

Dual Range Electrical Troubleshooting Guide

(Automatic Transmission)

How the Dual Range Electronics Works

With the ignition on, when you push and release the shift control switch with your thumb, it sends a 12V signal to the control module through the blue wire. That signal activates the control module, which has been receiving 12V power from the battery. The signal from the shift control switch causes the control module to open the “gate” and send power to the electric motor of the Dual Range. That power is sent to the motor for 1.6 seconds and then the “gate” closes again. The power from the control module to the motor is sent through the brown or the white wire alternately. The control module sends power through one wire (brown or white) when the switch is depressed, and the next time the switch is depressed, the control module sends power through the other wire. The module alternates back and forth between brown and white because the Dual Range motor is unidirectional.

Power is continuously being sent to the control module through red wire to the battery. The shift control switch receives power from a red wire connected to a switched 12V source only when the ignition is ‘on’. The electric motor gets power only in 1.6 second bursts from the control module through the brown or white wire.

Note: The gray switches on the passenger side rear of the Dual Range are simply position switches which control the lights on the thumb control switch. They have nothing to do with shifting.

Components Used in Electrical System

Thumb control switch — mounted to transmission shift lever

Control module — black box 4x4x1½ mounted in the engine compartment on the driver’s side firewall or fenderwell (has white six position connector with wires as listed below).

15 amp circuit breaker — located between the control module and the battery

Dual Range electric shift motor — located in the Dual Range

Tools needed to troubleshoot electronics — 12 volt test lite

Control module (PN 59-80011) schematic:

1. Red to battery (12V +)
2. Green to good ground
3. Blue from shift switch on lever. (12V when shift control switch is pushed)
4. Brown to motor in Dual Range (right motor rotation)
5. White to motor in Dual Range (left motor rotation)

Automatic transmission shift control switch (PN 59-80007) schematic:

1. Red - power 12V controlled by ignition key
2. Blue - has 12V when button depressed (key on)
3. Black - provides ground for low light (when closed)
4. Orange - provides ground for high light (when closed)

Note: The following instructions are sequential. In other words, if there is a problem with a component early in the list, every component shown after that problem will fail. If you encounter a problem, you must remedy it before you continue troubleshooting. For troubleshooting purposes, you may shift the Dual Range while the vehicle is not moving.

1) With the key on, the shift control switch should have either high (green) or low (yellow) light lit. (If there is no light, check in-line fuse in the red wire from shift control switch to ignition source or possibly at the fuse box.)

2) At control module

1. Red - 12V + from battery

- a. if no power - check the wire and circuit breaker to battery
- b. if 12 volts - proceed

2. Green - is Ground. Be sure to grind paint or undercoating on metal, frame, firewall, etc. Use only bright, non-anodized (uncoated) screw.

3. Blue - Will have 12V when the shift control switch is depressed (hold button for a moment).

- a. if no 12V - verify power to thumb control switch; if there is 12V to the switch and no break in the blue wire, then you have a bad thumb control switch.
- b. if 12V - proceed

4. Brown - powers up motor in gear box (will cause motor to rotate a specific direction). Remember, the control modules alternates between the brown wire and the white wire when sending power to the motor. It is impossible to tell which wire will be hot when the thumb switch is depressed. So to check the brown wire, you may have to depress the thumb control switch twice before getting a light.

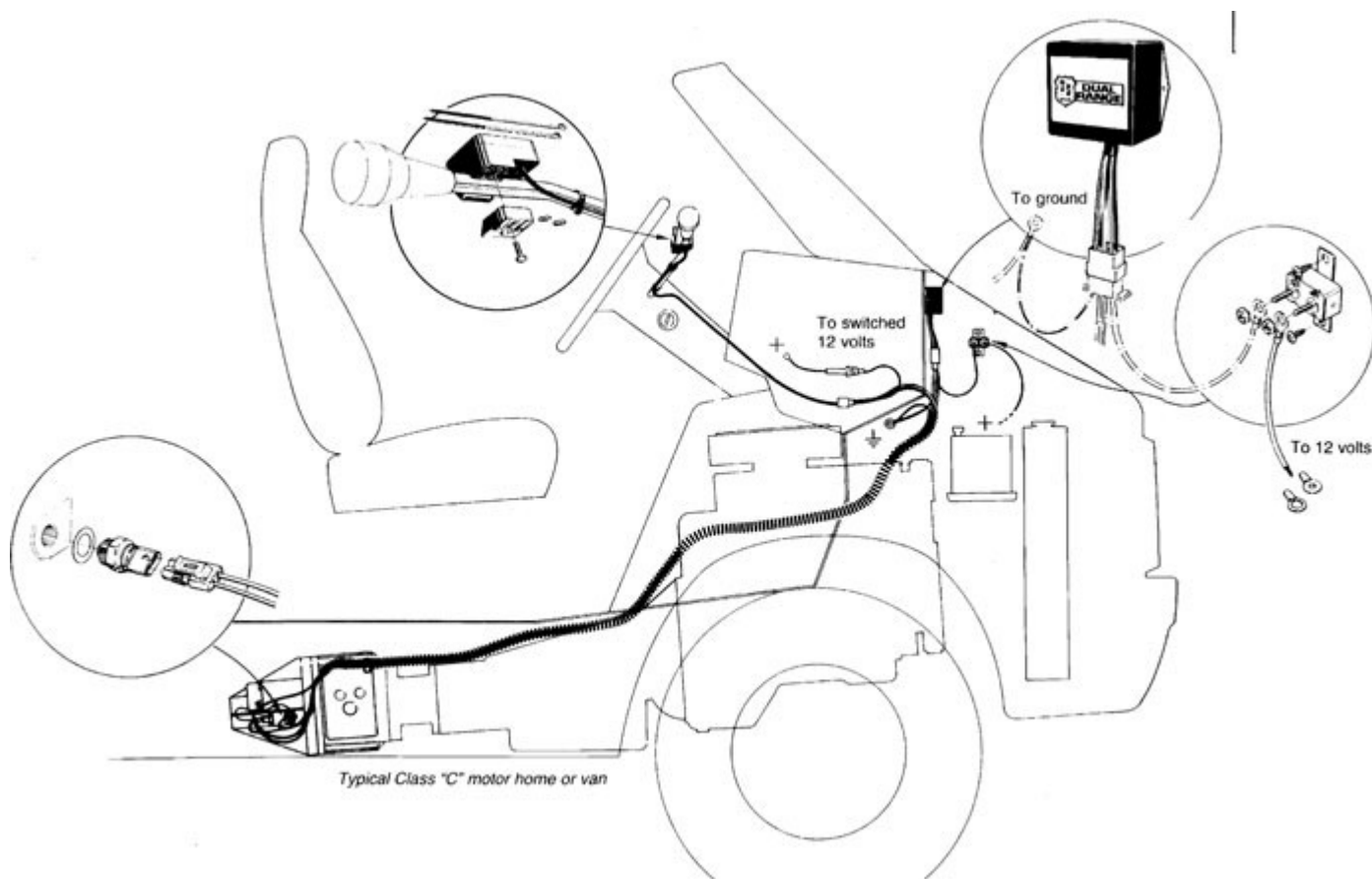
- a. brown wire should have 12V for 1.6 seconds. If no power, depress the switch again. Now the wire must have 12V power. If no 12V power after two consecutive pushes of the button, the module is bad.
- b. if 12V present, move to white wire

5. White - should power up 12V alternately with the brown wire each time

6. If there is no power at brown or white wires, then you have a bad module. If you have power on one wire or the other only, or not on any wire, then you have a bad module. You must have power on each wire alternating between the brown wire and the white wire.

7. Repeat steps 4 and 5 at the motor to confirm there is no pinch, melt, or other break in any of the wires.

- a. if there is power at the motor at the correct times, but there is no motor noise (running sound), then you have a bad motor connection
- b. if power at motor and motor sounds as if it is running, the electrical system appears to be functioning properly.
- c. if the Dual Range still will not shift properly, then you probably have a mechanical shift problem such as a worm screw, shift fork, etc.



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