

INSTALLATION INSTRUCTIONS

ECM MOTOR SIMULATOR KIT

NAHA00101MS

NOTE: Read the entire instruction manual before starting the installation.

SAFETY CONSIDERATIONS



WARNING

FIRE, EXPLOSION, ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury, death and/or property damage.

The ability to properly perform maintenance on this equipment requires certain knowledge, mechanical skills, tools, and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment other than those procedures recommended in the Home Owner's Information Manual.

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes, the current editions of the National Fuel Gas Code (NFPA) NFPA 54/ANSI Z223.1 and the National Electrical Code (NEC) NFPA 70.

In Canada, refer to the current editions of the National Standards of Canada CAN/CSA-B149.1 and Canadian Electrical Code CSA C22.1.

Recognize safety information. This is the safety-alert symbol



. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words **DANGER**, **WARNING**, and **CAUTION**. These words are used with the safety-alert symbol. **DANGER** identifies the most serious hazards which **will** result in severe personal injury or death. **WARNING** signifies hazards which **could** result in personal injury or death. **CAUTION** is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. **NOTE** is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

INTRODUCTION

This instruction covers the use of the ECM motor simulator for the following variable speed gas-fired furnaces.

Table 1	Furnace Models	
(F/G)9MAC	(F/G)9MAE	(F/G)8MVL

NOTE: The ECM motor simulator can only be used with the furnace component self test function. In addition, an adapter harness is included for installations with ECM 3.0 motors and an inducer adapter harness is included for conversion to a 12-pin connector.

Use the procedure outlined below several times before relying on the condensed instructions printed on the ECM motor simulator labels. This procedure should be inserted into the main troubleshooting guide.

DESCRIPTION AND USAGE

The ECM motor simulator is designed to assist the service technician in troubleshooting the variable speed gas-fired furnaces. Use the procedure outlined below to troubleshoot with the ECM motor simulator.



WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in damage to this equipment, personal injury, or death.

Only trained and qualified personnel should install, repair or service this equipment.

QUICK MOTOR TEST PROCEDURE (WHEN USING ECM MOTOR SIMULATOR)

In an effort to provide a method of troubleshooting a variable speed inducer and/or variable speed blower motor by themselves, the following procedure may save time in the event any of the following status codes are the reason for the service call.

- Status codes 3, 1+5. 4+1. 4+2. on furnace control 1183506, 1183507, 1184327, 1184407, 1184836 and 1184837

If any other status code present, use the main troubleshooting guide (not included in this kit) to isolate the problem.

VARIABLE SPEED FURNACE CONTROL BOARDS
1183506, 1183507, 1184327, 1184407, 1184836 or 1184837

STEP	ACTION	YES	NO	GO TO
1	Turn power off, remove blower access panel, and disconnect Communication Connector (PL7), if used, or the R thermostat lead, if used.			2
2	Turn the power on and depress the door switch. Use a piece of tape to hold it closed.			3
3	Put setup switch SW1–6 for COMPONENT TEST in the ON position.			4
4	After the COMPONENT TEST is completed, does Status Code flash a heartbeat?	5	8	
5	Turn power off, put setup switch SW1–6 for COMPONENT TEST in the OFF position, and reconnect the Communication Connector, if used, or the R thermostat lead, if used, to the furnace control board.			6
6	Replace blower access panel and turn power on. Wait a few seconds then reset thermostat. Observe operation of the furnace through 1 heating cycle.			7
7	Go to the “START HERE” section in the main troubleshooting guide.			TS GUIDE
8	Does Status Code 4 + 2 flash? Note: If you get this status code on a furnace that does not have a variable speed inducer motor then the model plug is incorrect. Reference the model plug chart on the wiring schematic for the correct part number.	9	24	
9	Did inducer motor IDM turn on and come up to speed?	18	10	
10	Does the inducer wheel rub against the inducer housing?	16	11	
11	Does the inducer wheel turn freely?	12	20	
12	Disconnect PL11 from the inducer motor IDM and plug into the ECM motor simulator use inducer adapter harness for inducers without a 12–pin connector. Does the LED next to the inducer motor connector on the ECM motor simulator turn ON?	15	13	
13	Do you have 120 volts between PL2–4 and L2 on the furnace control board?	14	16	
14	You have an open wire or bad terminal on either the BLACK or WHITE wire between the furnace control board and inducer motor IDM. Repair it or replace main harness.			16
15	Are all pins and wire leads intact on the connectors between the furnace control board and the inducer motor IDM?	19	16	
16	Fix problem.			17
17	Go to the “CLEANUP AND START-UP INSTRUCTIONS” section in the main troubleshooting guide.			TS GUIDE
18	Disconnect PL11 from the inducer motor IDM and plug into the ECM motor simulator use inducer adapter harness for inducers without a 12–pin connector.			19
19	Repeat COMPONENT TEST by turning setup switch SW1–6 OFF and then back ON. Does Status Code 4 + 2 flash?	21	20	
20	Replace the inducer motor or the inducer motor assembly. Inspect electronics portion of failed motor for water damage. If present, find source of water and fix. Check A–coil and/or humidifier.			17
21	Turn power off and disconnect PL11 from the ECM motor simulator. Do you have continuity across the BROWN, YELLOW, and ORANGE wires between connectors PL1 and PL11?	23	22	
22	You have an open wire or bad terminal on either the BROWN, YELLOW, or ORANGE wire between connectors PL1 and PL11. Repair it or replace the main harness.			17
23	Replace the furnace control board. NOTE: If replacing the furnace control board still results in the same problem, reinspect the wire harness terminals checked in the previous step (step 21, or step 38).			17
24	Does Status Code 4 + 1 flash?	25	7	
25	Did blower motor BLWM turn on and come up to speed?	37	26	
26	Remove tape from door switch and shut power off at main disconnect.			27
27	Does the blower wheel rub against the blower housing?	16	28	
28	Does the blower wheel turn freely?	29	30	
29	Is blower wheel firmly mounted on motor shaft?	31	16	
30	Replace the entire blower motor or the blower control module attached to the blower motor. If you replace the blower control module go to step 40. Always inspect failed motor for water damage. If present find source of water and fix it. Check A–coil and/or humidifier.			17
31	Put setup switch SW1–6 for COMPONENT TEST in the OFF position.			32

VARIABLE SPEED FURNACE CONTROL BOARDS
1183506, 1183507, 1184327, 1184407, 1184836 or 1184837 (Continued)

STEP	ACTION	YES	NO	GO TO
32	Turn power on and depress the door switch. Use a piece of tape to hold switch closed. Put setup switch SW1–6 for COMPONENT TEST in the OFF position. Wait a few seconds for self test before proceeding to the next step.			33
33	Do you have 120 volts between L1 and L2 on the furnace control board?	34	16	
34	Do you have 120 volts between BLACK and WHITE power leads at blower motor BLWM?	36	35	
35	You have an open wire or bad terminal on either the BLACK or WHITE wire between the furnace control board and blower motor BLWM. Repair it or replace blower harness(es).			16
36	Are all pins and wire leads intact on the connectors between the furnace control board and the blower motor?	37	16	
37	Disconnect PL13 from the blower motor BLWM and plug into the ECM motor simulator. Use the adapter harness for installations with ECM 3.0 blower motors. Repeat COMPONENT TEST by turning setup switch SW1–6 OFF and then back ON. Does Status Code 4 + 1 flash?	38	30	
38	Remove tape from door switch and turn power off at main disconnect. Disconnect PL13 from the ECM motor simulator or adapter harness, if used. Do you have continuity across the BLUE, YELLOW, GREEN, and RED wires between connectors PL3 and PL13?	23	39	
39	You have an open wire or bad terminal on either the BLUE, YELLOW, GREEN, or RED wire between connectors PL3 and PL13. Repair it or replace blower harness.			17



WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.

Wait at least five minutes after disconnecting line voltage from equipment before opening blower motor to prevent electric shock.

STEP	ACTION	YES	NO	GO TO
40	Remove tape from door switch and turn power off at main disconnect.			41
41	Disconnect both multi-pin connectors from blower control module attached to the blower motor. Be sure to depress release latches on connectors or they may get damaged.			42
42	Remove control box assembly from blower shelf and position out of the way.			43
43	Remove blower assembly from furnace.			44
44	Remove two ½-in. hex head bolts from blower control module attached to blower motor.			45
45	Carefully lift blower control module off blower motor. Depress latch on internal connector to disconnect blower control module from motor portion of blower motor. DO NOT PULL ON WIRES. GRIP PLUG ONLY.			46
46	When blower control module is completely detached from blower motor, verify with standard ohmmeter that the resistance from each motor lead in motor plug to unpainted motor end plate is greater than 100k ohms. Then verify motor windings are not shorted or open by measuring resistance between each combination of pins in motor plug (there are three different combinations, pin 1–2, pin 2–3, and pin 1–3). Resistance should be approximately equal across each combination of pins.			47
47	Did the motor pass the resistance check?	48	50	
48	Does blower wheel turn freely with blower control module removed?	49	50	
49	Replace blower control module. Inspect failed blower control module for water damage. If present, find source of water and fix. Check A–coil and/or humidifier.			17
50	Replace entire blower motor including blower control module. Inspect blower control module for water damage. If present, find source of water and fix. Check A–coil and/or humidifier.			17

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