CAT® Lift Trucks

Service Manual

EV100ZX SCR Motor Controller

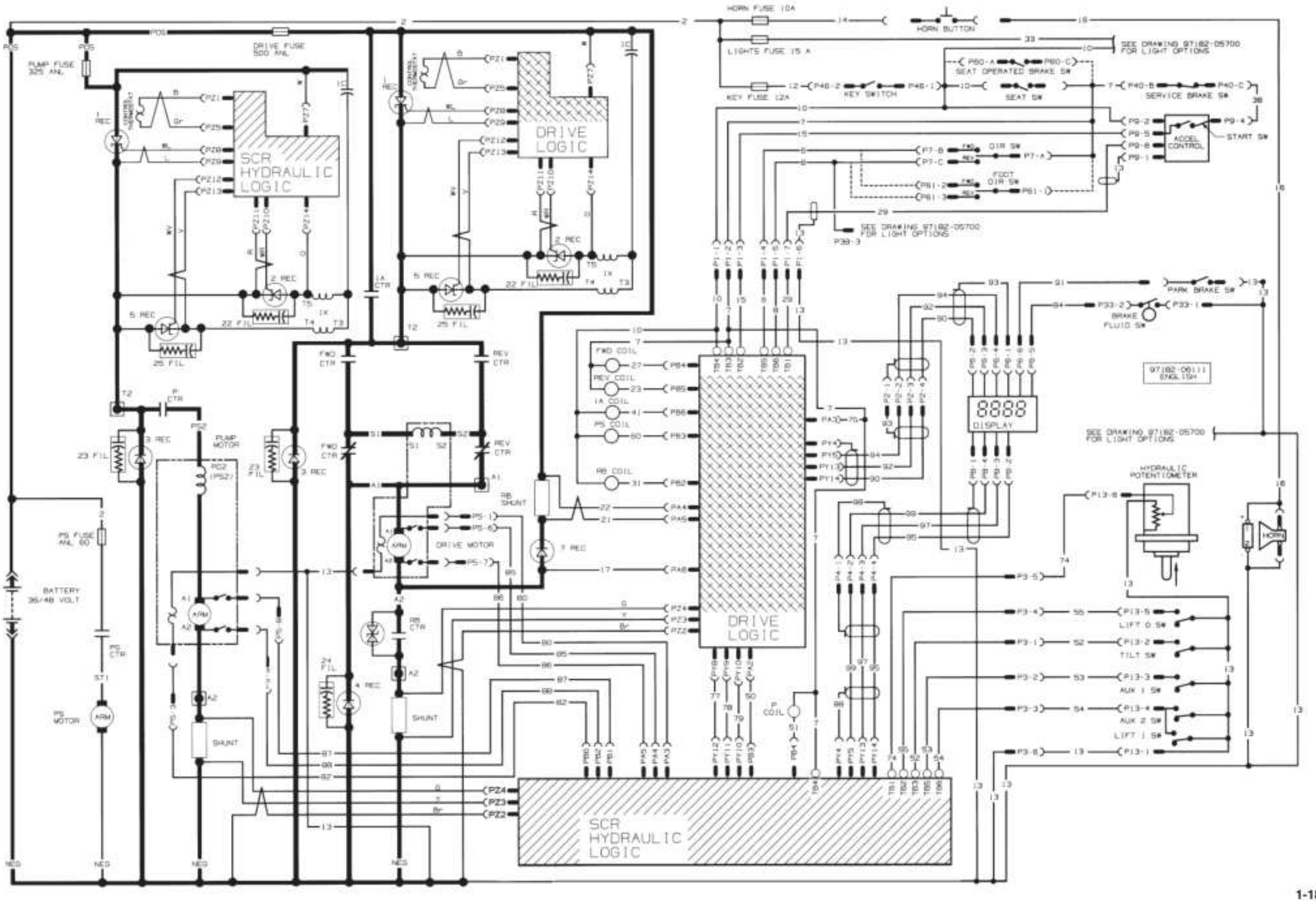
2EC15
2EC18
2EC20
2EC25
2EC25E
2EC30

SENB8606-01

MidWestTech | Caterpillar EV100ZX SCR Forklift Motor Controller Service Manual | Publica... Order the manual at mid-west-tech.com >

EV100ZX SCR Control Wiring Schematic

With SCR Hydraulics



MidWestTech | Caterpillar EV100ZX SCR Forklift Motor Controller Service Manual | Publication SENB8606-01

Order the manual at mid-west-tech.com >

EV100ZX Logic Card Specifications

CONTROL FEATURES	TRACTION	PUMP
On-Board Diagnostics	Standard Displayed to Handset or Dash Display	Standard Displayed to Handset or Dash Display
Hourmeter	1-Displayed to Dash 1-Secure (Handset Read)	1-Displayed to Dash 1-Secure (Handset Read)
Stored Status Codes	16 Codes with BDI and Hourmeter reference	16 Codes with BDI and Hourmeter reference
Card Type Selection	Standard Enable / Disable features	Standard Enable / Disable features
Creep Speed	Adjustable 2% to 15% On Time	Not applicable
Current Limit	Adjustable. See C/L Curves Standard/High Performance	Adjustable. See C/L Curves Standard/High Performance
Plugging	Adjustable 200 to 930 amps	Not applicable
Pedal Position Plug	Adjustable. 100 to 930 Amps Can be disabled	Not applicable
Ramp Start	Standard	Not applicable
Full Power Transition	Standard with 1A Ctr	Standard with 1A Ctr
Controlled Acceleration	Adjustable .1 to 22 seconds	Adjustable .1 to 5.5 seconds
1A Timed Pick-Up	Follows CA by .2 seconds with Accel Volts is <.5V or Accel Ohms is <200	Follows CA by .2 seconds with Accel Volts is <.5V or Accel Ohms is <200
1A Thermal Hold-Off	Standard at 90°C Cutback at 20%	Standard at 90°C Cutback at 20%
1A Plugging Hold-Off	Standard	Not applicable
Delay to First Pulse	Standard	Standard
PMT (Fault Shut Down)	Standard Look ahead and reset two count	Standard Look ahead and reset two count
Thermal Protection	Standard 90°C Cutback	Standard 90°C Cutback
Static Return to Off	Standard 2 second delay	Not applicable
Voltage Range	24 - 80 VDC	24 - 80 VDC
Accelerator Input	3.5-0 VDC	3.5-0 VDC
Low Battery Operation	Standard 50% at 36-80 VDC 75% at 24 VDC	Standard 50% at 36-80 VDC 75% at 24 VDC
Reverse Battery Protection	Standard	Standard
Ambient Temperature	-30 to +50°C	-30 to +50°C
Approximate Weight	5.5 Kg	5.5 K
Coil Drivers F / R or Line	On-Board	On-Board
1A	On-Board	On-Board
FW	On-Board	Not applicable
Regen	Standard	Not applicable
PS	On-Board	Not applicable

MidWestTech | Caterpillar EV100ZX SCR Forklift Motor Controller Service Manual | Publica... Order the manual at mid-west-tech.com >

Secondary Troubleshooting

TABLE THREE (cont'd)
Mis-operation of Other Features

NOTE

Conduct all testing with truck jacked up.

Symptom	Probable Cause
3m. RB contactor remains open after reversal.	• Check for open connection between sensor-2 *yellow* lead and control card PA4. • Replace Control Card.
3n. Failure to transition to regen braking mode.	• Check for proper adjustment of regen. • Replace Control Card.
3o. RB contactor does not open during regen braking mode.	• Check coil voltage. • Replace Control Card.
3p. Very soft reversal.	• Check plug adjustment setting on Control Card. • Replace Control Card.
3q. Blown power fuse.	• Check 3 REC for short (refer to pg. 4). Very hot power cables. (Also, possible damage to 1 REC).

Hydraulic Pump Control Troubleshooting

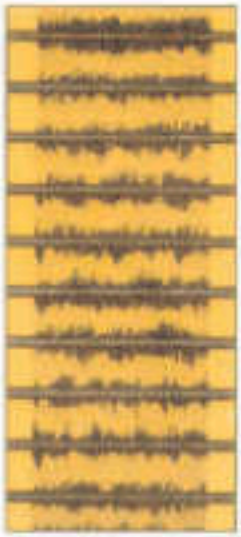
Troubleshooting is based on using the voltmeter to determine if the proper voltages are available to permit the control to operate properly.

TABLE FOUR
Failures that Cause Reduced or No Motor Torque with SCR Control

Symptom	Probable Cause
4a. Hydraulic pump will not operate when any hydraulic hand lever is moved from neutral position. No control voltage from positive to negative.	• Check power and control fuses. • Check battery for low specific gravity and connections for looseness or broken fittings.
4b. Hydraulic pump will not operate. Control volts present from positive to negative with proper polarity.	• Plug in the battery with the key switch OFF. Voltage on TB4 should be less than 4 volts. • Close key switch and check volts at T2; voltage should be about 50% battery volts. If above 85% of battery volts, check for shorted 1A tips or shorted 1 REC.

MidWestTech | Caterpillar EV100ZX SCR Forklift Motor Controller Service Manual | Publica... Order the manual at mid-west-tech.com >

Commutator Surfaces



UNSATISFACTORY CONDITION

EXAMPLE OF POOR COMMUTATOR MACHINING

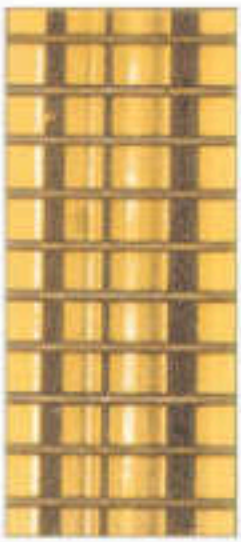
Bars are low in the middle giving rise to the brushes riding on entry and leaving bar edges. This and the previous illustration indicate the need for better maintenance.



UNSATISFACTORY CONDITION

BRUSH CONTACT MARK

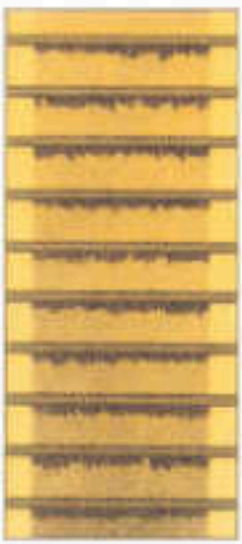
Storage of machines, for lengthy periods, with brushes in position. This can also result from operation of machine in prolonged stall conditions.



UNSATISFACTORY CONDITION

STREAKY FILM WITH COMMUTATOR WEAR

This is a further development of the third example, previous page. Brush grade, machine applications and working environment all suspect. Earlier corrective action should have been taken.



UNSATISFACTORY CONDITION

BAR EDGE BURNING CAUSE HIGH MICA

Illustration shows high mica in every slot. Same effect can occur on one bar only. Similar conditions can be caused by a high or low bar.



UNSATISFACTORY CONDITION

DOUBLE POLE PITCH

Darkening of commutator in sequences two pole pitches apart is due to armature fault, defective coil, riser bars or equalizer connections.



UNSATISFACTORY CONDITION

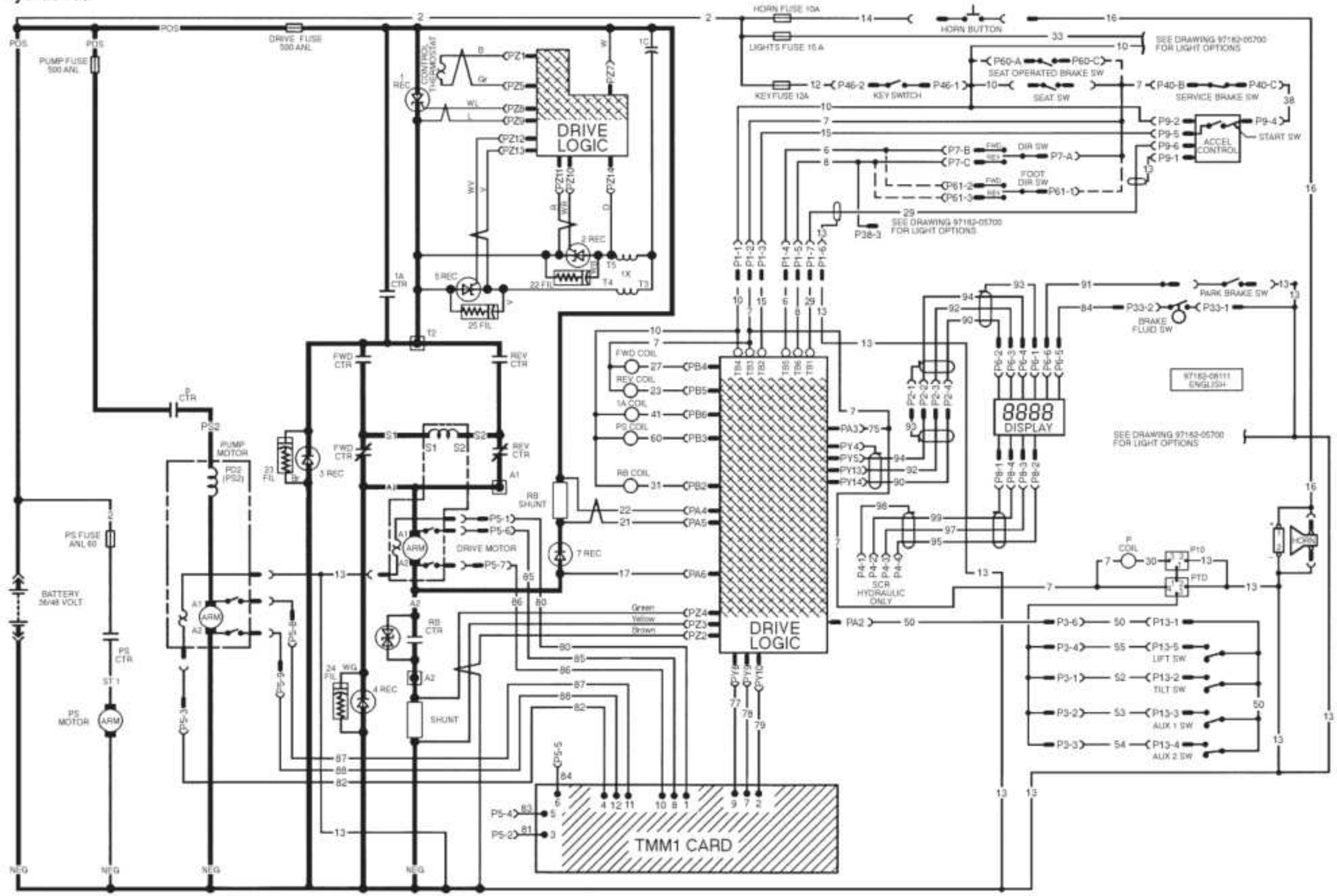
SMALL BRIGHT SPOTS

Related to over-loaded machines and low brush pressure. Due to sparking under brush which gives rise to spots being of a random distribution. If not corrected, will result in scored commutator.

MidWestTech | Caterpillar EV100ZX SCR Forklift Motor Controller Service Manual | Publica... Order the manual at mid-west-tech.com >

EV100ZX SCR Control Wiring Schematic

Without SCR Hydraulics



MidWestTech | Caterpillar EV100ZX SCR Forklift Motor Controller Service Manual | Publication SENB8606-01

Order the manual at mid-west-tech.com >