CAT® Lift Trucks

Service Manual

MC/FC

Controller

EP20K	ETB8B-00011-up
EP25K	ETB8B-50001-up
EP30K	ETB9B-00011-up
EP35K	ETB9B-50001-up

For use with EP20K-EP35K Chassis Service Manual. 99759-6E100

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Setup Options (Group 1)

Option #	Title of Option	Description	Range	Default value
#1	Application pre-sets (truck operation mode)	There are 5 truck modes. This option sets combination of 7 option values, which are Top travel speed, Acceleration rate, Traveling power, Regen adjustment, Start lift speed, Top lift speed, Tilt speed.	A, B, C, D, E If any of these 7 option values are changed, A through E will flash in order to show that the truck mode is not in default setting.	A
#2	Start lift speed	This option sets starting lift speed. (when the first lift switch is on) Start lift speed cannot exceed top lift speed.	1 to 10	7
#3	Top lift speed	This option sets maximum lift speed. (when the second lift switch is on)	1 to 10	9
#4	Tilt speed	This option sets tilt speed. Tilt speed is prior to lift speed in case the two levers are simultaneously operated.	1 to 10	7
#5	Auxiliary 1 speed	This option sets speed setting for attachment 1.	1 to 10	3
#6	Auxiliary 2 speed	This option sets speed setting for attachment 2.	1 to 10	1
#7	Top travel speed limit	This option sets maximum travel speed.	5 to 16 km/h (3 to 10 mph)	14
#8	Acceleration rate	This option determines acceleration rate. (Slow, Moderate, Fast)	1, 2, 3	2
#9	Traveling power mode	This option determines powering characteristic. (Economy, Standard, High power)	1, 2, 3	2
#10	Service indicator	This option sets the maintenance time which is a reminder for service personnel. The time set is added to the truck's hourmeter and that value is stored in memory as maintenance time. When the truck's hourmeter reaches maintenance time, the service indicator LED turns on. It will flicker 20 hours before maintenance time. You can reduce the truck power when the LED is solid on by setting selection. You can also set the demo-mode, which shows the Service Indicator function in a short period of time.	100 to 500 hours in 50-hr. increments. Selecting '=' attached number makes the power reduction function effective. Setting 0.1 makes the truck demo-mode. 0: Disable	0

NOTICE:

(1) In #1 Application pre-sets, we add Traveling Power to the Gemini's function.

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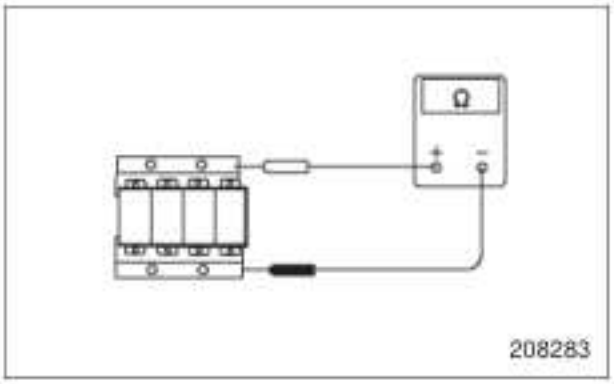
Measurement of Head Capacitor

⚠ WARNING

Disconnect the battery plug before working on the controller.

⚠ CAUTION

Be careful not to damage the head capacitors.



(1) Turn the key switch off.

(2) Disconnect the battery plug.

(3) Check voltage of the head capacitor. If it is not 0 V, discharge voltage with the resistor. (ex: 100 ohm)

(4) Remove the head capacitor with bus bar.

(5) Check the head capacitor visually. (break or melt)

(6) Measure resistance of the head capacitor. It must be over 10 k ohm.

- If you find any troubles, replace the capacitor.

Checking Contactor Coil

⚠ WARNING

Disconnect the battery plug before working on the controller.

(1) Disconnect the lead wire of coil.

(2) Set the multimeter to 200 ohm range.

(3) Measure coil resistance. It must be 118 to 145 ohm.

- If the measured value deviates from the above range, replace the contactor assembly.

(4) With the lead wire of contactor coil connected, set the multimeter to 200-VDC range.

(5) Connect the negative (-) terminal of the multimeter to the negative-side coil terminal (small fasten terminal) and the positive (+) terminal of the multimeter to the positive-side coil terminal (large fasten terminal).

(6) Connect the battery, and operate the control device that activates the contactor.

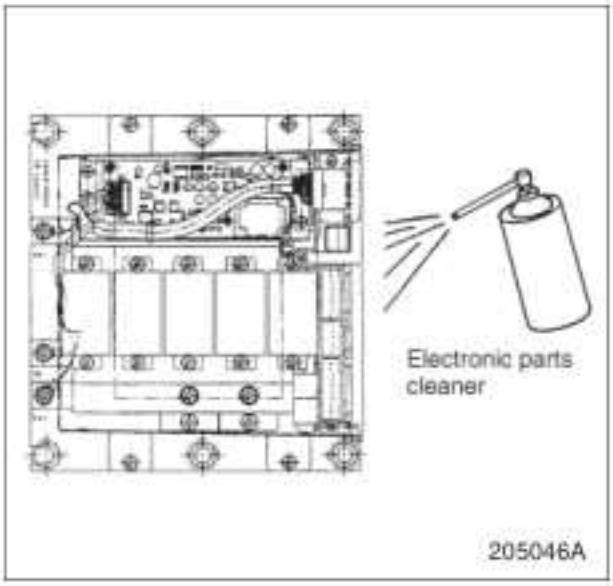
(7) The multimeter should indicate a value between 23.4 and 52 V after the contactor operates. When the contactor is found to be normal during the coil resistance test and if the measured voltage is not within this range, replace the logic card.

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How to clean harness connectors and system components

1. Open-circuits are often caused by dirty harness connectors and components. Dust, together with greasy matter, forms grime which, in time, penetrates electrical connections, resulting in loose metal-to-metal contact or, for worse, electrical separation of surfaces in contact. For this reason, it is essential that the connectors and components be cleaned at each periodic inspection and at when servicing the truck. Instead of a commonly used solvent, use electronic parts cleaner (in the manner illustrated on the right).

Electronic parts cleaner	Three Bond 29D or Pow-R-Wash CZ*

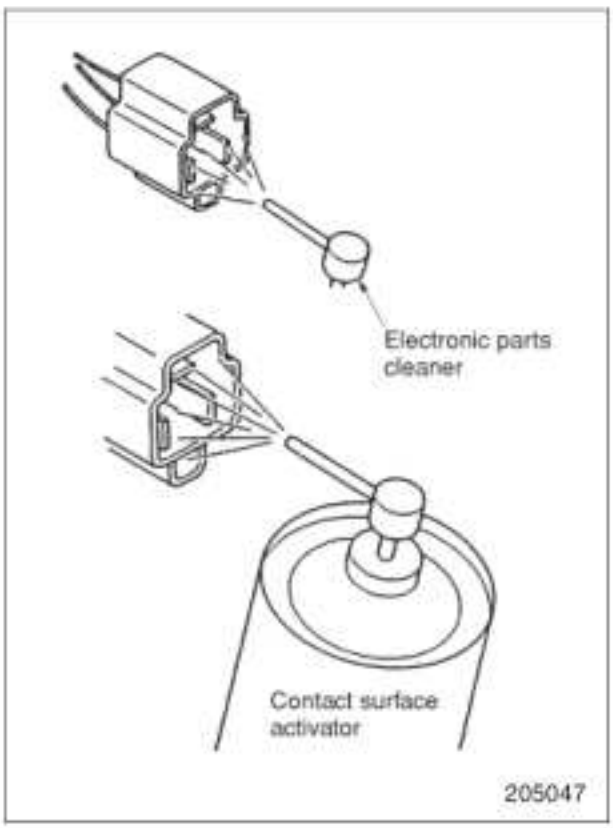


NOTE

The cleaner liquid is volatile. All you have to do is just give a strong spray to wash off grime.
No need to wipe off the sprayed liquid.

2. After checking the connector for continuity, wash it as shown. Then, uncouple the connector and spray contact surface activator onto contact surfaces. Install and remove the connector several times to wet the surfaces thoroughly with the activator liquid. After coupling up the connector, check to be sure that it is in locked state.

Contact surface activator	Three Bond 2501S (aerosol) or Nyogel 760G*



NOTE

Do not spray too much liquid into the connector. Cleaner liquid reacts differently with some resins (plastic materials).

*: Produce contained in Terminal Maintenance Kit (SE000003)

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Problem: FC Solenoid, Fault (55)

(1) Situation
Indication: "55" display. Related function is disabled.

(2) Possible cause
Faulty solenoid, faulty wiring, faulty hydraulic logic board.

(3) How the error code is triggered
When any of the following solenoid current is less than 10 mA or more than 900 mA and longer than 200 msec.
Software checks following signals and detects fault.
- Lift A Current (CN1-45 to 47)
- Tilt B Current (CN1-48 to 50)
- ATT1A Current (CN1-51 to 53)
- ATT2B Current (CN1-54 to 56)
- ATT3A Current (CN1-57 to 59)

(4) Checks
Check emergency button.

Released

Pushed

(5) Release and turn key switch on again.

(6) Disconnect battery plug. Disconnect hydraulic controller connector CN14.
Check continuity between CN14-43 and CN14-44.

Continuity

No continuity

(7) Correct or replace wiring.

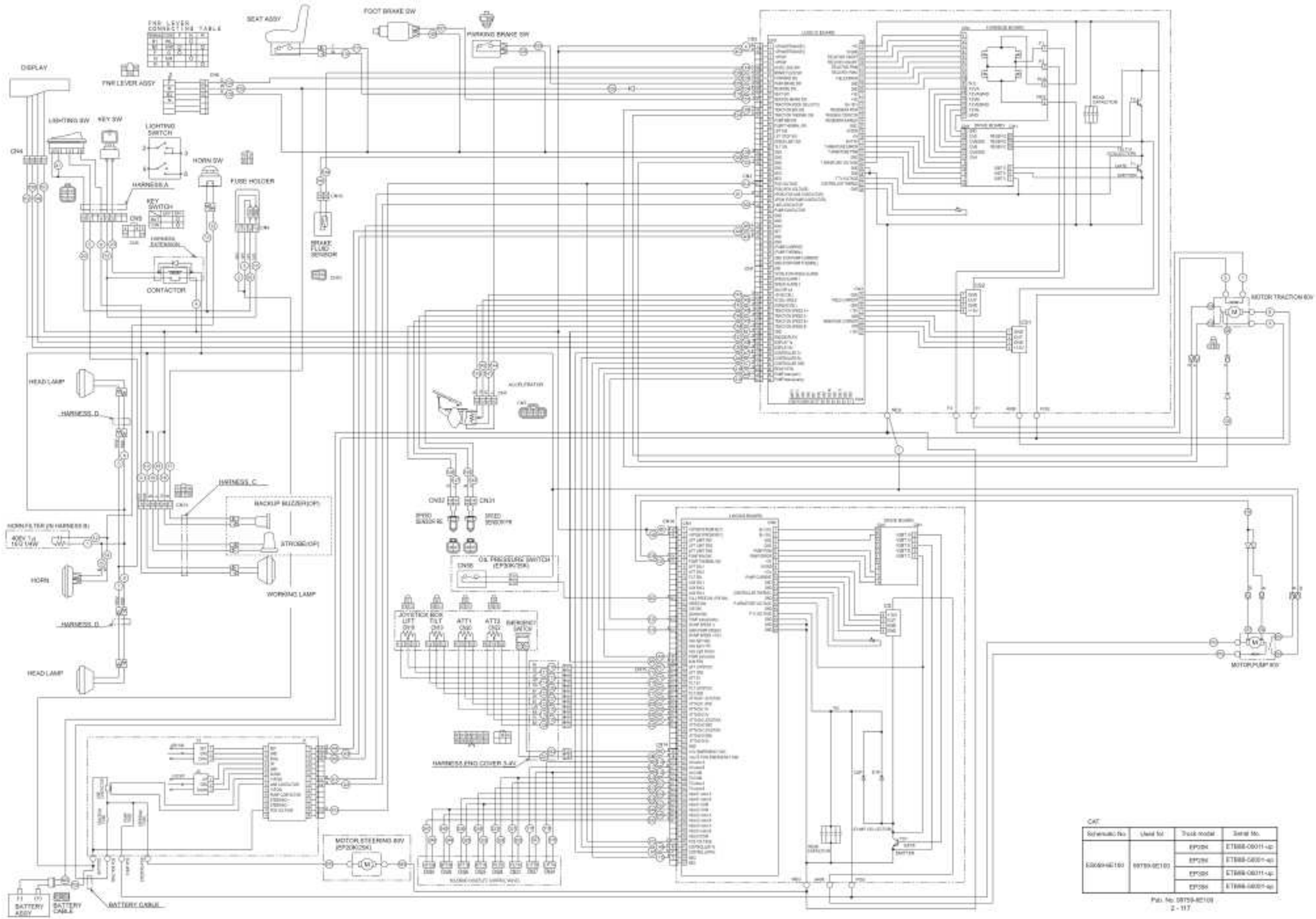
(8) Check continuity and shorting to NEG between solenoid connector and hydraulic controller connector CN14.
- Lift ; 319Y and CN14-45, 317W and CN14-46, 318G and CN14-47, 327G and CN14-47
- Tilt ; 321L and CN14-49, 323G and CN14-50, 320Y and CN14-48, 328V and CN14-48
- Attach 1; 324V and CN14-51, 326O and CN14-52, 322B and CN14-53, 325L and CN4-53
- Attach 2; 345G and CN14-55, 347B and CN14-56, 344O and CN14-54, 346W and CN14-54

Continuity and not shorted

No continuity, or shorted

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Electric Schematic (DC motor, FC models)



CAT			
Schematic No.	Used for	Truck model	Serial No.
E3069-6E100	99759-6E100	EP20K	ETB88-08011-up
		EP25K	ETB88-08001-up
		EP30K	ETB88-08011-up
		EP35K	ETB88-08001-up

Pub. No. 99759-6E100
2 - 117

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