

ICM281

Fixed Speed Furnace Control Replacement Module

Replaces: Carrier CESO110057-00, CESO110057-01, CESO110057-02

Features

- Controls gas valve, ignitor, blower motor, inducer, humidifier and air cleaner
- Microprocessor-based
- Designed for 100% gas shutoff in case of ignition failure
- Twinning compatible with other ICM281 boards
- Reverse polarity protection
- Secondary brownout voltage protection
- Compatible with 24 VAC standard thermostat
- Provides diagnostic LED to aid in troubleshooting

Safety Considerations

Only trained personnel should install or service heating equipment. When working with heating equipment, be sure to read and understand all precautions in the documentation, on labels, and on tags that accompany the equipment. Failure to follow all safety guidelines may result in damage to equipment, severe personal injury or death.

Introduction

The ICM281 fixed speed furnace control replaces the following Carrier/BDP modules: CESO110057, CESO110057-1, CESO110057-2, CESO110048, CESO110020, and HH84AA016

The ICM281 has incorporated LED diagnostics to assist in troubleshooting.

It is recommended that a sight glass (not included) be installed in a convenient location on the furnace to take advantage of this feature. If a sight glass is not installed, the self-test feature of the board can still be used for routine troubleshooting. A fault code label is included in this package and must be installed on the furnace.

Electrostatic Discharge (ESD) Precautions

CAUTION!

Use caution when installing and servicing the furnace to avoid and control electrostatic discharge; ESD can impact electronic components. These precautions must be followed to prevent electrostatic discharge from hand tools and personnel. Following the precautions will protect the control from ESD by discharging static electricity buildup to ground.

1. Disconnect all power to the furnace. Do not touch the control or the wiring prior to discharging your body's electrostatic charge to ground.
2. To ground yourself, touch your hand and tools to a clean, metal (unpainted) furnace surface near the control board.
3. Service the furnace after touching the chassis. Your body will recharge with static electricity as you shuffle your feet or move around, and you must reground yourself.
4. Reground yourself if you touch ungrounded items.
5. Before handling a new control, reground yourself; this will protect the control. Store used and new controls in separate containers before touching ungrounded objects.
6. ESD damage can also be prevented by using an ESD service kit.

Specifications

Electrical

- Voltage Range: Line (98 to 132 VAC) @ 60Hz
- Ignitor: 5A @ 120 VAC
- Cool Blower: 30A, 2HP, 240 VAC
- Heat: 5A, 1/2 HP, 240 VAC
- Inducer Motor: 4A, FLA-8.0 LRA @ 120 VAC
- Gas Valve: 1.5A @ 30 VAC

Step 1: Remove Existing Control

CAUTION!

To service control, and prior to disconnection, label all wires. Failure to do so may result in wiring errors can cause dangerous operation.

1. Turn thermostat to OFF position or set it to the lowest possible setting.
2. Turn OFF electrical supply to furnace.
3. Turn OFF gas supply to furnace.
4. Remove furnace blower and control access doors.
5. Remove control box cover.

CAUTION!

Failure to turn off gas and electric supplies can result in explosion, fire, death, or personal injury.

6. Disconnect thermostat wires and humidifier wires (if equipped with a humidifier).
7. Disconnect line voltage, blower, electronic air cleaner wires (if equipped), and transformer wires.
8. Remove wiring harness edge connector and gasket from circuit board.
9. Remove screws or any other fasteners and old circuit board.
10. Examine control and control box to check for water stains.
11. Make repairs if any sources of water leakage are found. Be sure to check humidifiers, evaporator coils, and vent systems in the area of the control.

Step 2: Install the New Control

1. Ground yourself. When handling circuit board, hold it by the edges.
2. For 90 percent efficient furnaces, clip JW9 jumper wire. The JW9 jumper is found close to the right hand corner of the circuit board, beneath the HUM-1 terminal (see Figure 1). This will result in a 15-second inducer OFF delay.
3. Insert board's edge between control box tabs.
4. Fasten circuit board with retaining screws.

IMPORTANT:

For 58EJA or 349MAV horizontal furnaces, the bottom control board bracket may need to be notched and trimmed to prevent the LED and circuit trace from interfering with the mounting bracket. This may cause a short and result in damage to the control.

To prevent:

- a. Remove the mounting bracket from the control box.
- b. Mark, notch and trim the bracket between where the bottom center and bottom right mounting holes/pins align. Be sure to trim enough of the bracket so the circuitry on the underside of the control board lies clear of the bracket.
- c. Verify clearance by mounting the control board on the bottom of the support rail.

- d. If clear, remove the bottom mounting bracket from the control board and re-attach the bracket to the control box.
 - e. Install the control board into the control box by sliding the mounting tab on the control board through the slots in the top of the control box.
 - f. Attach the control board to the bottom mounting rail of the furnace control box.
 - g. Continue on to Step-5 of the installation process.
5. Connect all line voltage, low voltage, and accessory wires.
 6. Connect wiring harness edge connector to circuit board.
 7. Set blower off delay. Blower off delay DIP switch SW1 is found near the right-hand corner of the board (see Figure 1).
 8. Re-install control box cover.

✱ **Note:** Do not connect thermostat wires to control board until system tests are complete.

System Tests

Step 1: Component Self Test

1. Begin component test sequence by ensuring that thermostat is turned to OFF position and thermostat wires are disconnected. Turn power ON and engage blower door switch. With a short piece of wire, briefly short TEST/TWIN terminal to Com/24V terminal. The component test sequence follows:
 - A. Status LED will flash code and will then turn ON the inducer motor.
 - B. Inducer motor will run for the entire component test.
 - C. Hot surface ignitor and blower motor heat speed will run for 10 secs.
 - D. Blower motor cool speed will turn ON for 10 secs.
2. Repair, replace, or service any failing components from the component self test. The gas valve is not energized during the self test.
3. Turn power OFF.
4. Disengage the blower door switch.
5. Connect thermostat wires.
6. Install blower door and access door.
7. Turn power ON.
8. Turn gas ON.

Step 2: Flame Sensor Operation

Connect a DC microammeter in series with flame sensor. Initiate a heat call. After burners ignite and stabilize, measure flame current. Nominal flame current is between 4.0 and 6.0 microamps DC. If flame current reading is less than 4.0 microamps DC, either replace or remove and clean flame sensor with a fine grade steel wool. When the flame current falls to 0.5 microamps DC, the furnace control will lock out.

Step 3: System Operation

1. Perform necessary safety checks. Consider flame safety, limit switch, and vent system.
2. Operate unit through a complete call for heat cycle.

Optional Observation Port/Sight Glass Installation

✱ **Note:** If a sight glass is not installed, current fault code will be erased when blower door is removed.

The ICM281 furnace control has LED fault code capability. To utilize this feature, it is necessary to field install a sight glass or observation port. The location of this device will vary depending on the model of the furnace.

Upflow Condensing Furnaces:

With the blower door(s) removed, locate the LED on the control board. Check the sides of the casing. You may be able to utilize the unused condensate drain opening or electrical knock-out as an observation port on some models. A 1/2-inch electrical box knock-out plug must be installed when this option is used.

All Furnaces:

1. Measure the height of the floor for upflow furnaces or off the blower shelf on downflow/horizontal furnaces.
2. Measure the distance from the front inside edge of the casing.
3. Orient the blower door to the correct position and mark this location on the front of the blower door.
4. Using a step-drill or chassis punch, drill a 1 1/2-inch hole in the blower door.
5. Install a sight glass in the blower door (Use Carrier Part No. 323017-201 or 323018-201, or equivalent).
6. A 1/2 inch hole may be drilled and an electrical box plug may be used and are available from hardware stores or electrical suppliers.

✱ **Note:** DO NOT INSTALL AN OBSERVATION PORT OR SIGHT GLASS THROUGH WARNING LABELS ON FURNACE.

CAUTION!

A loose fitting sight glass should be sealed with clear silicone to prevent leakage and sight glass from falling out.

7. Install Fault Code Label in a convenient location on the blower door adjacent to the sight glass.

CAUTION!

Do not install a sight glass or observation port between the furnace and the blower compartment. To avoid having carbon monoxide drawn into the living area, do not cover any port with tape, and do not leave the unit unattended and operational with the blower door off. Failure to follow this warning could result in possible damage to this equipment, serious illness or personal injury, or death.

Twinning Instructions

A 3/16" quick connect terminal is provided on the ICM281 control board for communication between another ICM281 control board for furnace twinning.

To configure your control boards for twinning, simply (1) install each control board according to the installation instructions; (2) connect the TWIN terminals together (see Fig. 1); and (3) connect the 24 VAC common together. A common ground between the two furnaces is also required.

If the 24 VAC supplies to the control are in phase, both furnaces will turn the blower on and off synchronously and at the same speed. If the 24 VAC supplies are not in phase, then neither control will respond to the thermostat commands and the status LED will flash rapidly.

Bottom Right Corner of Control Board

Figure 1

