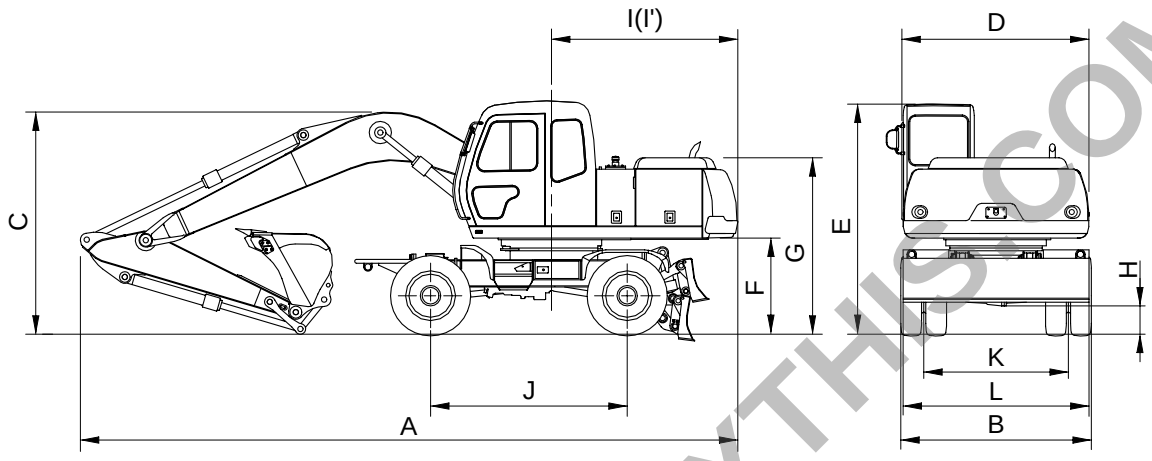
2. SPECIFICATIONS

1) 5.2m(17' 1") ONE PIECE BOOM, 2.2m(7' 3") ARM AND REAR DOZER BLADE



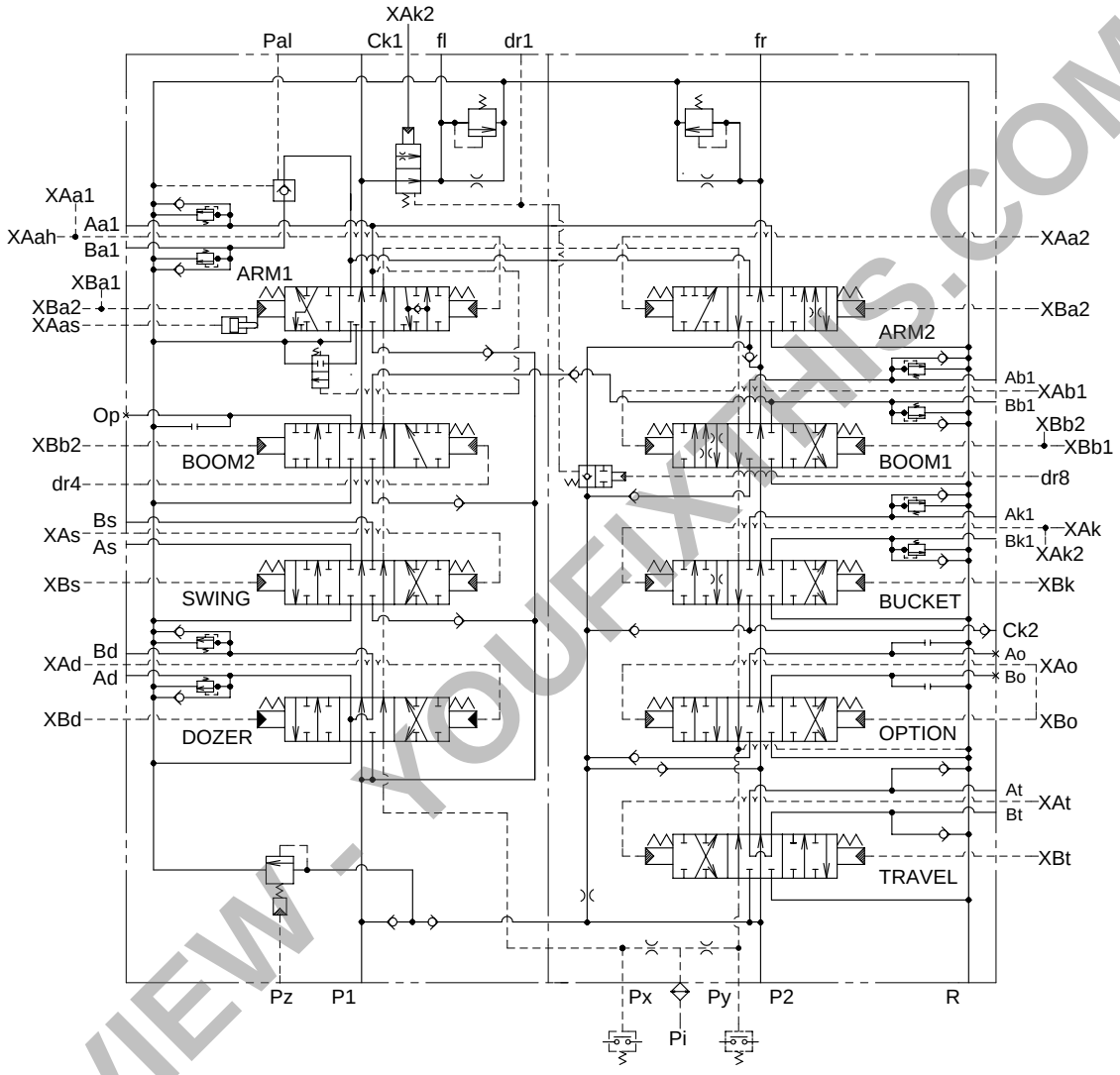
Description		Unit	Specification
Operating weight		kg(lb)	16480(36330)
Bucket capacity(PCSA heaped), standard		$m^3(yd^3)$	0.70(0.92)
Overall length	A	mm(ft-in)	8690(28' 6")
Overall width	B		2500(8' 2")
Overall height	C		3050(10' 0")
Superstructure width	D		2450(8' 0")
Cab height	E		3080(10' 1")
Ground clearance of counterweight	F		1270(4' 2")
Engine cover height	G		2330(7' 8")
Minimum ground clearance	H		375(1' 3")
Rear-end distance	I		2450(8' 0")
Rear-end swing radius	I'		2530(8' 4")
Wheel base	J		2600(8' 6")
Tread	K		1914(6' 3")
Dozer blade width	L		2490(8' 2")
Travel speed	Low	km/hr(mph)	6.5(4.1)
	High		25(15.6)
Swing speed		rpm	11.5
Gradeability		Degree(%)	30(58)

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2. FUNCTION

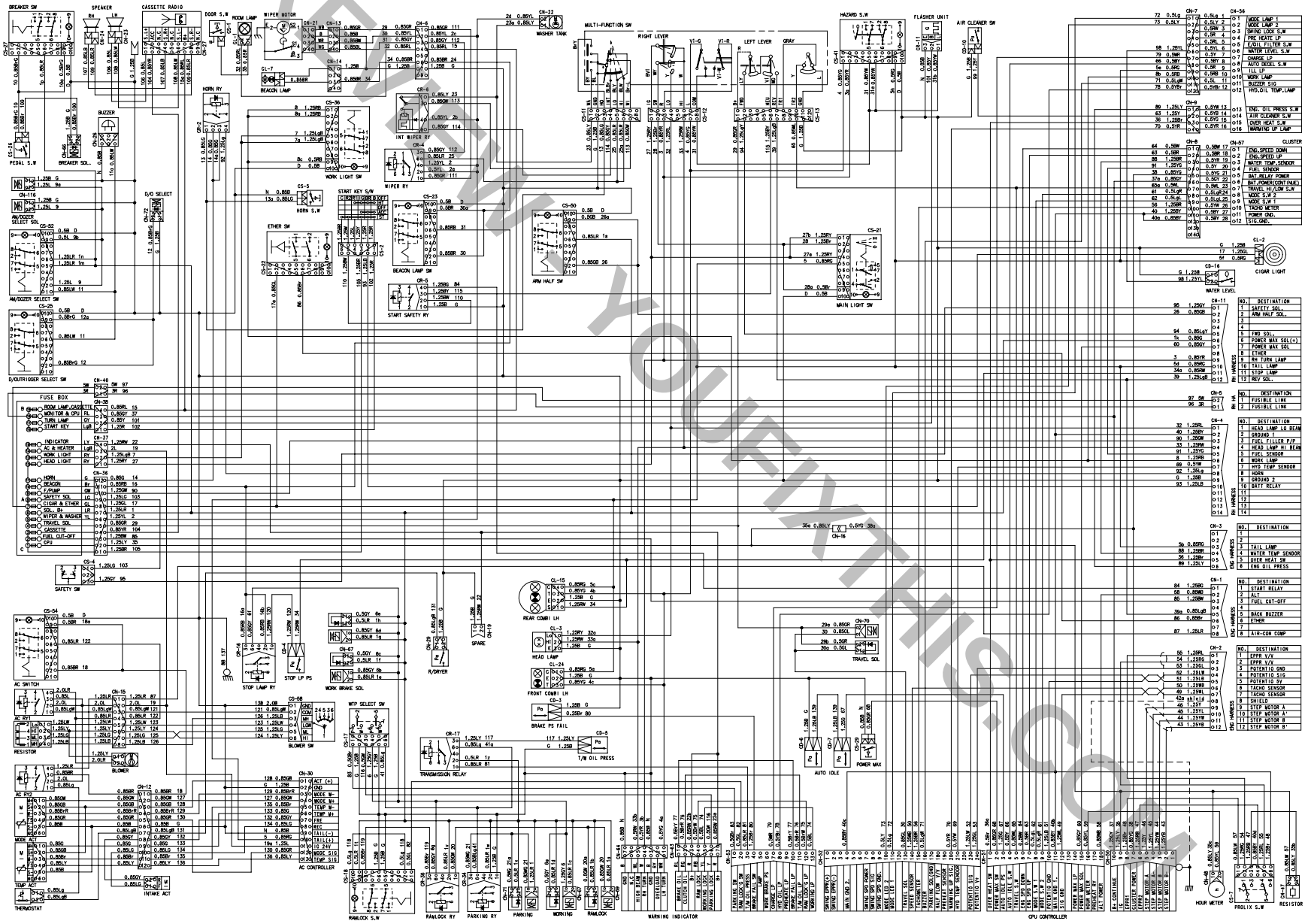
1) HYDRAULIC CIRCUIT



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MACHINE SERIAL NO. : -#0062 (1/2)



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SECTION 6 TROUBLESHOOTING

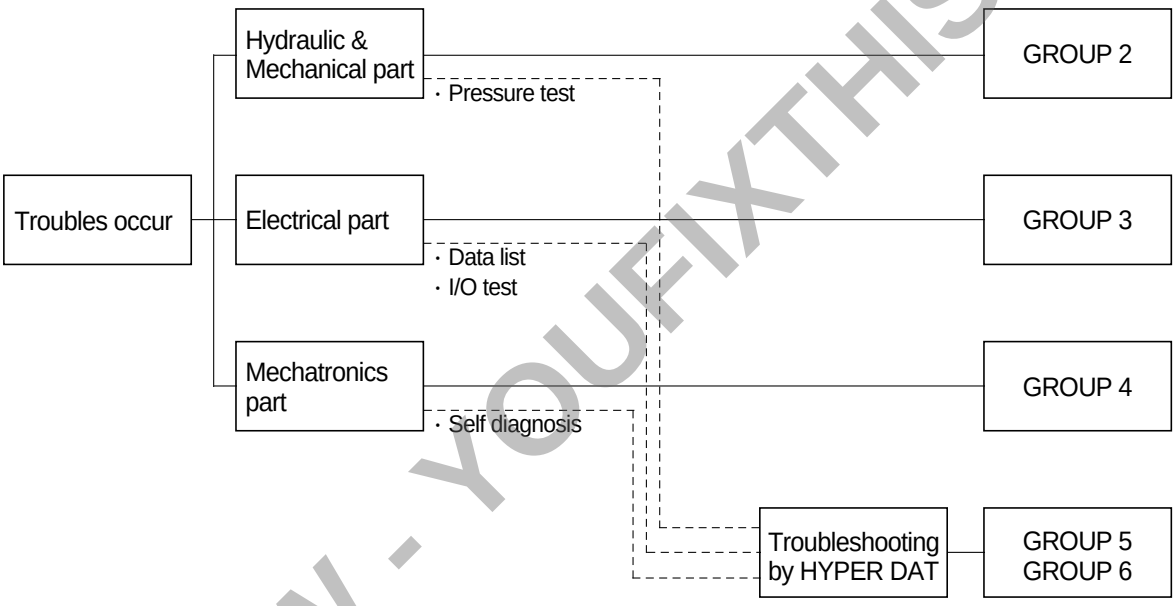
GROUP 1 BEFORE TROUBLESHOOTING

1. INTRODUCTION

When a trouble is occurred in the machine, this section will help an operator to maintain the machine with easy.

The trouble of machine is parted Hydraulic & Mechanical system, Electrical system and Mechatronics system. At each system part, an operator can check the machine according to the troubleshooting process diagram.

Especially in the troubleshooting by HYPER DAT part, usable functions of HYPER DAT related to the upper 3 system parts are introduced and how to use the relate function, if the abnormal items are displayed on the main body, is explained with easy.



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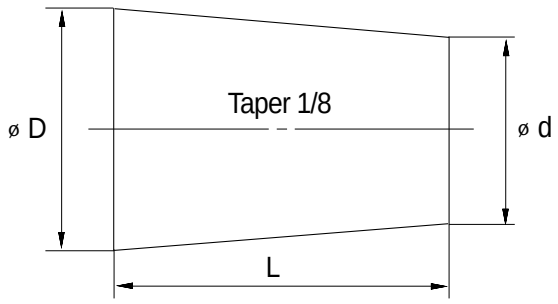
SECTION 8 DISASSEMBLY AND ASSEMBLY

GROUP 1 PRECAUTIONS

1. REMOVAL WORK

1) Lower the work equipment completely to the ground.
   If the coolant contains antifreeze, dispose of it correctly.
2) After disconnecting hoses or tubes, cover them or fit blind plugs to prevent dirt or dust from entering.
3) When draining oil, prepare a container of adequate size to catch the oil.
4) Confirm the match marks showing the installation position, and make match marks in the necessary places before removal to prevent any mistake when assembling.
5) To prevent any excessive force from being applied to the wiring, always hold the connectors when disconnecting the connectors.
6) Fit wires and hoses with tags to show their installation position to prevent any mistake when installing.
7) Check the number and thickness of the shims, and keep in a safe place.
8) When raising components, be sure to use lifting equipment of ample strength.
9) When using forcing screws to remove any components, tighten the forcing screws alternately.
10) Before removing any unit, clean the surrounding area and fit a cover to prevent any dust or dirt from entering after removal.
11) When removing hydraulic equipment, first release the remaining pressure inside the hydraulic tank and the hydraulic piping.
12) If the part is not under hydraulic pressure, the following corks can be used.

Nominal number	Dimensions		
	D	d	L
06	6	5	8
08	8	6.5	11
10	10	8.5	12
12	12	10	15
14	14	11.5	18
16	16	13.5	20
18	18	15	22
20	20	17	25
22	22	18.5	28
24	24	20	30
27	27	22.5	34



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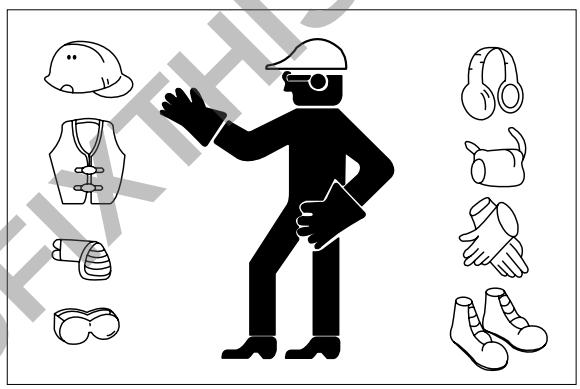
GROUP 1 SAFETY

FOLLOW SAFE PROCEDURE

Unsafe work practices are dangerous. Understand service procedure before doing work; do not attempt shortcuts.

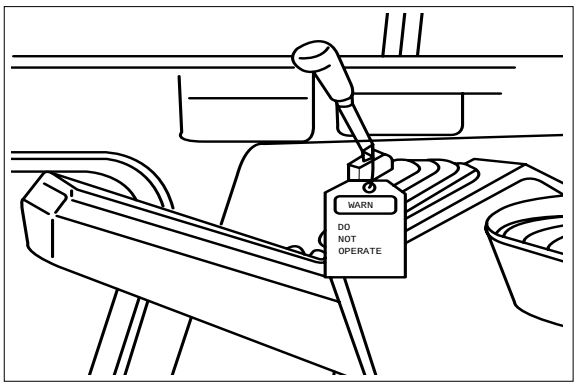
WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.



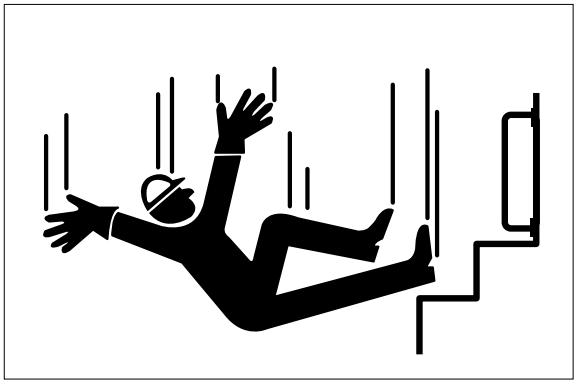
WARN OTHERS OF SERVICE WORK

Unexpected machine movement can cause serious injury.
Before performing any work on the excavator, attach a 「**Do Not Operate**」 tag on the right side control lever.



USE HANDHOLDS AND STEPS

Falling is one of the major causes of personal injury.
When you get on and off the machine, always maintain a three point contact with the steps and handrails and face the machine. Do not use any controls as handholds.
Never jump on or off the machine. Never mount or dismount a moving machine.
Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.



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Millimeters to inches

1mm = 0.03937 in

	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

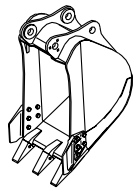
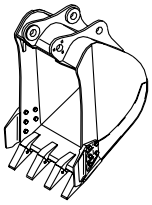
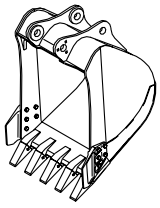
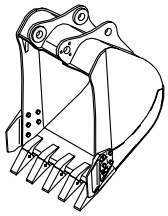
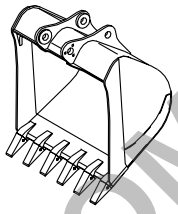
1kg = 2.2046 lb

	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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6. BUCKET SELECTION GUIDE

				
0.45m³ PCSA heaped bucket	0.57m³ PCSA heaped bucket	0.70m³ PCSA heaped bucket	0.80m³ PCSA heaped bucket	1.03m³ PCSA heaped bucket

Capacity		Width		Weight	Recommendation					
					5.2m (17' 1") one piece boom				*5.0m (16' 5") boom	
PCSA heaped	CECE heaped	Without side cutter	With side cutter		1.85m arm (6' 1")	2.2m arm (7' 3")	2.6m arm (8' 6")	3.2m arm (10' 6")	1.85m arm (6' 1")	2.2m arm (7' 3")
0.45m³ (0.59yd³)	0.35m³ (0.46yd³)	620mm (24.4")	740mm (29.1")	410kg (900lb)						
0.57m³ (0.75yd³)	0.50m³ (0.65yd³)	840mm (33.1")	960mm (37.8")	490kg (1080lb)						
※0.70m³ (0.92yd³)	0.60m³ (0.78yd³)	990mm (39.0")	1110mm (43.7")	540kg (1190lb)						
0.80m³ (1.05yd³)	0.70m³ (0.92yd³)	1080mm (42.5")	1200mm (47.2")	570kg (1260lb)						
1.03m³ (1.35yd³)	0.90m³ (1.18yd³)	1400mm (55.1")	1520mm (59.8")	650kg (1430lb)						

※: Standard bucket *: Two piece boom

Applicable for materials with density of 2000kg/m³(3370lb/yd³) or less

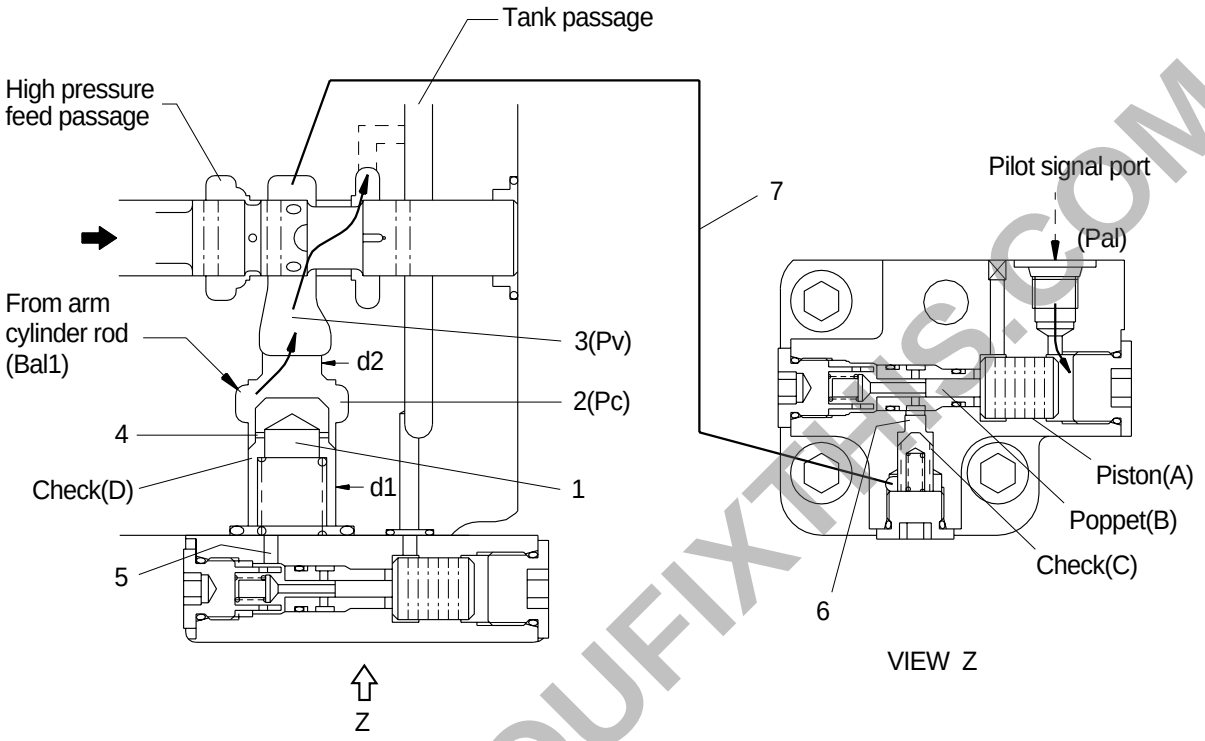
Applicable for materials with density of 1600kg/m³(2700lb/yd³) or less

Applicable for materials with density of 1100kg/m³(1850lb/yd³) or less

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· **If Pc is higher than Pv**(in the case of arm in operation)



When the pressure of pilot signal enters, piston(A) moves to left and poppet(B) opens; passages(5) and (6) are connected.

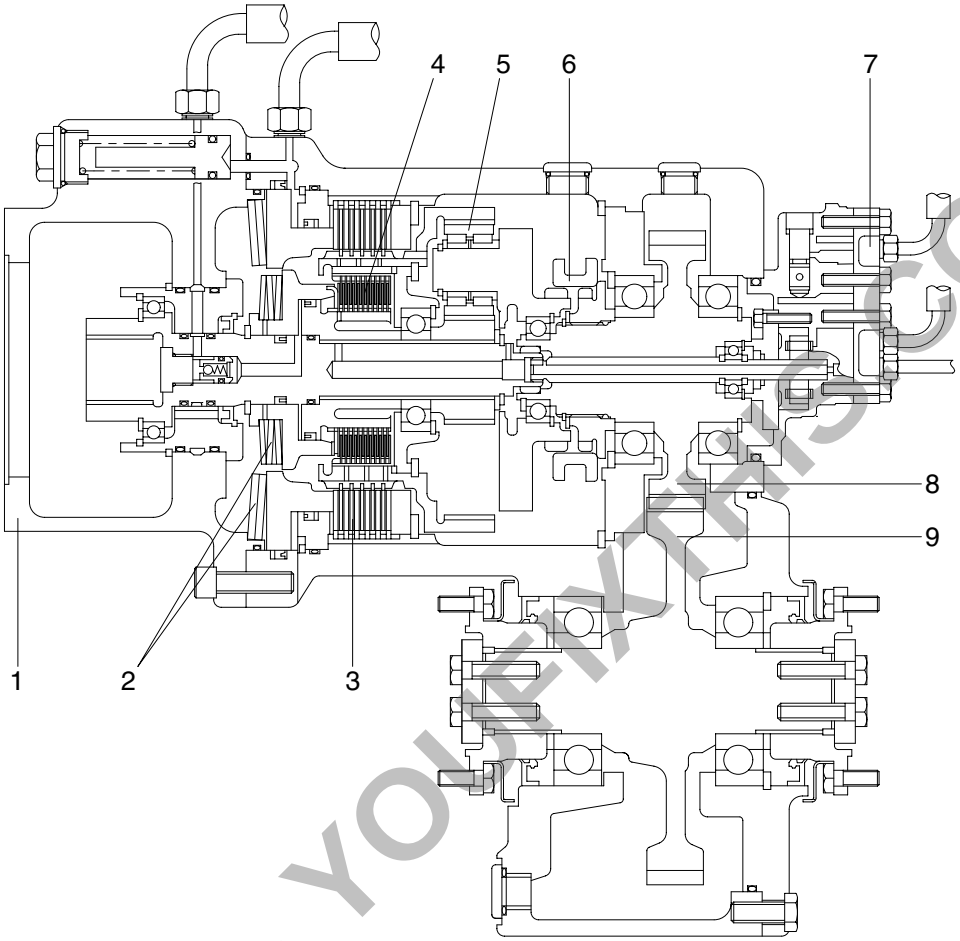
If pressure Pc of cylinder port chamber(2) is higher than pressure Pv of chamber(3) (in the case of arm in operation) oil from chamber(1) pushes up check valve(C) via passages(5) and (6) and enters chamber(3) through passage(7). Chamber(3) is connected with the tank passage because the arm plunger is moved to right. Therefore, pressure Pc is applied to(area d1- area d2), pushing open poppet(D), and return oil from the cylinder rod side flows into the tank passage.

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3. OPERATION OF TRANSMISSION

1) DESCRIPTION



17032TM03

1	Travel motor	4	Disc clutch	7	Shift interlock
2	Spring cup	5	Planetary gear set	8	Helical gear 1
3	Disc brake	6	Disconnect device	9	Helical gear 2

Coaxially-mounted variable displacement travel motor(1) with specific displacement 105cm^3/rev.

The 2-speed powershift transmission comprises a planetary gear set(5), a 2-shaft helical gear drive(8) with output flanges to front and rear axle.

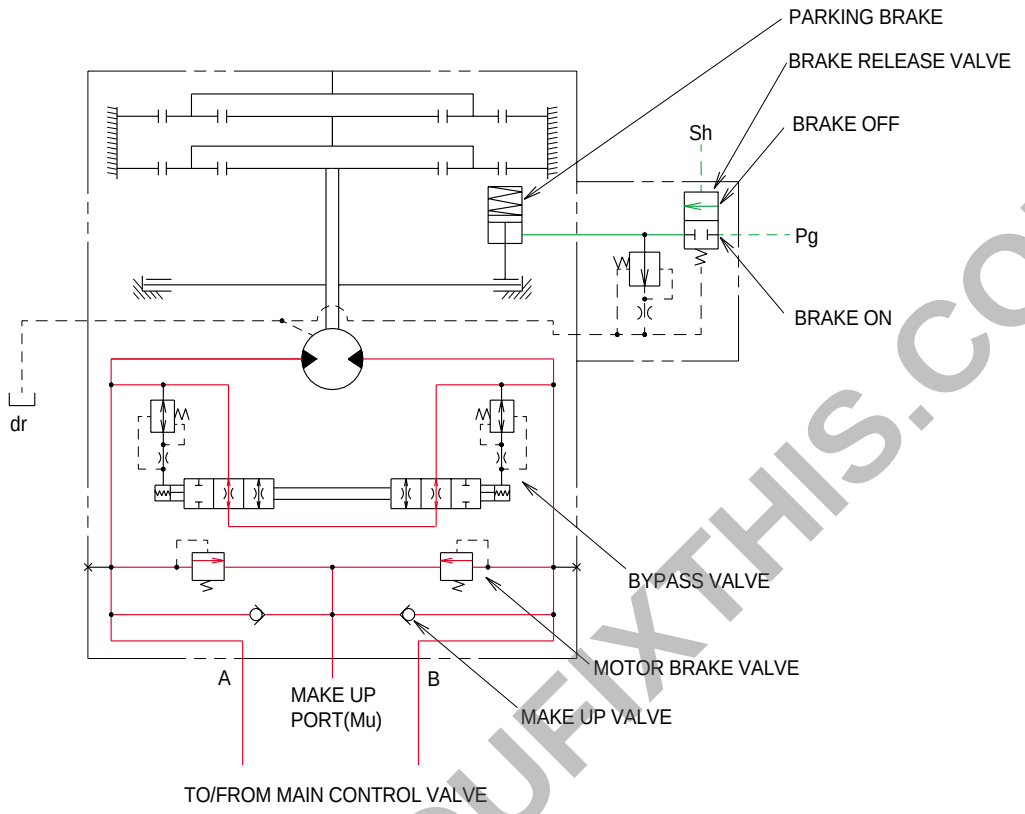
The powershift mechanism for the planet drive comprises a rotating multi-disc clutch(4) underneath a multi-disc brake(3) rigidly connected to the housing. Both are closed by spring pressure(2) and released hydraulically.

Between the planet drive and the helical drive, a disconnect device(6) is provided(Shifting when machine standstill). It is actuated by means of a lever mounted on the transmission housing, with firm locking in IN/OUT positions. This disconnect device interrupts the power drive train between the powershift section and the output and thus allows the machine to be towed up to its maximum speed and without special restrictions on distance.

⚠ When the disconnect device disconnected, the parking brake does not function.

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SWING CIRCUIT OPERATION



1) MOTOR BRAKE VALVE

Motor brake valve for the swing motor limits to cushion the starting and stopping pressure of swing operation.

2) MAKE UP VALVE

The make up valves prevent cavitation by supplying return oil to the vacuum side of the motor.

3) PARKING BRAKE

In case that the parking, of the machine at slope is required during operation, there is the danger of involuntary swing caused by the self weight of the machine. The brake is connected to prevent this involuntary swing.

PARKING BRAKE "OFF" OPERATION

The parking brake is released by the pilot pressure oil from the pilot pump.

When the left control lever placed in the swing position, the pilot pressure at the shuttle valve is transferred to the brake release valve and the brake release valve is change over. Then the pilot pressure lift the brake piston and release the parking brake.

PARKING BRAKE "ON" OPERATION

When the control lever placed in the neutral position, the pressure of the pilot oil passage down. Then the brake release valve returned to the neutral position and the oil is returned from the brake piston to the tank. And the brake is set to "ON".

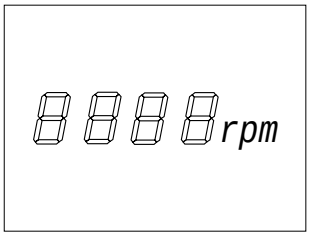
4) BYPASS VALVE

This bypass valve absorbs shocks produced as swing motion stops and reduces oscillation cause by swing motion.

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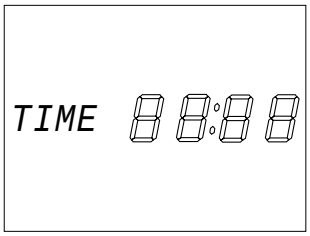
4. CLUSTER FUNCTION

1) TACHOMETER



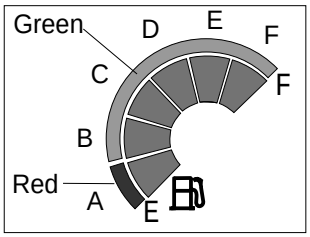
① Tachometer displays the number of engine revolutions.
② Refer select switch for the selection and adjustment.

2) CLOCK



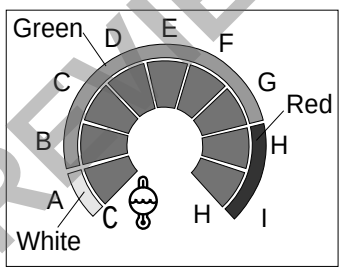
① Clock displays the current time by electric digital timer(LCD).
② Refer select switch for the selection and adjustment.

3) FUEL GAUGE



① This gauge indicates the amount of fuel in the fuel tank.
- Segment A : Approximately 30 ℓ (Warning lamp display)
- Segment B : Approximately 65 ℓ
- Segment C : Approximately 100 ℓ
- Segment D : Approximately 138 ℓ
- Segment E : Approximately 176 ℓ
- Segment F : Approximately 214 ℓ
- Quantity of fuel tank : Approximately 250 ℓ

4) ENGINE COOLANT TEMPERATURE GAUGE



① This gauge indicates the temperature of coolant.
- Segment A : Approximately 40~60℃(White)
- Segment B : Approximately 60~67℃(Green)
- Segment C : Approximately 67~74℃(Green)
- Segment D : Approximately 74~81℃(Green)
- Segment E : Approximately 81~88℃(Green)
- Segment F : Approximately 88~95℃(Green)
- Segment G : Approximately 95~102℃(Green)
- Segment H : Approximately 102~110℃(Red)
- Segment I : Approximately 110℃~ (Red)

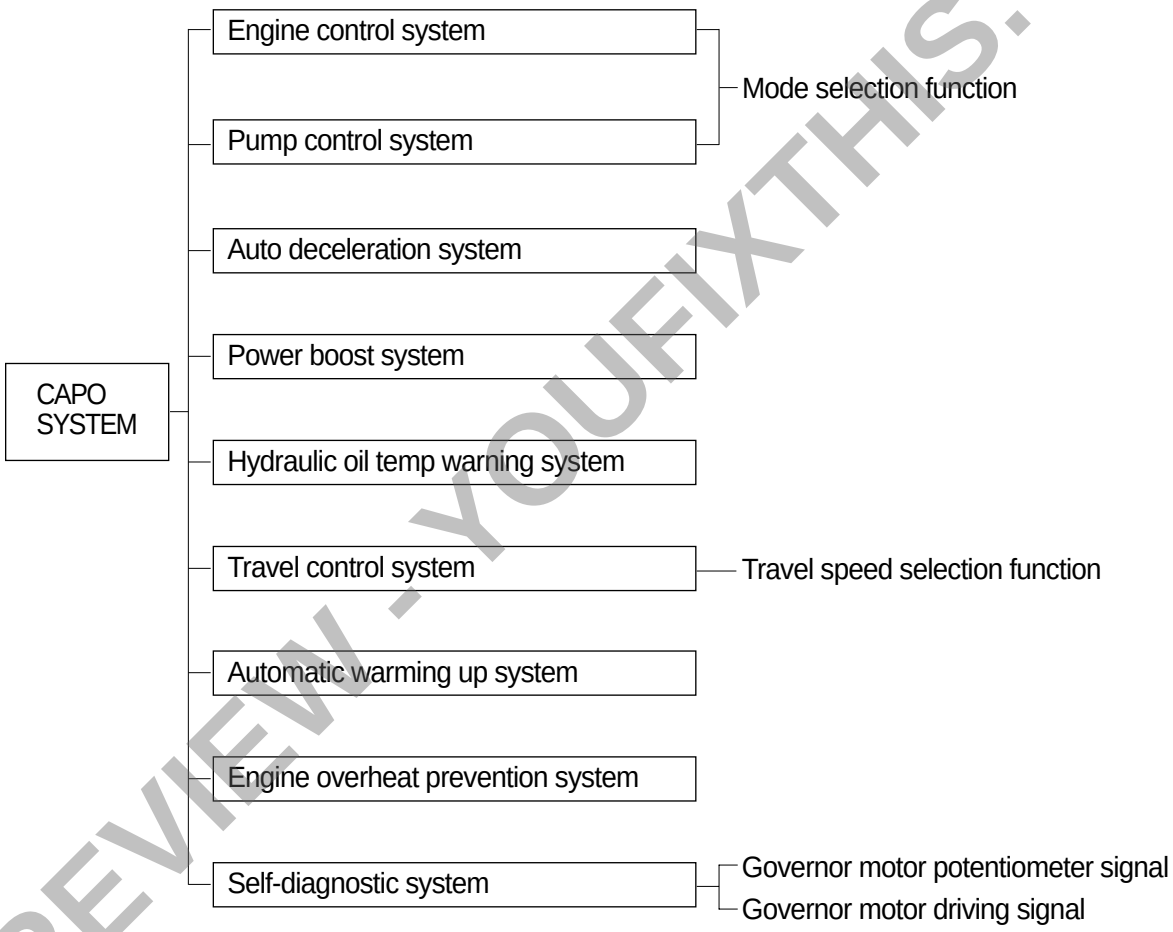
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SECTION 5 MECHATRONICS SYSTEM

GROUP 1 OUTLINE

The CAPO(Computer Aided Power Optimization) system mainly consists of the engine control system and pump control system. By using the CAPO system, an operator can use the machine power in optimal condition and in fuel economic state.
It also includes the self-diagnostic system. If any malfunction of short or open circuit happens on the governor motor part, the error display on cluster let an operator know which error happened to the governor motor. And if any short circuit occurs in or out of the CPU controller it protects itself from electric damage.

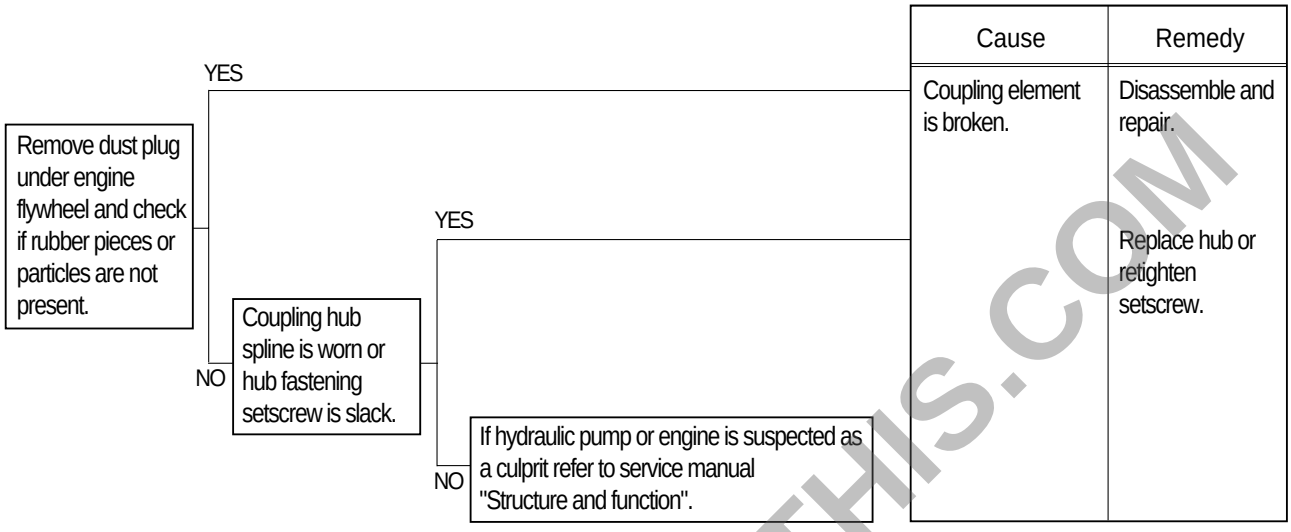


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2. DRIVE SYSTEM

1) UNUSUAL NOISE COMES OUT OF PUMP CONNECTION



Cause	Remedy
Coupling element is broken.	Disassemble and repair.
	Replace hub or retighten setscrew.

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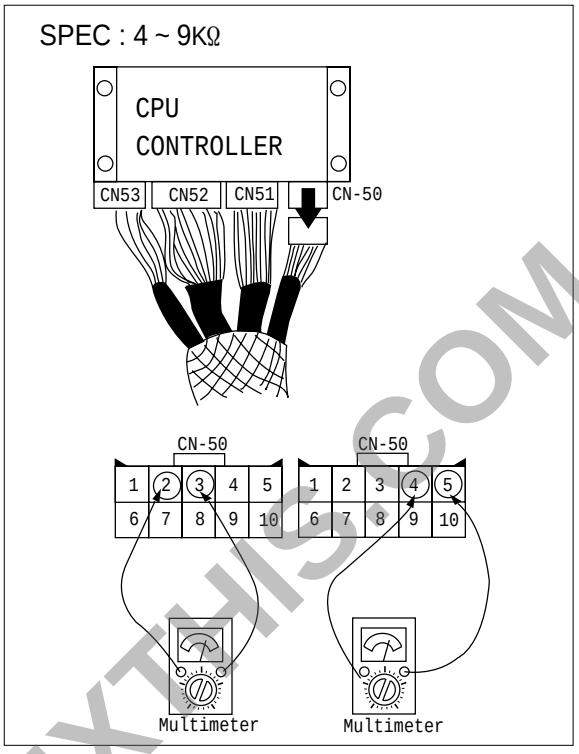
2) TEST PROCEDURE

(1) **Test 5 :** Check resistance between (2)-(3) and (4)-(5) at connector CN-50.

① Starting key OFF.

② Remove CPU controller and disconnect connector CN-50 from CPU controller.

③ Check resistance as figure.



(2) **Test 6 :** Check tachometer (Work properly or not.)

① Start engine.

② Check tachometer reading.

unit : rpm

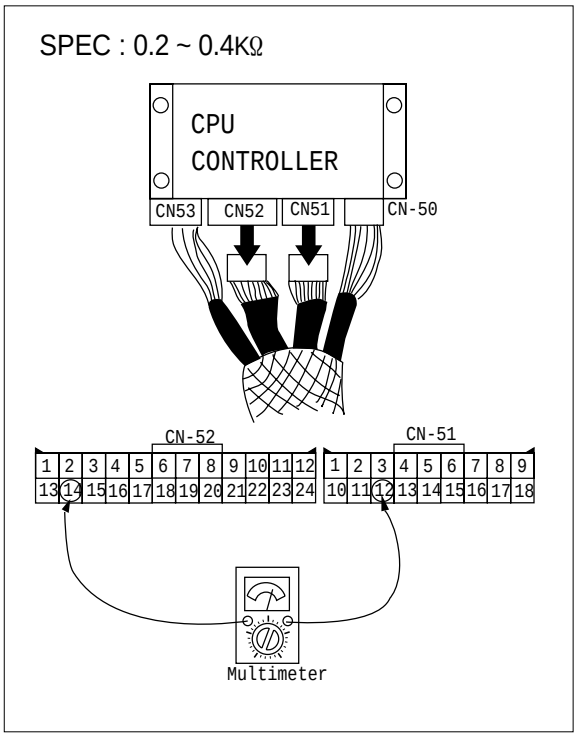
Spec		Remark
H-mode	2250^{+50}rpm	Check rpm after cancel the Auto decel mode.
S-mode	2250^{+50}rpm	
L-mode	2000^{+50}rpm	
F-mode	1650^{+50}rpm	

(2) **Test 7 :** Check resistance between (14) of CN-52 and (12) of CN-51.

① Starting key OFF.

② Remove CPU controller and disconnect connector CN-51 and CN-52 from CPU controller.

③ Check resistance as figure.

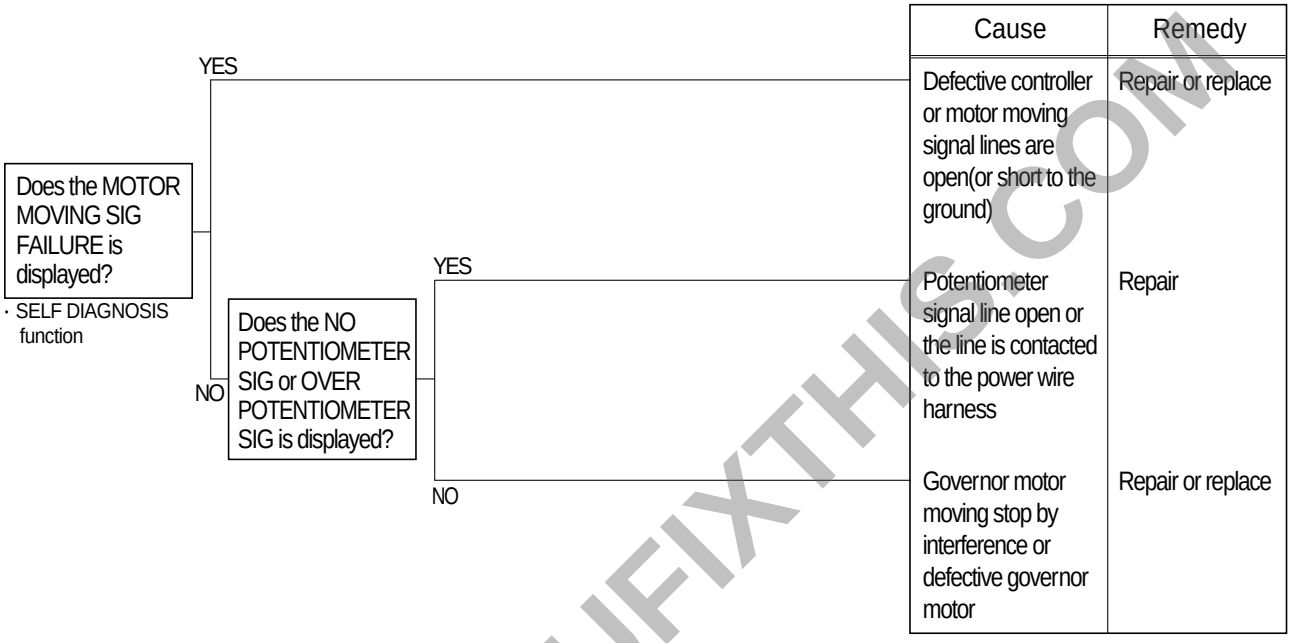


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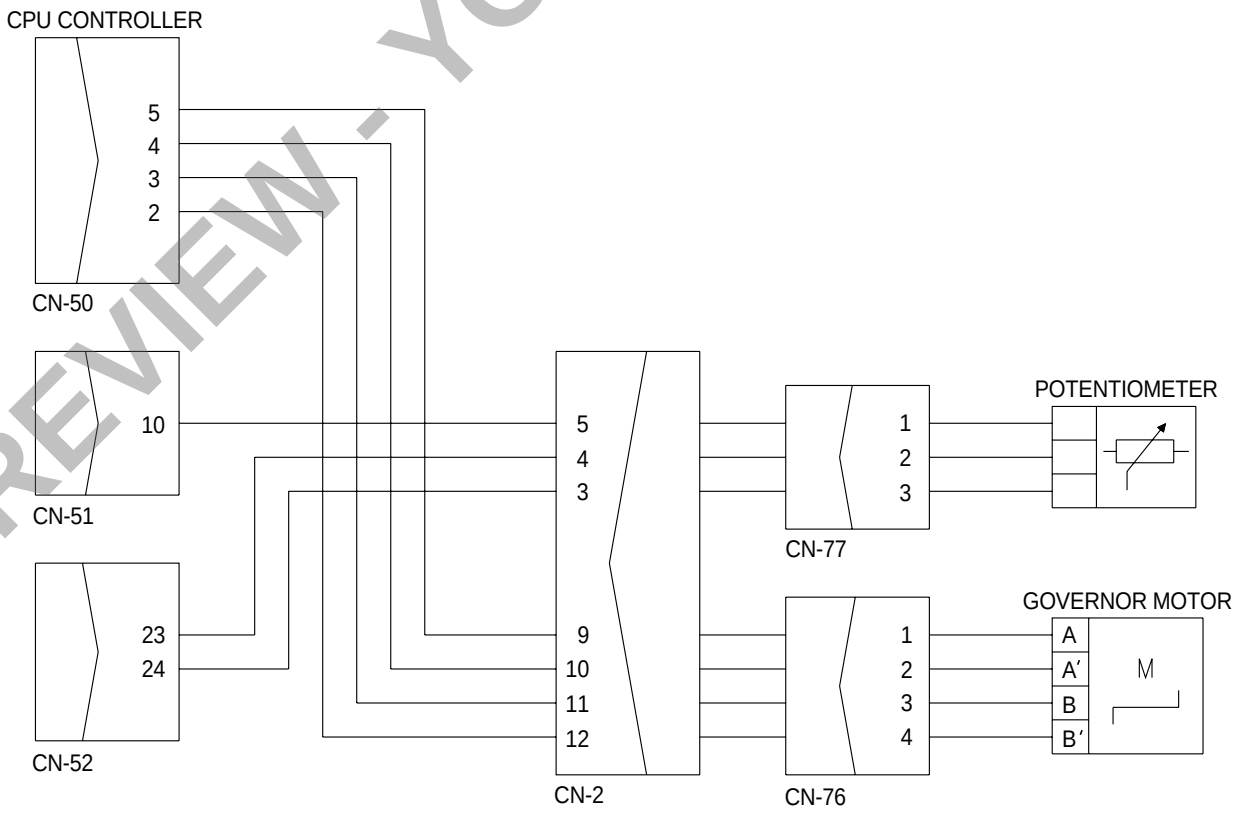
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6. ENGINE SPEED IS NOT CHANGING WHEN CHANGE THE MODE

- Before using the HYPER DAT make sure you understand the user's guide of HYPER DAT.
- Before mounting or dismounting the HYPER DAT, always turn the starting switch OFF.
- Before starting switch turn ON or OFF, check all related connectors are properly inserted.



Wiring diagram



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2. TORQUE CHART

The torques given are standard figures. Any figures specifically described in this manual has priority.

1) METRIC BOLT-coarse thread

Bolt size	8T		10T	
	kg · m	lb · ft	kg · m	lb · ft
M 6 × 1.0	0.85 ~ 1.25	6.15 ~ 9.04	1.14 ~ 1.74	8.2 ~ 12.6
M 8 × 1.25	2.0 ~ 3.0	14.5 ~ 21.7	2.73 ~ 4.12	19.7 ~ 29.8
M10 × 1.5	4.0 ~ 6.0	28.9 ~ 43.4	5.5 ~ 8.3	39.8 ~ 60
M12 × 1.75	7.4 ~ 11.2	53.5 ~ 79.5	9.8 ~ 15.8	71 ~ 114
M14 × 2.0	12.2 ~ 16.6	88.2 ~ 120	16.7 ~ 22.5	121 ~ 167
M16 × 2.0	18.6 ~ 25.2	135 ~ 182	25.2 ~ 34.2	182 ~ 247
M18 × 2.5	25.8 ~ 35.0	187 ~ 253	35.1 ~ 47.5	254 ~ 343
M20 × 2.5	36.2 ~ 49.0	262 ~ 354	49.2 ~ 66.6	356 ~ 482
M22 × 2.5	48.3 ~ 63.3	350 ~ 457	65.8 ~ 98.0	476 ~ 709
M24 × 3.0	62.5 ~ 84.5	452 ~ 611	85.0 ~ 115	615 ~ 832
M30 × 3.5	124 ~ 168	898 ~ 1214	169 ~ 229	1223 ~ 1655
M36 × 4.0	174 ~ 236	1261 ~ 1703	250 ~ 310	1808 ~ 2242

2) METRIC BOLT-Fine thread

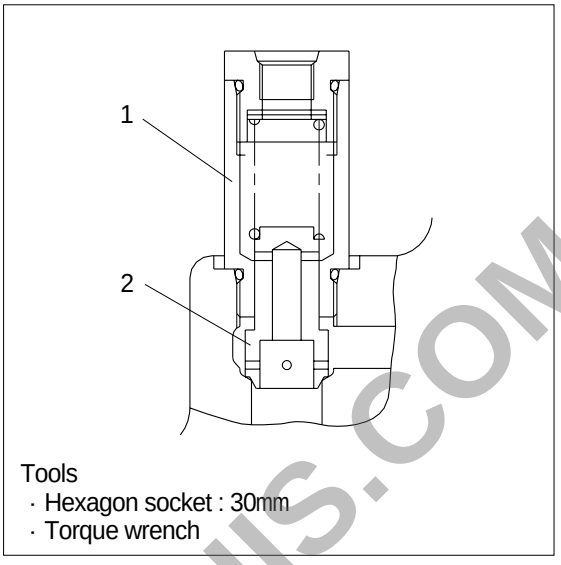
Bolt size	8T		10T	
	kg · m	lb · ft	kg · m	lb · ft
M 8 × 1.0	2.17 ~ 3.37	15.7 ~ 24.3	3.04 ~ 4.44	22.0 ~ 32.0
M10 × 1.25	4.46 ~ 6.66	32.3 ~ 48.2	5.93 ~ 8.93	42.9 ~ 64.6
M12 × 1.25	7.78 ~ 11.58	76.3 ~ 83.7	10.6 ~ 16.0	76.6 ~ 115
M14 × 1.5	13.3 ~ 18.1	96.2 ~ 130	17.9 ~ 24.1	130 ~ 174
M16 × 1.5	19.9 ~ 26.9	144 ~ 194	26.6 ~ 36.0	193 ~ 260
M18 × 1.5	28.6 ~ 43.6	207 ~ 315	38.4 ~ 52.0	278 ~ 376
M20 × 1.5	40.0 ~ 54.0	289 ~ 390	53.4 ~ 72.2	386 ~ 522
M22 × 1.5	52.7 ~ 71.3	381 ~ 515	70.7 ~ 95.7	512 ~ 692
M24 × 2.0	68 ~ 92	491 ~ 664	90.9 ~ 123	658 ~ 890
M30 × 2.0	137 ~ 185	990 ~ 1338	182 ~ 248	1314 ~ 1795
M36 × 3.0	192 ~ 260	1389 ~ 1879	262 ~ 354	1893 ~ 2561

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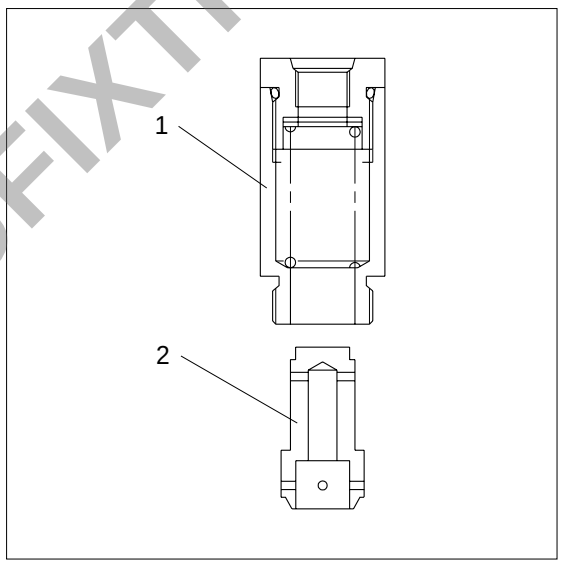
6) FOOT RELIEF ASSEMBLY

(1) Loosen socket bolt(1) and remove poppet (2).
· Tightening torque : 6kgf · m(43.4lbf · ft)

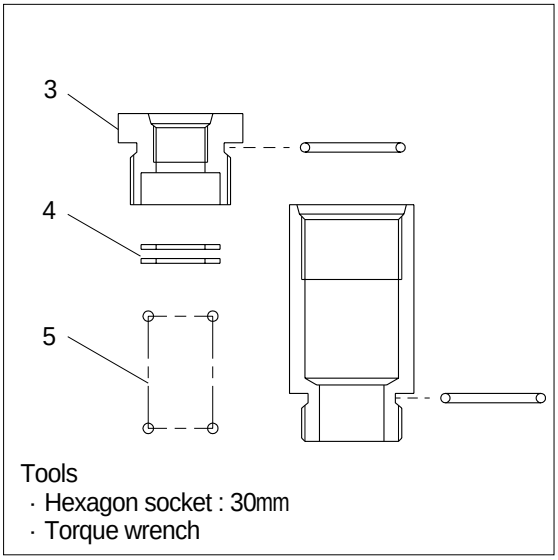


Tools
· Hexagon socket : 30㎜
· Torque wrench

(2) Remove cap (3) and take off shim (4) and spring (5).
· Tightening torque : 6kgf · m(43.4lbf · ft)
※ Make sure adjust shim quantity.



(3) Remove the poppet (3) and take off piston (4) and spring (5,6).



Tools
· Hexagon socket : 30㎜
· Torque wrench

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GROUP 6 TRAVEL MOTOR

1. REMOVAL AND INSTALL

1) REMOVAL

(1) Lower the work equipment to the ground and stop the engine.

(2) Operate the control levers and pedals several times to release the remaining pressure in the hydraulic piping.

(3) Loosen the breather slowly to release the pressure inside the hydraulic tank.

⚠ Escaping fluid under pressure can penetrate the skin causing serious injury.

(4) Loosen the socket bolt(1) and remove the pipe assy(2).

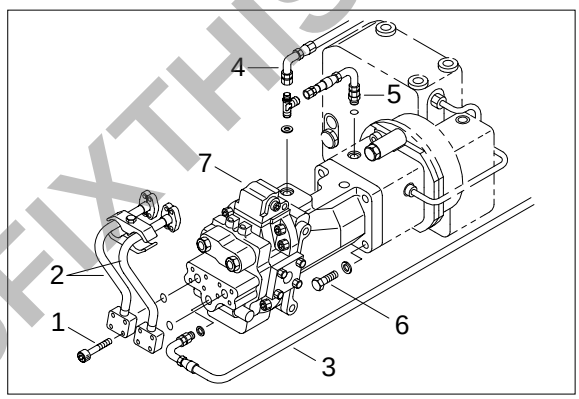
(5) Disconnect hoses(3,4,5).

(6) Loosen the hex bolt(6) and remove travel motor(7).

・Weight : 105kg(230lb)

※ When removing the travel motor assembly, check that all the hoses have been disconnected.





2) INSTALL

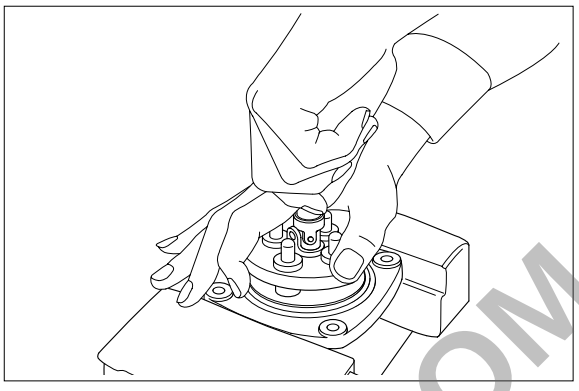
(1) Carry out installation in the reverse order to removal.

(2) Confirm the hydraulic oil level and check the hydraulic oil leak or not.

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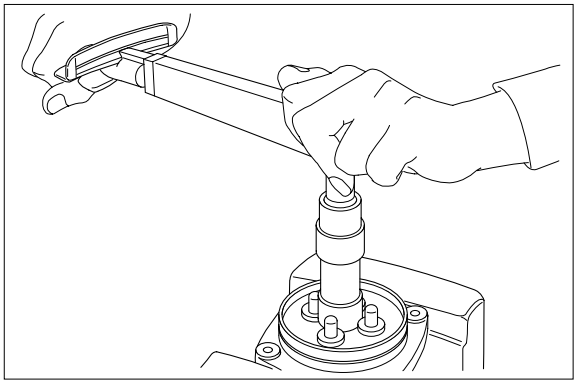
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(11) When return spring is strong in force, assemble 4 sets at the same time, utilizing plate(151), and tighten joint(301) temporarily.



(12) Fit plate(151).

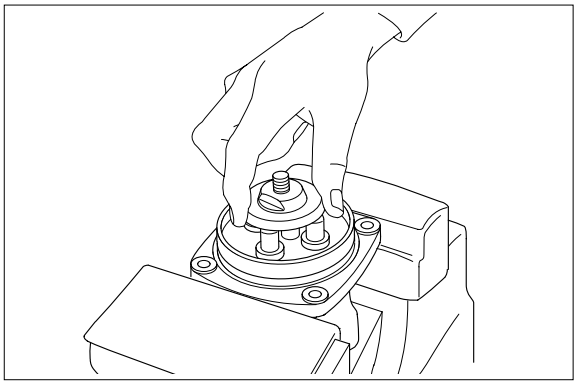
(13) Tighten joint(301) with the specified torque to casing, utilizing jig.



(14) Assemble plate(302) to joint(301).

※ Screw it to position that it contacts with 4 push rods evenly.

※ Do not screw it over.



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1. REMOVAL TRANSMISSION

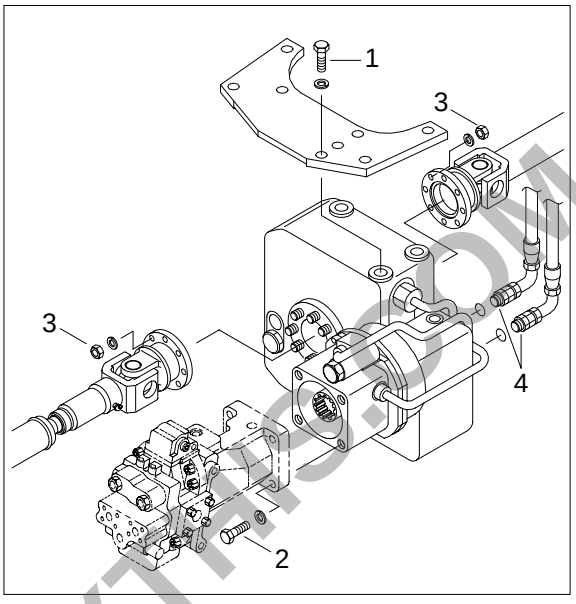
1) Transmission mounting bolt(1, M20)
   °§Tightening torque : 44 ° æ 2kgf°§m
   (318.2 ° æ 14lb°§ft)

2) Travel motor mounting bolt(2, M16)
   °§Tightening torque : 29.6 ° æ 3.2kgf°§m
   (214 ° æ 23.1lb°§ft)

3) Propeller shaft mounting nut(3, M10)
   °§Tightening torque : 5.9 ° æ 0.6kgf°§m
   (42.7 ° æ 4.3lb°§ft)

4) Hose assy(4, PF3/8)
   °§Tightening torque : 5kg°§m(36.2lb°§ft)

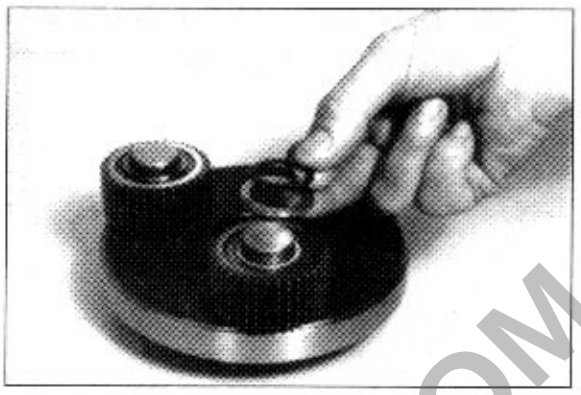
5) Transmission weight : 132kg(290lb)



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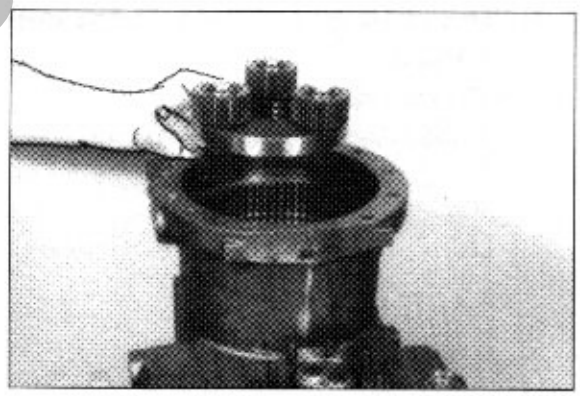
(3) Install collar shim and circlip.



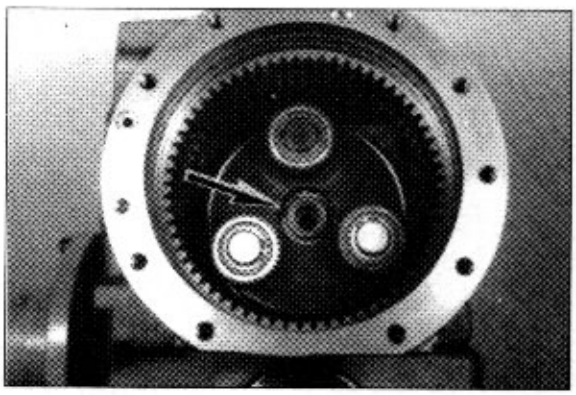
(4) Insert ball bearing firmly against shoulder and fix with circlip.



(5) Heat ball bearing and mount planetary carrier until contact is obtained.



(6) Fix planetary carrier with circlip(Arrow).

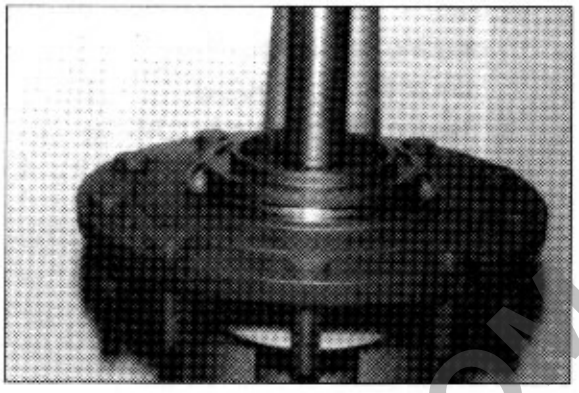


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② Cover shaft seal on the outer diameter with loctite(Type-No. 574) and install it (see Draft ③).

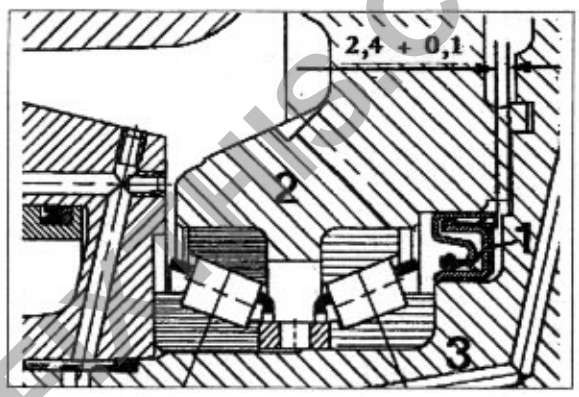
※ Wet shaft seal in the zone of the inner diameter, immediately prior to the reassembly of the hub(Figure ④) with spirit.



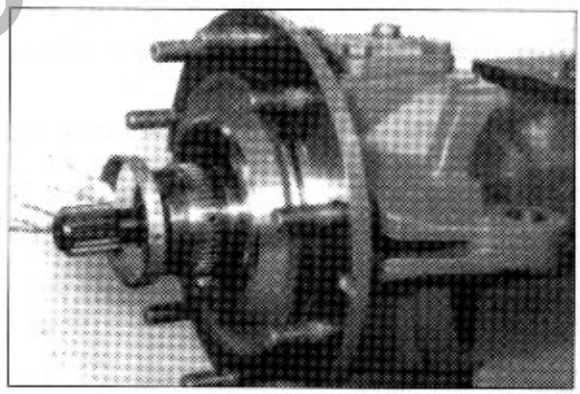
※ By using the prescribed driver, the exact installation depth is obtained(see Draft on the right).

③ Reference Draft

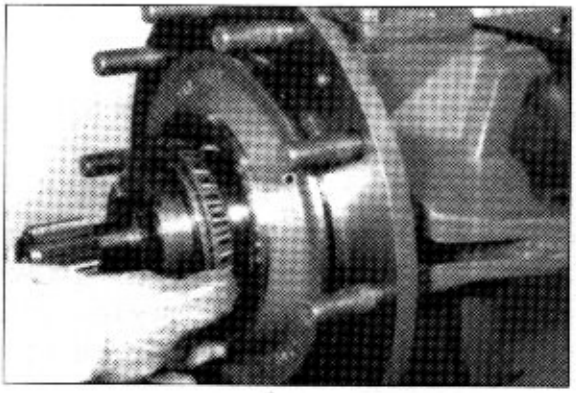
1 Shaft seal
2 Hub
3 Steering knuckle hull



④ Assemble pre-assembled hub and determined spacing ring (e.g. s = 14.50 mm).



⑤ Fix the hub by means of the heated bearing inner race.

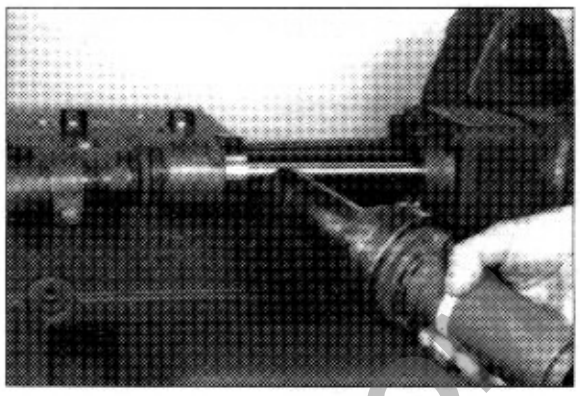


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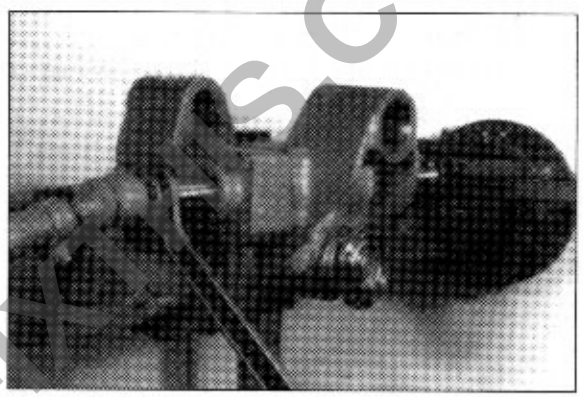
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Version-tie rod "with" stop ring for the steering lock

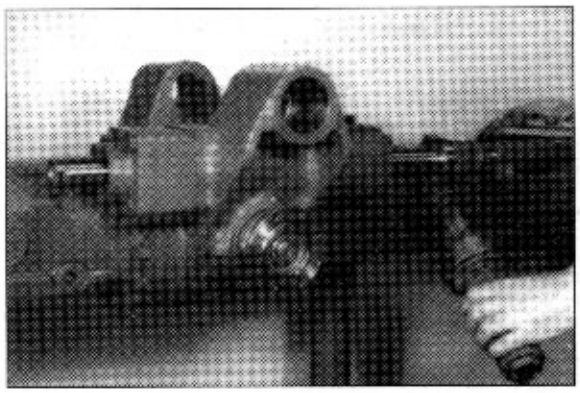
④ Heat piston rod in the zone of the bolting piston rod / thrust bearing.



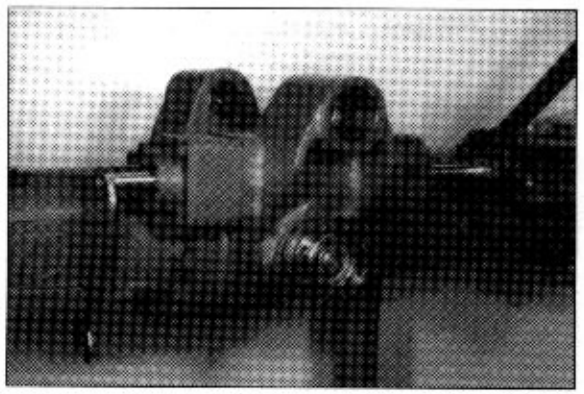
⑤ Loosen bolting and separate the complete tie rod from the piston rod. Now, pull off stop ring.



⑥ Heat the second bolting of piston rod / axial joint.



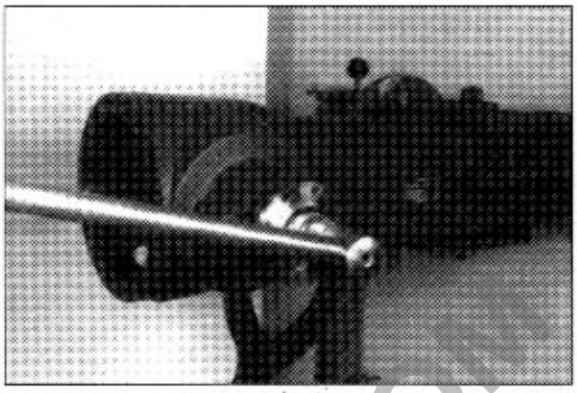
⑦ Remove second tie rod and stop ring.



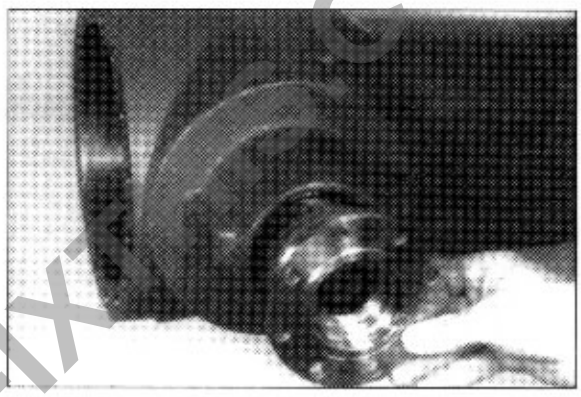
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(13) Loosen hex nut.

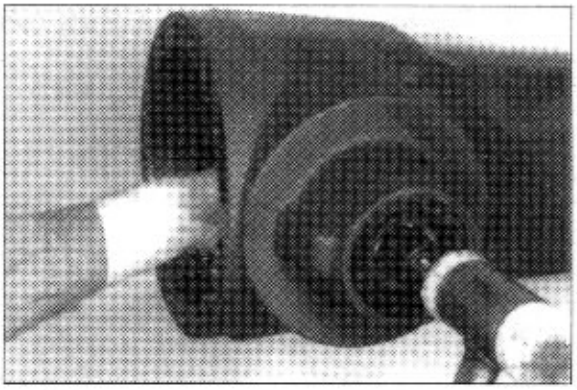


(14) Pull off drive flange.

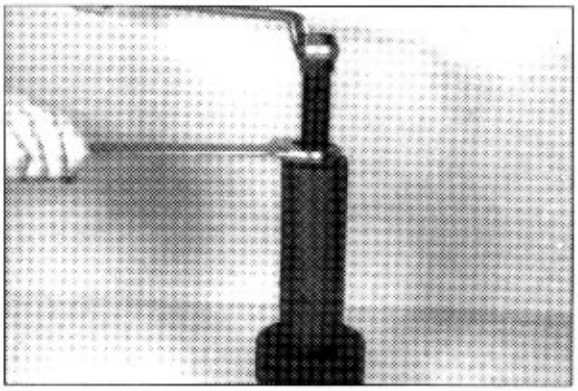


(15) Remove drive pinion.

※ If the pinion bearing must not be renewed pay attention that at the driving out of the drive pinion, the outer bearing inner race has always contact on the bearing outer race.
If this is not the case, the bearing would be damaged and must therefore be renewed.



(16) Remove the spacer and pull the tapered roller bearing from the drive pinion.



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