KGBSD0301FMS
ECM Motor Simulator Kit

Installation Instructions

NOTE: Read the entire instruction manual before using the ECM motor simulator.

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 service on this equipment requires certain expertise, mechanical skills, tools, and equipment. If you do not possess these, do not attempt to perform any service on this equipment other than those procedures recommended in the User's Manual.

Installing and servicing heating equipment can be hazardous due to gas and electrical components. Only trained and qualified service personnel should install, repair, or service heating equipment.

Untrained personnel can perform basic maintenance functions such as cleaning coils, or cleaning and replacing filters. All other operations should be performed by trained service personnel. When working on heating equipment, observe precautions in literature, on tags, and on labels attached to or shipped with the unit, and other safety precautions that may apply.

Follow all safety codes. In the United States, follow all safety codes including the National Fuel Gas Code (NFGC) NFPA 54/ANSI Z223.1. In Canada, refer to the National Standard of Canada Natural Gas and Propane Installation Codes (NSCNGPIC), CSA B149.1 and Canadian Electrical Code CSA C22.1.

Wear safety glasses and work gloves. Have a fire extinguisher available during start-up, adjustment procedures, and service calls.

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the furnace and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, CAUTION, and NOTE. The words DANGER, WARNING, and CAUTION 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 furnaces:

90% Furnace Models			
59MN7A	987MA	58MVP	355MAV
59MN7B	987MB	58VUA*	321AAZ*
59TN6A	986TB	58VCA*	320AAZ*
59TN6B	986TC	58SXB*	398BAZ*
58MVC	355CAV	PG9UAA	398BAW*
58UVB	355BAV	59CU5A	935CA
58MVB	355AAV		
80% Furnace Models			
58CVA	58CVX	315A	315J
58TN0	58TN1	880T	881T
58CU0A	830CA	PG8MVA	PG8JVA

*. Requires HK42FZ003 or HK42FZ012 control.

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 VCA/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 some time in the event any of the following status codes are the reason for the service call.

- Status codes 12, 32, 41, 42, or 44 on furnace controls in Section A.
- Status codes 15, 32, 41, or 42 on furnace controls in Section B.

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

Section A- Variable Speed Furnace Control Boards HK42FZ003, HK42FZ012, HK42FZ055, HK42FZ056, HK42FZ064, HK42FZ057, HK42FZ058, HK42FZ088, HK42FZ089

STEP	ACTION	YES	NO	GO TO
1	Turn power off, remove blower access panel, and disconnect R thermostat lead.			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 11 flash?	5	8	
5	Turn power off, put setup switch SW1-6 for COMPONENT TEST in the OFF position, and reconnect the R thermostat lead 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 42 flash?	9	24	
9	Did inducer motor MTR1 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 PL7 from the inducer motor MTR1 and plug into the ECM motor simulator. 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 I1 and I2 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 MTR1. 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 MTR1?	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 PL7 from the inducer motor MTR1 and plug into the ECM motor simulator.			19
19	Repeat COMPONENT TEST by turning setup switch SW1-6 OFF and then back ON. Does Status Code 42 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 PL7 from the ECM motor simulator. Do you have continuity across the BROWN, YELLOW, and ORANGE wires between connectors PL1 and PL7?	23	22	
22	You have an open wire or bad terminal on either the BROWN, YELLOW, or ORANGE wire between connectors PL1 and PL7. 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 41 flash?	25	7	
25	Did blower motor MTR2 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 Section B - 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
32	Turn power on and depress the door switch. Use a piece of tape to hold switch closed. Wait a few seconds for self test before proceeding to the next step.			33
33	Do you have 120 volts between B1 and B2 on the furnace control board?	34	16	
34	Do you have 120 volts between BLACK and WHITE power leads at blower motor MTR2?	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 MTR2. 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 MTR2 and plug into the ECM motor simulator. Repeat COMPONENT TEST by turning setup switch SW1-6 OFF and then back ON. Does Status Code 41 flash?	38	30	
38	Remove tape from door switch and turn power off at main disconnect. Disconnect PL13 from the ECM motor simulator. Do you have continuity across the BLUE, YELLOW, VIOLET, ORANGE, and RED wires between connectors PL3 and PL13?	23	39	
39	You have an open wire or bad terminal on either the BLUE, YELLOW, VIOLET, ORANGE, or RED wire between connectors PL3 and PL13. Repair it or replace blower harness(es).			17

Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.

Section B- Variable Speed Furnace Control Boards HK42FZ022, HK42FZ024 HK42FZ026, HK42FZ031, HK42FZ035, HK42FZ043, HK42FZ044, HK42FZ050, HK42FZ051, HK42FZ052, HK42FZ063, HK42FZ069, HK42FZ070, HK42FZ071, HK42FZ072, HK42FZ073, HK42FZ074, HK42FZ075, HK42FZ079, HK42FZ090, HK42FZ091, HK42FZ092, HK42FZ093, HK42FZ103, HK42FZ104, HK42FZ105

STEP	ACTION	YES	NO	GO TO
1	Turn power off, remove blower access panel, and disconnect User Interface ABCD 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 11 flash?	5	8	
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 User Interface ABCD Connector (PL7) (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 42 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 diagram or the rating plate for the correct part number.	9	24	
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 diagram or rating plate 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 42 flash?	21	2	
19	Repeat COMPONENT TEST by turning setup switch SW1-6 OFF and then back ON. Does Status Code 4 + 2 flash?	20	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	

Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.

Section B- Variable Speed Furnace Control Boards HK42FZ022, HK42FZ024 HK42FZ026, HK42FZ031, HK42FZ035, HK42FZ043, HK42FZ044, HK42FZ050, HK42FZ051, HK42FZ052, HK42FZ063, HK42FZ069, HK42FZ070, HK42FZ071, HK42FZ072, HK42FZ073, HK42FZ074, HK42FZ075, HK42FZ079, HK42FZ090, HK42FZ091, HK42FZ092, HK42FZ093, HK42FZ103, HK42FZ104, HK42FZ105

STEP	ACTION	YES	NO	GO TO
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 41 flash?	25	7	
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
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 41 flash?	38	30	
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

Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.

Section B- Variable Speed Furnace Control Boards HK42FZ022, HK42FZ024 HK42FZ026, HK42FZ031, HK42FZ035, HK42FZ043, HK42FZ044, HK42FZ050, HK42FZ051, HK42FZ052, HK42FZ063, HK42FZ069, HK42FZ070, HK42FZ071, HK42FZ072, HK42FZ073, HK42FZ074, HK42FZ075, HK42FZ079, HK42FZ090, HK42FZ091, HK42FZ092, HK42FZ093, HK42FZ103, HK42FZ104, HK42FZ105

⚠ 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 ¼-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

© 2020 Carrier. All rights reserved.
Edition Date: 06/20
Catalog No:AG-KGBSD0301FMS-03
A Carrier Company
Replaces:AG-KGBSD0301FMS-01
Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.