SHOP MANUAL

KOMATSU

GD555-3C
GD655-3C
GD675-3C

MACHINE MODEL	SERIAL NUMBER
GD555-3C	**50001 and up**
GD655-3C	**50001 and up**
GD675-3C	**50001 and up**

- This shop manual may contain attachments and optional equipment that are not available in your area. Please consult your local Komatsu distributor for those items you may require.
  Materials and specifications are subject to change without notice.
- GD555-3C mounts the SA6D102E-1 or SAA6D102E-2 engine.
  GD655-3C, GD675-3C mount the S6D114E-1, SA6D114E-1 or SAA6D114E-2 engine.
  For details of the engine, see the 102 Series Engine Shop Manual and the 114 Series Engine Shop Manual.

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METHOD OF DISASSEMBLING, CONNECTING PUSH-PULL TYPE COUPLER

Before carrying out the following work, release the residual pressure from the hydraulic tank. For details, see TESTING AND ADJUSTING, Releasing residual pressure from hydraulic tank.

Even if the residual pressure is released from the hydraulic tank, some hydraulic oil flows out when the hose is disconnected. Accordingly, prepare an oil receiving container.

Disconnection

1) Release the residual pressure from the hydraulic tank. For details, see TESTING AND ADJUSTING, Releasing residual pressure from hydraulic tank.

2) Hold adapter (1) and push hose joint (2) into mating adapter (3). (See Fig. 1)
   - ★ The adapter can be pushed in about 3.5 mm.
   - ★ Do not hold rubber cap portion (4).

3) After hose joint (2) is pushed into adapter (3), press rubber cap portion (4) against (3) until it clicks. (See Fig. 2)

4) Hold hose adapter (1) or hose (5) and pull it out. (See Fig. 3)
   - ★ Since some hydraulic oil flows out, prepare an oil receiving container.

Connection

1) Hold hose adapter (1) or hose (5) and insert it in mating adapter (3), aligning them with each other. (See Fig. 4)
   - ★ Do not hold rubber cap portion (4).

2) After inserting the hose in the mating adapter perfectly, pull it back to check its connecting condition. (See Fig. 5)
   - ★ When the hose is pulled back, the rubber cap portion moves toward the hose about 3.5 mm. This does not indicate abnormality, however.

Type 1

Fig. 1

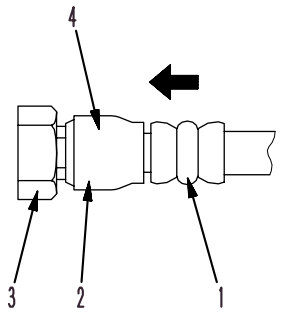


Fig. 2

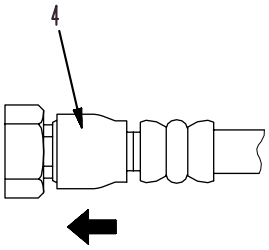


Fig. 3

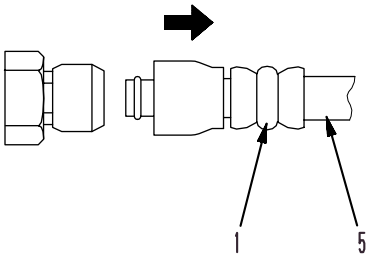


Fig. 4

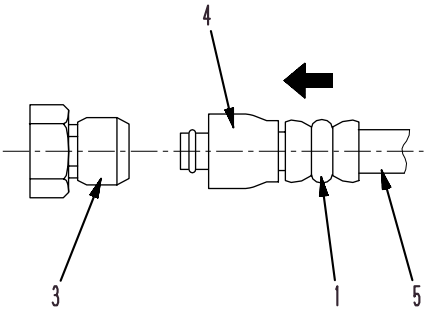
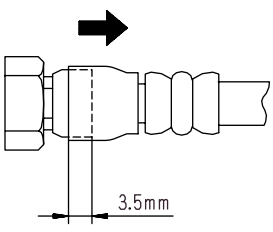


Fig. 5



CWP10701

Liter to U.S. Gallon

1ℓ = 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

Liter to U.K. Gallon

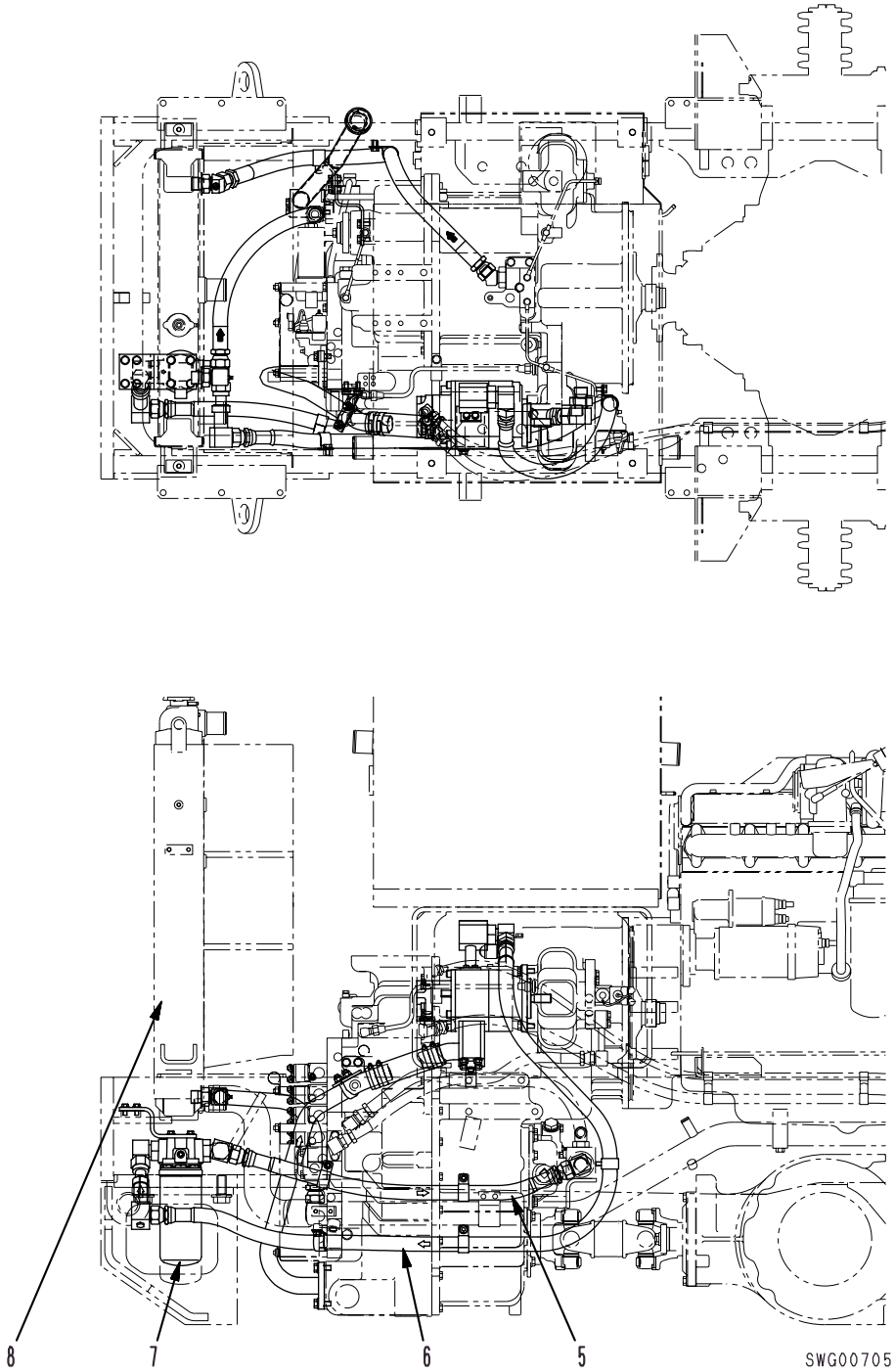
1ℓ = 0.21997 U.K. Gal

	0	1	2	3	4	5	6	7	8	9
0	0	0.220	0.440	0.660	0.880	1.100	1.320	1.540	1.760	1.980
10	2.200	2.420	2.640	2.860	3.080	3.300	3.520	3.740	3.950	4.179
20	4.399	4.619	4.839	5.059	5.279	5.499	5.719	5.939	6.159	6.379
30	6.599	6.819	7.039	7.259	7.479	7.969	7.919	8.139	8.359	8.579
40	8.799	9.019	9.239	9.459	9.679	9.899	10.119	10.339	10.559	10.778
50	10.998	11.281	11.438	11.658	11.878	12.098	12.318	12.528	12.758	12.978
60	13.198	13.418	13.638	13.858	14.078	14.298	14.518	14.738	14.958	15.178
70	15.398	15.618	15.838	16.058	16.278	16.498	16.718	16.938	17.158	17.378
80	17.598	17.818	18.037	18.257	18.477	18.697	18.917	19.137	19.357	19.577
90	19.797	20.017	20.237	20.457	20.677	20.897	21.117	21.337	21.557	21.777

Machine Model			GD555-3C	
Serial Number			50001 – 51000	51001 and up
Blade	Blade dimension (Length x Height x Thickness)	mm	3,660 x 660 x 22	
	Cutting edge dimension (Length x Width x Thickness – Number)		1,830 x 153 x 16 – 2	
	Max. lift above ground		460	
	Max. cutting depth		635	
	Blade base		2,500	
	Blade load	kN {kg}	68 {6,939}	68.5 {6,985}
	Turning angle (with scarifier)	deg.	360 (130)	
	Max. side shift distance (left)	mm	625	
	Max. side shift distance (right)		625	
	Cutting angle	deg.	—	
	[Standard]		37	
	[Adjustable]		32 to 81	

Serial No. 51001 and up Unit: kg

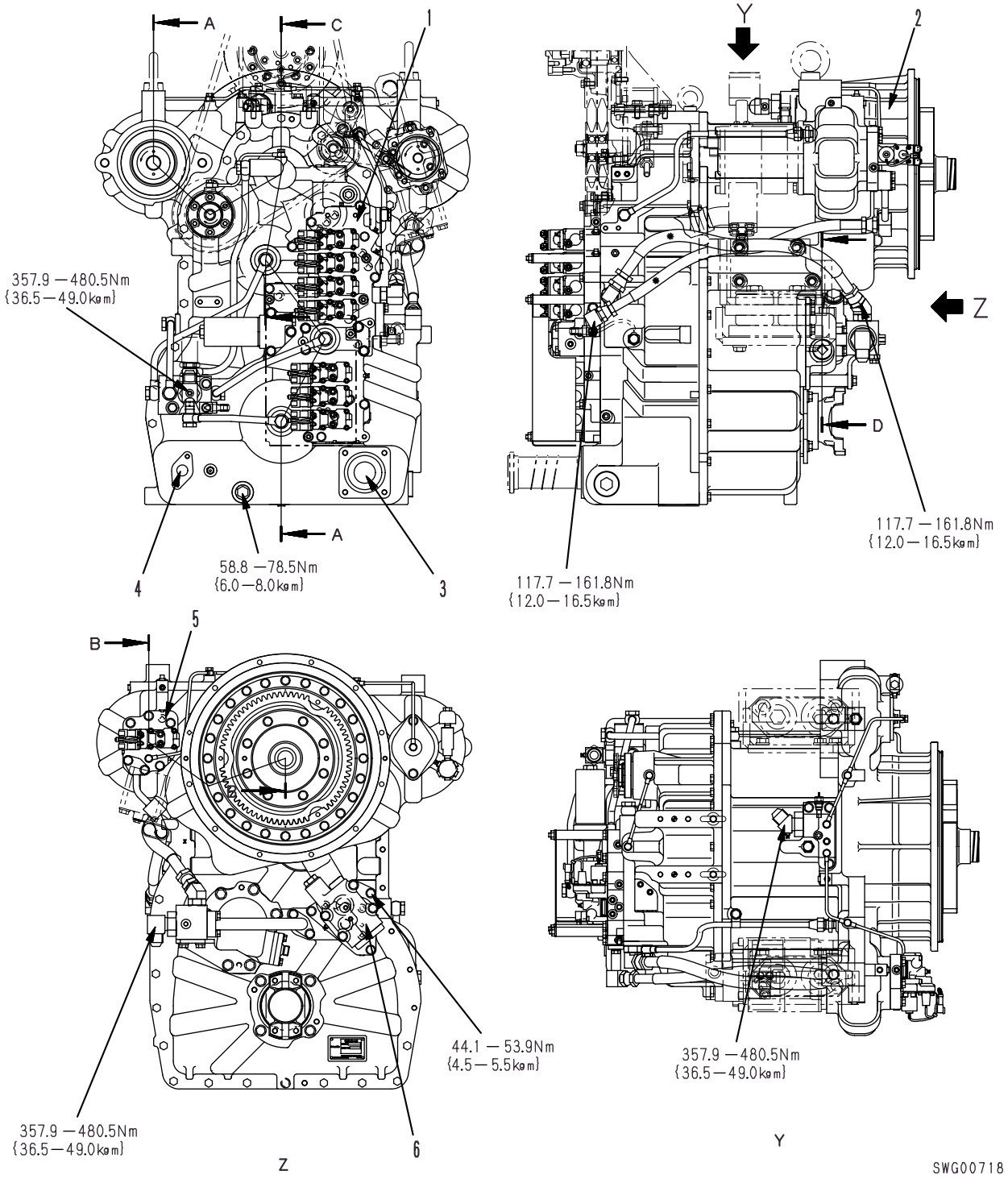
Machine model	GD555-3C	GD655-3C	GD675-3C
Serial Number	51001 and up		
Engine assembly (dry)	550	750	750
Radiator assembly (dry)	115	115	115
Transmission assembly (dry)	755	755	755
Transmission pump	9	9	9
Final drive assembly	1,012	1,012	1,012
Tandem drive (one side)	876	876	876
Front axle assembly, except leaning cylinder	418	548	548
Parking brake assembly	26	26	26
Wheel assembly (front)	138 x 2	151 x 2	179 x 2
Wheel assembly (rear)	138 x 4	151 x 4	179 x 4
Scarifier assembly	450	530	530
Hydraulic pump	49	49	49
Fuel tank and hydraulic tank (both dry)	160	160	160
Circle rotation motor	10	10	10
Steering cylinder assembly	12 x 2	12 x 2	12 x 2
Leaning cylinder assembly	11	15	15
Articulating cylinder assembly	25 x 2	25 x 2	25 x 2
Blade lift cylinder assembly	49 x 2	49 x 2	49 x 2
Blade side-shift cylinder assembly	48	48	48
Blade power tilt cylinder assembly	19	19	19
Drawbar side-shift cylinder assembly	32	32	32
Scarifier cylinder assembly	22	24	24
Drawbar assembly	538	557	557
Blade assembly	625	625	675
Circle gear	252	272	272
Circle rotation gear assembly	119	119	119
Front frame assembly	1,613	1,814	1,814
Rear frame assembly	883	980	980
Ripper	595	900	900
Operator's compartment assembly and controls	200	200	200



5. Hose-oil cooler inlet port
6. Hose-oil cooler outlet port
7. Oil filter
8. Radiator and oil cooler

TRANSMISSION

Serial No.: 50001 – 51000



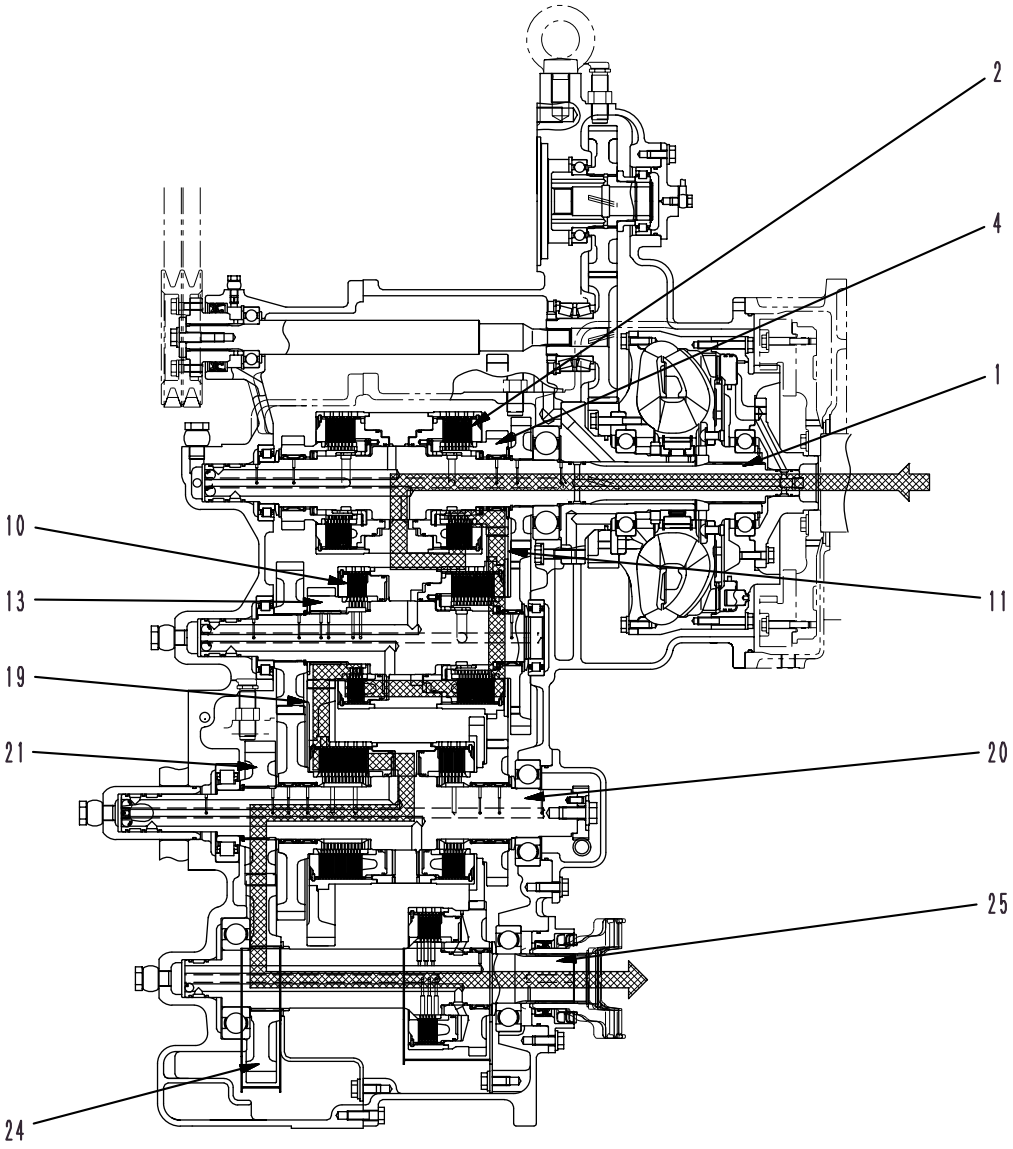
1. Transmission control valve
2. Transmission case
3. Strainer mounting port
4. Dipstick tube mounting port
5. Torque converter lock-up valve
6. Main relief, torque converter relief valve

Unit: mm

No.	Check Item		Criteria					Remedy
			Std. Size	Tolerance		Standard Clearance	Clearance Limit	
				Shaft	Hole			
1	Clearance between FL, R clutch bearing and case (F)		150	0 –0.018	+0.030 0	0 to 0.048	—	
2	Clearance between FL, R clutch bearing and case (R)		100	0 –0.015	+0.022 –0.013	–0.013 to 0.037	—	
3	Clearance between FH, 1st clutch bearing and case (F)		100	0 –0.015	+0.030 0	0 to 0.045	—	
4	Clearance between FH, 1st clutch bearing and case (R)		110	0 –0.015	+0.022 –0.013	–0.013 to 0.037	—	
5	Clearance between 2nd, 3rd clutch bearing and case (F)		140	0 –0.018	+0.026 –0.014	–0.014 to 0.044	—	
6	Clearance between 2nd, 3rd clutch bearing and case (R)		130	0 –0.018	+0.026 –0.014	–0.014 to 0.044	—	
7	Clearance between 4th clutch bearing and case (F)		140	0 –0.018	+0.026 –0.014	–0.014 to 0.044	—	
8	Clearance between 4th clutch bearing and case (R)		160	0 –0.025	+0.040 0	0 to 0.065	—	
9	Clearance between idler gear and bearing		50	+0.018 +0.002	0 –0.012	–0.030 to –0.002	—	
10	Clearance between idler gear bearing and case		90	0 –0.015	+0.016 –0.006	–0.006 to 0.031	—	Replace
11	Clearance between fan drive shaft and bearing		35	+0.025 +0.009	0 –0.012	–0.037 to –0.009	—	
12	Clearance between fan drive shaft bearing and case		80	0 –0.013	+0.030 0	0 to 0.043	—	
13	Clearance between pump drive shaft and bearing (F)		50	+0.020 +0.009	0 –0.012	–0.032 to –0.009	—	
14	Clearance between pump drive shaft bearing and case (F)		90	0 –0.015	+0.030 0	0 to 0.045	—	
15	Clearance between pump drive shaft and bearing (R)		70	+0.030 +0.011	0 –0.015	–0.045 to –0.011	—	
16	Clearance between pump drive shaft bearing and case (R)		110	0 –0.015	+0.030 0	0 to 0.045	—	
17	Width of input shaft seal ring groove		Standard Size		Tolerance		Repair Limit	
			2.5		+0.018 +0.010		2.7	
	Wear of input shaft seal ring	Width	2.4		±0.05		2.2	
		Thickness	1.7		0 –0.010		1.5	

POWER FLOW

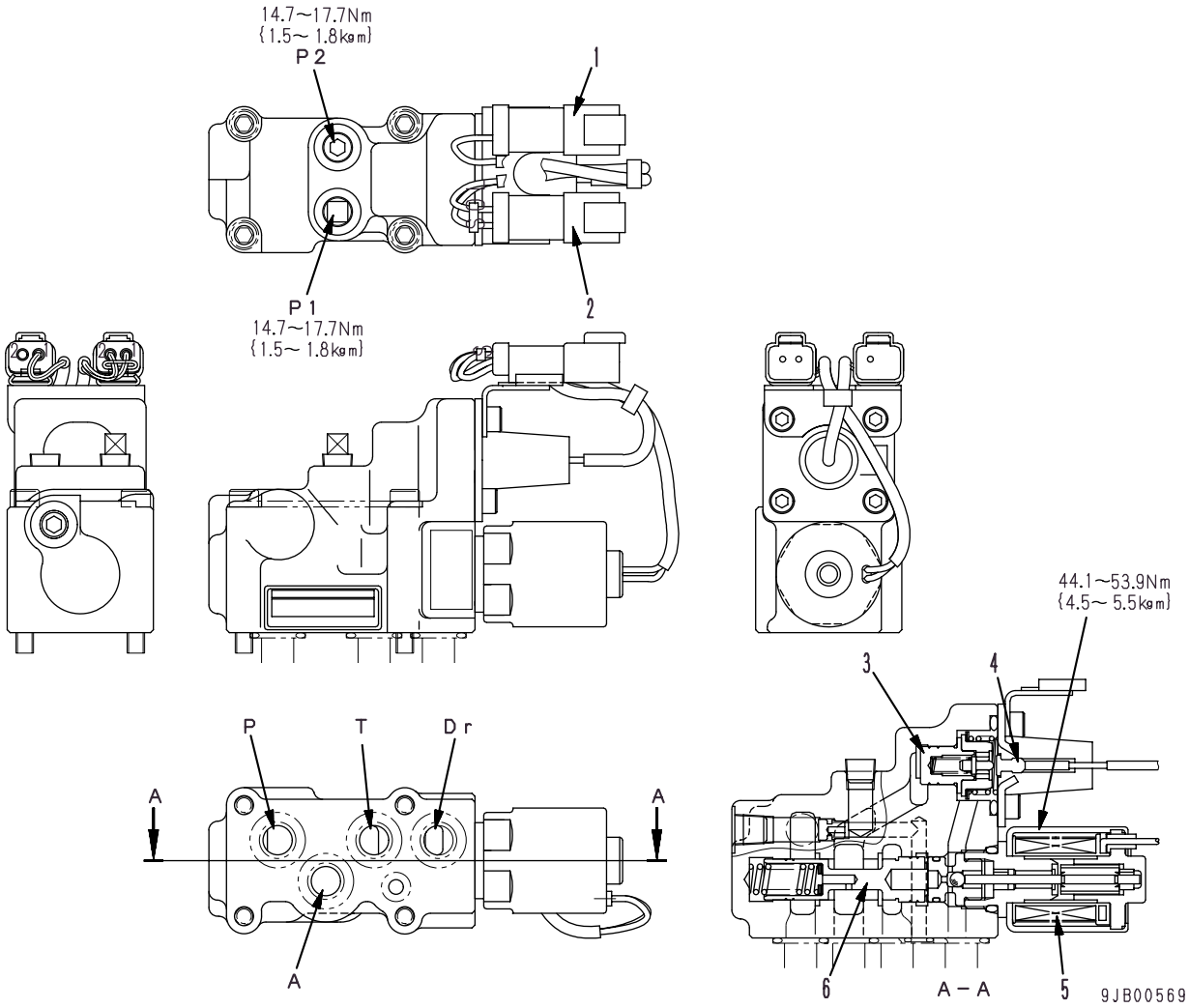
Forward 1st



Operation

- In FORWARD 1st, the FL clutch (2) and 1st clutch (10) are engaged. The FL clutch (2) and 1st clutch (10) hold each clutch disc in position with the oil pressure applied to the piston.
- The power from the torque converter is transmitted from the input shaft (1) through the FL clutch (2) to the FL gear (4). The power is then transmitted to FH, 1st cylinder gear (11).
- The 1st clutch (10) is engaged, so the power transmitted to FH, 1st cylinder gear (11) passes through the 1st clutch (10). From the 1st clutch the power goes from 1st gear (13) to 2nd, 3rd cylinder gear (19). The power flow continues through the lower shaft (20), idler gear (21), output gear (24), and finally to the output shaft (25).

ECMV (ELECTRONIC CONTROL MODULATION VALVE)

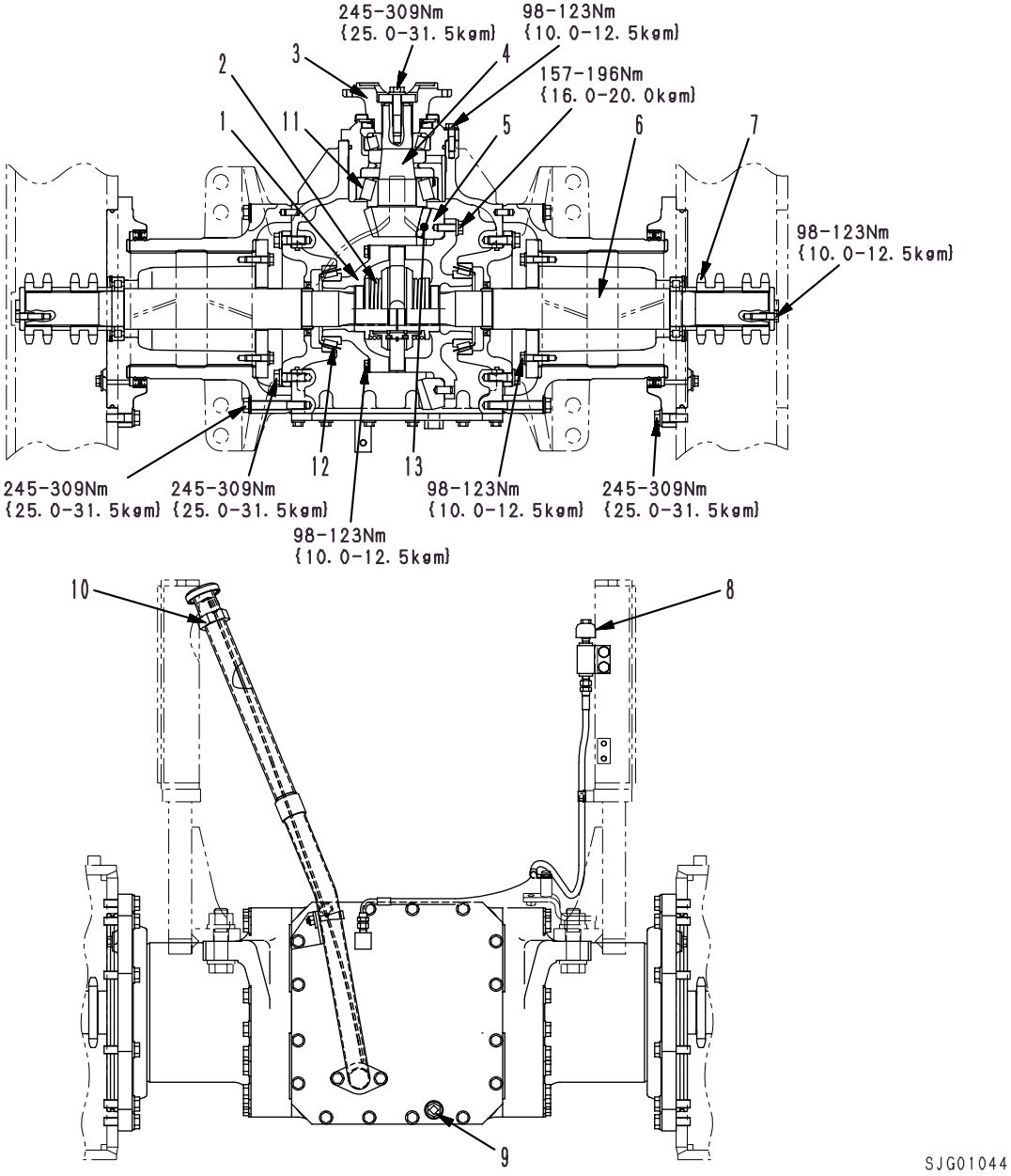


A : To clutch
P : From pump
T : Drain
Dr : Drain
P1 : Clutch oil pressure detection port
P2 : Pilot oil pressure detection port

1. Connector for fill switch
2. Connector for proportional solenoid
3. Oil pressure detection valve
4. Fill switch
5. Proportional solenoid
6. Pressure control valve spool

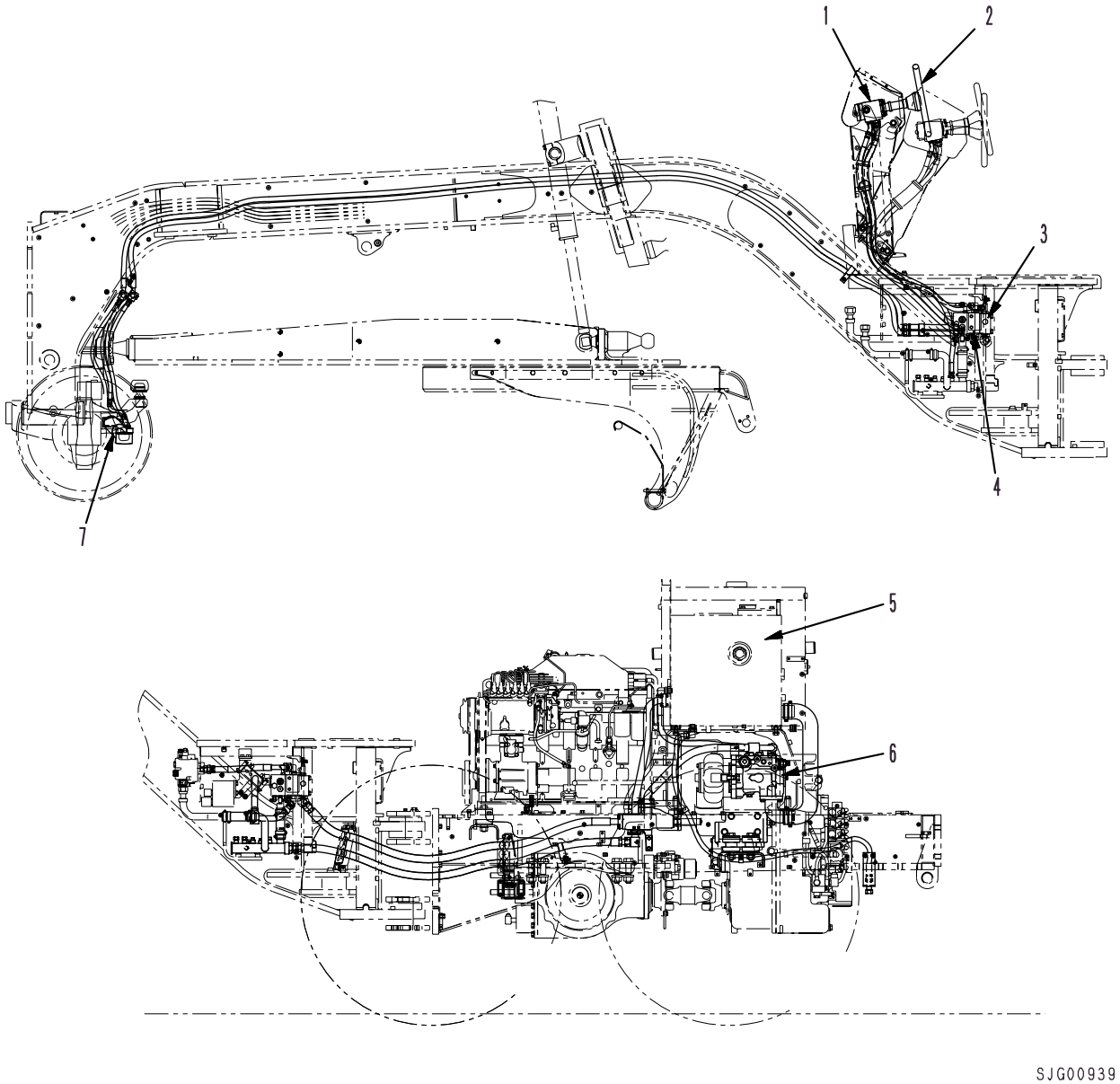
FINAL DRIVE

STANDARD FINAL DRIVE (NON-SPIN DIFFERENTIAL)



1. Cage
2. Non-spin differential
3. Coupling
4. Bevel pinion (12 teeth)
5. Bevel gear (43 teeth)
6. Shaft
7. Sprocket (12 teeth)
8. Breather
9. Drain plug
10. Oil filler tube

Serial No.: 51001 and up



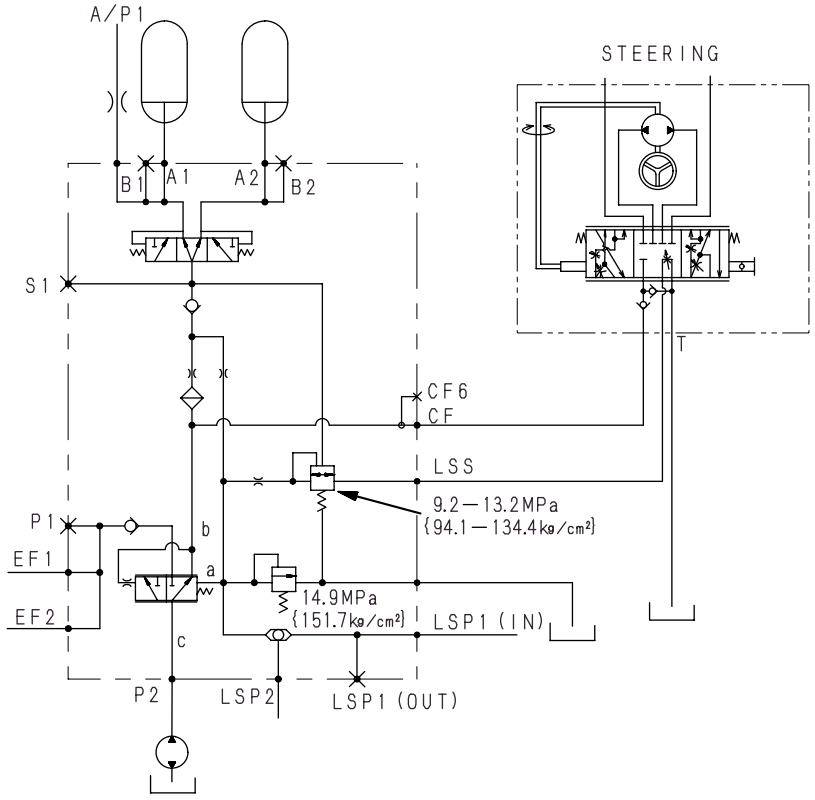
1. Steering valve
2. Steering wheel
3. Priority valve
4. Accumulator charge valve
5. Hydraulic tank
6. Hydraulic pump
7. Steering cylinder

OUTLINE

- If the hydraulic systems for both the work equipment and steering are covered by one pump, all the oil flow is consumed by the work equipment circuit. Thus, there is a lack of oil for the steering circuit. To prevent this dangerous situation, a valve is installed to ensure that priority is given to the oil flow to the steering circuit.

- If a large flow of oil is sent to the steering circuit even when the steering is at neutral, the oil flow to the work equipment circuit will be reduced and poor efficiency results. To prevent this situation and to ensure a quick response when operating the steering, this valve keeps the steering circuit oil flow to a minimum (approx. 1 ℓ/min) when the steering is at neutral. And to send the rest of the oil to the work equipment circuit. In addition, this valve is a load-sensing type that ensures the necessary flow even when operating the steering.

Valve circuit diagram



SWG00752

4. Steering cylinder at end of stroke

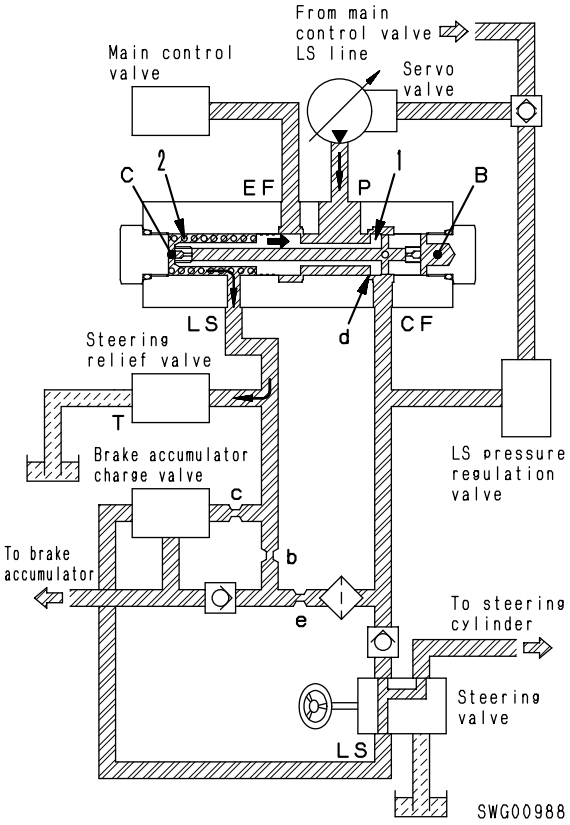
When the steering cylinder reaches the end of its stroke, and the operator continues to turn the steering wheel, the flow of oil to the cylinder is stopped regardless of the opening of the steering valve.

There is no flow of oil, so the **CF** and **LS** pressure rise together with the pressure at pump port **P**, and at the same time, pressure chamber **B** and chamber **C** also rise, and spool (1) is moved to the right.

If pressure chamber **C** goes above 15.21 MPa {155 kg/cm²}, steering relief valve opens and drains the oil in chamber **C**. Because of this flow of oil, a difference in pressure on both sides of orifices **b** and **e** is created, and pressure chamber **C** becomes lower than pressure chamber **B**. As a result, spool (1) moves to the left to a poistion where the oil flow inside the spool is 1 ℓ/min. Spool (1) stabilizes at a position where portion **d** of the spool is throttled, and this prevents the large loss of oil if the circuit is relieved.

If spool (1) moves too far to the left, portion **d** is closed and the oil stops flowing. The flow of oil through orifice **b** stops, so pressure chamber **C** and pressure chamber **B** become the same, and spool (1) is moved again to the right by spring (2) to open portion **d**.

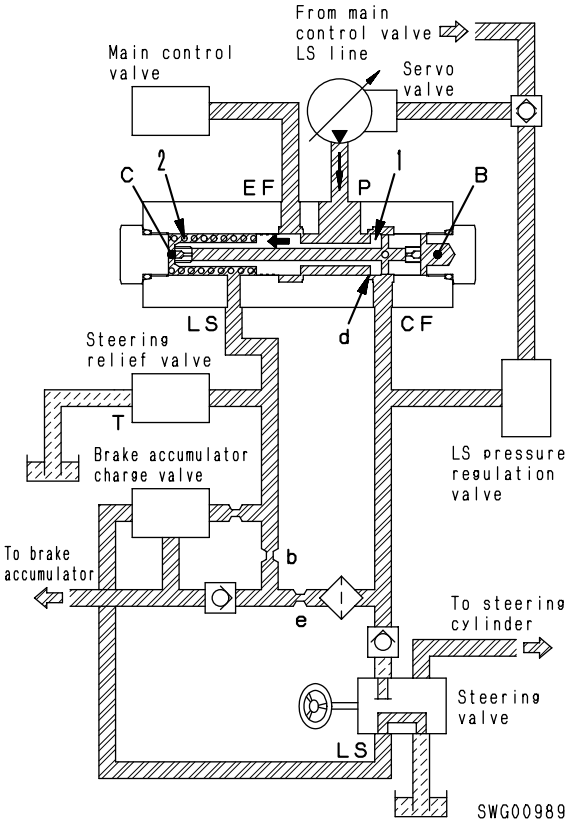
Because of this repeated action, the pressure in the steering circuit is maintained at a maximum of 15.21 MPa {155 kg/cm²}.

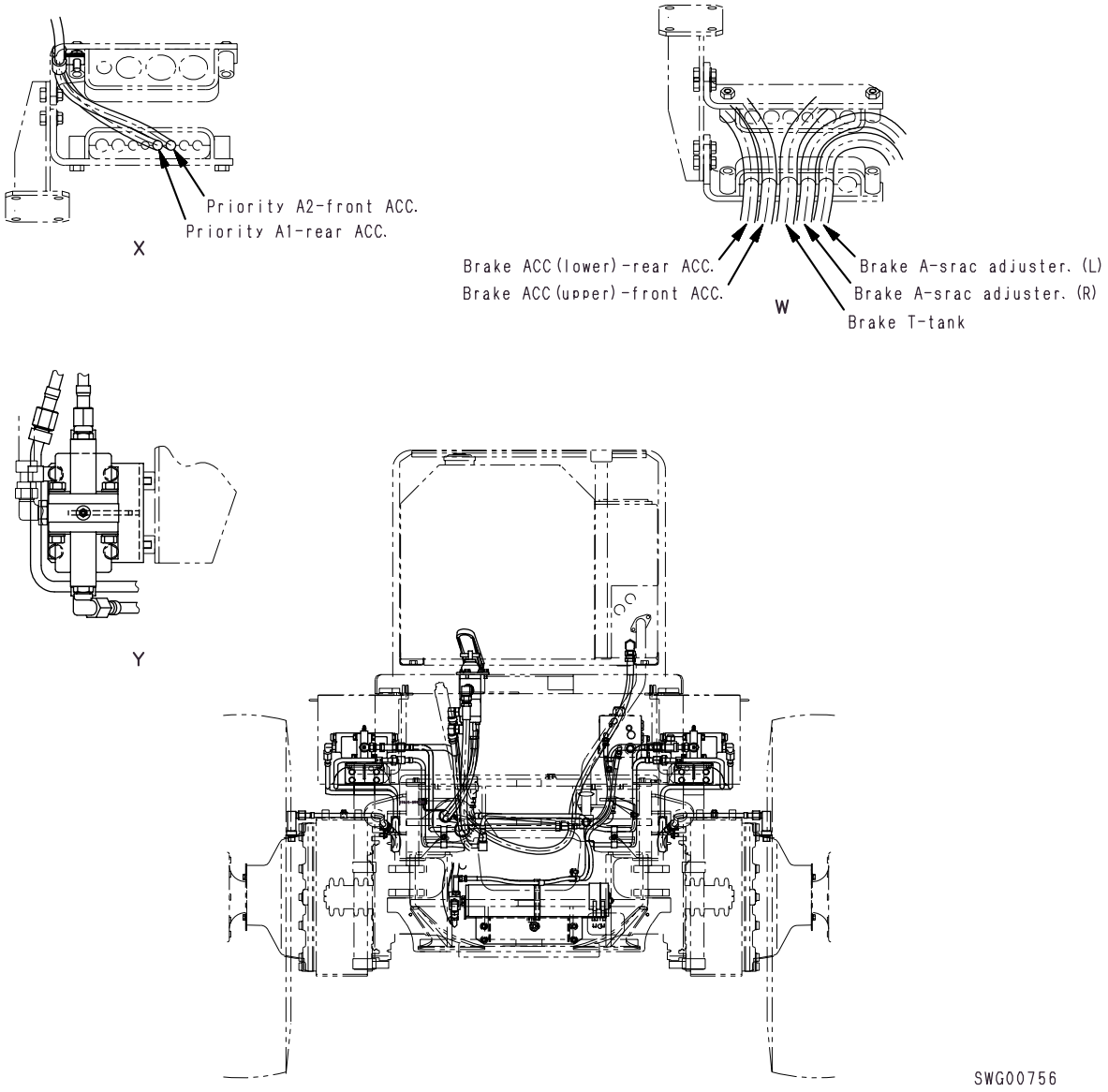


5. Steering valve at neutral, work equipment control lever operated

If the work equipment control lever is operated, pressure **A** changes to 1.96 – 24.5 MPa {20 – 250 kg/cm²}. However, the steering valve is at neutral, so the condition is the same as in Section 2. "When engine is started (steering and main control valves at neutral)", and the force acting on spool (1) is constant regardless of pressure **A**.

If pressure **A** rises, the pressure at port **CF** also rises momentarily, and the amount of oil flowing through orifice **b** increases. A large difference in pressure is created, so spool (1) is pushed to the left, and the area of the opening of portion **d** becomes smaller. The oil flow is automatically adjusted so that only 1 ℓ/min. flows.

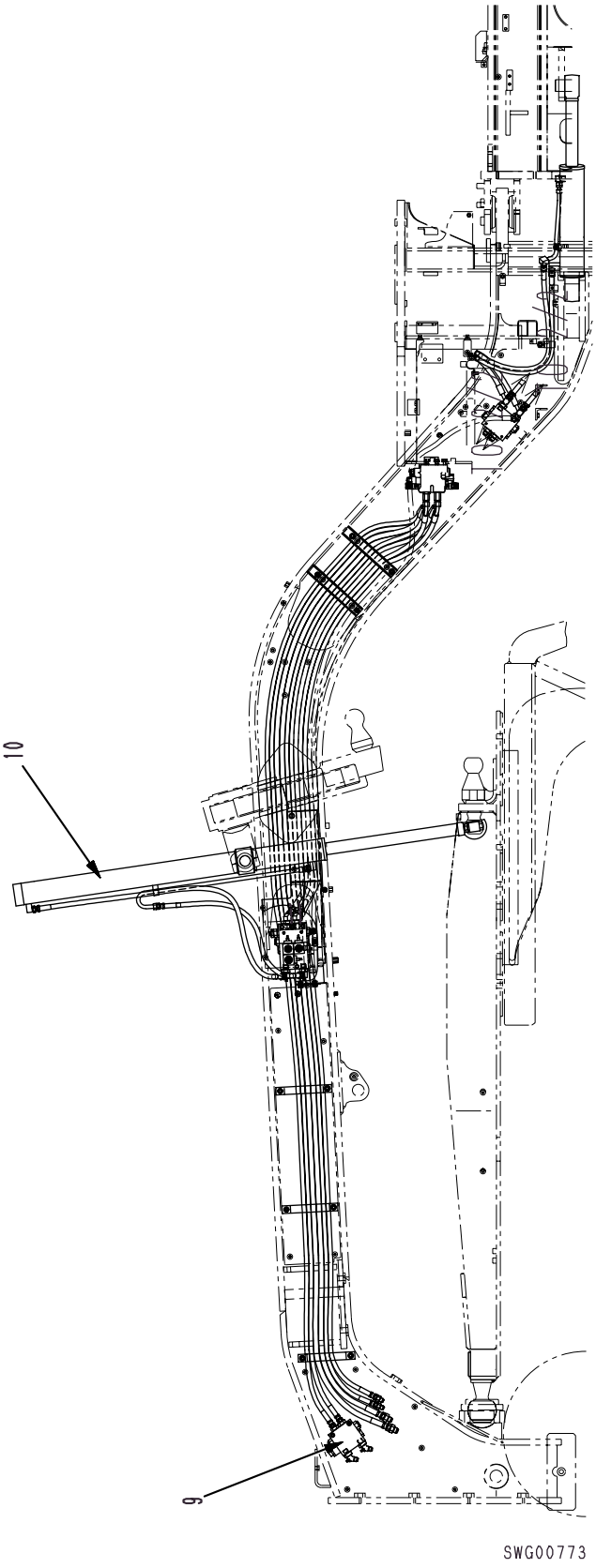




1. Priority ACC governor valve
2. Air breather
3. Slack adjuster
4. Wheel brake
5. Accumulator
6. Stop lamp switch
7. Brake valve

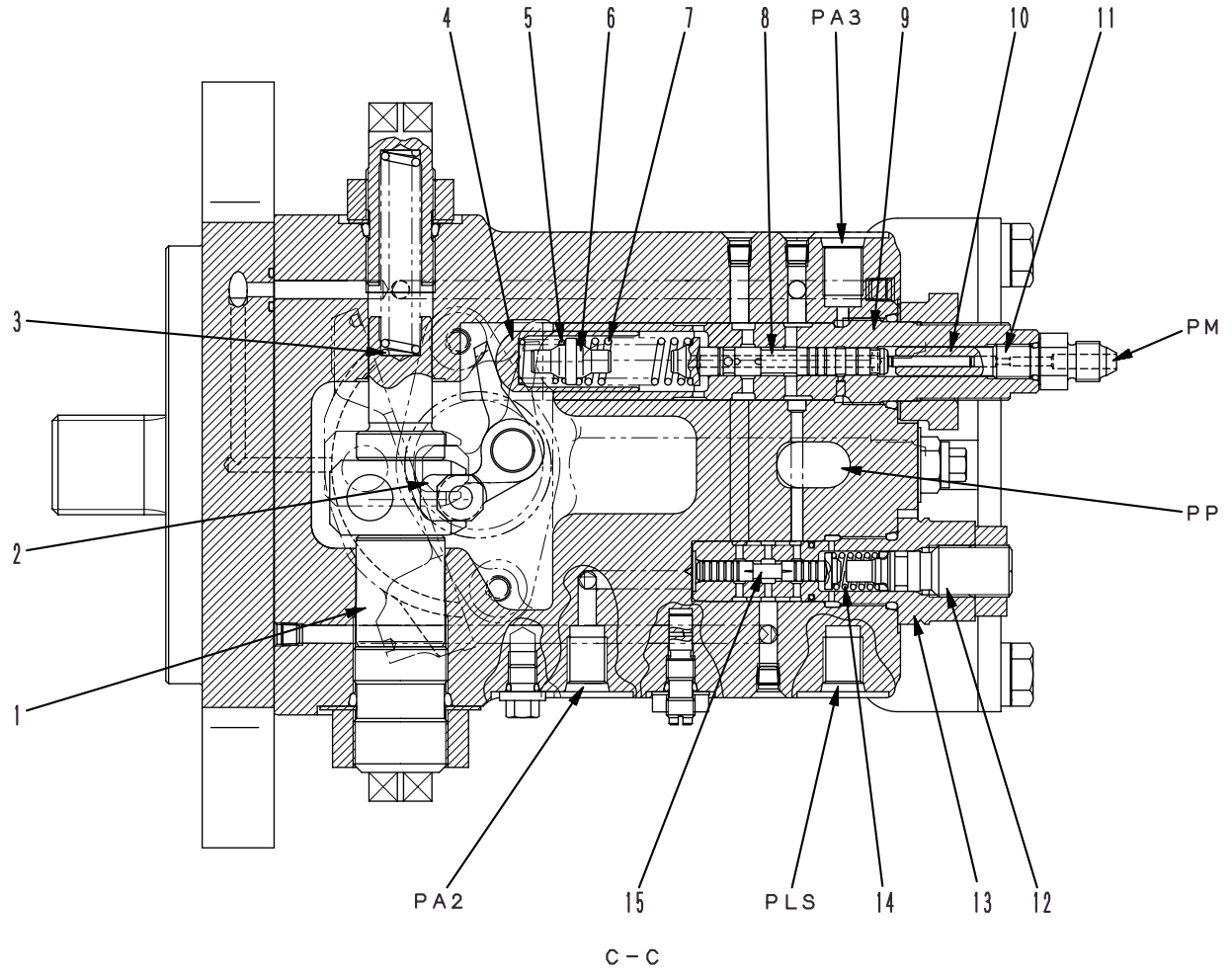
HIGH PRESSURE PIPING (2/3)

Right side



1. Pilot check valve – drawbar shift
2. Pilot check valve – leaning
3. Pilot check valve – articulate
4. Pilot check valve – right blade lift
5. Main control valve – right
6. Articulate cylinder
7. Main control valve
8. Pilot check valve – left blade lift
9. Pilot check valve – blade tip
10. Blade lift cylinder

PC VALVE, LS VALVE, SERVO PISTON



PA2 : LS pump pressure inlet port
PA3 : Drain port
PLS : LS pressure inlet port
PM : Drain port
PP : Pump discharge port

Servo piston
1. Servo piston
2. Lever
3. Spring

PC valve
4. Piston
5. Spring
6. Seat
7. Spring
8. Piston
9. Sleeve
10. Piston
11. Plug

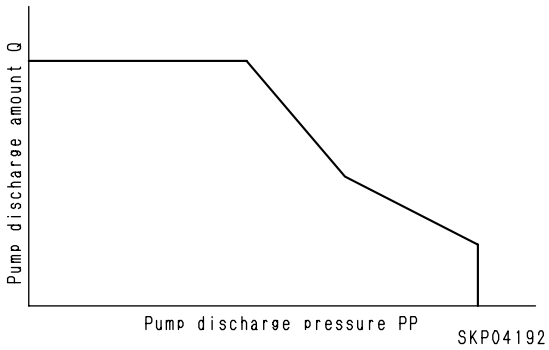
LS valve
12. Plug
13. Sleeve
14. Spring
15. Piston

- Let us take the area receiving the pressure at the large diameter end of servo piston as **A1**, the area receiving the pressure at the small diameter end as **A2**, the pressure acting on the large piston diameter end as **Pen**, and the pressure acting on the small piston diameter end as **PP**.
- When the flow of oil from the pump reaches the flow demanded by the control valve, LS pump pressure **Pa2** acting on port **b** of the LS valve and the combined force of LS pressure **PLS** + force of spring (14) acting on spring chamber **a** are balanced, so piston (15) stops at almost the central position.
- As a result, port **c**, port **d**, and port **e** open approximately the same amount, so the pump pressure flows from port **c** to port **d**.
  Part flows from port **e** to the tank case and is drained, so the pressure is reduced by approx. 1/2 and flows to chamber **X** at the large diameter end of servo piston (1).
- At this point, the relationship between the area receiving the pressure at both ends of piston (1) is **A2 : A1** = 1 : 2, so the pressure applied to both ends of servo piston (1) becomes **PP : Pen** = 2 : 1. This makes the force acting on both ends of servo piston (1) 1 : 1, so servo piston (1) stops in that position and the pump discharge amount is balanced with the oil flow demanded by the control valve.
- The force of the spring is adjusted so that **Pa2 – PLS =** △**PLS** = 2.35 MPa {24 kg/cm^2} at the point where piston (15) is balanced.
- In other words, when the area of opening of control valve is 1/2, the pump swash plate angle is also 1/2, and when the area of opening of control valve is 1/4, the pump swash plate angle is also 1/4. LS differential pressure △**PLS** is always held at 1.96 MPa {20kg/cm^2}, so the pump discharge amount is in accordance with the area of opening of the control valve.
- For example, after balancing at an area of opening 1/4 of the control valve, LS differential pressure △**PLS** will drop momentarily. As a result, the LS valve is actuated and the pump discharge amount is increased, but when the pump swash plate angle rises to 3/4, the LS differential pressure △**PLS** rises to 2.35 MPa {24 kg/cm^2}, so it is balanced in this position.

PC VALVE

Function

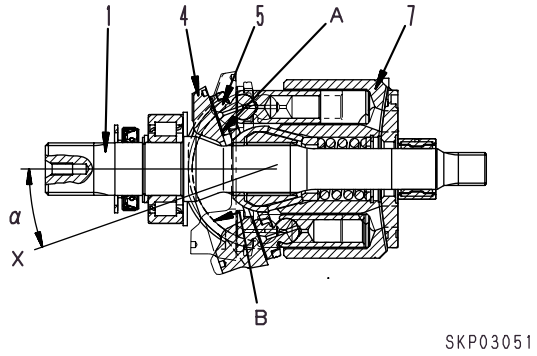
- When discharge pressure **PP** becomes higher, the area of opening of the control valve becomes larger, and even if the LS valve tries to increase pump discharge amount **Q**, the PC valve carries out control to prevent any increase above fixed discharge amount **Q** to match discharge pressure **PP**. It carries out approximate horsepower control to prevent the hydraulic horsepower absorbed by the pump from exceeding the engine horsepower.
- In other words, if the load during operations becomes larger and pump discharge pressure **PP** rises, pump discharge amount **Q** is reduced; and if pump discharge pressure **PP** goes down, pump discharge amount **Q** is increased.
- The relationship between pump discharge pressure **PP** and pump discharge amount **Q** is as shown in the diagram below.



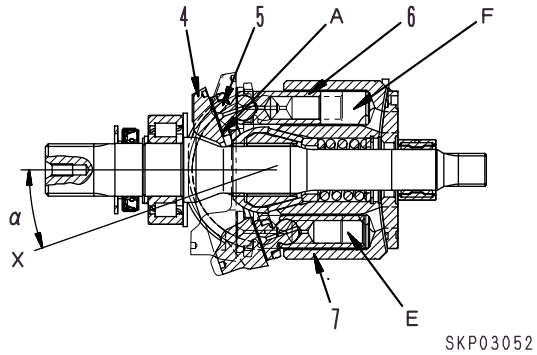
Operation

1. Operation of pump

i) Cylinder block (7) rotates together with shaft (1), and shoe (5) slides on flat surface **A**. When this happens, rocker cam (4) moves along cylindrical surface **B**, so angle α between center line **X** of rocker cam (4) and the axial direction of cylinder block (7) changes. (Angle α is called the swash plate angle.)

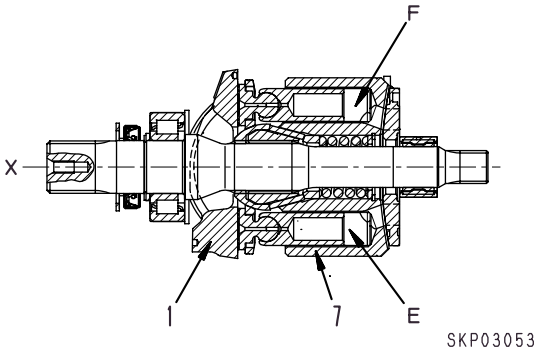


ii) Center line **X** of rocker cam (4) maintains swash plate angle α in relation to the axial direction of cylinder block (7), and flat surface **A** moves as a cam in relation to shoe (5).
In this way, piston (6) slides on the inside of cylinder block (7), so a difference between volumes **E** and **F** is created inside cylinder block (7). The suction and discharge is carried out by this difference **F** – **E**.
In other words, when cylinder block (7) rotates and the volume of chamber **E** becomes smaller, the oil is discharged during that stroke.
At the same time the volume of chamber **F** becomes larger, and as the volume becomes bigger, the oil is sucked in.
(The diagram shows chamber **F** at the end of the suction process and chamber **E** at the end of the discharge process.)



iii) If center line **X** of rocker cam (4) is in line with the axial direction of cylinder block (7) (swash plate angle = 0), the difference between volumes **E** and **F** inside cylinder block (7) becomes 0, so the pump does not carry out any suction or discharge of oil. (In actual fact, the swash plate angle never becomes 0.)

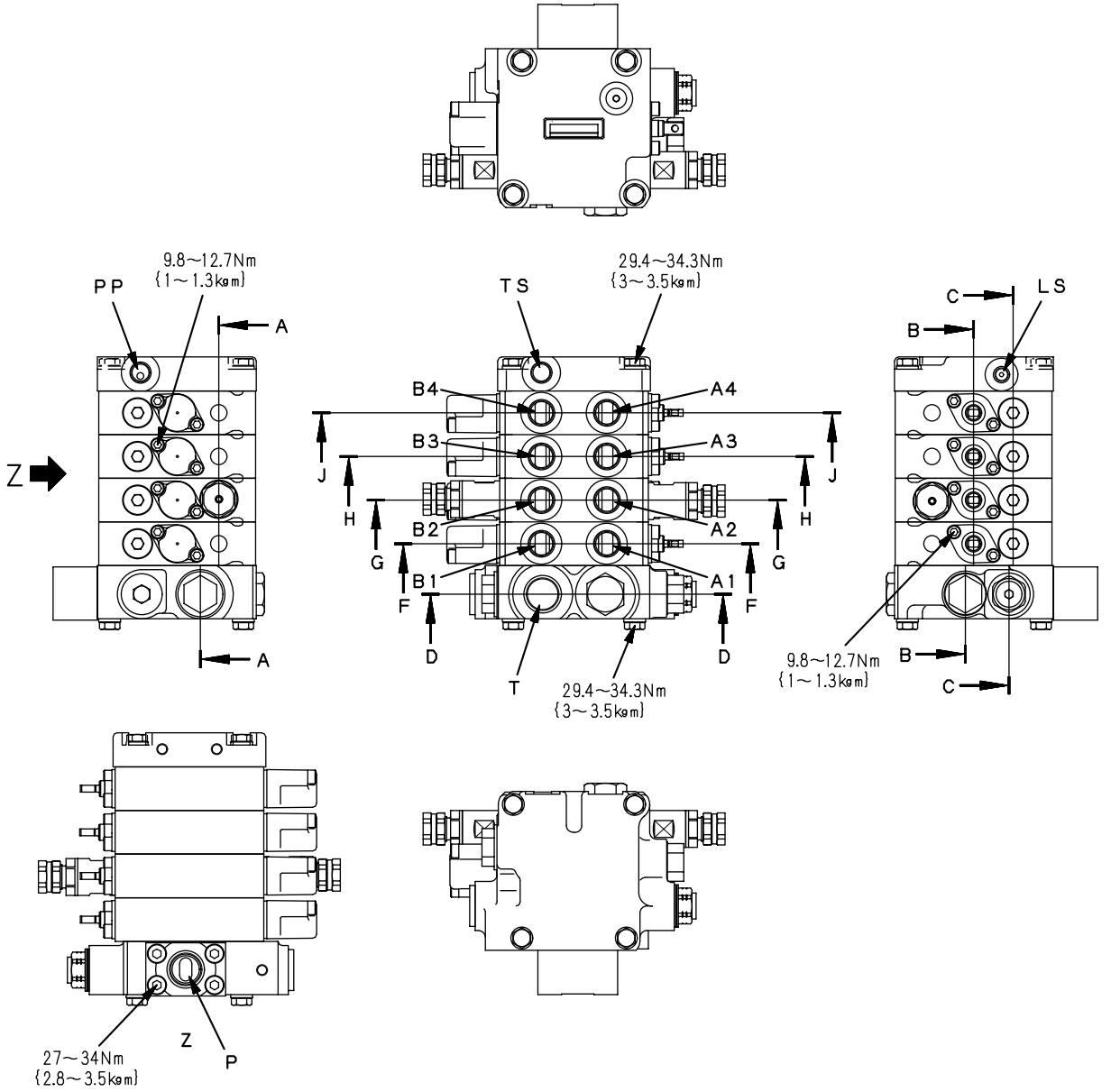
iv) In other words, there is a proportional relationship between swash plate angle α and the pump discharge amount.



- When the control lever is operated finely or set in the HOLD position and the open area of the control valve is reduced, LS differential pressure △**PLS** between LS pump pressure **PA2** and LS pressure **PLS** is increased.
- At this time, the mechanism operates as described in "1. When control valve is at HOLD position". LS pump pressure **PA2** pushes spool (14) to the right and servo piston (1) moves toward the minimum swash plate angle side (upper side).
- In other words, on the basis of the LS set differential pressure of 2.35 MPa {24 kg/cm^2} for the LS valve and in the range from the HOLD position of the control valve to the minimum open area of the control valve (in the fine control operation), when LS differential pressure △**PLS** is higher than 2.35 MPa {24 kg/cm^2}, the swash plate angle reduces. When the open area of the control valve increases and LS differential pressure △**PLS** lowers below 2.35 MPa {24 kg/cm^2}, the swash plate angle increases.

MAIN CONTROL VALVE

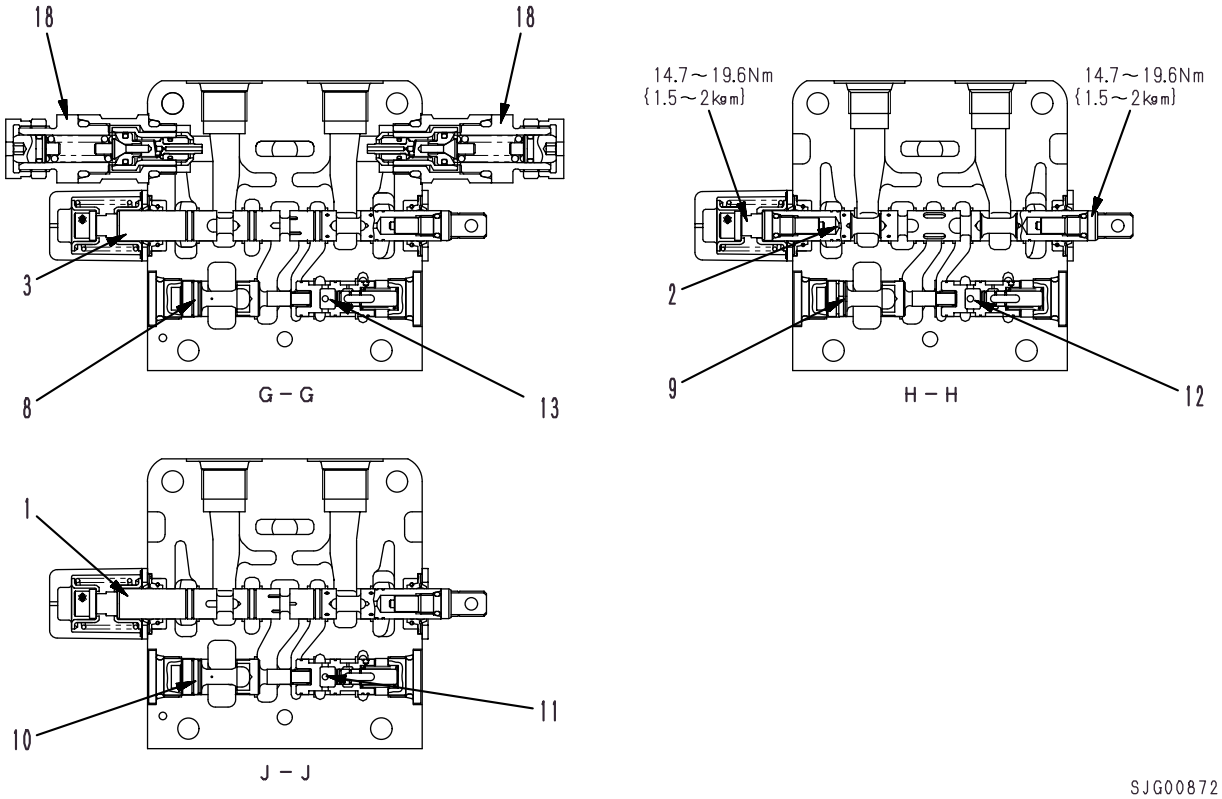
LEFT 4-SPOOL VALVE (1/3)



SJG00864

P : Pump port (from main pump)
PP : PP port (to main pump)
LS : LS port (to main pump)
T : Tank port (to tank)
TS : Seal drain port (to tank)
A1 : To left blade lift cylinder bottom
B1 : To left blade lift cylinder head
A2 : To blade shift cylinder bottom
B2 : To blade shift cylinder head
A3 : To circle motor
B3 : To circle motor
A4 : To blade tilt cylinder bottom
B4 : To blade tilt cylinder head

LEFT 5-SPOOL VALVE (SCARIFIER SPECIFICATION) (3/3)



1. Spool (blade tilt)
2. Spool (circle)
3. Spool (blade shift)
4. Spool (left blade lift)
5. Spool (scarifier)
6. Pressure compensation valve F (scarifier)
7. Pressure compensation valve F (left blade lift)
8. Pressure compensation valve F (blade shift)
9. Pressure compensation valve F (circle)
10. Pressure compensation valve F (blade tilt)
11. Pressure compensation valve R (blade tilt)
12. Pressure compensation valve R (circle)
13. Pressure compensation valve R (blade shift)
14. Pressure compensation valve R (left blade lift)
15. Pressure compensation valve (scarifier)
16. LS bypass plug
17. Unload valve
18. Safety-suction valve

Unit: mm

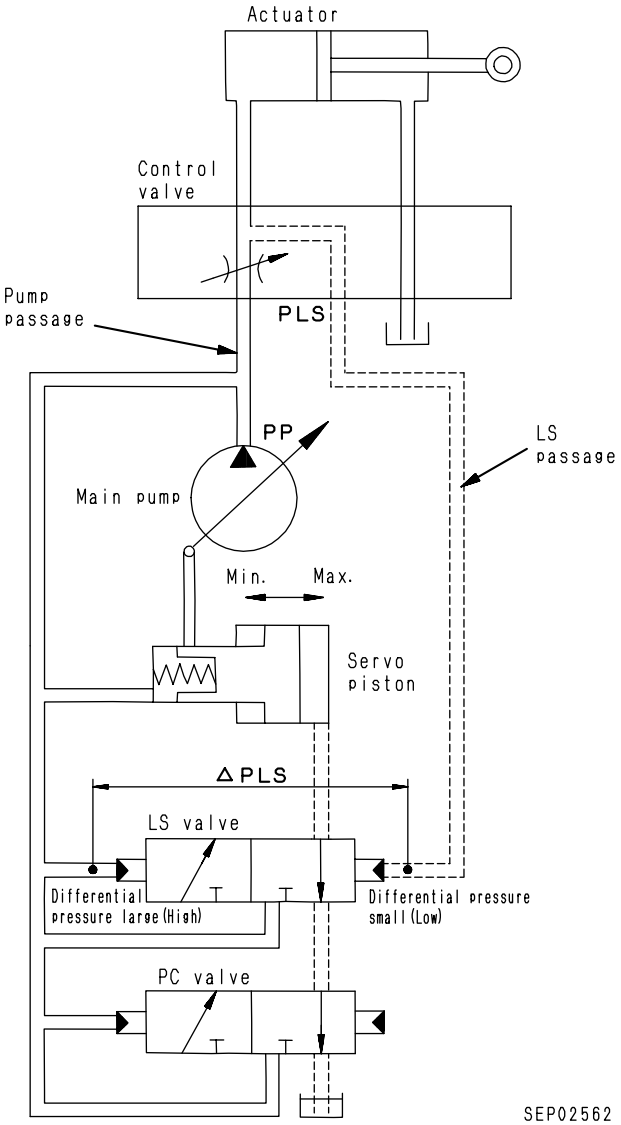
No.	Check item	Criteria					Remedy
		Standard size			Repair limit		
19	Spool return spring	Free length x OD	Installed length	Installed load	Free length	Installed load	
		56.27 x 20.1	25.4	34.8 N {3.55 kg}	—	27.9 N {2.84 kg}	
20	Spool return spring (circle)	87.7 x 19.7	25.4	34.8 N {3.55 kg}	—	27.9 N {2.84 kg}	Replace spring if damaged or deformed
21	Pressure compensation valve spring (R)	23 x 8.4	15	6.9 N {0.7 kg}	—	5.52 N {0.56 kg}	
22	Pressure compensation valve spring (F)	15.4 x 6	8	7.45 N {0.76 kg}	—	5.98 N {0.61 kg}	
23	Unload valve spring	35.25 x 19	20.5	137 N {14 kg}	—	110 N {11.2 kg}	

2. BASIC PRINCIPLE

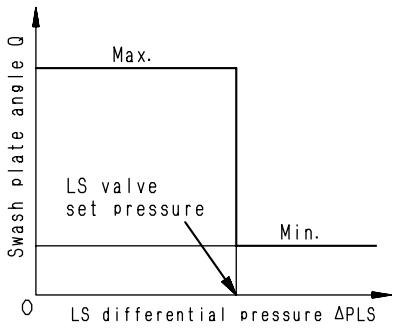
1) Control of pump swash plate angle

- The pump swash plate angle (pump discharge amount) is controlled so that LS differential pressure △**PLS** (the difference between pump pressure **PP** and control valve outlet port LS pressure **PLS**) (load pressure of actuator) is constant.
  (LS pressure △**PLS** = Pump discharge pressure **PP** – LS pressure **PLS**)
- If LS differential pressure △**PLS** becomes lower than the set pressure of the LS valve, the pump swash plate becomes larger; if it becomes higher than the set pressure of the LS valve, the pump swash plate becomes smaller.

★ For details of the operation, see HYDRAULIC PUMP.

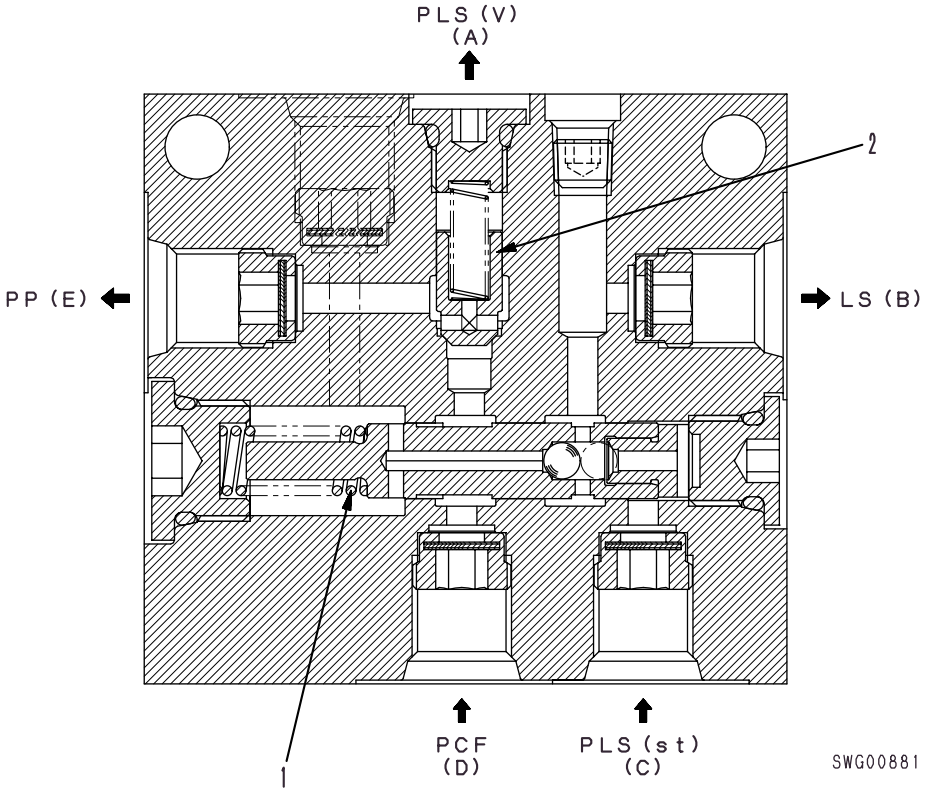


SEP02562



SDP02563

LS REDUCING VALVE



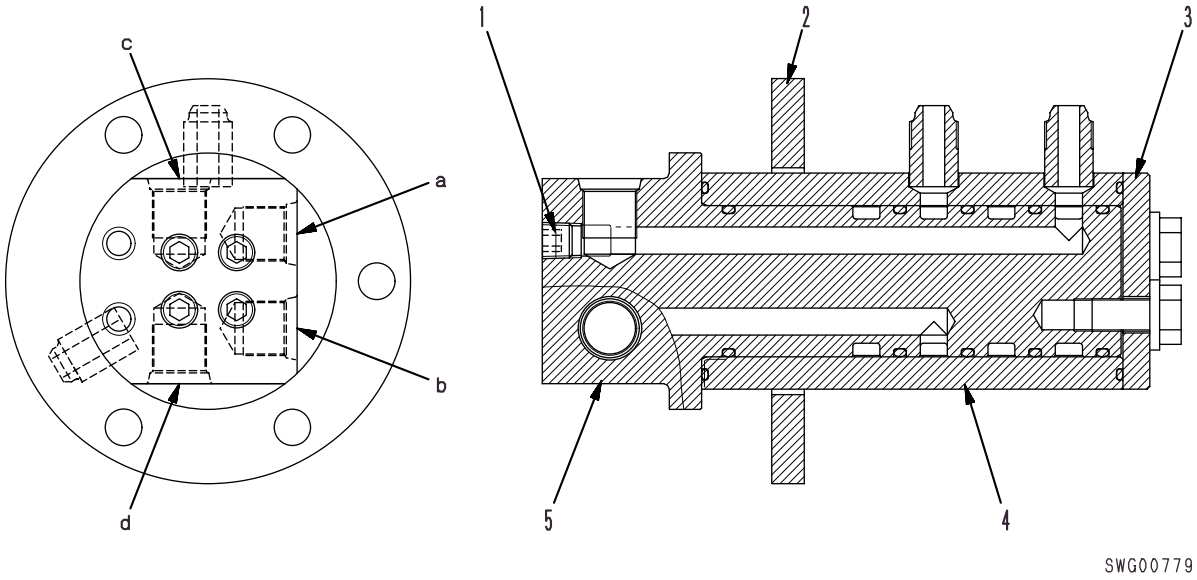
A : To main control valve
B : To pump LS port
C : From steering valve LS port
D : From steering valve P port
E : To pump PP port

Function
- The LS differential pressure (△**PLS**) of the main control valve and the steering valve are set to different values; the value for the main control valve is higher.
- If the steering is operated with this circuit, the pump discharges the maximum flow. The excess oil is relieved by the unload valve of the main control valve, so there is a large energy loss. To prevent this, the steering LS pressure is reduced and is set to the same value as the LS differential pressure of the main control valve. This reduces the loss.

Operation
- Pump pressure **PCF** and LS pressure **PLS** (st) are brought in from the steering valve.
- The **PCF** pressure is taken as the base pressure, and LS pressure **PLS** (v) reduced from **PLS** (st) by the load of spring (1) is taken to the main control valve.
- Check valve (2) is installed to prevent the **PP** pressure when the work equipment is operated from entering the steering valve.

SWIVEL JOINT

Serial No.: 50001 – 51000

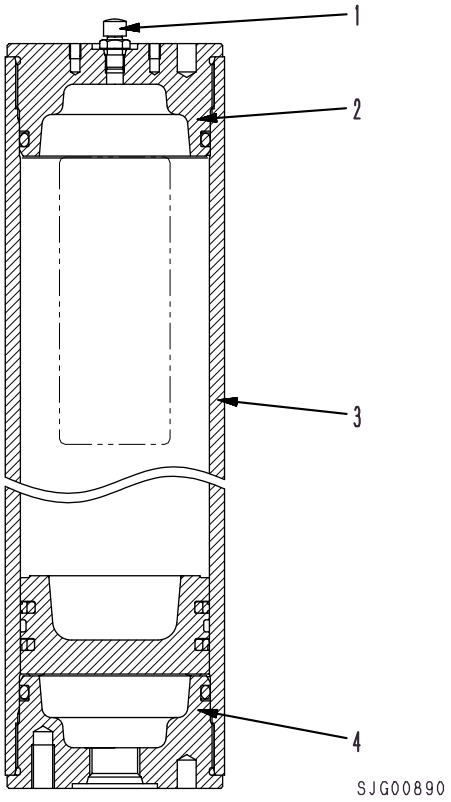


1. Plug
2. Plate
3. Cover
4. Shaft
5. Roter

a. Blade tilt cylinder head
b. Blade tilt cylinder bottom
c. Blade shift cylinder head
d. Blade shift cylinder bottom

ACCUMLATOR

For blade float



1. Valve assembly
2. Top cover
3. Cylinder
4. Cylinder

Specifications

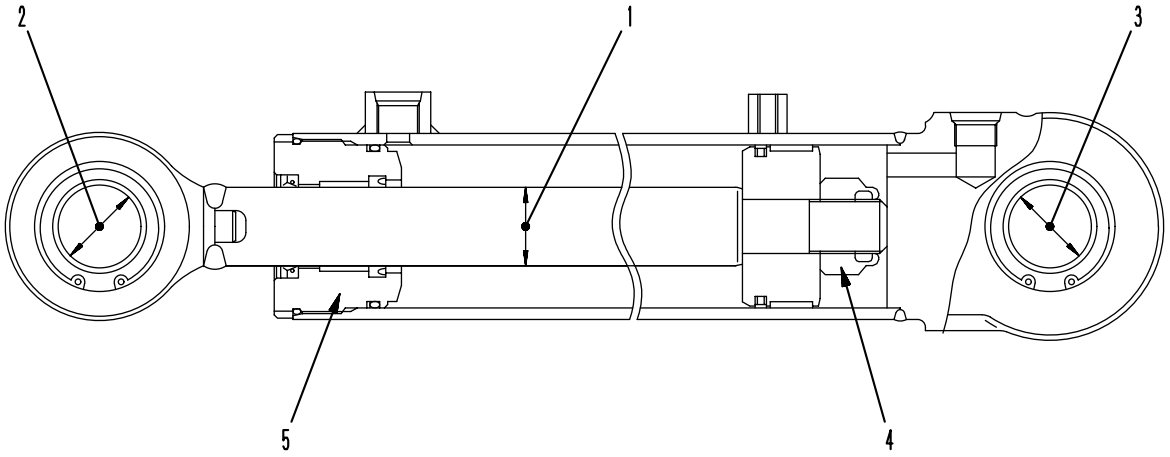
Gas used:	Nitrogen gas
Amount of gas:	1,000 cc
Gas charging pressure:	2.0 ± 0.1 MPa {20 ± 1.0 kg/cm^2} (at 20 ± 5°C)

Function

When oil pressure is applied to the blade cylinder, the pressure oil flows to the accumulator through the solenoid valve and the oil flows into cylinder (4). Thereby, nitrogen gas is compressed and piston moves upper side. Consequently, the shock imposed on the blade cylinder is reduced by the compressible amount of the nitrogen gas.

When the oil pressure in the blade cylinder drops, the piston moves to lower side by the gas pressure in cylinder (3), and the oil in cylinder (4) sends to the blade cylinder until the oil pressure in the cylinder balances to that in blade cylinder circuit. The flow of oil in the accumulator hydraulic circuit is repeated smoothly to reduce the shock imposed on the blade.

GD655, 675-3C



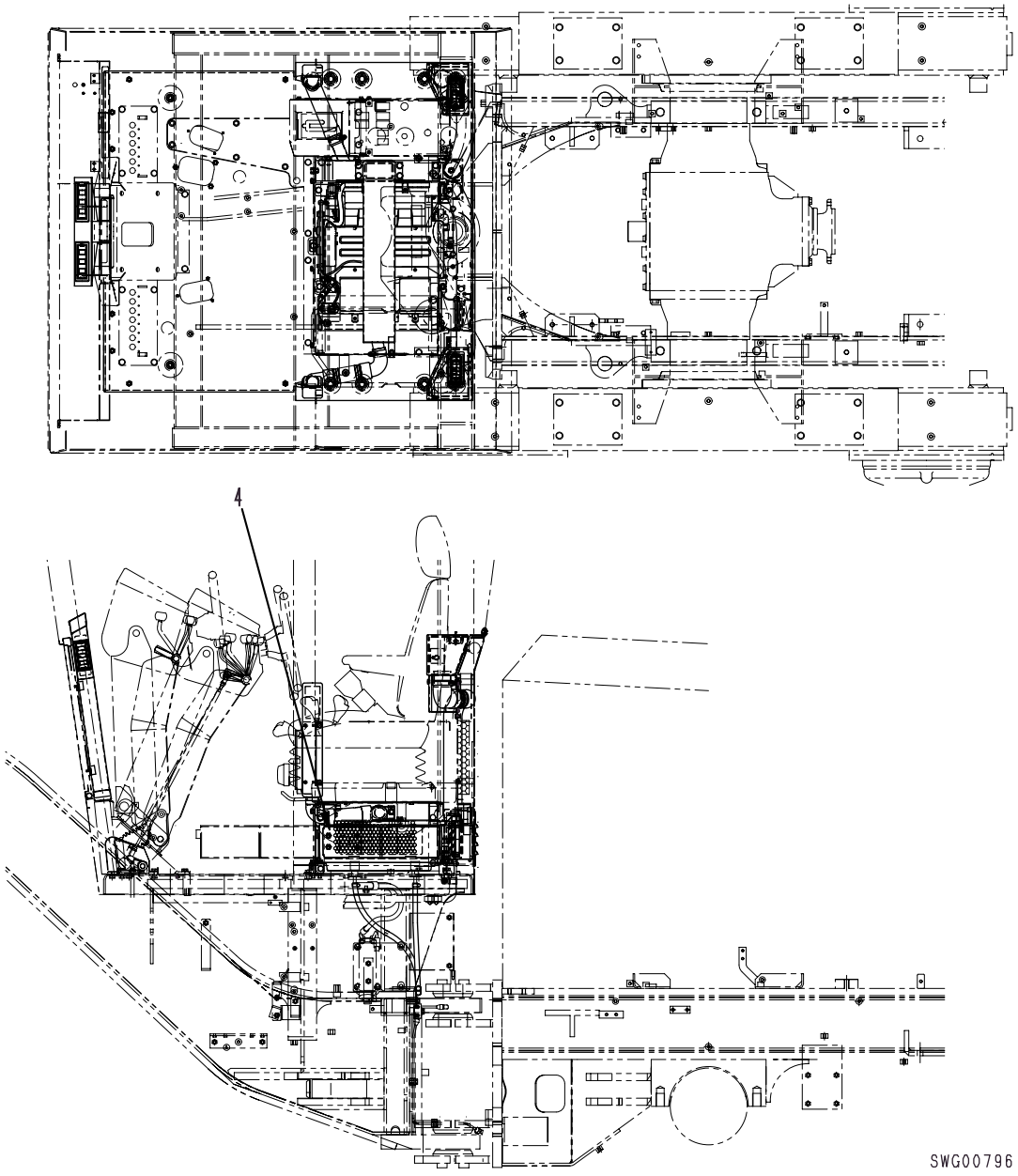
SJG00896

Unit: mm

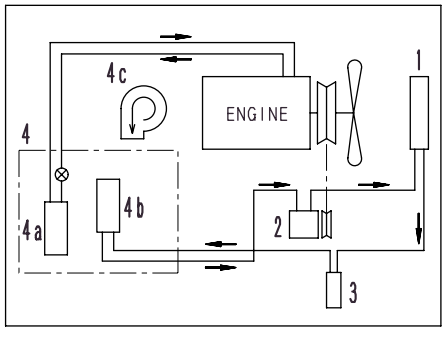
No.	Check item		Criteria					Remedy
			Standard size	Tolerance		Standard clearance	Clearance limit	
				Shaft	Hole			
1	Clearance between piston rod and bushing	Steering	35	–0.025 –0.087	+0.132 +0.006	0.031 to 0.219	0.519	Replace bushing
		Blade lift	50	–0.025 –0.087	+0.164 +0.007	0.032 to 0.251	0.551	
		Blade side shift	50	–0.025 –0.087	+0.164 +0.007	0.032 to 0.251	0.551	
		Drawbar shift	45	–0.025 –0.087	+0.152 +0.007	0.032 to 0.239	0.539	
		Leaning	40	–0.025 –0.087	+0.132 +0.006	0.031 to 0.219	0.519	
		Articulate	50	–0.025 –0.087	+0.164 +0.007	0.032 to 0.251	0.551	
		Blade tilt	40	–0.025 –0.087	+0.132 +0.006	0.031 to 0.219	0.519	
		Scarifier	50	–0.025 –0.087	+0.164 +0.007	0.032 to 0.251	0.551	
		Ripper	55	–0.030 –0.104	+0.163 +0.006	0.036 to 0.267	0.567	

Unit: mm

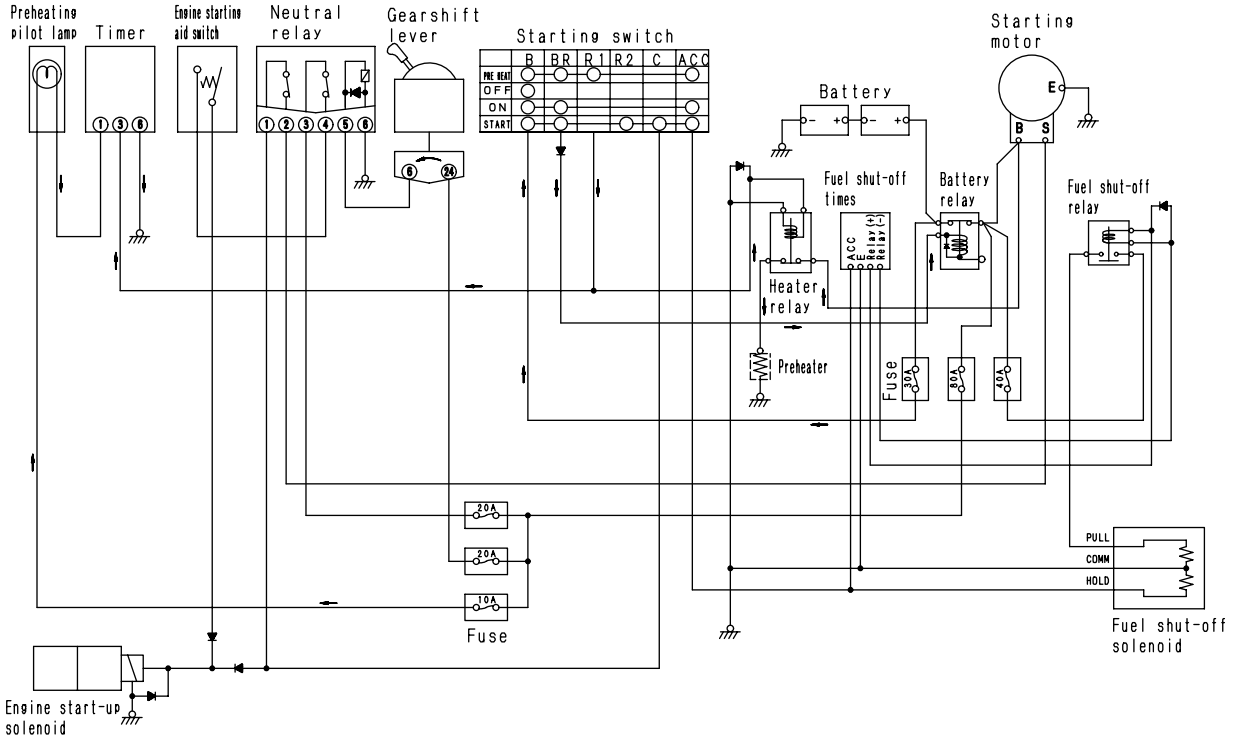
<table>
<tr><th rowspan="2">No.</th><th rowspan="2">Check item</th><th colspan="5">Criteria</th><th rowspan="2">Remedy</th></tr>
<tr><td rowspan="2">Std. Size</td><td colspan="2">Tolerance</td><td rowspan="2">Standard clearance</td><td rowspan="2">Clearance limit</td></tr>
<tr><td>Shaft</td><td>Hole</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Clearance between worm wheel shaft and bushing</td><td rowspan="2">75</td><td rowspan="2">+0.291
+0.077</td><td rowspan="2">+0.057
+0.010</td><td rowspan="2">0.281 to 0.02</td><td rowspan="2">0.4</td><td rowspan="3">Replace bushing</td></tr>
<tr></tr>
<tr><td>8</td><td>Clearance between worm wheel shaft and bushing</td><td>75</td><td>+0.035
+0.005</td><td>+0.057
+0.010</td><td>0.052 to 0.025</td><td>0.4</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">Backlash between worm and worm wheel</td><td colspan="3">Standard clearance</td><td colspan="2">Clearance limit</td><td rowspan="2">Replace</td></tr>
<tr><td colspan="3">0.3 to 0.4</td><td colspan="2">2.0</td></tr>
<tr><td>10</td><td>Cleaarance between pinion gear and wear plate</td><td colspan="3">0.1 to 0.5</td><td colspan="2">0.6</td><td>Adjust</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">Pinion gear wear</td><td colspan="3">Standard size</td><td colspan="2">Repair limit</td><td rowspan="2">Replace</td></tr>
<tr><td colspan="3">25</td><td colspan="2">20</td></tr>
<tr><td>12</td><td>Wormshaft bearing preload</td><td colspan="5">Starting torque: 2.9 to 7.8 Nm (0.3 to 0.8 kgm)
when worm wheel is not meshed</td><td>Adjust</td></tr>
</table>



4. Air conditioner unit
   4a. Hot water heater
   4b. Evaporator
   4c. Blower unit



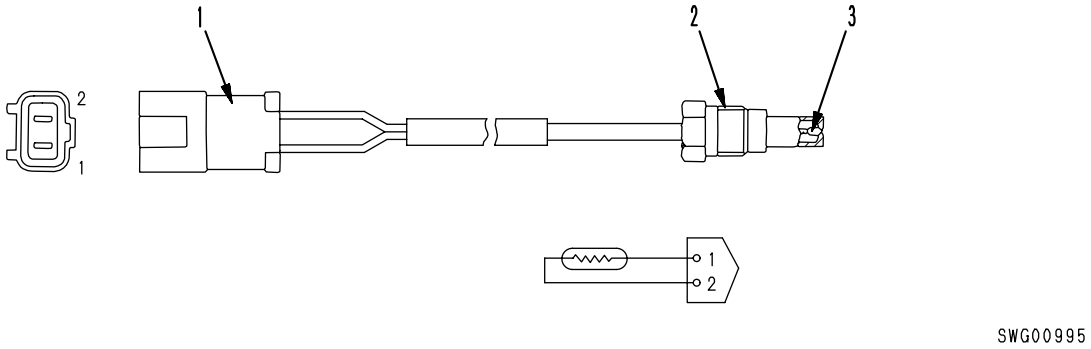
Serial No.: 51001 and up



Operation

- If the starting switch is set in the PREHEAT position, a current flows from starting switch terminal BR through the battery relay to the ground, and the battery relay contacts are "closed".
  At this time, a current flows from starting switch terminal R1 through the heater relay to the ground, and the heater relay contacts are "closed".
  As a result, the circuit from the battery through the battery relay, heater relay, and preheater to the ground is formed, and the engine is preheated.
- At this time, another current flows from starting switch terminal R1 to timer terminal 3 to turn the timer ON.
  Then, a current flows through the fuse, preheater pilot lamp, and timer to the ground and the pilot lamp lights up for a certain period (about 20 seconds).

Serial No.: 51001 and up



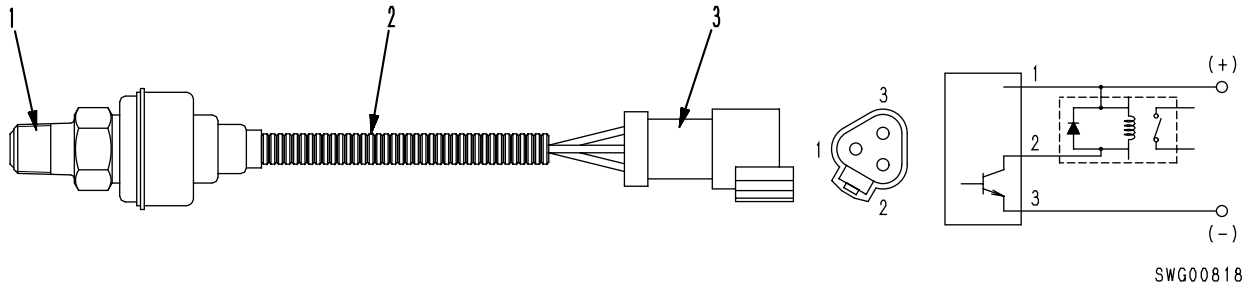
1. Connector
2. Plug
3. Thermistor

Temperature (°C)	50 ± 0.2	60 ± 0.2	80 ± 0.2	100 ± 0.3	106 ± 0.3	120 ± 0.3
Resistance (Ω)	80 ± 10	56.3 ± 5	29.5 ± 2.5	16.5 ± 0.9	14.3 ± 0.5	10 ± 0.3

Function

- The engine water temperature sensor is installed to the engine cylinder block. As the engine temperature changes, so does the sensor's resistance. The gauge on the monitor panel moves to indicate the engine temperature.
- The torque converter oil temperature sensor is installed to the torque converter outlet port on the transmission. If it senses the torque converter outlet oil temperature, its resistance changes. The resistance is converted into temperature and displayed on the monitor panel.

Brake oil pressure switch



1. Pressure sensor
2. Cable
3. Connector

Function

- This electronic switch uses a semiconductor. When the brake oil pressure (accumulator pressure) drops below a specified value, the switch turns ON. This action causes the brake oil pressure lamp to light up and warn of a problem.

GD675-3C							
51001 and up							
VHP specification machine							
SAA6D114E-2							
Standard value	Permissible value						
2,200 ± 50 800 ± 100 1,900	2,200 ± 50 800 ± 100 1,900						
490 to 550	—						
Max. 3.7 {380}	Max. 6.2 {635}						
Max. 6.5 Max. 1.0	Max. 8.5 Max. 2.0						
0.30 0.56	— —						
1.0 {100}	2.0 {200}						
0.29 to 0.49 {3.0 to 5.0} Min. 0.12 {1.2}	Min. 0.21 {2.1} Min. 0.07 {0.7}						
80 to 110	Max. 120						
7.5 to 9.5	—						
12 to 13	Max. 11 or Min. 14						
14 to 16	Max. 13 or Min. 17						

System	Component		Connector No.	Inspection method	Judgement table			Measurement condition
Transmission control related	Controller	Drive lever (D)	T5	Measure voltage	If the condition is as shown in the table below, the condition is normal.			1. Turn starting switch OFF 2. Insert the T-adapter 3. Turn starting switch ON
					Gearshift lever at (F1) thru (F3)	Between (8) and chassis	20 to 30V	
					Gearshift lever at any position except above.		Max. 1V	
		Drive lever (E)		Measure voltage	If the condition is as shown in the table below, the condition is normal.			1. Turn starting switch OFF 2. Insert the T-adapter 3. Turn starting switch ON
					Gearshift lever at (F3) thru (F6) and (R1), (R2)	Between (16) and chassis	20 to 30V	
					Gearshift lever at any position except above.		Max. 1V	
		Reset switch		Measure resistance	If the condition is as shown in the table below, the condition is normal.			1. Turn starting switch OFF 2. Insert the T-adapter 3. Turn starting switch ON
					Reset switch ON	Between (9) and chassis	Max. 1 Ω	
					Reset switch OFF		Min. 1 Ω	
		Memory reset switch	T3A	Measure resistance	If the condition is as shown in the table below, the condition is normal.			1. Turn starting switch OFF 2. Insert the T-adapter 3. Turn starting switch ON
					Initialize switch (memory reset)	Between (11) and chassis	Max. 1 Ω	
					Initialize switch (Initialize learning function or OFF)		Min. 1 Ω	
		Initialize switch		Measure resistance	If the condition is as shown in the table below, the condition is normal.			1. Turn starting switch OFF 2. Insert the T-adapter 3. Turn starting switch ON
					Initialize switch (Initialize learning function)	Between (13) and chassis	Max. 1 Ω	
					Initialize switch (memory reset or OFF)		Min. 1 Ω	
		Lockup switch	T5	Measure voltage	If the condition is as shown in the table below, the condition is normal.			1. Turn starting switch OFF 2. Insert the T-adapter 3. Turn starting switch ON
					T/C lock-up switch ON	Between (17) and chassis	20 to 30V	
					T/C lock-up switch OFF		Max. 1V	
		Differential switch		Measure voltage	If the condition is as shown in the table below, the condition is normal.			1. Turn starting switch OFF 2. Insert the T-adapter 3. Turn starting switch ON
					Differential switch ON	Between (9) and chassis	20 to 30V	
					Differential switch OFF		Max. 1V	

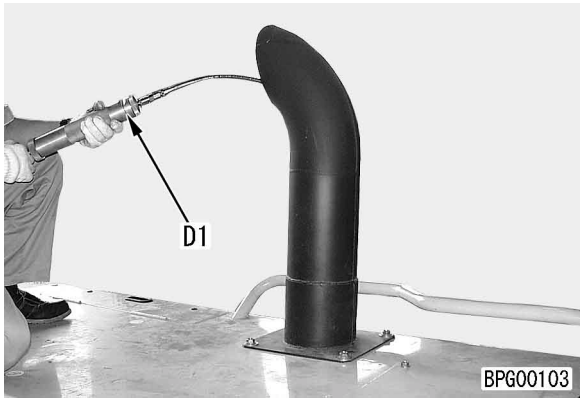
MEASURING EXHAUST COLOR

- When measuring in the field where is no air or electric power supply, use tool **D1**; when recording formal data, use tool **D2**.

★ Increase the coolant temperature to the operating temperature range before measuring.

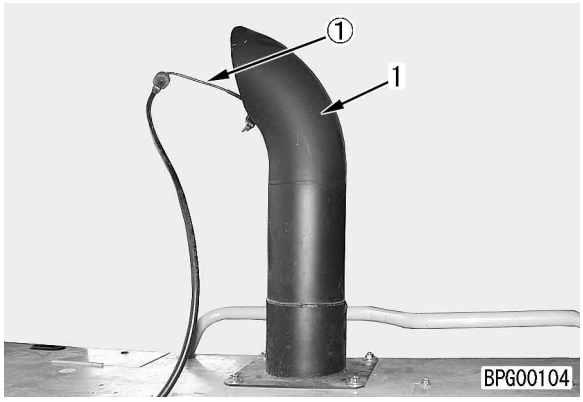
Measuring with D1

1. Install the filter paper to tool **D1**.
2. Insert the exhaust gas suction port into the exhaust pipe.
3. Accelerate the engine suddenly while simultaneously operating the handle of tool **D1**.
4. Remove the filter paper and compare it with the scale supplied to judge the condition.

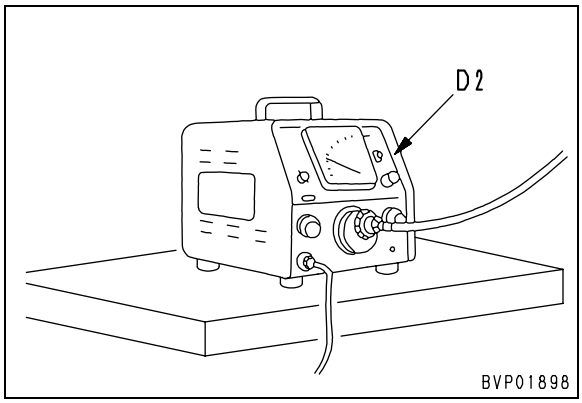


Measuring with D2

1. Insert the probe ① into the outlet port of the exhaust pipe (1) and tighten the clip to secure the probe to the exhaust pipe.

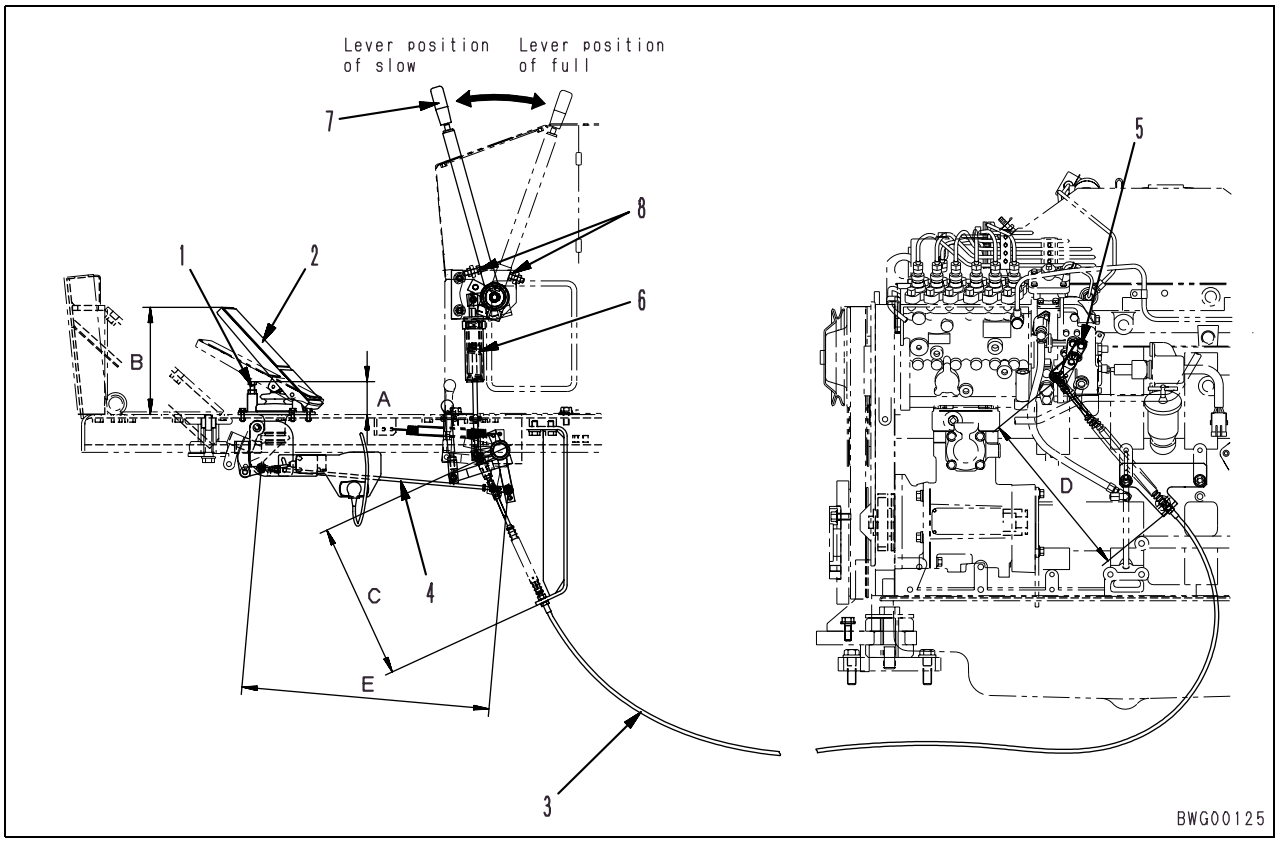


2. Connect the air hose of the probe hose accelerator switch to the tool **D2**.
   ★ Keep the air pressure supply below 1.47 MPa {15 kg/cm^2}.
3. Connect the power cord to the AC 100V socket.
   ★ When connecting the cord, check that the power switch of tool **D2** is OFF.



4. Loosen the cap nut of the suction pump and fit the filter paper.
   ★ Fit the filter paper securely so that exhaust gas gas cannot leak.
5. Turn the power switch of tool **D2** ON.
6. Accelerate the engine suddenly while simultaneously depressing the accelerator pedal of tool **D2** to collect the exhaust gas color on the filter.
7. Place the filter paper used to catch the exhaust gas color on top of at least 10 sheets of unused filter paper inside the filter paper holder.
8. Read the value shown.

ADJUSTING ACCELERATOR CONTROL LINKAGE



1. Procedure for adjusting the accelerator pedal:

• Remove the floor mat to adjust.

1) Set the installed height of the stopper bolt (1) to dimension **A**.
   ★ Dimension **A**: 75 mm
2) Set the installed length of pedal (2) to dimension **B**.
   ★ Dimension **B**: 193 mm
3) Set the installed length of cable (3) to dimensions **C** and **D**.

Unit: mm

Serial No.	GD555-3C		GD655, 675-3C	
	50001 – 51000	51001 and up	50001 – 51000	51001 and up
Dimension **C**	289	290	289	290
Dimension **D**	322.5	280	331.5	332

4) Adjust the rod length (4) so that the idle speed is 800 to 850 rpm.
   ★ Dimension **E** of rod (4) (standard length): 459 mm
5) Depress the pedal (2) until it contacts the stopper bolt (1), and adjust the rod length (4) so that the engine governor lever (5) is at the end of its stroke (engine high idle: 2,200 ± 50 rpm).
   ★ Dimension **E** of rod (4) (standard length): 459 mm
6) Turn back the stopper bolt (1) one-half turn and lock in position.

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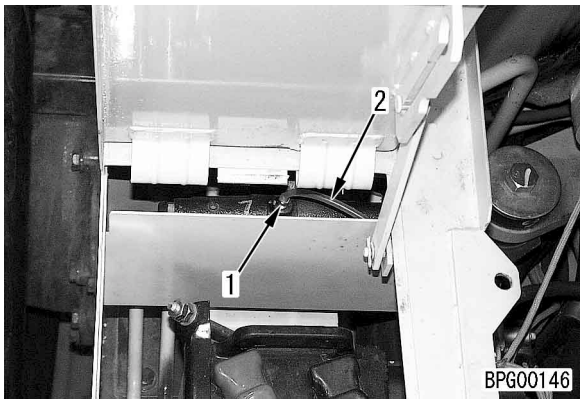
BLEEDING AIR FROM BRAKE PIPING

⚠ Stop the machine on flat ground and put blocks under the front wheels.

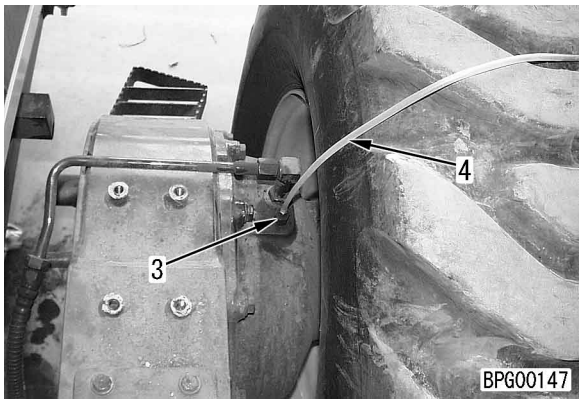
★ Start the engine and charge the accumulator.

1. Bleeding the air between the brake valve and the slack adjuster
   1) Open the battery cover, then install vinyl tube (2) to the tip of air bleed valve (1) at the top face of the slack adjuster.



   2) Depress the brake pedal and loosen the air bleed valve (1) 3/4 turns, then close the valve and release the pedal.
   3) Continue this procedure until no more bubbles exit with the oil discharged from the air bleed valve (1).
   4) Bleed the air from the slack adjuster air bleed valves at 2 places on the left and right.

2. Bleeding the air between the slack adjuster and the brake
   1) Install the vinyl tube (4) to the tip of the air bleed valve (3).



   2) Depress the brake pedal and loosen the air bleed valve (3) 3/4 turns, then close the valve and release the pedal.
   3) Continue this procedure until no more bubbles exit with the oil discharged from the air bleed valve (3).
   4) Bleed the air from the brake air bleed valves at four places on the left and right.

MOVING MACHINE WHEN TRANSMISSION VALVE FAILS

★ If the machine cannot be moved because of a failure in any part of the transmission valve system (electrical system, solenoid valves, spools, etc.), it is possible to move the machine by installing Plug **K**.

⚠ Plug **K** is only for emergency use when the machine cannot be moved by any other means because of a failure in the transmission control valve system. Do not install plate N to the ECMV except when there has been a failure and it is necessary to move the machine from a dangerous working area to a safe place for repairs.

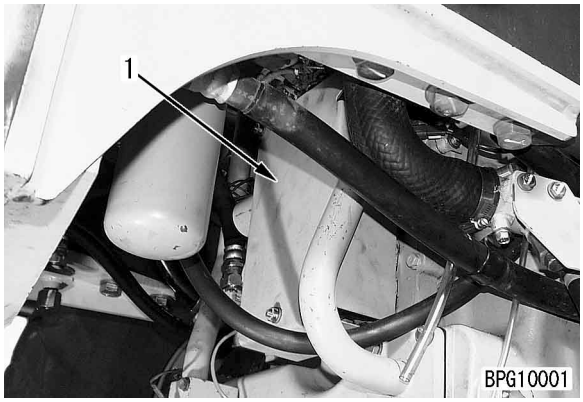
⚠ When carrying out this operation, keep strictly to the procedure and pay careful attention to safety when moving the machine.

⚠ To prevent the machine from moving, lower the work equipment completely to the ground, apply the parking brake, and put blocks under the tires.

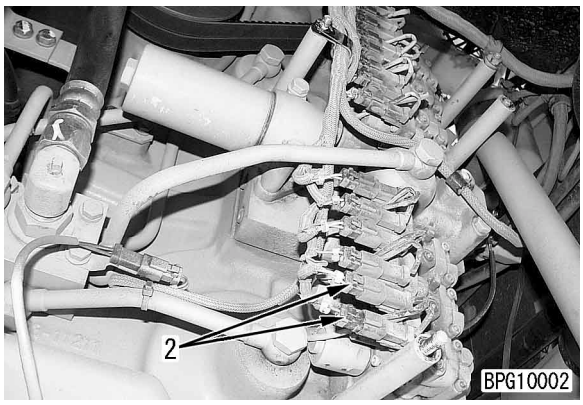
⚠ Carry out operation with the engine stopped.

⚠ Be careful not to burn yourself if the oil is hot.

1. Remove valve cover (1) at front of transmission.
   ★ Clean around the ECMV and remove all dirt and dust.

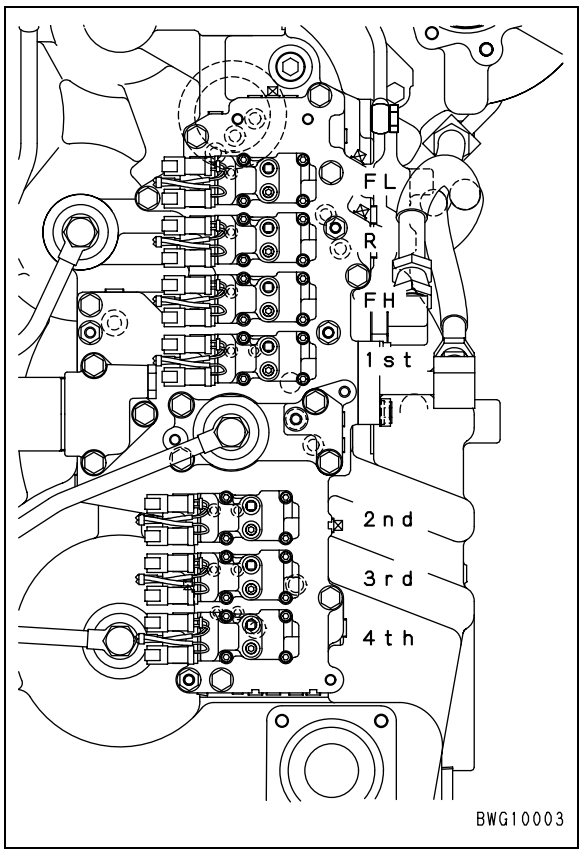


2. Disconnect wiring connectors (2). (14 places)



3. Depending on the direction for moving the machine (forward or reverse), remove the following 2 ECMV sooenoids (3) and install Plug **K**.
   - FORWARD: F L solenoid and 2nd solenoid
   - REVERSE: R solenoid and 2nd solenoid

   ★ If there is any mistake in the selection of the solenoid to remove, there is danger that the transmission may be damaged.
   ★ Install Plug **K** with the protruding surface facing the ECMV. Check also that there is an O-ring installed to the mating surface.
   ★ Be careful not to let any dirt or mud get inside the removed solenoid or valve.



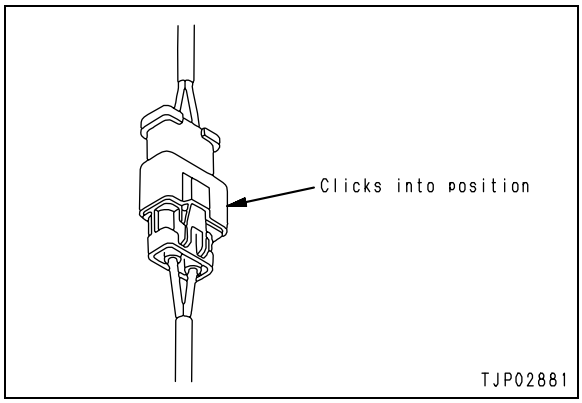
- **Connecting connectors**
  1) Check the connector visually.
     1) Check that there is no oil, dirt, or water stuck to the connector pins (mating portion).
     2) Check that there is no deformation, faulty contact, corrosion, or damage to the connector pins.
     3) Check that there is no damage or breakage to the outside of the connector.

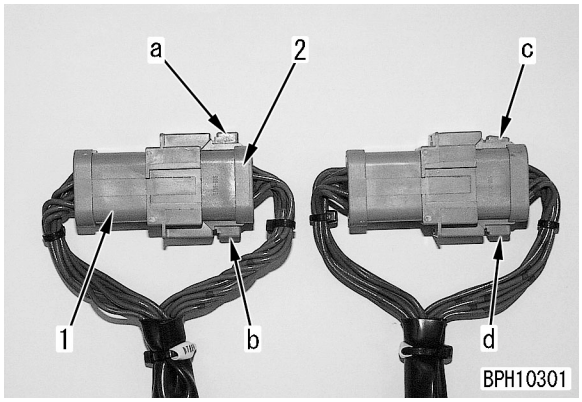
     ★ If there is any oil, water, or dirt stuck to the connector, wipe it off with a dry cloth. If any water has gotten inside the connector, warm the inside of the wiring with a dryer, but be careful not to make it too hot as this will cause short circuits.

     ★ If there is any damage or breakage, replace the connector.

     Since the DT 8-pole and 12-pole heavy duty wire connectors have 2 latches respectively, push them in until they click 2 times.

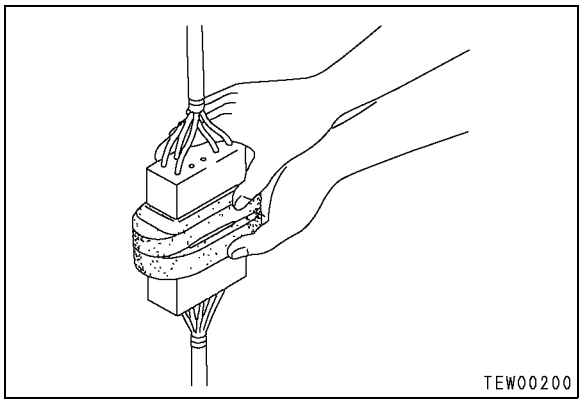
     ★ 1: Male connector, 2: Female connector
        - Normal locking state (Horizontal): **a**, **b**, **d**
        - Incomplete locking state (Diagonal): **c**

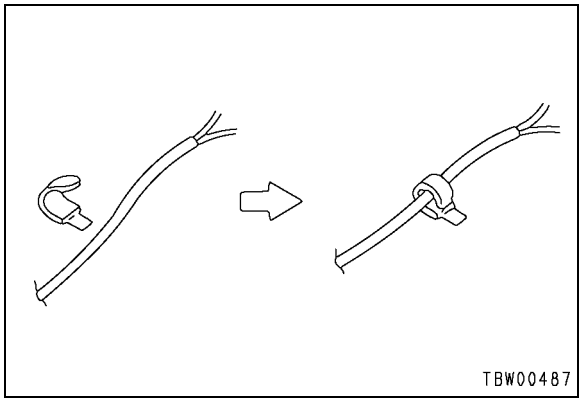




  2) Assemble the connector securely.
     Align the position of the connector correctly, then insert it securely.
     For connectors with a lock stopper:
     Push in the connector until the stopper clicks into position.
  3) Correct any protrusion of the boot and any misalignment of the wiring harness.
     For connectors fitted with boots, correct any protrusion or the boot. In addition, if the wiring harness is misaligned, or the clamp is out of position, adjust it to its correct position.

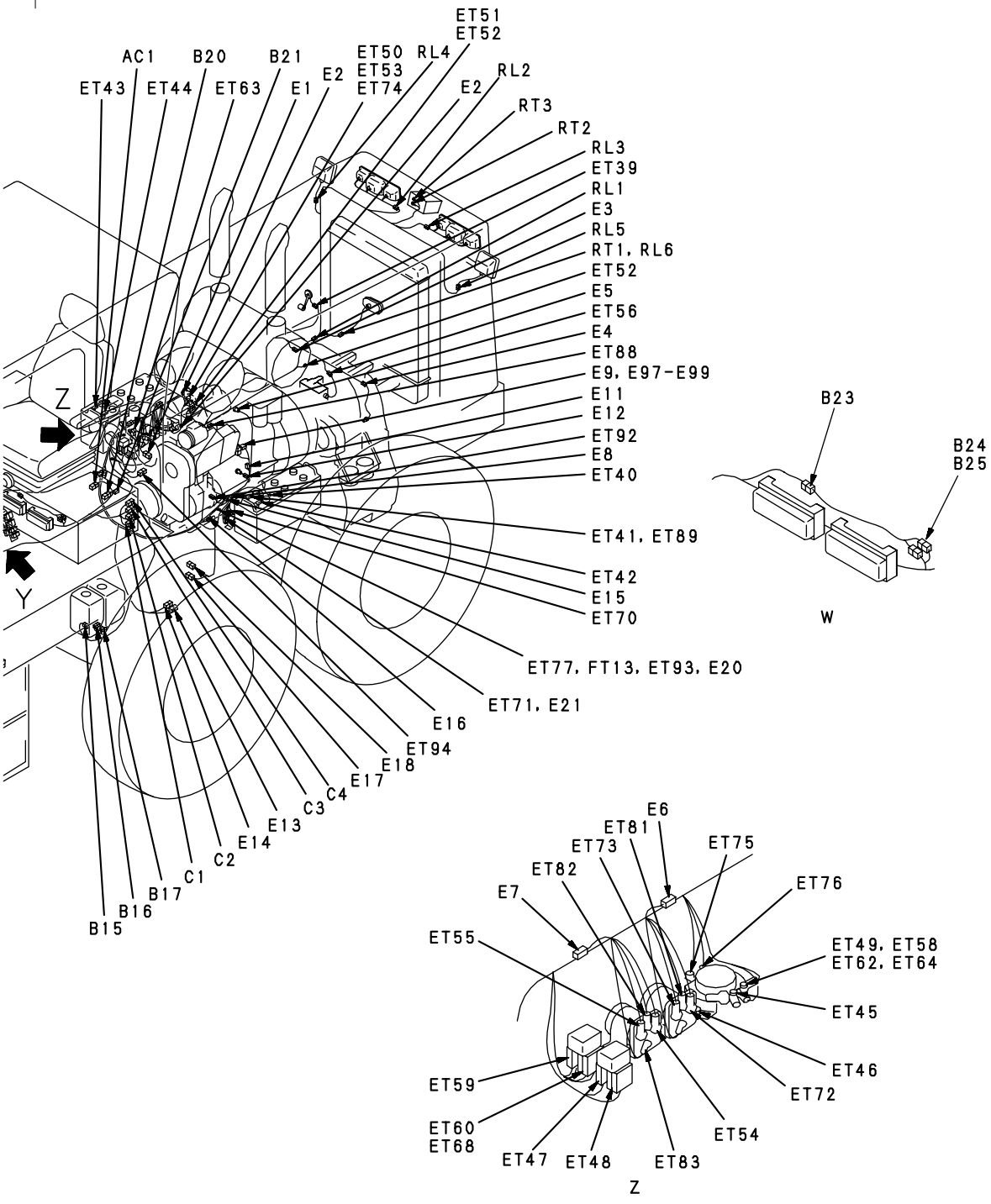
     ★ When blowing with dry air, there is danger that the oil in the air may cause improper contact, so clean with properly filtered air.
  4) When the wiring harness clamp of the connector has been removed, always return it to its original condition and check that there is no looseness of the clamp.



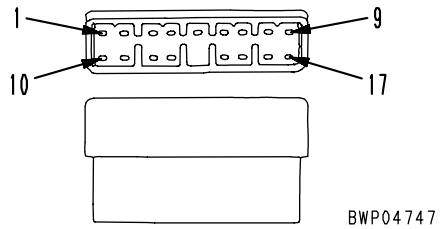
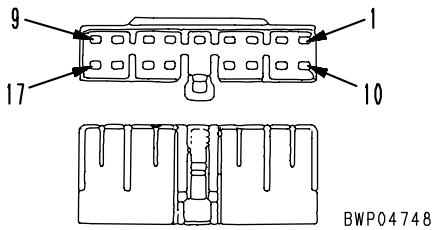
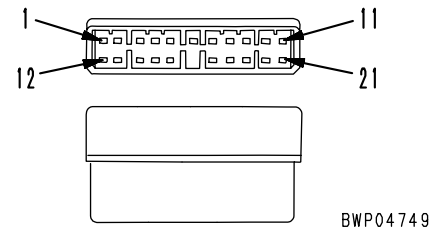
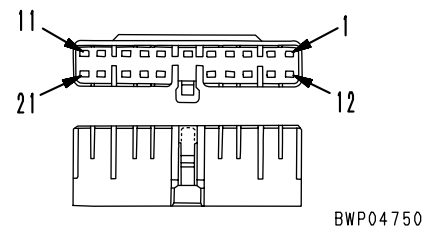


Serial No. 51001 and up

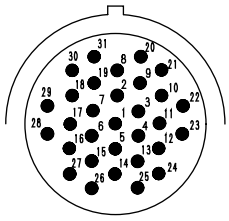
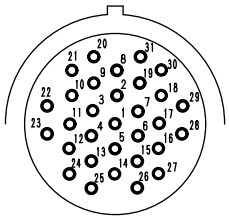
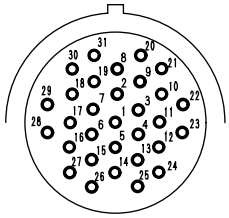
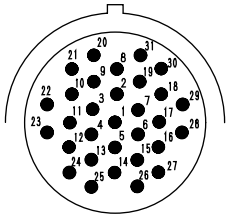
Connector No.	Type	No. of pins	Mounting location	Address
AC1	SWP	12	Air-con unit (If equipped)	G-9
AC3	SWP	14	Air-con unit (If equipped)	X-3
AC4	SWP	16	Air-con unit (If equipped)	W-2
AC5	—	16	Air-con control unit (If equipped)	U-7
AC6	—	20	Air-con control unit (If equipped)	U-8
AC8	—	7	Air-con intake duct (If equipped)	W-2
B1	DT2 (G)	12	Intermediate connector	D-8
B2	DT2 (Gr)	12	Intermediate connector	C-8
B3	DT2 (Br)	12	Intermediate connector	C-8
B4	DT2 (B)	8	Intermediate connector	A-8
B5	DT2 (G)	8	Intermediate connector	C-9
B6	L	2	Intermediate connector	D-8
B7	DT2 (Br)	8	Intermediate connector	D-9
B8	DT2 (B)	12	Intermediate connector	B-9
B9	DT2 (Gr)	8	Intermediate connector	B-9
B10	DT2 (G)	8	Intermediate connector	B-9
B11	L	2	Intermediate connector (Battery relay)	B-8
B12	L	2	Intermediate connector (Battery relay)	B-8
B13	DT2	2	Brake lamp switch	D-7
B15	KES	2	Window washer (Front upper) (If equipped)	G-3
B16	KES	2	Window washer (Front lower) (If equipped)	G-3
B17	KES	2	Window washer (Rear) (If equipped)	G-3
B18	DT2	3	Float cancel switch (R.H.)	D-6
B19	DT2	3	Float cancel switch (L.H.)	E-5
B20	DT2	2	Engine start solenoid	G-9
B21	DT2	2	Diode (Engine start up solenoid)	H-9
B22	DT1	4	Intermediate connector	B-8
B23	L	1	Fuse box	K-7
B24	DT2 (B)	8	Intermediate connector	L-6
B25	DT2 (B)	12	Intermediate connector	L-6
B26	DT2	2	Diode	—
B27	DT2	2	Diode	—
BR1	DT2	2	Diode (Battery relay)	M-5
BR2	DT2	2	Diode (Battery relay)	M-5
BR3	DT2	2	Diode (Buzzer)	N-4
BR4	Relay	5	Alternator relay	Q-1
BR5	Relay	5	Charge lamp relay	Q-1
BR6	Relay	5	Buck-up alarm relay	R-3
BR7	Relay	5	Differential relay	R-2
BR8	Relay	5	VHP relay	—
BR9	Relay	5	Accumulator hydraulic pressure relay	R-2
BR10	Relay	5	Brake pump relay	R-3
BR11	Relay	5	Parking brake relay	P-5
BR12	Relay	6	Neutral relay	Q-5
BR13	Relay	6	Front work lamp relay	R-3
BR14	Relay	5	Rear work lamp relay	P-5 R-3
BR15	Relay	5	Float cancel relay (R.H.)	R-4
BR16	Relay	5	Float cancel relay (L.H.)	R-3
BR18	KES	4	Front wiper switch	N-4
BR19	KES	6	Preheat timer relay	R-4
BR20	KES	4	Flasher	R-4
BR21	DT2	2	Buzzer (B)	P-1
BR22	M	2	Buzzer (A)	Q-1
BR23	DT2	2	Lift lock switch	Q-5
BR24	DT2	2	Work lamp switch (If equipped)	O-4
BR25	DT2	2	Fog lamp (If equipped)	O-5
BR26	(VCH)	8	Hazard lamp switch	O-5
BR27	(VCH)	8	Head lamp switch	P-5
BR28	DT2	3	Accumulator float switch	N-4
BT30	TERMINAL	1	GND	D-7
BT31	TERMINAL	1	Starter switch (B)	P-5
BT32	TERMINAL	1	Starter switch (BR)	P-5
BT33	TERMINAL	1	Starter switch (R1)	P-5
BT34	TERMINAL	1	Starter switch (C)	P-5
BT35	TERMINAL	1	Starter switch (ACC)	P-5
BT36	TERMINAL	1	Horn relay	M-3
BT37	TERMINAL	1	Horn relay	N-3
BT38	TERMINAL	1	Horn relay	N-3
BT41	1-pin connector	1	Switch panel lamp	P-5
BT42	1-pin connector	1	Cigar lighter	O-5
BT43	1-pin connector	1	Cigar lighter	O-5
C1	DT2 (G)	8	Intermediate connector	G-4
C2	DT2 (Gr)	8	Intermediate connector	G-4
C3	DT2	6	Intermediate connector (Wiper)	H-4
C4	DT1	3	Glass heater (If equipped)	H-4
C5	—	9	Radio (If equipped)	U-8
C6	KES	2	Speaker (R.H.) (If equipped)	V-8
C7	KES	2	Speaker (L.H.) (If equipped)	X-7
C8	KES	6	Rear wiper switch (If equipped)	X-4
C9	KES	6	Front lower wiper switch (If equipped)	X-3


ET51
ET52
AC1
B20
B21
ET50
RL4
ET43
ET44
ET63
E1
E2
ET53
ET74
E2
RL2
RT3
RT2
RL3
ET39
RL1
E3
RL5
RT1, RL6
ET52
E5
ET56
E4
ET88
E9, E97-E99
E11
E12
ET92
E8
ET40
Z
Y
ET41, ET89
ET42
E15
ET70
ET77, FT13, ET93, E20
ET71, E21
E16
ET94
E18
E17
C4
C3
E13
E14
C2
C1
B17
B16
B15
B23
B24
B25
W
E6
ET81
ET73
ET75
ET82
E7
ET76
ET55
ET49, ET58
ET62, ET64
ET45
ET46
ET72
ET59
ET60
ET68
ET54
ET47
ET48
ET83
Z

TJG00491

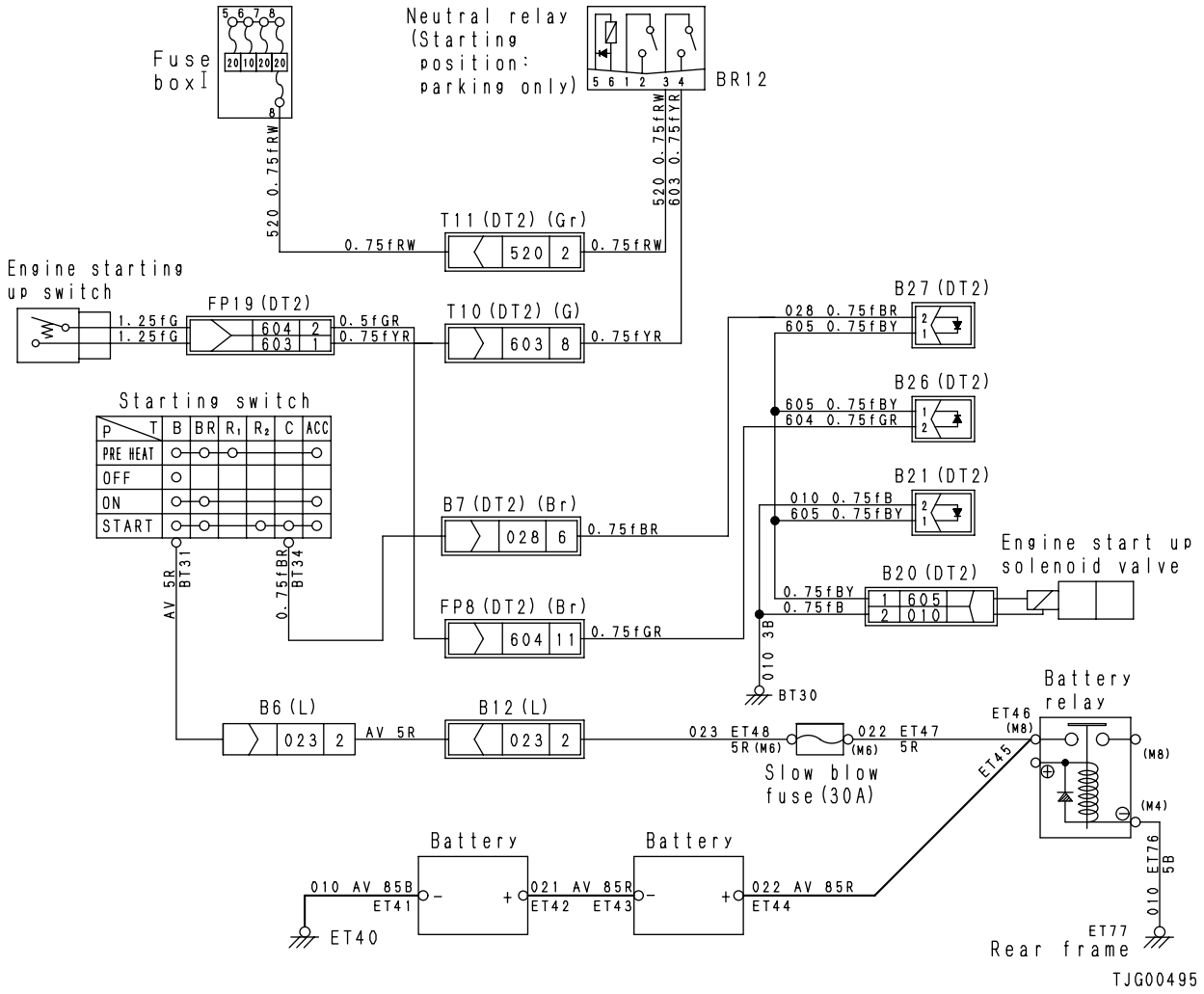
Number of Pins	MIC-Type Connector		
	Male (Female Housing)	Female (Male Housing)	T-adapter Part Number
17			799-601-2730
	Body Part Number: 79A-222-2730 (Quantity: 2 pieces)	Body Part Number: 79A-222-2720 (Quantity: 2 pieces)	
21			799-601-2740
	Body Part Number: 79A-222-2750 (Quantity: 2 pieces)	Body Part Number: 79A-222-2740 (Quantity: 2 pieces)	
	Body Part Number: 79A-222-2770 (Quantity: 50 pieces)	Body Part Number: 79A-222-2760 (Quantity: 50 pieces)	—

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

<table>
<tr><td rowspan="2">Type (shell size code)</td><td colspan="3">HD30 Series connector</td></tr>
<tr><td>Body (plug)</td><td>Body (receptacle)</td><td>T-adapter Part No.</td></tr>
<tr><td rowspan="4">24-31 (9)</td><td>Pin (male termial)</td><td>Pin (female terminal)</td><td rowspan="2">799-601-9290</td></tr>
<tr><td> 
BWP05033</td><td> 
BWP05034</td></tr>
<tr><td>Part No.:08191-91203, 08191-91204, 08191-91205, 08191-91206</td><td>Part No.:08191-94103, 08191-94104, 08191-94105, 08191-94106</td></tr>
<tr><td>Pin (female terminal)</td><td>Pin (male termial)</td><td rowspan="2">799-601-9290</td></tr>
<tr><td> 
BWP05035</td><td> 
BWP05036</td></tr>
<tr><td>Part No.:08191-92203, 08191-92204, 08191-92205, 08191-92206</td><td>Part No.:08191-93103, 08191-93104, 08191-93105, 08191-93106</td></tr>
</table>

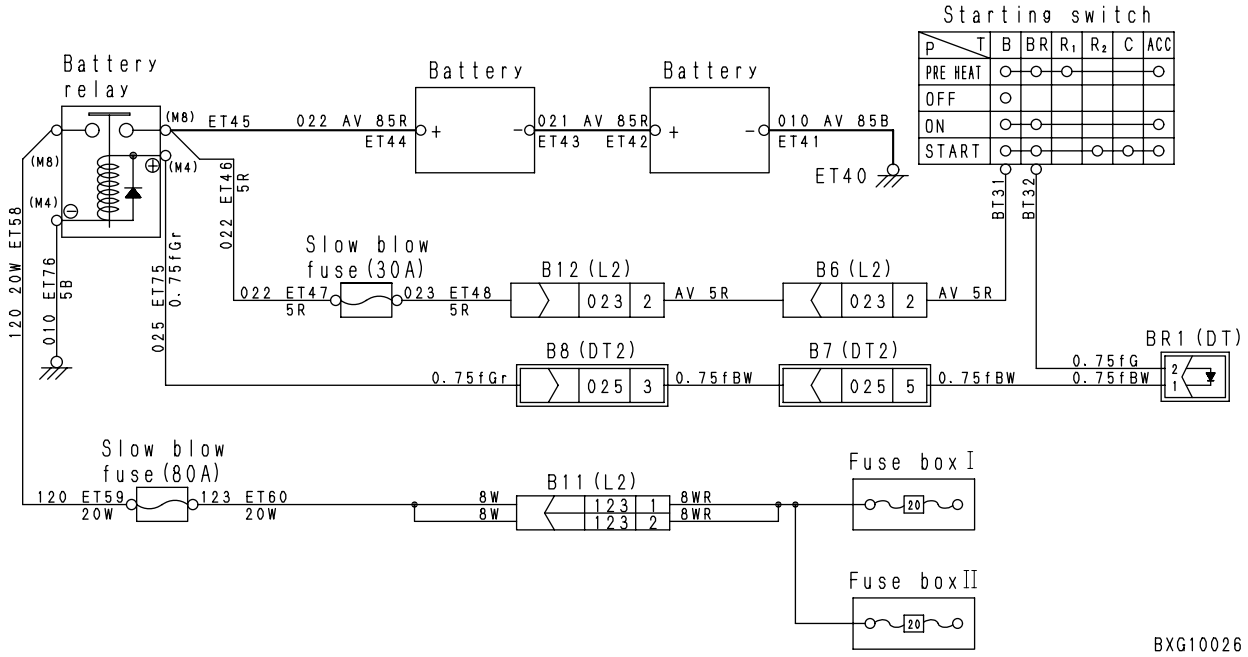
TROUBLESHOOTING OF ELECTRICAL SYSTEM (E MODE)

Serial No. 51001 and up

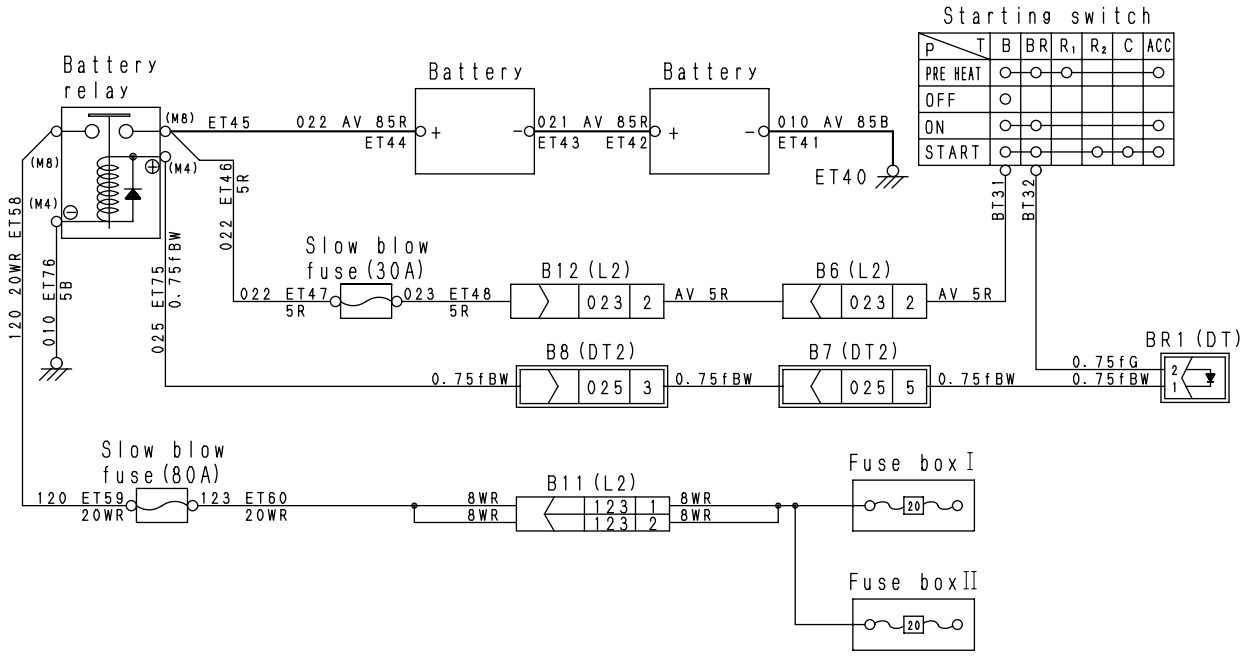


E-4 Related electrical circuit diagram

Serial No. 50001 – 51000



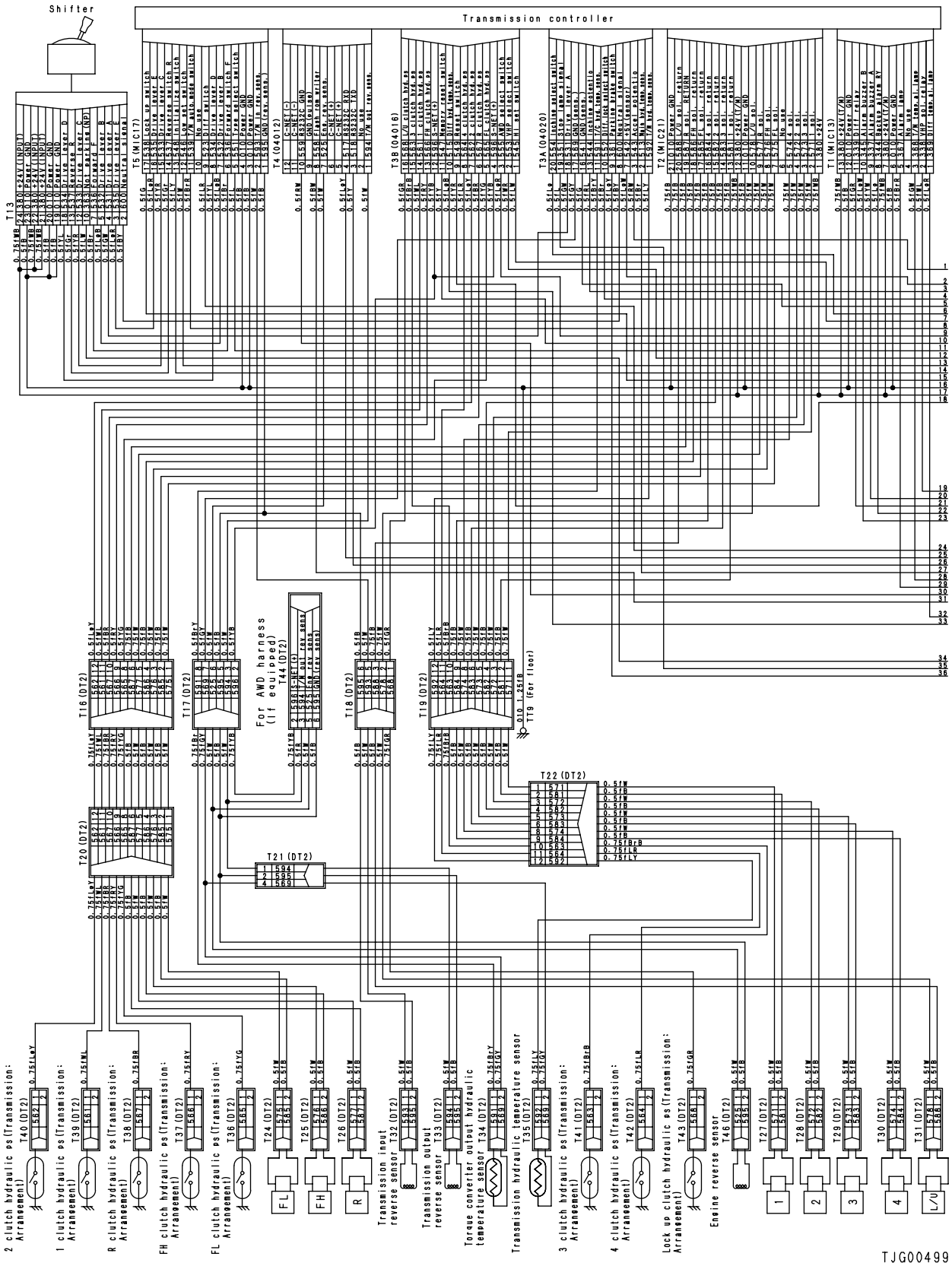
Serial No. 51001 and up



No.	Fail-ure code	System problem	Nature of the problem	Normal condition (volts, amps and ohms)
6	A8	Short circuit to the power source in the lock-up solenoid system	1. Defective lock-up solenoid 2. Short circuit to ground, short circuit to power source in the wiring harness between T2 (female) (10) and T31 (female) (1) 3. Short circuit to power source in the wiring harness between T2 (female) (20) and T31 (female) (2) 4. Short circuit in wiring harness between T2 (female) (10) and T31 (female) (1); and between T2 (female) (20) and T31 (female) (2) 5. Defective transmission controller	Resistance between T2 (female) (7) and (17): 5 to 15 Ω Voltage between T2 (17) and chassis at neutral: Less than 0.1 V
7	b1	Open circuit in the FL solenoid circuit	1. Defective FL solenoid 2. Defective contact or open circuit in the wiring harness between T2 (female) (7) and T24 (female) (1) 3. Short circuit to ground in wiring harness between T2 (female) (17) and T24 (female) (2) 4. Defective transmission controller	Resistance between T2 (female) (8) and (18): 5 to 15 Ω Voltage between T2 (18) and chassis at neutral: Less than 0.1 V
8	b2	Open circuit in the FH solenoid circuit	1. Defective FH solenoid 2. Defective contact or open circuit in wiring harness between T2 (female) (8) and T25 (female) (1) 3. Short circuit to ground in wiring harness between T2 (female) (18) and T25 (female) (2) 4. Defective transmission controller	Resistance between T2 (female) (9) and (19): 5 to 15 Ω Voltage between T2 (19) and chassis at neutral: Less than 0.1 V
9	b3	Open circuit in the R solenoid system	1. Defective R solenoid 2. Defective contact or open circuit in wiring harness between T2 (female) (9) and T26 (female) (1) 3. Short circuit to ground in wiring harness between T2 (female) (19) and T26 (female) (2) 4. Defective transmission controller	Resistance between T2 (female) (2) and (13): 5 to 15 Ω Voltage between T2 (13) and chassis at neutral: Less than 0.1 V
10	b4	Open circuit in the 1st solenoid system	1. Defective 1st solenoid 2. Defective contact or open circuit in wiring harness between T2 (female) (2) and T27 (female) (1) 3. Short circuit to ground in wiring harness between T2 (female) (13) and T27 (female) (2) 4. Defective transmission controller	Resistance between T2 (female) (4) and (15): 5 to 15 Ω Voltage between T2 (15) and chassis at neutral: Less than 0.1 V
11	b5	Open circuit in the 2nd solenoid system	1. Defective 2nd solenoid 2. Defective contact or open circuit in wiring harness between T2 (female) (4) and T28 (female) (1) 3. Short circuit to ground in wiring harness between T2 (female) (15) and T28 (female) (2) 4. Defective transmission controller	Resistance between T2 (female) (3) and (14): 5 to 15 Ω Voltage between T2 (14) and chassis at neutral: Less than 0.1 V
12	b6	Open circuit in the 3rd solenoid system	1. Defective 3rd solenoid 2. Defective contact or open circuit in wiring harness between T2 (female) (3) and T29 (female) (1) 3. Short circuit to ground in wiring harness between T2 (female) (14) and T29 (female) (2) 4. Defective transmission controller	Resistance between T2 (female) (5) and (16): 5 to 15 Ω Voltage between T2 (16) and chassis at neutral: Less than 0.1 V
13	b7	Open circuit in the 4th solenoid system	1. Defective 4th solenoid 2. Defective contact or open circuit in wiring harness between T2 (female) (5) and T30 (female) (1) 3. Short circuit to ground in wiring harness between T2 (female) (16) and T30 (female) (2) 4. Defective transmission controller	Resistance between T2 (female) (10) and (20): 5 to 15 Ω Voltage between T2 (20) and chassis at neutral: Less than 0.1 V
14	b8	Open circuit in the lock-up solenoid system	1. Defective lock-up solenoid 2. Defective contact or open circuit in wiring harness between T2 (female) (10) and T31 (female) (1) 3. Short circuit to ground in wiring harness between T2 (female) (20) and T31 (female) (2)	Voltage between T1 (7), (13) – chassis: 19 to 30V Voltage between T2 (1), (12) – chassis: 19 to 30 V
15	C0	Power source voltage reduced	1. Defective contact or open circuit in wiring harness between T1 (female) (7), (13), T2 (1), (12) - T11 (male) (1) 2. Defective contact or open circuit in wiring harness between T1 (female) (6), (12), T2 (11), (21) - chassis 3. Defective contact or open circuit in wiring harness between T11 (female) (11) and battery relay 4. Defective transmission controller	Resistance between T4 (female) (7) and T5 (female) (1): 500 to 1000 Ω

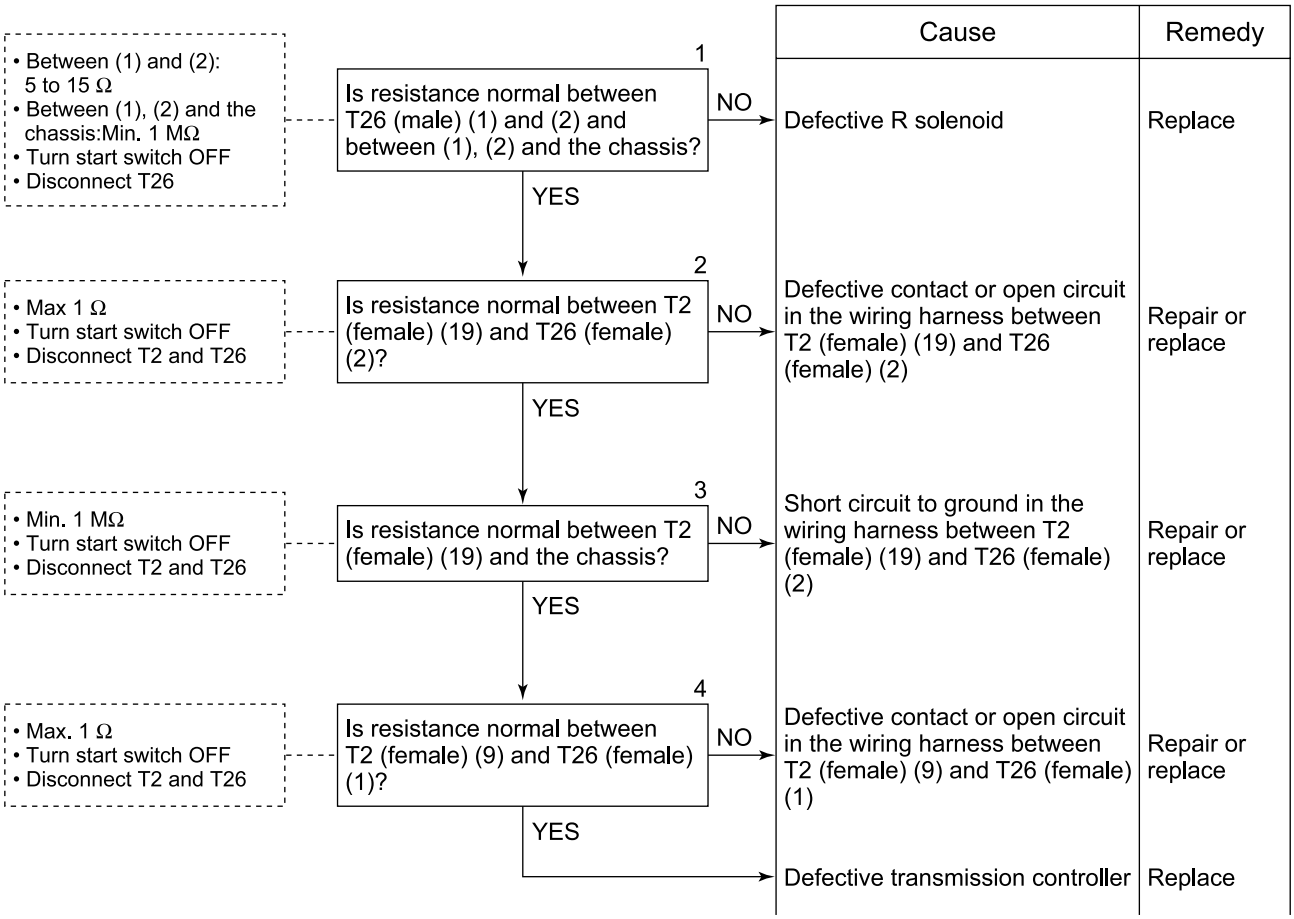
No.	Failure code	System problem	Nature of the problem	Normal condition (volts, amps and ohms)
57	E8	Short circuit to power source in logic E system	1. Defective gearshift lever 2. Short circuit to power source in wiring harness between T5 (female) (16) and T13 (female) (3) 3. Defective transmission controller	Voltage between T5 (16) and chassis: Except when gearshift lever is at [F3] - [F6], [R1], [R2]: Max. 1 V
58	E8	Open circuit in logic E system	1. Defective gearshift lever 2. Defective contact or open circuit in wiring harness between T5 (female) (16) and T13 (female) (3) 3. Defective transmission controller	Voltage between T5 (16) and chassis: When gearshift lever is at [F3] - [F6], [R1], [R2]: 20 to 30 V
59	—	Short circuit to power source in stop lamp signal system	1. Defective stop lamp or stop lamp relay 2. Short circuit to power source in wiring harness between T3A (female) (19) and BR10 (female) (5) or RL1 (female) (3) 3. Defective transmission controller	Voltage between T3A (19) and chassis: When output is OFF (brake pedal not being depressed): Max. 1 V
60	—	Open circuit in the stop lamp signal system	1. Defective stop lamp or stop lamp relay 2. Defective contact or open circuit in wiring harness between T3A (female) (19) and BR10 (female) (5) or RL1 (female) (3) 3. Defective transmission controller	Voltage between T3A (19) and chassis: When output is ON (brake pedal being depressed): 17 to 30 V
61	—	Short circuit to ground in differential selector switch system	1. Defective differential switch 2. Short circuit to ground, short circuit, or short circuit to power source in wiring harness between T5 (female) (9) and FP13 (female) (2) 3. Defective transmission controller	Voltage between T1 (11) and chassis: When differential selector switch is ON: 20 to 30 V When differential selector switch is OFF: Max. 1 V
62	—	Open circuit in the differential selector switch system	1. Defective differential switch 2. Defective contact or open circuit in the wiring harness between T5 (female) (9) and FP13 (female) (2) 3. Defective transmission controller	Voltage between T1 (11) and chassis: When differential selector switch is ON: 20 to 30 V When differential selector switch is OFF: Max. 1 V
63	—	Short circuit to ground in lock-up switch system	1. Defective lock-up switch 2. Short circuit to the ground, short circuit, or short circuit to power source in wiring harness between T5 (female) (17) and T14 (female) (2) 3. Defective transmission controller	Voltage between T5 (17) and chassis: When lock-up switch is ON: 20 to 30 V When lock-up switch is OFF: Max. 1 V
64	—	Open circuit in the differential lock-up switch system	1. Defective lock-up switch 2. Defective contact or open circuit in the wiring harness between T5 (female) (17) and T14 (female) (2) 3. Defective transmission controller	Voltage between T5 (17) and chassis: When lock-up switch is ON: 20 to 30 V When lock-up switch is OFF: Max. 1 V
65	—	Short circuit to ground in low set switch system	1. Defective low set switch 2. Short circuit to ground, short circuit, or short circuit to power source in wiring harness between T5 (female) (12) and TT (terminal) (4) 3. Defective transmission controller	Resistance between T5 (12) and chassis: When potentiometer switch is at LOW: Max. 1 Ω When potentiometer switch is at HIGH OFF: Min. 1 MΩ
66	—	Open circuit in the low set switch system	1. Defective low set switch 2. 2. Defective contact or open circuit in wiring harness between T5 (female) (12) and TT (terminal) (4) 3. 3. Defective transmission controller	Resistance between T5 (12) and chassis: When potentiometer switch is at LOW: Max. 1 Ω When potentiometer switch is at HIGH OFF: Min. 1 MΩ
67	—	Short circuit to ground in the model selection switch system	1. Short circuit to ground, short circuit, or short circuit to the power source in the wiring harness between T5 (female) (5) and T7 (female) (1)	Resistance between T5 (5) and chassis: STD specification: Max. 1 Ω Specification: Min. 1 M≒
68	—	Open circuit in the model selection switch system	1. Defective contact or open circuit in the wiring harness between T5 (female) (5) and T7 (female) (1)	Resistance between T5 (5) and chassis: STD specification: Max. 1 Ω Specification: Min.1 MΩ

Serial No. 51001 and up

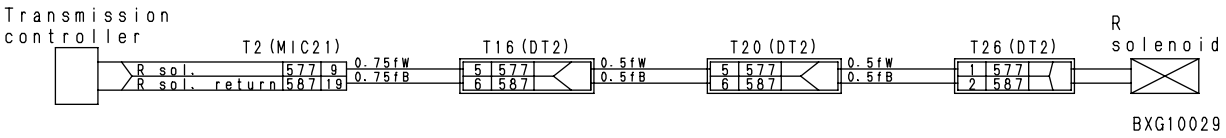


T-9 Failure code [b3]

Open R solenoid circuit

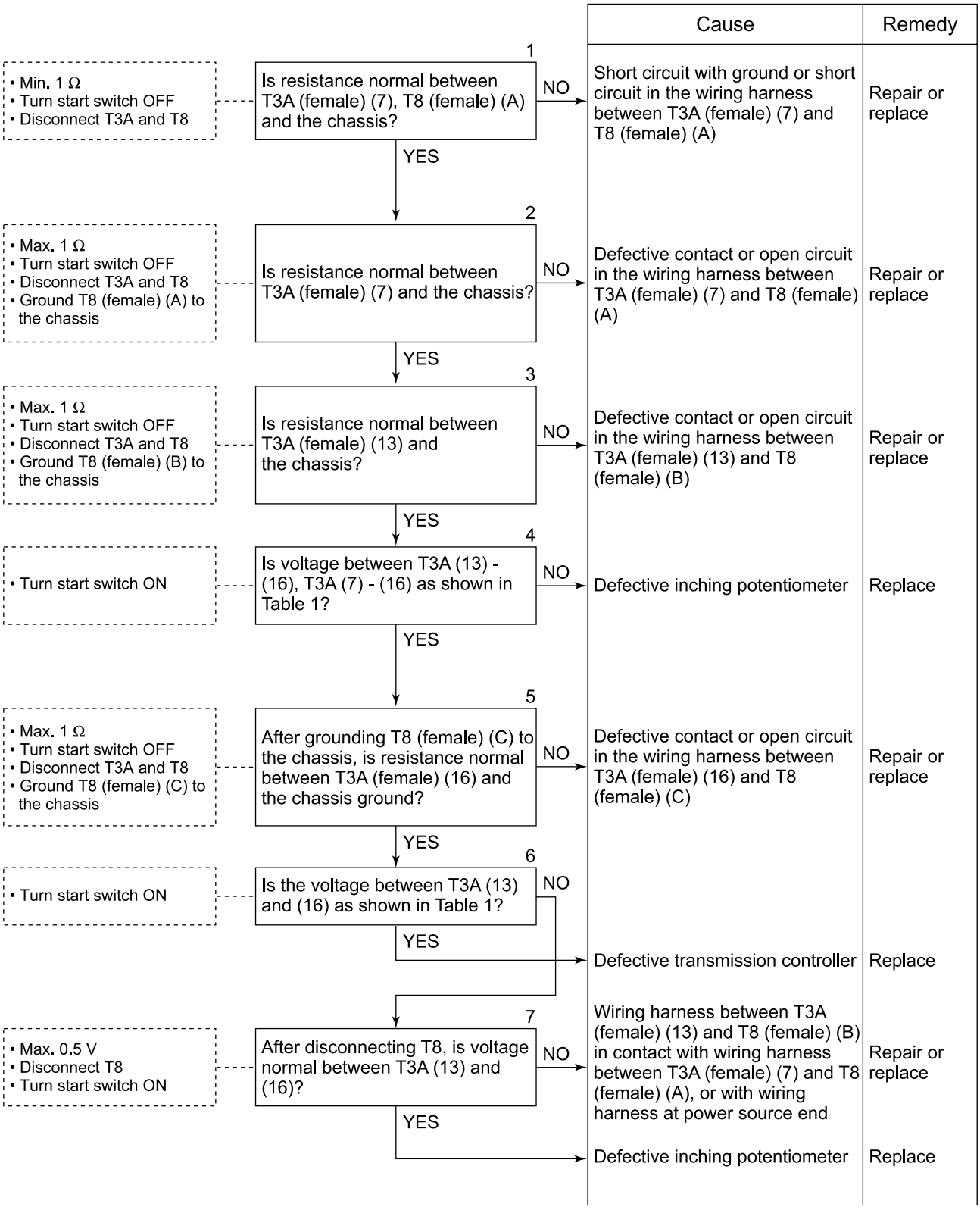


T-9 Related electrical circuit diagram



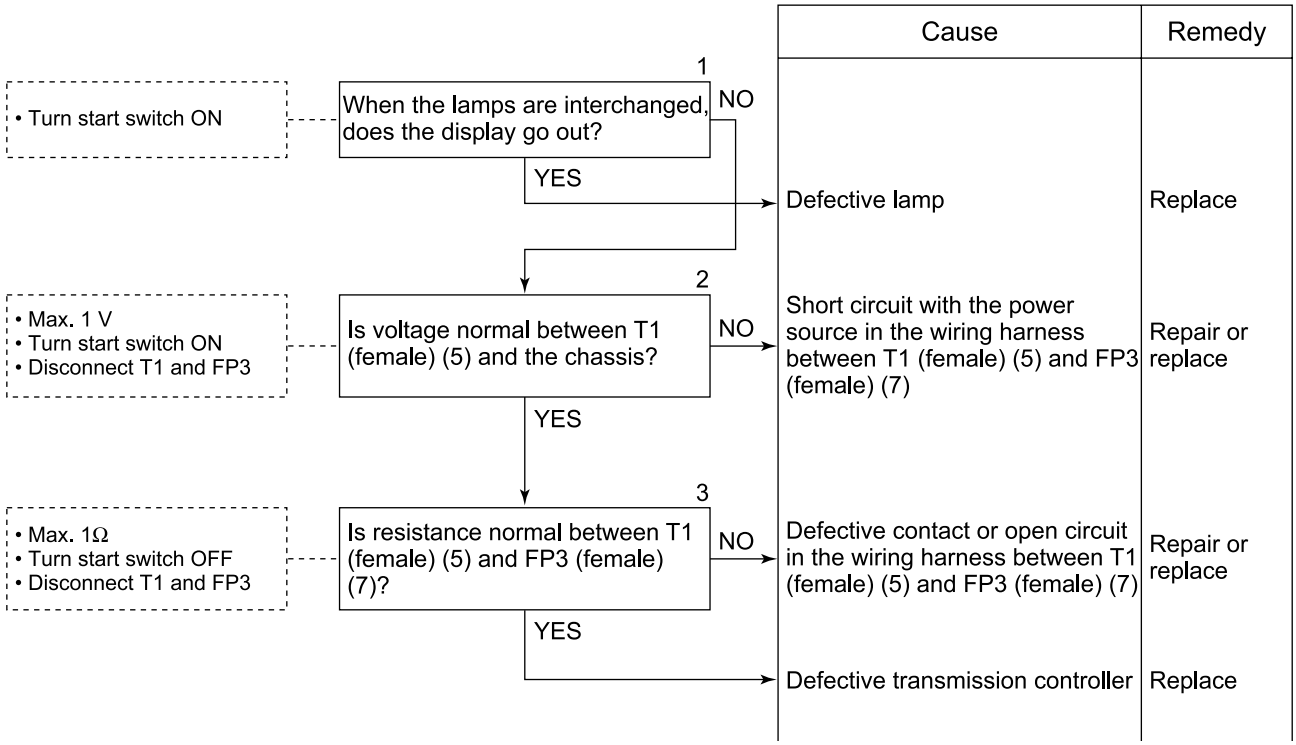
T-18 Failure code [C4]

Short circuit with power source or open inching potentiometer circuit

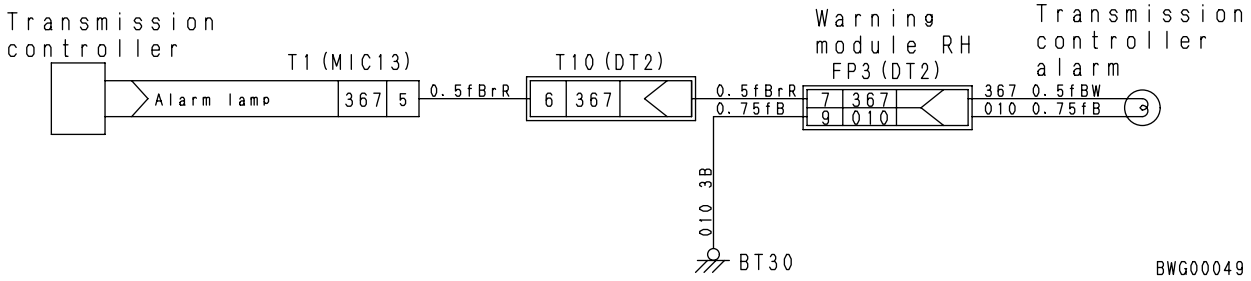


T-27 Failure code [d5]

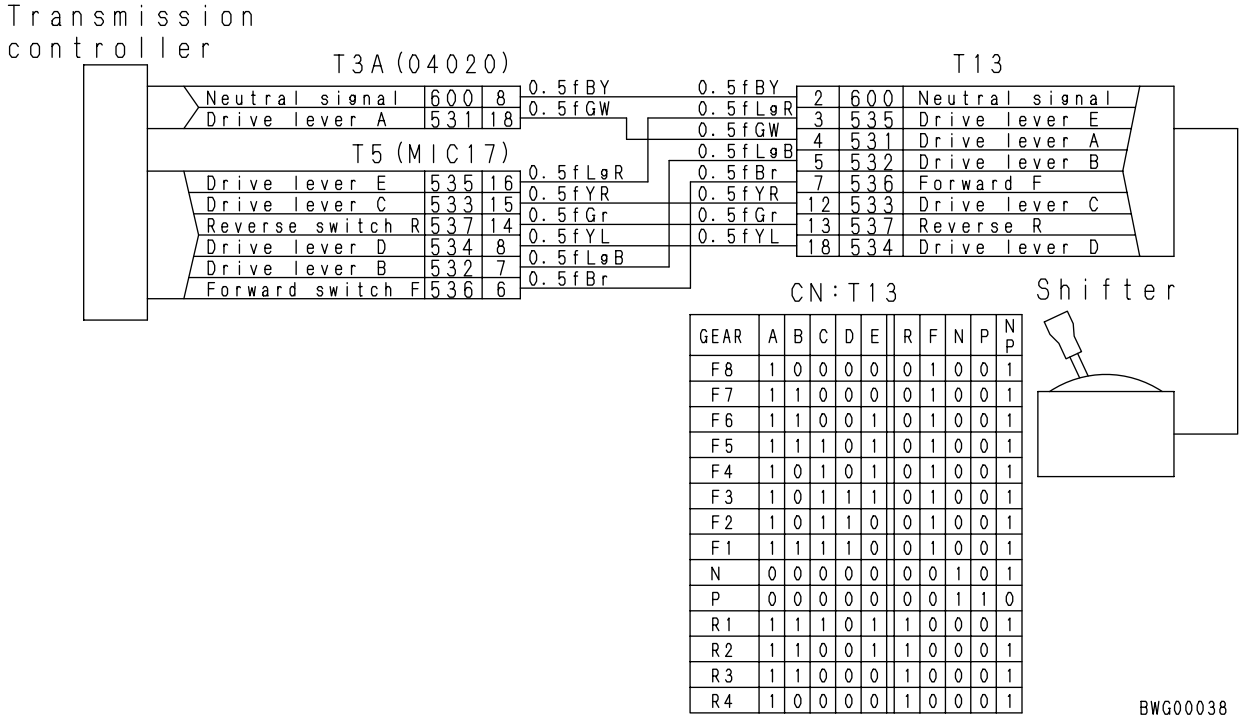
Short circuit with the power source or open circuit in the transmission control warning lamp system



T-27 Related electrical circuit diagram

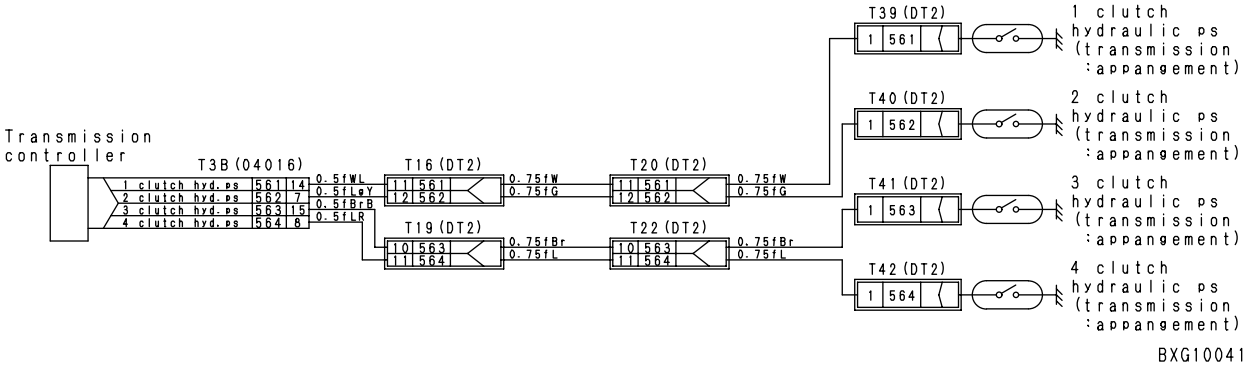


T-36, T-37 Related electrical circuit diagram

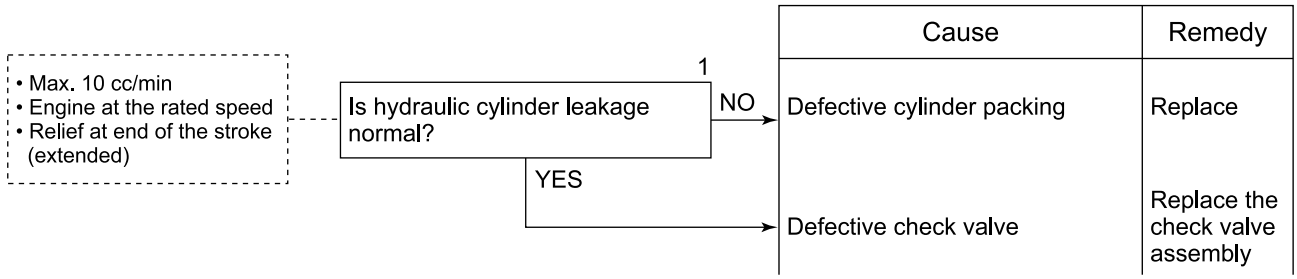


GEAR	A	B	C	D	E	R	F	N	P	NP
F8	1	0	0	0	0	0	1	0	0	1
F7	1	1	0	0	0	0	1	0	0	1
F6	1	1	0	0	1	0	1	0	0	1
F5	1	1	1	0	1	0	1	0	0	1
F4	1	0	1	0	1	0	1	0	0	1
F3	1	0	1	1	1	0	1	0	0	1
F2	1	0	1	1	0	0	1	0	0	1
F1	1	1	1	1	0	0	1	0	0	1
N	0	0	0	0	0	0	0	1	0	1
P	0	0	0	0	0	0	0	1	1	0
R1	1	1	1	0	1	1	0	0	0	1
R2	1	1	0	0	1	1	0	0	0	1
R3	1	1	0	0	0	1	0	0	0	1
R4	1	0	0	0	0	1	0	0	0	1

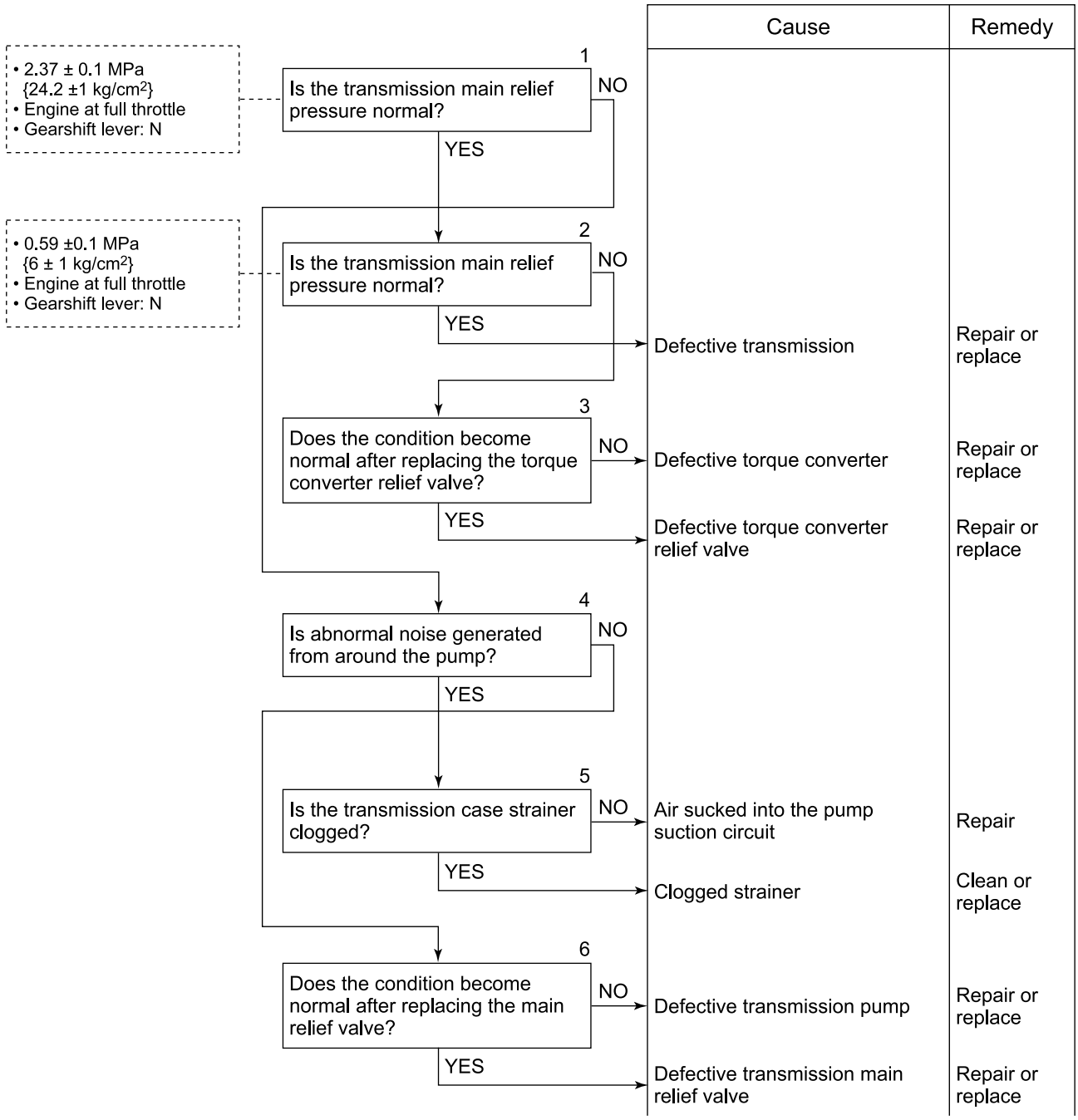
T-49, T-50, T-51, T-52 Related electrical circuit diagram

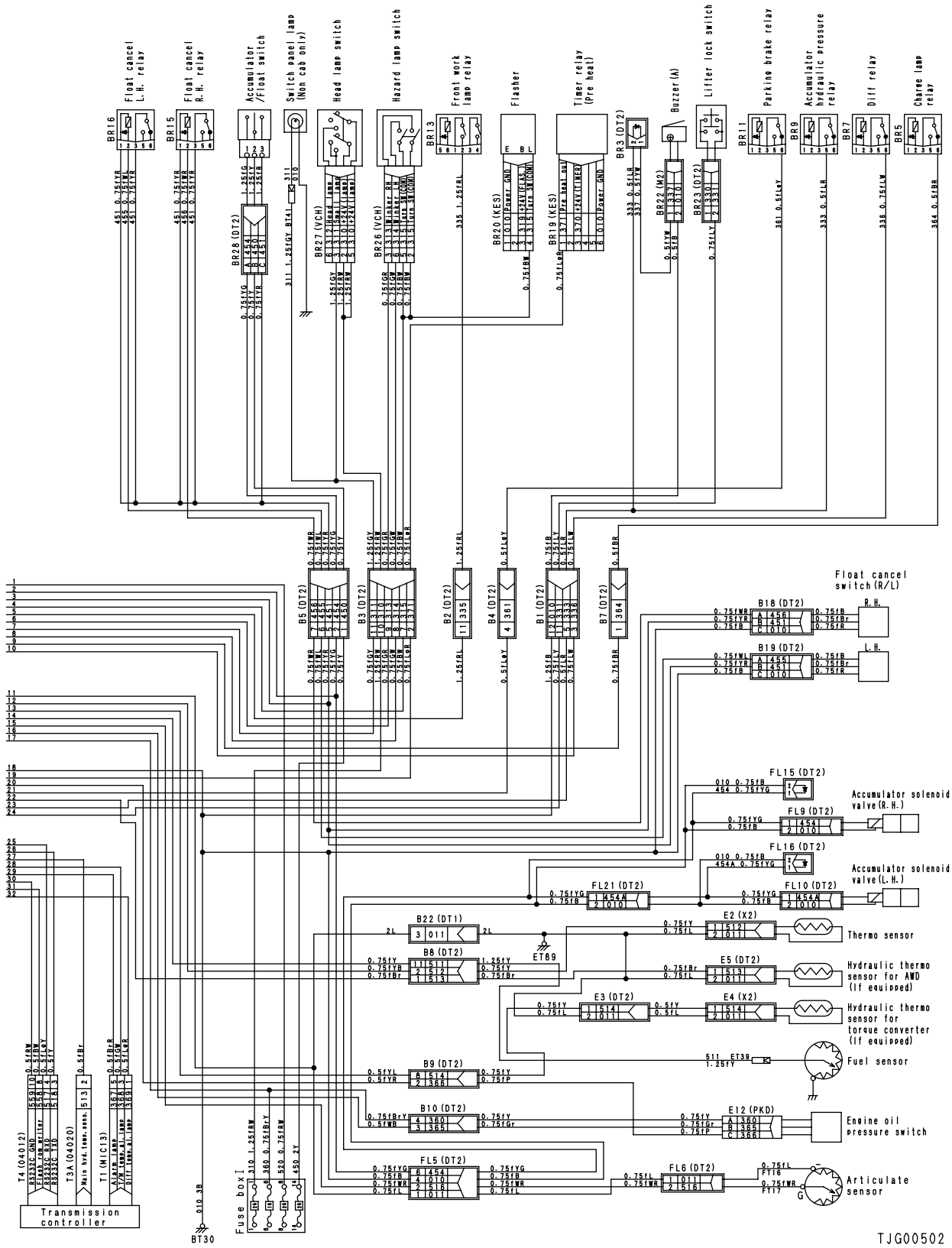


H-10 Excessive scarifier drift

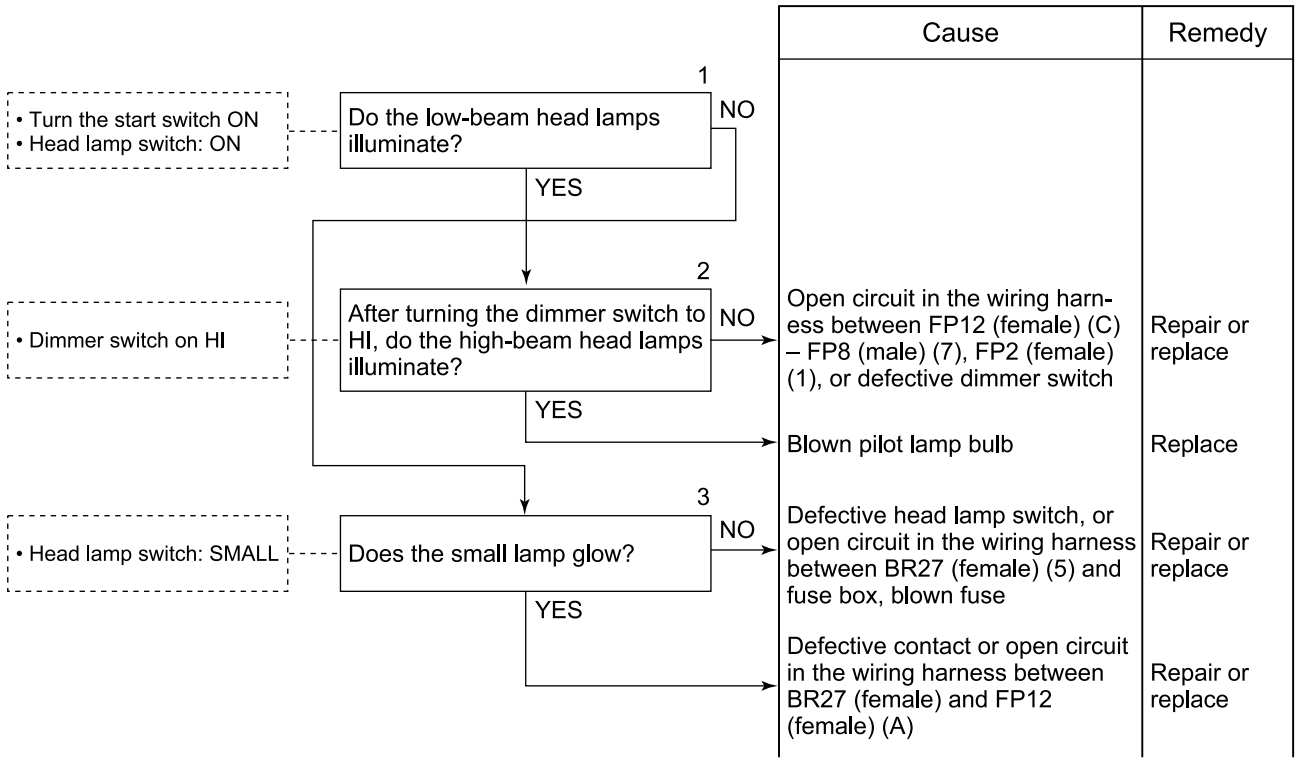


H-11 Machine does not move in either forward or reverse

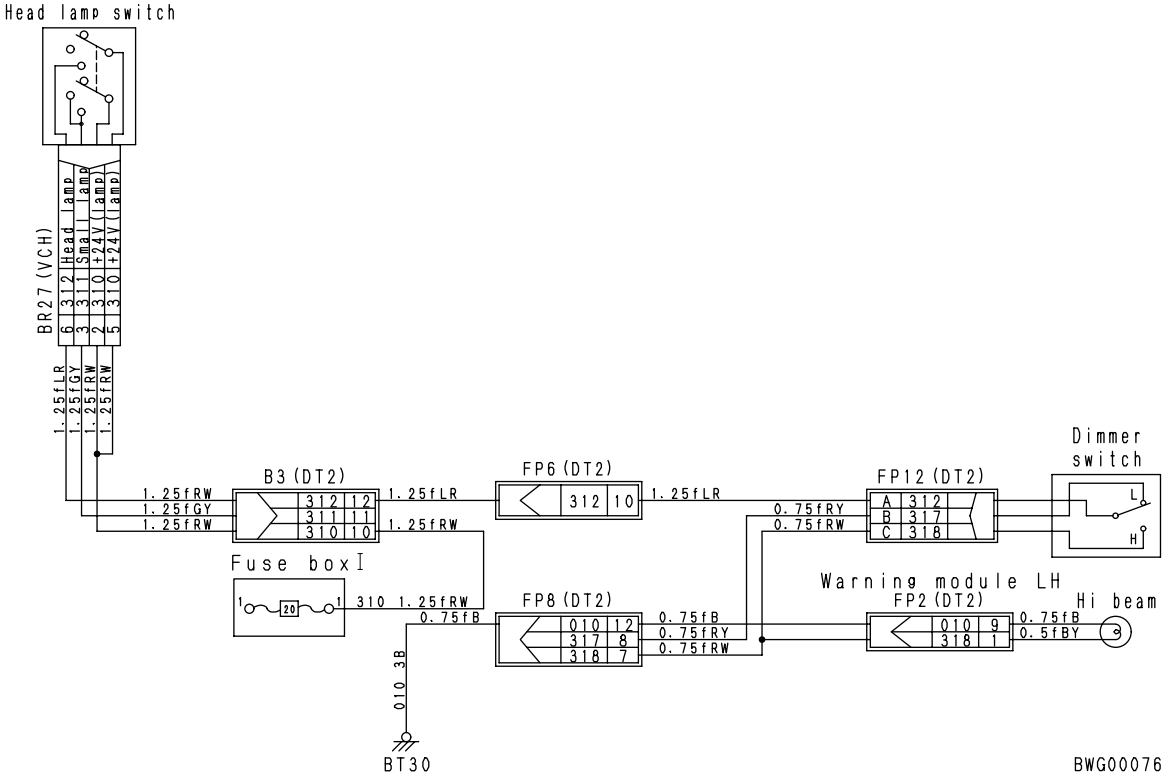



Float cancel L.H. relay
Float cancel R.H. relay
Accumulator /Float switch
Switch panel lamp (Non cab only)
Head lamp switch
Hazard lamp switch
Front work lamp relay
Flasher
Timer relay (Pre heat)
Buzzer(A)
Lifter lock switch
Parking brake relay
Accumulator hydraulic pressure relay
Diff relay
Charge lamp relay
Float cancel switch(R/L)
R.H.
L.H.
Accumulator solenoid valve(R.H.)
Accumulator solenoid valve(L.H.)
Thermo sensor
Hydraulic thermo sensor for AWD (If equipped)
Hydraulic thermo sensor for torque converter (If equipped)
Fuel sensor
Engine oil pressure switch
Articulate sensor
Transmission controller
Fuse box
TJG00502

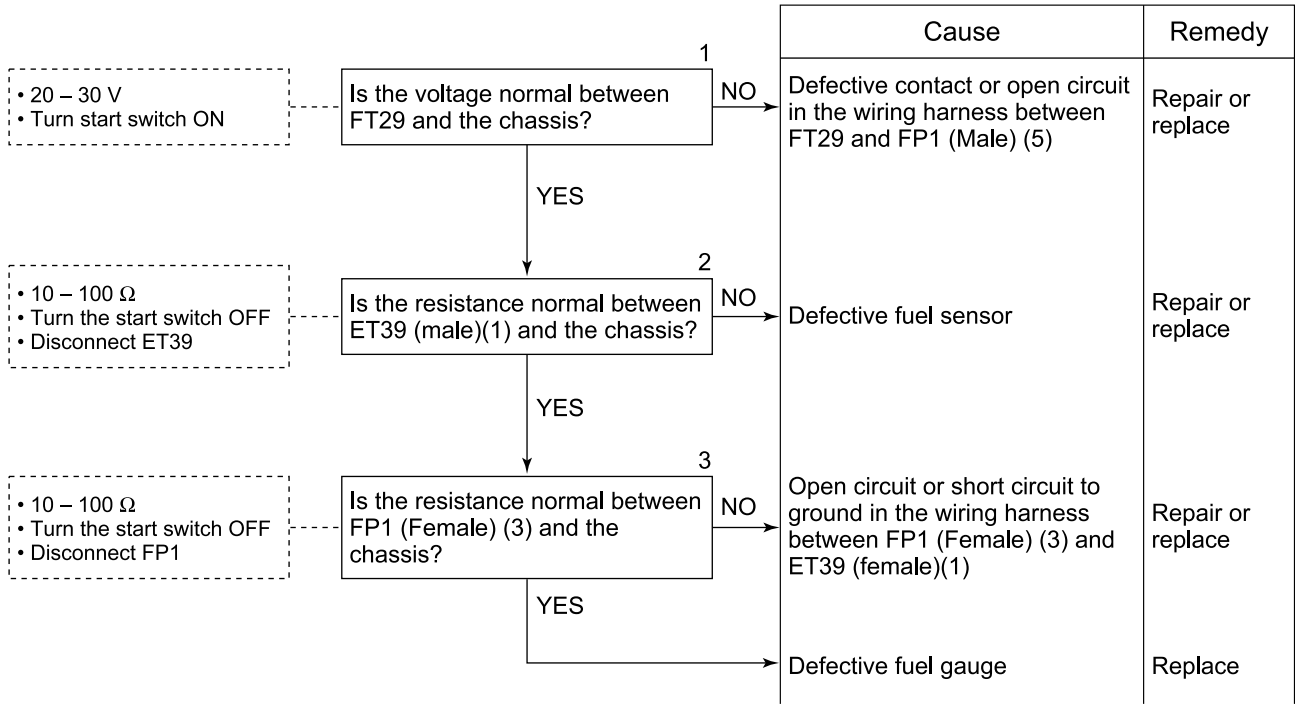
M-9 High beam display does not light up



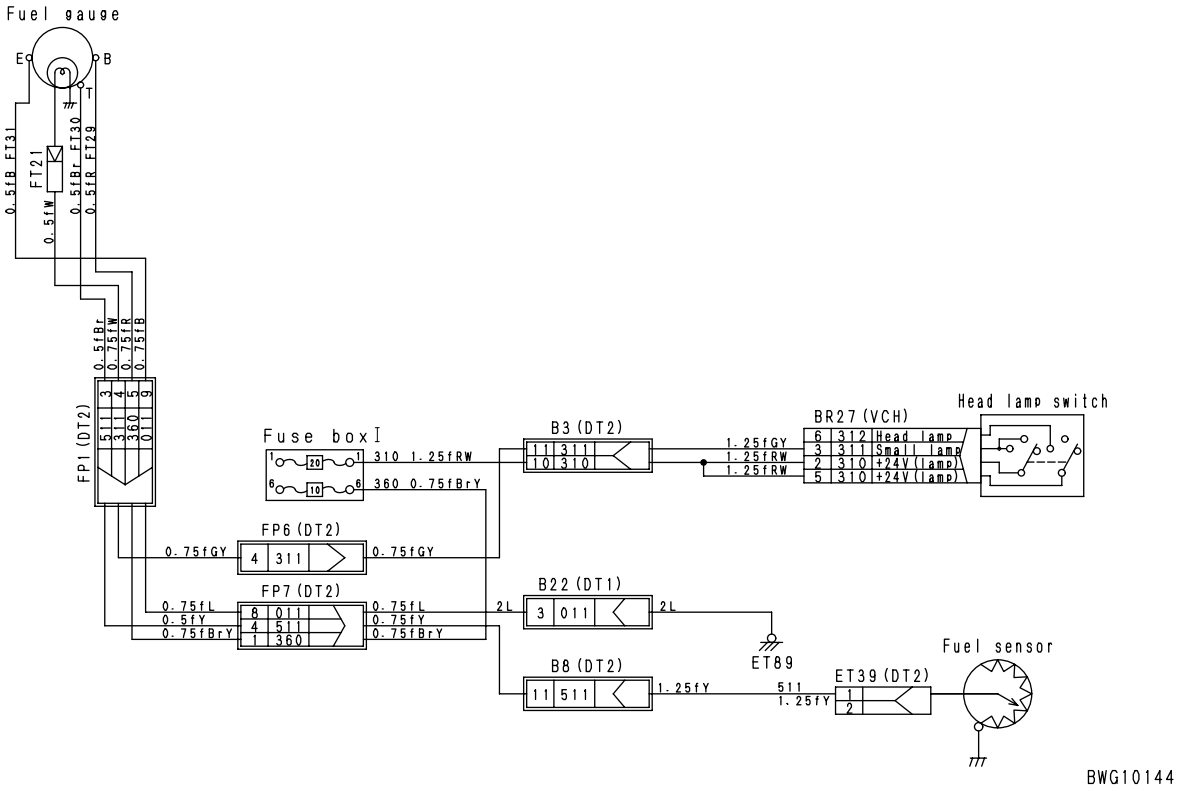
M-9 Related electrical circuit diagram



Serial No. 51001 and up



M-17 Related electrical circuit diagram



2. Precautions when carrying out installation work

- Tighten all bolts and nuts (sleeve nuts) to the specified (KES) torque.
- Install the hoses without twisting or interference.
- Replace all gaskets, O-rings, cotter pins, and lock plates with new parts.
- Bend the cotter pins and lock plates securely.
- When coating with adhesive, clean the part and remove all oil and grease, then coat the threaded portion with 2 – 3 drops of adhesive.
- When coating with gasket sealant, clean the surface and remove all oil and grease, check that there is no dirt or damage, then coat uniformly with gasket sealant.
- Clean all parts, and correct any damage, dents, burrs, or rust.
- Coat rotating parts and sliding parts with engine oil.
- When press fitting parts, coat the surface with anti-friction compound (LM-P).
- After fitting snap rings, check that the snap ring is fitted securely in the ring groove.
- When connecting wiring connectors, clean the connector to remove all oil, dirt, or water, then connect securely.
- When using eyebolts, check that there is no deformation or deterioration, screw them in fully, and align the direction of the hook.
- When tightening split flanges, tighten uniformly in turn to prevent excessive tightening on one side.

★ When operating the hydraulic cylinders for the first time after reassembling cylinders, pumps and other hydraulic equipment removed for repair, always bleed the air as follows:
  1) Start the engine and run at low idling.
  2) Operate the work equipment control lever to operate the hydraulic cylinder 4 – 5 times, stopping the cylinder 100 mm from the end of its stroke.
  3) Next, operate the hydraulic cylinder 3 – 4 times to the end of its stroke.
  4) After doing this, run the engine at normal speed.

★ When using the machine for the first time after repair or long storage, follow the same procedure.

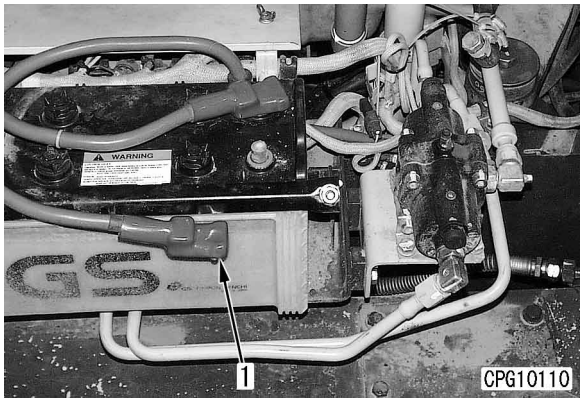
3. Precautions when completing the operation

- If the coolant has been drained, tighten the drain valve, and add water to the specified level. Run the engine to circulate the water through the system. Then check the water level again.
- If the hydraulic equipment has been removed and installed again, add engine oil to the specified level. Run the engine to circulate the oil through the system. Then check the oil level again.
- If the piping or hydraulic equipment have been removed, always bleed the air from the system after reassembling the parts.
  ★ For details, see TESTING AND ADJUSTING, Bleeding air.
- Add the specified amount of grease (molybdenum disulphide grease) to the work equipment parts.

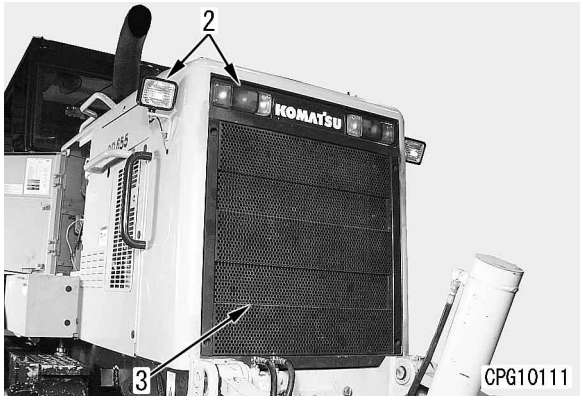
REMOVAL OF ENGINE HOOD ASSEMBLY

Serial No.: 50001 – 51000

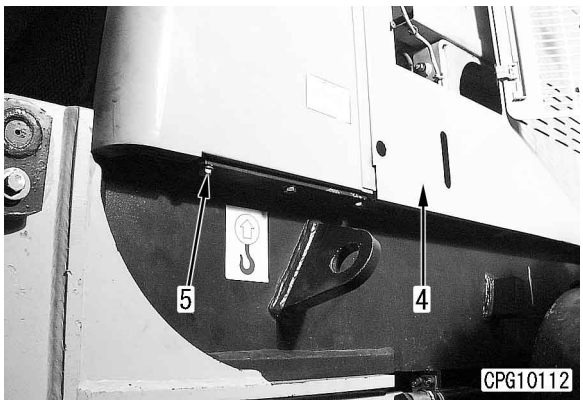
1. Remove battery ground wire (1) from terminal.



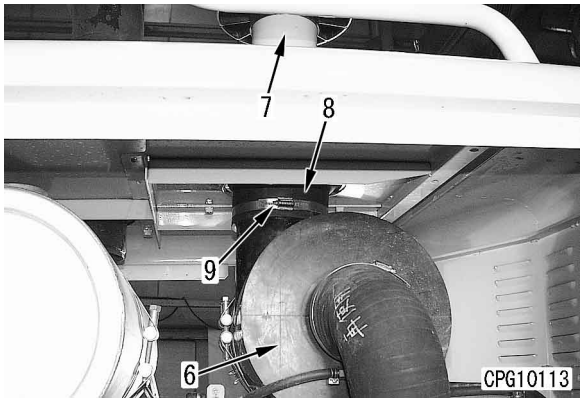
2. Remove connectors of left and right working lamp and license lamp (2) on inside.
   Loosen mounting bolts of radiator guard (3) and remove guard.



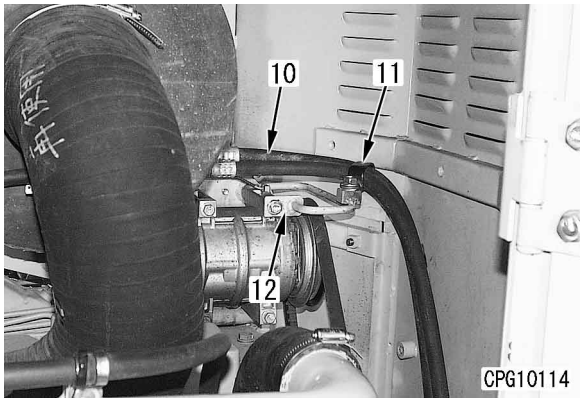
3. Remove left and right mounting bolts (5) (front: 4, center: 4, rear: 6) of hood assembly (4).



4. Loosen clamp (9) of hose (8) connecting air cleaner (6) and precleaner (7), then remove hose (8) from air cleaner (6).

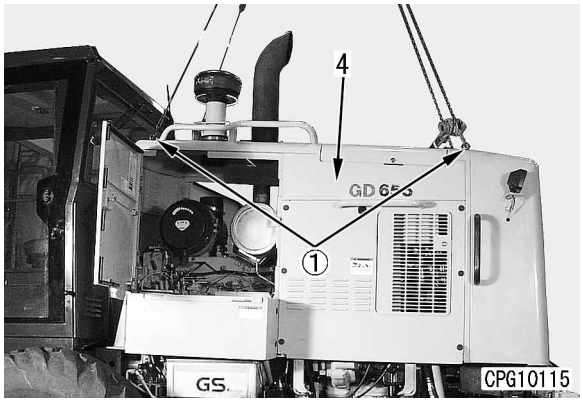


5. Loosen mounting bolts of clamp (11) of air conditioner hose (10) and remove clamp (11). Loosen mounting bolts of guard (12) and remove guard (12).
   ★ The clearance between the hood and operator's cab is small, and it is difficult to remove the hood, so remove the guard at this point.



6. Install 4 eyebolts ① to hood assembly (4), then lift off hood assembly (4).

Hood assembly: **340 kg**



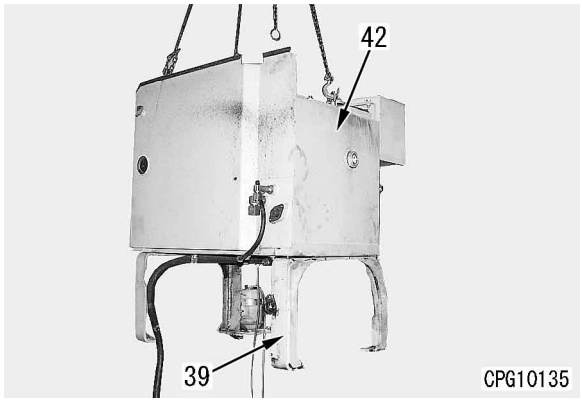
INSTALLATION OF FUEL TANK, HYDRAULIC TANK, AND COOLING WATER SUB TANK ASSEMBLY

Serial No.: 50001 – 51000

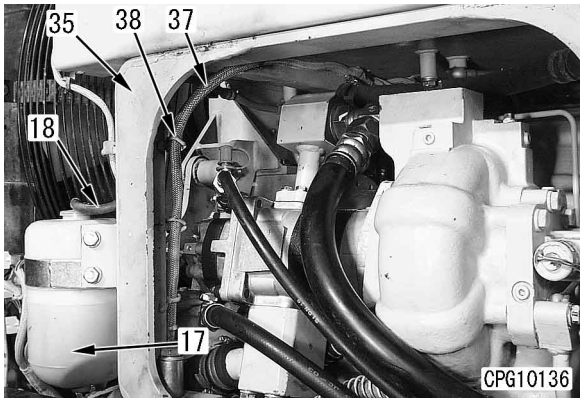
★ When assembling, be extremely careful not to cause failures due to dirt, rust, or scratches.
★ At places where there is double clamping of the hoses, assemble so that the screws are at 180° to each other.
★ Install the hoses carefully so that there is no twisting.
★ Coat the blind plugs with LT-2A.

1. Install eyebolts to tank (42), raise to a suitable height, remove left side of tank mount (39), then tighten temporarily to mounting position on main frame.
   Raise tank (42) and set to mounting position on main frame, insert bolts in right side of tank mount, then temporarily tighten left side mount to tank.

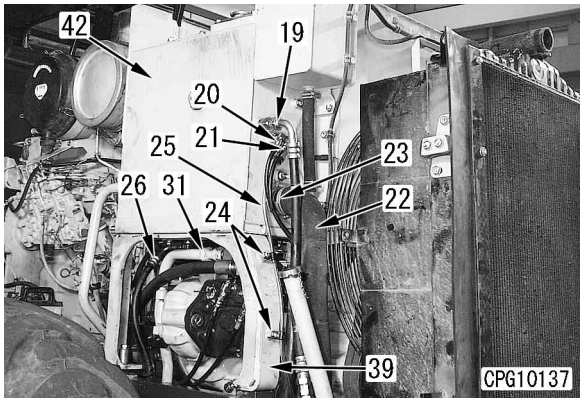
   Tank assembly: **200 kg**



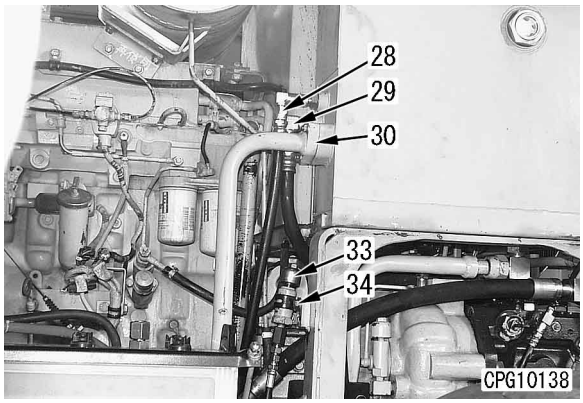
2. Tighten mounting bolts of tank mount (35) fully. Secure wiring harness (37) with clamps (38). Install hose (18) to reserve tank (17).



3. Tighten mounting bolts of tank (42) and tank mount (39). Install drain hose (26) and tube (31). Pass hose (25) through clamp (24) and tighten bolt. Install hoses (21), (20), and (19). Install pump suction hose (22), and tighten clamp (23).



4. Install hoses (28) and (29). Install tube (30) and tighten clamp (34) of breather (33) with bolt.



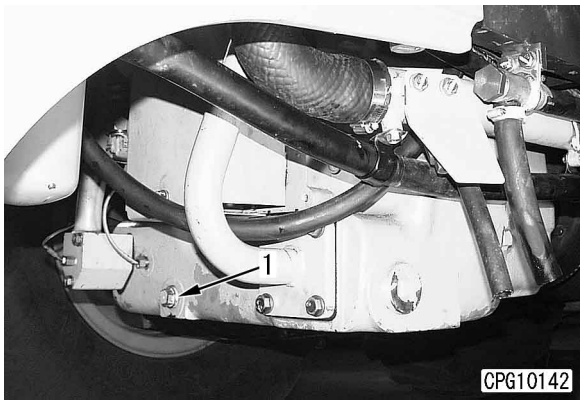
REMOVAL OF TRANSMISSION ASSEMBLY

1. Remove engine hood assembly.
   (For details, see REMOVAL OF ENGINE HOOD ASSEMBLY.)

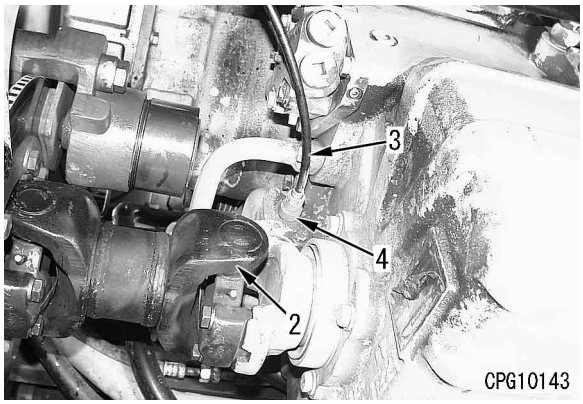
2. Remove fuel tank, hydraulic tank, and coolant sub tank assembly.
   (For details, see REMOVAL OF FUEL TANK, HYDRAULIC TANK, COOLANT SUB TANK).

3. Remove drain plug (1) of transmission oil tank, and drain into container.

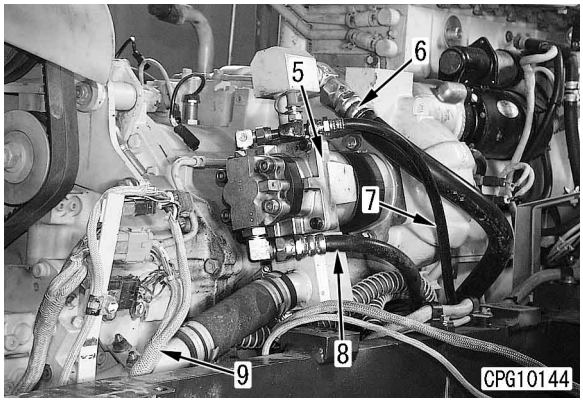
   Transmission oil: **Approx. 45 ℓ**



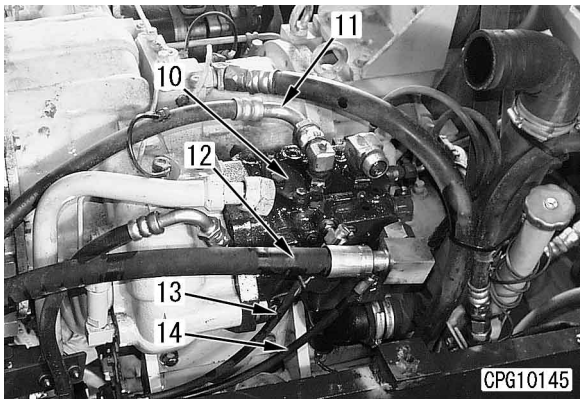
4. Loosen mounting bolts of universal joint (2) and remove joint from flange. Loosen mounting nut (4) of speedometer cable (3), then remove cable.



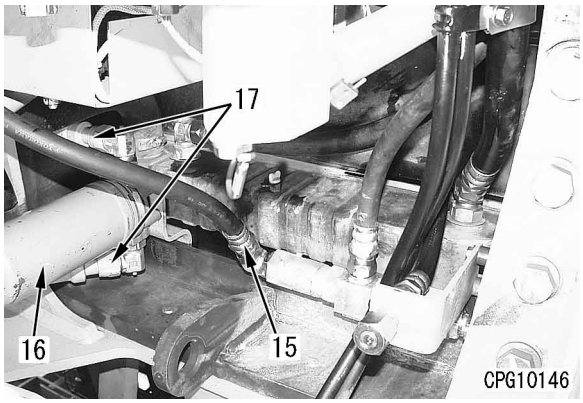
5. Remove hoses (6), (7), and (8) of pump (5) at pump end. Remove connectors of speed sensor system wiring harness (9).
   ★ Fit male and female plugs into the hoses and nipples after removing them.
   ★ Cover the removed connectors with a nylon bag to prevent the entry of dust or water.



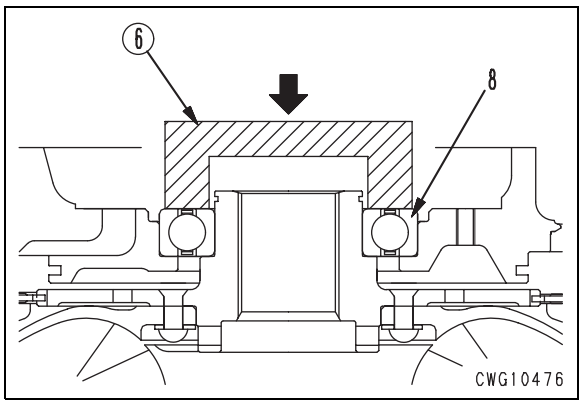
6. Remove hoses (11), (12), (13), and (14) installed to hydraulic pump (10) at pump end.
   ★ Fit male and female plugs in the hoses and nipples after removing them.



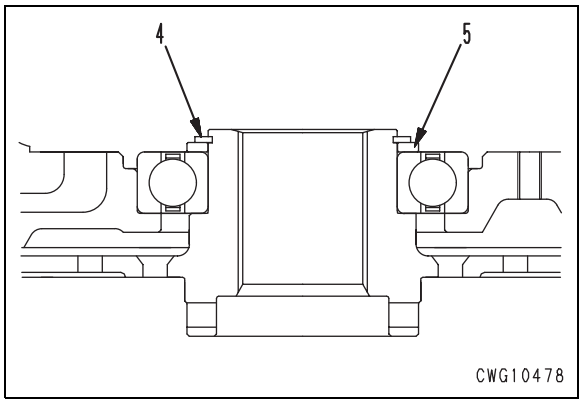
7. Remove hydraulic hose (15) under radiator. Remove filter (16), then remove 2 filter hoses (17). (Because right side mounting bolts cannot be removed)



5) Install bearing (8) with push tool ⑥.
★ Press fit the outer race and inner race at the same time.

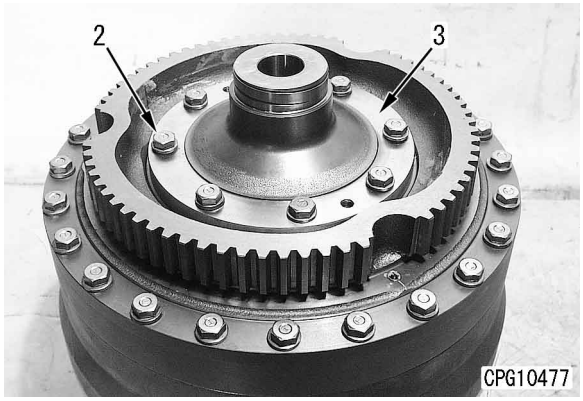


6) Fit spacer (5) and install snap ring (4).
★ Check that the snap ring is securely fitted in the groove.



7) Tighten mounting bolts (6).
Mounting bolt:
Thread tightener (LT-2)
Mounting bolt:
66.15 ± 7.35 N·m {6.75 ± 0.75 kgm}

7. Pilot
Install pilot (3), then tighten mounting bolts (2).
Mounting bolt: **Thread tightener (LT-2)**
Mounting bolt:
66.15 ± 7.35 N·m {6.75 ± 0.75 kgm}

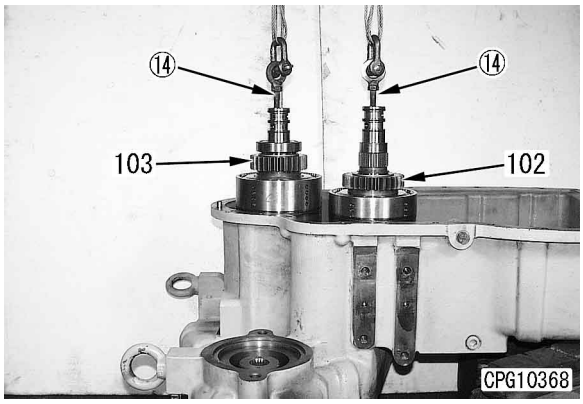


29. 1st, FH clutch assembly, REVERSE, FL clutch assembly

1) Using eyebolt ⑭, remove 1st, FH clutch assembly (102) and REVERSE, FL clutch assembly (103) at the same time.

★ The gears of the two sets of clutch assemblies cross, so both sets must be raised at the same time in order to remove them.

★ Raise both types of clutch assemblies perpendicularly.



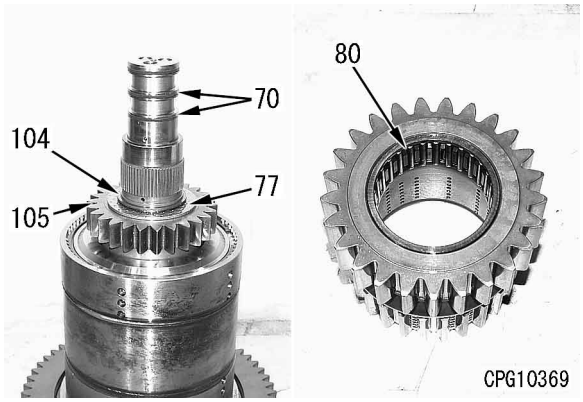
2) Disassembly of 1st, FH clutch assembly

★ The intermediate gear and bearing at the tip of the 1st gear shaft were removed in Step 29.

i) Remove seal ring (70).

ii) Remove snap ring (104) and thrust washer (77).

iii) Remove 1st speed clutch gear (105), then remove needle bearing (80).

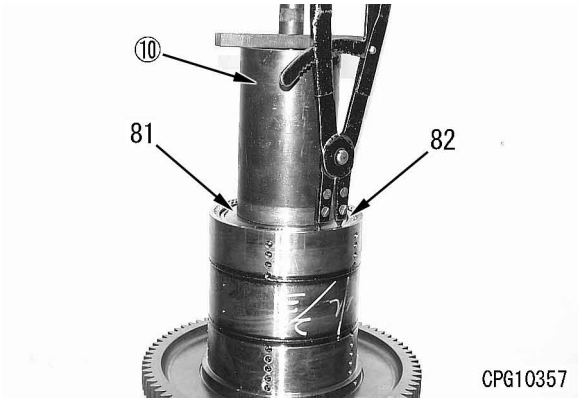


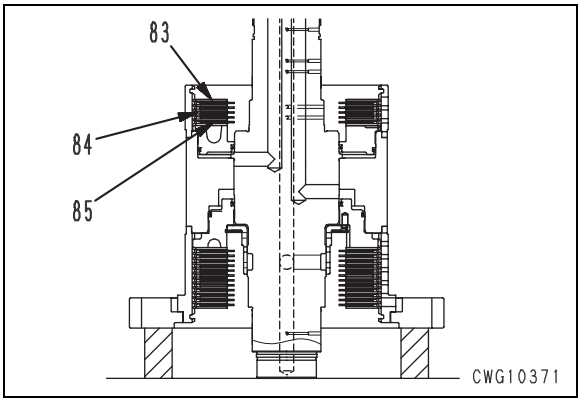
iv) Push in end plate (81) with push tool ⑩, and remove snap ring (82).

v) Remove end plate (81).

vi) Remove 6 plates (83), 5 springs (84), and 5 discs (85) in turn.

★ Store the discs and plates in a flat place to prevent them from warping.





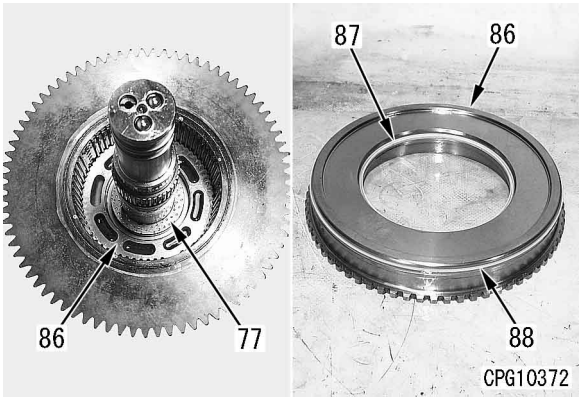
vii) Remove thrust washer (77).

viii) Remove piston assembly (86).

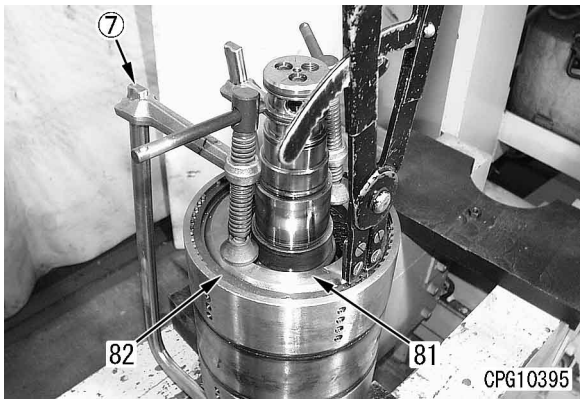
★ The piston cannot be removed if it is at an angle, so set it horizontal to remove it.

★ Be careful not to use force when removing. This will scratch the inside surface of the cylinder.

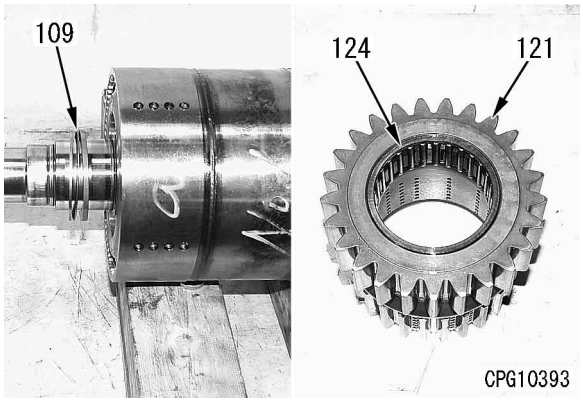
ix) Remove seal rings (87) and (88) from piston assembly (86).



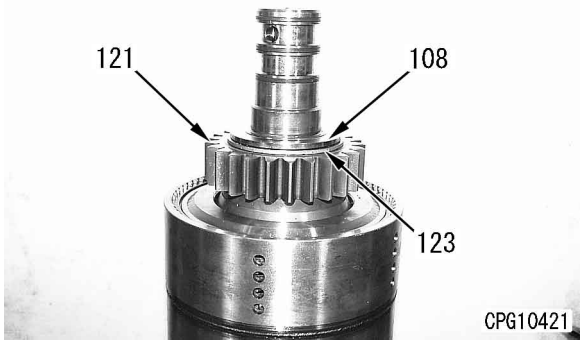
v) Assemble end plate (81), then push in with bar handle ⑦ and install snap ring (82).
★ Check that the snap ring is fitted securely in the groove.



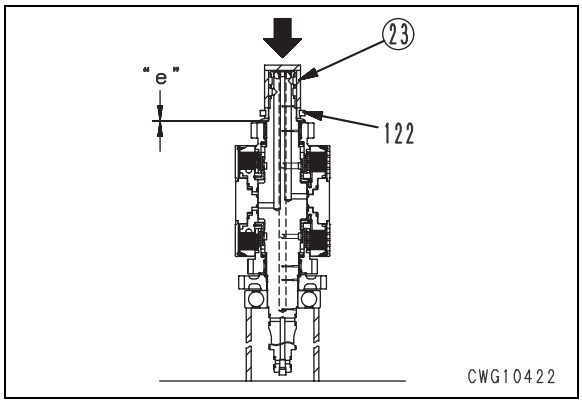
vi) Install thrust bearing (109).
★ Insert the thick race to the clutch end.
vii) Assemble needle bearing (124) to R clutch gear (121).



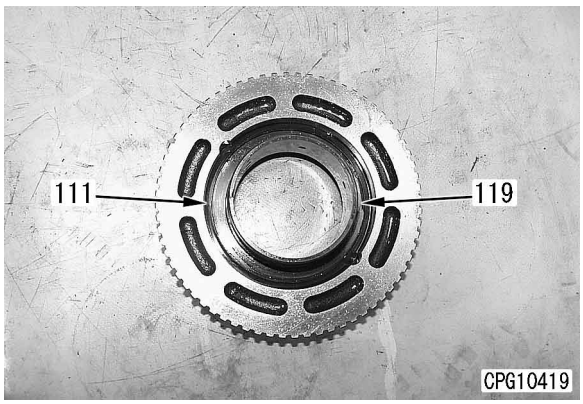
viii) Align inner teeth of discs and install R clutch gear (121).
★ Move the gear carefully a little at a time to the left, right, up, and down to align the teeth of the gear and discs when installing.
ix) Install thrust washer (123) and spacer (108).



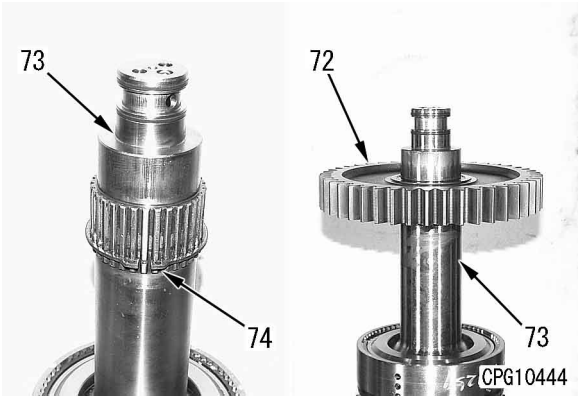
x) Using push tool ㉓, press fit bearing (122) to shaft.
★ After press fitting the bearing, check that there is no clearance between the end face of the bearing and the spacer.
★ After press fitting the bearing, check clearance "e" between the thrust washer and the spacer.
★ Clearance: 0.29 – 0.69 mm



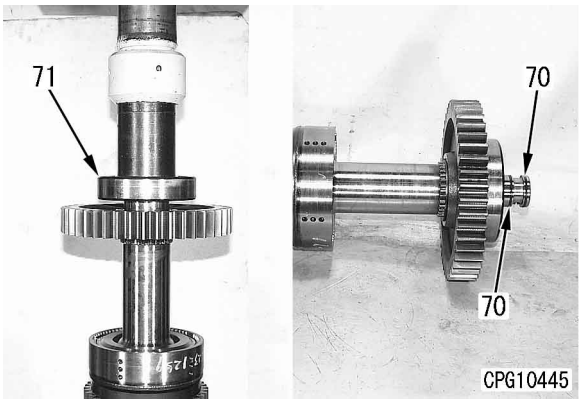
xi) Set sleeve (119) to piston, then install snap ring (111).
★ Check that the snap ring is fitted securely in the groove.



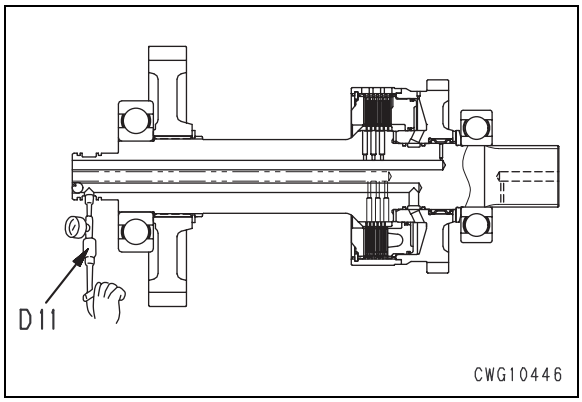
xi) Install snap ring (74) to tip of shaft (73) on opposite side from clutch.
★ Check that the snap ring is fitted securely in the groove.
xii) Install gear (72).



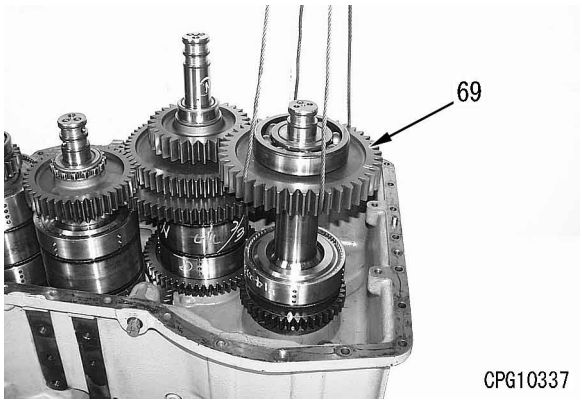
xiii) Using press, press fit bearing (71).
★ After press fitting the bearing, check that there is no clearance between the end face of the bearing and the gear.
xiv) Install seal ring (70).
★ Coat the outer circumference of the seal ring with grease (G2-LI), and be careful to install it uniformly.



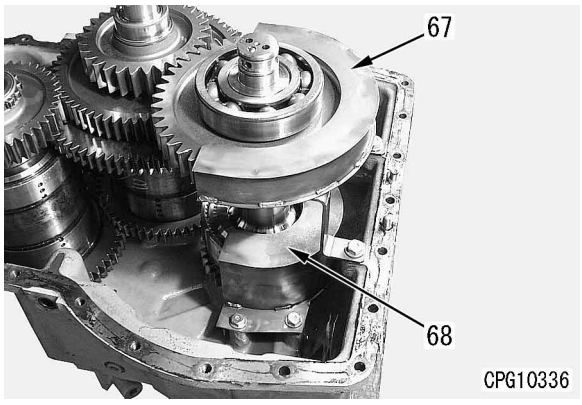
xv) Using tool **D11**, pump in air through oil hole in shaft and check operation of clutch.
★ If the gear at the end where the air is pumped in is held in position, the clutch is working normally.
★ Air pressure:
0.5 – 0.6 MPa {5.0 – 6.0 kg/cm²}



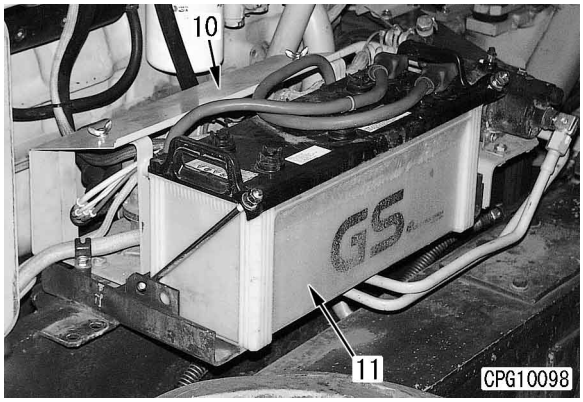
2) Using 2 wire ropes, install 4th speed clutch assembly (69).



3) Install oil guides (68) and (67).

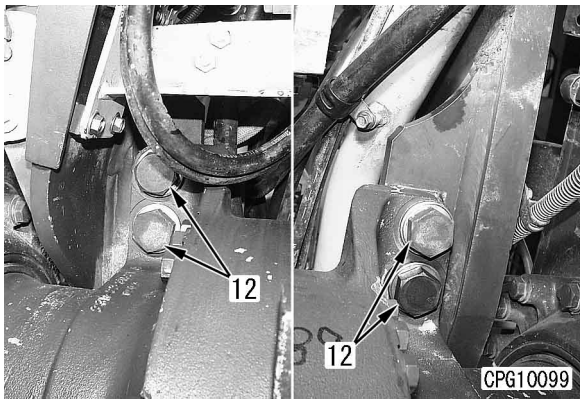


12. Remove cover (10) of electric relay system box. (Because mounting bolts and nuts of final drive assembly cannot be removed.)
Remove left and right batteries (11).

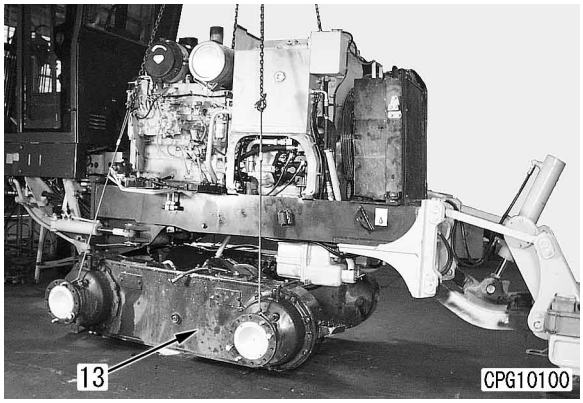


13. Raise final drive assembly, remove bolts (12) mounting assembly to main frame (2 each at left, right, front, rear: total 8), then lower.

Final drive assembly: **2750 kg**



14. After raising final drive assembly (13), use a crane and forklift truck together. Insert forks of lift truck from right side (or left side) of final drive and remove lifting tool from fork. With left side of final drive raised, operate crane slowly and drive lift truck in reverse. When tip of forks is holding tandem case on left side, check that forks can support final drive, then remove lifting tool on left side and use lift truck to remove to outside of machine. Then raise with crane and set on stable stand.

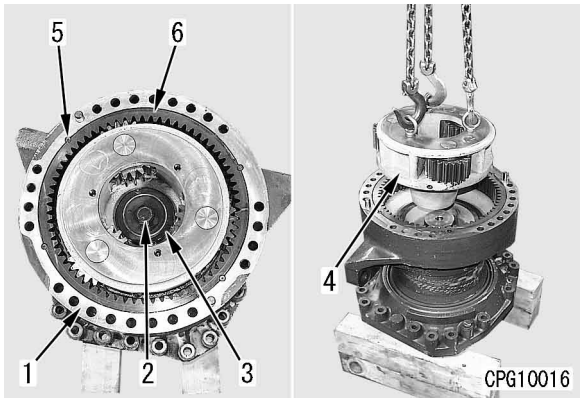


DISASSEMBLY OF SIDE CASE

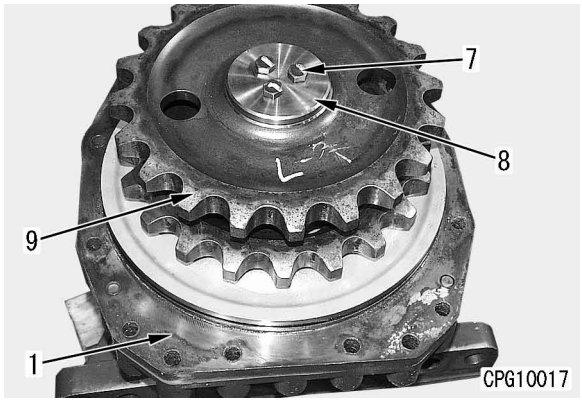
1. Raise side case (1), set sprocket at bottom, then set on stable stand. Remove center shaft bolt (2), remove plate (3), then remove shim. Lift off planetary gear (4). Pull out 4 roll pins (5), then remove ring gear (6).

   Side case assembly: **310 kg**

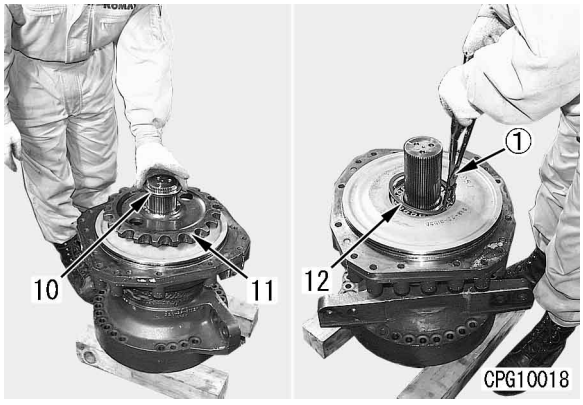
   Planetary gear: **45 kg**



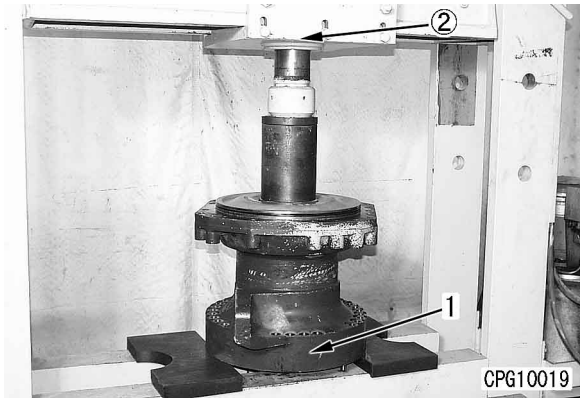
2. Raise side case (1) and turn over to set sprocket at the top, then set on stable stand. Remove bolt (7), remove plate (8), then remove shim. Remove outside sprocket (9).



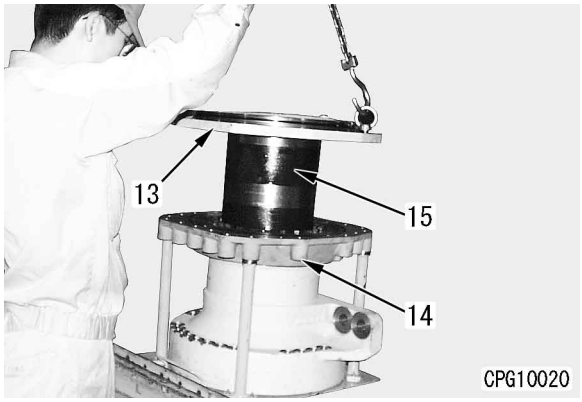
3. Remove collar (10), then remove inside sprocket (11). Using ring pliers ①, remove snap ring (12).



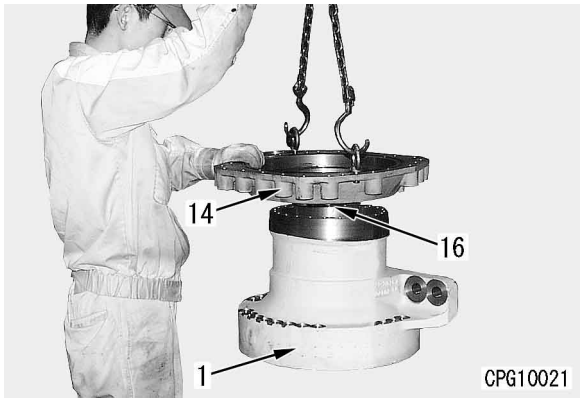
4. Set side case (1) to press stand, and use press ② to remove shaft together with bearing. Using press in same way, remove bearing from shaft.



5. Remove dowel pin of cage (14) and flange (13), lift off flange (13), then remove 2 bushings (15).

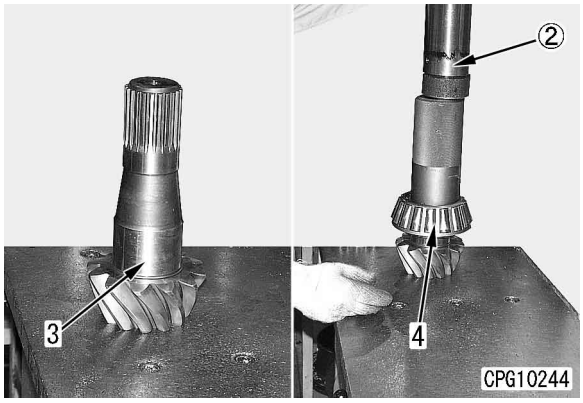


6. Remove mounting bolts of side case (1) and cage (14), lift off cage, then remove oil seal (16).

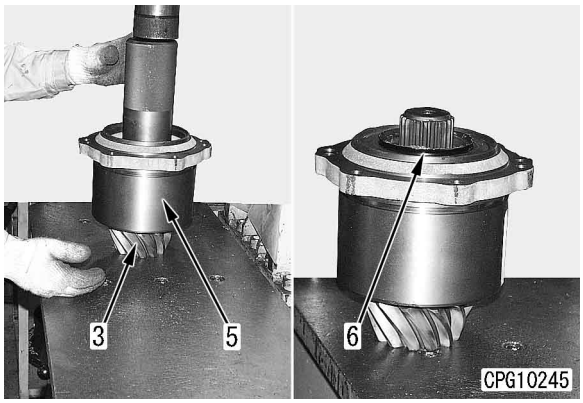


ASSEMBLY OF BEVEL PINION ASSEMBLY

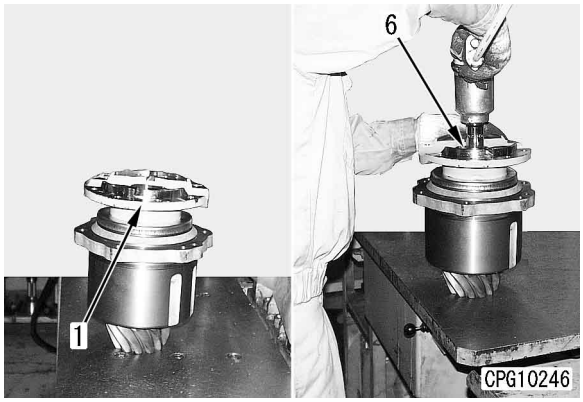
1. Press fit bearing (4) to pinion shaft (3) with press ②.
   Bearing: **Coat with EO 30**



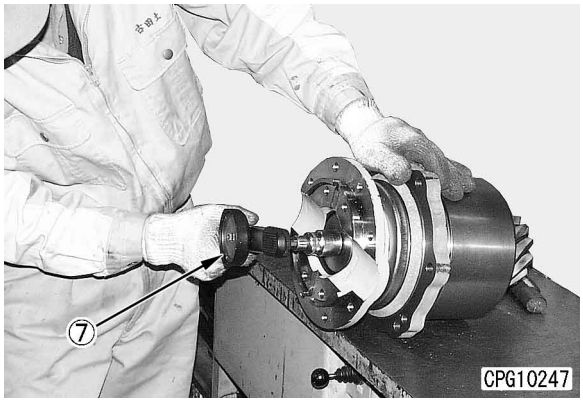
2. Press fit cage (5) and bearing to pinion shaft (3), and install seal (6).
   Bearing: **Coat with EO 30**
   Oil seal lip:
   Fill 80% of space with G2-LI



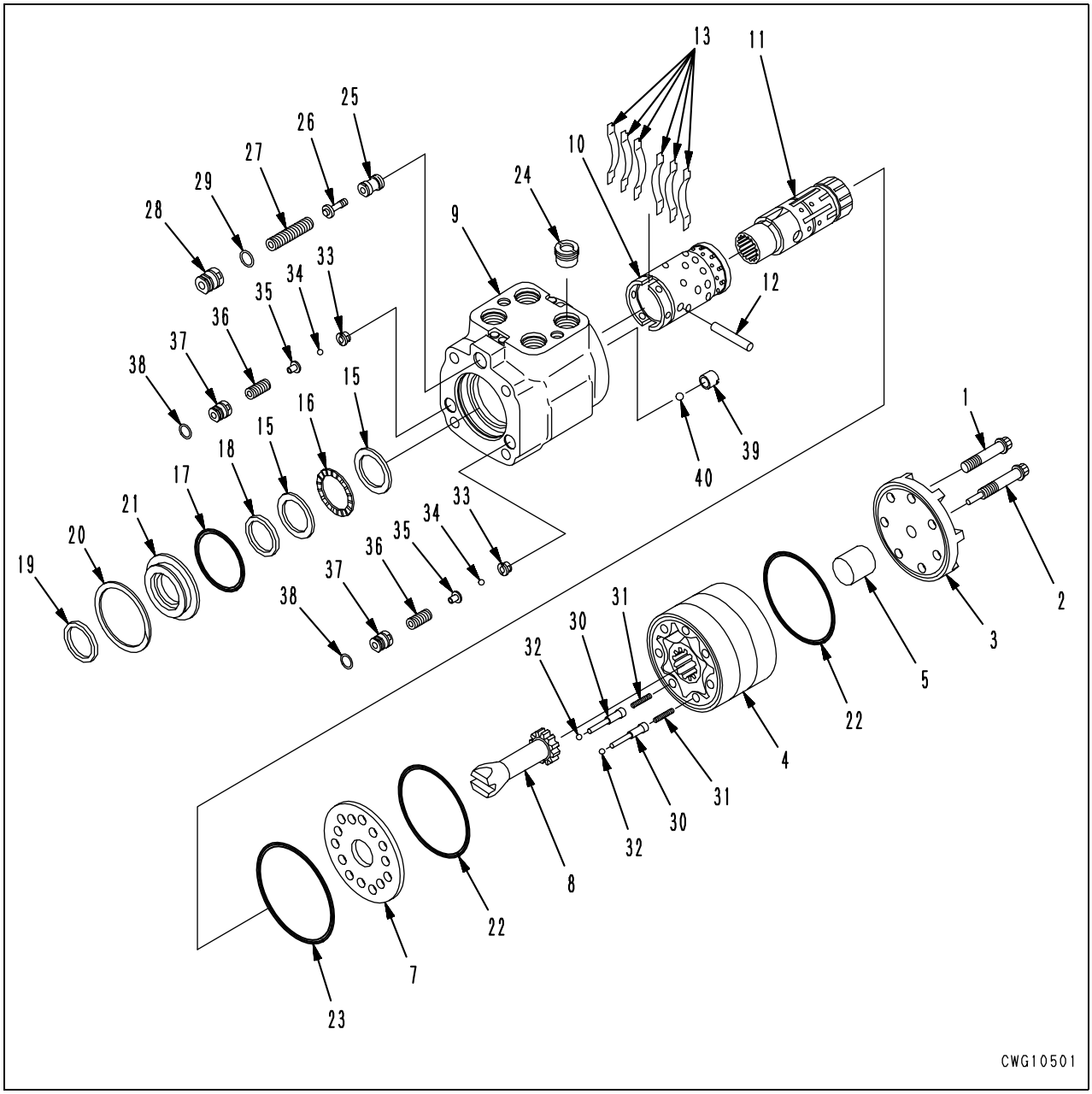
3. Install deflector and coupling (1), assemble O-ring, shim, and holder, then tighten bolts (6).
   Mating surface of coupling and seal:
   Coat with G2-LI.
   Coupling mounting bolt:
   Thread tightener (LT-2)
   Coupling mounting bolt:
   245 – 309 N·m {25 – 31.5 kgm}
   Target: **227 N·m {28.2 kgm}**
   ★ Types of shim: 0.1, 0.2, 0.5 mm



4. Install torque wrench ⑦ to coupling mounting bolt, and measure starting torque.
   ★ Starting torque:
   8.73 – 10.69 N·m {0.89 – 1.19 kgm}



STANDARD INTEGRAL ORBIT-ROLL



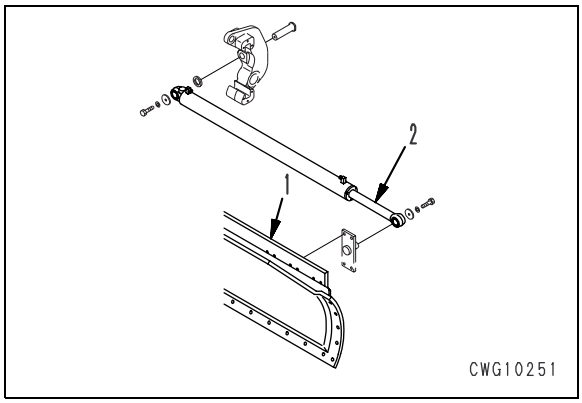
Tools needed for disassembly and assembly

(1) Torque wrench (torque capacity: 49 Nm {5 kgm})
(2) 5/12 in - 12 point socket
(3) Flat-headed screwdriver (large)
(4) Flat-headed screwdriver (small)
(5) Spring insertion tool (P/N: 600057)
(6) 3/16 in hexagonal wrench
(7) Plastic hammer
(8) Small amount of grease
(9) Vice
(10) Oil-based felt pen
(11) Tweezers

REMOVAL OF BLADE ASSEMBLY

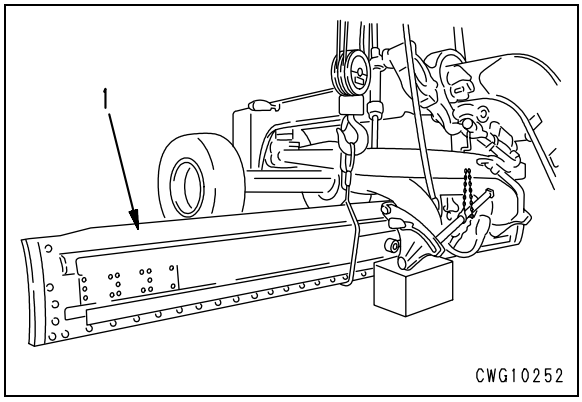
⚠ Start the engine, operate the work equipment control levers, raise blade so that bottom is approx. 100 mm from ground, set stable stand to match height under circle, then lower.

1. Operate blade control lever and shift blade (1) fully to left. Sling blade, remove mounting bolts of blade side shift cylinder rod (2), remove rod head, then operate control lever to retract cylinder rod fully.
   ★ After completing operation of the control lever, stop the engine and lock the lever.



2. Sling blade (1), move position of wire to center of blade while pushing blade out, then lift off.

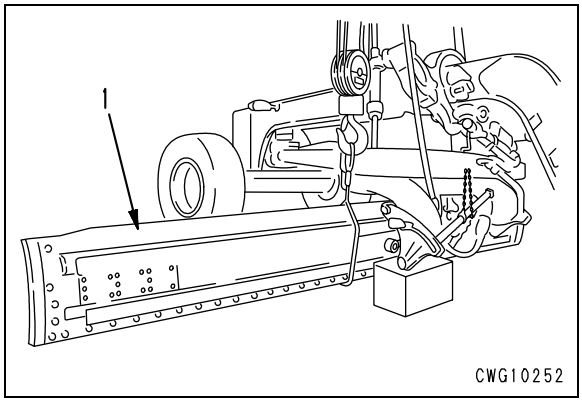
Blade assembly: **Approx. 755 kg (differs according to blade)**



INSTALLATION OF BLADE ASSEMBLY

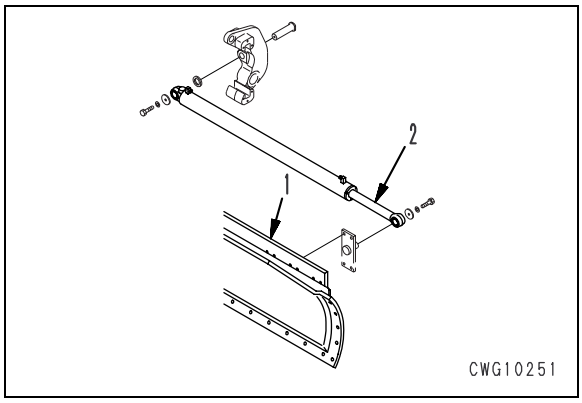
1. Raise center of blade (1), and install right tip of blade to adjuster. Extend blade side shift cylinder rod fully, and move position of lifting wire while pushing in blade to point where it is possible to connect cylinder rod.
   ★ Do not coat the rail at the rear of the blade with grease.

Blade assembly: **Approx. 755 kg (differs according to blade)**

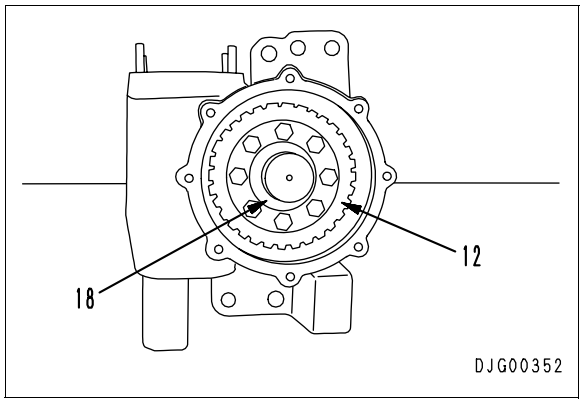


2. Install cylinder rod (2) to blade (1) and tighten mounting bolts to specified torque. Remove stand from under circle.

Cylinder rod pin hole: **Coat with G2-LI**



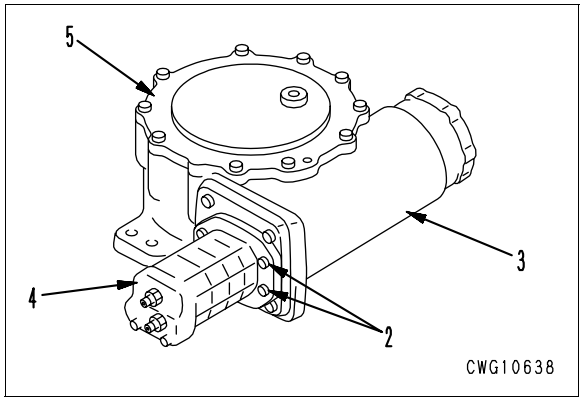
4) Install worm wheel shaft assembly (12).
   ★ Matching the teeth of the worm wheel gear and worm wheel, tighten the nuts on the housing side.
   ★ Install washers (17) and (18) to the top and bottom of the worm wheel shaft assembly.



4. Connection of circle rotation gear and motor assembly

Matching circle rotation gear (3) and motor assembly (4), install mounting bolts (2).

★ Install the key to the motor assembly shaft.

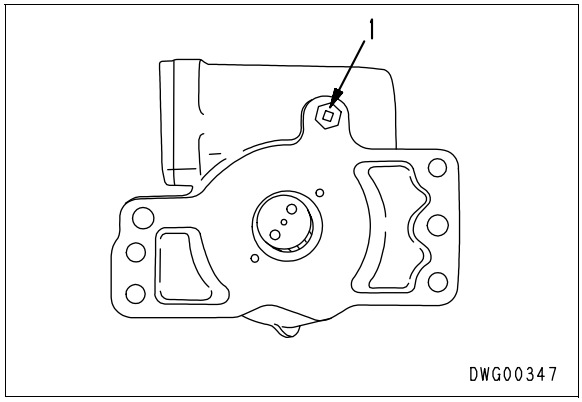


5. Refilling with oil

Tighten drain plug (1) and add gear oil to the specified level.

Circle rotation gear case: **4 ℓ**

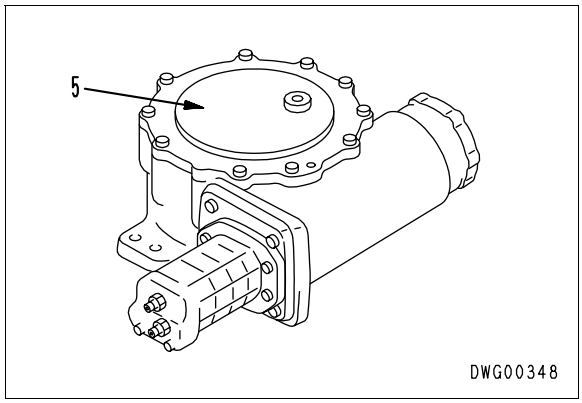
Drain plug:
32.36 – 44.13 Nm {3.3 – 4.5 kgm}



6. Cover

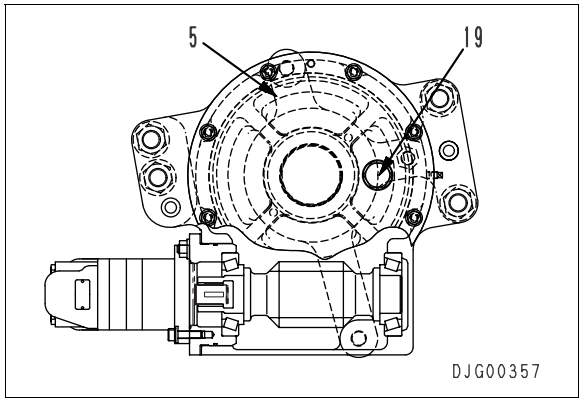
Set the O-ring and install cover (5).

Bolts at 2 through parts of case tap on worm gear side: **Adhesive (LT-2)**



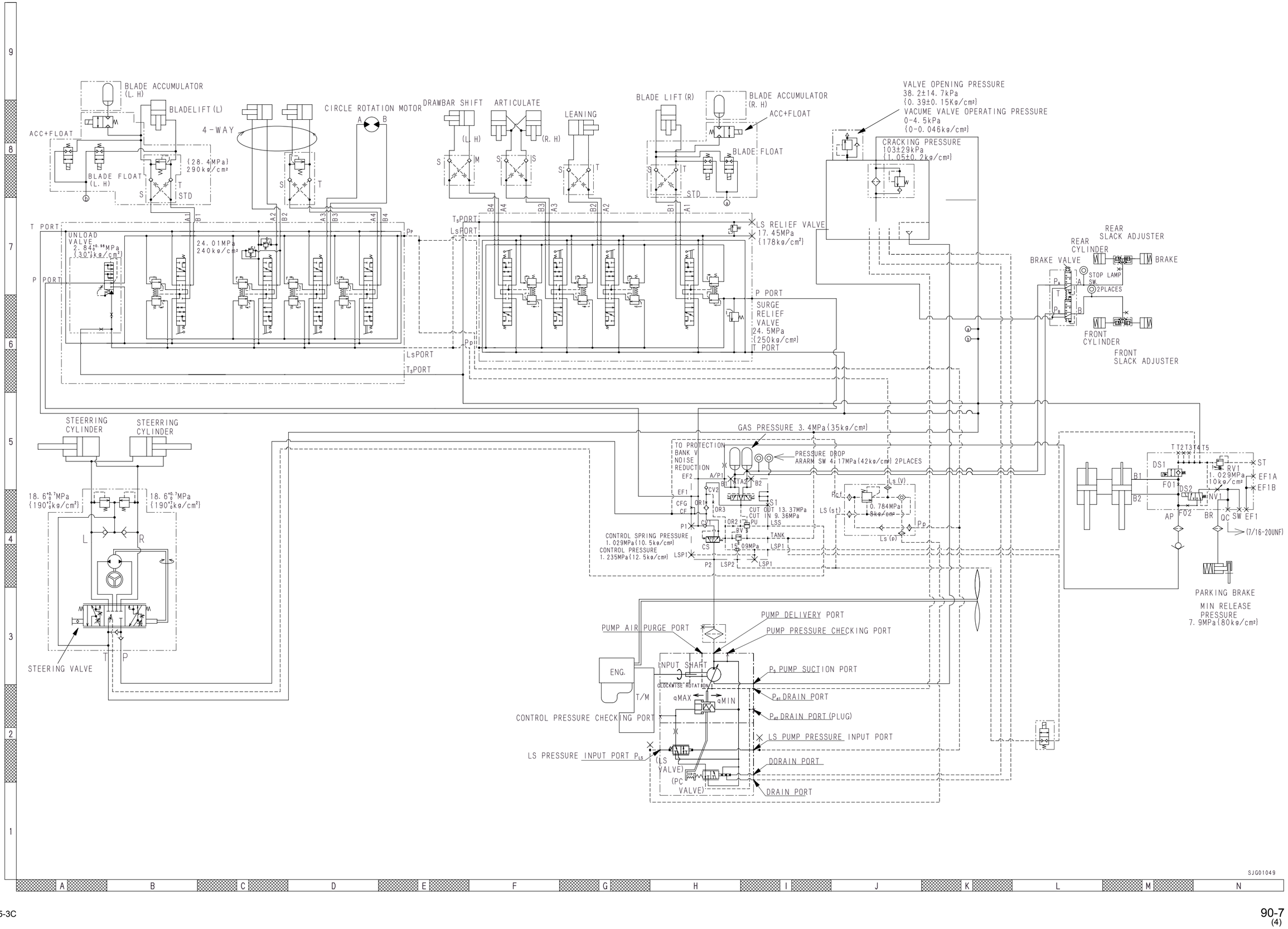
★ Install cover (5) so that oil filler plug (19) will be positioned as shown in the illustration.

Oil filler plug:
73.55 – 122.58 Nm {7.5 – 12.5 kgm}



HYDRAULIC CIRCUIT DIAGRAM

Serial No.: 50001 – 51000



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