Premium Pilot Burner Assembly 791P-751KT1

Carrier/ICP Brands

EMERSON

Business and Product Overview

Premium Pilot Burner Assembly
791P-751KT1

EMERSON

The White-Rodgers 791P-751KT1 Carrier 3-Wire Pilot Burner Assembly

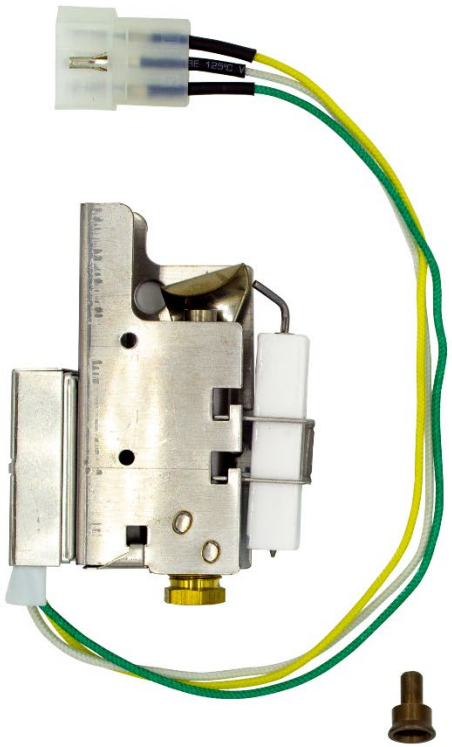
The 791P-751KT1 is the only replacement part of its kind made by a Carrier OEM qualified manufacturer.

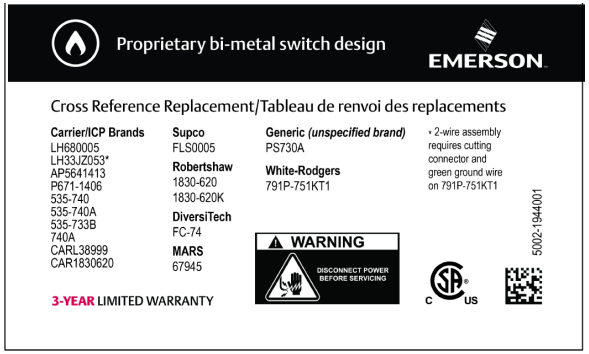
- Made using original factory tooling
- Proprietary bi-metal switch uses precious metals contacts to protect from oxidation and scaling
- 100% performance tested:
  - Each assembly ignited and calibrated using natural gas
- Crosses 17 Part Numbers on 1700+ furnace model numbers
- 3-Year Manufacturer Warranty

2 Million installed annually from 1984 through 2006

What's in the Box

- Pilot Burner Assembly with OEM QC Plug
- Attached Electrode Assembly
- LP Orifice
- Instruction Sheet



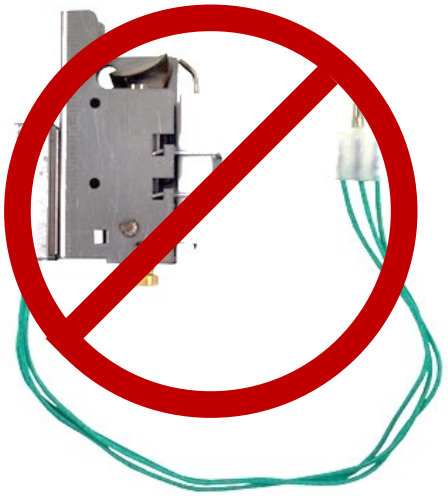


Cross-References are listed on the box

What is a 3-Wire Flame Sensor?

In 1984, Carrier launched a system that utilized a bi-metal switch to identify a flame present on a pilot. A single pole double throw switch was built into the pilot, giving it 3 wire leads to connect to a gas valve. This design recognized when the pilot flame was present and energized the main gas valve.

This system was manufactured under Carrier and ICP product labels, but due to the weakening of the bi-metal materials and the harsh environment in which the pilot exists, these pilot assemblies have a limited life span.

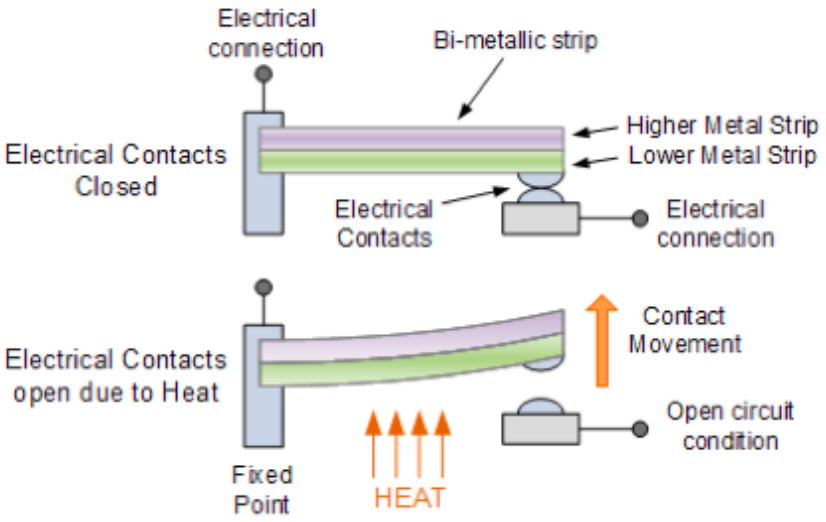


Understanding Bi-Metal Technology

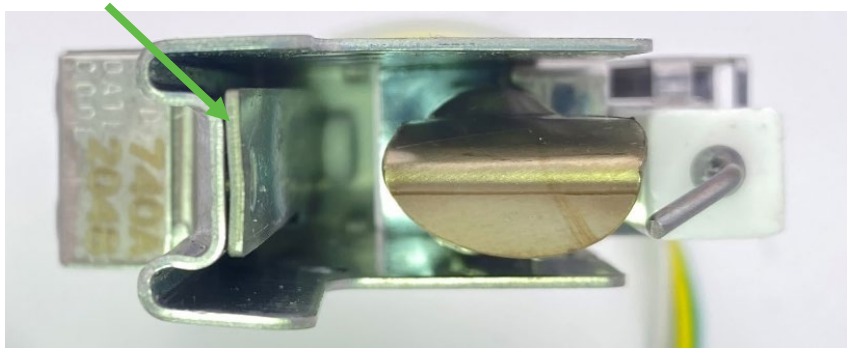
A bi-metallic object is made from two different types of metal. Unlike some other products, bi-metallic items are not made from a mixture of metals but consist of layers of different metals.

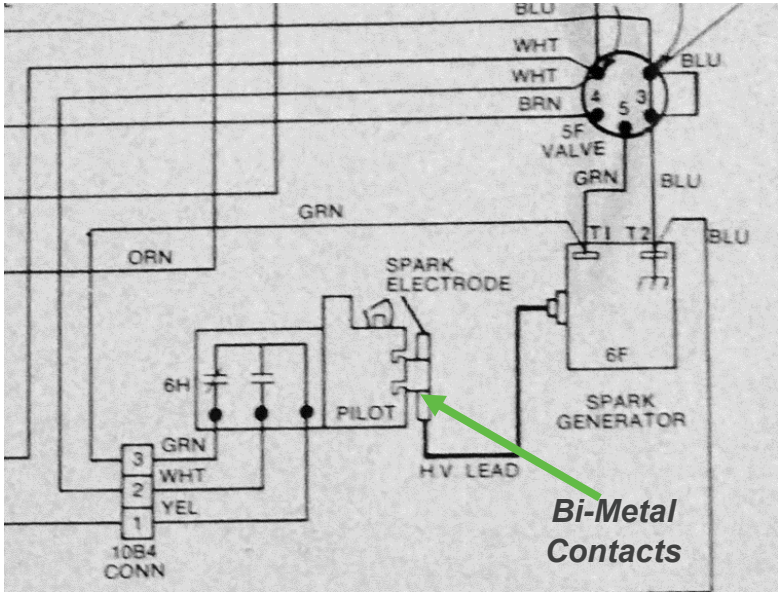
The bi-metal strip in the assembly reacts to pilot light heat and opens a set of contacts, while closing another, based on whether the pilot is on or off.

The metals in the strip react to heat in different ways and cause the strip to bend



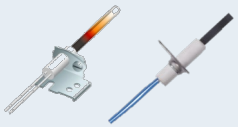
Bi-Metal





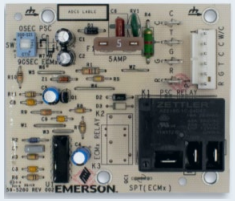
Extensive Carrier/ICP Offerings

Integrated Furnace Controls



Ignitors

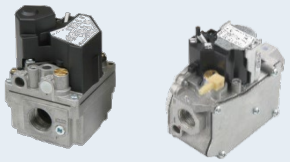
Fan Timer



Air handler Controls

SureSwitch Multi-Volt

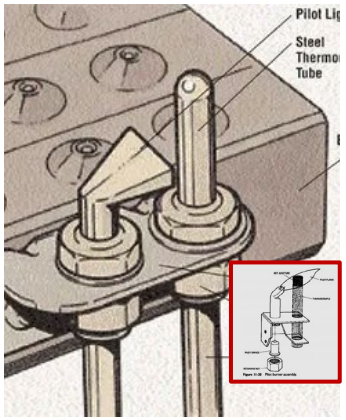
Defrost Control

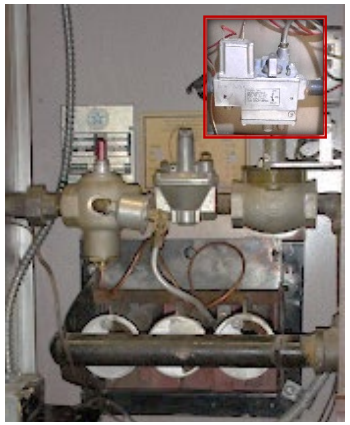


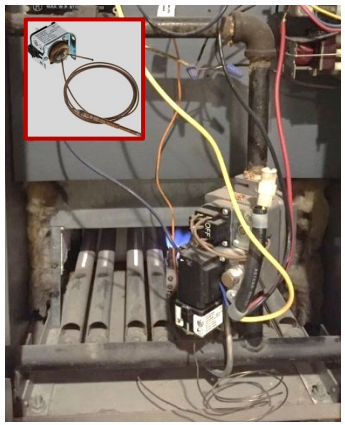
Gas valves

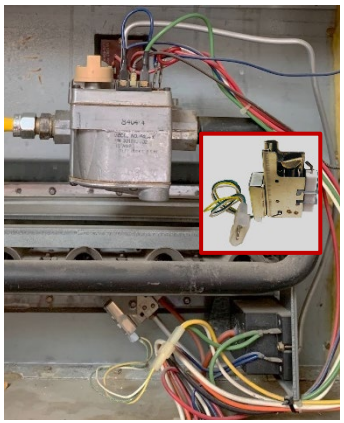
Offering	Model Numbers	Replaces
Integrated Furnace Controls Single & 2-stage	50M56U-751 21V51D-751	HK42FZ004, 005, 007, 008, 009, 010, 011, 013, 015, 016, 017, 019, 020, 028, 034, 040, 041
Air Handler Controls	48M55-751 48P55-751	HK61EA002, 006, 010 1171734, 1172975
Ignitors, Nitride & Carbide	767A-370	LH33ZS001, 002, 003, 004
	789A-751A1	LH33ZG001
	789A-751KT1/KT2	331930-751, 332505-751
Flame Sensor	790-751A1	LH33WZ511, 515, 517
		LH680012, LH680014
		LH33WZ521
Fan Timer - Universal	50F06-843	ST9120, ST9160 ICP Brand Intelligent Valve Systems
Defrost Control - Universal	47D01U-843	CES0110063, CES0130024 & 76 HK32EA series 1052757, 1069364, 1087952 & 53, 1093410, and many more
SureSwitch Multi-Volt – Universal Contactor	49M11-843	250+ Parts Replaced
Gas Valves	36C03-333 36H32-423 36H33-412 36H64-463 36J22-214 36J54-214 36J24-214	1000+ Parts Replaced

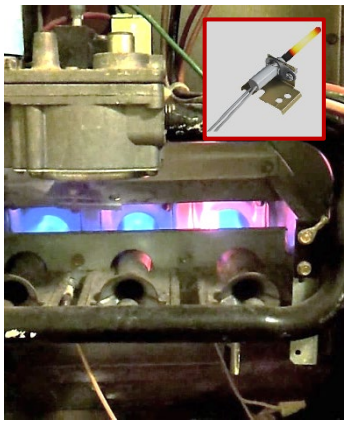
The Evolution of Ignition in Residential Furnaces











1928

- Dante Raso of Brooklyn, NY invents the standing pilot light system.

1971

- Combination gas valves begin to replace systems that had a separate 24V main valve, thermocouple pilot safety, and pressure regulator.

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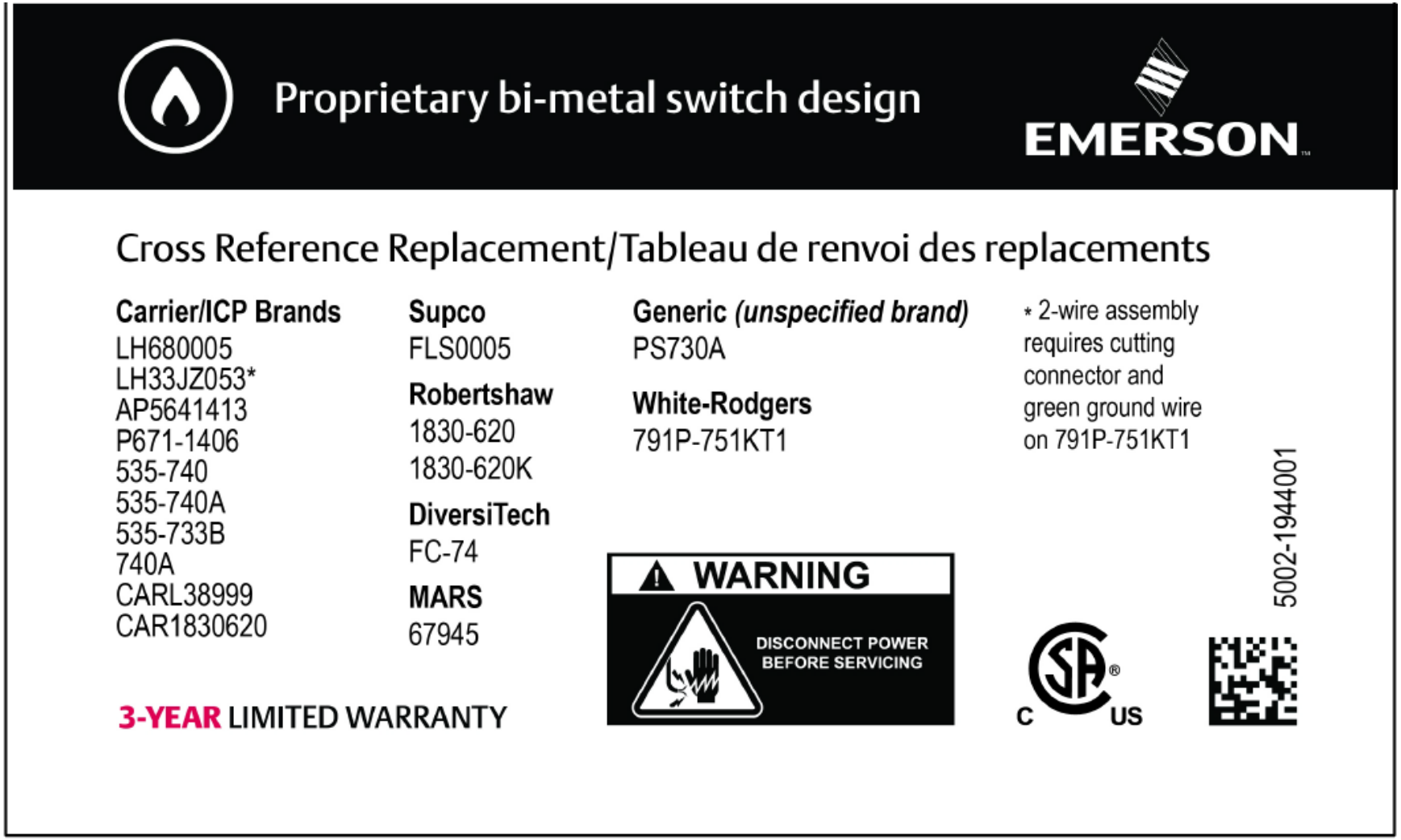
Cross Ref


Proprietary bi-metal switch design
EMERSON
Cross Reference Replacement/Tableau de renvoi des replacements
Carrier/ICP Brands
LH680005
LH33JZ053*
AP5641413
P671-1406
535-740
535-740A
535-733B
740A
CARL38999
CAR1830620
Supco
FLS0005
Robertshaw
1830-620
1830-620K
DiversiTech
FC-74
MARS
67945
Generic (unspecified brand)
PS730A
White-Rodgers
791P-751KT1
* 2-wire assembly requires cutting connector and green ground wire on 791P-751KT1
WARNING
DISCONNECT POWER BEFORE SERVICING
3-YEAR LIMITED WARRANTY
C US
5002-1944001

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

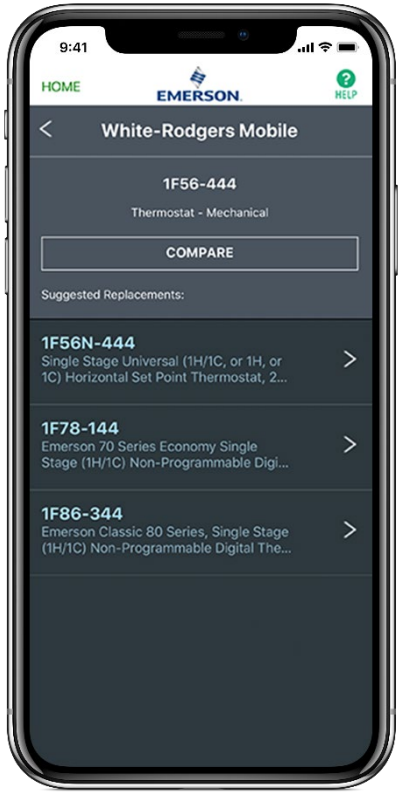
- Open your camera
- Hold it over the QR code
- Tap “Open” on the pop-down
- Install the app

WR Mobile App

Easy to use!

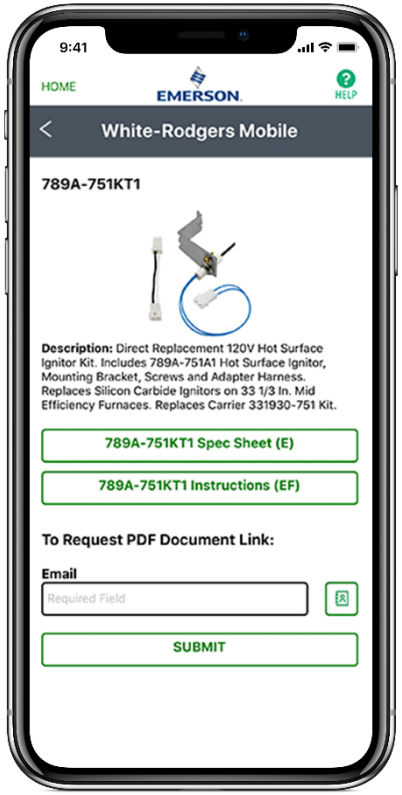
Search by OEM, Competitive, or White-Rodgers Model Number

Product Number



Scrollable Product List

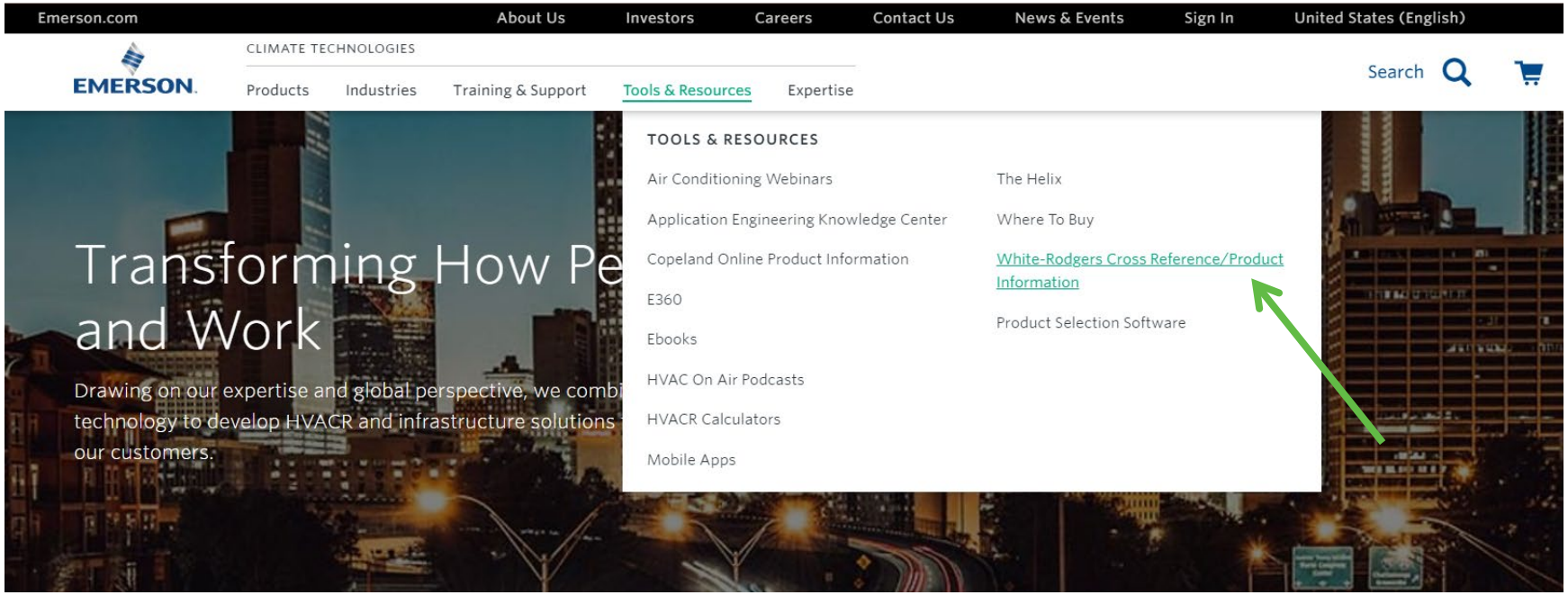
WR Replacement



White-Rodgers Cross Reference

Go to: 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



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

Premium Pilot Burner Assembly
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- Proprietary bi-metal switch uses precious metals contacts to protect from oxidation and scaling
- 100% performance tested:
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- Crosses 17 Part Numbers on 1700+ furnace model numbers
- 3-Year Manufacturer Warranty

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White-Rodgers 791P-751KT1 Components

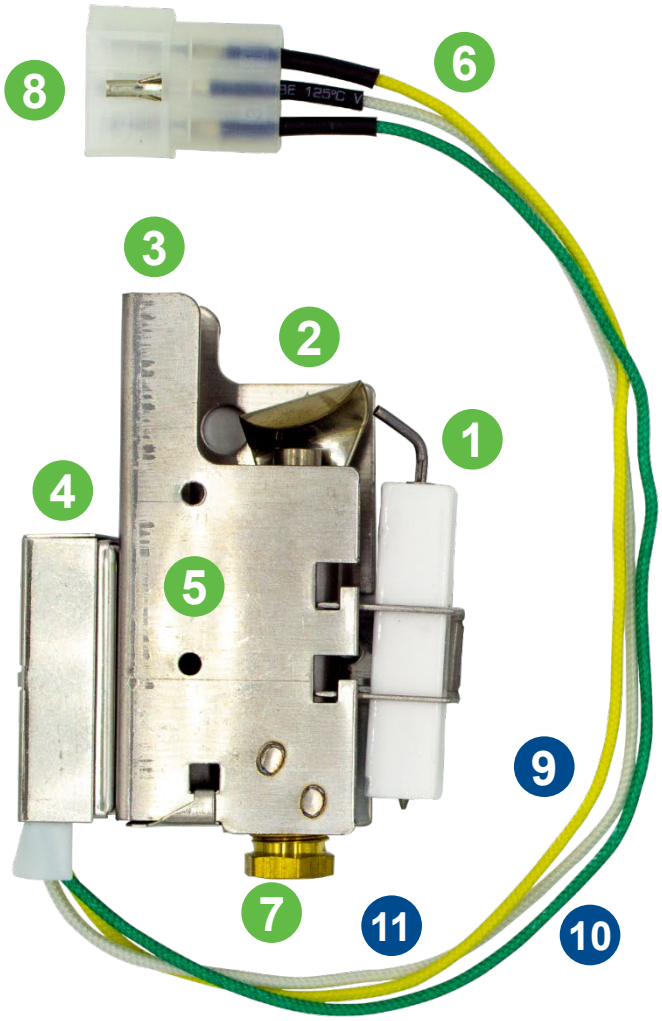
Carrier / ICP *791P-751KT1*

Pilot Assembly Components:

1. Spark Ignitor
2. Pilot Burner
3. Bi-Metal Strip
4. 24v Single Pole Double Throw Switch
5. Threaded Mounting Holes
6. Nail Type Spark Wire Connector
7. Pilot Tubing Connector
8. 3-pin Harness Connector

24v Wires:

9. Yellow – 24v Power input
10. Green – N/C Pilot & Sparker Circuit
11. White – N/O Main Valve Circuit

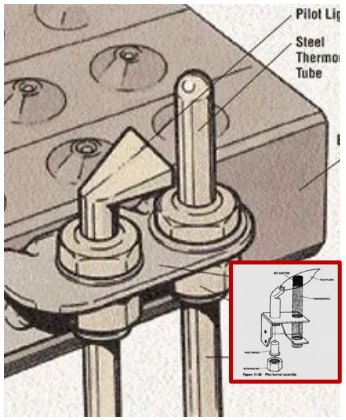


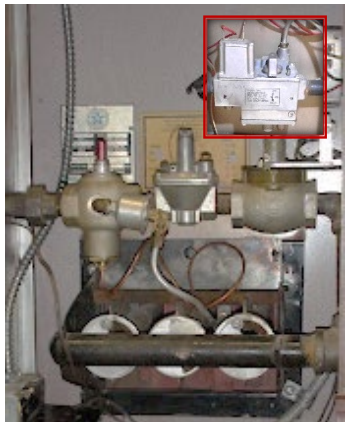
EMERSON

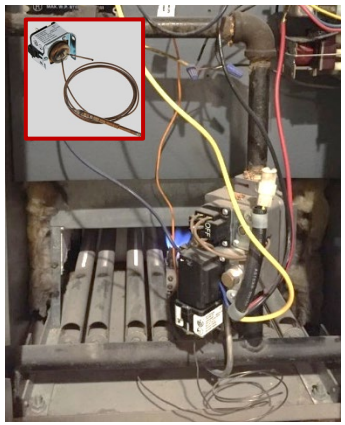
791P-751KT1 Benefit Analysis

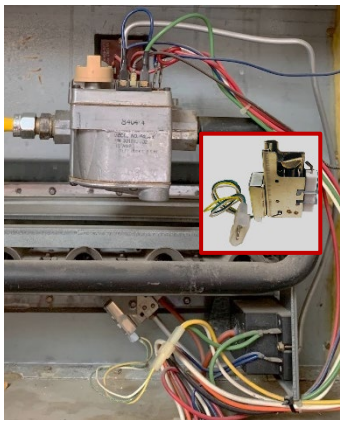
Feature	Description	Benefit
Proprietary Design	The only Carrier (OEM qualified) source to produce these combustion ignition components	OEM Quality
Original Tooling	Critical components made using original factory tooling	OEM Quality
Proprietary Bi-metal Switch	Proprietary bi-metal switch manufactured using precious metals contacts to protect them from oxidation and scaling	OEM Quality
Factory Tested	100% performance tested including switch timing	Peace Of Mind
Factory Calibrated	Each assembly ignited and calibrated using natural gas	Accurate Operation
Certified	CSA certified	Certification Backing
Warranty	3-Year Limited Warranty	Peace of Mind

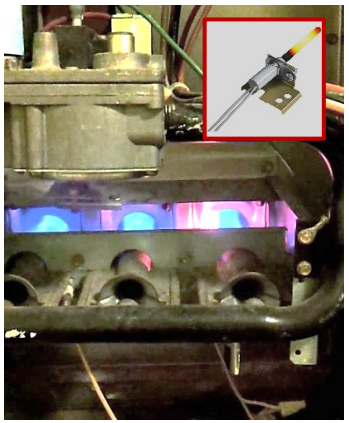
The Evolution of Ignition in Residential Furnaces











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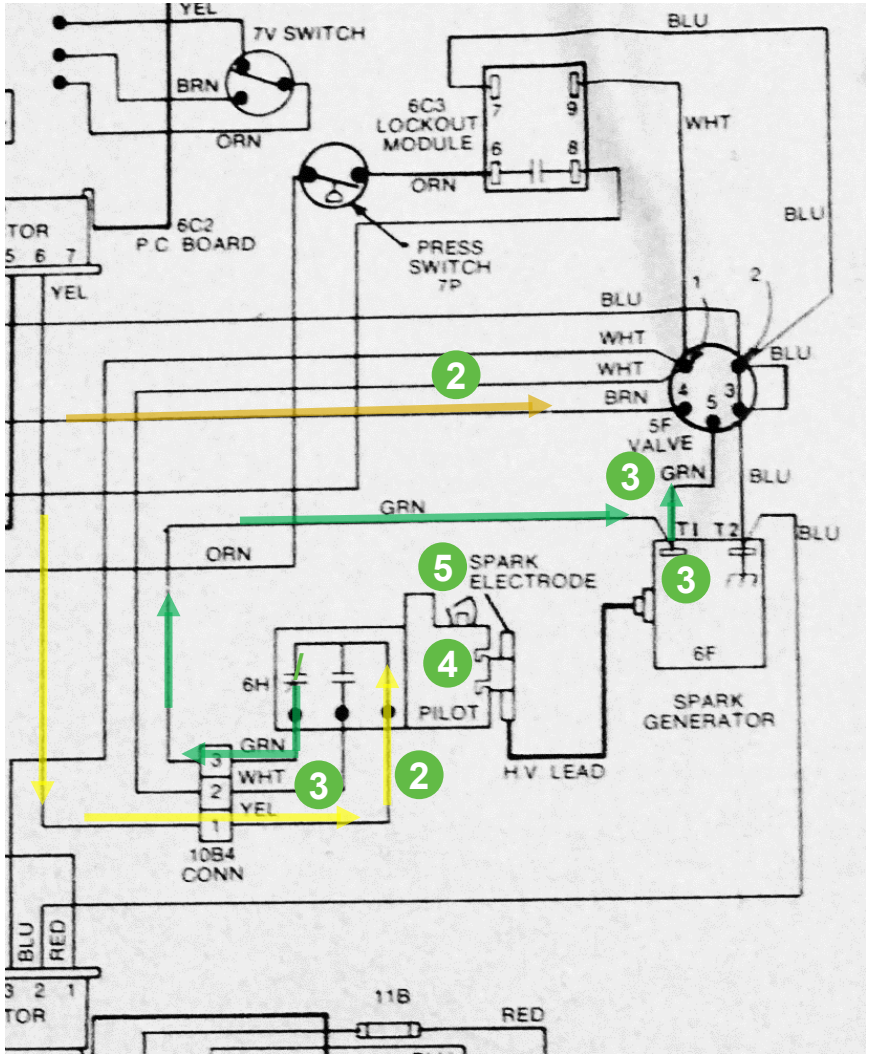
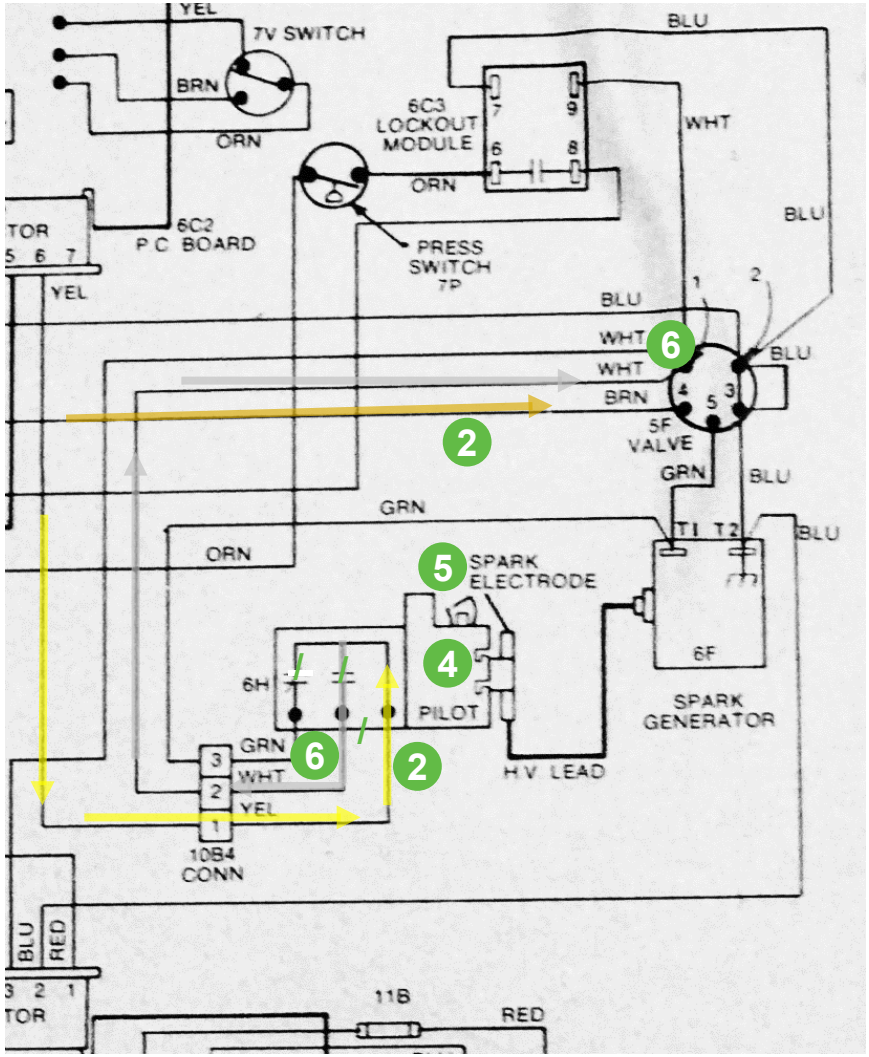
How a 3-Wire Pilot Works

1. The system thermostat calls for heat.
2. 24 volts goes to the HOLD (GV#4) coil in the gas valve and to the 3-wire pilot switch.
3. The 3-wire pilot switch sends 24 volts out through the “cold” N/C contact to the spark module. It then produces the high voltage spark and 24 volts is also sent to the PICK (GV#5) operator.
4. With 24 volts going to the PICK (GV#5) and the HOLD (GC#4) coils on the pilot gas operator in the gas valve, the PICK operator opens and gas flows out to the pilot and into the gas valve down to the inlet of the MAIN operator. (To open the pilot operator, both the PICK and the HOLD coils must be energized, but to keep the pilot operator open it takes only the HOLD coil staying energized.)
5. With the spark going and the pilot gas flowing, the pilot lights.



How a 3-Wire Pilot Works - Continued

6. The bi-metal strip in the pilot switch assembly is heated by the pilot flame causing it to bend and the switch to toggle. The “cold” N/C contact opens and the “hot” N/O contact closes. This shuts off the 24 volts to the high voltage spark box and to the PICK (GV#5) operator in the gas valve. 24 volts is sent to the MAIN (GV#1) operator coil. The MAIN operator opens to send gas down the manifold to the main burners.
7. The pilot light provides the source of ignition for the main burner gas and the main burner light.
8. As long as the thermostat keeps calling for heat and the bi-metal switch works correctly ("hot” contact stays closed), the HOLD and the MAIN operators stay engaged until the temperature on the thermostat is reached.



Specs

SPECIFICATIONS

Specification	Value		Unit
Input Voltage	18-33		VAC
Input Current	1.0		amp
Line Frequency	60		Hz
Operating Temperature Range	- 40 to 1225		°F
	- 40 to 662		°C
Gas Type	Natural Gas	LP	
Recommended Gas Input Rating	875 +/- 10%	725 +/- 10%	BTU/hr
Recommended Gas Orifice Size	0.018	0.012	Inches
Recommended Gas Inlet Pressure	5.00 +/- 0.25	11.00 +/- 0.25	in. W.C.
Lead Wire Length	9.125		inches
Lead Wire Gauge	18		AWG
Spark Gap (Minimimum)	0.156		inches

Install

Premium Pilot Burner Assembly
791P-751KT1

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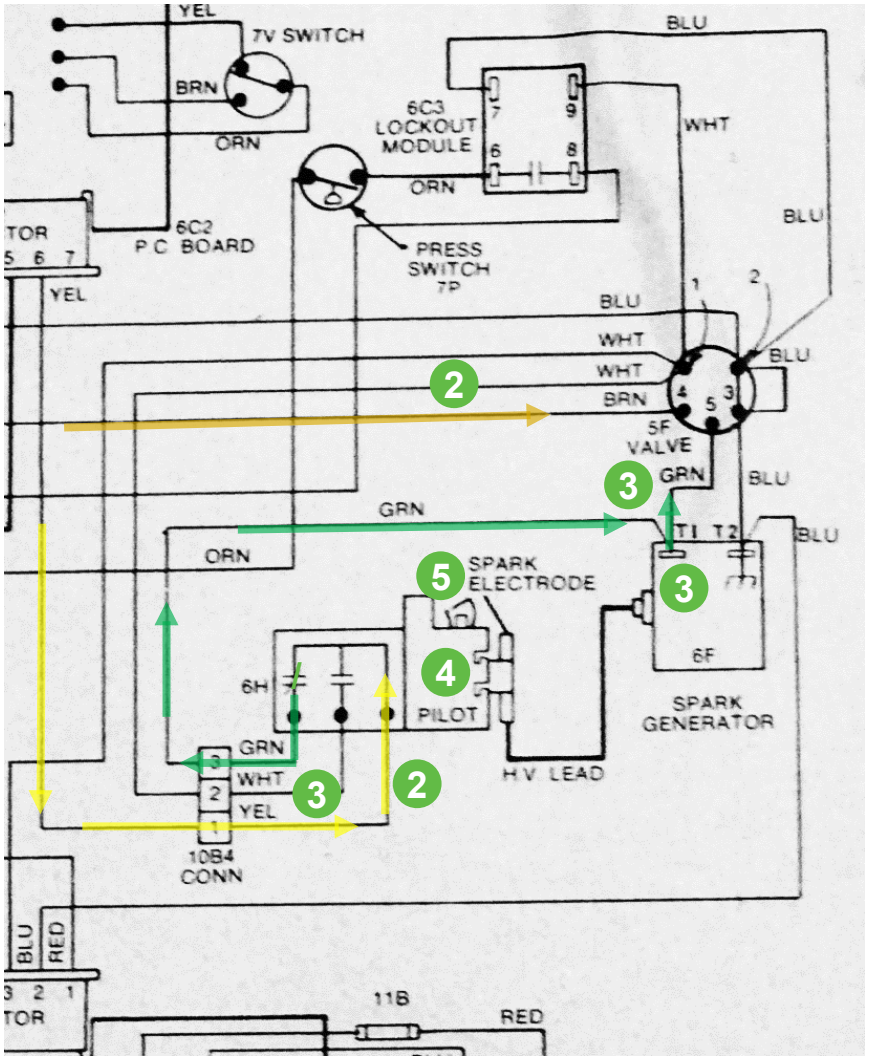

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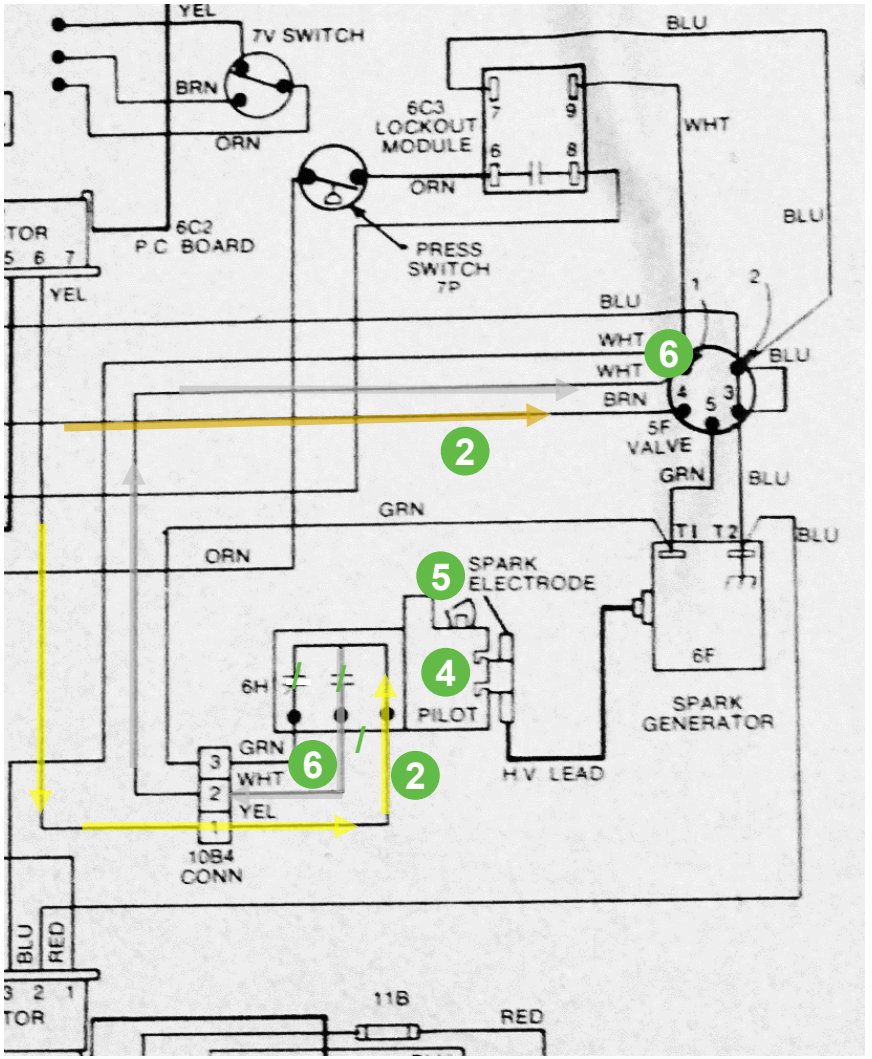
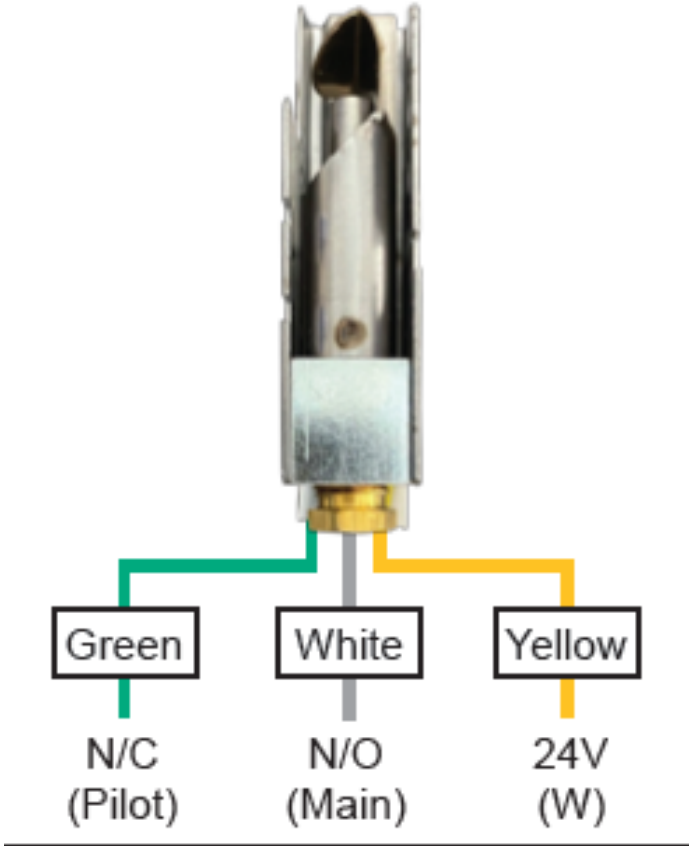
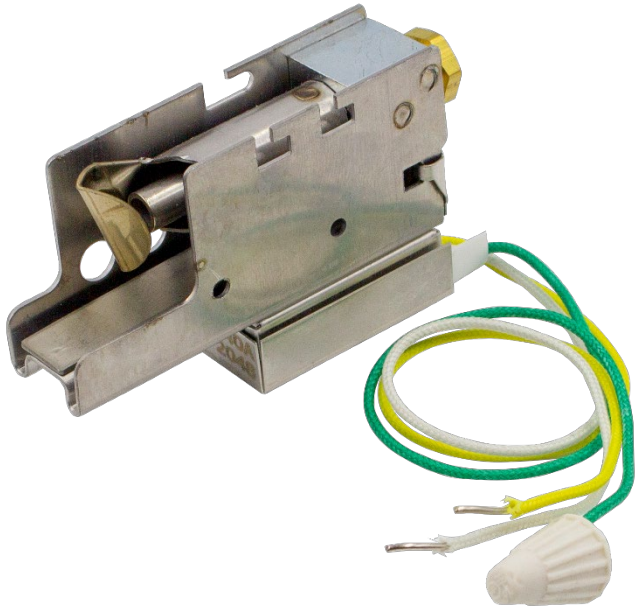


Wire Designation

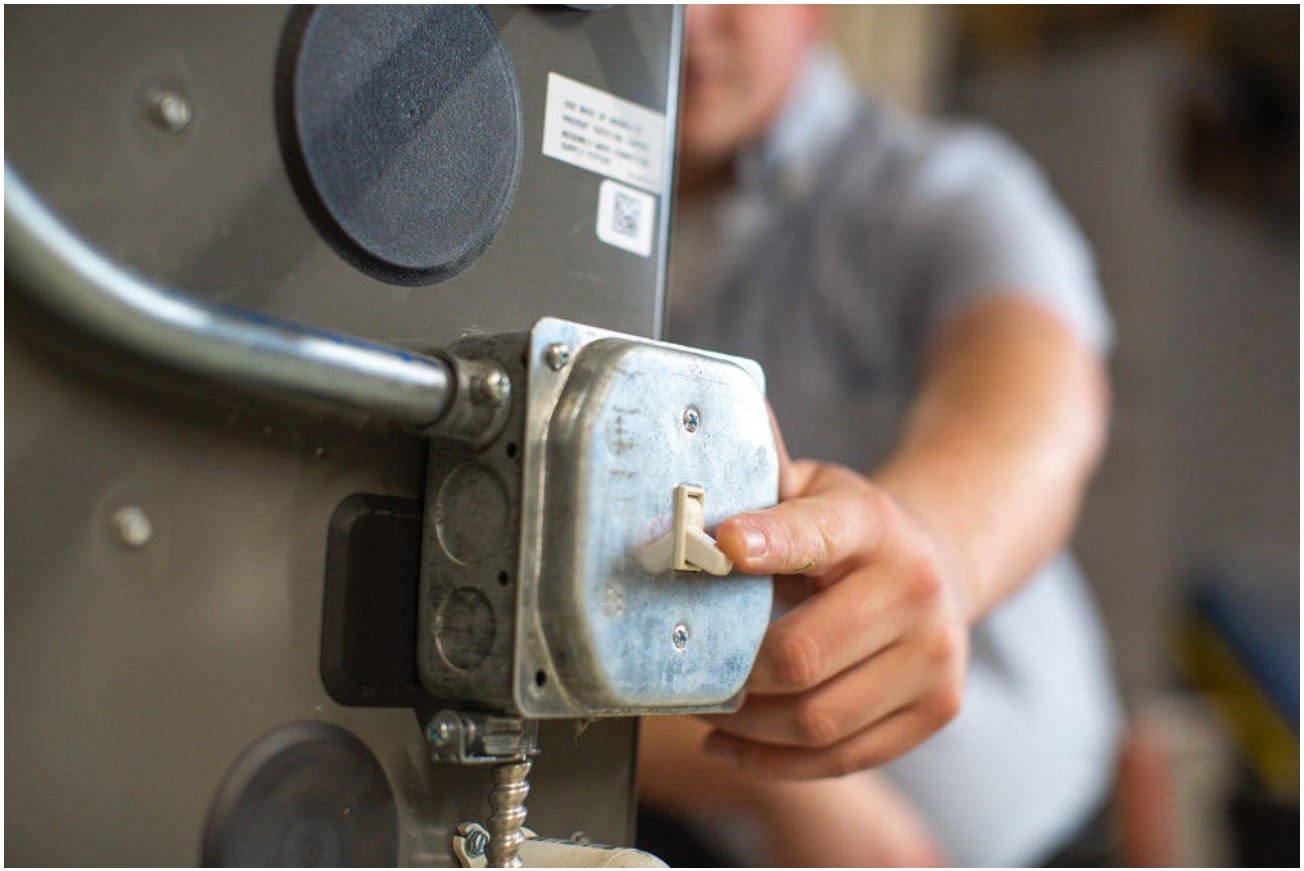




For 2 wire applications, cut off the plug connector and place a wire nut on the green wire. Strip and connect the white & yellow wires using wire-nuts.

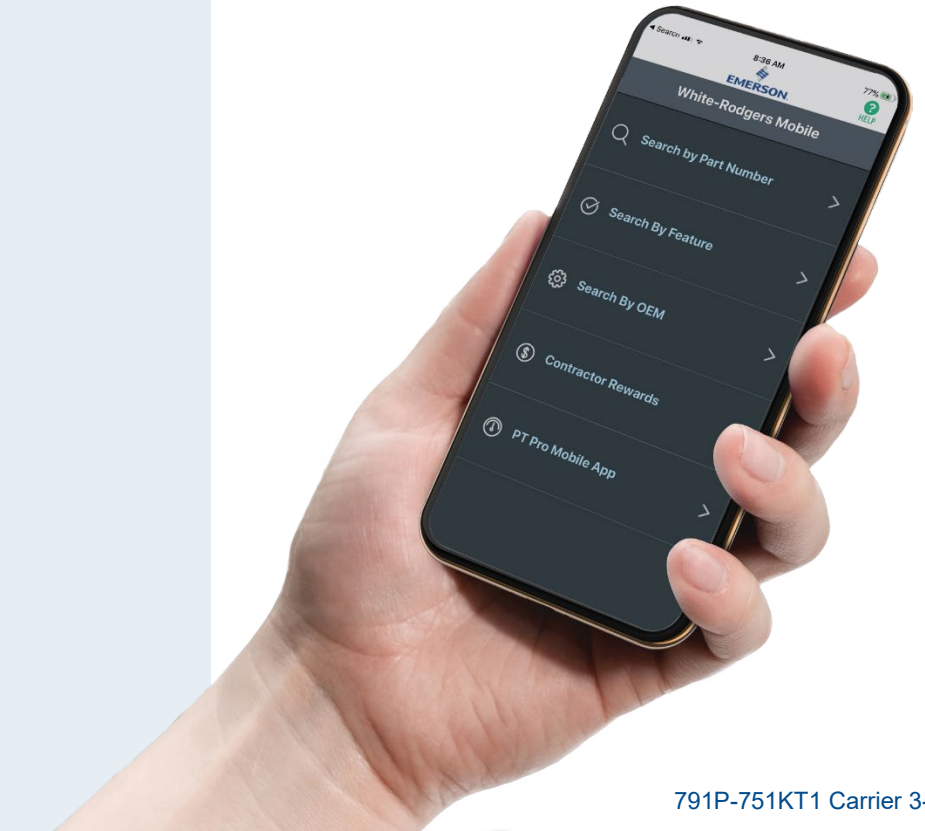
Disconnect power and gas

1. Disconnect electric power and gas to the unit, then remove unit access panels.



Cross-reference

2 Verify a cross-reference, check the side of the box, installation instructions, or the WR Mobile app.



WHITE-RODGERS

D
OEM Direct

Premium Pilot Burner Assembly

791P-751KT1 | Carrier/ICP Brands

30V, 60 Hz applications

Includes electrode

3-wire OEM connector

Cross Reference Replacement/Tableau de renvoi des replacements

Carrier/ICP Brands	Supco	Generic *(unspecified brand)*	* 2-wire assembly requires cutting connector and green ground wire on 791P-751KT1
LH680005	FLS0005	PS730A	
LH33JZ053*	**Robertshaw**	**White-Rodgers**	
AP5641413	1830-620	791P-751KT1	
P671-1406	1830-620K		
535-740	**DiversiTech**		
535-740A	FC-74		
535-733B	**MARS**		
740A	67945		
CARL38999			
CAR1830620			

3-YEAR LIMITED WARRANTY

WARNING

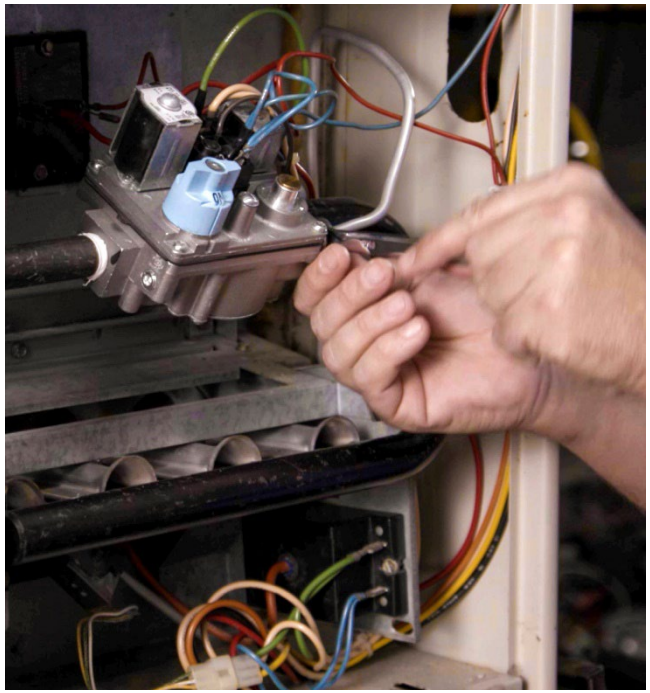
DISCONNECT POWER BEFORE SERVICING

5002-1944001

Disconnect Existing Pilot

3

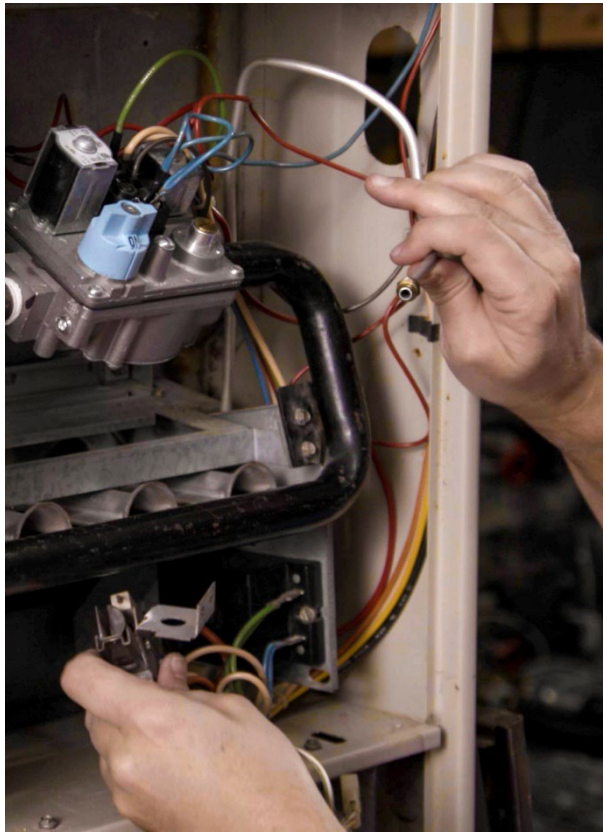
- Disconnect the pilot tubing from the gas valve and separate.
- Disconnect the 2 or 3-wire wiring going to the existing pilot assembly. For this application, the 3-wire plug can be disconnected.
- Disconnect the existing pilot assembly and remove from the furnace.



Remove Existing Pilot

4

- Remove the spark wire from the existing electrode.
- Disconnect the pilot tubing from the existing Pilot assembly.
- Remove the pilot bracket from the assembly, then discard the assembly.

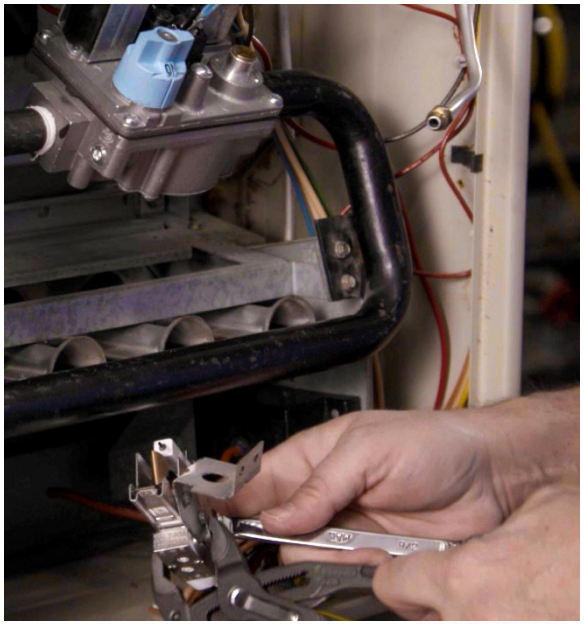


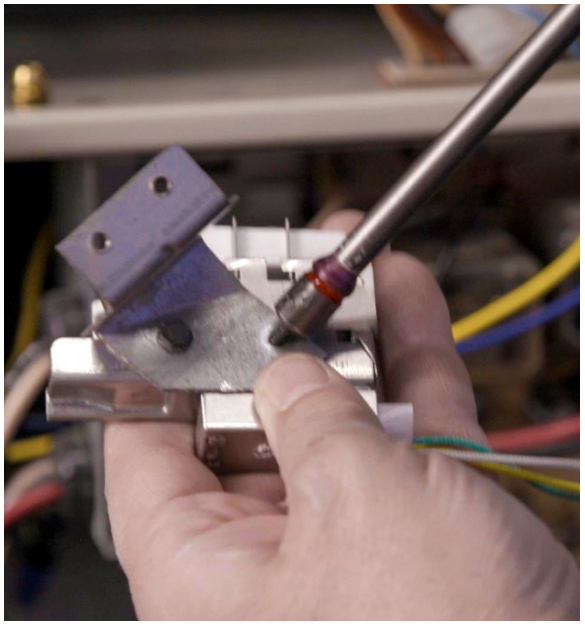
791P-751KT1 Carrier 3-Wire Pilot Burner Assembly

Reinstall and Reconnect

5

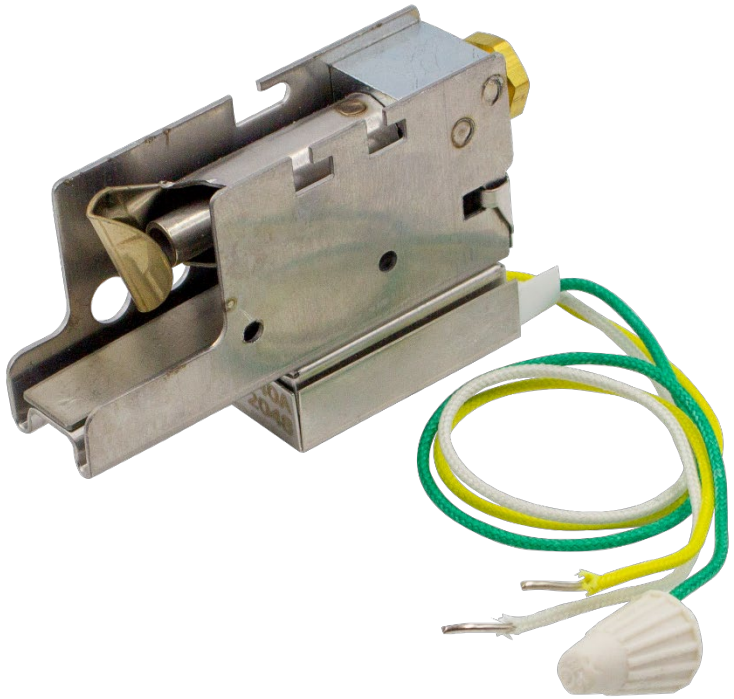
- For this application natural gas is used, so the factory installed orifice can be left in the assembly.
- Re-install the pilot bracket on the new 791P-751KT1.
- Re-connect the existing pilot tubing, tightening snugly.
- Re-connect the existing spark wire.
- Re-Install the new pilot assembly in the same position where the existing assembly was.





Reinstall and Reconnect

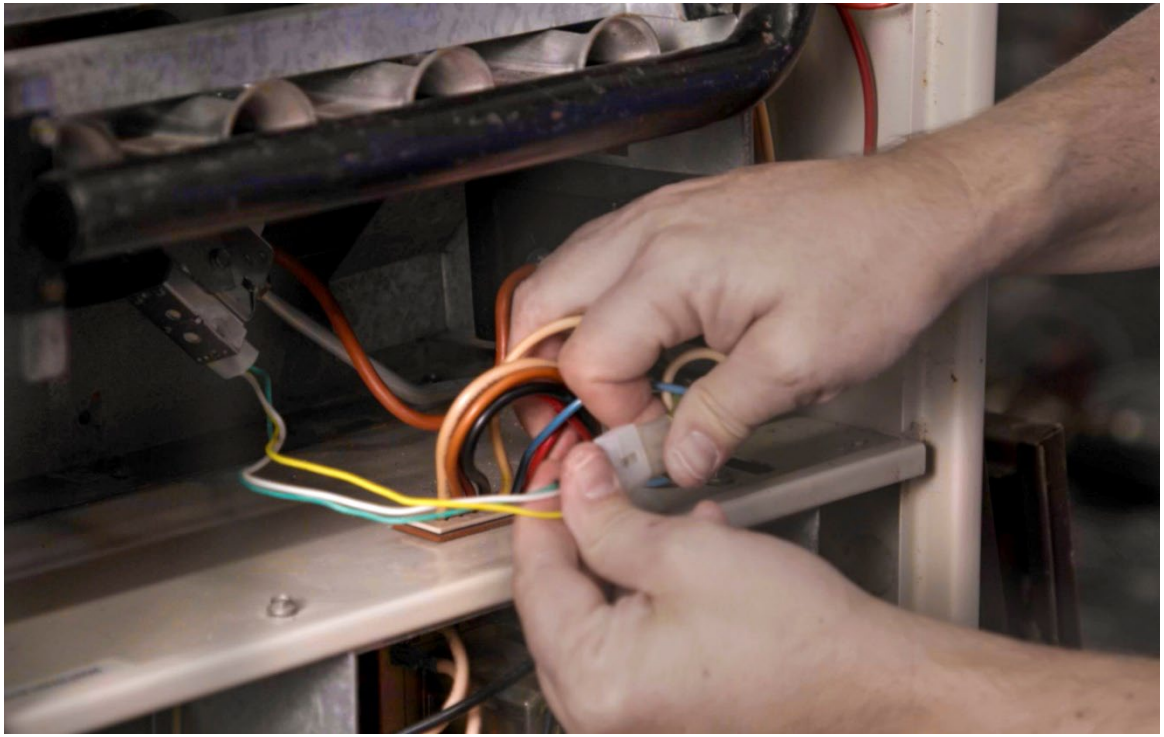
6 For 2-wire applications, cut off the plug connector and place a wire nut on the green wire. Strip and connect the white & yellow wires using wire-nuts.



Reinstall and Reconnect

7

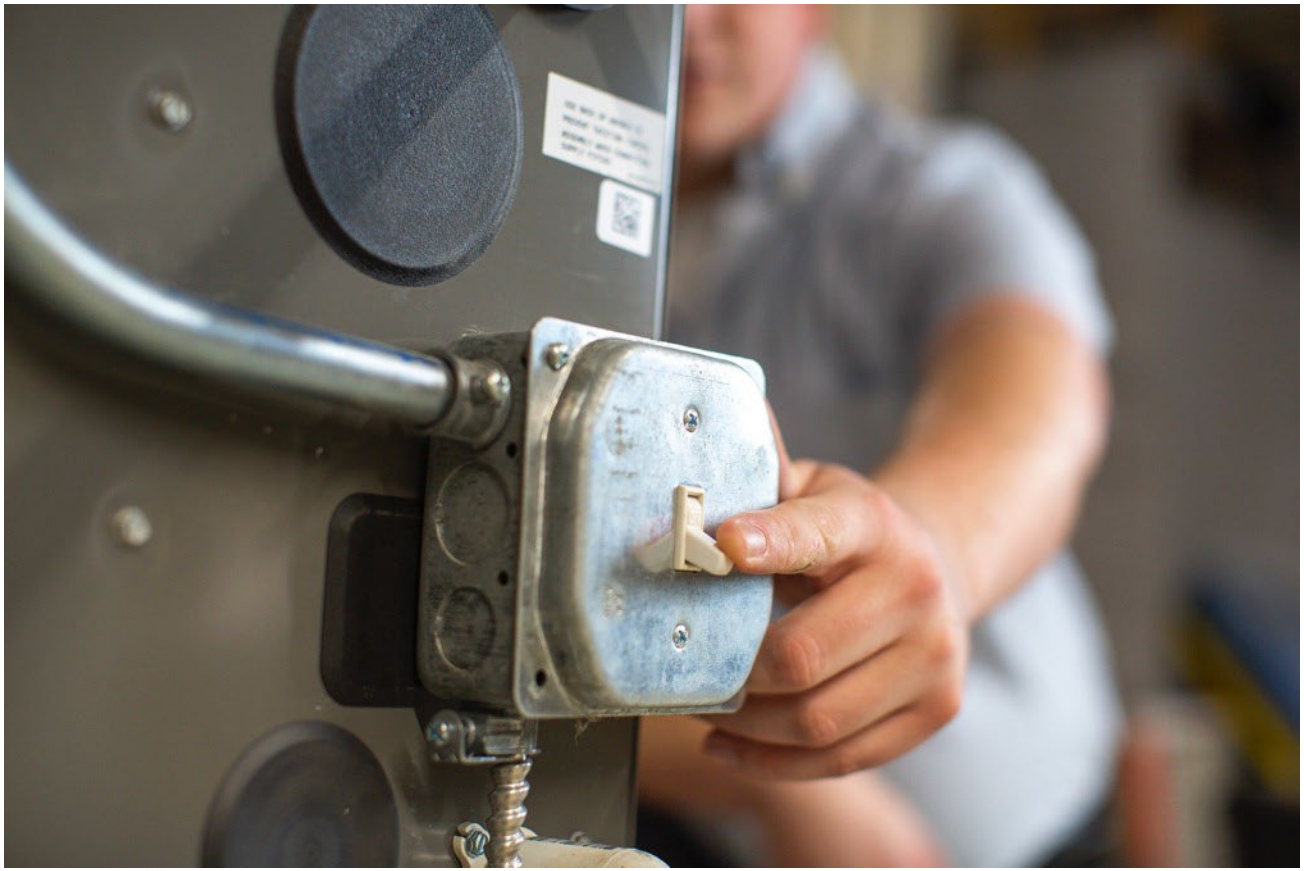
- For this application using 3-wires, the plug can be reconnected to the furnace harness connector.
- Finally, reconnect the pilot tubing to the gas valve, making sure not to cross-thread. Tighten the fitting snugly.



Reconnect Power and Gas

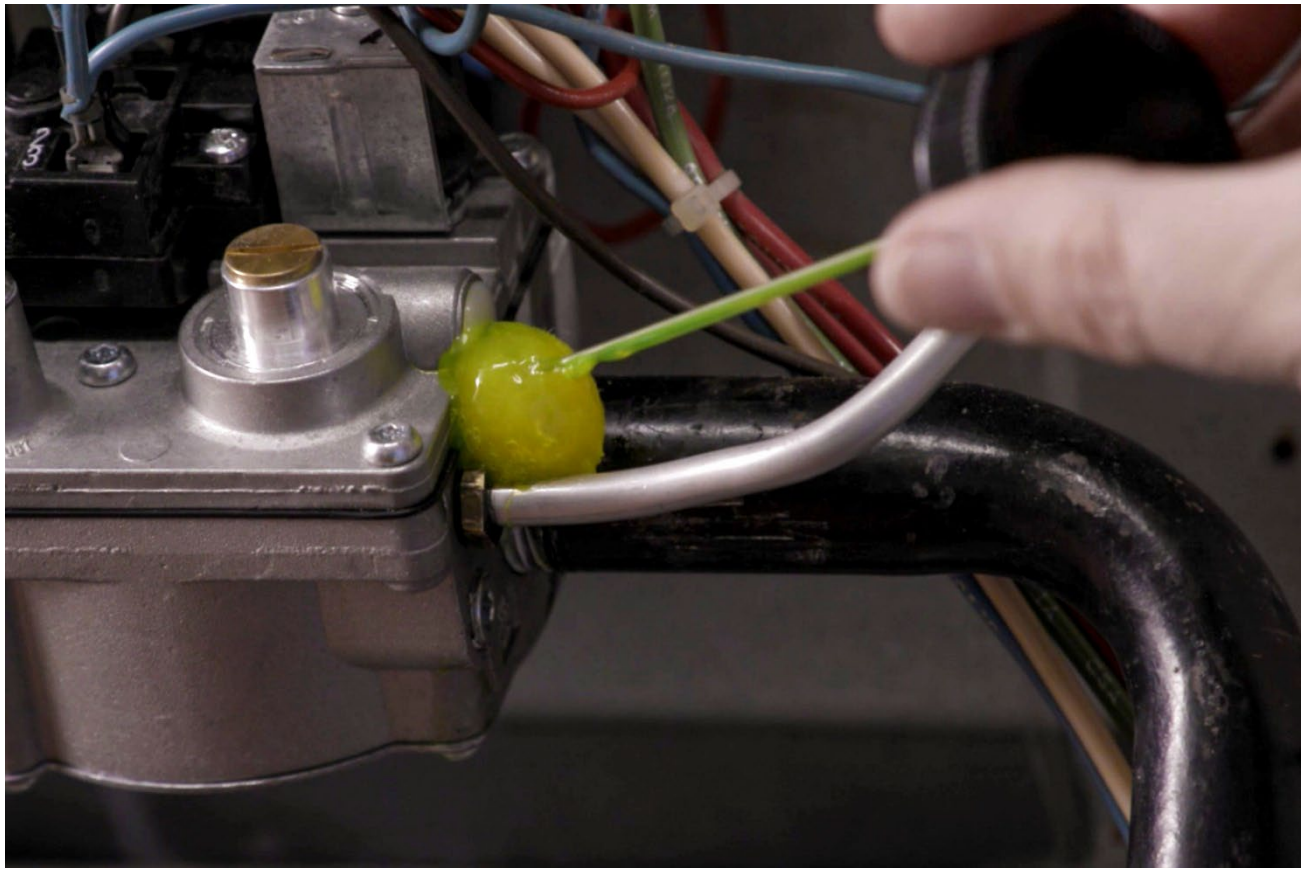
8

The system is now ready to be powered on. Reconnect the electric power and gas to the unit, and make sure the door switch is engaged.

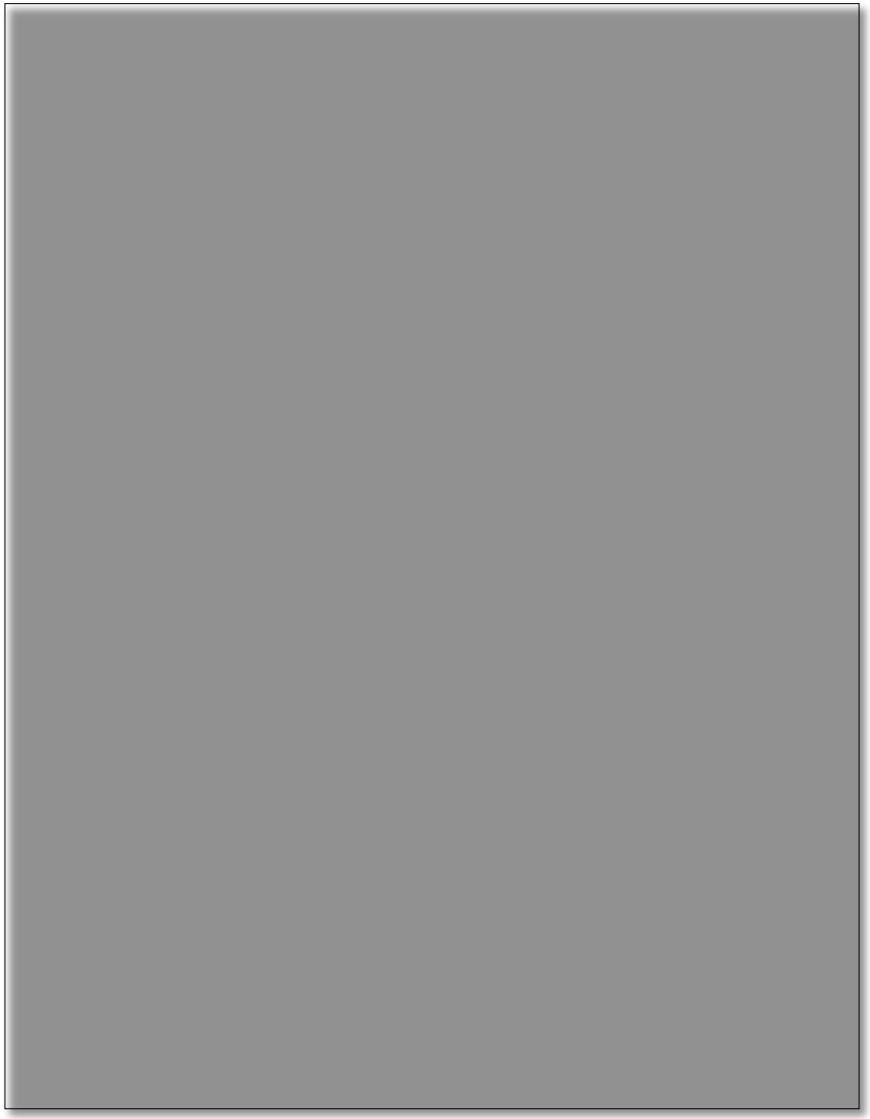


Reconnect Power and Gas

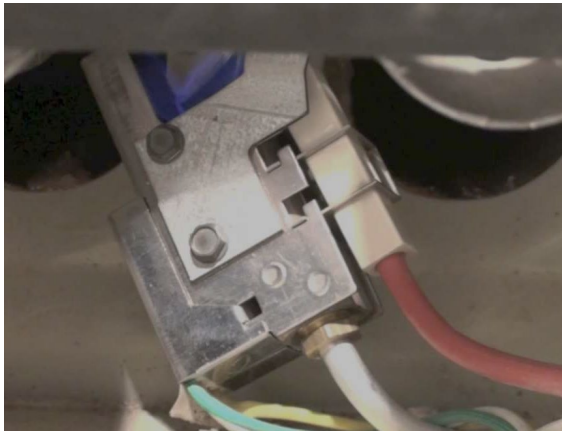
9 To check for pilot tubing leaks, make a call for heat and apply leak detection solution to the tubing fittings. Check for leaks on both ends.



Instruction Sheet

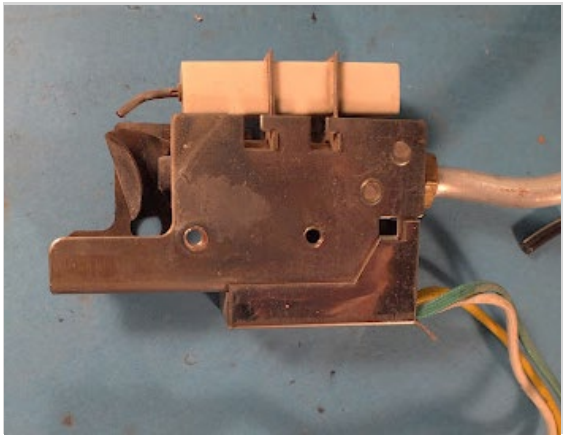


Ignition Operation Troubleshooting



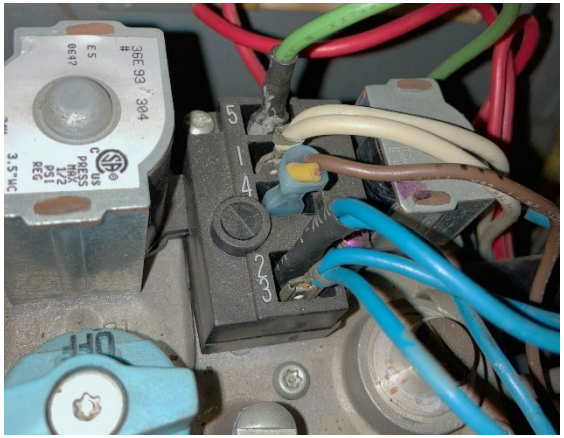
Poor Flame

A poor or weak flame may cause the bi-metal to click the pilot switch on and off. This can cause the gas valve main circuit to continue to open/close, as well as cause the spark ignitor to continue sparking after the main burner ignition has occurred.



Weak Bi-Metal

Over time the bi-metal strip is fatigued from the heating/cooling process of each ignition. The 2 metals gradually harden until the heat from the flame is not strong enough to cause the bending action and trip the pilot switch.



Other Factors

The coils in the gas valve can stick/fail, causing the burners to cycle or not come on at all.

Rust occurring over time can cause the pilot switch to stick closed, and the bi-metal strength cannot overcome it.

Thank you!

EMERSON