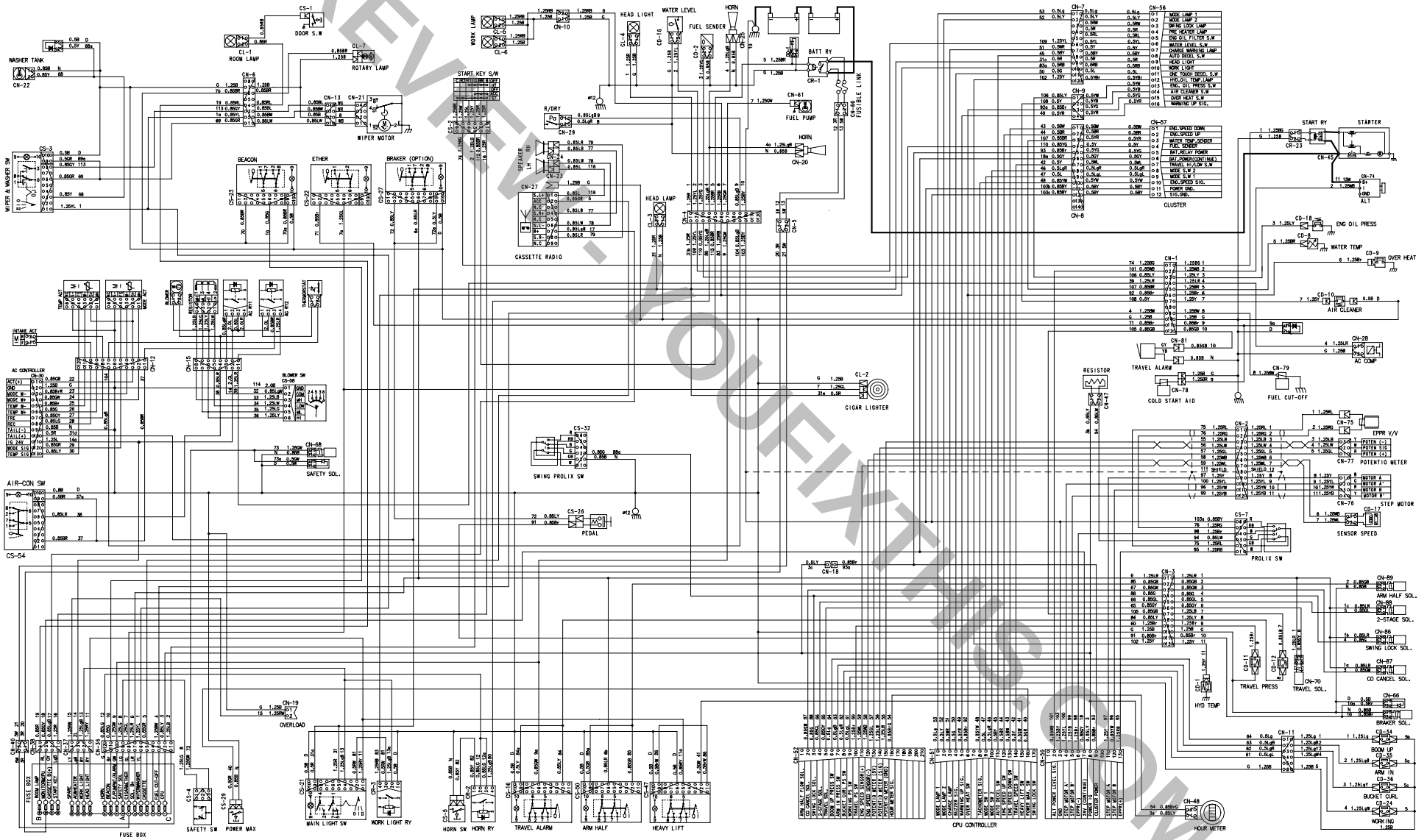
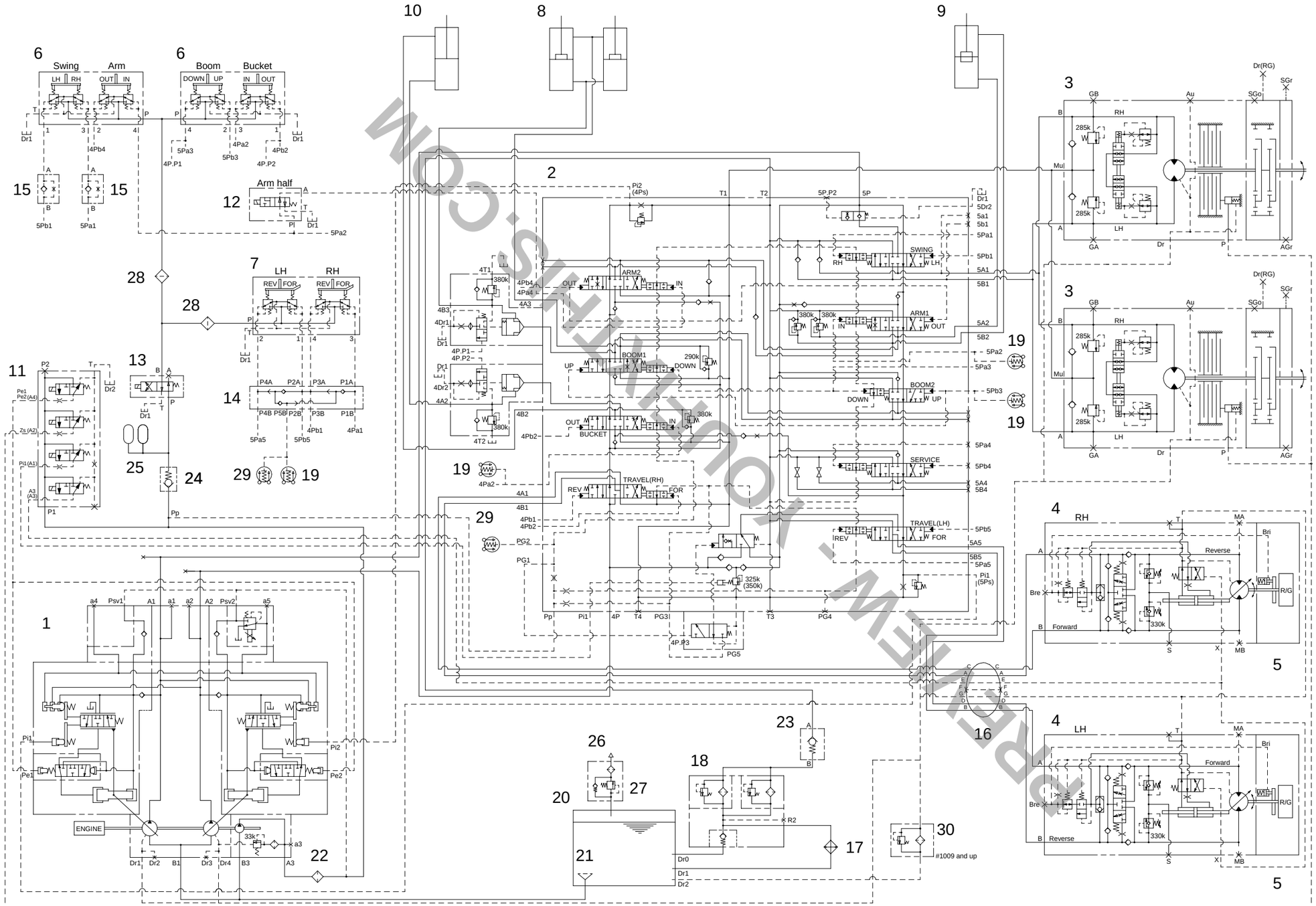


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GROUP 1 HYDRAULIC CIRCUIT



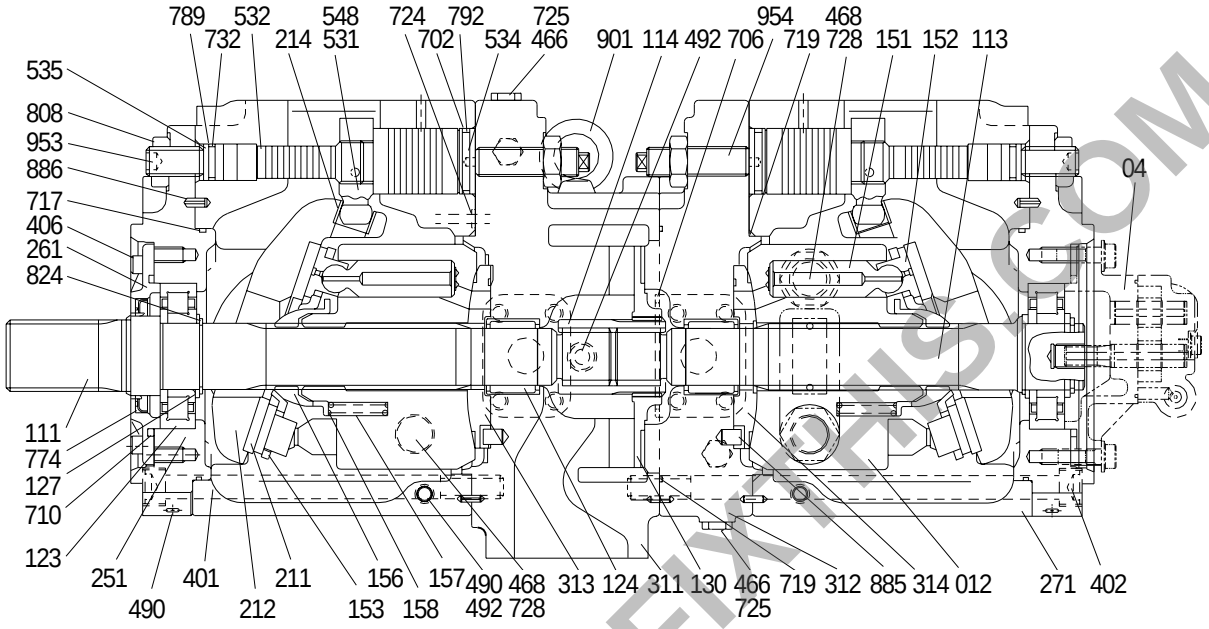
1 Main pump
2 Main control valve
3 Swing motor
4 Travel motor
5 Track drive
6 RCV lever
7 RCV pedal
8 Boom cylinder
9 Arm cylinder
10 Bucket cylinder
11 Solenoid valve
12 Solenoid valve
13 Solenoid valve
14 Shuttle valve
15 Slow return valve
16 Turning joint
17 Oil cooler
18 Return filter assy
19 Pressure switch
20 Hydraulic tank
21 Suction strainer
22 Line filter
23 Return check valve
24 Check valve
25 Accumulator
26 Air breather
27 Strainer
28 Line filter
29 Pressure switch
30 Drain filter

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1) MAIN PUMP(1/2)

The main pump consists of two piston pump(front & rear) and valve block.



04	Gear pump	261	Seal cover(F)	706	O-ring
012	Cylinder block	271	Pump casing	710	O-ring
111	Drive shaft(F)	311	Valve cover(F)	717	O-ring
113	Drive shaft(R)	312	Valve cover(R)	719	O-ring
114	Spline	313	Valve plate(R)	724	O-ring
123	Roller bearing	314	Valve plate(L)	725	O-ring
124	Needle bearing	401	Hexagon socket bolt	728	O-ring
127	Bearing spacer	402	Hexagon socket bolt	732	O-ring
130	Booster	406	Hexagon socket bolt	774	Oil seal
151	Piston	466	VP Plug	789	Back up ring
152	Shoe	468	VP Plug	792	Back up ring
153	Set plate	490	Plug	808	Hexagon head nut
156	Bushing	492	Plug	824	Snap ring
157	Cylinder spring	531	Tilting pin	885	Pin
158	Spacer	532	Servo piston	886	Spring pin
211	Shoe plate	534	Stopper(L)	901	Eye bolt
212	Swash plate	535	Stopper(S)	953	Hexagon socket screw
214	Bushing	548	Feed back pin	954	Set screw
251	Support plate	702	O-ring		

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GROUP 2 TIGHTENING TORQUE

1. MAJOR COMPONENTS

No.	Items		Size	kgf · m	lbf · ft
1	Engine	Engine mounting bolt, nut-Front	M20×2.5	57.9±8.7	419 ± 63
2		Engine mounting bolt, nut-Rear	M16×2.0	19±3	137 ± 22
3		Engine mounting bracket bolt	M20×2.5	46.4±4.6	336 ± 33
4		Radiator mounting bolt	M16×2.0	29.7±4.5	215 ± 33
5		Damper mounting bolt	3/8-16UNC	4.6±1.0	33 ± 7
6		Main pump housing mounting bolt	M10×1.5	4.6±1.0	33 ± 7
7	Hydraulic system	Main pump mounting socket bolt	M20×2.5	44±6.6	318 ± 48
8		Control valve mounting nut	M20×2.5	57.9±8.7	419 ± 63
9		Fuel tank mounting bolt	M20×2.5	57.9±8.7	419 ± 63
10		Hydraulic oil tank mounting bolt	M20×2.5	57.9±8.7	419 ± 63
11		Turning joint mounting bolt, nut	M16×2.0	29.7±4.5	215 ± 33
12	Power train system	Swing motor mounting bolt	M20×2.5	57.9±8.7	419 ± 63
13		Swing bearing upper part mounting bolt	M24×3.0	94.5±10.5	684 ± 76
14		Swing bearing lower part mounting bolt	M24×3.0	94.5±10.5	684 ± 76
15		Travel motor mounting bolt	M20×2.5	57.9±8.7	419 ± 63
16		Sprocket mounting bolt	M20×2.5	57.9±8.7	419 ± 63
17	Under carriage	Carrier roller mounting bolt, nut	M16×1.5	31.3±4.7	226 ± 34
18		Track roller mounting bolt	M22×1.5	83.2±12.5	602 ± 90
19		Track tension cylinder mounting bolt	M22×1.5	76±8	550 ± 58
20		Track shoe mounting bolt, nut	3/4-16UNF	78 ± 3	564 ± 22
21		Track guard mounting bolt	M22×1.5	83.2±12.5	602 ± 90
22	Others	Counterweight mounting bolt	M42×3.0	390± 40	2821 ± 289
23		Cab mounting bolt, nut	M12×1.75	12.2 ± 1.3	88.2 ± 9.4
24		Operator's seat mounting bolt, nut	M 8 ×1.25	1.17 ± 0.1	8.5 ± 0.7

※ For tighting torque of engine and hydraulic components, see each components disassembly and assembly.

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5. ABNORMALITY CODE

Code	Description	Display
00	Normal	***00***
01	Short circuit in governor motor system	***01***
02	Open circuit in governor motor system	***02***
03	Short circuit in potentiometer system	***03***
04	Open circuit in potentiometer system	***04***
05	Short circuit in EPPR valve system	***05***
06	Open circuit in EPPR valve system	***06***
07	Short circuit in 2-stage relief solenoid system	***07***
08	Open circuit in 2-stage relief solenoid system	***08***
09	Short circuit in travel speed solenoid system	***09***
10	Open circuit in travel speed solenoid system	***10***
11	Short circuit in swing lock solenoid system	***11***
12	Open circuit in swing lock solenoid system	***12***
15	Short circuit in Cut-off cancel solenoid system	***15***
16	Open circuit in Cut-off cancel solenoid system	***16***
17	Abnormality in engine speed sensor system	***17***
18	Open circuit in continuous battery power system	***18***
19	Below 18V of input voltage	***19***
20	Open circuit in cluster input voltage	***20***
21	Abnormality in engine rpm setting	***21***
22	Malfunction of CPU controller	***22***
	Open circuit in power source system	***88 (OFF)***

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GROUP 3 PUMP DEVICE

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 drain plug under the hydraulic tank and drain the oil from the hydraulic tank.

- Hydraulic tank quantity : 230 ℓ

(5) Remove bolts(7) and disconnect hoses(1, 2,3,4).

(6) Remove bolt(22,23) and disconnect blocks(19,20,21).

(7) Disconnect pilot line hoses(8,9,10,11, 12,13,14,15,16,17,18).

(8) Remove bolts(6) and disconnect pump suction tube (5).

※ When pump suction tube is disconnected, the oil inside the piping will flow out, so catch it in oil pan.

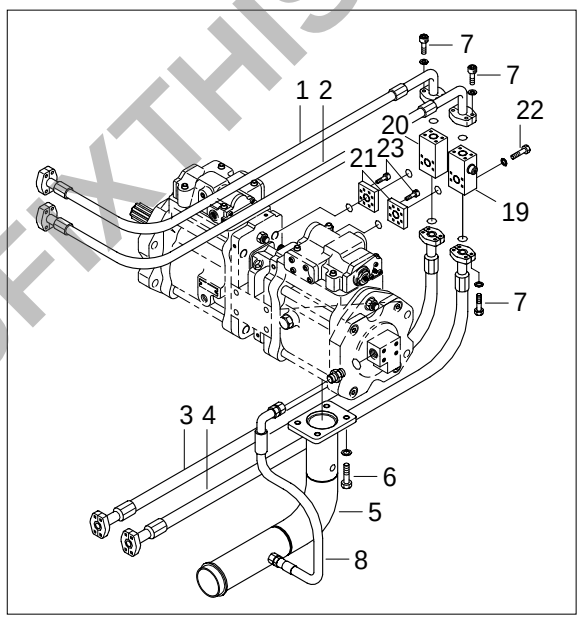
(9) Sling the pump assembly and remove the pump mounting bolts.

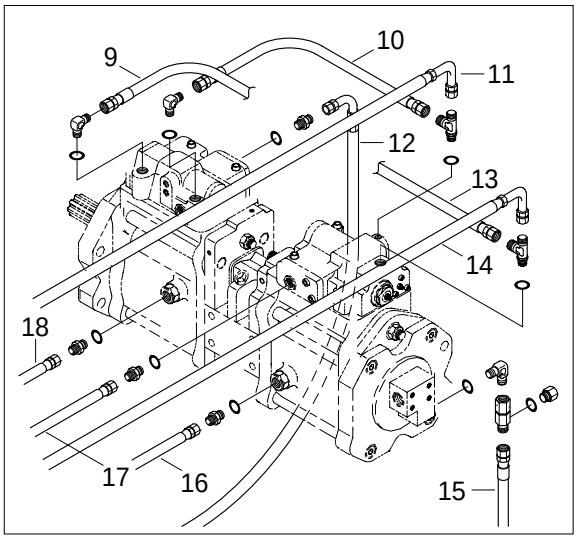
※ - Weight : 190 kg(420lb)

Pull out the pump assembly from housing.

When removing the pump assembly, check that all the hoses have been disconnected.



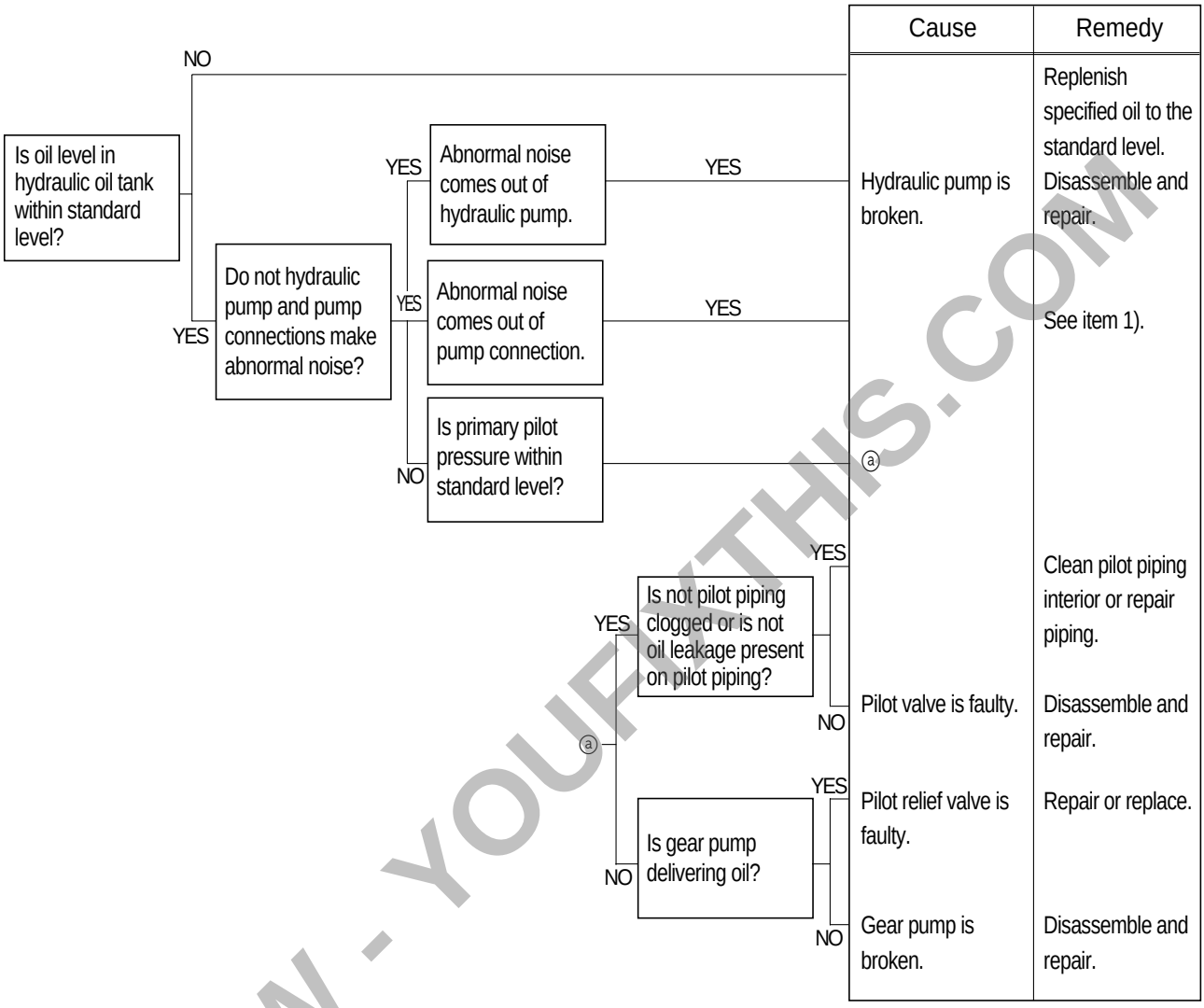




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2) ENGINE STARTS BUT MACHINE DOES NOT OPERATE AT ALL

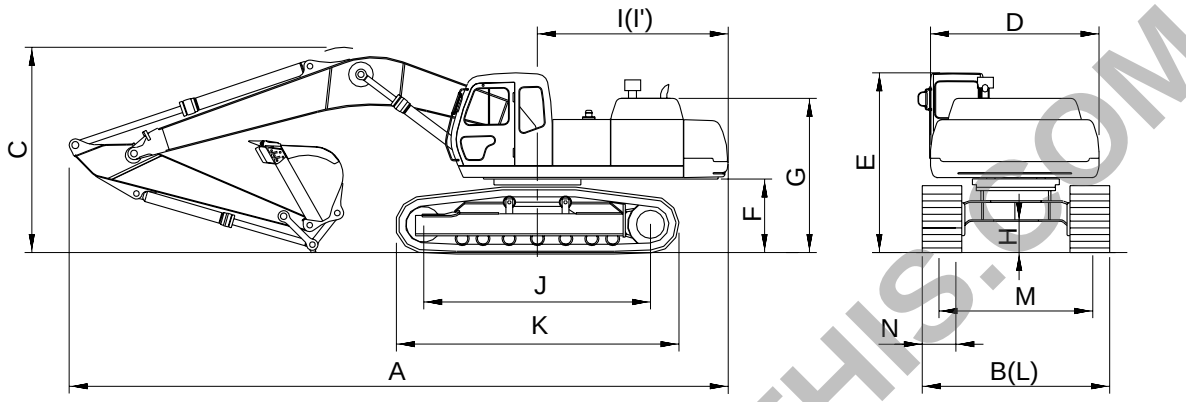


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2. SPECIFICATIONS

1) ROBEX450-3 (7.06m(23'2") boom and 3.38m(11'1") arm)



Description		Unit	Specification
Operating weight		kg(lb)	43400(95680)
Bucket capacity(PCSA heaped) ,standard		m^3 (yd^3)	1.97(2.58)
Overall length	A	mm(ft-in)	11700(38' 5")
Overall width, with 750㎜ shoe	B		3490(11' 5")
Overall height	C		3540(11' 7")
Superstructure width	D		3000(9' 10")
Cab height	E		3200(10' 6")
Ground clearance of counterweight	F		1335(4' 5")
Engine cover height	G		2745(9' 0")
Minimum ground clearance	H		555(1' 10")
Rear-end distance	I		3400(11' 2")
Rear-end swing radius	I'		3400(11' 2")
Distance between tumblers	J		4038(13' 3")
Undercarriage length	K		5030(16' 6")
Undercarriage width	L		3490(11' 5")
Track gauge	M		2740(9' 0")
Track shoe width, standard	N		750(30")
Travel speed (low/high)		km/hr(mph)	3.2/5.1(2.0/3.2)
Swing speed		rpm	10.0
Gradeability		Degree(%)	40(84)
Ground pressure(750㎜ shoe)		kg/cm^2(psi)	0.66(9.39)

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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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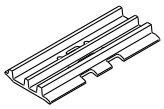
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7. UNDERCARRIAGE

1) TRACKS

X-leg type center frame is integrally welded with reinforced box-section track frames. The design includes dry tracks, lubricated rollers, idlers, sprockets, hydraulic track adjusters with shock absorbing springs, and assembled track-type tractor shoes with triple grousers.

2) TYPES OF SHOES

Model	Shapes		Triple grouser			
						
R450-3	Shoe width	mm(in)	600(24)	700(28)	750(30)	800(32)
	Operating weight	kg(lb)	42600(93920)	43160(95150)	43400(95680)	43640(96210)
	Ground pressure	kg/cm^2(psi)	0.81(11.5)	0.70(10.0)	0.66(9.4)	0.62(8.8)
	Overall width	mm(ft-in)	3340(10' 11")	3440(11' 3")	3490(11' 5")	3540(11' 7")
R450LC-3	Shoe width	mm(in)	600(24)	700(28)	750(30)	800(32)
	Operating weight	kg(lb)	43500(95900)	43850(96670)	44300(97660)	44570(98260)
	Ground pressure	kg/cm^2(psi)	0.75(10.7)	0.64(9.1)	0.61(8.7)	0.58(8.2)
	Overall width	mm(ft-in)	3340(10' 11")	3440(11' 3")	3490(11' 5")	3540(11' 7")

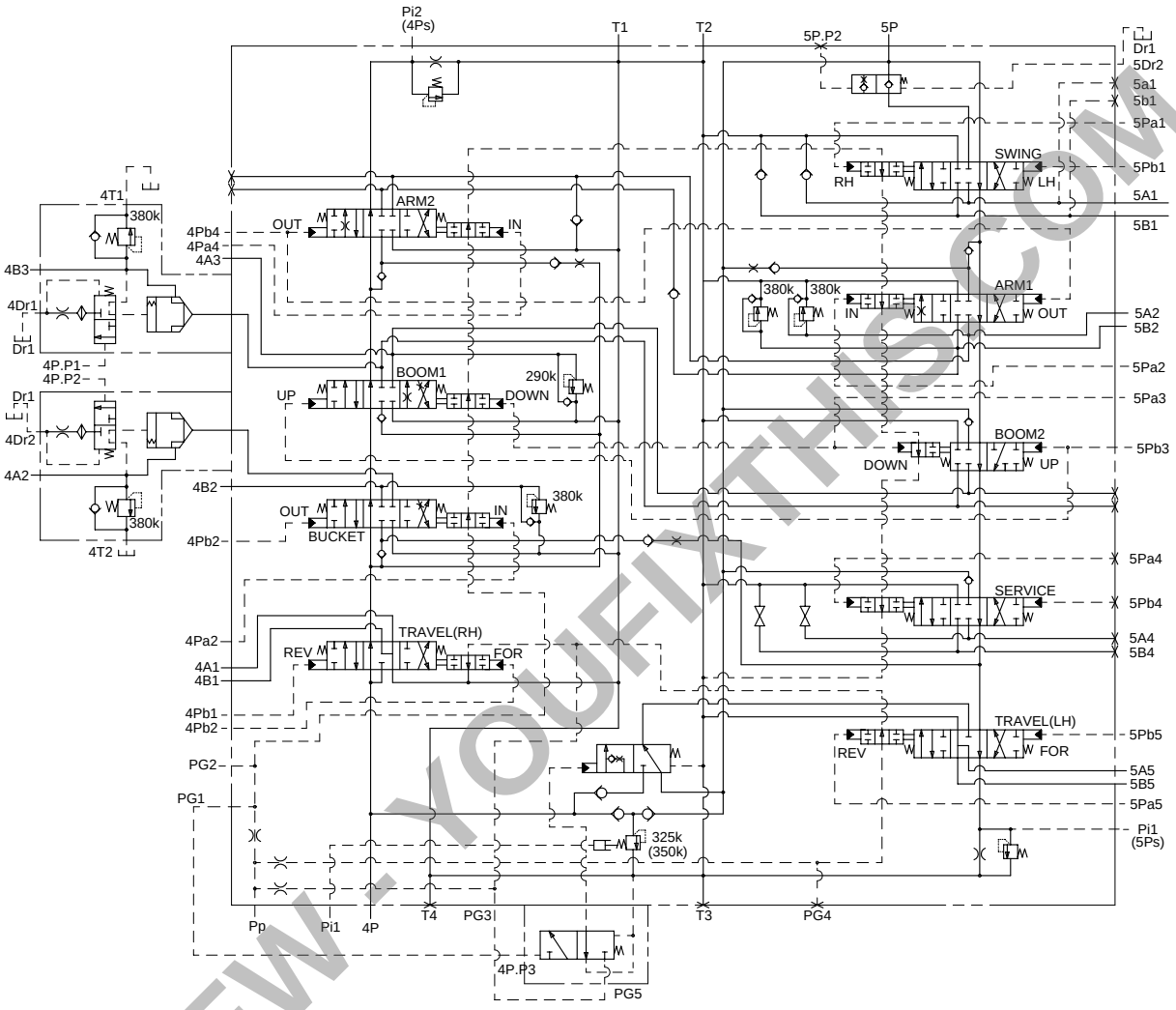
3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity	
	ROBEX 450-3	ROBEX 450LC-3
Carrier rollers	2EA	3EA
Track rollers	7EA	9EA
Track shoes	49EA	53EA

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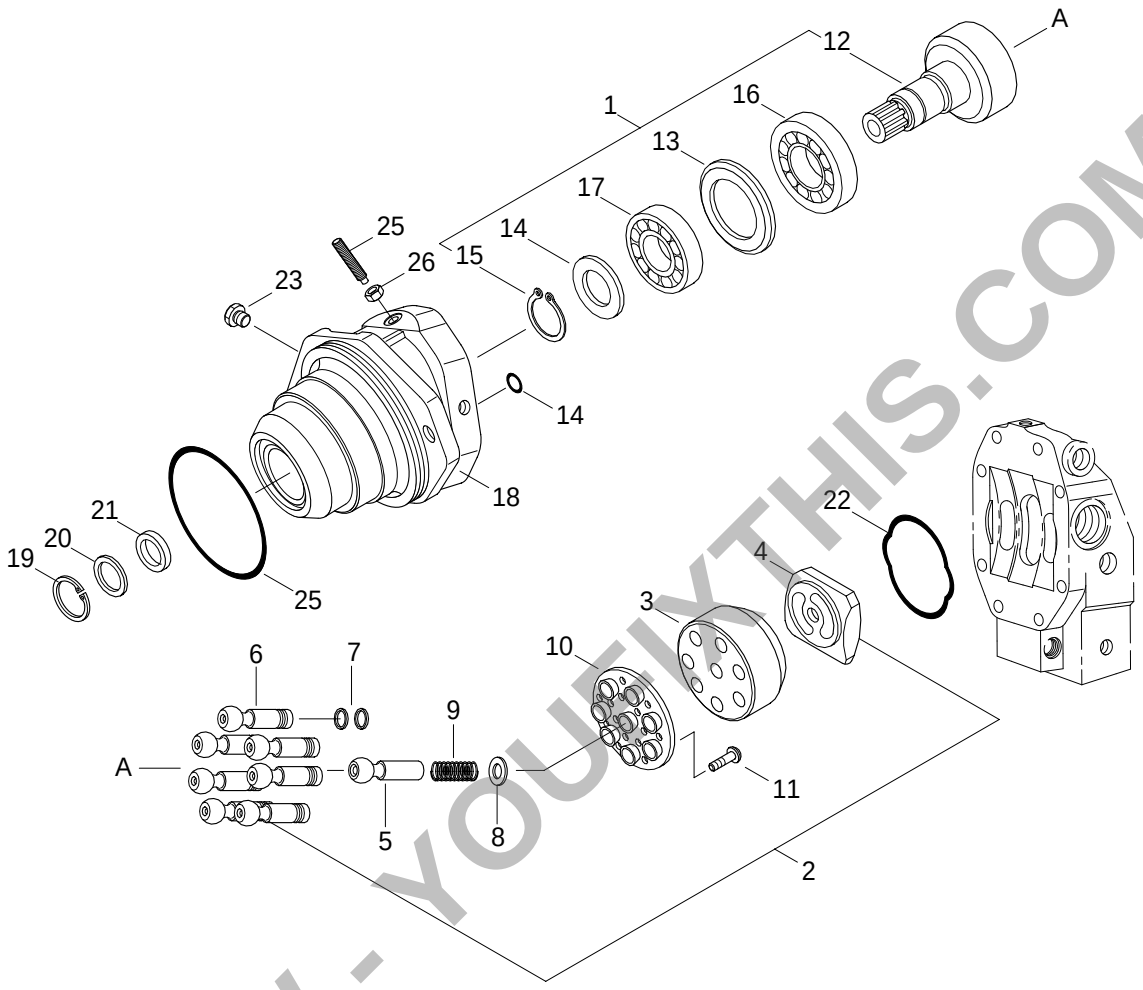
2. HYDRAULIC CIRCUIT



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1) TRAVEL MOTOR(1/2)



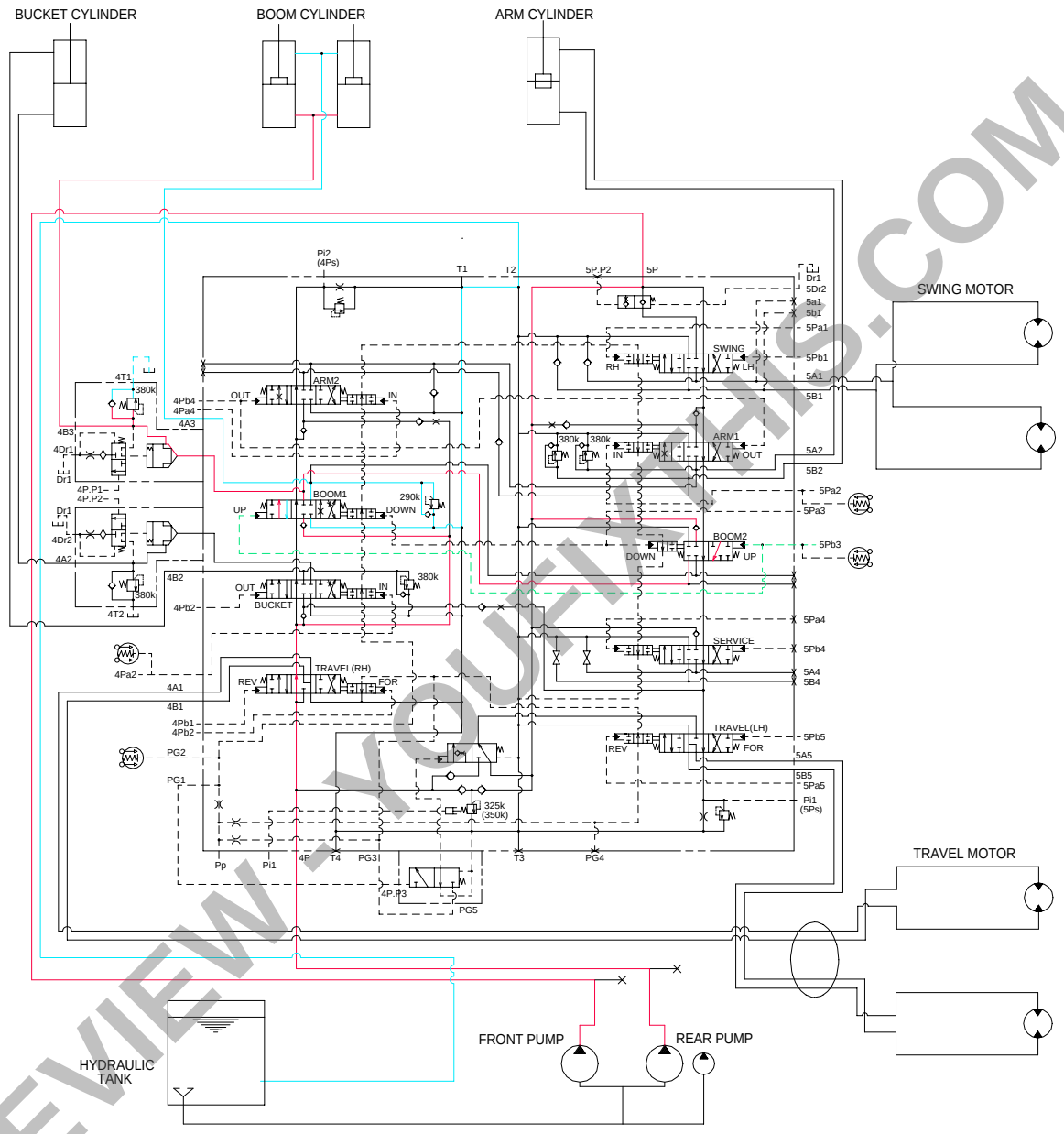
1	Rotary group	10	Retainer plate	19	Retainer ring
2	Hyd section rotary	11	Screw	20	Shaft seal ring
3	Cylinder	12	Drive shaft	21	Back up plate
4	Control lens	13	Shim	22	O-ring
5	Center pin	14	Back up plate	23	Locking screw
6	Piston	15	Retainer ring	24	O-ring
7	Steel ring	16	Roller bearing	25	Threaded pin
8	Adjustment shim	17	Roller bearing	26	Seal lock nut
9	Pressure spring	18	Housing	27	O-ring

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GROUP 4 SINGLE OPERATION

1. BOOM RAISE OPERATION



When the right control lever is pulled back, the boom spools in the main control valve are moved to the raise position by the pilot oil pressure from the remote control valve.

The oil from the front and rear pump flows into the main control valve and then goes to the large chamber of boom cylinders through the boom holding valve.

At the same time, the oil from the small chamber of boom cylinders returns to the hydraulic oil tank through the boom spool in the main control valve.

When this happens, the boom goes up.

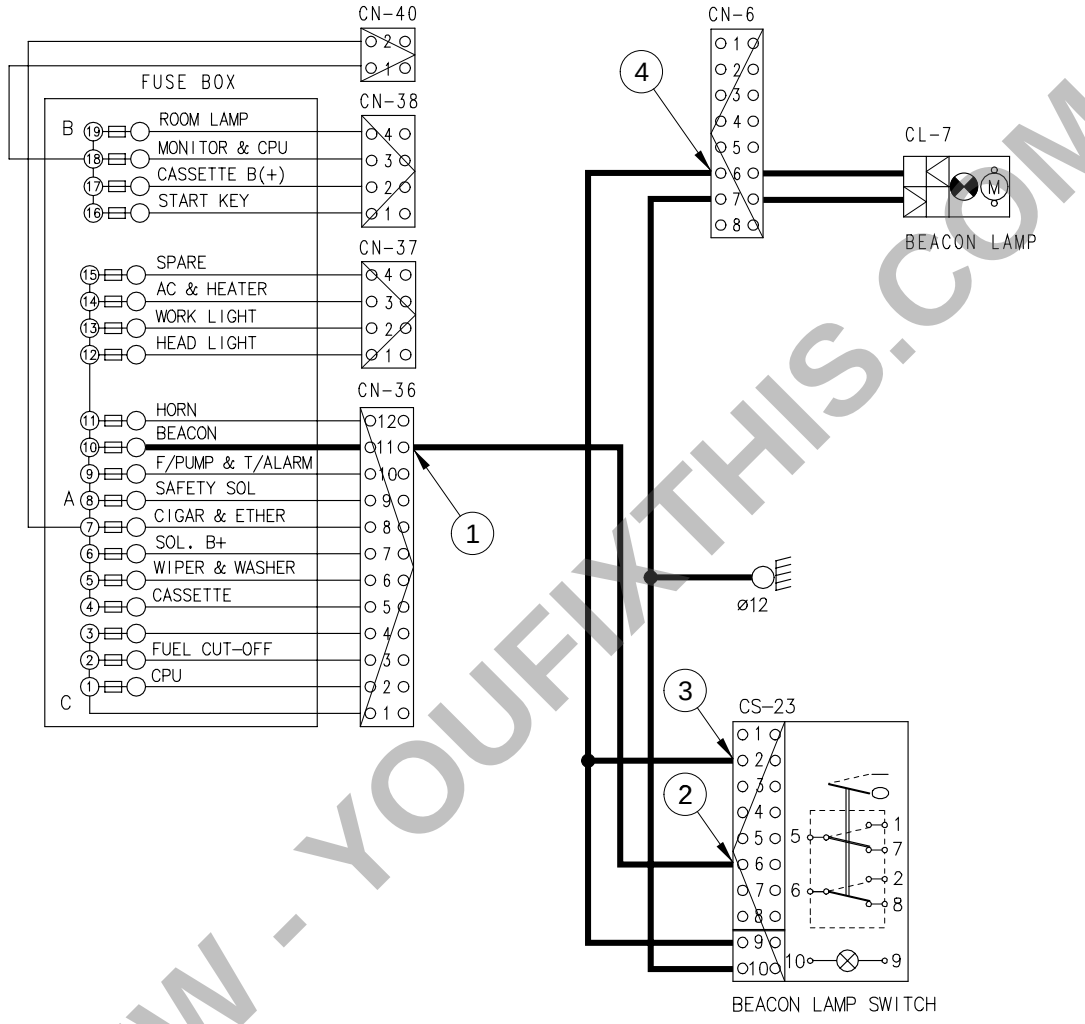
The excessive pressure in the boom cylinder bottom end circuit is prevented by the overload relief valve in the main control valve.

When the boom is raised and the control lever is returned to neutral, the circuit for the holding pressure at the bottom end of the boom cylinder is closed by the boom holding valve in the main control valve.

This prevents the hydraulic drift of boom cylinder.

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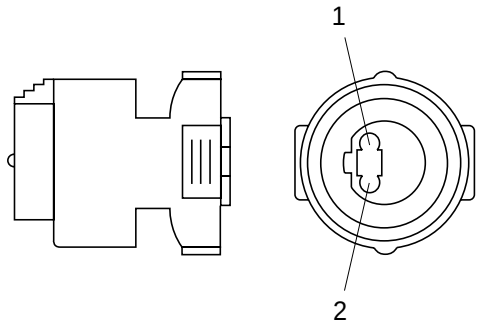
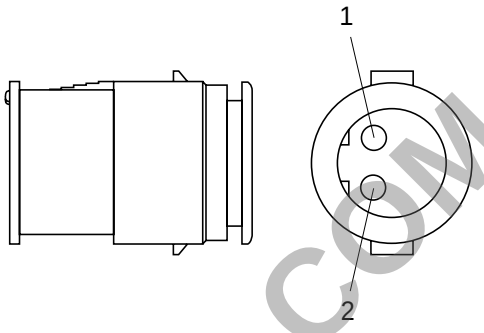
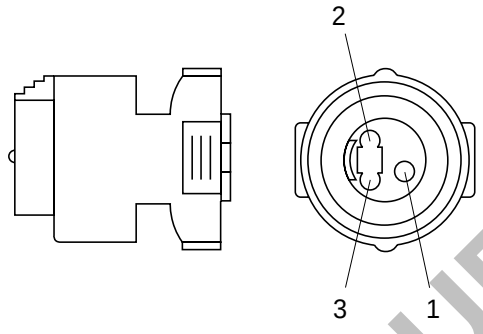
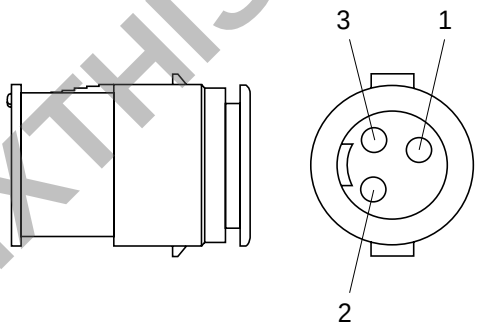
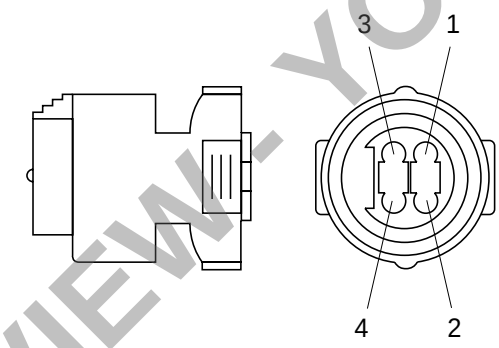
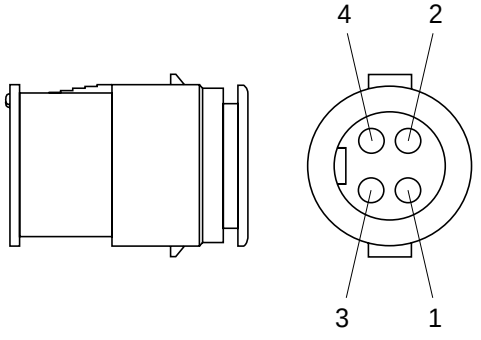
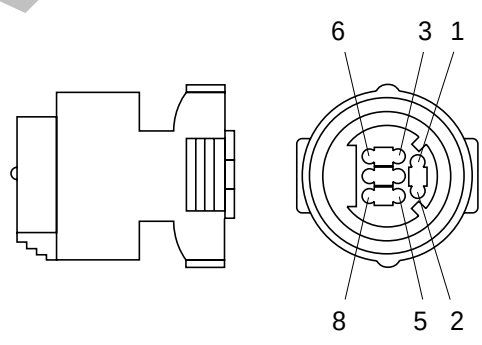
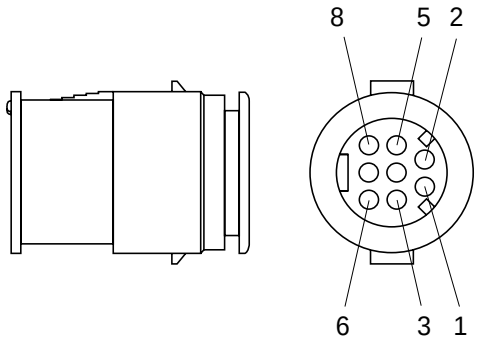
BEACON LAMP CIRCUIT



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5) J TYPE CONNECTOR

No. of pin	Receptacle connector(Female)	Plug connector(Male)
2	 S816-002001	 S816-102001
3	 S816-003001	 S816-103001
4	 S816-004001	 S816-104001
8	 S816-008001	 S816-108001

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4. Logic table(1)

	Condition	Function
Actuated	- Coolant temperature : Less than 30℃(after engine run)	- Mode : **F** after 10 seconds of low idling (upto #1023) Auto decel after 10 seconds of low idling(#1024 and up) - Warming up time : At least 10 minutes - Warming-up lamp : ON
Canceled	- Coolant temperature : Above 30℃ - Warming up time : Above 10 minutes - Changed mode set by operator ★ If any of the above conditions is applicable, the automatic warming-up function is canceled	- Default mode - Default mode - Changed mode
Warming-up lamp	Coolant temperature : Above 30℃	Warming-up lamp : OFF

5. Logic table(2)

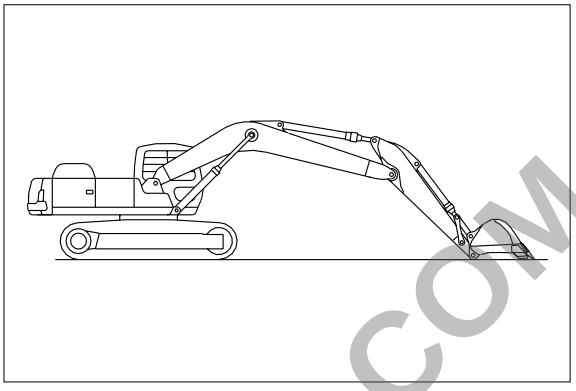
	Coolant temp ≤30℃	Coolant temp >30℃	Description
Signal	Low(0V)	High(5V)	Cluster
Warming-up lamp	ON	OFF	
Mode	F(upto #1023)	Default(S)	CPU controller
	Default(S, #1024 and up)	Default(S)	

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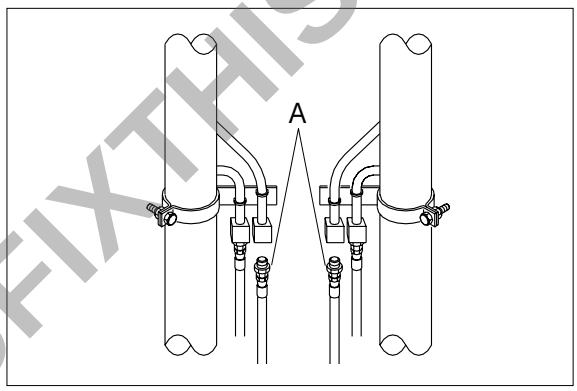
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※ HOW TO CHECK INTERNAL BOOM CYLINDER LEAKAGE

1. Lower the bucket teeth to the ground with bucket cylinder fully retracted and arm cylinder rod retracted almost in full.

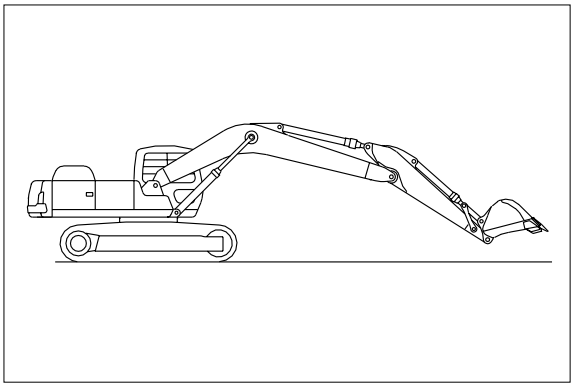


2. Disconnect hose(A) from rod side of boom cylinder and drain oil from cylinders and hose.(Put cups on piping and hose ends)



3. Raise bucket OFF the ground by retracting the arm cylinder rod.

   If off leaks from piping side and boom cylinder rod is retracted there is an internal leak in the cylinder.
   If no oil leaks from piping side and boom cylinder rod is retracted, there is an internal leak in the control valve.



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9) OPEN CIRCUIT OF 2-STAGE RELIEF SOLENOID SYSTEM(Error code : 08)

- Before checking, check all the related connectors are properly inserted.
- Before carrying out next procedure, connect the disconnected connectors again immediately unless otherwise specified.

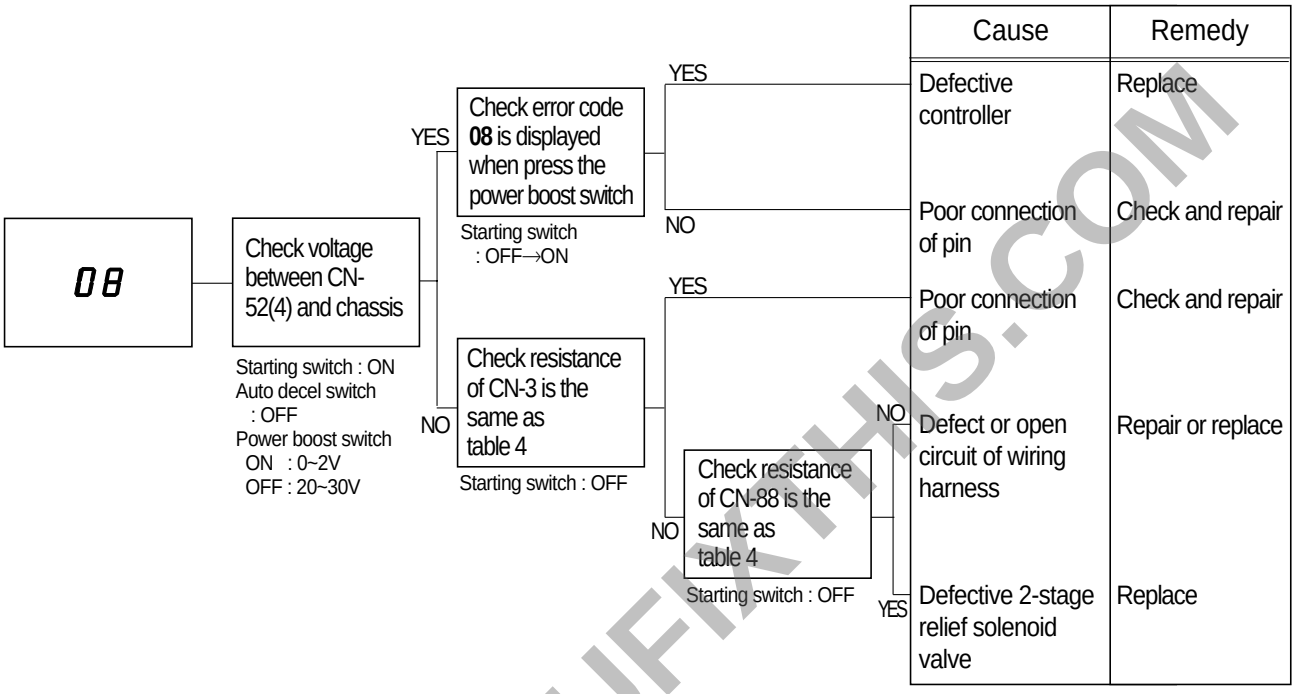
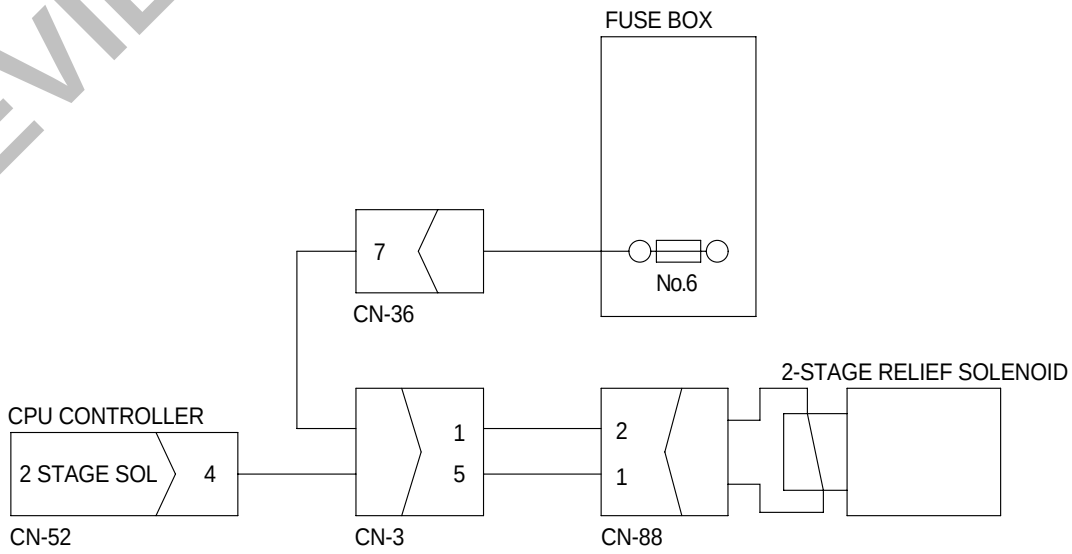


Table 4

CN-52(Female)	CN-3(Male)	CN-88(Male)	Resistance
-	(1) - (5)	(1) - (2)	20 ~ 30 Ω
(4) - Chassis	(5) - Chassis	(1) - Chassis	Min 1MΩ



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5) TRAVEL DEVIATION

(1) Measure the deviation by the tracks from a 20m straight line.

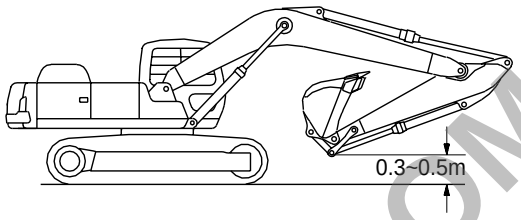
(2) Preparation

① Adjust the tension of both tracks to be equal.

② Provide a flat, solid test yard 20m in length, with extra length of 3 to 5m on both ends for machine acceleration and deceleration.

③ Hold the bucket 0.3 to 0.5m above the ground with the arm and bucket rolled in.

④ Keep the hydraulic oil temperature at 50 ±5℃.



(3) Measurement

① Measure the amount of mistracking at high and low travel speeds.

② Before beginning each test, select the following switch positions.

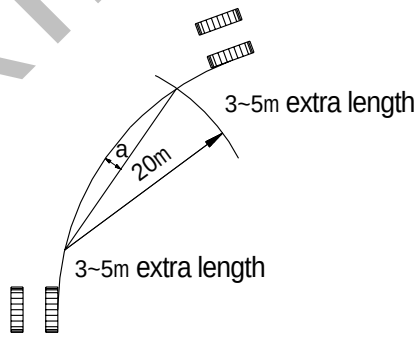
· MODE selector : H mode

③ Start traveling the machine in the acceleration zone with the travel levers at full stroke.

④ Measure the distance between a straight 20m line and the track made by the machine(dimension a).

⑤ After measuring the tracking in forward travel, turn the upperstructure 180° and measure that in reverse travel.

⑥ Repeat steps ④ and ⑤ three times and calculate the average values.



(4) Evaluation

Mistrack should be within the following specifications.

Unit : mm/20m

Model	Standard	Maximum allowable	Remarks
R450LC-3	Max 200	Max 220	

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3) PIPE & HOSE

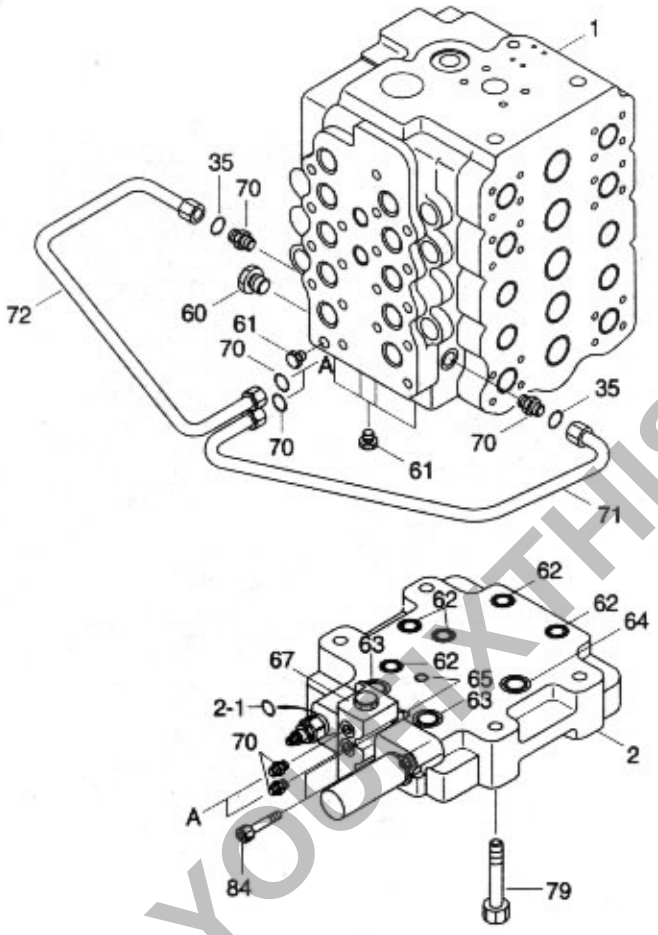
Thread size	Width across flat(mm)	kgf · m	lbf · ft
1/4"	19	3	21.7
3/8"	22	4	28.9
1/2"	27	5	36.2
3/4"	36	12	86.8
1"	41	14	101

4) FITTING

Thread size	Width across flat(mm)	kgf · m	lbf · ft
1/4"	19	4	28.9
3/8"	22	5	36.2
1/2"	27	6	43.4
3/4"	36	13	94.0
1"	41	15	109

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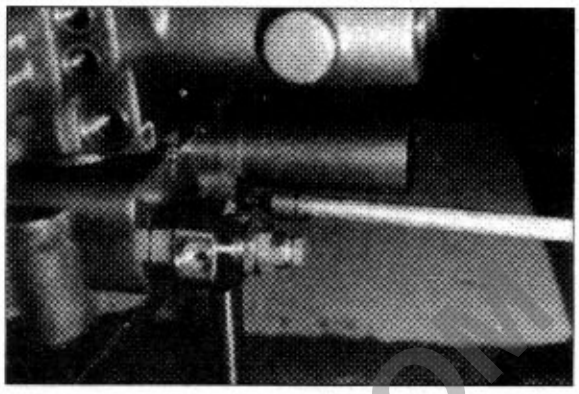
1	Valve housing	62	O-ring	71	Pipe
2	Side body assy	63	O-ring	72	Pipe
2-1	O-ring	64	O-ring	79	Socket bolt
35	O-ring	65	O-ring	84	Socket bolt
60	Plug assy	67	Pilot valve		
61	Plug	70	Joint		

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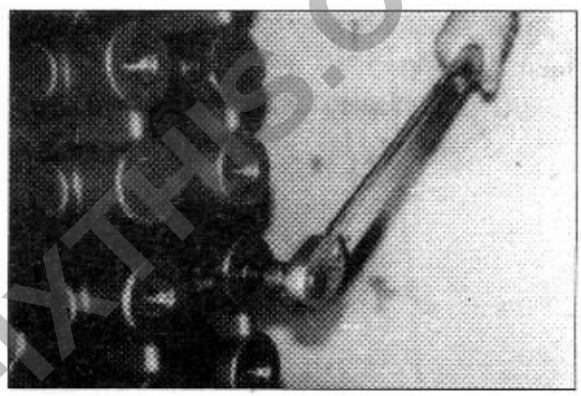
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③ Insert cap (2-8) and tighten socket head bolt (2-7).
- Tightening torque : 34~39N · m (3.5~4kgf · m)

※ When assembling cab, be careful not to separate O-ring of mating face.



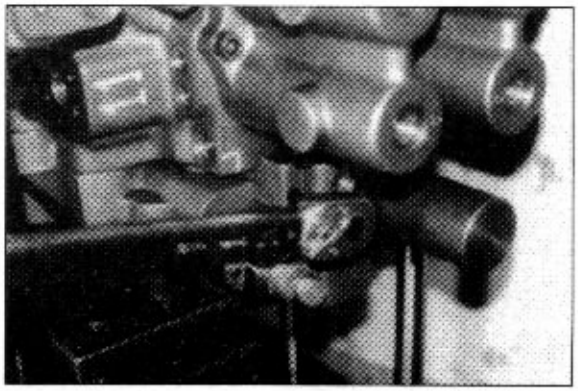
④ Tighten plug assembly (15) attached O-ring to service pilot port.
- Tightening torque : 49~59N · m (5~6kgf · m)



(10) Assembly of straight travel pilot valve

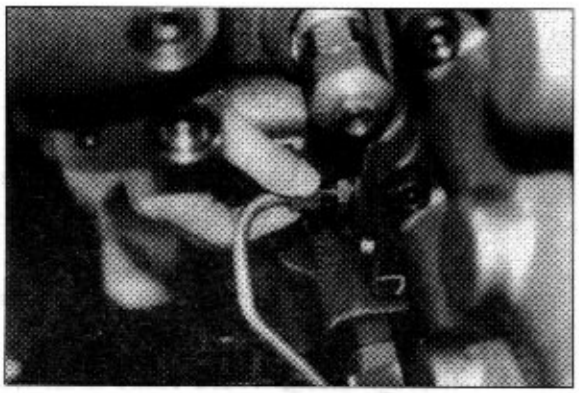
① Insert straight travel pilot valve and tighten socket head bolt (84).
- Tightening torque : 36.9±2N · m (3.8±0.2kgf · m)

※ Be careful not to separate O-ring of mating face.



② Mount O-ring (35) to fitting (70) and assemble it to body.
- Tightening torque : 34±36N · m (3.5±4kgf · m)

③ Assemble pipes (71, 72).
- Tightening torque : 34±36N · m (3.5±4kgf · m)

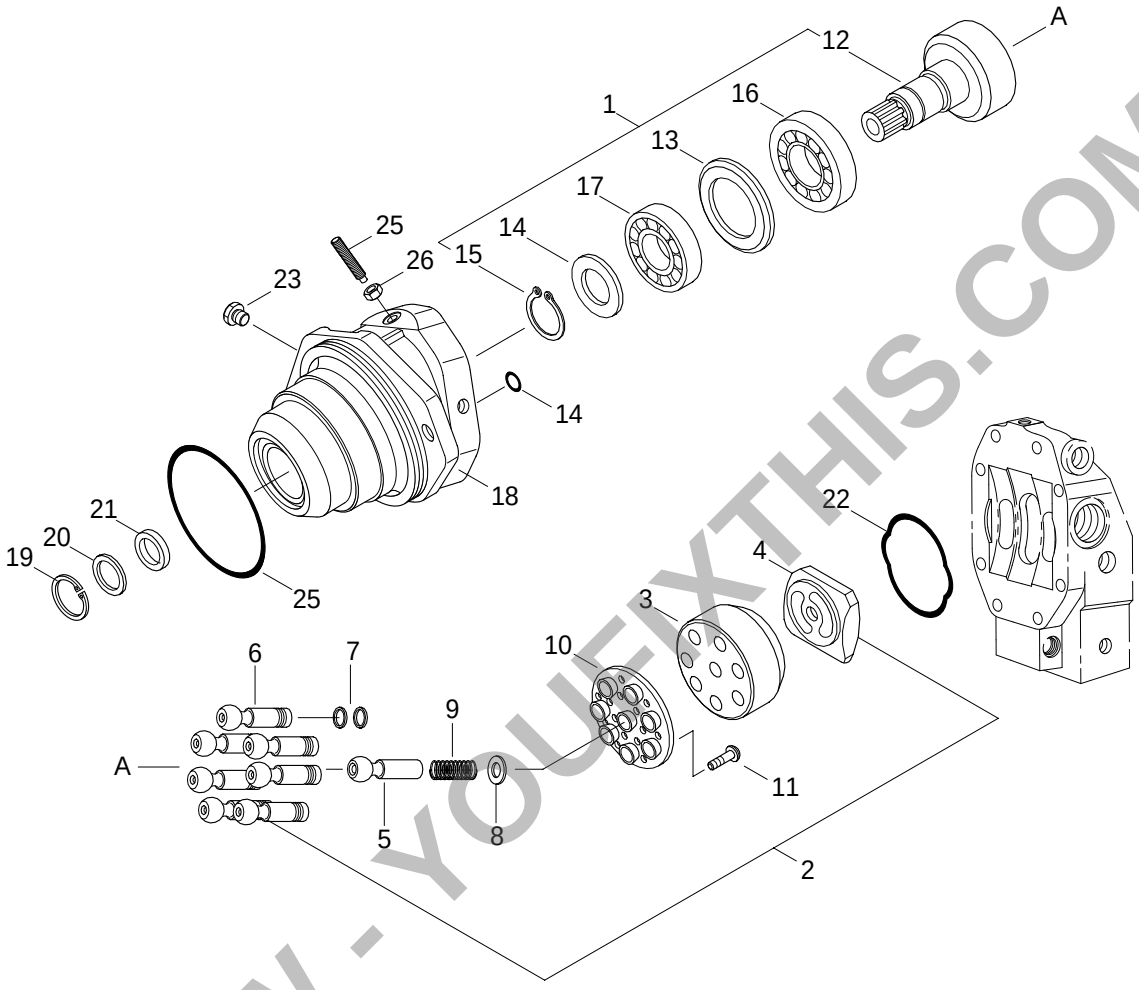


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2. TRAVEL MOTOR

1) STRUCTURE(1/2)

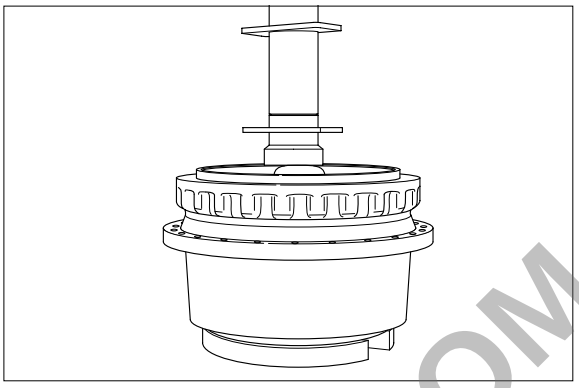


1	Rotary group	10	Retainer plate	19	Retainer ring
2	Hyd section rotary	11	Screw	20	Shaft seal ring
3	Cylinder	12	Drive shaft	21	Back up plate
4	Control lens	13	Shim	22	O-ring
5	Center pin	14	Back up plate	23	Locking screw
6	Piston	15	Retainer ring	24	O-ring
7	Steel ring	16	Roller bearing	25	Threaded pin
8	Adjustment shim	17	Roller bearing	26	Seal lock nut
9	Pressure spring	18	Housing	27	O-ring

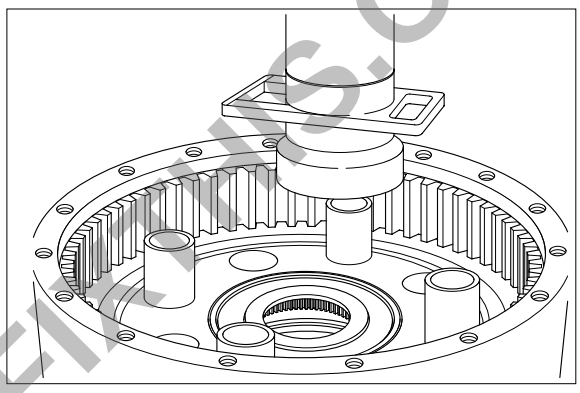
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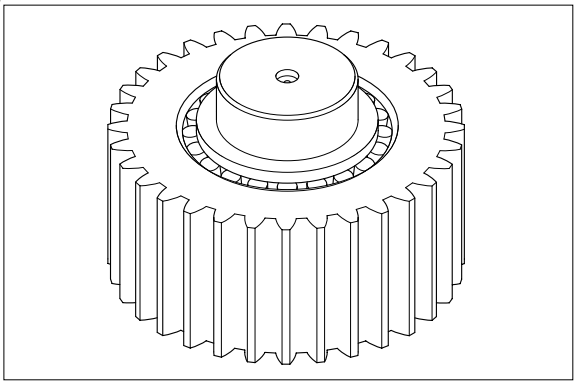
(9) Using a press and a metal stopper, push the flanged hub(17) against the shoulder on the gearbox housing(15) until assembling is complete.



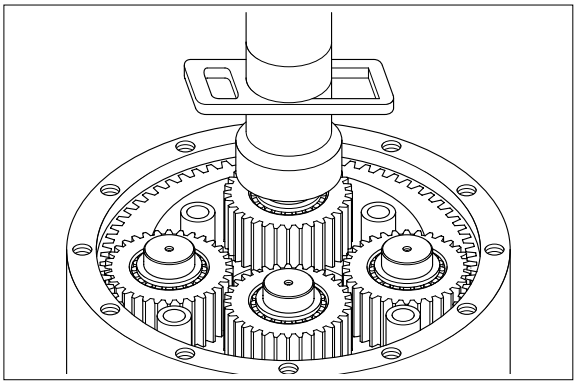
(10) Using a press, place and push the 4 bush, inside their seats on the flanged hub(17).



(11) View of the 3rd reduction's planet assembly.



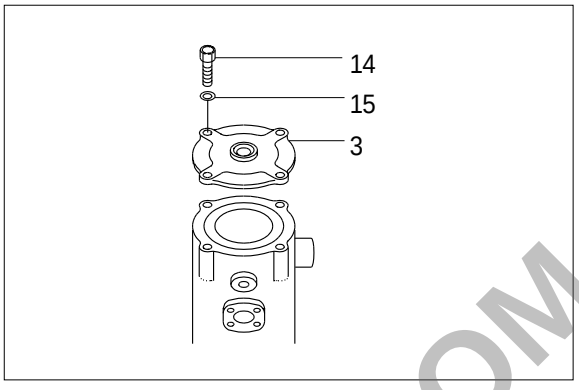
(12) Using a press push the 4 planet assemblies against the shoulder on the flanged hub(17).



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(7) Install cover(3) to body(1) and tighten bolts(14).
- Torque : 10 ~ 12.5 kgf · m
  (72 ~ 90 lbf · ft)



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