

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

PARTS INCLUDED

- 50I56-905 120V HSI IP Furnace Control Board
- 1 - Main CONTROL Harness (0115-0339)
- 1 - Gas VALVE Harness (0115-0336)
- 1 - Ignitor/Inducer C Harness (0115-0256)
- 1 - 791Q-905KT1 120V Ignitor + Flame Sensor Kit for Pilot Assembly
- 1 - 36G33-905 IP Gas Valve
- 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

DESCRIPTION

The 50I56D-905 Retrofit Kit is an aftermarket service solution for popular ICP and Lennox brand furnaces using SV9500, SV9501 and SV9502 Intelligent Valves and Fan Timer Control boards. Upgrades system from 24V to 120V hot surface pilot ignition and utilizes reliable standard IP gas valve. For single stage furnaces with PSC inducer and blower motors.

SPECIFICATIONS

ELECTRICAL RATINGS:

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 insure flame detection: 0.25 µA DC*

Maximum current for non-detection: 0.1 µA DC

Maximum allowable leakage resistance: 100 M ohms

*Measuring with a DC voltmeter (1VDC = µA)

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 @ 120 VAC (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)

GASES APPROVED: Natural, Manufactured, Mixed, Liquid Petroleum, and LP Gas Air Mixtures.



WARNING



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

- Installation should be done by a qualified heating and air conditioning contractor or licensed electrician.
- All wiring must conform to local and national electrical codes and ordinances.
- Following installation or replacement, follow manufacturer's recommended installation/service instructions to ensure proper operation.

FIRE HAZARD

- Do not exceed the specified voltage.
- Protect 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

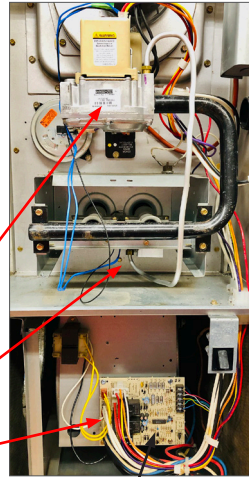
- Shut off main gas to appliance until installation is complete.



INSTALLATION

REMOVE PARTS TO PREPARE FOR RETROFIT

STEP	DETAILS
Warning: Disconnect unit electrical & gas supply	
1	Remove access panels
2	Take pictures before removing any wiring
3	Label existing wiring as necessary
4	Disconnect both 4-pin plugs and pilot tubing, remove gas valve & discard
5	Disconnect pilot assembly. Remove 24V HSI ignitor + sensor & clip from assembly.
6	Unwire fan timer, remove & discard



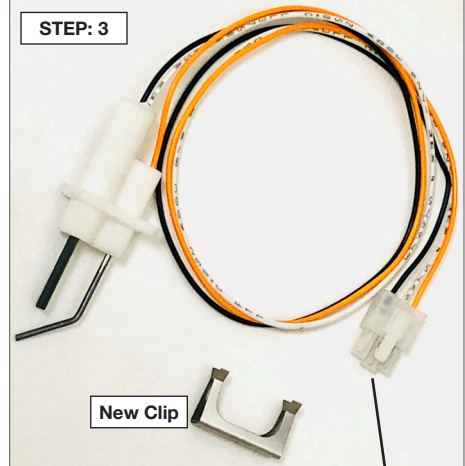
NOTE on removal step 5: discard existing 24V ignitor + sensor and clip. Use new clip for best fit.

RETROFIT NEW PARTS INTO FURNACE

STEP	DETAILS
Warning: Avoid damaging components when drilling or driving screws. All wiring should be installed according to local and national code.	
1	Mount 50I56-905 control in blower area using cover as drill template and using 4 x 1" screws
2	Install 36G33-905 gas valve in furnace. See instructions in box.
3	Install 791Q-905 120V HSI Ignitor + sensor into pilot assembly <u>using new clip</u> . Reinstall pilot assembly and connect gas supply tubing to new gas valve.
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
4	Locate an existing wire passage between the burner and blower areas or drill 7/8" hole(s) and install wire grommet(s)
5	Plug 3-pin EXTENSION harness into ignitor + sensor, route wires from burner area to blower control board area
6	Plug orange flame sensor wire onto control board 3/16" FS spade, see page 4
7	Plug 4-pin Ignitor/Inducer C harness into control board connector E25 , see page 4

IGNITOR + FLAME SENSOR & CLIP

STEP: 3



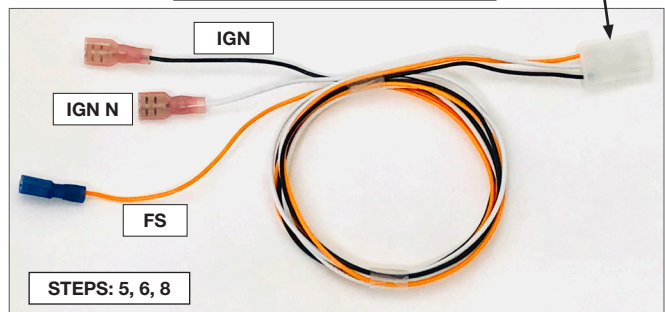
STEP: 5, 10

Wire passes through grommet easiest this way



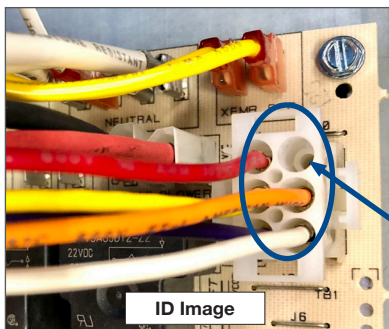
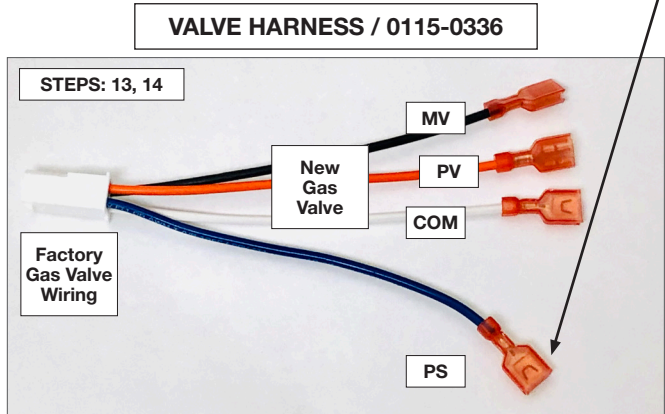
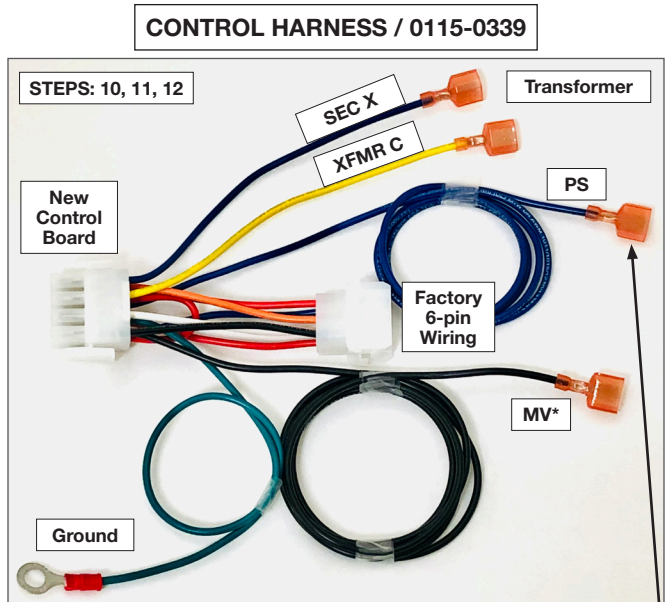
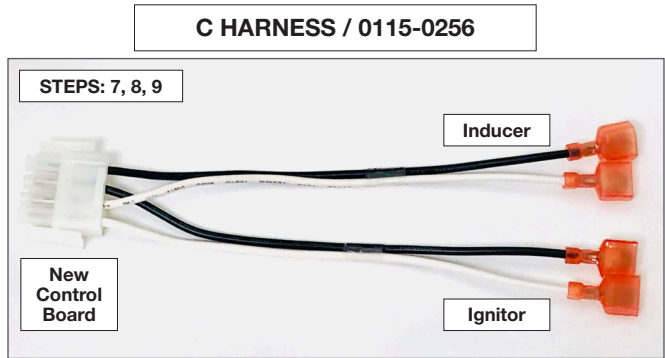
New Clip

EXTENSION HARNESS



RETROFIT NEW PARTS INTO FURNACE

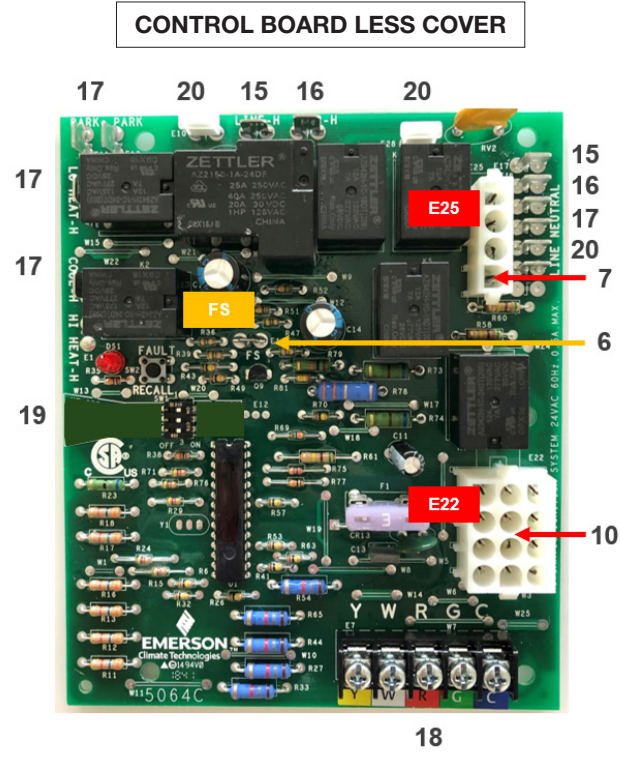
STEP	DETAILS
8	Connect Ignitor hot (IGN) and neutral (IGN N) from EXTENSION harness to C harness leads 2 & 4, see control board label
9	Connect Inducer hot (IND) and neutral (IND N) to C harness leads 1 & 3, see control board label
10	<p>Plug main CONTROL harness into control board 12-pin connector E22, see page 4</p> <ul style="list-style-type: none"> 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 Special Replacement Instructions to complete MV* wiring from STEP 9
11	<p>Connect transformer to CONTROL harness</p> <ul style="list-style-type: none"> 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
13	<p>Plug 4-pin VALVE harness into factory 4-pin square plug removed from gas valve</p> <ul style="list-style-type: none"> 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
14	Connect blue PS wire previously routed from CONTROL board harness to burner area to PS spade of VALVE harness



Armstrong type MV* wiring can be ID'd by noting only 5 wires present in factory 6-pin plug

INSTALLATION

FINISH INSTALLATION AND TEST UNIT	
STEP	DETAILS
15	Connect line voltage hot to LINE-H, then connect LINE NEUTRAL
16	Connect transformer hot to XFMR-H, then connect transformer neutral to LINE NEUTRAL
17	Connect blower leads <ul style="list-style-type: none"> Cool speed to COOL-H Heat speed to LO HEAT-H Unused leads on PARK, PARK Neutral to LINE NEUTRAL
18	Connect thermostat wires to screw terminal block
19	Verify dipswitch setting using cover label and DIPSWITCHES section below
20	Option - connect 120V humidifier to HUM-H and LINE NEUTRAL Option - connect 120V EAG to EAC-H and LINE NEUTRAL
21	Apply wire ties as needed to secure wiring and install Unit Retrofit label.
22	Reinstall access panels, reconnect gas supply and electric power.
23	Verify unit operation in HEAT, COOL, and FAN modes
NOTE	See Wiring Diagrams, Timings & Wiring Designators, and Operation sections for additional details



NOTIFICATION

This furnace has been modified with a White-Rodgers 50156D-905 retrofit kit.
Hot Surface Pilot Ignitor upgraded with 120 VAC nitride. Replace only with 791Q-905A1 (KT1 kit).

Installer _____

Servicing Company _____

Date Installed _____

UNIT RETROFIT LABEL

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

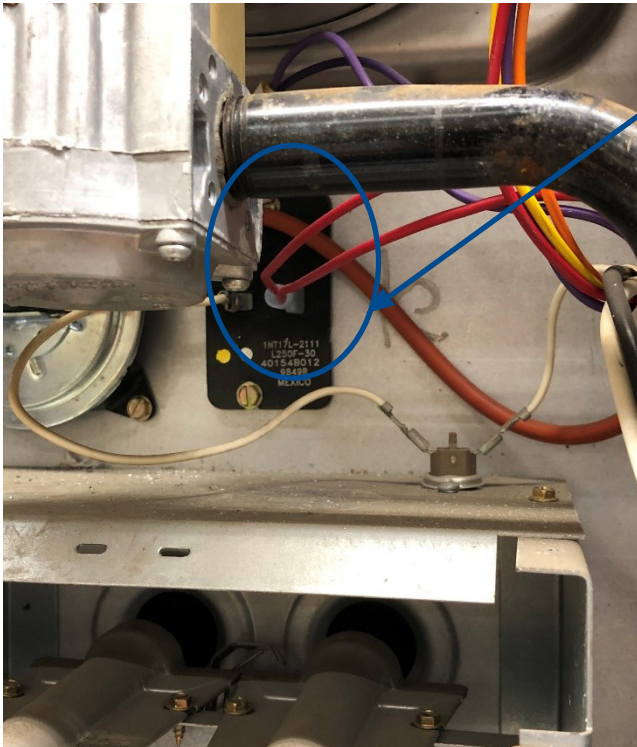
- Notes:
- Cool Off is 30 sec. non-adjustable
 - Cycle power after making any changes.

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

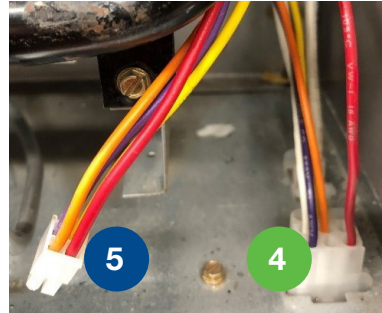
Blue shading = A change from default may be required. See unit information or match existing control

SPECIAL REPLACEMENT INSTRUCTIONS

Armstrong MV* / High Limit Wiring

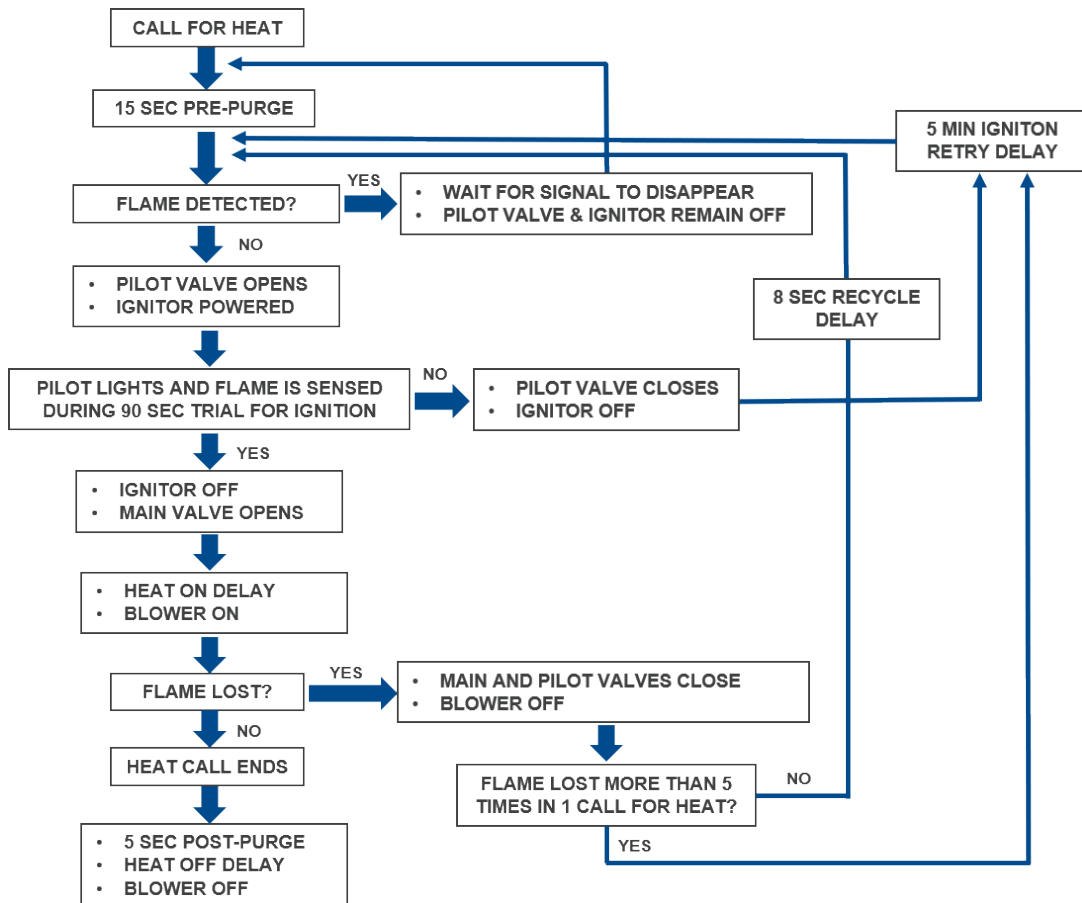


1. Remove the double red wire/single spade from limit
2. Clip off the single spade terminal
3. Strip both red wires and crimp on provided 1/4" female spade terminals to each wire
4. Plug the red wire from the control board wiring (9-pin plug between the burner and blower sections of furnace) back onto the limit
5. Plug the red wire from the original gas valve (4-pin square plug) to the long black MV* lead of CONTROL harness 0115 0339 (remove cap from the black wire to connect)

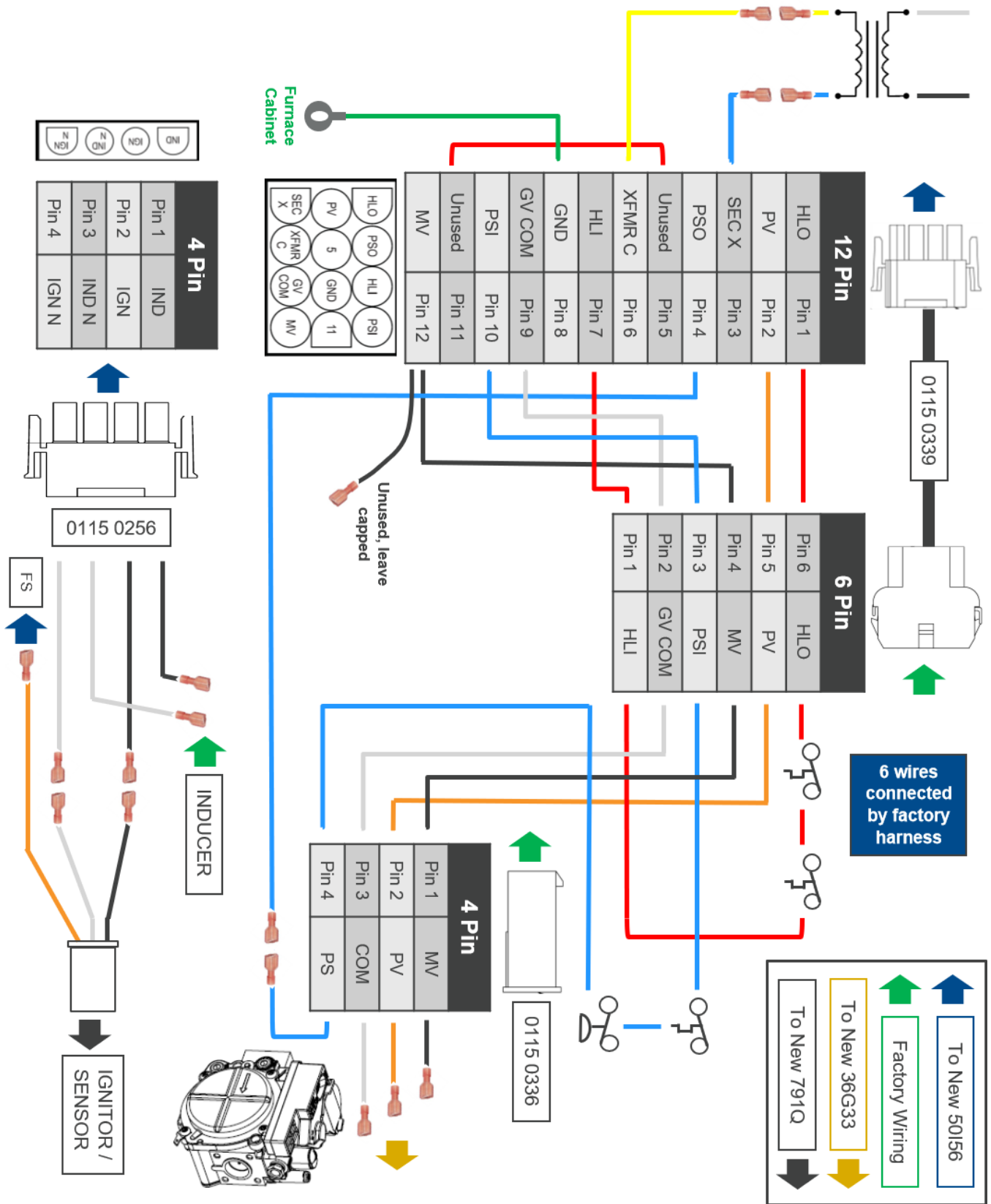


NOTE: Control will flash fault code 4 if red wires in steps 4 & 5 are reversed.

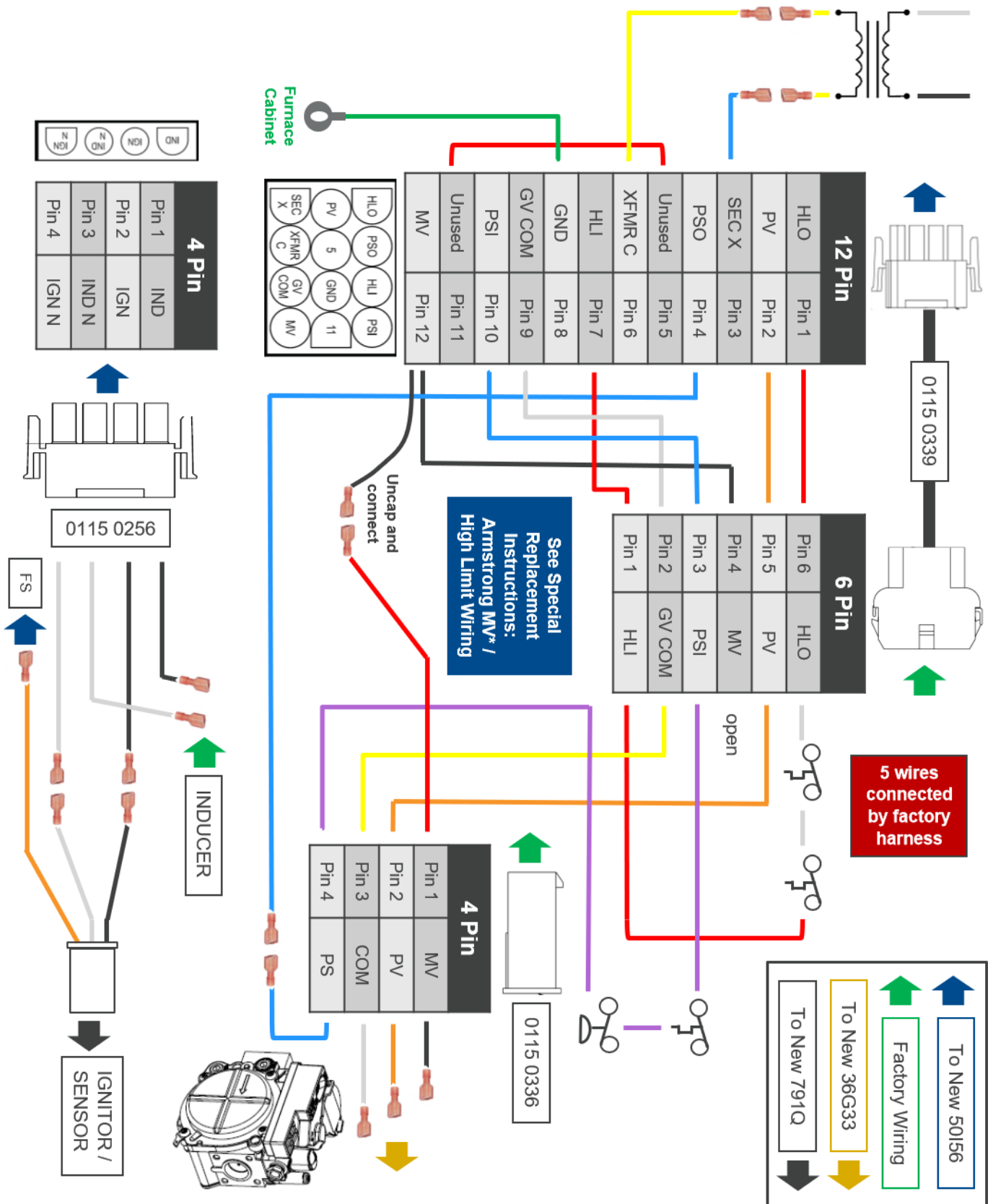
OPERATION



TYPICAL ICP BRANDS & DUCANE WIRING
(MV connected through 12 x 6 C harness)



TYPICAL LENNOX/ARMSTRONG BRANDS WIRING
 (MV connected from 12 pin to 4 pin VALVE harness)



TIMINGS & WIRING DESIGNATORS

50I56-905 Timings	
Pre-purge	15 sec
Ignitor Warm-up (turned on simultaneously with pilot)	0 sec
Flame Failure Response	2 sec max
Trial for Ignition	90 sec
Post-purge	5 sec
Energize Main Valve after Pilot Proven	2.5 sec
Heat Off Delay	100/140* sec
Heat On Delay	60/30* sec
Cool On Delay	4/30* sec
Cool Off Delay	30 sec
Ignition Retries (pilot does not light on 1 st attempt)	Continuous, 5 min delay
Ignition Recycles (flame lost after successful ignition)	5 times, 8 sec delay
Ignition Lockout (ignition failure or recycles exceeded)	5 min
* Default dipswitch setting	
See OPERATION flowchart for additional details	

Wiring Designator Conversions		
Connection	ST Fan Timers	50I56-905
Neutrals	NEUTRAL	LINE NEUTRAL
Unused Motor Leads	M1/2/3, UNUSED	PARK
Humidifier, Air Cleaner	HUM, EAC	HUM-H, EAC-H
Cool Blower Speed	COOL	COOL-H
Heat Blower Speed	HEAT	LO HEAT-H
Continuous Blower	CONT	N/A
Thermostat	C,G,Y,W,R	C,G,Y,W,R
Line Input	L1, S, S1-S3	LINE-H
Line - Transformer	L1, S, S1-S3	XFMR-H
Transformer 24V	SEC, X	24V SEC, X (CONTROL harness)
Transformer 24V Common	XFMR, C	24V XFMR, C (CONTROL harness)
Inducer Hot	IND, DI	E25 plug (C harness)

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.

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

TECHNICAL SUPPORT: 1-888-725-9797

WHITE-RODGERS

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