



Service Manual

M70D	36/48v	A1EC4 - 60200 - 80199
	72/80v	A1EC4 - 80200 - 99999
M80D	36/48v	A1EC4 - 60200 - 80199
	72/80v	A1EC4 - 80200 - 99999
M100D	36/48v	A1EC4 - 60200 - 80199
	72/80v	A1EC4 - 80200 - 99999
M120D	36/48v	A1EC5 - 60200 - 80199
	72/80v	A1EC5 - 80200 - 99999

INDEX

Specifications

Component Measurements	5
Console	6
Contactor Tip Clearance	7
Control Panel	8
Current Measurements	5
Direction Switch	6
Display Layout	6
Fuses	7
Head Capacitor	7
Instrument Panel	6
Logic Board Layout	5
Thermal Switch	7
Transistor Connections	5
Transistor Measurements	5

Systems Operation

Accessory Circuits	26
DC-DC Converter	27
Horn Circuit	26
Hour Meter Circuit	26
Actuation Circuit	28
Capacitor Charging Circuit	29
Drive Circuit	41
Bypass Circuit With Shunt Field Activated	46
Bypass Circuit Without Shunt Field Activated	47
Control Circuit	41
Current Limit	45
Electrical Braking (Regenerative and Plugging)	48
Flyback Circuit	44
Failure Protection Circuit	45
Power Circuit	42
Thermal Protection Circuits	45
General Information	17
Glossary	10
Hydraulic Pump Motor Circuit	29
Lift Circuit	36
Power Steering Circuit	29
Tilt And Auxiliary Control	40
Location of Control Panel Components	15

Logic Unit	20
Option Jumpers	20
Operational Circuit Elements	22
Accelerator Control	26
Battery Discharge Indicator (BDI)	22
Vehicle Monitoring System	22
Chat Mode	25
Contactors	25
Current Sensor	25
International Pictorial Symbols	24
On Board "Run Time" Diagnostics – (Fault Detection)	22
Resistor (Charging)	25
Programmable Features	18
Activating Default Settings	19
Programming Features	20
Symbol Library	14

Testing And Adjusting

Accessing Stored Faults	53
System Tests And Adjustments	107
Component Tests	110
Accelerator Control	113
Capacitor (Head)	113
Conductor And Switch Continuity	113
Contactor (Bypass Activation)	114
Contactor Components	115
Current Sensor	115
DC-DC Converter	116
Diode Replacement	117
Diodes	117
Display Panel	114
Driver Board (Off Vehicle)	124
Driver Board (On Vehicle)	118
Logic Unit Quick Reference Voltage Check	111
Resistor (Charging)	128
Resistors (R322 and R312)	127
Thermal Switch	128
Transistors T1P, T2P, T3P, T1D, T2D And T3D	126
Transistor Replacement T1P, T2P, T3P, T1D, T2D And T3D Valve Control Card	126
Vehicle Monitoring System Self Test	114
Vehicle Monitoring System Quick Reference Voltage Check	110
Discharging Head Capacitor (HEAD CAP)	107

Thermal Switch

Contacts open at 81 to 89°C (178 to 192°F)
Contacts close at 69 to 77°C (156 to 170°F)

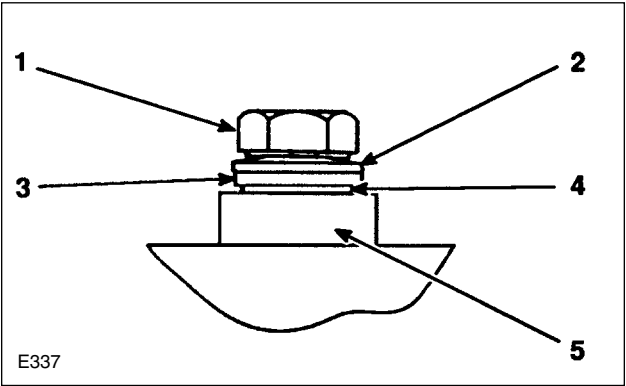
Contactor Tip Clearance (Gap)

Line, lift, bypass, regen no adjustment
Direction (forward and reverse) 2.62+ .08 mm
(.103+ .003 in)

Fuses

Key 10A
Line
 (72/80 V) 675V
 (36/48) 750A
Horn (if equipped) 3A
Drive shunt field 10A
Pump shunt field 10A

Head Capacitor

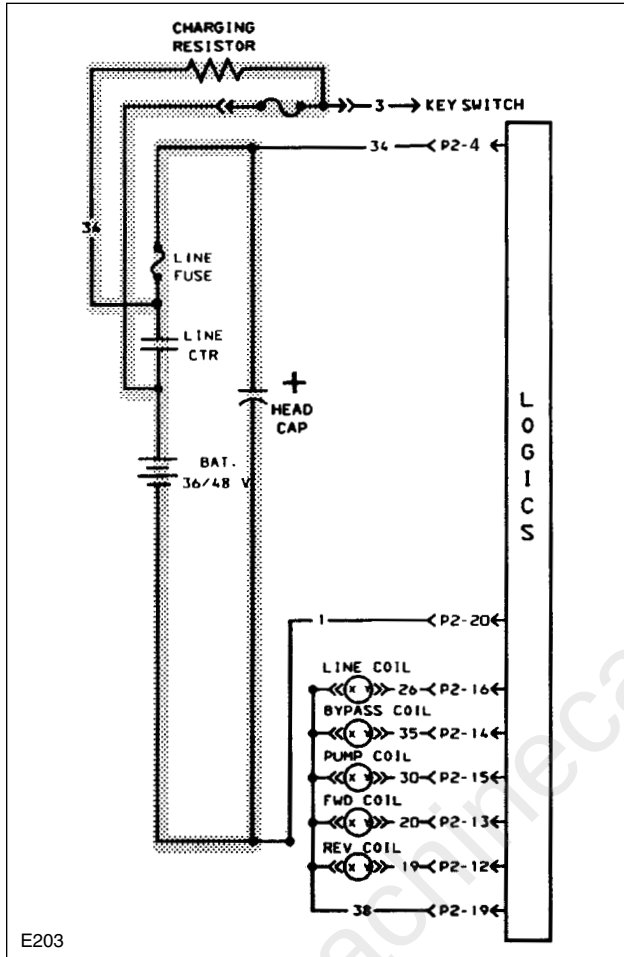


NOTE: Proper torque and assembly of capacitor hardware is critical. Avoid disassembly unless capacitor has to be replaced.

- (1) Tighten capacitor terminal bolt to a torque of 4.5 to 5.5 N·m (40 to 50 lb in)
- (2) Spring washer 8T2229.
- (3) Ring terminal of wire assembly.
- (4) Lockwasher 8C3398.
- (5) Head capacitor terminal.

With the line contactor tips closed, the logics continues its checks for any "Run Time" faults. If no faults are detected, the display will indicate the battery charge level, the power steering system operates, the pump and drive power circuits receive battery voltage and the logics receives battery voltage on wire #34 at P2-4.

Capacitor Charging Circuit



Capacitor Charging Circuit (Typical Example)

A charging resistor is used to maintain voltage on the head capacitor whenever the battery is connected and the line contactor is open. This voltage reduces arcing of the line contactor tips during line contactor activation. The charging resistor is installed parallel with the line contactor tips. Current flows from battery positive through the key fuse, charging resistor, line fuse and the positive heat sink into battery negative. This circuit will maintain a voltage across the head capacitor above approximately 20 volts.

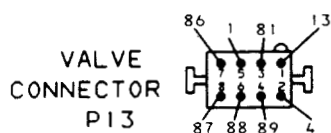
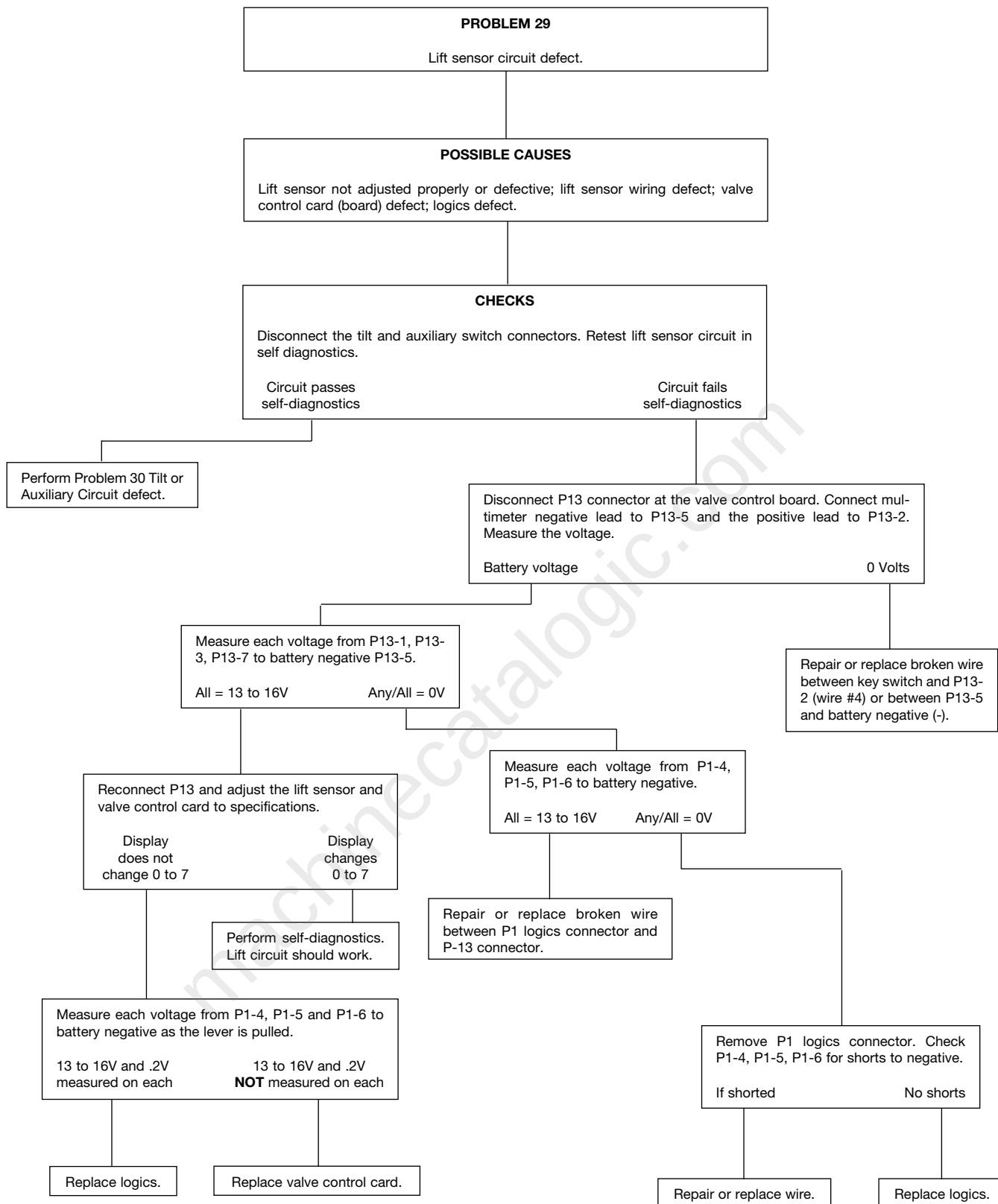
Hydraulic Pump Motor Circuit

Only one hydraulic pump motor is used for all power steering, lift, tilt, and auxiliary hydraulic functions. To activate the pump circuit, the seat switch, key switch and line contactor must be closed first as explained in the topic, Actuation Circuit. The power steering, lift, tilt, and auxiliary circuits are explained as follows:

Power Steering Circuit

The power steering (PS) circuit has two speeds (PS idle and PS in use) independent of the lifting speeds.

NOTE: Shaded lines on the circuit diagrams indicate current flow. Other circuits can be activated at the same time, but each one is shown separately to illustrate current flow in each individual circuit.



NOTE: Before lift truck is placed into service, connect tilt and auxiliary switches and verify proper adjustment.

MEMO

MEMO

Full Version Available

Caterpillar M120D 36-48V Forklift Service Manual (SENB8470)

Caterpillar M120D 36-48V forklift service manual, covers hydraulics, wiring, drive systems, and repairs. Searchable PDF download.

[VIEW THE FULL MANUAL](https://machinecatalogic.com/caterpillar-m120d-36-48v-forklift-service-manual-senb8470/)

<https://machinecatalogic.com/caterpillar-m120d-36-48v-forklift-service-manual-senb8470/>