CRAWLER EXCAVATOR

SERVICE MANUAL

HX480520SL

HYUNDAI

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8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Cummins QSM11
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	125 × 147.1 mm (4.92" × 5.79")
Piston displacement	10800 cc (659 cu in)
Compression ratio	16.3 : 1
Rated gross horse power (SAE J1995)	335 Hp at 2000 rpm (250 kW at 2000 rpm)
Maximum torque	183 kgf · m (1320 lbf · ft) at 1400 rpm
Engine oil quantity	37.9 ℓ (10 U.S. gal)
Dry weight	942 kg (2077 lb)
Low idling speed	950 ± 50 rpm
High idling speed	1950 + 50 rpm
Rated fuel consumption	144 g/Hp · hr at 1900 rpm
Starting motor	Delco Remy 42MT (24V-7.2kW)
Alternator	Delco Remy 24V-90A
Battery	2 × 12V × 200Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 200 cc/rev
Maximum pressure	330 kgf/cm² (4690 psi) [360 kgf/cm² (5120 psi)]
Rated oil flow	2 × 380 ℓ/min (100.4 U.S. gpm / 83.6 U.K. gpm)
Rated speed	1900 rpm

[ ] : Power boost

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2. STARTING CIRCUIT

1) OPERATING FLOW

Battery (+) terminal → Battery relay [CR-1] → Bettery power fuse [CN-60] → Master switch [CS-74A]
→ Fuse box [No.6] → Master switch [CS-74B] → I/conn [CN-5 (36)] → Start switch [CS-2A (1)]
→ Power relay [CR-35 (30)]

(1) When start key switch is in ON position

→ Start switch ON [CS-2A (2)] → I/conn [CN-5 (39)]
→ Battery relay [CR-1] → Battery relay operating (all power is supplied with the electric component)
→ Start switch ON [CS-2A (3)] → GPS conn [CN-125 (2) → (4)]
→ I/conn [CN-5 (40)] → Power relay [CR-35 (86) → (87)]
→ Fuse box [No.12] → MCU [CN-51 (2)]
→ Reader [CN-427 (1)]
→ RMS [CN-125A (2)]

(2) When start key switch is in START position

Start switch START [CS-2A (6)] → I/conn [CN-5 (35)] → Anti-restart relay [CR-5 (86) → (87)]
→ I/conn CN-3 (11) → Start relay [CR-23] → Starter motor operating

2) CHECK POINT

Engine	Start switch	Check point	Voltage
OPERATING	START	① - GND (battery) ② - GND (start switch) ③ - GND (battery relay M4) ④ - GND (starter B^+) ⑤ - GND (starter M) ⑥ - GND (start relay) ⑦ - GND (battery relay M8)	20–25V

※ The circuit diagram may differ from the equipment, so please check before a repair.

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Fault code J1939 SPN J1939 FMI	Reason	Effect (only when fault code is active)
311 651 6	Current detected at No.1 injector when voltage is turned off.	The injector for cylinder number 1 is turned off.
312 655 6	Current detected at No.5 injector when voltage is turned off.	The injector for cylinder number 5 is turned off.
313 653 6	Current detected at No.3 injector when the voltage is turned off	The injector for cylinder number 3 is turned off.
314 656 6	Current detected at No 6 injector when the voltage is turned off.	The injector for cylinder number 6 is turned off.
315 652 6	Current detected at No.2 injector when the voltage is turned off.	The injector for cylinder number 2 is turned off.
319 251 2	Real time clock lost power.	None on performance. Data in the ECM will not have accurate time and date information.
321 654 6	Current detected at No.4 injector when the voltage is turned on.	The injector for cylinder number 4 is turned off.
322 656 5	Injector solenoid driver cylinder 1 circuit-current below normal, or open circuit. Current detected at injector number 1 when voltage is turned off.	The current to the injector is shut off. The engine can possibly misfire or run rough.
323 656 5	Injector solenoid driver cylinder 5 circuit-current below normal, or open circuit. Current detected at injector number 5 when voltage is turned off.	The current to the injector is shut off. The engine can possibly misfire or run rough.
324 656 5	Injector solenoid driver cylinder 3 circuit-current below normal, or open circuit. Current detected at injector number 3 when voltage is turned off.	The current to the injector is shut off. The engine can possibly misfire or run rough.
325 656 5	Injector solenoid driver cylinder 6 circuit-current below normal, or open circuit. Current detected at injector number 6 when voltage is turned off.	The current to the injector is shut off. The engine can possibly misfire or run rough.
331 656 5	Injector solenoid driver cylinder 2 circuit-current below normal, or open circuit. Current detected at injector number 2 when voltage is turned off.	The current to the injector is shut off. The engine can possibly misfire or run rough.
332 656 5	Injector solenoid driver cylinder 4 circuit-current below normal, or open circuit. Current detected at injector number 4 when voltage is turned off.	The current to the injector is shut off. The engine can possibly misfire or run rough.
341 630 2	Severe loss of data from the ECM.	Possible no noticeable performance effects OR engine dying OR hard starting. Fault information, trip information and maintenance monitor data may be inaccurate.
343 629 12	Internal ECM error.	Possible none on performance or severe derate.
349 191 16	A frequency greater than calibrated threshold was detected at the tail shaft governor signal pin of the 31-pin machine connector.	Calibration dependent power and speed derate.
352 620 4	Low voltage detected on the ECM voltage supply line to some sensors (VSEN 1 supply).	Engine is derated to no air setting.
386 620 3	High voltage detected on the ECM voltage supply line to some sensors (VSEN 1 supply).	Engine is derated to no air setting.

※ Some fault codes are not applied to this machine.

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(4) Assembling pinion gear sub assy

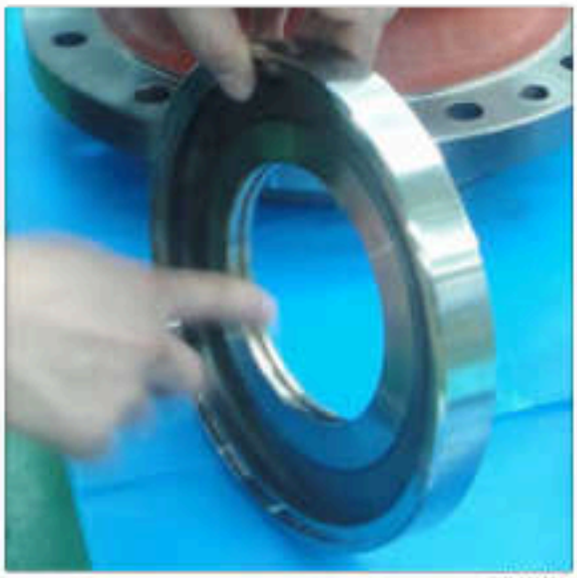
① Prepare drive shaft pinion gear vertical with ground.



480L2SM70

② Fully apply grease (albania ep02) to sleeve's O-ring gutter.
(Be sure to maintain it vertical with ground when assembling it.)

③ Put O-ring into sleeve's O-ring gutter.
(Fully apply grease on O-ring.)



480L2SM71

④ Assemble bearing taper and sleeve into drive shaft using press jig.
(Use special jig for pressing. Leave no space between sleeve and bearing taper.)



480L2SM72

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6) SEAL COVER ASSEMBLY

Apply three bond #1194 on contact surface of housing and seal cover, tighten hex socket head bolt (M10×25L) with designed torque 6.3±0.6 kgf·m (45.6±4.3 lbf·ft) using torque wrench.

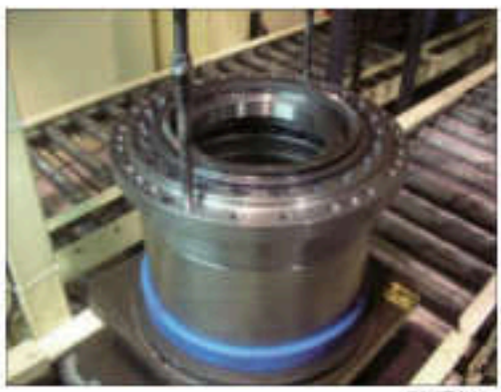


480LZTM225

7) HOUSING COMPONENTS AND RING GEAR ASSEMBLY

(1) Apply three bond #1194 on the surface of ring gear and housing contact surface, tighten hex socket head bolt (M20×120L) with designed torque 53±5.3 kgf·m (383±38.3 lbf·ft) using torque wrench.

(2) Wipe O-ring side of floating seal and contact surface of floating seal of seal cover with oil applied lint free towel, and press fitting floating seal into seal cover.



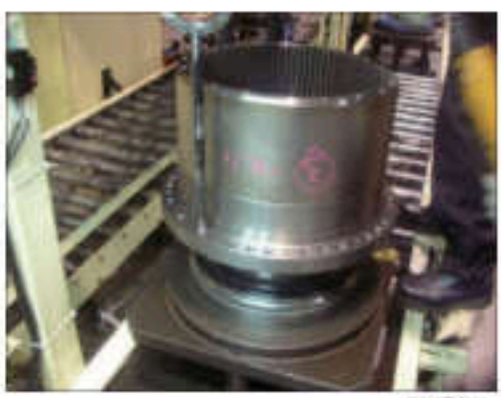
480LZTM223

8) MOTOR & ASSEMBLED HOUSING COMPONENTS ASSEMBLY

(1) Set eye bolt (M20) in housing flange tap hole.

(2) Assemble assembled housing components on motor using hoist.

※ Be sure set eye bolt firmly to keep operator safe.



480LZTM228

9) NUT RING AND LOCK PLATE ASSEMBLY

(1) Tighten nut ring with designed torque using torque wrench.

(2) Set lock plate along with bolt hole of nut ring and assemble them.

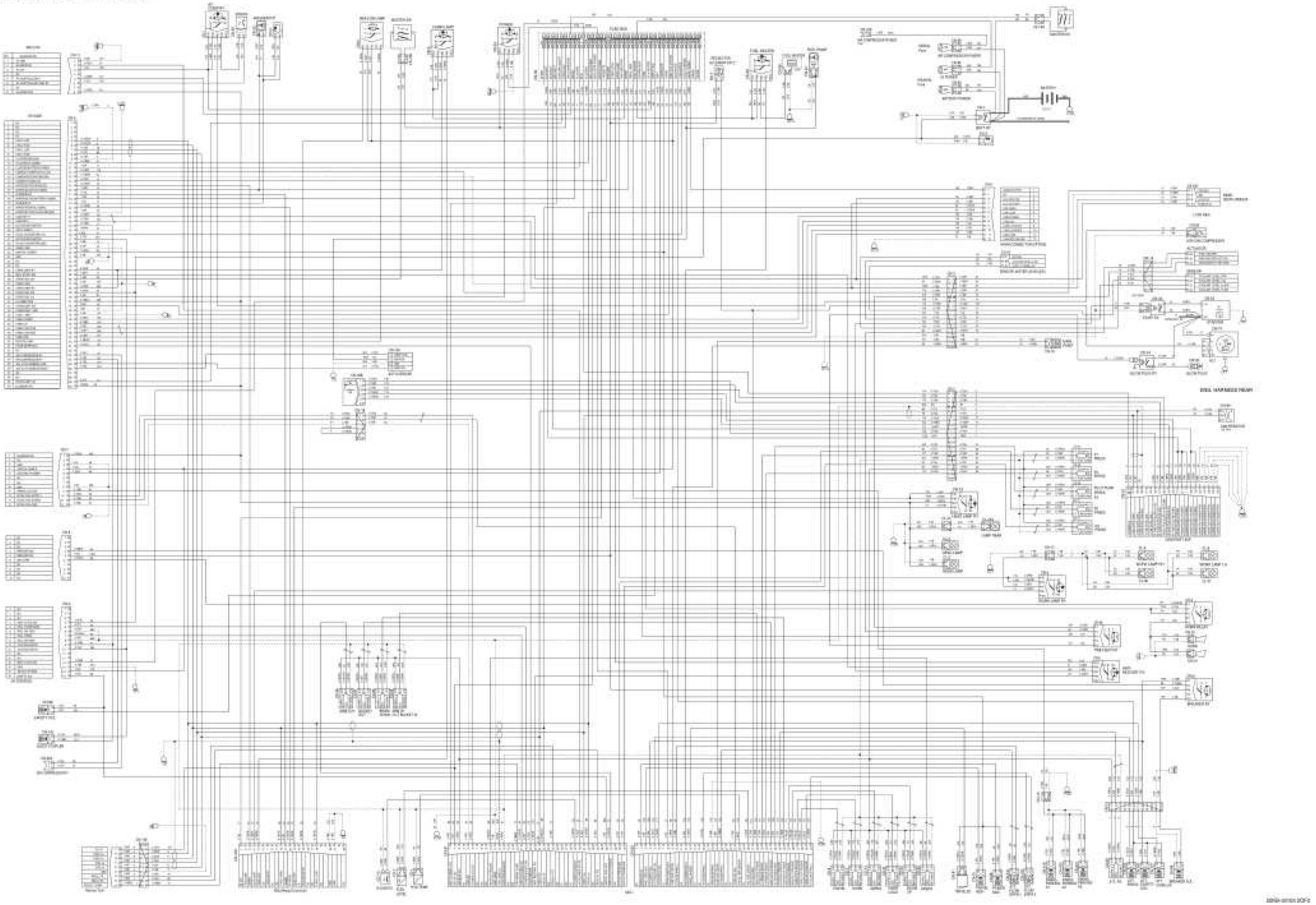
(3) Tighten hex head bolt (M12×20L) with designed torque 8.8±0.9 kgf·m (63.6±6.5 lbf·ft).



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1. ELECTRICAL CIRCUIT (1/2, OLD VERSION)



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