



Technical Bulletin

TB-E0001

Date: July 29, 2003
Subject: ICM Variable Speed
Blower Motor Troubleshooting

Introduction:

The purpose of this Technical Service Bulletin is to assist in troubleshooting ICM Blower Motor Operation. The procedures discussed are only guidelines to help assist in troubleshooting. Any questions regarding ICM Motor Operation and Testing should be directed to your local Distributor/Field Technical Manager or the factory Technical Service Department at 1 800 299-9747 in Oklahoma City, OK.

Basic understanding of motor operation:

The motors we utilize are purchased as “non-programmed” ICM motors. ClimateMaster specifically “programs” the motor solid state control for each unit Series and unit size at the factory. **Be sure to refer to the IOM (Installation, Operation and Maintenance) manual for the specific unit your working on for proper airflow jumper setup on the ICM Interface Board.** Factory settings are noted in bold type. *Caution: The ICM Blower Motor High Voltage (230 Volts) input is connected to the L1 & L2 contactor input terminals and are energized any time the power is on. Never disconnect the 230-volt moxex plug from the motor with the power “On”.*

Danger: Electrical shock to the technician and/or damage to the motor and controls may result.

The Blower motor low voltage output Speed/CFM is controlled via the HP CFM and AUX CFM jumpers on the ICM Interface Board. Verify that the plastic insulated jumpers are truly across on the ICM Interface Board PINS as required for your model/unit. Should you find or make any changes to the board jumper/set up, the ICM Interface Board must be “re-energized” before it will recognize the change. Resetting the 230volt power to the unit easily does this. The ICM Interface Board low voltage output (24vDC) signals to the motor are dependent upon 24vAC inputs from the Room Thermostat. Be sure your room thermostat model is appropriate to use with the ICM Motor units (see the Accessories in the current Price List). The ICM Interface Board then sends a variation of 24vDC output “pulse” signals to the motor control head. Reading this accurately may not be possible in the field.

ICM Interface Inputs/Outputs:

The design of the ICM Interface Board provides easy troubleshooting by illuminating LED Light’s (24vAC input to the board) located on the ICM Interface Board from the Room thermostat outputs. Be sure to check for 24vAC to the ICM Board at the “R & C” terminals from the CXM control board.



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To energize “Fan On,” a “G” signal input to the ICM Board will be required. This can be visually confirmed by looking for the “G” LED Light on the ICM Board.

During a call for Heating the room thermostat will energize the “Y” input and “G” input on the ICM Board, illuminating the both the “Y” & “G” LED Lights, verifying a call for first (1st) stage Heat. If the Room thermostat is not satisfied and continues to fall in temperature, the second (2nd) stage of Heat input will energize the “Y2” input and “Y2” LED Light (for 2 stg units), or the “W1” input terminal and “W1” LED Light may be utilized for single stg units. When the room thermostat is in the **Emergency Heat mode**, the ICM Interface board will require both a “W1 & G” input to energize the auxiliary Heat Fan Speed/CFM output. For **single Cooling mode** the “O” input terminal and “O” LED Lights will be energized by the room thermostat as well as the “Y1 & “G” terminals and LED Lights. The “O” energizes the reversing valve to shift to cooling. If a **two stage Cooling mode** is desired, the “Y1, Y2 & G” terminals and LED Lights will be illuminated indicating 24vDC output to the low voltage motor harness.

The ICM Interface Board also has a Red LED Light located near the center of the board close to the 24vAC Thermostat input terminals. This light will “flash” the CFM output to indicate the blower CFM output. One (1) flash represents 100 CFM. Example: 12 Flashes = 1200 CFM blower output.

Use the TEST jumper located on the CFM ADJ terminals on the ICM Interface Board. Disconnect the compressor power (230 volt) set the CFM ADJ jumper to the TEST pins. It should be set on the NORM pins normally. Re-energize the unit power (230 volt) and apply a “G” input to the ICM Interface Board, the motor should ramp up.

Check the Low Voltage Harness Molex Plugs.

Disconnect the power to the unit for safety. Use of an ohmmeter to verify wire continuity and integrity in the harnesses between the ICM Interface Board and ICM Motor Low Voltage head at the motor. Be sure to check each wire to be sure they are “locked” in the Molex plug ends. Replace or repair as necessary. Important: verify that the harness is “grounded” to the motor housing as well. This is necessary to complete the 24vDC to ground electrical circuit to the ICM Motor Low Voltage control head.

Verify 230 volts to the ICM motor input at the blower. Caution; DO NOT DISCONNECT THE MOLEX PLUG, WHILE ENERGIZED, ELECTRICAL SHOCK DANGER.



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Diagnostic Summary:

If the 24vAC inputs from the room thermostats are present at the ICM Interface Board, the corresponding LED Lights will be illuminated. This dictates the 24vDC output signals to the ICM Low Voltage Harness. The terminals leading to the CXM control will be providing 24vAC to control the compressor CXM control board. The ICM Interface Board is merely a control devise for the ICM motor fan speeds and “passes the room thermostat 24vAC output” on to the CXM control. Check that all ICM Interface Board “HP CFM, AUX CFM” jumpers are in place. The “CFM ADJ” should be on “NORM” or the “TEST” pins for diagnostic checking only. The “DELAY” pins are not used, but must have the jumper installed for proper operation. The “DEHUM” pins must have the jumper installed and only change CFM output by decreasing (20% lower) the Cooling Mode CFM setting (from the NORM CFM setting) while in the Cooling Mode. Heating Mode does not affect DEHUM operations.

ICM MOTOR TROUBLESHOOTING

CAUTION:

Disconnect power from unit before removing or replacing connectors or servicing motor.

Wait at least five minutes after disconnecting power before opening motor.

SYMPTOM	CAUSE/PROCEDURE
Motor rocks slightly when starting	Normal startup for ICM motors
Motor won't start	
No movement	<p>Check high voltage at motor</p> <p>Check low voltage at motor (24VAC R to C)</p> <p>Check low voltage connections at motor (G, Y, W, R, C)</p> <p>Check for unseated pins in motor connectors</p> <p>Test with temporary jumper between R & G</p> <p>Check motor shaft for proper freedom of movement</p> <p>Perform moisture check</p>



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Motor rocks but won't start

Check for loose or compliant motor mount

Insure blower wheel is tight on shaft

Motor oscillates up and down while being tested off of blower

This is normal with no load on shaft

Motor starts but runs erratic

Check line voltage for variation or sag.

Check low voltage connections for loose or unseated pins.

Check BK for erratic CFM Command (variable speed applications only.)

Check system controls Ie: t-stat

Perform Moisture Check

Motor hunts or puffs at high speed

Does removing panel or filter reduce puffing?

Reduce restriction.
Reduce maximum CFM.

Runs on low CFM with call for cool or heat

Check low voltage connections and wires at motor and control board.

Verify motor is not in the delay mode. Wait for time delay to elapse.
R missing or not connected at motor.
Verify 24VAC from Y or W to C.

Motor stays at high CFM

R missing/not connected at motor.

24VAC present at Y or W.



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Blower runs continuously

Current leakage from thermostat or controller to G, Y, or W.

Check for Triac switched thermostat, controller, or solid state relay.

Excessive Noise

Determine type of noise. Air, cabinet, duct, or motor.

Air noise

Is high static pressure creating high blower speed?
Check for proper speed setting.
Check/replace air filter.
Use low pressure drop filter.
Check/repair duct connections.

Cabinet or blower noise

Is high static pressure creating creating high blower speed?
See above.

Check for loose blower parts, proper motor mounting, panels, flexible duct connectors, etc.

Evidence of moisture

Motor failure or malfunction has occurred and moisture is present

Replace motor and perform moisture check

Evidence of moisture inside Blower compartment

Perform moisture check