WHITE-RODGERS
by COPELAND

21M51U-843

Universal Integrated Two-Stage
120V Hot Surface Ignition Control Kit

INSTALLATION INSTRUCTIONS

FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING OR OPERATING THIS CONTROL COULD CAUSE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

DESCRIPTION

The 21M51U-843 is an aftermarket universal replacement control kit for two-stage furnace products with PSC blower and inducer motors.

This control replaces Goodman/Amana, Lennox/Armstong, Trane/American Standard, and York applications.

TWINNING: 21M51U-843 can be twinned. Both control boards must be from the same manufacturer for proper functionality.

Parts included:

- 50M51-843 Integrated Furnace Control
- 21D64-2 HotRod Universal Ignitor Kit (120V)
- Trane Ignitor Mounting Bracket
- 3 – Mounting Screws
- 5 – Motor Lead Extensions
- Installation Instructions

SPECIFICATIONS

ELECTRICAL RATINGS:

Input Voltage: 120 VAC, 60 Hz (Class II transformer required)

Max. Input Current @ 24 VAC: 800mA + MV

Relay & Triac Load Ratings:

Gas Valve Relays: 1.5 amps @ 24 VAC, 60 Hz
Ignitor: 4.0 amps @ 132 VAC, 60 Hz
Inducer Relays: 2.2 FLA - 3.5 LRA @ 120 VAC
Circulator Relays: 14.5 FLA - 25.0 LRA @ 120 VAC
Humidifier Load: 1.0 A max @ 120 VAC
Electronic Air Cleaner Load: 1.0 A max @ 120 VAC

Flame Current Requirements:

Minimum current to ensure flame detection: 0.3 µA DC*

*Measured with a DC microammeter in series with flame probe lead

Operating Temperature Range:

-40° to 175°F (-40 to 80°C)

Humidity Range:

5% to 93% relative humidity (non-condensing)

Gases Approved: Natural, Manufactured, Mixed, Liquid Petroleum, and LP Gas Air Mixtures are all approved for use.

⚠ CAUTION

Risk of Electric Shock. Disconnect electric power to system until installation is complete. Do not use on circuit exceeding specified voltage. Higher voltage will damage control and could cause shock or fire hazard.

This control is not intended for use in locations where it may come in contact with water.

May cause flame rollout. Shut off main gas to heating system until installation is complete.

INSTALLATION

MOUNTING AND WIRING

Refer to Typical System Wiring Diagram on page 3.

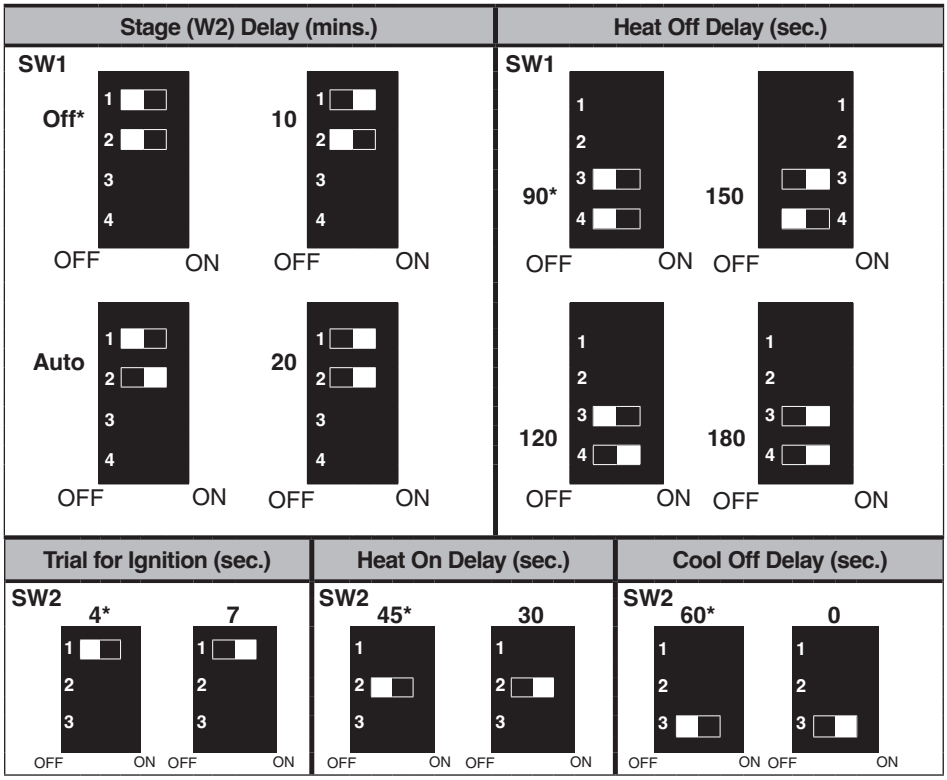
NOTE: All wiring should be installed according to local and national electrical codes and ordinances.

1. Disconnect electrical power and gas supply to unit, then remove unit access panel.
2. Mark and disconnect all wires from the existing control, then remove the old control.
3. Mount and new control board in the unit and reconnect all the wires.
4. Verify Stage Delay, Heat Off Delay, Trial for Ignition, Heat On Delay, and Cool Off Delay settings by matching prior boards configuration or refer to Dipswitch Configuration section of instructions and original OEM install manual and wiring diagrams.
5. **If replacing 50A51 control, set Trial for Ignition for 7 seconds.**
6. Secure any wiring with the provided cable ties as necessary.
7. Reinstall unit access panels and reconnect electric power and gas supply to the unit.
8. Verify unit operation by placing thermostat in heating mode and initiating a call for heat by adjusting thermostat 5 degrees above room temperature.

NOTES:

- Motor lead extensions are included to be used if the original wiring does not reach the control after mounting.
- **Lennox applications will require connection to the stand alone flame probe terminal.**
- The installer may have to modify existing ignitor hole to accommodate the larger 21D64-2 (ceramic diameter 0.394")
- **When replacing Amana 50A51-225, Amana 50A51-235, and York 50A51-243, "CIRC INPUT" is a redundant line voltage connection which should be taped and tied off.**

DIPSWITCH CONFIGURATION

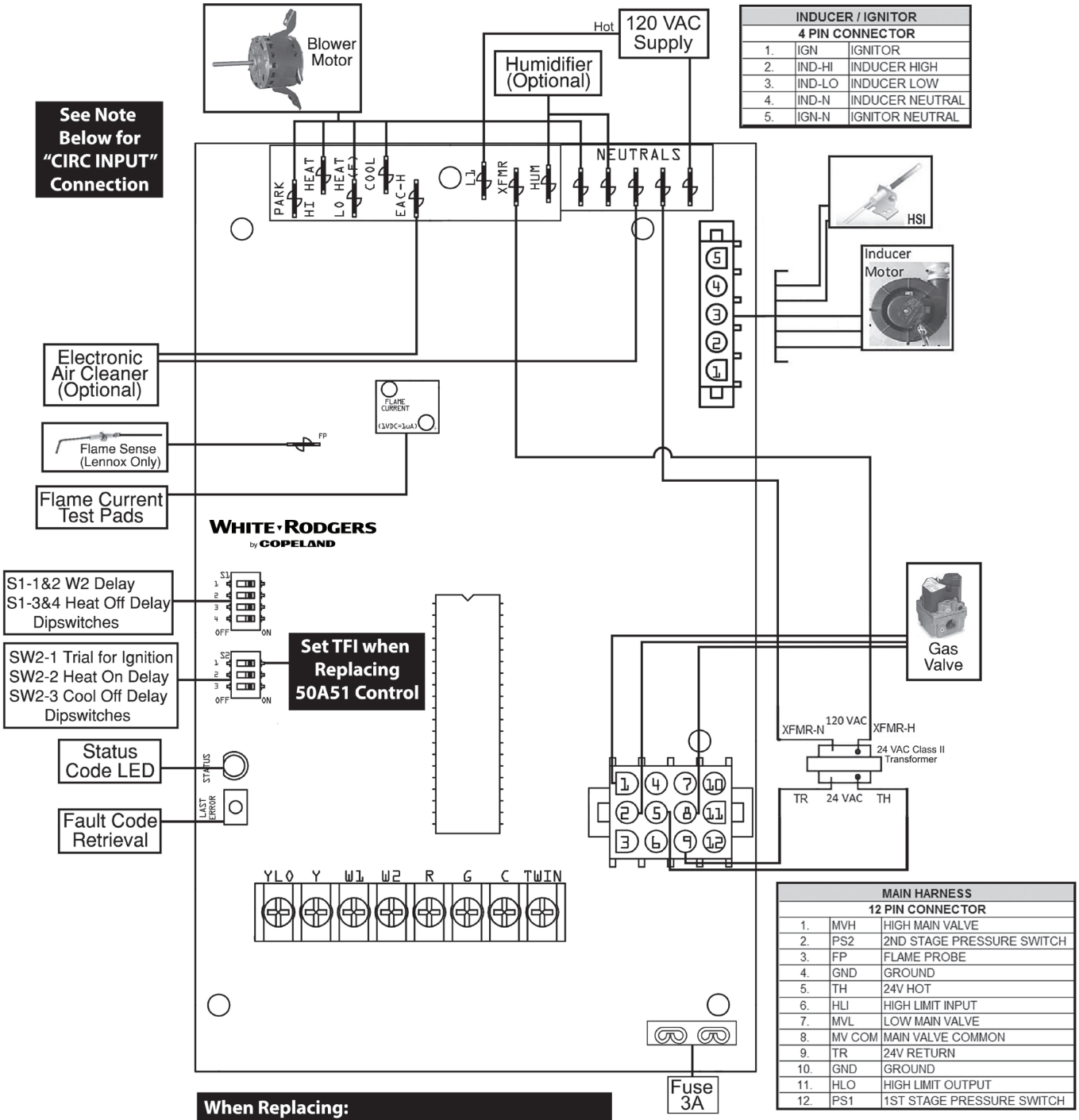


*default

NOTES:

- Cycle power after changes are made.
- For best results, set dip switches to prior boards configuration or refer to original OEM install manual for further details.
- Only use Stage W2 delay with single-stage thermostat.
- AUTO mode is based on an algorithm method of energizing the second stage gas valve based on the recent average of the heating duty cycle.

WIRING DIAGRAM



INDUCER / IGNITOR		
4 PIN CONNECTOR		
1.	IGN	IGNITOR
2.	IND-HI	INDUCER HIGH
3.	IND-LO	INDUCER LOW
4.	IND-N	INDUCER NEUTRAL
5.	IGN-N	IGNITOR NEUTRAL

MAIN HARNESS		
12 PIN CONNECTOR		
1.	MVH	HIGH MAIN VALVE
2.	PS2	2ND STAGE PRESSURE SWITCH
3.	FP	FLAME PROBE
4.	GND	GROUND
5.	TH	24V HOT
6.	HLI	HIGH LIMIT INPUT
7.	MVL	LOW MAIN VALVE
8.	MV COM	MAIN VALVE COMMON
9.	TR	24V RETURN
10.	GND	GROUND
11.	HLO	HIGH LIMIT OUTPUT
12.	PS1	1ST STAGE PRESSURE SWITCH

When Replacing:

- **Amana 50A51-225**
- **Amana 50A51-235**
- **York 50A51-243**

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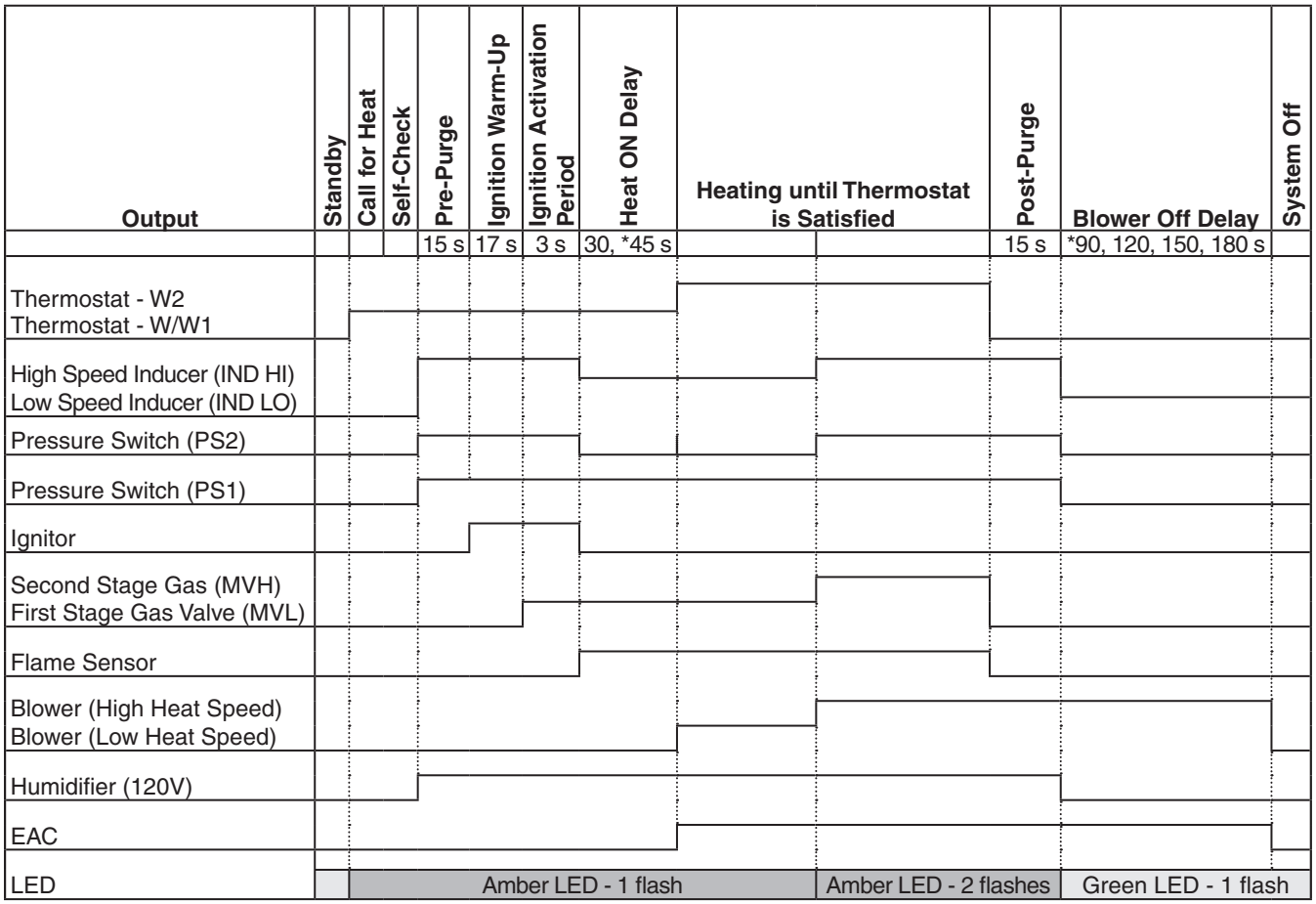
OPERATION

HEAT MODE



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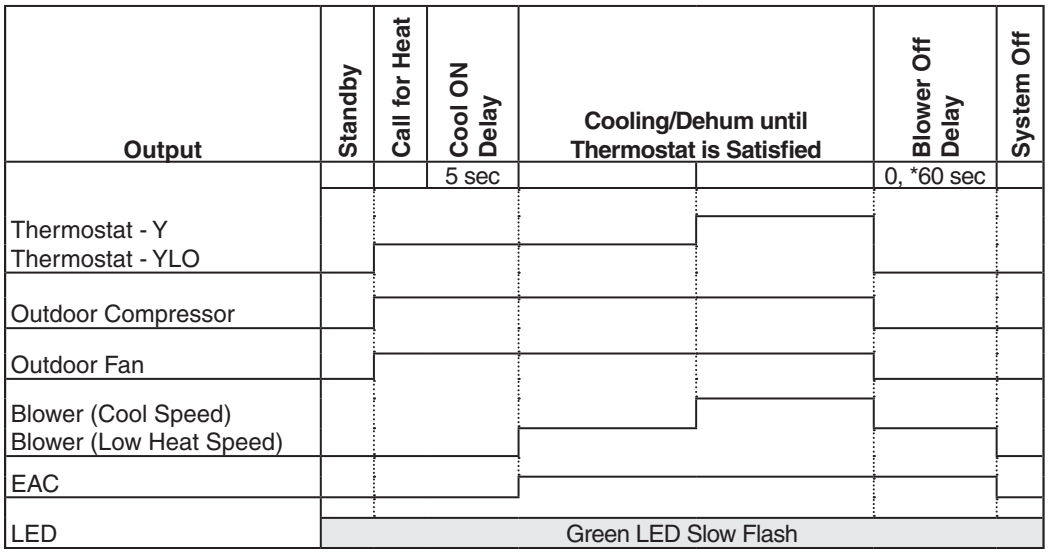
COOL MODE



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OPERATION

FAN MODE

Output	Standby	Call for Heat	Fan ON Delay	Fan until Thermostat is Satisfied	System Off
			2 sec		
Thermostat - G					
Blower (Lo Heat Speed)					
EAC					
LED	Green LED – 1 Flash				

TROUBLESHOOTING

Green LED Flash	Amber LED Flash	Red LED Flash	Error/Condition	Comments/Troubleshooting
		1	Flame sensed when no flame should be present.	Verify the gas valve is operating and shutting down properly. Flame in burner assemble should extinguish promptly at the end of the cycle. Check orifices and gas pressure.
		2	Pressure switch stuck closed/ inducer error.	Pressure switch stuck closed. Check switch function, verify inducer is turning off.
		3	1st-stage pressure switch stuck open/inducer error.	Check pressure switch function and tubing. Verify inducer is turning on the pulling sufficient vacuum to engage switch.
		4	Open limit switch.	Verify continuity through rollout switch circuit.
		5	Open rollout/open fuse detect.	Verify continuity through rollout switch circuit, check fuse.
		6	1st-stage pressure switch cycle lockout.	If the first stage pressure switch cycles 5 times (open, closed) during one call for heat from the thermostat the control will lockout. Check pressure switch for fluttering, inconsistent closure or poor vacuum pressure.
		7	External lockout (retries).	Failure to sense flame is often caused by carbon deposits on the flame sensor, a disconnected or shorted flame sensor lead or a poorly grounded furnace. Carbon deposits can be cleaned with emery cloth. Verify sensor is not contacting the burner and is located in a good position to sense flame. Check sensor lead for shorting and verify furnace is grounded properly.
		8	External lockout (ignition recycles exceeded where flame is established and then lost).	Check items for exceeded retries listed above and verify valve is not dropping out allowing flame to be established and then lost.
		9	Grounding or Reversed polarity.	Verify the control and furnace are properly grounded. Check and reverse polarity (primary) if incorrect.
		10	Control valve contacts energized with no call for heat.	Verify valve is not receiving voltage from a short. If a valve wiring is correct and condition persists, replace control.
		11	Limit switch open – possible blower failure overheating limit.	Possible blower failure, restricted air flow through appliance or duct work. Verify continuity through limit switch circuit and correct overheating cause.
		12	Ignitor contact failure.	Fault code indicates the control ignitor contacts are not functioning properly. Replace control.
		Solid	Internal fault condition.	Control contacts for gas valve not operating or processor fault. Reset control. If condition persists replace control.

TROUBLESHOOTING

Green LED Flash	Amber LED Flash	Red LED Flash	Error/Condition	Comments/Troubleshooting
		Rapid	Twinning error	Check wire connections. If condition persists, replace control.
		3 Double	2nd-stage Pressure Switch Stuck Open/Inducer Error	Check pressure switch function and tubing. Verify inducer is turning on and pulling sufficient vacuum to engage switch.
	1		Normal Operation with call for first stage heat	Normal operation - first stage
	2		Normal Operation with call for second stage heat	Normal operation - second stage
	3		W2 present with no W1	Second stage call for heat on thermostat circuit with no call for first stage. Verify dip switches are set for two stage thermostat and check thermostat first stage circuit. Configured for a multi-stage thermostat the control will not initiate heating unless first stage call from thermostat is received.
	4		Y present with no G call	Control will allow cooling to operate with only a "Y" signal from the thermostat but will also trigger this code. Verify thermostat is energizing both "Y" and "G" on call for cool. Check "G" terminal connections.
	Rapid		Low flame sense current	Low flame sense current is often caused by carbon deposits on the flame sensor, a poorly grounded furnace or a mis-aligned flame sense probe. Carbon deposits can be cleaned with emery cloth. Check for improve furnace and module ground. Verify sensor is located in or very near flame as specified by the appliance manufacturer.
1			Call for cool	Normal operation.
Solid			Standby	Waiting for call from thermostat or receiving thermostat call for cool.

SYSTEM LOCKOUT AND DIAGNOSTIC FEATURES

FAULT RECALL

When the control is in standby mode (no call for heat or cool), press the "LAST ERROR" button for approximately one – five seconds. The LED will flash up to five stored fault codes, beginning with the most recent. If there are no fault codes in memory, the LED will flash two green flashes.

FAULT CODE RESET

When the control is in standby mode (no call for heat or cool), press the "LAST ERROR" button for five to ten seconds or until the diagnostic LED begins to rapid flash. The LED will flash three green flashes when the memory has been cleared.

CONTROL RESET

1. Interrupt the call for heat at the thermostat for at least one second but less than 20 seconds (if flame is sensed with the gas valve de-energized, interrupting the call for heat at the thermostat will not reset the control).
2. Interrupt the 24 VAC power at the control for at least 20 seconds. You may also need to reset the flame rollout sensor switch.
3. After 1 hour in lockout, the control will automatically reset itself.

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