CRAWLER EXCAVATOR

SERVICE MANUAL

R390LC-9 (India)

HYUNDAI

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8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	HMC D6AC-C
Type	4-cycle turbocharged charger air cooled diesel engine
Cooling method	Water cooling
Number of cylinders and arrangement	6 cylinders, in-line
Firing order	1-5-3-6-2-4
Combustion chamber type	Direct injection type
Cylinder bore × stroke	130 × 140 mm (5.12" × 5.51")
Piston displacement	11,149 cc (680 cu in)
Compression ratio	17 : 1
Rated gross horse power (SAE J1995)	276 Hp at 1900 rpm (206 kW at 1900 rpm)
Maximum torque	120.0 kgf · m (868 lbf · ft) at 1400 rpm
Engine oil quantity	27.3 ℓ (7.2 U.S. gal)
Dry weight	920 kg (2028 lb)
Low idling speed	800 ± 100 rpm
High idling speed	2050 ± 50 rpm
Rated fuel consumption	157.1 g/Hp · hr at 1900 rpm
Starting motor	24V-5.5 kW
Alternator	24V-70A
Battery	2 × 12V × 160Ah, *2 × 12V × 200Ah

*: Artic machinery

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 175 cc/rev
Maximum pressure	330 kgf/cm² (4690 psi) [360 kgf/cm² (5120 psi)]
Rated oil flow	2 × 280 ℓ/min (74.0 U.S. gpm/61.6 U.K. gpm)

[ ]: Power boost

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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.
135	0	Swing pilot pressure sensor data above normal range.
	1	Swing pilot pressure sensor data below normal range.
	2	Swing pilot pressure sensor data error.
	4	Swing pilot pressure sensor circuit - Voltage below normal, or shorted to low source.

※ Some error codes are not applied to this model.

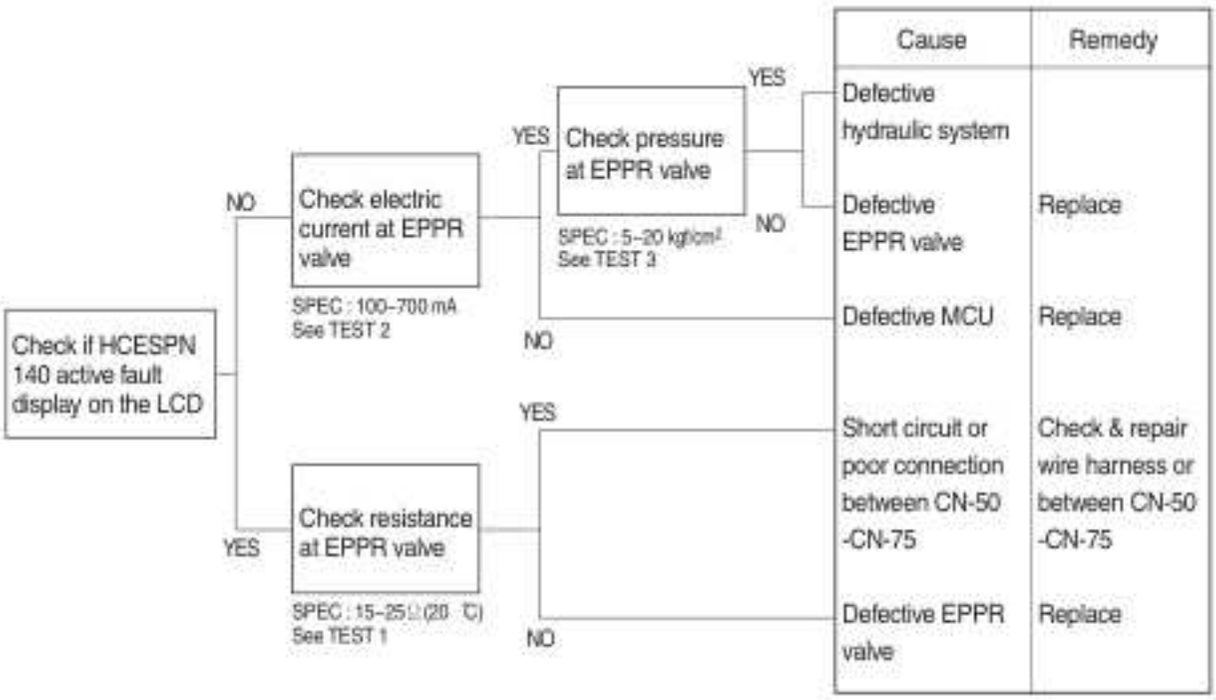
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■ MECHATRONICS SYSTEM (CLUSTER TYPE 2)

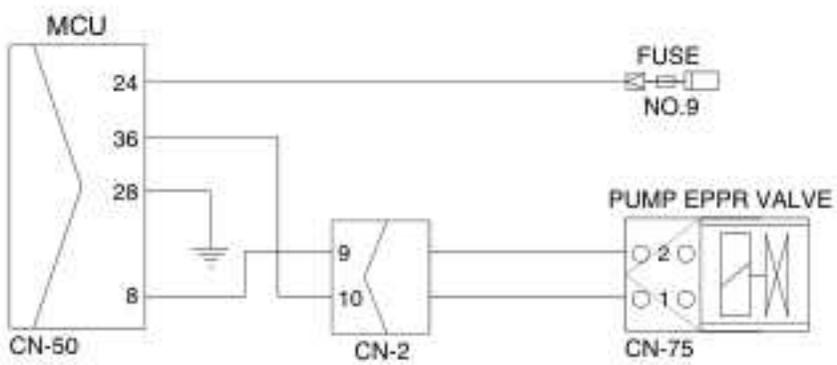
1. ALL ACTUATORS SPEED ARE SLOW

※ Boom, Arm, Bucket, Swing and travel speed are slow, but engine speed is good.
※ Spec : P-mode 1800 ± 50 rpm S -mode 1700 ± 50 rpm E-mode 1600 ± 50 rpm
※ Before carrying out below procedure, check all the related connectors are properly inserted and fault code on the cluster.

1) INSPECTION PROCEDURE



Wiring diagram



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(8) Remove carrier 2 (6), with planetary gears 2 (13), sun gear 3 (11), etc. fitted.

※ Use M10 eyebolt. In this case, thrust ring (26) is removed simultaneously.



(9) Disassembling of carrier 2 sub-assembly

① Push in spring pin (36), and remove pin 2 (16), from carrier 2.

※ Carry out the following check in advance. If any abnormality should be found, carry out disassembling.

- Is there any crevice, crack or pitting on tooth surface of planetary gear?
- When turning planetary gear lightly, is there any abnormal noise or eccentric clearance? Carry out check similarly to the above for carrier 3.



② Remove side plate (20), planetary gear 2 (13), and needle bearing (22) from carrier 2.

③ Remove thrust ring (26).



④ Remove snap ring (46), and remove carrier 2 (6) from sun gear 3 (11).

⑤ Remove thrust ring (27) from sun gear 3 (11).



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3) ASSEMBLING TRAVEL MOTOR

(1) Shaft sub assembly

① Fit bearing spacer to shaft (08) and press-fit roller bearing (09).

※ Press the roller bearing after preheating.



3609A2TM060



3609A2TM061

a. Induction heating apparatus temperature : 100˚C

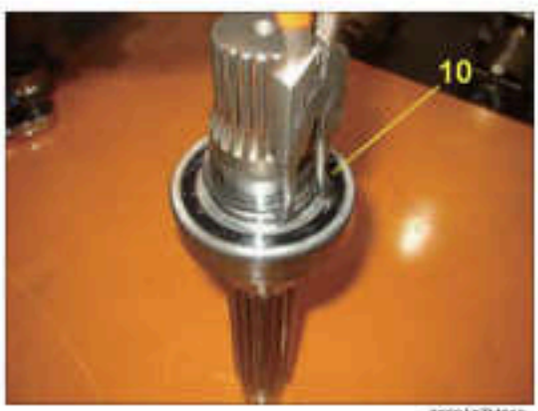
b. Be careful not to damage the sliding surface for the seal on the shaft.



3609A2TM062

② Insert stop ring (10) with snap ring pliers.

※ Pay attention to the direction of the stop ring. (round direction is bearing direction.)

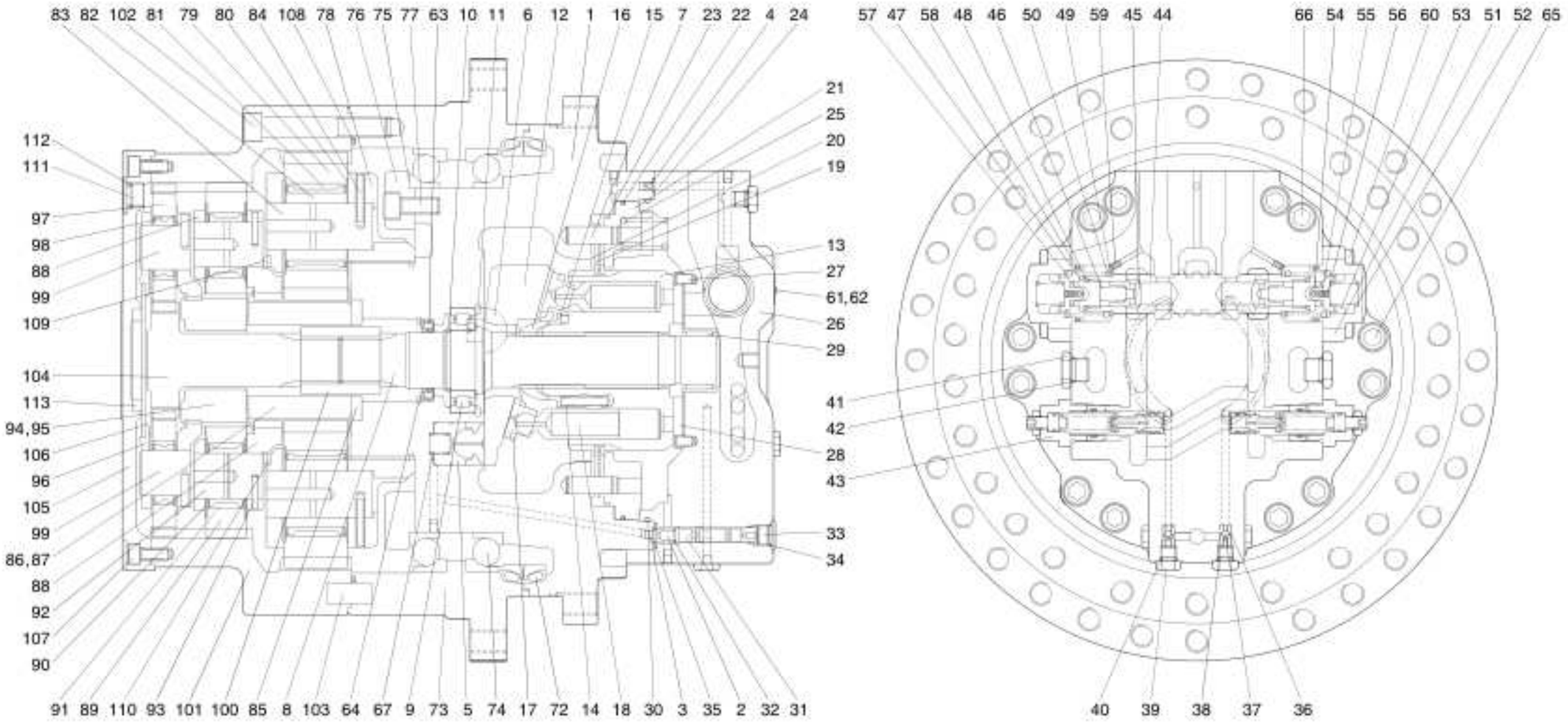


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2. SPECIFICATION

1) TRAVEL MOTOR



3659A2TM22

1	Shaft casing	15	Spacer	29	Needle bearing	43	Relief valve assy	57	Spring seat	75	Shim	89	Planetary gear	103	Planetary pin
2	Plug	16	Ball guide	30	O-ring	44	Main spool	58	O-ring	76	Bearing guide	90	Plate	104	Drive gear
3	Orifice	17	Set plate	31	Swash spool	45	Check	59	Orifice	77	Wrench bolt	91	Needle bearing	105	End cover
4	Orifice screw	18	Piston & Shoe assy	32	Swash spring	46	Spring	60	Wrench bolt	78	Carrier	92	Pin	106	Plate
5	Swash piston	19	Friction plate	33	Plug	47	Plug	61	Name plate	79	Planetary gear	93	Spring pin	107	Wrench bolt
6	Swash ball	20	Separator plate	34	O-ring	48	O-ring	62	Rivet	80	Plate	94	Sun gear	108	O-ring
7	Brake pin	21	Brake piston	35	O-ring	49	Spring seat	63	Oil seal	81	Needle bearing	95	Snap ring	109	Ring
8	Shaft	22	Piston ring	36	Seat	50	Spring	64	Snap ring	82	Bearing bushing	96	Carrier	110	Ring
9	Roller bearing	23	Piston ring	37	Steel ball	51	Cover	65	Wrench bolt	83	Pin	97	Planetary gear	111	Plug
10	Stop ring	24	O-ring	38	Stopper	52	Spring	66	Wrench bolt	84	Spring pin	98	Needle bearing	112	O-ring
11	Lock ring	25	Brake spring	39	Plug	53	Spool	67	Spring pin	85	Thrust plate	99	Pin	113	Bushing
12	Swash plate	26	Valve casing	40	O-ring	54	Steel ball	72	Floating seal	86	Sun gear	100	Coupling		
13	Cylinder block	27	Valve plate pin	41	Plug	55	Spring	73	Hub	87	Snap ring	101	Ring gear		
14	Cylinder spring	28	Valve plate	42	O-ring	56	Plug	74	Bearing	88	Carrier	102	Wrench bolt		

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