SPACE-RAY
INFRARED GAS HEATERS

CONVERSION OF INPUT BTU/HR RATE AND GAS TYPE

DESCRIPTION:
These kits are designed to convert from one input BTU/Hr rate to another while utilizing the same gas type. It requires the replacement of the main burner orifice as well as the corresponding flue restrictor plate.

When conversion from one gas type to another is desired (eg. from Natural Gas to LP Gas), the gas valve must also be replaced along with the main gas orifice. Refer to instructions on replacing the gas valve and required gas pressure tests when making this conversion.

WARNING

This conversion kit is to be installed by an authorized distributor or other qualified agency in accordance with the manufacturer's instructions and all codes and requirements of the authority having jurisdiction. **Failure to follow instructions could result in serious injury, property damage or death. The qualified agency performing this work assumes responsibility for this conversion.**

CAUTION: Disconnect Gas and Electrical Supply Before Making This Conversion.

REPLACING MAIN BURNER ORIFICE - (20 thru 75m BTU Units)

1. Loosen screw of burner clamp (Figure 1 or 2).
2. Rotate the burner (counterclockwise) loose from the orifice fitting.
3. Push the valve manifold slightly to the left until the orifice can be reached. Remove the orifice with a 1/2" open end or box type wrench.
4. Replace the orifice with the one supplied in the kit. The orifice size is indicated on the parts list of the kit as well as on the face of the orifice for identification.
5. Reverse steps 1,2 and 3 above to reattach the burner and reinstall the control arm.

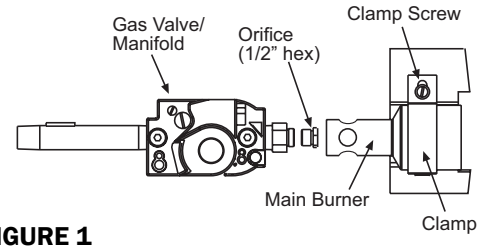


FIGURE 1

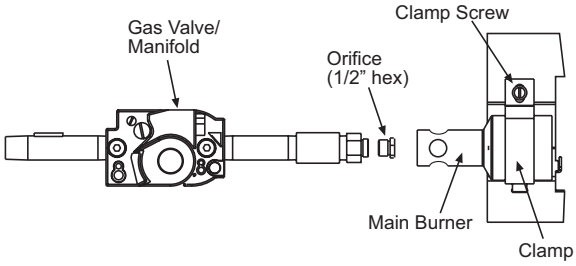


FIGURE 2

REPLACING MAIN BURNER ORIFICE - (80 thru 250m BTU Units)

1. The existing orifice can be removed with a 5/8" open end or box type wrench (Figure 3).
2. Replace the orifice with the one supplied in this kit. The orifice size is indicated on the parts list of this kit as well as on the face of the orifice for identification.

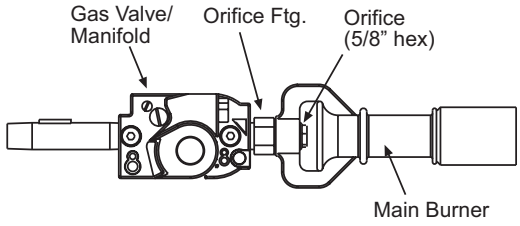


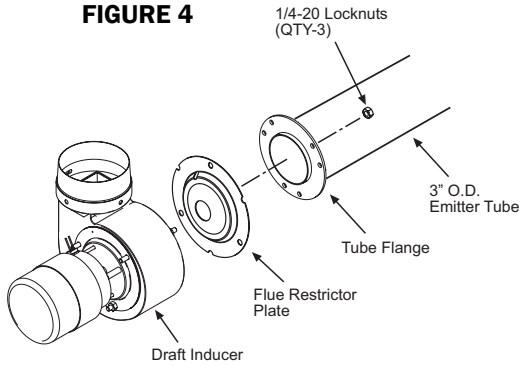
FIGURE 3

REPLACING FLUE RESTRICTOR PLATE

1. Remove the (3) 1/4-20 locknuts from the weld studs of the draft inducer assembly (Figure 4 or 5).
2. Carefully pull the draft inducer assembly slightly away from the tube flange and remove the existing flue restrictor plate.
3. Replace the restrictor plate with the one supplied in this kit. This must be mounted with the stamped flange facing towards the draft inducer. The restrictor plate opening size is indicated on the parts list for identification.
4. Reverse steps 1 and 2 to reassemble the draft inducer to the tube.

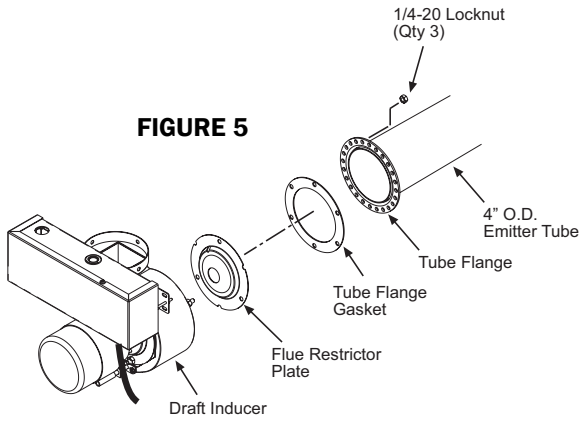
WARNING: Failure to use the correct orifice with the corresponding restrictor plate will result in improper combustion and possible sooting.

FIGURE 4



NOTE: Heaters utilizing 4" O.D. tube assemblies are equipped with a gasket between the restrictor plate and the tube flange as shown in Figure 5. Care must be taken not to damage this gasket.

FIGURE 5



REPLACING GAS VALVE

WARNING: Gas Type Conversion requires the replacement of the gas valve as well as the corresponding main burner orifice as outlined on the previous page. Failure to use the correct valve with the corresponding main burner orifice will result in improper combustion and possible sooting.

1. Disconnect the valve subassembly from the union of the inlet gas piping and remove it from the heater.
2. Remove the pipe nipples from the valve using a pipe wrench on the square ends of the valve. See Figure 6.
3. Apply a moderate amount of good quality pipe compound (use only pipe compound resistant to LP gas) to the pipe nipples only, leaving the two end threads bare.
4. Thread the pipe nipples approximately 3/4" into the new valve. DO NOT THREAD THE NIPPLES TOO FAR. Valve distortion or malfunction may result if the nipples are inserted too deeply.
5. Install the valve subassembly into the heater and reconnect all components (described earlier) in reverse order.

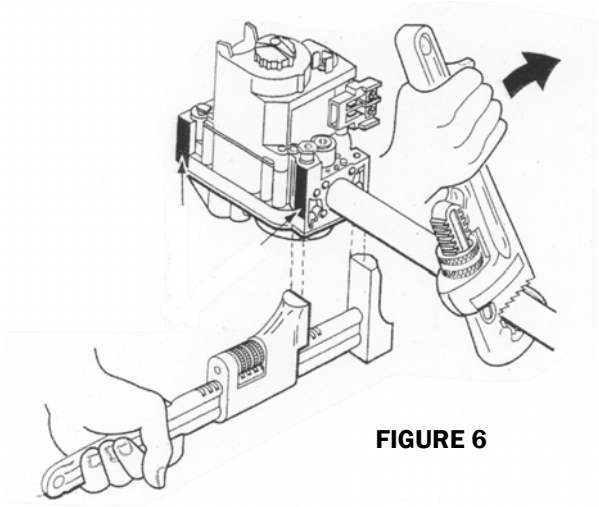


FIGURE 6

GAS LEAK TEST WARNING: DO NOT OMIT THIS TEST

1. With the main burner in operation, cover all pipe joints with a rich soap and water solution. Bubbles indicate gas leakage.
2. To stop leaks, tighten joints and screws.

CHECK GAS INLET (SUPPLY) PRESSURE

1. Be sure that the valve is in the "OFF" position before removing the pressure tap plug. Connect a water manometer to a 1/8" N.P.T. tapping immediately upstream of the gas supply connection. Turn the valve to the "ON" position. DO NOT EXCEED THE PRESSURES SHOWN IN THE FOLLOWING TABLE.
2. Turn the valve knob back to the "OFF" position before removing the manometer and replacing the plug. Repeat the gas leak test at the plug.

GAS PRESSURE REQUIREMENTS

	SUPPLY PRESSURE		MANIFOLD
GAS TYPE	MINIMUM	MAXIMUM	PRESSURE
Natural	4.5" W.C.	14.0" W.C.	3.5" W.C.
Propane	11.0" W.C.	14.0" W.C.	10.0" W.C.

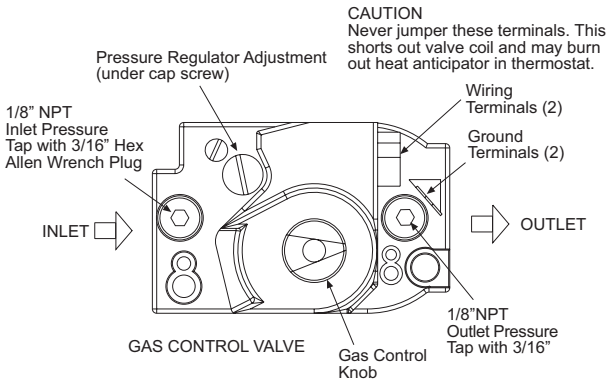


FIGURE 7

CHECK MANIFOLD PRESSURE

1. Be sure that the valve is in the "OFF" position before removing the pressure tap plug. With the main burner operating, check the manifold pressure using a water manometer connected to the downstream pressure tapping. See the valve drawing above. The regulator is factory set and should not require adjustment. DO NOT EXCEED THE PRESSURES SHOWN IN THE TABLE ON THIS PAGE.

2. If adjustment is required, remove the cover screw (see valve drawing above). Using a small screwdriver, turn adjusting screw clockwise ↻ to increase or counterclockwise ↺ to decrease the gas pressure to the burner. NOTE: The adjustment fitting is plastic and may require slightly greater turning force than metal threads. Replace the cover screw.

3. Check the burner performance at step pressure, observing the burner ignition and flame characteristics. The burner should ignite promptly and without flashback to the orifice and cycle the burner several times. (Wait 30 seconds between cycles to allow the servo regulator in the valve to resume the step action.). Repeat after allowing the heater to cool.

4. Turn the valve knob back to the "OFF" position before removing the manometer and replacing the plug. Repeat the gas leak test.

MARKINGS

1. After the conversion is complete, type or print in ink the information required on the conversion information label and place the label onto the nameplate for future reference.

WARNING

Minimum and maximum tube lengths per BTU/Hr input as outlined in the heater instruction manual must always be observed.

SPACE-RAY
305 Doggett Street · Charlotte, NC 28203-4923
Phone (704) 372-3485 · Fax (704) 332-5843 · info@spaceray.com

Form 43130010
Rev Feb 2010

Form 43130010
Rev Feb 2010

Space-Ray Tube Heater Input and Gas Type Conversion Charts

INPUT BTU/HR CONVERSION

BTU/Hr Input	Flue Restrictor Plate	
	Part No.	Inside Diameter
20,000	4274111-0	5/8"
30,000	4274112-0	7/8"
40,000	1 4274104-0	1"
50,000	1 4274103-0	1-1/8"
60,000	4274102-0	1-7/32"
75,000	4274101-0	1-7/16"
80,000	4274105-0	1-1/2"
90,000	4274105-0	1-1/2"
100,000	4274106-0	1-5/8"
110,000	4274107-0	1-3/4"
120,000	4274107-0	1-3/4"
125,000	4274108-0	1-7/8"
130,000	4274108-0	1-7/8"
140,000	4274109-0	2-1/32"
150,000	4274109-0	2-1/32"
160,000	4274110-0	2-1/4"
175,000	4274110-0	2-1/4"
180,000	4274110-0	2-1/4"
200,000	4274113-0	2-3/8"
225,000	4274114-0	2-1/2"
250,000	4274115-0	2-3/4"

Orifice - Natural Gas	
Part No.	Size
0325945-0	#45 (.082)
0325938-0	#38 (.1015)
0325931-0	#31 (.120)
0325997-0	3.3mm (.130)
0325927-0	#27 (.144)
0325920-0	#20 (.161)
0325819-0	#19 (.166)
0325816-0	#16 (.177)
0325814-0	#14 (.182)
0325810-0	#10 (.194)
0325899-0	13/64 (.203)
0325805-0	#5 (.206)
0325804-0	#4 (.209)
0325882-0	5.5mm (.216)
0325883-0	5.7mm (.224)
0325884-0	5.8mm (.228)
0325895-0	"C" (.242)
0325895-0	"C" (.242)
0325886-0	"F" (.257)
0325896-0	6.9mm (.272)
0325889-0	"K" (.281)

Orifice - LP Gas	
Part No.	Size
0325955-0	#55 (.052)
0325952-0	#52 (.064)
0325949-0	#49 (.073)
0325946-0	#46 (.081)
0325943-0	#43 (.089)
0325939-0	#39 (.099)
0325838-0	#38 (.102)
0325836-0	#36 (.106)
0325833-0	#33 (.113)
0325831-0	#31 (.120)
0325892-0	1/8 (.125)
0325830-0	#30 (.129)
0325894-0	3.3mm (.130)
0325829-0	#29 (.136)
0325828-0	#28 (.140)
0325827-0	#27 (.144)
0325881-0	3.8mm (.150)
0325824-0	#24 (.152)
0325821-0	#21 (.159)
0325818-0	#18 (.170)
0325887-0	4.5mm (.177)

Gas Valve	
Part No.	Description
3033307-0	VR8205P-2408 - (Natural Gas)
3033308-0	VR8205P-2416 - (LP Gas)
2 3047505-0	VR8305P-2208 - (Natural Gas)
2 3047501-0	VR8305P-2224 - (LP Gas)

Kit, Conversion (Input BTU/Hr Rate)	
4319899-0	Kit, Conversion Information
See Chart	Flue Restrictor Plate
See Chart	Main Burner Orifice

Kit,Gas Conversion	
4319899-0	Kit, Conversion Information
See Chart	Flue Restrictor Plate
See Chart	Main Burner Orifice

GAS TYPE CONVERSION

NOTES:
1 CB40 amd CB50 heaters require the use of special restrictor plates. Order part no. 4274104-1 (CB40) or 4274103-1 (CB50).

2 These gas valves are for 225,000 and 250,000 BTU/Hr input heaters only.