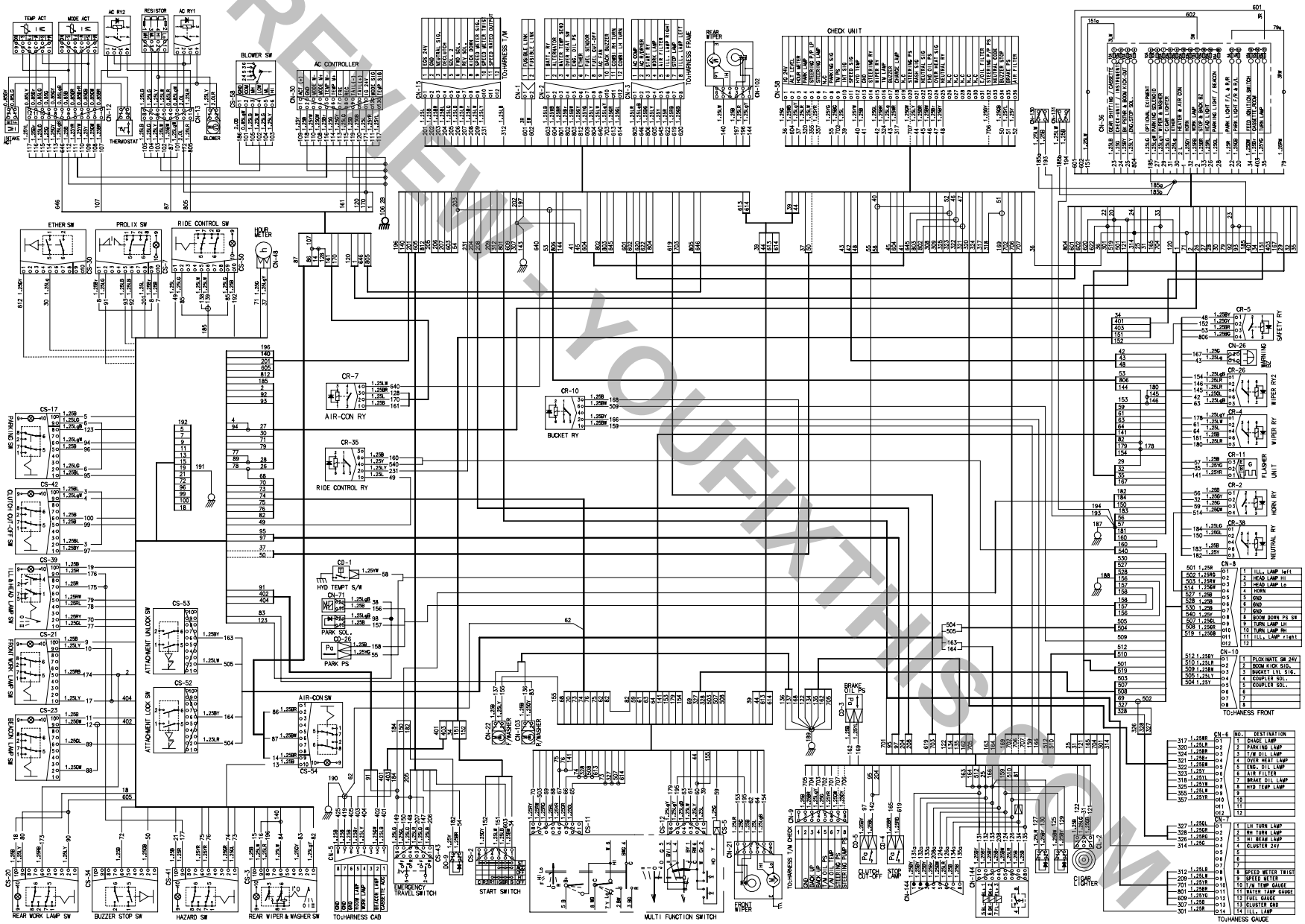
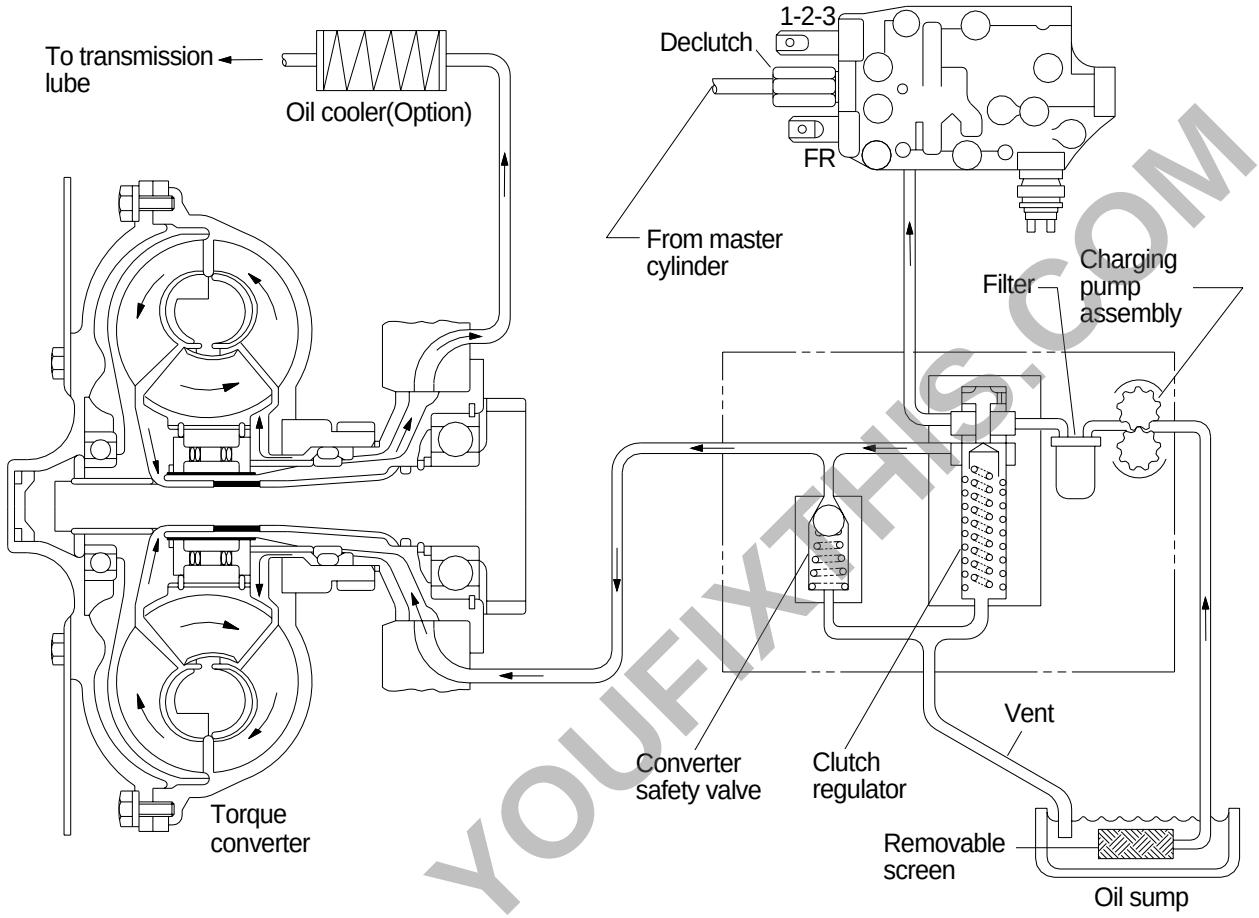


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1) HYDRAULIC SCHEMATIC



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5. TIGHTENING TORQUE OF MAJOR COMPONENT

No.	Items		Size	kgf · m	lbf · ft
1	Engine	Engine mounting bolt, nut	M10×1.5	6.9 ± 1.4	50 ± 10
2		Radiator mounting bolt, nut	M12×1.75	12.3 ± 2.5	89 ± 18
3	Hydraulic system	Main pump housing mounting bolt	1/2-13UNC	19.6 ± 2.9	142 ± 21
4		Main control valve mounting socket bolt	M10×1.5	7.2 ± 1.6	52 ± 12
5		Orbitrol valve mounting bolt	M10×1.5	5 ± 1	36 ± 7.2
6		Priority valve mounting bolt	M 8×1.25	2.5 ± 0.5	18 ± 3.6
7		Brake valve mounting bolt	M 8×1.25	2.5 ± 0.5	18 ± 3.6
8		Cut off valve mounting bolt	M 8×1.25	2.5 ± 0.5	18 ± 3.6
9		Cushion valve mounting bolt	M 8×1.25	2.5 ± 0.5	18 ± 3.6
10		Fuel tank mounting bolt	M20×2.5	57.9 ± 8.7	419 ± 63
11		Hydraulic oil tank mounting bolt	M16×2.0	29.7 ± 4.5	215 ± 33
12		Service tank mounting bolt	M16×2.0	29.7 ± 4.5	215 ± 33
13	Power train system	Transmission mounting bolt	3/4-10UNC	45 ± 7.3	325 ± 33
14		Front axle mounting bolt	M20×2.5	57.9 ± 8.7	419 ± 63
15		Rear axle support mounting bolt, nut	M27×2.0	135 ± 15	976 ± 108
16		Tire mounting nut	M22×1.5	79 ± 2.5	571 ± 18
17		Drive shaft joint mounting bolt, nut	3/8-24UNF	6 ± 0.8	43 ± 5.8
18	Others	Counterweight mounting bolt	M30×3.0	199 ± 30	1439 ± 216
19		Operator's seat mounting bolt	M 8×1.25	3.4 ± 0.8	25 ± 5
20		ROPS Cab mounting bolt(12EA)	1-14UNS	86	620
		ROPS Cab mounting bolt(4EA)	1 1/4-12UNF		

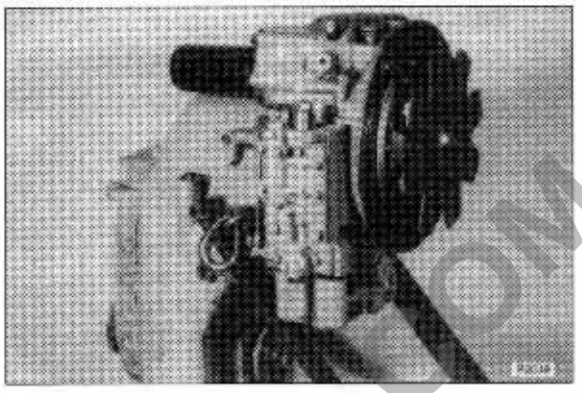
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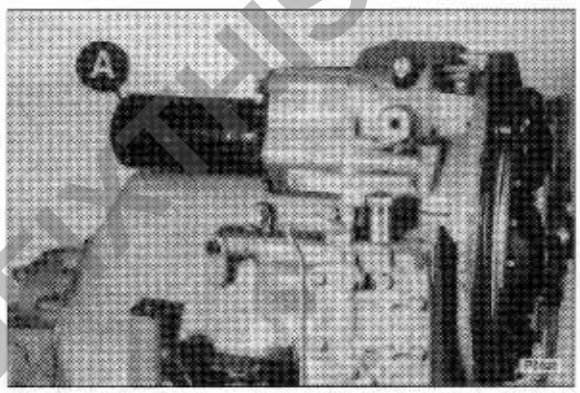
1. TRANSMISSION

1) 4 SPEED TRANSMISSION DISASSEMBLY

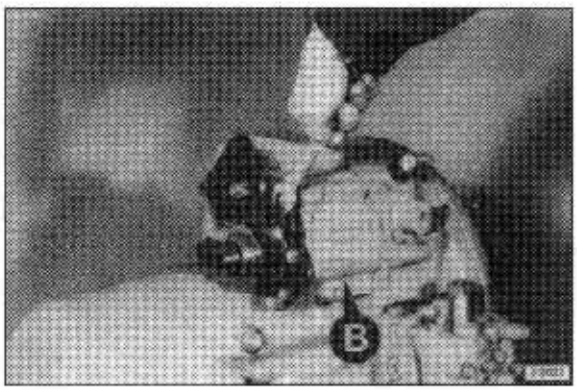
(1) It is recommended that a locally made stand is used to support the transmission as shown during disassembly.



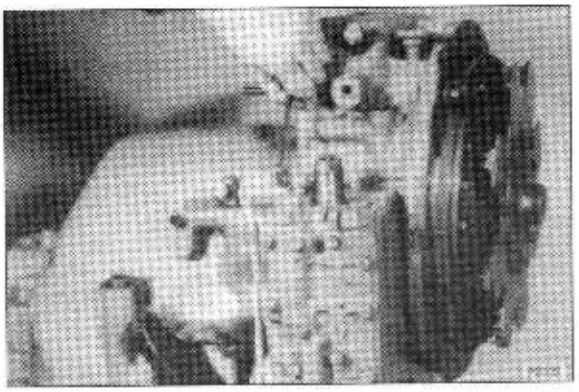
(2) Remove the filter cartridge **A** and dipstick/filler tube(Not shown).



(3) Remove the charge pump **B** and the main hydraulic pump(Not shown).



(4) Remove the cross-over pipe.



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2. TROUBLESHOOTING

1) TRANSMISSION

※ **Diagnose malfunction charts are arranged from most probable and simplest to verify, to least likely, more difficult to verify. Remember the following steps when troubleshooting a problem :**

Step 1. Operational check out procedure(See group 3 in section 1.)
Step 2. Operational checks(In this group.)
Step 3. Troubleshooting
Step 4. Tests and/or adjustments(See group 3.)

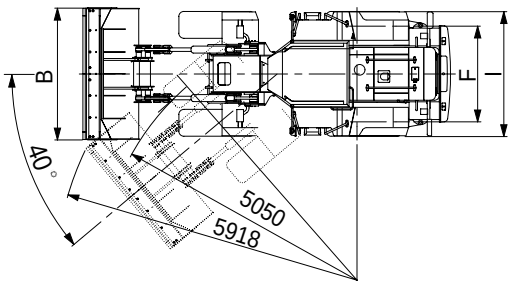
Problem	Cause	Remedy
Transmission slippage	Low oil level.	Add oil.
	Wrong oil grade.	Change oil.
	Restricted transmission pump suction screen.	Remove and clean screen.
	Leak in transmission control valve or gasket.	Remove valve and inspect gaskets.
	Low transmission pump flow due to worn pump.	Do transmission pump flow test.
	Weak or broken pressure regulating valve spring.	Do transmission system pressure test.

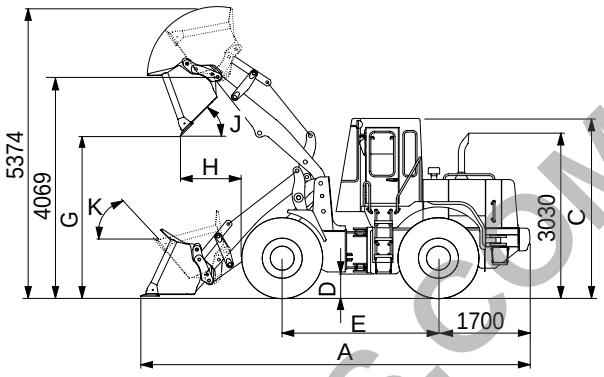
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2. SPECIFICATIONS

1) WITHOUT CUTTING EDGE TYPE BUCKET



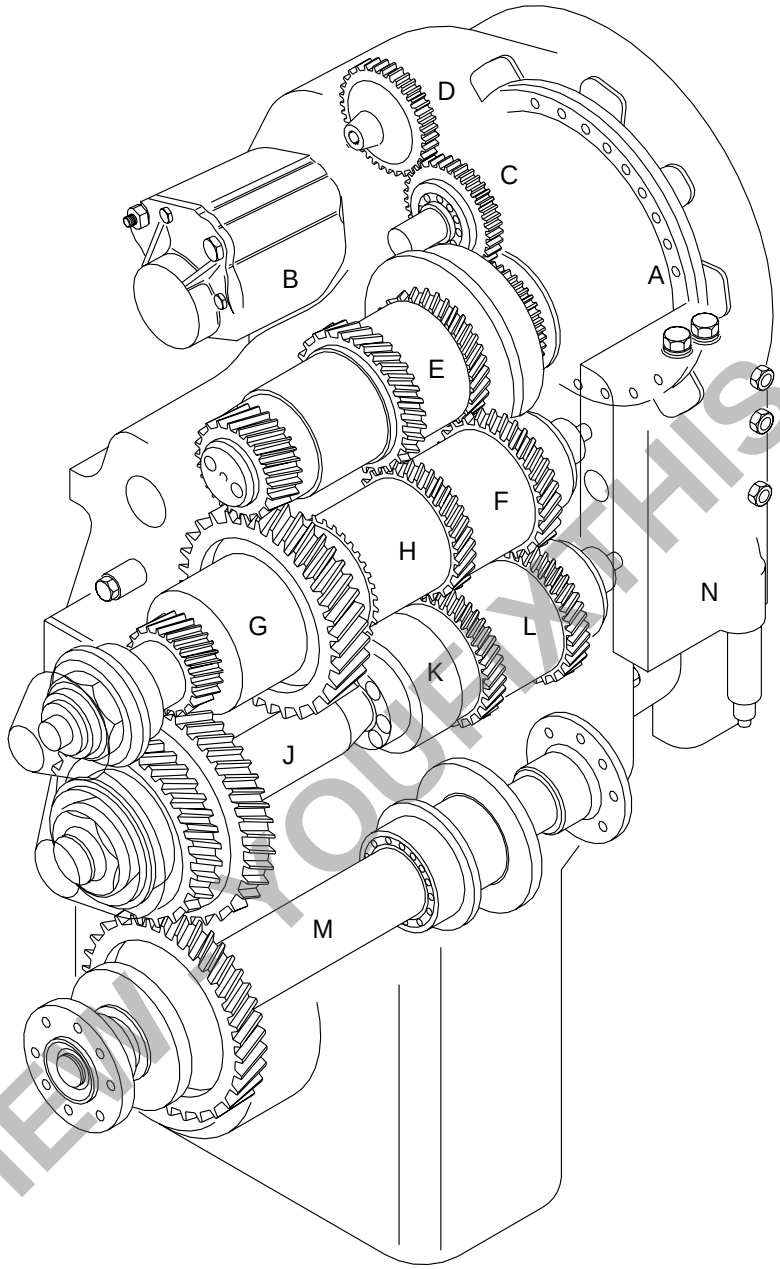


Description			Unit	Specification
Operating weight			kg(lb)	13180(29060)
Bucket capacity		Struck	$m^3(yd^3)$	1.9(2.5)
		Heaped		2.2(2.9)
Overall length		A	mm(ft-in)	7132(23' 5")
Overall width		B		2600(8' 6")
Overall height		C		3300(10' 10")
Ground clearance		D		412(1' 4")
Wheelbase		E		2900(9' 6")
Tread		F		1930(6' 4")
Dump clearance at 45°		G		3037(10' 0")
Dump reach		H		1106(3' 8")
Width over tires		I		2460(8' 1")
Dump angle		J	Degree (°)	50
Roll back angle(Carry position)		K		52
Cycle time		Lift(With load)	sec	6.6
		Dump(With load)		1.5
		Lower(Empty)		2.8
Maximum travel speed			km/hr(mph)	38(23.7)
Braking distance			m(ft-in)	13(42' 8")
Minimum turning radius				5.05(16' 7")
Gradability			Degree (°)	30
Travel speed	Forward	First gear	km/hr(mph)	6(3.7)
		Second gear		12.5(7.8)
		Third gear		25.1(15.6)
		Fourth gear		38(23.7)
	Reverse	First gear		6(3.7)
		Second gear		12.5(7.8)
		Third gear		25.1(15.6)

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2) TRANSMISSION LAYOUT



A	Torque converter	F	Reverse clutch	K	3rd clutch
B	Charge pump assembly	G	1st clutch	L	4th clutch
C	Pump drive idler gear	H	2st clutch	M	Output shaft
D	Pump drive gear	J	Idler shaft	N	Solenoid control valve
E	Forward clutch				

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Millimeters to Inches

1mm = 0.03937in

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

Kilogram to Pound

1kg = 2.2046lb

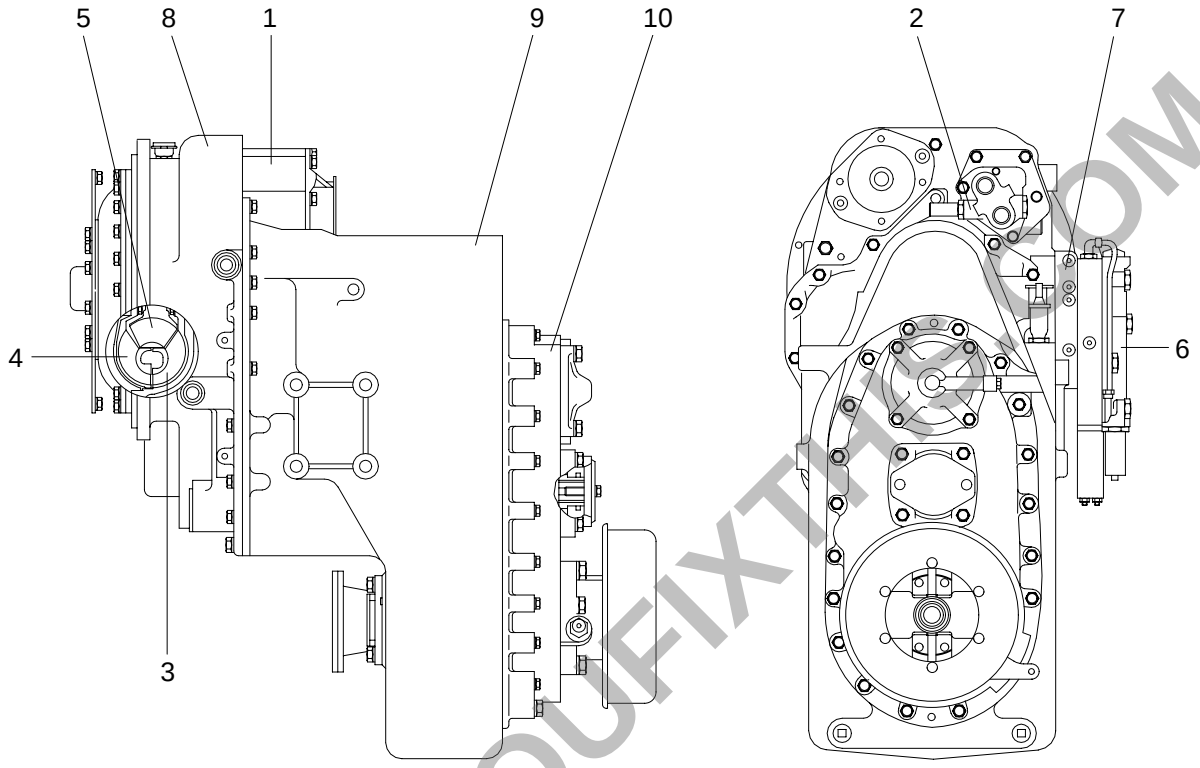
	0	1	2	3	4	5	6	7	8	9
0		2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	51.91	55.12	57.32	59.5.	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.78	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	101.41	103.62	105.82	108.03
50	110.23	112.44	114.64	116.85	119.05	121.25	123.46	125.66	127.87	130.07
60	132.28	134.48	136.69	138.89	141.10	143.30	145.51	147.71	149.91	152.12
70	154.32	156.53	158.73	160.94	163.14	165.35	167.55	169.76	171.96	174.17
80	176.37	178.57	180.78	182.98	185.19	187.39	189.60	191.80	194.01	196.21
90	198.42	200.62	202.83	205.03	207.24	209.44	211.64	213.85	216.05	218.26

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2. TORQUE CONVERTER

1) STRUCTURE



1	Charging pump	5	Stator(Reaction member)	9	Transmission case
2	Regulating valve	6	Control valve	10	Rear cover
3	Impeller	7	Modulator valve		
4	Turbine	8	Converter housing		

The transmission consists of a torque converter and powershifted transmission in one package mounted directly to the engine.
The control valve assembly(6) mounted directly on the side of the converter housing(8).
The function of the control valve assembly is to direct oil under pressure to the desired directional and speed clutch. A provision is made to neutralize the transmission when the brakes are applied. This is accomplished through use of a brake actuated shutoff valve. The speed and direction clutch assemblies are mounted inside the transmission case(9) and are connected to the output shaft of the converter either by direct gearing or drive shaft. The purpose of the speed or directional clutches is to direct the power flow through the gear train to provide the desired speed range and direction.

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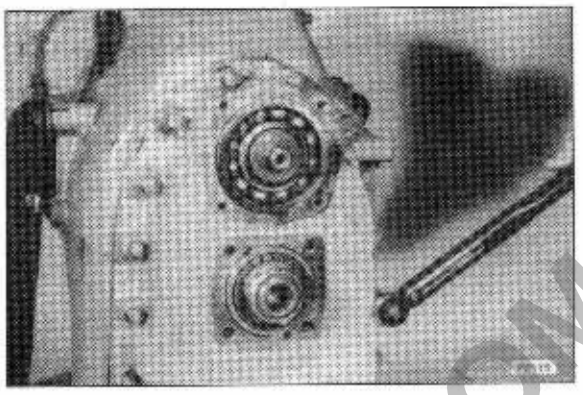
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Problem	Cause	Remedy
Transmission shifts too fast	Wrong transmission controller.	Check if transmission controller has been changed
	System pressure too high.	Do transmission system pressure test.
	Stuck modulation valve.	Remove and inspect modulation valve. Replace if necessary. Also remove end cover to inspect modulation spool and control valve housing. Replace if necessary.
	Malfunctioning two stage piston.	Remove and inspect two stage piston.
	Stuck or missing check valves.	Inspect transmission control valve.
	Missing O-ring from end of modulation orifice.	Remove orifice and inspect port for O-ring.
	Broken piston return spring.	Disassemble and inspect clutch.
Machine "creeps" in neutral	Warped disks and plates in transmission.	Check transmission.
Transmission hydraulic system overheats	High oil level.	Transmission overfilled or hydraulic pump seal leaking.
	Low oil level.	Add oil.
	Wrong oil grade.	Change oil.
	Park brake dragging.	Check for heat in park brake area.
	Pinched, restricted or leaking lube lines.	Check cooler lines.
	Machine operated in too high gear range.	Operate machine in correct gear range.
	Malfunction in temperature gauge or sender.	Install temperature sensor the verify temperature. Do tachometer/temperature reader installation procedure.
	Restricted air flow through oil cooler or radiator.	Do radiator air flow test.
	Failed oil cooler bypass valve(In thermal bypass valve).	Disassemble and inspect.
	Failed thermal bypass valve.	Remove thermal bypass valve and check to see if machine still overheats. Do transmission oil cooler thermal bypass valve test.
	Internally restricted oil cooler.	Do oil cooler restriction test.
	Leakage in transmission hydraulic system.	Do transmission system pressure, element leakage, and shift modulation test.
	Malfunction in converter relief valve.	Do converter out pressure test.
	Low transmission pump output.	Do transmission pump flow test.

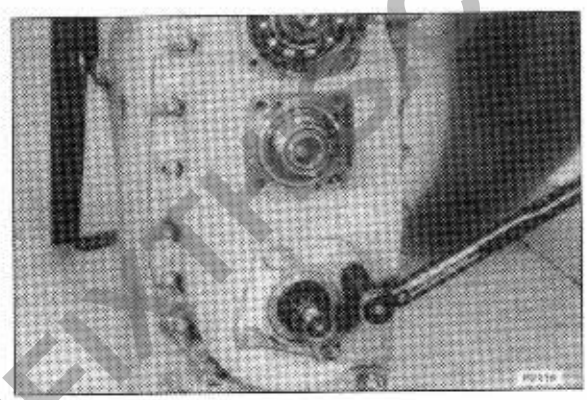
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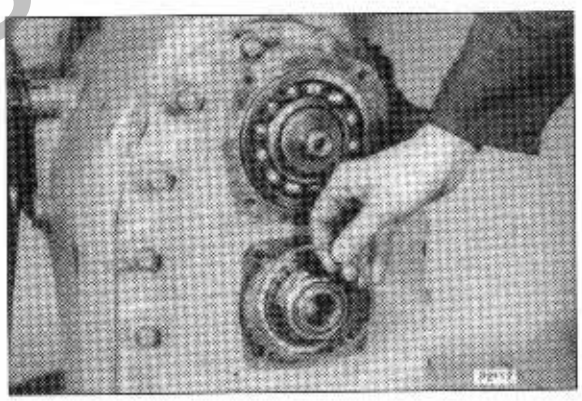
(17) Align the lock ball in the idler shaft rear bearing with the notch in the transmission rear cover. Tap the cover into place and secure with bolts and washers. Tighten cover bolts to 7.2-7.9kgf · m(52-57lbf · ft).



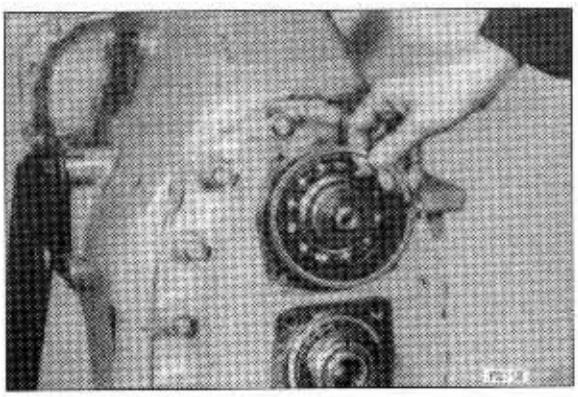
(18) Apply a light coat of JCB Multi-gasket to the outer diameter of the rear output oil seal. Press the seal in the bearing cap with the lip of the seal in. Install the taper bearing cup and O-ring. Install bolts and washers and tighten to 11.3-12.4kgf · m (82-90lbf · ft).



(19) From the front, tap the idler shaft to the rear until the rear bearing locating ring groove is exposed. Fit the locating ring.



(20) From the front, tap the 1st clutch to the rear until the rear bearing locating ring groove is exposed. Fit the locating ring.



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SECTION 4 BRAKE SYSTEM

GROUP 1 STRUCTURE AND FUNCTION

1. OUTLINE

※ **The brakes are operated by a pressure compensated, closed center hydraulic system. Flow is supplied by a fixed displacement, gear type brake pump.**

BRAKE SYSTEM

The fixed displacement brake pump supplies flow to the cut-off valve for service brake circuit and park brake circuits. It flows to four accumulator. The accumulator has a gas precharge and an inlet check valve to maintain a pressurized volume of oil for reserve brake applications.

Oil through the accumulator flows to the brake valves. The brake valve is a closed center design, dual circuit operated by a pedal.

The front and rear brakes will operate simultaneously with only one brake pedal depressed.

The differential contains annular brake piston and double sided disk.

Brake pump flow also goes to the parking brake solenoid valve.

The brake system contains the following components:

- Brake pump
- Parking brake solenoid valve
- Cut-off valve
- Brake valve
- Accumulators
- Parking brake cylinder
- Pressure switches

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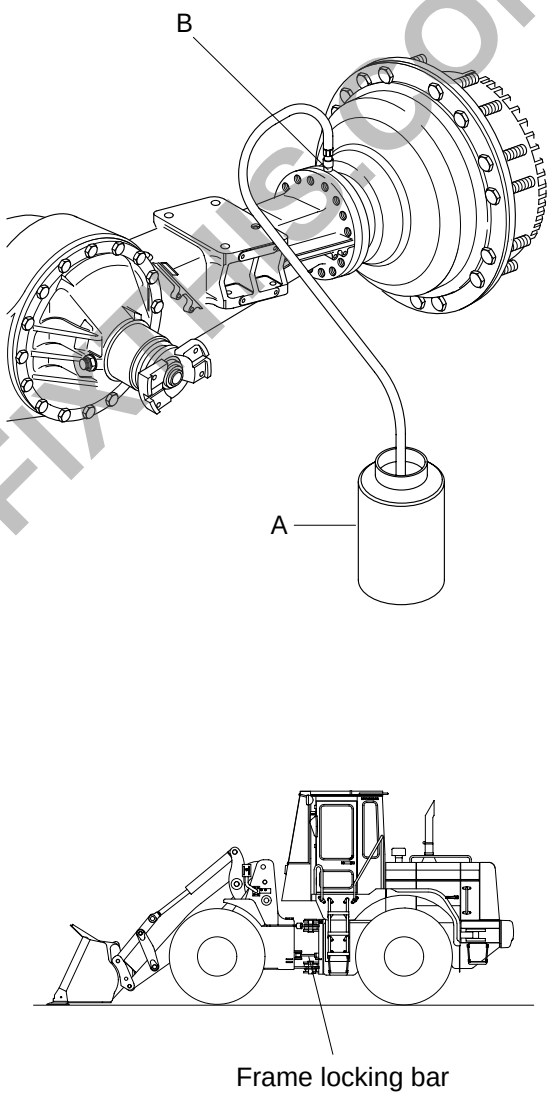
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3. HYDRAULIC BRAKE BLEEDING PROCEDURE

⚠ **Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.**
Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

※ **If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.**
Doctors unfamiliar with this type of injury should reference a knowledgeable medical source.
Two people are required to bleed brake system oil, one to operate brake valve and other to open and close bleed screws.

1) Install frame locking bar. Engage parking brake.
2) Put a clear plastic tube on bleed screw(B) to route low to hydraulic reservoir filler tube or container(A).
3) Start engine and run at low idle.
4) Push and hold brake pedal down until brake bleeding procedure is complete.
   ※ **If bubbles continue for more than 2 minutes, stop bleeding procedure.**
   Check for and correct problem, then continue.
5) Open on bleed screw on differential and axle assembly until hydraulic oil starts to flow. Close bleed screw when oil is free of air. Release brake pedal.
6) Repeat steps 1-5 for each bleed screw.
7) Push either brake pedal and hold down.
8) Check hydraulic oil level.

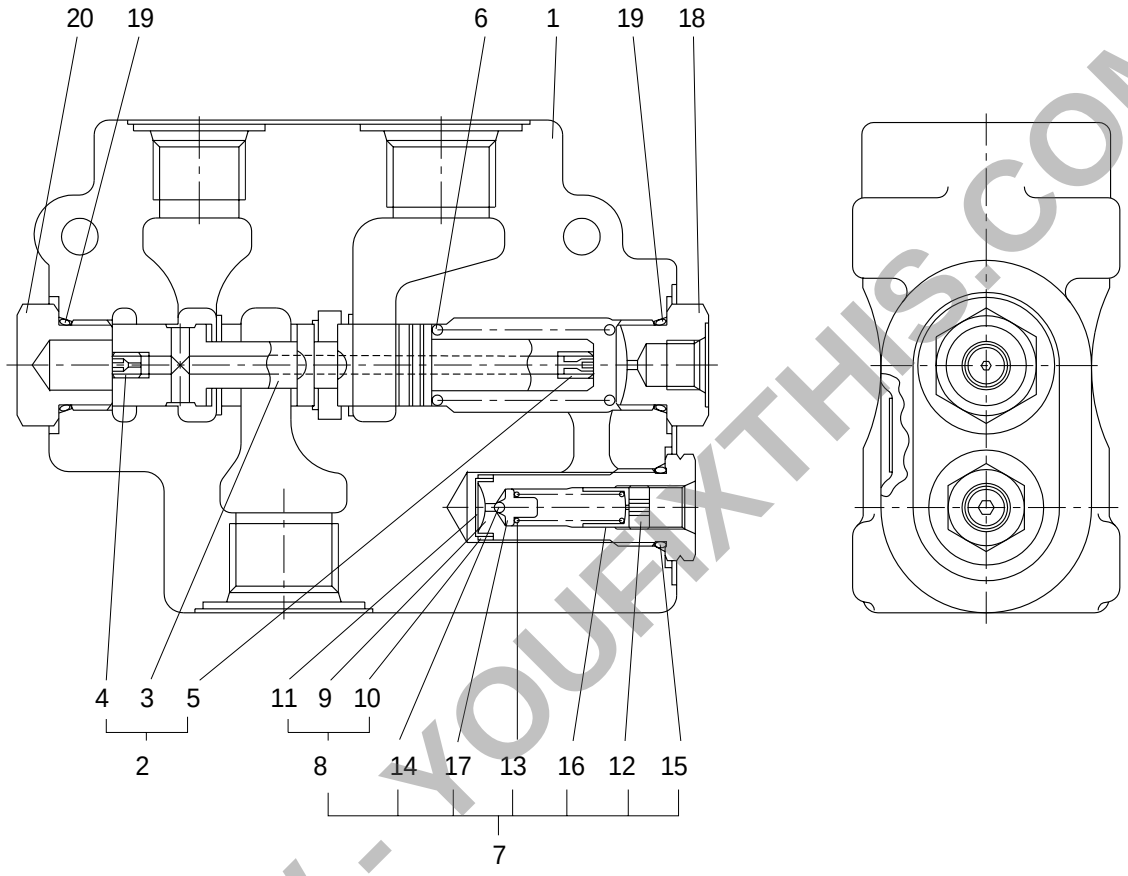


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1. PRIORITY VALVE

1) STRUCTURE



1	Housing	8	Body sub assy	15	O-ring
2	Spool assy	9	Body	16	Guide
3	Spool	10	Ring	17	Holder
4	Orifice	11	Screen	18	Plug
5	Orifice	12	Screw	19	O-ring
6	Control spring	13	Spring	20	Plug
7	Relief cartridge	14	Ball		

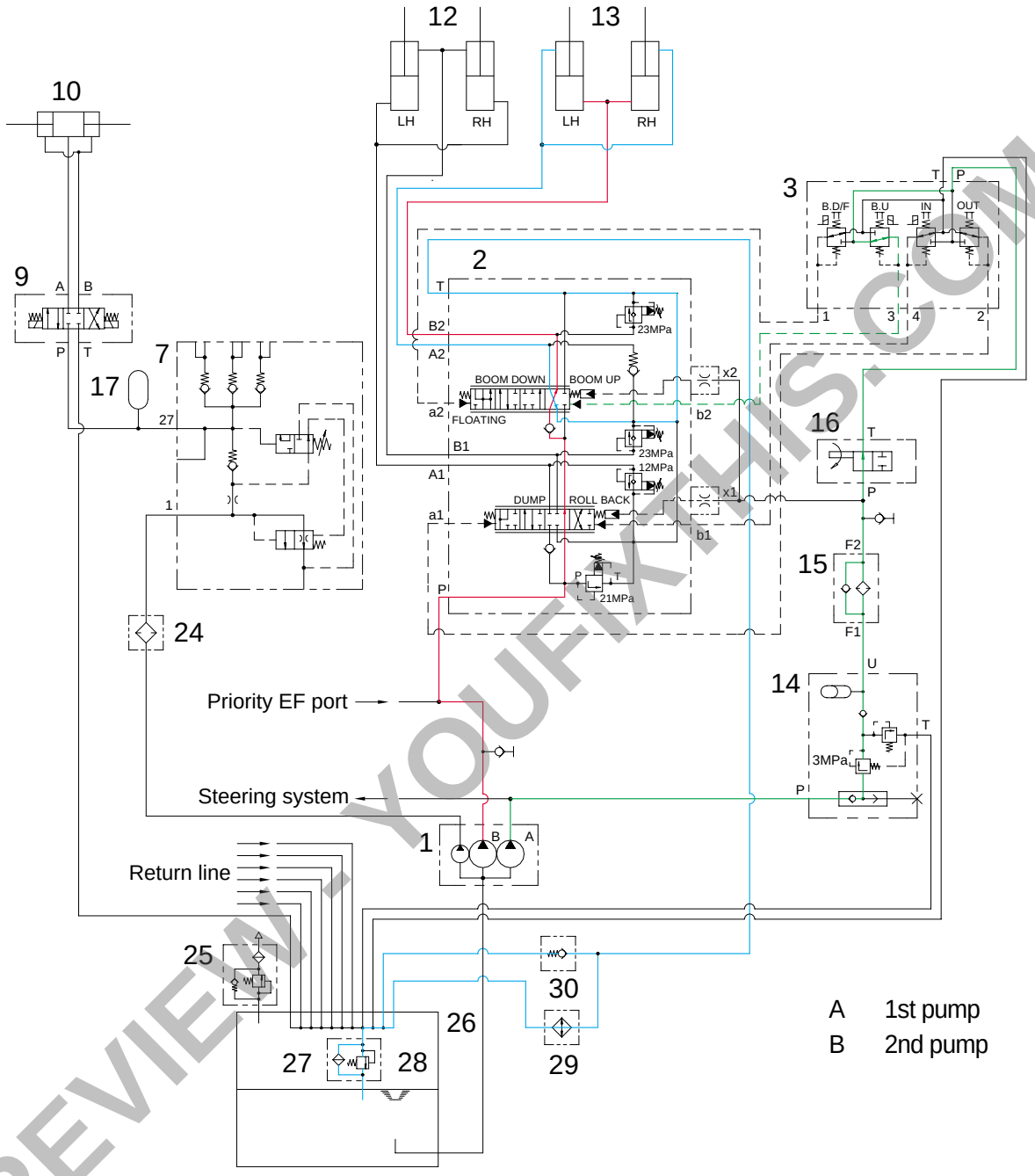
2) TOOLS

- Torque wrench(5kgf · m)
- Hex socket wrench(1")
- Hex socket wrench(7/8")
- Hex wrench (7/32")
- Pincette
- Grease

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1) WHEN THE RCV LEVER IS IN THE RAISE POSITION



- When the RCV lever(3) is pulled back, the boom spool on the second block is moved to raise position by pilot oil pressure from port 3 of RCV.
- The oil from main pump(1) flows into main control valve(2) and then goes to the large chamber of boom cylinder (13) by pushing the load check valve of the boom spool through center bypass circuit of the bucket spool.
- The oil from the small chamber of boom cylinder(13) returns to hydraulic oil tank(26) through the boom spool at the same time.
- When this happens, the boom goes up.

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※ MEASURING BOOM AND BUCKET CYCLE TIME

1. MEASUREMENT CONDITION

- Coolant temperature : Inside operating range
- Steering position : Neutral
- Hydraulic temperature : 45~55℃
- Bucket : Unloaded
- Engine speed : High idling

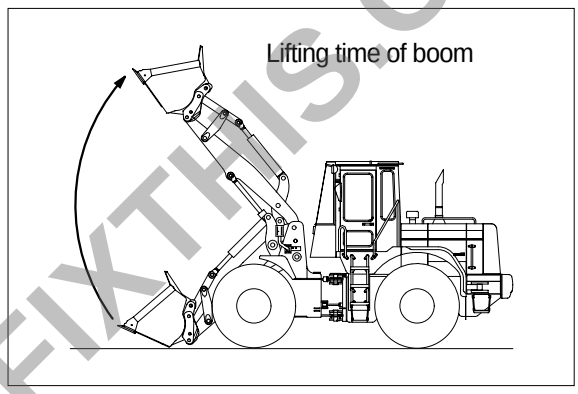
2. MEASURING TOOL

- Stop watch(1 EA)

3. MEASURING PROCEDURE

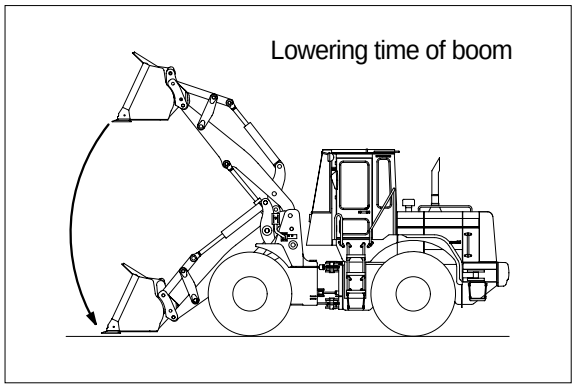
1) LIFTING TIME OF BOOM

Set the bucket near the maximum tilt back position and at the lowest position on the ground. Raise the bucket and measure the time taken for bucket to reach the maximum height of the boom.



2) LOWERING TIME OF BOOM

Set the bucket horizontal with the boom at the maximum height, lower the bucket and measure the taken for the bucket to reach the lowest position on the ground.

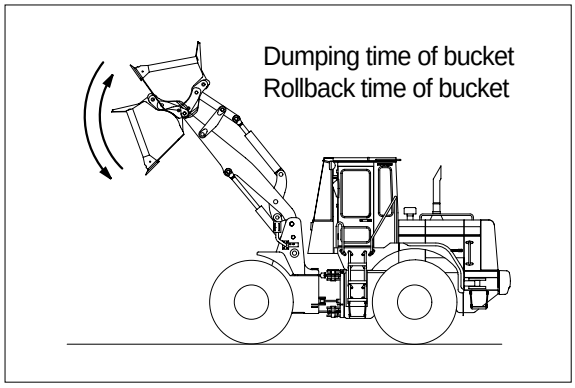


3) DUMPING TIME OF BUCKET

Raise the boom to the maximum height and measure the time taken for the bucket to move from the maximum tilt back position to the maximum dump position

4) ROLL BACK TIME OF BUCKET

Raise the boom to the maximum height and measure the time taken for the bucket to reach the maximum tilt back position.



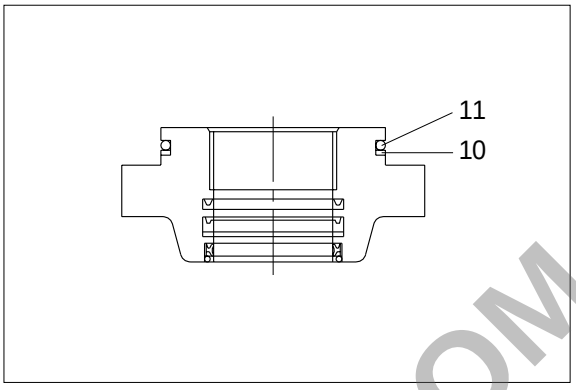
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⑤ Fit back up ring(11) to gland(3).

※ Put the backup ring in the warm water of 30~50℃.

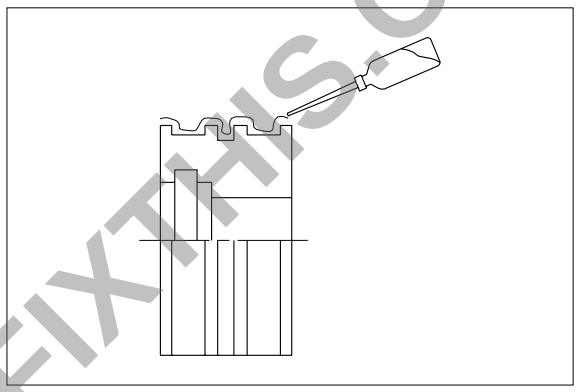
⑥ Fit O-ring(10) to gland(3).



(2) Assemble gland assembly

※ Check for scratches or rough surfaces if found smooth with an oil stone.

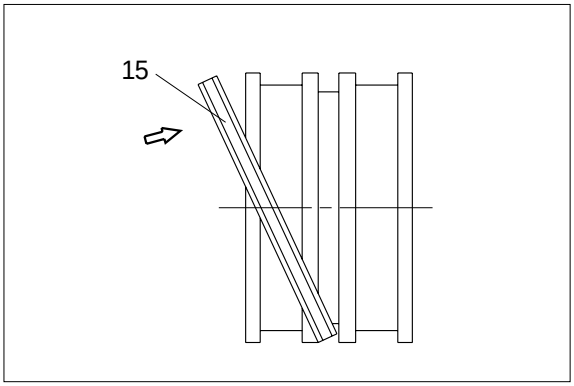
① Coat the outer face of piston(12) with hydraulic oil.



② Fit piston seal(15) to piston

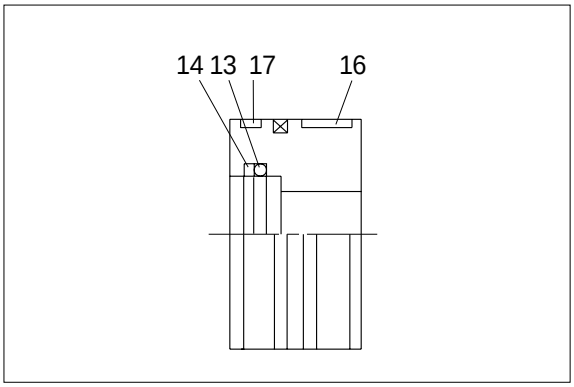
※ Put the piston seal in the warm water of 60~100℃for more than 5 minutes.

※ After assembling the piston seal, press its outer diameter to fit in.



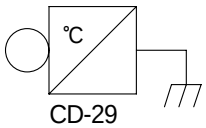
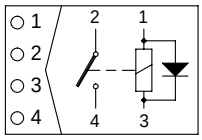
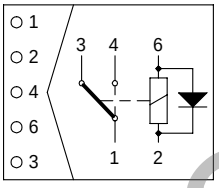
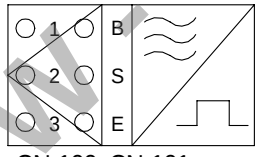
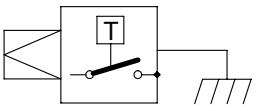
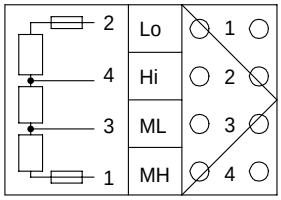
③ Fit wear ring(16) and dust ring(17) to piston(12).

④ Fit back up rings(14) and O-ring(13) to piston(12).



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Part name	Symbol	Specifications	Check
Transmission oil temperature sender	 CD-29	1/2 P.T.F	※ Check resistance 137.2±14.5Ω at 87.8℃
Relay (4pin)	 CR-2 CR-7 AC RY1 CR-5 CR-10 AC RY2	24V 20A	※ Check resistance Normal : About 200Ω (For terminal 1-3) : ∞Ω (For terminal 2-4)
Relay (5pin)	 CR-4 CR-35 CR-26 CR-38	24V 20A	※ Check resistance Normal : About 160Ω (For terminal 2-6) : 0Ω (For terminal 1-3) : ∞Ω (For terminal 1-3)
Proximate switch	 CN-100 CN-101	24V 400mA	-
Hydraulic temperature	 CD-1	-	※ Check resistance Normal : ∞Ω 105℃ Over : 0Ω
Air conditioner resistor		-	※ Check contact Normal : 1.12Ω (For terminal 2-4) : 2.07Ω (For terminal 3-4) : 3.17Ω (For terminal 4-1)

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