

# **50M56U-801**

## **Universal Single Stage Integrated Furnace Control**

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Lennox Family Brands

# Business and Product Overview

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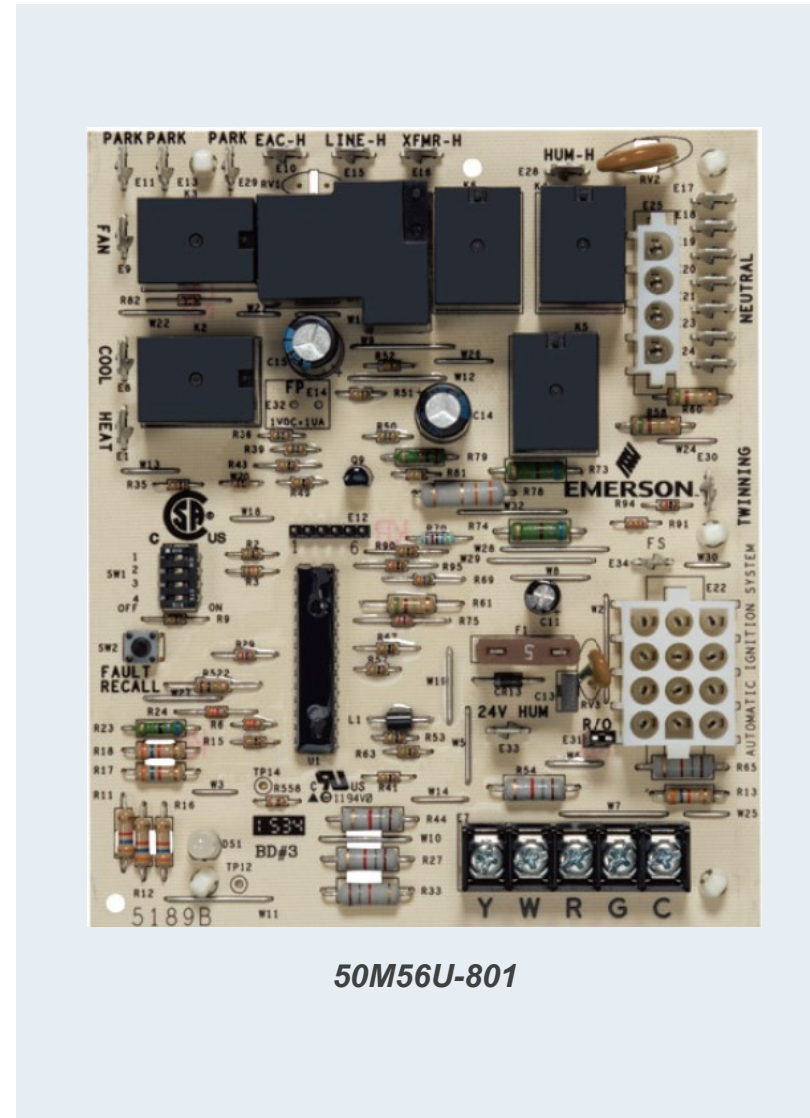
50M56U-801 Single-Stage  
Integrated Furnace Control

# 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.

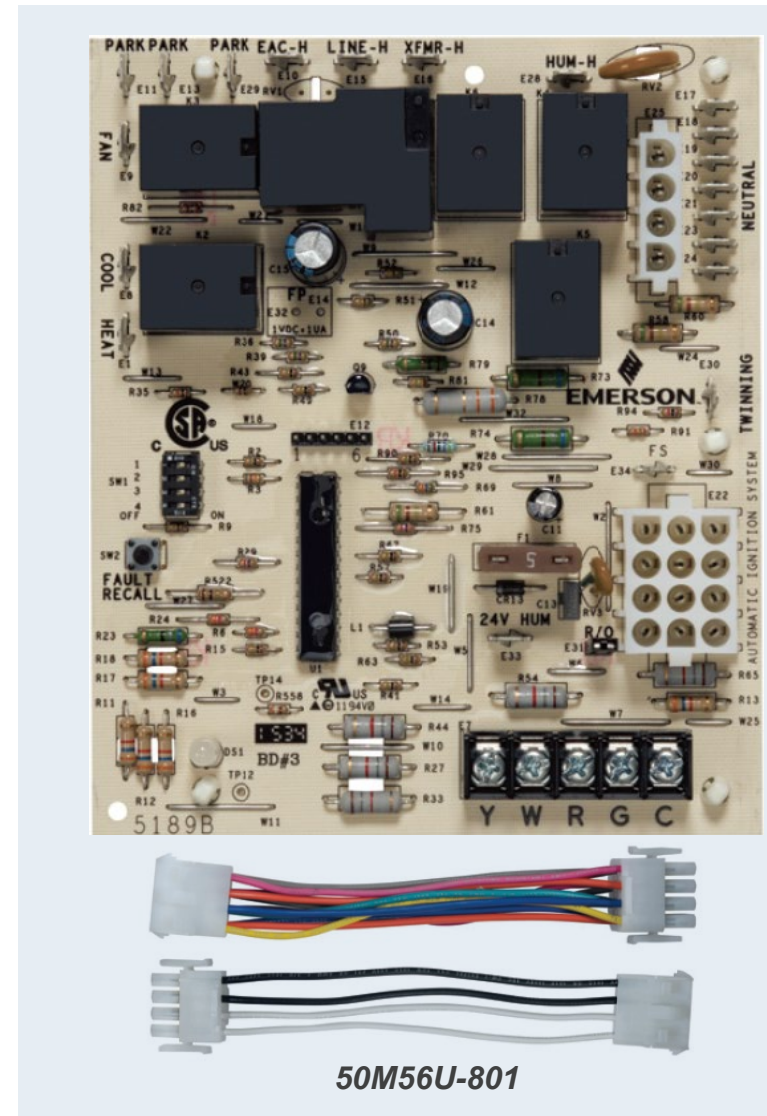
The kit contains two harness assemblies, and cross references 28 OEM part numbers from Lennox, Armstrong, Ducane, AirEase, Concord, and Aire-Flo.



# 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 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:

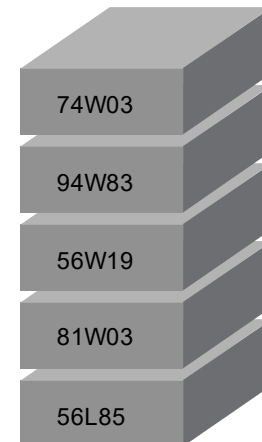
- Fewer parts to stock for distributors
- Fewer parts to keep on trucks for service calls for contractors

No competitive products currently exist in the aftermarket.



**1 White Rodgers product**

**VS**



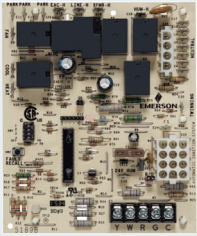
**5 Lennox products**

# Lennox Family Brands Universal IFC

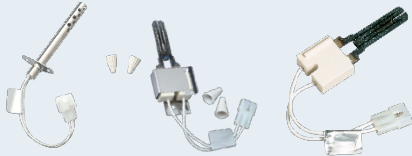
## Competitive Comparison

	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	45	30	30	30	<b>30/45</b>
Heat Off	60/90/120/180	60/90/120/180	60/90/120/180	60/90/120/180	<b>60/90/120/180</b>
Cool On	0	1	2	2	<b>2</b>
Cool Off	0	60	60	45	<b>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**



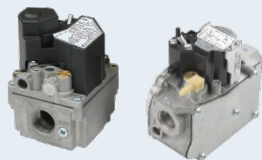
**Fan timer**



**SureSwitch**



**Defrost control**



**Gas valves**

Offering	Model Numbers	Cross References
1 & 2 Stage Integrated Furnace Controls	50M56U-801 50D50-801 21D83M-843 50A66-743 50M56U-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	49P11-843	284 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™

**2** **Integrated** Furnace Control

50M56U-801 | Lennox/Allied Air

**5** **Single Stage Applications**


PSC Blower Motor

120V HSI Ignition


**Replaces Most Lennox Family Controls**

Trusted by **PROs**

**3**




**4**



**1**

D  
 OEM Direct

**1-Year** Limited Warranty



**EMERSON**  
Climate Technologies

**6** **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	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)

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

# WR Mobile App

Always up-to-date and easy to use:

- Mobile App
- White-Rodgers Website



Your resource for:

- Product information and spec sheets
- Complete Cross Reference
- OEM compatibility
- Installation information and videos
- Wiring diagrams

Download:

- Go to your app store
- Type in **WR Mobile**
- Install the app



OR

- Open your camera
- Hold it over the QR code
- Tap “Open” on the pop-down
- Install the app



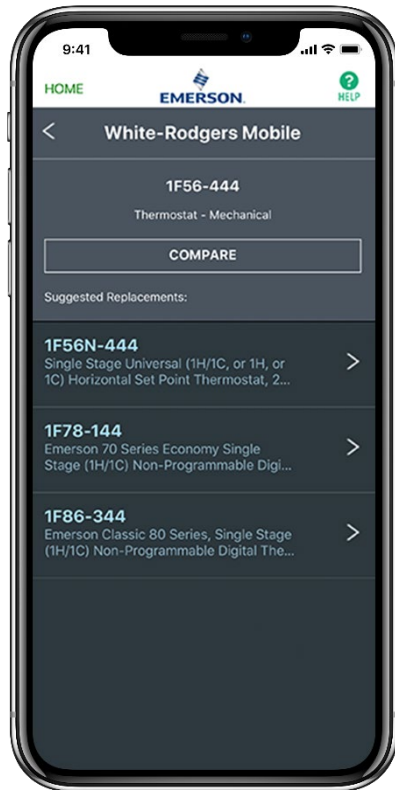
# WR Mobile App

Easy to use!

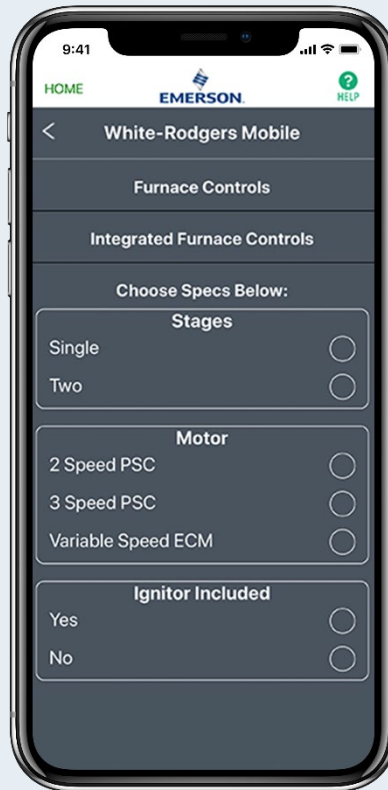
Search by OEM, Competitive, or White-Rodgers Model Number



## Product Number

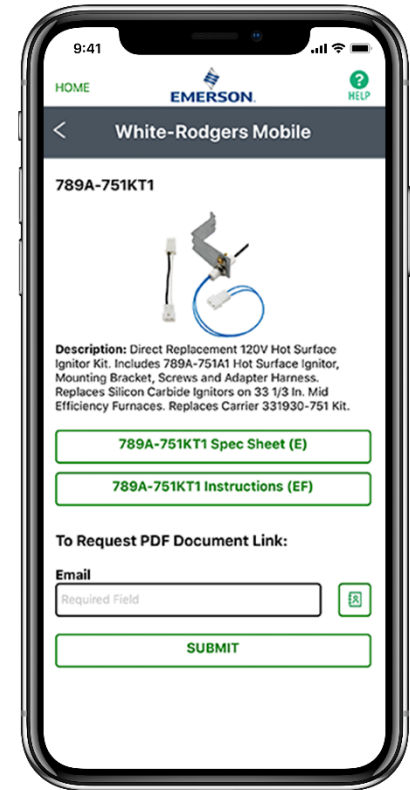


## Scrollable Product List



Lennox 1-Stage

## WR Replacement



# White-Rodgers Cross Reference

Go to: [www.whiterodgers.com](http://www.whiterodgers.com)

- Hover over Tools & Resources
- Click on: White-Rodgers Cross Reference/Product Information
- Enter the Model Number or click on: Search Replacement Heating Controls by Major OEM Brand

The screenshot shows the Emerson website's navigation bar and a dropdown menu. The navigation bar includes links for Emerson.com, About Us, Investors, Careers, Contact Us, News & Events, Sign In, and United States (English). Below the navigation bar, the 'CLIMATE TECHNOLOGIES' section is visible, with 'Tools & Resources' highlighted. The dropdown menu lists various resources, including 'White-Rodgers Cross Reference/Product Information', which is pointed to by a green arrow.

Emerson.com About Us Investors Careers Contact Us News & Events Sign In United States (English)

CLIMATE TECHNOLOGIES

EMERSON Products Industries Training & Support **Tools & Resources** Expertise Search Q

Transforming How People and Work

Drawing on our expertise and global perspective, we combine technology to develop HVACR and infrastructure solutions for our customers.

TOOLS & RESOURCES

- Air Conditioning Webinars
- Application Engineering Knowledge Center
- Copeland Online Product Information
- E360
- Ebooks
- HVAC On Air Podcasts
- HVACR Calculators
- Mobile Apps
- The Helix
- Where To Buy
- [White-Rodgers Cross Reference/Product Information](#)
- Product Selection Software

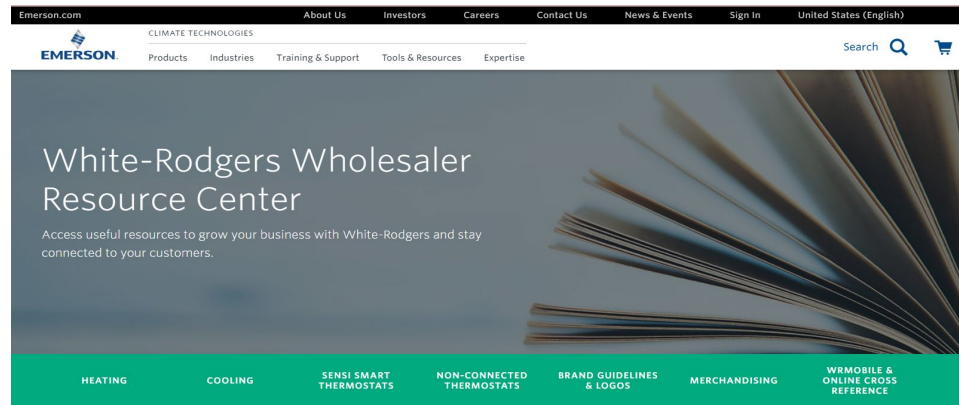
# Wholesale Resource Site

Access useful resources to grow your business.

Visit: <https://climate.emerson.com/en-us/brands/white-rodgers/white-rodgers-wholesaler-resource-center>

You'll find videos, stocking lists and product launch information for the following product families:

- Heating Controls
- Cooling Controls
- Sensi Smart™ Thermostats
- Traditional Thermostats
- Contractor Rewards
- Product Merchandising



The comfort in knowing Emerson is there.

Confidence comes from knowing your reputation is in good hands; that you have the stability of an industry leader by your side; that they've been in the game for 125 years and they'll be around for a whole lot longer. That's the comfort you feel when you recommend Emerson, because you know you're working with the best for your customers and your business.

[BROCHURE](#)

# Why Contractors Trust White-Rodgers

## 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

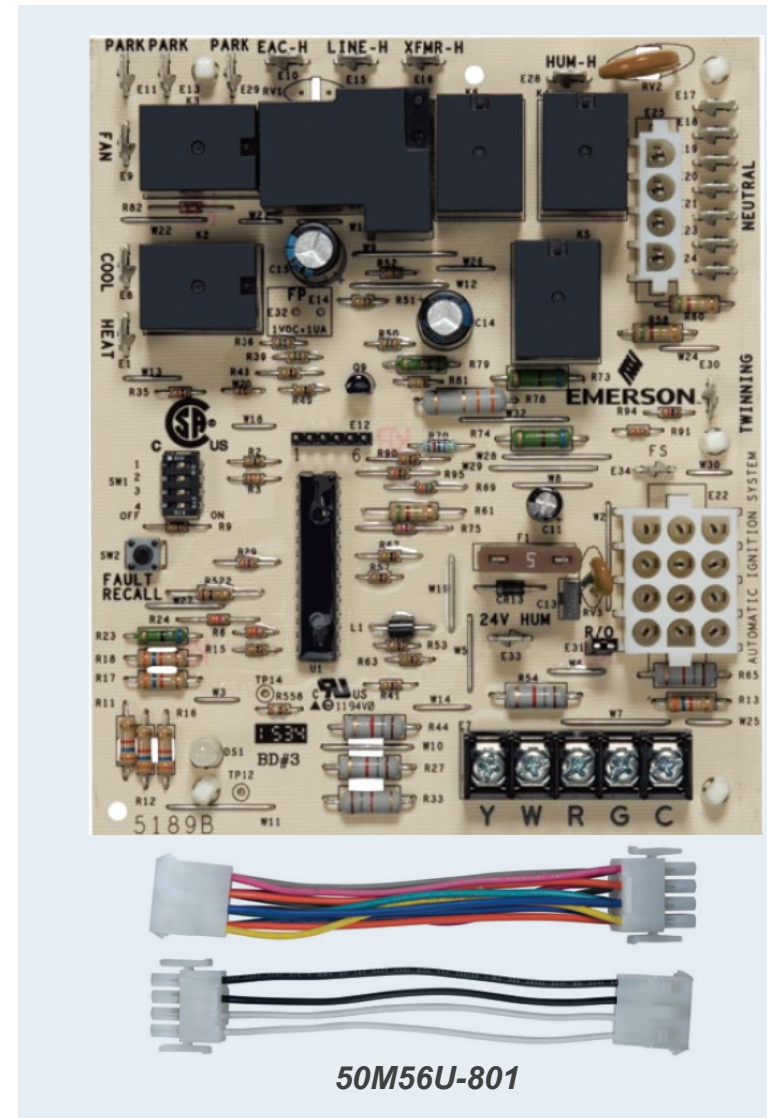
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50M56U-801 Single-Stage  
Integrated Furnace Control

# 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





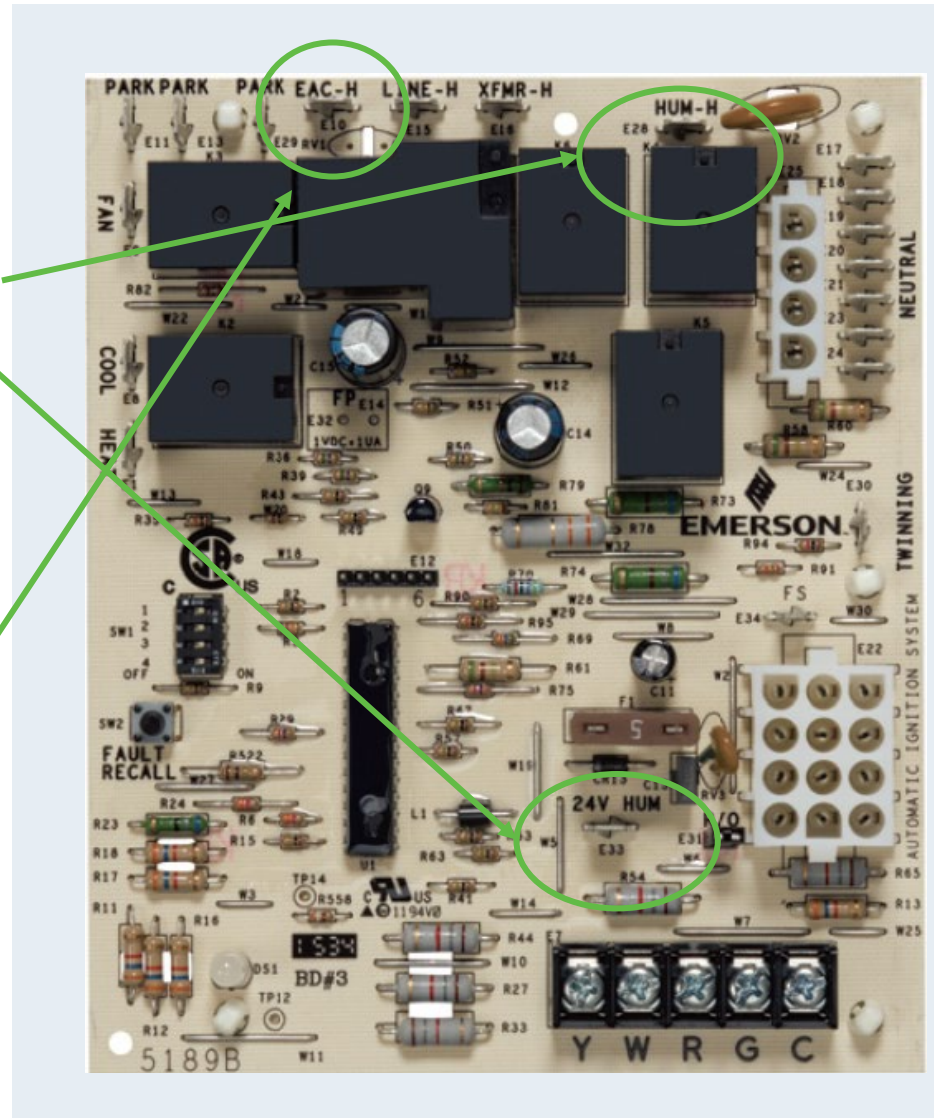
# EAC / Humidification

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



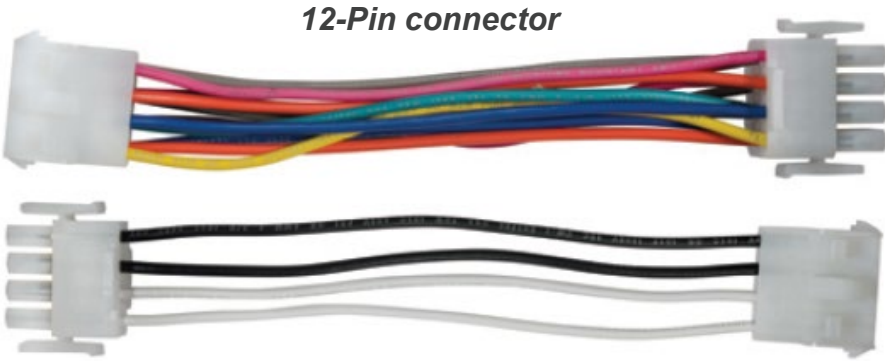
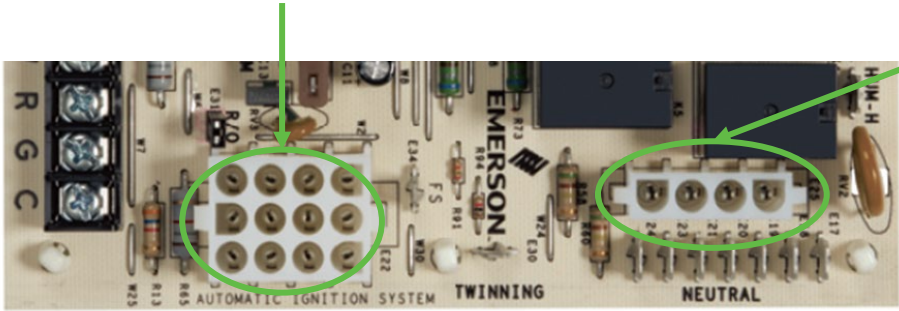
120V  
24V

120V EAC spade connection at top of the board.



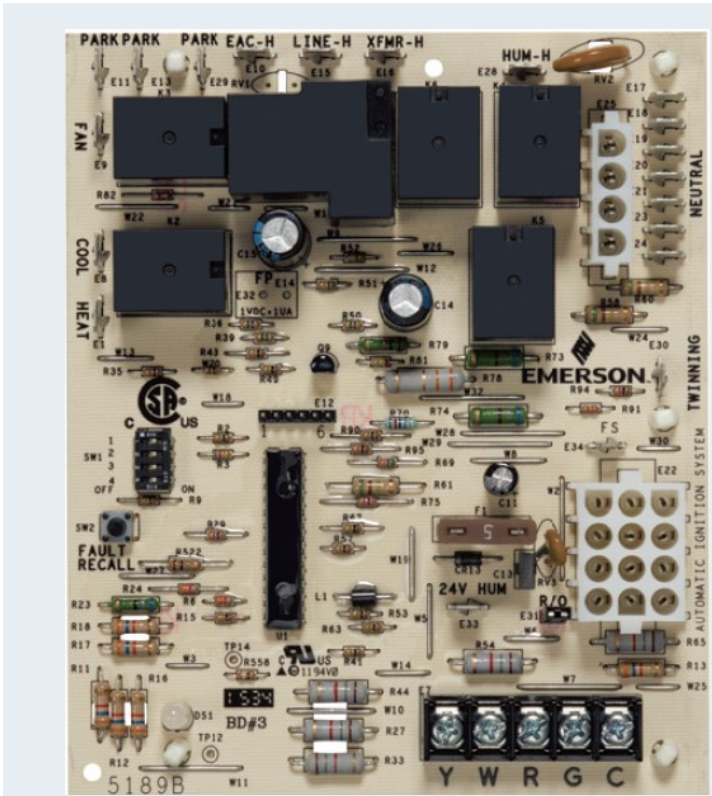
# Features and Design

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

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## 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 uA DC\*

**Maximum Current for Non-Detection:** 0.10 uA DC\*

**Maximum Allowable Leakage Resistance:** 100 M ohms

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

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

## 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

# 50M56U-801 Cross Reference

Lennox, Armstrong, AirEase, Concord, Ducane, Aire-Flo

100973-01*	103098-01	78M4701*
100973-02*	1195-83-100A	80M2701
1012-83-9673A	1195-100	81W03*
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103085-01	74W03	
103085-02	75M1701*	
103085-03	78M1701*	

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



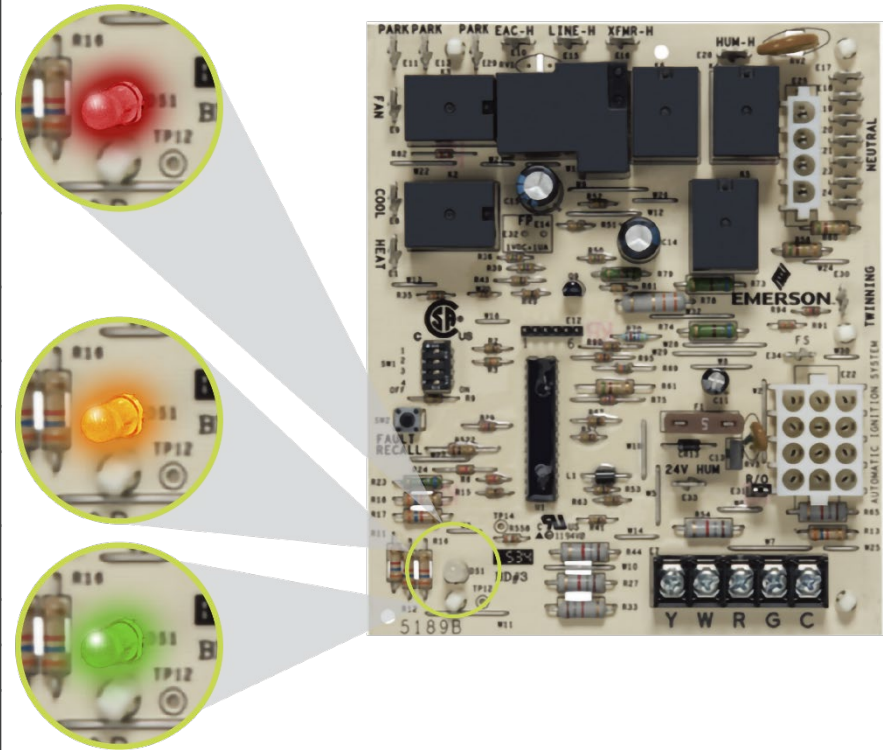
**WR HotRod  
Nitride 21D64-2**

# 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
<b>Below Flash Codes Shall NOT Be Stored</b>			
	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.

# Install

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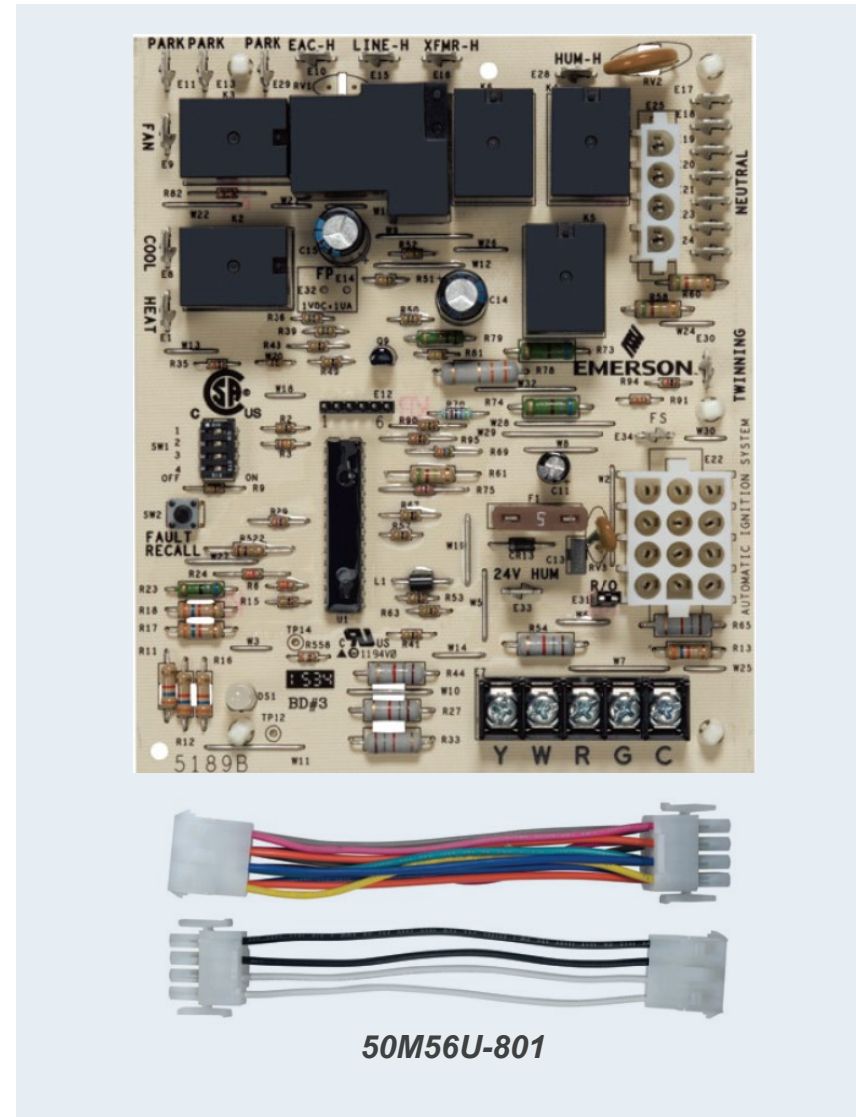
50M56U-801 Single-Stage  
Integrated Furnace Control

# 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.





# 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**

60s 7s

SW1 OFF ON

**Heat on Delay**

45s 20s\*

SW1 OFF ON

**Heat off Delay**


60s 30s

SW1 OFF ON

120s\* 180s

SW1 OFF ON

\* = Default  
Note: Cycle power after changes are made.  
For Complete Instruction Manual:



**EMERSON**

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	Blink	Weak Flame Sensed
		Continuous	Twinning Error
		Solid	Internal Fault
		1	Normal Heat Mode Operation
		4	Y present with no G call
			Standby mode
	Solid		Normal Fan Mode Operation (G)
			Normal Operation with call for cool (Y + C)
			Control Power ON Display Indication
	Off	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**

**50M56U-801**  
Single Stage 1 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**

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Operation ..... Page 4

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Troubleshooting ..... Page 5

Definition of Terms and Timing Specifications ..... Page 7

**DESCRIPTION**

The 50M56U-801 kit 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 valves, inducer, and fan. The kit contains:

- 50M56-01 Integrated Furnace Control
- Harness Assemblies
- Control Label
- Wire Ties
- Installation Instructions

**ELECTRICAL SPECIFICATIONS**

Electrical Specification [27 deg F (25 deg C)]	
Input Voltage	120 VAC only
Max Input Current	45A @ 25 VAC
Gas Valve Relay	1.8 amp @ 120 VAC
Ignitor Relay	1.2 amp @ 120 VAC
Blower Relay	1.8 amp @ 120 VAC
Converter Relay	10 amp FEA @ 230 VAC
Controler Relay	25 amp LRA @ 230 VAC
Transformer Load	1.8 amp @ 24 VAC or 120 VAC
Controler Air Changer	1.8 amp @ 120 VAC
Minimum current to insure flame detection	0.35 amp DC
Maximum current for non-detection	100 mA dc
Maximum allowable leakage resistance	100 M ohms

**Operating Temperature Range**

40°F to 100°F (4°C to 38°C)

**HUMIDITY RANGE**

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

**MOUNTING**

Surface Mount (see details)

**Clearance Approval**

Natural, Manufactured, Mixed, Liquid-filled, Potting, and SF-6 Gas Air Mixtures are all approved for use.

**Timing Specification**

Flame Establishment Time: 0.8 sec

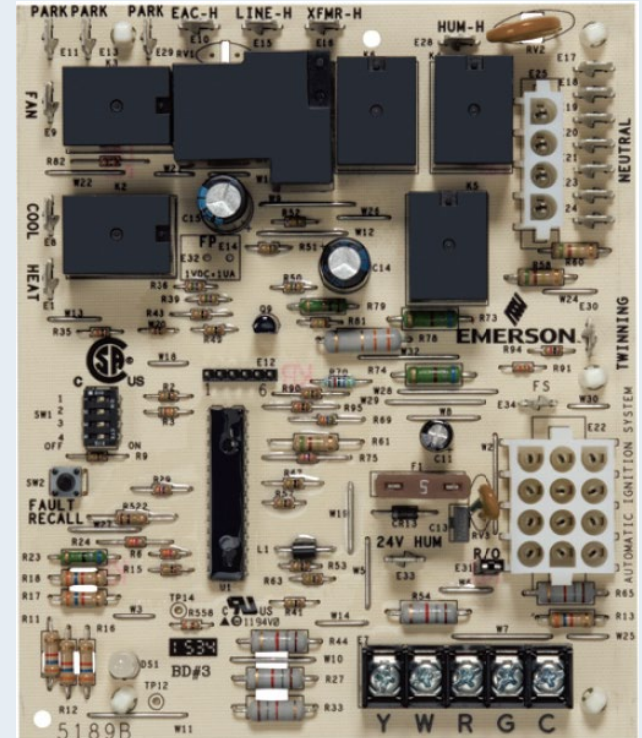
Flame Failure Response Time: 0.8 sec

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

**EMERSON**  
Climate Technologies

white-rodgers.com  
emersonclimate.com

PART NO. 37-76148  
37-76148  
1023



# Harness Selection Table

## OEM REPLACEMENT INSTRUCTIONS - 50M56U-801

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

<b>Lennox Model Furnace using control:</b>	NOTE: Ignitor must be replaced with 120V Ignitor (Recommend 21D64-2) 75M21 Ignitor - Remove existing control and verify part number to be replaced - Reference Wiring diagram - Install harness <b>0115-0303</b> into the Inducer and Ignitor 4-pin connector - Connect flame sense to 3/16" FS spade - Plug in remaining connections	<b>Lennox, Armstrong, Ducane Furnaces using control:</b>	- Remove existing control and verify part number to be replaced - Reference Wiring diagram - Plug in all connections
81W03		56W19	
1012-969A		94W83	
17W70		R47582-001	
100973-01,02		103085-01	
1012-969		1012-967	
78M4701		103085-02	
78M1701		103085-03	
75M1701	1012-83-9673A		
<b>Lennox Model Furnace using control:</b>	- Remove existing control and verify part number to be replaced - Reference Wiring Diagram - Install harness <b>0115-0303</b> into the Inducer and Ignitor 4-pin connector. - Install harness <b>0115-0302</b> into the main 12-pin connector. - Connect flame sense to 3/16" FS spade - Plug in remaining connections.	1012-977A	
74W03		81W11	
103098-01		56L8501*	
1195-100		12L4201*	
1195-83-100A		50A55-120*	
		80M2701	
	1012-968		*Connect flame sense to 3/16" FS spade

# Pre-Install Steps

## **WARNING**



Failure to comply with the following warnings could result in personal injury or property damage.

### **FIRE HAZARD**

- Do not exceed the specified voltage.
- Replace existing control with exact model and dash number.
- Protect the control from direct contact with water (dripping, spraying, rain, etc.).
- If the control has been in direct contact with water, replace the control.
- Label all wires before disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.
- Route and secure wiring away from flame.

### **SHOCK HAZARD**

- Disconnect electric power before servicing.
- Ensure proper earth grounding of appliance.
- Ensure proper connection of line neutral and line hot wires.

### **EXPLOSION HAZARD**

- Shut off main gas to appliance until installation is complete.

## **WARNING**

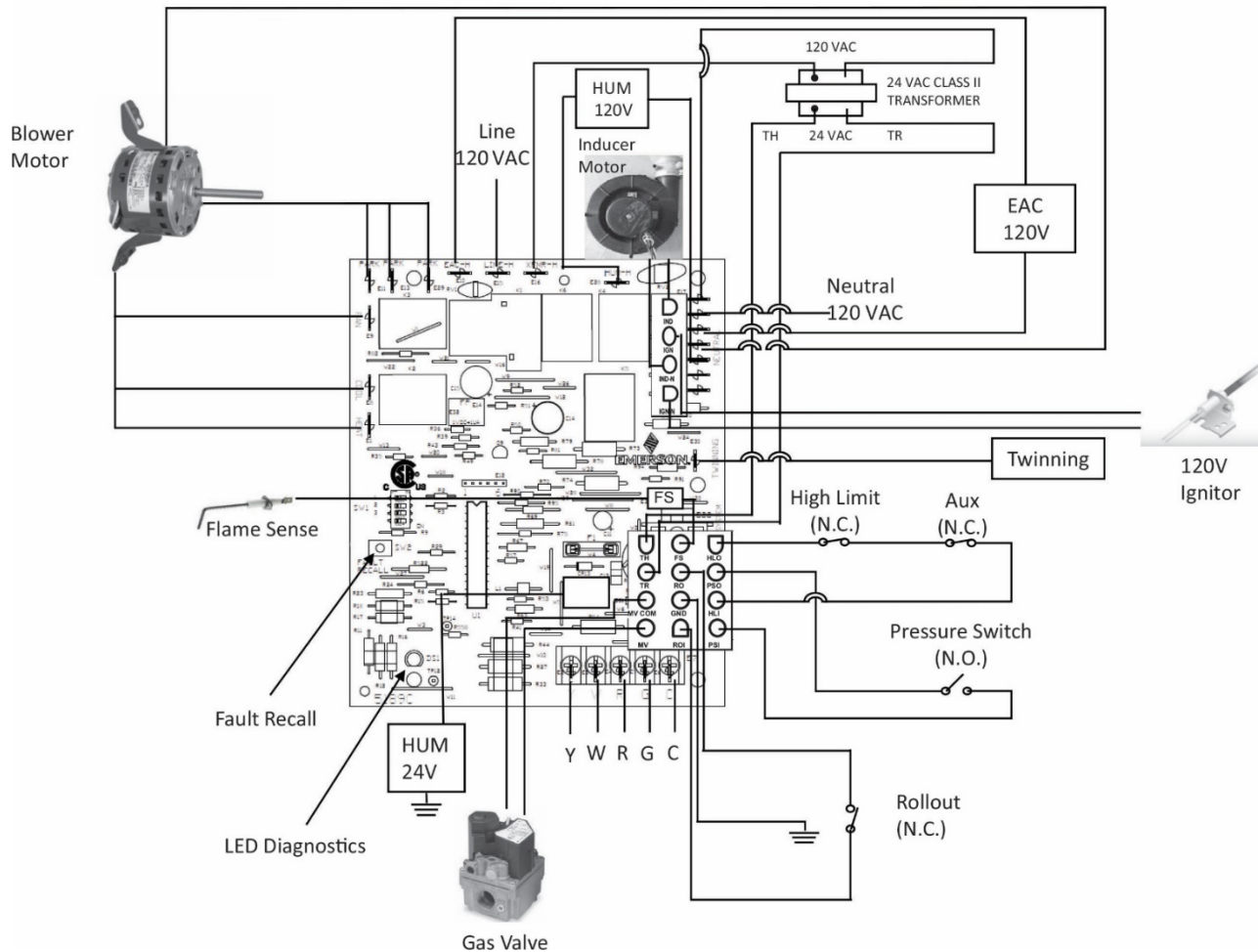
All installation procedures should be carried out **ONLY** by a qualified Heating and Air Conditioning contractor or licensed electrician, according to Local and National Electrical codes and Ordinances.

**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.

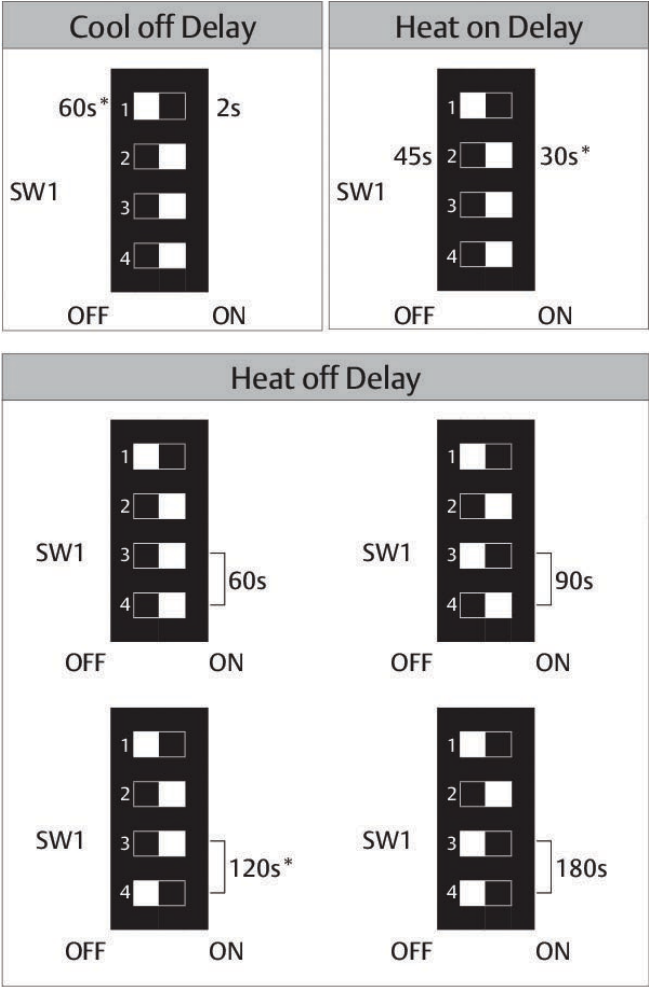
# Wiring Diagram

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

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

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											

\*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).

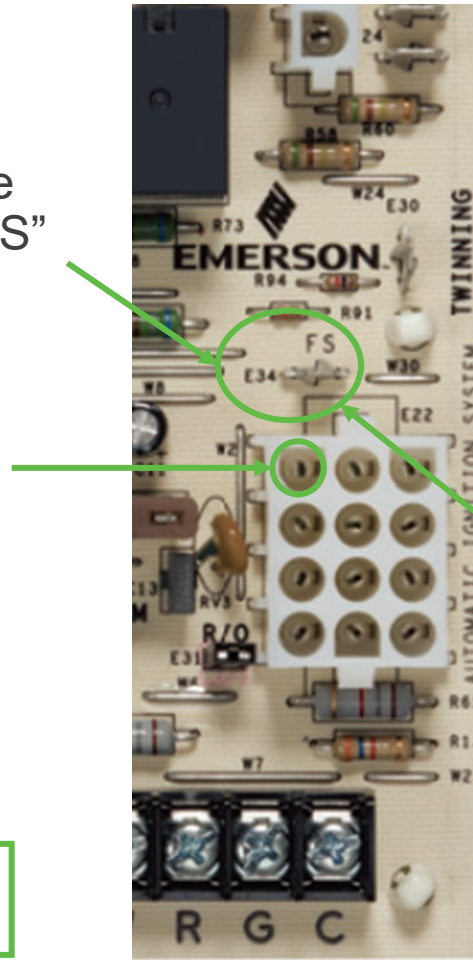


**WR HotRod  
Nitride 21D64-2**

# 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.

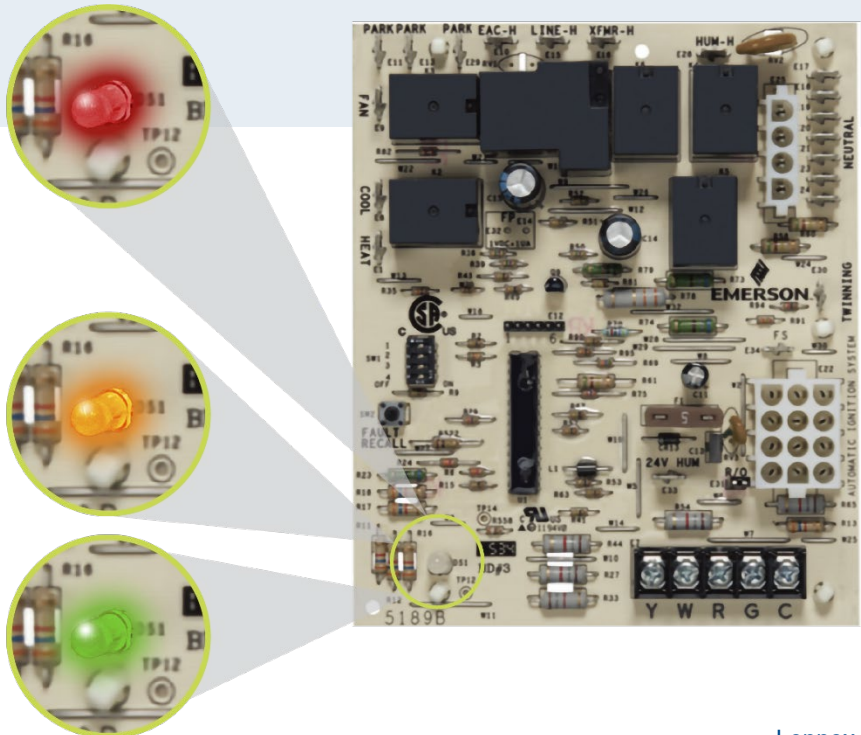
- Includes Fault Recall and Fault Code Reset instructions

**System Status**

- Standby
- Heat
- Cool
- Fan

**Trouble Fault Codes**

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

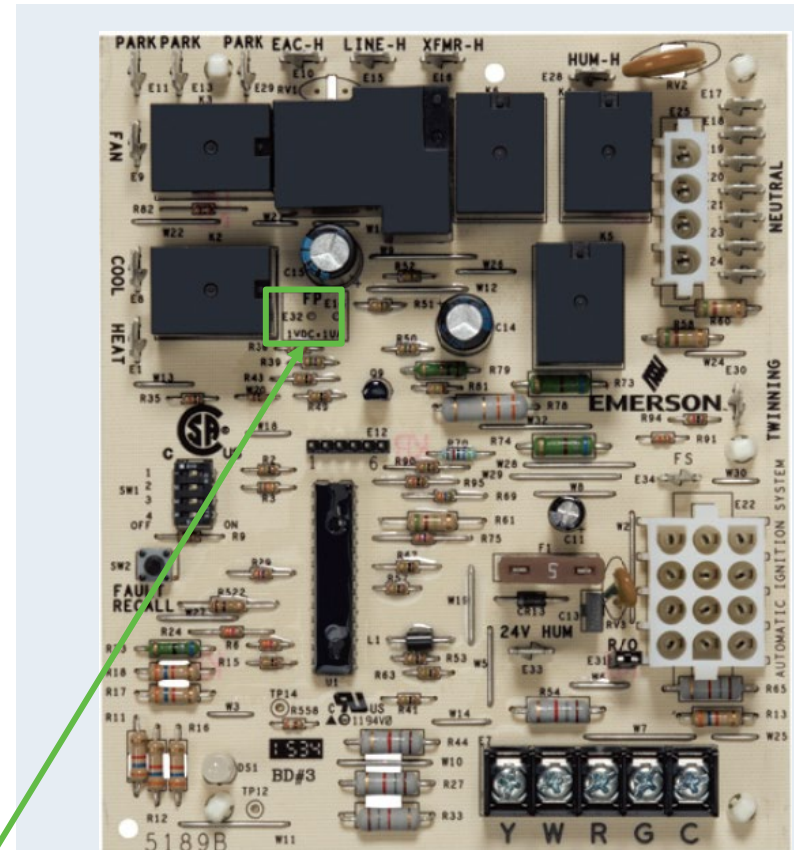


# Flame Current Test Pad Feature

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



Dirty

VS



Clean