

Operating Manual Crawler Excavator R210LC-7 <http://engine.od.ua>

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8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification	
Model	Cummins B5.9-C	*Cummins 6BTAA
Type	4-cycle turbocharged diesel engine, low emission	
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	102 × 120mm(4.02" × 4.72")	
Piston displacement	5880cc(359cu in)	
Compression ratio	17.4 : 1	*17.3 : 1
Rated gross horse power(SAE J1995)	155Hp at 2100rpm(116kW at 2100rpm)	
	*150Hp at 1950rpm(112kW at 1950rpm)	
Maximum torque at 1600rpm *at 1500rpm	62.1kgf · m(450lbf · ft)	
	*62.6kgf · m(453lbf · ft)	
Engine oil quantity	24 l (6.3U.S. gal)	
Dry weight	400kg(882lb)	*496kg(1094lb)
High idling speed	2250 + 50rpm	*2180 + 50rpm
Low idling speed	950 ± 100rpm	*1050 ± 100rpm
Rated fuel consumption	171.5g/Hp · hr at 2100rpm	*164.8g/Hp · hr at 1950rpm
Starting motor	Nippon denso(24V-5.5kW)	*(24V-4.5kW)
Alternator	Delco Remy (24V-50A)	
Battery	2 × 12V × 100Ah	

* : TIER II

2) MAIN PUMP

Item	Specification	
Type	Variable displacement tandem axis piston pumps	
Capacity	2 × 105cc/rev	*2 × 113cc/rev
Maximum pressure	330kgf/cm ² (4694psi) [360kgf/cm ² (5120psi)]	
Rated oil flow	2 × 220 l /min (58.1U.S. gpm/ 48.4U.K. gpm)	
Rated speed	2100rpm	*1950rpm

[] : Power boost

* : TIER II

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	15cc/rev
Maximum pressure	35kgf/cm ² (500psi)
Rated oil flow	29.3 l /min(7.7U.S. gpm/6.4U.K. gpm)

4) MAIN CONTROL VALVE

Item	Specification
Type	9 spools mono-block
Operating method	Hydraulic pilot system
Main relief valve pressure	330kgf/cm ² (4695psi) [360kgf/cm ² (5120psi)]
Overload relief valve pressure	390kgf/cm ² (5550psi)

[]: Pooer boost

5) SWING MOTOR

Item	Specification
Type	Two fixed displacement axial piston motor
Capacity	151cc/rev
Relief pressure	240kgf/cm ² (3414psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	59kgf · m(427lbf · ft)
Brake release pressure	33~50kgf/cm ² (470~711psi)
Reduction gear type	2 - stage planetary
Swing speed	12.5rpm

6) TRAVEL MOTOR**(1) TRAVEL MOTOR(GM35VL, up to #2078)**

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	330kgf/cm ² (4695psi)
Reduction gear type	3-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	6kgf/cm ² (85psi)
Braking torque	40.6kgf · m(294lbf · ft)

(2) TRAVEL MOTOR(RMV147, #2079 and up)

Item	Specification	
Type	Variable displacement axial piston motor	
Relief pressure	330kgf/cm ² (4695psi)	*325kgf/cm ² (4625psi)
Reduction gear type	2-stage planetary	
Braking system	Automatic, spring applied hydraulic released	
Brake release pressure	11kgf/cm ² (156psi)	*11kgf/cm ² (157psi)
Braking torque	49.3kgf · m(357lbf · ft)	*49.3kgf · m(357lbf · ft)

* : HIGH WALKER

7) REMOTE CONTROL VALVE

Item		Specification
Type		Pressure reducing type
Operating pressure	Minimum	6.5kgf/cm ² (92psi)
	Maximum	26kgf/cm ² (370psi)
Single operation stroke	Lever	61mm(2.4in)
	Pedal	123mm(4.84in)

8) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	ø 120 × ø 85 × 1290mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	ø 140 × ø 100 × 1510mm # ø 140 × ø 95 × 1460mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	ø 125 × ø 85 × 1055mm # ø 100 × ø 70 × 870mm
	Cushion	Extend only

※ Discoloration of cylinder rod can occur when the friction reduction additive of lubrication oil spreads on the rod surface.

※ Discoloration does not cause any harmful effect on the cylinder performance.

: LONG REACH

9) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
R210LC-7	Standard	600mm(24")	0.46kgf/cm ² (6.54psi)	49	2990mm(9' 10")
	Option	700mm(28")	0.40kgf/cm ² (5.69psi)	49	3090mm(10' 2")
		800mm(32")	0.35kgf/cm ² (4.98psi)	49	3190mm(10' 6")
R210LC-7 LONG REACH	Standard	800mm(32")	0.42kgf/cm ² (5.97psi)	49	3190mm(10' 6")
R210LC-7 HIGH WALKER	Standard	600mm(24")	0.49kgf/cm ² (6.97psi)	49	3395mm(11' 2")
	Option	700mm(28")	0.43kgf/cm ² (6.12psi)	49	3495mm(11' 6")
		800mm(32")	0.38kgf/cm ² (5.40psi)	49	3595mm(11' 10")
		※ 710mm(28")	0.43kgf/cm ² (6.12psi)	49	3505mm(11' 6")

※ : Double grouser.

10) BUCKET

Item		Capacity		Tooth quantity	Width	
		SAE heaped	CECE heaped		Without side cutter	With side cutter
R210LC-7	STD	0.92m ³ (1.20yd ³)	0.80m ³ (1.05yd ³)	5	1150mm(45.3")	1270mm(50.0")
	OPT	0.51m ³ (0.67yd ³)	0.45m ³ (0.59yd ³)	3	700mm(27.6")	820mm(32.3")
		0.80m ³ (1.05yd ³)	0.70m ³ (0.92yd ³)	5	1000mm(39.4")	1120mm(44.1")
		1.10m ³ (1.44yd ³)	0.96m ³ (1.26yd ³)	5	1320mm(52.0")	1440mm(56.7")
		1.20m ³ (1.57yd ³)	1.00m ³ (1.31yd ³)	6	1400mm(55.1")	1520mm(59.8")
		1.34m ³ (1.75yd ³)	1.15m ³ (1.50yd ³)	6	1550mm(61.0")	1670mm(65.7")
		◆0.74m ³ (0.97yd ³)	0.65m ³ (0.85yd ³)	5	985mm(38.8")	-
		◆0.90m ³ (1.18yd ³)	0.80m ³ (1.05yd ³)	5	1070mm(42.0")	-
		◆1.05m ³ (1.37yd ³)	0.92m ³ (1.20yd ³)	5	1290mm(50.8")	-
		◎0.87m ³ (1.14yd ³)	0.75m ³ (0.98yd ³)	5	1140mm(44.9")	-
		◎1.20m ³ (1.57yd ³)	1.00m ³ (1.31yd ³)	5	1410mm(55.5")	-
		■0.75m ³ (0.98yd ³)	0.65m ³ (0.85yd ³)	-	1790mm(70.5")	-

◆ : Heavy duty bucket

◎ : Rock bucket(Heavy)

■ : Slope finishing bucket

4. MAINTENANCE CHECK LIST

1) DAILY SERVICE BEFORE STARTING

Check items	Service	Page
Visual check		
Fuel tank	Check, Refill	6-25
Hydraulic oil level	Check, Add	6-30
Engine oil level	Check, Add	6-18
Coolant level	Check, Add	6-20
Control panel & pilot lamp	Check, Clean	6-40
Water separator(~#3341)	Check, Drain	6-26
Prefilter(#3342~)	Check, Clean	6-26
Fan belt tension	Check, Adjust	6-24

2) EVERY 50 HOURS SERVICE

Check items	Service	Page
Fuel tank(Water sediment)	Drain	6-25
Track tension	Check, Adjust	6-35
Swing bearing grease	Lubricate	6-33
Swing reduction gear oil	Check, Add	6-33
Swing reduction gear grease	Check, Add	6-33
Lubricate pin and bushing	Lubricate	6-39
· Boom cylinder tube end		
· Boom foot		
· Boom cylinder rod end		
· Arm cylinder tube end		
· Arm cylinder rod end		
· Boom + Arm connecting		
· Bucket cylinder tube end		
· Bucket cylinder rod end		
· Arm + Bucket connecting		
· Arm + Link, Bucket control		
· Bucket control rod		

3) INITIAL 50 HOURS SERVICE

Check items	Service	Page
Engine oil	Change	6-18, 19
Engine oil filter	Replace	6-18, 19
Prefilter(#3342~)	Replace	6-26-1
Pilot line filter	Replace	6-32
Hydraulic return filter	Replace	6-31
Drain filter cartridge	Replace	6-32
Fuel filter element	Replace	6-26-1
Bolts & Nuts	Check, Tight	6-8
· Sprocket mounting bolts · Travel motor mounting bolts · Swing motor mounting bolts · Swing bearing mounting bolts · Engine mounting bolts · Counterweight mounting bolts · Turning joint locating bolts · Track shoe mounting bolts and nuts · Hydraulic pump mounting bolts		

Service the above items only for the new machine, and thereafter keep the normal service interval.

4) EVERY 100 HOURS SERVICE

Check items	Service	Page
★ Return filter	Replace	6-31
★ Pilot line filter	Replace	6-32
★ Air breather element	Replace	6-32
★ Drain cartridge filter	Replace	6-32

★ Replace 4 filters for continuous hydraulic breaker operation only.

5) INITIAL 250 HOURS SERVICE

Check items	Service	Page
Swing reduction gear oil	Change	6-33

6) EVERY 250 HOURS SERVICE

Check items	Service	Page
Battery electrolyte	Check, Add	6-40
Hydraulic oil return filter	Replace	6-31
Drain filter cartridge	Replace	6-32
Pilot line filter	Replace	6-32
Aircon & heater flesh filter	Check	6-44
Air breather element	Replace	6-32
Bolts & Nuts	Check, Tight	6-8
· Sprocket mounting bolts		
· Travel motor mounting bolts		
· Swing motor mounting bolts		
· Swing bearing mounting bolts		
· Engine mounting bolts		
· Counterweight mounting bolts		
· Turning joint locating bolts		
· Track shoe mounting bolts and nuts		
· Hydraulic pump mounting bolts		

7) INITIAL 500 HOURS SERVICE

Check items	Service	Page
Travel reduction gear oil	Change	6-34

8) EVERY 500 HOURS SERVICE

Check items	Service	Page
★Engine oil	Change	6-18, 19
★Engine oil filter	Replace	6-18, 19
Radiator, cooler fin and charge air cooler	Check, Clean	6-23
☆Air cleaner element(Primary)	Check, Clean	6-25
Fuel filter element	Replace	6-26-1
Prefilter(#3342~)	Change	6-26

★ If you use high sulfur containing fuel above than 0.5% or use low grade of engine oil reduce change interval.

☆ Clean the primary element only after 500 hours operation or when the air cleaner warning lamp blinks. Replace primary element and safety element after 4 times cleanings of primary element.

9) EVERY 1000 HOURS SERVICE

Check items	Service	Page
Travel motor reduction gear oil	Change	6-34
Swing reduction gear oil	Change	6-33
Grease in swing gear and pinion	Change	6-33

10) EVERY 2000 HOURS SERVICE

Check items	Service	Page
Hydraulic tank		
★ · Oil	Change	6-31
· Suction strainer	Check, Clean	6-31
Coolant	Change	6-20, 21, 22, 23

★Change oil every 600 hours of continuous hydraulic breaker operation.

11) WHEN REQUIRED

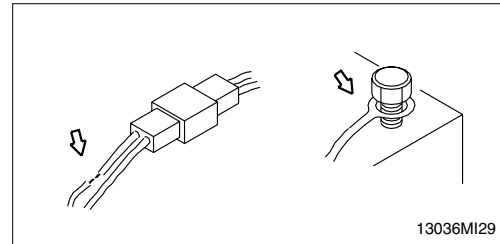
Whenever you have trouble in the machine, you must perform the service of related items, system by system.

Check items	Service	Page
Fuel system		
· Fuel tank	Drain or Clean	6-25
· Water separator(~#3341)	Drain or Replace	6-26
· Prefilter(#3342~)	Clean or Replace	6-26
· Fuel filter element	Replace	6-26-1
Engine lubrication system		
· Engine oil	Change	6-18, 19
· Engine oil filter	Replace	6-18, 19
Engine cooling system		
· Coolant	Add or Change	6-20, 21, 22, 23
· Radiator	Clean or Flush	6-20, 21, 22, 23
· Charge air cooler	Check	6-23
Engine air system		
· Air cleaner element	Replace	6-25
Hydraulic system		
· Hydraulic oil	Add or Change	6-30
· Return filter	Replace	6-31
· Drain line filter	Replace	6-32
· Pilot line filter	Replace	6-32
· Element of breather	Replace	6-32
· Suction strainer	Clean	6-31
Under carriage		
· Track tension	Check, Adjust	6-35
Bucket		
· Tooth	Replace	6-37
· Side cutter	Replace	6-37
· Linkage	Adjust	6-36
· Bucket assy	Replace	6-36
Air conditioner and heater		
· Fresh filter	Clean, Replace	6-43
· Recirculation filter	Clean	6-44

7. ELECTRICAL SYSTEM

1) WIRING, GAUGES

Check regularly and repair loose or malfunctioning gauges when found.



2) BATTERY

(1) Check and repair

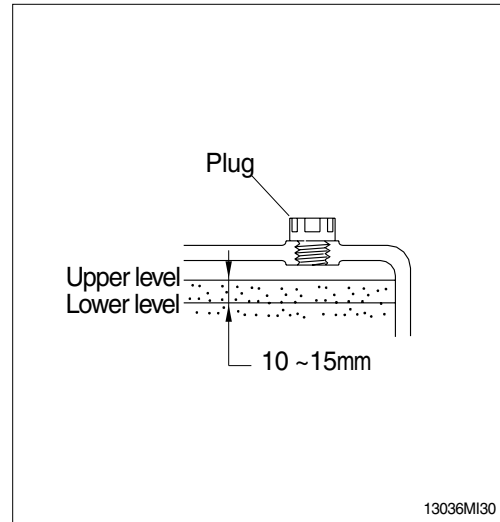
- ① Check the electrolyte level and fill with distilled water to the prescribed level as necessary.
- ② Wash the terminal with hot water if it is contaminated, and apply grease to the terminals after washing.

▲ Do not stain clothes or skin with electrolyte as it is acid.

Be careful not to get the electrolyte in eyes.

Wash with clean water and go to the doctor if it enters the eyes.

※ Remove the fire and spark around battery.

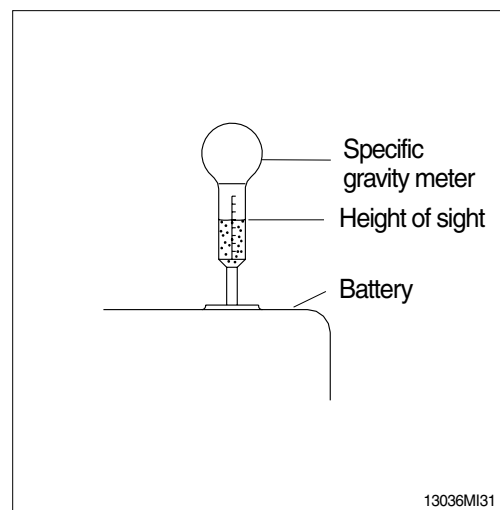


(2) Specific gravity of battery

Judge the charging rate of battery by the specific gravity. The specific gravity changes by the ambient temperature.

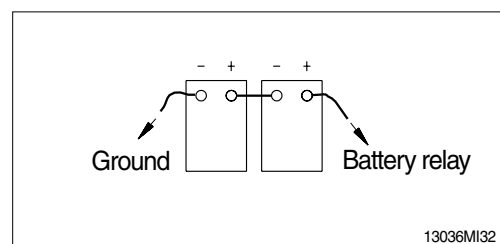
Check the charging rate by referring to the chart below.

Temperature Charging rate	20°C (68°F)	10°C (50°F)	-10°C (14°F)
100%	1.26	1.27	1.28
90%	1.24	1.25	1.26
80%	1.22	1.23	1.24
75%	1.21	1.22	1.23



(3) Method of removing the battery cable

Remove the cable from the ground connection first(⊖ terminal side) and reconnect it last when reassembling.



3) STARTING THE ENGINE WITH A BOOSTER CABLE

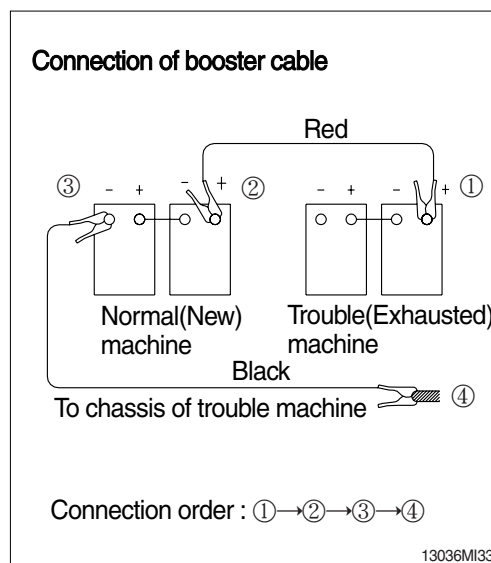
Keep following order when you are going to start engine using booster cable.

(1) Connection of booster cable

※ Use the same capacity of battery for starting.

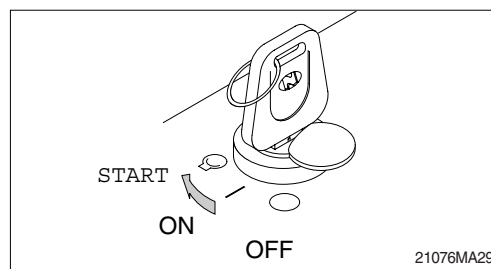
- ① Make sure that the starting switches of the normal machine and trouble machine are both at the OFF position.
- ② Connect the red terminal of booster cable to the battery (+) terminal between exhausted and new battery.
- ③ Connect the black terminal of the booster cable between new battery (-) terminal and chassis of trouble machine.

※ Keep firmly all connection, the spark will be caused when connecting finally.



(2) Starting the engine

- ① Starting the engine of the normal machine and keep it to run at high idle.
- ② Start engine of the trouble machine with starting switch.
- ③ If you can not start it by one time, restart the engine after 2 minutes.



(3) Taking off the booster cable

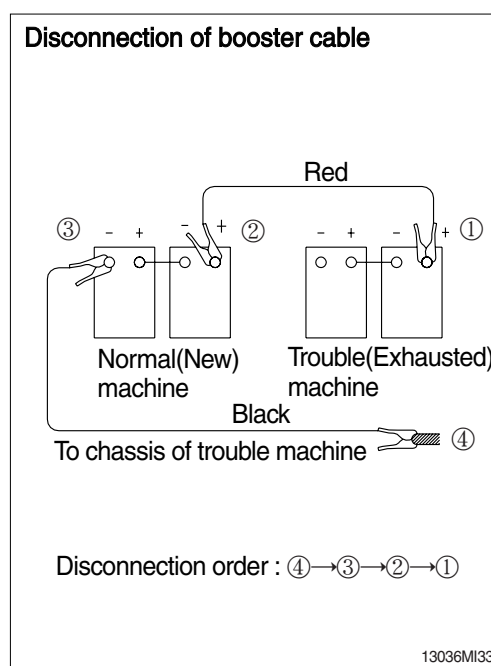
- ① Take off the booster cable(black).
- ② Take off the booster cable(red) connected to the (+) terminal.
- ③ Run engine with high idle until charging the exhausted battery by alternator, fully.

▲ Explosive gas is generated while using the battery or charging it. Keep away flame and be careful not to cause the spark.

※ Charge the battery in the well ventilated place.

※ Place the machine on the earth or concrete. Avoid charging the machine on the steel plate.

※ Do not connect (+) terminal and (-) terminal when connecting booster cable because it will be shorted.



(4) Welding repair

Before start to welding, follow the below procedure.

- ① Shut off the engine and remove the starting switch.
- ② Disconnect ground cable from battery by master switch.
- ③ Before carrying out any electric welding on the machine, the battery cables should be disconnected and the connectors pulled out of the electronic control units(CPU, cluster etc).
- ④ Connect the earth(ground) lead of the welding equipment as close to the welding point as possible.

※ Do not weld or flame cut on pipes or tubes that contain flammable fluids. Clean them thoroughly with nonflammable solvent before welding or flame cutting on them.

▲ Do not attempt to welding work before carry out the above.

If not, it will caused serious damage at electric CAPO system.

