

ET204

Troubleshooting the EV T5 Control

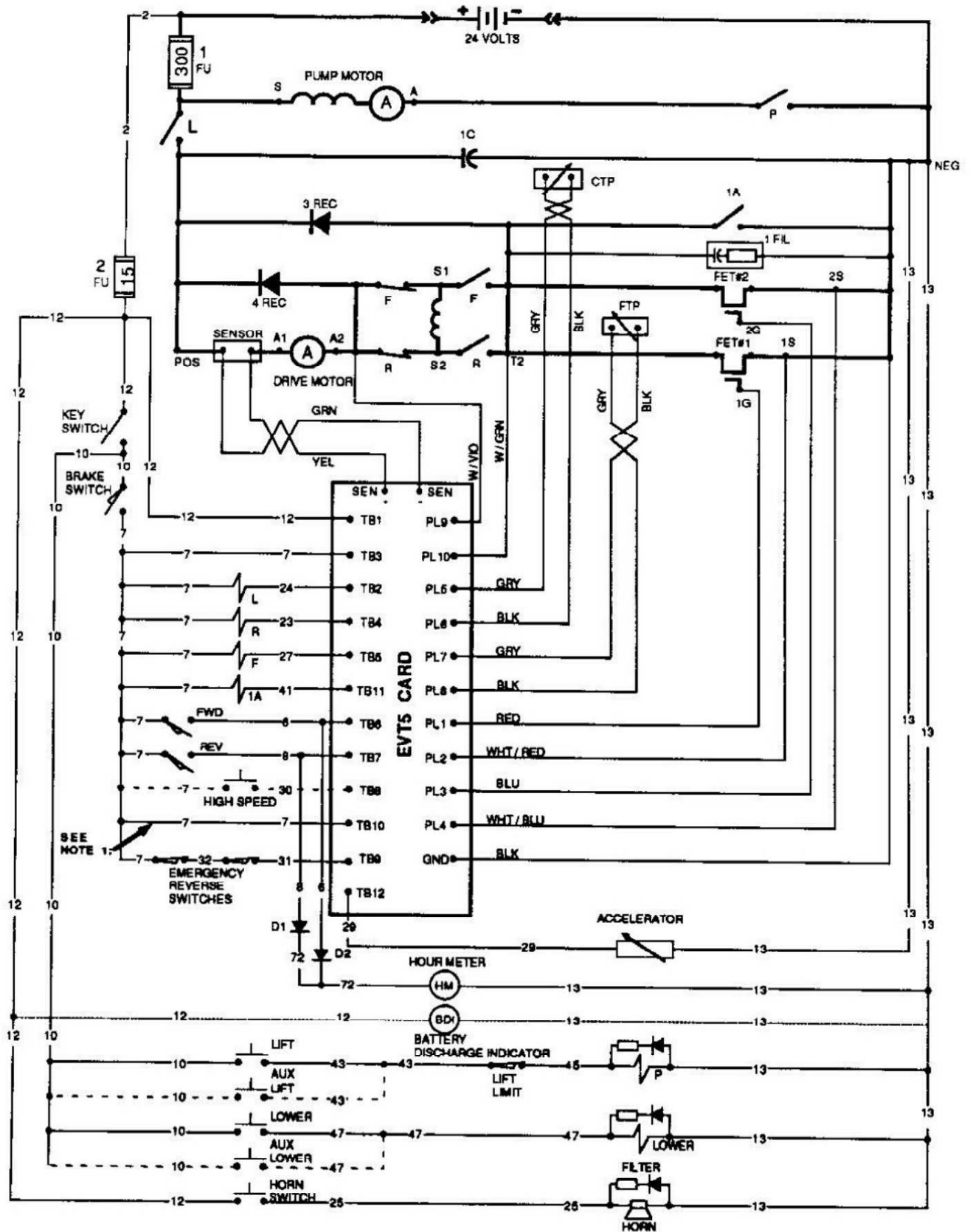


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NOTE 1: Wire #7A should be connected to terminal TB10 of the EV5 control only on a P truck.

NOTE 2: Solid lines - Standard P Truck
Dash lines - Add on for HWP Truck
Phantom lines - Options

(R 42002 C)

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Sequence 3. Close the Key Switch

- A. Closing the Key Switch will supply battery positive to the lift and lower switches through the #10 wires.
- B. Closing the lift or auxiliary lift switch (on grab bar) will apply battery positive to the pump contactor solenoid coil through the #43 wire, the lift limit switch and wire #45.
- C. The pump solenoid coil will be energized, closing the pump contact tips.
- D. Current will now flow from the battery through the 1FU fuse, the pump motor, the closed contact tips, to battery negative. This causes the pump motor to operate resulting in the raising of the forks.
- E. If the forks are raised to a predetermined height, the lift limit switch is activated (opened). This will deactivate the pump solenoid, which will in turn shut off the pump motor.
- F. Closing of the lower or auxiliary lower switch will apply battery positive to the lower solenoid coil through the #47 wires. This energizes the lower solenoid, opening a hydraulic valve to release the hydraulic pressure, thus, lowering the forks.

Voltages Present:

- A. Battery positive on all #10 wires.
- B. Battery positive on all #43 wires.
- C. Battery voltage across the pump solenoid.
- D. Battery positive at 'S' terminal, battery negative at 'A' terminal.
- F. Battery positive on all #47 wires.

Sequence 4. Energizing The Line Contactor

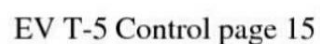
A. Before the brake switch is closed, the control checks for 0 volts at terminal TB3 on the card. If voltage is present, the system is shut 'OFF'. To restart, the brake switch must be cycled.

B. Pulling the steer control handle down to the operating position will close the brake switch. This will apply battery positive to the card at terminal TB3, all contactor coils, the directional switches, the emergency reverse switches, terminal TB9, and the high speed switch on the rider trucks or to terminal TB10 on the walkie trucks.

C. If the 1C capacitors are fully charged, the control will complete the circuit from wire #24 to battery negative. This will energize the line contactor coil in turn closing the line contactor power tips.

Voltages Present

- A. TB# 3 must be 0 Volts before the brake switch is closed.
- B. Battery positive on all #7 wires and at terminal TB3.
- C. Battery voltage across Line Contactor coil.



Sequence 5 Energizing the Directional Contactors

A. Rotating the directional/speed control handle forward will close the forward switch. With the forward switch closed, battery positive is applied to terminal TB6 at the card.

B. The control will now make the following safety checks:

- 1) T2 voltage is between 6-20 volts. This checks for shorted forward, reverse or 1A contactor drivers, shorted #3 REC or power MOSFETs, or welded forward, reverse or 1A contact tips.
- 2) Check for open high speed switch. Should be 0 volts at card terminal TB8 (Control will ignore TB8 if TB10 is at battery volts).
- 3) Checks for closed emergency reverse switches. Card terminal TB9 must be battery positive when the brake switch is closed or the vehicle will not start.
- 4) Checks for open F & R switch inputs, TB6 and TB7 at 0 volts.
- 5) Checks the accelerator input volts at terminal TB12. Must be greater than 2.5 volts.

C. If the above safety checks are satisfied and when the control senses battery positive at TB6, and 0 volts at terminal TB7, it will complete the circuit from the forward contactor coil to battery negative through wire #27.

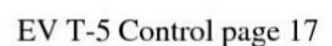
D. This will energize the forward contactor coil and in turn, open the normally closed contactor tips and close the normally open tips.

E. Current also flows to the hour meter (HM) from wire #6 (or #8 in Rev), through the D1 or D2 Diodes, #72 wire and to battery negative through wire #13.

NOTE: If battery voltage is applied to both terminals TB6 and TB7 at the sametime, the control will be shut OFF.

Voltages Present:

- A. Battery positive at terminal TB6.
- B. 50% Battery positive at T2.
- C. Battery negative at terminal TB5 and battery voltage across the forward coil.
- D. Battery voltage across the hour meter.



Sequence 6. Turning 'ON' the MOSFETs

- A. The control senses that the forward contactor has closed when it senses that T2 voltage is at battery positive through the white and green wire at PL10.
- B. A signal from the accelerator at terminal TB12 starts the time delay which controls the oscillator in the card.
- C. The control applies a gate voltage at terminals PL1 and PL3, through the red and blue wires, to the gates of the MOSFETs, turning the MOSFETs 'ON'. This will complete the drive motor circuit to battery negative.
- D. Current now flows from the battery, through the 1FU fuse, the Line contactor, sensor, drive motor armature and field windings, the closed directional contactor tips and through the MOSFETs to battery negative.
- E. Current will also flow from the Capacitors through the same drive motor circuit to battery negative. The amount of current flowing out of the capacitors will depend on the percent ON-TIME of the control.
- F. The interaction of magnetic energy between the motor fields and the armature causes the armature to rotate.

Voltages Present:

- A. Battery positive at terminal PL10 (T2).
- B. Less than 3.5 volts at terminal TB12.
- C. Not measurable.
- D. Battery positive.
- E. N/A
- F. N/A