ICM2812 and ICM2812-KIT

Hot Surface Ignition (HSI) Control Board

MADE IN AMERICA

INSTALLATION, OPERATION & APPLICATION GUIDE

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Intertek 5018419

FEATURES

- Hot Surface Ignition (HSI) control board
- Microprocessor-based
- Monitors timing, trial for ignition, system switches, flame sensing and lockout.
- 100% lockout safety feature
- Compatible with LP or Natural Gas
- LED indication for status and fault codes to aid in troubleshooting
- ICM2812 includes a replacement board only
- ICM2812-KIT includes cable harnesses for compatibility with more than 150 furnace control boards

INTRODUCTION

The **ICM2812** has incorporated LED diagnostics to assist in troubleshooting. Fault code information can be found in this application guide. Please keep this application guide with the furnace installation manual for future reference.

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.

SPECIFICATIONS

- **Control voltage:** 24 VAC (18-30 VAC), 60 Hz
- **Line voltage:** 120 VAC, 60 Hz
- **Operating temperature:** -40˚to 175˚F (-40˚to 80˚C)

OUTPUTS

- **HSI Hot Surface Ignitor:** 6 amp @ 120 VAC
- **Gas Valve:** 1.5 amp @ 24 VAC
- **Inducer draft motor:** 2.2 FLA @ 120 VAC
- **Blower motor:** 9.5 FLA @ 120 VAC

REPLACES

See pages at end of this instruction.

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.

REMOVE EXISTING CONTROL

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

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

4. Remove furnace blower and control access doors.
5. Disconnect thermostat wires and humidifier wires (if equipped with a humidifier).
6. Disconnect line voltage, blower, electronic air cleaner wires (if equipped), and transformer wires.
7. Remove screws and any other fasteners, and the old circuit board.
8. Examine control and control box to check for water stains.
9. 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.

INSTALL NEW CONTROL

1. Ground yourself. When handling circuit board, hold it by the edges.
2. Fasten circuit board with retaining screws.
3. Connect all line voltage, low voltage, and accessory wires.
4. Verify the sequence of operation.

SEQUENCE OF OPERATION

On the application of power, the **ICM2812** will continuously monitor the rollout switch, limit switch, pressure switch, gas valve output and flame sense.

During a Call for Heat, the control makes sure the limit switch is closed and the pressure switch contact is open before turning on the Inducer blower, which will be energized for the 30-second pre-purge. Following the pre-purge period, the pressure switch contact is closed and power is applied to the hot surface ignitor (there is a 19-second warm-up period), both gas valves are energized. Once flame is established and sensed the ignitor is turned off.

1STG (Single Stage): After the 30 seconds heat blower on delay the high (HI HEAT-H) speed is energized.

2STG (Dual Stage): After 5 seconds the high gas valve (MV HI) is turned off. The low (LO HEAT-H) speed blower will energize after the 30 seconds heat blower on delay. The **ICM2812** will switch to second stage heat after 5 minutes of continuous operation; the high gas valve (MV HI) is re-energized along with the low gas valve (MV LO) and the main blower will switch to the high (HI HEAT-H) speed for the duration of the heat call.

Once the heat call is satisfied; the blower is switched to the low (LO HEAT-H) speed; the Inducer Draft motor turns off after the 25 second post purge delay and the blower motor turns off after the preselected heat blower off delay of either 100 or 150 seconds.

Fan: A fan call from the thermostat will energize the blower motor without delay at low (LO HEAT-H) speed. The blower is turned off without delay when the Fan call is removed.

Cooling: A cooling call from the thermostat will energize the blower motor at high (COOL-H) speed after the 6 second cool blower on delay. The blower is turned off 45 seconds after the cooling call is satisfied.

FLAME SENSE TROUBLESHOOTING TIPS

Flame not established

1. If flame is not established during the 4 second initial sequence then the control will start the next trial for ignition in 60 seconds.
2. There will be 2 more attempts to ignite after the 60 seconds delay, before the respective fault code is triggered and the ignition trials are stopped.
3. If flame has not been established after the 3 trials for ignition; the control will enter a 60 minute soft lockout and flash the respective fault code. The lockout can be cleared by cycling the W call or the input power.
4. The blower motor is off until 30 seconds after flame is established and sensed.

Flame out

1. Flame out is considered when flame is lost during heating.
2. When a W signal is present and flame is not sensed, then gas valve will disengage until the next trial for ignition.
3. If flame is not established on the immediate sequence (2 above) then the control will continue with 2 additional trials for ignition.
4. The Inducer and Blower motors will continue running during the flame out scenario.

Flame out of sequence

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

ICM2812 TIMING

Input	18-30 VAC, 60Hz
Ignition Activation Period	3 seconds
Ignitor Warm-up	19 seconds
Inducer Inter-purge	60 seconds
Inducer Post-Purge	25 seconds
Inducer Pre-purge	30 seconds
Trial for Ignition	4 seconds

Trials	3
Cool Blower OFF delay	45 seconds
Cool Blower ON delay	6 seconds
Heat Blower OFF delay	100/150 seconds
Heat Blower ON delay	30 seconds
Lockout	60 minutes

FAULT RECALL BUTTON

To review the fault history; press and hold the **Fault Recall** button and release once the LED goes out. The previous five fault codes will be displayed. The LED will turn off momentarily and then go solid after the last fault has been displayed.

The ICM2812 will not respond to thermostat calls while the fault history is being displayed.

To clear the fault history; press and hold the Fault Recall button and release once the LED starts flashing. The LED will turn off momentarily and then go solid after the fault history has been cleared.

The fault history will not erase while the ICM2812 is performing a heating or cooling call.

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 the 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	Checked 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 the flame sensor . Clean or replace the flame sensor, reassure grounds, ensure the flame sensor is fully enveloped in the flame.
8	Mis--wired gas valve	Check for shorted or mis--wired 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 the incoming voltage on the primary and secondary sides of the transformer.
11	Brownout	A brownout fault indicates a low voltage condition. Check the voltage on the primary and secondary sides of the transformer and ensure there is no excessive load on the transformer.

ICM2812-KIT CROSS REFERENCE

The **ICM2812** is a board only replacement for the White-Rodgers universal control board packaged with the 50M56U-843.
The **ICM2812-KIT** includes the replacement board and wiring adapters/harnesses that allow it to also be a replacement for all of the furnace board models listed in the table below.

Manufacturer	Part Number	Harness
Amana/Goodman	10207701	6
Amana/Goodman	10207704	5 & 6
Amana/Goodman	10207706	5 & 6
Amana/Goodman	10207710	5 & 6
Amana/Goodman	10207714	5 & 6
Amana/Goodman	10207717	6
Amana/Goodman	10207718	5 & 6
Amana/Goodman	10207719	5 & 6
Amana/Goodman	10207720	6
Amana/Goodman	0130F00005(S)	5 & 6
Amana/Goodman	0130F00006(S)	5
Amana/Goodman	102077-02	5 & 6
Amana/Goodman	102077-03	5 & 6
Amana/Goodman	102077-04	5 & 6
Amana/Goodman	102077-09	5 & 6
Amana/Goodman	10207720S	6
Amana/Goodman	B1809926(S)	5 & 6
Amana/Goodman	PCB00109	5
Amana/Goodman	PCBBF109	5
Amana/Goodman	PCBBF110(S)	5 & 6
Amana/Goodman	PCBBF112(S)	5 & 6
Amana/Goodman	PCBBF122(S)	5
Amana/Goodman	PCBBF123(S)	5 & 6
Amana/Goodman	PCBBF132(S)	5
Amana/Goodman	PCBBF134	5 & 6
Amana/Goodman	PCBBF135	5 & 6
Amana/Goodman	PCBBF136	5 & 6
Amana/Goodman	PCBBF138	5 & 6
American Standard/Trane	CNT02789	6
American Standard/Trane	CNT02891	6
American Standard/Trane	CNT03076	6
American Standard/Trane	CNT03798	6
American Standard/Trane	CNT03799	6
American Standard/Trane	CNT05164	6
American Standard/Trane	CNT05165	6
American Standard/Trane	D341122P01	6
American Standard/Trane	D341235P01	6
American Standard/Trane	D341235P03	6
American Standard/Trane	D341396P04	6
American Standard/Trane	D341396P05	6
American Standard/Trane	D34139P03	6
Carrier	HK42FZ004	11 & 12
Carrier	HK42FZ007	11 & 12
Carrier	HK42FZ008	11 & 12
Carrier	HK42FZ009	11 & 12
Carrier	HK42FZ011	11 & 12
Carrier	HK42FZ016	11 & 12
Coleman/Evcon/Lennox/Luxaire/York	G951ADB-1401(C)	6
Coleman/Evcon/Lennox/Luxaire/York	G951ADB1402	6
Coleman/Evcon/Lennox/Luxaire/York	G951ADB-1403	6
Coleman/Evcon/Lennox/Luxaire/York	G951AEB-1403	6
Coleman/Evcon/Luxaire/York	265901	6
Coleman/Evcon/Luxaire/York	265902	6
Coleman/Evcon/Luxaire/York	539617	6
Coleman/Evcon/Luxaire/York	52537074000	6
Coleman/Evcon/Luxaire/York	52537077000	6
Coleman/Evcon/Luxaire/York	031-00662	6
Coleman/Evcon/Luxaire/York	031-00662-700	6
Coleman/Evcon/Luxaire/York	031-01250-700	6
Coleman/Evcon/Luxaire/York	031-01266-700	6
Coleman/Evcon/Luxaire/York	031-01284-000	6
Coleman/Evcon/Luxaire/York	031-01973-000	6
Coleman/Evcon/Luxaire/York	031-09166-000	6
Coleman/Evcon/Luxaire/York	331-01933-000	6
Coleman/Evcon/Luxaire/York	331-01972-000	6
Coleman/Evcon/Luxaire/York	331-09167-000	6
Coleman/Evcon/Luxaire/York	S1-03100662000	6
Coleman/Evcon/Luxaire/York	S1-03101250000	6

See Note 1

Manufacturer	Part Number	Harness
Coleman/Evcon/Luxaire/York	S1-03101266000	6
Coleman/Evcon/Luxaire/York	S1-03101267000	6
Coleman/Evcon/Luxaire/York	S1-03101267001	6
Coleman/Evcon/Luxaire/York	S1-03101284000	6
Coleman/Evcon/Luxaire/York	S1-03101933000	6
Coleman/Evcon/Luxaire/York	S1-03101972000	6
Coleman/Evcon/Luxaire/York	S1-03101973000	6
Coleman/Evcon/Luxaire/York	S1-03109167000	6
Coleman/Evcon/Luxaire/York	S1-33102956000	6
Coleman/Evcon/Luxaire/York	S1-33103010000	6
Heil Quaker/ICP/Thermo Products/ Whirlpool	1010806	5 & 6
International Comfort Products	1380686	6
International Comfort Products	1380698	6
International Comfort Products	1380699	6
Lennox	1214201	6
Lennox	100925(-01,-02,-03)	6
Lennox	10M93	6
Lennox	10M9301	6
Lennox	12L6901	6
Lennox	17W92	6
Lennox	17W9201	6
Lennox	23W51	6
Lennox	23W5101	6
Lennox	30W25	6
Lennox	30W2501	6
Lennox	32M8801	6
Lennox	56L84	6
Lennox	56L8401	6
Lennox	69M08	6
Lennox	69M0801	6
Lennox	69M15	6
Lennox	69M1501	6
Lennox	X4459	6
Lennox	X445901	6
Nordyne	624557	2, 8 & 9
Nordyne	624564	2, 8 & 9
Nordyne	624591	2, 8 & 9
Nordyne	624628	2, 8 & 9
Nordyne	902378	2, 8 & 9
Nordyne	902696	2, 8 & 9
Nordyne	903106	2, 8 & 9
Nordyne	624631(A)	2, 8 & 9
Nordyne	710128A	2, 8 & 9
Rheem	695-200	2 & 4
Rheem/RUUD	62-22694-xx	2 & 4
Rheem/RUUD	62-22732-xx	2 & 4
Rheem/RUUD	62-24044-xx	2 & 4
Rheem/RUUD	62-24045-01	2 & 4
Rheem/RUUD	62-24046-01	2 & 4
Rheem/RUUD	62-24084-82	2 & 4
Rheem/RUUD	62-24268(-01,-02,-03)	2 & 4
Texas Instruments	41F-5	1 & 3
Texas Instruments	61F3	6
Texas Instruments	6DT(-1,-2)	6
Thermo Products	350486	6
Thermo Products	350836	6

See Note 3

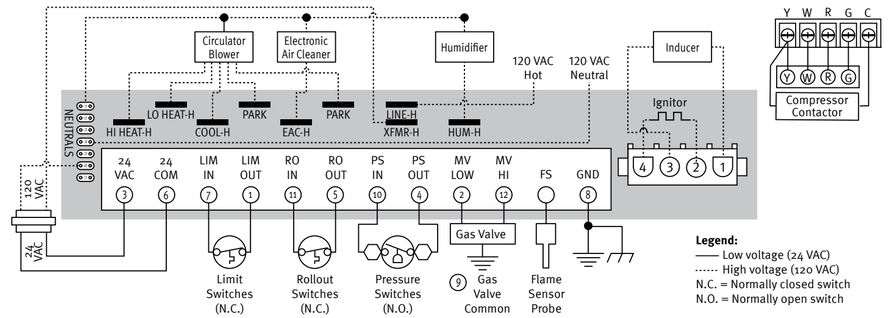
See Note 2

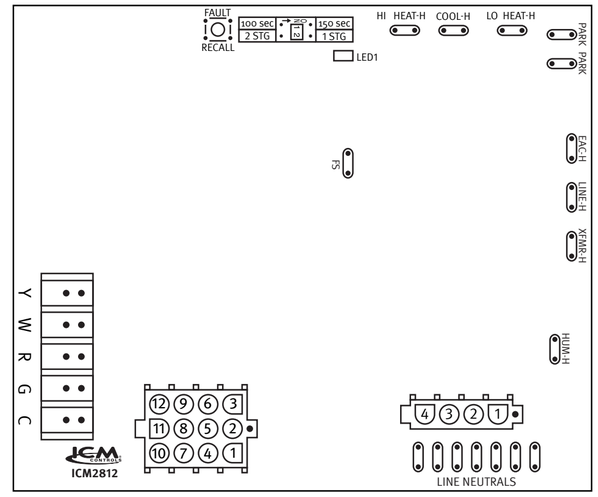
Trane	D330927P01	6
Trane	D330930P01	6
Trane	D330934P01	6
Trane	D340035P01	6
Trane	D340774P01	6
Trane	D341213P01	6
Trane	D341396P01	6
United Technologies	1012-83-9336A	1 & 3
United Technologies	1012-83-9337A	1 & 3
United Technologies	1012-925(A,B,C)	2 & 4
United Technologies	1012-933D	1 & 3
Whirlpool	8068142	6
Whirlpool	8068561	6
Whirlpool	8068563	6
Whirlpool	99958174	6
Whirlpool	99958175	6
White-Rodgers	50A50-110	6
White-Rodgers	50A50-111	6
White-Rodgers	50A50-112	6
White-Rodgers	50A50-113	6
White-Rodgers	50A50-130	6
White-Rodgers	50A50-131	6
White-Rodgers	50A50-142	6
White-Rodgers	50A50-143	6
White-Rodgers	50A50-205	6
White-Rodgers	50A50-206	6
White-Rodgers	50A50-207	5 & 6
White-Rodgers	50A50-208	6
White-Rodgers	50A50-209	6
White-Rodgers	50A50-210	6
White-Rodgers	50A50-215	6
White-Rodgers	50A50-216	6
White-Rodgers	50A50-229	6
White-Rodgers	50A50-230	6
White-Rodgers	50A50-240	6
White-Rodgers	50A50-241	6
White-Rodgers	50A50-245	6
White-Rodgers	50A50-285	5 & 6
White-Rodgers	50A50-286	6
White-Rodgers	50A50-288	5 & 6
White-Rodgers	50A50-295	6
White-Rodgers	50A50-296	6
White-Rodgers	50A50-298	5 & 6
White-Rodgers	50A50-405	6
White-Rodgers	50A50-406	6
White-Rodgers	50A50-407	6
White-Rodgers	50A50-408	6
White-Rodgers	50A50-438	6
White-Rodgers	50A50-471	6
White-Rodgers	50A50-472	6
White-Rodgers	50A50-473	6
White-Rodgers	50A50-474	6
White-Rodgers	50A50-475	6
White-Rodgers	50A50-571	6
White-Rodgers	50A55-143	6
White-Rodgers	50A55-241	6
White-Rodgers	50A55-245	6
White-Rodgers	50A55-250	6
White-Rodgers	50A55-285	6
White-Rodgers	50A55-286	6
White-Rodgers	50A55-288	6
White-Rodgers	50A55-289	6
White-Rodgers	50A55-3797	6
White-Rodgers	50A55-438	6
White-Rodgers	50A55-474	6
White-Rodgers	50A55-476	6
White-Rodgers	50A55-480	6
White-Rodgers	50A55-486	6

See Note 1

White-Rodgers	50A55-571	6
White-Rodgers	50A55-743	5 & 6
White-Rodgers	50A55-843	6
White-Rodgers	50A56-242	6
White-Rodgers	50A56-243	6
White-Rodgers	50A56-956	6
White-Rodgers	50A65-120	6
White-Rodgers	50A65-121	6
White-Rodgers	50A65-143	6
White-Rodgers	50A65-288	6
White-Rodgers	50A65-289	6
Manufacturer	**Part Number**	**Harness**
White-Rodgers	50A65-474	6
White-Rodgers	50A65-475	6
White-Rodgers	50A65-476	6
White-Rodgers	50A65-5165	6
White-Rodgers	50A65-843	6
White-Rodgers	50A66-122	6
White-Rodgers	50A66-123	6
White-Rodgers	50A66-743	6
White-Rodgers	50M56-281	5 & 6
White-Rodgers	50M56-289	6
White-Rodgers	50M56-291	5 & 6
White-Rodgers	50M56-743	5
White-Rodgers	50T35-730	1, 3 & 7
White-Rodgers	50T35-743	1, 3 & 7
White-Rodgers	50T55-288	5 & 6
White-Rodgers	50T55-289	5 & 6

WIRING DIAGRAM





12-Pin Connections
1 = Limit switch Out
2 = Low gas valve
3 = 24 VAC hot (R)
4 = Pressure switch Out
5 = Rollout switch Out
6 = 24 VAC common (C)
7 = Limit switch In
8 = Earth ground
9 = Gas valve common
10 = Pressure switch In
11 = Rollout switch In
12 = High gas valve

4-Pin Connections
1 = Inducer blower
2 = Hot Surface Ignitor (HSI)
3 = Inducer blower neutral
4 = Hot Surface Ignitor (HSI) neutral

Note 1: For American Standard/Trane, York PCLU and York P3UR furnaces: Install the black wire labeled “10” from pin 5 to pin 11 of the 12-pin harness which is connected to the furnace.

Note 2: There are some Rheem/RUUD furnace models which performed flame sense differently. Please read the information below before testing the furnace.

Note 3: For Nordyne furnaces, ICM2812-KIT will only be compatible with 120VAC models.

1. Rheem/RUUD furnaces without a separate flame sensor will require the purchase of a Rheem flame sensor kit (62-24044-71) to be wired to pin 7 of the 9-pin harness which is connected to the furnace.
2. Rheem/RUUD furnaces with a separate flame sensor which is NOT routed through the 9-pin harness will require removal of the flame sensor wire from the existing connection and rewiring it to pin 7 of the 9-pin harness which is connected to the furnace.
3. Rheem/RUUD furnaces which have a separate flame sensor already routed to pin 7 of the 9-pin harness will not require this modification.

Connect the other end of the furnace harness into the **ICM2812** harness labeled “2”, connect the other end of this harness to the ICM2812 circuit board and connect the orange wire to the “FS” (flame sensor) terminal.

ICM CONTROLS
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