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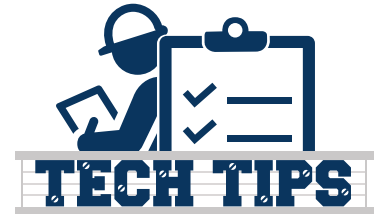


ECM TROUBLESHOOTING

Lately, we've been receiving a lot of calls about ECM troubleshooting. Here is a guide to help you resolve any issues.

Variable Speed or Constant CFM:

These motors are not new to the industry. In fact, they've been around for quite some time. This document focuses on ECM 2.3 and 3.0. ECM 2.3 has a 16-pin control wiring harness running from the board to the motor. ECM 3.0 is a communicating motor that consists of four control wires connecting the board to the motor. Both of these motors will have a high-voltage harness as well.



ECM 2.3 Troubleshooting

- What is the motor doing or not doing? For this motor to operate, make sure you have the voltage necessary to turn it on. Let's assume the motor is not responding to a fan call.
 - If the motor is not operational, make sure you have a "G" or "Fan" call. This will be a 24VAC reading between "G" and "B/C" or ground.
 - Also, confirm you have 120VAC to the motor itself. Without these voltages, the motor will not operate!
- If your motor has 120VAC high voltage and the 24VAC fan demand is on the IFC (furnace board) look further into the motor and board.
 - Inspect the 16-pin wire harness between the board and the motor. Is it in good shape? Confirm this by ohming each wire from one end to the other.
 - If you find a pinched wire, cuts or scrapes, or a loose pin in the molex, replace the harness.
- After confirming the necessary voltage and that the harness is in good shape, check the motor and module by performing a, "Go-no-Go test".
 - Take the molex plug for the motor harness off the IFC.
 - Secure some paper clips or small thermostat wire to make a jumper. If you have an ECM motor tester, skip this test and follow the procedures for your ECM tool.
 - Add a jumper between pins one and three. See image below.
 - Add a jumper between 12 and 15. See image below.
 - Apply 24VAC COMMON to the 1-3 jumper.
 - Apply 24VAC HOT to the 12-15 jumper.
 - Does the motor run? If so, the problem more than likely lies in the board.
 - If the motor does not run, you will need to investigate the motor and module.
- To inspect the module, remove the wire harnesses and blower housing to get access to the motor and module.

- Remove the screws holding the module to the motor.
- Remove the plug harness that internally connects the module to the motor.
 - Ohm the motor like a three-phase motor. These ohm values should be nearly identical but may have up to $\pm 10\%$ difference.
 - Red to blue
 - Red to black
 - Black to blue
 - If your ohm readings are outside $\pm 10\%$, then your motor is outside of spec.
 - Example: L1 to L2 = 10.4 ohms; L2 to L3 = 10.5 ohms; L3 to L1 = 14 ohms.
 - Now confirm there is continuity between the motor windings and the motor shell.
 - If your motor ohms properly, spins freely and does not have continuity to ground, then focus on the module itself.
- Does the module have a black, quarter-sized thermistor? If not, you're looking at a module replacement.

Notes:

- More than likely, the motor is not the issue. These motors rarely fail.
- A heating call does not need to see a "G" call from the thermostat. This is done internal to the IFC.
- Cooling calls need to provide a "G" and a "Y" call to the board for proper cooling speeds.
- The TecMate Pro ECM tester can test both ECM 2.3 and 3.0 ECM motors.

ECM 3.0 Troubleshooting - S9V2, TAM8, TAM9, UHM:

- Does the motor have 120VAC?
- Did we confirm there is a call for "fan" or "G"?
- Are you getting a blower communication fault?
 - We will cover this another day.
- We can still use the "Go-no-Go test" for these motors:
 - Remove the plug for the motor off the IFC.
 - Take small wire or paper clip and insert into pins three and four.
 - Apply 24VAC hot and common to pins three and four.
 - Does the motor work? Confirm harness and connections.
 - Most, if not all, ECM 3.0 motors with Trane and American Standard will be a one-piece motor. This means the module and motor are combined and replaced as one whole piece.

ECM 2.3 (16-pin) Jumpers

2. Unplug 16 wire low voltage harness from the motor control board. Jumper 24 V.A. C., to pins #12, #15 and common pins #1 and #3.

Does the motor run?

NO: Go to step #3.

YES: Replace the

motor control board

on Air handlers, or

Package units.

On Gas Furnaces, which

use a CNT02223 furnace

ignition control and a plug

on the motor control

board CNT01537, go

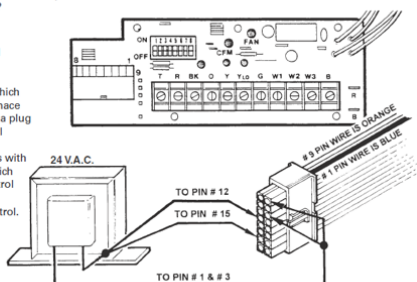
to step #5. Furnaces with

ignition controls which

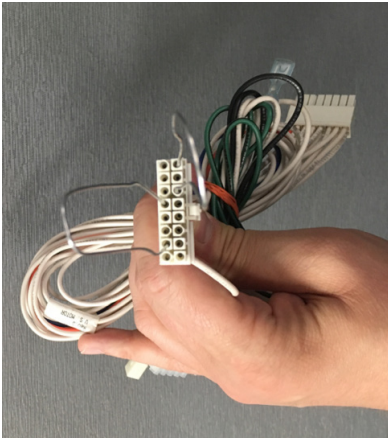
have the motor control

built in, replace the

furnace ignition control.



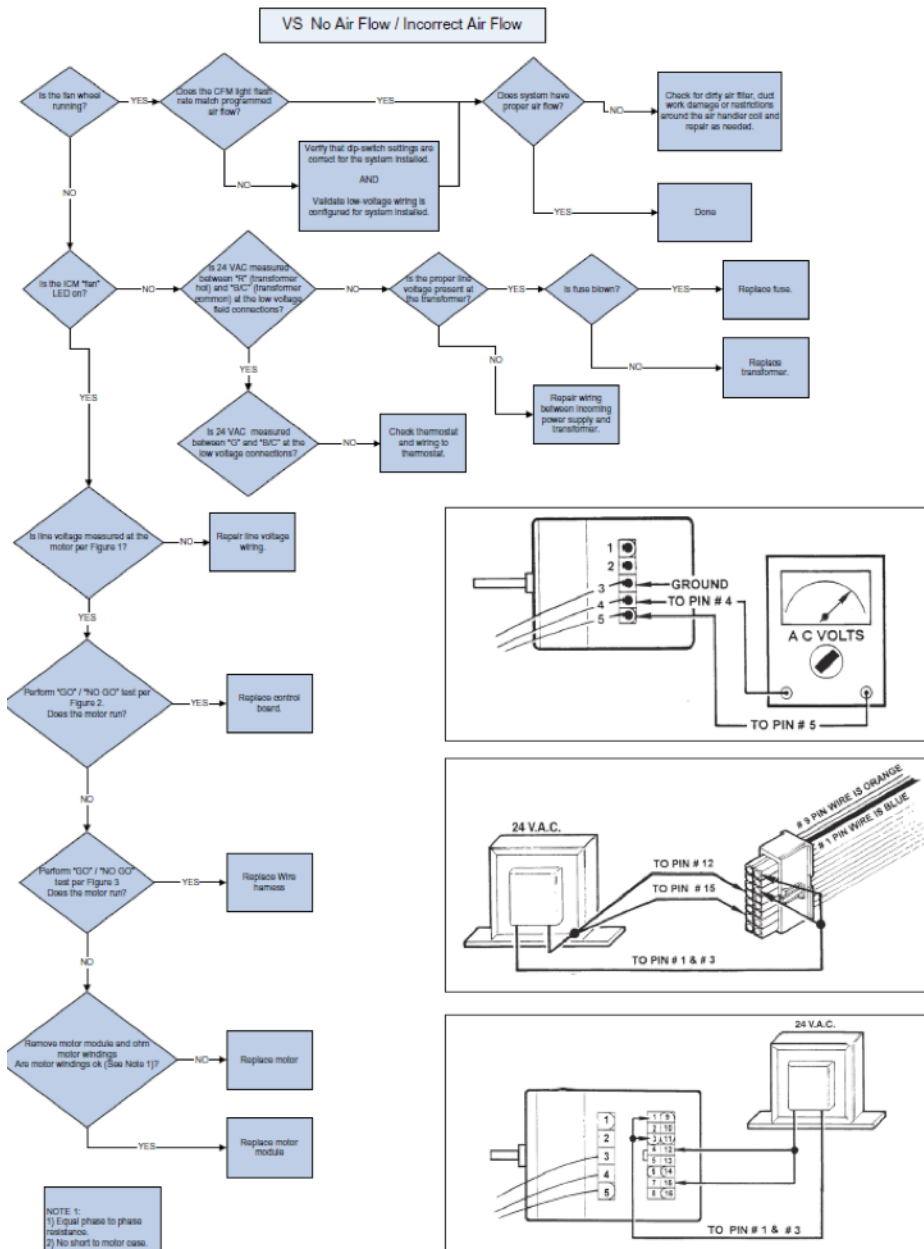
Paper clips in place for jumper test



Thermister in ECM 2.3 module



UH2 or UY furnaces - Two-Stage Variable Speed Legacy Furnaces



DEFINITION:
 This fault can be generated by many communication errors. The most likely is due to field mis-wiring of the low voltage control wires. (See Installer Guide for field wiring diagrams)

10 Flash Fault LED

Scroll through User Interface to View number 1 of Last 4 Faults

See next page for additional 10 flash faults

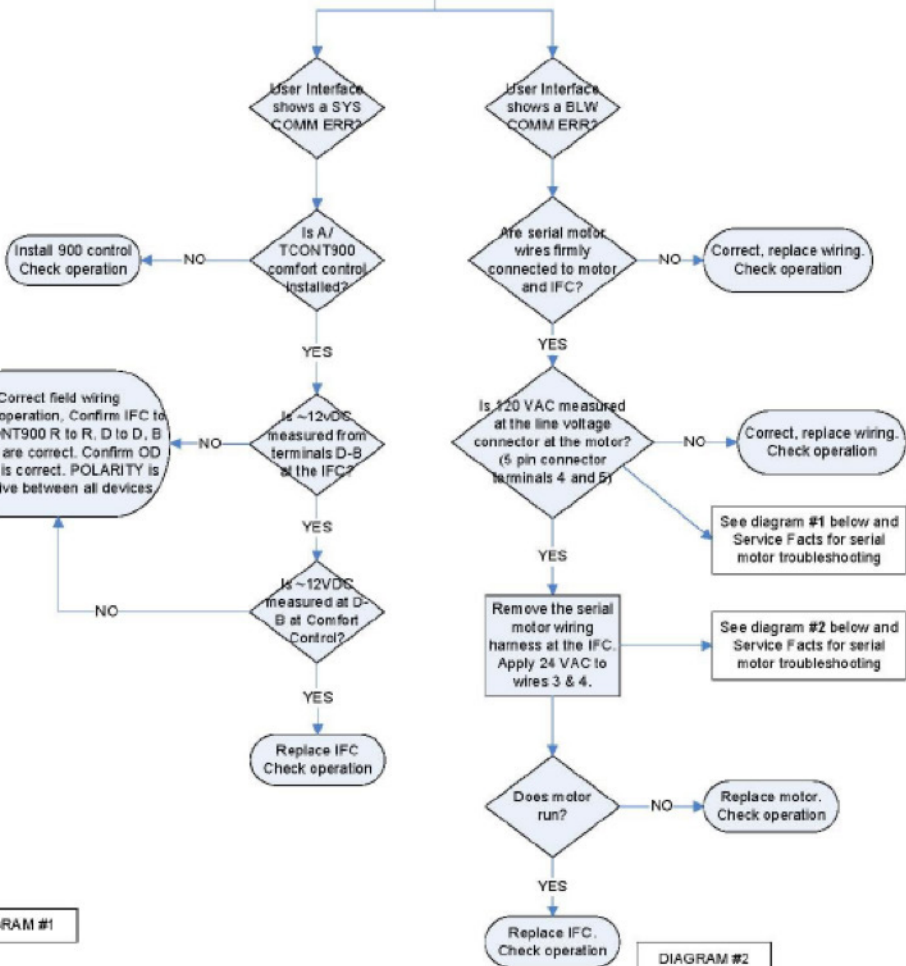


DIAGRAM #1

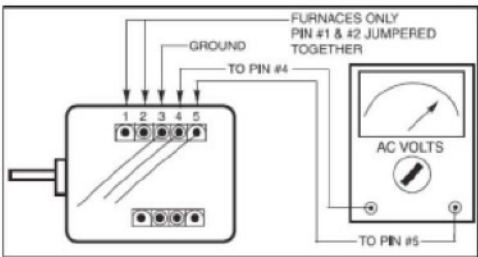


DIAGRAM #2

