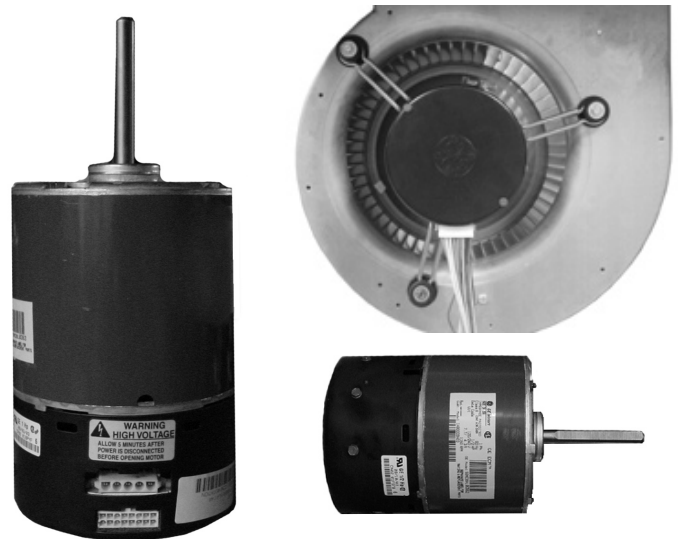




## Installation, Operation & Maintenance Instructions

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# ECM Blower Motor Replacement Controls Programming Process

SERIES:	BLOWER MOTOR
CLASS:	ALL
Hz:	60
UNIT OF MEASURE:	N/A
LANGUAGE:	ENGLISH
DOCUMENT PART #:	97B0004N03
REVISION DATE:	5/04

**Installed By:**

# Section 1:

## GE ECM 2.3

### Field Troubleshooting Procedures

*Troubleshooting GE ECM™ -Driven Systems:*

#### Caution:

Disconnect power unit before removing or replacing connectors, or servicing motor. Wait at least 5 minutes after disconnecting power before opening motor.

#### Symptom Cause/Procedure

- Motor rocks slightly when starting
  - This is normal start-up for ECM
- Motor won't start
  - *No movement* -
  - Check power at motor
  - Check low voltage (24 Vac R to C) at motor
  - Check low voltage connections (G, Y, W, R, C) at motor
  - Check for unseated pins in connectors on motor harness
  - Test with a temporary jumper between R - G
  - Check motor for tight shaft
  - Perform motor/control replacement check
  - Run Moisture Check
- Motor rocks, but won't start
  - Check for loose or compliant motor mount
  - Make sure blower wheel is tight on shaft
  - Perform motor/control replacement check
- Motor oscillates up and down
  - It is normal for motor to oscillate being tested off of blower with no load on shaft
- Motor starts, but runs erratically
  - *Varies up and down or intermittent* -
  - Check line voltage for variation or "sag"
  - Check low voltage connections (G, Y, W, R, C) at motor, unseated pins in motor harness connectors
  - Check "Bk" GE ICM2 for erratic CFM command (in variable speed applications)
  - Check-out system controls
  - T'stat?
  - Perform Moisture Check
  - *"Hunts" or "puffs" at high CFM (speed)* -
  - Does removing panel or filter reduce "puffing"?
  - Reduce restriction
  - Reduce max airflow
- Evidence of Moisture
  - Motor failure or malfunction has occurred -
  - Replace motor and perform Moisture Check
  - Evidence of moisture present inside air mover
  - Perform Moisture Check

#### Do:

- Check-out motor, controls, wiring, and connections thoroughly before replacing motor

#### Don't:

- Automatically assume the motor is bad

#### Do:

- Orient connectors down so water can't get in

#### Don't:

- Locate connectors above 7 and install drip loops 4 o'clock positions

#### Do:

- Use authorized motor and control model #'s

#### Don't:

- Replace one motor or control for replacement model # with another (unless an authorized replacement)

#### Do:

- Keep static pressure to a minimum

#### Don't

- Use high pressure drop filters

#### Do:

- Recommend high efficiency, low static some have 1/2" H<sub>2</sub>O drop!

#### Filters

##### Don't:

- Use restricted returns

##### Do:

- Recommend keeping filters clean
- Design duct work for min. static, max comfort
- Look for and recommend duct work improvement, where necessary, in replacement
- Size the equipment wisely

##### Don't:

- Oversize system, then compensate with low airflow

##### Do:

- Check orientation before inserting motor

##### Don't:

- Plug in power connector backwards

#### Connectors

##### Don't:

- Force plugs

#### Moisture Check

- Orientate connectors "down"
- Arrange harnesses with "drip loop" under motor
- Unplug condensate drain
- Check for low airflow (too much latent capacity)
- Check for undercharged condition
- Check and plug leaks in return ducts, cabinet

#### Comfort Check

- Check for proper airflow settings
- Obtain low static pressure for lowest noise
- Set low continuous-fan CFM
- Use humidistat and 2-speed cooling units
- Use zoning controls designed for the ECM that regulate CFM
- Check if the T'stat is in a bad location

## Section 2:

### GE ECM 2.3

#### Field Control Replacement Procedure

##### *Replacing ECM Control Module:*

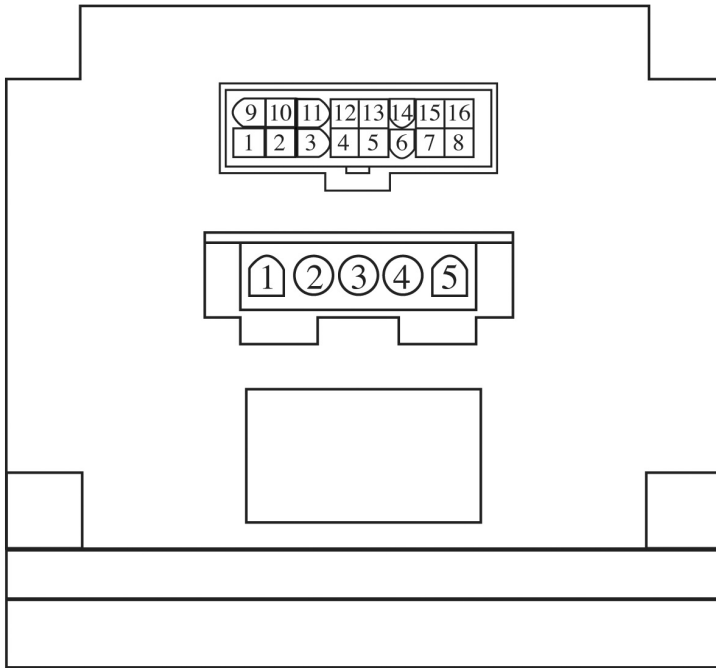
To replace the control module for the GE variable speed indoor blower motor, you need to take the following steps.

1. You **MUST** have the correct replacement module. The controls are factory programmed for specific operating modes. Even though they look alike, different modules may have completely different functionality.
2. Begin by removing AC power from the furnace or airhandler being serviced. **DO NOT WORK ON THE MOTOR WITH AC POWER APPLIED.** Wait at least 5 minutes after disconnecting AC power from the equipment before opening the motor.
3. It is usually not necessary to remove the motor from the blower assembly. However, it is recommended that the whole blower assembly, with the motor, be removed from the furnace/airhandler. (Follow the manufacturer's procedures). Unplug the two cable connectors to the motor. There are latches on each connector. **DO NOT PULL ON THE WIRES.** The plugs remove easily when properly released.
4. Locate the two standard 1/4" hex-head bolts at the rear of the control housing (at the back end of the control opposite the shaft end). Remove these two bolts from the motor and control assembly while holding the motor in a way that will prevent the motor or control from falling when the bolts are removed. If an ECM2.0 control is being replaced (recognized by an aluminum casting rather than a deep-drawn black steel can housing the electronics), remove the hex-head bolts. **DO NOT REMOVE THE TORX-HEAD SCREWS.**
5. The control module is now free of mechanical attachment to the motor endshield, but is still connected by a plug and three wires inside the control. Carefully rotate the control to gain access to the plug at the control end of the wires. With thumb and forefinger, reach the latch holding the plug to the control and release by squeezing the latch tab and the opposite side of the connector plug and gently pulling the plug out of the connector socket in the control. **DO NOT PULL ON THE WIRES. GRIP THE PLUG ONLY.**
6. The control module is now completely detached from the motor. Verify with a standard ohmmeter that the resistance from each motor lead (in the motor plug just removed) to the motor shell is >100K ohms. (Measure to unpainted motor endshield). If any motor lead fails this test, do not proceed to install the control module. **THE MOTOR IS DEFECTIVE AND MUST BE REPLACED.** Installing the new control module will cause it to fail also.
7. Verify that the replacement control is correct for your application. Refer to the manufacturer's authorized replacement list. **USING THE WRONG CONTROL WILL RESULT IN IMPROPER OR NO BLOWER OPERATION.** Orient the control module so that the 3-wire motor plug can be inserted into the socket in the control. Carefully insert the plug and press it into the socket until it latches. **A SLIGHT CLICK WILL BE HEARD WHEN PROPERLY INSERTED.** Finish installing the replacement control per one of the three paragraphs, 8a, 8b, or 8c.
- 8a. IF REPLACING AN ECM2.0 *CONTROL (control in cast aluminum can with air vents on the back of the can)* WITH AN ECM2.3 CONTROL (*control containing black potting for water protection in black deep-drawn steel case with no vents in the bottom of the can*), locate the two through-bolts and plastic tab that are packed with the replacement control. Insert the plastic into the slot at the perimeter of the open end of the can so that the pin is located on the inside of the perimeter of the can. Rotate the can so that the tab inserts into the tab locator in the endshield of the motor. Using the two through-bolts provided with the replacement control, reattach the can to the motor. **THE TWO THROUGH-BOLTS PROVIDED WITH THE REPLACEMENT ECM2.3 CONTROL ARE SHORTER THAN THE BOLTS ORIGINALLY REMOVED FROM THE ECM2.0 CONTROL AND MUST BE USED IF SECURE ATTACHMENT OF THE CONTROL TO THE MOTOR IS TO BE ACHIEVED. DO NOT OVERTIGHTEN THE BOLTS.**
- 8b. IF REPLACING AN ECM2.3 CONTROL WITH AN ECM2.3 CONTROL, the plastic tab and shorter through-bolts are not needed. The control can be oriented in two positions 180° apart. **MAKE SURE THE ORIENTATION YOU SELECT FOR REPLACING THE CONTROL ASSURES THE CONTROL'S CABLE CONNECTORS WILL BE LOCATED DOWNWARD IN THE APPLICATION SO THAT WATER CANNOT RUN DOWN THE CABLES AND INTO THE CONTROL.** Simply orient the new control to the motor's endshield, insert bolts, and tighten. **DO NOT OVERTIGHTEN THE BOLTS.**
- 8c. IF REPLACING AN ECM2.0 CONTROL WITH AN ECM2.0 CONTROL (*It is recommended that ECM2.3 controls be used for all replacements*), the new control must be attached to the motor using through-bolts identical to those removed with the original control. **DO NOT OVERTIGHTEN THE BOLTS.**
9. Reinstall the lower/motor assembly into the HVAC equipment. Follow the manufacturer's listed and suggested procedures.

10. Plug the 16-pin control plug into the motor. The plug is keyed. Make sure the connector is properly seated and latched
11. Plug the 5-pin power connector into the motor. Even though the plug is keyed, **OBSERVE THE PROPER ORIENTATION. DO NOT FORCE THE CONNECTOR.** It plugs very easily when properly oriented. **REVERSING THIS PLUG WILL CAUSE IMMEDIATE FAILURE OF THE CONTROL MODULE.**
12. Final installation check. Make sure the motor is installed as follows: Insert motor as far INTO the blower housing as possible. Make sure the belly band isn't covering vent holes or on the control module. Orient motor connectors between the 4 and 8 o'clock positions when the blower is positioned in its final location and orientation. Add a drip loop to the cables so that water cannot enter the motor by draining down the cables.

The installation is now complete. Reapply the AC power to the HVAC equipment and verify that the new motor control module is working properly. Follow the manufacturer's procedures for disposition of the old control module.

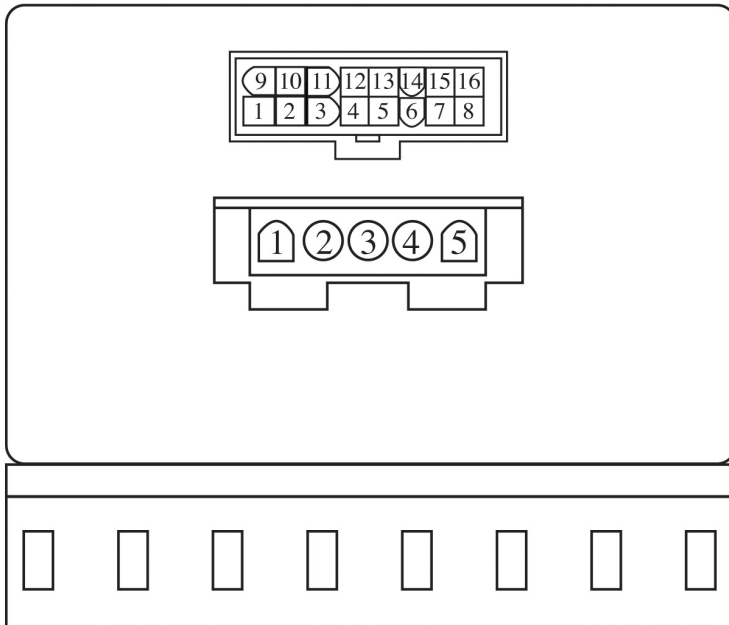
# ECM Connections Diagram



**ECM2**

Control Connector ***	
PWB Header	
AMP 770974-1	
PIN	Description
1	C1
2	W/W1
3	C2
4	Delay
5	Cool
6	Y1
7	Adjust
8	Out-
9	D
10	BK/PWM
11	Heat
12	R
13	EM/W2
14	Y/Y2
15	G
16	Out+

\*\*\* Suggested Mating Connector  
 Housing - AMP 770583-1  
 Contact - AMP 770904-1



**ECM2.3**

Power Connector *	
PWB Header	
AMP 1-350949-0	
PIN	Description
1	Jumper PIN 1 to Pin for 120VAC line input <i>ONLY</i> **
2	
3	Chassis Ground
4	AC Line
5	AC Line

\* Suggested Mating Connector  
 Housing - AMP 1-480763-1  
 Contact - AMP 350537-1







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