As outlined in the latest edition of ANSI® standard Z223.1 (NFPA® 54), the heater location must be properly vented to provide sufficient air supply for proper combustion.

When combustion air is supplied directly through an outside wall, each opening should have a minimum free area of 1 square inch per 4,000 BTU/h (1.2 kW) input of the total input rating of all appliances in the enclosed area. If combustion air must pass through horizontal ducts, each opening should have a minimum free area of 1 square inch per 2,000 BTU/h (1.2 kW) input of the total input rating of all appliances in the enclosed area. Details can be found in *Figure 4*.

The "Minimum Net Free Open Area" information from *Figure 4* is not applicable in installations where exhaust fans or blowers of any type are used. Any equipment which exhausts air from the room where the heater is installed can deplete the combustion air supply which could lead to poor combustion, decreased heater efficiency and reliability and increased emissions. This could cause flue products to accumulate in the room. Additional air must be supplied to compensate for such exhaust. Consult a professional engineer to ensure that installations where exhaust fans or blowers are used are designed and installed in accordance with all applicable local and national installation codes.

In addition, the heater must be completely isolated and protected from any source of corrosive chemical fumes or corrosive vapors (i.e. chlorine or hydrochloric acid).

⚠ WARNING

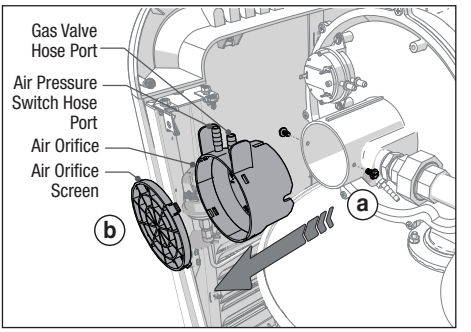
Do not store any chemicals, cleaners, or other corrosive material near combustion air openings or in the room. Avoid locating appliance vents in the vicinity of combustion air openings. Failure to prevent corrosive materials from mixing with combustion air can result in reduced heater life and unsafe heater operation.

3.3.2 Direct Venting

If you plan to supply the intake air directly to the heater, refer to *Section 3.3.3, Direct Air Intake* and *Section 3.3.4, Exterior Venting and Air Intake*.

3.3.3 Direct Air Intake

In certain applications it may be necessary to supply intake air directly to the heater. You will need to order and install the direct air conversion R-Kit R0724600. A total equivalent length of 65 ft (20 m) of 3 in (75 mm) PVC tubing can be used on the JXI200 and JXI 260 models. A total equivalent length of 65 ft (20 m) of 6 in (152 mm) PVC tubing can be used on the JXI400 models. Please be aware that each elbow used will account for 12 ft (3.6 m) of length.



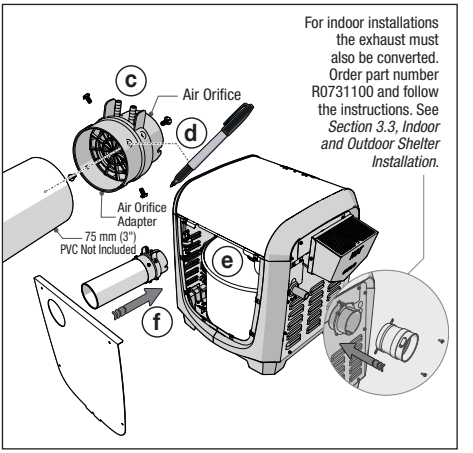
TIP: When removing the air hoses form the air orifice, mark the hoses with tape or a marker to help with reassembly.

For ease of access, remove the rear and top panels.

a. Loosen the two screws securing the air orifice and screen in place. Remove the air pressure switch and gas valve hose from the air orifice.

b. Remove the air orifice, separate and dispose of the orifice screen.

c. Align the orifice adapter with the orifice tabs and secure with four screws.



d. Dry fit the 3 in (75 mm) PVC tubing into the orifice adapter. Mark screw hole locations with a pen. Remove and drill pilot holes in the PVC. Fit the PVC into the orifice adapter, align the holes and secure with four screws. In the case of the JXI400 (399,000 BTU models), up to a 6 in (152 mm) length of 3 in (75 mm) PVC can be used before increasing it to 6 in (75 mm) diameter PVC pipe.

e. Reinstall the air orifice and air hoses.

f. Install the new rear panel over the PVC and secure with four screws.

3.3.4 Exterior Venting and Air Intake

The JXi must be vented to the outdoors. It must not be vented in common with any other appliance, even if that appliance is of the condensing type. Common venting can result in severe corrosion of the JXi or of the other appliances or their venting, or escape of combustion product gases through such appliances or vents. Do not vent the JXi to a fireplace chimney or building chase.

Combustion air ducting, when provided, must not be shared with any other appliance or with another JXi. Doing so may result in flow of air through the other appliances instead of directly from the outdoors.

The combustion air intake and vent outlet must be located exterior to the building and in the same pressure zone - i.e. both through the roof or both through a side wall. The vent terminal must be located in accordance with local codes, as applicable, and in accordance with the following:

- Locate the vent terminal so that it will not be damaged by pedestrians and other traffic, and so that the discharge is not offensive. The National Fuel Gas Code requires a through-wall vent terminal be at least 7 feet (2.13 m) above grade if located at a public walkway.
- Locate the vent terminal so the vent exhaust does not settle on building surfaces and other nearby objects. Vent products may corrode such surfaces or objects.
- Locate the vent terminal at a sufficient horizontal distance from any gas or electric metering, regulating or relief equipment. In the United States, this distance must be at least 4 feet (1.22 m). In Canada, it must be at least 10 feet (3.05 m).
- Locate the vent terminal at a sufficient horizontal distance from any building opening. Take special care to assure that combustion products do not enter a building through windows, doors, ventilation inlets, etc. In the United States, this distance must be at least 4 feet (1.21 m). In Canada, it must be at least 10 feet (3.04 m).

As shown in *Figure 5* and *Figure 6*, the combustion air intake and the vent outlet must be installed no closer together than 18 in (45.7cm) and no farther apart than 60 in (1.5m). The combustion air inlet opening must face downward to prevent entry of rain or snow. The vent outlet must discharge away from the combustion air inlet - normally in a horizontal direction when on a wall and vertically upward when on a roof. Both should terminate at least 12 in (30.5cm) above the snow accumulation level. In locations with freezing climate, extension of the vent pipe outside of the building should be minimized.

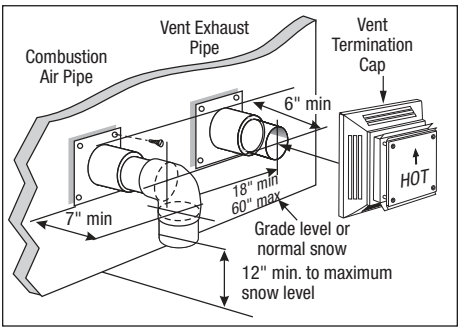


Figure 5. Vent and combustion air terminals at exterior wall

Connect the vent pipe to the heater vent collar with an air-tight corrosion-resistant clamp. The connection must not allow leakage of combustion products into the space but should be removable for service.

Install vent piping with a continuous rise of at least 1/4 in per foot (20 mm per meter) away from the heater. This will assure that any condensate forming in the vent pipe will flow back to the heater where it can be disposed of properly.

Support vent piping with suitable hangers so its weight does not bear on the heater or building penetration and so that piping joints are not strained. Support horizontal runs at intervals no greater than 6 feet (1.82 meters), and closer if necessary to avoid sagging. Sagging can trap condensate water and block the vent.

NOTE: Both combustion air and vent piping joints must be sealed appropriately. Connection of combustion air and vent piping to the heater should be serviceable - i.e. removable for heater service.

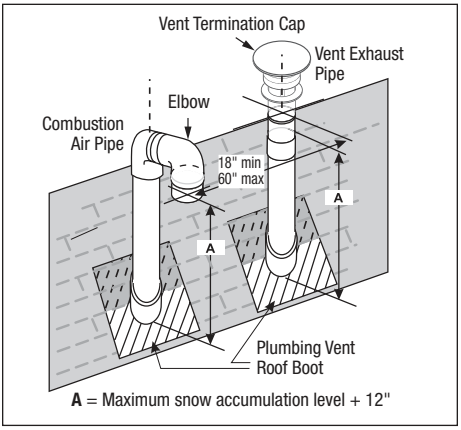


Figure 6. Vent and combustion air terminals at roof

3.3.5 Exhaust Venting

When the JXi heater is installed indoors (US only) or in an outdoor shelter it can be vented as a Category I or Category III appliance. In either case, the vent pipe sizing must be in accordance with the specifications listed in *Table 1*. Category III is required for indoor installation in Canada.

For cases when the heater is installed outdoors and there is concern over extreme weather conditions, we also provide the option of adding Category III venting per the specifications listed in *Table 1*.

It is recommended that all venting be engineered by a licensed mechanical contractor.

- **Category I:** Appliance operates with a negative vent static pressure, a vent gas temperature that avoids excessive condensate production and will vent vertically terminating at the roof. Venting materials for Category I must be Type B double wall vent. Category I is not approved for indoor installation in Canada.
- **Category III:** Appliance operates with a positive vent static pressure, a vent gas temperature that avoids excessive condensate production and can be vented horizontally terminating at a side wall.
- **Do not** terminate heater vents near air conditioning or air supply fans which could pick up exhaust flue products, such as carbon monoxide and other hazardous effluent, and return them inside the building.
- Vent pipe type and material must be carefully selected and depends on the type of installation.
- **Do not** locate the vent terminal where exhaust flue products could strike against building materials and cause degradation.
- Vent opening should be well away from landscaping or other obstructions that would prevent free air flow to and from vent terminal.
- **Do not** terminate vent under decks, stairs, or car ports.
- **Do not** use the appliance to support the vent pipe.
- Vent piping must be supported with no low spots or sagging which could allow condensate to collect.
- Horizontal runs must be sloped upwards away from the heater to a vent terminal at a minimum of 1/4 in per horizontal foot (2 cm/m). See *Figure 4*.
- Install the vent pipe so it can expand and contract freely with temperature changes.
- **Do not** run the heater vent into a common vent with any other appliance.
- It is recommended that vent runs over 18 feet be insulated to reduce condensation and use a condensate trap in the vent run close to the heater, especially in cold climate installations.
- When using Category III vent material, it is acceptable to use a larger diameter pipe size if needed. ‡
- For heaters installed outdoors where there is concern over extreme weather conditions, Category III venting with approved vent termination cap can be installed as noted in *Table 1* and *Section 3.3.8, Outdoor Heater Install with Venting for Extreme Weather Conditions*.‡

⚠ WARNING

Vent pipe materials, sizing, and installation must be as required by the National Fuel Gas Code NFPA 54/ ANSI® Z223.1 or the Canadian Installation Codes for Gas Appliances CAN/CSA-B149.1. Undersized pipe can result in inadequate venting and oversize pipe can result in vent condensation. Improper selection of vent pipe material, incorrect sizing of the pipe, and incorrect installation of vent piping can result in release of combustion products to the indoors. This can cause serious injury or death by Carbon Monoxide poisoning or asphyxiation.

Improper installation or maintenance can cause nausea or asphyxiation from carbon monoxide in flue gases which could result in severe injury or death. For indoor installations, as an added measure of safety, Zodiac Pool Systems LLC strongly recommends installation of suitable carbon monoxide detectors in the vicinity of this appliance and in any adjacent occupied spaces.

Incorrect design and installation of heater vents and ducts can result in personal injury, damage to property, or death. To avoid such hazards, the heater must be installed only by a qualified professional service technician.

It is recommended that all venting be engineered by a licensed mechanical contractor

Codes*		
	US	National Fuel Gas code ANSI® Z223.1 (NFPA® 54)
	CA	CAN/CSA-B149.1

Category	Static Press.	Stack Temp.	Condensate	Termination Location	Pipe Sizing		
					Model	Pipe Size	Special Gas Vent Length† (Vertical or horizontal)
I	Negative	High	Minimal	Roof	200	6 in (15 cm)	N/A
					260	7 in (18 cm)	N/A
					400	8 in (20 cm)	N/A
III	Positive	High	Minimal	Roof or Side Wall	200	4 in (10 cm) or larger	65 ft (20 m)
					260	4 in (10 cm) or larger	65 ft (20 m)
					400	4 in (10 cm) or larger	65 ft (20 m)
III	Positive	High	Minimal	Outdoor‡	200	4 in (10 cm) or larger	25 ft (7.5 m)
					260	4 in (10 cm) or larger	25 ft (7.5 m)
					400	4 in (10 cm) or larger	25 ft (7.5 m)

*Ensure that you are referencing the latest edition and pay special attention to the chapter addressing "Venting of Equipment".
†For each elbow installed, reduce the run length by 12 feet (3.7 m)
‡ Applies to outdoor installed heater with concerns over extreme weather conditions.

Table 1. Vent Pipe Sizing Requirements

3.3.6 Indoor and Outdoor Shelter Exhaust Conversion

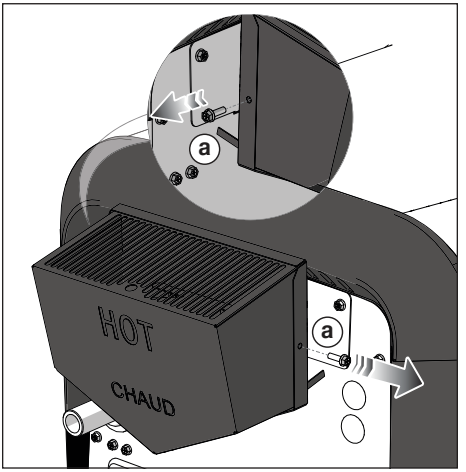
For both Category I and Category III vent types the heater must first be converted to an indoor exhaust type. In order to complete the conversion you will need to order exhaust conversion R-Kit R0731100.

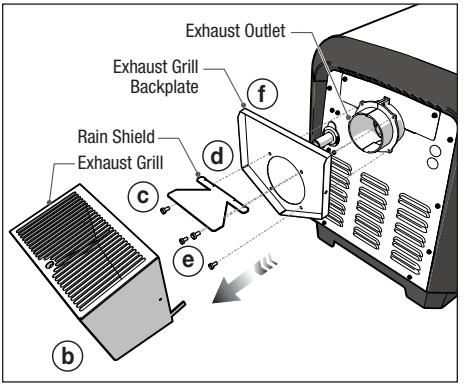
a. Remove two screws securing the exhaust grill to the exhaust grill backplate.

b. Remove exhaust grill.

c. Remove the two screws securing the rain shield to the exhaust backplate.

d. Remove the rain shield.





e. Remove the remaining two screws securing the exhaust backplate to the exhaust outlet.

f. Remove the exhaust grill backplate.

g. Using two #10 thread cutting screws secure the vent adapter from R-Kit R0731100 to the exhaust outlet.

h. If venting for Category I, install an appropriate vent pipe increaser to accommodate the correct pipe size from *Table 1*. Secure to the vent adapter using the screw clamp.

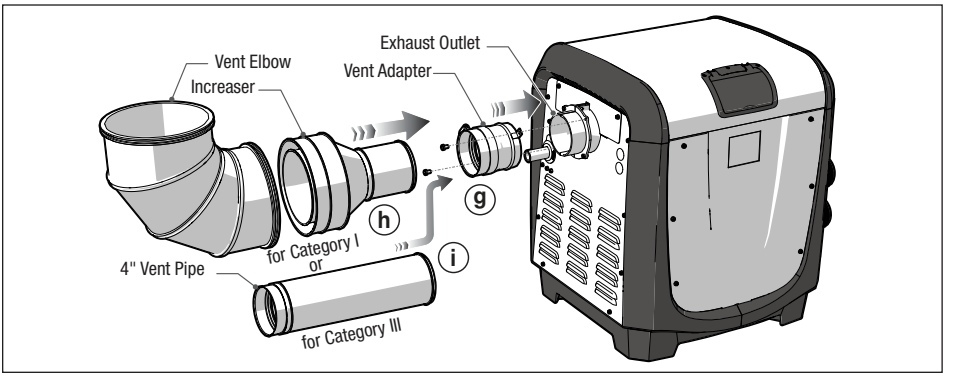
When the installation requires horizontal venting in excess of what is allowed for Category I installations or calls for horizontal discharge, the JXi may be installed with a Category III venting system.

Vent the heater either vertically or horizontally using Al29-4C stainless steel components. Consult manufacturers such as Z-Flex® or Heat Fab® to obtain approved components. Venting materials must comply with UL® 1738 for Category III, Special Gas Vent. Based on the normally expected flue temperatures of this appliance. PLASTIC VENTING MUST NOT BE USED.

i. If venting for Category III, install appropriate vent pipe from *Table 1*. Secure to the vent adapter using the screw clamp to ensure a proper seal.

Double check that there are no possible leak paths between joints. If a leak path is identified or suspected it can be sealed using red RTV 600° F rated silicone adhesive.

When using parts or materials from other manufacturers please be sure to follow the manufacturers instructions completely to ensure harmonious function.



IMPORTANT NOTE: In the Commonwealth of Massachusetts, additional requirements, covered in document CMR 248 5.00, which supersede some of the requirements of ANSI Z223.1 (NFPA 54) apply to Side Wall Horizontally Vented appliances. If installing this product using an approved side-wall horizontal vent system in the Commonwealth of Massachusetts, be sure to adhere to these additional requirements. These requirements include verbiage that says that the property owner is to ensure that Carbon Monoxide Detectors are installed in the vicinity of the appliance and also on all levels of the dwelling in which the appliance is installed. For further instructions, contact Technical Support at 1.800.822.7933.

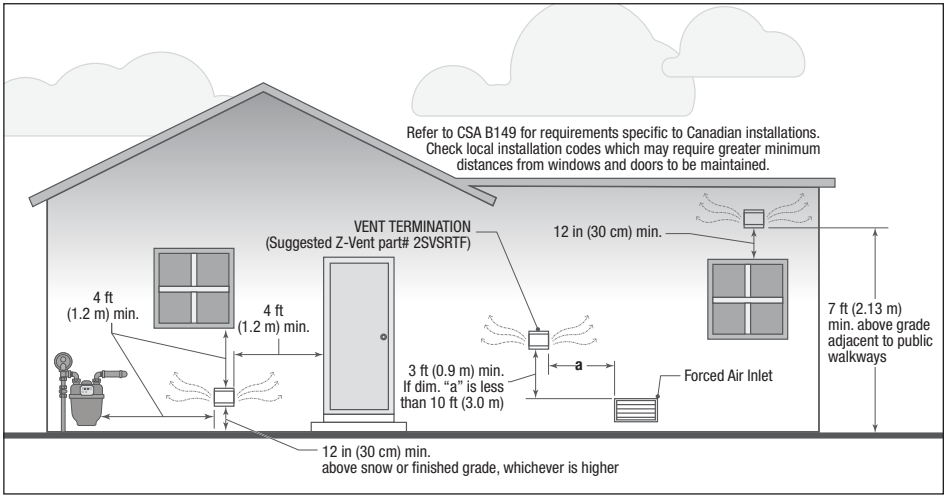


Figure 7. Side Wall Vent Termination

3.3.7 Indoor and Outdoor Shelter Exhaust Termination

Category I: Appliance must be vented vertically and terminate at the roof. Vent must terminate at least 2 feet (610 mm) above any objects within 10 feet (3.05 m). Termination must pass through a properly installed and approved roof jack, a properly sized storm collar and an listed vent cap. See *Figure 4*.

Category III: Appliance can be vented vertically to terminate at the roof or vented horizontally to terminate at a side wall. Side wall vents must be installed and located in accordance with the National Fuel Gas Code NFPA® 54 / ANSI® Z223.1 or the Canadian Natural Gas and Propane Installation Code CAN/CSA-B149.1. In addition some local installation codes may have requirements that exceed those of the national codes. The product must be installed in accordance with the codes being enforced by the local Authority Having Jurisdiction (AHJ).

3.3.8 Outdoor Heater Install with Venting for Extreme Weather Conditions

In the event that the heater is installed outdoors and there are concerns over extreme weather conditions, the heater exhaust can be converted using Category III vent material as shown in this section. An approved Category III vent termination cap needs to be installed vertically. We recommend using a vent termination cap from Z-flex (part #: 2SVSRCF04). The vent adapter is also required and can be ordered as R-Kit R0731100.

a. Remove two screws securing the exhaust grill to the exhaust grill backplate.

b. Remove exhaust grill.

c. Remove the two screws securing the rain shield to the exhaust backplate.

d. Remove the rain shield.

e. Remove the remaining two screws securing the exhaust backplate to the exhaust outlet.

f. Remove the exhaust grill backplate.

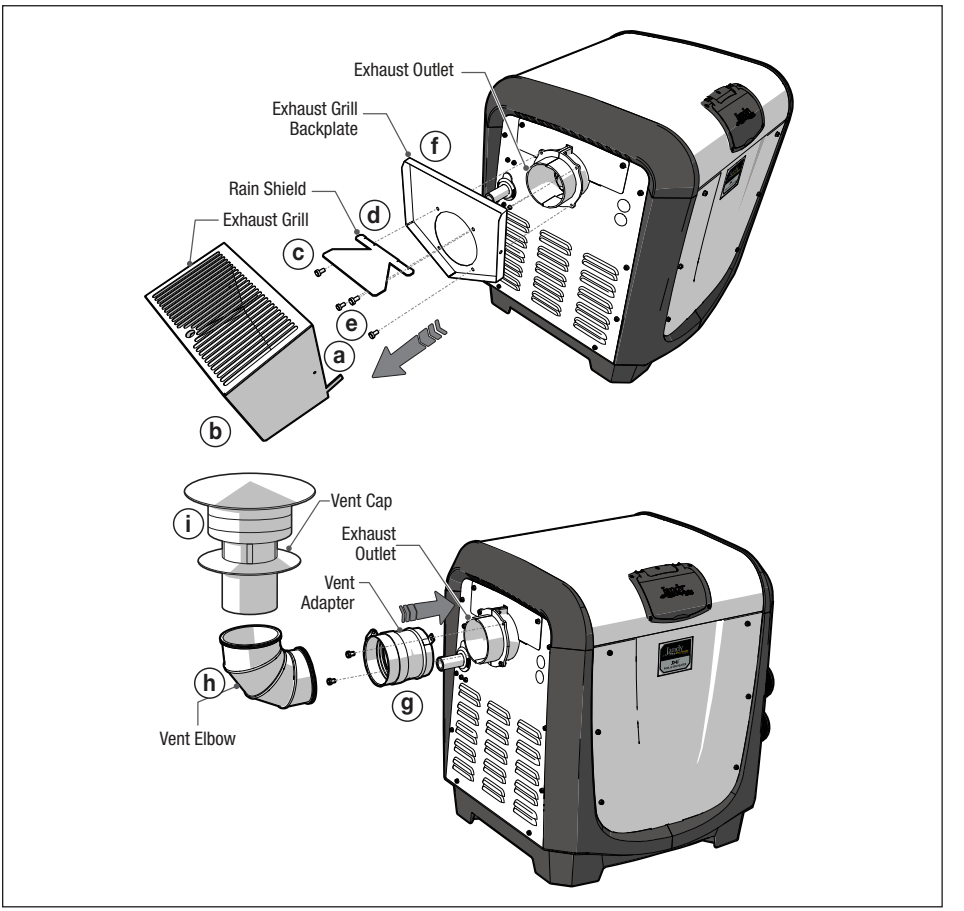
g. Using two #10 thread cutting screws secure the vent adapter from R-Kit R0731100 to the exhaust outlet.

h. Install 4" elbow to the vent adapter using the screw clamp to ensure a proper seal.

Vent the heater vertically using Al29-4C stainless steel components. Consult manufacturers such as Z-Flex® or Heat Fab® to obtain approved components. Venting materials must comply with UL® 1738 for Category III, Special Gas Vent. Based on the normally expected flue temperatures of this appliance. PLASTIC VENTING MUST NOT BE USED.

i. Install vent cap to the vent elbow. Double check that there are no possible leak paths between joints. If a leak path is identified or suspected it can be sealed using red RTV 600° F rated silicone adhesive.

When using parts or materials from other manufacturers please be sure to follow the manufacturers instructions completely to ensure harmonious function.



IMPORTANT NOTE: In the Commonwealth of Massachusetts, additional requirements, covered in document CMR 248 5.00, which supersede some of the requirements of ANSI Z223.1 (NFPA 54) apply to Side Wall Horizontally Vented appliances. If installing this product using an approved side-wall horizontal vent system in the Commonwealth of Massachusetts, be sure to adhere to these additional requirements. These requirements include verbiage that says that the property owner is to ensure that Carbon Monoxide Detectors are installed in the vicinity of the appliance and also on all levels of the dwelling in which the appliance is installed. For further instructions, contact Technical Support at 1.800.822.7933.

3.3.9 Precautions Against Common Venting

Zodiac Pool Systems LLC does not recommend using a common vent to vent multiple appliances through a common duct. If no other option is deemed available by the installer, seek the assistance of a Registered Professional Engineer for proper design of a common venting system.

A properly designed common venting system must include vent temperature limit switches for each appliance. All vent limit switches must be wired in series so as to prevent any appliance from firing in the event of a blocked vent. An outside draft inducer must be installed to pull and create negative pressure in the vent system. Refer to ANSI® Z223.1 or in Canada CAN/CSA B149.1 for more information on common venting multiple appliances. Do not connect vent systems of different categories to the same venting system.

3.3.10 Inspection and Replacement of Existing Vent System with New Components

When replacing an existing pool heater with the JXi, it is recommended that a new appropriate venting system is installed with the new heater.

However, if the existing venting system must be used, be sure to carefully inspect the existing system to ensure that it is in good condition and appropriate for the JXi heater. Replace any parts that are not in serviceable condition before completing the installation.

Section 4. Gas Connections

Gas piping installation must be in accordance with the latest edition of ANSI Z223.1 and all local codes. In Canada, the installation must be in accordance with CAN/CSA B149.1 and all local codes that apply.

The heater must be isolated from the gas supply piping system by closing the individual manual shut off valve during any pressure testing of the gas supply piping system at test pressure greater than or equal to 1/2 psi (3.5kPa).

⚠ CAUTION

Permanent damage to the gas valve will occur if the installation procedures are not followed correctly.

⚠ WARNING

The JXi pool and spa heaters are designed for use with either natural gas or LP gas. Check the rating plate on the front of the combustion chamber to be sure that the heater is designed to use the type of gas being supplied. CONVERTING THIS HEATER FOR USE WITH ANY OTHER FUEL TYPE IS NOT RECOMMENDED BUT, WHEN NECESSARY, SHOULD ONLY BE PERFORMED BY A LICENSED AND QUALIFIED PROFESSIONAL, AND ONLY AFTER CONTACTING ZODIAC POOL SYSTEMS LLC FOR THE PROPER INSTRUCTIONS AND CONVERSION KIT.

All questions should be directed to the Zodiac customer service center at 1.800.822.7933.

4.1 Supply Gas Requirements

Maximum Equivalent Pipe Length (Sch 40 Metallic Pipe)

Natural Gas 1000BTU/FT^3 — 0.60 Specific Gravity @ 0.5 in. W.C. Pressure Drop

Propane Gas 2500BTU/FT^3 — 1.53 Specific Gravity @ 0.5 in. W.C. Pressure Drop

	3/4"		1"		1-1/4"		1-1/2"	
Model	NG	LP	NG	LP	NG	LP	NG	LP
JXi200	25 ft	60 ft	90 ft	215 ft	360 ft			
JXi260	15 ft	35 ft	50 ft	125 ft	210 ft	480 ft	445 ft	
JXi400	*	15 ft	20 ft	55 ft	95 ft	225 ft	215 ft	480 ft

*** A 3/4" gas line can be used for up to 5 feet maximum length from the gas valve in addition to the sediment trap.**

NOTE:

- Check supply pressure and local code requirements before proceeding with installation.
- Consider pipe fittings when determining gas pipe sizing. For every elbow used add three (3) feet to straight pipe length.
- Table shows the minimum supply gas pipe size required. Larger pipe size can be used if required by local code or if desired.
- It is critical that the incoming gas supply pressure at the heater is within the maximum and minimum pressure requirements. If the range of acceptable supply pressure is not provided, the gas supply system to the heater must be modified to meet pressure requirements.

Table 2. Natural Gas Pipe Size Requirements

- Refer to *Table 2* for correct gas inlet piping length from the gas meter to the heater.
- Check the gas meter to make sure it will supply enough gas to the heater and any other appliances using the same gas supply. If unsure, contact your local gas utility to confirm.
- Install a manual gas shutoff valve outside the heater body for service and safety. Never install the shutoff valve inside the body of the heater.
- Install a sediment trap and union ahead of the gas controls and outside the heater body. See *Figure 8*.
- Do not use a restrictive gas valve.

NOTE: The gas line from the meter is usually larger than the gas valve. Therefore, you will need to reduce connecting pipe as necessary. Make this reduction as close to the heater as possible.

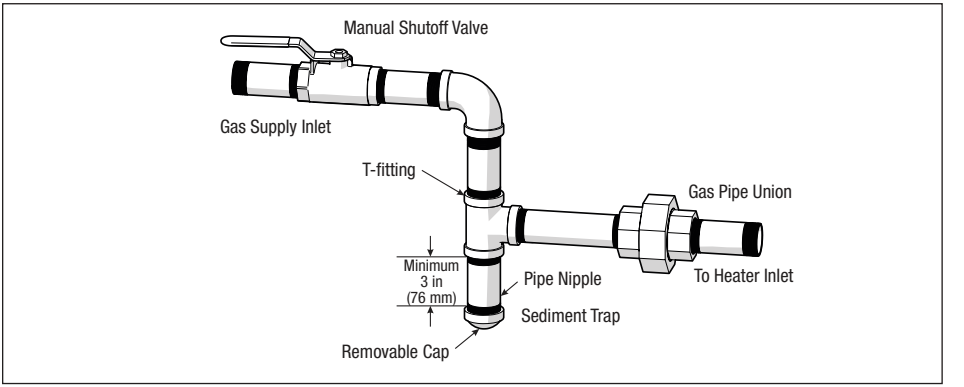


Figure 8. Manual Shut-off Valve and Sediment Trap

ATTENTION

Do not use flexible appliance connectors on any gas connections unless the connector is CSA approved for outdoor installation, and is marked with the BTUH capacity (which must be equal to or greater than the heater rated input) and the type of gas (Natural or LP). Also, any flexible connectors, such as CSST buried underground must be certified for underground installation and meet all applicable codes. Please note, use of flexible connector still requires the installation of a sediment trap per NFPA 54. See *Figure 8*.

4.2 Gas Inlet Pressure

Before operating the heater it is necessary to test the input gas pressure to ensure that it falls within the required range as outlined in *Table 3*.

Inlet Gas Pressure	NG (Natural Gas)	LP (Liquid Propane)
	Inches W.C.	
MAX	10.5	14
MIN	4	4

- All readings must be made while heater is operating.
- Relying on any reading taken while heater is off may result in poor performance and difficulty in operation.

Table 3. Supply Gas Input Pressure Requirements

a. Pull gas inlet grommet away from heater body panel.

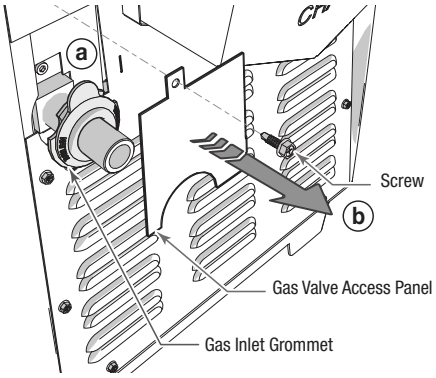
b. Remove one screw and the gas valve access panel.

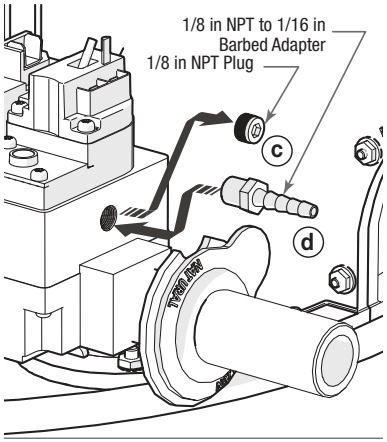
c. Remove 1/8 in NPT plug using a 3/16 in Hex Key.

d. Install a 1/8 in to 1/16 in barbed adapter.

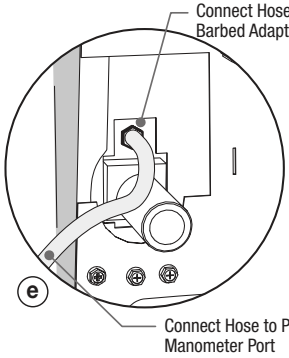
e. Connect positive manometer lead to barbed adapter.

- Inlet gas pressure must be taken while the heater, and if possible, all other gas burning appliances supplied by the same gas delivery system, are operating.
- If the gas supply pressure is less than required, check for an undersized pipe between the meter and the heater, a restrictive fitting, or an undersized gas meter. If needed contact the local gas utility company for assistance.
- Once proper inlet pressure has been confirmed, shut off gas supply.
- Remove manometer, hose and barbed fitting from the gas valve.
- Apply joint compound to the NPT plug and reinstall.
- Before operating the heater, test the gas supply system and all connections for leaks using a soap solution. **Do not use an open flame to test for leaks.**
- Reinstall the gas valve access panel.
- Secure the gas inlet grommet at heater side panel.





View With Side Panel Hidden



For ALL installations the combustion air openings requirements and NFPA54 / ANSI Z223.1 MUST be followed for safe and proper operation.

4.3 Special Precautions for LP Gas

Under the same environmental conditions, liquid propane (LP) gas is more dense or heavier than air and will more readily collect or pool in enclosed areas if adequate ventilation is not provided. It is not recommended to install LP gas heaters in enclosed areas such as pits. Locate heaters a safe distance from LP gas cylinders and filling equipment. Consult the National Fuel Gas Code (NFPA® 54/ANSI® Z223.1, latest edition), the Liquefied Petroleum Gas Code (NFPA 58, latest edition), the Natural Gas and Propane Installation Code in Canada (CAN/CSA B149.1, latest edition), and any other local codes and fire protection authorities about specific installation restrictions in your area.

Section 5. Water Connections

Install pool system components with connections as illustrated in *Figure 9*. Any configuration other than as illustrated in *Figure 9* can affect the operation of the water pressure switch. Locating the heater above or below the pool water surface can also affect operation of the water pressure switch.

NOTE: When pool equipment is located below the pool surface, Zodiac Pool System LLC is not responsible for any large scale water loss, flooding or damage caused by a leak.

⚠ CAUTION

The pool equipment must be protected from back-siphoning of water. If there is any chance of back-siphoning, provide a check valve between the pool and the filter pump inlet.