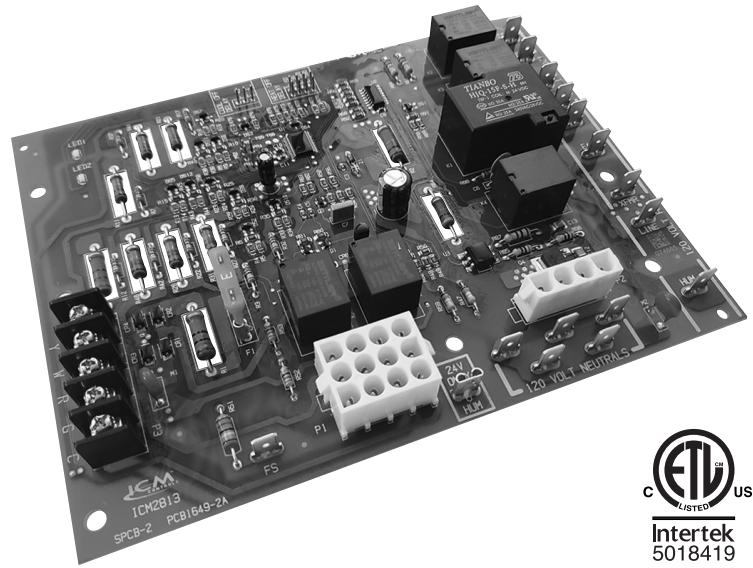




INSTALLATION, OPERATION & APPLICATION GUIDE

For more information on our complete range of American-made products – plus wiring diagrams, troubleshooting tips and more, visit us at www.icmcontrols.com



REPLACES

Lennox: 10M9301, 12L6901, 32M8801, 56L8401, 24L8501, 63K8901, 97L4801, 100925-01, 100925-03, 17W9201, 23W5101, 30W2501, 69M0801, 69M1501, 83M00

White-Rodgers: 50A65-120, 50A65-121, 50A62-120, 50A62-121, 50A62-820, 21D83M-843, 50A66-122, 50A66-123

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 the used and new controls in separate; containers before touching ungrounded objects.
6. ESD damage can also be prevented by using an ESD service kit.

INTRODUCTION AND OPERATION

The **ICM2813** is a form, fit, and functional replacement for the Lennox and White Rodgers boards shown in the cross reference section of this guide. The **ICM2813** automated gas ignition control board monitors the ignition sequence including the inducer, pressure switch, hot surface igniter, gas valve, flame sense, and circulating blower while maintaining full safety circuit monitoring including the high limit switch, roll out switch and auxiliary limit switch circuits. Onboard diagnostics will indicate when a fault condition exists.

SPECIFICATIONS

- **Electrical Rating** @ 77°F (25°C)
- **Input Voltage:** 18-30 VAC, 60 Hz
- **Ignitor Current:** 2.0 amp @ 80 VAC, 60 Hz (resistive)
- **Inducer Relay:** 2.2 FLA-3.5 LRA @ 120 VAC
- **Blower Relay:** 9.5 FLA-25.0 LRA @ 120 VAC (Heat / Cool / Fan)
- **Gas Valve Relay:** 1.5 amp @ 25 VAC, 60 Hz 0.6 pf

Environmental

- **Operating Temp Range:** -40° to 176°F (-40° to 80°C)
- **Humidity Range:** 5 to 95% relative humidity (non-condensing)

REMOVE EXISTING CONTROL

CAUTION To service control, and prior to disconnection, label all wires. Failure to do so may result in wiring errors which 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 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.

TIMING (IN SECONDS UNLESS SPECIFIED)

Pre Purge	15
Ignitor Warm Up Time	20
Trial for Ignition	4
Retries	4 retries
Interpurge	15
Post Purge	5
Lockout Time	300
Heat Fan ON Delay	45
Heat Fan OFF Delay*	60/90/120/180
Cooling Fan ON Delay	2
Cooling Fan OFF Delay*	2 OR 45
Auto Reset	60 minutes

* The heating and cooling OFF delay depends on the option chosen by the jumper position. The default settings for the heating and cooling OFF delays are 90 seconds and 45 seconds respectively.

SEQUENCE OF OPERATION

Upon a call for heat, the thermostat will energize the W terminal with 24 VAC. With the heat call in place, the inducer fan and humidifier (optional) will be energized thus closing a pressure safety switch. The control will enter a 15 second inducer pre purge cycle. Upon verification of the pressure switch closure and completion of the 15 second inducer pre-purge, the hot surface igniter is energized. There is a 20 second igniter warm up period before energizing the gas valve. Once the gas valve is energized, gas flows into the burners where it is ignited by the hot surface igniter. Once the burners are on, the flame is sensed by a flame rectification circuit and flame sensor. There is a 4 second trial for ignition period where the control checks the flame signal and proves the flame. Once flame is established, there will be a 45 second heat ON delay before energizing the main blower. When the call for heat ends, the gas valve is de-energized, burners go off, flame is proven lost and there is a fixed 5 second inducer post purge to purge any residual exhaust gases from the system. Following the inducer post purge, the inducer and humidifier are turned off and subsequently the heat blower is turned off after the user selected off delay time expires. Upon a call for cooling, the Y terminal is energized with 24 VAC and a 2 second cool blower ON delay begins. After the ON delay expires, the EAC and cool blower outputs are energized. Once the call for cooling ends, there is a user selectable 2 second or 45 second cooling blower OFF delay to purge the residual cool air from the duct work. At the end of the OFF delay, the cool blower and EAC are turned off.

HEAT BLOWER JUMPER SETTINGS

Pin	Time
1 - 2	180 seconds
3 - 4	120 seconds
5 - 6	90 seconds
7 - 8	60 seconds

COOL BLOWER JUMPER SETTINGS

PIN	Time
9 - 10	2 seconds
10 - 11	45 seconds

INSTALL NEW CONTROL

1. Ground yourself properly before installing the new **ICM2813** control board.
2. Mount the new control using any screws and fasteners previously removed.
3. Connect all line/low voltage, accessory, thermostat and ground wires.
4. Verify the sequence of operation.

NOTE: The wire from the door switch to Line 1 120 VAC input terminal may be too short on some model furnaces. You can extend the wire or use the WIH110 blue wire in kit.

MOUNTING THE ICM2813

Vertical mounting of the ICM2813 in the previous circuit board location

1. Place the ICM mounting plate over the previous circuit board location with arrow facing up as seen in Figure 1.
2. Move the ICM mounting plate over to the right 1" for fresh metal to drill through and mount the unit too.
3. Hold in place with your hand or use tape to secure.
4. With a pencil or marker, mark the (4) holes labeled "Drill 3/16" Hole" as seen in Figure 1.
5. Remove ICM mounting plate and drill (4) holes with a 3/16" drill bit.
6. Line up the (4) plastic standoffs from the **ICM2813** with the (4) holes shown on the ICM mounting plate. These two components only connect one way.
7. With your thumb, firmly press each of the (4) standoffs until each one snaps into the ICM mounting plate.
8. With the **ICM2813** now firmly secured to the ICM mounting plate, line up the (4) standoffs with the new holes drilled in Step 5 above.
9. With your thumb, firmly press each of the (4) standoffs until each one snaps and locks into the sheet metal surface. Check to make sure all (4) standoffs are securely fastened to the sheet metal.

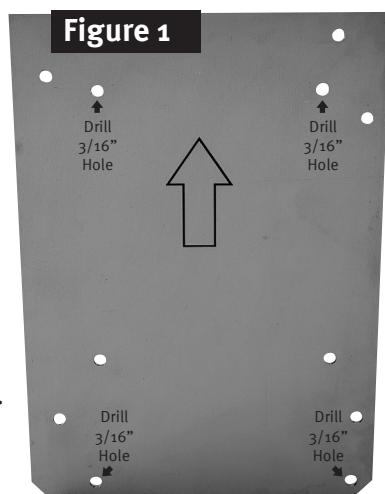


Figure 1

Horizontal or Vertical mounting of the ICM2813 in a new location

1. Select desired location for the ICM mounting plate.
2. Select orientation (horizontal down flow or vertical up flow) for the ICM mounting plate.
3. Hold in place with your hand or use tape to secure.
4. With a pencil or marker, mark the (4) holes labeled "Drill 3/16" Hole" as seen in Figure 2.
5. Remove ICM mounting plate and drill (4) holes with a 3/16" drill bit.
6. Line up the (4) plastic standoffs from the **ICM2813** with the (4) holes shown on the ICM mounting plate. These two components only connect one way.
7. With your thumb, firmly press each of the (4) standoffs until each one snaps into the ICM mounting plate.
8. With the **ICM2813** now firmly secured to the ICM mounting plate, line up the (4) standoffs with the new holes drilled in Step 5 above.
9. With your thumb, firmly press each of the (4) standoffs until each one snaps and locks into the sheet metal surface. Check to make sure all (4) standoffs are securely fastened to the sheet metal.

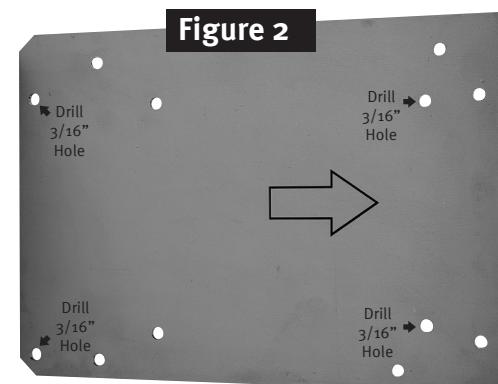


Figure 2

WIRE HARNESS CONNECTIONS

1. Plug 12-pin wiring harness supplied with the **ICM2813** board into the 12 pin socket on the **ICM2813** board as seen in Figure 3 location 1. It is a keyed connector and only connects one way. There are 3 wires which have 1/4" quick connects attached to the ends as seen in Figure 3 labeled 1A, 1B, 1C. Connect these wires as stated below:
 1A = Blue wire connects to transformer secondary side 24VAC or inline fuse if used.
 1B = Yellow wire connects to transformer secondary side Common
 1C = Green wire: Connects to Earth Ground
2. Plug the 4-pin wiring harness into the **ICM2813** as seen in Figure 3 location 2. It only connects one way.
3. Connect the opposite ends of both harnesses labeled 3 & 4 on Figure 3 to the mating connections of the harnesses on the furnace.
4. Ensure all other connections are wired per wiring diagram.

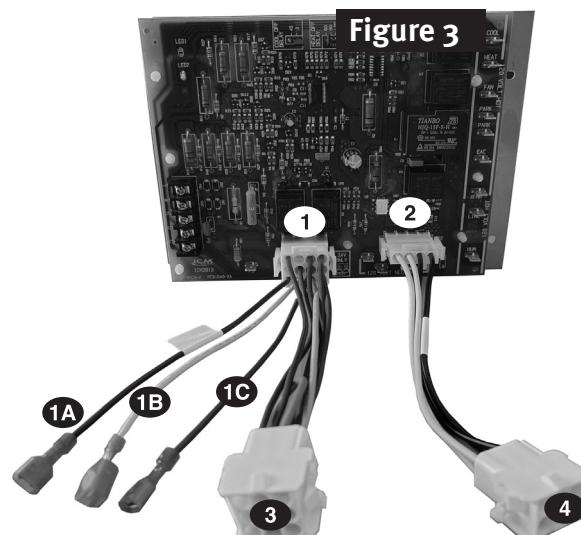


Figure 3

FLAME SENSE TROUBLESHOOTING TIPS

Flame not established

1. If the flame is not established or proven during the initial sequence, the gas is shut off (if energized) and the board will enter a retry mode. There will be four more successive attempts allowed each having a 15 second inducer purge between attempts.
2. After the initial attempt and four successive attempts, if flame is still not established and proven there will be a 1 hour lock out before the system will reset automatically. To reset the control before the 1 hour lockout has elapsed, cycle off and on the 24 VAC power to the board. If the problem is not a false flame, the board can also be reset by cycling the heat call off and on. However if the problem is a false flame (flame detected when the gas valve is de-energized and there is no flame), cycling the heat call will not reset the board.

Flame out

1. Flame out is considered when flame is lost during heating.
2. When a W signal is present and flame is lost and no longer sensed, the gas valves will disengage until the next trial for ignition. The circulating blower and inducer will remain running.
3. If all retry attempts fail and the flame is still not proven, there will be a 1 hour lock out before the system resets automatically.

False flame

1. Flame out of sequence represents a scenario when flame is sensed while gas valve is de-energized.
2. Inducer and Blower motors will be engaged (if not already running) and keep running for as long as the fault condition is present.

LOCKOUT FEATURES

There is a 5 minute self healing recovery which occurs if the pressure switch is stuck open. The inducer will run for 150 seconds then enter a 5 minute self healing recovery. This cycle will repeat until the pressure switch closes.

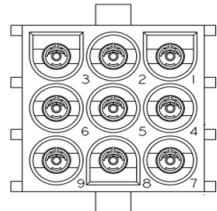
There will be a 1 hour lock out if the flame is not established and proved within 5 successive attempts. After one hour in lockout, the control will reset automatically.

LED FAULT CODES

LED Status	Description	Trouble Shooting Tips
ON	Normal Operation	N/A
OFF	Control Board Failure	Check for proper input voltage and check the fuse; if not resolved replace control.
1	Ignition Failure (Soft Lockout)	Clean or replace the flame sensor, check the igniter for proper operation & input voltage, check the transformer's common is grounded to earth ground.
2	Pressure Switch Stuck Closed	Check for contaminated or defective pressure switch.
3	Pressure Switch Stuck Open	Check for obstructed pressure switch tubing or defective pressure switch. Check for oxidation on terminals, broken wires, or defective inducer motor.
4	Limit Switch Fault	Check for blocked airflow, blocked duct work, and dirty filter. Check or replace high limit switch if defective.
5	Flame Out of Sequence	Check for intermittent or defective gas valve and check for dirty or defective flame sensor.
6	Roll Out Switch Fault	Check for a cracked heat exchanger, defective rollout switch, broken wires on the roll out switch, or replace roll out switch if required.
7	Weak Flame	Weak flame is caused by carbon build up on the flame sensor, poor grounds, or improper placement of flame sensor. Clean or replace flame sensor, reassess grounds, ensure flame sensor is fully enveloped in the flame.
8	Miswired Gas Valve	Check for shorted or miswired gas valve, check harness wires for any shorts or breaks, and check the pressure switch for proper operation.
9	Unused	N/A
10	Hot and Neutral Reversed	Check for proper polarity of incoming voltage on the primary and secondary of the transformer.
11	Brownout	A brownout fault indicates a low voltage condition. Check the voltage on the primary and the secondary of the transformer and ensure there is no excessive load on the transformer.

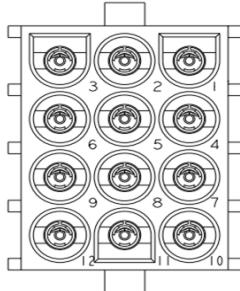
WIRING HARNESS 9 TO 12 PIN

P1 Harness (9-Pin End)



- 1 LS1 (Limit Switch In)
- 2 Connected to Pin 9
- 3 RS2 (Rollout Switch)
- 4 MV (Gas valve)
- 5 PRS (Pressure Switch)
- 6 LS2 (Limit Switch Out)
- 7 NC
- 8 RS2 (Rollout Switch)
- 9 MVC (24 VAC Earth Ground)

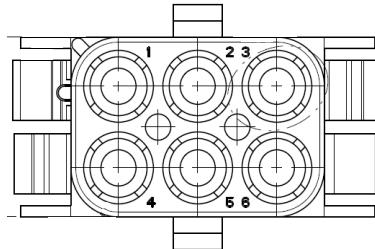
P1 Harness (12-Pin End)



- 1 LS2 (Limit Switch Out)
- 2 NC
- 3 TH (24 VAC input)
- 4 NC
- 5 RS1 (Rollout Switch)
- 6 C (24 VAC Earth Ground)
- 7 LS1 (Limit Switch In)
- 8 Earth Ground
- 9 MVC (24 VAC Earth Ground)
- 10 PRS (Pressure Switch)
- 11 RS2 (Rollout Switch)
- 12 MV (Gas valve)

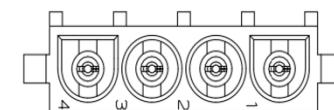
WIRING HARNESS 4 TO 6 PIN

P2 Harness (6-Pin End)



- 1 Hot Surface Ignitor
- 2 NC
- 3 Neutral
- 4 Inducer Blower
- 5 NC
- 6 Neutral

P2 Harness (4-Pin End)



- 1 Inducer Blower
- 2 Hot Surface Ignitor
- 3 Neutral
- 4 Neutral

WIRING DIAGRAM

P1 Plug Pin Out

- 1 = High limit output
- 2 = N/A
- 3 = 24 VAC
- 4 = N/A
- 5 = Rollout switch 1
- 6 = 24 VAC common
- 7 = High limit input
- 8 = Ground
- 9 = Main Valve common
- 10 = Pressure switch
- 11 = Rollout switch 2
- 12 = Main valve

P2 Plug Pin Out

- 1 = Inducer blower
- 2 = Hot surface ignitor
- 3 = Neutral
- 4 = Neutral

Legend

- AC Blow = Low speed blower
- EAC = Electronic air cleaner
- FS = Flame sensor
- GND = Ground
- HSI = Hot surface ignitor
- HTG ACC = Accessory
- HUM = Humidifier
- LS = Limit switch
- PRI = Primary
- PRS = Pressure switch
- RS = Rollout switch
- SEC = Secondary
- XFRM = Transformer

Chassis ground Earth ground

