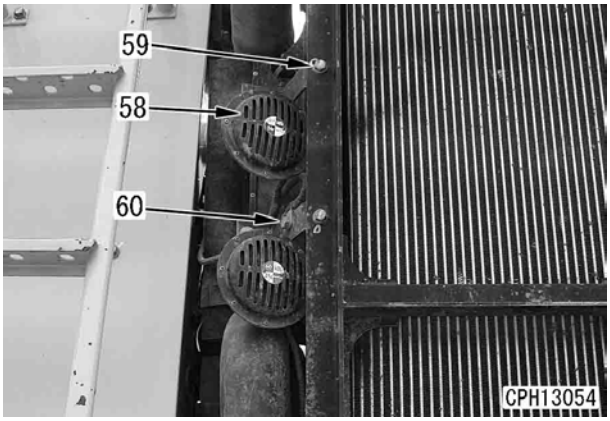
50 Disassembly and assembly
Engine and cooling system

7. **Air conditioner condenser and steering oil cooler**
   1) Remove mounting bolts (49) and air conditioner condenser (39).
   2) Remove mounting bolts (51) and steering oil cooler (50).
   3) Remove oil cooler hose clamp mounting bolts (52) – (57).
      ★ Fix condenser (39) and oil cooler (50) and their hoses to the middle of the cab ladder with strings so that they will not be obstacles to slinging of the radiator assembly.

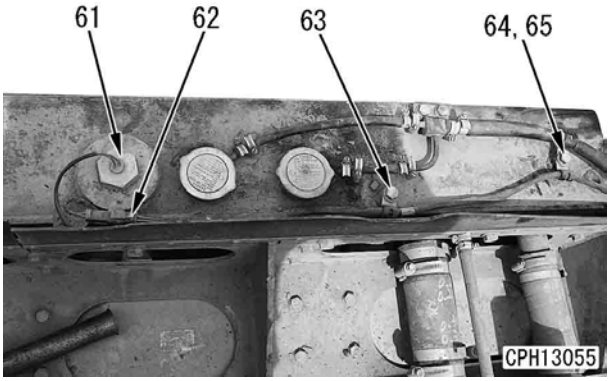




8. Remove wiring clamp (60), mounting bolts (59) and horn and bracket assembly (58).



9. Disconnect connector (62) of radiator coolant level sensor (61) and remove wiring clamp mounting bolts (63), (64) and (65).

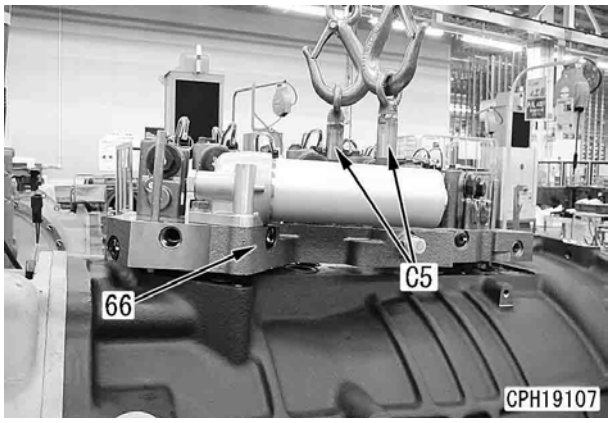


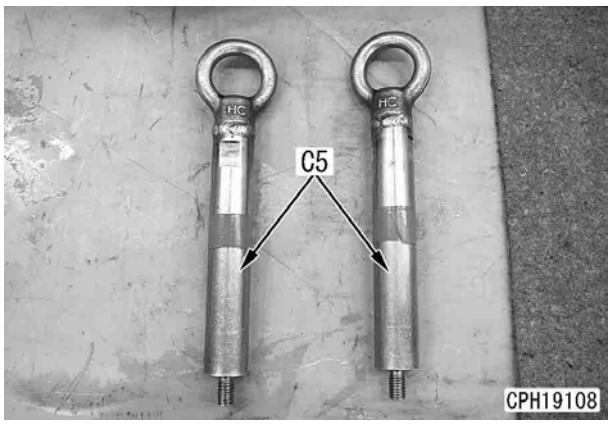
DUMP TRUCK
HD785-7

Machine model	Serial number
HD785-7	7001 -

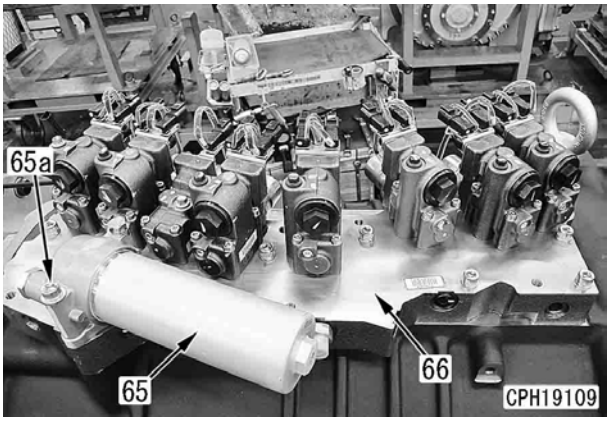
50 Disassembly and assembly
Power train, Part 1

8. Sling and install ECMV assembly (66) by using tool **C5** (M10).
   - Mounting bolt: **Liquid gasket (LG-5)**
   - ★ Before slinging ECMV assembly (66), check that tool **C5** is installed to the base.
   - ★ Check that there is no dirt or flaw on ECMV assembly (66) before installing.
   - ★ Remove the oil on the mounting face of ECMV assembly (66) so that it does not drip.
   - ★ Before fitting ECMV assembly (66) firmly, visually check that O-ring (75) is fitted.

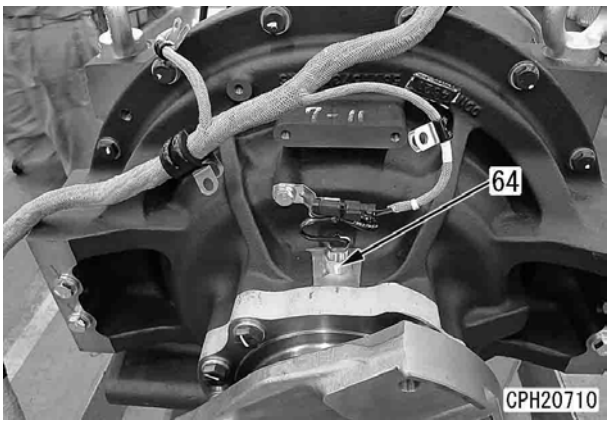


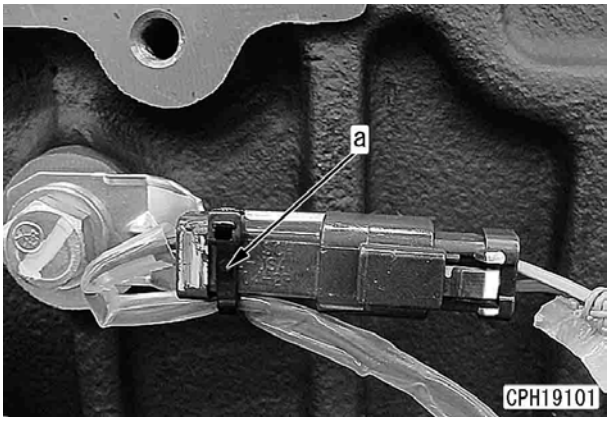


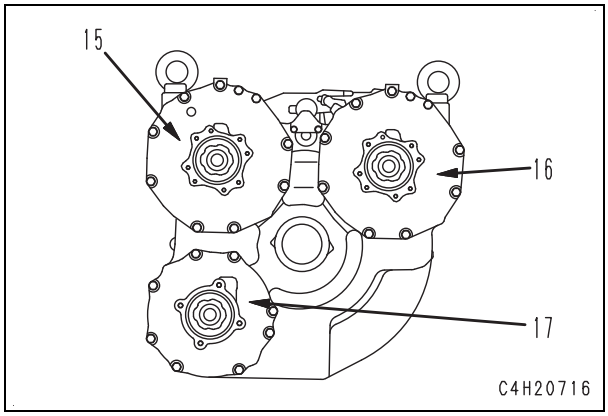
9. Install oil filter assembly (65) to ECMV assembly (66).
   - Mounting bolts (65a): **58.3 to 73.5 Nm {6.0 to 7.5 kgm}**
   - Mounting bolt (65a): **Liquid gasket (LG-5)**
   - ● When installing oil filter unit (561-15-71730) separately.
   - Case: **73.6 to 83.4 Nm {7.5 to 8.5 kgm}**



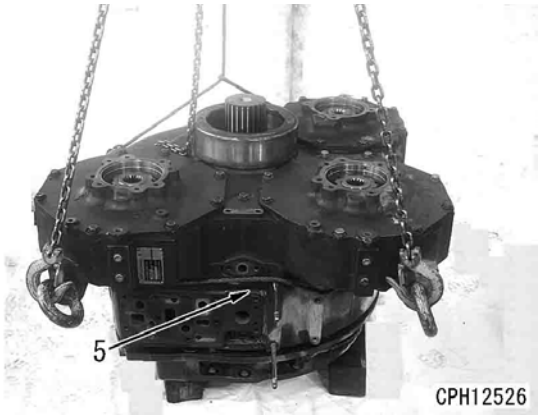
10. Install output shaft speed sensor (64).
    - ★ Check the end of sensor (64) for dirt or flaws.
    - ★ Tighten the wiring of sensor (64), clamp, and connector together with band (a).
    - ★ Lightly touch the speed sensor to the gear, return 1/2 to 1 turn front that position, and tighten the lock nut.
    - Threaded portion of sensor: **Liquid gasket (LG-5)**
    - Mounting locknut: **49.0 to 68.6 Nm {5.0 to 7.0 kgm}**



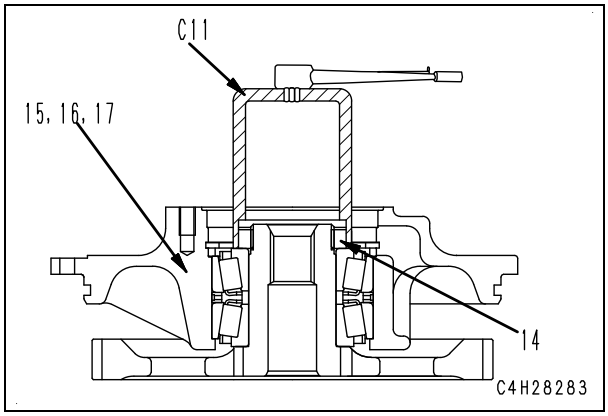


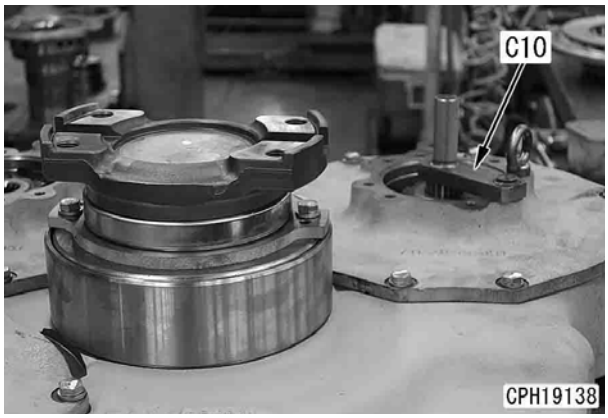


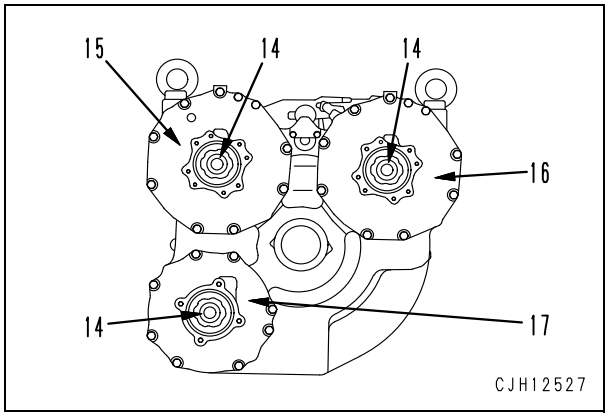
10. **PTO assembly**
    1) Fit the O-ring, and install PTO assembly (5), while meshing PTO gear.
       ★ When slinging PTO assembly (5), touch all around the spigot joint to check for flaw and dirt.
       ★ After installing, turn the shaft and check the operation. However, do not put your body in.
       O-ring: **Grease (G2-LI)**



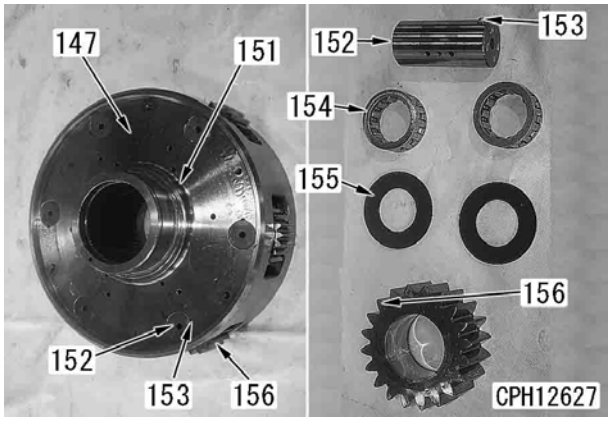
    2) Lock the pump drive gear with tool **C10**, and tighten nut (14) with tool **C11**.
       Nut (14):
       313 to 392 Nm {32 to 40 kgm}
       Nut (14): **Liquid adhesive (LT-2)**
       ★ Apply liquid adhesive (LT-2) all around the gear side (male thread portion). Do not apply it to the nut directly.
       ★ Nut (14) is used at 3 places on pump drive gear cage assemblies (17), (16), and (15).



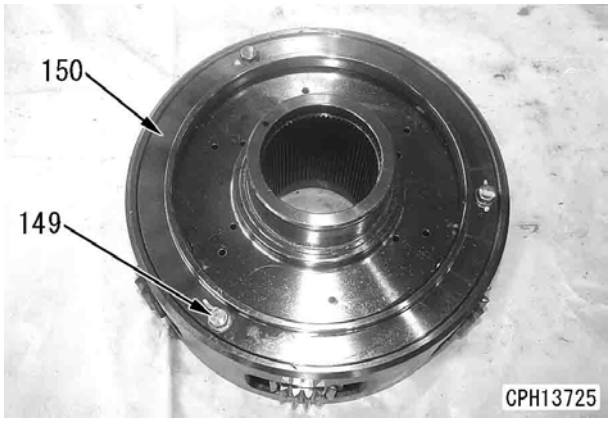




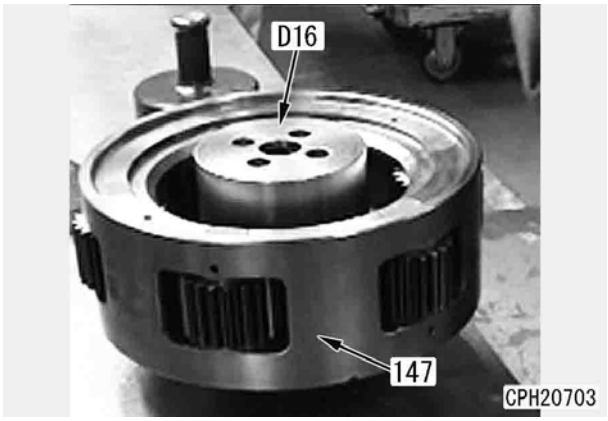
2. **Assembly of No. 7 carrier assembly**
   1) No. 7 planetary gear
      1] Install gear (156), bearing (154), and thrust washer (155) as a unit to carrier assembly (147). For details, see "Assembly of No. 4 planetary gear".
      2] Fix ball (153) to shaft (152) with grease, and insert them into carrier assembly (147).
         ★ See "Assembly of No. 4 carrier and No. 5 ring gear assembly", Step 1).
         ★ Check that ball (153) mounting hole on the shaft is aligned with the hole on the carrier, and install the shaft carefully not to damage the bearing and thrust washer.
         ★ Check that each gear rotates smoothly.
      3] Install seal ring (151).

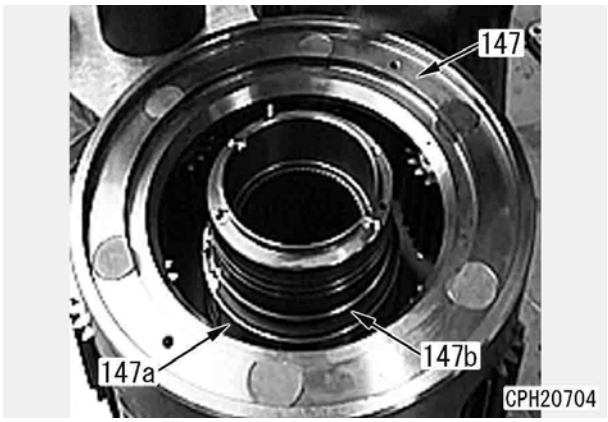


      4] Install plate (150).
         Mounting bolt (149):
         Liquid adhesive (LT-2)
         Mounting bolt (149):
         58.3 to 73.5 Nm {6 to 7.5 kgm}

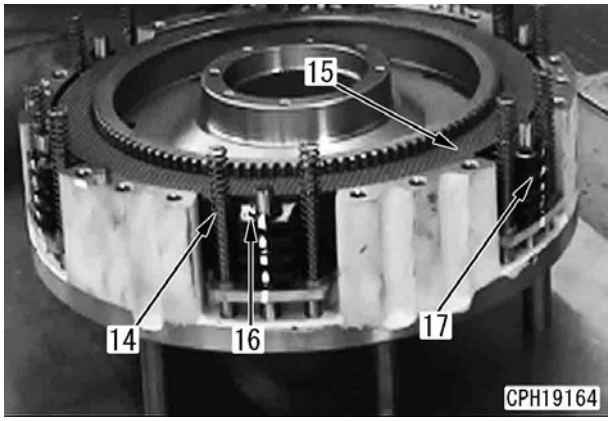


      5] Reverse carrier assembly (147) and press fit bushing (147a) by using tool **D16** or by shrink fit.
         ★ Be sure to use the guide which forms a set with tool **D16** to align and press fit the assembly.
      6] Install snap ring (147b).



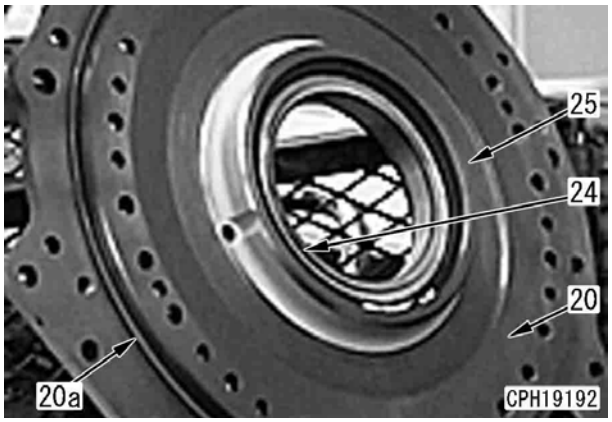


2) Housing, disc, plate, and spring
Install discs (15), plates (17), and springs (16) and (14) to the housing assembly.
★ After installing, visually check the 6 places for omission, and make marks with a marker.



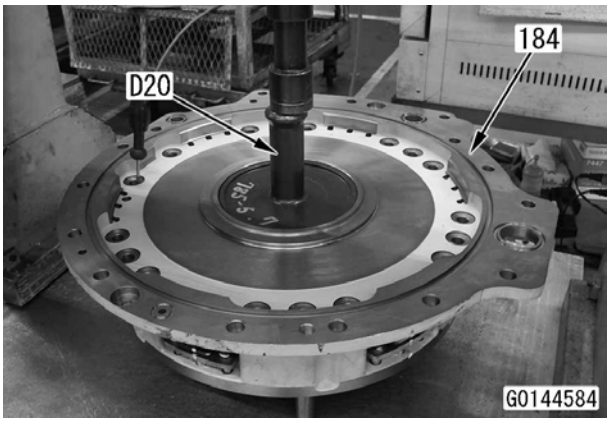
3) Bearing
Install bearing (24) to cage (20) by using the push tool or by expansion fit, and fix it with snap ring (25).

4) O-ring
1] Check the fitting portion of O-ring (20a) for dirt and flaws, and apply high-viscosity grease at regular intervals of approximately 10 cm.
2] After installing O-ring (20a), touch all around it, and check that it is fitted securely.

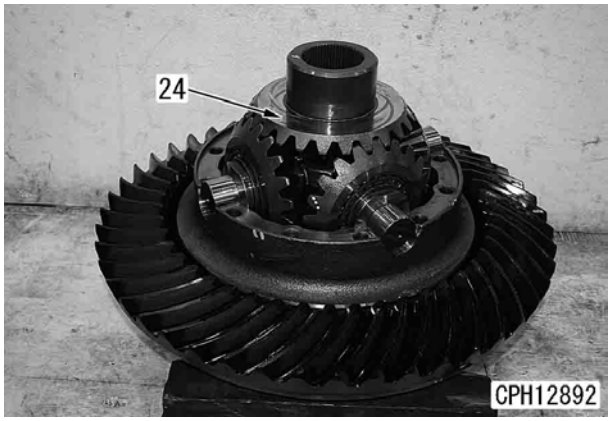


5) Cage
1] Sling the cage assembly (184) with a crane, and install it to No. 1 clutch assembly.
★ When installing, be sure to align the holes with No. 1 clutch assembly by using guide bars, screwdrivers, etc.
★ Check that each spring (14) is fitted to the upper and lower grooves.

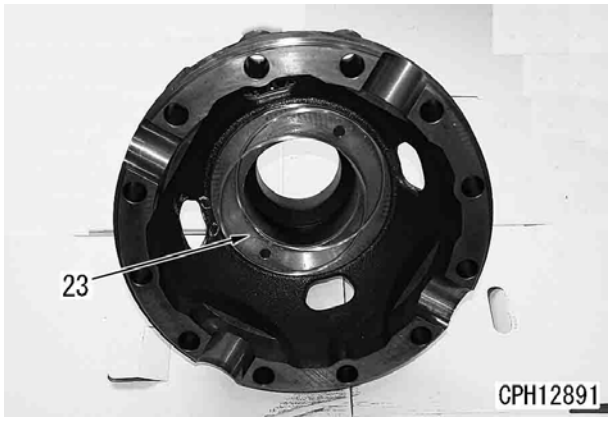
2] Using tool **D20**, press fit the cage assembly (184) to No. 1 clutch assembly by using a press machine.



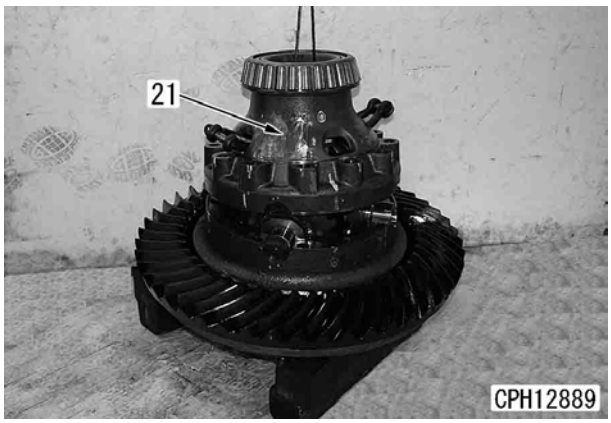
7) Install side gear (24).



8) Install thrust washer (23), setting it to the dowel pin.
   ★ The side with the groove is foreground.
   ★ Check that the dowel pin head is from 0.35 to 0.75 mm lower than the thrust washer surface.
   Thrust washer:
   Power train oil (TO30)

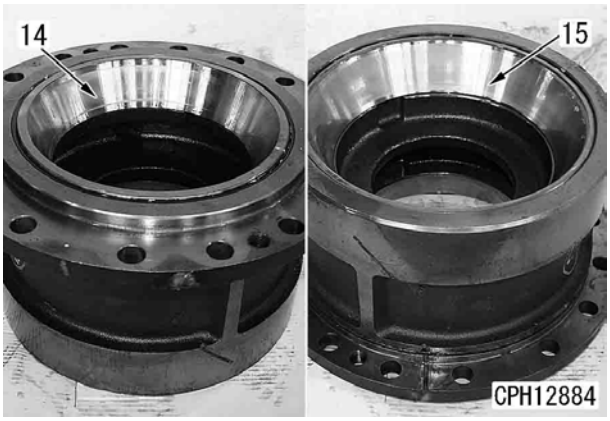


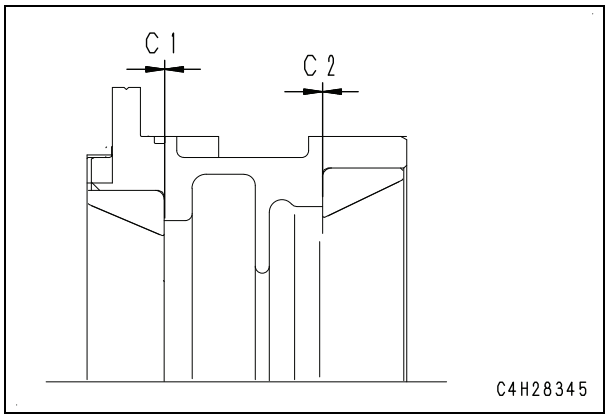
9) Install case (21) with engraving.
   Mounting bolt:
   823.8 – 1,029.7 Nm {84.0 – 105.0 kgm}
   Gear: **Power train oil (TO30)**



2. Assembly of pinion cage assembly

1) Using the push tool, press fit outer races (14) and (15) to cage (6).
   ★ Check with thickness gauge (Thickness: Max. 0.05 mm) that there is not clearance in (C1) and (C2) between the outer race and cage.





2) Using two push tools **H7**, press fit bearing inner race (13).
   ★ Shrink fit is also possible. (Must not be above 100°C)
   Contact surface of bearing inner race on pinion gear:
   Lubricant (LM-P)
   ★ When installing, check the match No.
   ★ Check that there is not clearance in (C3) between the pinion gear and end face of bearing inner race. (C3 ≦ 0.05mm)
   Bearing: **Power train oil (TO30)**

Special tools

Symbol		Part No.	Part name	Necessity	Q'ty	New/Remodel	Sketch
T	1	790-452-1200	Pilot ring tool	■	1		
	2	790-452-1100	Installer set	■	1		

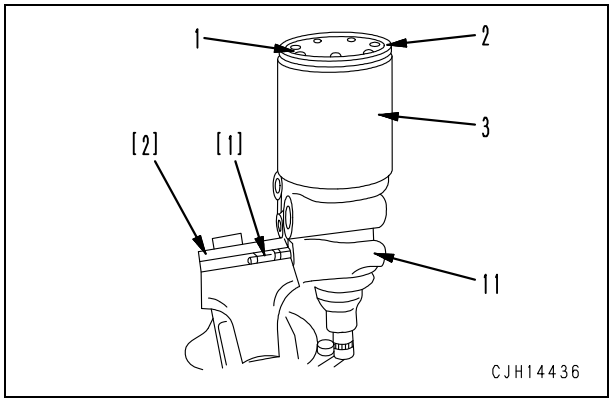
★ Cleanliness is essential to maintenance of the power steering system. The hydraulic circuit must be isolated from dirt and other foreign matter.
★ When disassembling any part of the unit, prepare a clean worktable.
★ Before disconnecting a pipe, wipe off the external dirt from it.
★ Before placing the unit on the worktable, be sure to wipe off the external dirt from it.
★ After disassembling the unit, clean the parts in kerosene-based solvent containing no impurity and dry them by blowing dry compressed air containing no impurity against them.
★ If any solvent other than the above is used, it can deteriorate the rubber seals. Never wipe the parts with cloths or blow steam against the unit.
★ Since the solvent is combustible material, handle it carefully and keep it off fire.

Preparation work

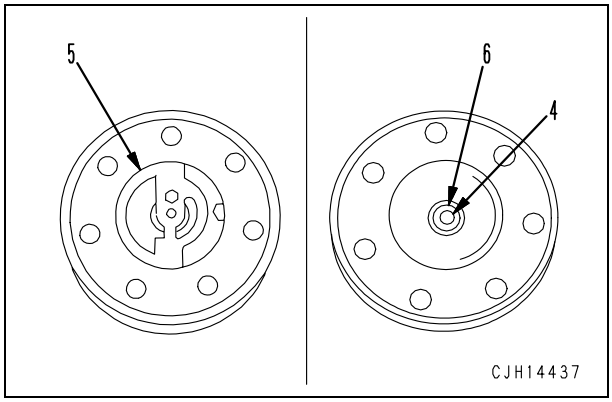
1) Install plugs to the 5 ports of housing assembly (11) and clean the outside of the housing, and then remove the plugs.
2) Install tube nut [1] to one of the ports.
3) Install the housing assembly to vise [2] with end cover assembly (2) up.
   ★ Do not hold housing assembly (11) directly with the vise. If it is held so, the unit may be broken.

Disassembly

1. Remove 7 mounting bolts (1). Insert a flat-head screwdriver between end cover assembly (2) and sleeve (3) to remove end cover assembly (2).
   ★ After removing the end cover assembly, check the edges of the end cover hole for breakage.



2. Remove commutator (5) and washer (6) from end cover assembly (2).
   ★ Do not remove pin (4).

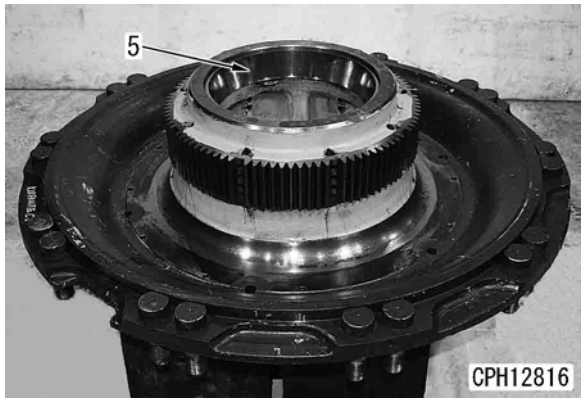


5) Remove plate (33).
★ Both sides of this plate are polished. Record its installed direction.

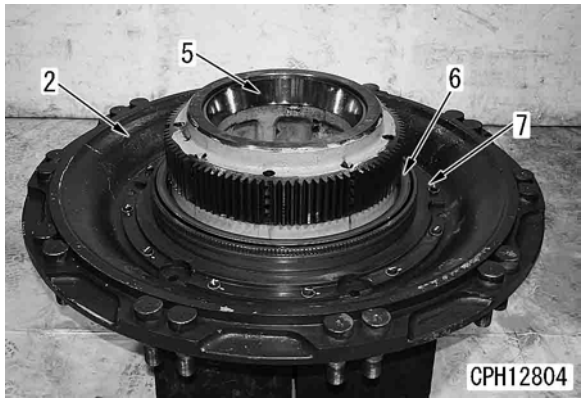
Assembly

1. Front wheel hub

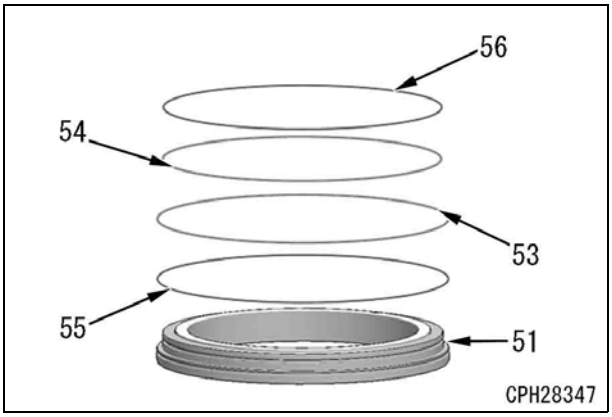
1) Place the inner gear.
Inner gear: **160 kg**
2) Install outer race (5).



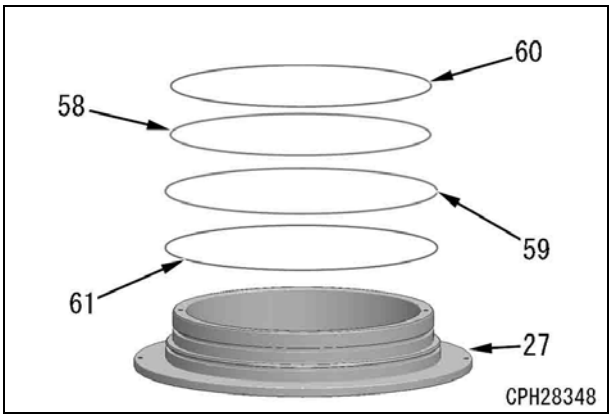
3) Install retainer (7).
Mounting bolt:
98 – 123 Nm {10.0 – 12.5 kgm}
4) Install floating seal (6).



8) Remove seals (53) and (54) and backup rings (55) and (56) from parking piston (51).



9) Remove seals (58) and (59) and backup rings (60) and (61) from service piston (27).

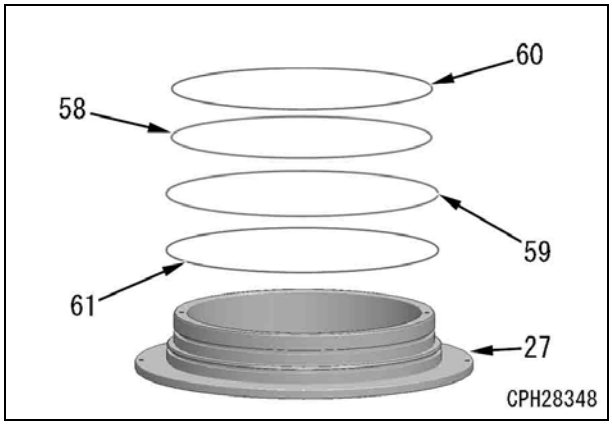


Assembly

★ Completely clean all the parts and check them for dirt or breakage before assembling them.

1. Cylinder assembly

1) Install seals (58) and (59) and backup rings (60) and (61) to service piston (27).
   ★ Install the seals to the pressure-receiving side (inside).



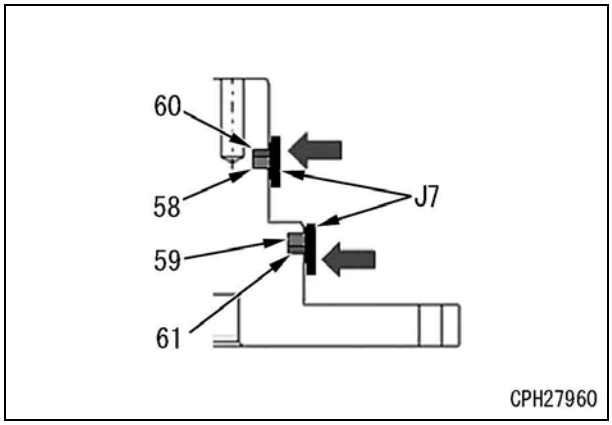
- How to install backup rings

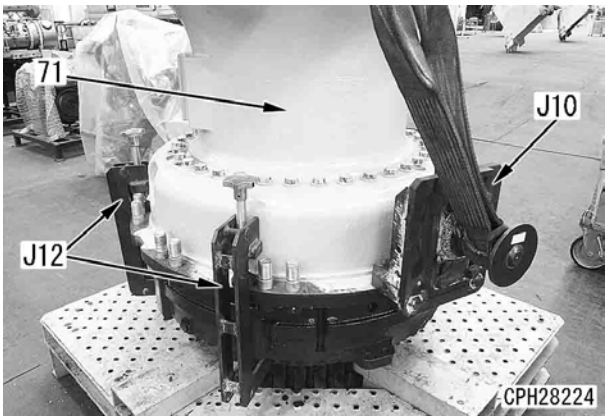
1] Soak the backup rings in water or oil at 80°C to 100°C for approximately 10 minutes.

2] Install the backup rings to the installation grooves.
   ★ Do not excessively stretch, twist, or bend the backup rings.

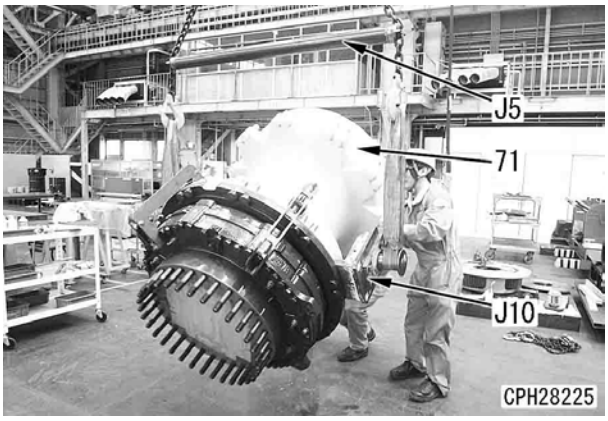
3] Hold with rubber bands **J7** to shrink the expanded backup ring.
   ★ Inatall the rubber band **J7** until temperature of the backup ring returns to room temperature.

4] Remove rubber bands **J7**, and check that the backup rings are free from sags and scratches.

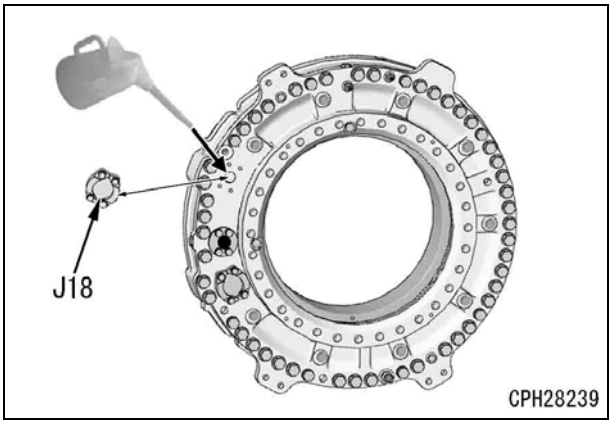




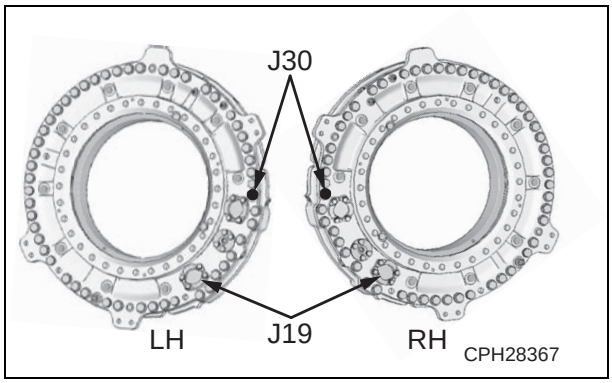
2) Place hub wheel-brake-tube assembly (71) on its side on the floor.
   ★ Place blocks on the right and left of the assembly to prevent from rolling.
   Tools: Inverted lifting tool J10, balance lifting tool J5.



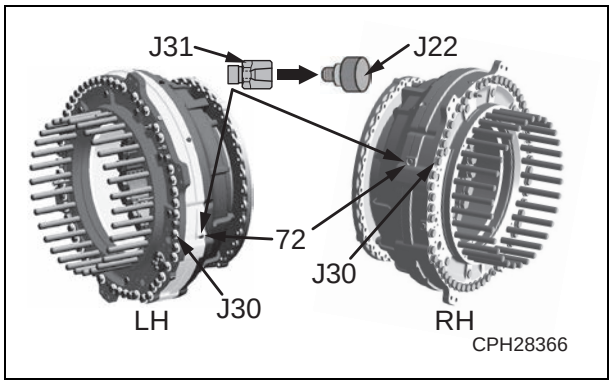
3) Remove tool **J18** from the brake oil inlet.
4) Add power train oil into the brake cooling oil inlet.
   Power train oil (TO30): **Approx. 20 ℓ**
5) Close the brake oil inlet with tool **J18**.



6) Relocate turning slings **J10** so that tools **J19** are almost at bottom.
   ★ At this time, plugs **J30** installed to the parking brake ports are almost right at the side.



7) Install coupling **J22** to adapter **J31**.
   Tools: Adapter J31, coupling J22
8) Remove plugs (72) from the side of **J30**, and install adapters **J31** instead.
   Tool: Socket wrench
   Plug (72): Width across flats19 mm, M12



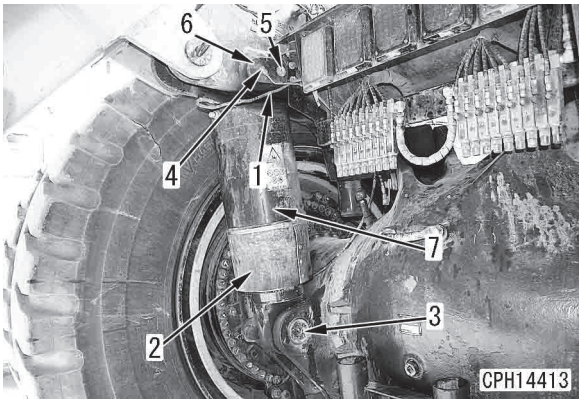
9) Horizontally sling hub wheel, brake and tube assembly (71), and install it to the housing or stand **J11**.
   ★ If tools **J2** (releasing bolts for the parking brake) are removed, clamps **J12** are not necessary.
   Tools: Inverted lifting tool for hub wheel, brake and tube assembly J10, balance lifting tool J5, stand J11
   Hub wheel, brake and tube assembly (71): **3600 kg**
10) If clamps **J12** are installed, remove clamps **J12**.

Removal and installation of rear suspension cylinder assembly

Removal

⚠ **Stop the machine on a level ground, set the parking brake switch in the "PARK" position, and lock the tires with chocks.**
⚠ **Raise the body and fix it with the lock pin.**
⚠ **Disconnect the cable from the negative (–) terminal of the battery.**

1. Release nitrogen gas. [*1]
   ★ For details, see Testing and adjusting, "Testing and adjusting rear suspension cylinder".
2. Disconnect pressure sensor connector DT2 (1).
3. Remove guard (2). [*2]
4. Remove pin (3) on the rear suspension cylinder head side.
5. Sling rear suspension cylinder assembly (7) with a lift truck
6. Remove bolt (5) and pin (6) on the rear suspension cylinder rod side. [*3]
7. Disconnect grease supply hose (4).



8. Sling and remove rear suspension cylinder assembly (7) with the lift truck.
   Rear suspension cylinder assembly: **250 kg**

Installation

- Carry out installation in the reverse order to removal.

⚠ **When aligning the pin holes, use a bar. Never insert your fingers in the pin holes.**

[*1]
Oil level valve: **39 – 49 Nm {4 – 5 kgm}**

[*2]
Mounting band: **6.8 ± 0.49 Nm {0.7 ± 0.05 kgm}**

[*3]
Bolt: **157 – 196 Nm {16 – 20 kgm}**

★ Charge the rear suspension cylinder with nitrogen gas and adjust it. For details, see Testing and adjusting, "Testing and adjusting rear suspension cylinder".

DUMP TRUCK

HD785-7

Machine model	Serial number
HD785-7	7001 and up

50 Disassembly and assembly

Cab and its attachments

DUMP TRUCK

HD785-7

Machine model	Serial number
HD785-7	7001 and up

80 Appendix

Air conditioner