1. STRUCTURE

This service manual has been prepared as an aid to improve the quality of repairs by giving the serviceman an accurate understanding of the product and by showing him the correct way to perform repairs and make judgements. Make sure you understand the contents of this manual and use it to full effect at every opportunity.
This service manual mainly contains the necessary technical information for operations performed in a service workshop.
For ease of understanding, the manual is divided into the following sections.

SECTION 1 GENERAL
This section explains the safety hints and gives the specification of the machine and major components.

SECTION 2 STRUCTURE AND FUNCTION
This section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting.

SECTION 3 HYDRAULIC SYSTEM
This section explains the hydraulic circuit, single and combined operation.

SECTION 4 ELECTRICAL SYSTEM
This section explains the electrical circuit, monitoring system and each component. It serves not only to give an understanding electrical system, but also serves as reference material for trouble shooting.

SECTION 5 MECHATRONICS SYSTEM
This section explains the computer aided power optimization system and each component.

SECTION 6 TROUBLESHOOTING
This section explains the troubleshooting charts correlating **problems** to **causes**.

SECTION 7 MAINTENANCE STANDARD
This section gives the judgement standards when inspecting disassembled parts.

SECTION 8 DISASSEMBLY AND ASSEMBLY
This section explains the order to be followed when removing, installing, disassembling or assembling each component, as well as precautions to be taken for these operations.

SECTION 9 COMPONENT MOUNTING TORQUE
This section shows bolt specifications and standard torque values needed when mounting components to the machine.

The specifications contained in this shop manual are subject to change at any time and without any advance notice. Contact your HYUNDAI distributor for the latest information.

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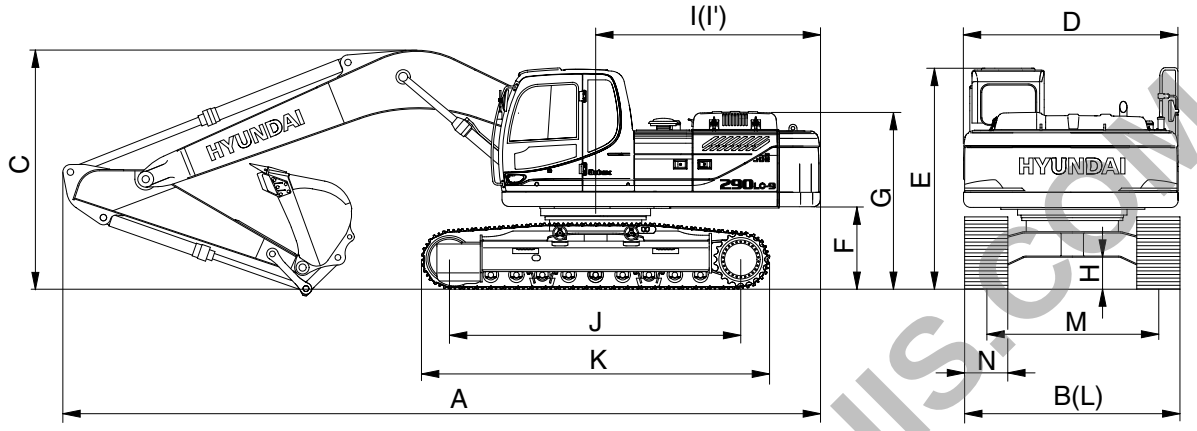
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2. SPECIFICATIONS

1) R290LC-9

· 6.25 m (20' 6") BOOM and 3.05 m (10' 0") ARM



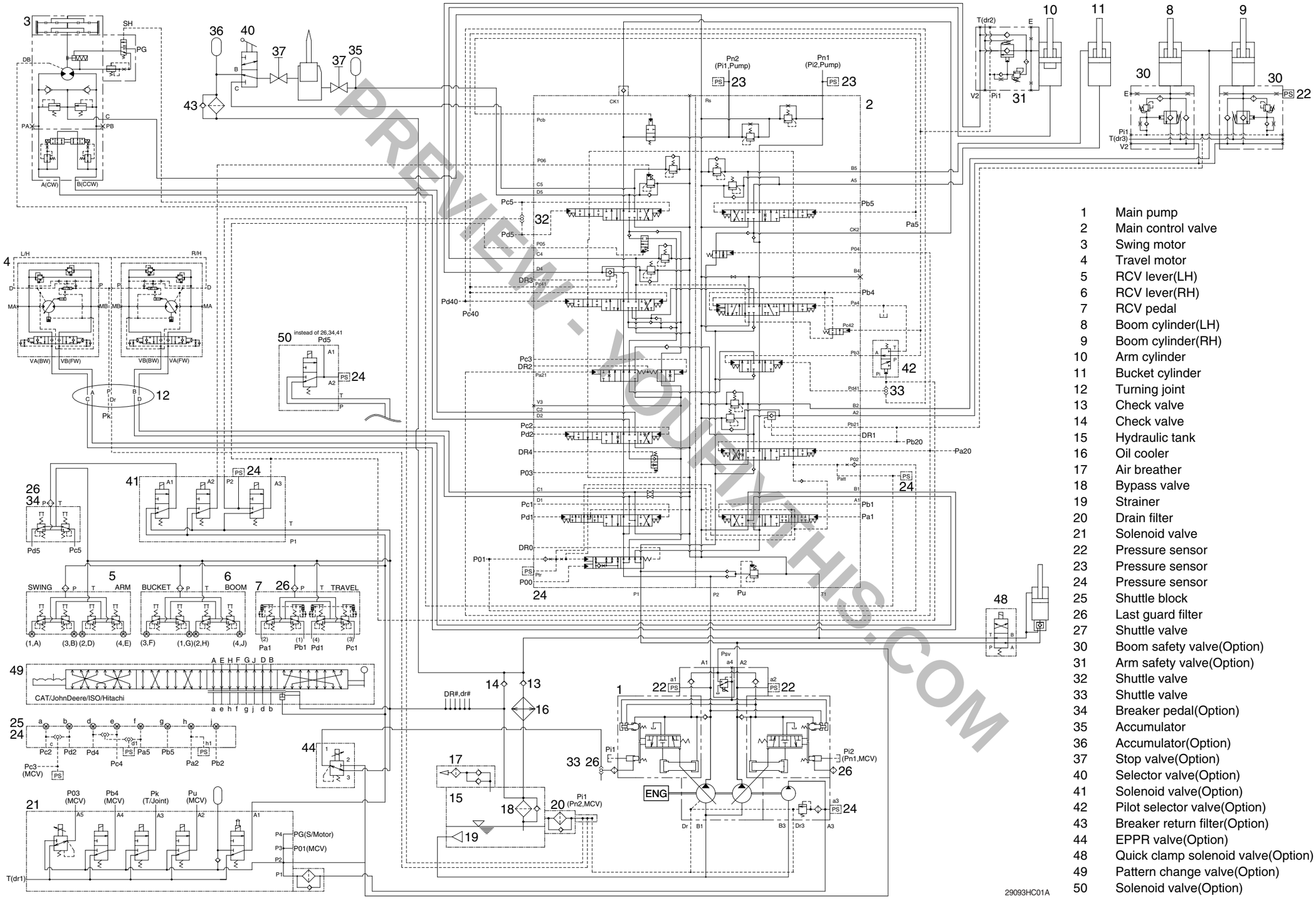
29092SP02

Description		Unit	Specification
Operating weight		kg (lb)	29300 (64600)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	1.27 (1.66)
Overall length	A	mm (ft-in)	10560 (34' 8")
Overall width, with 600mm shoe	B		3200 (10' 6")
Overall height	C		3290 (10' 10")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3010 (9' 11")
Ground clearance of counterweight	F		1190 (3' 11")
Engine cover height	G		3190 (10' 6")
Minimum ground clearance	H		500 (1' 8")
Rear-end distance	I		3120 (10' 3")
Rear-end swing radius	I'		3200 (10' 6")
Distance between tumblers	J		4030 (13' 3")
Undercarriage length	K		4940 (16' 2")
Undercarriage width	L		3200 (10' 6")
Track gauge	M		2600 (8' 6")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.1/5.2 (1.9/3.2)
Swing speed		rpm	10.2
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.56 (7.97)
Max traction force		kg (lb)	27300 (60200)

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GROUP 1 HYDRAULIC CIRCUIT

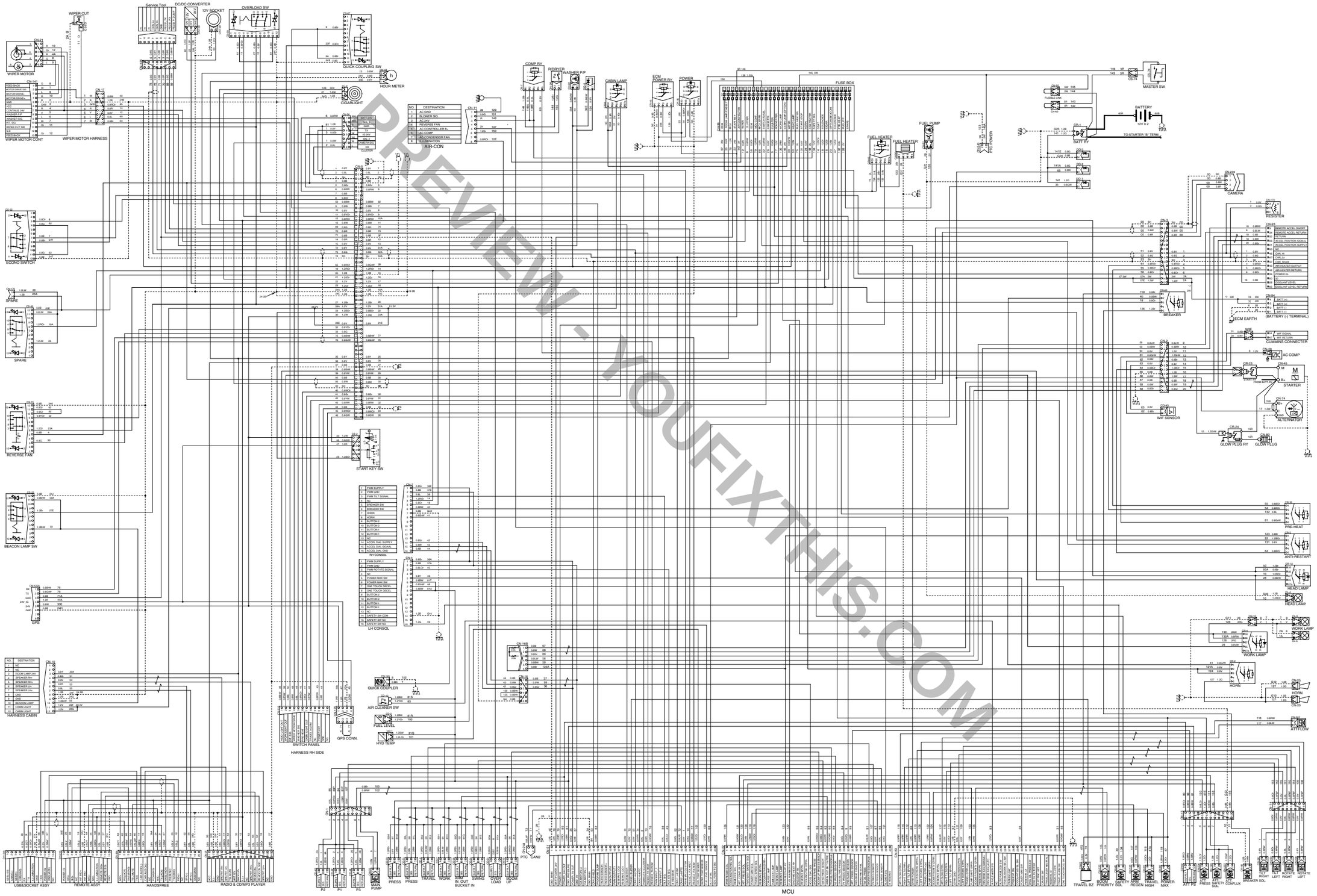


29093HC01A

1 Main pump
2 Main control valve
3 Swing motor
4 Travel motor
5 RCV lever(LH)
6 RCV lever(RH)
7 RCV pedal
8 Boom cylinder(LH)
9 Boom cylinder(RH)
10 Arm cylinder
11 Bucket cylinder
12 Turning joint
13 Check valve
14 Check valve
15 Hydraulic tank
16 Oil cooler
17 Air breather
18 Bypass valve
19 Strainer
20 Drain filter
21 Solenoid valve
22 Pressure sensor
23 Pressure sensor
24 Pressure sensor
25 Shuttle block
26 Last guard filter
27 Shuttle valve
30 Boom safety valve(Option)
31 Arm safety valve(Option)
32 Shuttle valve
33 Shuttle valve
34 Breaker pedal(Option)
35 Accumulator
36 Accumulator(Option)
37 Stop valve(Option)
40 Selector valve(Option)
41 Solenoid valve(Option)
42 Pilot selector valve(Option)
43 Breaker return filter(Option)
44 EPPR valve(Option)
48 Quick clamp solenoid valve(Option)
49 Pattern change valve(Option)
50 Solenoid valve(Option)

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GROUP 2 ELECTRICAL CIRCUIT(1/2)



29094EL03A

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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) Remove the wirings for the pressure sensors and so on.

(5) Loosen the drain plug under the hydraulic tank and drain the oil from the hydraulic tank.

- Hydraulic tank quantity : 190 ℓ

(6) Remove bolts (13) and disconnect pipe (1,2).

(7) Disconnect pilot line hoses (4, 5, 6, 7, 8, 9, 10).

(8) Remove bolts(12) and disconnect pump suction tube (3).

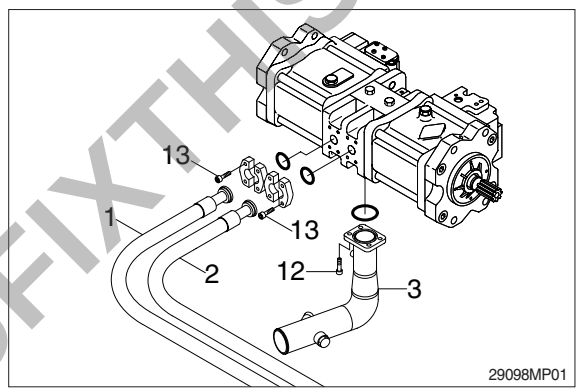
※ **When pump suction tube is disconnected, the oil inside the piping will flow out, so catch it in oil pan.**

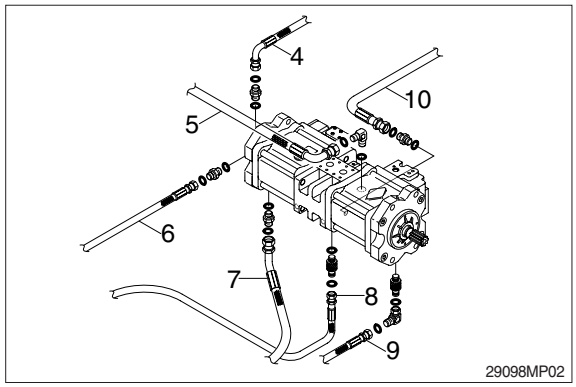
(9) Sling the pump assembly and remove the pump mounting bolts.

- Weight : 155 kg (340 lb)

※ **Pull out the pump assembly from housing. When removing the pump assembly, check that all the hoses have been disconnected.**







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GROUP 2 TIGHTENING TORQUE

1. MAJOR COMPONENTS

No.	Descriptions		Bolt size	Torque	
				kgf · m	lbf · ft
1	Engine	Engine mounting bolt (engine-bracket)	M12 × 1.75	9.7 ± 1.9	70.2 ± 13.7
2		Engine mounting bolt (bracket-frame, FR)	M20 × 2.5	55 ± 3.5	398 ± 25
3		Engine mounting bolt (bracket-frame, RR)	M24 × 3.0	90 ± 7.0	651 ± 51
4		Radiator mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
5		Coupling mounting socket bolt	M20 × 2.5	46.5 ±2.5	336 ± 18
6		Main pump housing mounting bolt	M10 × 1.5	4.8 ± 0.3	34.7 ± 2.2
7	Hydraulic system	Main pump mounting socket bolt	M20 × 2.5	42 ± 4.5	304 ± 32.5
8		Main control valve mounting nut	M12 × 1.75	12.3 ± 1.3	89.0 ± 9.4
9		Fuel tank mounting bolt	M20 × 2.5	46 ± 5.1	333 ± 36.9
10		Hydraulic oil tank mounting bolt	M20 × 2.5	46 ± 5.1	333 ± 36.9
11		Turning joint mounting bolt, nut	M12 × 1.75	12.3 ± 1.3	89.0 ± 9.4
12	Power train system	Swing motor mounting bolt	M20 × 2.5	58.4 ± 6.4	422 ± 46.3
13		Swing bearing upper part mounting bolt	M24 × 3.0	97.8 ± 10	707 ± 72.3
14		Swing bearing lower part mounting bolt	M24 × 3.0	97.8 ± 10	707 ± 72.3
15		Travel motor mounting bolt	M24 × 3.0	84 ± 8.0	608 ± 57.8
16		Sprocket mounting bolt	M20 × 2.5	57 ± 6.0	412 ± 433
17	Under carriage	Carrier roller mounting bolt, nut	M16 × 2.0	29.7± 4.5	215 ± 32.5
18		Track roller mounting bolt	M20 × 2.5	57.9 ± 4.4	126 ± 31.8
19		Track tension cylinder mounting bolt	M16 × 2.0	29.7 ± 4.5	215 ± 32.5
20		Track shoe mounting bolt, nut	M20 × 1.5	115 ± 5.0	831 ± 36
21		Track guard mounting bolt	M20 × 2.5	57.9 ± 8.7	419 ± 62.9
22	Others	Counterweight mounting bolt	M36 × 3.0	308 ± 46	2228 ± 333
23		Cab mounting bolt	M12 × 1.75	12.8 ± 3.0	92.6 ± 21.7
24		Operator's seat mounting bolt	M 8 × 1.25	4.05 ± 0.8	29.3 ± 5.8

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

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3. MACHINE ERROR CODES TABLE

Error code		Description
HCESPN	FMI	
101	3	Hydraulic oil temperature sensor circuit - Voltage above normal, or shorted to high source.
	4	Hydraulic oil temperature circuit - Voltage below normal, or shorted to low source.
105	0	Working pressure sensor data above normal range.
	1	Working pressure sensor data below normal range.
	2	Working pressure sensor data error.
	4	Working pressure sensor circuit - Voltage below normal, or shorted to Low source.
108	0	Travel oil pressure sensor data above normal range.
	1	Travel oil pressure sensor data below normal range.
	2	Travel oil pressure sensor data error.
	4	Travel oil pressure sensor circuit - Voltage below normal, or shorted to low source.
120	0	Main pump 1 (P1) pressure sensor data above normal range.
	1	Main pump 1 (P1) pressure sensor data below normal range.
	2	Main pump 1 (P1) pressure sensor data error.
	4	Main pump 1 (P1) pressure sensor circuit - Voltage below normal, or shorted to low source.
121	0	Main pump 2 (P2) pressure sensor data above normal range.
	1	Main pump 2 (P2) pressure sensor data below normal range.
	2	Main pump 2 (P2) pressure sensor data error.
	4	Main pump 2 (P2) pressure sensor circuit - Voltage below normal, or shorted to low source.
122	0	Overhead pressure sensor data above normal range.
	1	Overhead pressure sensor data below normal range.
	2	Overhead pressure sensor data error.
	4	Overhead pressure sensor circuit - Voltage below normal, or shorted to low source.
123	0	Negative 1 pressure sensor data above normal range.
	1	Negative 1 pressure sensor data below normal range.
	2	Negative 1 pressure sensor data error.
	4	Negative 1 pressure sensor circuit - Voltage below normal, or shorted to low source.
124	0	Negative 2 Pressure sensor data above normal range.
	1	Negative 2 Pressure sensor data below normal range.
	2	Negative 2 Pressure sensor data error.
	4	Negative 2 Pressure sensor circuit - Voltage below normal, or shorted to low source.
125	0	Pilot pump (P3) pressure sensor data above normal range.
	1	Pilot pump (P3) pressure sensor data below normal range.
	2	Pilot pump (P3) pressure sensor data error.
	4	Pilot pump (P3) pressure sensor circuit - Voltage below normal, or shorted to low source.
127	0	Boom up pilot pressure sensor data above normal range.
	1	Boom up pilot pressure sensor data below normal range.
	2	Boom up pilot pressure sensor data error.
	4	Boom up pilot pressure sensor circuit - Voltage below normal, or shorted to low source.
133	0	Arm in/out & bucket in pilot pressure sensor data above normal range.
	1	Arm in/out & bucket in pilot pressure sensor data below normal range.
	2	Arm in/out & bucket in pilot pressure sensor data error.
	4	Arm in/out & bucket in pilot pressure sensor circuit - Voltage below normal, or shorted to low source.

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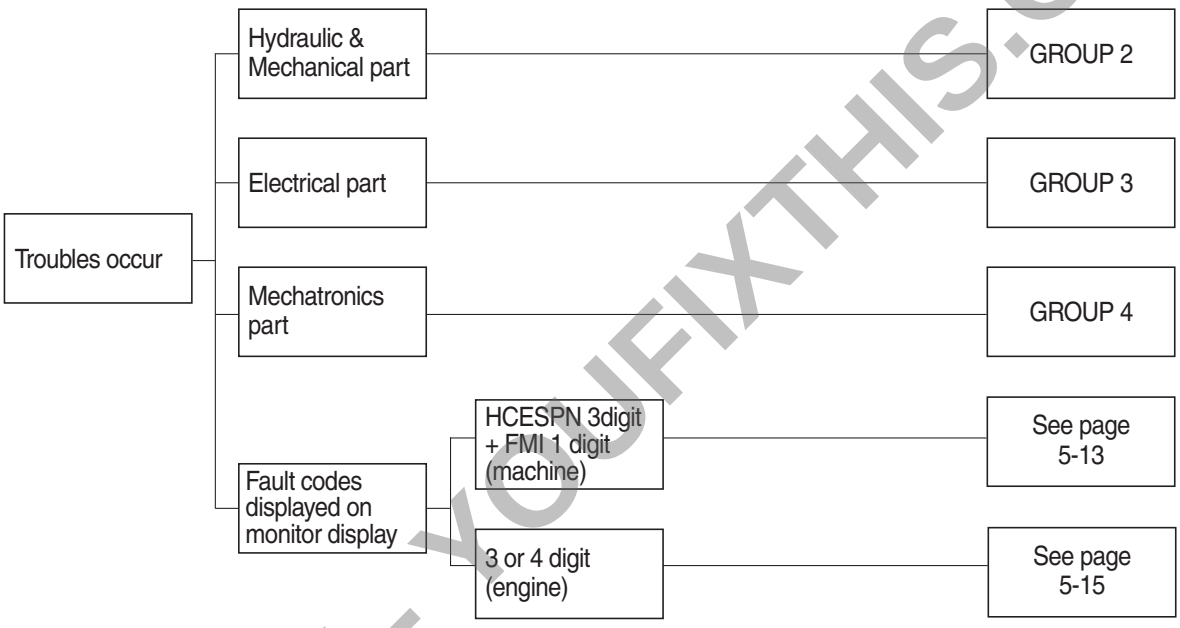
GROUP 1 BEFORE TROUBLESHOOTING

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.

※ **Before carring out troubleshooting procedure, check monitoring menu in the cluster.**



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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

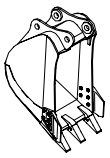
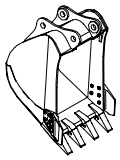
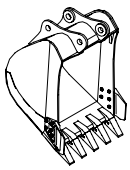
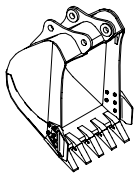
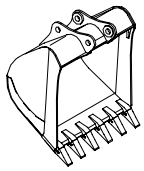
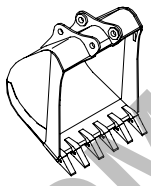
	0	1	2	3	4	5	6	7	8	9
0		2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	51.91	55.12	57.32	59.5.	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.78	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	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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6. BUCKET SELECTION GUIDE

1) GENERAL BUCKET

					
0.79 m³ SAE heaped bucket	1.03 m³ SAE heaped bucket	※1.27 m³ SAE heaped bucket	1.50 m³ SAE heaped bucket	1.73 m³ SAE heaped bucket	1.85 m³ SAE heaped bucket

Capacity		Width		Weight	Recommendation			
					6.25 m (20' 6") boom			
SAE heaped	CECE heaped	Without side cutter	With side cutter		2.1 m arm (6' 11")	2.5 m arm (8' 2")	3.05 m arm (10' 0")	3.75 m arm (12' 4")
0.79 m³ (1.03 yd³)	0.70 m³ (0.92 yd³)	890 mm (35.0")	1010 mm (39.8")	790 kg (1740 lb)				
1.03 m³ (1.35 yd³)	0.90 m³ (1.18 yd³)	1090 mm (42.9")	1210 mm (47.6")	890 kg (1960 lb)				
※1.27 m³ (1.66 yd³)	1.10 m³ (1.44 yd³)	1290 mm (50.8")	1410 mm (55.5")	1010 kg (2230 lb)				
1.50 m³ (1.96 yd³)	1.30 m³ (1.70 yd³)	1490 mm (58.7")	1610 mm (63.4")	1080 kg (2380 lb)				
1.73 m³ (2.26 yd³)	1.50 m³ (1.96 yd³)	1700 mm (66.9")	1820 mm (71.7")	1170 kg (2580 lb)				
1.85 m³ (2.42 yd³)	1.60 m³ (2.09 yd³)	1800 mm (70.9")	1920 mm (75.6")	1230 kg (2710 lb)				

※ : Standard bucket

Applicable for materials with density of 2000 kgf/m³ (3370 lbf/yd³) or less

Applicable for materials with density of 1600 kgf/m³ (2700 lbf/yd³) or less

Applicable for materials with density of 1100 kgf/m³ (1850 lbf/yd³) or less

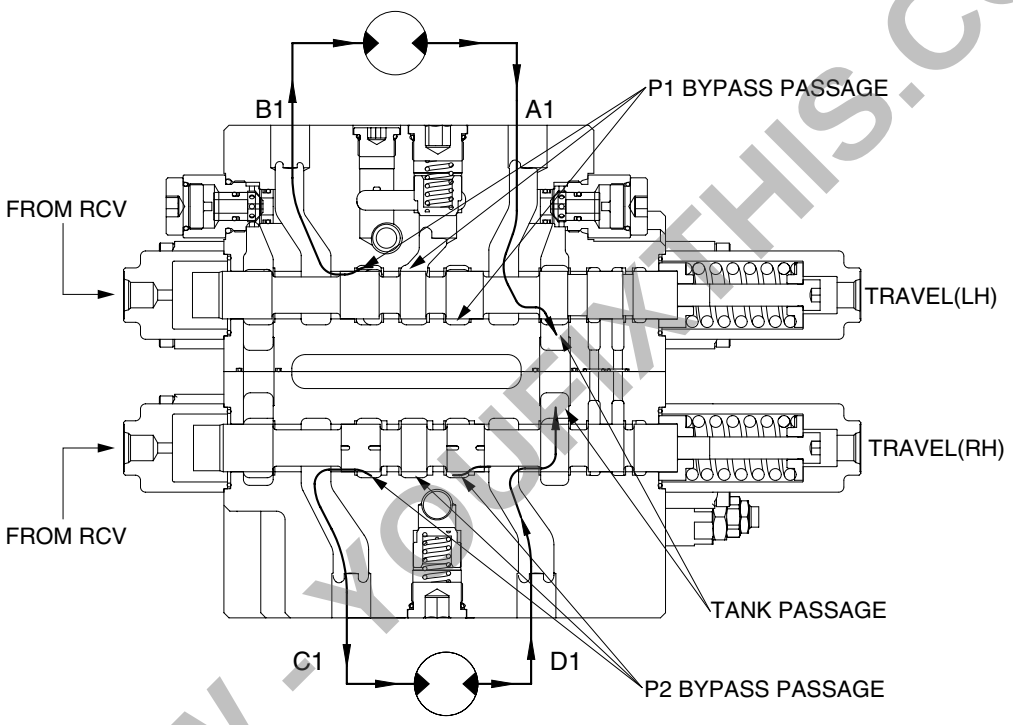
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(2) TRAVEL REVERSE OPERATION

During the travel reverse operation, the pilot pressure of RCV is supplied to the port of the spring opposite side, and it shifts travel right and left spools in the right direction against springs. Hydraulic fluid from the pump flows into the bypass passage of travel spool through the land of the straight travel spool.

Then the bypass passage is shut off by the movement of the spool, they are directed to the each travel motor through port A1 and C1. At the same time, the hydraulic fluid from the each travel motor through port B1 and D1 returns to the tank passage through the travel spools.



29092MC08

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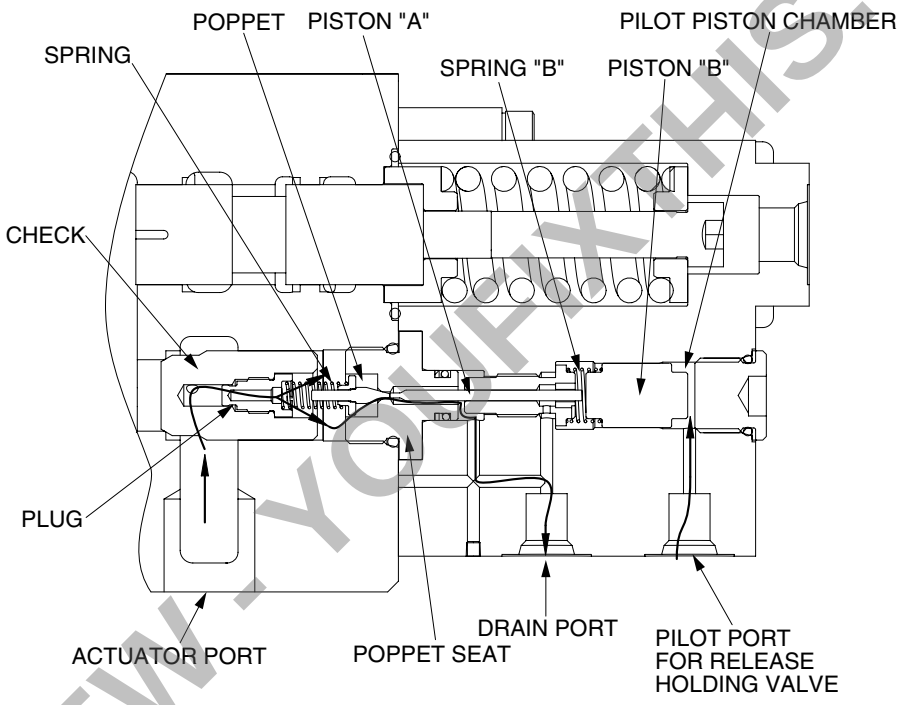
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(2) RELEASE HOLDING OPERATION

The pilot pressure is supplied to the pilot port for release holding valve and shifts the piston "B" in the left direction against the spring "B", and shifts the poppet in the left direction through piston "B" and piston "A" against spring "B" and shifts the spool in the left side.

At same time, the return fluid from actuator returns to the drain port through the periphery hole of check, crevice of the check and the plug, the periphery hole of the plug, in side of holding valve, crevice of the poppet and the poppet seat, the periphery hole of the poppet seat, crevice of socket and spool and internal passage of spool.

When the poppet is opened, pressure of inside of holding valve is decreased and the return fluid from actuator returns to the tank passage through the notch of spool.

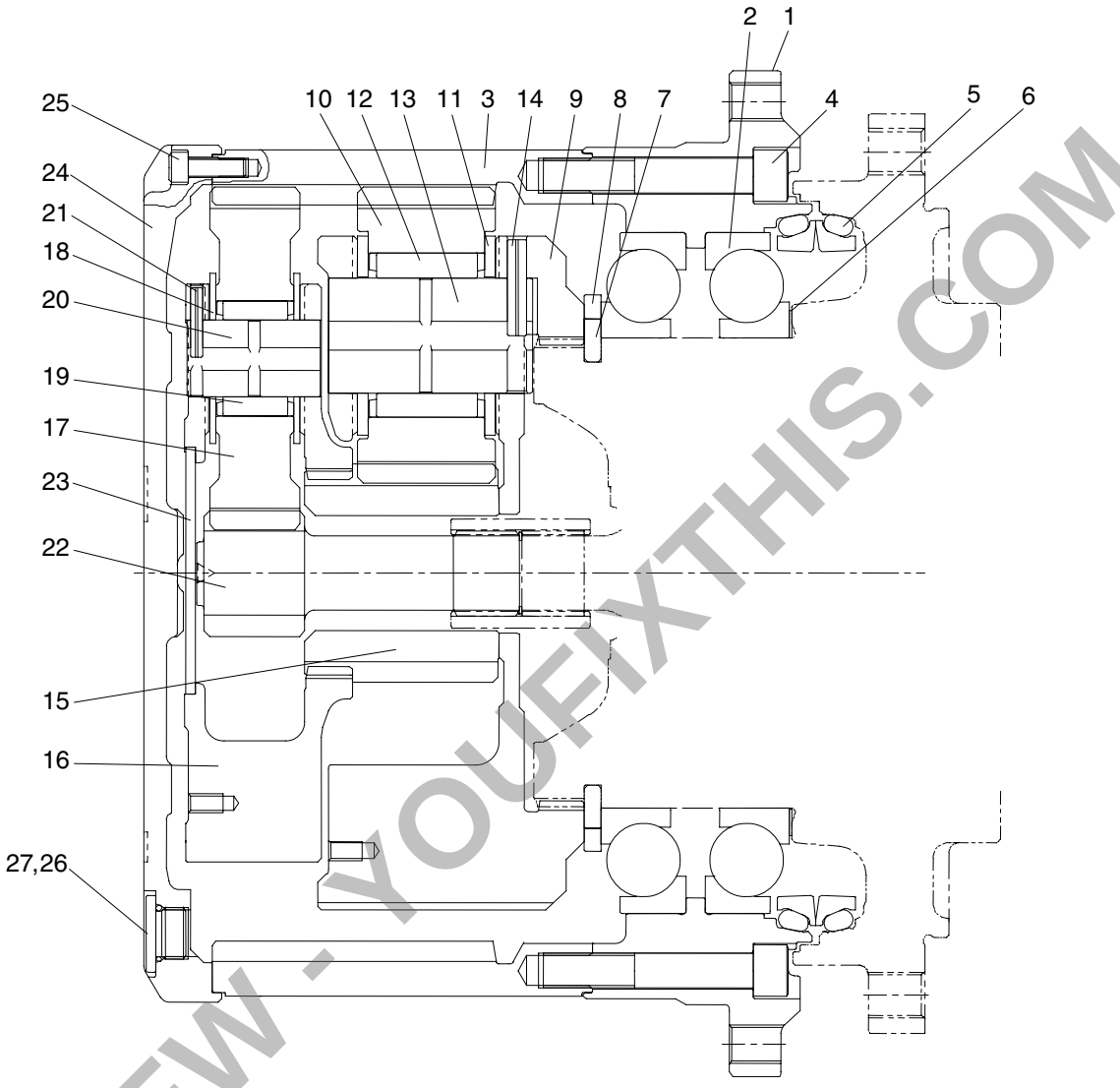


29092MC14

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2) TRAVEL REDUCTION GEAR



29092TM02

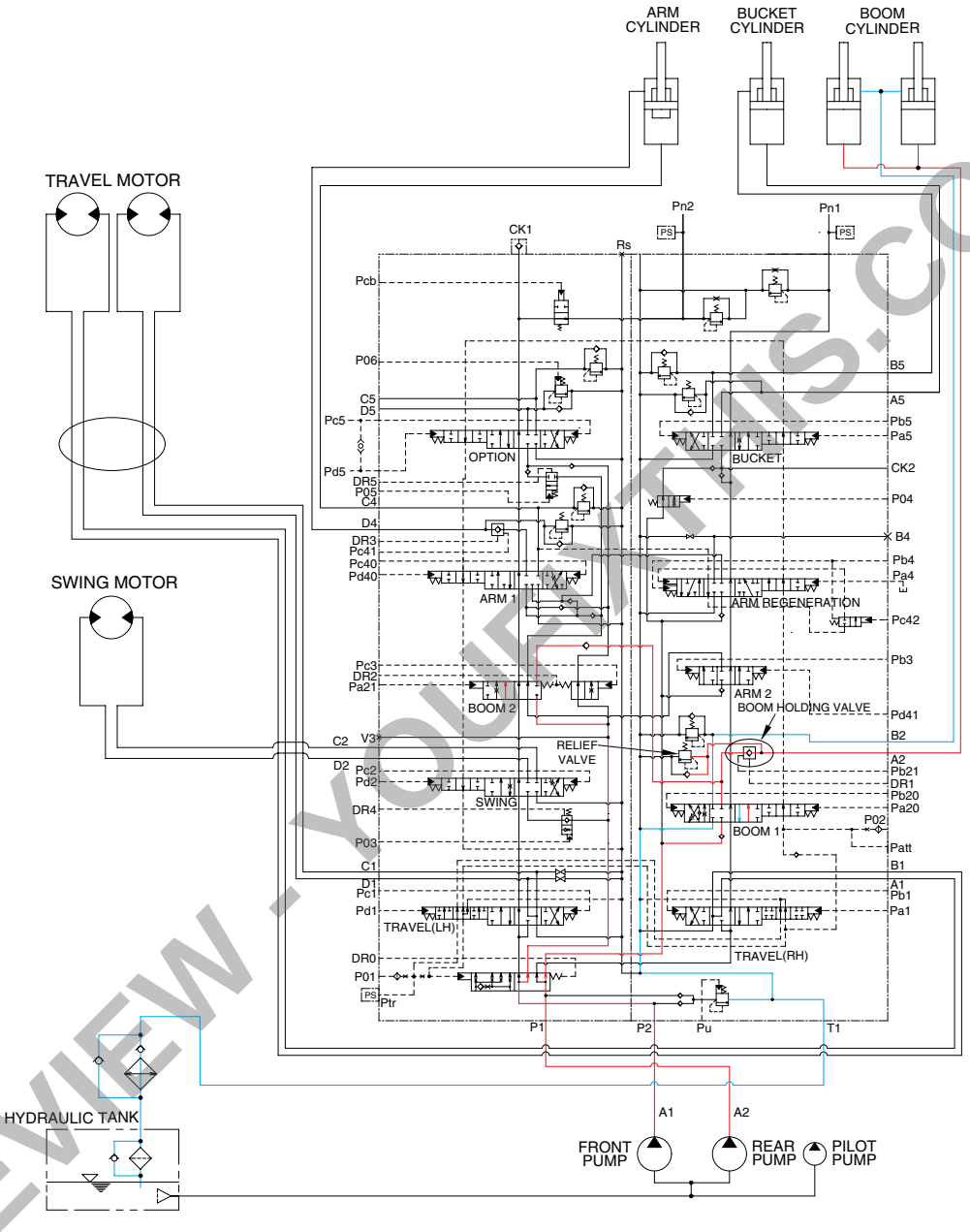
1	Housing	10	Planetary gear 2	19	Needle bearing
2	Bearing	11	Thrust washer 2	20	Carrier pin 1
3	Ring gear	12	Needle bearing	21	Spring pin
4	Hexagon socket head blot	13	Carrier pin 2	22	Sun gear 1
5	Floating seal	14	Spring pin	23	Thrust plate
6	Shim	15	Sun gear 2	24	Cover
7	Lock washer	16	Carrier 1	25	Hexagon socket head bolt
8	Support ring	17	Planetary gear 1	26	Plug
9	Carrier 2	18	Thrust washer 1	27	O-ring

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GROUP 4 SINGLE OPERATION

1. BOOM UP OPERATION



29093HC10

When the RH control lever is pulled back, the boom spools in the main control valve are moved to the up 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.

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.

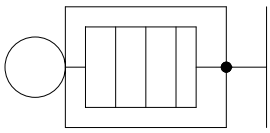
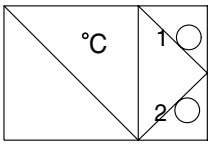
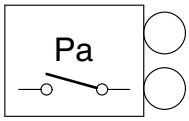
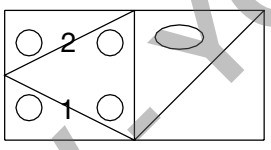
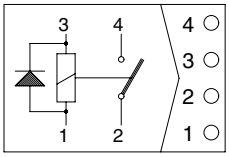
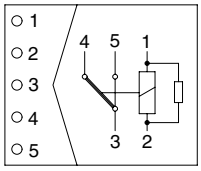
The excessive pressure in the boom cylinder bottom end circuit is prevented by relief valve.

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

This prevents the hydraulic drift of boom cylinder.

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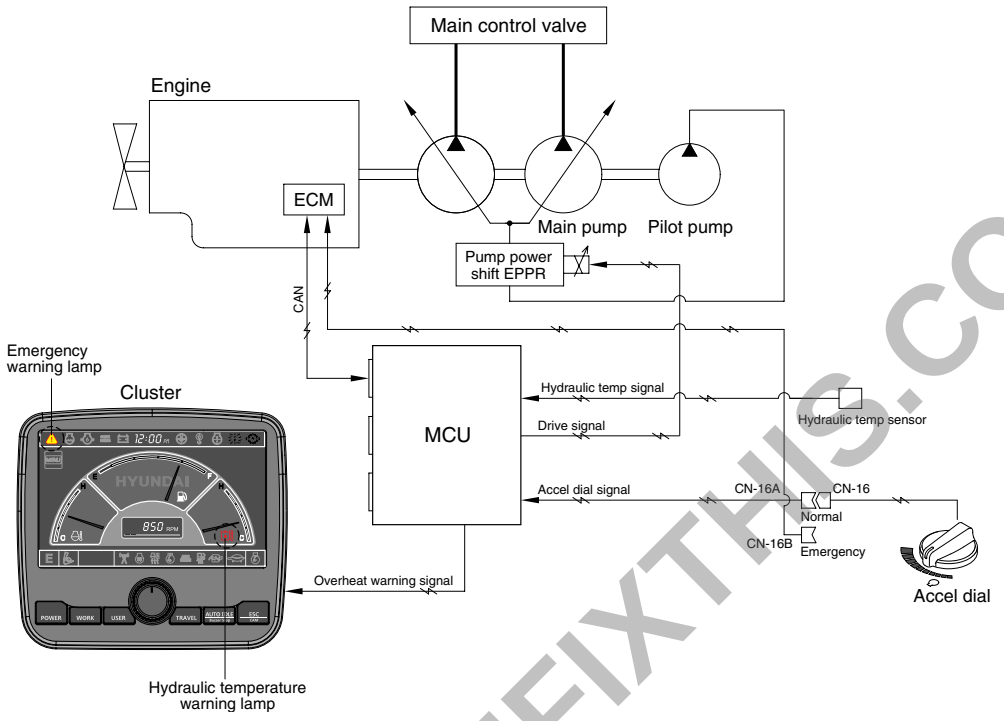
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Part name	Symbol	Specifications	Check
Glow plug	 CN-80	24V 200A	※ Check resistance 0.25~0.12 Ω
Temperature sensor (hydraulic)	 CD-1	-	※ Check resistance 50˚C : 804 Ω 80˚C : 310 Ω 100˚C : 180 Ω
Air cleaner pressure switch	 CD-10	(N.O TYPE)	※ Check contact High level : ∞ Ω Low level : 0 Ω
Fuel sender	 CD-2	-	※ Check resistance Full : 50 Ω 6/12 : 350 Ω 11/12 : 100 Ω 5/12 : 400 Ω 10/12 : 150 Ω 4/12 : 450 Ω 9/12 : 200 Ω 3/12 : 500 Ω 8/12 : 250 Ω 2/12 : 550 Ω 7/12 : 300 Ω 1/12 : 600 Ω Empty warning : 700 Ω
Relay (air con blower)		24V 20A	※ Check resistance Normal : About 200 Ω (for terminal 1-3) 0 Ω (for terminal 2-4)
Relay	 CR-2 CR-5 CR-7 CR-36 CR-45 CR-62	24V 16A	※ Check resistance Normal : About 160 Ω (for terminal 1-2) 0 Ω (for terminal 3-4) ∞ Ω (for terminal 3-5)

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GROUP 7 ENGINE OVERHEAT PREVENTION SYSTEM



21095MS09

1. The engine coolant temperature or the hydraulic oil temperature is overheated over 100˚C, the warning lamp is ON and the pump input torque or the engine speed is reduced as below logic table.

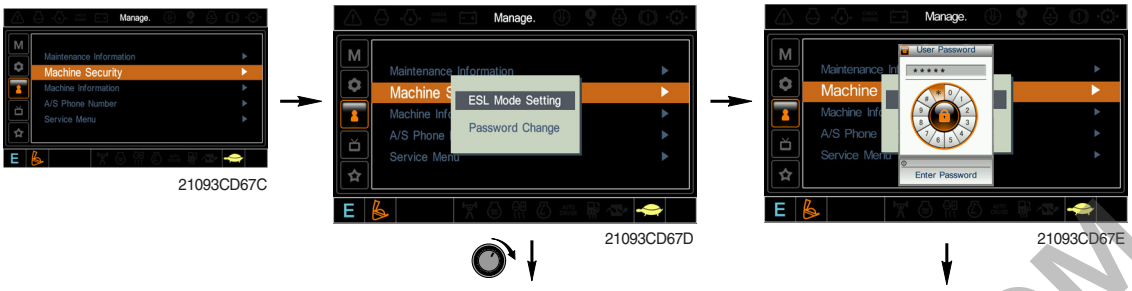
2. LOGIC TABLE

Description		Condition	Function
First step warning	Activated	- Coolant or hydraulic oil temperature : Above 100˚C	- Warning lamp & buzzer : ON - Pump input torque is reduced.
	Canceled	- Coolant or hydraulic oil temperature : Less than 95˚C	- Return to pre-set the pump input torque.
Second step warning	Activated	- Coolant or hydraulic oil temperature : Above 105˚C	- Emergency warning lamp pops up on the center of LCD and the buzzer sounds. - Engine speed is reduced after 10 seconds.
	Canceled	- Coolant or hydraulic oil temperature : Less than 100˚C	- Return to pre-set the engine speed. - Hold pump input torque on the first step warning.

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② Machine security



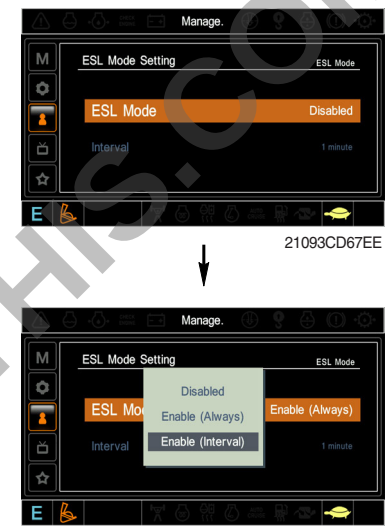
21093CD67C 21093CD67D 21093CD67E

· **ESL mode**

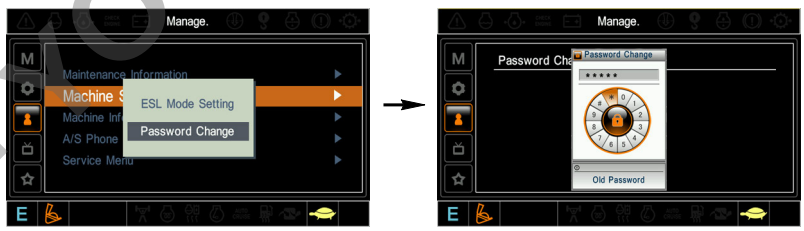
- ESL : Engine Starting Limit
- ESL mode is designed to be a theft deterrent or will prevent the unauthorized operation of the machine.
- If the ESL mode was selected Enable, the password will be required when the start switch is turned ON.
- Disable : Not used ESL function

Enable (always) : The password is required whenever the operator start engine.

Enable (interval) : The password is required when the operator start engine first. But the operator can restart the engine within the interval time without in putting the password. The interval time can be set maximum 4 hours.



21093CD67EE 21093CD67H



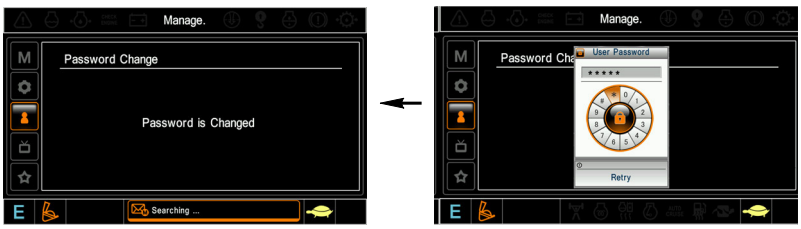
21093CD67U Enter the current password 21093CD67V

· **Password change**

- The password is 5~10 digits.



Enter the new password 21093CD67VV



21093CD67X 21093CD67XX

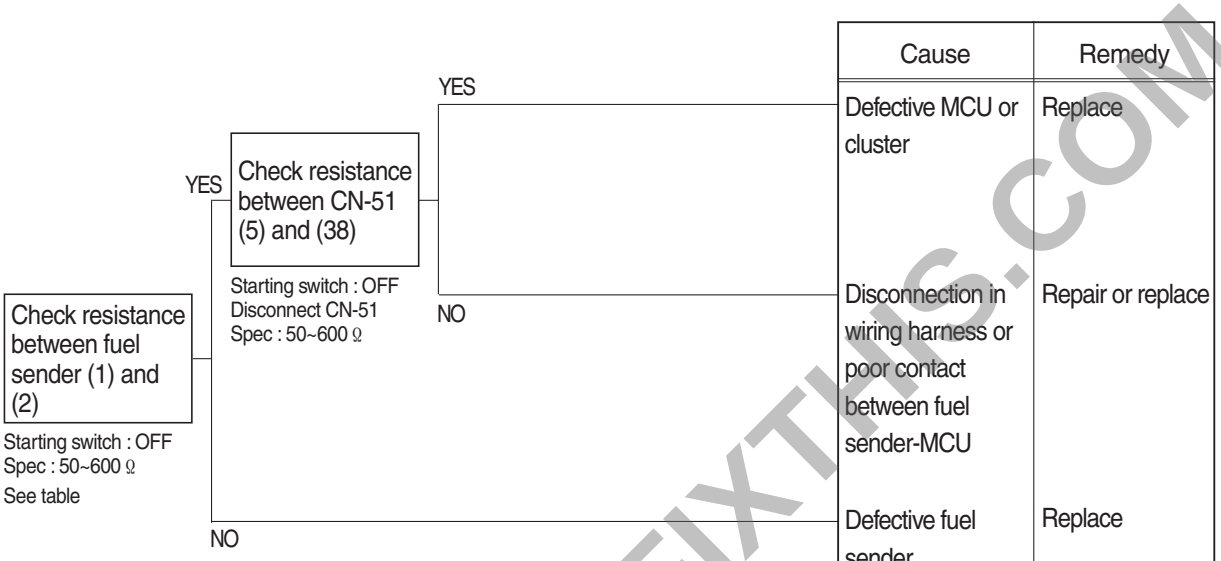
The new password is stored in the MCU. Enter the new password again

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9. WHEN FUEL GAUGE DOES NOT OPERATE(HCESPN 301, FMI 3 or 4)

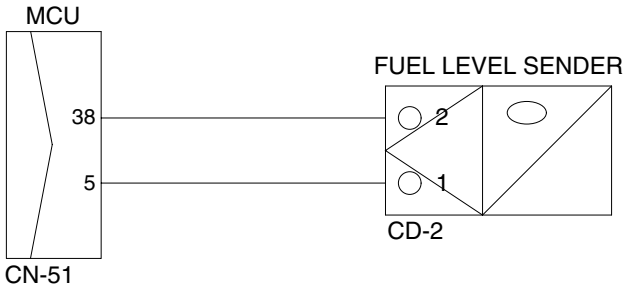
- Before disconnecting the connector, always turn the starting switch OFF.
- Before carrying out below procedure, check all the related connectors are properly inserted.
- After checking, insert the disconnected connectors again immediately unless otherwise specified.





Check Table

Range	Resistance (Ω)	Range	Resistance (Ω)
Full	50	5/12	400
11/12	100	4/12	450
10/12	150	3/12	500
9/12	200	2/12	550
8/12	250	1/12	600
7/12	300	Empty warning	700
6/12	350	-	-



21096ES09

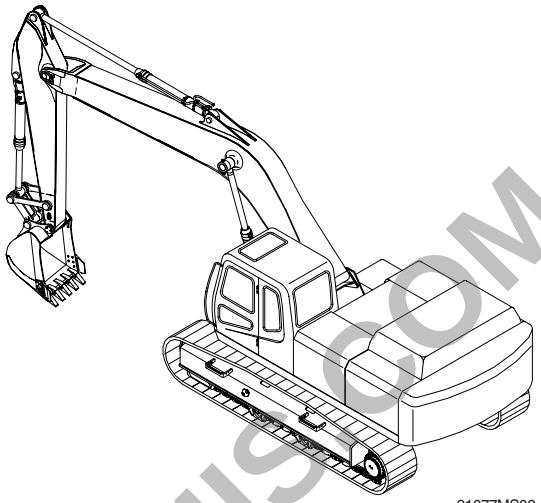
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2. TERMINOLOGY

1) STANDARD

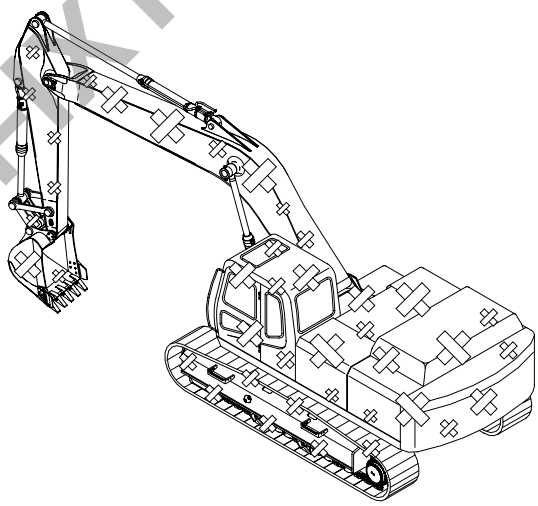
Specifications applied to the brand-new machine, components and parts.



21077MS02

2) SERVICE LIMIT

The lowest acceptable performance level. When the performance level of the machine falls below this level, the machine must be removed from work and repaired. Necessary parts and components must be replaced.



21077MS03

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4) ASSEMBLY

(1) Precaution

① When you assemble, please wash all parts by pure cleaning liquid.
② For re-assembling, basically use only bland new seals for all portions.
③ Apply grease or hydraulic oil to the seals and seal fitting section to make the sliding smooth, unless otherwise specified.
④ Pay attention not to roll the O-ring when fitting and it may cause oil leakage.
⑤ Do not tap the valve even if the spool movement is not smooth.
⑥ Prepare the section drawing and study the structure of MCV and then start disassembly work.
⑦ Tighten bolt and parts with thread for all section by torque wrench to the respective tightening torque.

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(14) Disassemble cylinder sub.

① Disassemble set plate (25) and piston (26) sub.



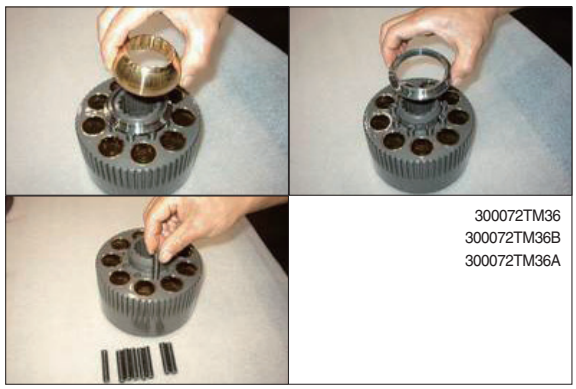
300072TM34

② Disassemble friction plate (27) and lee plate (28) in cylinder block (21).



300072TM35

③ Dismantle ball guide (24), spacer (23), and cylinder spring (22).



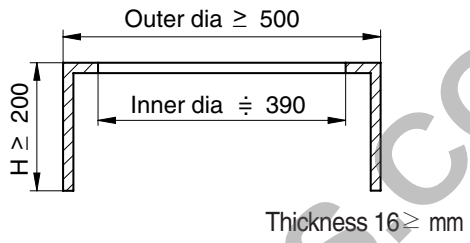
300072TM36
300072TM36B
300072TM36A

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2) TOOLS AND TIGHTENING TORQUE

(1) Tools

Description	Specification
Torque wrench	For 38.5 kgf · m (278 lbf · ft)
Hexagon socket wrench	Width across flats 8, 14 mm
Work stand	
Micro depth gauge	0~15 mm
Vernier caliper	0~150 mm
Knocking pin	For knocking in spring pins item 7 and 15 ø 5.5 × 80, ø 9.5 × 60
Eye bolt	M10 and M20 (or equiv. hooks) each 3 pcs
Others small items	Kerosene as cleaner, solvent, gear oil, grease, Loctite No. 242 and No. 515, seal tape, waists etc.
Vertical press and jigs	To press in angular bearings and to assemble its lock washers. (press capacity 3 ton)

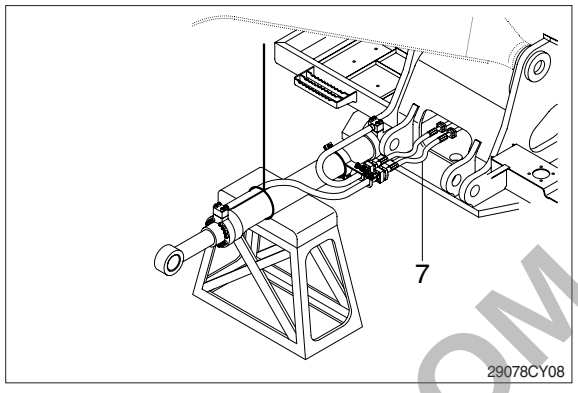
(2) Tightening torque

Item	Part name	Size	Torque	
			kgf · m	lbf · ft
4	Socket head bolt	M18 × 110	38.5±3.85	278.4±27.8
25	Socket head bolt	M10 × 30	7±0.7	50.6±5.0
26	Taper plug	PF 3/4	14.9±1.5	107±10.8

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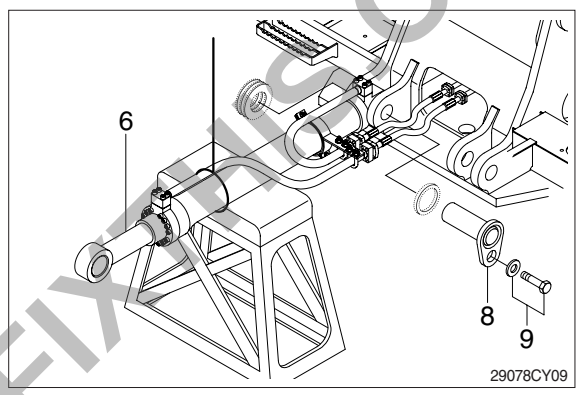
⑤ Disconnect boom cylinder hoses (7) and put plugs on cylinder pipe.



⑥ Remove bolt (9) and pull out pin (8).

⑦ Remove boom cylinder assembly (6).

· Weight : 270 kg (600 lb)



(2) Install

① Carry out installation in the reverse order to removal.

⚠ **When aligning the mounting position of the pin, do not insert your fingers in the pin hole.**

※ Bleed the air from the boom cylinder.

※ Conformed the hydraulic oil level and check the hydraulic oil leak or not.

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