

# **50I56D-905 Integrated Intelligent Valve Retrofit Kit**

---

# Business and Product Overview

---

# White-Rodgers Intelligent Valve Retrofit Kit

The White-Rodgers 50I56D-905 Intelligent Valve Retrofit Kit converts furnaces built with a SmartValve® and Fan Timer to operate with a standard intermittent pilot valve and integrated furnace control, and replaces over 50 first generation SmartValve® controls.

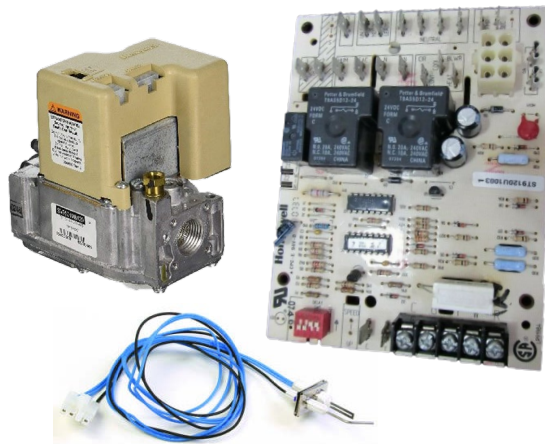
## Applications:

- Single Stage Gas Heat
- PSC Blower Motor
- Upgrade 24v HSI ignitor to 120v
- Intermittent Pilot Operation
- ICP & Lennox Brands
- 1<sup>st</sup> Gen SmartValve Retrofit



# A Reliable Replacement. Simple Troubleshooting

## Complicated



24v

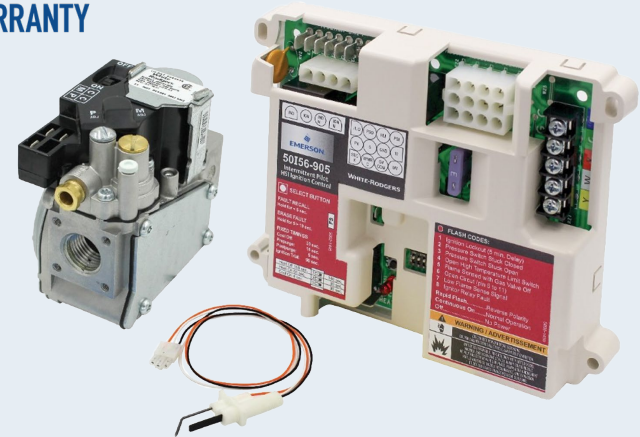
In traditional SmartValve setups an electronic board in the SmartValve sends a signal back to the fan timer to initiate the blower operation.

Troubleshooting issues between the SmartValve and the Fan Timer has long made it consistently difficult to diagnose errors.

INDUSTRY LEADING



## Simple!



120v

Now, our 50I56D-905 offers both pieces in an easy-to-understand product that eliminates difficult troubleshooting, while also upgrading the hot surface ignitor to 120v. Reliable valve with 5-year warranty.

# Value Proposition

---

Our research indicates that ICP alone produced more than 3 million furnaces between 1994 and 2006, offering a significant install base for replacement parts.

In fact, we estimate there is a **total install base** of 5 million (first generation) SmartValve products, offering annual replacement volume of 250,000 controls, with a history of difficult diagnosis and troubleshooting that can now be eliminated with our retrofit kit.

**INDUSTRY LEADING**



# Extensive Cross-Reference Options

References are listed on the box packaging, on WR Mobile, or at our website.

## To get the App:

Go to your App Store and type in WR Mobile or hold the camera over the QR code on the side of the box.

## Cross Reference on the Box

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

#### Honeywell (Application Dependent)

SV9500H2609  
SV9500H2724  
SV9500M2628  
SV9500M2682  
SV9500M2690  
SV9500M2708  
SV9501H2409  
SV9501H2417  
SV9501M2056  
SV9501M2528  
SV9501M2700  
SV9501M2718  
SV9501M2726  
SV9502H1706  
SV9502H2522  
SV9502H2704

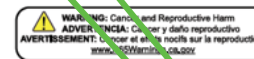
#### ICP/Arcoaire/ Comfortmaker/ Heil/Tempstar

1008751  
1008752  
1009089  
1009090  
1009093  
1009094  
1010988  
1011024  
1011024  
1011421  
1096725  
1170429  
1170430

HQ1008751HW  
HQ1008752HW  
HQ1009089HW  
HQ1009090HW  
HQ1009093HW  
HQ1009094HW  
HQ1010988HW  
HQ1011024HW  
HQ1011421HW  
HQ1096725HW  
HQ1170429HW  
HQ1170430HW

#### Lennox/Armstrong/ Ducane/Excel/ AirEase/Concord

20256701  
42487-001  
43166-001  
44479-001  
70L53  
70L5301  
R20270901  
R20270902  
R42487-001  
R43166-001  
R44479-001



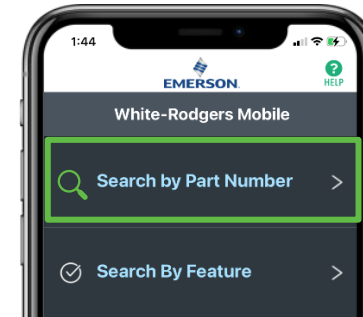
## White-Rodgers Mobile App

Answers at your fingertips, with your smartphone or tablet.

- ✓ Latest cross references
- ✓ Installation instructions
- ✓ Spec sheets
- ✓ Product selection
- ✓ Easy access to Contractor Rewards™



Install & Open



Search by Valve Part

# What's in the Box?

- 50I56-905 120V HSI IP Furnace Control Board
- 1 - Main CONTROL Harness
- 1 - Gas VALVE Harness
- 1 - Ignitor/Inducer C Harness
- 1 - 120V Ignitor + Flame Sensor Kit for Pilot Assembly
- 1 - 36G33-905 IP Gas Valve w/ LP Conversion kit
- 4 - 1" Sheet Metal Mounting Screws
- 4 - Wire Ties
- 2 - 1/4" Female Crimp-on Spades
- 2 - 7/8" Sheet Metal Wire Grommets
- Unit Retrofit Label
- Installation Instructions
- Troubleshooting Label on Control Cover





# 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 with the following links: Emerson.com, About Us, Investors, Careers, Contact Us, News & Events, Sign In, and United States (English). Below the navigation bar is the Emerson logo and the text 'CLIMATE TECHNOLOGIES'. The main navigation menu includes: Products, Industries, Training & Support, Tools & Resources (highlighted), and Expertise. A search bar and a shopping cart icon are also visible. The 'Tools & Resources' dropdown menu is open, displaying a list of links: 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](#) (highlighted with a green arrow), and Product Selection Software. The background of the website features a cityscape at night with the text 'Transforming How People and Work' and a sub-headline: 'Drawing on our expertise and global perspective, we combine technology to develop HVACR and infrastructure solutions for our customers.'



# 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

---

# White-Rodgers Intelligent Valve Retrofit Kit

The White-Rodgers 50I56D-905 Intelligent Valve Retrofit Kit converts furnaces built with a SmartValve® and Fan Timer to operate with a standard intermittent pilot valve and integrated furnace control, and replaces over 50 first generation SmartValve® controls.

## Applications:

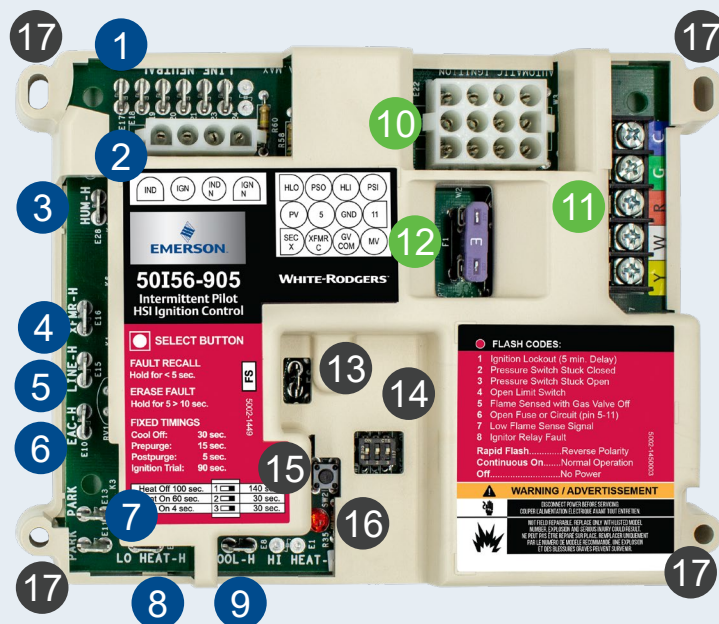
- Single Stage Gas Heat
- PSC Blower Motor
- Upgrade 24v HSI ignitor to 120v
- Intermittent Pilot Operation
- ICP & Lennox Brands
- 1<sup>st</sup> Gen SmartValve Retrofit



# White-Rodgers 50I56D-905 Retrofit Kit IFC Components

## 120v Components:

1. 6 120v Neutral Spades
2. 4-Pin 120v Inducer / Ignitor Molex Connector
3. 120v Humidifier Spade
4. 120v to Transformer Spade
5. 120v Hot Input Spade
6. 120v EAC Spade
7. 2 Extra Blower Speed Park Spades
8. PSC Blower Heat Spade
9. PSC Blower Cool Spade



50I56D-905  
Retrofit Kit IFC

## 24v Components:

10. 12-Pin 24v Wiring Molex Connector
11. 24v Thermostat Bus
12. 3a Low Voltage Fuse

## Other Components:

13. Flame Sense 3/16" Spade
14. Blower Delay Dipswitches
15. Fault Recall Button
16. Status / Fault LED
17. Mounting Holes

# Intelligent Valve Retrofit Kit Benefit Summary

## Simple Parts

The 50I56D-905 utilizes common parts to retrofit furnaces with complex gas with hot surface ignition, making troubleshooting much easier.

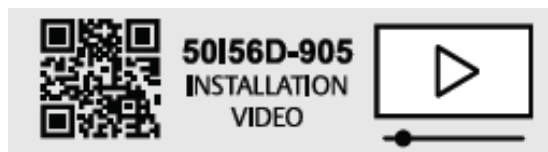
**INDUSTRY LEADING**

**5 YEAR  
WARRANTY**

## Easy to Follow Instructions

Step-by-step instructions offer a seamless installation experience.

A QR Code on the box offers a complete installation video.



## Lower Cost

The complete 50I56D-905 retrofit kit is priced competitively, allowing you to purchase an Integrated Furnace Control, Gas Valve, & 120v Ignitor for less than a replacement valve alone in most cases.

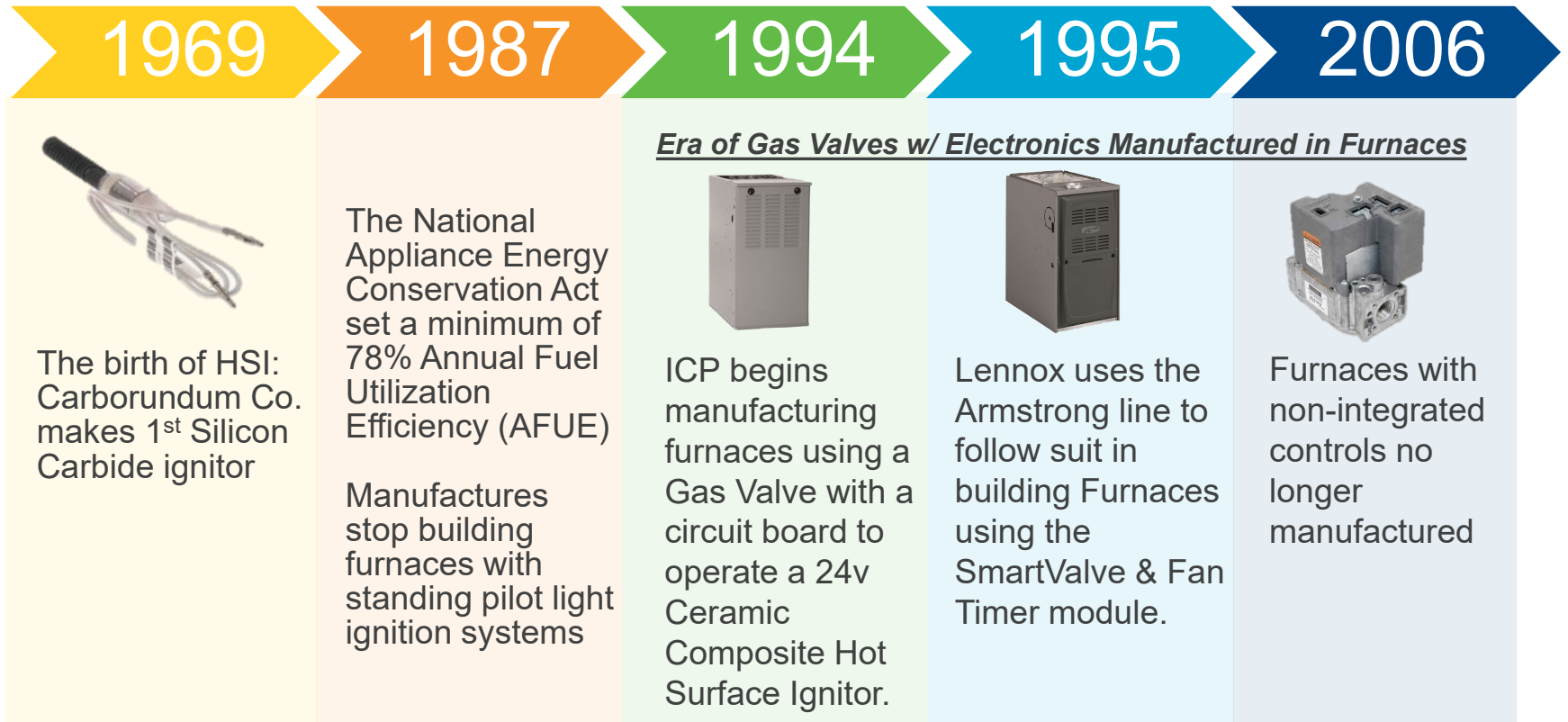
# 50I56D-905 Competitive Comparison

White-Rodgers simplifies the SmartValve replacement process.

FEATURE	Honeywell	White Rodgers
Stocking Requirement	Hard – Three or Four Separate Parts	Easy - One Complete Kit
Warranty	1 Year	5 Years
Ignitor Technology	24V Ceramic Composite	120V Nitride
Gas Valve Technology	Complex Integrated Electronics	Reliable Standard Mechanical
Intermittent Pilot System Operation	✓	✓
Fault Recall & Pushbutton	✗	✓
Troubleshooting	Hard - Specialized Parts & Training	Easy - Like Most Standard Furnaces
Dipswitch Selectable OEM Blower Delays	✓	✓
Main Board with Full Cover & Fault Code Label	✗	✓



# SmartValve History



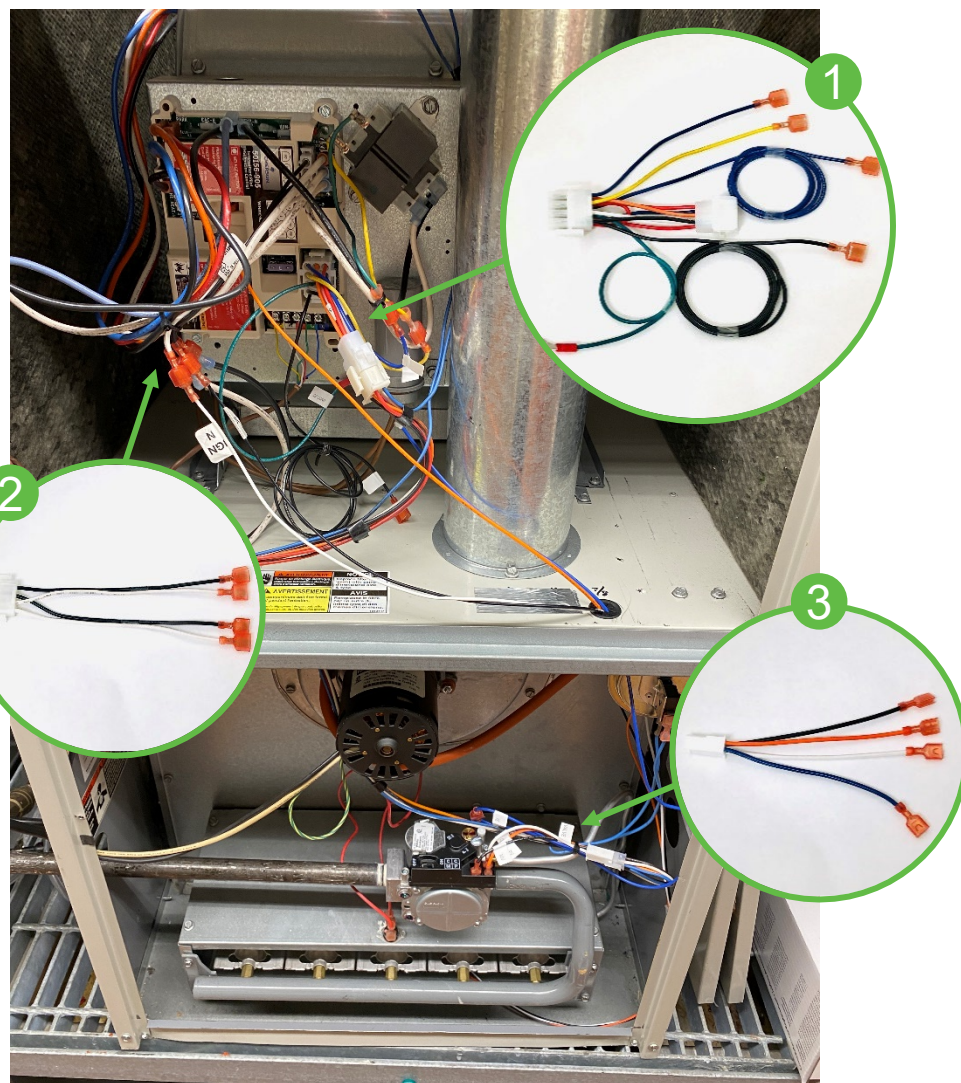
ICP produced >3M furnaces from 1994 to 2006. During this period they manufactured Furnaces using a Fan Timer Control and SmartValve®.



# Wiring the Intelligent Valve Retrofit Kit

- ICP & Lennox use a harness with a 6-pin Molex that connects to the Fan Module, and a 4-pin plug that connects to the SmartValve®
- The White-Rodgers Kit comes with two adapters that connect the existing furnace harness to a standard IFC & Gas Valve.
- We also include a harness to connect the 120v Inducer and the 120v Hot Surface Ignitor.

1. Control Harness
2. Ignitor/Inducer Harness
3. Valve Harness



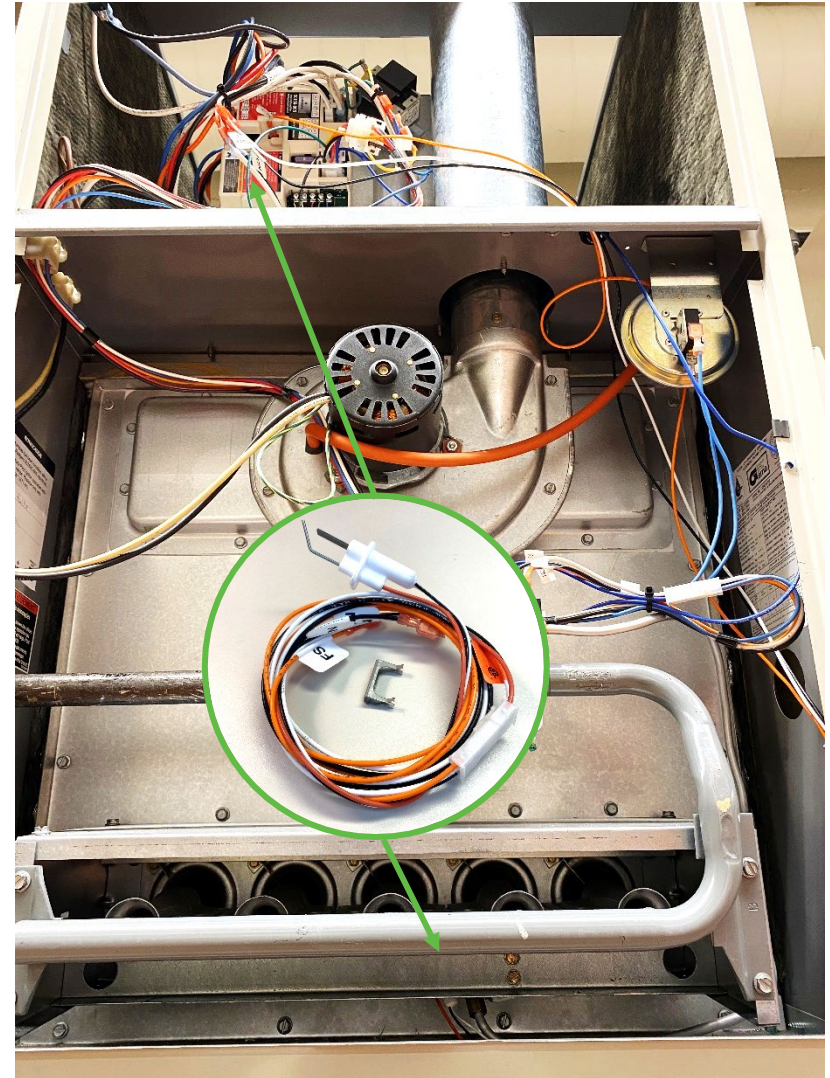
**TECH TIP:** White-Rodgers simplifies Retrofitting by using the existing Main Furnace Harness.

# Upgrading to 120V Hot Surface Ignition

- In SmartValve systems, the HSI relies on 24v from the valve to heat the ignitor. These ceramic ignitors will often fail, due to comparably poor materials.
- We include a 120v Nitride Ignitor in our kit that matches the size & shape of the existing ignitor, and has a factory installed harness that runs to the blower area and connects to the IFC through the “C” Harness.



24v





# Specs

## ELECTRICAL RATING

Input Low Voltage: 25 VAC, 60 Hz  
Input Line Voltage: 120 VAC, 60 Hz  
Max Input Current: .45A @ 25 VAC

## FLAME CURRENT REQUIREMENTS:

Minimum current to ensure flame detection: 0.25  $\mu$ A DC\*  
Maximum current for non-detection: 0.1  $\mu$ A DC  
Maximum allowable leakage resistance: 100 M ohms  
\* Measuring with a DC voltmeter (1VDC = 1  $\mu$ A)

## RELAY CONTACT RATINGS:

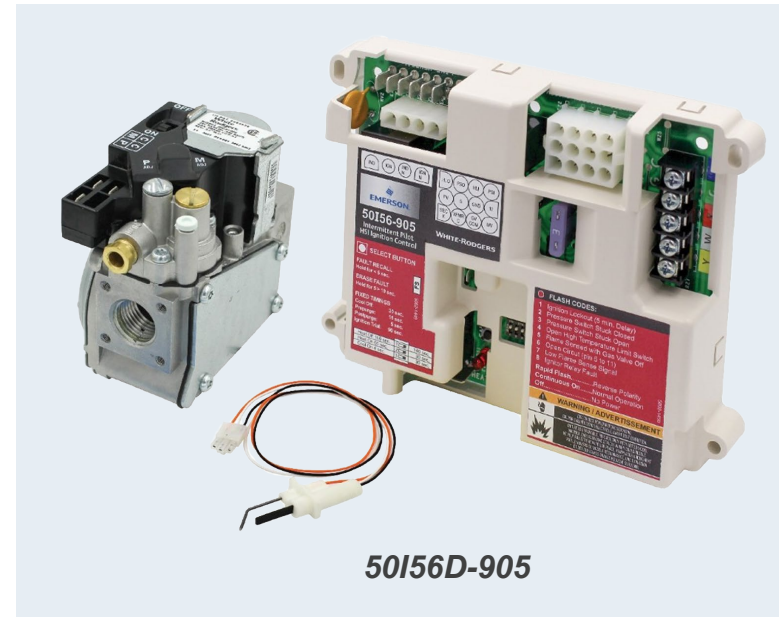
Inducer Output: 2.2 FLA @ 120 VAC 3.5 LRA  
Blower Output: 14.5 FLA @ 120 VAC 25 LRA  
Gas Valve Output: 1.5A @ 25 VAC 0.6 pf  
Ignitor Output: 6.0A @ 120VAC (resistive)  
Hum and EAC Load: 1.0A @ 120 VAC

## OPERATING TEMPERATURE RANGE:

-40° to 176°F (-40° to 80°C)

## HUMIDITY RANGE:

5 to 95% relative humidity (non-condensing)



## CROSS REFERENCE ON THE BOX

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

Honeywell (Application Dependent)	ICP/Arcoaire/ Comfortmaker/ Heil/Tempstar	HQ1008751HW HQ1008752HW HQ1009089HW HQ1009090HW HQ1009093HW HQ1009094HW HQ1010988HW HQ1011024HW HQ1011421HW HQ1096725HW HQ1170429HW HQ1170430HW	Lennox/Armstrong/ Ducane/Excel/ AirEase/Concord
SV9500H2609	1008751		20256701
SV9500H2724	1008752		42487-001
SV9500M2628	1009089		43166-001
SV9500M2682	1009090		44479-001
SV9500M2690	1009093		70L53
SV9500M2708	1009094		70L5301
SV9501H2409	1010988		R20270901
SV9501H2417	1011024		R20270902
SV9501M2056	1011421		R42487-001
SV9501M2528	1096725		R43166-001
SV9501M2700	1170429		R44479-001
SV9501M2718	1170430		
SV9501M2726			
SV9502H1706			
SV9502H2522			
SV9502H2704			

# Install

---

# White-Rodgers Intelligent Valve Retrofit Kit

The White-Rodgers 50I56D-905 Intelligent Valve Retrofit Kit converts furnaces built with a SmartValve® and Fan Timer to operate with a standard intermittent pilot valve and integrated furnace control, and replaces over 50 first generation SmartValve® controls.

## Applications:

- Single Stage Gas Heat
- PSC Blower Motor
- Upgrade 24v HSI ignitor to 120v
- Intermittent Pilot Operation
- ICP & Lennox Brands
- 1<sup>st</sup> Gen SmartValve Retrofit





# What's in the Box?

- 50I56-905 120V HSI IP Furnace Control Board
- 1 - Main CONTROL Harness
- 1 - Gas VALVE Harness
- 1 - Ignitor/Inducer C Harness
- 1 - 120V Ignitor + Flame Sensor Kit for Pilot Assembly
- 1 - 36G33-905 IP Gas Valve w/ LP Conversion kit
- 4 - 1" Sheet Metal Mounting Screws
- 4 - Wire Ties
- 2 - 1/4" Female Crimp-on Spades
- 2 - 7/8" Sheet Metal Wire Grommets
- Unit Retrofit Label
- Installation Instructions
- Troubleshooting Label on Control Cover



# Disconnect Power and Gas

- 1 First, ensure power and gas are disconnected prior to servicing the unit.



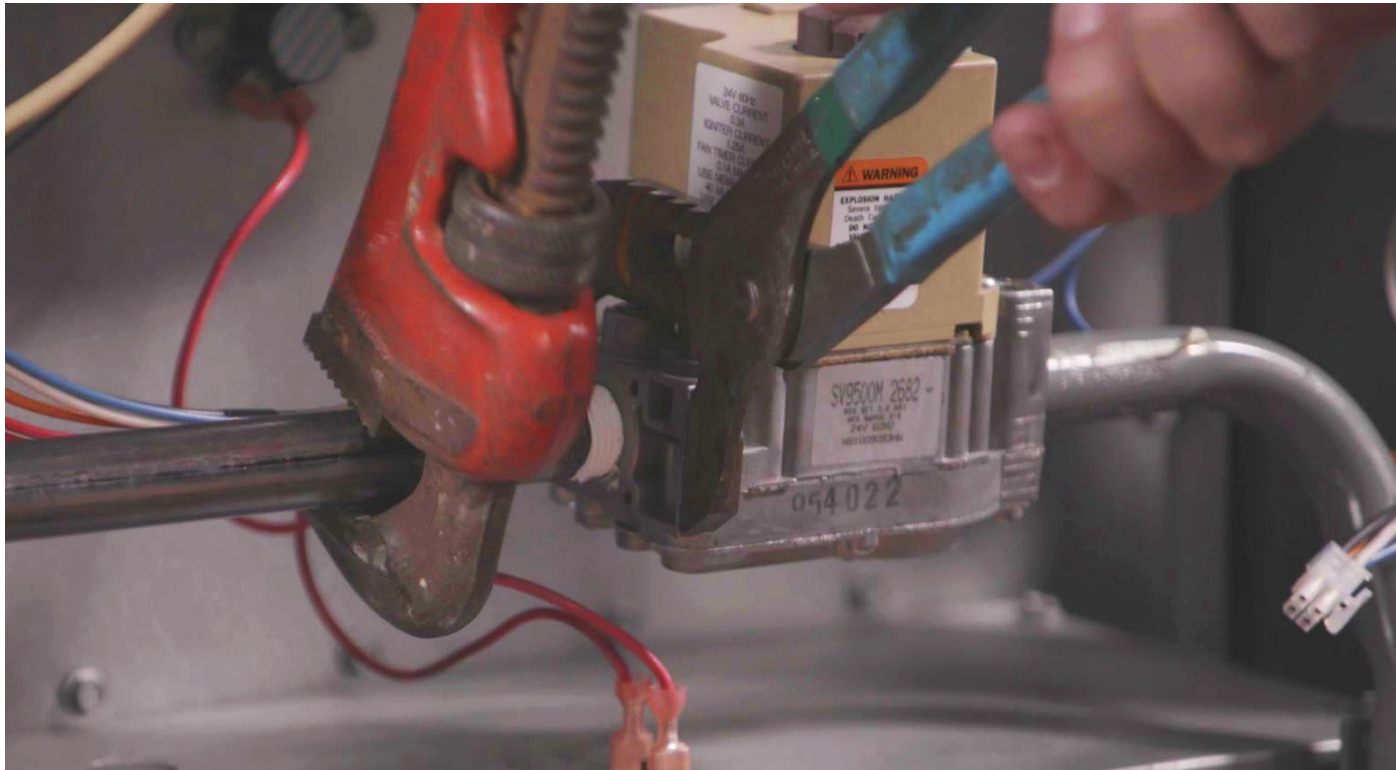
## Take a Picture of Wiring

- 2 Remove access panels and take pictures before removing any wiring. Label existing wiring as necessary.



# Remove Parts to Prepare for Retrofit

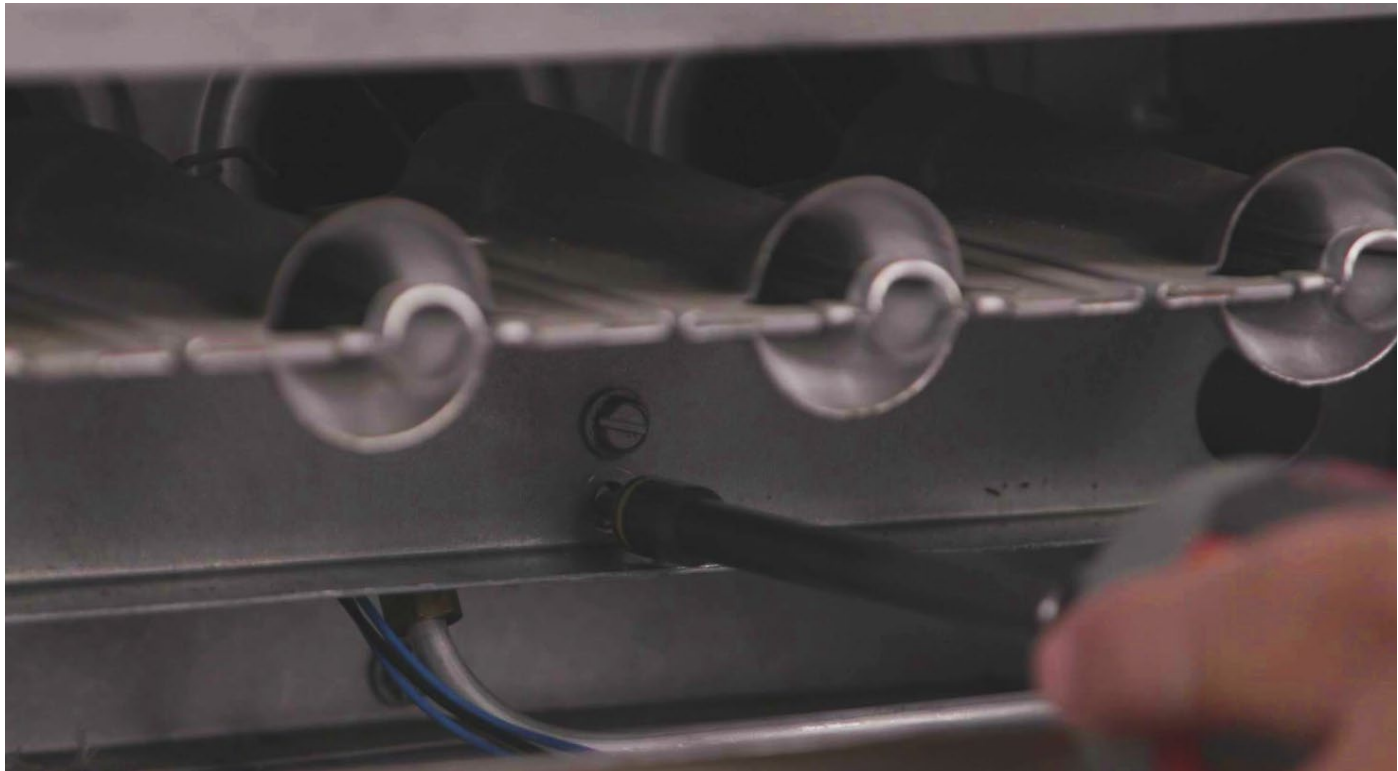
- 3 Disconnect both 4-pin plugs and pilot tubing, remove gas valve and discard.





# Disconnect Pilot Assembly

- 4 Remove 24V HSI ignitor + sensor and clip from assembly. *NOTE: Discard existing 24V ignitor + sensor and clip. Use new clip for best fit.*



# Disconnect Fan Timer

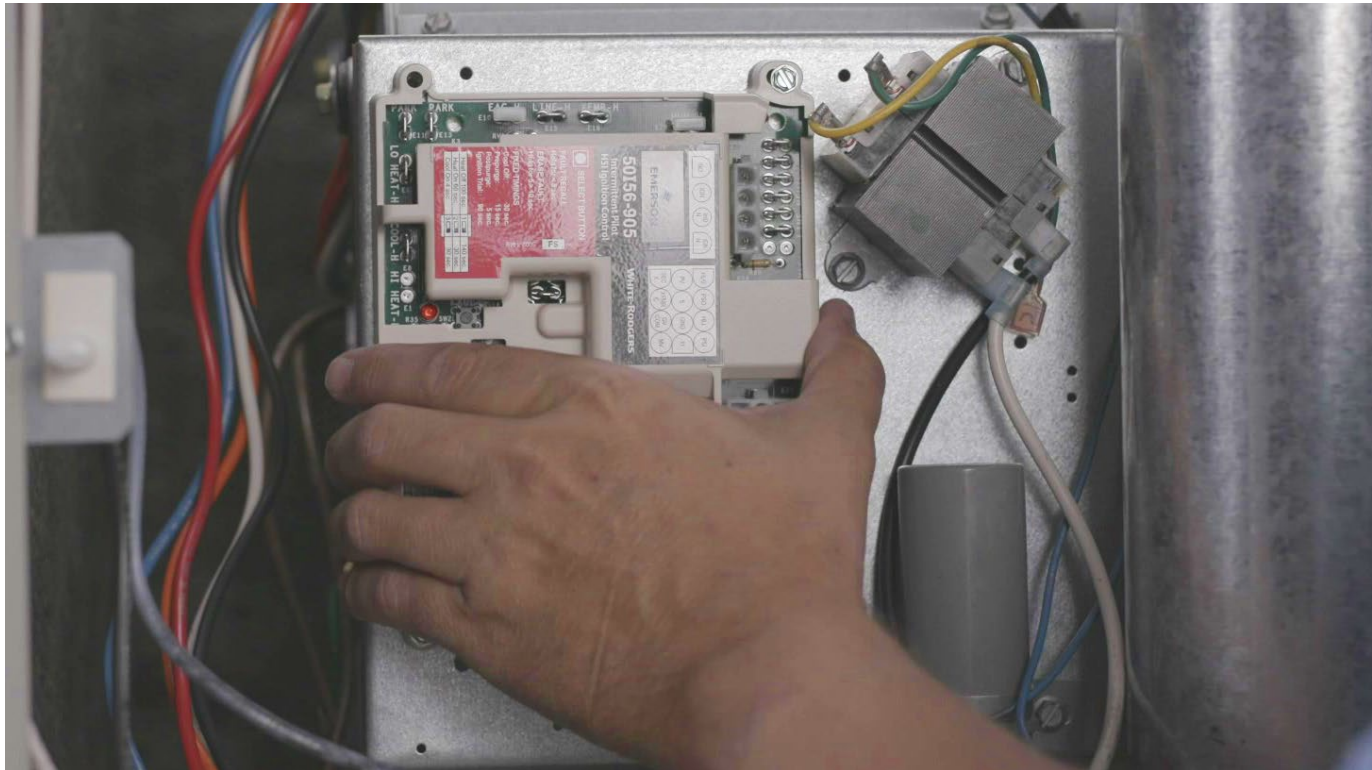
- 5 Unwire fan timer, remove & discard





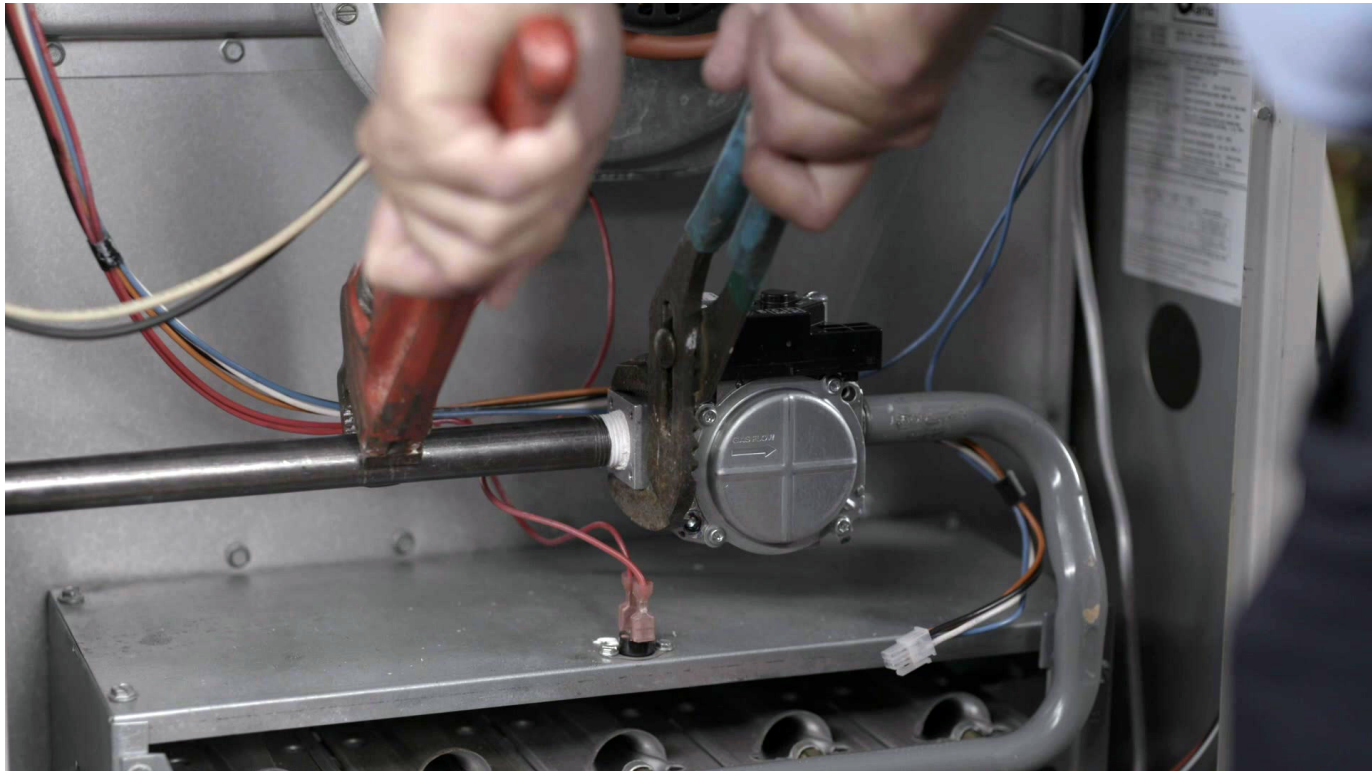
# Retrofit New Parts into Furnace

- 1 Mount 50I56-905 control in blower area using cover as drill template and using 4" x 1" screws.  
*Warning: Avoid damaging components when drilling or driving screws. All wiring should be installed according to local and national code.*



# Install Gas Valve

- 2 Install 36G33-905 gas valve in furnace. See instructions in box.



# Install Ignitor + Sensor

- 3 Install 791Q-905 120V HSI Ignitor + sensor into pilot assembly **using new clip for best fit**. Reinstall pilot assembly and connect gas supply tubing to new gas valve.



# Wire Passage

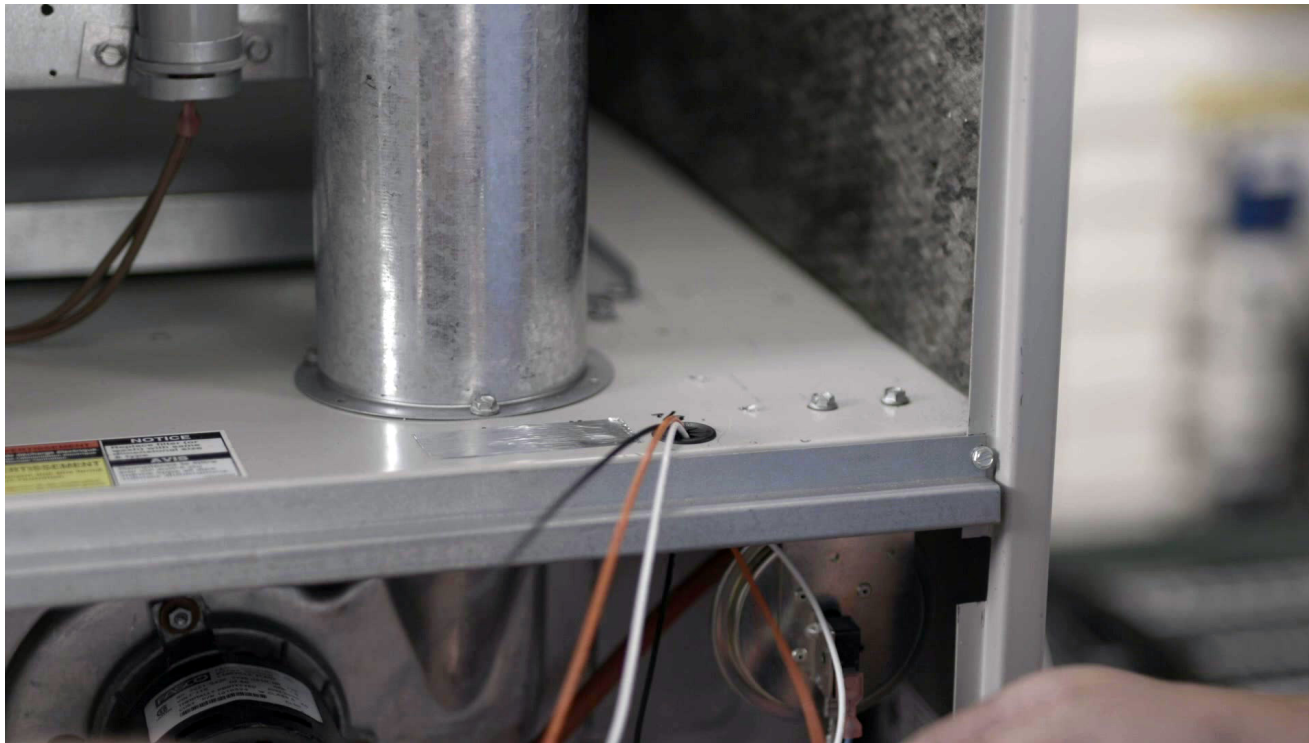
- 4 Locate an existing wire passage between the burner and blower areas or drill 7/8" hole(s) and install wire grommet(s). *NOTE: Some new wiring such as ignitor + sensor, pressure switch, and MV wire (Armstrong) will be run from the burner area to the blower control board area.*





# Extension Harness

- 5 Route 3-pin EXTENSION harness connected to the ignitor + sensor wires from burner area to blower control board area.





# Connect Flame Sensor

- 6 Plug **orange** flame sensor wire onto control board 3/16" **FS** spade, see page 4 of the Install Guide.



# Connect C Harness

7

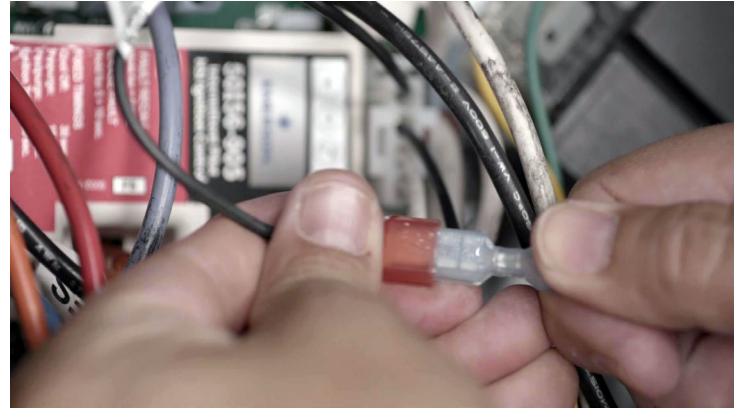
Plug 4-pin Ignitor/Inducer **C** harness into control board connector **E25**, see page 4 of the Install Guide.



# Connect Ignitor and Inducer Wires

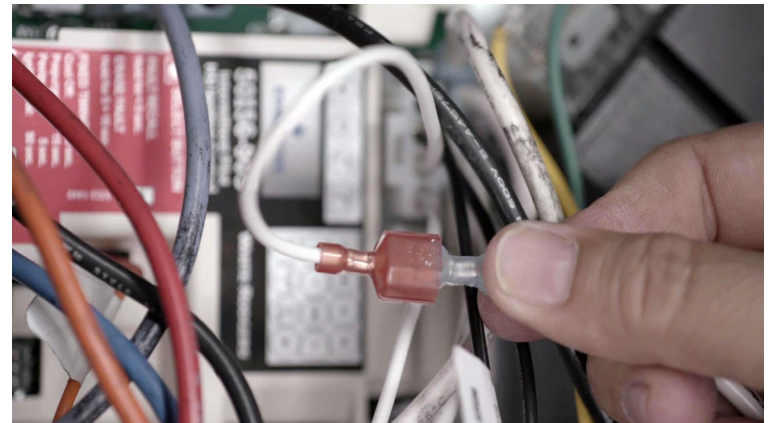
8

Connect Ignitor hot (IGN) and neutral (IGN N) from **EXTENSION** harness to **C** harness leads 2 & 4, see control board label.



9

Connect Inducer hot (IND) and neutral (IND N) to **C** harness leads 1 & 3, see control board label.



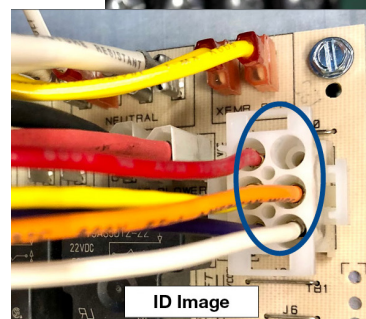
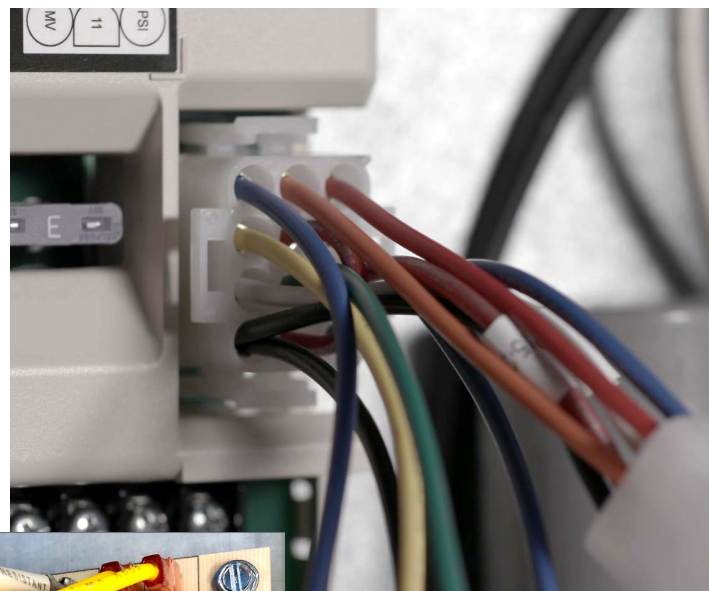
# Continue Connecting Wires

10

Plug main **CONTROL** harness into control board 12-pin connector E22, see page 4 of the Install Guide.

- Route blue **PS** pressure switch wire from control board to burner area.
- Connect green **GROUND** wire to chassis.
- For Armstrong (or similarly wired units – see **ID IMAGE** below), route black **MV\*** wire from control board to burner area and read **NOTE** below.

*NOTE: Armstrong MV\* / High Limit Wiring: See page 5 of the Install Guide, Special Replacement Instructions, to complete MV\* wiring from STEP 9*

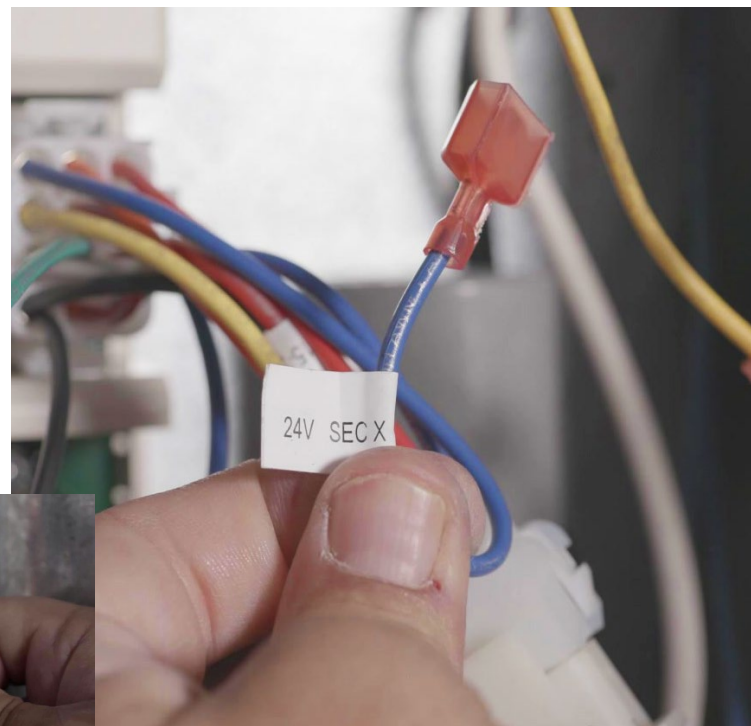




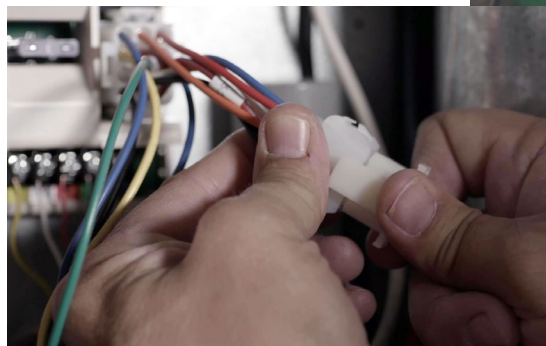
# Continue Connecting Wires

**11** Connect transformer to **CONTROL** harness.

- Secondary to blue 24V SEC X wire.
- Common to yellow 24V XFMR C wire.



**12** Connect **OEM** factory wiring 6-pin plug into **CONTROL** harness.

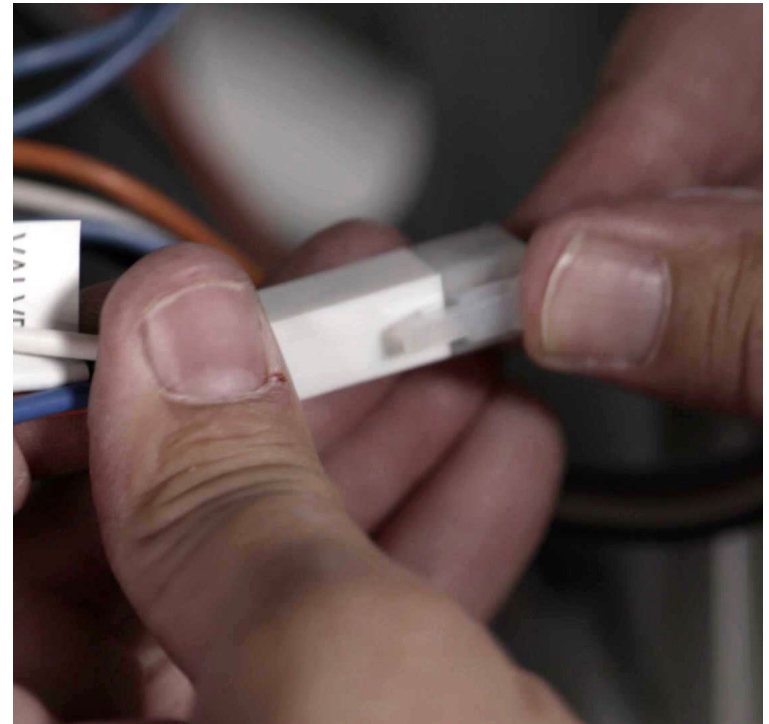




# Connect Valve Harness

**13** Plug 4-pin **VALVE** harness into factory 4-pin square plug removed from gas valve.

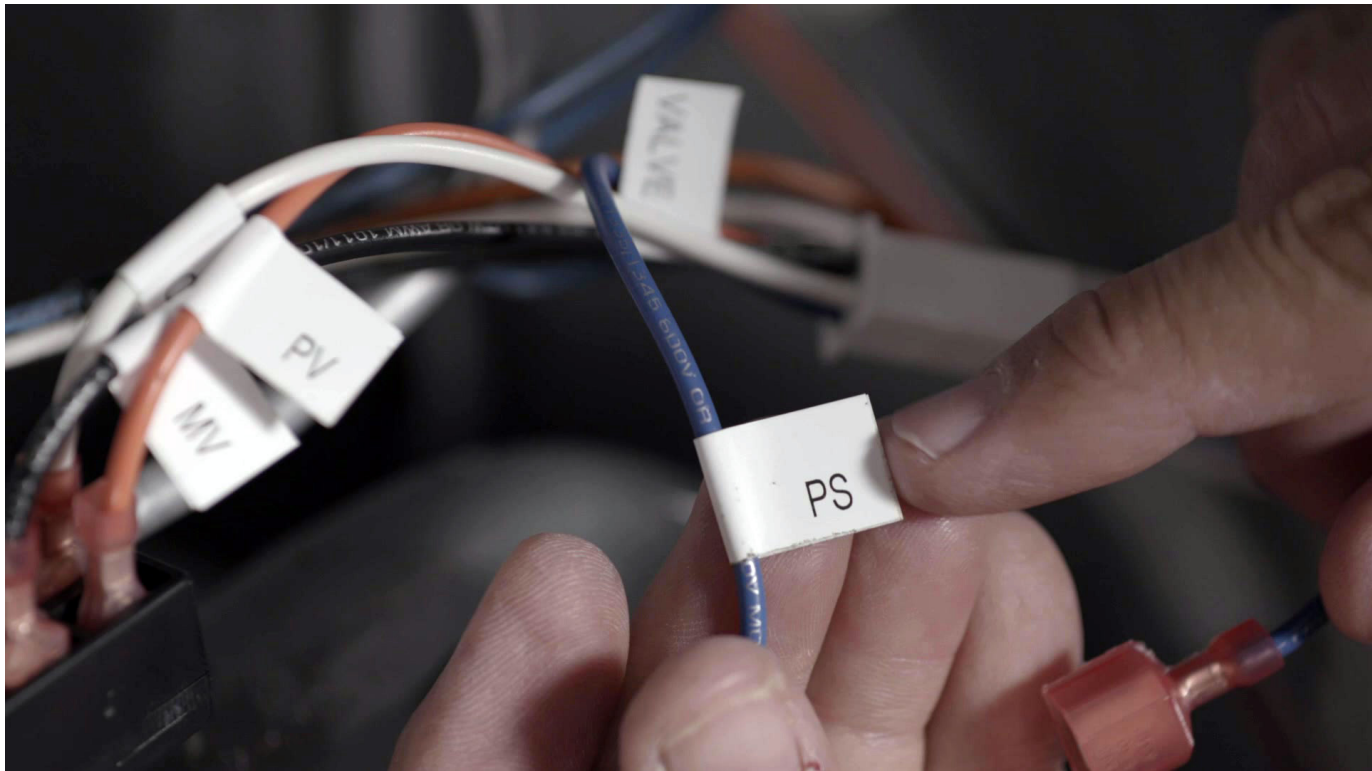
- Connect black MV harness spade to gas valve M terminal.
- Connect orange PV harness spade to gas valve P terminal.
- Connect white COM harness spade to gas valve C terminal.



# Continue Connecting Valve Harness

14

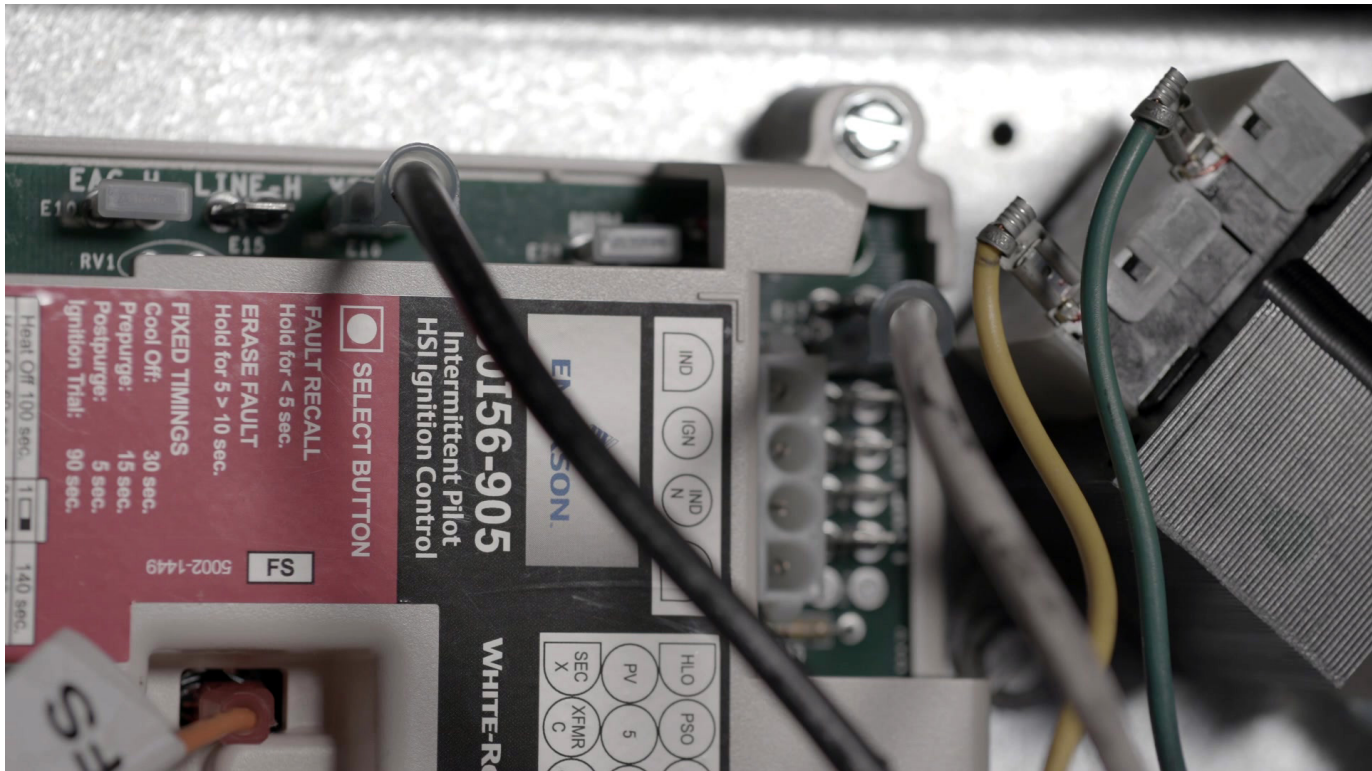
Connect blue PS wire previously routed from **CONTROL** board harness to burner area to PS spade of **VALVE** harness.



# Connect Transformer

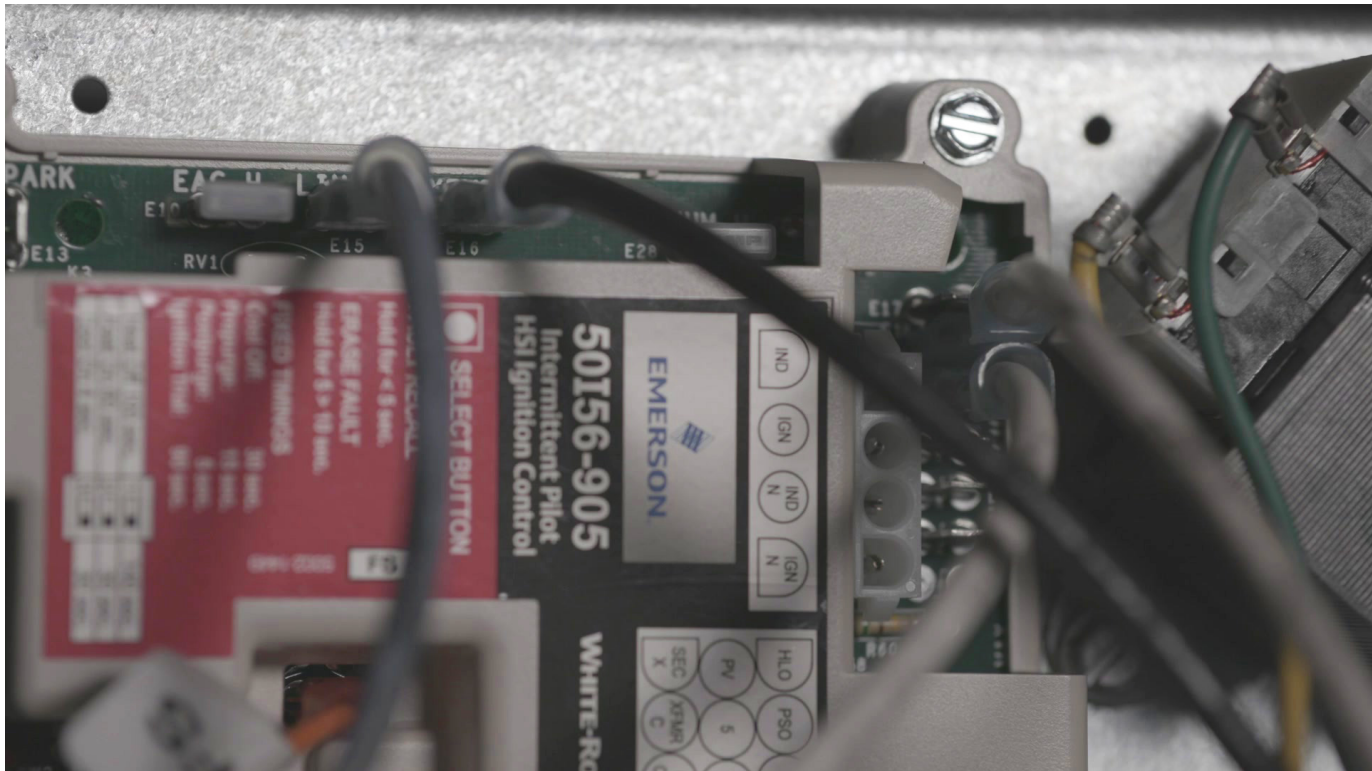
15

Connect transformer hot to XFMR-H, then connect transformer neutral to LINE NEUTRAL.



# Connect Line Voltage

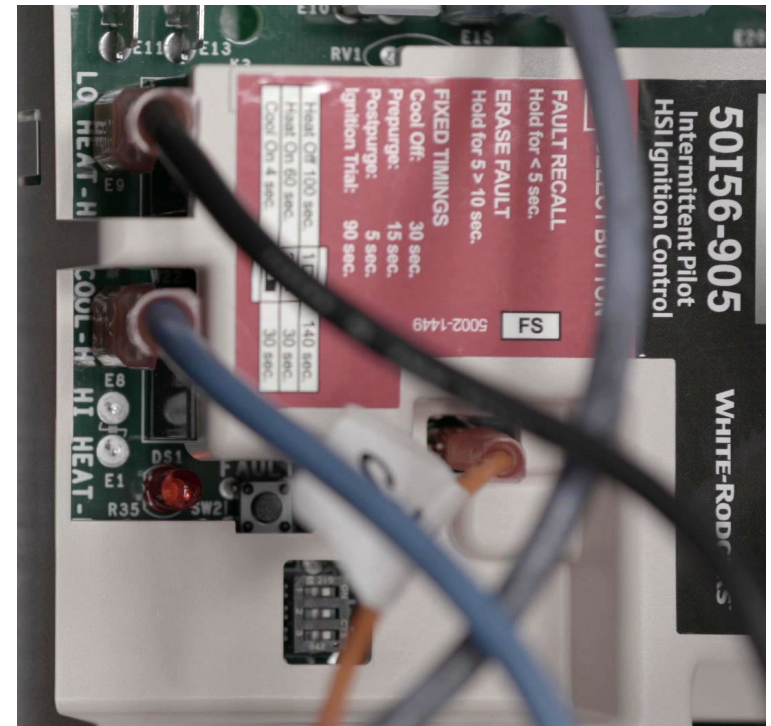
- 16** Connect line voltage hot to LINE-H, then connect LINE NEUTRAL.



# Connect Blower Leads

17

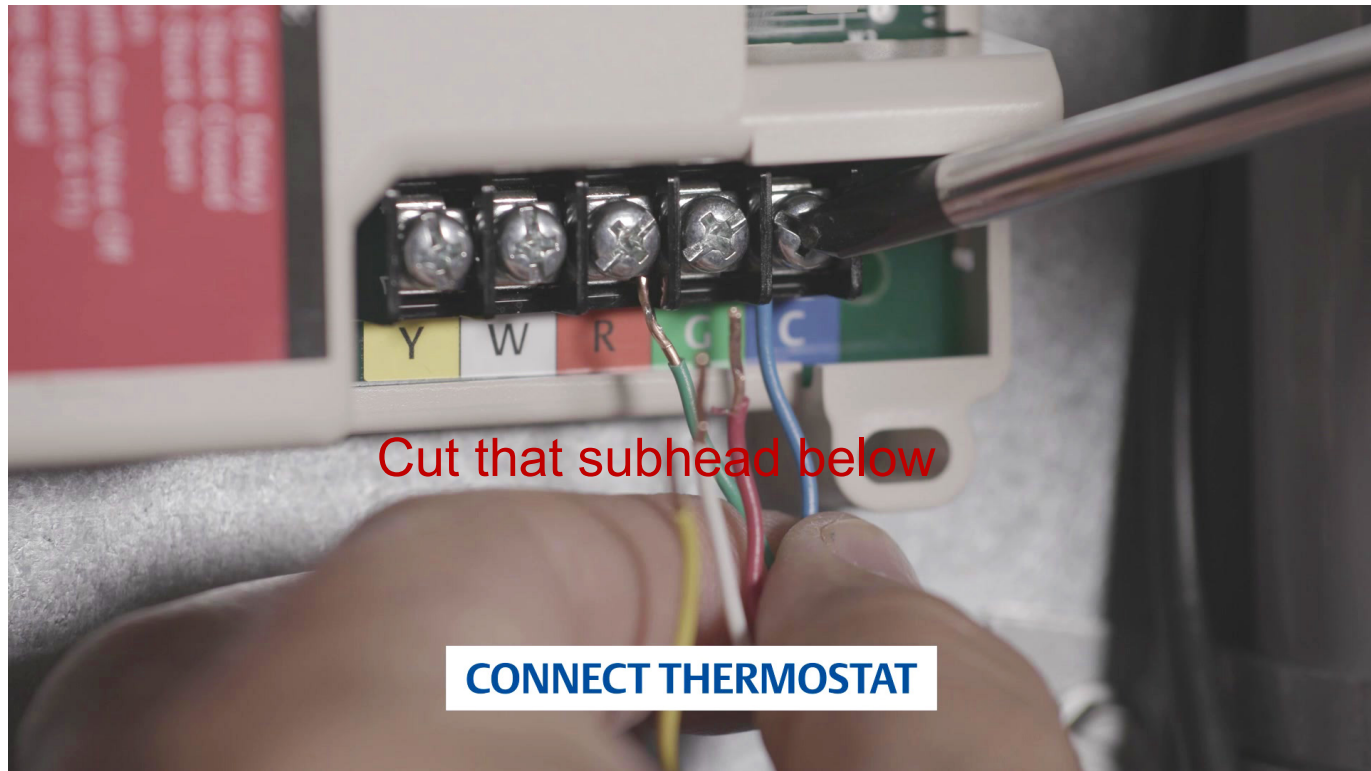
- Cool speed to COOL-H
- Heat speed to LO HEAT-H
- Unused leads on PARK, PARK
- Neutral to LINE NEUTRAL





# Connect Thermostat Wires

- 18** Connect thermostat wires to screw terminal block.



# Dipswitch Settings

**19** Verify dipswitch setting using cover label and DIPSWITCHES section below.



## DIPSWITCHES

Heat Off 100 sec.	1	<input type="checkbox"/>	140 sec.
Heat On 60 sec.	2	<input type="checkbox"/>	30 sec.
Cool On 4 sec.	3	<input type="checkbox"/>	30 sec.

Default Settings

- Notes:
- Cool Off is 30 sec. non-adjustable
  - Cycle power after making any changes.

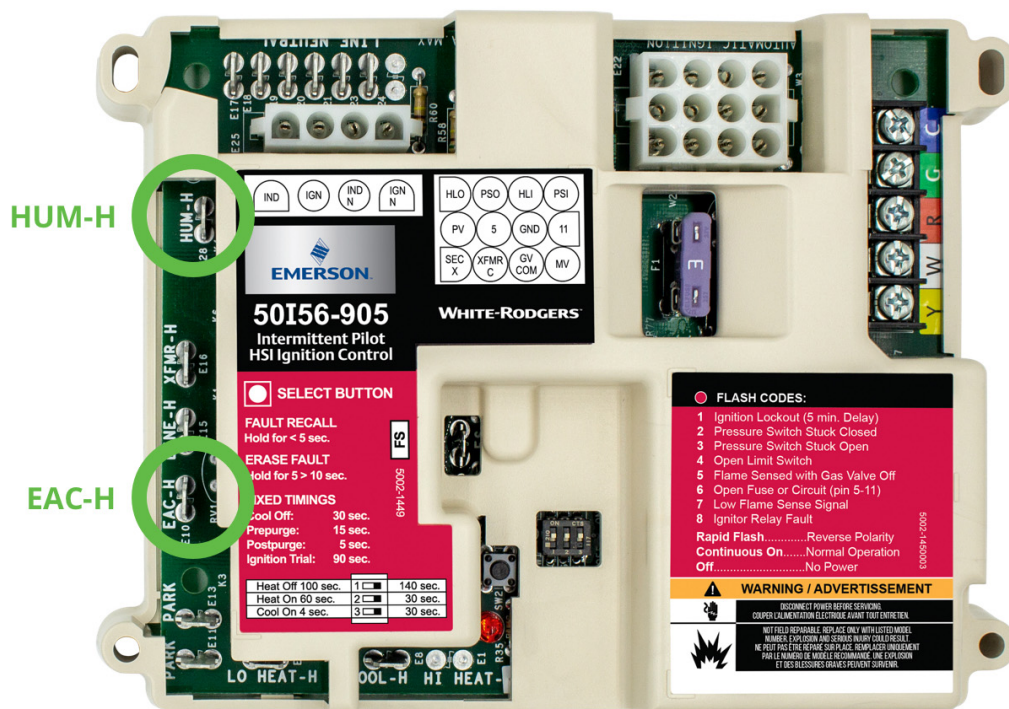
Blower Delay	Most ICP Units	Other ICP Units	Most Lennox Armstrong Ducane Units	Other Lennox Armstrong Ducane Units
Heat Off	140 sec	100 sec	100 sec	140 sec
Heat On	30 sec	60 sec	30 sec	30 sec
Cool On	30 sec	4 sec	4 sec	4 sec

Blue shading = A change from default may be required. See unit information or match existing control

# Optional Connections

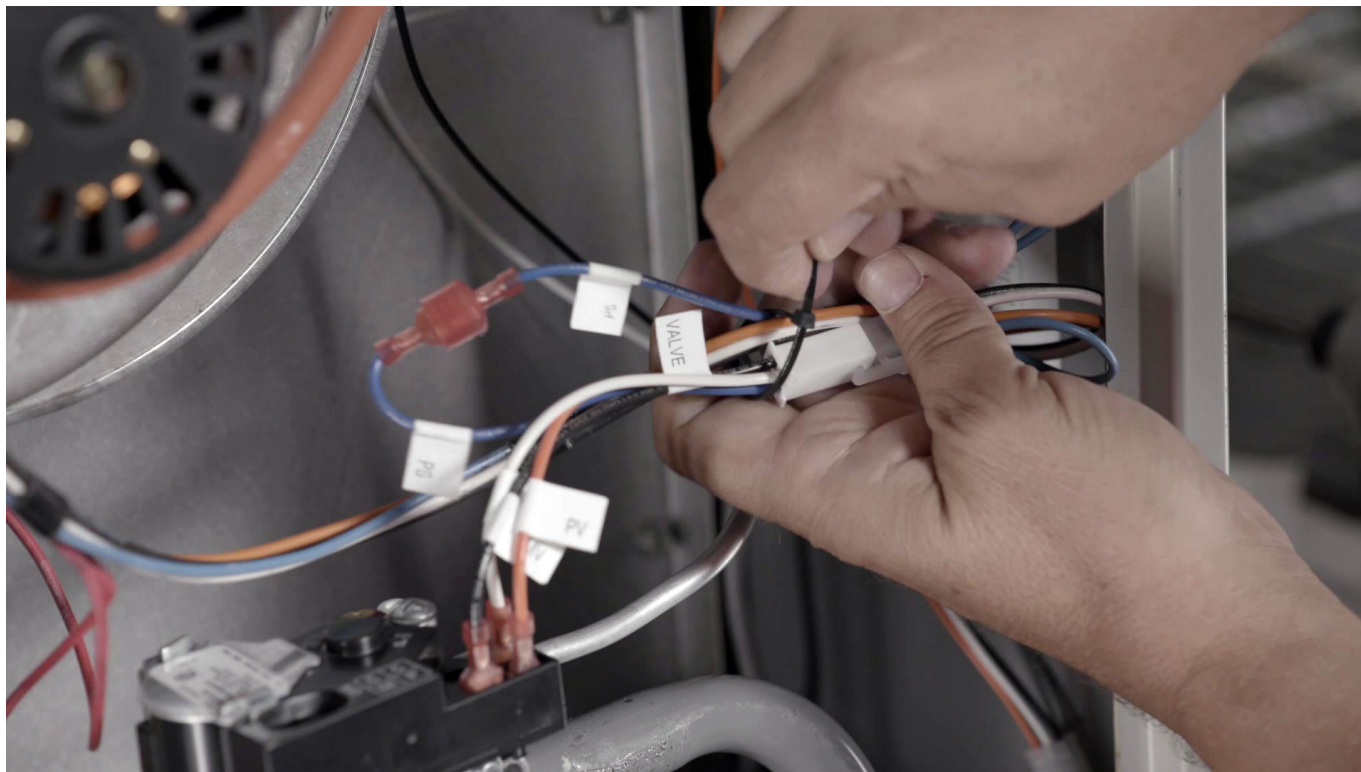
20

Option - connect 120V humidifier to HUM-H and LINE NEUTRAL.  
Option - connect 120V EAC to EAC-H and LINE NEUTRAL.



## Secure Wiring

- 21 Apply wire ties as needed to secure wiring and install **Unit Retrofit** label. Reinstall access panels, reconnect gas supply and electric power.



# Reconnect Gas and Power

- 22** Reinstall access panels, reconnect gas supply and electric power.



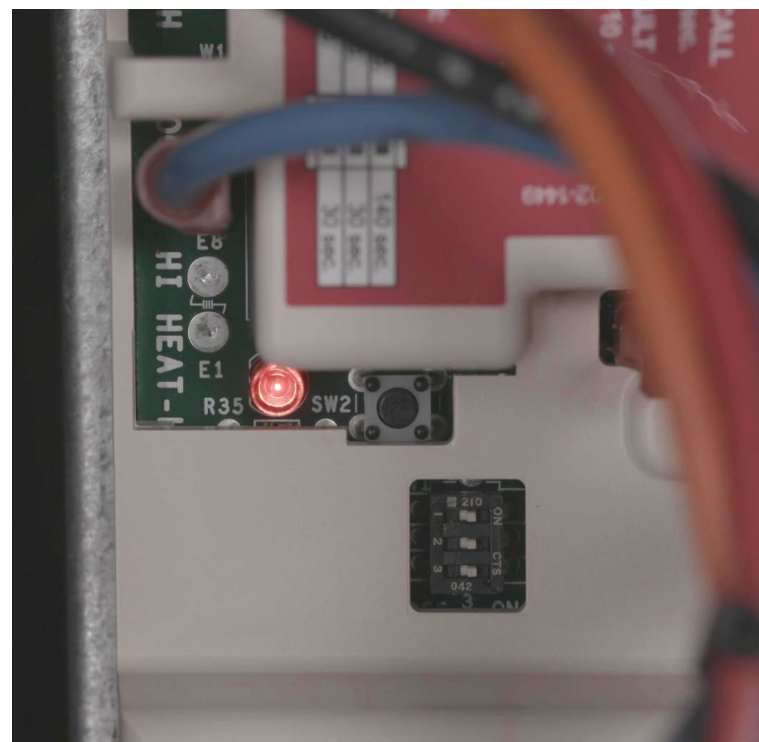


# Verify

23

Test the Gas Valve using the instructions supplied with the Gas Valve. Verify unit operation in HEAT, COOL, and FAN modes.

*NOTE: See Wiring Diagrams, Timings & Wiring Designators, and Operation sections for additional details*



# Troubleshooting

## FAULT RECALL

When the control is in Standby mode (no call for heat or cool), press the SELECT button for approximately 2 to 5 seconds or until the diagnostic LED turns off. Up to 5 fault codes are stored. **NOTE:** While displaying the stored fault codes, the control will ignore any new call for heat, cool or fan.

## FAULT CODE ERASE & RESET

When the control is in Standby mode (no call for heat or cool), press the SELECT button for 5 to 10 seconds or until the diagnostic LED begins to rapid flash.

*NOTE: If the button is pressed for over 10 seconds the rapid flash will stop and the control will return to Standby.*

FLASH CODES:	
1	Ignition Lockout (5 min. Delay)
2	Pressure Switch Stuck Closed
3	Pressure Switch Stuck Open
4	Open Limit Switch
5	Flame Sensed with Gas Valve Off
6	Open Fuse or Circuit (pin 5-11)
7	Low Flame Sense Signal
8	Ignitor Relay Fault
Rapid Flash .....	Reverse Polarity
Continuous On .....	Normal Operation
Off .....	No Power

**NOTE: Control will flash fault code 4 if Armstrong limit wiring is reversed, see Special Replacement Instructions**

# Troubleshooting Continued

## CONTROL LOCKOUT RESET

Remove 24 VAC power to the control for greater than 10 seconds to reset. An example would be to reset & troubleshoot a unit with flash code 1 that is in a 5-min. lockout / delay.

**FLASH CODES:**

1	Ignition Lockout (5 min. Delay)
2	Pressure Switch Stuck Closed
3	Pressure Switch Stuck Open
4	Open Limit Switch
5	Flame Sensed with Gas Valve Off
6	Open Fuse or Circuit (pin 5-11)
7	Low Flame Sense Signal
8	Ignitor Relay Fault

Rapid Flash .....	Reverse Polarity
Continuous On .....	Normal Operation
Off .....	No Power

**NOTE: Control will flash fault code 4 if Armstrong limit wiring is reversed, see Special Replacement Instructions**