

# White-Rodgers 50M56U-801 Universal Single Stage Integrated Furnace Control



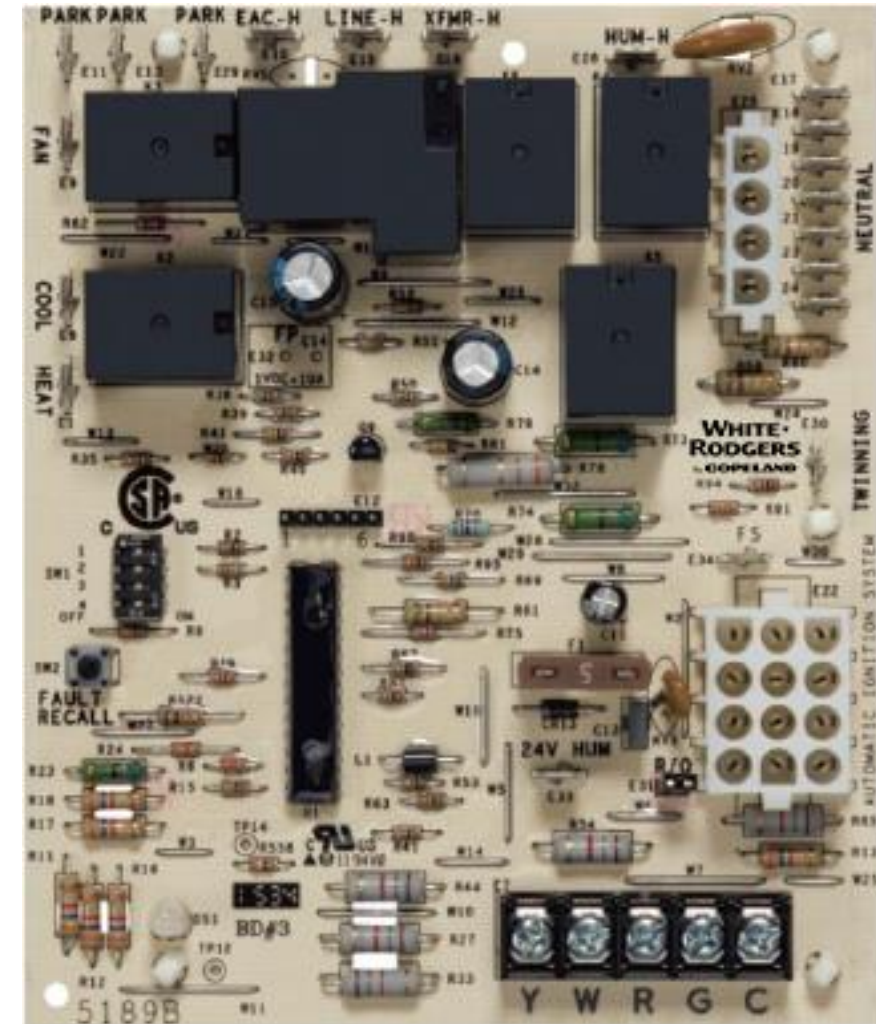
# Business and Product Overview

# What is It?

The 50M56U-801 Universal Single Stage Furnace Control is designed to replace virtually all 120V Lennox HSI single stage furnace controls using a PSC blower motor.

It employs a microprocessor to continually monitor, analyze and control the proper operation of the gas burner, inducer, and fan.

The kit contains two harness assemblies, and cross references 28 OEM part numbers from Lennox, Armstrong, Ducane, AirEase, Concord, and Aire-Flo.

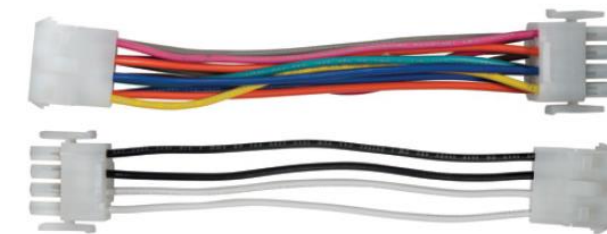
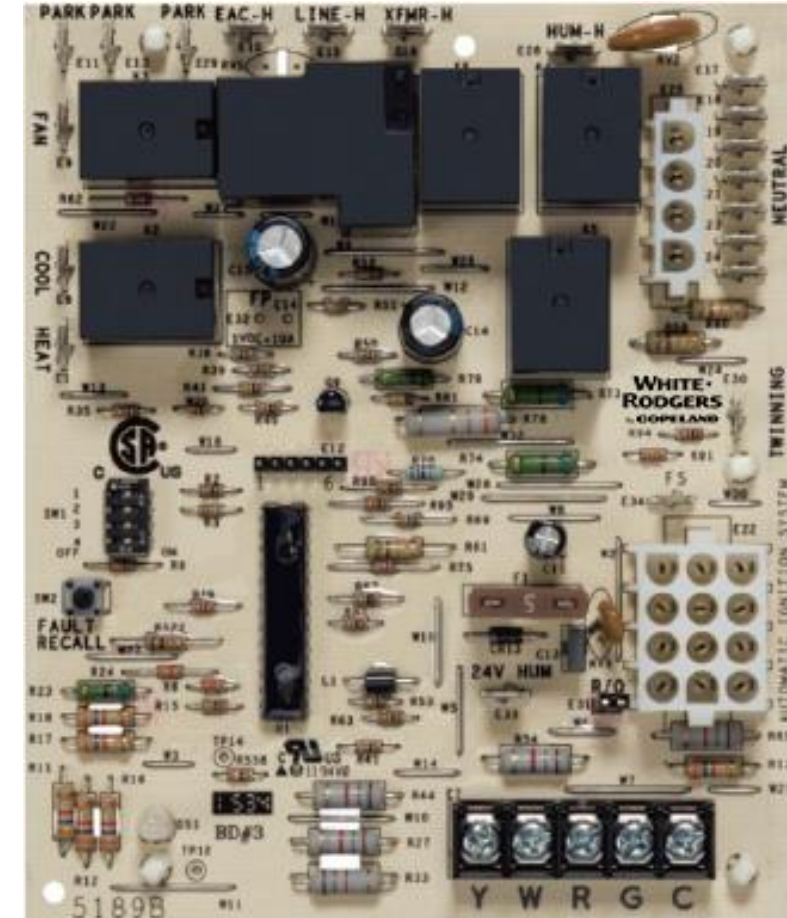


**50M56U-801**

# Features and Benefits

## The 50M56U-801 Universal Single Stage Furnace Control offers:

- 120V Hot Surface Ignition
- 3 Speed PSC Blower Motor
  - Heat, Cool, Fan Only supported
- Flame current test pads
  - Easy on-board checkout
- Blower Delay Dipswitches
  - Match all OEM options
- Advance diagnostic for servicing
  - Simple push-button to retrieve fault codes
  - Tri-color LED shows operational status and fault codes
- Pin to Socket converter harnesses when needed
- Two options for flame sensor connection



50M56U-801

# 50M56U-801 Cross Reference

The 50M56U-801 Universal Single Stage Furnace Control replaces 28 SKUs from Lennox, Armstrong, Ducane, AirEase, Concord, and Aire-Flo.

LENNOX, ARMSTRONG, AIREASE, CONCORD, DUCANE, AIRE-FLO		
100973-01*	103098-01	78M4701*
100973-02*	1195-83-100A	80M2701
1012-83-9673A	1195-100	81W03*
1012-967	12L4201	81W11
1012-968	17W70*	94W83
1012-969*	50A55-120	R47582-001
1012-969A*	56L8501	
1012-977A	56W19	
103085-01	74W03	
103085-02	75M1701*	
103085-03	78M1701*	



\*Requires 120V Ignitor (21D64-2 / HotRod)

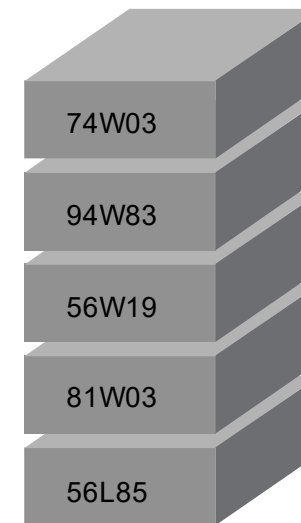
# Business Case

- 50M56U-801 is widely available through White-Rodgers' distributor network.
  - Avoid replacement part shipping delays from direct OEM purchase.
- 28 Cross References and 1 Universal board to replace 5 OEM options:
  - Fewer parts to stock for distributors
  - Fewer parts to keep on trucks for service calls for contractors
- No competitive products currently exist in the aftermarket.



*1 White Rodgers product*

**VS**



*5 Lennox products*

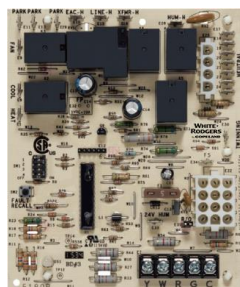


# Lennox Family Brands Universal IFC

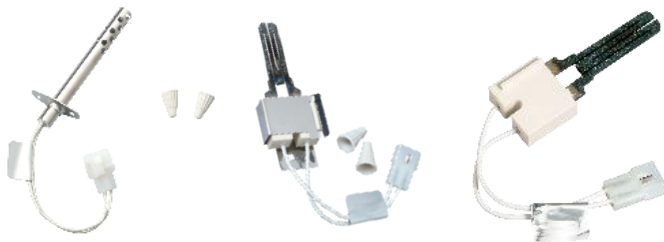
## Competitive Comparison

	81W03	56W19	94W83	74W03	W-R 50M56U-801
Ignitor/ Inducer Connections	Sockets	Pins	Pins	Sockets	<b>2 Harnesses Covers all combinations</b>
Main Harness Connections	Pins	Pins	Pins	Sockets	
Flame Sense	Dedicated 3/16" Spade	In Main Harness	In Main Harness	Dedicated 3/16" Spade	<b>Both Options</b>
Timings (sec): Heat On Heat Off Cool On Cool Off	45 60/90/120/180 0 0	30 60/90/120/180 1 60	30 60/90/120/180 2 60	30 60/90/120/180 2 45	<b>30/45 60/90/120/180 2 45/60</b>
Fan Speeds	Heat Cool	Heat Cool Fan	Heat Cool Fan	Heat Cool Fan	<b>Heat Cool Fan</b>
Stand-off Locations	✓	✓	✓	✓	✓
Ignitor Voltage	95V (Replace with HotRod)	120V	120V	120V	<b>120V</b>

# Extensive Lennox Offerings



*Integrated Furnace Controls*



*Ignitors*



*Fan timer*



*SureSwitch*



*Defrost control*



*Gas valves*

OFFERING	MODEL NUMBERS	CROSS REFERENCES
1 & 2 Stage Integrated Furnace Controls	50M56U-801 50D50-801 21D83M-843 50A66-743 50M56X-843 21M51U-843 21V51U-843	688+ Parts Replaced
Ignitors, Nitride & Carbide	789A-801A1 768A-844 767A-361 767A-371 767A-372 767A-373 790-801A1	30+ Parts Replaced
Fan Timer (ICP)	50F06-843	162 Parts Replaced
Defrost Controls	47D01U-843	396 Parts Replaced
SureSwitch	49M11-843	550+ Parts Replaced
Gas Valves	36C03-333 36H32-423 36H33-412 36H64-463 36J22-214 36J54-214 36J24-214	1000+ Parts Replaced

# Customer Driven Packaging

## Easy To Merchandise, Select, And Use

**WHITE RODGERS**  
... FURNACE & BLADE

**Integrated Furnace Control**  
50M56U-801 | Lennox/Allied Air

**Single Stage Applications**  
PSC Blower Motor  
120V HSI Ignition

Replaces Most Lennox Family Controls

Trusted by **PROs**

**1-Year Limited Warranty**

**WHITE RODGERS**  
... FURNACE & BLADE

**Cross Reference Replacement / Tableau de renvoi des remplacements**

Lennox, Armstrong, AirEase, Concord, Ducane, Aire-Flo		
100973-01*	103098-01	78M4701*
100973-02*	1195-83-100A	80M12701
1012-83-9673A	1195-100	81W03*
1012-967	12L4201	81W11
1012-968	17W70*	94W83
1012-969*	50A55-120	R47582-001
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103085-02	75M1701*	
103085-03	78M1701*	

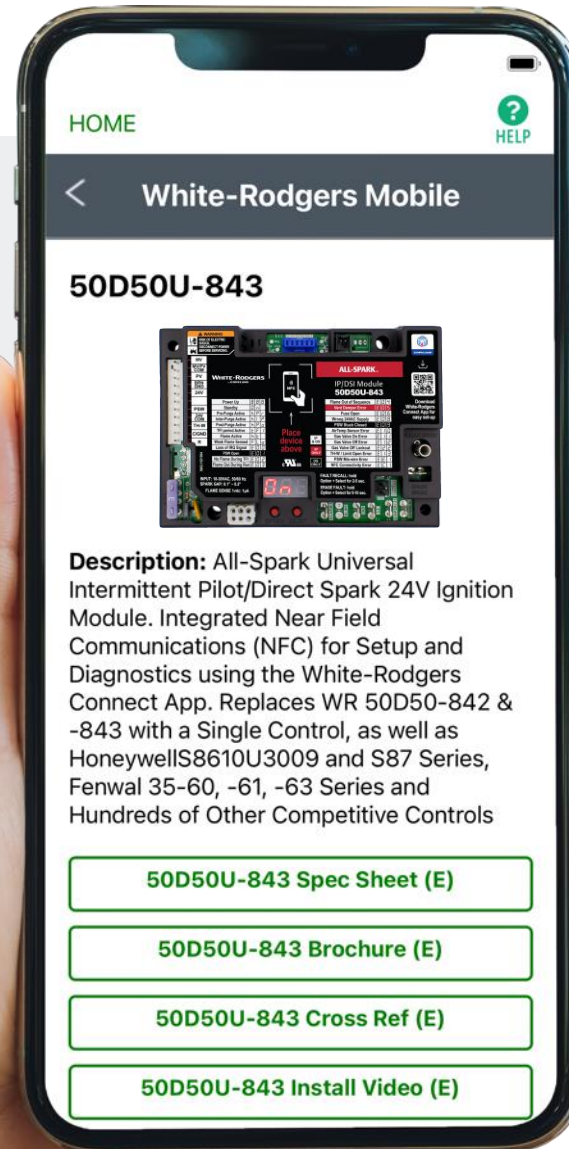
\*Requires 120V Ignitor (21D64-2)

1. Universal or Direct OEM
2. Product Type & Color Code
  - a) Red = Indoor Units
  - b) Purple = Outdoor Units
  - c) Gold = Commercial
3. Model Number
4. Large Product Image(s)
5. Key Attributes
  - a) Stages
  - b) Blower Motor Type
  - c) Ignitor Voltage
  - d) Other
6. Cross Reference on Carton

# Comprehensive Cross Reference & Product Information

Find the right part while on the job.

Search by OEM, Competitor and White-Rodgers part numbers.



## Your on-the-go resource for:

- Complete cross reference
- Product information and spec sheets
- Installation information and videos
- Wiring diagrams
- Select product by features
- Priority technical support

## WR Mobile App

Search for “WR Mobile” in both Apple and Google Play Stores



## Desktop Version

Access the online version [HERE](#)

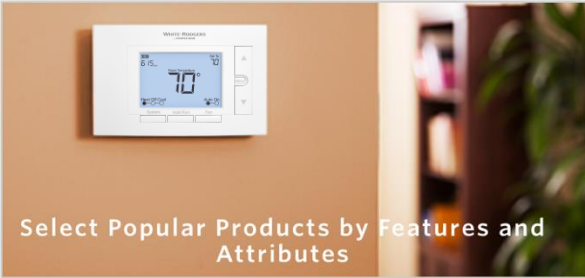
# White-Rodgers Cross Reference

Go to: <https://webapps.copeland.com/wrproductselector/>


- Enter the Model Number or click on: Search Replacement Heating Controls by Major OEM Brand

**COPELAND****WHITE-RODGERS™**

White-Rodgers Cross-Reference and Product Information



Select Popular Products by Features and Attributes



Search Replacement Heating Controls by Major OEM Brand

# Our commitment to you

## Industry Leading Products

- Used by more OEM's
- Offering the widest range of Universal Replacement Controls

## Ease of Installation

- Simple, easy to understand instructions

## Product Reliability

- Quality Control assures reliable products

## Affordable

- Competitive pricing

## Supported by Knowledgeable Representatives

- Contractor direct phone support



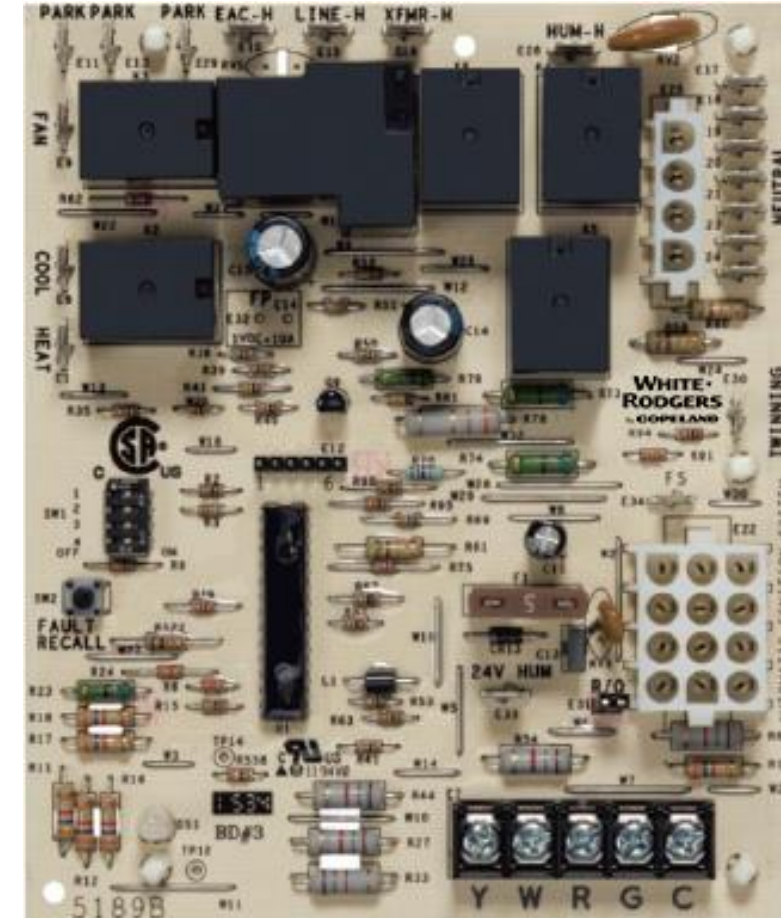


# Technical Overview

# Features and Benefits

## The 50M56U-801 Universal Single Stage Furnace Control offers:

- 120V Hot Surface Ignition
- 3 Speed PSC Blower Motor
  - Heat, Cool, Fan Only supported
- Flame current test pads
  - Easy on-board checkout
- Blower Delay Dipswitches
  - Match all OEM options
- Advance diagnostic for servicing
  - Simple push-button to retrieve fault codes
  - Tri-color LED shows operational status and fault codes
- Pin to Socket converter harnesses when needed
- Two options for flame sensor connection



**50M56U-801**

# EAC / Humidification

Supports Lennox HUM Outputs for either 24V or 120V operation.

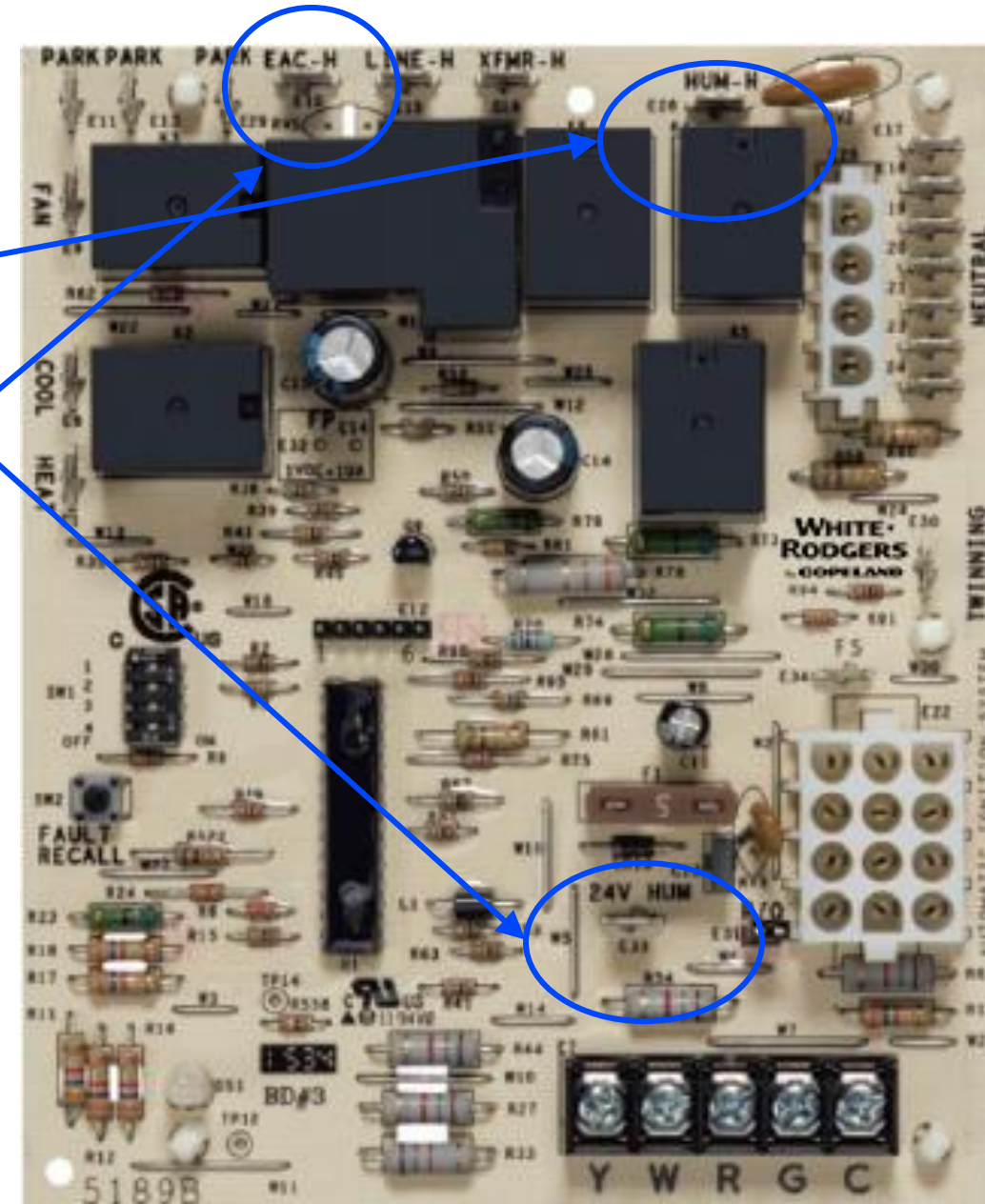


120V EAC spade connection at top of the board.



120V

24V

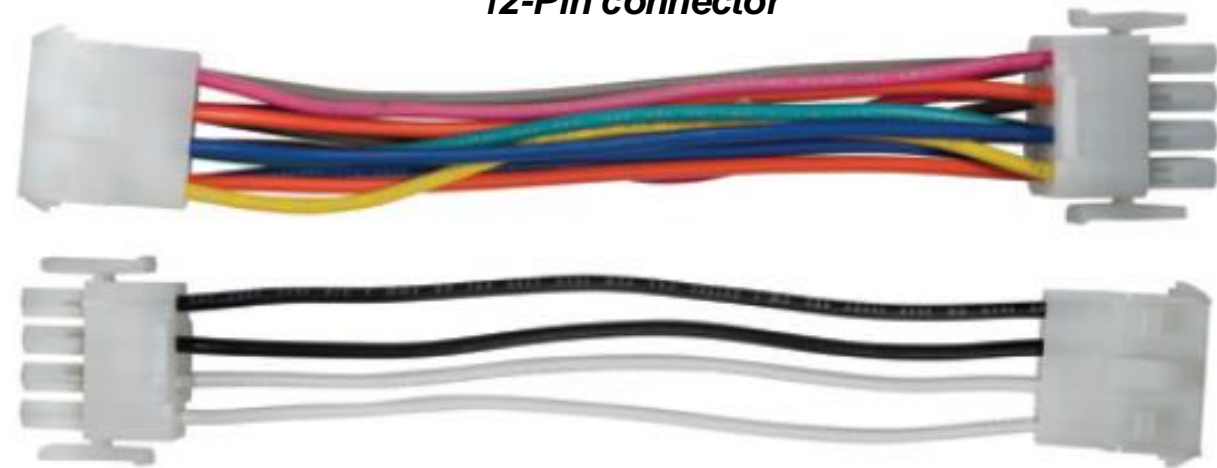


# Features and Design

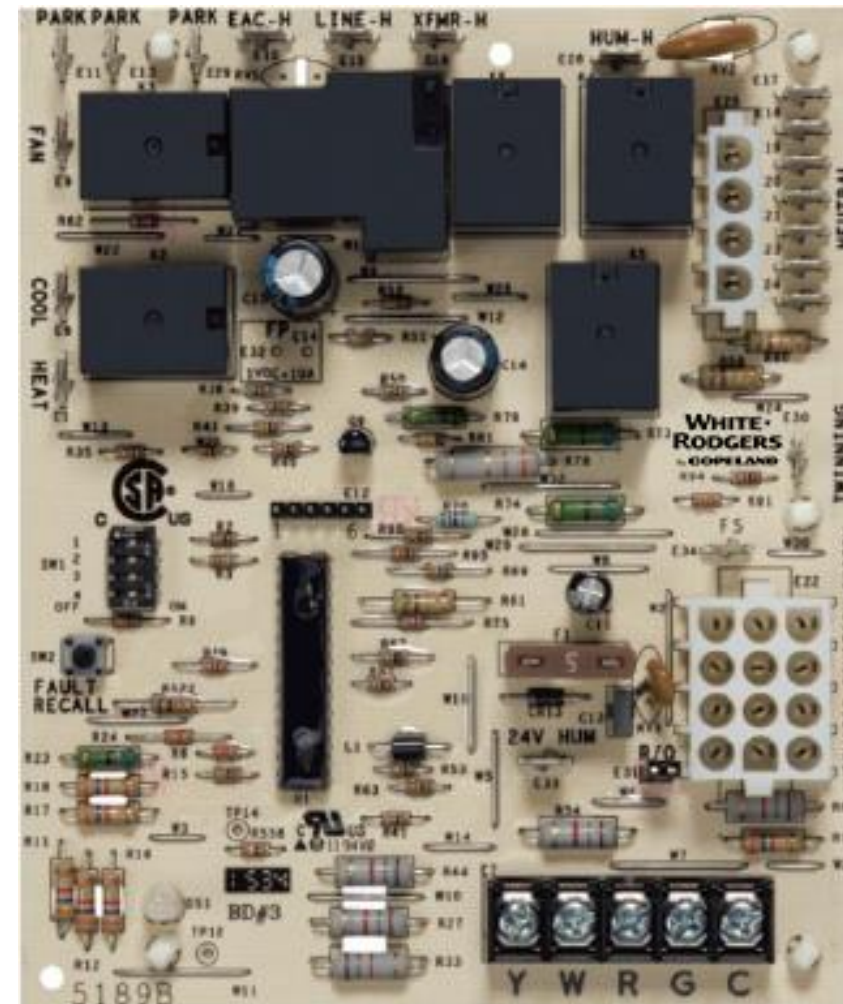
Harnesses that can adapt pin or socket connections for **main system wiring**  
**12-pin connector** and/or the **ignitor/inducer 4-pin connector**.



*12-Pin connector*



*Ignitor/inducer 4-pin connector*



# Specs

## Electrical Ratings @77°F (25°C)

**Input Voltage:** 25 VAC 50 / 60Hz

**Maximum Input Current:** .045 amp @ 25 VAC

**Gas Valve Relay:** 1.5 amp 0.6 PF @ 30 VAC

**Ignitor Relay:** 1.2 amp @120 VAC 50/60 Hz

**Inducer Relay:** 2.8 amp @120 VAC

**Circulator Relay:** 10.0 FLA-25.0 LRA @120 VAC

**Humidifier Load:** 1.0 amp @24 VAC or 120 VAC

**Electronic Air Cleaner:** 1.0 amp @120 VAC

## Flame Current Requirements

**Minimum Current to Insure Flame Detection:**

0.25  $\mu$ A DC\*

**Maximum Current for Non-Detection:** 0.10  $\mu$ A DC\*

**Maximum Allowable Leakage Resistance:**

100 M ohms

## Operating Temperature

-40 to 175°F

## Humidity Range

5% to 93% RH (non-condensing)

## Mounting

Snap in standoffs

## Timing Specifications (@60 Hz)

**Flame Establishing Time:** 0.8 sec

**Flame Failure Response Time:** 2.0 sec

NOTE: At 50 Hz, all timing specifications should be increased by 20%.

\*Measured with a DC microammeter in the flame probe lead.

# 50M56U-801 Cross Reference

## LENNOX, ARMSTRONG, AIREASE, CONCORD, DUCANE, AIRE-FLO

100973-01*	103098-01	78M4701*
100973-02*	1195-83-100A	80M2701
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103085-03	78M1701*	

\* Requires 120V Ignitor (21D64-2 / HotRod)



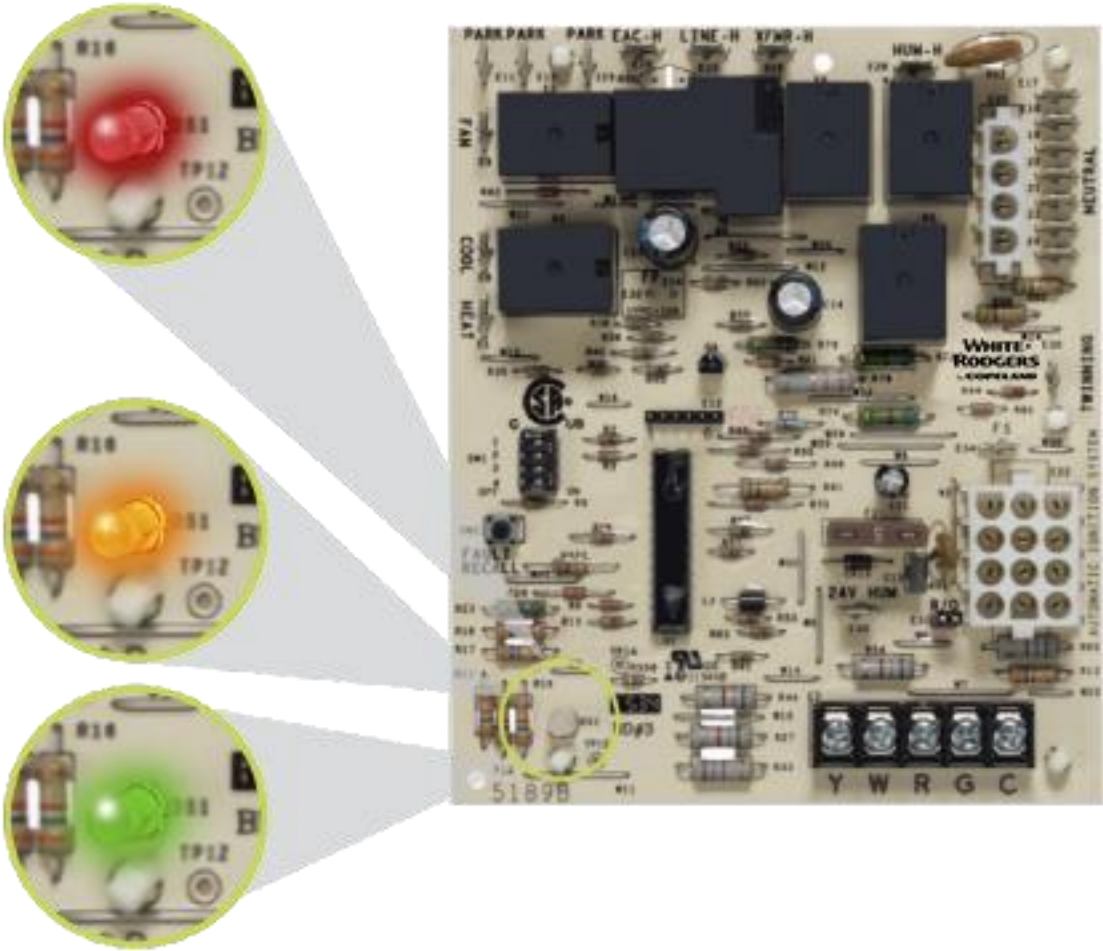
**WR HotRod  
Nitride 21D64-2**

# Troubleshooting

## Fault and Status Codes

The LED will indicate fault or status codes as shown in the table below. Please refer to installation instructions for comments and troubleshooting guide.

GREEN LED FLASH	AMBER LED FLASH	RED LED FLASH	ERROR/CONDITION
			Below Flash Codes Shall Be Stored if Fault Occurs
		1	Open Flame Rollout Switch or fuse
		2	Pressure Switch Open Lockout
		3	Pressure Switch Stuck Open / Inducer Error
		4	High Limit Switch Open
		5	Open Flame Rollout Switch or Fuse
		6	Pressure Switch Open Lockout
		7	Retry - External Lockout
		8	Recycle - External Lockout
		9	Reversed 120 VAC Line Polarity or Bad Ground
		10	Gas Flow with No Call for Heat
		12	Ignitor Relay Failure



# Troubleshooting

## Fault and Status Codes

The LED will indicate fault or status codes as shown in the table below. Please refer to installation instructions for comments and troubleshooting guide.

GREEN LED FLASH	AMBER LED FLASH	RED LED FLASH	ERROR/CONDITION
			Below Flash Codes Shall Be Stored if Fault Occurs
	Rapid		Weak Flame Sensed
		Blink Continuous	Twinning error
		Solid	Internal Fault
	1		Normal Heat Mode Operation
	4		Y present with no G call
Solid			Standby Mode
Blink Continuous			Normal Fan Mode Operation (G)
1			Normal Operation with call for cool (Y + G)
2 sec ON the OFF			Control Power ON Display Indication
OFF	OFF	OFF	No Power

NOTE: Continuous Blink flash code shall use 250ms ON time and 250ms OFF time for LED blink.



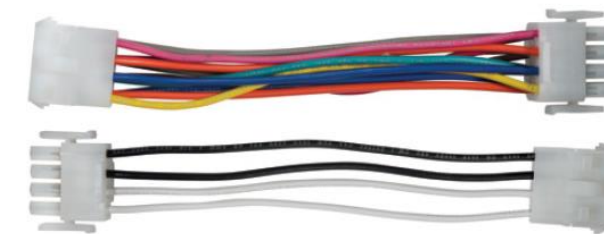
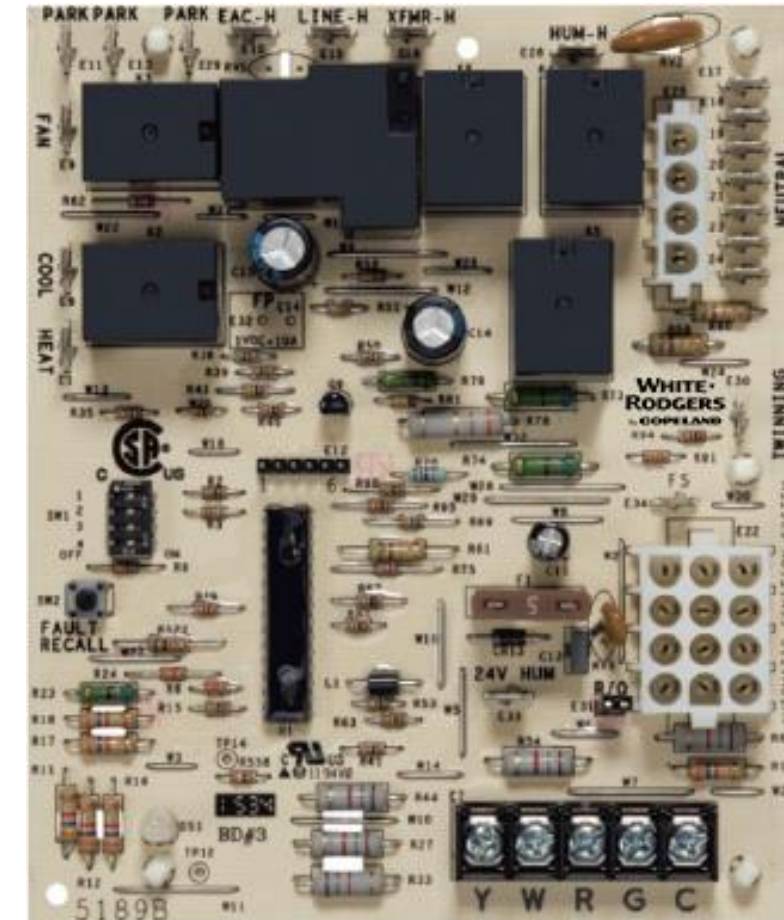
# Installation Overview

# Introduction

The 50M56U-801 kit is an HSI Integrated Furnace Control designed to replace virtually all 120V Lennox HSI single stage furnace controls using a PSC blower motor.

It employs a microprocessor to continually monitor, analyze and control the proper operation of the gas burner, inducer, and fan.

The kit contains two harness assemblies, and cross references 28 OEM part numbers from Lennox, Armstrong, Ducane, AirEase, Concord, and Aire-Flo.



**50M56U-801**

# What's in the Box?

## Lennox Single Stage 50M56U-801

- 1 – Ignition Control with four mounting standoffs
- 2 – Wire ties
- 1 – Installation instruction sheet
- 1 – 4-pin adapter harness
- 1 – 12-pin adapter harness
- 1 – Control Box Label
  - Fault & Status Codes
  - Dipswitch Settings

Cool off Delay

Heat on Delay

SW1

SW1

OFF

ON

2s

30s\*

Heat off Delay

SW1

SW1

OFF

ON

60s

90s

SW1

SW1

OFF

ON


120s\*

180s

\* = Default

Note: Cycle power after changes are made.

For Complete Instruction Manual:



**WHITE RODGERS**  
by **COPELAND**

5001-9310

TROUBLESHOOTING			
Green LED Flash	Amber LED Flash	Red LED Flash	Error/Condition
Below flash codes shall be stored into flash if fault occurs			
		1	Flame Present Without Gas Valve Energized
		2	Pressure Switch Stuck Closed / Inducer Error
		3	Pressure Switch Stuck Open / Inducer Error
		4	High Limit Switch Open
		5	Open Flame Rollout Switch or fuse
		6	Pressure Switch Open Lockout
		7	Re-try - External Lockout
		8	Recycle - External Lockout
		9	Reversed 120VAC Line Polarity or Bad Ground
		10	Gas Flow with No Call for Heat
		12	Ignitor Relay Failure
Below flash codes shall NOT be stored into flash			
		Rapid	Weak Flame Sensed
		Blink Continuous	Twinning Error
		Solid	Internal Fault
		1	Normal Heat Mode Operation
		4	Y present with no G call
			Standby mode
			Normal Fan Mode Operation (G)
			Normal Operation with call for cool (Y + G)
		2 sec ON then OFF	Control Power ON Display Indication
		OFF	No Power

Note: Continuous blink flash code shall use 250ms ON time and 250ms OFF time for LED blink. Faults will erase from memory after 14 days.

FAULT RECALL - Press button for approximately 2 seconds or until the LED turns off

**WHITE RODGERS**  
by **COPELAND**

**50M56U-801**  
Single Stage I Direct I HSI  
Integrated Furnace 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.

CONTENTS

Description

Electrical Specifications

Installation

Wiring Diagram

Operation

System Lockout and Diagnostic Features

Troubleshooting

Definition of Terms and Timing Specifications

DESCRIPTION

The 50M56U-801 is a HSI Integrated Furnace Control designed to replace virtually all 120V Lennox HSI single stage furnace controls using a PSC blower motor. It employs a microprocessor to continually monitor, analyze, and control the proper operation of the gas burner, inducer, and fan. The Kit contains:

• 50M56-801 Integrated Furnace Control

• 2 Harness Assemblies

• Control Label

• Wire Ties

• Installation Instructions

ELECTRICAL SPECIFICATIONS

Electrical Specifications (97°F dry @ 20 deg C)	
Input Voltage	24 VAC 60Hz
Max Input Current	45A @ 24 VAC
Gas Valve Relay	1.5 amp 1/2 HP @ 30 VAC
Igniter Relay	1.2 amp @ 120 VAC
Inducer Relay	2.8 amp @ 120 VAC
Circulator Relay	10 amp FLA @ 120 VAC
Circulator Relay	25 amp LRA @ 120 VAC
Humidifier Load	1.5 amp @ 24 VAC or 120 VAC
Electronic Air Cleaner	1.0 amp @ 120 VAC
Minimum current to insure flame detection	0.25 uA DC
Maximum current for non-detection	0.1 uA DC
Maximum allowable leakage resistance	100 M ohms

Operating Temperature Range	
40°F to 170°F (4°C to 80°C)	

Humidity Range	
5% to 95% relative humidity (non-condensing)	

UL Listing	
Surface mount components	

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

Timing Specification	
Flame Establishment Time	0.5 sec
Flame Failure Response Time	2.0 sec

\*Measured with a DC microammeter in the flame probe lead

white-roddgers.com  
emersonclimate.com

PART NO. 37-7616B  
37-7616A  
1629

**WHITE RODGERS**  
by **COPELAND**

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# Harness Selection Table





## OEM REPLACEMENT INSTRUCTIONS – 50M56U-801

Follow Appliance Manufacturer’s recommended installation or service instructions to ensure proper operation after Installation.

LENNOX MODEL FURNACE USING CONTROL:	NOTE: Ignitor must be replaced with 120V Ignitor (Recommend 21D64-2) 75M21 Ignitor	LENNOX, ARMSTRONG, DUCANE FURNACES USING CONTROL:	<ul style="list-style-type: none"><li>Remove existing control and verify part number to be replaced</li><li>Reference Wiring diagram</li><li>Plug in all connections</li></ul>
81W03		56W19	
1012-969A		94W83	
17W70		R47582-001	
100973-01,02		103085-01	
1012-969		1012-967	
78M4701		103085-02	
LENNOX MODEL FURNACE USING CONTROL:	<ul style="list-style-type: none"><li>Remove existing control and verify part number to be replaced</li><li>Reference Wiring diagram</li><li>Install harness <b>0115-0303</b> into the Inducer and Ignitor 4-pin connector</li><li>Connect flame sense to 3/16" FS spade</li><li>Plug in remaining connections</li></ul>	LENNOX, ARMSTRONG, DUCANE FURNACES USING CONTROL:	
78M1701		103085-03	
75M1701		1012-83-9673A	
		1012-977A	
		81W11	
		56L8501*	
		12L4201*	
LENNOX MODEL FURNACE USING CONTROL:	<ul style="list-style-type: none"><li>Remove existing control and verify part number to be replaced</li><li>Reference Wiring Diagram</li><li>Install harness <b>0115-0303</b> into the Inducer and Ignitor 4-pin connector.</li><li>Install harness <b>0115-0302</b> into the main 12-pin connector.</li><li>Connect flame sense to 3/16" FS spade</li><li>Plug in remaining connections.</li></ul>	LENNOX, ARMSTRONG, DUCANE FURNACES USING CONTROL:	
74W03		50A55-120*	
103098-01		80M2701	
1195-100		1012-968	
1195-83-100A			

\*Connect flame sense to 3/16" FS spade

# Pre-Install Steps

 <b>WARNING</b>			
<p>Failure to comply with the following warnings could result in personal injury or property damage.</p>			
<p><b>FIRE HAZARD</b></p> <ul style="list-style-type: none"><li>• Do not exceed the specified voltage.</li><li>• Replace existing control with exact model and dash number.</li><li>• Protect the control from direct contact with water (dripping, spraying, rain, etc.).</li><li>• If the control has been in direct contact with water, replace the control.</li><li>• Label all wires before disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.</li><li>• Route and secure wiring away from flame.</li></ul> <p><b>SHOCK HAZARD</b></p> <ul style="list-style-type: none"><li>• Disconnect electric power before servicing.</li><li>• Ensure proper earth grounding of appliance.</li><li>• Ensure proper connection of line neutral and line hot wires.</li></ul> <p><b>EXPLOSION HAZARD</b></p> <ul style="list-style-type: none"><li>• Shut off main gas to appliance until installation is complete.</li></ul>			

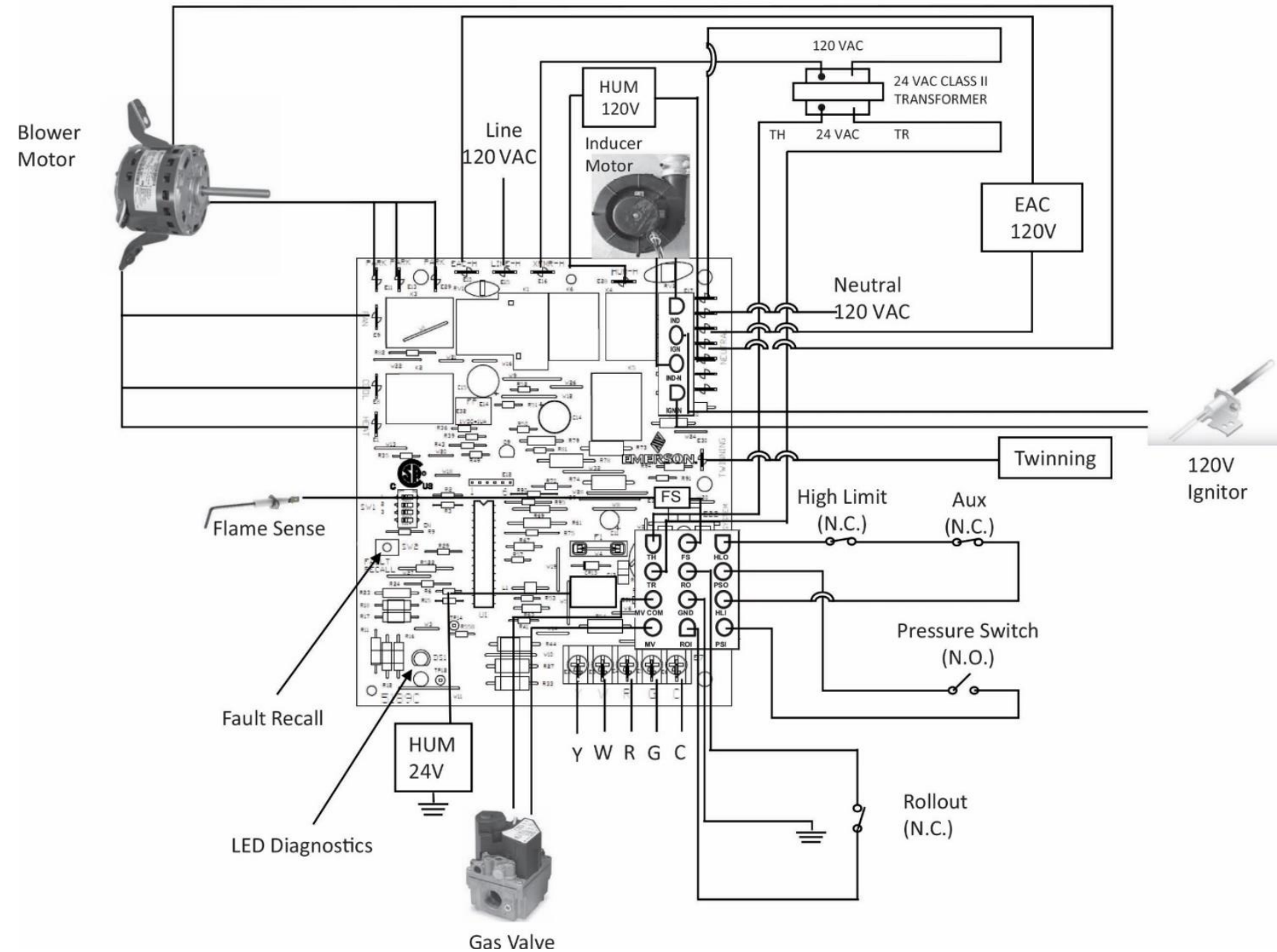
 <b>WARNING</b>
<p>All installation procedures should be carried out <b>ONLY</b> by a qualified Heating and Air Conditioning contractor or licensed electrician, according to Local and National Electrical codes and Ordinances.</p>

NOTE: It's always a good idea to snap a quick picture before you get started.

Follow warnings found in your installation sheet prior to beginning replacement.

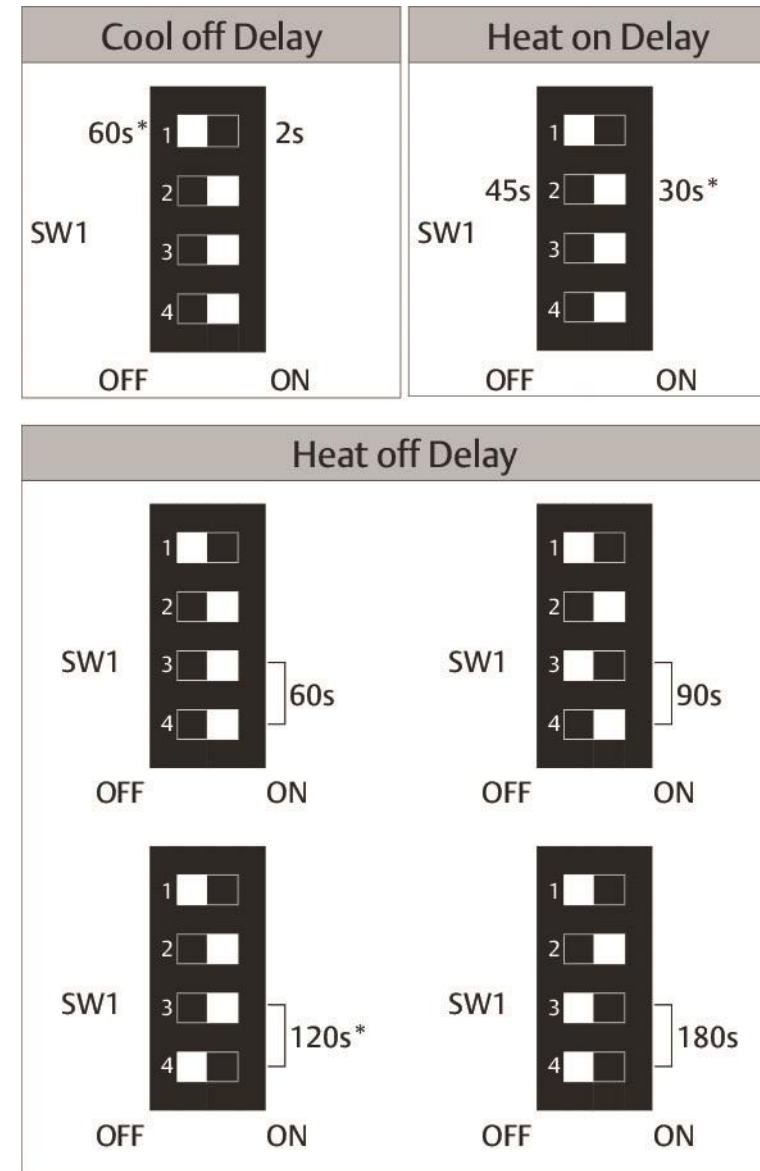
# Wiring Diagram

A detailed wiring diagram can be found in your instruction sheet or online.



# Dipswitch Configuration

Adjust dipswitches for easy blower configuration.



\* = Default

Note: Cycle power after changes are made.

# Operation: Heat Mode

Time Output	Standby	Call for Heat (W)	Self-Check	Pre-Purge (15 seconds)	Ignitor Warm up (17-19 Seconds)	Ignition Activation Period (<3s)	Heat ON Delay* Selectable (30/45 seconds)	Heating until Thermostat Satisfied	Post-Purge (25 seconds)	Blower Off Delay* 60/90/120/180 Seconds	System off
Thermostat											
Inducer											
Pressure Switch											
Ignitor											
Gas (MV)											
Flame Sensor											
Blower Motor											
Humidifier (120V)											
Humidifier (24V)											
EAC											
LED											

NOTE: See instruction sheets in packaging for full list of operation modes.

\*All Dipswitch timing changes made during an active call will not go into effect until the next active call.

# Ignitor Replacement

Ensure you replace 95V Ignitor (Lennox p/n 75M21) with a 120V when on the 81W03 Platform

## Best Practice:

- Match the ignitor voltage to the output of the new 50M56U-801 control board (120V) using a universal ignitor (WR HotRod Nitride 21D64-2).

\* Requires 120V Ignitor (21D64-2 / HotRod)

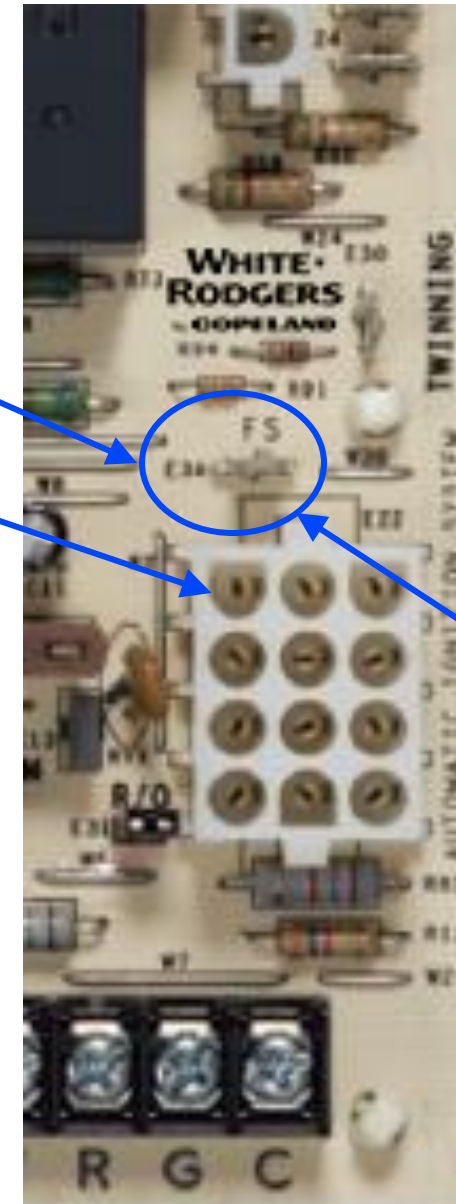


**WR HotRod  
Nitride 21D64-2**

# Flame Sensor

Two-options for connecting the flame sensor:

- Some systems connect the flame sensor to 3/16" spade labeled "FS" as a manual step
- Other systems have the flame sensor connected through a factory wiring plug to the 12-pin main system connector.
  - No additional step necessary.

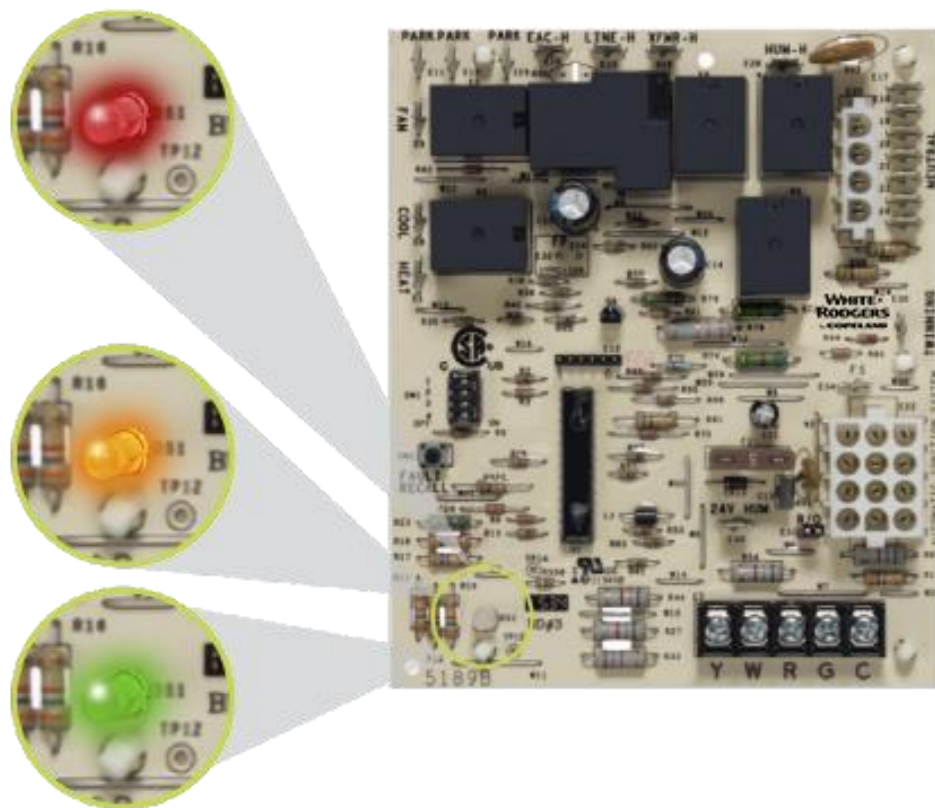


**WR 790-801A1**  
**Lennox Flame Sensor**

NOTE: Full details are available on page 2 of the Installation Instructions.

# Tri-Color LED for Status and Fault Codes

A Tri-Color LED communicates with either Green, Amber, or Red, eliminating potential confusion from diagnosing system faults/status codes from single color options.



The 50M56U-801 continuously monitors its own operation and the operation of the system.

- If a failure occurs, the LED will indicate a failure code as shown on page 5 of the instruction sheets in product packaging.
  - Includes Fault Recall and Fault Code Reset instructions

## System Status

- Standby
- Heat
- Cool
- Fan

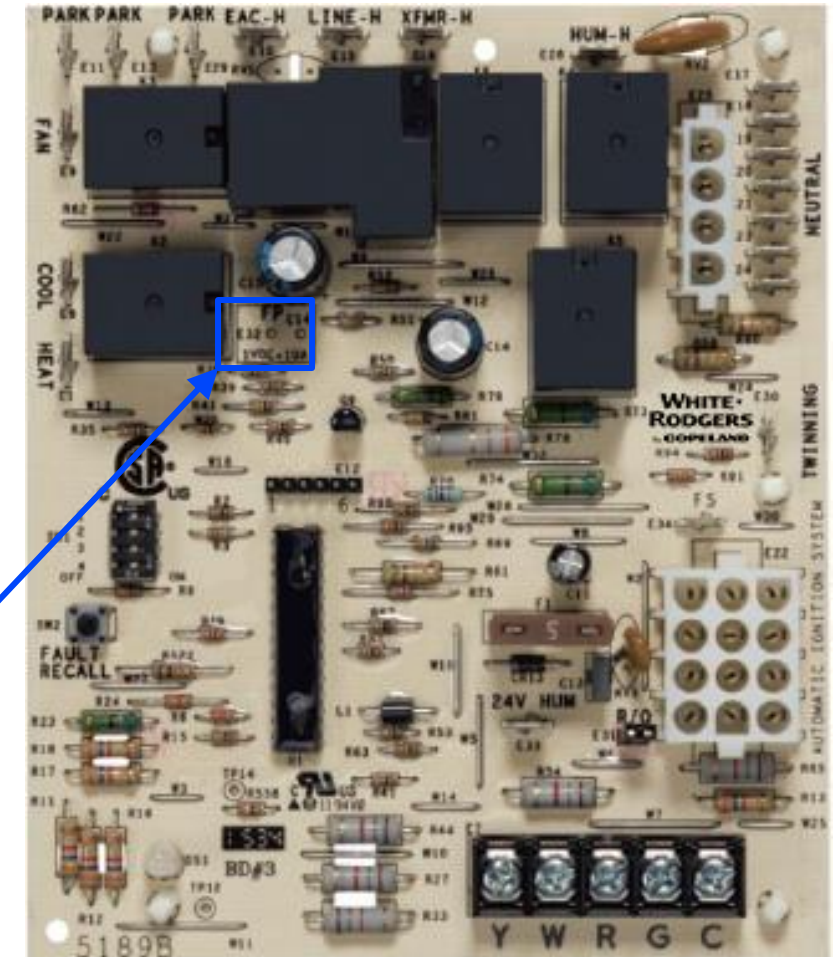
## Trouble Fault Codes

- Open Limit
- Pressure Switch
- Voltage Error
- Reverse Polarity
- (See Fault Label for more)

# Flame Current Test Pad Feature

Easy access test pads provide valuable, diagnostic information to technicians and improve service call performance.

- Set meter to DC volt scale and place leads on test pads with the furnace burners on.
- Reading results: 0.5 – 1.0 = marginal, 1.0 – 5.0 = good
- Note: Lower than acceptable readings will cause furnace control to halt operation and display a rapid **Amber LED flash** code = Weak Flame Error (as shown on Control box label). Flame sensor should be cleaned or replaced as needed.



*Flame current  
test pads*



**VS**



**COPELAND**

Thank you.