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GAS KITS & ACCESSORIES

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GAS MANIFOLD, PRESSURE SWITCH AND OPERATING SIGNAL TEST KIT

INSTALLATION INSTRUCTIONS FOR GAS MANIFOLD, PRESSURE SWITCH AND OPERATING SIGNAL TEST KIT (10L34) USED WITH ML193, ML195, EL195, EL296 & SLP98 FURNACES

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional installer (or equivalent), service agency or the gas supplier.

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions to neutralize electrostatic charge by touching your hand and tools to metal prior to handling the control.

Shipping & Packing List

Package 1 of 1 contains the following:

- 4 - Tee
- 1 - Barbed fitting
- 2 - Square tubing 40" length (see note below)
- 1 - Reducing fitting
- 1 - 5/16 Round tubing
- 1 - Clamp
- 1 - Plug/Pressure tap assembly

NOTE - Cut each piece of provided 40" inch tubing to the following lengths: 1 piece of 10", 2 pieces of 2" and 1 piece of 26".

Application

Kit (10L34) provides tubing and fittings needed to facilitate manifold pressure testing and pressure switch testing for EL296UHV/DFV, ML193UH/DF, ML195UH/DF, EL195UH/DF and SLP98UHV/DFV gas furnaces.

Gas Manifold Check

Gas Manifold Check - EL296UHV/DFV With White-Rodgers Two-Stage Gas Valve

A manifold pressure post located on the gas valve provides access to the manifold pressure. See figure 1. Back out the 3/32 hex screw one turn. Refer to figure 2 and use the provided fittings and tubing to follow the steps below.

- 1 - Connect the 5/16" round tubing to the manifold post. Secure with the clamp.
- 2 - Connect the reducer fitting to the 5/16" round tubing followed by a piece of 10" length square tubing.
- 3 - Connect the other end of the square tubing to the "+" positive side of the measuring device.
- 4 - Take the 2" length square tubing, tee, 10" length of square tubing and tee into the gas valve regulator vent hose. Connect to the measuring device negative "-" side. This will give the total manifold pressure reading.

NOTE- Total manifold pressure is the sum of the positive "+" and negative "-" sides of the manifold pressure.

- 5 - Ignite unit on low fire and let run for 5 minutes to allow for steady state conditions.
- 6 - After allowing unit to stabilize for 5 minutes, record total manifold pressure and compare to value given in table 1.
- 7 - If necessary, make adjustments. Figure 1 shows location of high fire and low fire adjustment screws.
- 6 - Repeat steps 5, 6 and 7 on high fire. See values in table 1.

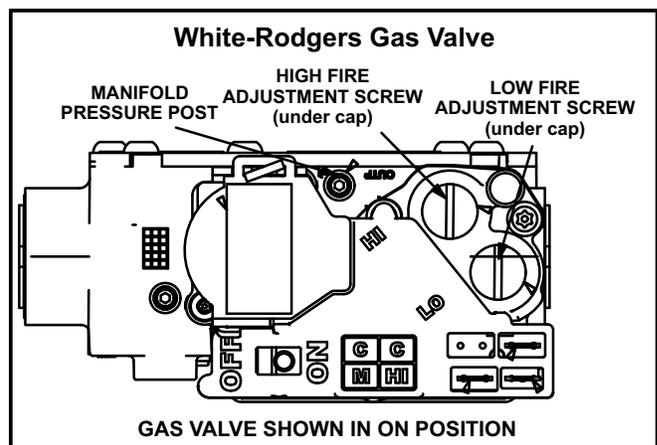


FIGURE 1



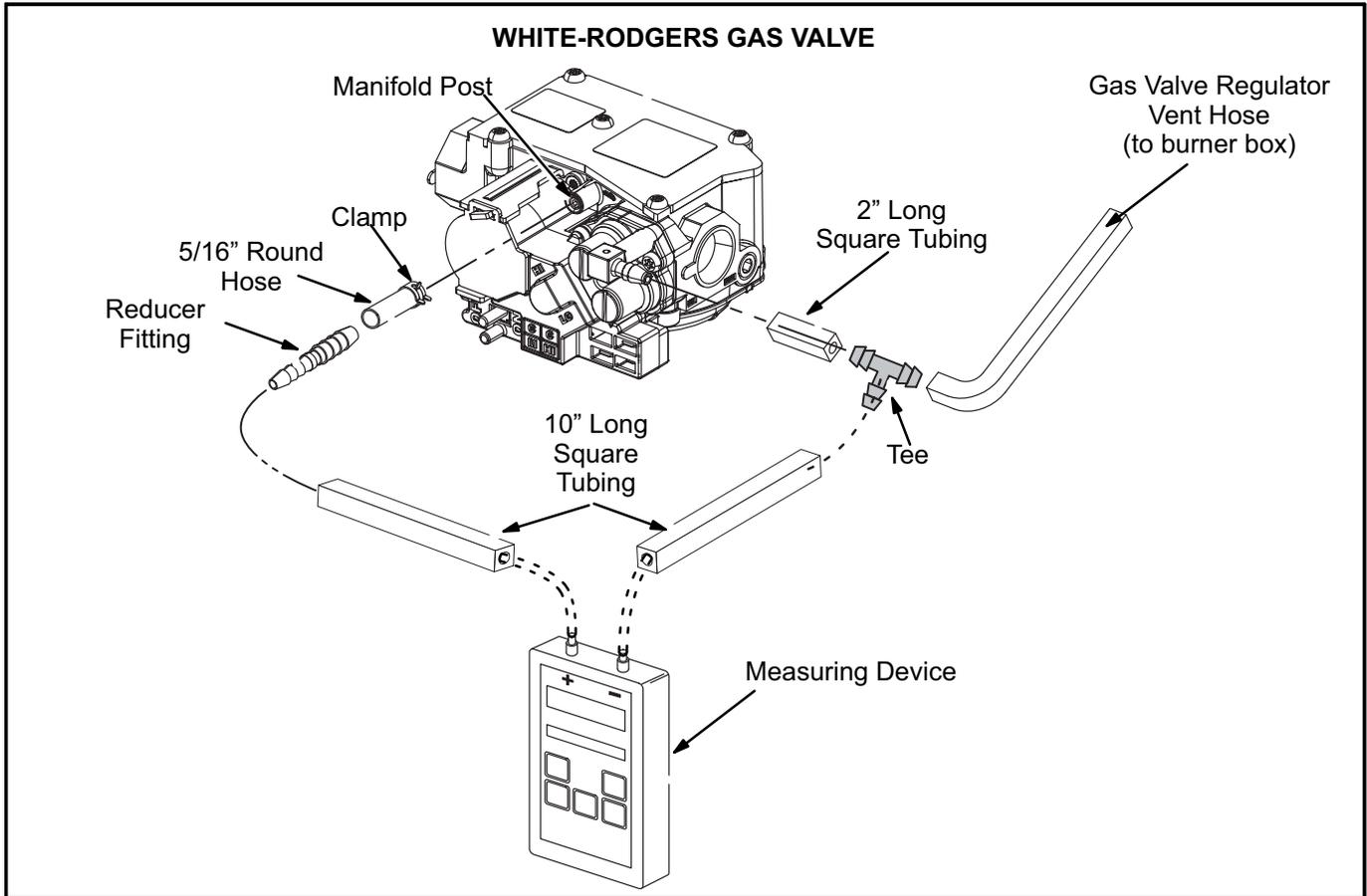


FIGURE 2

TABLE 1
White-Rodgers Gas Valve Manifold

EL296 Unit	Gas	Total Manifold Pressure in.wg.	
		Low Fire	High Fire
All Sizes	Natural	1.7	3.5
	LP/propane	4.9	10.0

- 4 - Start unit and allow 5 minutes for unit to reach steady state.
- 5 - After allowing unit to stabilize for 5 minutes, record manifold pressure and compare to value given in table 2.
- 6 - If necessary make adjustment. See figure 3 for manifold pressure adjustment screw.

Gas Manifold Check - ML193UH/D & ML195/DF With Honeywell Gas Valve

When testing manifold gas pressure, use the 1/8" N.P.T. plugged tap (manifold pressure outlet) located on the gas valve to facilitate test measuring device. Figure 3 shows location of manifold pressure outlet. Use the provided fittings and tubing to follow the steps below.

- 1 - Remove the furnace access panel and **leave off** during the test.
- 2 - Remove the threaded manifold pressure outlet plug from the gas valve and install the barbed fitting.
- 3 - Take the 10" length of square tubing and connect to the measuring device positive "+" side.

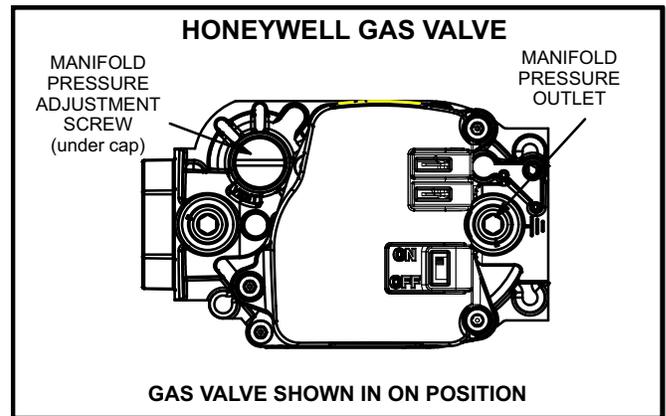


FIGURE 3

Gas Manifold Check - EL195UH/DF With Honeywell Gas Valve

When testing manifold gas pressure, use the 1/8" N.P.T. plugged tap (manifold pressure outlet) located on the gas valve to facilitate test measuring device. See figure 4. Refer to figure 4 and use the provided fittings and tubing to follow the steps below.

- 1 - Remove the threaded manifold pressure outlet plug from the gas valve and install the barbed fitting.
- 2 - Take the 10" length of square tubing and connect one end to the barbed fitting and the other to the positive "+" side of the measuring device.

- 3 - Take the 2" length square tubing, tee, 10" length of square tubing and tee into the gas valve regulator vent hose. Connect to the measuring device negative "-" side.
- 4 - Start unit and allow 5 minutes for unit to reach steady state.
- 5 - After allowing unit to stabilize for 5 minutes, record the *total* manifold pressure and compare to value given in table 2.
- 6 - If necessary make adjustment. With the unit running, remove the 2" square tubing and negative (-) barbed fitting. *Measuring device will now read positive (+) pressure only.* Use a screw driver to increase or decrease positive manifold pressure as needed.
- 7 - Re-connect the tubing and barbed fitting and compare reading to table 2
- 8 - Repeat steps 6, 7 and 8 until manifold pressure is correct

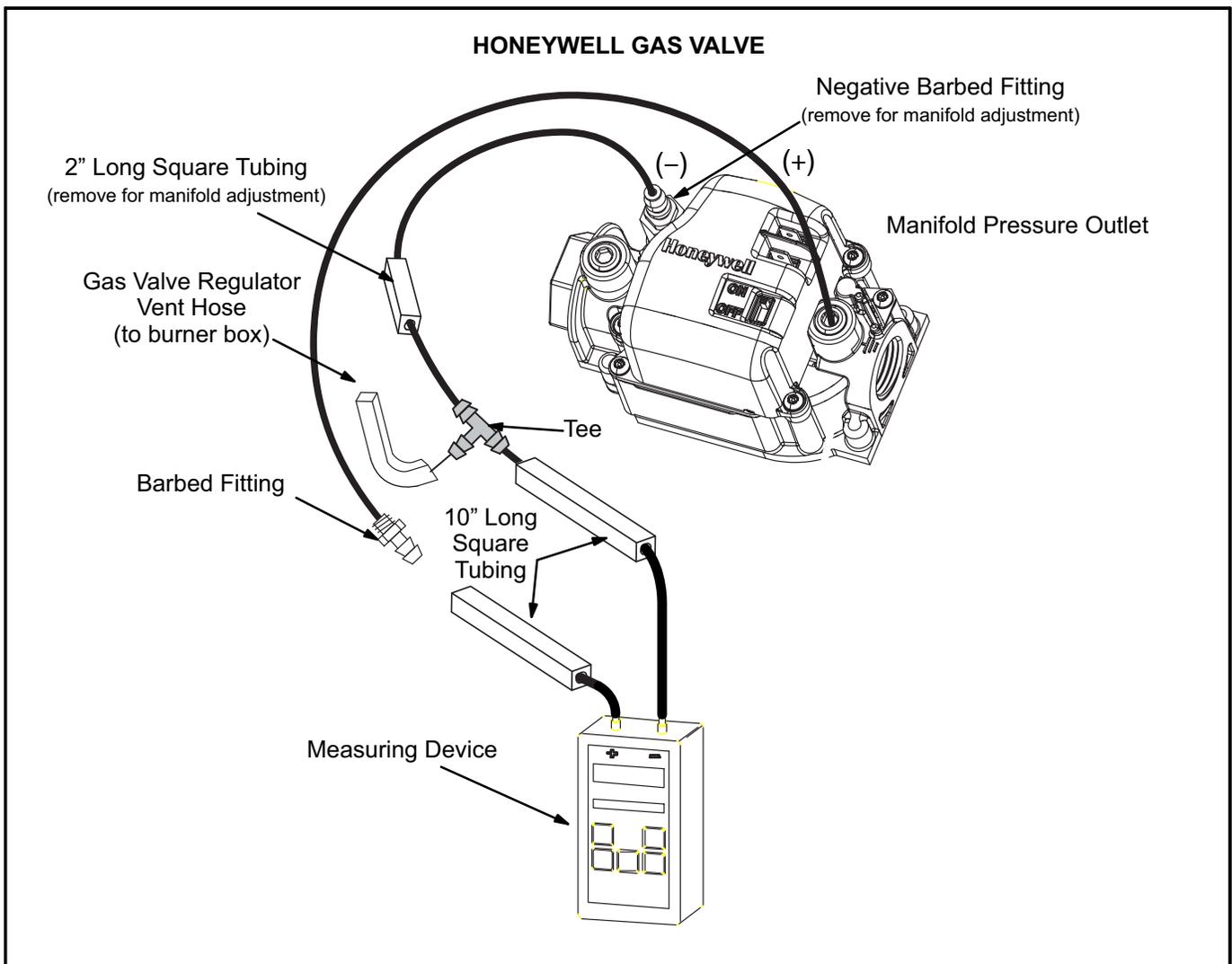


FIGURE 4

TABLE 2
Manifold Pressure (inches w.c.)

ML193, ML195 And EL195	Fuel	Manifold Pressure
All Models	Natural Gas	3.5 ± 0.3
	L.P. Propane	10.0 ± 0.3

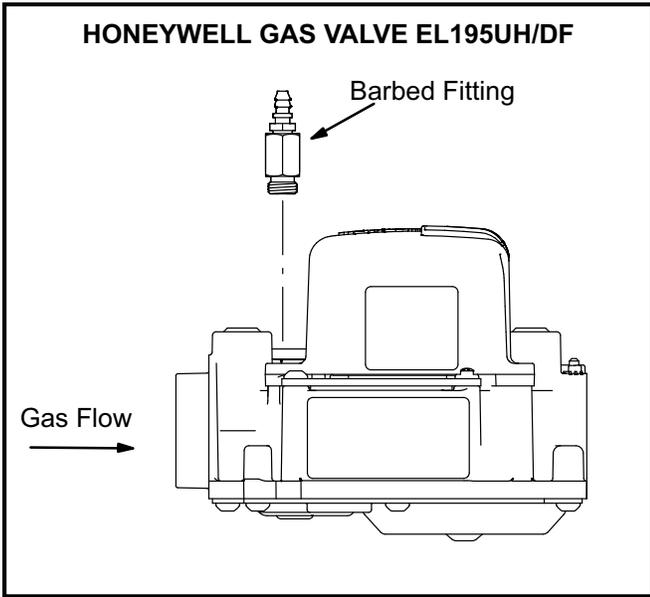


FIGURE 5

Gas Manifold Check - SLP98UH/DFV

To correctly measure manifold pressure, the differential pressure between the positive gas manifold and the negative burner box must be considered. Refer to figure 6 and use the provided fittings and tubing to follow the steps below.

- 1 - Remove the threaded plug from the outlet side of the gas valve and install a field-provided barbed fitting. Connect measuring device "+" connection to barbed fitting to measure manifold pressure.
- 2 - Tee into the gas valve regulator vent hose and connect measuring device "-" connection.
- 3 - Start unit on low heat (35% rate) and allow 5 minutes for unit to reach steady state.
- 4 - While waiting for the unit to stabilize, notice the flame. Flame should be stable and should not lift from burner. Natural gas should burn blue.
- 5 - After allowing unit to stabilize for 5 minutes, record manifold pressure and compare to value given in table 3.
- 6 - Repeat steps 3, 4 and 5 on high heat.
- 7 - Shut unit off and remove manometer as soon as an accurate reading has been obtained. Take care to remove barbed fitting and replace threaded plug.
- 8 - Start unit and perform leak check. Seal leaks if found.

⚠ CAUTION

Do not attempt to make adjustments to the gas valve.

TABLE 3
Manifold Pressure (inches w.c.)

SLP98 Firing Rate	Manifold Pressure Natural Gas		Manifold Pressure LP/Propane	
	Min	Max	Min	Max
Low	0.4	0.95	1.2	2.8
High	3.0	3.8	9.1	10.5

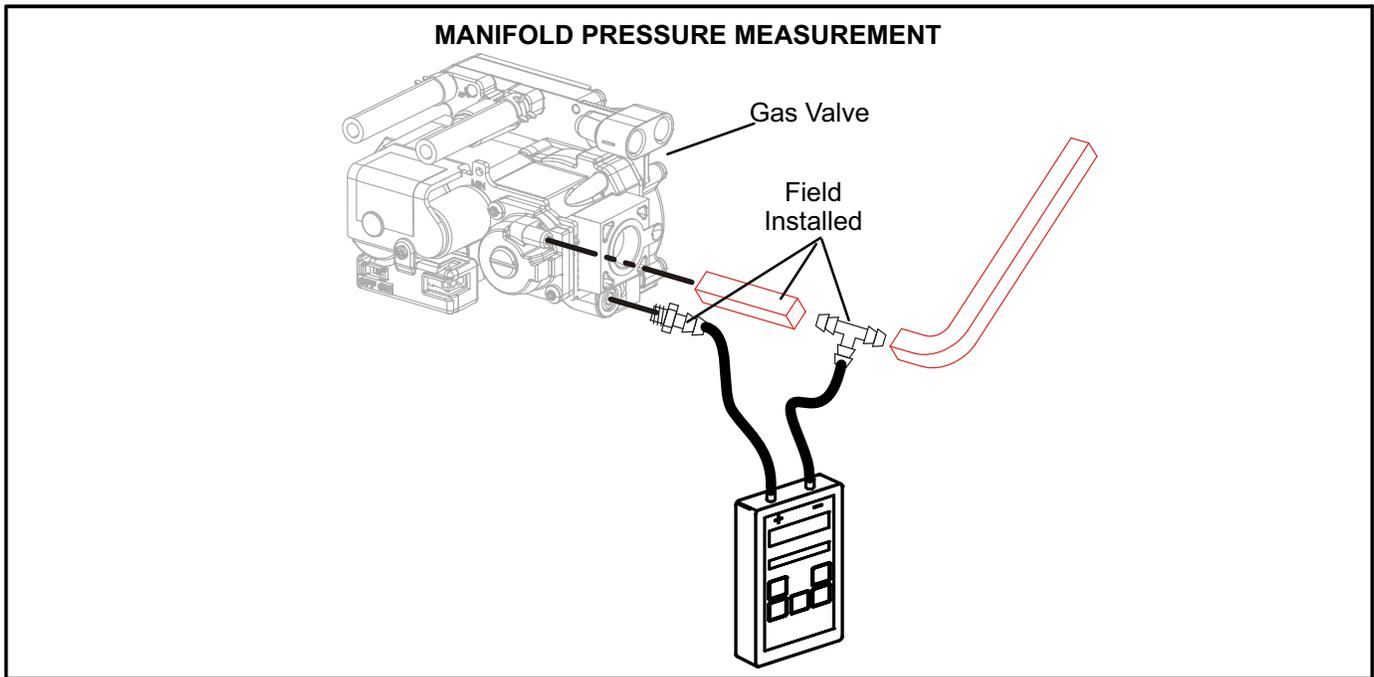


FIGURE 6

Pressure Switch Check

Pressure Switch Check EL195UH/DF

To check pressure switch differential, refer to figure 7 and use the provided fittings and tubing to follow the steps below.

- 1 - Remove thermostat demand and allow unit to cycle off.
- 2 - Remove the tubing from the negative side (red and black or red) and positive side (black) of the pressure switch (leave both connected to cold end header box).
- 3 - Take the 2" length square tubing and connect to the positive (+) side of the pressure switch. Take the 10" length square tubing and tee into the tubing from the positive side of the cold end header box and the other side of the 2" square tubing. Connect the other end of the 10" square tubing to the positive (+) side of the measuring device.
- 4 - Take a second piece the 2" length square tubing and connect to the negative (-) side of the pressure switch. Take a second piece of 10" length square tubing and tee into the tubing from the negative (-) side of the cold end header box and the other side of the 2" square tubing. Connect the other end of the 10" square tubing to the negative (-) side of the measuring device.
- 5 - Operate unit and observe manometer reading.
Readings will change as heat exchanger warms.
 - a. Take one reading immediately after start-up.
 - b. Take a second reading after unit has reached steady state (approximately 5 minutes). This will be the pressure differential.

The pressure differential should be at least 0.15" greater than those listed in table 4. Readings in table are the set points or "break point".

- 6 - Remove thermostat demand and allow to cycle off.

- 7 - Replace original pressure switch tubing.

Pressure Switch Check ML193UH/DF & ML195UH/DF

To check pressure switch differential, refer to figure 8 and use the provided fittings and tubing to follow the steps below.

- 1 - Remove thermostat demand and allow unit to cycle off.
- 2 - Remove the 2" plug from the side of the cabinet not used for gas supply piping and replace with the provided plug/pressure tap assembly. See figure 9.
- 3 - Remove the tubing from the negative side (red and black or red) and positive side (black) of the pressure switch (leave both connected to cold end header box).
- 4 - Take the 2" length square tubing and connect to the positive (+) side of the pressure switch. Take the 26" length square tubing and tee into the tubing from the positive side of the cold end header box and the other side of the 2" square tubing. Connect the other end of the 26" tubing to the plug/pressure tap assembly on the inside of the cabinet. Take the 10" piece of tubing and connect to the other side of the plug/pressure tap assembly on the outside of the cabinet and connect to the positive (+) side of the measuring device.
- 5 - Take the other 2" length square tubing and connect to the negative (-) side of the pressure switch. Take the other 26" length square tubing and tee into the tubing from the negative side of the cold end header box and the other side of the 2" square tubing. Connect the other end of the 26" tubing to the plug/pressure tap assembly on the inside of the cabinet. Take the other 10" piece of tubing and connect to the other side of the plug/pressure tap assembly on the outside of the cabinet and connect to the negative (-) side of the measuring device.

- 6 - Operate unit and observe manometer reading.
Readings will change as heat exchanger warms.
 - a. Take one reading immediately after start-up.
 - b. Take a second reading after unit has reached steady state (approximately 5 minutes). This will be the pressure differential.

The pressure differential should be at least 0.15" greater than those listed in table 5. Readings in table are the set points or "break points".

- 7 - Remove thermostat demand and allow to cycle off.
- 8 - Replace original pressure switch tubing and plug in side of cabinet.

**TABLE 4
EL195UH/DF, ML195UH/DF**

Unit	Altitude ft		
	0 - 4500	4501 - 7500	7501 - 10000
	Set Point	SetPoint	Set Point
-045	-0.65	-0.65	-0.60
-070	-0.90	-0.85	-0.65
-090	-0.90	-0.85	-0.65
-110	-0.90	-0.80	-0.65
-135	-0.90	-0.80	-0.65

NOTE - Pressure differential values (set point) in table are the "break", or "open" specifications. "Make", or "close" pressure differentials are 0.15" greater than the set points listed in table.

**TABLE 5
ML193UH/DF**

Unit	Altitude ft.		
	0 - 4500	4501 - 7500	7501 - 10000
	Set Point	Set Point	Set Point
-045	-0.65	-0.60	-0.55
-070			
-090			
-110			
-135			

NOTE - Pressure differential values (set point) in table are the "break", or "open" specifications. "Make", or "close" pressure differentials are 0.15" greater than the set points listed in table.

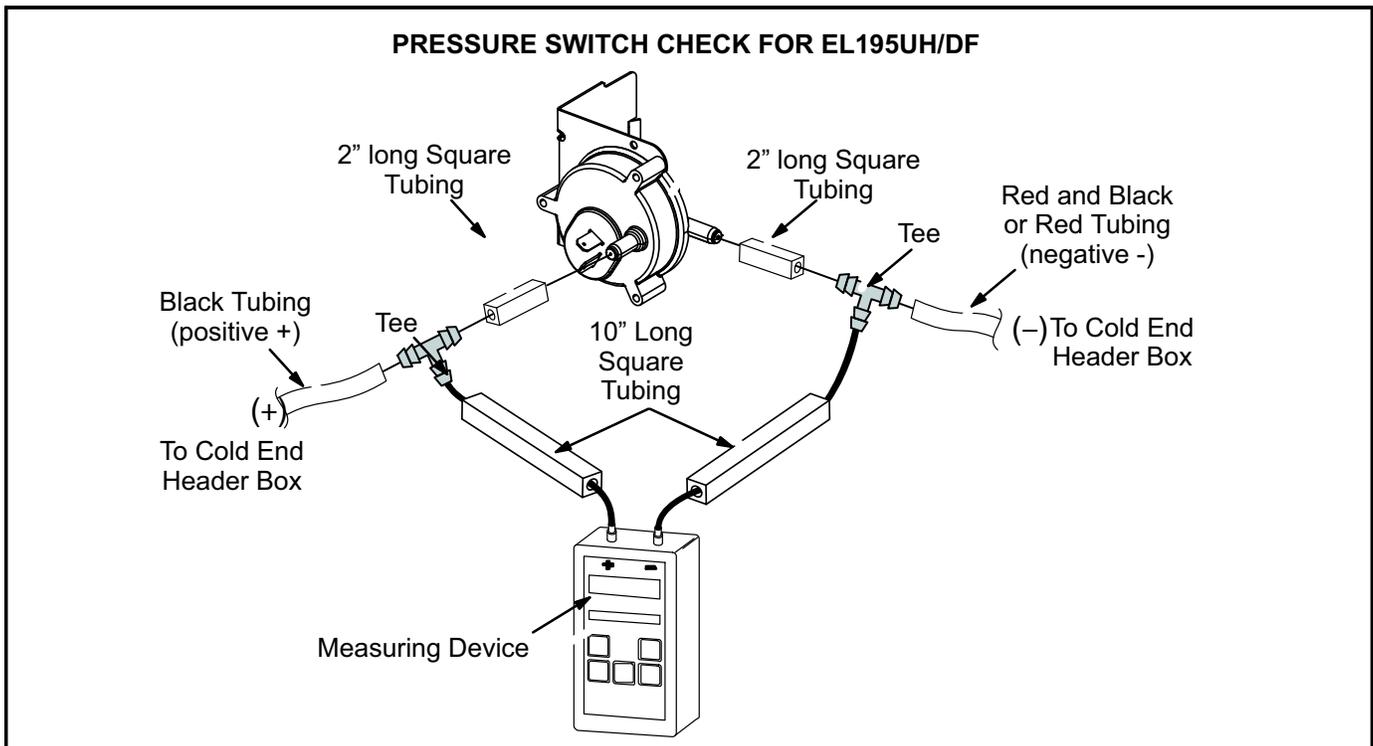


FIGURE 7

PRESSURE SWITCH CHECK FOR ML193UH/DF & ML195UH/DF

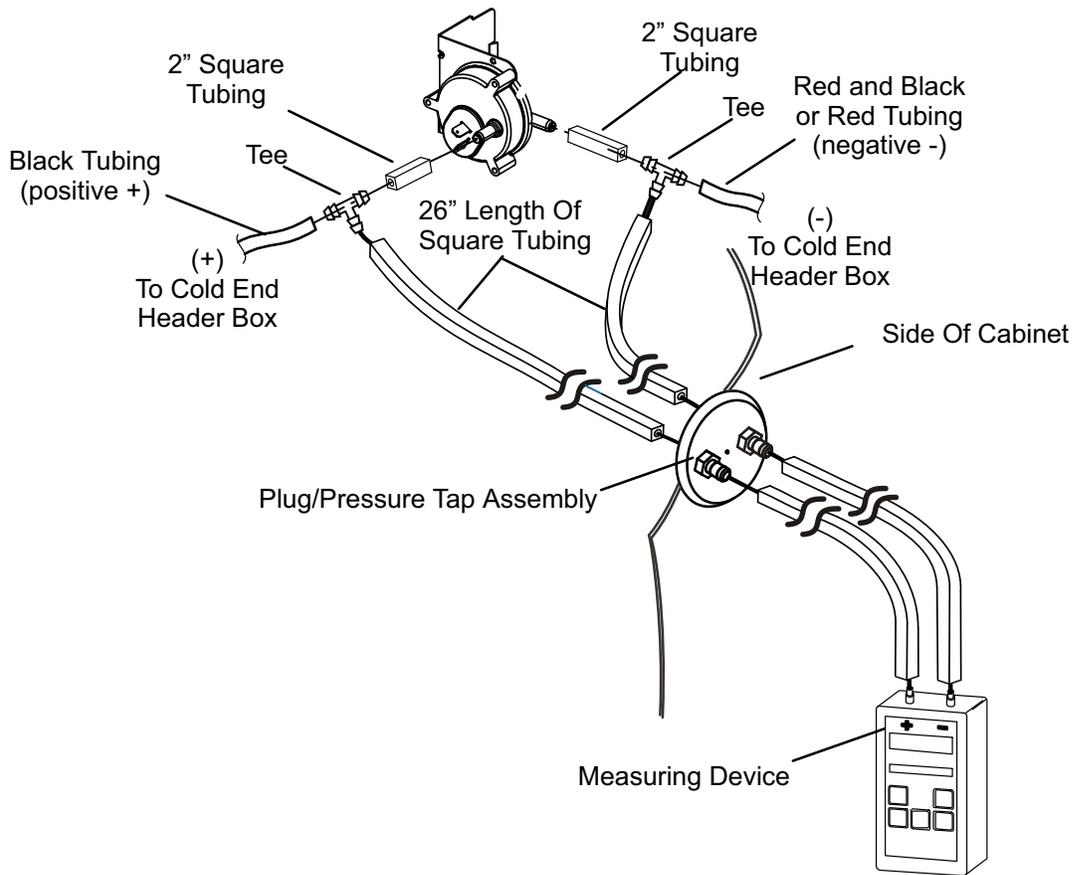


FIGURE 8

UPFLOW MODEL WITH LEFT SIDE PIPING SHOWN

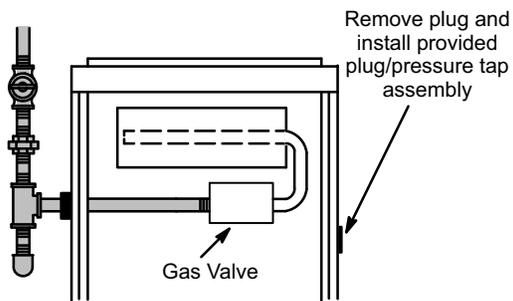


FIGURE 9

Pressure Switch Check EL296UHV and EL296DFV

To check pressure switch differential, refer to figure 10 and use the provided fittings and tubing to follow the steps below.

- 1 - Remove thermostat demand and allow unit to cycle off.
- 2 - Remove the tubing from the negative side (red and black or red) and positive side (black) of the pressure switch (leave both connected to cold end header box).
- 3 - Take the 2" length square tubing and connect to the positive (+) side of the pressure switch. Take the 10" length square tubing and tee into the tubing from the positive side of the cold end header box and the other side of the 2" square tubing. Connect the other end of the 10" square tubing to the positive (+) side of the measuring device.
- 4 - Take a second piece the 2" length square tubing and connect to the negative (-) side of the pressure switch. Take a second piece of 10" length square tubing and tee into the tubing from the negative (-) side of the cold end header box and the other side of the 2" square tubing. Connect the other end of the 10" square tubing to the negative (-) side of the measuring device.
- 5 - Operate unit and observe manometer reading.
Readings will change as heat exchanger warms.

- a. Take one reading immediately after start-up.
- b. Take a second reading after unit has reached steady state (approximately 5 minutes). This will be the pressure differential.

The pressure differential should be at least 0.15" greater than those listed in tables 6. Readings in table are the set points or "break points".

- 6 - Remove thermostat demand and allow to cycle off.
- 7 - Replace original pressure switch tubing.

**TABLE 6
EL296UHV/EL296DFV**

Unit	Altitude ft					
	0 - 4500		4501 - 7500		7501 - 10000	
	Set Point		Set Point		Set Point	
	Low	High	Low	High	Low	High
-045	0.35	0.60	0.35	0.55	0.35	0.50
-070	0.45	0.90	0.45	0.81	0.41	0.74
-090	0.50	0.90	0.50	0.85	0.45	0.81
-110	0.45	0.90	0.45	0.81	0.41	0.74
-135	0.45	0.90	0.45	0.85	0.41	0.74

NOTE - Pressure differential values (set point) in table are the "break", or "open" specifications. "Make", or "close" pressure differentials are 0.15" greater than the set points listed in table.

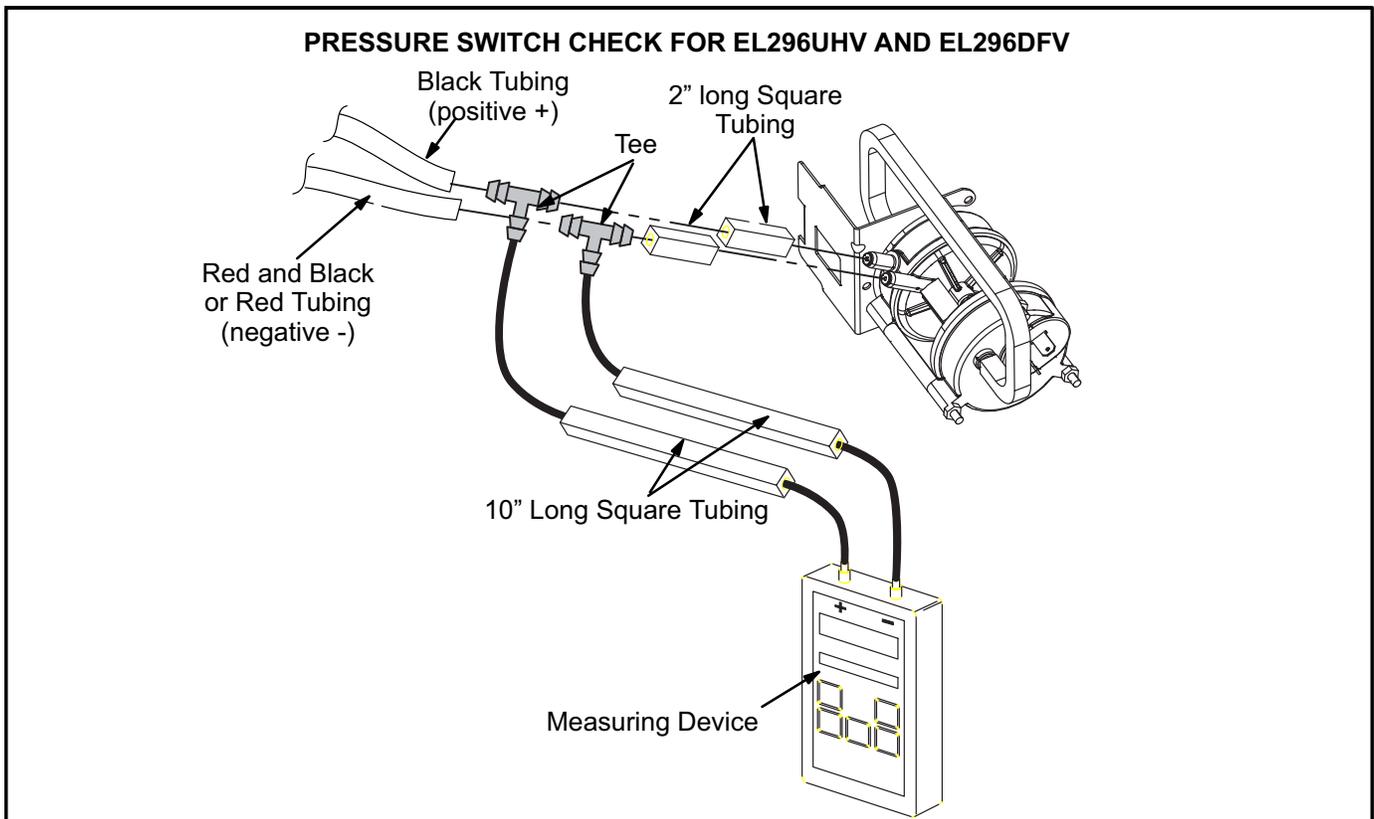


FIGURE 10

Pressure Switch Check SLP98UHand SLP98DFV

To check pressure switch differential, refer to figure 11 and use the provided fittings and tubing to follow the steps below. *NOTE - Operating signal can be measured while pressure switch check is taken.*

- 1 - Remove thermostat demand and allow unit to cycle off.
- 2 - Install a tee in the negative (-) line (red and black or red tubing) and a tee in the positive (+) line (black tubing) running from the pressure switch to the gas valve.
- 3 - Install a measuring device with hose from the negative (-) side of the measuring device to the tee installed in the negative (-) line and with hose from the positive (+) side of the measuring device to the tee in the positive (+) line.
- 4 - Operate unit and observe measuring device reading. *Readings will change as heat exchanger warms.*
 - a. Take one reading immediately after start-up.
 - b. Take a second reading after unit has reached steady state (approximately 5 minutes). This will be the pressure differential.

The pressure differential should be at least 0.15" greater than those listed in table 7. Readings in table are the set points or "break points".
- 5 - Remove thermostat demand and allow to cycle off.
- 6 - Remove measuring device and tee's. Reinstall combustion air sensing hoses to the pressure switch.

**TABLE 7
Pressure Switch 0' to 7500'**

All SLP98 Units	Set Point High Fire	Set Point Low Fire
	1.00 ± 0.05	0.25 ± 0.05

NOTE - Pressure differential values (set point) in table are the "break", or "open" specifications. "Make", or "close" pressure differentials are 0.15" greater than the set points listed in table.

Operating Signal Check

Operating Pressure Signal (Delta P) Measurement (Figure 11)

Operating pressure signal can be taken while the pressure switch pressure check is taken.

- 1 - Tee into the negative line between the gas valve and pressure switch and connect to measuring device negative "-".
- 2 - Tee into the positive line between the gas valve and pressure switch and connect to measuring device positive "+".
- 3 - Start unit on low heat (35% rate) and allow 5 minutes for unit to reach steady state.
- 4 - After allowing unit to stabilize for 5 minutes, record operating pressure signal and compare to value given in table 8.
- 5 - Repeat steps 3 on 4 high heat.

**TABLE 8
Operating Signal Pressures in inches 0 - 7500 ft**

SLP98 Firing Rate	Operating Pressure Signal (Delta P)	
	Min	Max
Low	0.20	0.40
High	0.95	1.25

**PRESSURE SWITCH CHECK AND OPERATING SIGNAL MEASUREMENT
FOR SLP98UHV AND SLP98DFV**

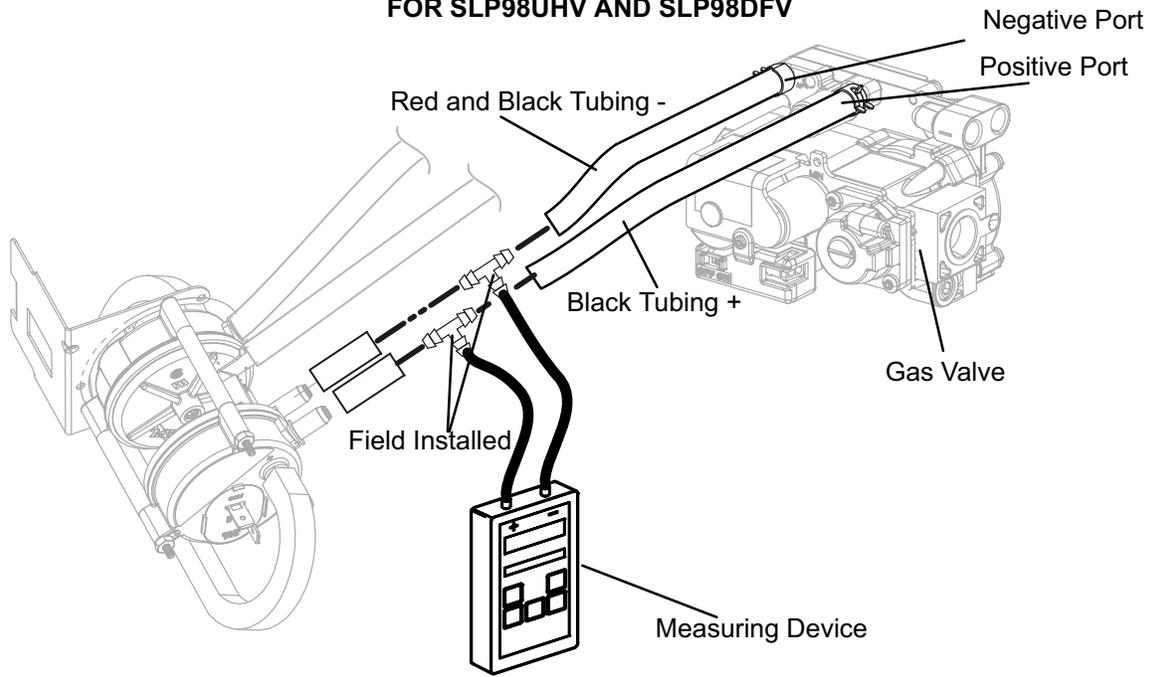


FIGURE 11