

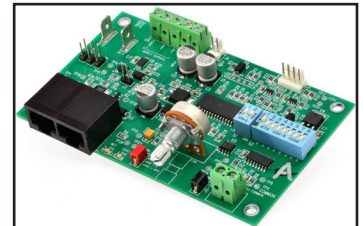
**TECHNICAL NOTES**

**WARNING:** These tests are to be performed by qualified personnel who are familiar with the machinery where the ENVIRCO electronically commutated (EC) motor controller and connected motor is installed. All mechanical, electrical, and other applicable safety practices must be observed when performing these tests. While the EC motor controls are low voltage devices, they are often installed in or near high voltage cabinets and wiring, and they are connected to electrically isolated connections on the EC motor. Wiring and device faults can occur. Always test for high voltage before starting these tests!

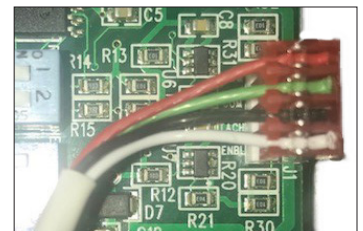
**■ High Voltage Fault Test**

Perform this test in addition to all tests and practices prescribed by the equipment manufacturer and your professional training.

1. Remove the electrical box cover located on top of the fan filter unit (FFU) to access the electrical components.
2. Provide power to the equipment to troubleshoot. The switch on the FFU at this point should be OFF.
3. Set the multimeter to measure expected AC voltage of the unit (120V, 208-240V, 277V).
4. Connect the **black** lead to the electrical earth.
5. Touch the **red** lead to the set screw for the **black** lead of the terminal block.
  - If meter reads a voltage outside of +/- 10% tolerance of expected value, power supply/source must be corrected.
6. The switch on the FFU can now be turned ON. Test the primary side of the transformer for expected AC voltage of the unit.
  - If 0 or low voltage is measured, disconnect power, and then check double-pole switch connection for any loose wires or possible damage. There is a potential wiring issue between terminal block and transformer (switch or choke).
7. Test secondary side of transformer for approximately 24VAC.
  - If 0 or low voltage is measured, disconnect power, and remove load from the transformer. Reconnect power and check voltage on secondary side of transformer.
8. Repair/replace faulty items to continue testing.



UCC typical component side



Motor control connection

You are now ready to test the EC motor control.





TECHNICAL NOTES

This procedure allows you to test an EC motor control while it is powered and connected to the motor.

**Note: ~10Vdc for UCC controls. VCU and IR controls should expect ~22Vdc.**

■ **Motor Interface**

EC motors use a 4-wire interface to the motor. Most equipment uses our standard color coding for these wires:

Pin 1	White		Motor ON/OFF	0 = OFF, ~10Vdc = ON
Pin 2	Black		Tachometer	
Pin 3	Green		Common	
Pin 4	Red		Speed	0 = Min. Speed, ~10Vdc = Max Speed

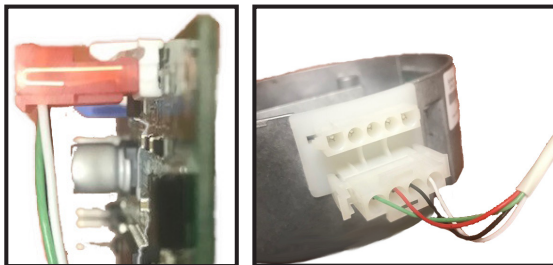
■ **Problem Solver**

ECM motor will not run.

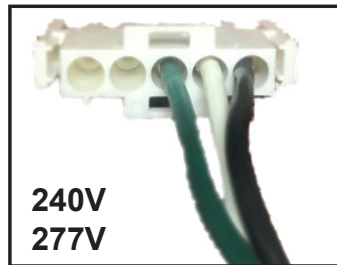
Motor runs, but the speed does not change.

Perform the Motor ON test.

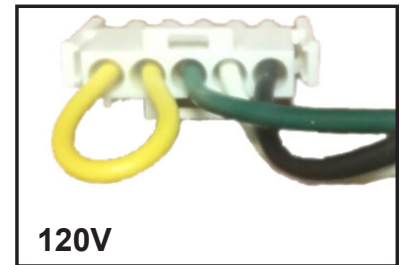
Perform the Variable Speed test.



Correct installation of communication cable



240V  
277V



120V

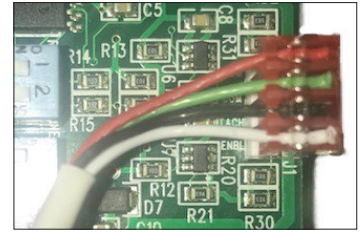
■ **A Fast Test...**

If the motor is running and you want to determine if the EC motor control is calling for the motor to run, just measure the DC voltage between the **Green** and **White** wires on the motor control cable. If this voltage is greater than 10Vdc, the motor should be running, especially if this voltage is measured at the connection to the motor. If there is an instance where the motor stops intermittently and restarts when power is removed and restored, then perform this test before removing power. It will tell you if the intermittent part is the EC motor series control!

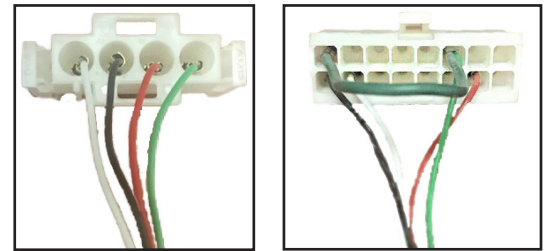
**TECHNICAL NOTES**
**Motor ON Test**

The FFU with EC motor control must be set to ON to perform this test.

Set the multimeter to read 24Vdc.



1. Touch the **black** lead to the common (**green**) wire on the 4-pin motor connector.
2. Touch the **red** lead to the Motor ON/OFF (**white**) wire on the 4-pin motor connector.
3. If the DC voltage is ~10Vdc (22Vdc), the motor should run.
4. If the motor does not run, the cable may be defective.
5. Go to the control connector on the motor.
6. Insert the **black** meter lead into the connector shell hole containing the single **green** wire.
7. Insert the **red** meter lead into the connector shell hole containing the **white** wire. The DC voltage should be 10Vdc (~22Vdc). If not, the control cable is defective. If the voltage is greater than 10Vdc and the motor does not run, contact the equipment manufacturer for further instructions.
8. Turn the FFU control to OFF. The motor should stop, and the voltage between the **green** and **black** wires should fall to less than 0.2Vdc.



4-pin Nidec and 16-pin Eon motor connectors

**Variable Speed Test**

The motor should be running to perform this test.

Set the multimeter to read 24Vdc.

1. Touch the **black** lead to the common (**green**) wire on the 4-pin motor connector.
2. Touch the **red** lead to the speed (**red**) wire on the 4-pin motor connector.
3. Set the EC motor controller to full speed.
4. The DC voltage should be equal to the voltage on the white wire - 10Vdc (~22Vdc). The motor should run at full speed.
5. If the motor does not run at full speed, the cable may be defective.
6. Go to the control connector on the motor.
  1. Insert the **black** meter lead into the connector shell hole containing the single **green** wire.
  2. Insert the **red** meter lead into the connector shell hole containing the **red** wire. The DC voltage should be equal to the voltage on the **white** wire - 10Vdc (~22Vdc). If not, the control cable is defective. If the voltage is ~10Vdc (~22Vdc) and the motor does not run at full speed, contact the equipment manufacturer for further instructions.