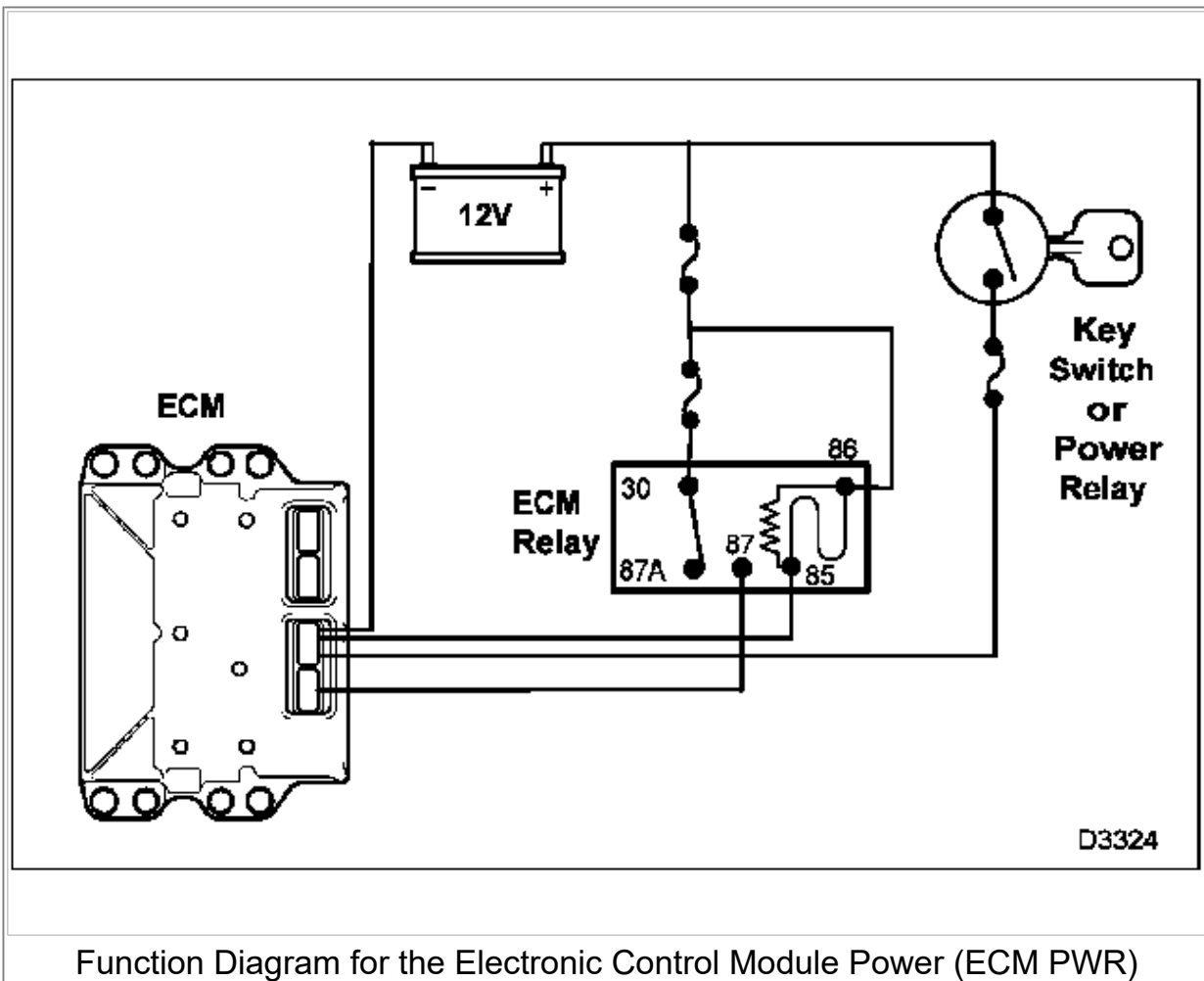


Electronic Control Module Power (ECM PWR)



Function Diagram for the Electronic Control Module Power (ECM PWR)

The Function Diagram for ECM PWR includes the following:

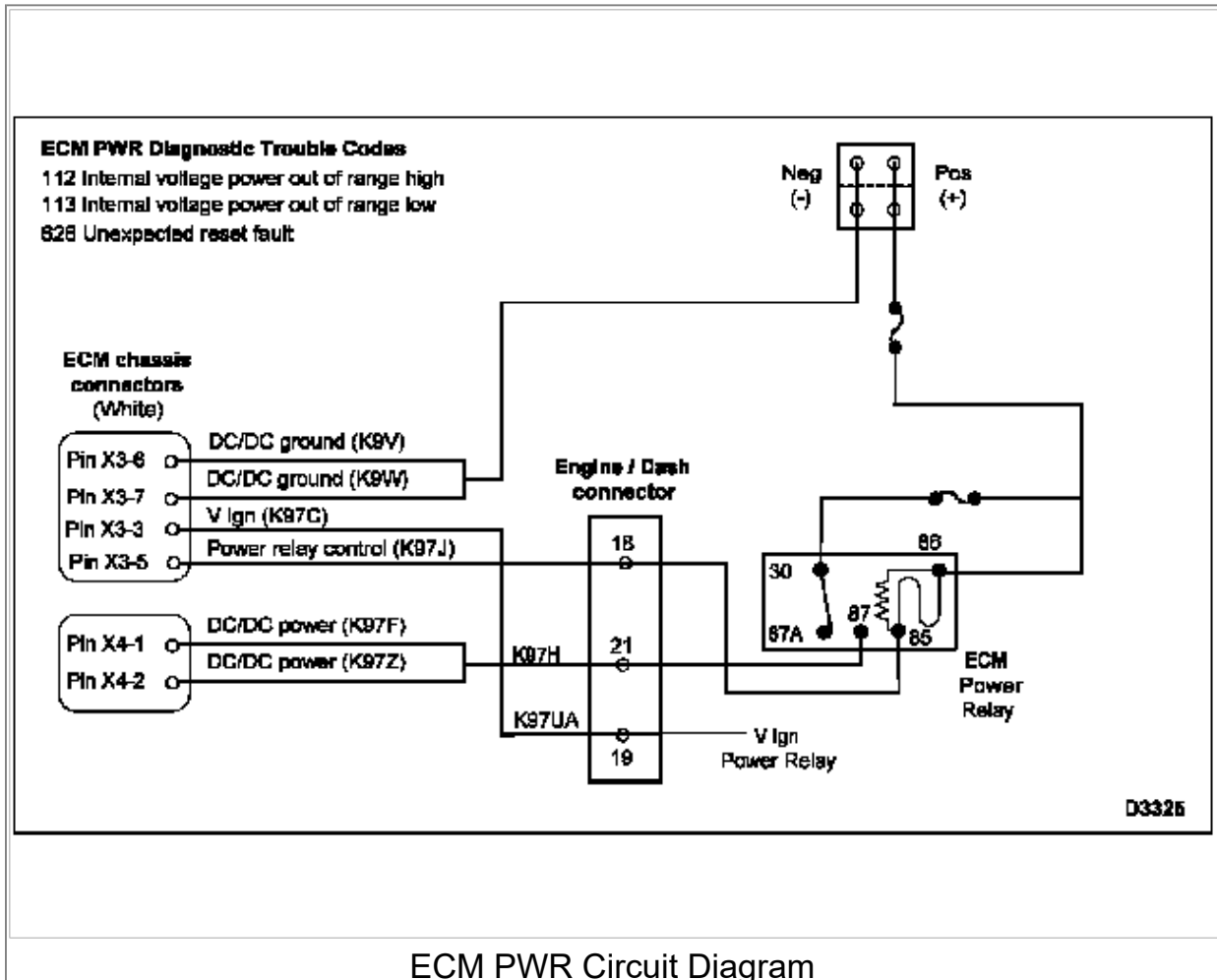
- Electronic Control Module (ECM)
- Battery
- Electronic Control Module relay
- Ignition switch or power relay
- Fuses

Function

The Electronic Control Module (ECM) requires a 12V power source to function correctly. The operating power is received directly from the vehicle batteries through the ECM relay contacts each time the ignition key switch is turned ON.

Turning the ignition key switch ON causes the ECM to provide an internal ground to the coil side of the ECM relay. This causes the relay to close its contacts and provide the ECM with the power necessary to perform its various functions.

ECM PWR Circuit Operation



The ECM is grounded directly to the battery negative terminal through ECM terminals X3-6 and X3-7.

The ECM receives V_{IGN} power at terminal X3-3. The power signals the ECM to provide a ground path to switch the ECM power relay from terminal X3-5 to 85. Switching the ECM relay provides power directly from the battery positive terminal through 2 fuses and relay contacts 30 and 87 to terminals X4-1 and X4-2. See truck Chassis Electrical Circuit Diagram manual for circuit numbers, connector and fuse locations.

Fault Detection / Management

The ECM internally monitors battery voltage. When the ECM continuously receives less than 7V or more than 23V a Diagnostic Trouble Code (DTC) will be set.

ECM PWR Diagnostic Trouble Codes (DTCs)

DTCs are read using the Electronic Service Tool (EST) or by counting the flashes from the amber and red ENGINE lamp.

DTC 112

Internal voltage power out of range high

- DTC 112 is set when the ECM detects an alternator output greater than 23V at pin X3-3 for more than 0.5 sec.
- DTC 112 can be set when jump starting the engine and additional voltage is introduced. Incorrect external battery connections can cause the voltage increase.
- If the condition causing DTC 112 is intermittent, the code will change from active to inactive status. DTC 112 will not cause the amber ENGINE lamp to turn on.

DTC 113**Internal voltage power out of range low**

- DTC 113 is set when the ECM detects less than 7.0V at pin X3-3 for more than 0.5 sec.
- DTC 113 can be set by a defective alternator or ECM power relay, discharged batteries, or increased resistance in the battery feed circuits.
- If the condition causing DTC 113 is intermittent, the code will change from active to inactive status. DTC 113 will not cause the amber ENGINE lamp to turn on.

NOTE: The ECM monitors voltage on $V_{REF A}$ and will adjust signal values for the sensors that use $V_{REF A}$ for operation. If a sensor or circuit pulls V_{REF} lower than 5V, the ECM may set out of range high DTCs for the sensors that operate on $V_{REF B}$ (APS, BAP, B+, and VSS).

DTC 626**Unexpected reset fault**

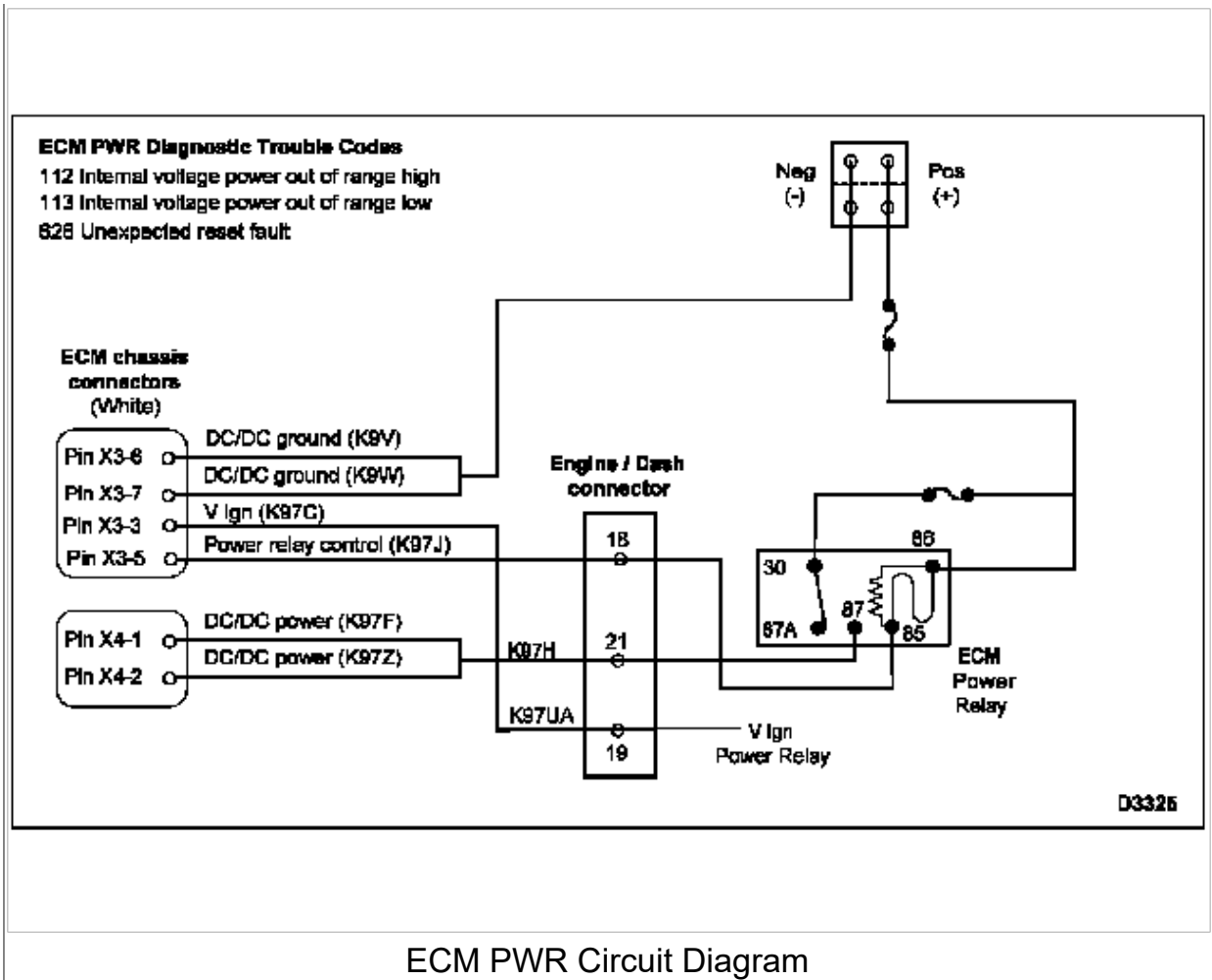
- DTC 626 is set when power is interrupted to the ECM. Loose or dirty connections at battery or ground cables can cause the ECM to power down.
- After circuit becomes intact, the ECM will reboot. Erratic engine performance can occur. Turning engine ignition key OFF and then ON will cause the code to change from active to inactive status.
- When DTC 626 is active, monitor the voltage at ECM pins X4-1 and X4-2. Examine for intermittent connections in the power feed wiring. The EST can be used to indicate DTCs and display the V_{IGN} voltage measured by the ECM to pin X3-3.
- DTC 626 will not turn the amber ENGINE lamp on.

When DTC 112 or 113 is active, see truck Chassis Electrical Circuit Diagram manual for circuit numbers, connector and fuse locations.

Tools

- Electronic Service Tool (EST) with Master Diagnostics software
- International® EZ-Tech Interface Cable
- Digital Multimeter (DMM)
- Relay Breakout harness
- Breakout box
- Terminal Test Adapter Kit

ECM PWR Pin Point Diagnostics



The ECM PWR circuit requires the use of vehicle circuit diagrams. See truck Chassis Electrical Circuit Diagram manual for circuit numbers, connector and fuse locations.

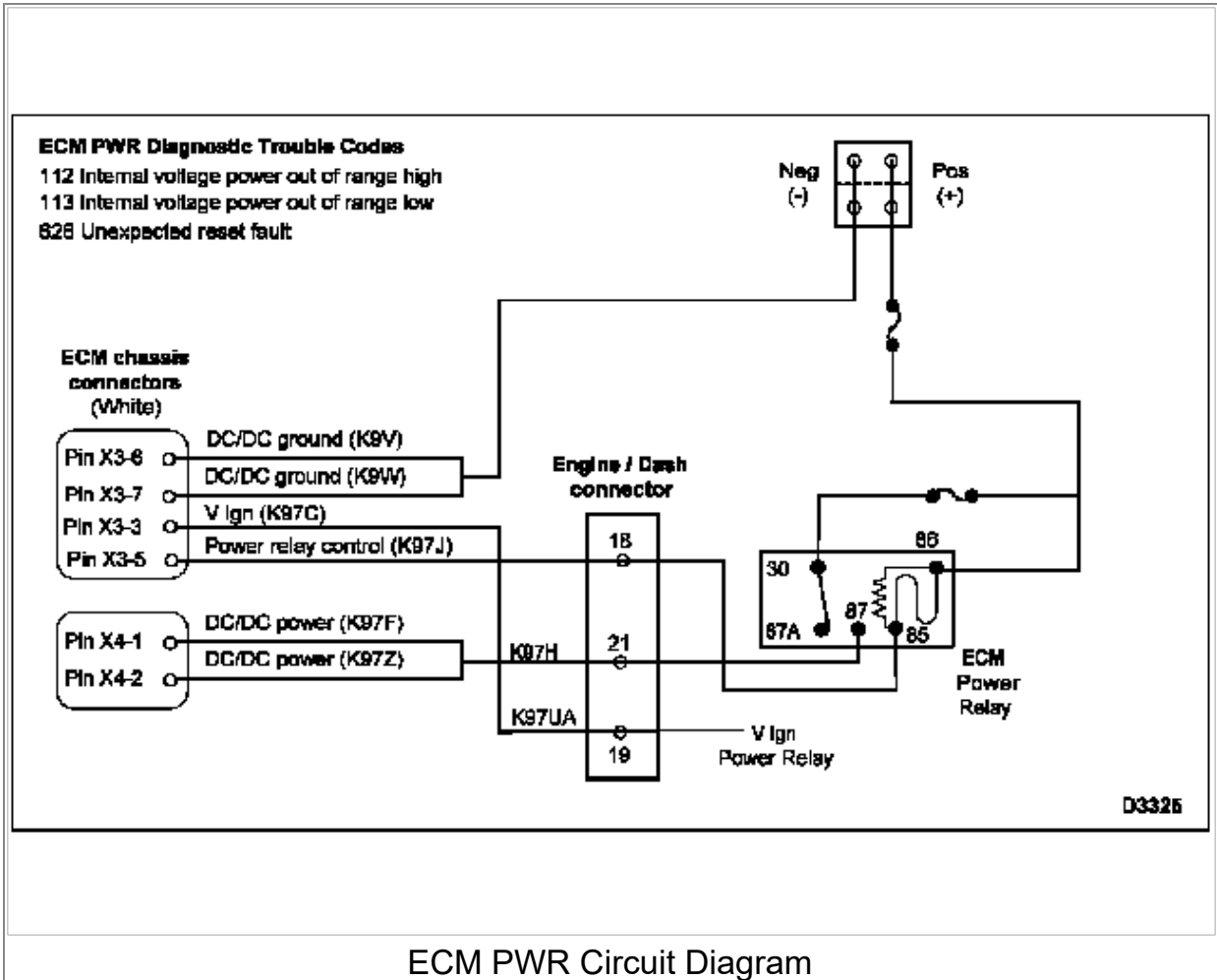
CAUTION:

To avoid damage to engine, before unplugging IDM connectors and relay, turn ignition key OFF. Failure to turn ignition key OFF will create a voltage spike and damage electrical components.

Key ON Engine OFF - Voltage Checks at ECM Power Relay Socket (Follow tests in order. Check with ECM relay and breakout harness installed, ignition Key ON Engine OFF. Inspect for bent pins or corrosion.)

Test Point	Spec	Comments
86 to gnd	12V ±1.5	Continuous voltage. If no voltage, check power circuits from batteries through fuse. If fuse is blown, check for short to ground. If fuse is good, check for open between PIN 30 and B+. See truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.
30 to	12V ±	Continuous voltage. If no voltage, check fuses. If fuse is blown, check

gnd	1.5	for short to ground. If fuse is good, check for open between PIN 30 and B+. See truck Chassis Electrical Circuit Diagram manual for fuse and relay locations.
85 to gnd	0.06 to 2V	If >2V is present, check for open circuit between PIN X3-5 to PIN 85 on relay or V _{IGN} circuit. See truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.
87 to gnd	12V ±1.5	Continuous voltage. If no voltage, replace relay.



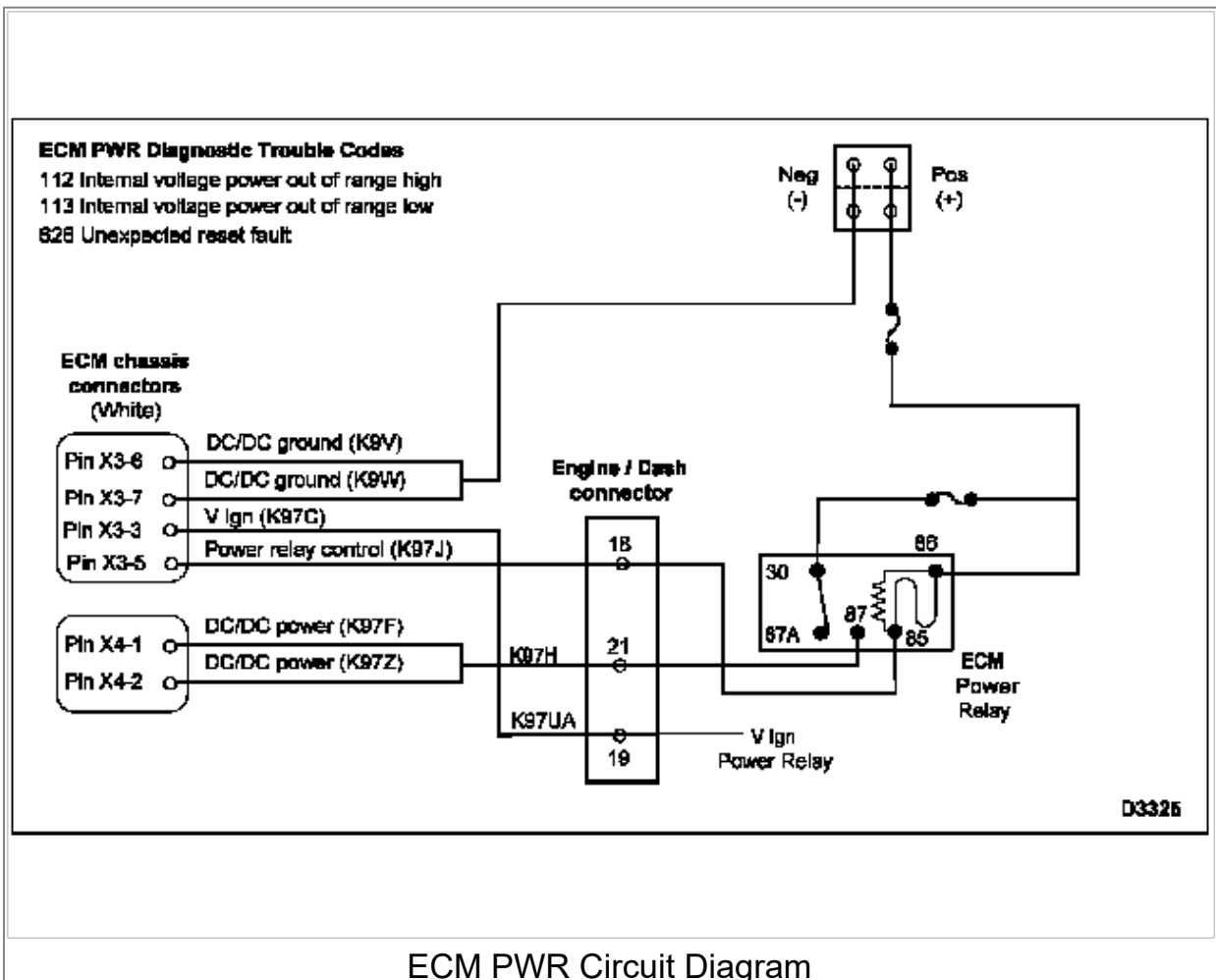
CAUTION:

To avoid damage to engine, before unplugging IDM connectors and relay, turn ignition key OFF. Failure to turn ignition key OFF will create a voltage spike and damage electrical components.

Key ON Engine OFF - Voltage Checks at ECM (Follow tests in order. Check with

breakout box installed between chassis harness and ECM. Inspect for bent pins and corrosion.)

Test Point	Spec	Comments
X3-3 to gnd	12V ±1.5	Power from ignition switch to ECM. If no voltage, see truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.
X3-6 to gnd	0V	Ground - voltage reading indicates poor ground to battery. If voltage is present check for open or high resistance between battery (-) and ECM pins.
X3-7 to gnd	0V	Ground - voltage reading indicates poor ground to battery. If voltage is present check for open or high resistance between battery (-) and ECM pins.
X3-5 to gnd	0.06-2V	ECM grounds relay through internal transistor. If >2V is present, replace ECM.
X4-1 to gnd	12V ±1.5	Power from relay to ECM. If no voltage, check for open between X4-1 and 87 on ECM relay. See truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.
X4-2 to gnd	12V ±1.5	Power from relay to ECM. If no voltage, check for open between X4-2 and 87 on ECM relay. See truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.



 **WARNING:**

To avoid serious personal injury, possible death, or damage to the engine or vehicle, always disconnect main negative battery cable first. Always connect the main negative battery cable last.

CAUTION:

To avoid damage to engine, before unplugging IDM connectors and relay, turn ignition key OFF. Failure to turn ignition key OFF will create a voltage spike and damage electrical components.

Harness Resistance Checks (Check with Key OFF. Disconnect negative battery cable. Inspect for bent pins or corrosion. Install relay breakout harness and breakout box to X3 and X4 chassis harness only.)

Test Point	Spec	Comments
X3-5 to 85 (ECM relay)	<5Ω	If >5Ω, check connections for open between ECM and relay. See truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.
X4-1 to 87 (ECM relay)	<5Ω	If >5Ω, check connections for open between ECM and relay. See truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.
X4-2 to 87 (ECM relay)	<5Ω	If >5Ω, check connections for open between ECM and relay. See truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.
30 (ECM relay) to B+ cable	<5Ω	If >5Ω, check connections for open between relay and positive battery cable. Check fuses. See truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.
86 (ECM relay) to B+ cable	<5Ω	If >5Ω, check connections for open between relay and positive battery cable. Check fuse. See truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.
X3-6 to neg bat cable	<5Ω	If >5Ω, check connections to battery ground. See truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.
X3-7 to neg bat cable	<5Ω	If >5Ω, check connections to battery ground. See truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.
X3-3 to V _{IGN} (power relay)	<5Ω	If >5Ω, check connections or open between ECM and V _{IGN} power relay. See truck Chassis Electrical Circuit Diagram manual for relay and fuse locations.

ECM PWR Diagnostic Trouble Code

DTC 112 = Internal voltage power out of range high >23V

DTC 113 = Internal voltage power out of range low <7V

DTC 626 = Unexpected reset fault



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