



Service Manual

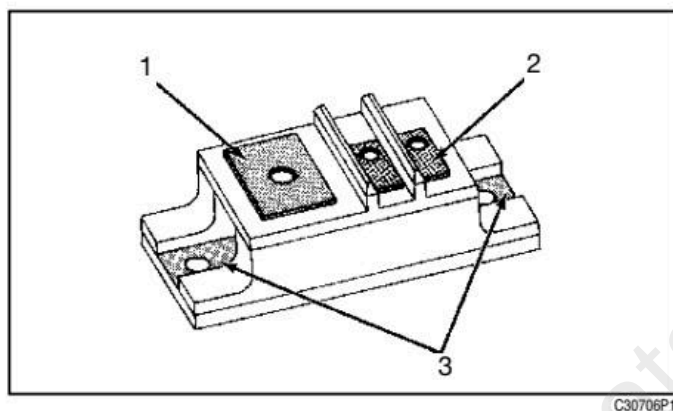
MicroCommand II Control

2EC15	A2EC1-60001-79999
2EC18	A2EC1-60001-79999
2EC20	A2EC2-60001-79999
2EC25	A2EC2-60001-79999
2EC25E	A2EC3-60001-79999
2EC30	A2EC3-60001-79999

Transistor Measurements

Multimeter Setting	(+) Test Lead	(-) Test Lead	927566 Results	974222 Results
Resistance	Emitter	Base	45 to 135Ω	60 to 180Ω
Diode	Base	Collector	.3 to .9V	.3 to .9V
Diode	Collector	Base	OL	OL
Diode	Emitter	Collector	.3 to .9V	.3 to .9V
Diode	Collector	Emitter	OL	OL

Transistor Connections

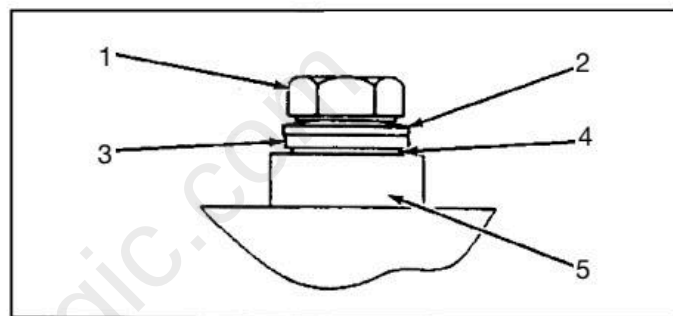


1. Emitter
2. Base
3. Collector

Head Capacitor

NOTE: Proper torque and assembly of capacitor hardware is critical. Avoid disassembly unless capacitor has to be replaced.

1. Tighten capacitor terminal screw to a torque of $5 \pm 0.5 \text{ N}\cdot\text{m}$ ($50 \pm 5 \text{ lb in}$).
2. Spring washer 8T2229 concave side down.
3. Bus bar assembly 925789.
4. Lockwasher 8C3398.
5. Head capacitor terminal.

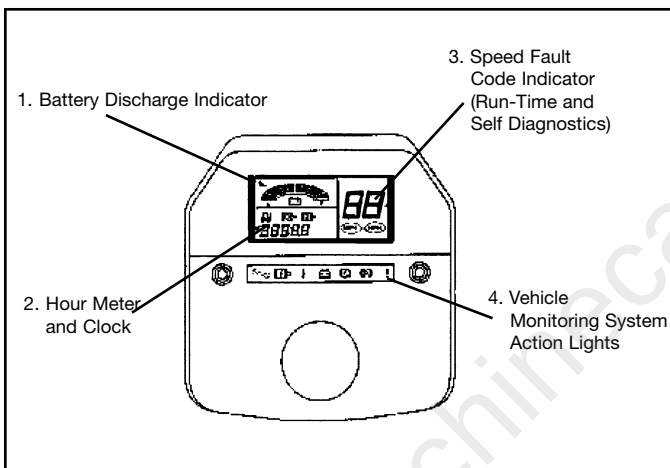


C30610P1

Vehicle Monitoring System Display Unit

The vehicle monitoring system display unit is located in the steering console. It is a self-contained, solid-state instrument panel with a liquid crystal display (LCD) that has areas for showing: BDI; truck, drive motor, and pump motor hours; clock; truck speed; and fault codes. A separate action light strip below the LCD display uses seven international pictorial symbols to alert the operator of conditions that need attention.

The display unit interacts with the logics and failure protection circuits. It functions as a BDI, and provides on-board diagnostic data on the operational condition of the truck during normal use ("Run-Time" diagnostics) as well diagnostics during troubleshooting ("Self" diagnostics). See the topic, "Built-in Diagnostic Operation" in the Troubleshooting section of this manual.



Display Unit

1. Battery Discharge Indicator 2. Hour Meter and Clock
3. Speed/Fault Code Indicator (Run-time and Self- Diagnostics).
4. Action Lights.

Battery Discharge Indicator

This liquid crystal display (LCD) uses bars and a battery symbol to indicate the level of battery discharge. When all ten bars appear, the battery is fully charged. As the battery discharges, bars disappear from the display one by one. When only one bar remains on the display, the battery is 70% discharged and the battery symbol will flash. At 80% discharge, the battery symbol is solid and no bars appear. The drive and lift (hydraulic) motors run at a slower speed. The operator should complete the current lift operation and travel to the battery replacement or charge area. Replacement of the discharged battery will reset the BDI, and normal operation will resume.

Hour Meter and Clock

At start-up, the five LCD numbers and the three symbols above them indicate service hours for the truck, for the drive motor, and for the *pump* motor. Each symbol momentarily lights and its respective hours appear on the LCD display, in cycle. Periodic maintenance is based on the number of pump hours recorded. After start up and while the truck is operating, the LCD numbers display the time of day.

Speed / Fault Code Indicator

During normal operation, truck speed is indicated by the two LCD numbers in this area. Either miles per hour or kilometers per hour can be chosen for the display by pushing the left orange button. The numbers will change to a fault code if a run-time fault is detected. The "!" action light will flash on and off while the code is displayed.

PROBLEM 44

Lift switch 1 and 2 circuit defects.

POSSIBLE CAUSES

Lift switch 1 and 2 not adjusted properly or defective: wiring defect: logics defect.

CHECKS

Check mechanical linkage for proper operation. Switch 1 should "click" in before switch 2.

Linkage OK

Measure the voltage on logics card (silver area) at P1-1 and P1-2. Scrape coating off card pins if needed. Use the following chart to determine proper voltages:

Logics Pin	Lift Lever Fully FWD	Lift Lever Fully BACK	Lift Lever 1/2 BACK	Lift Lever NEUTRAL
P1-1	High	Low	Low	High
P1-2	High	Low	High	High

Linkage Not OK

Adjust linkage.

Voltage NOT OK

Disconnect switches and check continuity with lever in neutral position and pulled fully back. Resistance for these switches should be:

Neutral—OL (infinite)
Fully Back—<50 ohms.

Voltages OK

Verify problem still exists. If it does, replace logics.

CHECK OK

Check continuity between P13-5 to P1-1 (wire #13).
Check continuity between P13-6 to P1-2 (wire #81).
Check continuity between P13-1 to battery negative (wire #1).

NOT OK

Replace defective switches.

Checks OK

Check for short to battery negative (wire #1) in wire #13.
Check for short to battery negative (wire #1) in wire #81.
Repair shorts.

Checks Not OK

Repair or replace open wire.

Control Panel Thermal Switch

Contacts open at 81 to 89° C (178 to 192° F)

Contacts close at 69 to 77° C (156 to 171° F)

Contactors Tip Clearance (Gap)

Line no adjustment

Directional (Forward and Reverse) 3.05mm ± 7%

. (0.120" ± 7%)

Bypass no adjustment

Pump no adjustment

Regen no adjustment

Fuses

Accessory 15 A

Key 10 A

Line 675 A

Shunt Field Fuses 15 A

Drive and Pump Motor Shunt Field Resistances

Model	Drive Motor Shunt Field Resistances (ohms)		Pump Motor Shunt Field Resistances (ohms)	
2EC15/18	9" Diameter GE Motor 36/48 V 72/80 V		7" Diameter GE Motor 36/48 V 72/80 V	
	11.09- 13.55 Ω	27.99- 34.21 Ω	8.55- 10.45Ω	23.76- 29.04Ω
2EC20-30	11" Diameter GE Motor 36/48 V 72/80 V		9" Diameter GE Motor 36/48 V 72/80 V	
	3.78- 4.62Ω	33.07- 40.43Ω	29.16- 35.64Ω	11.52- 14.08Ω

Full Version Available

Caterpillar 2EC20-36-48V Forklift Service Manual (SENB8604-02)

Caterpillar 2EC20-36-48V forklift service manual, covers drive unit, hydraulics, mast, and wiring. Searchable PDF. Instant PDF download.

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